

Hardware Integration and Verification Plan**9500 MPT Radio**
Hardware Integration
L6 GHz V2ALCATEL-LUCENT CONFIDENTIAL & PROPRIETARY INFORMATION
Copyright 2002-2007 Alcatel-Lucent. All Rights Reserved8BD 00044 0118 QRZZA_05 (0307) A - WORD
REQUIREMENTS SPECIFICATION TEMPLATE

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

01	9/11/13	CN Number	Duane Mortensen	Julio C Montoya
ED	DATE	CHANGE NOTE	APPRAISAL AUTHORITY	ORIGINATOR
Hardware Integration and Verification Plan for L6 GHz V2				
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	1 / 302

1	SCOPE	13
1.1	HARDWARE VERIFICATION TEST	15
1.1.1	TESTING AND DATA COLLECTION GOALS	15
1.2	EQUIPMENT REQUIRED	16
1.2.1	CONFIGURATIONS OF HARDWARE REQUIRED FOR TESTING:	18
1.2.2	HARDWARE CONFIGURATION FOR SYSTEM TESTING	21
1.2.3	RADIO PERFORMANCE REQUIREMENTS	24
1.2.4	TEST SEQUENCE PLAN	26
1.2.5	TEST CASE SECTIONS	27
1.2.6	TEST CASE MATRIX	28
1.2.7	TEST CONFIGURATION MATRIX	32
2	TRANSMITTER PERFORMANCE	40
2.1	TRANSMITTER POWER ACCURACY OVER RTPC RANGE	41
2.1.1	TOOLS NEEDED TO PERFORM THIS TEST	41
2.1.2	SETUP CONFIGURATION	41
2.1.3	TEST PROCEDURE	41
2.1.4	TEST DATA	41
2.2	TRANSMITTER POWER ACCURACY OVER FREQUENCY RANGE	51
2.2.1	TOOLS NEEDED TO PERFORM THIS TEST	51
2.2.2	SETUP CONFIGURATION	51
2.2.3	TEST PROCEDURE	51
2.2.4	TEST DATA	51
2.3	PREDISTORTION PRE-CHECK	54
2.3.1	TOOLS NEEDED TO PERFORM THIS TEST	54
2.3.2	SETUP CONFIGURATION	54
2.3.3	TEST PROCEDURE	54
2.3.4	TEST DATA	54
2.4	TRANSMITTER CARRIER NULL	60
2.4.1	TOOLS NEEDED TO PERFORM THIS TEST	60
2.4.2	SETUP CONFIGURATION	60
2.4.3	TEST PROCEDURE	60
2.4.4	TEST DATA	60
2.5	FCC AND INDUSTRY CANADA (IC) MASK REQUIREMENTS	74
2.5.1	TOOLS NEEDED TO PERFORM THIS TEST	74
2.5.2	SETUP CONFIGURATION	74

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZA	2 / 302

2.5.3	TEST PROCEDURE	74
2.5.4	TEST DATA	75
2.6	UNLICENSED OUT BAND EMISSIONS	93
2.6.1	TOOLS NEEDED TO PERFORM THIS TEST	93
2.6.2	SETUP CONFIGURATION.....	93
2.6.3	TEST PROCEDURE	93
2.6.4	TEST DATA	94
2.7	TRANSMITTER POWER VERIFICATION OVER TEMPERATURE.....	106
2.7.1	TOOLS NEEDED TO PERFORM THIS TEST	106
2.7.2	SETUP CONFIGURATION.....	106
2.7.3	TEST PROCEDURE	106
2.7.4	TEST DATA	106
2.8	TRANSMITTER FREQUENCY VERIFICATION OVER TEMPERATURE	110
2.8.1	TOOLS NEEDED TO PERFORM THIS TEST	110
2.8.2	SETUP CONFIGURATION.....	110
2.8.3	TEST PROCEDURE	110
2.8.4	TEST DATA	111
2.9	TRANSMITTER PHASE NOISE SPURS OVER TEMPERATURE.....	112
2.9.1	TOOLS NEEDED TO PERFORM THIS TEST	112
2.9.2	SETUP CONFIGURATION.....	112
2.9.3	TEST PROCEDURE	112
2.9.4	TEST DATA	113
2.10	TRANSMITTER FREQUENCY CHANGE OVER BATTERY RANGE.....	118
2.10.1	TOOLS NEEDED TO PERFORM THIS TEST	118
2.10.2	SETUP CONFIGURATION.....	118
2.10.3	TEST PROCEDURE	118
2.10.4	TEST DATA	119
2.11	WIDEBAND SPURIOUS [FCC AND INDUSTRY CANADA (IC)]	121
2.11.1	TOOLS NEEDED TO PERFORM THIS TEST	121
2.11.2	SETUP CONFIGURATION.....	121
2.11.3	TEST PROCEDURE	121
2.11.4	TEST DATA	122
2.12	OCCUPIED BANDWIDTH [FCC AND IC].....	137
2.12.1	TOOLS NEEDED TO PERFORM THIS TEST	137
2.12.2	SETUP CONFIGURATION.....	137
2.12.3	TEST PROCEDURE	137
2.12.4	TEST DATA	137

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	3 / 302

3	DOD DATA.....	162
4	RECEIVER PERFORMANCE	163
4.1	RECEIVER LEVEL VERIFICATION	163
4.1.1	TOOLS NEEDED TO PERFORM THIS TEST	163
4.1.2	SETUP CONFIGURATION.....	163
4.1.3	TEST PROCEDURE	163
4.1.4	TEST DATA	164
4.2	RECEIVER L.O. LEAKAGE VERIFICATION	169
4.2.1	TOOLS NEEDED TO PERFORM THIS TEST	169
4.2.2	SETUP CONFIGURATION.....	169
4.2.3	TEST PROCEDURE	169
4.2.4	TEST DATA	170
5	SYSTEM PERFORMANCE	175
5.1	CAPTURE ALARM/WARNINGS, 1X10E-06 THRESHOLD POINTS, HYSTERESIS OF THE ALARMS.....	177
5.1.1	TOOLS NEEDED TO PERFORM THIS TEST	177
5.1.2	SETUP CONFIGURATION.....	177
5.1.3	TEST PROCEDURE	177
5.1.4	TEST DATA	178
5.2	NO ERRORS WHEN TX POWER IS CHANGED.....	194
5.2.1	TOOLS NEEDED TO PERFORM THIS TEST	194
5.2.2	SETUP CONFIGURATION.....	194
5.2.3	TEST PROCEDURE	194
5.2.4	TEST DATA	194
5.3	SWITCHING THRESHOLDS DUE TO A FIX FREQUENCY NOTCH (ACM PROFILES ONLY)	197
5.3.1	TOOLS NEEDED TO PERFORM THIS TEST	197
5.3.2	SETUP CONFIGURATION.....	197
5.3.3	TEST PROCEDURE	197
5.3.4	TEST DATA	199
5.4	ERROR FREE OPERATION DUE TO A SWEEP NOTCH ACROSS THE PASS-BAND (ACM PROFILES ONLY) 200	
5.4.1	TOOLS NEEDED TO PERFORM THIS TEST	200
5.4.2	SETUP CONFIGURATION.....	200
5.4.3	TEST PROCEDURE	200
5.4.4	TEST DATA	200
5.5	SWITCHING THRESHOLDS DUE TO A FLAT FADE (ACM PROFILES ONLY).....	204
5.5.1	TOOLS NEEDED TO PERFORM THIS TEST	204
5.5.2	SETUP CONFIGURATION.....	204

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	4 / 302

5.5.3	TEST PROCEDURE	204
5.5.4	TEST DATA	205
5.6	PATH FADE RATE (FLAT FADE) ACM PROFILES SET TO ADAPTIVE MODE	207
5.6.1	TOOLS NEEDED TO PERFORM THIS TEST	207
5.6.2	SETUP CONFIGURATION	207
5.6.3	TEST PROCEDURE	207
5.6.4	TEST DATA	208
5.7	PATH FADE RATE (FLAT FADE) ACM PROFILES SET TO FIXED MODE.	208
5.7.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.7.2	SETUP CONFIGURATION	208
5.7.3	TEST PROCEDURE	208
5.7.4	TEST DATA	208
5.8	PATH FADE RATE (FLAT FADE) FOR 30 MHZ PROFILES (FCM MODE ONLY)	208
5.8.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.8.2	SETUP CONFIGURATION	208
5.8.3	TEST PROCEDURE	208
5.8.4	TEST DATA	208
5.9	RECEIVER OVERLOADS	208
5.9.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.9.2	SETUP CONFIGURATION	208
5.9.3	TEST PROCEDURE	208
5.9.4	TEST DATA	208
5.10	T/I LIKE MODULATION DATA	208
5.10.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.10.2	SETUP CONFIGURATION	208
5.10.3	TEST PROCEDURE	208
5.10.4	TEST DATA	208
5.11	C/I LIKE MODULATION DATA	208
5.11.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.11.2	SETUP CONFIGURATION	208
5.11.3	TEST PROCEDURE	208
5.11.4	TEST DATA	208
5.12	T/I CW DATA	208
5.12.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.12.2	SETUP CONFIGURATION	208
5.12.3	TEST PROCEDURE	208
5.12.4	TEST DATA	208
5.13	C/I CW DATA	208

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	5 / 302

5.13.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.13.2	SETUP CONFIGURATION.....	208
5.13.3	TEST PROCEDURE	208
5.13.4	TEST DATA	208
5.14	DFM TEST	208
5.14.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.14.2	SETUP CONFIGURATION.....	208
5.14.3	TEST PROCEDURE	208
5.14.4	TEST DATA	208
5.15	TRANSMITTER SWITCHING OUTAGE/DELAY	208
5.15.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.15.2	SETUP CONFIGURATION.....	208
5.15.3	TEST PROCEDURE	208
5.15.4	TEST DATA	208
5.16	LINK OUTAGE TIME DUE TO A TRANSMITTER SWITCH	208
5.16.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.16.2	SETUP CONFIGURATION.....	208
5.16.3	TEST PROCEDURE	208
5.16.4	TEST DATA	208
5.17	ATPC SWITCHING THRESHOLDS FCM MODE ONLY	208
5.17.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.17.2	SETUP CONFIGURATION.....	208
5.17.3	TEST PROCEDURE	208
5.17.4	TEST DATA	208
5.18	ATPC TRACKING SPEED FCM MODE ONLY	208
5.18.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.18.2	SETUP CONFIGURATION.....	208
5.18.3	TEST PROCEDURE	208
5.18.4	TEST DATA	208
5.19	ISOLATION OF LOCAL TRANSMITTER TO RECEIVER STANDARD T/R SEPARATION.....	208
5.19.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.19.2	SETUP CONFIGURATION.....	208
5.19.3	TEST PROCEDURE	208
5.19.4	TEST DATA	208
5.20	ISOLATION OF LOCAL TRANSMITTER TO RECEIVER WITH THE LOCAL TRANSMITTER SET TO THE FREQUENCY OF THE RECEIVER.....	208
5.20.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.20.2	SETUP CONFIGURATION.....	208

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	6 / 302

5.20.3	TEST PROCEDURE	208
5.20.4	TEST DATA	208
5.21	TRANSMITTER OVERLOAD	208
5.21.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.21.2	SETUP CONFIGURATION.....	208
5.21.3	TEST PROCEDURE	208
5.21.4	TEST DATA	208
5.22	BER CURVES FOR NS TO THE 1X10-12	208
5.22.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.22.2	SETUP CONFIGURATION.....	208
5.22.3	TEST PROCEDURE	208
5.22.4	TEST DATA	208
5.23	LONG TERM BER TEST	208
5.23.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.23.2	SETUP CONFIGURATION.....	208
5.23.3	TEST PROCEDURE	208
5.23.4	TEST DATA	208
5.24	RETURN LOSS FOR THE TRANSMITTER AND RECEIVER SECTIONS	208
5.24.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.24.2	SETUP CONFIGURATION.....	208
5.24.3	TEST PROCEDURE	208
5.24.4	TEST DATA	208
5.25	VERIFY RANDOM TRANSMITTER SPURS DON'T DEGRADE RECEIVER THRESHOLD.	208
5.25.1	TOOLS NEEDED TO PERFORM THIS TEST	208
5.25.2	SETUP CONFIGURATION.....	208
5.25.3	TEST PROCEDURE	208
5.25.4	TEST DATA	208
6	TEMPERATURE PERFORMANCE.....	208
6.1	RADIO PERFORMANCE OVER TEMPERATURE	208
6.1.1	TOOLS NEEDED TO PERFORM THIS TEST	208
6.1.2	SETUP CONFIGURATION.....	208
6.1.3	TEST PROCEDURE	208
6.1.4	TEST DATA	208
6.2	COLD START AT -10 DEGREES C°	208
6.2.1	TOOLS NEEDED TO PERFORM THIS TEST	208
6.2.2	SETUP CONFIGURATION.....	208
6.2.3	TEST PROCEDURE	208

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	7 / 302

6.2.4	TEST DATA	208
7	MISCELLANEOUS RADIO PERFORMANCE TEST	208
7.1	MICROPHONICS TEST	208
7.1.1	TOOLS NEEDED TO PERFORM THIS TEST	208
7.1.2	SETUP CONFIGURATION.....	208
7.1.3	TEST PROCEDURE	208
7.1.4	TEST DATA	208
7.2	DC POWER CONSUMPTION	208
7.2.1	TOOLS NEEDED TO PERFORM THIS TEST	208
7.2.2	SETUP CONFIGURATION.....	208
7.2.3	TEST PROCEDURE	208
7.2.4	TEST DATA	208
7.3	GENERAL BATTERY RANGE TESTING.....	208
7.3.1	TOOLS NEEDED TO PERFORM THIS TEST	208
7.3.2	SETUP CONFIGURATION.....	208
7.3.3	TEST PROCEDURE	208
7.3.4	TEST DATA	208
7.4	VERIFY CHANNEL EXTREMES CAN BE SELECTED	208
7.4.1	TOOLS NEEDED TO PERFORM THIS TEST	208
7.4.2	SETUP CONFIGURATION.....	208
7.4.3	TEST PROCEDURE	208
7.4.4	TEST DATA	208

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	8 / 302

Figures

Figure 1 Non Standby Configuration.....	18
Figure 2 Non-Standby Adaptive Modulation Configuration.....	19
Figure 3 Hot Standby Configurations.....	20
Figure 4 Test Sequence Plan.....	26
Figure 5 Power Measurement Setup.....	40
Figure 6 Spectrum Analyzer Setup	59
Figure 7 Transmitter verification setup over Temperature	104
Figure 8 Battery Range Test setup	117
Figure 9 Threshold Setup	175
Figure 10 Threshold Setup (Adaptive Modulation).....	176
Figure 18 Path fade Setup (FCM Mode).....	202
Figure 19 Path Fade Setup (ACM Mode only)	203
Figure 11 Receiver Overload	208
Figure 12 Receiver Overload Setup (Adaptive Modulation).....	208
Figure 13 T/I and C/I like Modulation setup	208
Figure 14 T/I and C/I Like Modulation Setup (Adaptive Modulation).....	208
Figure 15 T/I and C2I CW Setup	208
Figure 16 T/I C/I CW Setup (Adaptive Modulation)	208
Figure 17 DFM Setup.....	208
Figure 21 Transmitter switching Time.....	208
Figure 22 Link Outage Time Setup due to a transmitter switch	208
Figure 20 ATPC Setup.....	208
Figure 23 TX and RX Return Loss Evaluation Setup	208

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	9 / 302

Tables

Table 1 Modulation Configurations.....	14
Table 2 Hardware Configuration.....	23
Table 3 Radio Specifications.....	25
Table 4 Test Case Matrix	29
Table 5 Table of Results	31
Table 6 Temperature Cycle	105
Table 7 DoD Table	162

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	10 / 302

History

Date	Document number	Edition	Description	Comments
9/11/2013	3DB19060AAAAQZZZA	01	L 6 GHz V2	This edition contains the evaluation of the 30 MHz profiles in AFC mode, the corner profiles in FCM mode which will include the 60 MHz profiles, ACM profiles, Hot stand by and the V1-V2 evaluation profiles testing.

Note:

3DB19060AAAA intended to track all test results for L 6Ghz standard and high power test campaigns going forward. Previous test campaigns are listed for reference to give a history of testing related to L 6 GHz. The latest edition does not accumulate data from all previous test campaigns. Please refer to previous editions for specific information of interest.

ACRONYMS

Abbreviation	Description	Acronym	Description
FCM	Fix Code Modulation	Telsa	Modem ANSI
ACM	Adaptive Code Modulation	Jupiter	Power Supply Unit
FCC	Federal Communications Commission	DFM	Dispersive Fade Margin
IC	Industry Canada	AGC	Automatic Gain control
T/R	Transmit to Receive	CT	Craft Terminal
XPIC	Cross polar Interference Cancellation	MSS	Microwave Service Switch
T/I	Threshold to Interference		
C/I	Carrier to Interference		
CW	Continuous Wave form		
RF	Radio Frequency		
RX	Receiver		
TX	Transmitter		
RTPC	Remote Transmit Power Control		
PSU	Power Supply Unit		
Aurelianus	RF Module		

ED

01

ECCN: 5E991

HTS: 4901.99.0050

3DB19060AAAAQZZZA

11 / 302

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	12 / 302

1 SCOPE

This document will incorporate the Integration and Validation test for the Lower 6 GHz MPT-HL V2. The testing only evaluated the performance of the hardware; the software features will be exercised by the System Verification team.: a) The evaluation of the 30 MHz profiles in FCM mode, b) The Corner profiles in FCM mode which will include the 60 MHz profiles, ACM Profiles, c) the V1-V2 profiles, and e) the hot stand by option.. The descriptions below outlines the test configurations related to each test campaign.

Description of the Profiles:

30 MHz FCM: The 30 Mhz profiles in FCM mode were the first profiles available for test from the software team. This test campaign concentrated the efforts on evaluating the EM1 (Engineering Modules) units.

Corner Profiles in FCM mode: These profiles were evaluating the critical modulations from each bandwidth and consisted on the lowest & highest modulation/capacity at each bandwidth. It was impossible to test all the bandwidths, and all the modulations in the amount of time for the DR2 release. The following table describes the critical modulations tested.

Corner Profiles Description	
Bandwidth (MHz)	Modulation (QAM)
5	4,128,1024
10	128,1024
30	4,16,32,64,128,256,512,1024
60	256, 1024

Corner Profiles in ACM mode: The Adaptive Modulation software profiles were available later in the test campaign. Once the FCM mode was evaluated, the efforts were switched to test the adaptive modulation (ACM) mode. This test campaign also evaluated the EM2 hardware.

V1-V2 Evaluation Profiles: These profiles will evaluate the compatibility of the provigent chip 310, and the provigent 620 profiles. The option will allow the radio to migrate from a MPT-HL V1 to a MPT-HL V2 unit. The purpose of this test campaign is to verify that the hardware is capable to perform in a MPT-HL V1 mode.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	13 / 302

30 MHz Profiles in FCM mode

		L6GHz MPT-HL V2 EM1 Pre-Integration																							
Channel Size		5 MHz Channels								10 MHz Channels								30 MHz Channels							
modulation states		4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024
L6GHz fixed modulation PVG310 compatible		na	na	na	na	0	na	na	na	na	na	0	na	0	na	na	na	na	na	0	na	0	0	na	na
L6GHz fixed modulation		na	na	0	na	0	na	na	na	na	na	0	0	0	0	na	na	na	na	1	1	1	1	1	1
L6GHz Adaptive modulation		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
L6GHz XPIC fixed		na	na	na	na	na	na	na	na	na	na	na	na	0	0	na	na	na	na	0	0	0	0	0	0
L6GHz XPIC adaptive		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0	0	0	0	0	0	0	0

Corner Profiles MHz Profiles in FCM mode

		L6GHz MPT-HL V2 EM2 Hardware Validation PVG 620 fixed modulation																																
Channel Size		5 MHz Channels								10 MHz Channels								30 MHz Channels								60 MHz Channels								
modulation states		4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	
L6GHz fixed modulation PVG310 compatible		na	na	2	na	2	na	na	na	na	na	2	na	2	na	na	na	na	na	2	na	2	2	na	na	na	na	na	na	na	na	na	na	na
L6GHz fixed modulation		na	na	2	na	2	na	na	na	na	na	2	2	2	2	na	na	na	na	2	2	2	2	2	2	2	na	na	na	2	2	2	2	2
L6GHz Adaptive modulation		1	2	2	2	1	2	2	1	2	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
L6GHz XPIC fixed		na	na	na	2	na	na	na	na	na	na	na	2	2	na	na	na	na	na	2	2	2	2	2	2	na	na	na	2	2	2	2	2	2
L6GHz XPIC adaptive		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

ACM PROFILES

		L6GHz MPT-HL V2 EM2 Hardware Validation PVG 620 Adaptive modulation and other testing.																																
Channel Size		5 MHz Channels								10 MHz Channels								30 MHz Channels								60 MHz Channels								
modulation states		4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	
L6GHz fixed modulation PVG310 compatible	L6GHz fixed modulation	na	na	2	na	2	na	na	na	na	na	2	na	2	na	na	na	na	na	2	na	2	2	na	na	na	na	na	na	na	na	na	na	na
	L6GHz fixed modulation	na	na	2	na	2	na	na	na	na	na	2	2	2	2	na	na	na	na	2	2	2	2	2	2	2	na	na	na	2	2	2	2	2
	L6GHz Adaptive modulation	1	2	2	2	1	2	2	1	2	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
	L6GHz XPIC fixed	na	na	na	na	2	na	na	na	na	na	na	na	2	2	na	na	na	na	2	2	2	2	2	2	2	na	na	na	2	2	2	2	2
	L6GHz XPIC adaptive	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Evaluation of the V1-V2 profiles

		L6GHz MPT-HL V2 EM2 Hardware Validation PVG 310 compatibility																							
Channel Size		5 MHz Channels								10 MHz Channels								30 MHz Channels							
modulation states		4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024
L6GHz fixed modulation PVG310 compatible		na	na	1	na	1	na	na	na	na	1	na	1	na	na	na	na	na	1	na	1	1	na	na	na
L6GHz fixed modulation		na	na	2	na	2	na	na	na	na	2	2	2	2	2	2	2	na	na	2	2	2	2	2	2
L6GHz Adaptive modulation		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
L6GHz XPIC fixed		na	na	na	na	2	na	na	na	na	na	na	na	2	2	na	na	na	na	2	2	2	2	2	2
L6GHz XPIC adaptive		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Table 1 Modulation Configurations

ED	01		
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA
		14 / 302	

1.1 HARDWARE VERIFICATION TEST

1.1.1 TESTING AND DATA COLLECTION GOALS

The current test campaign is focused on validating the Lower 6 GHz V2 Profiles for the PVG 620, 30MHz profiles in Fix Code Modulation (FCM), the Corner profiles in FCM mode, the Adaptive Code modulation (ACM) profiles, the V1-V2 profiles and the Hot stand by option.. The test campaign is separated into the following evaluation groups.

- Transmitter
- FCC and Industry Canada requirements
- Receiver
- System
- Stacking Filters and flexible T/R s
- Temperature Performance
- Miscellaneous Radio Performance
- V1-V2 profiles

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	15 / 302

1.2 EQUIPMENT REQUIRED**Test Link equipment**

- 3 MPT units Lower 6 GHz V2 P/N: 3DB19060 AAAA
- 2 NEBS compliant Radio Shelves P/N: 3EM2423AB
- 2 MSS shelves P/N: 3DB18125AB

This all together includes:

- 2 Core E cards P/N: 3DB18326AB
- 4 EAS cards P/N: 3DB18206AC
- 2 DS1 cards P/N: 3DB18126AC
- 2 DS3 cards P/N: 3DB18194AC
- 2 DS1 Patch Panels P/N: 1AF15245AB
- 2 DS3 cables P/N 3EM226887AA
- 2DS1 cables CDS C00412006
- 2 Sync cables 3DB05850AA
- 2 RF shelves P/N: 3EM22683AE
- 2 Diplexers for L6 GHz P/N: 3EM10486AA/AB
- 2 Diplexer bracket kits P/N: 3EM23465AA
- 4 SFP short cables P/N: 3EM23141AC
- 4 SFP long cables P/N: 3EM23141AF
- 2 L6 GHz Stacking Filter Configurations

TEST Equipment Required

- Power meter HP 437B
- Low power sensor HP 8481D
- High power sensor HP 8481A
- Spectrum Analyzer E4407B
- Network Analyzer HP 8722D
- 1 Ethernet test set ACTERNA Model No. 2802
- 2 DS3/DS1 Data test set Tektronix ST112 or similar
- HP coupler HP 779D or similar
- RF Counter Agilent 53181A
- Temperature Chamber Thermotron (+55 to -5 °C)
- 6 GHz Variable Attenuator ARRA

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	16 / 302

DFM Test equipment required

- 1 – DFM Multipath Fading Simulator/Signature TS HP 11757B
- 1 – Signal Generator (1-20 GHz) HP 83731B
- 1 – IF Amplifier ((.1- 400 MHz) HP 8447A
- 1 – GPIB to Printer Interface Intelligent Interfaces Micro Print 45CH3.0-01
- 1 – Printer HP LaserJet 2100 C4170A
- 1 – Diplexer Filter (MPT-HL V2 6004.5 MHz) 3EM04148AA
- 1 – Isolator (5.85-6.425 GHz) 355-0506-170
- 1 – Low Pass Filter (0-4.4 GHz) HP 11689A
- 1 – Combiner/Splitter (6 GHz) Triangle Microwave Inc. YL-2085
- IF Mixers (3.4-15 GHz) Mini Circuits

T/I and C/I Test equipment required

- 1 – Prog. Variable Atten.(5.38 GHz – 8.18 GHz) Flann 14621
- 1 – PMG. Controller/Driver Flann CP2020
- 1 – PMG. Step Atten. (0– 50GHz, 60 dB,10dB step) Agilent 8490M
- 1 – Prog. Atten. Controller/Driver Agilent 11713B/C
- 1 – PMG. Synthesizer (1– 20 GHz) HP 83711B
- 1 – DS3/DS1 Test Set Tektronix ST112
- 2 – Step Attenuator (70dB or 110dB) HP 8495B or 8496B
- 1 – Step Attenuator (11dB) HP 8494B
- 2 – Variable Attenuators ARRA 9804-20 or PE 7065-14
- 3 – Isolator (5.85-6.425 GHz) 355-0506-170
- 1 – Signal Splitter HP 11667B
- 1 – Ethernet to GPIB Interface GPIB-Enet 100

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	17 / 302

1.2.1 CONFIGURATIONS OF HARDWARE REQUIRED FOR TESTING:

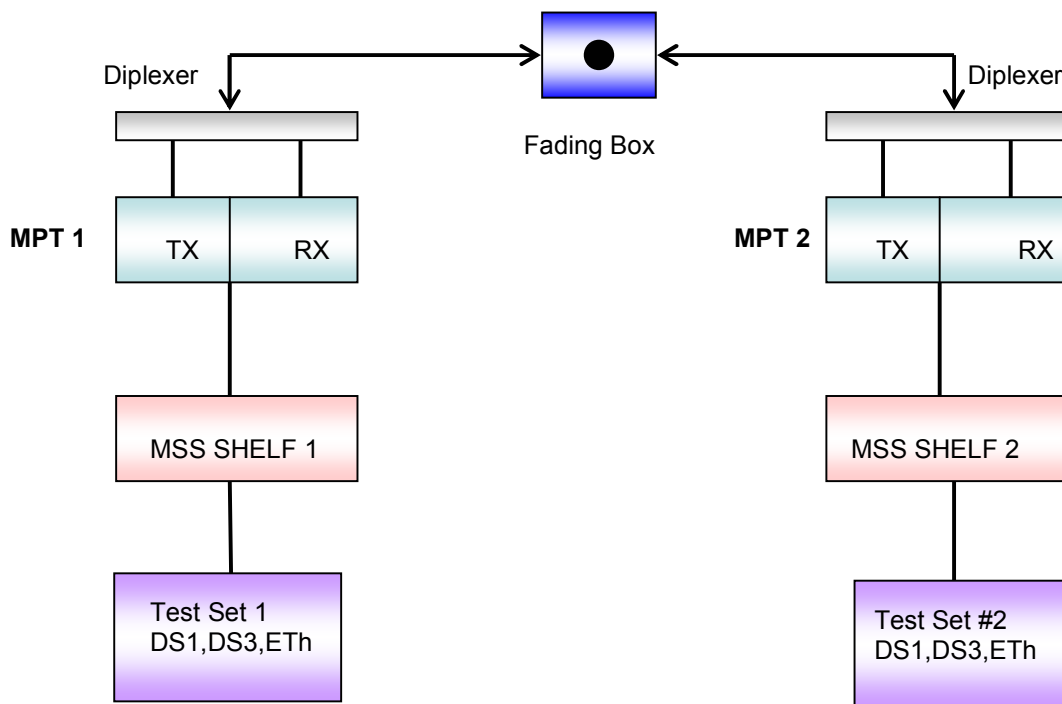


Figure 1 Non Standby Configuration

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	18 / 302

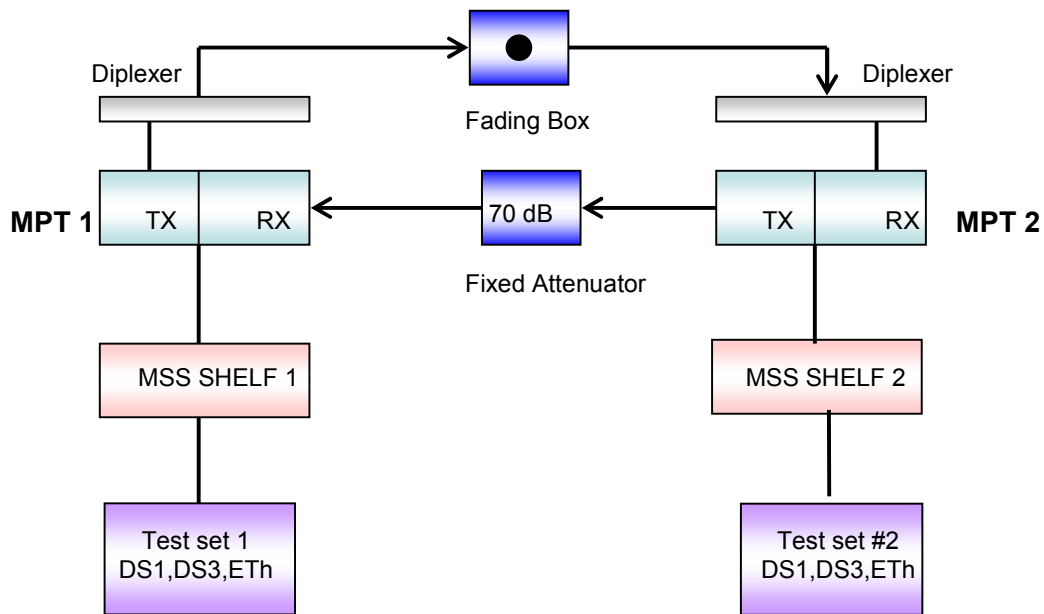


Figure 2 Non-Standby Adaptive Modulation Configuration

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	19 / 302

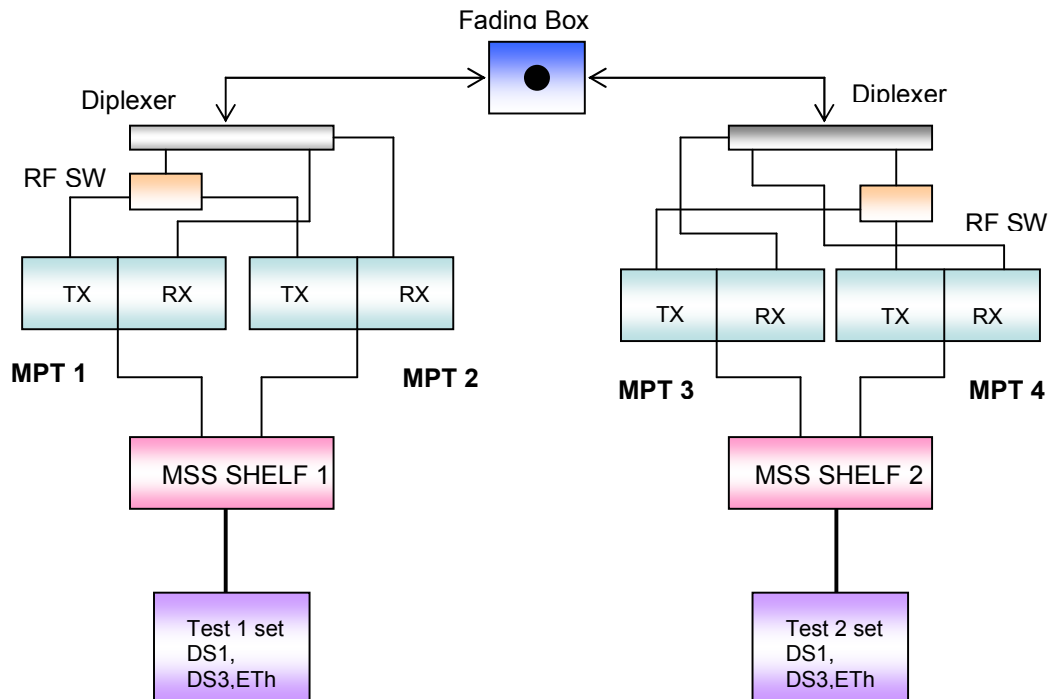


Figure 3 Hot Standby Configurations

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	20 / 302

1.2.2 HARDWARE CONFIGURATION FOR SYSTEM TESTING

Lower 6GHz Inventory for Corner Profiles:

MSS39				
Slot	Unit	HW P/N ICS	SW P/N ICS	S/N
1	CORE MAIN	3DB18326ACAB04	N/A	BS1049B3K2G
2	MSS/P8ETH	3DB18206ACAA09	N/A	CA17H213
3	MSS/P8ETH/SFP#5	3EM23141AC01	N/A	912530020
4	N/A	N/A	N/A	N/A
5	MSS/DS3	3DB18194ACAA01	N/A	CA15Y630
6	N/A	N/A	N/A	N/A
7	MSS/DS1	3DB18126AEAA01	N/A	BS1050B3KSF
8	N/A	N/A	N/A	N/A
9	MSS/FANS	3DB18134BBAB01	N/A	BS1026B1YGT
MSS40				
Slot	Unit	HW P/N ICS	SW P/N ICS	S/N
1	MSS/CORE-MAIN	3DB18326ACAAB04	N/A	TH1050Q02SB
2	N/A	N/A	N/A	N/A
3	MSS/P8ETH	3DB18206ACAA09	N/A	CA188110
3.1	MSS/P8ETH/SFP#5	3EM23141AC01	N/A	017030080
4	N/A	N/A	N/A	N/A
5	MSS/DS3	3DB18194ACAA01	N/A	CA15Y624
6	N/A	N/A	N/A	N/A
7	MSS/DS1	3DB18126AEAB01	N/A	TH1047Q00GU
8	N/A	N/A	N/A	N/A
9	MSS/FANS	3DB18134BBAB01	N/A	BS1026B1YG2

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZA	21 / 302

Lower 6GHz Inventory for V1-V2 Profiles:

MSS45				
Slot	Unit	HW P/N ICS	SW P/N ICS	S/N
1	CORE MAIN	3DB18326ACAC04	N/A	TH1110Q02BS
2	MSS/P8ETH	3DB18206ACAA09	N/A	CA170602
3	MSS/P8ETH/SFP#5	3EM23141AG01	N/A	017530404
4	N/A	N/A	N/A	N/A
5	MSS/DS3	3DB18194ACAA01	N/A	CA15N867
6	N/A	N/A	N/A	N/A
7	MSS/DS1	3DB18126AEAB01	N/A	TH1111Q030D
8	N/A	N/A	N/A	N/A
9	MSS/FANS	3EM23911AAAB01	N/A	NS112169941
MSS46				
Slot	Unit	HW P/N ICS	SW P/N ICS	S/N
1	MSS/CORE-MAIN	3DB18326ACAC04	N/A	TH1110Q02Z1
2	N/A	N/A	N/A	N/A
3	MSS/P8ETH	3DB18206ACAA09	N/A	CA170667
3.1	MSS/P8ETH/SFP#5	3EM23141AC01	N/A	017030091
4	N/A	N/A	N/A	N/A
5	MSS/DS3	3DB18194ACAA01	N/A	CA15N878
6	N/A	N/A	N/A	N/A
7	MSS/DS1	3DB18126AEAB01	N/A	TH1111Q026C
8	N/A	N/A	N/A	N/A
9	MSS/FANS	3EM23911AAAB01	N/A	NS11216A030

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZA	22 / 302

Lower 6GHz MPT-HL V2 (3DB19060AAAA & BAAA)				
Serial number	Remote Inventory	HW P/N ICS	MSS	MPTHL V2 IP Address
BS1315UW037	Aurelianus	N/A	39	172.22.47.68
	Telsa	3DB80224AAAA		
	Jupiter	3DB80248AAAA		
	Geminus	3DB9238AAAA		
BS1315UW01N	Aurelianus	3DB80203AAAA	39	172.22.47.70
	Telsa	3DB80224AAAA		
	Jupiter	3DB80248AAAA		
	Geminus	3DB9238AAAA		
BS1315UW03w	Aurelianus	3DB80203AAAA	40	172.22.47.69
	Telsa	3DB80224AAAA		
	Jupiter	3DB80248AAAA		
	Geminus	N/A		
BS1315UW032	Aurelianus	3DB80203AAAA	40	172.22.47.71
	Telsa	3DB80224AAAA		
	Jupiter	3DB80248AAAA		
	Geminus	3DB9238AAAA		
Lower 6GHz MPT-HL V2 (3DB19060AAAA & BAAA) MPT-HL V1()				
BS1315UW037	Aurelianus	N/A	39	172.22.46.68
	Telsa	3DB80224AAAA		
	Jupiter	3DB80248AAAA		
	Geminus	3DB9238AAAA		
BS1315UW01N	Aurelianus	3DB80203AAAA	39	172.22.46.70
	Telsa	3DB80224AAAA		
	Jupiter	3DB80248AAAA		
	Geminus	3DB9238AAAA		
BS1315UW03w	Aurelianus	3DB80203AAAA	40	172.22.46.69
	Telsa	3DB80224AAAA		
	Jupiter	3DB80248AAAA		
	Geminus	N/A		
BS1315UW032	Aurelianus	3DB80203AAAA	40	172.22.46.71
	Telsa	3DB80224AAAA		
	Jupiter	3DB80248AAAA		
	Geminus	3DB9238AAAA		
RF DIPLEXER				
Part Number	Transmit Frequency	Receive Frequency	Separation	Filter Bandwidth
3EM04148AE	5925-6175 MHz	6175-6425 MHz	252.04 MHz	30MHz
3EM04148AF	6175-6425 MHz	5925-6175 MHz	252.04 MHz	30 MHz

Table 2 Hardware Configuration

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	23 / 302

1.2.3 RADIO PERFORMANCE REQUIREMENTS

L6GHz V2 Fixed Modulation											
Chan BW (MHz)	Mod (QAM)	ETH Max (Mbps)	Baud Rate (MHz)	Thresholds at the input of the Receiver				T/I		DFM	
				TYP (dBm)	Guar (dBm)	RX OVLD 10 ⁶ (dBm)	TX Power Out (dBm)	Co-	Adj-	10 ⁶	10 ³
5	4	6.457	4.27	-97.9	-97.3	-22	32.5	14.4	-18	88.3	89.3
	16	14.525	4.27	-90.4	-89.8	-22	32.5	21.9	-18	83.3	84.3
	32	18.324	4.27	-86.9	-86.2	-22	32.5	25.4	-16	79.9	80.9
	64	22.368	4.27	-84.2	-83.5	-22	32.5	28.1	-15	76.3	77.3
	128	25.835	4.27	-81.8	-81	-22	32.5	30.5	-15	73.3	74.3
	256	29.195	4.27	-78.8	-77.8	-22	32.5	33.5	-13	71.3	72.3
	512	32.319	4.27	-75.7	-74.4	-22	31.5	36.6	-10	70.3	71.3
	1024	34.937	4.27	-72.4	-70.7	-22	31.5	39.9	-8	68.3	69.3
10	4	14.931	8.70	-93.4	-92.8	-22	32.5	15.8	-18	81.3	82.3
	16	30.006	8.70	-87.7	-87.1	-22	32.5	21.5	-17	76.3	77.3
	32	37.404	8.70	-84.2	-83.5	-22	32.5	25	-16	72.9	73.9
	64	45.658	8.70	-81.7	-81	-22	32.5	27.5	-16	69.3	70.3
	128	52.827	8.70	-78.9	-78.1	-22	32.5	30.3	-16	66.3	67.3
	256	60.59	8.70	-75.6	-74.6	-22	32.5	33.6	-14	64.3	65.3
	512	67.066	8.70	-72.4	-71.2	-22	31.5	36.8	-10	63.3	64.3
	1024	72.453	8.70	-68.9	-67.1	-22	31.5	40.3	-8	61.3	62.3
25	4	35.995	22.25	-90.4	-89.8	-22	32.5	14.8	-18	72.0	73.0
	16	74.885	22.25	-84.2	-83.6	-22	32.5	21	-17	67.0	68.0
	32	94.102	22.25	-80.7	-80	-22	32.5	24.5	-15	63.6	64.6
	64	113.221	22.25	-78.6	-78	-22	32.5	26.6	-14	60.0	61.0
	128	133.713	22.25	-75.8	-75.1	-22	32.5	29.4	-12	57.0	58.0
	256	152.04	22.25	-72.9	-72	-22	32.5	32.3	-5	55.0	56.0
	512	170.636	22.25	-70	-68.9	-22	31.5	35.2	-2	54.0	55.0
	1024	188.527	22.25	-66.6	-65.2	-22	31.5	38.6	0	52.0	53.0
30	4	44.085	27.13	-90.1	-89.5	-22	32.5	14.2	-18	70.0	71.0
	16	91.602	27.13	-83.8	-83.2	-22	32.5	20.5	-17	65.0	66.0
	32	115.082	27.13	-80.2	-79.5	-22	32.5	24.1	-16	61.6	62.6
	64	138.444	27.13	-78.1	-77.4	-22	32.5	26.2	-15	58.0	59.0
	128	163.481	27.13	-75.2	-74.5	-22	32.5	29.1	-14	55.0	56.0
	256	185.875	27.13	-72.3	-71.5	-22	32.5	32	-13	53.0	54.0
	512	208.127	27.13	-69.2	-68.1	-22	31.5	35.1	-9	52.0	53.0
	1024	229.942	27.16	-65.8	-64.5	-22	31.5	38.5	-3	50.0	51.0
60	4	81.321	50.60	-87.7	-87.1	-22	32.5	13.9	-18	63.8	64.8
	16	162.1935	50.60	-81.6	-81	-22	32.5	20	-17	58.8	59.8
	32	201.482	50.60	-78.1	-77.4	-22	32.5	23.5	-16	55.4	56.4
	64	260.072	50.60	-75	-74.4	-22	32.5	26.6	-15	51.8	52.8
	128	309.059	50.60	-72	-71.3	-22	32.5	29.6	-14	48.8	49.8
	256	354.146	50.60	-69	-68.1	-22	32.5	32.6	-13	46.8	47.8
	512	401.000	50.60	-65.6	-64.5	-22	31.5	36	-9	45.8	46.8
	1024	440.972	50.60	-62.1	-60.5	-22	31.5	39.5	-3	43.8	44.8

* Specs values are based on MPT-HL V2 data sheet edition 2

* Document 3DB80202AAAA DTZZA ED 03

ED	01										
		ECCN: 5E991 HTS: 4901.99.0050			3DB19060AAAAQZZA					24 / 302	

L6GHz V2 Fixed Modulation											
Chan BW (MHz)	Mod (QAM)	ETH Max (Mbps)	Baud Rate (MHz)	Thresholds at the input of the Receiver				T/I		DFM	
				TYP (dBm)	Guar (dBm)	RX OVLD 10^6 (dBm)	TX Power Out (dBm)	Co-	Adj-	10^6	10^3

Adaptive Modulation Profiles											
10	4	14.931	8.70	-93.4	-92.8	-22	32.5	15.8	-18	81.3	82.3
	16	30.006	8.70	-87.7	-87.1	-22	32.5	21.5	-17	76.3	77.3
	32	37.404	8.70	-84.2	-83.5	-22	32.5	25	-16	72.9	73.9
	64	45.658	8.70	-81.7	-81	-22	32.5	27.5	-16	69.3	70.3
	128	52.827	8.70	-78.9	-78.1	-22	32.5	30.3	-16	66.3	67.3
	256	60.59	8.70	-75.6	-74.6	-22	32.5	33.6	-14	64.3	65.3
	512	67.066	8.70	-72.4	-71.2	-22	31.5	36.8	-10	63.3	64.3
	1024	72.453	8.70	68.9	-67.1	-22	31.5	40.3	-8	61.3	62.3
30	4	44.085	27.13	-90.1	-89.5	-22	32.5	14.2	-18	70.0	71.0
	16	91.602	27.13	-83.8	-83.2	-22	32.5	20.5	-17	65.0	66.0
	32	115.082	27.13	-80.2	-79.5	-22	32.5	24.1	-16	61.6	62.6
	64	138.444	27.13	-78.1	-77.4	-22	32.5	26.2	-15	58.0	59.0
	128	163.481	27.13	-75.2	-74.5	-22	32.5	29.1	-14	55.0	56.0
	256	185.875	27.13	-72.3	-71.5	-22	32.5	32	-13	53.0	54.0
	512	208.127	27.13	-69.2	-68.1	-22	31.5	35.1	-9	52.0	53.0
	1024	229.942	27.16	-65.8	-64.5	-22	31.5	38.5	-3	50.0	51.0

* Specs values are based on MPT-HL V2 data sheet edition 2

* Document 3DB80202AAAA DTZZA ED 03

Table 3 Radio Specifications

ED	01									
		ECCN: 5E991 HTS: 4901.99.0050				3DB19060AAAAQZZA				25 / 302

1.2.4 TEST SEQUENCE PLAN

The blocks below can be performed in sequential order or according to the priorities dictated by the test campaign.

Test sequence Plan

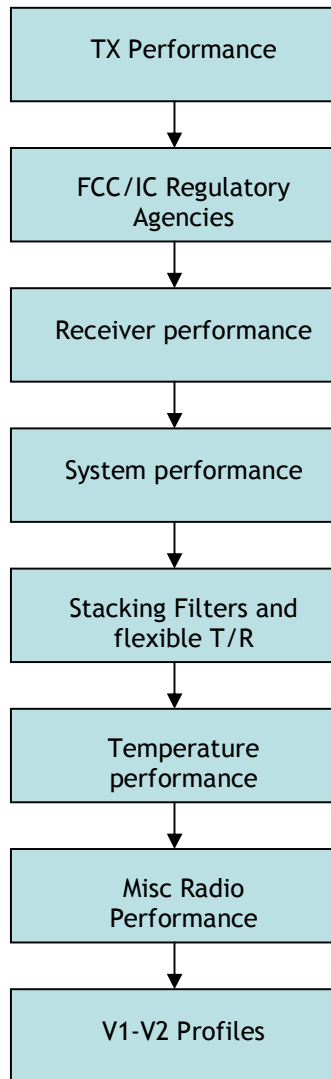


Figure 4 Test Sequence Plan

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	26 / 302

1.2.5 TEST CASE SECTIONS

The test matrix is divided up into eight sections as shown in the table below. For these test campaigns are the following profiles will be evaluated: The Transmitter performance, regulatory Agencies (FCC, IC) data, Receiver performance, System Performance, The stacking and flexible T/R, Temperature Performance, Miscellaneous Radio Performance and the V1-V2 profiles. The table below describes the test sequence.

Section Description
Transmitter performance
Regulatory Agencies (FCC, IC)
Receiver Performance
System Performance
Stacking Filters and Flexible T/R
Temperature Performance (PVG 620 only)
Miscellaneous Radio Performance
V1-V2 Profiles

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	27 / 302

1.2.6 TEST CASE MATRIX

The Matrix below will be performed for Lower 6 GHz V2.

Integration Test case	Test case Description	30 MHz (FCM)	Corner Profiles FCM	Corner Profiles ACM	V1-V2 Profiles
Evaluation of the 30 MHz AFC mode, Corner Profiles in FCM mode, ACM Profiles and the V1-V2 profiles for each section					
Transmitter Performance					
Test case 1a	Transmitter power accuracy over RTPC range	X	X	X	X
Test case 1b	Transmitter power accuracy over frequency	X	X	X	N/T
Test case 1c	Pre-distortion pre-check	X	X	X	X
Test case 1d	Transmitter Carrier null	N/T	X	X	X
FCC/Industry Canada requirements					
Test case 2a	FCC and Industry Canada mask	X	X	N/T	X
Test case 2b	Unlicensed out of band emissions	N/T	X	X	N/T
Test case 2c	Transmitter Power verification over temperature	X	X	N/T	N/T
Test case 2d	Transmit frequency stability over temperature	X	X	N/T	N/T
Test case 2e	Transmitter phase noise spurs over temperature	X	X	N/T	N/T
Test case 2f	Transmitter frequency change over battery range	X	X	N/T	N/T
Test case 2g	Wideband spurious	X	X	N/T	N/T
Test case 2h	Occupied Bandwidth	X	X	X	N/T
Receiver Performance					
Test case 3a	Receiver signal level verification	X	X	N/T	X
Test case 3b	Receiver L.O leakage	N/T	X	N/T	N/T
System Performance					
Test case 4a	Capture Alrms/warnings/1X10-6 threshold points, including Hysteresis	X	X	X	N/T
Test case 4b	No errors on link when TX power is changed	X	X	N/T	X
Test case 4c	Switching Thresholds due to a fixed frequency notch	N/T	N/T	X	N/T
Test case 4d	Error free operation due to a swept notch across pass band	N/T	N/T	X	N/T
Test case 4e	Switching thresholds due to a flat fade	N/T	N/T	X	N/T
Test case 4f	Path fade rate (flat fade) ACM set to adaptive mode	N/T	N/T	X	N/T
Test case 4g	Path fade rate (flat fade) ACM set to fixed mode	N/T	N/T	X	N/T
Test case 4h	Path fade rate (flat fade) FCM Mode only	X	X	N/T	N/T
Test case 4i	Receiver overloads	X	X	N/T	X
Test case 4j	T/I Like modulation	X	X	N/T	N/T
Test case 4k	C/I Like modulation	X	X	N/T	N/T
Test case 4l	T/I CW	X	X	N/T	N/T

ED

01

ECCN: 5E991

HTS: 4901.99.0050

3DB19060AAAAQZZA

28 / 302

Test case 4m	C/I CW	X	X	N/T	N/T
Test case 4n	DFM test	N/T	X	X	X
Test case 4o	Transmit switch outage Time	N/T	N/T	X	N/T
Test case 4p	Switch delay	N/T	N/T	X	N/T
Test case 4q	Link Outage Time due to TX switch	N/T	N/T	X	X
Test case 4r	Receiver flat fade tracking speed	N/T	N/T	N/T	X
Test case 4s	ATPC switching thresholds	X	N/T	X	N/T
Test case 4t	ATPC tracking speed	X	N/T	X	N/T
Test case 4u	Latency	X	X	N/T	N/T
Test case 4v	Measure Isolation TX to RX standard T/R separation	X	X	N/T	N/T
Test case 4w	Measure Isolation TX to RX local transmitter set to the receiver frequency	X	X	N/T	N/T
Test case 4x	TX headroom	X	X	N/T	X
Test case 4y	Full BER curve (to 1X10-12)	X	X	X	X
Test case 4z	Long term BER test (72 Hrs)	X	X	X	X
Stacking and Flexible T/R Frequency Performance					
Test case 5a	Verify Return loss (TX and Rx)	X	X	N/T	N/T
Test case 5b	Verify random transmitter spurs don't degrade receiver threshold	X	X	N/T	N/T
Temperature Performance (PVG 620 Profiles Only)					
Test case 6a	Verify error free performance over temperature	X	X	N/T	X
Test case 6b	Power on at -10 deg C	X	X	N/T	N/T
Miscellaneous Radio Performance (PVG 620 Profiles Only)					
Test case 7a	Micro phonics	X	X	N/T	X
Test case 7b	DC power consumption	X	X	N/T	N/T
Test case 7c	General battery range testing	N/T	N/T	N/T	N/T
Test case 7d	Verify channel extremes can be selected	X	X	N/T	N/T

*

Table 4 Test Case Matrix

ED	01				
		ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	29 / 302

Table Of Results

Test Case	Test Description	30 MHZ (AFC)	Corner Profiles (FCM)	(ACM) Profiles	V1-V2 Profiles
Transmitter Performance					
Test case 1a	Transmitter power accuracy over RTPC range	Pass	Pass	Pass	Fail
Test case 1b	Transmitter power accuracy over frequency	Pass	Pass	Pass	N/T
Test case 1c	Pre-distortion pre-check	Pass	Pass	Pass	Pass
Test case 1d	Transmitter Carrier null	N/T	Pass	Pass	Pass
FCC/Industry Canada Requirements					
Test case 2a	FCC and Industry Canada mask	Pass	Pass	N/T	Pass
Test case 2b	Unlicensed out of band emissions	N/T	Fail	Fail	N/T
Test case 2c	Transmitter Power verification over temperature	Pass	Pass	N/T	N/T
Test case 2d	Transmit frequency stability over temperature	Pass	Pass	N/T	N/T
Test case 2e	Transmitter phase noise spurs over temperature	Fail	Pass	N/T	N/T
Test case 2f	Transmitter frequency change over battery range	Fail	Pass	N/T	N/T
Test case 2g	Wideband spurious	Pass	Pass	N/T	N/T
Test case 2h	Occupied Bandwidth (99%)	Pass	Pass	Pass	N/T
Receiver Performance					
Test case 3a	Receiver signal level verification	Pass	Pass	N/T	Pass
Test case 3b	Receiver L.O. leakage	N/T	Pass	N/T	N/T
System Performance					
Test case 4a	Capture Alrms/warnings/1X10-6 threshold points, including Hysteresis	Pass	Pass	Pass	N/T
Test case 4b	No errors on link when TX power is changed	Pass	Pass	N/T	Pass
Test case 4c	Switching Thresholds due to a fixed frequency notch	N/T	N/T	Pass	N/T
Test case 4d	Error free operation due to a swept notch across pass band	N/T	N/T	Pass	N/T
Test case 4e	Switching thresholds due to a flat fade	N/T	N/T	Pass	N/T
Test case 4f	Path fade rate (flat fade) ACM set to adaptive mode	N/T	N/T	Pass	N/T
Test case 4g	Path fade rate (flat fade) ACM set to fixed mode	N/T	N/T	Pass	N/T
Test case 4h	Path fade rate (flat fade) FCM Mode only	Fail	Pass	Pass	N/T
Test case 4i	Receiver overloads	Pass	Pass	N/T	Pass
Test case 4j	T/I Like modulation	Pass	Pass	N/T	Pass
Test case 4k	C/I Like modulation	Pass	Pass	N/T	N/T
Test case 4l	T/I CW	Pass	Pass	N/T	N/T
Test case 4m	C/I CW	Pass	Pass	N/T	N/T

ED

01

ECCN: 5E991

HTS: 4901.99.0050

3DB19060AAAAQZZA

30 / 302

Test case 4n	DFM test	N/T	Pass	Pass	Pass
Test case 4o	Transmit switch outage Time	N/T	N/T	Fail	N/T
Test case 4p	Switch delay	N/T	N/T	Pass	N/T
Test case 4q	Link Outage Time due to TX switch	N/T	N/T	Pass	N/T
Test case 4r	Receiver flat fade tracking speed	N/T	N/T	N/T	Fail
Test case 4s	ATPC switching thresholds FCM Mode only	Fail	N/T	Pass	N/T
Test case 4t	ATPC tracking speed FCM Mode only	Fail	N/T	Pass	N/T
Test case 4u	Latency	Fail	Pass	N/T	N/T
Test case 4v	Measure Isolation TX to RX standard T/R separation	Pass	Pass	N/T	N/T
Test case 4w	Measure Isolation TX to RX local transmitter set to the receiver frequency	Pass	Fail	N/T	N/T
Test case 4x	TX headroom	Pass	Fail	N/T	Fail
Test case 4y	Full BER curve (to 1X10-12)	Pass	Pass	Pass	Fail
Test case 4z	Long term BER test (72 Hrs)	Pass	Pass	Pass	Fail
Stacking Filters and flexible T/R					
Test case 5a	Verify Return loss (TX and Rx)	Pass	Pass	N/T	N/T
Test case 5b	Verify random transmitter spurs don't degrade receiver threshold	Pass	Pass	N/T	N/T
Temperature Performance					
Test case 6a	Verify error free performance over temperature	Pass	Fail	N/T	Pass
Test case 6b	Power on at -10 deg C	Pass	Fail	N/T	N/T
Miscellaneous radio Performance					
Test case 7a	Micro phonics	Pass	Pass	N/T	Pass
Test case 7b	DC power consumption	Pass	Pass	N/T	N/T
Test case 7c	General battery range testing	N/T	N/T	N/T	N/T
Test case 7e	Verify channel extremes can be selected	Pass	Pass	N/T	N/T

Table 5 Table of Results

ED	01				
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	31 / 302	

1.2.7 TEST CONFIGURATION MATRIX

The specific configurations tested for the test matrix above is shown below.

30 MHz Profiles in FCM mode

Channel Size	L6GHz MPT-HL V2 EM1 Pre-Integration															
	5 MHz Channels								10 MHz Channels							
modulation states	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024
L6GHz fixed modulation PVG310 compatible	na	na	na	na	0	na	na	na	na	na	0	na	0	na	na	na
L6GHz fixed modulation	na	na	0	na	0	na	na	na	na	na	0	0	0	0	na	na
L6GHz Adaptive modulation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L6GHz XPIC fixed	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
L6GHz XPIC adaptive	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

Transmitter Performance [PVG 620 fixed modulation profiles]																
Transmitter power accuracy over frequency and RTPC range	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Predistortion pre-check	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Transmitter carrier null	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A

FCC/Industry Canada requirements [Fixed modulation PVG 620 profiles]																
FCC/Industry Canada mask	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Transmitter power verification over temperature	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Capture LO phase noise/spurious	1															
Transmit Frequency stability over Temperature	1															
Transmit Frequency change over battery range	1															
wideband spurious	D/T				N/A	N/A	N/A	D/T				N/A	N/A	1	D/T	D/T
occupied bandwidth	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A

Receiver Performance [fixed modulation PVG 620 profiles]																
Receiver signal level verification.	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Receiver LO leakage	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A

System Performance [fixed modulation PVG 620 profiles]																
Capture Alarm/warning/1x10-6 threshold points, including hysteresis, due to flat fade.	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
No errors on link when Tx power is changed.	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Receiver Overloads	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
T/I like modulation with filters	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
T/I like modulation without filters	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
C/I like modulation	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
T/I CW	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
C/I CW	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
DFM test	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Receiver acquisition time [due to transmitter switching]	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Receiver flat fade tracking speed	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
ATPC switching thresholds	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
ATPC tracking speed	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Latency test	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Measured isolation tx to rx	1															
Isolation of local transmitter to receiver standard T/R separation	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Isolation of local transmitter to receiver Local transmitter set to FO of receiver	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
TX Overload headroom	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Capture full BER curve [1x10-10 min] [1x10-12 preferred]	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A
Long term BER test	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A

ED

01

ECCN: 5E991

HTS: 4901.99.0050

3DB19060AAAAQZZA

32 / 302

		L6GHz MPT-HL V2 EM1 Pre-Integration																							
Channel Size		5 MHz Channels								10 MHz Channels								30 MHz Channels							
modulation states		4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024
L6GHz fixed modulation PVG310 compatible		na	na	na	na	0	na	na	na	na	na	0	na	0	na	na	na	na	na	0	na	0	0	na	na
L6GHz fixed modulation		na	na	0	na	0	na	na	na	na	na	0	0	0	0	na	na	na	na	1	1	1	1	1	1
L6GHz Adaptive modulation		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L6GHz XPIC fixed		na	na	na	na	na	na	na	na	na	na	na	na	0	0	na	na	na	na	0	0	0	0	0	0
L6GHz XPIC adaptive		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0	0	0	0	0	0	0	0

Stacking and flexible T/R frequency performance (PVG 620 profiles)																									
Verify T/T minimum separation		D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
Verify T/T maximum separation		D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
Verify T/R minimum separation		D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
Verify T/R minimum separation		D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
verify return loss [tx and rx]		1																							
Archive diplexer swept performance		D/T																							
Archive stacking filter swept performance		D/T																							
Archive space diversity receive filter swept performance		D/T																							
verify random transmitter spurs don't degrade receiver threshold.]		D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1
quantify ZA-B performance.		D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T

Temperature Performance [representative modulation PVG 620 profiles]																									
Verify error free performance over temperature		D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1
Power on at -10C -cold start		D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T

Misc. Radio Performance [representative modulation PVG 620 profiles]																									
Micro phonics tests		D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	1
DC power consumption [at full power]		D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1
DC power consumption during ATPC		D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1
DC power consumption in off line		D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
DC power consumption across fan operating range		D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1
General Battery range testing		D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
Offline side hitting online unit.		D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
verify channel extremes can be selected [no filters]		D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1

ED	01		
ECCN: 5E991		3DB19060AAAAQZZZA	
HTS: 4901.99.0050		33 / 302	

Corner Profiles in FCM mode

[illegible]

Transmitter Performance [PVG 620 fixed modulation profiles]																																
Transmitter power accuracy over RTPC range	1	N/A	D/T	N/A	1	N/A	N/A	1	N/A	N/A	D/T	D/T	1	D/T	N/A	1	N/A	N/A	D/T	D/T	D/T	D/T	1	D/T	N/A	N/A	N/A	D/T	D/T	1	D/T	1
Transmitter power accuracy over frequency range	1	N/A	D/T	N/A	1	N/A	N/A	1	N/A	N/A	D/T	D/T	1	D/T	N/A	1	N/A	N/A	D/T	D/T	D/T	D/T	1	D/T	N/A	N/A	N/A	D/T	D/T	1	D/T	1
Predistortion pre-check	1	N/A	D/T	N/A	1	N/A	N/A	1	N/A	N/A	D/T	D/T	1	D/T	N/A	1	N/A	N/A	D/T	D/T	D/T	D/T	1	D/T	N/A	N/A	N/A	D/T	D/T	1	D/T	1
Transmitter carrier null	2	N/A	D/T	N/A	2	N/A	N/A	2	N/A	N/A	D/T	D/T	2	D/T	N/A	2	N/A	N/A	D/T	D/T	D/T	D/T	2	D/T	N/A	N/A	N/A	D/T	D/T	2	D/T	2

[illegible]

Receiver Performance [adaptive modulation PVG 620 profiles]																														
Receiver signal level verification.	1	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	1
Receiver LO leakage	1																													

System Performance [fixed modulation PVG 620 profiles]																																			
Capture Alarm/warning/fx10-6 threshold points, including hysteresis, due to flat fade.	✓	D/T	D/T	D/T	✓	D/T	D/T	✓	D/T	D/T	D/T	D/T	✓	D/T	D/T	✓	✓	✓	✓	✓	✓	✓	✓	✓	D/T	D/T	D/T	D/T	✓	D/T	✓				
No errors on link when Tx power is changed.	N/A	N/A	D/T	N/A	D/T	N/A	N/A	✓	N/A	N/A	D/T	D/T	D/T	D/T	N/A	N/A	N/A	N/A	D/T	D/T	D/T	D/T	D/T	D/T	N/A	N/A	N/A	D/T	D/T	D/T	✓				
Path fade rate (Flat fade) [AM set to fixed mode]	✓	D/T	D/T	D/T	D/T	D/T	D/T	2	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	✓	D/T	✓			
Receiver Overloads	✓	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	✓	D/T	✓			
TA like modulation	✓	D/T	D/T	D/T	✓	D/T	D/T	✓	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	✓	✓	✓	✓	D/T	D/T	D/T	D/T	✓	D/T	✓			
CA like modulation	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	✓	✓	✓	D/T	D/T	D/T	D/T	D/T	✓	D/T	✓			
TA CW	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	✓	D/T	✓		
CA CW	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	✓		
DFM test	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	D/T	✓	✓	D/T	D/T	D/T	D/T	D/T	✓	D/T	✓			
Receiver acquisition time [due to transmitter switching]	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T			
Transmitter Switching in Protective mode	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T			
ATPC switching thresholds	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T			
ATPC tracking speed	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T			
Latency test	✓	D/T	D/T	D/T	✓	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	✓			
Measured isolation tx to rx	✓																																		
Isolation of local transmitter to receiver standard TR separation	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓			
Isolation of local transmitter to receiver Local transmitter set to FO of receiver	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓			
TX Overflow headroom	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓			
Capture full BER curve [1x10-10 min] [1x10-12 preferred]	D/T	D/T	D/T	D/T	D/T	D/T	✓	✓	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	✓	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	✓		
Long term BER test	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	✓	✓	D/T	D/T	D/T	D/T	D/T	D/T	✓	D/T	✓	

[illegible]

		L6GHz MPT-HL V2 EM2 Hardware Validation PVG 620 fixed modulation																															
Channel Size		5 MHz Channels								10 MHz Channels								30 MHz Channels								60 MHz Channels							
modulation states		4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024
L6GHz fixed modulation PVG310 compatible		na	na	2	na	2	na	na	na	na	na	2	na	2	na	na	na	na	na	2	na	2	2	2	na	na	na	na	na	na	na	na	na
L6GHz fixed modulation		na	na	2	na	2	na	na	na	na	na	2	2	2	2	na	na	na	na	2	2	2	2	2	2	na	na	na	na	2	2	2	2
L6GHz Adaptive modulation		1	2	2	2	1	2	2	1	2	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	2	1
L6GHz XPIC fixed		na	na	na	na	2	na	na	na	na	na	na	na	2	2	na	na	na	na	2	2	2	2	2	2	na	na	na	2	2	2	2	2
L6GHz XPIC adaptive		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Temperature Performance [representative modulation PVG 620 profiles]																																
Verify error free performance over temperature	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	
Power on at -10C -cold start	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
Misc. Radio Performance [representative modulation PVG 620 profiles]																																
Micro phonics tests	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1
DC power consumption [at full power]	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1
DC power consumption during ATPC	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
DC power consumption in off line	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
DC power consumption across fan operating range	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
General Battery range testing	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
Offline side hitting online unit.	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
verify channel extremes can be selected [no filters]	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

35 / 302

[illegible][illegible][illegible][illegible]

ACM Profiles

L6GHz MPT-HL V2 EM2 Hardware Validation PVG 620 Adaptive modulation and other testing.																																	
Channel Size		5 MHz Channels								10 MHz Channels								30 MHz Channels								60 MHz Channels							
modulation states		4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024
L6GHz fixed modulation PVG310 compatible	na	na	2	na	2	na	na	na	na	na	na	2	na	2	na	na	na	na	na	2	na	2	na	na	na	na	na	na	na	na	na	na	na
	na	na	2	na	2	na	na	na	na	na	na	2	2	2	2	na	na	na	na	2	2	2	2	2	2	na	na	na	2	2	2	2	2
	L6GHz Adaptive modulation	1	2	2	2	1	2	2	1	2	2	2	2	1	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	1	2	1	
	L6GHz XPC fixed	na	na	na	na	2	na	na	na	na	na	na	2	na	2	na	na	na	na	2	2	2	2	2	2	na	na	na	2	2	2	2	2
	L6GHz XPC adaptive	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

System Performance [adaptive modulation PVG 620 profiles]																																		
Capture Alarm/warning/1x10-6 threshold points, including hysteresis, due to flat fade.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
No errors on link when Tx power is changed.	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T			
switching thresholds due to fixed frequency notch	1								1								1								1									
error free operation due to swept notch across pass-band	1								1								1								1									
switching thresholds due to flat fades	1								1								1								1									
space diversity switching (not standby configuration)	0								0								0								0									
Error measurement during long term modulation switching [Tx set for constant power 1000 cycles]	2								2								2								2									
Error measurement during long term modulation switching [Tx set for full power 1000 cycles]	1								1								1								1									
Path fade rate (Flat fade) [AM set to adaptive mode]	2								1								1								1									
Path fade rate (Flat fade) [AM set to fixed mode]	1	1	1	1	1	3	3	4	1	D/T	D/T	D/T	D/T	D/T	D/T	3	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	1	D/T	D/T	D/T	D/T	D/T	1	
Receiver Overloads	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	
TA like modulation	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	
CA like modulation	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	
TA CW	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	
CA CW	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	
DFM test	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	1
Link outage time due to tx switch	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	
Verify no ATPC/ACM oscillation at trigger point	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Error measurement during long term modulation switching [in ATPC mode 1000 cycles]	0								0								0								0									
ATPC switching thresholds [adaptive modulation]	0								0								0								0									
ATPC tracking speed [dynamic modulation]	0								0								0								0									
ATPC switching thresholds [modulation fixed]	1	D/T	D/T	D/T	D/T	D/T	D/T	1	1	D/T	D/T	D/T	D/T	D/T	D/T	1	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	1	D/T	D/T	D/T	D/T	D/T	1		
ATPC tracking speed [modulation fixed]	1	D/T	D/T	D/T	D/T	D/T	D/T	1	1	D/T	D/T	D/T	D/T	D/T	D/T	1	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	1	D/T	D/T	D/T	D/T	D/T	1		
Latency test	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	
Measured isolation tx to rx	D/T																																	
Isolation of local transmitter to receiver standard T/R separation	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T		
Isolation of local transmitter to receiver Local transmitter set to FO of receiver	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T		
TX Overload headroom	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	
Capture full BER curve [1x10-10 min] [1x10-12 preferred]	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	
Long term BER test	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	

Misc. Radio Performance [representative modulation PVG 620 profiles]																																
Micro phonics tests	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
DC power consumption [at full power]	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
DC power consumption during ATPC	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
DC power consumption in off line	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
DC power consumption across fan operating range	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
General Battery range testing	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
Offline side hitting online unit. [PA switch operation]	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1
Offline side hitting online unit. [plug/unplug Ethernet cable]	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1
Offline side hitting online unit. [plug/unplug battery]	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1
Offline side hitting online unit. [plug/unplug complete unit]	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	1
verify channel extremes can be selected [no filters]	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T

V1-V2 Profiles

		L6GHz MPT-HL V2 EM2 Hardware Validation PVG 310 compatibility																											
Channel Size		5 MHz Channels								10 MHz Channels								30 MHz Channels											
modulation states		4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024				
L6GHz fixed modulation PVG310 compatible		na	na	1	na	1	na	na	na	na	na	1	na	1	na	na	na	na	na	1	na	1	1	na	na				
L6GHz fixed modulation		na	na	2	na	2	na	na	na	na	na	2	2	2	2	na	na	na	na	2	2	2	2	2	2				
L6GHz Adaptive modulation		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
L6GHz XPIC fixed		na	na	na	na	2	na	na	na	na	na	na	na	2	2	na	na	na	na	2	2	2	2	2	2				
L6GHz XPIC adaptive		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				

Transmitter power accuracy RTPC range	N/A	N/A	1	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A																																				
Transmitter power accuracy over frequency range	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A																																				
Predistortion pre-check	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1	1	N/A	N/A																																				
Transmitter carrier null	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1	2	N/A	N/A																																				
FCC/Industry Canada requirements [Fixed modulation 310 Compatible Profiles]																																																															
FCC/Industry Canada mask	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1	1	N/A	N/A																																				
Transmitter power verification over temperature	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A																																				
Transmit Frequency stability over Temperature	D/T																																																														
Transmit Frequency change over battery range	D/T																																																														
wideband spurious	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A																																				
occupied bandwidth	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A																																				
Receiver Performance [fixed modulation 310 compatible profiles]																																																															
Receiver signal level verification	N/A	N/A	D/T	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A																																				

System Performance [fixed modulation 310 Compatible Profiles V2 as a Receiver]																																		
Capture Alarm/warning/1x10-6 threshold points, including hysteresis, due to flat fade	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A
Isolation of local transmitter to receiver	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A
No errors on link when Tx power is changed	N/A	N/A	D/T	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A
Receiver Overloads	N/A	N/A	D/T	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A
T/I like modulation curves	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A
C/I like modulation curves	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A
T/I CW	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A
C/I CW	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A
DFM test	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1	1	N/A	N/A	N/A	N/A	1	N/A	1	1	N/A	N/A
Receiver acquisition time [due to transmitter switching]	N/A	N/A	D/T	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A
Receiver AGC tracking speed	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A
ATPC switching thresholds	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A
ATPC tracking speed	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A
Latency test	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A
TX Overload headroom	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A
Capture full BER curve [1x10-10 min] [1x10-12 preferred]	N/A	N/A	1	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A
Long term BER test	N/A	N/A	D/T	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A	N/A	N/A	D/T	N/A	D/T	1	N/A	N/A

System Performance (fixed modulation 310 Compatible Profiles V1 as a Receiver)																																					
Capture Alarm/warning/1x10-6 threshold points, including hysteresis, due to flat fade.	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Isolation of local transmitter to receiver	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No errors on link when Tx power is changed.	N/A	N/A	D/T	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Receiver Overloads	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T/I like modulation curves	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C/I like modulation curves	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
T/I CW	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C/I CW	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DFM test	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Receiver acquisition time [due to transmitter switching]	N/A	N/A	D/T	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Receiver AGC tracking speed	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ATPC switching thresholds	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ATPC tracking speed	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Latency test	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TX Overload headroom	N/A	N/A	D/T	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Capture full BER curve [1x10-10 min (1x10-12 preferred)]	N/A	N/A	D/T	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Long term BER test	N/A	N/A	D/T	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	D/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

		L6GHz MPT-HL V2 EM2 Hardware Validation PVG 310 compatibility																											
Channel Size	5 MHz Channels								10 MHz Channels								30 MHz Channels												
modulation states	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024	4	16	32	64	128	256	512	1024					
L6GHz fixed modulation PVG310 compatible	na	na	1	na	1	na	na	na	na	na	1	na	1	na	na	na	na	na	1	na	1	1	na	na					
L6GHz fixed modulation	na	na	2	na	2	na	na	na	na	na	2	2	2	2	na	na	na	na	2	2	2	2	2	2					
L6GHz Adaptive modulation	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
L6GHz XPIC fixed	na	na	na	na	2	na	na	na	na	na	na	na	2	2	na	na	na	na	2	2	2	2	2	2					
L6GHz XPIC adaptive	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					

System Performance [fixed modulation 310 compatible profiles V2 TX in PVG 310 mode and V2 Receiver in PVG 310 mode]																											
Capture Alarm/warning/1x10-6 threshold points, including hysteresis, due to flat fade.	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
Isolation of local transmitter to receiver	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
No errors on link when Tx power is changed.	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
Receiver Overloads	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
T/I like modulation curves	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
C/I like modulation curves	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
T/I CW	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
C/I CW	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
DFM test	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
Receiver acquisition time [due to transmitter switching]	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
Receiver AGC tracking speed	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
ATPC switching thresholds	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
ATPC tracking speed	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
Latency test	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
TX Overload headroom	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
Capture full BER curve [1x10-10 min] [1x10-12 preferred]	N/A	N/A	D/T	N/A	1	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A
Long term BER test	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A	N/A	D/T	N/A	D/T	N/A	D/T	N/A	N/A	N/A	N/A

Temperature Performance [representative modulation PVG 310 profiles]																											
Verify error free performance over temperature	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
Power on at -10C -cold start	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
Misc. Radio Performance [representative modulation PVG 310 profiles]																											
Micro phonics tests	D/T	D/T	D/T	D/T	1	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
DC power consumption [at full power]	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
DC power consumption during ATPC	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
DC power consumption in off line	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
DC power consumption across fan operating range	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
General Battery range testing	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
Offline side hitting online unit.	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
verify channel extremes can be selected [no filters]	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

39 / 302

2 TRANSMITTER PERFORMANCE

The goal of this series of tests is to verify that the units are meeting the critical transmitter requirements.

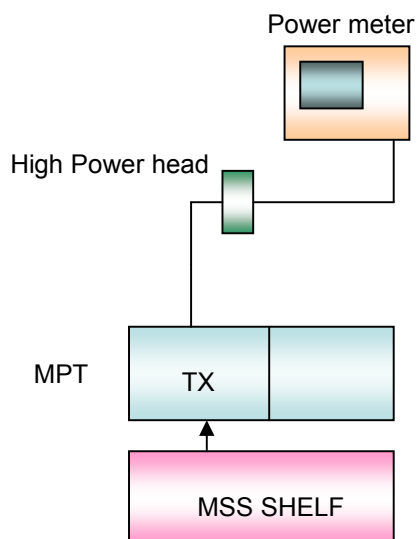


Figure 5 Power Measurement Setup

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	40 / 302

2.1 TRANSMITTER POWER ACCURACY OVER RTPC RANGE

The goal of this test is to verify the power accuracy over the Remote Transmit Power Control (RTPC) range.

2.1.1 TOOLS NEEDED TO PERFORM THIS TEST

- MPT-HL V2
- Power meter HP 437B or similar
- High power head HP 8481B or similar

2.1.2 SETUP CONFIGURATION

- Connect as shown in figure 5.
- Connect power head to the MPT-HL V2 TX output

2.1.3 TEST PROCEDURE

Test Case 1a: Transmitter power verification across RTPC range.

Summary: To measure the Transmit power of the unit under test across frequency and modulation.

Steps:

The following will be verified on the units under test.

- Set the transmitter power according to the table 3 for the modulation and frequency scheme.
- Verify the power level throughout frequency in 50 MHz steps
- Verify the accuracy of the power 10 dB below nominal power in decrements of 1 dB for each modulation.
- Record values and verified that the transmitter meet spec.

Expected Results:

The power of the transmitter should be with in +/-2 dB of the radio setting according to Table 3.

Results:

See data below.

2.1.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	41 / 302

Power through RTPC

30 MHz Profiles

Nominal Power out

Lower 6 GHz 30 MHz Profiles in FCM mode Fc=5753MHz									
Power Setting (+dBm)	30MHz / 4QAM	30Hz / 16QAM	30MHz / 32 QAM	30MHz / 64QAM	30Hz / 128QAM	30MHz / 256 QAM	30MHz / 512QAM	30Hz / 1024QAM	
	P out	P out	P out	P out	P out	P out	P out	P out	
5.00	5.72	6.25	6.25	6.35	6.27	6.35	6.28	6.35	dBm
12.50	12.47	13.08	13.1	13.19	13.14	13.21	13.15	13.20	dBm
13.50	13.45	14.08	14.10	14.18	14.15	14.21	14.15	14.21	dBm
14.50	14.42	15.05	15.08	15.18	15.11	15.19	15.13	15.19	dBm
15.50	15.38	16.03	16.04	16.14	16.09	16.17	16.10	16.17	dBm
16.50	16.34	16.99	17.01	17.10	17.05	17.11	17.06	17.12	dBm
17.50	17.31	17.95	17.97	18.06	18.02	18.08	18.03	18.08	dBm
18.50	18.29	18.92	18.94	19.03	18.98	19.05	18.99	19.05	dBm
19.50	19.26	19.88	19.90	19.99	19.94	20.01	19.95	20.01	dBm
20.50	20.22	20.82	20.86	20.94	20.90	20.97	20.92	20.97	dBm
21.50	21.18	21.79	21.81	21.91	21.88	21.92	21.88	21.93	dBm
22.50	22.15	22.77	22.80	22.89	22.84	22.90	22.85	22.91	dBm
23.50	23.11	23.74	23.76	23.85	23.80	23.87	23.82	23.88	dBm
24.50	24.17	24.81	24.84	24.92	24.88	24.94	24.89	24.95	dBm
25.50	25.15	25.78	25.81	25.90	25.85	25.91	25.86	25.95	dBm
26.50	26.17	26.79	26.81	26.90	26.86	26.93	26.87	26.93	dBm
27.50	27.27	27.99	28.01	28.12	28.06	28.14	28.07	28.15	dBm
28.50	28.27	29.02	29.03	29.15	29.09	29.18	29.10	29.19	dBm
29.50	29.37	30.14	30.17	30.29	30.22	30.31	30.23	30.33	dBm
30.50	30.41	31.24	31.26	31.40	31.33	31.42	31.33	31.43	dBm
31.50	31.32	32.10	32.13	32.25	32.18	32.27	32.19	32.28	dBm
32.50	32.21	32.96	32.98	33.09	33.03	33.11	33.04	33.12	dBm
33.50	33.21	33.97	34.00	34.10	34.05	34.12	34.06	34.12	dBm
34.50	34.29	35.06	35.08	35.18	35.13	35.21	35.14	35.21	dBm

Lower 6 GHz 30 MHz Profiles in FCM mode Fc=6075Mhz									
Power Setting (+dBm)	30MHz / 4QAM	30Hz / 16QAM	30MHz / 32 QAM	30MHz / 64QAM	30Hz / 128QAM	30MHz / 256 QAM	30MHz / 512QAM	30Hz / 1024QAM	
	P out	P out	P out	P out	P out	P out	P out	P out	
5.00	5.68	6.24	6.25	6.33	6.28	6.32	6.31	6.34	
12.50	12.4	13.04	13.07	13.13	13.08	13.15	13.11	13.16	dBm
13.50	13.35	13.99	14.02	14.11	14.05	14.12	14.07	14.13	dBm
14.50	14.34	14.97	15.00	15.00	15.04	15.10	15.06	15.11	dBm
15.50	15.30	15.95	15.97	16.06	16.01	16.07	16.03	16.08	dBm
16.50	16.27	16.91	16.93	17.02	16.98	17.03	16.99	17.05	dBm
17.50	17.25	17.88	17.90	17.99	17.94	18.00	17.96	18.01	dBm
18.50	18.23	18.85	18.87	18.96	18.92	18.98	18.94	18.99	dBm
19.50	19.19	19.81	19.83	19.92	19.87	19.93	19.89	19.94	dBm
20.50	20.16	20.76	20.80	20.88	20.85	20.90	20.85	20.91	dBm
21.50	21.13	21.75	21.77	21.86	21.82	21.88	21.83	21.88	dBm
22.50	22.10	22.73	22.75	22.84	22.80	22.86	22.81	22.87	dBm
23.50	23.01	23.64	23.67	23.75	23.71	23.77	23.72	23.78	dBm
24.50	24.10	24.73	24.75	24.83	24.80	24.85	24.81	24.86	dBm
25.50	25.12	25.74	25.77	25.85	25.81	25.87	25.82	25.88	dBm
26.50	26.09	26.71	26.73	26.81	26.78	26.83	26.79	26.84	dBm
27.50	27.16	27.80	27.83	27.92	27.87	27.93	27.88	27.95	dBm
28.50	28.14	28.80	28.82	28.91	28.87	28.93	28.87	28.94	dBm
29.50	29.20	29.87	29.90	30.00	29.95	30.02	29.96	30.03	dBm
30.50	30.22	30.92	30.95	31.04	31.00	31.07	31.00	31.08	dBm
31.50	31.20	31.91	31.94	32.04	31.99	32.05	32.00	32.07	dBm
32.50	32.15	32.87	32.90	32.99	32.95	33.01	32.95	33.02	dBm
33.50	33.11	33.84	33.87	33.96	33.92	33.98	33.93	34.00	dBm
34.50	34.15	34.88	34.90	34.99	34.96	35.01	34.96	35.02	dBm

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01		
	ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	42 / 302

Lower 6 GHz 30 MHz Profiles in FCM mode Fc=6397Mhz									
Power Setting (+dBm)	30MHz / 4QAM	30Hz / 16QAM	30MHz / 32 QAM	30MHz / 64QAM	30Hz / 128QAM	30MHz / 256 QAM	30MHz / 512QAM	30Hz / 1024QAM	
	P out	P out	P out	P out	P out	P out	P out	P out	
5.00	5.65	6.16	6.2	6.29	6.25	6.29	6.27	6.31	
12.50	12.4	13.02	13.04	13.13	13.09	13.15	13.09	13.15	dBm
13.50	13.32	13.94	13.97	14.06	14.02	14.08	14.03	14.08	dBm
14.50	14.30	14.93	14.96	15.05	15.01	15.07	15.02	15.07	dBm
15.50	15.28	15.91	15.93	16.02	15.97	16.05	15.99	16.04	dBm
16.50	16.20	16.83	16.85	16.94	16.90	16.96	16.91	16.96	dBm
17.50	17.19	17.80	17.82	17.91	17.87	17.93	17.88	17.93	dBm
18.50	18.17	18.78	18.80	18.90	18.85	18.91	18.86	18.92	dBm
19.50	19.13	19.74	19.76	19.85	19.81	19.87	19.82	19.87	dBm
20.50	20.09	20.72	20.74	20.83	20.78	20.85	20.79	20.85	dBm
21.50	21.07	21.69	21.72	21.81	21.76	21.83	21.77	21.83	dBm
22.50	22.00	22.69	22.70	22.80	22.75	22.82	22.76	22.82	dBm
23.50	22.97	23.60	23.62	23.71	23.67	23.73	23.68	23.74	dBm
24.50	24.06	24.69	24.70	24.79	24.75	24.81	24.76	24.82	dBm
25.50	25.03	25.66	25.67	25.76	25.72	25.78	25.73	25.79	dBm
26.50	26.05	26.67	26.69	26.77	26.73	26.80	26.74	26.80	dBm
27.50	27.05	27.69	27.71	27.80	27.75	27.83	27.77	27.83	dBm
28.50	28.03	28.69	28.71	28.80	28.75	28.83	28.76	28.83	dBm
29.50	29.09	29.77	29.79	29.89	29.84	29.92	29.85	29.92	dBm
30.50	30.11	30.83	30.85	30.94	30.89	30.98	30.90	30.98	dBm
31.50	31.12	31.85	31.88	31.96	31.92	31.99	31.93	31.99	dBm
32.50	32.11	32.83	32.85	32.94	32.90	32.96	32.90	32.96	dBm
33.50	33.08	33.79	33.81	33.88	33.84	33.90	33.85	33.90	dBm
34.50	34.11	34.77	34.79	34.85	34.82	34.87	34.83	34.87	dBm

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01				
	ECCN: 5E991 HTS: 4901.99.0050			3DB19060AAAAQZZZA	43 / 302

Corner Profiles in FCM mode

Nomial Power out

60 MHz

Corner Profiles FCM mode			
L6 GHz Fc=5755MHz			
Power Setting (+dBm)	60MHz / 256 QAM	60Hz / 1024QAM	
	P out	P out	
5.00	5.52	5.52	dBm
12.50	12.90	12.91	dBm
13.50	13.93	13.94	dBm
14.50	14.92	14.93	dBm
15.50	15.91	15.91	dBm
16.50	16.89	16.89	dBm
17.50	17.87	17.87	dBm
18.50	18.84	18.84	dBm
19.50	19.81	19.81	dBm
20.50	20.77	20.77	dBm
21.50	21.73	21.72	dBm
22.50	22.71	22.71	dBm
23.50	23.69	23.68	dBm
24.50	24.76	24.75	dBm
25.50	25.73	25.72	dBm
26.50	26.75	26.73	dBm
27.50	27.72	27.70	dBm
28.50	28.69	28.67	dBm
29.50	29.74	29.73	dBm
30.50	30.76	30.73	dBm
31.50	31.76	31.73	dBm
32.50	32.73	32.71	dBm
33.50	33.78	33.76	dBm
34.50	34.90	34.89	dBm

Corner Profiles FCM mode			
L6 GHz Fc=6075MHz			
Power Setting (+dBm)	60MHz / 256 QAM	60Hz / 1024QAM	
	P out	P out	
5.00	5.16	5.21	dBm
12.50	12.53	12.52	dBm
13.50	13.53	13.51	dBm
14.50	14.54	14.52	dBm
15.50	15.51	15.50	dBm
16.50	16.48	16.50	dBm
17.50	17.46	17.48	dBm
18.50	18.44	18.47	dBm
19.50	19.39	19.43	dBm
20.50	20.37	20.41	dBm
21.50	21.34	21.38	dBm
22.50	22.32	22.37	dBm
23.50	23.23	23.29	dBm
24.50	24.32	24.37	dBm
25.50	25.34	25.39	dBm
26.50	26.31	26.35	dBm
27.50	27.34	27.39	dBm
28.50	28.32	28.36	dBm
29.50	29.39	29.42	dBm
30.50	30.41	30.44	dBm
31.50	31.44	31.46	dBm
32.50	32.44	32.46	dBm
33.50	33.47	33.47	dBm
34.50	34.46	34.45	dBm

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	44 / 302

10 MHz

Corner Profiles FCM mode			
L6 GHz Fc=6395 MHz			
Power Setting	60MHz / 256 QAM	60Hz / 1024QAM	
	P out	P out	
5.00	4.72	4.72	dBm
12.50	12.13	12.14	dBm
13.50	13.10	13.11	dBm
14.50	14.10	14.13	dBm
15.50	15.09	15.11	dBm
16.50	16.03	16.04	dBm
17.50	17.01	17.04	dBm
18.50	17.95	18.03	dBm
19.50	18.96	18.00	dBm
20.50	19.95	19.97	dBm
21.50	20.95	20.96	dBm
22.50	21.93	21.95	dBm
23.50	22.85	22.86	dBm
24.50	23.93	23.95	dBm
25.50	24.90	24.91	dBm
26.50	25.91	25.93	dBm
27.50	26.90	26.90	dBm
28.50	27.88	27.89	dBm
29.50	28.96	28.97	dBm
30.50	30.00	30.02	dBm
31.50	31.04	31.05	dBm
32.50	32.04	32.05	dBm
33.50	33.06	33.06	dBm
34.50	34.06	34.07	dBm

Corner Profiles in FCM mode			
L6 GHz Fc=5730MHz			
Power Setting	10MHz / 128 QAM	10Hz / 1024QAM	Units
	P out	P out	
5.00	5.50	5.65	dBm
12.50	12.96	13.00	dBm
13.50	13.97	14.02	dBm
14.50	14.97	15.03	dBm
15.50	15.96	16.02	dBm
16.50	16.92	16.99	dBm
17.50	17.90	17.96	dBm
18.50	18.87	18.93	dBm
19.50	19.83	19.90	dBm
20.50	20.80	20.87	dBm
21.50	21.76	21.82	dBm
22.50	22.74	22.81	dBm
23.50	23.71	23.78	dBm
24.50	24.78	24.85	dBm
25.50	25.75	25.82	dBm
26.50	26.76	26.83	dBm
27.50	27.74	27.81	dBm
28.50	28.71	28.78	dBm
29.50	29.76	29.83	dBm
30.50	30.78	30.85	dBm
31.50	31.78	31.85	dBm
32.50	32.78	32.83	dBm
33.50	33.83	33.88	dBm
34.50	34.96	35.00	dBm

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	45 / 302

Corner Profiles in FCM mode			
L6 GHz Fc=6075MHz			
Power Setting	10Hz / 128QAM	10Hz / 1024QAM	Units
	P out	P out	
5.00	5.13	5.2	dBm
12.50	12.49	12.52	dBm
13.50	13.49	13.55	dBm
14.50	14.50	14.56	dBm
15.50	15.48	15.55	dBm
16.50	16.46	16.53	dBm
17.50	17.43	17.50	dBm
18.50	18.42	18.49	dBm
19.50	19.38	19.44	dBm
20.50	20.31	20.42	dBm
21.50	21.29	21.40	dBm
22.50	22.28	22.39	dBm
23.50	23.20	23.30	dBm
24.50	24.29	24.40	dBm
25.50	25.32	25.41	dBm
26.50	26.28	26.37	dBm
27.50	27.33	27.36	dBm
28.50	28.31	28.34	dBm
29.50	29.36	29.40	dBm
30.50	30.38	30.42	dBm
31.50	31.38	31.43	dBm
32.50	32.37	32.42	dBm
33.50	33.39	33.43	dBm
34.50	34.50	34.45	dBm

Corner Profiles in FCM mode			
L6 GHz Fc=6420MHz			
Power Setting	10Hz / 128QAM	10Hz / 1024QAM	Units
	P out	P out	
5.00	4.51	4.66	dBm
12.50	11.99	12.04	dBm
13.50	12.94	13.00	dBm
14.50	13.96	14.05	dBm
15.50	14.95	15.04	dBm
16.50	15.90	15.97	dBm
17.50	16.88	16.96	dBm
18.50	17.87	17.95	dBm
19.50	18.84	18.91	dBm
20.50	19.82	19.90	dBm
21.50	20.81	20.89	dBm
22.50	21.80	21.87	dBm
23.50	22.72	22.79	dBm
24.50	23.80	23.86	dBm
25.50	24.77	24.85	dBm
26.50	25.79	25.86	dBm
27.50	26.78	26.84	dBm
28.50	27.79	27.85	dBm
29.50	28.86	28.92	dBm
30.50	29.90	30.00	dBm
31.50	30.95	31.03	dBm
32.50	31.97	32.03	dBm
33.50	32.96	33.05	dBm
34.50	33.97	34.03	dBm

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	46 / 302

5 MHz

Corner Profiles in FCM mode				
L6 GHz Fc= 55727.5MHz				
Power Setting (+dBm)	5MHz / 4QAM	5Hz / 128QAM	5Hz / 1024QAM	
	P out	P out	P out	
5.00	4.72	5.44	5.53	dBm
12.50	12.17	12.87	12.96	dBm
13.50	13.20	13.91	14.00	dBm
14.50	14.19	14.90	15.01	dBm
15.50	15.19	15.90	16.00	dBm
16.50	16.15	16.88	16.96	dBm
17.50	17.14	17.85	17.94	dBm
18.50	18.13	18.82	18.91	dBm
19.50	19.10	19.79	19.88	dBm
20.50	20.06	20.76	20.84	dBm
21.50	21.03	21.71	21.81	dBm
22.50	22.02	22.70	22.80	dBm
23.50	22.98	23.68	23.77	dBm
24.50	24.05	24.76	24.84	dBm
25.50	25.02	25.74	25.81	dBm
26.50	26.04	26.74	26.82	dBm
27.50	27.02	27.72	27.80	dBm
28.50	28.00	28.69	28.76	dBm
29.50	29.14	29.74	29.83	dBm
30.50	30.11	30.75	30.82	dBm
31.50	31.10	31.76	31.83	dBm
32.50	32.07	32.73	32.80	dBm
33.50	33.10	33.79	33.86	dBm
34.50	34.18	34.91	34.98	dBm

Corner Profiles in FCM mode				
L6 GHz Fc= 6075 MHz				
Power Setting (+dBm)	5MHz / 4QAM	5Hz / 128QAM	5Hz / 1024QAM	
	P out	P out	P out	
5.00	4.33	5.04	5.11	dBm
12.50	11.77	12.45	12.55	dBm
13.50	12.78	13.47	13.55	dBm
14.50	13.78	14.49	14.55	dBm
15.50	14.77	15.48	15.54	dBm
16.50	15.76	16.45	16.52	dBm
17.50	16.75	17.44	17.51	dBm
18.50	17.74	18.43	18.49	dBm
19.50	18.71	19.38	19.45	dBm
20.50	19.68	20.37	20.43	dBm
21.50	20.66	21.34	21.39	dBm
22.50	21.64	22.33	22.38	dBm
23.50	22.55	23.24	23.30	dBm
24.50	23.64	24.33	24.39	dBm
25.50	24.68	25.35	25.41	dBm
26.50	26.65	26.32	26.38	dBm
27.50	26.68	27.35	27.40	dBm
28.50	27.66	28.33	28.39	dBm
29.50	28.70	29.39	29.45	dBm
30.50	29.70	30.40	30.47	dBm
31.50	30.71	31.41	31.49	dBm
32.50	31.66	32.42	32.47	dBm
33.50	32.67	33.43	33.50	dBm
34.50	33.66	34.33	34.50	dBm

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	47 / 302

Corner Profiles in FCM mode				
L6 GHz Fc= 6422.5 MHz				
Power Setting (+dBm)	5MHz / 4QAM	5Hz / 128QAM	5Hz / 1024QAM	
	P out	P out	P out	
5.00	3.77	4.5	4.61	dBm
12.50	11.28	12.02	12.11	dBm
13.50	12.25	12.99	13.08	dBm
14.50	13.29	14.00	14.09	dBm
15.50	14.28	15.00	15.07	dBm
16.50	15.23	15.94	16.00	dBm
17.50	16.23	16.92	16.99	dBm
18.50	17.23	17.92	17.98	dBm
19.50	18.21	18.89	18.95	dBm
20.50	19.18	19.87	19.94	dBm
21.50	20.17	20.85	20.93	dBm
22.50	21.15	21.84	21.92	dBm
23.50	22.07	22.77	22.85	dBm
24.50	23.17	23.85	23.92	dBm
25.50	24.16	24.83	24.90	dBm
26.50	25.18	25.84	25.92	dBm
27.50	26.17	26.83	26.90	dBm
28.50	27.14	27.82	27.90	dBm
29.50	28.20	28.89	28.97	dBm
30.50	29.22	29.93	30.01	dBm
31.50	30.25	30.98	31.08	dBm
32.50	31.22	31.98	32.06	dBm
33.50	31.22	32.99	33.05	dBm
34.50	33.25	33.96	34.01	dBm

Corner Profiles in ACM mode

L6 GHz Corner Profiles in ACM				
	5730Mhz	6075Mhz	6420Mhz	
Power Setting (+dBm)	10MHz / 1024QAM			
	P out	P out	P out	
5.00	N/T	N/T	N/T	dBm
12.50	13.02	12.43	12.16	dBm
13.50	13.97	13.40	13.14	dBm
14.50	14.92	14.36	14.11	dBm
15.50	15.92	15.33	15.07	dBm
16.50	16.87	16.26	16.01	dBm
17.50	17.81	17.20	16.96	dBm
18.50	18.79	18.19	17.97	dBm
19.50	19.76	19.19	18.93	dBm
20.50	20.74	20.11	19.93	dBm
21.50	21.70	21.12	20.88	dBm
22.50	22.72	22.12	21.87	dBm
23.50	23.65	23.07	22.81	dBm
24.50	24.70	24.10	23.86	dBm
25.50	25.68	25.08	24.83	dBm
26.50	26.67	26.07	25.85	dBm
27.50	27.70	27.11	26.90	dBm
28.50	28.68	28.10	27.90	dBm
29.50	29.66	29.08	28.90	dBm
30.50	30.66	30.09	29.92	dBm
31.50	31.69	31.15	31.02	dBm
32.50	32.72	32.23	32.05	dBm
33.50	33.69	33.19	32.98	dBm
34.50	N/T	N/T	N/T	dBm

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	48 / 302

V1-V2 Profiles**5 128 QAM**

L6 GHz V1-V2 Profiles V2 as a RX Fc= 6226.89 MHZ				
Power Setting (+dBm)	5 MHz Profiles			
	128 QAM			
	MTK	TX Pout Measured	Offsett	Units
14.50	14.5	19.53	5.03	dBm
15.50	15.5	20.24	4.74	dBm
16.50	16.5	20.97	4.47	dBm
17.50	17.5	21.74	4.24	dBm
18.50	18.5	22.5	4.00	dBm
19.50	19.5	23.38	3.88	dBm
20.50	20.5	24.25	3.75	dBm
21.50	21.5	25.13	3.63	dBm
22.50	22.5	26.05	3.55	dBm
23.50	23.5	26.92	3.42	dBm
24.50	24.5	27.92	3.42	dBm
25.50	25.5	28.87	3.37	dBm
26.50	26.5	29.81	3.31	dBm
27.50	27.5	30.83	3.33	dBm
28.50	28.5	31.81	3.31	dBm
29.50	29.5	32.84	3.34	dBm
30.50	30.5	33.89	3.39	dBm
31.50	31.5	34.84	3.34	dBm
32.50	32.5	35.87	3.37	dBm

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	49 / 302

5 MHz 32 QAM

L6 GHz V1-V2 Profiles V2 as a RX Fc= 6226.89 MHZ				
Power Setting (+dBm)	5 MHz Profiles			
	32 QAM			
	MTK	TX Pout Measured	Offsett	Units
14.50	14.5	19.53	5.03	dBm
15.50	15.5	20.24	4.74	dBm
16.50	16.5	20.97	4.47	dBm
17.50	17.5	21.74	4.24	dBm
18.50	18.5	22.54	4.04	dBm
19.50	19.5	23.33	3.83	dBm
20.50	20.5	24.25	3.75	dBm
21.50	21.5	25.08	3.58	dBm
22.50	22.5	26.01	3.51	dBm
23.50	23.5	26.92	3.42	dBm
24.50	24.5	27.87	3.37	dBm
25.50	25.5	28.81	3.31	dBm
26.50	26.5	29.78	3.28	dBm
27.50	27.5	30.78	3.28	dBm
28.50	28.5	31.76	3.26	dBm
29.50	29.5	32.78	3.28	dBm
30.50	30.5	33.78	3.28	dBm
31.50	31.5	34.79	3.29	dBm
32.50	32.5	35.44	2.94	dBm
33.50	X	X	X	dBm
34.50	X	X	X	dBm

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	50 / 302

2.2 TRANSMITTER POWER ACCURACY OVER FREQUENCY RANGE

The goal of this test is to verify the power accuracy over the frequency range.

2.2.1 TOOLS NEEDED TO PERFORM THIS TEST

- MPT-HL V2
- Power meter HP 437B or similar
- High power head HP 8481B or similar
- Spectrum analyzer Agilent E4407B or similar
- Test set Tektronix ST112

2.2.2 SETUP CONFIGURATION

- Connect as shown in figure 5.
- Connect power head to the MPT-HL V2 TX output

2.2.3 TEST PROCEDURE

Test Case 1b: Transmitter power verification across frequency.

Summary: To measure the Transmit power of the unit under test across the frequency range.

Steps:

The following will be verified on the units under test.

- Set the transmitter power according to the table 3 for the modulation and frequency scheme.
- Verify the power level throughout the frequency range in 50 MHz steps
- Record values and verified that the transmitter meet spec.

Expected Results:

The power of the transmitter should be with in +/-2 dB of the radio setting according to Table 3.

Results:

The units meet the spec, see data below.

2.2.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	51 / 302

Power through out Frequency

30 MHz Profiles in FCM Mode

Lower 6 GHz 30 MHz Profiles in FCM mode										
Modulation	Nom. PWR out (dBm)	MHz								Units
		5740	5750	5800	5850	5900	5950	6000	6050	
1024 QAM	31.5	32.32	32.28	32.24	32.20	32.13	32.13	32.11	32.05	dBm
512 QAM	31.5	32.23	32.19	32.16	32.12	32.13	32.05	32.03	31.97	dBm
256 QAM	32.5	33.15	33.11	33.09	33.07	33.10	33.04	33.03	32.98	dBm
128 QAM	32.5	33.08	33.03	33.01	32.99	33.02	32.96	32.96	32.91	dBm
64QAM	32.5	33.13	33.08	33.07	33.04	33.07	33.01	33.00	32.96	dBm
32 QAM	32.5	33.02	32.98	32.96	32.94	32.97	32.91	32.90	32.86	dBm
16 QAM	32.5	33.00	32.95	32.93	32.91	32.94	32.88	32.88	32.84	dBm
4 QAM	32.5	32.26	32.21	32.18	32.18	32.21	32.15	32.15	32.11	dBm

Lower 6 GHz 30 MHz Profiles in FCM mode										
Modulation	Nom. PWR out (dBm)	MHz								Units
		6100	6150	6200	6250	6300	6350	6400	6410	
1024 QAM	31.5	32.05	32.04	32.03	31.99	31.98	31.98	31.99	32.00	dBm
512 QAM	31.5	31.98	31.98	31.97	31.92	31.92	31.92	31.92	31.94	dBm
256 QAM	32.5	33.01	33.00	33.00	32.95	32.95	32.95	32.95	32.97	dBm
128 QAM	32.5	32.94	32.93	32.93	32.88	32.89	32.89	32.89	32.91	dBm
64QAM	32.5	32.98	32.97	32.97	32.92	32.93	32.93	32.93	32.95	dBm
32 QAM	32.5	32.88	32.88	32.88	32.83	32.83	32.84	32.84	32.86	dBm
16 QAM	32.5	32.86	32.85	32.86	32.81	32.81	32.81	32.82	32.84	dBm
4 QAM	32.5	32.14	32.13	32.13	32.08	32.09	32.09	32.11	32.12	dBm

Corner Profiles in FCM Mode

60 MHz Profiles

Lower 6 GHz 60 MHz Corner Profiles in FCM mode									
60MHz Profiles	Nom. PWR out (dBm)	Frequency (MHz)							Units
		5755	5800	5850	5900	5950	6000	6050	
1024 QAM	31.5	31.78	31.74	31.69	31.69	31.59	31.54	31.46	dBm
256 QAM	32.5	32.76	32.70	32.64	32.63	32.53	32.49	32.41	dBm

Lower 6 GHz 60 MHz Corner Profiles in FCM mode									
60MHz Profiles	Nom. PWR out (dBm)	Frequency (MHz)							Units
		6100	6150	6200	6250	6300	6350	6395	
1024 QAM	31.5	31.43	31.38	31.33	31.21	31.14	31.09	31.04	dBm
256 QAM	32.5	32.39	32.31	32.27	32.19	32.14	32.08	32.02	dBm

10 MHz Profiles

Lower 6 GHz 10 MHz Corner Profiles in FCM mode									
10MHz Profiles	Nom. PWR out (dBm)	Frequency (MHz)							Units
		5730	5750	5800	5850	5900	5950	6000	
1024 QAM	31.5	31.84	31.80	31.75	31.70	31.69	31.59	31.55	dBm
128 QAM	32.5	32.75	32.72	32.67	32.62	32.62	32.52	32.48	dBm

Lower 6 GHz 10 MHz Corner Profiles in FCM mode									
10MHz Profiles	Nom. PWR out (dBm)	Frequency (MHz)							Units
		6100	6150	6200	6250	6300	6350	6400	
1024 QAM	31.5	31.44	31.38	31.33	31.23	31.17	31.11	31.06	dBm
128 QAM	32.5	32.37	32.31	32.27	32.17	32.11	32.05	32.00	dBm

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED

01

ECCN: 5E991

HTS: 4901.99.0050

3DB19060AAAAQZZZA

52 / 302

5 MHz Profiles

Lower 6GHz 5 MHz Corner Profiles in FCM									
5MHz Profiles	Nom. PWR out (dBm)	Frequency (MHz)							
		5727.5	5750	5800	5850	5900	5950	6000	6050
1024 QAM	31.5	31.86	31.82	31.77	31.72	31.72	31.62	31.58	31.50
128 QAM	32.5	32.77	32.72	32.68	32.63	32.63	32.54	32.50	32.42
4 QAM	32.5	32.04	32.00	31.95	31.91	31.90	31.81	31.77	31.68

Lower 6GHz 5 MHz Corner Profiles in FCM									
5MHz Profiles	Nom. PWR out (dBm)	Frequency (MHz)							
		6100	6150	6200	6250	6300	6350	6400	6422.5
1024 QAM	31.5	31.46	31.43	31.37	31.26	31.20	31.15	31.07	31.04
128 QAM	32.5	32.42	32.36	32.31	32.20	32.16	32.10	32.03	31.99
4 QAM	32.5	31.66	31.60	31.55	31.44	31.37	31.30	31.24	31.22

Corner Profiles in ACM Mode

10 MHz Profiles

L6 GHz 10 MHz Corner Profiles in ACM mode									
5MHz Profiles	Nom. PWR out	Frequency in (MHz)							
		5730	5750	5800	5850	5900	5950	6000	6050
1024 QAM	31.5	31.69	31.70	31.66	31.40	31.24	31.20	31.19	31.13
128 QAM	32.5	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4 QAM	32.5	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T

L 6 GHz Corner Profiles in ACM mode									
5MHz Profiles	Nom. PWR out	Frequency in (MHz)							
		6100	6150	6200	6250	6300	6350	6400	6420
1024 QAM	31.5	31.13	31.14	31.05	31.03	31.02	31.02	31.01	31.01
128 QAM	32.5	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4 QAM	32.5	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01							
		ECCN: 5E991 HTS: 4901.99.0050			3DB19060AAAAQZZA			53 / 302

2.3 PREDISTORTION PRE-CHECK

The goal of this test is to evaluate the calibration of the pre-distorter.

2.3.1 TOOLS NEEDED TO PERFORM THIS TEST

- MPT-HL V2
- Power meter HP 437B or similar
- High power head HP 8481B or similar
- Spectrum analyzer Agilent E4407B or similar

2.3.2 SETUP CONFIGURATION

- Connect as shown in figure 6.

2.3.3 TEST PROCEDURE

Test Case 1c: Transmitter pre-distorter verification across frequency and power.

Summary: To verify the calibration of the pre-distorter.

Steps:

The following will be verified on the units under test.

- Set the transmitter power according to the table 3 for the modulation and frequency scheme.
- Verify the linearity at **low**, **middle**, **high** point of the frequency range.
- Verify the power at this points: **Pmax** (nominal power), **Pmed** (2 dB below nominal power), **Pmin** (4 dB below nominal power) and **20 dB** below nominal power.
- Record values.

Expected Results:

There is no requirement for this test; however the data will provide statistics of the pre-distorter behavior.

Results:

The data results are attached below.

2.3.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	54 / 302

30 MHz Profiles in FCM Mode

L6 GHz 30 MHz Profiles in FCM mode				
Modulation	Calibration Points	TX Po dBm	Frequency MHz	
			6375	
			Linearity	MSE
1024 QAM	Pmax	31.5	N/T	N/A
	Pmed	30.5	-43	N/A
	Pmin	29.5	N/T	N/A
	20 dB down	9.5	N/T	N/A
512 QAM	Pmax	31.5	N/T	N/A
	Pmed	30.5	-43.07	N/A
	Pmin	29.5	N/T	N/A
	20 dB down	9.5	N/T	N/A
256 QAM	Pmax	32.5	N/T	N/A
	Pmed	30.5	-36.5	N/A
	Pmin	28.5	N/T	N/A
	20 dB down	10.5	N/T	N/A
128 QAM	Pmax	32.5	N/T	N/A
	Pmed	30.5	-36.47	N/A
	Pmin	28.5	N/T	N/A
	20 dB down	10.5	N/T	N/A
64 QAM	Pmax	32.5	N/T	N/A
	Pmed	30.5	-36.4	N/A
	Pmin	28.5	N/T	N/A
	20 dB down	10.5	N/T	N/A
32 QAM	Pmax	32.5	N/T	N/A
	Pmed	30.5	-37.25	N/A
	Pmin	28.5	N/T	N/A
	20 dB down	10.5	N/T	N/A
16 QAM	Pmax	32.5	N/T	N/A
	Pmed	30.5	-37.23	N/A
	Pmin	28.5	N/T	N/A
	20 dB down	10.5	N/T	N/A
4 QAM	Pmax	32.5	N/T	N/A
	Pmed	30.5	-41.55	N/A
	Pmin	28.5	N/T	N/A
	20 dB down	10.5	N/T	N/A

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	55 / 302

Corner Profiles an FCM Mode**60 MHz**

L6 GHz 60 MHz Profile in FCM mode				
Modulation	Calibration Points	TX Po dBm	Frequency MHz	
			6375	
			Linearity	MSE
1024 QAM	Pmax	31.5	NA	NA
	Pmed	30.5	-55.81	NA
	Pmin	29.5	NA	NA
	20 dB down	9.5	NA	NA
256 QAM	Pmax	31.5	NA	NA
	Pmed	30.5	-54.77	NA
	Pmin	29.5	NA	NA
	20 dB down	9.5	NA	NA

30 MHz

L6 GHz 30 MHz Profile in FCM mode				
Modulation	Calibration Points	TX Po dBm	Frequency MHz	
			6375	
			Linearity	MSE
512 QAM	Pmax	31.5	NA	NA
	Pmed	30.5	-51.78	NA
	Pmin	29.5	NA	NA
	20 dB down	9.5	NA	NA

10 MHz

L6 GHz 10 MHz Profile in FCM mode				
Modulation	Calibration Points	TX Po dBm	Frequency MHz	
			6375	
			Linearity	MSE
1024 QAM	Pmax	31.5	NA	NA
	Pmed	30.5	-52.73	NA
	Pmin	29.5	NA	NA
	20 dB down	9.5	NA	NA
128 QAM	Pmax	31.5	NA	NA
	Pmed	30.5	-49.03	NA
	Pmin	29.5	NA	NA
	20 dB down	9.5	NA	NA

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZA

56 / 302

5 MHz

L6 GHz 5 MHz Profile in FCM mode				
Modulation	Calibration Points	TX Po dBm	Frequency MHz	
			6375	
			Linearity	MSE
1024 QAM	Pmax	31.5	NA	NA
	Pmed	30.5	-52.68	NA
	Pmin	29.5	NA	NA
	20 dB down	9.5	NA	NA
256 QAM	Pmax	31.5	NA	NA
	Pmed	30.5	-48.8	NA
	Pmin	29.5	NA	NA
	20 dB down	9.5	NA	NA
4 QAM	Pmax	31.5	NA	NA
	Pmed	30.5	-46.49	NA
	Pmin	29.5	NA	NA
	20 dB down	9.5	NA	NA

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	57 / 302

Corner Profiles an ACM Mode

10 MHz

L6 GHz 10 MHz Profiles in ACM mode									
SN	Modulation	Calibration Points	TX Po dBm	Frequency MHZ					
				5730		6075		6420	
				Linearity	MSE	Linearity	MSE	Linearity	MSE
BS1315UW01N	1024 QAM	Pmax	31.5	NA	NA	NA	NA	NA	NA
		Pmed	30.5	-49.7	NA	-49.14	NA	-47.9	NA
		Pmin	29.5	NA	NA	NA	NA	NA	NA
		20 dB down	9.5	NA	NA	NA	NA	NA	NA
BS1315UW037	1024 QAM	Pmax	31.5	NA	NA	NA	NA	NA	NA
		Pmed	30.5	-49.77	NA	-49.14	NA	-48.83	NA
		Pmin	29.5	NA	NA	NA	NA	NA	NA
		20 dB down	9.5	NA	NA	NA	NA	NA	NA

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01						
	ECCN: 5E991 HTS: 4901.99.0050			3DB19060AAAAQZZA			58 / 302

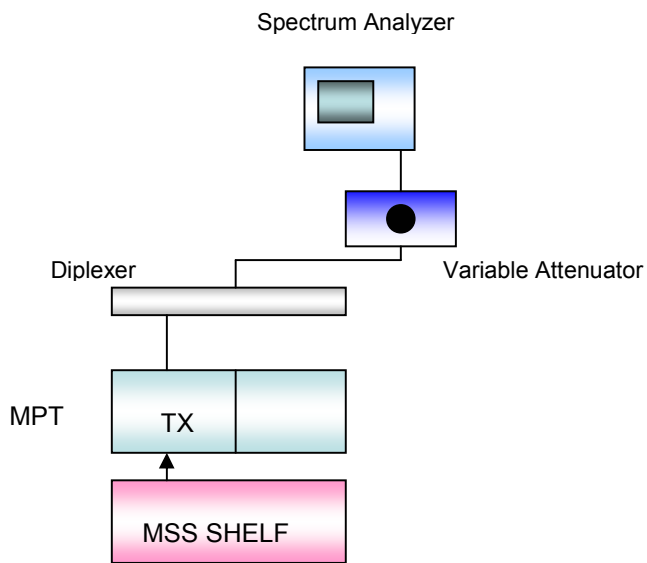


Figure 6 Spectrum Analyzer Setup

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	59 / 302

2.4 TRANSMITTER CARRIER NULL

The goal of this test is to evaluate the carrier suppression of the MPT-HL V2 transmitter.

2.4.1 TOOLS NEEDED TO PERFORM THIS TEST

- Variable attenuators
- U6 GHz Diplexer
- Power meter HP 437B or similar
- Spectrum analyzer Agilent E4407B or similar

2.4.2 SETUP CONFIGURATION

- Connect as shown in figure 6
- Adjust the power into the Spectrum Analyzer to -15 dBm.
- Connect Spectrum Analyzer to the antenna port.

2.4.3 TEST PROCEDURE

Test Case 1d: Transmitter carrier null

Summary: The goal of this test is to evaluate the carrier suppression loop in the MPT-HL V2.

Steps:

The following will be verified on the units under test.

- Set transmitter power at maximum output power for the modulation and frequency scheme
- Adjust the power into the spectrum analyzer to -15 dBm.
- Connect the Spectrum Analyzer to the antenna port.
- Set the spectrum analyzer for 8000 points.
- Set the spectrum analyzer to channel 1 and in max hold.
- Set the spectrum analyzer to sweep in channel 2.
- Drop Transmit power 10 dB.
- Verify that the carrier is not visible.
- Record the spectrums in an electronic format(BMP, CSV file)

Expected Results:

No carrier visible when TX power is drop 10 dB.

Results:

Carrier was visible for the V1-V2 profiles 256 QAM profile.

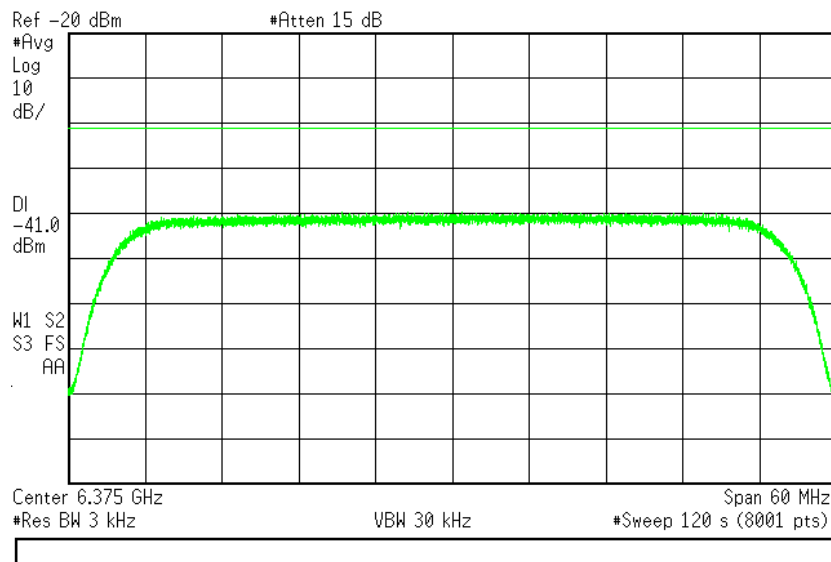
2.4.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	60 / 302

60 MHz Profiles in FCM Mode

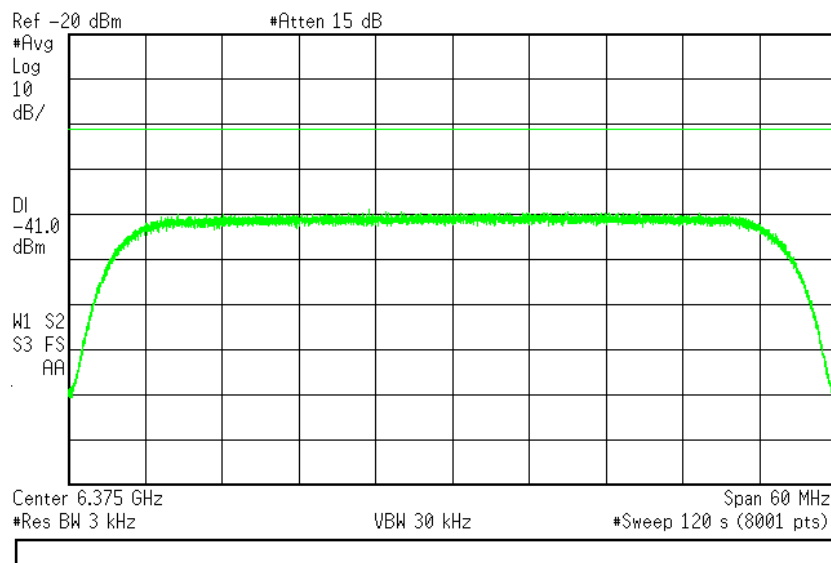
1024 QAM

Agilent 09:40:54 Apr 12, 2013



1024 QAM

Agilent 09:27:03 Apr 12, 2013

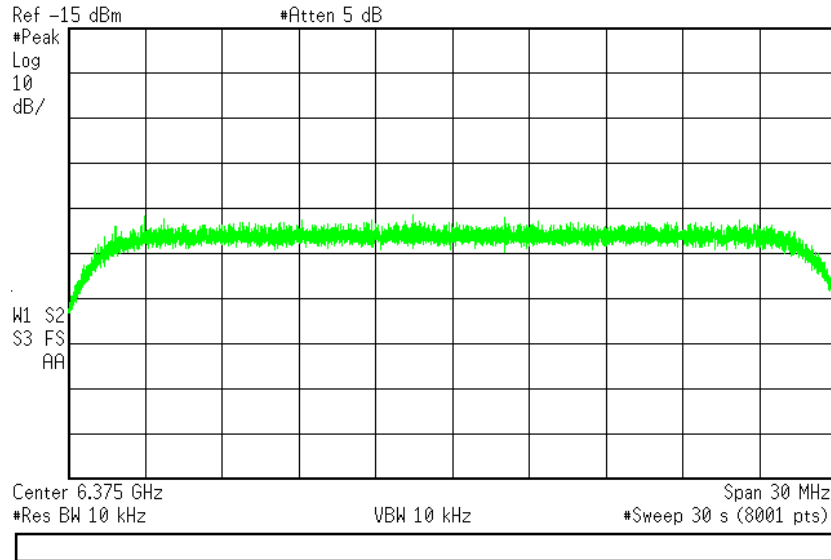


ED	01			
	ECCN: 5E991		3DB19060AAAAQZZA	61 / 302
	HTS: 4901.99.0050			

30 MHz Profiles in FCM Mode

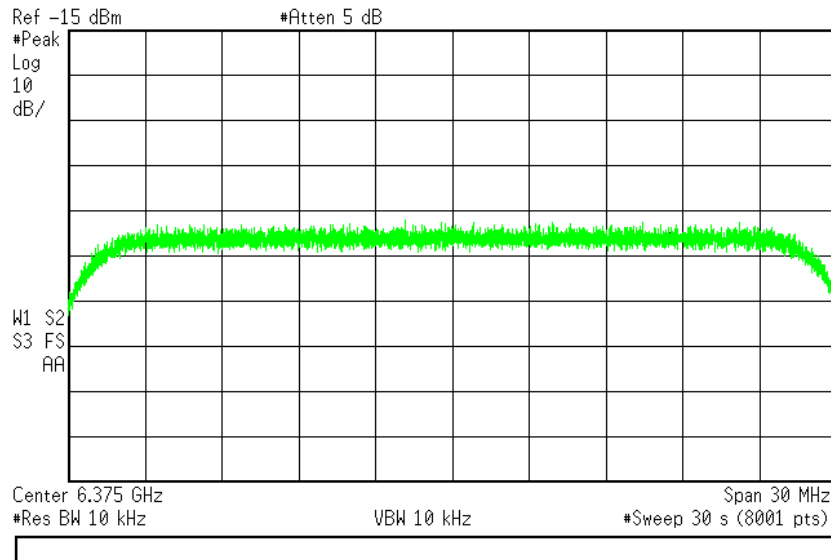
1024 QAM

* Agilent 10:41:48 Feb 7, 2013



512QAM

* Agilent 10:45:06 Feb 7, 2013

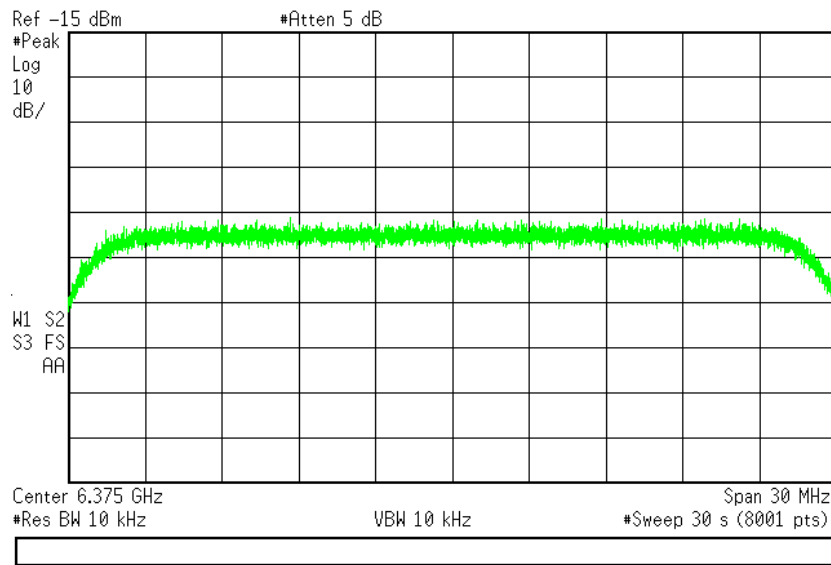


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	62 / 302

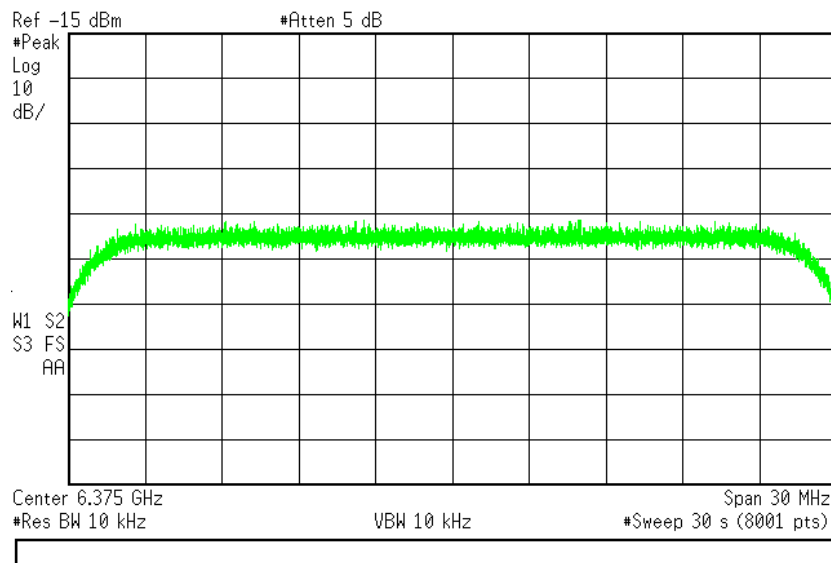
256 QAM

Agilent 10:47:21 Feb 7, 2013



128QAM

Agilent 10:48:43 Feb 7, 2013

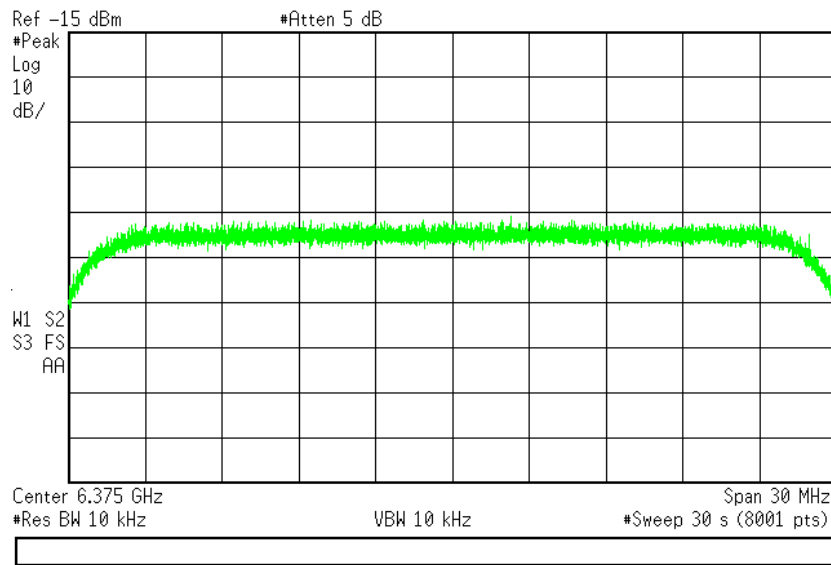


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	63 / 302

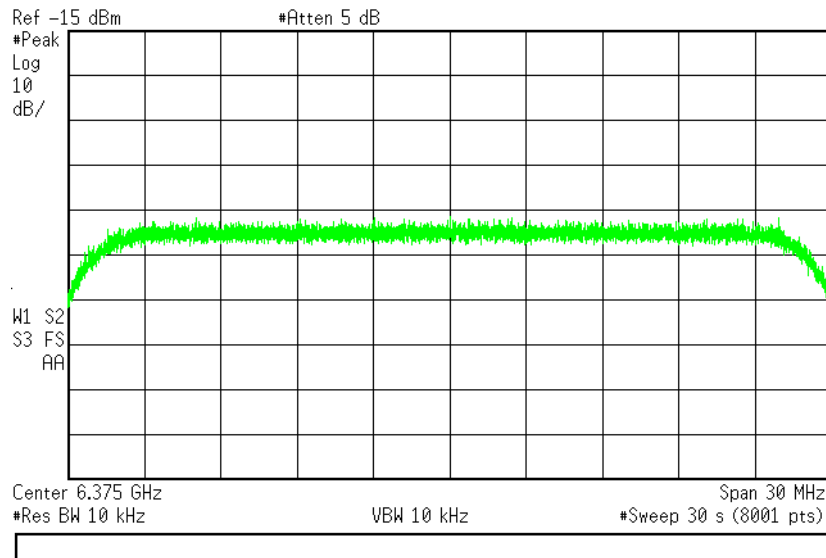
64 QAM

Agilent 10:49:41 Feb 7, 2013



32 QAM

Agilent 10:50:35 Feb 7, 2013

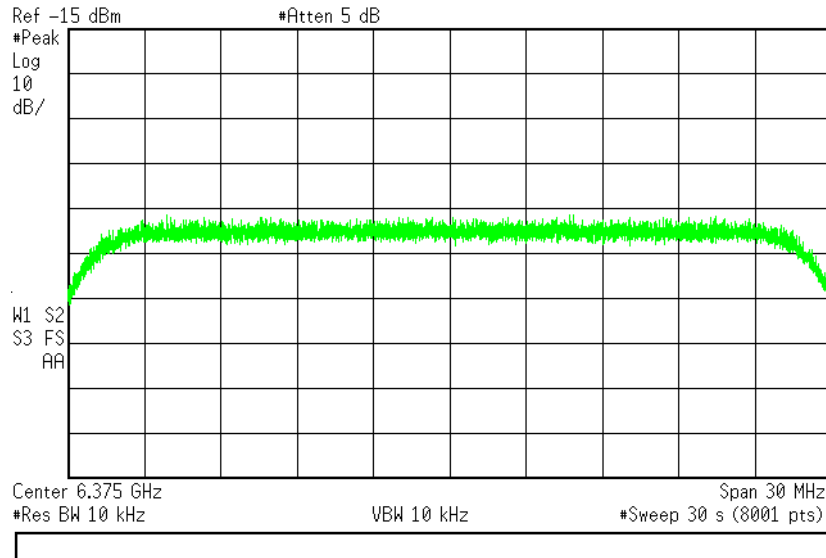


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	64 / 302

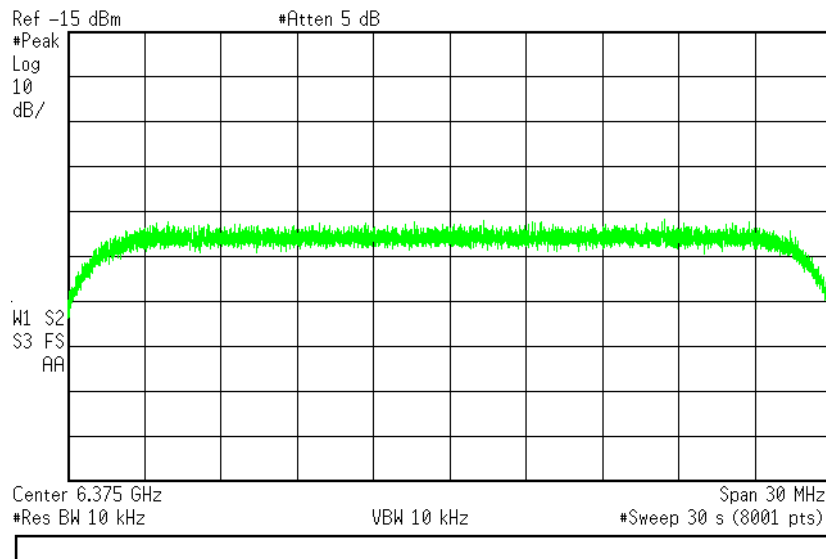
16 QAM

* Agilent 10:54:40 Feb 7, 2013



4 QAM

* Agilent 10:55:46 Feb 7, 2013



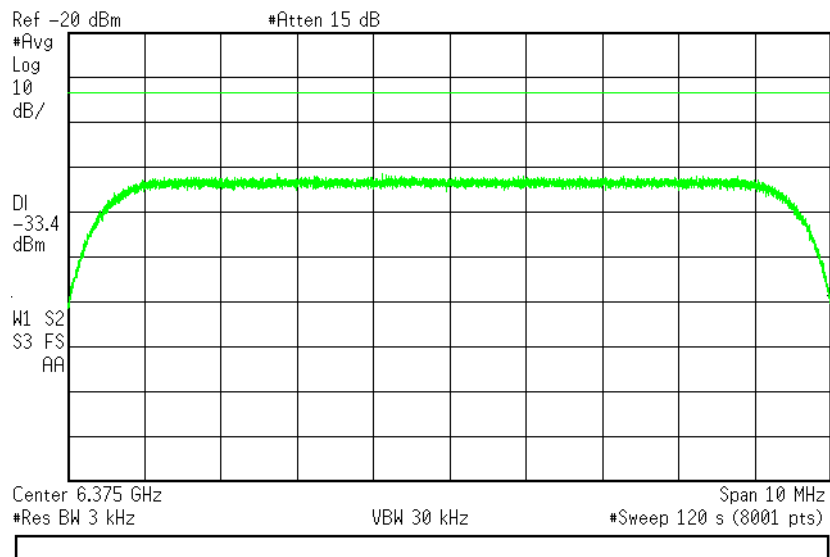
This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	65 / 302

10 MHz Corner Profiles in FCM Mode

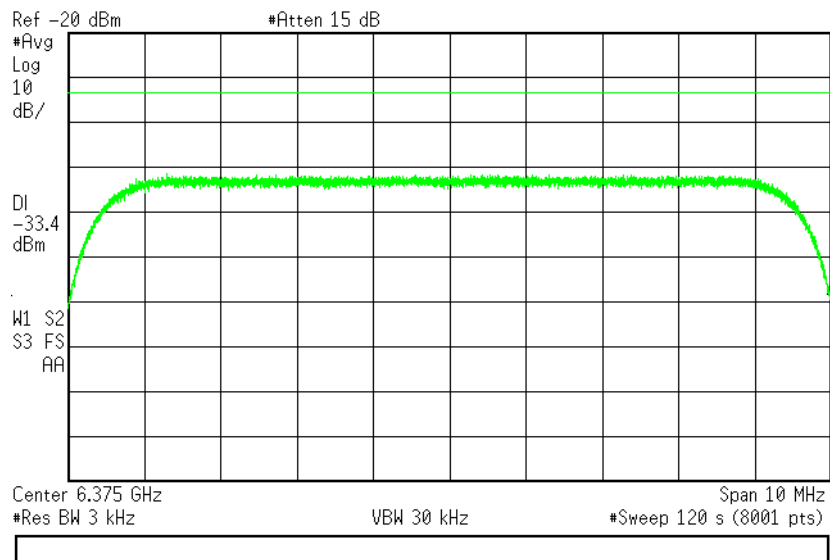
1024 QAM

* Agilent 09:55:24 Apr 12, 2013



4 QAM

* Agilent 10:01:31 Apr 12, 2013



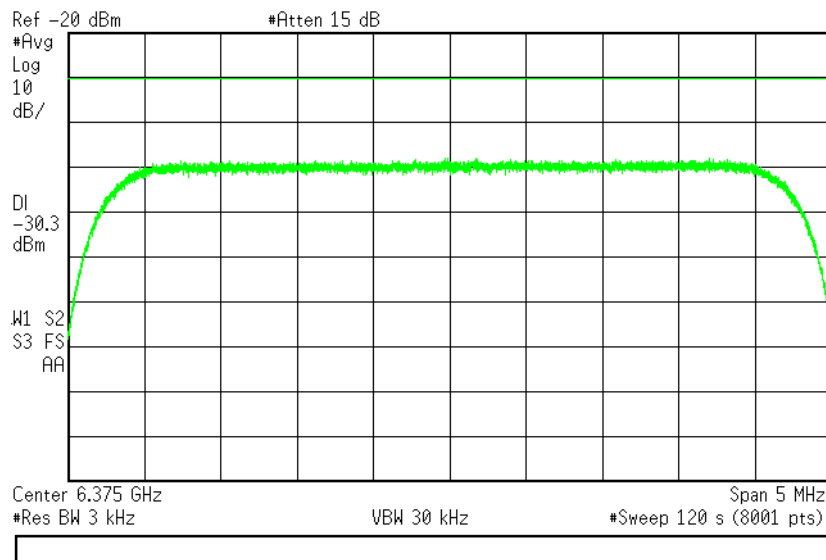
This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	66 / 302

5 MHz Corner Profiles in FCM Mode

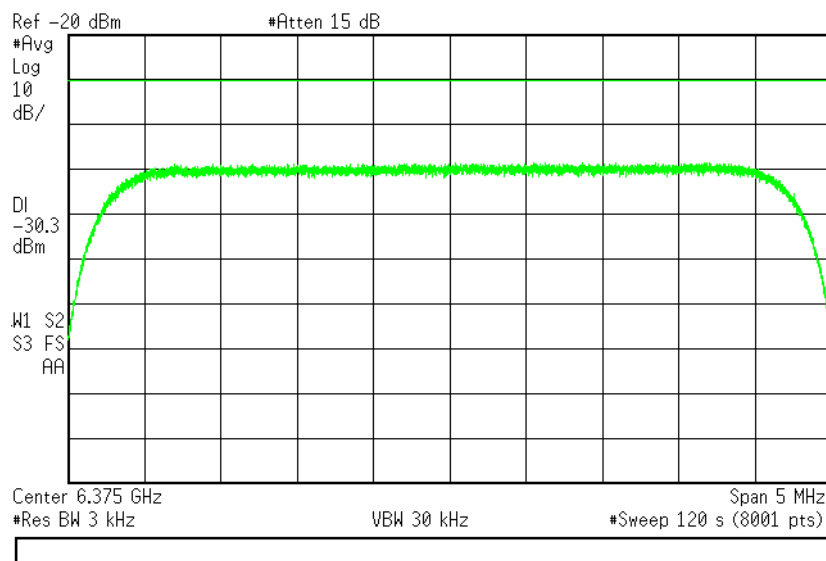
1024 QAM

* Agilent 10:51:38 Apr 12, 2013



1024 QAM

* Agilent 10:44:21 Apr 12, 2013

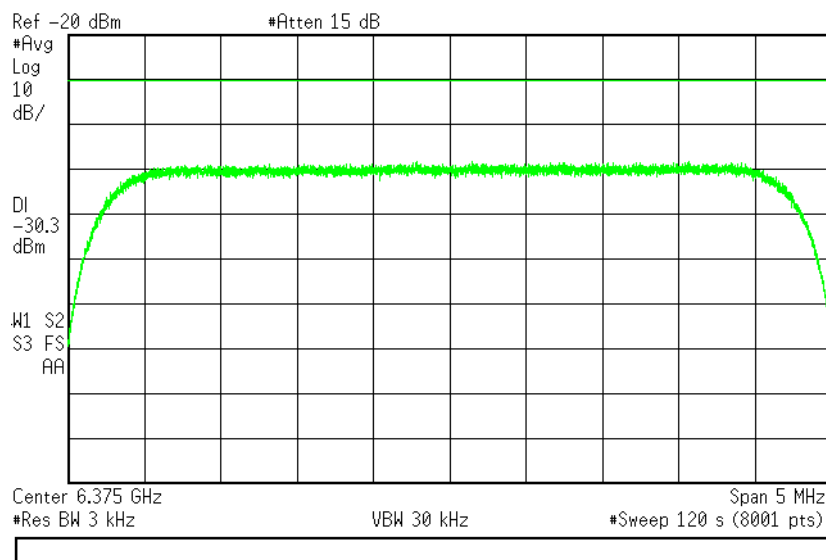


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	67 / 302

4 QAM

* Agilent 10:35:47 Apr 12, 2013



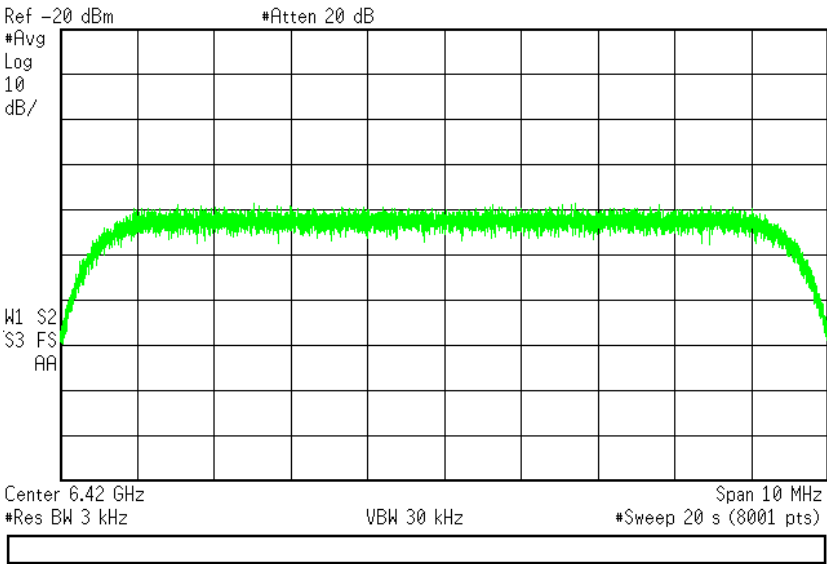
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	68 / 302

Corner Profiles an ACM Mode

10 MHz BW

1024 QAM

Agilent 15:48:40 Jun 17, 2013



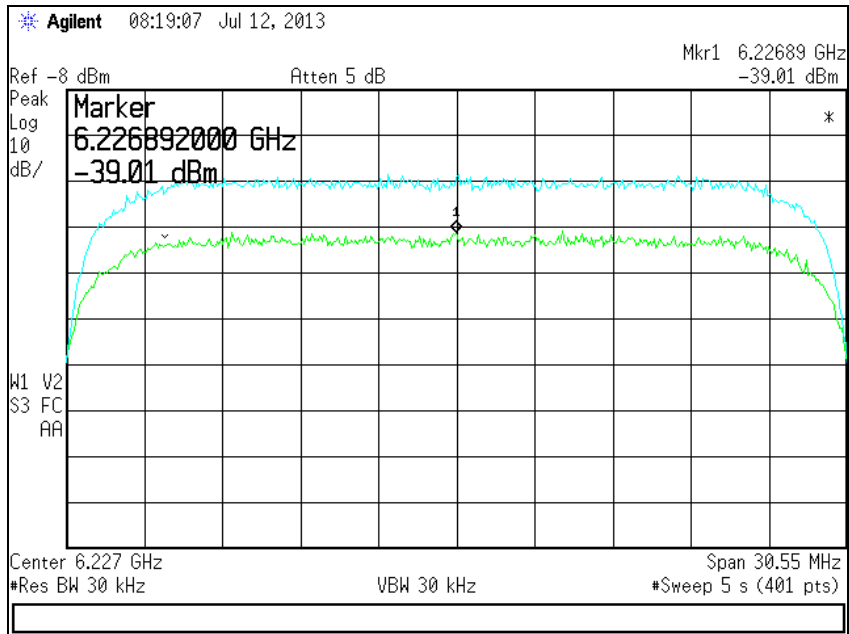
This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	69 / 302

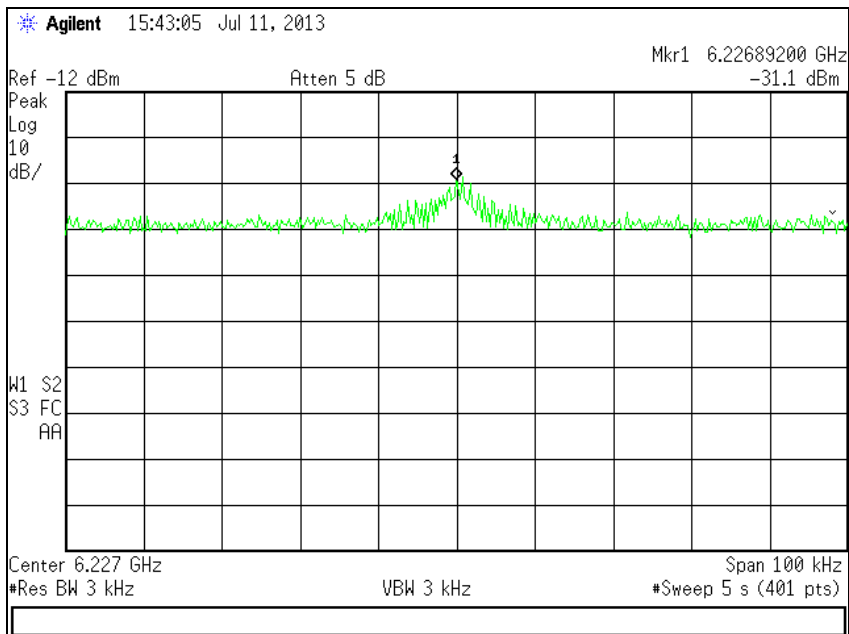
V1-V2 Profiles

30 MHz BW

256 QAM (Carrier Null Leakage)

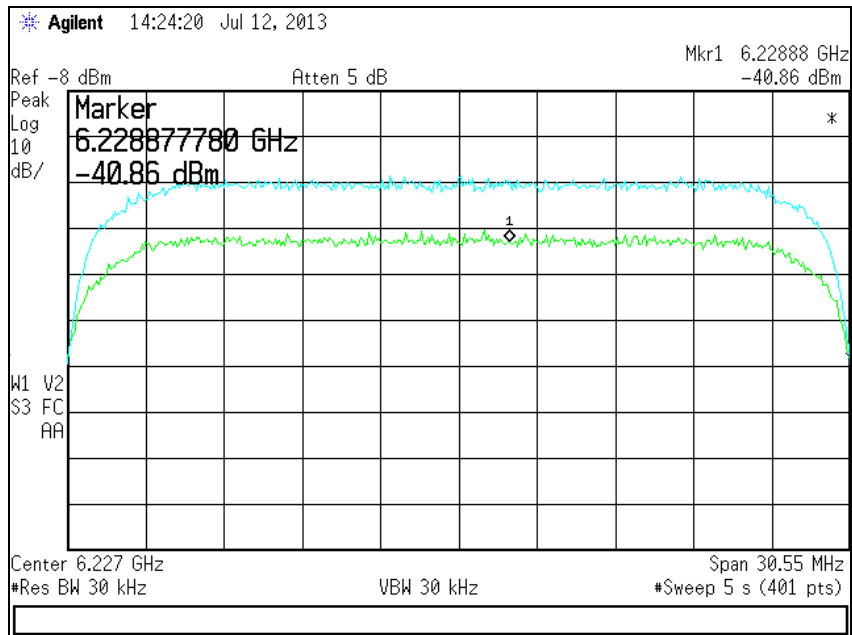


Carrier Null Leakage

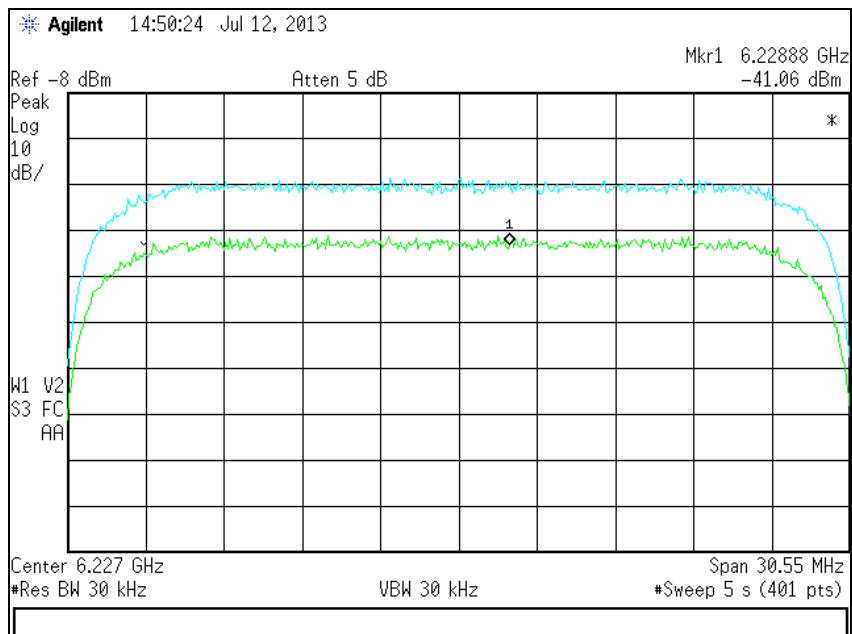


ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	70 / 302
	HTS: 4901.99.0050			

128 QAM



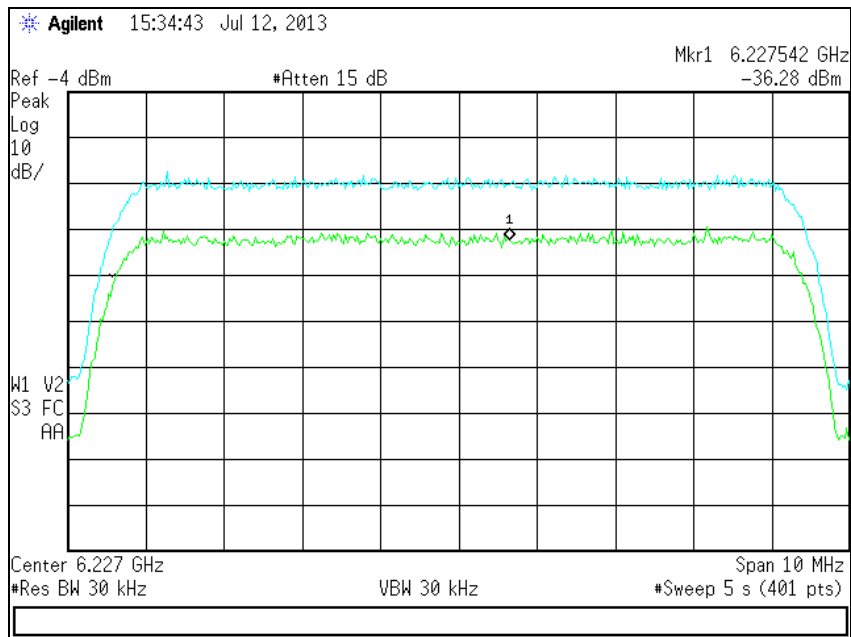
32 QAM



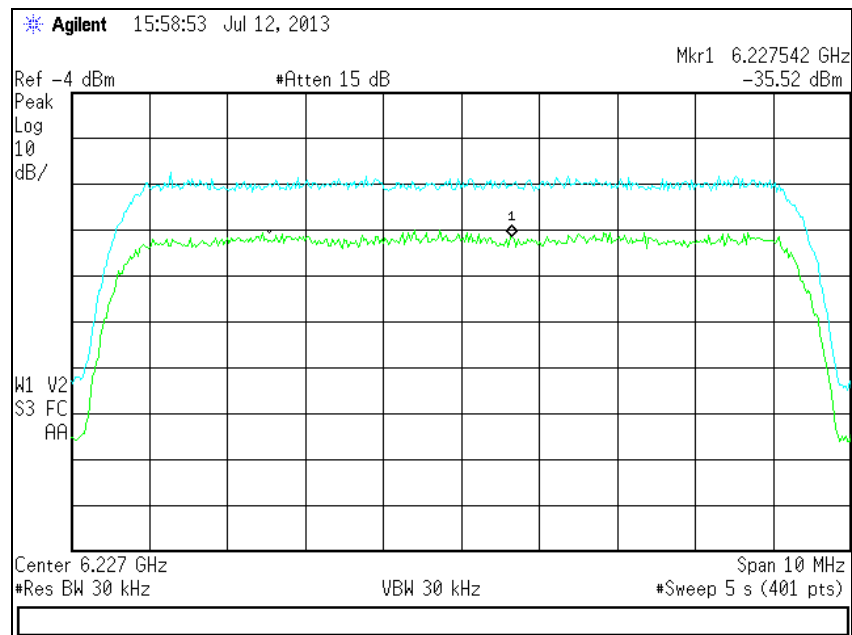
This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	71 / 302

10 MHz BW
128 QAM



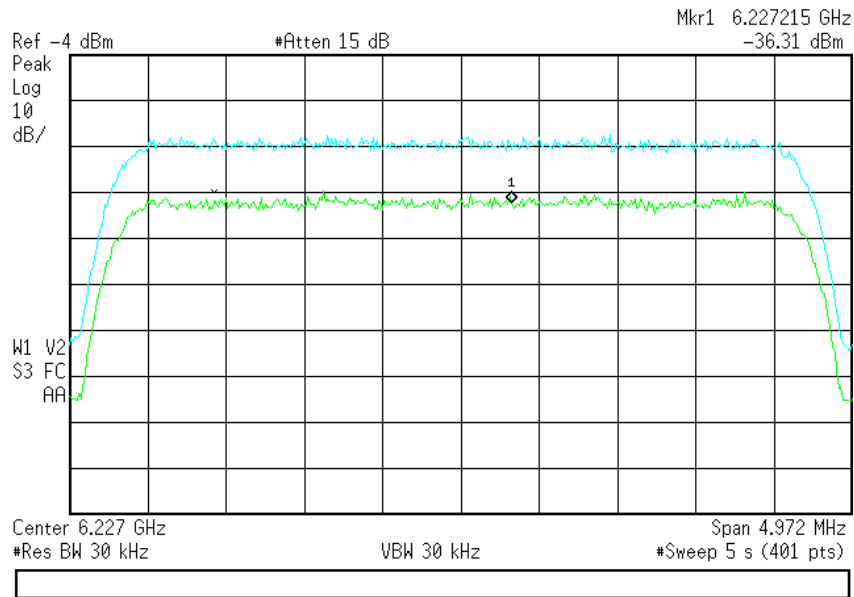
32 QAM



ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZA	72 / 302

5 MHz BW
128 QAM

Agilent 16:20:14 Jul 12, 2013



32 QAM

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	73 / 302

2.5 FCC AND INDUSTRY CANADA (IC) MASK REQUIREMENTS

The goal of this test is to verify that the emission limits requirements are met for Industry Canada (IC) and Federal Communication Commission (FCC) regulations.

2.5.1 TOOLS NEEDED TO PERFORM THIS TEST

- MPT-HL V2
- High power head HP 8481B or similar
- Variable attenuator
- Upper 6GHz Diplexer
- Spectrum analyzer

2.5.2 SETUP CONFIGURATION

- Connect as shown in figure 6
- Adjust the power into the Spectrum Analyzer to -15 dBm
- Connect Spectrum Analyzer to the antenna port

2.5.3 TEST PROCEDURE

Test Case 2a: FCC and Industry Canada Mask requirements

Summary: To verify that the transmitter spectrum meet the Emission Limits requirement established by the Federal Communication Commission (FCC) part 101.111 and the Industry Canada (IC) SRSP 306.4.

Steps:

The following will be verified on the units under test.

- Set Transmitter power at nominal for the modulation and frequency scheme
- Adjust the power into the spectrum analyzer to -15 dBm.
- Connect the Spectrum Analyzer to the Antenna port.
- Set the spectrum analyzer for 8000 points.
- Load the FCC mask into the spectrum Analyzer.
- Measure the Mask.
- Verify that transmitter spectrum meet the FCC/IC specs.

Expected Results:

Transmitter spectrum to meet the Emission Limits requirement for the Industry Canada document SRSP-306.4, and FCC part 101.111 regulations.

The Emission Limits are the same for The FCC and the Industry Canada for Upper 6 GHz.

Results:

See plots below.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	74 / 302

2.5.4 TEST DATA

Regulatory Requirements:

FCC part 101.111:

2.5.4.1.1 § 101.111 EMISSION LIMITATIONS.

(a) The mean power of emissions must be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) When using transmissions other than those employing digital modulation techniques:

(i) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 decibels;

(ii) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 decibels;

(iii) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log_{10}(\text{mean output power in watts})$ decibels, or 80 decibels, whichever is the lesser attenuation.

(2) When using transmissions employing digital modulation techniques (see §101.141(b)) in situations not covered in this section:

(i) For operating frequencies below 15 GHz, in any 4 KHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 250 percent of the authorized bandwidth: As specified by the following equation but in no event less than 50 decibels:

$A = 35 + 0.8(P - 50) + 10 \log_{10} B$. (Attenuation greater than 80 decibels or to an absolute power of less than -13 dBm/1MHz is not required.) where:

A = Attenuation (in decibels) below the mean output power level.

P = Percent removed from the center frequency of the transmitter bandwidth.

B = Authorized bandwidth in MHz.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	75 / 302

Technical Requirements for Fixed Line-of-Sight Radio Systems Operating in the Band 6425-6930 MHz SRSP-306.4

7

5.4 Emission Limits

5.4.1 In any 4 kHz band, the centre frequency of which is removed from the assigned frequency by more than 50% up to and including 250% of the authorized bandwidth, the mean power of the emission shall be attenuated below the mean output power of the transmitter in accordance with the following equation:

$$A = 35 + 0.8 (P \text{ B } 50) + 10 \log_{10} B \text{ (dB)}$$

Where: A = attenuation (dB) below the mean output power level

P = percent removed from the carrier frequency

B = authorized bandwidth (MHz)

Note: 1. In no case shall the attenuation be less than 50 dB.

2. Attenuation greater than 80 dB or to an absolute power of less than -13 dBm/MHz is not necessary.

5.4.2 In any 1 MHz band, the centre frequency of which is removed from the assigned frequency by more than 250% of the authorized bandwidth, the mean power of the emission shall be attenuated by $43 + 10 \log_{10}$ (mean power in watts) dB, or 80 dB, whichever is the lesser attenuation.

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	76 / 302

MPT-HL V2 U6 GHz FCC/IC Emission Limits (30 MHz Profiles in FCM mode)				
BW (MHz)	Mod QAM	Mask Plot	Requirement (mask)	Requirement Met? (yes/no)
30	4	See plot below	mask	yes
	16	See plot below	mask	yes
	32	See plot below	mask	yes
	64	See plot below	mask	yes
	128	See plot below	mask	yes
	256	See plot below	mask	yes
	512	See plot below	mask	yes
	1024	See plot below	mask	yes

MPT-HL V2 U6 GHz FCC/IC Emission Limits (Corner Profiles in FCM mode)				
BW (MHz)	Mod QAM	Mask Plot	Requirement (mask)	Requirement Met? (yes/no)
60	4	N/T	N/T	N/T
	16	N/T	N/T	N/T
	32	N/T	N/T	N/T
	64	N/T	N/T	N/T
	128	N/T	N/T	N/T
	256	See plot below	mask	yes
	512	N/T	N/T	N/T
	1024	See plot below	mask	yes
30	4	See plot below	mask	yes
	16	N/T	N/T	N/T
	32	N/T	N/T	N/T
	64	N/T	N/T	N/T
	128	N/T	N/T	N/T
	256	N/T	N/T	N/T
	512	See plot below	mask	yes
	1024	See plot below	mask	yes
	4	See plot below	mask	yes

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	77 / 302

10	4	See plot below	mask	yes
	16	N/T	N/T	N/T
	32	N/T	N/T	N/T
	64	N/T	N/T	N/T
	128	See plot below	mask	yes
	256	N/T	N/T	N/T
	512	N/T	N/T	N/T
	1024	See plot below	mask	yes
5	4	See plot below	mask	yes
	16	N/T	N/T	N/T
	32	N/T	N/T	N/T
	64	N/T	N/T	N/T
	128	See plot below	mask	yes
	256	N/T	N/T	N/T
	512	N/T	N/T	N/T
	1024	See plot below	mask	yes

MPT-HL V2 U6 GHz FCC/IC Emission Limits (V1-V2 Profiles)				
BW (MHz)	Mod QAM	Mask Plot	Requirement (mask)	Requirement Met? (yes/no)
30	4	N/T	N/T	N/T
	16	N/T	N/T	N/T
	32	See plot below	mask	yes
	64	N/T	N/T	N/T
	128	See plot below	mask	yes
	256	See plot below	mask	yes
10	4	N/T	N/T	N/T
	16	N/T	N/T	N/T
	32	See plot below	mask	yes
	64	N/T	N/T	N/T
	128	See plot below	mask	yes
	256	N/T	N/T	N/T
	4	N/T	N/T	N/T

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	78 / 302

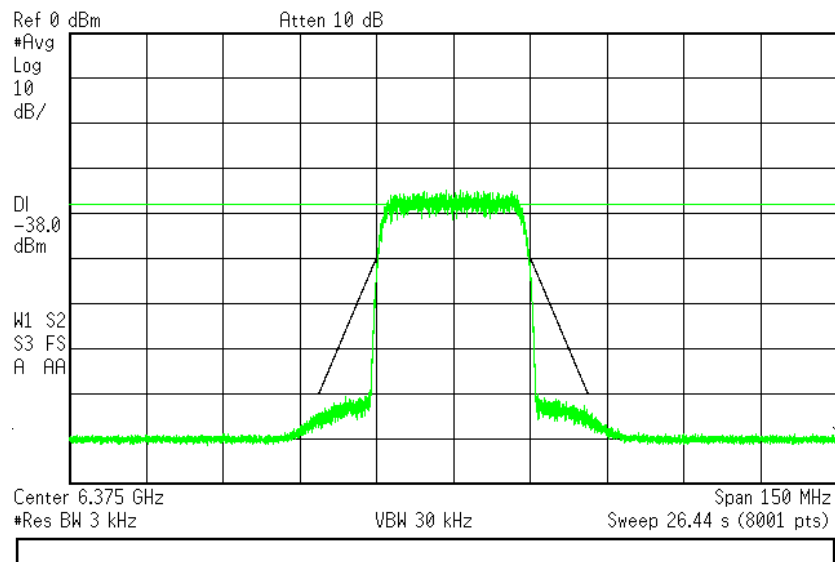
5	4	N/T	N/T	N/T
	16	N/T	N/T	N/T
	32	See plot below	mask	yes
	64	N/T	N/T	N/T
	128	See plot below	mask	yes
	256	N/T	N/T	N/T

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	79 / 302

30 MHz Profiles in FCM Mode

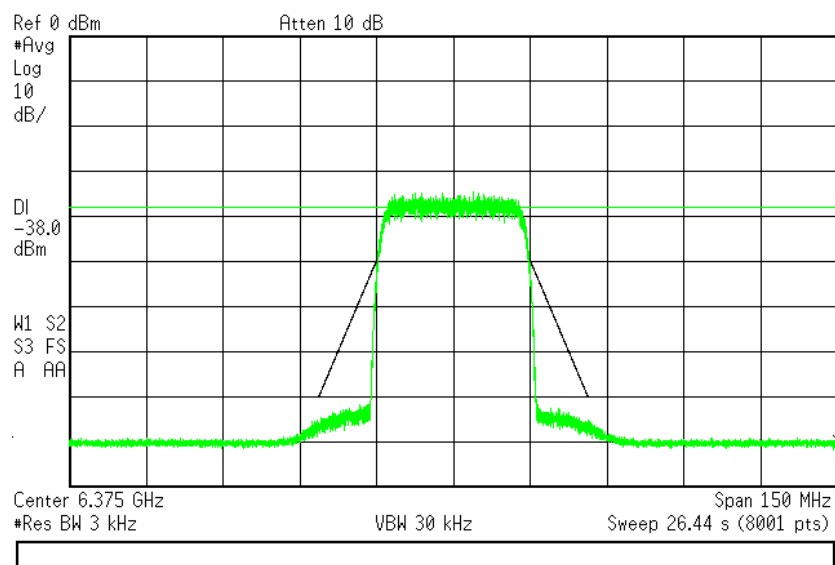
1024 QAM Po +31.5 dBm

Agilent 14:31:05 Mar 20, 2013



512 QAM Po +32.5 dBm

Agilent 14:36:46 Mar 20, 2013

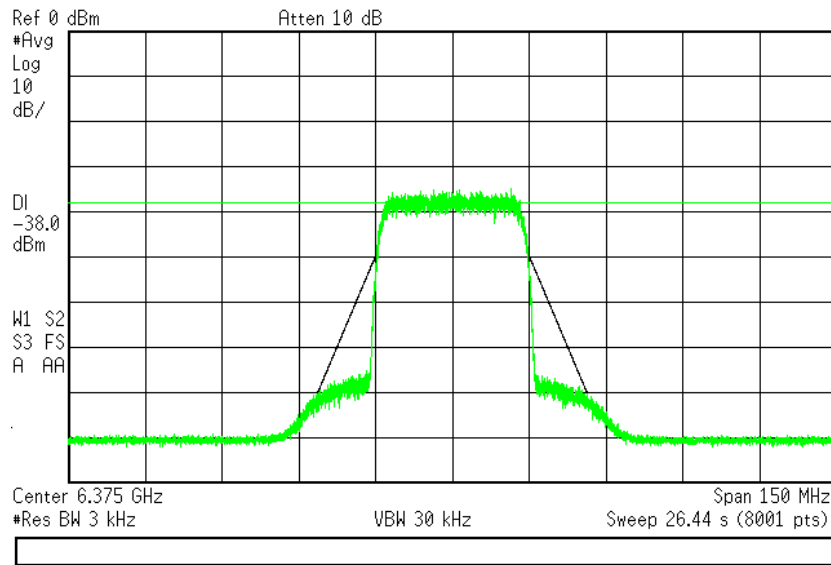


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	80 / 302

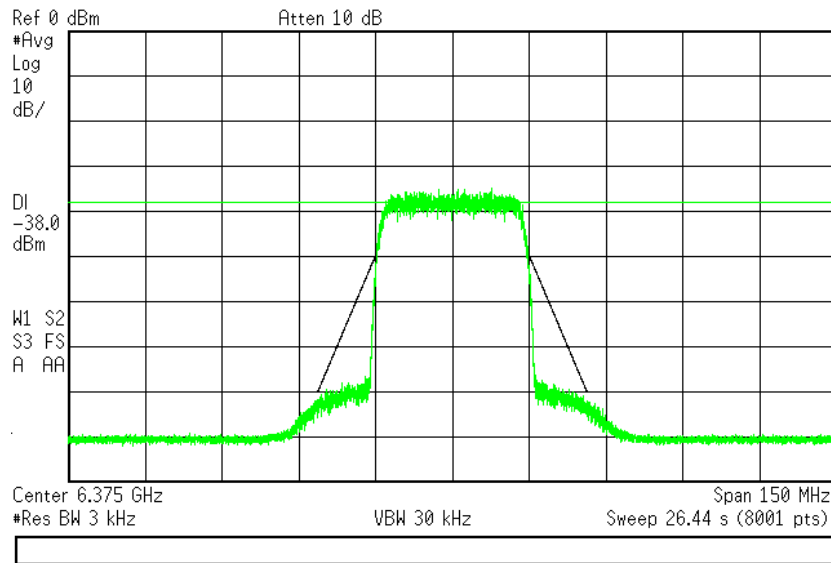
256 QAM Po +32.5 dBm

Agilent 14:42:21 Mar 20, 2013



128 QAM Po +32.5 dBm

Agilent 14:43:40 Mar 20, 2013

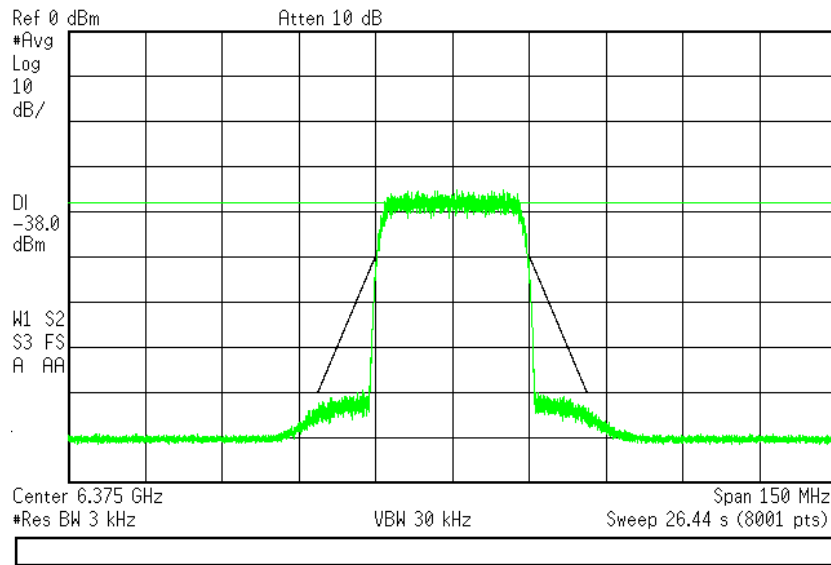


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	81 / 302

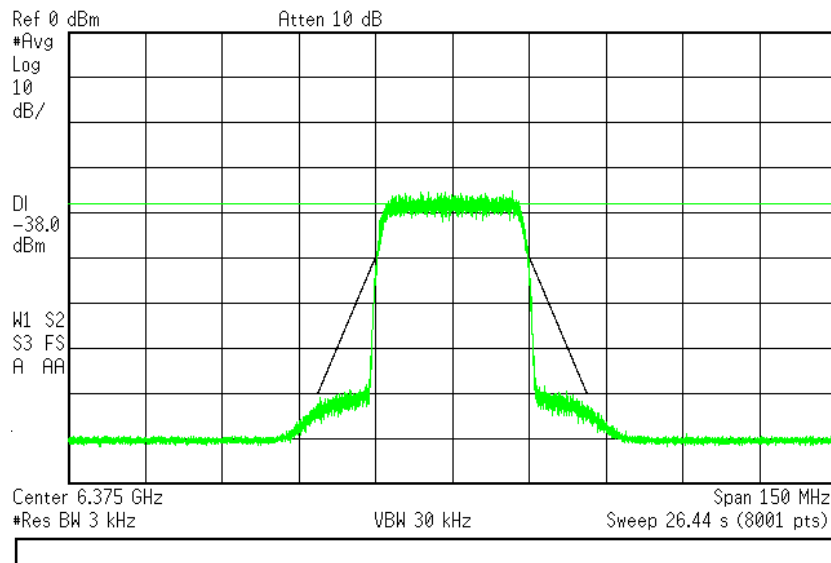
64 QAM Po +32.5 dBm

Agilent 14:49:17 Mar 20, 2013



32 QAM Po +32.5 dBm

Agilent 14:50:32 Mar 20, 2013

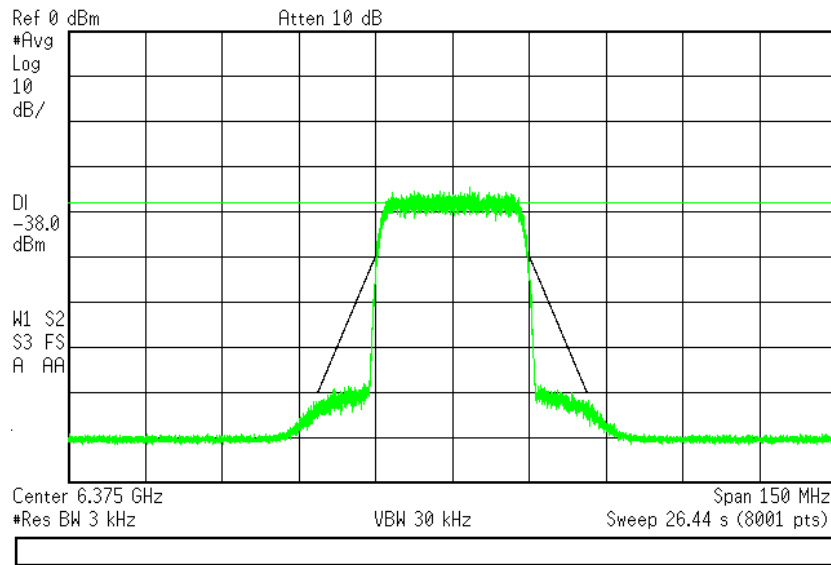


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	82 / 302

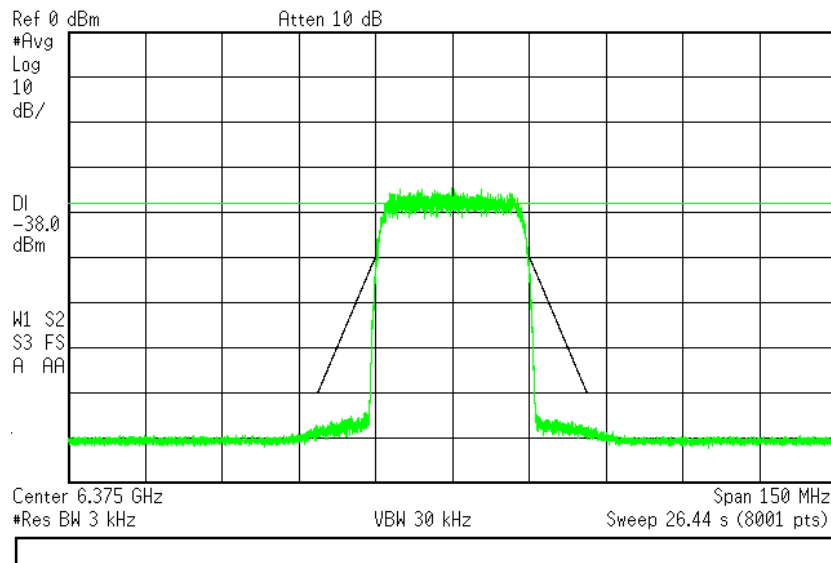
16 QAM Po +32.5 dBm

Agilent 14:55:43 Mar 20, 2013



4 QAM Po +32.5 dBm

Agilent 15:00:33 Mar 20, 2013



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

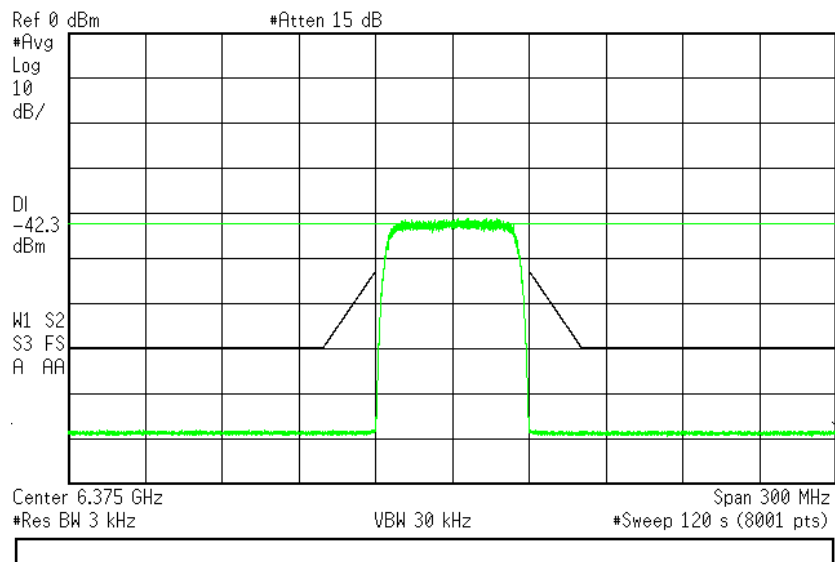
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	83 / 302

Corner Profiles in FCM mode

60 MHz BW

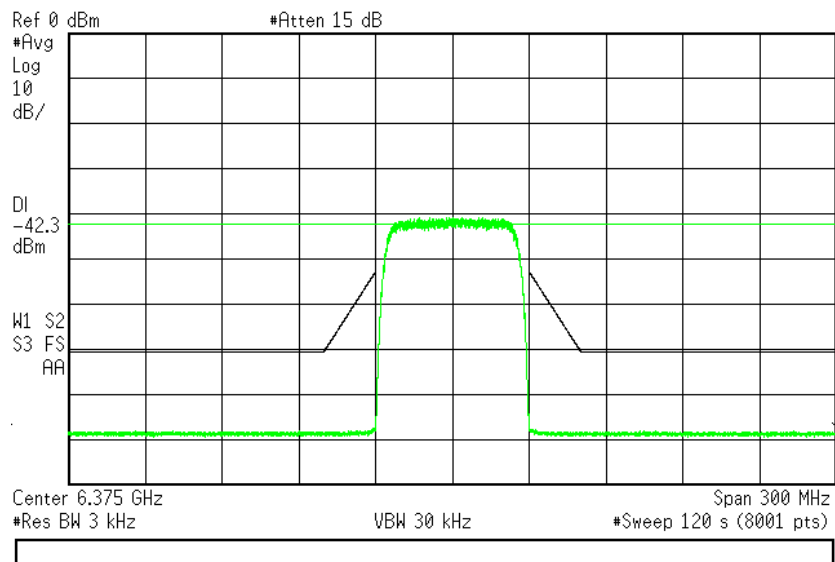
1024 QAM Po +31.5 dBm

Agilent 14:12:05 Apr 18, 2013



256 QAM Po +31.5 dBm

Agilent 14:05:02 Apr 18, 2013



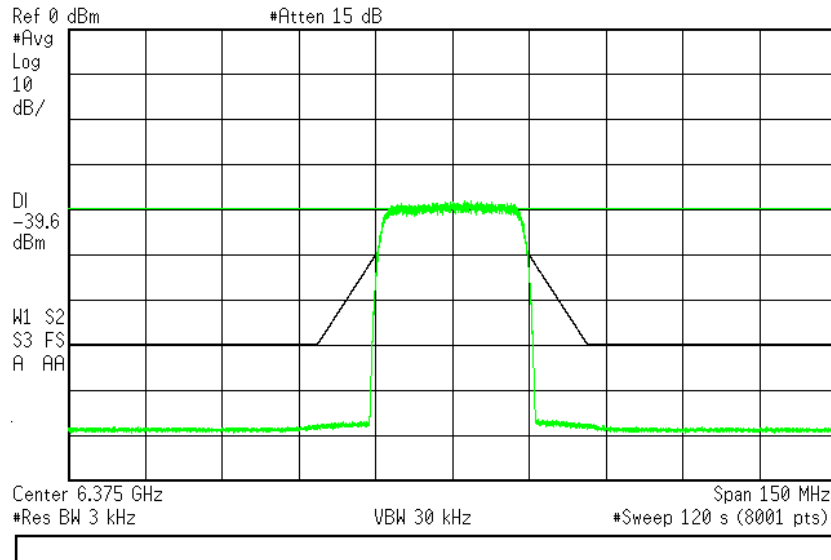
This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	84 / 302

30 MHz BW

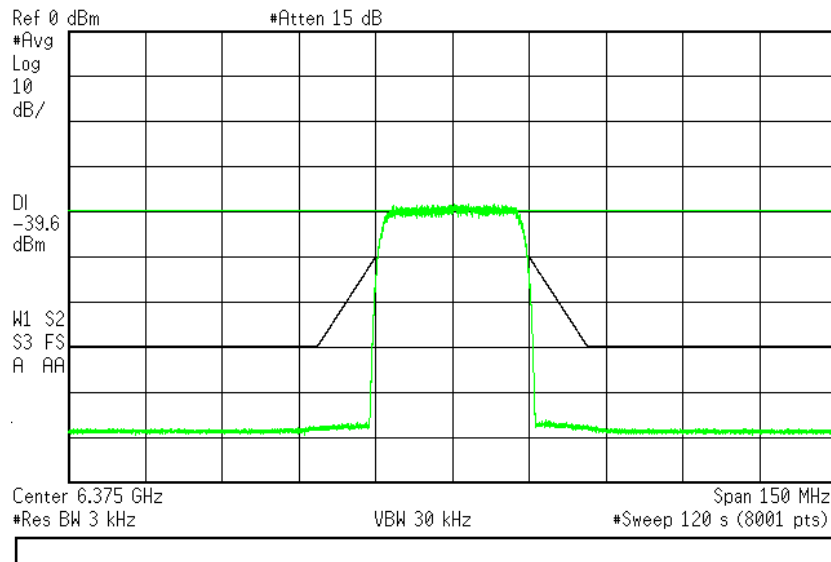
1024 QAM Po +31.5 dBm

Agilent 13:57:14 Apr 18, 2013



512 QAM Po +32.5 dBm

Agilent 13:51:40 Apr 18, 2013

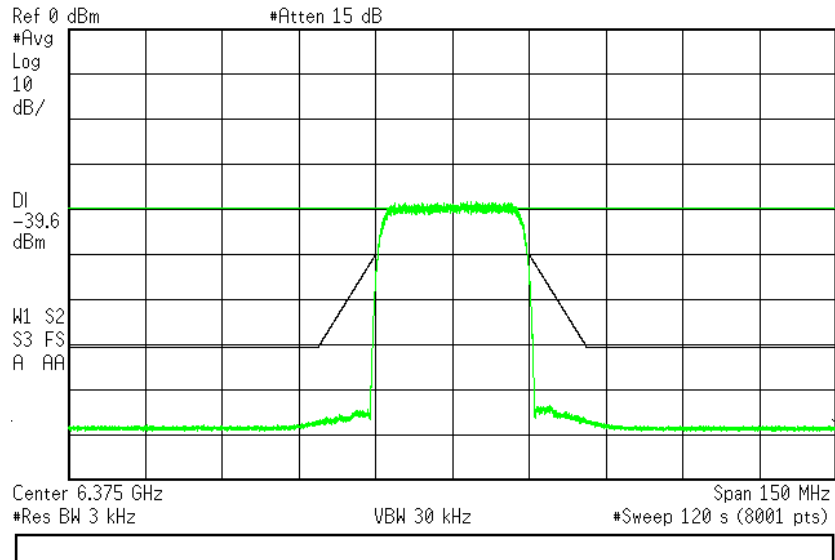


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	85 / 302

4 QAM Po +32.5 dBm

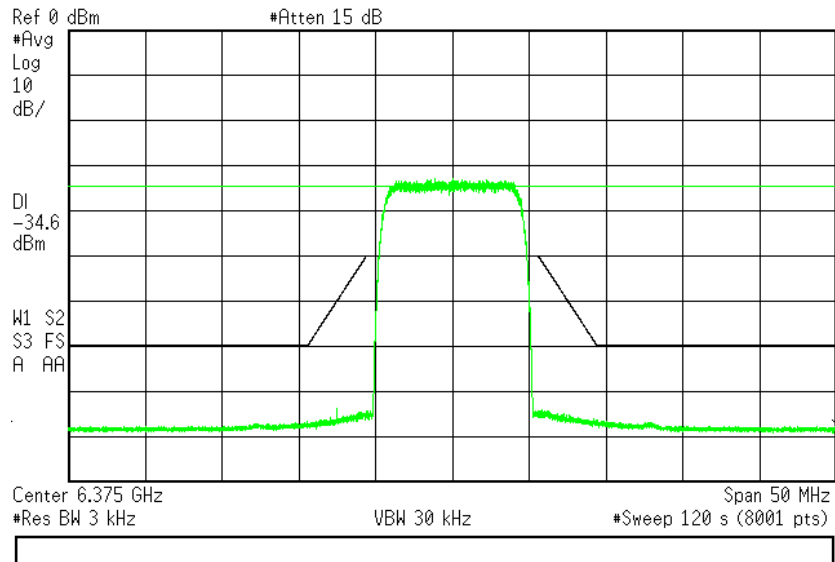
Agilent 13:47:08 Apr 18, 2013



10 MHz BW

1024 QAM Po +31.5 dBm

Agilent 13:39:30 Apr 18, 2013

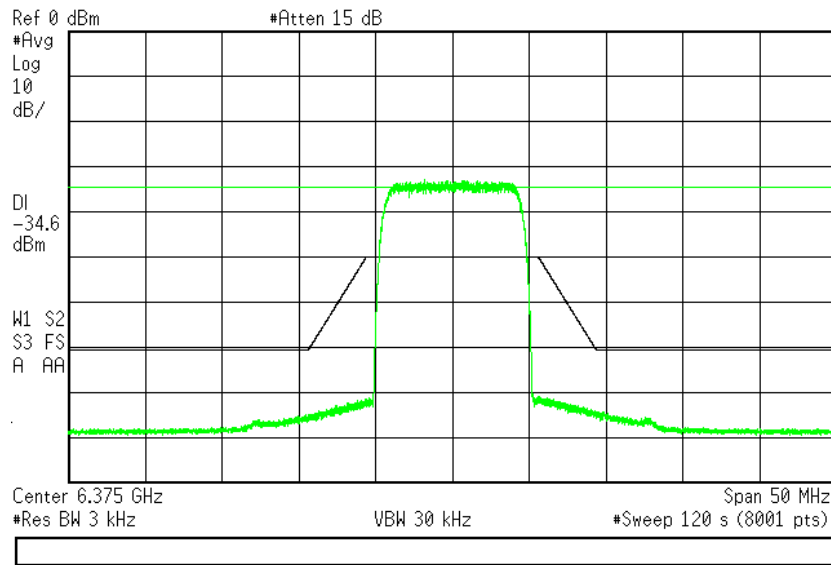


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	86 / 302

128 QAM Po +32.5 dBm

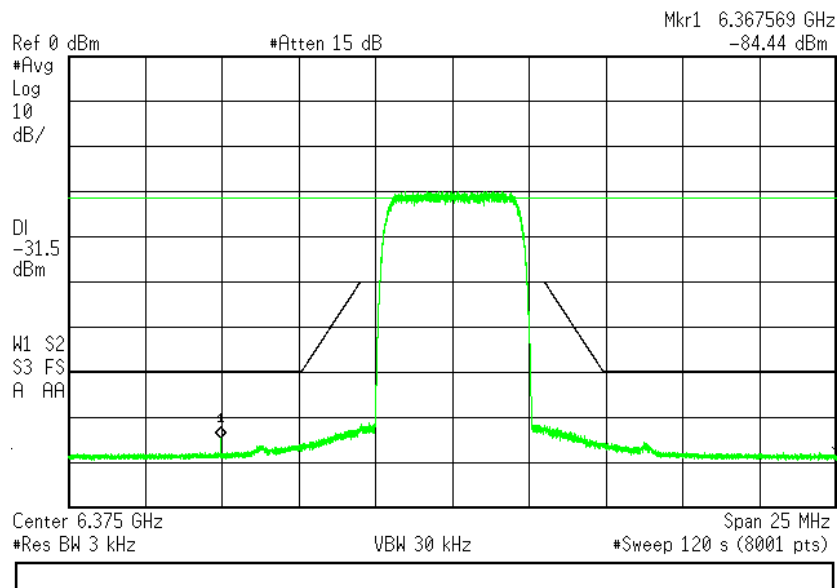
Agilent 13:25:03 Apr 18, 2013



5 MHz BW

1024 QAM Po +31.5 dBm

Agilent 13:12:03 Apr 18, 2013

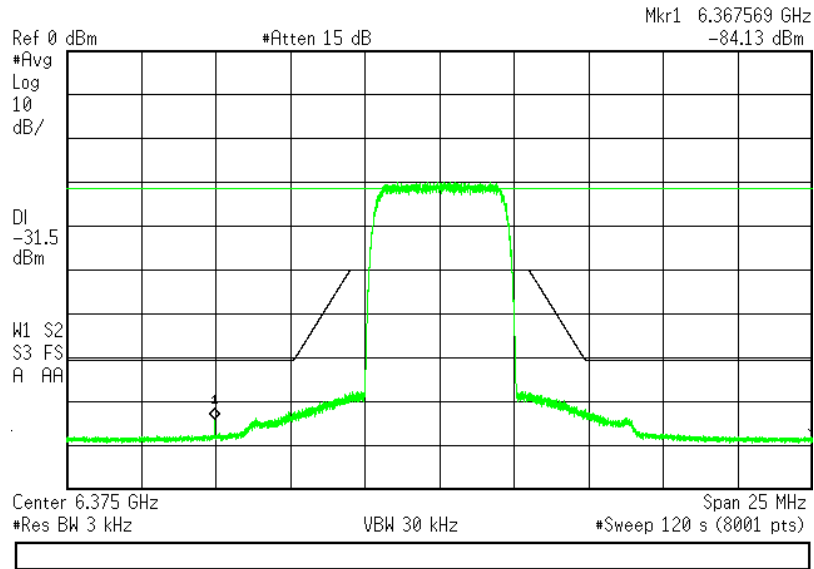


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	87 / 302

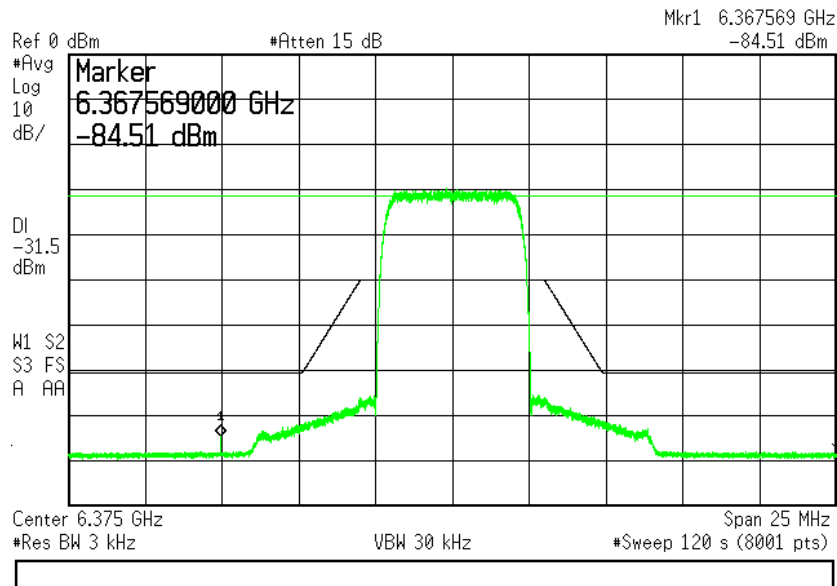
128 QAM Po +32.5 dBm

Agilent 13:03:13 Apr 18, 2013



4 QAM Po +32.5 dBm

Agilent 12:54:38 Apr 18, 2013



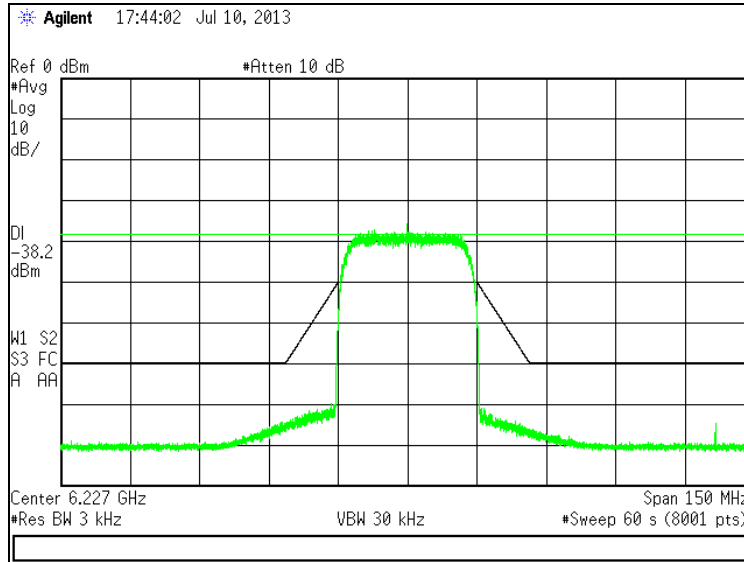
This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	88 / 302

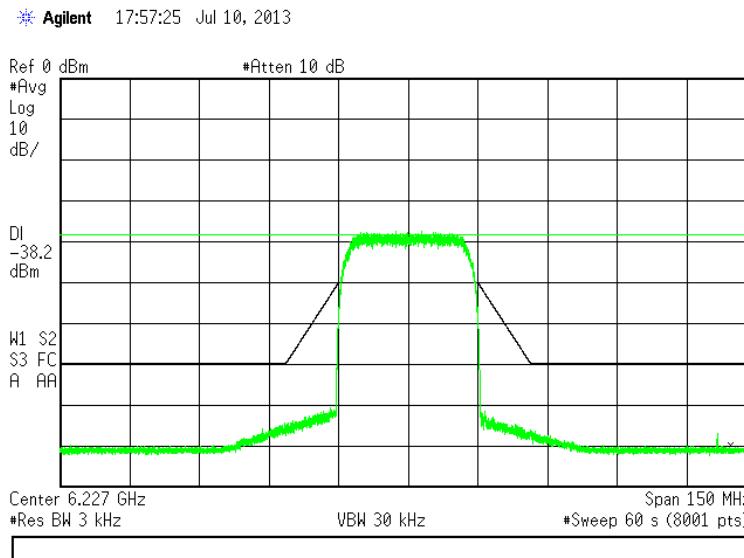
V1-V2 Profiles

30 MHz

256 QAM Po +32.5 dBm



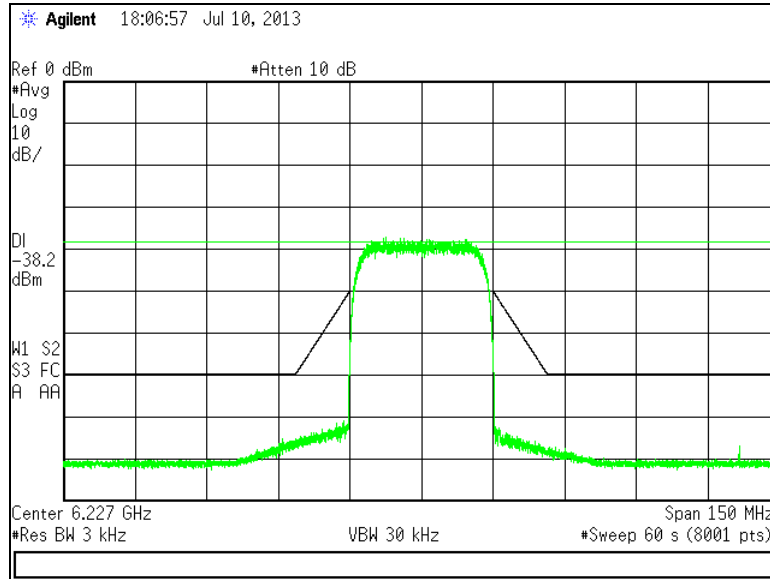
128 QAM Po +32.5 dBm



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

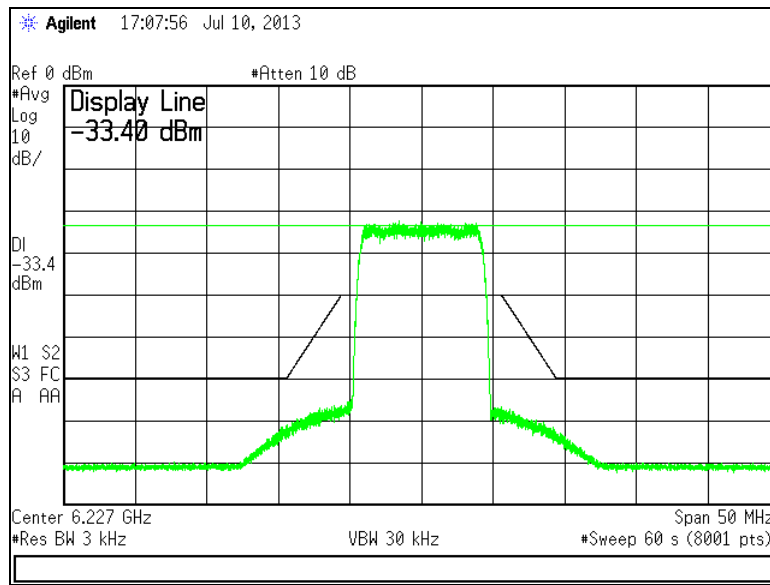
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	89 / 302

32QAM Po +32.5 dBm



10 MHz

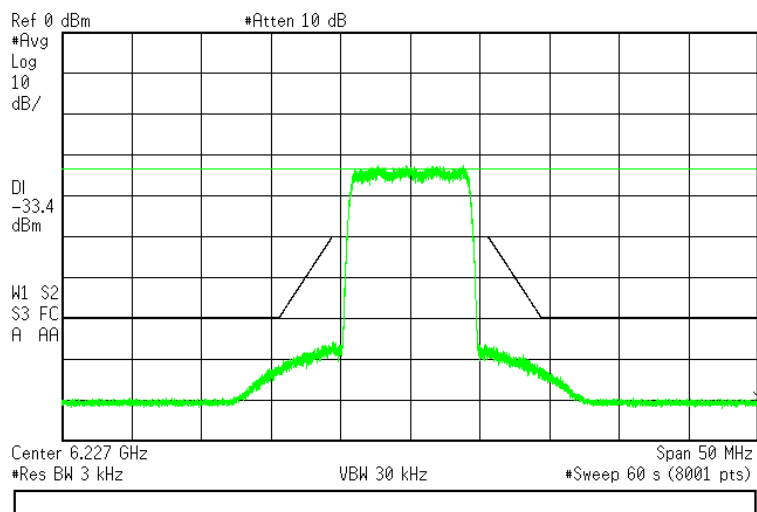
128 QAM Po +32.5 dBm



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	90 / 302

32 QAM Po +32.5 dBm

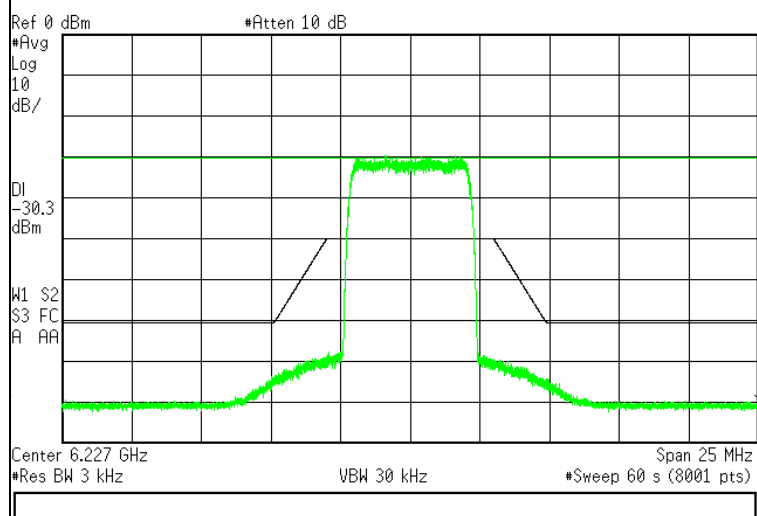
* Agilent 17:25:38 Jul 10, 2013



5 MHz

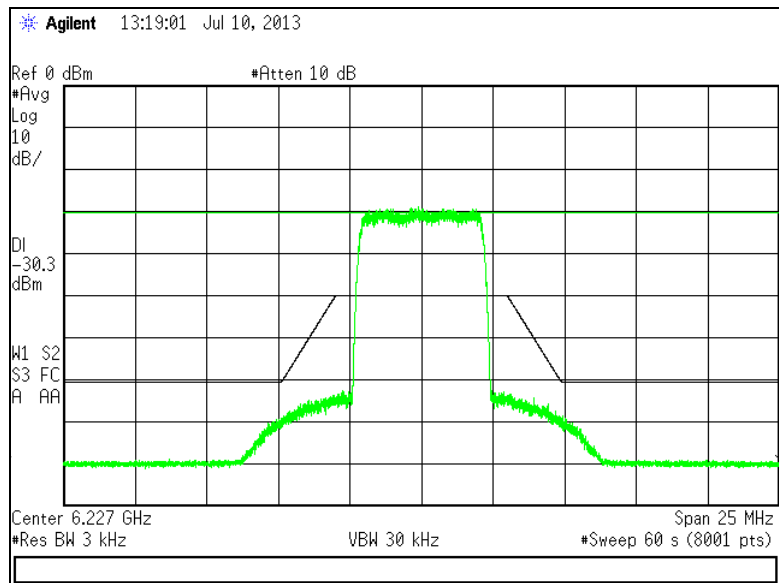
128 QAM Po +32.5 dBm

* Agilent 15:45:01 Jul 9, 2013



ED	01			
	ECCN: 5E991		3DB19060AAAAQZZA	91 / 302
	HTS: 4901.99.0050			

32 QAM Po +32.5 dBm



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	92 / 302

2.6 UNLICENSED OUT BAND EMISSIONS

The goal of this test is to verify that the emission limits requirements are met for Industry Canada (IC) part RSS-210 federal Communication Commission (FCC) regulations part 15.247.

2.6.1 TOOLS NEEDED TO PERFORM THIS TEST

- MPT-HL V2
- High power head HP 8481B or similar
- Variable attenuator
- Lower 6GHz Diplexer
- Spectrum analyzer

2.6.2 SETUP CONFIGURATION

- Connect as shown in figure 6
- Adjust the power into the Spectrum Analyzer to -15 dBm.
- Connect Spectrum Analyzer to the antenna port

2.6.3 TEST PROCEDURE

Test Case 2b: FCC part 15.247(d) and Industry Canada RSS-210A8.5

Summary: To verify that the transmitter spectrum meet the Emission Limits requirement established by the Federal Communication Commission (FCC) part 101.111 and the Industry Canada (IC) SRSP 306.4.

Steps:

The following will be verified on the units under test.

- Set Transmitter power at nominal for the modulation and frequency scheme
- Adjust the power into the spectrum analyzer to -15 dBm.
- Connect the Spectrum Analyzer to the Antenna port.
- Set the spectrum analyzer for 8000 points.
- Load the FCC mask into the spectrum Analyzer.
- Measure the Mask at 8000 points.
- Verify that transmitter spectrum meet the FCC/IC specs.

Expected Results:

Transmitter spectrum to meet the Emission Limits requirement for the Industry Canada document RSS-210 A8.5 and FCC part 15.247 regulations.

Results:

The L6 GHz MPT-HL V2 failed this spec.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	93 / 302

2.6.4 TEST DATA

FCC: Part 15.247 (b)(3) Transmitter Power Limitations:

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

Industry Canada Requirements: RSS-210 A8.4(4):

For systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4 (5), the e.i.r.p. shall not exceed 4 W.

FCC and Industry Canada Emissions Requirements (Antenna Conducted).

The goal of this test is to verify that the Unlicensed 6GHz MPT-HC meets FCC Part 15.247 and Industry Canada RSS-210 requirements. In general, these requirements describe the Emissions Bandwidth specification. These specifications state that the spectrum of the 5 MHz, 10 MHz, & 30 MHz channels shall be within the Unlicensed Band 5.725 GHz to 5.850 GHz, with emissions not outside the rejection points of -20 dB down (from the top of the spectrum) outside the frequencies of 5.725 GHz and 5.850 GHz.

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	94 / 302

Corner Profiles in FCM mode

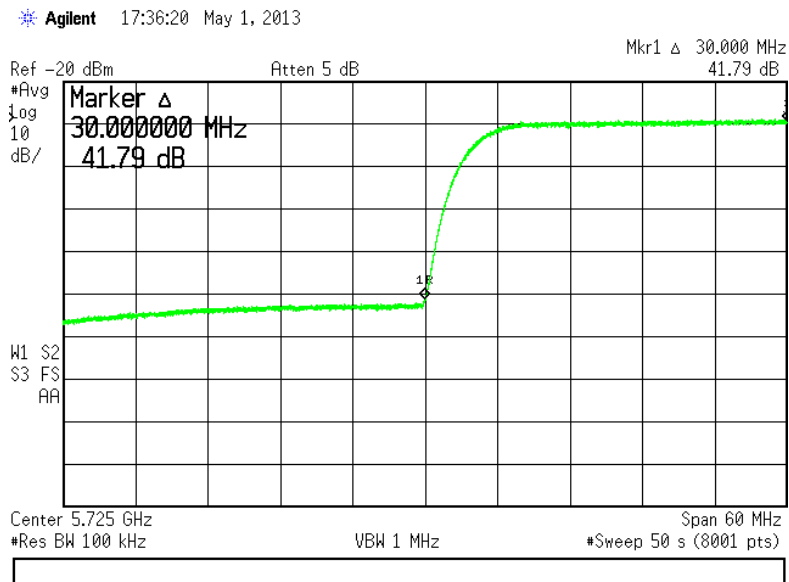
Summary Table

Unlicensed Band			
Spectrum Edge			
Modulation Profile	Low end (5725MHz)	High end (5850MHz)	
5MHz/4QAM	-59.01	-56.72	dB
5MHz/1024QAM	-59.84	-58.43	dB
10MHz/128QAM	-26.18	-25.47	dB
30MHz/4QAM	-14.81	-15.25	dB
30MHz/1024QAM	-15.1	-15.13	dB
60MHz/256QAM	-41.79	-42.24	dB

60 MHz

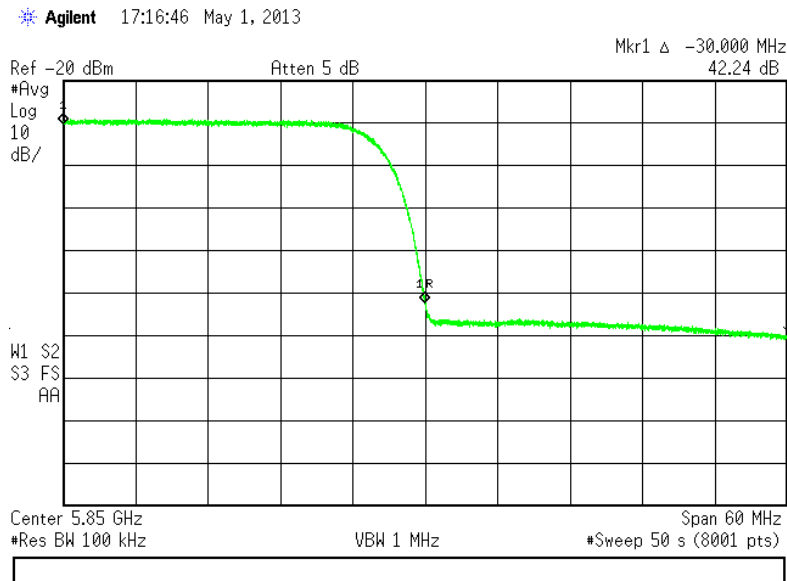
256 QAM

Lower Limit



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	95 / 302

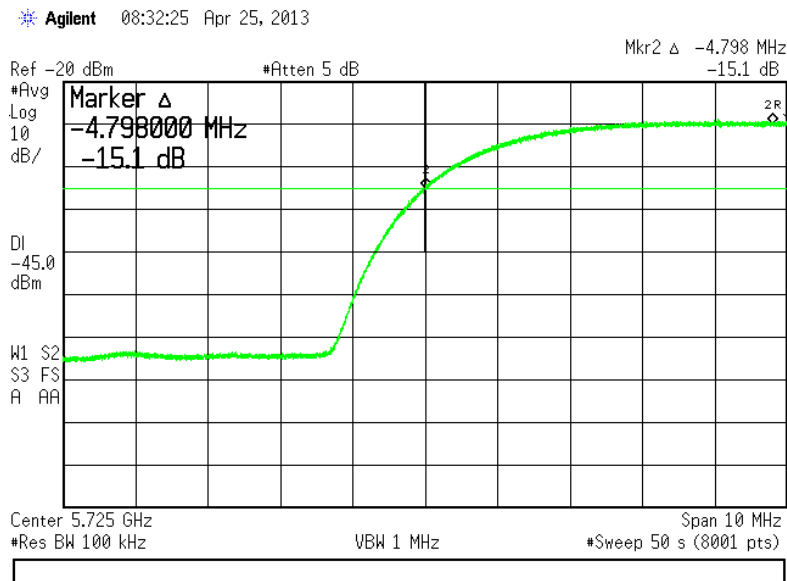
Upper Limit



30 MHz

1024 QAM

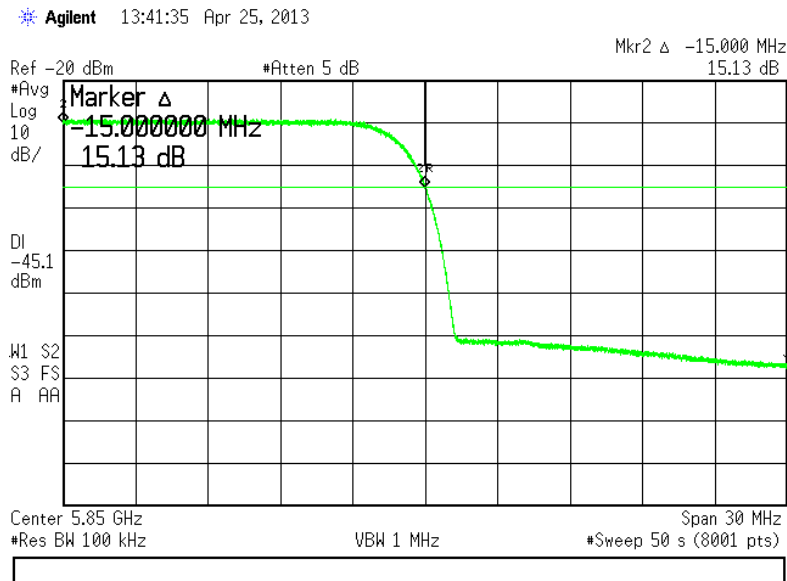
Lower Limit



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZA	96 / 302
	HTS: 4901.99.0050			

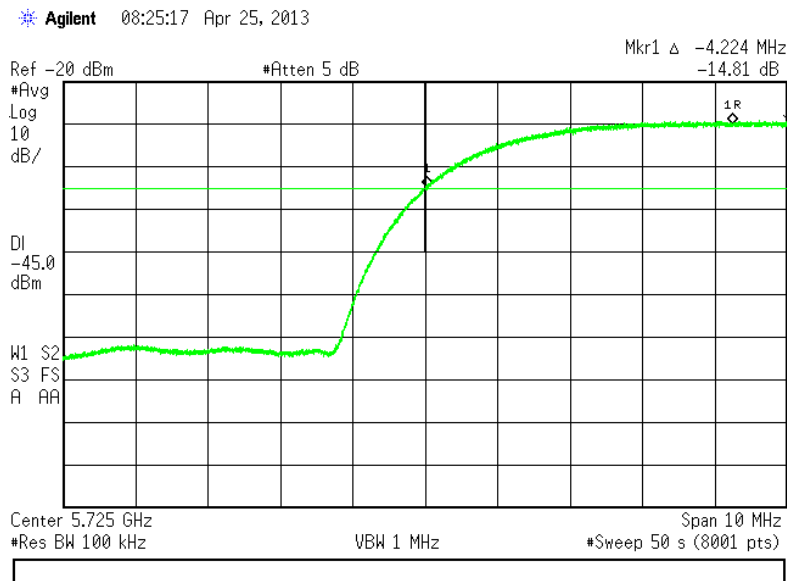
Upper Limit



30 QAM

4 QAM

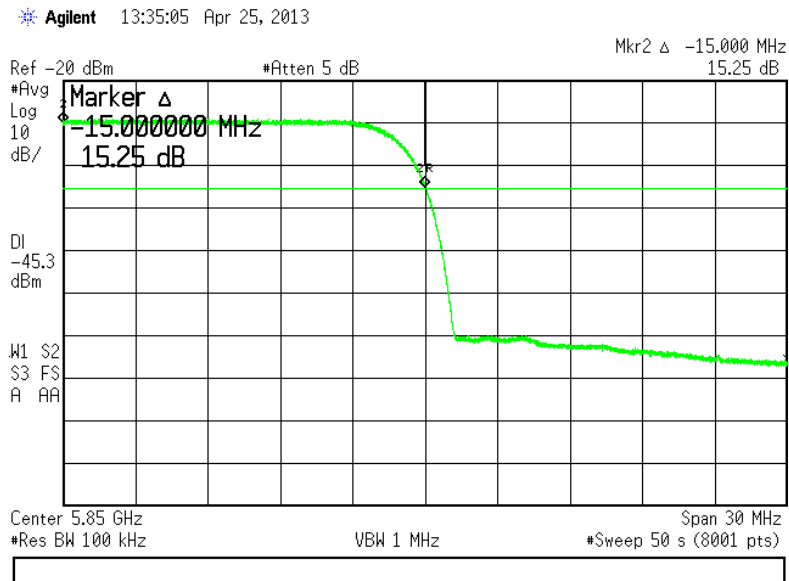
Lower Limit



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZA	97 / 302
	HTS: 4901.99.0050			

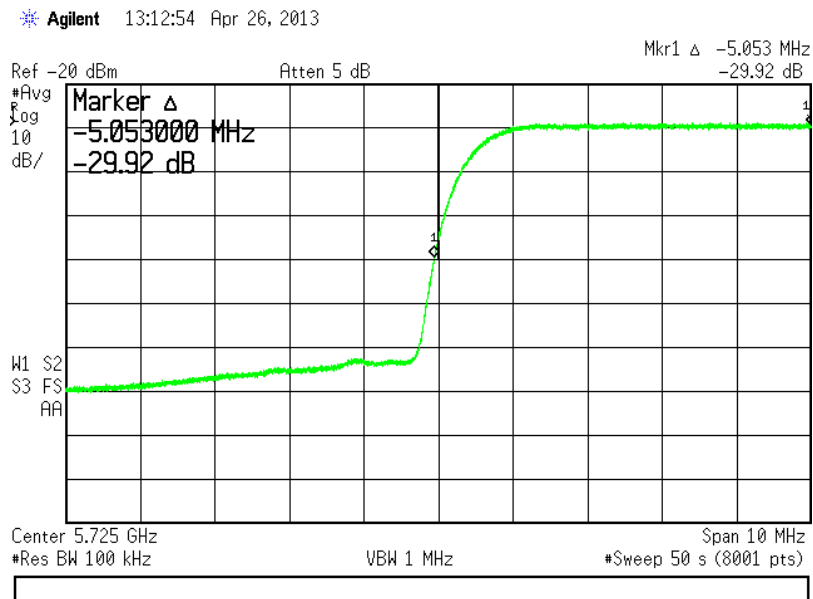
Upper Limit



10 MHz

128 QAM

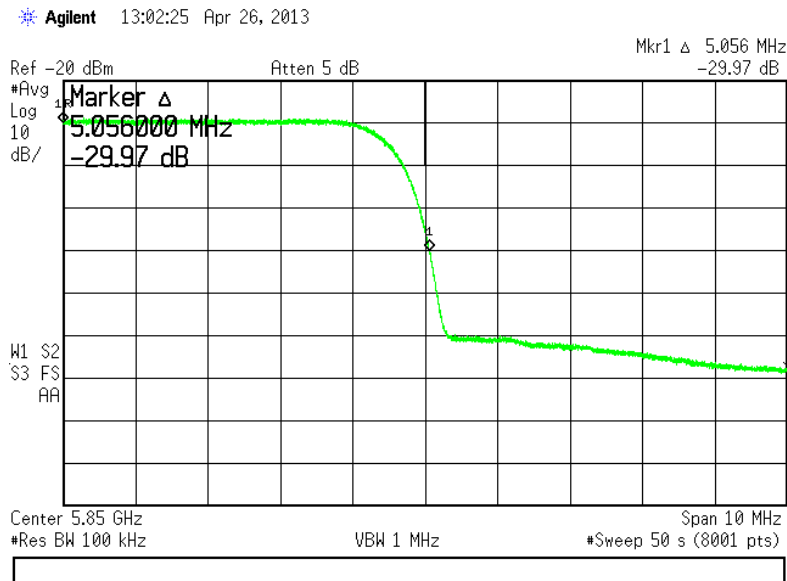
Lower Limit



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZA	98 / 302
	HTS: 4901.99.0050			

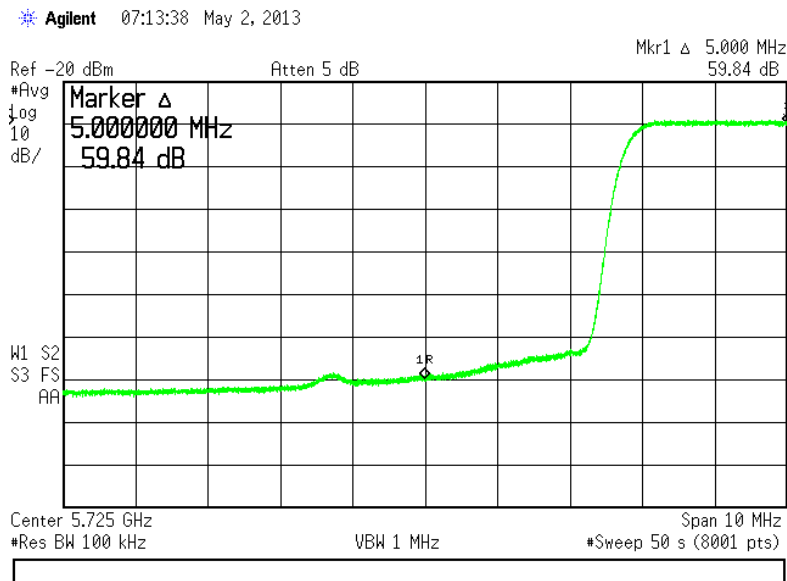
Upper Limit



5 MHz

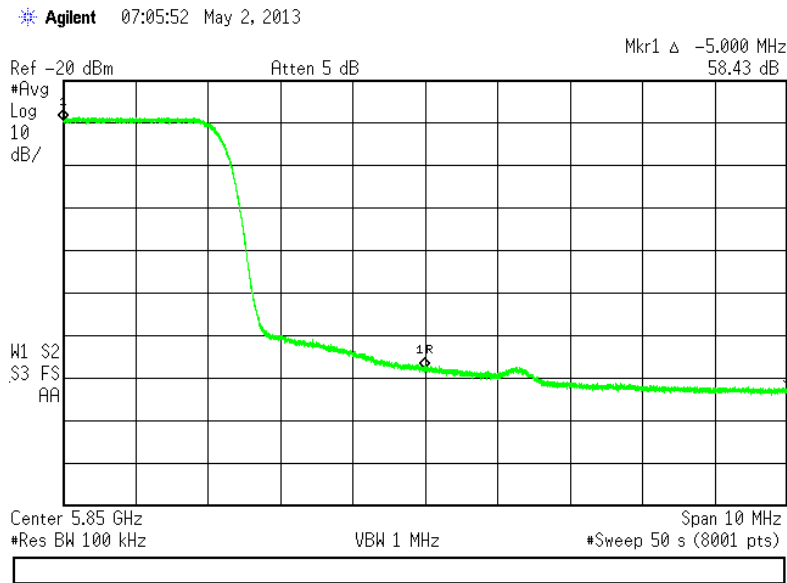
1024 QAM

Lower Limit



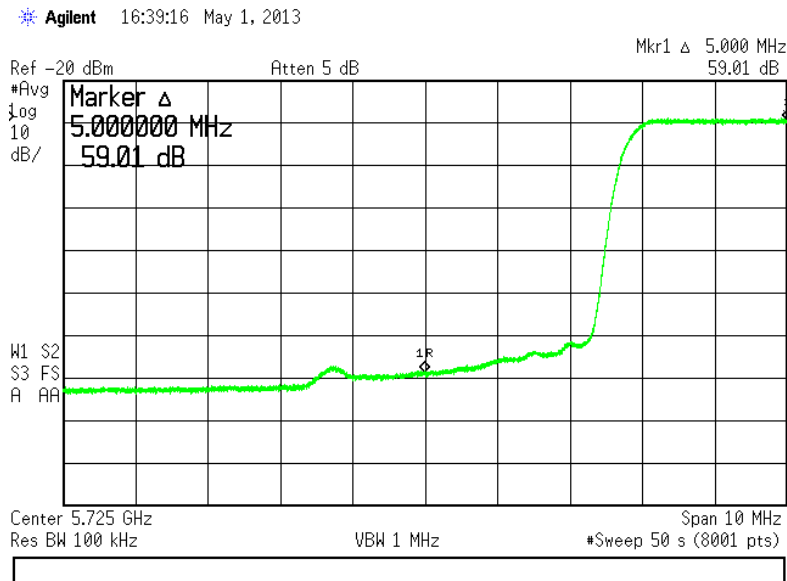
ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	99 / 302
	HTS: 4901.99.0050			

Upper Limit



4 QAM

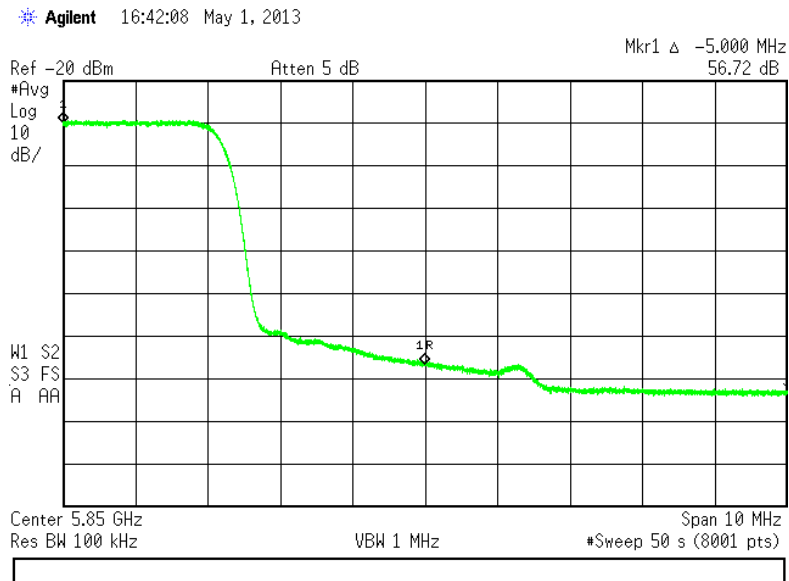
Lower Limit



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	100 / 302
	HTS: 4901.99.0050			

Upper Limit

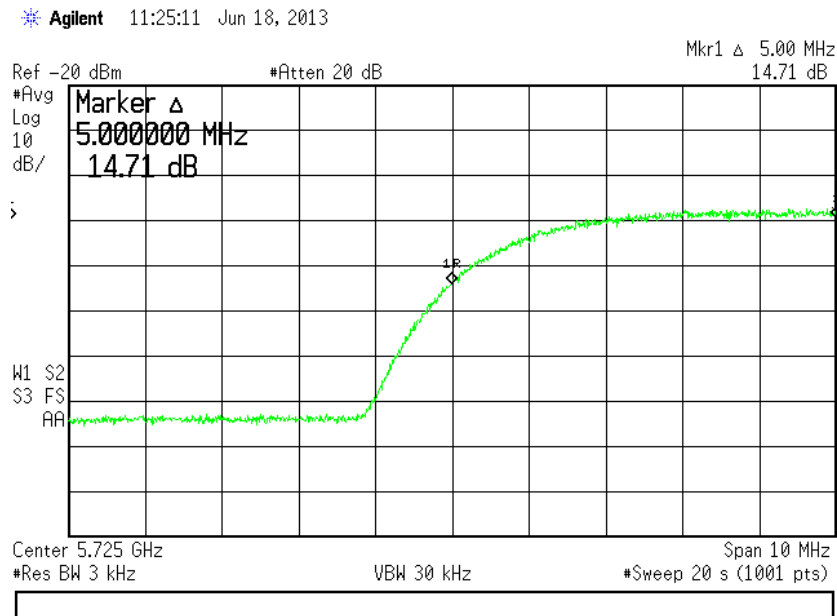


Corner Profiles in ACM mode

30 MHz

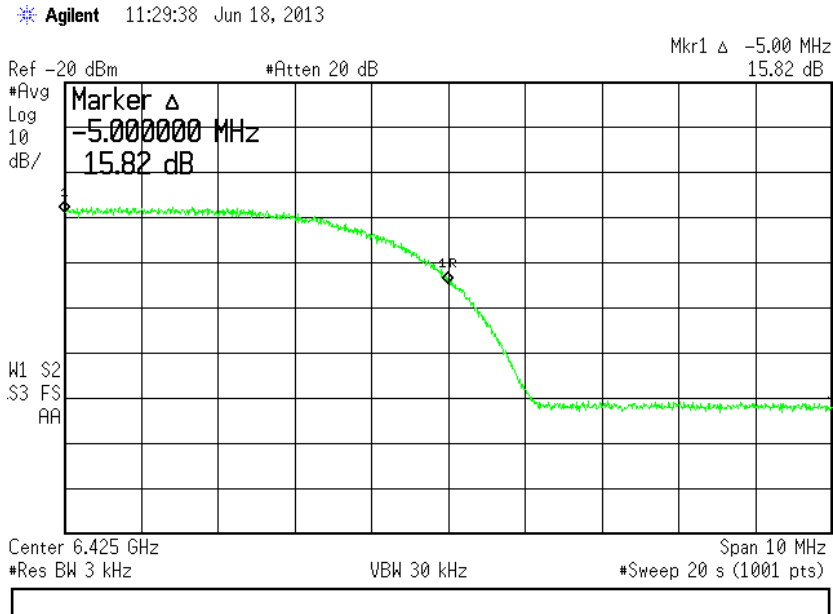
256 QAM

Lower Limit



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	101 / 302

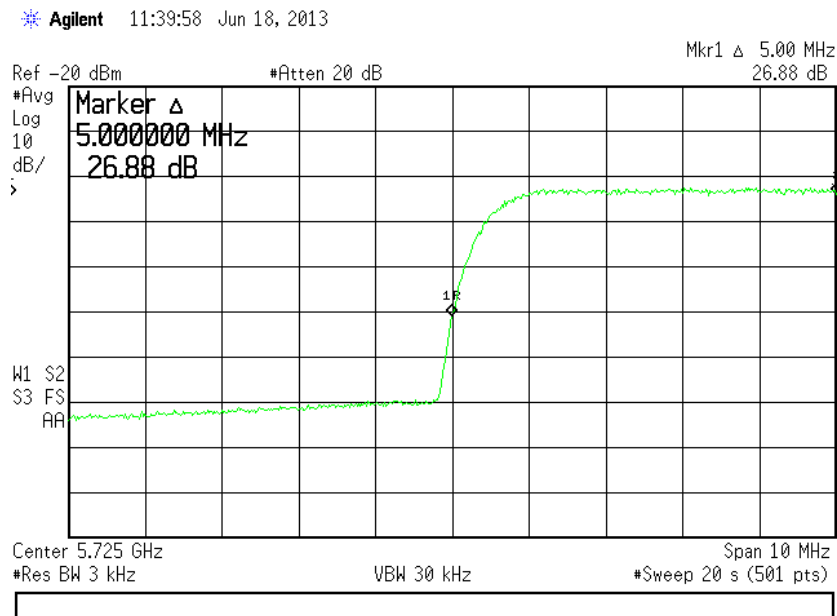
Upper Limit



10 MHz

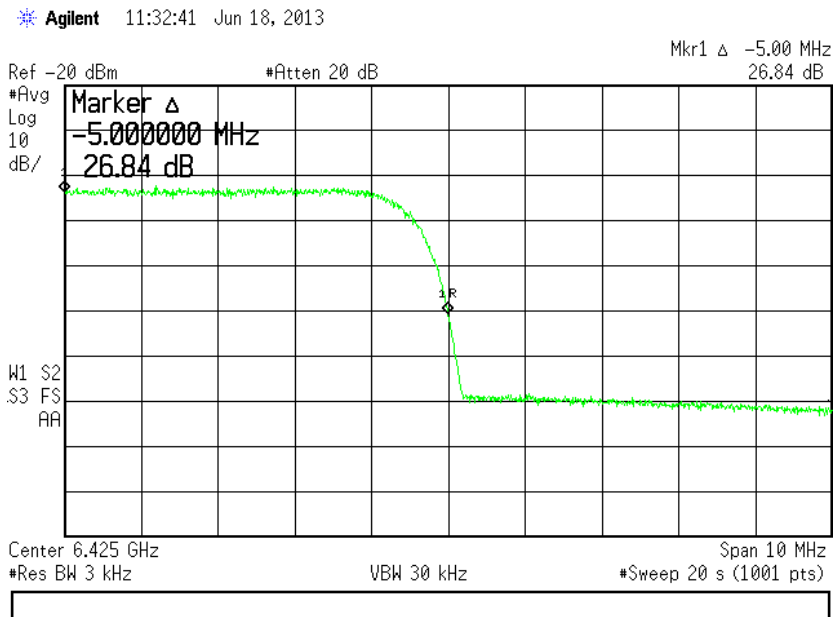
256 QAM

Lower Limit



ED	01			
	ECCN: 5E991		3DB19060AAAAQZZA	102 / 302
	HTS: 4901.99.0050			

Upper Limit



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	103 / 302

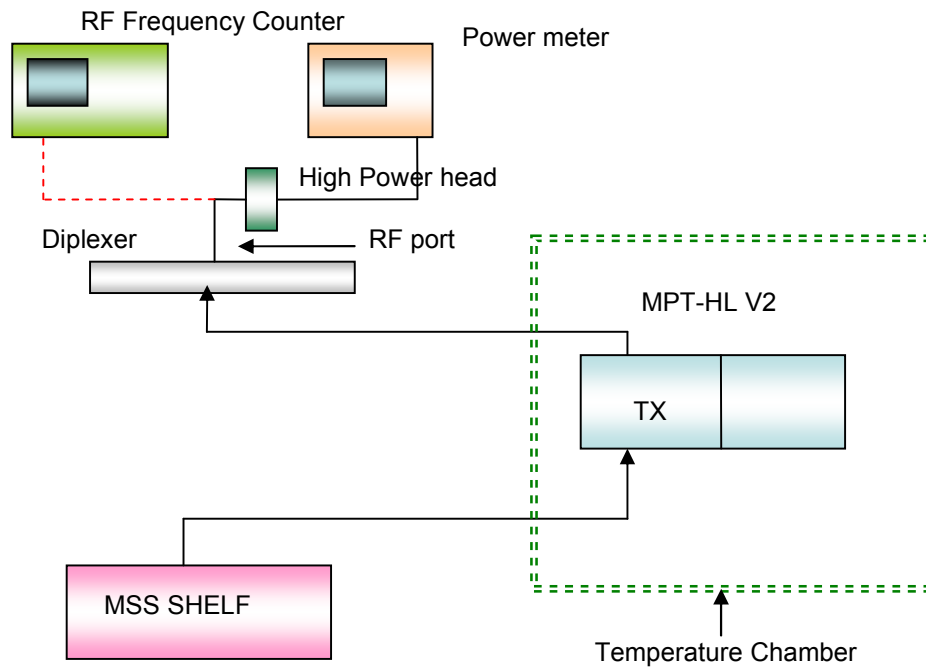


Figure 7 Transmitter verification setup over Temperature

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	104 / 302

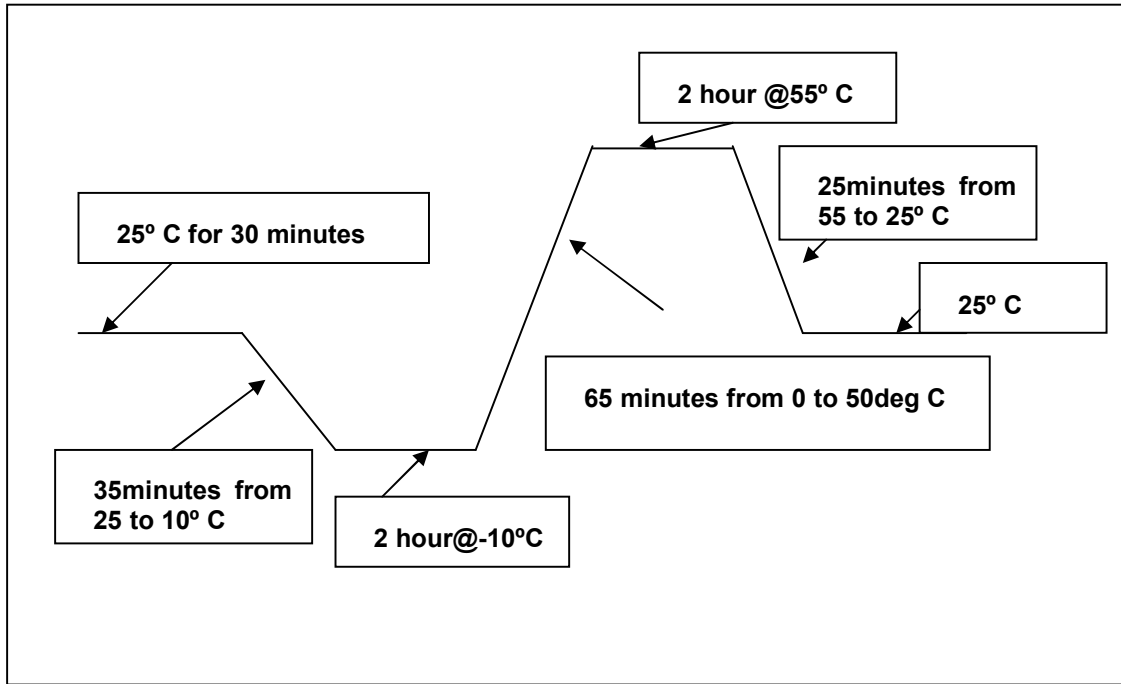


Table 6 Temperature Cycle

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	105 / 302

2.7 TRANSMITTER POWER VERIFICATION OVER TEMPERATURE

Goal of this test is to verify power stability of the transmitter over the temperature range.

2.7.1 TOOLS NEEDED TO PERFORM THIS TEST

- High power head HP 8481B or similar
- Temperature chamber

2.7.2 SETUP CONFIGURATION

- Move the MPT-HL V2 inside of the temperature chamber.
- Connect as shown in figure 7
- Program the temperature chamber according to table 6(Temperature table).
- Connect a power meter to the transmitter output.
- Connect a RF frequency counter to the transmitter.
- Adjust the power out of the transmitter according to the modulation base on table 3.

2.7.3 TEST PROCEDURE

Test Case 2c: Power stability of the TX over the Temperature range.

Summary: To measure power stability throughout temperature according to the Radio Specs

Steps:

The following will be verified on units under test.

- Verify the transmitter power for the modulation established in table 3.
- Program the temperature chamber to run cycles from -10° C to 55° C.
- See temperature cycle table 6.
- Soak the transmitter at 25° C for 30 minute before running temperature cycles.
- Record the power after 30 minutes at 25° C
- Record the power every 5° C from 25° C to -10° C and from -10° C to 55° C.
- Record the power from 55° C to 25° C.
- Verify the results with the specs of the radio.

Expected Results:

Power should not change more than +/- 2 dB

Results:

MPT-HL V2 met the Spec.

2.7.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	106 / 302

9500MPT-HL V2 Power Stability

The Power stability check was performed on 9500MPT-HL V2 terminal installed in a temperature chamber. The temperature was cycled for each terminal at a rate of approx. 1degC/minute from 10 deg C to +55degC (table 6).

30 MHz Profiles in FCM Mode

1024 QAM

L6 GHz Fo= 6123.1 MHz 30 MHz 1024 QAM					
Ambient Temp °C	MTK / MPT Temp °C	Power Variation (dB)	Linearity	Far end rcvr MSE	Data Errors
65					
60	66	-0.2	-48	-37.7	0
55	62	-0.17	-48.20	-38.1	0
50	54	-0.15	-48.50	-38.6	0
45	50	-0.13	-48.50	-38.8	0
40	45	-0.10	-48.50	-39.2	0
35	40	-0.01	-48.60	-39.5	0
30	35	0.00	-48.60	-39.6	0
25	30	0.00	-47.90	-40	0
20	25	0.06	-48.40	-40.1	0
15	20	-0.01	-48.00	-40.5	0
10	15	0.07	-48.50	-41.6	0
5	10	0.08	48.50	-41.8	0
0	5	0.09	49.50	-41.8	0
-5	0	0.17	-49.50	-41.9	0
-10	-5	0.21	-49.50	-41.9	0
-15					
-25					

4 QAM

L6 GHz Fo= 6123.1 MHz 30 MHz 4 QAM					
Ambient Temp °C	MTK / MPT Temp °C	Power Variation (dB)	Linearity	Far end rcvr MSE	Data Errors
65					
60	66	-0.13	-49.6	-38.2	0
55	61	-0.12	-50.10	-38.5	0
50	55	-0.06	-49.70	-39	0
45	50	0.04	-49.80	-39.2	0
40	45	0.05	-49.00	-39.6	0
35	40	0.00	-50.30	-39.9	0
30	35	0.07	-50.30	-40.1	0
25	30	0.00	-50.00	-40.6	0
20	25	0.07	-50.30	-40.8	0
15	20	0.07	-50.50	-40.9	0
10	15	0.04	-50.60	-42.3	0
5	10	0.07	-50.80	-42.5	0
0	5	0.06	-51.50	-42.5	0
-5	0	0.16	-51.80	-42.5	0
-10	-5	0.21	-51.50	-42.5	0
-15					
-25					

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01				
		ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	107 / 302

Corner Profiles in FCM Mode

60 MHZ

1024 QAM

L6 GHz 60 MHz 1024 QAM Corner Profiles in FCM mode				
TX BS1315UW01N, RX BS1315UW037			FREQ. 6395 mHz	
Ambient Temp °C	MTK / MPT Temp °C	Far end rcvr MSE	Data Errors	Power Variation (dB)
65				
60	63	-39.7	0	0.3
55	58	-39.7	0	0.25
50	51	-39.7	0	0.20
45	47	-39.5	0	0.17
40	42	-39.6	0	0.12
35	37	-39.6	0	0.07
30	32	-39.6	0	0.03
25	27	-39.5	0	0.00
25	28	-39.4	0	0.00
20	22	-39.5	0	-0.04
15	18	-39.9	0	-0.09
10	13	-39.8	0	-0.16
5	8	-39.5	0	-0.21
0	3	-39.4	0	-0.26
-5	-2	-39.3	0	-0.31
-10	-7	-39.4	0	-0.36
-15				
-25				

30 MHZ

256 QAM

L6 GHz 30 MHz 256 QAM Corner Profiles in FCM mode				
TX BS1315UW01N, RX BS1315UW037			FREQ. 6395	
Ambient Temp °C	MTK / MPT Temp °C	Far end rcvr MSE	Data Errors	Power Variation (dB)
65				
60	63	-41.7	0	0.27
55	58	-41.9	0	0.23
50	51	-42	0	0.17
45	46	-42	0	0.14
40	42	-42	0	0.11
35	37	-42	0	0.08
30	32	-41.9	0	0.05
25	27	-42	0	0.00
25	27	-42.3	0	0.00
20	22	-42.3	0	-0.04
15	18	-42.5	0	-0.10
10	13	-42.4	0	-0.17
5	8	-42	0	-0.21
0	2	-42	0	0.22
-5	-3	-41.8	0	-0.29
-10	-7	-41.6	0	-0.37
-15				
-25				

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	108 / 302

5 MHZ**4 QAM**

L6 GHz 5 MHz 5MHz 4QAM Corner Profiles in FCM mode				
TX BS1315UW01N, RX BS1315UW037			FREQ. 6395 mHz	
Ambient Temp °C	MTK / MPT Temp °C	Far end rcvr MSE	Data Errors	Power Variation (dB)
65				
60	63	-45.5	0	0.28
55	58	-45.4	0	0.24
50	52	-45.2	0	0.19
45	46	-45	0	0.15
40	41	-44.4	0	0.11
35	36	-44.3	0	0.07
30	31	-44	0	0.04
25	27	-45.5	0	0.00
25	27	-44	0	0.00
20	22	-43.5	0	-0.07
15	17	-43.3	0	-0.10
10	13	-43.4	0	-0.16
5	8	-43	0	-0.20
0	2	-39.4	0	-0.23
-5	-3	-43.6	0	-29.00
-10	-8	-43.3	0	-0.35
-15				
-25				

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	109 / 302

2.8 TRANSMITTER FREQUENCY VERIFICATION OVER TEMPERATURE

Goal of this test is to verify transmitter frequency stability over the temperature range.

2.8.1 TOOLS NEEDED TO PERFORM THIS TEST

- MPT-HL V2
- Frequency Counter
- High power head HP 8481B or similar
- Temperature chamber
- Spectrum Analyzer

2.8.2 SETUP CONFIGURATION

- Move the transmitter to a temperature chamber.
- Connect as shown in figure 7.
- Connect a power meter to the transmitter output.
- Connect a RF frequency counter to the transmitter.
- Adjust the power out of the transmitter according to the modulation base on table 3.

2.8.3 TEST PROCEDURE

Test Case 2d: Frequency stability of the TX over the Temperature range.

Summary: To measure frequency stability throughout temperature according to the Radio Specs

Steps:

The following will be verified on units under test.

- Turn off the data from the transmitter using MTK software.
- Use a spectrum analyzer to monitor the carrier only.
- Use a RF frequency counter to monitor the frequency throughout temperature.
- Program the temperature chamber to run cycles from -10° C to 55° C.
- See temperature cycle table 6.
- Soak the transmitter at 25° C for 30 minute before running temperature cycles.
- Record the frequency after 30 minutes at 25° C
- Record the frequency every 5° C from 25° C to -10° C and from -10° C to 55° C.
- Record the frequency from 55° C to 25° C.
- Verify the results with the specs of the radio.

Expected Results:

Frequency range remains below 5 PPM.

Results:

Radio frequency remained below 2 PPM.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	110 / 302

2.8.4 TEST DATA

9500MPT-HL V2 Frequency Stability

The frequency stability check was performed on 9500MPT-HL V2 terminal installed in a temperature chamber. The temperature is cycled for each terminal at a rate of approx. 1degC/minute from -10 deg C to +55 deg C (table 6)

30 MHz Profiles in FCM Mode

L6 GHz 30 MHz Profiles in ACM					
L6GHz Fo= 6410000000 MHz					
Ambient Temp °C	MTK / MPT Temp °C	ΔPower (dB)	Frequency (Hz)	Error (Hz)	PPM
65					
60	66	-0.01	6409992100	-7900	-1.232450817
55	61	-0.02	6409992000	-8000	-1.24805148
50	55	-0.11	6409992600	-7400	-1.154447511
45	50	-0.08	6409994100	-5900	-0.920437665
40	45	0.01	6409995300	-4700	-0.733229867
35	40	0.00	6409995500	-4500	-0.702028574
30	35	0.02	6409996100	-3900	-0.608424707
25	30	0.00	6409995100	-4900	-0.764431162
20	25	-0.04	6409995200	-4800	-0.748830514
15	20	-0.02	6409996000	-4000	-0.62402535
10	15	-0.04	6409995900	-4100	-0.639625994
5	10	0.06	6409996500	-3500	-0.546022139
0	5	0.10	6409996500	-3500	-0.546022139
-5	0	0.18	6409995700	-4300	-0.670827283
-10	-5	0.25	6409995200	-4800	-0.748830514
-15					
-25					

Corner Profiles in FCM Mode

L6GHz Corner Profiles in FCM					
L6GHz Fo= 6395000000 MHz					
Ambient Temp °C	MTK / MPT Temp °C	Power Variation (dB)	Frequency (Hz)	Error (Hz)	PPM
65					
60	64	0.32	6395000610	610	0.095387012
55	59	0.28	6395001034	1034	0.161688793
50	52	0.22	6395002912	2912	0.455355539
45	47	0.17	6395002630	2630	0.411258627
40	42	0.12	6395002840	2840	0.444096754
35	37	0.08	6395002660	2660	0.415949788
30	32	0.04	6395002370	2370	0.370601895
25	30	0.00	6394998126	-1874	-0.293041524
20	24	-0.04	6394997682	-2318	-0.362470812
15	19	-0.10	6394997306	-2694	-0.421266792
10	14	-0.16	6394996920	-3080	-0.481626502
5	9	-0.22	6394996099	-3901	-0.610008191
0	4	-0.27	6394995040	-4960	-0.775606544
-5	-1	-0.33	6394994365	-5635	-0.88115793
-10	-6	-0.39	6394993615	-6385	-0.998437275
-15					
-25					

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZA

111 / 302

2.9 TRANSMITTER PHASE NOISE SPURS OVER TEMPERATURE

Goal of this test is to monitors any spurious tones in the transmitter L.O. over temperature.

2.9.1 TOOLS NEEDED TO PERFORM THIS TEST

- MPT-HL V2
- High power head HP 8481B or similar
- Temperature chamber
- Spectrum Analyzer

2.9.2 SETUP CONFIGURATION

- Move the transmitter to a temperature chamber.
- Connect as shown in figure 7.
- Connect a power meter to the transmitter output.
- Connect a RF frequency counter to the transmitter output.
- Connect a Network Analyzer to the transmitter output.
- Adjust the power out of the transmitter according to the modulation base on table 3.

2.9.3 TEST PROCEDURE

Test Case 2e: To monitor any spurs that might appear throughout the temperature cycle.

Summary: To measure any spurs that might appear during the temperature cycle.

Steps:

The following will be verified on units under test.

- Turn off the data from the transmitter using MTK software.
- Use a spectrum analyzer to monitor the carrier only.
- Program the temperature chamber to run from -10° C, 25° C, and 55° C.
- See temperature cycle table 6.
- Soak the transmitter at 25° C for 30 minute before running temperature cycles.
- Record the L.O. after 30 minutes at 25° C
- Record the spurs at -10° C.
- Record the spurs at 55° C.
- Verify the results with the specs of the radio.

Expected Results:

No spurs.

Results:

No Spurs, see plots below...

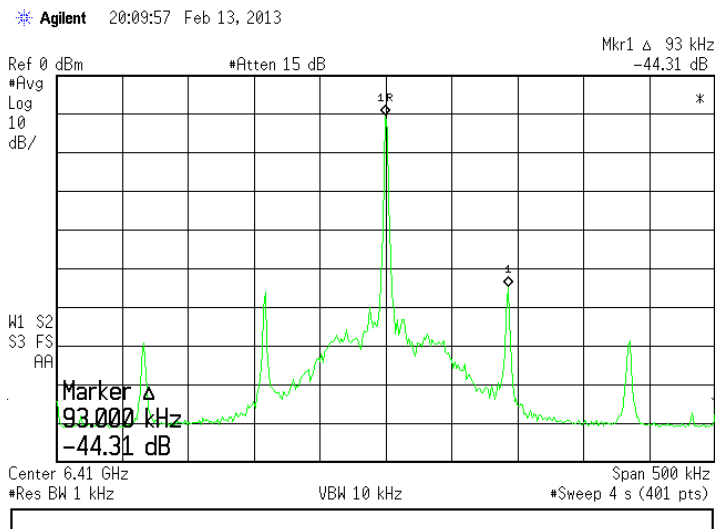
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	112 / 302

2.9.4 TEST DATA

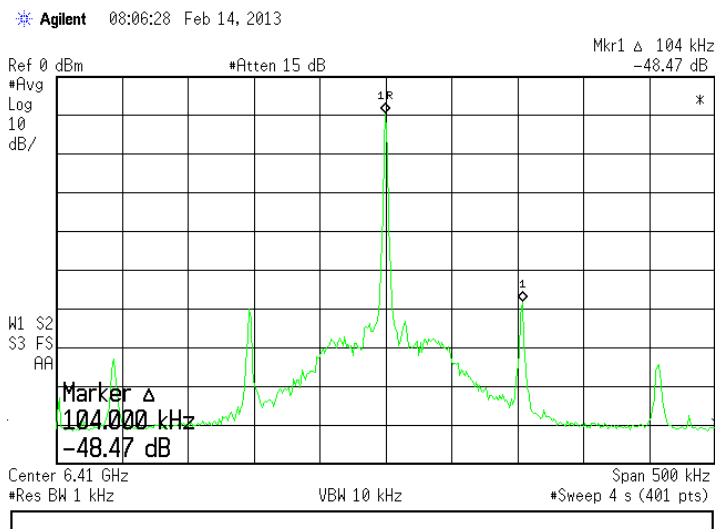
30 MHz Profiles in FCM Mode

U6GHz MPT-HLV2 LO Phase Noise/ Spurious

55 C



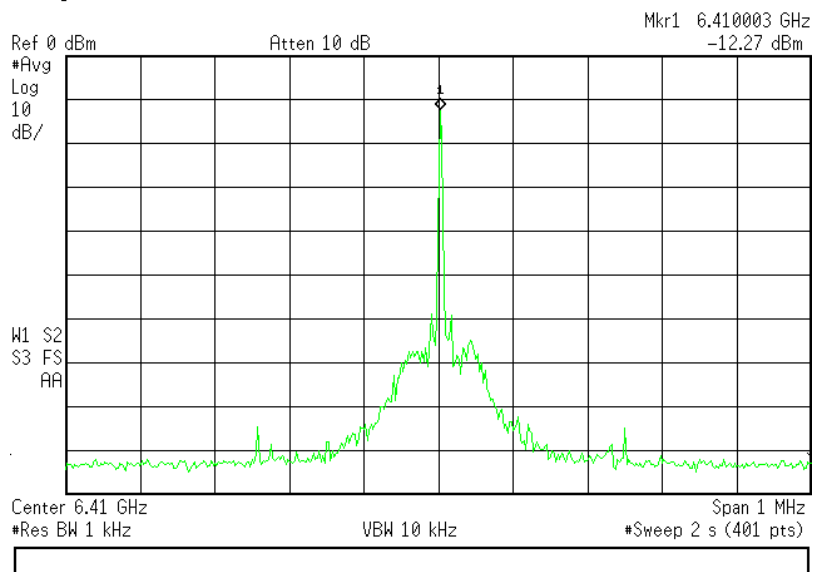
25 C



ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	113 / 302
	HTS: 4901.99.0050			

-5 C

Agilent 15:54:32 Feb 13, 2013

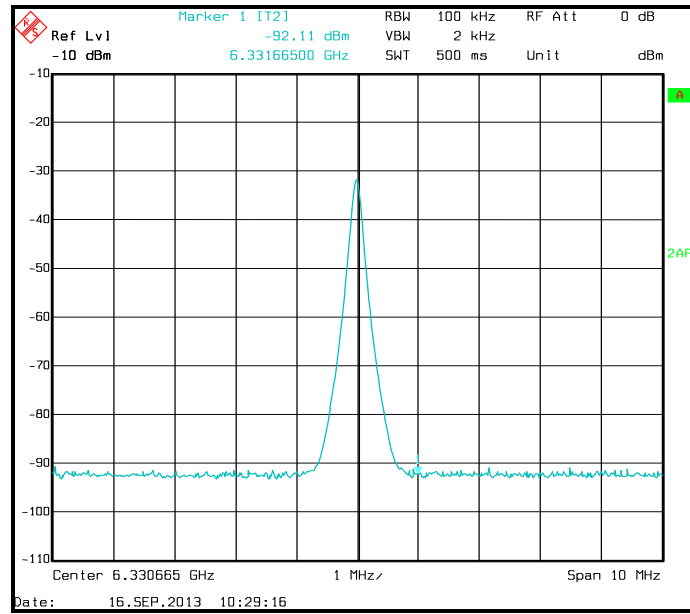


ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	114 / 302

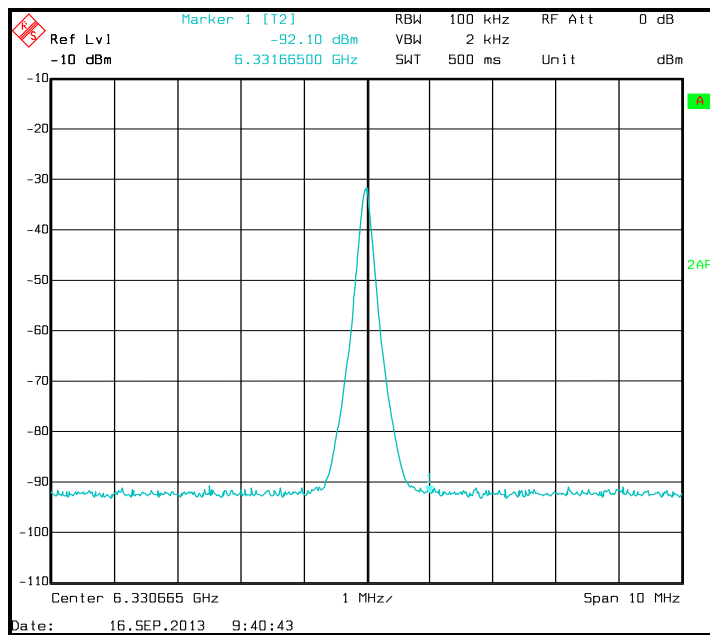
Corner Profiles in FCM Mode

Note : The spurs were resolved with a rework done on the RF board.

+55 C



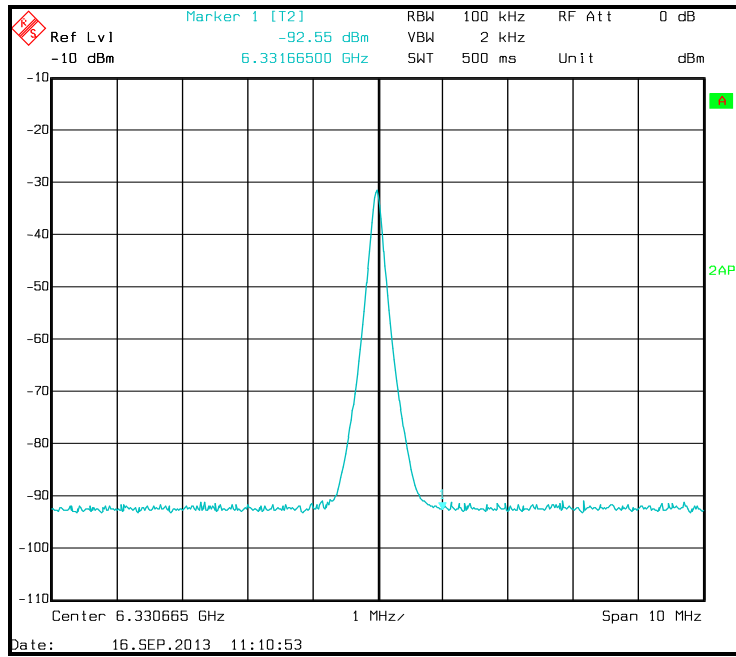
25 C



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	115 / 302

-10 C



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	116 / 302

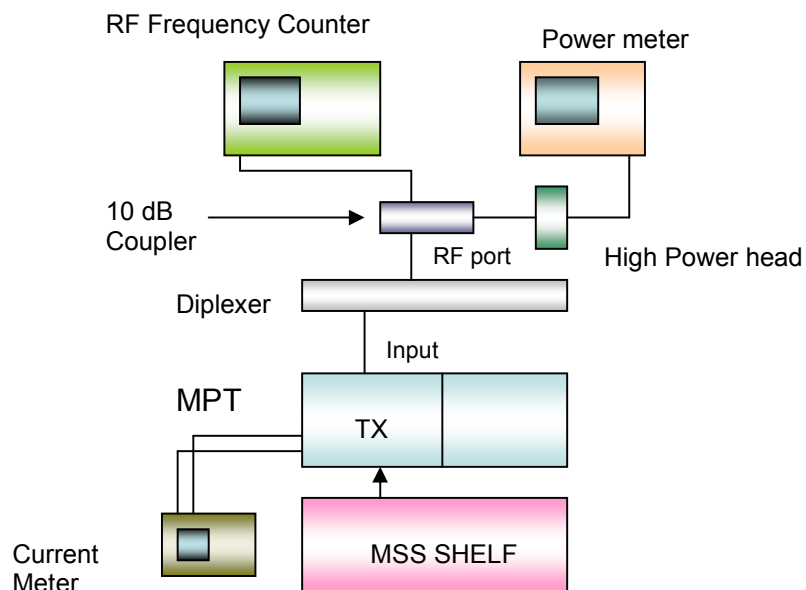


Figure 8 Battery Range Test setup

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	117 / 302

2.10 TRANSMITTER FREQUENCY CHANGE OVER BATTERY RANGE

The goal of this test is to monitor the transmitter frequency, change through the battery range.

2.10.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- High power head HP 8481B or similar
- Variable power supply
- Frequency Counter
- Current meter

2.10.2 SETUP CONFIGURATION

- Connect as shown in figure 8.
- Connect power head to the MPT-HL V2 TX power output

2.10.3 TEST PROCEDURE

Test Case 2f: transmitter frequency over battery range.

Summary: To measure the transmitter frequency through the battery range.

Steps:

The following will be verified on the units under test.

- Set Power supply to -48 VDC
- Set TX power at according to the table 3 for the modulation and frequency scheme.
- Adjust the variable power supply to change the DC voltage into the MPT-HL V2
- Vary the voltage -55 VDC to -20 VDC
- Record the power consumption.
- Record the TX power.
- For the transmit frequency test, disable the data using the MTK software to measure the carrier.
- Measure the frequency with the RF counter.
- Vary the voltage -55 VDC to -20 VDC
- Record values.

Expected Results:

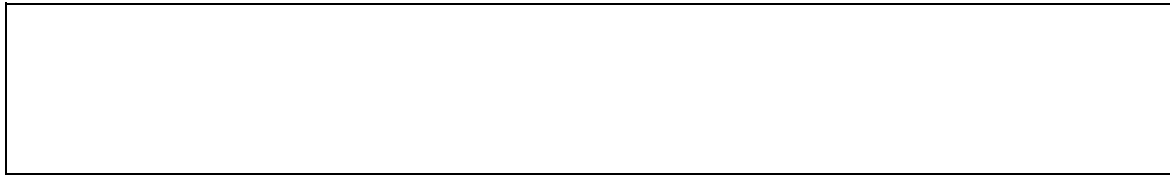
No more then 140 Watts

Results:

.The EM1 hardware was dying at 23 VDC.

The Frequency on the EM2 hardware remained with in less than 1 PPM .The Problem with the PSU was solved on EM2 hardware.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	118 / 302



2.10.4 TEST DATA

30 MHz Profiles in FCM Mode

L6_V2 Frequency vs Battery_Voltage 30 MHz Profiles in ACM					
BS1250P06C4	L6GHz Fo=	6075000000			
Battery Voltage (-V)	Frequency	Frequency Offset (Hz)	PPM	Current (Amps)	Power (Watts)
56	6075003883	3883	0.639177	1.85	103.60
55	6075003879	3879	0.638519	1.87	102.85
54	6075003877	3877	0.638189	1.91	103.14
53	6075003873	3873	0.637531	1.95	103.35
52	6075003870	3870	0.637037	1.98	102.96
51	6075003870	3870	0.637037	2.02	103.02
50	6075003874	3874	0.637695	2.06	103.00
49	6075003872	3872	0.637366	2.10	102.90
48	6075003866	3866	0.636379	2.14	102.72
47	6075003863	3863	0.635885	2.19	102.93
46	6075003860	3860	0.635391	2.24	103.04
45	6075003855	3855	0.634568	2.28	102.60
44	6075003855	3855	0.634568	2.33	102.52
43	6075003855	3855	0.634568	2.39	102.77
42	6075003853	3853	0.634239	2.44	29.45
41	6075003855	3855	0.634568	2.50	102.50
40	6075003846	3846	0.633086	2.56	102.40
24	6075003808	3808	0.626831	4.40	105.60
23		-6075000000	-1000000.000000		0.00
22		-6075000000	-1000000.000000		0.00
21		-6075000000	-1000000.000000		0.00
20		-6075000000	-1000000.000000		0.00

Note : The PSU was dying when the voltage was below 24 VDC. The problem was solved in EM2 Hardware.

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

119 / 302

Corner Profiles in ACM Mode

L6_V2_EM2_Frequency_vs_Battery_Voltage Corner Profiles in ACM mode									
BS1315UW03	Fo= 6075000000								
	Fans at 50%							Fans at 100% 60MHz/1024QAM	
Battery Voltage (-V)	Frequency	Frequency Offset (Hz)	PPM	Current (Amps)	Power (Watts)	TX Pout CW (dBm)	TX Pout Modulated (dBm)	Current (Amps)	Power (Watts)
56	6074996684	-3316	-0.545844	1.67	93.52	30.07	31.87	2.09	117.04
55	6074996656	-3344	-0.550453	1.70	93.50	30.07	31.87	2.12	116.6
54	6074996614	-3386	-0.557366	1.73	93.42	30.07	31.87	2.16	116.64
53	6074996585	-3415	-0.562140	1.76	93.28	30.07	31.87	2.2	116.6
52	6074996565	-3435	-0.565432	1.79	93.08	30.07	31.87	2.23	115.96
51	6074996562	-3438	-0.565926	1.82	92.82	30.07	31.87	2.28	116.28
50	6074996552	-3448	-0.567572	1.85	92.50	30.07	31.87	2.32	116
49	6074996544	-3456	-0.568889	1.89	92.61	30.07	31.87	2.37	116.13
48	6074996544	-3456	-0.568889	1.92	92.16	30.07	31.87	2.41	115.68
47	6074996538	-3462	-0.569877	1.96	92.12	30.07	31.87	2.46	115.62
46	6074996541	-3459	-0.569383	2.00	92.00	30.07	31.87	2.51	115.46
45	6074996550	-3450	-0.567901	2.04	91.80	30.07	31.87	2.56	115.2
44	6074996551	-3449	-0.567737	2.08	91.52	30.07	31.87	2.62	115.28
43	6074996545	-3455	-0.568724	2.13	91.59	30.07	31.87	2.67	114.81
42	6074996544	-3456	-0.568889	2.17	91.14	30.07	31.87	2.73	114.66
41	6074996543	-3457	-0.569053	2.23	91.43	30.07	31.87	2.8	114.8
40	6074996545	-3455	-0.568724	2.28	91.20	30.07	31.87	2.86	114.4
39	6074996539	-3461	-0.569712	2.33	90.87	30.07	31.87	2.94	114.66
38	6074996534	-3466	-0.570535	2.39	90.82	30.07	31.87	3.01	114.38
37	6074996525	-3475	-0.572016	2.46	91.02	30.07	31.87	2.09	77.33
36	6074996520	-3480	-0.572840	2.52	90.72	30.07	31.87	3.17	114.12
35	6074996507	-3493	-0.574979	2.59	90.65	30.07	31.87	3.27	114.45
34	6074996497	-3503	-0.576626	2.67	90.78	30.07	31.87	3.36	114.24
33	6074996496	-3504	-0.576790	2.75	90.75	30.07	31.87	3.45	113.85
32	6074996497	-3503	-0.576626	2.83	90.56	30.07	31.87	3.57	114.24
31	6074996502	-3498	-0.575802	2.92	90.52	30.07	31.87	3.67	113.77
30	6074996491	-3509	-0.577613	3.02	90.60	30.07	31.87	3.8	114
29	6074996503	-3497	-0.575638	3.12	90.48	30.07	31.87	3.94	114.26
28	6074996505	-3495	-0.575309	3.24	90.72	30.07	31.87	4.09	114.52
27	6074996495	-3505	-0.576955	3.37	90.99	30.07	31.87	4.26	115.02
26	6074996495	-3505	-0.576955	3.50	91.00	30.07	31.87	4.43	115.18
25	6074996499	-3501	-0.576296	3.65	91.25	30.07	31.87	4.61	115.25
24	6074996497	-3503	-0.576626	3.81	91.44	30.07	31.87	4.82	115.68
23	6074996496	-3504	-0.576790	3.98	91.54	30.07	31.87	5.05	116.15
22	6074996488	-3512	-0.578107	4.18	91.96	30.07	31.87	5.31	116.82
21	6074996496	-3504	-0.576790	4.40	92.40	30.07	31.87	5.59	117.39
20	6074996495	-3505	-0.576955	4.65	93.00	30.07	31.87	5.92	118.4

ED

01

ECCN: 5E991

HTS: 4901.99.0050

3DB19060AAAAQZZZA

120 / 302

2.11 WIDEBAND SPURIOUS [FCC AND INDUSTRY CANADA (IC)]

Goal of this test is to verify the wideband spurious requirement.

2.11.1 TOOLS NEEDED TO PERFORM THIS TEST

- MPT
- Power meter HP 437B or similar
- Power head
- Variable attenuator
- Upper 6GHz Diplexer
- Spectrum analyzer

2.11.2 SETUP CONFIGURATION

- Connect as shown in figure 6
- Connect Spectrum Analyzer to the antenna port

2.11.3 TEST PROCEDURE

Test Case 2g: Wideband Spurious Requirement

Summary: To verify that the transmitter spectrum meet the wideband spurious requirement.

Steps:

The following will be verified on the units under test.

- Set Transmitter power at maximum TX output power for the modulation and frequency scheme
- Connect the Spectrum Analyzer to the antenna port through the appropriate calibrated attenuation.
- Measure the wide band spurious response in 1 GHz increments.
- Verify that are no spurious tones greater then -13dBm/MHz.

Expected Results:

Transmitter spectrum to meet the wideband spurious requirement for the FCC and the Industry of Canada documents FCC part 101.111 and IC SRSP-306.4.

Results:

Spurs did not violate the FCC rules.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	121 / 302

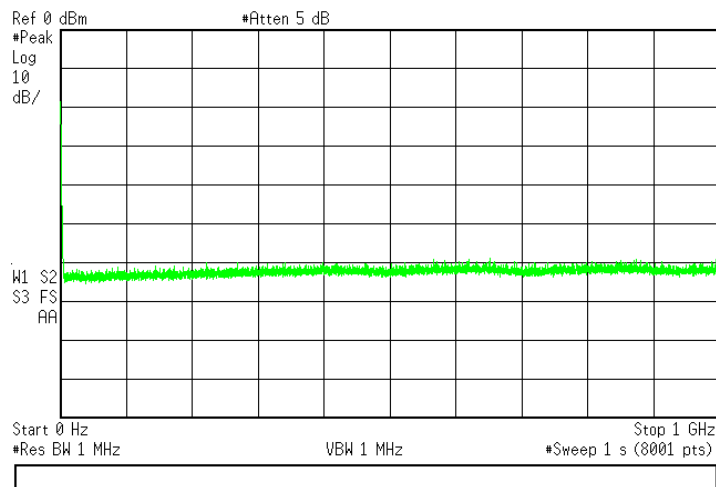
2.11.4 TEST DATA

30 MHz Profiles in FCM Mode

L6 GHz 30 MHz 1024 QAM WIDEBAND SPURIOUS

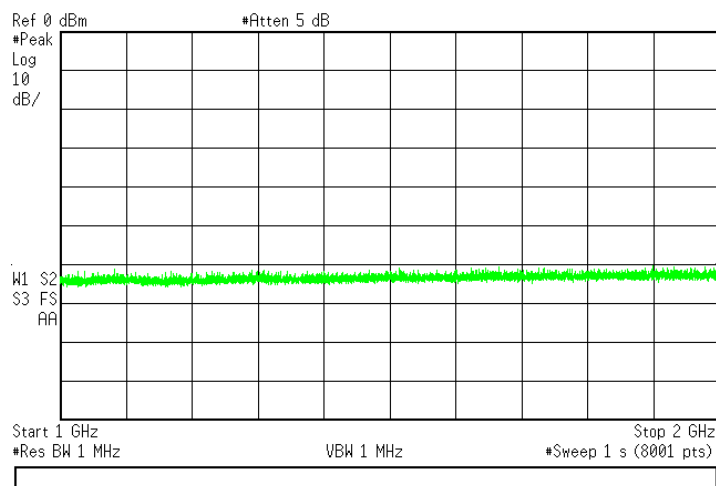
10 MHz - 1GHz

* Agilent 12:51:15 Feb 7, 2013



1 MHz - 2GHz

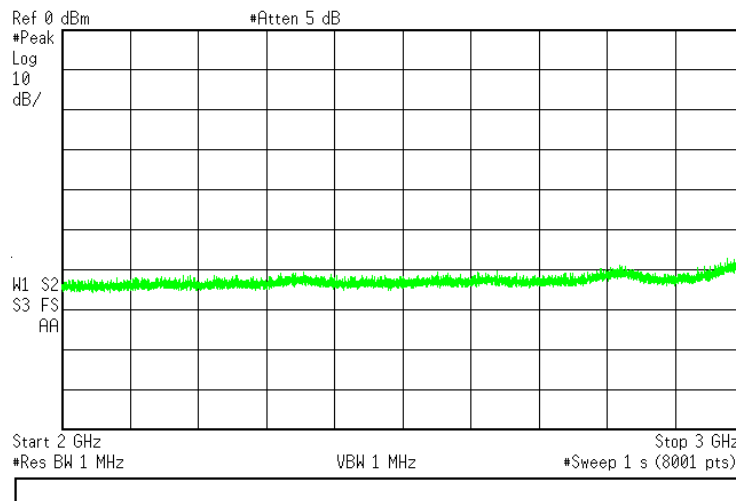
* Agilent 12:52:21 Feb 7, 2013



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	122 / 302

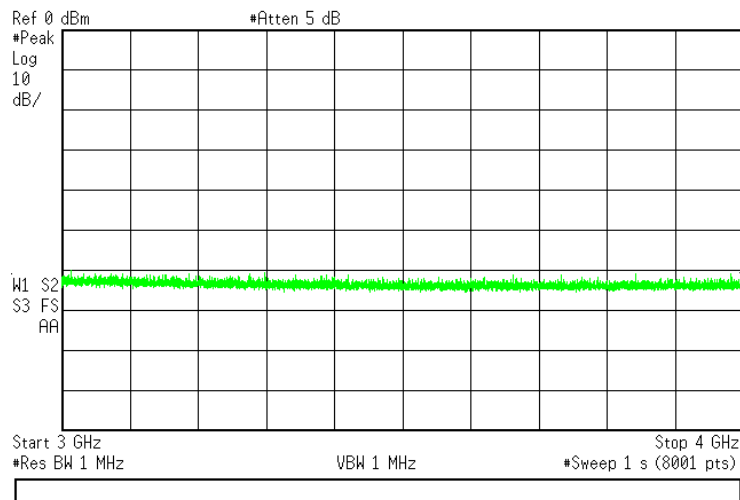
2 MHz - 3GHz

Agilent 12:53:37 Feb 7, 2013



3 MHz - 4GHz

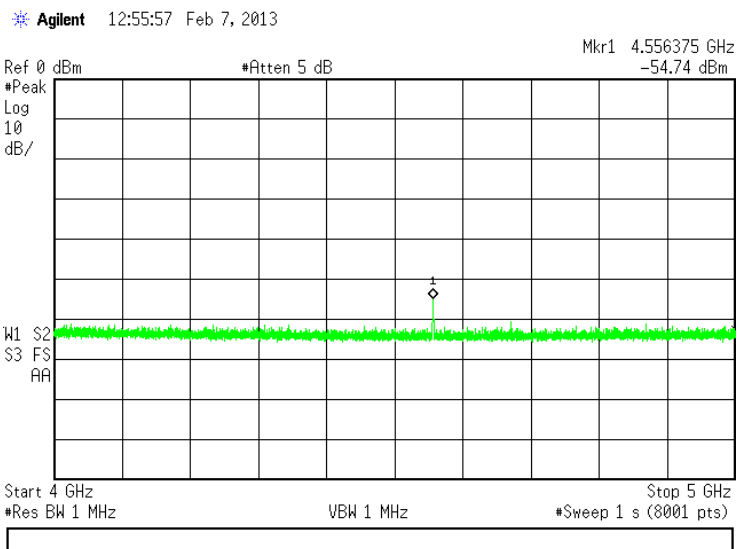
Agilent 12:54:48 Feb 7, 2013



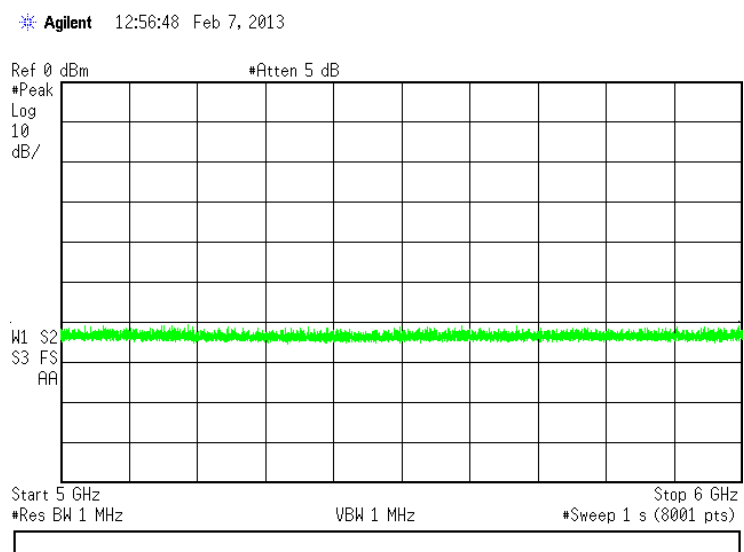
This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	123 / 302

4 MHz - 5GHz



5 MHz - 6GHz

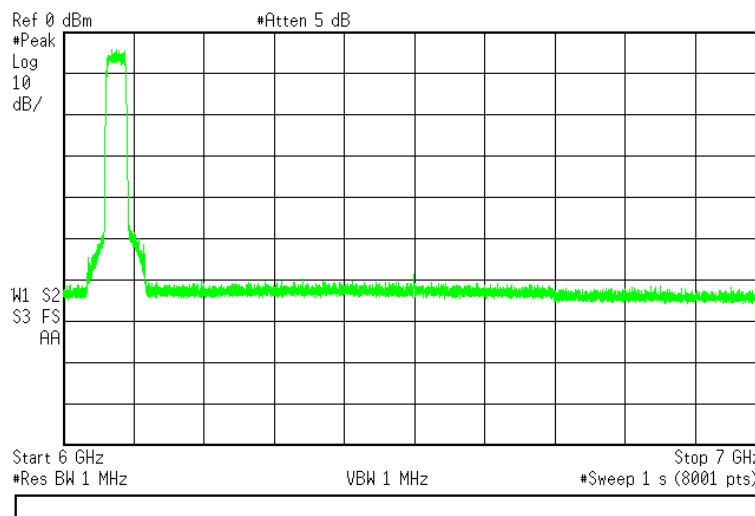


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	124 / 302

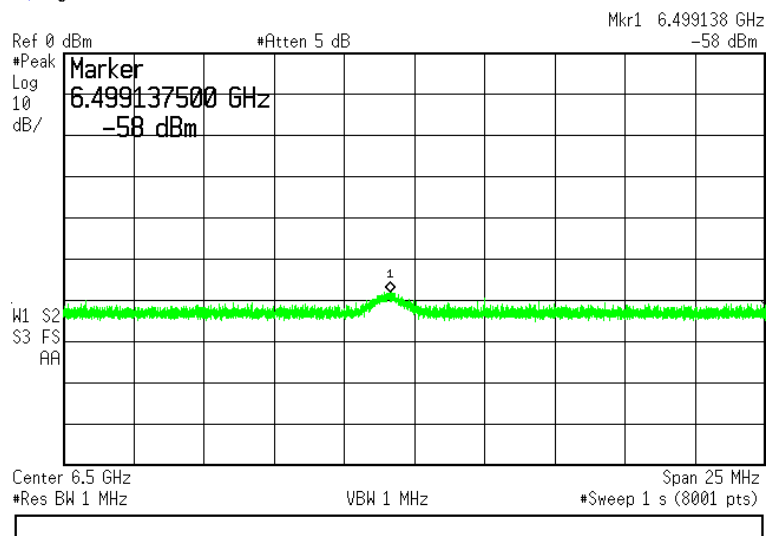
6 MHz - 7GHz

Agilent 13:00:31 Feb 7, 2013



7 MHz - 8GHz

Agilent 13:04:15 Feb 7, 2013

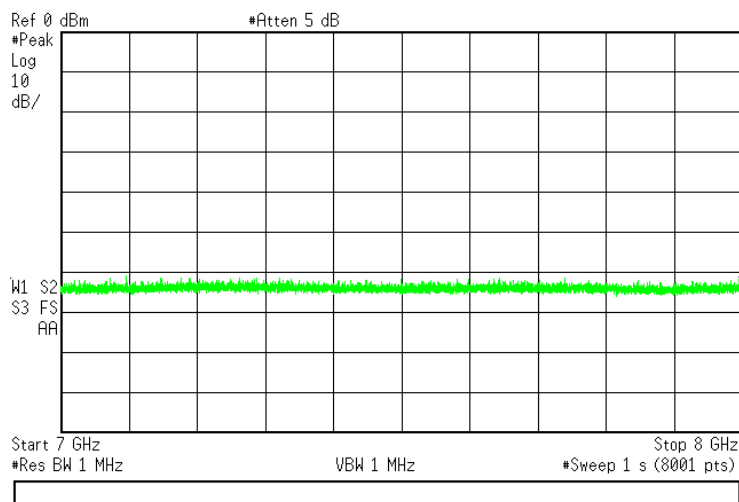


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	125 / 302

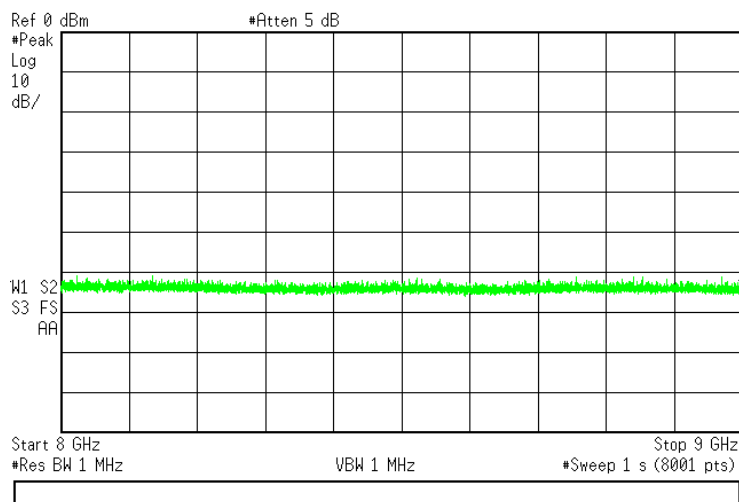
8MHz - 9GHz

Agilent 13:05:41 Feb 7, 2013



9 MHz - 10GHz

Agilent 13:06:23 Feb 7, 2013

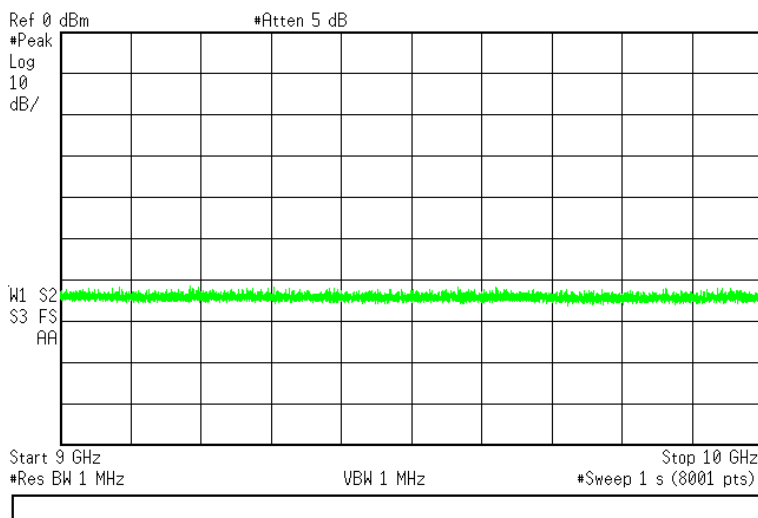


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	126 / 302

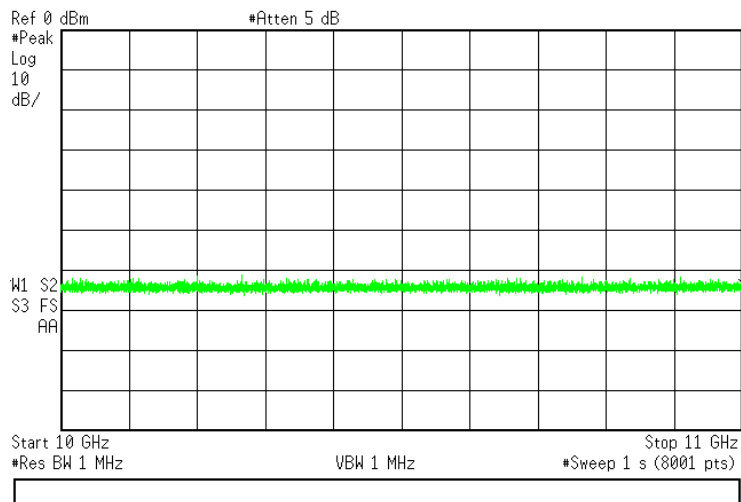
10 MHz - 11GHz

Agilent 13:07:05 Feb 7, 2013



11 MHz - 12GHz

Agilent 13:08:15 Feb 7, 2013

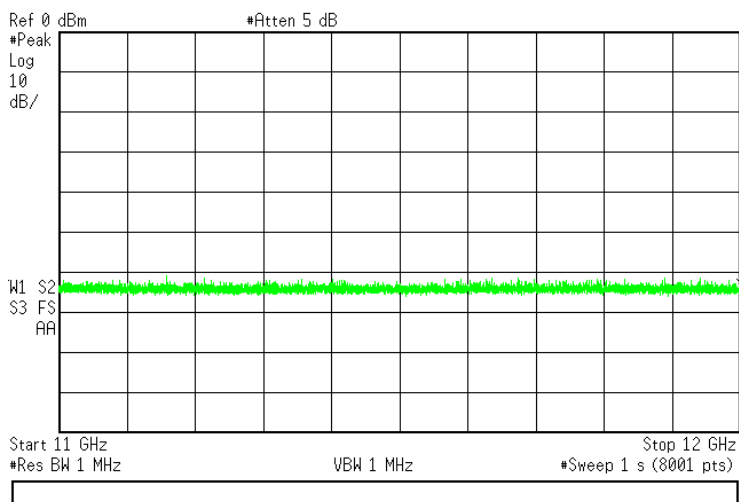


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	127 / 302

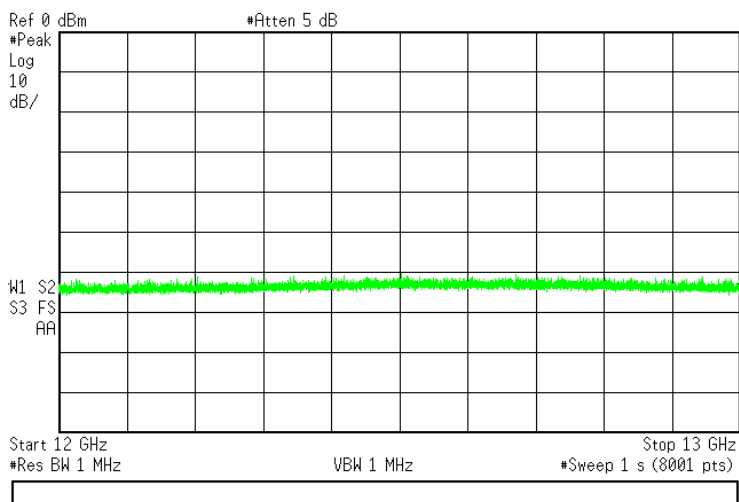
12 MHz - 13GHz

Agilent 13:08:52 Feb 7, 2013



13 MHz - 14GHz

Agilent 13:09:44 Feb 7, 2013

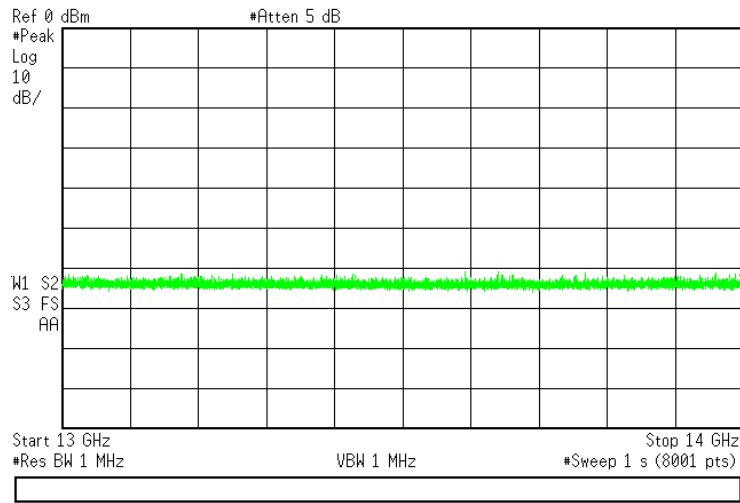


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	128 / 302

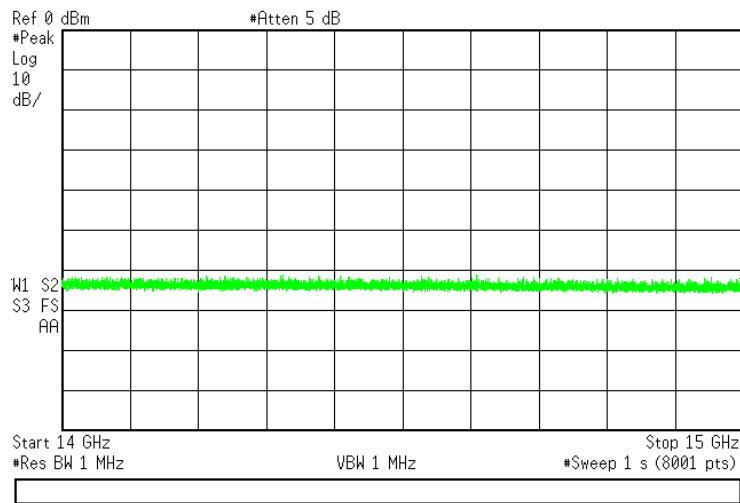
14 MHz - 15GHz

Agilent 13:10:41 Feb 7, 2013



15 MHz - 16GHz

Agilent 13:11:23 Feb 7, 2013



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

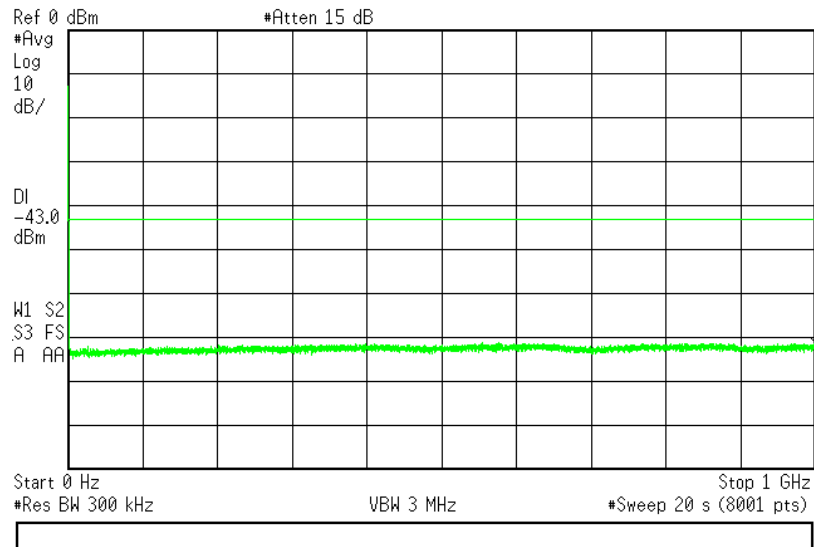
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	129 / 302

Corner Profiles in FCM Mode

L6 GHz 30 MHz 4 QAM WIDEBAND SPURIOUS

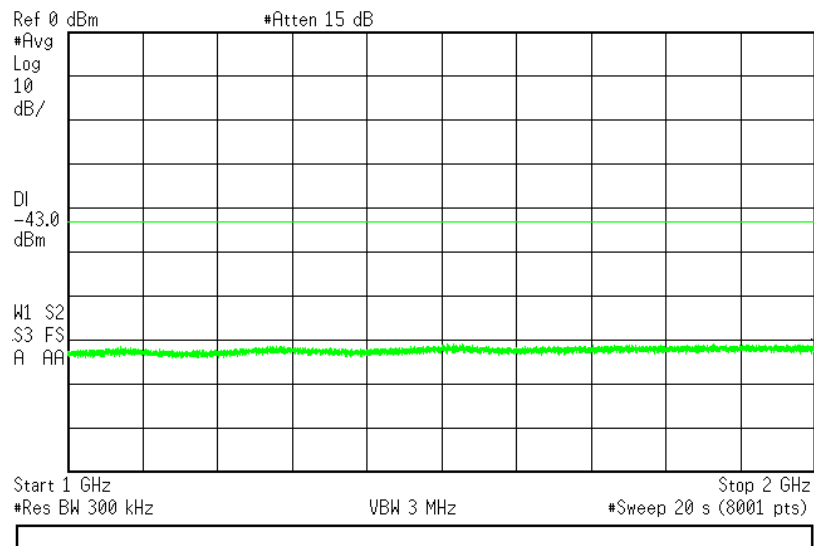
10 MHz - 1GHz

Agilent 12:49:33 Apr 23, 2013



1 GHz - 2GHz

Agilent 12:50:53 Apr 23, 2013

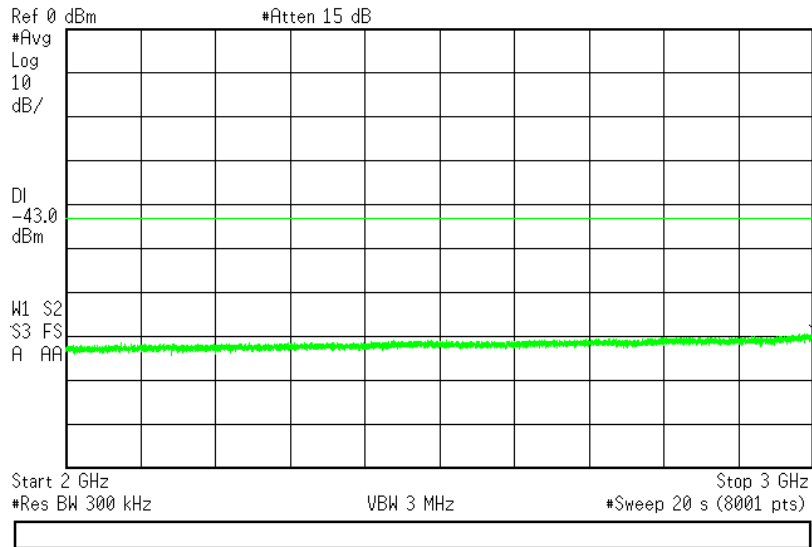


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	130 / 302

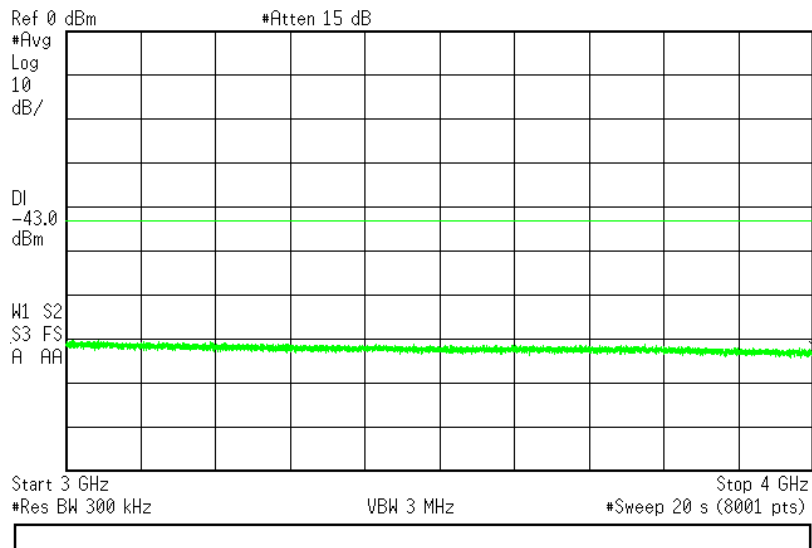
2 GHz - - 3GHz

Agilent 12:51:58 Apr 23, 2013



3 GHz - - 4GHz

Agilent 12:52:54 Apr 23, 2013

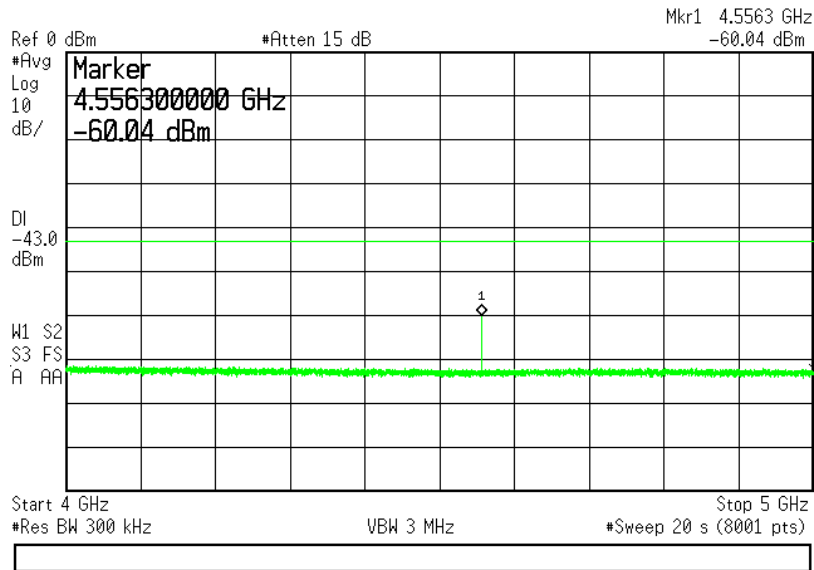


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	131 / 302

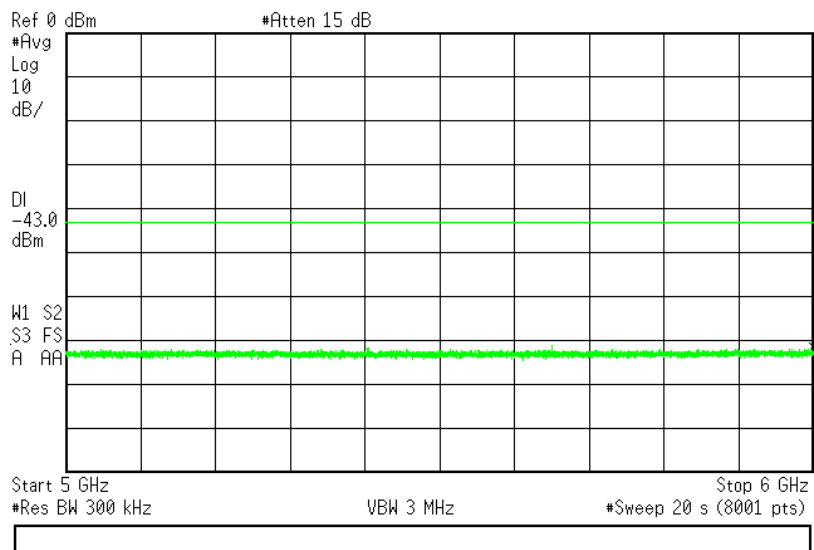
4 GHz - - 5GHz

Agilent 12:54:09 Apr 23, 2013



5 GHz - - 6GHz

Agilent 12:55:21 Apr 23, 2013

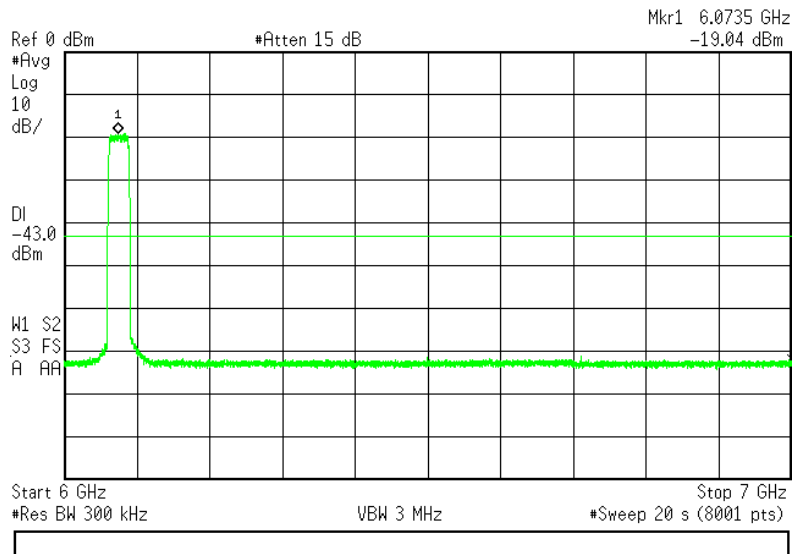


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	132 / 302

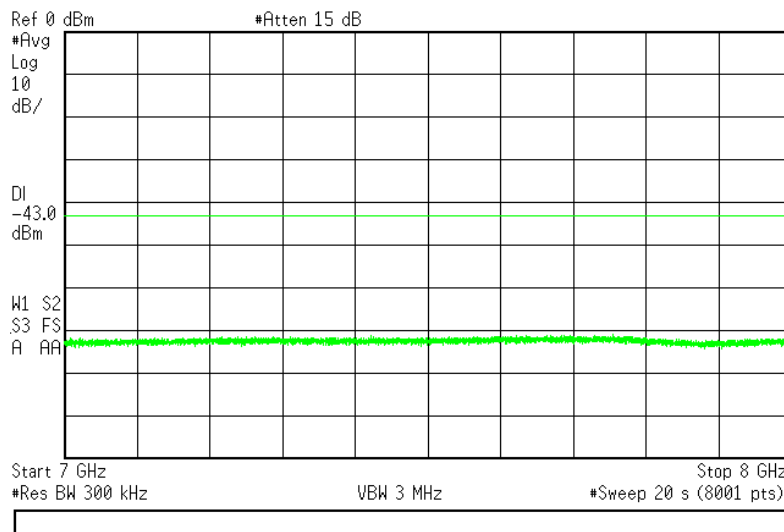
6GHz - - 7GHz

Agilent 12:56:33 Apr 23, 2013



7 GHz - - 8GHz

Agilent 12:57:27 Apr 23, 2013

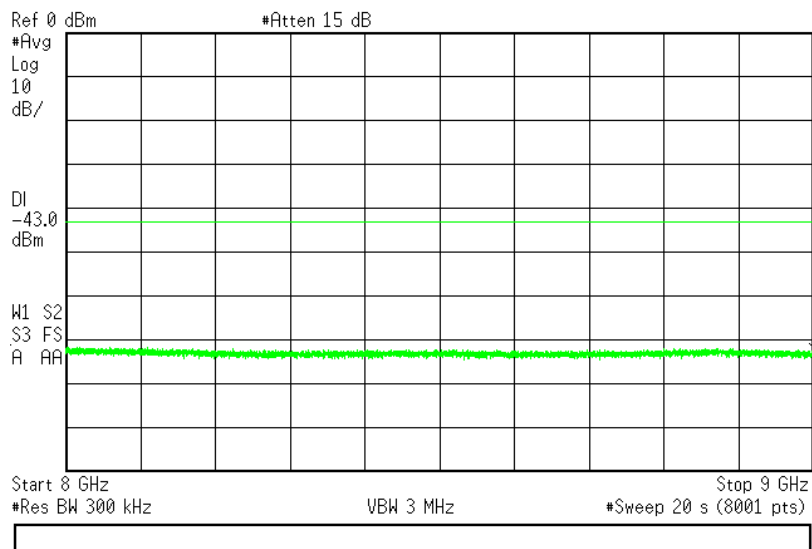


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZA	133 / 302
	HTS: 4901.99.0050			

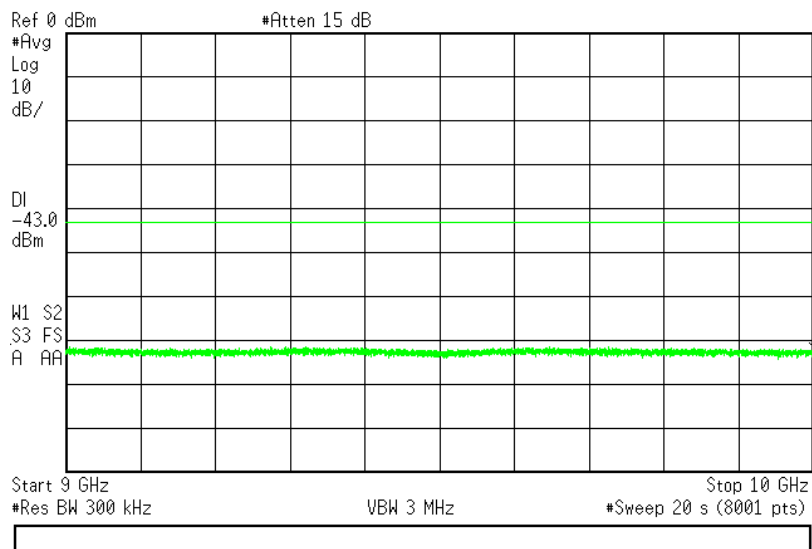
8 GHz - - 9GHz

Agilent 12:58:20 Apr 23, 2013



9 GHz - - 10GHz

Agilent 12:59:11 Apr 23, 2013

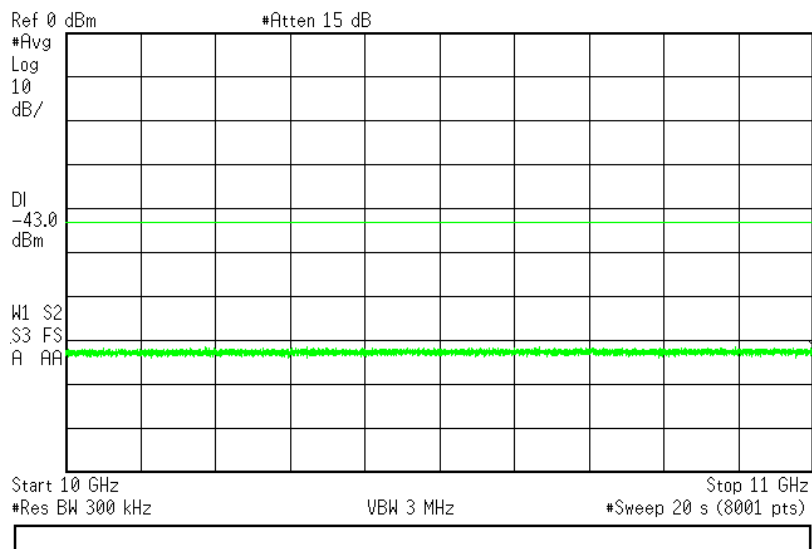


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	134 / 302

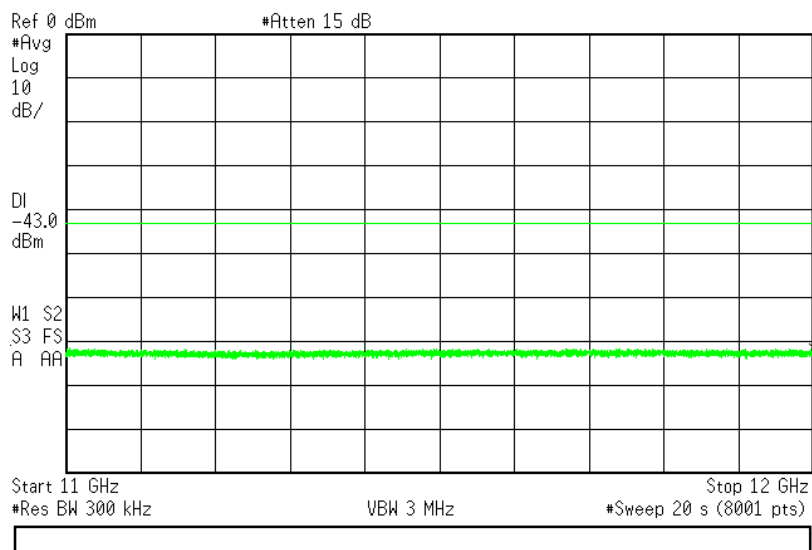
10 GHZ - - 11GHz

Agilent 12:59:59 Apr 23, 2013



11 GHZ - - 12GHz

Agilent 13:00:49 Apr 23, 2013

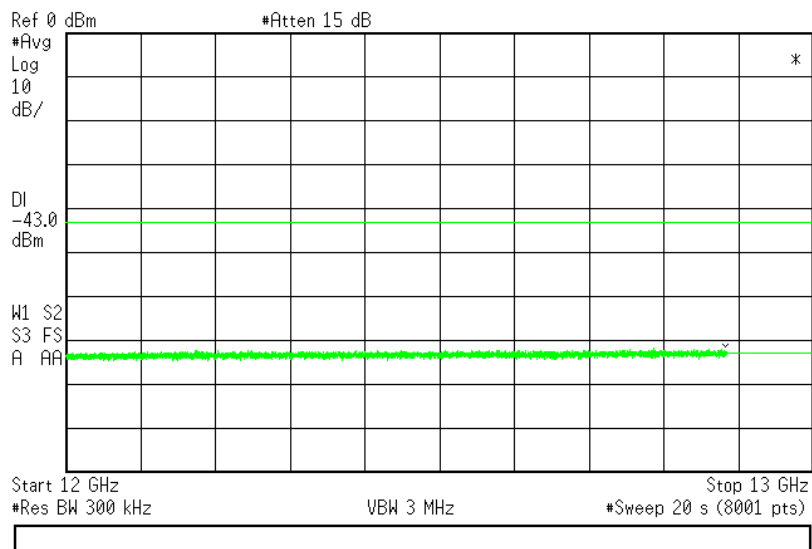


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	135 / 302

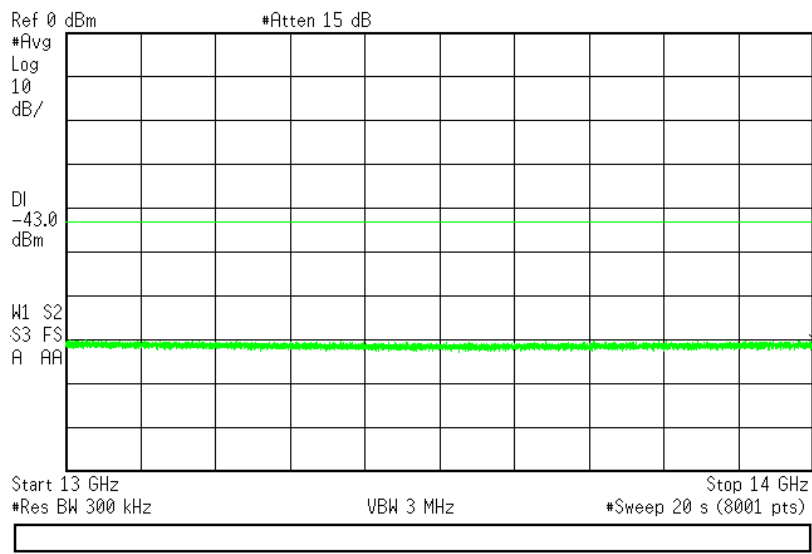
12 GHZ - - 13GHz

 Agilent 13:02:08 Apr 23, 2013



13 GHZ - - 14GHz

 Agilent 13:03:03 Apr 23, 2013



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	136 / 302

2.12 OCCUPIED BANDWIDTH [FCC AND IC]

The goal of this test is to measure the occupied bandwidth of 99% of the total power of the spectrum for the FCC requirements.

2.12.1 TOOLS NEEDED TO PERFORM THIS TEST

- MPT-HL V2
- Power meter HP 437B or similar
- High power head HP 8481B or similar
- Variable attenuator
- Upper 6GHz Diplexer
- Spectrum analyzer

2.12.2 SETUP CONFIGURATION

- Connect as shown in figure 6
- Adjust the power into the Spectrum Analyzer to -15 dBm
- Connect Spectrum Analyzer to the Antenna port

2.12.3 TEST PROCEDURE

Test Case 2h: Occupied Bandwidth Requirement

Summary: To record the occupied bandwidth.

Steps:

The following will be verified on the units under test.

- Connect as shown in figure 6
- Verify the transmit power is the correct level for the modulation under test according to table 3.
- Adjust the power into the spectrum analyzer to -15 dBm.
- Connect the Spectrum Analyzer to the Antenna port through the appropriate calibrated calibration.
- Set the spectrum analyzer to measure "Occupied Bandwidth".
- Measure the occupied bandwidth for the 99%.
- Measure the occupied bandwidth at the 3 dB points.
- Record the spectrums in an electronic format.

Expected Results:

Record the spectrums of the occupied bandwidth for 99%.

Results:

Data Taken see plots below.

2.12.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	137 / 302

Occupied Bandwidth			
L6 GHz MPT-HL V2 30 MHz Profiles in FCM mode			
Bandwidth MHz	Modulation QAM	BW	MHZ
30	1024	99%	28.04
		-3 dB	24.02
	512	99%	28.08
		-3 dB	25.15
	256	99%	28.09
		-3 dB	23.01
	128	99%	28.04
		-3 dB	25.39
	64	99%	28.02
		-3 dB	25.52
	32	99%	28.04
		-3 dB	25.12
	16	99%	28.01
		-3 dB	25.48
	4	99%	28.04
		-3 dB	25.95

Occupied Bandwidth			
L6 GHz MPT-HL V2 Corner Profiles in FCM mode			
Bandwidth MHz	Modulation QAM	BW	MHZ
60	1024	99%	52.14
		-3 dB	47.59
	256	99%	52.16
		-3 dB	47.95
5	1024	99%	4.43
		-3 dB	4.10
	128	99%	4.43
		-3 dB	4.07

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	138 / 302

L6 GHz Corner Profiles in ACM mode				L6 GHz Corner Profiles in ACM mode			
Occupied Bandwidth				Occupied Bandwidth			
BW MHz	QAM	BW	MHz	BW MHz	QAM	BW	MHz
60	1024	99%	52.18	10	1024	99%	9.01
		(-3dB)	46.99			(-3dB)	8.2
	512	99%	52.27		512	99%	9.01
		(-3dB)	46.61			(-3dB)	9.00
	256	99%	52.21		256	99%	9.01
		(-3dB)	46.79			(-3dB)	8.17
	128	99%	52.15		128	99%	9.00
		(-3dB)	48.77			(-3dB)	8.12
	64	99%	52.18		64	99%	9.01
		(-3dB)	48.96			(-3dB)	8.29
30	1024	99%	52.16	5	1024	99%	4.42
		(-3dB)	45.19			(-3dB)	3.97
	512	99%	52.16		512	99%	4.43
		(-3dB)	46.48			(-3dB)	4.08
	256	99%	52.18		256	99%	4.42
		(-3dB)	46.99			(-3dB)	4.05
	128	99%	28.05		128	99%	4.42
		(-3dB)	25.62			(-3dB)	3.94
	64	99%	28.07		64	99%	4.41
		(-3dB)	26.02			(-3dB)	4.03
30	1024	99%	28.05	5	1024	99%	4.42
		(-3dB)	25.72			(-3dB)	4.09
	512	99%	28.07		512	99%	4.41
		(-3dB)	25.92			(-3dB)	4.01
	256	99%	28.06		256	99%	4.41
		(-3dB)	25.77			(-3dB)	4.41
	128	99%	28.06		128	99%	4.41
		(-3dB)	25.85			(-3dB)	3.97
	64	99%	28.06		64	99%	4.41
		(-3dB)	25.38			(-3dB)	3.97
30	1024	99%	28.03	5	1024	99%	4.41
		(-3dB)	26.06			(-3dB)	3.97
	512	99%	28.05		512	99%	4.42
		(-3dB)	25.62			(-3dB)	3.97
	256	99%	28.07		256	99%	4.43
		(-3dB)	26.02			(-3dB)	4.08
	128	99%	28.05		128	99%	4.42
		(-3dB)	25.72			(-3dB)	4.05
	64	99%	28.07		64	99%	4.42
		(-3dB)	25.92			(-3dB)	3.94

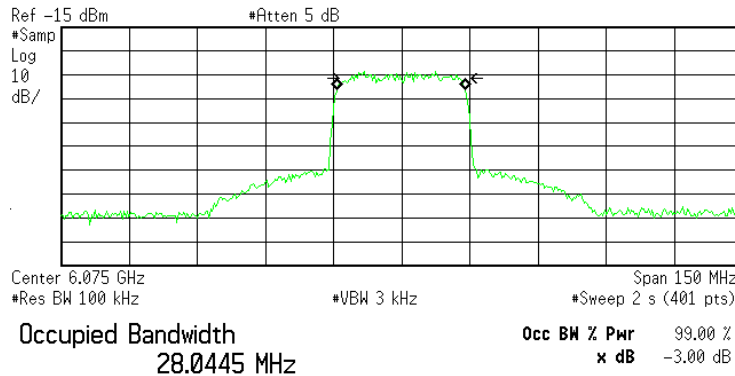
This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01						
		ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA			139 / 302

30 MHz Profiles in FCM Mode

1024 QAM

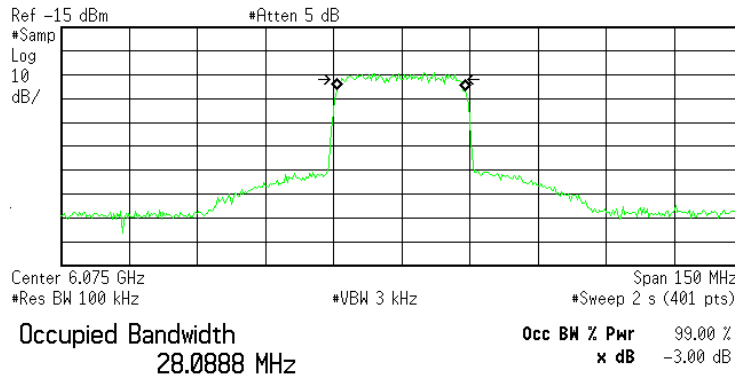
Agilent 15:19:56 Feb 6, 2013



Transmit Freq Error -163.256 kHz
Occupied Bandwidth 24.020 MHz*

512 QAM

Agilent 15:21:40 Feb 6, 2013

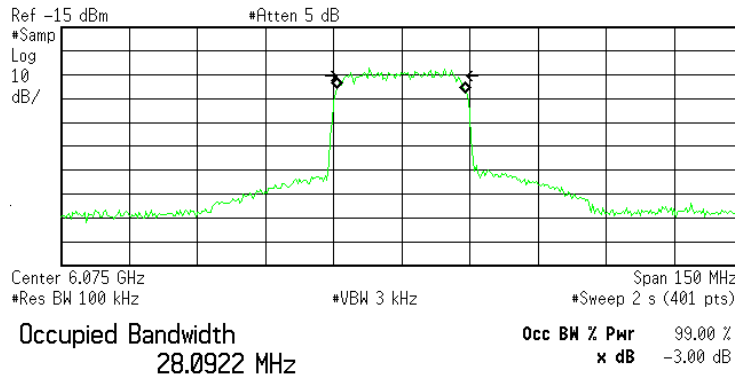


Transmit Freq Error -140.902 kHz
Occupied Bandwidth 25.156 MHz*

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	140 / 302

256 QAM

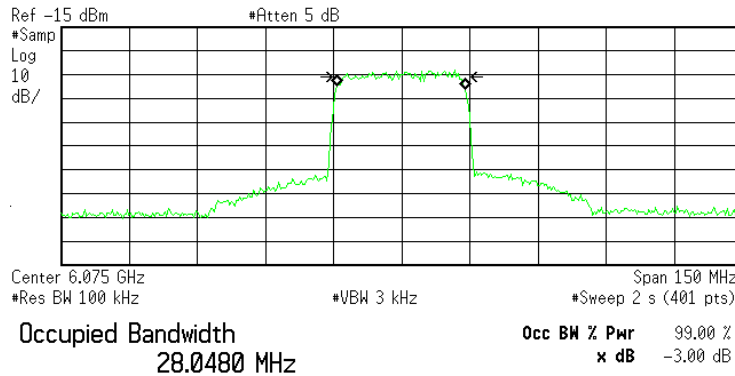
Agilent 15:23:19 Feb 6, 2013



Transmit Freq Error -130.436 kHz
Occupied Bandwidth 23.018 MHz*

128 QAM

Agilent 15:23:59 Feb 6, 2013

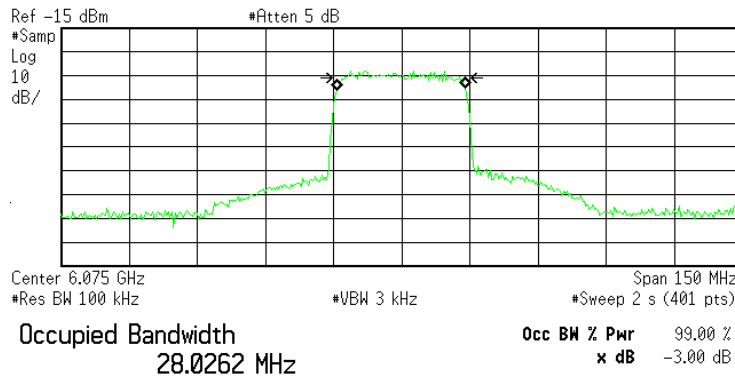


Transmit Freq Error -226.129 kHz
Occupied Bandwidth 25.390 MHz*

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	141 / 302

64 QAM

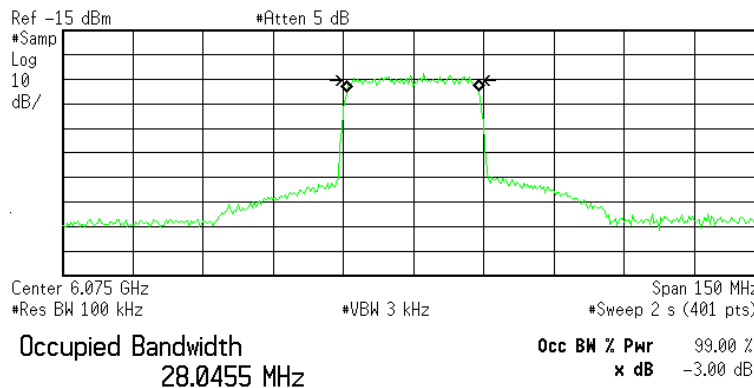
Agilent 15:24:46 Feb 6, 2013



Transmit Freq Error -158.786 kHz
Occupied Bandwidth 25.524 MHz*

32 QAM

Agilent 15:30:37 Feb 6, 2013



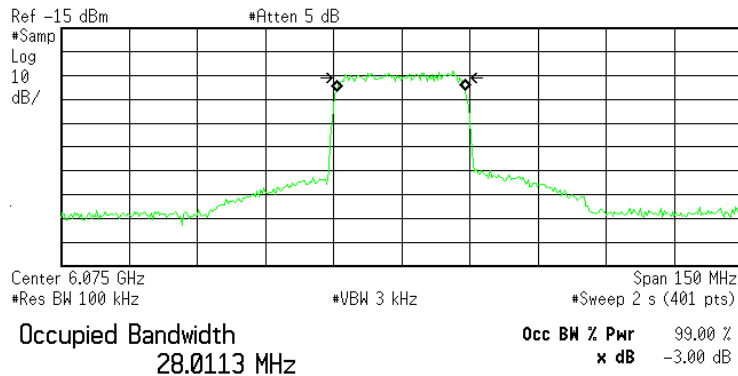
Transmit Freq Error -158.735 kHz
Occupied Bandwidth 25.126 MHz*

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	142 / 302

16 QAM

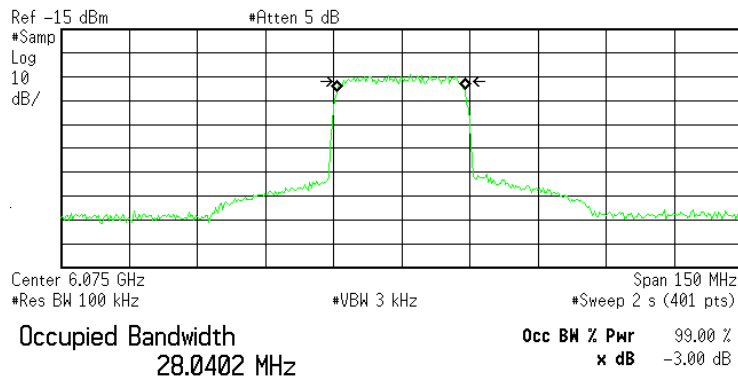
Agilent 15:27:20 Feb 6, 2013



Transmit Freq Error -222.664 kHz
Occupied Bandwidth 25.484 MHz*

4 QAM

Agilent 15:33:01 Feb 6, 2013



Transmit Freq Error -190.955 kHz
Occupied Bandwidth 25.954 MHz*

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

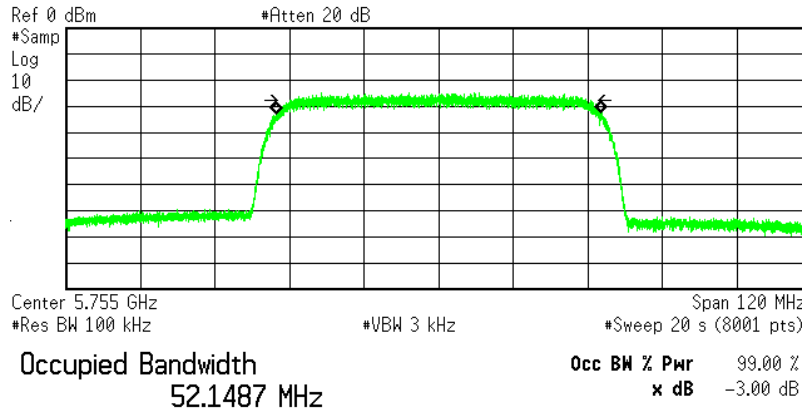
ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	143 / 302
	HTS: 4901.99.0050			

Corner Profiles in FCM Mode

60 MHz

1024 QAM

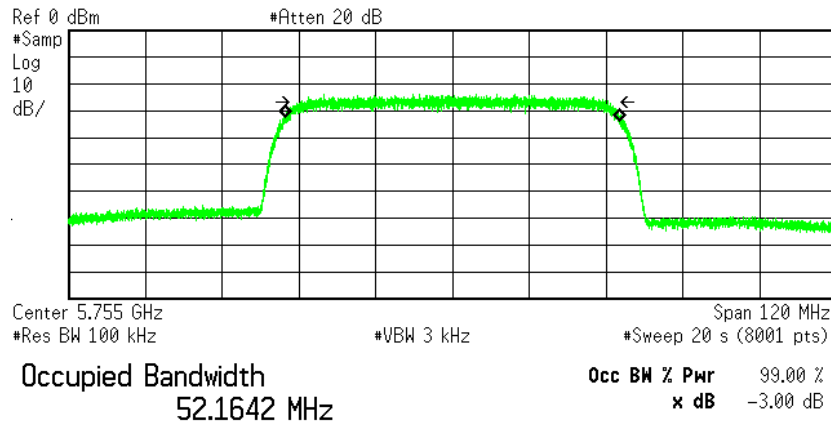
Agilent 07:46:17 May 7, 2013



Transmit Freq Error 30.850 kHz
Occupied Bandwidth 47.597 MHz*

256 QAM

Agilent 07:45:05 May 7, 2013

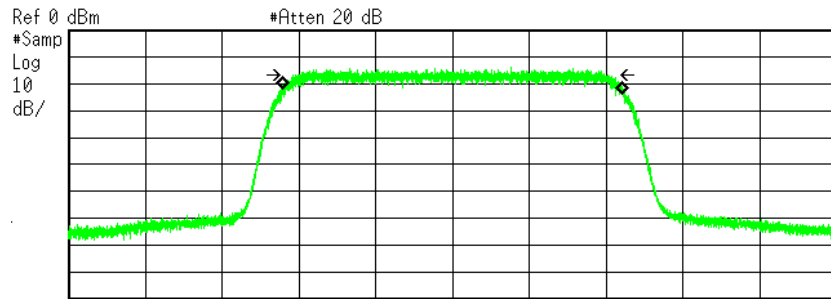


Transmit Freq Error 37.385 kHz
Occupied Bandwidth 47.753 MHz*

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	144 / 302
	HTS: 4901.99.0050			

5 MHz
1024 QAM

Agilent 08:01:05 May 7, 2013



Center 5.73 GHz Span 10 MHz
#Res BW 100 kHz #VBW 3 kHz #Sweep 20 s (8001 pts)

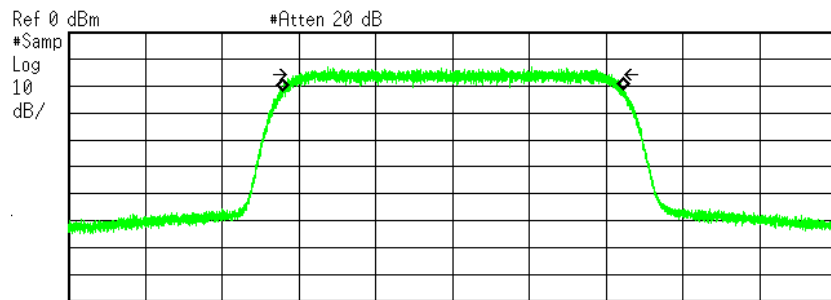
Occupied Bandwidth
4.4352 MHz

Occ BW % Pwr 99.00 %
x dB -3.00 dB

Transmit Freq Error -563.207 mHz
Occupied Bandwidth 4.105 MHz*

128QAM

Agilent 07:59:54 May 7, 2013



Center 5.73 GHz Span 10 MHz
#Res BW 100 kHz #VBW 3 kHz #Sweep 20 s (8001 pts)

Occupied Bandwidth
4.4372 MHz

Occ BW % Pwr 99.00 %
x dB -3.00 dB

Transmit Freq Error 2.183 kHz
Occupied Bandwidth 4.074 MHz*

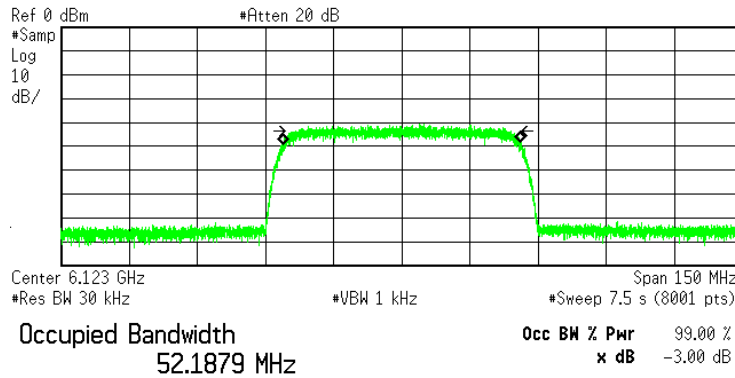
ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	145 / 302
	HTS: 4901.99.0050			

Corner Profiles in ACM Mode

60 MHz

1024 QAM

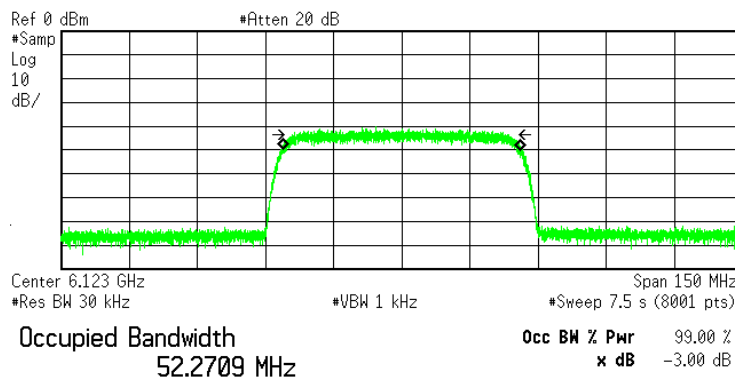
Agilent 15:00:08 Jun 14, 2013



Transmit Freq Error -3.893 kHz
x dB Bandwidth 46.996 MHz*

512 QAM

Agilent 15:00:58 Jun 14, 2013



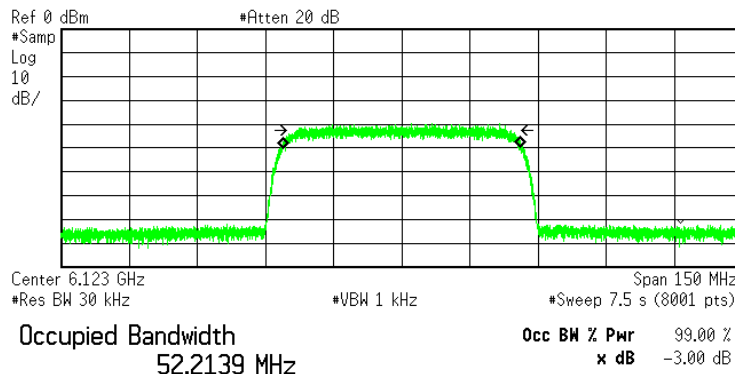
Transmit Freq Error 14.016 kHz
x dB Bandwidth 46.619 MHz*

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	146 / 302

256 QAM

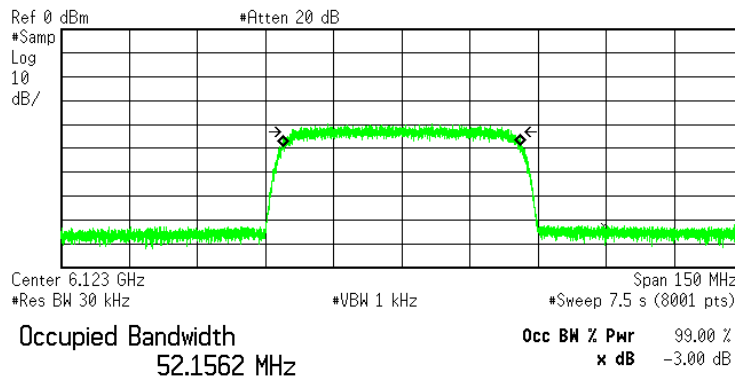
Agilent 15:02:33 Jun 14, 2013



Transmit Freq Error -22.686 kHz
x dB Bandwidth 46.790 MHz*

128 QAM

Agilent 15:03:22 Jun 14, 2013

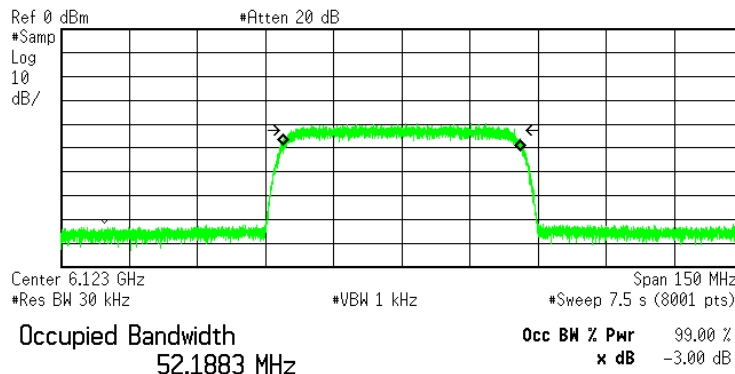


Transmit Freq Error 937.171 Hz
x dB Bandwidth 48.773 MHz*

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	147 / 302
	HTS: 4901.99.0050			

64 QAM

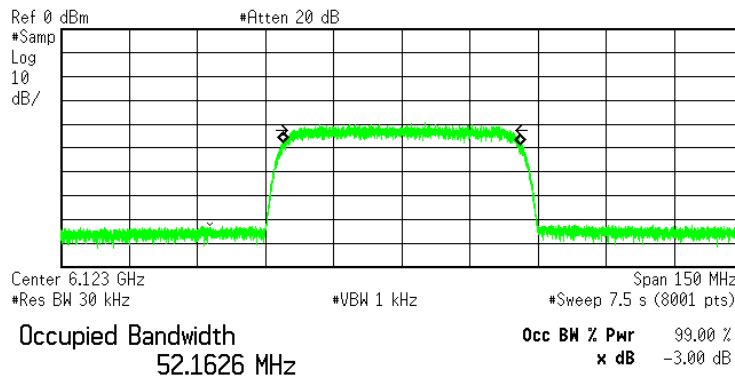
Agilent 15:04:15 Jun 14, 2013



Transmit Freq Error 22.449 kHz
x dB Bandwidth 48.960 MHz*

32 QAM

Agilent 15:05:09 Jun 14, 2013

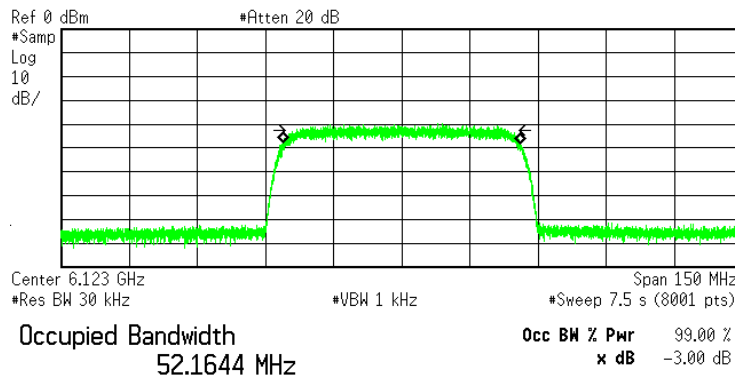


Transmit Freq Error 11.076 kHz
x dB Bandwidth 45.192 MHz*

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	148 / 302
	HTS: 4901.99.0050			

16 QAM

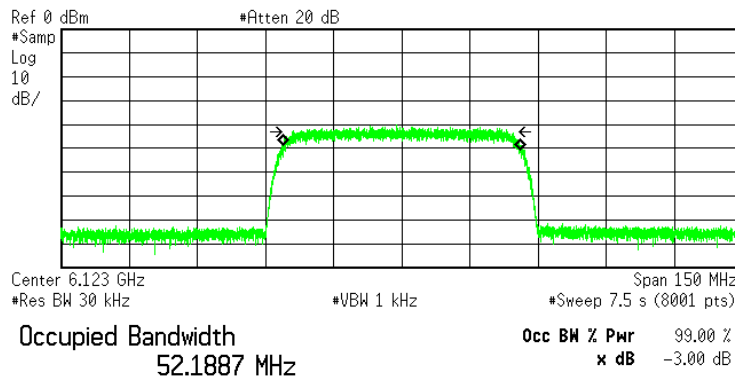
Agilent 15:06:09 Jun 14, 2013



Transmit Freq Error -17.385 kHz
x dB Bandwidth 46.488 MHz*

4 QAM

Agilent 15:07:09 Jun 14, 2013



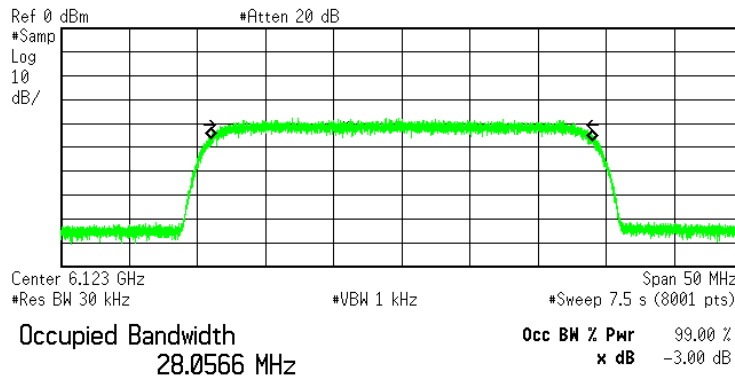
Transmit Freq Error 16.432 kHz
x dB Bandwidth 46.994 MHz*

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	149 / 302
	HTS: 4901.99.0050			

30 MHz

1024 QAM

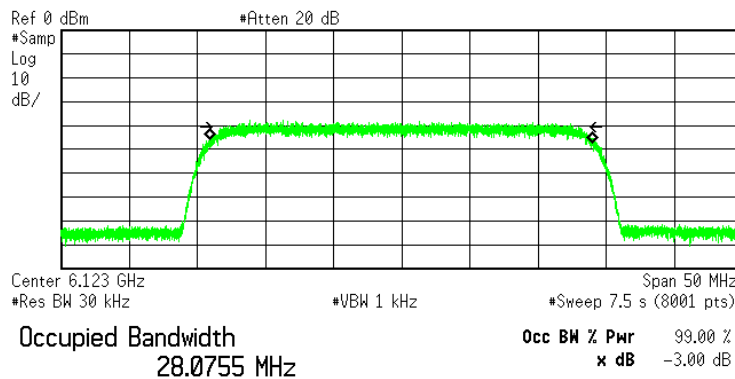
Agilent 15:08:35 Jun 14, 2013



Transmit Freq Error 2.103 kHz
Occupied Bandwidth 25.621 MHz*

512 QAM

Agilent 15:09:36 Jun 14, 2013



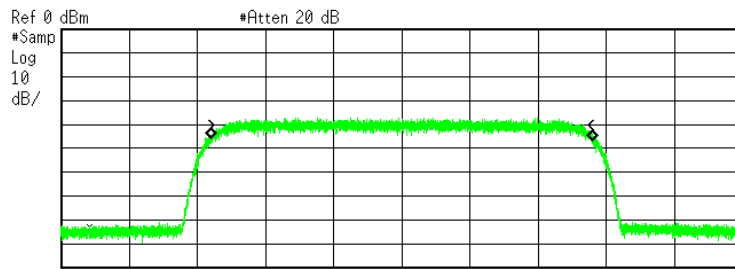
Transmit Freq Error -8.628 kHz
Occupied Bandwidth 26.026 MHz*

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	150 / 302

256 QAM

Agilent 15:10:35 Jun 14, 2013



Center 6.123 GHz Span 50 MHz
#Res BW 30 kHz #VBW 1 kHz #Sweep 7.5 s (8001 pts)

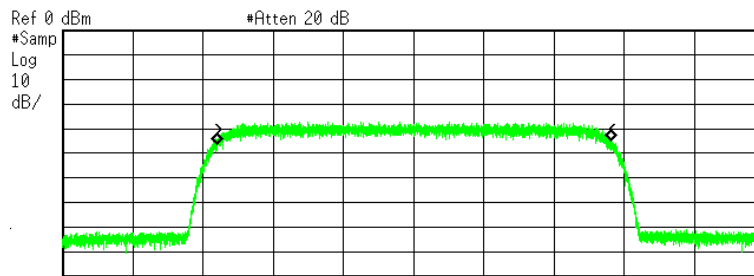
Occupied Bandwidth
28.0514 MHz

Occ BW % Pwr 99.00 %
x dB -3.00 dB

Transmit Freq Error -7.258 kHz
Occupied Bandwidth 25.732 MHz*

128 QAM

Agilent 15:12:00 Jun 14, 2013



Center 6.123 GHz Span 50 MHz
#Res BW 30 kHz #VBW 1 kHz #Sweep 7.5 s (8001 pts)

Occupied Bandwidth
28.0705 MHz

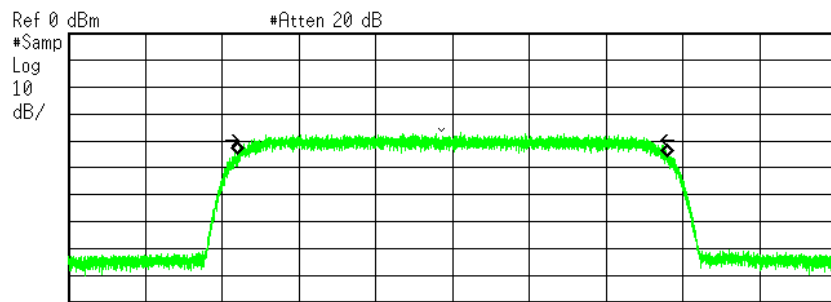
Occ BW % Pwr 99.00 %
x dB -3.00 dB

Transmit Freq Error 1.528 kHz
Occupied Bandwidth 25.921 MHz*

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	151 / 302

64 QAM

Agilent 15:13:21 Jun 14, 2013



Center 6.123 GHz Span 50 MHz
#Res BW 30 kHz #VBW 1 kHz #Sweep 7.5 s (8001 pts)

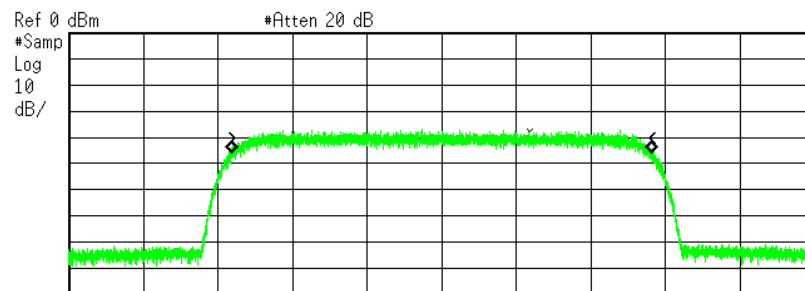
Occupied Bandwidth
28.0604 MHz

Occ BW % Pwr 99.00 %
x dB -3.00 dB

Transmit Freq Error -4.137 kHz
Occupied Bandwidth 25.770 MHz*

32 QAM

Agilent 15:15:08 Jun 14, 2013



Center 6.123 GHz Span 50 MHz
#Res BW 30 kHz #VBW 1 kHz #Sweep 7.5 s (8001 pts)

Occupied Bandwidth
28.0731 MHz

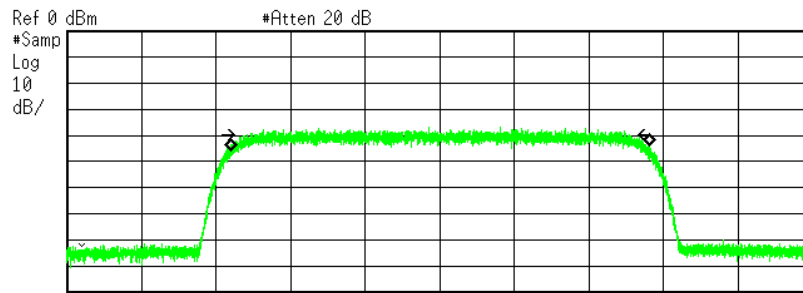
Occ BW % Pwr 99.00 %
x dB -3.00 dB

Transmit Freq Error 1.238 kHz
Occupied Bandwidth 26.015 MHz*

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	152 / 302
	HTS: 4901.99.0050			

16 QAM

Agilent 15:16:42 Jun 14, 2013

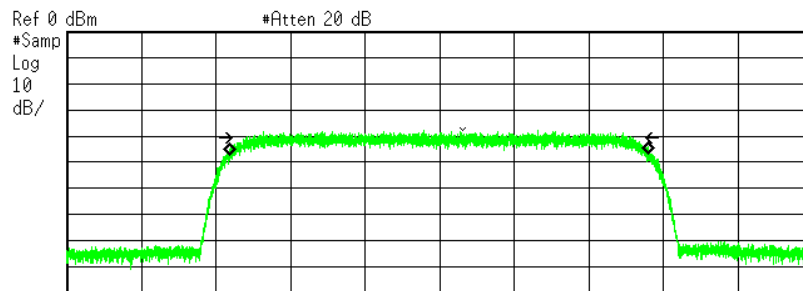


Center 6.123 GHz Span 50 MHz
 #Res BW 30 kHz #VBW 1 kHz #Sweep 7.5 s (8001 pts)
Occupied Bandwidth 28.0688 MHz
Occ BW % Pwr 99.00 %
x dB -3.00 dB

Transmit Freq Error 481.035 Hz
Occupied Bandwidth 25.385 MHz*

4 QAM

Agilent 15:19:28 Jun 14, 2013



Center 6.123 GHz Span 50 MHz
 #Res BW 30 kHz #VBW 1 kHz #Sweep 7.5 s (8001 pts)
Occupied Bandwidth 28.0398 MHz
Occ BW % Pwr 99.00 %
x dB -3.00 dB

Transmit Freq Error -20.075 kHz
Occupied Bandwidth 26.065 MHz*

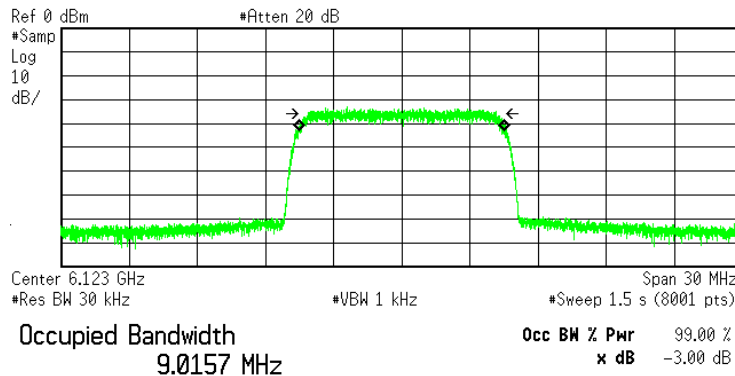
This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	153 / 302

10 MHz

1024 QAM

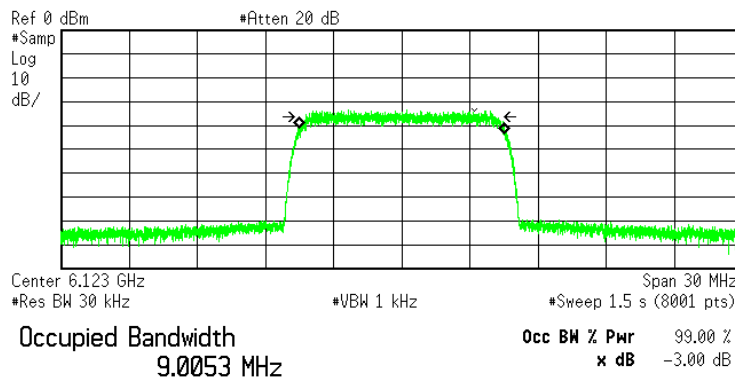
Agilent 14:07:36 Jun 14, 2013



Transmit Freq Error -1.848 kHz
x dB Bandwidth 8.205 MHz*

512 QAM

Agilent 14:08:17 Jun 14, 2013



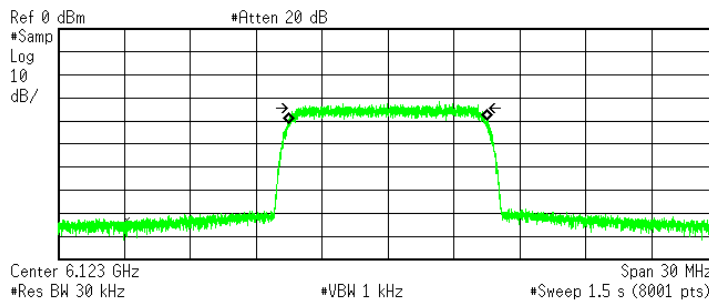
Transmit Freq Error -2.046 kHz
x dB Bandwidth 8.240 MHz*

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	154 / 302

256 QAM

Agilent 14:09:26 Jun 14, 2013



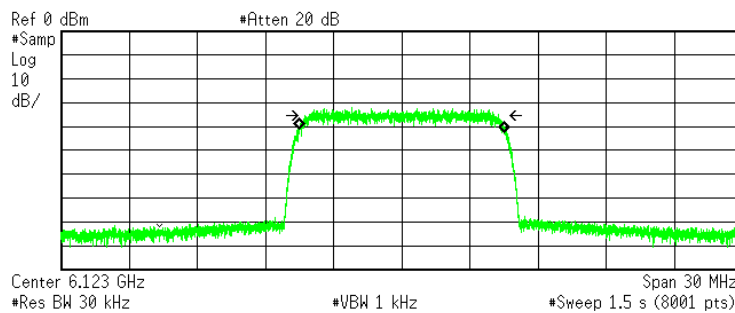
Occupied Bandwidth
9.0172 MHz

Occ BW % Pwr 99.00 %
x dB -3.00 dB

Transmit Freq Error -4.978 kHz
x dB Bandwidth 8.175 MHz*

128 QAM

Agilent 14:10:59 Jun 14, 2013



Occupied Bandwidth
9.0008 MHz

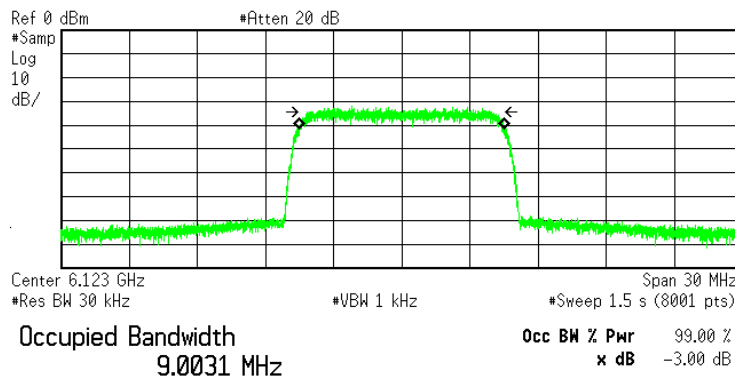
Occ BW % Pwr 99.00 %
x dB -3.00 dB

Transmit Freq Error 2.460 kHz
x dB Bandwidth 8.315 MHz*

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	155 / 302
	HTS: 4901.99.0050			

64 QAM

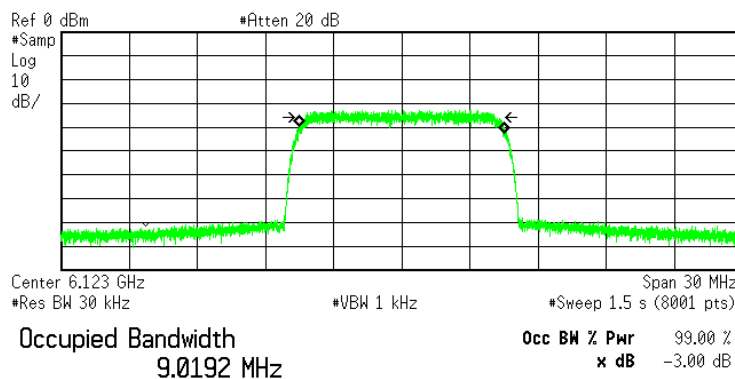
Agilent 14:12:56 Jun 14, 2013



Transmit Freq Error 7.415 kHz
x dB Bandwidth 8.127 MHz*

32 QAM

Agilent 14:13:53 Jun 14, 2013



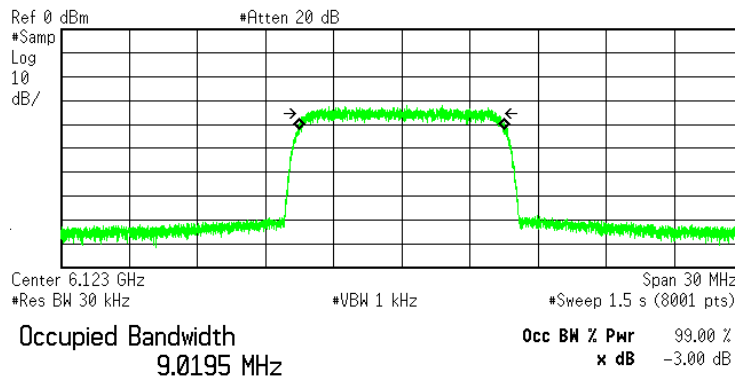
Transmit Freq Error -1.589 kHz
x dB Bandwidth 8.294 MHz*

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	156 / 302

16 QAM

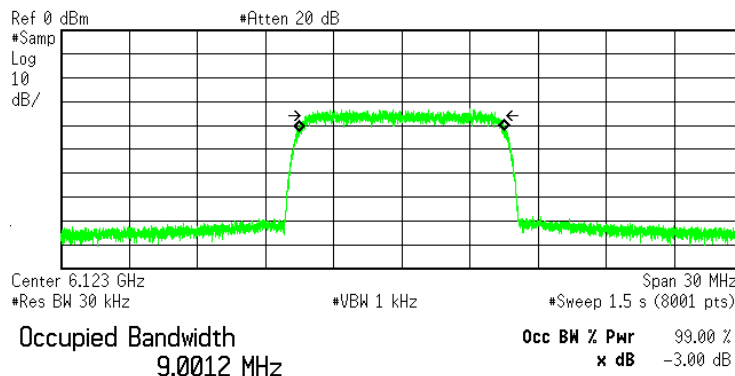
Agilent 14:15:45 Jun 14, 2013



Transmit Freq Error 9.822 kHz
x dB Bandwidth 8.206 MHz*

4 QAM

Agilent 14:17:03 Jun 14, 2013



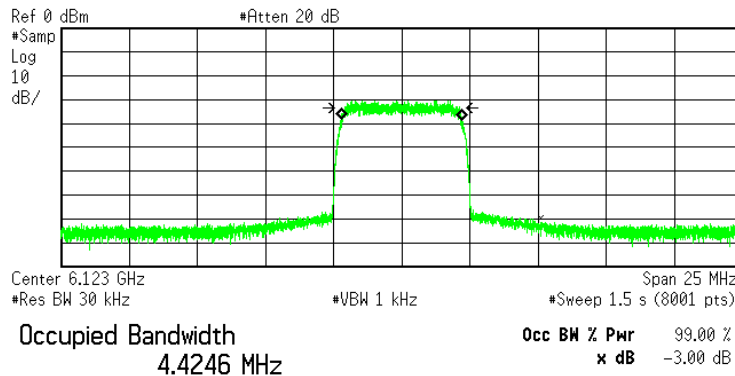
Transmit Freq Error 7.942 kHz
x dB Bandwidth 8.065 MHz*

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	157 / 302

5 MHz

1024 QAM

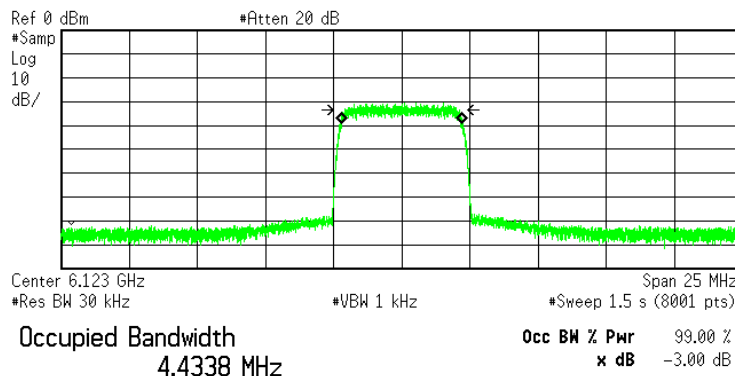
Agilent 13:42:40 Jun 14, 2013



Transmit Freq Error 2.197 kHz
x dB Bandwidth 3.978 MHz*

512 QAM

Agilent 13:43:31 Jun 14, 2013

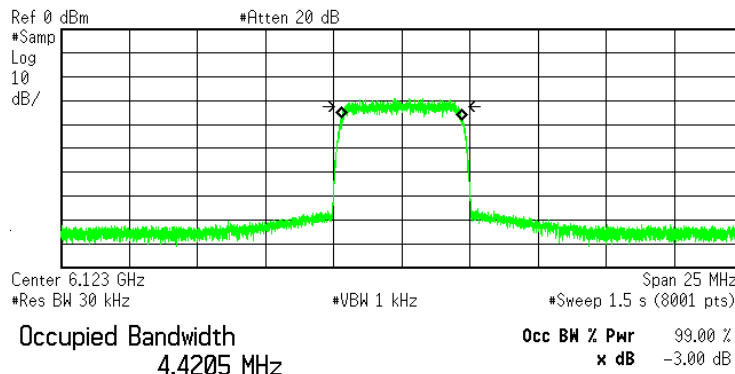


Transmit Freq Error -496.917 Hz
x dB Bandwidth 4.087 MHz*

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	158 / 302
	HTS: 4901.99.0050			

256 QAM

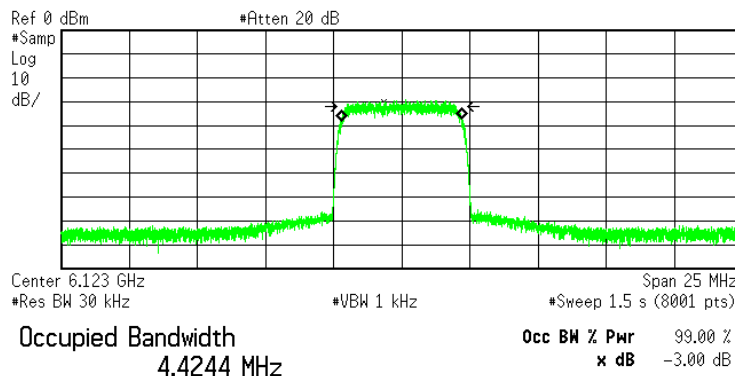
Agilent 13:44:34 Jun 14, 2013



Transmit Freq Error 3.247 kHz
x dB Bandwidth 4.053 MHz*

128 QAM

Agilent 13:46:49 Jun 14, 2013

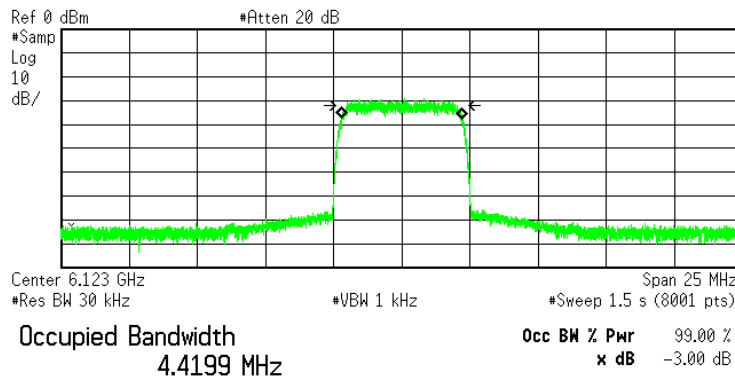


Transmit Freq Error 5.677 kHz
x dB Bandwidth 3.948 MHz*

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	159 / 302
	HTS: 4901.99.0050			

64 QAM

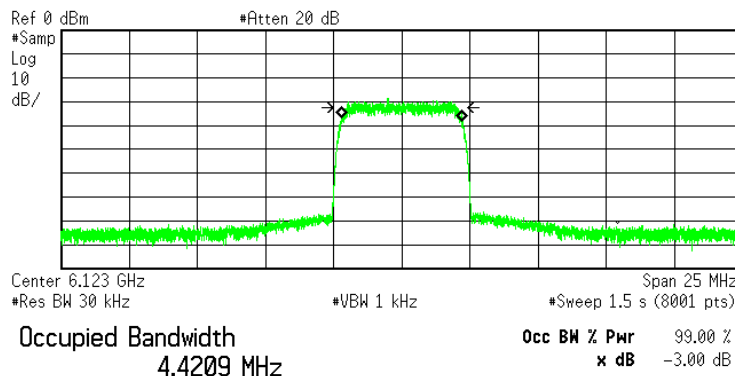
Agilent 13:47:57 Jun 14, 2013



Transmit Freq Error 4.796 kHz
x dB Bandwidth 4.034 MHz*

32 QAM

Agilent 13:49:06 Jun 14, 2013

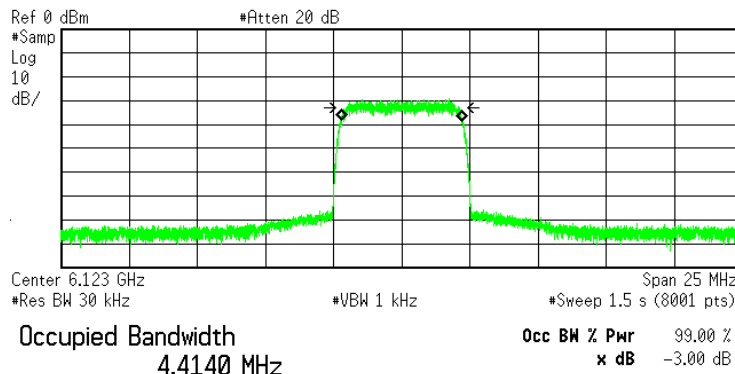


Transmit Freq Error -1.264 kHz
x dB Bandwidth 4.096 MHz*

ED	01			
	ECCN: 5E991		3DB19060AAAAQZZZA	160 / 302
	HTS: 4901.99.0050			

16 QAM

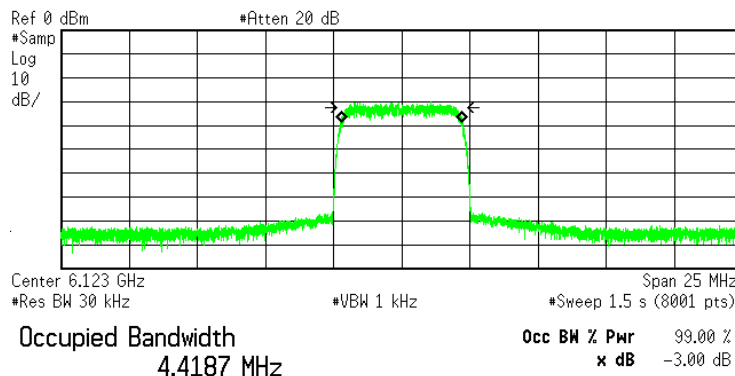
Agilent 13:50:25 Jun 14, 2013



Transmit Freq Error 3.828 kHz
x dB Bandwidth 4.016 MHz*

4 QAM

Agilent 13:51:28 Jun 14, 2013



Transmit Freq Error 3.868 kHz
x dB Bandwidth 3.975 MHz*

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	161 / 302

3 DOD DATA

The goal of this series of tests is to acquire the necessary data for the department of defense (DoD).

PVG 620				
U6 GHz V2	Emission Bandwidth			
Bandwidth	-3dB	-20 dB	-40 dB	-60dB
5 MHz	4.08 MHz	N/A	N/A	N/A
10 MHz	8.2	N/A	N/A	N/A
30 MHz	26.02	N/A	N/A	N/A
60 MHz	46.99	N/A	N/A	N/A
Transmitter Filter Nomenclature	.01 dB ripple Chebychev response			
Nr. Cavities or Rolloff	5 cavities no zero Rolloff			
Transmitter Harmonic Attenuation	Second		N/A	
	Third		N/A	
Transmitter Inter modulation Criteria	Amplifier Gain		N/A	
	1 dB compression		N/A	
	3rd order Intercept Point		N/A	

Table 7 DoD Table

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	162 / 302

4 RECEIVER PERFORMANCE

The goal of this series of tests is to verify the accuracy of the receiver calibration, and the Receiver L.O. leakage.

4.1 RECEIVER LEVEL VERIFICATION

The goal of this test is verify the accuracy of the receiver calibration.

4.1.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- 10 dB fixed attenuator
- Test set Tektronix ST112

4.1.2 SETUP CONFIGURATION

- Connect as shown in figure 9
- Mute the local transmitter.
- Calibrate the RSL level going into the receiver.
- Verify the receiver connected to the test set #2 (figure 1) is locked at nominal level (-45 dBm RSL)
- Verify that test set #2 is running error free.

4.1.3 TEST PROCEDURE

Test Case 3a: Measure the receiver level with the power meter and compared with the craft terminal.

Summary: To verify that the receiver is calibrated.

Steps:

The following will be verified on the radio under test under test.

- Verify the receiver is locked
- Monitor the receiver connected to test set #2, make sure is running error free at nominal level
- Verify that traffic is running on main side.
- Measure the RSL into the receiver with a power meter
- Read the value in the craft terminal and compare the values.

Expected Results:

See Spec below.

Results:

See Data Below.

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZA

163 / 302

--

4.1.4 TEST DATA

Spec

SRID-R_SYS_RADI_MGMT_1512 [R] # Received Power computation accuracy

The received power computation accuracy shall be:

- +/- 2.5dB in range from -102dBm up to -96dBm
- +/- 1.5dB in range from -96dBm up to -53dBm
- +/- 2.0dB in range from -53dBm up to -35dBm
- +/- 3.0dB in range from -35dBm up to -20dBm

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	164 / 302

30 MHz Profiles in FCM Mode

L6 GHz 30 MHz Profiles in FCM mode Fc=6123.1 MHz								
30 MHz Profiles in FCM in mode								
6123.1MHz 30MHz 1024QAM			6123.1MHz, 30MHz, 128QAM			6123.1MHz 30MHz16QAM		
RSL Input (dBm)	Reading (dBm)	Offset	RSL Input (dBm)	Reading (dBm)	Offset	RSL Input (dBm)	Reading (dBm)	Offset
-20.0	-19.7	-0.3	-20	-19.6	-0.4	-20.0	-19.5	-0.5
-22.0	-21.4	-0.6	-22	-21.5	-0.5	-21.0	-20.7	-0.3
-24.0	-23.7	-0.3	-24	-23.4	-0.6	-22.0	-21.5	-0.5
-26.0	-24.1	-1.9	-26	-25.3	-0.7	-23.0	-22.2	-0.8
-28.0	-26.7	-1.3	-28	-26.7	-1.3	-24.0	-23.6	-0.4
-30.0	-28.2	-1.8	-30	-30.1	0.1	-25.0	-23.5	-1.5
-32.0	-31.3	-0.7	-32	-31.6	-0.4	-26.0	-23.9	-2.1
-34.0	-33.5	-0.5	-34	-33.7	-0.3	-27.0	-25.60	-1.4
-36.0	-34.7	-1.3	-36	-34.7	-1.3	-28.0	-26.8	-1.2
-38.0	-36.2	-1.8	-38	-36.2	-1.8	-29.0	-29.8	0.8
-40.0	-38.7	-1.3	-40	-38	-2	-30.0	-28.1	-1.9
-42.0	-40.6	-1.4	-42	-40.6	-1.4	-31.0	-31	0.0
-44.0	-43.8	-0.2	-44	-42.6	-1.4	-32.0	-31.7	-0.3
-45.0	-44.7	-0.3	-45.0	-44.4	-0.6	-33.0	-32.3	-0.7
-46.0	-45.9	-0.1	-46.0	-45.6	-0.4	-34.0	-33.3	-0.7
-47.0	-47.1	0.1	-47.0	-47.0	0	-35.0	-34.3	-0.7
-48.0	-48.1	0.1	-48.0	-47.9	-0.1	-36.0	-35.5	-0.5
-49.0	-49.9	0.9	-49.0	-49.4	0.4	-37.0	-35.4	-1.6
-50.0	-51.1	1.1	-50.0	-50.7	0.7	-38.0	-36.3	-1.7
-51.0	-52.0	1.0	-51.0	-51.7	0.7	-39.0	-37.3	-1.7
-52.0	-52.7	0.7	-52.0	-52.5	0.5	-40.0	-38.8	-1.2
-53.0	-53.4	0.4	-53.0	-53.3	0.3	-41.0	-40	-1.0
-54.0	-54.0	0.0	-54.0	-53.8	-0.2	-42.0	-40.7	-1.3
-55.0	-54.9	-0.1	-55.0	-54.6	-0.4	-43.0	-42.9	-0.1
-56.0	-55.9	-0.1	-56.0	-55.5	-0.5	-44.0	-43.9	-0.1
-57.0	-57.0	0.0	-57.0	-56.6	-0.4	-45.0	-45.4	0.4
-58.0	-58.2	0.2	-58.0	-57.8	-0.2	-46.0	-46.0	0.0
-59.0	-59.5	0.5	-59.0	-58.9	-0.1	-47.0	-47.2	0.2
-60.0	-60.6	0.6	-60.0	-60.2	0.2	-48.0	-48.8	0.8
-61.0	-62.0	1.0	-61.0	-61.3	0.3	-49.0	-49.8	0.8
-62.0	-63.1	1.1	-62.0	-62.7	0.7	-50.0	-51.0	1.0
-63.0	-64.0	1.0	-63.0	-63.7	0.7	-51.0	-52.0	1.0
-64.0	-64.8	0.8	-64.0	-64.4	0.4	-52.0	-52.7	0.7
-65.0	-65.4	0.4	-65.0	-65.0	0	-53.0	-53.4	0.4
-66.0	-66.0	0.0	-66.0	-65.6	-0.4	-54.0	-54.1	0.1
-67.0	-66.7	-0.3	-67.0	-66.2	-0.8	-55.0	-55.0	0.0
-68.0	-67.5	-0.5	-68.0	-67.1	-0.9	-56.0	-55.6	-0.4
-69.0	-68.4	-0.6	-69.0	-67.9	-1.1	-57.0	-57.1	0.1
-70.0	-69.6	-0.4	-70.0	-68.8	-1.2	-58.0	-58.3	0.3
-71.0	-70.6	-0.4	-71.0	-70.0	-1	-59.0	-59.6	0.6
-72.0	-71.7	-0.3	-72.0	-71.0	-1	-60.0	-60.7	0.7
-73.0	-73.0	0.0	-73.0	-72.0	-1	-61.0	-62.1	1.1
-74.0	-74.3	0.3	-74.0	-73.2	-0.8	-62.0	-63.2	1.2
-75.0	-75.7	0.7	-75.0	-74.6	-0.4	-63.0	-64.2	1.2
-76.0	-76.5	0.5	-76.0	-76.4	0.4	-64.0	-64.8	0.8
-78.0	-77.8	-0.2	-78.0	-77.7	-0.3	-65.0	-65.6	0.6
-80.0	-79.0	-1.0	-80.0	-79.3	-0.7	-66.0	-66.0	0.0
-82.0	-81.1	-0.9	-82.0	-81	-1	-67.0	-66.8	-0.2
-84.0	-83.2	-0.8	-84.0	-83.2	-0.8	-68.0	-67.6	-0.4
-86.0	-85.4	-0.6	-86.0	-85.3	-0.7	-69.0	-68.5	-0.5
-88.0	-87.5	-0.5	-88.0	-87.6	-0.4	-70.0	-69.5	-0.5
-90.0	-88.9	-1.1	-90.0	-88.8	-1.2	-71.0	-70.7	-0.3
						-72.0	-71.8	-0.2
						-73.0	-73.1	0.1
						-74.0	-74.5	0.5
						-75.0	-75.7	0.7
						-76.0	-76.6	0.6
						-77.0	-77.1	0.1
						-78.0	-77.8	-0.2
						-79.0	-78.5	-0.5
						-80.0	-79.1	-0.9
						-81.0	-80.3	-0.7
						-82.0	-81.1	-0.9
						-83.0	-82.2	-0.8
						-84.0	-83.3	-0.7
						-85.0	-84.4	-0.6
						-86.0	-85.5	-0.5

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01		
	ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	165 / 302

Corner Profiles in FCM Mode

L6 GHz Corner Profiles in FCM mode Fc= 6123.1 MHz														
60 MHz						30 MHz			5 MHz					
1024QAM			256 QAM			30MHz 128QAM			1024QAM			5MHz 4QAM		
RSL Input (dBm)	Reading (dBm)	Offset	RSL Input (dBm)	Reading (dBm)	Offset	RSL Input (dBm)	Reading (dBm)	Offset	RSL Input (dBm)	Reading (dBm)	Offset	RSL Input (dBm)	Reading (dBm)	Offset
-20.0	-19.3	-0.7	-20.0	-19.3	-0.7	-20.0	-20.2	0.2	-20	-20.2	0.2	-20.0	-19.9	-0.1
-21.0	-20.3	-0.7	-21.0	-20.1	-0.9	-21.0	-21.5	0.5	-22	-22.2	0.2	-22.0	-22.0	0.0
-22.0	-21.3	-0.7	-22.0	-21.3	-0.7	-22.0	-22.5	0.5	-24	-24.1	0.1	-24.0	-24.2	0.2
-23.0	-22.3	-0.7	-23.0	-22.3	-0.7	-23.0	-23.5	0.5	-26	-26.2	0.2	-26.0	-25.8	-0.2
-24.0	-23.3	-0.7	-24.0	-23.3	-0.7	-24.0	-24.5	0.5	-28	-27.9	-0.1	-28.0	-27.6	-0.4
-25.0	-24.4	-0.6	-25.0	-24.4	-0.6	-25.0	-25.3	0.3	-30	-29.6	-0.4	-30.0	-29.7	-0.3
-26.0	-25.2	-0.8	-26.0	-25.3	-0.7	-26.0	-26.5	0.5	-32	-31.6	-0.4	-32.0	-31.4	-0.6
-27.0	-26.10	-0.9	-27.0	-26.10	-0.9	-27.0	-27.30	0.3	-34	-33.9	-0.1	-34.0	-33.7	-0.3
-28.0	-27.1	-0.9	-28.0	-27.1	-0.9	-28.0	-28.1	0.1	-36	-35.9	-0.1	-36.0	-35.7	-0.3
-29.0	-28.1	-0.9	-29.0	-28	-1.0	-29.0	-29.2	0.2	-38	-37.5	-0.5	-38.0	-37.4	-0.6
-30.0	-29.1	-0.9	-30.0	-28.9	-1.1	-30.0	-30.1	0.1	-40	-39.4	-0.6	-40.0	-39.6	-0.4
-31.0	-29.9	-1.1	-31.0	-29.9	-1.1	-31.0	-30.9	-0.1	-42	-41.1	-0.9	-42.0	-41.2	-0.8
-32.0	-30.9	-1.1	-32.0	-30.9	-1.1	-32.0	-32.1	0.1	-44	-43.1	-0.9	-44.0	-43.0	-1.0
-33.0	-31.7	-1.3	-33.0	-31.8	-1.2	-33.0	-32.9	-0.1	-45.0	-44.2	-0.8	-45.0	-44.0	-1.0
-34.0	-32.6	-1.4	-34.0	-32.5	-1.5	-34.0	-34	0.0	-46.0	-45.1	-0.9	-46.0	-45.2	-0.8
-35.0	-34.3	-0.7	-35.0	-34.1	-0.9	-35.0	-35.2	0.2	-47.0	-46.3	-0.7	-47.0	-46.1	-0.9
-36.0	-34.9	-1.1	-36.0	-35.3	-0.7	-36.0	-36.3	0.3	-48.0	-47.1	-0.9	-48.0	-47.2	-0.8
-37.0	-36.1	-0.9	-37.0	-36.3	-0.7	-37.0	-37.2	0.2	-49.0	-48.3	-0.7	-49.0	-48.0	-1.0
-38.0	-37.1	-0.9	-38.0	-37	-1.0	-38.0	-37.9	-0.1	-50.0	-49.2	-0.8	-50.0	-49.1	-0.9
-39.0	-37.9	-1.1	-39.0	-37.9	-1.1	-39.0	-38.9	-0.1	-51.0	-50.4	-0.6	-51.0	-50.1	-0.9
-40.0	-38.6	-1.4	-40.0	-38.8	-1.2	-40.0	-39.5	-0.5	-52.0	-51.3	-0.7	-52.0	-51.1	-0.9
-41.0	-39.7	-1.3	-41.0	-39.3	-1.7	-41.0	-40.6	-0.4	-53.0	-52.3	-0.7	-53.0	-52.2	-0.8
-42.0	-40.4	-1.6	-42.0	-40.3	-1.7	-42.0	-41.5	-0.5	-54.0	-53.2	-0.8	-54.0	-53.1	-0.9
-43.0	-41.4	-1.6	-43.0	-41.3	-1.7	-43.0	-42.5	-0.5	-55.0	-54.3	-0.7	-55.0	-54.2	-0.8
-44.0	-42.3	-1.7	-44.0	-42.4	-1.6	-44.0	-43.4	-0.6	-56.0	-55.4	-0.6	-56.0	-55.1	-0.9
-45.0	-43.5	-1.5	-45.0	-43.6	-1.4	-45.0	-44.5	-0.5	-57.0	-56.3	-0.7	-57.0	-56.2	-0.8
-46.0	-44.5	-1.5	-46.0	-44.2	-1.8	-46.0	-45.4	-0.6	-58.0	-57.4	-0.6	-58.0	-57.2	-0.8
-47.0	-45.5	-1.5	-47.0	-45.2	-1.8	-47.0	-46.3	-0.7	-59.0	-58.4	-0.6	-59.0	-58.2	-0.8
-48.0	-46.2	-1.8	-48.0	-46.4	-1.6	-48.0	-47.3	-0.7	-60.0	-59.4	-0.6	-60.0	-59.3	-0.7
-49.0	-47.2	-1.8	-49.0	-47.3	-1.7	-49.0	-48.3	-0.7	-61.0	-60.6	-0.4	-61.0	-60.3	-0.7
-50.0	-48.3	-1.7	-50.0	-48.2	-1.8	-50.0	-49.3	-0.7	-62.0	-61.3	-0.7	-62.0	-61.2	-0.8
-51.0	-49.1	-1.9	-51.0	-49.4	-1.6	-51.0	-50.5	-0.5	-63.0	-62.4	-0.6	-63.0	-62.3	-0.7
-52.0	-50.2	-1.8	-52.0	-50.6	-1.4	-52.0	-51.3	-0.7	-64.0	-63.3	-0.7	-64.0	-63.4	-0.6
-53.0	-51.1	-1.9	-53.0	-51.7	-1.3	-53.0	-52.2	-0.8	-65.0	-64.5	-0.5	-65.0	-64.2	-0.8
-54.0	-52.1	-1.9	-54.0	-52.4	-1.6	-54.0	-53.5	-0.5	-66.0	-65.2	-0.8	-66.0	-65.1	-0.9
-55.0	-53.1	-1.9	-55.0	-53.2	-1.8	-55.0	-54.4	-0.6	-67.0	-66.4	-0.6	-67.0	-66.2	-0.8
-56.0	-54.0	-2.0	-56.0	-54.7	-1.3	-56.0	-55.3	-0.7	-68.0	-67.2	-0.8	-68.0	-67.3	-0.7
-57.0	-55.1	-1.9	-57.0	-55.4	-1.6	-57.0	-56.3	-0.7	-69.0	-68.2	-0.8	-69.0	-68.1	-0.9
-58.0	-56.1	-1.9	-58.0	-56.4	-1.6	-58.0	-57.5	-0.5	-70.0	-69.4	-0.6	-70.0	-69.2	-0.8
-59.0	-57.1	-1.9	-59.0	-57.4	-1.6	-59.0	-58.5	-0.5	-71.0	-70.3	-0.7	-71.0	-70.3	-0.7
-60.0	-58.1	-1.9	-60.0	-58.5	-1.5	-60.0	-59.4	-0.6	-72.0	-71.2	-0.8	-72.0	-71.2	-0.8
-61.0	-59.0	-2.0	-61.0	-59.4	-1.6	-61.0	-60.6	-0.4	-73.0	-72.2	-0.8	-73.0	-72.2	-0.8
-62.0	-60.2	-1.8	-62.0	-60.4	-1.6	-62.0	-61.5	-0.5	-74.0	-73.3	-0.7	-74.0	-73.1	-0.9
-63.0	-61.0	-2.0	-63.0	-61.4	-1.6	-63.0	-62.4	-0.6	-75.0	-74.1	-0.9	-75.0	-74.2	-0.8
-64.0	-62.2	-1.8	-64.0	-62.3	-1.7	-64.0	-63.4	-0.6	-76.0	-75.2	-0.8	-76.0	-75.2	-0.8
-65.0	-62.9	-2.1	-65.0	-63.5	-1.5	-65.0	-64.3	-0.7	-78.0	-77.3	-0.7	-78.0	-77.1	-0.9
-66.0	-64.1	-1.9	-66.0	-64.3	-1.7	-66.0	-65.3	-0.7	-80.0	-79.3	-0.7	-80.0	-79.1	-0.9
-67.0	-65.1	-1.9	-67.0	-65.4	-1.6	-67.0	-66.4	-0.6	-82.0	-81	-1	-82.0	-81.2	-0.8
-68.0	-66.2	-1.8	-68.0	-66.5	-1.5	-68.0	-67.5	-0.5	-84.0	-83.4	-0.6	-84.0	-83.3	-0.7
-69.0	-67.2	-1.8	-69.0	-67.5	-1.5	-69.0	-68.6	-0.4	-86.0	-85.4	-0.6	-86.0	-85.2	-0.8
-70.0	-68.0	-2.0	-70.0	-68.5	-1.5	-70.0	-69.6	-0.4	-88.0	-87.4	-0.6	-88.0	-87.2	-0.8
-71.0	-69.1	-1.9	-71.0	-69.4	-1.6	-71.0	-70.5	-0.5	-90.0	-89.1	-0.9	-90.0	-88.9	-1.1
-72.0	-70.2	-1.8	-72.0	-70.6	-1.4	-72.0	-71.6	-0.4						
-73.0	-71.0	-2.0	-73.0	-71.3	-1.7	-73.0	-72.6	-0.4						
-74.0	-72.3	-1.7	-74.0	-72.6	-1.4	-74.0	-73.7	-0.3						
-75.0	-73.4	-1.6	-75.0	-73.5	-1.5	-75.0	-74.4	-0.6						
-76.0	-74.0	-2.0	-76.0	-74.6	-1.4	-76.0	-75.6	-0.4						
-77.0	-75.0	-2.0	-77.0	-75.5	-1.5	-77.0	-76.6	-0.4						
-78.0	-76.0	-2.0	-78.0	-76.3	-1.7	-78.0	-77.7	-0.3						
-79.0	-77.1	-1.9	-79.0	-77.3	-1.7	-79.0	-78.7	-0.3						
-80.0	-78.0	-2.0	-80.0	-78.3	-1.7	-80.0	-79.6	-0.4						
-82.0	-79.6	-2.4	-82.0	-80.0	-2.0	-82.0	-81.4	-0.6						
-84.0	-81.3	-2.7	-84.0	-81.5	-2.5	-84.0	-83.3	-0.7						
-86.0	-82.8	-3.2	-86.0	-83.3	-2.7	-86.0	-84.8	-1.2						
-88.0	-85.3	-2.7	-88.0	-85.6	-2.4	-88.0	-86.2	-1.8						
-90.0	-87.4	-2.6	-90.0	-87.5	-2.5	-90.0	-88.5	-1.5						

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	166 / 302

V1-V2 Profiles

Receive Level Verification				
L6 GHz V1-V2 Profiles V2 as a Receiver Fc=5974.85 MHz				
30 MHz				
Power Setting (-dBm) RSL	Reference	256 QAM		
		MTK	MSE	Cal Off
20.00	-20.00	-21.40	-37.70	1.40
22.00	-22.00	-23.40	-38.00	1.40
24.00	-24.00	-25.50	-38.20	1.50
26.00	-26.00	-27.40	-38.90	1.40
28.00	-28.00	-29.20	-38.40	1.20
30.00	-30.00	-30.20	-39.30	0.20
32.00	-32.00	-31.90	-38.40	-0.10
34.00	-34.00	-34.40	-39.00	0.40
36.00	-36.00	-36.50	-38.20	0.50
38.00	-38.00	-38.40	-39.30	0.40
40.00	-40.00	-39.70	-38.70	-0.30
42.00	-42.00	-41.90	-37.20	-0.10
44.00	-44.00	-44.10	-38.30	0.10
46.00	-46.00	-45.90	-39.70	-0.10
48.00	-48.00	-47.90	-39.00	-0.10
50.00	-50.00	-50.00	-35.70	0.00
52.00	-52.00	-51.90	-36.60	-0.10
54.00	-54.00	-54.10	-37.60	0.10
56.00	-56.00	-56.10	-36.90	0.10
58.00	-58.00	-57.80	-36.20	-0.20
60.00	-60.00	-59.80	-35.20	-0.20
62.00	-62.00	-62.70	-33.30	0.70
64.00	-64.00	-64.5	-31.7	0.50
66.00	-66.00	-66.2	-30.3	0.20
68.00	-68.00	-68.2	-28.5	0.20
70.00	-70.00	-70.4	-26.7	0.40
72.00	-72.00	-72.9	-25.2	0.90
74.00	-74.00	-74.6	-14.4	0.60
76.00	-76.00	-76.8	-24	0.80
78.00	-78.00	-78.7	-66	0.70
80.00	-80.00	-80.6	-62	0.60
82.00	-82.00	-82.5	-64.5	0.50
84.00	-84.00	-84.3	-64.8	0.30
86.00	-86.00	-85.8	-70.1	-0.20
88.00	-88.00	-87.6	-77	-0.40
90.00	-90.00	-90.1	-69.8	0.10

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	167 / 302

Receive Level Verification				
L6 GHz V1-V2 Profiles V2 as a Receiver Fc=5974.85 MHz				
5 MHz				
Power Setting (dBm) RSL	Reference	128 QAM		
		MTK	MSE	Cal Off
20.00	-20.00	-22.80	-35.40	2.80
22.00	-22.00	-25.10	-35.80	3.10
24.00	-24.00	-27.00	-34.30	3.00
26.00	-26.00	-28.80	-36.20	2.80
28.00	-28.00	-30.50	-35.80	2.50
30.00	-30.00	-31.60	-35.10	1.60
32.00	-32.00	-34.20	-36.20	2.20
34.00	-34.00	-36.00	-36.20	2.00
36.00	-36.00	-38.20	-36.00	2.20
38.00	-38.00	-39.50	-35.80	1.50
40.00	-40.00	-41.40	-36.00	1.40
42.00	-42.00	-43.70	-36.60	1.70
44.00	-44.00	-45.70	-34.70	1.70
46.00	-46.00	-47.50	-36.60	1.50
48.00	-48.00	-49.90	-35.50	1.90
50.00	-50.00	-51.50	-35.70	1.50
52.00	-52.00	-53.70	-35.70	1.70
54.00	-54.00	-55.80	-36.30	1.80
56.00	-56.00	-57.80	-35.60	1.80
58.00	-58.00	-59.90	-35.80	1.90
60.00	-60.00	-61.70	-35.20	1.70
62.00	-62.00	-64.30	-34.50	2.30
64.00	-64.00	-66.30	-34.40	2.30
66.00	-66.00	-68.10	-34.40	2.10
68.00	-68.00	-70.20	-33.50	2.20
70.00	-70.00	-72.00	-32.50	2.00
72.00	-72.00	-74.00	-30.80	2.00
74.00	-74.00	-76.20	-29.40	2.20
76.00	-76.00	-78.30	-27.80	2.30
78.00	-78.00	-80.50	-26.10	2.50
80.00	-80.00	-82.50	-24.40	2.50
82.00	-82.00	-84.70	-22.90	2.70
84.00	-84.00	-86.70	-19.80	2.70
86.00	-86.00	-88.40	-19.30	2.40
88.00	-88.00	-90.30	-19.60	2.30
90.00	-90.00	-92.00	-19.00	2.00

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	168 / 302

4.2 RECEIVER L.O. LEAKAGE VERIFICATION

The goal of this test is measure the L.O. leakage of the MPT-HL V2.

4.2.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- 10 dB fixed attenuator
- Test set Tektronix ST112

4.2.2 SETUP CONFIGURATION

- Connect as shown in figure 9
- Mute the local transmitter.
- Calibrate the RSL level going into the receiver.
- Verify the receiver connected to the test set #2 (figure 1) is locked at nominal level (-45 dBm RSL)
- Verify that test set #2 is running error free.

4.2.3 TEST PROCEDURE

Test Case 3b: Measure the receiver L.O. leakage of the MPT-HL V2.

Summary: To evaluate the L.O leakage of the local transmitter coming out of the receiver port

Steps:

The following will be verified on the radio under test under test.

- Verify the receiver is locked
- Monitor the receiver connected to test set #2, make sure is running error free at nominal level
- Verify that traffic is running on main side.
- Connect the Spectrum Analyzer to the input receiver port.
- Monitor the Receiver LO leakage frequency coming out of the receiver port.
- Monitor the leakage in the low, middle, high band of the frequency range.
- Record the data digitally.

Expected Results:

There is no spec right now.

Results:

The LO leakage is not visible.

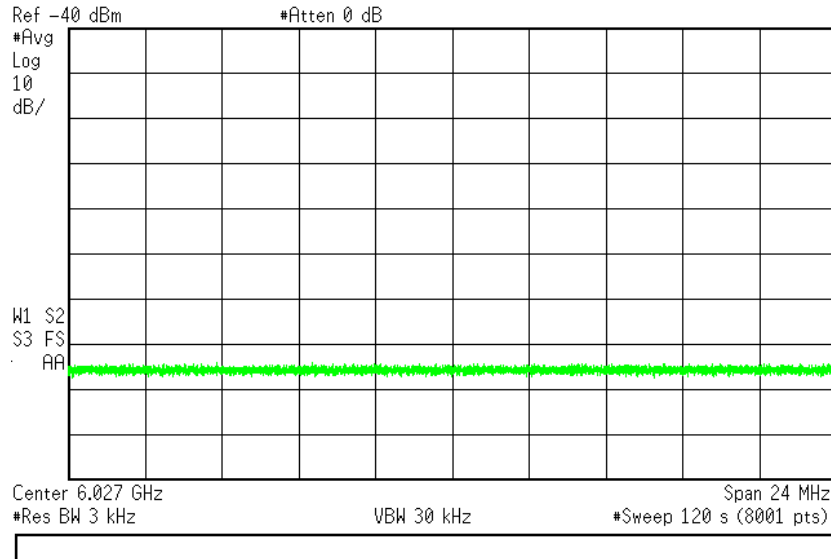
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	169 / 302

4.2.4 TEST DATA

Corner Profiles in FCM Mode

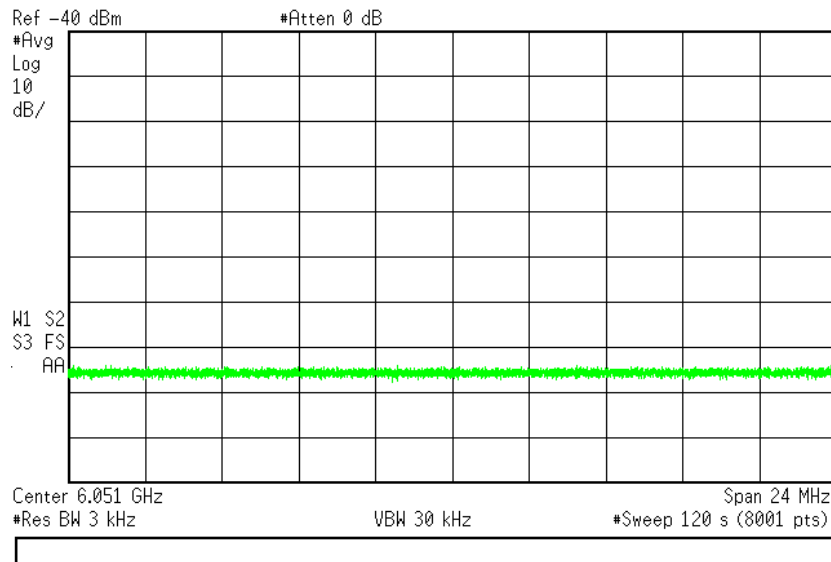
RX L.O. Leakage at 6027 MHZ (No Leakage)

Agilent 07:35:24 May 1, 2013



RX L.O. Leakage at 6051 MHZ (No Leakage)

Agilent 07:32:44 May 1, 2013

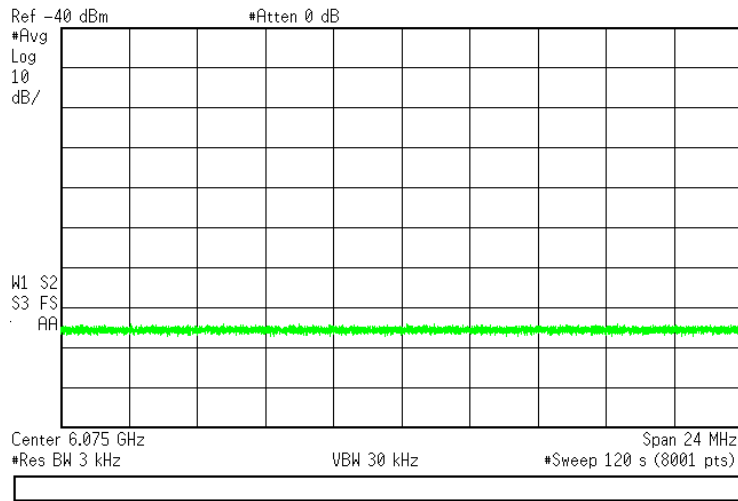


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	170 / 302

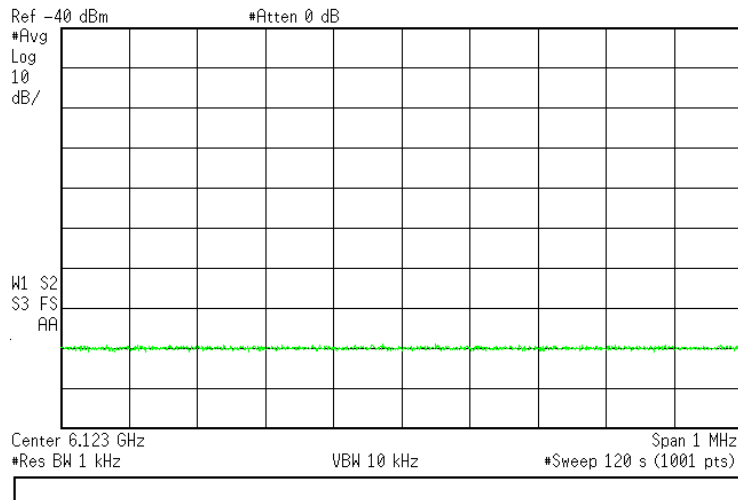
RX L.O. Leakage at 6075 MHZ (No Leakage)

Agilent 07:23:20 May 1, 2013



RX L.O. Leakage at 6123 MHZ (No Leakage)

Agilent 16:48:00 Apr 30, 2013

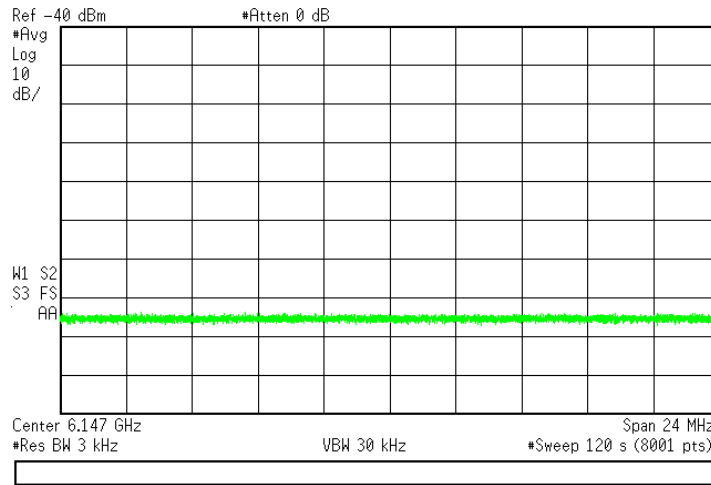


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	171 / 302

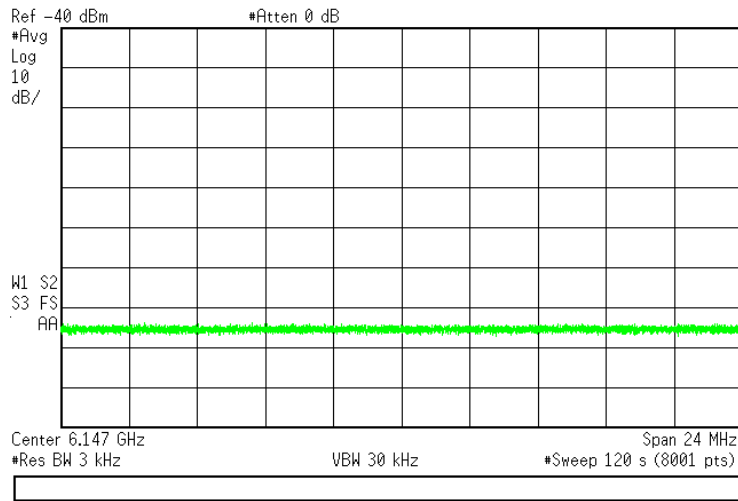
RX L.O. Leakage at 6147 MHZ (No Leakage)

Agilent 07:16:22 May 1, 2013



RX L.O. Leakage at 6147 MHZ (No Leakage)

Agilent 07:16:22 May 1, 2013

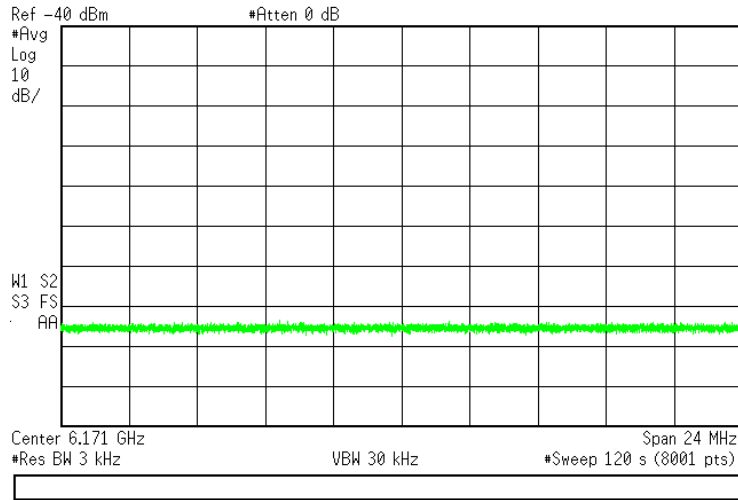


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	172 / 302

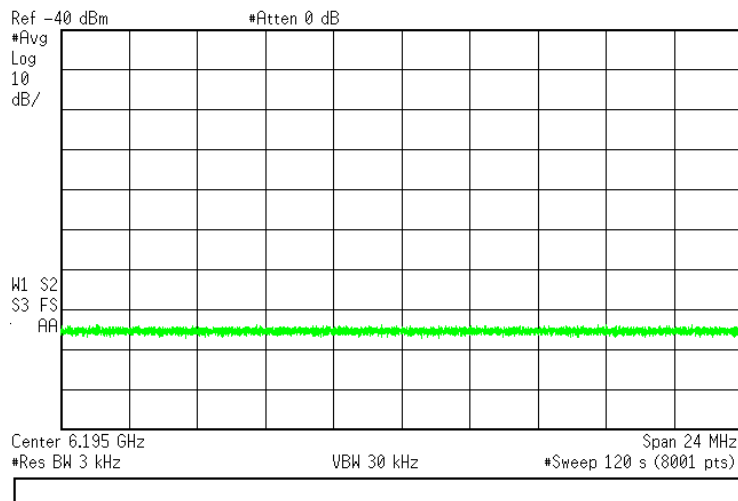
RX L.O. Leakage at 6171 MHZ (No Leakage)

Agilent 07:26:57 May 1, 2013



RX L.O. Leakage at 6195 MHZ (No Leakage)

Agilent 07:29:39 May 1, 2013

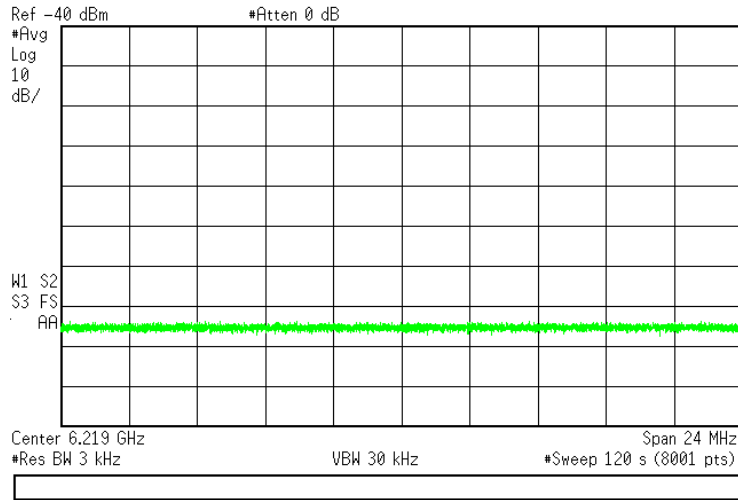


This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	173 / 302

RX L.O. Leakage at 6219 MHZ (No Leakage)

Agilent 07:38:18 May 1, 2013



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	174 / 302

5 SYSTEM PERFORMANCE

The goal of this series of tests is to acquire the data necessary to verify the performance of the 9500 MPT-HL V2.

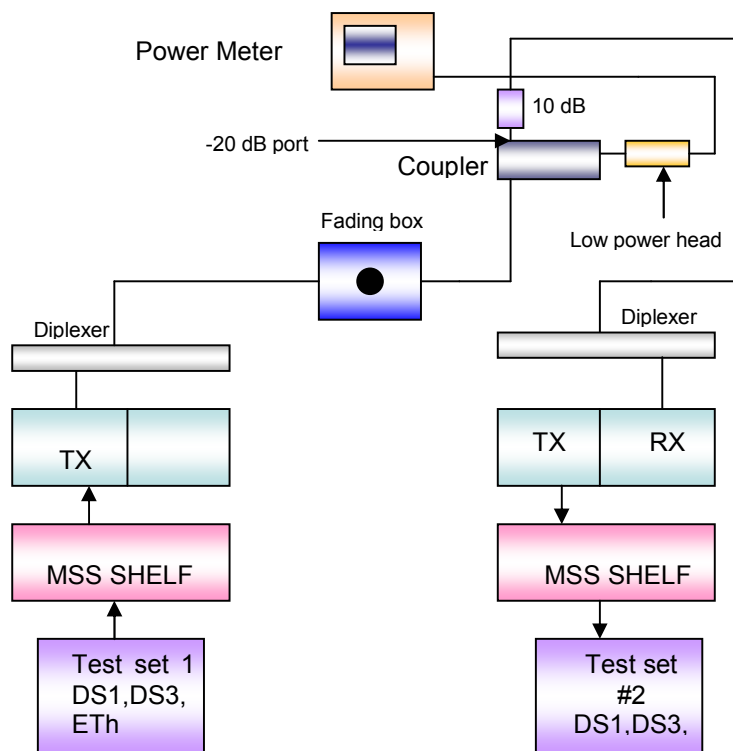


Figure 9 Threshold Setup

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	175 / 302

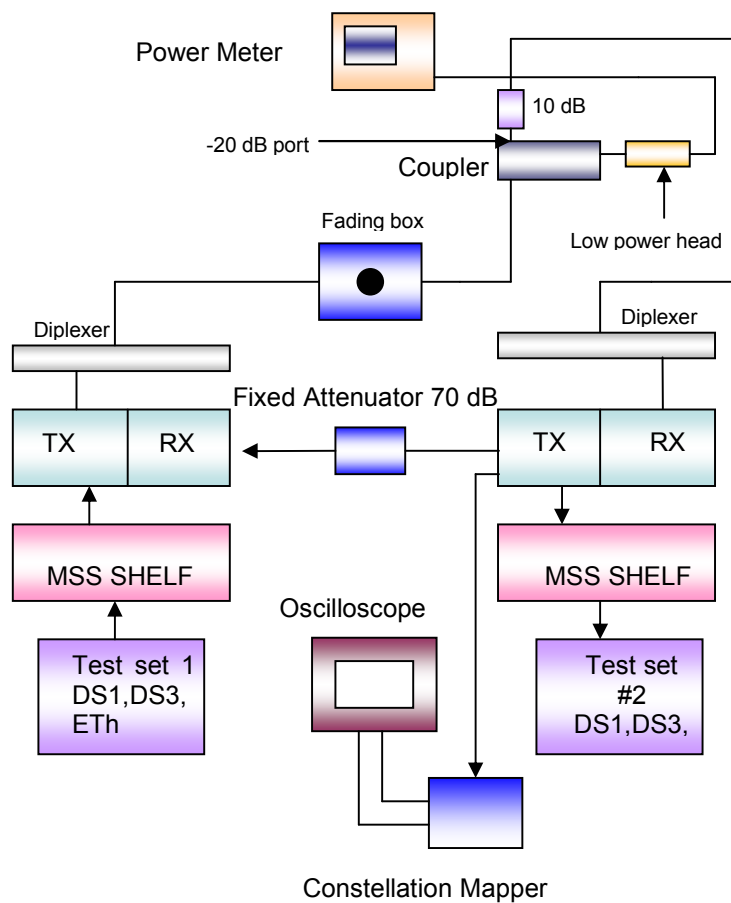


Figure 10 Threshold Setup (Adaptive Modulation)

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	176 / 302

5.1 CAPTURE ALARM/WARNINGS, 1X10E-06 THRESHOLD POINTS, HYSTERESIS OF THE ALARMS

The goal of this test is to capture the alarms/warning and the Hysteresis of the alarms events.

5.1.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- 10 dB fixed attenuator
- Test set Tektronix ST112

5.1.2 SETUP CONFIGURATION

- Connect as shown in figure 9
- Calibrate the level going into the receiver.
- Verify the receiver connected to the test set #2 is locked at nominal level (-45 RSL)
- Verify that test set #2 is running error free.

5.1.3 TEST PROCEDURE

Test Case 4a: Measure the Alarms/warnings, 1x10E-06 threshold points, and the hysteresis of the alarms.

Summary: To acquire the alarms/warnings, 1x10e-06 threshold points and the hysteresis of the alarm events.

Steps:

The following will be verified on the radio under test under test.

- Verify the receiver is locked.
- Monitor the receiver connected to test set #2, make sure is running error free at nominal level.
- Vary the RSL level until the early warning alarm appears in the craft terminal.
- Record the RSL and the hysteresis of the Alarm
- Vary the RSL level until the 1X10-6 appears in the test set.
- Record the RSL and the hysteresis of the 1X10-6.
- Vary the RSL level until the HBER alarm appears in the craft terminal
- Record the RSL and the hysteresis of the HBER alarm.
- Vary the RSL level until the carrier alarm appears in the craft terminal
- Record the RSL and the hysteresis of the carrier loss alarm.
- Vary the RSL level until the clock loss alarm appears in the craft terminal
- Record the RSL and the hysteresis of the clock loss alarm.
- Measure RSL for the alarms on all modulations and record the hysteresis.

Expected Results:

Record value.

Results:

See Data.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	177 / 302

5.1.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	178 / 302

30 MHz Profiles in FCM Mode

Bouncing between Early warning and High BER can't see the alarm

NOTE: The early load were showing no Hysteresis in the HBER alarm, however this problem was resolved in later software loads.

L6 GHz MPT-HL V2 30 MHz Profiles in FCM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
30 MHz 4 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-87.9	-89.81	-9	-86.8	-88.43	-10.1	-1.1	-1.38
RSL where link runs 1x10-6 BER	-88.7	-91.12	-8	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-89	-91.44	-7.7	-89	-91.44	-7.7	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-89.4	-92.47	-7.2	-89.4	-92.47	-7.2	0	0
30 MHz 16 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-80.8	-82.85	-15.4	-79.7	-81.55	-16.7	-1.1	-1.3
RSL where link runs 1x10-6 BER	-82.6	-84.64	-14	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-82.7	-84.67	-14	-82.7	-84.67	-14	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-83.5	-84	-13.4	-83.5	-84	-13.4	N/T	0
30 MHz 32 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-78.3	-79.64	-18.6	-77.6	-78.48	-19.7	-0.7	-1.16
RSL where link runs 1x10-6 BER	-79.2	-81	-17.4	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-79.4	-91.26	-17.2	-79.4	-91.26	-17.2	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-79.9	-81.88	-16.2	-79.9	-81.88	-16.2	0	0
30 MHz 64 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-76.55	-76.3	-21.6	-75.1	-75.2	22.9	-1.45	-1.1
RSL where link runs 1x10-6 BER	-77.9	-78.95	-19.7	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-77.5	-78.2	-20.3	-77.5	-78.2	-20.3	0	0
changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-78.3	-79.63	-19.3	-78.3	-79.63	-19.3	0	0

ED

01

ECCN: 5E991

HTS: 4901.99.0050

3DB19060AAAAQZZZA

179 / 302

L6 GHz MPT-HL V2 30 MHz Profiles in FCM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
30 MHz 128 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-72.9	-73.59	-24.6	-71.2	-72.16	-25.8	-1.7	-1.43
RSL where link runs 1x10-6 BER	-75.9	-76.01	-22.7	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-75	-75.22	-23.3	-75	-75.22	-23.3	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-76.6	-76.75	-22.2	-76.6	-76.75	-22.2	0	0
30 MHz 256 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-68.9	-70.17	-27.8	-67.2	-68.69	-29	-1.7	-1.48
RSL where link runs 1x10-6 BER	-72.6	-73.3	-25.5	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-70.9	-71.97	26.4	-70.9	-71.97	26.4	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-73.5	-74.03	24.9	-73.5	-74.03	24.9	0	0
30 MHz 512 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-66	-66.76	-30.8	-65	-65.07	-32	-1	-1.69
RSL where link runs 1x10-6 BER	-69.1	-70.34	-28.4	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-67.5	-68.77	-29.4	N/T	N/T	N/T	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-69.9	-71.1	-28	N/T	N/T	N/T	0	0
30 MHz 1024 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-63.3	-62.81	-34.2	-61.5	-61.35	-35.2	-1.8	-1.46
RSL where link runs 1x10-6 BER	-66	-66.74	-31.6	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-64.8	-64.82	-32.6	N/T	N/T	N/T	0	0
changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-66.8	-67.85	-28.1	N/T	N/T	N/T	0	0

ED	01						
		ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA			180 / 302

Corner Profiles in FCM Mode

Bouncing between Early warning and High BER can't see the alarm

NOTE: The early load were showing no Hysteresis in the HBER alarm, however this problem was resolved in later software loads.**60 MHz**

L6 GHz MPT-HL V2 EM2								
60 MHz Corner Profiles in FCM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis decreasing - increasing	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
60 MHz 256 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-65.3	-66.86	-27.7	-63.8	-65.4	-28.9	-1.5	-1.46
RSL where link runs 1x10-6 BER	-68	69.6	25.7					
RSL where HBER alarm changes state	-67	68.7	26.3	-67	68.7	26.3	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]								
RSL where clock loss alarm changes state [timing alarm]								
RSL where AGC loss alarm changes state [AGC alarm]								
5dB below AGC alarm								
Demod Failure	-68.7	-70.33	-25.1	-68.7	-70.33	-25.1	0	0
60 MHz 1024 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-58.2	-59.91	-33.9	-56.4	-57.82	-35.1	-1.8	-2.09
RSL where link runs 1x10-6 BER	-61.2	-63.01	-31.9					
RSL where HBER alarm changes state	-60.2	-61.99	-32.5	-60.2	-61.99	-32.5	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]								
RSL where clock loss alarm changes state [timing alarm]								
RSL where AGC loss alarm changes state [AGC alarm]								
5dB below AGC alarm								
Demod Failure	-62.3	-63.98	-31.3	-62.3	-63.98	-31.3	0	0

30 MHz

L6 GHz MPT-HL V2 EM2								
30 MHz Corner Profiles in FCM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis decreasing - increasing	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
30 MHz 4 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-89.4	-89.4	-9	-88	-88.1	-10.1		
RSL where link runs 1x10-6 BER	-92	-91.1	-7.6	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-91.5	-90.84	-7.9	-91.5	-90.84	-7.9		
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-93.2	-92.34	-6.8	-93.2	-92.22	-7.1	0	-0.12

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

181 / 302

L6 GHz MPT-HL V2 EM2								
30 MHz Corner Profiles in FCM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis decreasing - increasing	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)

30 MHz 16 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-82.6	-82.5	-15.4	-81.2	-81.25	-16.7		
RSL where link runs 1x10 ⁻⁶ BER	-84.1	-84.37	-14	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-84.1	-84.3	-14	-84.2	-84.14	-14.1		
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-85.1	-85.15	-13.5	-85.1	-85.15	-13.5	0	0

30 MHz 32 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-79.3	-79.4	-18.5	-77.9	-78.12	-19.7		
RSL where link runs 1x10 ⁻⁶ BER	-80.7	-80.8	-17.3	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-80.9	-81	-17.1	-80.8	-80.9	-17.2		
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-81.8	-81.61	-16.7	-81.8	-81.73	-16.7	0	0.12

30 MHz 64 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-76.4	-76.4	-21.6	-74.9	-75	-22.9		
RSL where link runs 1x10 ⁻⁶ BER	-78.7	-78.64	-19.8	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-77.9	-77.9	-20.3	-77.9	-77.9	-20.3		
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-79.4	-79.45	-19.3	-79.3	-79.3	-19.3	-0.1	-0.15

30 MHz 128 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-73.3	-73.4	-24.6	-71.8	-72	-25.8		
RSL where link runs 1x10 ⁻⁶ BER	-75.9	-75.82	-22.6	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-74.8	-75	-23.2	-74.8	-75	-23.2		
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-76.7	-76.6	-22.1	-76.6	-76.5	-22.2	-0.1	-0.1

ED	01						
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA				182 / 302

L6 GHz MPT-HL V2 EM2								
30 MHz Corner Profiles in FCM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis decreasing - increasing	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
30 MHz 256 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-69.6	-70.5	-27.7	-68.1	-68.6	-29		
RSL where link runs 1x10-6 BER	-72.9	-73	-25.5	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-71.3	-71.83	-26.3	-71.2	-71.68	-26.4		
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-73.4	-73.8	-19.9	-73.5	-73.7	-25.1	0.1	-0.1
30 MHz 512 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-66.3	-66.86	-30.7	-65	-65.44	-31.9		
RSL where link runs 1x10-6 BER	-69.7	-70.13	-28.4	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-68	-68.6	-29.3	-106.1	-29.4		38.1	-39.2
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-70.5	-70.94	-27.9	-70.5	-70.8	-28	0	-0.14
30 MHz 1024 QAM								
Running error free	X	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where early warning changes state	-63.1	-63.48	-34	-61.4	-61.91	-35.3		
RSL where link runs 1x10-6 BER	-66	-66.74	-31.5	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-64.7	-65.1	-32.6	-64.5	-65	-32.7	-0.2	-0.1
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-67.2	-67.66	-31.1	-67	-67.6	-31.3	-0.2	-0.06

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

183 / 302

10 MHz

Bouncing between Early warning and High BER can't see the alarm

NOTE: The early load were showing no Hysteresis in the HBER alarm, however this problem was resolved in later software loads.

L6 GHz MPT-HL V2 EM2								
10 MHz Corner Profiles in FCM								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis decreasing - increasing	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
10 MHz 128 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-78	-78	-24.7	-76.5	-76.7	-25.9	-1.5	-1.3
RSL where link runs 1x10-6 BER	-80	-80	-22.9	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-79.6	-79.55	-23.3	-79.8	-79.44	-23.4	0.2	-0.11
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-81.1	-80.65	-22.5	-81	-80.57	-22.6	-0.1	-0.08
10 MHz 1024 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-67.4	-67.77	-34.3	-65	-65.65	-35.7		
RSL where link runs 1x10-6 BER	-71.2	-71.62	-31.8	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-69.4	-70	-32.9	-69.1	-69.87	-32.9	-0.3	-0.13
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-72.2	-72.55	-31	-72.1	-72.43	-31.4	-0.1	-0.12

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01						
		ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA			184 / 302

5 MHz

Bouncing between Early warning and High BER can't see the alarm

NOTE: The early load were showing no Hysteresis in the HBER alarm, however this problem was resolved in later software loads.

L6 GHz MPT-HL V2 EM2								
5 MHz Corner Profiles in FCM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis decreasing - increasing	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
5 MHz 4 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where link runs 1x10-6 BER	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5 MHz 128 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-80.8	-80.75	-24.7	-79.2	-79.22	-26.2	-1.6	-1.53
RSL where link runs 1x10-6 BER	-81.9	-81.96	-23.6	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-82.6	-82.34	-23.3				-82.6	-82.34
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-83.3	-82.85	-22.3	-82.9	-82.6	-23.1		
5 MHz 1024 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-70.3	-70.8	-34.6	-67.8	-68.5	-36	-2.5	-2.3
RSL where link runs 1x10-6 BER	-73.2	-73.7	-32.4	N/T	N/T	N/T	N/T	N/T
RSL where HBER alarm changes state	-72.2	-72.75	-33	-72.1	-72.63	-33.2	-0.1	-0.12
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-74.5	-74.9	-31.3	-74.4	-74.8	-31.7	-0.1	-0.1

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

185 / 302

Corner Profiles in ACM Mode

60 MHz

L6 GHz MPT-HL V2								
60 MHz Corner Profiles in ACM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis decreasing - increasing	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
60 MHz 4 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-85	-86.5	-9.1	-83.3	-85.3	-10.2	-1.7	-1.2
RSL where link runs 1x10-6 BER	-86.4	-88.1	-7.8	-86.4	-88.1	-7.8		
RSL where HBER alarm changes state	-87	-88.6	-7.5	-86.4	-88.3	-7.7	-0.6	-0.3
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-87.7	-89.5	-7	-87.5	-89.3	-7	-0.2	-0.2
60 MHz 16 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-78.1	-80.1	-15.3	-76.9	-78.7	-16.6	-1.2	-1.4
RSL where link runs 1x10-6 BER	-79.6	-82.2	-13.7	-79.6	-82.2	-13.7		
RSL where HBER alarm changes state	-79.7	-82.3	-13.6	-79.3	-81.9	-13.9	-0.4	-0.4
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-81.1	-83.4	-12.2	-80.9	-83.3	-13	-0.2	-0.1
60 MHz 32 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-75.2	-76.8	-18.5	-74	-75.6	-19.7	-1.2	-1.2
RSL where link runs 1x10-6 BER	-76.6	-78.6	-17.1	-76.6	-78.6	-17.1		
RSL where HBER alarm changes state	-77.1	-78.9	-16.9	-76.7	-78.6	-17.1	-0.4	-0.3
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-77.8	-79.9	-15.8	-77.8	-79.8	-16.3	0	-0.1
60 MHz 64 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-72.6	-73.7	-21.6	-70.8	-72.3	-22.9	-1.8	-1.4
RSL where link runs 1x10-6 BER	-74.2	-75.75	-20	-74.2	-75.75	-20		
RSL where HBER alarm changes state	-74.3	-75.9	-19.8	-74.2	-75.5	-20.1	-0.1	-0.4
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-75	-76.7	-19.4	-75	-76.6	-19.4	0	-0.1
60 MHz 128 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-69.1	-70.6	-24.5	-67.8	-69.2	-25.8	-1.3	-1.4
RSL where link runs 1x10-6 BER	-71	-72.6	-23	-71	-72.6	-23		
RSL where HBER alarm changes state	-71.3	-72.8	-22.8	-71.1	-72.45	-23.1	-0.2	-0.35
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01		
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA 186 / 302

L6 GHz MPT-HL V2								
60 MHz Corner Profiles in ACM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis decreasing - increasing	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
60 MHz 256 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-65.6	-67.1	-27.7	-64.4	-65.7	-28.9	-1.2	-1.4
RSL where link runs 1x10-6 BER	-68.4	-69.5	-25.9	-68.4	-69.5	-25.9		
RSL where HBER alarm changes state	-68.5	-69.8	-25.8	-67.8	-68.9	-26.2	-0.7	-0.9
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-69.2	-70.6	-25	-69	-70.5	-25.3	-0.2	-0.1
60 MHz 512 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-62.7	-63.9	-30.6	-61	-62.3	-31.9	-1.7	-1.6
RSL where link runs 1x10-6 BER	-65.1	-66.4	-28.9	-65.1	-66.4	-28.9		
RSL where HBER alarm changes state	-64.9	-66.41	-28.9	-64.5	-65.9	-29.2	-0.4	-0.51
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-65.9	-67.4	-28	-66	67.3	-28.3	0.1	-134.7
60 MHz 1024 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-58.5	-60	-34	-56.7	-58.1	-35.2	-1.8	-1.9
RSL where link runs 1x10-6 BER	-61.6	-63.1	-31.9	-61.6	-63.1	-31.9		
RSL where HBER alarm changes state	-61.7	-63	-31.9	-60.8	-62.2	-32.5	-0.9	-0.8
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-62.7	-64.1	-31.3	-62.5	-64	-31.4	-0.2	-0.1

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

187 / 302

30 MHz

L6 GHz MPT-HL V2								
30 MHz Corner Profiles in ACM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	decreasing (dBm)	increasing (dBm)
30 MHz 4 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-88.4	-89.1	-9	-87.2	-87.9	-10.1	-1.2	-1.2
RSL where link runs 1x10-6 BER	-89.4	-90.6	-7.7	-89.4	-90.6	-7.7		
RSL where HBER alarm changes state	-90.2	-90.9	-7.5	89.5	-90.7	-7.7	-179.7	-0.2
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-91.1	-91.7	-6.2	-90.6	-91.5	-7.1	-0.5	-0.2
30 MHz 16 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-81.3	-82.7	-15.4	-80.1	-81.3	-16.7	-1.2	-1.4
RSL where link runs 1x10-6 BER	-83	-84.3	-14.1	-83	-84.3	-14.1		
RSL where HBER alarm changes state	-83.7	-84.8	-13.7	-83.3	-84.5	-14	-0.4	-0.3
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-84	-85.2	-13.5	-84	-85.1	-13.5	0	-0.1
30 MHz 32 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-78.6	-79.5	-18.5	-77.5	-78.3	-19.7	-1.1	-1.2
RSL where link runs 1x10-6 BER	-80	-80.9	-17.3	-80	-80.9	-17.3		
RSL where HBER alarm changes state	-80.4	-81.6	-16.8	-80.3	-81.3	-17.1	-0.1	-0.3
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-80.7	-81.9	-16.7	-80.4	-81.6	-16.8	-0.3	-0.3
30 MHz 64 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-75.8	-75.6	-21.6	-74.4	-75	-23	-1.4	-0.6
RSL where link runs 1x10-6 BER	-78.1	-78.8	-19.7	-78.1	-78.8	-19.7		
RSL where HBER alarm changes state	-78	-78.7	-19.8	-77.5	-78.2	-20.2	-0.5	-0.5
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-78.5	-79.5	-19.4	-78.6	-79.4	-19.3	0.1	-0.1
30 MHz 128 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-73	-73.5	-24.5	-71.6	-72.1	25.8	-1.4	-1.4
RSL where link runs 1x10-6 BER	-75.4	-75.9	-22.6	-75.4	-75.9	-22.6		
RSL where HBER alarm changes state	-75.5	-76	-22.6	-74.6	-75.2	-23.1	-0.9	-0.8
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T

ED

01

ECCN: 5E991

HTS: 4901.99.0050

3DB19060AAAAQZZZA

188 / 302

L6 GHz MPT-HL V2								
30 MHz Corner Profiles in ACM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis decreasing - increasing	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
30 MHz 256 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-69.7	-70.1	-27.7	-68.7	-68.7	29	-1	-1.4
RSL where link runs 1x10 ⁻⁶ BER	-72.7	-73.15	-25.5	-72.7	-73.15	-25.5		
RSL where HBER alarm changes state	-72.5	-73.1	-25.5	-71.4	-71.9	-26.3	-1.1	-1.2
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-73.4	-73.8	-25.1	-73.3	-73.77	-25.1	-0.1	-0.03
30 MHz 512 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-66.7	-67	30.7	-65	-65.5	-32	-1.7	-1.5
RSL where link runs 1x10 ⁻⁶ BER	-69.8	-70.3	-28.4	-69.8	-70.3	-28.4		
RSL where HBER alarm changes state	-69.8	-70.3	-28.4	-68.1	-68.7	-29.3	-1.7	-1.6
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-70.8	-71.1	N/A	-70.7	-71	-28	-0.1	-0.1
30 MHz 1024 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-62.8	-63.3	34	-61.2	-61.75	-35.1	-1.6	-1.55
RSL where link runs 1x10 ⁻⁶ BER	-66.5	-67	-31.5	-66.5	-67	-31.5		
RSL where HBER alarm changes state	-66.5	-67	31.5	-64.7	-65.4	32.6	-1.8	-1.6
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-67.5	-67.9	N/A	-67.4	-67.8	-31.1	-0.1	-0.1

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

189 / 302

10 MHz

L6 GHz MPT-HL V2								
10 MHz Corner Profiles in ACM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis decreasing - increasing	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
10 MHz 4 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-93.2	-94.2	-9	-92	-93.1	-10	-1.2	-1.1
RSL where link runs 1x10-6 BER	-93.4	-95.2	-8.4					
RSL where HBER alarm changes state	-94.2	-96.1	1.9	-94.2	-96.1	-7.6	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-94.2	-96.1	1.9	-94.2	-96.1	-7.6	0	0
10 MHz 16 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-86	-87.3	-15.4	-85.3	-86	-16.6	-0.7	-1.3
RSL where link runs 1x10-6 BER	-87.3	-88.4	-14.4	-87.3	-88.4	-14.4		
RSL where HBER alarm changes state	-87.6	-89	-14	-87.6	-88.9	-14.1	0	-0.1
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-87.8	-89.3	-13.7	-87.7	-89.2	-13.7	-0.1	-0.1
10 MHz 32 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-83.6	-84.1	-18.6	-82.5	-82.9	-19.8	-1.1	-1.2
RSL where link runs 1x10-6 BER	-84.3	-85.13	-17.7	-84.3	-85.13	-17.7		
RSL where HBER alarm changes state	-85	-85.7	-17.2	-85	-85.7	-17.2	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-85.2	-85.9	-0.8	-85.1	-85.82	17.1	-0.1	-0.08
10 MHz 64 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-81.1	-81.1	-21.7	-79.5	-79.7	-23	-1.6	-1.4
RSL where link runs 1x10-6 BER	-82.4	-82.7	-20.3	-82.4	-82.7	-20.3		
RSL where HBER alarm changes state	-82.8	-83.1	-20	-82.4	-82.8	-20.3	-0.4	-0.3
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-83	-83.3	-19.8	-82.8	-83.2	-19.9	-0.2	-0.1
10 MHz 128 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-77.8	-78.1	-24.7	-76.4	-76.6	-26	-1.4	-1.5
RSL where link runs 1x10-6 BER	-80.1	-80.2	-23	-80.1	-80.2	-23		
RSL where HBER alarm changes state	-80.1	-80.3	-22.8	-79.2	-79.8	-23.2	-0.9	-0.5
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T

ED	01						
		ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA			190 / 302

L6 GHz MPT-HL V2								
10 MHz Corner Profiles in ACM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis decreasing - increasing	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
10 MHz 256 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-74.1	-74.7	-27.9	-72.9	-73.3	-29.2	-1.2	-1.4
RSL where link runs 1x10 ⁻⁶ BER	-76.8	-77.1	-26	-76.8	-77.1	-26		
RSL where HBER alarm changes state	-77.1	-77.1	-26	-76.3	-76.5	-26.4	-0.8	-0.6
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-77.5	-77.8	-25.5	-77.3	-77.7	-25.6	-0.2	-0.1
10 MHz 512 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-71.3	-71.7	-30.9	-69.9	-70.3	-32.2	-1.4	-1.4
RSL where link runs 1x10 ⁻⁶ BER	-74.2	-74.3	-28.9					
RSL where HBER alarm changes state	-74.2	-74.2	-28.8	-73.2	-73.4	-29.5	-1	-0.8
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-74.9	-75.1	-28.3	-74.6	-75	-28.4	-0.3	-0.1
10 MHz 1024 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-68.1	-68.3	-34.3	-66.1	-66.4	-35.7	-2	-1.9
RSL where link runs 1x10 ⁻⁶ BER	-71.2	-71.4	-31.9	-71.2	-71.4	-31.9		
RSL where HBER alarm changes state	-71.2	-71.6	-31.8	-69.9	-71.1	-32.8	-1.3	-0.5
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-72.2	-72.4	-31.4	-71.9	-72.2	-31.4	-0.3	-0.2

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZA

191 / 302

5 MHz

L6 GHz MPT-HL V2								
5 MHz Corner Profiles in ACM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	decreasing (dBm)	increasing (dBm)
5 MHz 4 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-95.6	-97.7	-9	-94.4	-96.5	-10.1	-1.2	-1.2
RSL where link runs 1x10 ⁻⁶ BER	-96.8	-99.4	-7.9	-96.8	-99.4	-7.9		
RSL where HBER alarm changes state	-97.2	-100	-7.5	-97	-99.7	-7.8	-0.2	-0.3
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-97.2	-100.9	-7.4	97.5	-100.6	-7.1	-194.7	-0.3
5 MHz 16 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-88.8	-89.9	-15.5	-87.8	-88.6	-16.8	-1	-1.3
RSL where link runs 1x10 ⁻⁶ BER	-89.1	90.5	-15	-89.1	90.5	-15		
RSL where HBER alarm changes state	-90.2	-91.5	-12.6	-90.2	-91.5	-12.6	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-90.2	-91.5	-12.6	-90.2	-91.5	-12.6	0	0
5 MHz 32 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-86.3	-86.8	-18.7	-85.2	-85.7	-19.8	-1.1	-1.1
RSL where link runs 1x10 ⁻⁶ BER	-86.5	-87.1	-18.4	-86.5	-87.1	-18.4		
RSL where HBER alarm changes state	-87.4	-88.2	-17.4	-87.4	-88.2	-17.4	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-87.4	-88.2	-17.4	-87.4	-88.2	-17.4	0	0
5 MHz 64 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-83.6	-83.86	-21.8	-82.2	-82.5	-23.1	-1.4	-1.36
RSL where link runs 1x10 ⁻⁶ BER	-84.2	-84.6	-21.1	-84.2	-84.6	-21.1		
RSL where HBER alarm changes state	-85.1	85.4	-20.4	-85.1	85.4	-20.4	0	0
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-85.1	85.4	-20.4	-85.1	85.4	-20.4	0	0
5 MHz 128 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-80.6	-80.9	-24.7	-79	-79.4	-26.2	-1.6	-1.5
RSL where link runs 1x10 ⁻⁶ BER	-81.9	-82.3	-23.6	-81.9	-82.3	-23.6		
RSL where HBER alarm changes state	-82.6	-83.1	-23	-82.3	-82.6	-23.3	-0.3	-0.5
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T

ED

01

ECCN: 5E991

HTS: 4901.99.0050

3DB19060AAAAQZZA

192 / 302

L6 GHz MPT-HL V2								
5 MHz Corner Profiles in ACM mode								
Hysteresis of losing and acquiring alarm events.								
Event	Decreasing RSL			Increasing RSL			hysteresis decreasing - increasing	
	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dBm)	MSE (dB)	MTK reported (dBm)	measured (dB)
5 MHz 256 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-77.6	-77.6	-28.1	-75.8	-76.3	-29.3	-1.8	-1.3
RSL where link runs 1x10 ⁻⁶ BER	-79.1	-79.4	-26.5	-79.1	-79.4	-26.5		
RSL where HBER alarm changes state	-79.4	-79.7	-26.3	-79	-79.3	-26.6	-0.4	-0.4
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-79.9	-80.3	-25.9	-79.7	-80.2	-26	-0.2	-0.1
5 MHz 512 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-74	-74.5	-31.1	-72.5	-73	-32.4	-1.5	-1.5
RSL where link runs 1x10 ⁻⁶ BER	-76.1	-76.7	-29.3	-76.1	-76.7	-29.3		
RSL where HBER alarm changes state	-76.4	-76.8	-29.2	-75.9	-76.4	-29.6	-0.5	-0.4
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-77.3	-77.7	-28.6	-77.3	-77.6	-28.7	0	-0.1
5 MHz 1024 QAM								
Running error free	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RSL where early warning changes state	-70.9	-71.15	-34.5	-69.2	-69.7	-35.9	-1.7	-1.45
RSL where link runs 1x10 ⁻⁶ BER	-73.3	-73.6	-32.4	-73.3	-73.6	-32.4		
RSL where HBER alarm changes state	-73	-73.5	-32.5	-72.3	-72.8	-32.9	-0.7	-0.7
RSL where Link carrier loss alarm changes state [alarm PIN]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where clock loss alarm changes state [timing alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
RSL where AGC loss alarm changes state [AGC alarm]	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5dB below AGC alarm	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T
Demod Failure	-74.7	-74.9	-31.6	-74.6	-74.8	-31.6	-0.1	-0.1

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

193 / 302

5.2 NO ERRORS WHEN TX POWER IS CHANGED

The goal of this test is to verify that the transmit power change should not interfere with the data traffic.

5.2.1 TOOLS NEEDED TO PERFORM THIS TEST

- Variable attenuator
- U6 GHz Diplexer
- Power meter HP 437B or similar
- Spectrum analyzer Agilent E4407B or similar

5.2.2 SETUP CONFIGURATION

- Connect as shown in figure 9
- Calibrate the level going into the input of the receiver
- Verify the receiver connected to the test set #2 is locked at nominal level

5.2.3 TEST PROCEDURE

Test Case 4b: Error free when TX power is changed (PVG 310)

Summary: The goal of this test is to verify the transmit power change should not interfere with the data traffic.

Steps:

The following will be verified on the units under test.

- Set Transmitter power at maximum power for the modulation and frequency scheme.
- In the craft terminal drop the transmit power 20 dB.
- Verify that radio is running error free during the power change.
- Increase the transmit power by 20 dB.
- Verify that the radio is running error free.
- Record the results in a excel table.
-

Expected Results:

No errors when TX power is dropped or increased 20 dB.

Results:

See table below.

5.2.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	194 / 302



30 MHz Profiles in FCM Mode

30 MHz Profiles in FCM mode								
Lower 6GHz								
TX power Change Error free								
Pout (dBm)	Modulation (QAM)							
	1024	512	256	128	64	32	16	4
32.5	No errors	No errors	N/T	N/T	N/T	N/T	N/T	N/T
27.5	No errors	No errors	N/T	N/T	N/T	N/T	N/T	N/T
22.5	No errors	No errors	N/T	N/T	N/T	N/T	N/T	N/T
17.5	No errors	No errors	N/T	N/T	N/T	N/T	N/T	N/T
12.5	No errors	No errors	N/T	N/T	N/T	N/T	N/T	N/T
17.5	No errors	No errors	N/T	N/T	N/T	N/T	N/T	N/T
22.5	No errors	No errors	N/T	N/T	N/T	N/T	N/T	N/T
27.5	No errors	No errors	N/T	N/T	N/T	N/T	N/T	N/T
32.5	No errors	No errors	N/T	N/T	N/T	N/T	N/T	N/T

Corner Profiles in FCM Mode

60 MHz Corner Profiles in FCM mode								
Lower 6GHz								
Pout (dBm)	Modulation (QAM)							
	1024	512	256	128	64	32	16	4
32.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
27.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
22.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
17.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
12.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
17.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
22.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
27.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
32.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T

5 MHz Corner Profiles in FCM mode								
Lower 6GHz								
Pout (dBm)	Modulation (QAM)							
	1024	512	256	128	64	32	16	4
32.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	No errors
27.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	No errors
22.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	No errors
17.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	No errors
12.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	No errors
17.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	No errors
22.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	No errors
27.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	No errors
32.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	No errors

ED

01

ECCN: 5E991

HTS: 4901.99.0050

3DB19060AAAAQZZZA

195 / 302

V1-V2 Profiles**10 MHz**

10 MHz V1-V2 Profiles								
Lower 6GHz								
Pout (dBm)	Modulation (QAM)							
	1024	512	256	128	64	32	16	4
32.5	N/T	N/T	N/T	No errors	N/T	N/T	N/T	N/T
27.5	N/T	N/T	N/T	No errors	N/T	N/T	N/T	N/T
22.5	N/T	N/T	N/T	No errors	N/T	N/T	N/T	N/T
17.5	N/T	N/T	N/T	No errors	N/T	N/T	N/T	N/T
12.5	N/T	N/T	N/T	No errors	N/T	N/T	N/T	N/T
17.5	N/T	N/T	N/T	No errors	N/T	N/T	N/T	N/T
22.5	N/T	N/T	N/T	No errors	N/T	N/T	N/T	N/T
27.5	N/T	N/T	N/T	No errors	N/T	N/T	N/T	N/T
32.5	N/T	N/T	N/T	No errors	N/T	N/T	N/T	N/T

5 MHz

5 MHz V1-V2 Profiles in FCM mode								
Lower 6GHz								
Pout (dBm)	Modulation (QAM)							
	1024	512	256	128	64	32	16	4
32.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
27.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
22.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
17.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
12.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
17.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
22.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
27.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T
32.5	No errors	N/T	N/T	N/T	N/T	N/T	N/T	N/T

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01						
		ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA			196 / 302

5.3 SWITCHING THRESHOLDS DUE TO A FIX FREQUENCY NOTCH (ACM PROFILES ONLY)

Goal of this test is to measure the tolerance of the receiver for a fix notch at the center of the spectrum. The notch will be varied in depth to observe the modulation switch.

5.3.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- Synthesizer Agilent 837
- Test set Tektronix ST112
- DFM test set HP 11757B or similar

5.3.2 SETUP CONFIGURATION

- Connect as shown in figure 19
- Calibrate the level going into the input of the receiver.
- Verify the receiver connected to the test set #2 is locked at nominal level (-45 dBm RSL)

5.3.3 TEST PROCEDURE

Test Case 4c: Switching thresholds due to a fix frequency notch.

Summary: To measure the tolerance of a notch at the center of the frequency.

Steps:

The following will be verified on the units under test.

- Verify the receiver is locked
- Monitor receiver #2 running error free at nominal level
- Perform the test with the DFM test set
- Set the DFM test for a notch at the center of the band.
- Increase the depth of the notch until the modulation changes from 1024 QAM to 512 QAM.
- Record the notch level
- Increase the depth of the notch until the modulation changes from 512 QAM to 256 QAM.
- Record the notch level 6.
- Increase the depth of the notch until the modulation changes from 256QAM to 128 QAM.
- Record the notch level.
- Increase the depth of the notch until the modulation changes from 128 QAM to 64 QAM.
- Record the notch level.
- Increase the depth of the notch until the modulation changes from 64 QAM to 32 QAM.
- .Record the level of the notch.
- Increase the depth of the notch until the modulation changes from 32 QAM to 16

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	197 / 302

- QAM.
- Record the level of the notch.
- Increase the depth of the notch until the modulation changes from 32 QAM to 16 QAM.
- Record the notch level.
- Observe that as the notch depth is increased modulation changed.
- Record the data.

Expected Results:

The radio should change modulation as the notch increases in depth.

Results:

Radio did change modulation as the notch depth increased, see tables below.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	198 / 302

5.3.4 TEST DATA

DFM Notch at the Center of the Band (6.2 ns)				
L6 Corner Profiles in ACM Mode				
60 MHz				
	Change Down		Change Up	
Modulation (QAM)	Notch Depth (dB)	MSE (dB)	Notch Depth	MSE (dB)
1024			-11.5	-38.4
512	-13.3	-37.4	-15.9	-35.4
256	-18.2	-34.6	-20.9	-31
128	-21.4	-30	-22.4	-28.2
64	-23	-27	-23.7	-25.6
32	-24.2	-24.6	-24.9	-23.4
16	-25.4	-22.4	-27.4	-20
4	-28.2	-19		
30 MHz				
	Change Down		Change Up	
Modulation (QAM)	Notch Depth	MSE (dB)	Notch Depth	MSE (dB)
1024			-15.5	-38.4
512	-18.7	-37.4	-23.3	-35.4
256	-23.9	-34.6	-25.9	-31
128	-26.5	-30	-27.3	-28
64	-27.9	-27	-28.5	-25.6
32	-29.1	-24.6	-29.6	-23.4
16	-30.2	-22.4	-32	-20
4	-32.9	-19		
10 MHz				
	Change Down		Change Up	
Modulation (QAM)	Notch Depth	MSE (dB)	Notch Depth	MSE (dB)
1024			-24.7	-38.4
512	-26.3	-37.4	-30.3	-35.4
256	-31.4	-34.6	-34.7	-31
128	-35.3	-30	-36.3	-28
64	-36.9	-27	-37.6	-25.6
32	-38.2	-24.6	-38.7	-23.4
16	-39.3	-22.4	-40.8	-20
4	-41.8	-19		
5MHz				
	Change Down		Change Up	
Modulation (QAM)	Notch Depth	MSE (dB)	Notch Depth	MSE (dB)
1024			-25.7	-38.4
512	-27.5	-37.4	-31.5	-35.4
256	-32.8	-34.6	-38.8	-31
128	-39.6	-30	-41.2	-28
64	-41.9	-27	-42.7	-25.6
32	-43.2	-24.6	-43.8	-23.4
16	-44.3	-22.4	-45.8	-20
4	-46.7	-19		

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	199 / 302

5.4 ERROR FREE OPERATION DUE TO A SWEEP NOTCH ACROSS THE PASS-BAND (ACM PROFILES ONLY)

Goal of this test is to measure the tolerance of a notch across the band. The radio should remain error free.

5.4.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- Synthesizer Agilent 837
- Test set Tektronix ST112
- DFM test set HP 11757B or similar

5.4.2 SETUP CONFIGURATION

- Connect as shown in figure 19
- Calibrate the level going into the input of the receiver.
- Verify the receiver connected to the test set 2 is locked at nominal level(-45 RSL dBm)

5.4.3 TEST PROCEDURE**Test Case 4d: Error free operation due to a sweep notch across the pass-band.**

Summary: To measure the operation of the radio by running a notch across the frequency band.

Steps:

The following will be verified on the units under test.

- Verify the receiver is locked
- Monitor receiver #2 running error free at nominal level
- Perform the test with the DFM test set
- Set the DFM test for a notch at the center of the band.
- Increase the depth of the notch until the modulation changes to 16 QAM.
- Sweep the notch from 120 MHz to 160 MHz.
- Monitor the BER test set for errors.
- Record the data

Expected Results:

No errors.

Results:

SEE Table below.

5.4.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	200 / 302

L6 Corner Profiles in ACM mode						
Sweep Notch across the Frequency Band						
	Sweep Time (sec.)	Notch depth (dB)	Run Time (min.)	Bit errors	BER	
10Mhz	2	35	30	0	0	Sweep: 130MHz- 150MHz
	1	32	30	0	0	
	0.02	20	15	27102	1.90E-05	
	0.02	20	20	0	0	
	0.02	20	36	33512	1.00E-05	
5	1	33	29	646	2.30E-07	Sweep: 130MHz- 150MHz
	0.02	20	20	0	0	
	0.02	20	10	10	1.10E-08	
	0.02	20	1:30	0	0	
30	1	31	30	0	0	Sweep: 120MHz- 160MHz
	0.04	16	16	32179	2.10E-05	
	0.04	16	20	0	0	
	0.04	16	30	0	0	
60	1	30	30	0	0	Sweep: 105MHz- 175MHz
	0.07	11	30	0	0	
	0.07	11	25	2179	9.20E-07	
	0.07	11	1:30	0	0	

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01				
	ECCN: 5E991 HTS: 4901.99.0050			3DB19060AAAAQZZA	201 / 302

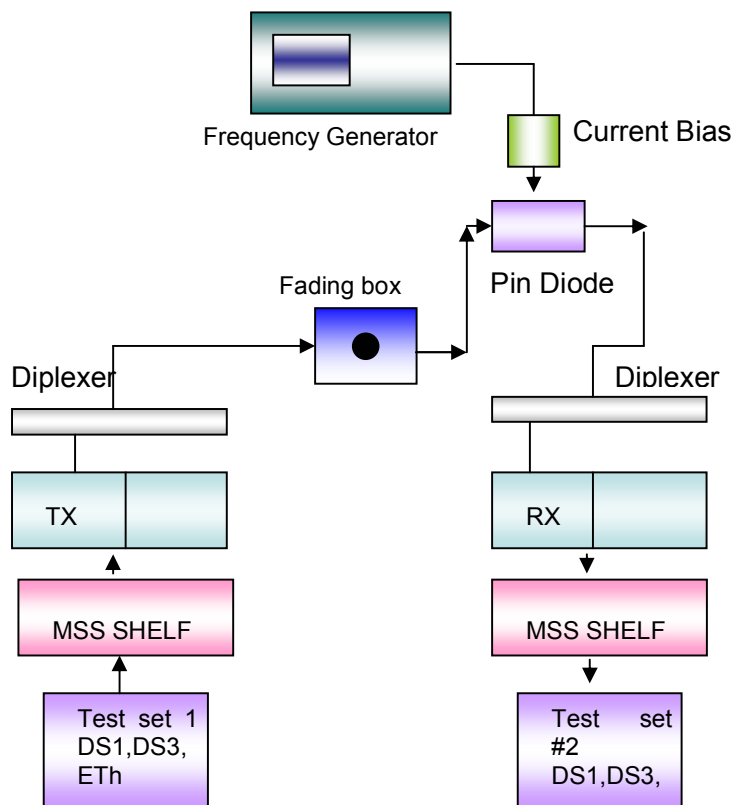


Figure 11 Path fade Setup (FCM Mode)

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	202 / 302

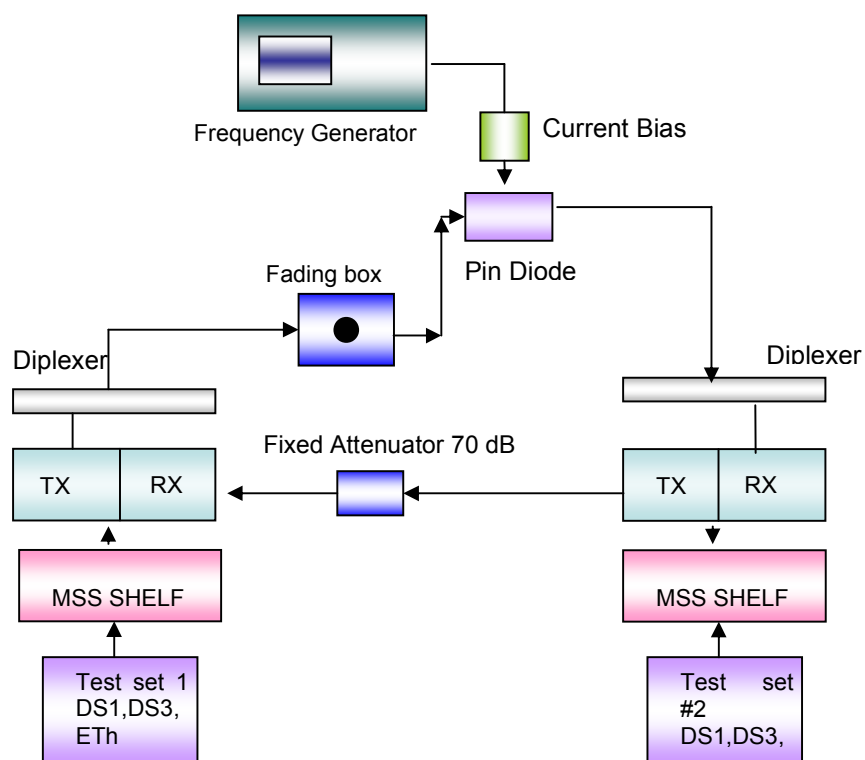


Figure 12 Path Fade Setup ([ACM Mode only](#))

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	203 / 302

5.5 SWITCHING THRESHOLDS DUE TO A FLAT FADE (ACM PROFILES ONLY).

The goal of this test is to verify the switching modulation thresholds in a flat fade, when the radio is operating in Adaptive Modulation.

- For the Adaptive modulation record the switching thresholds, the RSL and the MSE for each modulation.

5.5.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- RF Coupler
- Variable Attenuator
- Directional coupler HP 779D or similar
- 10 dB fixed attenuator
- Spectrum Analyzer
- Oscilloscope
- High power head HP 8481B or similar

5.5.2 SETUP CONFIGURATION

- Connect as shown in figure 19.
- Calibrate the RSL into the receiver input

5.5.3 TEST PROCEDURE

Test Case 4e: Switching thresholds for adaptive modulation

Summary: To measure the switching thresholds for adaptive modulation.

Steps:

The following will be verified on the units under test.

- Set power at according to the table 3 for the modulation and frequency scheme.
- Verify that the receiver is locked and passing data.
- Calibrate the RSL level into the receiver
- Using the variable attenuator change the RSL level until the modulation switches from 256 QAM to 128 QAM.
- Record the RSL and MSE where changes modulation.
- Using the variable attenuator change the RSL level until the modulation switches from 128 QAM to 64 QAM.
- Record the RSL and MSE where changes modulation.
- Using the variable attenuator change the RSL level until the modulation switches from 64 QAM to 32 QAM.
- Using the variable attenuator change the RSL level until the modulation switches from 32 QAM to 16 QAM.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	204 / 302

- Record the RSL and MSE where changes modulation.
- Using the variable attenuator change the RSL level until the modulation switches from 16 QAM to 4 QAM.

Expected Results:

See table below

Results:

See data below.

5.5.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	205 / 302

L6 GHz Corner Profiles in ACM mode				
Switching Thresholds due to a Flat Fade				
60 MHz	Change Down		Change Up	
Modulation (QAM)	RSL (dBm)	MSE (dB)	RSL (dBm)	MSE (dB)
1024			-48.6	-38.4
512	-49.7	-37.8	-54	-35.4
256	-55.55	-35	-60.7	-31
128	-61.5	-30	-63.4	-28
64	-63.7	-27.6	-65.5	-25.6
32	-66.45	-24.6	-67.5	-23.6
16	-68.5	-22.6	-70.6	-20
4	-72.3	-19		
30 MHz	Change Down		Change Up	
Modulation (QAM)	RSL (dBm)	MSE (dB)	RSL (dBm)	MSE (dB)
1024			-58	-38.4
512	-59.8	-37.4	-62.3	-35.4
256	-63.4	-34.4	-67.2	-31.2
128	-68.7	-29.8	-70.6	-28
64	-71.8	-27	-73.2	-25.6
32	-74.4	-24.4	-75.3	-23.6
16	-76.4	-22.4	-78.2	-20
4	-80.8	-18.2		
10 MHz	Change Down		Change Up	
Modulation (QAM)	RSL (dBm)	MSE (dB)	RSL (dBm)	MSE (dB)
1024			-63.5	-38.6
512	-64.87	-37.4	-67.58	-35.4
256	-68.62	-34.6	-72.37	-31
128	-73.61	-29.8	-75.55	-28
64	-76.74	-27	-78.07	-25.6
32	-79.37	-24.4	-80.3	-23.6
16	-81.45	-22.4	-83.7	-20
4	-85.54	-19		
5 MHz	Change Down		Change Up	
Modulation (QAM)	RSL (dBm)	MSE (dB)	RSL (dBm)	MSE (dB)
1024			-66.41	-38.4
512	-68.25	-37.4	-70.95	-35.4
256	-71.75	-34.6	-75.44	-31
128	-76.78	-30	-78.62	-28
64	-79.61	-27	-81.2	-25.6
32	-82.16	-24.6	-83.3	-23.4
16	-84.23	-22.4	-86.7	-20
4	-87.7	-19		

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	206 / 302

5.6 PATH FADE RATE (FLAT FADE) ACM PROFILES SET TO ADAPTIVE MODE.

The goal of this test is to measure the speed of RSL change where errors occur.

5.6.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Pin Diode HP 8735B or similar
- RF Coupler
- Variable Attenuator
- Fixed Attenuators
- Function Generator
- Current bias for the pin diode
- Spectrum Analyzer
- Oscilloscope
- High power head HP 8481B or similar

5.6.2 SETUP CONFIGURATION

- Connect as shown in figure 19.
- Set the transmitter output to a fixed power for all modulations
- Calibrate the RSL into the receiver

5.6.3 TEST PROCEDURE

Test Case 4f: Measure the maximum speed where errors occur with the profiles set to a dynamic mode (ACM).

Summary: To monitor at what speed the radio starts making errors.

Steps:

The following will be verified on the units under test.

- Set power according to the table 3 for the modulation and frequency scheme.
- Verify that the receiver is locked and passing data.
- Set the RSL level into the receiver at -30 dBm
- Using the pin diode change the RSL level until the modulation switches from 1024 QAM to 4 QAM
- Increase the rate of change until the radio starts making errors.
- Measure the flat fade speed.
- Record the speed

Expected Results:

Better than 100 db/sec.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	207 / 302

Results: the 5 MHz profiles failed at -43 dBm. This problem is known, there is a rework pending to fix this problem.

5.6.4 TEST DATA

Dynamic Mode Flat Fade			
L6 GHz Corner Profiles in ACM mode			
BW (MHz)	RSL Range (dB)	# of Cycles (1000)	dB/sec
60	(-20 to -60)	1000	437
30	(-20 to -60)	1000	478
10	(-20 to -60)	1000	243
5	(-20 to -60)	1000	FAILED

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	208 / 302

5.7 PATH FADE RATE (FLAT FADE) ACM PROFILES SET TO FIXED MODE.

The goal of this test is to measure the speed of RSL change where errors occur.

5.7.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Pin Diode HP 8735B or similar
- RF Coupler
- Variable Attenuator
- Fixed Attenuators
- Function Generator
- Current bias for the pin diode
- Spectrum Analyzer
- Oscilloscope
- High power head HP 8481B or similar

5.7.2 SETUP CONFIGURATION

- Connect as shown in figure 19.
- Set the transmitter output to a fixed power for all modulations
- Calibrate the RSL into the receiver

5.7.3 TEST PROCEDURE

Test Case 4g: Measure the maximum speed where errors occur with the profiles set to a fixed mode.

Summary: To monitor at what speed the radio starts making errors.

Steps:

The following will be verified on the units under test.

- Set TX power according to the table 3 for the modulation and frequency scheme.
- Verify that the receiver is locked and passing data.
- .Set each modulation individually from 1024 QAM to 4 QAM.
- Measure the fade speed for each modulation from 1024 QAM to 4 QAM.
- Increase the rate of change until the radio starts making errors.
- Record the speed

Expected Results:

Better than 100 db/sec.

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZA

209 / 302

Results: the 5 MHz profiles failed at -43 dBm. This problem is known, there is a rework pending to fix this problem.

5.7.4 TEST DATA

* Would not run error free at any speed. Errors occur passing through -41dBm RSL.

L6 GHz Corner Profiles in FCM mode			
Path Fade Rate			
Modulation Profile	Max FADE rate	RSL Range	Freq.
60MHz/1024QAM	2038dB/sec	-25 to -45dBm	27.07Hz
60MHz/1024QAM	2038dB/sec	-35 to -55dBm	27.07Hz
30MHz/1024QAM	1635dB/sec	-25 to -45dBm	24.0Hz
60MHz/256QAM	1921dB/sec	-25 to -45dBm	27.7Hz
30MHz/4QAM	4647dB/sec	-25 to -45dBm	67Hz
5MHz/4QAM	3122dB/sec	-25 to -45dBm	45Hz
5MHZ/1024QAM	*Fail	-25 to -45dBm	N/A
5MHZ/1024QAM	*Fail	-45 to -65dBm	N/A

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	210 / 302

5.8 PATH FADE RATE (FLAT FADE) FOR 30 MHZ PROFILES (FCM MODE ONLY).

The goal of this test is to measure the speed of RSL change where errors occur.

5.8.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Pin Diode HP 8735B or similar
- RF Coupler
- Variable Attenuator
- Fixed Attenuators
- Function Generator
- Current bias for the pin diode
- Spectrum Analyzer
- Oscilloscope
- High power head HP 8481B or similar

5.8.2 SETUP CONFIGURATION

- Connect as shown in figure 18.
- Set the transmitter output to a fixed power for all modulations
- Calibrate the RSL into the receiver

5.8.3 TEST PROCEDURE

Test Case 4h: Measure the maximum speed where errors occur

Summary: To monitor at what speed the radio starts making errors.

Steps:

The following will be verified on the units under test.

- Set power according to the table 3 for the modulation and frequency scheme.
- Verify that the receiver is locked and passing data.
- Set the RSL level into the receiver at -30 dBm
- Set each modulation individually from 1024 QAM to 4 QAM.
- Measure the fade speed for each modulation from 1024 QAM to 4 QAM.
- Increase the rate of change until the radio starts making errors.
- Record the speed

Expected Results:

The 5 MHz profiles failed to meet the 100 dB/sec.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	211 / 302

Results:

5.8.4 TEST DATA

30 MHz Profiles in FCM Mode

* Would not run error free at any speed. Errors occur passing through -41dBm RSL.

- * Fade approx 20dB, RSL level approx. -45 to -65dBm
- * Sine wave used to modulate pin diode
- * Fade rate measurement taken from Oscilloscope presentation of pin control voltage
- ** Max Fade Rate test stopped at indicated time, with out errors.

L6 GHz 30 MHz Profiles in FCM mode					
Path Fade Rate (Flat Fade)					
30 MHz Profile:	Run overnight @ 200db/sec	Max Fade rate (NLT 2000 Cycles)	ET for Max Fade Rate test **	# of cycles for Max Fade Rate test	Freq. of pin diode Control voltage
4	No errors	Could not test	N/A	N/A	N/A
16	Not tested	2890dB/sec.	5:00 min	13,770	45.9 Hz
32	Not tested	2745dB/sec.	5:00 min	12,918	43.06 Hz
64	No errors	2530dB/sec.	5:00 min	12,360	41.2 Hz
128	Not tested	2610dB/sec.	3:00 min	7,356	40.87 Hz
256	No errors	2200dB/sec.	5:00 min.	10,362	34.54 Hz
512	Not tested	2307dB/sec.	5:00 min	10,800	36.0 Hz
1024	No errors	1880dB/sec.	5:00 min	9,171	30.57 Hz

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01				
		ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	212 / 302

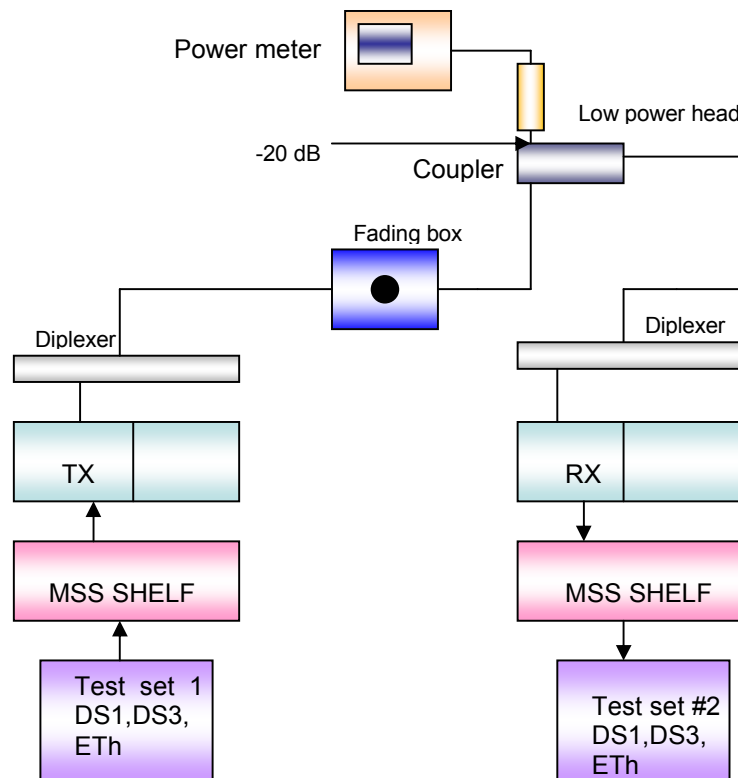


Figure 13 Receiver Overload

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	213 / 302

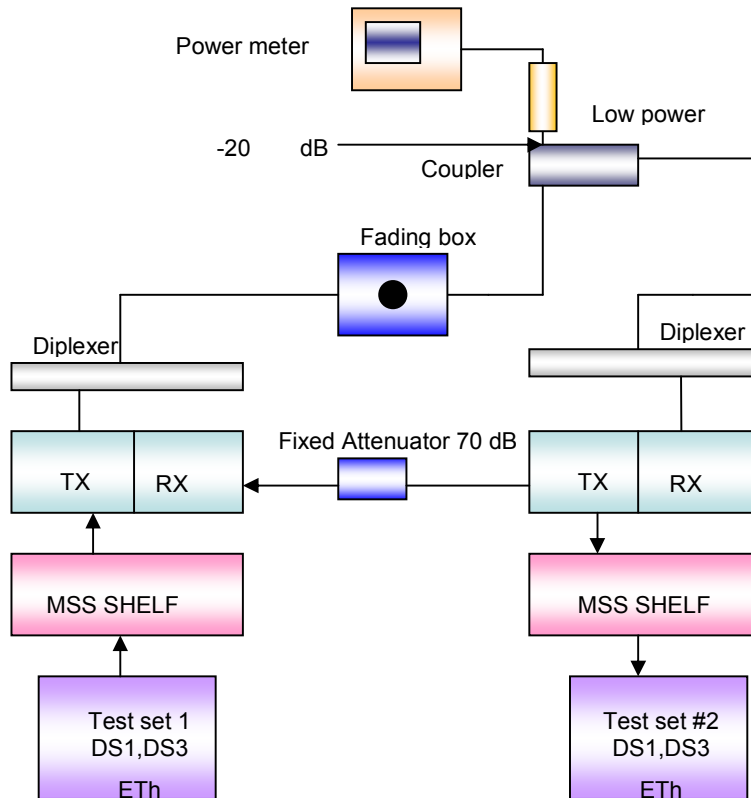


Figure 14 Receiver Overload Setup (**Adaptive Modulation**)

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	214 / 302

5.9 RECEIVER OVERLOADS

Goal of this test is to verify Receiver overload.

5.9.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- Variable attenuator
- Test sets Tektronix ST112

5.9.2 SETUP CONFIGURATION

- Connect as shown in figure 12.
- Connect as shown in figure 13 ([adaptive modulation ONLY](#))
- Calibrate the level going into the receiver.
- Verify the receiver connected to the test set #2 is locked at nominal level.
- Capture the error rate curve between -10 to -30 dBm RSL at the receiver input.

5.9.3 TEST PROCEDURE

Test Case 4i: Receiver Overload

Summary: To measure the Receiver Overload

Steps:

The following will be verified on units under test.

- Verify the receiver is locked.
- Monitor receiver #2 running error free at nominal level (-45 dBm).
- Vary the level into the Receiver from -20 dBm to -30 dBm.
- Set the RSL level into the receiver to -25 dBm.
- Increase the level in .5 dB steps and record the BER.
- Plot the values in a excel graph, record the 1x10⁻⁶ error rate.

Expected Results:

Receiver shall meet the specs of -22 dBm into the receiver.

Results:

Units met the Spec see data below.

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZA

215 / 302

5.9.4 TEST DATA

30 MHz Profiles in FCM Mode

NOTE: For the results >-10 dBm the units were running error free at -10 dBm.

Receiver Overloads				
L6 GHz 30 MHz Profiles in ACM mode				
30 MHz Profile				
Modulation QAM	Spec (dB)	BER	RSL Level Into Receiver (dBm)	MSE (dB)
4	-22	N/A	> -10	N/A
16	-22	N/A	> -10	N/A
32	-22	N/A	> -10	N/A
64	-22	N/A	> -10	N/A
128	-22	N/A	> -10	N/A
256	-22	1.00E-06	-11.5	-29.2
512	-22	1.00E-06	-12.2	-31.2
1024	-22	1.00E-06	-13.6	-33.8

Corner Profiles in FCM Mode

Receiver Overloads					
L6 GHz Corner Profiles Profiles in ACM mode					
BW (MHz)	Modulation QAM	Spec (dB)	BER	RSL Level Into Receiver (dBm)	MSE (dB)
60	256	-22	1.00E-06	-13.8	-34.2
	1024	-22	1.00E-06	-13.8	-34.2
30	4	-22	N/A	> -10	N/A
	1024	-22	1.00E-06	-13	-34.6
10	128	-22	N/A	> -10	N/A
5	4	-22	N/A	> -10	N/A
	1024	-22	1.00E-06	-13	-35.2

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01				
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA		216 / 302

V1-V2 Profiles

L6 GHz MHT-HLV1-V2 Profiles V2 as Receiver Overloads				
30 MHz Profile				
Modulation QAM	Spec	BER	RSL Level Into Receiver (dBm)	MSE
4	-22	1.00E-06	>-10	N/A
16	-22	N/T	N/T	N/T
32	-22	N/T	N/T	N/T
64	-22	N/T	N/T	N/T
128	-22	N/T	N/T	N/T
256	-22	1.00E-06	-11.4	-34.2
512	-22	N/T	N/T	N/T
1024	-22	N/T	N/T	N/T

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	217 / 302

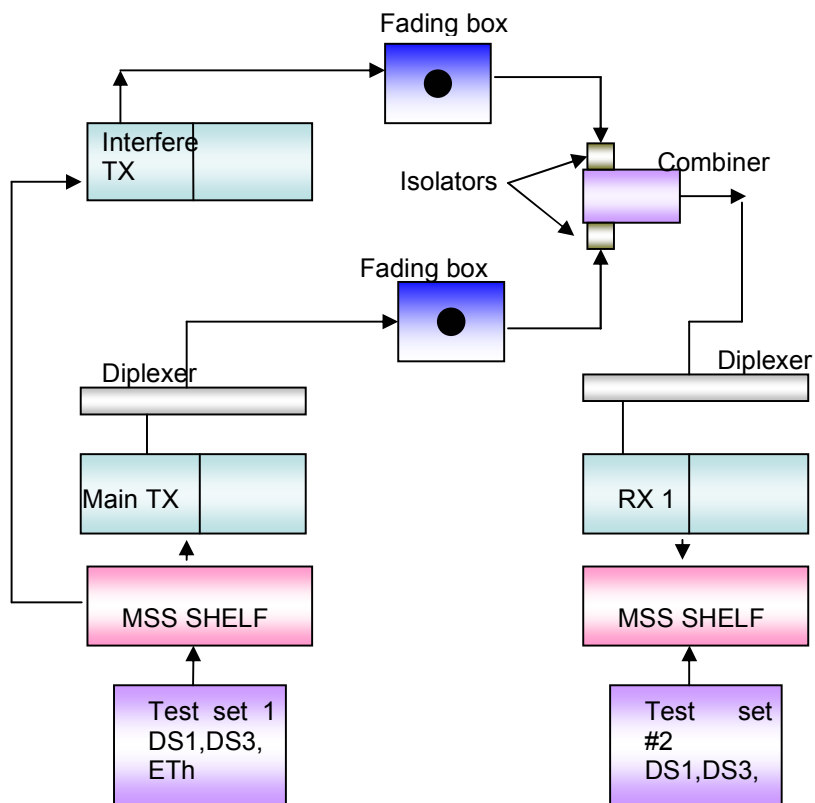


Figure 15 T/I and C/I like Modulation setup

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	218 / 302

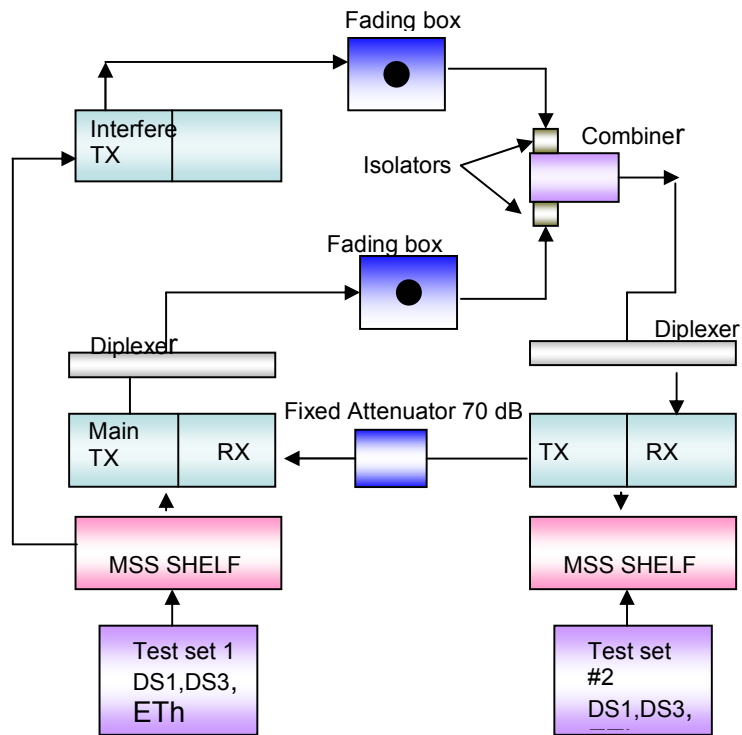


Figure 16 T/I and C/I Like Modulation Setup (**Adaptive Modulation**)

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	219 / 302

5.10 T/I LIKE MODULATION DATA

The goal of this test is to measure the threshold to interference with a like modulation RF signal.

5.10.1 TOOLS NEEDED TO PERFORM THIS TEST

- MSS Shelf
- MPT -HL units (3)
- Power meter HP 437B or similar
- Variable attenuators
- Isolators
- 3 dB combiner
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Test set Tektronix ST112/ ACTERNA Model No. 2802 or similar

5.10.2 SETUP CONFIGURATION

- Connect as shown in figure .13
- Connect as shown in figure 14 ([Adaptive modulation Only](#))
- Turn off the interfering transmitter.
- Calibrate the level going into the receiver with the main transmitter on.
- Set the RSL level into the receiver to -50 dBm.
- . Verify the receiver connected to the test set #2 is locked and running error free.

5.10.3 TEST PROCEDURE

Test Case 4j: Measure T/I with Like Modulation

Summary: To measure T/I with Like Modulation.

Steps:

The following will be verified on units under test.

- Verify the receiver is locked
- Monitor the receiver connected to test set #2. Make sure is running error free.
- Turn off the interfering transmitter.
- Adjust the RSL level into the receiver until the test set reads 1Xe-06.
- Increase the level 1 dB better than threshold.
- Turn off the main transmitter.
- Turn on the interfering transmitter.
- Increase the RSL level until -50 dBm is reach.
- Turn the main transmitter on.
- Decrease the interfering transmitter level until the 1X10-6 is found.
- Record the points and plot them in excel.
- For automated setup follow the instructions from the software.

Expected Results:

Radio shall meet specs from table 3.

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZA	220 / 302

Results:

The 5 MHz Corner profiles were bursting errors; this profile will be re-evaluated in the next test campaign. .

5.10.4 TEST DATA**T/I Table of Results****30 MHz Profiles in FCM Mode**

Main Frequency 6123.1 MHz									
T/ILike Modulation With Filters 30 MHz profiles In FCM Mode									
Frequency Band	Mode	BW	QAM	Co-Chan Spec	T/I (with Filters)				
					-2	-1	Co-Chan	1	2
L6 GHz	ACM	30 MHz	4	14.2	-44.3	-24.3	13.8	-25.3	-44.3
			16	20.5	-37.7	-20.7	19.4	-22.7	-37.7
			32	24.1	-33.9	-20.9	24.1	-22.9	-33.9
			64	26.2	-31.8	-19.8	26.2	-21.8	-32.8
			128	29.1	-28.6	-18.6	28.5	-20.6	-28.6
			256	32	-25.9	-18.9	32.1	-20.9	-25.9
			512	35.1	-23.1	-16.1	34.9	-17.1	-23.1
			1024	38.5	-19.1	-11.1	38	-14.1	-20.1

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZA

221 / 302

Corner Profiles in FCM Mode

Main Frequency 6123.1 MHz									
T/ILike Modulation Without Filters Corner Profiles in FCM Mode									
Frequency Band	Mode	BW	QAM	Co-Chan Spec	T/I (without Filters)				
					-2	-1	Co-Chan	1	2
L6 GHz	ACM	60 MHz	4	14.2	N/T	N/T	N/T	N/T	N/T
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	N/T	N/T	N/T	N/T	N/T
			256	32	-28.7	-6.7	32.3	-7.7	-30.7
			512	35.1	N/T	N/T	N/T	N/T	N/T
			1024	38.5	-21.2	-2.2	38.8	-2.2	-24.2
L6 GHz	ACM	30 MHz	4	14.2	-48.7	-26.7	12.3	-26.7	-51.7
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	N/T	N/T	N/T	N/T	N/T
			256	32	-29.1	-20.1	31.9	-17.1	-31.1
			512	35.1	-27.2	-18.2	34.2	-16.2	-28.2
			1024	38.5	-23.8	-16.8	38.2	-15.8	-25.8
L6 GHz	ACM	10 MHz	4	14.2	N/T	N/T	N/T	N/T	N/T
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	-37.4	-19.4	28.6	-18.4	-36.4
			256	32	N/T	N/T	N/T	N/T	N/T
			512	35.1	N/T	N/T	N/T	N/T	N/T
			1024	38.5	N/T	N/T	N/T	N/T	N/T
L6 GHz	ACM	5 MHz	4	14.2	-39.7	-22.7	11.3	-22.7	-40.7
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	-27.6	-16.2	30.4	-15.6	-27.6
			256	32	N/T	N/T	N/T	N/T	N/T
			512	35.1	N/T	N/T	N/T	N/T	N/T
			1024	38.5	-19	7	35	-7	-19

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01							
	ECCN: 5E991 HTS: 4901.99.0050				3DB19060AAAAQZZZA			222 / 302

V1-V2 Profiles

Main Frequency 6226.89 MHz										
T2I/ Like Modulation Without Filters V1-V2 Profiles evaluation										
Frequency Band	Mode	BW	QAM	Adj Chan Spec (dBm)	Co-Chan Spec (dBm)	T2I				
						-2	-1	Co-Chan	1	2
U6 GHz	FCM	30 MHz	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			16	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			32	-8	27	-29.6	-11.6	25.4	-13.6	-30.6
			64	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			128	-5	33	-24	-12	31	-18	-22
			256	-2	36.5	-20.4	-9.3	32.7	-7.3	-19.4
			512	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			1024	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	FCM	10 MHz	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			16	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			32	-8	27	N/A	N/A	N/A	N/A	N/A
			64	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			128	-5	33	-17.2	-13.2	27.8	-11.2	-13.2
			256	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			512	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			1024	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	FCM	5 MHz	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			16	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			32	-8	27	-16.1	-15.1	23.9	-14.1	-17.1
			64	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			128	-5	33	-13.2	-13.2	-30.8	-13.2	-14.2
			256	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			512	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			1024	N/A	N/A	N/A	N/A	N/A	N/A	N/A

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

223 / 302

5.11 C/I LIKE MODULATION DATA

The goal of this test is to measure the Carrier to interference with a like modulation RF signal.

5.11.1 TOOLS NEEDED TO PERFORM THIS TEST

- MPT-HL V2 units (2)
- MSS Shelf
- Synthesizer
- Power meter HP 437B or similar
- Variable attenuator
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Test set Tektronix ST112/ ACTERNA Model No. 2802 or similar

5.11.2 SETUP CONFIGURATION

- Connect as shown in figure 15
- Connect as shown in figure 16 ([Adaptive Modulation profiles only](#))
- Turn off the interfering transmitter.
- Calibrate the level going into the receiver with the main transmitter on.
- Set the RSL level into the receiver to -50 dBm.
- . Verify the receiver connected to the test set #2 is locked and running error free.

5.11.3 TEST PROCEDURE

Test Case 4e: C/I with Like Modulation

Summary: To measure C/I with Like Modulation.

Steps:

The following will be verified on units under test.

- Verify the receiver is locked
- Monitor the receiver connected to test set #2. Make sure is running error free.
- Turn off the interfering transmitter.
- Adjust the RSL level into the receiver to -50 dBm.
- Turn off the main transmitter.
- Turn on the interfering transmitter.
- Increase the RSL level until -50 dBm is reach.
- Turn the main transmitter on.
- Decrease the interfering transmitter level until the 1X10-6 is found.
- Record the points and plot them in excel.

Expected Results:

Radio shall meet specs from table 3.

Results:

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	224 / 302

See data below.

5.11.4 TEST DATA

C/I Table of Results

30 MHz Profiles in FCM Mode

Main Frequency 6123.1 MHz									
C/ILike Modulation WithFilters 30 MHz profiles In FCM Mode									
Frequency Band	Mode	BW	QAM	Co-Chan Spec	C/I (with Filters)				
					-2	-1	Co-Chan	1	2
L6 GHz	ACM	30 MHz	4	14.2	N/T	N/T	N/T	N/T	N/T
			16	20.5	-43	-21	13	-23	-43
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	N/T	N/T	N/T	N/T	N/T
			256	32	N/T	N/T	N/T	N/T	N/T
			512	35.1	-26	-18	28	-20	-27
			1024	38.5	-24	-18	13	-23	-43

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01							
	ECCN: 5E991 HTS: 4901.99.0050				3DB19060AAAAQZZZA			225 / 302

Corner Profiles in FCM Mode

Main Frequency 6123.1 MHz									
C/Like Modulation Without Filters Corner Profiles in FCM Mode									
Frequency Band	Mode	BW	QAM	Co-Chan Spec	C/I (without Filters)				
					-2	-1	Co-Chan	1	2
L6 GHz	ACM	60 MHz	4	14.2	N/T	N/T	N/T	N/T	N/T
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	N/T	N/T	N/T	N/T	N/T
			256	32	-22	-13	26	-14	-23
			512	35.1	N/T	N/T	N/T	N/T	N/T
			1024	38.5	-19	-6	33	-7	20
L6 GHz	ACM	30 MHz	4	14.2	N/T	N/T	N/T	N/T	N/T
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	N/T	N/T	N/T	N/T	N/T
			256	32	-23	-17	35	-17	-23
			512	35.1	-22	-16	28	-15	-22
			1024	38.5	-21	-16	32	-15	-21
L6 GHz	ACM	10 MHz	4	14.2	N/T	N/T	N/T	N/T	N/T
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	N/T	N/T	N/T	N/T	N/T
			256	32	N/T	N/T	N/T	N/T	N/T
			512	35.1	N/T	N/T	N/T	N/T	N/T
			1024	38.5	N/T	N/T	N/T	N/T	N/T
L6 GHz	ACM	5 MHz	4	14.2	N/T	N/T	N/T	N/T	N/T
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	N/T	N/T	N/T	N/T	N/T
			256	32	N/T	N/T	N/T	N/T	N/T
			512	35.1	N/T	N/T	N/T	N/T	N/T
			1024	38.5	-20	-14	32	-14	-20

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01							
	ECCN: 5E991 HTS: 4901.99.0050				3DB19060AAAAQZZZA			226 / 302

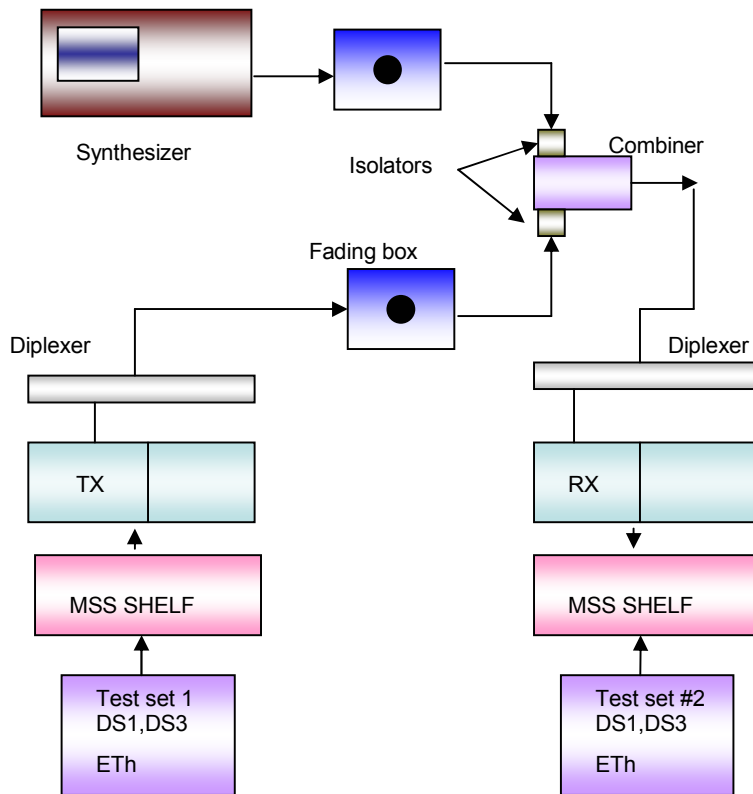


Figure 17 T/I and C2I CW Setup

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	227 / 302

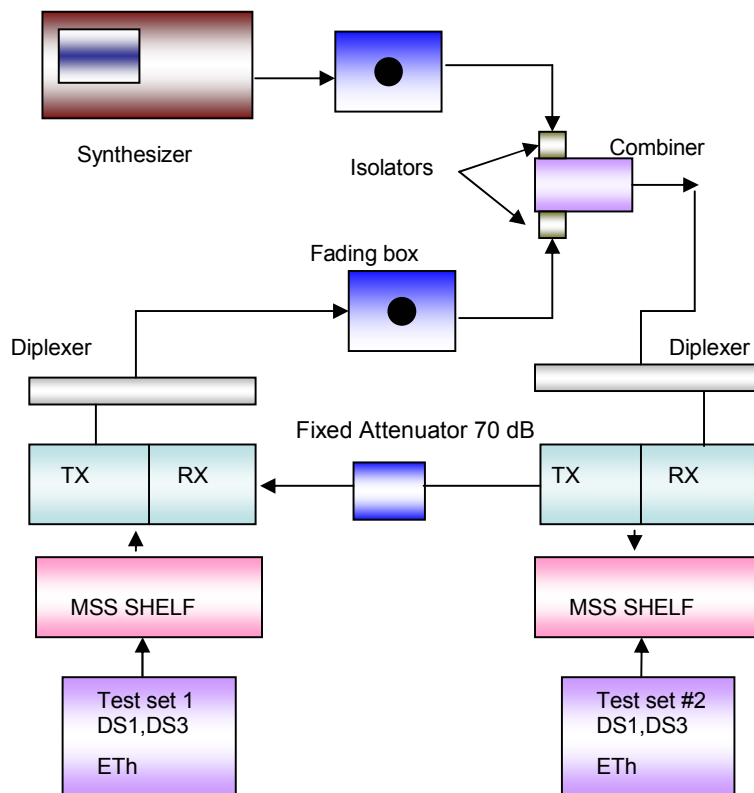


Figure 18 T/I C/I CW Setup (Adaptive Modulation)

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	228 / 302

5.12 T/I CW DATA

The goal of this test is to measure the Threshold to interference with a CW signal as an interfering CW RF signal.

5.12.1 TOOLS NEEDED TO PERFORM THIS TEST

- MSS Shelf
- MPT -HL units (3)
- Power meter HP 437B or similar
- Variable attenuators
- Isolators
- 3 dB combiner
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Test set Tektronix ST112/ ACTERNA Model No. 2802 or similar

5.12.2 SETUP CONFIGURATION

- Connect as shown in figure 15
- Connect as shown in figure 16 (Adaptive Modulation profiles only)
- Turn off the interfering CW RF signal.
- Calibrate the level going into the receiver with the main transmitter on.
- Set the RSL level into the receiver to -50 dBm.
- . Verify the receiver connected to the test set #2 is locked and running error free.

5.12.3 TEST PROCEDURE

Test Case 4f: Measure T/I with a CW signal

Summary: To measure T/I with a CW signal.

Steps:

The following will be verified on units under test.

- Verify the receiver is locked
- Monitor the receiver connected to test set #2. Make sure is running error free.
- Turn off the interfering transmitter.
- Adjust the RSL level into the receiver until the test set reads 1Xe-06.
- Increase the level 1 db better then threshold.
- Turn off the main transmitter.
- Turn on the interfering CW RF signal.
- Increase the CW level until -50 dBm is reach.
- Turn the main transmitter on.
- Decrease the interfering CW R.F. signal level until the 1X10-6 is found.
- Record the points and plot them in excel.

Expected Results:

Radio shall meet specs from table 3.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	229 / 302

Results:

The data was collected in the tables below.

5.12.4 TEST DATA**T/I CW Table of Results****30 MHz Profiles in FCM Mode**

Main Frequency 6123.1 MHz									
T/I CW With Filters 30 MHz profiles in FCM Mode									
Frequency Band	Mode	BW	QAM	Co-Chan Spec	T/I (with Filters)				
					-2	-1	Co-Chan	1	2
L6 GHz	FCM	30 MHz	4	14.2	-72.2	-50.2	7.8	-62.2	-72.2
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	N/T	N/T	N/T	N/T	N/T
			256	32	-54.1	-21.3	30.9	-35.1	-54.1
			512	35.1	-51.3	-21.3	34.8	-33.3	-51.3
			1024	38.5	-47.7	17.7	38.3	-29.7	-47.7

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

230 / 302

Corner Profiles in FCM Mode

Main Frequency 6123.1 MHz									
T/I CW Without Filters Corner profiles In FCM Mode									
Frequency Band	Mode	BW	QAM	Co-Chan Spec	T/I CW (No Filters)				
					-2	-1	Co-Chan	1	2
L6 GHz	FCM	60 MHz	4	14.2	N/T	N/T	N/T	N/T	N/T
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	N/T	N/T	N/T	N/T	N/T
			256	32	N/T	N/T	N/T	N/T	N/T
			512	35.1	N/T	N/T	N/T	N/T	N/T
			1024	38.5	-30.2	-7	35	-7	-20
L6 GHz	FCM	30 MHz	4	14.2	N/T	N/T	N/T	N/T	N/T
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	N/T	N/T	N/T	N/T	N/T
			256	32	N/T	N/T	N/T	N/T	N/T
			512	35.1	N/T	N/T	N/T	N/T	N/T
			1024	38.5	-38.8	-38.8	38.2	-33.8	-33.8
L6 GHz	FCM	10 MHz	4	14.2	N/T	N/T	N/T	N/T	N/T
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	N/T	N/T	N/T	N/T	N/T
			256	32	N/T	N/T	N/T	N/T	N/T
			512	35.1	N/T	N/T	N/T	N/T	N/T
			1024	38.5	-19	-7	35	7	-20

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01							
	ECCN: 5E991 HTS: 4901.99.0050				3DB19060AAAAQZZZA			231 / 302

5.13 C/I CW DATA

The goal of this test is to measure the Carrier to interference with a CW RF signal.

5.13.1 TOOLS NEEDED TO PERFORM THIS TEST

- MPT-HL V2 units (2)
- MSS Shelf
- Synthesizer
- Power meter HP 437B or similar
- Variable attenuator
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Test set Tektronix ST112/ ACTERNA Model No. 2802 or similar

5.13.2 SETUP CONFIGURATION

- Connect as shown in figure 15
- Connect as shown in figure 16 (**Adaptive Modulation profiles only**)
- Turn off the interfering transmitter.
- Calibrate the level going into the receiver with the main transmitter on.
- Set the RSL level into the receiver to -50 dBm.
- . Verify the receiver connected to the test set #2 is locked and running error free.

5.13.3 TEST PROCEDURE

Test Case 4g: Measure C2I with a CW signal

Summary: To measure C2I with a CW signal.

Steps:

The following will be verified on units under test.

- Verify the receiver is locked
- Monitor the receiver connected to test set #2. Make sure is running error free.
- Turn off the interfere transmitter.
- Adjust the RSL level into the receiver to -50 dBm.
- Turn off the main transmitter.
- Turn on the interference CW RF signal.
- Increase the signal level until -50 dBm is reach.
- Turn the main transmitter on.
- Decrease the CW interference signal level until the 1X10-6 is found.
- Record the points and plot them in excel.

Expected Results:

Radio shall meet specs from table 3.

Results:

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	232 / 302

See data below.

5.13.4 TEST DATA

C/I CW Table of Results

30 MHz Profiles in FCM Mode

Main Frequency 6123.1 MHz									
C/I CW With Filters 30 MHz profiles In FCM Mode									
Frequency Band	Mode	BW	QAM	Co-Chan Spec	C/I (with Filters)				
					-2	-1	Co-Chan	1	2
L6 GHz	FCM	30 MHz	4	14.2	>.+10	-55	0	-48	>+10
			16	20.5	N/T	N/T	N/T	N/T	N/T
			32	24.1	N/T	N/T	N/T	N/T	N/T
			64	26.2	N/T	N/T	N/T	N/T	N/T
			128	29.1	N/T	N/T	N/T	N/T	N/T
			256	32	>+10	-45	-25	-51	>+10
			512	35.1	>+10	-42	28	-36	>+10
			1024	38.5	-59	-22	31	-33	-60

Corner Profiles in FCM Mode

Main Frequency at 6123.1 MHz									
C/I CW Without Filters Corner profiles In FCM Mode									
Frequency Band	Mode	BW	QAM	Co-Chan Spec	C/I CW (without Filters)				
					-2	-1	Co-Chan	1	2
L6 GHz	FCM	30	1024	38.5	-32	-32	33	-29	-29

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

233 / 302

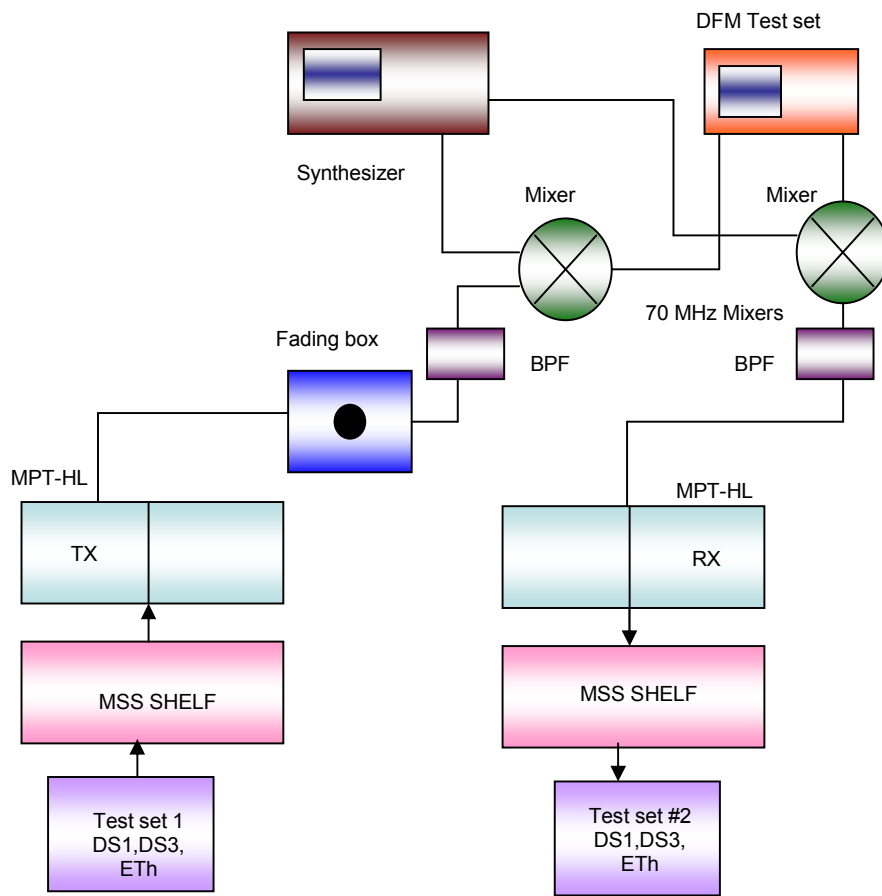


Figure 19 DFM Setup

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	234 / 302

5.14 DFM TEST

The goal of this test is to measure Dispersive Fade Margin.

5.14.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- DFM test set HP1157B
- Spectrum Analyzer Agilent E4407B
- Synthesized signal generator HP 83620A or similar
- Test set HP3789B with ECL output
- A 3 dB splitter
- 2 isolators
- 2 mixers

5.14.2 SETUP CONFIGURATION

- Connect as shown in figure 17

5.14.3 TEST PROCEDURE

Test Case 4h: DFM Test

Summary: To measure Dispersive Fade Margin

Steps:

The following will be verified on the units under test.

- Connect as shown in figure 13
- Connect a printer to the DFM test set
- Set the parameters for the DFM test set
- Print the results
- Compare the results with the table 3
- Perform the measurements and record the results electronically.

Expected Results:

Radio shall meet the Specs from table 3.

Results:

See data Below.

5.14.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	235 / 302

Corner Profiles in ACM Mode

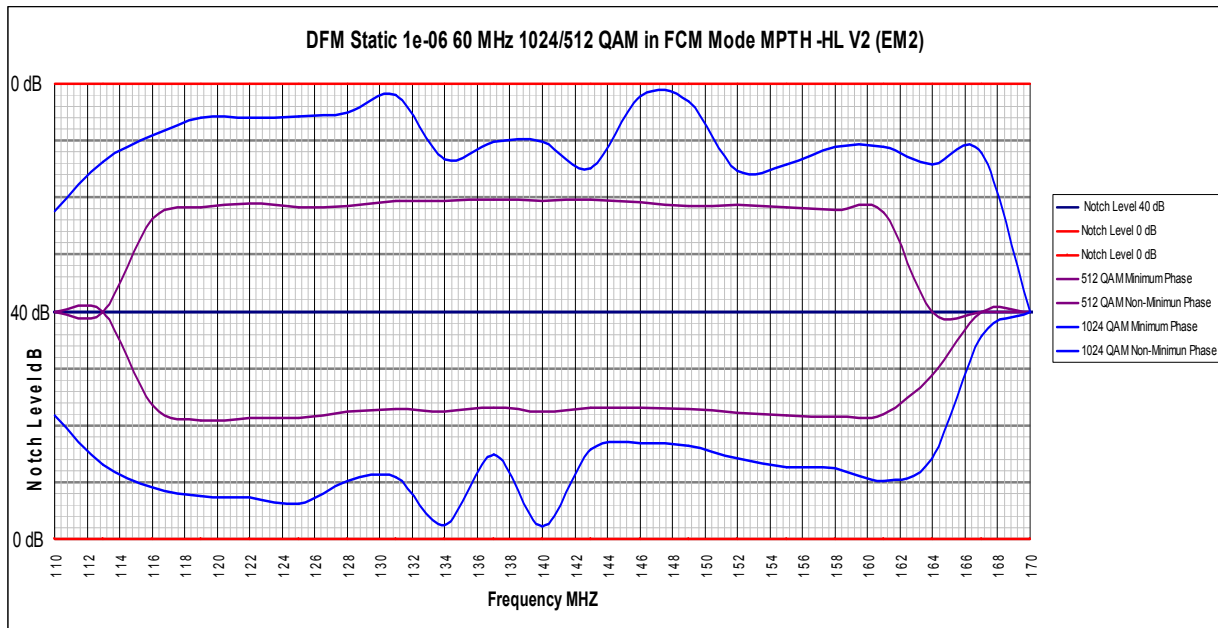
DFM Static 1.0E-06			
L6 GHz Corner Profiles			
Bandwidth MHz	MODULATION QAM	FCM 1x10- 6 (dB)	ACM 1x10- 6 (dB)
60	1024	29	39.7
	512	N/T	N/T
	256	44.7	
	128	N/T	N/T
	64	N/T	N/T
	32	N/T	N/T
	16	N/T	N/T
	4	N/T	N/T
30	1024	N/T	49.7
	512	52.1	N/T
	256	N/T	N/T
	128	N/T	N/T
	64	N/T	N/T
	32	N/T	N/T
	16	N/T	N/T
	4	N/T	N/T
10	1024	53.8	59.1
	512	N/T	N/T
	256	N/T	N/T
	128	70.6	N/T
	64	N/T	N/T
	32	N/T	N/T
	16	N/T	N/T
	4	N/T	N/T

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	236 / 302

60 MHz Profiles in FCM

60 MHz Corner Profiles In FCM Mode							
DFM-Bell Core 44.7 dB				DFM-Bell Core 29 dB			
256 QAM FCM				1024QAM FCM			
512 QAM Minimum Phase	512 QAM Non-Minimum Phase	1024 QAM Minimum Phase	1024 QAM Non-Minimum Phase				
40	0	40	0	22.4	17.6	21.8	-18.2
40	0	40	0	13.7	26.3	13	-27
23.8	16.2	23.4	-16.6	9	31	9	-31
21.8	18.2	20.8	-19.2	5.9	34.1	7.5	-32.5
21.1	18.9	21.2	-18.8	6	34	7.3	-32.7
21.7	18.3	21.3	-18.7	5.7	34.3	6.1	-33.9
21.5	18.5	22.4	-17.6	5	35	10.1	-29.9
20.5	19.5	22.8	-17.2	2.1	37.9	10.8	-29.2
20.5	19.5	22.3	-17.7	13.2	26.8	2.4	-37.6
20.4	19.6	23	-17	10.3	29.7	14.8	-25.2
20.5	19.5	22.3	-17.7	10.2	29.8	2.2	-37.8
20.3	19.7	23	-17	14.8	25.2	15.8	-24.2
20.8	19.2	23.1	-16.9	2.2	37.8	16.8	-23.2
21.5	18.5	22.8	-17.2	3.2	36.8	16.4	-23.6
21.3	18.7	22.1	-17.9	15.3	24.7	14.1	-25.9
21.7	18.3	21.8	-18.2	14.1	25.9	12.7	-27.3
22.1	17.9	21.6	-18.4	11	29	12.3	-27.7
22.6	17.4	21.9	-18.1	11.1	28.9	10.2	-29.8
40	0	28.8	-11.2	14.1	25.9	14.1	-25.9
40	0	40	0	12.2	27.8	35.6	-4.4
40	0	40	0	40	0	40	0



ED

01

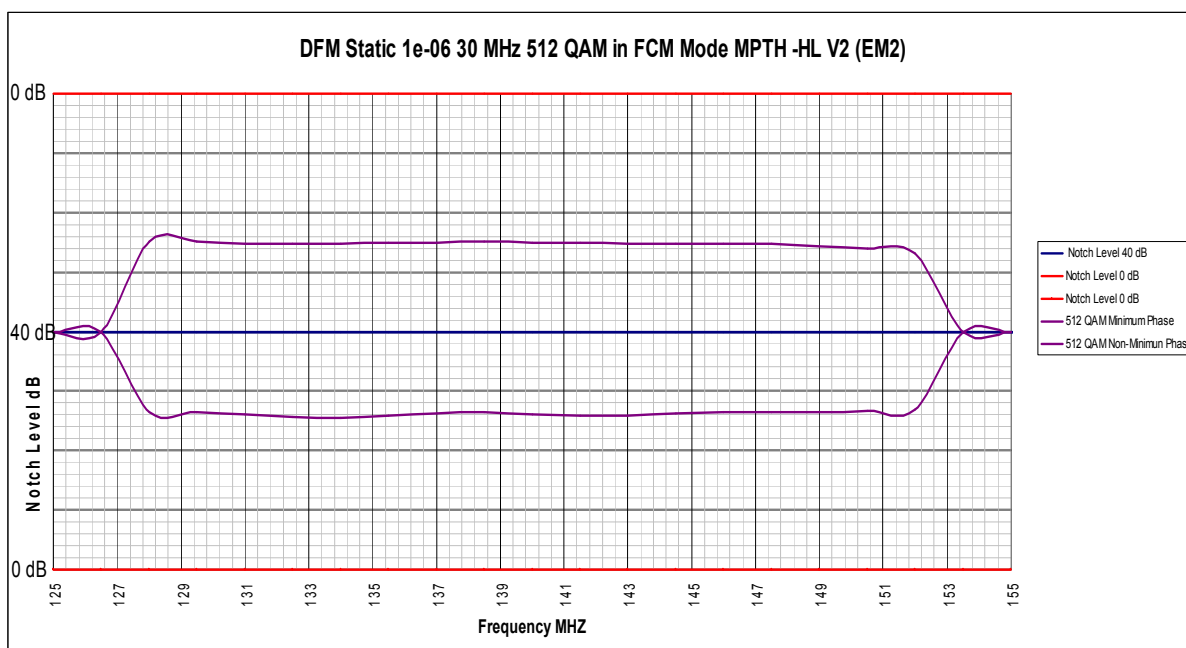
ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZZA

237 / 302

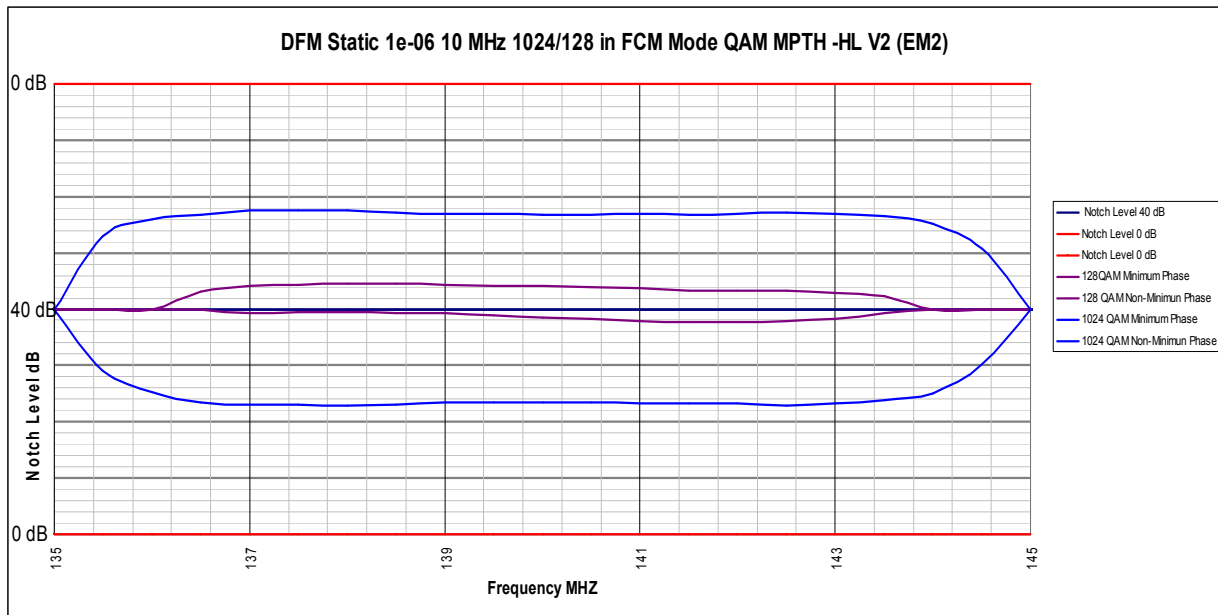
Corner Profiles in FCM Mode

30 MHz Corner Profiles in FCM Mode			
DFM-Bell Core 52.1 dB			
512 QAM FCM			
512 QAM Minimum Phase		512 QAM Non-Minimum Phase	
40	0	40	0
40	0	40	0
24.8	15.2	26.4	-13.6
24.8	15.2	26.4	-13.6
25.3	14.7	26.1	-13.9
25.2	14.8	25.6	-14.4
25.2	14.8	25.5	-14.5
25.1	14.9	25.8	-14.2
25	15	26.3	-13.7
24.8	15.2	26.5	-13.5
25	15	26.1	-13.9
25	15	25.8	-14.2
25.3	14.7	25.8	-14.2
25.3	14.7	26.2	-13.8
25.3	14.7	26.5	-13.5
25.3	14.7	26.4	-13.6
25.7	14.3	26.4	-13.6
26.1	13.9	26.7	-13.3
26.8	13.2	26.8	-13.2
40	0	40	0
40	0	40	0



ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	238 / 302

10 MHz Corner Profiles In FCM Mode							
DFM-Bell Core 70.6 dB				DFM-Bell Core 53.8 dB			
128 QAM FCM				1024QAM FCM			
128QAM Minimum Phase	128 QAM Non-Minimum Phase			1024 QAM Minimum Phase	1024 QAM Non-Minimum Phase		
40	0	40	0	40	0	40	0
40	0	40	0	27	13	29	-11
40	0	40	0	24	16	25.2	-14.8
36.8	3.2	40	0	23.3	16.7	23.4	-16.6
35.9	4.1	39.3	-0.7	22.4	17.6	23.1	-16.9
35.6	4.4	39.4	-0.6	22.4	17.6	23	-17
35.5	4.5	39.5	-0.5	22.4	17.6	22.8	-17.2
35.5	4.5	39.3	-0.7	22.8	17.2	23.1	-16.9
35.6	4.4	39.3	-0.7	23	17	23.5	-16.5
35.8	4.2	38.9	-1.1	23.1	16.9	23.5	-16.5
35.9	4.1	38.5	-1.5	23.2	16.8	23.4	-16.6
36.1	3.9	38.2	-1.8	23.3	16.7	23.5	-16.5
36.3	3.7	37.9	-2.1	23	17	23.3	-16.7
36.6	3.4	37.6	-2.4	23.3	16.7	23.3	-16.7
36.6	3.4	37.6	-2.4	23.1	16.9	23.2	-16.8
36.7	3.3	37.8	-2.2	22.8	17.2	22.8	-17.2
37.1	2.9	38.2	-1.8	23.1	16.9	23.3	-16.7
37.6	2.4	39.3	-0.7	23.5	16.5	23.8	-16.2
40	0	40	0	24.8	15.2	25.1	-14.9
40	0	40	0	29.2	10.8	30.2	-9.8
40	0	40	0	40	0	40	0

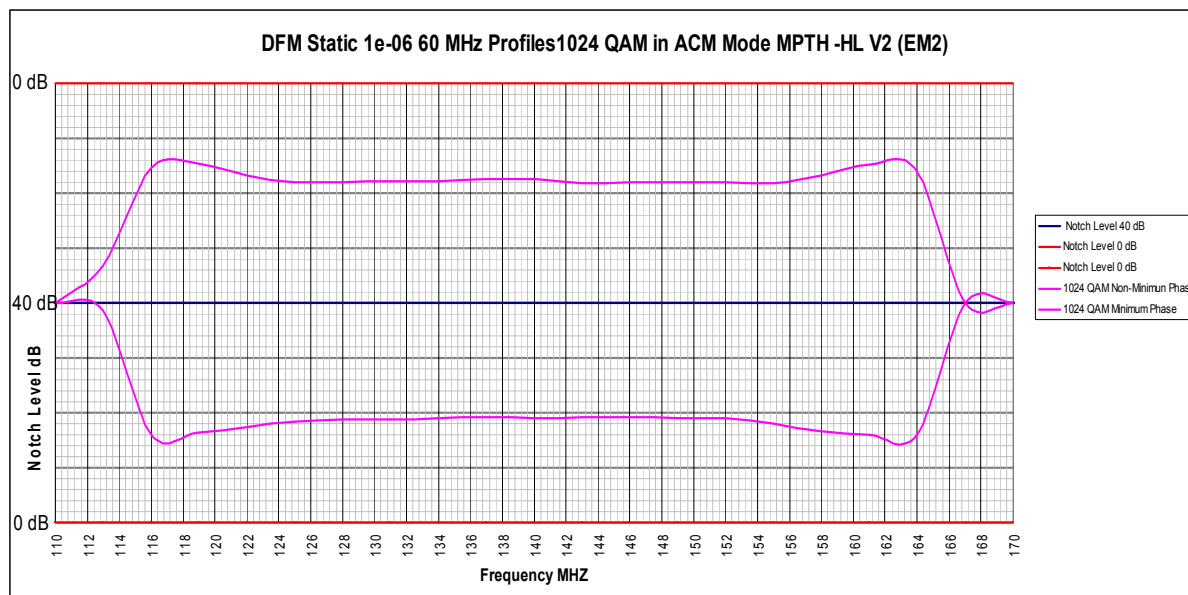


ED	01			
	ECCN: 5E991		3DB19060AAAAQZZA	239 / 302
	HTS: 4901.99.0050			

Corner Profiles in ACM Mode

60 MHz

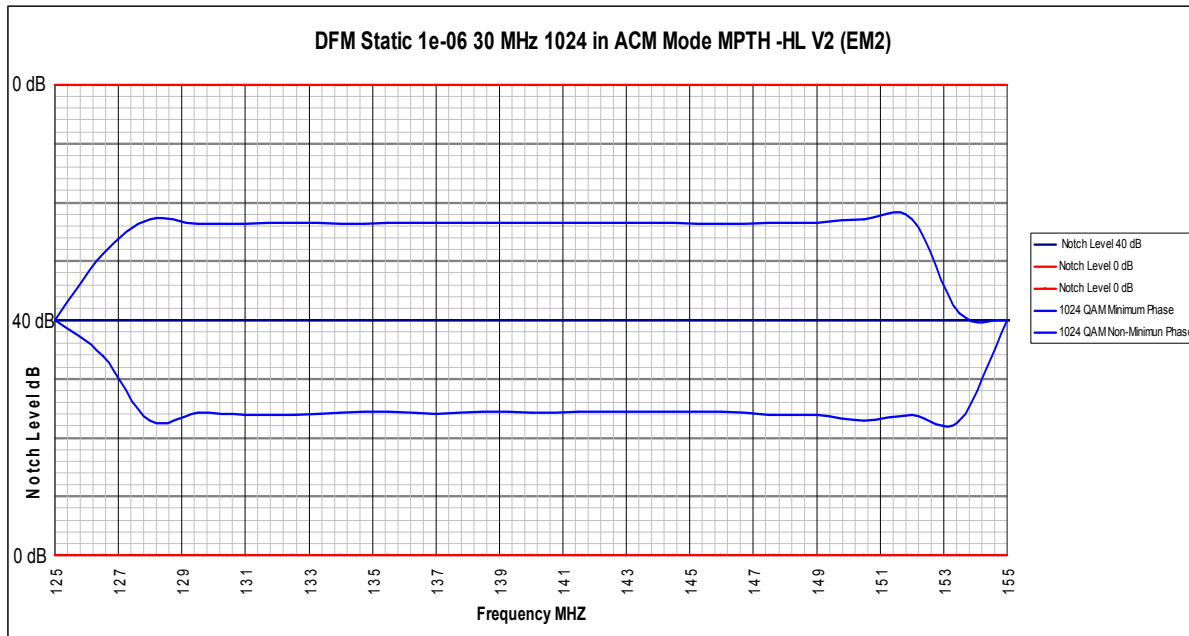
60 MHz Corner Profiles in ACM Mode			
DFM-Bell Core 39.7 dB			
1024QAM ACM			
1024 QAM Minimum Phase		1024 QAM Non-Minimum Phase	
40	0	40	0
33.1	6.9	38.6	-1.4
15.4	24.6	16.1	-23.9
14.6	25.4	16.5	-23.5
16.7	23.3	17.4	-22.6
17.9	22.1	18.4	-21.6
17.9	22.1	18.8	-21.2
17.7	22.3	18.9	-21.1
17.8	22.2	19.1	-20.9
17.4	22.6	19.2	-20.8
17.3	22.7	19	-21
18.1	21.9	19.3	-20.7
17.9	22.1	19.3	-20.7
18	22	19.1	-20.9
17.9	22.1	19	-21
18.1	21.9	18.1	-21.9
16.8	23.2	16.7	-23.3
14.7	25.3	16	-24
16	24	16.1	-23.9
40	0	40	0
40	0	40	0



ED	01		
	ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	240 / 302

30 MHz

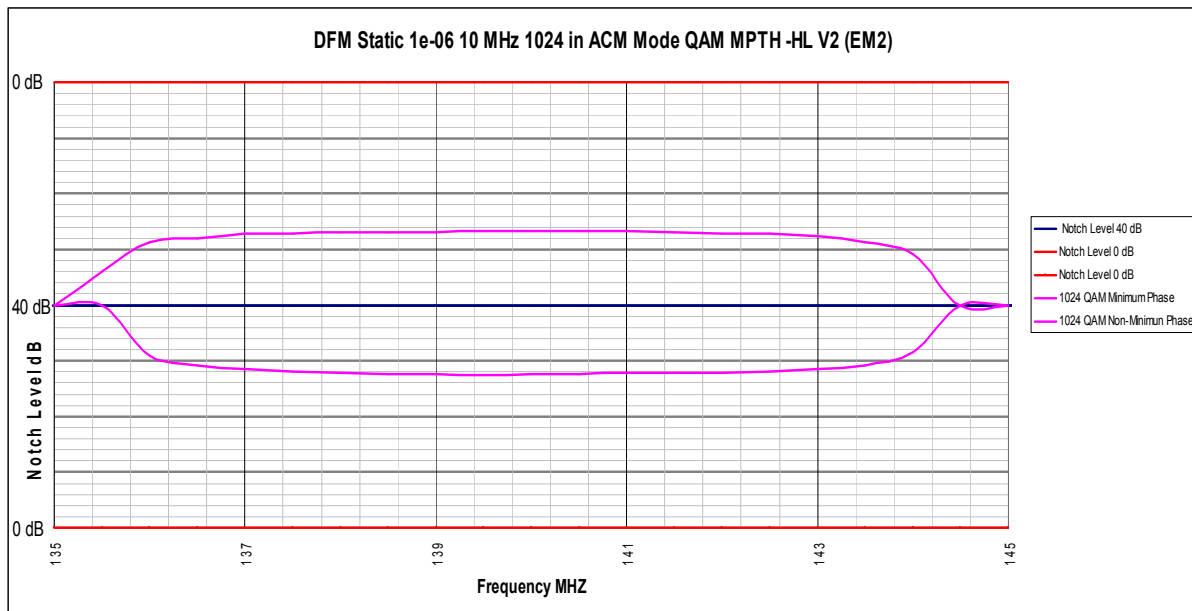
30 MHz Corner Profiles in ACM Mode			
DFM-Bell Core 49.7 dB			
1024QAM ACM			
1024 QAM Minimum Phase		1024 QAM Non-Minimum Phase	
40	0	40	0
28.8	11.2	33.9	-6.1
22.8	17.2	22.8	-17.2
23.7	16.3	24.2	-15.8
23.6	16.4	23.9	-16.1
23.5	16.5	23.8	-16.2
23.6	16.4	24.2	-15.8
23.5	16.5	24.4	-15.6
23.4	16.6	24.1	-15.9
23.5	16.5	24.4	-15.6
23.5	16.5	24.3	-15.7
23.5	16.5	24.5	-15.5
23.5	16.5	24.5	-15.5
23.5	16.5	24.4	-15.6
23.6	16.4	24.4	-15.6
23.5	16.5	23.8	-16.2
23.5	16.5	23.8	-16.2
22.8	17.2	22.8	-17.2
22.8	17.2	23.8	-16.2
38.9	1.1	22.8	-17.2
40	0	40	0



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	241 / 302

10 MHz

10 MHz Corner Profiles in ACM Mode			
DFM-Bell Core 59.1 dB			
1024QAM ACM			
1024 QAM Minimum Phase		1024 QAM Non-Minimum Phase	
40	0	40	0
33.9	6.1	40	0
28.8	11.2	30.8	-9.2
28.1	11.9	29.2	-10.8
27.2	12.8	28.5	-11.5
27.1	12.9	28.1	-11.9
27	13	27.8	-12.2
27	13	27.7	-12.3
26.9	13.1	27.6	-12.4
26.7	13.3	27.4	-12.6
26.8	13.2	27.7	-12.3
26.8	13.2	27.7	-12.3
26.8	13.2	27.9	-12.1
27	13	27.8	-12.2
27.1	12.9	27.8	-12.2
27.1	12.9	28.1	-11.9
27.7	12.3	28.4	-11.6
28.7	11.3	29.2	-10.8
30.8	9.2	31.6	-8.4
40	0	40	0
40	0	40	0



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	242 / 302

V1-V2 Profiles

Note : The DFM test was done setting the points manually in the DFM test set.

DFM Static 1E-06							
L6 GHz V1-V2 Profiles V2 as a Receiver							
	30 MHz QAM			10 MHz QAM		5 MHz	
	256	128	32	128	32	128	32
V 1 SPEC	47	50	52	55	58	58	61.1
V2 as a Rx	54.1	56.0	60.0	67.5	69.2	66.5	69.3
V1 as a Receiver	N/T	N/T	N/T	N/T	N/T	N/T	N/T

ED	01						
	ECCN: 5E991 HTS: 4901.99.0050			3DB19060AAAAQZZZA			243 / 302

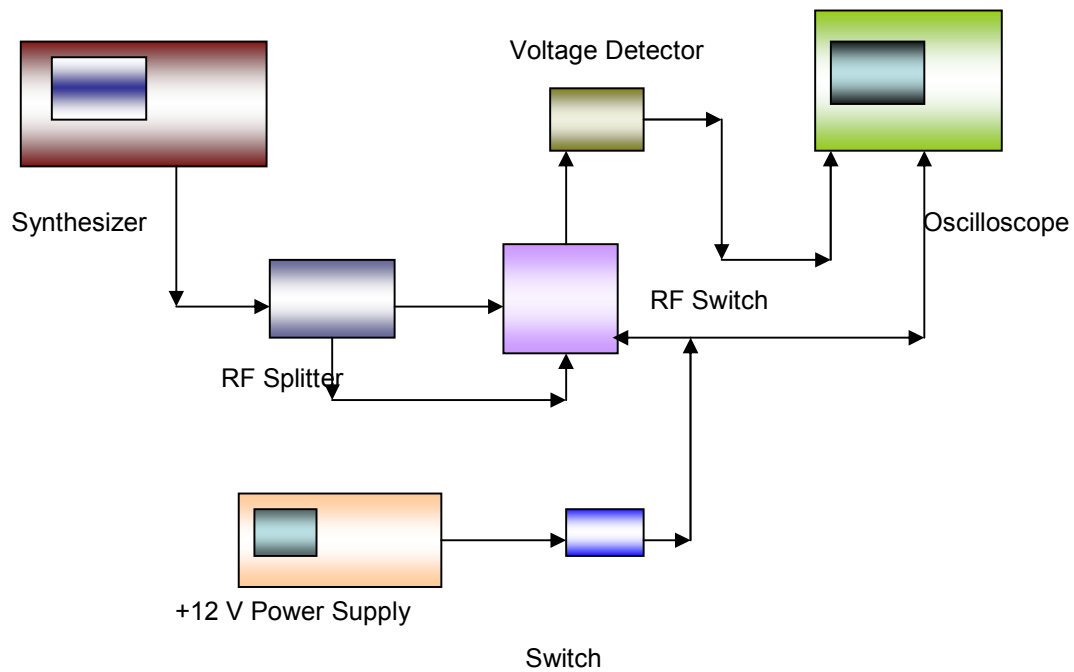


Figure 20 Transmitter switching Time

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	244 / 302

5.15 TRANSMITTER SWITCHING OUTAGE/DELAY

Goal of this test is to record the outage time of the transmitter due to a transmitter switch and record the Delay of the RF switch. ` .

5.15.1 TOOLS NEEDED TO PERFORM THIS TEST

- 3 MPT-HL V2 units
- Fading Box
- Digital scope
- Spectrum analyzer
- Voltage detector
- Directional coupler HP 779D or similar

5.15.2 SETUP CONFIGURATION

- Connect as shown in figure 21
- Calibrate the level going into the receiver input of the receiver.
- Verify the receiver connected to the test set #2 is passing data at nominal level (-45 dBm RSL)
-

5.15.3 TEST PROCEDURE

Test Case 5s: Transmitter switching outage.

Summary: Measure the transmitter outage time during the TX switch.

Steps:

The following will be verified on the units under test.

- Connect as shown in figure 21
- Connect the digital scope to the RF voltage detector.
- Monitor the time that takes to switch from the main TX to the hot stand by transmitter.
- Monitor the Delay of the switch.
- Capture the data in an electric format.
- Record the data in a table.

Expected Results:

Transmitter switch time under 5 ms.

Results:

The data below shows the time for both RF switches.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	245 / 302

5.15.4 TEST DATA

Relcomm RF Switch

Note : The NC stands for Normally Close and The NO for Normally Open.

TX Switch time /Delay				
Relcomm	Switching time		Delay	
Switching	Picture name	(ms)	Picture name	(ms)
NC to NO	NC to NO_1	1.878	NC to NO_Delay_1	2.858
NC to NO	NC to NO_2	1.835	NC to NO_Delay_2	2.885
NC to NO	NC to NO_3	1.877	NC to NO_Delay_3	2.882
NC to NO	NC to NO_4	1.876	NC to NO_Delay_4	2.933
NC to NO	NC to NO_5	1.865	NC to NO_Delay_5	2.879
NC to NO	No Pic	1.870	No Pic	2.752
NC to NO	No Pic	1.862	No Pic	2.798
NC to NO	No Pic	1.890	No Pic	2.890
NC to NO	No Pic	1.883	No Pic	2.803
NC to NO	No Pic	1.840	No Pic	2.736
Average		1.868		2.842

TX Switching time/ Delay				
Relcomm	Switching time		Delay	
Switching	Picture name	(ms)	Picture name	(ms)
NO to NC	NO to NC_1	1.879	NO to NC_Delay_1	2.582
NO to NC	NO to NC_2	1.918	NO to NC_Delay_2	2.584
NO to NC	NO to NC_3	1.876	NO to NC_Delay_3	2.564
NO to NC	NO to NC_4	1.909	NO to NC_Delay_4	2.562
NO to NC	NO to NC_5	1.907	NO to NC_Delay_5	2.561
NO to NC	No Pic	1.907	No Pic	2.552
NO to NC	No Pic	1.915	No Pic	2.565
NO to NC	No Pic	1.910	No Pic	2.583
NO to NC	No Pic	1.915	No Pic	2.625
NO to NC	No Pic	1.880	No Pic	2.561
Average		1.902		2.574

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	246 / 302

Dow Key RF Switch

TX Switch time /Delay				
Dow-Key	Switching time		Delay	
Switching	Picture name	(ms)	Picture name	(ms)
NC to NO	NC to NO_1	4.559	NC to NO Delay_1	4.496
NC to NO	NC to NO_2	3.688	NC to NO Delay_2	4.126
NC to NO	NC to NO_3	3.594	NC to NO Delay_3	4.193
NC to NO	NC to NO_4	3.967	NC to NO Delay_4	4.149
NC to NO	NC to NO_5	3.574	NC to NO Delay_5	4.201
NC to NO	NC to NO_6	4.002	NC to NO Delay_6	4.433
NC to NO	NC to NO_7	3.535	NC to NO Delay_7	4.271
NC to NO	NC to NO_8	3.594	NC to NO Delay_8	4.271
NC to NO	NC to NO_9	3.180	NC to NO Delay_9	4.228
NC to NO	NC to NO_10	3.636	NC to NO Delay_10	4.205
Average		3.733		4.257

TX Switch time /Delay				
Dow-Key	Switching time		Delay	
Switching	Picture name	(ms)	Picture name	(ms)
NO to NC	NO to NC_1	3.027	NO to NC Delay_1	3.760
NO to NC	NO to NC_2	2.853	NO to NC Delay_2	4.119
NO to NC	NO to NC_3	3.418	NO to NC Delay_3	4.143
NO to NC	NO to NC_4	3.401	NO to NC Delay_4	4.197
NO to NC	NO to NC_5	3.414	NO to NC Delay_5	4.225
NO to NC	NO to NC_6	3.412	NO to NC Delay_6	4.254
NO to NC	NO to NC_7	3.410	NO to NC Delay_7	4.304
NO to NC	NO to NC_8	3.400	NO to NC Delay_8	4.214
NO to NC	NO to NC_9	3.412	NO to NC Delay_9	4.273
NO to NC	NO to NC_10	3.381	NO to NC Delay_10	4.294
Average		3.313		4.178

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	247 / 302

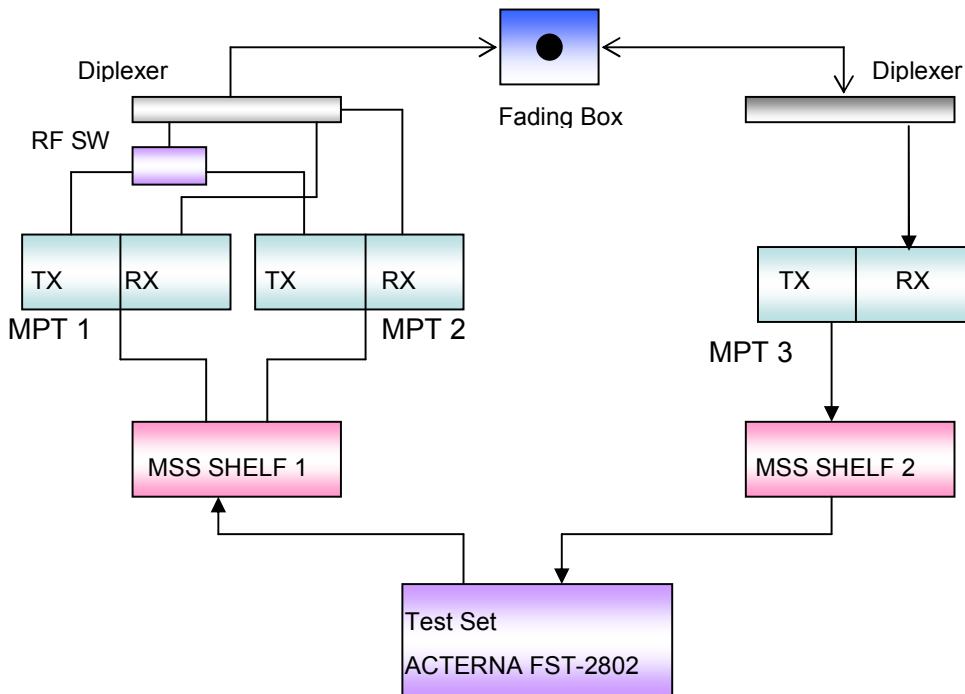


Figure 21 **Link Outage** Time Setup due to a transmitter switch

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	248 / 302

5.16 LINK OUTAGE TIME DUE TO A TRANSMITTER SWITCH

Goal of this test the outage time of the receiver before acquires lock.

5.16.1 TOOLS NEEDED TO PERFORM THIS TEST

- 3 MPT-HL V2
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- Optical cables
- Acterna FST 2802 test set

5.16.2 SETUP CONFIGURATION

- Connect as shown in figure 21
- Calibrate the level going into the receiver input of the radio
- Verify the receiver connected to the Acterna test and passing data at nominal level (-45 dBm RSL)

5.16.3 TEST PROCEDURE

Test Case 5r: Receiver acquisition time due to a transmitter switch

Summary: To measure the receiver acquisition time due to a transmitter switch.

Steps:

The following will be verified on units under test.

- Verify the receiver is locked
- Monitor the receiver connected to the Acterna test set. make sure is running error free at nominal level (-45 dBm RSL)
- Measure the receiver acquisition time using the Acterna test set FST-2802 or similar.
- Take 10 measurements and take the average.
- Record the results in a table.

Expected Results:

No more then 50 ms

Results:

See Data Below.

V1-V2 Profiles Failed the 50 ms spec.

5.16.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	249 / 302

Corner Profiles in ACM Mode**V1 -V2 Profiles**

Link Outage Time due to Transmit Switch		
L6 V1-V2 Profiles		
Case 1 TX V1 RXV2		
Switching times	Switch A-B	Switch B-A
	Time (ms)	Time (ms)
1	126	124
2	125	126
3	124	124
4	126	126
5	126	124
6	124	124
7	124	125
8	126	126
9	124	3879
10	124	125
Average	124.9	500.3

Link Outage Time due to Transmit Switch		
L6 V1-V2 Profiles		
Case 2 TX V2 RXV1		
Switching times	Switch A-B	Switch B-A
	Time (ms)	Time (ms)
1	46	44
2	49	47
3	46	47
4	45	47
5	46	46
6	44	48
7	44	48
8	49	49
9	44	49
10	46	47
Average	45.9	47.2

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	250 / 302

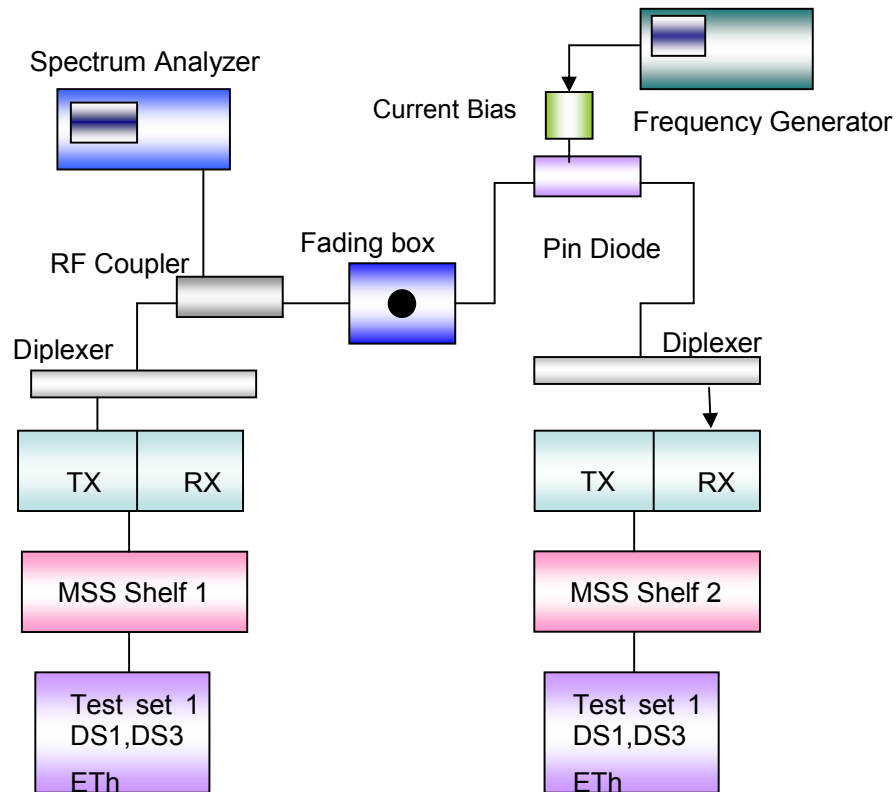


Figure 22 ATPC Setup

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	251 / 302

5.17 ATPC SWITCHING THRESHOLDS FCM MODE ONLY

The goal of this test is to measure the thresholds of the ATPC (Automatic Transmit Power).

5.17.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Fading Box
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- HP 8735B Pin Diode
- Spectrum Analyzer
- Variable attenuator
- 2 Test set Tektronix ST112

5.17.2 SETUP CONFIGURATION

- Connect as shown in figure 22
- Calibrate the level going into the receiver input.
- Verify the receiver connected to the test set #2 is locked at nominal level(-45 dBm, RSL)

5.17.3 TEST PROCEDURE

Test Case 5t: ATPC switching Thresholds

Summary: To measure the ATPC Thresholds.

Steps:

The following will be verified on the radio under test under test.

- Verify the receiver is locked
- Monitor the receiver connected to test set #2. make sure is running error free at nominal level (-45 dBm RSL)
- Enable ATPC
- Decrease the RSL until the ATPC became active record the RSL level.
- Increase the RSL until the ATPC drops the transmitter power and record the RSL.
- Verify that ATPC is working accordingly to the radio specs.
- Record the results in a table.

Expected Results:

Radio works according to the Radio Specs.

Results:

See Plots below.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	252 / 302

5.17.4 TEST DATA

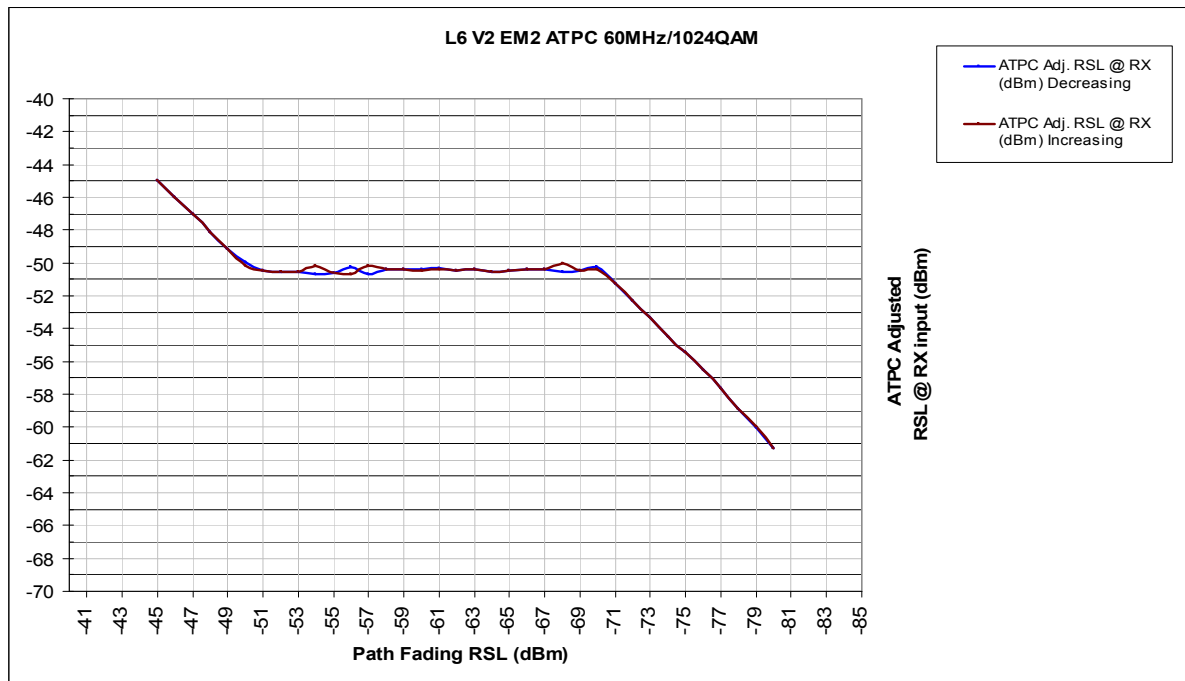
30 MHz Profiles in FCM Mode

ATPC Failed for the 30 MHz Profiles .The ATPC Software was not working at this early stage.

Corner Profiles in ACM Mode

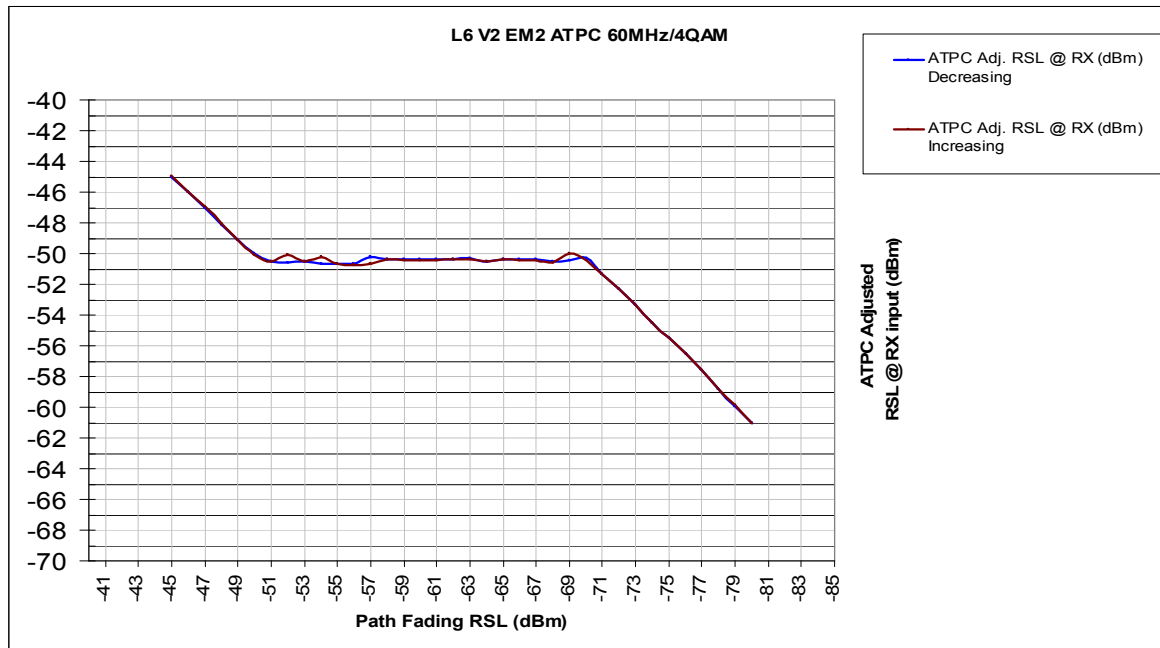
60 MHz Profiles

1024 QAM



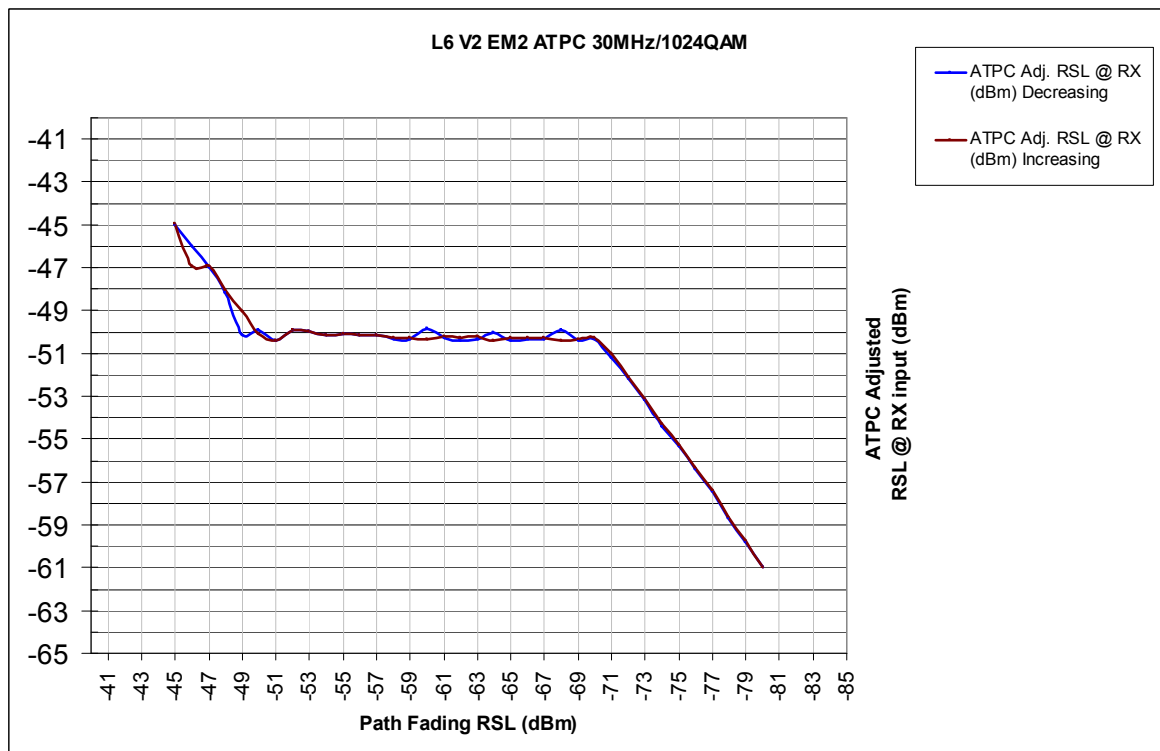
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	253 / 302

4 QAM



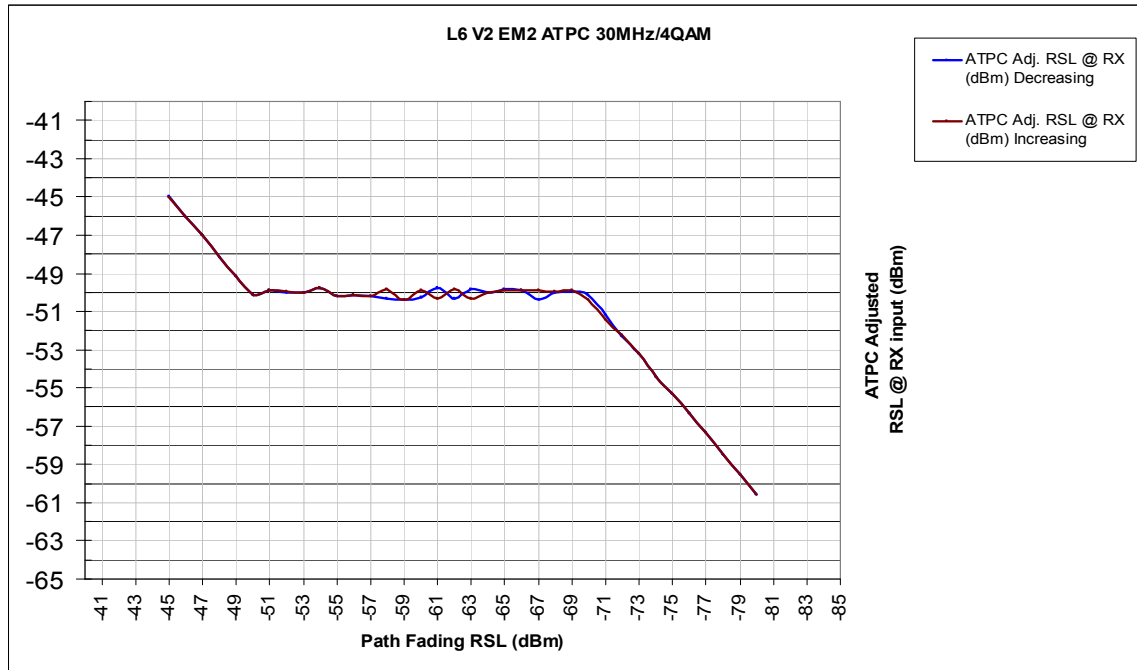
30 MHz Profiles

1024 QAM



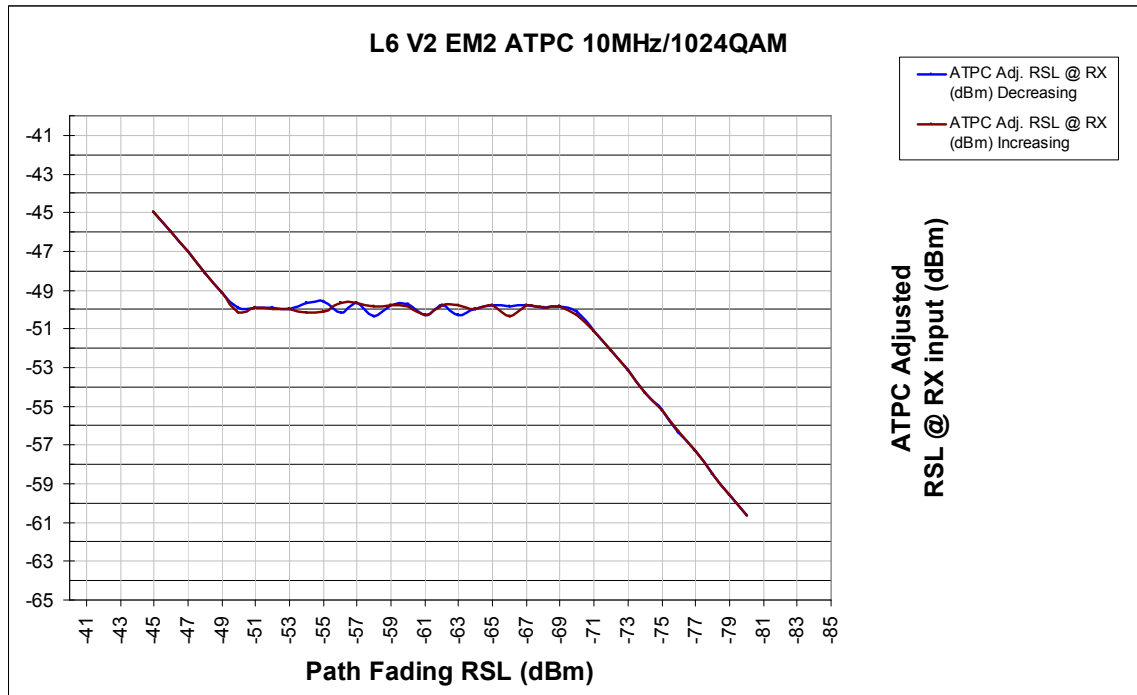
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	254 / 302

4 QAM



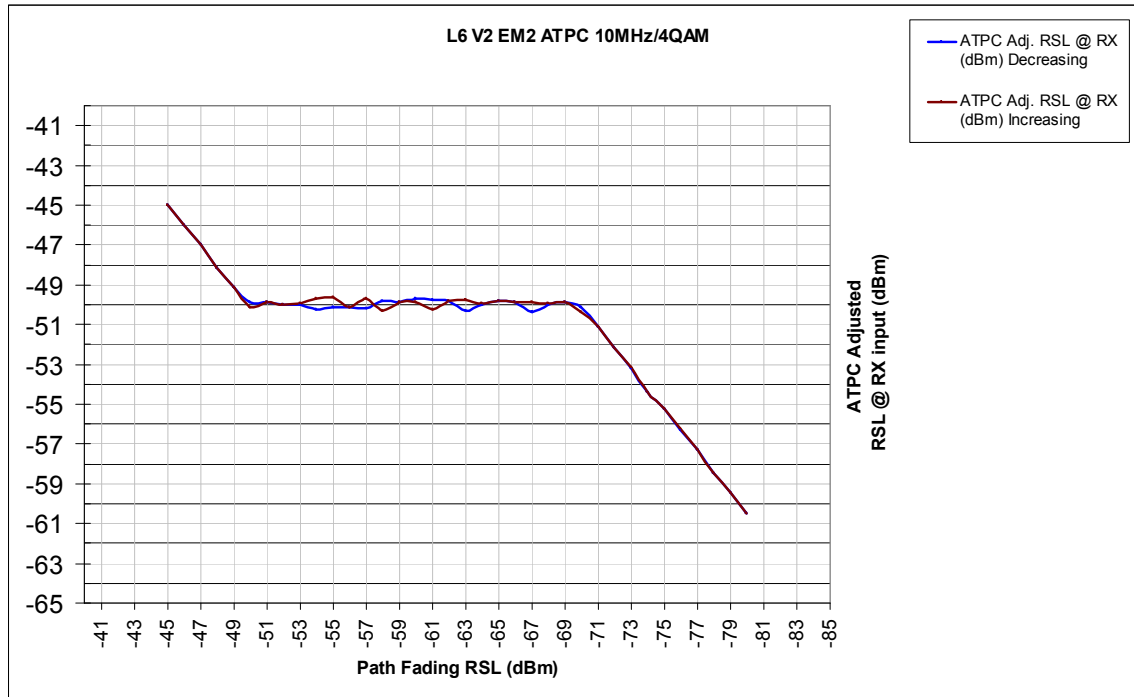
10 MHz Profiles

1024 QAM



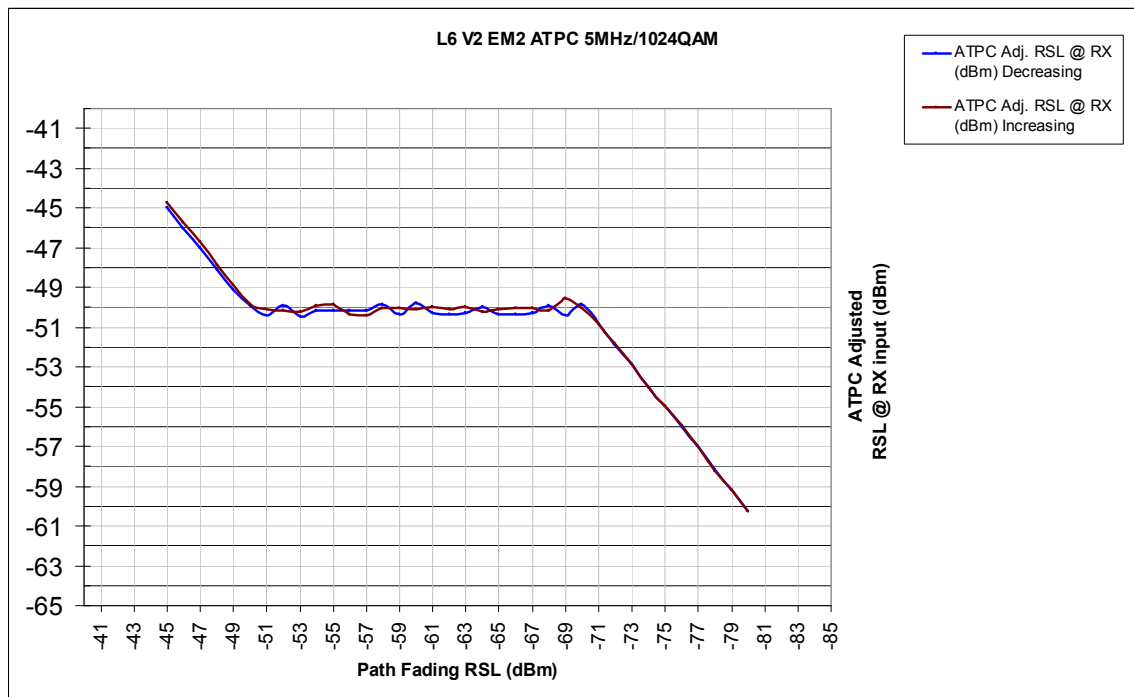
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	255 / 302

4 QAM



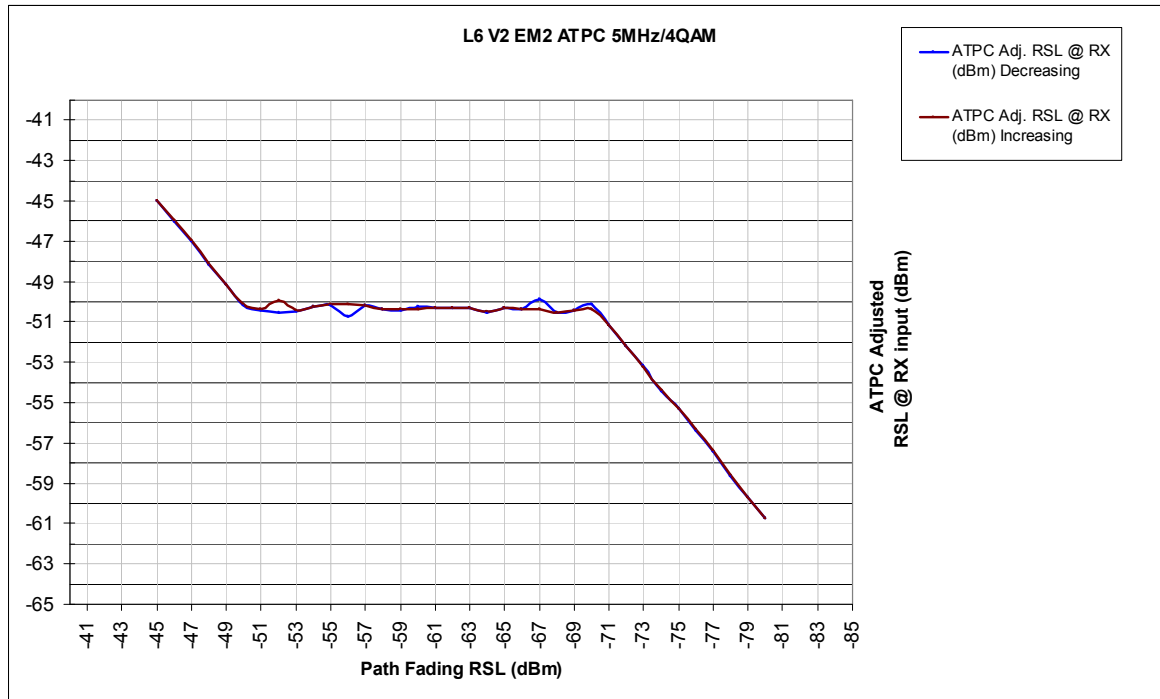
5 MHz Profiles

1024 QAM



ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	256 / 302

4 QAM



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	257 / 302

5.18 ATPC TRACKING SPEED FCM MODE ONLY

The goal of this test is to verify the operation of ATPC (Automatic Transmit Power Control).

5.18.1 TOOLS NEEDED TO PERFORM THIS TEST

- 2 MPT-HL-V2 units.
- 2 MSS Shelves
- Power meter HP 437B or similar
- Fading Box
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- HP 8735B Pin Diode
- Spectrum Analyzer
- Variable attenuator
- 2 Test set Tektronix ST112

5.18.2 SETUP CONFIGURATION

- Connect as shown in figure 22
- Calibrate the level going into the receiver input.
- Verify the receiver connected to the test set #2 is locked at nominal level(-45 dBm, RSL)

5.18.3 TEST PROCEDURE

Test Case 5u: ATPC tracking speed

Summary: To measure the ATPC Tracking speed.

Steps:

The following will be verified on the radio under test under test.

- Verify the receiver is locked
- Monitor the receiver connected to test set #2. make sure is running error free at nominal level (-45 dBm RSL)
- Enable ATPC
-
- Verify that ATPC is working accordingly to the radio specs.
- Measure the speed of the ATPC with the Spectrum Analyzer
- Record the results in digital format.

Expected Results:

Radio works according to the Radio Specs.

Results:

See Data.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	258 / 302

5.18.4 TEST DATA

30 MHz Profiles in FCM Mode

For the 30 MHz Profiles in FCM the ATPC software was not ready for test.

Corner Profiles in FCM Mode

L6 GHz Corner Profiles in FCM Mode			
Tracking Speed Measurements			
Modulation Profile	ElapsedTime for 20dB change (Sec)	dB / sec. change	Measurement Equipment
5MHz/1024QAM_1	0.20118	99.41346058	RF Det. / LeCroy
5MHz/1024QAM_2	0.19852	100.7455168	RF Det. / LeCroy
5MHz/1024QAM_3	0.1823648	109.6702872	R/S FSEK Spectrum Analyzer
5 MHz 1024 QAM Average Speed	0.1940216	103.2764216	dB/sec
5MHz/4QAM_1	0.20073	99.6363274	RF Det. / LeCroy
5MHz/4QAM_2	0.19852	100.7455168	RF Det. / LeCroy
5MHz/4QAM_3	0.182547	109.5608254	R/S FSEK Spectrum Analyzer
5 MHz 4 QAM Average Speed	0.193932333	103.3142232	dB/sec
10MHz/1024QAM_1	0.20308	98.48335631	RF Det. / LeCroy
10MHz/1024QAM_2	0.19853	100.7404423	RF Det. / LeCroy
10MHz/1024QAM_3	0.1783468	112.1410645	R/S FSEK Spectrum Analyzer
10 MHz 1024 QAM Average Speed	0.193318933	103.7882877	dB/sec
10MHz/4QAM_1	0.19908	100.4621258	RF Det. / LeCroy
10MHz/4QAM_2	0.19853	100.7404423	RF Det. / LeCroy
10MHz/4QAM_3	0.182547	109.5608254	R/S FSEK Spectrum Analyzer
10 MHz 4 QAM Average Speed	0.193385667	103.5877978	dB/sec
30MHz/1024QAM_1	0.20458	97.76126699	RF Det. / LeCroy
30MHz/1024QAM_2	0.19853	100.7404423	RF Det. / LeCroy
30MHz/1024QAM_3	0.1843688	108.4782241	R/S FSEK Spectrum Analyzer
30 MHz 1024 QAM Average Speed	0.195826267	102.3266444	dB/sec
30MHz/4QAM_1	0.20028	99.86019573	RF Det. / LeCroy
30MHz/4QAM_2	0.19853	100.7404423	RF Det. / LeCroy
30MHz/4QAM_3	0.1823648	109.6702872	R/S FSEK Spectrum Analyzer
30 MHz 4 QAM Average Speed	0.193724933	103.4236417	dB/sec
60MHz/1024QAM	0.19852	100.7455168	RF Det. / LeCroy
60MHz/1024QAM_1	0.20118	99.41346058	RF Det. / LeCroy
60MHz/1024QAM_3	0.1823648	109.6702872	R/S FSEK Spectrum Analyzer
60 MHz 1024 QAM Average Speed	0.1940216	103.2764216	dB/sec
60MHz/4QAM_1	0.21078	94.88566278	RF Det. / LeCroy
60MHz/4QAM_2	0.19878	100.6137438	RF Det. / LeCroy
60MHz/4QAM_3	0.1863728	107.3117966	R/S FSEK Spectrum Analyzer
60 MHz 4 QAM Average Speed	0.198644267	100.9370677	dB/sec

Corner Profiles in ACM Mode

For the Corner Profiles in ACM mode, the ATPC software was not ready for test.

ED

01

ECCN: 5E991

HTS: 4901.99.0050

3DB19060AAAAQZZA

259 / 302

5.19 ISOLATION OF LOCAL TRANSMITTER TO RECEIVER STANDARD T/R SEPARATION

Goal of this test is to verify that the local transmitter does not interfere with the receiver in a standard T/R separation.

5.19.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- 10 dB fixed attenuator
- Test set Tektronix ST112
- Spectrum analyzer Agilent E4407B or similar

5.19.2 SETUP CONFIGURATION

- Connect as shown in figure 9.
- Calibrate the level going into the Antenna port of the radio.
- Verify the receiver connected to the test set #2 is locked at nominal level.
- Verify that the local transmitter is off.
- Varied the receive signal level until the 1xe-06 point is found.

5.19.3 TEST PROCEDURE

Test Case 4j: Isolation of local transmitter to receiver standard T/R separation

Summary: To verify the isolation of the local transmitter to receiver in a standard separation.

Steps:

The following will be verified on units under test.

- Verify the receiver is locked.
- Varied the receiver signal level until the 1X10-06 point is reach.
- Record the RSL level at 1X10-6.
- Turn the local transmitter on and verify that the threshold is not degraded.
- Connect the Spectrum Analyzer to he receiver input.
- Monitor the Local TX frequency and record the leakage.
- Plot he values in an excel plot.

Expected Results:

No degradation.

Results:

.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	260 / 302

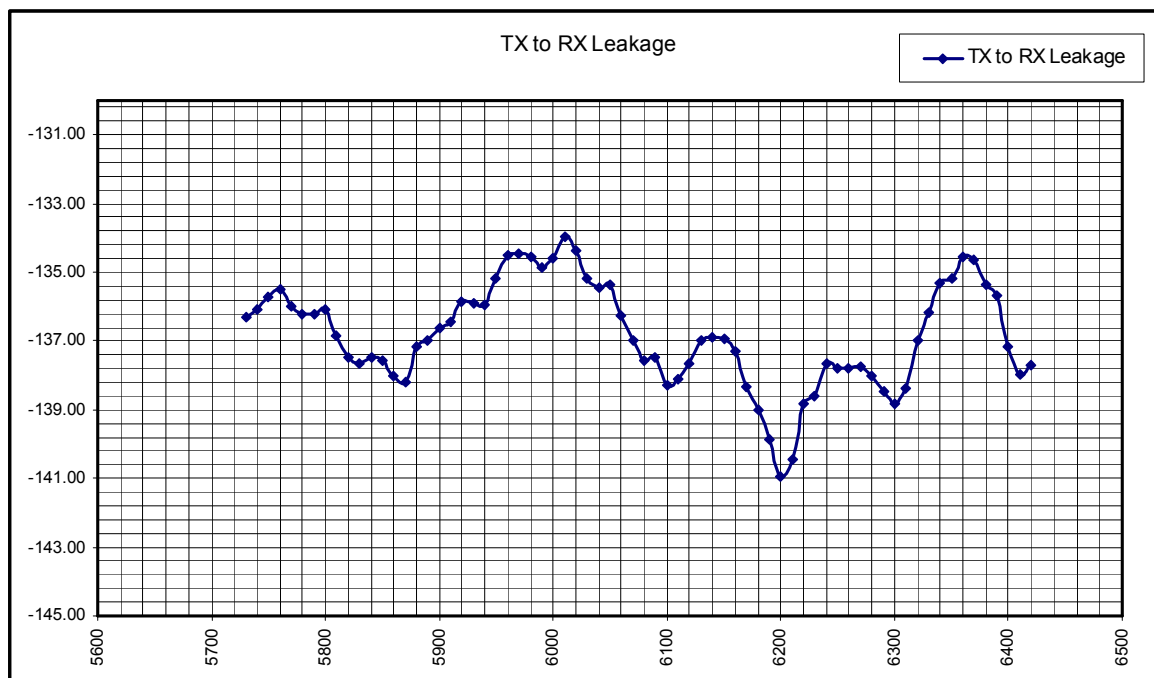
5.19.4 TEST DATA

30 MHz Profiles in FCM Mode

L6 GHz 30 MHz Profiles in FCM mode fo=6123.1MHz				
Local TX set to the normal T/R separation				
30MHz	Local TX	RSL	BER	MSE
4QAM	Off	-91.1dBm	1.10E-06	-8dB
	On		1.10E-06	-7.9dB
	On, RSL Adj.	-90.6dBm	1.00E-06	-8.1dB
256QAM	Off	-73.24dBm	1.00E-06	-25.5
	On		1.10E-06	-25.2
	On, RSL Adj.	-72.6dBm	1.02E-06	-25.4
1024QAM	Off	-66.75dBm	1.03E-06	-31.5
	On		1.10E-06	-31.3
	On, RSL Adj.	-65.95dBm	1.15E-06	-31.6

Corner Profiles in ACM Mode

The Graph describes the isolation of the transmitter to the receiver. In other words how much transmitter leaks into the receiver.



ED

01

ECCN: 5E991

HTS: 4901.99.0050

3DB19060AAAAQZZZA

261 / 302

5.20 ISOLATION OF LOCAL TRANSMITTER TO RECEIVER WITH THE LOCAL TRASMITTER SET TO THE FREQUENCY OF THE RECEIVER

Goal of this test is to verify that the local transmitter does not interfere with the receiver, when the TX is set to the same frequency as the receiver.

5.20.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- 10 dB fixed attenuator
- Test set Tektronix ST112
- Spectrum analyzer Agilent E4407B or similar

5.20.2 SETUP CONFIGURATION

- Connect as shown in figure 9.
- Calibrate the level going into the Antenna port of the radio.
- Verify the receiver connected to the test set #2 is locked at nominal level
- Verify that the local transmitter is off.
- Set the local transmitter to the same frequency of the receiver.
- Varied the receive signal level until the 1xe-06 point is found.

5.20.3 TEST PROCEDURE

Test Case 4k: Isolation of local transmitter to receiver with the local transmitter set to the same frequency as the receiver.

Summary: To verify the local transmitter has no affect on the receiver BER curve characteristics.

Steps:

The following will be verified on units under test.

- Verify the receiver is locked.
- Varied the receiver signal level until the 1X10-06 point is reach.
- Record the RSL level at 1X10-6.
- Turn the local transmitter on and verify that the threshold is not degraded
- Connect the Spectrum Analyzer to he receiver input.
- Monitor the Local TX frequency and record the leakage.
- Plot he values in an excel plot.

Expected Results:

No degradation.

Results: The threshold was degraded when the transmitter was set to the same frequency of the local receiver.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	262 / 302



5.20.4 TEST DATA

30 MHz Profiles in FCM Mode

L6 GHz 30 MHz Profiles in FCM mode fo=6123.1MHz				
Local TX set to the same Frequency as the receiver				
30MHz	Local TX	RSL	BER	MSE
4QAM	Off	-91.1dBm	1.10E-06	-8dB
	On		1.30E-04	-7.6dB
	On, RSL Adj.	-90.6dBm	1.00E-06	-8.1dB
256QAM	Off	-73.24dBm	1.00E-06	-25.5
	On		3.30E-03	-25.2
	On, RSL Adj.	-72.6dBm	1.02E-06	-25.4
1024QAM	Off	-66.75dBm	1.03E-06	-31.5
	On		2.20E-04	-31.3
	On, RSL Adj.	-65.95dBm	1.15E-06	-31.6

Corner Profiles in FCM Mode

L6 GHz Corner Profiles in FCM mode fo=6123.1MHz					
Local TX set to the same Frequency as the receiver					
BW (MHz)	Modulation QAM	Local TX	RSL	BER	MSE
60	1024 QAM	Off	-65.65	1.00E-06	-31.6
		On	Receiver running errors to 1E-04		
5	1024 QAM	Off	-73.7	1.00E-06	-32.4
		On	Receiver running errors to 1E-04		

ED	01				
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	263 / 302	

5.21 TRANSMITTER OVERLOAD

Goal of this test is to verify the headroom of the Transmitter.

5.21.1 TOOLS NEEDED TO PERFORM THIS TEST

- High power head HP 8481B or similar
- Variable attenuator
- Power meter HP 437B or similar
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- 10 dB fixed attenuator
- Test set Tektronix ST112

5.21.2 SETUP CONFIGURATION

- Connect as shown in figure 9
- Calibrate the RSL level at the input of the receiver.
- Verify the receiver connected to test set #2 is locked and running error free

5.21.3 TEST PROCEDURE

Test Case 4I: Transmitter Headroom

Summary: To measure the margin in the Power Amplifier.

Steps:

The following will be verified on the units under test.

- Perform a BER curve.
- Connect as shown in figure 9.
- Increase the transmitter power 1 dB from nominal power.
- Monitor test set #2 and run a BER curve.
- Monitor changes in the BER curves.
- Keep increasing the transmitter power in 1 db increments until the threshold changes.
- Record the value.

Expected Results:

BER curve meet spec with transmitter 2 dB above nominal.

Results: 30 MHZ PROFILES (FCM mode) had 2 dB of headroom.

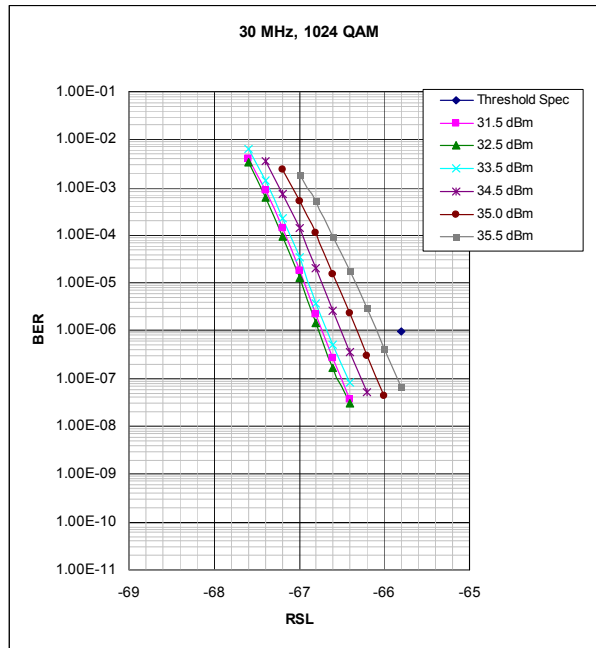
CORNER PROFILES: degradation was visible at 2 dB.

5.21.4 TEST DATA

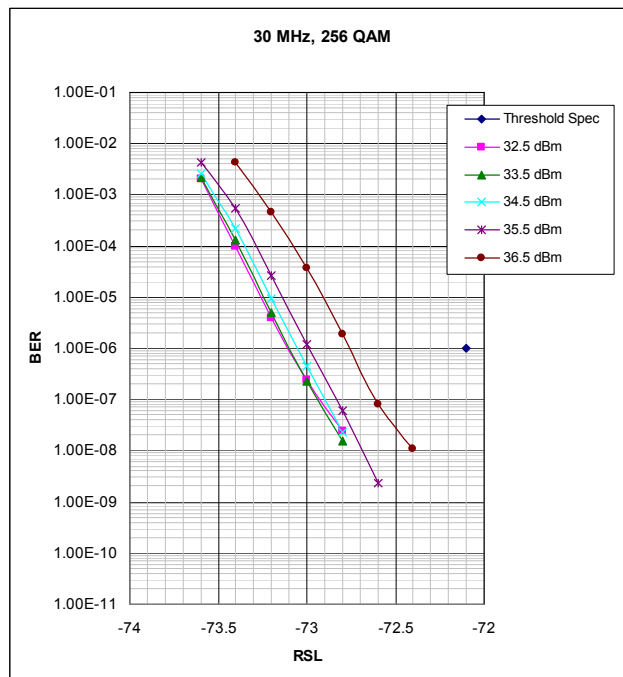
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	264 / 302

30 MHz Profiles in FCM Mode

1024 QAM

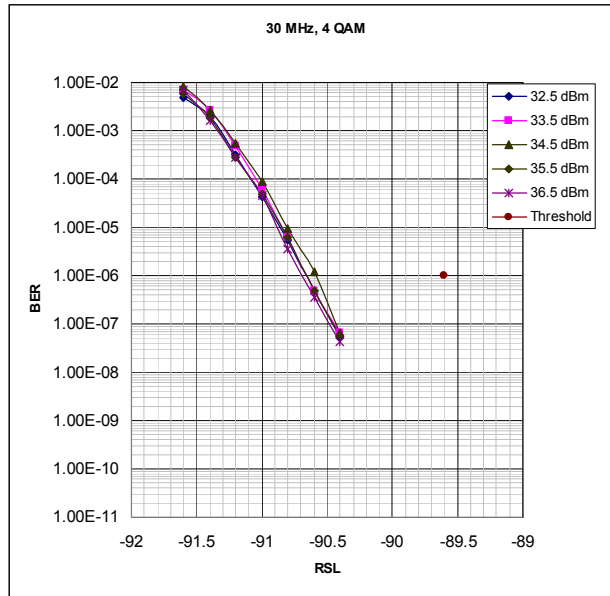


256 QAM



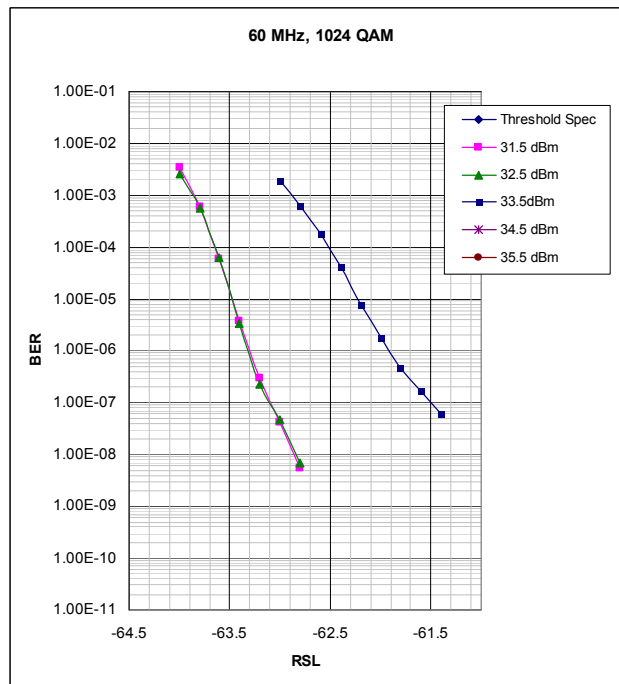
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	265 / 302

4 QAM



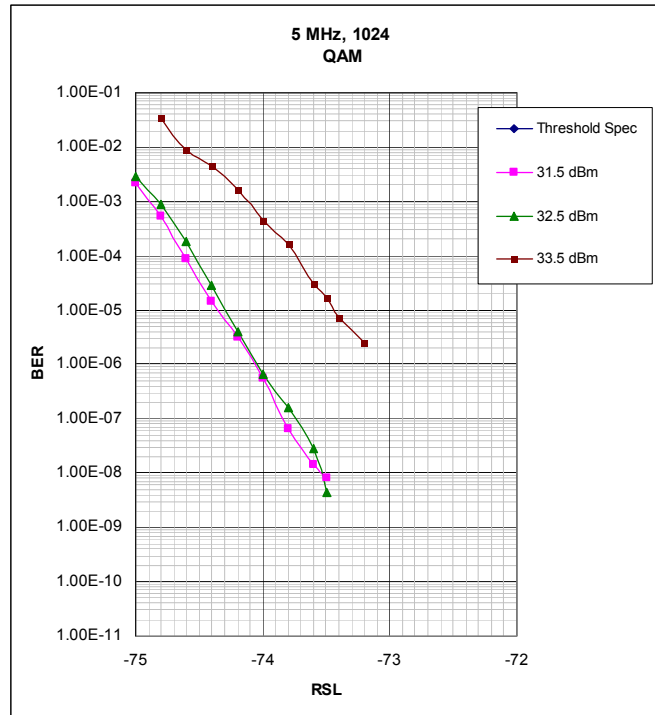
Corner Profiles in FCM Mode

60 MHz /1024 QAM



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	266 / 302

5 MHz /1024 QAM



Corner Profiles in ACM Mode

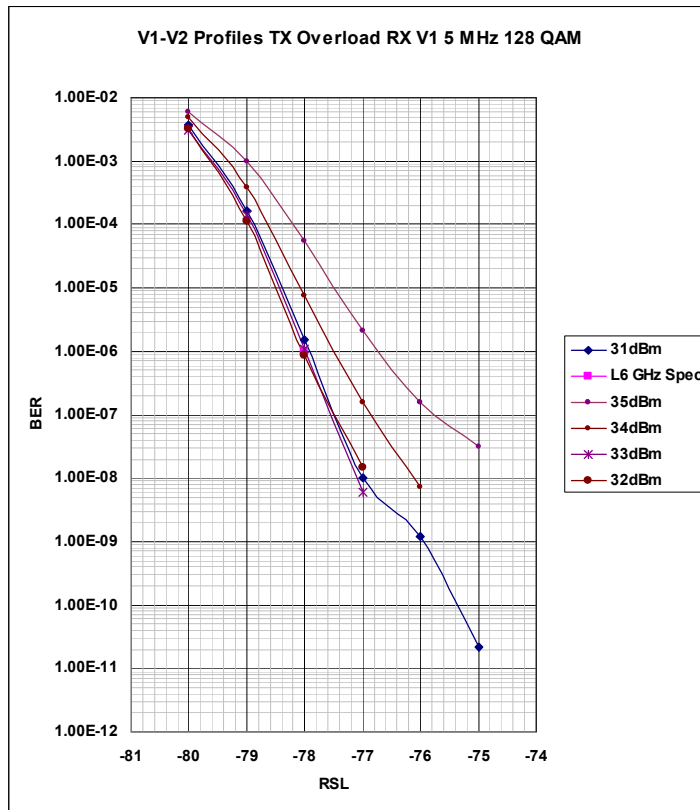
5 MHz /1024 QAM

Note: The 5 MHz 1024 QAM had less then a 1 dB of headroom

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	267 / 302

V1-V2 Profiles

V1 as a Receiver



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	268 / 302

5.22 BER CURVES FOR NS TO THE 1X10-12

The goal of this test is to capture the BER curve to the 1X10-12 point or 1x10-10 minimum.

5.22.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Variable Attenuator
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- 10 dB fixed attenuator
- Test set Tektronix ST112

5.22.2 SETUP CONFIGURATION

- Connect as shown in figure 9
- Calibrate the level going into the input of the receiver
- Verify the receiver connected to the test set #2 is locked at nominal level (-45 dBm RSL)

5.22.3 TEST PROCEDURE

Test Case 4m: BER NS to 1X10-12 point or 1X10-10 minimum.

Summary: To measure thresholds according to table 3

Steps:

The following will be verified on units under test.

- Verify the receiver is locked.
- Monitor the receiver connected to test set #2 make sure is running error free at nominal level.
- Run BER curves.
- Verify that thresholds are met according to table 1.
- Capture error rate as RSL is adjusted in .5 dB steps.
- Curves should be run down to at least 1x10-12 error rate.

Expected Results:

Thresholds with in the Specs of table 3.

Results:

The 30 MHz profiles where close to the typical threshold values for this specific unit.

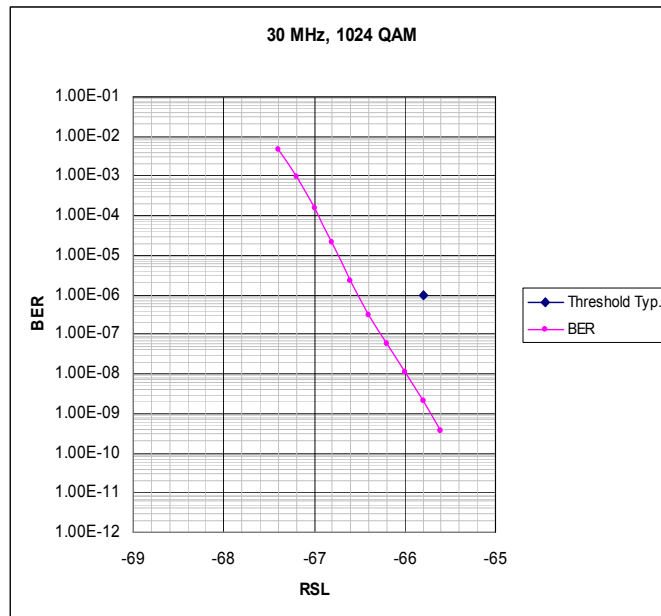
The Corner Profiles: The 5 MHz were showing flaring for the 256 QAM and 128 QAM at lower thresholds. The problem was fixed with a rework in the RX L.O., the problem will be re-evaluated in the next test campaign.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	269 / 302

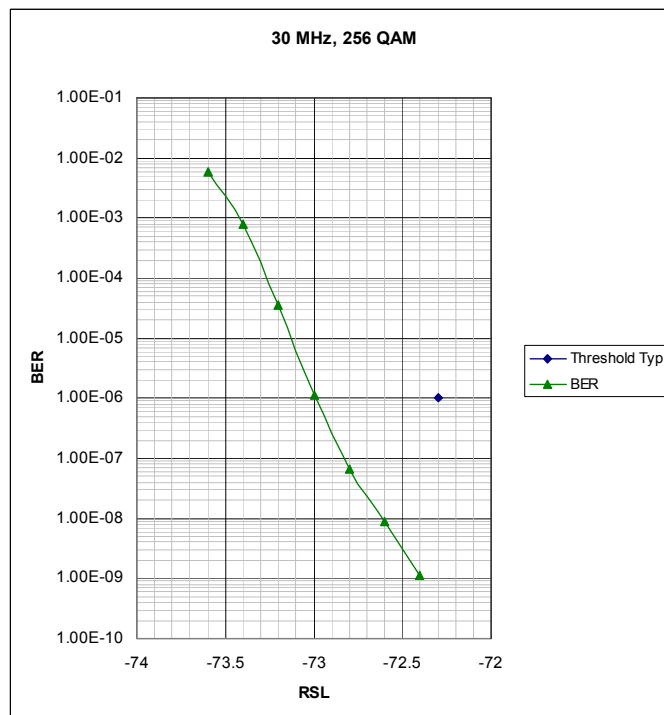
5.22.4 TEST DATA

30 MHz Profiles in FCM Mode

1024 QAM

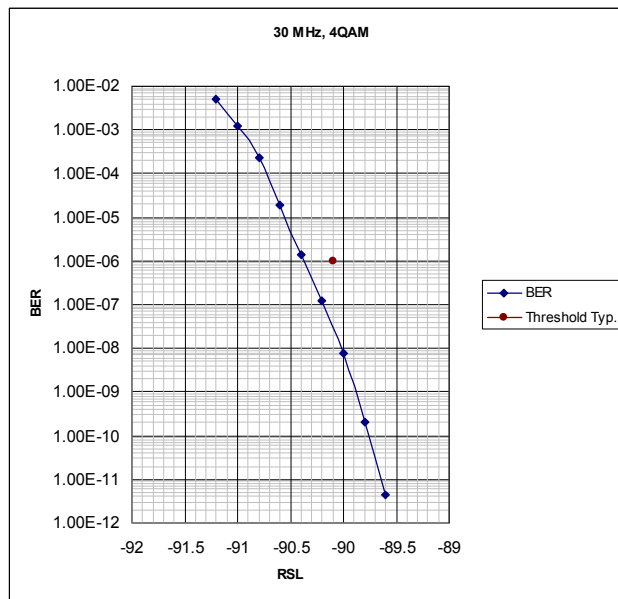


256 QAM



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	270 / 302

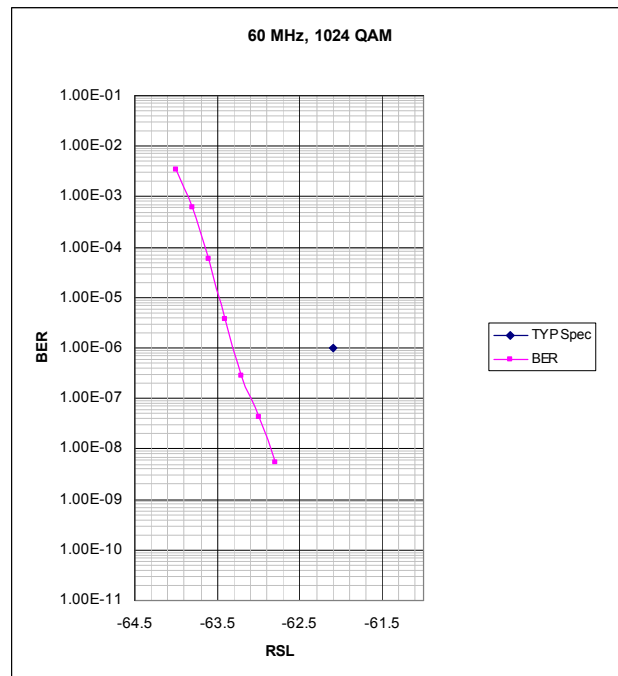
4 QAM



Corner Profiles in FCM Mode

60 MHz

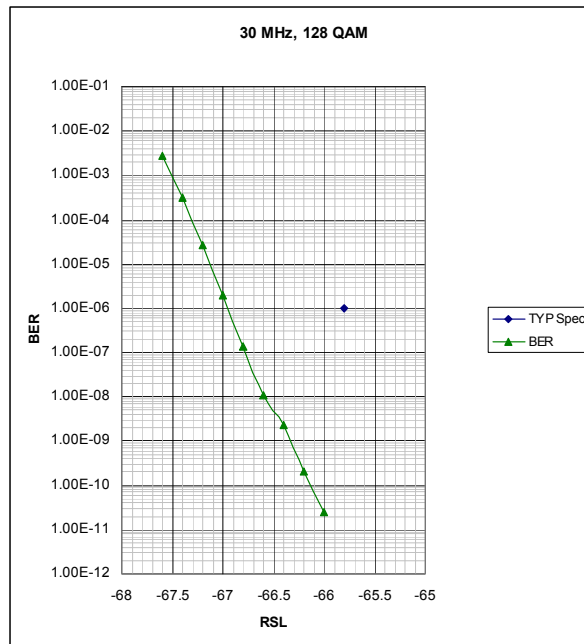
1024 QAM



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	271 / 302

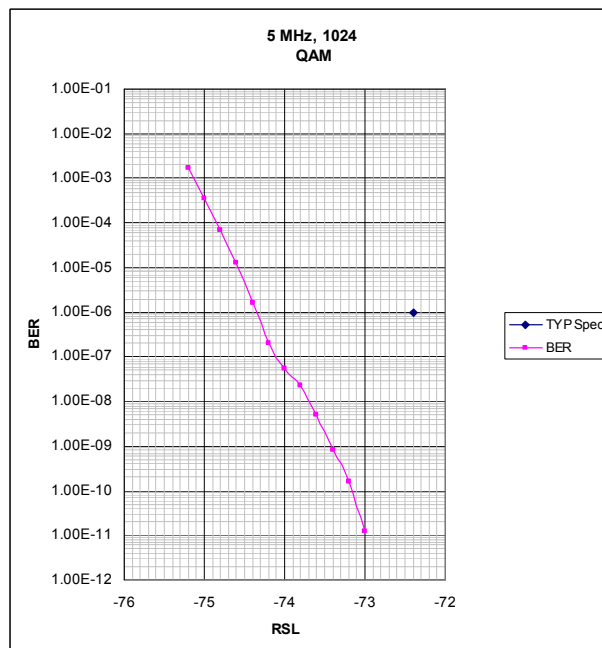
30 MHz

1024 QAM



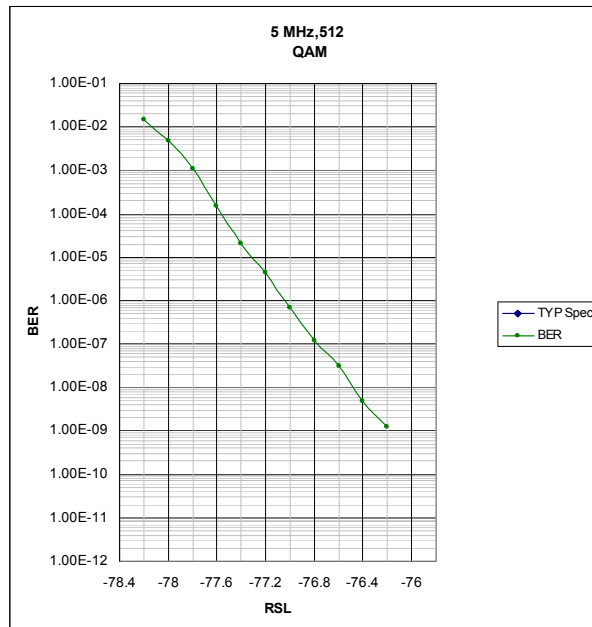
5 MHz

1024 QAM



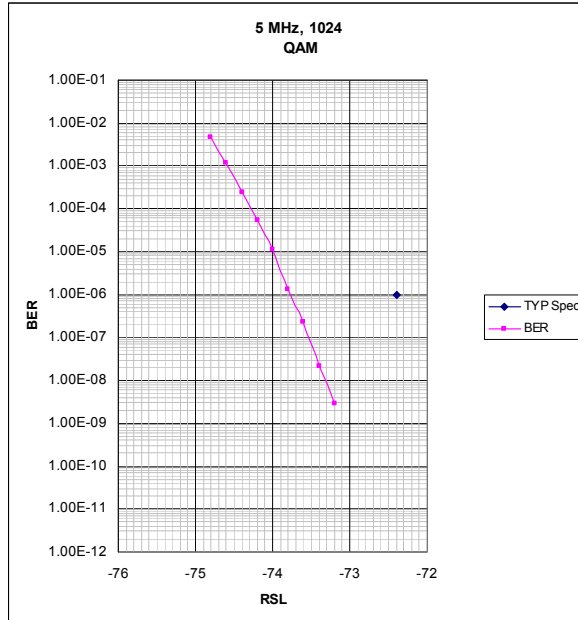
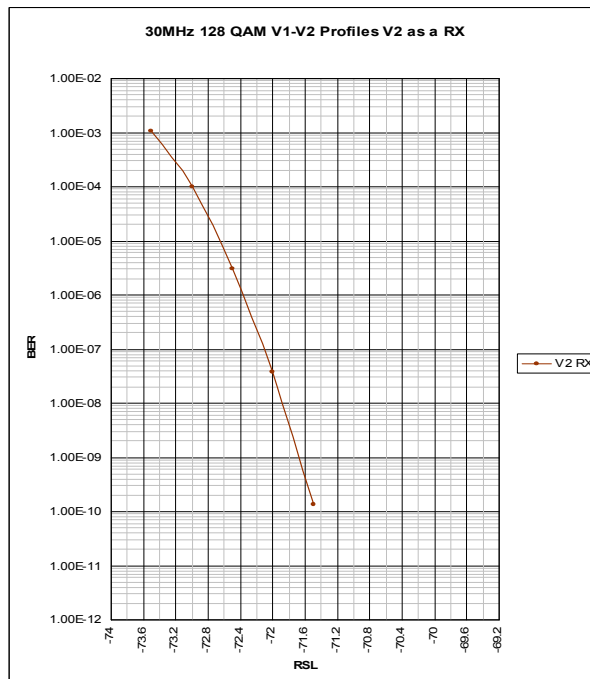
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	272 / 302

5 MHz
512 QAM



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

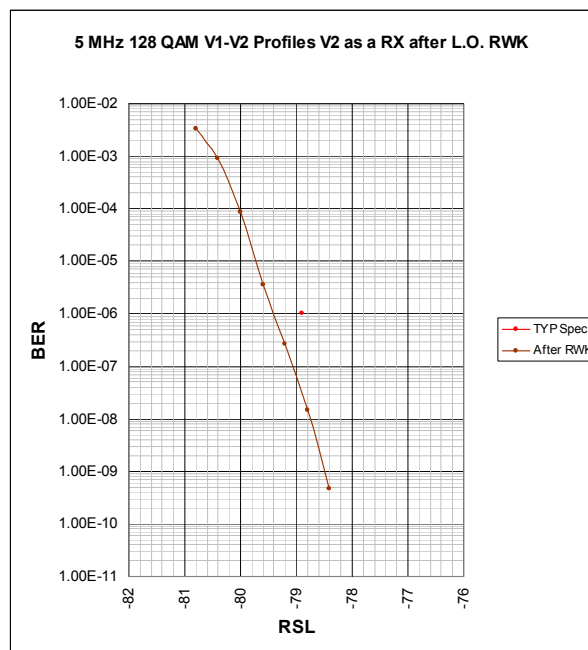
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	273 / 302

Corner Profiles in ACM Mode**5 MHz****1024 QAM****V1-V2 Profiles****30 MHz****128 QAM**

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	274 / 302

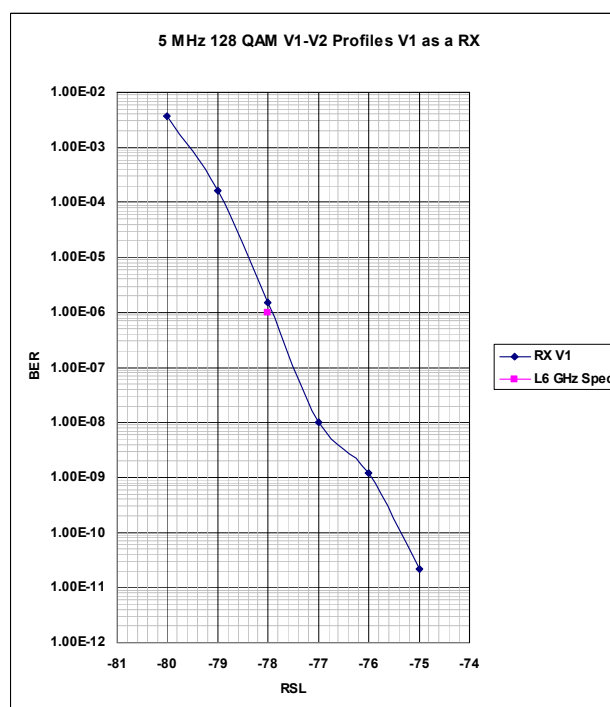
5 MHz

128 QAM V2 as a Receiver



5 MHz

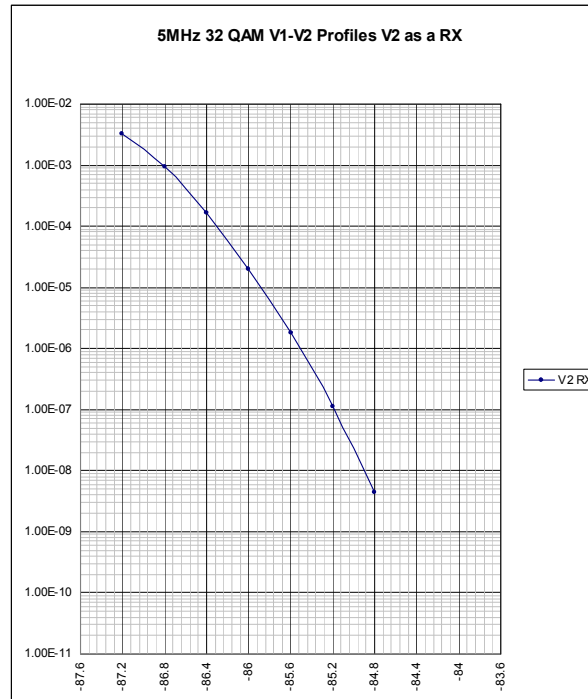
128 QAM V1 as a Receiver



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	275 / 302

5 MHz

32 QAM



This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	276 / 302

5.23 LONG TERM BER TEST

The goal of this test is verify the link will ran long term with no errors.

5.23.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Variable power attenuator
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- 10 dB fixed attenuator
- Test set Tektronix ST112

5.23.2 SETUP CONFIGURATION

- Connect as shown in figure 9
- Calibrate the level going into the receiver input.
- Verify the receiver connected to the test set #2 is locked at nominal level (-45 dBm RSL).

5.23.3 TEST PROCEDURE

Test Case 4n: Long term BER TEST

Summary: To verify the link will ran long term with no errors.

Steps:

The following steps will be taken.

- Verify the receiver is locked.
- Monitor the receiver connected to test set DS3 #2 make sure is running error free at nominal level.
- Measure Threshold.
- Set the RSL level to 5 db higher than measured threshold.
- Run the radio for 72 hrs verify it runs error free.

Expected Results:

No errors in 72 hours

Results:

Radio ran 72 errors in the V1-V2 Profiles when the V1 was running as a receiver.

5.23.4 TEST DATA

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	277 / 302

30 MHz Profiles in FCM Mode

L6 GHz 30 MHz Profiles in FCM Mode						
Long Term Test						
Frequency Band	BW (MHz)	QAM	Threshold 1E-06 (dBm)	RSL (dBm)	Duration (Hrs)	SIT Measurements (Errors)
L6 GHz	30	1024	-65.8	-60.8	72	0
		256	-72.3	-68	72	0

Corner Profiles in FCM Mode

L6 GHz Corner Profiles in FCM Mode						
Long Term Test						
Frequency Band	BW (Hz)	QAM	Threshold 1E-06 (dBm)	RSL (dBm)	Duration (Hrs)	SIT Measurements (Errors)
L6 GHz	60	1024	-62.1	-57	72	0
	30	1024	-65.8	-60	72	0
	5	1024	-97.9	-92	72	0

Corner Profiles in ACM Mode

L6 GHz Corner Profiles in ACM Mode						
Long Term Test						
Frequency Band	BW (Hz)	QAM	Threshold 1E-06 (dBm)	RSL (dBm)	Duration (Hrs)	SIT Measurements (Errors)
L6 GHz	5	1024	-97.2	-92	72	0

V1-V2 Profiles

L6 GHz V1-V2 Profiles V2 as a Receiver						
Long Term Test						
Frequency Band	BW (Hz)	QAM	Threshold 1E-06 (dBm)	RSL (dBm)	Duration (Hrs)	SIT Measurements (Errors)
L6 GHz	5	128	-78	-75	72	0

ED

01

 ECCN: 5E991
 HTS: 4901.99.0050

3DB19060AAAAQZZZA

278 / 302

L6 GHz V1-V2 Profiles V1 as a Receiver						
Long Term Test						
Frequency Band	BW (Hz)	QAM	Threshold 1E-06 (dBm)	RSL (dBm)	Duration (Hrs)	SIT Measurements (Errors)
L6 GHz	5	128	-78	-75	72	72

ED	01					
	ECCN: 5E991 HTS: 4901.99.0050			3DB19060AAAAQZZA		279 / 302

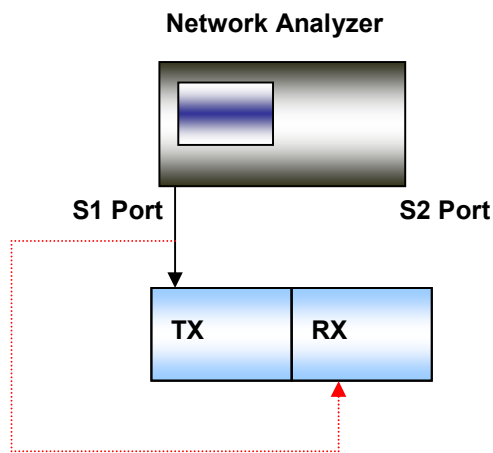


Figure 23 TX and RX Return Loss Evaluation Setup

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	280 / 302

5.24 RETURN LOSS FOR THE TRANSMITTER AND RECEIVER SECTIONS

The goal of this test is to verify the transmitter meets the return loss requirements for the transmitter and receiver ports.

5.24.1 TOOLS NEEDED TO PERFORM THIS TEST

- Network Analyzer HP 8722D
- MPT-HL V2

5.24.2 SETUP CONFIGURATION

- **DO NOT APPLY POWER TO THE MPT-HL V2**
- Connect as figure 20.
- Calibrate the Network Analyzer for the frequency in use
- Connect the S1 port to the Transmitter port.
- Connect the S1 to the receiver port.

5.24.3 TEST PROCEDURE

Test Case 5a: Transmitter and Receiver section return loss

Summary: To measure the Transmitter and receiver return loss.

Steps:

The following will be verified on the units under test.

- Verify the Network analyzer is set for the frequency in use.
- Sweep the return loss across the band for the transmitter and receiver ports.
- Record values and verified that the transmitter meet the spec.

Expected Results:

The return loss should be better than 15 db

Results:

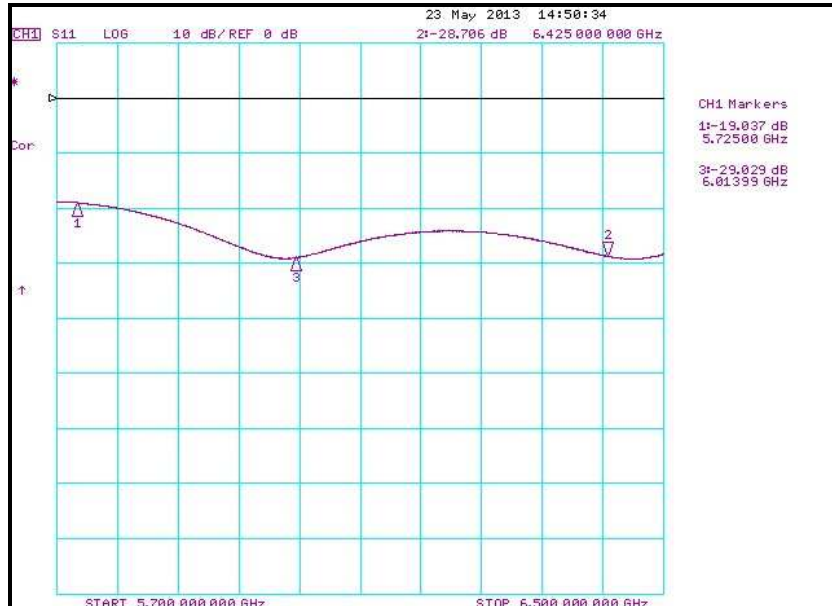
See data below.

5.24.4 TEST DATA

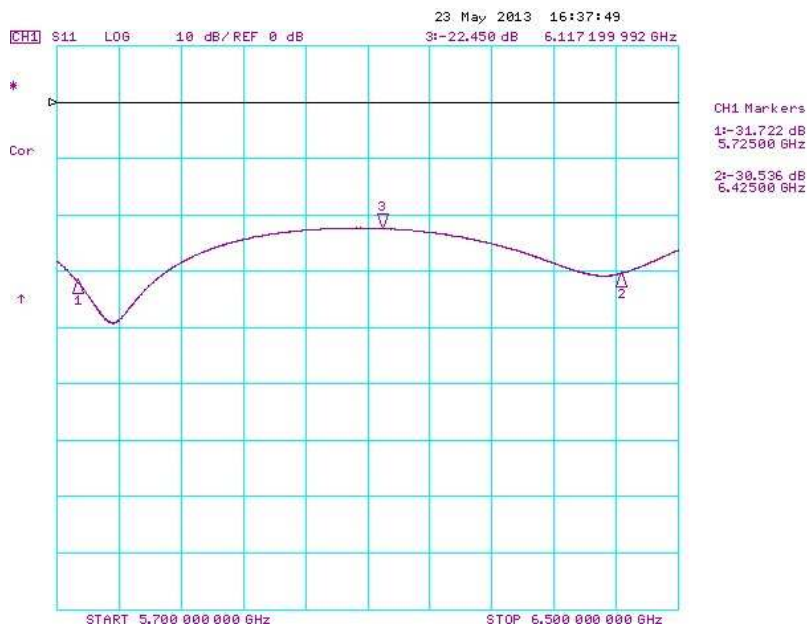
ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	281 / 302

Return Loss

SN BS1317UW0AD TX Side: **-20.5 dB**



SN BS1317UW0AD RX Side: **-20.39 dB**



ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	282 / 302

5.25 VERIFY RANDOM TRANSMITTER SPURS DON'T DEGRADE RECEIVER THRESHOLD.

The goal of this test is verify that the local transmitter spurs don't degrade the receiver threshold.

5.25.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Variable power attenuator
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- 10 dB fixed attenuator
- Test set Tektronix ST112
- Spectrum Analyzer Agilent E4407B

5.25.2 SETUP CONFIGURATION

- Connect as shown in figure 9
- Calibrate the level going into the receiver input.
- Verify the receiver connected to the test set #2 is locked at nominal level (-45 dBm RSL).
- Monitor the local transmitter spectrum

5.25.3 TEST PROCEDURE

Test Case 5b: Verify the local transmitter spurs do not degrade the local receiver threshold.

Summary: To verify the local transmitter don't affect threshold.

Steps:

The following steps will be taken.

- Verify the receiver is locked.
- Monitor the receiver connected to test set DS3 #2 make sure is running error free at nominal level.
- Find the 1XE-06 point.
- Monitor any spurs coming out of the local transmitter
- Record the frequency of those spurs.
- Set the local receiver to the frequency of the same spurs (Far end TX and Local RX).
- Measure threshold again and look for any degradation.
- Record findings.

Expected Results:

No degradation.

Results:

No degradation.

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	283 / 302

5.25.4 TEST DATA

30 MHz Profiles in FCM Mode

Spurs Found

Setup;

- *Secondary path set at low end of band (5740MHz), Nominal TX Power level 'of
- *Primary path set to threshold (1×10^{-6}) at spurious signal frequency.
- *Secondary path TX Power turned on to produce spurious signal.
- *Monitored Primary path for change in threshold (1×10^{-6})

Spurious tones with Secondary path at 5740MHz;	
6001.0025MHz @ -79.1dBm	No affect on Threshold
6164.0025MHz @ -70.23dBm	No affect on Threshold
6213.0025MHz @ -79.41dBm	No affect on Threshold
6376.0025MHz @ -70.57dBm	No affect on Threshold
6425.0025MHz @ -70.82dBm	No affect on Threshold

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	284 / 302

Corner Profiles in FCM Mode**Spurs Found****NOTE: Data was taken at 30 MHz 4 QAM**

Spurs had no affect on Threshold		
Spurs @ 5730MHz (MHz)		
Frequency (MHz)	Level (dBm)	Threshold Degradation (dB)
5,836,000,242	86.5	0.0
5,833,000,242	92.3	0.0
5,942,001,242	91.7	0.0
5,993,500,242	90.3	0.0
6,045,000,242	90.0	0.0
6,099,500,242	98.4	0.0
6,154,001,242	76.1	0.0
6,205,500,242	85.7	0.0
6,257,000,242	90.8	0.0
6,263,002,242	93.3	0.0
6,311,500,242	95.5	0.0
6,366,001,242	73.0	0.0
6,369,002,242	97.0	0.0
6,380,001,242	98.3	0.0
6,417,500,242	100.8	0.0

Spurs had no affect on Threshold		
Spurs @ 6420MHz (MHz)		
Frequency (MHz)	Level (dBm)	Threshold Degradation (dB)
6,390,000,000	90.2	0.0
6,314,001,000	88.2	0.0
6,299,001,000	96.4	0.0
6,208,002,000	94.8	0.0
6,178,000,000	92.8	0.0
5,996,002,000	81.7	0.0
5,966,000,000	96.4	0.0
5,784,000,000	73.6	0.0
5,770,002,000	97.0	0.0
5,769,000,000	98.3	0.0
5,754,000,000	95.8	0.0

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	285 / 302

6 TEMPERATURE PERFORMANCE

The goal of this series is to verify the radio performance over temperature. The MPT-HL V2 has to meet the temperature requirements dictated by the specification documents and the regulatory agencies.

6.1 RADIO PERFORMANCE OVER TEMPERATURE

Goal of this test is to verify radio performance over the temperature range. The radio should perform error free throughout the temperature cycles establish in table 6

6.1.1 TOOLS NEEDED TO PERFORM THIS TEST

- Test set Tektronix ST112/ ACTERNA Model No. 2803 or similar
- RF link
- Temperature chamber
- Spectrum Analyzer
- MTK software

6.1.2 SETUP CONFIGURATION

- Move the transmitter to a temperature chamber
- Connect as shown in figure 7
- Set the RSL to nominal level (-45 dBm RSL)
- Make sure radio is locked and passing data.
- Adjust the power out of the transmitter according to the modulation base on table 3.

6.1.3 TEST PROCEDURE

Test Case 6a: Radio performance over temperature

Summary: To ensure the radio runs error free throughout the temperature cycles.

Steps:

The following will be verified on units under test.

- Program the temperature chamber to run cycles from -10° C to 55° C.
- See temperature cycle table 6.
- Soak the transmitter at 25° C for 30 minute before running the temperature cycles.
- Record the power after 30 minutes at 25° C
- Record the errors every 5° C from -10° C to 55° C.
- Verify the radio run error free throughout the temperature cycles.

Expected Results:

No errors

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZA

286 / 302

Results:

See Data.

6.1.4 TEST DATA

* Cold start was performed in the Transmitter at -10 C comeback ok

Soaking time 30 minutes

30 MHz Profiles in FCM Mode

L6 Fo= 6123.1 MHz 30 MHz 1024 QAM					
Ambient Temp °C	MTK / MPT Temp °C	Power Variation (dB)	Linearity	Far end rcvr MSE	Data Errors
60	66	-0.2	-48	-37.7	0
55	62	-0.17	-48.20	-38.1	0
50	54	-0.15	-48.50	-38.6	0
45	50	-0.13	-48.50	-38.8	0
40	45	-0.10	-48.50	-39.2	0
35	40	-0.01	-48.60	-39.5	0
30	35	0.00	-48.60	-39.6	0
25	30	0.00	-47.90	-40	0
20	25	0.06	-48.40	-40.1	0
15	20	-0.01	-48.00	-40.5	0
10	15	0.07	-48.50	-41.6	0
5	10	0.08	-48.50	-41.8	0
0	5	0.09	-49.50	-41.8	0
-5	0	0.17	-49.50	-41.9	0
-10	-5	0.21	-49.50	-41.9	0

Upper Six Fo= 6123.1 MHz 30 MHz 4 QAM					
Ambient Temp °C	MTK / MPT Temp °C	Power Variation (dB)	Linearity	Far end RX MSE	Data Errors
60	66	-0.13	-49.6	-38.2	0
55	61	-0.12	-50.10	-38.5	0
50	55	-0.06	-49.70	-39	0
45	50	0.04	-49.80	-39.2	0
40	45	0.05	-49.00	-39.6	0
35	40	0.00	-50.30	-39.9	0
30	35	0.07	-50.30	-40.1	0
25	30	0.00	-50.00	-40.6	0
20	25	0.07	-50.30	-40.8	0
15	20	0.07	-50.50	-40.9	0
10	15	0.04	-50.60	-42.3	0
5	10	0.07	-50.80	-42.5	0
0	5	0.06	-51.50	-42.5	0
-5	0	0.16	-51.80	-42.5	0
-10	-5	0.21	-51.50	-42.5	0

ED	01				
		ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	287 / 302

Corner Profiles in FCM Mode

60 MHz 1024 QAM				
L6 GHz Corner Profiles in FCM profiles				
TX BS1315UW01N, RX BS1315UW037			FREQ. 6395MHz	
Ambient Temp °C	MTK / MPT Temp °C	Far end rcvr MSE	Data Errors	Power Variation (dB)
60	63	-39.7	0	0.3
55	58	-39.7	0	0.25
50	51	-39.7	0	0.20
45	47	-39.5	0	0.17
40	42	-39.6	0	0.12
35	37	-39.6	0	0.07
30	32	-39.6	0	0.03
25	27	-39.5	0	0.00
20	22	-39.5	0	-0.04
15	18	-39.9	0	-0.09
10	13	-39.8	0	-0.16
5	8	-39.5	0	-0.21
0	3	-39.4	0	-0.26
-5	-2	-39.3	0	-0.31
-10	-7	-39.4	0	-34.00

5 MHz 4 QAM				
L6 GHz Corner Profiles in FCM profiles				
TX BS1315UW01N, RX BS1315UW037			FREQ. 6395 MHz	
Ambient Temp °C	MTK / MPT Temp °C	Far end rcvr MSE	Data Errors	Power Variation (dB)
60	63	-45.5	0	0.28
55	58	-45.4	0	0.24
50	52	-45.2	0	0.19
45	46	-45	0	0.15
40	41	-44.4	0	0.11
35	36	-44.3	0	0.07
30	31	-44	0	0.04
25	27	-45.5	0	0.00
20	22	-43.5	0	-0.07
15	17	-43.3	0	-0.10
10	13	-43.4	0	-0.16
5	8	-43	0	-0.20
0	2	-39.4	0	-0.23
-5	-3	-43.6	0	-29.00
-10	-8	-43.3	0	-0.35

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	288 / 302

V1-V2 Profiles

L6 GHz Fo 6790 MHz TX V1 RX V2					
V1-V2 Profiles 5 MHz 128 QAM Performance Over Temperature					
Temp °C	# Bits Received	Erroneous bits	Disp error Counter	Uncorrected Errors	Corrected Errors
55	388861113312	0	0	0.00E+00	0.00E+00
50	290759430640	0	0	0.00E+00	0.00E+00
45	243278792400	0	0	0.00E+00	0.00E+00
40	82800379504	0	0	0.00E+00	0.00E+00
35	154179187456	0	0	0.00E+00	0.00E+00
30	94907378048	0	0	0.00E+00	0.00E+00
25	78038313136	0	0	0.00E+00	0.00E+00
20	119561777104	0	0	0.00E+00	0.00E+00
15	170275493024	0	0	0.00E+00	0.00E+00
10	225352552432	0	0	0.00E+00	0.00E+00
5	366071090112	0	0	0.00E+00	0.00E+00
0	415839089232	0	0	0.00E+00	0.00E+00
-5	508320768	0	0	0.00E+00	0.00E+00
-10	50417442464	0	0	0.00E+00	0.00E+00

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01				
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA		289 / 302

6.2 COLD START AT -10 DEGREES C°

The goal of this test is to verify that the MTP-HL recovers from a power shut down and passes traffic at -10°C.

6.2.1 TOOLS NEEDED TO PERFORM THIS TEST

- Test set Tektronix ST112/ ACTERNA Model No. 2803 or similar
- RF link
- Temperature chamber
- Spectrum Analyzer

6.2.2 SETUP CONFIGURATION

- Move the transmitter to a temperature chamber
- Connect as shown in figure 7
- Set the RSL to nominal level (-45 dBm RSL)
- Make sure radio is locked and passing data.
- Adjust the power out of the transmitter according to the modulation base on table 3.
- Verify that the temperature chamber reach -10°C.

6.2.3 TEST PROCEDURE

Test Case 6b: Cold Start at -10°C

Summary: To verify that the MPT-HL V2 recovers and passes data.

Steps:

The following will be verified on the radio under test under test.

- Verify the transmitter power for the modulation established in table 3.
- Program the temperature chamber to run cycles from -10° C to 55° C.
- See temperature cycle table 6.
- Went the temperature reach -10°C.
- Turn the power off on the MPT-HL V2
- Verify that the MPT-HL V2 recovers and passes data.

Expected Results:

MPTH-HL recovers from the power shut down and passes traffic.

Results:

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZA	290 / 302

6.2.4 TEST DATA

30 MHz Profiles in FCM Mode

* Cold start was performed in the Transmitter at -10 C comeback ok
Soaking time 30 minutes

L6 Fo= 6123.1 MHz 30 MHz 1024 QAM					
Ambient Temp °C	MTK / MPT Temp °C	Power Variation (dB)	Linearity	Far end rcvr MSE	Data Errors
60	66	-0.2	-48	-37.7	0
55	62	-0.17	-48.20	-38.1	0
50	54	-0.15	-48.50	-38.6	0
45	50	-0.13	-48.50	-38.8	0
40	45	-0.10	-48.50	-39.2	0
35	40	-0.01	-48.60	-39.5	0
30	35	0.00	-48.60	-39.6	0
25	30	0.00	-47.90	-40	0
20	25	0.06	-48.40	-40.1	0
15	20	-0.01	-48.00	-40.5	0
10	15	0.07	-48.50	-41.6	0
5	10	0.08	48.50	-41.8	0
0	5	0.09	49.50	-41.8	0
-5	0	0.17	-49.50	-41.9	0
-10	-5	0.21	-49.50	-41.9	0

Corner Profiles in FCM Mode

* Cold start was performed in the Transmitter at -10 C comeback ok
Soaking time 30 minutes

5 MHz 4QAM				
L6 GHz Corner Profiles in FCM profiles				
TX BS1315UW01N, RX BS1315UW037 FREQ. 6395 MHz				
Ambient Temp °C	MTK / MPT Temp °C	Far end rcvr MSE	Data Errors	Power Variation (dB)
60	63	-45.5	0	0.28
55	58	-45.4	0	0.24
50	52	-45.2	0	0.19
45	46	-45	0	0.15
40	41	-44.4	0	0.11
35	36	-44.3	0	0.07
30	31	-44	0	0.04
25	27	-45.5	0	0.00
20	22	-43.5	0	-0.07
15	17	-43.3	0	-0.10
10	13	-43.4	0	-0.16
5	8	-43	0	-0.20
0	2	-39.4	0	-0.23
-5	-3	-43.6	0	-29.00
-10	-8	-43.3	0	-0.35

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZZA	291 / 302

7 MISCELLANEOUS RADIO PERFORMANCE TEST

The goal of this series of tests is necessary but not critical for the first run of modules. These series of test will be performing as time became available.

7.1 MICROPHONICS TEST

Goal of this test is to verify the stability of the transmitter and receiver when vibration is introduced.

7.1.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- Low power head (-20 dB to -70 dB) HP 8481D or similar
- Directional coupler HP 779D or similar
- 10 dB fixed attenuator
- Test set Tektronix ST112

7.1.2 SETUP CONFIGURATION

- Connect as shown in figure 9
- Calibrate the level going into the input of the receiver.
- Verify the receiver connected to the test set 2 is locked at nominal level (-45 dBm RSL)
- Verify the radio is running error free.

7.1.3 TEST PROCEDURE

Test Case 7a: Micro phonics

Summary: The test verifies the stability of the units when vibration is introduced.

Steps:

The following will be verified on units under test.

- Verify the receiver is locked
- Monitor the receiver connected to test set #2. make sure is running error free at nominal level (-45dBm RSL)
- Lightly hit with a calibrated thumper (if available) or a screw driver the front and side of the MPT-HL V2.
- Verify that the receiver connected to the test set #2 does not show errors.

Expected Results:

No errors.

Results: No errors

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	292 / 302

7.1.4 TEST DATA

30 MHz Profiles in FCM Mode

U6 GHz 30 MHz Profiles in AFC Mode			
Verification of error free performance during micro-phonics			
			DS3-Line 1 /DS1 Line 1 Errors
BW	Modulation	RSL level (dBm)	SN: BS1250P06U2
30 MHz	256 QAM	-45	No Errors'
	128 QAM	-45	No Errors'

Corner Profiles in ACM Mode

U6 GHz Corner Profiles in ACM Mode			
Verification of error free performance during micro-phonics			
			DS3-Line 1 /DS1 Line 1 Errors
BW	Modulation	RSL level (dBm)	SN: BS1250P06U3
30 MHz	1024 QAM	-45	No Errors'
5 MHz	1024 QAM	-45	No Errors'

ED

01

ECCN: 5E991
HTS: 4901.99.0050

3DB19060AAAAQZZA

293 / 302

7.2 DC POWER CONSUMPTION

The goal of this test is to record the DC power consumption of the MPT-HL V2.

7.2.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- High power head HP 8481B or similar
- Variable power supply
- Frequency Counter
- Current meter

7.2.2 SETUP CONFIGURATION

- Connect as shown in figure 8.
- Connect the current meter to the MPT-HL V2.
- Connect the variable power supply to the MPT-HL V2.

7.2.3 TEST PROCEDURE

Test Case 7b: DC power consumption.

Summary: To measure the current consumption through the battery range.

Steps:

The following will be verified on the units under test.

- Set Power supply to -48 VDC
- Set power at according to the table 3 for the modulation and frequency scheme.
- Adjust the variable power supply to change the DC voltage into the MPT-HL V2
- Vary the voltage -55 VDC to -20 VDC
- Record the power consumption.
- Record the TX power.
- For the transmit frequency test, disable the data using the MTK software to measure the carrier.
- Measure the frequency with the RF counter.
- Vary the voltage -55 VDC to -20 VDC
- Verify that the MPT-HL V2 remains operational at +72 Vdc.
- Record values.

Expected Results:

No more then 140 Watts

Results:

The PSU was shutting down at -22 Vdc with hardware EM1, this is a known problem.

ED	01			
		ECCN: 5E991 HTS: 4901.99.0050	3DB19060AAAAQZZA	294 / 302

7.2.4 TEST DATA

30 MHz Profiles in FCM Mode

Power Consumption			
L6 GHz 30 MHz Profiles in FCM Mode			
Fan Speed	Input VDC	Current Drain	Power
100%	52.6	2.52A	132.55W
75%	52.6	2.23A	117.3W
50%	52.6	2.01A	105.73W
25%	52.6	1.89A	99.4W
0%	52.6	1.85A	97.3W

Power Consumption vs Voltage		
L6 GHz 30 MHz Profiles in FCM Mode		
Battery Voltage (-V)	Current (Amps)	*Power (Watts)
56	1.84	103.04
55	1.87	102.85
54	1.91	103.14
53	1.94	102.82
52	1.98	102.96
51	2.02	103.02
50	2.05	102.50
49	2.09	102.41
48	2.13	102.24
47	2.18	102.46
46	2.22	102.12
45	2.27	102.15
44	2.32	102.08
43	2.37	101.91
42	2.42	29.45
41	2.48	101.68
40	2.54	101.60
28	3.65	102.20
27	3.81	102.87
26	3.96	102.96
25	4.13	103.25
24	4.31	103.44
23	4.52	103.96
22	TX Power output erratic	
21	TX Power output erratic	
20	TX Power output erratic	

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA	295 / 302

Corner Profiles in FCM Mode

Power Consumption						
L6 GHz Corner Profiles in FCM Mode						
	Fans at 50 % of the Power				Fans at 100%	
Battery Voltage (-V)	Current (Amps)	Power (Watts)	TX Pout CW (dBm)	TX Pout Modulated (dBm)	Current (Amps)	Power (Watts)
56	1.67	93.52	30.07	31.87	2.09	117.04
55	1.70	93.50	30.07	31.87	2.12	116.6
54	1.73	93.42	30.07	31.87	2.16	116.64
53	1.76	93.28	30.07	31.87	2.2	116.6
52	1.79	93.08	30.07	31.87	2.23	115.96
51	1.82	92.82	30.07	31.87	2.28	116.28
50	1.85	92.50	30.07	31.87	2.32	116
49	1.89	92.61	30.07	31.87	2.37	116.13
48	1.92	92.16	30.07	31.87	2.41	115.68
47	1.96	92.12	30.07	31.87	2.46	115.62
46	2.00	92.00	30.07	31.87	2.51	115.46
45	2.04	91.80	30.07	31.87	2.56	115.2
44	2.08	91.52	30.07	31.87	2.62	115.28
43	2.13	91.59	30.07	31.87	2.67	114.81
42	2.17	91.14	30.07	31.87	2.73	114.66
41	2.23	91.43	30.07	31.87	2.8	114.8
40	2.28	91.20	30.07	31.87	2.86	114.4
39	2.33	90.87	30.07	31.87	2.94	114.66
38	2.39	90.82	30.07	31.87	3.01	114.38
37	2.46	91.02	30.07	31.87	2.09	77.33
36	2.52	90.72	30.07	31.87	3.17	114.12
35	2.59	90.65	30.07	31.87	3.27	114.45
34	2.67	90.78	30.07	31.87	3.36	114.24
33	2.75	90.75	30.07	31.87	3.45	113.85
32	2.83	90.56	30.07	31.87	3.57	114.24
31	2.92	90.52	30.07	31.87	3.67	113.77
30	3.02	90.60	30.07	31.87	3.8	114
29	3.12	90.48	30.07	31.87	3.94	114.26
28	3.24	90.72	30.07	31.87	4.09	114.52
27	3.37	90.99	30.07	31.87	4.26	115.02
26	3.50	91.00	30.07	31.87	4.43	115.18
25	3.65	91.25	30.07	31.87	4.61	115.25
24	3.81	91.44	30.07	31.87	4.82	115.68
23	3.98	91.54	30.07	31.87	5.05	116.15
22	4.18	91.96	30.07	31.87	5.31	116.82
21	4.40	92.40	30.07	31.87	5.59	117.39
20	4.65	93.00	30.07	31.87	5.92	118.4

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01				
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA		296 / 302

7.3 GENERAL BATTERY RANGE TESTING

The goal of this test is to verify the range of operation of the PSU through the battery range.

7.3.1 TOOLS NEEDED TO PERFORM THIS TEST

- Power meter HP 437B or similar
- High power head HP 8481B or similar
- Variable power supply
- Frequency Counter
- Current meter

7.3.2 SETUP CONFIGURATION

- Connect as shown in figure 8.
- Connect the current meter to the MPT-HL V2
- Connect the variable power supply to the MPT-HL V2.

7.3.3 TEST PROCEDURE

Test Case 7c: test the PSU battery range.

Summary: To measure the current consumption through the battery range.

Steps:

The following will be verified on the units under test.

- Set Power supply to -48 VDC
- Set power at according to the table 3 for the modulation and frequency scheme.
- Adjust the variable power supply to change the DC voltage into the MPT-HL V2
- Vary the voltage -72 VDC to -18 VDC
- Find the lower threshold point.
- Find the lower threshold Hysteresis.
- Record the values.
- Set the variable power supply to -72 volts.
- Verify that the module works at -72 volts.
- Record values.

Expected Results:

MPT-HL V2 remains operational from -72 volts through -20 volts DC.

Results:

.See Table Below

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	297 / 302

7.3.4 TEST DATA

Note: The Radio remained operational and passing data when the DC voltage was set to -72 Vdc.

S/W Load V05.01.0k		
L6, V2, EM2, Power Supply startup/shutdown		
S/N BS1315UW037		
Input Vdc	Decreasing input Vdc	Increasing Input Vdc
-18.75 Vdc	Stops reboot attempt	
-18.96 Vdc	Attempting to reboot	Attempting to reboot
-19.15 Vdc	Link failure, RF Spectrum goes away	Link Shutdown
-19.25 Vdc	Attempting to reboot	Attempting to reboot
-19.5 Vdc	Attempting to reboot	Attempting to reboot
-19.75 Vdc	Attempting to reboot	Attempting to reboot
-20.0 Vdc	Link operational	Link Startup

S/W Load V05.01.0k		
L6, V2, EM2, Power Supply startup/shutdown		
S/N BS1315UW01N		
Input Vdc	Decreasing input Vdc	Increasing Input Vdc
-18.40 Vdc	Stops reboot attempt	
-18.50 Vdc	Attempting to reboot	Attempting to reboot
-18.65 Vdc	Link failure, RF Spectrum goes away	Link Shutdown
-18.75 Vdc	Attempting to reboot	Attempting to reboot
-18.9 Vdc	Link operational	Link Startup

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	298 / 302

7.4 VERIFY CHANNEL EXTREMES CAN BE SELECTED

The goal of this test is to verify that the MPT-HL V2 locks at the lower and upper band channels.

7.4.1 TOOLS NEEDED TO PERFORM THIS TEST

- MPT-HL V2
- Power meter HP 437B or similar
- High power head HP 8481B or similar
- Spectrum analyzer Agilent E4407B or similar
- Test set Tektronix ST112

7.4.2 SETUP CONFIGURATION

- Connect as shown in figure 9.
- Connect power head to the MPT-HL V2 TX output

7.4.3 TEST PROCEDURE

Test Case 7d: Verify that the channel extremes can be selected.

Summary: To select the lowest and most upper channels of the band.

Steps:

The following will be verified on the units under test.

- Set the transmitter power according to the table 3 for the modulation and frequency scheme.
- Select the lowest Channel (5 MHz).
- Verify that the radio locks and passes data error free.
- Select the most upper channel (5 MHz).
- Verify that the radio locks and passes data error free.

Expected Results:

The Radio should be able to lock in the lowest and most upper channels of the band.

Results:

The units meet the spec, see data below.

7.4.4 TEST DATA

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	299 / 302

30 MHz Profiles in FCM Mode

Channel Selection Test					
L6 GHz 30 MHz Profiles in FCM Mode					
Frequency Band	BW (MHz)	Modulation (MHz)	MHz		
			Lowest Channel	Middle Channel	Highest Channel
			5945.2	6034.15	6152.75
			6197.24	6286.19	6404.79
L6 GHz	30 MHz	1024 QAM	Radio Locked	Radio Locked	Radio Locked
			Ran Error Free	Ran Error Free	Ran Error Free

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(s).

ED	01				
	ECCN: 5E991 HTS: 4901.99.0050			3DB19060AAAAQZZA	300 / 302

Corner Profiles in FCM Mode

Channel Selection Test					
Lower 6 GHz 60 MHz Corner Profiles in FCM mode					
Frequency Band	BW (MHz)	Modulation (MHz)	MHz		
			Lowest Channel	Middle Channel	Highest Channel
			5960.025	6019.325	6137.925
L6 GHz	60 MHz	1024 QAM	6212.065	6271.365	6389.965
			Radio Locked	Radio Locked	Radio Locked
			Ran Error Free	Ran Error Free	Ran Error Free

Channel Selection Test					
Lower 6 GHz 5 MHz Corner Profiles in FCM Mode					
Frequency Band	BW (MHz)	Modulation (MHz)	MHz		
			Lowest Channel	Middle Channel	Highest Channel
			6110.75	6135.45	6165.1
L6 GHz	5 MHz	1024 QAM	63.62.79	6387.49	6417.14
			Radio Locked	Radio Locked	Radio Locked
			Ran Error Free	Ran Error Free	Ran Error Free

This transfer of commodities, technology, or software, if from the United States, is an export in accordance with the U.S. export administration regulations. Diversion contrary to U.S. law prohibited. The export or re-export (further transfer) of such commodities, technology, software, or products made from such technology is prohibited without proper authorization(s) from the U.S. Department of Commerce or other appropriate U.S. Government Agency(ies).

ED	01				
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZZA		301 / 302

END OF DOCUMENT

ED	01			
	ECCN: 5E991 HTS: 4901.99.0050		3DB19060AAAAQZZA	302 / 302