FCC Test Report

Report No: FCS202303069W01

Issued for

Applicant:	EnpingshiYaoshengdianzishangwuyouxiangongsi
Address:	529400 guangdong enpingshi Room B370, Building B,Unit A1, 2 District of EnPing Industrial Park.
Product Name:	Wireless in Ear Monitor System
Brand Name:	OPQRST
Model Name:	B0BWF4VZB1
Series Model:	B0BWF4WW9F,B0BWF99695
FCC ID:	2BAX7-B0BWF4VZB1
Issued By: Flux Compliance Service Laboratory Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan Tel: 769-27280901 Fax:769-27280901 http://www.fcs-lab.com	

TEST RESULT CERTIFICATION

Applicant's Name..... :	EnpingshiYaoshengdianzishangwuyouxiangongsi
Address..... :	529400 guangdong enpingshi Room B370, Building B,Unit A1, 2 District of EnPing Industrial Park.
Manufacture's Name..... :	EnpingshiYaoshengdianzishangwuyouxiangongsi
Address..... :	529400 guangdong enpingshi Room B370, Building B,Unit A1, 2 District of EnPing Industrial Park.

Product Description

Product Name..... :	Wireless in Ear Monitor System
Brand Name .....:	OPQRST
Model Name..... :	B0BWF4VZB1
Series Model.....:	B0BWF4WW9F,B0BWF99695
Test Standards..... :	FCC Rules and Regulations Part 15 Subpart C section 15.236
Test Procedure..... :	ANSI C63.10:2013

This device described above has been tested FCS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Date of Test..... :

Date (s) of performance of tests. :	Mar 07, 2023 ~ Mar 15, 2023
Date of Issue.....:	Mar 15, 2023
Test Result.....:	Pass

Tested by : Scott Shen

(Scott Shen)

Reviewed by : Duke Qian

(Duke Qian)

Approved by : Jack Wang

(Jack Wang)

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Revision History

Rev.	Issue Date	Effect Page	Contents
00	Mar 15, 2023	All	Initial Issue

1. SUMMARY OF TEST RESULTS

FCC Part 15 Subpart C section 15.236			
Standard Section	Test Item	Judgment	Remark
FCC Part 15.236(d)	Maximum Radiated Power	PASS	--
FCC Part 15.236(f)(2)	Occupied Bandwidth	PASS	--
FCC Part 15.236(g)	Necessary bandwidth	PASS	--
FCC Part 15.236(f)(3)	Frequency stability	PASS	--
FCC Part 15.236(g)	Emission within the band and outside this band	PASS	--
FCC Part 207(a)	Conducted Emission	PASS	--

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) All tests are according to ANSI C63.10:2013

1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
FCC Test Firm Registration Number: 514908 Designation number: CN0127 A2LA accreditation number：5545.01	

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ±U**, where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.71dB
2	Unwanted Emissions, conducted	±2.98 dB
3	Conducted Emission (9KHz-150KHz)	±4.13 dB
4	Conducted Emission (150KHz-30MHz)	±4.74 dB
5	All emissions,radiated(<1G) 30MHz-1000MHz	±3.1 dB
6	All emissions,radiated(<1G) 30MHz-1000MHz	±3.2 dB
7	All emissions,radiated (1GHz -18GHz)	±3.66 dB
8	All emissions,radiated (18GHz -40GHz)	±4.31 dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Wireless in Ear Monitor System
Brand Name	OPQRST
Model Name	B0BWF4VZB1
Series Model	B0BWF4WW9F,B0BWF99695
Model Difference	The electrical circuit design, layout, components used and internal wiring for above models are identical, only different in model name and appearance color
Channel List	Please refer to the Note 2.
Operation frequency	520.0MHz-580.0MHz
Modulation Type	FM
Antenna Type	External Antenna
Antenna Gain (dBi)	1.0
Power Supply	Input:100-240V AC 50/60Hz Output:DC 12V 1A
Battery	N/A
Hardware version number	V1.0
Software version number	V1.0
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.

2. **Channel List**

Channel			
Channel A	Frequency (MHz)	Channel B	Frequency (MHz)
01	520.0	22	551.5
02	521.5	23	553.0
03	523.0	24	554.5
04	524.5	25	556.0
05	526.0	26	557.5
06	527.5	27	559.0
07	529.0	28	560.5
08	530.5	29	562.0
09	532.0	30	563.5
10	533.5	31	565.0
11	535.0	32	566.5
12	536.5	33	568.0
13	538.0	34	569.5
14	539.5	35	571.0
15	541.0	36	572.5
16	542.5	37	574.0
17	544.0	38	575.5
18	545.5	39	577.0
19	547.0	40	578.5
20	548.5	41	580.0
21	550.0		

Ant.	Atnenna Brand	Antenna Model Name	Antenna Type	Connector	Gain (dBi)	EIRP(dBm)	NOTE
1	N/A	N/A	External Antenna	N/A	-2.09	2	Antenna
2	N/A	N/A	External Antenna	N/A	-2.09	2	Antenna

2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test software:FCC tools
The test softeware was used to control EUT work in continuous TX mode, and select test channel, Wireless mode as below table, the following operating modes were applied for the related test items. All test modes were tested, only the result of the worst case was recorded in the report.

Tested mode, channel , information		
Mode	Channel	Frequency (MHz)
Channel A	CH 01	520.0
	CH 11	535.0
	CH 21	550.0
Channel B	CH 22	551.5
	CH 32	566.5
	CH 41	580.0

Note：that use new battery during the test

2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
1	Adapter	N/A	005126V-240050-Y	005126V-24050-18108	This adapter is for testing only in report.

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2022.08.30	2023.08.29
Signal Analyzer	R&S	FSV40-N	FCS-E012	2022.08.30	2023.08.29
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2022.08.30	2023.08.29
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2022.08.30	2023.08.29
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2022.08.30	2023.08.29
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2022.08.30	2023.08.29
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2022.08.30	2023.08.29
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2022.08.30	2023.08.29
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2022.08.30	2023.08.29
Temperature & Humidity	HTC-1	victor	FCS-E005	2022.08.30	2023.08.29
Signal generator	Agilent	E4421B	FCS-E025	2022.08.30	2023.08.29

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2022.08.30	2023.08.29
LISN	R&S	ENV216	FCS-E007	2022.08.30	2023.08.29
LISN	ETS	3810/2NM	FCS-E009	2022.08.30	2023.08.29
Temperature & Humidity	HTC-1	victor	FCS-E008	2022.08.30	2023.08.29

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
Spectrum Analyzer	Keysight	N9020A	FCS-E015	2022.08.30	2023.08.29
Spectrum Analyzer	Agilent	E4447A	MY50180039	2022.08.30	2023.08.29
Spectrum Analyzer	R&S	FSV-40	101499	2022.08.30	2023.08.29
Audio Analyzer	R&S	UPL	FCS-E39	2022.08.30	2023.08.29

3 MAXIMUM RADIATED POWER

3.1 LIMIT

Refer to FCC 15.236(d)
In the bands allocated and assigned for broadcast television and in the 600 MHz service band: 50 mW EIRP

3.2 TEST PROCEDURE

A · Connect each EUT's antenna output to power sensor by RF cable and attenuator

3.3 TEST SETUP

3.4 TEST RESULTS

ANT 1

Test mode	Channel	Frequency（MHz）	Peak Output Power (dBm)	Atnenna Gain (dBi)	EIRP(dBm)	Limit(dBm)	Verdict
Channel A	CH 01	520.0	3.21	-2.09	1.11	16.99	PASS
	CH 11	535.0	3.36	-2.09	1.27		
	CH 21	550.0	3.96	-2.09	1.87		
Channel B	CH 22	551.5	3.01	-2.09	0.92	16.99	PASS
	CH 32	566.5	3.06	-2.09	0.97		
	CH 41	580.0	3.12	-2.09	1.03		

ANT 2

Test mode	Channel	Frequency（MHz）	Peak Output Power (dBm)	Atnenna Gain (dBi)	EIRP(dBm)	Limit(dBm)	Verdict
Channel A	CH 01	520.0	3.16	-2.09	1.07	16.99	PASS
	CH 11	535.0	3.29	-2.09	1.20		
	CH 21	550.0	3.40	-2.09	1.31		
Channel B	CH 22	551.5	3.26	-2.09	1.17	16.99	PASS
	CH 32	566.5	3.38	-2.09	1.29		
	CH 41	580.0	3.25	-2.09	1.16		

4. OCCUPIED BANDWIDTH

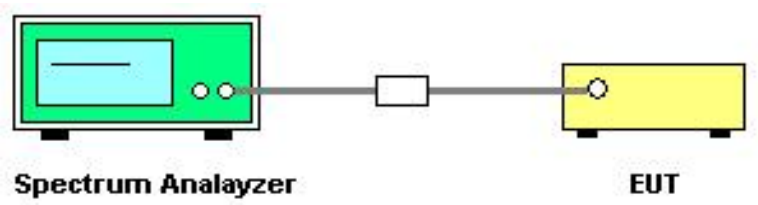
4.1 LIMIT

One or more adjacent 25KHz segments within the assignable frequencies may be combined to form a channel whose maximum bandwidth shall not exceed 200 kHz. The operating bandwidth shall not exceed 200 kHz

4.2 TEST PROCEDURE

Parameter	Setting
Detector	Peak/AV
Sweep time	Auto
Resolution bandwidth	1 % to 5 % of the occupied bandwidth
Video bandwidth:	3 x resolution bandwidth
Span:	2 x emission bandwidth
Trace mode:	Max. hold
Analyzer function:	99% power occupied bandwidth function
EUT:	Modulated signal with max(FM,2.5kHz tone). frequency deviation

4.3 TEST SETUP



4.4 TEST RESULTS

ANT 1

Test mode	Channel	Frequency （MHz）	20dB Bandwidth (KHz)	Limt(KHz)	Verdict
Channel A	CH 01	520.0	101.4	200KHz	PASS
	CH 11	535.0	112.7		
	CH 21	550.0	102.2		
Channel B	CH 22	551.5	101.1	200KHz	PASS
	CH 32	566.5	100.4		
	CH 41	580.0	100.8		

ANT 2

Test mode	Channel	Frequency （MHz）	20dB Bandwidth (KHz)	Limt(KHz)	Verdict
Channel A	CH 01	520.0	112.2	200KHz	PASS
	CH 11	535.0	102.3		
	CH 21	550.0	102.2		
Channel B	CH 22	551.5	103.6	200KHz	PASS
	CH 32	566.5	113.3		
	CH 41	580.0	103.6		

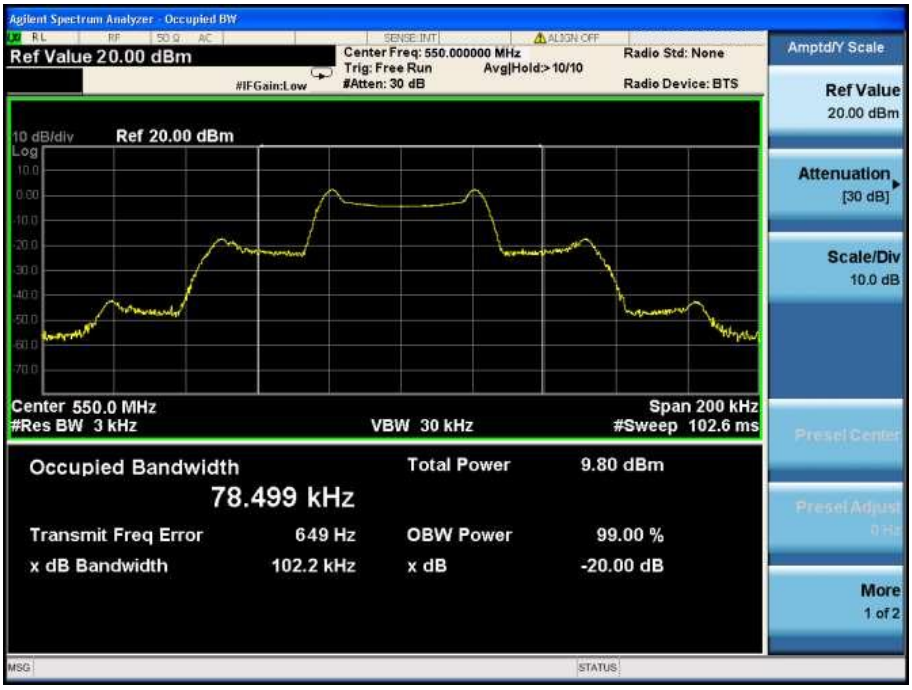
ANT 1

CH A

Low

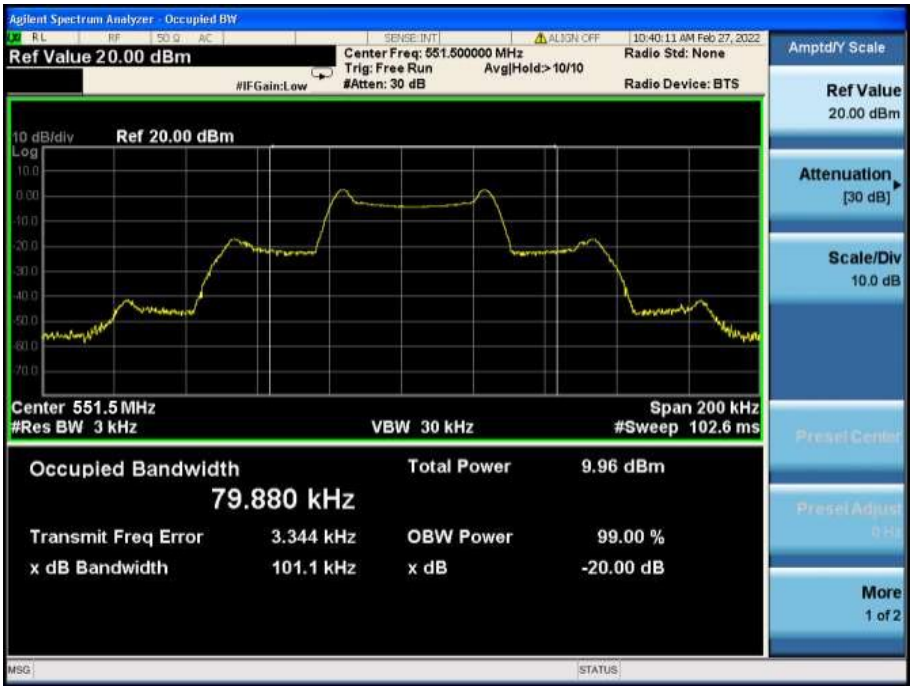
Middle

High


Agilent Spectrum Analyzer - Occupied BW
Ref Value 20.00 dBm
Center Freq: 550.000000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
10 dB/div
Ref 20.00 dBm
Center 550.0 MHz
#Res BW 3 kHz
VBW 30 kHz
Span 200 kHz
#Sweep 102.6 ms
Occupied Bandwidth
78.499 kHz
Total Power 9.80 dBm
Transmit Freq Error 649 Hz
OBW Power 99.00 %
x dB Bandwidth 102.2 kHz
x dB -20.00 dB
Amptd/Y Scale
Ref Value 20.00 dBm
Attenuation [30 dB]
Scale/Div 10.0 dB
More 1 of 2
MSG
STATUS

CH B

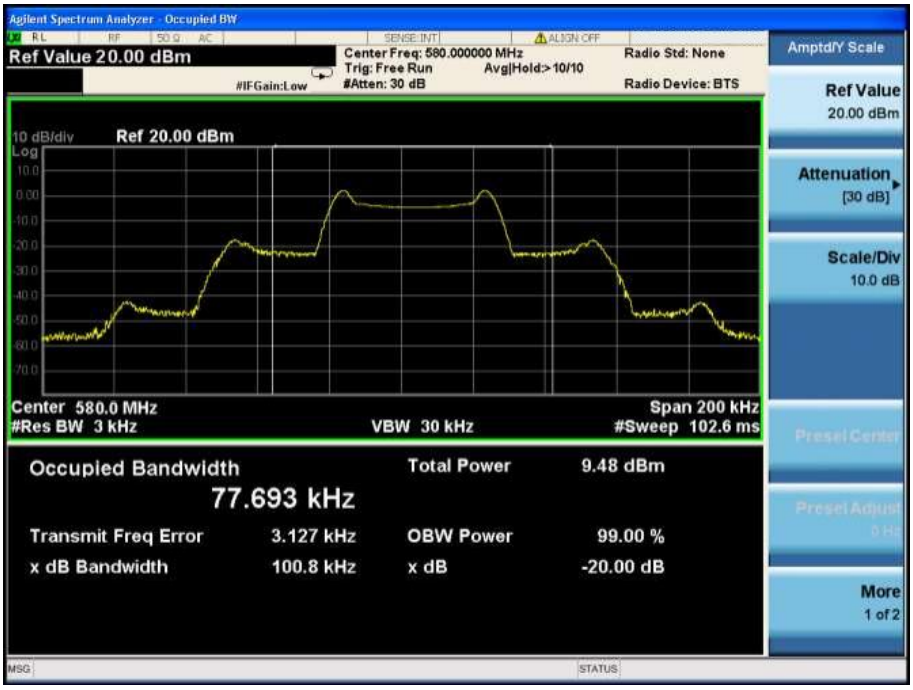
Low


Agilent Spectrum Analyzer - Occupied BW
Ref Value 20.00 dBm
Center Freq: 551.500000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
10:40:11 AM Feb 27, 2022
10 dB/div
Ref 20.00 dBm
Center 551.5 MHz
#Res BW 3 kHz
VBW 30 kHz
Span 200 kHz
#Sweep 102.6 ms
Occupied Bandwidth
79.880 kHz
Total Power 9.96 dBm
Transmit Freq Error 3.344 kHz
OBW Power 99.00 %
x dB Bandwidth 101.1 kHz
x dB -20.00 dB
Amptd/Y Scale
Ref Value 20.00 dBm
Attenuation [30 dB]
Scale/Div 10.0 dB
More 1 of 2
MSG
STATUS

Middle

Agilent Spectrum Analyzer - Occupied BW
Ref Value 20.00 dBm
Center Freq: 566.500000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10 dB/div
Ref 20.00 dBm
Center 566.5 MHz
#Res BW 3 kHz
VBW 30 kHz
Span 200 kHz
#Sweep 102.6 ms
Occupied Bandwidth
76.407 kHz
Total Power 9.91 dBm
Transmit Freq Error 3.291 kHz
OBW Power 99.00 %
x dB Bandwidth 100.4 kHz
x dB -20.00 dB
Amptd/Y Scale
Ref Value 20.00 dBm
Attenuation [30 dB]
Scale/Div 10.0 dB
More 1 of 2
MSG
STATUS

High


Agilent Spectrum Analyzer - Occupied BW
Ref Value 20.00 dBm
Center Freq: 580.000000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10 dB/div
Ref 20.00 dBm
Center 580.0 MHz
#Res BW 3 kHz
VBW 30 kHz
Span 200 kHz
#Sweep 102.6 ms
Occupied Bandwidth
77.693 kHz
Total Power 9.48 dBm
Transmit Freq Error 3.127 kHz
OBW Power 99.00 %
x dB Bandwidth 100.8 kHz
x dB -20.00 dB
Amptd/Y Scale
Ref Value 20.00 dBm
Attenuation [30 dB]
Scale/Div 10.0 dB
More 1 of 2
MSG
STATUS

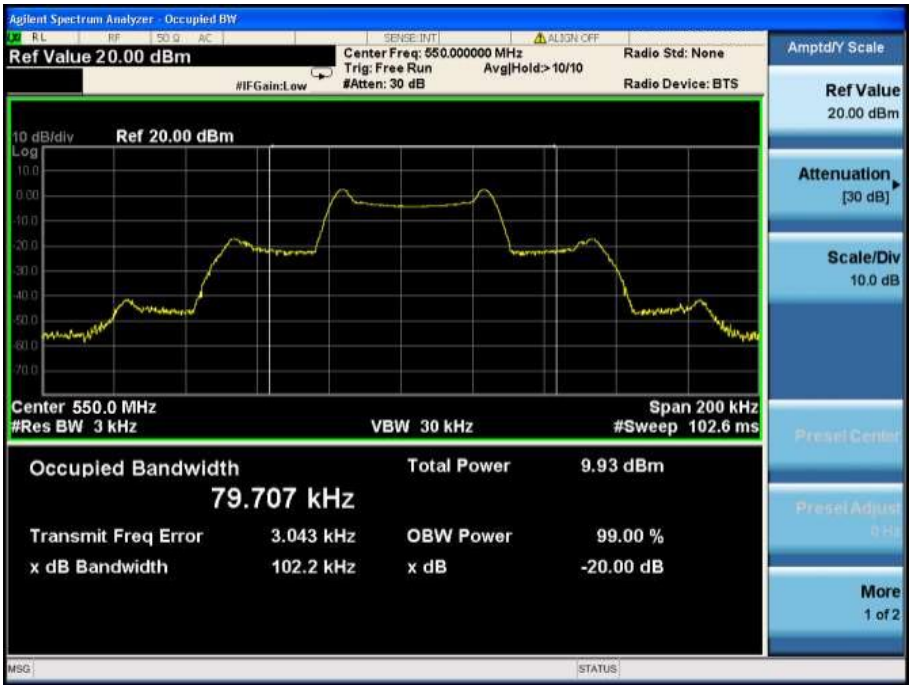
ANT 2

CH A

Low

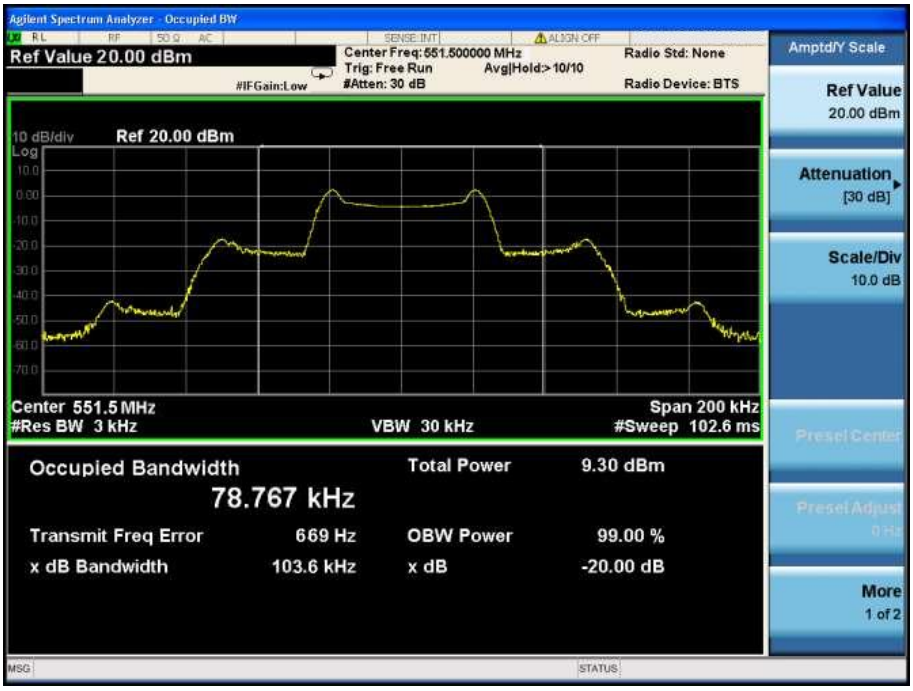
Middle

High


Agilent Spectrum Analyzer - Occupied BW
Ref Value 20.00 dBm
Center Freq: 550.000000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10 dB/div
Ref 20.00 dBm
Center 550.0 MHz
#Res BW 3 kHz
VBW 30 kHz
Span 200 kHz
#Sweep 102.6 ms
Occupied Bandwidth
79.707 kHz
Total Power 9.93 dBm
Transmit Freq Error 3.043 kHz
OBW Power 99.00 %
x dB Bandwidth 102.2 kHz
x dB -20.00 dB
Amptd/Y Scale
Ref Value 20.00 dBm
Attenuation [30 dB]
Scale/Div 10.0 dB
More 1 of 2
MSG
STATUS

CH B

Low


Agilent Spectrum Analyzer - Occupied BW
Ref Value 20.00 dBm
Center Freq: 551.500000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10 dB/div
Ref 20.00 dBm
Center 551.5 MHz
#Res BW 3 kHz
VBW 30 kHz
Span 200 kHz
#Sweep 102.6 ms
Occupied Bandwidth
78.767 kHz
Total Power 9.30 dBm
Transmit Freq Error 669 Hz
OBW Power 99.00 %
x dB Bandwidth 103.6 kHz
x dB -20.00 dB
Amptd/Y Scale
Ref Value 20.00 dBm
Attenuation [30 dB]
Scale/Div 10.0 dB
More 1 of 2
MSG
STATUS

Middle

Agilent Spectrum Analyzer - Occupied BW
Ref Value 20.00 dBm
Center Freq: 566.500000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10 dB/div
Ref 20.00 dBm
Center 566.5 MHz
#Res BW 3 kHz
#VBW 30 kHz
Span 200 kHz
#Sweep 102.6 ms
Occupied Bandwidth
77.696 kHz
Total Power 10.9 dBm
Transmit Freq Error 633 Hz
OBW Power 99.00 %
x dB Bandwidth 113.3 kHz
x dB -20.00 dB
Amptd/Y Scale
Ref Value 20.00 dBm
Attenuation [30 dB]
Scale/Div 10.0 dB
More 1 of 2
MSG
STATUS

High

Agilent Spectrum Analyzer - Occupied BW
Ref Value 20.00 dBm
Center Freq:580.000000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10 dB/div
Ref 20.00 dBm
Center 580.0 MHz
#Res BW 3 kHz
#VBW 30 kHz
Span 200 kHz
#Sweep 102.6 ms
Occupied Bandwidth
74.916 kHz
Total Power 9.36 dBm
Transmit Freq Error 613 Hz
OBW Power 99.00 %
x dB Bandwidth 103.6 kHz
x dB -20.00 dB
Amptd/Y Scale
Ref Value 20.00 dBm
Attenuation [30 dB]
Scale/Div 10.0 dB
More 1 of 2
MSG
STATUS

5. NECESSARY BANDWITH

5.1 LIMIT

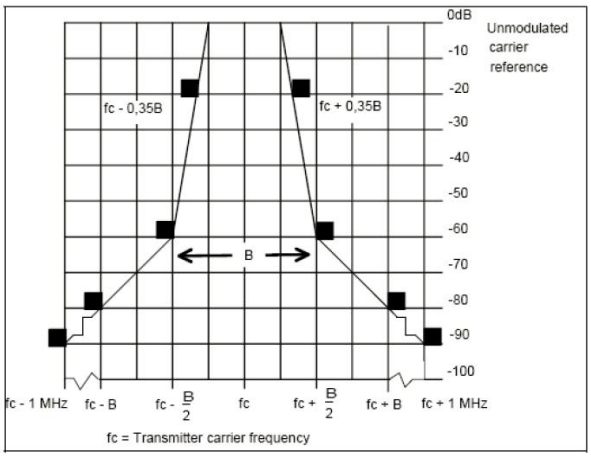
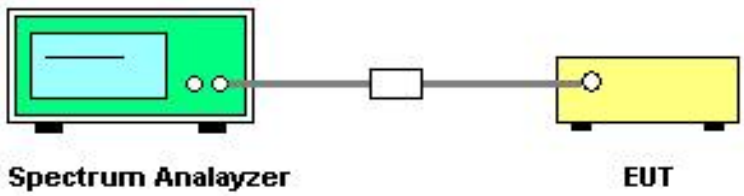


Figure 1: Spectrum mask for analogue systems in all bands

5.2 TEST PROCEDURE

EN300422-1 V1.4.2 Clause 8.3.

5.3 TEST SETUP

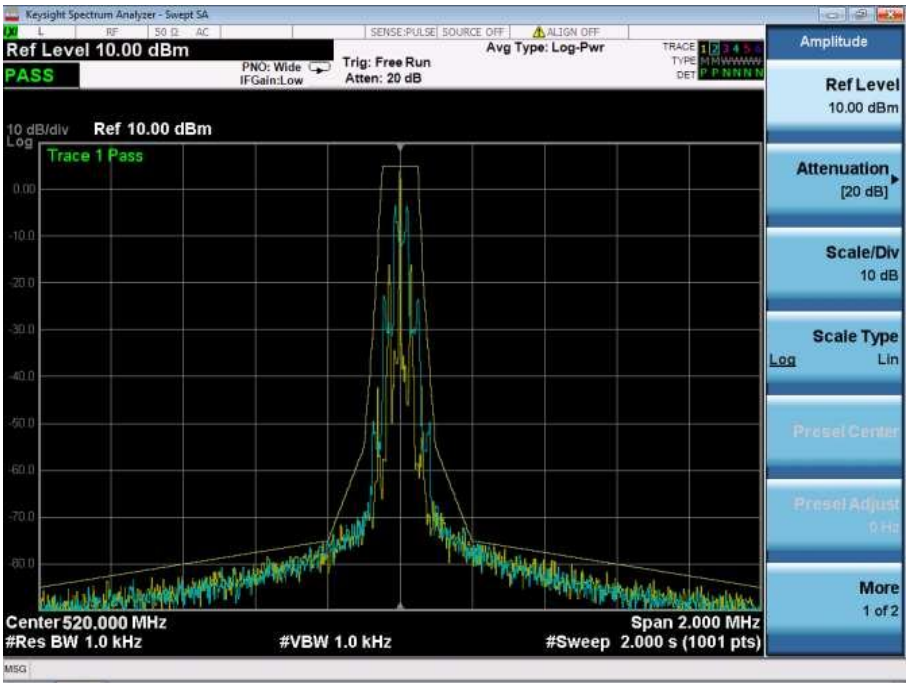


5.4 TEST RESULT

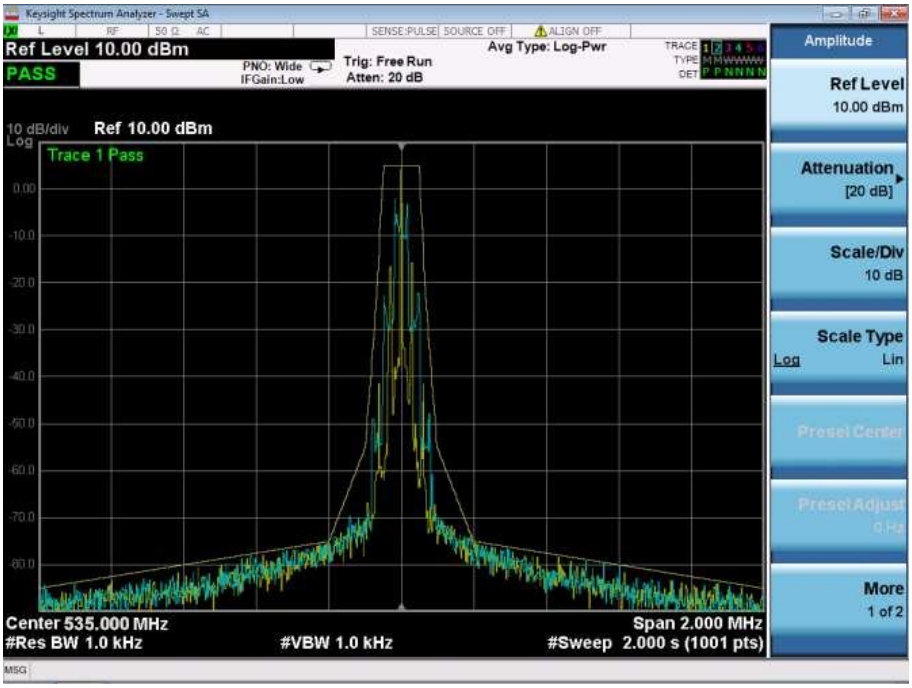
ANT 1

CH A

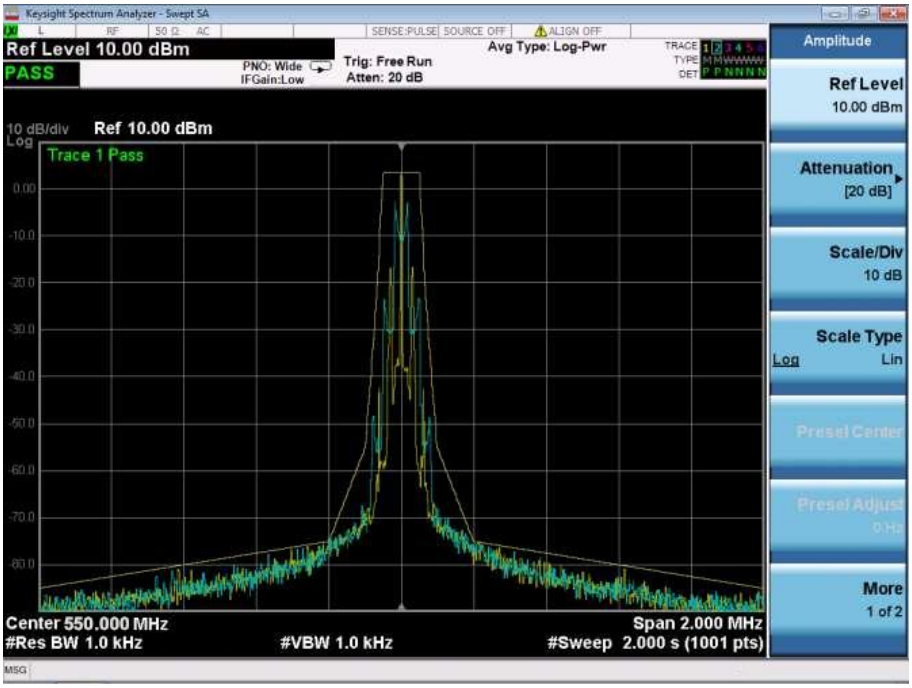
Low



Middle

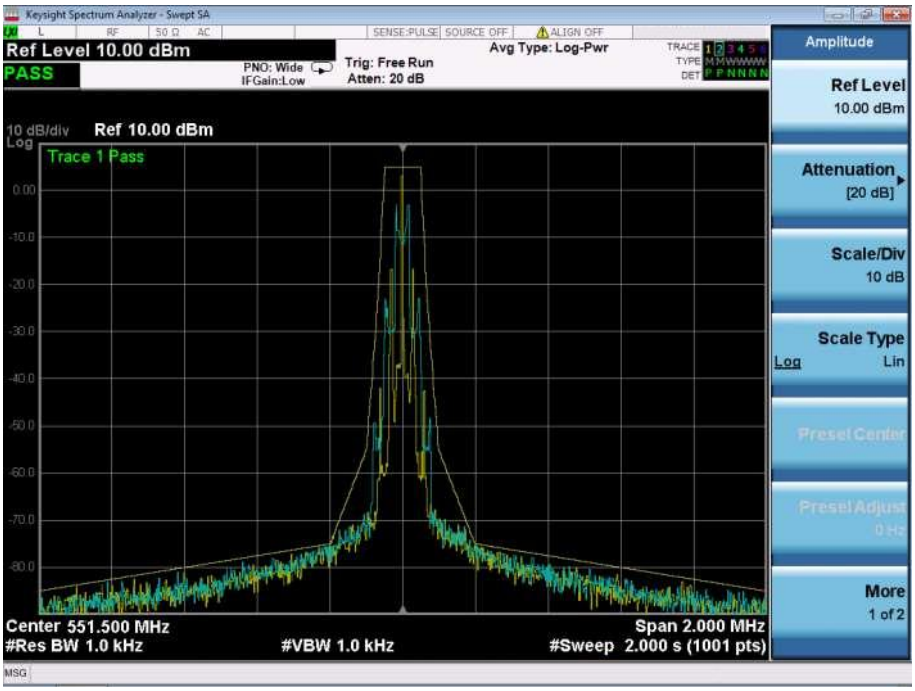


High

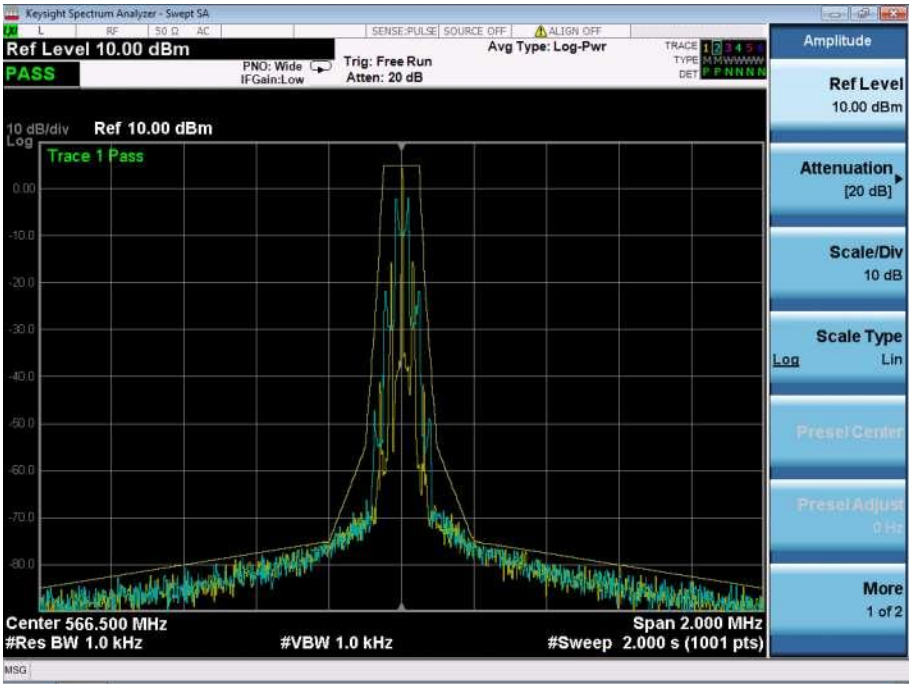

Keysight Spectrum Analyzer - Swept SA
Ref Level 10.00 dBm
PASS
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
10 dB/div Ref 10.00 dBm
Log
Trace 1 Pass
Center 550.000 MHz
#Res BW 1.0 kHz
#VBW 1.0 kHz
Span 2.000 MHz
#Sweep 2.000 s (1001 pts)
Amplitude
Ref Level
10.00 dBm
Attenuation
[20 dB]
Scale/Div
10 dB
Scale Type
Log Lin
More
1 of 2

CH B

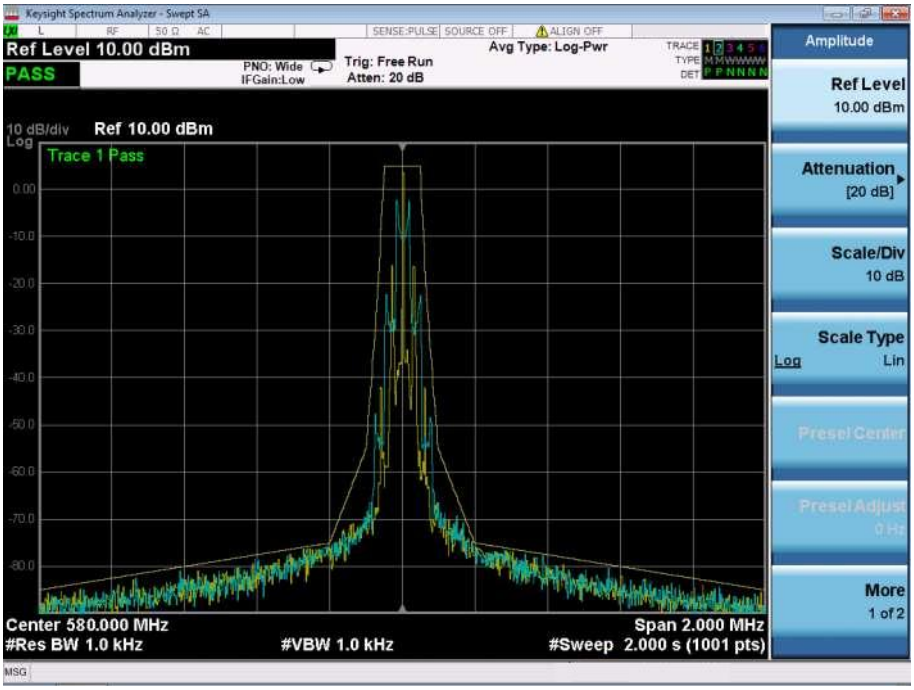
Low


Keysight Spectrum Analyzer - Swept SA
Ref Level 10.00 dBm
PASS
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
10 dB/div Ref 10.00 dBm
Log
Trace 1 Pass
Center 551.500 MHz
#Res BW 1.0 kHz
#VBW 1.0 kHz
Span 2.000 MHz
#Sweep 2.000 s (1001 pts)
Amplitude
Ref Level
10.00 dBm
Attenuation
[20 dB]
Scale/Div
10 dB
Scale Type
Log Lin
More
1 of 2

Middle


Keysight Spectrum Analyzer - Swept SA
Ref Level 10.00 dBm
PASS
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
10 dB/div Ref 10.00 dBm
Log
Trace 1 Pass
Center 566.500 MHz
#Res BW 1.0 kHz
#VBW 1.0 kHz
Span 2.000 MHz
#Sweep 2.000 s (1001 pts)
Amplitude
Ref Level
10.00 dBm
Attenuation
[20 dB]
Scale/Div
10 dB
Scale Type
Log Lin
More
1 of 2

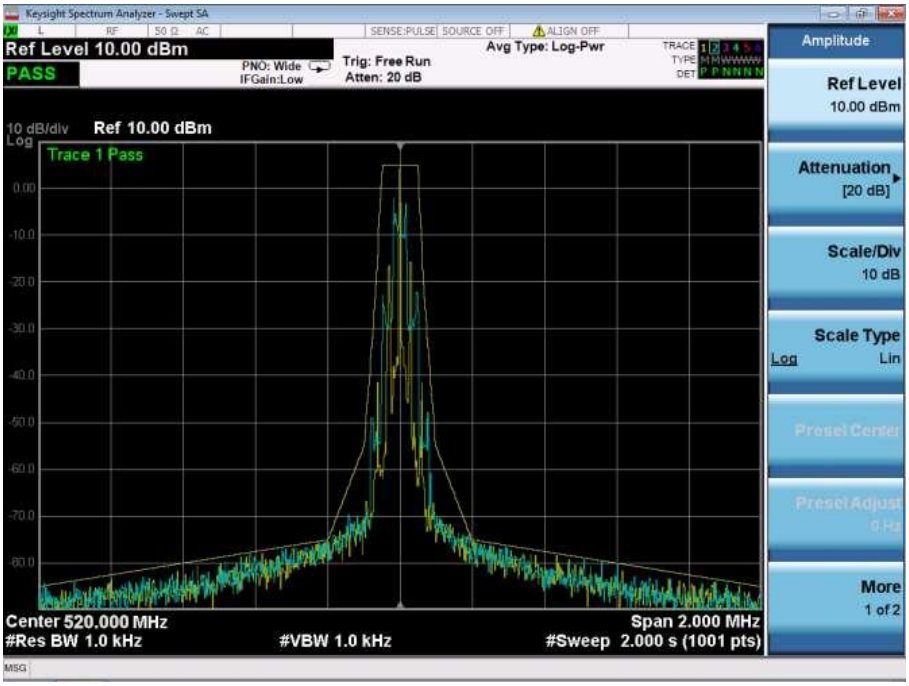
High


Keysight Spectrum Analyzer - Swept SA
Ref Level 10.00 dBm
PASS
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
10 dB/div Ref 10.00 dBm
Log
Trace 1 Pass
Center 580.000 MHz
#Res BW 1.0 kHz
#VBW 1.0 kHz
Span 2.000 MHz
#Sweep 2.000 s (1001 pts)
Amplitude
Ref Level
10.00 dBm
Attenuation
[20 dB]
Scale/Div
10 dB
Scale Type
Log Lin
More
1 of 2

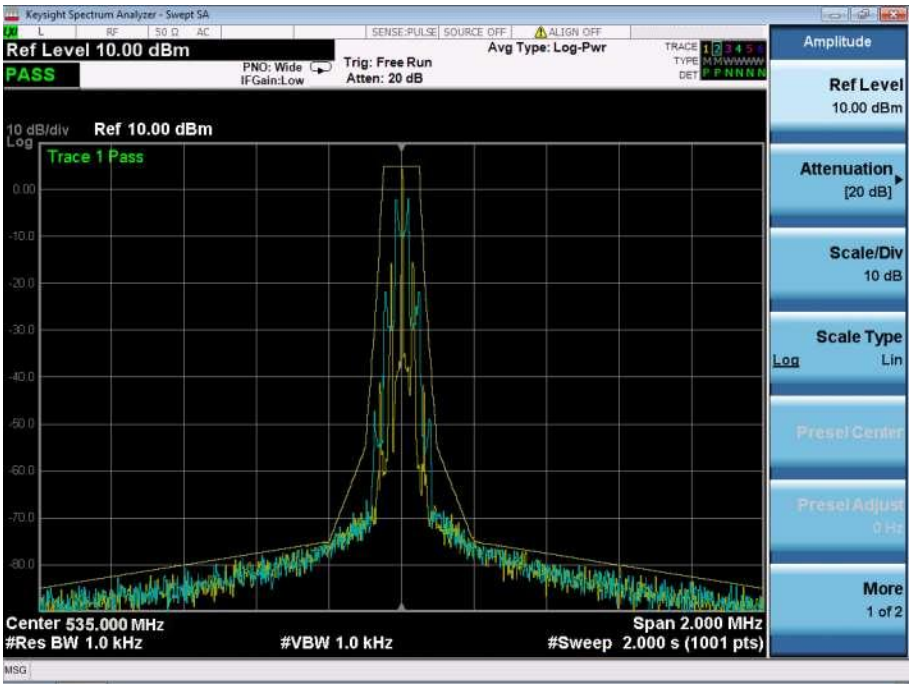
ANT 2

CH A

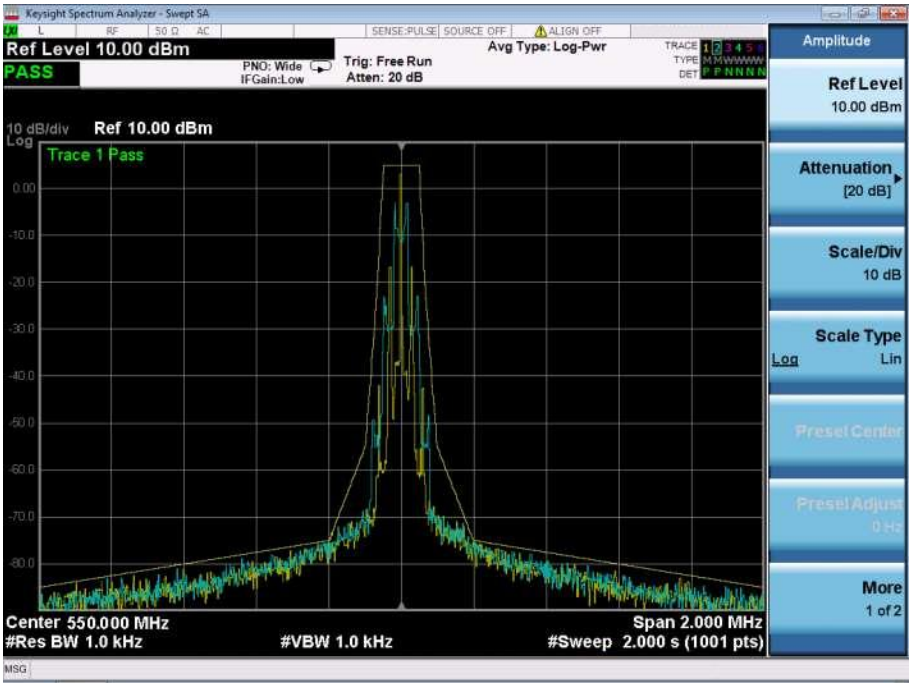
Low



Middle

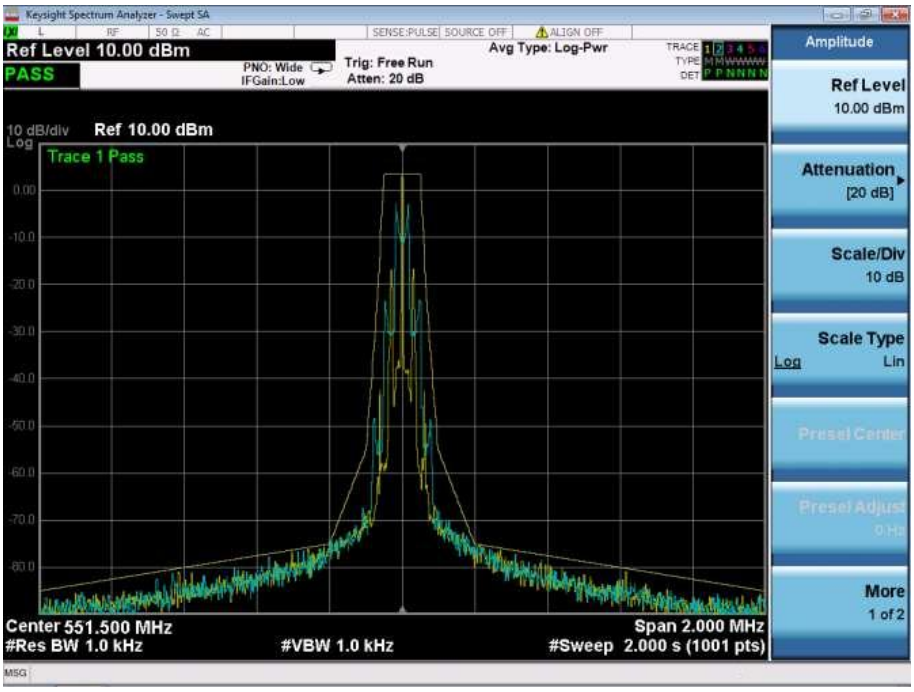


High

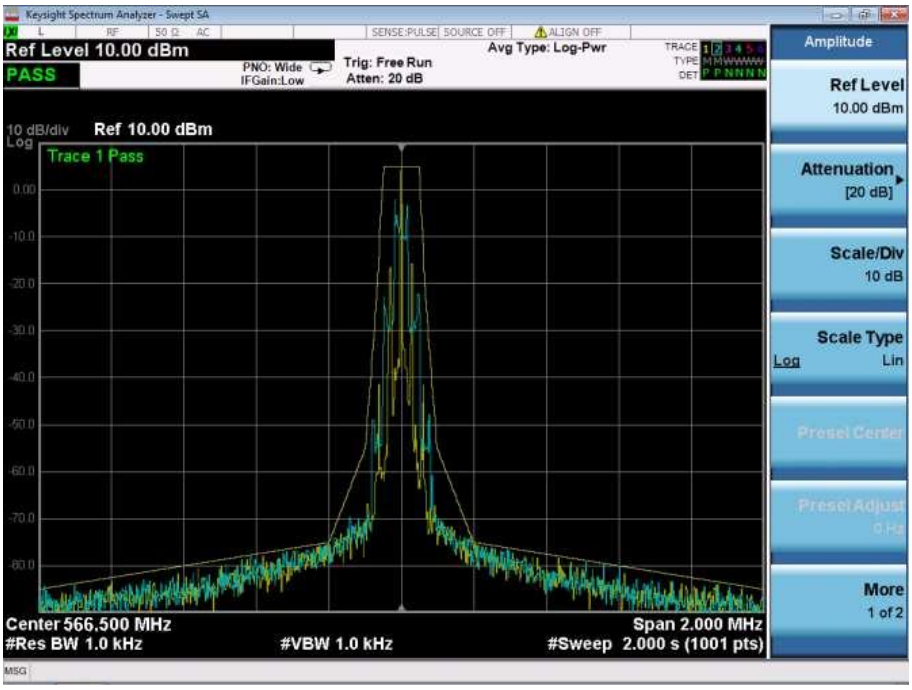

Keysight Spectrum Analyzer - Swept SA
Ref Level 10.00 dBm
PASS
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
10 dB/div Ref 10.00 dBm
Log
Trace 1 Pass
Center 550.000 MHz
#Res BW 1.0 kHz
#VBW 1.0 kHz
Span 2.000 MHz
#Sweep 2.000 s (1001 pts)
Amplitude
Ref Level
10.00 dBm
Attenuation
[20 dB]
Scale/Div
10 dB
Scale Type
Log
Lin
More
1 of 2

CH B

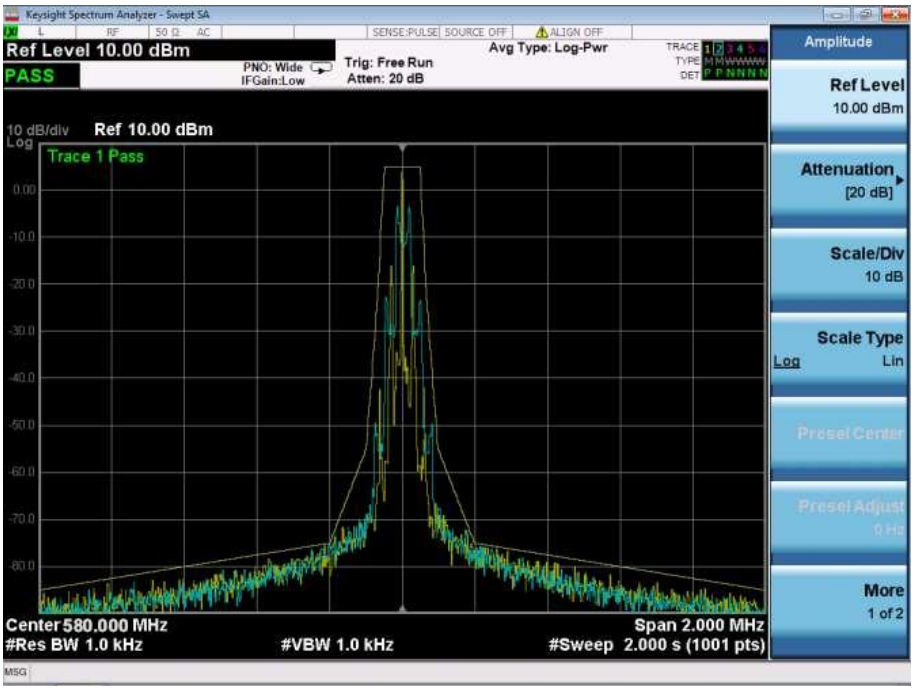
Low


Keysight Spectrum Analyzer - Swept SA
Ref Level 10.00 dBm
PASS
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
10 dB/div Ref 10.00 dBm
Log
Trace 1 Pass
Center 551.500 MHz
#Res BW 1.0 kHz
#VBW 1.0 kHz
Span 2.000 MHz
#Sweep 2.000 s (1001 pts)
Amplitude
Ref Level
10.00 dBm
Attenuation
[20 dB]
Scale/Div
10 dB
Scale Type
Log
Lin
More
1 of 2

Middle


Keysight Spectrum Analyzer - Swept SA
Ref Level 10.00 dBm
PASS
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
10 dB/div Ref 10.00 dBm
Log
Trace 1 Pass
Center 566.500 MHz
#Res BW 1.0 kHz
#VBW 1.0 kHz
Span 2.000 MHz
#Sweep 2.000 s (1001 pts)
Amplitude
Ref Level
10.00 dBm
Attenuation
[20 dB]
Scale/Div
10 dB
Scale Type
Log
Lin
More
1 of 2

High


Keysight Spectrum Analyzer - Swept SA
Ref Level 10.00 dBm
PASS
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
10 dB/div Ref 10.00 dBm
Log
Trace 1 Pass
Center 580.000 MHz
#Res BW 1.0 kHz
#VBW 1.0 kHz
Span 2.000 MHz
#Sweep 2.000 s (1001 pts)
Amplitude
Ref Level
10.00 dBm
Attenuation
[20 dB]
Scale/Div
10 dB
Scale Type
Log
Lin
More
1 of 2

6. TRANSMITTER UNWANTED EMISSIONS

6.1 LIMIT

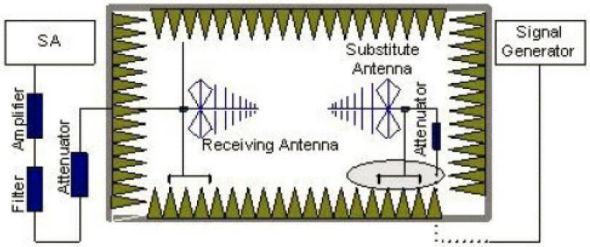
Spurious emissions are emissions outside the frequency range(s) of the equipment. The power of the spurious emissions shall not exceed the limits of table as below:

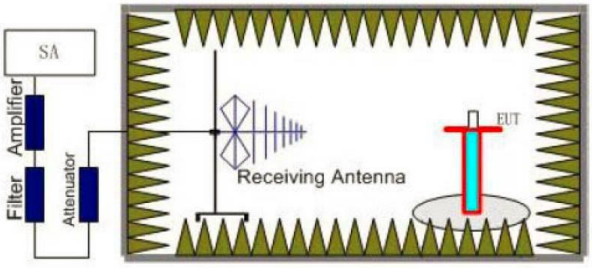
State	Frequency		
	47MHz to 74MHz, 87.5MHz to 137MHz 174MHz to 230MHz, 470MHz to 862MHz	Other Frequencies below 1000MHz	Frequencies above 1000MHz
Operation	4nW	250nW	1uW
Standby	2nW	2nW	20nW

5.2 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator. Set spectrum analyzer start 30MHz to 6000MHz with 100 KHz RBW and 300 KHz VBW
2 Please refer to ETSI EN 300 422-1 V1.4.2 (2011-08) clause 6.1 for the test conditions.
3 Please refer to ETSI EN 300 422-1 V1.4.2 (2011-08) clause 8.4.2 for the measurement method.

5.3 TEST SETUP

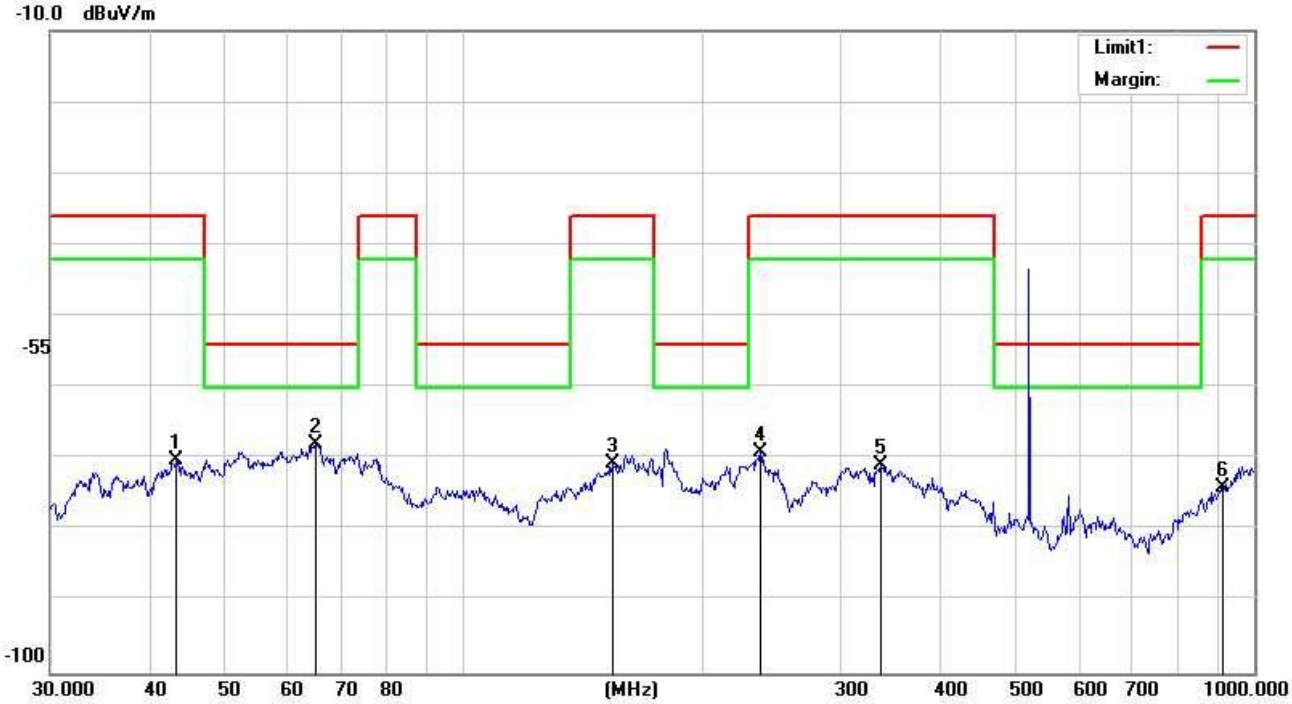




6.4 TEST RESULTS

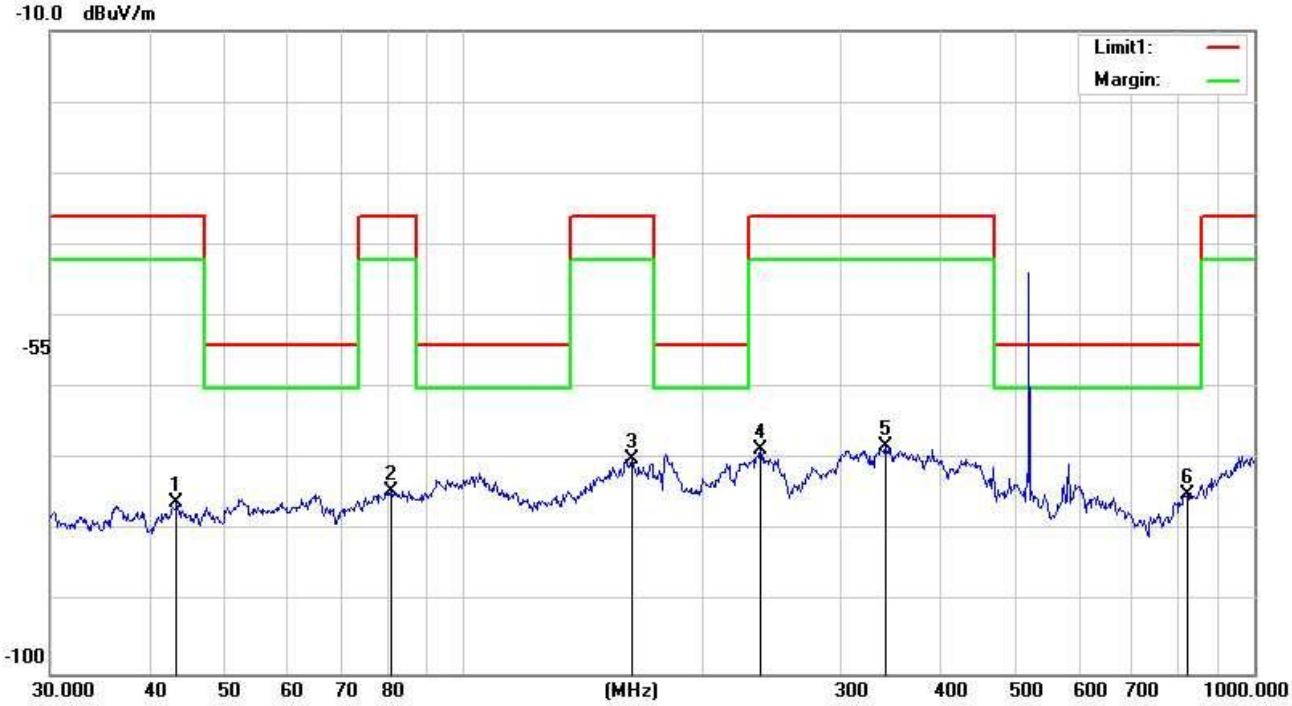
CHNNEL A –LOW CH–30MHZ-1000MHZ

Vertical



No.	Frequency (MHz)	Reading (dBm)	Correction (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	43.3534	-53.20	-16.92	-70.12	-36.00	-34.12	peak
2	65.1145	-48.58	-19.38	-67.96	-54.00	-13.96	peak
3	154.2786	-51.35	-19.28	-70.63	-36.00	-34.63	peak
4	237.4760	-53.78	-15.34	-69.12	-36.00	-33.12	peak
5	337.2155	-57.91	-12.88	-70.79	-36.00	-34.79	peak
6	912.8620	-70.77	-3.14	-73.91	-36.00	-37.91	peak

Horizontal



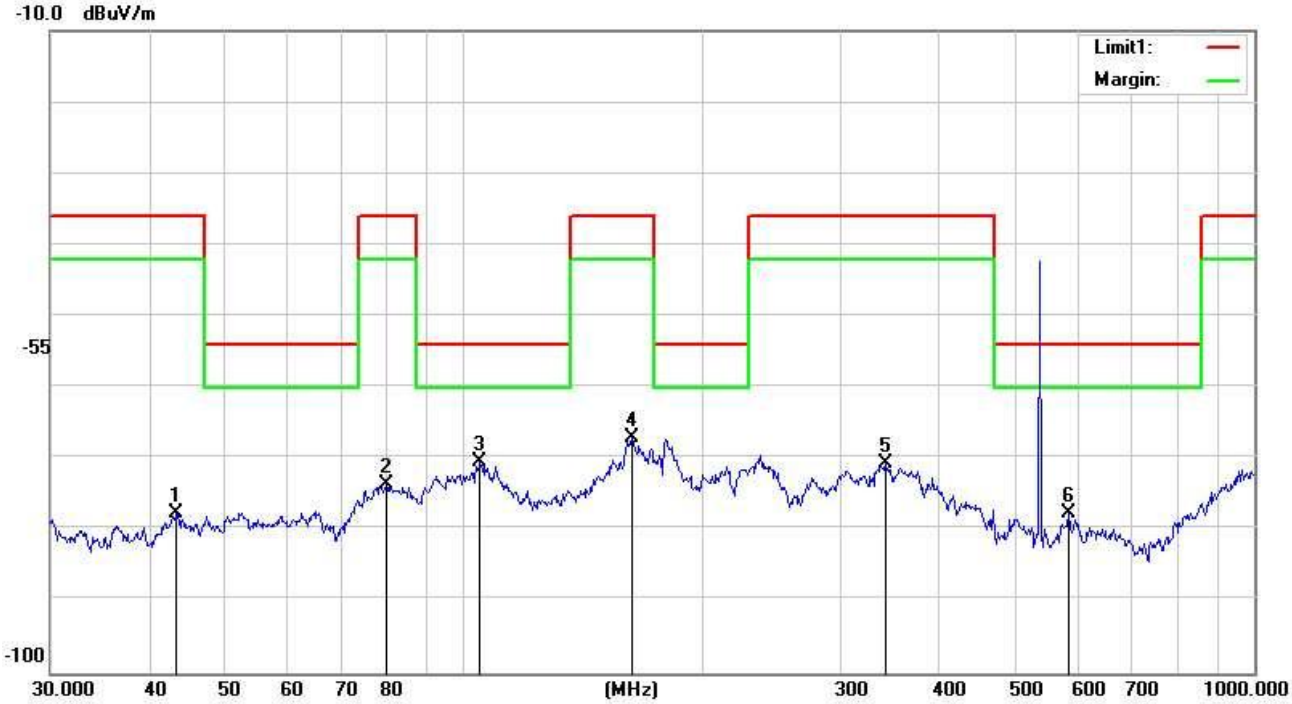
No.	Frequency (MHz)	Reading (dBm)	Correction (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	43.3534	-59.20	-16.92	-76.12	-36.00	-40.12	peak
2	80.9274	-52.68	-21.76	-74.44	-36.00	-38.44	peak
3	163.1818	-51.27	-18.68	-69.95	-36.00	-33.95	peak
4	237.4760	-53.28	-15.34	-68.62	-36.00	-32.62	peak
5	341.9786	-55.42	-12.78	-68.20	-36.00	-32.20	peak
6	821.7103	-70.45	-4.46	-74.91	-54.00	-20.91	peak

Note :

1. Result = Reading + Corrected Factor Note :

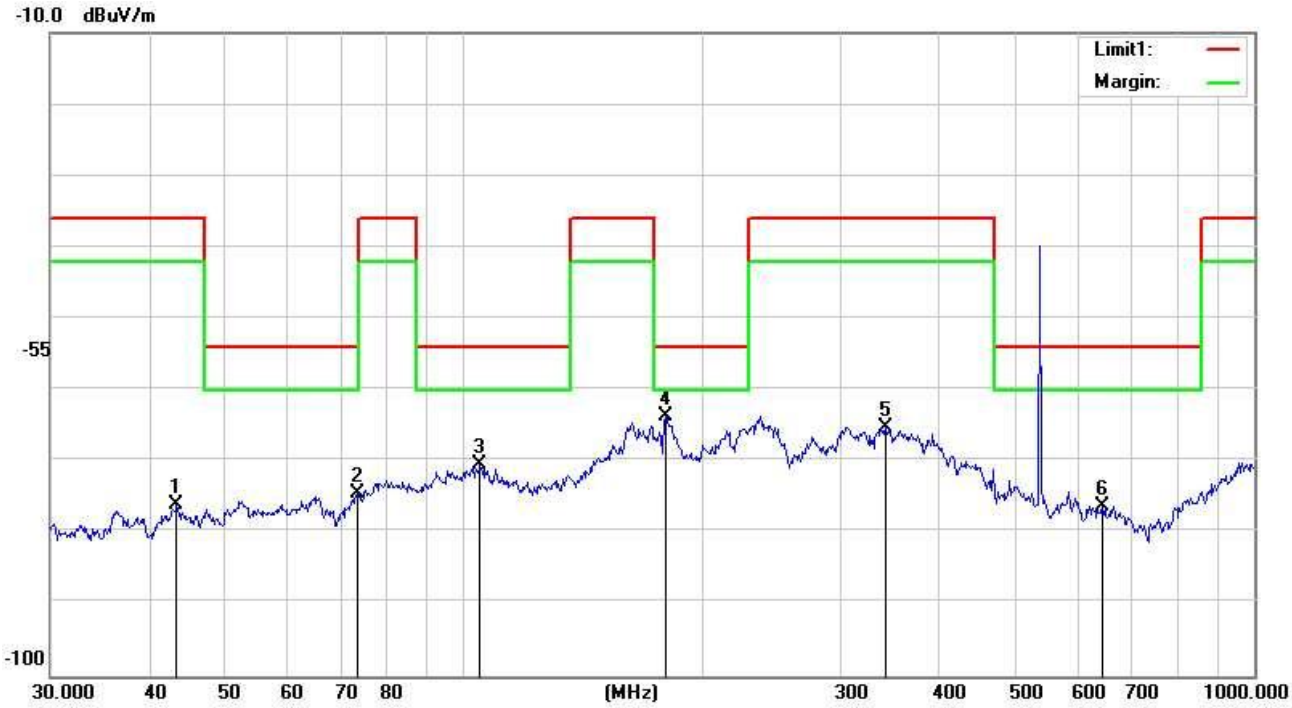
CHNNEL A –MIDDLE CH–30MHZ-1000MHZ

Vertical



No.	Frequency (MHz)	Reading (dBm)	Correction (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	43.3534	-60.70	-16.92	-77.62	-36.00	-41.62	peak
2	79.8002	-51.75	-21.90	-73.65	-36.00	-37.65	peak
3	104.9033	-53.10	-17.34	-70.44	-54.00	-16.44	peak
4	163.1818	-48.27	-18.68	-66.95	-36.00	-30.95	peak
5	341.9786	-57.92	-12.78	-70.70	-36.00	-34.70	peak
6	582.7423	-69.09	-8.58	-77.67	-54.00	-23.67	peak

Horizontal



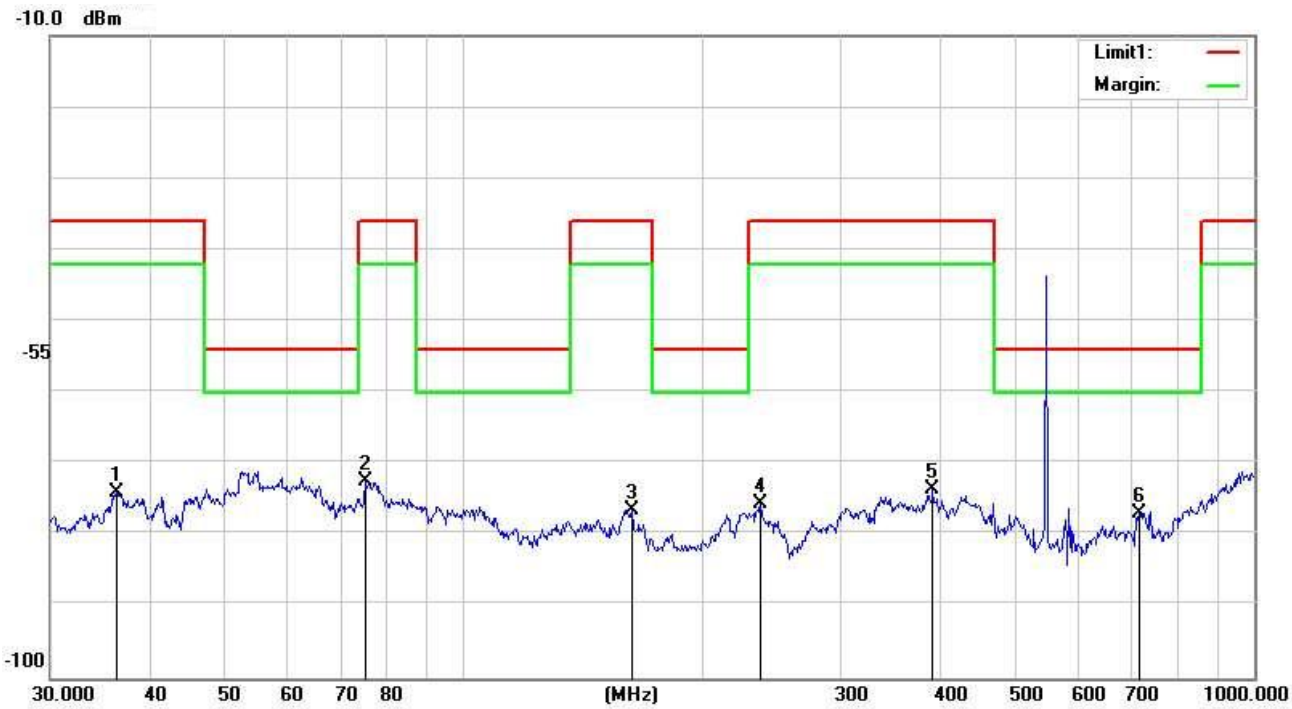
No.	Frequency (MHz)	Reading (dBm)	Correction (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	43.3534	-59.20	-16.92	-76.12	-36.00	-40.12	peak
2	73.3593	-53.36	-21.00	-74.36	-54.00	-20.36	peak
3	104.9033	-53.10	-17.34	-70.44	-54.00	-16.44	peak
4	180.0165	-44.26	-19.44	-63.70	-54.00	-9.70	peak
5	341.9786	-52.42	-12.78	-65.20	-36.00	-29.20	peak
6	642.8613	-69.31	-6.97	-76.28	-54.00	-22.28	peak

Note :

1. Result = Reading + Corrected Factor Note :

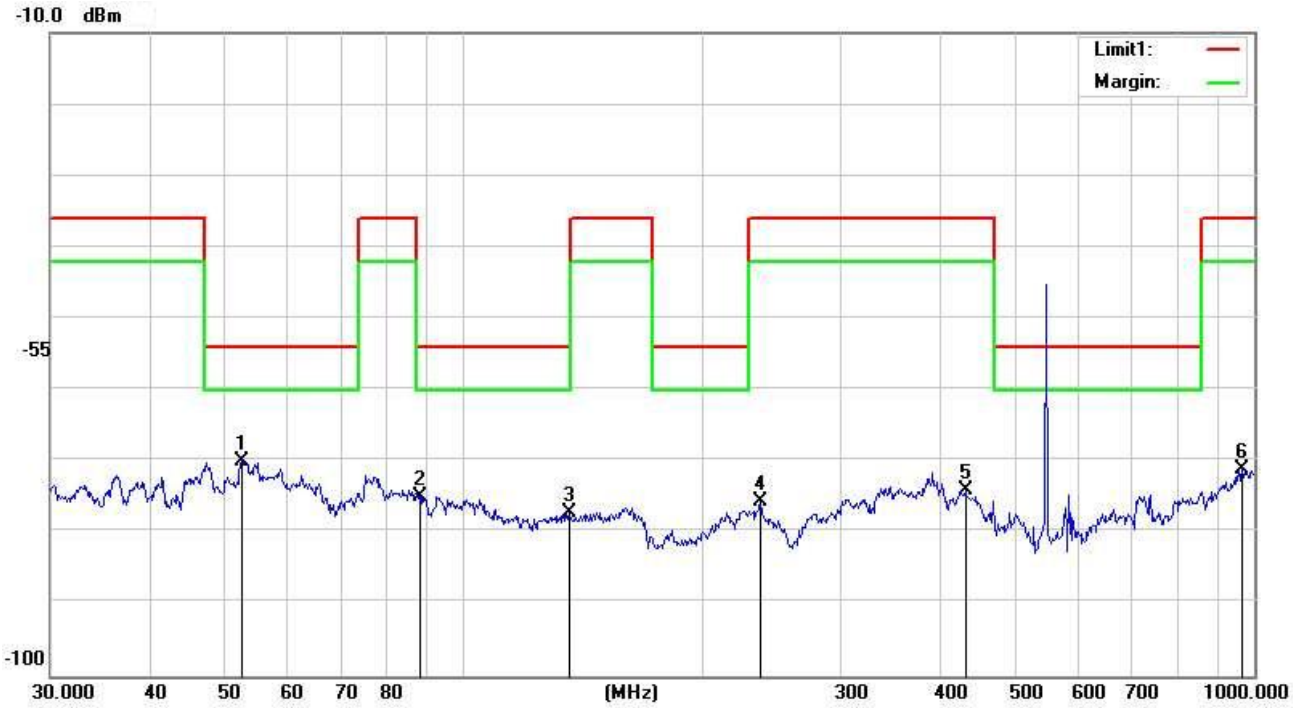
CHNNEL A –HIGH CH–30MHZ-1000MHZ

Vertical



No.	Frequency (MHz)	Reading (dBm)	Correction (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	36.3813	-57.51	-16.50	-74.01	-36.00	-38.01	peak
2	75.1821	-51.07	-21.38	-72.45	-36.00	-36.45	peak
3	163.1818	-57.77	-18.68	-76.45	-36.00	-40.45	peak
4	237.4760	-60.28	-15.34	-75.62	-36.00	-39.62	peak
5	392.0951	-60.74	-12.84	-73.58	-36.00	-37.58	peak
6	716.6820	-70.99	-5.93	-76.92	-54.00	-22.92	peak

Horizontal



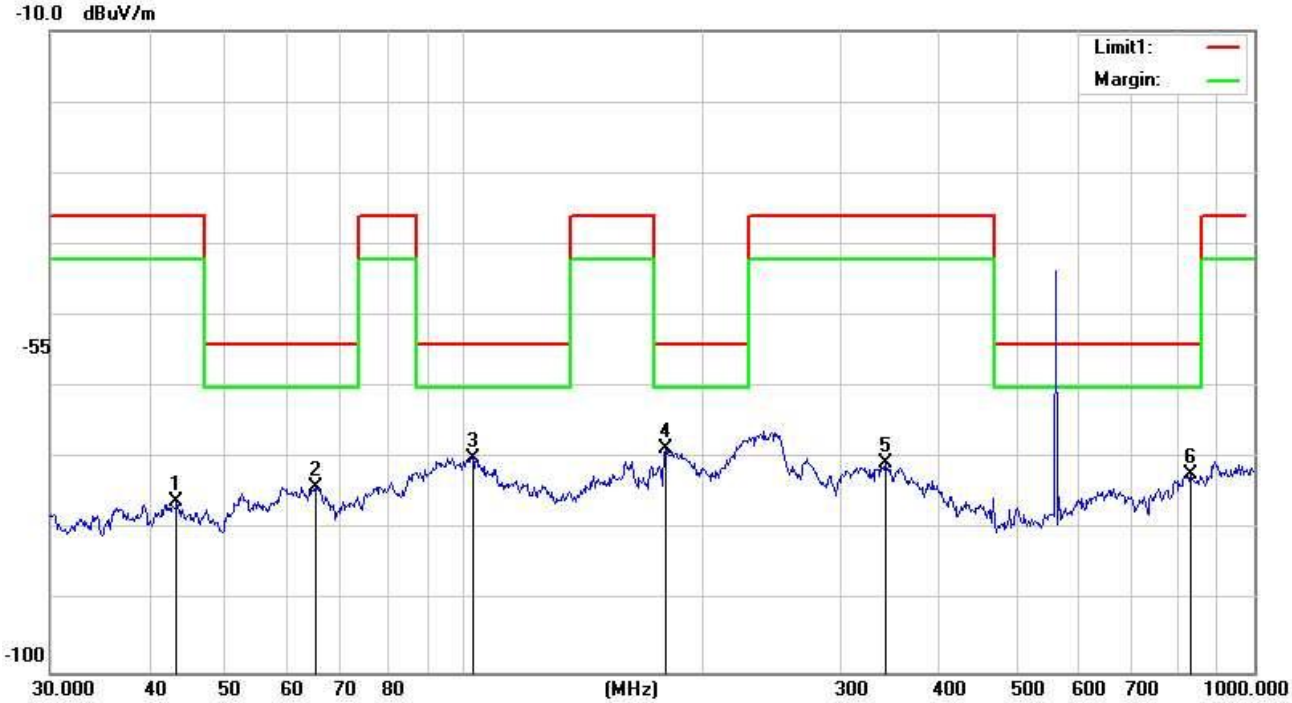
No.	Frequency (MHz)	Reading (dBm)	Correction (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	52.3913	-53.47	-16.54	-70.01	-54.00	-16.01	peak
2	88.0327	-54.34	-20.60	-74.94	-54.00	-20.94	peak
3	135.9822	-56.26	-20.95	-77.21	-54.00	-23.21	peak
4	237.4760	-60.28	-15.34	-75.62	-36.00	-39.62	peak
5	431.0316	-62.24	-11.69	-73.93	-36.00	-37.93	peak
6	965.5421	-68.79	-2.32	-71.11	-36.00	-35.11	peak

Note :

1. Result = Reading + Corrected Factor Note :

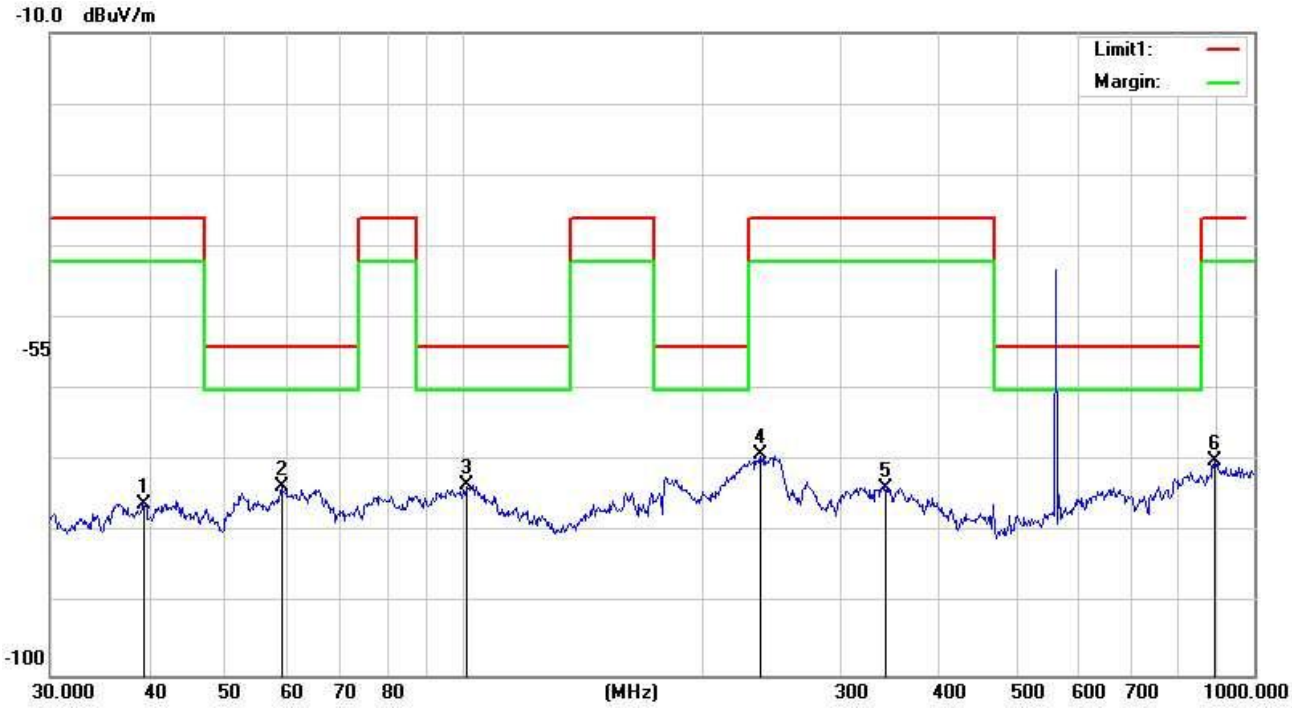
CHNNEL B –LOW CH–30MHZ-1000MHZ

Vertical



No.	Frequency (MHz)	Reading (dBm)	Correction (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	43.3534	-59.20	-16.92	-76.12	-36.00	-40.12	peak
2	65.1145	-54.58	-19.38	-73.96	-54.00	-19.96	peak
3	102.7192	-52.34	-17.58	-69.92	-54.00	-15.92	peak
4	180.0165	-49.26	-19.44	-68.70	-54.00	-14.70	peak
5	341.9786	-57.92	-12.78	-70.70	-36.00	-34.70	peak
6	830.4002	-67.88	-4.26	-72.14	-54.00	-18.14	peak

Horizontal



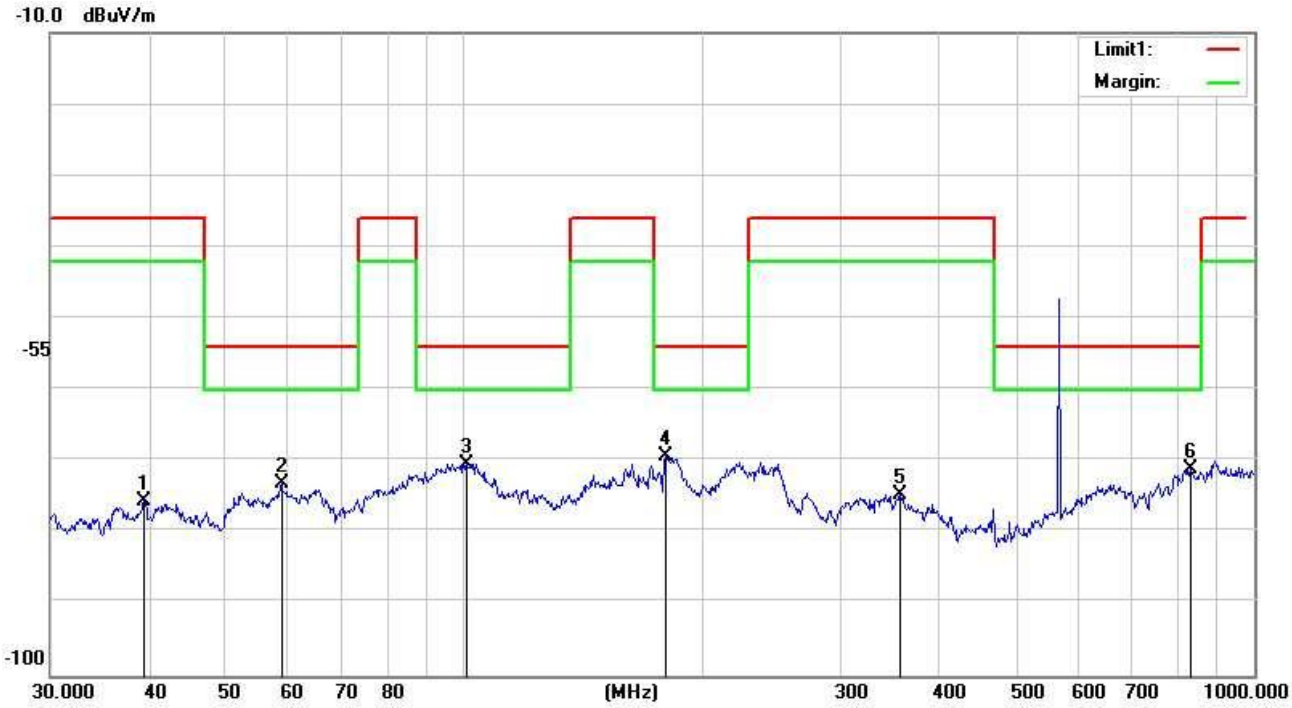
No.	Frequency (MHz)	Reading (dBm)	Correction (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	39.4371	-58.95	-17.09	-76.04	-36.00	-40.04	peak
2	58.8185	-56.68	-16.91	-73.59	-54.00	-19.59	peak
3	100.9340	-55.63	-17.78	-73.41	-54.00	-19.41	peak
4	237.4760	-53.78	-15.34	-69.12	-36.00	-33.12	peak
5	341.9786	-60.92	-12.78	-73.70	-36.00	-37.70	peak
6	890.7278	-66.47	-3.43	-69.90	-36.00	-33.90	peak

Note :

2. Result = Reading + Corrected Factor Note :

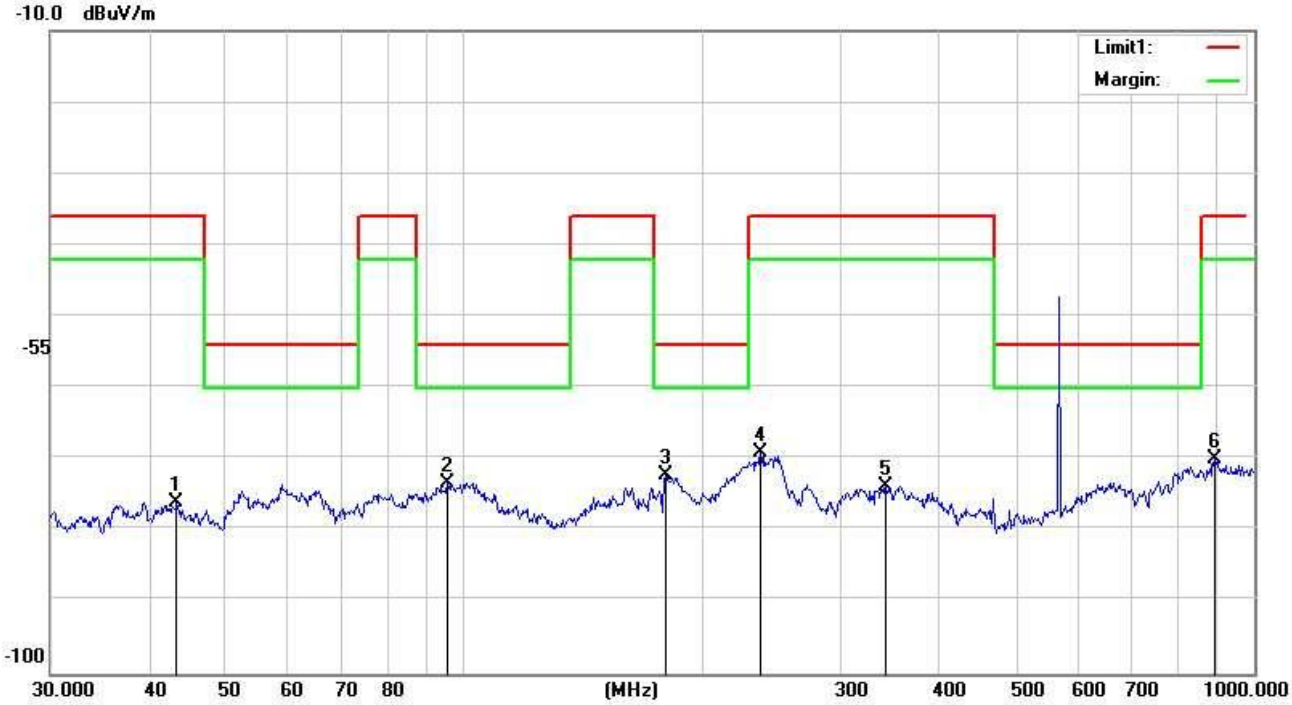
CHNNEL B –MIDDLE CH–30MHZ-1000MHZ

Vertical



No.	Frequency (MHz)	Reading (dBm)	Correction (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	39.4371	-58.45	-17.09	-75.54	-36.00	-39.54	peak
2	58.8185	-56.18	-16.91	-73.09	-54.00	-19.09	peak
3	100.9340	-52.63	-17.78	-70.41	-54.00	-16.41	peak
4	180.0165	-49.76	-19.44	-69.20	-54.00	-15.20	peak
5	356.6757	-62.14	-12.64	-74.78	-36.00	-38.78	peak
6	830.4002	-66.88	-4.26	-71.14	-54.00	-17.14	peak

Horizontal



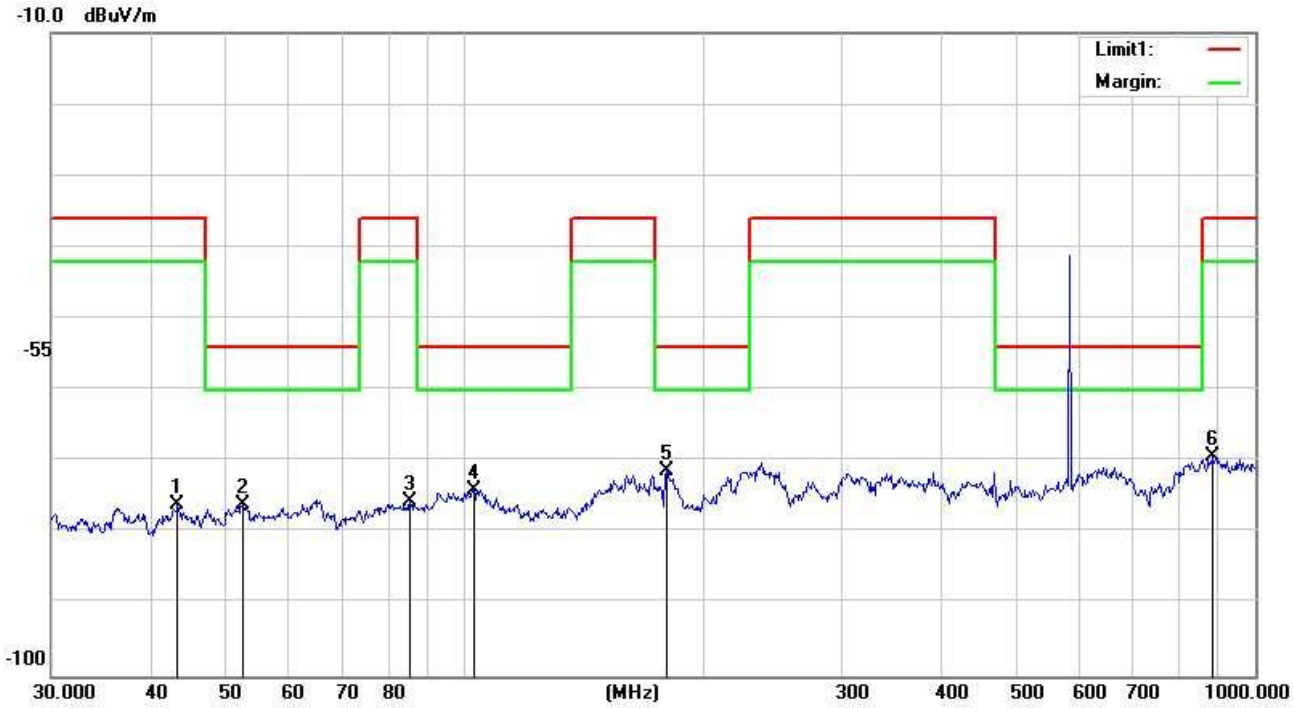
No.	Frequency (MHz)	Reading (dBm)	Correction (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	43.3534	-59.20	-16.92	-76.12	-36.00	-40.12	peak
2	95.4270	-54.32	-19.09	-73.41	-54.00	-19.41	peak
3	180.0165	-52.76	-19.44	-72.20	-54.00	-18.20	peak
4	237.4760	-53.78	-15.34	-69. 12	-36.00	-33.12	peak
5	341.9786	-60.92	-12.78	-73.70	-36.00	-37.70	peak
6	890.7278	-66.47	-3.43	-69.90	-36.00	-33.90	peak

Note :

1. Result = Reading + Corrected Factor Note :

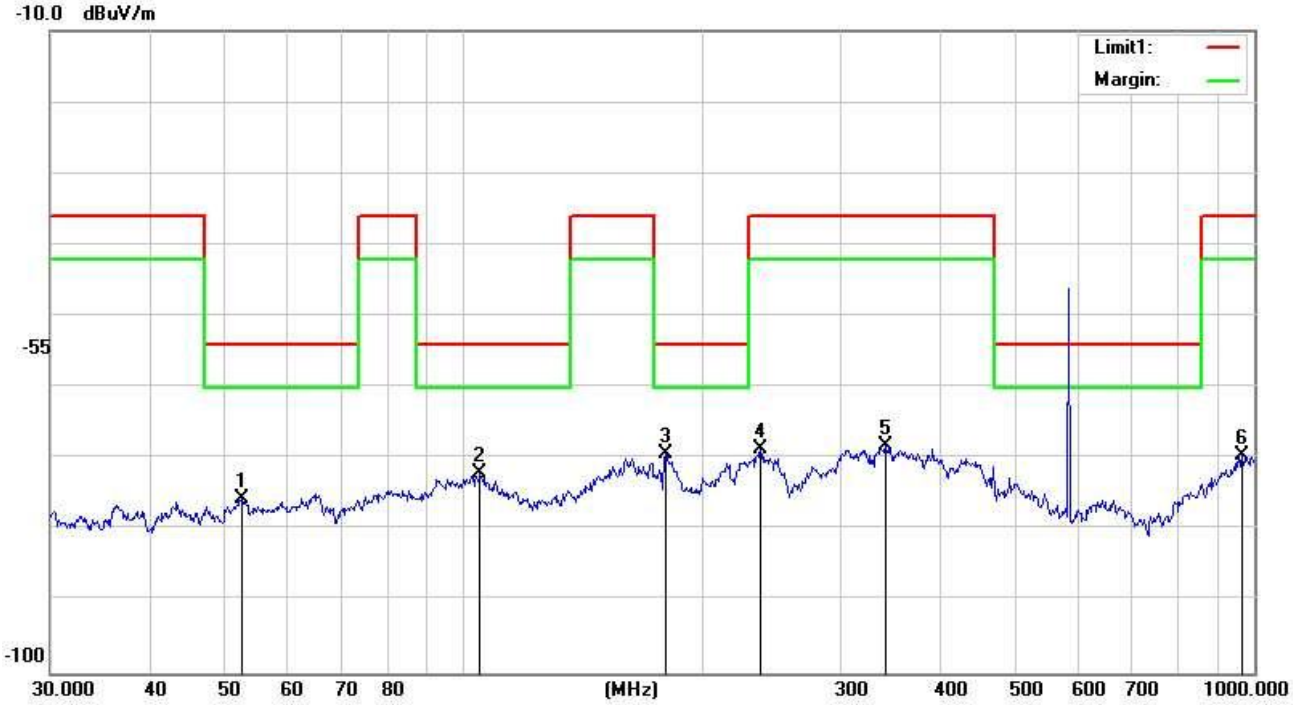
CHNNEL B –HIGH CH–30MHZ-1000MHZ

Vertical



No.	Frequency (MHz)	Reading (dBm)	Correction (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	43.1356	-59.20	-16.92	-76.12	-36.00	-40.12	peak
2	52.3912	-59.47	-16.54	-76.01	-54.00	-22.01	peak
3	85.2980	-54.53	-20.98	-75.51	-36.00	-39.51	peak
4	102.7192	-56.34	-17.58	-73.92	-54.00	-19.92	peak
5	180.0165	-51.76	-19.44	-71.20	-54.00	-17.20	peak
6	884.5027	-65.70	-3.49	-69.19	-36.00	-33.19	peak

Horizontal



No.	Frequency (MHz)	Reading (dBm)	Correction (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	52.3912	-58.97	-16.54	-75.51	-54.00	-21.51	peak
2	104.9033	-54.60	-17.34	-71.94	-54.00	-17.94	peak
3	180.0165	-49.76	-19.44	-69.20	-54.00	-15.20	peak
4	237.4760	-53.28	-15.34	-68.62	-36.00	-32.62	peak
5	341.9786	-55.42	-12.78	-68.20	-36.00	-32.20	peak
6	965.5421	-67.29	-2.32	-69.61	-36.00	-33.61	peak

Note :

1. Result = Reading + Corrected Factor Note :

CHANNEL A 1GHZ-6GHZ

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Channel Low -520.0MHz						
1040.00	-53.68	8.27	-45.41	-30	-15.41	H
1560.00	-52.11	13.73	-38.38	-30	-8.38	H
1040.00	-50.36	8.27	-42.09	-30	-12.09	V
1560.00	-49.25	13.73	-35.52	-30	-5.52	V
Channel Middle -535.0MHz						
1070.00	-51.35	9.65	-41.70	-30	-11.70	H
1605.00	-52.04	9.23	-42.81	-30	-12.81	H
1070.00	-51.26	9.65	-41.61	-30	-11.61	V
1605.00	-53.11	9.23	-43.88	-30	-13.88	V
Channel High -550.0MHz						
1100.00	-49.65	7.92	-41.73	-30	-11.73	H
1650.00	-52.36	13.97	-38.39	-30	-8.39	H
1100.00	-48.27	7.92	-40.35	-30	-10.35	V
1650.00	-49.69	13.97	-35.72	-30	-5.72	V

CHANNEL B 1GHZ-6GHZ

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Channel Low -551.5MHz						
1103.00	-53.33	8.68	-44.65	-30	-14.65	H
1654.50	-52.05	11.25	-40.80	-30	-10.80	H
1103.00	-50.16	8.68	-41.48	-30	-11.48	V
1654.50	-49.38	11.25	-38.13	-30	-8.13	V
Channel Middle -566.5MHz						
1133.00	-50.48	8.02	-42.46	-30	-12.46	H
1699.50	-51.29	11.69	-39.60	-30	-9.60	H
1133.00	-49.36	8.02	-41.34	-30	-11.34	V
1699.50	-49.24	11.69	-37.55	-30	-7.55	V
Channel High -580.0MHz						
1600.00	-53.48	9.05	-44.43	-30	-14.43	H
1740.50	-52.14	10.37	-41.77	-30	-11.77	H
1600.00	-53.07	9.05	-44.02	-30	-14.02	V
1740.50	-51.27	10.37	-40.90	-30	-10.90	V

7.CONDUCTED EMISSION MEASUREMENT

7.1 LIMIT

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a) limit in the table below has to be followed.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:
(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

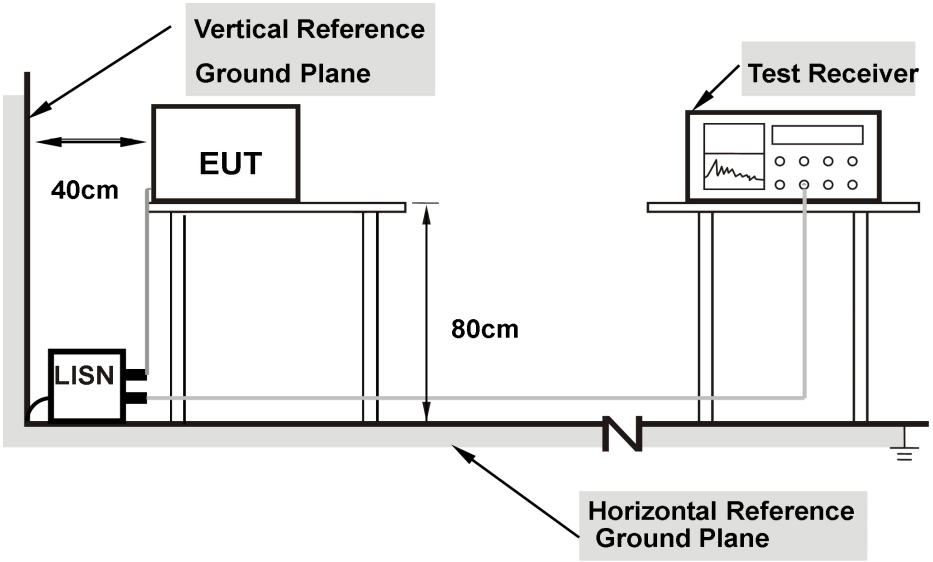
7.2 TEST PROCEDURE

The following table is the setting of the receiver

Receiver Parameters	**Setting**
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

7.3 TEST SETUP



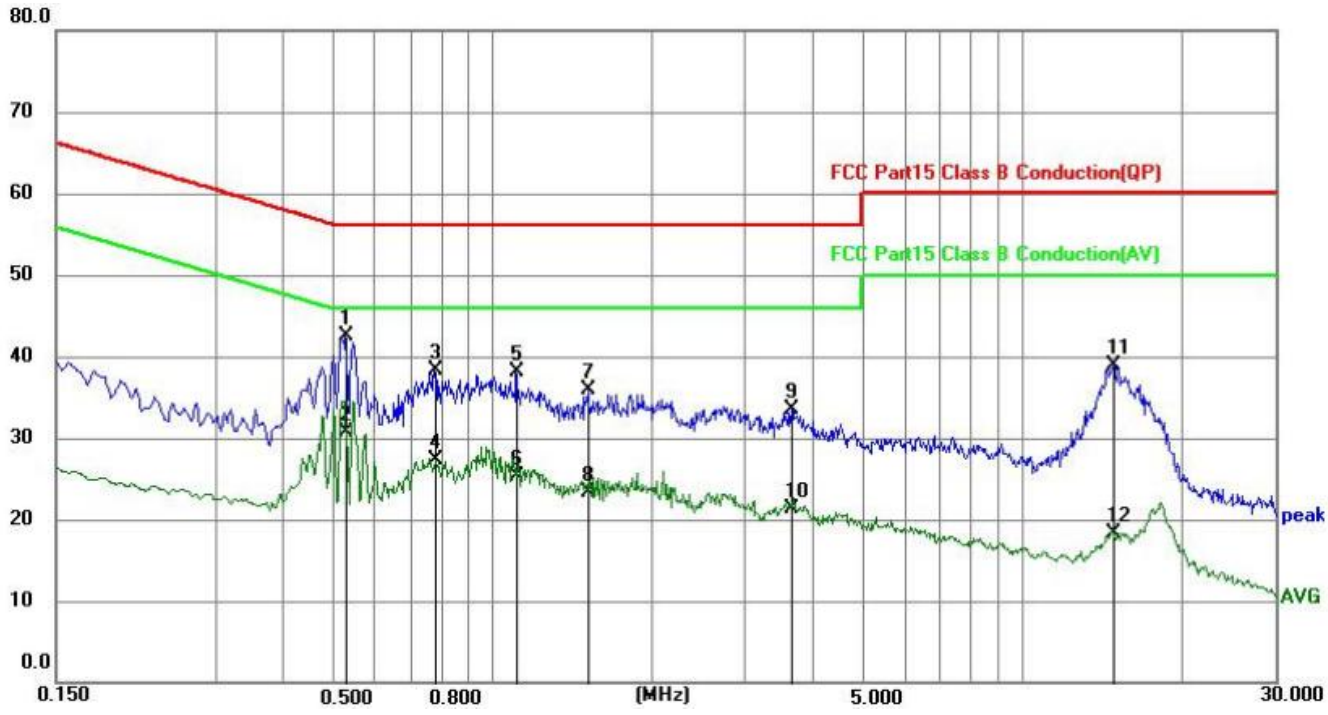
Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

7.4 TEST RESULTS

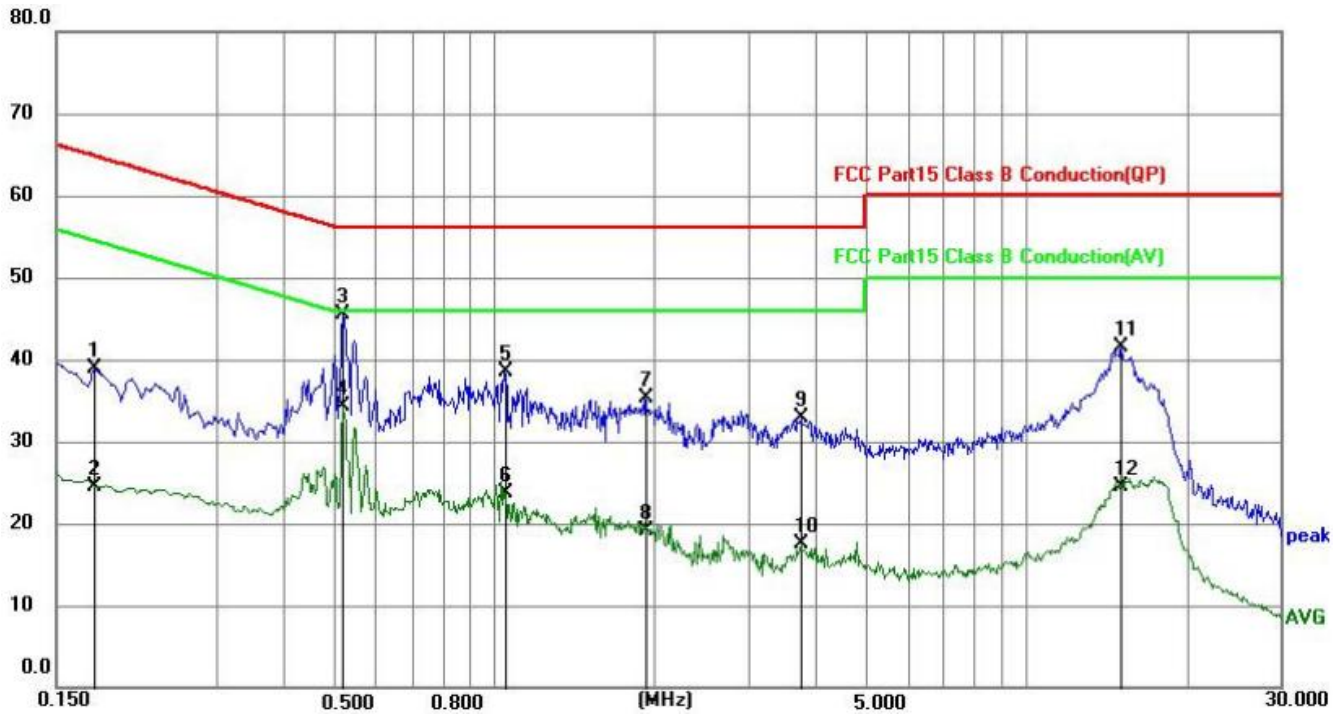
Temperature:	25℃	Relative Humidity:	50%
Test Mode:	GFSK	Test Voltage:	DC 12V By adapter
Phase:	L	Result:	Pass

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.5280	32.56	9.87	42.43	56.00	13.57	QP
2	0.5280	20.86	9.87	30.73	46.00	15.27	AVG
3	0.7755	28.47	9.89	38.36	56.00	17.64	QP
4	0.7755	17.33	9.89	27.22	46.00	18.78	AVG
5	1.1085	28.17	9.92	38.09	56.00	17.91	QP
6	1.1085	15.35	9.92	25.27	46.00	20.73	AVG
7	1.5135	25.93	9.93	35.86	56.00	20.14	QP
8	1.5135	13.30	9.93	23.23	46.00	22.77	AVG
9	3.6735	23.52	9.95	33.47	56.00	22.53	QP
10	3.6735	11.45	9.95	21.40	46.00	24.60	AVG
11	14.8290	28.73	10.12	38.85	60.00	21.15	QP
12	14.8290	8.14	10.12	18.26	50.00	31.74	AVG



Temperature:	25℃	Relative Humidity:	50%
Test Mode:	GFSK	Test Voltage:	DC 12V By adapter
Phase:	N	Result:	Pass

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1770	29.09	9.78	38.87	64.63	25.76	QP
2	0.1770	14.67	9.78	24.45	54.63	30.18	AVG
3	0.5190	35.65	9.87	45.52	56.00	10.48	QP
4	0.5190	24.48	9.87	34.35	46.00	11.65	AVG
5	1.0455	28.59	9.92	38.51	56.00	17.49	QP
6	1.0455	13.71	9.92	23.63	46.00	22.37	AVG
7	1.9185	25.34	9.93	35.27	56.00	20.73	QP
8	1.9185	9.17	9.93	19.10	46.00	26.90	AVG
9	3.7725	22.86	9.98	32.84	56.00	23.16	QP
10	3.7725	7.58	9.98	17.56	46.00	28.44	AVG
11	15.1260	31.30	10.20	41.50	60.00	18.50	QP
12	15.1260	14.28	10.20	24.48	50.00	25.52	AVG



Remark:All readings are Quasi-Peak and Average values.

8. FREQUENCY STABILITY

8.1 LIMIT

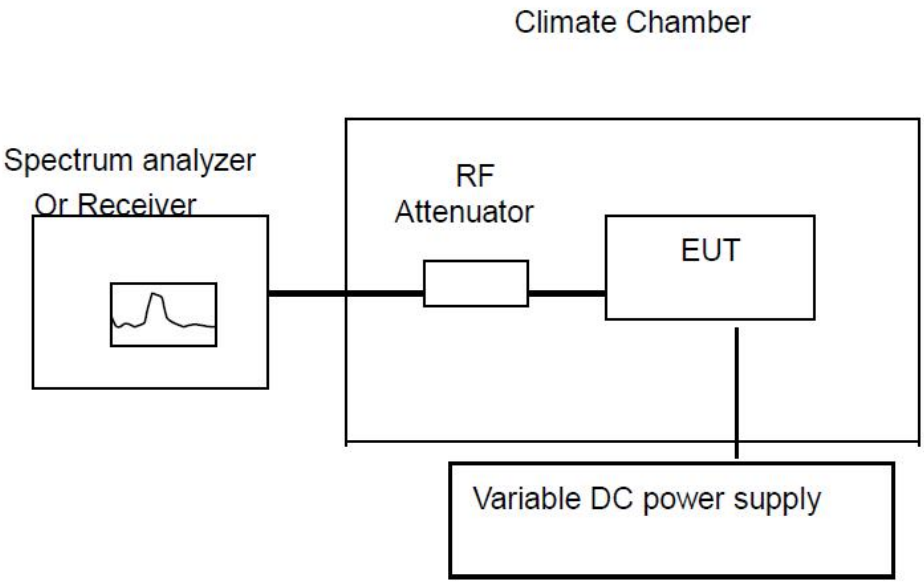
The frequency tolerance of the carrier signal shall be maintained within ±0.005% of the operating frequency over a temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C

8.2 TEST PROCEDURE

a. The EUT was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. The DC leads and the RF output cable, exited the chamber through an opening made for that purpose.
After the temperature stabilized the frequency output was recorded form the counter. An external variable DC power supply was connected to the battery terminals of the equipment under test.

b. For hand carried, battery powered equipment primary supply voltage was reduced to the battery operating end point as specified by the manufacturer. The output frequency was recorded for each battery voltage.

8.3 TEST SETUP



8.4 TEST RESULTS

(1) Frequency stability versus input voltage (Supply Nominal voltage is DC 3V)

(2) Frequency stability versus input voltage (Supply battery operating end point which shall be specified by the manufacturer DC 2.55V)

Refernce Frequency: 520.0MHz			
Power supply	Environment Temperature(℃)	Frequency Error （Hz）	Frequency Error (ppm)
DC 2.55V	20	611	1.175
DC 3V	20	610	1.173
DC 3.45V	20	611	1.175

Refernce Frequency: 520.0MHz				
Frequency Deviation measured with time Elapse(30 minutes)				
Environment Temperature(℃)	Frequency Error （Hz）	Frequency Error (ppm)	Limit (ppm)	Results
50	611	1.175	50	Pass
40	590	1.135		
30	589	1.133		
20	598	1.150		
10	601	1.156		
0	602	1.158		
-10	605	1.163		
-20	609	1.171		

Refernce Frequency: 535.0MHz			
Power supply	Environment Temperature(℃)	Frequency Error （Hz）	Frequency Error (ppm)
DC 2.55V	20	630	1.178
DC 3V	20	633	1.183
DC 3.45V	20	632	1.181

Refernce Frequency: 535.0MHz				
Frequency Deviation measured with time Elapse(30 minutes)				
Environment Temperature(℃)	Frequency Error （Hz）	Frequency Error (ppm)	Limit (ppm)	Results
50	631	1.179	50	Pass
40	611	1.142		
30	616	1.151		
20	625	1.168		
10	630	1.178		
0	628	1.174		
-10	629	1.176		
-20	619	1.157		

Refernce Frequency: 550.0MHz			
Power supply	Environment Temperature(℃)	Frequency Error （Hz）	Frequency Error (ppm)
DC 2.55V	20	648	1.178
DC 3V	20	649	1.180
DC 3.45V	20	646	1.175

Refernce Frequency: 550.0MHz				
Frequency Deviation measured with time Elapse(30 minutes)				
Environment Temperature(℃)	Frequency Error （Hz）	Frequency Error (ppm)	Limit (ppm)	Results
50	623	1.133	50	Pass
40	616	1.120		
30	605	1.110		
20	611	1.111		
10	635	1.155		
0	638	1.160		
-10	624	1.135		
-20	629	1.144		

Refernce Frequency: 551.5MHz			
Power supply	Environment Temperature(℃)	Frequency Error （Hz）	Frequency Error (ppm)
DC 2.55V	20	3324	6.027
DC 3V	20	3344	6.063
DC 3.45V	20	3335	6.047

Refernce Frequency: 551.5MHz				
Frequency Deviation measured with time Elapse(30 minutes)				
Environment Temperature(℃)	Frequency Error （Hz）	Frequency Error (ppm)	Limit (ppm)	Results
50	3333	6.044	50	Pass
40	3315	6.011		
30	3326	6.031		
20	3339	6.054		
10	3324	6.027		
0	3318	6.016		
-10	3305	5.993		
-20	3324	6.027		

Refernce Frequency: 566.5MHz			
Power supply	Environment Temperature(℃)	Frequency Error （Hz）	Frequency Error (ppm)
DC 2.55V	20	3387	5.979
DC 3V	20	3391	5.986
DC 3.45V	20	3388	5.981

Refernce Frequency: 566.5MHz				
Frequency Deviation measured with time Elapse(30 minutes)				
Environment Temperature(℃)	Frequency Error （Hz）	Frequency Error (ppm)	Limit (ppm)	Results
50	3381	5.968	50	Pass
40	3383	5.972		
30	3376	5.959		
20	3379	5.965		
10	3381	5.968		
0	3380	5.966		
-10	3371	5.951		
-20	3369	5.947		

Refernce Frequency: 580.0MHz			
Power supply	Environment Temperature(℃)	Frequency Error （Hz）	Frequency Error (ppm)
DC 2.55V	20	3122	5.383
DC 3V	20	3127	5.391
DC 3.45V	20	3124	5.386

Refernce Frequency: 580.0MHz				
Frequency Deviation measured with time Elapse(30 minutes)				
Environment Temperature(℃)	Frequency Error （Hz）	Frequency Error (ppm)	Limit (ppm)	Results
50	3112	5.366	50	Pass
40	3116	5.372		
30	3118	5.376		
20	3109	5.360		
10	3123	5.384		
0	3105	5.353		
-10	3119	5.378		
-20	3117	5.374		

※※※※※END OF THE REPORT※※※※※