



**FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8
CERTIFICATION TEST REPORT**

FOR

solo2 wireless

MODEL NUMBER: B0534

FCC ID: BCG-B0534

IC: 579C-B0534

REPORT NUMBER: 14U18945-E1, Revision B

ISSUE DATE: NOVEMBER 06, 2014

Prepared for
**APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.**

Prepared by
**UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888**



NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/31/2014	Initial Issue	M. Mekuria
A	11/03/2014	Correct above 18GHz limit & add AC line emission data	M. Mekuria
B	11/06/2014	Add Reference information on the conducted spurious plots	M. Mekuria

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	5
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION	6
4. CALIBRATION AND UNCERTAINTY	6
4.1. MEASURING INSTRUMENT CALIBRATION	6
4.2. SAMPLE CALCULATION	6
4.3. MEASUREMENT UNCERTAINTY.....	7
5. EQUIPMENT UNDER TEST	8
5.1. DESCRIPTION OF EUT	8
5.2. MAXIMUM OUTPUT POWER.....	8
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	8
5.4. SOFTWARE AND FIRMWARE.....	8
5.5. WORST-CASE CONFIGURATION AND MODE.....	8
5.6. DESCRIPTION OF TEST SETUP.....	9
6. TEST AND MEASUREMENT EQUIPMENT	14
7. ON TIME AND DUTY CYCLE.....	15
7.1. ON TIME AND DUTY CYCLE RESULTS.....	15
7.2. DUTY CYCLE PLOTS	16
8. ANTENNA PORT TEST RESULTS.....	18
8.1. BASIC DATA RATE GFSK MODULATION.....	18
8.1.1. 20 dB AND 99% BANDWIDTH	18
8.1.2. HOPPING FREQUENCY SEPARATION	21
8.1.3. NUMBER OF HOPPING CHANNELS.....	23
8.1.4. AVERAGE TIME OF OCCUPANCY	26
8.1.5. OUTPUT POWER	30
8.1.6. AVERAGE POWER	33
8.1.7. CONDUCTED SPURIOUS EMISSIONS.....	34
8.2. ENHANCED DATA RATE QPSK MODULATION.....	39
8.2.1. OUTPUT POWER	39
8.2.2. AVERAGE POWER.....	42
8.3. ENHANCED DATA RATE 8PSK MODULATION	43
8.3.1. 20 dB AND 99% BANDWIDTH	43
8.3.2. HOPPING FREQUENCY SEPARATION	46
8.3.3. NUMBER OF HOPPING CHANNELS.....	48
8.3.4. AVERAGE TIME OF OCCUPANCY	51
8.3.5. OUTPUT POWER	55
8.3.6. AVERAGE POWER	58

8.3.7.	CONDUCTED SPURIOUS EMISSIONS.....	59
9.	RADIATED TEST RESULTS.....	64
9.1.	LIMITS.....	64
9.2.	TRANSMITTER ABOVE 1 GHz.....	65
9.2.1.	BASIC DATA RATE GFSK MODULATION.....	65
9.2.2.	ENHANCED DATA RATE QPSK MODULATION	75
9.2.3.	ENHANCED DATA RATE 8PSK MODULATION	85
9.3.	WORST-CASE BELOW 1 GHz.....	95
9.4.	WORST-CASE ABOVE 18 GHz	101
10.	AC POWER LINE CONDUCTED EMISSIONS	102
11.	SETUP PHOTOS	106

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: solo2 wireless

MODEL: B0534

SERIAL NUMBER: FL6NJ01AG8PT (CONDUCTED) & FL6NK0ALG8PP (RADIATED)

DATE TESTED: OCTOBER 16 – NOVEMBER 03, 2014

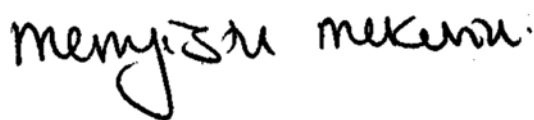
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Verification Services Inc. By:

Tested By:



Mengistu Mekuria
Senior Engineer
UL Verification Services Inc.



Tom Chen
Test Engineer
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☐ Chamber A	☒ Chamber D
☒ Chamber B	☒ Chamber E
☐ Chamber C	☐ Chamber F
	☐ Chamber G
	☒ Chamber H

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned}\text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m}\end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.52 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.94 dB
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Solo2 wireless headset with Bluetooth and BLE radios.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	4.46	2.79
2402 - 2480	Enhanced QPSK	4.93	3.11
2402 - 2480	Enhanced 8PSK	5.28	3.37

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an Monopole Antenna with a maximum gain of 1.5 dBi.

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was CSR BlueTest3, Ver. 2.5.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission, 30-1000MHz and 18-26GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

All testing was performed with the EUT in normal use orientation as described by the manufacturer.

Worst-case packet types during test were:

GFSK mode: DH5
QPSK mode: 2-DH5
8PSK mode: 3-DH5

5.6. DESCRIPTION OF TEST SETUP

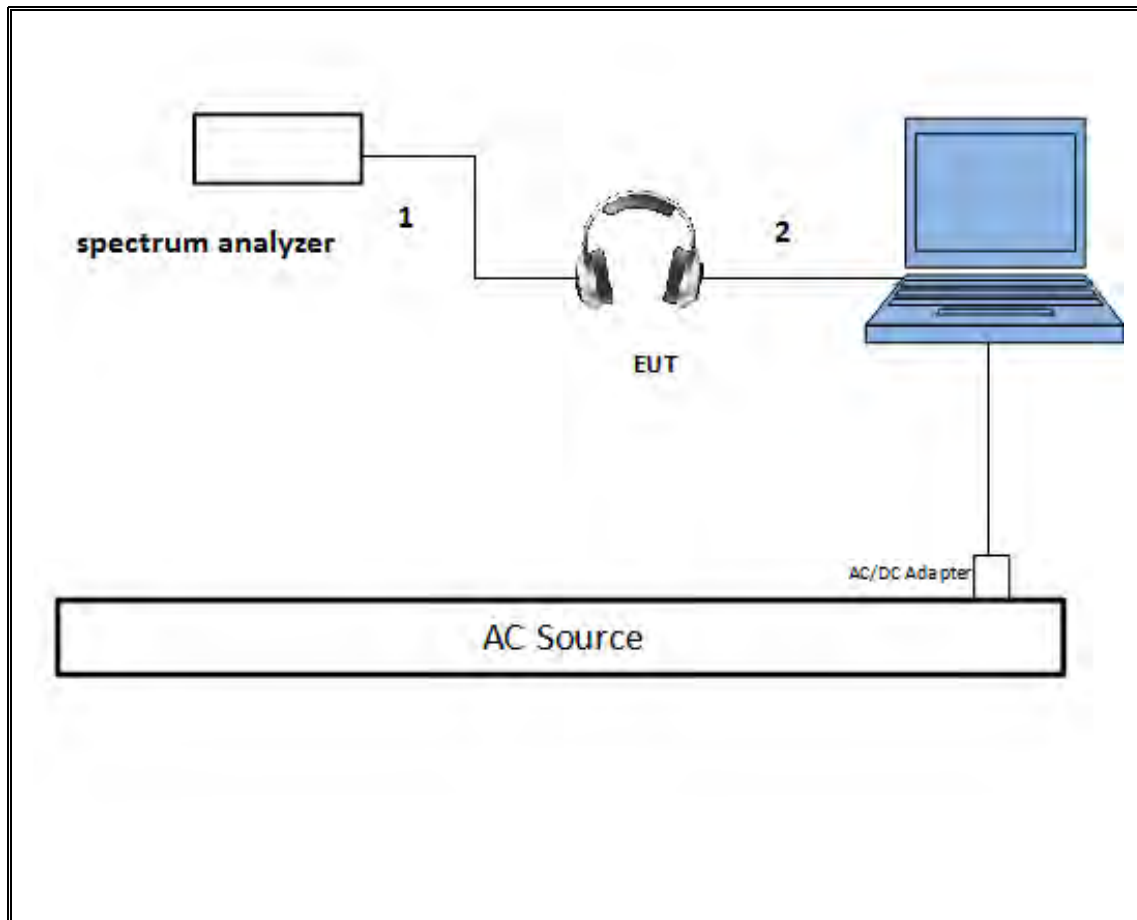
SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC/ DC Adapter	Apple Inc.	A1540	C4H433700AZFPWW1E	N/A
Laptop PC	Apple Inc.	MacBook Pro	N/A	N/A
Rechargeable Power Bank	Anker	3000	05D141	Doc
AC/ DC Adapter	Apple Inc.	A1385	D293062E3ZDDHLHCR	N/A

I/O CABLES

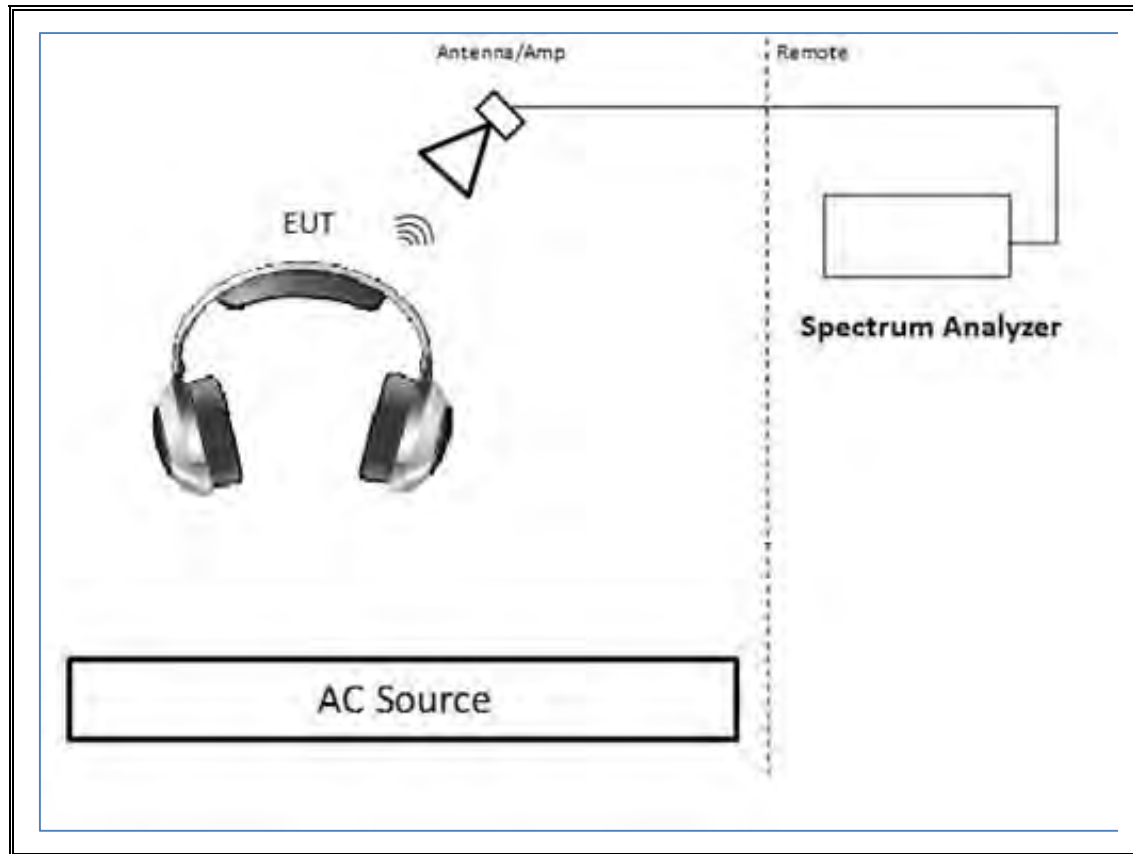
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Antenna	1	SMA	Un-Shielded	0.2	To Spectrum Analyzer
2	USB	1	USB	Shielded	0.5	PC to EUT
3	USB	1	USB	Shielded	0.2	N/A
4	USB	1	USB	Shielded	1.0	N/A

ANTENNA PORT TEST SETUP

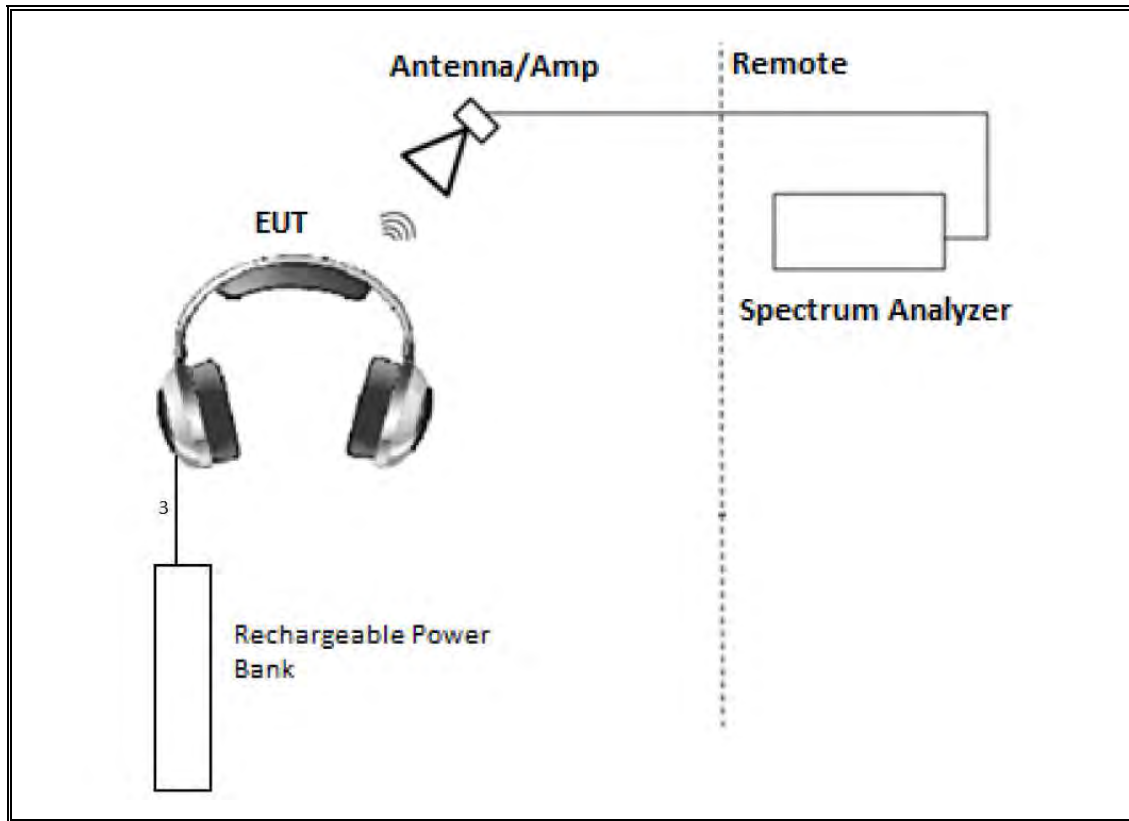


RADIATED TEST SETUP

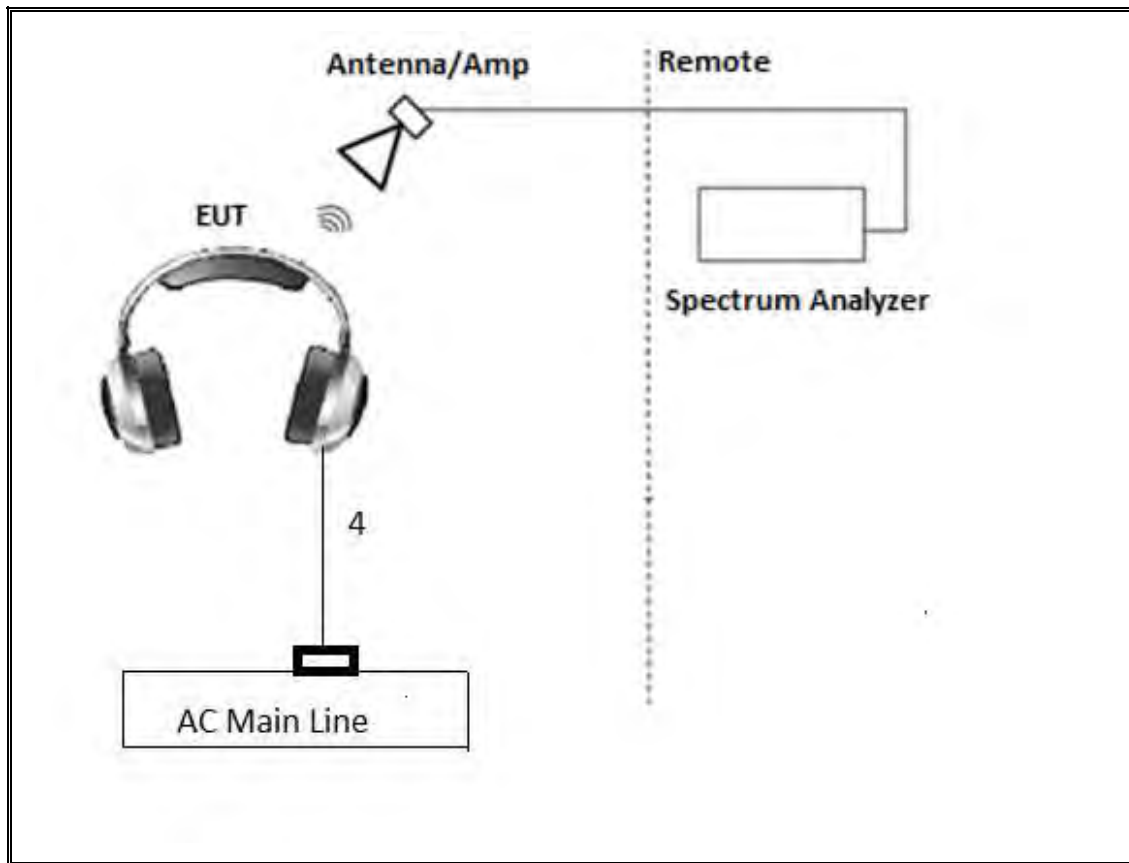
EUT ALONE



EUT POWRED VIA RECHARGEABLE POWER BAND VIA USB CABLE



EUT POWRED VIA AC/DC ADAPTER VIA USB CABLE



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	Manufacturer	Model	T Number	Cal Due
PXA Signal Analyzer	Agilent	N9030A	T342	06/25/15
Power Meter	Agilent	N1911A	T382	04/09/15
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T344	02/18/15
Antenna, Hybrid 30MHz to 2GHz	Sunol Sciences	JB3	T407	05/05/15
Amplifier, 10KHz to 1GHz	Sonoma	310N	T286	04/23/15
Amplifier, 1 to 18GHz	Miteq	AFS42-00101	T740	01/11/15
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T346	02/25/15
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	T408	03/28/15
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	T741	02/07/15
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	T285	05/28/15
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	T459	05/02/15
Amplifier, 1 to 26.5 Ghz	Agilent	8449B	T404	03/25/15
Antenna Horn 18 to 26.5 Ghz	ARA	MWH-1826/B	T89	11/26/14
Spectrum Analyzer	Agilent	8564E	T106	08/06/15
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T863	04/14/15
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	T495	06/05/15
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	T900	05/14/15
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB1	T243	03/04/15
Amplifier, 10KHz to 1GHz, 32dB	Agilent	8447D	T10	04/28/15
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	T907	05/07/15
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	T284	09/16/15
LISN, 30 MHz	FCC	LISN-50/250-25-2	T24	01/17/15

7. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

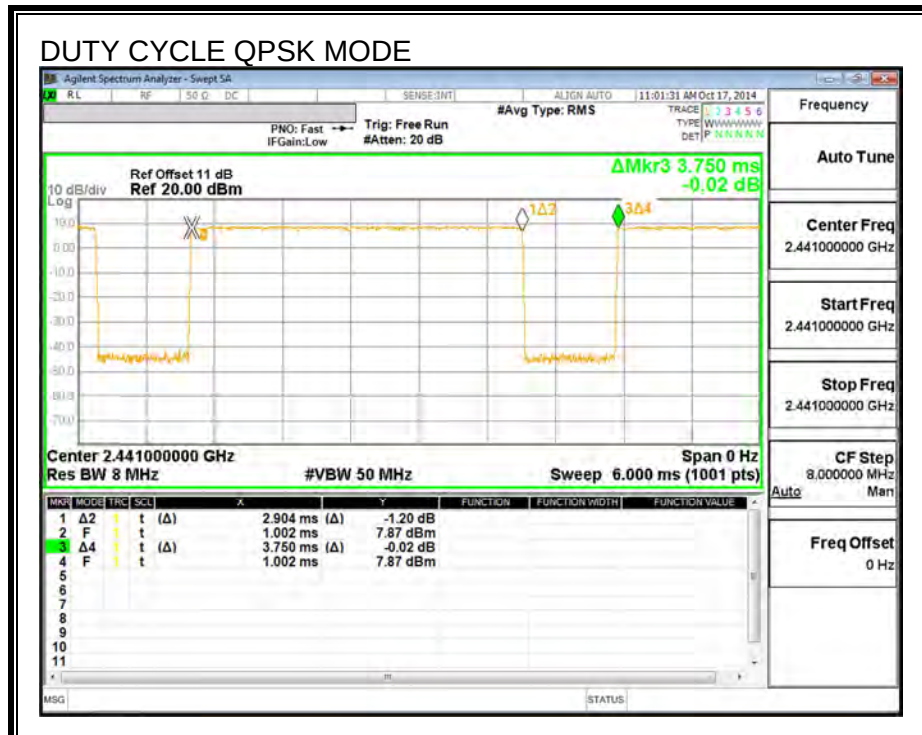
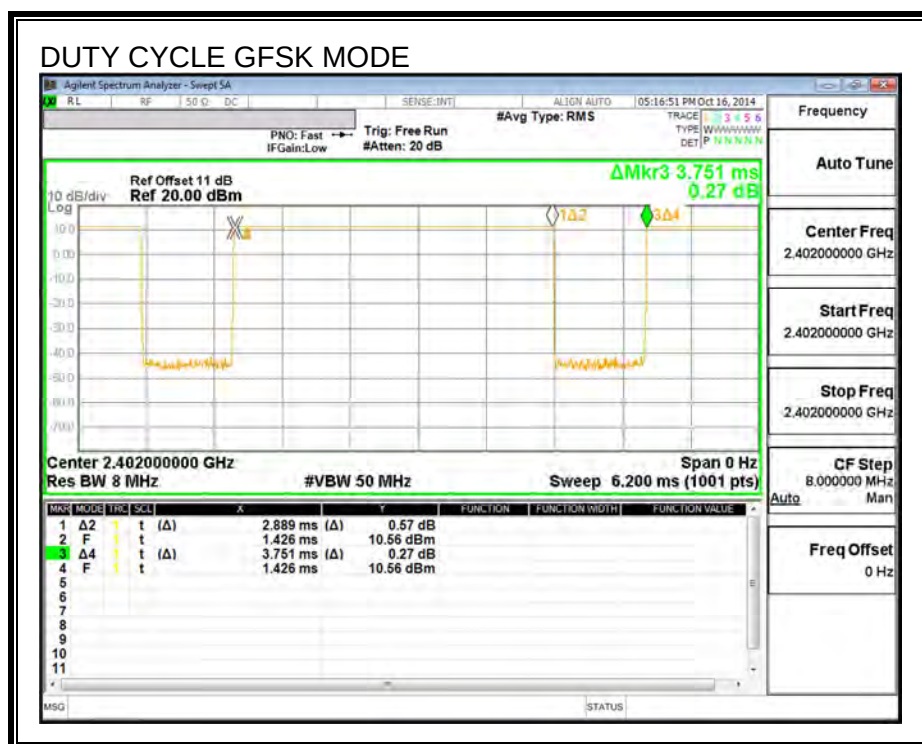
PROCEDURE

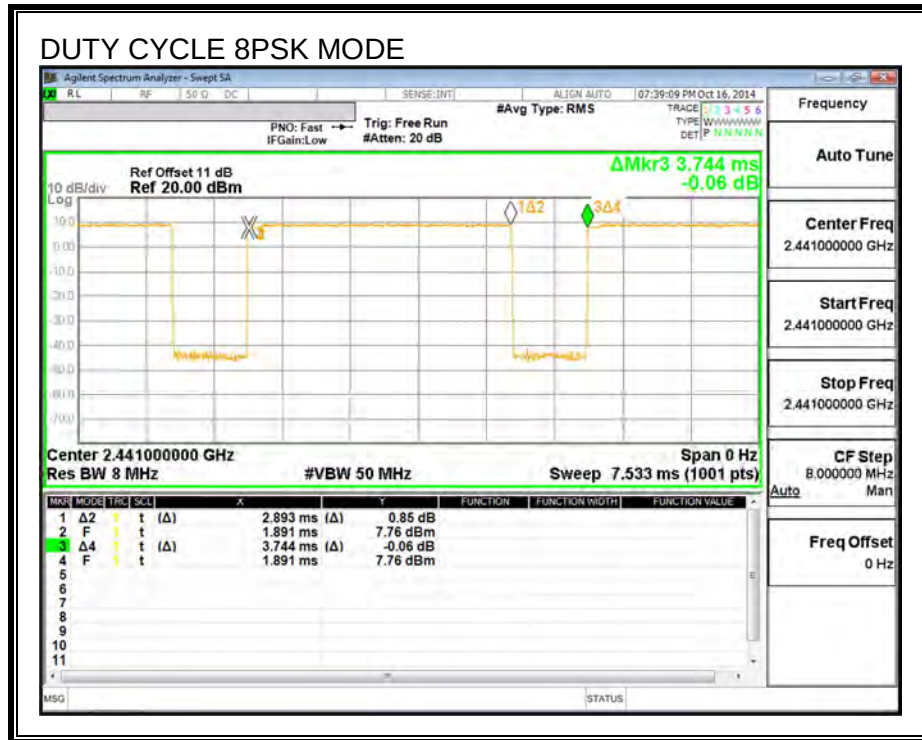
KDB 789033 Zero-Span Spectrum Analyzer Method.

7.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4 GHz band (Hopping OFF)						
Bluetooth GFSK	2.889	3.751	0.770	77.02%	1.13	0.346
Bluetooth QPSK	2.904	3.760	0.772	77.23%	1.12	0.344
Bluetooth 8PSK	2.893	3.744	0.773	77.27%	1.12	0.346

7.2. DUTY CYCLE PLOTS





8. ANTENNA PORT TEST RESULTS

8.1. BASIC DATA RATE GFSK MODULATION

8.1.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

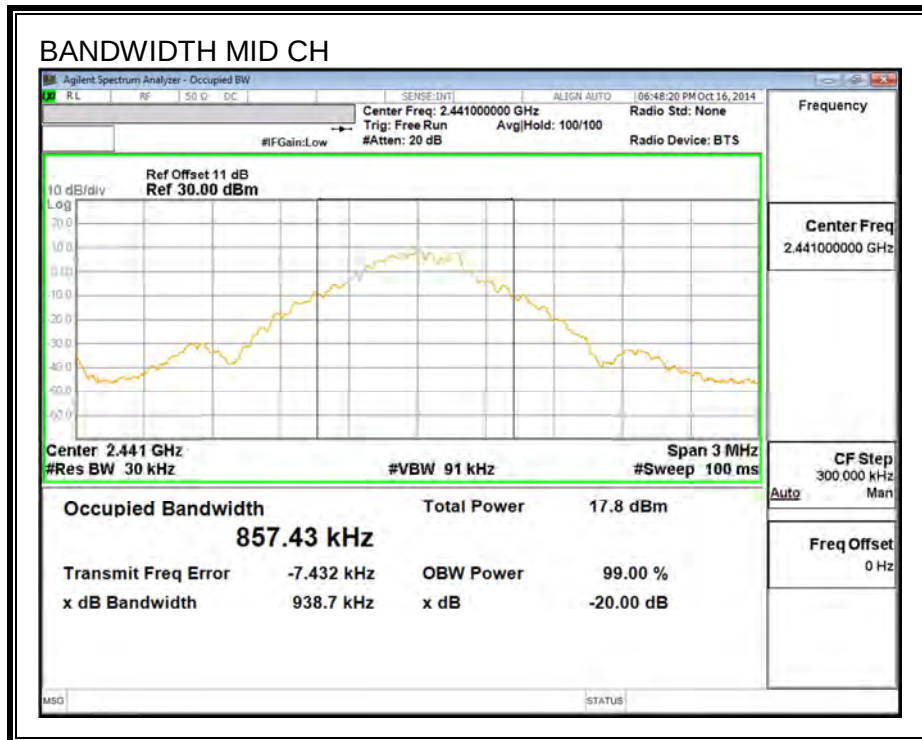
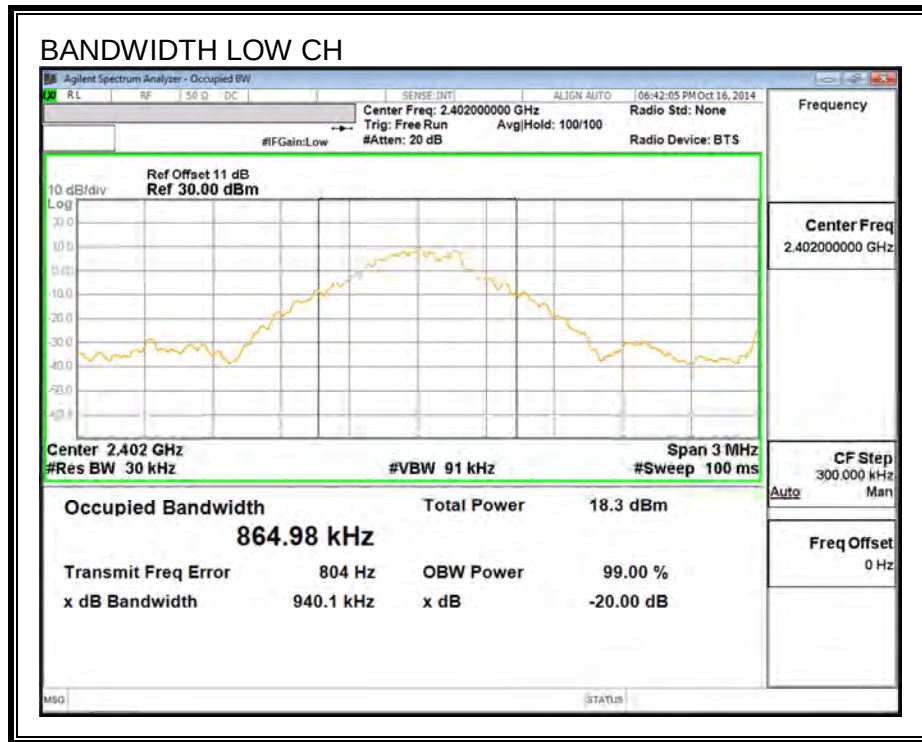
TEST PROCEDURE

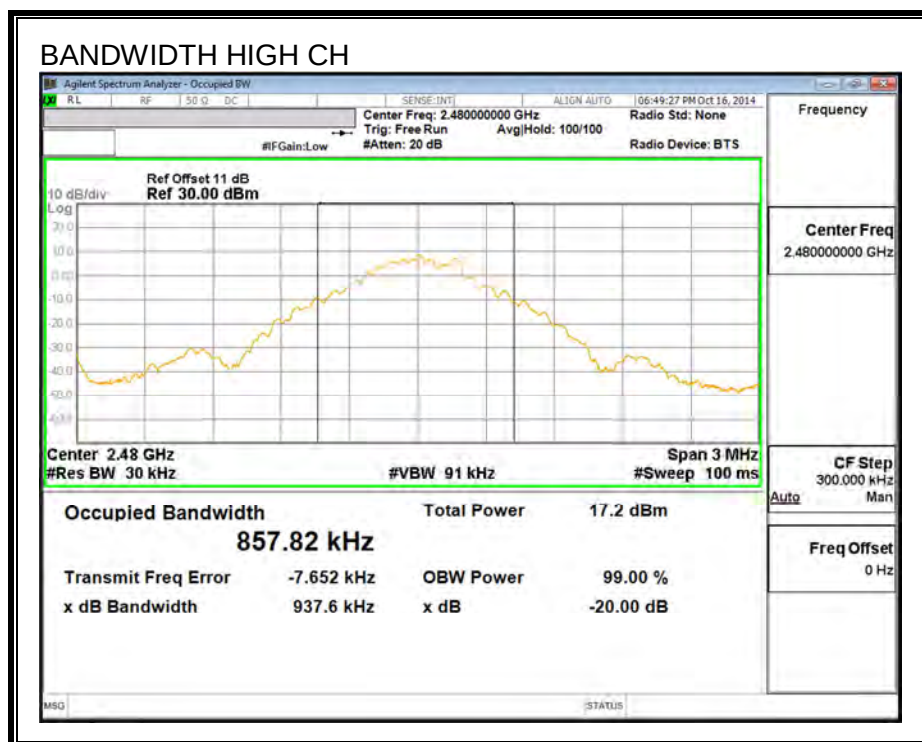
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to $\geq$ RBW. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	940.1	864.98
Middle	2441	938.7	857.43
High	2480	937.6	857.82

20 dB AND 99% BANDWIDTH





8.1.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

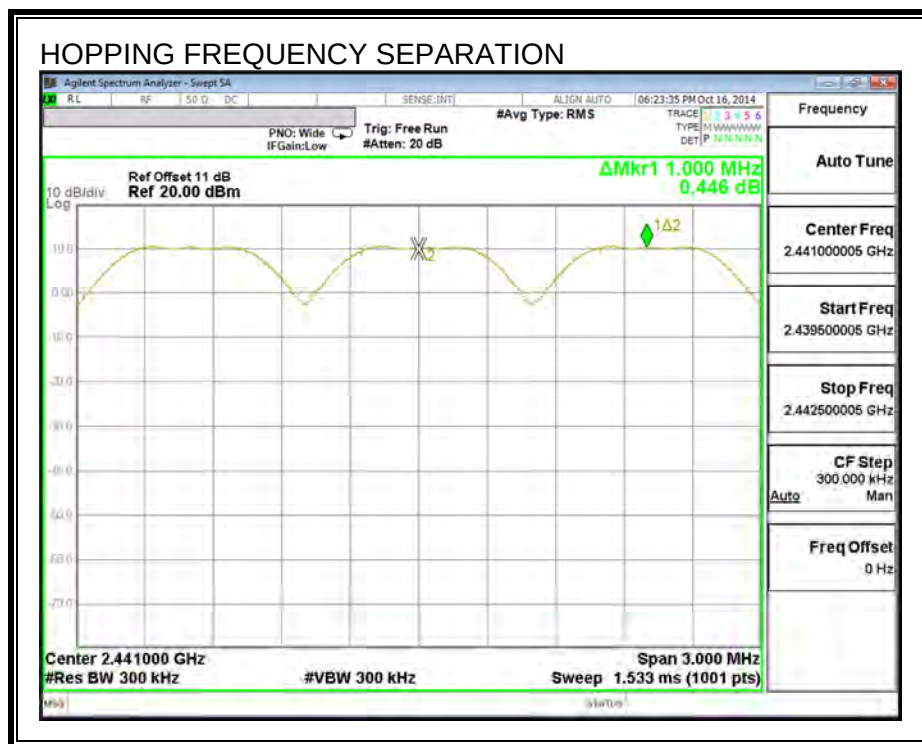
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to => RBW. The sweep time is coupled.

RESULTS

HOPPING FREQUENCY SEPARATION



8.1.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

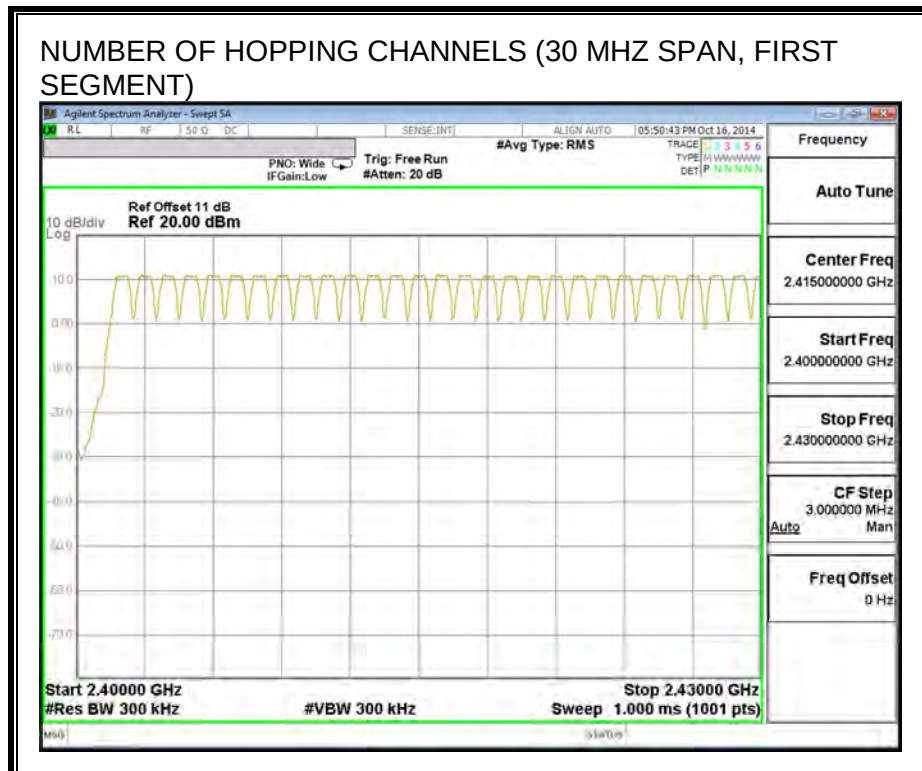
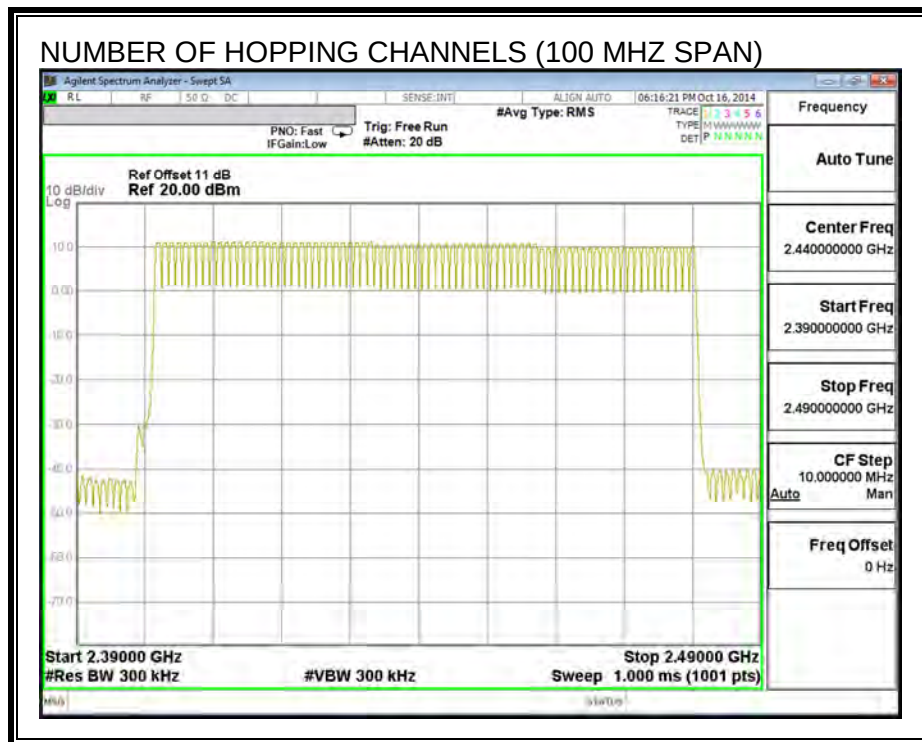
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

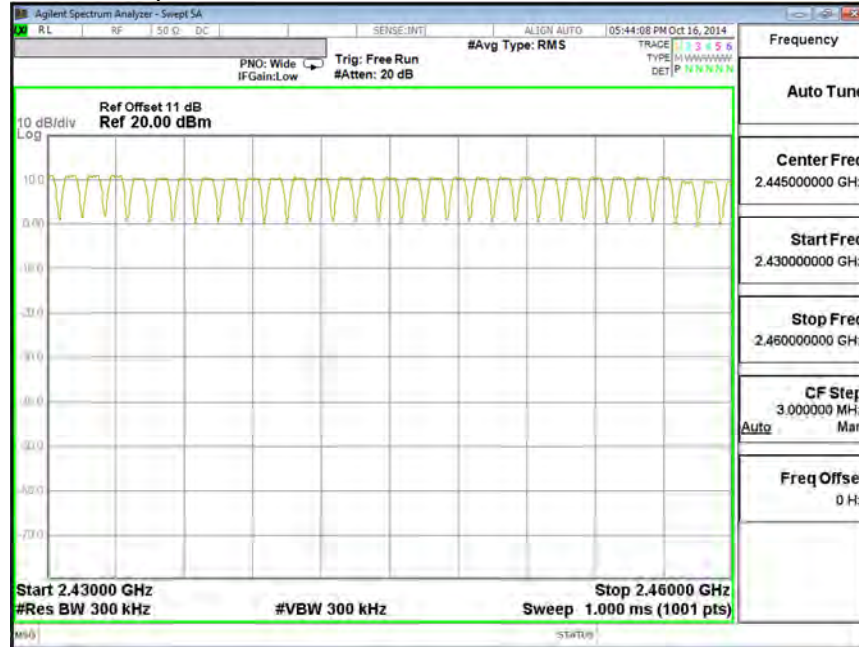
RESULTS

Normal Mode: 79 Channels observed.

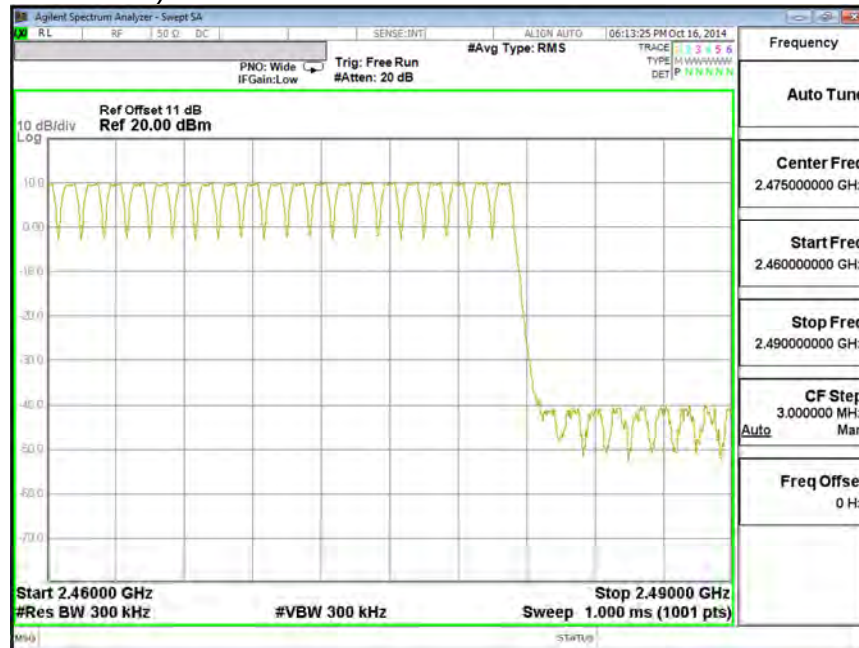
NUMBER OF HOPPING CHANNELS



NUMBER OF HOPPING CHANNELS (30 MHz SPAN, SECOND SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHz SPAN, THIRD SEGMENT)



8.1.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

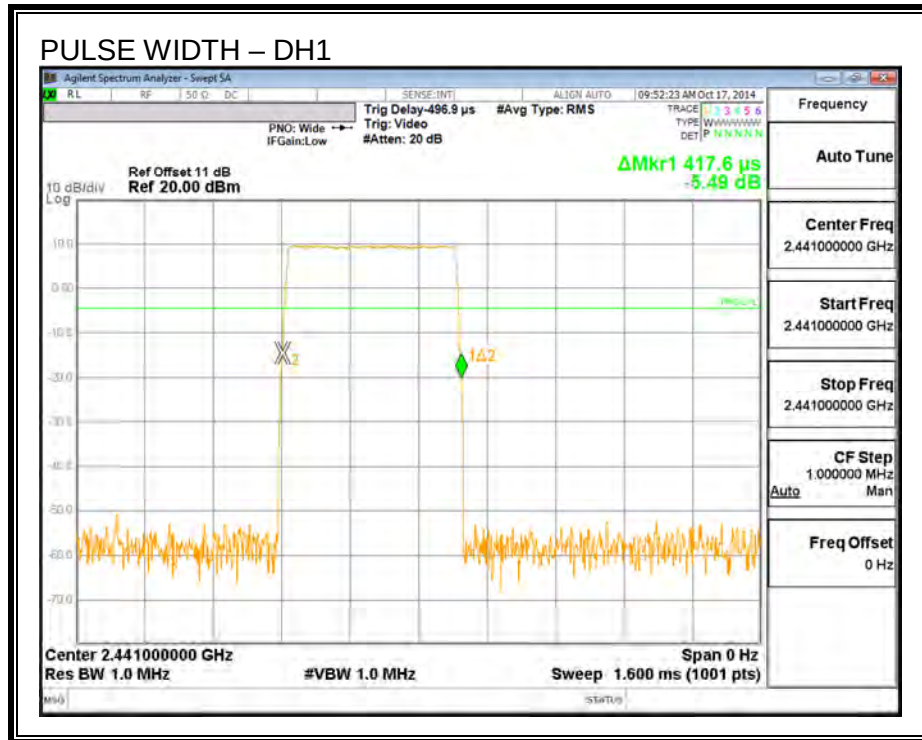
The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{pulse width}$.

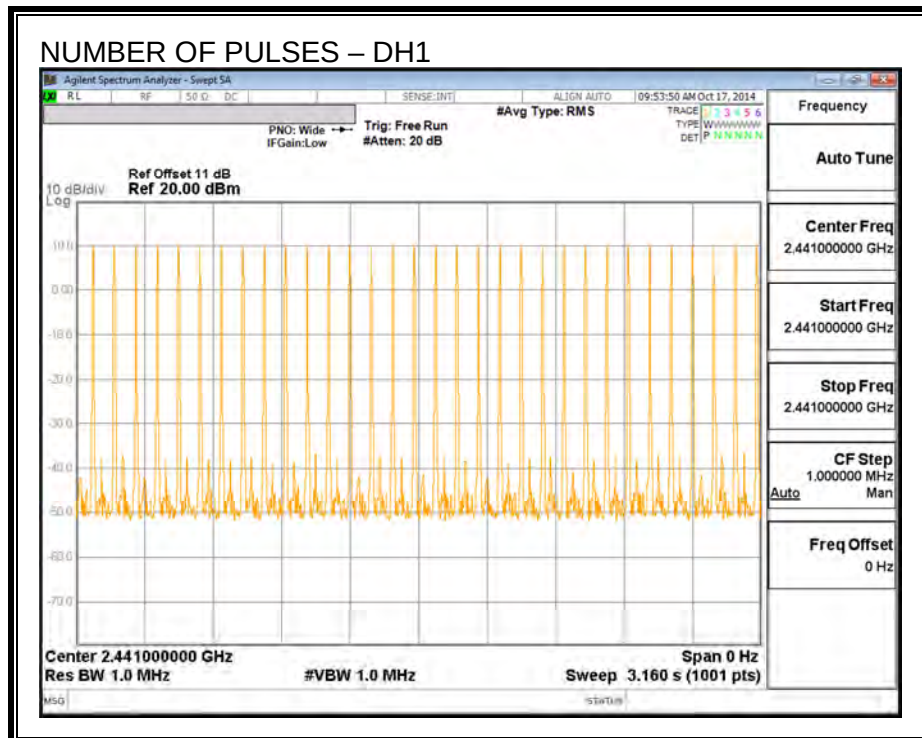
RESULTS

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK Normal Mode					
DH1	0.417	32	0.133	0.4	-0.267
DH3	1.670	16	0.267	0.4	-0.133
DH5	2.910	11	0.320	0.4	-0.080

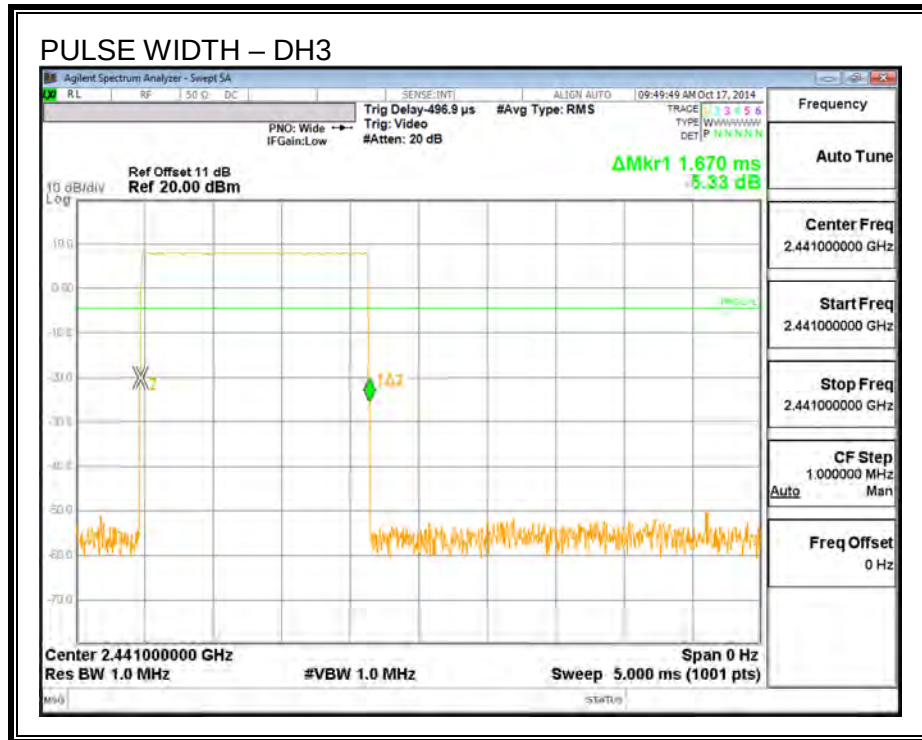
PULSE WIDTH - DH1



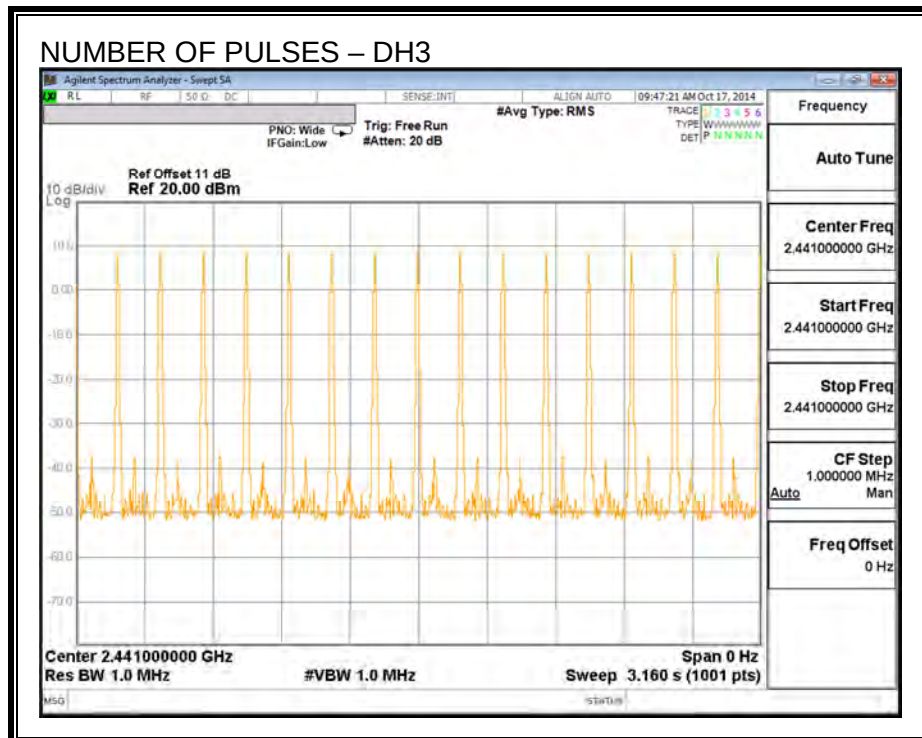
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



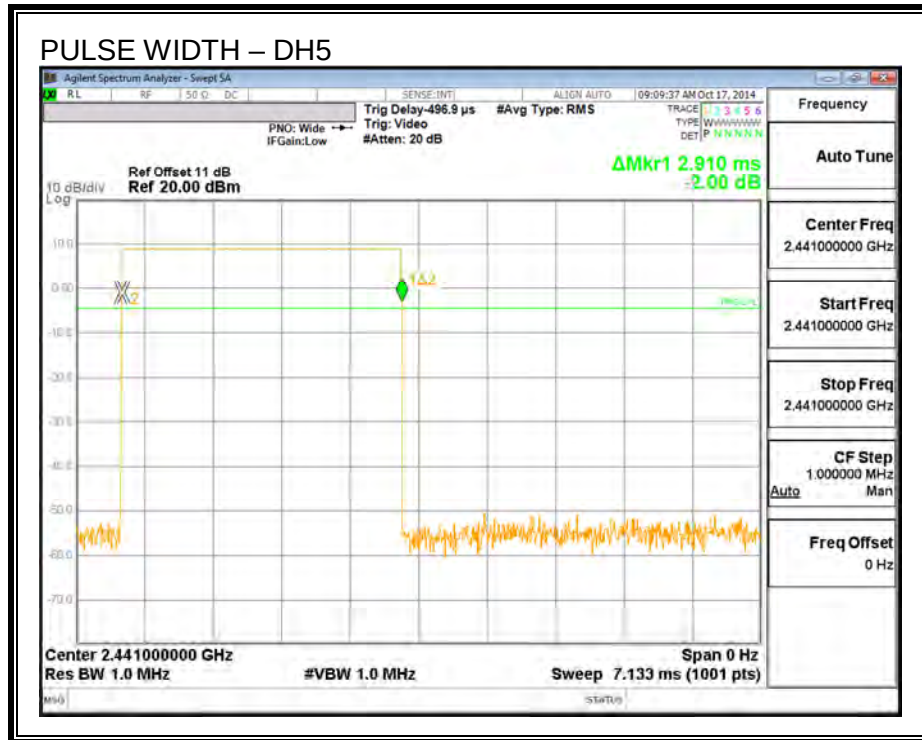
PULSE WIDTH – DH3



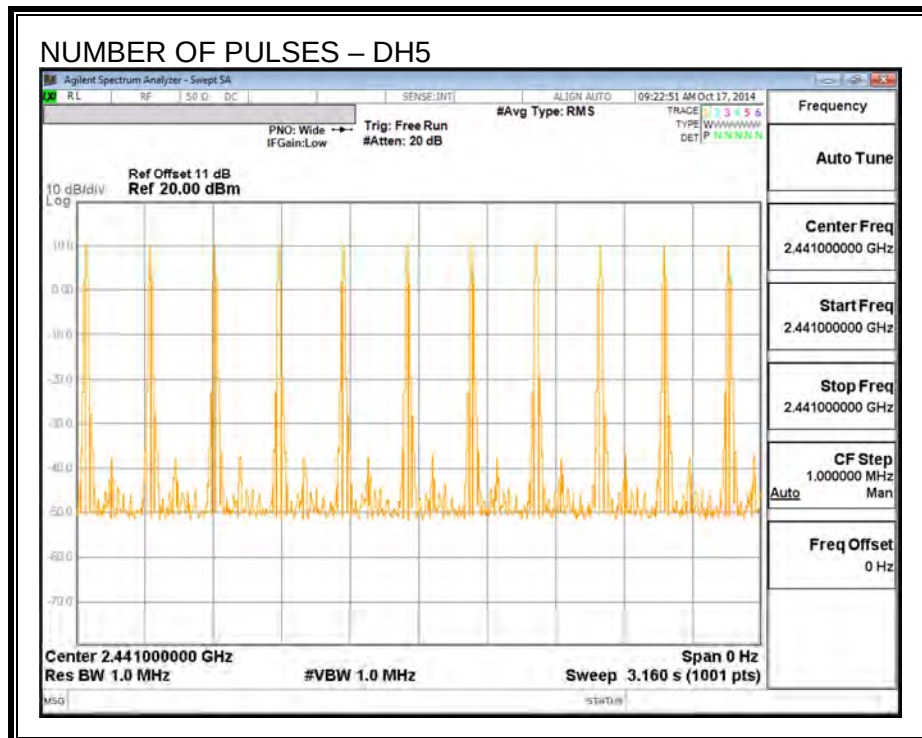
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5



8.1.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

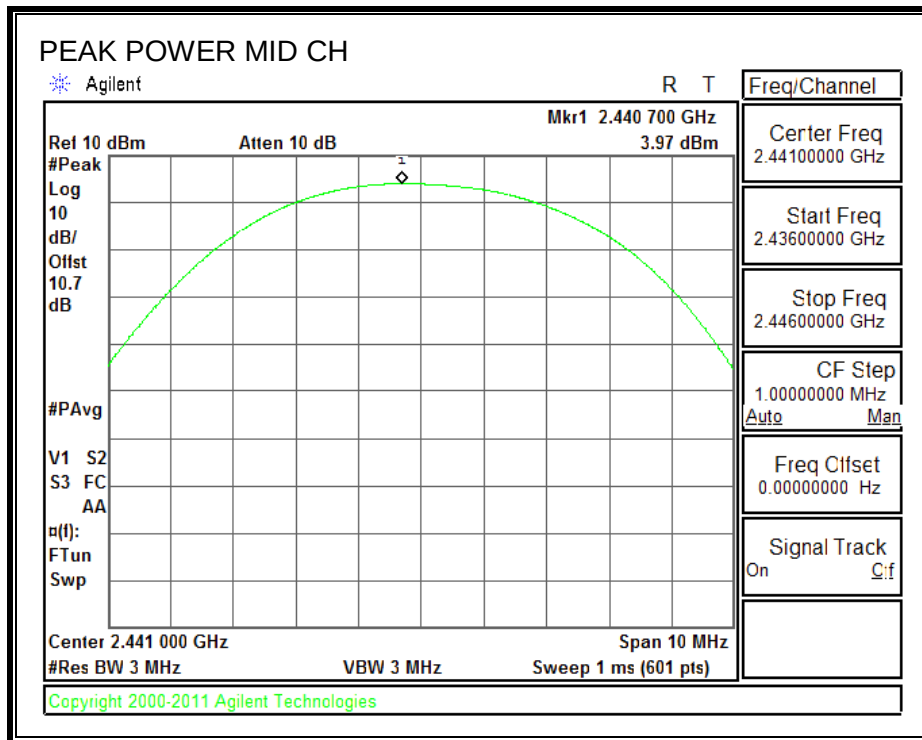
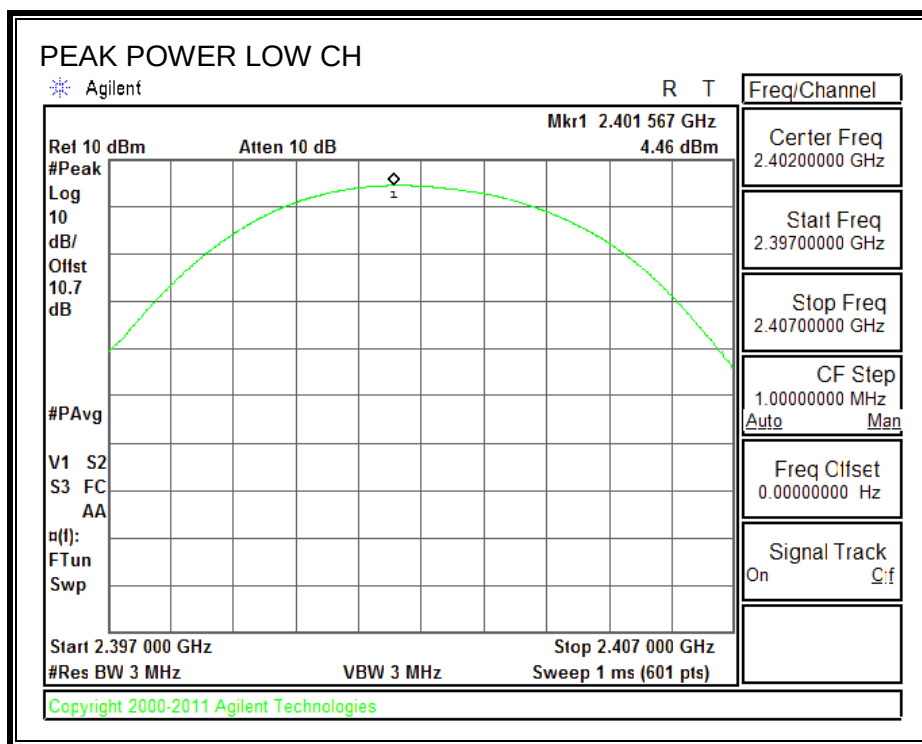
TEST PROCEDURE

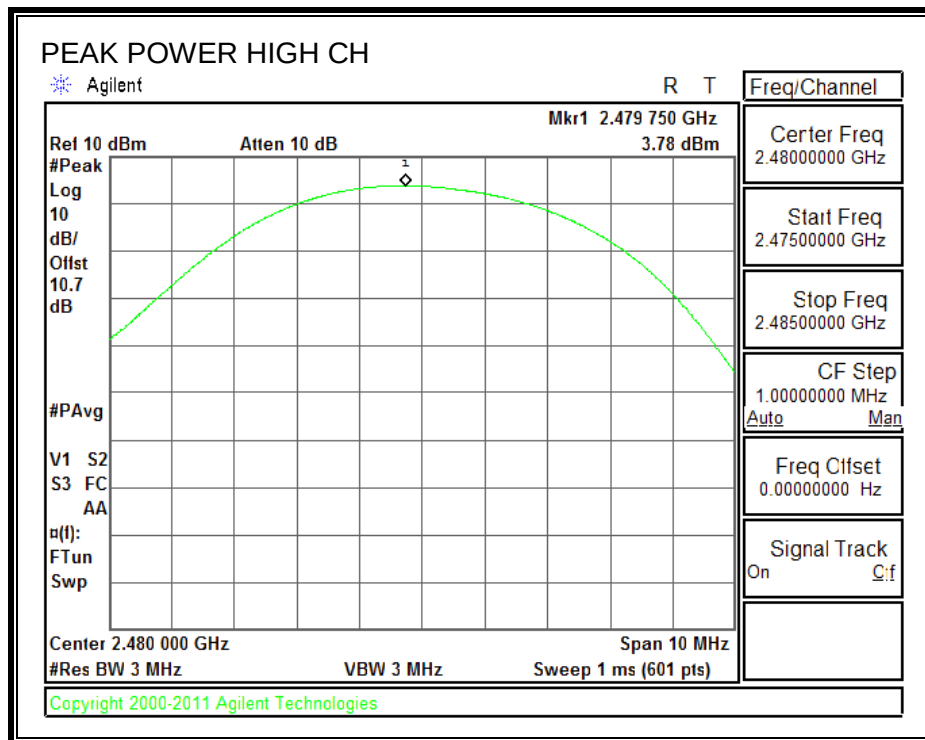
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	4.46	30	-25.54
Middle	2441	3.97	30	-26.03
High	2480	3.78	30	-26.22

OUTPUT POWER





8.1.6. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	3.95
Middle	2441	3.34
High	2480	3.15

8.1.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

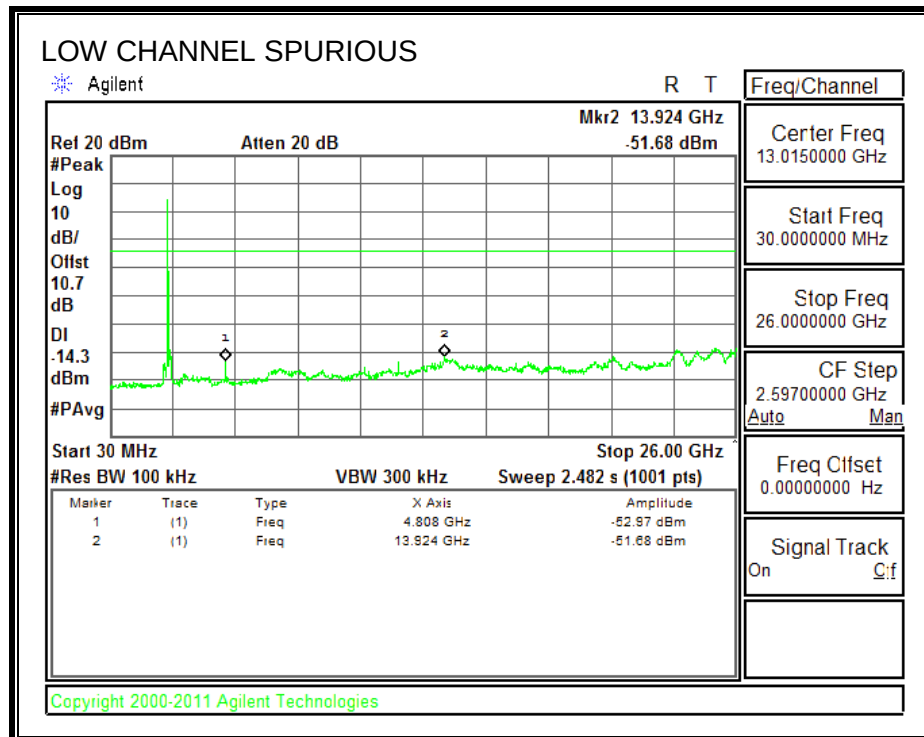
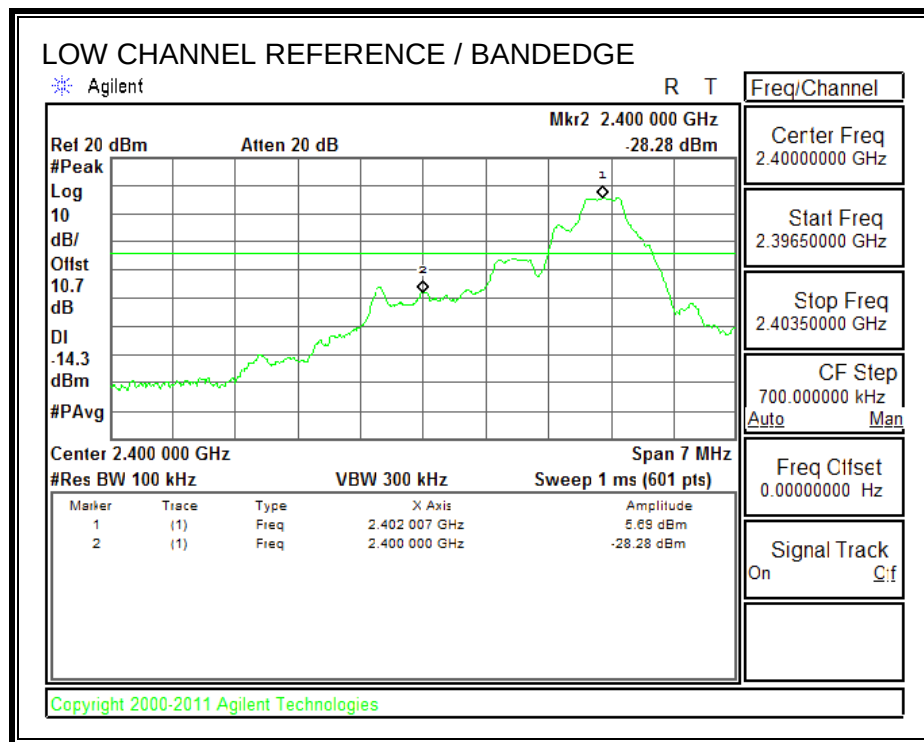
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

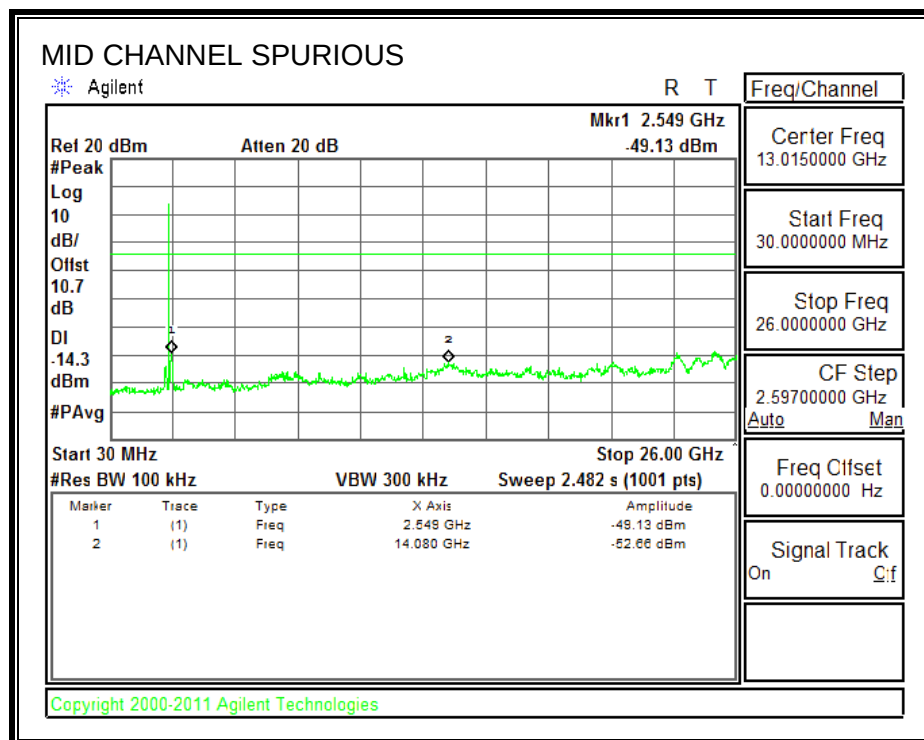
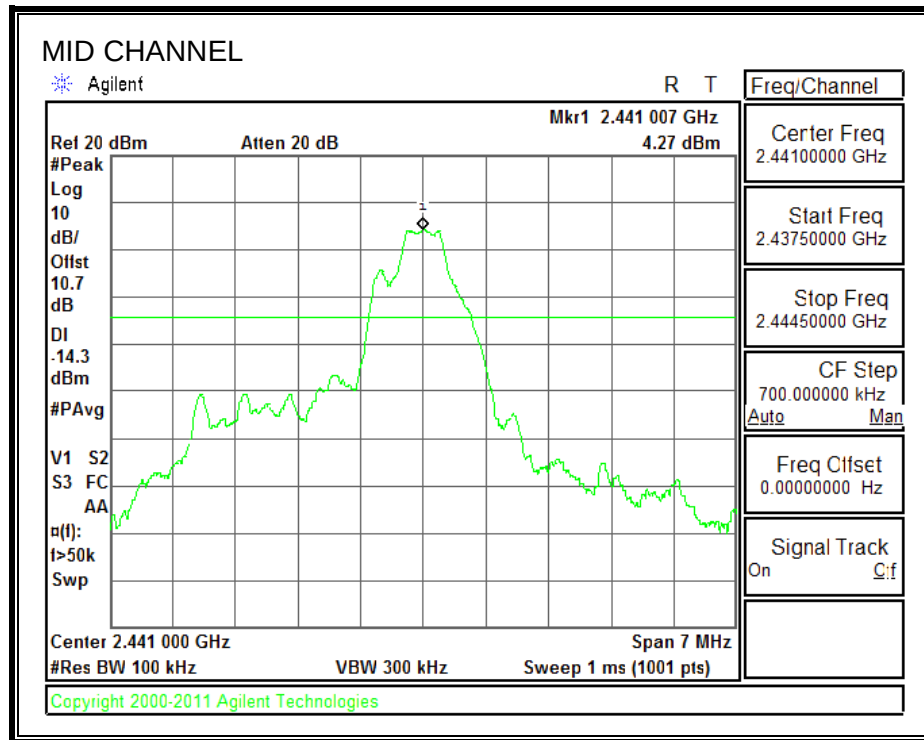
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

RESULTS

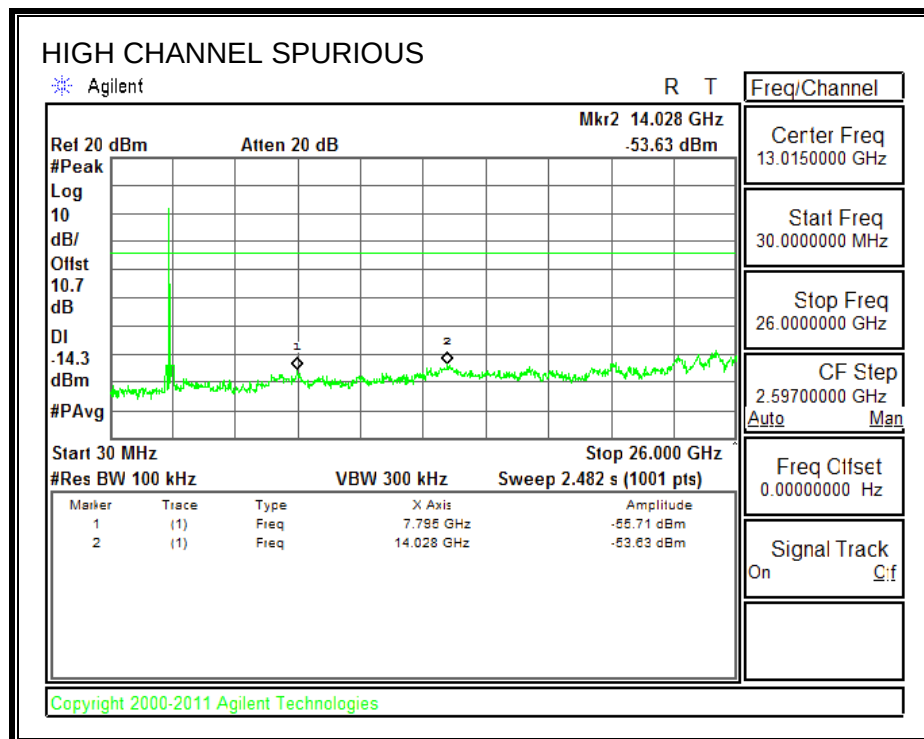
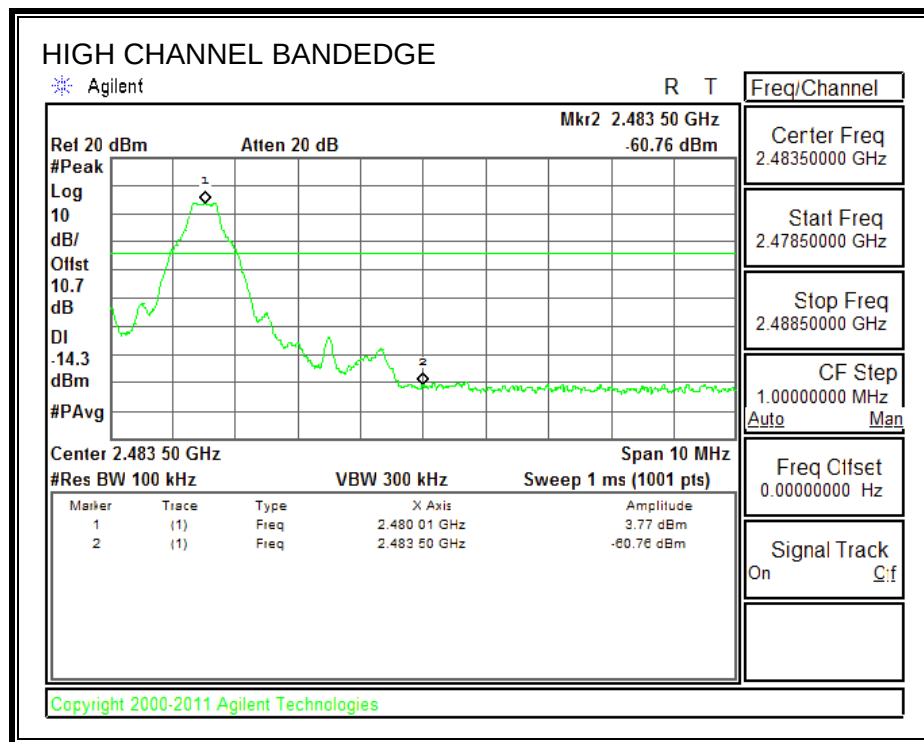
SPURIOUS EMISSIONS, LOW CHANNEL



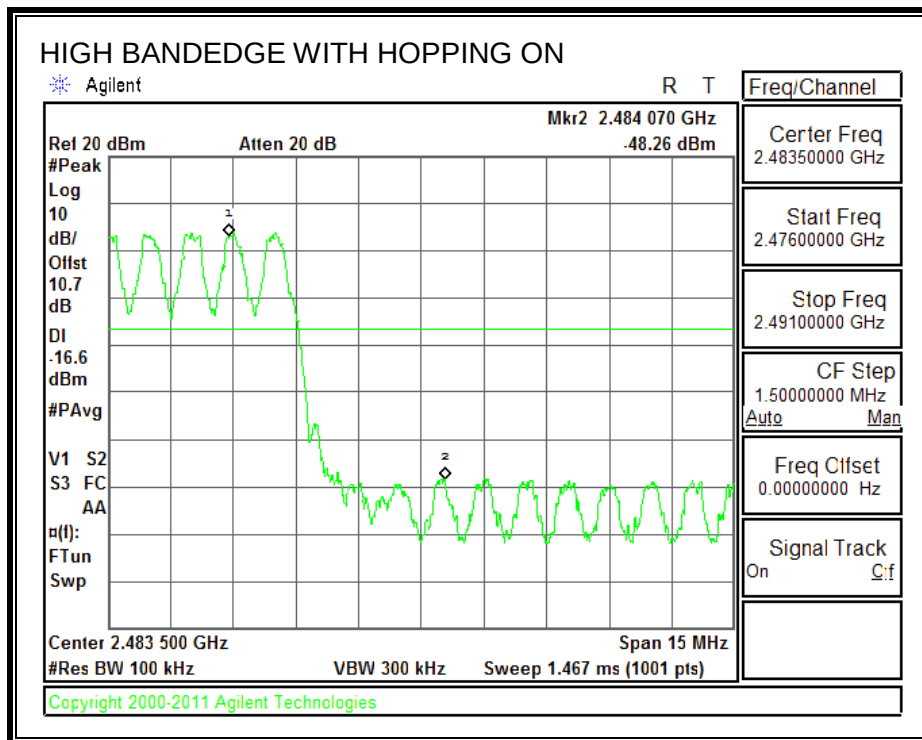
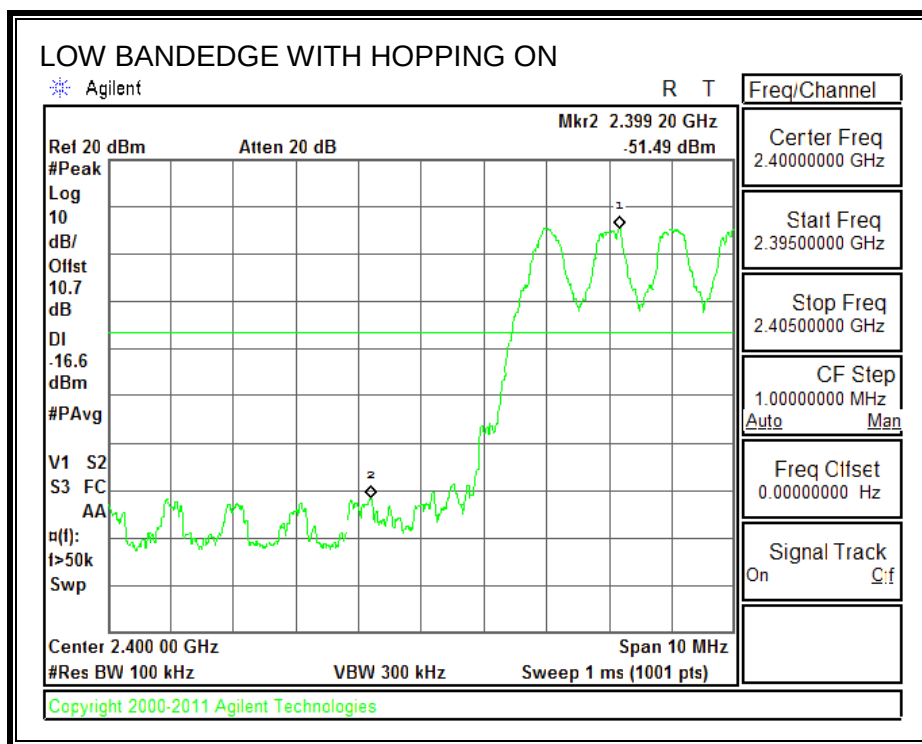
SPURIOUS EMISSIONS, MID CHANNEL



SPURIOUS EMISSIONS, HIGH CHANNEL



SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



8.2. ENHANCED DATA RATE QPSK MODULATION

8.2.1. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

The maximum antenna gain is less than 6 dBi, therefore the limit is 21 dBm.

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

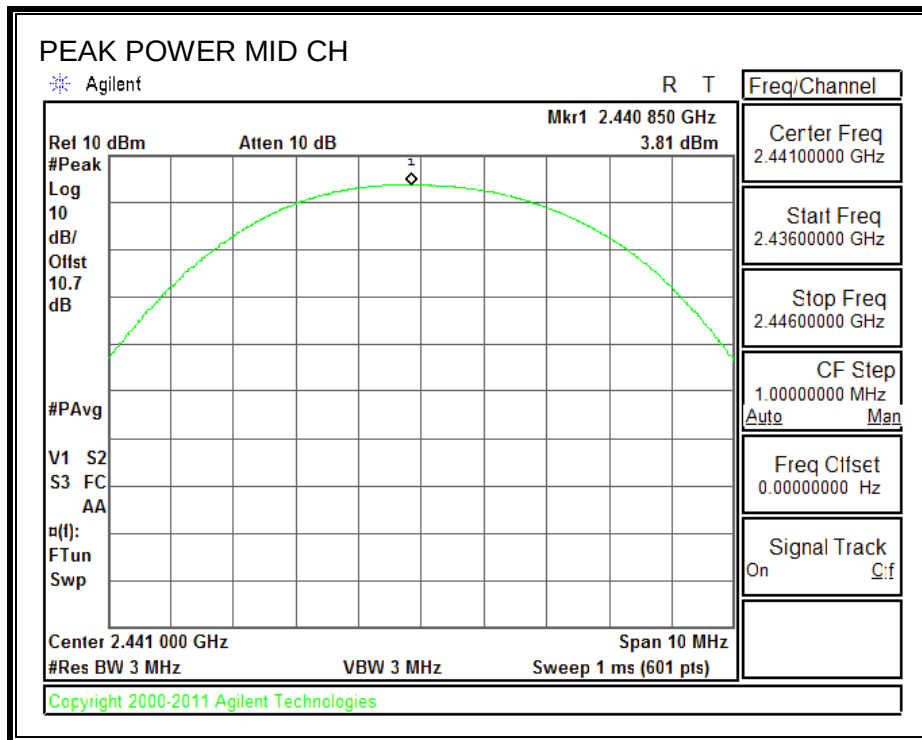
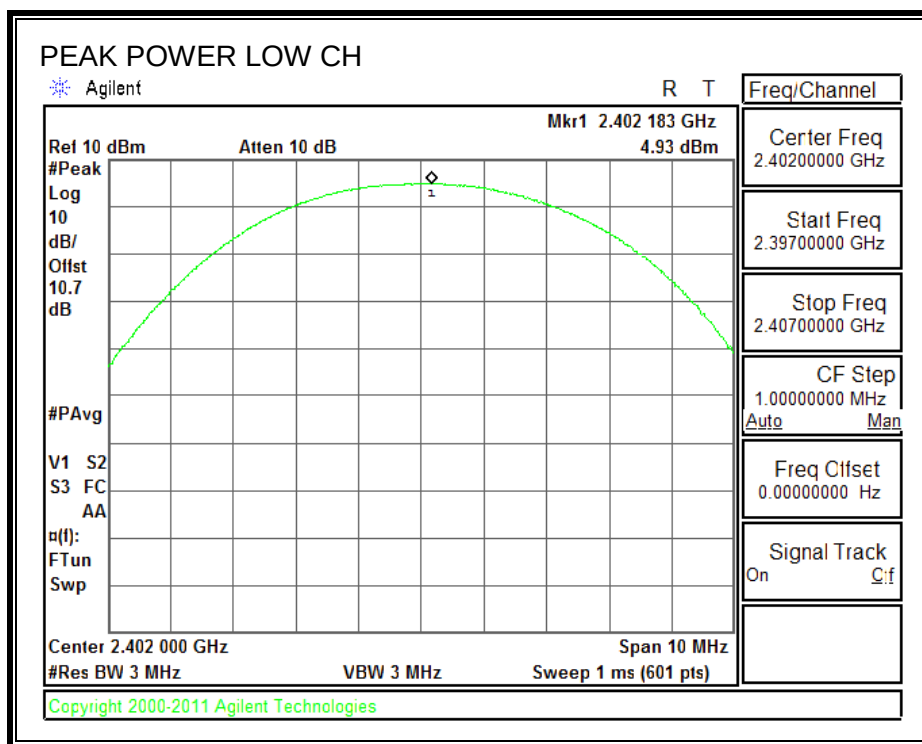
TEST PROCEDURE

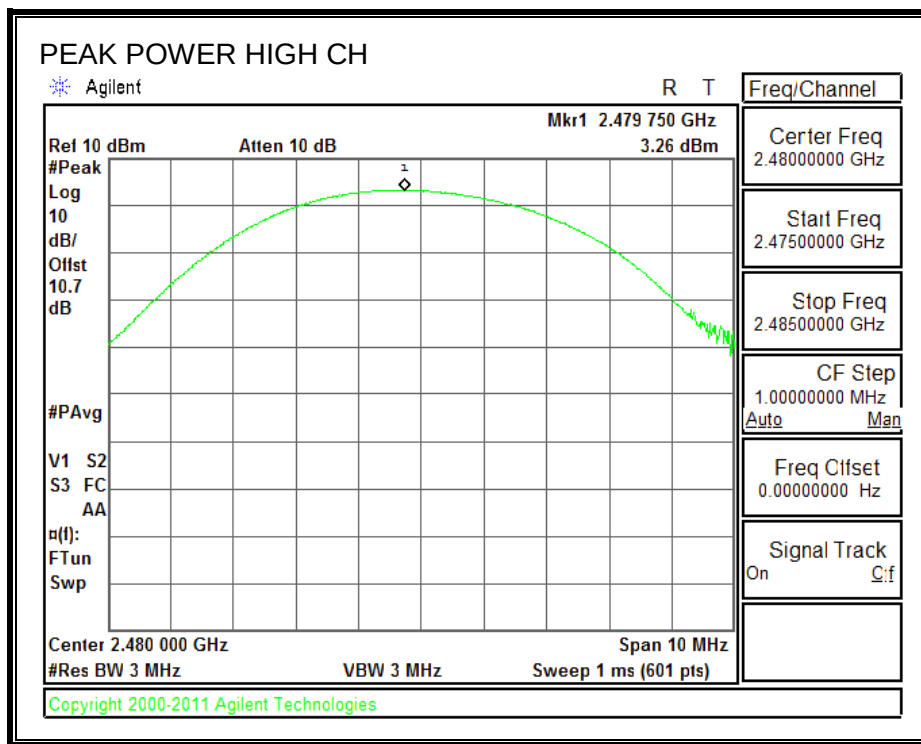
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	4.93	21	-16.07
Middle	2441	3.81	21	-17.19
High	2480	3.26	21	-17.74

OUTPUT POWER





8.2.2. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.0 dB (including 10.0 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	3.91
Middle	2441	2.69
High	2480	2.64

8.3. ENHANCED DATA RATE 8PSK MODULATION

8.3.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

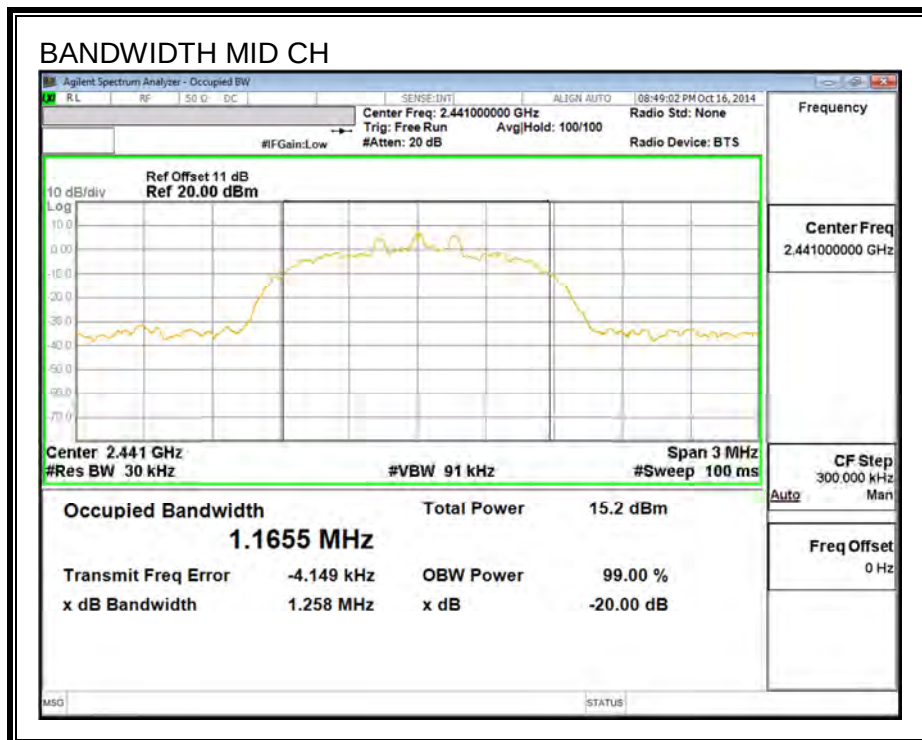
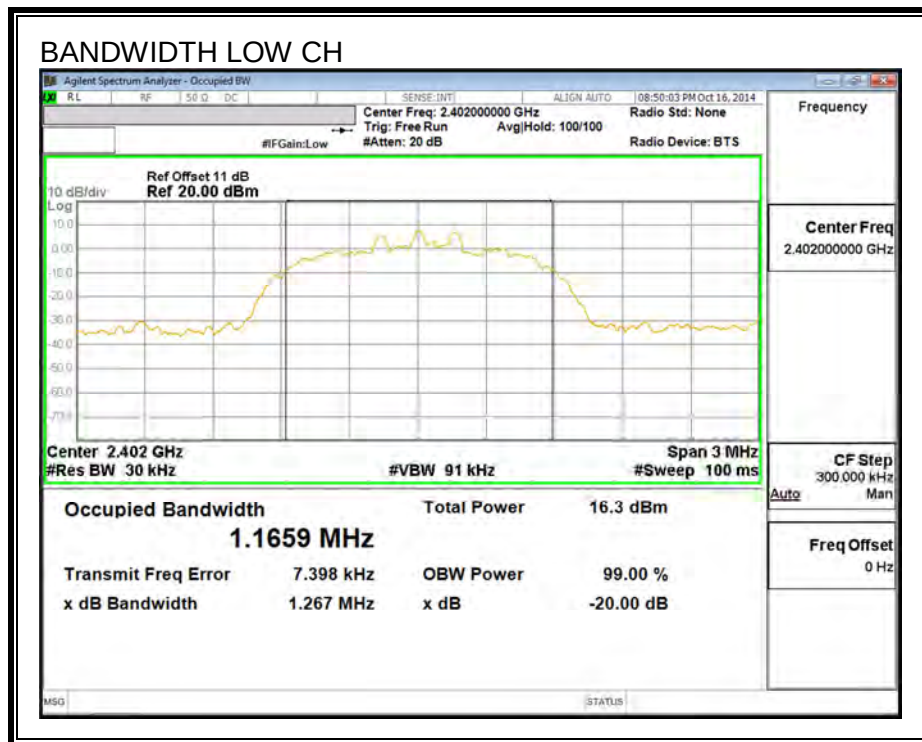
TEST PROCEDURE

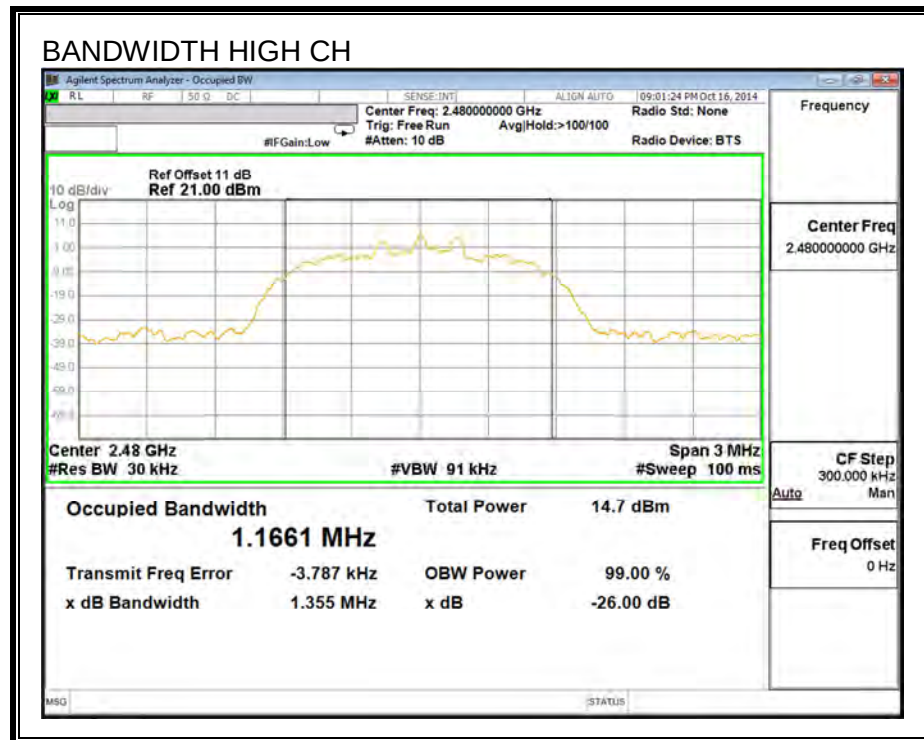
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to $\geq$ RBW. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.267	1.1659
Middle	2441	1.258	1.1655
High	2480	1.355	1.1661

20 dB AND 99% BANDWIDTH





8.3.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

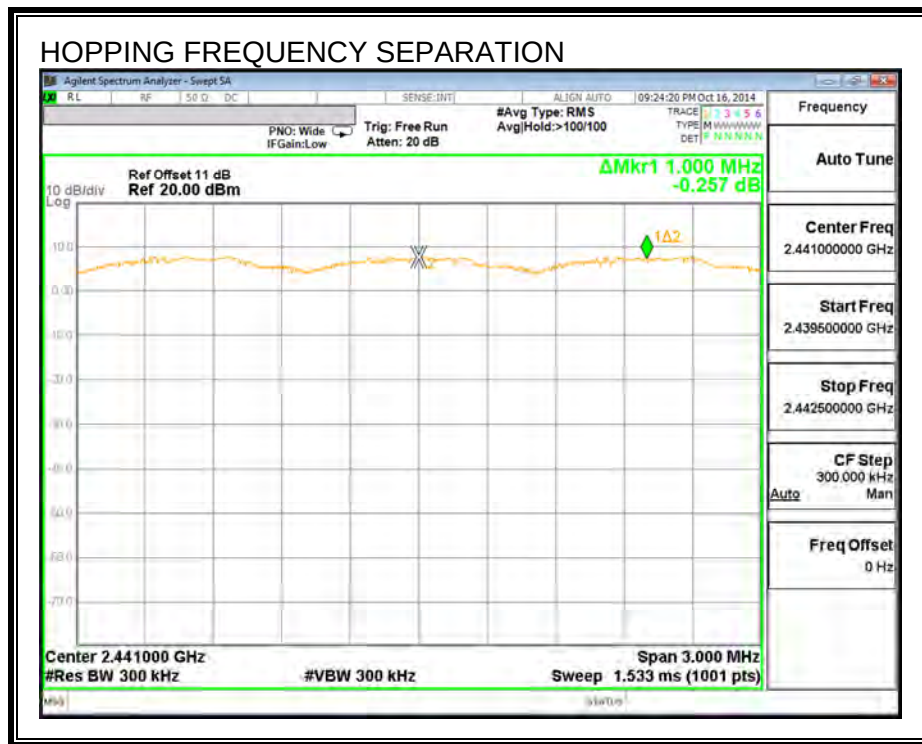
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to => RBW. The sweep time is coupled.

RESULTS

HOPPING FREQUENCY SEPARATION



8.3.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

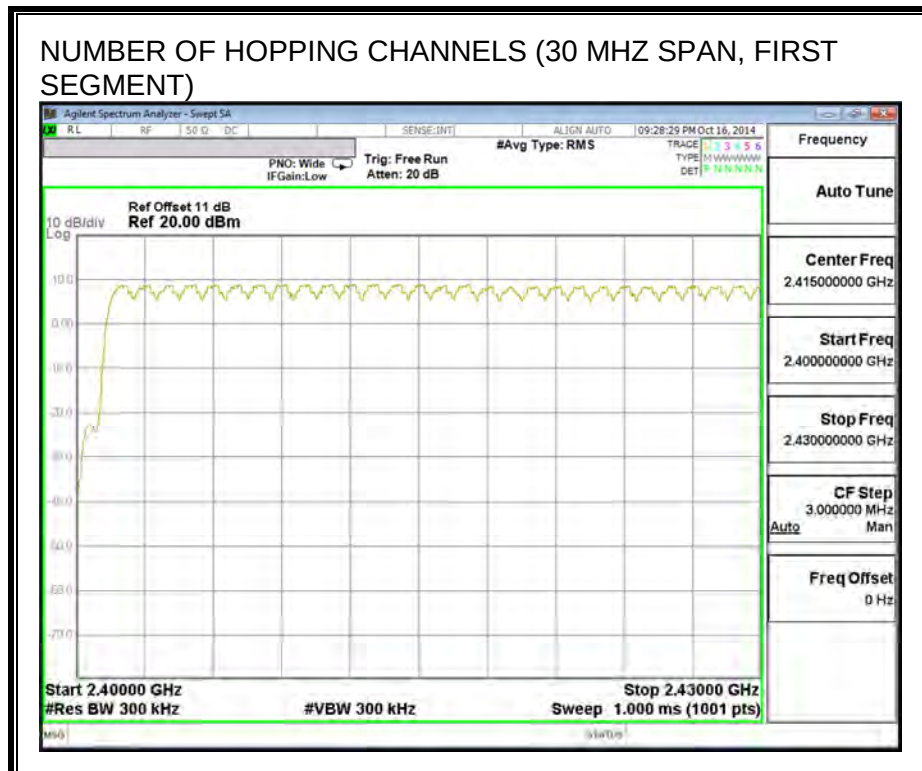
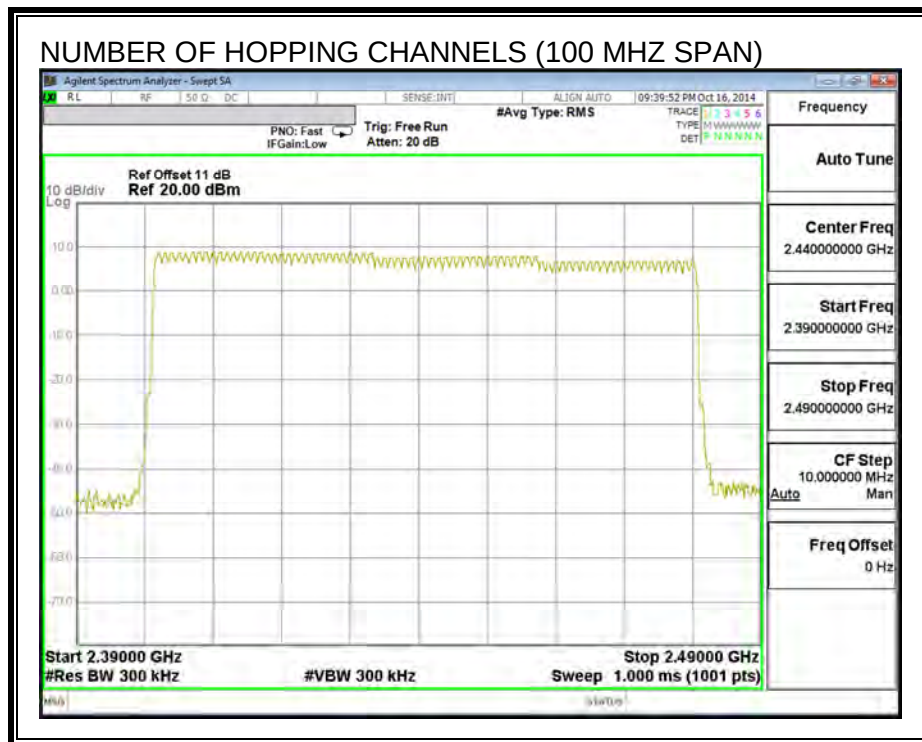
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

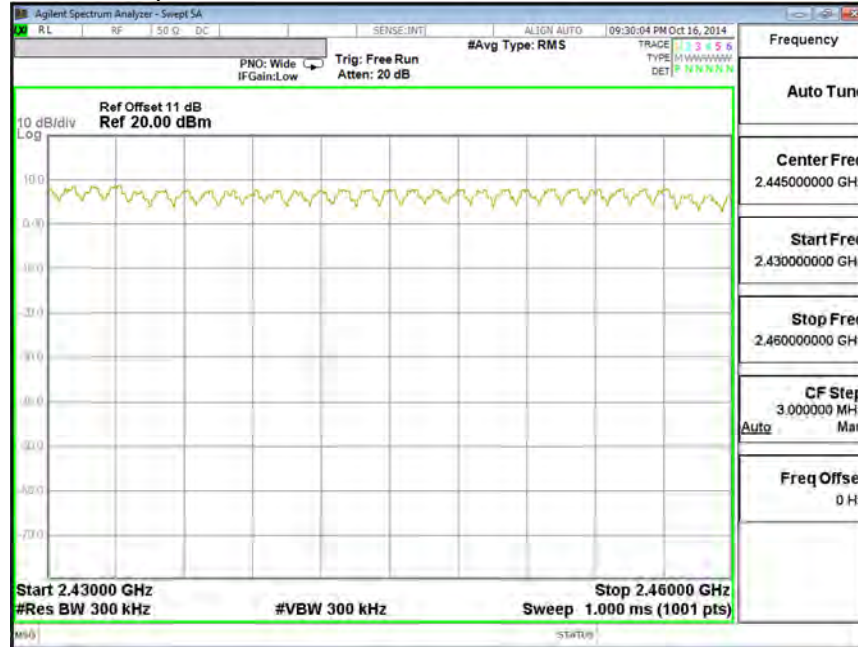
RESULTS

Normal Mode: 79 Channels observed.

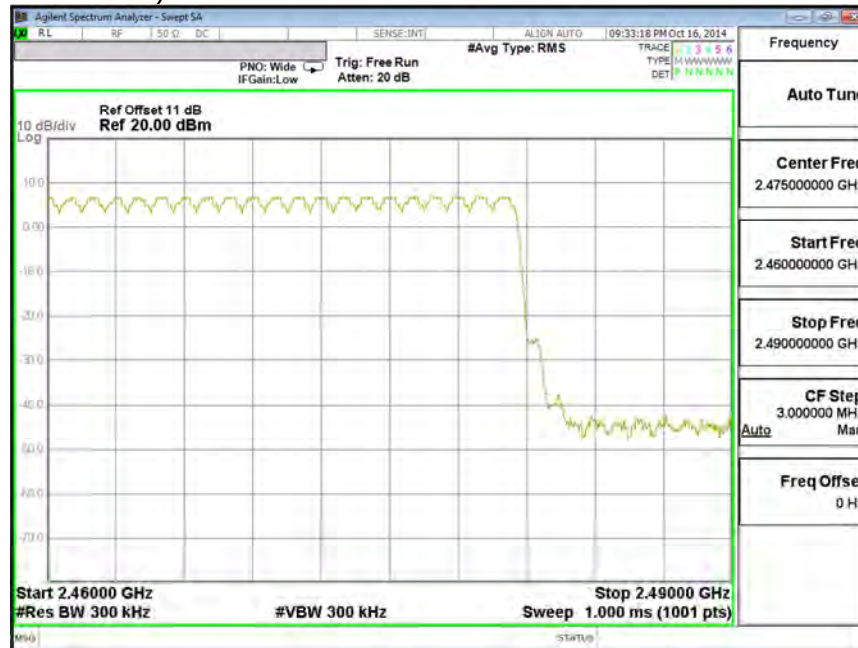
NUMBER OF HOPPING CHANNELS



NUMBER OF HOPPING CHANNELS (30 MHz SPAN, SECOND SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHz SPAN, THIRD SEGMENT)



8.3.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{pulse width}$.

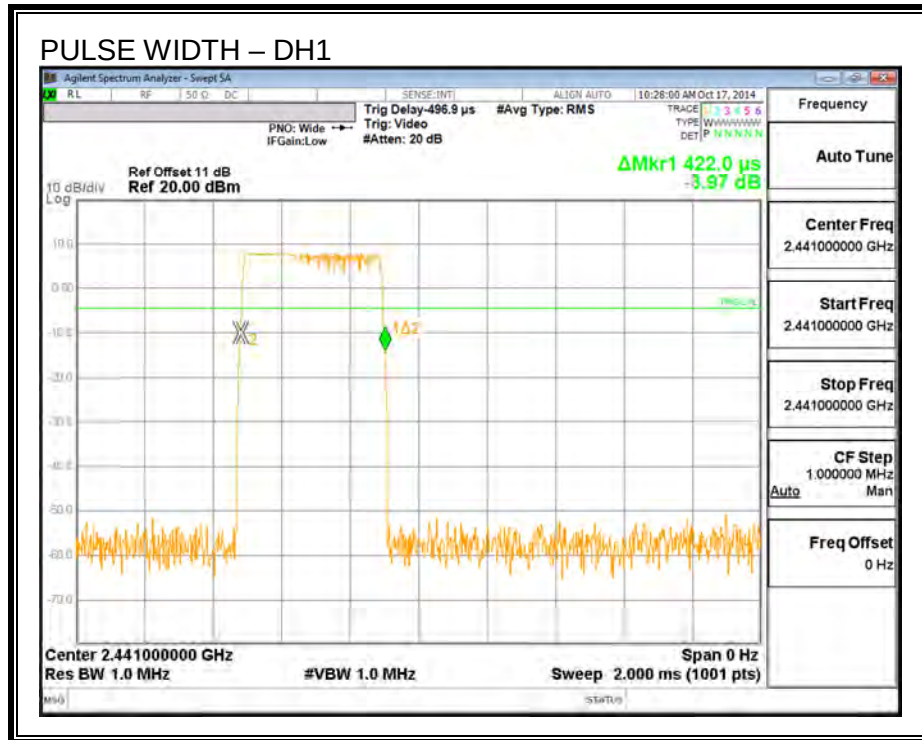
RESULTS

Time Of Occupancy = $10 * \text{xx pulses} * \text{yy msec} = \text{zz msec}$

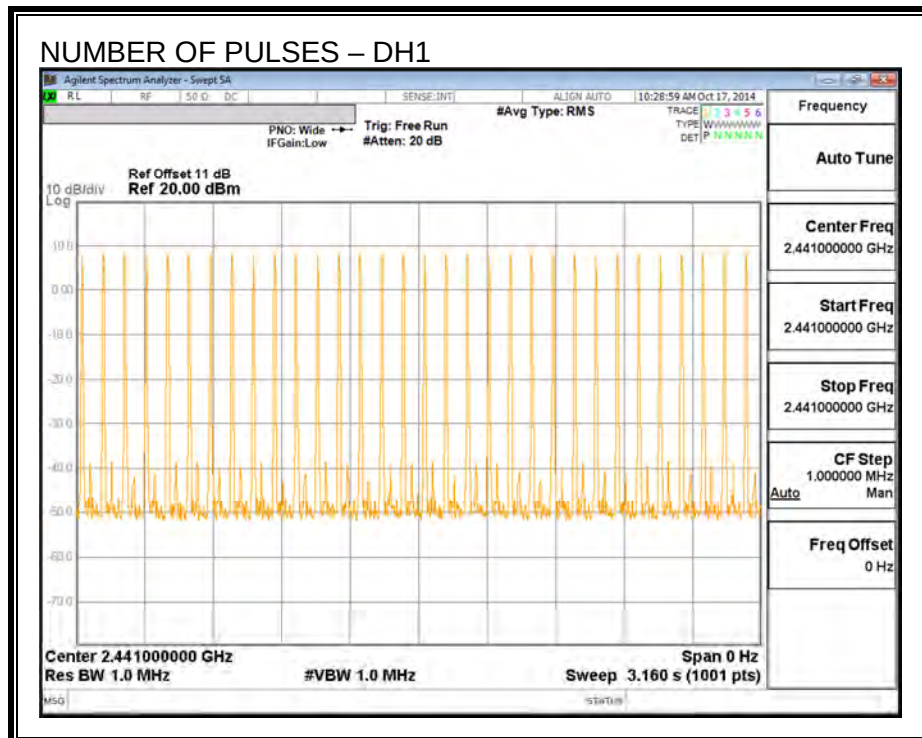
8PSK (EDR) Mode

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
3DH1	0.422	32	0.135	0.4	-0.265
3DH3	1.673	16	0.268	0.4	-0.132
3DH5	2.935	11	0.323	0.4	-0.077

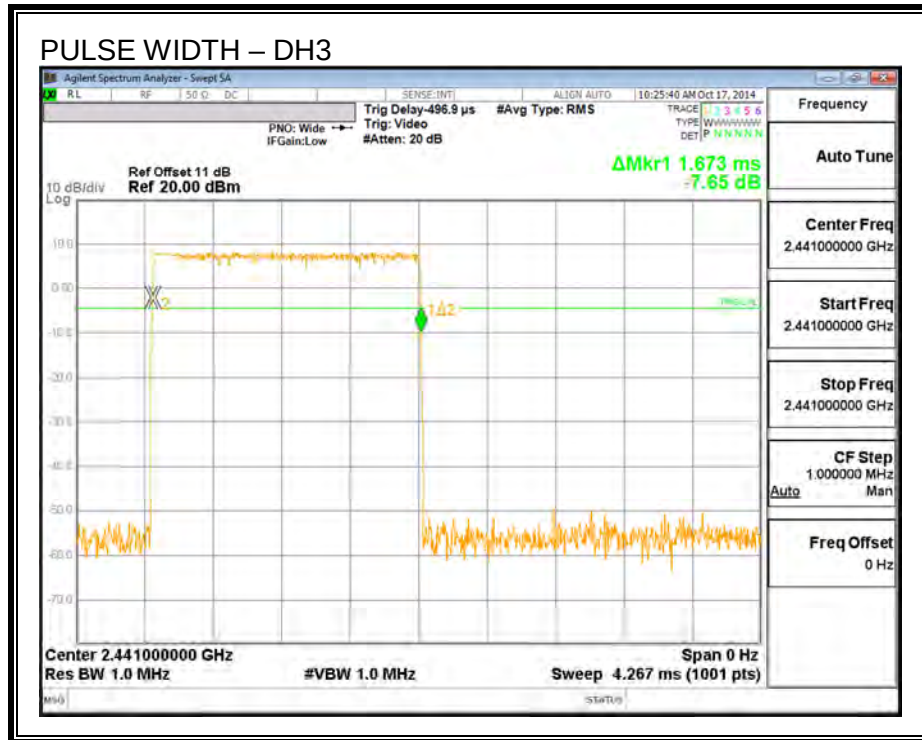
PULSE WIDTH - DH1



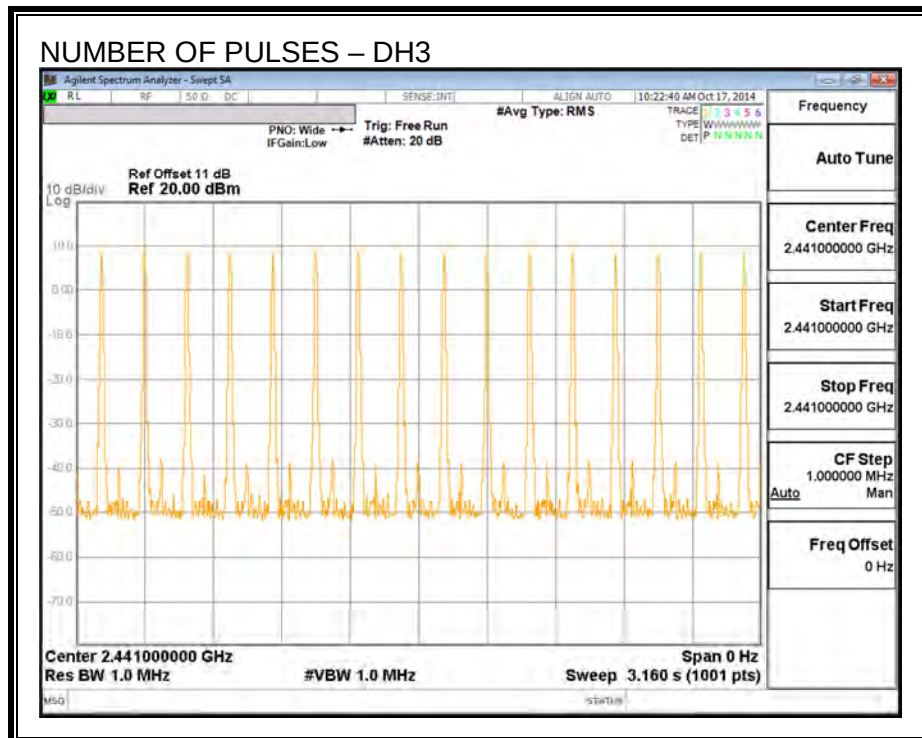
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



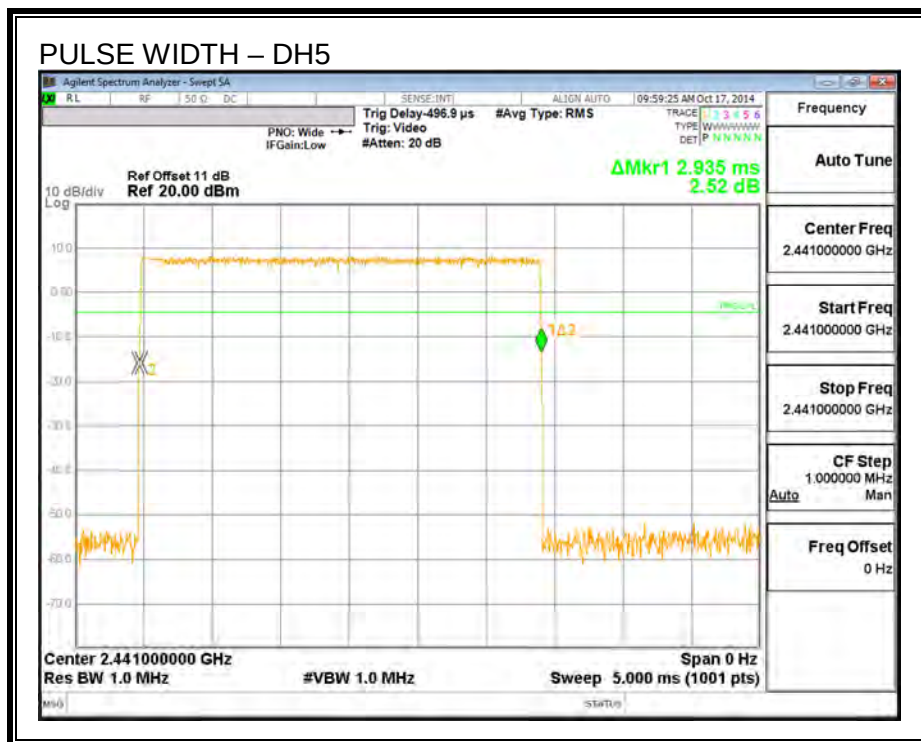
PULSE WIDTH – DH3



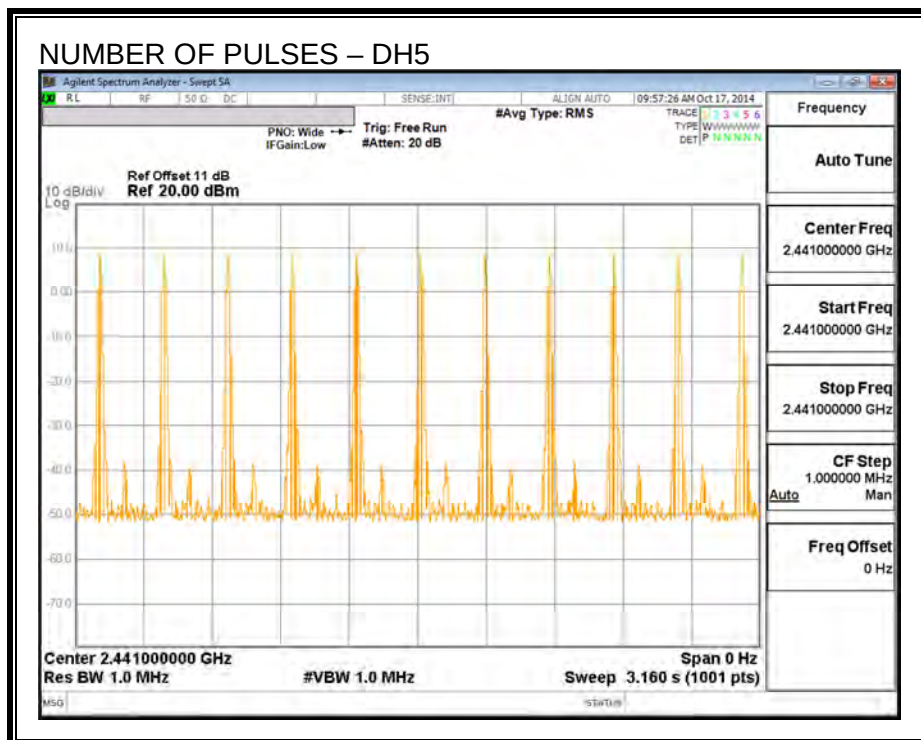
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5



8.3.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

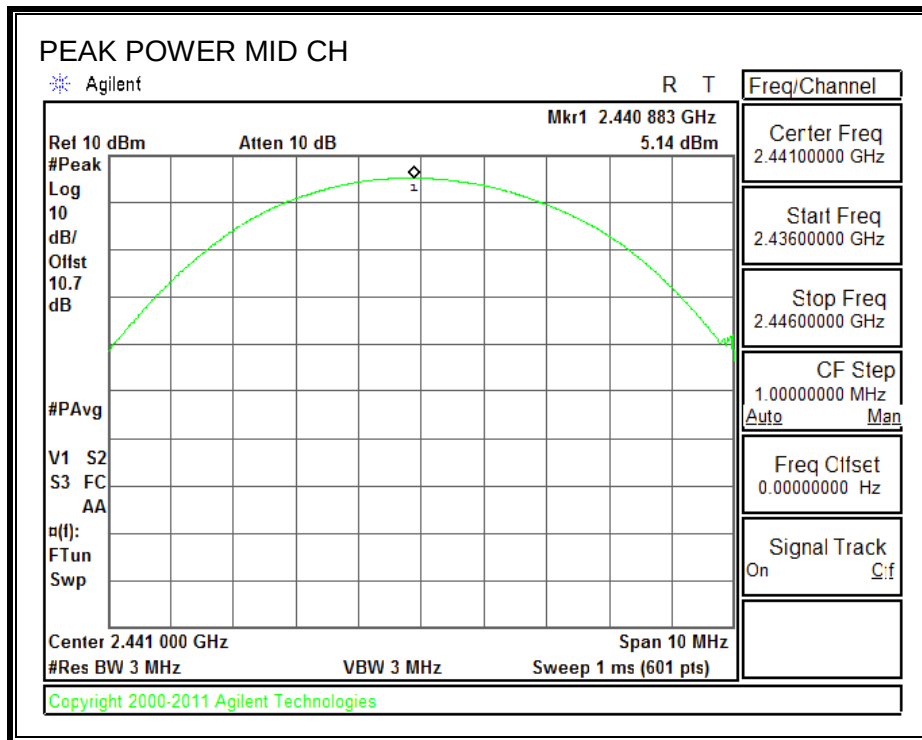
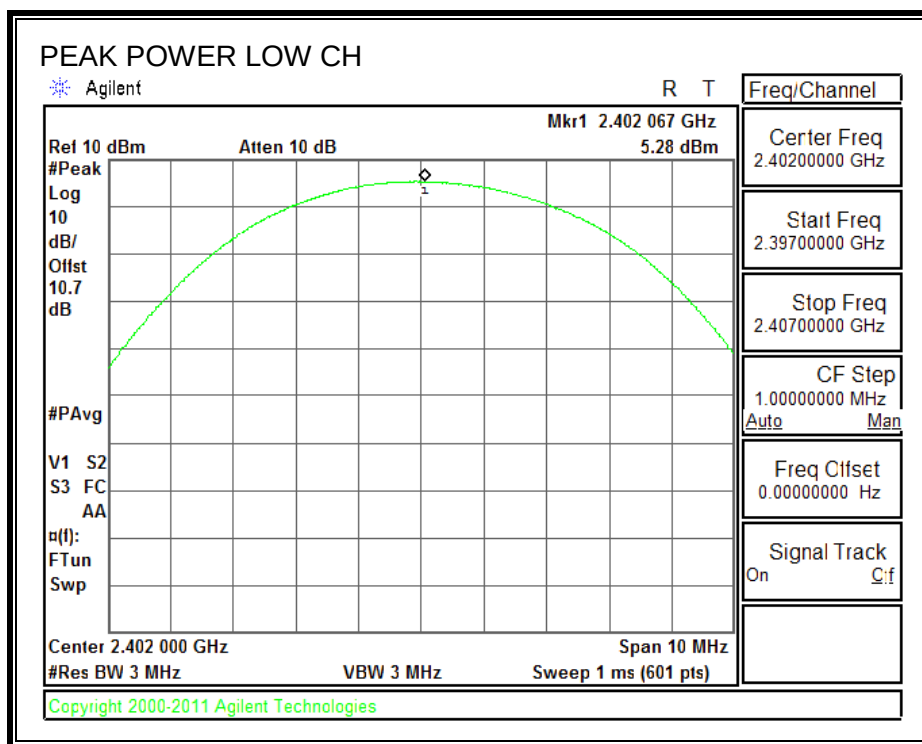
TEST PROCEDURE

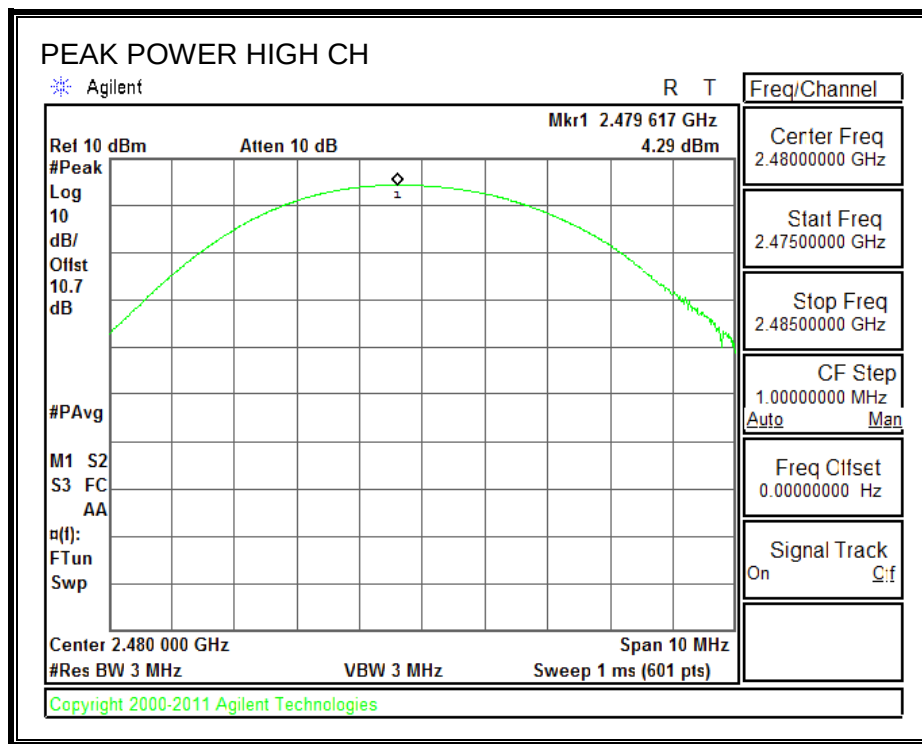
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.28	21	-15.72
Middle	2441	5.14	21	-15.86
High	2480	4.29	21	-16.71

OUTPUT POWER





8.3.6. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.6 dB (including 10.0 dB pad and 1.6 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	3.92
Middle	2441	3.58
High	2480	2.64

8.3.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

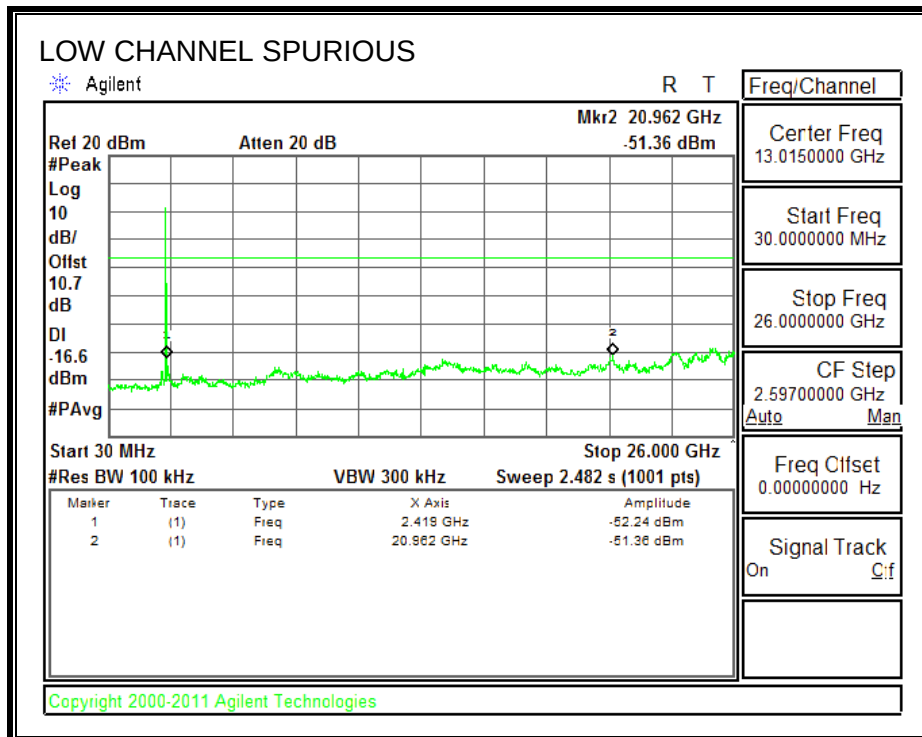
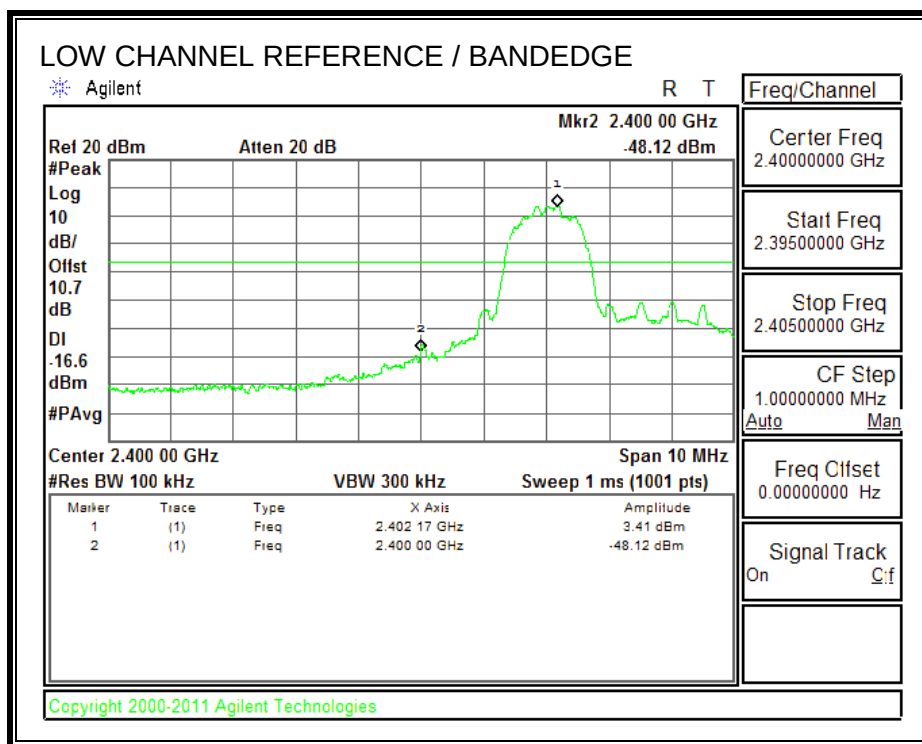
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

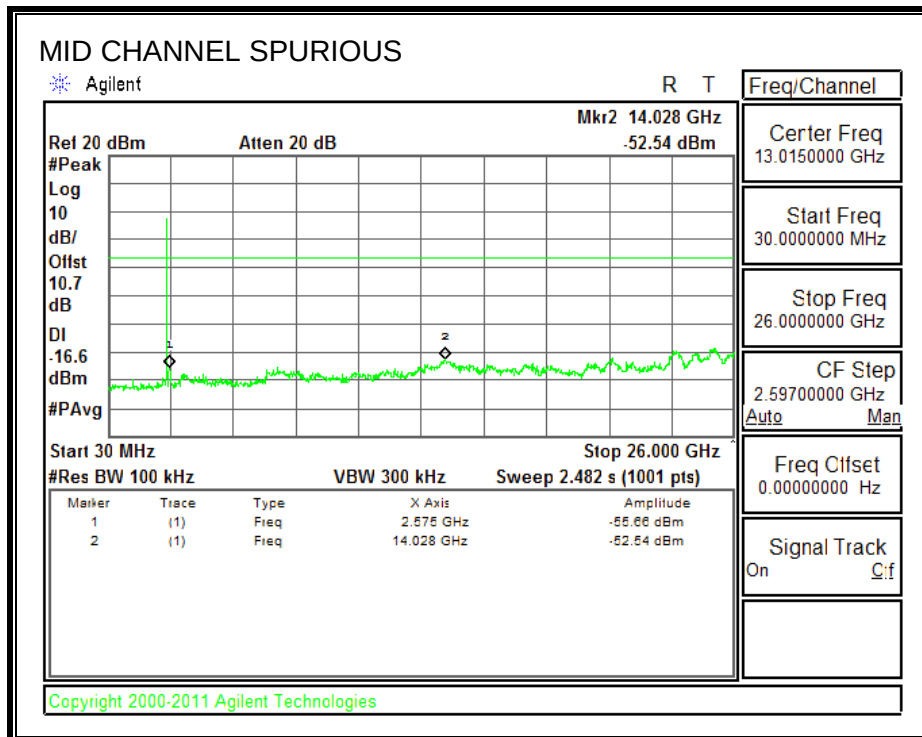
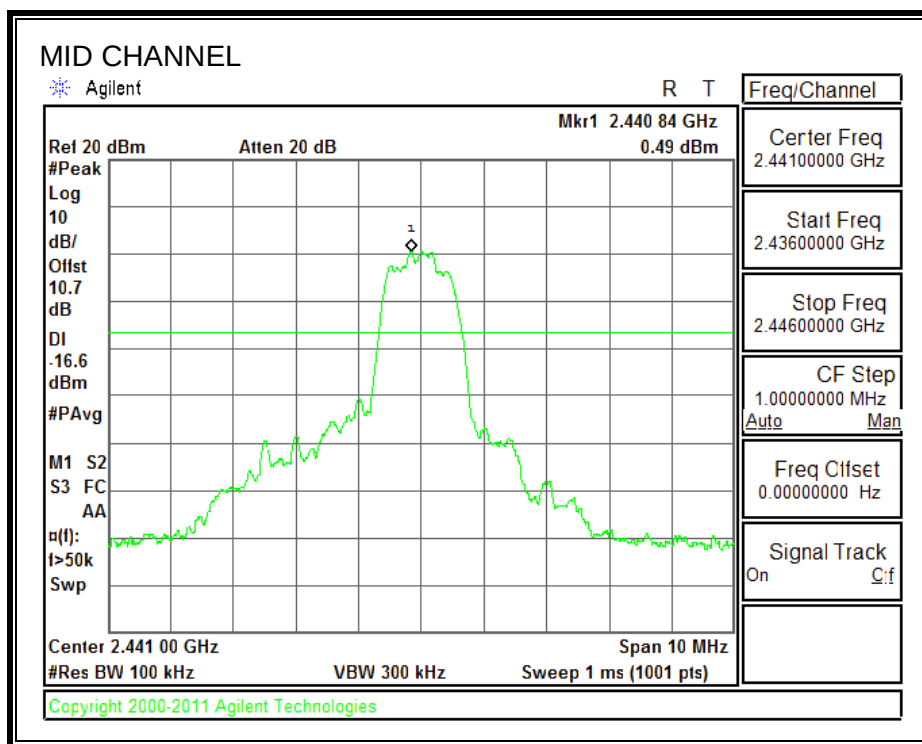
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

RESULTS

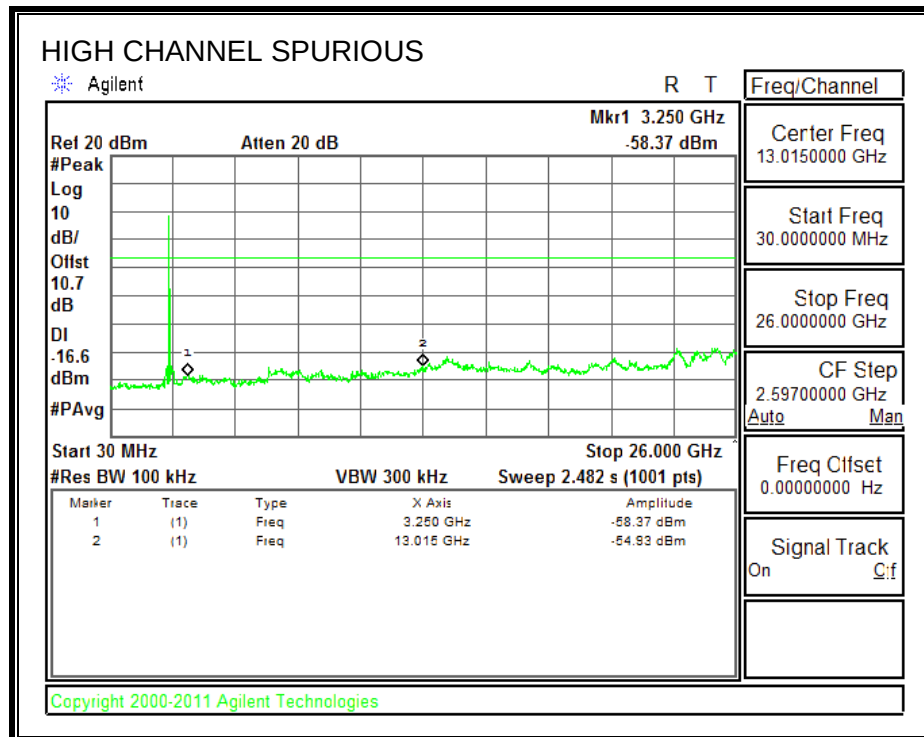
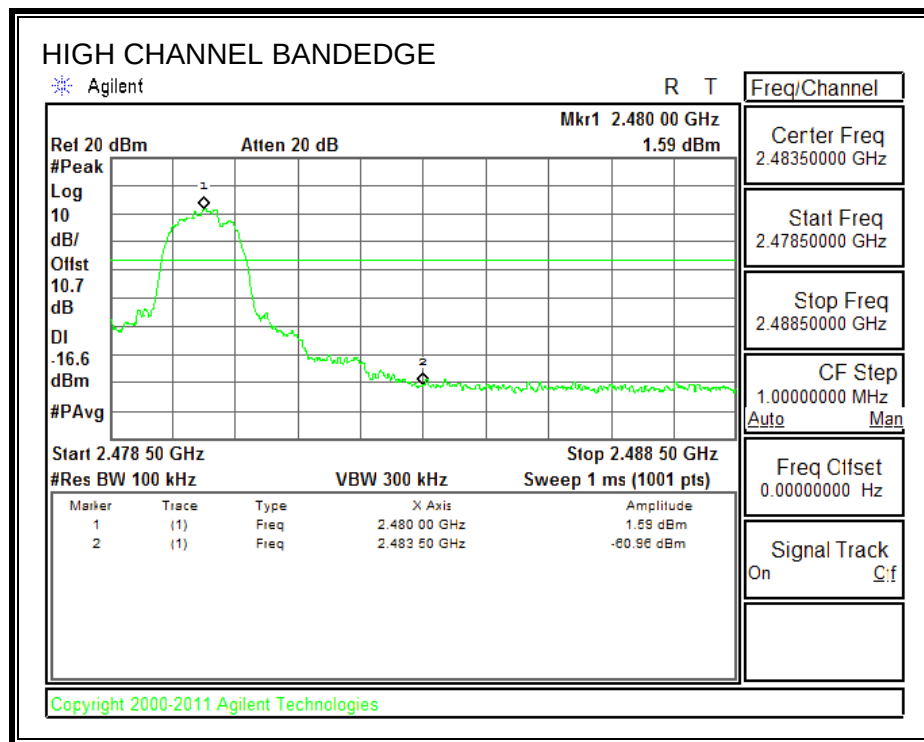
SPURIOUS EMISSIONS, LOW CHANNEL



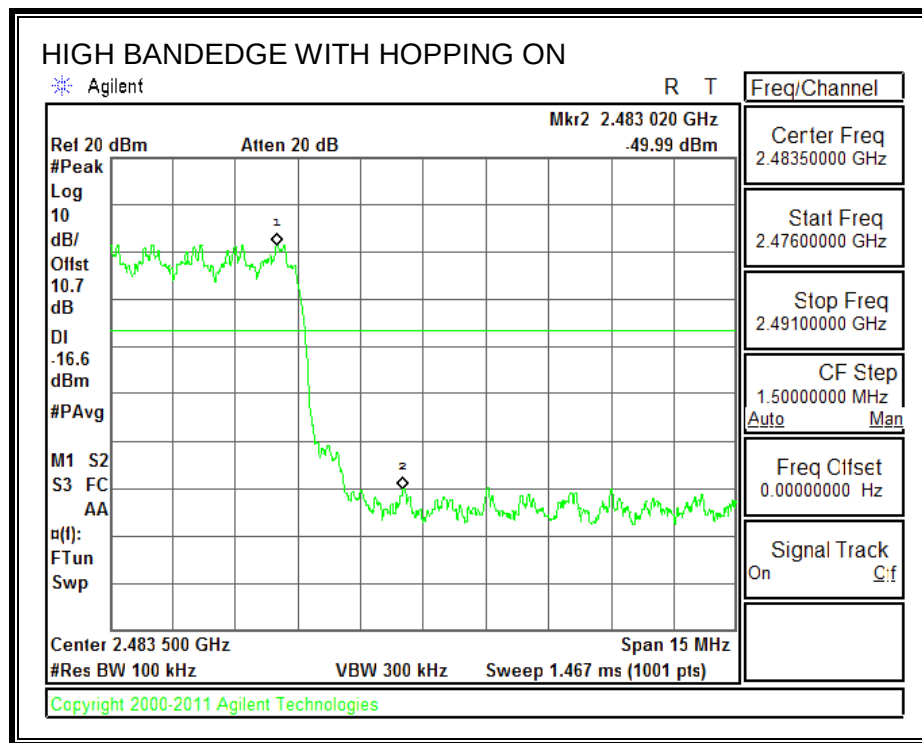
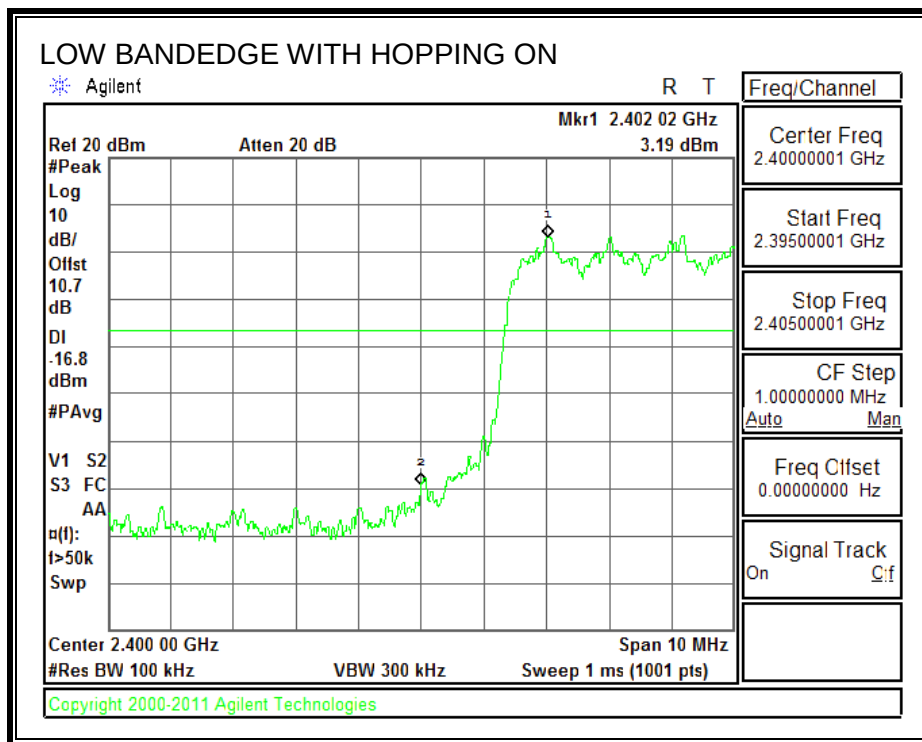
SPURIOUS EMISSIONS, MID CHANNEL



SPURIOUS EMISSIONS, HIGH CHANNEL



SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



9. RADIATED TEST RESULTS

9.1. LIMITS

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

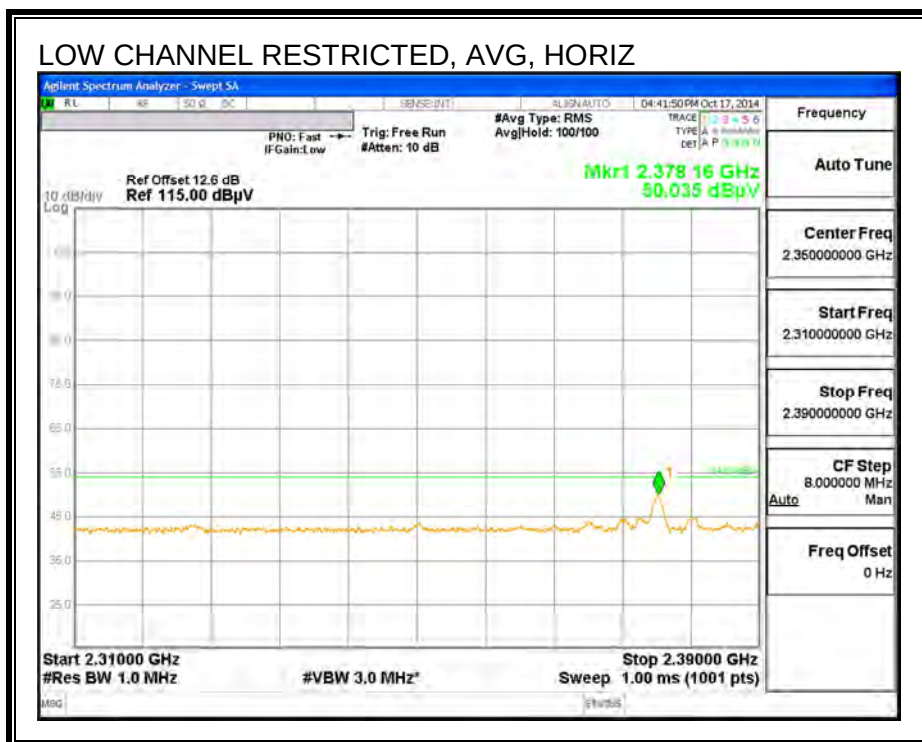
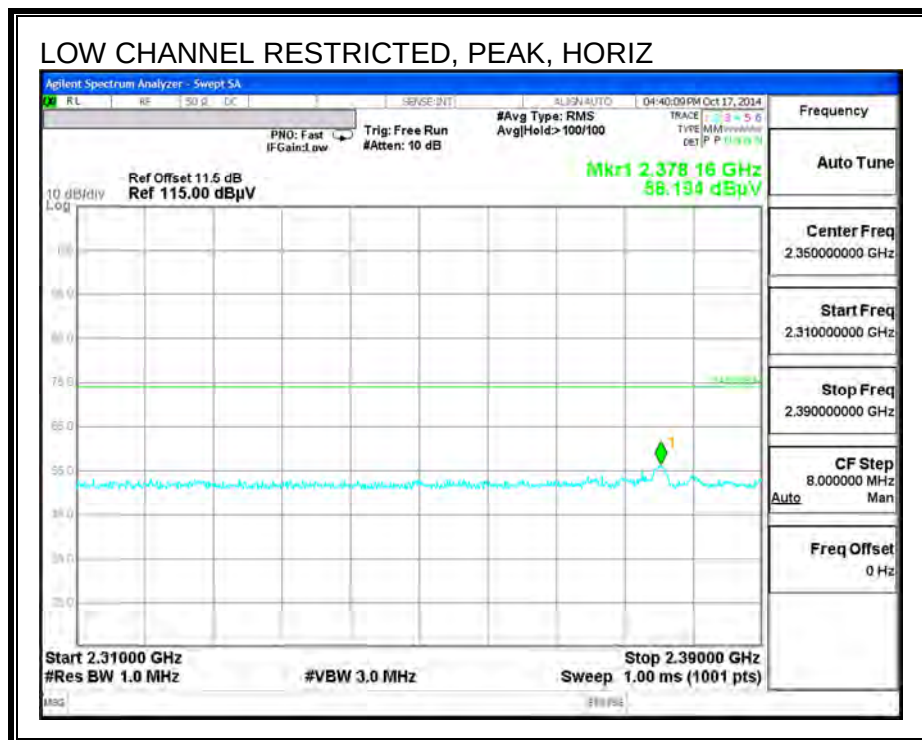
IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

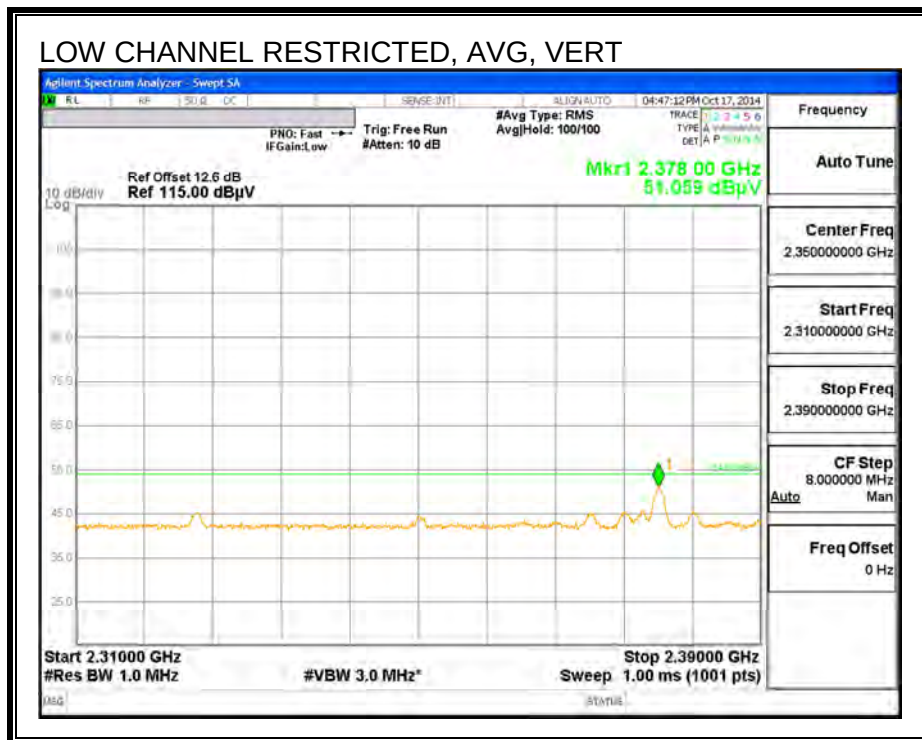
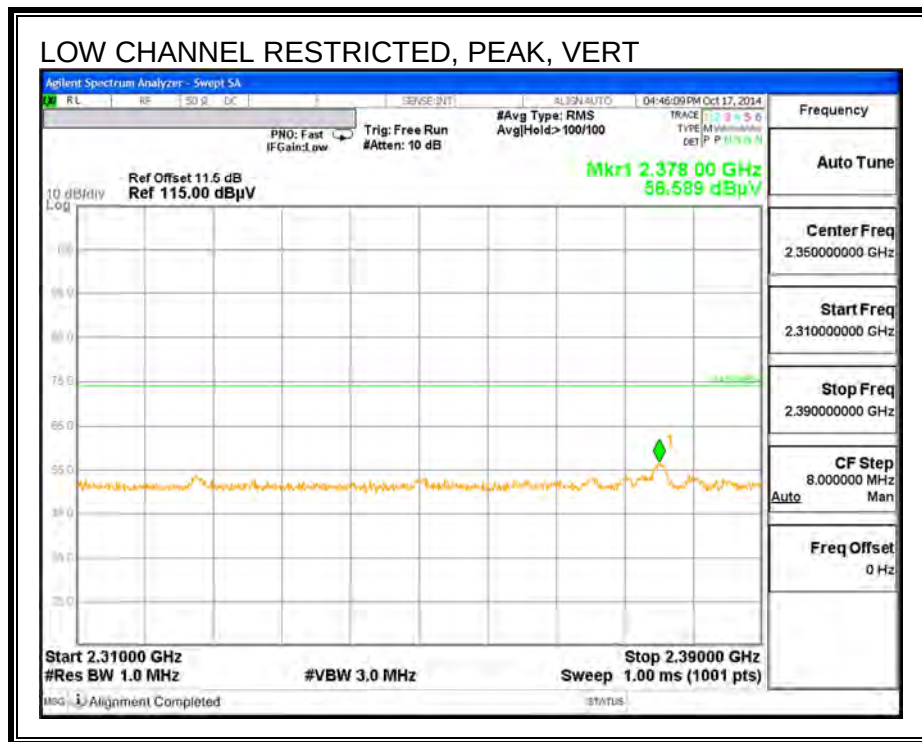
9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. BASIC DATA RATE GFSK MODULATION

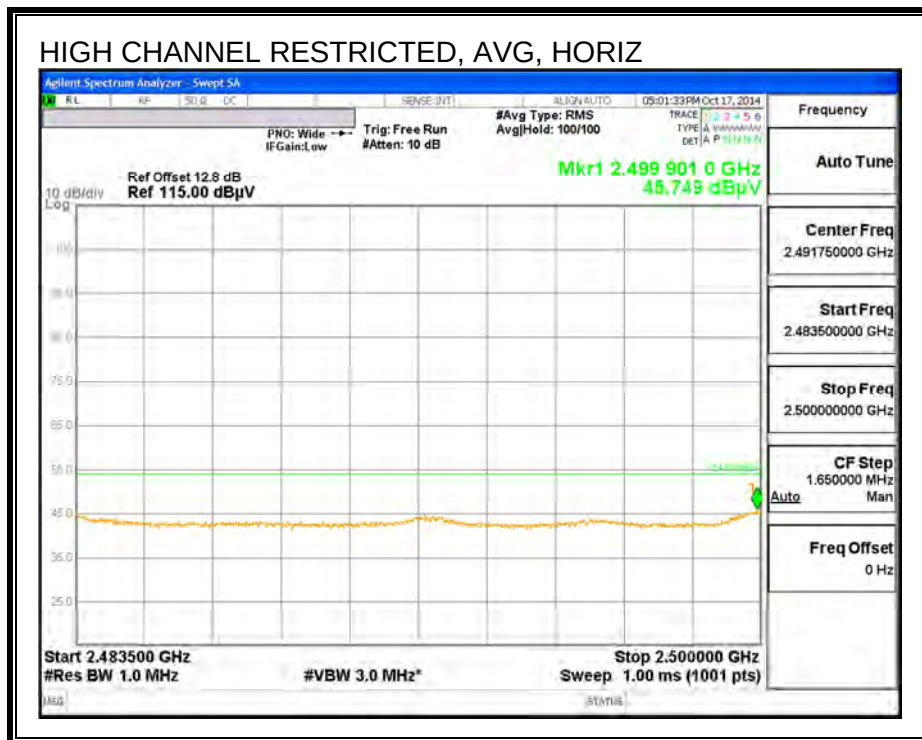
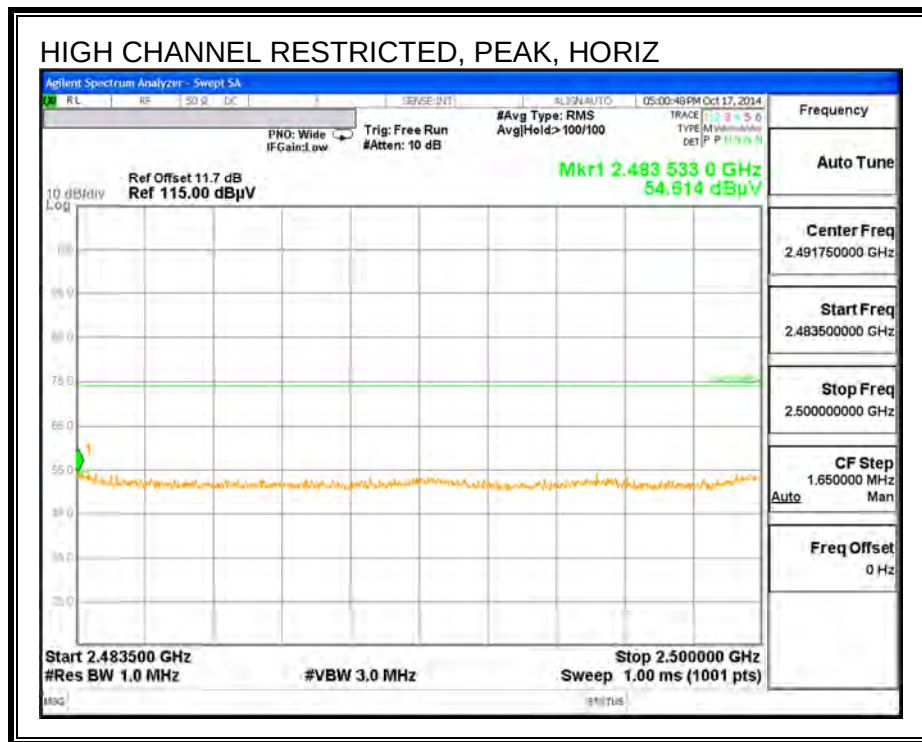
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



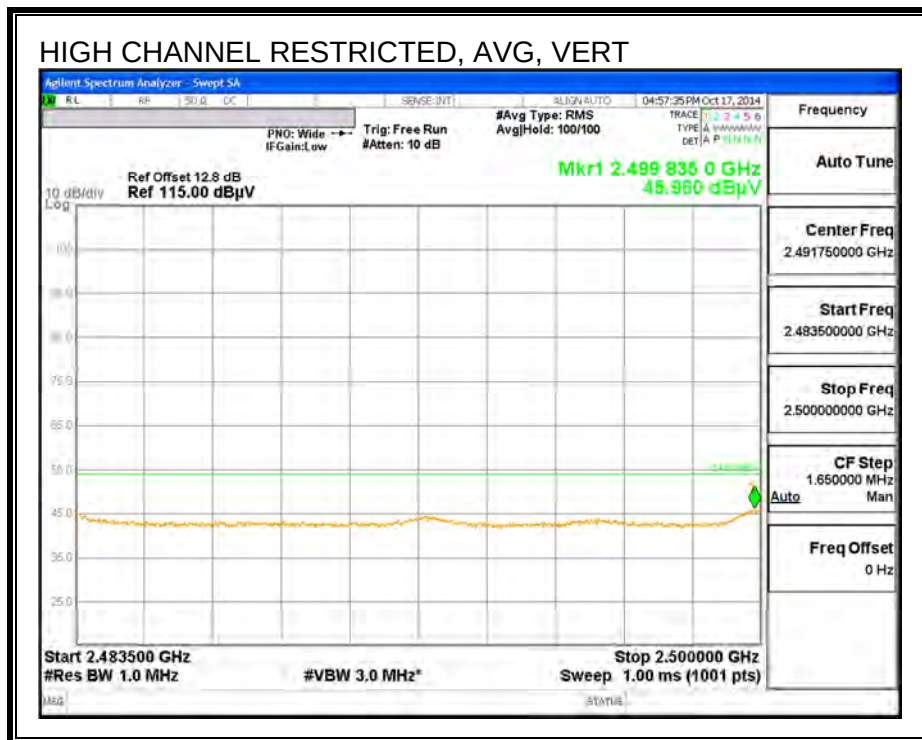
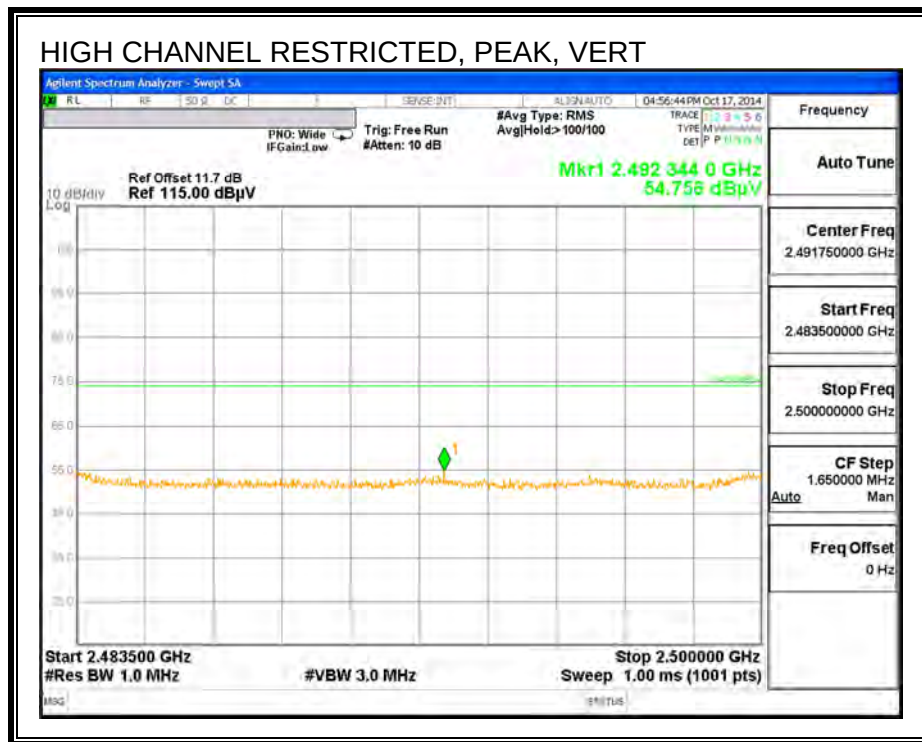
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



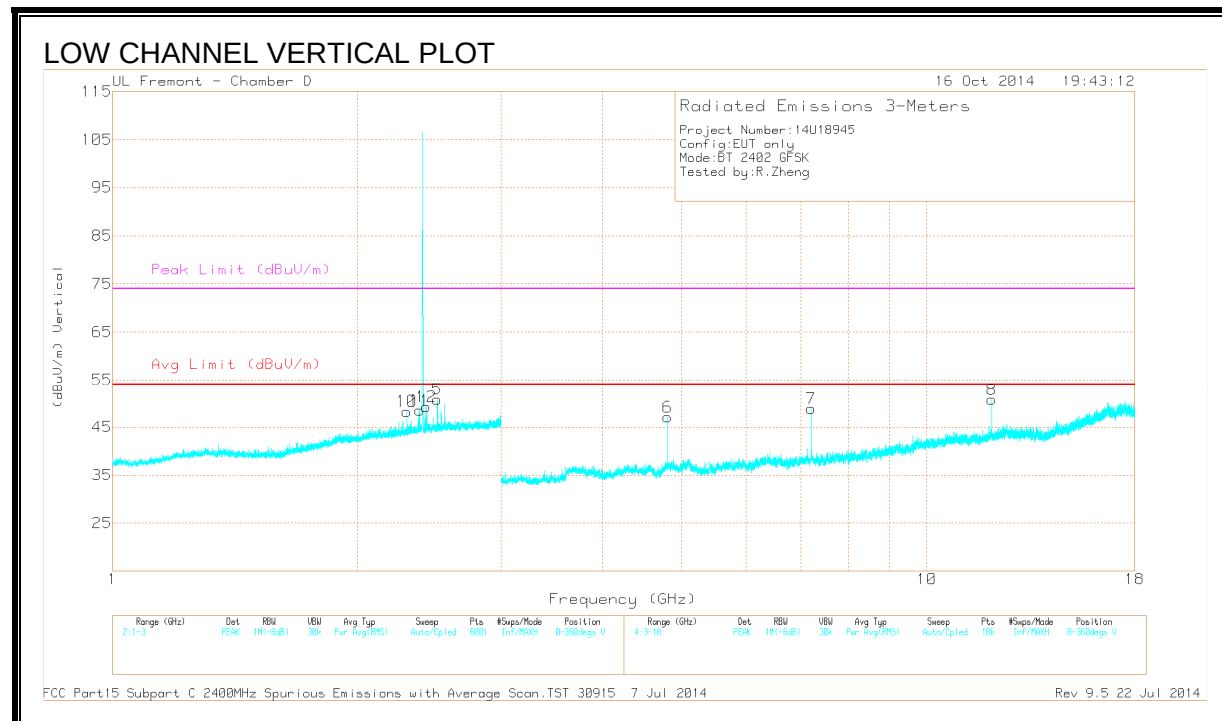
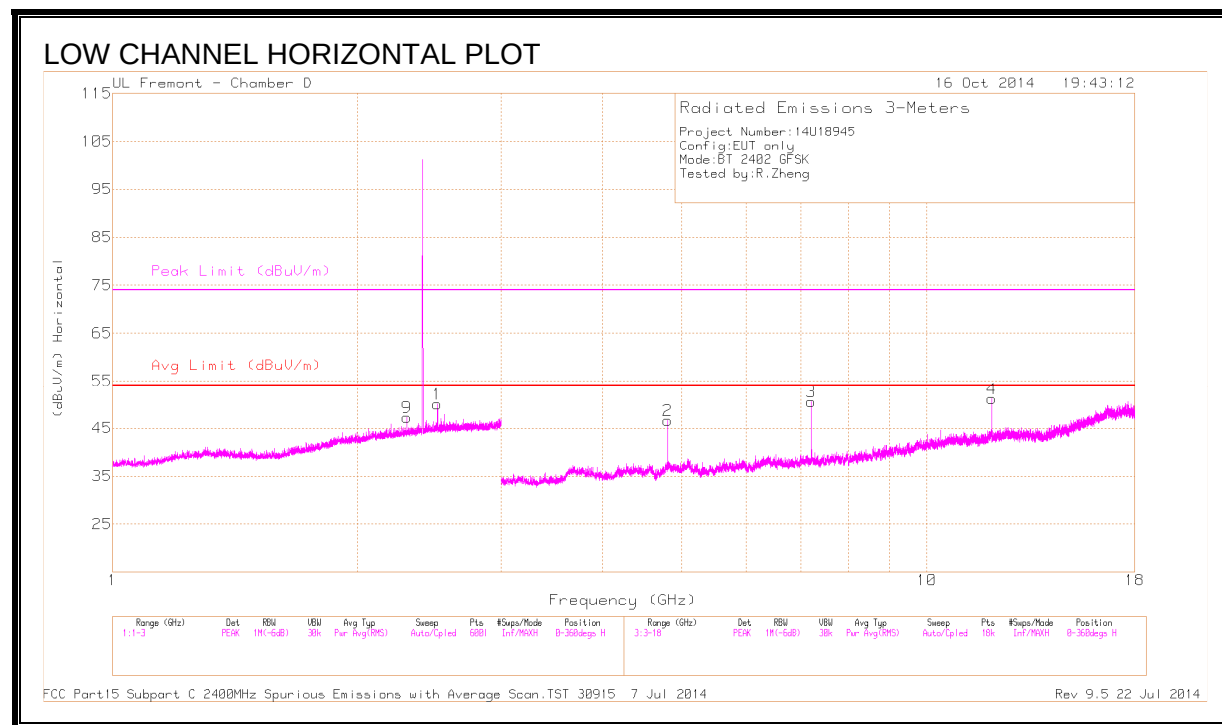
RESTRICTED BANEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS(LOW)



DATA

Radiated Emissions

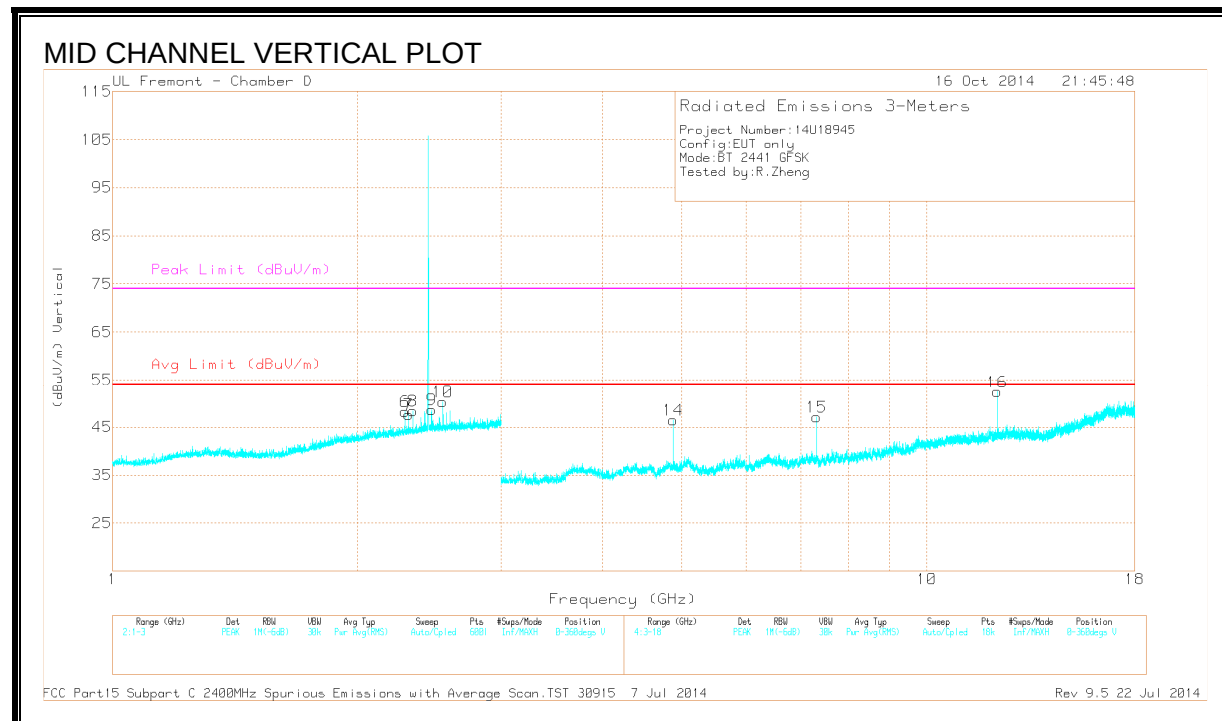
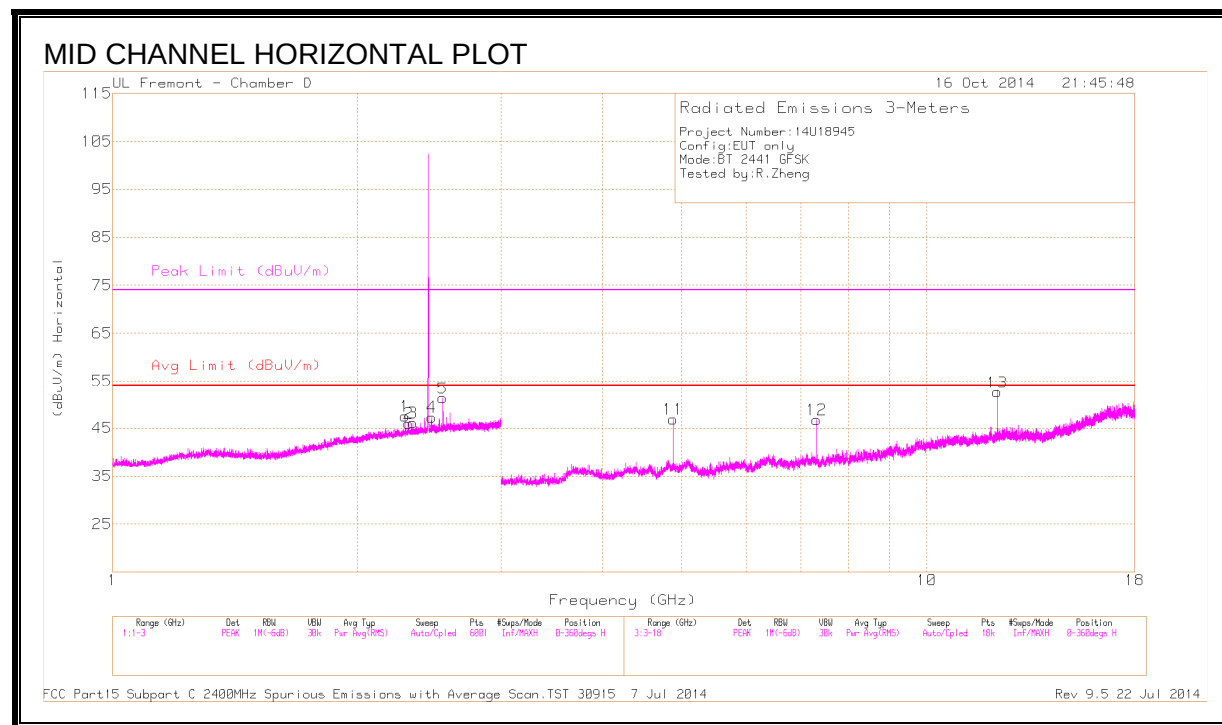
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
9	* 2.298	41.96	PK3	31.9	-20.8	0	53.06	-	-	74	-20.94	213	103	H
	* 2.298	29.5	VB10	31.9	-20.8	1.13	41.73	54	-12.27	-	-	213	103	H
10	* 2.297	43.76	PK3	31.9	-20.8	0	54.86	-	-	74	-19.14	46	204	V
	* 2.298	32.06	VB10	31.9	-20.8	1.13	44.29	54	-9.71	-	-	46	204	V
11	* 2.382	43.62	PK3	32.1	-20.7	0	55.02	-	-	74	-18.98	15	110	V
	* 2.382	31.63	VB10	32.1	-20.7	1.13	44.16	54	-9.84	-	-	15	110	V
2	* 4.804	39.44	PK3	34.2	-27.1	0	46.54	-	-	74	-27.46	15	202	H
	* 4.804	28.43	VB10	34.2	-27.1	1.13	36.66	54	-17.34	-	-	15	202	H
4	* 12.009	37.82	PK3	38.8	-20.8	0	55.82	-	-	74	-18.18	21	320	H
	* 12.01	26.5	VB10	38.8	-20.9	1.13	45.53	54	-8.47	-	-	21	320	H
6	* 4.804	43.27	PK3	34.2	-27.1	0	50.37	-	-	74	-23.63	10	101	V
	* 4.804	34.22	VB10	34.2	-27.1	1.13	42.45	54	-11.55	-	-	10	101	V
8	* 12.01	40.43	PK3	38.8	-20.9	0	58.33	-	-	74	-15.67	59	371	V
	* 12.01	29.63	VB10	38.8	-20.9	1.13	48.66	54	-5.34	-	-	59	371	V
12	2.426	44.24	PK3	32.2	-20.5	0	55.94	-	-	-	-	15	101	V
1	2.506	43.23	PK3	32.3	-20.6	0	54.93	-	-	-	-	213	103	V
5	2.507	42.28	PK3	32.3	-20.6	0	53.98	-	-	-	-	213	103	H
3	7.206	41.4	PK3	35.7	-25.1	0	52	-	-	-	-	15	202	H
7	7.206	37.45	PK3	35.7	-25.1	0	48.05	-	-	-	-	10	202	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK3 - FHSS Method: Maximum Peak

VB10Hz - FHSS Method: 10Hz Video Bandwidth

HARMONICS AND SPURIOUS EMISSIONS(MID)



DATA

Radiated Emissions

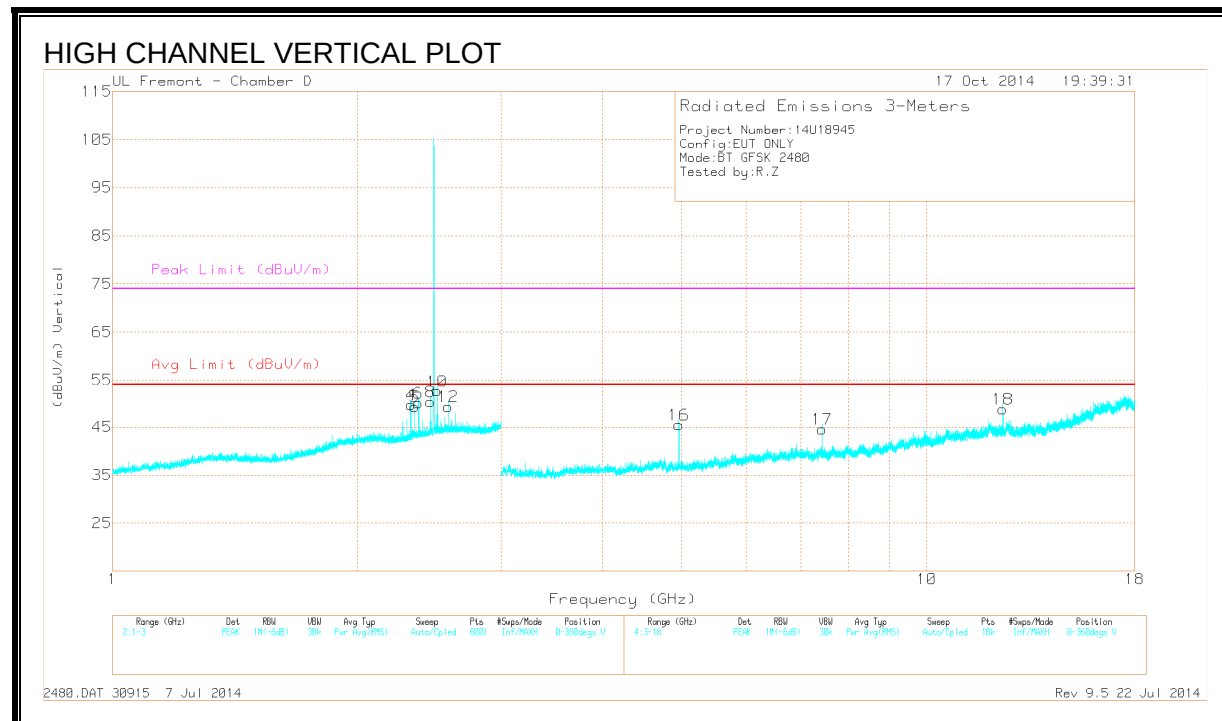
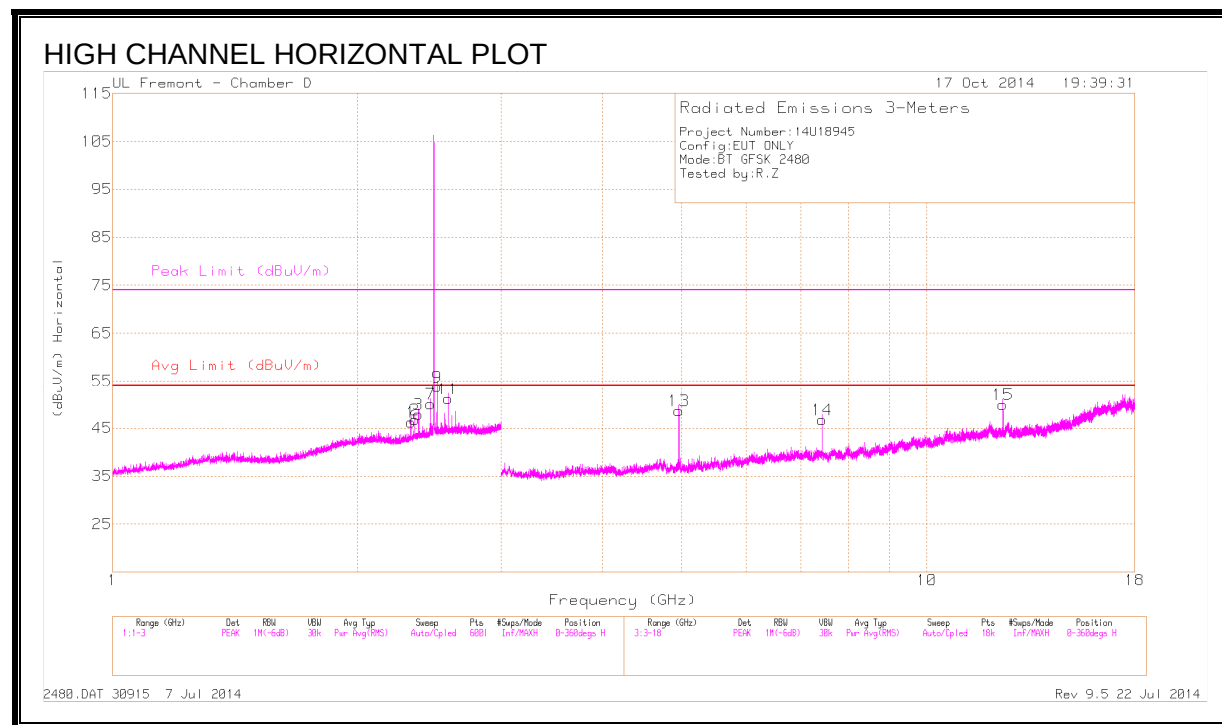
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.285	42.93	PK3	31.9	-20.7	0	54.13	-	-	74	-19.87	25	194	H
	* 2.285	31.01	VB10	31.9	-20.7	1.13	43.34	54	-10.66	-	-	25	194	H
2	* 2.311	42.65	PK3	31.9	-20.7	0	53.85	-	-	74	-20.15	204	222	H
	* 2.311	30.15	VB10	31.9	-20.7	1.13	42.48	54	-11.52	-	-	204	222	H
3	* 2.337	42.83	PK3	32	-20.8	0	54.03	-	-	74	-19.97	216	118	H
	* 2.337	30.92	VB10	32	-20.8	1.13	43.25	54	-10.75	-	-	216	118	H
6	* 2.285	43.85	PK3	31.9	-20.7	0	55.05	-	-	74	-18.95	213	159	V
	* 2.285	32.64	VB10	31.9	-20.7	1.13	44.97	54	-9.03	-	-	213	159	V
7	* 2.311	44.02	PK3	31.9	-20.7	0	55.22	-	-	74	-18.78	189	116	V
	* 2.311	31.92	VB10	31.9	-20.7	1.13	44.25	54	-9.75	-	-	189	116	V
8	* 2.337	43.66	PK3	32	-20.8	0	54.86	-	-	74	-19.14	226	248	V
	* 2.337	31.99	VB10	32	-20.8	1.13	44.32	54	-9.68	-	-	226	248	V
11	* 4.882	44.56	PK3	34.2	-27.1	0	51.66	-	-	74	-22.34	348	312	H
	* 4.882	36.3	VB10	34.2	-27.1	1.13	44.53	54	-9.47	-	-	348	312	H
12	* 7.322	42.92	PK3	35.7	-25	0	53.62	-	-	74	-20.38	238	213	H
	* 7.322	33.57	VB10	35.7	-25	1.13	45.4	54	-8.6	-	-	238	213	H
13	* 12.205	41.22	PK3	39	-21.4	0	58.82	-	-	74	-15.18	210	113	H
	* 12.205	30.64	VB10	39	-21.4	1.13	49.37	54	-4.63	-	-	210	113	H
14	* 4.882	42.78	PK3	34.2	-27.1	0	49.88	-	-	74	-24.12	178	113	V
	* 4.882	33.23	VB10	34.2	-27.1	1.13	41.46	54	-12.54	-	-	178	113	V
15	* 7.322	42.43	PK3	35.7	-25	0	53.13	-	-	74	-20.87	349	171	V
	* 7.322	33.42	VB10	35.7	-25	1.13	45.25	54	-8.75	-	-	349	171	V
16	* 12.205	40.2	PK3	39	-21.4	0	57.8	-	-	74	-16.2	126	180	V
	* 12.205	29.48	VB10	39	-21.4	1.13	48.21	54	-5.79	-	-	126	180	V
4	2.465	43.2	PK3	32.3	-20.6	0	54.9	-	-	-	-	216	202	H
9	2.465	43.64	PK3	32.3	-20.6	0	55.34	-	-	-	-	226	100	V
5	2.545	44.44	PK3	32.3	-20.5	0	56.24	-	-	-	-	216	100	H
10	2.545	44.16	PK3	32.3	-20.5	0	55.96	-	-	-	-	226	100	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK3 - FHSS Method: Maximum Peak

VB10Hz - FHSS Method: 10Hz Video Bandwidth

HARMONICS AND SPURIOUS EMISSIONS(HIGH)



DATA

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl /Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.324	46.91	PK3	31.6	-25	0	53.51	-	-	74	-20.49	328	329	H
	* 2.324	37.9	VB10	31.6	-25	1.13	45.63	54	-8.37	-	-	328	329	H
2	* 2.35	46.44	PK3	31.8	-24.7	0	53.54	-	-	74	-20.46	313	257	H
	* 2.35	37.44	VB10	31.8	-24.7	1.13	45.67	54	-8.33	-	-	313	257	H
3	* 2.376	47.17	PK3	31.9	-24.6	0	54.47	-	-	74	-19.53	313	322	H
	* 2.376	38.33	VB10	31.9	-24.6	1.13	46.76	54	-7.24	-	-	313	322	H
4	* 2.324	48.52	PK3	31.6	-25	0	55.12	-	-	74	-18.88	309	103	V
	* 2.324	41.13	VB10	31.6	-25	1.13	48.86	54	-5.14	-	-	309	103	V
5	* 2.35	47.34	PK3	31.8	-24.7	0	54.44	-	-	74	-19.56	319	106	V
	* 2.35	39.49	VB10	31.8	-24.7	1.13	47.72	54	-6.28	-	-	319	106	V
6	* 2.376	47.45	PK3	31.9	-24.6	0	54.75	-	-	74	-19.25	307	146	V
	* 2.376	39.53	VB10	31.9	-24.6	1.13	47.96	54	-6.04	-	-	307	146	V
13	* 4.96	48.43	PK3	34.1	-30.2	0	52.33	-	-	74	-21.67	83	135	H
	* 4.96	42.52	VB10	34.1	-30.2	1.13	47.55	54	-6.45	-	-	83	135	H
14	* 7.439	44.5	PK3	35.7	-28.2	0	52	-	-	74	-22	2	115	H
	* 7.44	36.5	VB10	35.7	-28.2	1.13	45.13	54	-8.87	-	-	2	115	H
15	* 12.399	42.56	PK3	38.9	-24.2	0	57.26	-	-	74	-16.74	332	152	H
	* 12.399	32.51	VB10	38.9	-24.2	1.13	48.34	54	-5.66	-	-	332	152	H
16	* 4.96	45.93	PK3	34.1	-30.2	0	49.83	-	-	74	-24.17	249	229	V
	* 4.96	39.46	VB10	34.1	-30.2	1.13	44.49	54	-9.51	-	-	249	229	V
17	* 7.44	44.03	PK3	35.7	-28.2	0	51.53	-	-	74	-22.47	113	162	V
	* 7.44	35.5	VB10	35.7	-28.2	1.13	44.13	54	-9.87	-	-	113	162	V
18	* 12.402	36.7	PK3	38.9	-24.1	1.13	52.63	-	-	74	-21.37	118	386	V
	* 12.402	24.02	VB10	38.9	-24.1	1.13	39.95	54	-14.05	-	-	118	386	V
7	2.456	47.18	PK3	32.2	-24.5	0	54.88	-	-	-	-	307	101	H
8	2.456	48	PK3	32.2	-24.5	0	55.7	-	-	-	-	307	101	V
9	2.504	49	PK3	32.4	-24.2	0	57.2	-	-	-	-	307	101	H
10	2.504	48.49	PK3	32.4	-24.2	0	56.69	-	-	-	-	307	200	V
11	2.584	46.98	PK3	32.5	-24.2	0	55.28	-	-	-	-	307	102	H
12	2.584	47.29	PK3	32.5	-24.2	0	55.59	-	-	-	-	307	200	V

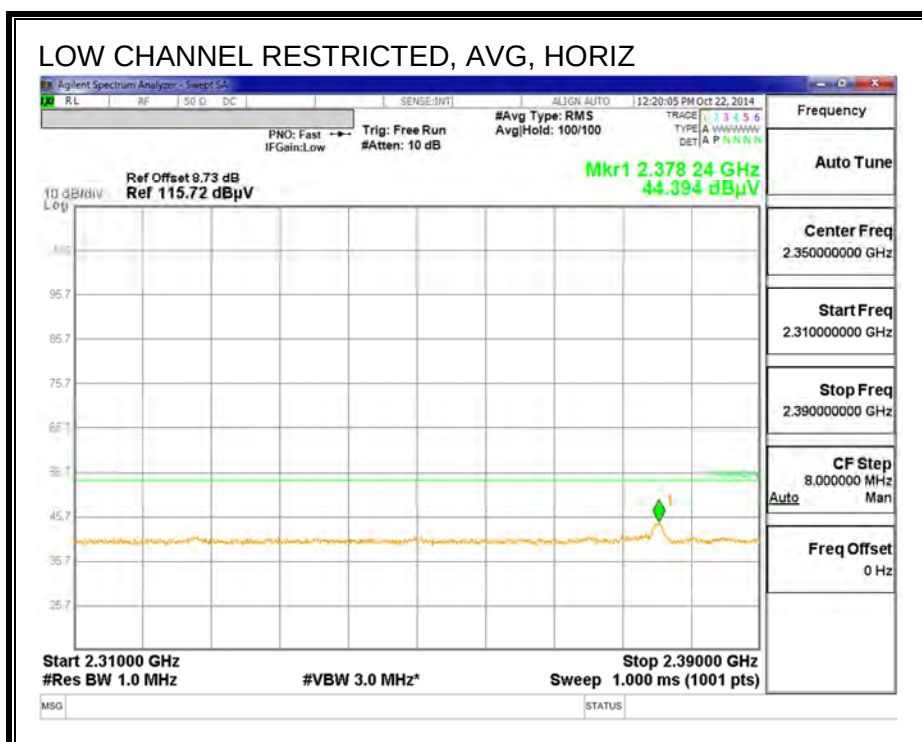
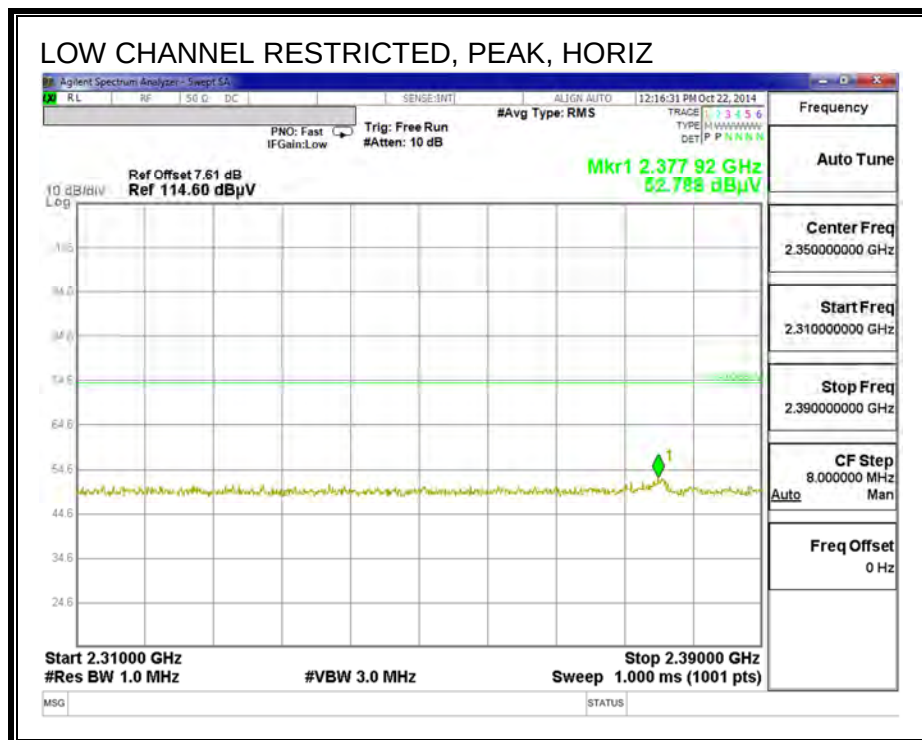
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK3 - FHSS Method: Maximum Peak

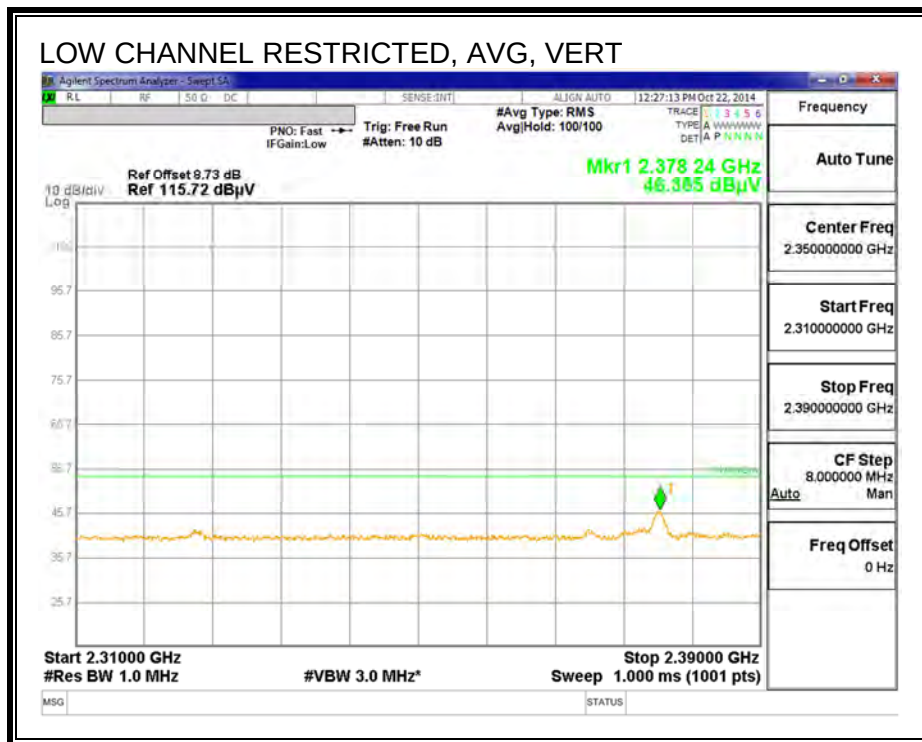
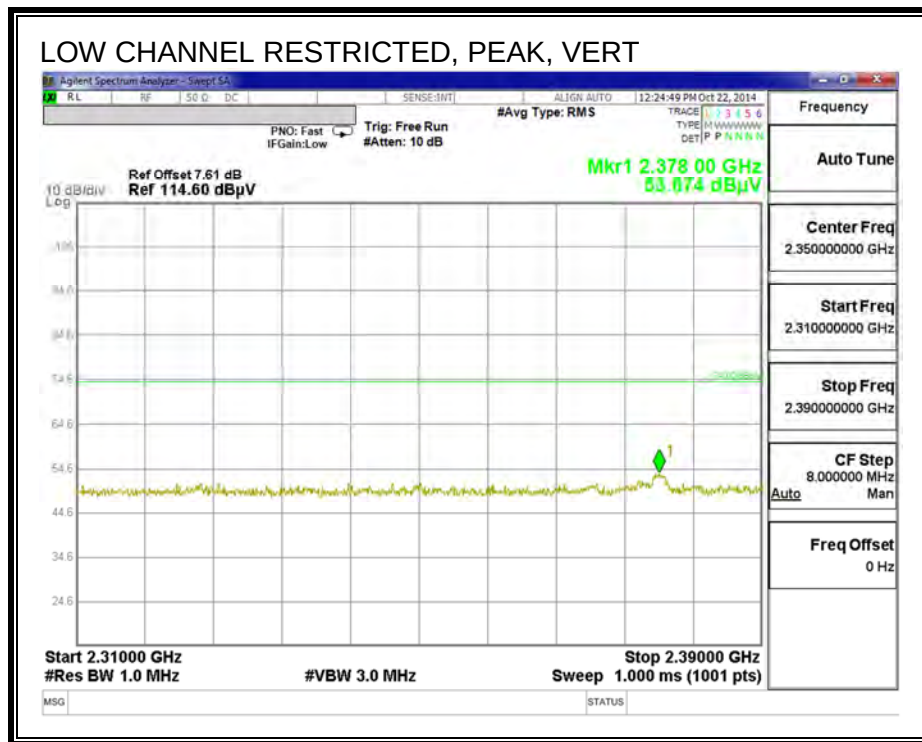
VB10Hz - FHSS Method: 10Hz Video Bandwidth

9.2.2. ENHANCED DATA RATE QPSK MODULATION

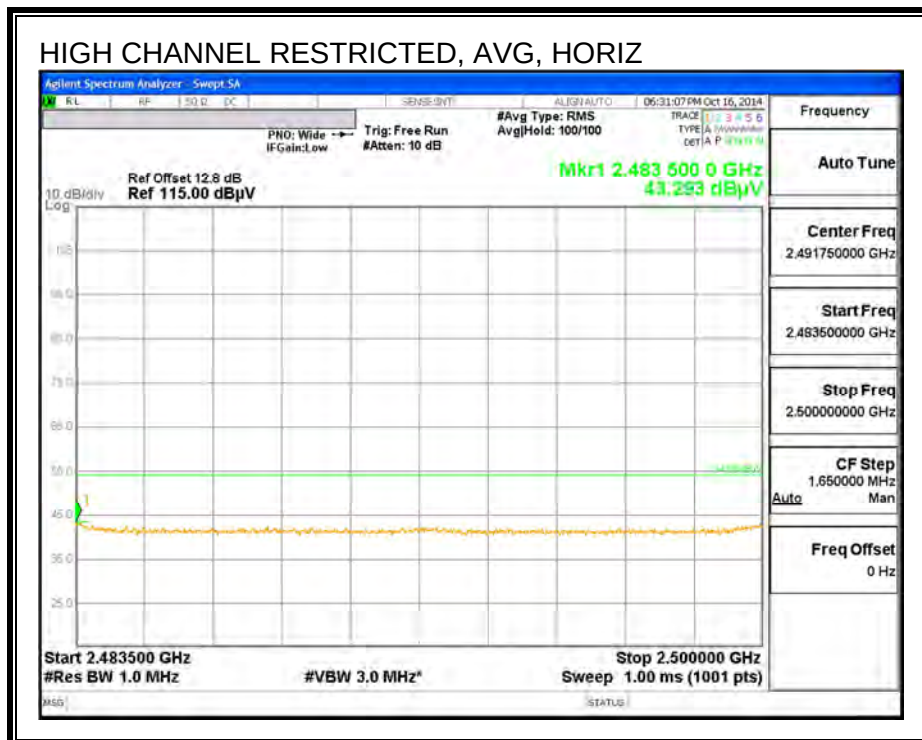
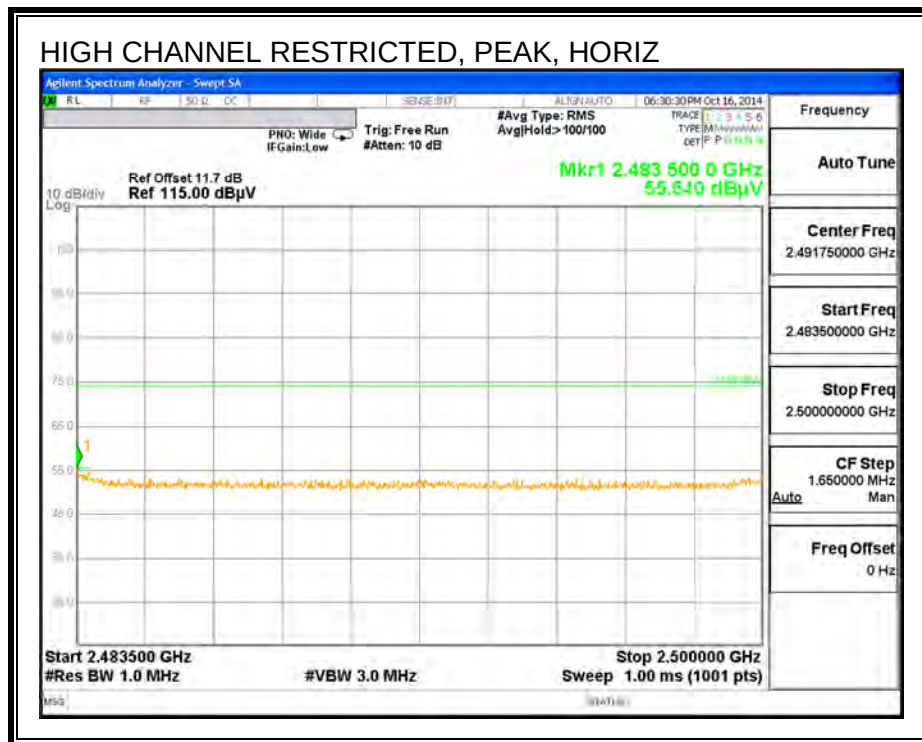
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



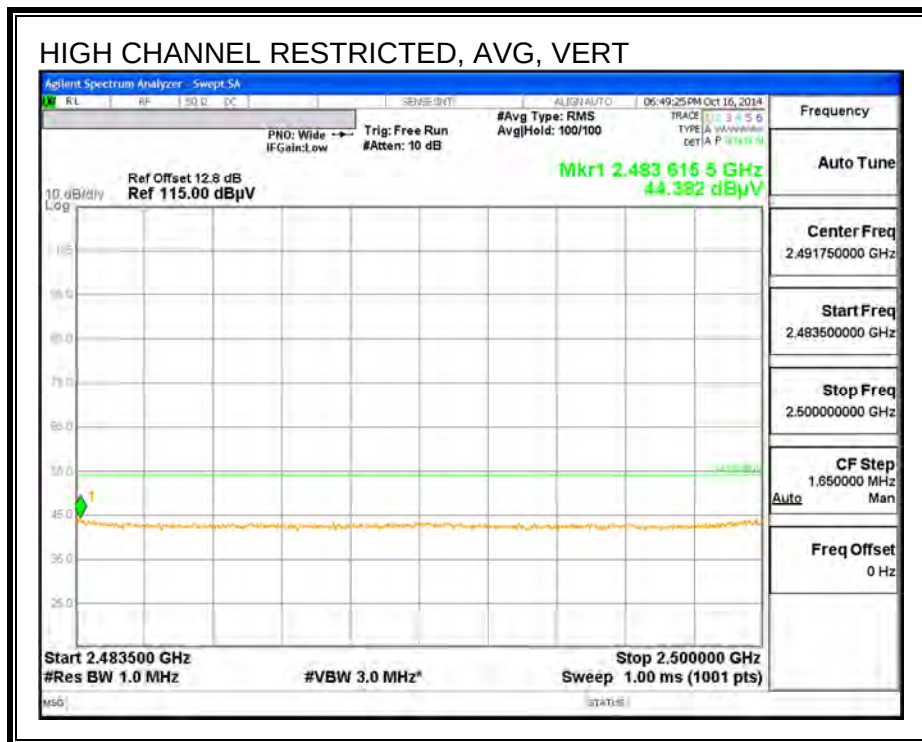
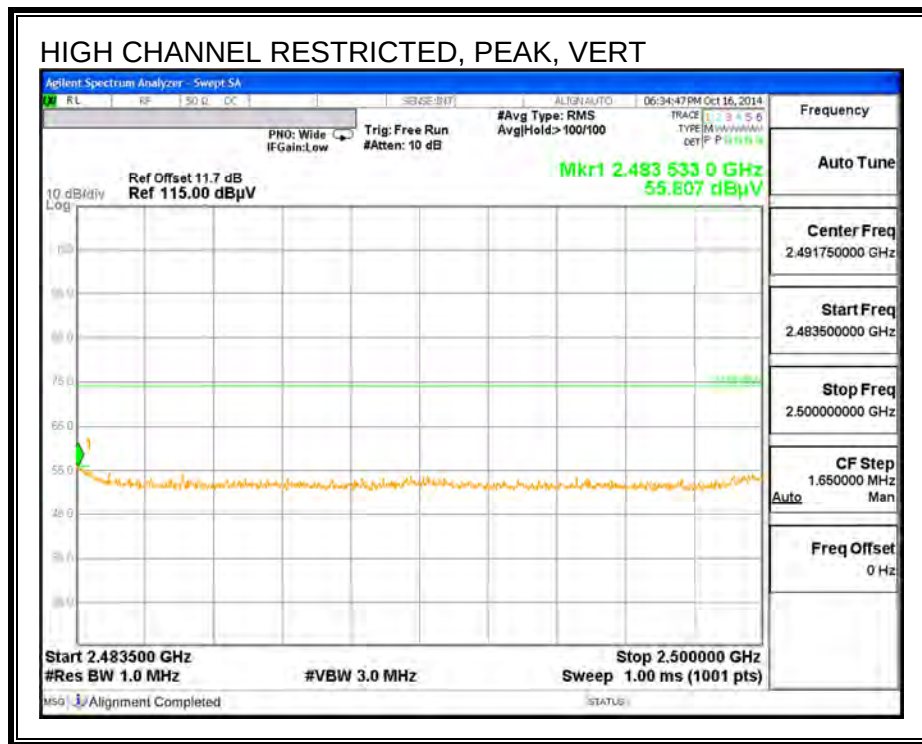
RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)



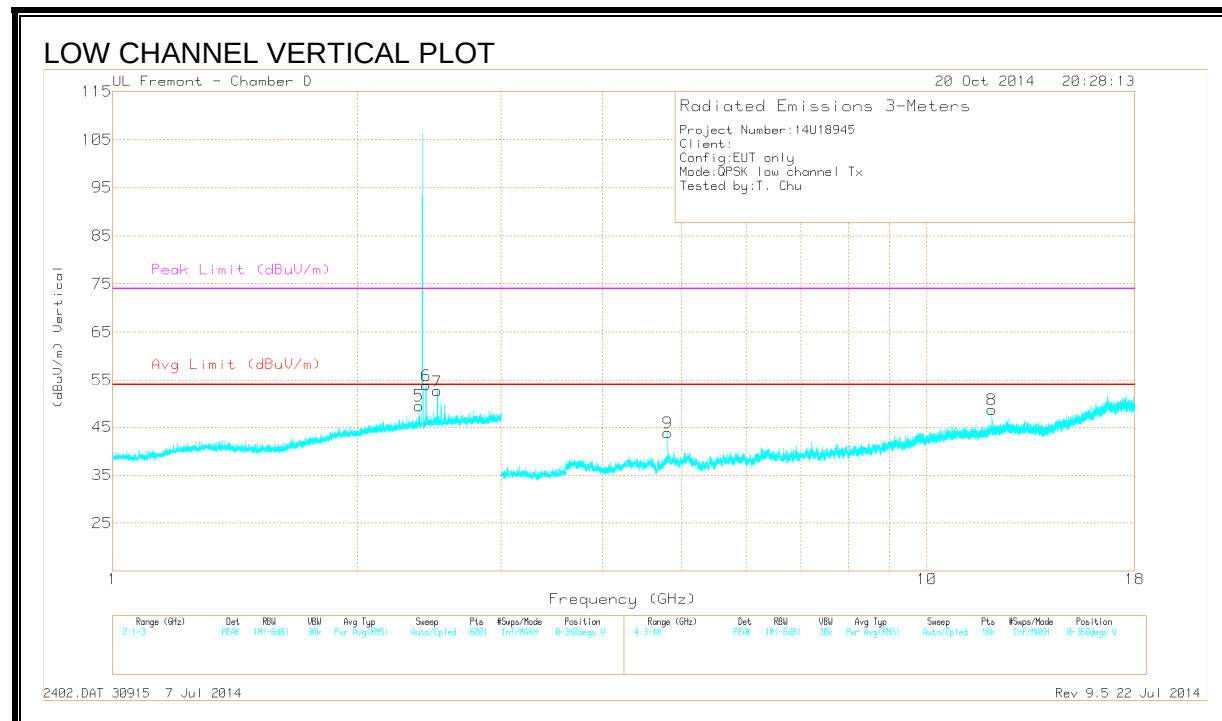
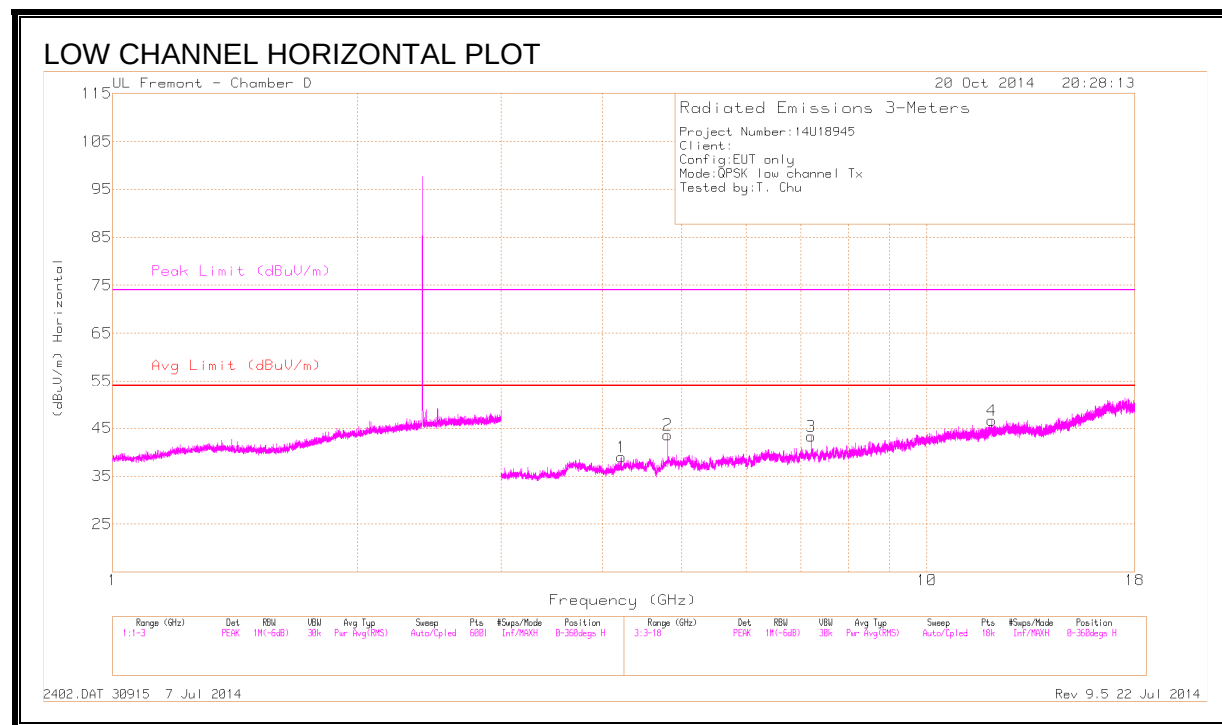
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS(LOW)



DATA

Radiated Emissions

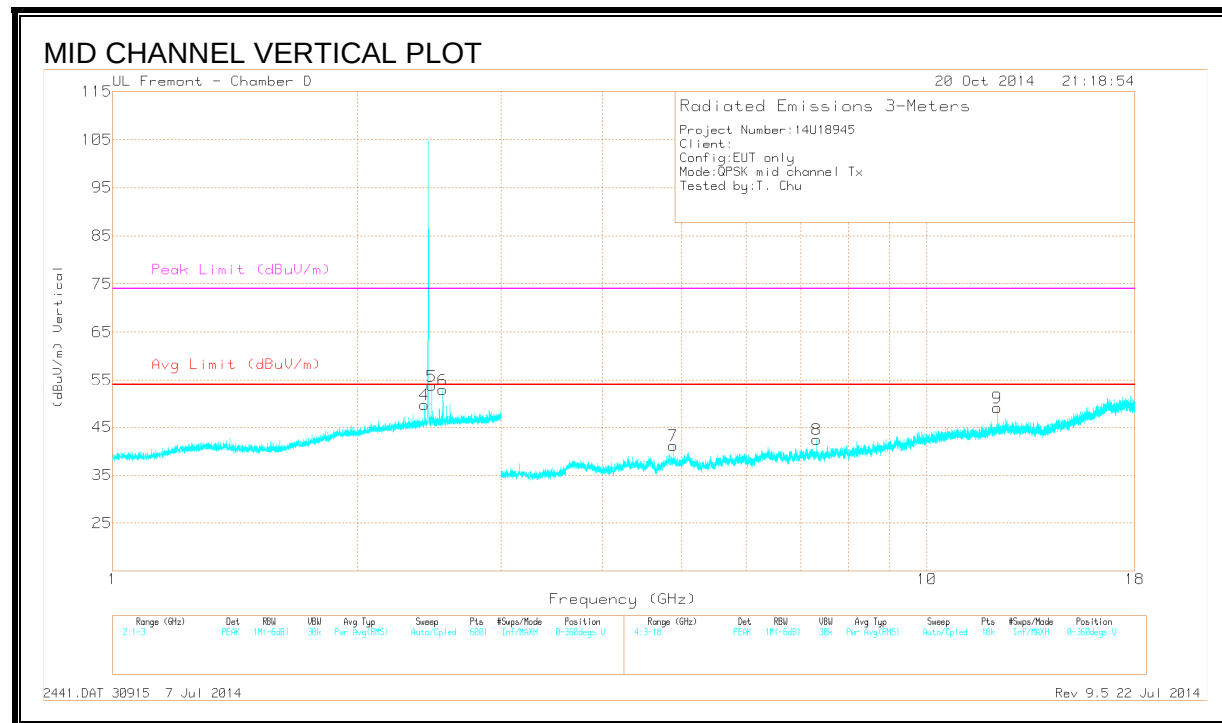
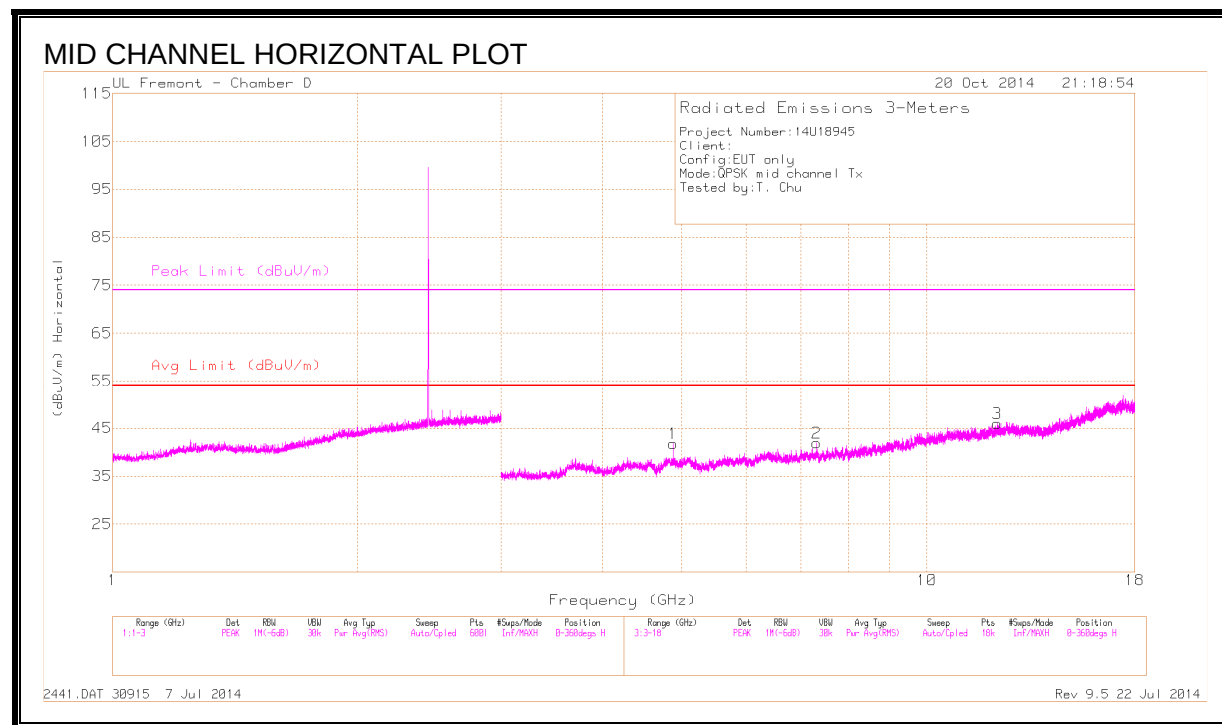
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.217	38.42	PK3	33.5	-28.4	1.12	44.64	-	-	74	-29.36	207	237	H
	* 4.217	25.3	VB10	33.5	-28.4	1.12	31.52	54	-22.48	-	-	207	237	H
2	* 4.803	42.97	PK3	34.2	-27.1	1.12	51.19	-	-	74	-22.81	234	282	H
	* 4.804	32.62	VB10	34.2	-27.1	1.12	40.84	54	-13.16	-	-	234	282	H
3	7.205	36.95	PK3	35.7	-25.1	1.12	48.67	-	-	-	-	234	282	H
4	* 12.009	38.41	PK3	38.8	-20.9	1.12	57.43	-	-	74	-16.57	108	122	H
	* 12.009	25.87	VB10	38.8	-20.9	1.12	44.89	54	-9.11	-	-	108	122	H
5	* 2.378	43.73	PK3	32.1	-20.7	1.12	56.25	-	-	74	-17.75	64	143	V
	* 2.378	33.34	VB10	32.1	-20.7	1.12	45.86	54	-8.14	-	-	64	143	V
6	2.426	45.94	PK3	32.2	-20.5	1.12	58.76	-	-	-	-	64	101	V
7	2.506	44.38	PK3	32.3	-20.6	1.12	57.2	-	-	-	-	64	101	V
8	* 12.011	38.14	PK3	38.8	-20.9	1.12	57.16	-	-	74	-16.84	135	313	V
	* 12.009	26.16	VB10	38.8	-20.9	1.12	45.18	54	-8.82	-	-	135	313	V
9	* 4.804	44.51	PK3	34.2	-27.1	1.12	52.73	-	-	74	-21.27	218	282	V
	* 4.804	34.15	VB10	34.2	-27.1	1.12	42.37	54	-11.63	-	-	218	282	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK3 - FHSS Method: Maximum Peak

VB10Hz - FHSS Method: 10Hz Video Bandwidth

HARMONICS AND SPURIOUS EMISSIONS(MID)



DATA

Radiated Emissions

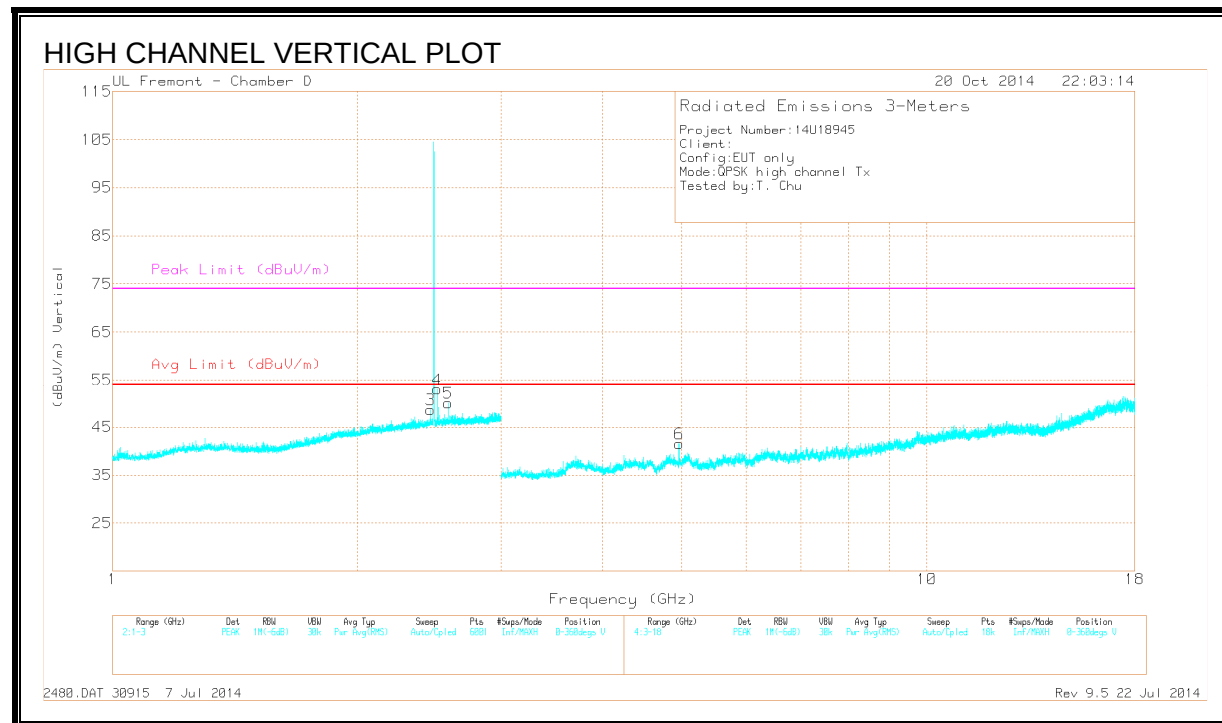
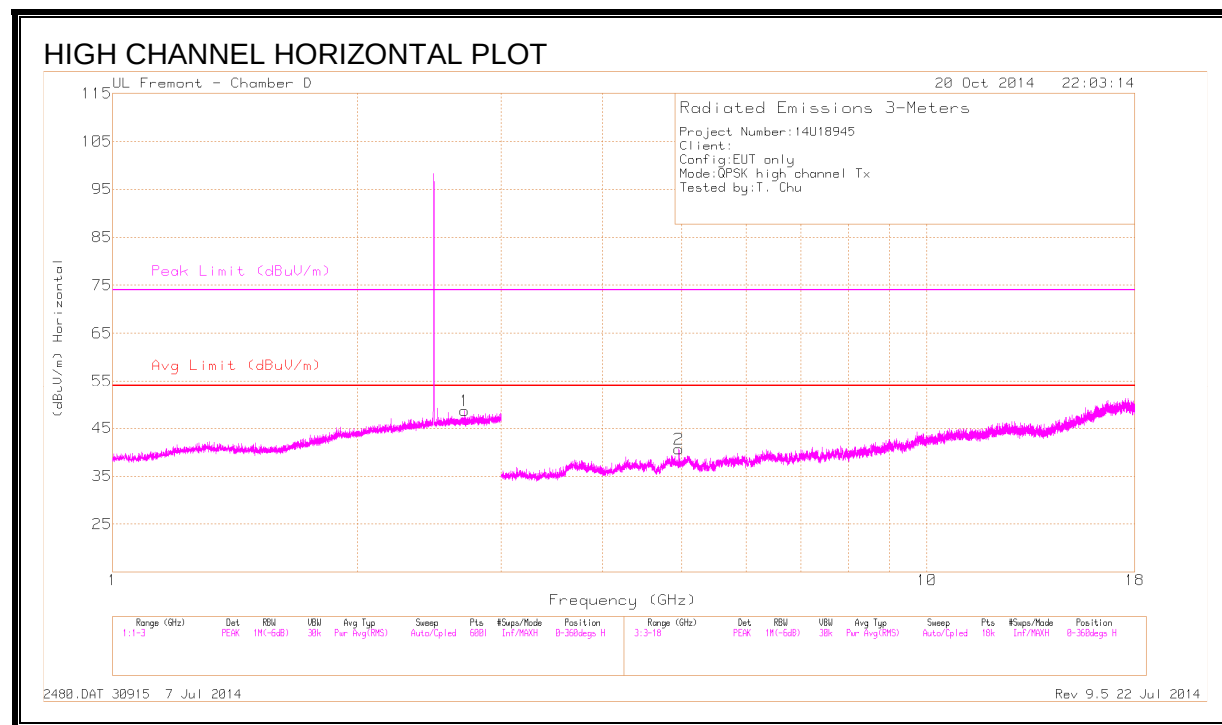
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.881	41.79	PK3	34.2	-27	1.12	50.11	-	-	74	-23.89	226	334	H
	* 4.882	31.25	VB10	34.2	-27.1	1.12	39.47	54	-14.53	-	-	226	334	H
2	* 7.323	38.03	PK3	35.7	-25	1.12	49.85	-	-	74	-24.15	283	386	H
	* 7.323	25.87	VB10	35.7	-25	1.12	37.69	54	-16.31	-	-	283	386	H
3	* 12.206	34.76	PK3	39	-21.4	1.12	53.48	-	-	74	-20.52	170	138	H
	* 12.204	22.61	VB10	39	-21.4	1.12	41.33	54	-12.67	-	-	170	138	H
4	2.417	42.03	PK3	32.2	-20.7	1.12	54.65	-	-	-	-	2	100	V
5	2.465	43.27	PK3	32.3	-20.6	1.12	56.09	-	-	-	-	2	100	V
6	2.545	42.37	PK3	32.3	-20.5	1.12	55.29	-	-	-	-	2	100	V
7	* 4.882	39.5	PK3	34.2	-27.1	1.12	47.72	-	-	74	-26.28	98	313	V
	* 4.882	28.52	VB10	34.2	-27.1	1.12	36.74	54	-17.26	-	-	98	313	V
8	* 7.322	37.06	PK3	35.7	-25	1.12	48.88	-	-	74	-25.12	225	383	V
	* 7.323	24.76	VB10	35.7	-25	1.12	36.58	54	-17.42	-	-	225	383	V
9	* 12.206	37.18	PK3	39	-21.4	1.12	55.9	-	-	74	-18.1	123	313	V
	* 12.204	24.64	VB10	39	-21.4	1.12	43.36	54	-10.64	-	-	123	313	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK3 - FHSS Method: Maximum Peak

VB10Hz - FHSS Method: 10Hz Video Bandwidth

HARMONICS AND SPURIOUS EMISSIONS(HIGH)



DATA

Radiated Emissions

Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Fi tr/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.706	41.44	PK3	32.4	-20.3	1.12	54.66	-	-	74	-19.34	53	278	H
	* 2.706	28.48	VB10	32.4	-20.3	1.12	41.7	54	-12.3	-	-	53	278	H
2	* 4.959	41.05	PK3	34.2	-28.1	1.12	48.27	-	-	74	-25.73	203	375	H
	* 4.96	31.02	VB10	34.2	-28.1	1.12	38.24	54	-15.76	-	-	203	375	H
3	2.456	42.86	PK3	32.3	-20.6	1.12	55.68	-	-	-	-	53	278	V
4	2.504	43.16	PK3	32.3	-20.7	1.12	55.88	-	-	-	-	53	278	V
5	2.584	42.7	PK3	32.3	-20.3	1.12	55.82	-	-	-	-	53	278	V
6	* 4.96	41.11	PK3	34.2	-28.1	1.12	48.33	-	-	74	-25.67	245	103	V
	* 4.96	30.06	VB10	34.2	-28.1	1.12	37.28	54	-16.72	-	-	245	103	V

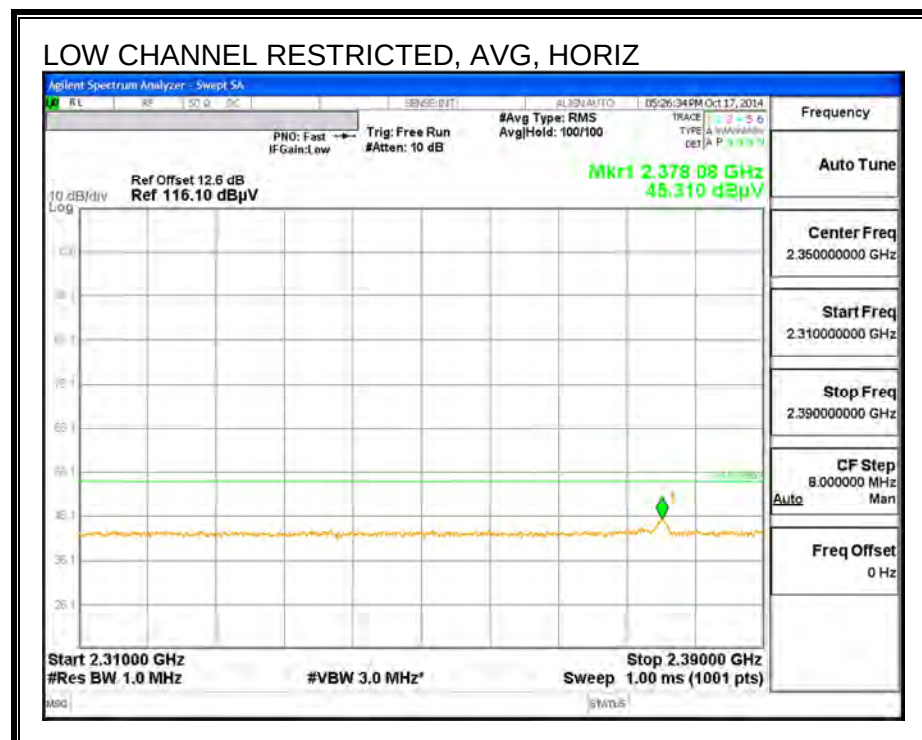
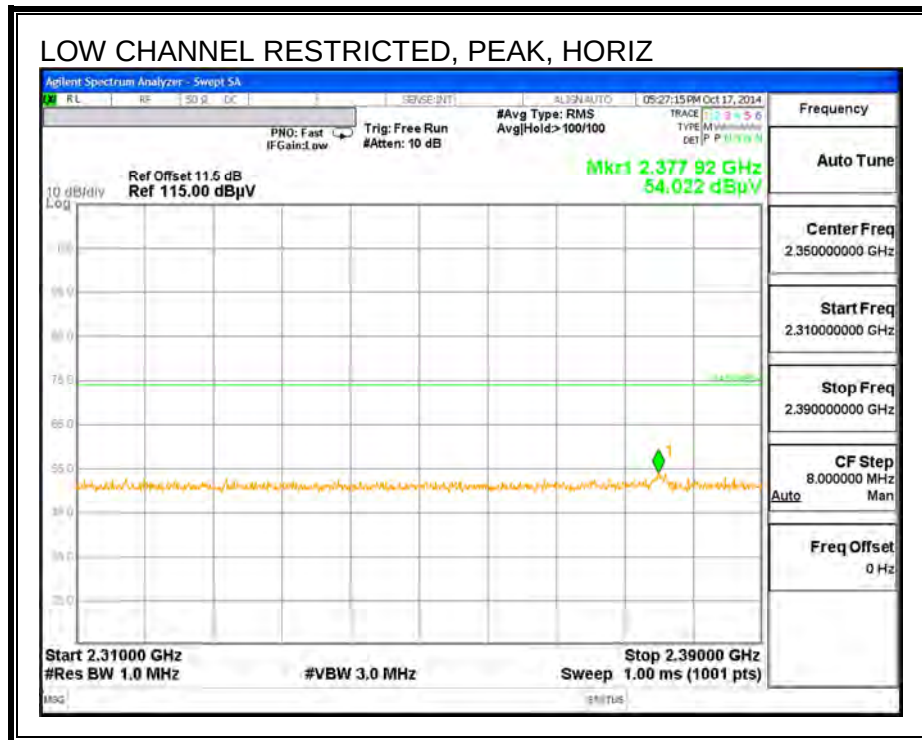
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK3 - FHSS Method: Maximum Peak

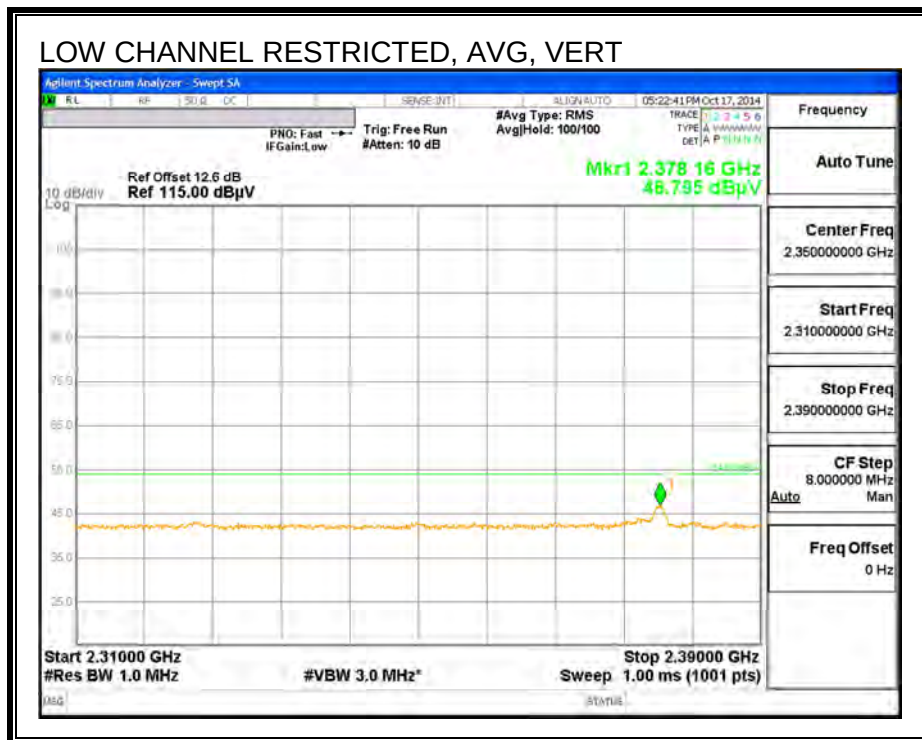
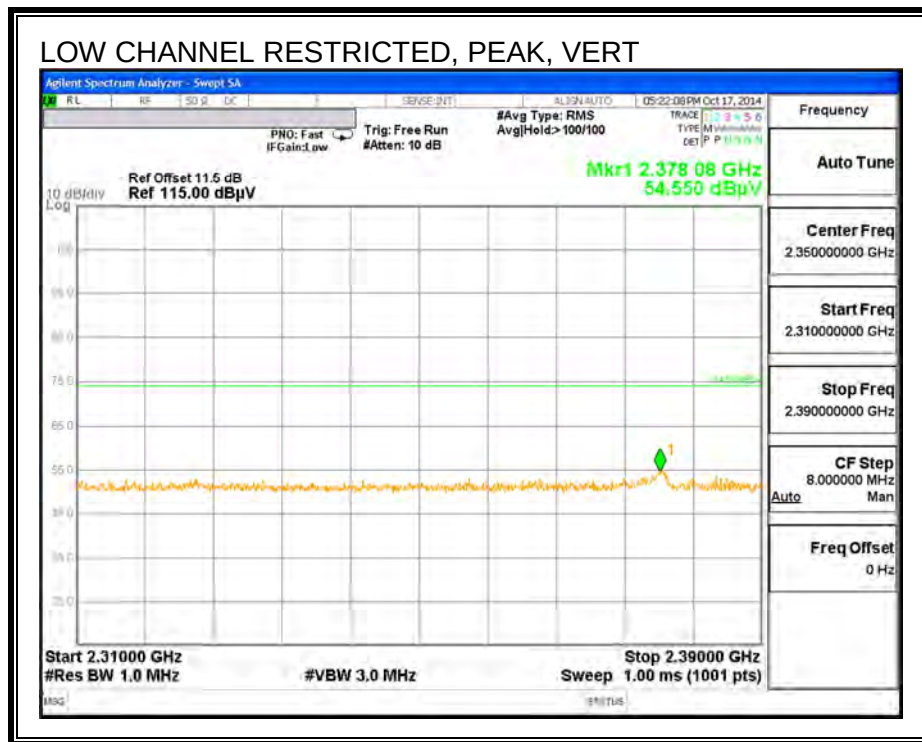
VB10Hz - FHSS Method: 10Hz Video Bandwidth

9.2.3. ENHANCED DATA RATE 8PSK MODULATION

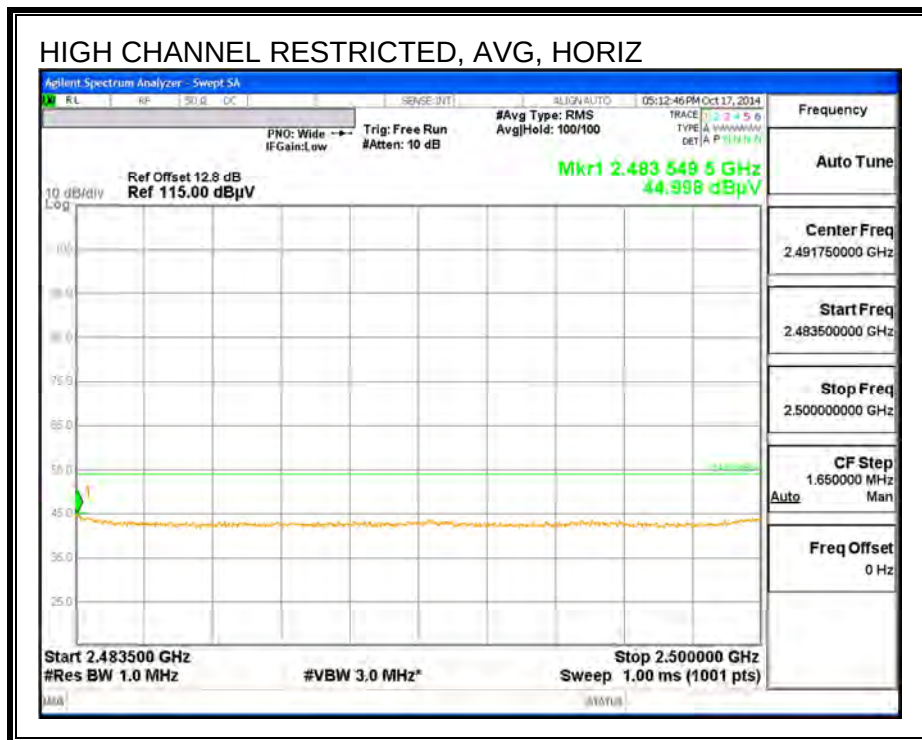
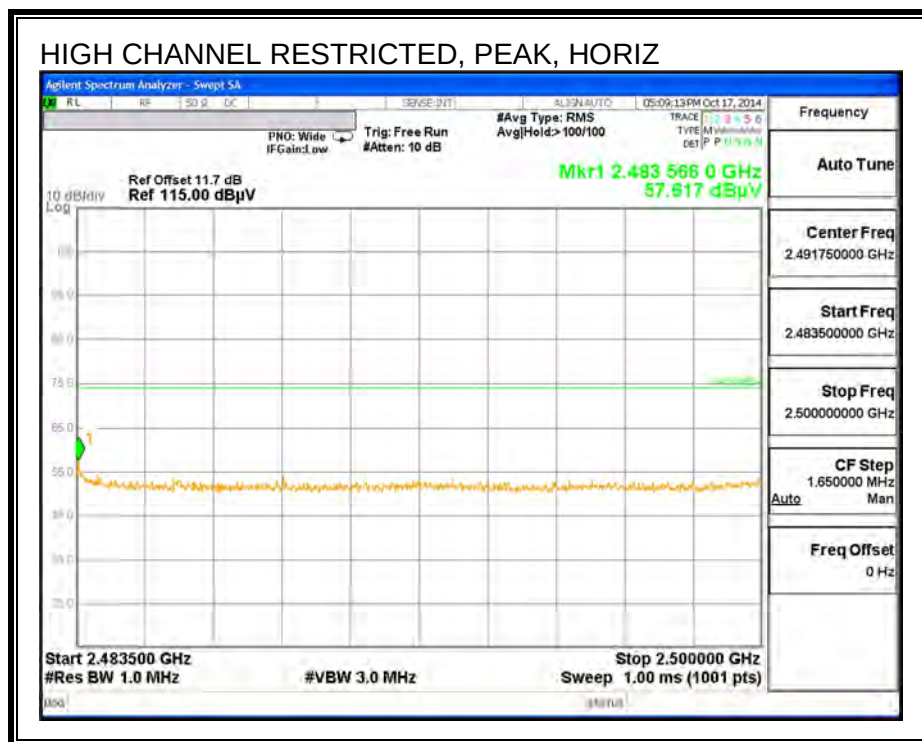
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



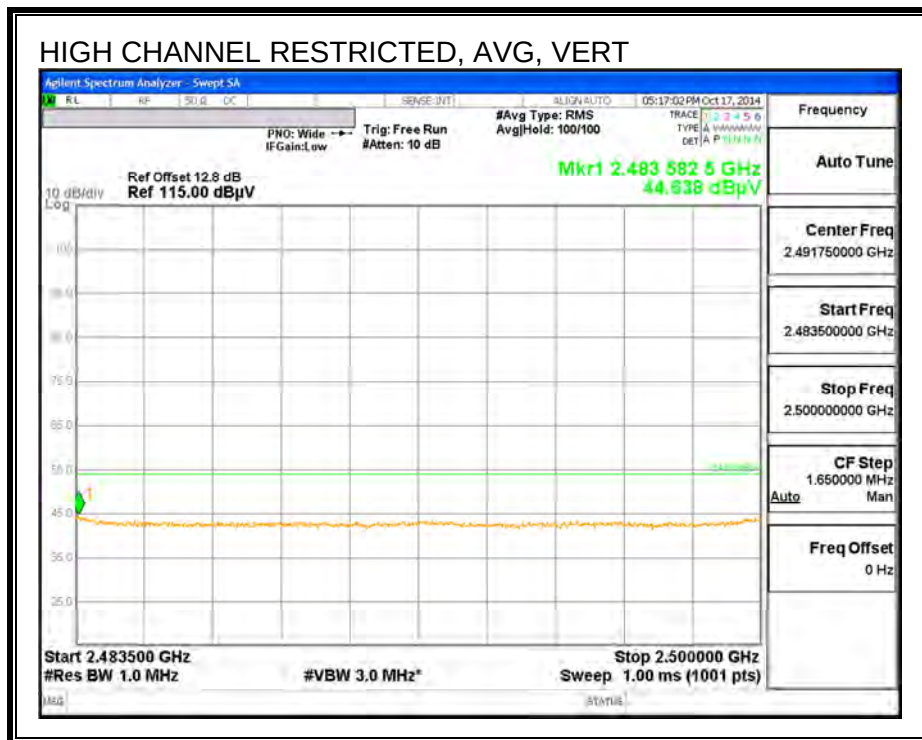
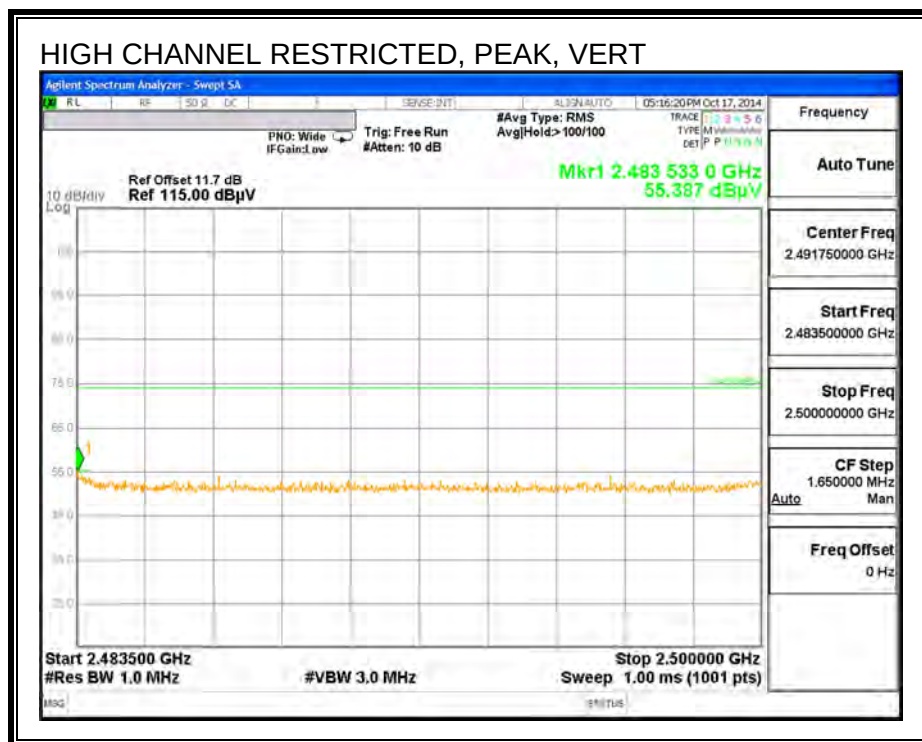
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



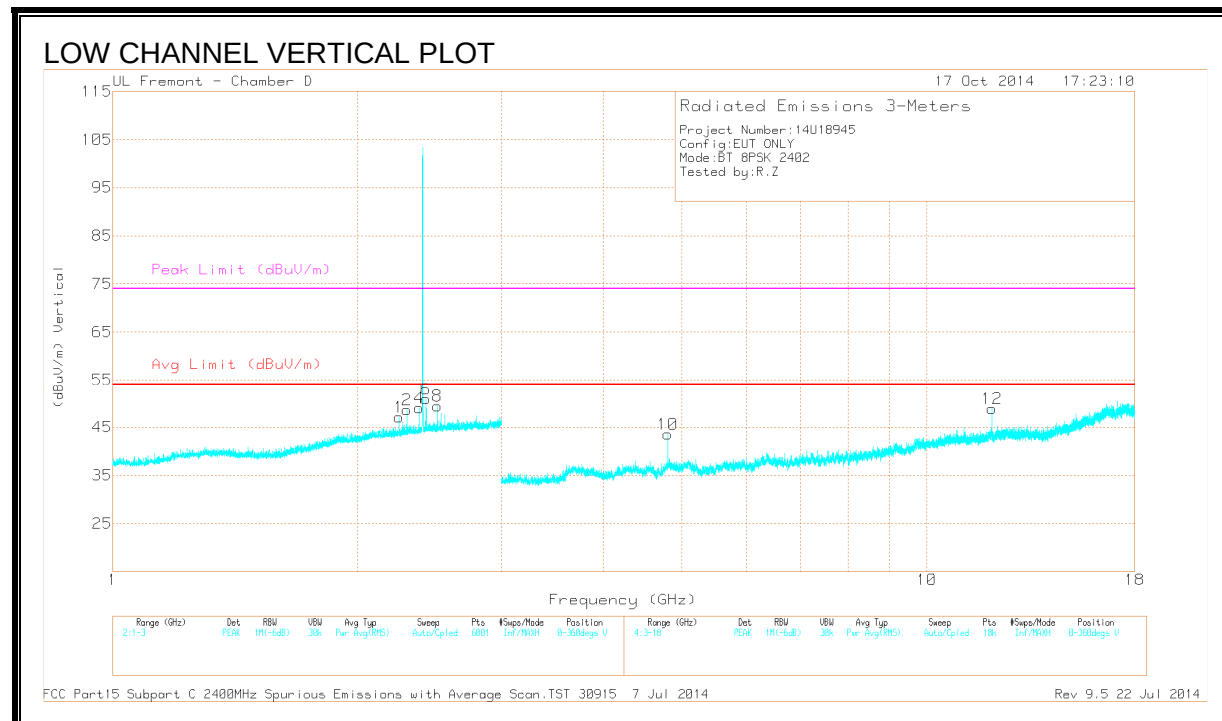
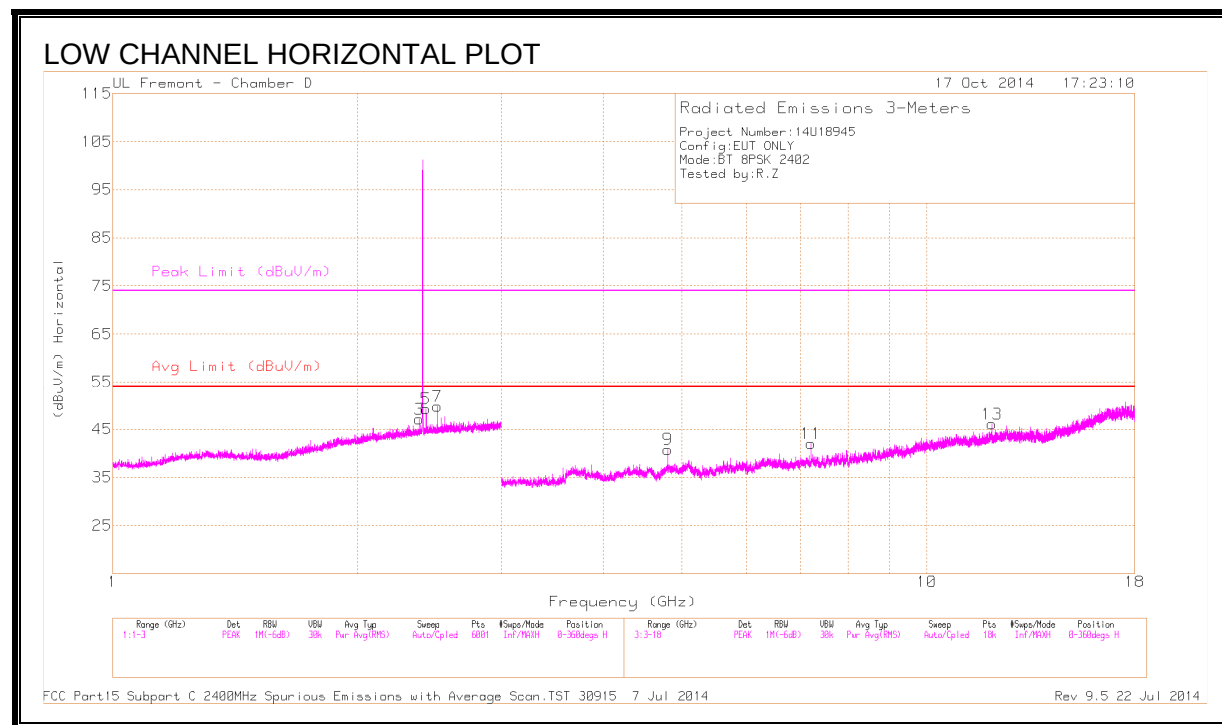
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS(LOW)



DATA

Radiated Emissions

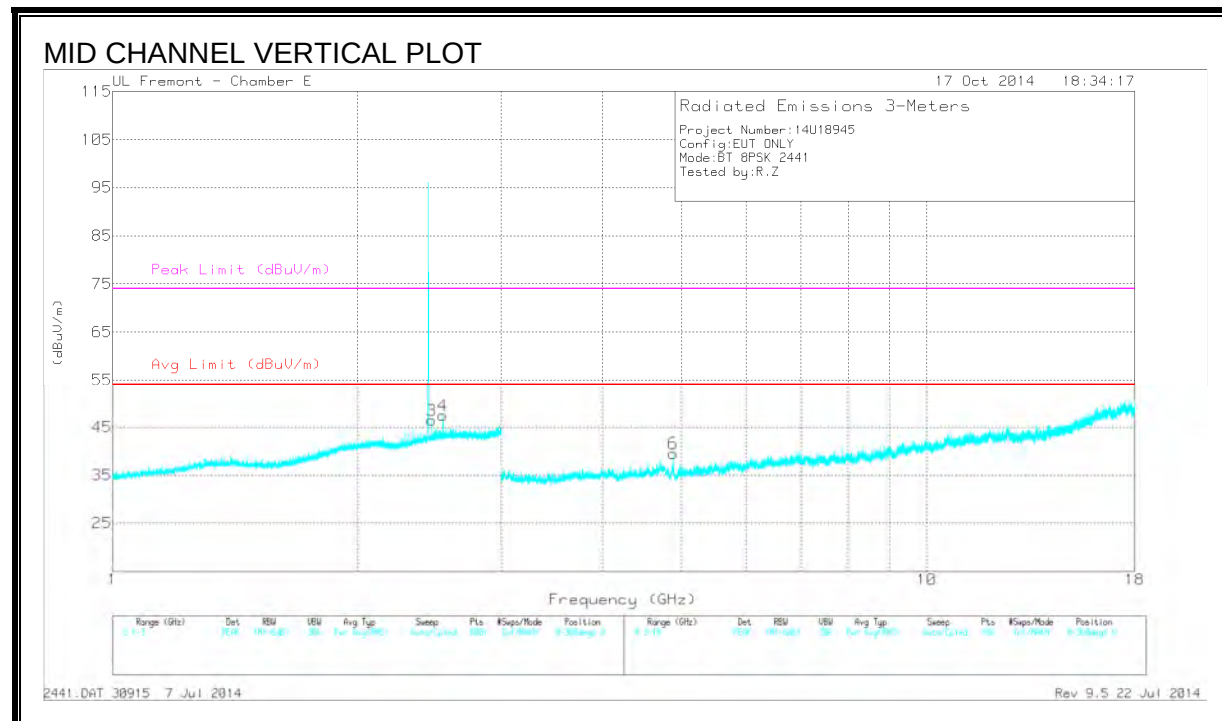
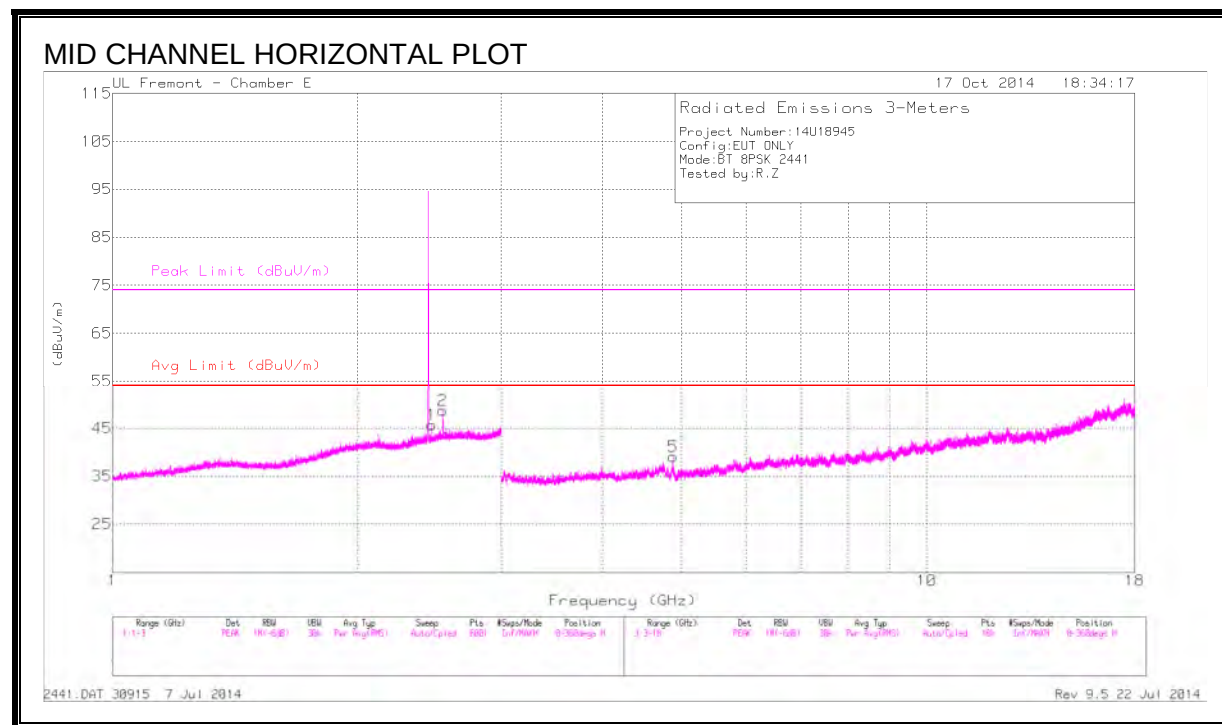
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 2.378	42.95	PK3	32.1	-20.7	0	54.35	-	-	74	-19.65	296	304	H
	* 2.378	31.18	VB10	32.1	-20.7	1.12	43.7	54	-10.3	-	-	296	304	H
1	* 2.246	43.42	PK3	31.8	-20.8	0	54.42	-	-	74	-19.58	327	104	V
	* 2.246	31.61	VB10	31.8	-20.8	1.12	43.73	54	-10.27	-	-	327	104	V
2	* 2.298	43.71	PK3	31.9	-20.8	0	54.81	-	-	74	-19.19	303	103	V
	* 2.298	32.21	VB10	31.9	-20.8	1.12	44.43	54	-9.57	-	-	303	103	V
4	* 2.379	44.31	PK3	32.1	-20.7	0	55.71	-	-	74	-18.29	297	101	V
	* 2.378	33.94	VB10	32.1	-20.7	1.12	46.46	54	-7.54	-	-	297	101	V
9	* 4.804	40.16	PK3	34.2	-27.1	0	47.26	-	-	74	-26.74	312	123	H
	* 4.804	28.87	VB10	34.2	-27.1	1.12	37.09	54	-16.91	-	-	312	123	H
13	* 12.01	37.39	PK3	38.8	-20.9	0	55.29	-	-	74	-18.71	213	282	H
	* 12.01	25.4	VB10	38.8	-20.9	1.12	44.42	54	-9.58	-	-	213	282	H
10	* 4.804	42.18	PK3	34.2	-27.1	0	49.28	-	-	74	-24.72	74	272	V
	* 4.804	32.31	VB10	34.2	-27.1	1.12	40.53	54	-13.47	-	-	74	272	V
12	* 12.011	36.41	PK3	38.8	-20.9	0	54.31	-	-	74	-19.69	220	142	V
	* 12.01	24.29	VB10	38.8	-20.9	1.12	43.31	54	-10.69	-	-	220	142	V
5	2.426	44.47	PK3	32.2	-20.5	0	56.17	-	-	-	-	297	101	H
6	2.426	45.05	PK3	32.2	-20.5	0	56.75	-	-	-	-	297	101	V
7	2.506	44.42	PK3	32.3	-20.6	0	56.12	-	-	-	-	297	101	H
8	2.506	44.12	PK3	32.3	-20.6	0	55.82	-	-	-	-	297	203	V
11	7.207	36.21	PK3	35.7	-25.1	0	46.81	-	-	-	-	74	100	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK3 - FHSS Method: Maximum Peak

VB10Hz - FHSS Method: 10Hz Video Bandwidth

HARMONICS AND SPURIOUS EMISSIONS(MID)



DATA

Radiated Emissions

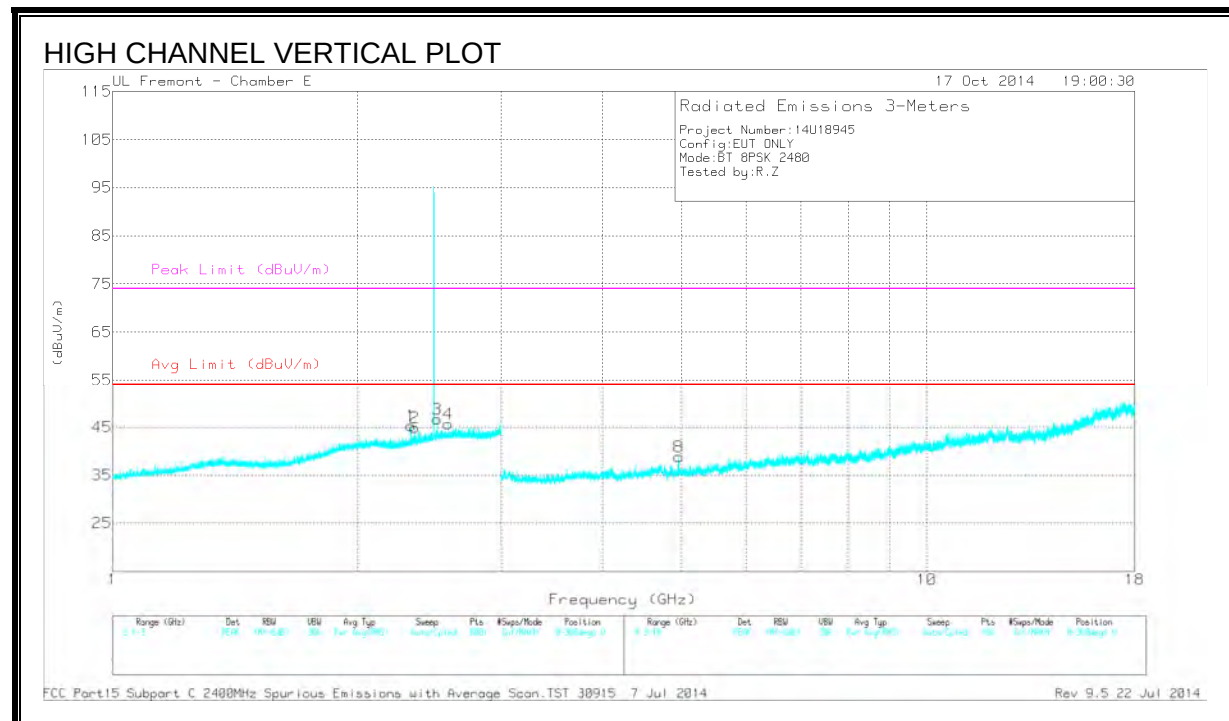
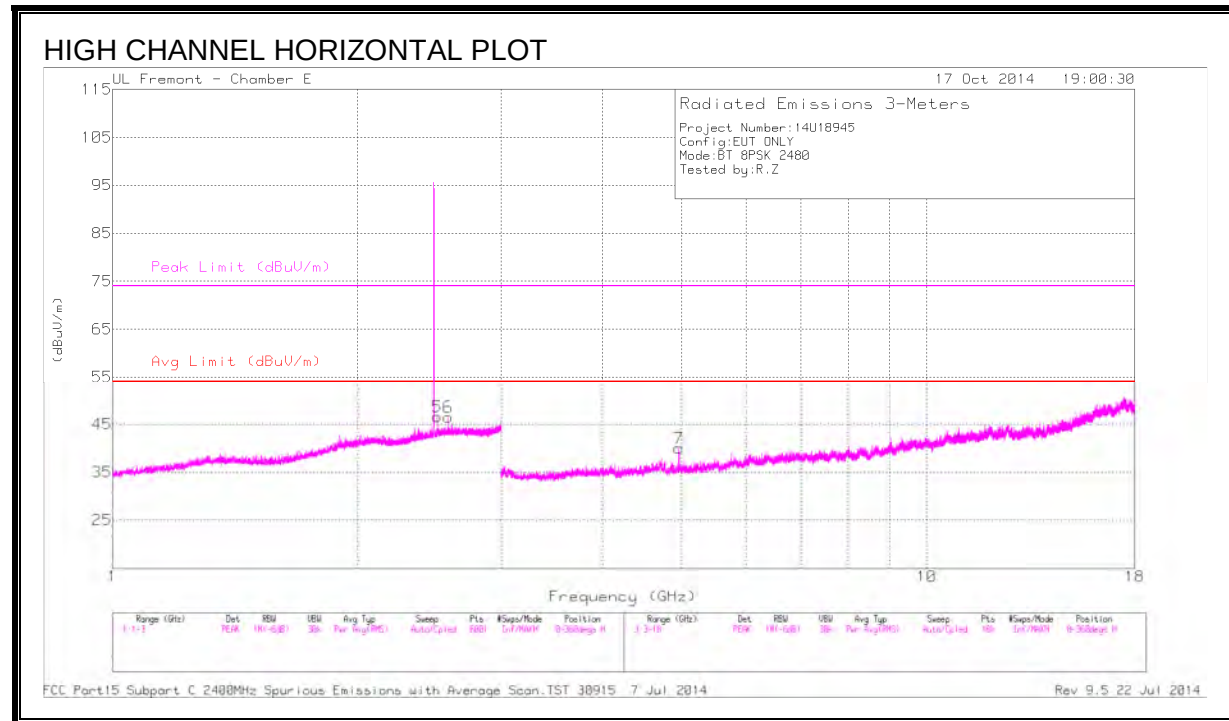
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 4.882	44.37	PK3	34	-30.9	0	47.47	-	-	74	-26.53	79	138	H
	* 4.882	33.52	VB10	34	-30.9	1.12	37.74	54	-16.26	-	-	79	138	H
6	* 4.882	44.54	PK3	34	-30.9	0	47.64	-	-	74	-26.36	267	230	V
	* 4.882	33.66	VB10	34	-30.9	1.12	37.88	54	-16.12	-	-	267	230	V
1	2.465	44.55	PK3	32.2	-24.5	0	52.25	-	-	-	-	360	101	H
3	2.465	44.2	PK3	32.2	-24.5	0	51.9	-	-	-	-	360	101	V
2	2.545	45.74	PK3	32.5	-24.2	0	54.04	-	-	-	-	360	101	H
4	2.545	44.25	PK3	32.5	-24.2	0	52.55	-	-	-	-	360	200	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK3 - FHSS Method: Maximum Peak

VB10Hz - FHSS Method: 10Hz Video Bandwidth

HARMONICS AND SPURIOUS EMISSIONS(HIGH)



DATA

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/ Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.324	45.35	PK3	31.6	-25	0	51.95	-	-	74	-22.05	331	143	V
	* 2.324	34.67	VB10	31.6	-25	1.12	42.39	54	-11.61	-	-	331	143	V
2	* 2.35	44.46	PK3	31.8	-24.7	0	51.56	-	-	74	-22.44	339	148	V
	* 2.35	33.31	VB10	31.8	-24.7	1.12	41.53	54	-12.47	-	-	339	148	V
7	* 4.96	42.38	PK3	34.1	-30.2	0	46.28	-	-	74	-27.72	330	137	H
	* 4.96	31.84	VB10	34.1	-30.2	1.12	36.86	54	-17.14	-	-	330	137	H
8	* 4.96	42.09	PK3	34.1	-30.2	0	45.99	-	-	74	-28.01	289	219	V
	* 4.96	30.87	VB10	34.1	-30.2	1.12	35.89	54	-18.11	-	-	289	219	V
5	2.504	45.64	PK3	32.4	-24.2	0	53.84	-	-	-	-	339	100	H
3	2.504	45.24	PK3	32.4	-24.2	0	53.44	-	-	-	-	339	200	V
6	2.584	45.61	PK3	32.5	-24.2	0	53.91	-	-	-	-	339	100	H
4	2.584	44.8	PK3	32.5	-24.2	0	53.1	-	-	-	-	339	200	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

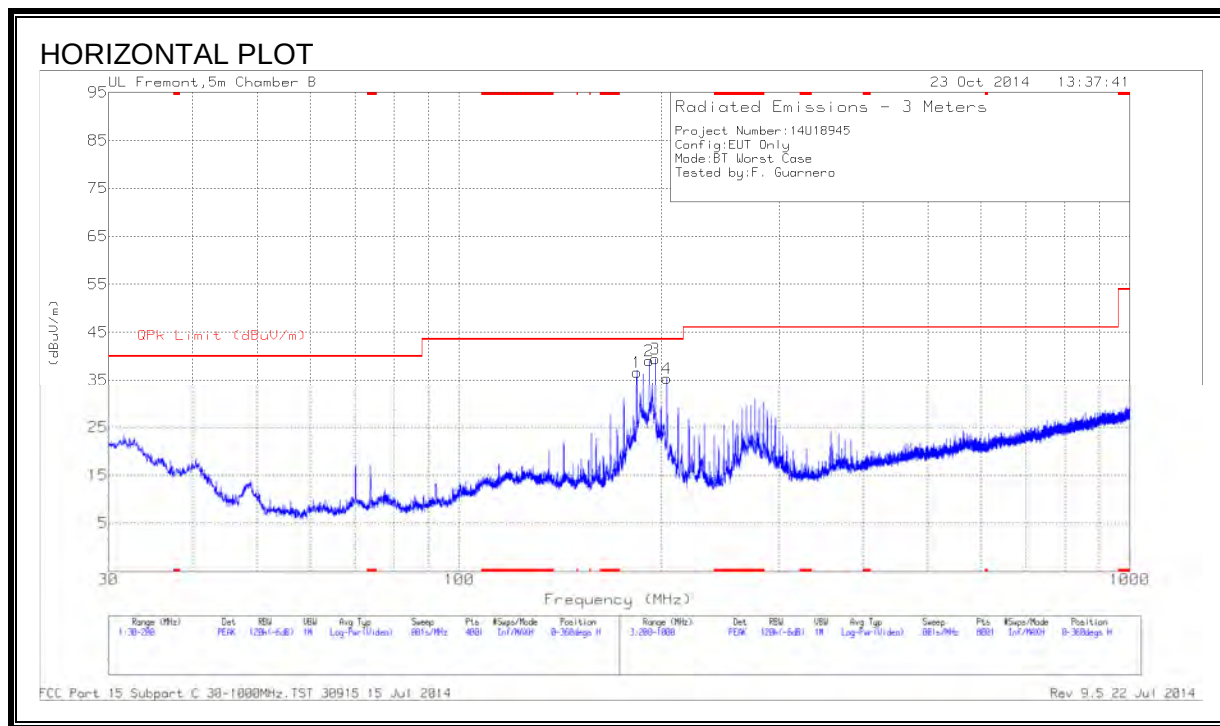
PK3 - FHSS Method: Maximum Peak

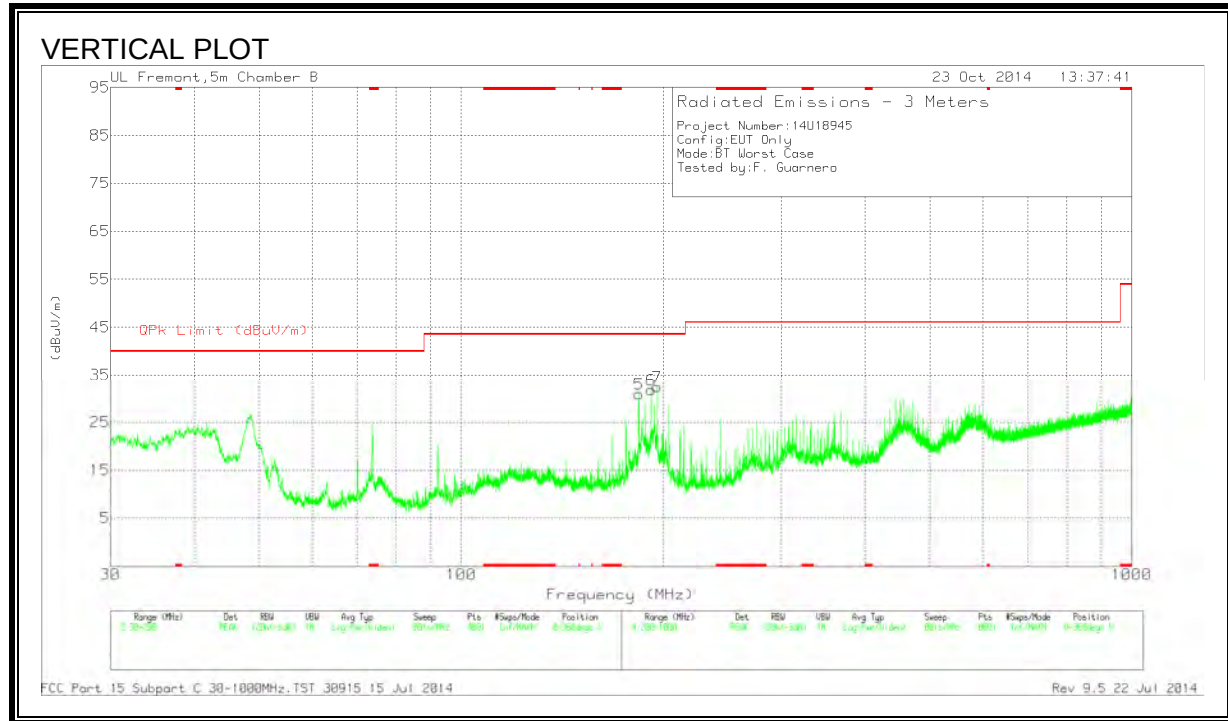
VB10Hz - FHSS Method: 10Hz Video Bandwidth

9.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (HORIZONTAL & VERTICAL)

EUT ALONE CONFIGURATION





HORIZONTAL AND VERTICAL DATA

Marker	Frequenc y (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Correcte d Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	183.9775	52.81	PK	10.9	-27.1	36.61	43.52	-6.91	0-360	101	H
5	184.02	47.1	PK	10.9	-27.1	30.9	43.52	-12.62	0-360	101	V
2	192.01	54.77	PK	11.3	-27	39.07	43.52	-4.45	0-360	101	H
6	192.01	47.54	PK	11.3	-27	31.84	43.52	-11.68	0-360	101	V
3	196.005	54.53	PK	11.8	-26.9	39.43	43.52	-4.09	0-360	101	H
7	196.005	47.58	PK	11.8	-26.9	32.48	43.52	-11.04	0-360	101	V
4	204	50.91	PK	11.3	-26.8	35.41	43.52	-8.11	0-360	101	H

Marker	Frequenc y (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Correcte d Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimu t (Degs)	Height (cm)	Polarity
2	192.01	54.36	QP	11.3	-27	38.66	43.52	-4.86	160	110	H
3	195.9954	54.43	QP	11.8	-26.9	39.33	43.52	-4.19	349	110	H

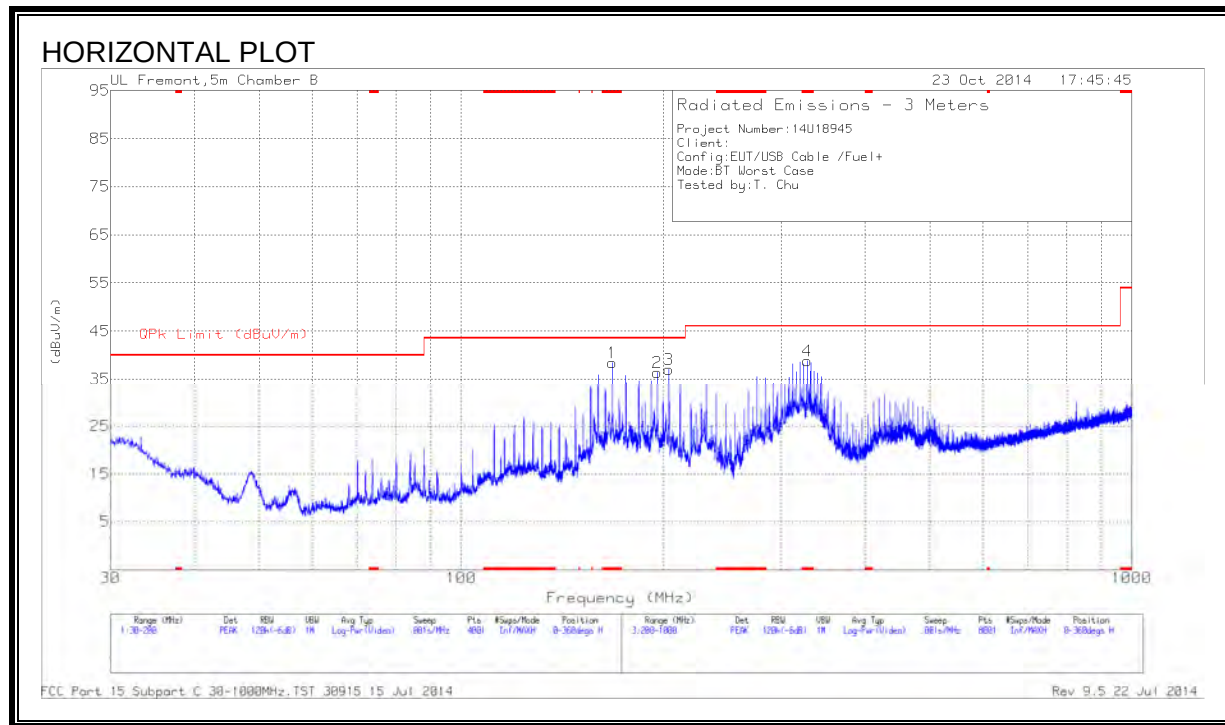
PK - Peak detector

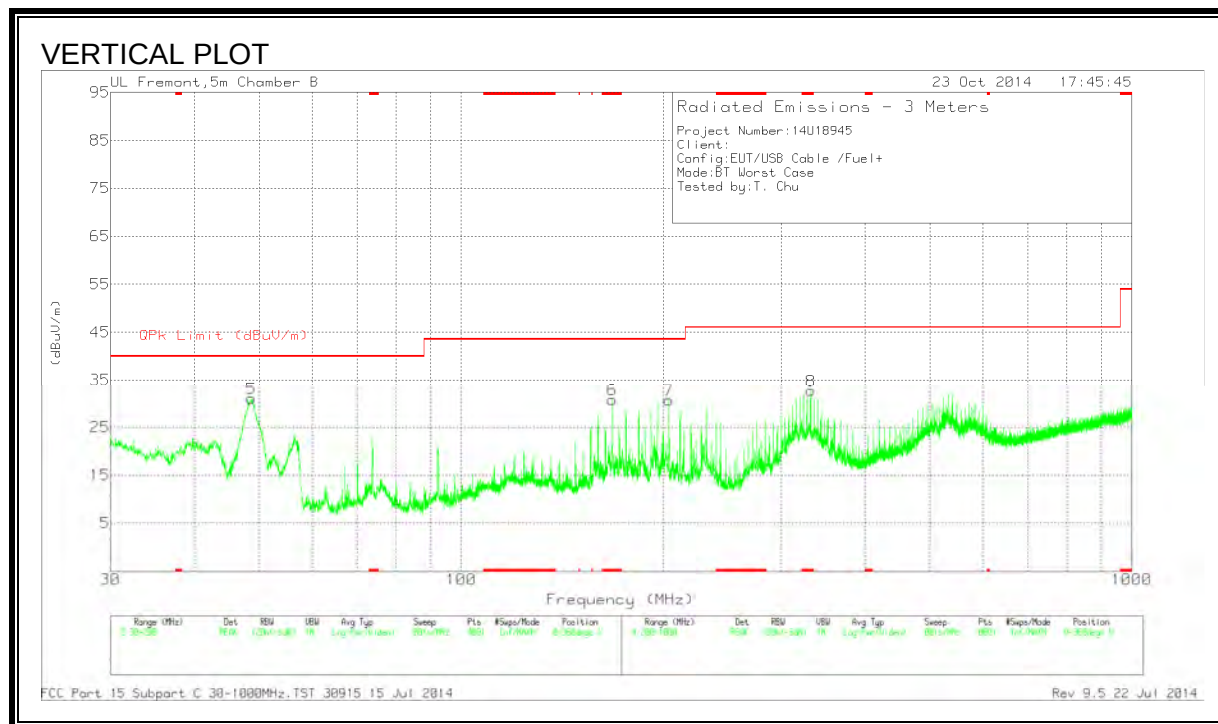
QP - Quasi-Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 15 Jul 2014

Rev 9.5 22 Jul 2014

EUT POWERED VIA RECHARGEABLE POWER BANK VIA USB CABLE CONFIGURATION





HORIZONTAL AND VERTICAL DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 167.9975	53.94	PK	11.7	-27.2	38.44	43.52	-5.08	0-360	100	H
6	* 167.9975	46.25	PK	11.7	-27.2	30.75	43.52	-12.77	0-360	101	V
4	* 328	50.65	PK	14	-25.8	38.85	46.02	-7.17	0-360	101	H
8	* 332	44.46	PK	14	-25.8	32.66	46.02	-13.36	0-360	200	V
5	48.7	51.01	PK	8.5	-28.5	31.01	40	-8.99	0-360	101	V
2	196.005	51.52	PK	11.8	-26.9	36.42	43.52	-7.1	0-360	100	H
3	204	52.57	PK	11.3	-26.8	37.07	43.52	-6.45	0-360	101	H
7	204	46.23	PK	11.3	-26.8	30.73	43.52	-12.79	0-360	101	V

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 167.996	54.63	QP	11.7	-27.2	39.13	43.52	-4.39	181	135	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
QP - Quasi-Peak detector
PK - Peak detector
FCC Part 15 Subpart C 30-1000MHz.TST 30915 15 Jul 2014
Rev 9.5 22 Jul 2014

9.4. WORST-CASE ABOVE 18 GHz

SPURIOUS EMISSIONS 18 TO 26 GHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)



DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T89 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	22.177	41.23	PK	33.2	-23.1	-9.5	41.833	54	-12.167	74	-32.167
2	24.015	43.87	PK	33.6	-22.8	-9.5	45.167	54	-8.833	74	-28.833
3	25.474	44.7	PK	34.1	-22.8	-9.5	46.5	54	-7.5	74	-27.5
4	18.32	41.9	PK	32.3	-24.7	-9.5	40	54	-14	74	-34
5	22.117	42.47	PK	33.3	-23.6	-9.5	42.667	54	-11.333	74	-31.333
6	25.074	44.3	PK	34	-22.8	-9.5	46	54	-8	74	-28

PK - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

ANSI C63.4

RESULTS

WORST EMISSIONS

Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.1635	50.88	PK	1.2	0	52.08	65.3	-13.22	-	-
2	.1635	30.2	Av	1.2	0	31.4	-	-	55.3	-23.9
3	.816	42.34	PK	.3	0	42.64	56	-13.36	-	-
4	.816	30.08	Av	.3	0	30.38	-	-	46	-15.62
5	1.131	36.72	PK	.2	0	36.92	56	-19.08	-	-
6	1.131	18.82	Av	.2	0	19.02	-	-	46	-26.98
7	6.666	37.2	PK	.2	.1	37.5	60	-22.5	-	-
8	6.666	21.44	Av	.2	.1	21.74	-	-	50	-28.26

Line-L2 .15 - 30MHz

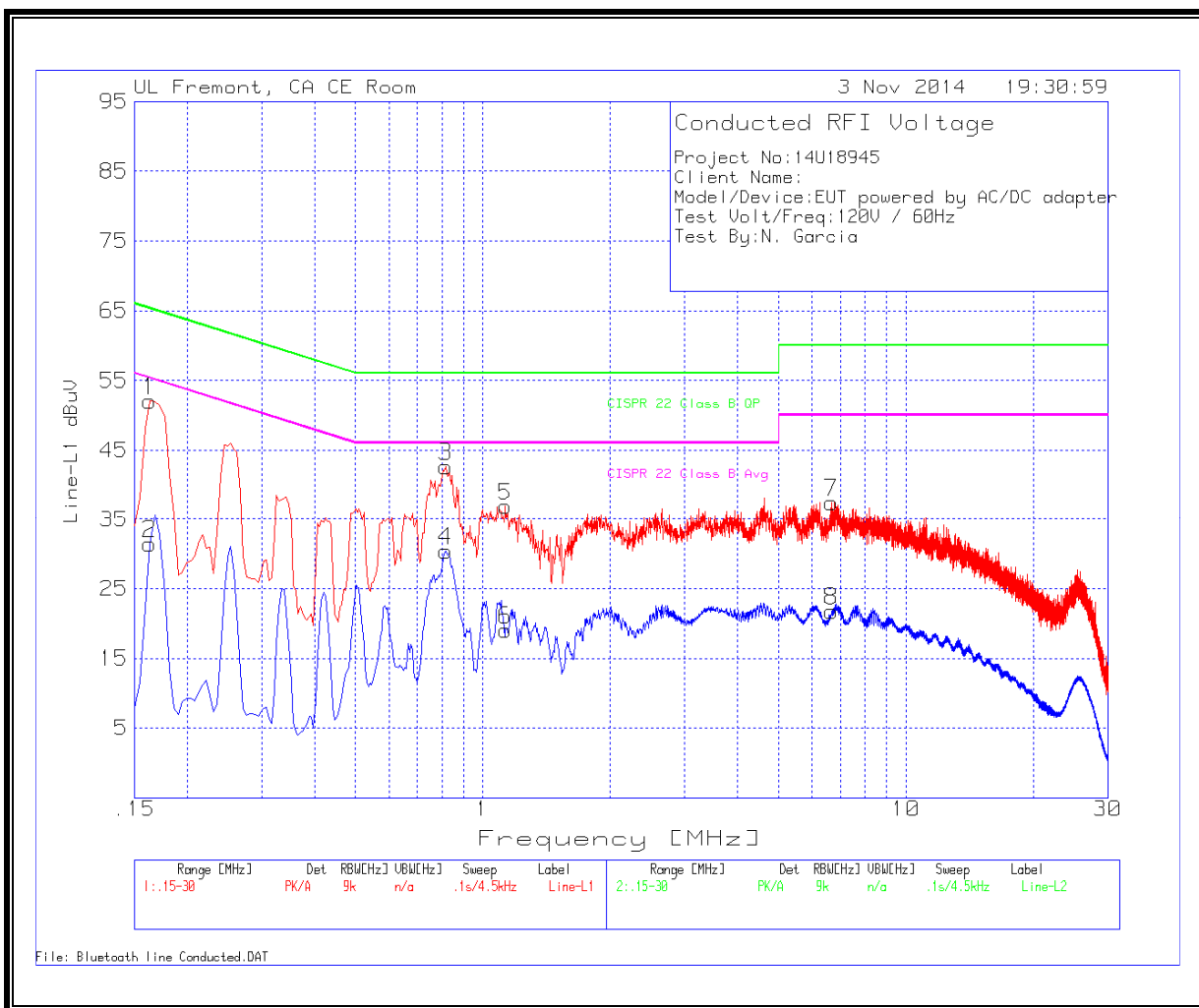
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
9	.1635	49.23	PK	1.3	0	50.53	65.3	-14.77	-	-
10	.1635	29.2	Av	1.3	0	30.5	-	-	55.3	-24.8
11	.8295	41.28	PK	.3	0	41.58	56	-14.42	-	-
12	.8295	23.95	Av	.3	0	24.25	-	-	46	-21.75
13	4.623	33.93	PK	.2	.1	34.23	56	-21.77	-	-
14	4.623	20.23	Av	.2	.1	20.53	-	-	46	-25.47
15	6.783	34.73	PK	.2	.1	35.03	60	-24.97	-	-
16	6.783	20.8	Av	.2	.1	21.1	-	-	50	-28.9

PK - Peak detector

Av - average detection

LINE 1 RESULTS



LINE 2 RESULTS

