



CERTIFICATION TEST REPORT

Report Number : 11882202-E4V2

Applicant : MICROSOFT CORP
ONE MICROSOFT WAY
REDMOND, WA 98052, U.S.A.

Model : 1832

FCC ID : C3K1832

IC : 3048A-1832

EUT Description : PORTABLE COMPUTING DEVICE

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS - 247 ISSUE 2

Date Of Issue:

September 28, 2017

Prepared by:

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	09/08/17	Initial Release	---
V2	09/28/17	- Updated test procedure for sections 7.2.6, 7.2.7, 7.3.1, 7.3.2, 7.4.6, 7.4.7	C. Susa

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: MICROSOFT CORP
ONE MICROSOFT WAY
REDMOND, WA 98052, U.S.A.

EUT DESCRIPTION: PORTABLE COMPUTING DEVICE

MODEL: 1832

SERIAL NUMBER: Radiated: 012813672657
Conducted: 009698372657

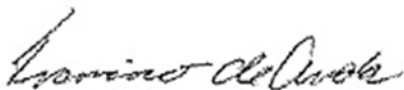
DATE TESTED: AUGUST 11 – AUGUST 24, 2017

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-247 Issue 2	Pass
INDUSTRY CANADA RSS-GEN Issue 4	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:



FRANCISCO DE ANDA
WiSE Program Manager
UL VERIFICATION SERVICES INC.

Prepared By:



ERIC YU
WiSE LAB ENGINEER
UL VERIFICATION SERVICES INC.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, RSS-GEN Issue 4, and RSS-247 Issue 2.

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(IC: 2324B-1)	☐ Chamber D(IC: 22541-1)
☒ Chamber B(IC: 2324B-2)	☐ Chamber E(IC: 22541-2)
☒ Chamber C(IC: 2324B-3)	☐ Chamber F(IC: 22541-3)
	☐ Chamber G(IC: 22541-4)
	☐ Chamber H(IC: 22541-5)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. Chambers A through C are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under Industry Canada company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

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:

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

4.3. MEASUREMENT UNCERTAINTY

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

Parameter	Uncertainty
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a portable computing device with 802.11 2x2, a/b/g/n/ac WLAN, Bluetooth, Bluetooth LE.

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	2.27	1.69
2402 - 2480	DQPSK	5.71	3.72
2402 - 2480	Enhanced 8PSK	5.99	3.97

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	2.10	1.62
2402 - 2480	DQPSK	3.15	2.07
2402 - 2480	Enhanced 8PSK	3.15	2.07

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes integrated antenna, with the maximum gains:

Frequency Band (GHz)	Antenna Gain (dBi)
2402-2480	3.26

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 14.2.201.159

The test utility software used during testing was Wifi tool v2.7.5

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated band edge, harmonics, and spurious emissions from 1 GHz to 18GHz were performed with the EUT was set to transmit at the Low/Middle/High channels.

Radiated emission below 30MHz, below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT was set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y, & Z, and it was determined that Y-Axis orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y-Axis orientation.

Worst-case data rates were:

GFSK mode: DH5

8PSK mode: 3-DH5

5.6. DESCRIPTION OF TEST SETUP

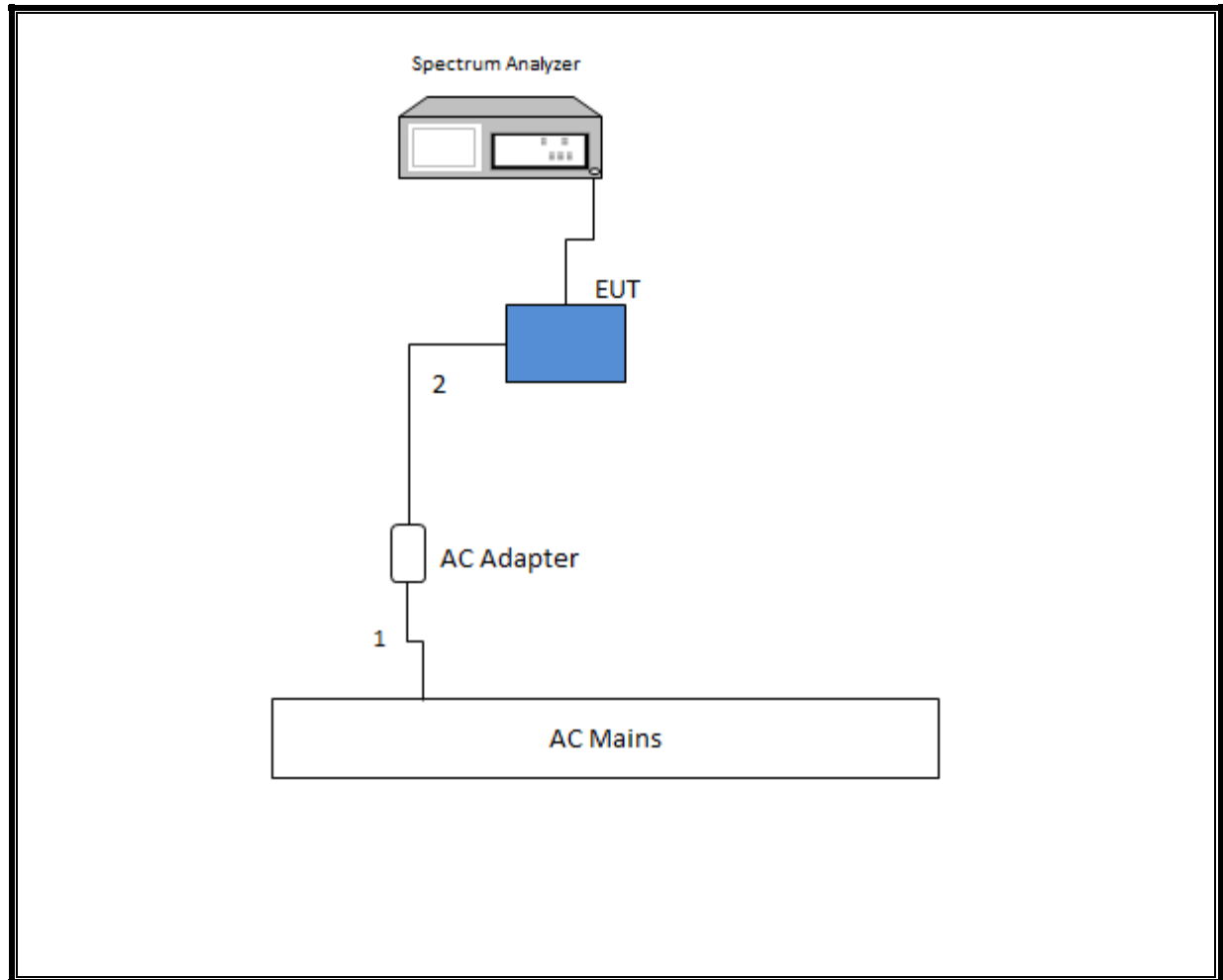
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	USB	Un-Shielded	0.17	
2	DC	1	Proprietary	Un-Shielded	1.75	

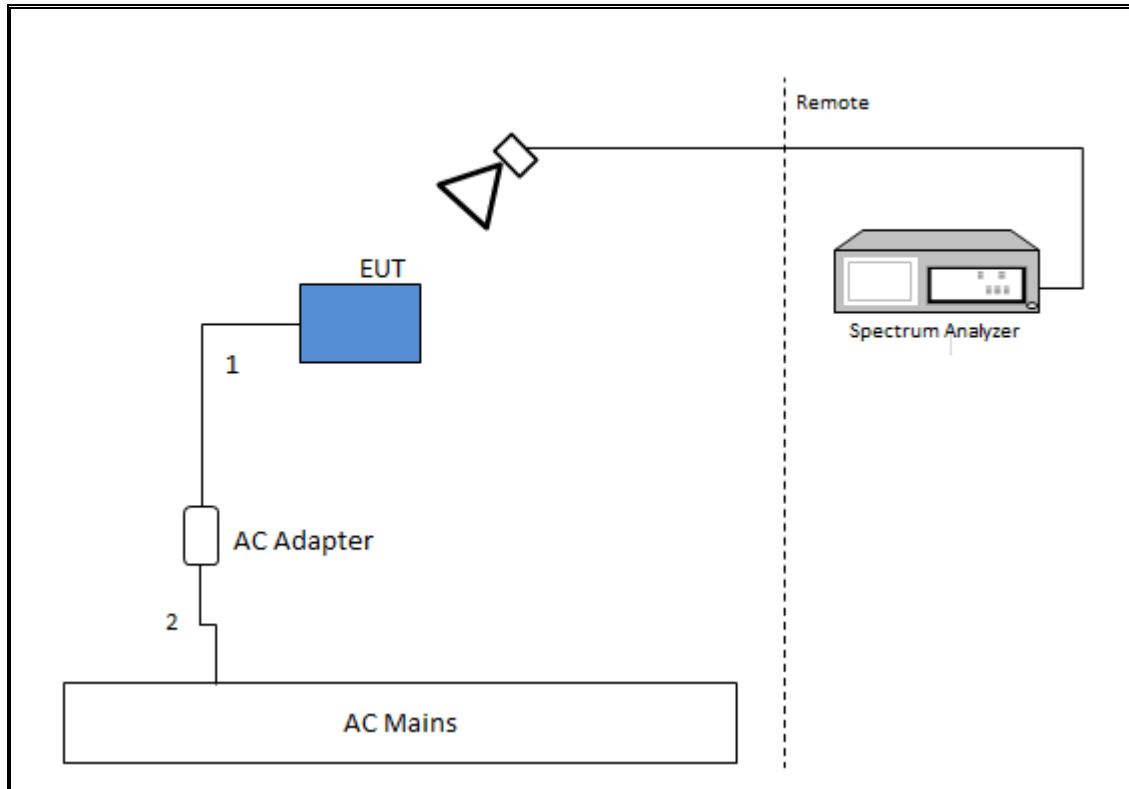
TEST SETUP

Test software is installed on the EUT that exercises the radio. During all tests the EUT is connected to the AC adapter.

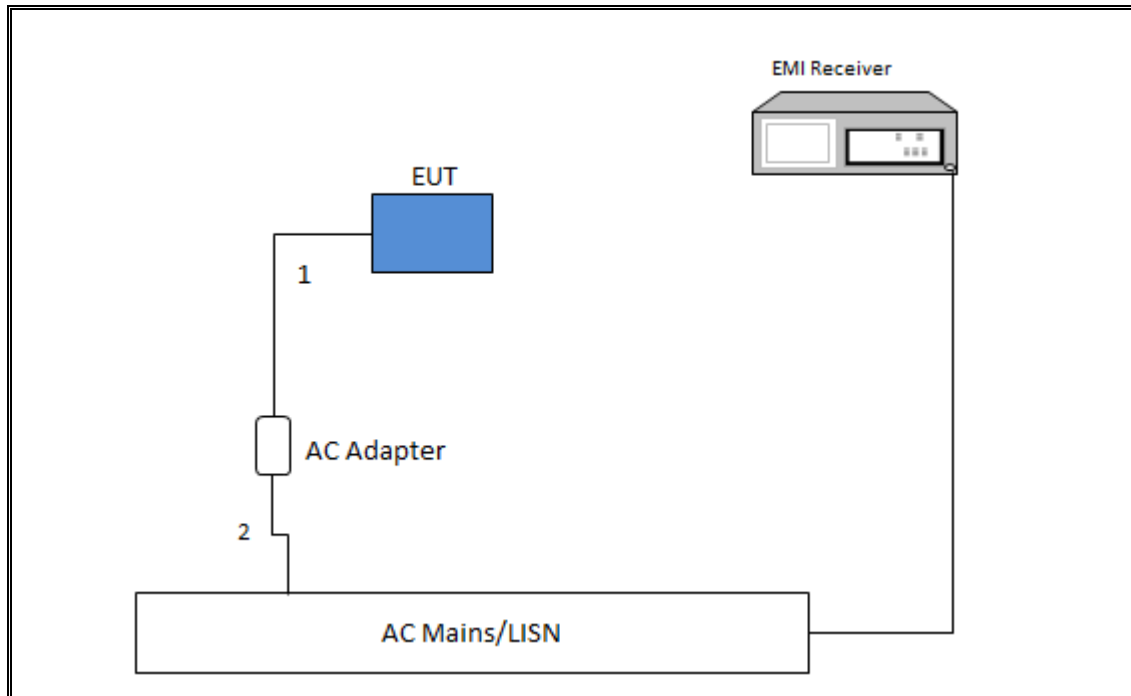
SETUP DIAGRAM FOR ANTENNA PORT CONDUCTED TESTS



SETUP DIAGRAM FOR RADIATED TESTS



SETUP DIAGRAM FOR AC LINE CONDUCTED TESTS



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	Asset	Cal Due
Spectrum Analyzer	Keysight	N9030A	T1210	07/17/18
Spectrum Analyzer	Keysight	N9030A	T1466	04/11/18
Antenna, Biconolog, 30-1GHz	Sunol Sciences	JB1	T130	09/23/17
RF Preamplifier, 10kHz – 1GHz	Sonoma	310N	T300	11/10/17
Antenna, Horn, 1-18GHz	ETS Lindgren	3117	T862	06/09/18
RF Preamplifier, 1-18GHz	Miteq	AFS42-00101800-25-S-42	T1165	06/24/18
RF Preamplifier, 1-8GHz	Miteq	AMF-4D-01000800-30-29P	T1573	06/24/18
Low Pass Filter, 5GHz	Micro-Tronics	LPS17541	T481	06/24/18
High Pass Filter, 6GHz	Micro-Tronics	HPS17542	T484	06/24/18
Spectrum Analyzer	Keysight	N9030A	T907	01/23/18
RF Preamplifier, 1-18GHz	Miteq	AFS42-00101800-25-S-42	T493	02/15/18
RF Preamplifier, 1-8GHz	Miteq	AMF-4D-01000800-30-29P	T1156	02/15/18
Antenna, Horn, 1-18GHz	ETS Lindgren	3117	T863	06/09/18
Low Pass Filter, 5GHz	Micro-Tronics	LPS17541	T482	02/15/18
High Pass Filter, 6GHz	Micro-Tronics	HPS17542	T483	02/15/18
Antenna, Horn, 18-26GHz	ARA	MWH-1826/B	T449	06/12/18
RF Preamplifier, 1-26GHz	Agilent	8499B	T404	07/23/18
Antenna, Horn, 26-40GHz	ARA	MWH-2640	T90	08/25/18
RF Preamplifier, 26-40GHz	Miteq	NSP4000-SP2	T88	04/29/18
Spectrum Analyzer	Keysight	N9030A	T1454	12/15/17
EMI Receiver	Rohde & Schwarz	ESR	T1436	01/06/18
LISN	Fischer Custom Communications	FCC-LSN-50/250-25-2-01	T1310	06/15/18

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	9.5, 12/01/16
Antenna Port Software	UL	UL RF	7.1, 8/6/17
Conducted Emissions Software	UL	UL EMC	9.5, 5/26/15

7. ANTENNA PORT TEST RESULTS

7.1. ON TIME AND DUTY CYCLE

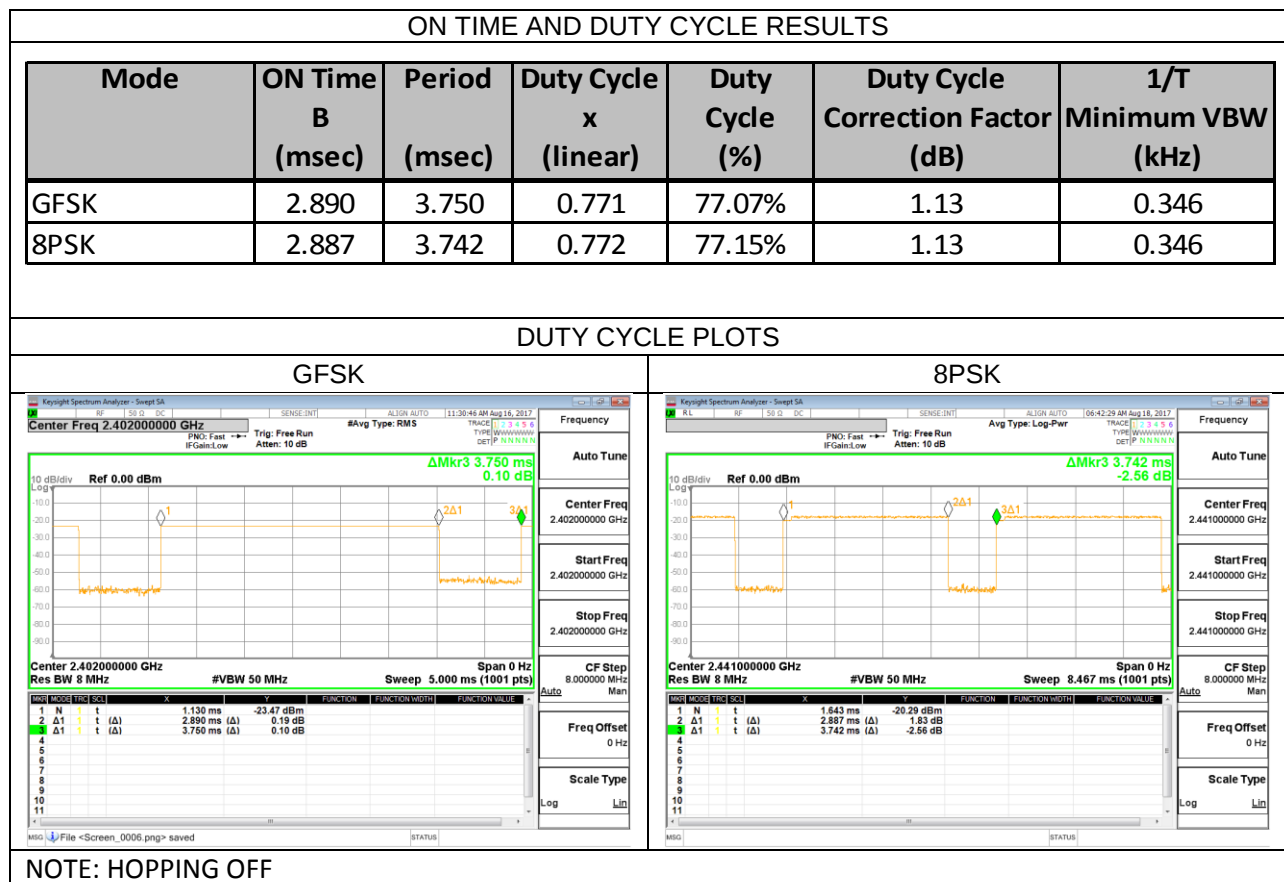
LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS



7.2. BASIC DATA RATE GFSK MODULATION

7.2.1. 20 dB BANDWIDTH

LIMITS

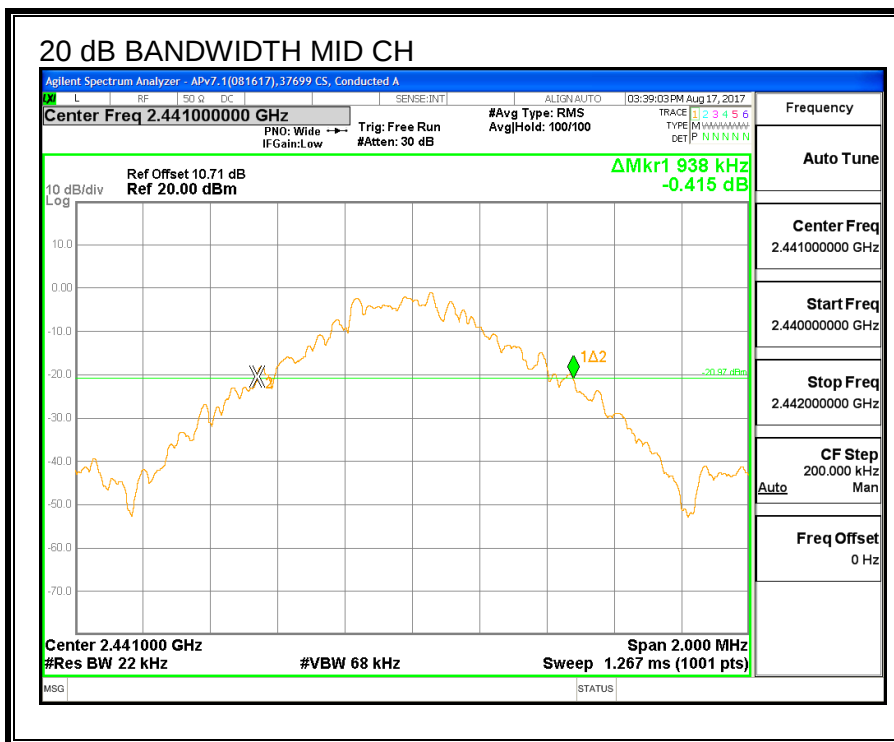
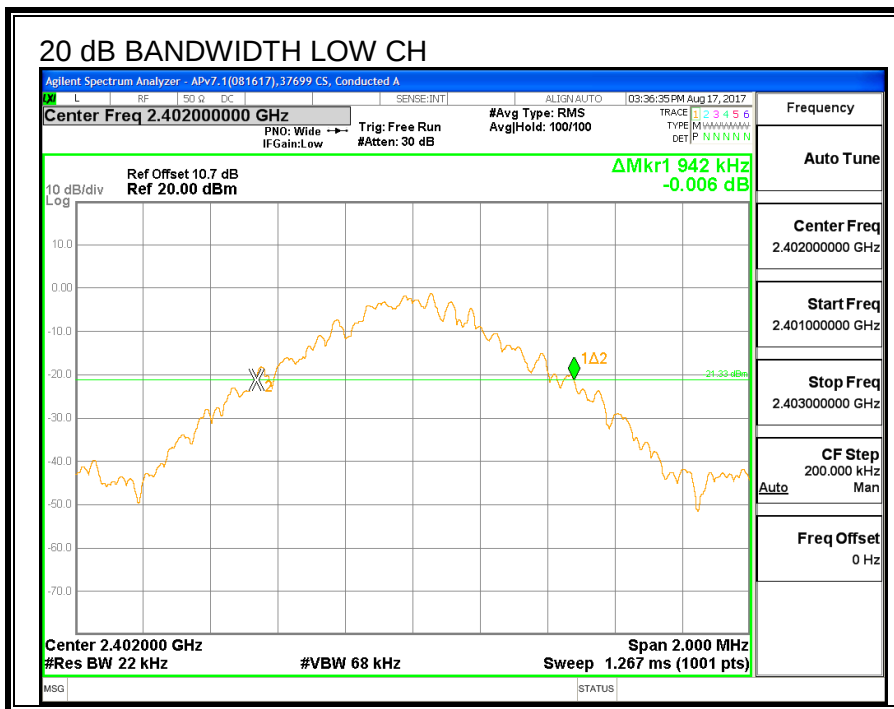
None; for reporting purposes only.

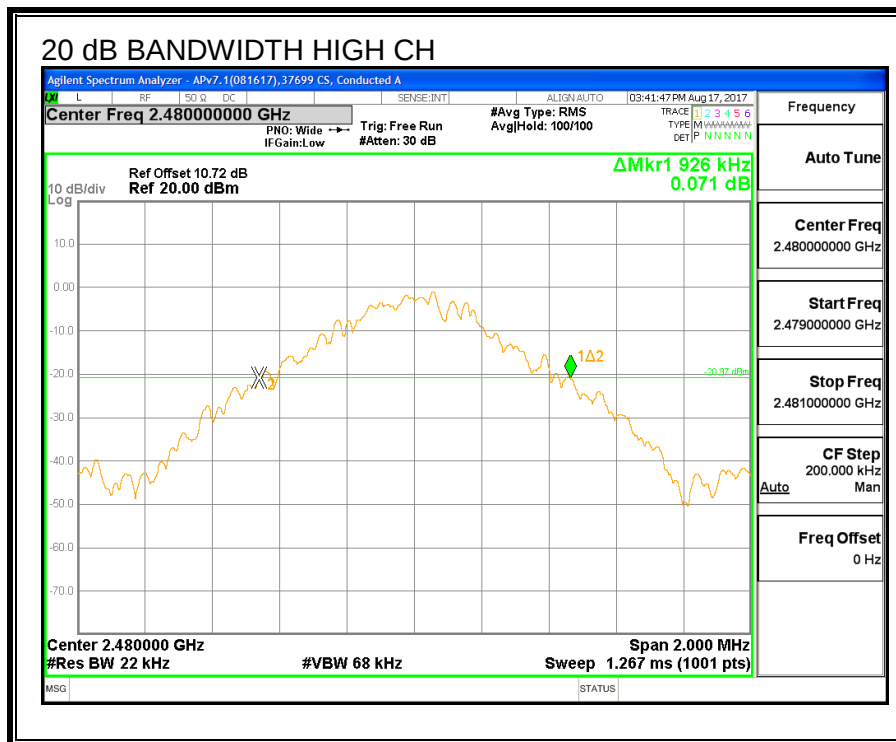
TEST PROCEDURE

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)
Low	2402	942
Middle	2441	938
High	2480	926





7.2.2. 99% BANDWIDTH

LIMITS

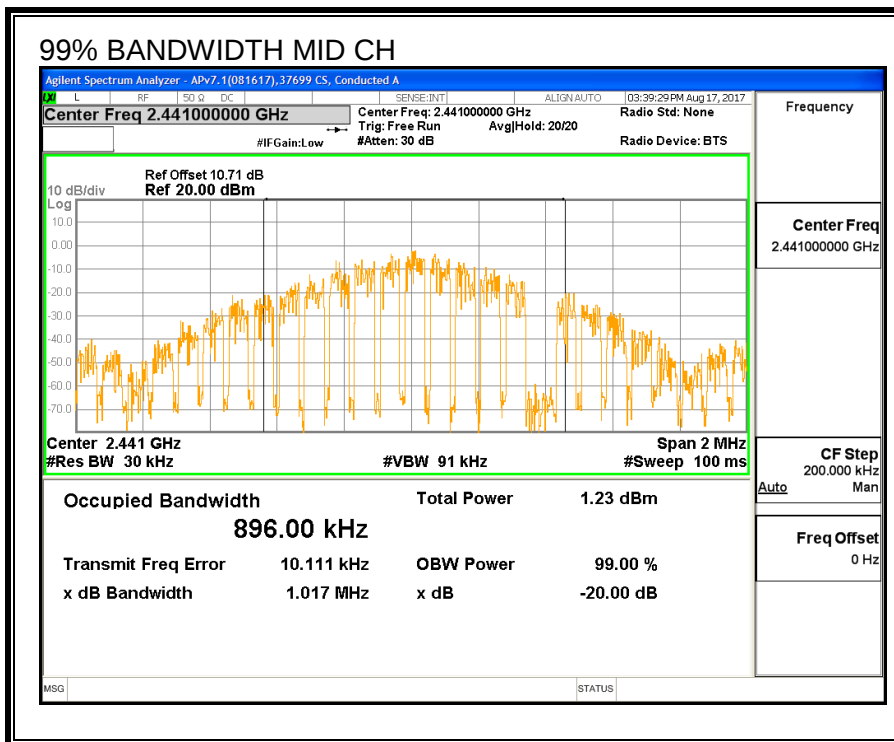
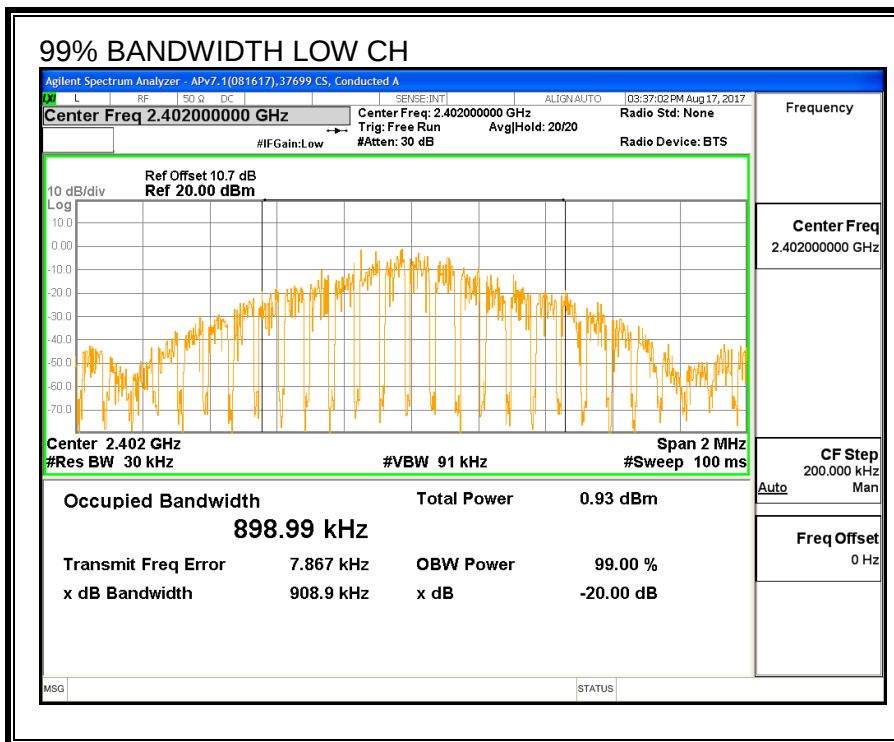
None; for reporting purposes only.

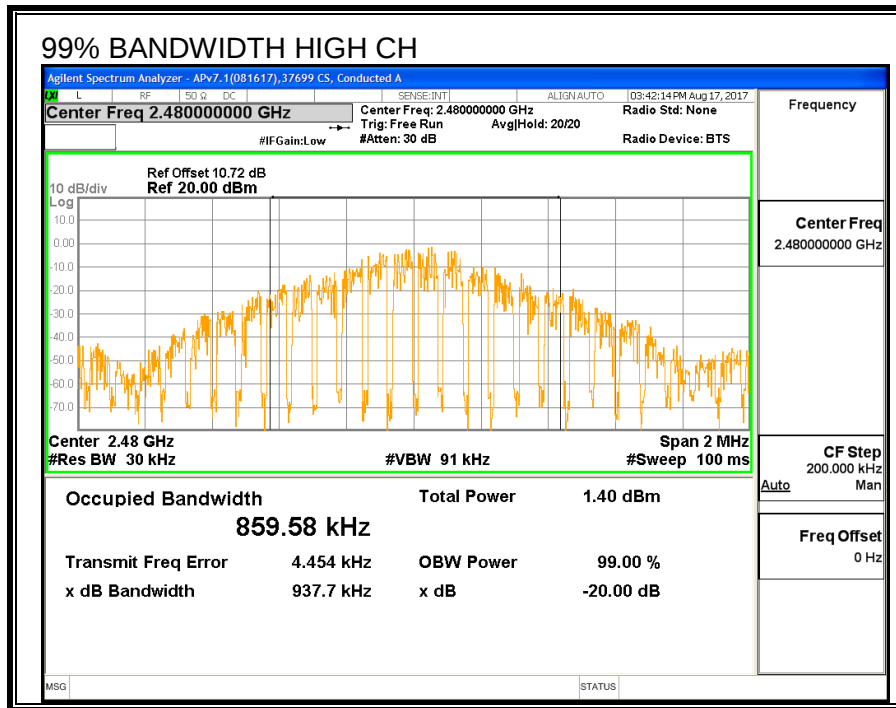
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1%-5% the OBW. The VBW is set to ≥ 3 times RBW. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (KHz)
Low	2402	898.99
Middle	2441	896.00
High	2480	859.58





7.2.3. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

IC RSS-247 (5.1) (b)

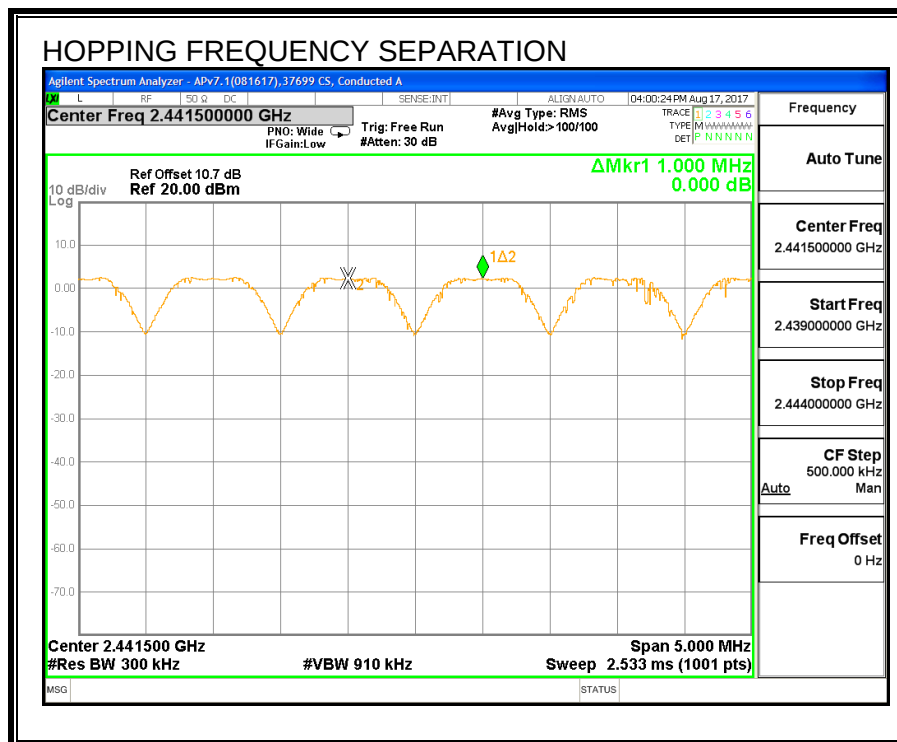
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

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 910 kHz. The sweep time is coupled.

RESULTS



7.2.4. NUMBER OF HOPPING CHANNELS

LIMITS

FCC §15.247 (a) (1) (iii)

IC RSS-247 (5.1) (d)

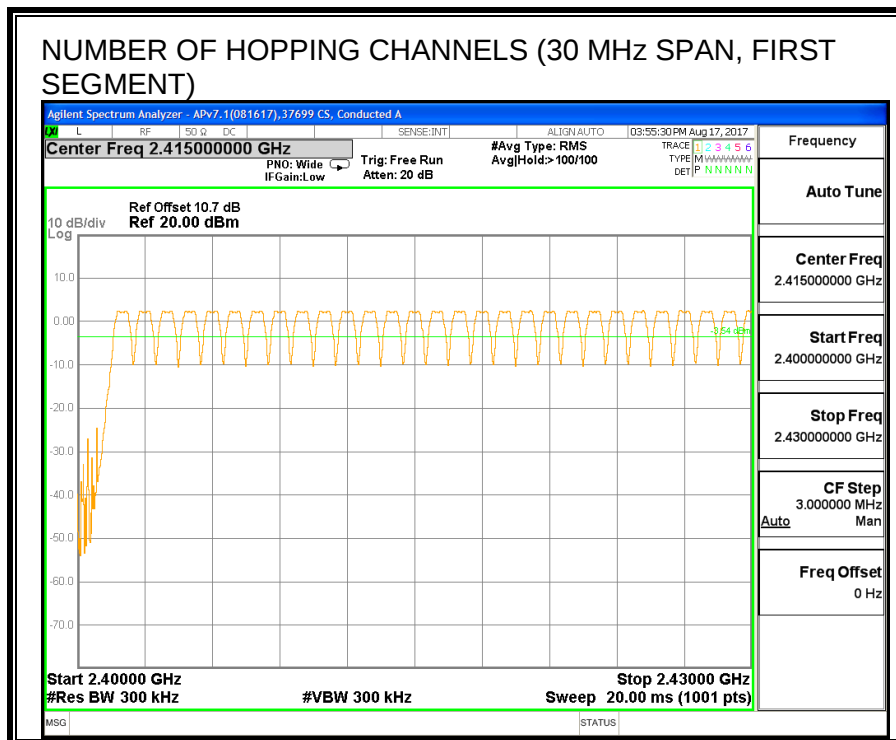
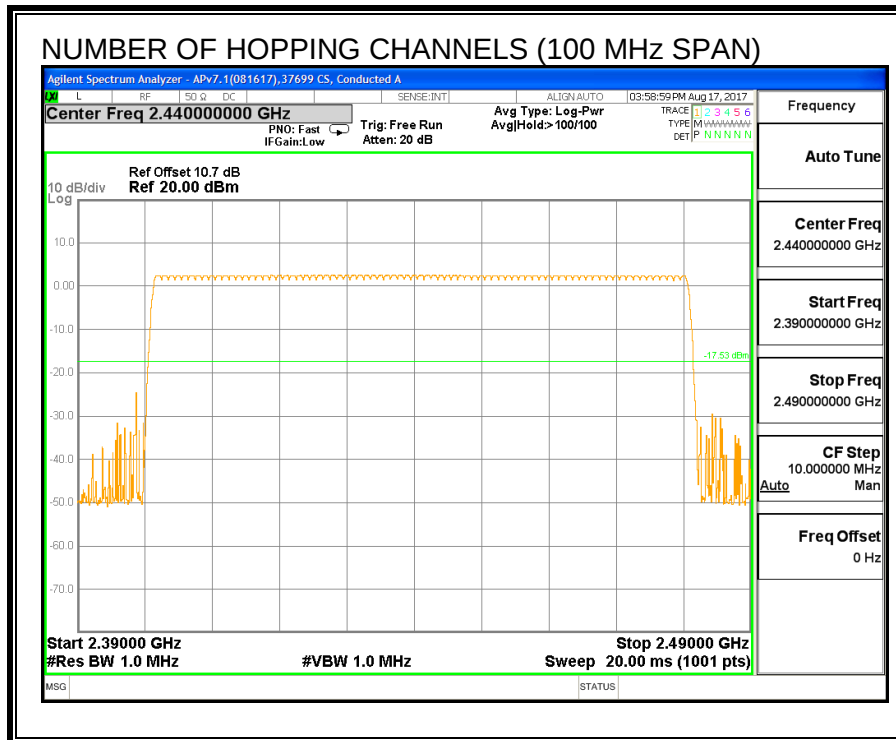
Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

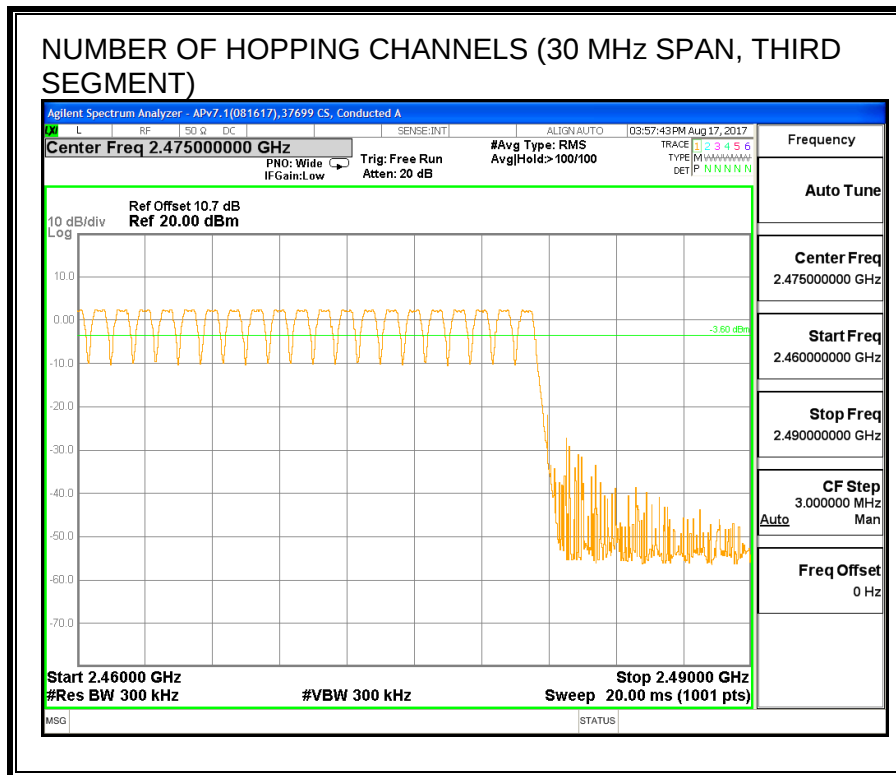
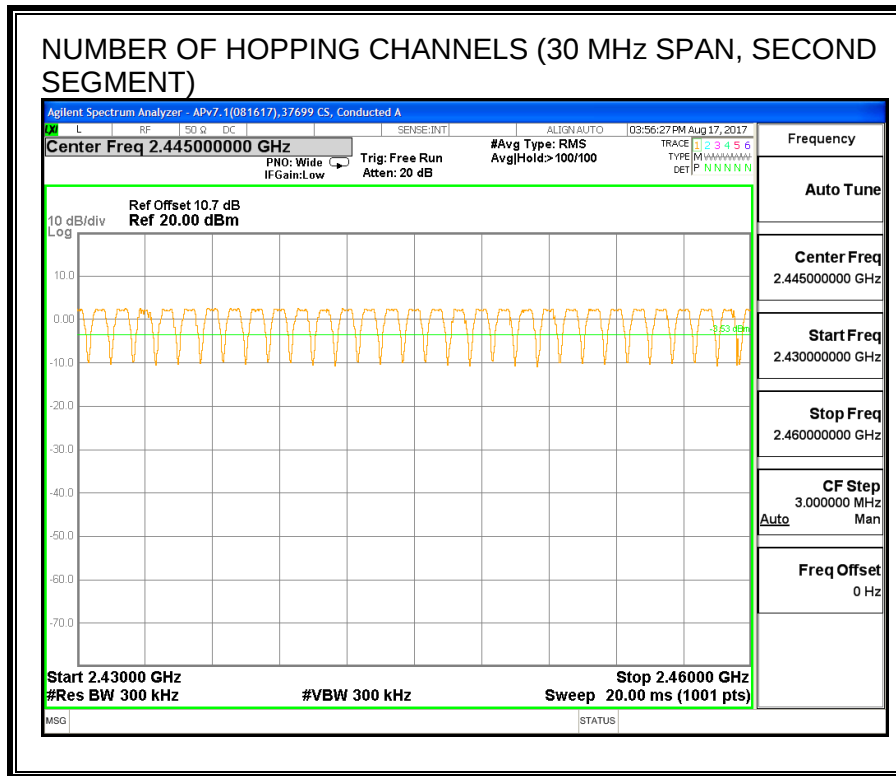
TEST PROCEDURE

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.





7.2.5. AVERAGE TIME OF OCCUPANCY

LIMITS

FCC §15.247 (a) (1) (iii)

IC RSS-247 (5.1) (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

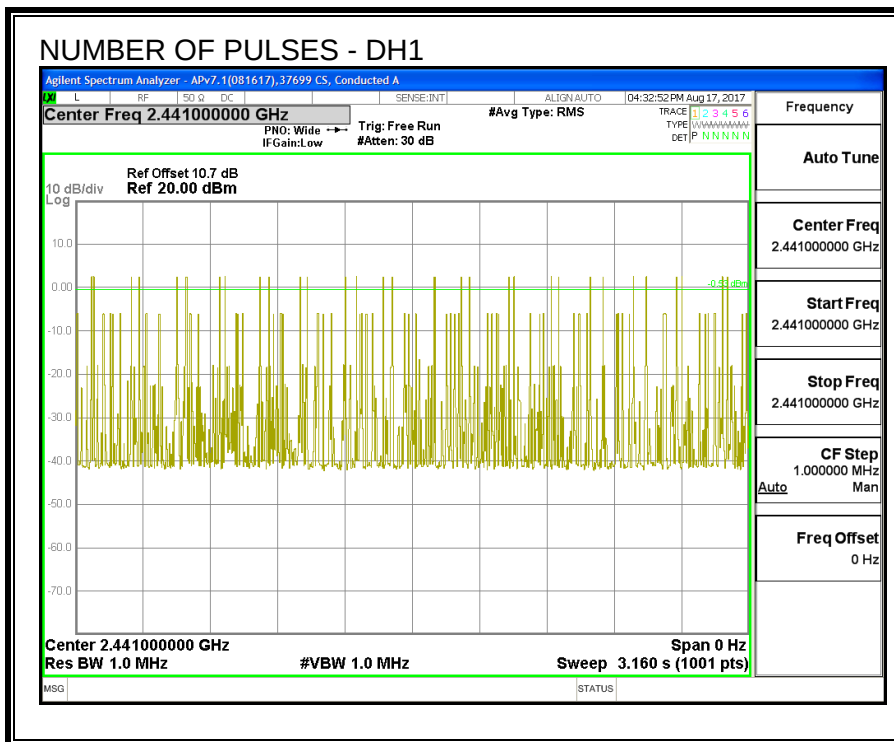
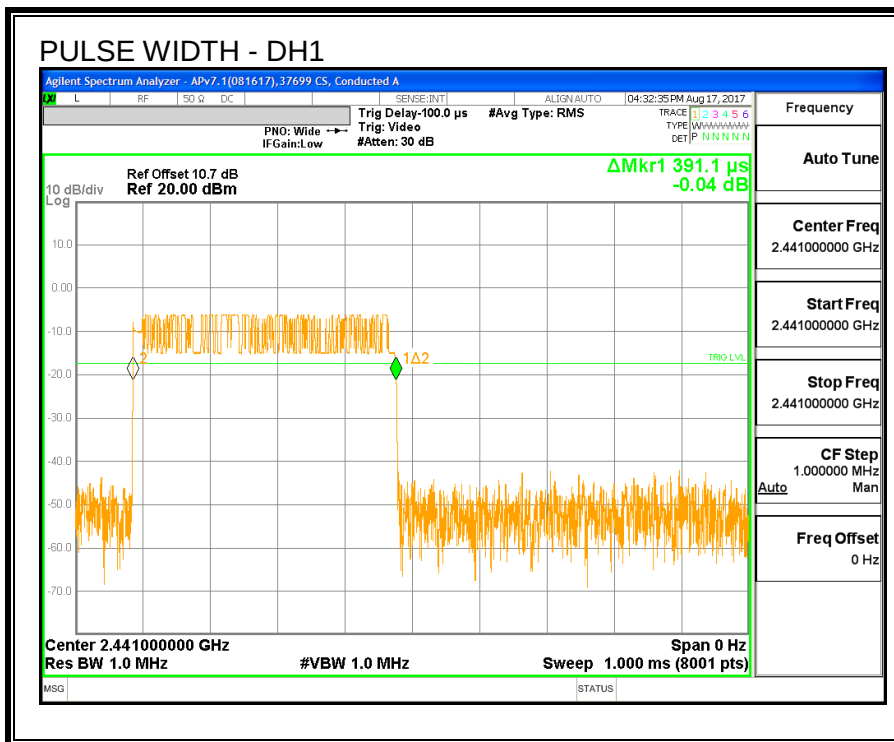
The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

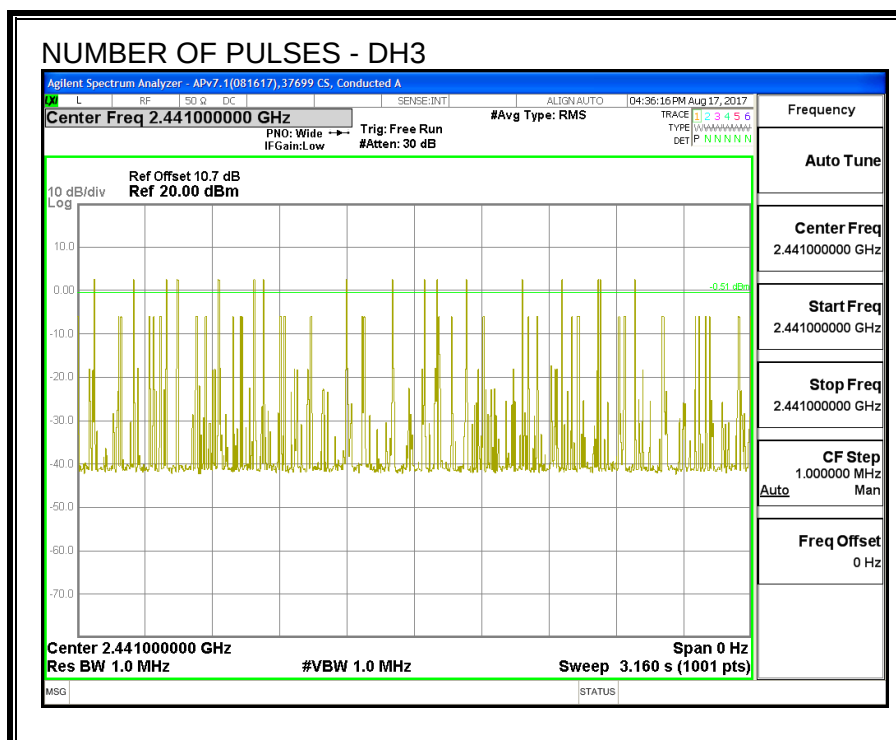
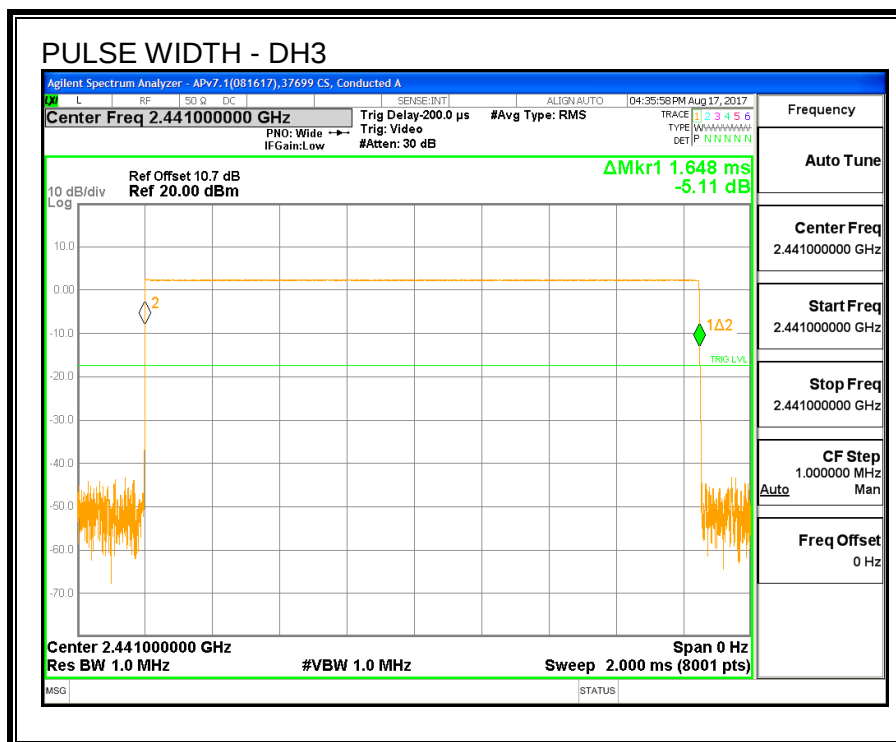
The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{pulse width}$.

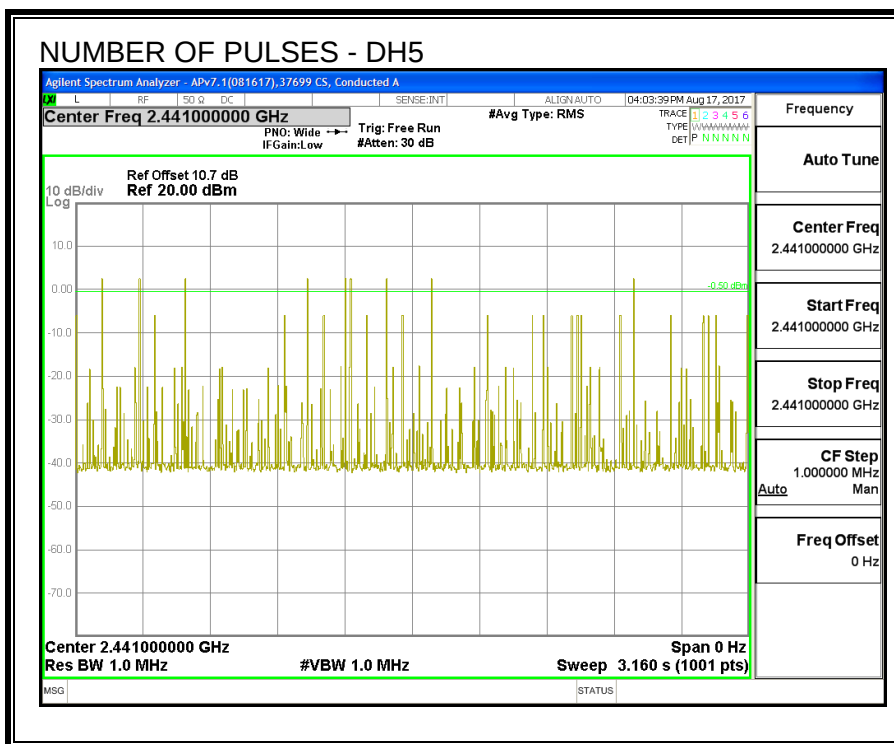
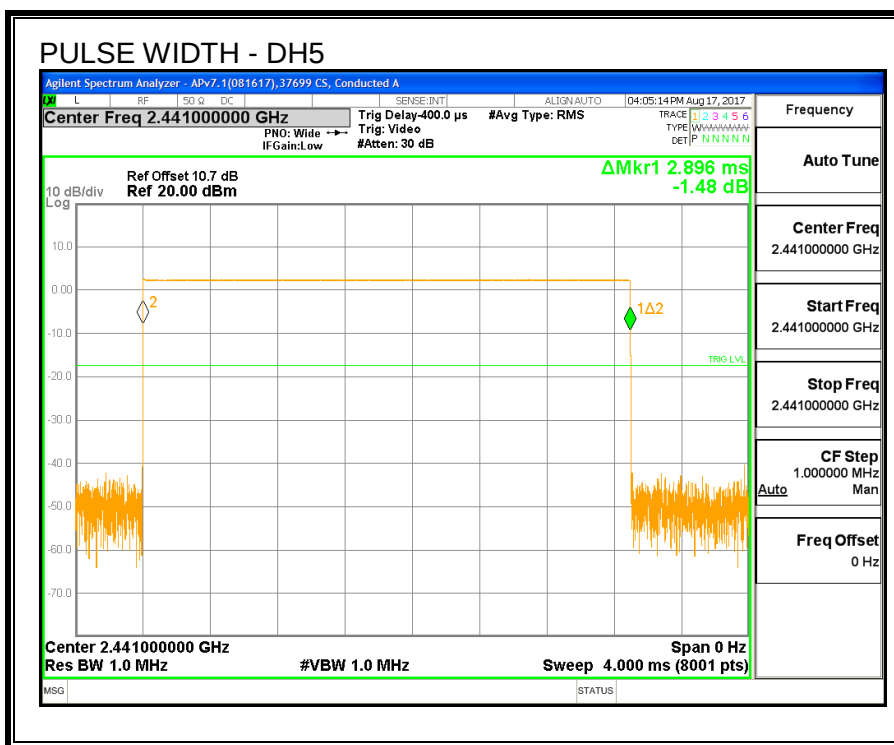
For AFH mode, the average time of occupancy in the specified 8 second period (20 channels * 0.4 seconds) is equal to $10 * (\# \text{ of pulses in } 0.8 \text{ s}) * \text{pulse width}$.

RESULTS

AVERAGE TIME OF OCCUPANCY					
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	0.391	32	0.1251	0.4	-0.2749
DH3	1.648	17	0.2802	0.4	-0.1198
DH5	2.896	9	0.2606	0.4	-0.1394
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH1	0.391	8	0.03128	0.4	-0.3687
DH3	1.648	4.25	0.07004	0.4	-0.3300
DH5	2.896	2.25	0.06516	0.4	-0.3348







7.2.6. OUTPUT POWER

LIMITS

§15.247 (b) (1)

RSS-247 (5.4) (b)

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

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 10.7 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

TEST ENGINEER:	37699	Date:	08/11/17
-----------------------	-------	--------------	----------

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	2.27	30	-27.73
Middle	2441	2.25	30	-27.75
High	2480	2.15	30	-27.85

7.2.7. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 10.7 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

TEST ENGINEER:	37699	Date:	08/11/17
-----------------------	-------	--------------	----------

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	2.10
Middle	2441	2.06
High	2480	1.99

7.2.8. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-247 5.5

Limit = -20 dBc

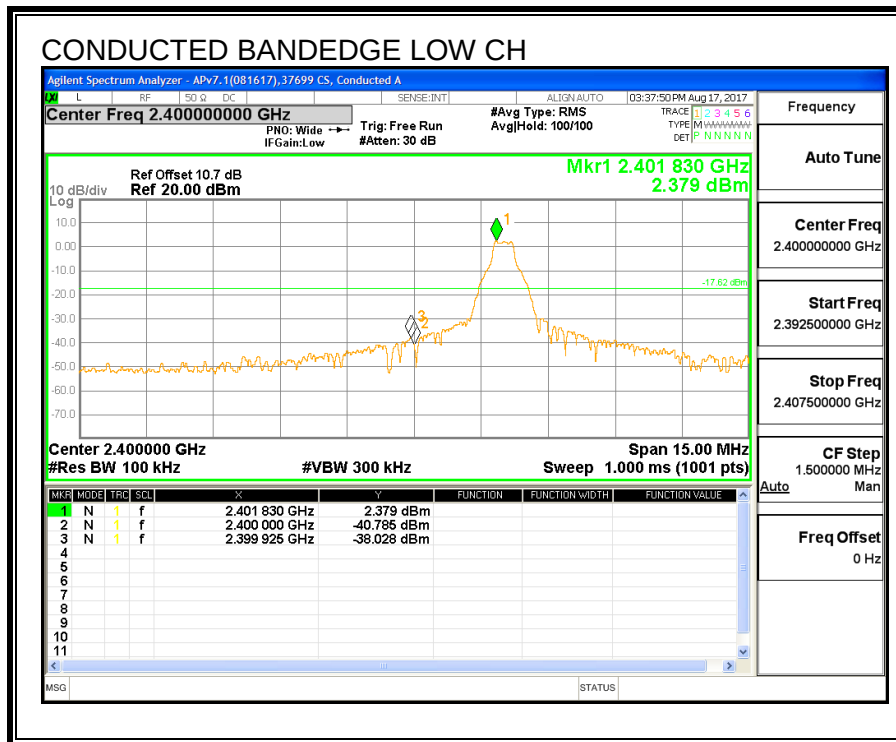
TEST PROCEDURE

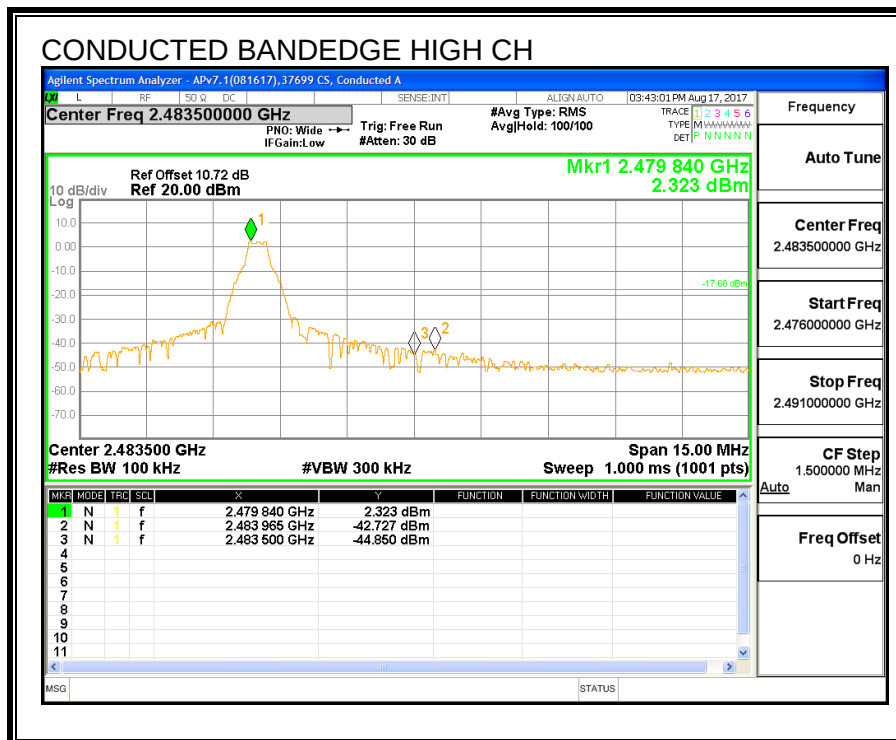
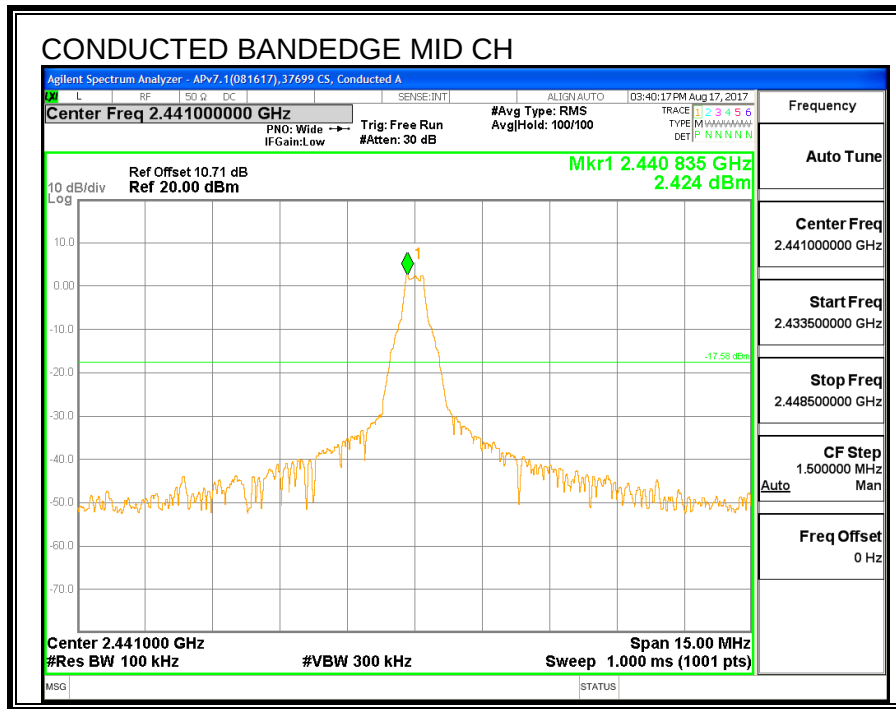
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

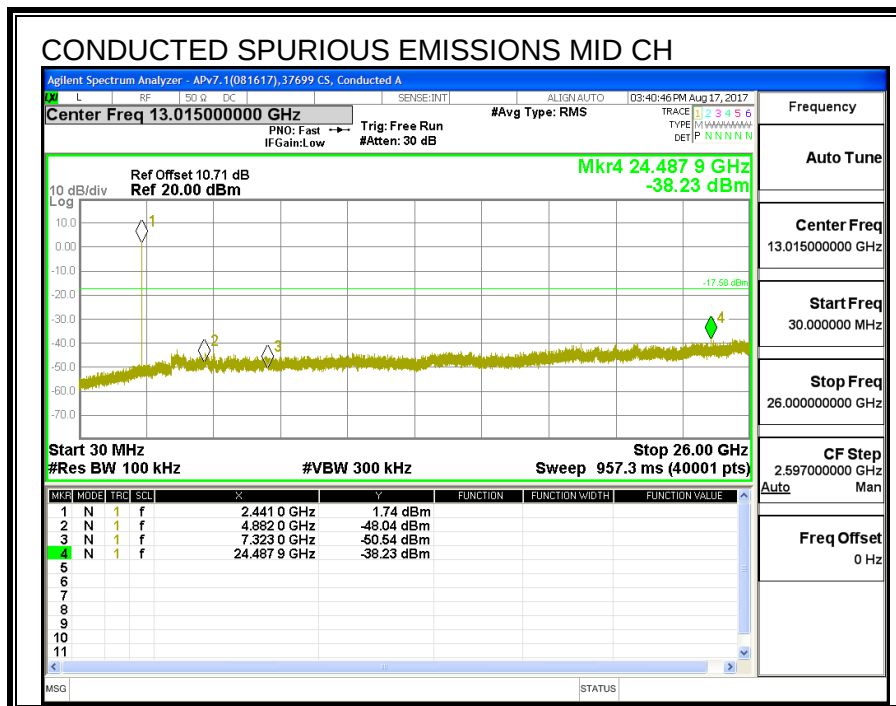
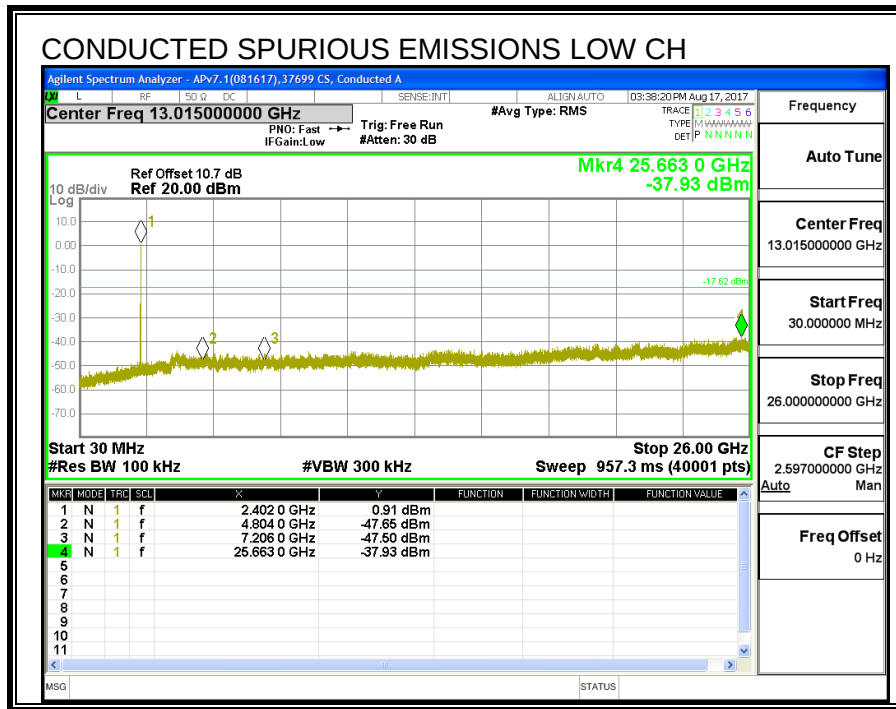
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

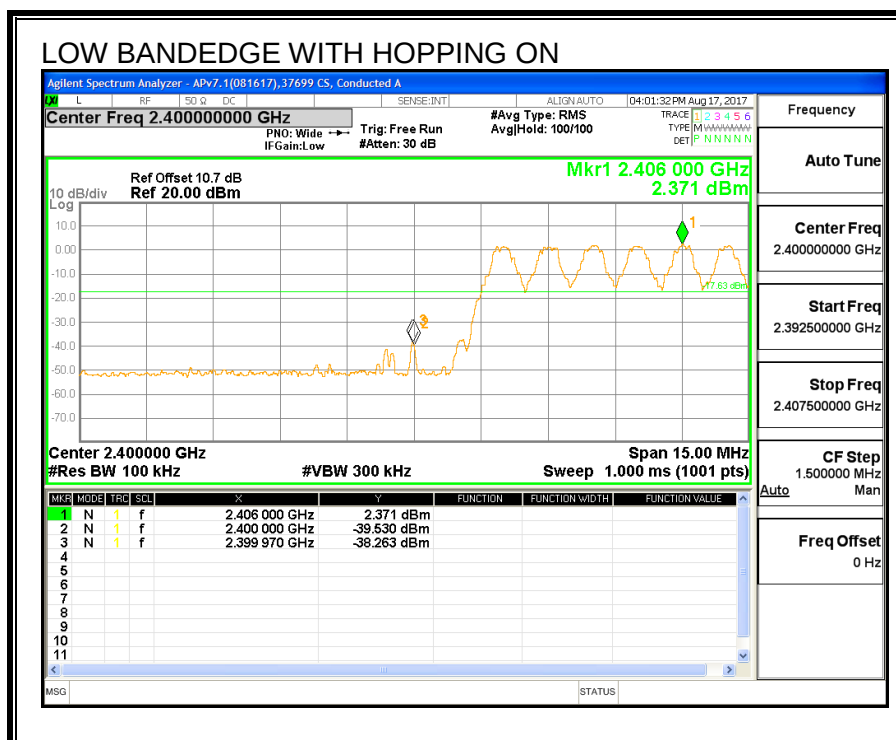
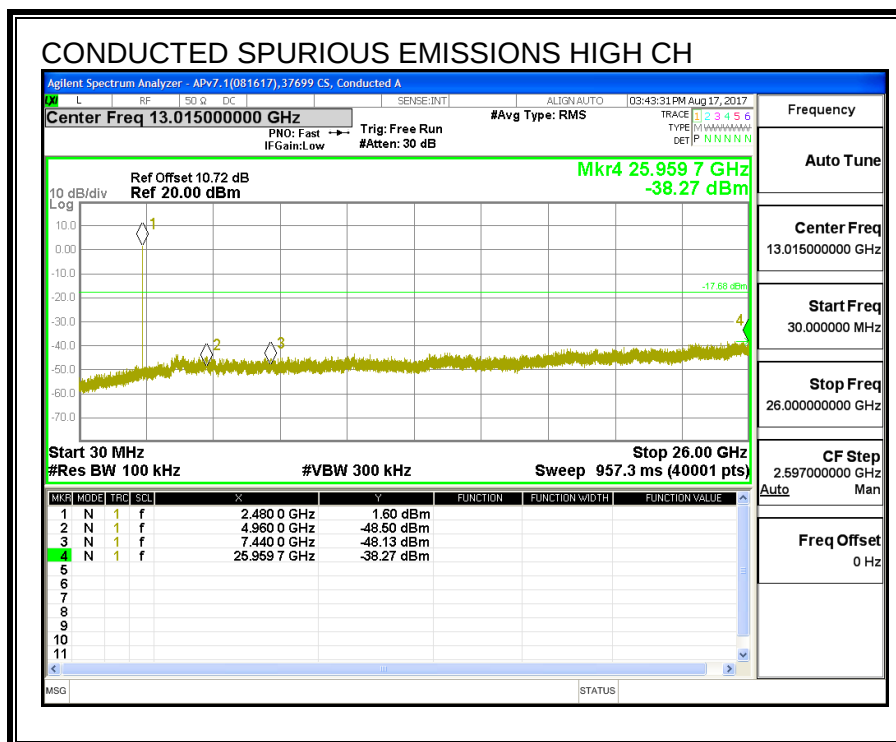
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

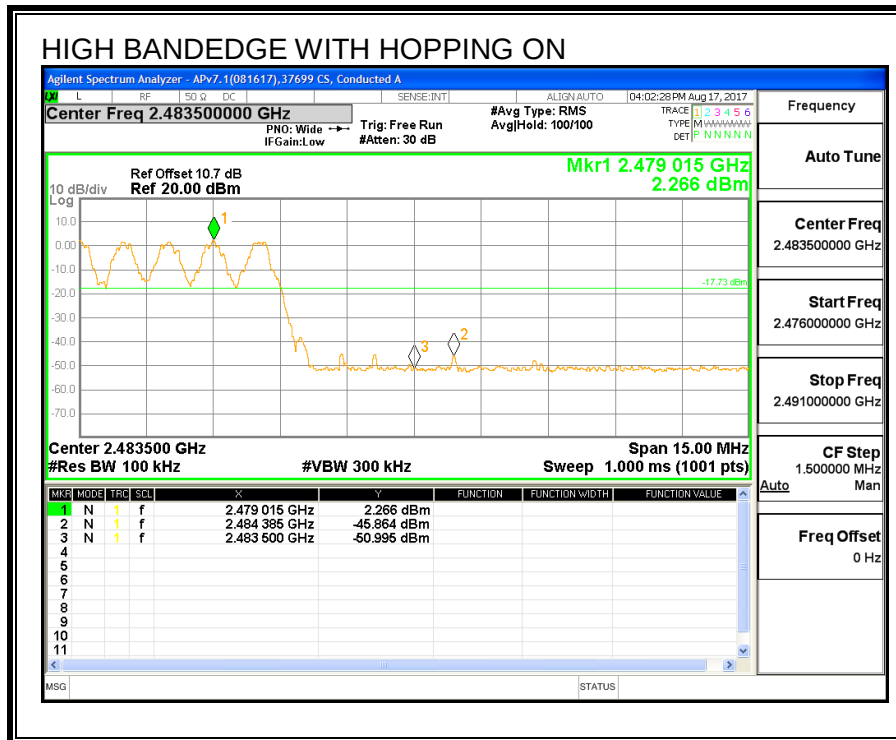
RESULTS











7.3. ENHANCED DATA RATE DQPSK MODULATION

7.3.1. OUTPUT POWER

LIMITS

§15.247 (b) (1)

RSS-247 (5.4) (b)

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

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 10.7 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

TEST ENGINEER:	37699	Date:	08/11/17
-----------------------	-------	--------------	----------

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.71	30	-24.29
Middle	2441	5.52	30	-24.48
High	2480	5.34	30	-24.66

7.3.2. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 10.7 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

TEST ENGINEER:	37699	Date:	08/11/17
-----------------------	-------	--------------	----------

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	3.15
Middle	2441	2.96
High	2480	2.73

7.4. ENHANCED DATA RATE 8PSK MODULATION

7.4.1. 20 dB BANDWIDTH

LIMITS

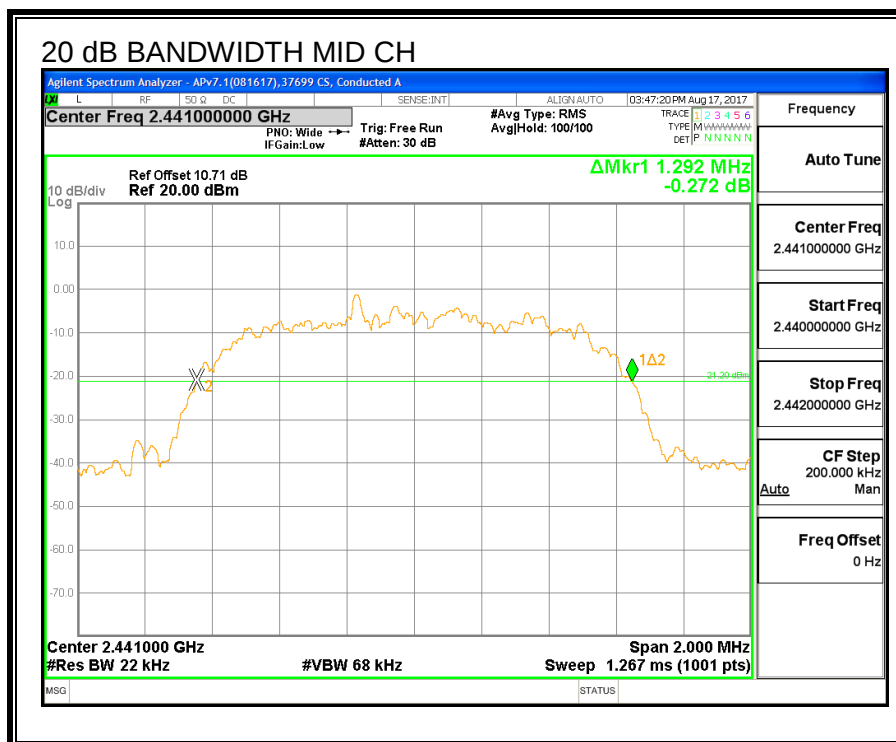
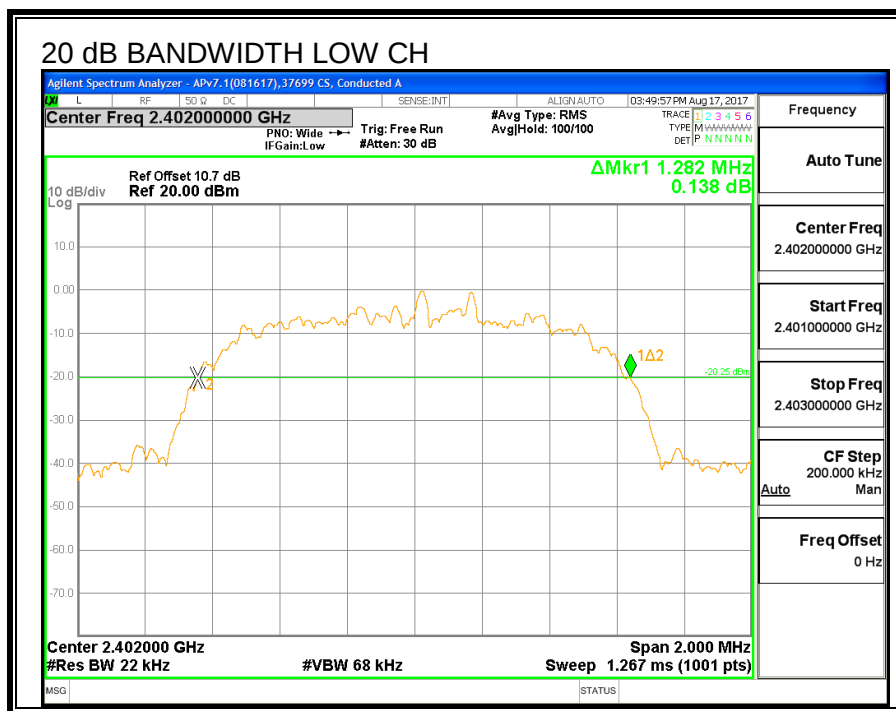
None; for reporting purposes only.

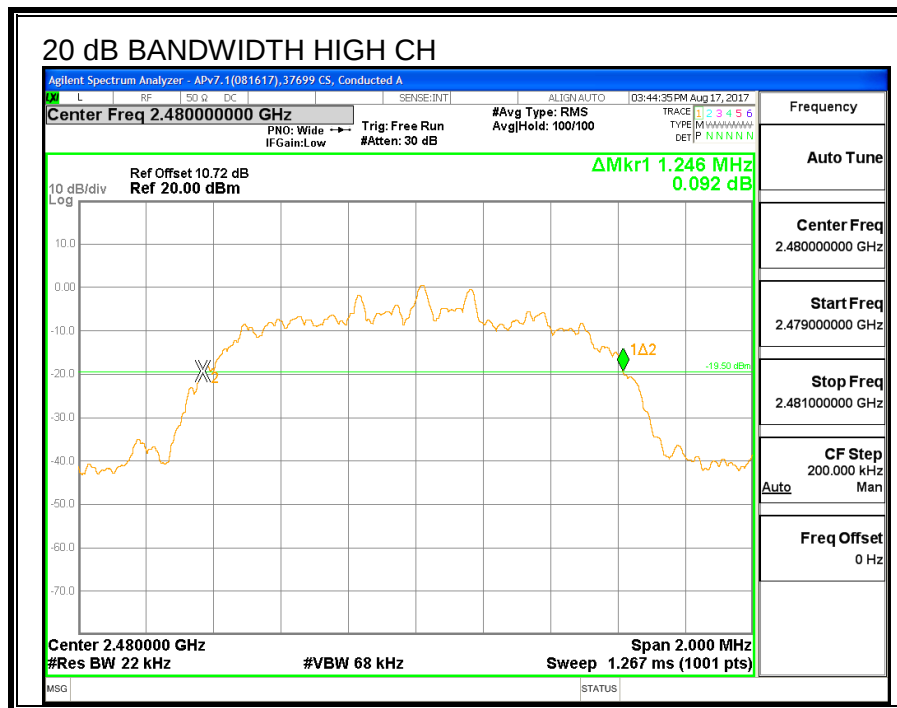
TEST PROCEDURE

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)
Low	2402	1.282
Middle	2441	1.292
High	2480	1.246





7.4.2. 99% BANDWIDTH

LIMITS

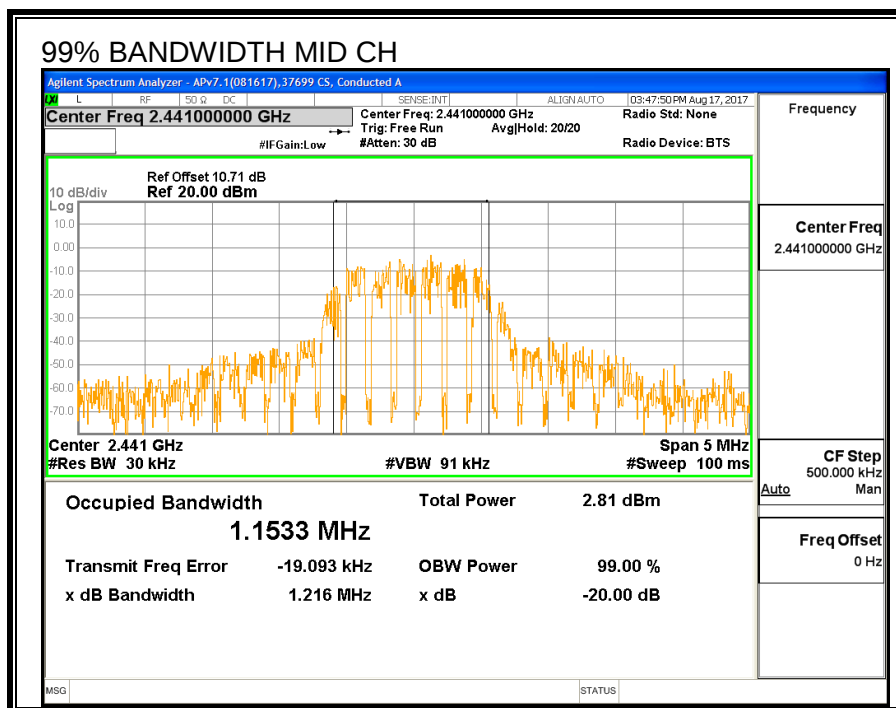
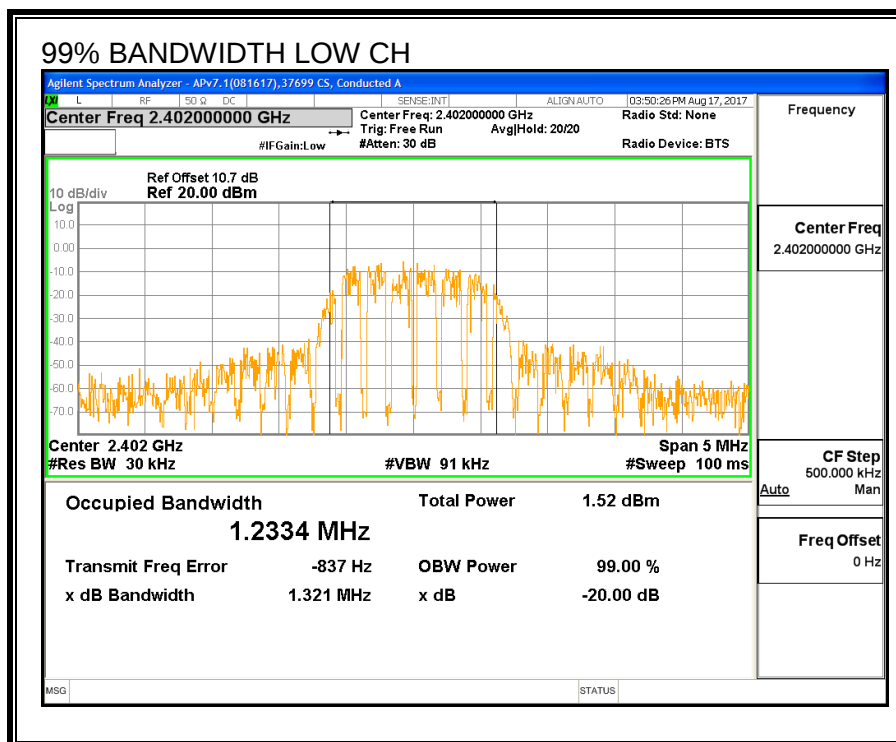
None; for reporting purposes only.

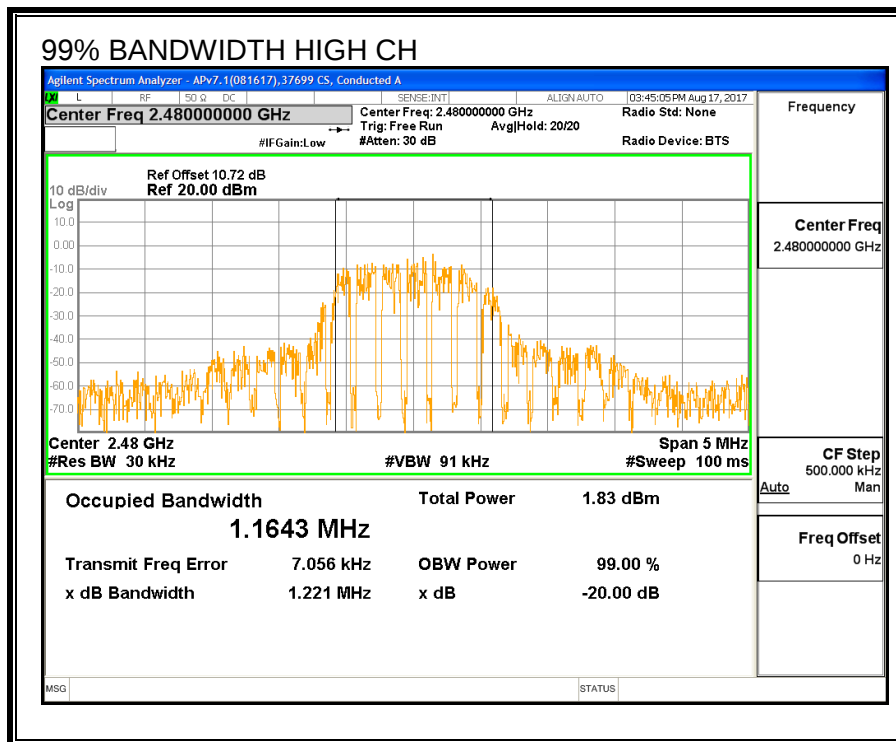
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1%-5% the OBW. The VBW is set to ≥ 3 times RBW. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.2334
Middle	2441	1.1533
High	2480	1.1643





7.4.3. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

IC RSS-247 (5.1) (b)

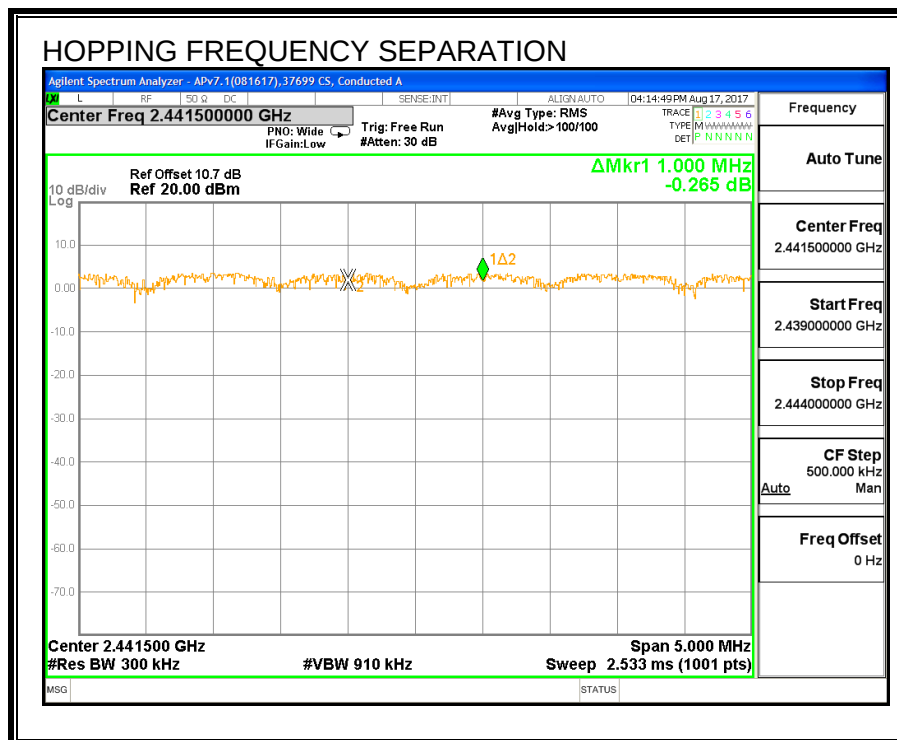
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

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 910 kHz. The sweep time is coupled.

RESULTS



7.4.4. NUMBER OF HOPPING CHANNELS

LIMITS

FCC §15.247 (a) (1) (iii)

IC RSS-247 (5.1) (d)

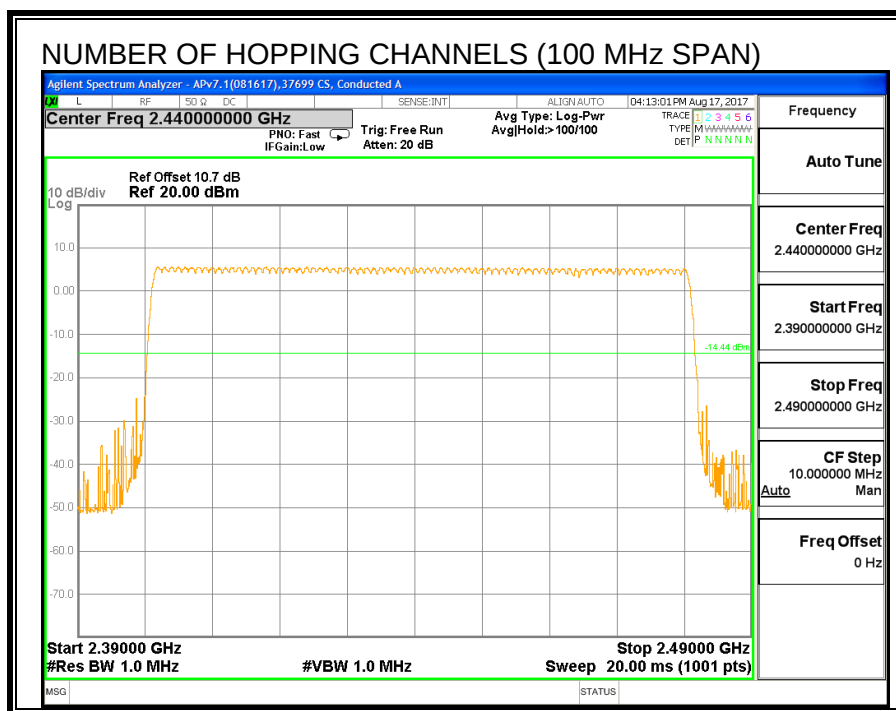
Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

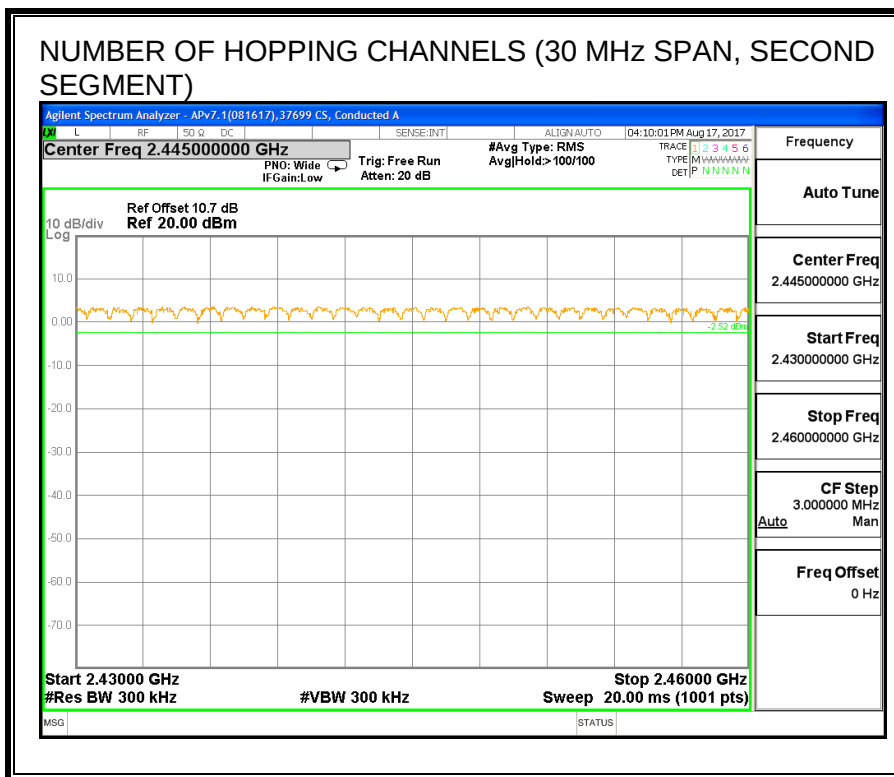
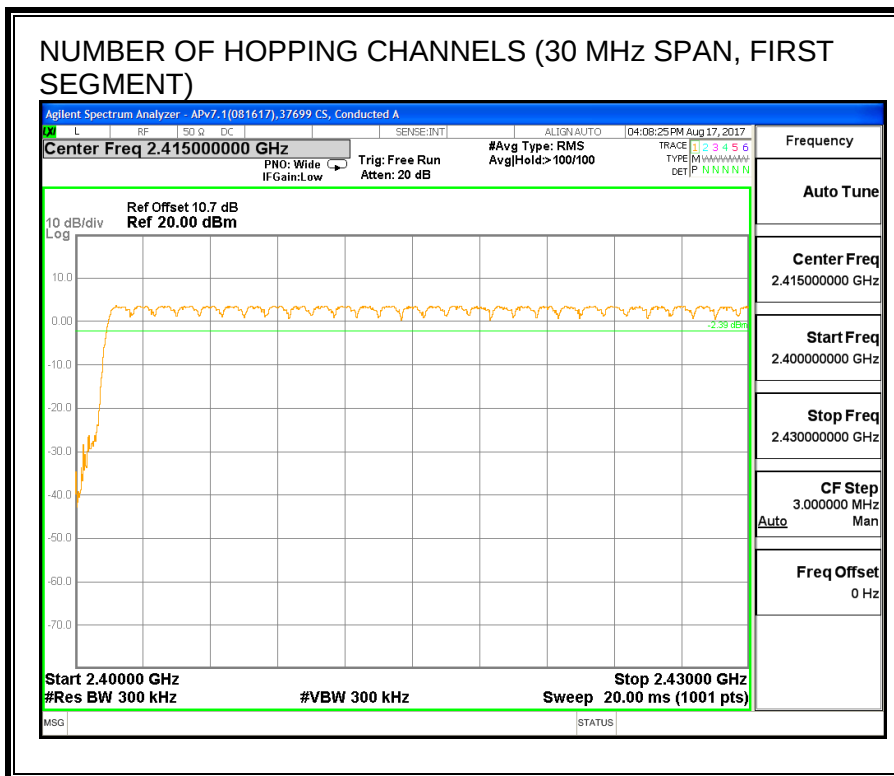
TEST PROCEDURE

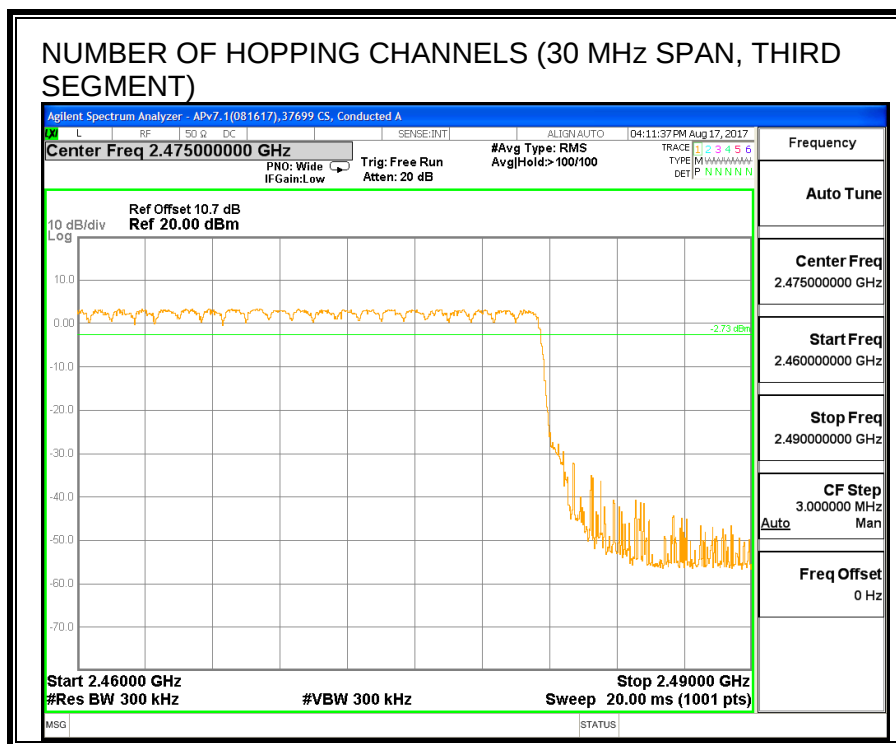
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

RESULTS

Normal Mode: 79 Channels observed.







7.4.5. AVERAGE TIME OF OCCUPANCY

LIMITS

FCC §15.247 (a) (1) (iii)

IC RSS-247 (5.1) (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

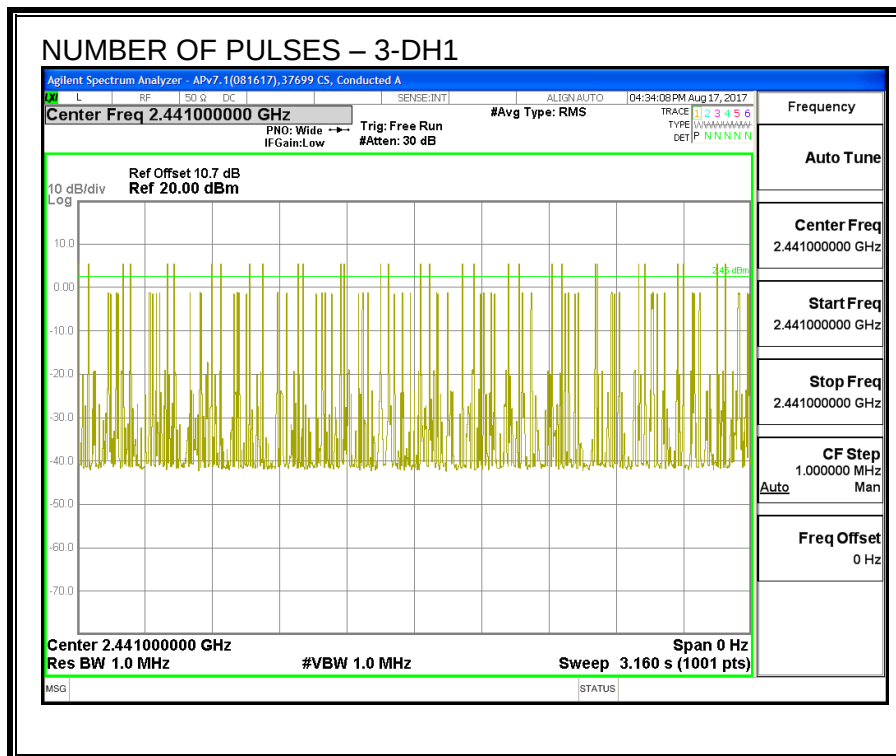
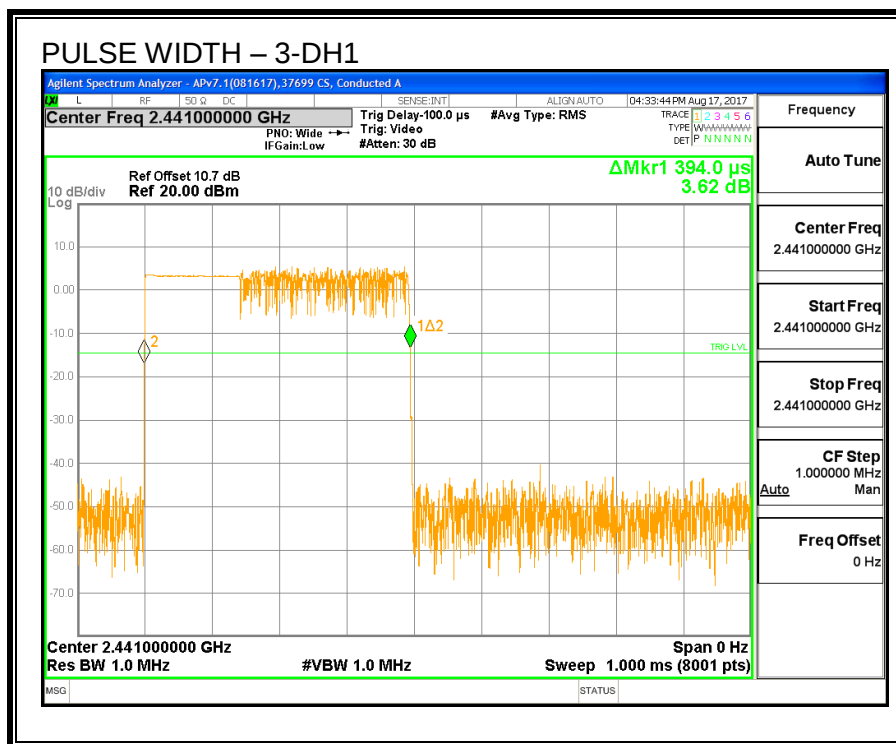
The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

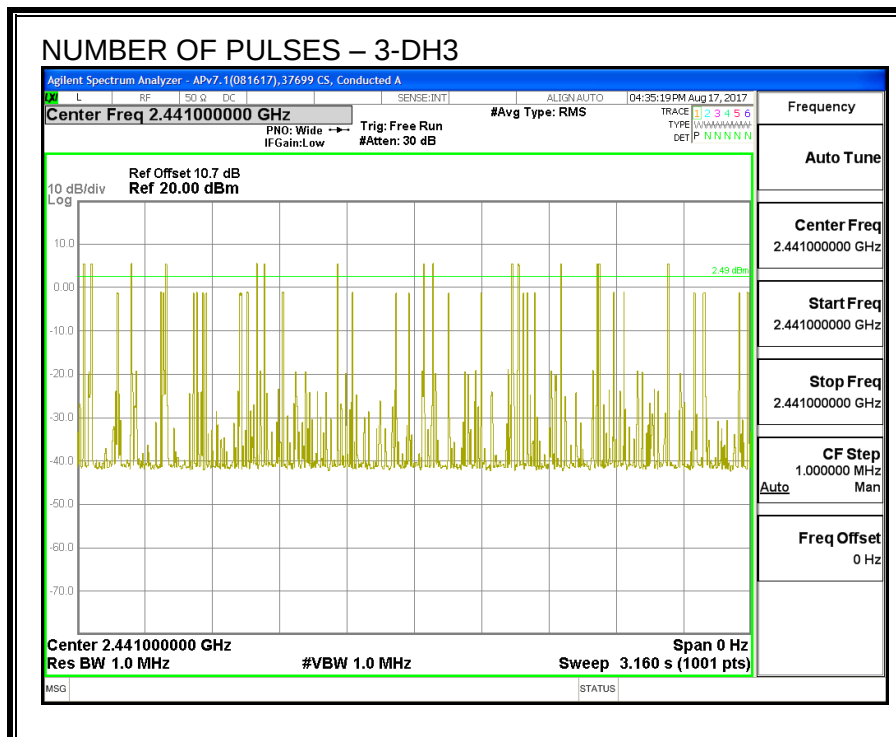
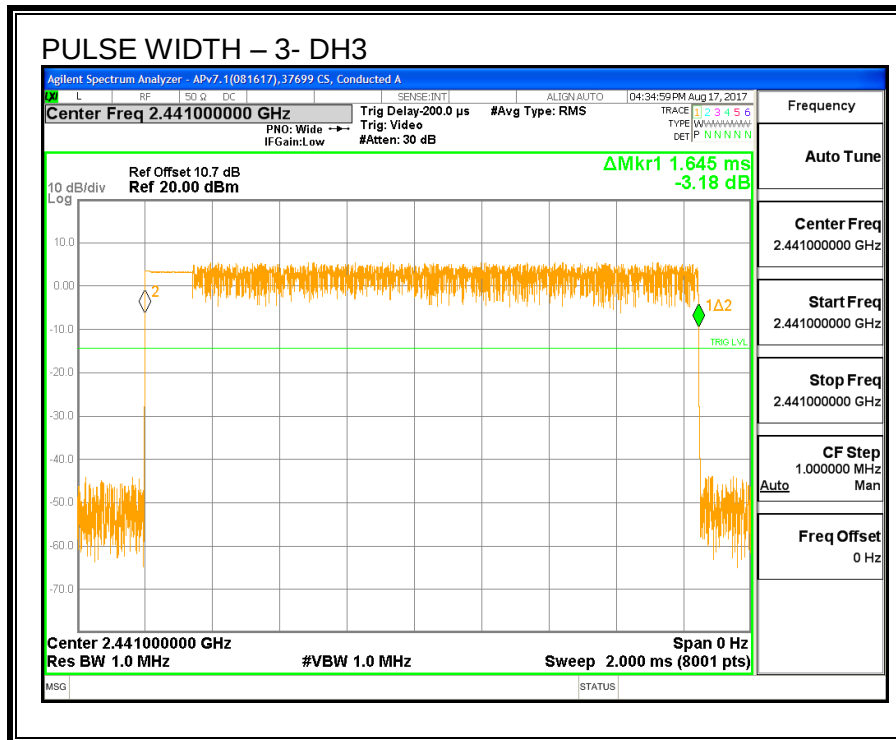
The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{pulse width}$.

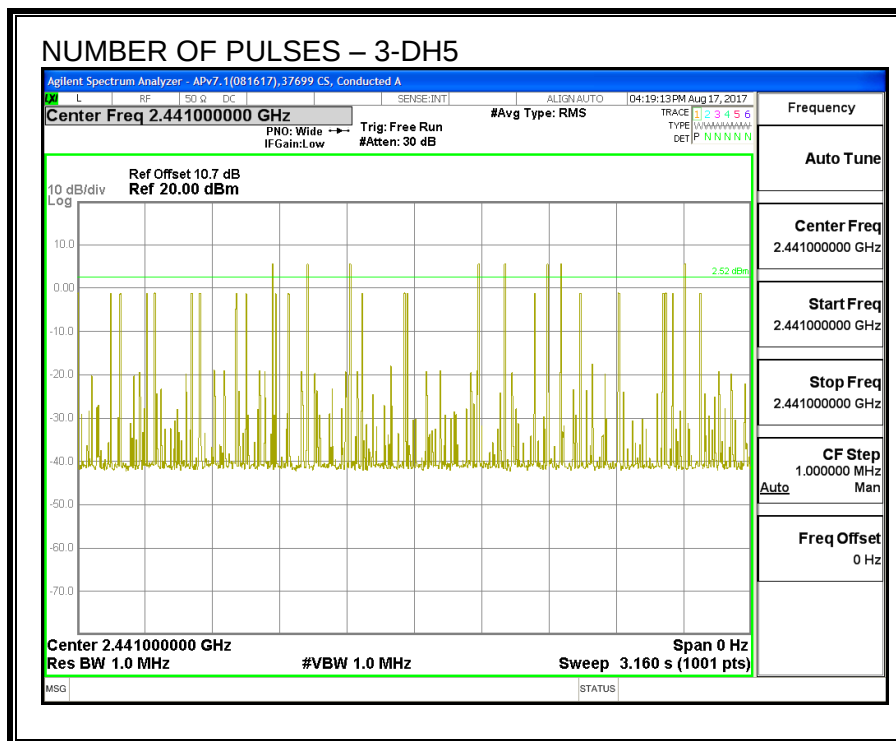
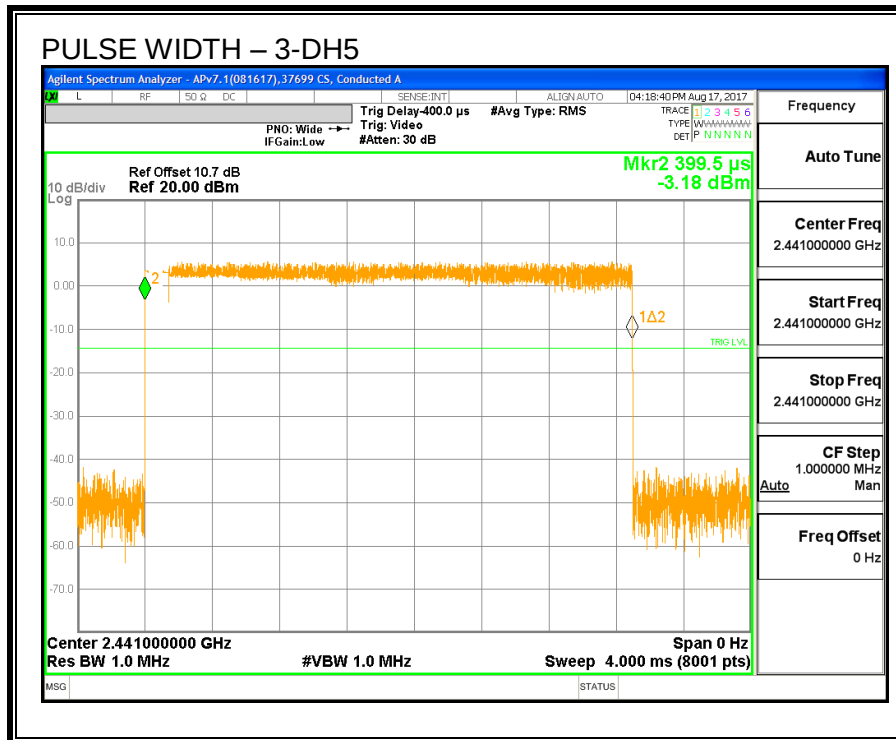
For AFH mode, the average time of occupancy in the specified 8 second period (20 channels * 0.4 seconds) is equal to $10 * (\# \text{ of pulses in } 0.8 \text{ s}) * \text{pulse width}$.

RESULTS

AVERAGE TIME OF OCCUPANCY					
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
8PSK Normal Mode					
3-DH1	0.394	32	0.1261	0.4	-0.2739
3-DH3	1.644	15	0.2466	0.4	-0.1534
3-DH5	0.399	8	0.0319	0.4	-0.3681
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
8PSK AFH Mode					
3-DH1	0.394	8	0.03152	0.4	-0.3685
3-DH3	1.644	3.75	0.06165	0.4	-0.3384
3-DH5	0.399	2	0.00798	0.4	-0.3920







7.4.6. OUTPUT POWER

LIMITS

§15.247 (b) (1)

RSS-247 (5.4) (b)

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

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 10.7 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

TEST ENGINEER:	37699	Date:	08/11/17
-----------------------	-------	--------------	----------

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.99	30	-24.01
Middle	2441	5.84	30	-24.16
High	2480	5.62	30	-24.38

7.4.7. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 10.7 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

TEST ENGINEER:	37699	Date:	08/11/17
-----------------------	-------	--------------	----------

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	3.15
Middle	2441	2.96
High	2480	2.73

7.4.8. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-247 5.5

Limit = -20 dBc

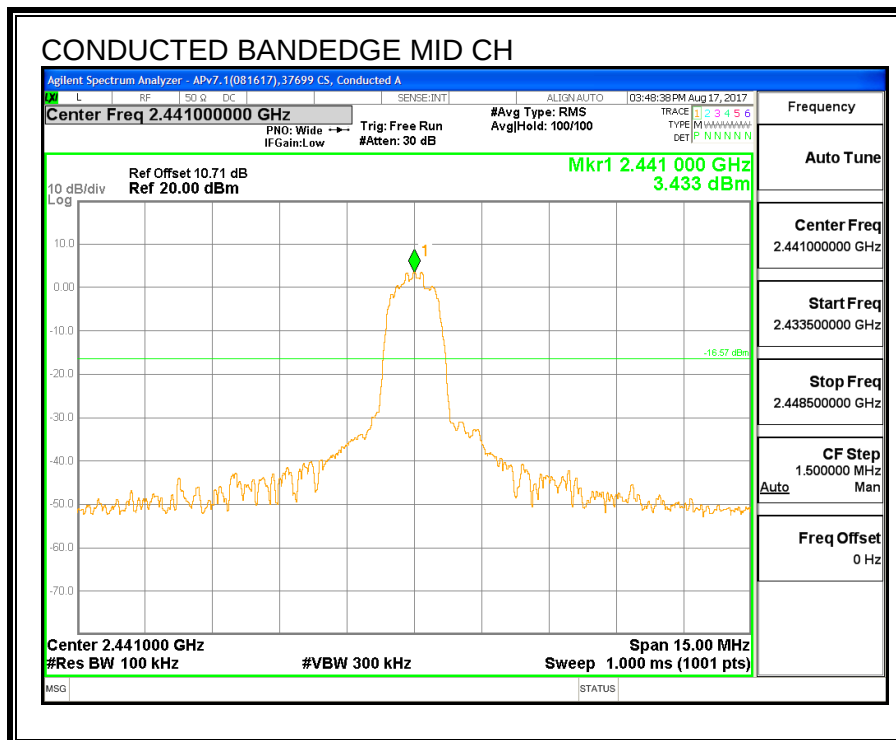
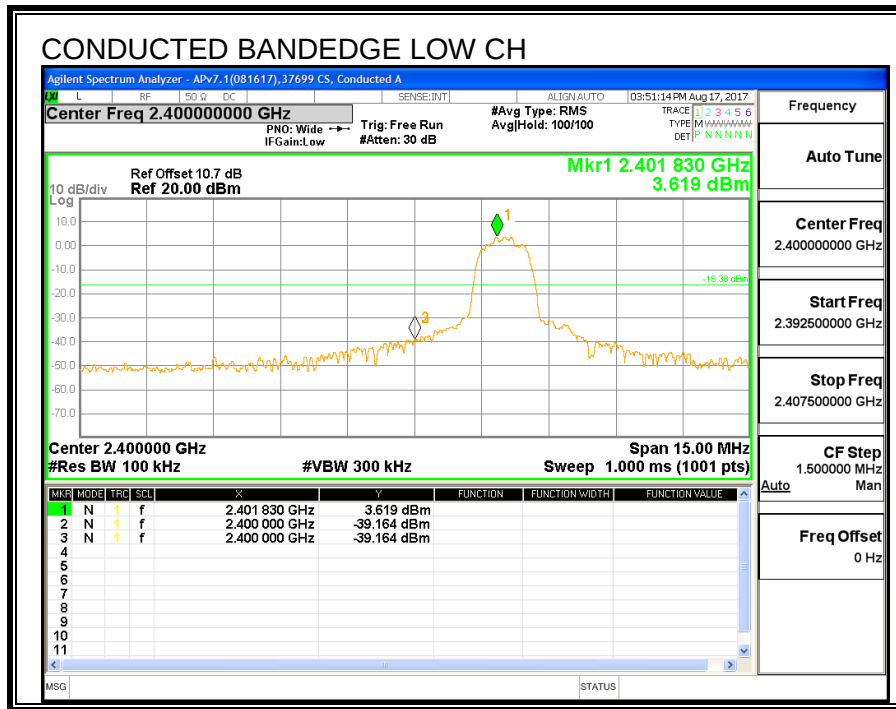
TEST PROCEDURE

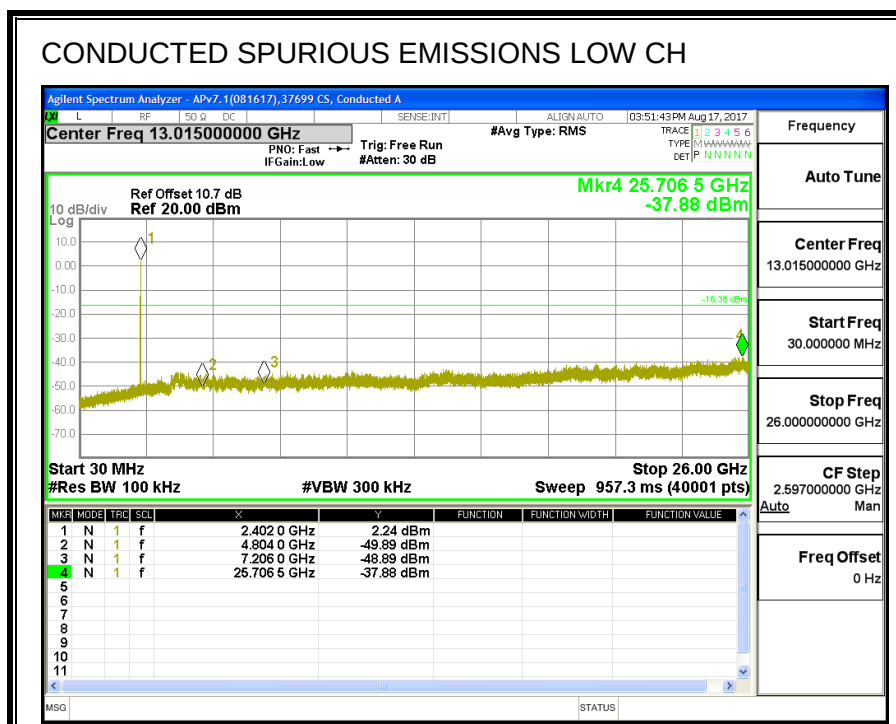
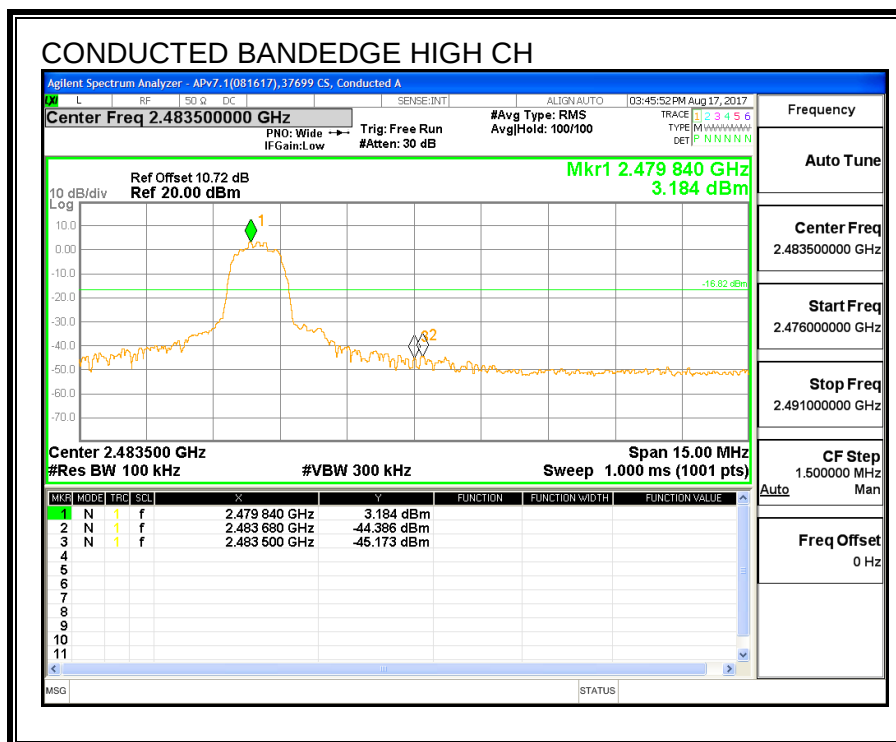
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

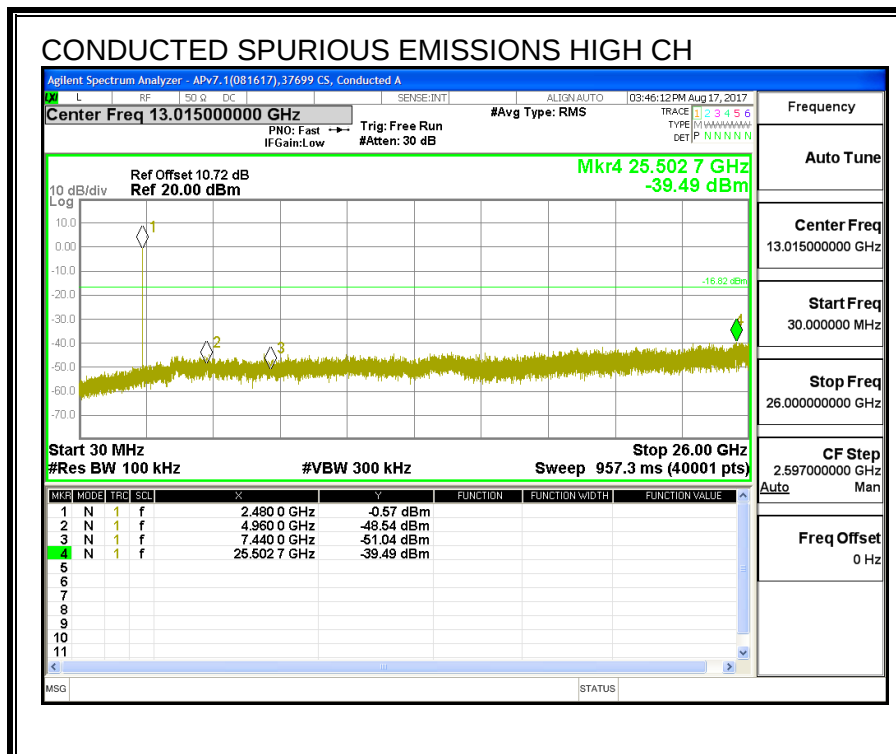
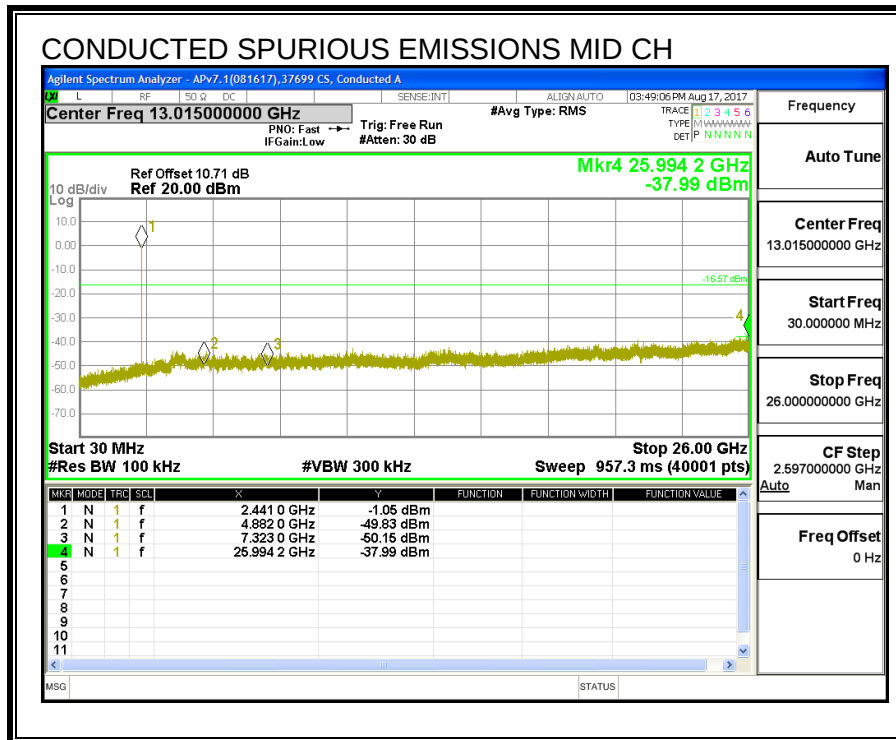
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

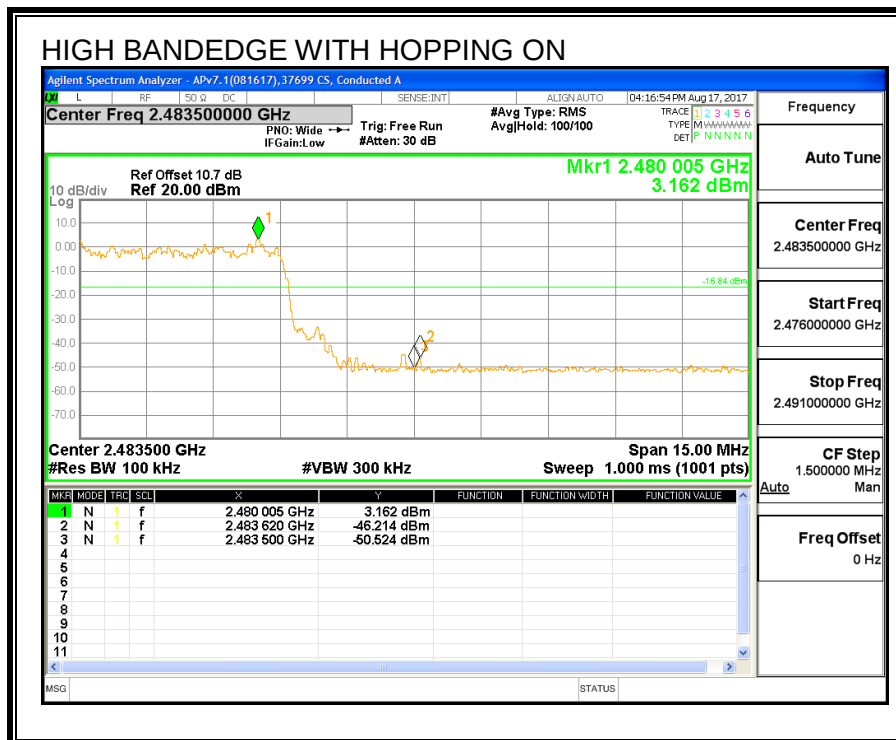
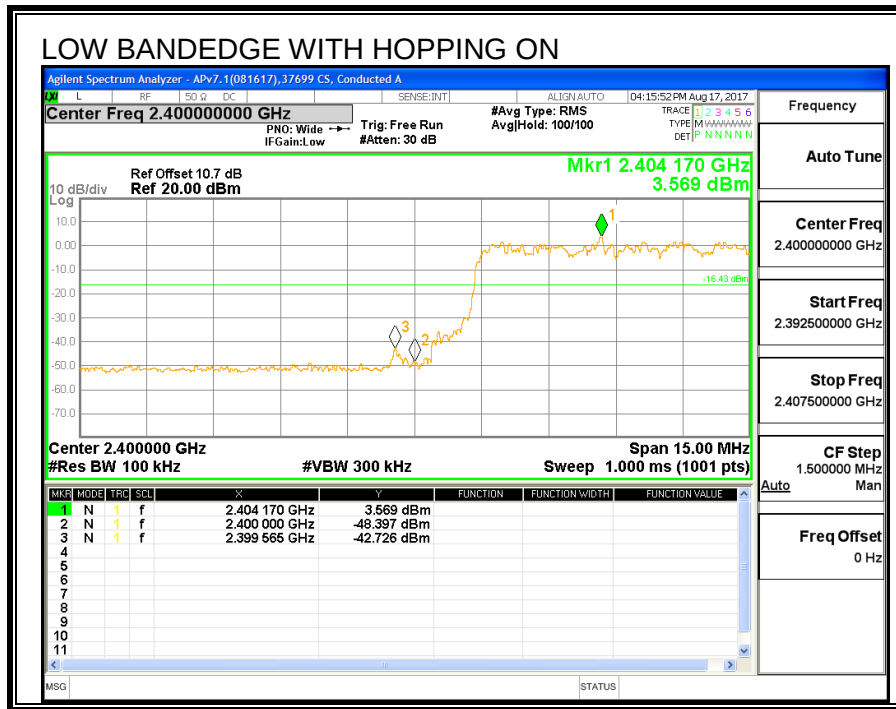
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

RESULTS









8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T (360 Hz) video bandwidth with peak detector for average measurements.

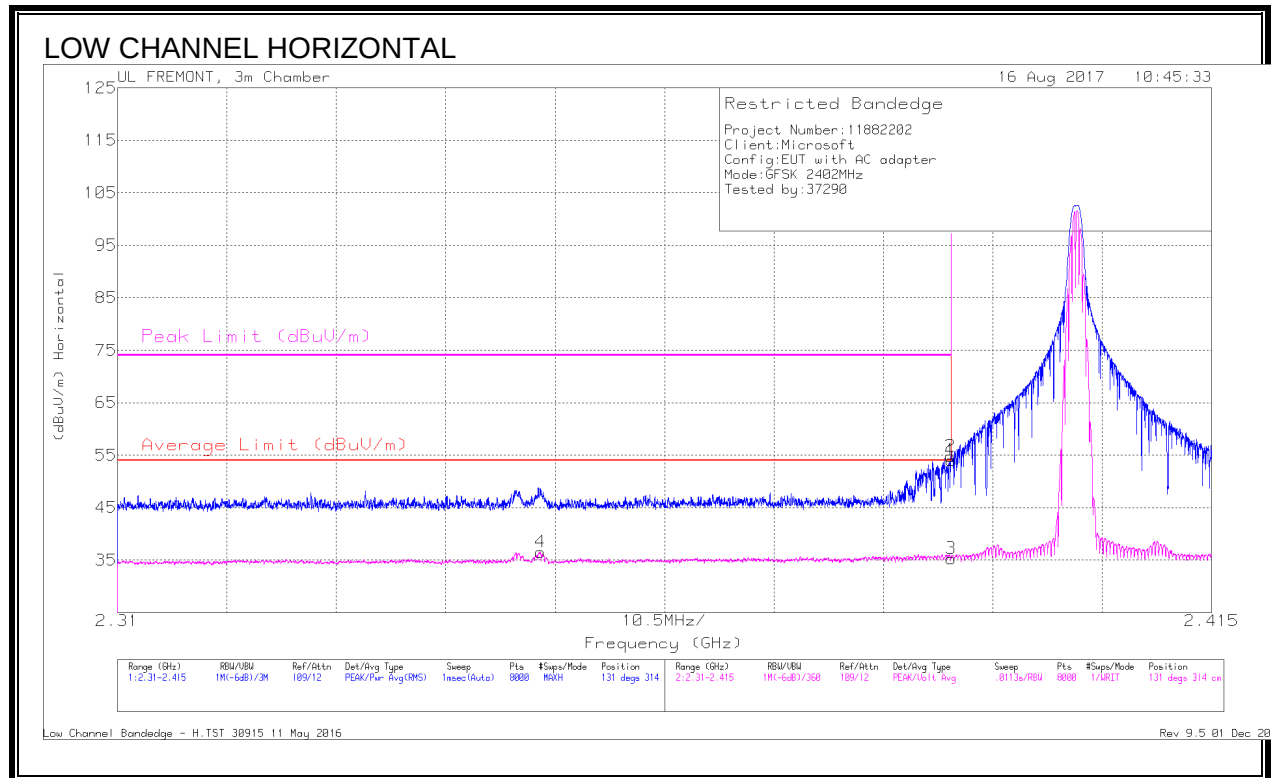
The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

RESULTS

8.2. BASIC DATA RATE GFSK MODULATION

8.2.1. RESTRICTED BANDEDGE (LOW CHANNEL)

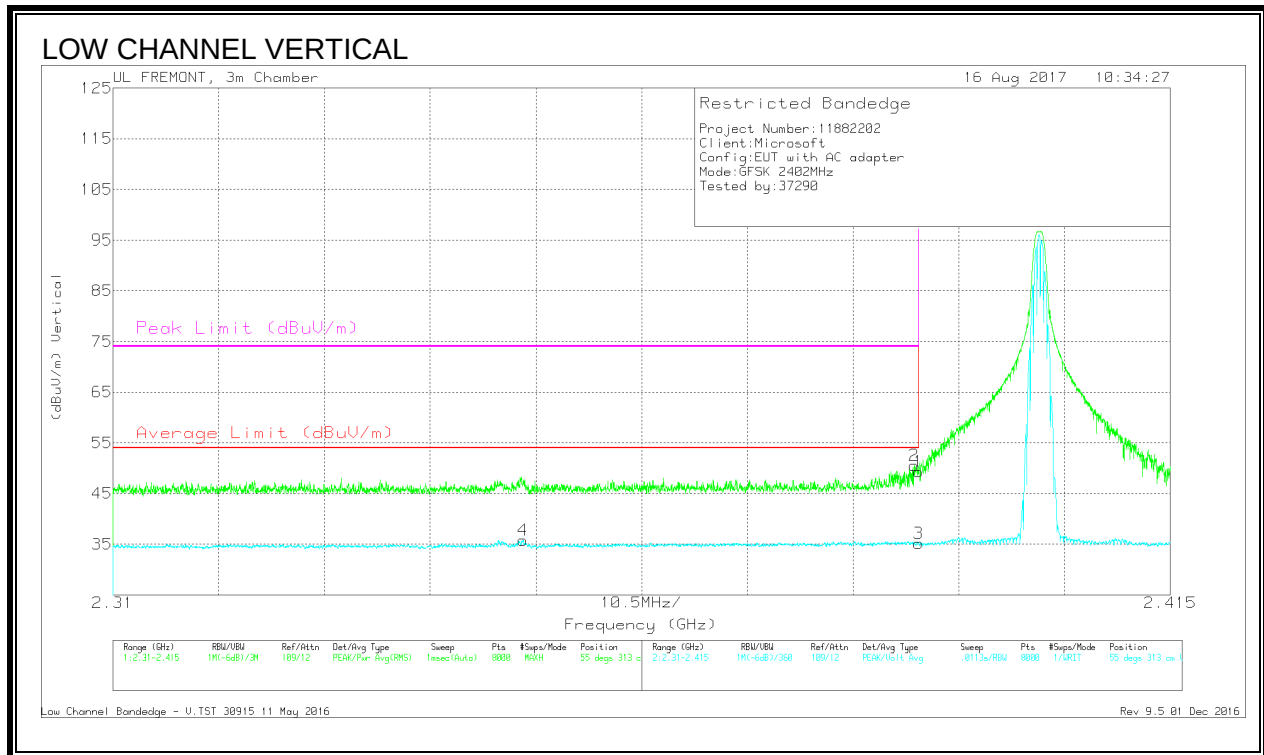


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cb/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	2.351	27.23	VA1T	31.9	-22.6	36.53	54	-17.47	-	-	131	314	H
1	2.39	44.72	Pk	31.9	-22.6	54.02	-	-	74	-19.98	131	314	H
2	2.39	45.41	Pk	31.9	-22.6	54.71	-	-	74	-19.29	131	314	H
3	2.39	25.98	VA1T	31.9	-22.6	35.28	54	-18.72	-	-	131	314	H

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration



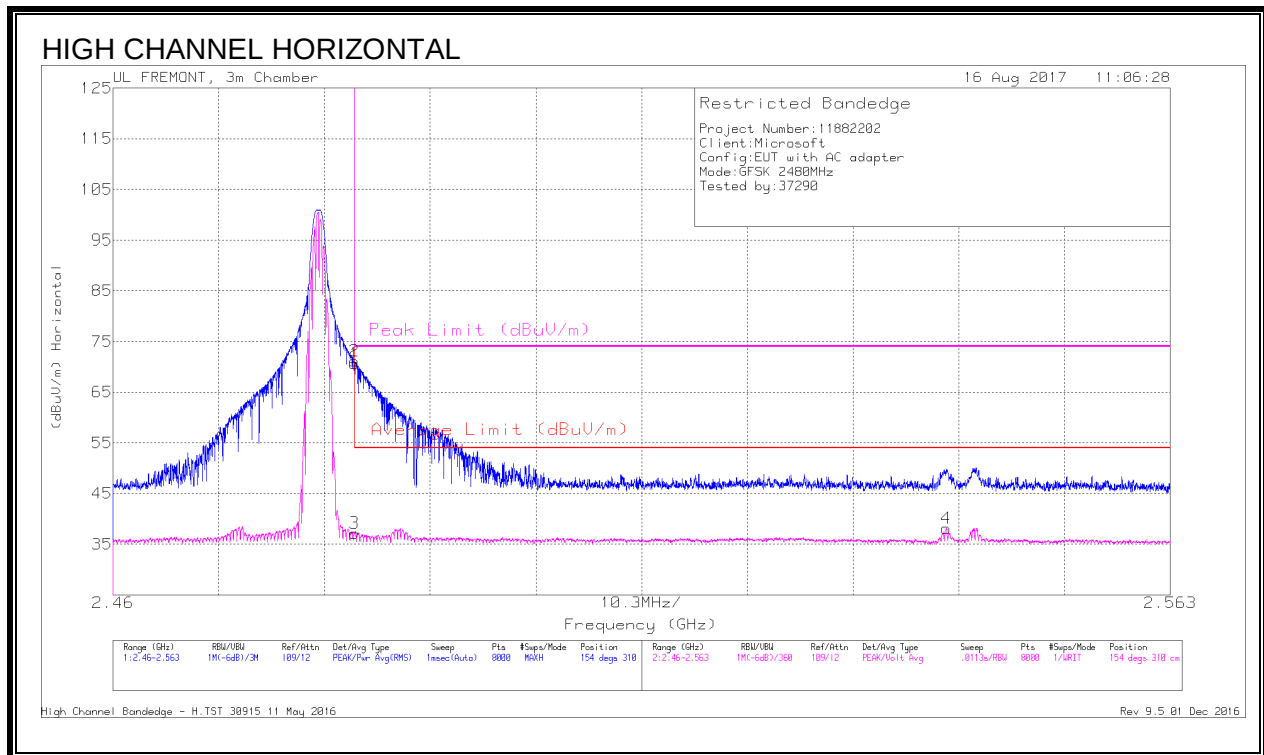
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	2.351	26.45	VA1T	31.9	-22.6	35.75	54	-18.25	-	-	55	313	V
1	2.39	39.99	Pk	31.9	-22.6	49.29	-	-	74	-24.71	55	313	V
2	2.39	41.1	Pk	31.9	-22.5	50.5	-	-	74	-23.5	55	313	V
3	2.39	25.9	VA1T	31.9	-22.6	35.2	54	-18.8	-	-	55	313	V

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average $V_B=1/T_{on}$ where: T_{on} is transmit duration

8.2.2. AUTHORIZED BANDEDGE (HIGH CHANNEL)

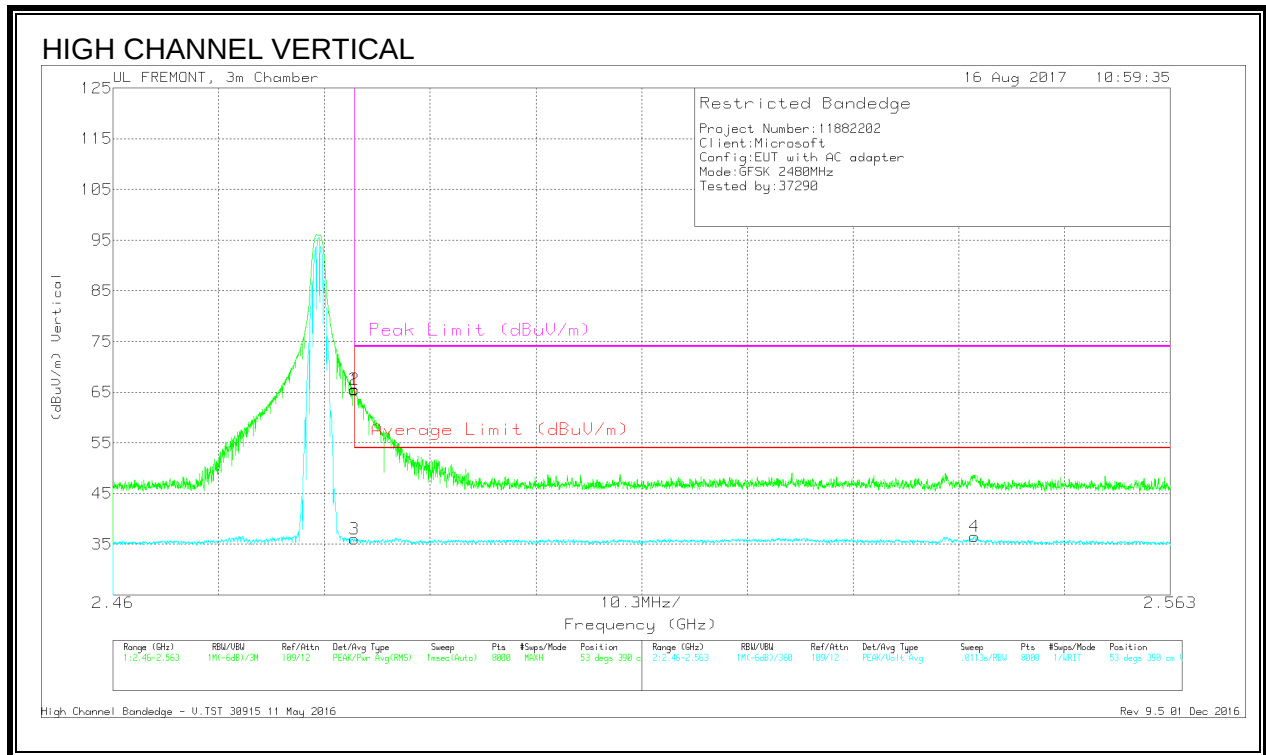


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/Fitr/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.484	60.98	Pk	32.4	-22.7	70.68	-	-	74	-3.32	154	310	H
2	2.484	61.45	Pk	32.4	-22.7	71.15	-	-	74	-2.85	154	310	H
3	2.484	27.49	VA1T	32.4	-22.7	37.19	54	-16.81	-	-	154	310	H
4	2.541	28.23	VA1T	32.4	-22.5	38.13	54	-15.87	-	-	154	310	H

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average $V_B = 1/T_{on}$ where: T_{on} is transmit duration



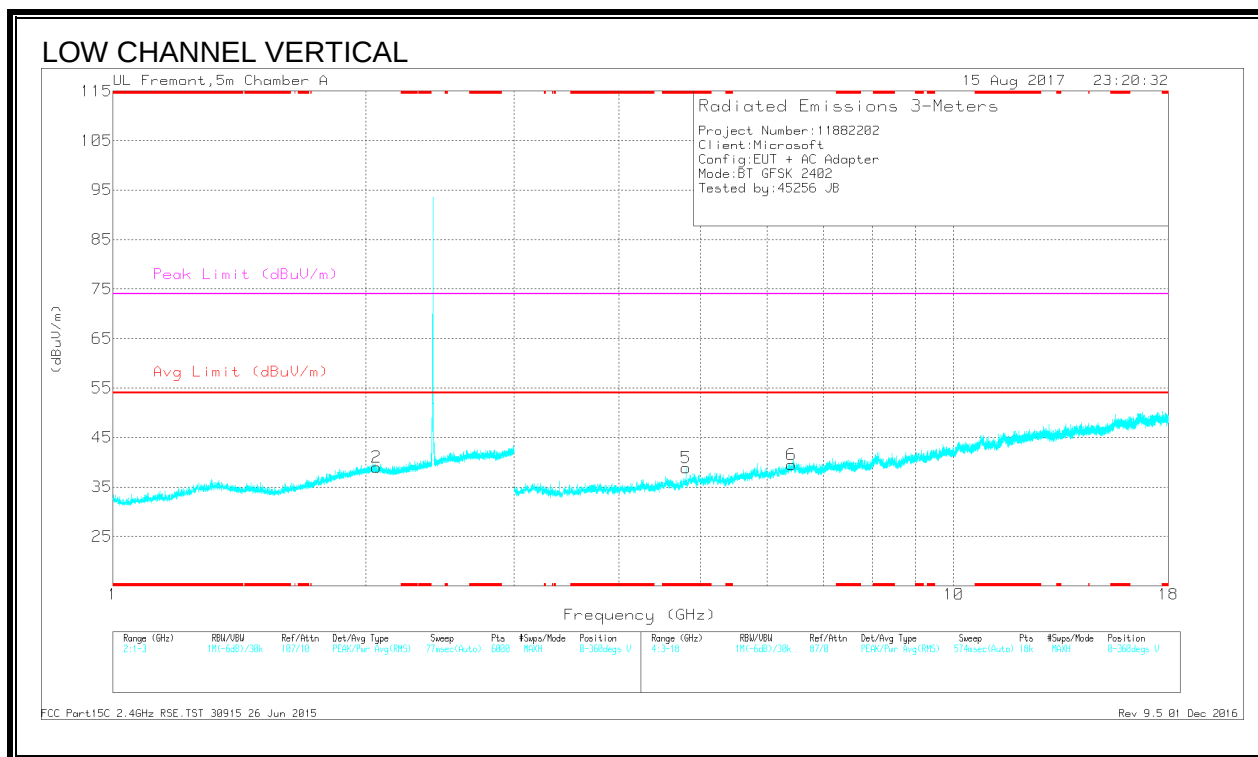
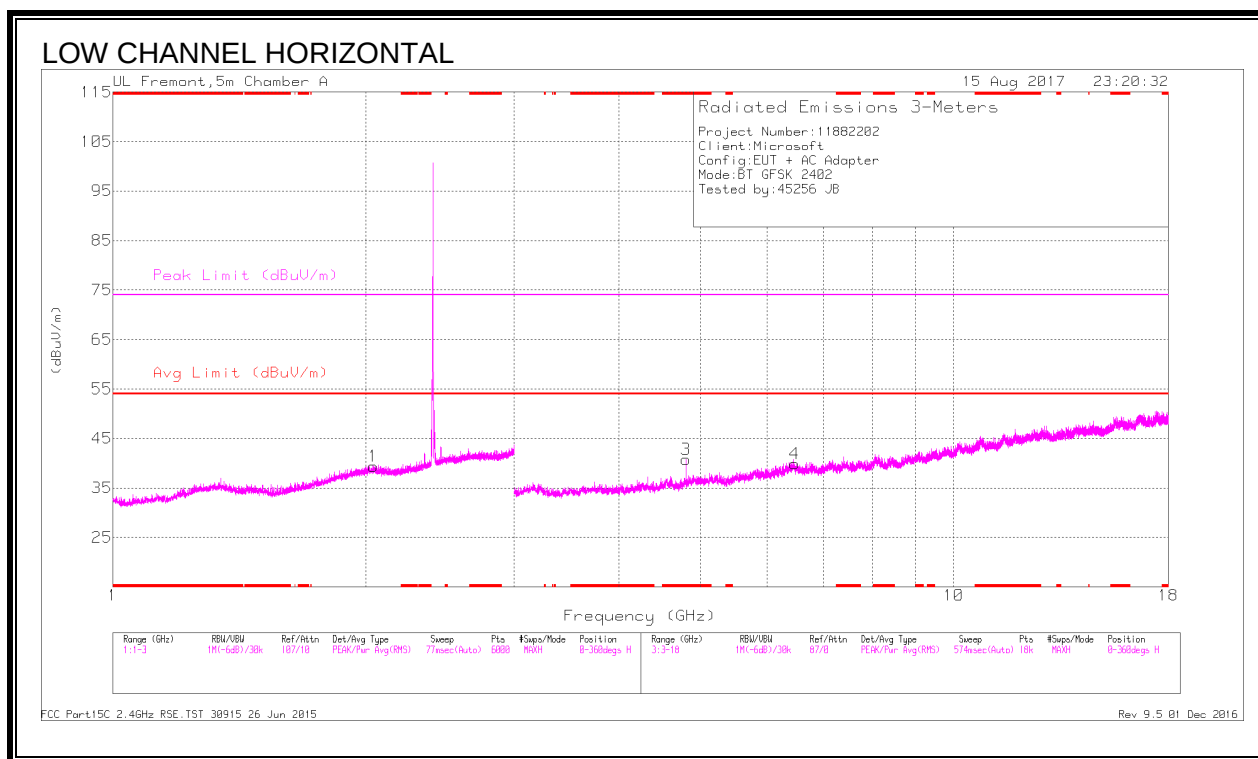
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.484	55.76	Pk	32.4	-22.7	65.46	-	-	74	-8.54	53	390	V
2	2.484	55.89	Pk	32.4	-22.7	65.59	-	-	74	-8.41	53	390	V
3	2.484	26.26	VA1T	32.4	-22.7	35.96	54	-18.04	-	-	53	390	V
4	2.544	26.65	VA1T	32.4	-22.5	36.55	54	-17.45	-	-	53	390	V

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average $V_B = 1/T_{on}$ where: T_{on} is transmit duration

8.2.3. HARMONICS AND SPURIOUS EMISSIONS



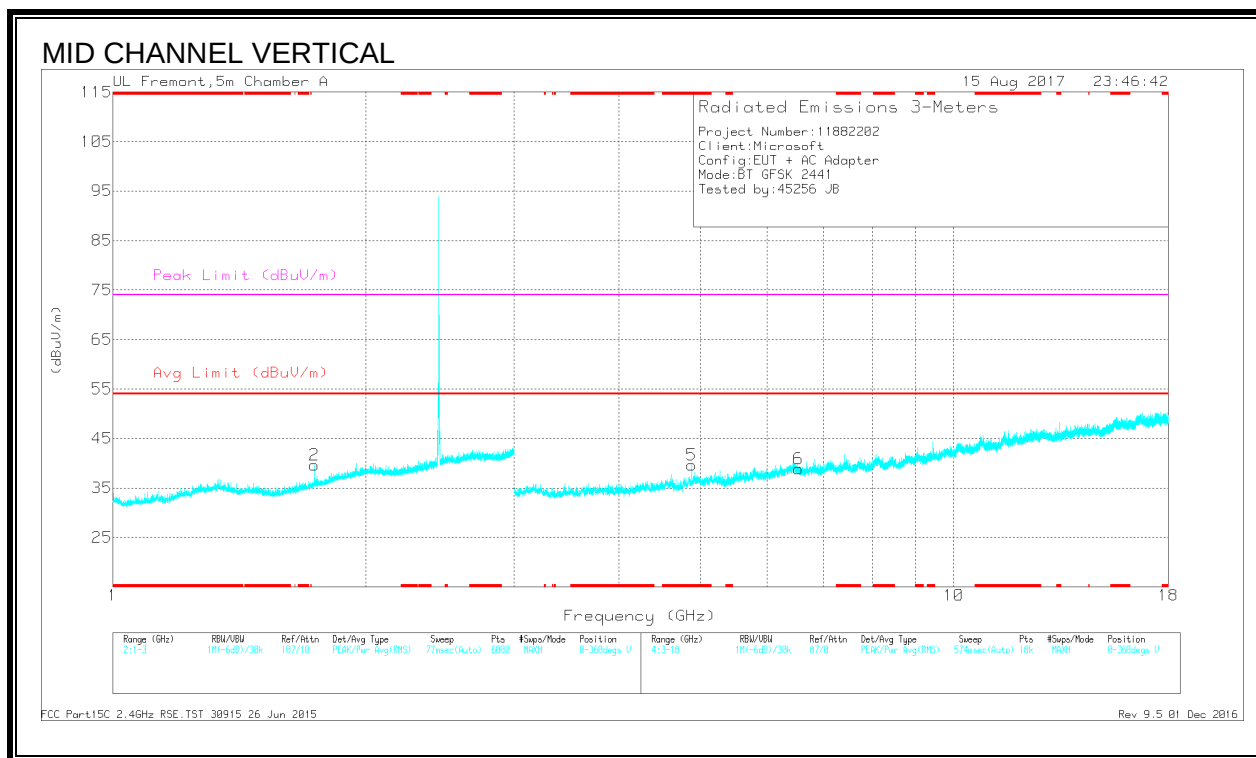
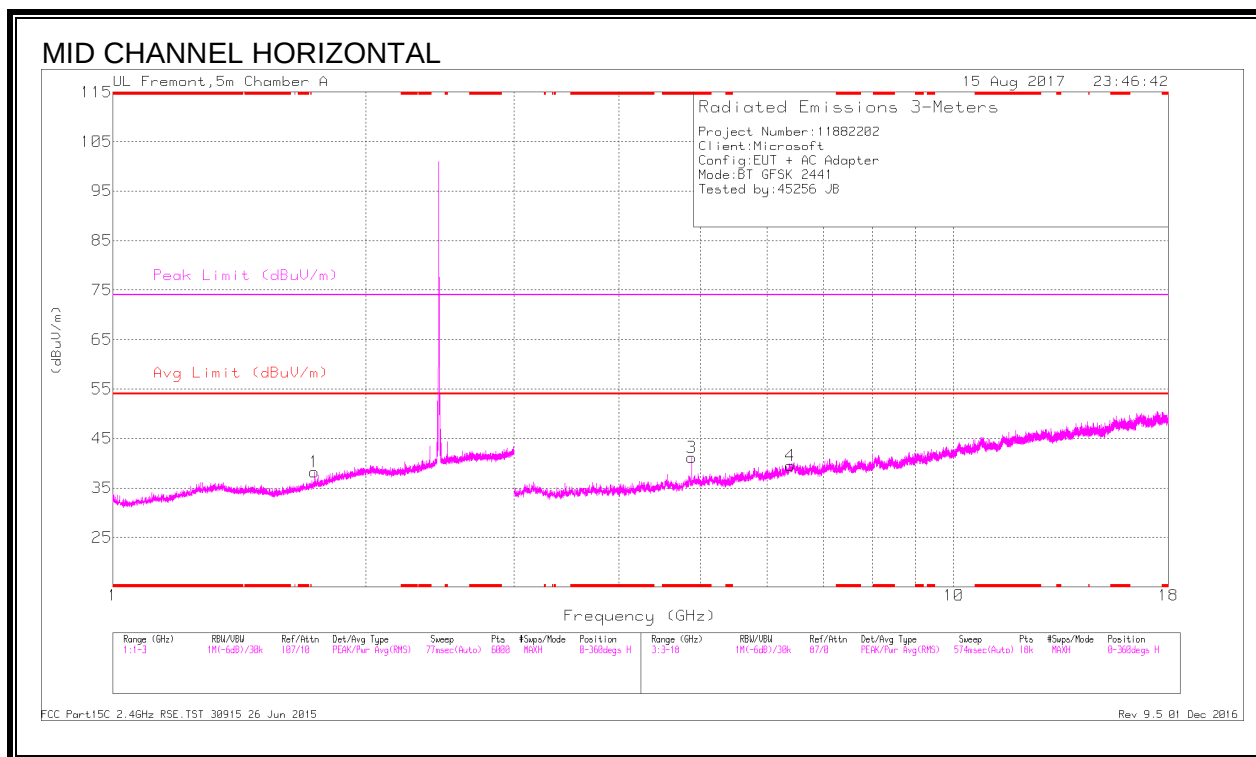
Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.804	38.23	PKFH	34.2	-27.7	44.73	-	-	74	-29.27	252	219	H
	* 4.804	30.85	VA1T	34.2	-27.7	37.35	54	-16.65	-	-	252	219	H
5	* 4.804	38.17	PKFH	34.2	-27.7	44.67	-	-	74	-29.33	121	243	V
	* 4.804	29.84	VA1T	34.2	-27.7	36.34	54	-17.66	-	-	121	243	V
1	2.042	30.94	PKFH	31.4	-23	39.34	-	-	-	-	0	199	H
2	2.06	30.75	PKFH	31.3	-23.1	38.95	-	-	-	-	0	101	V
6	6.413	28.4	PKFH	35.8	-24.7	39.5	-	-	-	-	0	200	V
4	6.465	28.09	PKFH	35.7	-23.9	39.89	-	-	-	-	0	199	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH - FHSS: RB=1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration



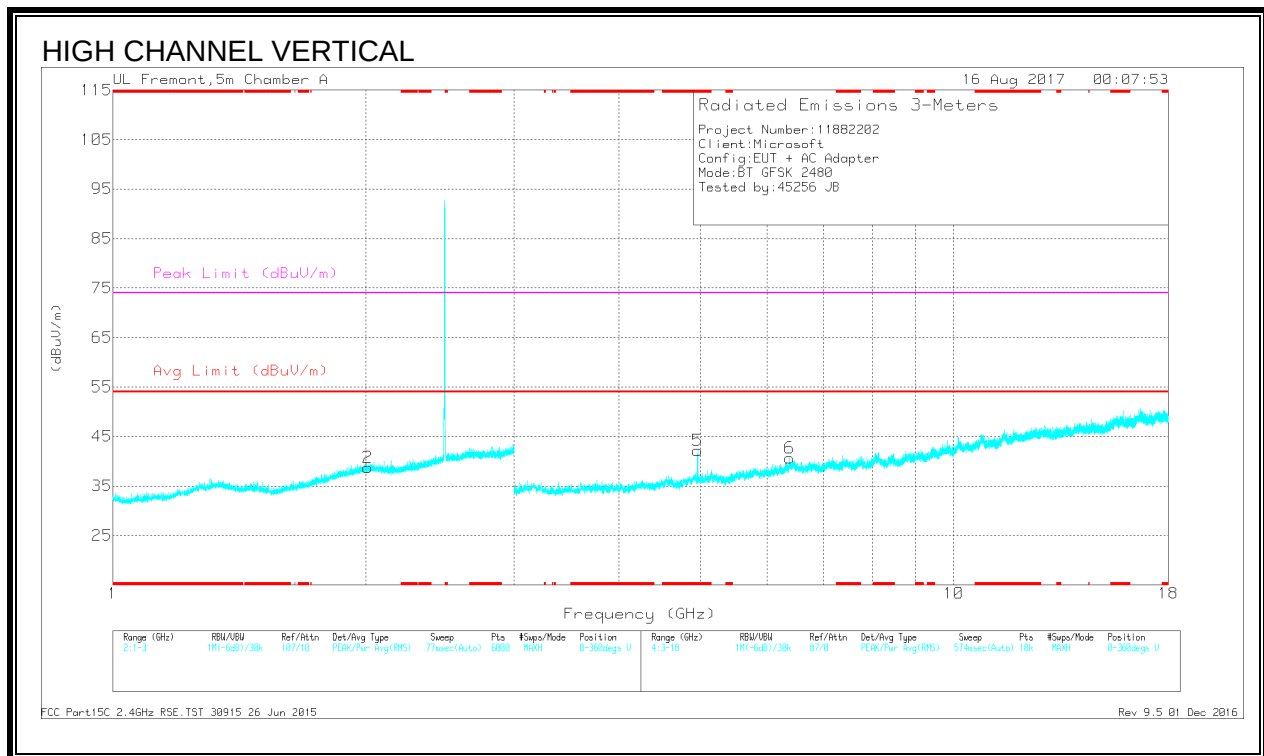
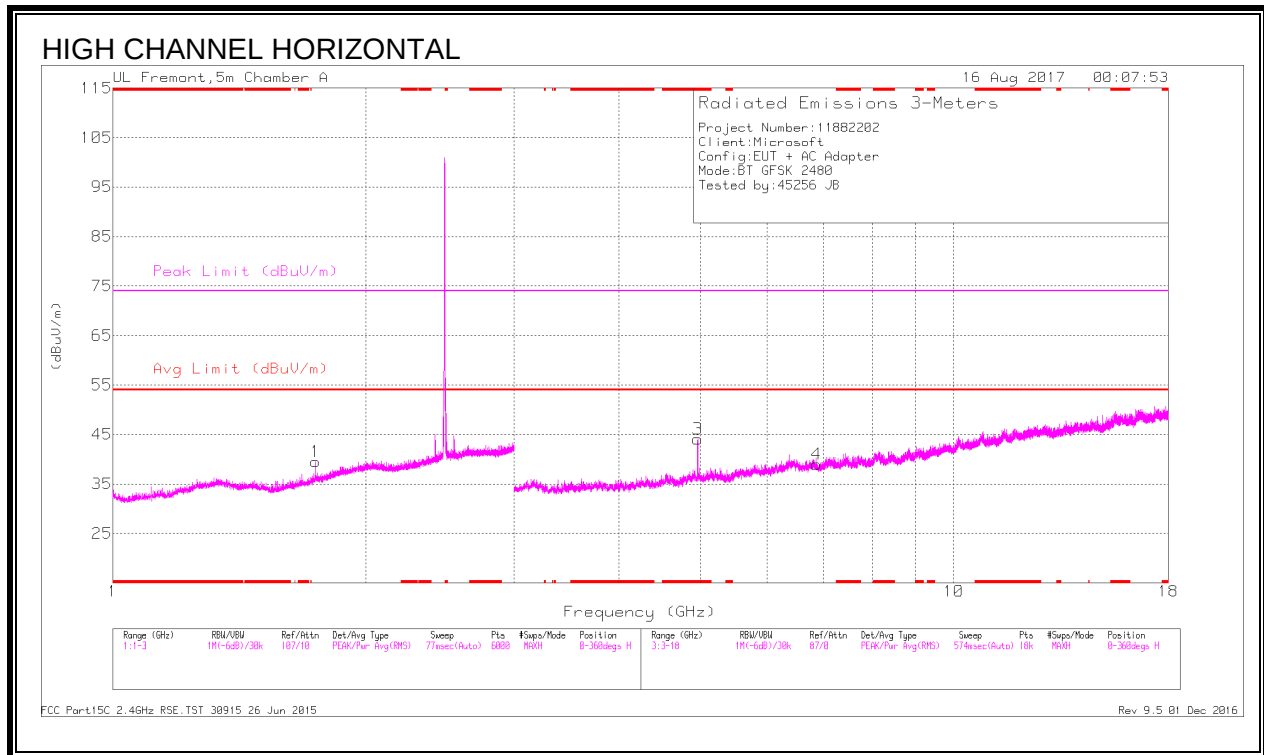
Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.882	39.59	PKFH	34.1	-27.3	46.39	-	-	74	-27.61	135	176	H
	* 4.882	33.1	VA1T	34.1	-27.3	39.9	54	-14.1	-	-	135	176	H
5	* 4.882	38.04	PKFH	34.1	-27.3	44.84	-	-	74	-29.16	127	214	V
	* 4.882	30.82	VA1T	34.1	-27.3	37.62	54	-16.38	-	-	127	214	V
1	1.737	31.99	PKFH	29.6	-23.3	38.29	-	-	-	-	0	199	H
2	1.737	33.38	PKFH	29.6	-23.3	39.68	-	-	-	-	0	200	V
4	6.395	28.26	PKFH	35.8	-24.5	39.56	-	-	-	-	0	199	H
6	6.541	27.78	PKFH	35.7	-24.6	38.88	-	-	-	-	0	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH - FHSS: RB=1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration



Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.96	42.09	PKFH	34.2	-27.9	48.39	-	-	74	-25.61	249	131	H
	* 4.96	37.62	VA1T	34.2	-27.9	43.92	54	-10.08	-	-	249	131	H
5	* 4.96	40.34	PKFH	34.2	-27.9	46.64	-	-	74	-27.36	117	210	V
	* 4.96	34.49	VA1T	34.2	-27.9	40.79	54	-13.21	-	-	117	210	V
1	1.742	33.22	PKFH	29.6	-23.3	39.52	-	-	-	-	0	199	H
2	2.011	30.5	PKFH	31.4	-23.1	38.8	-	-	-	-	0	200	V
6	6.381	29.57	PKFH	35.8	-24.7	40.67	-	-	-	-	0	101	V
4	6.868	27.46	PKFH	35.6	-24.1	38.96	-	-	-	-	0	101	H

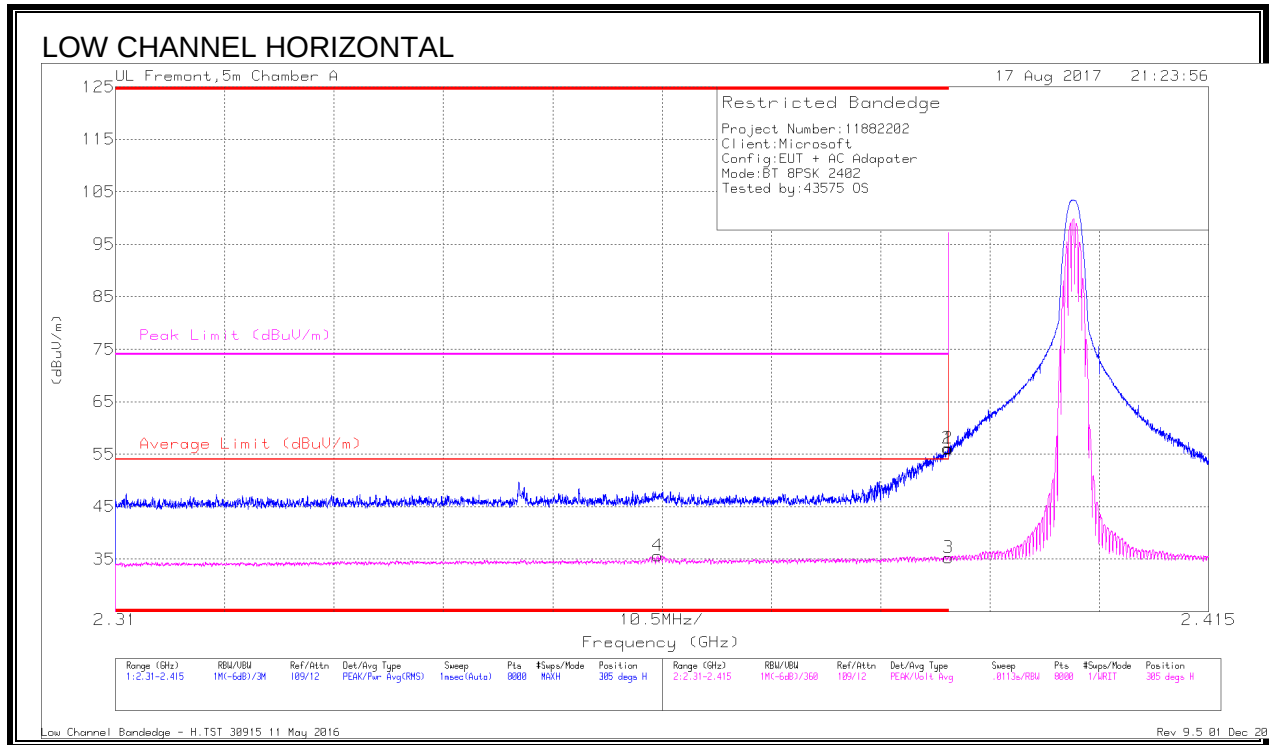
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH - FHSS: RB=1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

8.3. ENHANCED DATA RATE 8PSK MODULATION

8.3.1. RESTRICTED BANDEDGE (LOW CHANNEL)



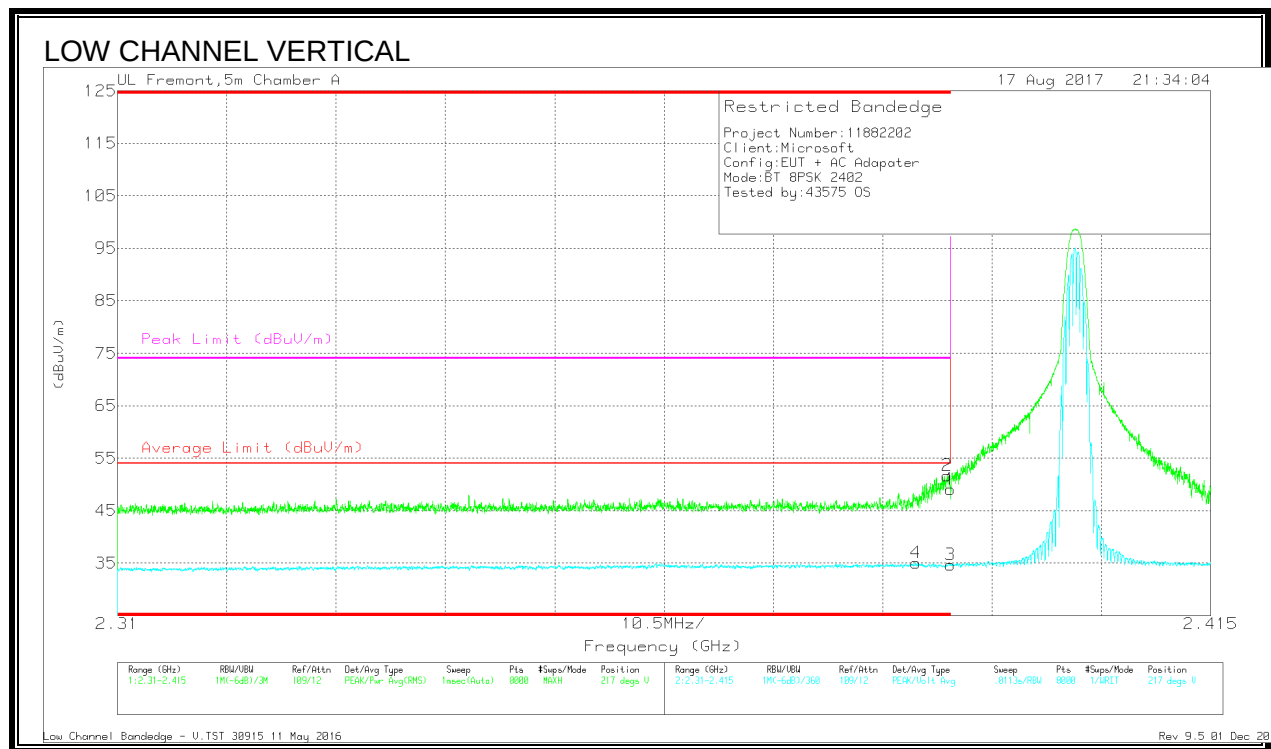
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	47.45	Pk	31.8	-23.2	56.05	-	-	74	-17.95	305	269	H
2	* 2.39	47.55	Pk	31.8	-23.2	56.15	-	-	74	-17.85	305	269	H
3	* 2.39	26.7	VA1T	31.8	-23.2	35.3	54	-18.7	-	-	305	269	H
4	* 2.362	27.22	VA1T	31.6	-23.2	35.62	54	-18.38	-	-	305	269	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration



Trace Markers

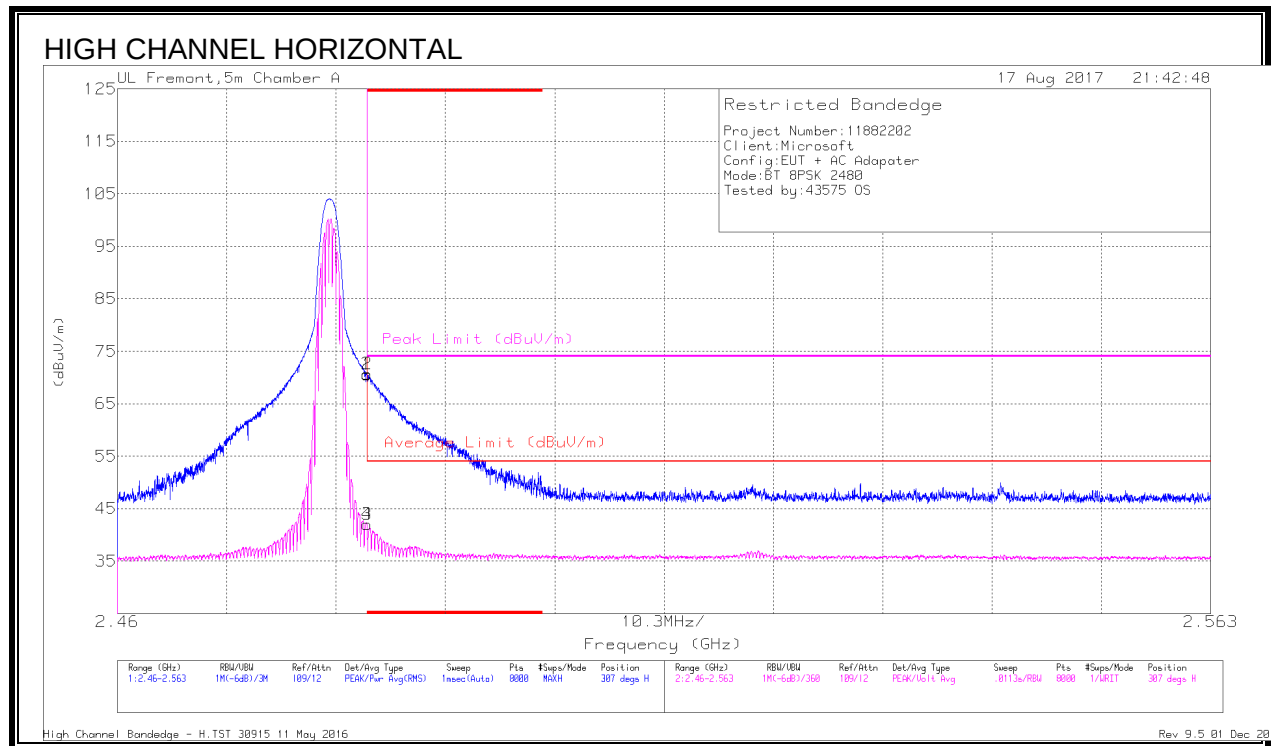
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 2.387	26.47	VA1T	31.8	-23.2	35.07	54	-18.93	-	-	217	270	V
1	* 2.39	40.43	Pk	31.8	-23.2	49.03	-	-	74	-24.97	217	270	V
2	* 2.39	43.01	Pk	31.8	-23.2	51.61	-	-	74	-22.39	217	270	V
3	* 2.39	26.09	VA1T	31.8	-23.2	34.69	54	-19.31	-	-	217	270	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

8.3.2. AUTHORIZED BANDEDGE (HIGH CHANNEL)



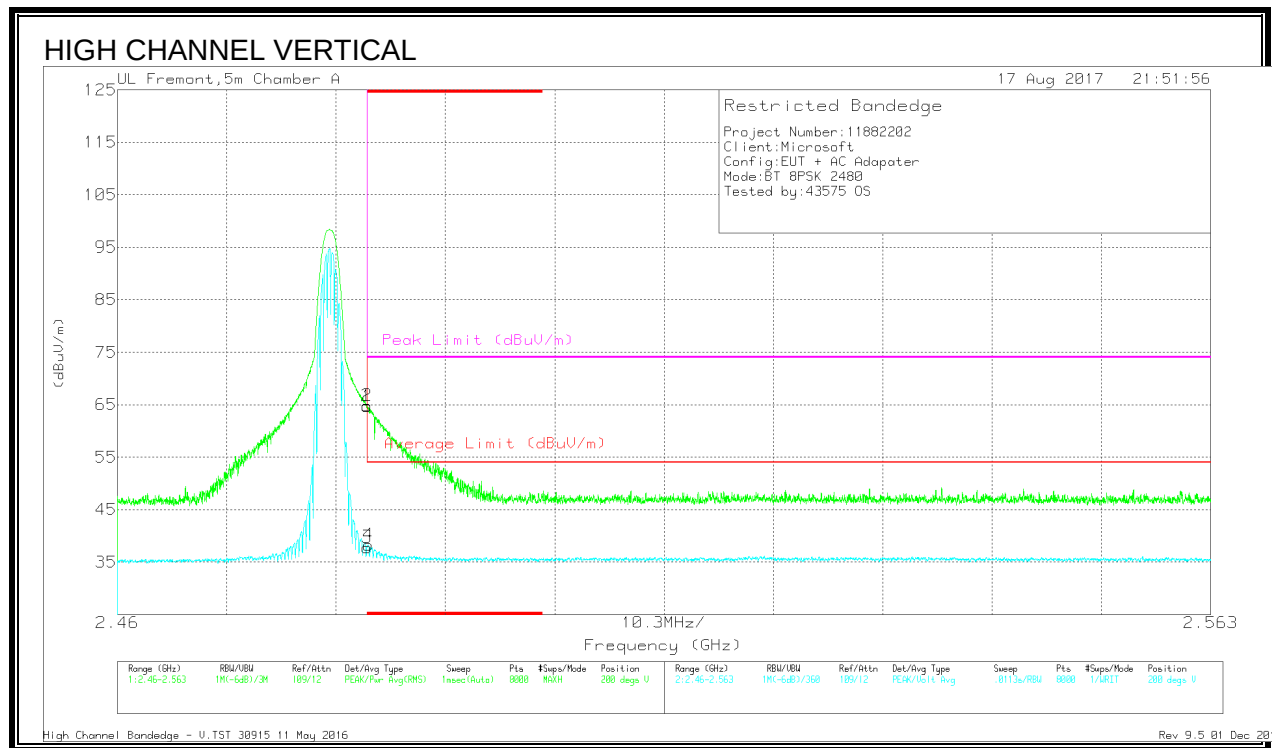
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Ampl/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	61.37	Pk	32.3	-23.1	70.57	-	-	74	-3.43	307	274	H
2	* 2.484	61.46	PK	32.3	-23.1	70.66	-	-	74	-3.34	307	274	H
3	* 2.484	32.72	VA1T	32.3	-23.1	41.92	54	-12.08	-	-	307	274	H
4	* 2.484	32.77	VA1T	32.3	-23.1	41.97	54	-12.03	-	-	307	274	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration



Trace Markers

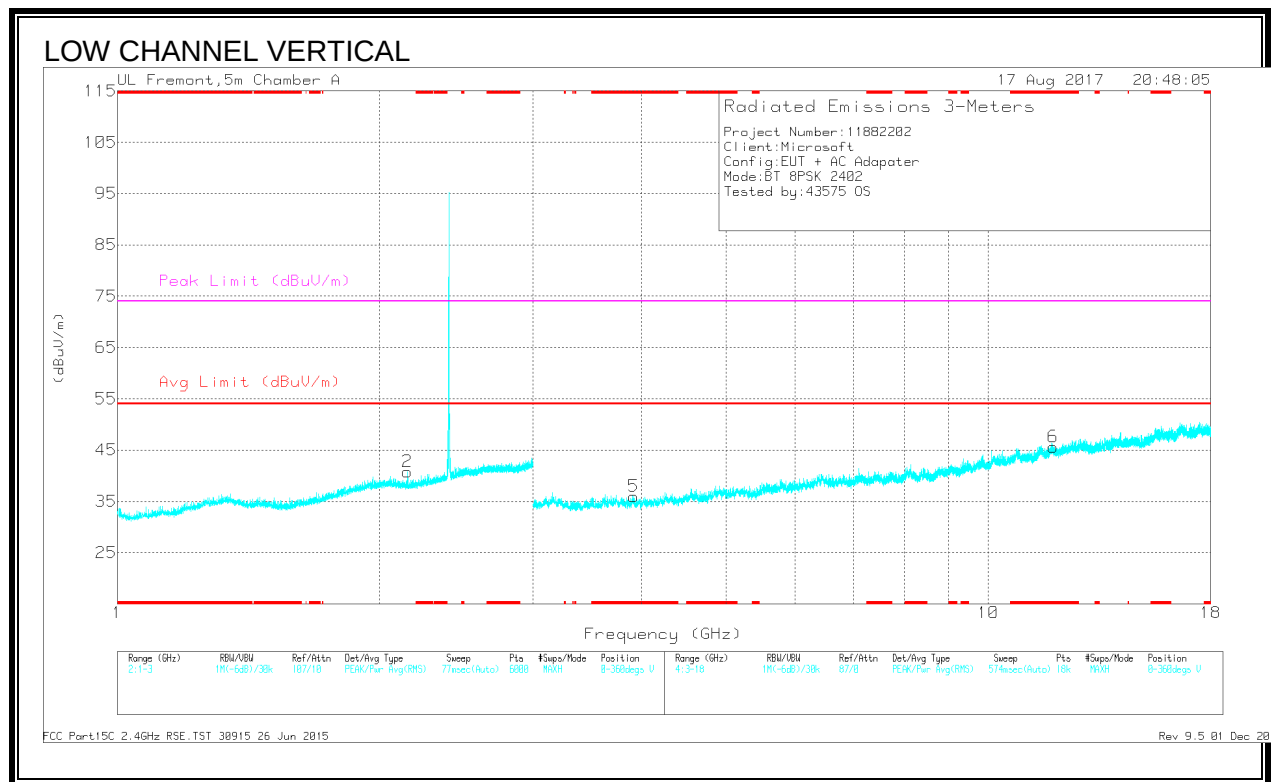
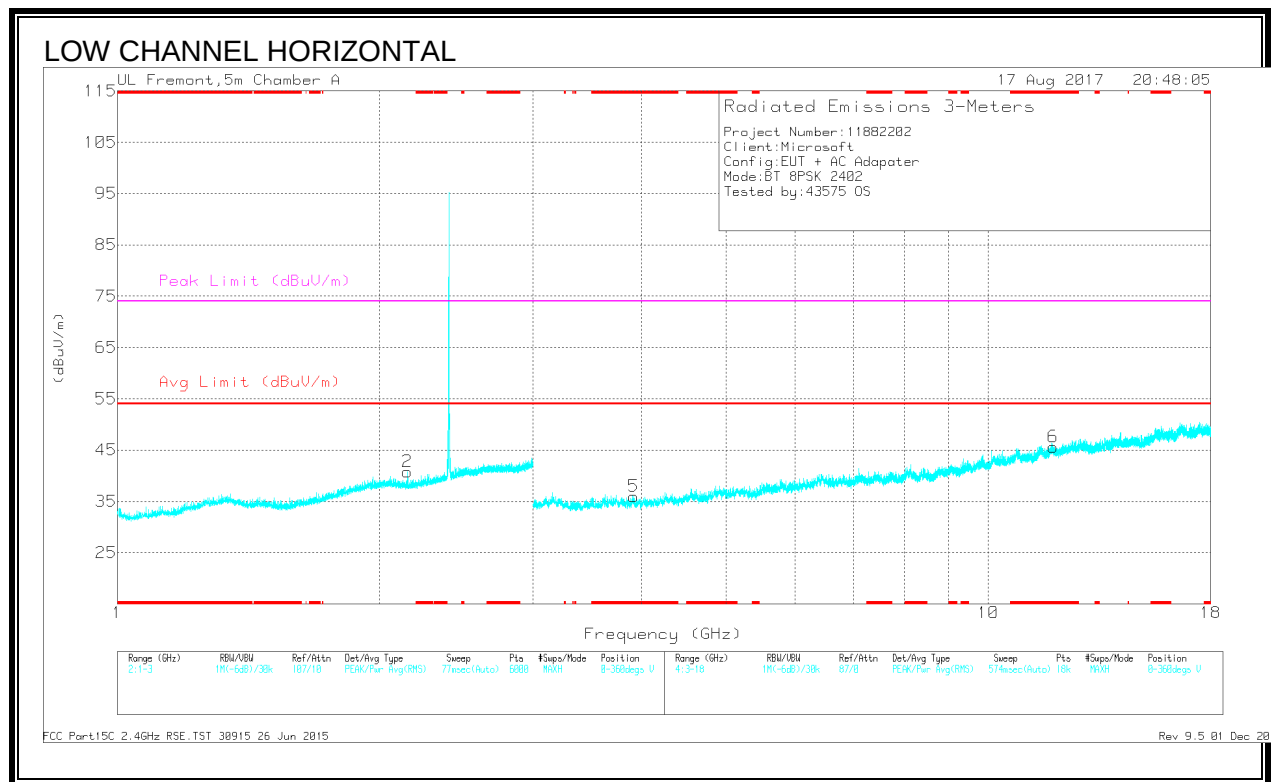
Marker	Frequency (GHz)	Meter Reading (dBUV)	Det	AF T862 (dB/m)	Amp/Cbl/Filt/Pad (dB)	Corrected Reading (dBUV/m)	Average Limit (dBUV/m)	Margin (dB)	Peak Limit (dBUV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	55.48	Pk	32.3	-23.1	64.68	-	-	74	-9.32	200	278	V
2	* 2.484	55.59	Pk	32.3	-23.1	64.79	-	-	74	-9.21	200	278	V
3	* 2.484	28.61	VA1T	32.3	-23.1	37.81	54	-16.19	-	-	200	278	V
4	* 2.484	29.02	VA1T	32.3	-23.1	38.22	54	-15.78	-	-	200	278	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average $V_B = 1/T_{on}$ where: T_{on} is transmit duration

8.3.3. HARMONICS AND SPURIOUS EMISSIONS



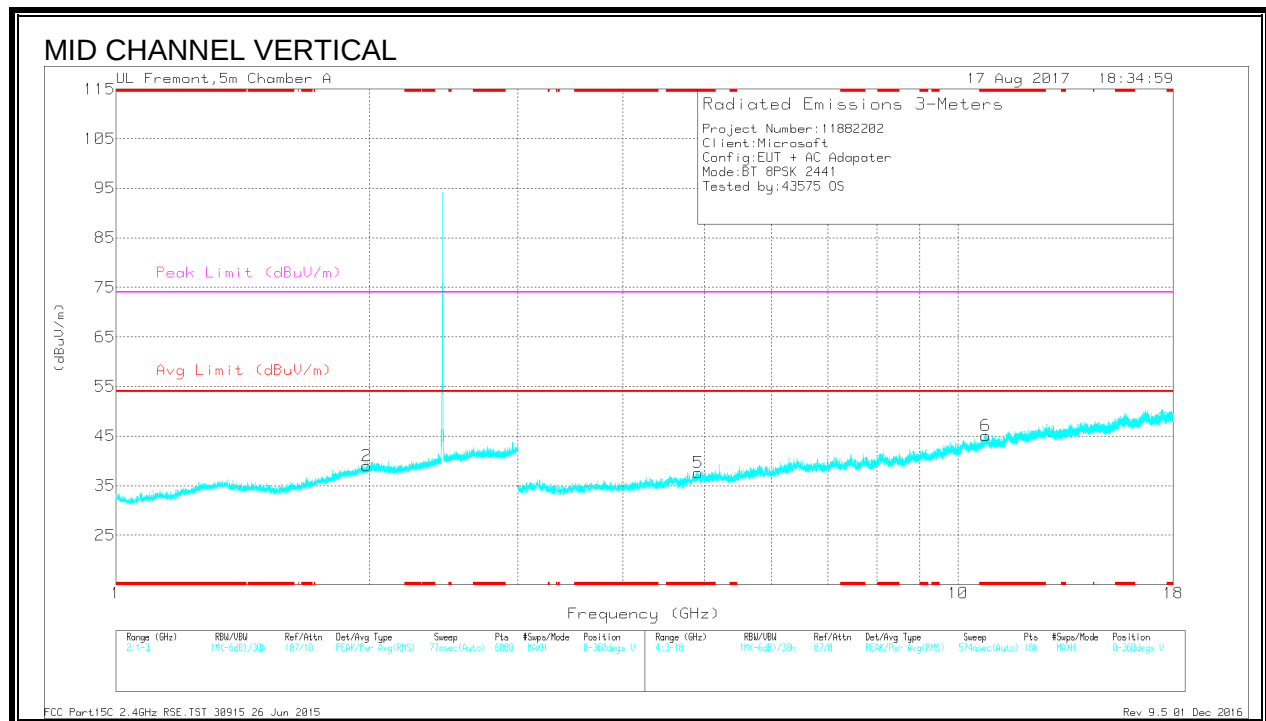
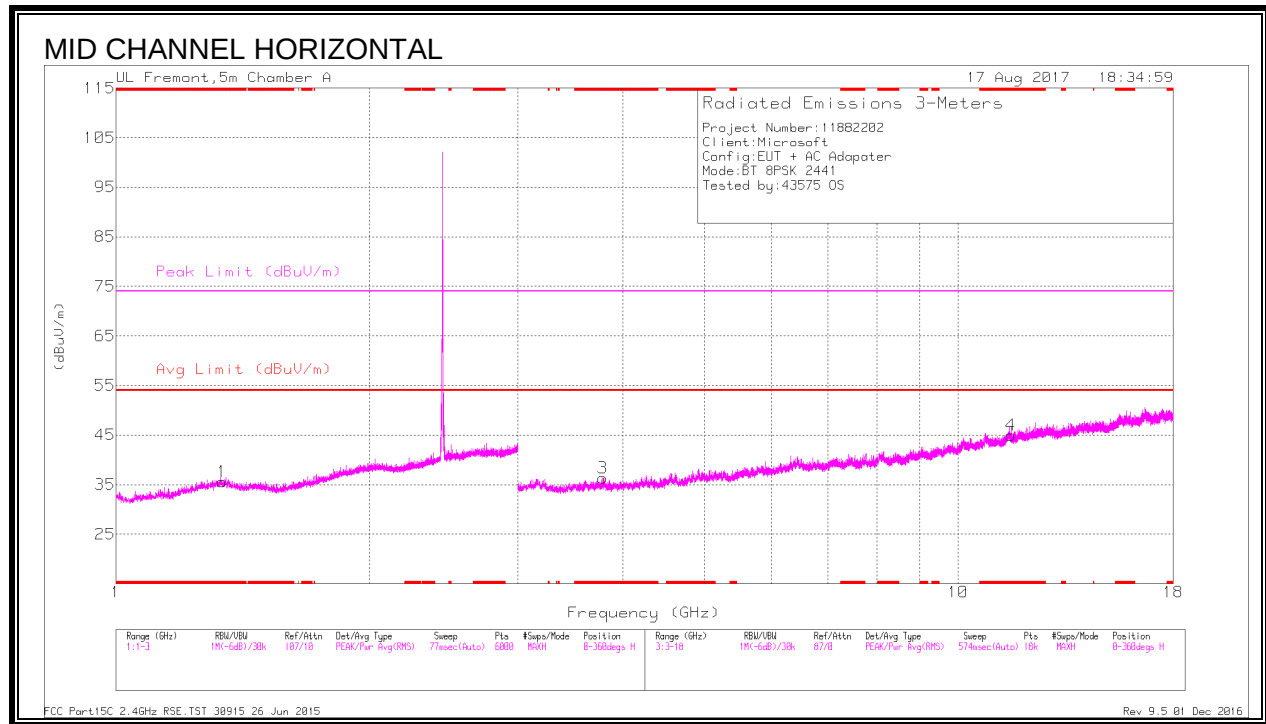
Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.237	33.8	PKFH	28.9	-23.7	39	-	-	74	-35	261	152	H
	* 1.237	23.32	VA1T	28.9	-23.7	28.52	54	-25.48	-	-	261	152	H
3	* 4.249	36.57	PKFH	33.5	-28.3	41.77	-	-	74	-32.23	231	124	H
	* 4.248	24.99	VA1T	33.5	-28.3	30.19	54	-23.81	-	-	231	124	H
4	* 11.432	30.51	PKFH	38.2	-18.9	49.81	-	-	74	-24.19	5	362	H
	* 11.431	19.58	VA1T	38.2	-18.9	38.88	54	-15.12	-	-	5	362	H
5	* 3.916	36.03	PKFH	33.2	-29.2	40.03	-	-	74	-33.97	301	256	V
	* 3.917	25.65	VA1T	33.2	-29.2	29.65	54	-24.35	-	-	301	256	V
6	* 11.87	30.79	PKFH	38.8	-19	50.59	-	-	74	-23.41	316	227	V
	* 11.868	19.58	VA1T	38.8	-19	39.38	54	-14.62	-	-	316	227	V
2	2.155	35.93	PKFH	31.1	-23.4	43.63	-	-	-	-	101	237	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration



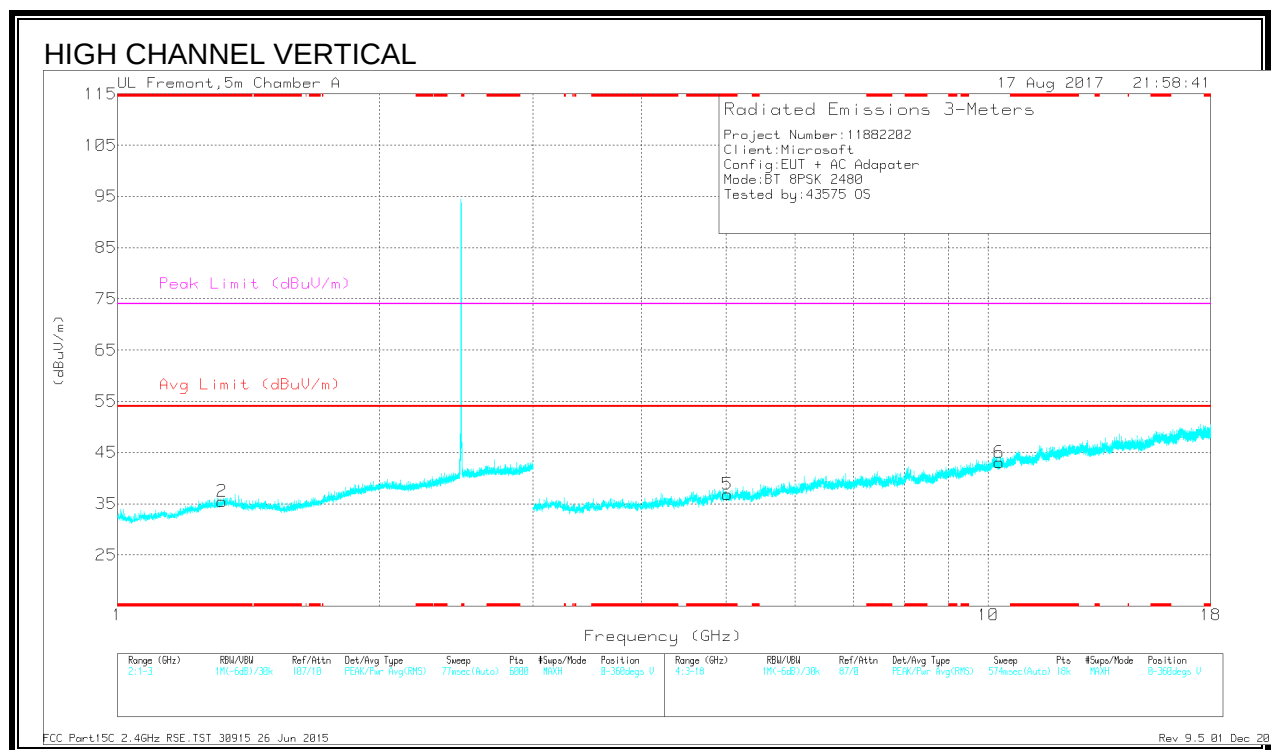
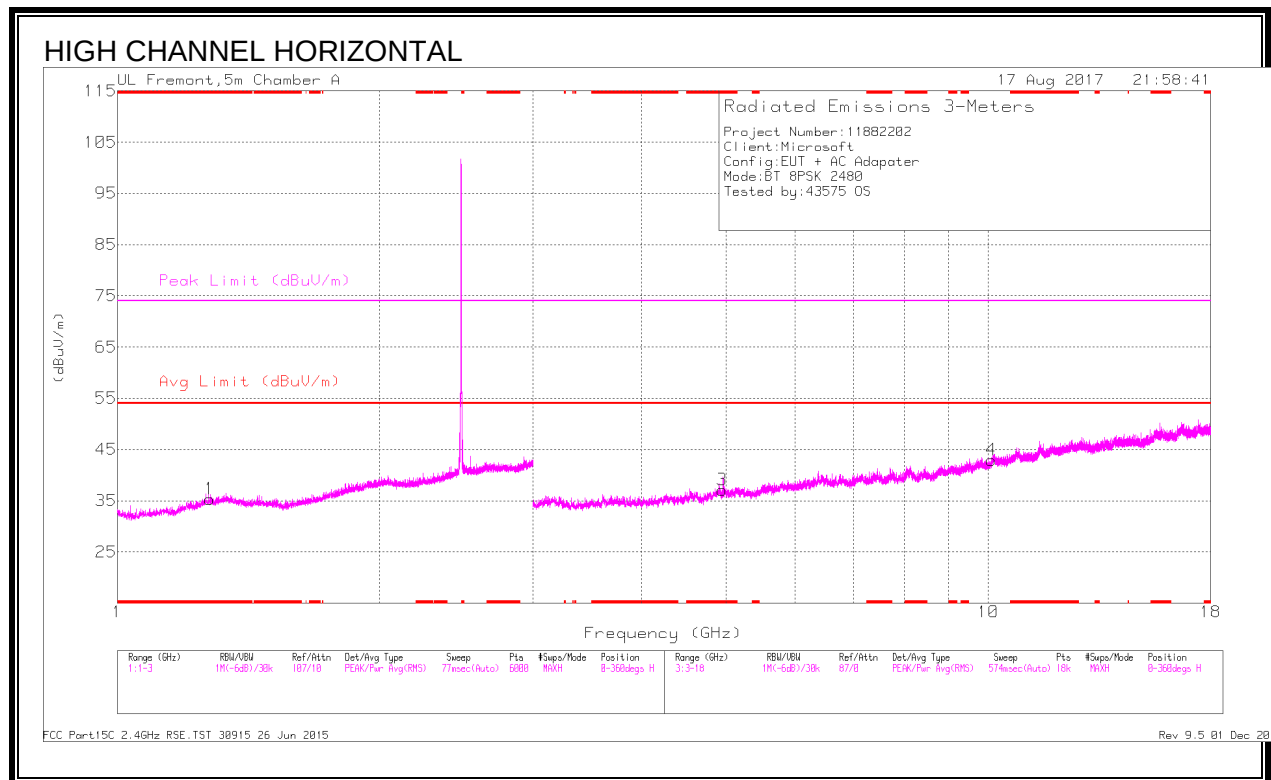
Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.336	35.18	PKFH	29.5	-23.5	41.18	-	-	74	-32.82	45	287	H
	* 1.337	23.31	VA1T	29.5	-23.5	29.31	54	-24.69	-	-	45	287	H
3	* 3.783	36.84	PKFH	33.2	-29.5	40.54	-	-	74	-33.46	248	319	H
	* 3.782	25.65	VA1T	33.2	-29.6	29.25	54	-24.75	-	-	248	319	H
4	* 11.553	31.09	PKFH	38.4	-19.2	50.29	-	-	74	-23.71	311	271	H
	* 11.553	19.73	VA1T	38.4	-19.2	38.93	54	-15.07	-	-	311	271	H
5	* 4.913	35.23	PKFH	34.1	-26.9	42.43	-	-	74	-31.57	169	114	V
	* 4.912	24.25	VA1T	34.1	-26.9	31.45	54	-22.55	-	-	169	114	V
6	* 10.783	31.26	PKFH	37.8	-18.7	50.36	-	-	74	-23.64	102	104	V
	* 10.783	19.69	VA1T	37.8	-18.7	38.79	54	-15.21	-	-	102	104	V
2	1.985	34.72	PKFH	31.4	-23	43.12	-	-	-	-	48	166	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH - FHSS: RB=1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration



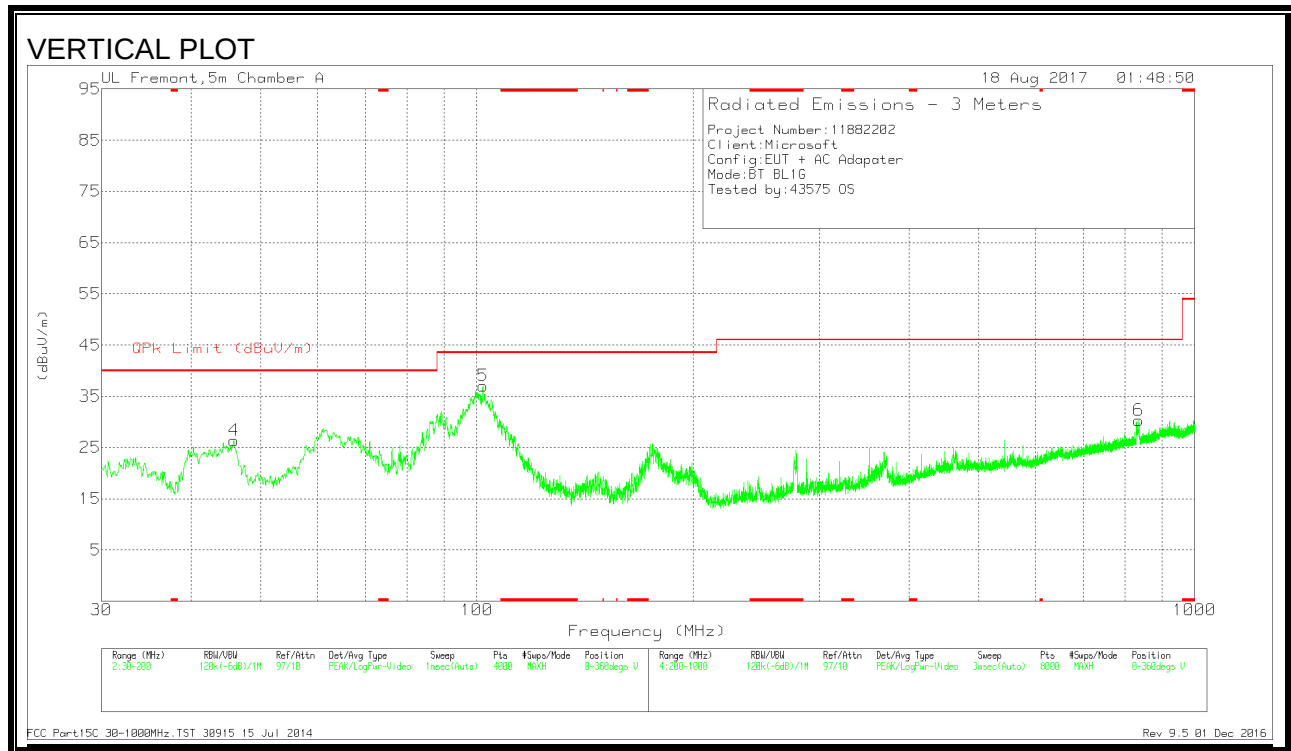
Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.277	34.02	PKFH	29.3	-23.5	39.82	-	-	74	-34.18	320	180	H
	* 1.274	23.18	VA1T	29.3	-23.5	28.98	54	-25.02	-	-	320	180	H
2	* 1.319	34.3	PKFH	29.5	-23.6	40.2	-	-	74	-33.8	165	226	V
	* 1.319	23.31	VA1T	29.5	-23.6	29.21	54	-24.79	-	-	165	226	V
3	* 4.95	37.15	PKFH	34.2	-27.9	43.45	-	-	74	-30.55	213	383	H
	* 4.949	25.04	VA1T	34.2	-27.8	31.44	54	-22.56	-	-	213	383	H
5	* 5.017	35.25	PKFH	34.3	-28.4	41.15	-	-	74	-32.85	325	234	V
	* 5.019	24.61	VA1T	34.3	-28.3	30.61	54	-23.39	-	-	325	234	V
4	10.087	30.71	PKFH	37.4	-20.5	47.61	-	-	-	-	324	119	H
6	10.294	31.55	PKFH	37.5	-20.5	48.55	-	-	-	-	272	118	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH - FHSS: RB=1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration



DATA

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	45.8566	43.74	Pk	13.6	-31	26.34	40	-13.66	0-360	100	V
1	99.9306	53.61	Pk	14.2	-30.6	37.21	43.52	-6.31	0-360	200	H
5	102.0561	52.82	Pk	14.7	-30.5	37.02	43.52	-6.5	0-360	100	V
2	174.1761	45.25	Pk	15.5	-30.1	30.65	43.52	-12.87	0-360	101	H
3	352.0198	39.69	Pk	18.4	-29.2	28.89	46.02	-17.13	0-360	101	H
6	835.5826	32.44	Pk	25.7	-27.8	30.34	46.02	-15.68	0-360	200	V

Pk - Peak detector

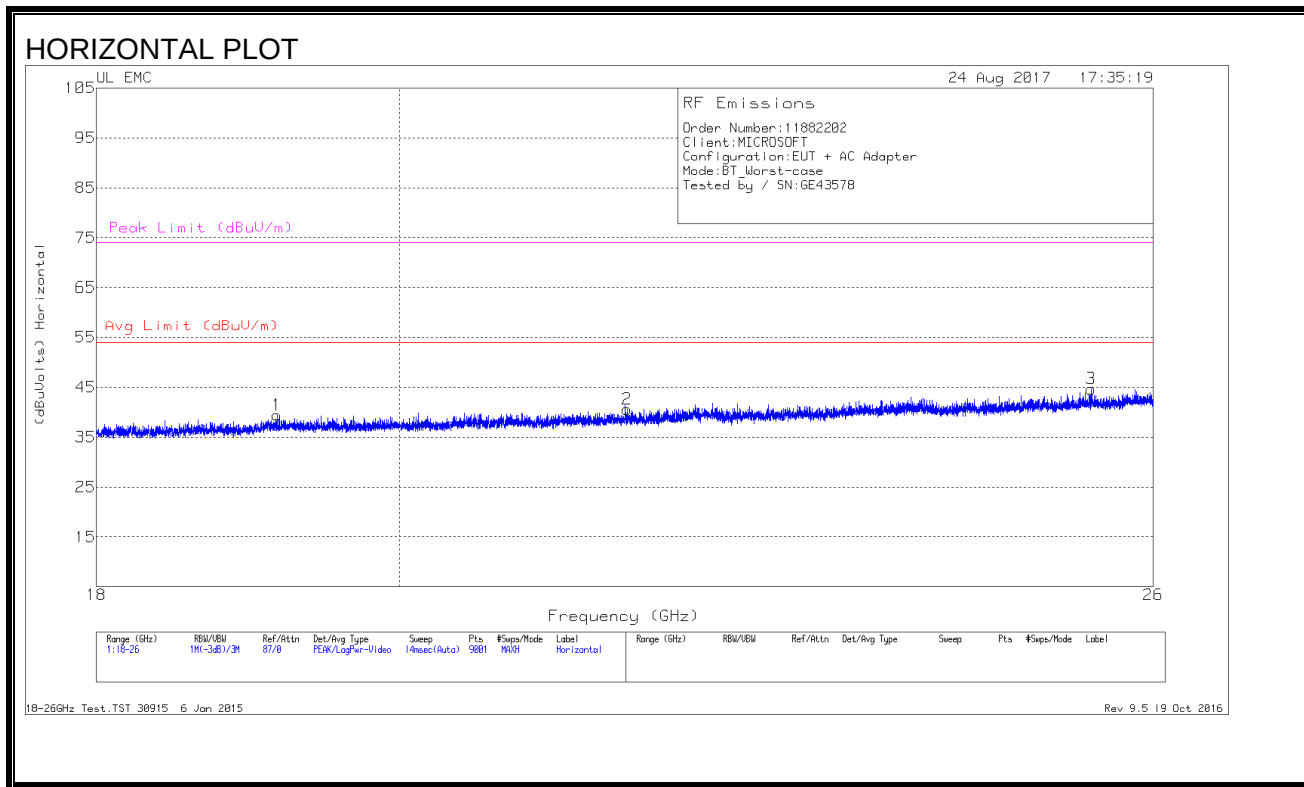
Radiated Emissions

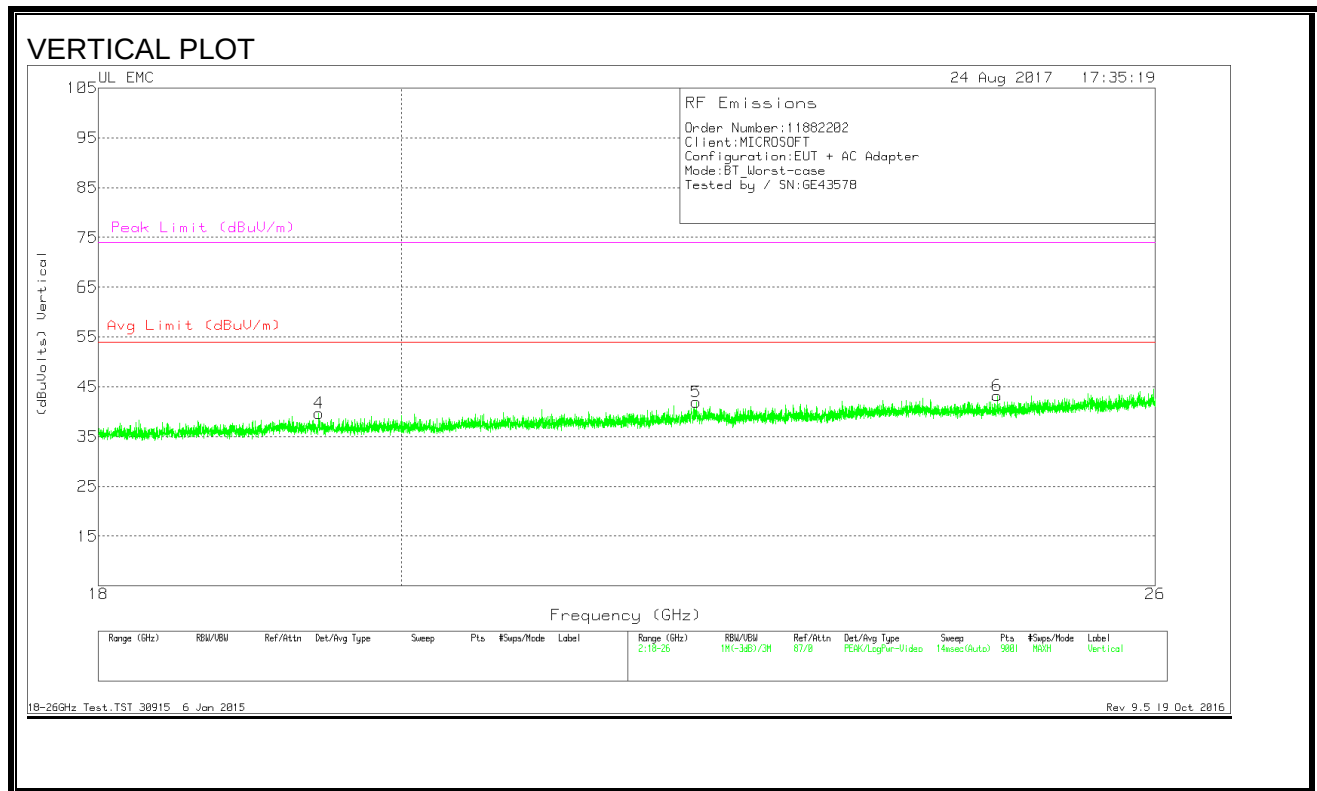
Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
99.8826	48.54	Qp	14.2	-30.6	32.14	43.52	-11.38	356	141	H

Qp - Quasi-Peak detector

8.5. WORST-CASE ABOVE 18 GHz

SPURIOUS EMISSIONS 18 TO 26 GHz (WORST-CASE CONFIGURATION)





Data

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T449 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.166	38.01	Pk	32.6	-21.7	-9.5	39.41	54	-14.59	74	-34.59
2	21.65	38.2	Pk	33.2	-21.3	-9.5	40.6	54	-13.4	74	-33.4
3	25.444	39.98	Pk	34.4	-20.2	-9.5	44.68	54	-9.32	74	-29.32
4	19.435	38.28	Pk	32.7	-21.8	-9.5	39.68	54	-14.32	74	-34.32
5	22.161	38.64	Pk	33.4	-20.6	-9.5	41.94	54	-12.06	74	-32.06
6	24.609	38.9	Pk	34.1	-20.3	-9.5	43.2	54	-10.8	74	-30.8

Pk - Peak detector

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	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

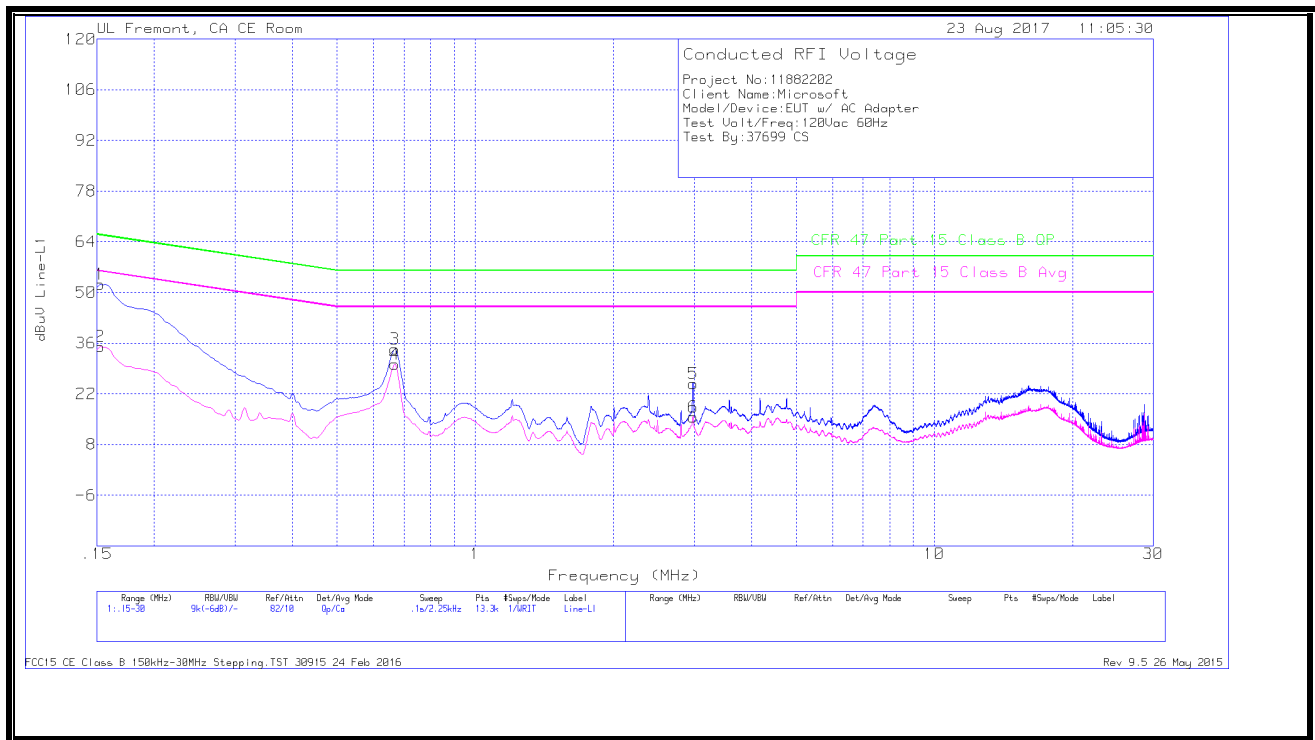
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

LINE 1 RESULTS



WORST EMISSIONS

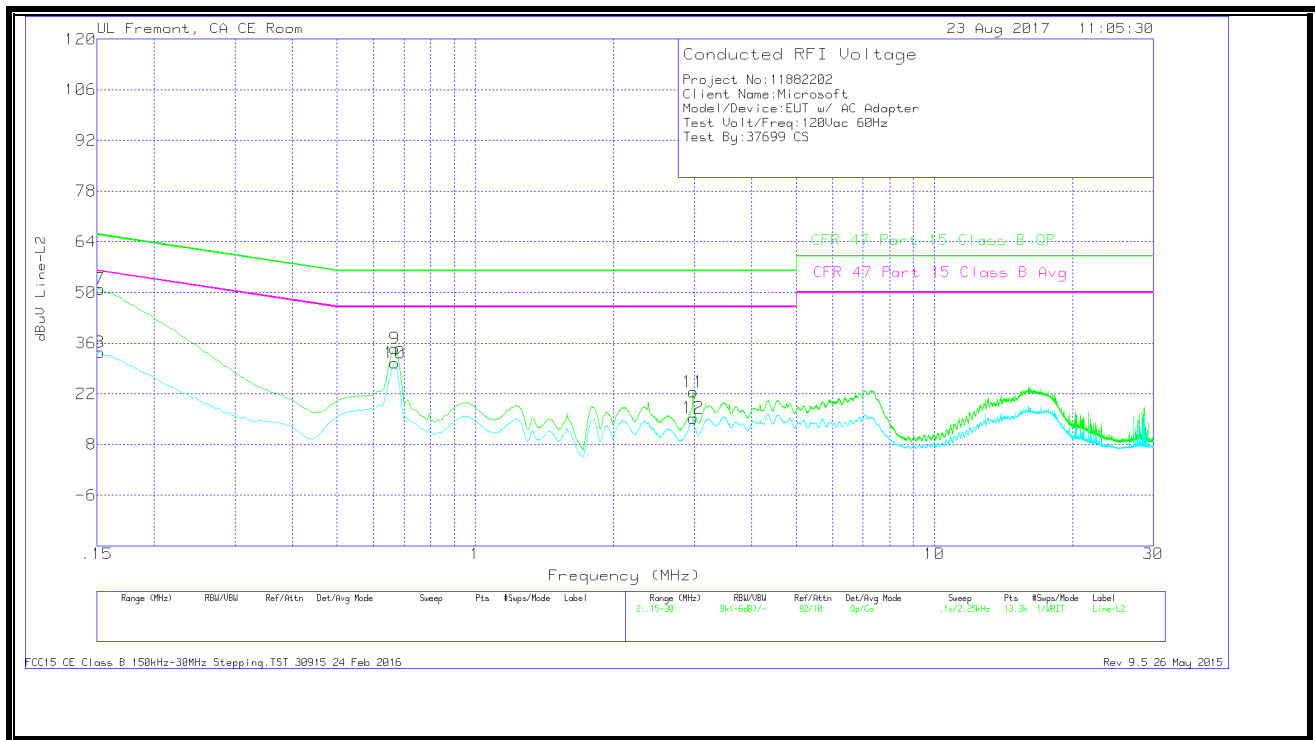
Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.15225	41.98	Qp	.1	.1	10.1	52.28	65.88	-13.6	-	-
2	.15225	24.78	Ca	.1	.1	10.1	35.08	-	-	55.88	-20.8
3	.6675	24.16	Qp	0	.1	10.1	34.36	56	-21.64	-	-
4	.6675	20.02	Ca	0	.1	10.1	30.22	-	-	46	-15.78
5	2.98275	14.66	Qp	0	.1	10.1	24.86	56	-31.14	-	-
6	2.98275	5.45	Ca	0	.1	10.1	15.65	-	-	46	-30.35

Qp - Quasi-Peak detector

Ca - CISPR average detection

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
7	.15225	40.86	Qp	0	0	10.1	50.96	65.88	-14.92	-	-
8	.15225	23.31	Ca	0	0	10.1	33.41	-	-	55.88	-22.47
9	.6675	24.32	Qp	0	.1	10.1	34.52	56	-21.48	-	-
10	.6675	20.3	Ca	0	.1	10.1	30.5	-	-	46	-15.5
11	2.9805	12.37	Qp	0	.1	10.1	22.57	56	-33.43	-	-
12	2.9805	5.12	Ca	0	.1	10.1	15.32	-	-	46	-30.68

Qp - Quasi-Peak detector

Ca - CISPR average detection