CERTIFICATION TEST REPORT

Report Number : 11735596-E1V2

Applicant	:	MICROSOFT CORP ONE MICROSOFT WAY REDMOND, WA 98052, U.S.A.
Model	:	1807
FCC ID	:	C3K1807
IC	:	3048A-1807
EUT Description	:	PORTABLE COMPUTING DEVICE
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C INDUSTRY CANADA RSS - 247 ISSUE 2

Date Of Issue:
October 02, 2017

Prepared by:
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	08/23/17	Initial Release	---
V2	10/02/17	- Updated test procedure in sections 6.2.6, 6.2.7, 6.3.1, 6.3.2, 6.4.6, 6.4.7	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: 1807

SERIAL NUMBER: RADIATED: 032012672953
CONDUCTED: 031936672953

DATE TESTED: AUGUST 04 – AUGUST 14, 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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 handheld 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	2.12	1.63
2402 - 2480	DQPSK	5.41	3.48
2402 - 2480	Enhanced 8PSK	5.66	3.68

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	1.84	1.53
2402 - 2480	DQPSK	2.78	1.90
2402 - 2480	Enhanced 8PSK	2.78	1.90

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes integrated antenna, with the maximum gains:

Frequency Band (GHz)	Antenna Gain (dBi)
2402-2480	0.20

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 v2.0.0.77

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 Z-Axis orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z-Axis orientation.

Worst-case data rates were:

GFSK mode: DH5
8PSK mode: 3-DH5

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop AC/DC adapter	Lenovo	ADLX45NCC2A	11S36200281ZZ20059W0H5	NA
Laptop	Lenovo	11e	LR-04N7BL	NA
USB Ethernet Adapter	Linksys	USB3GIGV1	15710S08406242	NA

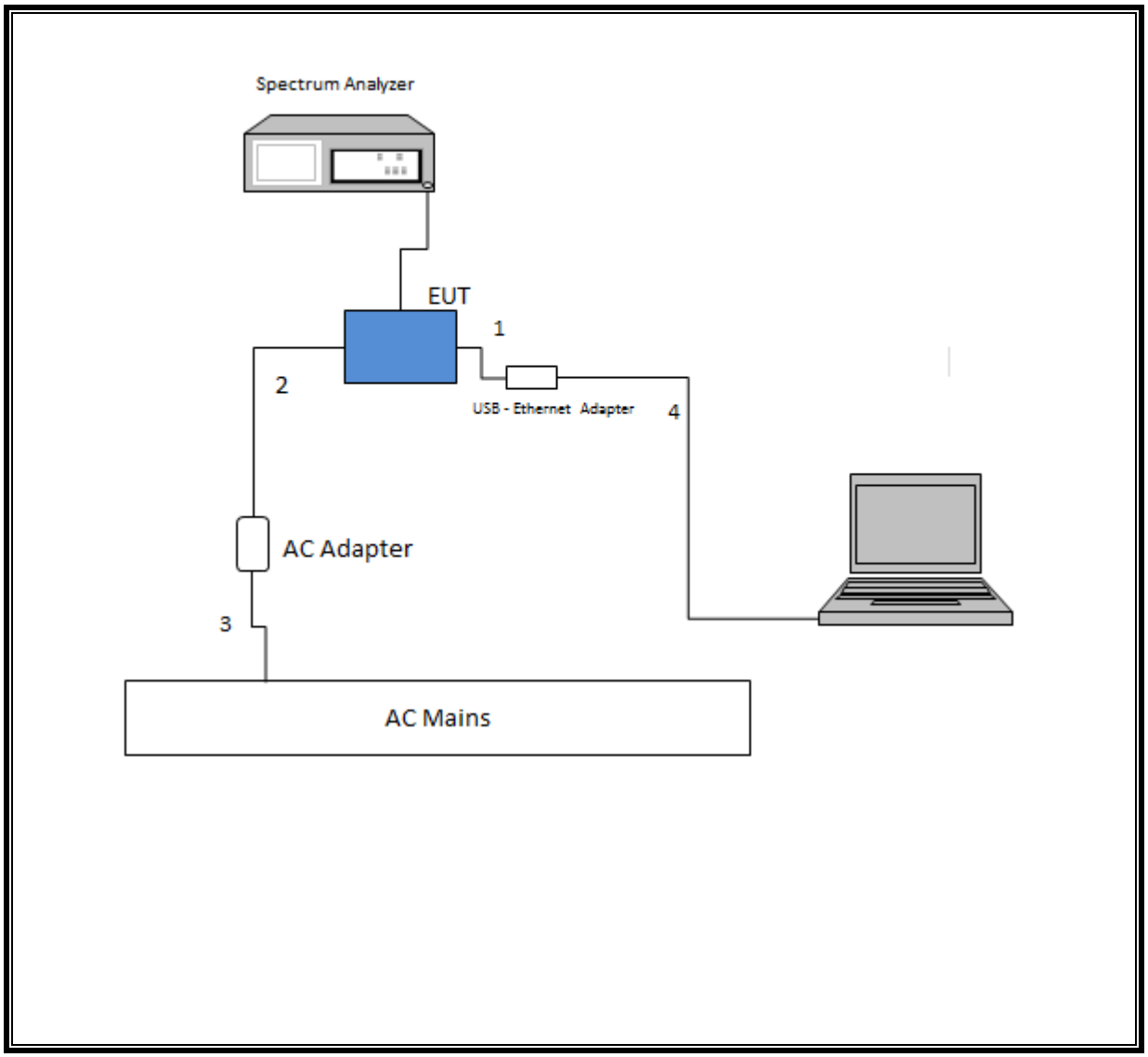
I/O CABLES

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	
3	AC	1	2-prong	Un-Shielded	0.5	
4	Ethernet	1	RJ45	Un-Shielded	2	

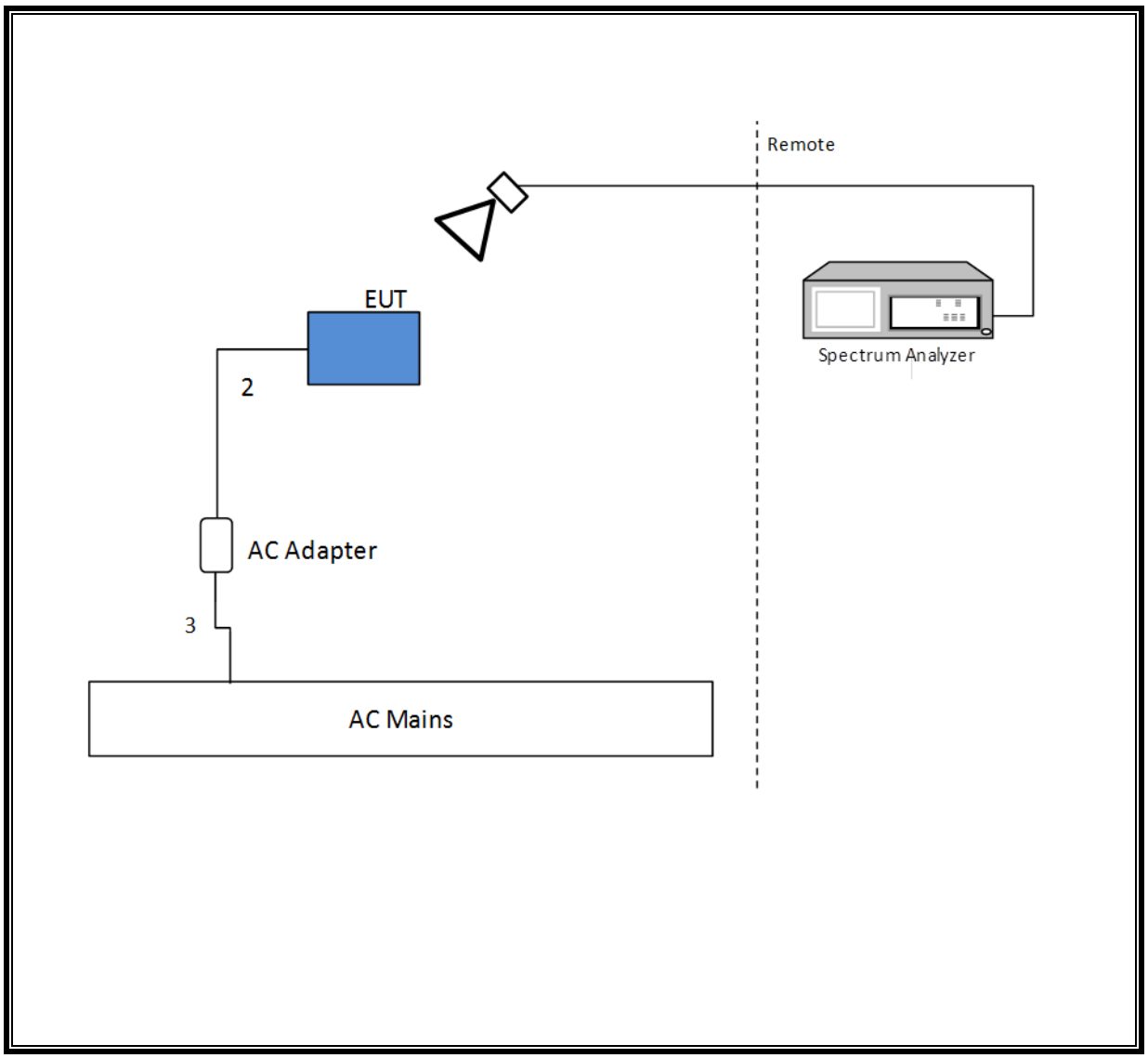
TEST SETUP

The EUT was tested connected to a host Laptop via RJ45/USB cable and AC adapter for antenna port. For radiated and AC line, tests were performed with EUT connected to AC adapter. Laptop was used to program settings then removed from setup.. Test software exercised the radio card.

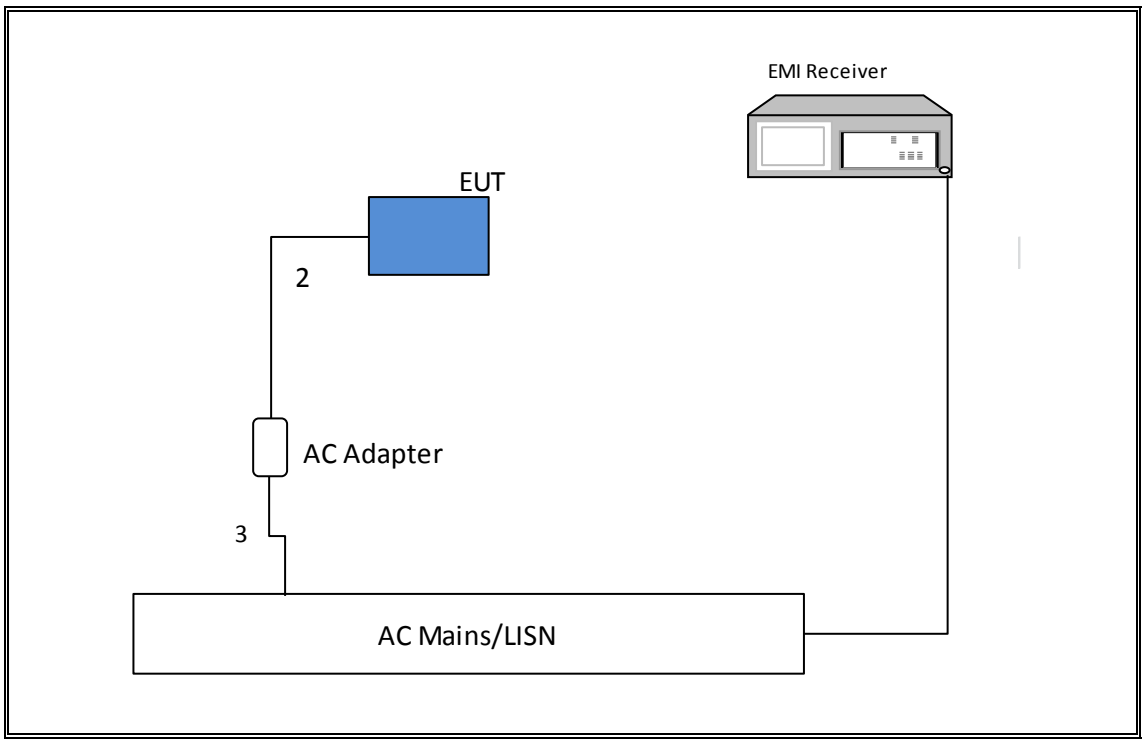
SETUP DIAGRAM FOR CONDUCTED TESTS



SETUP DIAGRAM FOR RADIATED TESTS



SETUP DIAGRAM FOR AC LINE CONDUCTED TESTS



5.7. TEST AND MEASUREMENT EQUIPMENT

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Antenna, Broadband Hybrid, 30MHz to 2000MHz w/4dB Pad	Sunol Sciences Corp.	JB3	T477	06/22/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T345	03/07/2018
Antenna, Horn 18-26.5GHz	ARA	MWH-1826/B	T449	05/26/2018
Power Meter, P-series single channel	Agilent (Keysight) Technologies	N1911A	T1264	07/08/2018
Power Sensor, P – series, 50MHz to 18GHz, Wideband	Agilent (Keysight) Technologies	N1921A	T413	06/20/2018
Amplifier, 1-26.5GHz	Agilent (Keysight) Technologies	8449B	T404	07/05/2018
Amplifier, 10kHz-1GHz	Agilent (Keysight) Technologies	8447D	T15	08/26/2017
RF Amplifier	MITEQ	AFS42-00101800-25-S-42	T493	02/15/2018
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Agilent (Keysight) Technologies	E4440A	T199	07/22/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T907	01/23/2018
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Agilent (Keysight) Technologies	E9030A	T905	01/11/2018
LISN	FISCHER	FCC-LISN-50/250-25-2-01	T1310	01/17/2018

Test Software List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	Ver 9.5, Apr 26, 2016
Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015
Antenna Port Software	UL	UL RF	Ver 5.1.1, July 15, 2016

6. ANTENNA PORT TEST RESULTS

6.1. 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

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/T Minimum VBW (kHz)
GFSK	2.895	3.749	0.772	77.22%	1.12	0.345
8PSK	2.890	3.749	0.771	77.09%	1.13	0.346

DUTY CYCLE PLOTS

GFSK

8PSK

NOTE: HOPPING OFF

6.2. BASIC DATA RATE GFSK MODULATION

6.2.1. 20 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

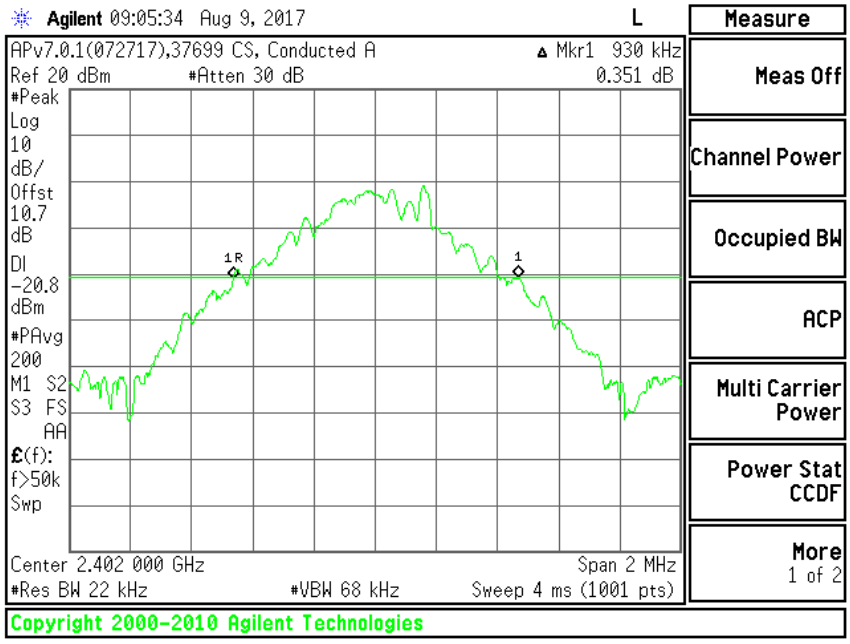
TEST PROCEDURE

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

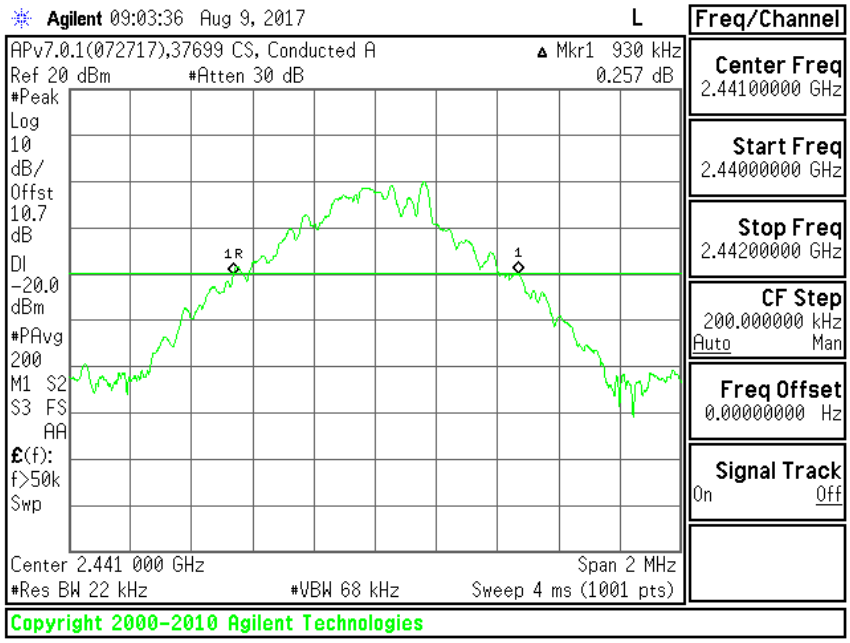
RESULTS

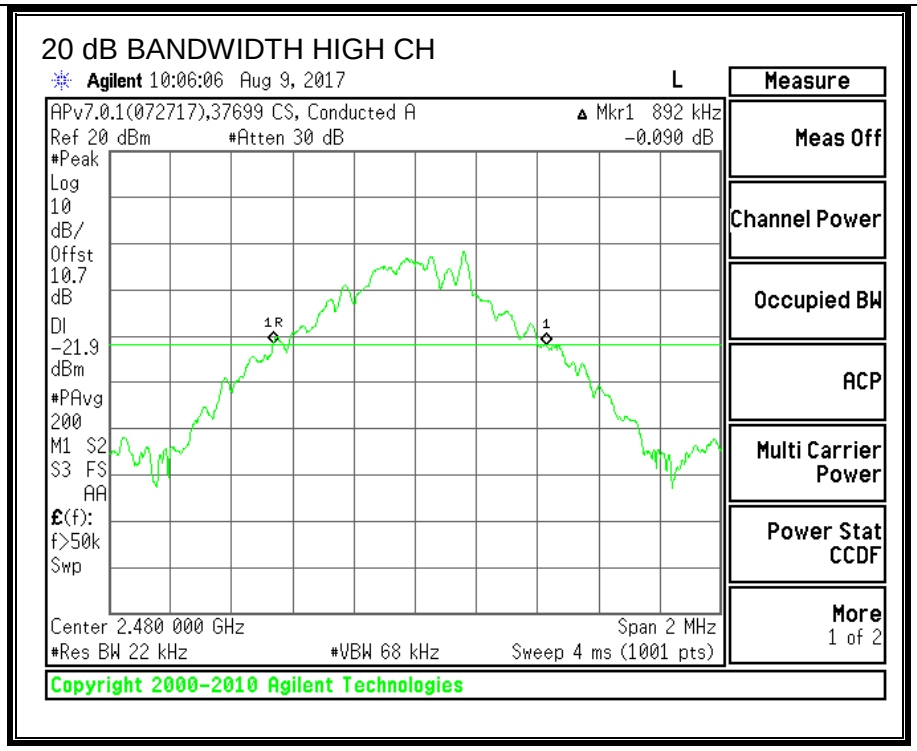
Channel	Frequency (MHz)	20 dB Bandwidth (KHz)
Low	2402	930
Middle	2441	930
High	2480	892

20 dB BANDWIDTH LOW CH



20 dB BANDWIDTH MID CH





6.2.2. 99% BANDWIDTH

LIMITS

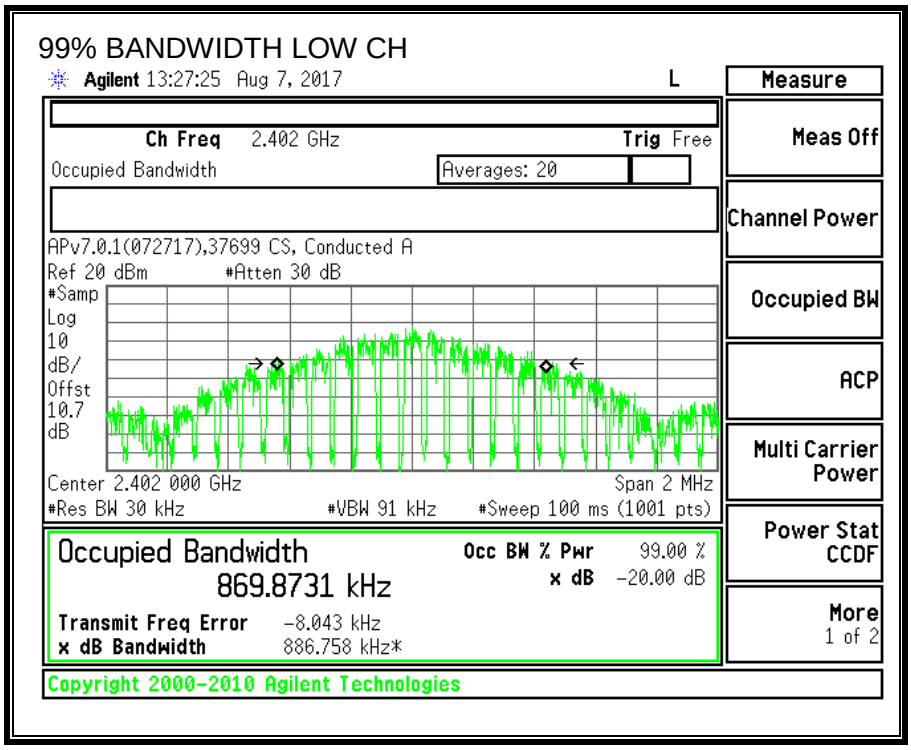
None; for reporting purposes only.

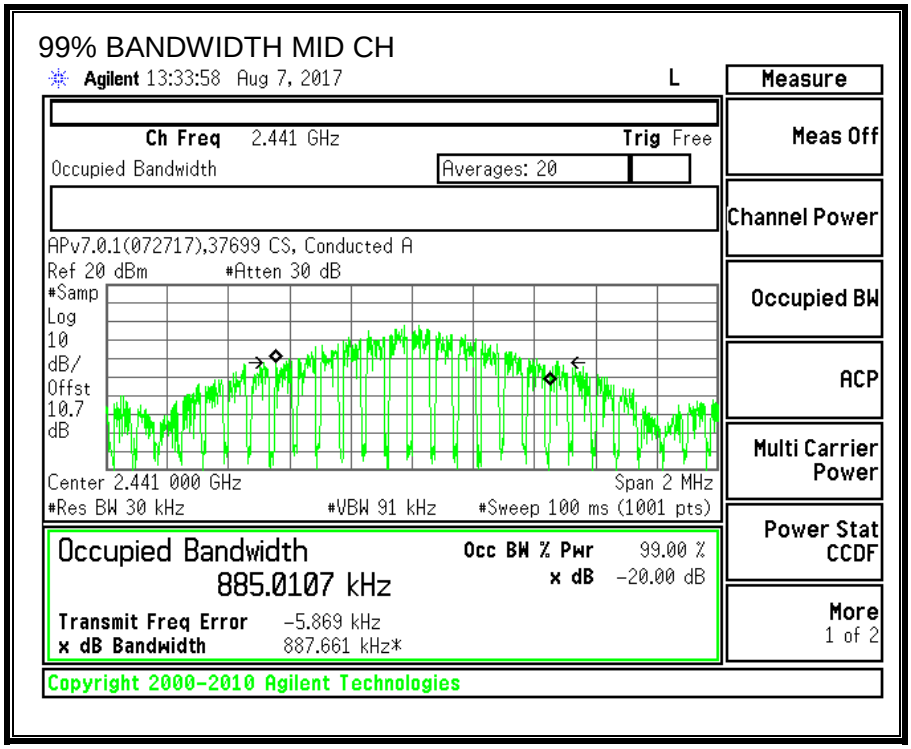
TEST PROCEDURE

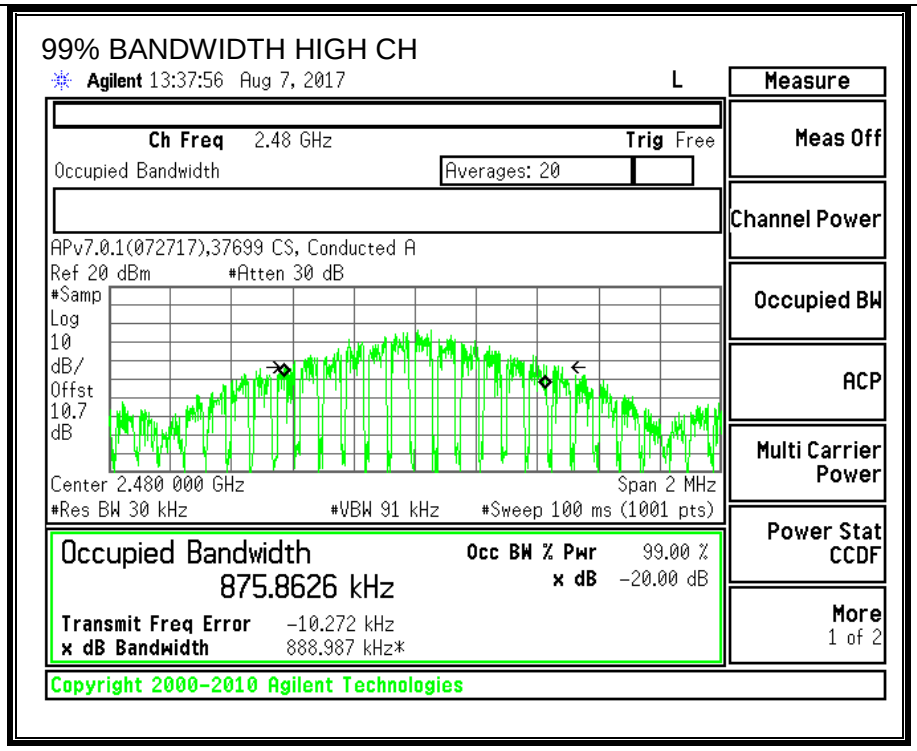
The transmitter output is connected to a spectrum analyzer. The RBW is set to 1%-5% the OBW. The VBW is set to ≥ 3 times RBW. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (KHz)
Low	2402	869.873
Middle	2441	885.011
High	2480	875.863







6.2.3. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

IC RSS-247 (5.1) (b)

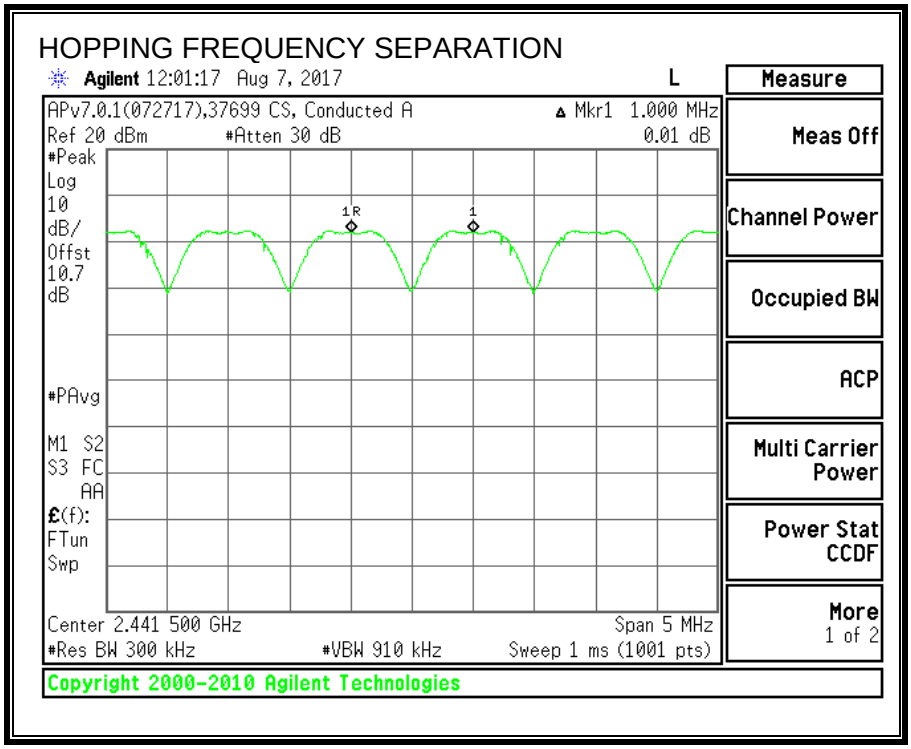
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

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



6.2.4. 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.

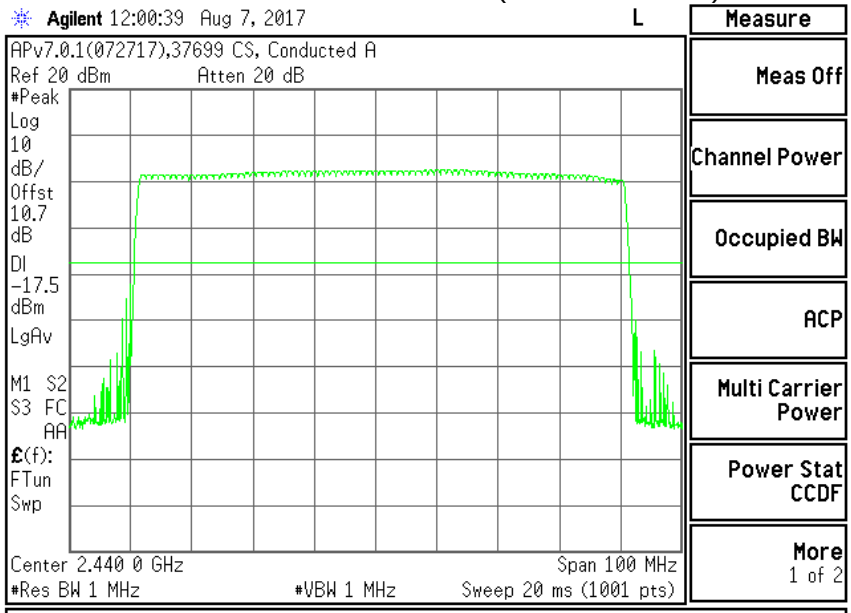
TEST PROCEDURE

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.

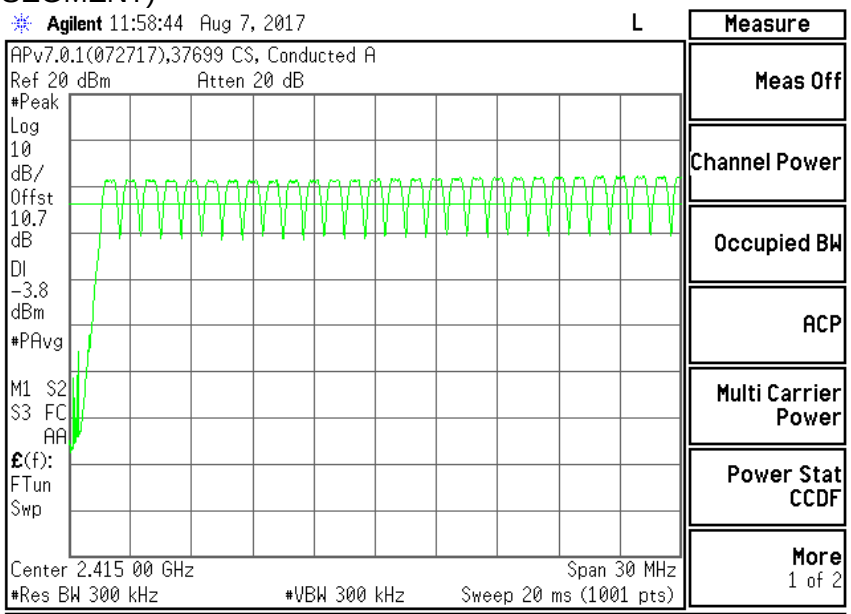
RESULTS

Normal Mode: 79 Channels observed.

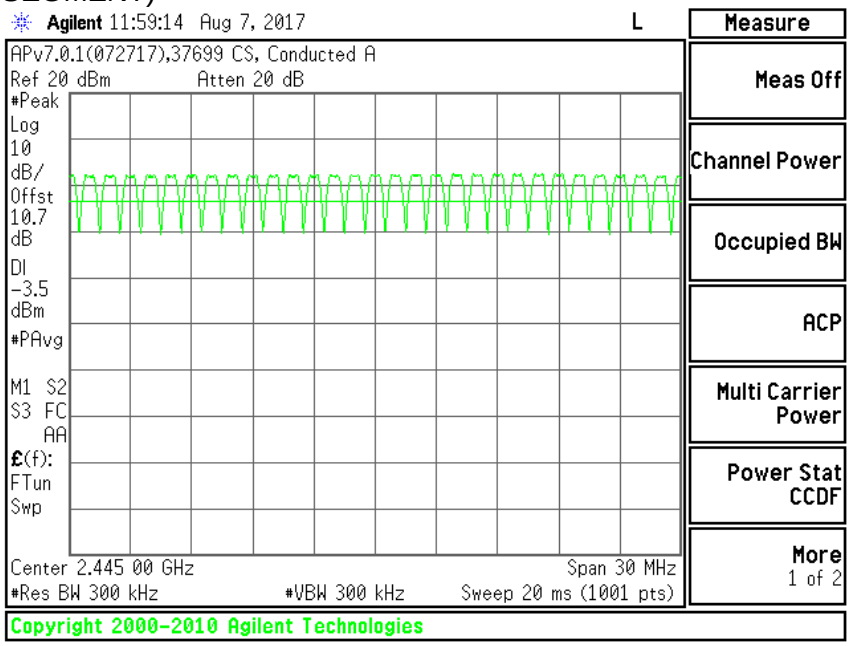
NUMBER OF HOPPING CHANNELS (100 MHz SPAN)



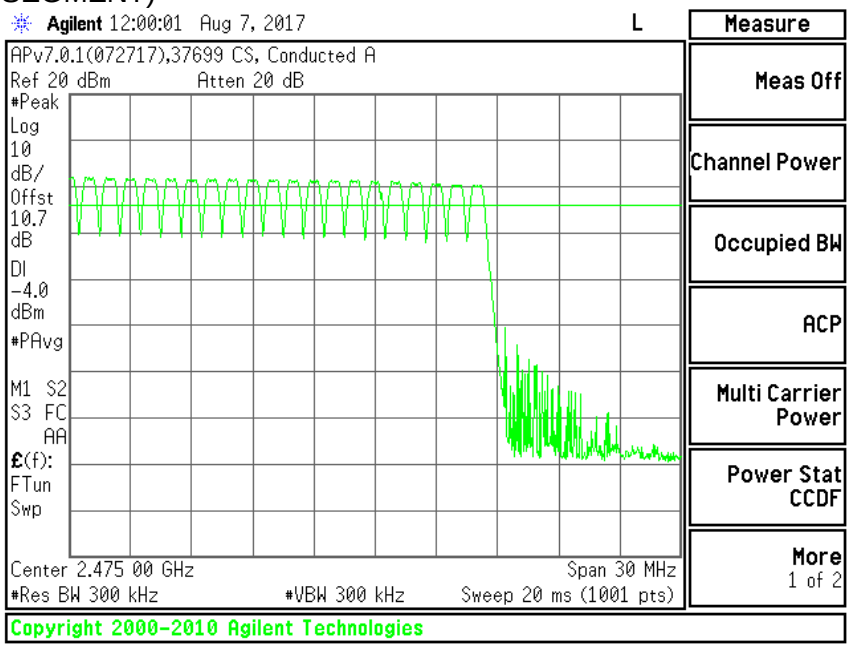
NUMBER OF HOPPING CHANNELS (30 MHz SPAN, FIRST SEGMENT)



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



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



6.2.5. 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 * (# of pulses in 3.16 s) * 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 * (# of pulses in 0.8 s) * pulse width.

RESULTS

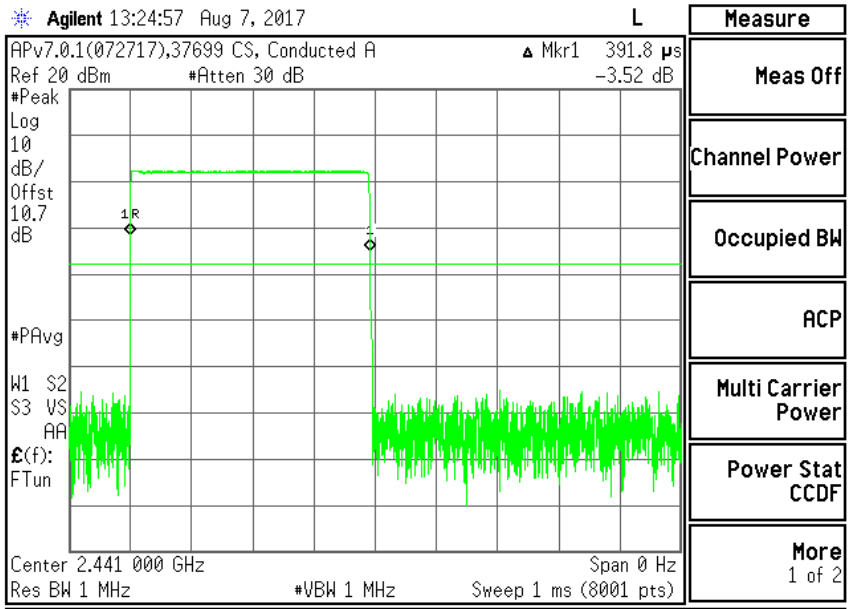
AVERAGE TIME OF OCCUPANCY

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	0.392	31	0.1215	0.4	-0.2785
DH3	1.648	16	0.2637	0.4	-0.1363
DH5	2.896	13	0.3765	0.4	-0.0235

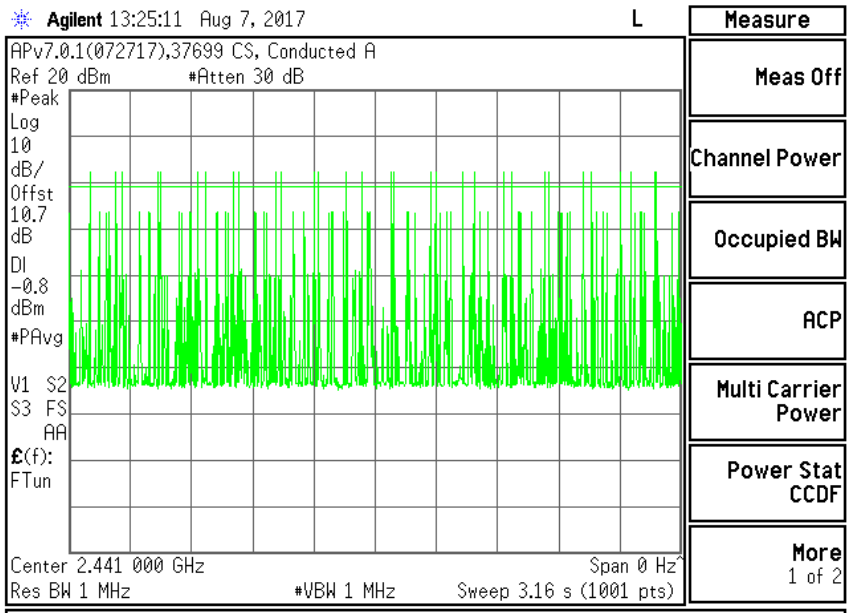
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH1	0.392	7.75	0.03038	0.4	-0.3696
DH3	1.648	4	0.06592	0.4	-0.3341
DH5	2.896	3.25	0.09412	0.4	-0.3059

NOTE: --

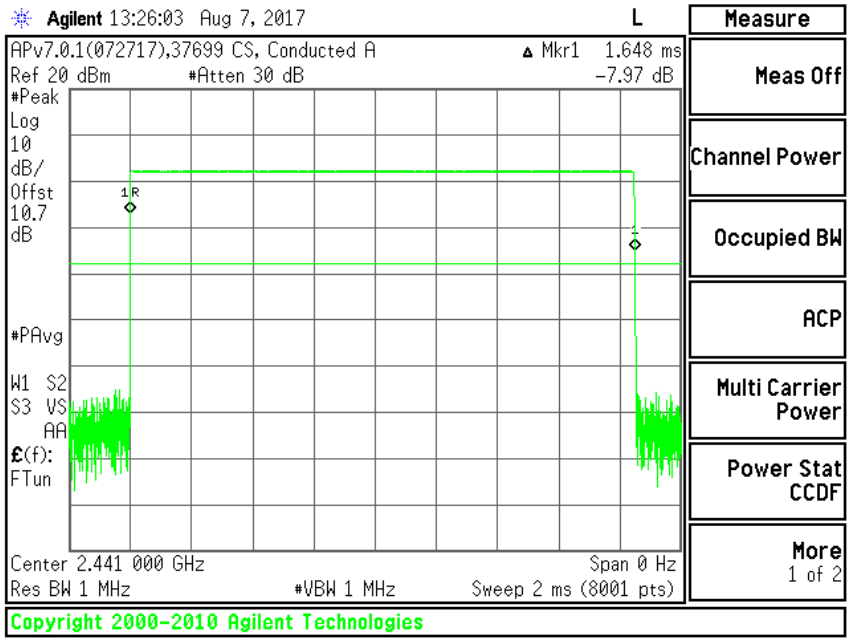
PULSE WIDTH - DH1



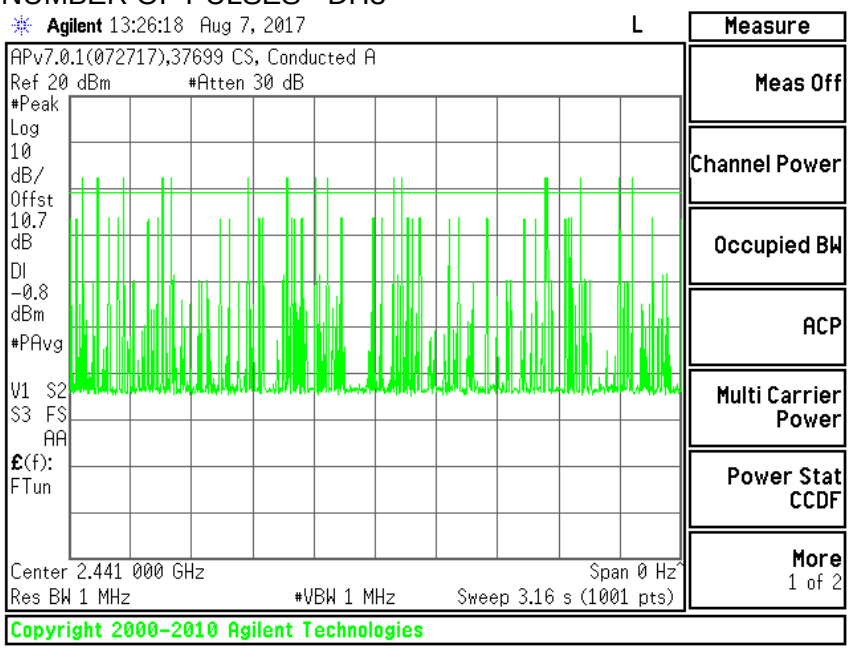
NUMBER OF PULSES - DH1



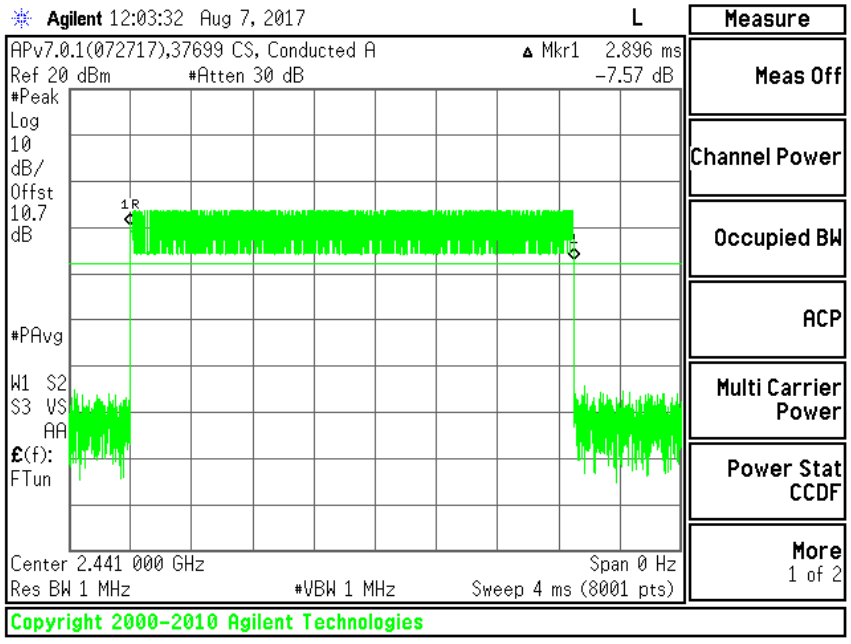
PULSE WIDTH - DH3



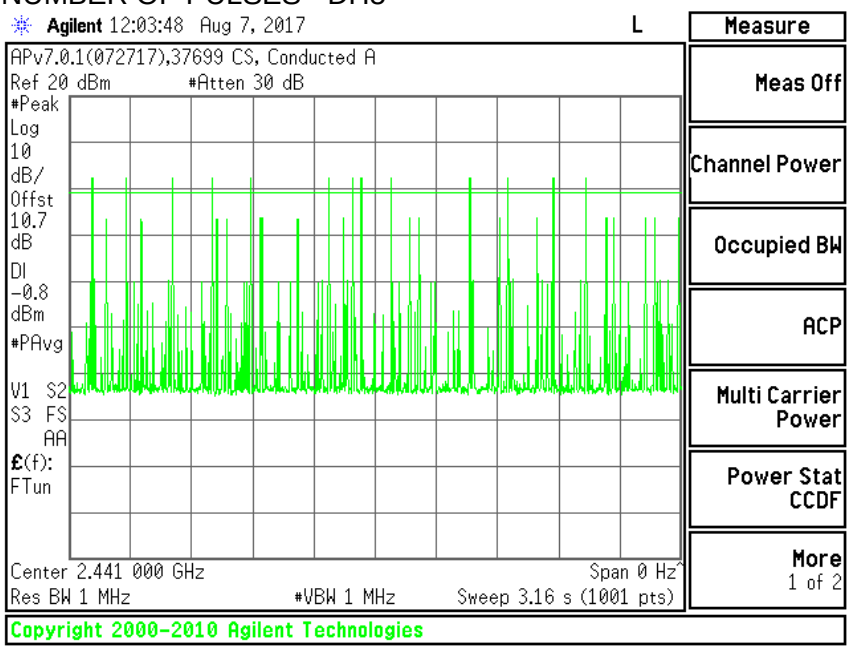
NUMBER OF PULSES - DH3



PULSE WIDTH - DH5



NUMBER OF PULSES - DH5



6.2.6. 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:**	08/04/17

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	2.12	30	-27.88
Middle	2441	1.86	30	-28.14
High	2480	1.19	30	-28.81

6.2.7. 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:**	08/04/17

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	1.84
Middle	2441	1.56
High	2480	0.01

6.2.8. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-247 5.5

Limit = -20 dBc

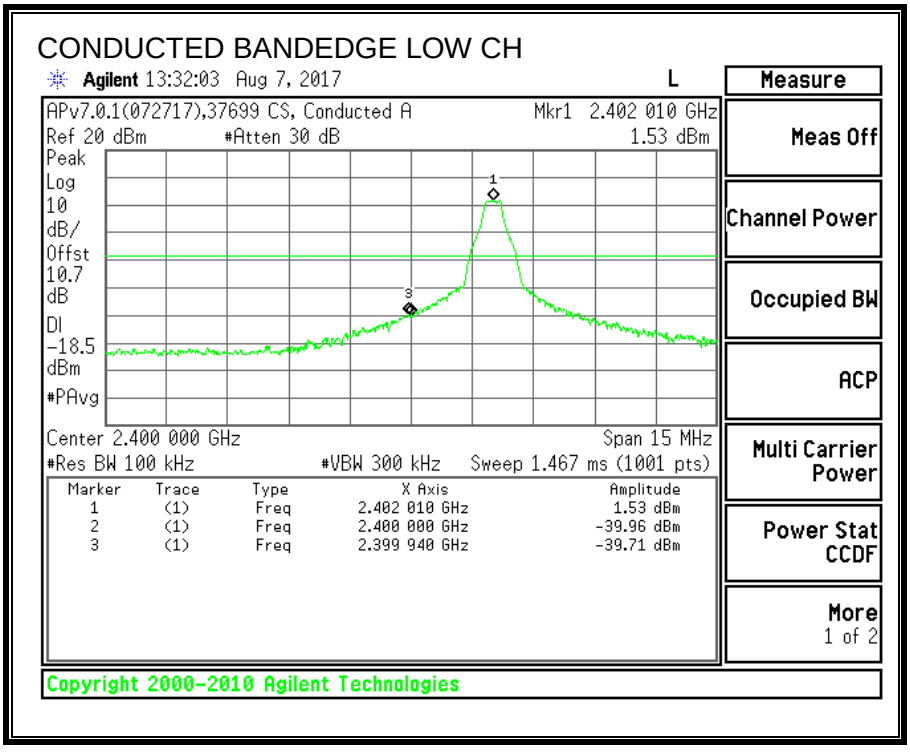
TEST PROCEDURE

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.

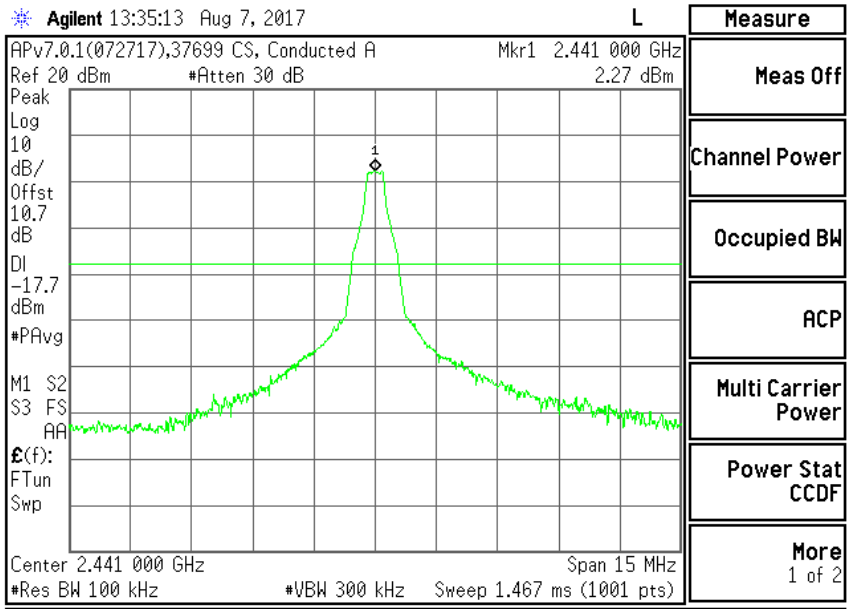
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

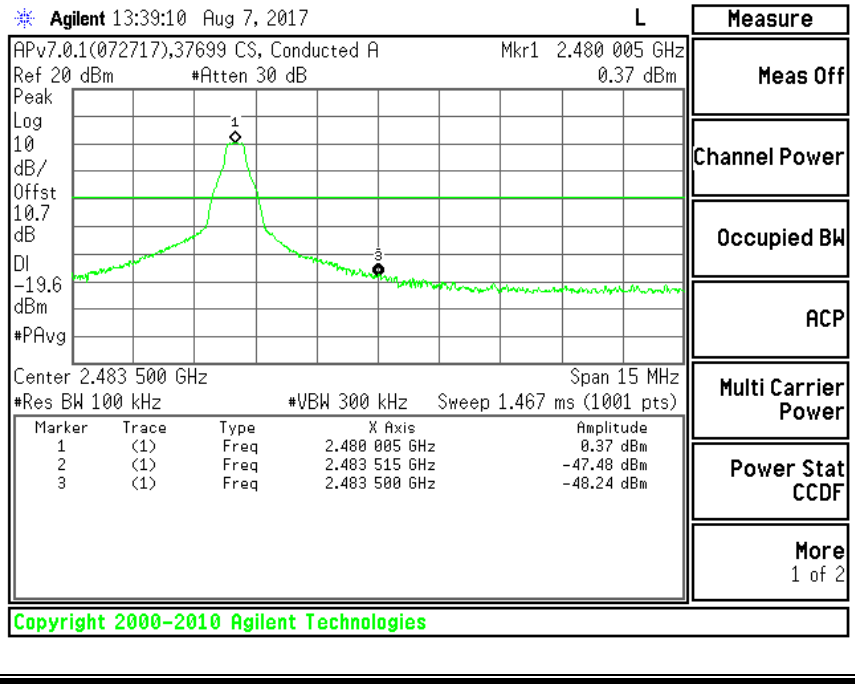
RESULTS

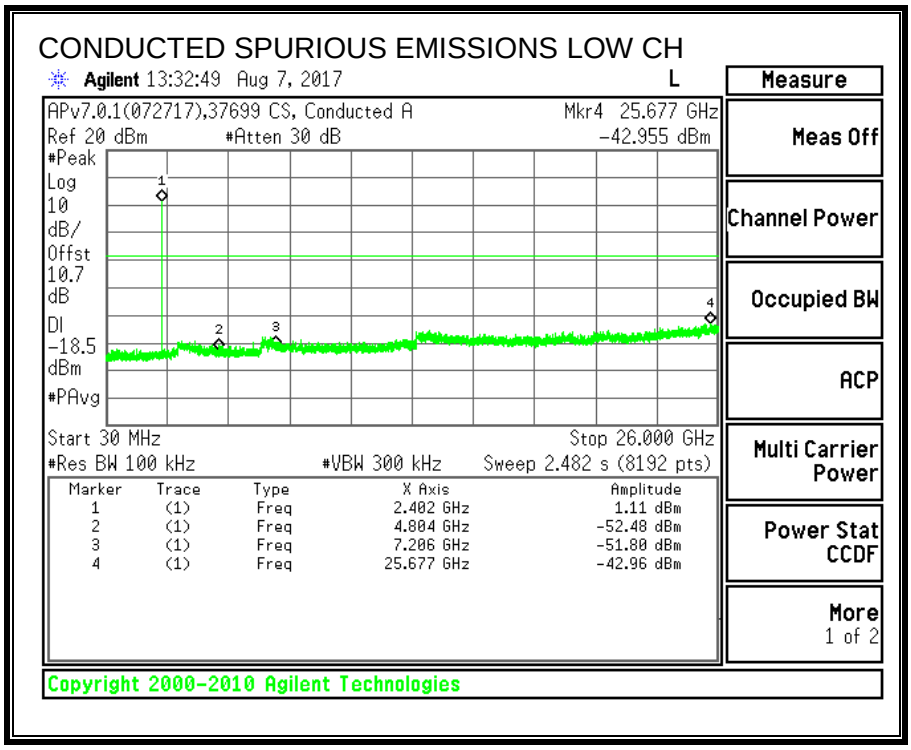


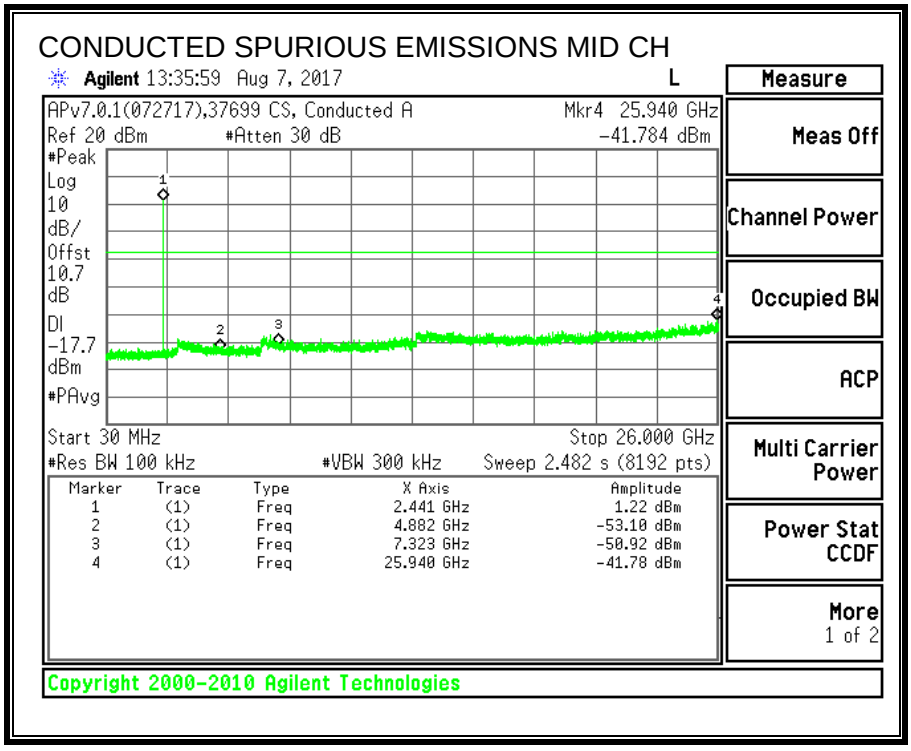
CONDUCTED BANDEDGE MID CH

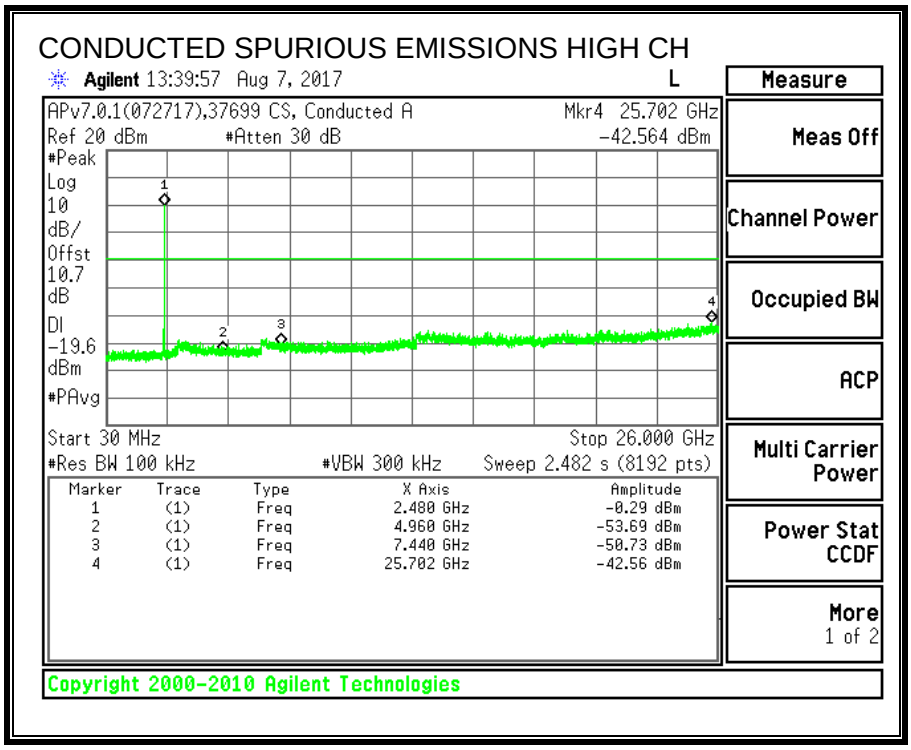


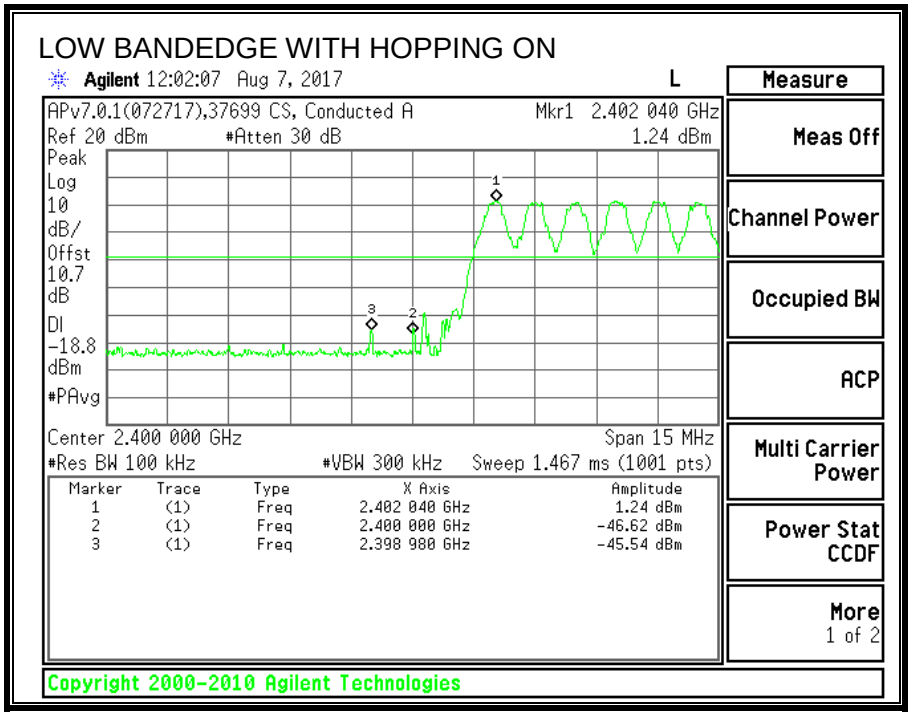
CONDUCTED BANDEDGE HIGH CH



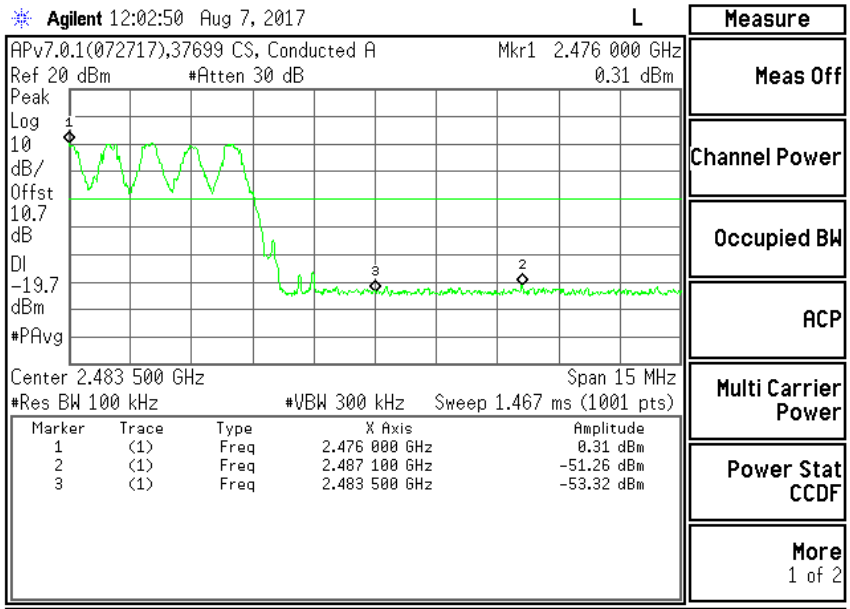








HIGH BANDEDGE WITH HOPPING ON



6.3. ENHANCED DATA RATE DQPSK MODULATION

6.3.1. 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:**	08/04/17

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	4.23	30	-25.77
Middle	2441	5.41	30	-24.59
High	2480	3.30	30	-26.70

6.3.2. 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:**	08/04/17

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	1.74
Middle	2441	2.78
High	2480	0.75

6.4. ENHANCED DATA RATE 8PSK MODULATION

6.4.1. 20 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

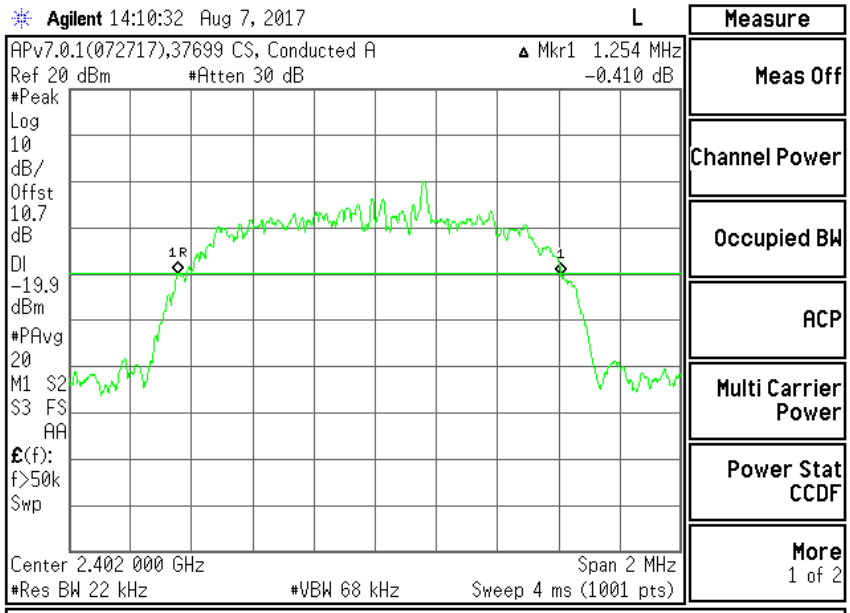
TEST PROCEDURE

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

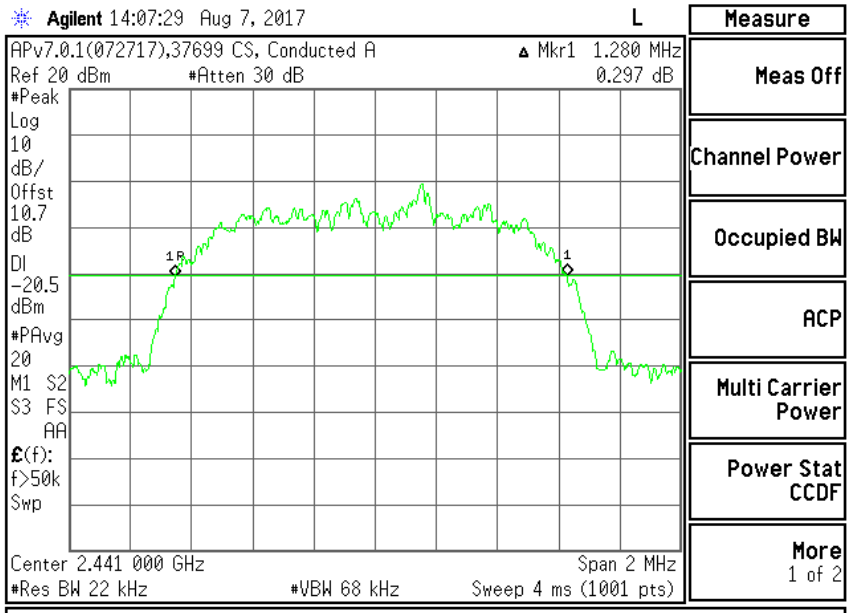
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	1.254
Middle	2441	1.280
High	2480	1.250

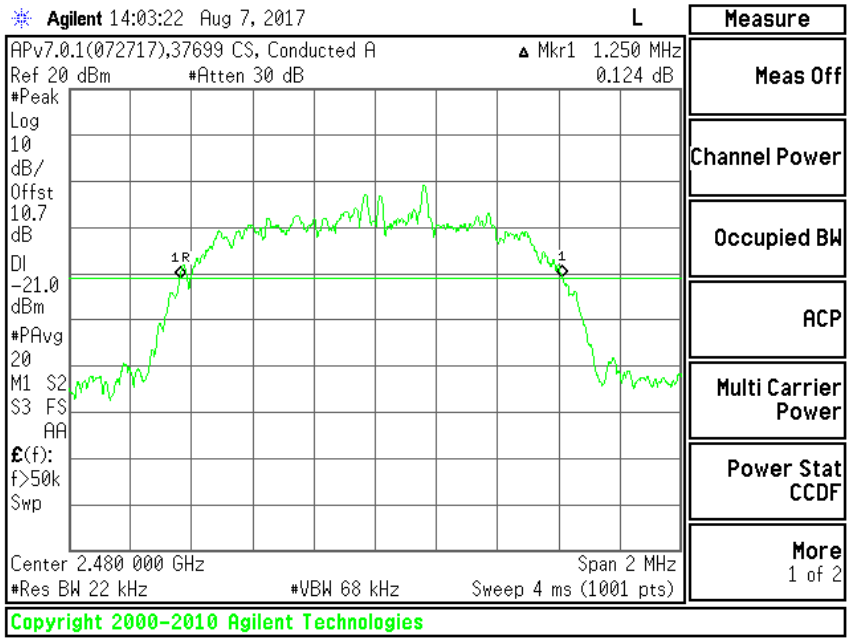
20 dB BANDWIDTH LOW CH



20 dB BANDWIDTH MID CH



20 dB BANDWIDTH HIGH CH



6.4.2. 99% BANDWIDTH

LIMITS

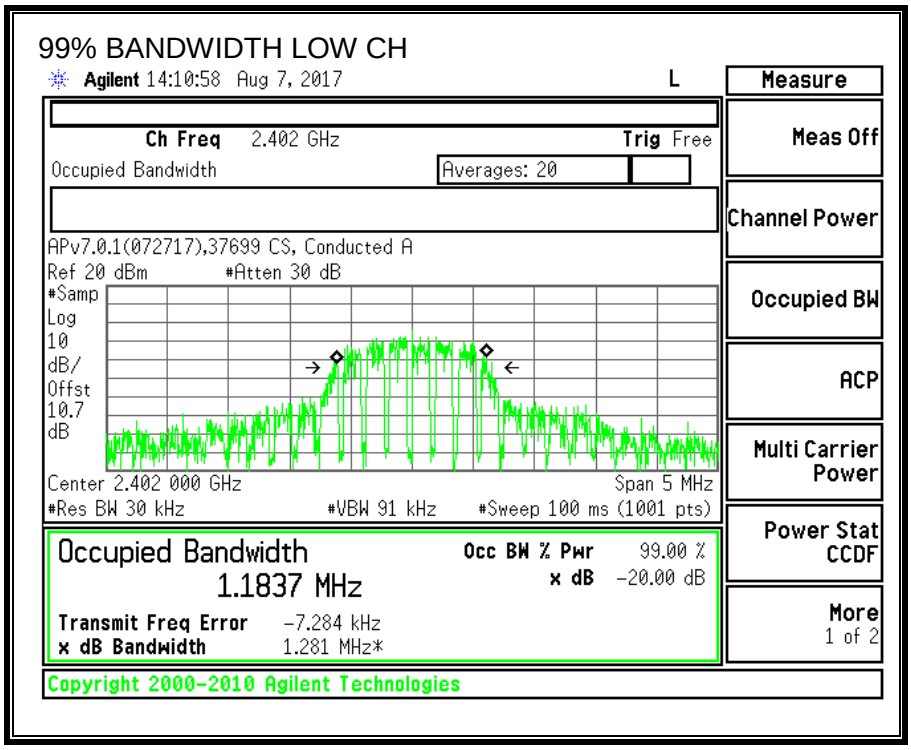
None; for reporting purposes only.

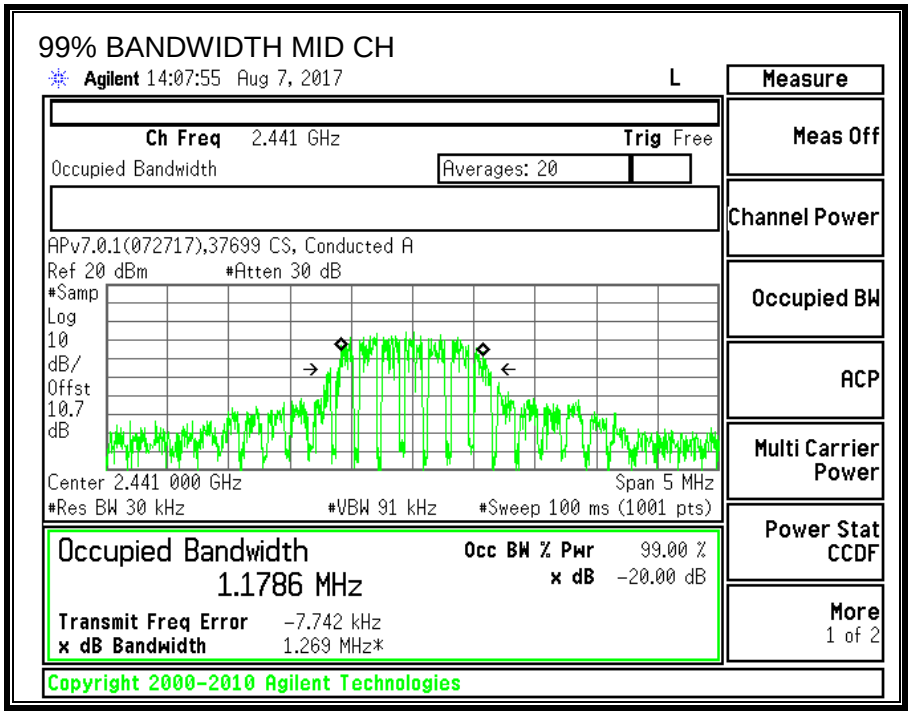
TEST PROCEDURE

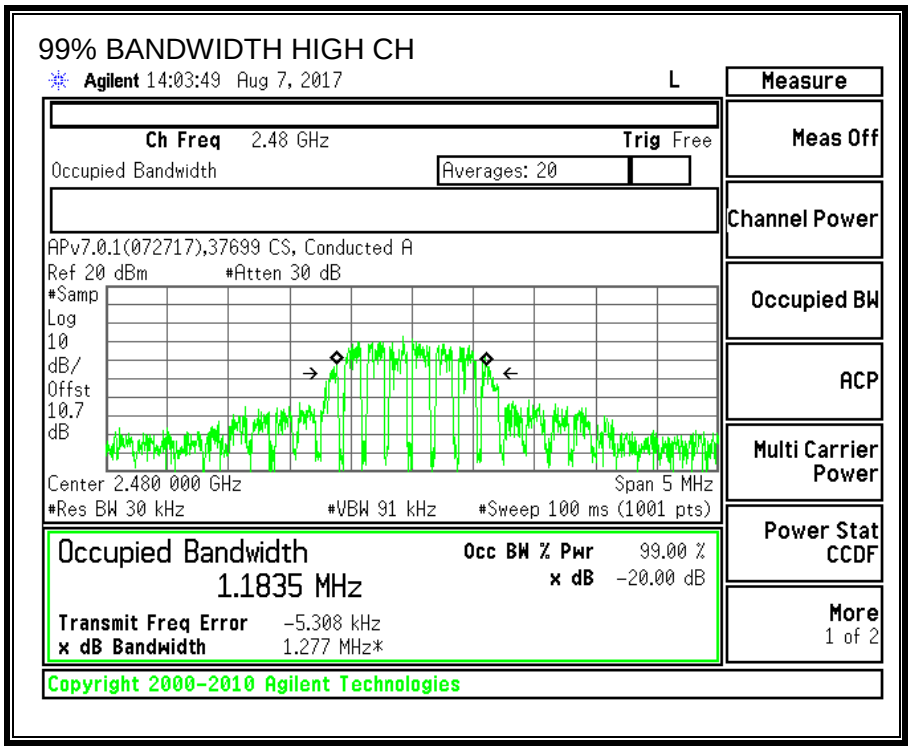
The transmitter output is connected to a spectrum analyzer. The RBW is set to 1%-5% the OBW. The VBW is set to ≥ 3 times RBW. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.1837
Middle	2441	1.1786
High	2480	1.1835







6.4.3. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

IC RSS-247 (5.1) (b)

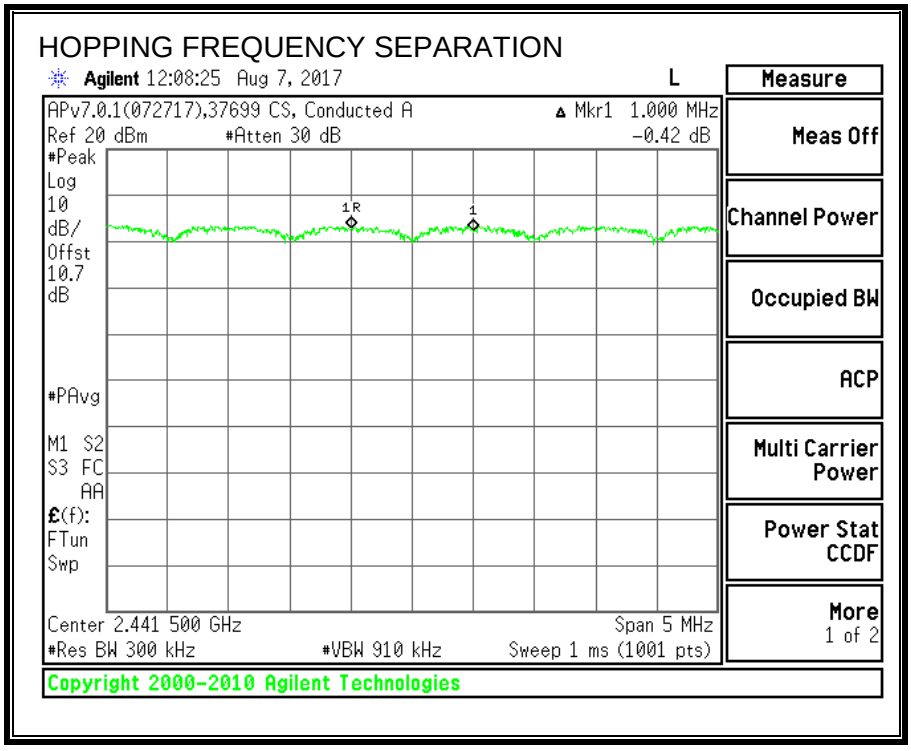
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

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



6.4.4. 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.

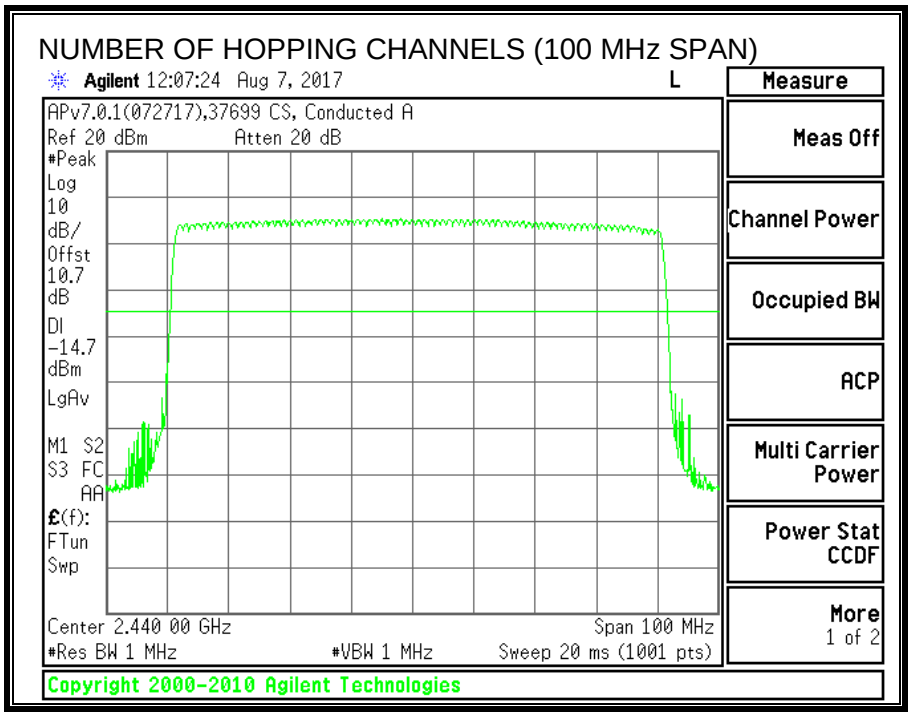
TEST PROCEDURE

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.

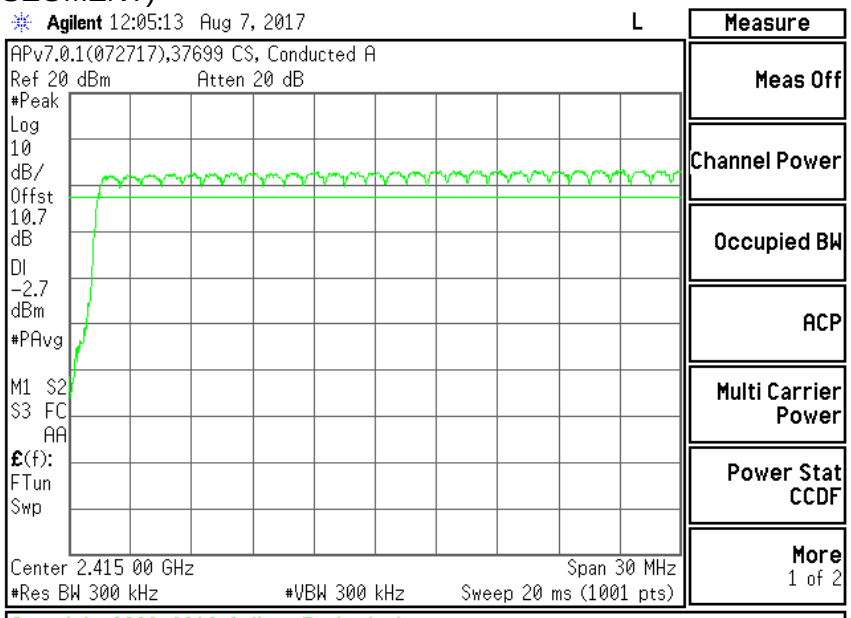
RESULTS

Normal Mode: 79 Channels observed.

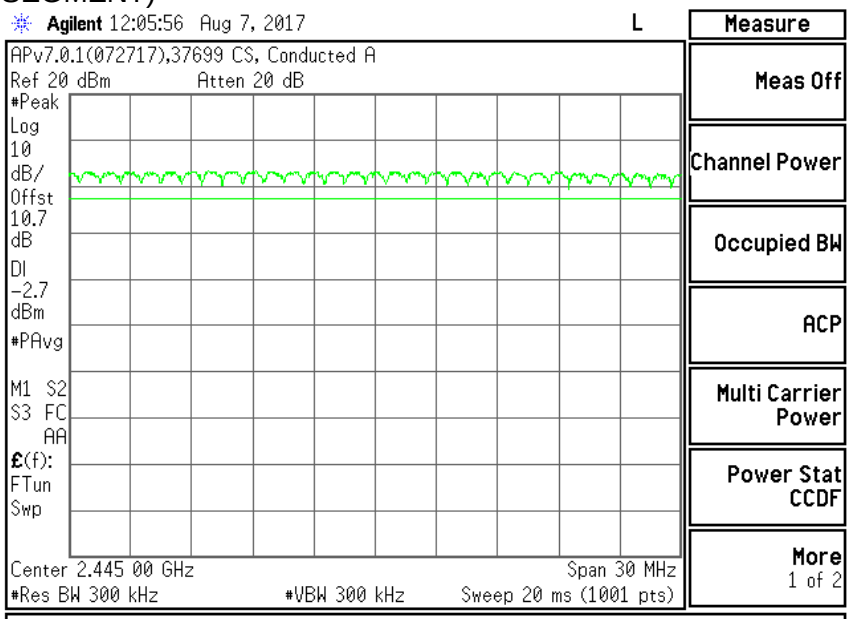
NUMBER OF HOPPING CHANNELS (100 MHz SPAN)



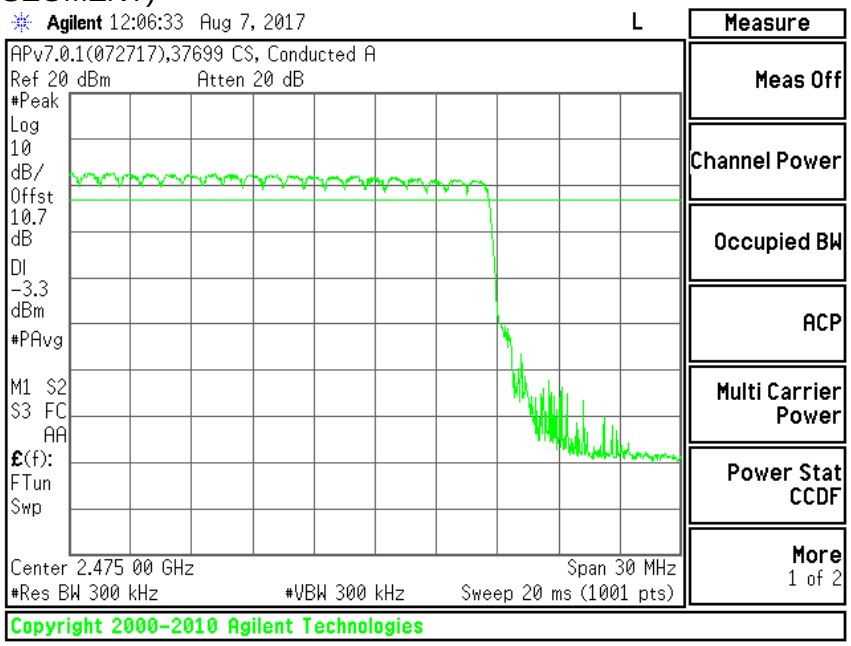
NUMBER OF HOPPING CHANNELS (30 MHz SPAN, FIRST SEGMENT)



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



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



6.4.5. 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 * (# of pulses in 3.16 s) * 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 * (# of pulses in 0.8 s) * pulse width.

RESULTS

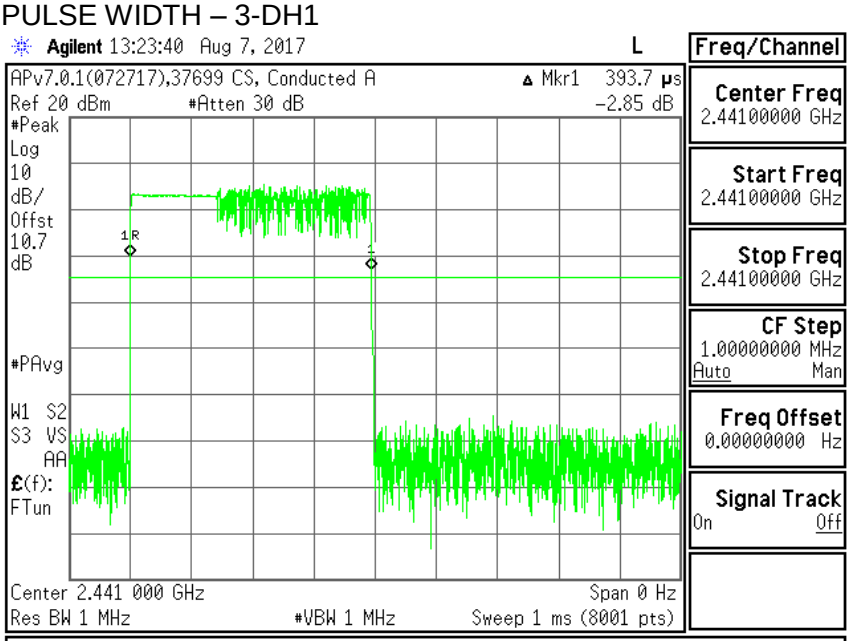
AVERAGE TIME OF OCCUPANCY

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	0.3940	31	0.1221	0.4	-0.2779
3-DH3	1.6440	18	0.2959	0.4	-0.1041
3-DH5	2.8920	7	0.2024	0.4	-0.1976

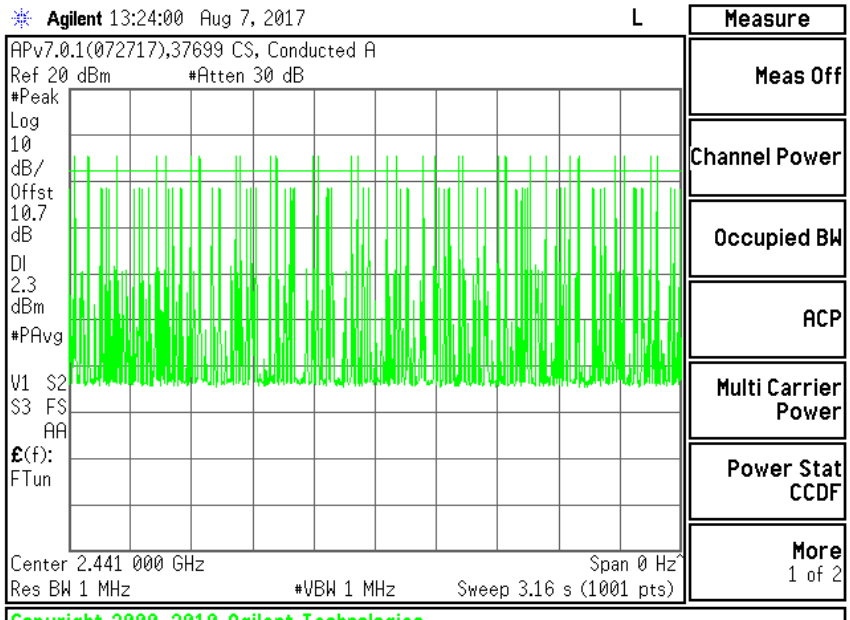
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
8PSK AFH Mode					
3-DH1	0.394	7.75	0.03054	0.4	-0.3695
3-DH3	1.644	4.5	0.07398	0.4	-0.3260
3-DH5	2.892	1.75	0.05061	0.4	-0.3494

NOTE: --

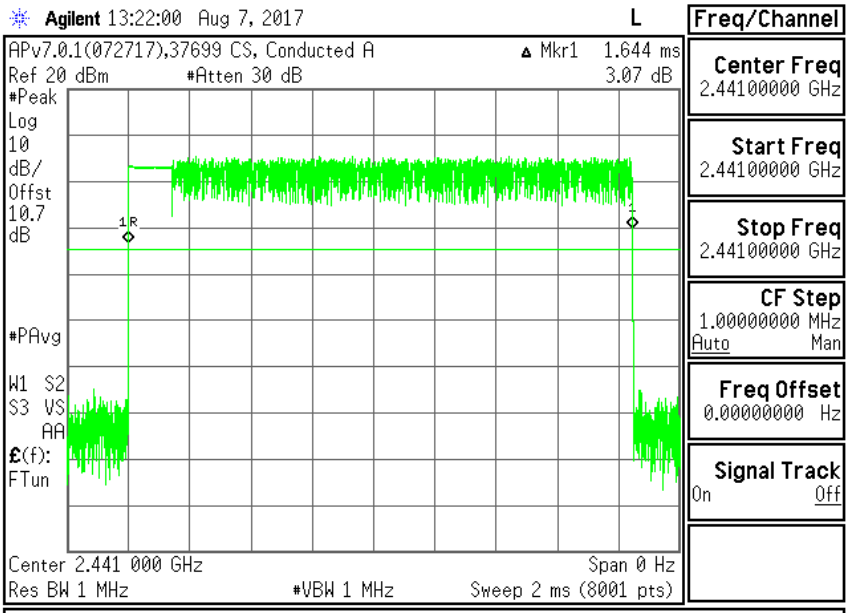
PULSE WIDTH – 3-DH1



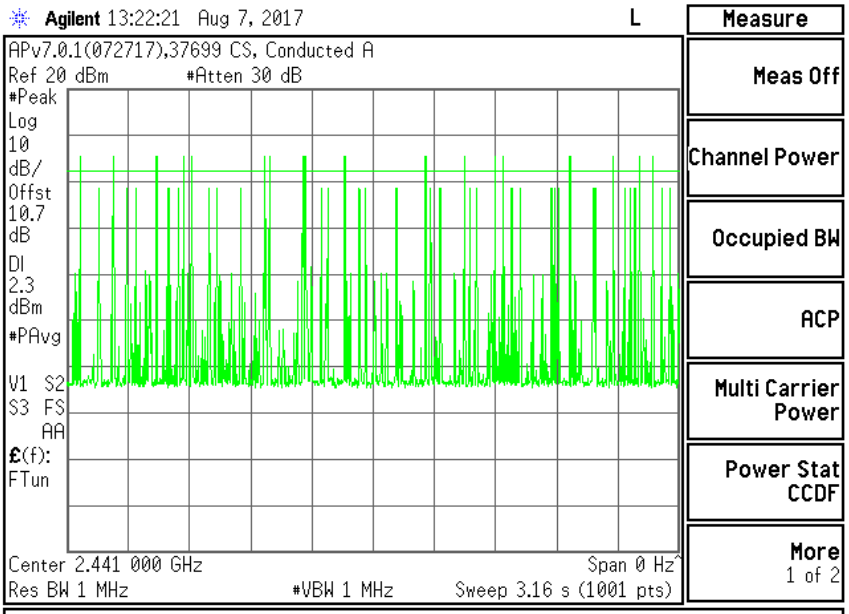
NUMBER OF PULSES – 3-DH1



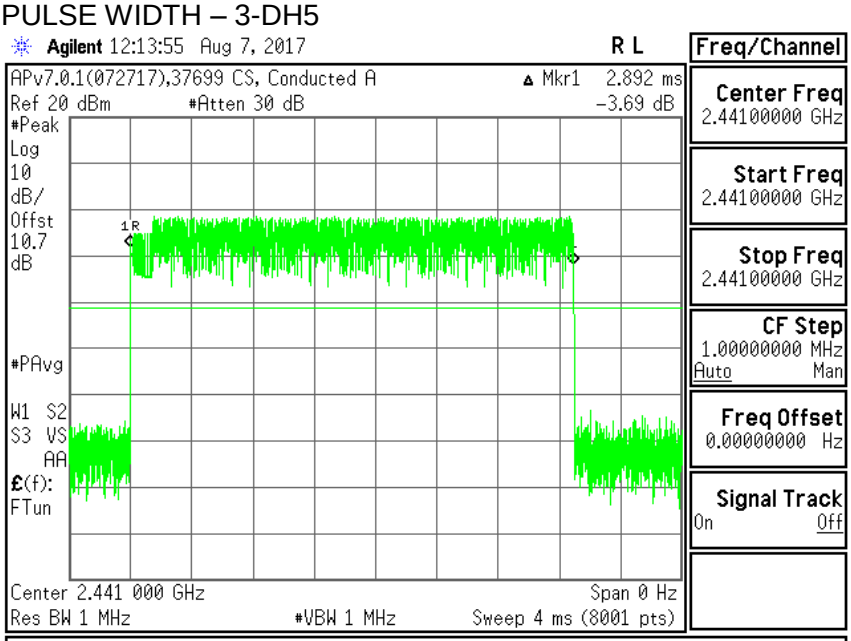
PULSE WIDTH – 3- DH3



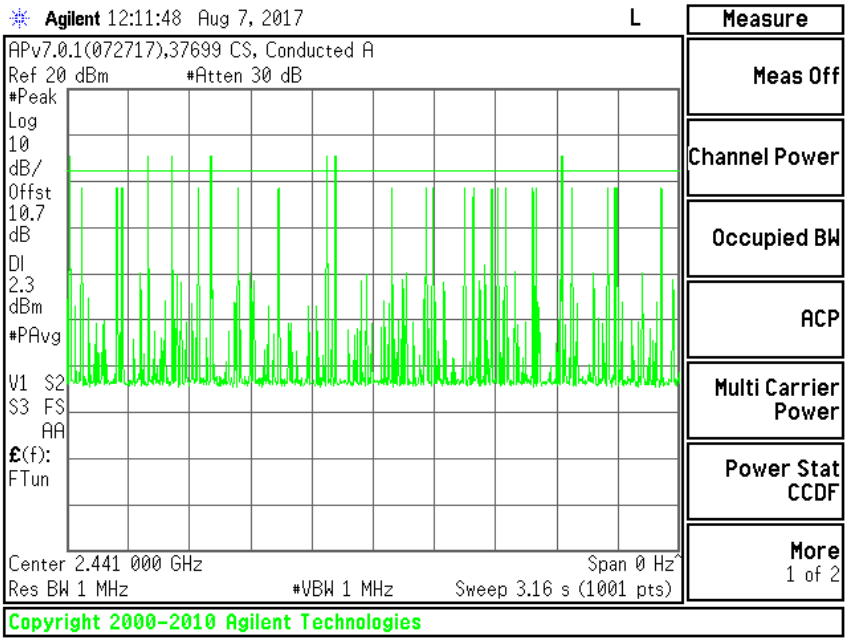
NUMBER OF PULSES – 3-DH3



PULSE WIDTH – 3-DH5



NUMBER OF PULSES – 3-DH5



6.4.6. 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:**	08/04/17

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	4.61	30	-25.39
Middle	2441	5.66	30	-24.34
High	2480	3.61	30	-26.39

6.4.7. 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:**	08/04/17

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	1.74
Middle	2441	2.78
High	2480	0.77

6.4.8. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-247 5.5

Limit = -20 dBc

TEST PROCEDURE

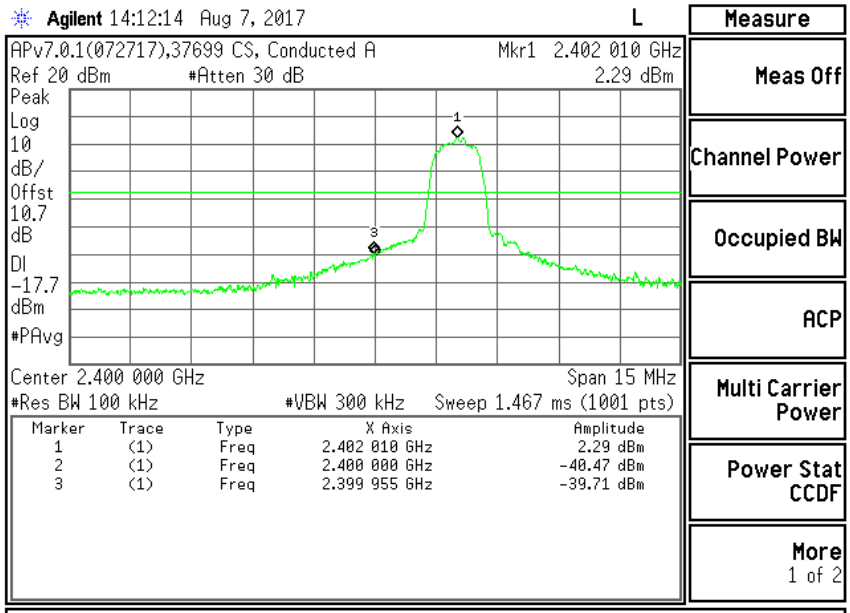
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

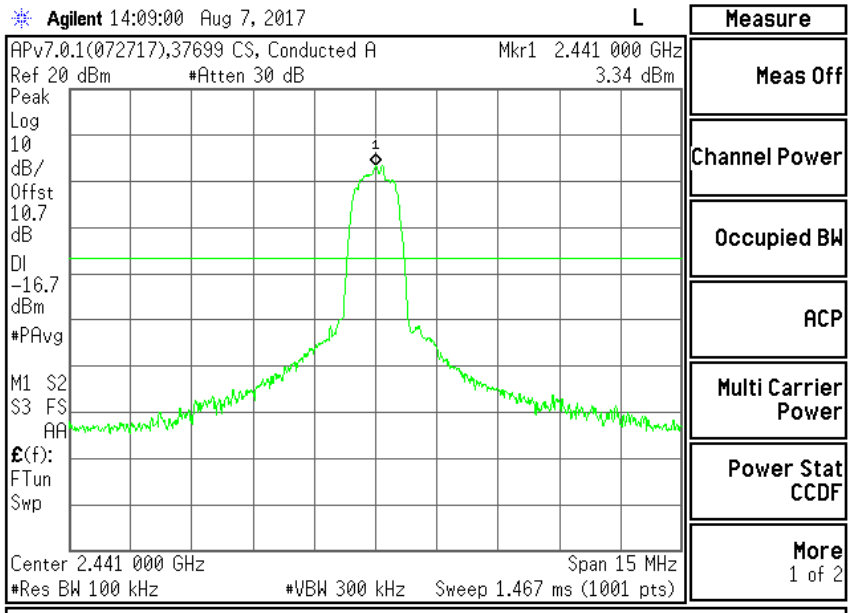
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

RESULTS

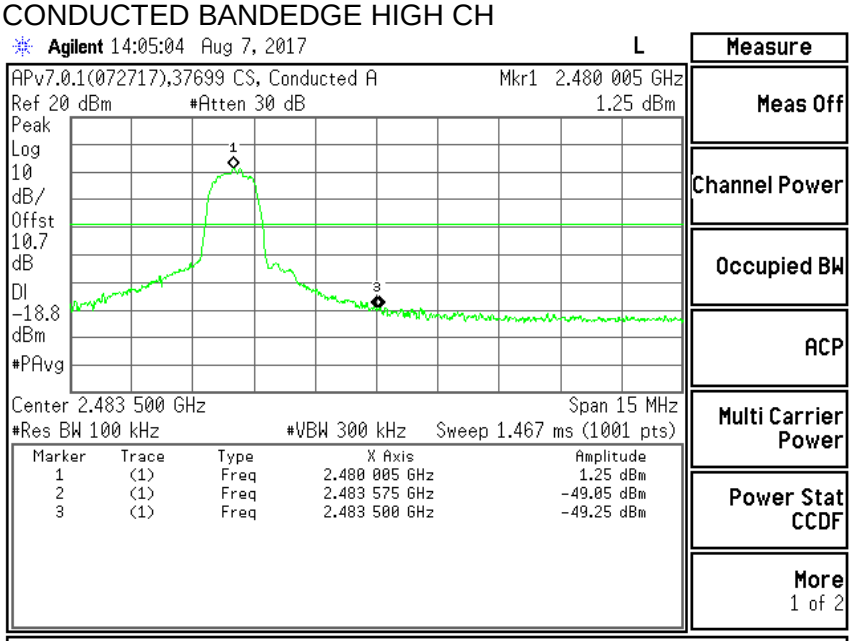
CONDUCTED BANDEDGE LOW CH



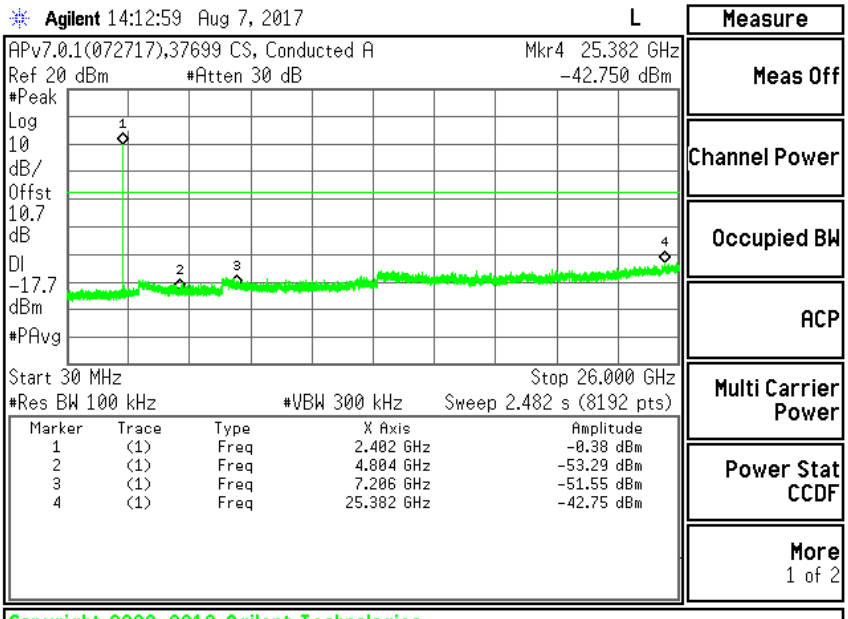
CONDUCTED BANDEDGE MID CH

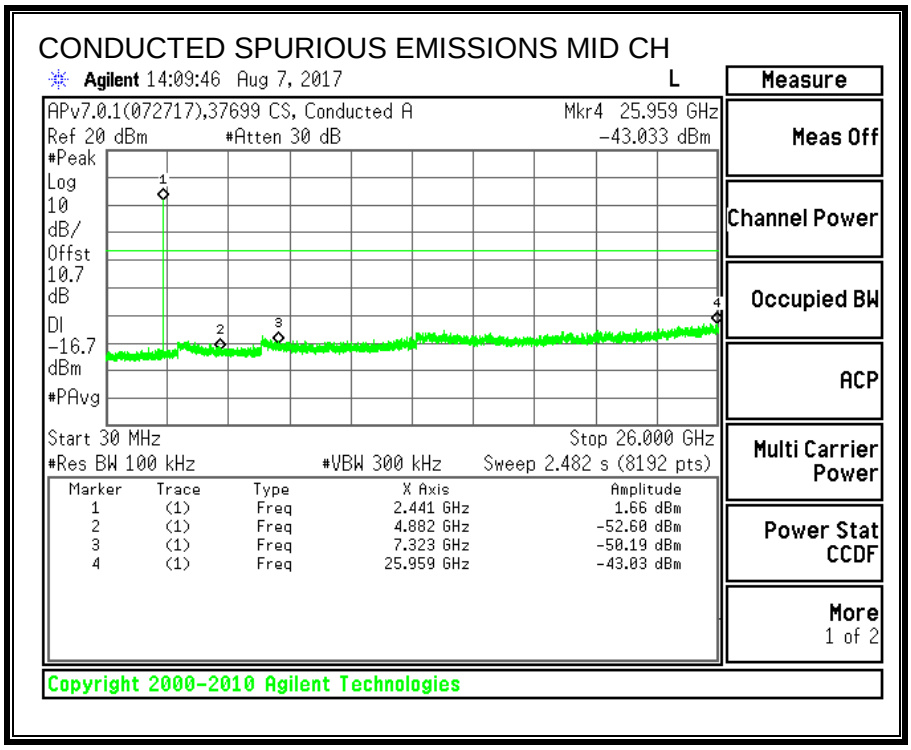


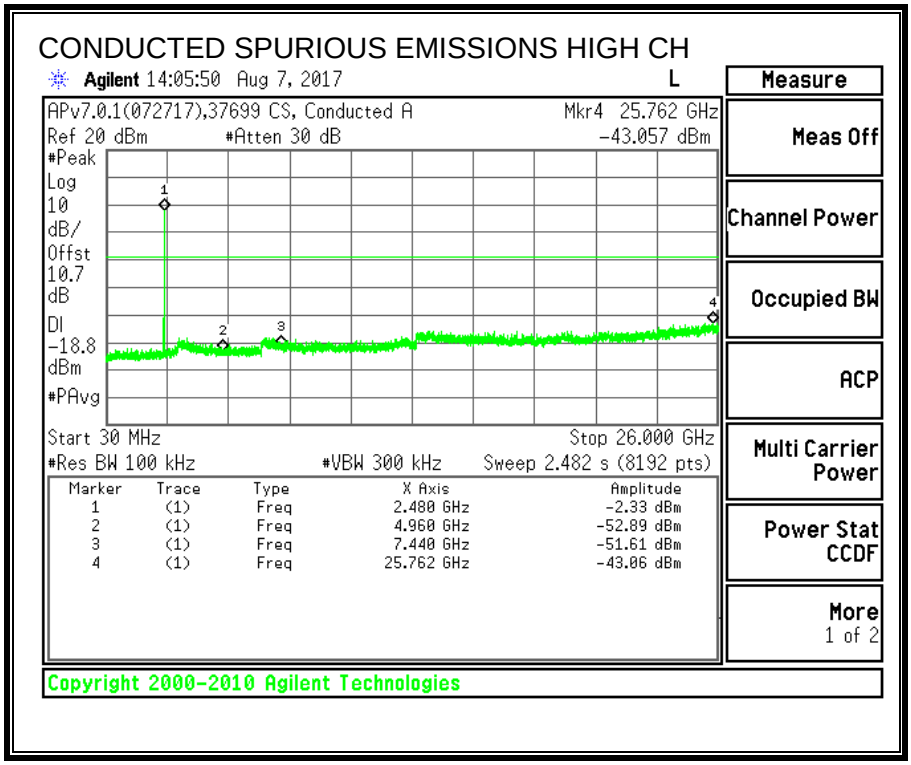
CONDUCTED BANDEDGE HIGH CH



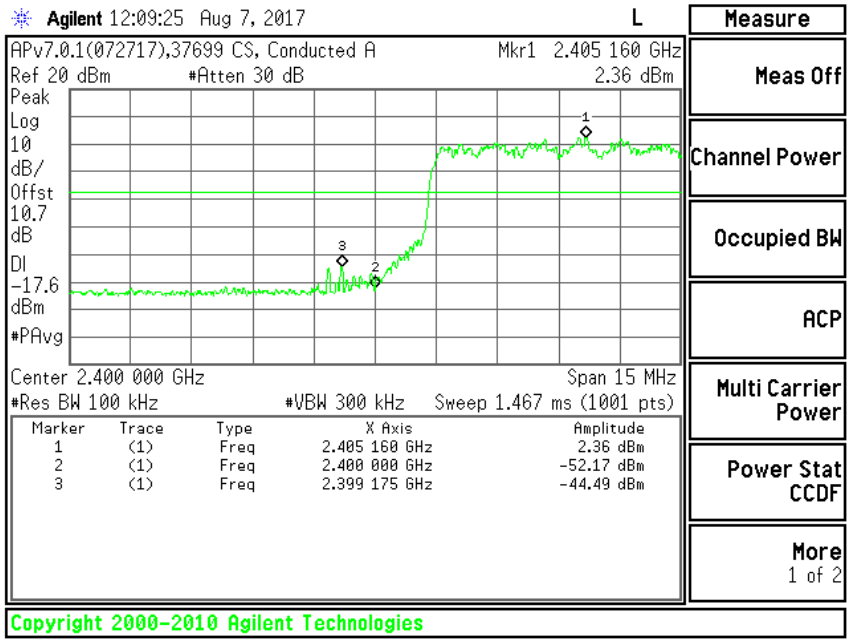
CONDUCTED SPURIOUS EMISSIONS LOW CH



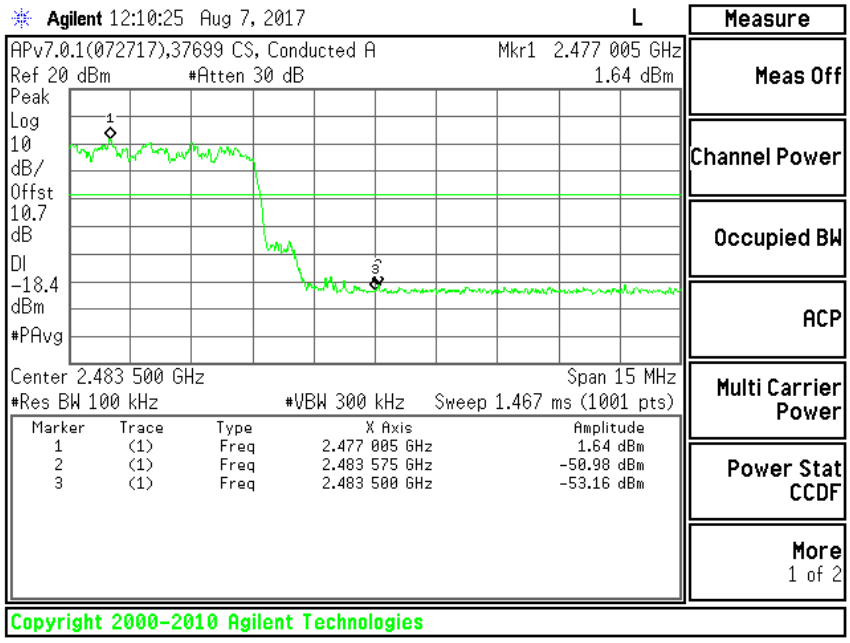




LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



7. RADIATED TEST RESULTS

7.1. 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.

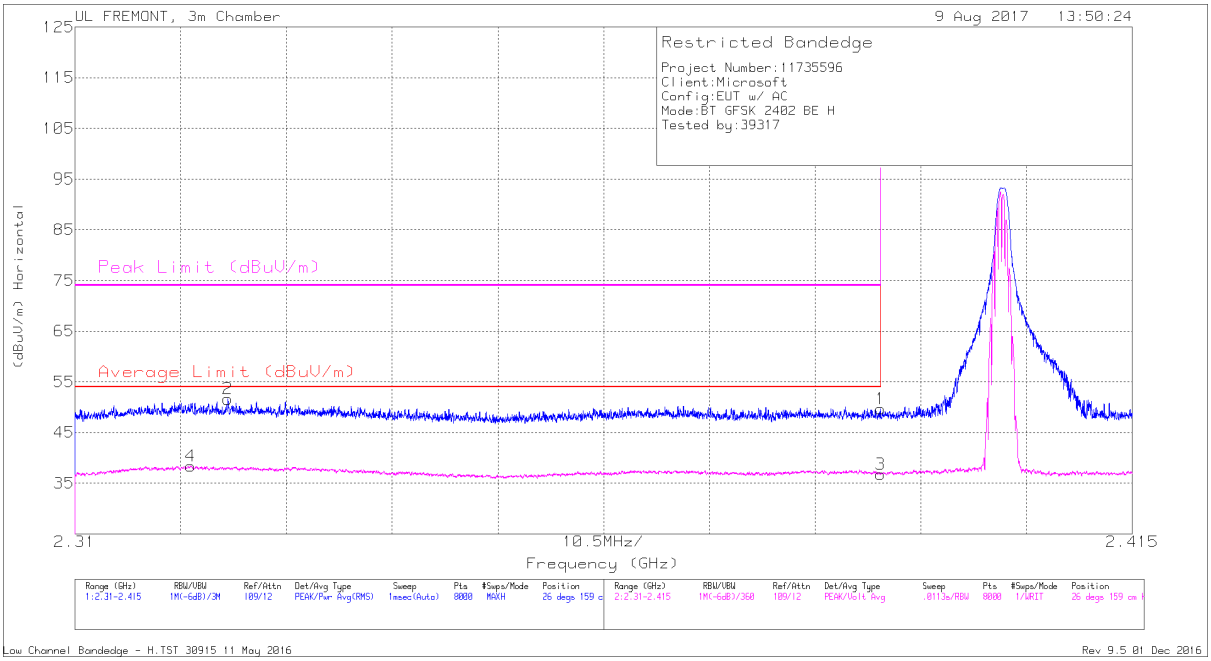
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

RESULTS

7.2. BASIC DATA RATE GFSK MODULATION

7.2.1. RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL HORIZONTAL

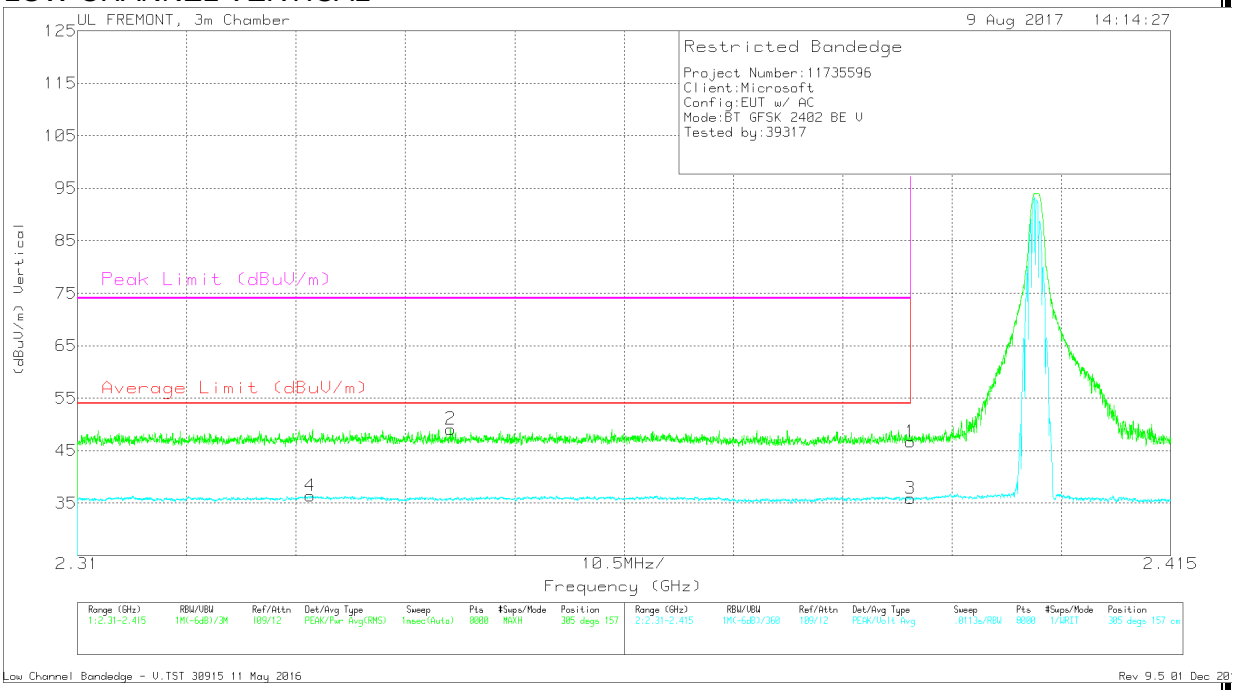


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/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	2.322	29	VA1T	31.8	-22.4	38.4	54	-15.6	-	-	26	159	H
2	2.325	42.3	Pk	31.8	-22.5	51.6	-	-	74	-22.4	26	159	H
1	2.39	40.33	Pk	31.9	-22.6	49.63	-	-	74	-24.37	26	159	H
3	2.39	27.5	VA1T	31.9	-22.6	36.8	54	-17.2	-	-	26	159	H

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

LOW CHANNEL VERTICAL



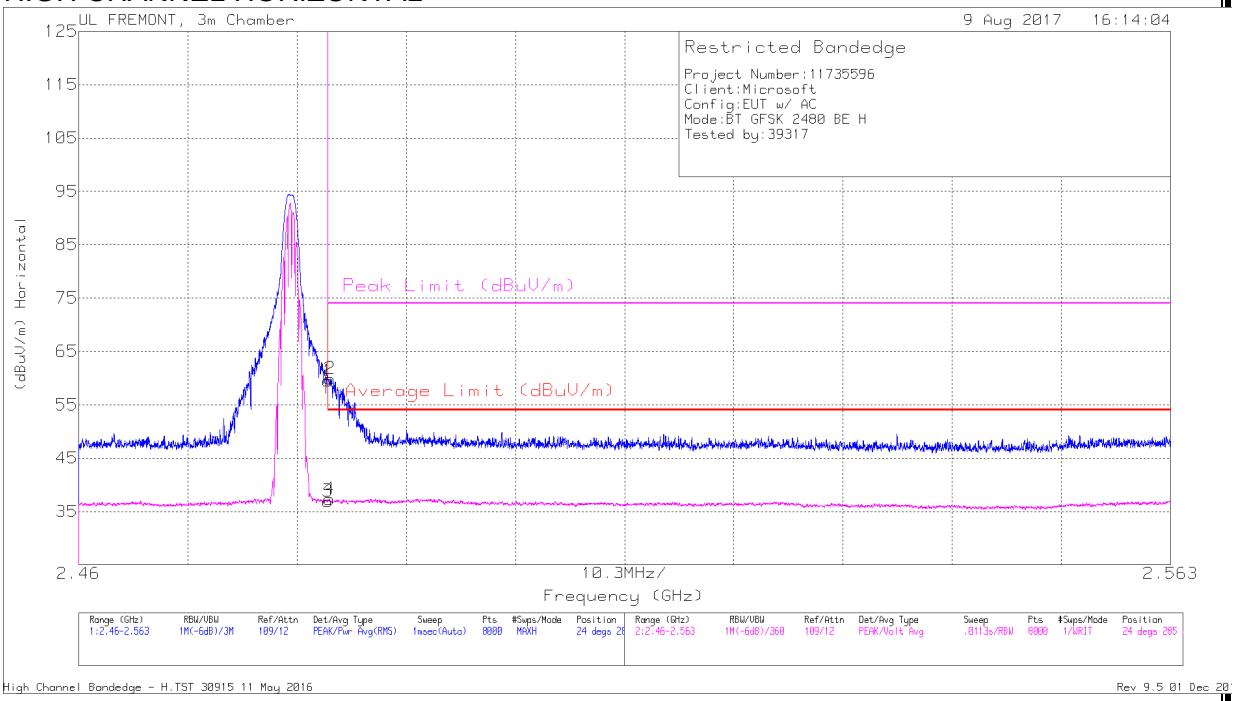
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/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	2.332	27.13	VA1T	31.8	-22.5	36.43	54	-17.57	-	-	305	157	V
2	2.346	40.01	Pk	31.8	-22.7	49.11	-	-	74	-24.89	305	157	V
1	2.39	37.38	Pk	31.9	-22.6	46.68	-	-	74	-27.32	305	157	V
3	2.39	26.54	VA1T	31.9	-22.6	35.84	54	-18.16	-	-	305	157	V

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

7.2.2. AUTHORIZED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL HORIZONTAL



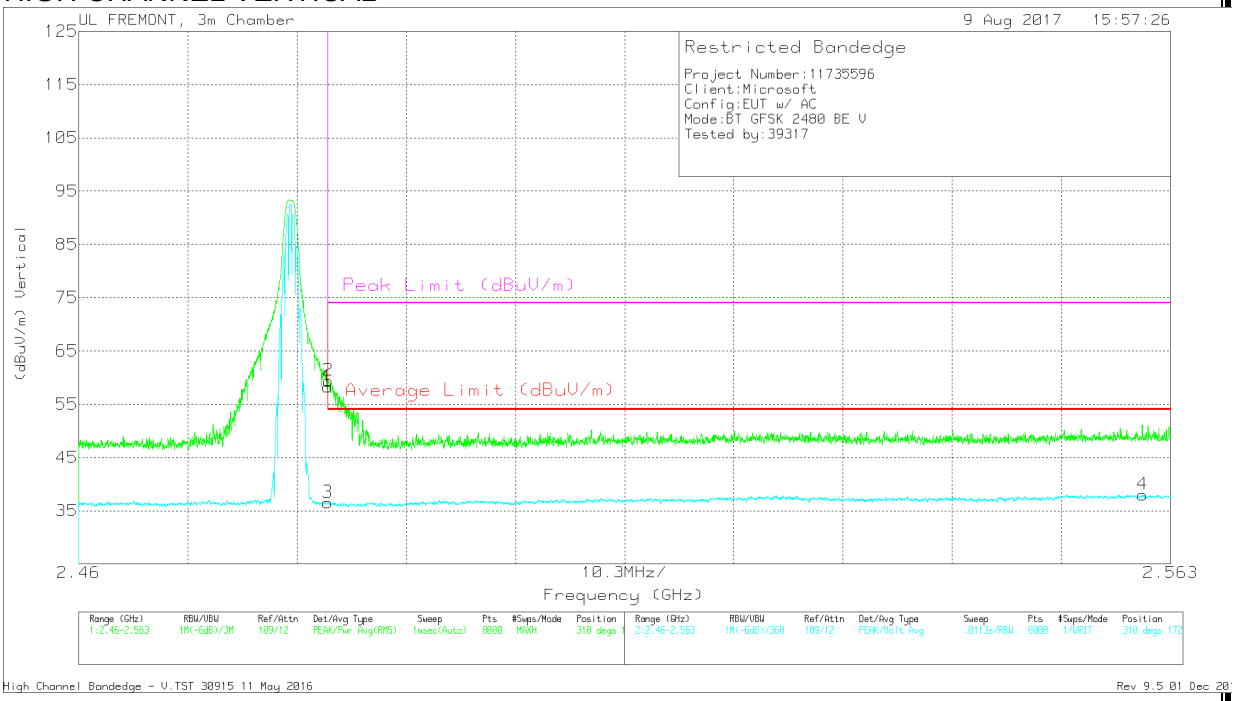
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/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
1	2.484	49.8	Pk	32.4	-22.7	59.5	-	-	74	-14.5	24	285	H
2	2.484	50.17	Pk	32.4	-22.7	59.87	-	-	74	-14.13	24	285	H
3	2.484	27.23	VA1T	32.4	-22.7	36.93	54	-17.07	-	-	24	285	H
4	2.484	27.63	VA1T	32.4	-22.7	37.33	54	-16.67	-	-	24	285	H

Pk - Peak detector

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

HIGH CHANNEL VERTICAL



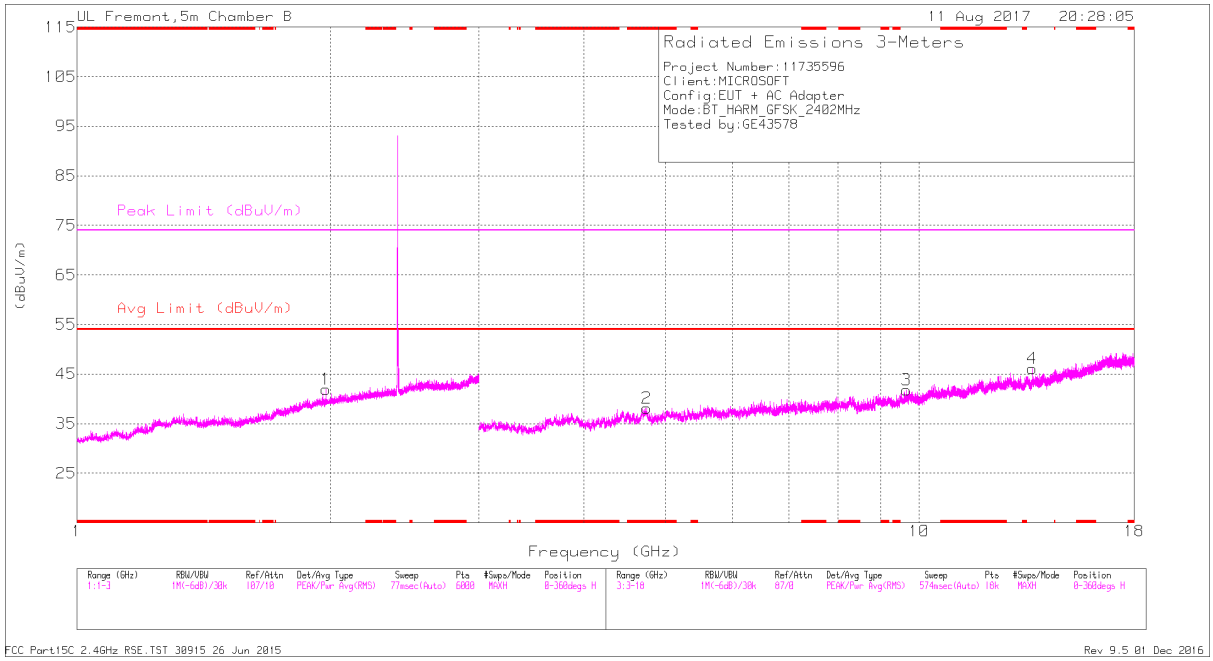
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/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
1	2.484	48.55	Pk	32.4	-22.7	58.25	-	-	74	-15.75	310	172	V
2	2.484	49.73	Pk	32.4	-22.7	59.43	-	-	74	-14.57	310	172	V
3	2.484	26.85	VA1T	32.4	-22.7	36.55	54	-17.45	-	-	310	172	V
4	2.56	28.35	VA1T	32.3	-22.6	38.05	54	-15.95	-	-	310	172	V

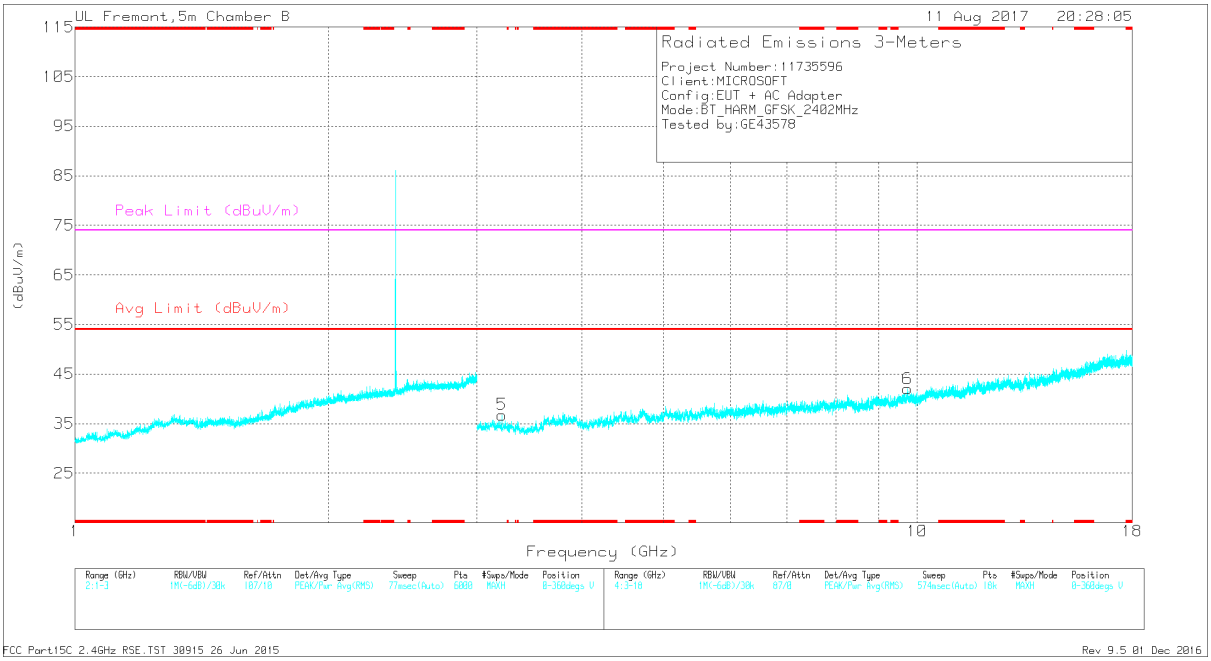
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

7.2.3. HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL

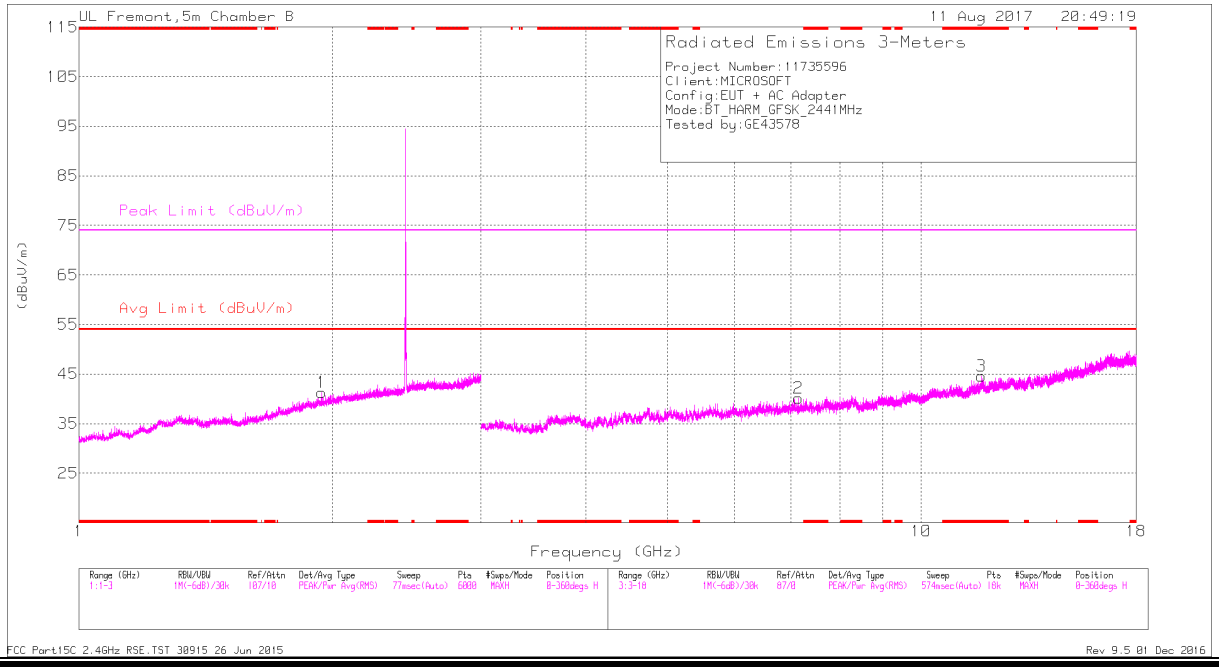


Radiated Emissions

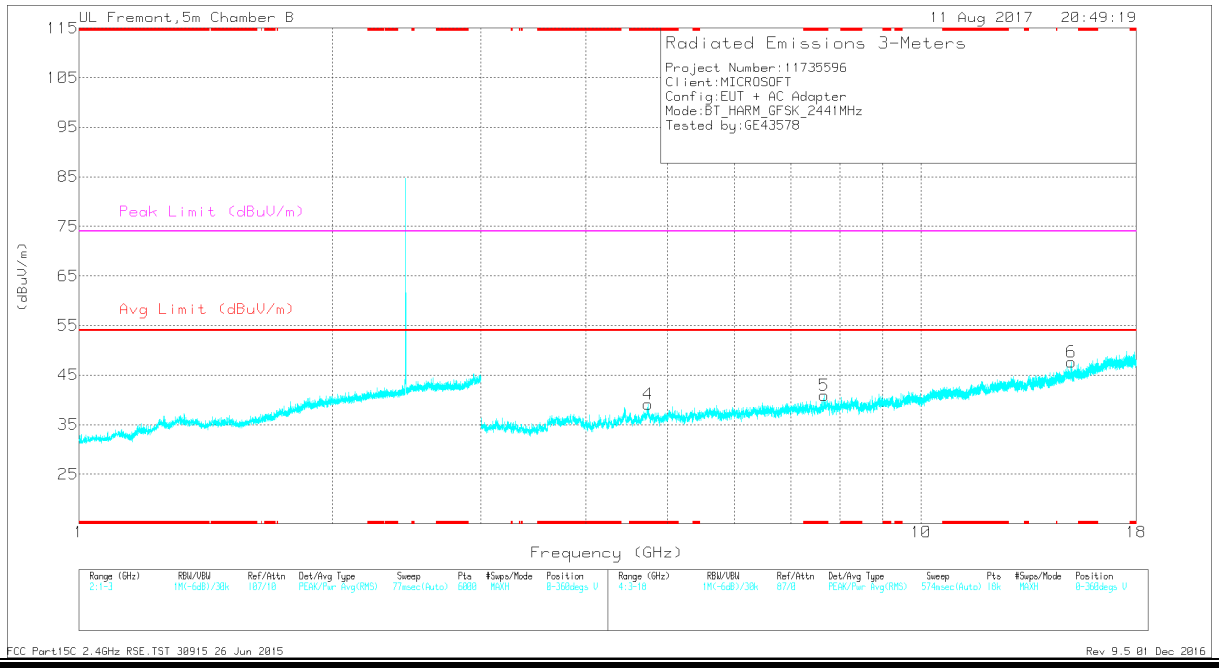
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.746	37.06	PKFH	34.2	-28.4	42.86	-	-	74	-31.14	55	102	H
	* 4.744	26.67	VA1T	34.2	-28.4	32.47	54	-21.53	-	-	55	102	H
1	1.973	33.41	PKFH	31.2	-21.1	43.51	-	-	-	-	329	102	H
	1.976	22.86	VA1T	31.2	-21.1	32.96	-	-	-	-	329	102	H
5	3.212	36.96	PKFH	33	-30.5	39.46	-	-	-	-	208	104	V
	3.215	26.33	VA1T	33	-30.5	28.83	-	-	-	-	208	104	V
3	9.66	21.67	VA1T	36.9	-23.8	34.77	-	-	-	-	136	102	H
	9.661	32.76	PKFH	36.9	-23.8	45.86	-	-	-	-	136	102	H
6	9.737	21.65	VA1T	36.9	-23.3	35.25	-	-	-	-	191	200	V
	9.74	32.75	PKFH	36.9	-23.2	46.45	-	-	-	-	191	200	V
4	13.61	32.17	PKFH	39.1	-22	49.27	-	-	-	-	244	199	H
	13.61	21.04	VA1T	39.1	-22	38.14	-	-	-	-	244	199	H

* - 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

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL

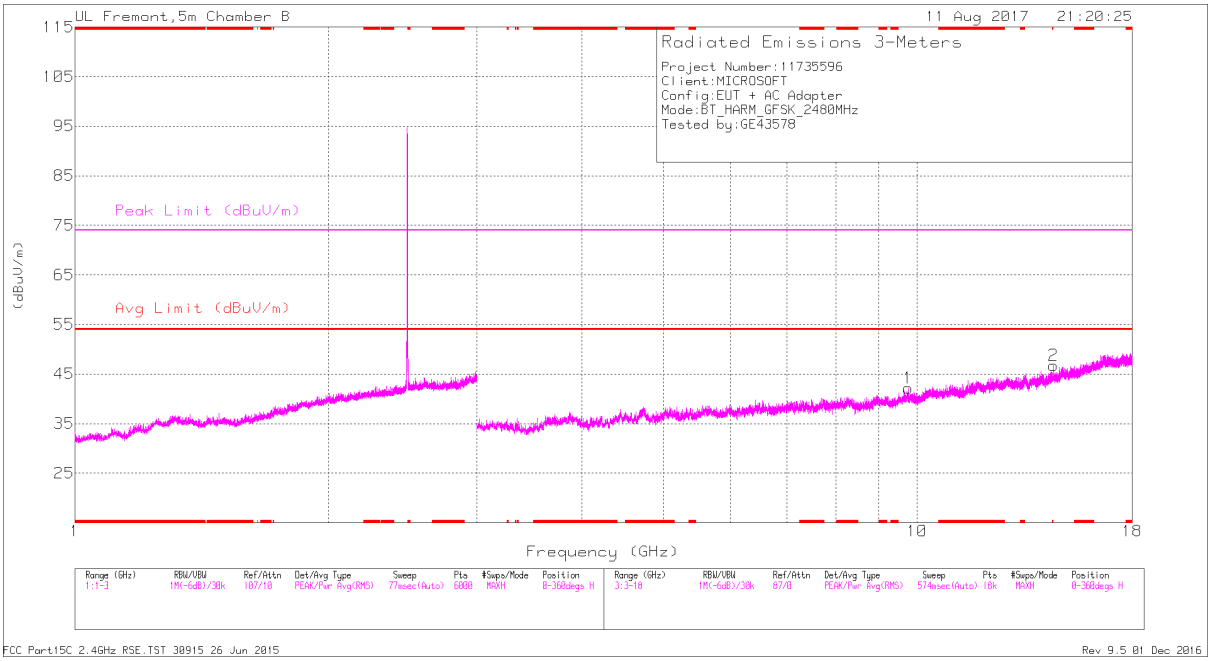


Radiated Emissions

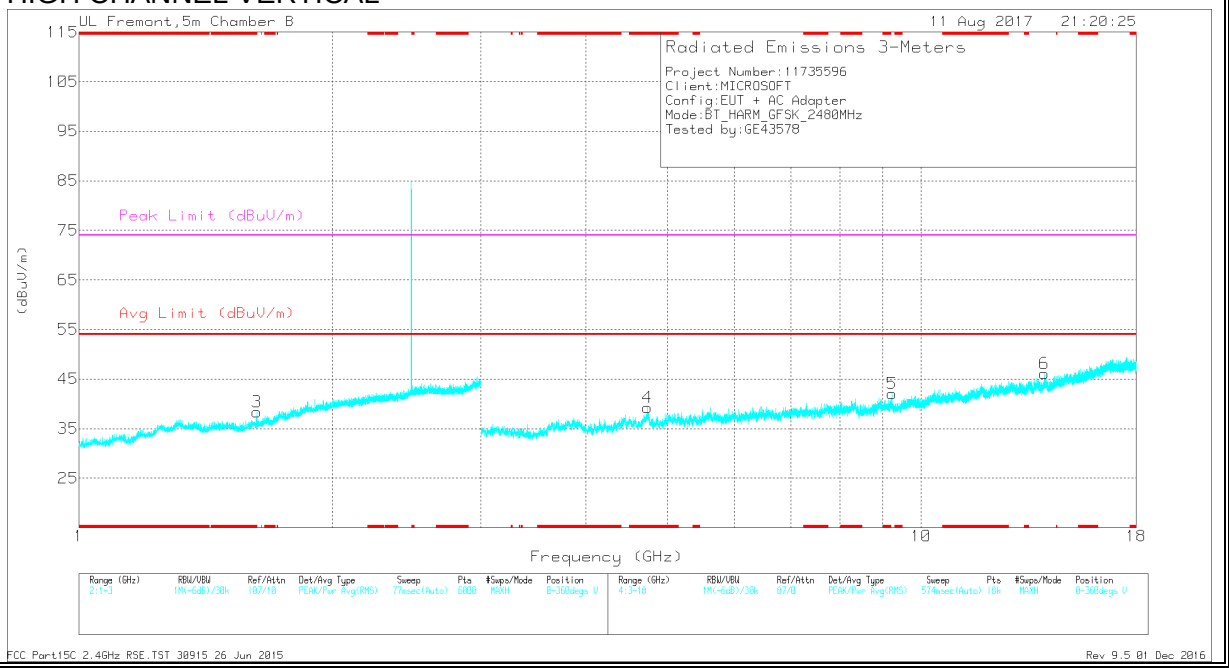
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 11.789	31.27	PKFH	38.6	-21	48.87	-	-	74	-25.13	204	199	H
	* 11.79	20.39	VA1T	38.6	-21	37.99	54	-16.01	-	-	204	199	H
4	* 4.742	37.87	PKFH	34.2	-28.3	43.77	-	-	74	-30.23	15	104	V
	* 4.742	26.81	VA1T	34.2	-28.3	32.71	54	-21.29	-	-	15	104	V
5	* 7.669	33.88	PKFH	36	-26	43.88	-	-	74	-30.12	135	104	V
	* 7.672	23.41	VA1T	36	-26	33.41	54	-20.59	-	-	135	104	V
1	1.938	22.74	VA1T	31.1	-20.8	33.04	-	-	-	-	285	199	H
	1.94	34.05	PKFH	31.1	-20.7	44.45	-	-	-	-	285	199	H
2	7.148	36.14	PKFH	35.9	-26.4	45.64	-	-	-	-	36	199	H
	7.15	23.46	VA1T	35.9	-26.5	32.86	-	-	-	-	36	199	H
6	15.073	30.24	PKFH	40.5	-20.1	50.64	-	-	-	-	180	200	V
	15.075	19.25	VA1T	40.5	-20	39.75	-	-	-	-	180	200	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

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



Radiated Emissions

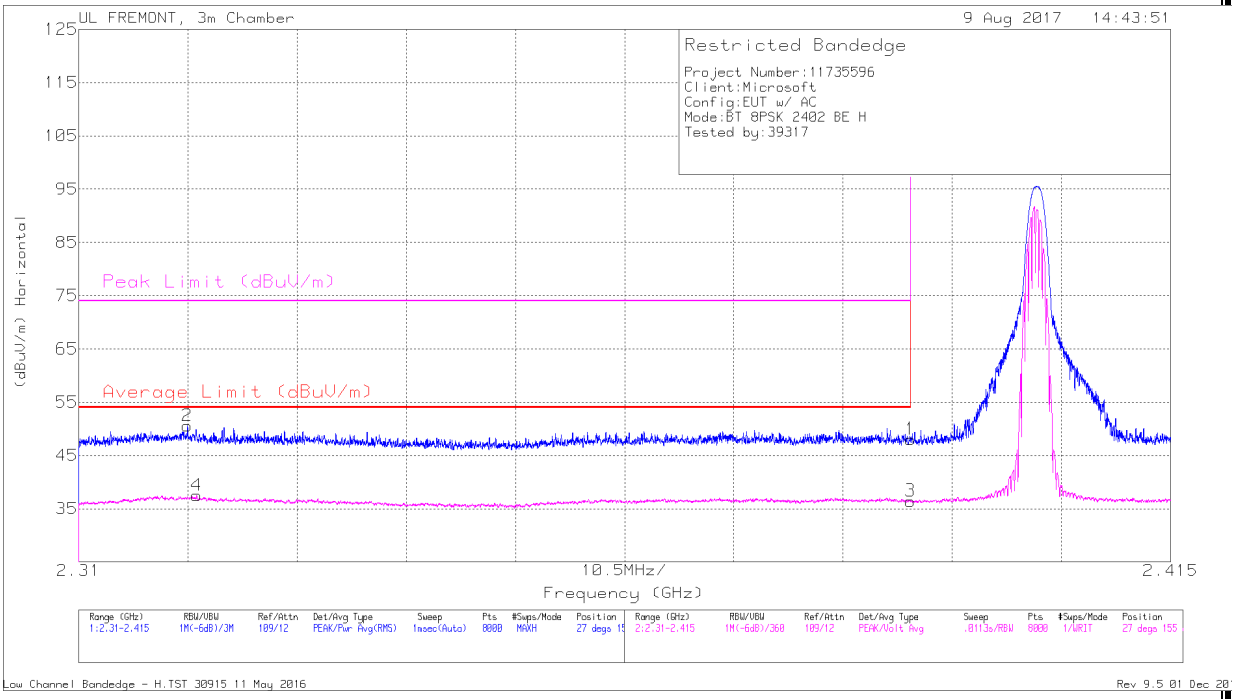
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 1.626	32.89	PKFH	28.5	-21.3	40.09	-	-	74	-33.91	356	199	V
	* 1.625	22.55	VA1T	28.5	-21.4	29.65	54	-24.35	-	-	356	199	V
4	* 4.73	39.23	PKFH	34.2	-28.5	44.93	-	-	74	-29.07	303	104	V
	* 4.73	26.97	VA1T	34.2	-28.5	32.67	54	-21.33	-	-	303	104	V
5	9.233	33.27	PKFH	36.4	-24.2	45.47	-	-	-	-	133	104	V
	9.234	21.73	VA1T	36.4	-24.2	33.93	-	-	-	-	133	104	V
1	9.756	21.31	VA1T	36.9	-23.3	34.91	-	-	-	-	92	199	H
	9.759	31.98	PKFH	36.9	-23.4	45.48	-	-	-	-	92	199	H
6	13.994	31.21	PKFH	39.2	-21.6	48.81	-	-	-	-	63	199	V
	13.994	20.37	VA1T	39.2	-21.6	37.97	-	-	-	-	63	199	V
2	14.518	30.76	PKFH	39.9	-20.5	50.16	-	-	-	-	234	199	H
	14.519	19.67	VA1T	39.9	-20.4	39.17	-	-	-	-	234	199	H

* - 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

7.3. ENHANCED DATA RATE 8PSK MODULATION

7.3.1. RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL HORIZONTAL

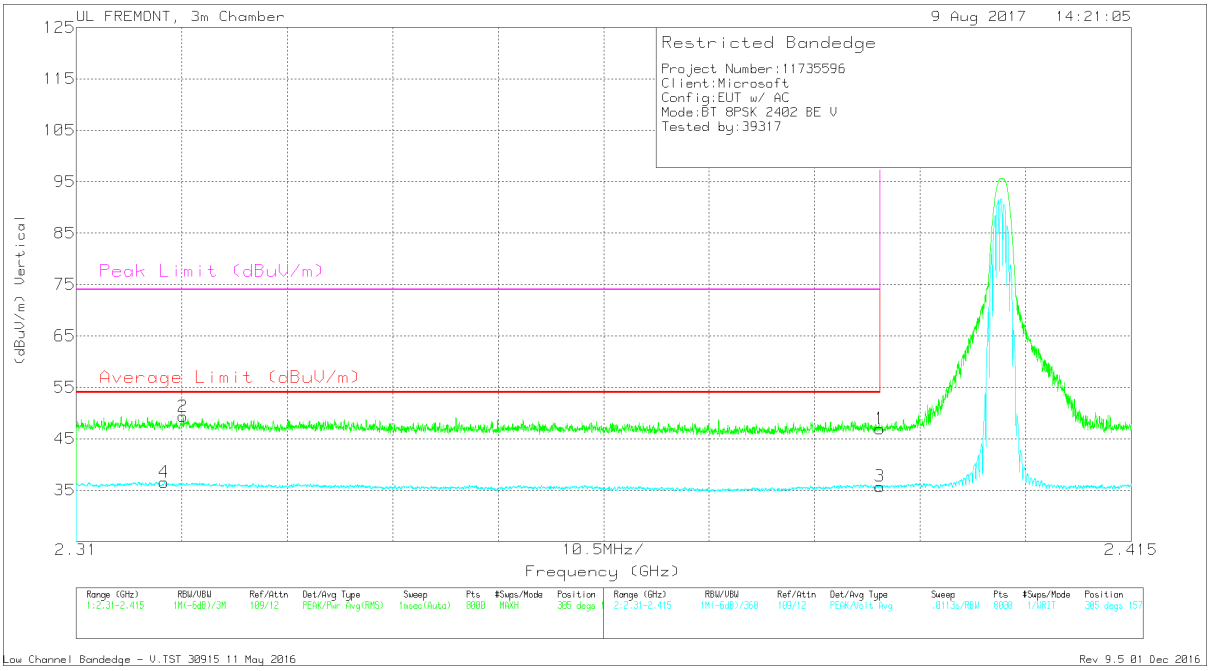


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/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
2	2.32	41.14	Pk	31.8	-22.4	50.54	-	-	74	-23.46	27	155	H
4	2.321	28.08	VA1T	31.8	-22.4	37.48	54	-16.52	-	-	27	155	H
1	2.39	38.72	Pk	31.9	-22.6	48.02	-	-	74	-25.98	27	155	H
3	2.39	27.13	VA1T	31.9	-22.6	36.43	54	-17.57	-	-	27	155	H

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

LOW CHANNEL VERTICAL



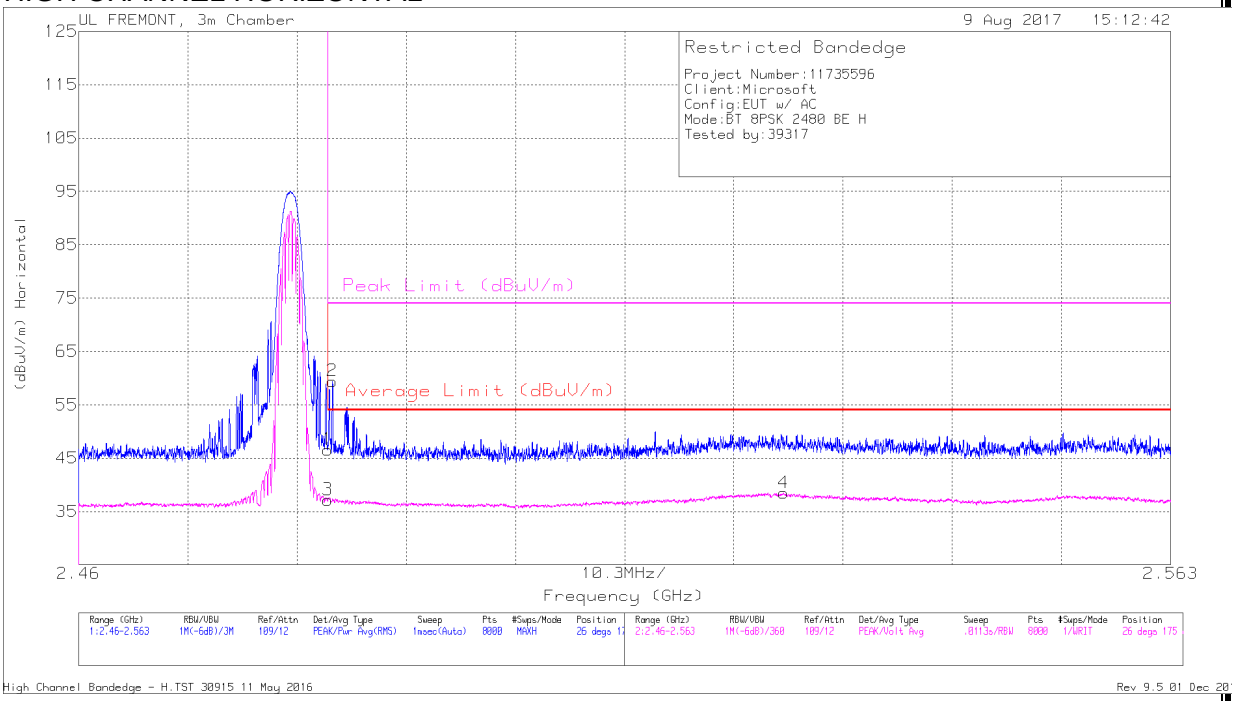
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/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	2.319	27.35	VA1T	31.8	-22.6	36.55	54	-17.45	-	-	305	157	V
2	2.321	39.95	Pk	31.8	-22.4	49.35	-	-	74	-24.65	305	157	V
1	2.39	37.65	Pk	31.9	-22.6	46.95	-	-	74	-27.05	305	157	V
3	2.39	26.42	VA1T	31.9	-22.6	35.72	54	-18.28	-	-	305	157	V

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

7.3.2. AUTHORIZED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL HORIZONTAL

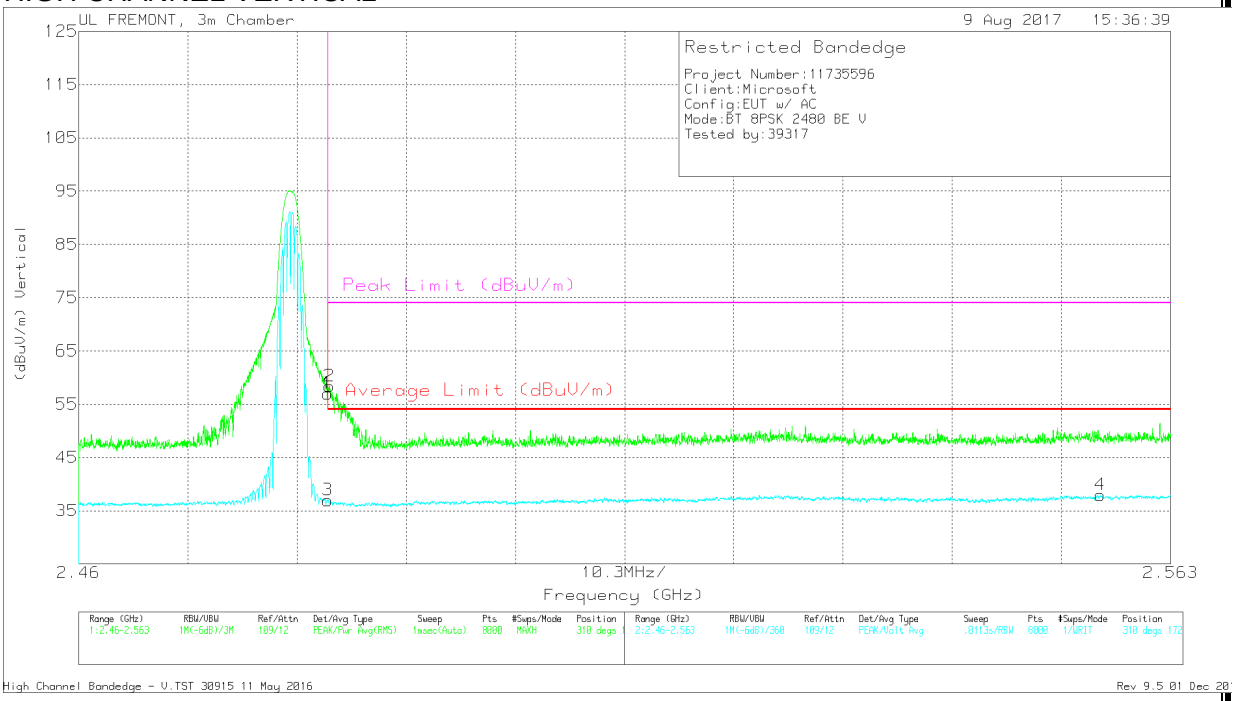


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/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
1	2.484	36.88	Pk	32.4	-22.7	46.58	-	-	74	-27.42	26	175	H
2	2.484	49.73	Pk	32.4	-22.7	59.43	-	-	74	-14.57	26	175	H
3	2.484	27.47	VA1T	32.4	-22.7	37.17	54	-16.83	-	-	26	175	H
4	2.526	28.26	VA1T	32.4	-22.2	38.46	54	-15.54	-	-	26	175	H

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

HIGH CHANNEL VERTICAL



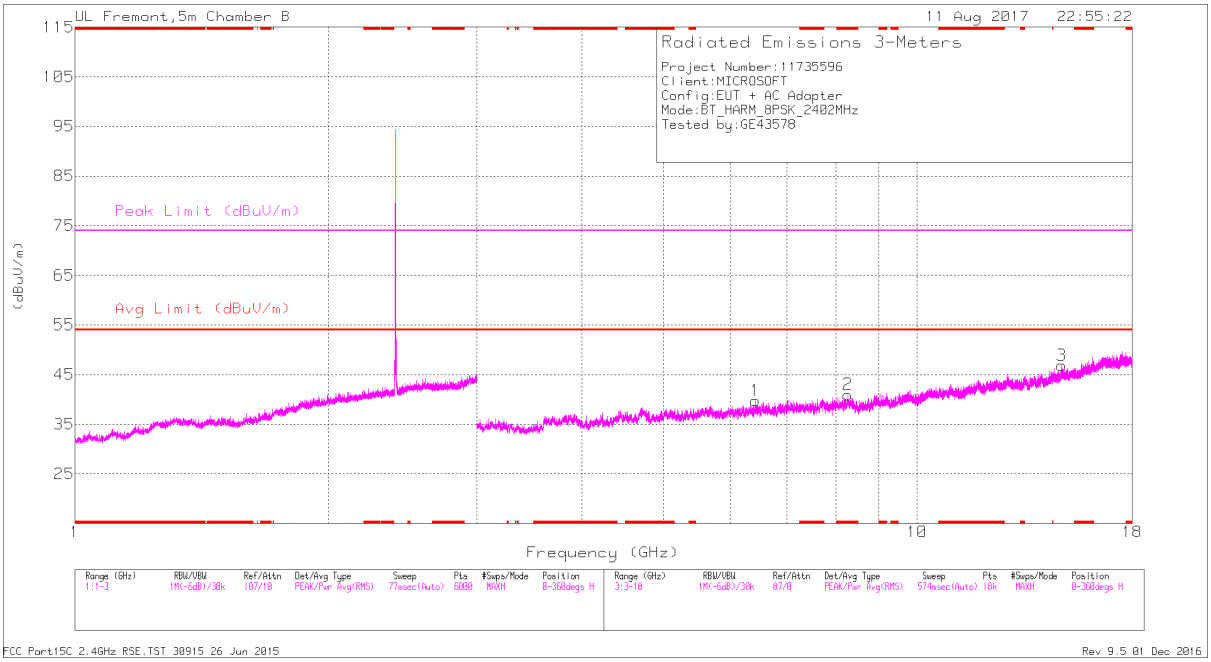
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T712 (dB/m)	Amp/Cbl/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
1	2.484	47.3	Pk	32.4	-22.7	57	-	-	74	-17	310	172	V
2	2.484	48.7	Pk	32.4	-22.7	58.4	-	-	74	-15.6	310	172	V
3	2.484	27.26	VA1T	32.4	-22.7	36.96	54	-17.04	-	-	310	172	V
4	2.556	28.15	VA1T	32.4	-22.6	37.95	54	-16.05	-	-	310	172	V

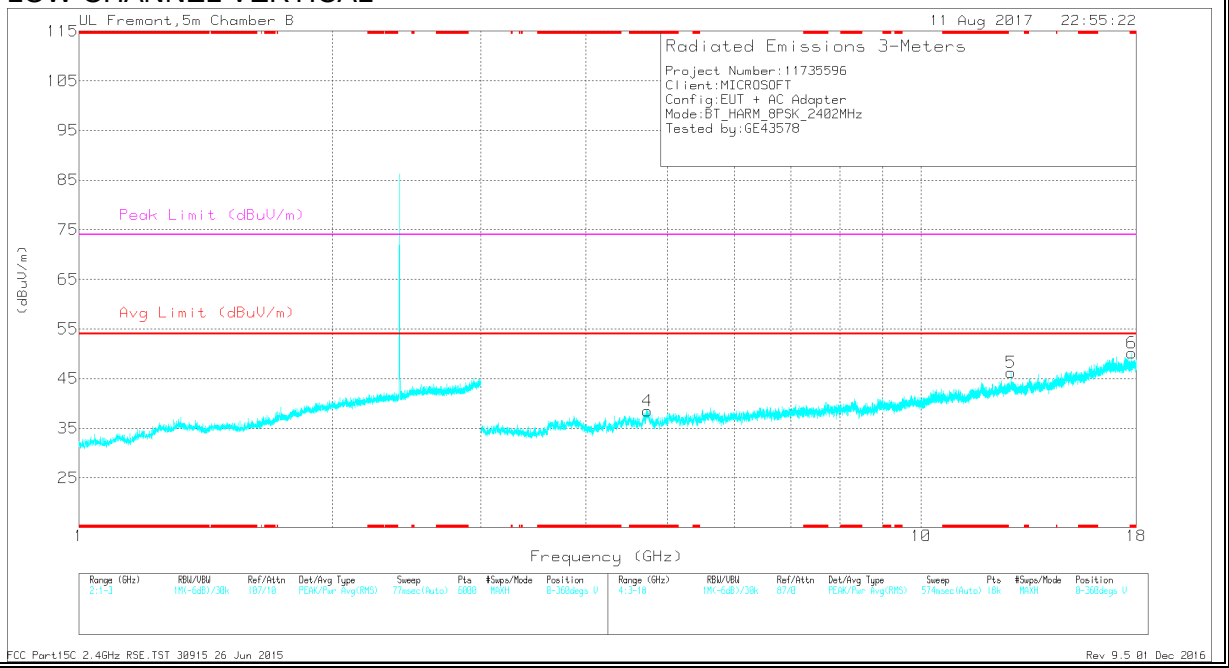
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

7.3.3. HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



Radiated Emissions

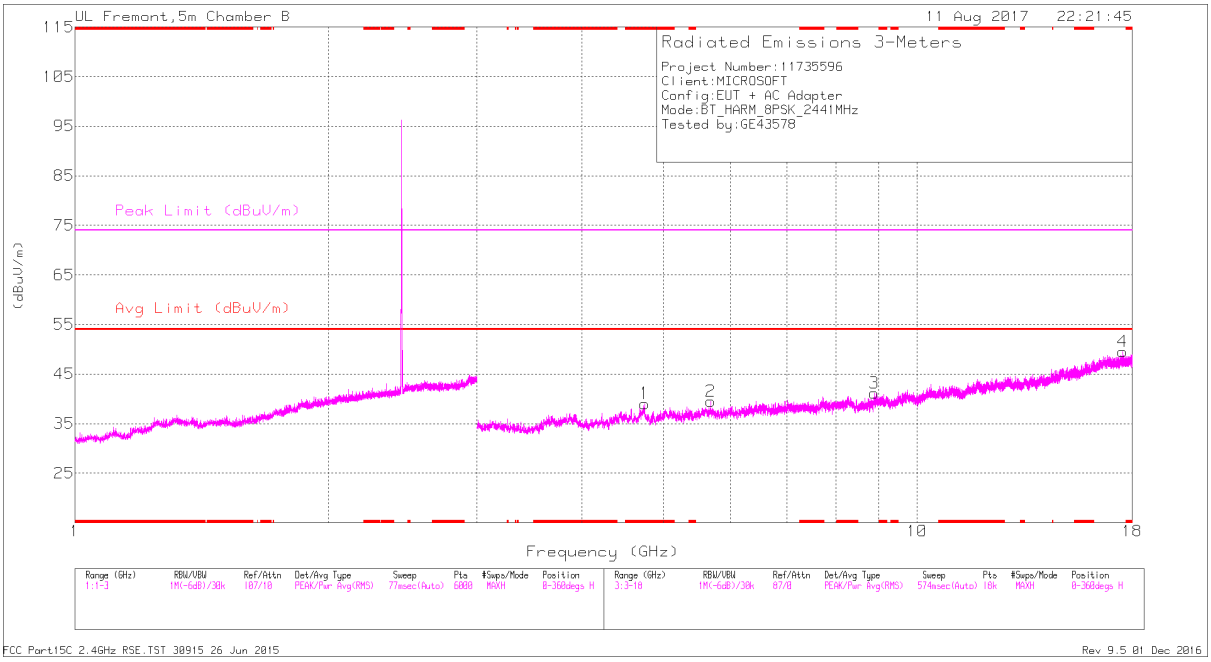
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 8.277	34.3	PKFH	36.1	-25.4	45	-	-	74	-29	125	101	H
	* 8.278	23.55	VA1T	36.1	-25.4	34.25	54	-19.75	-	-	125	101	H
4	* 4.729	38.75	PKFH	34.2	-28.5	44.45	-	-	74	-29.55	303	101	V
	* 4.729	26.99	VA1T	34.2	-28.5	32.69	54	-21.31	-	-	303	101	V
6	* 17.774	30.49	PKFH	41.7	-18.3	53.89	-	-	74	-20.11	91	200	V
	* 17.773	18.84	VA1T	41.7	-18.4	42.14	54	-11.86	-	-	91	200	V
1	6.423	25.31	VA1T	35.7	-28.3	32.71	-	-	-	-	271	101	H
	6.424	36.97	PKFH	35.7	-28.4	44.27	-	-	-	-	271	101	H
5	12.774	31.05	PKFH	39.4	-21.3	49.15	-	-	-	-	218	200	V
	12.775	20.02	VA1T	39.4	-21.4	38.02	-	-	-	-	218	200	V
3	14.84	20.75	VA1T	40.6	-21.5	39.85	-	-	-	-	115	101	H
	14.842	31.43	PKFH	40.6	-21.6	50.43	-	-	-	-	115	101	H

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

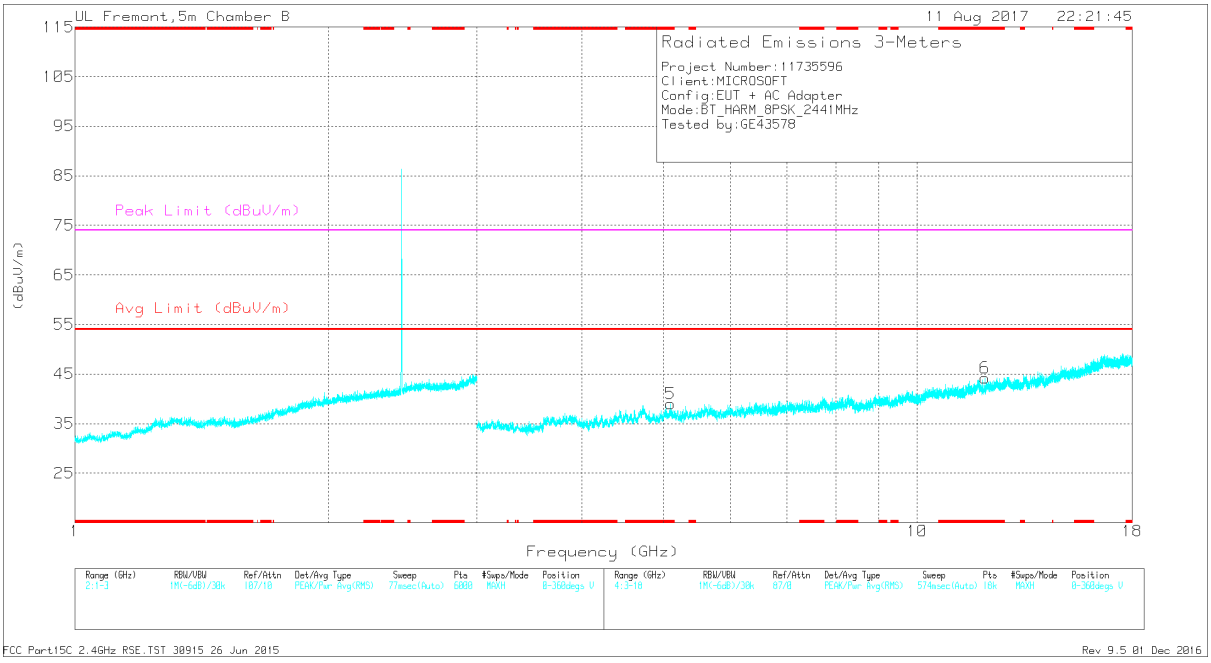
PKFH - FHSS: RB=1MHz VB=3 x RB, Peak

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

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL

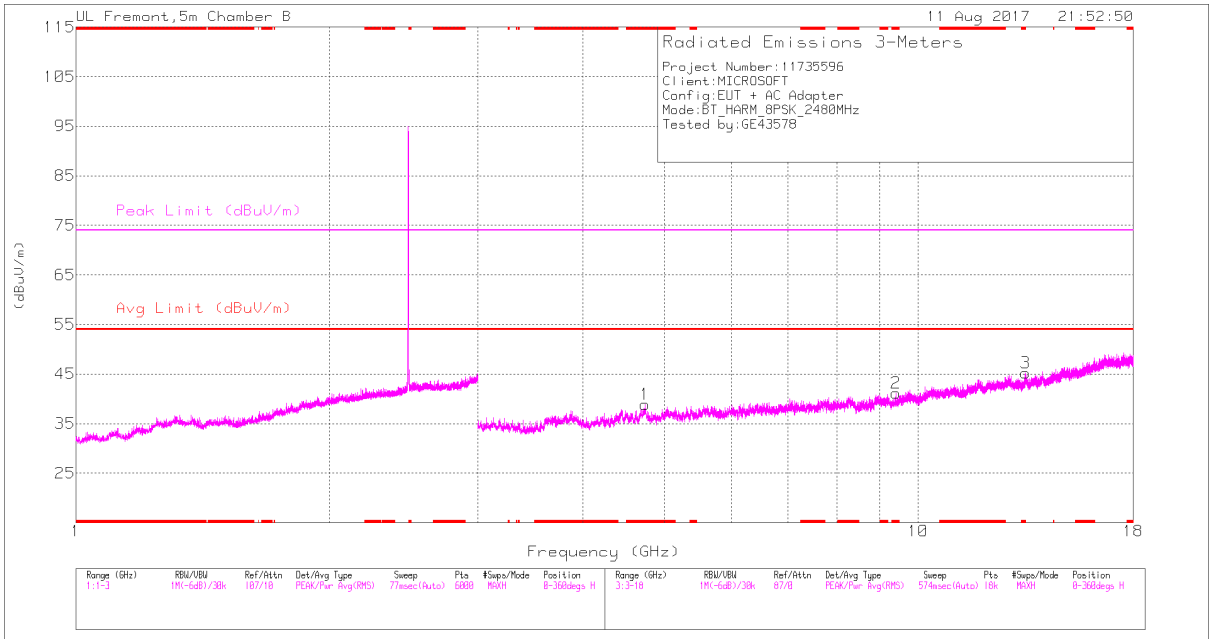


Radiated Emissions

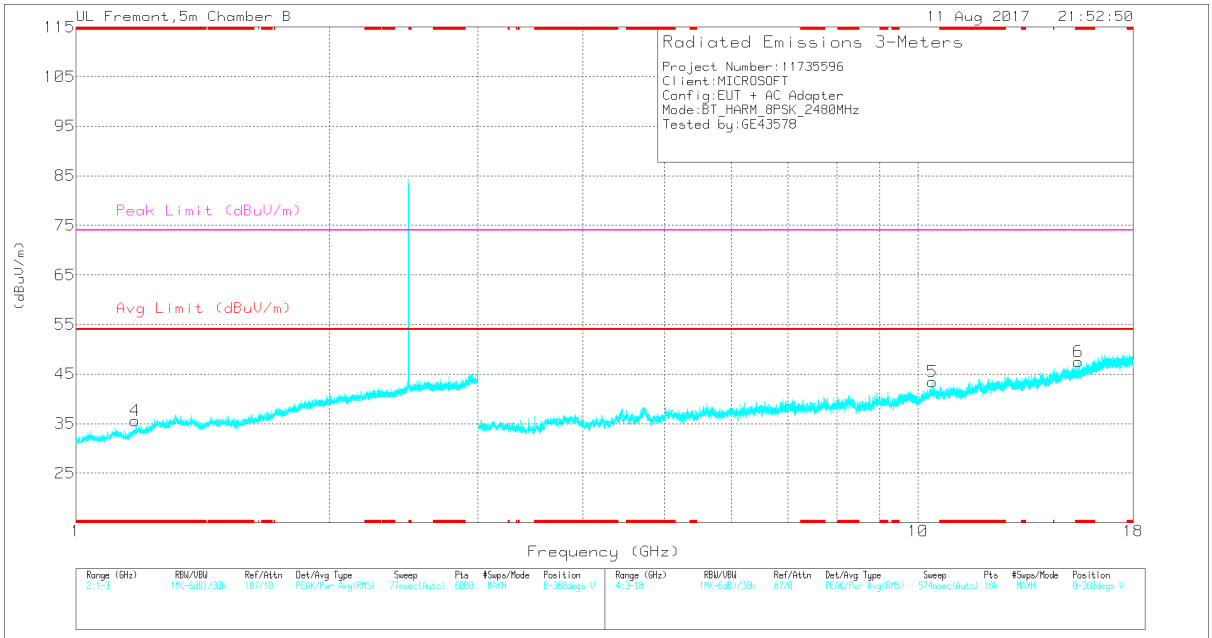
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.745	38.28	PKFH	34.2	-28.4	44.08	-	-	74	-29.92	83	199	H
	* 4.744	26.61	VA1T	34.2	-28.4	32.41	54	-21.59	-	-	83	199	H
5	* 5.097	37.51	PKFH	34.3	-28.5	43.31	-	-	74	-30.69	104	104	V
	* 5.096	26.09	VA1T	34.3	-28.4	31.99	54	-22.01	-	-	104	104	V
6	* 12.026	31.74	PKFH	38.8	-22.7	47.84	-	-	74	-26.16	327	104	V
	* 12.025	20.47	VA1T	38.8	-22.7	36.57	54	-17.43	-	-	327	104	V
2	5.685	25.46	VA1T	35.1	-28.3	32.26	-	-	-	-	230	199	H
	5.687	36.47	PKFH	35.1	-28.4	43.17	-	-	-	-	230	199	H
3	8.886	22.34	VA1T	36.2	-24.5	34.04	-	-	-	-	126	199	H
	8.888	33.35	PKFH	36.2	-24.5	45.05	-	-	-	-	126	199	H
4	17.523	29.77	PKFH	41.7	-17.4	54.07	-	-	-	-	269	199	H
	17.523	18.9	VA1T	41.7	-17.4	43.2	-	-	-	-	269	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

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



Radiated Emissions

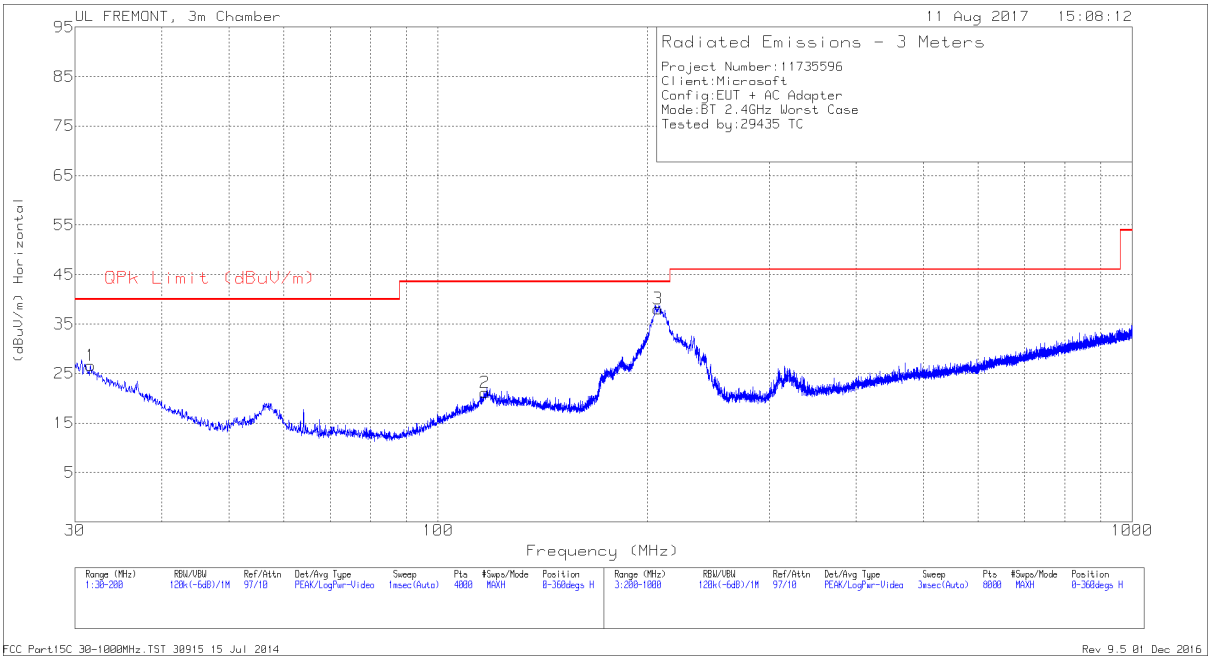
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 1.176	33.66	PKFH	27.7	-22.5	38.86	-	-	74	-35.14	154	101	V
	* 1.177	22.63	VA1T	27.8	-22.6	27.83	54	-26.17	-	-	154	101	V
1	* 4.741	37.91	PKFH	34.2	-28.3	43.81	-	-	74	-30.19	333	198	H
	* 4.741	26.91	VA1T	34.2	-28.3	32.81	54	-21.19	-	-	333	198	H
2	* 9.415	32.69	PKFH	36.6	-24.5	44.79	-	-	74	-29.21	256	104	H
	* 9.416	21.83	VA1T	36.6	-24.5	33.93	54	-20.07	-	-	256	104	H
6	* 15.508	30.88	PKFH	40.6	-21	50.48	-	-	74	-23.52	180	104	V
	* 15.509	20.04	VA1T	40.6	-21	39.64	54	-14.36	-	-	180	104	V
5	10.403	20.99	VA1T	37.5	-22.7	35.79	-	-	-	-	86	200	V
	10.404	32.62	PKFH	37.5	-22.8	47.32	-	-	-	-	86	200	V
3	13.414	20.19	VA1T	39.3	-21.1	38.39	-	-	-	-	359	104	H
	13.416	31.52	PKFH	39.3	-21.1	49.72	-	-	-	-	359	104	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

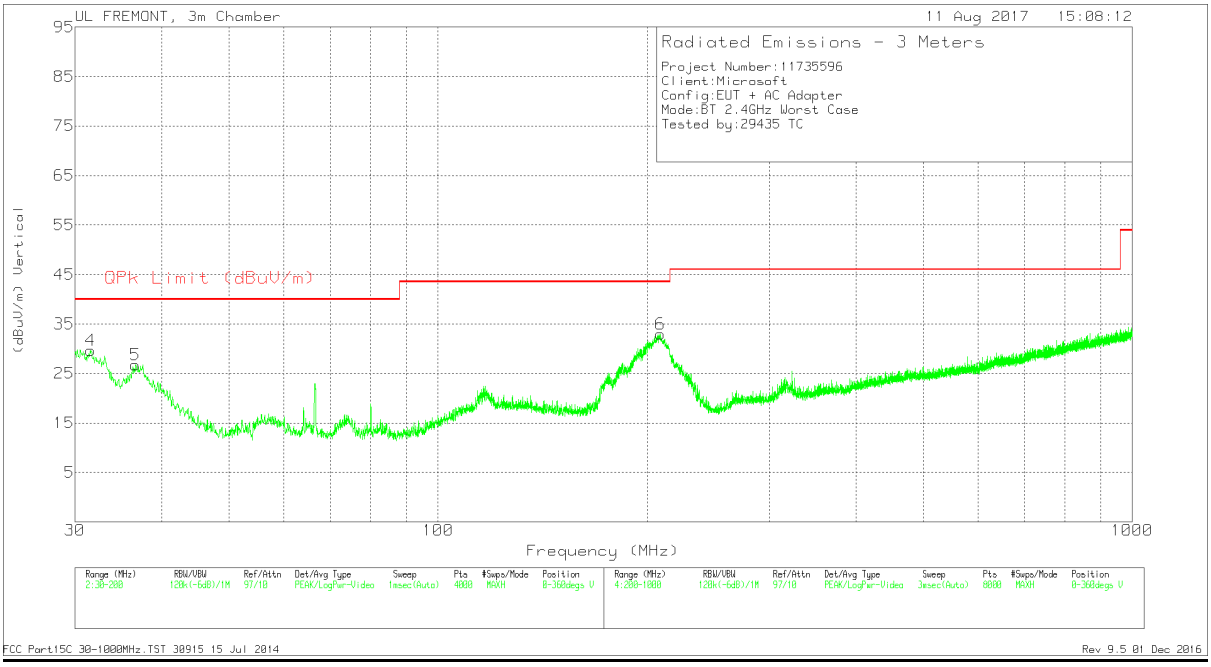
7.4. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL PLOT



VERTICAL PLOT



DATA

Radiated Emissions

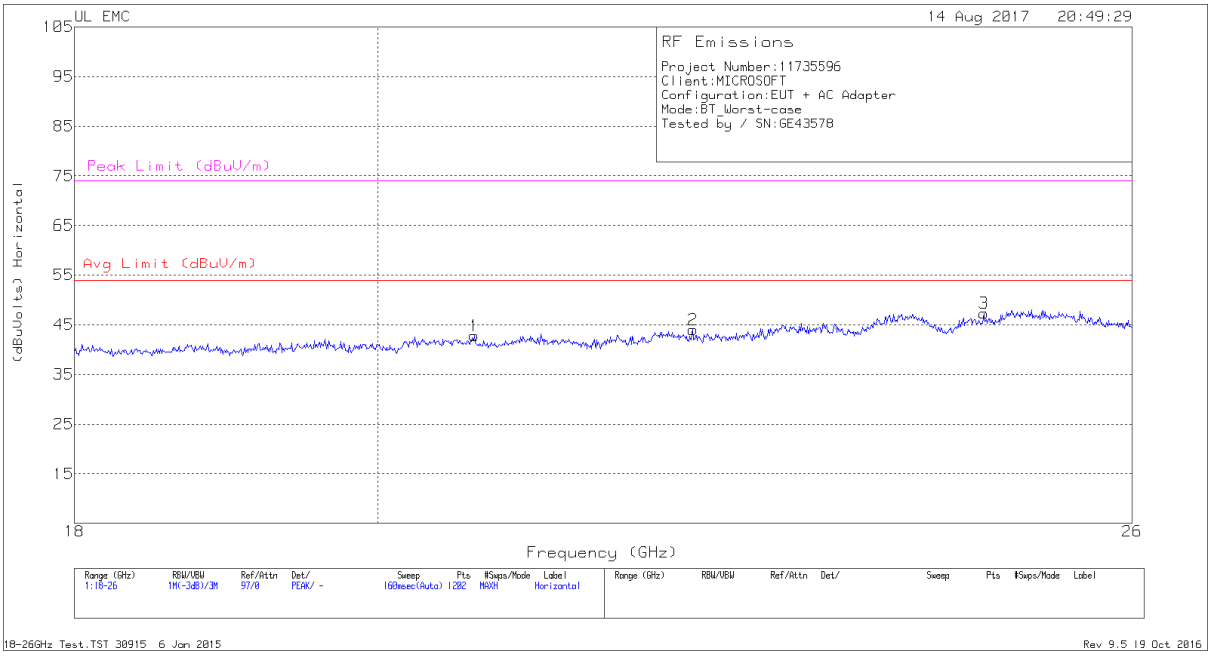
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T408 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	31.5729	29.61	Pk	24.2	-27.2	26.61	40	-13.39	0-360	400	H
4	31.5729	32.72	Pk	24.2	-27.2	29.72	40	-10.28	0-360	100	V
5	36.6742	33.54	Pk	20.4	-27.2	26.74	40	-13.26	0-360	100	V
2	116.9775	29.71	Pk	17.5	-26.1	21.11	43.52	-22.41	0-360	200	H
3	207.3929	49.21	Pk	14.9	-25	39.11	43.52	-4.41	196	152	H
		45.2	Qp	14.9	-25	35.1	43.52	-8.42	196	152	H
6	209.0012	43.37	Pk	14.6	-25	32.97	43.52	-10.55	0-360	200	V

Pk - Peak detector
Qp - Quasi-Peak detector

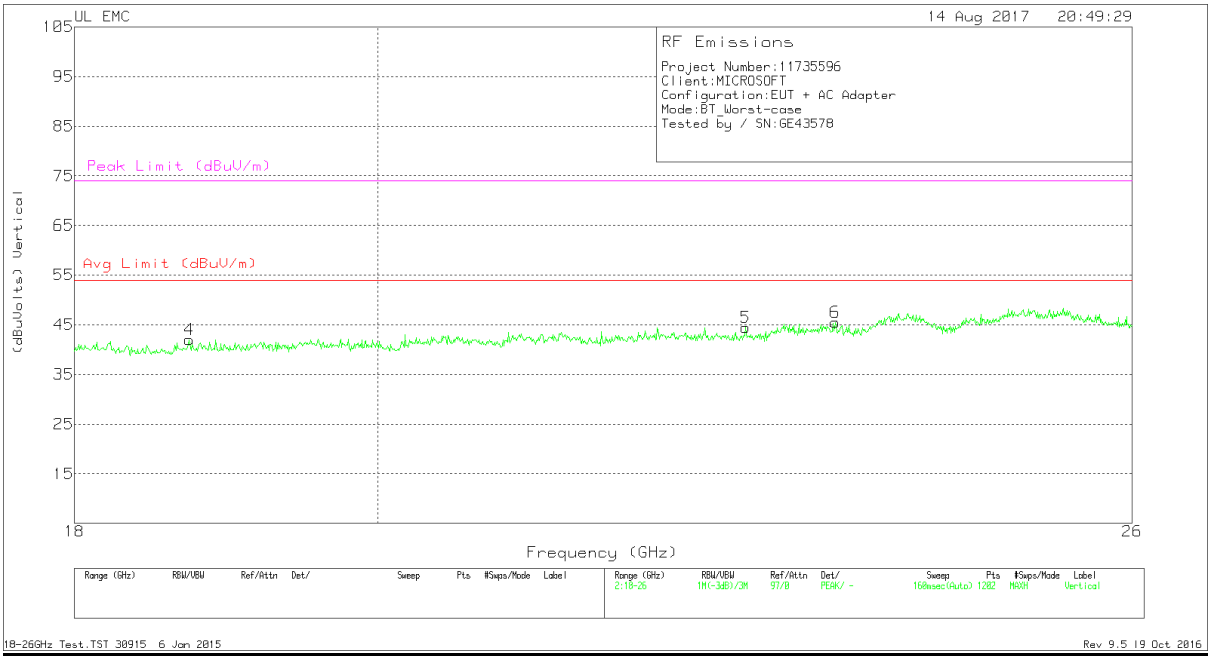
7.5. WORST-CASE ABOVE 18 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



Data

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T449 AF (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	20.684	41.03	Pk	33	-21.7	-9.5	42.83	54	-11.17	74	-31.17
2	22.316	40.7	Pk	33.5	-20.7	-9.5	44	54	-10	74	-30
3	24.694	42.93	Pk	34.1	-20.2	-9.5	47.33	54	-6.67	74	-26.67
4	18.733	41.1	Pk	32.3	-21.9	-9.5	42	54	-12	74	-32
5	22.729	41.5	Pk	33.4	-20.9	-9.5	44.5	54	-9.5	74	-29.5
6	23.449	41.6	Pk	33.9	-20.5	-9.5	45.5	54	-8.5	74	-28.5

Pk - Peak detector

8. 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

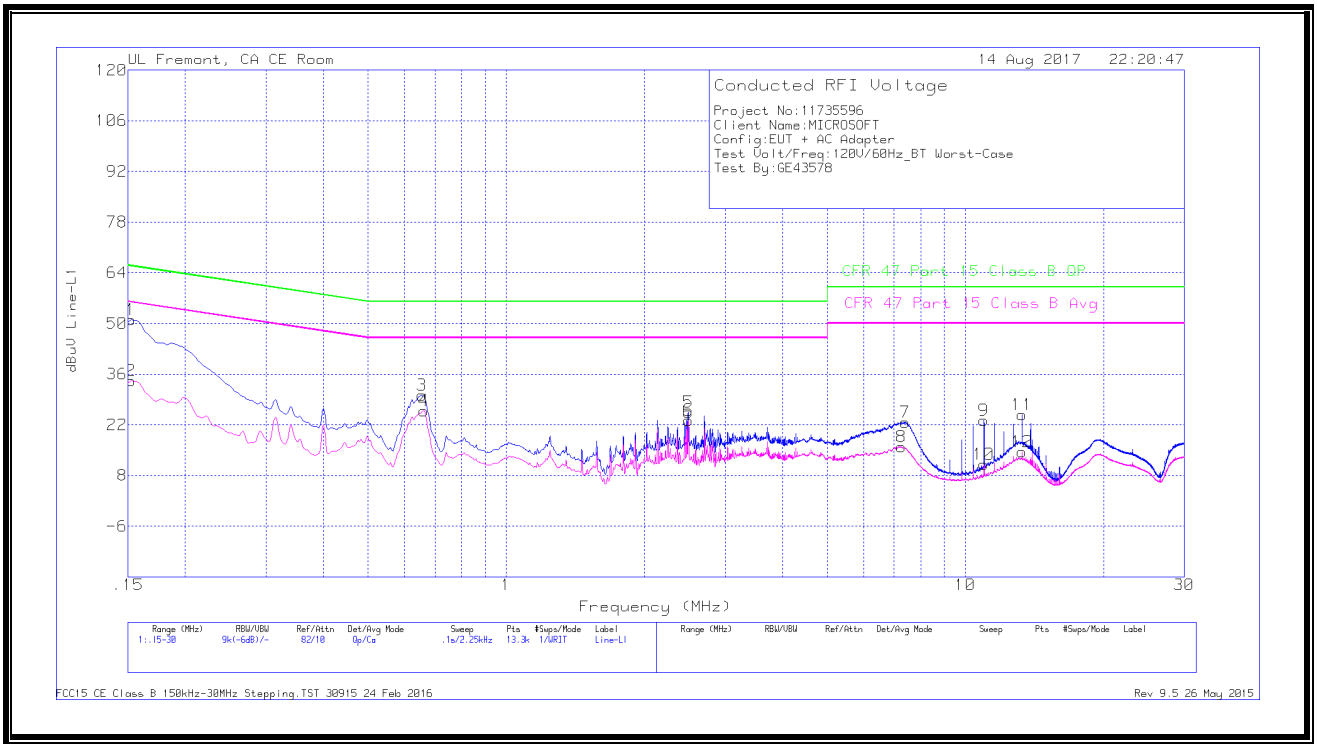
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

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



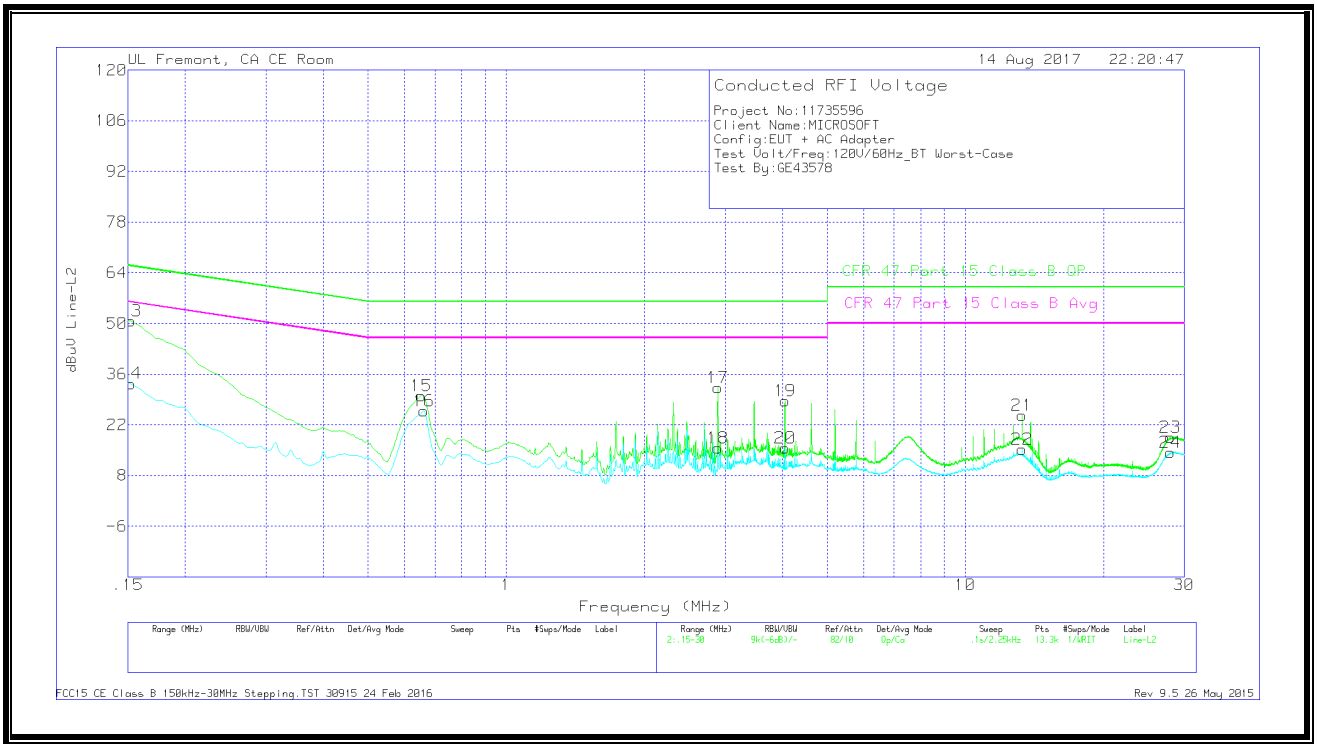
WORST EMISSIONS

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	40.73	Qp	.1	.1	10.1	51.03	65.88	-14.85	-	-
2	.15225	23.92	Ca	.1	.1	10.1	34.22	-	-	55.88	-21.66
3	.65512	19.91	Qp	0	.1	10.1	30.11	56	-25.89	-	-
4	.66075	15.72	Ca	0	.1	10.1	25.92	-	-	46	-20.08
5	2.49225	15.33	Qp	0	.1	10.1	25.53	56	-30.47	-	-
6	2.49225	13.11	Ca	0	.1	10.1	23.31	-	-	46	-22.69
7	7.39725	12.33	Qp	0	.2	10.2	22.73	60	-37.27	-	-
8	7.2555	5.59	Ca	0	.2	10.2	15.99	-	-	50	-34.01
9	10.986	12.83	Qp	0	.2	10.2	23.23	60	-36.77	-	-
10	10.986	.63	Ca	0	.2	10.2	11.03	-	-	50	-38.97
11	13.299	14.27	Qp	.1	.2	10.2	24.77	60	-35.23	-	-
12	13.299	4.09	Ca	.1	.2	10.2	14.59	-	-	50	-35.41

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)
13	.15225	40.66	Qp	0	0	10.1	50.76	65.88	-15.12	-	-
14	.15225	23.3	Ca	0	0	10.1	33.4	-	-	55.88	-22.48
15	.654	19.83	Qp	0	.1	10.1	30.03	56	-25.97	-	-
16	.66075	15.65	Ca	0	.1	10.1	25.85	-	-	46	-20.15
17	2.8905	22.03	Qp	0	.1	10.1	32.23	56	-23.77	-	-
18	2.8905	5.34	Ca	0	.1	10.1	15.54	-	-	46	-30.46
19	4.047	18.45	Qp	0	.1	10.1	28.65	56	-27.35	-	-
20	4.04925	5.4	Ca	0	.1	10.1	15.6	-	-	46	-30.4
21	13.29675	14.08	Qp	.1	.2	10.2	24.58	60	-35.42	-	-
22	13.29675	4.66	Ca	.1	.2	10.2	15.16	-	-	50	-34.84
23	27.9555	7.68	Qp	.1	.3	10.5	18.58	60	-41.42	-	-
24	27.95775	3.41	Ca	.1	.3	10.5	14.31	-	-	50	-35.69

Qp - Quasi-Peak detector

Ca - CISPR average detection