FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-247 ISSUE 1

CERTIFICATION TEST REPORT

FOR

WIRELESS EARPHONES

MODEL NUMBER: A1747

FCC ID: BCG-A1747
IC: 579C-A1747

REPORT NUMBER: 16U23787-E5V3

ISSUE DATE: AUGUST 29, 2016

Prepared for
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1 INFINITE LOOP
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	08/23/2016	Initial Review	Chin Pang
V2	08/26/2016	Address TCB's Questions	Chin Pang
V3	08/29/2016	Updated Section 5.5	Chin Pang

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: WIRELESS EARPHONES

MODEL: A1747

SERIAL NUMBER: FTRS3004G066 (Conducted) FTRS308UGQ65 (Radiated)

DATE TESTED: AUGUST 15, 2016 - AUGUST 17, 2016

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-247 Issue 1	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.

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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 1.

3. FACILITIES AND ACCREDITATION

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

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

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

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

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

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a wireless earphones. It has an integral battery, microphone and antenna. It can play music from a Bluetooth audio source. It has a USB Micro port for charging. It has 4 buttons, power, volume up, volume down, and multi-function.

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	8.45	7.00
2402 - 2480	DQPSK	11.16	13.06

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Band (GHz)	Antenna Gain (dBi)
2.4	0.34

5.4. SOFTWARE AND FIRMWARE

The software installed in the EUT during testing was 1A460

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case mode and channel used for 30-1000 MHz radiated emissions and AC line conducted emission were including AC/DC charger, mode and channel with the highest output power. EUT is transmitting while in charging mode.

Above 1G radiated emission were performed with low, middle and high channels. And above 18GHz radiated emission were performed with the EUT only 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, it was determined that Z (Portrait) orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in Z orientation.

Data Rate tested:

GFSK mode: DH5
DQPSK mode: 2-DH5

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop AC/DC adapter	Apple	A1424	NSW25679	N/A
Laptop	Apple	MacBook AIR	C02P41R2G086	N/A
Test jig	Apple	N/A	920-02191-02	N/A
USB	Apple	N/A	N/A	N/A
AC/DC Adapter	Apple	A1385	D292365A20FDHLHCW	N/A

I/O CABLES (CONDUCTED TEST)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Antenna	1	SMA	Un-Shielded	0.2	To spectrum Analyzer
2	USB	1	USB	Shielded	1	N/A
3	AC/DC	1	AC	Un-shielded	2	N/A

I/O CABLES (RADIATED ABOVE 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
None Used						

I/O CABLES (RADAITED BELOW 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	AC	Un-shielded	1	N/A

I/O CABLES (AC LINE CONDUCTED: AC/DC ADAPTER)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	AC	Un-shielded	1	N/A

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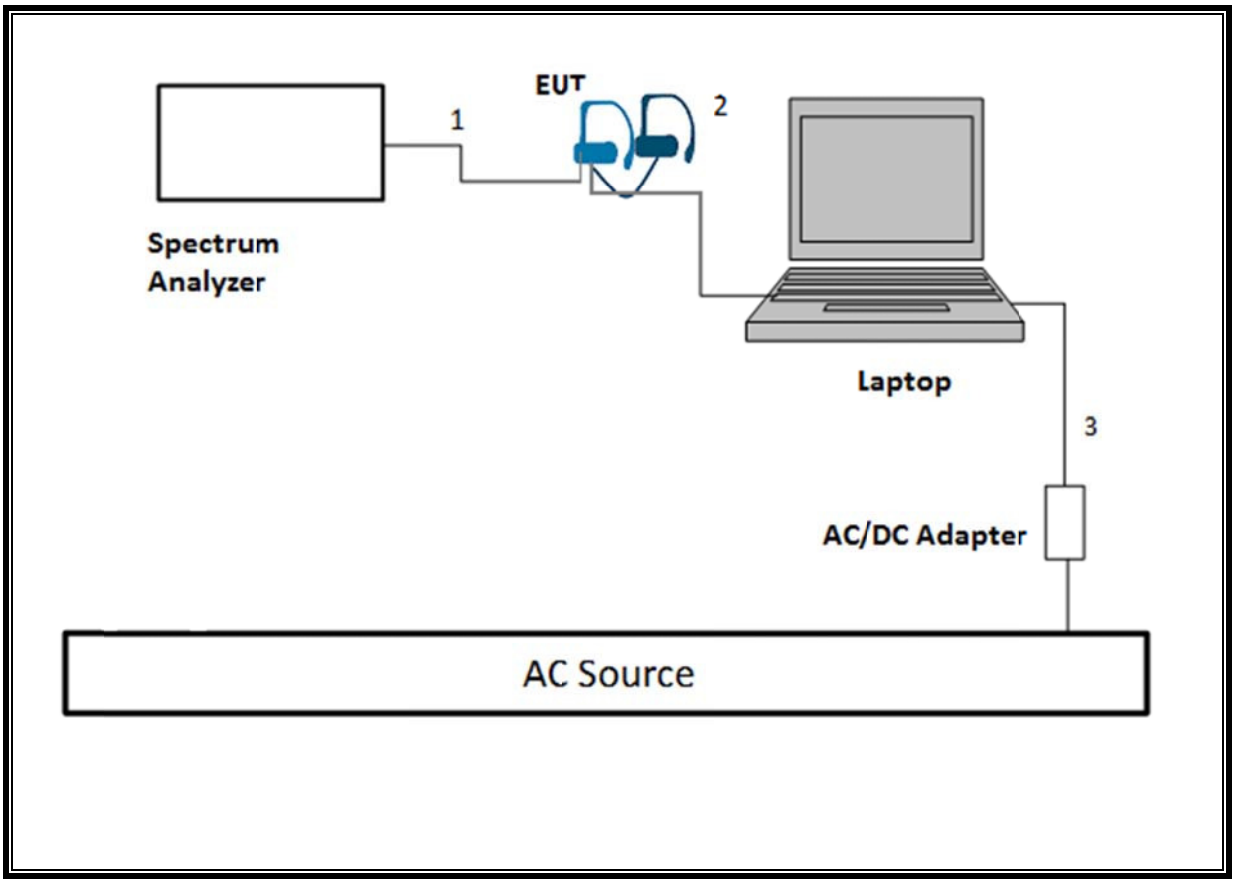
TEST SETUP- CONDUCTED PORT

The EUT was tested connected to a host Laptop via USB cable and spectrum analyzer to antenna port. Test software exercised the EUT.

SETUP DIAGRAM



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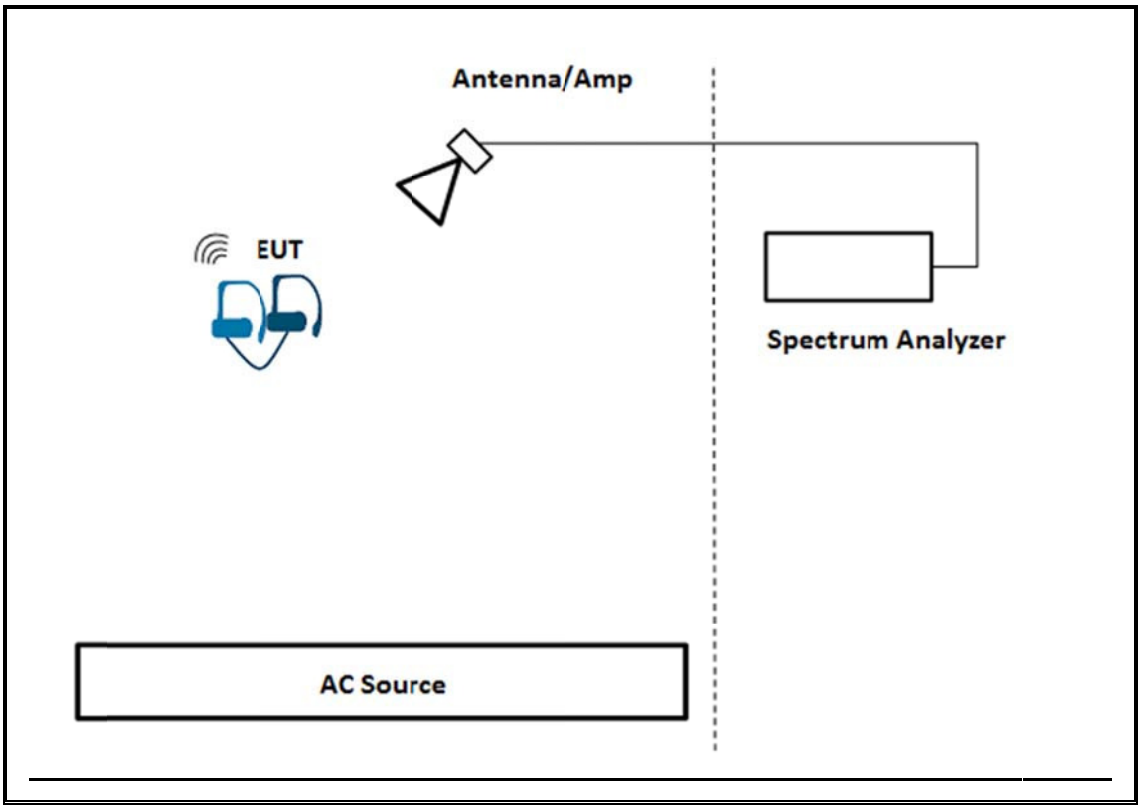
TEST SETUP- RADIATED-ABOVE 1 GHZ

The EUT was powered by battery. Test software exercised the EUT.

SETUP DIAGRAM



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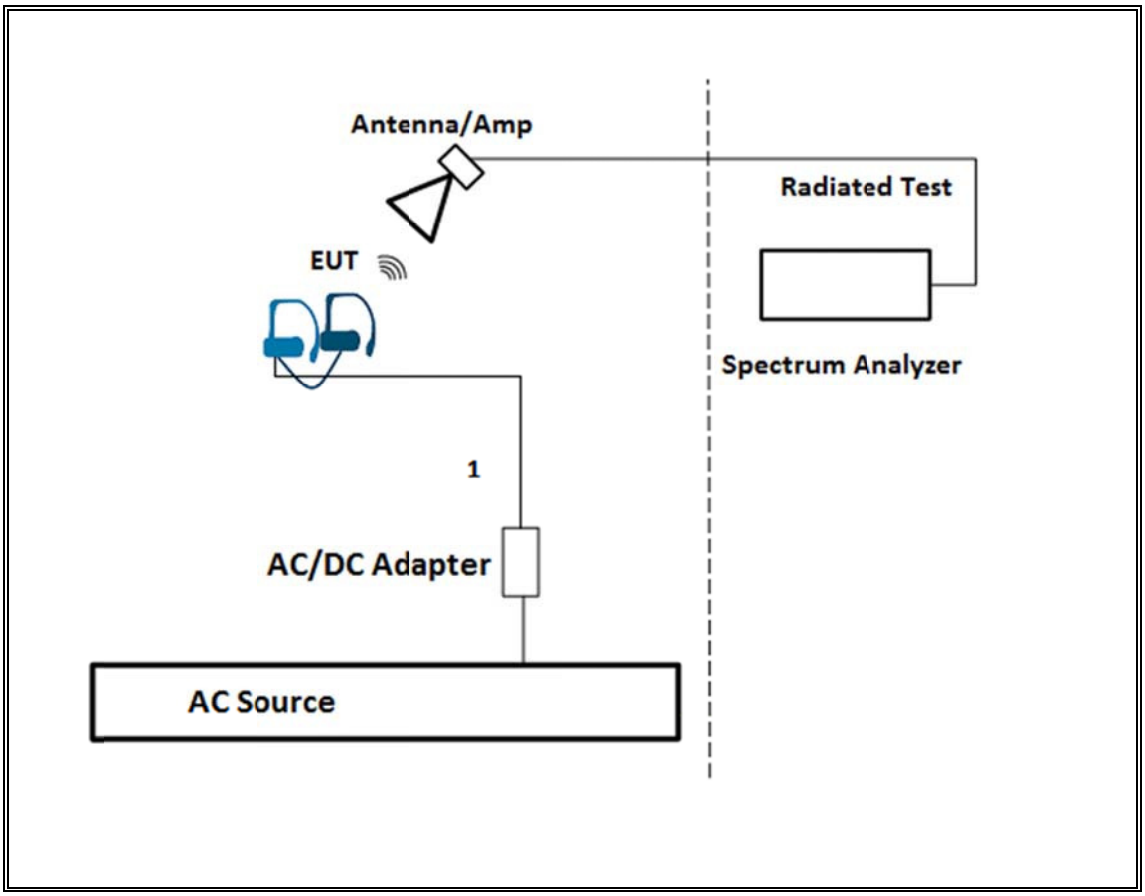
TEST SETUP- BELOW 1GHz

The EUT was tested powered by AC/DC adapter via USB cable. Test software exercised the EUT.

SETUP DIAGRAM



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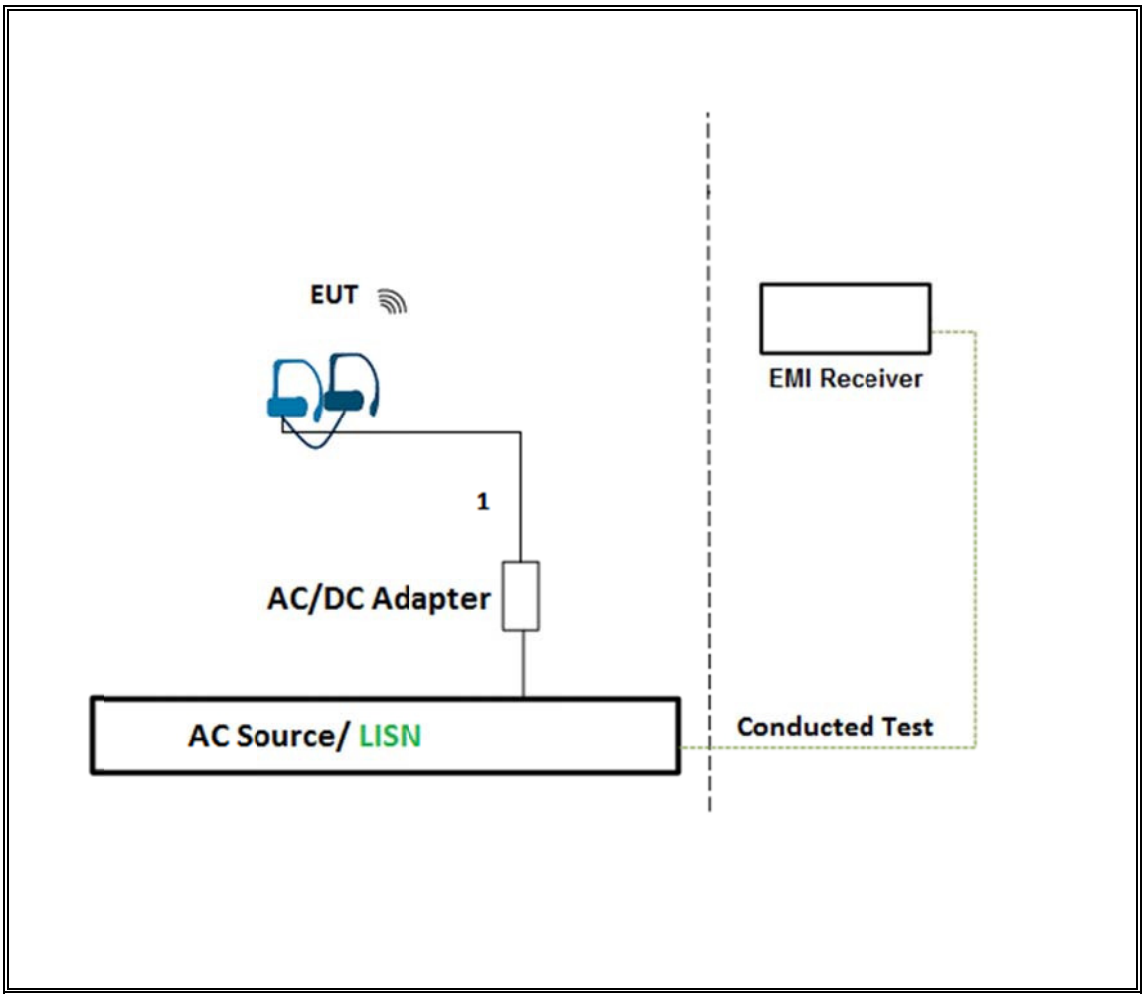
TEST SETUP- AC LINE CONDUCTED: AC/DC ADAPTER

The EUT was tested powered by AC/DC adapter via USB cable. Test software exercised the EUT.

SETUP DIAGRAM



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6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	**Manufacturer**	**Model**	**T Number**	**Cal Due**
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T863	4/26/2017
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	T900	5/3/2017
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	T495	10/20/2016
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	T835	6/18/2017
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	T906	2/3/2017
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	T1454	12/9/2016
Power Meter, P-series single channel	Agilent	N1911A	T1271	7/8/2017
Power Meter, P-series single channel	Agilent	N1911A	T1265	12/2/2016
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Agilent	N1921A	T1228	6/20/2017
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826	T447	6/16/2017
Spectrum Analyzer, 40 GHz	Agilent	N9030A	T340	11/15/2016
Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum	Keysight	8449B	T402	7/5/2017
AC Line Conducted				
EMI Test Receiver 9Khz-7GHz	Rohde & Schwarz	ESCI7	T1436	12/19/2016
LISN for Conducted Emissions CISPR-16	Fischer	50/250-25-2-01	T1310	6/8/2017
AC Source	Shaffner	NSG 1007	T134	9/11/2016
UL SOFTWARE				
* Radiated Software	UL	UL EMC	Ver 9.5, June 24, 2015	
* Conducted Software	UL	UL EMC	Ver 4.0, January 11, 2016	

Note: * indicates automation software version used in the compliance certification testing

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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.

RESULTS

ON TIME AND DUTY CYCLE

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
Bluetooth GFSK	1.000	1.000	1.000	100.00%	0.00	0.010
Bluetooth QPSK	1.000	1.000	1.000	100.00%	0.00	0.010

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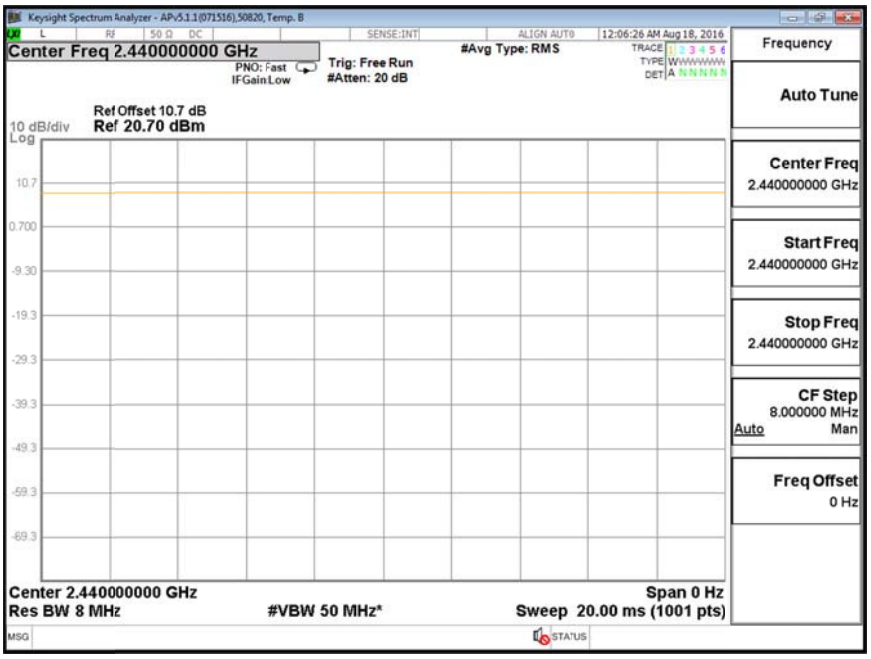
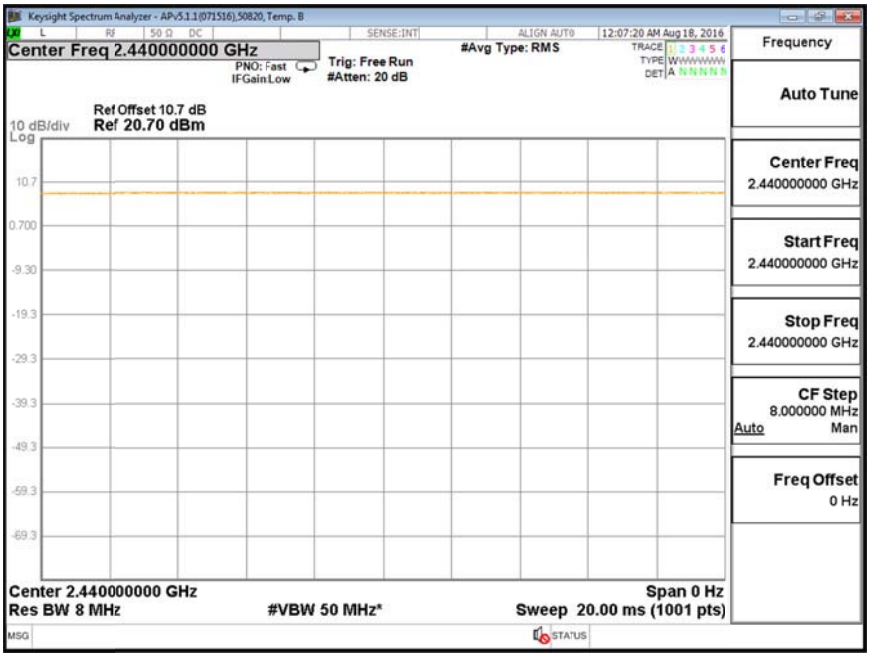
DUTY CYCLE PLOTS

HOPPING OFF

DUTY CYCLE GFSK MODE



DUTY CYCLE QPSK MODE



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7.2. BASIC DATA RATE GFSK MODULATION

7.2.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to ≥ 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)	99% Bandwidth (KHz)
Low	2402	931.3	886.8
Middle	2441	940.9	883.1
High	2480	941.3	884.5

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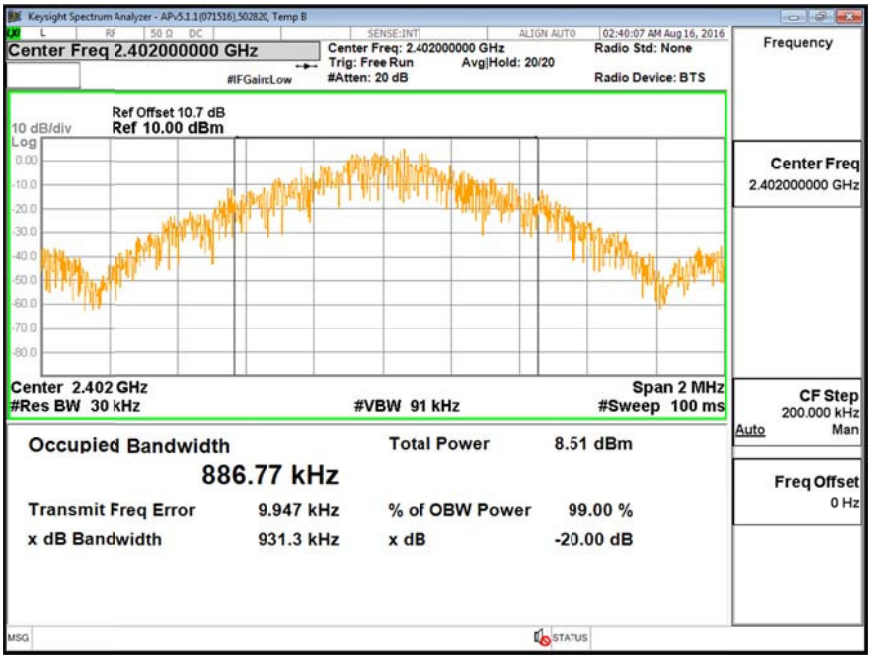
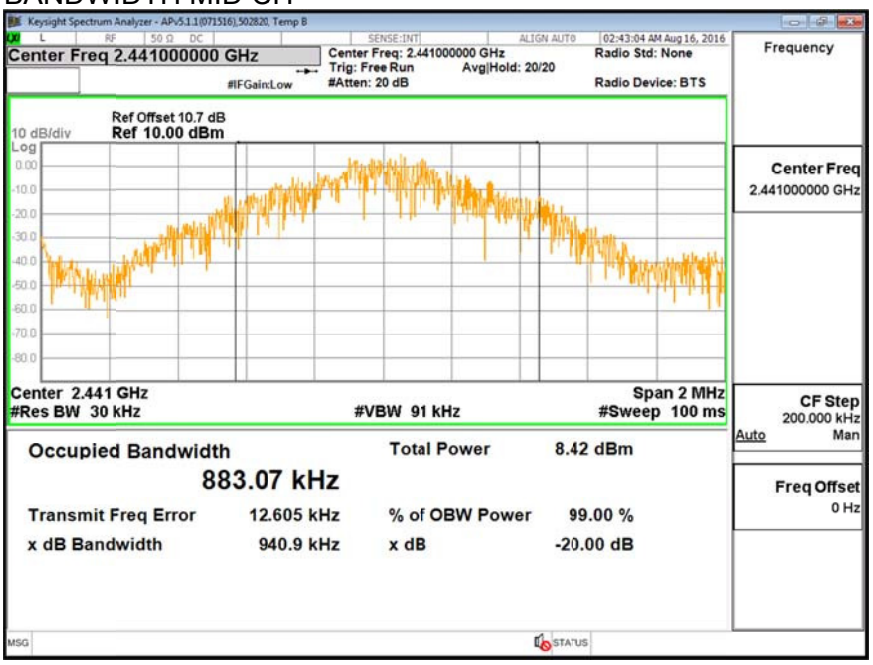
20 dB AND 99% BANDWIDTH

BANDWIDTH LOW CH



BANDWIDTH MID CH



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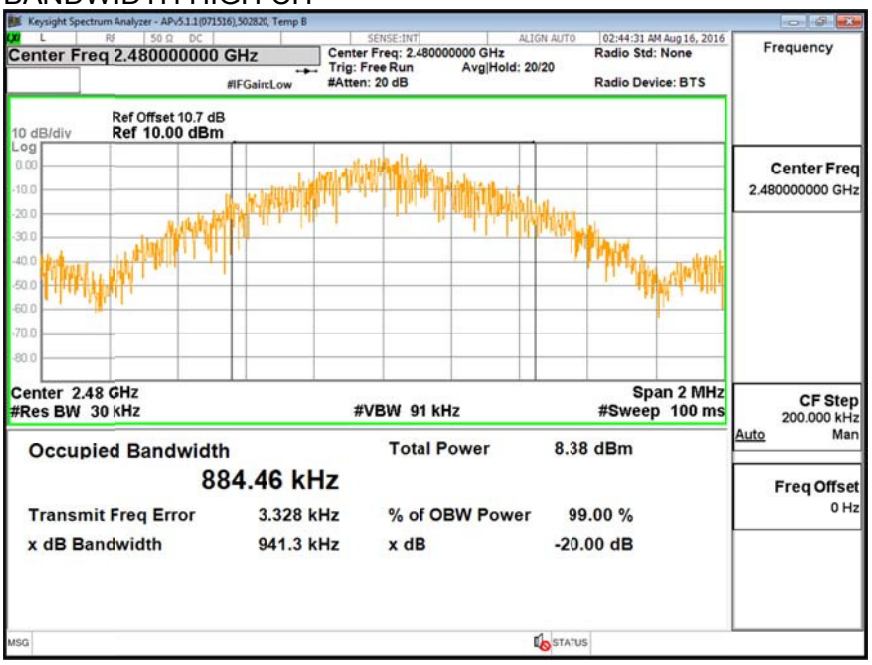
BANDWIDTH HIGH CH



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7.2.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-247 (5.1) (2)

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.

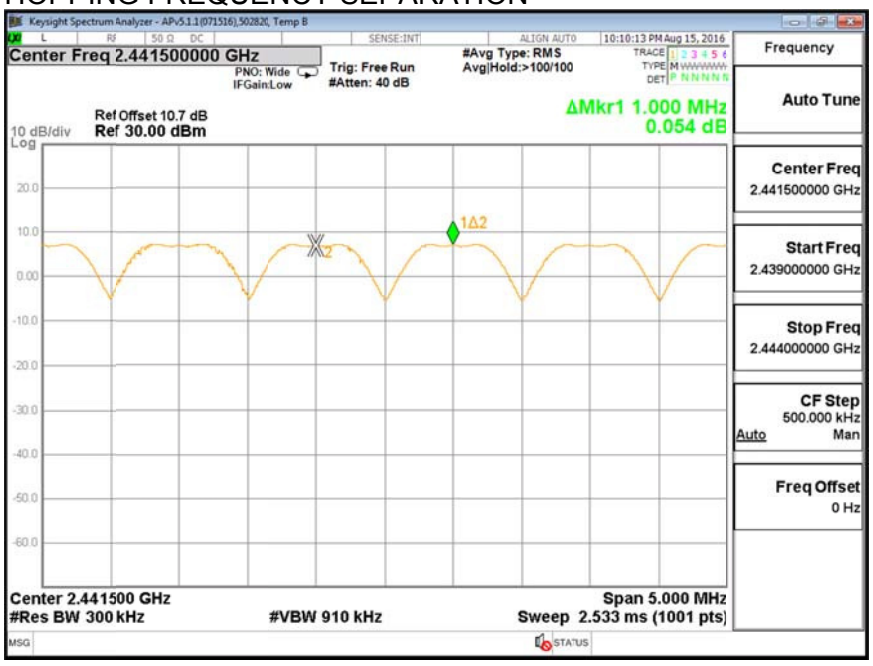
TEST PROCEDURE

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

HOPPING FREQUENCY SEPARATION

HOPPING FREQUENCY SEPARATION



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7.2.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-247 (5.1) (4)

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.

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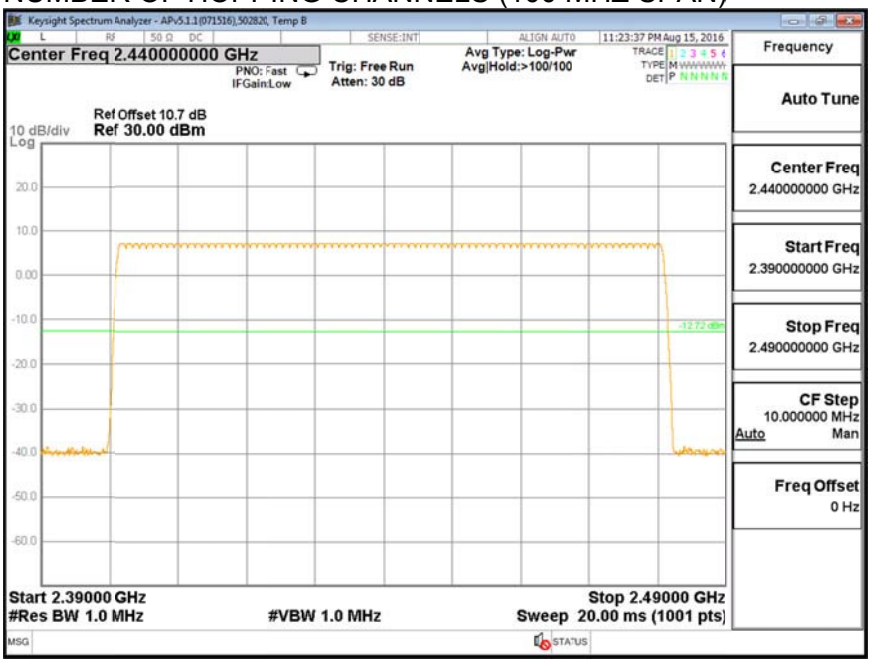
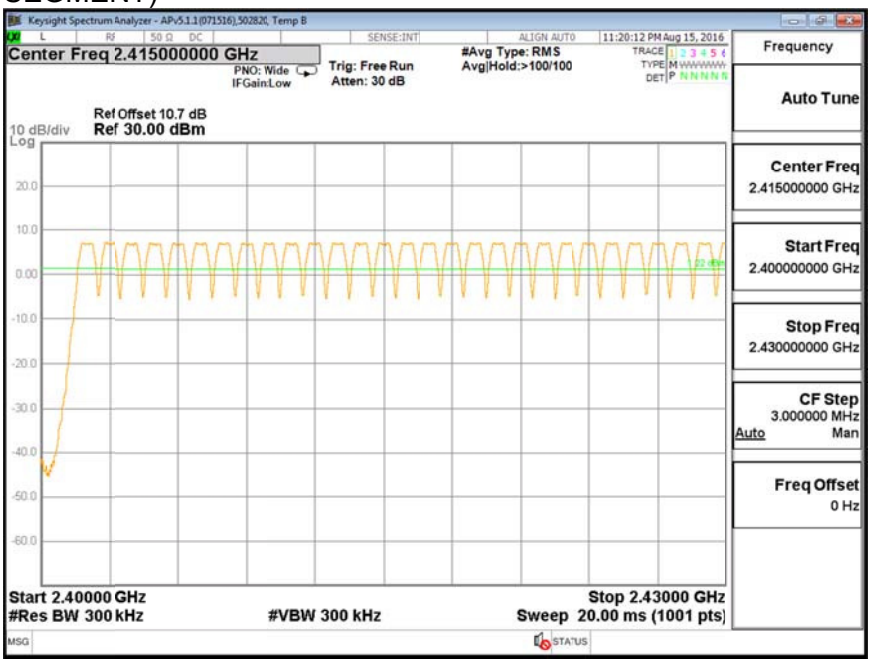
NUMBER OF HOPPING CHANNELS

NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)



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



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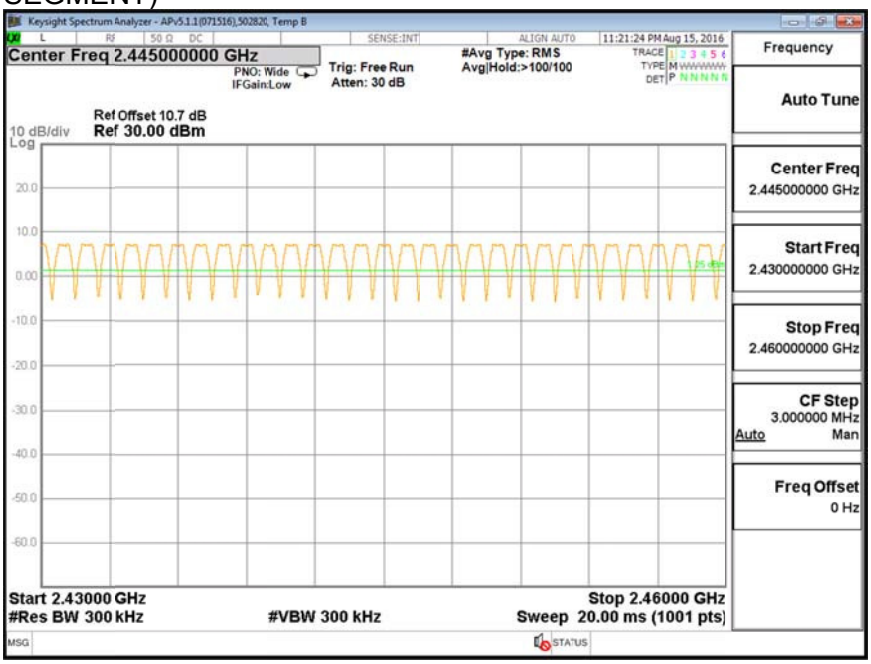
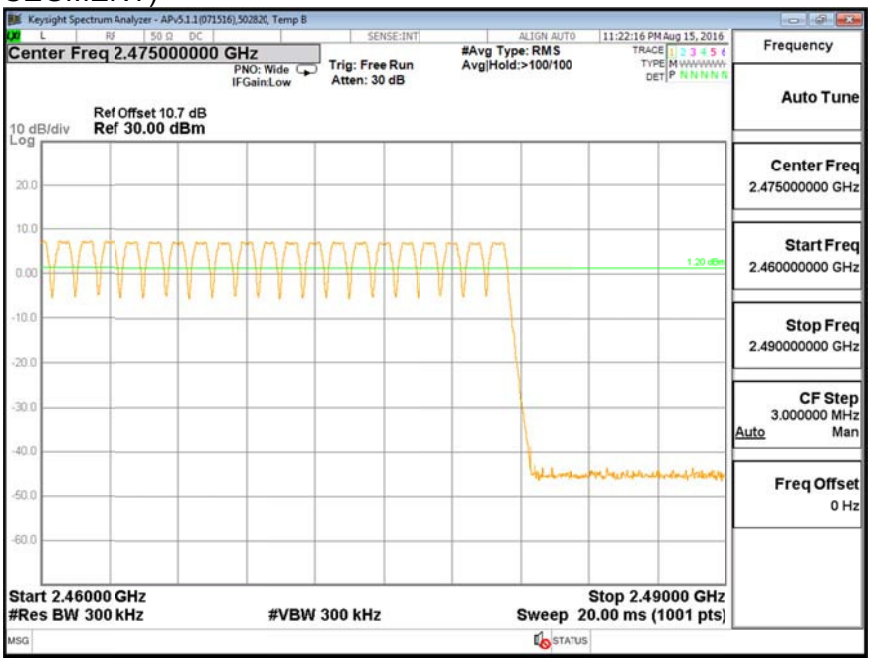
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)



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



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7.2.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-247 (5.1) (4)

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

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK Normal Mode					
DH5	2.876	6	0.173	0.4	-0.227
DH Packet	Pulse Width (msec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH5	2.876	1.5	0.043	0.4	-0.357

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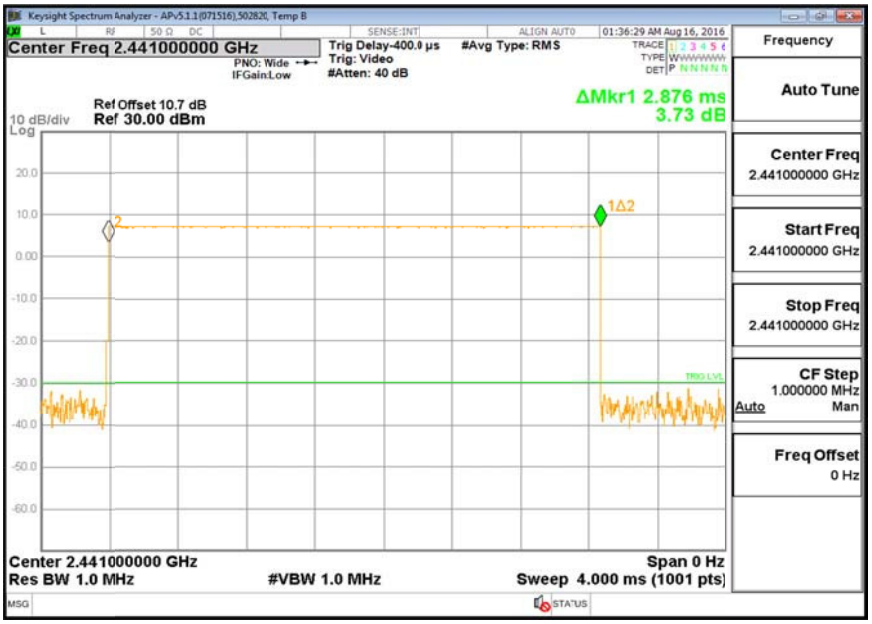
PULSE WIDTH – DH5

PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5

NUMBER OF PULSES – DH5

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7.2.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-247 (5.4) (2)

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.

RESULTS

ID:	50820	Date:	8/17/16

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	8.25	30	-21.75
Middle	2441	8.45	30	-21.55
High	2480	8.42	30	-21.58

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7.2.6. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

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

ID:	50820	Date:	8/17/16

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	8.19
Middle	2441	8.39
High	2480	8.36

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7.2.7. CONDUCTED 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

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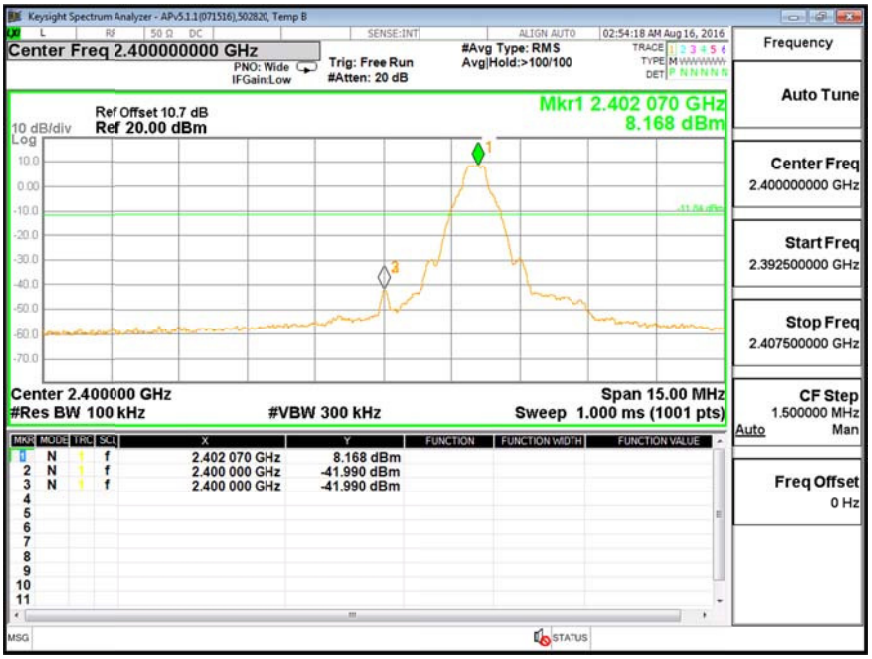
SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE



LOW CHANNEL SPURIOUS

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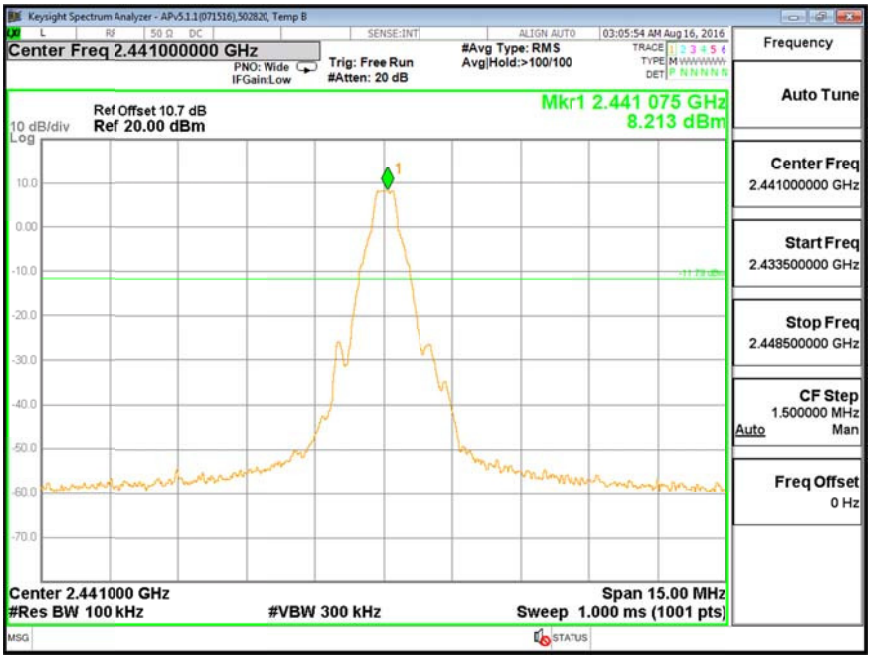
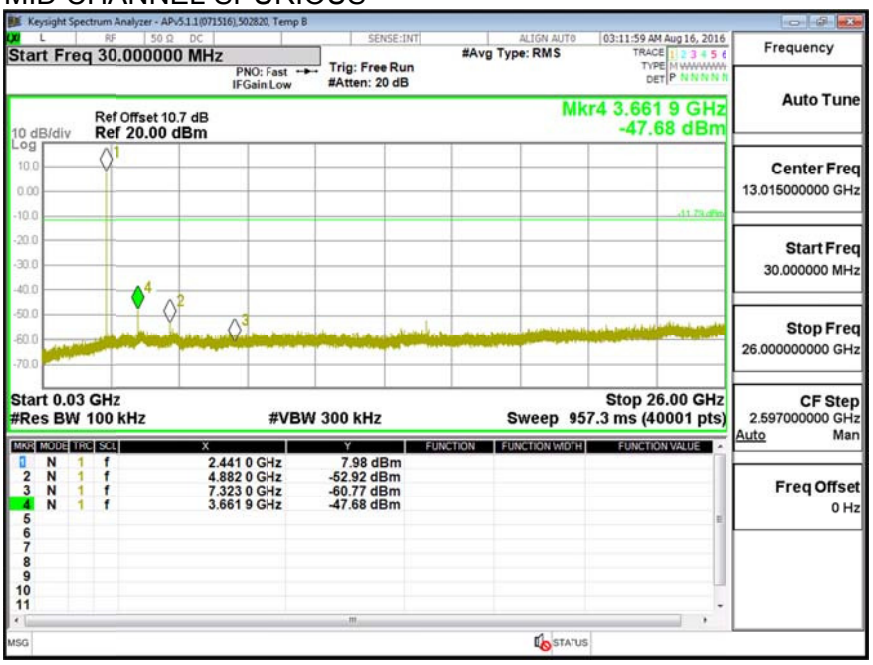
SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL



MID CHANNEL SPURIOUS



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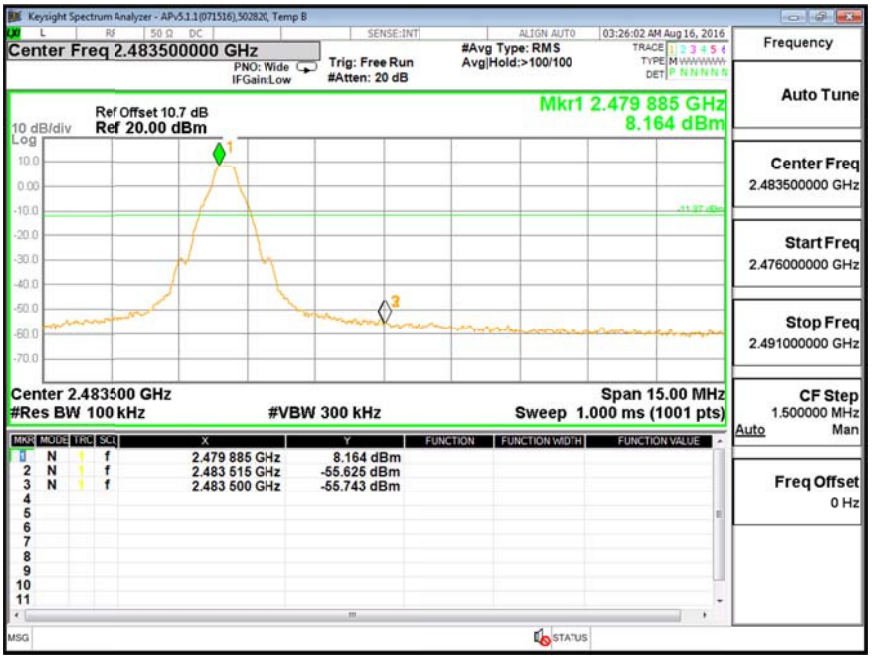
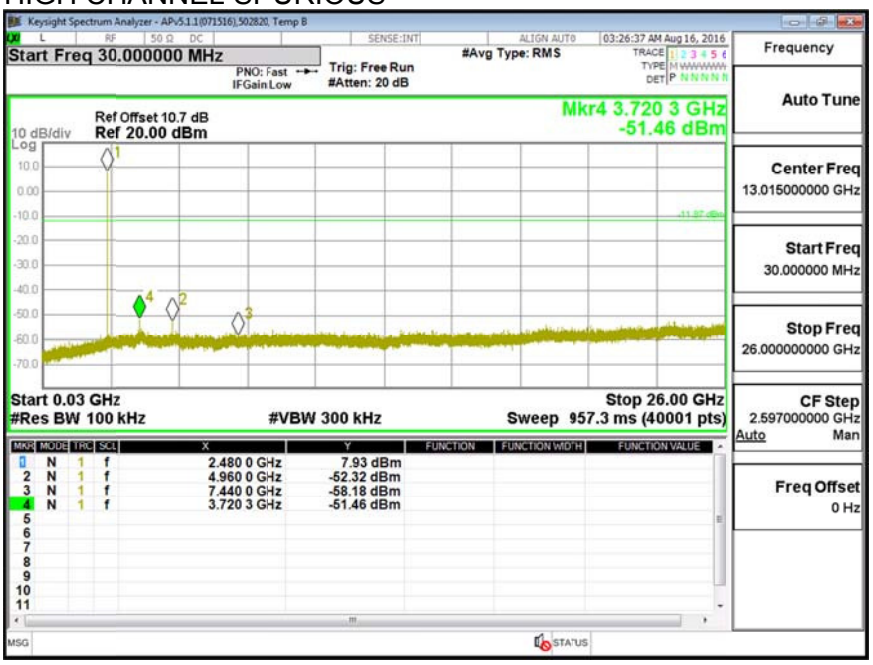
SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE



HIGH CHANNEL SPURIOUS



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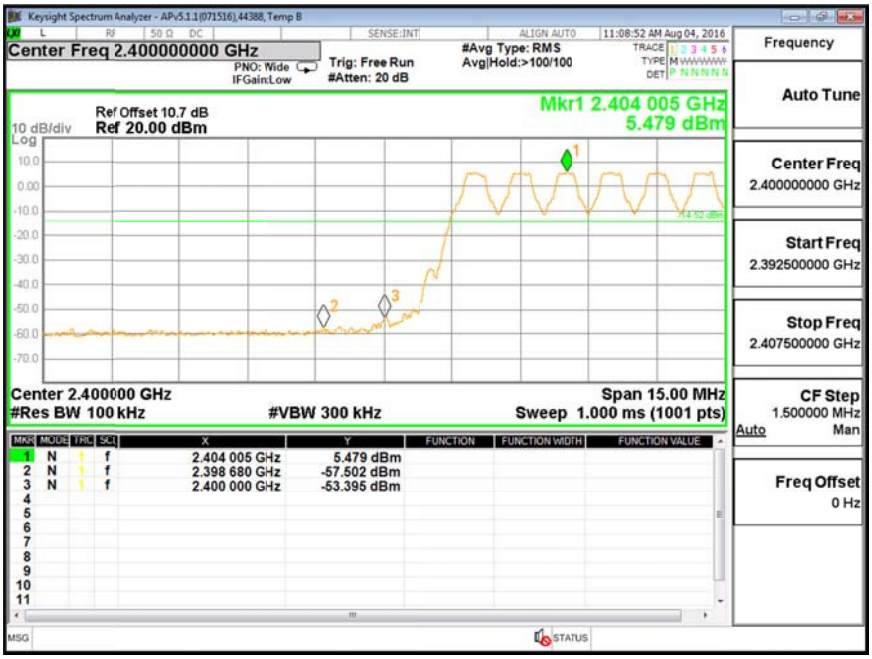
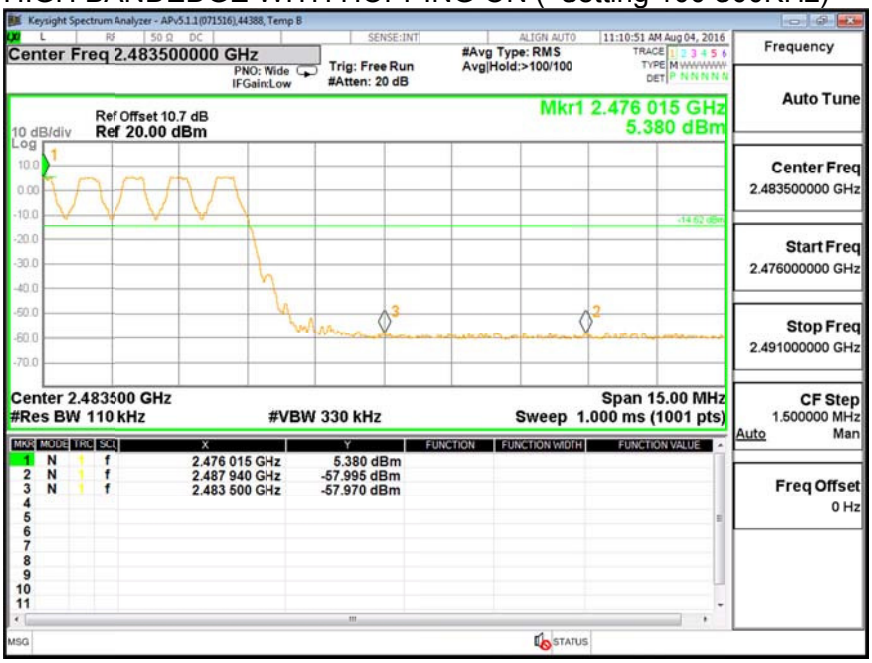
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON (setting 100 300KHz)



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7.3. ENHANCED DATA RATE QPSK MODULATION

7.3.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to ≥ 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)	99% Bandwidth (KHz)
Low	2402	1353.00	1192.40
Middle	2441	1339.00	1183.00
High	2480	1326.00	1193.10

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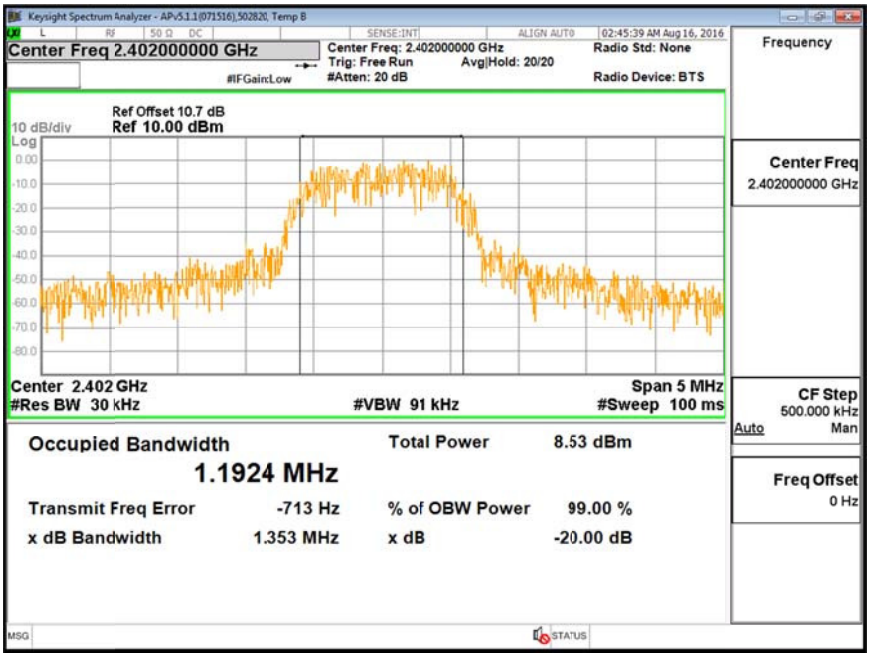
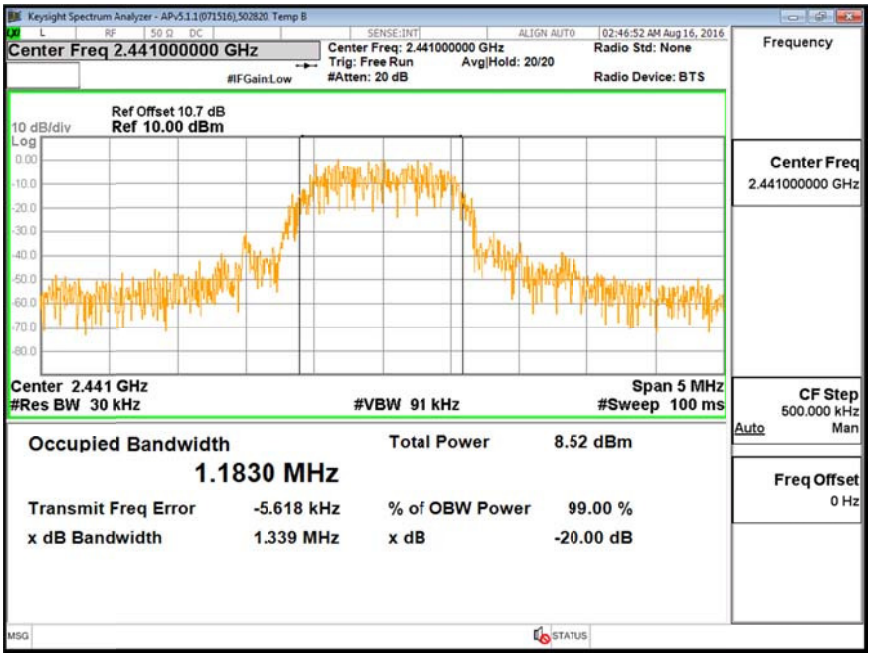
20 dB AND 99% BANDWIDTH

BANDWIDTH LOW CH



BANDWIDTH MID CH



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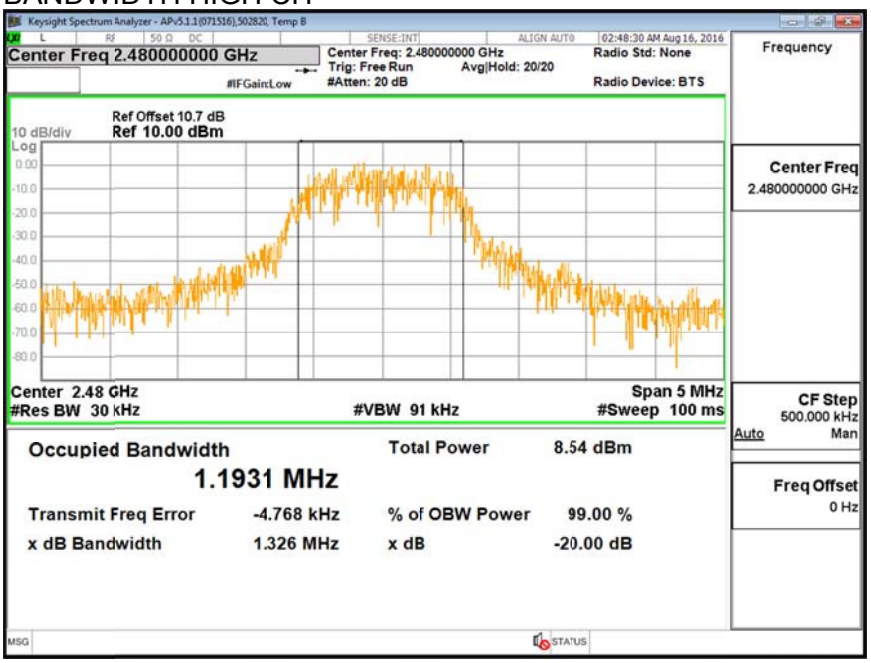
BANDWIDTH HIGH CH



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7.3.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-247 (5.1) (2)

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.

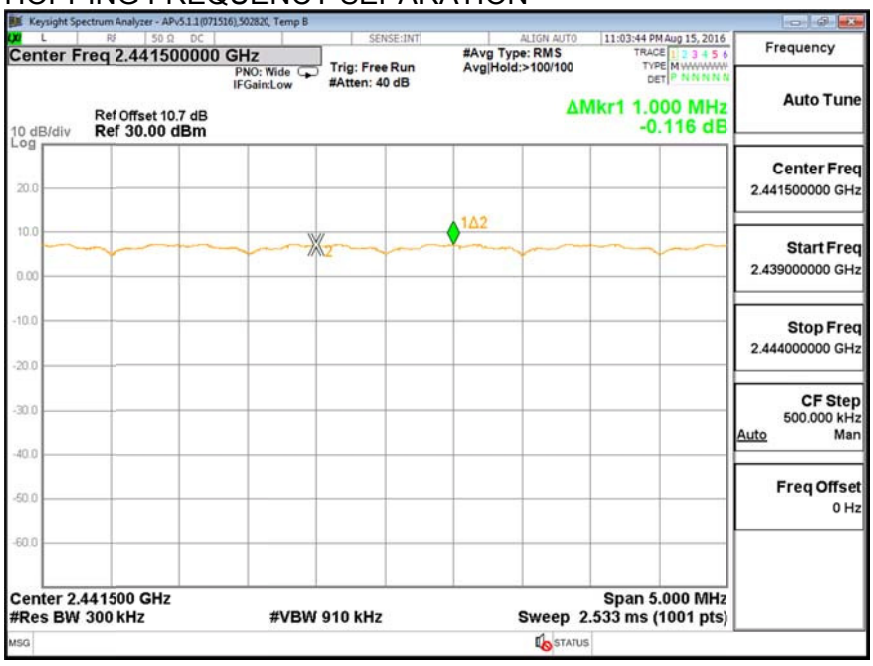
TEST PROCEDURE

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

HOPPING FREQUENCY SEPARATION

HOPPING FREQUENCY SEPARATION



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7.3.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-247 (5.1) (4)

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.

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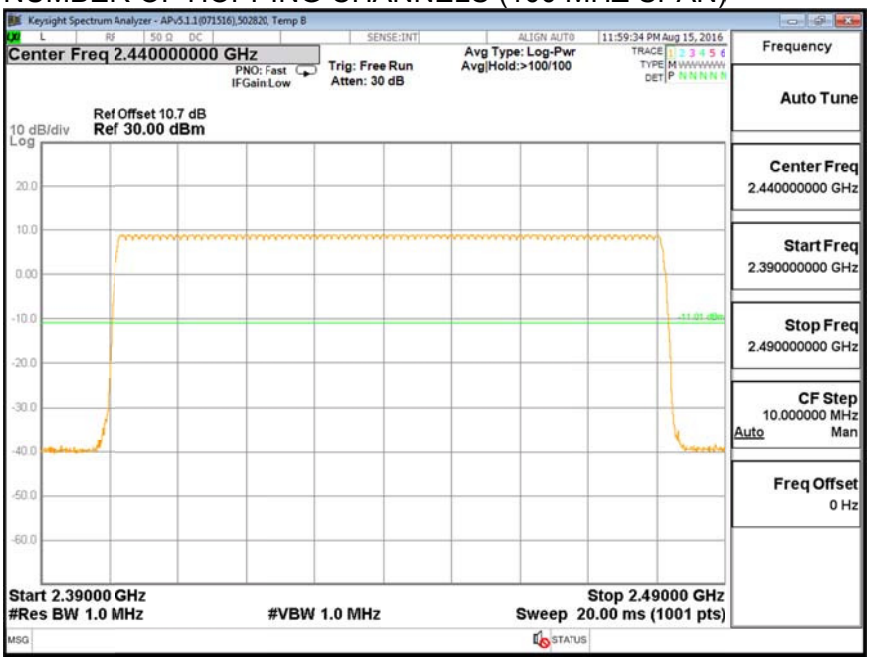
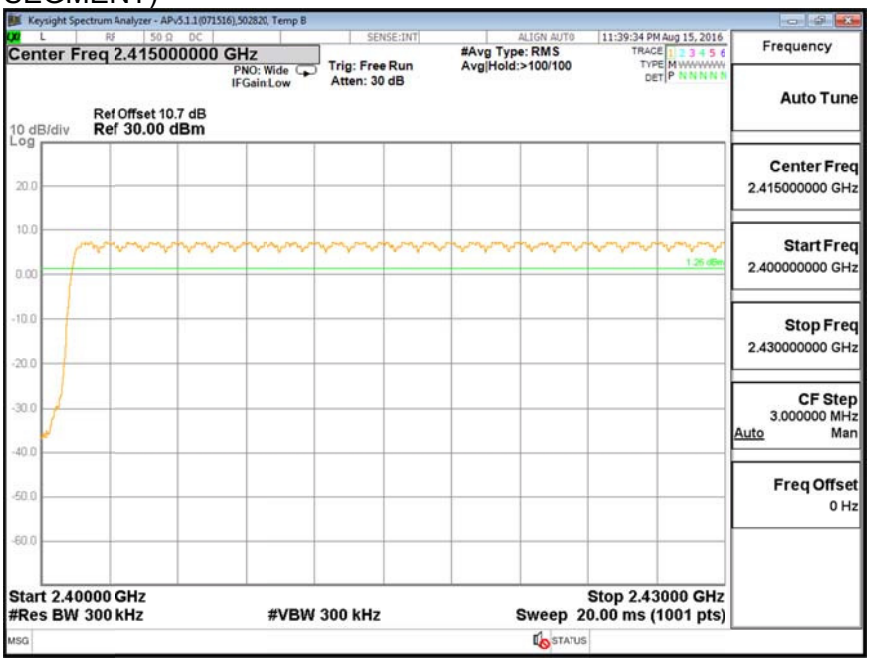
NUMBER OF HOPPING CHANNELS

NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)



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



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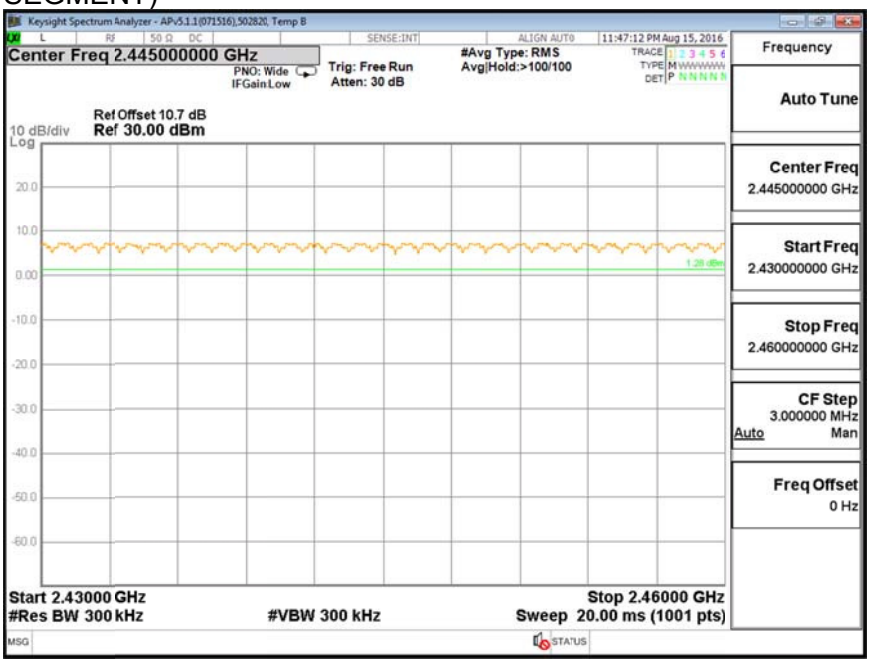
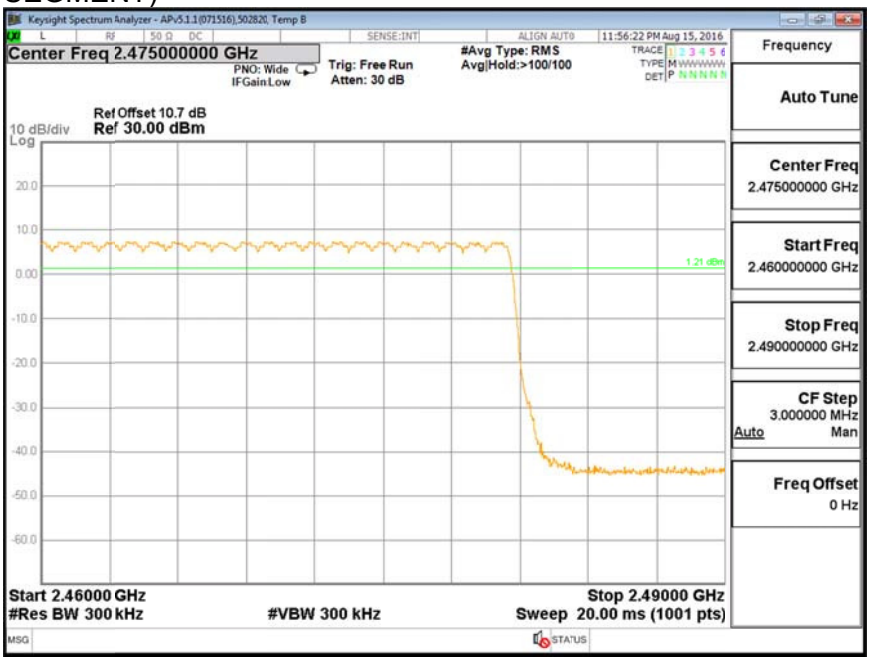
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)



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



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7.3.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-247 (5.1) (4)

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.

RESULTS

QPSK (EDR) Mode

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of (sec)	Limit (sec)	Margin (sec)
2DH5	2.884	4	0.115	0.4	-0.285

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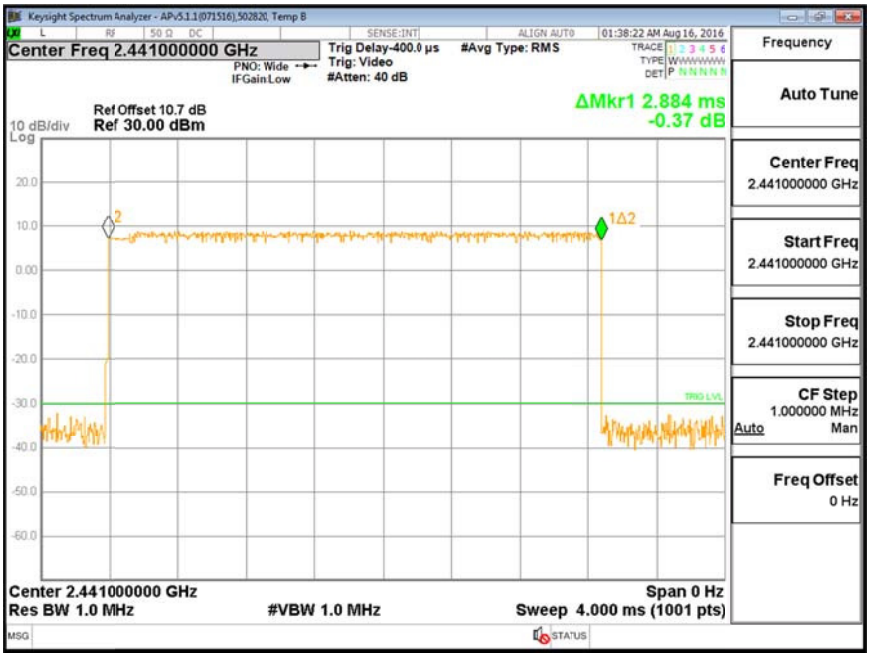
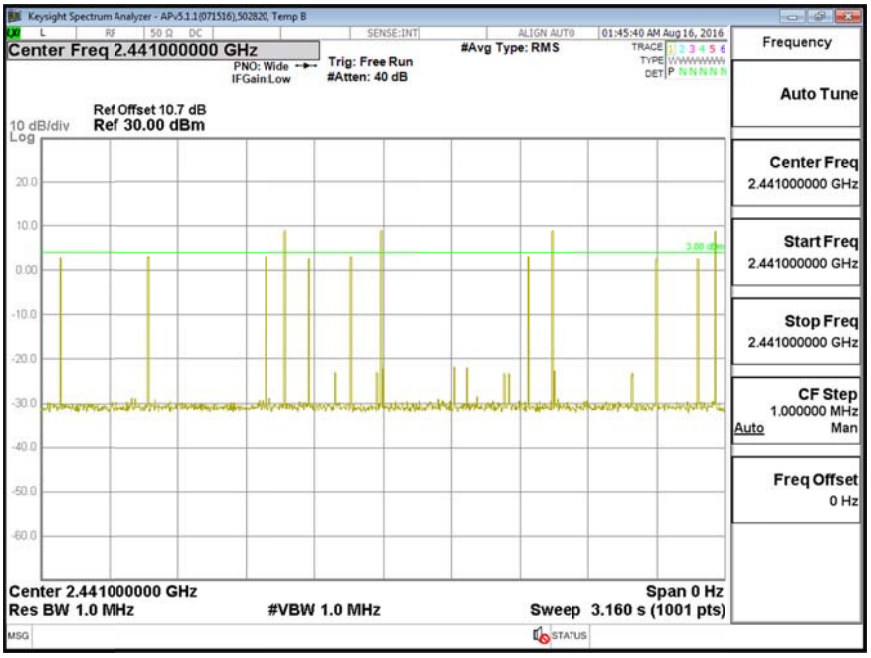
PULSE WIDTH – 2DH5

PULSE WIDTH – 2DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 2DH5

NUMBER OF PULSES – 2DH5



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7.3.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-247 (5.4) (2)

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

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 power meter.

RESULTS

ID:	50820	Date:	8/17/16

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	10.98	21	-9.99
Middle	2441	11.16	21	-9.81
High	2480	11.08	21	-9.89

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7.3.6. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

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

ID:	50820	Date:	8/15/16

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	8.38
Middle	2441	8.50
High	2480	8.49

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7.3.7. CONDUCTED 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

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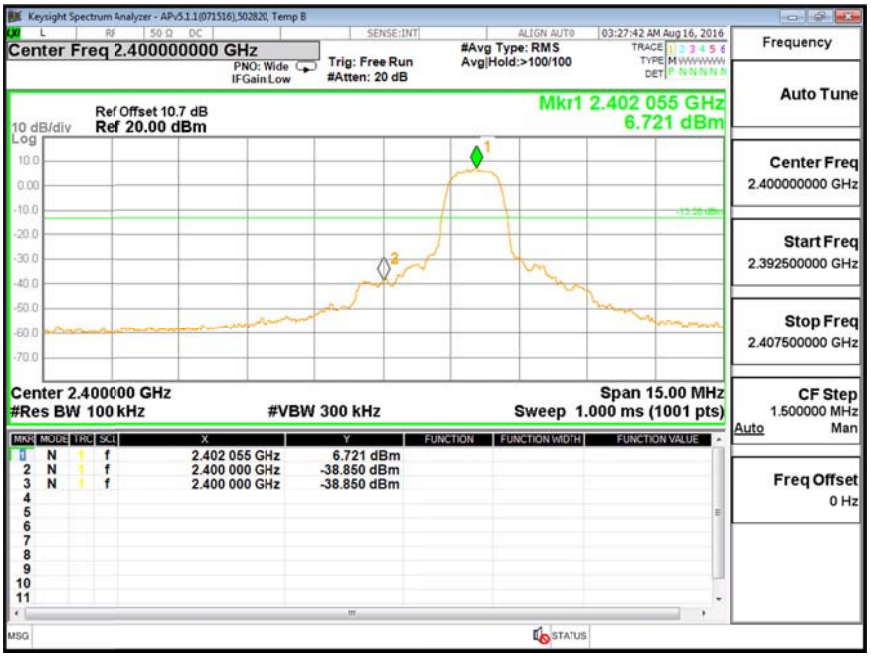
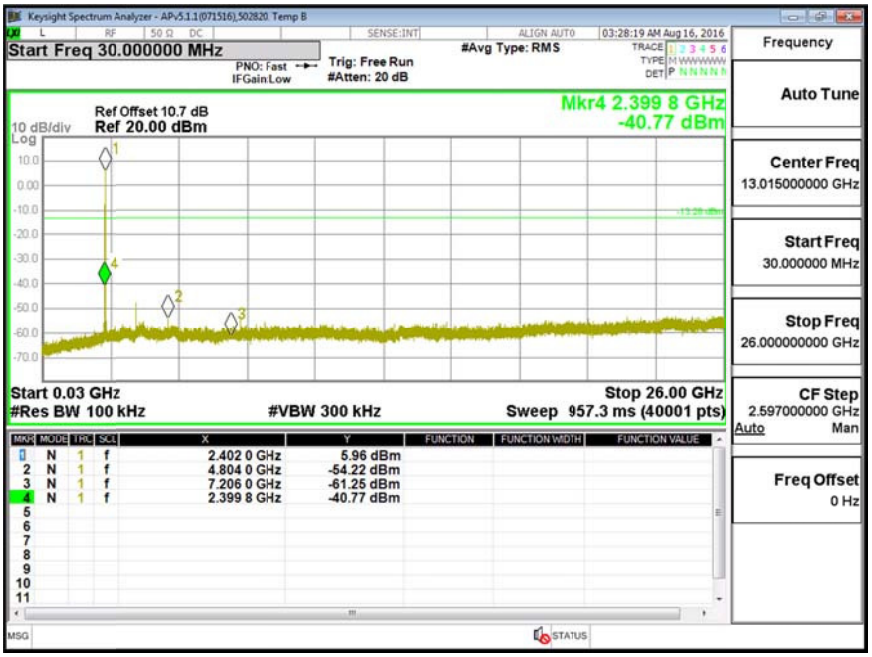
SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE



LOW CHANNEL SPURIOUS



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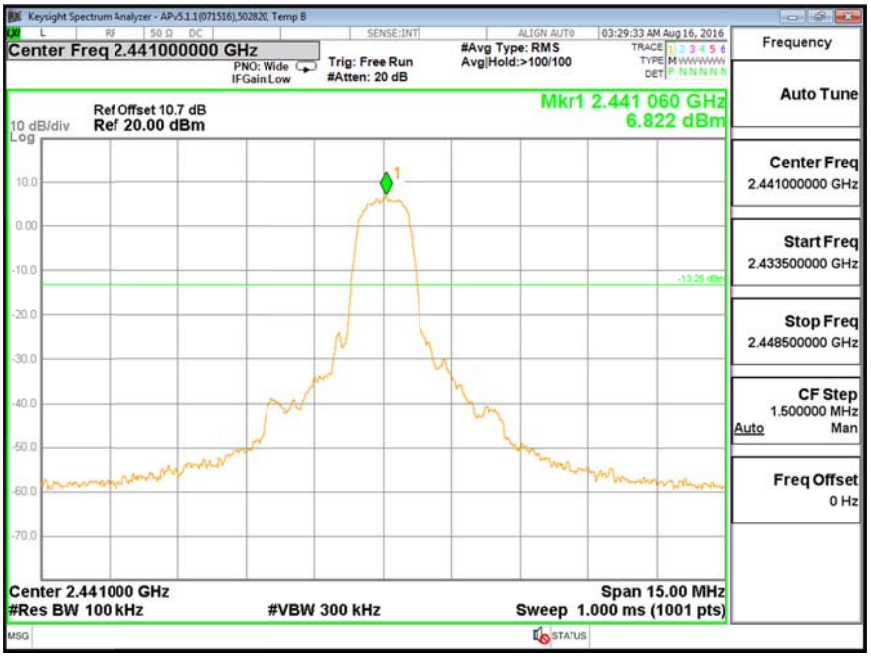
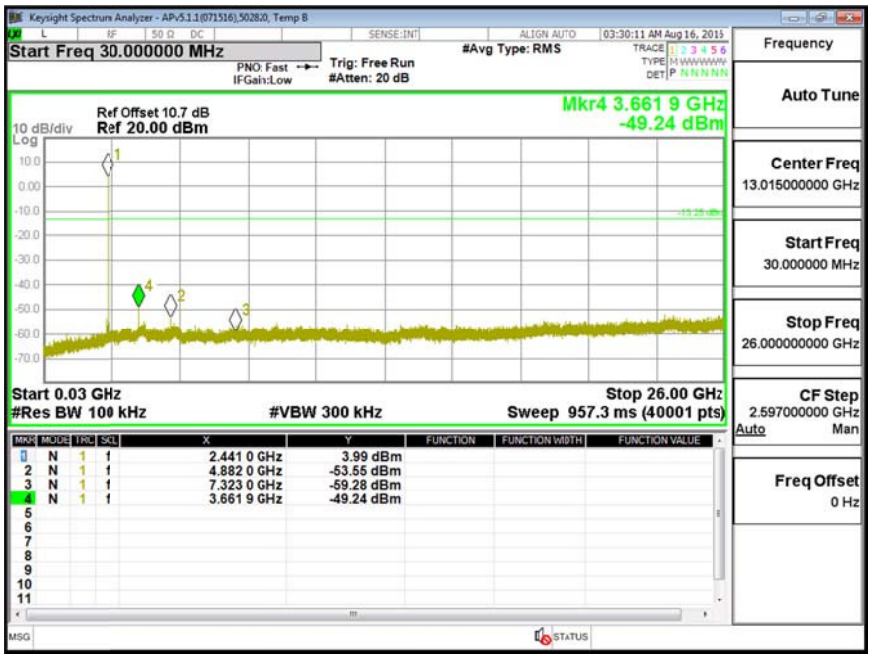
SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL



MID CHANNEL SPURIOUS



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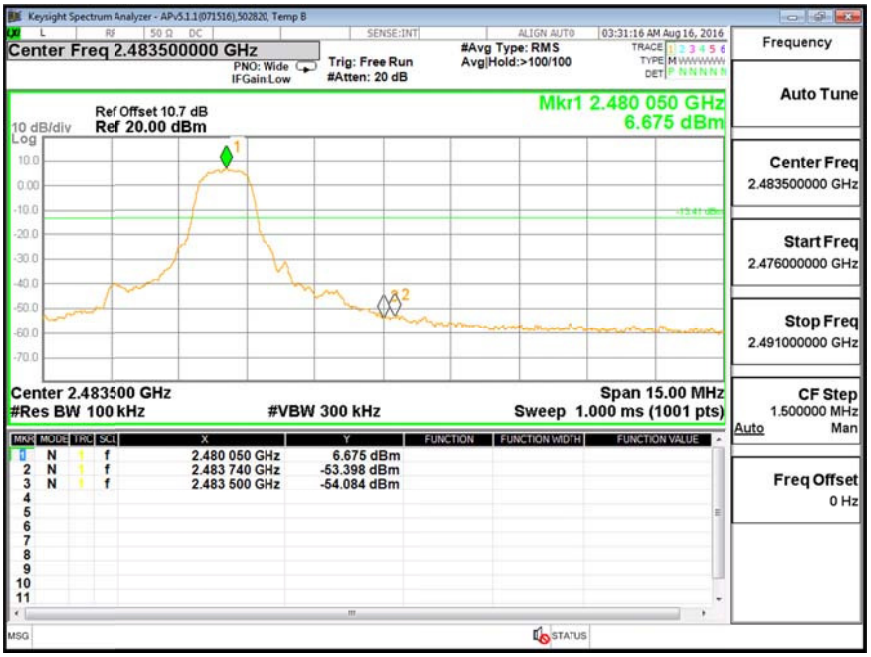
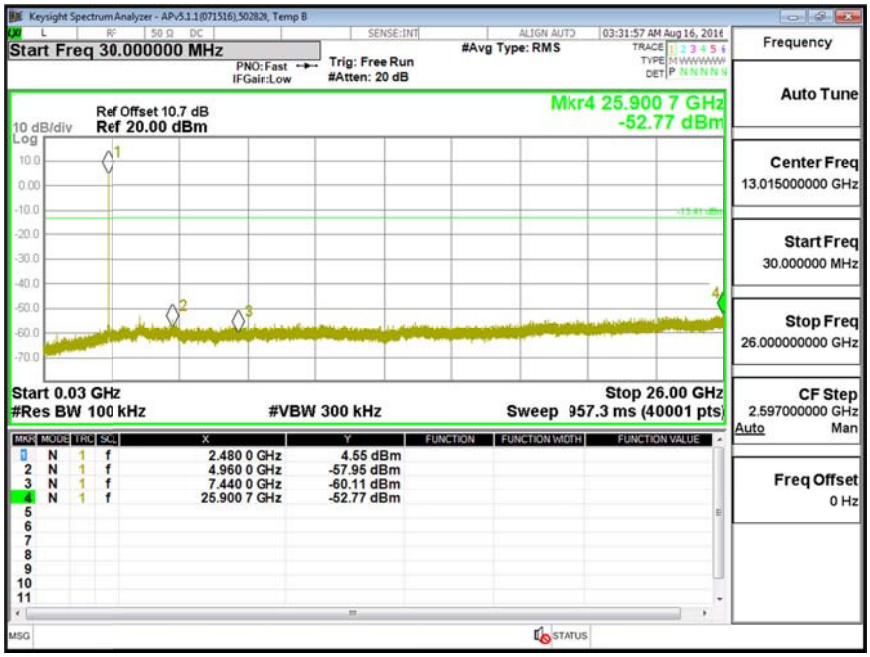
SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE



HIGH CHANNEL SPURIOUS



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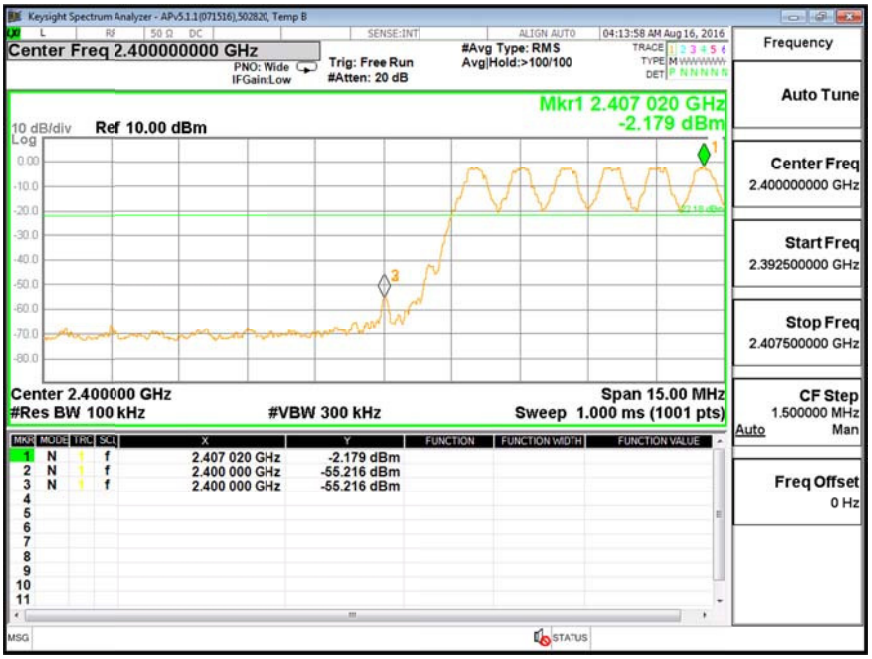
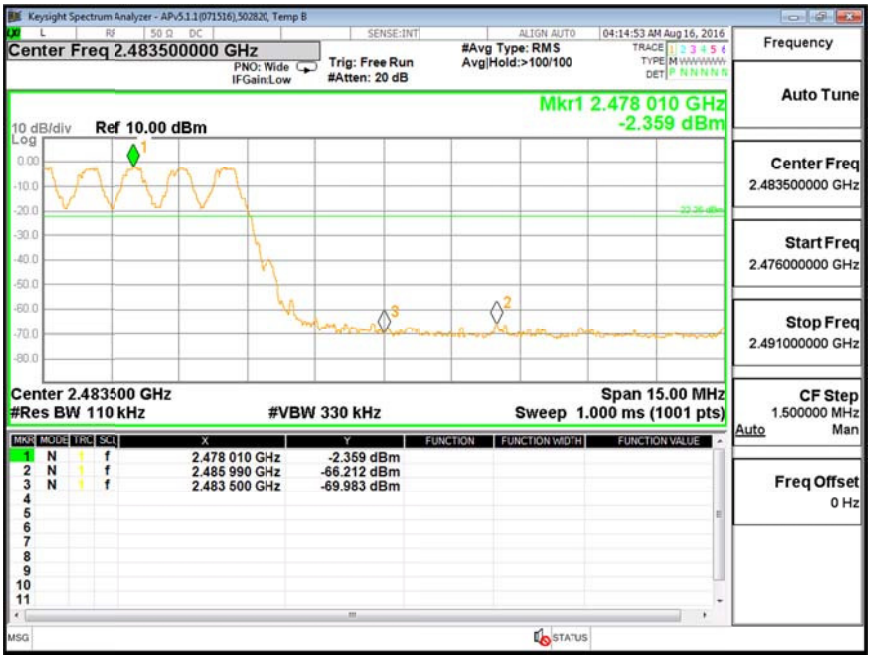
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



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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
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 pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final 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 (10 Hz) video bandwidth with peak detector for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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

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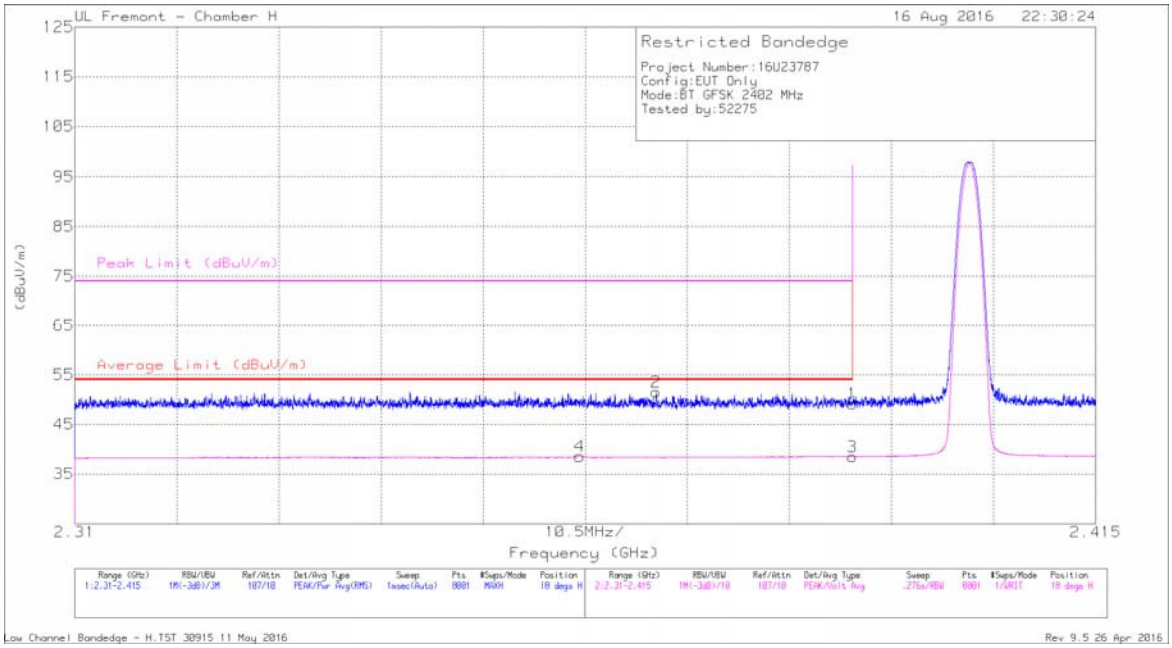
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. BASIC DATA RATE GFSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

LOW CHANNEL HORIZONTAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	* 2.39	45.06	Pk	31.9	-27.8	49.16	-	-	74	-24.84	18	103	H
2	* 2.37	47.56	Pk	31.8	-27.8	51.56	-	-	74	-22.44	18	103	H
3	* 2.39	34.37	VA1T	31.9	-27.8	38.47	54	-15.53	-	-	18	103	H
4	* 2.362	34.56	VA1T	31.8	-27.8	38.56	54	-15.44	-	-	18	103	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

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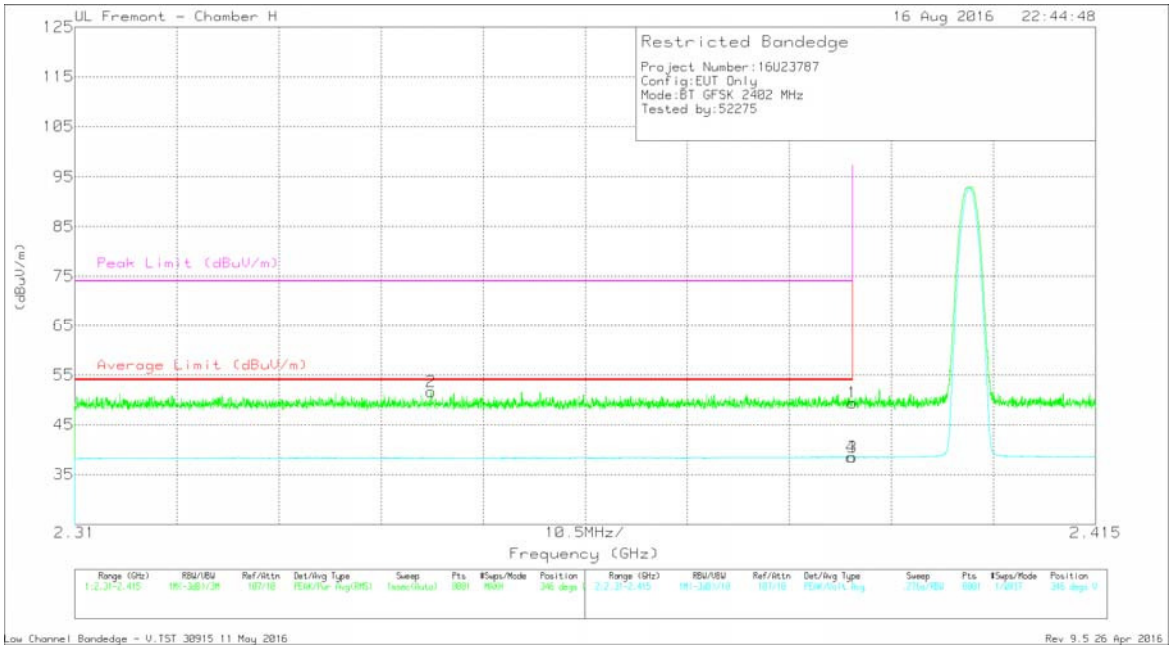
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

LOW CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	* 2.39	45.31	Pk	31.9	-27.8	49.41	-	-	74	-24.59	346	100	V
2	* 2.347	47.62	Pk	31.7	-27.7	51.62	-	-	74	-22.38	346	100	V
3	* 2.39	34.36	VA1T	31.9	-27.8	38.46	54	-15.54	-	-	346	100	V
4	* 2.39	34.39	VA1T	31.9	-27.8	38.49	54	-15.51	-	-	346	100	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

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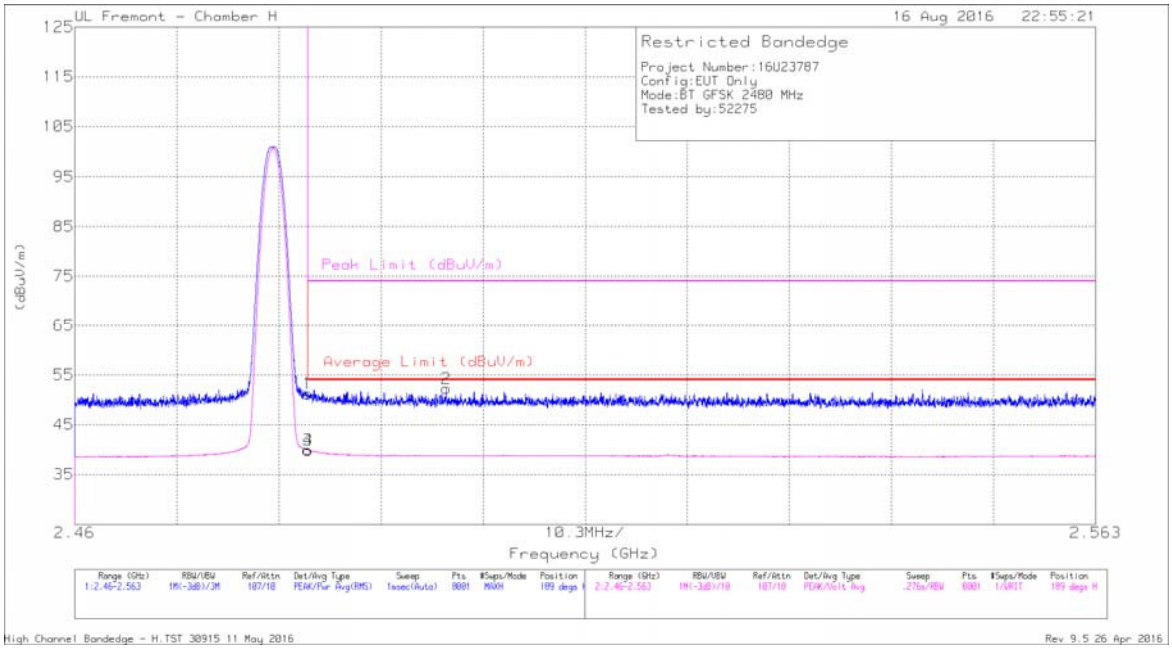
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

HIGH CHANNEL HORIZONTAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	46.96	Pk	32.2	-27.9	51.26	-	-	74	-22.74	189	134	H
2	* 2.497	47.98	Pk	32.2	-27.9	52.28	-	-	74	-21.72	189	134	H
3	* 2.484	35.61	VA1T	32.2	-27.9	39.91	54	-14.09	-	-	189	134	H
4	* 2.484	35.57	VA1T	32.2	-27.9	39.87	54	-14.13	-	-	189	134	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

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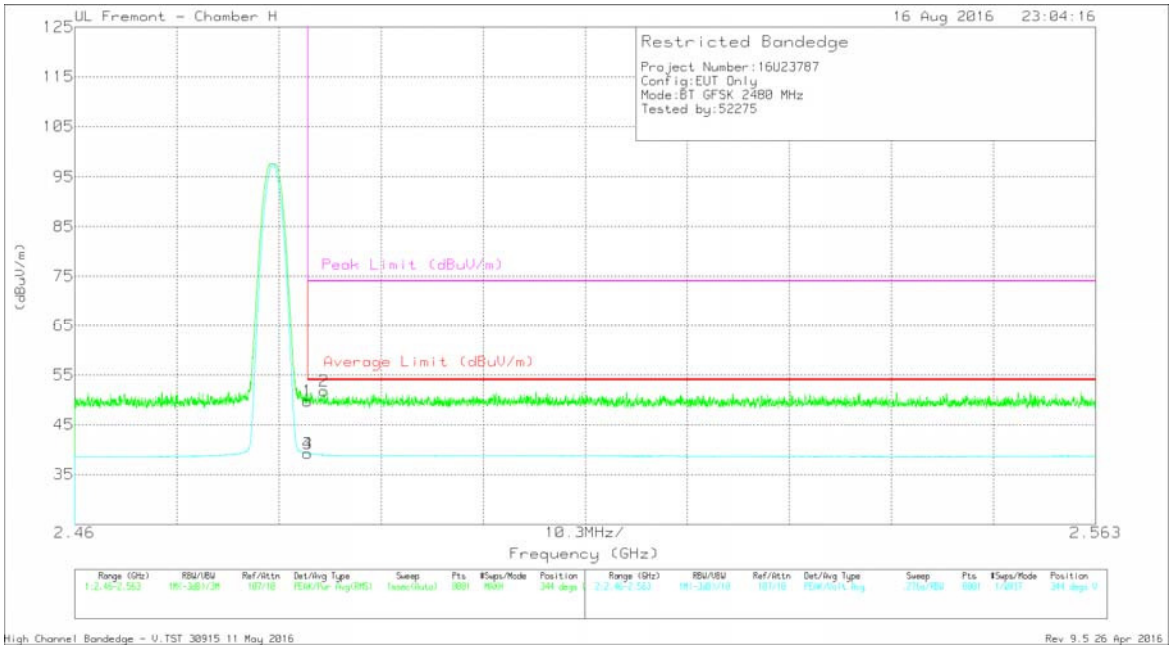
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

HIGH CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	45.47	Pk	32.2	-27.9	49.77	-	-	74	-24.23	344	106	V
2	* 2.485	47.47	Pk	32.2	-27.9	51.77	-	-	74	-22.23	344	106	V
3	* 2.484	34.9	VA1T	32.2	-27.9	39.2	54	-14.8	-	-	344	106	V
4	* 2.484	34.9	VA1T	32.2	-27.9	39.2	54	-14.8	-	-	344	106	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

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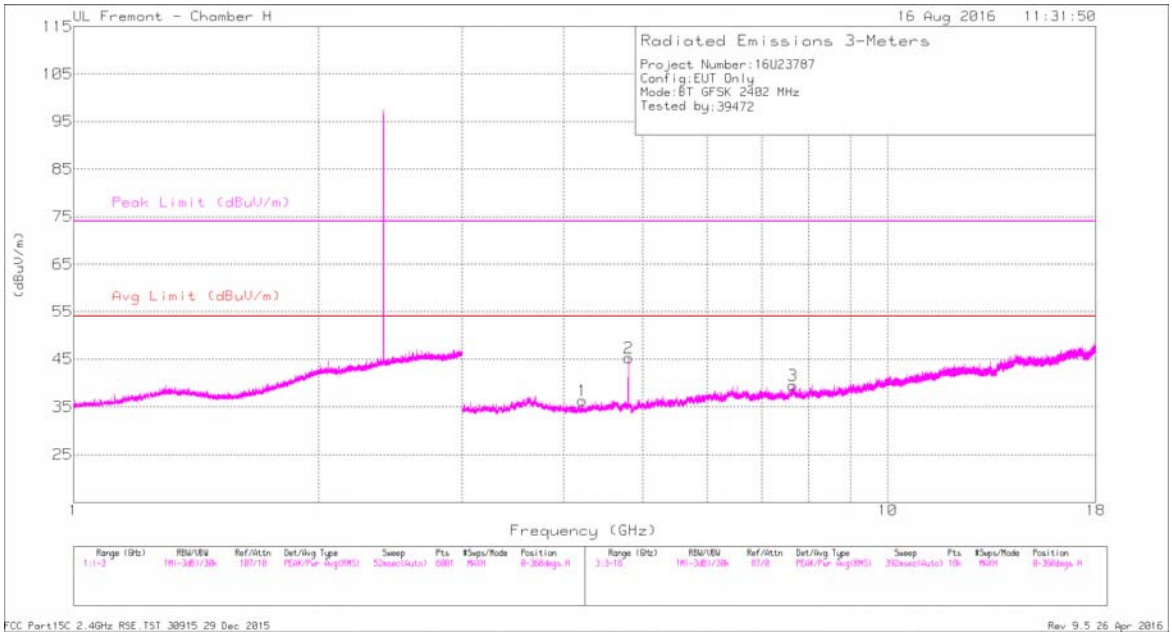
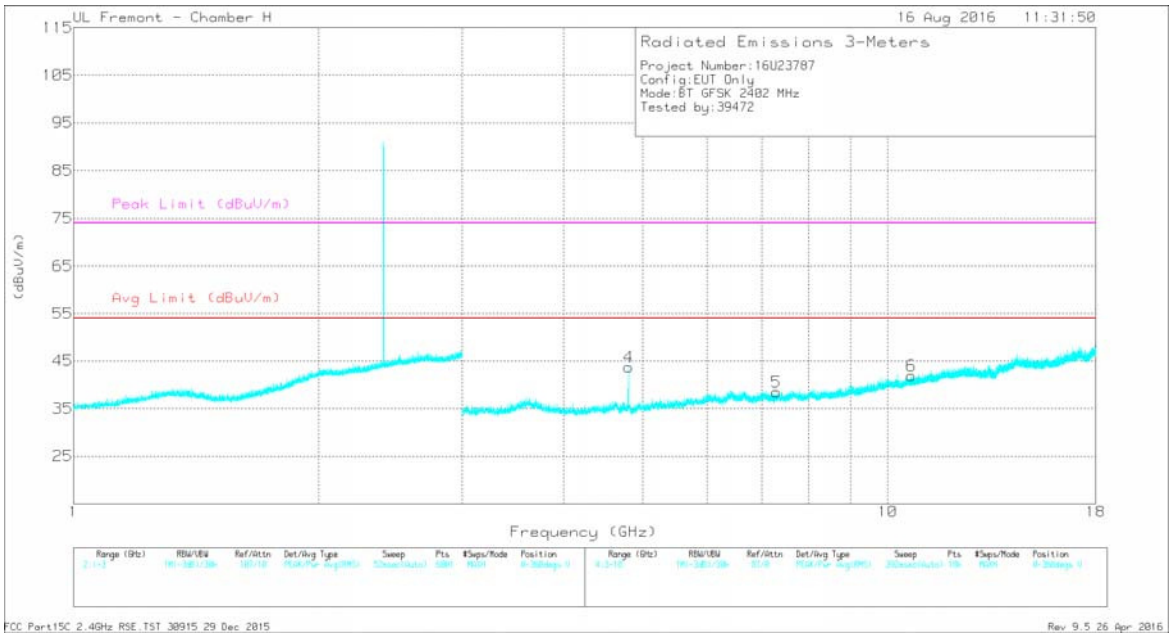
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	* 4.219	43.28	PKFH	33.4	-35.4	41.28	-	-	74	-32.72	171	132	H
	* 4.22	31.92	VA1T	33.4	-35.4	29.92	54	-24.08	-	-	171	132	H
2	* 4.804	49.97	PKFH	34	-35.1	48.87	-	-	74	-25.13	211	185	H
	* 4.804	45.39	VA1T	34	-35.1	44.29	54	-9.71	-	-	211	185	H
3	* 7.646	39.54	PKFH	35.8	-30.3	45.04	-	-	74	-28.96	261	226	H
	* 7.65	27.96	VA1T	35.8	-30.3	33.46	54	-20.54	-	-	261	226	H
4	* 4.804	48.59	PKFH	34	-35.1	47.49	-	-	74	-26.51	334	258	V
	* 4.804	44.11	VA1T	34	-35.1	43.01	54	-10.99	-	-	334	258	V
5	* 7.301	39.52	PKFH	35.7	-31.5	43.72	-	-	74	-30.28	314	216	V
	* 7.299	28.49	VA1T	35.7	-31.6	32.59	54	-21.41	-	-	314	216	V
6	* 10.69	37.74	PKFH	38	-28.4	47.34	-	-	74	-26.66	280	129	V
	* 10.691	26.24	VA1T	38	-28.4	35.84	54	-18.16	-	-	280	129	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

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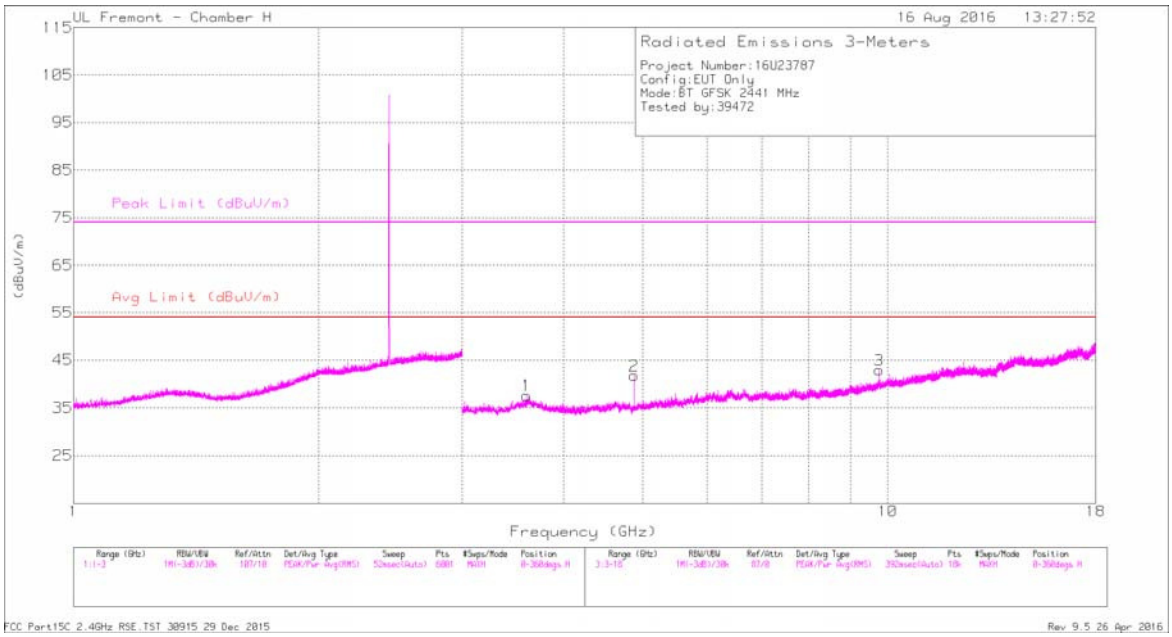
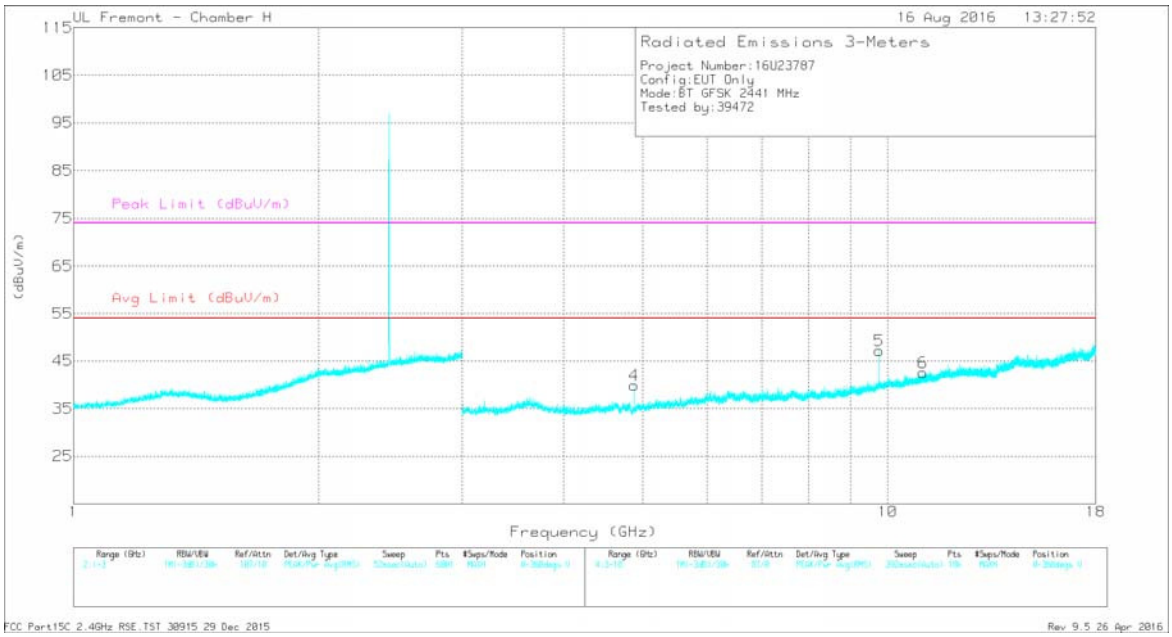
HARMONICS AND SPURIOUS EMISSIONS

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	* 3.648	43.97	PKFH	34.9	-35.9	42.97	-	-	74	-31.03	360	100	H
	* 3.65	31.96	VA1T	34.9	-35.9	30.96	54	-23.04	-	-	360	100	H
2	* 4.883	46.77	PKFH	34	-34.7	46.07	-	-	74	-27.93	27	280	H
	* 4.882	41.54	VA1T	34	-34.7	40.84	54	-13.16	-	-	27	280	H
3	9.765	40.6	PKFH	37.3	-29.1	48.8	-	-	-	-	175	101	H
4	* 4.882	46.6	PKFH	34	-34.7	45.9	-	-	74	-28.1	168	295	V
	* 4.882	40.79	VA1T	34	-34.7	40.09	54	-13.91	-	-	168	295	V
5	9.765	44.11	PKFH	37.3	-29.1	52.31	-	-	-	-	96	100	V
6	* 11.052	36.83	PKFH	38.3	-27.7	47.43	-	-	74	-26.57	134	288	V
	* 11.051	25.8	VA1T	38.3	-27.7	36.4	54	-17.6	-	-	134	288	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

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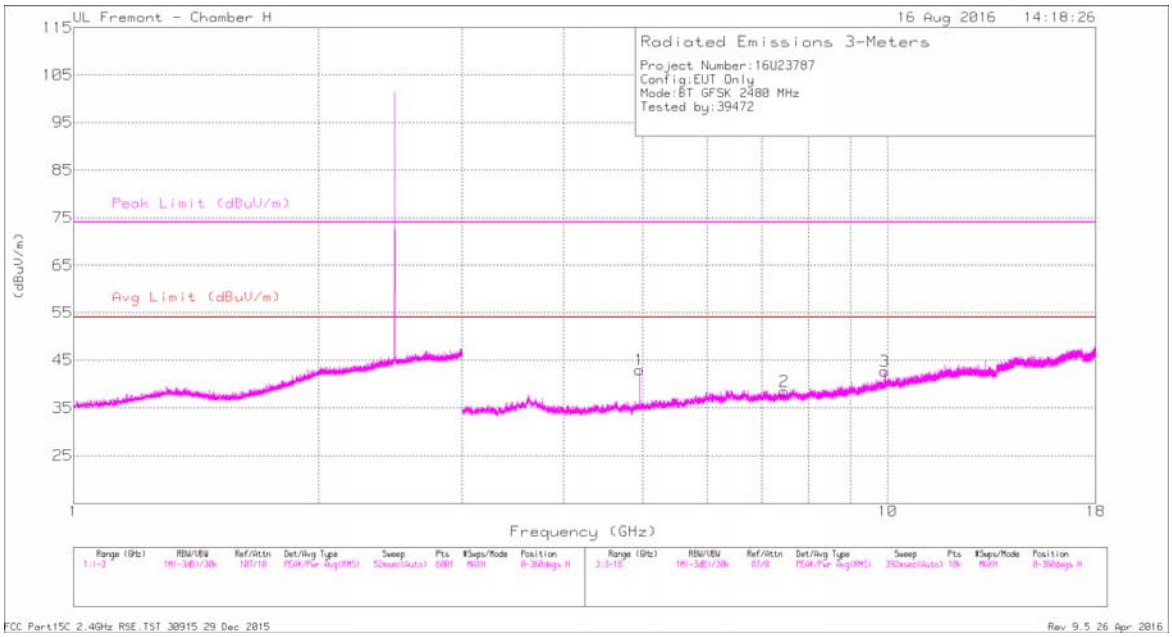
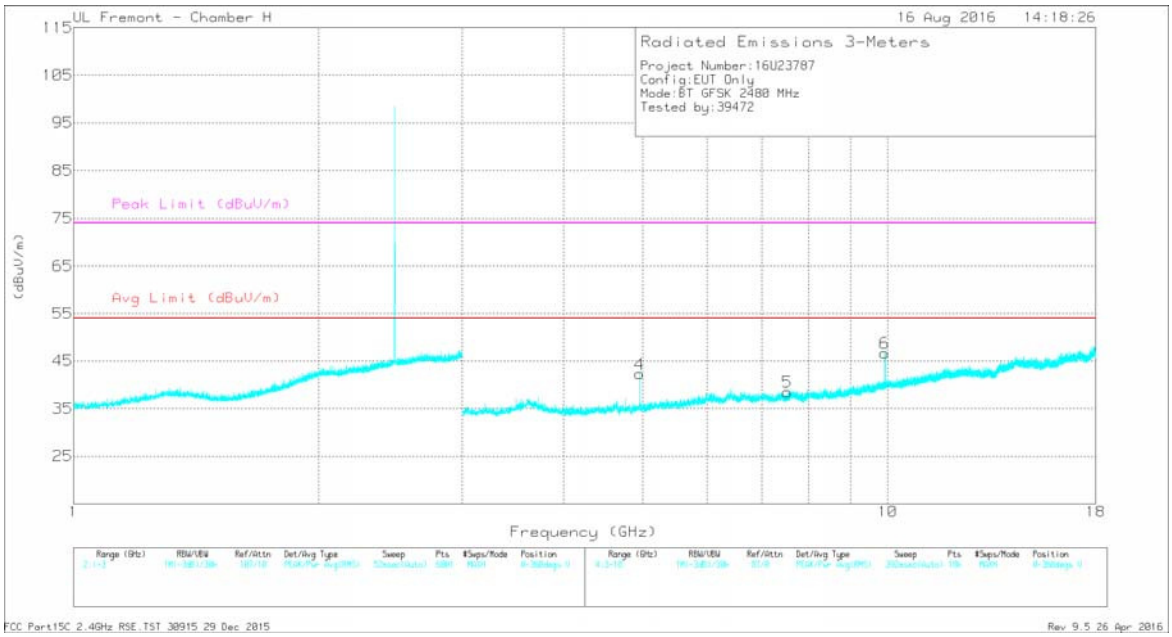
HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	* 4.96	47.24	PKFH	34	-34.3	46.94	-	-	74	-27.06	208	111	H
	* 4.96	41.6	VA1T	34	-34.3	41.3	54	-12.7	-	-	208	111	H
2	* 7.466	40.03	PKFH	35.7	-31.5	44.23	-	-	74	-29.77	0	239	H
	* 7.467	28.34	VA1T	35.7	-31.5	32.54	54	-21.46	-	-	0	239	H
3	9.919	41.08	PKFH	37.5	-29.3	49.28	-	-	-	-	203	248	H
4	* 4.96	47.45	PKFH	34	-34.3	47.15	-	-	74	-26.85	337	274	V
	* 4.96	41.87	VA1T	34	-34.3	41.57	54	-12.43	-	-	337	274	V
5	* 7.525	39.84	PKFH	35.8	-31.6	44.04	-	-	74	-29.96	296	118	V
	* 7.525	28.46	VA1T	35.8	-31.6	32.66	54	-21.34	-	-	296	118	V
6	9.921	43	PKFH	37.5	-29.2	51.3	-	-	-	-	263	100	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

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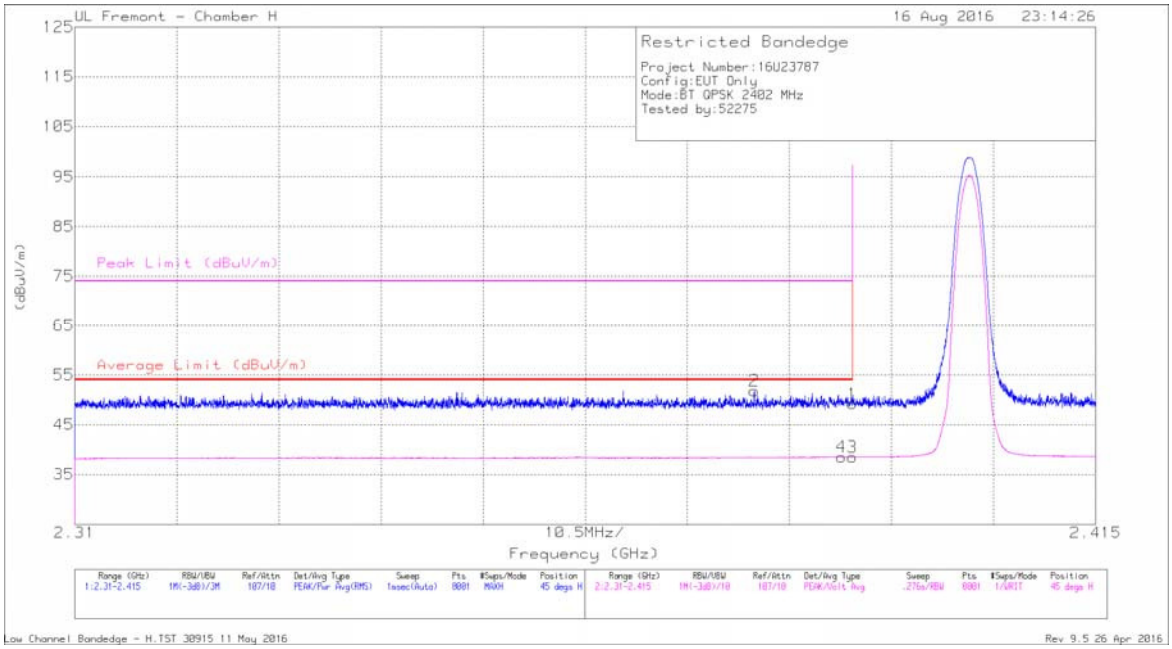
8.2.2. ENHANCED DATA RATE QPSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

LOW CHANNEL HORIZONTAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	* 2.39	45.1	Pk	31.9	-27.8	49.2	-	-	74	-24.8	45	329	H
2	* 2.38	47.73	Pk	31.9	-27.8	51.83	-	-	74	-22.17	45	329	H
3	* 2.39	34.39	VA1T	31.9	-27.8	38.49	54	-15.51	-	-	45	329	H
4	* 2.389	34.42	VA1T	31.9	-27.8	38.52	54	-15.48	-	-	45	329	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

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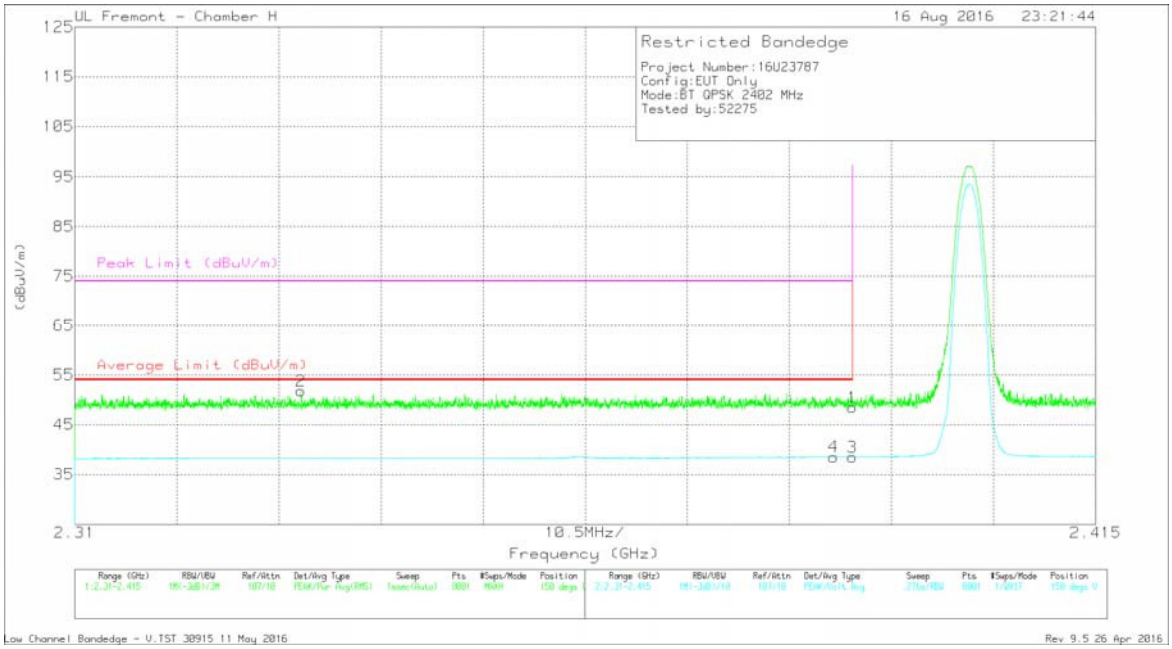
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

LOW CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	* 2.39	44.37	Pk	31.9	-27.8	48.47	-	-	74	-25.53	150	380	V
2	* 2.333	47.76	Pk	31.7	-27.7	51.76	-	-	74	-22.24	150	380	V
3	* 2.39	34.38	VA1T	31.9	-27.8	38.48	54	-15.52	-	-	150	380	V
4	* 2.388	34.43	VA1T	31.9	-27.8	38.53	54	-15.47	-	-	150	380	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

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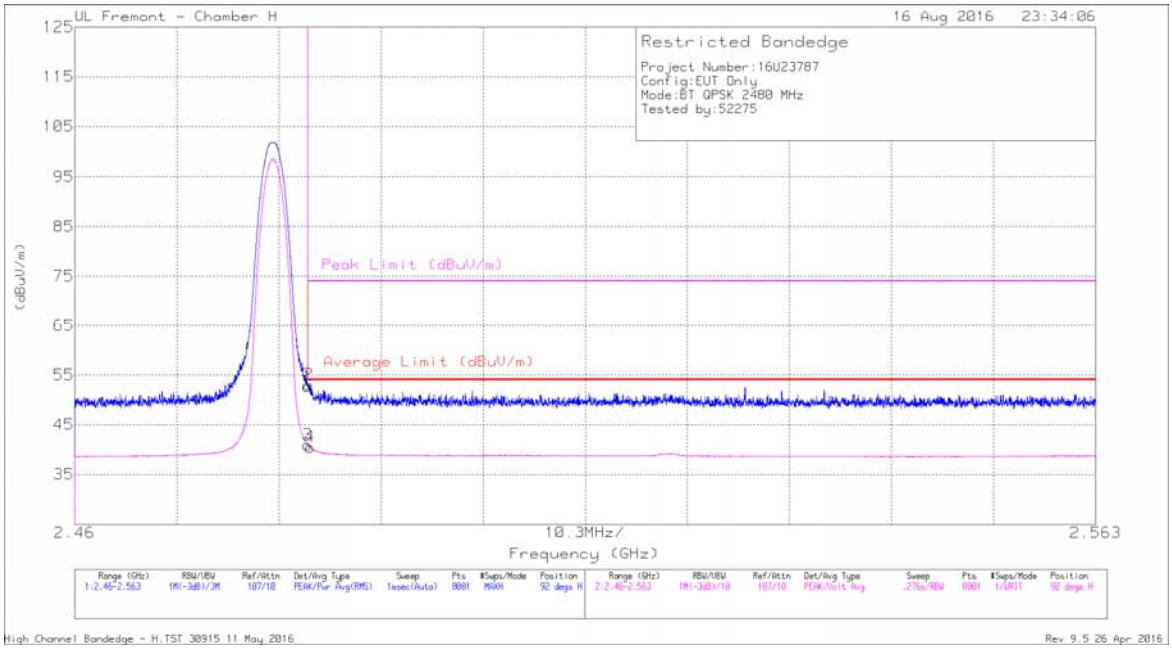
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

HIGH CHANNEL HORIZONTAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	48.41	Pk	32.2	-27.9	52.71	-	-	74	-21.29	92	112	H
2	* 2.484	48.76	Pk	32.2	-27.9	53.06	-	-	74	-20.94	92	112	H
3	* 2.484	36.67	VA1T	32.2	-27.9	40.97	54	-13.03	-	-	92	112	H
4	* 2.484	36.19	VA1T	32.2	-27.9	40.49	54	-13.51	-	-	92	112	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

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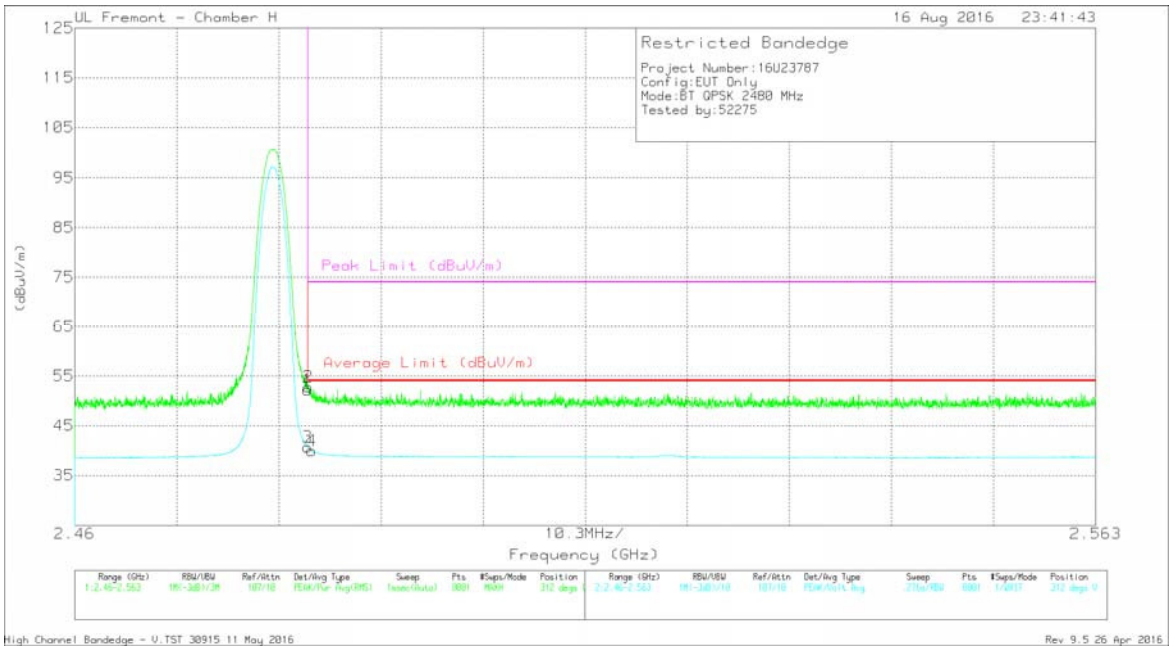
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

HIGH CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	47.93	Pk	32.2	-27.9	52.23	-	-	74	-21.77	312	109	V
2	* 2.484	48.49	Pk	32.2	-27.9	52.79	-	-	74	-21.21	312	109	V
3	* 2.484	36.42	VA1T	32.2	-27.9	40.72	54	-13.28	-	-	312	109	V
4	* 2.484	35.68	VA1T	32.2	-27.9	39.98	54	-14.02	-	-	312	109	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

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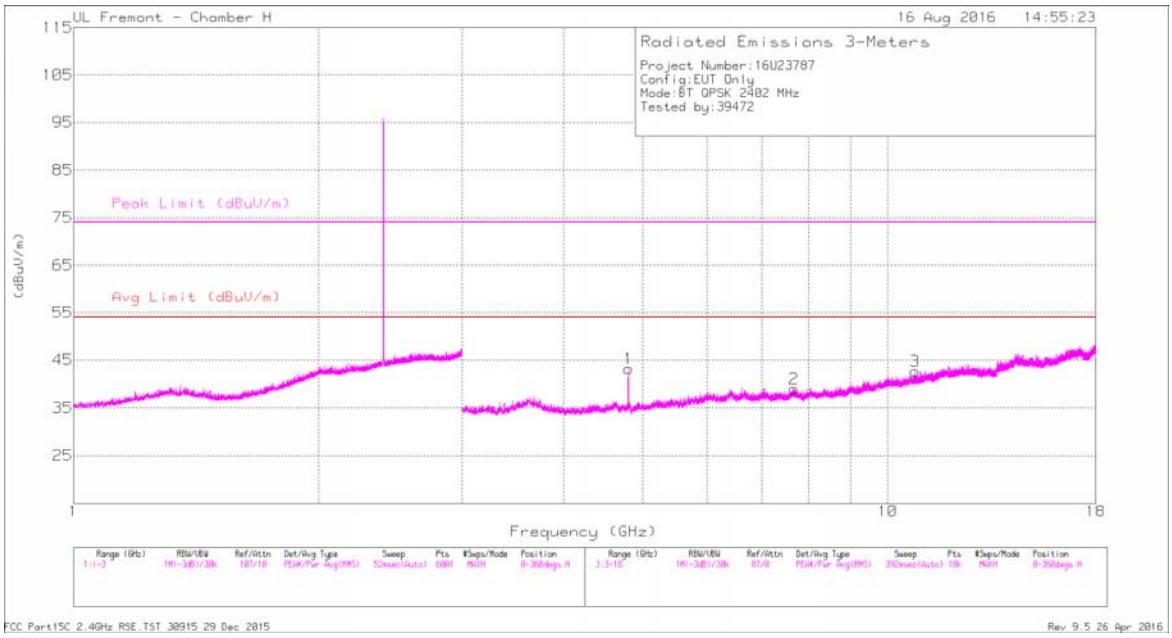
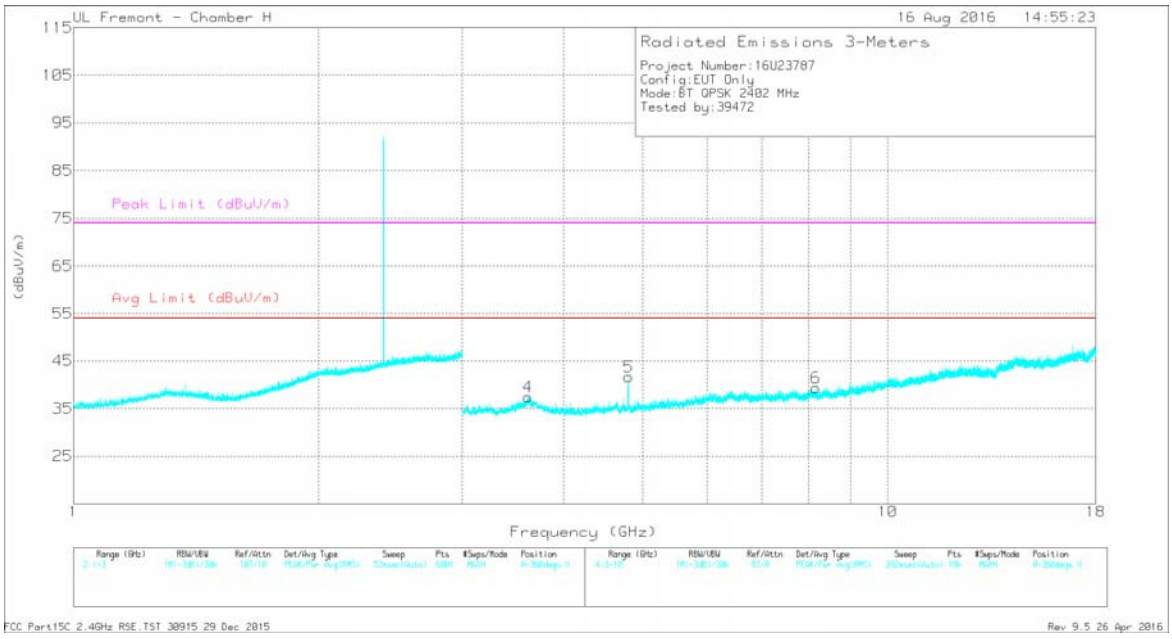
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



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DATA

Maeker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	* 4.804	49.49	PKFH	34	-35.1	48.39	-	-	74	-25.61	204	136	H
	* 4.804	41.91	VA1T	34	-35.1	40.81	54	-13.19	-	-	204	136	H
2	* 7.672	39.45	PKFH	35.8	-30.4	44.85	-	-	74	-29.15	260	185	H
	* 7.674	27.93	VA1T	35.8	-30.4	33.33	54	-20.67	-	-	260	185	H
3	* 10.803	38.2	PKFH	38.2	-28.3	48.1	-	-	74	-25.9	202	110	H
	* 10.801	26.48	VA1T	38.2	-28.3	36.38	54	-17.62	-	-	202	110	H
4	* 3.618	43.04	PKFH	34.9	-35.7	42.24	-	-	74	-31.76	43	246	V
	* 3.617	31.64	VA1T	34.9	-35.7	30.84	54	-23.16	-	-	43	246	V
5	* 4.804	49.27	PKFH	34	-35.1	48.17	-	-	74	-25.83	340	245	V
	* 4.804	41.41	VA1T	34	-35.1	40.31	54	-13.69	-	-	340	245	V
6	* 8.163	39.36	PKFH	35.8	-30.8	44.36	-	-	74	-29.64	294	141	V
	* 8.162	27.92	VA1T	35.8	-30.8	32.92	54	-21.08	-	-	294	141	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

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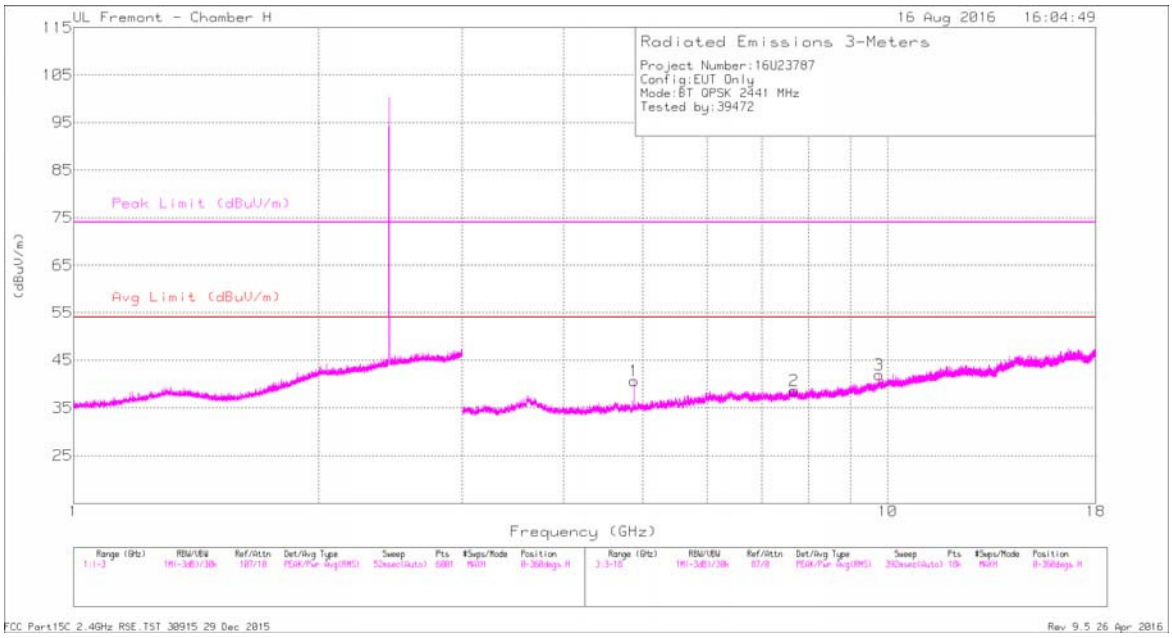
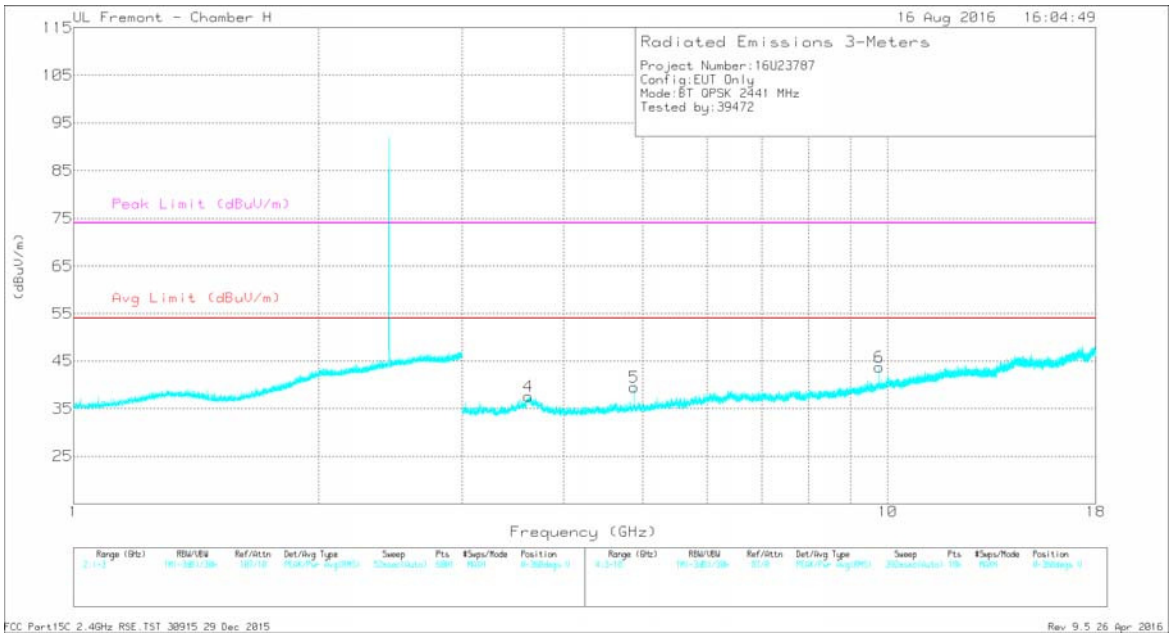
HARMONICS AND SPURIOUS EMISSIONS

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	* 4.881	47.03	PKFH	34	-34.7	46.33	-	-	74	-27.67	215	216	H
	* 4.882	37.8	VA1T	34	-34.7	37.1	54	-16.9	-	-	215	216	H
2	* 7.675	39.33	PKFH	35.8	-30.4	44.73	-	-	74	-29.27	95	381	H
	* 7.675	28.02	VA1T	35.8	-30.4	33.42	54	-20.58	-	-	95	381	H
4	* 3.624	42.68	PKFH	34.9	-35.8	41.78	-	-	74	-32.22	339	183	V
	* 3.624	32.1	VA1T	34.9	-35.8	31.2	54	-22.8	-	-	339	183	V
5	* 4.881	46.03	PKFH	34	-34.7	45.33	-	-	74	-28.67	341	250	V
	* 4.882	36.84	VA1T	34	-34.7	36.14	54	-17.86	-	-	341	250	V
3	9.754	38.62	PKFH	37.2	-29	46.82	-	-	-	-	242	314	H
6	9.764	45.5	PKFH	37.3	-29.1	53.7	-	-	-	-	273	101	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

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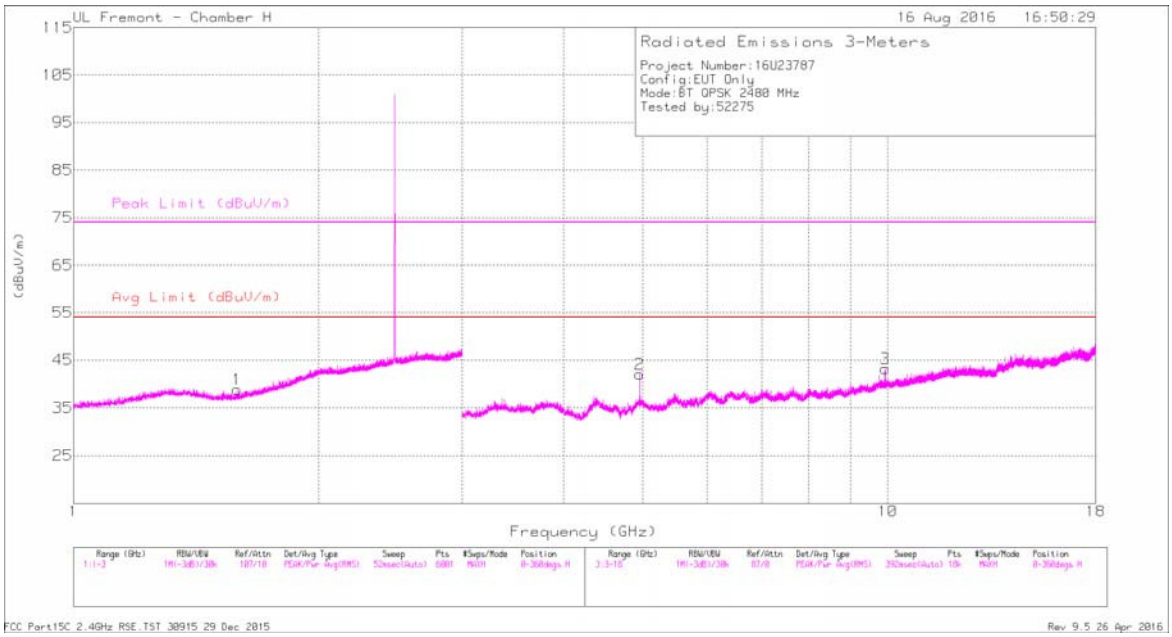
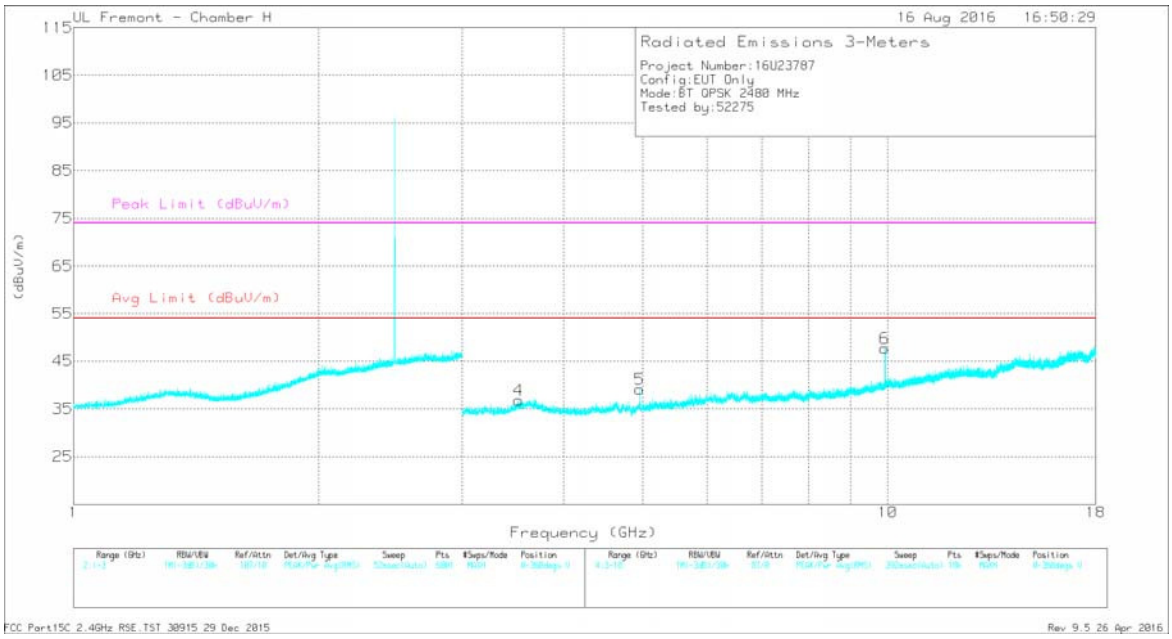
HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (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	* 1.588	36.79	PKFH	27.8	-21.2	43.39	-	-	74	-30.61	359	370	H
	* 1.59	25.27	VA1T	27.8	-21.1	31.97	54	-22.03	-	-	359	370	H
2	* 4.96	47.74	PKFH	34	-34.3	47.44	-	-	74	-26.56	40	224	H
	* 4.96	38.13	VA1T	34	-34.3	37.83	54	-16.17	-	-	40	224	H
4	* 3.519	43.9	PKFH	34.3	-36.1	42.1	-	-	74	-31.9	9	397	V
	* 3.517	32.79	VA1T	34.3	-36.1	30.99	54	-23.01	-	-	9	397	V
5	* 4.961	46.65	PKFH	34	-34.3	46.35	-	-	74	-27.65	163	340	V
	* 4.96	37.78	VA1T	34	-34.3	37.48	54	-16.52	-	-	163	340	V
6	9.92	46.43	PKFH	37.5	-29.3	54.63	-	-	-	-	108	109	V
3	9.921	42.63	PKFH	37.5	-29.2	50.93	-	-	-	-	103	106	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

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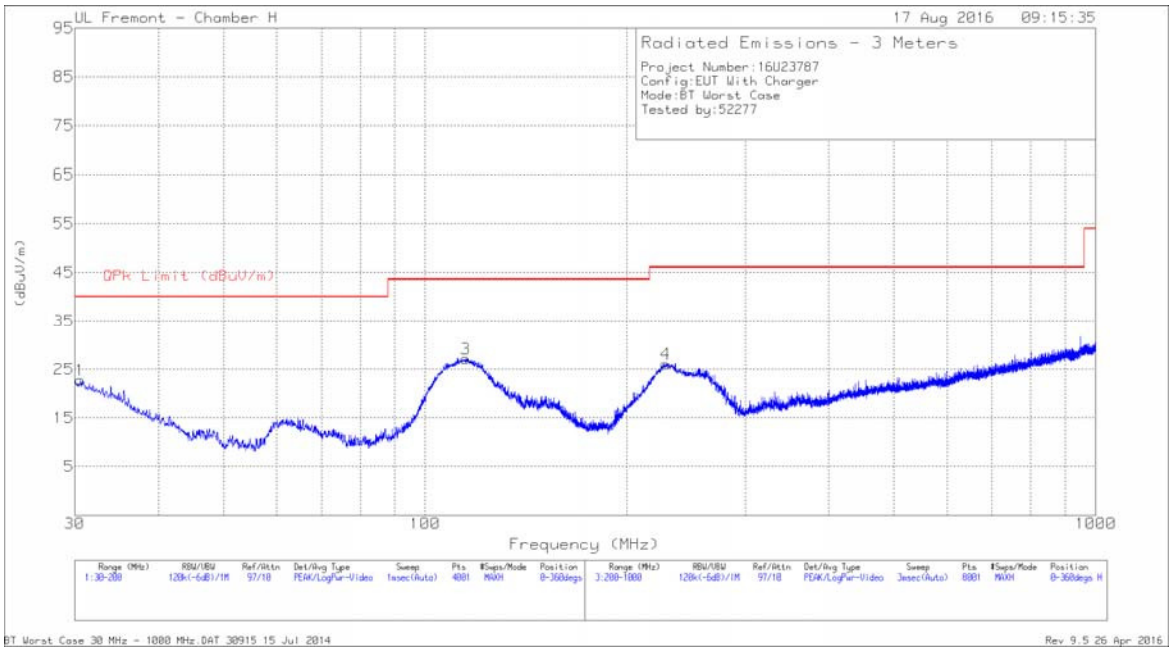
8.3. WORST-CASE BELOW 1 GHz

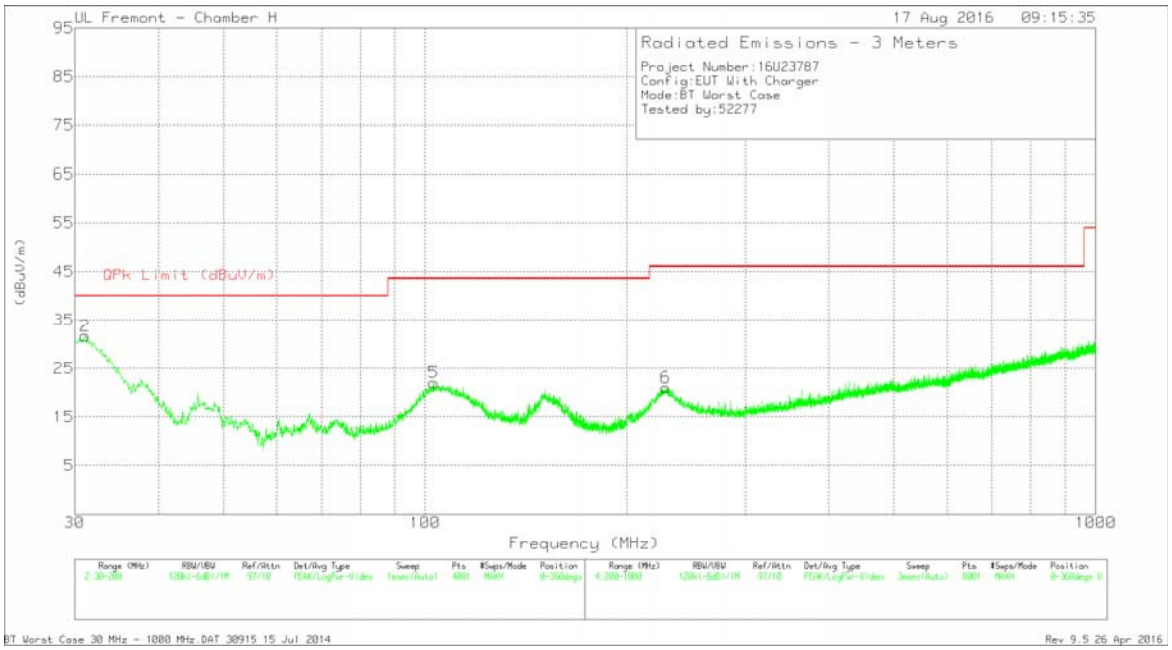
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



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

VERTICAL PLOT



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DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T407 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	30.595	29.25	Pk	24.8	-31.3	22.75	40	-17.25	0-360	101	H
2	31.105	38.52	Pk	24.5	-31.3	31.72	40	-8.28	0-360	100	V
3	* 114.8725	40.23	Pk	17.3	-30.4	27.13	43.52	-16.39	0-360	301	H
4	228.6	40.77	Pk	14.9	-29.6	26.07	46.02	-19.95	0-360	199	H
5	102.9725	37.49	Pk	15	-30.4	22.09	43.52	-21.43	0-360	100	V
6	228.4	35.78	Pk	14.9	-29.6	21.08	46.02	-24.94	0-360	201	V

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

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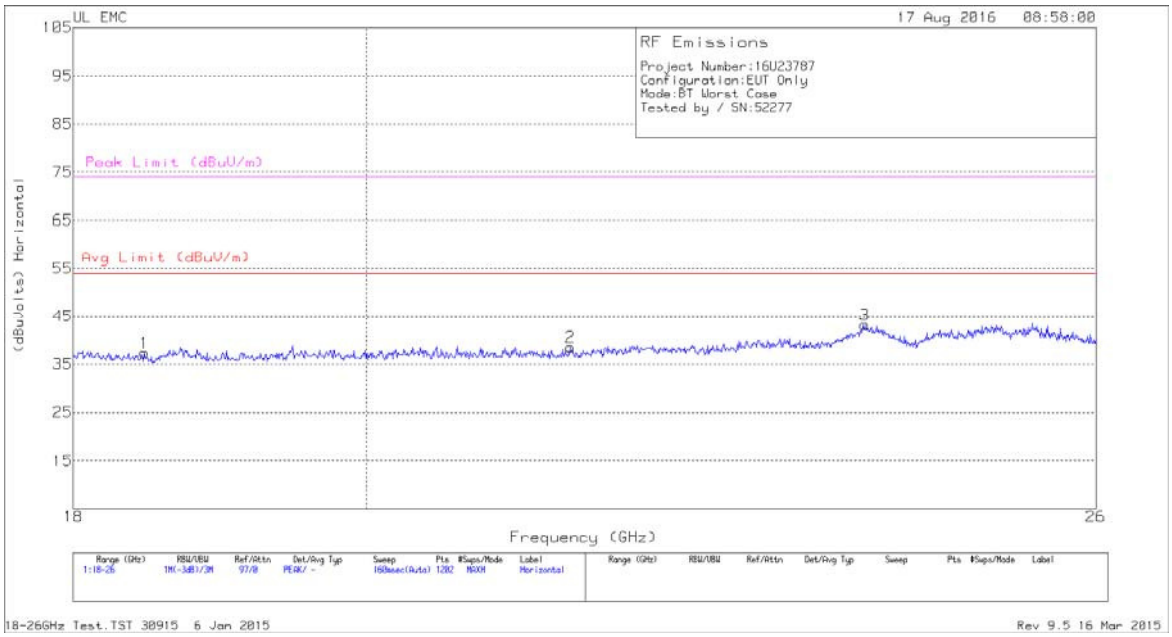
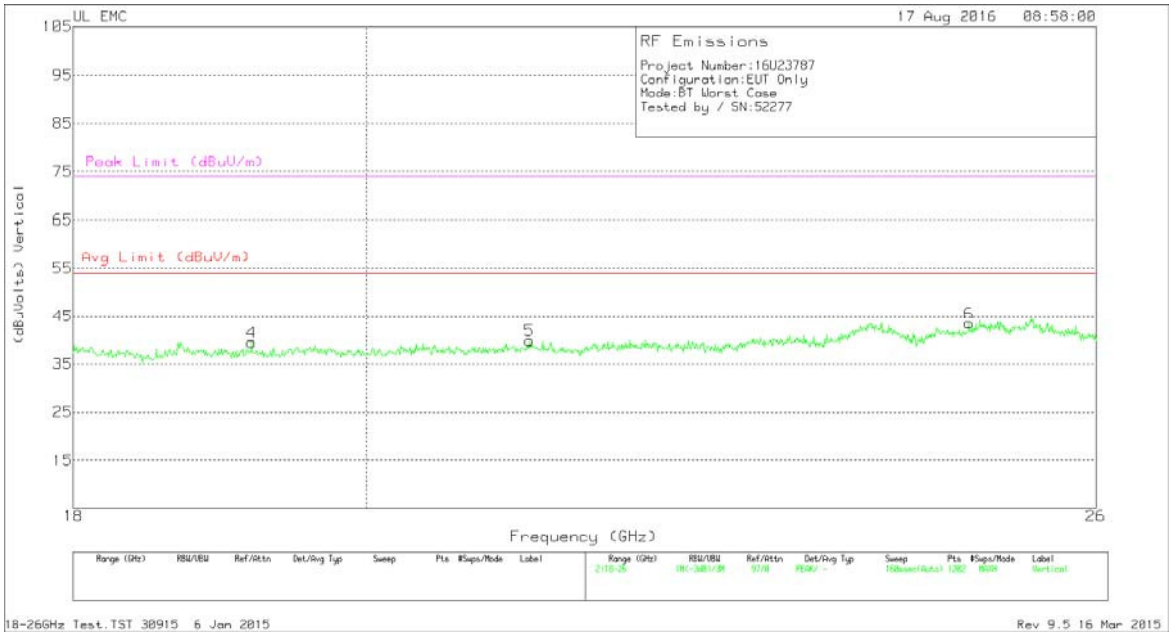
8.4. WORST-CASE ABOVE 18 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



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DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T449 (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	18.466	39.83	Pk	32.5	-25.5	-9.5	37.33	54	-16.67	74	-36.67
2	21.524	40.1	Pk	33.2	-25.3	-9.5	38.5	54	-15.5	74	-35.5
3	23.928	42.67	Pk	34	-24	-9.5	43.17	54	-10.83	74	-30.83
4	19.192	41.1	Pk	32.7	-24.8	-9.5	39.5	54	-14.5	74	-34.5
5	21.211	40.93	Pk	33.1	-24.7	-9.5	39.83	54	-14.17	74	-34.17
6	24.841	43	Pk	34.2	-24.2	-9.5	43.5	54	-10.5	74	-30.5

Pk - Peak detector

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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

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Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	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	.17025	36.72	Qp	0	0	10.1	46.82	64.95	-18.13	-	-
2	.1725	19.93	Ca	0	0	10.1	30.03	-	-	54.84	-24.81
3	.25575	33.63	Qp	0	0	10.1	43.73	61.57	-17.84	-	-
4	.258	17.87	Ca	0	0	10.1	27.97	-	-	51.5	-23.53
5	.78225	25.83	Qp	0	0	10.1	35.93	56	-20.07	-	-
6	.78225	20.78	Ca	0	0	10.1	30.88	-	-	46	-15.12
7	1.29075	16.36	Qp	0	.1	10.1	26.56	56	-29.44	-	-
8	1.293	10.5	Ca	0	.1	10.1	20.7	-	-	46	-25.3
9	6.20925	18.06	Qp	0	.1	10.2	28.36	60	-31.64	-	-
10	6.19125	11.59	Ca	0	.1	10.2	21.89	-	-	50	-28.11
11	18.4605	17.07	Qp	0	.2	10.3	27.57	60	-32.43	-	-
12	18.45825	10.46	Ca	0	.2	10.3	20.96	-	-	50	-29.04

Qp - Quasi-Peak detector
Ca - CISPR average detection

Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	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	.17025	37.39	Qp	0	0	10.1	47.49	64.95	-17.46	-	-
14	.1725	19.95	Ca	0	0	10.1	30.05	-	-	54.84	-24.79
15	.25575	33.93	Qp	0	0	10.1	44.03	61.57	-17.54	-	-
16	.258	16.33	Ca	0	0	10.1	26.43	-	-	51.5	-25.07
17	.78225	24.99	Qp	0	0	10.1	35.09	56	-20.91	-	-
18	.78	15.48	Ca	0	0	10.1	25.58	-	-	46	-20.42
19	1.2795	15.76	Qp	0	.1	10.1	25.96	56	-30.04	-	-
20	1.29075	6.77	Ca	0	.1	10.1	16.97	-	-	46	-29.03
21	6.189	16.05	Qp	0	.1	10.2	26.35	60	-33.65	-	-
22	6.1845	10.33	Ca	0	.1	10.2	20.63	-	-	50	-29.37
23	18.40875	12.14	Qp	0	.2	10.3	22.64	60	-37.36	-	-
24	18.40425	4.93	Ca	0	.2	10.3	15.43	-	-	50	-34.57

Qp - Quasi-Peak detector
Ca - CISPR average detection

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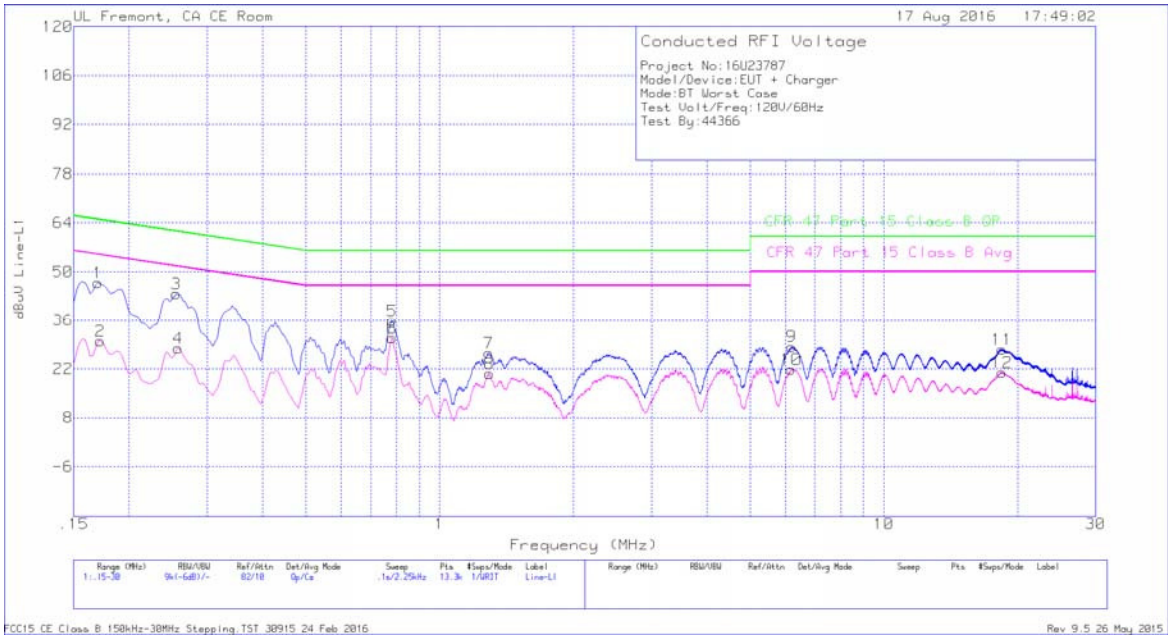
LINE 1 RESULTS



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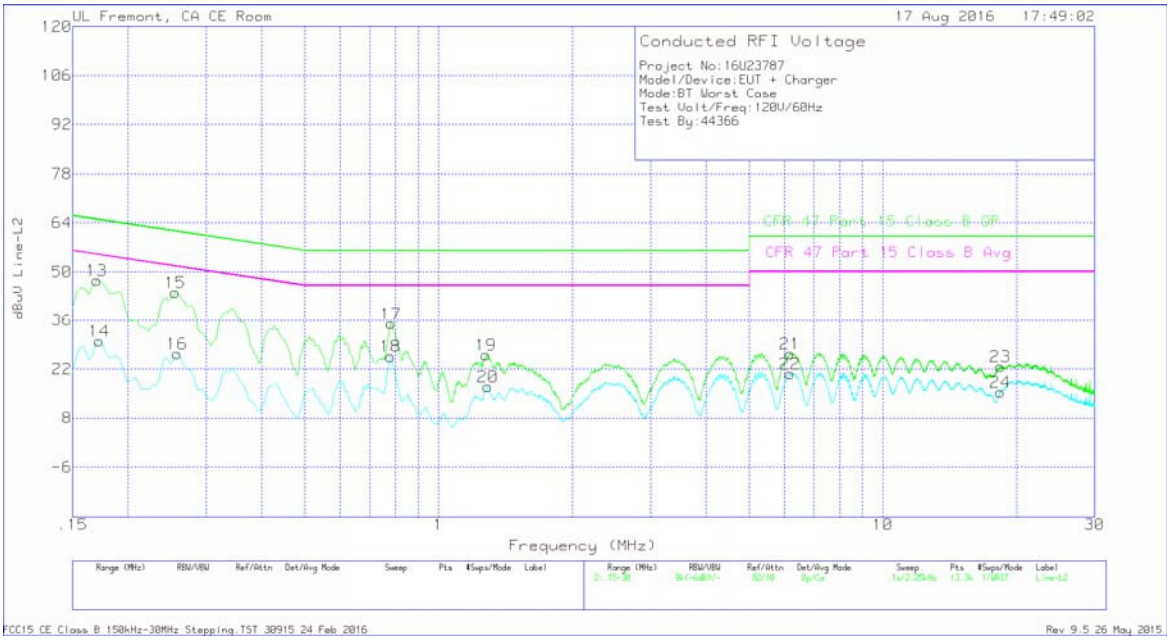
LINE 2 RESULTS



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