



CERTIFICATION TEST REPORT

Report Number. : 12241662-E1V3

Applicant : GOOGLE
1600 AMPHITHEATRE PARKWAY
MOUNTAIN VIEW, CA 94043, U.S.A.

Model : NC2-6A5

FCC ID : A4RNC2-6A5B

IC : 10395A-NC26A5

EUT Description : Multimedia Device with BLE/BT, 2.4Ghz and 5GHz WLAN Radios

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 2
ISED RSS-GEN ISSUE 4

Date Of Issue:

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Prepared by:

UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888



REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	04/17/2018	Initial Issue	---
V2	04/17/2018	Updated section 5.5	F. de Anda
V3	05/02/2018	Updated section 8.6 and 8.7	F. de Anda

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: GOOGLE
1600 AMPHITHEATRE PARKWAY
MOUNTAIN VIEW, CA 94043, U.S.A

EUT DESCRIPTION: Multimedia Device with BLE/BT, 2.4Ghz and 5GHz WLAN Radios

MODEL: NC2-6A5

SERIAL NUMBER: MLB1(Conducted)
G1172786 (Radiated)


DATE TESTED: April 04 –April 12, 2018

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 4	Complies

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 the U.S. government.

Approved & Released For
UL Verification Services Inc. By:



Francisco de Anda
CONSUMER TECHNOLOGY DIVISION
Operations Leader
UL Verification Services Inc.

Prepared By:



Eric Yu
CONSUMER TECHNOLOGY DIVISION
Test 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
<input checked="" type="checkbox"/> Chamber A (ISED:2324B-1)	<input type="checkbox"/> Chamber D (ISED:22541-1)
<input type="checkbox"/> Chamber B (ISED:2324B-2)	<input type="checkbox"/> Chamber E (ISED:22541-2)
<input type="checkbox"/> Chamber C (ISED:2324B-3)	<input type="checkbox"/> Chamber F (ISED:22541-3)
	<input type="checkbox"/> Chamber G (ISED:22541-4)
	<input type="checkbox"/> Chamber H (ISED:22541-5)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

Chambers A through C are covered under ISED company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under ISED company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at [NVLAP Lab Search](#).

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
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. EUT DESCRIPTION

The EUT is a Multimedia Device with BLE/BT, 2.4Ghz and 5GHz WLAN Radios.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	5.62	3.65
2402 - 2480	Enhanced 8PSK	6.38	4.35
2402 - 2480	Enhanced DQPSK	5.87	3.86

Note: GFSK, DQPSK, 8PSK average Power are all investigated, The GFSK & 8PSK testing was done on these modes to show compliance.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB antenna, with a maximum gain of 3.1dBi for antenna 1 and 2.3dBi for antenna 2.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 15.2.7.09.

The test utility software used during testing was Labtool ver 2.0.0.71

5.5. WORST-CASE CONFIGURATION AND MODE

An evaluation between antenna port 1 and antenna port 2, that drive the BT signals, was performed. Power levels on antenna port 1 are higher. Spot testing determined that antenna port 1 is worst case and data for this port is included in this report. Checks were also performed to confirm that with 802.11bgn + Bluetooth and with 802.11an + Bluetooth transmitters operational simultaneously no new emissions were created and the stand-alone measurements represent the worst case for emissions

Radiated emission and power line conducted emission were performed with the EUT 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 Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

Worst-case data rates as provided by the client were:

GFSK mode: DH5
8PSK mode: 3-DH5

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Dell	1650-05D	5U092	N/A
AC Adapter	Google	N/A	S005BB09500100	N/A
Laptop	Dell	N/A	CHFVLQ1	N/A
USB Hub	N/A	N/A	N/A	N/A

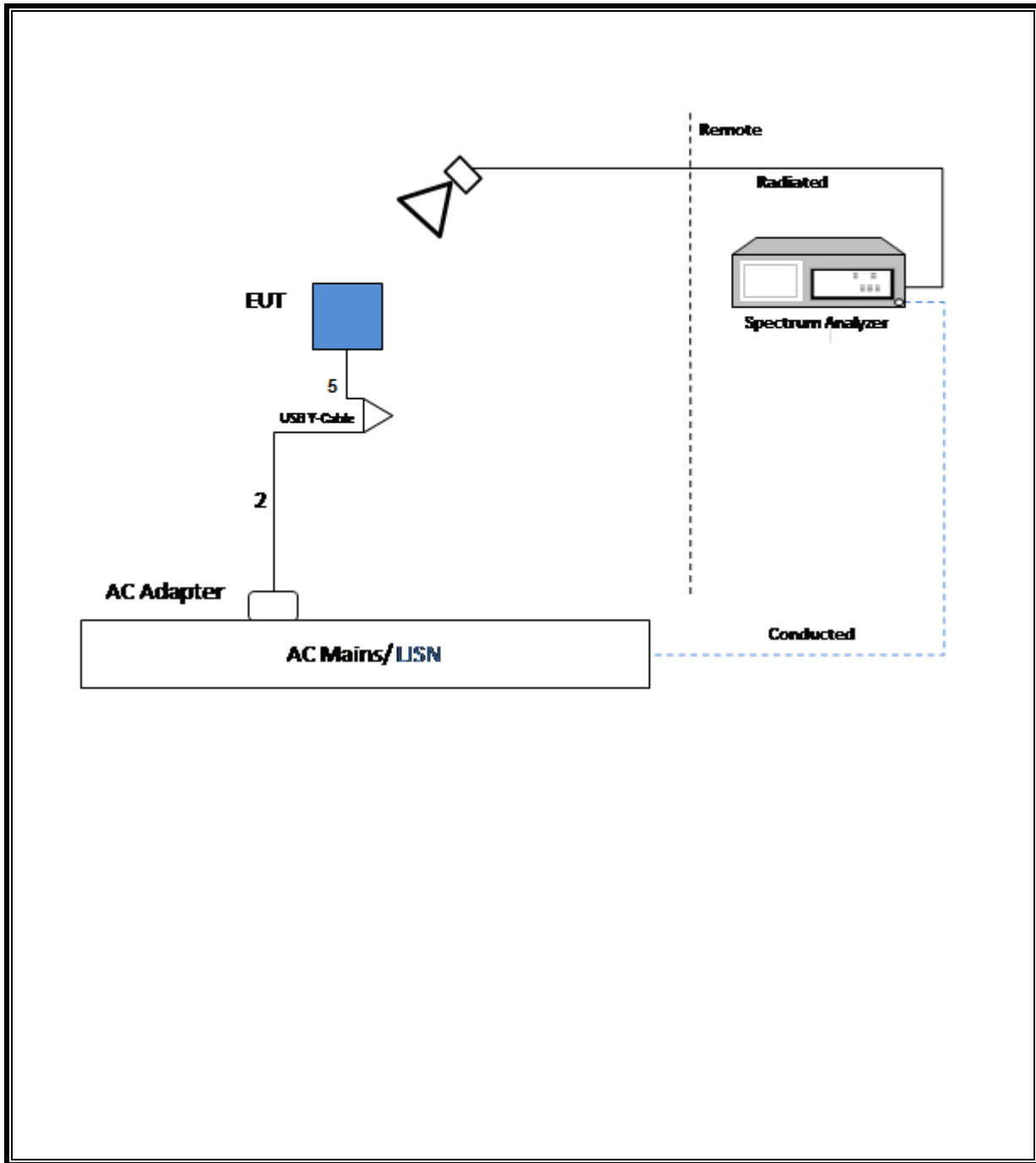
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	Barrel	unshielded	0.8	
2	USB	1	USB	unshielded	1.5	Power cable
3	USB	1	USB	unshielded	2.5	
4	USB	1	USB	unshielded	0.2	Data
5	USB	1	Micro USB	unshielded	0.2	Y-cable

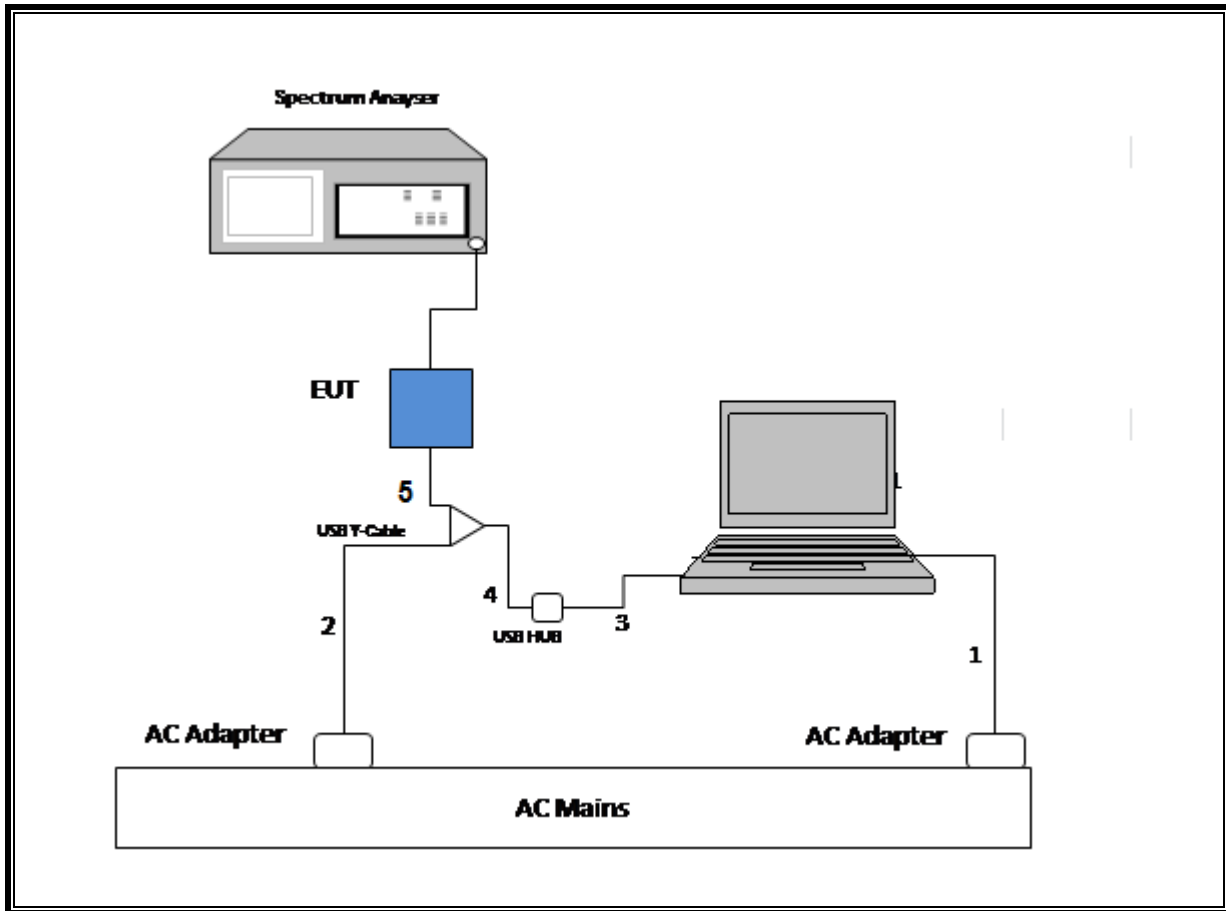
TEST SETUP

The EUT is connected to a host laptop via USB interface for conducted tests. Laptop was used to program EUT then removed for radiated tests, test software exercises the radio.

SETUP DIAGRAM FOR RADIATED and AC LC TESTS



SETUP DIAGRAM FOR CONDUCTED TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Amplifier, 10KHz to 1GHz, 32dB	Agilent (Keysight) Technologies	8447D	T15	08/14/2018
Amplifier, 1 - 18GHz	MITEQ	AFS42-00101800-25-S-42	T931	09/20/2018
RF Preamplifier, 1 - 26GHz	Agilent	8449B	T404	07/23/2018
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB3	T130	06/15/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T862	06/09/2018
Antenna Horn, 18 to 26GHz	ARA	MWH-1826	T89	01/18/2019
Power Meter, P-series single channel	Keysight	N1912A	T1245	05/12/2018
Power Sensor	Keysight	N1921A	T413	06/22/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1466	04/21/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1454	01/08/2019
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1113	12/21/2018
AC Line Conducted				
EMI Test Receiver 9Khz-7GHz	Rohde & Schwarz	ESC17	T1124	11/07/2018
LISN for Conducted Emissions CISPR-16	Fischer	50/250-25-2-01	T1310	06/15/2018
Power Cable, Line Conducted Emissions	UL	PG1	T861	08/31/2018
UL AUTOMATION SOFTWARE				
Radiated Software	UL	UL EMC	Ver 9.5, Dec 01, 2016	
Conducted Software	UL	UL EMC	Ver 7.7, Dec 14, 2017	
AC Line Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015	

NOTES:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

7. MEASUREMENT METHODS

On Time and Duty Cycle: ANSI C63.10-2013 Section 11.6

Occupied BW (20dB): ANSI C63.10-2013 Section 6.9.2

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Carrier Frequency Separation: ANSI C63.10-2013 Section 7.8.2

Number of Hopping Frequencies: ANSI C63.10-2013 Section 7.8.3

Time of Occupancy (Dwell Time): ANSI C63.10-2013 Section 7.8.4

Peak Output Power: ANSI C63.10-2013 Section 7.8.5

Conducted Spurious Emissions: ANSI C63.10-2013 Section 7.8.8

Conducted Band-Edge: ANSI C63.10-2013 Section 6.10.4

Radiated Spurious Emissions 30-1000MHz: ANSI C63.10-2013 Section 6.3 and 6.5

Radiated Spurious Emissions above 1GHz: ANSI C63.10-2013 Section 6.3 and 6.6

Radiated Band-edge: ANSI C63.10-2013 Section 6.10.5

AC Power-line conducted emissions: ANSI C63.10-2013, Section 6.2.

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

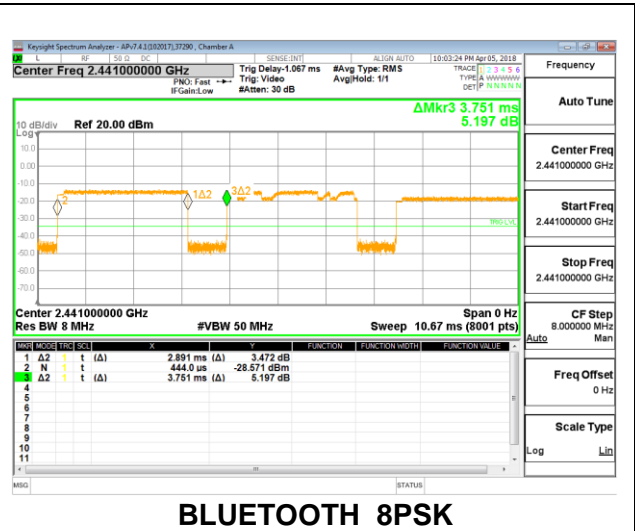
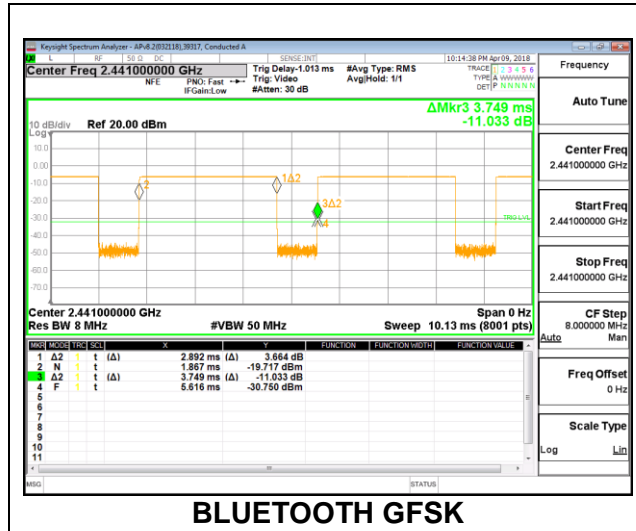
PROCEDURE

ANSI C63.10, Section 11.6 : Zero-Span Spectrum Analyzer Method.

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	2.89	3.75	0.771	77.1%	1.13	0.346
8PSK	2.89	3.75	0.771	77.1%	1.13	0.346

DUTY CYCLE PLOTS



8.2. 20 dB AND 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

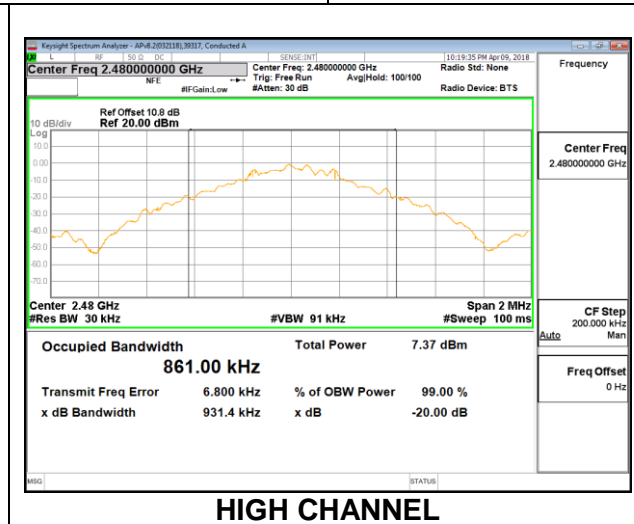
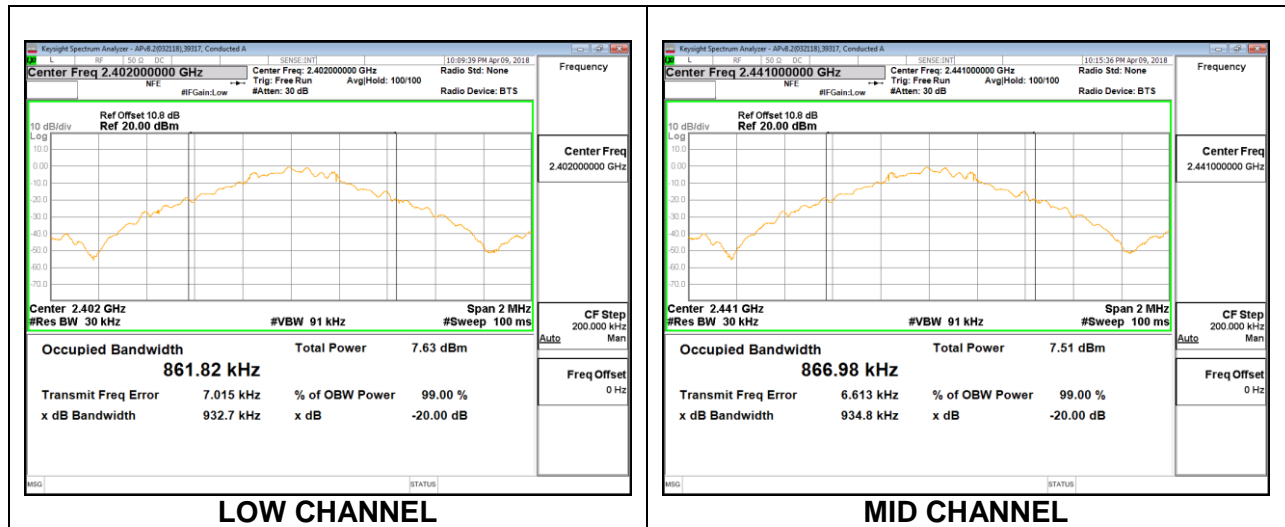
TEST PROCEDURE

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

RESULTS

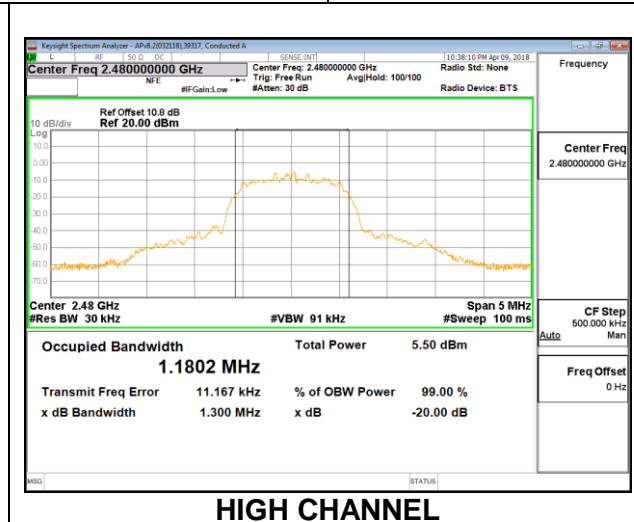
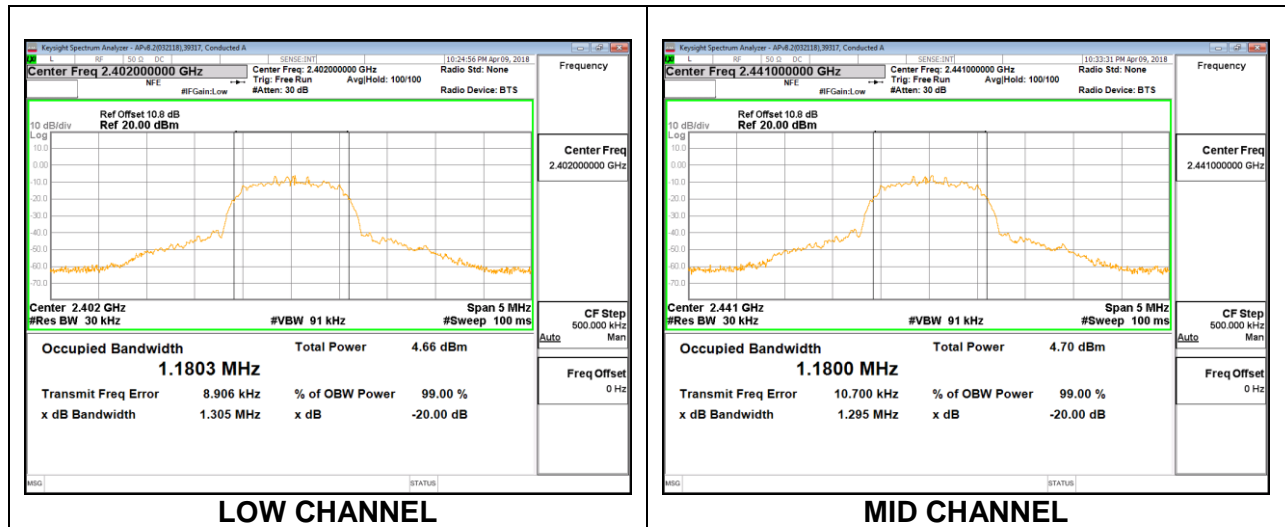
8.2.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.933	0.862
Mid	2441	0.935	0.867
High	2480	0.931	0.861



8.2.2. BLUETOOTH ENCHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.305	1.180
Mid	2441	1.295	1.180
High	2480	1.300	1.180



8.3. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

RSS-247 (5.1) (b)

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

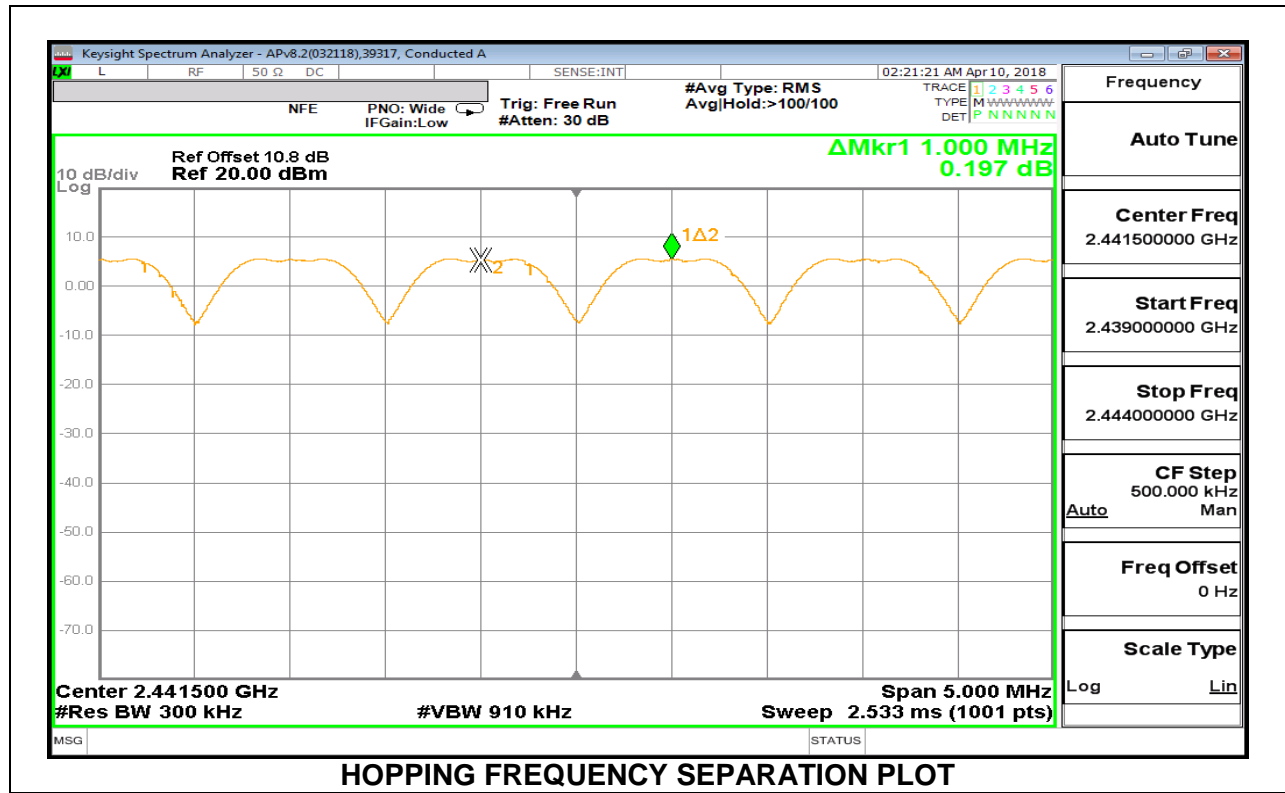
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

TEST PROCEDURE

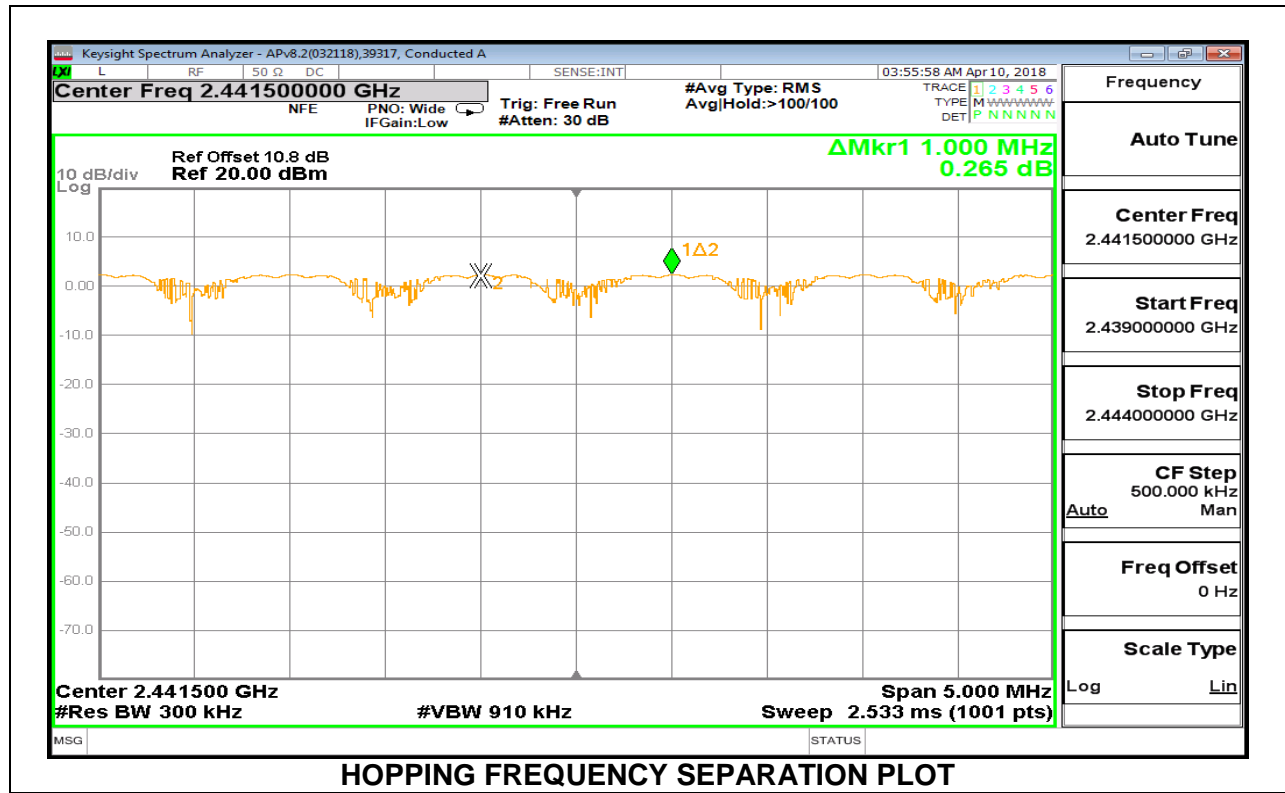
The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to 910 kHz. The sweep time is coupled.

RESULTS

8.3.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



8.3.2. BLUETOOTH ENCHANCED DATA RATE 8PSK MODULATION



8.4. NUMBER OF HOPPING CHANNELS

LIMITS

FCC §15.247 (a) (1) (iii)

RSS-247 (5.1) (d)

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

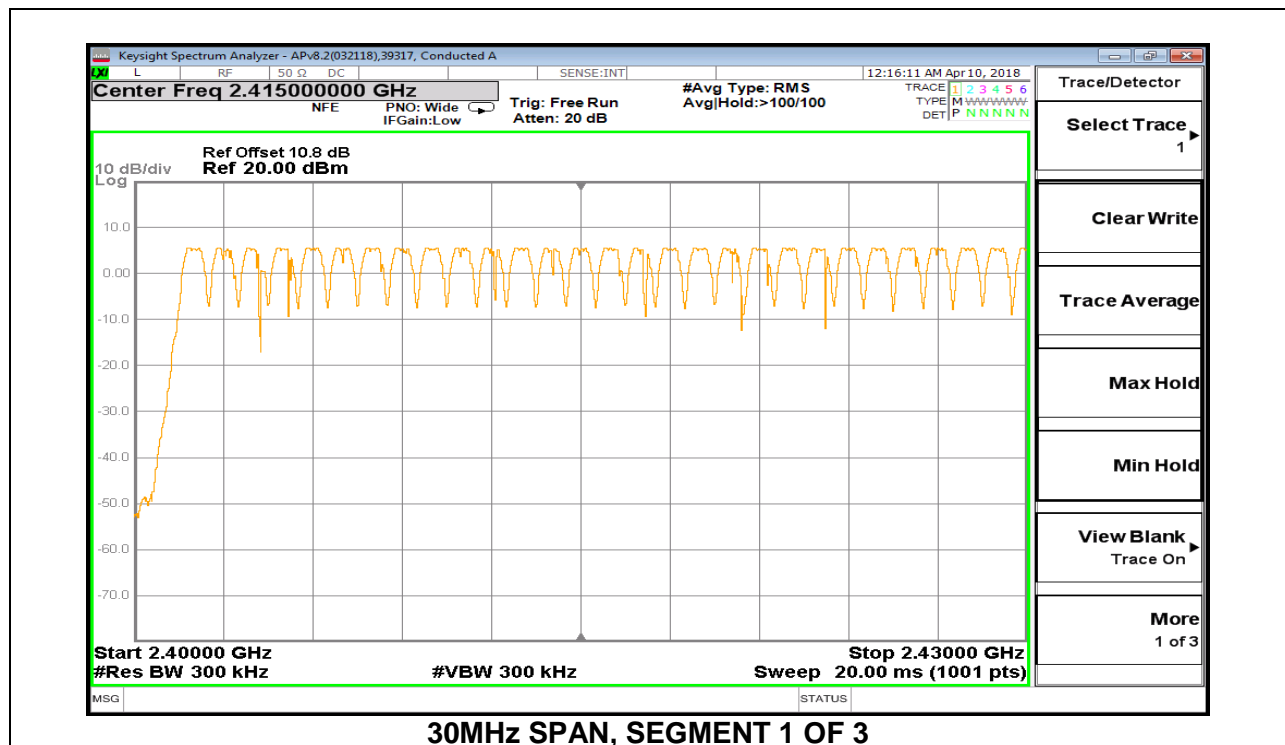
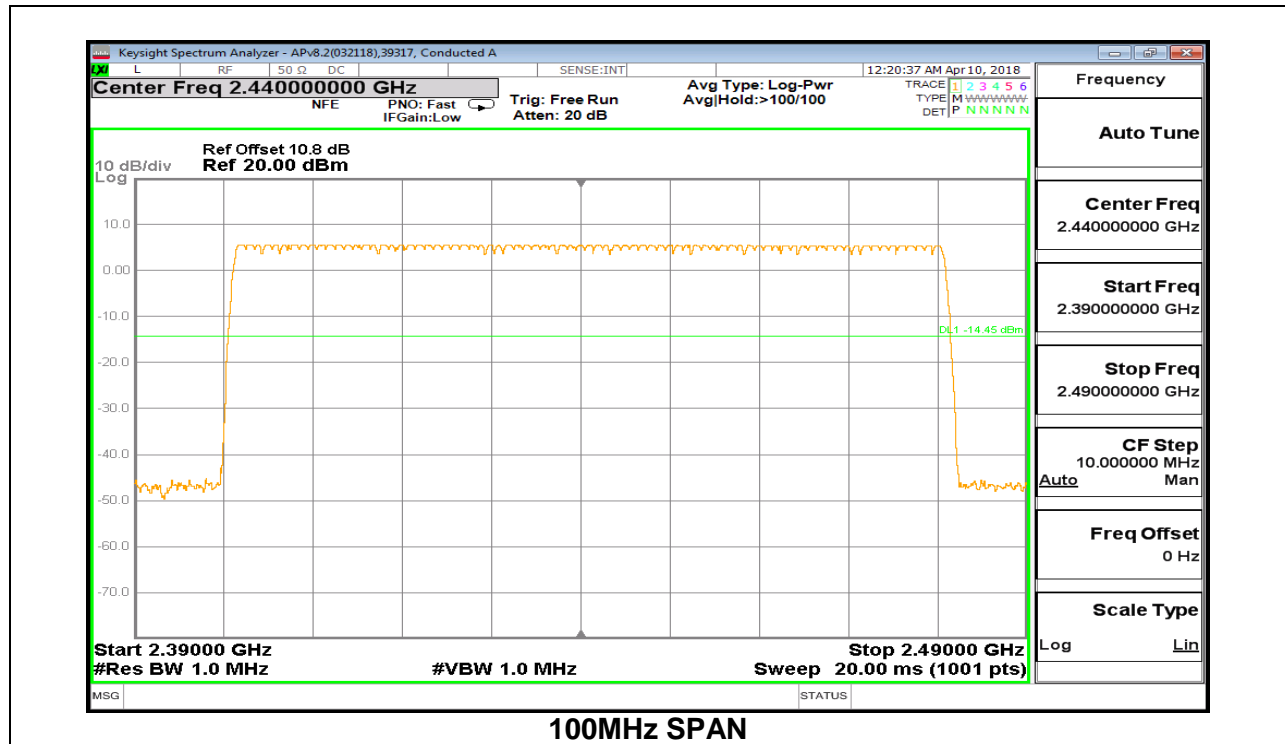
TEST PROCEDURE

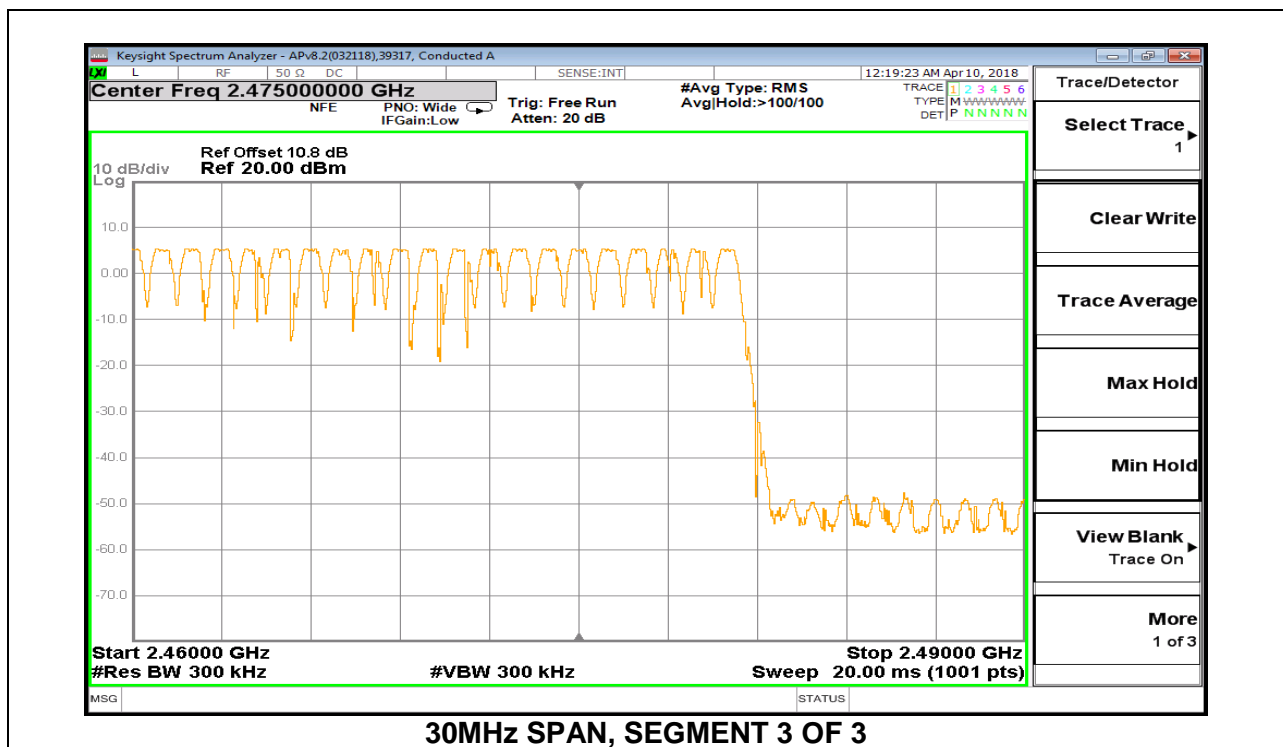
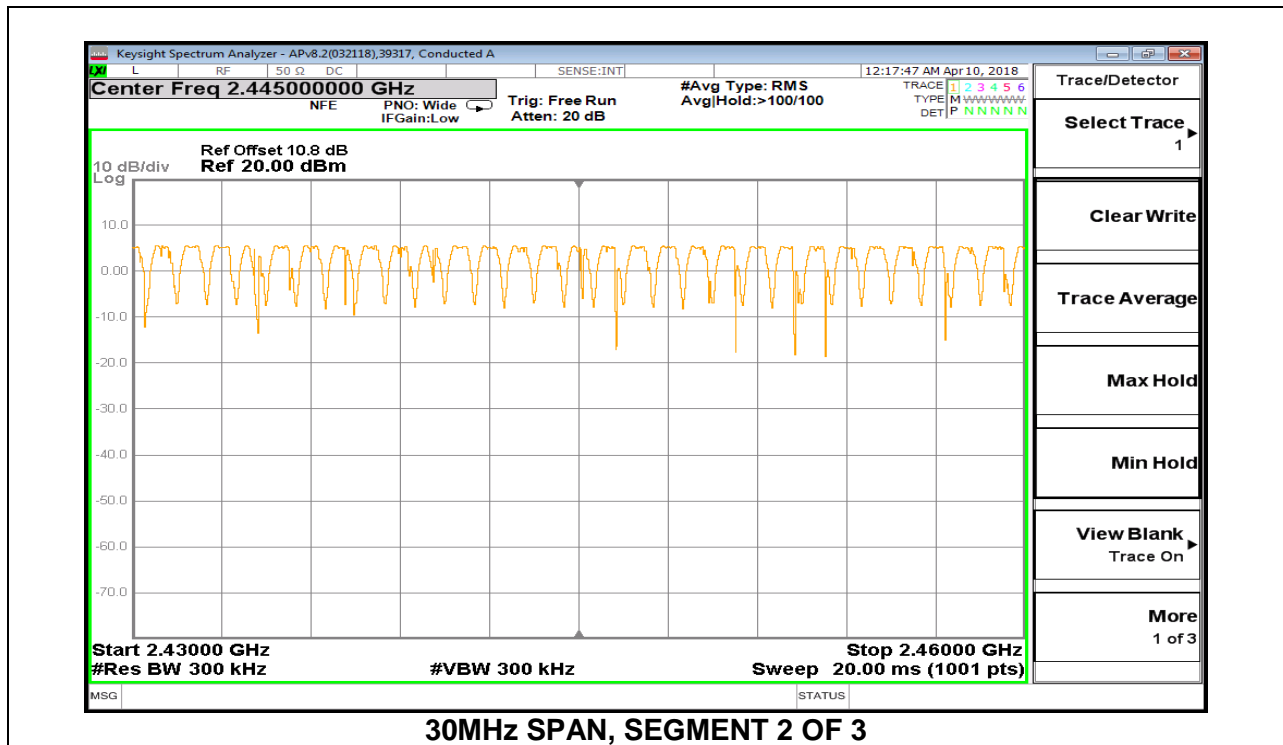
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

RESULTS

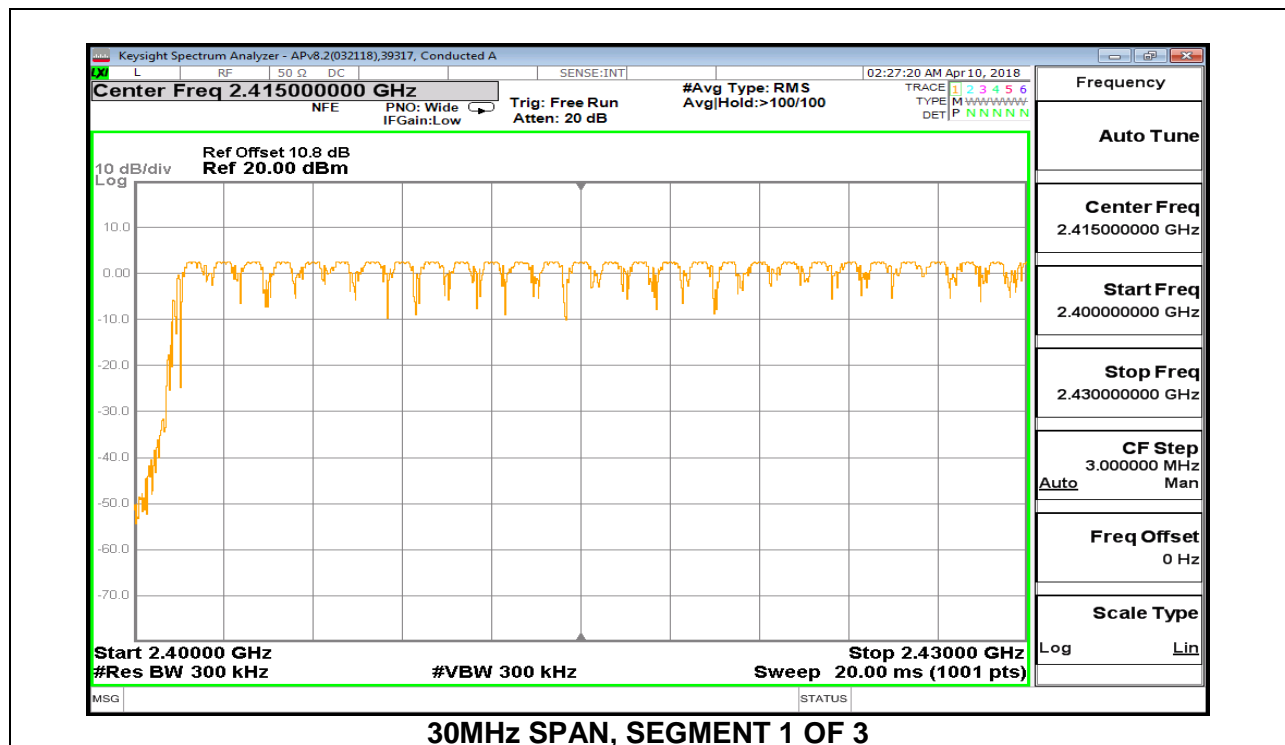
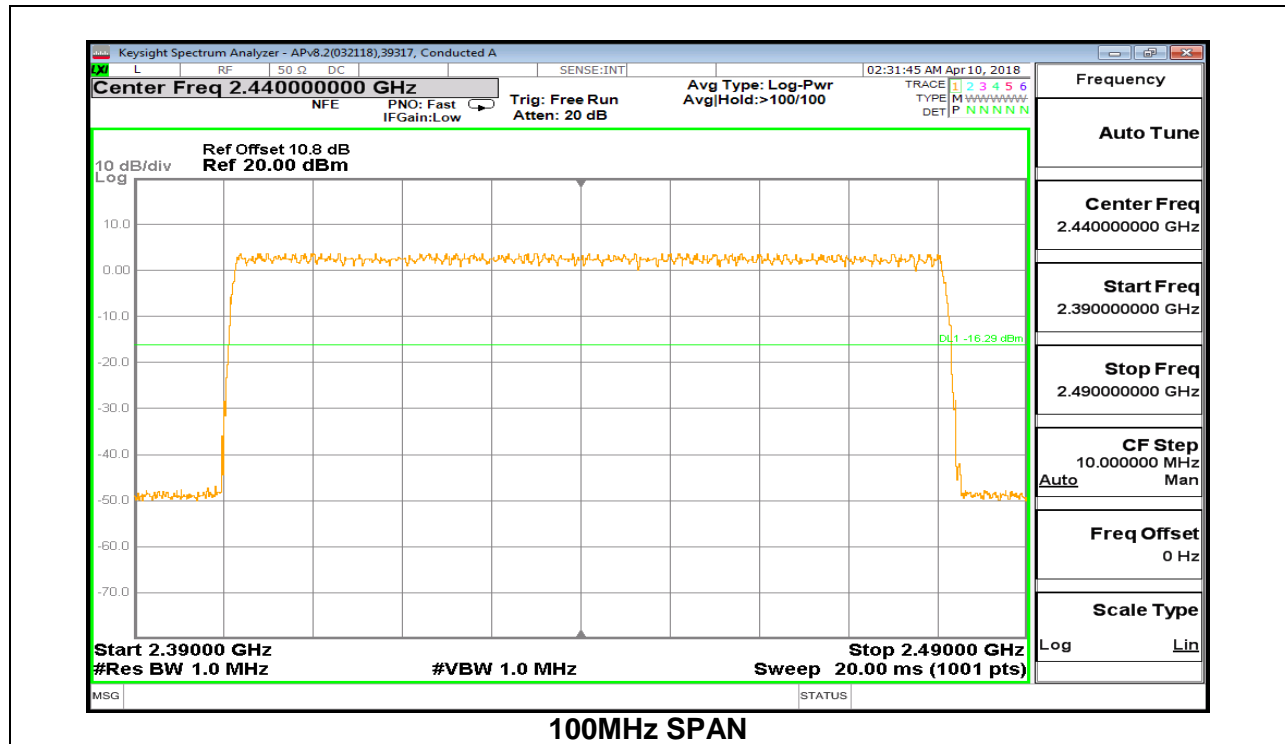
Normal Mode: 79 Channels Observed

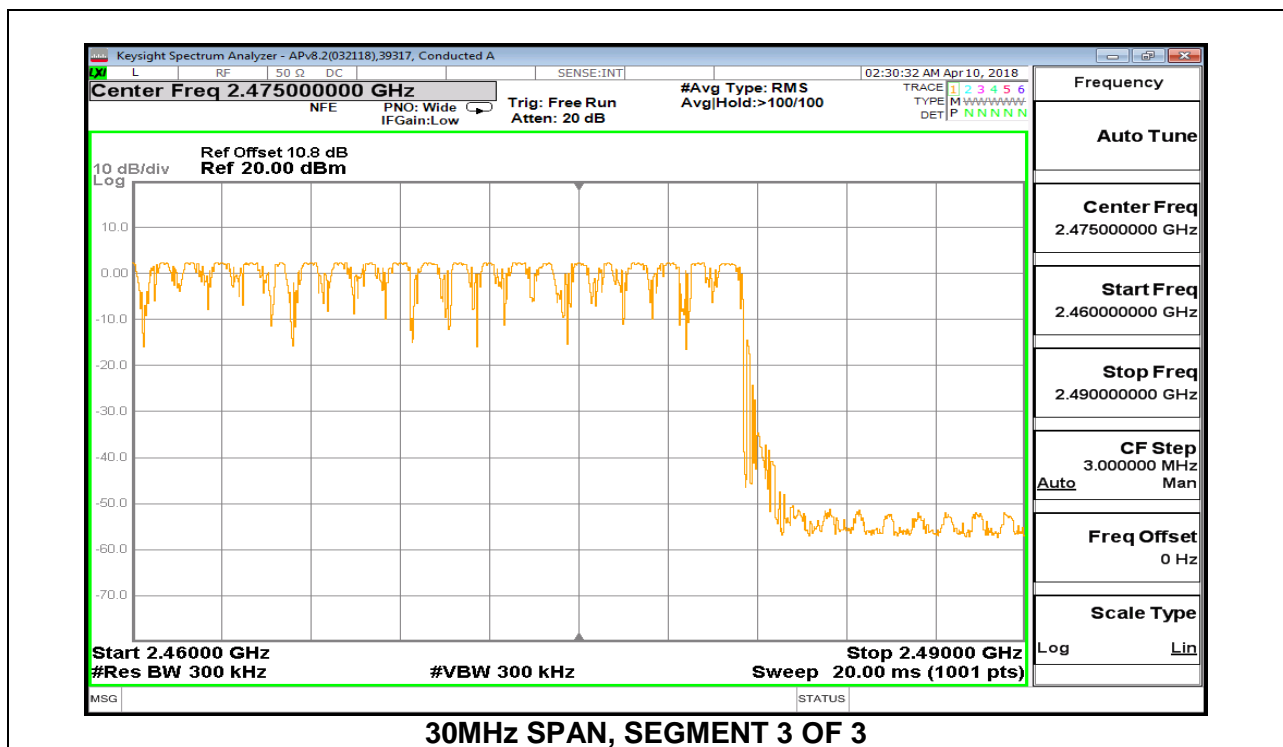
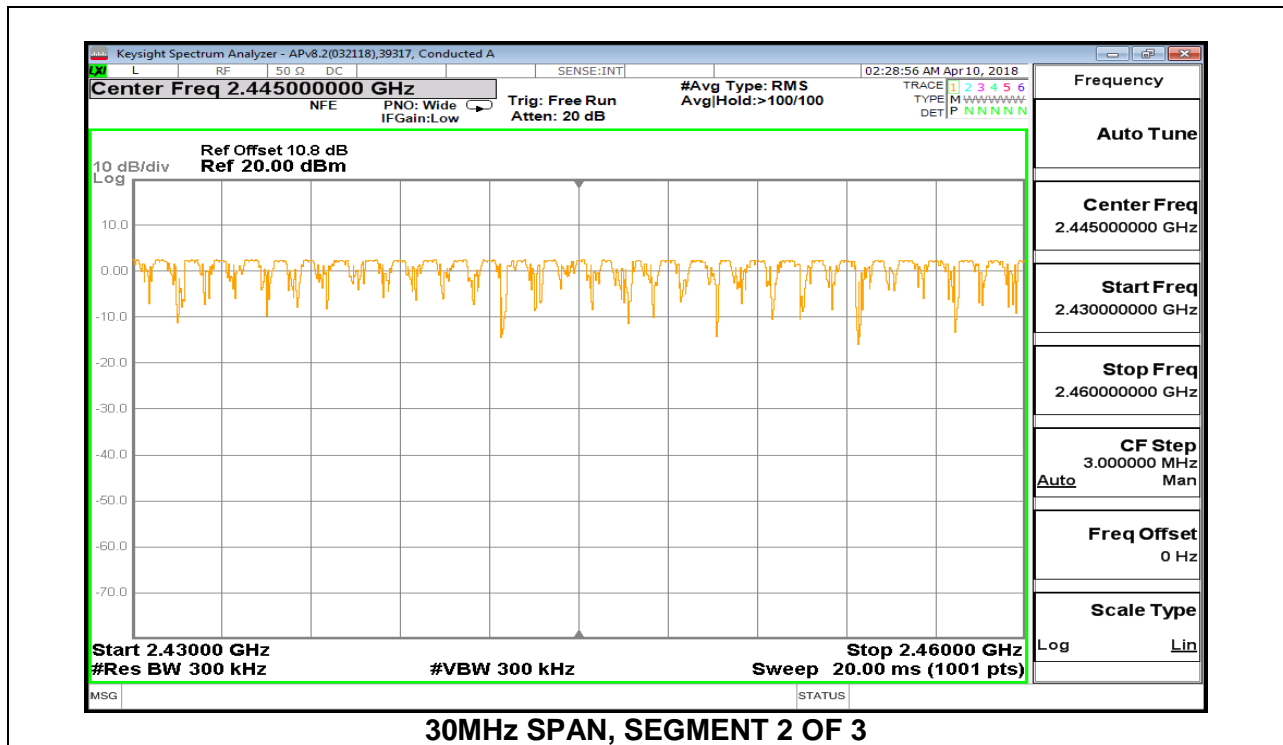
8.4.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION





8.4.2. BLUETOOTH ENCHANCED DATA RATE 8PSK MODULATION





8.5. AVERAGE TIME OF OCCUPANCY

LIMITS

FCC §15.247 (a) (1) (iii)

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.

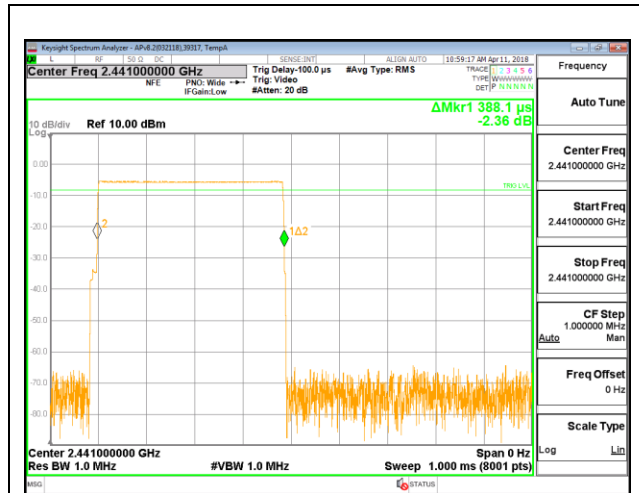
The average time of occupancy in the specified 3.16 second period (79 channels * 0.4 s) is equal to $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{ pulse width}$.

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

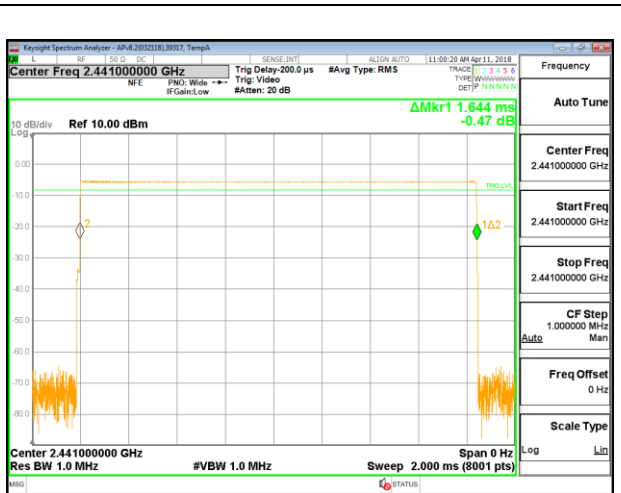
RESULTS

8.5.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

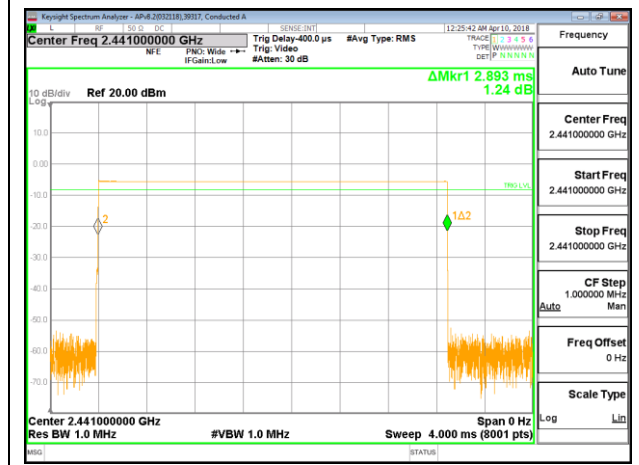
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK Normal Mode					
DH1	0.3881	32	0.1242	0.4	-0.2758
DH3	1.644	12	0.1973	0.4	-0.2027
DH5	2.893	7	0.2025	0.4	-0.1975
GFSK AFH Mode					
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
DH1	0.3881	8	0.03105	0.4	-0.3690
DH3	1.644	3	0.04932	0.4	-0.3507
DH5	2.893	1.75	0.05063	0.4	-0.3494



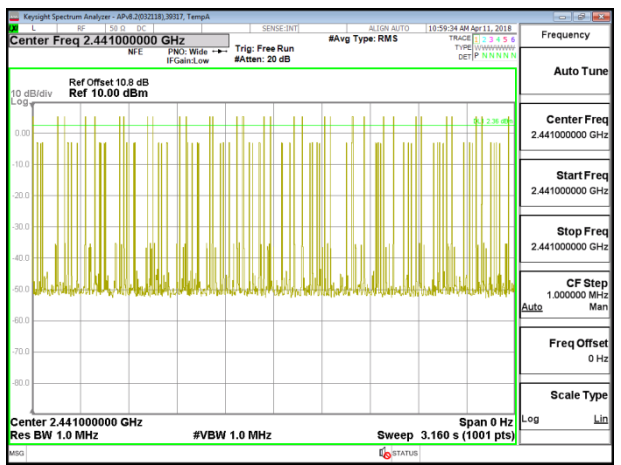
PULSE WIDTH – DH1



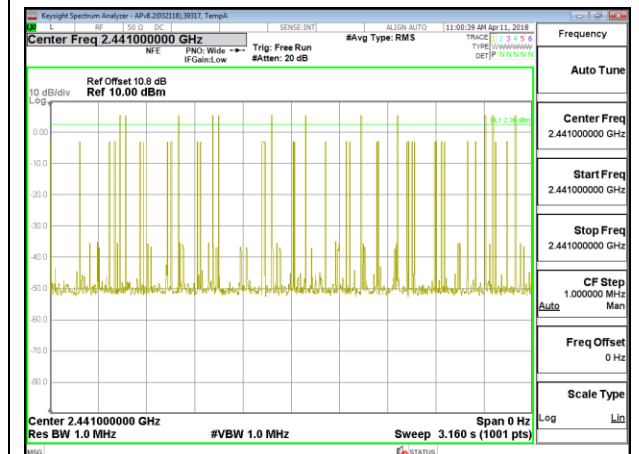
PULSE WIDTH – DH3



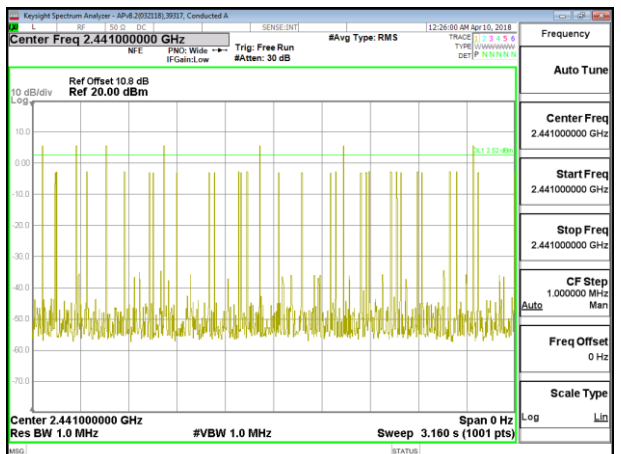
PULSE WIDTH – DH5



**NUMBER OF PULSES IN 3.16 SECOND
 OBSERVATION PERIOD – DH1**



**NUMBER OF PULSES IN 3.16 SECOND
 OBSERVATION PERIOD – DH3**

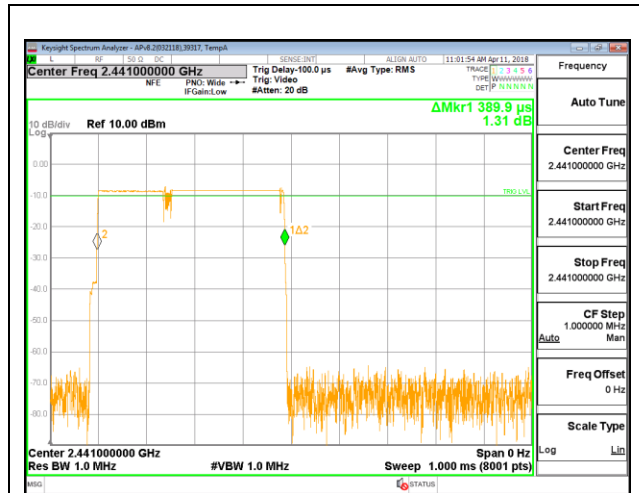


**NUMBER OF PULSES IN 3.16 SECOND
 OBSERVATION PERIOD – DH5**

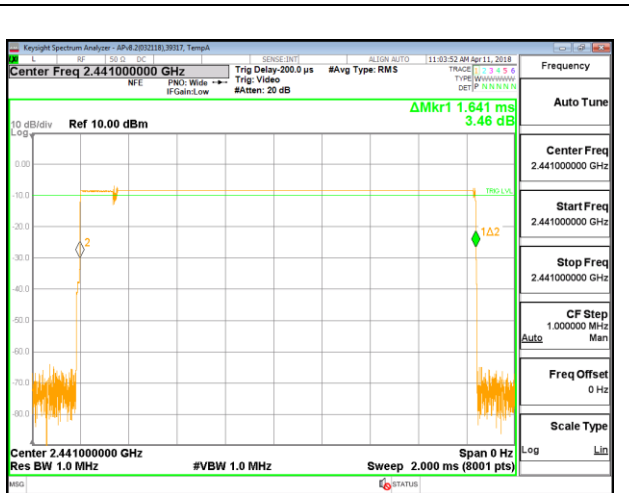
8.5.2. BLUETOOTH ENCHANCED DATA RATE 8PSK MODULATION

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
8PSK Normal Mode					
3DH1	0.390	32	0.12477	0.4	-0.27523
3DH3	1.641	15	0.24615	0.4	-0.15385
3DH5	2.891	10	0.28910	0.4	-0.1109

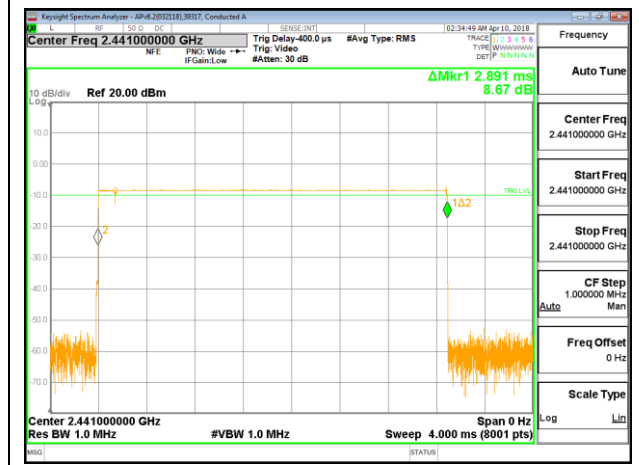
Note: for AFH(8PSK) mode, please refer to the results of AFH(GFSK) mode; the channel selection and hopping rate are the same for both EDR and Basic Rate operation, data for Basic Rate in section 4.5.1 demonstrates compliance with channel occupancy when AFH is employed.



PULSE WIDTH – DH1



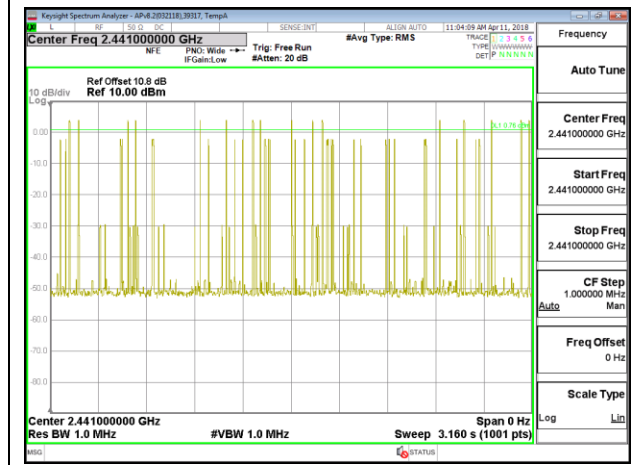
PULSE WIDTH – DH3



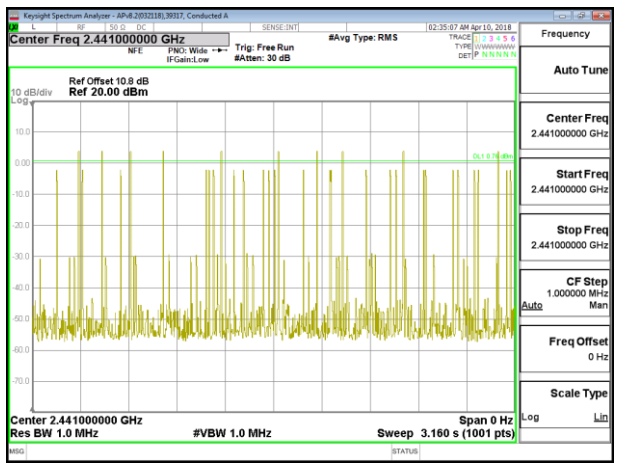
PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5

8.6. OUTPUT POWER ANTENNA 1

LIMITS

§15.247 (b) (1)

RSS-247 (5.4) (b)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts

TEST PROCEDURE

The transmitter output is connected to a wideband gated RF power meter..

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.8 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

8.6.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Tested By:	39317 ST
Date:	4/11/2018

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.62	21	-15.38
Middle	2441	5.56	21	-15.44
High	2480	5.46	21	-15.54

8.6.2. BLUETOOTH ENCHANCED DATA RATE 8PSK MODULATION

Tested By:	39317 ST
Date:	4/11/2018

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	6.38	30	-23.62
Middle	2441	6.31	30	-23.69
High	2480	6.28	30	-23.72

8.6.3. BLUETOOTH ENCHANCED DATA RATE DQPSK MODULATION

Tested By:	39317 ST
Date:	4/11/2018

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.87	21	-15.13
Middle	2441	5.79	21	-15.21
High	2480	5.66	21	-15.34

8.7. OUTPUT POWER ANTENNA 2

LIMITS

§15.247 (b) (1)

RSS-247 (5.4) (b)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts

TEST PROCEDURE

The transmitter output is connected to a wideband gated RF power meter..

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.8 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

8.7.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Tested By:	39317 ST
Date:	4/13/2018

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.11	21	-15.89
Middle	2441	5.01	21	-15.99
High	2480	4.84	21	-16.16

8.7.2. BLUETOOTH ENCHANCED DATA RATE 8PSK MODULATION

Tested By:	39317 ST
Date:	4/13/2018

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.80	30	-24.2
Middle	2441	5.70	30	-24.3
High	2480	5.66	30	-24.34

8.7.3. BLUETOOTH ENCHANCED DATA RATE DQPSK MODULATION

Tested By:	39317 ST
Date:	4/13/2018

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.56	21	-15.44
Middle	2441	5.44	21	-15.56
High	2480	5.31	21	-15.69

8.8. AVERAGE POWER ANTENNA 1

LIMITS

None; for reporting purposes only

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.8 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

8.8.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Tested By:	39317 ST
Date	4/11/2018

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	5.53
Middle	2441	5.49
High	2480	5.41

8.8.2. BLUETOOTH ENCHANCED DATA RATE 8PSK MODULATION

Tested By:	39317 ST
Date	4/11/2018

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	3.26
Middle	2441	3.32
High	2480	3.27

8.8.3. BLUETOOTH ENCHANCED DATA RATE DQPSK MODULATION

Tested By:	39317 ST
Date	4/11/2018

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	2.87
Middle	2441	2.86
High	2480	3.09

8.9. AVERAGE POWER ANTENNA 2

LIMITS

None; for reporting purposes only

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.8 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

8.9.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Tested By:	39317 ST
Date	4/13/2018

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	4.95
Middle	2441	4.87
High	2480	4.74

8.9.2. BLUETOOTH ENCHANCED DATA RATE 8PSK MODULATION

Tested By:	39317 ST
Date	4/13/2018

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	2.91
Middle	2441	2.45
High	2480	2.52

8.9.3. BLUETOOTH ENCHANCED DATA RATE DQPSK MODULATION

Tested By:	39317 ST
Date	4/13/2018

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	1.62
Middle	2441	2.03
High	2480	2.68

8.10. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

RSS-247 (5.5)

Limit = -20 dBc

TEST PROCEDURE

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

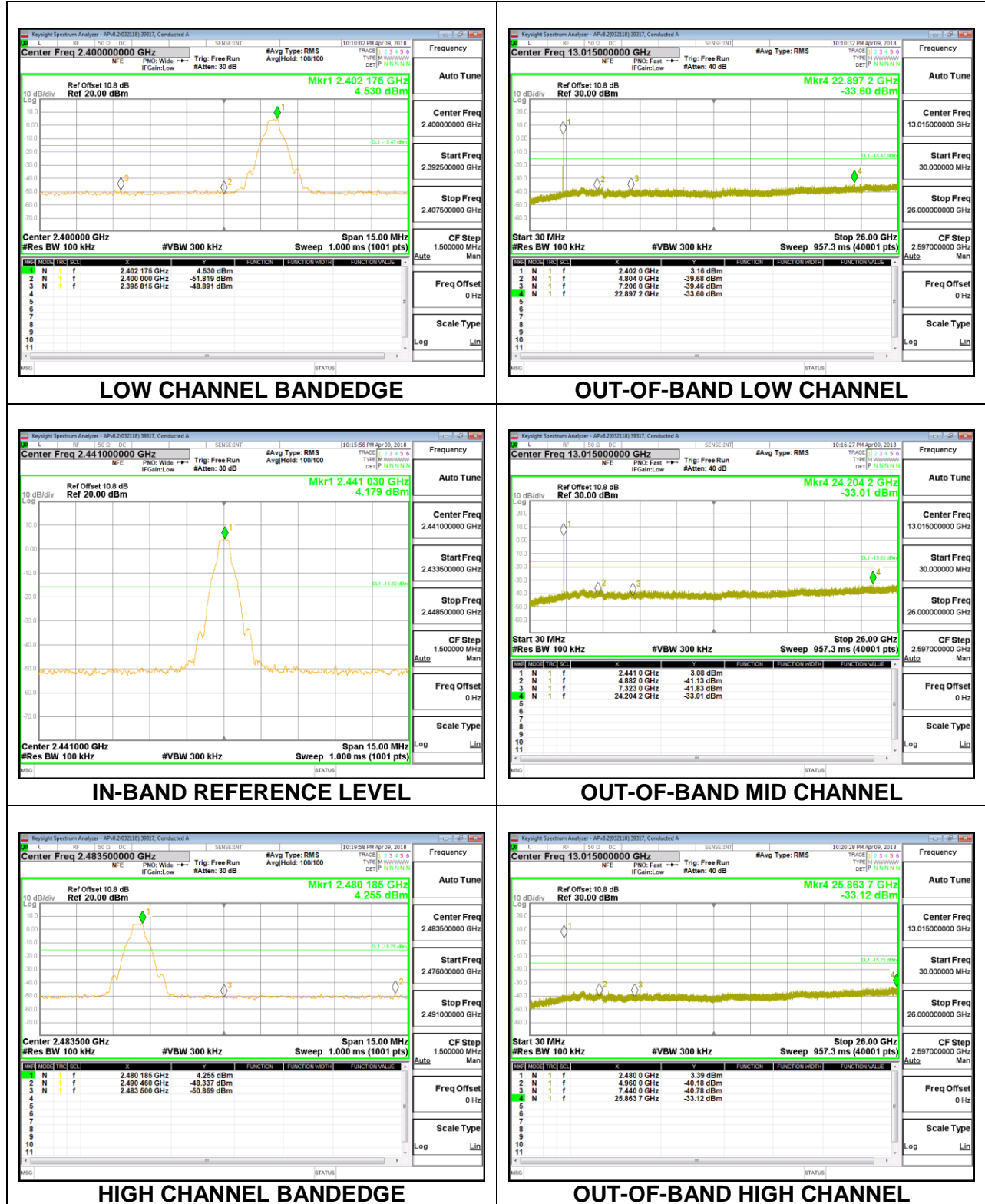
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

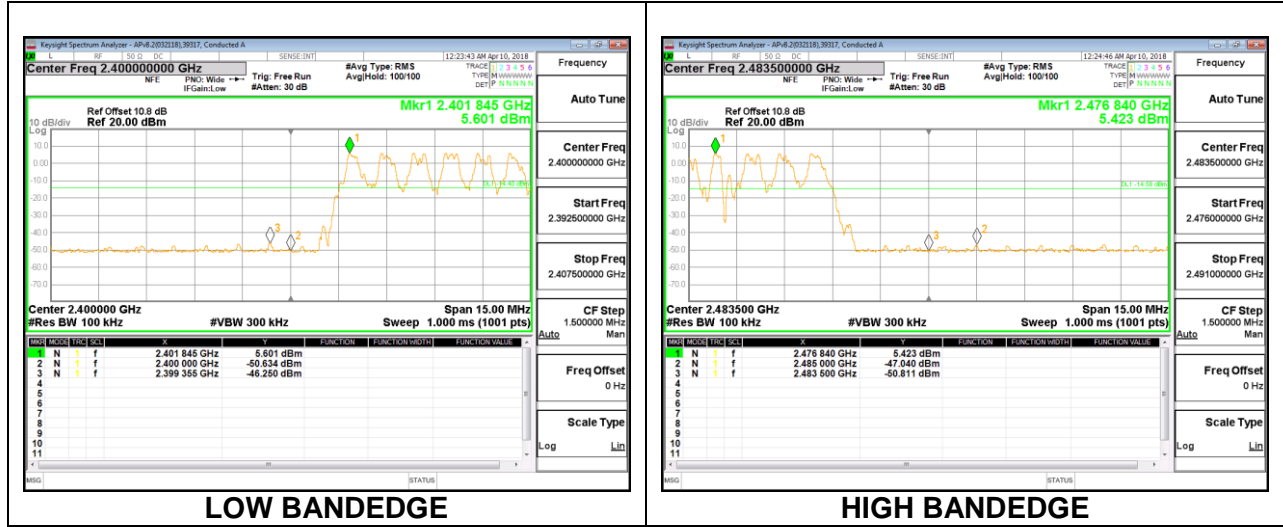
RESULTS

8.10.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

SPURIOUS EMISSIONS, NON-HOPPING



Antenna 1 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

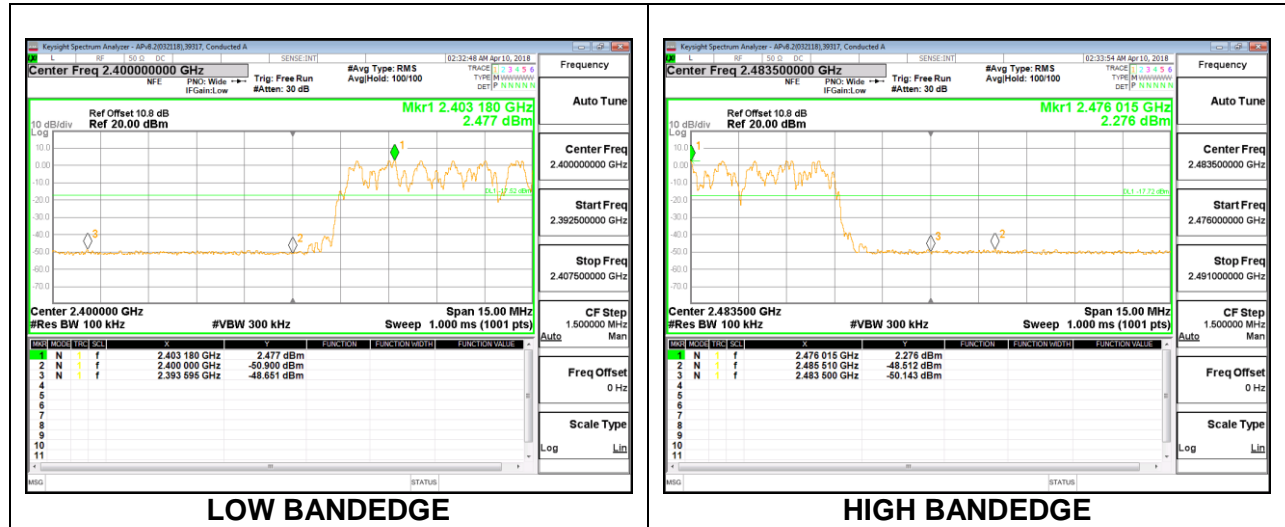


8.10.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

SPURIOUS EMISSIONS, NON-HOPPING



Antenna 1 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



9. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209

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 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; the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T (30 KHz) video bandwidth with peak detector for average measurements.

PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak→ this is a note from Radiated automation software. When the frequency is below 1G, software is using RB=100kHz; when the frequency is above 1G, software is using RB=1MHz.

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.

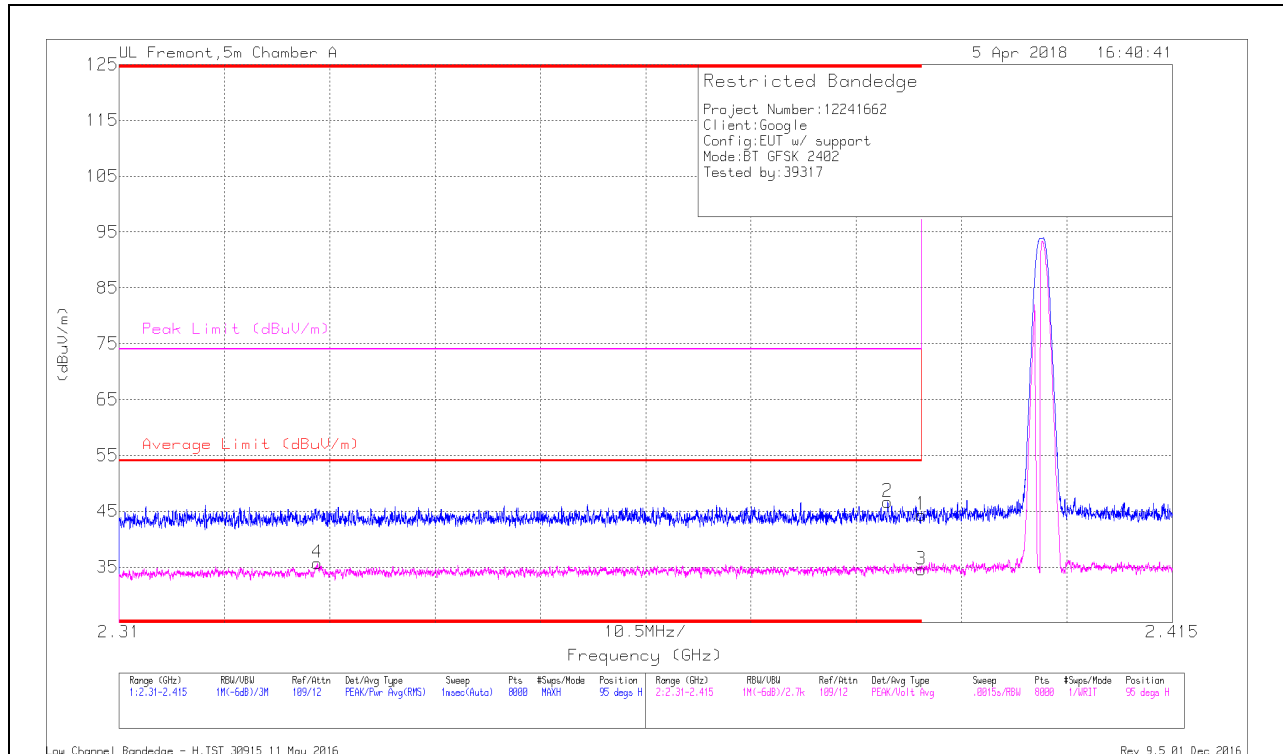
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

9.1. TRANSMITTER ABOVE 1 GHz

9.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



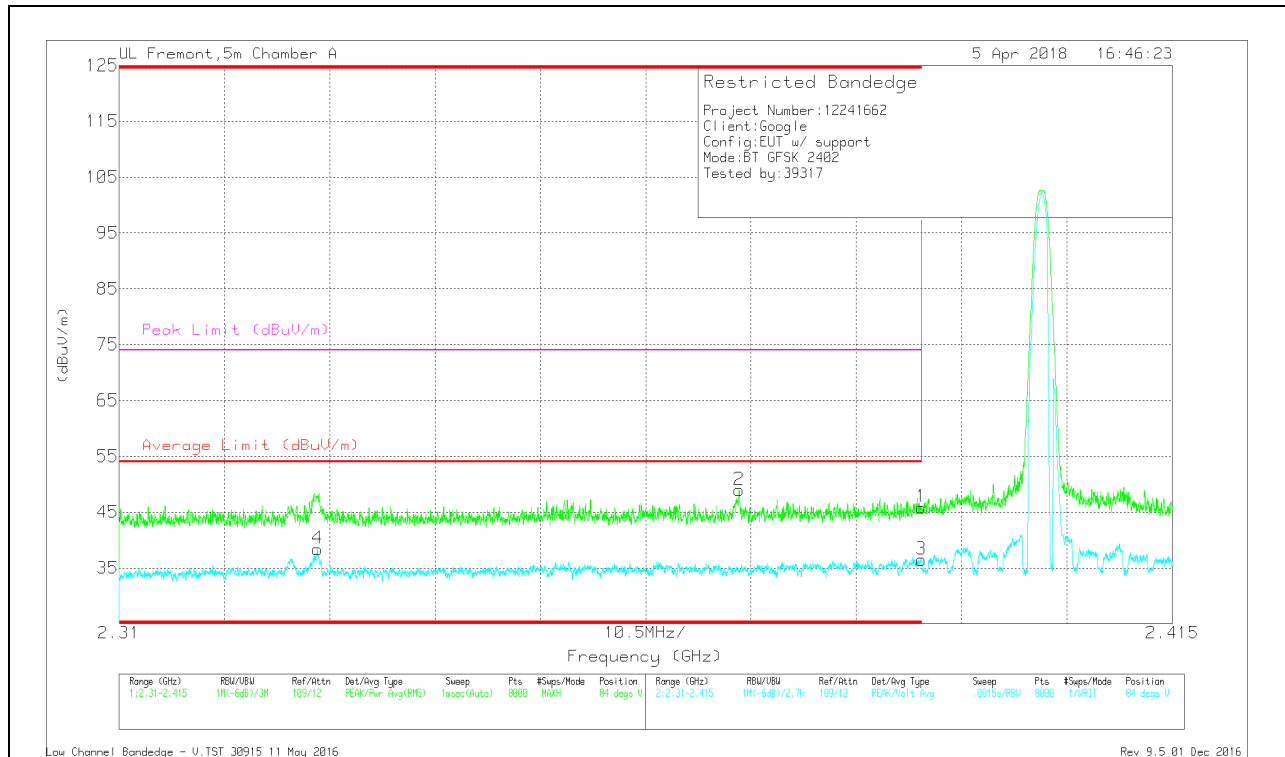
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.97	Pk	31.8	-23.4	44.37	-	-	74	-29.63	95	119	H
2	* 2.387	38.28	Pk	31.8	-23.4	46.68	-	-	74	-27.32	95	119	H
3	* 2.39	26.15	VA1T	31.8	-23.4	34.55	54	-19.45	-	-	95	119	H
4	* 2.33	27.62	VA1T	31.6	-23.5	35.72	54	-18.28	-	-	95	119	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

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	37.47	Pk	31.8	-23.4	45.87	-	-	74	-28.13	84	133	V
2	* 2.372	40.68	Pk	31.7	-23.4	48.98	-	-	74	-25.02	84	133	V
3	* 2.39	28.07	VA1T	31.8	-23.4	36.47	54	-17.53	-	-	84	133	V
4	* 2.33	30.31	VA1T	31.6	-23.5	38.41	54	-15.59	-	-	84	133	V

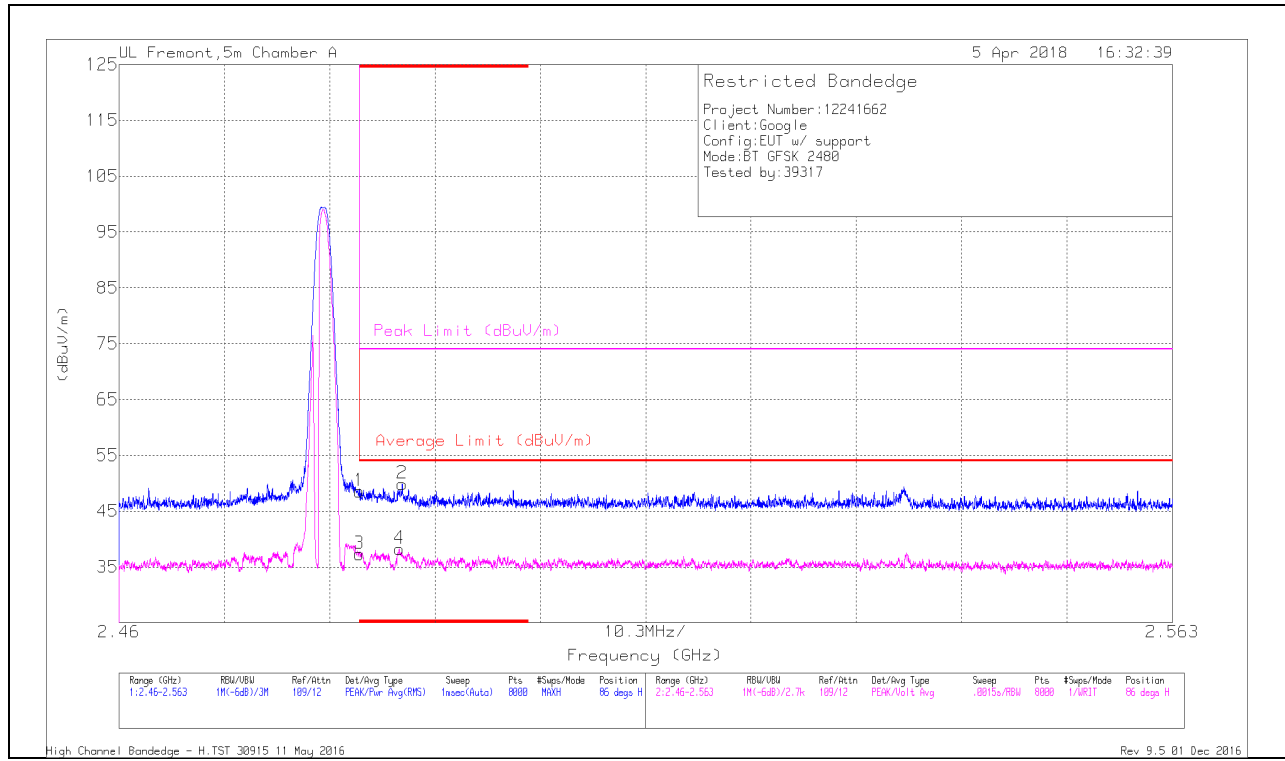
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

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

BANEDGE (HIGH CHANNEL)

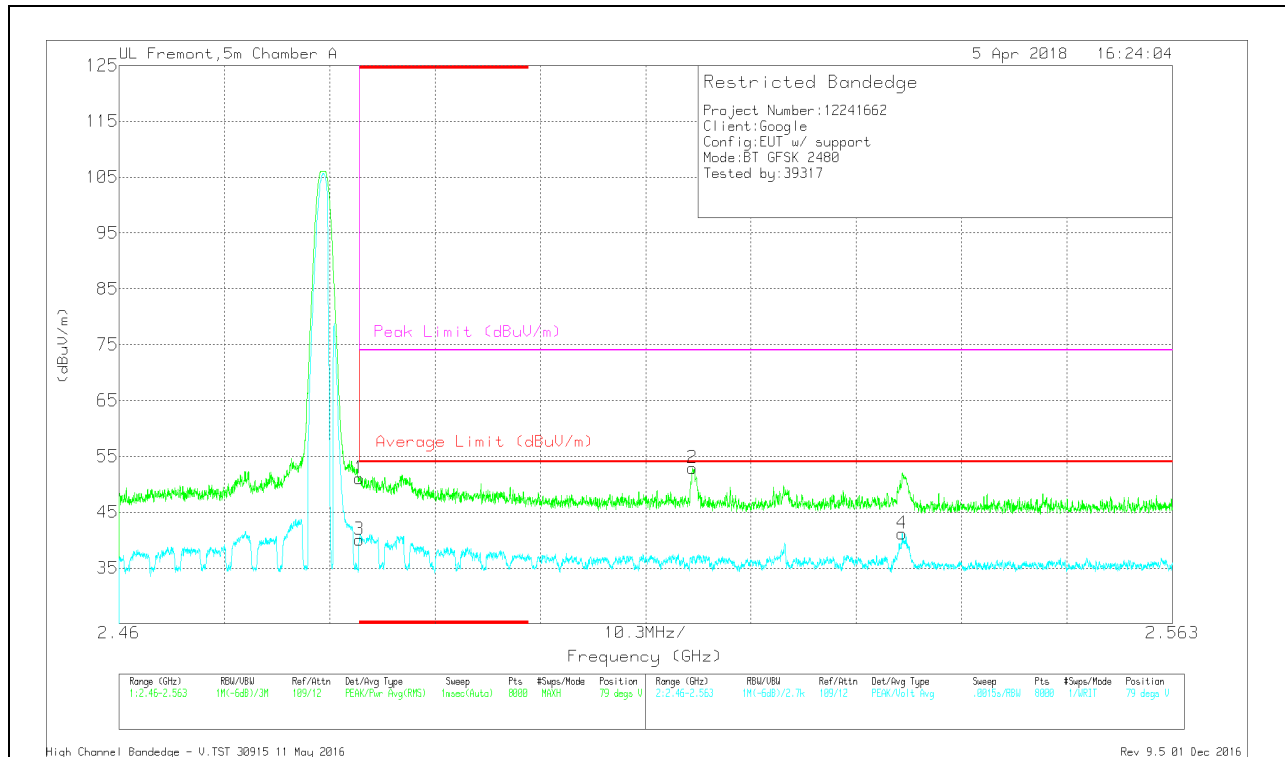
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.57	Pk	32.3	-23.3	48.57	-	-	74	-25.43	86	187	H
2	* 2.488	40.8	Pk	32.3	-23.2	49.9	-	-	74	-24.1	86	187	H
3	* 2.484	28.34	VA1T	32.3	-23.3	37.34	54	-16.66	-	-	86	186	H
4	* 2.487	29.15	VA1T	32.3	-23.2	38.25	54	-15.75	-	-	86	186	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

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42.06	Pk	32.3	-23.3	51.06	-	-	74	-22.94	79	187	V
3	* 2.484	31.05	VA1T	32.3	-23.3	40.05	54	-13.95	-	-	79	187	V
2	2.516	43.68	Pk	32.4	-23.2	52.88	-	-	74	-21.12	79	187	V
4	2.537	31.96	VA1T	32.4	-23.2	41.16	54	-12.84	-	-	79	187	V

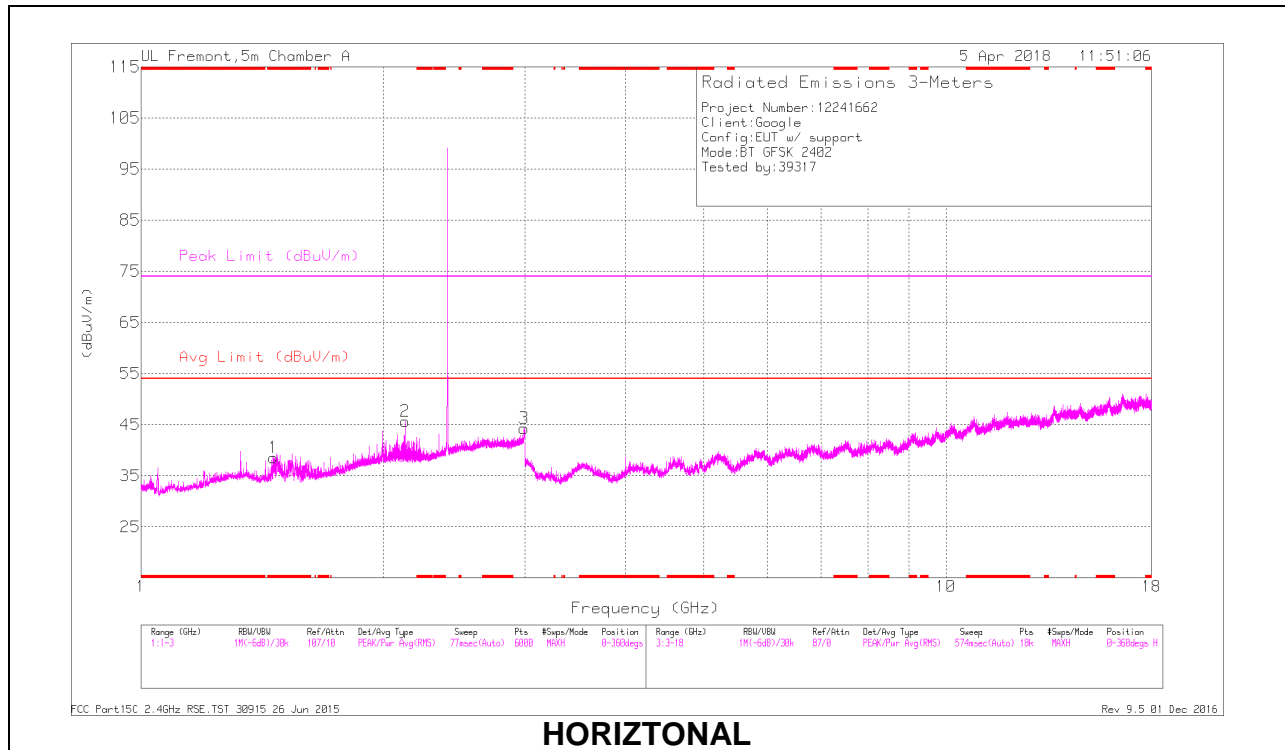
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

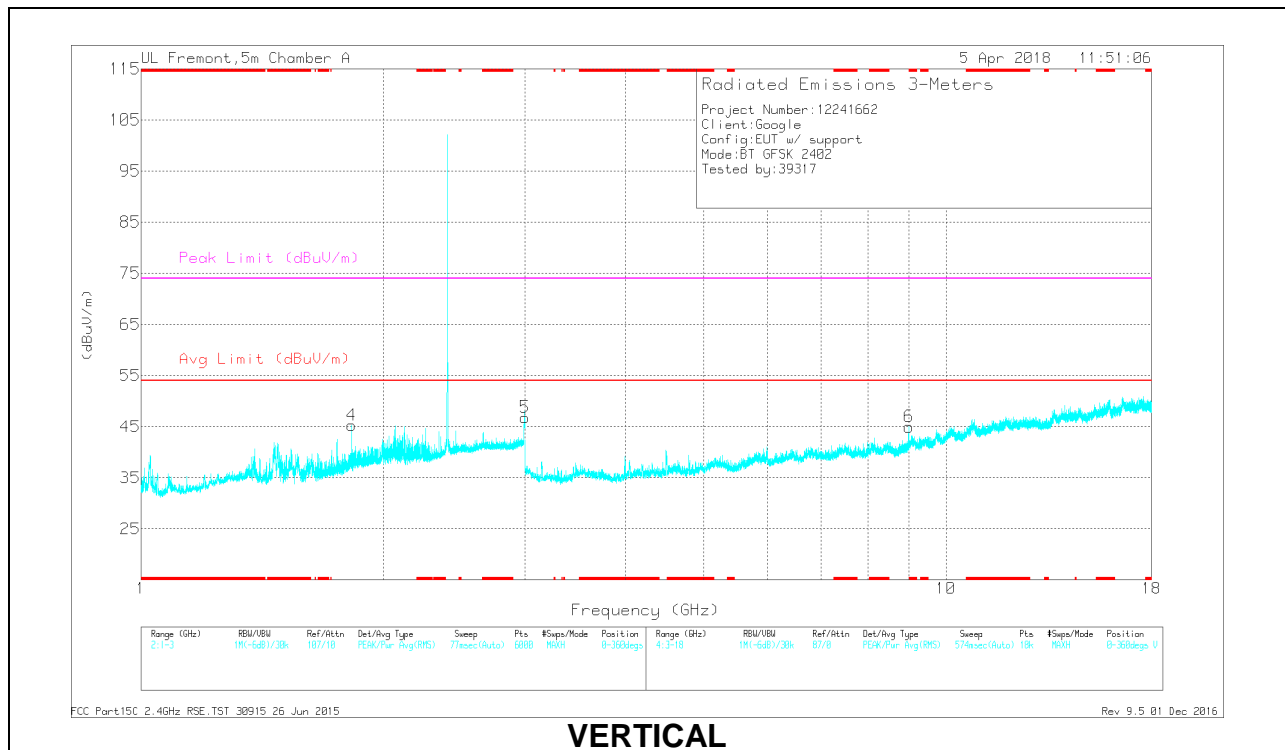
VA1T - FHSS: Linear Voltage Average $V_B=1/T_{on}$ where: T_{on} is transmit duration

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

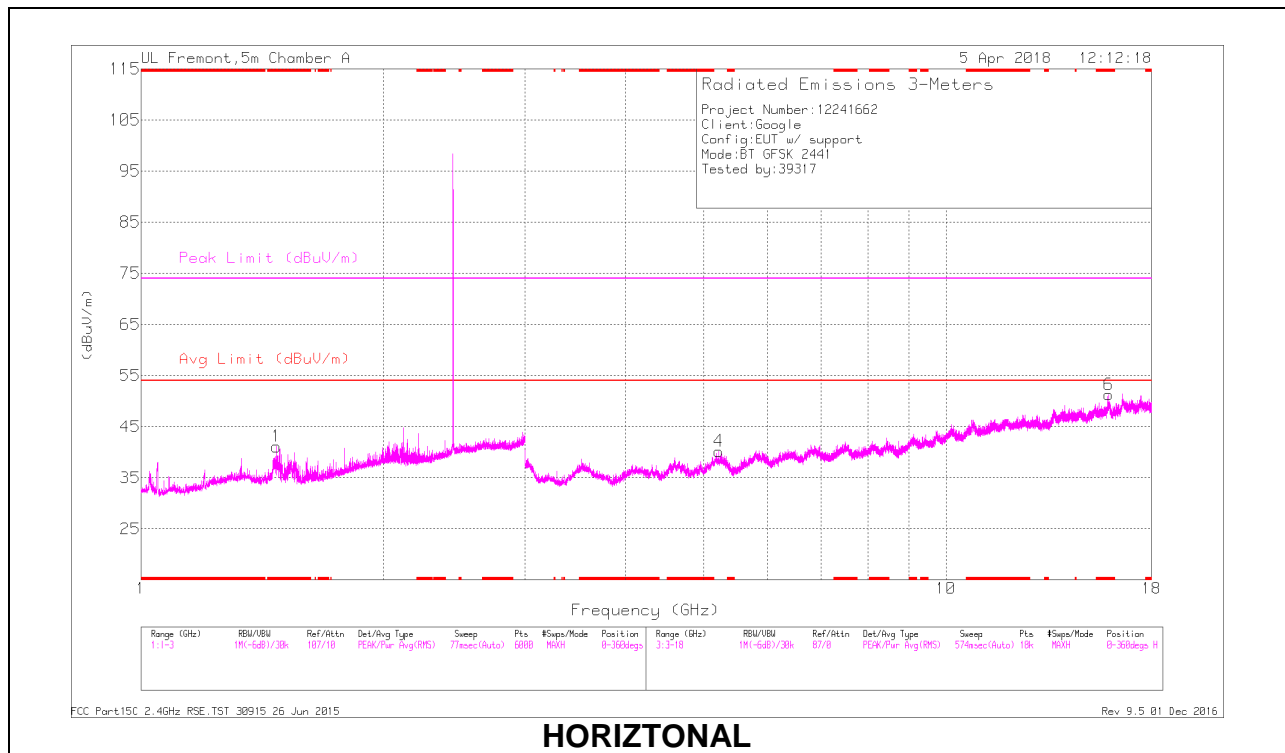
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.46	38.11	PKFH	28.7	-23.4	43.41	-	-	74	-30.59	360	199	H
* 1.461	26.35	VA1T	28.7	-23.5	31.55	54	-22.45	-	-	360	199	H
1.826	38.96	PKFH	30.6	-23.4	46.16	-	-	-	-	360	104	V
1.827	25.75	VA1T	30.6	-23.4	32.95	-	-	-	-	360	104	V
2.127	39.26	PKFH	31.1	-23.6	46.76	-	-	-	-	360	199	H
2.13	27.53	VA1T	31.1	-23.5	35.13	-	-	-	-	360	199	H
2.991	25.8	VA1T	32.3	-21.7	36.4	-	-	-	-	360	104	H
2.993	36.45	PKFH	32.3	-21.7	47.05	-	-	-	-	360	104	H
2.997	37.97	PKFH	32.3	-21.7	48.57	-	-	-	-	360	200	V
2.999	26.65	VA1T	32.3	-21.7	37.25	-	-	-	-	360	200	V
8.998	32.29	PKFH	36.2	-21.3	47.19	-	-	-	-	360	103	V
8.999	21.96	VA1T	36.2	-21.3	36.86	-	-	-	-	360	103	V

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

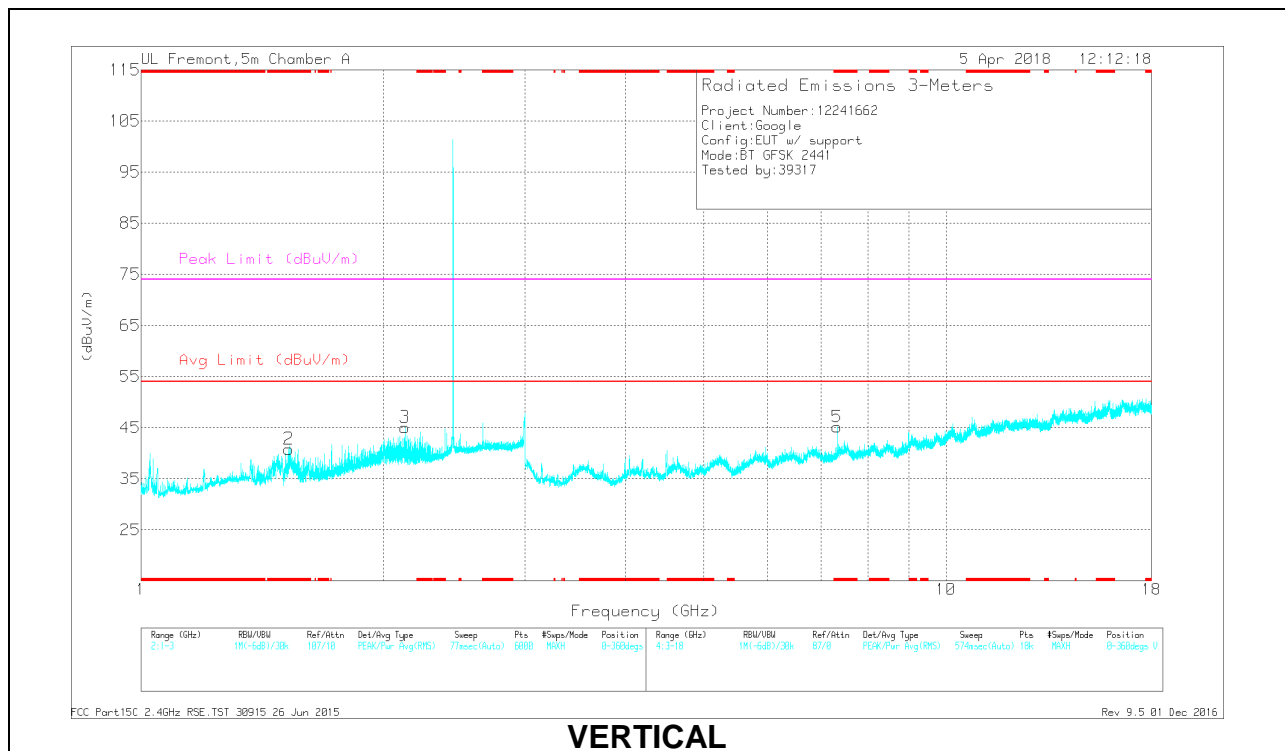
PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

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

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

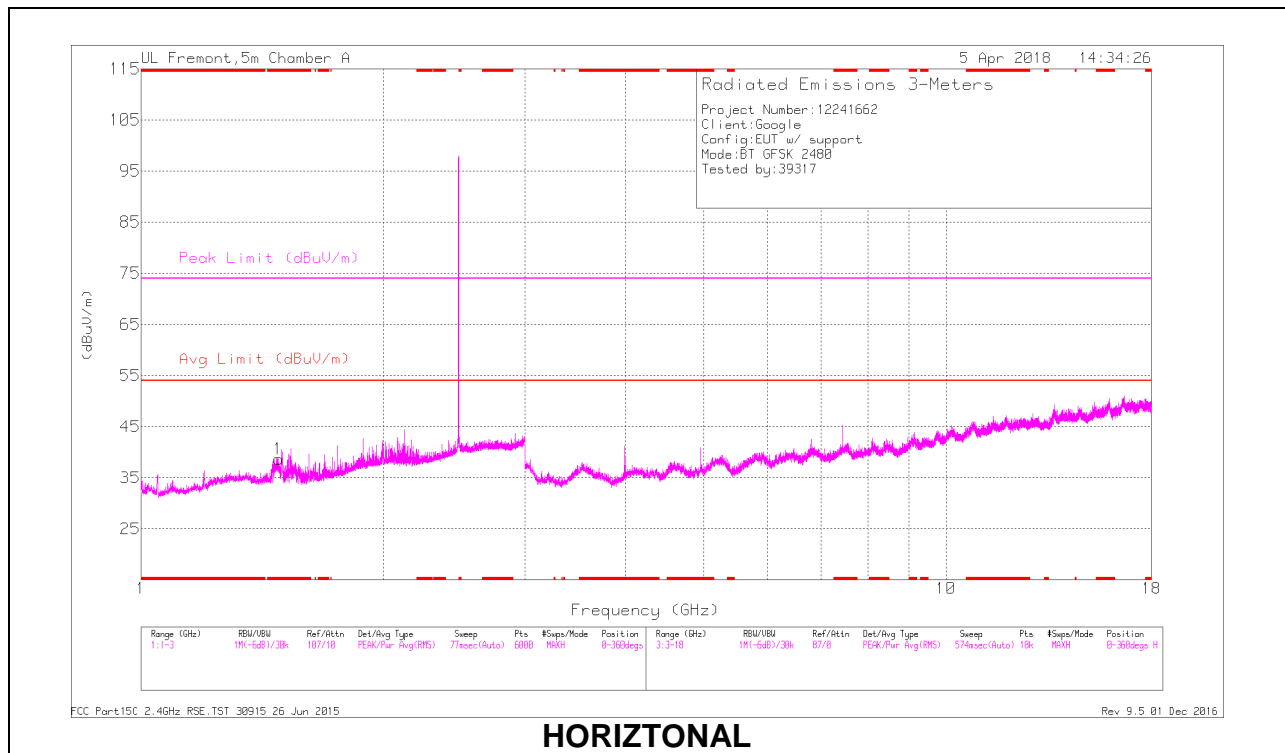
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.476	37.84	PKFH	28.6	-23.4	43.04	-	-	74	-30.96	360	199	H
* 1.474	27.57	VA1T	28.6	-23.4	32.77	54	-21.23	-	-	360	199	H
* 1.526	37.46	PKFH	28.1	-23.4	42.16	-	-	74	-31.84	13	199	V
* 1.526	28.57	VA1T	28.1	-23.4	33.27	54	-20.73	-	-	13	199	V
* 15.93	30.79	PKFH	40.3	-16.2	54.89	-	-	74	-19.11	13	104	H
* 15.928	20.42	VA1T	40.3	-16.3	44.42	54	-9.58	-	-	13	104	H
* 7.323	37.32	PKFH	35.7	-23.1	49.92	-	-	74	-24.08	119	117	V
* 7.323	28.94	VA1T	35.7	-23.1	41.54	54	-12.46	-	-	119	117	V
2.127	40.4	PKFH	31.1	-23.6	47.9	-	-	-	-	13	199	V
2.129	27.05	VA1T	31.1	-23.5	34.65	-	-	-	-	13	199	V
5.221	34.67	PKFH	34.5	-25.1	44.07	-	-	-	-	13	104	H
5.221	24.28	VA1T	34.5	-25.1	33.68	-	-	-	-	13	104	H

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

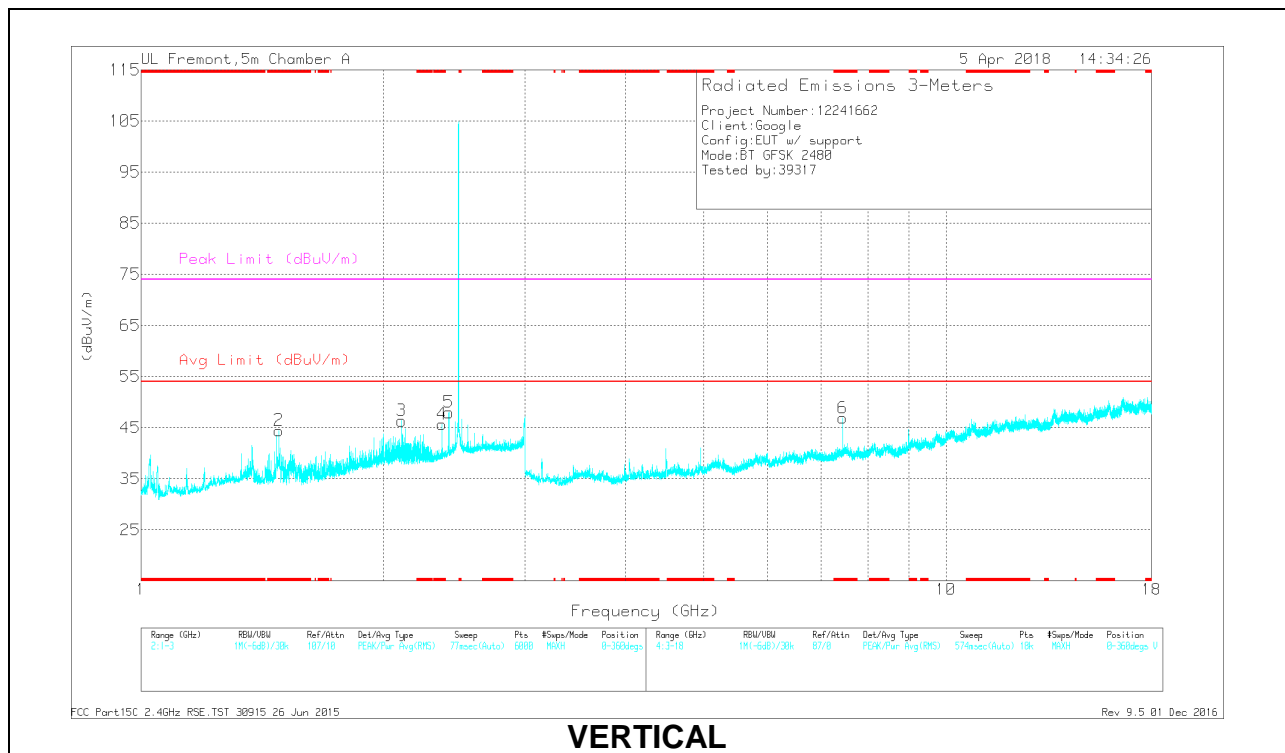
PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

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

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Prod (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.481	39.2	PKFH	28.5	-23.3	44.4	-	-	74	-29.6	78	106	H
* 1.481	31.38	VA1T	28.5	-23.3	36.58	54	-17.42	-	-	78	106	H
* 1.483	34.79	PKFH	28.5	-23.3	39.99	-	-	74	-34.01	78	103	V
* 1.485	24.75	VA1T	28.5	-23.4	29.85	54	-24.15	-	-	78	103	V
* 2.366	41.24	PKFH	31.6	-23.4	49.44	-	-	74	-24.56	51	129	V
* 2.366	31.56	VA1T	31.6	-23.4	39.76	54	-14.24	-	-	51	129	V
* 7.44	37.96	PKFH	35.6	-21.5	52.06	-	-	74	-21.94	101	118	V
* 7.44	31.45	VA1T	35.6	-21.5	45.55	54	-8.45	-	-	101	118	V
2.107	25.63	VA1T	31.1	-23.6	33.13	-	-	-	-	78	103	V
2.108	39.35	PKFH	31.1	-23.6	46.85	-	-	-	-	78	103	V
2.412	42.73	PKFH	31.9	-23.3	51.33	-	-	-	-	50	110	V
2.412	34.16	VA1T	31.9	-23.3	42.76	-	-	-	-	50	110	V

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

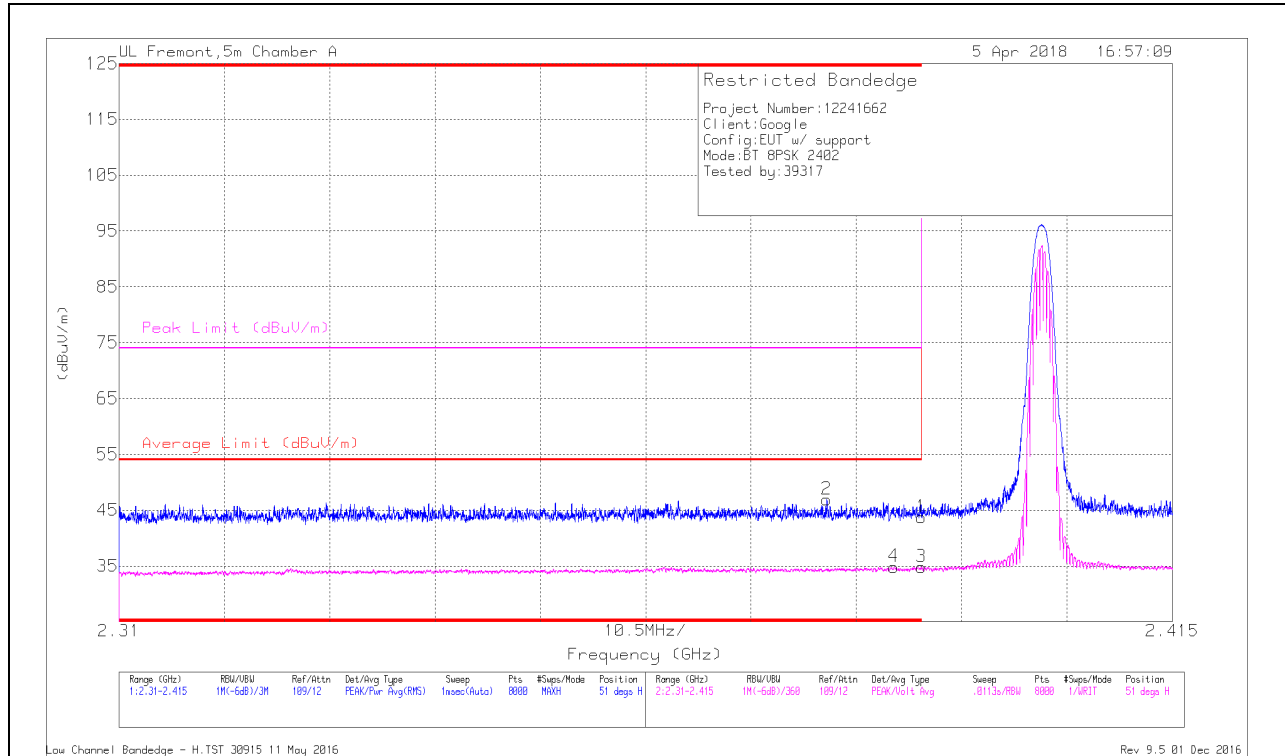
PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

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

9.1.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



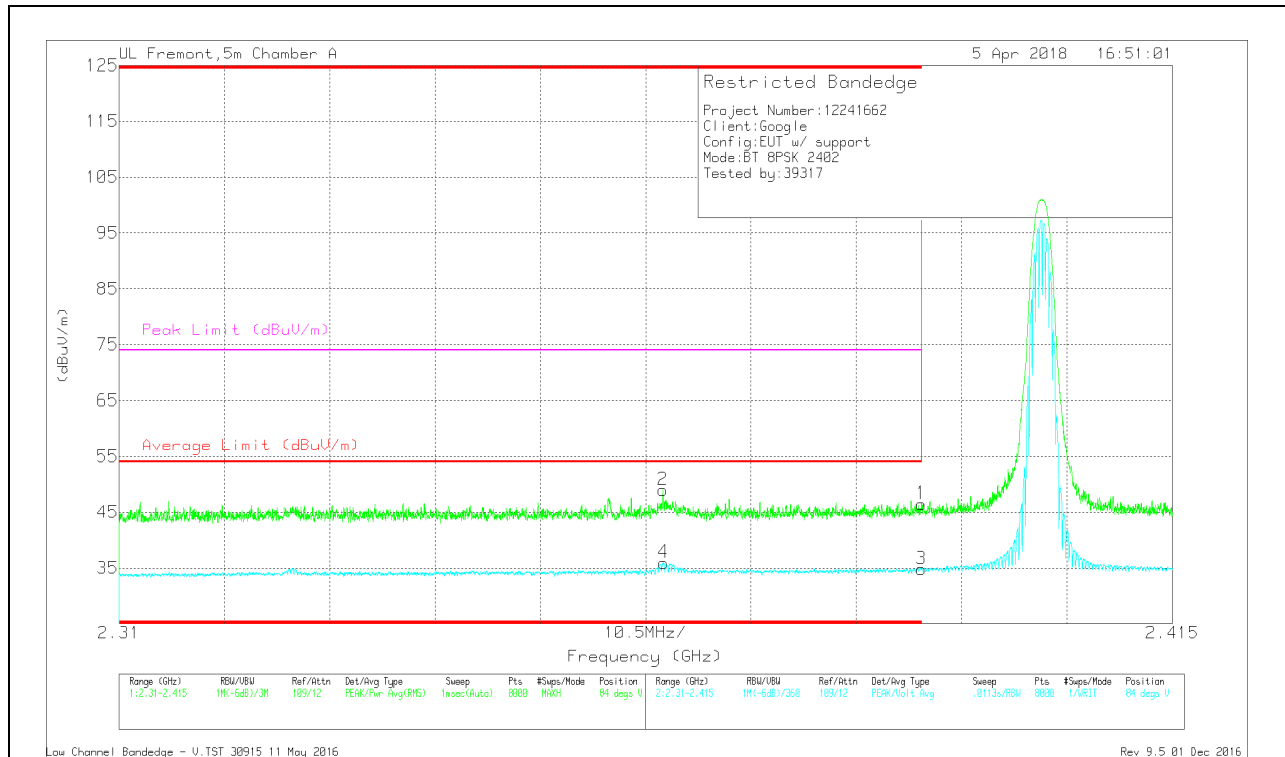
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Fitr/P ad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.32	Pk	31.8	-23.4	43.72	-	-	74	-30.28	51	125	H
2	* 2.381	38.6	Pk	31.7	-23.4	46.9	-	-	74	-27.1	51	125	H
3	* 2.39	26.42	VA1T	31.8	-23.4	34.82	54	-19.18	-	-	51	125	H
4	* 2.387	26.43	VA1T	31.8	-23.4	34.83	54	-19.17	-	-	51	125	H

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

Pk - Peak detector

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

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/P ad (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	38.05	Pk	31.8	-23.4	46.45	-	-	74	-27.55	84	133	V
2	* 2.364	40.78	Pk	31.6	-23.4	48.98	-	-	74	-25.02	84	133	V
3	* 2.39	26.4	VA1T	31.8	-23.4	34.8	54	-19.2	-	-	84	133	V
4	* 2.364	27.74	VA1T	31.6	-23.4	35.94	54	-18.06	-	-	84	133	V

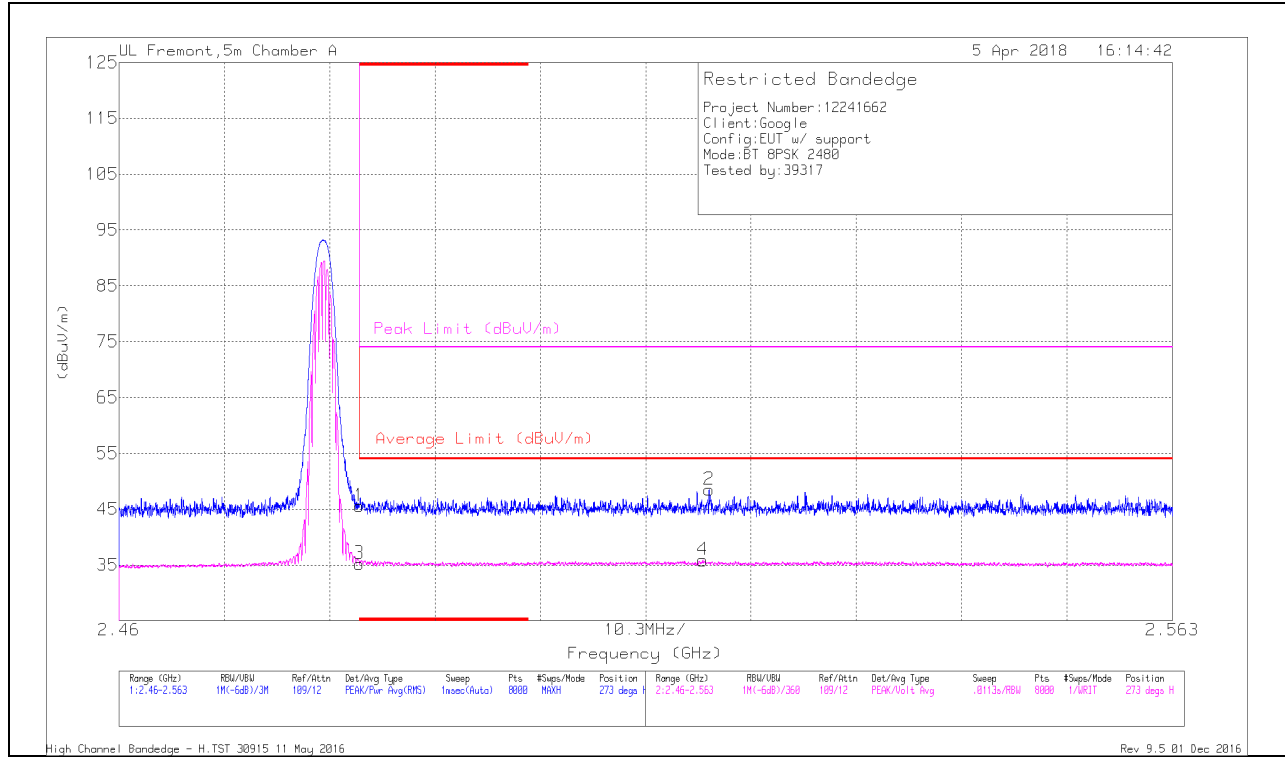
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

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

BANEDGE (HIGH CHANNEL)

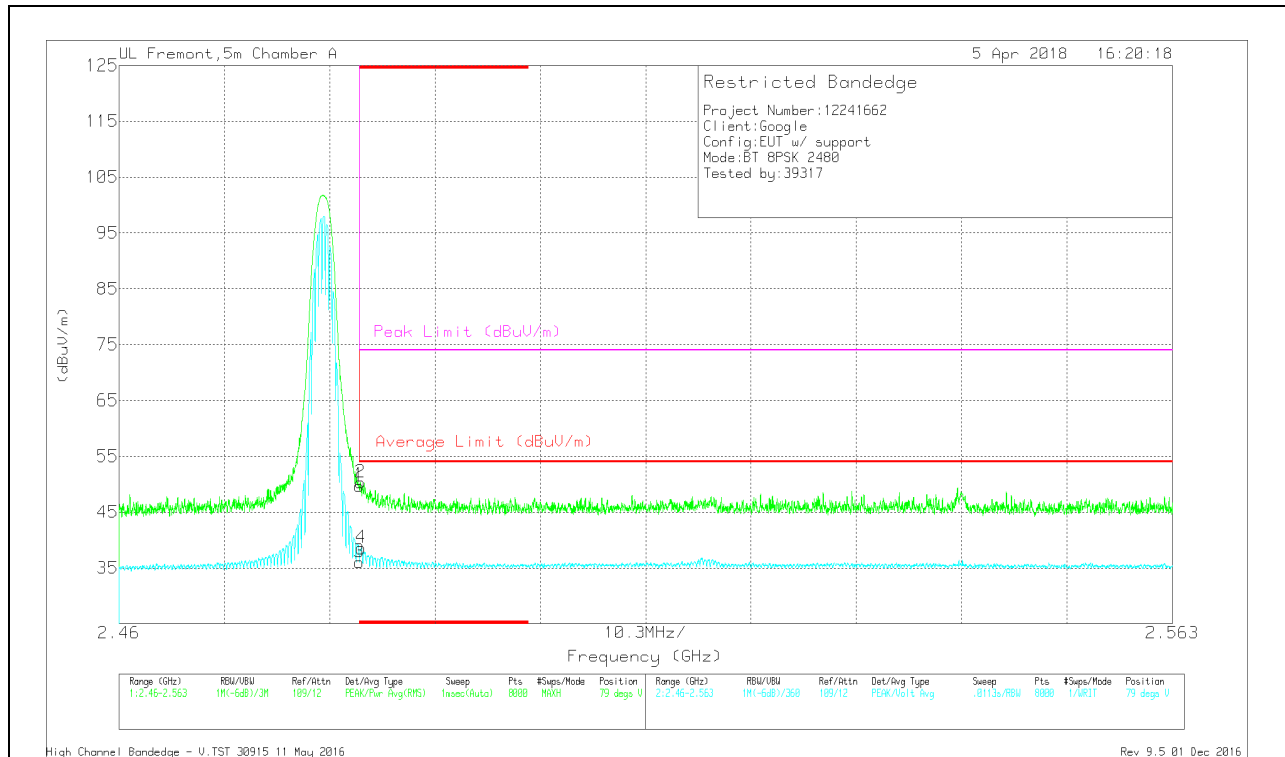
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.53	Pk	32.3	-23.3	45.53	-	-	74	-28.47	273	106	H
3	* 2.484	26.2	VA1T	32.3	-23.3	35.2	54	-18.8	-	-	273	106	H
4	2.517	26.77	VA1T	32.4	-23.3	35.87	54	-18.13	-	-	273	106	H
2	2.518	39.4	Pk	32.4	-23.3	48.5	-	-	74	-25.5	273	106	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

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.75	Pk	32.3	-23.3	49.75	-	-	74	-24.25	79	187	V
2	* 2.484	41.33	Pk	32.3	-23.3	50.33	-	-	74	-23.67	79	187	V
3	* 2.484	27.05	VA1T	32.3	-23.3	36.05	54	-17.95	-	-	79	187	V
4	* 2.484	29.56	VA1T	32.3	-23.3	38.56	54	-15.44	-	-	79	187	V

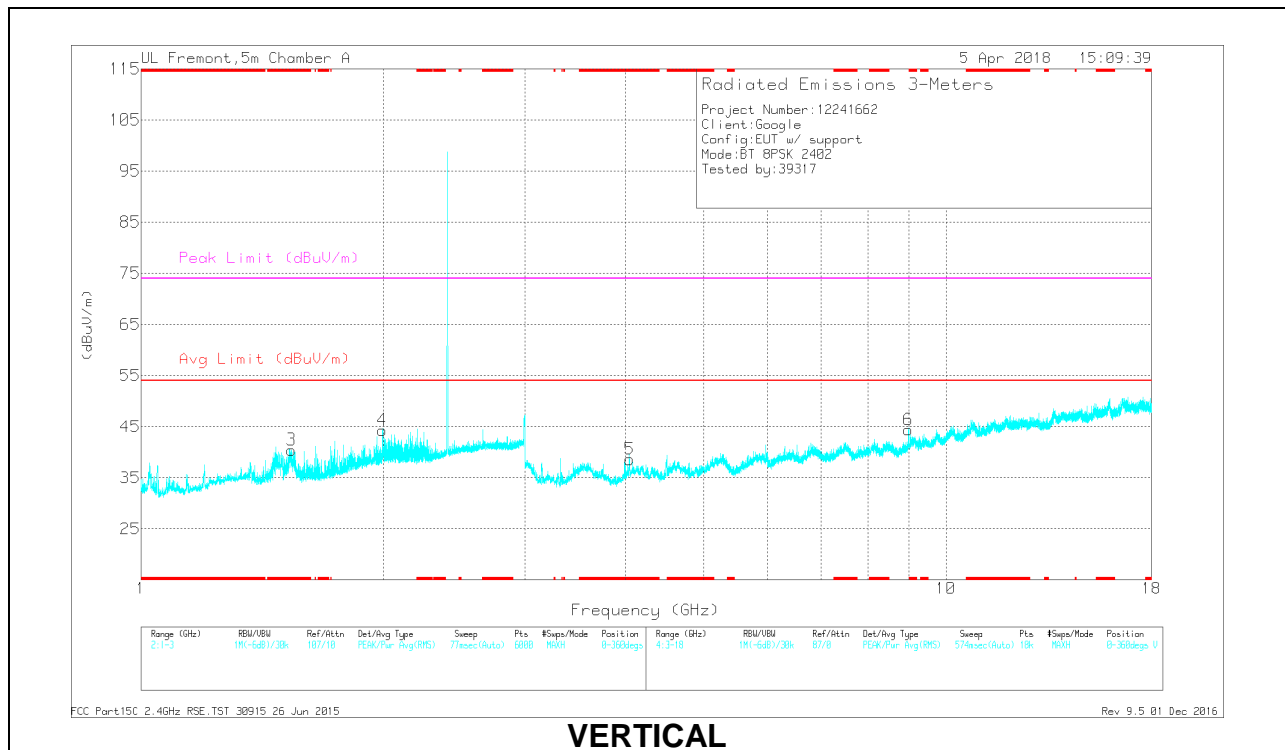
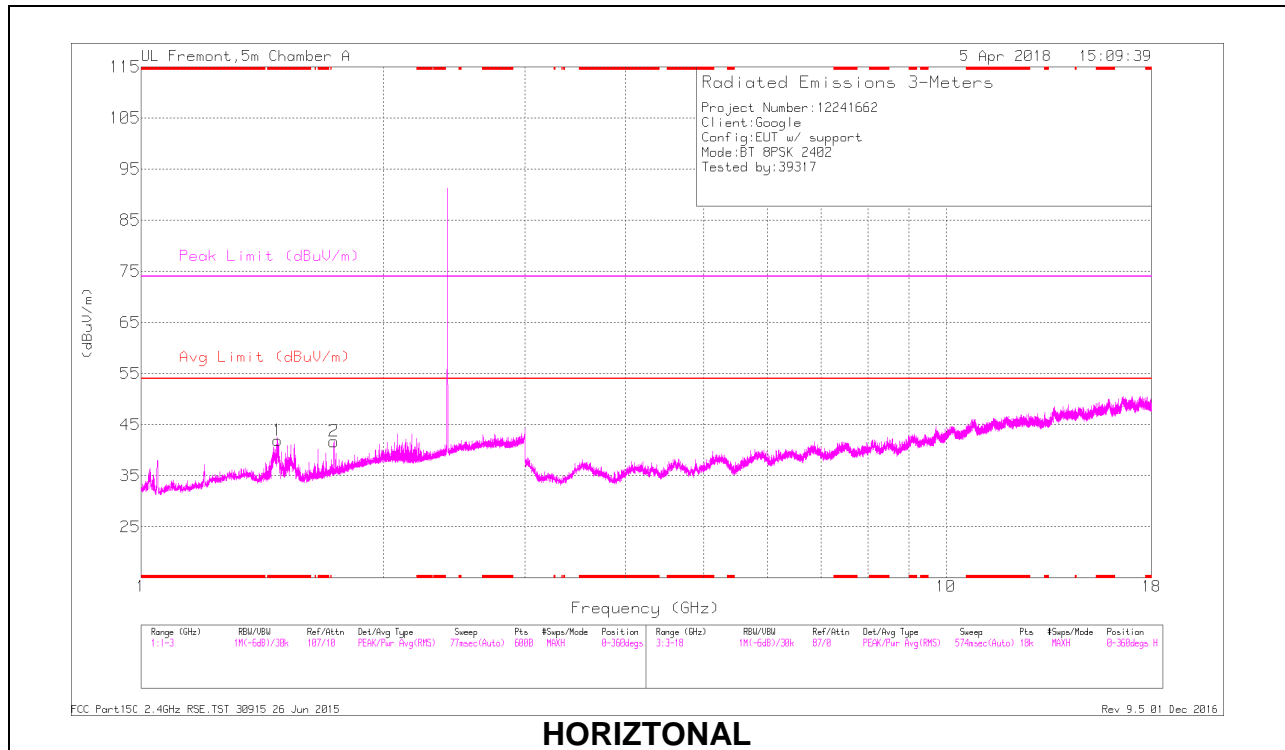
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

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

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

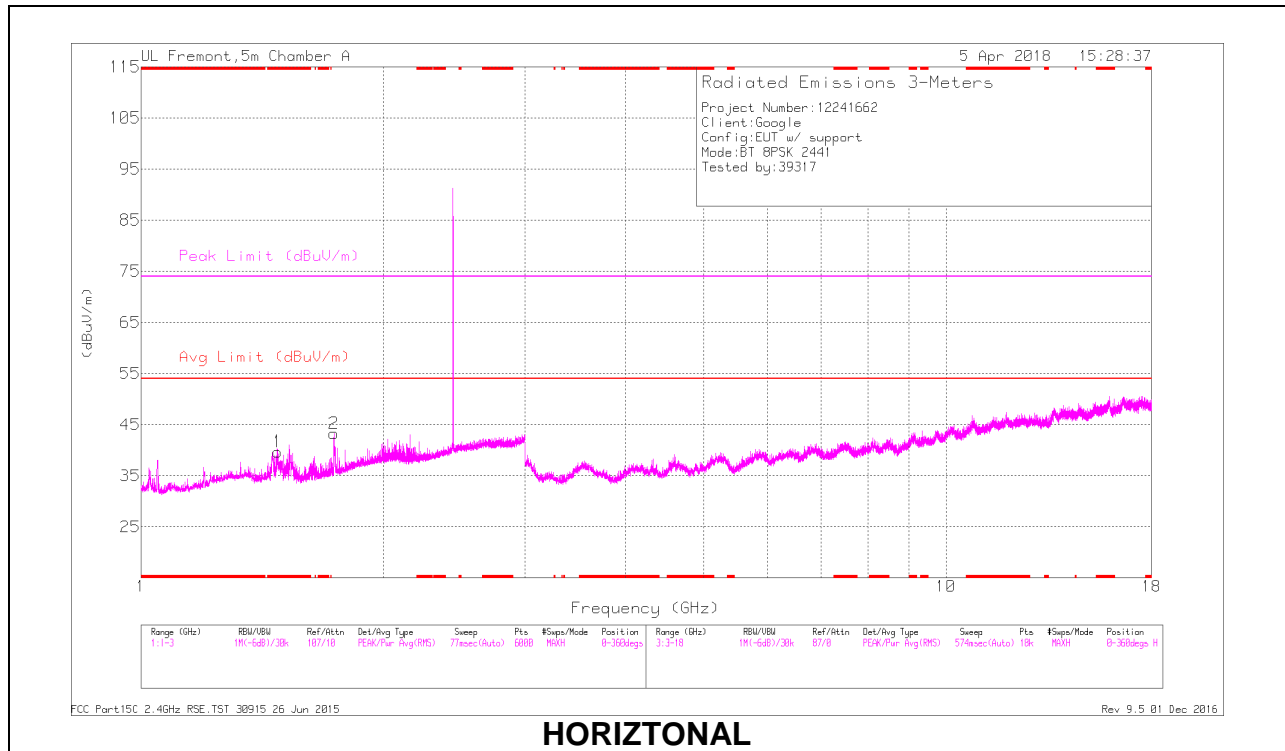
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Prod (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.479	37.9	PKFH	28.5	-23.4	43	-	-	74	-31	0	199	H
* 1.478	26.06	VA1T	28.6	-23.4	31.26	54	-22.74	-	-	0	199	H
* 1.539	42.23	PKFH	27.9	-23.4	46.73	-	-	74	-27.27	0	102	V
* 1.539	27.17	VA1T	27.9	-23.4	31.67	54	-22.33	-	-	0	102	V
* 4.046	37.33	PKFH	33.4	-27	43.73	-	-	74	-30.27	0	200	V
* 4.047	24.78	VA1T	33.4	-27	31.18	54	-22.82	-	-	0	200	V
1.735	34.76	PKFH	29.5	-23.5	40.76	-	-	-	-	0	199	H
1.738	23.6	VA1T	29.6	-23.5	29.7	-	-	-	-	0	199	H
1.994	42.96	PKFH	31.4	-23.3	51.06	-	-	-	-	0	102	V
1.994	25.12	VA1T	31.4	-23.3	33.22	-	-	-	-	0	102	V
8.981	21.62	VA1T	36.2	-21.5	36.32	-	-	-	-	0	103	V
8.985	32.53	PKFH	36.2	-21.5	47.23	-	-	-	-	0	103	V

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

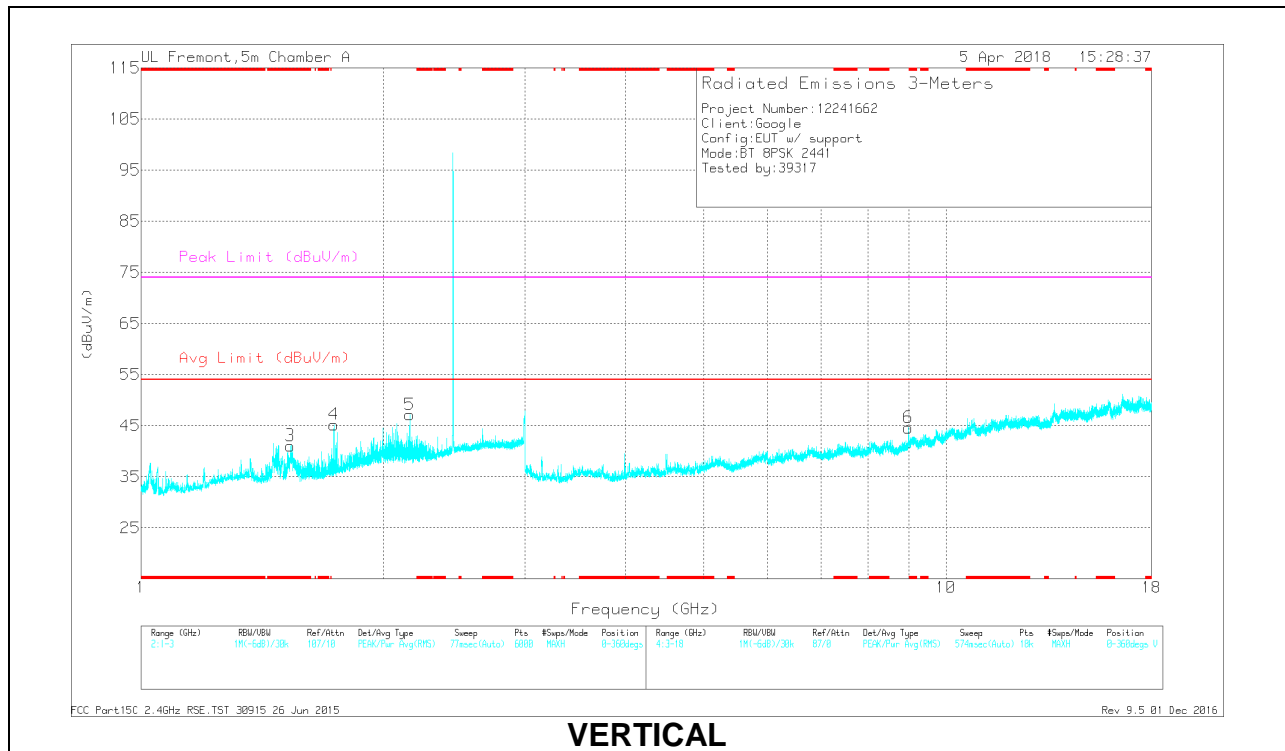
PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

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

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

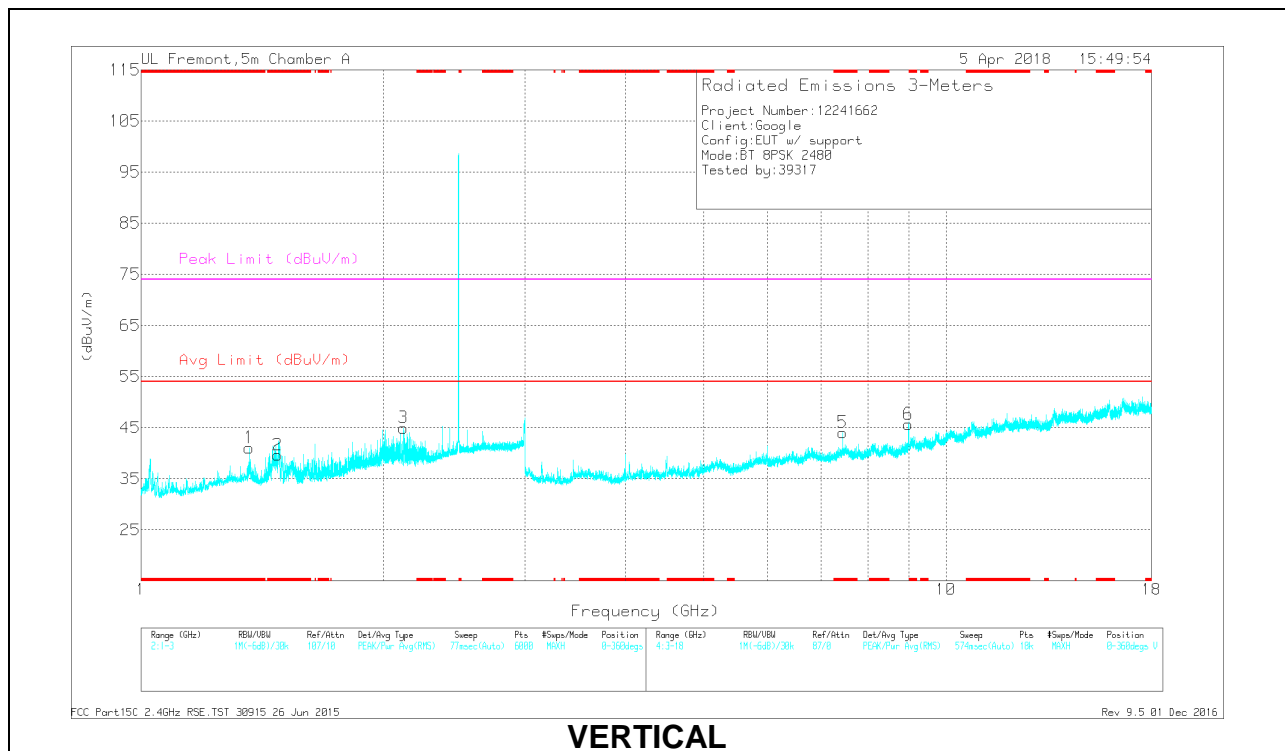
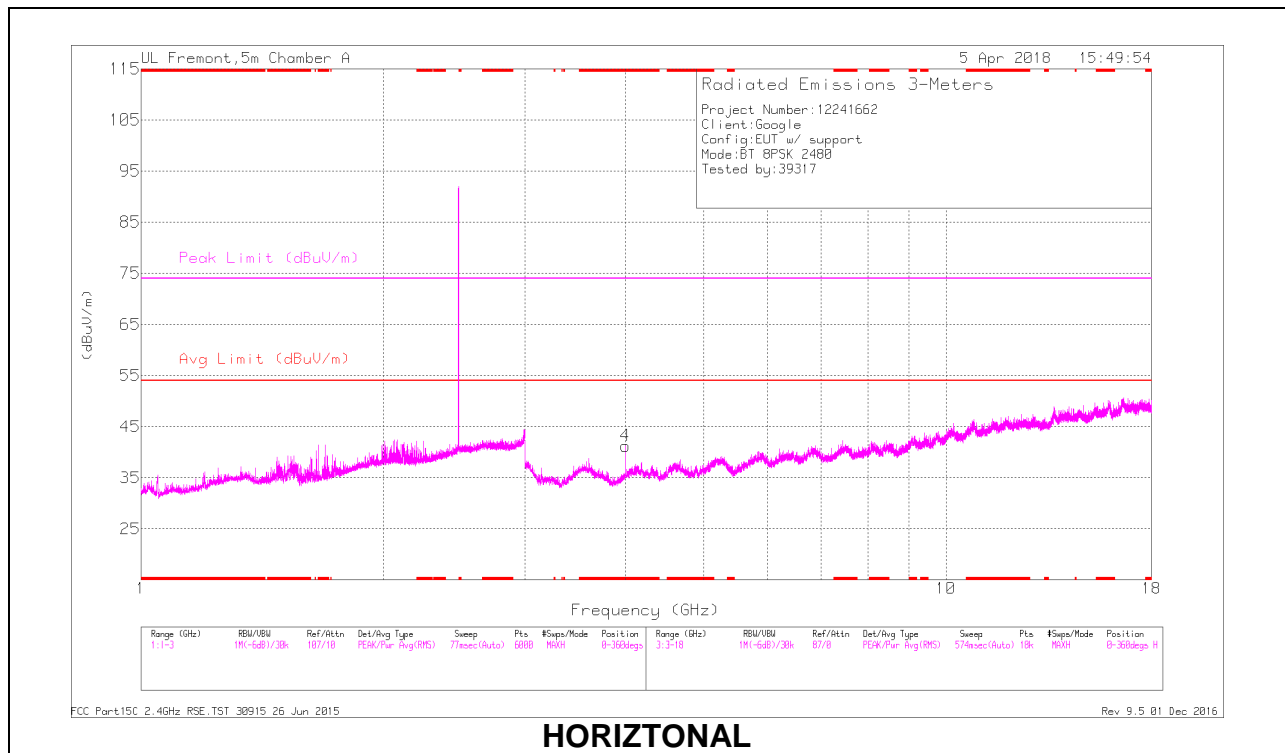
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.48	37.66	PKFH	28.5	-23.4	42.76	-	-	74	-31.24	0	199	H
* 1.48	24.67	VA1T	28.5	-23.3	29.87	54	-24.13	-	-	0	199	H
* 1.534	40.67	PKFH	28	-23.3	45.37	-	-	74	-28.63	0	102	V
* 1.532	28.55	VA1T	28	-23.3	33.25	54	-20.75	-	-	0	102	V
1.736	23.77	VA1T	29.5	-23.5	29.77	-	-	-	-	0	102	V
1.738	34.82	PKFH	29.6	-23.5	40.92	-	-	-	-	0	199	H
1.738	23.55	VA1T	29.6	-23.5	29.65	-	-	-	-	0	199	H
1.738	36.34	PKFH	29.6	-23.5	42.44	-	-	-	-	0	102	V
2.157	24.95	VA1T	31.1	-23.6	32.45	-	-	-	-	0	102	V
2.158	41	PKFH	31.1	-23.6	48.5	-	-	-	-	0	102	V
8.976	33.59	PKFH	36.2	-21.6	48.19	-	-	-	-	0	102	V
8.976	21.56	VA1T	36.2	-21.6	36.16	-	-	-	-	0	102	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 RESULTS



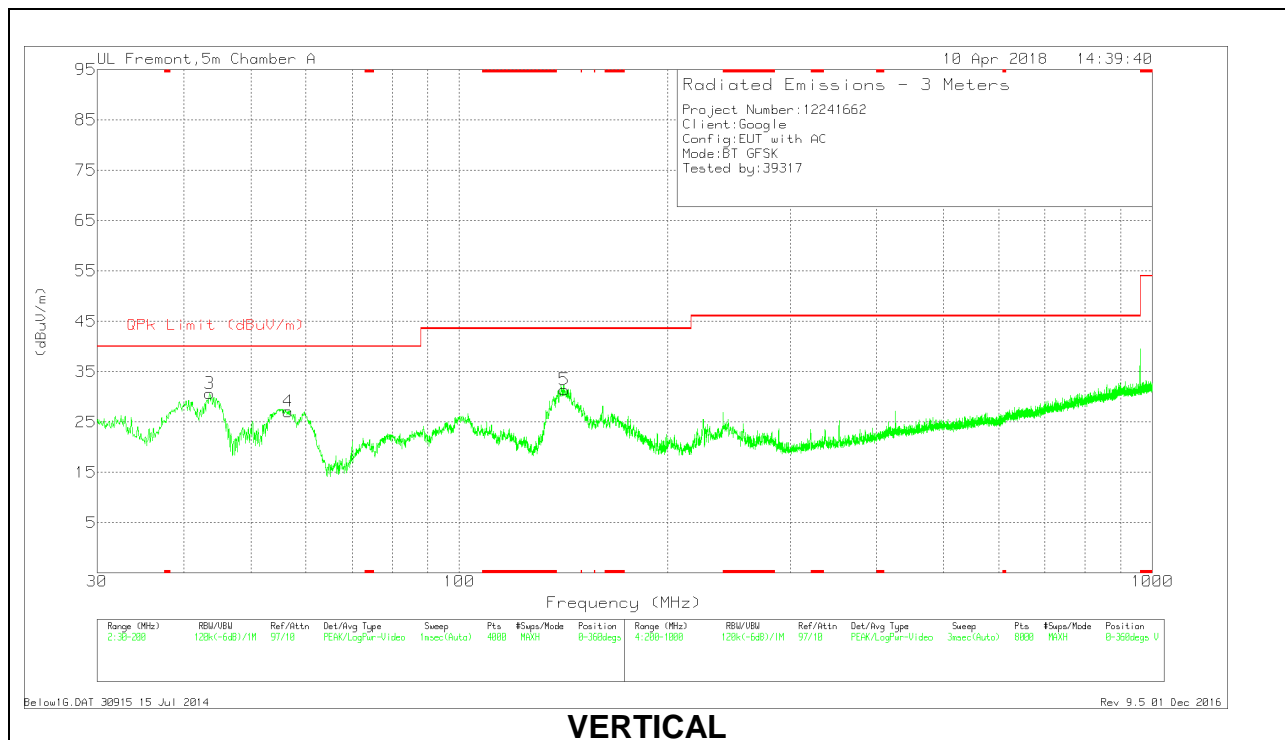
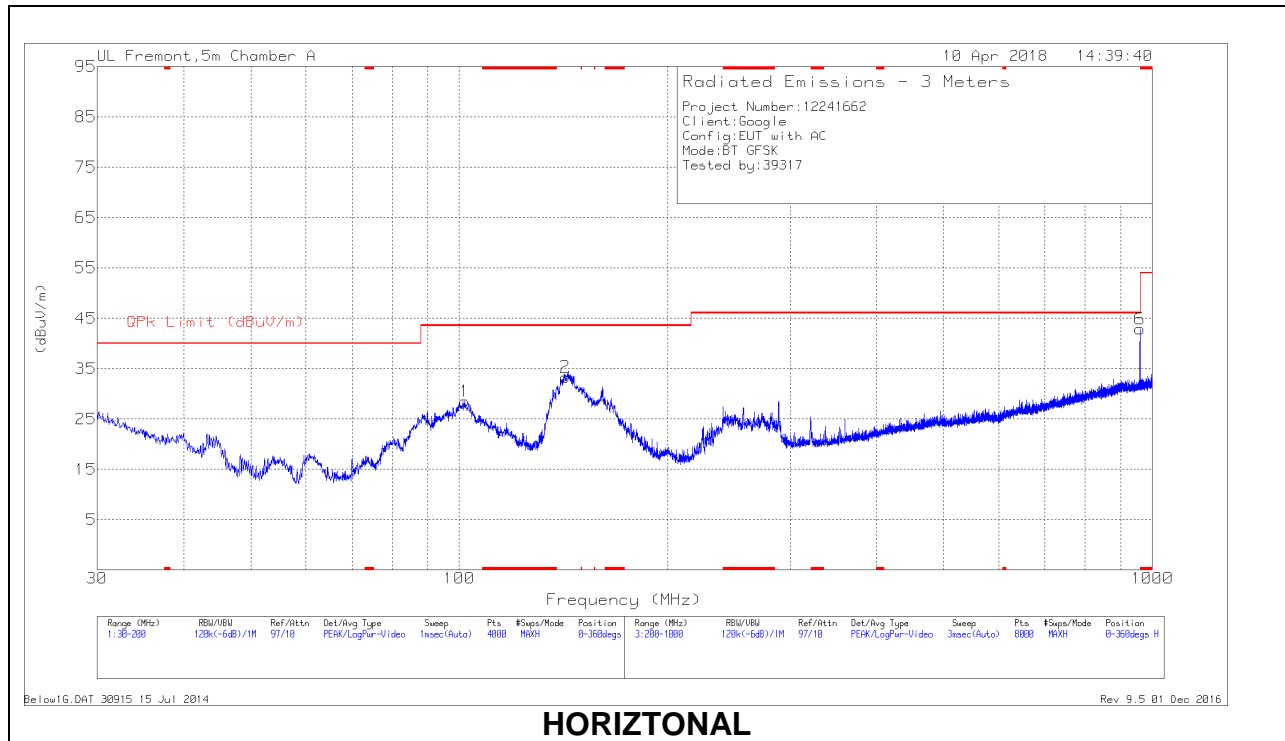
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.362	34.65	PKFH	29.3	-23.5	40.45	-	-	74	-33.55	0	100	V
* 1.363	23.84	VA1T	29.3	-23.5	29.64	54	-24.36	-	-	0	100	V
* 1.48	37.12	PKFH	28.5	-23.3	42.32	-	-	74	-31.68	0	100	V
* 1.48	25.24	VA1T	28.5	-23.3	30.44	54	-23.56	-	-	0	100	V
* 3.998	39.56	PKFH	33.4	-27.6	45.36	-	-	74	-28.64	0	100	H
* 3.996	24.38	VA1T	33.4	-27.7	30.08	54	-23.92	-	-	0	100	H
* 3.996	43.21	PKFH	33.4	-27.7	48.91	-	-	74	-25.09	0	100	H
* 3.999	24.37	VA1T	33.4	-27.6	30.17	54	-23.83	-	-	0	100	H
* 7.44	33.8	PKFH	35.6	-21.5	47.9	-	-	74	-26.1	0	200	V
* 7.44	24.17	VA1T	35.6	-21.5	38.27	54	-15.73	-	-	0	200	V
2.118	38.76	PKFH	31.1	-23.6	46.26	-	-	-	-	0	100	V
2.119	24.43	VA1T	31.1	-23.6	31.93	-	-	-	-	0	100	V
8.974	33.68	PKFH	36.2	-21.7	48.18	-	-	-	-	0	103	V
8.976	21.28	VA1T	36.2	-21.6	35.88	-	-	-	-	0	103	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

9.2. Worst Case Below 1 GHz

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



Below 1GHz Data

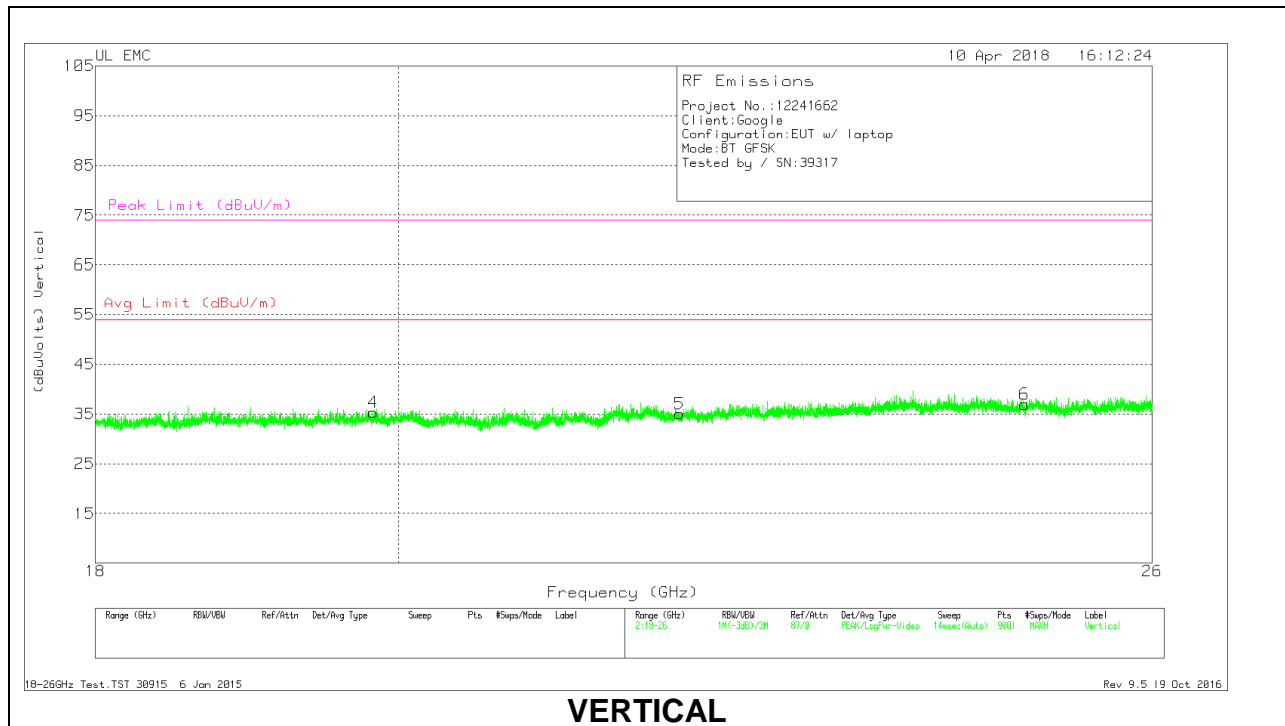
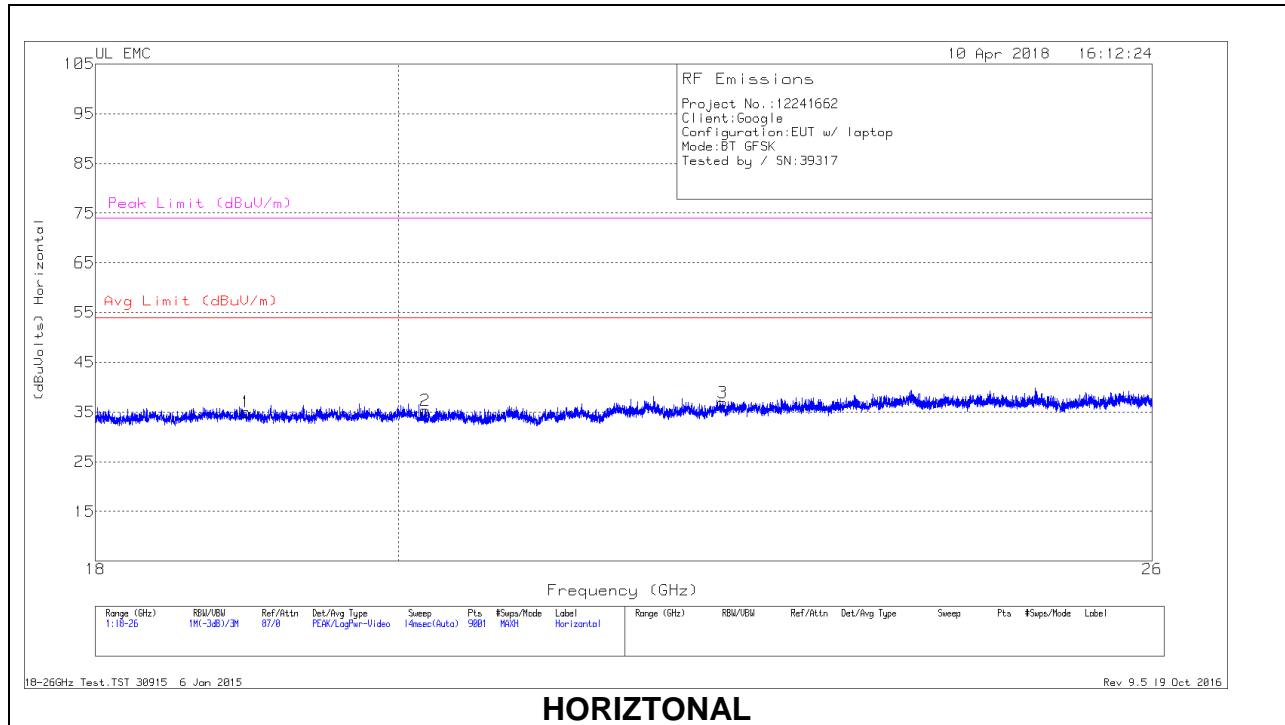
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	43.646	42.57	Pk	15.2	-27.1	30.67	40	-9.33	0-360	100	V
4	56.6544	42.81	Pk	11.2	-26.9	27.11	40	-12.89	0-360	100	V
1	101.7586	40.23	Pk	14.7	-26.4	28.53	43.52	-14.99	0-360	300	H
5	141.7189	40.33	Pk	17	-25.9	31.43	43.52	-12.09	0-360	100	V
2	142.2716	42.22	Pk	17	-25.9	33.32	43.52	-10.2	0-360	200	H
6	959.9988	38.68	Pk	26.9	-22.7	42.88	46.02	-3.14	0-360	101	H
	959.9852	33.15	Qp	26.9	-22.7	37.35	46.02	-8.67	0	101	H

Pk - Peak detector

Qp - Quasi-Peak detector

9.3. Worst Case 18-26 GHz

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



18 – 26GHz DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 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	18.968	37.47	Pk	32.2	-25.2	-9.5	34.97	54	-19.03	74	-39.03
2	20.188	37.28	Pk	32.7	-25.2	-9.5	35.28	54	-18.72	74	-38.72
3	22.389	38.09	Pk	33.1	-24.8	-9.5	36.89	54	-17.11	74	-37.11
4	19.825	37.1	Pk	32.7	-25	-9.5	35.3	54	-18.7	74	-38.7
5	22.055	36.77	Pk	33.1	-25.3	-9.5	35.07	54	-18.93	74	-38.93
6	24.87	37.23	Pk	34	-24.8	-9.5	36.93	54	-17.07	74	-37.07

Pk - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	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.

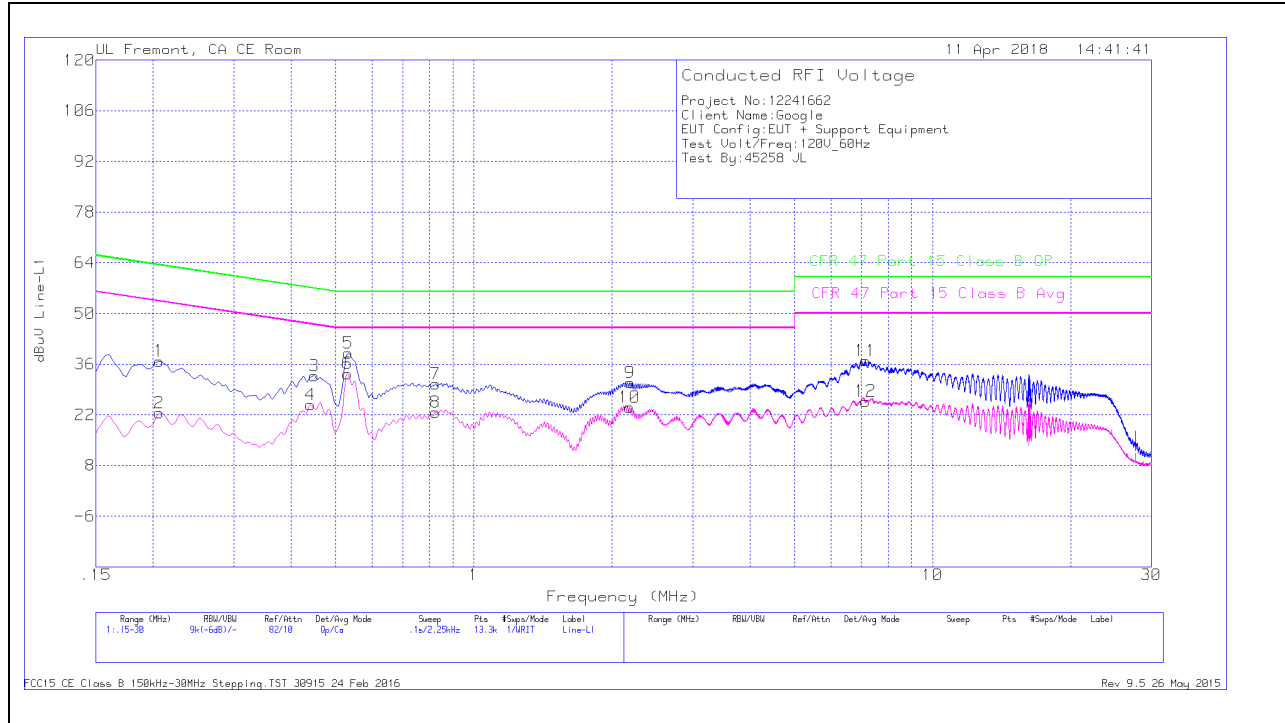
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

10.1.1. EUT POWERED BY AC/DC ADAPTER VIA USB CABLE

LINE 1 RESULTS

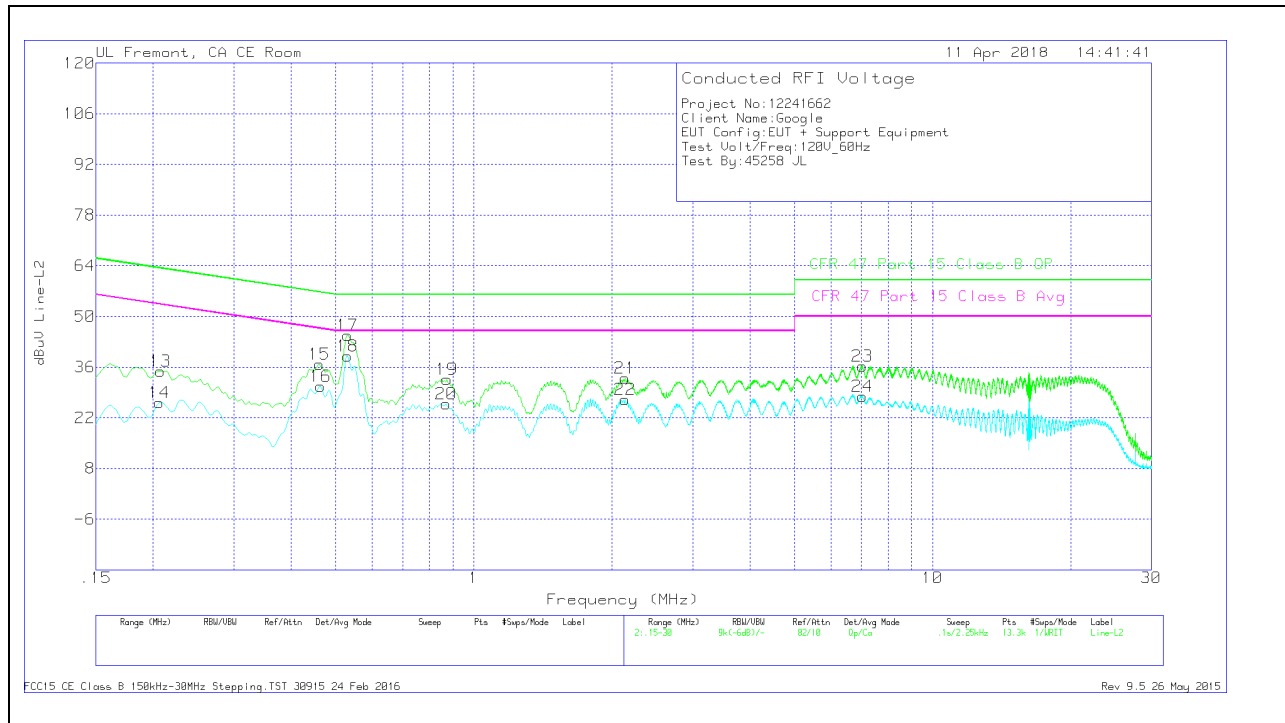


Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.20625	26.77	Qp	0	0	10.1	36.87	63.35	-26.48	-	-
2	.20625	12.44	Ca	0	0	10.1	22.54	-	-	53.35	-30.81
3	.44925	22.72	Qp	0	0	10.1	32.82	56.89	-24.07	-	-
4	.44025	14.77	Ca	0	0	10.1	24.87	-	-	47.06	-22.19
5	.5325	29	Qp	0	0	10.1	39.1	56	-16.9	-	-
6	.53025	23.3	Ca	0	0	10.1	33.4	-	-	46	-12.6
7	.825	20.48	Qp	0	0	10.1	30.58	56	-25.42	-	-
8	.825	12.66	Ca	0	0	10.1	22.76	-	-	46	-23.24
9	2.1885	20.75	Qp	0	.1	10.1	30.95	56	-25.05	-	-
10	2.18625	13.92	Ca	0	.1	10.1	24.12	-	-	46	-21.88
11	7.143	26.6	Qp	0	.2	10.2	37	60	-23	-	-
12	7.14075	15.35	Ca	0	.2	10.2	25.75	-	-	50	-24.25

Qp - Quasi-Peak detector

Ca - CISPR average detection

LINE 2 RESULTS



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	.20738	24.83	Qp	0	0	10.1	34.93	63.31	-28.38	-	-
14	.20625	16.1	Ca	0	0	10.1	26.2	-	-	53.35	-27.15
15	.4605	26.68	Qp	0	0	10.1	36.78	56.68	-19.9	-	-
16	.46275	20.68	Ca	0	0	10.1	30.78	-	-	46.64	-15.86
17	.53025	34.76	Qp	0	0	10.1	44.86	56	-11.14	-	-
18	.53025	29	Ca	0	0	10.1	39.1	-	-	46	-6.9
19	.8745	22.54	Qp	0	0	10.1	32.64	56	-23.36	-	-
20	.87	15.67	Ca	0	0	10.1	25.77	-	-	46	-20.23
21	2.139	22.78	Qp	0	.1	10.1	32.98	56	-23.02	-	-
22	2.13675	16.83	Ca	0	.1	10.1	27.03	-	-	46	-18.97
23	7.0395	25.9	Qp	0	.2	10.2	36.3	60	-23.7	-	-
24	7.0395	17.6	Ca	0	.2	10.2	28	-	-	50	-22

Qp - Quasi-Peak detector

Ca - CISPR average detection