



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Phone + Bluetooth/BLE and DTS b/g/n and NFC + ANT+

MODEL NUMBER : SM-J5008

FCC ID: A3LSMJ5008

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE Phone + Bluetooth/BLE, DTS b/g/n, NFC and ANT+
MODEL NUMBER: SM-J5008
SERIAL NUMBER: RV8G4023X3Y (RADIATED); RV8G4023N7F (CONDUCTED)
DATE TESTED: APRIL 11 - MAY 13, 2015

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass

UL Korea, Ltd. 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 Korea, Ltd. 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 Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. 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 IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Korea, Ltd. By:



Ji Ho Choi
Suwon Lab Manager
UL Korea, Ltd.

Tested By:



CY Choi
Suwon Lab Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea. Line conducted emissions are measured only at the 218 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.

218 Maeyeong-ro	
☒	Chamber 1
☐	Chamber 2

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/PDF/TL/TL-637.pdf>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.32 dB
Radiated Disturbance, Below 1GHz	4.14 dB
Radiated Disturbance, Above 1 GHz	5.97 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + Bluetooth/BLE, DTS b/g/n, NFC and ANT+. This test report addresses the DSS (BT) operational mode.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2402 - 2480	Basic GFSK	Average	9.57	9.07
		Peak	9.78	9.50
	Enhanced Pi/4-DPSK	Average	7.46	5.57
		Peak	9.52	8.95
	Enhanced 8PSK	Average	7.46	5.57
		Peak	9.52	8.96

Note: GFSK, Pi/4-DQPSK, 8PSK average Power are all investigated, The GFSK & Pi/4-DPSK Power are the worst case. Testing is based on this mode to showing compliance. For average power data please refer to section 8.6.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -0.2 dBi.

5.4. WORST-CASE CONFIGURATION AND MODE

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 and Z it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	ETA0U83CBC	N/A	N/A
Data Cable	SAMSUNG	EP-DG920UWE	N/A	N/A
Earphone	SAMSUNG	EHS61ASFWE	N/A	N/A

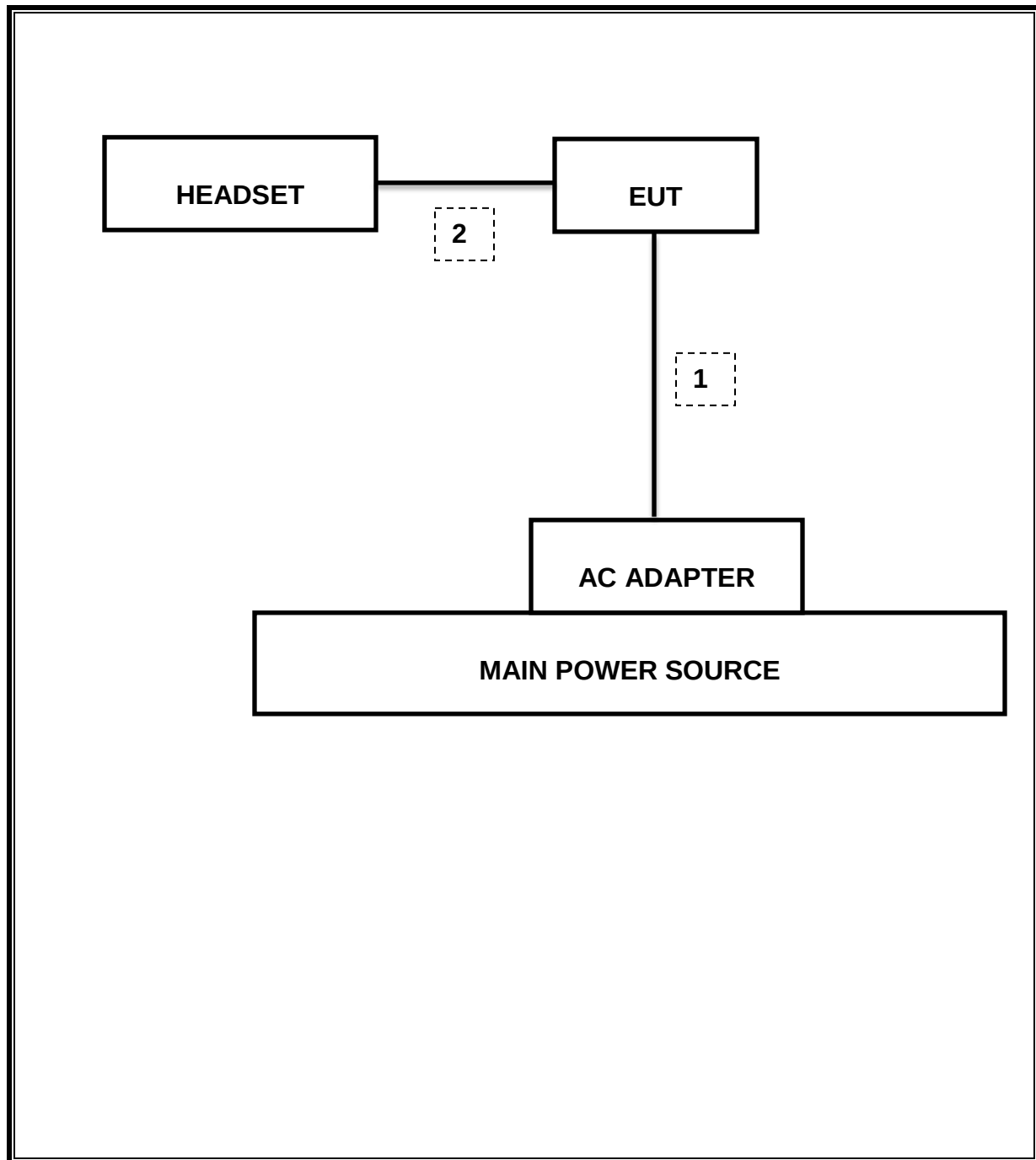
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	0.8m	N/A
2	Audio	1	Mini-Jack	Unshielded	1.0m	N/A

TEST SETUP

The EUT is continuously communicating to the Bluetooth tester during the tests.
EUT was set in the Hidden menu mode to enable BT communications.

SETUP DIAGRAM FOR 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	S/N	Cal Due
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	950	11-17-15
Antenna, Horn, 18 GHz	ETS	3115	00167211	09-20-15
Antenna, Horn, 40 GHz	ETS	3116C	00166255	09-23-15
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	09-29-15
Preamplifier, 1000 MHz	Sonoma	310N	341282	11-17-15
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	11-18-15
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	09-23-15
Bluetooth Tester	TESCOM	TC-3000C	3000C000546	11-17-15
Average Power Sensor	R&S	NRZ-Z91	102681	11-17-15
Average Power Sensor	Agilent / HP	U2000	MY54270007	09-23-15
EMI Test Receive, 40 GHz	R&S	ESU40	100439	11-17-15
EMI Test Receive, 3 GHz	R&S	ESR3	101832	11-17-15
Attenuator / Switch driver	HP	11713A	3748A04272	N/A
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	009	11-17-15
High Pass Filter 5GHz	Micro-Tronics	HPS17542	009	11-17-15
High Pass Filter 6GHz	Micro-Tronics	HPM17543	010	11-17-15
LISN	R&S	ENV-216	101836	04-09-16
LISN	R&S	ENV-216	101837	04-09-16

7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result	Worst Case
2.1049	Occupied Band width (99%)	N/A	Conducted	Pass	1.198 MHz
2.1051, 15.247 (d)	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-43.196 dBm
15.247 (b)(1)	TX conducted output power	<21dBm		Pass	9.57 dBm (AV)
15.247 (a)(1)	Hopping frequency separation	> 25KHz		Pass	1 MHz
15.247 (a)(1)(iii)	Number of Hopping channels	More than 15 non-overlapping channels		Pass	79
15.247 (a)(1)(iii)	Avg Time of Occupancy	< 0.4sec		Pass	0.317 sec
15.207 (a)	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass	46.52 dBuV (AV)
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m	Radiated	Pass	42.3 dBuV/m (AV)

8. ANTENNA PORT TEST RESULTS

8.1. 20 dB AND 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

DA 00-705: 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

8.1.1. BASIC DATA RATE GFSK MODULATION

Channel	Frequency [MHz]	20 dB Bandwidth [MHz]	99% Bandwidth [MHz]
Low	2402	0.893	0.891
Mid	2440	0.900	0.894
High	2480	0.882	0.891
Worst		0.900	0.894

8.1.2. ENHANCED DATA RATE $\pi/4$ -DQPSK MODULATION

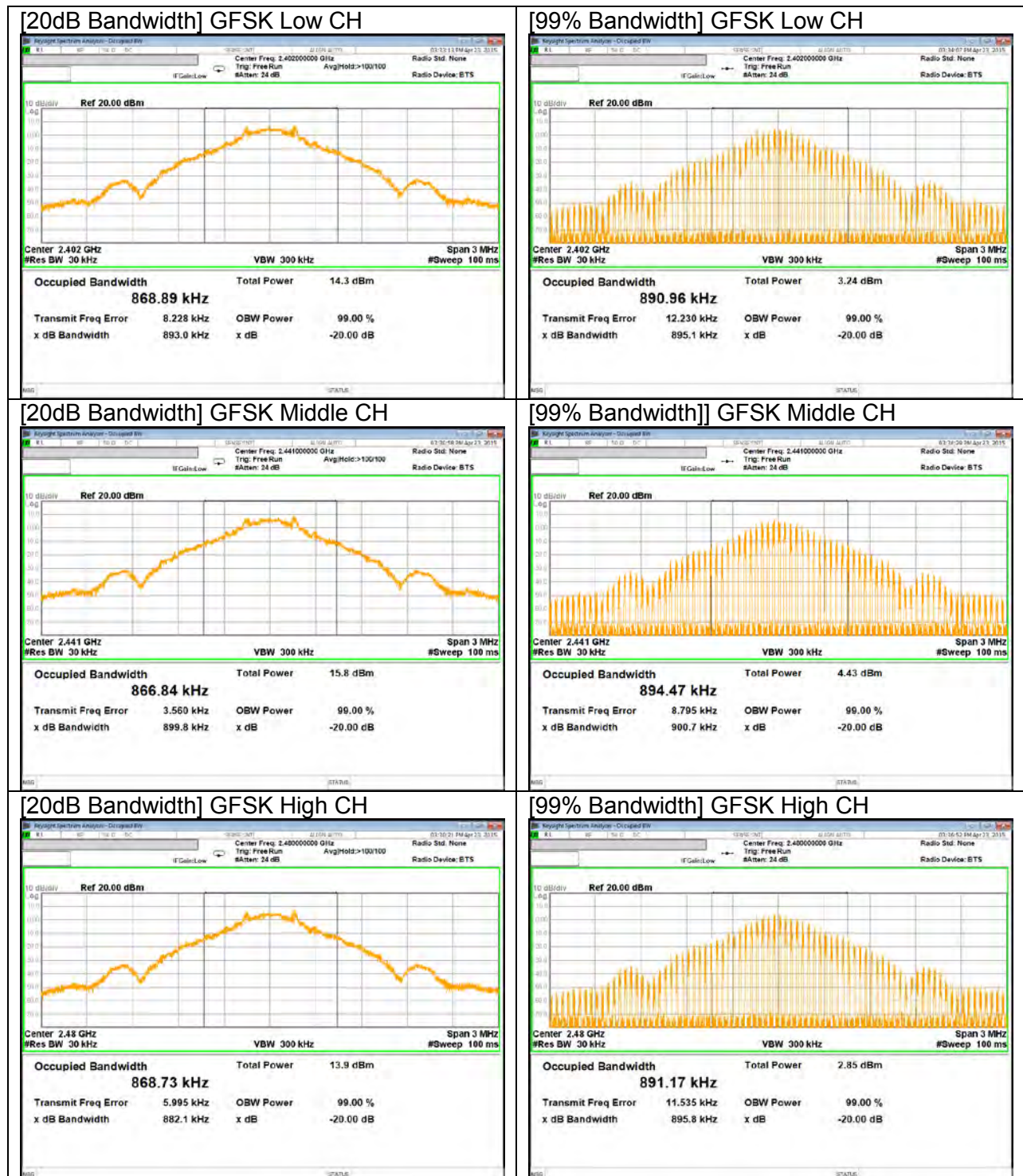
Channel	Frequency [MHz]	20 dB Bandwidth [MHz]	99% Bandwidth [MHz]
Low	2402	1.224	1.163
Mid	2440	1.228	1.163
High	2480	1.228	1.162
Worst		1.228	1.163

8.1.3. ENHANCED DATA RATE 8PSK MODULATION

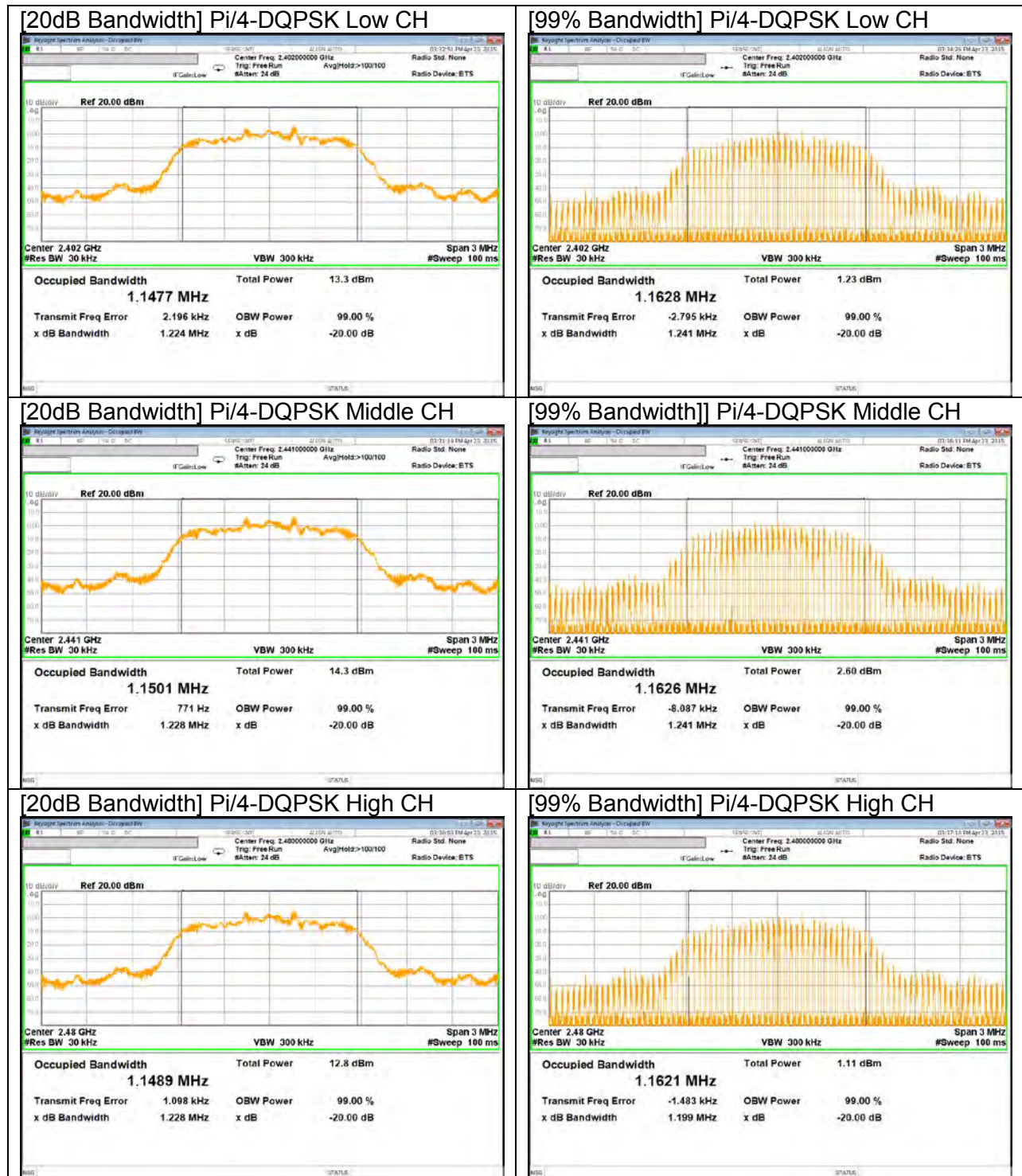
Channel	Frequency [MHz]	20 dB Bandwidth [MHz]	99% Bandwidth [MHz]
Low	2402	1.268	1.192
Mid	2440	1.261	1.198
High	2480	1.261	1.198
Worst		1.268	1.198

8.1.4. 20 dB AND 99% BANDWIDTH PLOTS

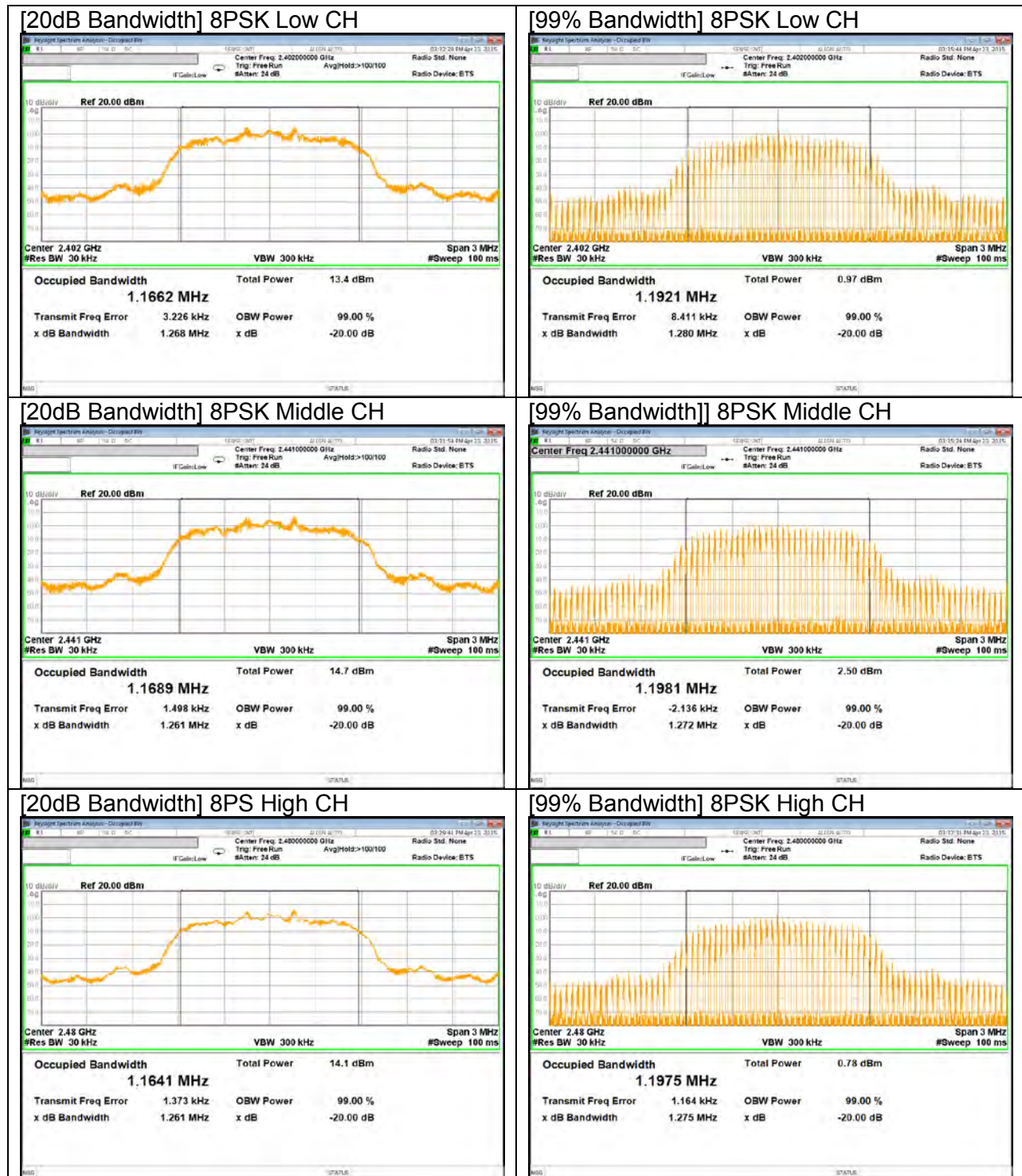
GFSK BANDWIDTH



Pi/4-DQPSK BANDWIDTH



8PSK BANDWIDTH



8.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

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.

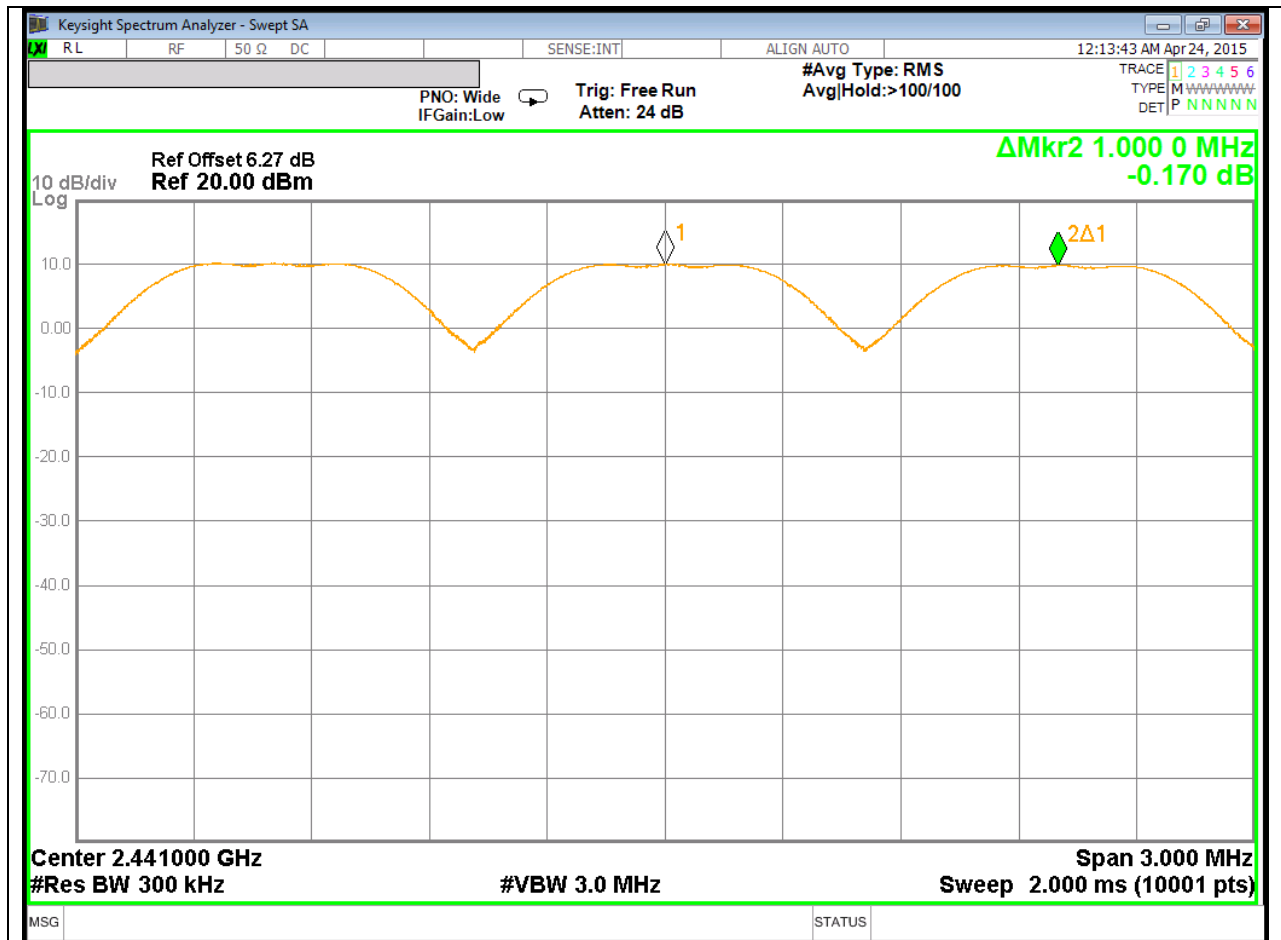
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

TEST PROCEDURE

DA 00-705: The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

HOPPING FREQUENCY SEPARATION PLOT



8.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

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

TEST PROCEDURE

DA 00-705: The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

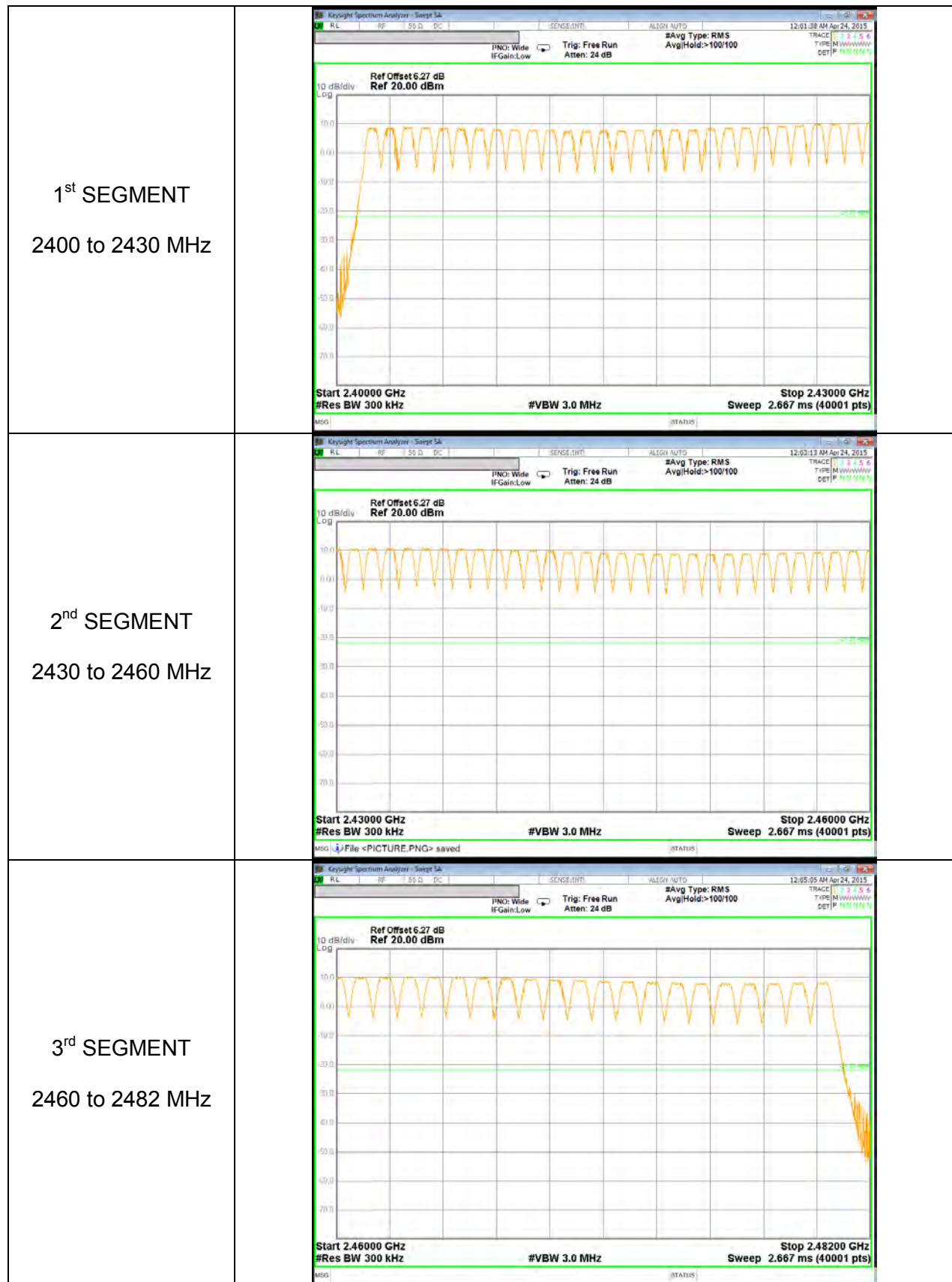
RESULTS

Normal Mode: 79 Channels observed.

NUMBER OF HOPPING CHANNELS PLOTS

NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)





8.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

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

TEST PROCEDURE

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

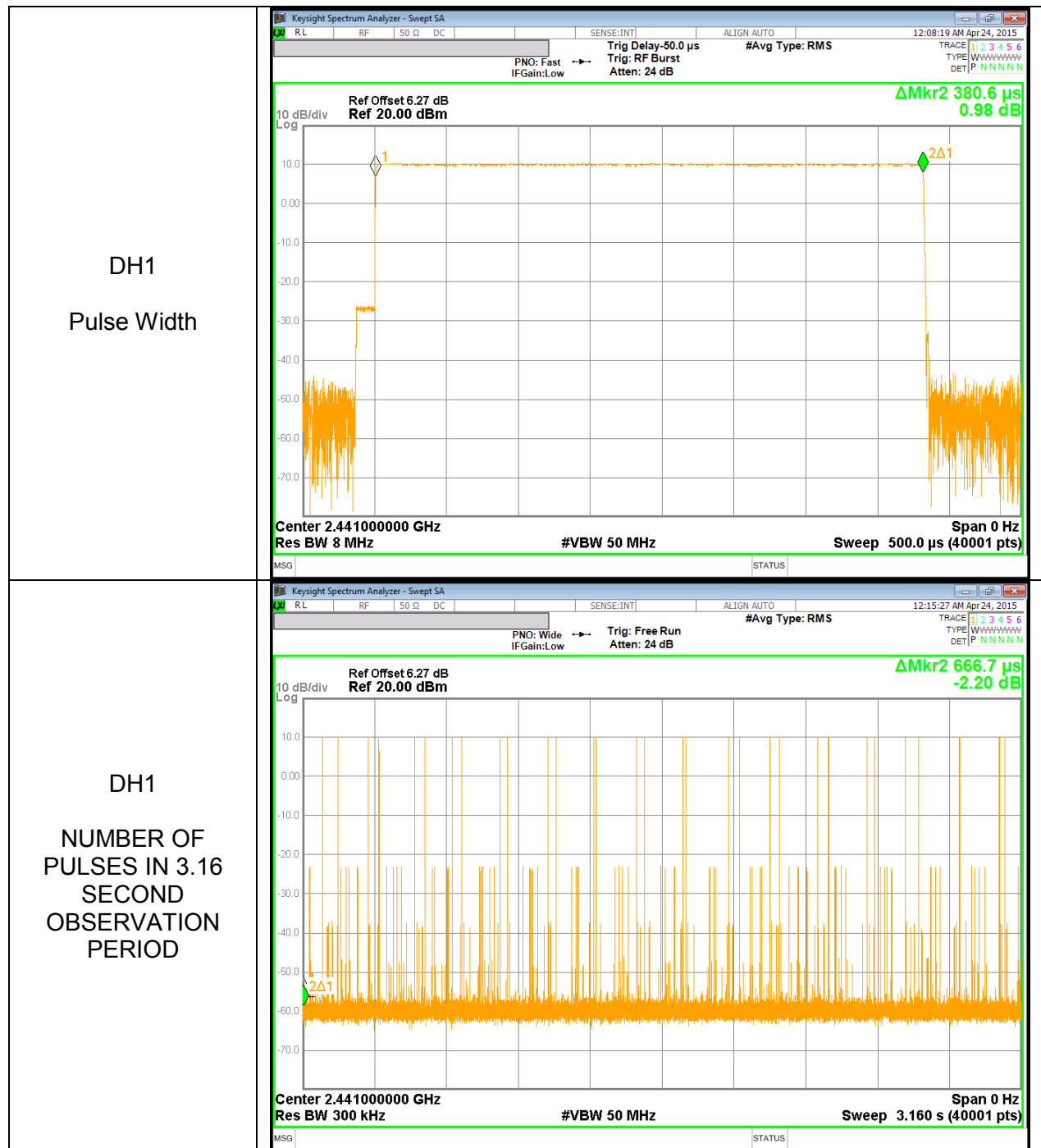
The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{pulse width}$.

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

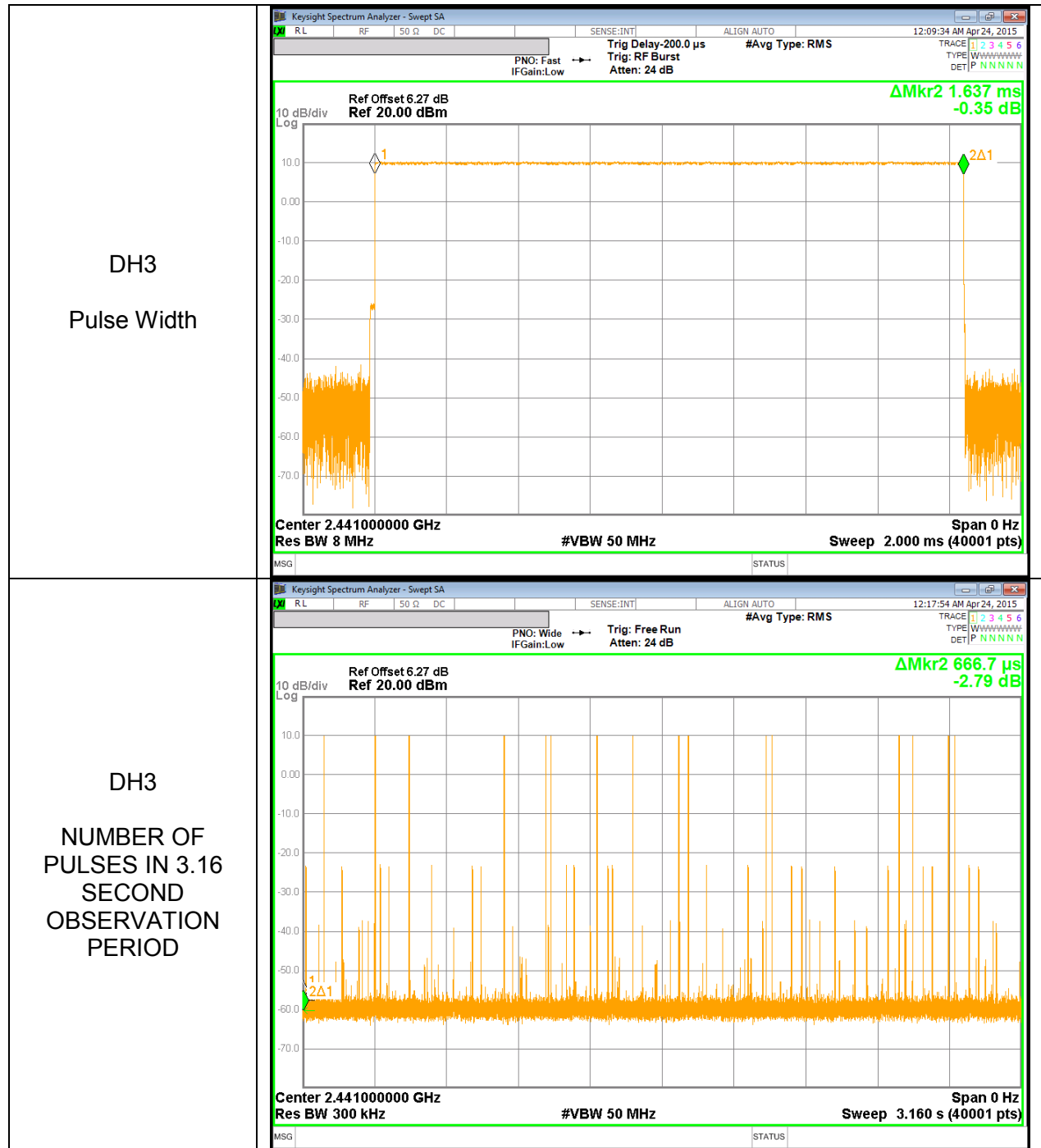
RESULTS

DH Packet	Pulse Width [msec]	Number of Pulses in 3.16 seconds	Average Time of Occupancy [sec]	Limit [sec]	Margin [sec]
GFSK Normal					
DH1	0.381	32	0.121792	0.4	-0.2782
DH3	1.637	16	0.261920	0.4	-0.1381
DH5	2.884	11	0.317240	0.4	-0.0828
DH Packet	Pulse Width [msec]	Number of Pulses in 0.8 seconds	Average Time of Occupancy [sec]	Limit [sec]	Margin [sec]
GFSK AFH					
DH1	0.381	8	0.030448	0.4	-0.3696
DH3	1.637	4	0.065480	0.4	-0.3345
DH5	2.884	2.75	0.079310	0.4	-0.3207

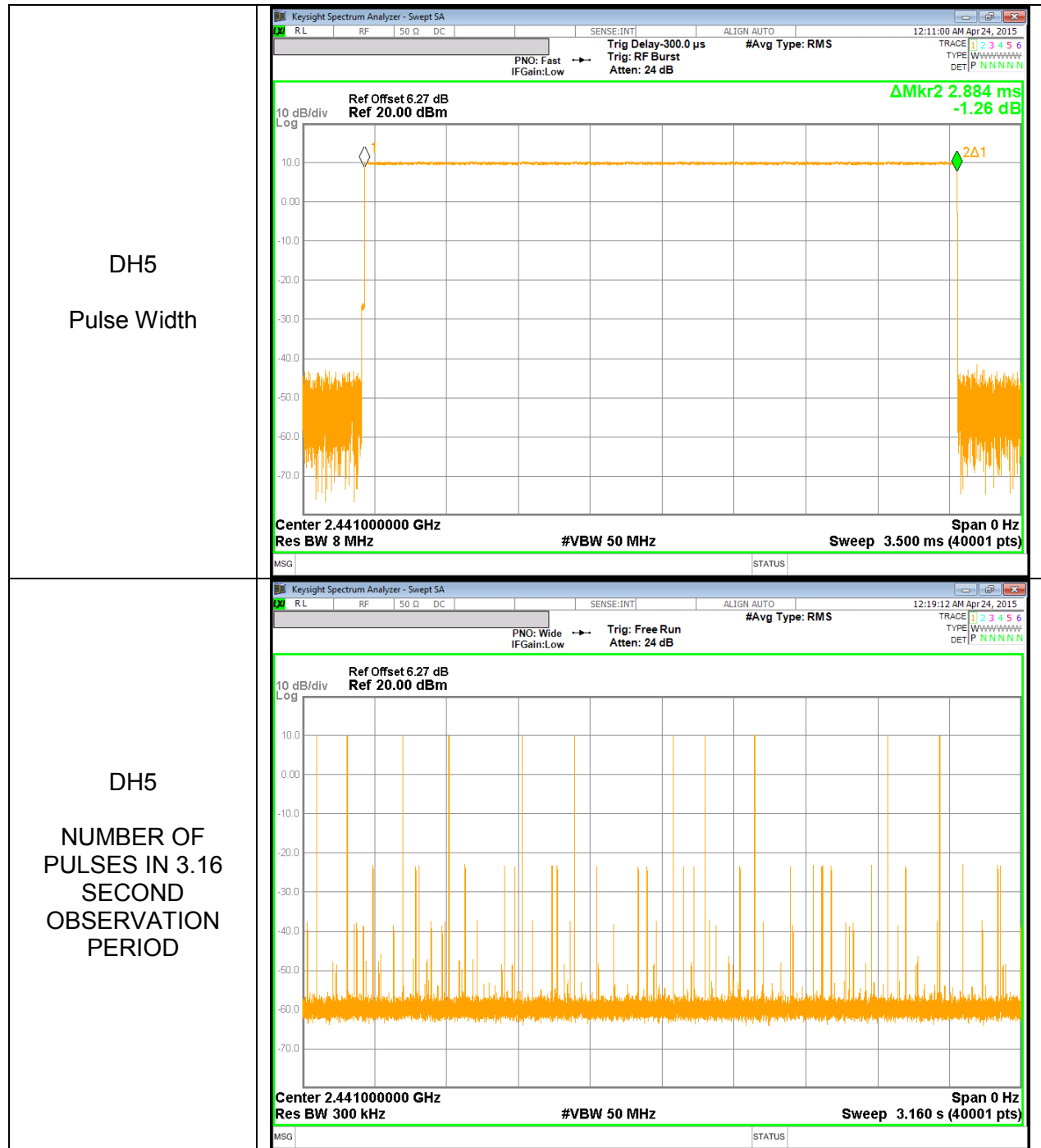
DH1



DH3



DH5



8.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

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

TEST PROCEDURE

DA 00-705: The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

RESULTS

8.5.1. BASIC DATA RATE GFSK MODULATION

Channel	Frequency [MHz]	Output Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	9.506	21	-11.494
Middle	2441	9.777	21	-11.223
High	2480	8.973	21	-12.027
Worst		9.777		-11.223

8.5.2. ENHANCED DATA RATE Pi/4-DPSK MODULATION

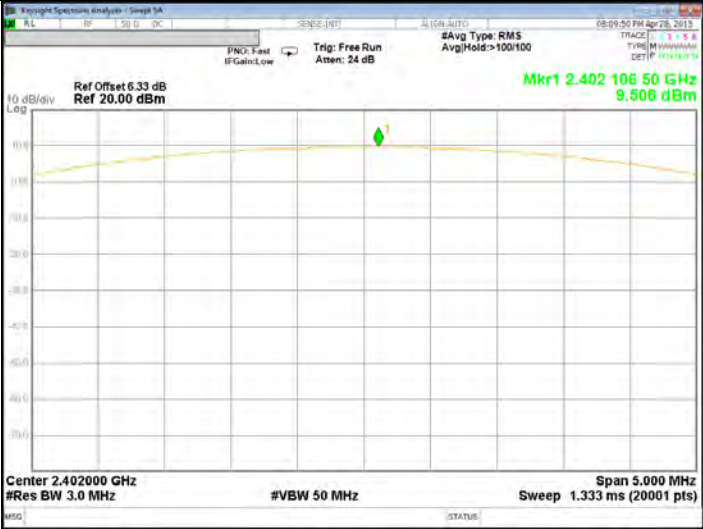
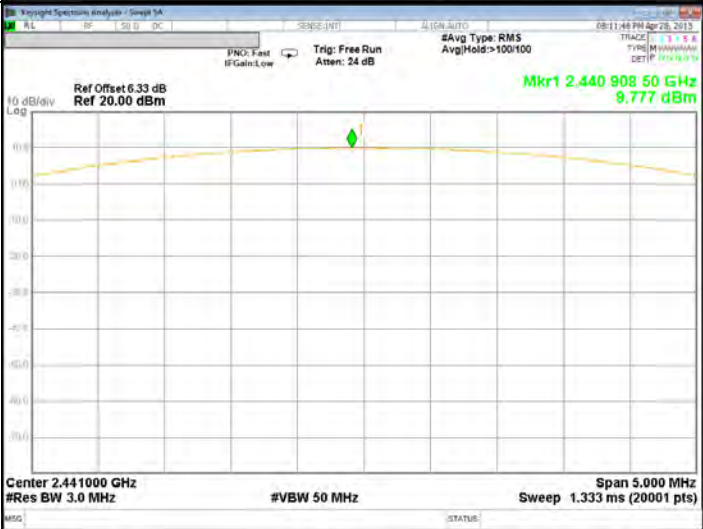
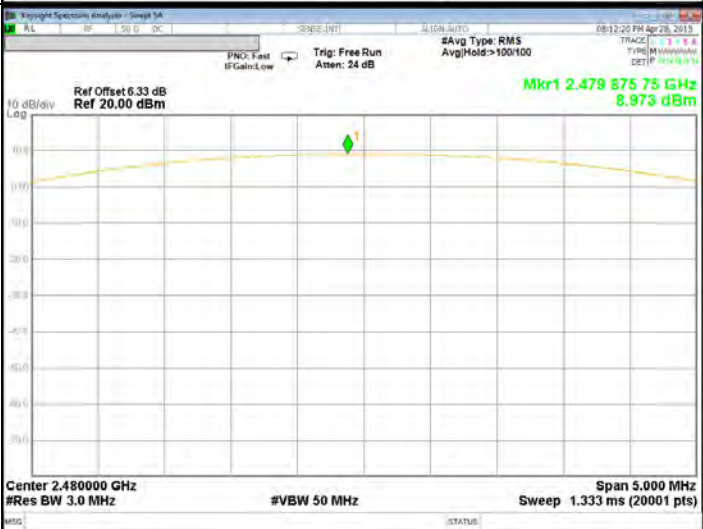
Channel	Frequency [MHz]	Output Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	9.242	21	-11.758
Middle	2441	9.516	21	-11.484
High	2480	8.735	21	-12.265
Worst		9.516		-11.484

8.5.3. ENHANCED DATA RATE 8PSK MODULATION

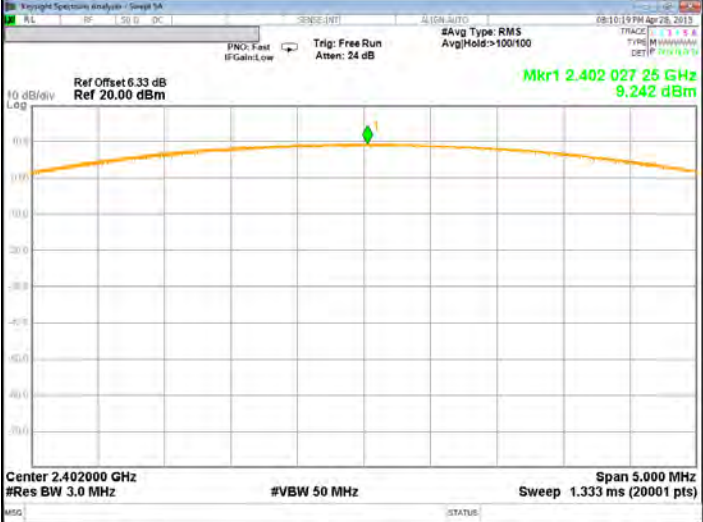
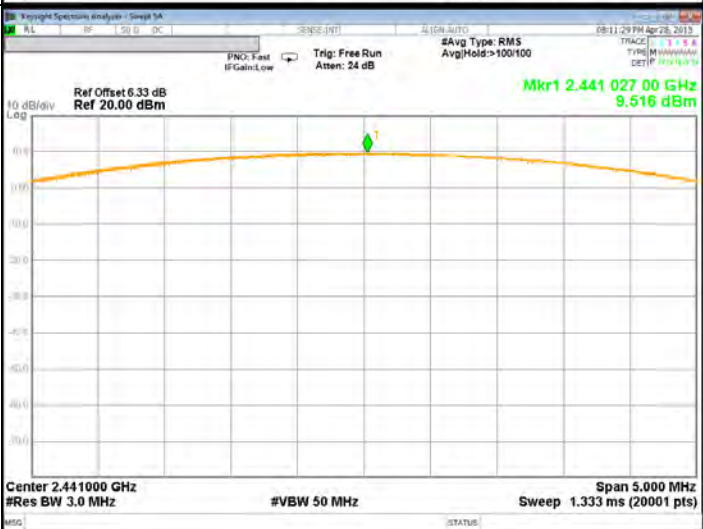
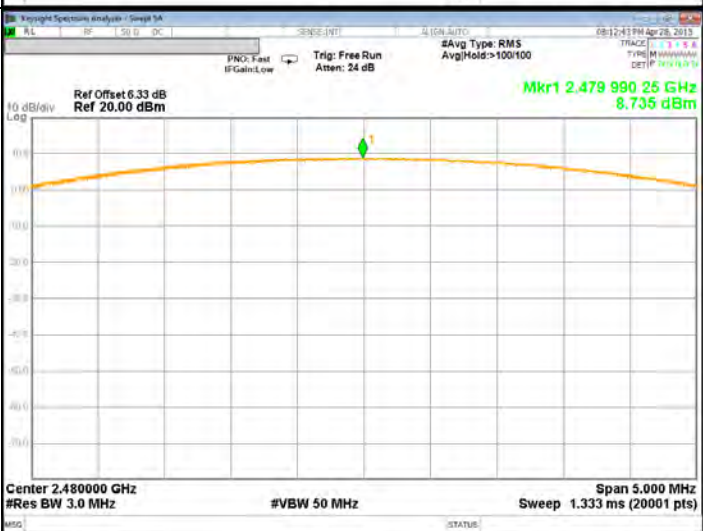
Channel	Frequency [MHz]	Output Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	9.256	21	-11.744
Middle	2441	9.522	21	-11.478
High	2480	8.735	21	-12.265
Worst		9.522		-11.478

8.5.4. OUTPUT POWER PLOTS

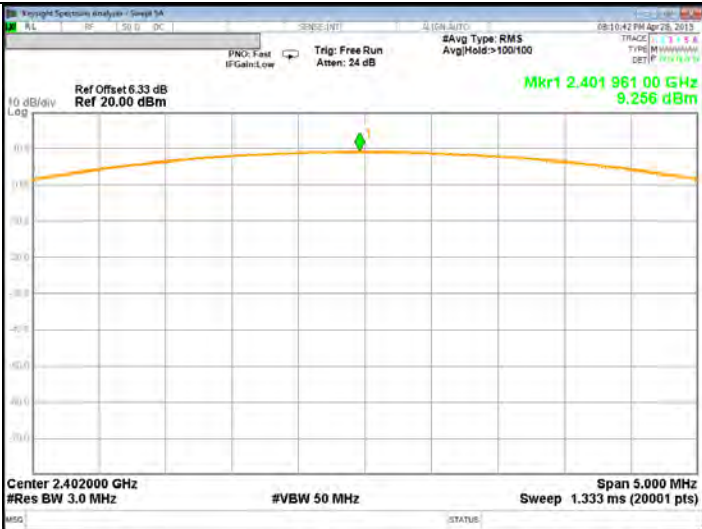
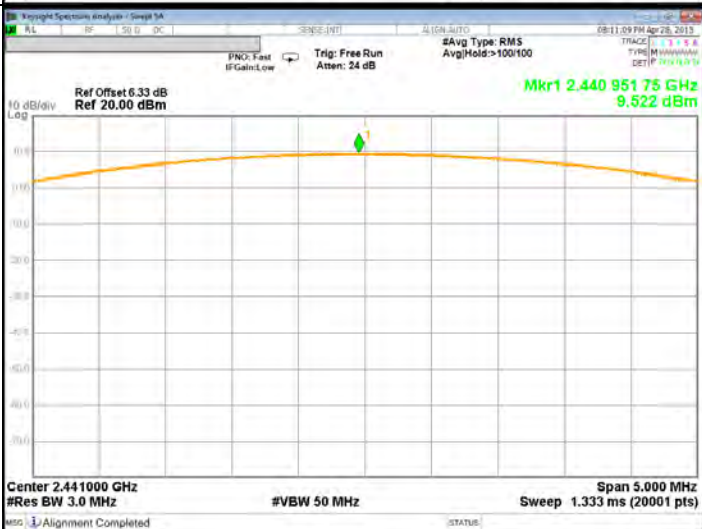
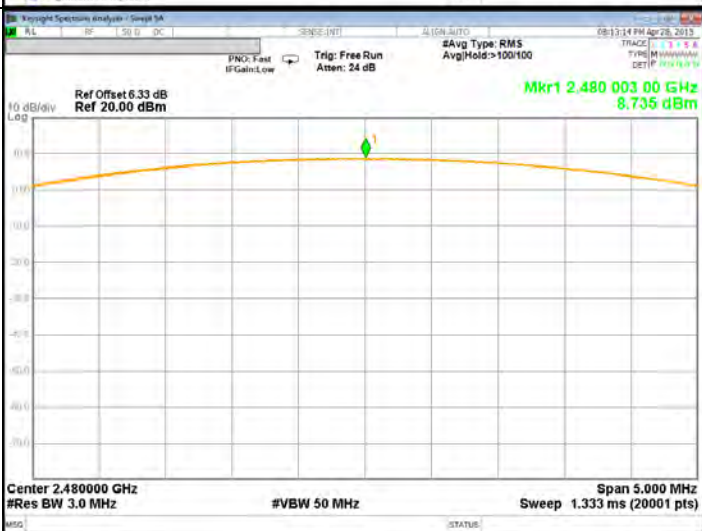
GFSK OUTPUT POWER

GFSK Low CH	
GFSK Middle CH	
GFSK High CH	

Pi/4-DPSK OUTPUT POWER

Pi/4-DPSK Low CH	
Pi/4-DPSK Middle CH	
Pi/4-DPSK High CH	

8PSK OUTPUT POWER

8PSK Low CH	
8PSK Middle CH	
8PSK High CH	

8.6. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

DA 00-705: The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 0.1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

8.6.1. BASIC DATA RATE GFSK MODULATION

Channel	Frequency [MHz]	AV power [dBm]	AV power [mW]
Low	2402	9.33	8.57
Middle	2441	9.57	9.06
High	2480	8.77	7.53

8.6.2. DATA RATE PI/4-DQPSK MODULATION

Channel	Frequency [MHz]	AV power [dBm]	AV power [mW]
Low	2402	7.20	5.25
Middle	2441	7.46	5.57
High	2480	6.65	4.62

8.6.3. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency [MHz]	AV power [dBm]	AV power [mW]
Low	2402	7.18	5.22
Middle	2441	7.46	5.57
High	2480	6.64	4.62

8.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

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.

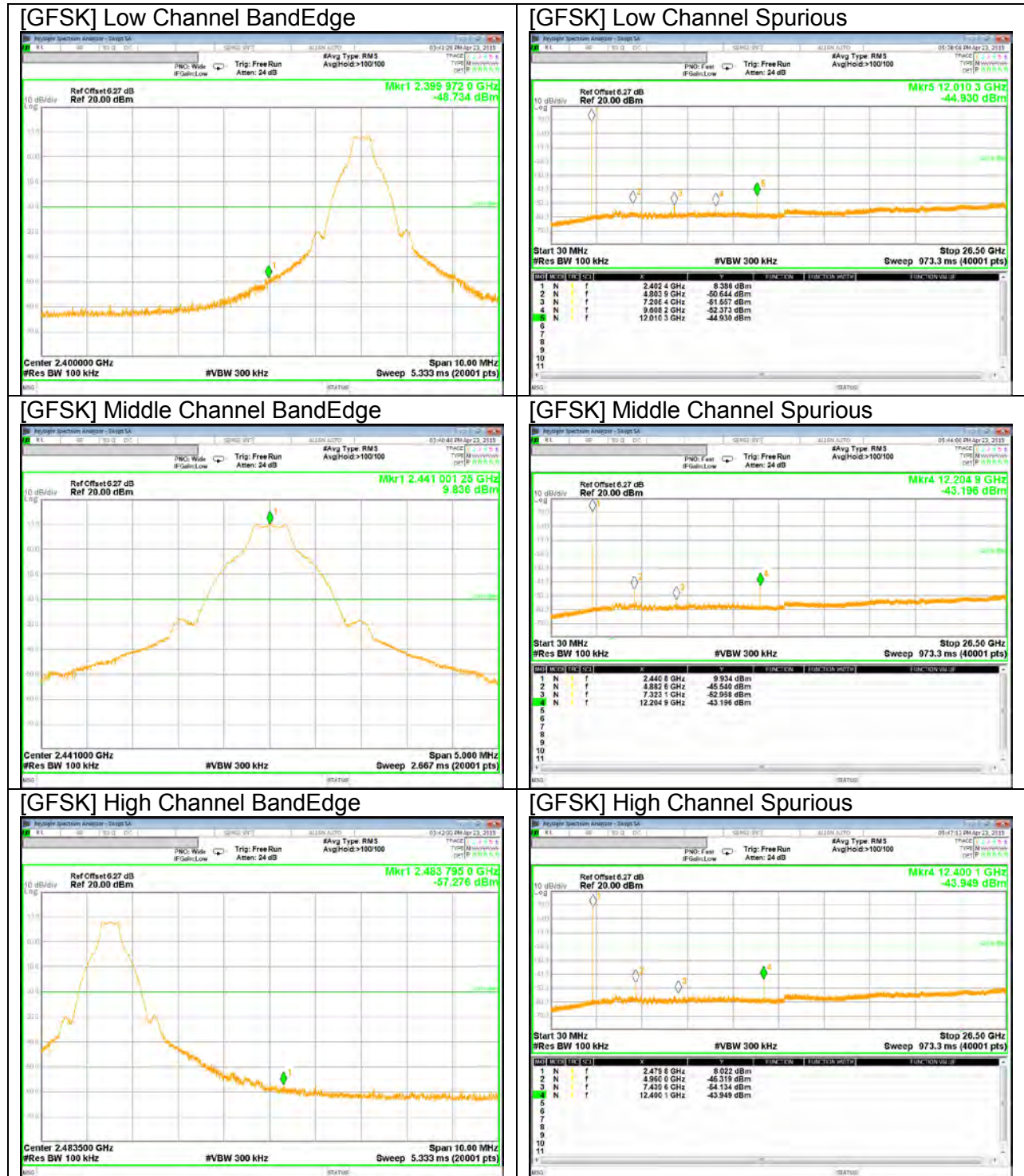
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

RESULTS

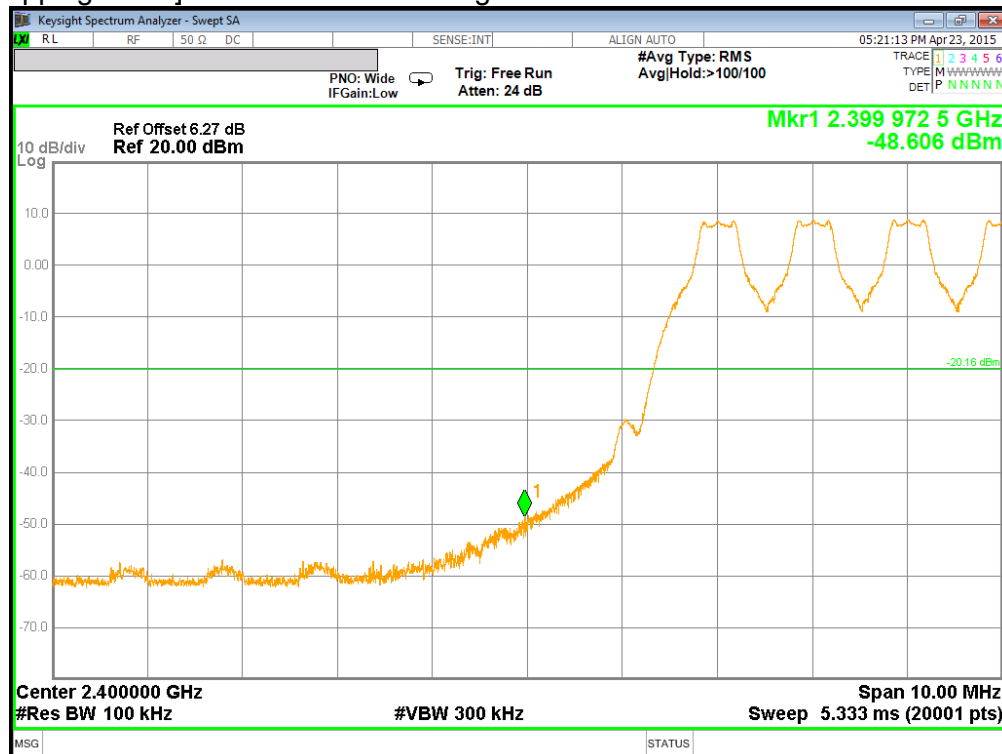
8.7.1. BASIC DATA RATE GFSK MODULATION

GFSK Mode

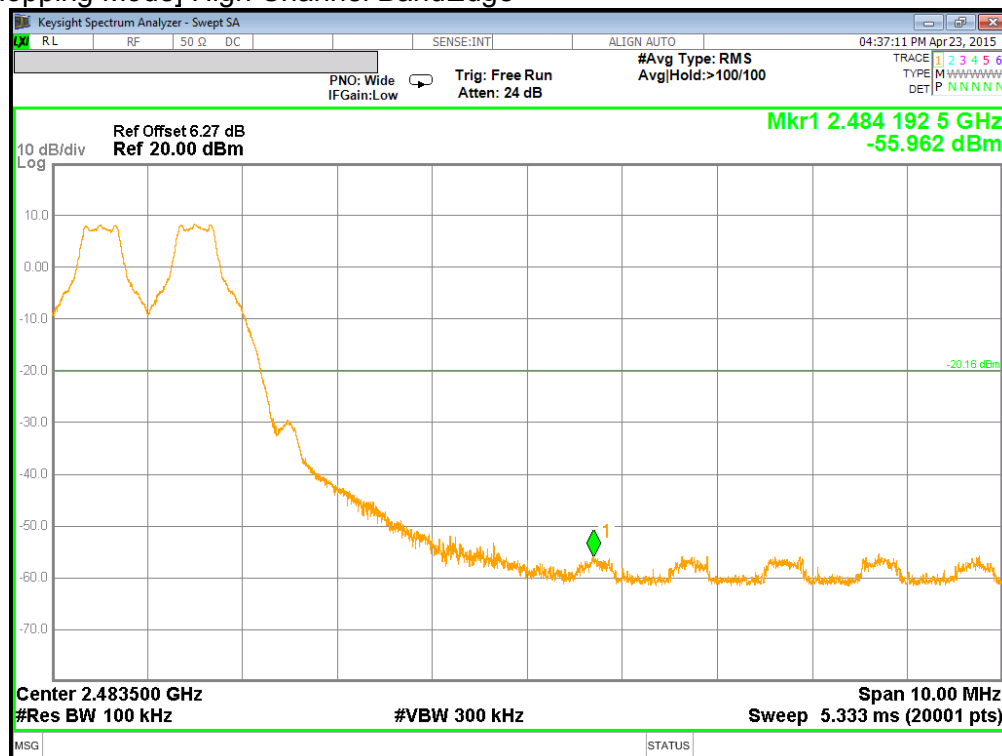


BandEdge Emission at GFSK Hopping Mode

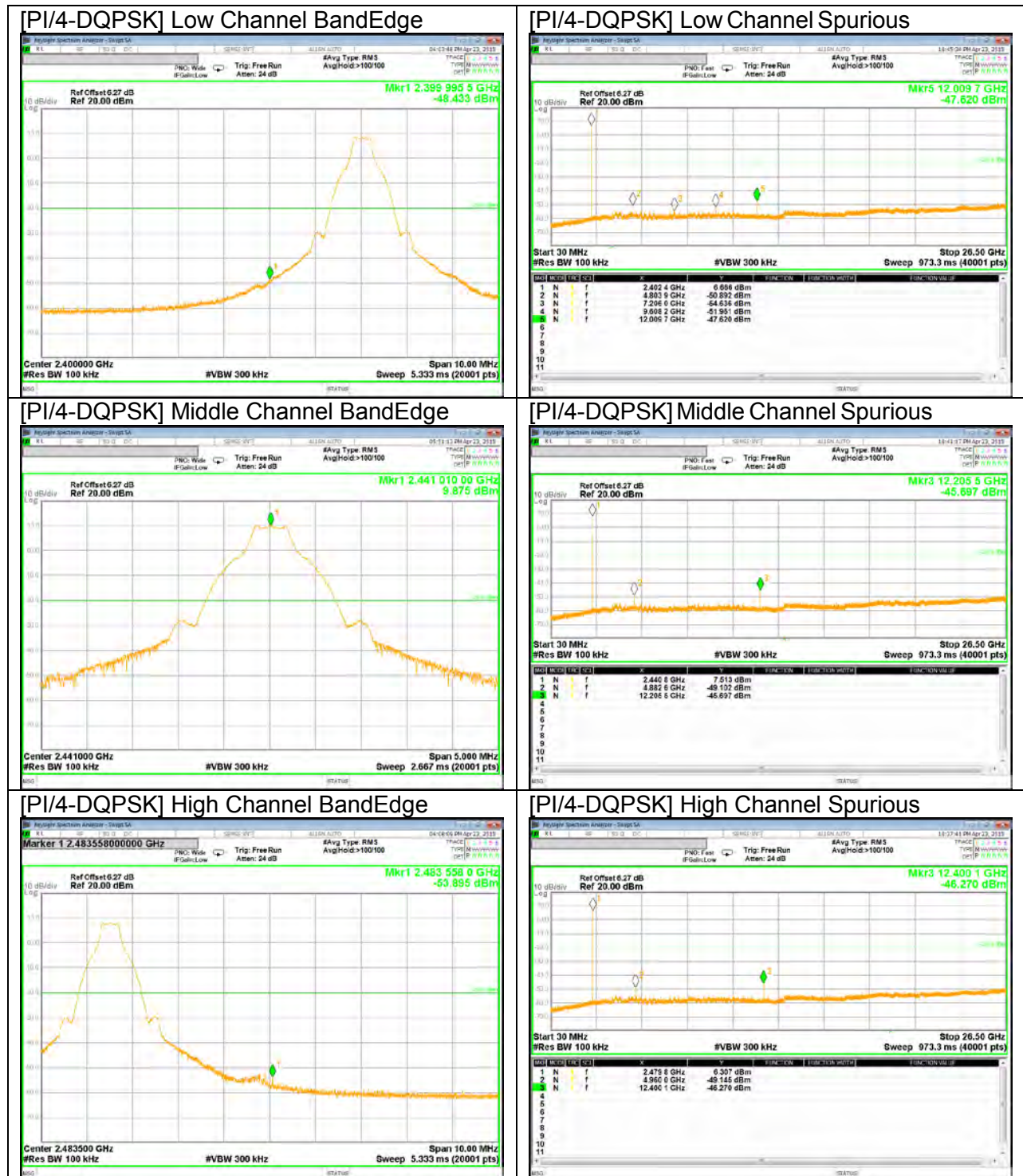
[GFSK Hopping Mode] Low Channel BandEdge



[GFSK Hopping Mode] High Channel BandEdge

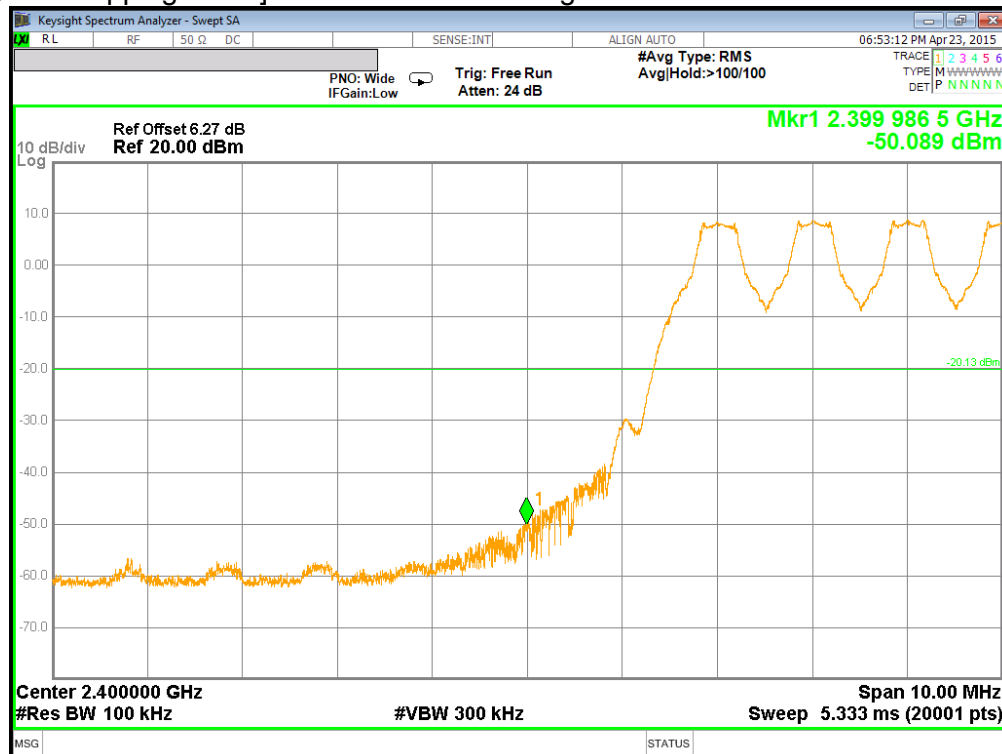


PI/4-DQPSK Mode

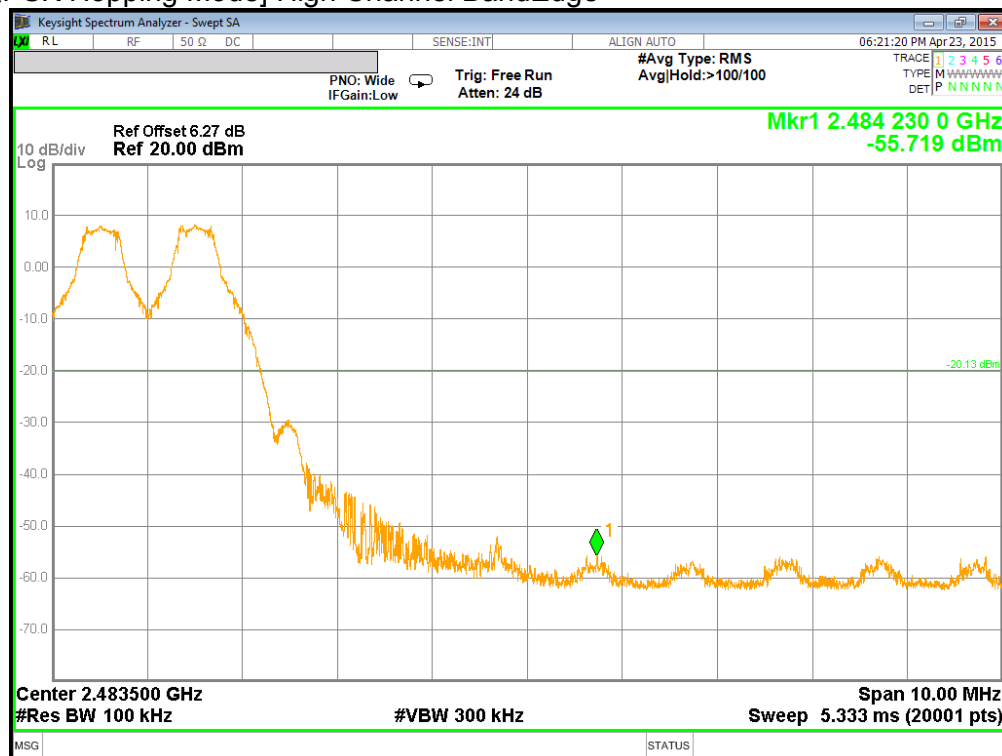


BandEdge Emission at PI/4-DQPSK Hopping Mode

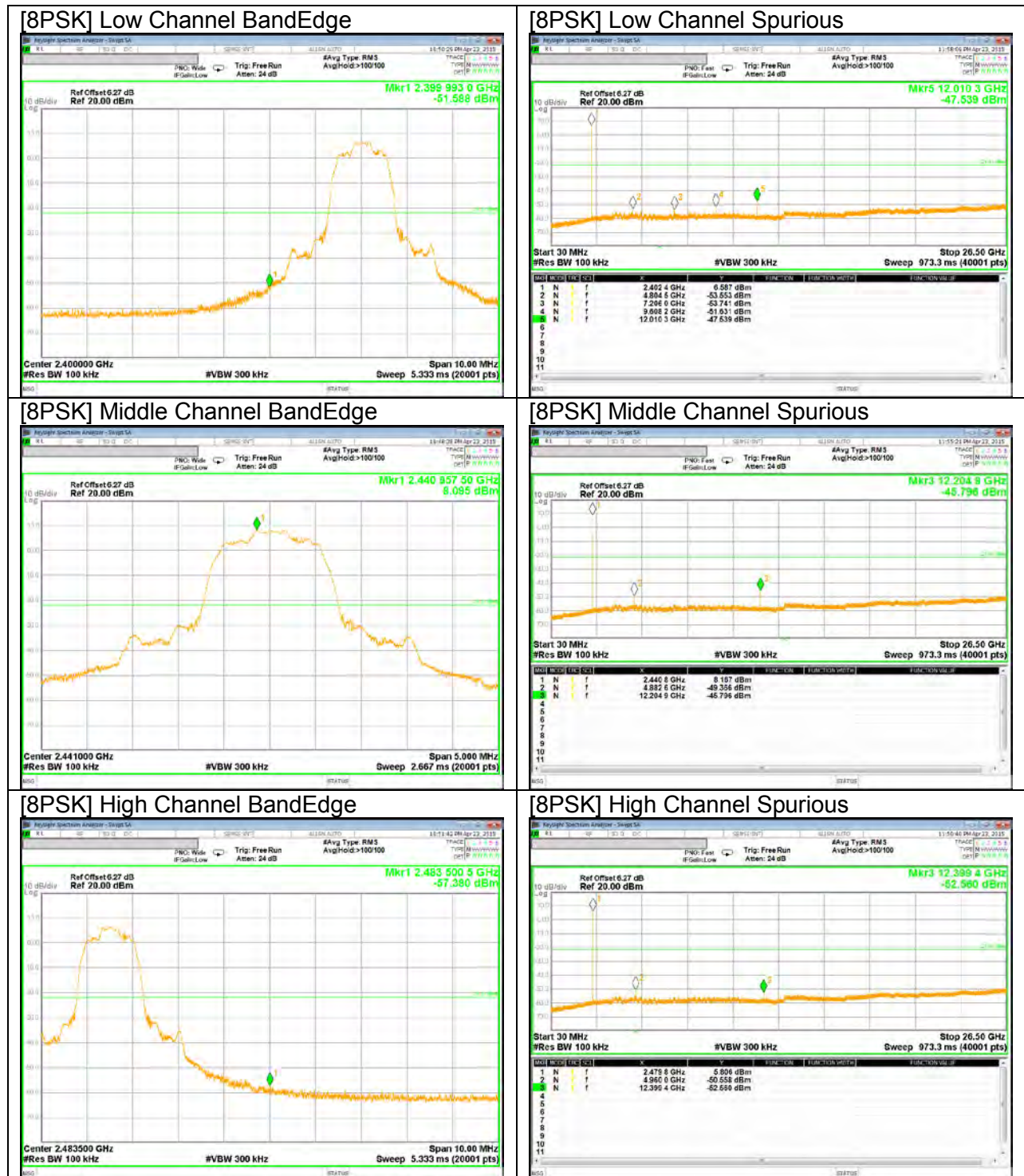
[PI/4-DQPSK Hopping Mode] Low Channel BandEdge



[PI/4-DQPSK Hopping Mode] High Channel BandEdge

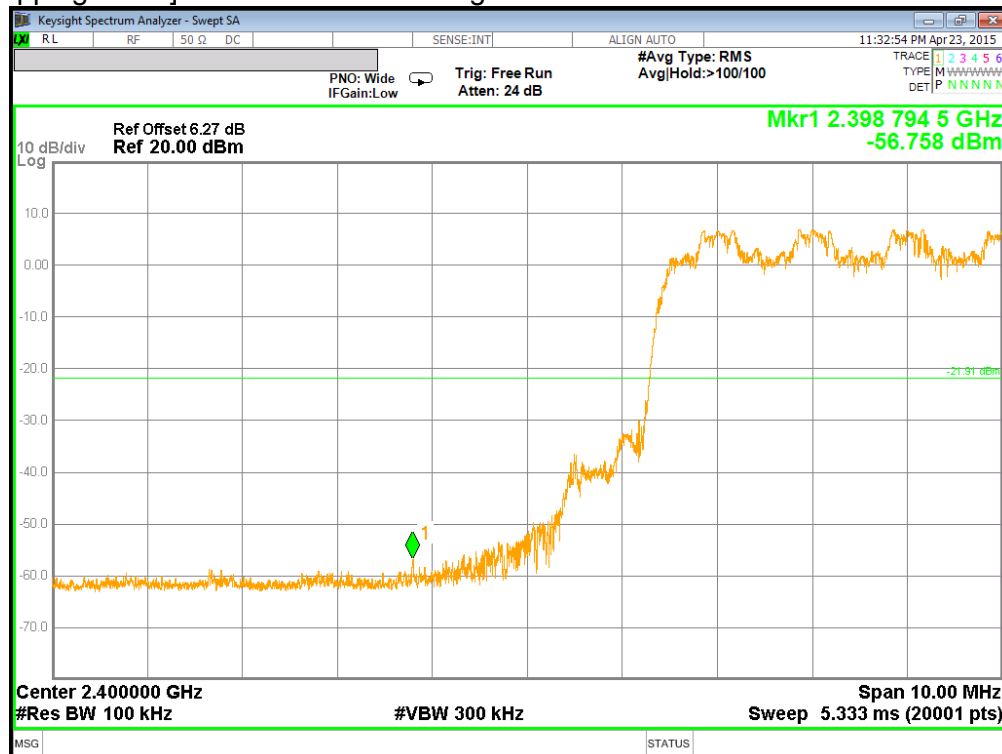


8PSK Mode

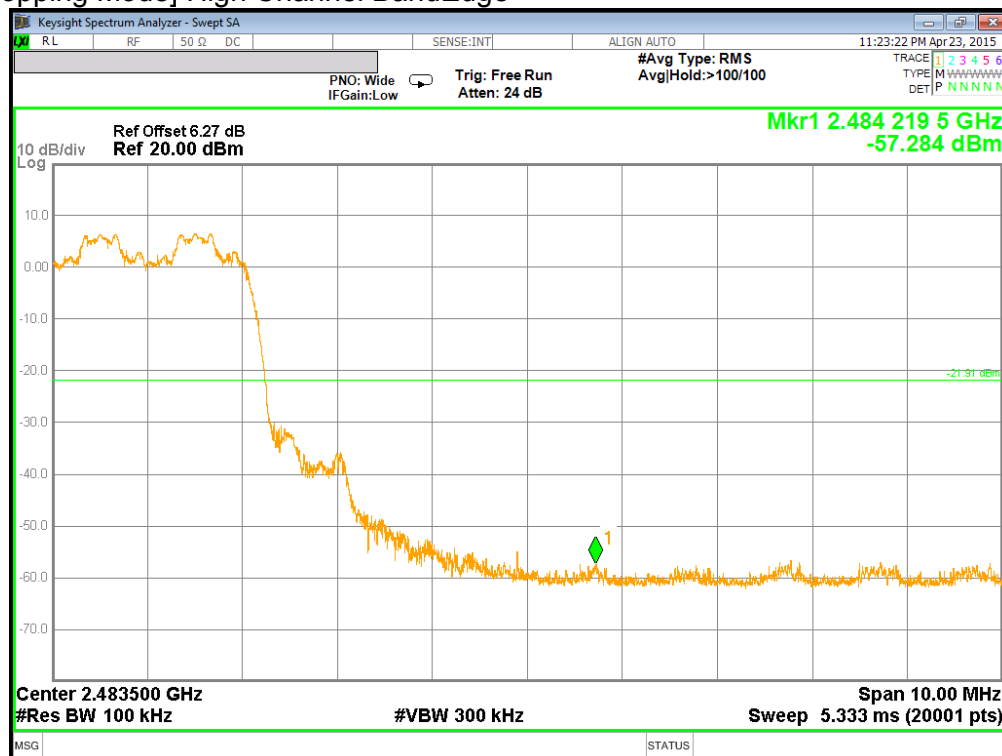


BandEdge Emission at 8PSK Hopping Mode

[8PSK Hopping Mode] Low Channel BandEdge



[8PSK Hopping Mode] High Channel BandEdge



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. 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 band edge measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 1/T (on time) for average measurement.

$$\text{GFSK} = 1/T = 1 / 0.0029\text{S} = 350\text{Hz}.$$

The spectrum from 1GHzHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

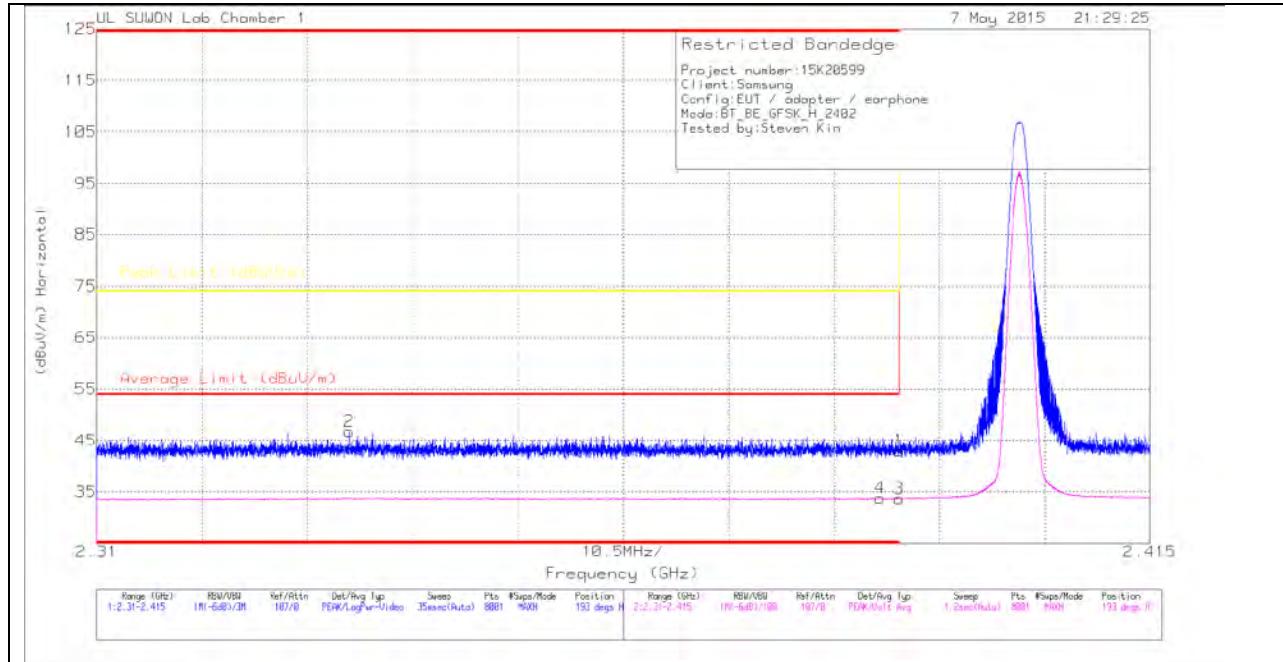
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. BASIC DATA RATE GFSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

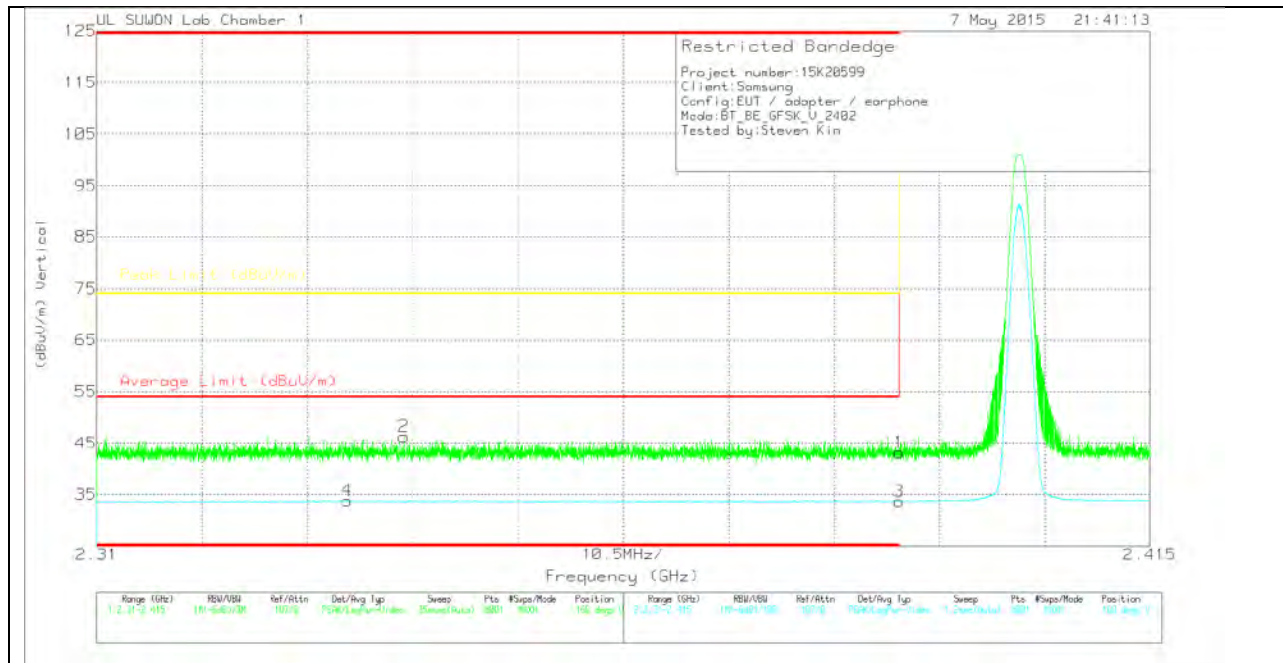
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_2_10 dB	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	37.9	Pk	27.9	-22.8	43	-	-	74	-31	193	101	H
2	* 2.335	41.81	Pk	27.8	-22.9	46.71	-	-	74	-27.29	193	101	H
3	* 2.39	28.57	VB1T	27.9	-22.8	33.67	54	-20.33	-	-	193	101	H
4	* 2.388	28.73	VB1T	27.9	-22.8	33.83	54	-20.17	-	-	193	101	H

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

Pk - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_2_10 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	38.06	Pk	27.9	-22.8	43.16	-	-	74	-30.84	160	251	V
2	* 2.341	41.4	Pk	27.8	-22.9	46.3	-	-	74	-27.7	160	251	V
3	* 2.39	28.57	VB1T	27.9	-22.8	33.67	54	-20.33	-	-	160	251	V
4	* 2.335	28.94	VB1T	27.8	-22.9	33.84	54	-20.16	-	-	160	251	V

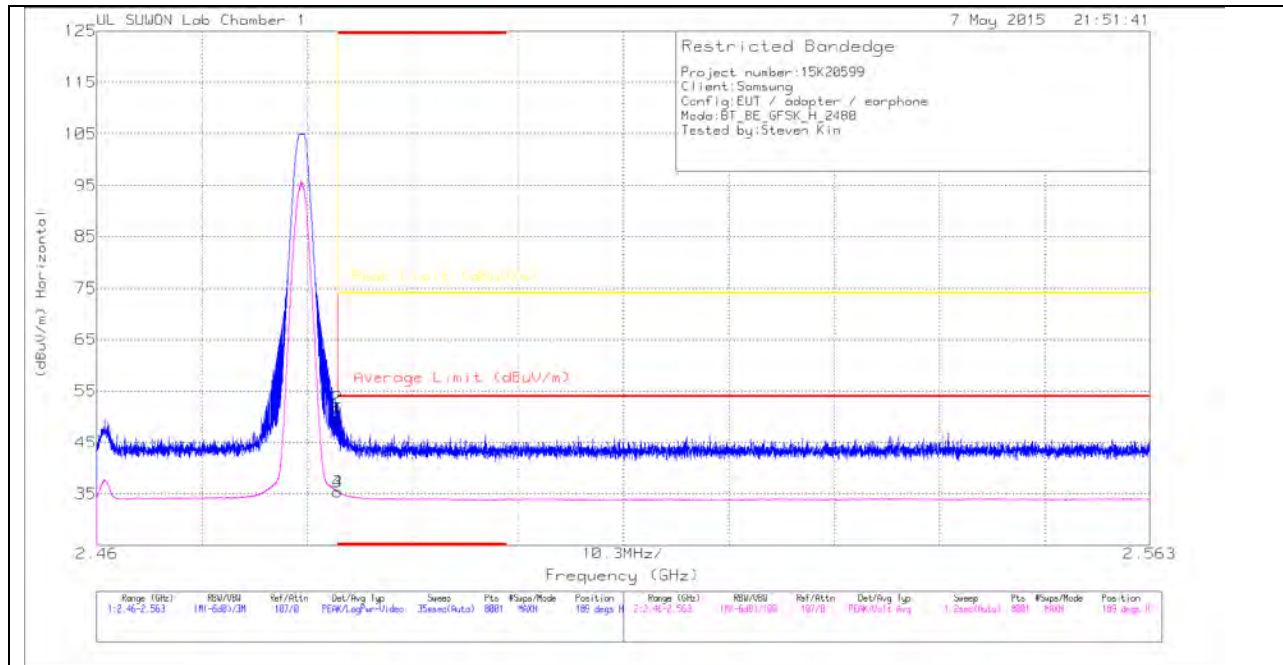
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

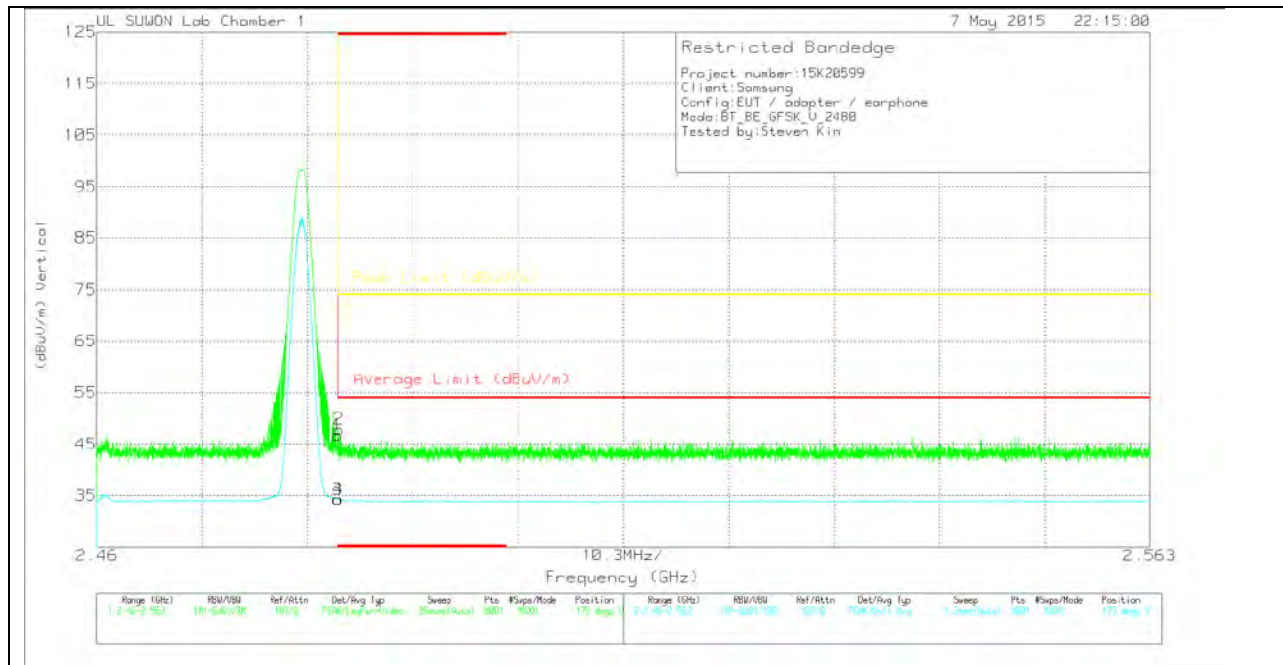
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_2_10 dB	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	44.32	Pk	27.9	-22.6	49.62	-	-	74	-24.38	189	105	H
2	* 2.484	46.46	Pk	27.9	-22.6	51.76	-	-	74	-22.24	189	105	H
3	* 2.484	30.06	VB1T	27.9	-22.6	35.36	54	-18.64	-	-	189	105	H
4	* 2.484	30.09	VB1T	27.9	-22.6	35.39	54	-18.61	-	-	189	105	H

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

Pk - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_2_10 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	41.42	Pk	27.9	-22.6	46.72	-	-	74	-27.28	179	368	V
2	* 2.484	42.59	Pk	27.9	-22.6	47.89	-	-	74	-26.11	179	368	V
3	* 2.484	28.98	VB1T	27.9	-22.6	34.28	54	-19.72	-	-	179	368	V
4	* 2.484	28.99	VB1T	27.9	-22.6	34.29	54	-19.71	-	-	179	368	V

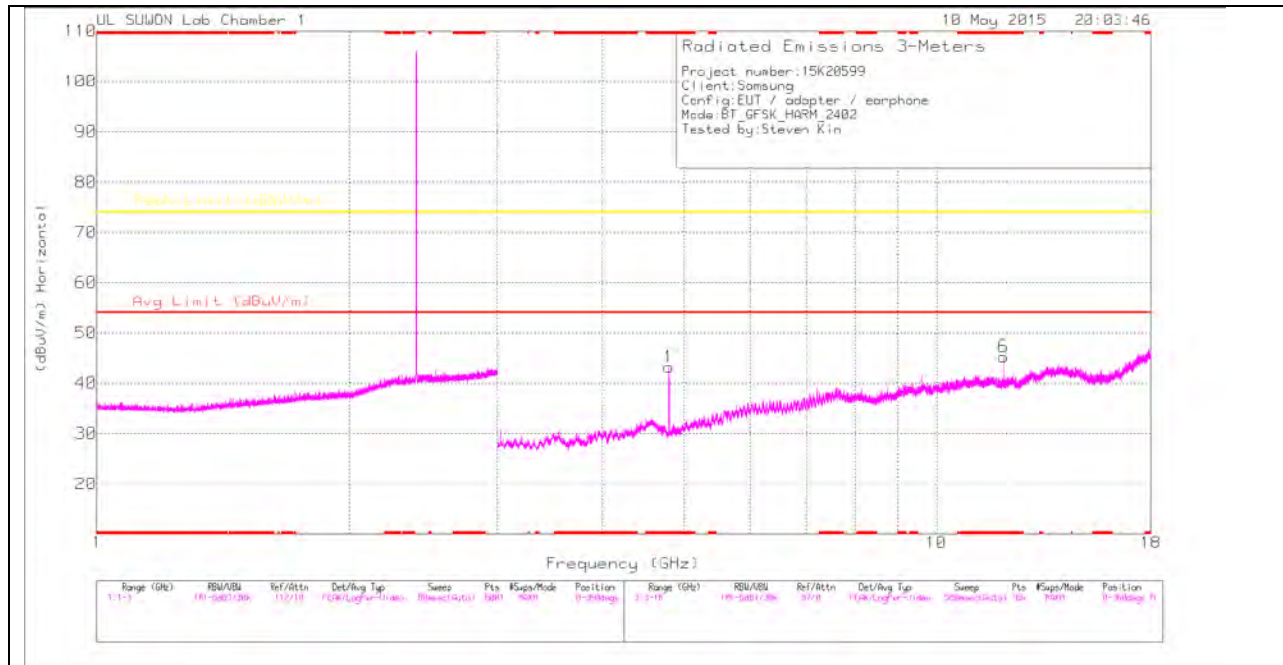
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

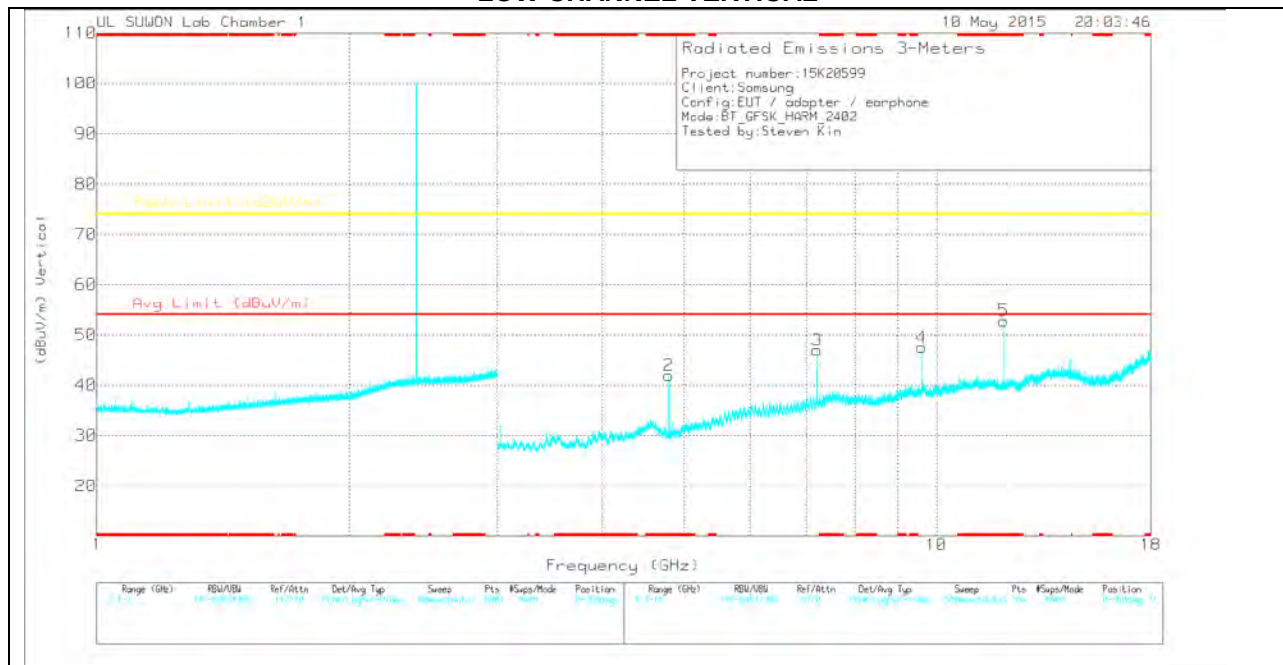
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3G HP	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.804	41.14	PK	31.9	-29.8	43.24	-	-	74	-30.76	0-360	100	H
6	* 12.01	27.38	PK	38.6	-20.7	45.28	-	-	74	-28.72	0-360	200	H
2	* 4.804	39.85	PK	31.9	-29.8	41.95	-	-	74	-32.05	0-360	100	V
3	7.206	35.4	PK	37	-25.4	47	-	-	-	-	0-360	100	V
4	9.608	30.77	PK	37.7	-21	47.47	-	-	-	-	0-360	100	V
5	* 12.01	34.89	PK	38.6	-20.7	52.79	-	-	74	-21.21	0-360	100	V

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

PK – Peak Detector

Radiated Emissions

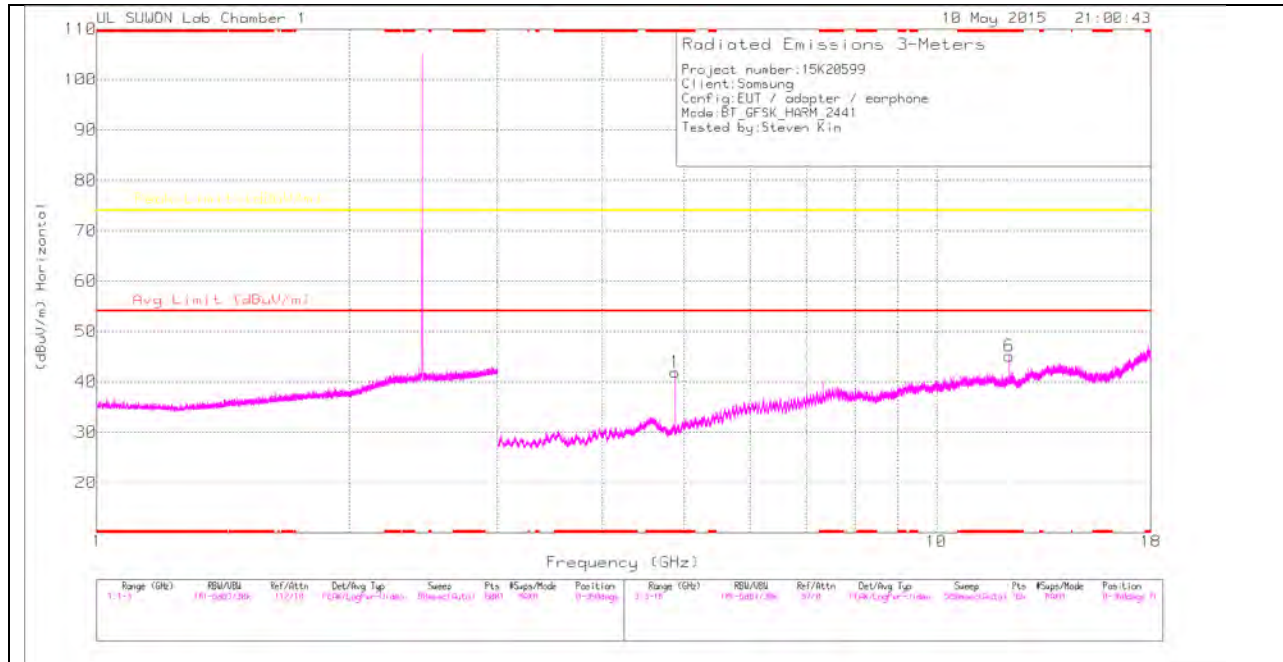
Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3G HP	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.804	46.61	PK3	31.9	-29.8	48.71	-	-	74	-25.29	182	103	H
* 4.804	31.19	VB1T	31.9	-29.8	33.29	54	-20.71	-	-	182	103	H
* 12.01	36.51	PK3	38.6	-20.7	54.41	-	-	74	-19.59	17	329	H
* 12.01	22.09	VB1T	38.6	-20.7	39.99	54	-14.01	-	-	17	329	H
* 4.804	44.43	PK3	31.9	-29.8	46.53	-	-	74	-27.47	11	318	V
* 4.804	29.82	VB1T	31.9	-29.8	31.92	54	-22.08	-	-	11	318	V
* 12.01	40.8	PK3	38.6	-20.7	58.7	-	-	74	-15.3	222	103	V
* 12.01	24.4	VB1T	38.6	-20.7	42.3	54	-11.7	-	-	222	103	V

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

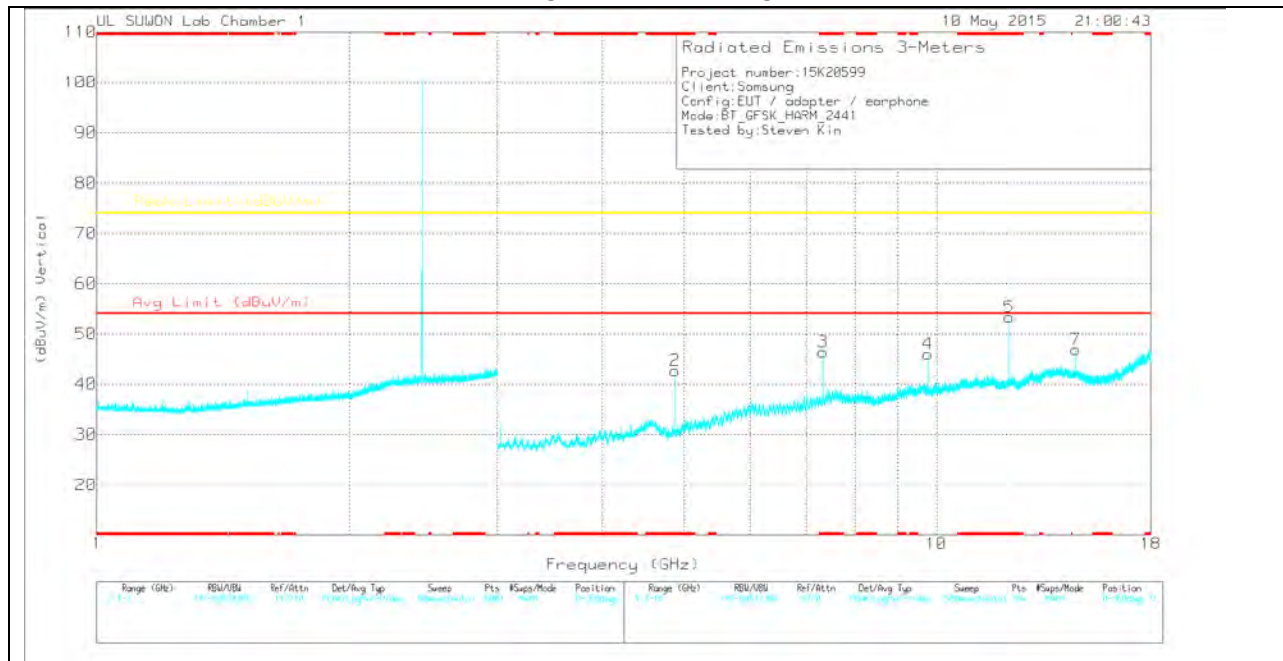
PK3 - FHSS Method: Maximum Peak

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3G HP	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.881	39.01	PK	32	-29.1	41.91	-	-	74	-32.09	0-360	100	H
6	* 12.205	27.81	PK	38.6	-21.3	45.11	-	-	74	-28.89	0-360	200	H
2	* 4.881	39.79	PK	32	-29.1	42.69	-	-	74	-31.31	0-360	100	V
3	* 7.323	34.82	PK	37.2	-25.6	46.42	-	-	74	-27.58	0-360	100	V
4	9.764	30.44	PK	37.6	-22	46.04	-	-	-	-	0-360	100	V
5	* 12.206	36.05	PK	38.6	-21.3	53.35	-	-	74	-20.65	0-360	100	V
7	14.647	28.3	PK	39.8	-21.2	46.9	-	-	-	-	0-360	200	V

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

PK – Peak Detector

Radiated Emissions

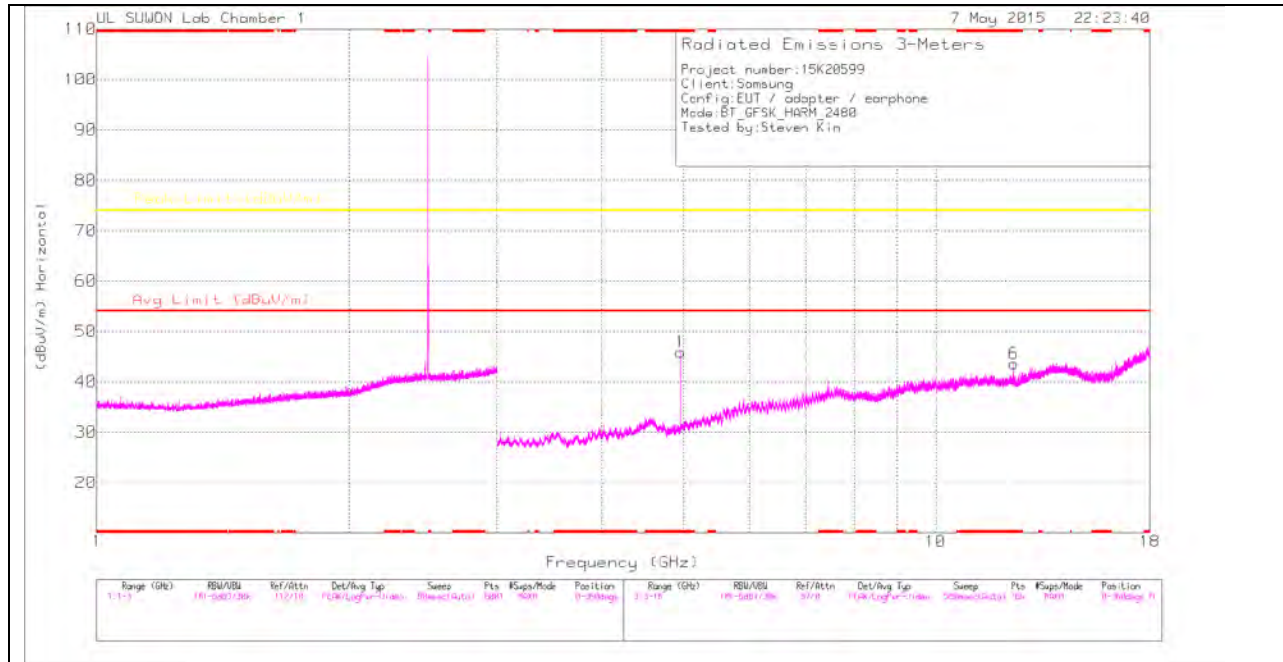
Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3G HP	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.882	45.52	PK3	32	-29.1	48.42	-	-	74	-25.58	183	102	H
* 4.882	30.35	VB1T	32	-29.1	33.25	54	-20.75	-	-	183	102	H
* 12.205	36.45	PK3	38.6	-21.3	53.75	-	-	74	-20.25	33	322	H
* 12.205	22.23	VB1T	38.6	-21.3	39.53	54	-14.47	-	-	33	322	H
* 4.882	43.67	PK3	32	-29.1	46.57	-	-	74	-27.43	59	304	V
* 4.882	29.21	VB1T	32	-29.1	32.11	54	-21.89	-	-	59	304	V
* 12.205	40.24	PK3	38.6	-21.3	57.54	-	-	74	-16.46	220	104	V
* 12.205	24.78	VB1T	38.6	-21.3	42.08	54	-11.92	-	-	220	104	V
* 7.323	41.63	PK3	37.2	-25.6	53.23	-	-	74	-20.77	112	226	V
* 7.323	26.71	VB1T	37.2	-25.6	38.31	54	-15.69	-	-	112	226	V

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

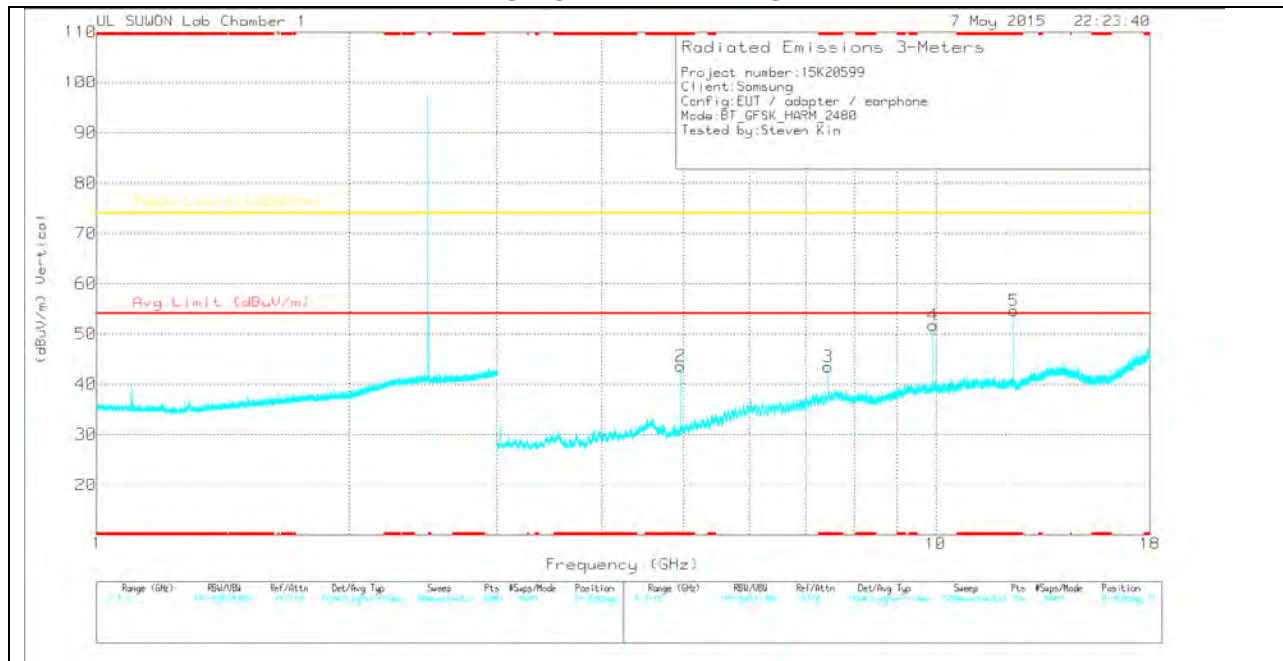
PK3 - FHSS Method: Maximum Peak

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3G HP	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.96	42.64	PK	32.1	-28.9	45.84	-	-	74	-28.16	0-360	100	H
6	* 12.4	26.09	PK	38.4	-20.9	43.59	-	-	74	-30.41	0-360	200	H
2	* 4.959	40.44	PK	32.1	-28.9	43.64	-	-	74	-30.36	0-360	100	V
3	* 7.44	31	PK	37.3	-24.8	43.5	-	-	74	-30.5	0-360	100	V
4	9.92	34.21	PK	37.9	-20.4	51.71	-	-	-	-	0-360	100	V
5	* 12.401	37.11	PK	38.4	-20.9	54.61	-	-	74	-19.39	0-360	100	V

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

PK – Peak detector

Radiated Emissions

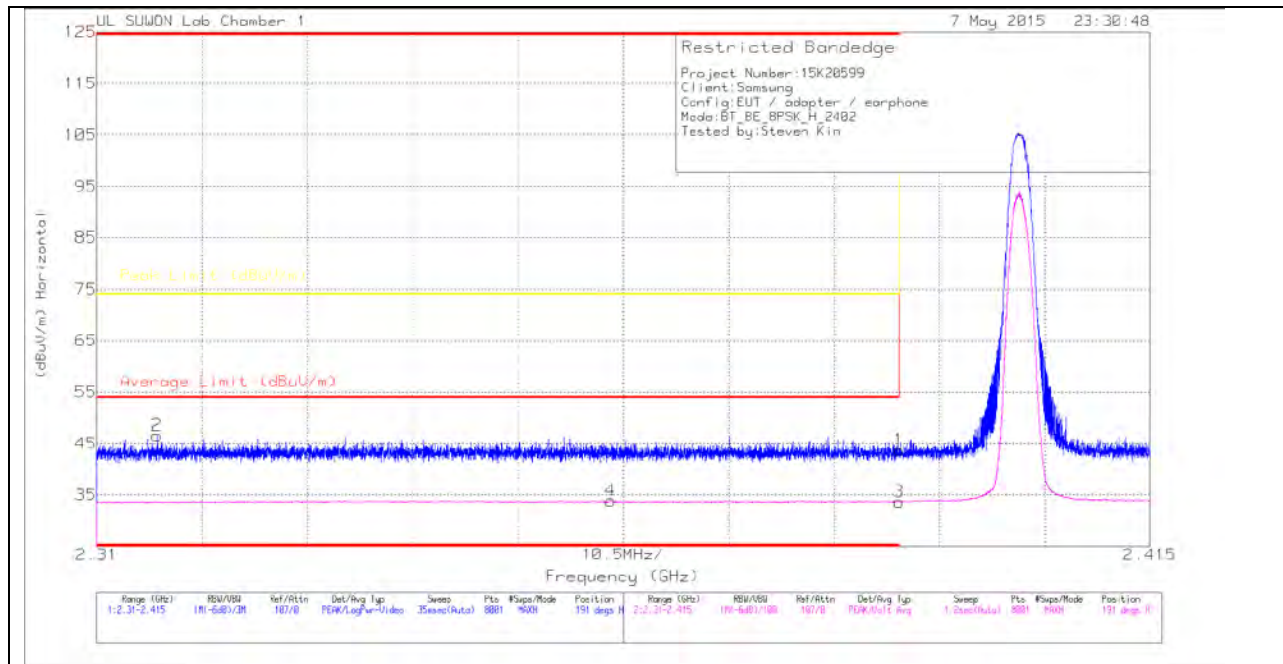
Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3G HP	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96	47.76	PK3	32.1	-28.9	50.96	-	-	74	-23.04	219	101	H
* 4.96	31.53	VB1T	32.1	-28.9	34.73	54	-19.27	-	-	219	101	H
9.92	38.31	PK3	37.9	-20.4	55.81	-	-	-	-	285	292	V
9.92	22.87	VB1T	37.9	-20.4	40.37	-	-	-	-	285	292	V
* 12.4	38.17	PK3	38.4	-20.9	55.67	-	-	74	-18.33	252	102	V
* 12.4	24.13	VB1T	38.4	-20.9	41.63	54	-12.37	-	-	252	102	V

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

PK3 - FHSS Method: Maximum Peak

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

9.2.2. ENHANCED DATA RATE Pi/4-DPSK MODULATION RESTRICTED BANDEDGE (LOW CHANNEL)



HORIZONTAL DATA

Trace Markers

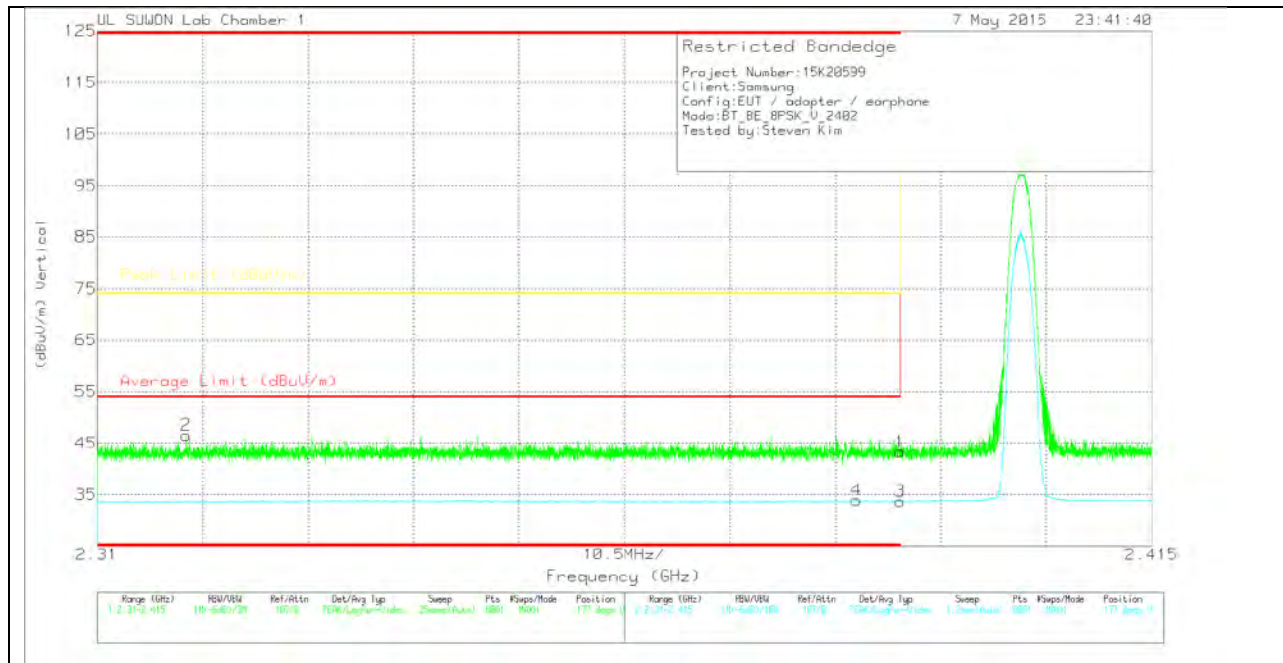
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_2_10 dB	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	38.63	Pk	27.9	-22.8	43.73	-	-	74	-30.27	191	106	H
2	* 2.316	41.65	Pk	27.8	-22.9	46.55	-	-	74	-27.45	191	106	H
3	* 2.39	28.53	VB1T	27.9	-22.8	33.63	54	-20.37	-	-	191	106	H
4	* 2.361	28.86	VB1T	27.8	-22.8	33.86	54	-20.14	-	-	191	106	H

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

Pk - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_2_10 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	38.2	Pk	27.9	-22.8	43.3	-	-	74	-30.7	177	321	V
2	* 2.319	41.63	Pk	27.8	-22.9	46.53	-	-	74	-27.47	177	321	V
3	* 2.39	28.61	VB1T	27.9	-22.8	33.71	54	-20.29	-	-	177	321	V
4	* 2.386	28.79	VB1T	27.9	-22.8	33.89	54	-20.11	-	-	177	321	V

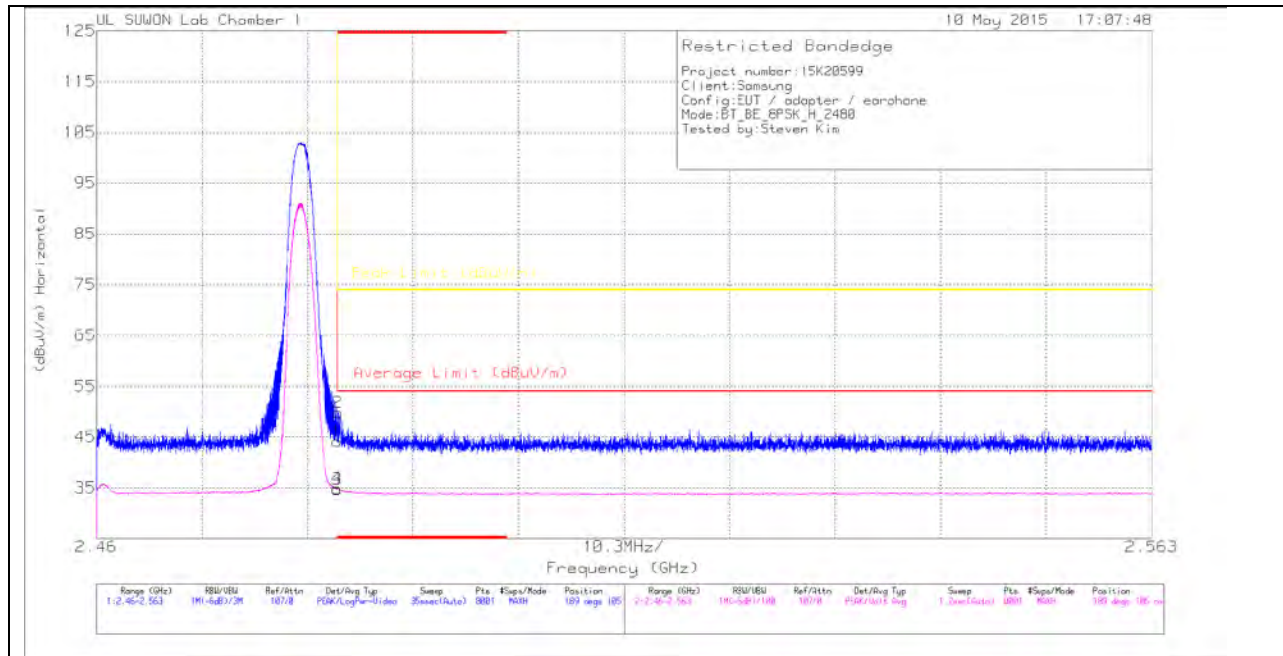
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_2_10 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	38.89	Pk	27.9	-22.6	44.19	-	-	74	-29.81	189	105	H
2	* 2.484	44.55	Pk	27.9	-22.6	49.85	-	-	74	-24.15	189	105	H
3	* 2.484	29.46	VB1T	27.9	-22.6	34.76	54	-19.24	-	-	189	105	H
4	* 2.484	29.51	VB1T	27.9	-22.6	34.81	54	-19.19	-	-	189	105	H

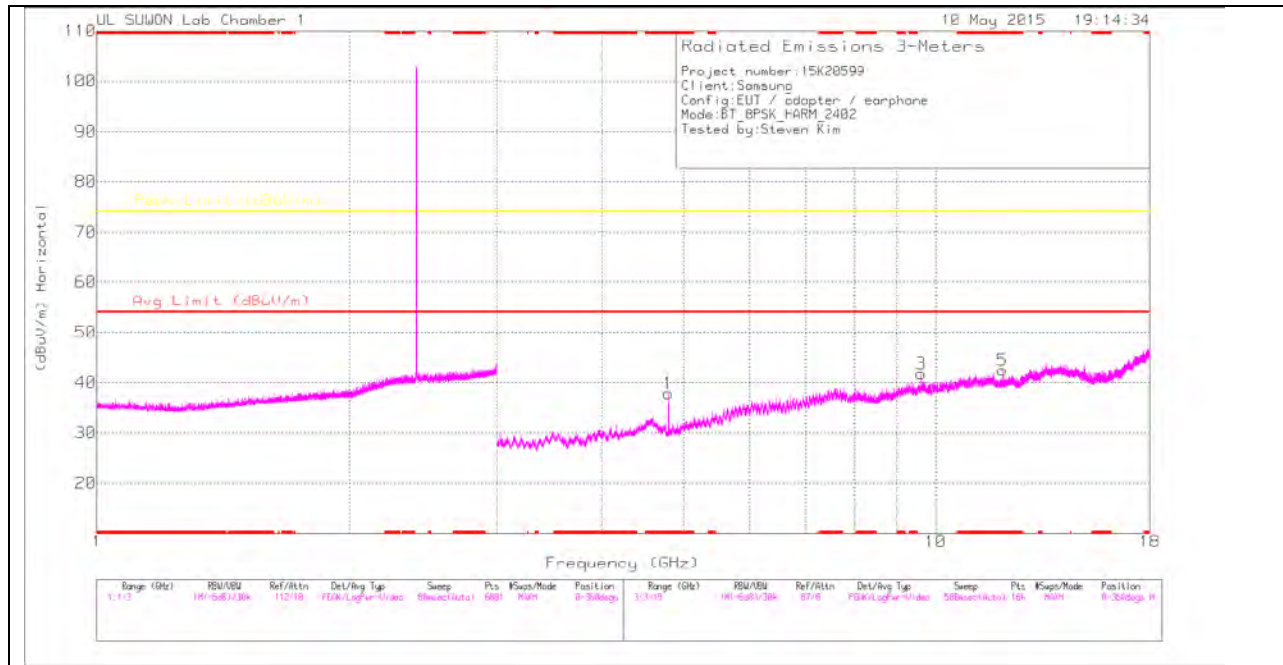
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

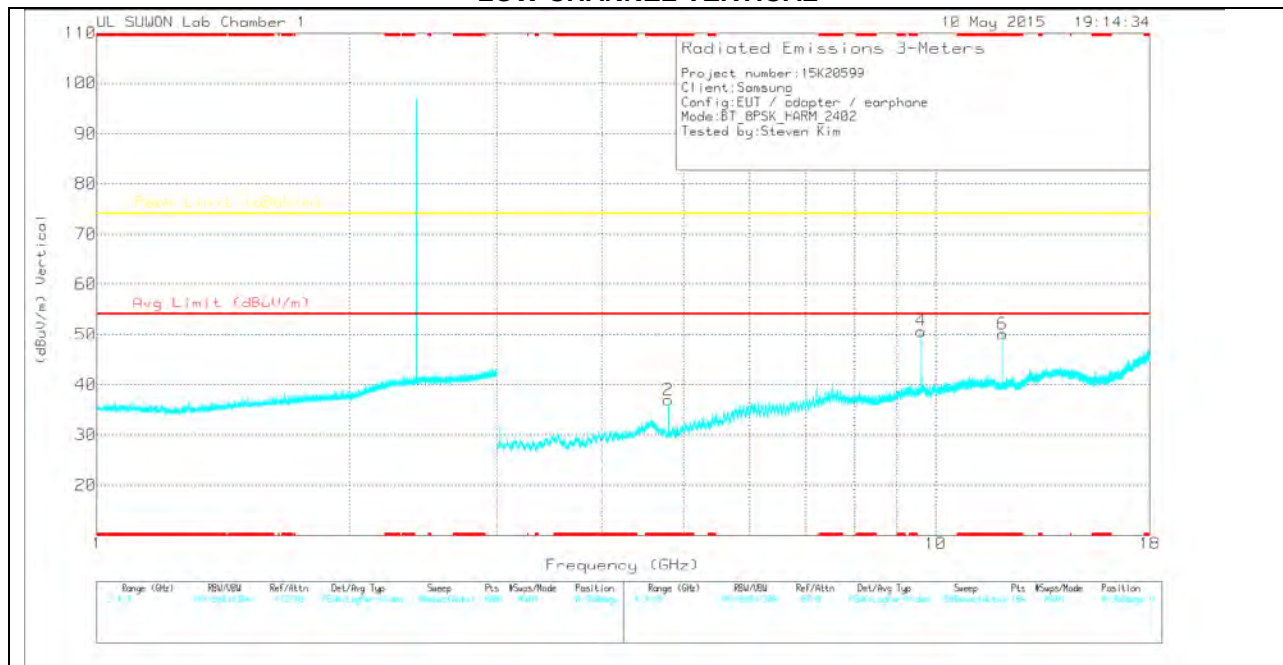
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3G HP	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.804	35.76	PK	31.9	-29.8	37.86	-	-	74	-36.14	0-360	100	H
3	9.608	25.09	PK	37.7	-21	41.79	-	-	-	-	0-360	200	H
5	* 12.011	24.6	PK	38.6	-20.7	42.5	-	-	74	-31.5	0-360	200	H
2	* 4.804	34.91	PK	31.9	-29.8	37.01	-	-	74	-36.99	0-360	100	V
4	9.608	33.98	PK	37.7	-21	50.68	-	-	-	-	0-360	100	V
6	* 12.011	32.22	PK	38.6	-20.7	50.12	-	-	74	-23.88	0-360	100	V

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

PK – Peak Detector

Radiated Emissions

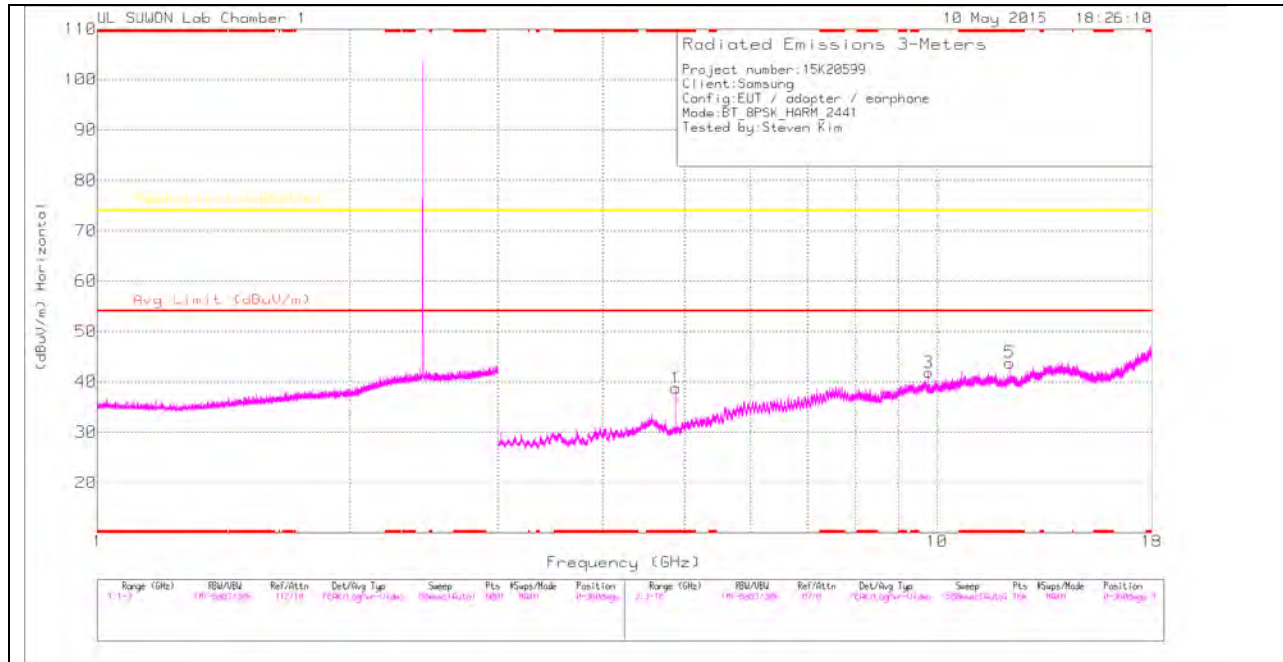
Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3G HP	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.804	44.37	PK3	31.9	-29.8	46.47	-	-	74	-27.53	186	106	H
* 4.804	29.15	VB1T	31.9	-29.8	31.25	54	-22.75	-	-	186	106	H
* 4.803	41.54	PK3	31.9	-29.8	43.64	-	-	74	-30.36	73	260	V
* 4.804	27.43	VB1T	31.9	-29.8	29.53	54	-24.47	-	-	73	260	V
* 12.01	38.78	PK3	38.6	-20.7	56.68	-	-	74	-17.32	233	103	V
* 12.01	23.17	VB1T	38.6	-20.7	41.07	54	-12.93	-	-	233	103	V

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

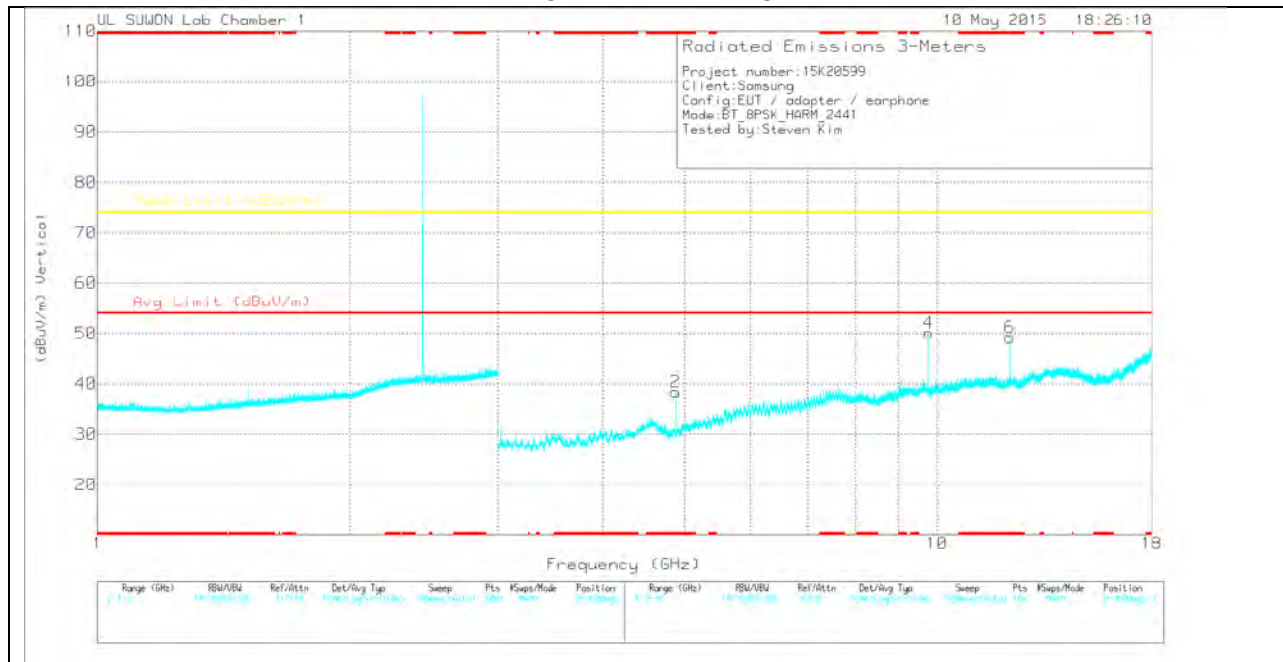
PK3 - FHSS Method: Maximum Peak

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3G HP	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.881	35.86	PK	32	-29.1	38.76	-	-	74	-35.24	0-360	100	H
3	9.764	26.26	PK	37.6	-22	41.86	-	-	-	-	0-360	200	H
5	* 12.205	26.51	PK	38.6	-21.3	43.81	-	-	74	-30.19	0-360	200	H
2	* 4.882	35.47	PK	32	-29.1	38.37	-	-	74	-35.63	0-360	100	V
4	9.764	34.49	PK	37.6	-22	50.09	-	-	-	-	0-360	100	V
6	* 12.205	31.9	PK	38.6	-21.3	49.2	-	-	74	-24.8	0-360	100	V

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

PK – Peak Detector

Radiated Emissions

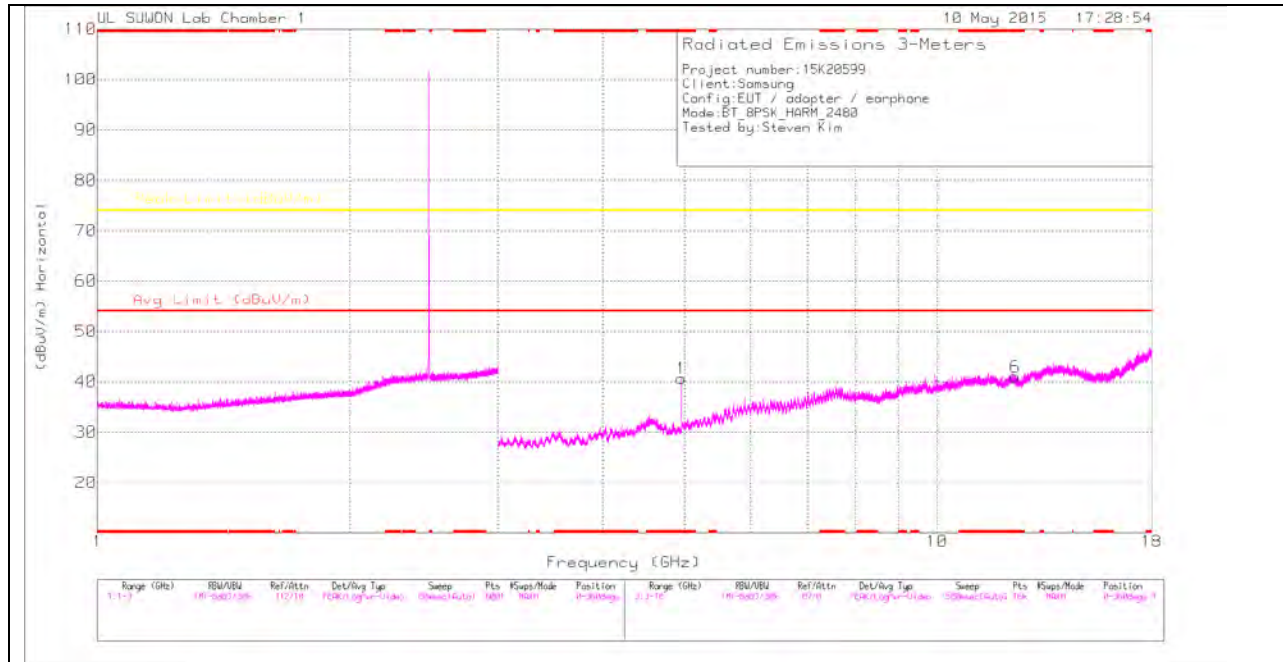
Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3G HP	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.882	42.79	PK3	32	-29.1	45.69	-	-	74	-28.31	179	107	H
* 4.882	27.86	VB1T	32	-29.1	30.76	54	-23.24	-	-	179	107	H
* 4.882	40.75	PK3	32	-29.1	43.65	-	-	74	-30.35	16	262	V
* 4.882	26.57	VB1T	32	-29.1	29.47	54	-24.53	-	-	16	262	V
* 12.205	37.76	PK3	38.6	-21.3	55.06	-	-	74	-18.94	260	101	V
* 12.205	22.73	VB1T	38.6	-21.3	40.03	54	-13.97	-	-	260	101	V

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

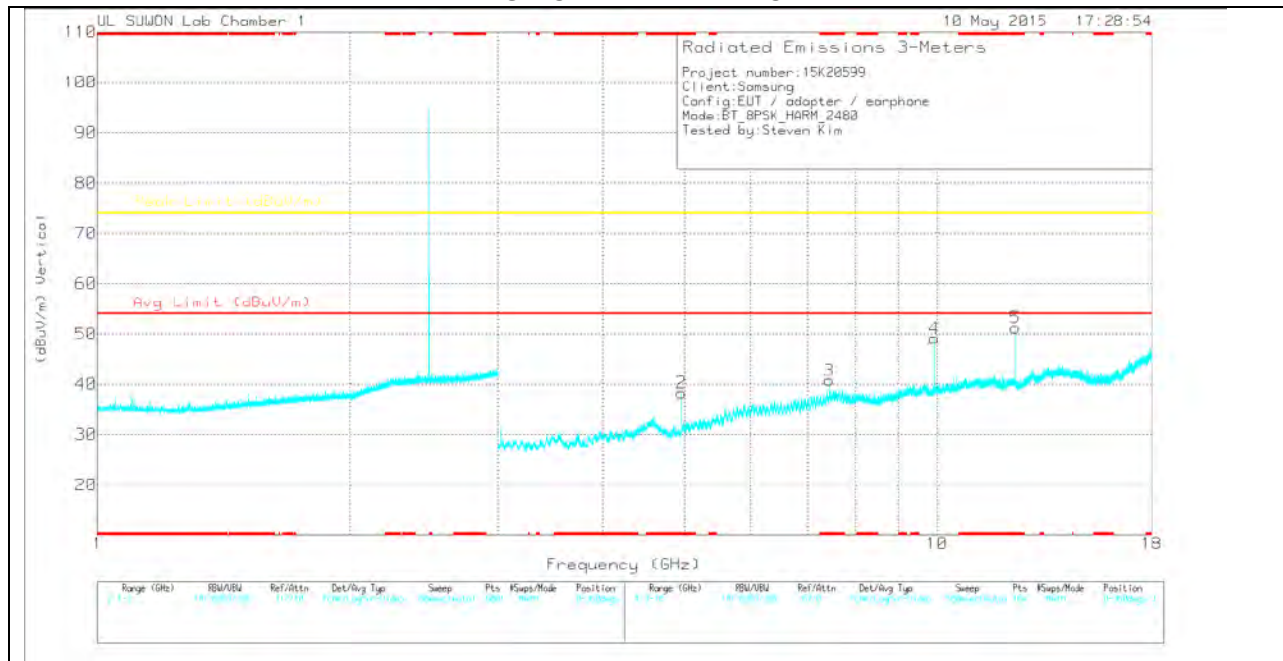
PK3 - FHSS Method: Maximum Peak

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3G HP	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.96	37.45	PK	32.1	-28.9	40.65	-	-	74	-33.35	0-360	100	H
6	* 12.4	23.49	PK	38.4	-20.9	40.99	-	-	74	-33.01	0-360	200	H
2	* 4.96	35.08	PK	32.1	-28.9	38.28	-	-	74	-35.72	0-360	100	V
3	* 7.44	28.25	PK	37.3	-24.8	40.75	-	-	74	-33.25	0-360	100	V
4	9.92	31.64	PK	37.9	-20.4	49.14	-	-	-	-	0-360	100	V
5	* 12.4	33.72	PK	38.4	-20.9	51.22	-	-	74	-22.78	0-360	100	V

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

PK – Peak Detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3G HP	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96	41.49	PK3	32.1	-28.9	44.69	-	-	74	-29.31	179	107	H
* 4.96	27.92	VB1T	32.1	-28.9	31.12	54	-22.88	-	-	179	107	H
* 4.96	42.29	PK3	32.1	-28.9	45.49	-	-	74	-28.51	12	265	V
* 4.96	27.53	VB1T	32.1	-28.9	30.73	54	-23.27	-	-	12	265	V
* 12.4	38.92	PK3	38.4	-20.9	56.42	-	-	74	-17.58	264	101	V
* 12.4	23.5	VB1T	38.4	-20.9	41	54	-13	-	-	264	101	V

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

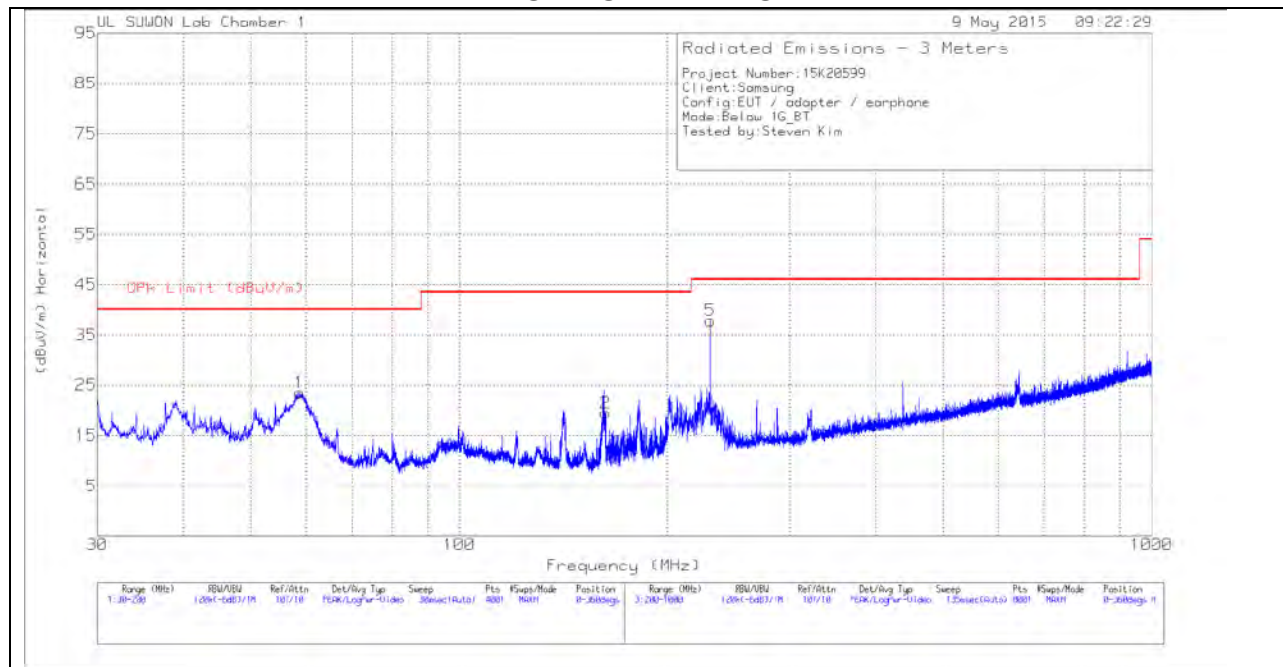
PK3 - FHSS Method: Maximum Peak

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

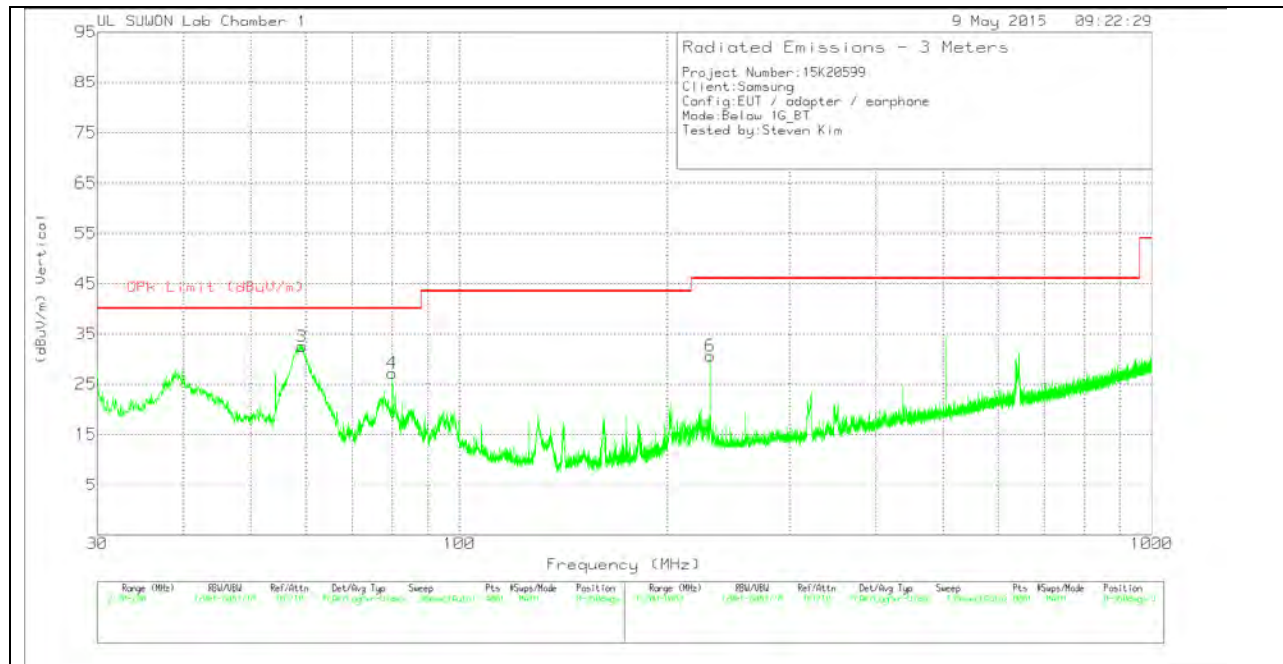
9.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



BELOW 1 GHz TABLE

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163-750	Bi-Log	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	58.815	40.62	Pk	12.8	-29.9	23.52	40	-16.48	0-360	400	H
2	162.7275	39.38	Pk	8.6	-28.5	19.48	43.52	-24.04	0-360	200	H
3	59.325	49.66	Pk	12.7	-29.9	32.46	40	-7.54	0-360	200	V
4	79.98	49.89	Pk	6.9	-29.6	27.19	40	-12.81	0-360	200	V
5	230.4	53.82	Pk	11.9	-27.9	37.82	46.02	-8.2	0-360	100	H
6	230.4	46.61	Pk	11.9	-27.9	30.61	46.02	-15.41	0-360	200	V

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

Pk - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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 C63.4.

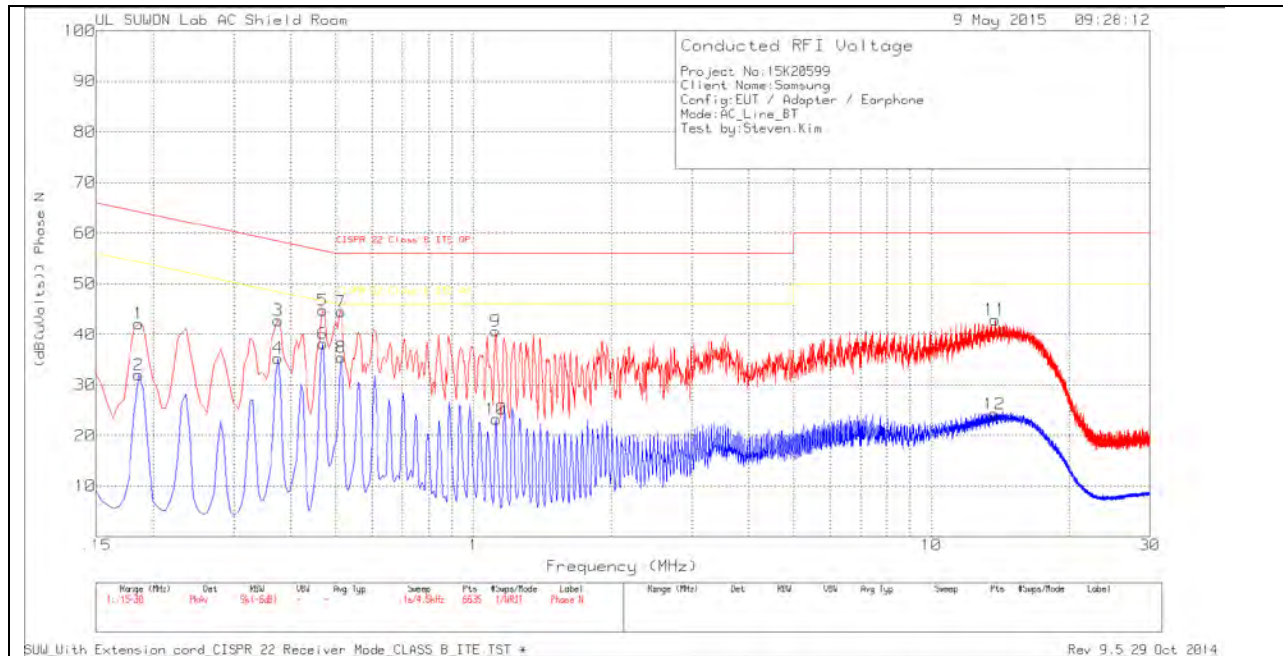
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

6 WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULTS

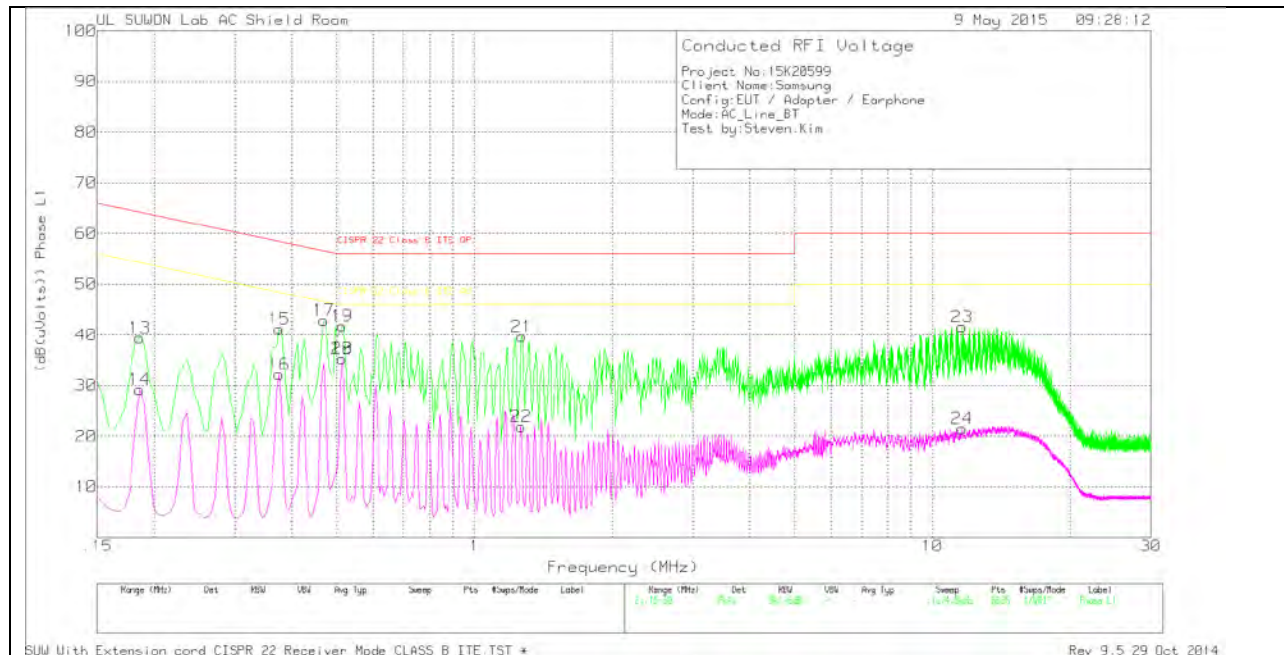
Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN HPF ON and Extension cord	CE Shield Room	Corrected Reading (dBuV)	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
1	.186	32.17	Pk	10	0	42.17	64.21	-22.04	-	-
2	.186	22.02	Av	10	0	32.02	-	-	54.21	-22.19
3	.375	32.67	Pk	10.1	0	42.77	58.39	-15.62	-	-
4	.375	25.18	Av	10.1	0	35.28	-	-	48.39	-13.11
5	.4695	34.6	Pk	10.1	0	44.7	56.52	-11.82	-	-
6	.4695	28.12	Av	10.1	0	38.22	-	-	46.52	-8.3
7	.5145	34.38	Pk	10.1	0	44.48	56	-11.52	-	-
8	.5145	25.31	Av	10.1	0	35.41	-	-	46	-10.59
9	1.1175	30.82	Pk	9.8	0	40.62	56	-15.38	-	-
10	1.122	13.52	Av	9.8	0	23.32	-	-	46	-22.68
11	13.758	32.53	Pk	10.2	.2	42.93	60	-17.07	-	-
12	13.722	13.9	Av	10.2	.2	24.3	-	-	50	-25.7

Pk - Peak detector

Av - Average detection

LINE 2 PLOT



LINE 2 RESULTS

Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_w ith extension cord_L1	CE Shield Room	Corrected Reading (dBuV)	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
13	.186	29.31	Pk	10.1	0	39.41	64.21	-24.8	-	-
14	.186	19.09	Av	10.1	0	29.19	-	-	54.21	-25.02
15	.375	31.02	Pk	10.1	0	41.12	58.39	-17.27	-	-
16	.375	22.17	Av	10.1	0	32.27	-	-	48.39	-16.12
17	.4695	32.78	Pk	10.1	0	42.88	56.52	-13.64	-	-
18	.5145	25.23	Av	10.1	0	35.33	-	-	46	-10.67
19	.5145	31.67	Pk	10.1	0	41.77	56	-14.23	-	-
20	.5145	25.23	Av	10.1	0	35.33	-	-	46	-10.67
21	1.2705	29.74	Pk	9.8	.1	39.64	56	-16.36	-	-
22	1.266	12.04	Av	9.8	.1	21.94	-	-	46	-24.06
23	11.6205	31.39	Pk	10	.2	41.59	60	-18.41	-	-
24	11.634	11.28	Av	10	.2	21.48	-	-	50	-28.52

Pk - Peak detector

Av - Average detection