



CERTIFICATION TEST REPORT

Report Number. : 4789433105-FR2V1

Applicant : DREAMUS COMPANY
5, Bangbae-ro 18-gil, Seocho-gu,
Seoul, Republic of Korea

Model : PPR21

FCC ID : QDMPPR21

EUT Description : SE200 (Music Player with BT and DTS b/g/n)

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C

Date Of Issue:

May 11, 2020

Prepared by:

UL Korea, Ltd.

26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Suwon Test Site: UL Korea, LTD. Suwon Laboratory

218 Maeyeong-ro, Yeongtong-gu

Suwon-si, Gyeonggi-do, 16675, Korea

TEL: (031) 337-9902

FAX: (031) 213-5433



Testing Laboratory

TL-637

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	05/11/20	Initial issue	Jaejin Lee

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	5
2. SUMMARY TABLE	6
3. TEST METHODOLOGY	7
4. FACILITIES AND ACCREDITATION	7
5. CALIBRATION AND UNCERTAINTY	8
5.1. MEASURING INSTRUMENT CALIBRATION.....	8
5.2. SAMPLE CALCULATION.....	8
5.3. MEASUREMENT UNCERTAINTY	8
5.4. DECISION RULE	8
6. EQUIPMENT UNDER TEST	9
6.1. EUT DESCRIPTION.....	9
6.2. MAXIMUM OUTPUT POWER.....	9
6.3. DESCRIPTION OF AVAILABLE ANTENNAS	9
6.4. WORST-CASE CONFIGURATION AND MODE	10
6.5. DESCRIPTION OF TEST SETUP	10
7. TEST AND MEASUREMENT EQUIPMENT	12
8. MEASUREMENT METHODS	13
9. ANTENNA PORT TEST RESULTS	14
9.1. ON TIME AND DUTY CYCLE	14
9.2. 20 dB AND 99% BANDWIDTH.....	15
9.2.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION	15
9.2.2. BLUETOOTH ENHANCED DATA RATE Pi/4-DQPSK MODULATION	15
9.2.3. BLUETOOTH ENHANCED DATA RATE 8DPSK MODULATION	15
9.2.4. 20 dB AND 99% BANDWIDTH PLOTS.....	16
10. ANTENNA PORT TEST RESULTS	19
10.1. HOPPING FREQUENCY SEPARATION	19
10.2. NUMBER OF HOPPING CHANNELS.....	20
10.2.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION	21
10.2.2. BLUETOOTH ENHANCED DATA RATE 8DPSK MODULATION	22
10.3. AVERAGE TIME OF OCCUPANCY.....	23
10.3.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION	24
10.3.2. BLUETOOTH ENHANCED DATA RATE 8DPSK MODULATION	26
10.4. OUTPUT POWER.....	28
10.4.1. BASIC DATA RATE GFSK MODULATION.....	29

10.4.2.	ENHANCED DATA RATE Pi/4-DQPSK MODULATION	30
10.4.3.	ENHANCED DATA RATE 8DPSK MODULATION	31
10.5.	AVERAGE POWER	32
10.5.1.	BASIC DATA RATE GFSK MODULATION.....	32
10.5.2.	ENHANCED DATA RATE Pi/4-DQPSK MODULATION	32
10.5.3.	ENHANCED DATA RATE 8DPSK MODULATION	32
10.6.	CONDUCTED SPURIOUS EMISSIONS.....	33
10.6.1.	BLUETOOTH BASIC DATA RATE GFSK MODULATION	34
10.6.2.	BLUETOOTH BASIC DATA RATE Pi/4-DQPSK MODULATION	36
10.6.3.	BLUETOOTH ENHANCED DATA RATE 8DPSK MODULATION	38
11.	RADIATED TEST RESULTS	40
11.1.	TRANSMITTER ABOVE 1 GHz	42
11.1.1.	BLUETOOTH BASIC DATA RATE GFSK MODULATION	42
11.1.2.	BLUETOOTH ENHANCED DATA RATE 8DPSK MODULATION	52
11.2.	WORST CASE BELOW 1 GHZ.....	62
12.	AC POWER LINE CONDUCTED EMISSIONS	64
12.1.1.	AC Power Line.....	65

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: DREAMUS COMPANY

EUT DESCRIPTION: SE200 (Music Player with BT and DTS b/g/n)

MODEL: PPR21

SERIAL NUMBER: proto type (CONDUCTED)
proto type (RADIATED);

DATE TESTED: APRIL 16, 2020 – MAY 08, 2020;

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.

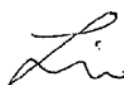
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration 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:



Changyoung Choi
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:



Jaejin Lee
Suwon Lab Technician
UL Korea, Ltd.

2. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
2.1051, 15.247 (d)	Band Edge / Conducted Spurious Emission	-20dBc	Conducted	Pass
15.247 (b)(1)	TX conducted output power	<21dBm		Pass
15.247 (a)(1)	Hopping frequency separation	> two-thirds of the 20 dB bandwidth		Pass
15.247 (a)(1)(iii)	Number of Hopping channels	More than 15 non-overlapping channels		Pass
15.247 (a)(1)(iii)	Avg Time of Occupancy	< 0.4sec		Pass
15.207 (a)	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m	Radiated	Pass

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 15.247 Meas Guidance v05r02.
4. ANSI C63.10-2013.

4. 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, 16675, 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
☒	Chamber 3

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/wp-content/uploads/2017/05/TL-637.pdf>.

5. CALIBRATION AND UNCERTAINTY

5.1. 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.

5.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

5.3. 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	3.31 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.49 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.82 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.49 dB

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

5.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 1, Clause 4.4.2 in IEC Guide 115:2007.

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a Music Player with BT, DTS b/g/n.
This test report addresses the DSS (BT) operational mode.

6.2. MAXIMUM OUTPUT POWER

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

Frequency range [MHz]	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2402 ~ 2480	Basic GFSK	Average	6.606	4.58
		Peak	7.486	5.61
	Enhanced Pi/4-DQPSK	Average	0.471	1.11
		Peak	3.617	2.30
	Enhanced 8DPSK	Average	0.474	1.12
		Peak	3.620	2.30

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

**The internal antenna was Permanently attached.
Therefore this E.U.T Complies with the requirement of §15.203.**

The radio utilizes an internal antenna, with a maximum gain of 1.119 dBi

6.4. WORST-CASE CONFIGURATION AND MODE

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

Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

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

Note: GFSK, Pi/4-DQPSK, 8DPSK average Power are all investigated, The GFSK & 8DPSK Power are the worst case. Testing is based on this mode to showing compliance.

6.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	N/A	N/A	N/A
Data Cable	DREAMUS COMPANY	N/A	N/A	N/A
Earphone	SAMSUNG	N/A	N/A	N/A

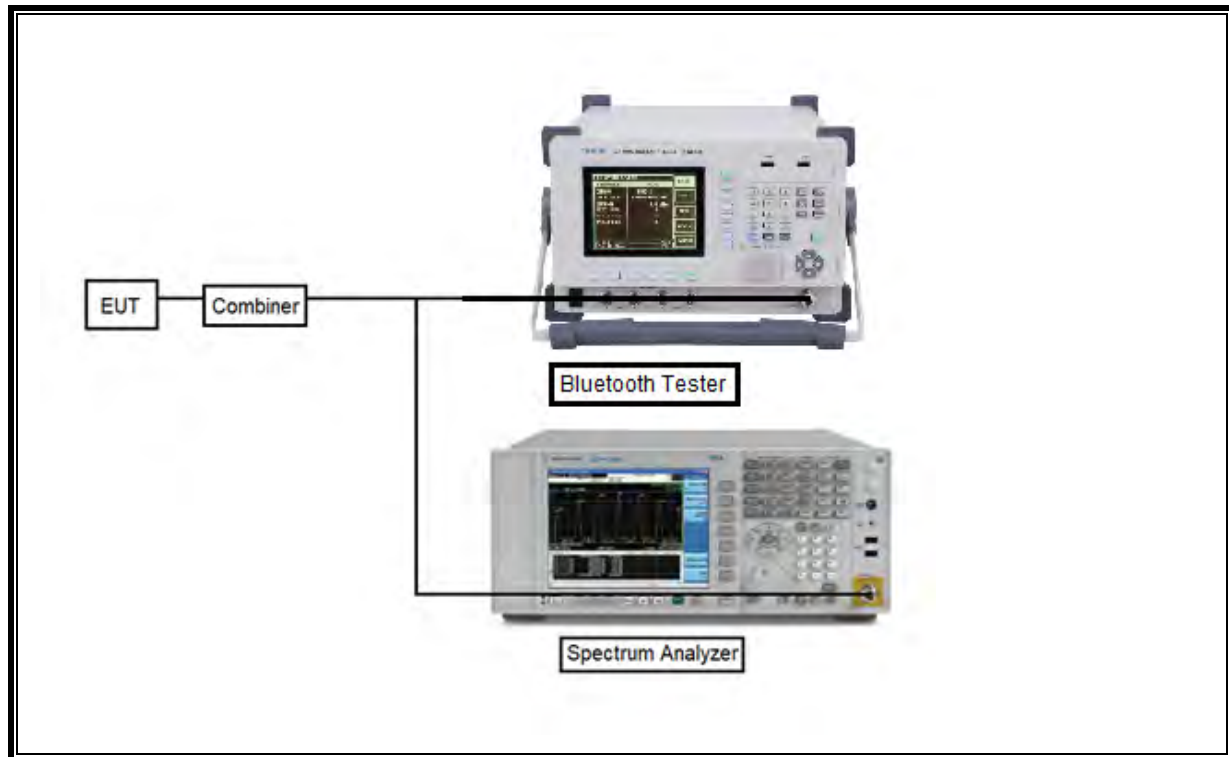
I/O CABLE

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C Type	Shielded	1.0m	N/A

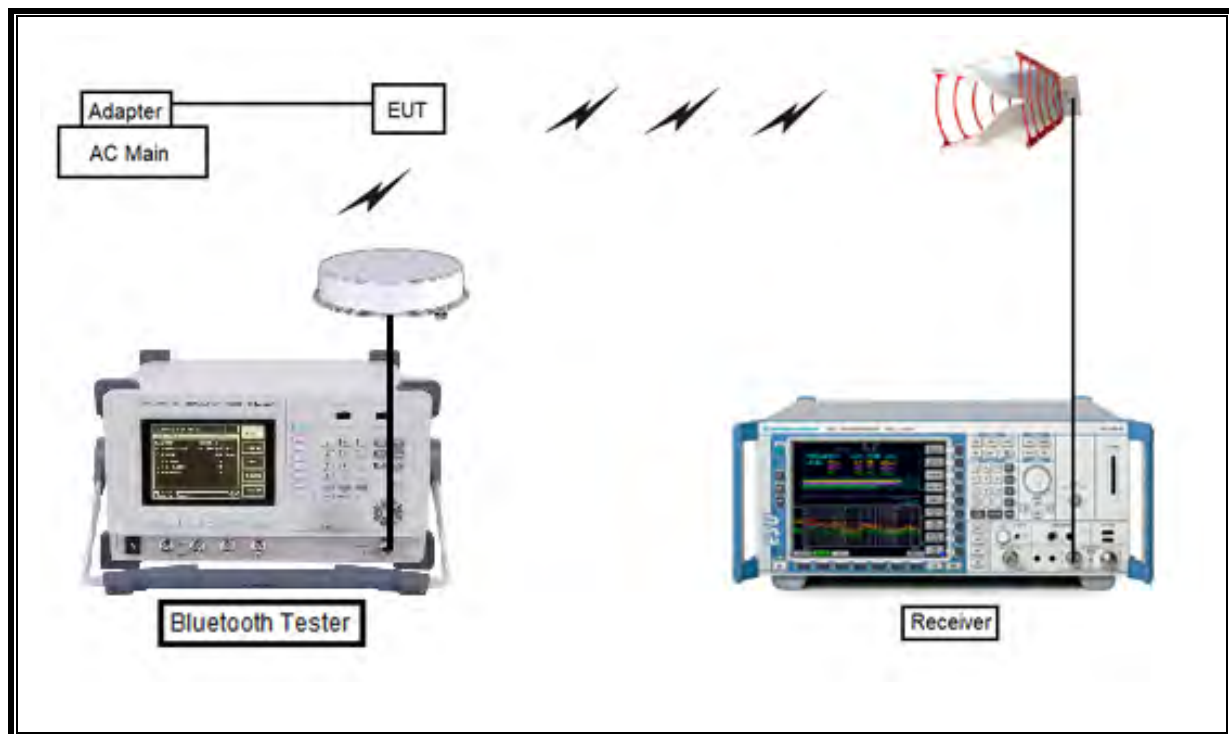
TEST SETUP

The EUT is continuously communicating to the Bluetooth tester during the tests. Test software enable BT communications.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



7. 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	750	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-04-20
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-02-21
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2E	100900	09-30-20
Antenna, Horn, 18 GHz	ETS	3115	00167211	08-04-20
Bias Unit	R&S	IN600	100974	09-30-20
Antenna, Horn, 18 GHz	ETS	3115	00161451	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168724	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168717	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00205959	08-04-20
Antenna, Horn, 40 GHz	ETS	3116C	00166155	08-14-20
Antenna, Horn, 40 GHz	ETS	3116C	00168645	10-02-21
Preamplifier	ETS	3116C-PA	00168841	08-08-20
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	80108-0004	N/A
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	110367-0003	N/A
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-05-20
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-05-20
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-05-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-06-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-06-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-06-20
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-06-20
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-06-20
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-09-20
Bluetooth Tester	TESCOM	TC-3000C	3000C000546	08-07-20
Combiner	WEINSCHEL	1575	2150	08-08-20
Combiner	WEINSCHEL	1575	2781	08-08-20
Attenuator	PASTERNAK	PE7087-10	A001	08-08-20
Attenuator	PASTERNAK	PE7087-10	A008	08-08-20
Attenuator	PASTERNAK	PE7087-10	2	08-06-20
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-06-20
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-06-20
EMI Test Receive, 44 GHz	R&S	ESW44	101590	08-05-20
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-05-20
EMI Test Receive, 3 GHz	R&S	ESR3	102592	06-28-20
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-06-20
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-06-20
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	08-06-20
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	08-06-20
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	08-06-20
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	08-06-20
LISN	R&S	ENV-216	101837	08-09-20
LISN	R&S	ENV216	102478	11-15-20
Termination	WEINSCHEL	M1406A	T01	08-08-20
Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	R&S	EMC32	10.50.40	

8. MEASUREMENT METHODS

20dB BW : ANSI C63.10, Section 6.9.2

99% BW : ANSI C63.10, Section 6.9.3

HOPPING FREQUENCY SEPARATION : ANSI C63.10, Section 7.8.2

NUMBER OF HOPPING CHANNELS : ANSI C63.10, Section 7.8.3

AVERAGE TIME OF OCCUPANCY : ANSI C63.10, Section 7.8.4

OUTPUT POWER : ANSI C63.10, Section 7.8.5.

Out-of-band EMISSIONS (Conducted) : ANSI C63.10, Section 7.8.6, 7.8.8

Out-of-band EMISSIONS IN NON-RESTRICTED BANDS: ANSI C63.10, Section 6.

Out-of-band EMISSIONS IN RESTRICTED BANDS : ANSI C63.10, Section 6.

AC Power Line Conducted Emission : ANSI C63.10-2013, Section 6.2.

9. ANTENNA PORT TEST RESULTS

9.1. 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 [msec]	Period [msec]	Duty Cycle x [linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Min. VBW [kHz]
2400 - 2483.5 MHz Bands						
BT	2.880	3.750	0.768	76.8%	1.15	0.347



< DH5 >

9.2. 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

9.2.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Channel	Frequency [MHz]	20 dB Bandwidth [MHz]	99% Bandwidth [MHz]
LOW	2402	1.055	0.899
MID	2441	1.031	0.898
HIGH	2480	1.051	0.897
WORST		1.055	0.899

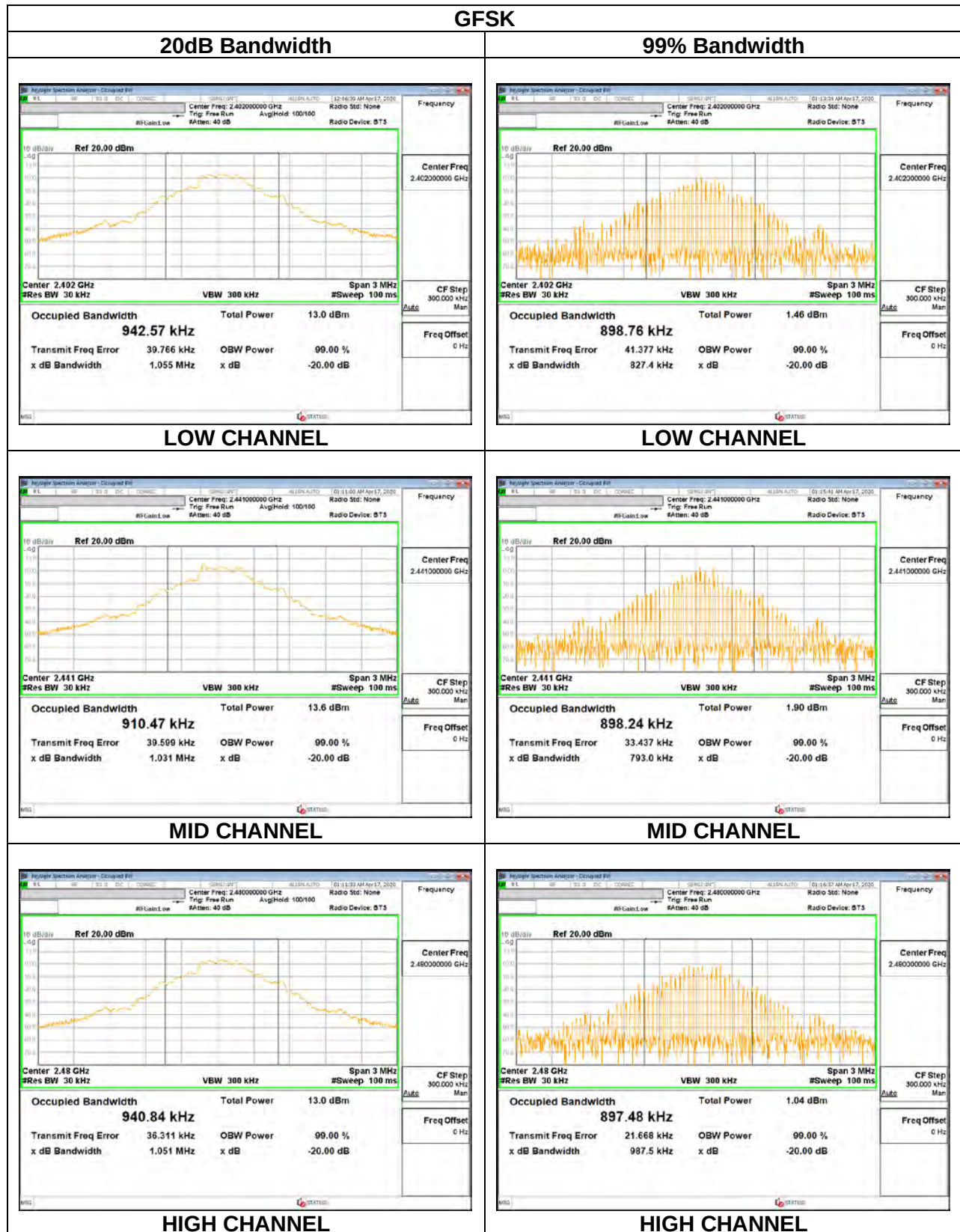
9.2.2. BLUETOOTH ENHANCED DATA RATE $\pi/4$ -DQPSK MODULATION

Channel	Frequency [MHz]	20 dB Bandwidth [MHz]	99% Bandwidth [MHz]
LOW	2402	1.344	1.169
MID	2441	1.345	1.169
HIGH	2480	1.347	1.196
WORST		1.347	1.196

9.2.3. BLUETOOTH ENHANCED DATA RATE 8DPSK MODULATION

Channel	Frequency [MHz]	20 dB Bandwidth [MHz]	99% Bandwidth [MHz]
LOW	2402	1.310	1.130
MID	2441	1.307	1.199
HIGH	2480	1.312	1.195
WORST		1.312	1.199

9.2.4. 20 dB AND 99% BANDWIDTH PLOTS



Pi/4-DQPSK

20dB Bandwidth

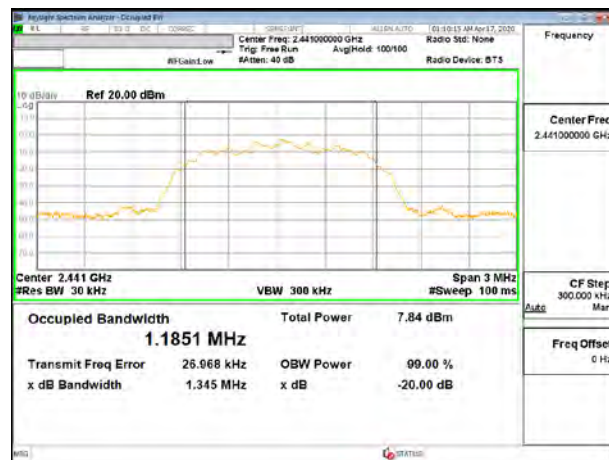


LOW CHANNEL

99% Bandwidth



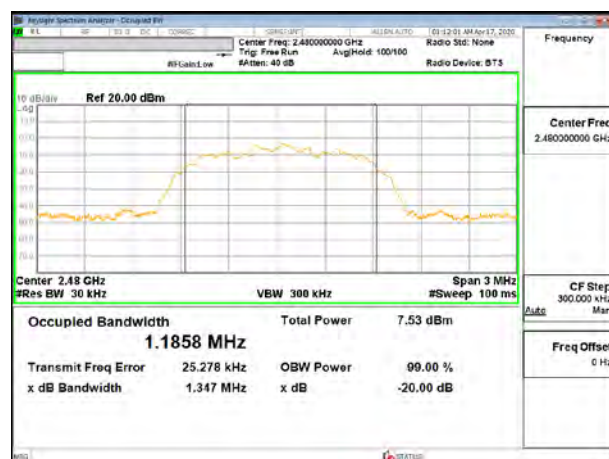
LOW CHANNEL



MID CHANNEL



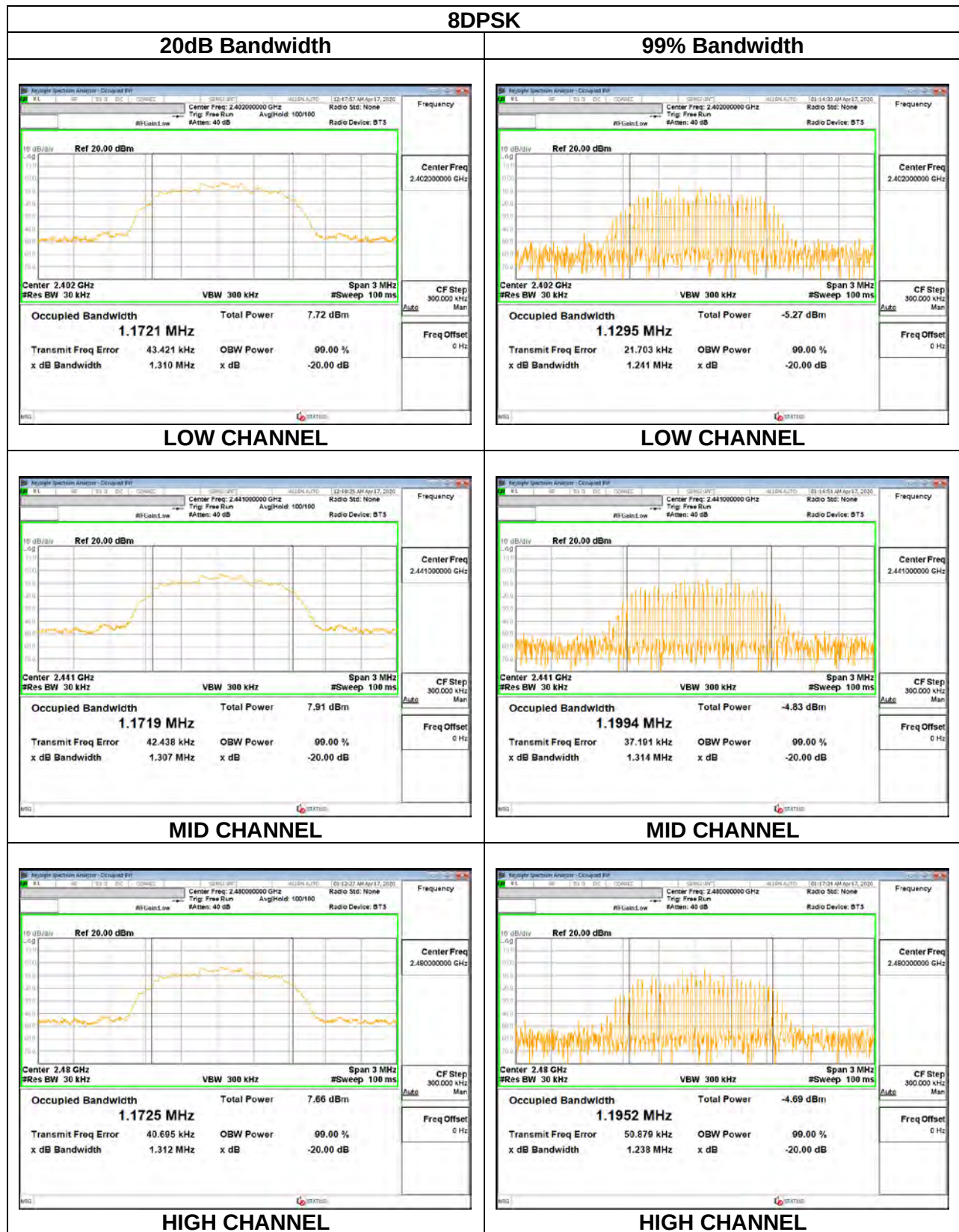
MID CHANNEL



HIGH CHANNEL



HIGH CHANNEL



10. ANTENNA PORT TEST RESULTS

10.1. HOPPING FREQUENCY SEPARATION

LIMITS

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

Span = wide enough to capture the peaks of two adjacent channels

RBW = Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.

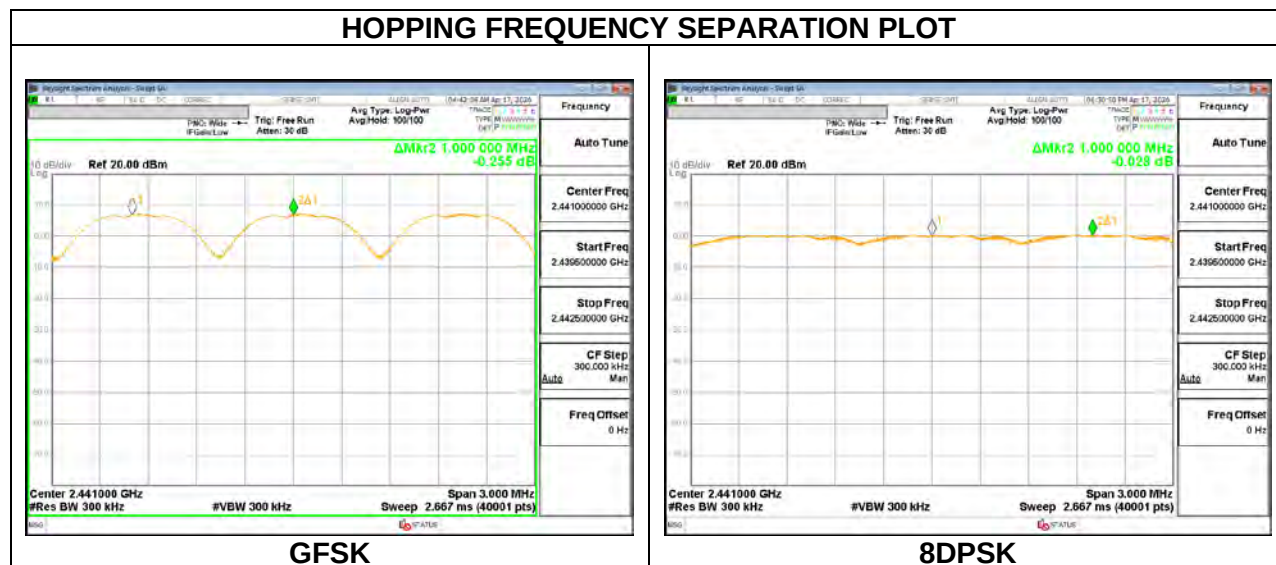
VBW $\geq$ RBW

Sweep = Auto

Detector function = Peak

Trace = Max hold

RESULTS



10.2. NUMBER OF HOPPING CHANNELS

LIMITS

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

RBW = To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

VBW $\geq$ RBW

Sweep = Auto

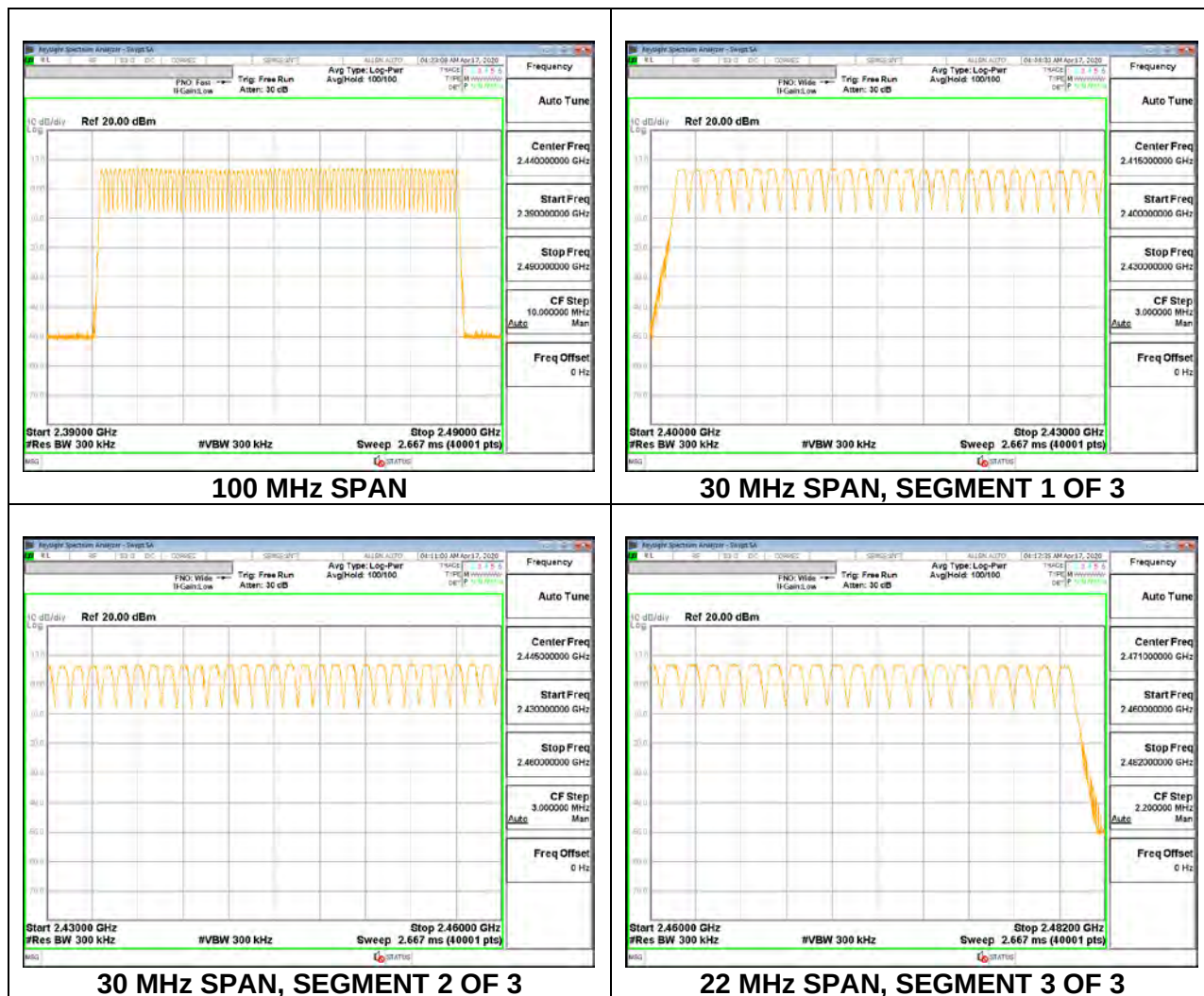
Detector function = Peak

Trace = Max hold

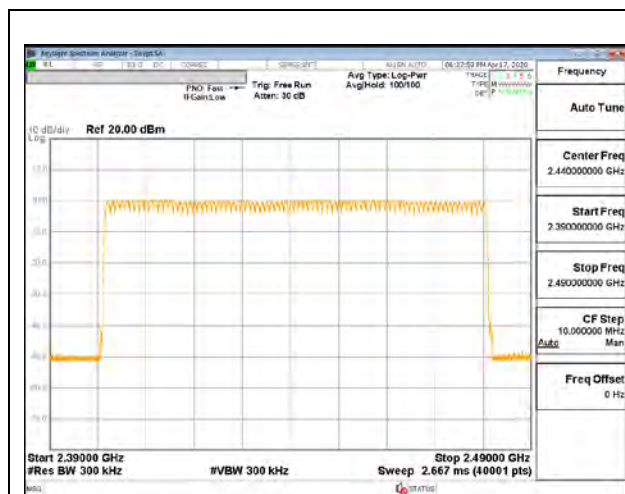
RESULTS

Normal Mode: 79 Channels Observed

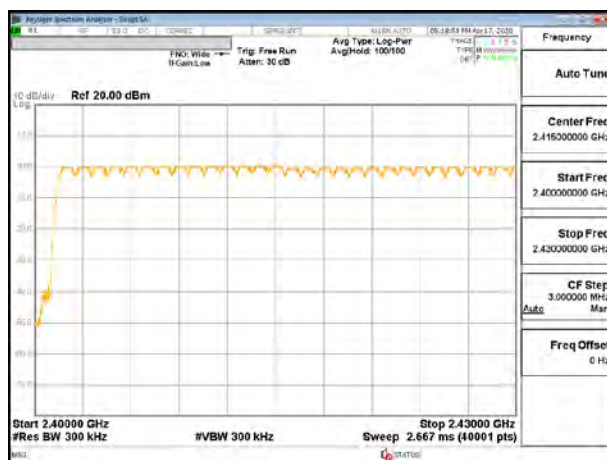
10.2.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



10.2.2. BLUETOOTH ENHANCED DATA RATE 8DPSK MODULATION



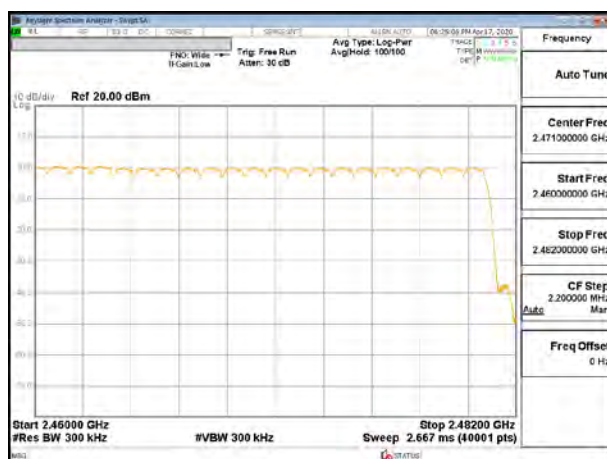
100 MHz SPAN



30 MHz SPAN, SEGMENT 1 OF 3



30 MHz SPAN, SEGMENT 2 OF 3



22 MHz SPAN, SEGMENT 3 OF 3

10.3. AVERAGE TIME OF OCCUPANCY

LIMITS

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 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 $10 * (\# \text{ of pulses in } 0.8 \text{ s}) * \text{pulse width}$.

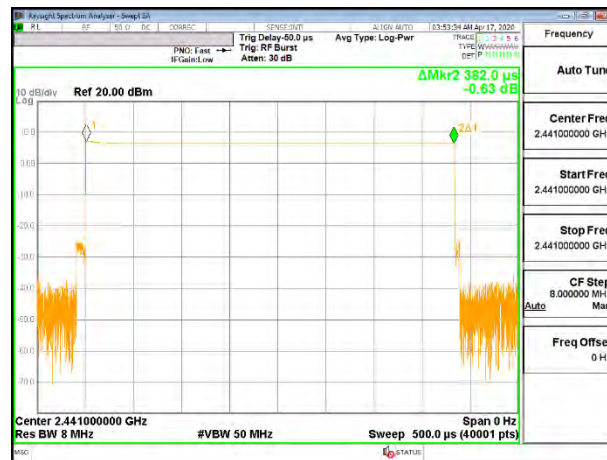
RESULTS

10.3.1. 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					
DH1	0.382	32	0.122240	0.4	-0.2778
DH3	1.638	16	0.262080	0.4	-0.1379
DH5	2.885	12	0.346200	0.4	-0.0538
GFSK AFH					
DH1	0.382	8	0.030560	0.4	-0.3694
DH3	1.638	4	0.065520	0.4	-0.3345
DH5	2.885	3	0.086550	0.4	-0.3135

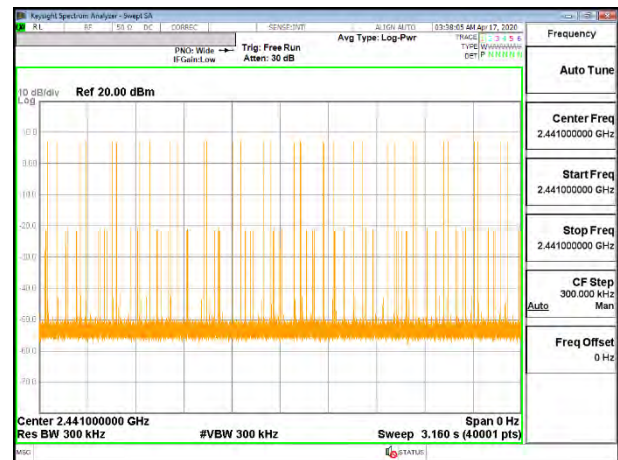
GFSK

PULSE WIDTH

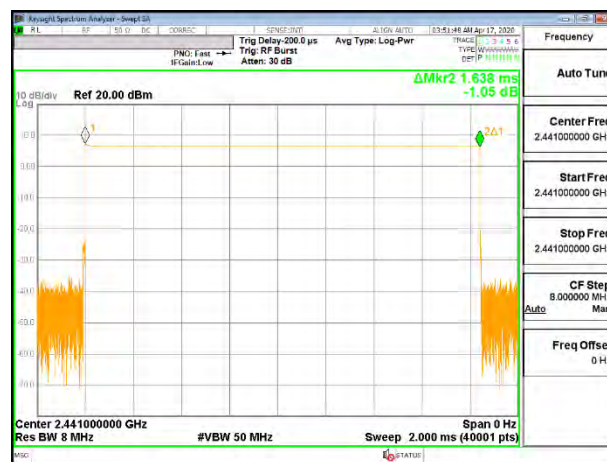


DH1

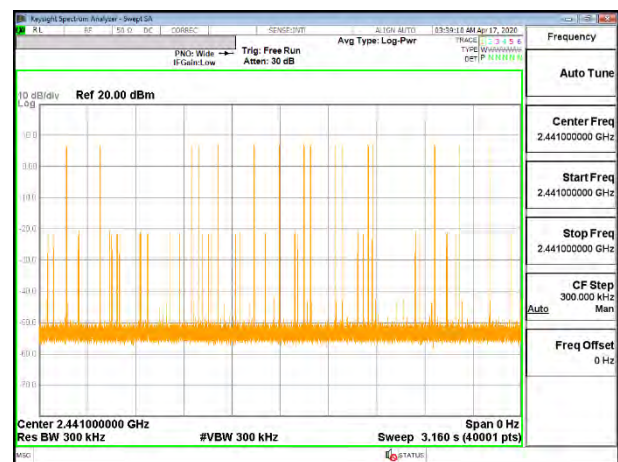
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD



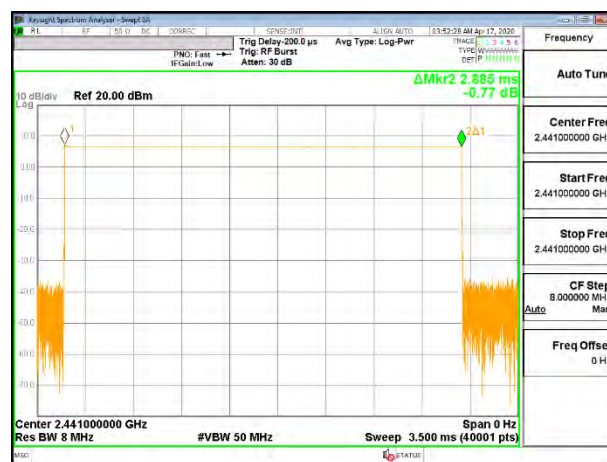
DH1



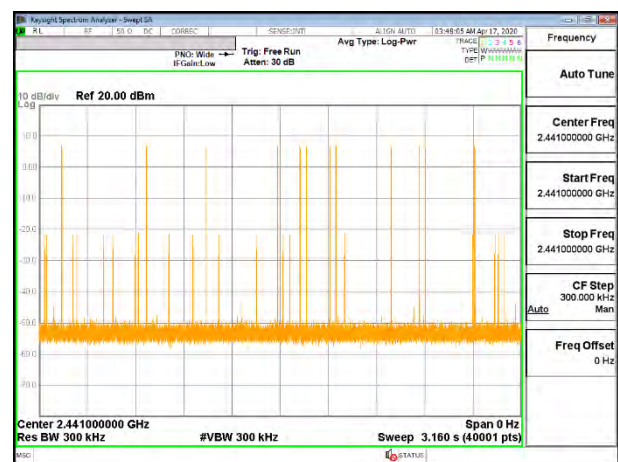
DH3



DH3



DH5



DH5

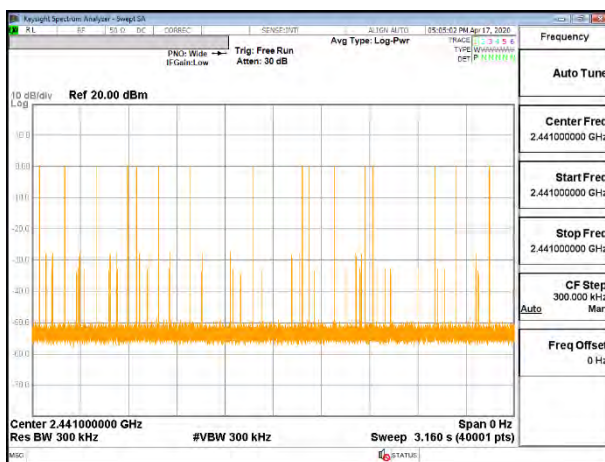
10.3.2. BLUETOOTH ENHANCED DATA RATE 8DPSK MODULATION

DH Packet	Pulse Width [msec]	Number of Pulses in 3.16 seconds	Average Time of Occupancy [sec]	Limit [sec]	Margin [sec]
GFSK Normal					
DH1	0.388	32	0.124160	0.4	-0.2758
DH3	1.638	16	0.262080	0.4	-0.1379
DH5	2.888	12	0.346560	0.4	-0.0534
DH Packet	Pulse Width [msec]	Number of Pulses in 0.8 seconds	Average Time of Occupancy [sec]	Limit [sec]	Margin [sec]
GFSK AFH					
DH1	0.388	8	0.031040	0.4	-0.3690
DH3	1.638	4	0.065520	0.4	-0.3345
DH5	2.888	3	0.086640	0.4	-0.3134

NUMBER OF PULSES IN 3.16 SECOND
OBSERVATION PERIOD



3DH1



3DH3



3DH5

10.4. OUTPUT POWER

LIMITS

§15.247 (b) (1)

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

TEST PROCEDURE

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

10.4.1. BASIC DATA RATE GFSK MODULATION

Channel	Frequency [MHz]	Output Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	7.247	21.000	-13.753
Mid	2441	7.486	21.000	-13.514
High	2480	7.429	21.000	-13.571
Worst		7.486	21.000	-13.514

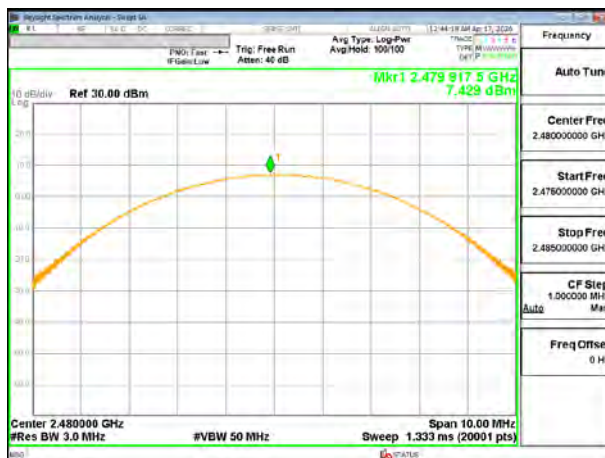
GFSK



LOW CHANNEL



MID CHANNEL

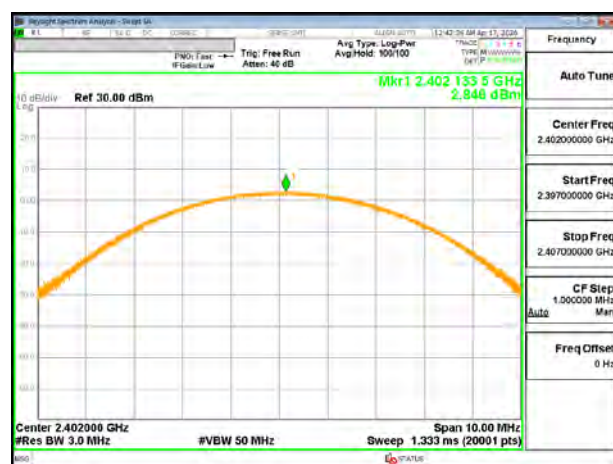


HIGH CHANNEL

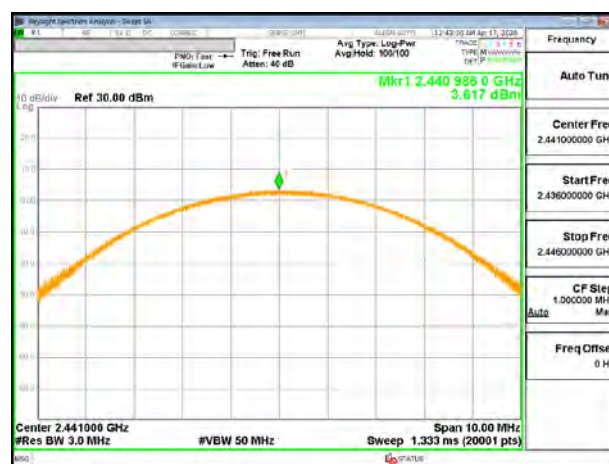
10.4.2. ENHANCED DATA RATE Pi/4-DQPSK MODULATION

Channel	Frequency [MHz]	Output Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	2.846	21.000	-18.154
Mid	2441	3.617	21.000	-17.383
High	2480	2.768	21.000	-18.232
Worst		3.617	21.000	-17.383

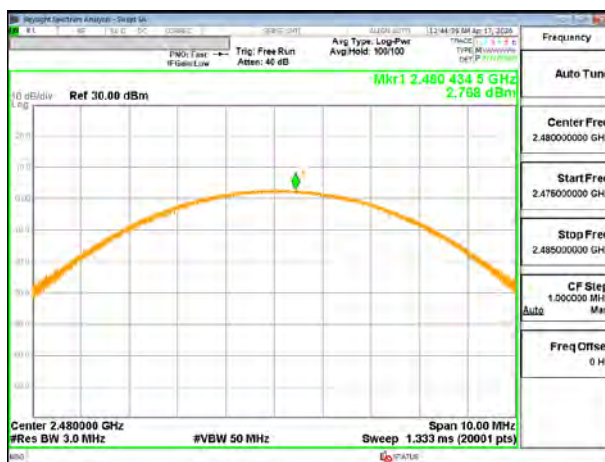
Pi/4-DQPSK



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

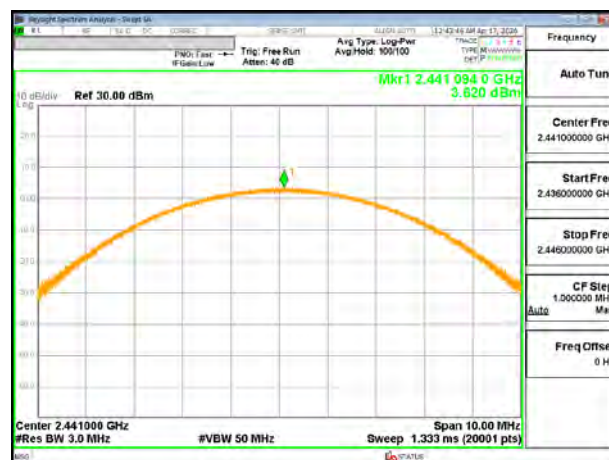
10.4.3. ENHANCED DATA RATE 8DPSK MODULATION

Channel	Frequency [MHz]	Output Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	3.466	21.000	-17.534
Mid	2441	3.620	21.000	-17.380
High	2480	3.417	21.000	-17.583
Worst		3.620	21.000	-17.380

8DPSK



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

10.5. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss was entered as an offset in the power meter to allow for direct reading of power

10.5.1. BASIC DATA RATE GFSK MODULATION

Channel	Frequency [MHz]	Av Power [dBm]	Av Power [mW]
Low	2402	6.410	4.38
Mid	2441	6.606	4.58
High	2480	6.441	4.41

10.5.2. ENHANCED DATA RATE Pi/4-DQPSK MODULATION

Channel	Frequency [MHz]	Av Power [dBm]	Av Power [mW]
Low	2402	0.289	1.07
Mid	2441	0.471	1.11
High	2480	0.215	1.05

10.5.3. ENHANCED DATA RATE 8DPSK MODULATION

Channel	Frequency [MHz]	Av Power [dBm]	Av Power [mW]
Low	2402	0.298	1.07
Mid	2441	0.474	1.12
High	2480	0.219	1.05

10.6. 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.

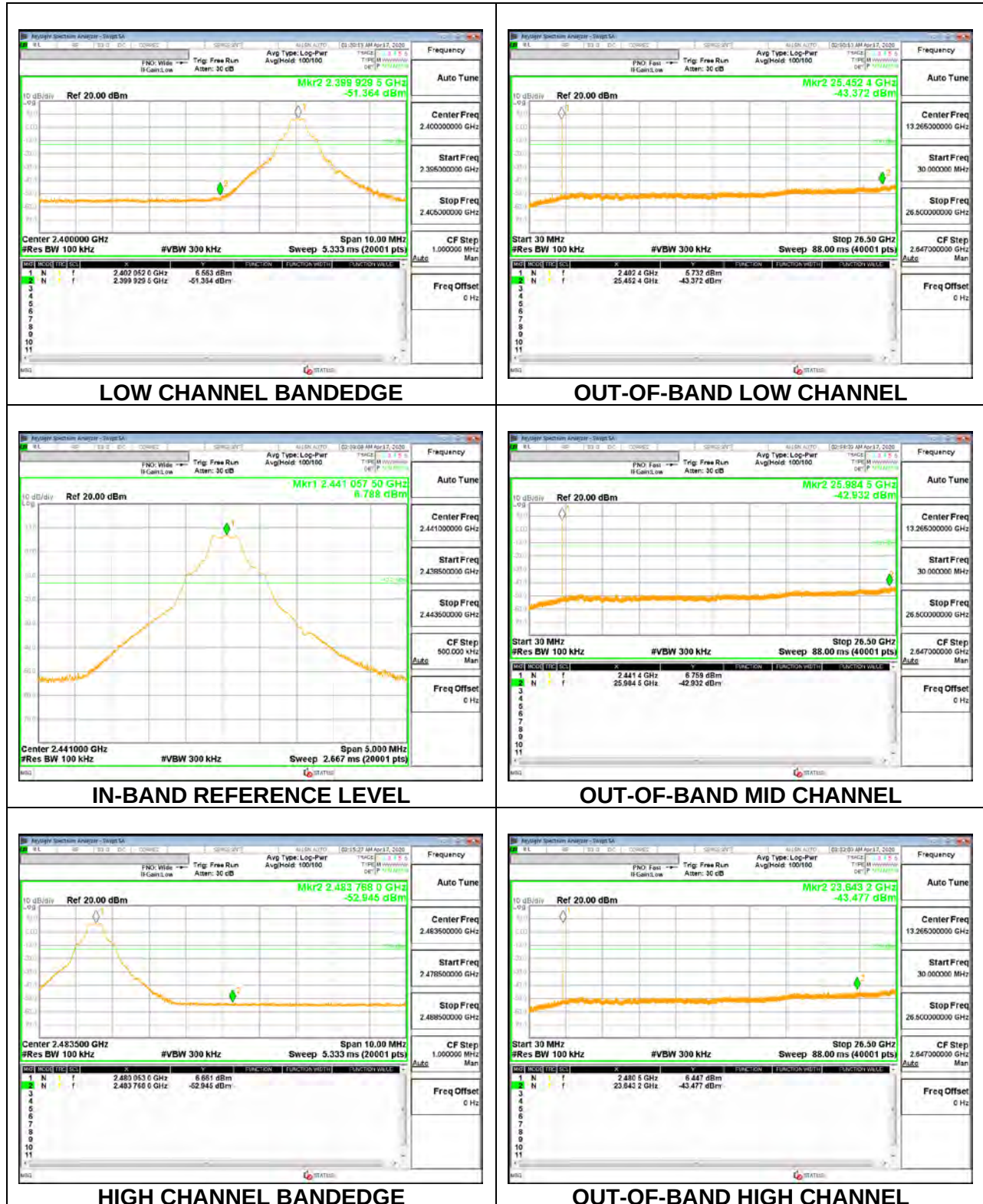
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

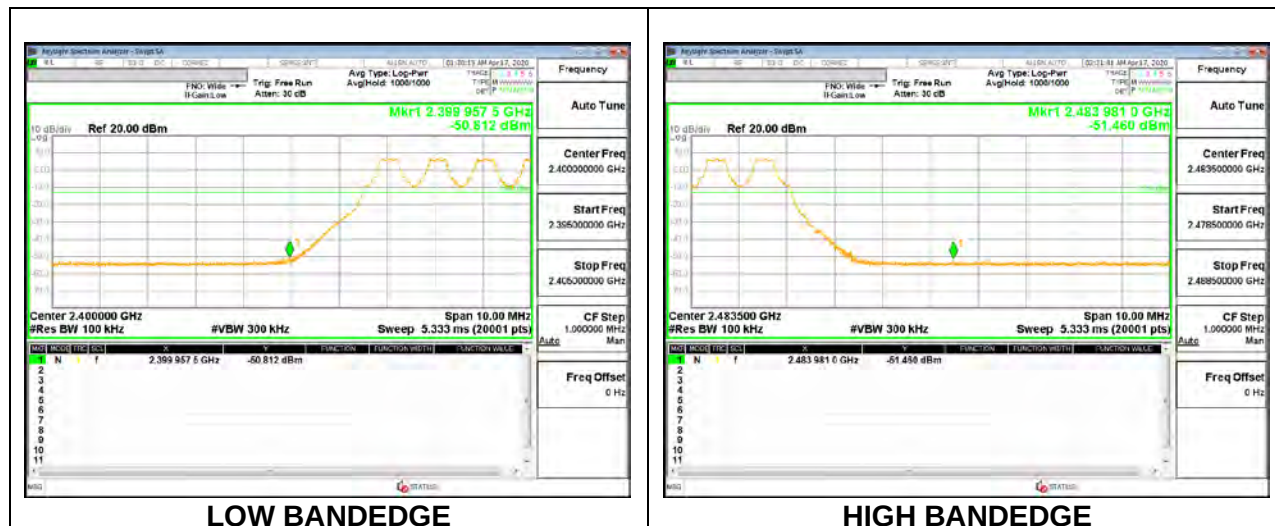
RESULTS

10.6.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

SPURIOUS EMISSIONS, NON-HOPPING

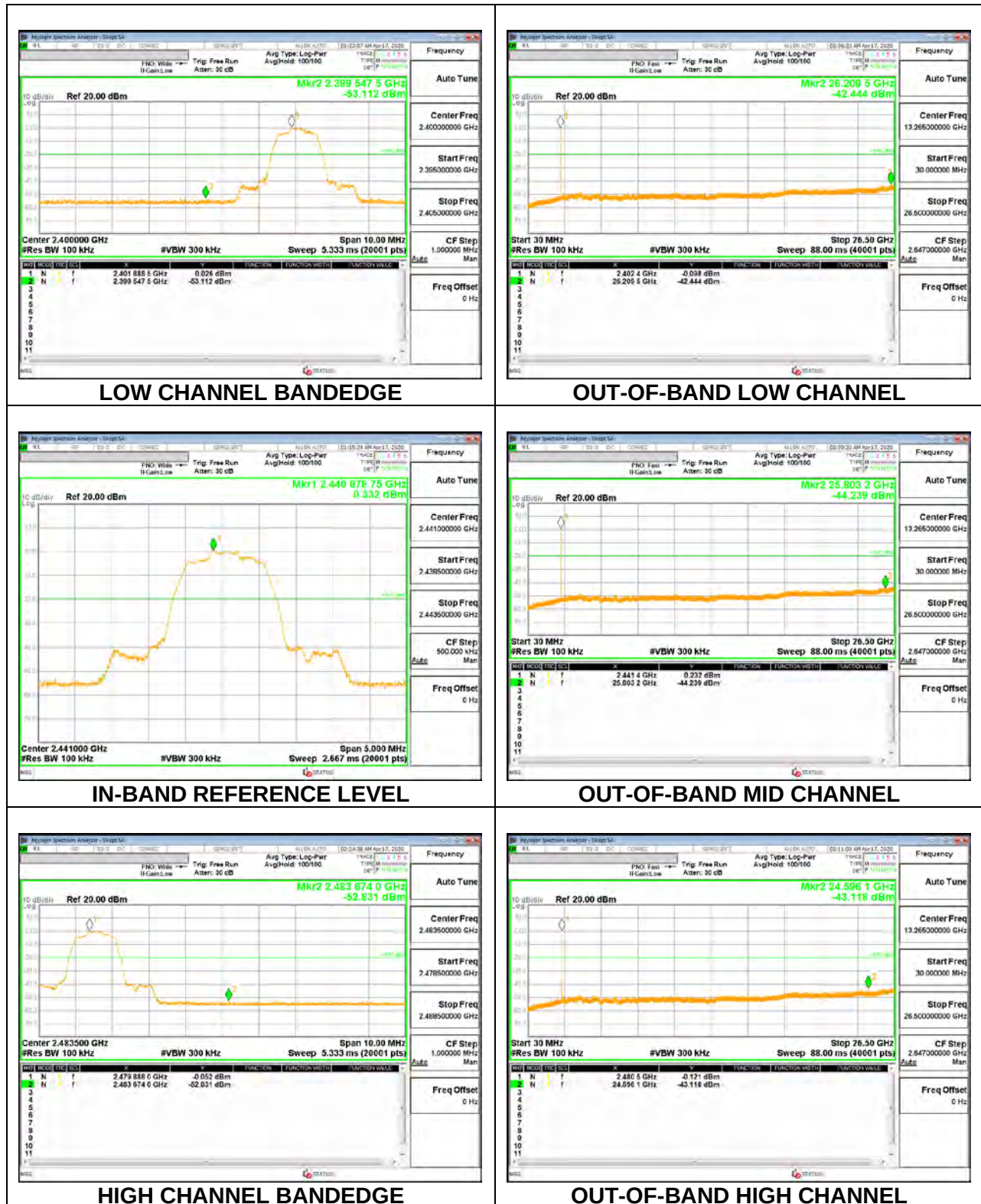


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

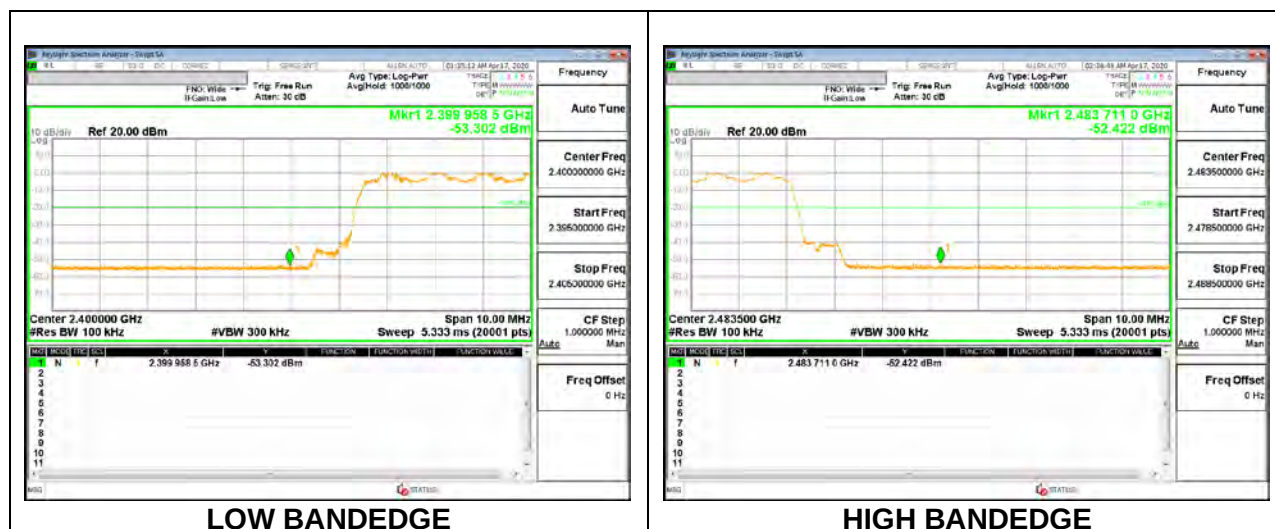


10.6.2. BLUETOOTH BASIC DATA RATE $\pi/4$ -DQPSK MODULATION

SPURIOUS EMISSIONS, NON-HOPPING

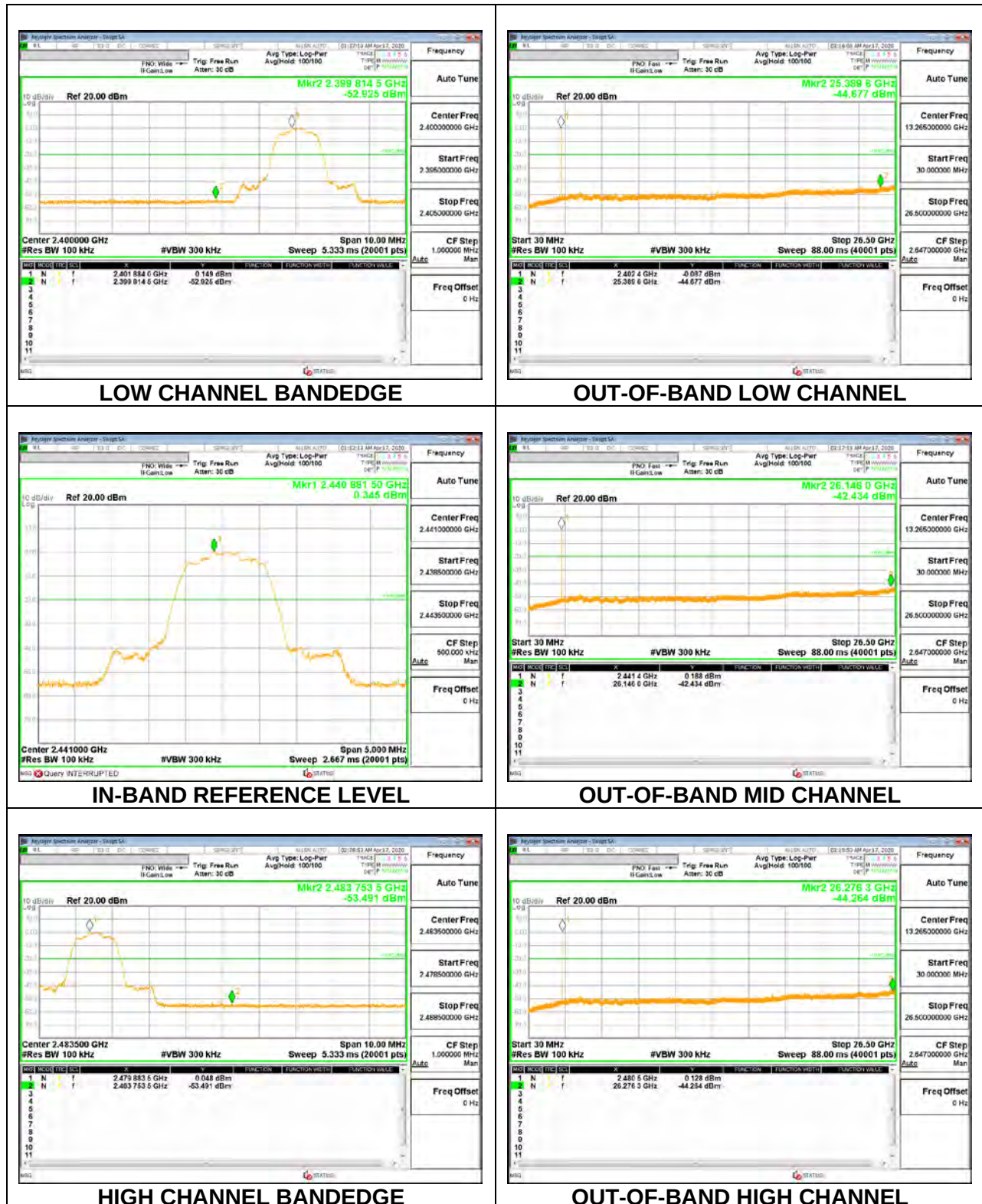


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

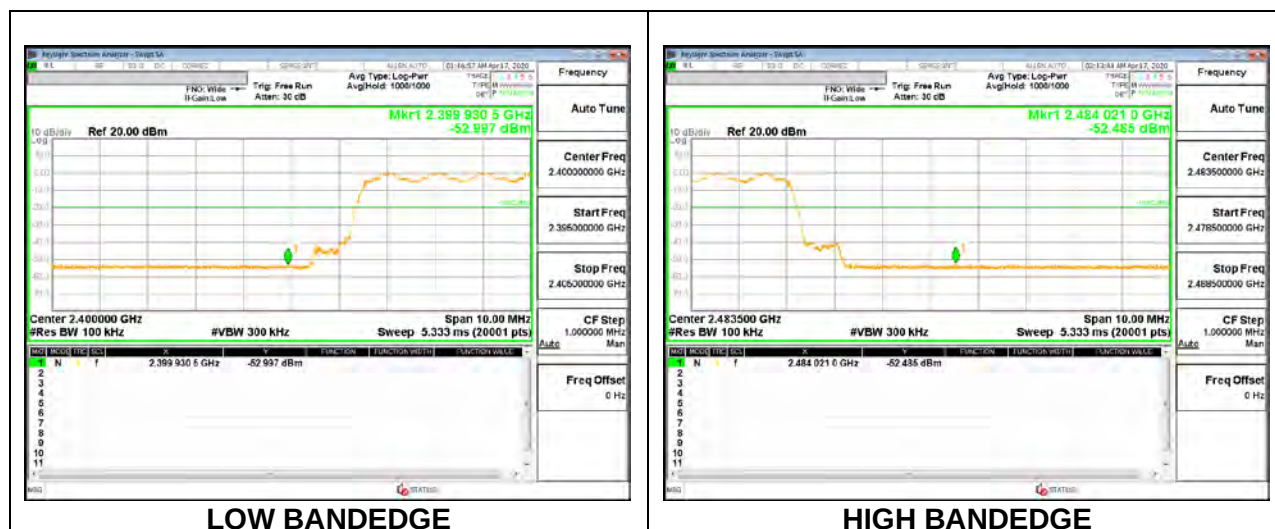


10.6.3. BLUETOOTH ENHANCED DATA RATE 8DPSK MODULATION

SPURIOUS EMISSIONS, NON-HOPPING



SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



11. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

FCC Part 15.205 (a) : Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.52525	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	156.7 ~ 156.9	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	162.0125 ~	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	167.17	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	167.72 ~ 173.2	2655 ~ 2900		
8.291 ~ 8.294	37.5 ~ 38.25	240 ~ 285	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	322 ~ 335.4	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	399.90 ~ 410	3345.8 ~ 3358		
		608 ~ 614	3600 ~ 4400		
		960 ~ 1240			

▪ FCC Part 15.205(b) : The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for above 1GHz. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

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

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements.(Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.)

For band edge measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1/T (on time) for average measurement.

$$\text{GFSK} = 1/T = 1 / 0.00288\text{S} = 347\text{Hz}.$$

The minimum VBW was 347Hz, but test receiver(ESW44) couldn't set value 347Hz. Due to this reason, testing VBW was set to 500Hz(Worst cases).

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

(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

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.

Note : Emission was pre-scanned from 9kHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

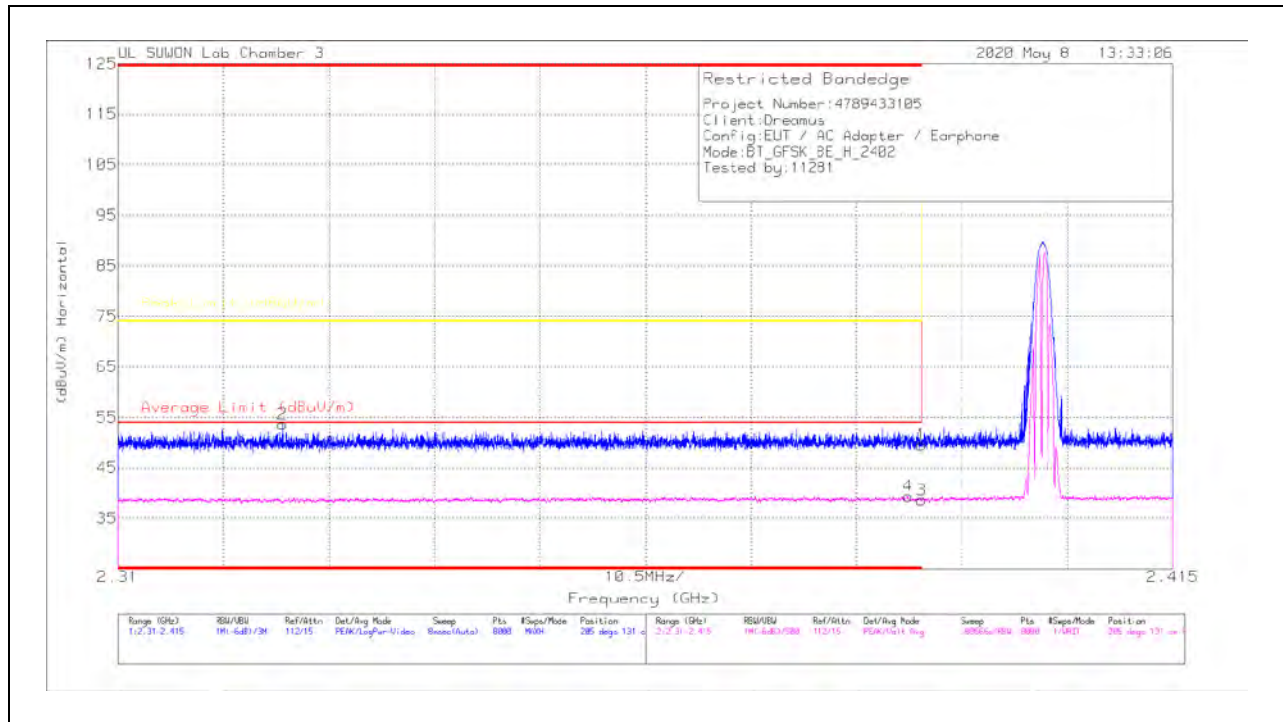
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

11.1. TRANSMITTER ABOVE 1 GHz

11.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



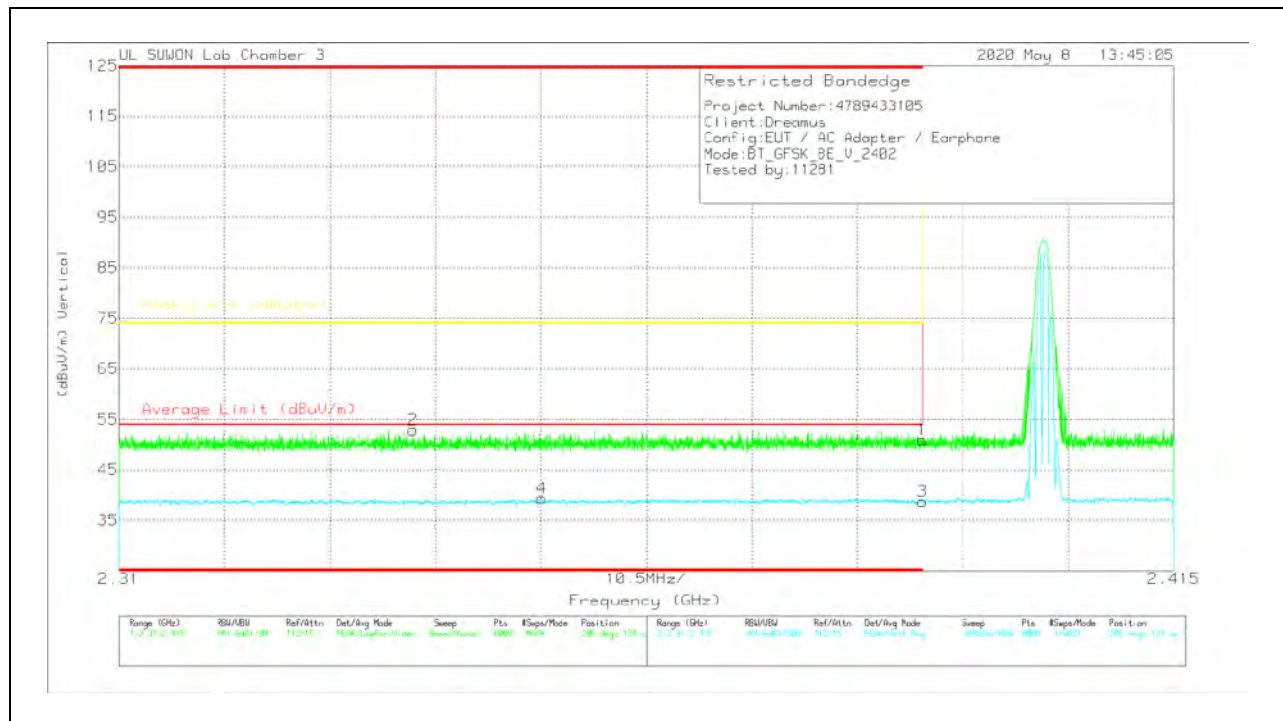
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.71	Pk	31.7	-22.9	49.51	-	-	74	-24.49	205	131	H
2	* 2.32642	45.02	Pk	31.5	-22.9	53.62	-	-	74	-20.38	205	131	H
3	* 2.39	29.78	VA1T	31.7	-22.9	38.58	54	-15.42	-	-	205	131	H
4	* 2.38864	30.53	VA1T	31.7	-22.9	39.33	54	-14.67	-	-	205	131	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	3117_00205959	10dB_ATT[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	42.16	Pk	31.7	-22.9	50.96	-	-	74	-23.04	205	134	V
2	* 2.33926	44.24	Pk	31.5	-22.9	52.84	-	-	74	-21.16	205	134	V
3	* 2.39	29.93	VA1T	31.7	-22.9	38.73	54	-15.27	-	-	205	134	V
4	* 2.35212	30.68	VA1T	31.6	-22.9	39.38	54	-14.62	-	-	205	134	V

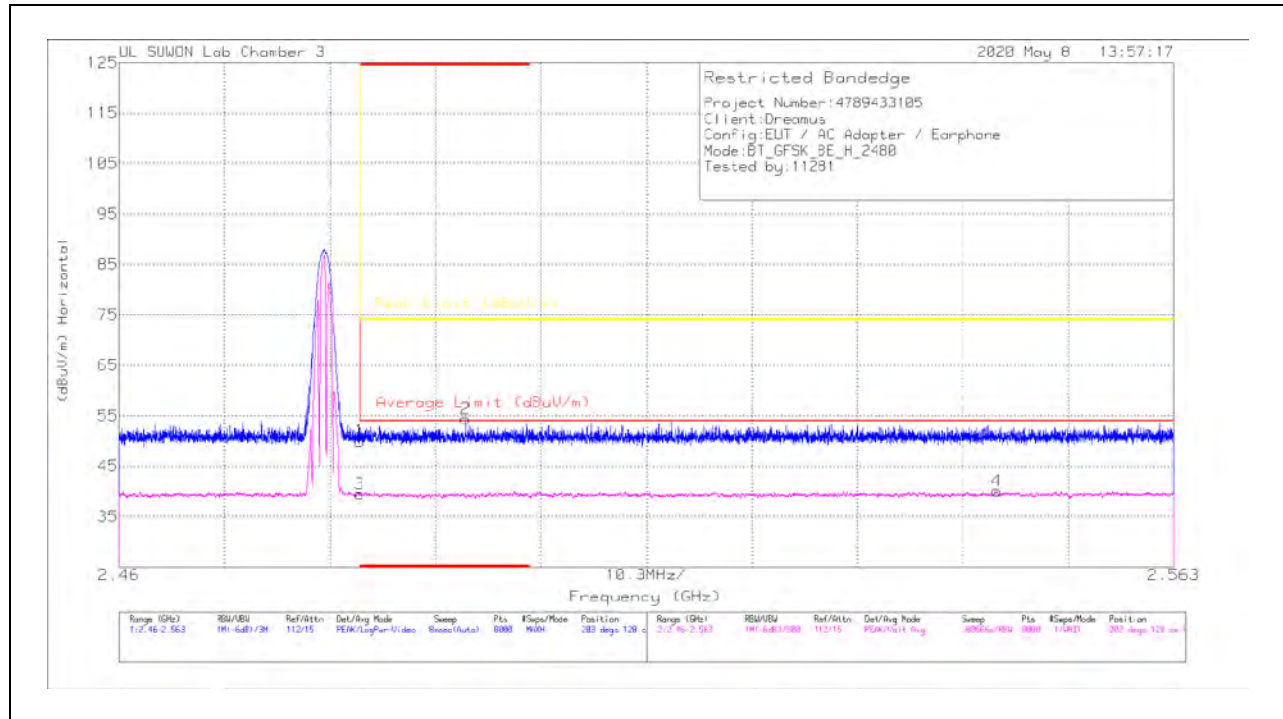
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

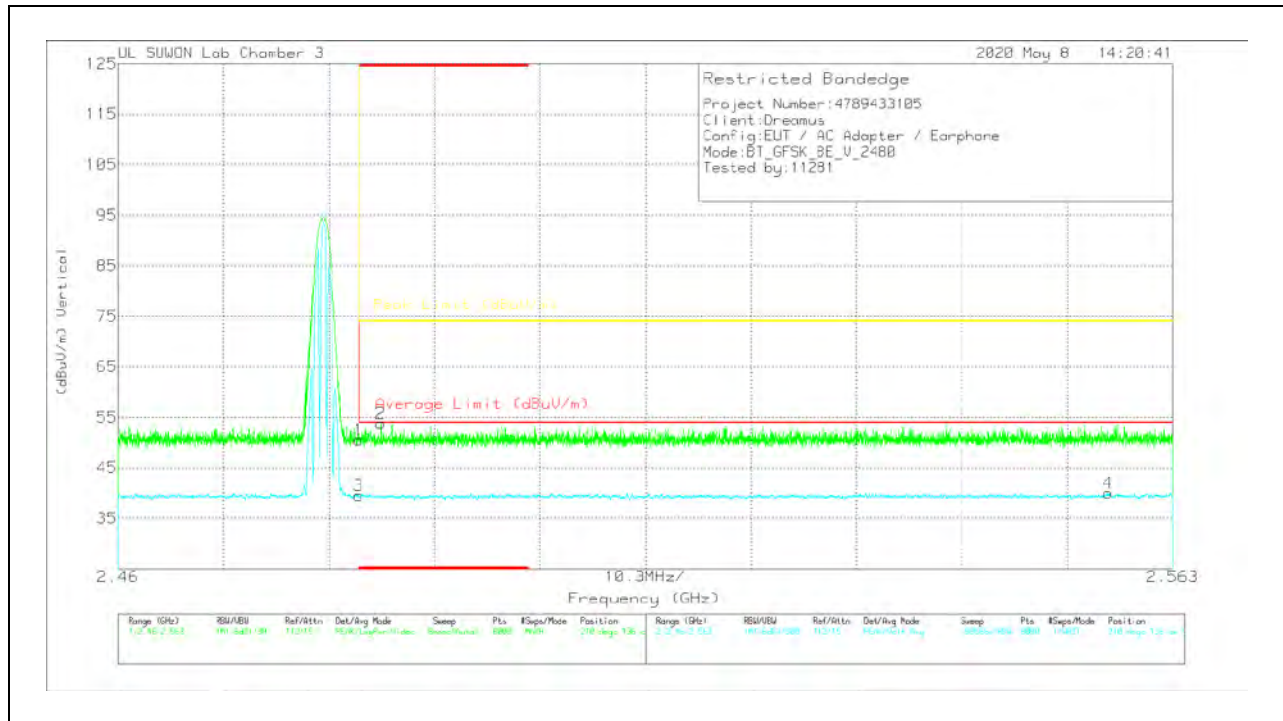


* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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	3117_00205959	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	41.46	Pk	31.9	-22.8	50.56	-	-	74	-23.44	210	136	V
2	* 2.48566	44.65	Pk	31.9	-22.8	53.75	-	-	74	-20.25	210	136	V
3	* 2.4835	30.39	VA1T	31.9	-22.8	39.49	54	-14.51	-	-	210	136	V
4	2.55668	30.7	VA1T	32	-22.7	40	54	-14	-	-	210	136	V

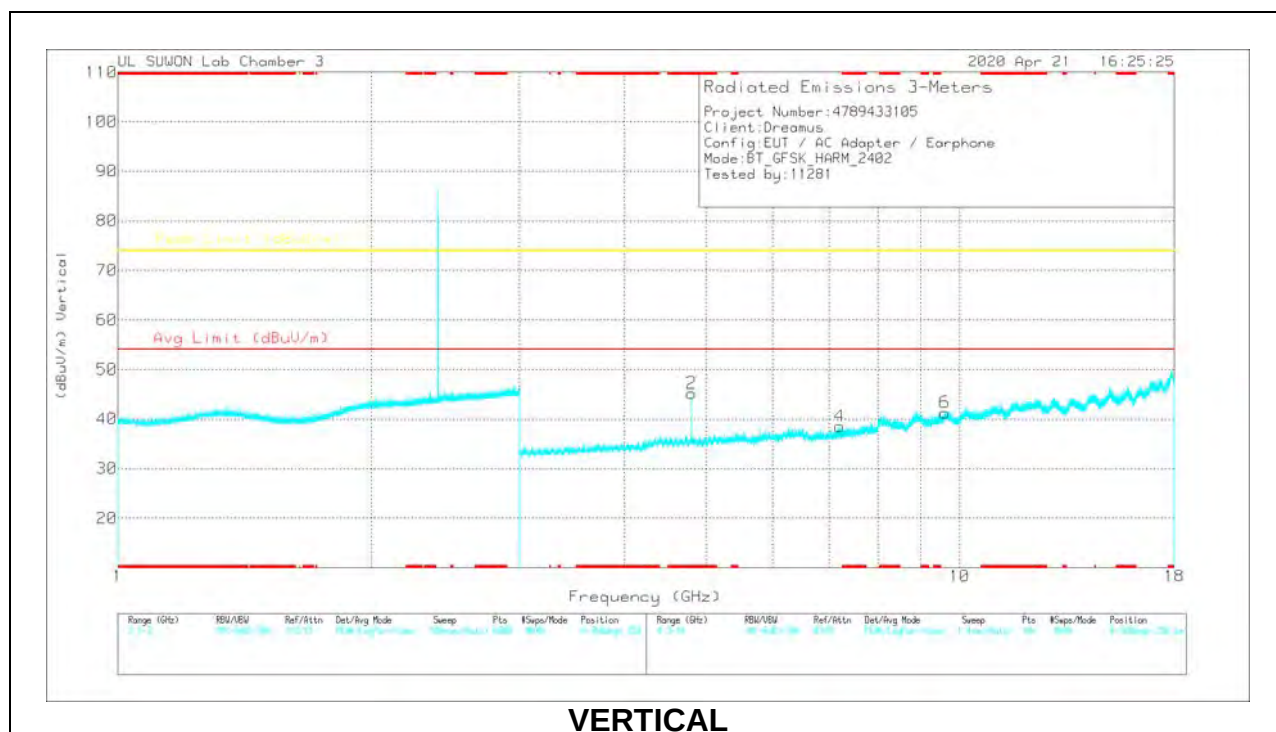
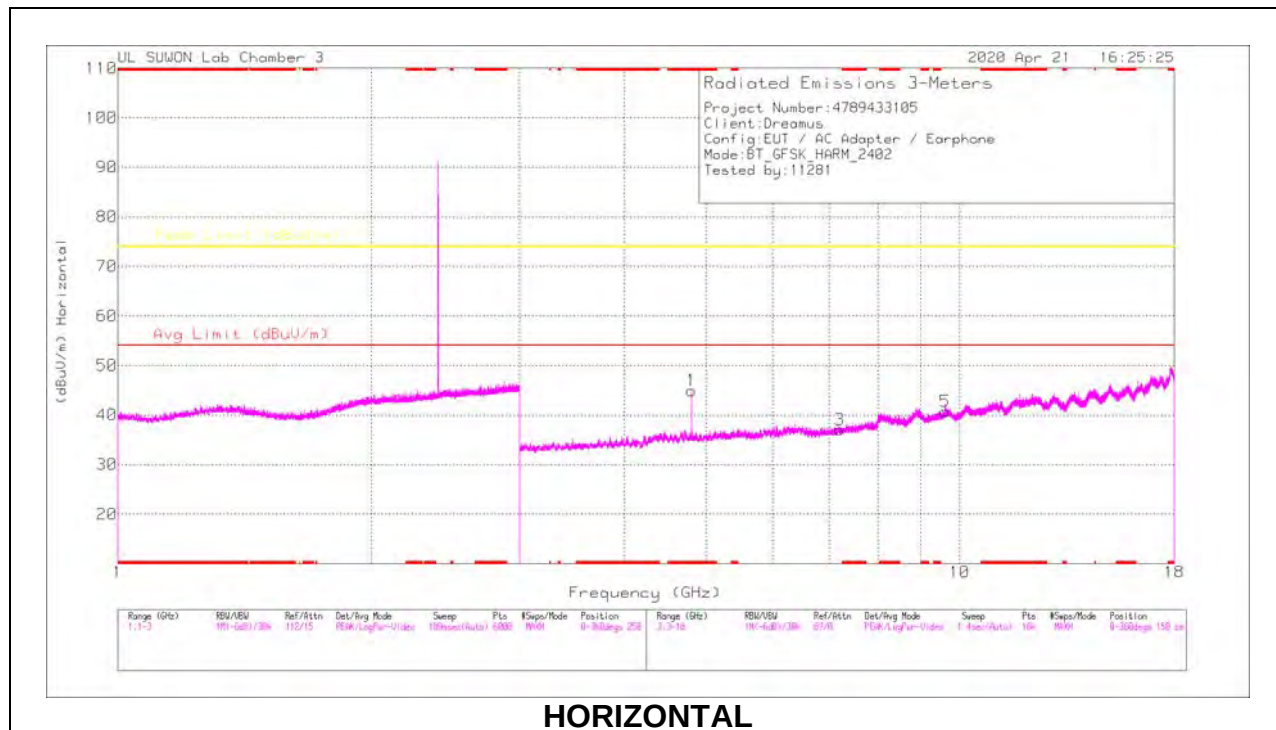
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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



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

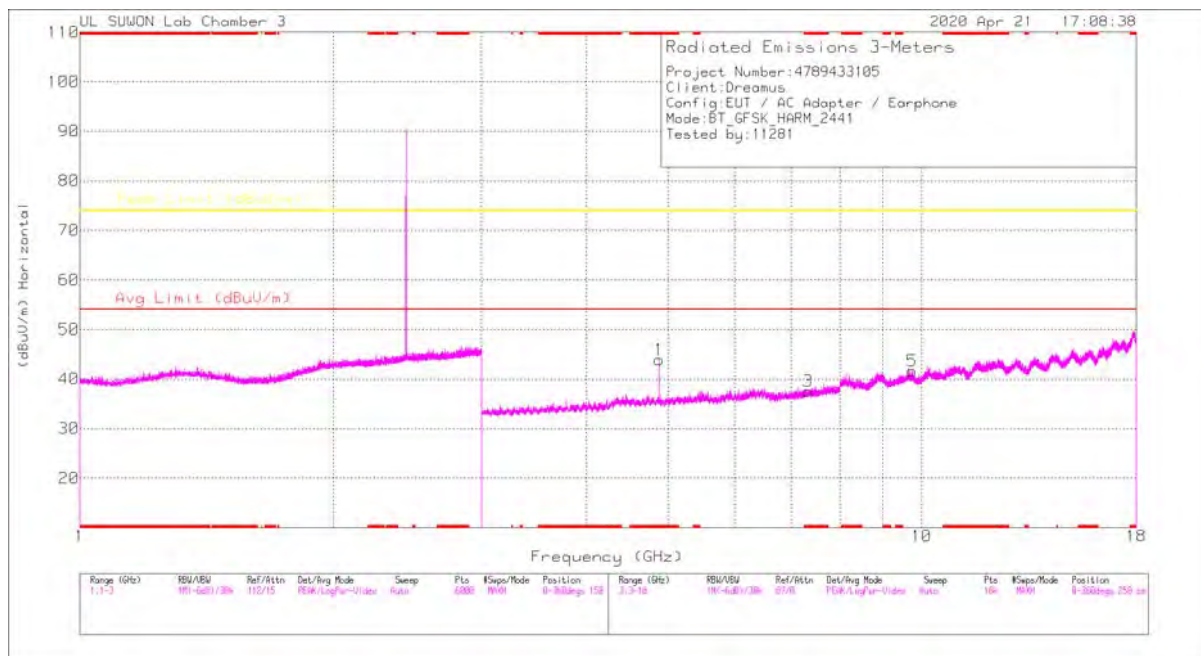
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	3GHz_HP(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80443	38.72	PKFH	34.2	-27.9	0	45.02	-	-	74	-28.98	360	100	H
7.19582	34.74	PKFH	35.8	-23.8	0	46.74	-	-	74	-27.26	360	100	H
9.61361	31.47	PKFH	37	-19.7	0	48.77	-	-	74	-25.23	360	100	H
* 4.80393	39.54	PKFH	34.2	-27.9	0	45.84	-	-	74	-28.16	360	100	V
7.1959	34.46	PKFH	35.8	-23.8	0	46.46	-	-	74	-27.54	360	100	V
9.60942	31.45	PKFH	37	-19.7	0	48.75	-	-	74	-25.25	360	100	V

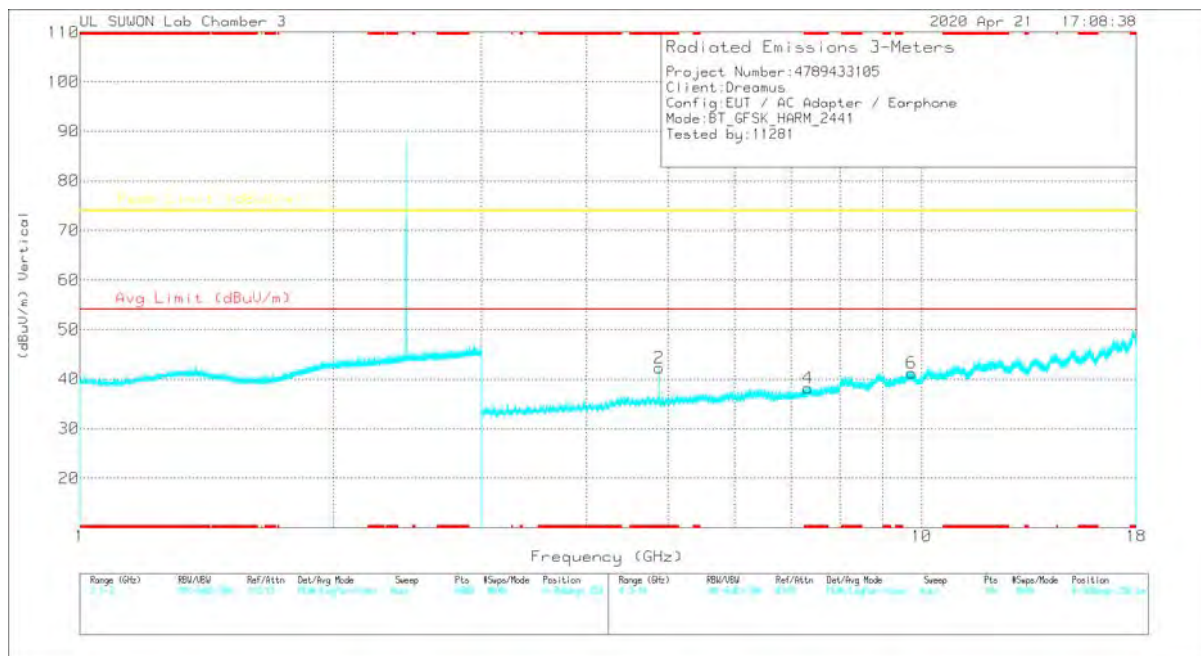
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

MID CHANNEL RESULTS



HORIZONTAL



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.

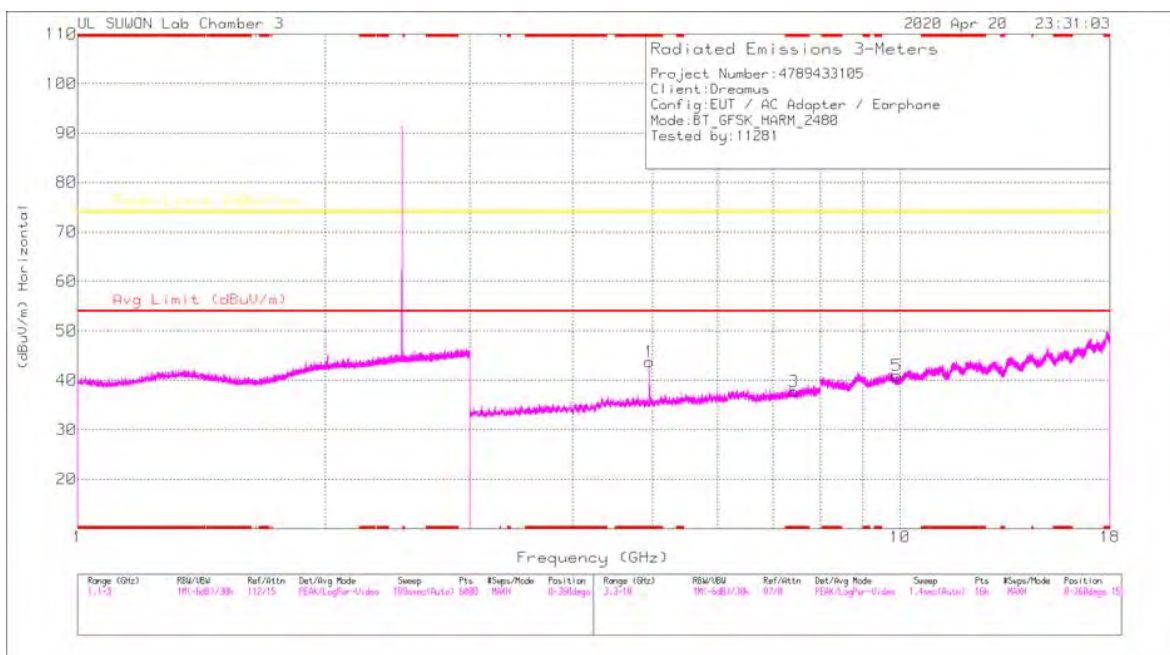
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.87266	39.49	PKFH	34.2	-28.7	44.99	-	-	74	-29.01	0	100	H
* 7.32958	33.66	PKFH	35.8	-23.1	46.36	-	-	74	-27.64	0	100	H
9.74697	31.49	PKFH	37.2	-19.3	49.39	-	-	74	-24.61	0	100	H
* 4.88251	39.03	PKFH	34.2	-28.8	44.43	-	-	74	-29.57	0	100	V
* 7.33066	33.97	PKFH	35.8	-23.1	46.67	-	-	74	-27.33	0	100	V
9.74295	31.63	PKFH	37.2	-19.3	49.53	-	-	74	-24.47	0	100	V

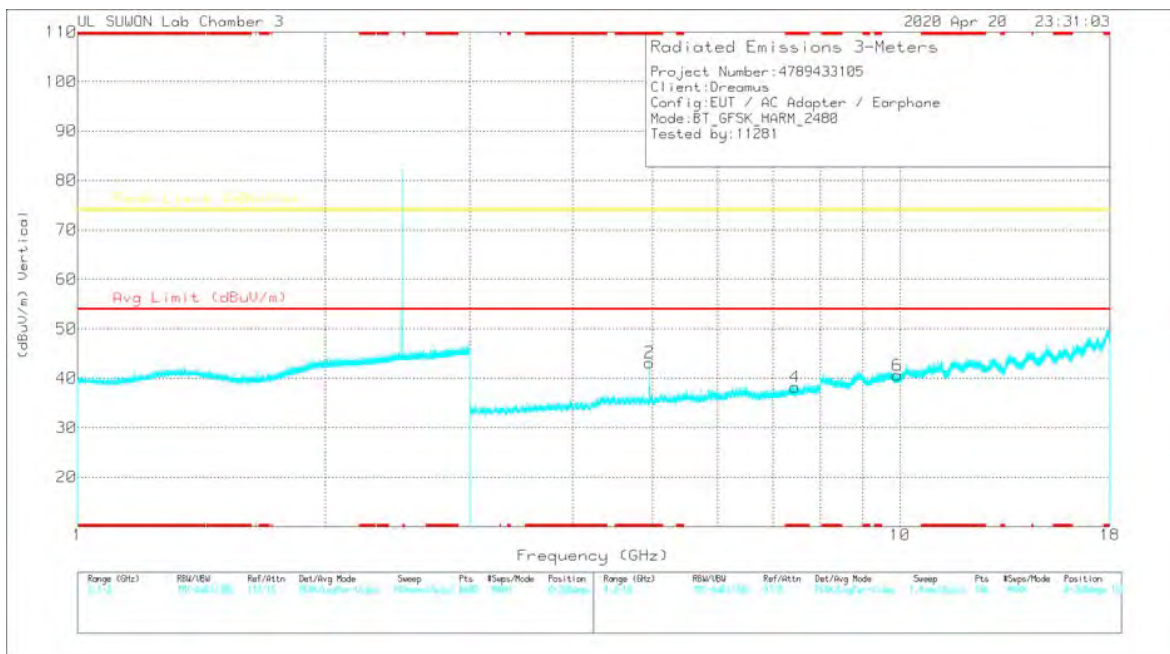
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

HIGH CHANNEL RESULTS



HORIZONTAL



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.

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.95986	42.38	PKFH	34.2	-28.5	48.08	-	-	74	-25.92	186	117	H
* 4.95991	36.18	VA1T	34.2	-28.5	41.88	54	-12.12	-	-	186	117	H
* 4.95972	42.6	PKFH	34.2	-28.5	48.3	-	-	74	-25.7	175	140	V
* 4.96013	36.94	VA1T	34.2	-28.5	42.64	54	-11.36	-	-	175	140	V
* 7.42982	33.78	PKFH	35.8	-23	46.58	-	-	74	-27.42	0	100	V
* 7.42804	32.94	PKFH	35.8	-22.9	45.84	-	-	74	-28.16	0	100	H
9.91149	29.97	PKFH	37.5	-19.5	47.97	-	-	74	-26.03	0	100	H
9.91221	30.15	PKFH	37.5	-19.5	48.15	-	-	74	-25.85	0	100	V

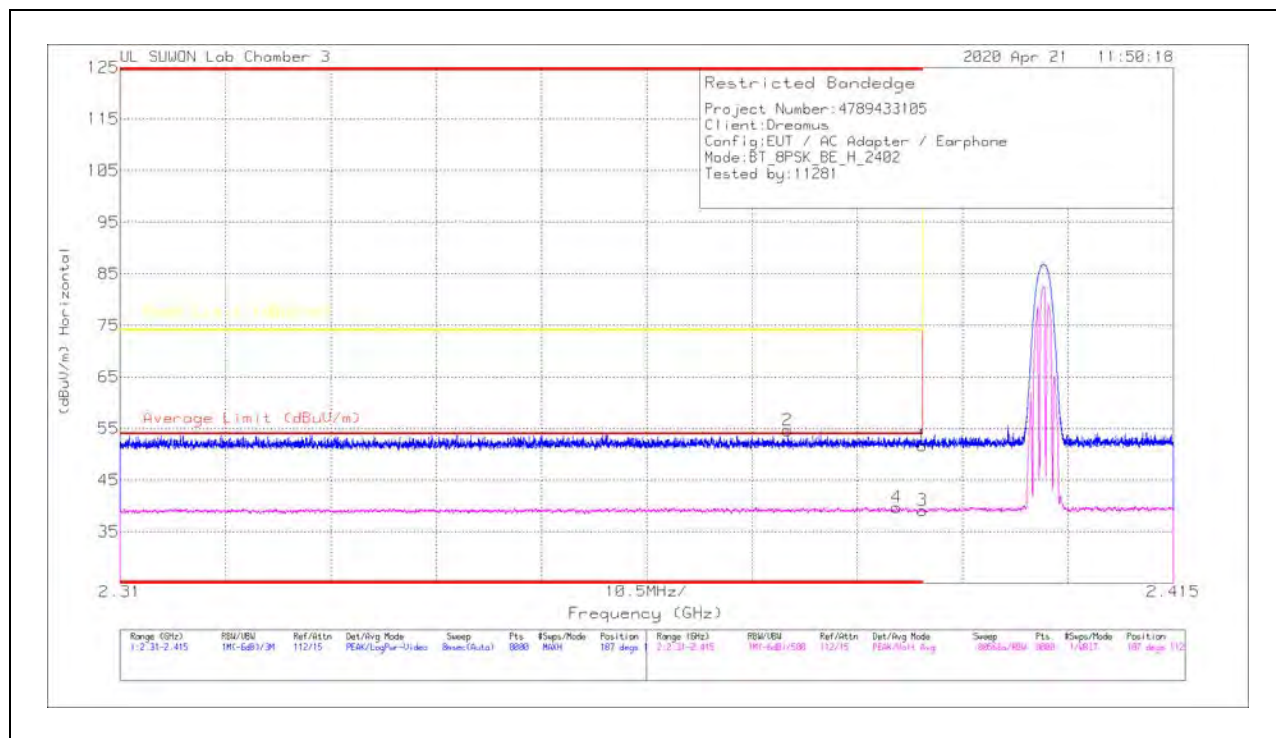
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

11.1.2. BLUETOOTH ENHANCED DATA RATE 8DPSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



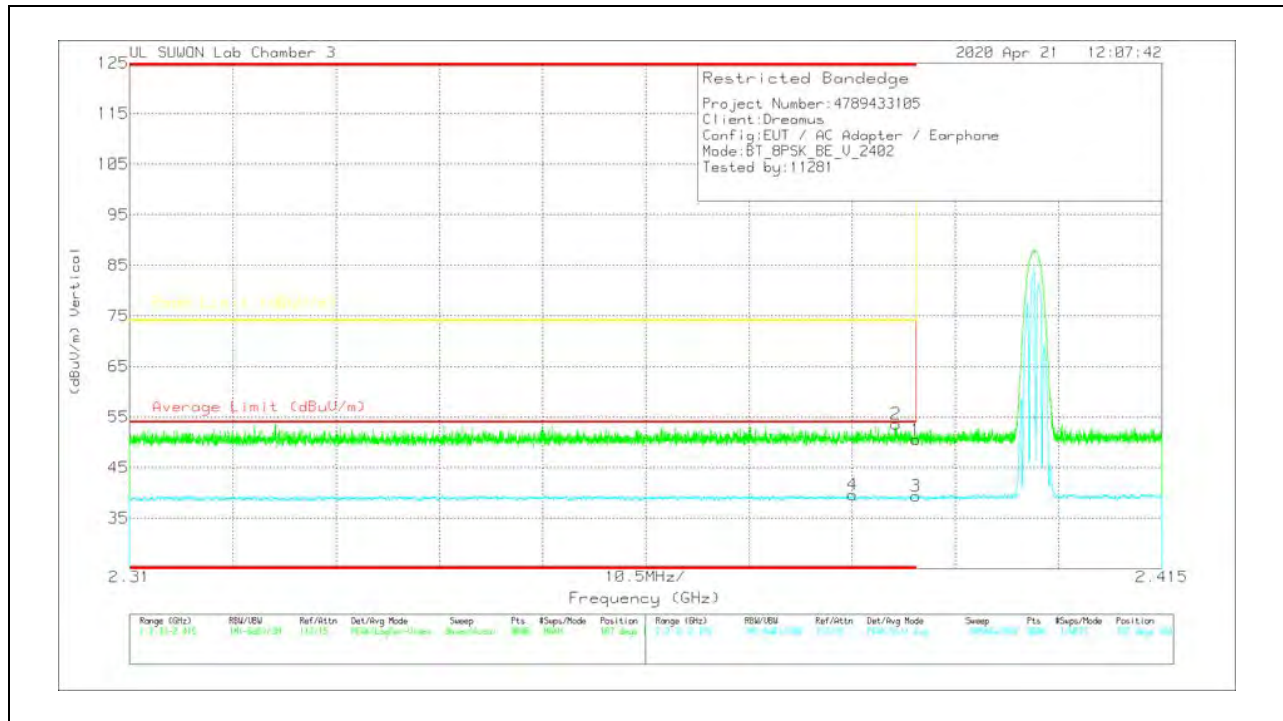
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.88	Pk	31.7	-22.9	51.68	-	-	74	-22.32	187	112	H
2	* 2.37655	45.97	Pk	31.6	-22.9	54.67	-	-	74	-19.33	187	112	H
3	* 2.39	30.35	VA1T	31.7	-22.9	39.15	54	-14.85	-	-	187	112	H
4	* 2.38742	30.93	VA1T	31.7	-22.9	39.73	54	-14.27	-	-	187	112	H

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

Pk - Peak detector

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

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	10dB_ATT[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	41.74	Pk	31.7	-22.9	50.54	-	-	74	-23.46	187	104	V
2	* 2.38795	44.82	Pk	31.7	-22.9	53.62	-	-	74	-20.38	187	104	V
3	* 2.39	30.6	VA1T	31.7	-22.9	39.4	54	-14.6	-	-	187	104	V
4	* 2.38355	30.86	VA1T	31.7	-22.9	39.66	54	-14.34	-	-	187	104	V

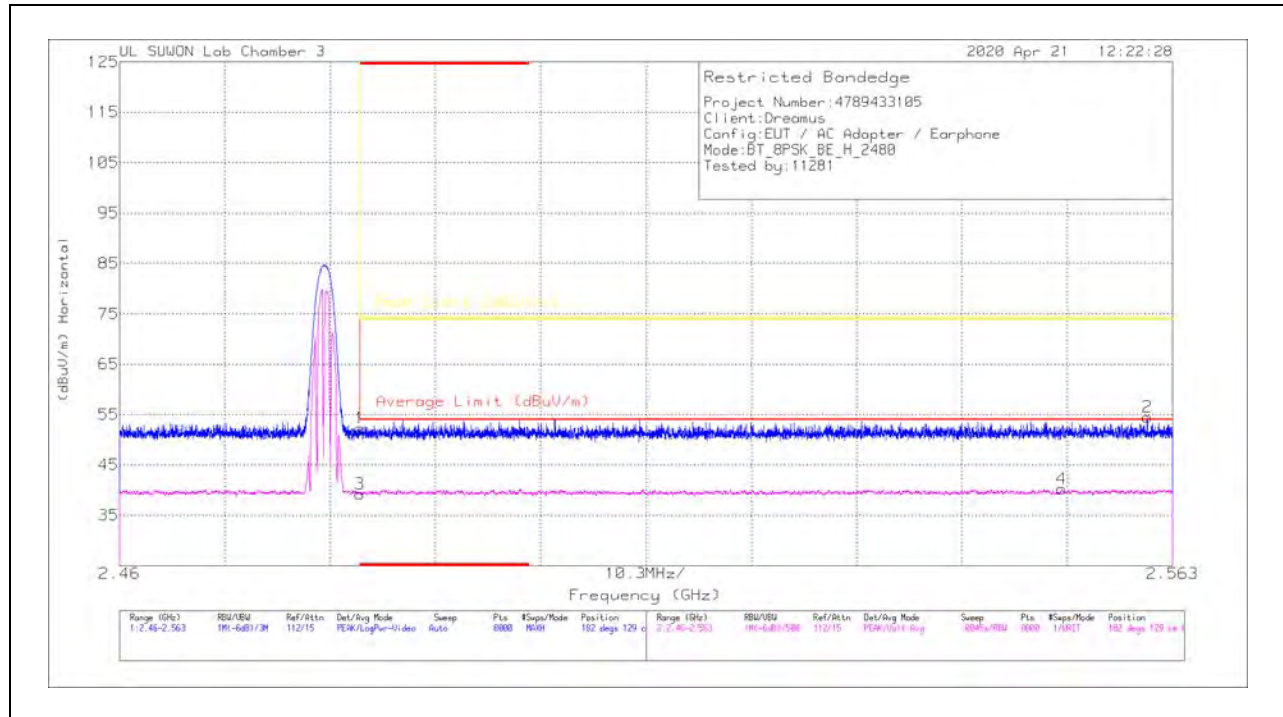
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



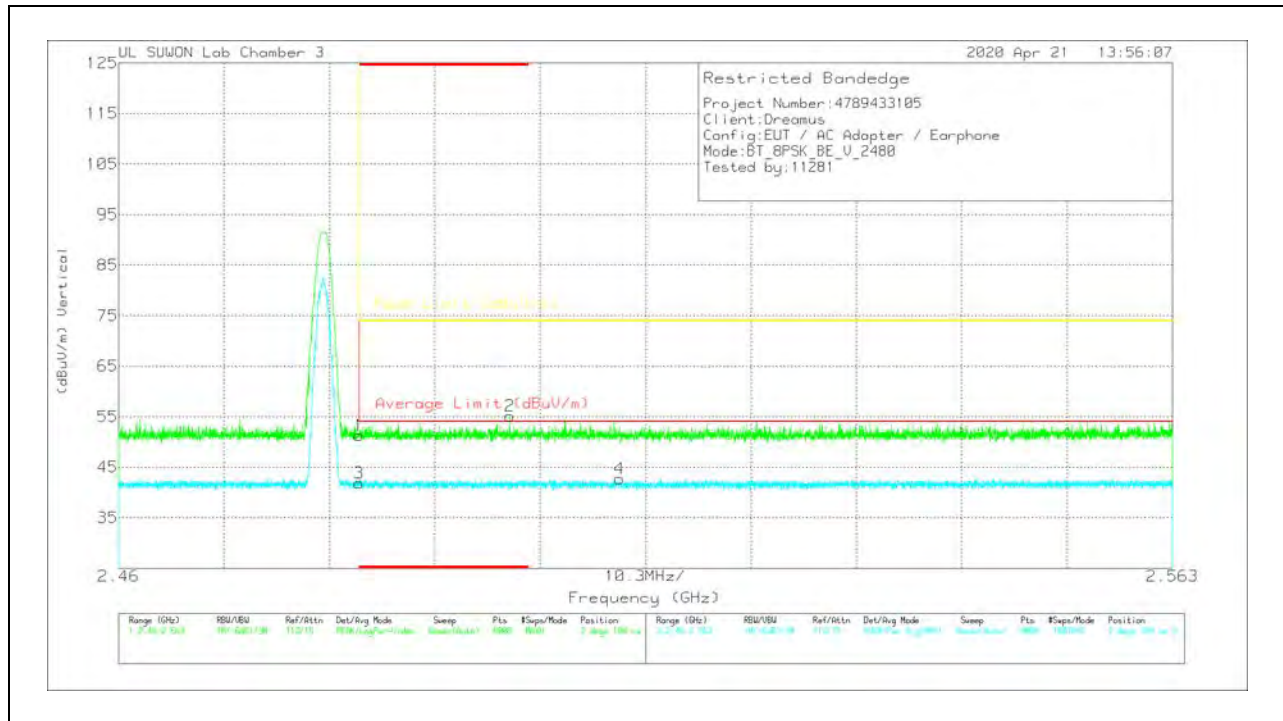
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	43.23	PK	31.9	-22.8	52.33	-	-	74	-21.67	182	129	H
2	2.56053	45.17	PK	32	-22.7	54.47	-	-	74	-19.53	182	129	H
3	* 2.4835	30.18	VA1T	31.9	-22.8	39.28	54	-14.72	-	-	182	129	H
4	2.55216	30.92	VA1T	32	-22.7	40.22	54	-13.78	-	-	182	129	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	3117_00205959	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	42.22	PK	31.9	-22.8	51.32	-	-	74	-22.68	2	104	V
2	* 2.49824	45.98	PK	31.9	-22.8	55.08	-	-	74	-18.92	2	104	V
3	* 2.4835	32.77	PK	31.9	-22.8	41.87	54	-12.13	-	-	2	104	V
4	2.50897	33.52	PK	32	-22.8	42.72	54	-11.28	-	-	2	104	V

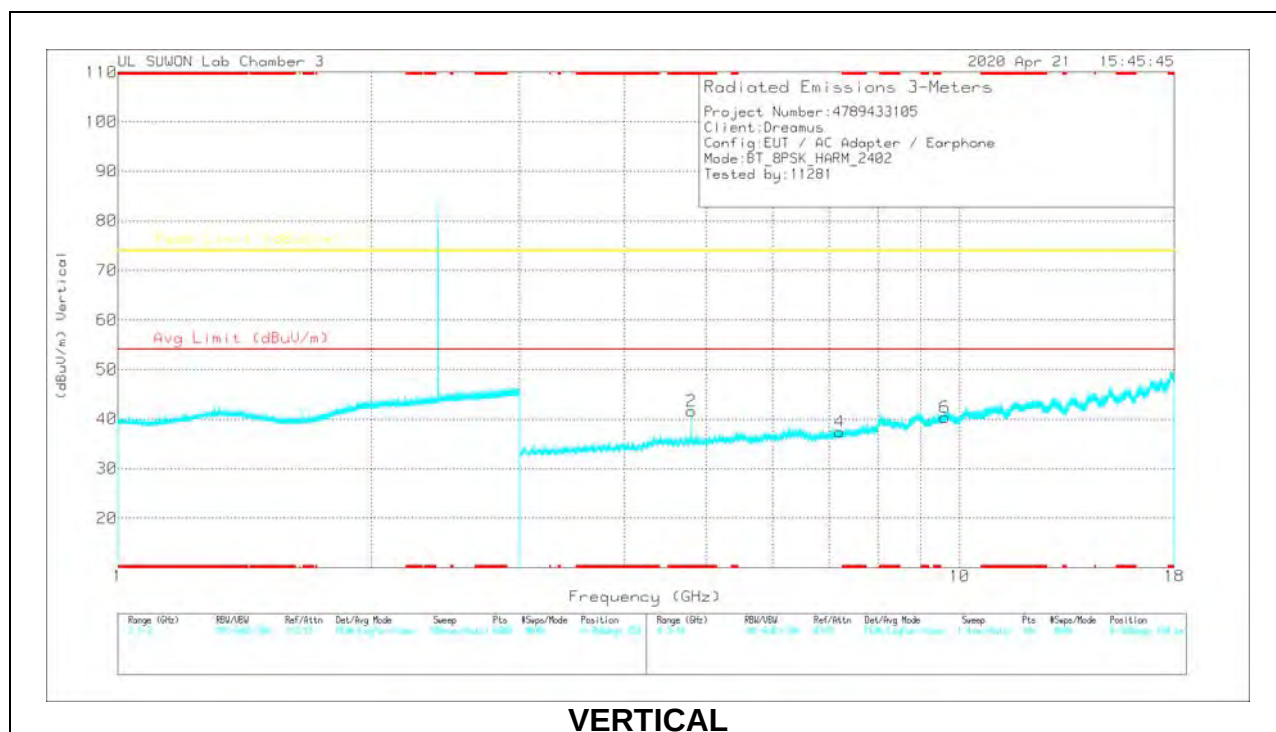
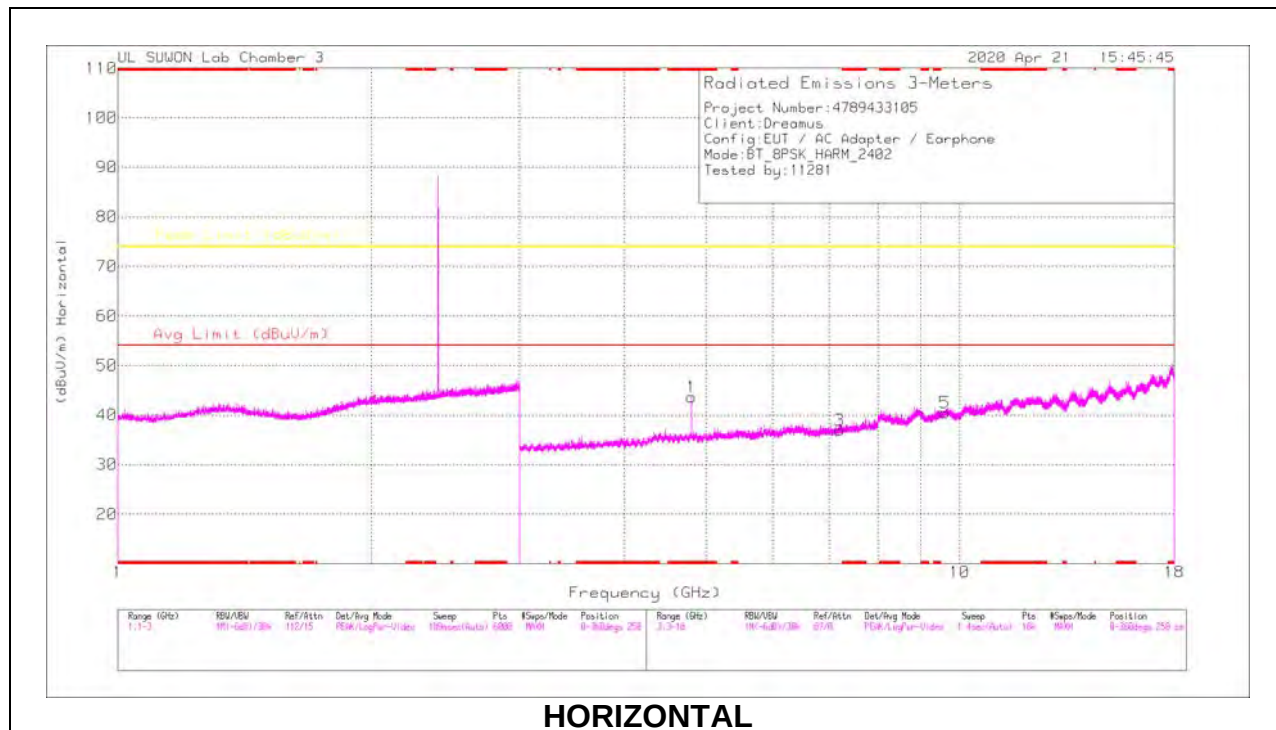
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

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

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



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

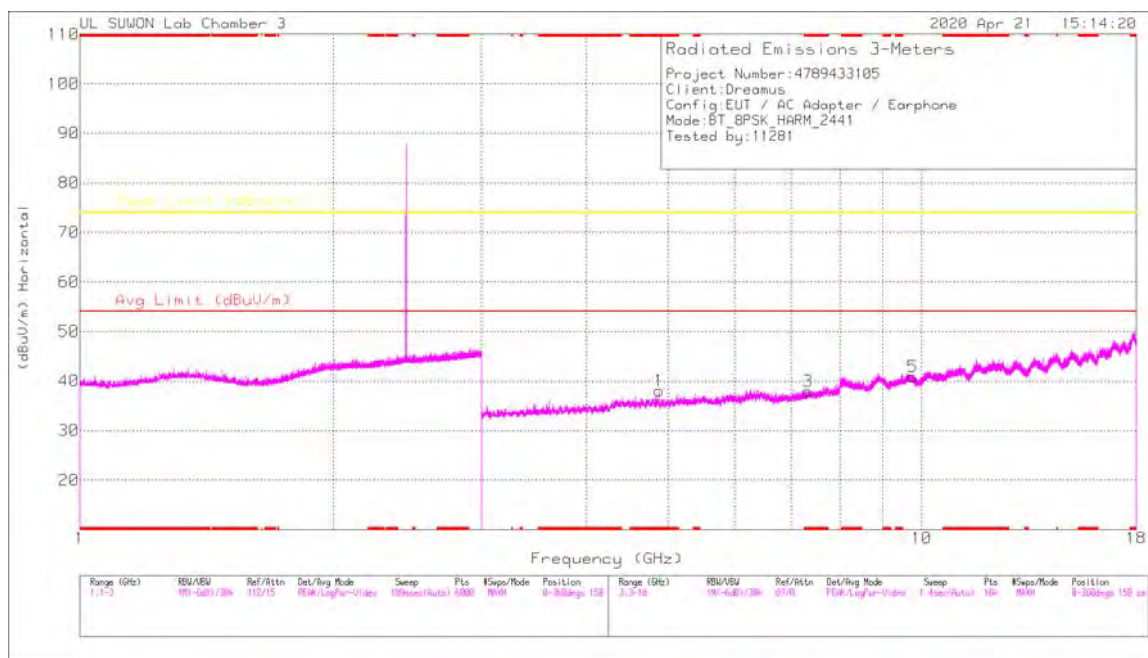
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80656	37.82	PKFH	34.2	-28	44.02	-	-	74	-29.98	360	100	H
7.20893	34.77	PKFH	35.8	-23.7	46.87	-	-	74	-27.13	360	100	H
9.60952	32.02	PKFH	37	-19.7	49.32	-	-	74	-24.68	360	100	H
* 4.80779	38.03	PKFH	34.2	-28	44.23	-	-	74	-29.77	360	100	V
7.20731	34.06	PKFH	35.8	-23.7	46.16	-	-	74	-27.84	360	100	V
9.61268	31.31	PKFH	37	-19.7	48.61	-	-	74	-25.39	360	100	V

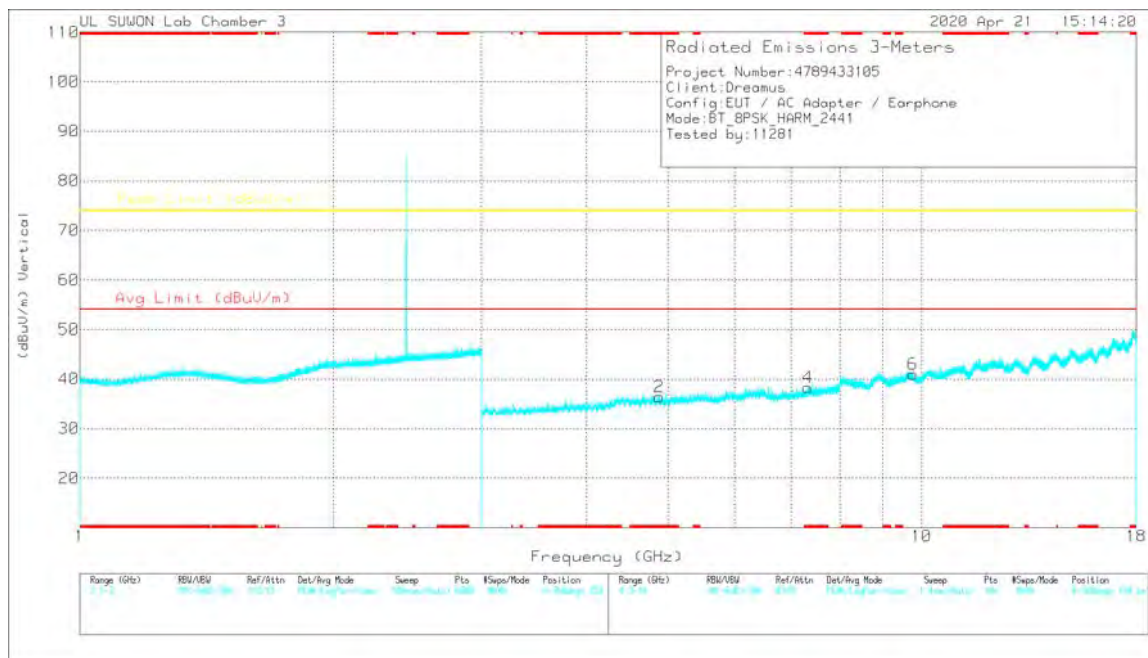
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

MID CHANNEL RESULTS



HORIZONTAL



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.

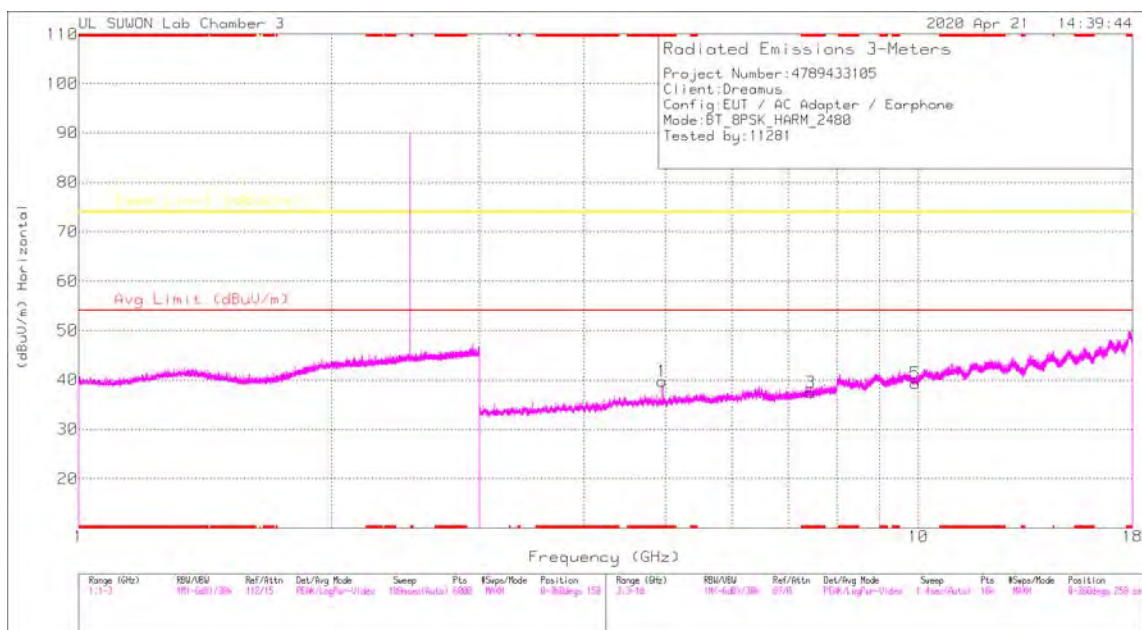
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.87979	37.94	PKFH	34.2	-28.7	43.44	-	-	74	-30.56	360	100	H
* 7.33067	33.44	PKFH	35.8	-23.1	46.14	-	-	74	-27.86	360	100	H
9.76932	31.72	PKFH	37.3	-19.4	49.62	-	-	74	-24.38	360	100	H
* 4.87984	38.22	PKFH	34.2	-28.7	43.72	-	-	74	-30.28	360	100	V
* 7.33269	34.91	PKFH	35.8	-23.1	47.61	-	-	74	-26.39	360	100	V
9.76539	30.77	PKFH	37.2	-19.3	48.67	-	-	74	-25.33	360	100	V

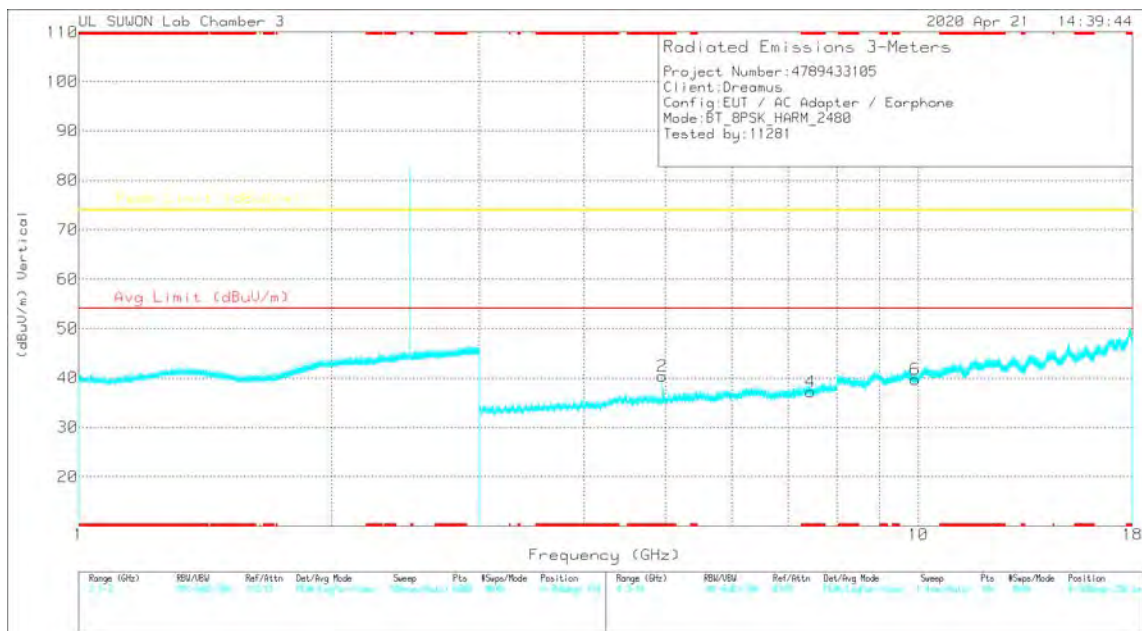
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

HIGH CHANNEL RESULTS



HORIZONTAL



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.

RADIATED EMISSIONS

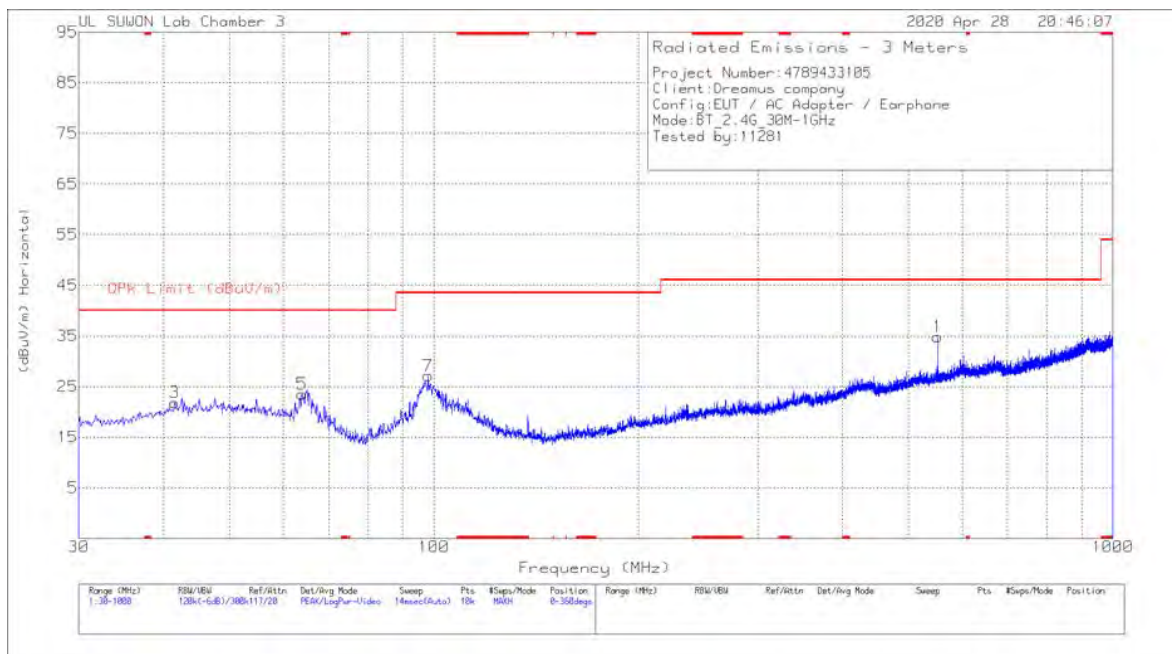
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.95996	38.64	PKFH	34.2	-28.5	44.34	-	-	74	-29.66	360	100	H
* 7.43985	32.17	PKFH	35.8	-23	44.97	-	-	74	-29.03	360	100	V
9.92017	29.83	PKFH	37.5	-19.5	47.83	-	-	74	-26.17	360	100	H
* 4.96027	37.45	PKFH	34.2	-28.5	43.15	-	-	74	-30.85	360	100	V
* 7.44095	32.92	PKFH	35.8	-23	45.72	-	-	74	-28.28	360	100	V
9.9211	29.17	PKFH	37.5	-19.5	47.17	-	-	74	-26.83	360	100	V

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

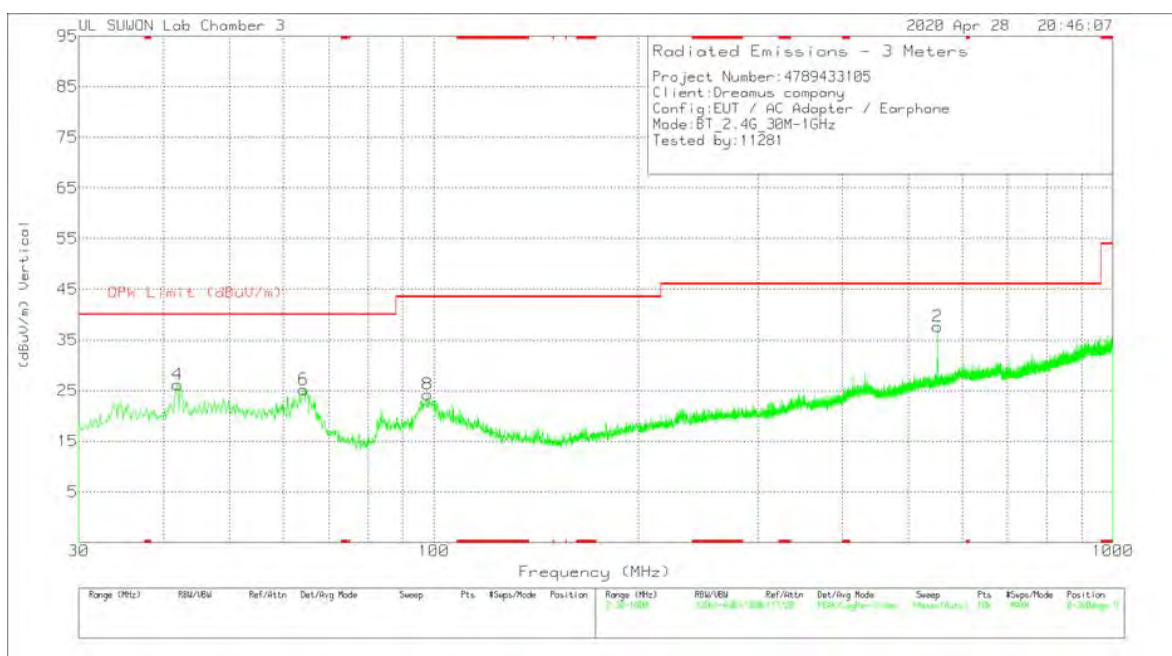
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

11.2. WORST CASE BELOW 1 GHz

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



HORIZONTAL



VERTICAL

Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163-845	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	552.0108	41.23	Pk	23.8	-30.2	34.83	46.02	-11.19	0-360	200	H
3	41.5442	34.63	Pk	19.3	-32.1	21.83	40	-18.17	0-360	400	H
5	63.9535	38.03	Pk	17.4	-31.9	23.53	40	-16.47	0-360	200	H
7	98.101	41.23	Pk	17.5	-31.6	27.13	43.52	-16.39	0-360	300	H
2	552.0108	44.08	Pk	23.8	-30.2	37.68	46.02	-8.34	0-360	100	V
4	41.9322	39	Pk	19.4	-32.2	26.2	40	-13.8	0-360	100	V
6	64.2445	39.82	Pk	17.3	-31.9	25.22	40	-14.78	0-360	200	V
8	97.907	38.48	Pk	17.5	-31.7	24.28	43.52	-19.24	0-360	400	V

Pk - Peak detector

12. 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 C63.10.

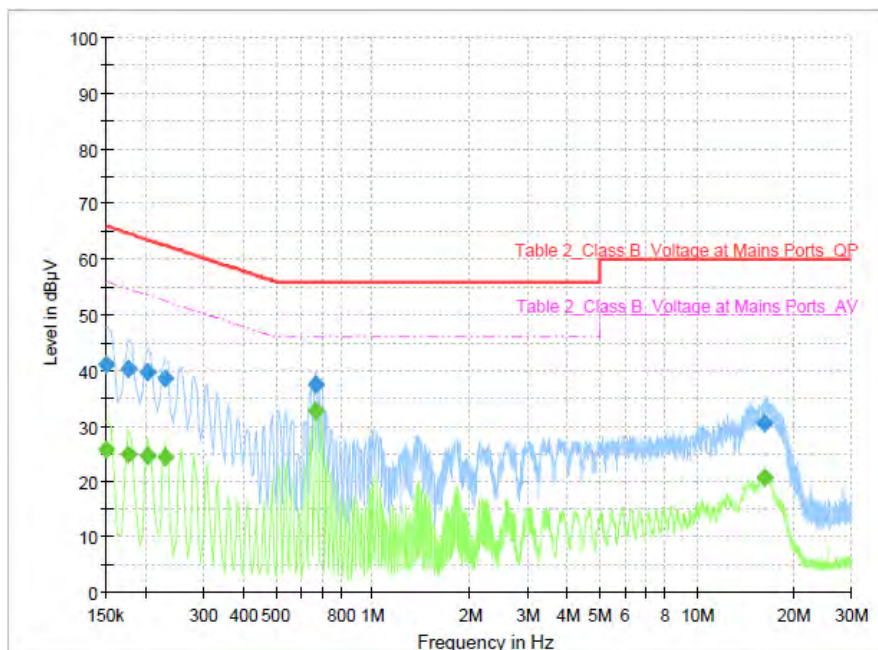
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

12.1.1. AC Power Line

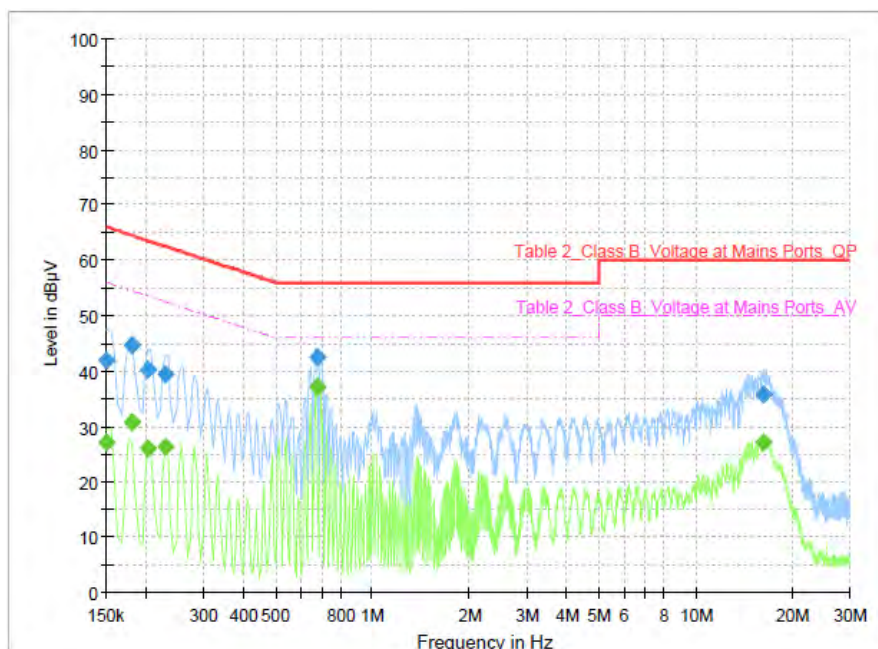
LINE 1 RESULTS



Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	25.78	56.00	30.22	L1	ON	9.7
0.150000	41.09	---	66.00	24.91	L1	ON	9.7
0.176338	---	24.99	54.66	29.66	L1	ON	10.0
0.176338	40.19	---	64.66	24.47	L1	ON	10.0
0.202677	---	24.57	53.50	28.93	L1	ON	9.8
0.202677	39.53	---	63.50	23.97	L1	ON	9.8
0.229015	---	24.41	52.49	28.07	L1	ON	9.7
0.229015	38.67	---	62.49	23.81	L1	ON	9.7
0.667985	---	32.60	46.00	13.40	L1	ON	9.9
0.667985	37.36	---	56.00	18.64	L1	ON	9.9
16.168037	---	20.71	50.00	29.29	L1	ON	10.1
16.168037	30.44	---	60.00	29.56	L1	ON	10.1

LINE 2 RESULTS



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	27.11	56.00	28.90	N	ON	9.7
0.150000	41.77	---	66.00	24.23	N	ON	9.7
0.180728	---	30.66	54.45	23.79	N	ON	9.9
0.180728	44.78	---	64.45	19.67	N	ON	9.9
0.202677	---	26.10	53.50	27.40	N	ON	9.8
0.202677	40.09	---	63.50	23.41	N	ON	9.8
0.229015	---	26.28	52.49	26.21	N	ON	9.7
0.229015	39.29	---	62.49	23.19	N	ON	9.7
0.672375	---	37.28	46.00	8.72	N	ON	9.8
0.672375	42.53	---	56.00	13.47	N	ON	9.8
16.150478	---	27.01	50.00	22.99	N	ON	10.1
16.150478	35.84	---	60.00	24.16	N	ON	10.1

END OF TEST REPORT