



CERTIFICATION TEST REPORT

Report Number. : 4789354110-E3V2

Applicant : SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
GYEONGGI-DO, 16677, KOREA

Model : SM-P610

FCC ID : A3LSMP610
IC : 649E-SMP610

EUT Description : DTS/UNII a/b/g/n/ac Tablet + BT/BLE and ANT+

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-247 Issue 2
INDUSTRY CANADA RSS-GEN Issue 5

Date Of Issue:

March 23, 2020

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Testing Laboratory
TL-637

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	03/19/20	Initial issue	SunGeun Lee
V2	03/23/20	Updated to address TCB's question	SunGeun Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: DTS/UNII a/b/g/n/ac Tablet + BT/BLE and ANT+

MODEL: SM-P610

SERIAL NUMBER: R52N10VDTBB (CONDUCTED)
R52N10VEG2H (RADIATED);

DATE TESTED: MAR 09, 2020 – MAR 19, 2020;

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
INDUSTRY CANADA RSS-247 Issue 2	Complies
INDUSTRY CANADA RSS-GEN Issue 5	Complies

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
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Tested By:



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UL Korea, Ltd.

2. SUMMARY TABLE

FCC Part Section	IC Section	Test Description	Test Limit	Test Condition	Test Result
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20dBc	Conducted	Pass
15.247 (b)(1)	RSS-247 5.1(b)	TX conducted output power	<21dBm		Pass
15.247 (a)(1)	RSS-247 5.1(b)	Hopping frequency separation	> two-thirds of the 20 dB bandwidth		Pass
15.247 (a)(1)(iii)	RSS-247 5.1(d)	Number of Hopping channels	More than 15 non-overlapping channels		Pass
15.247 (a)(1)(iii)	RSS-247 5.1(d)	Avg Time of Occupancy	< 0.4sec		Pass
15.207 (a)	RSS-GEN Clause 7 & 8.9	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass
15.205, 15.209	RSS-GEN Clause 8.8	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. IC RSS-GEN Issue 5
4. IC RSS-247 Issue 2
5. KDB 558074 D01 DTS Meas Guidance v05r02.
6. 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	2.35 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 DTS/UNII a/b/g/n/ac Tablet + BT/BLE and ANT+. 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	7.788	6.01
		Peak	8.024	6.34
	Enhanced Pi/4-DQPSK	Average	4.505	2.82
		Peak	6.767	4.75
	Enhanced 8PSK	Average	4.504	2.82
		Peak	7.331	5.41

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 -6.00 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 X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

Note: GFSK, Pi/4-DQPSK, 8PSK average Power are all investigated, The GFSK & 8PSK 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	EP-TA50EWE	R37N19P1472HM3	N/A
Data Cable	SAMSUNG	EP-DR140AWE	N/A	N/A
Earphone	SAMSUNG	EHS64AVFWE	N/A	N/A

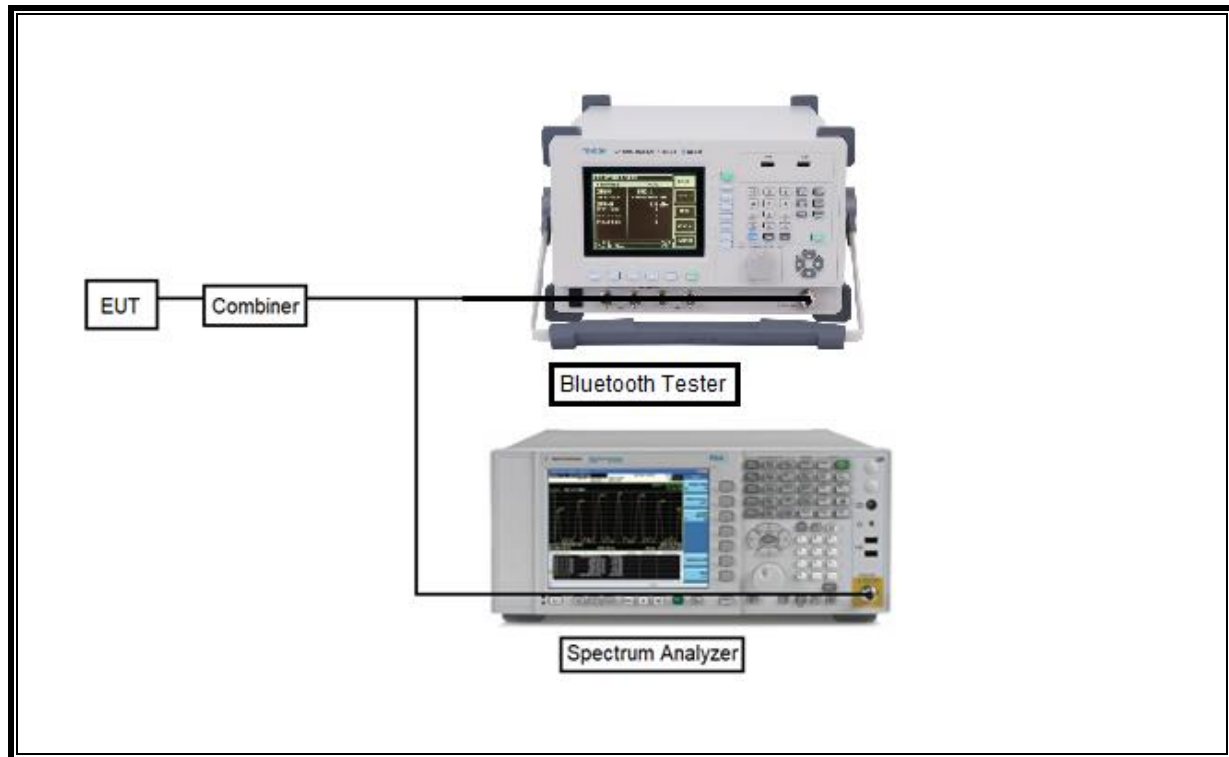
I/O CABLE

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
2	Audio	2	Mini-Jack	Unshielded	1.2m	N/A

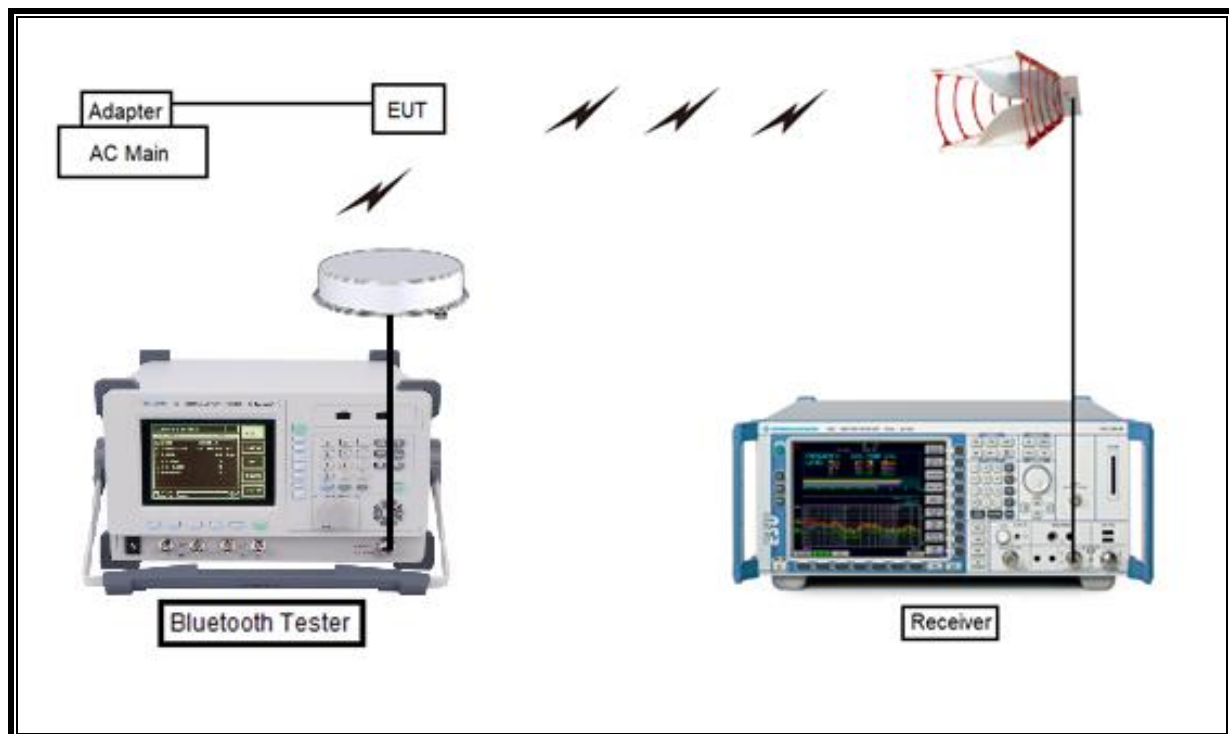
TEST SETUP

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	Next Cal. Date
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, Horn, 18 GHz	ETS	3115	00167211	08-04-20
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	WEINCHEL	1575	2150	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
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
Termination	WEINSCHL	M1406A	T01	08-08-20
UL Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

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

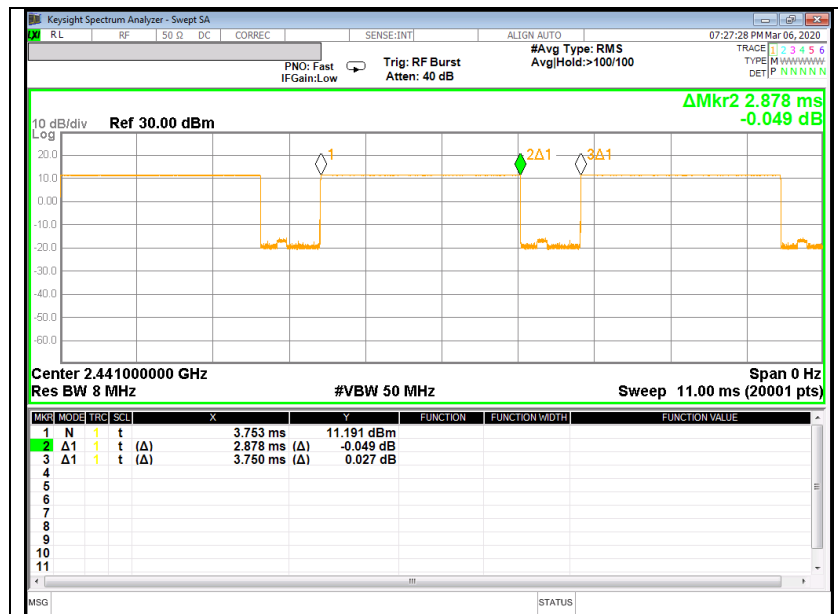
None; for reporting purposes only.

PROCEDURE

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

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B [msec]	Period [msec]	Duty Cycle x [linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
2400MHz Bands						
BT	2.878	3.750	0.767	76.7%	1.15	0.347



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	0.954	0.833
MID	2441	0.956	0.831
HIGH	2480	0.954	0.860
WORST		0.956	0.860

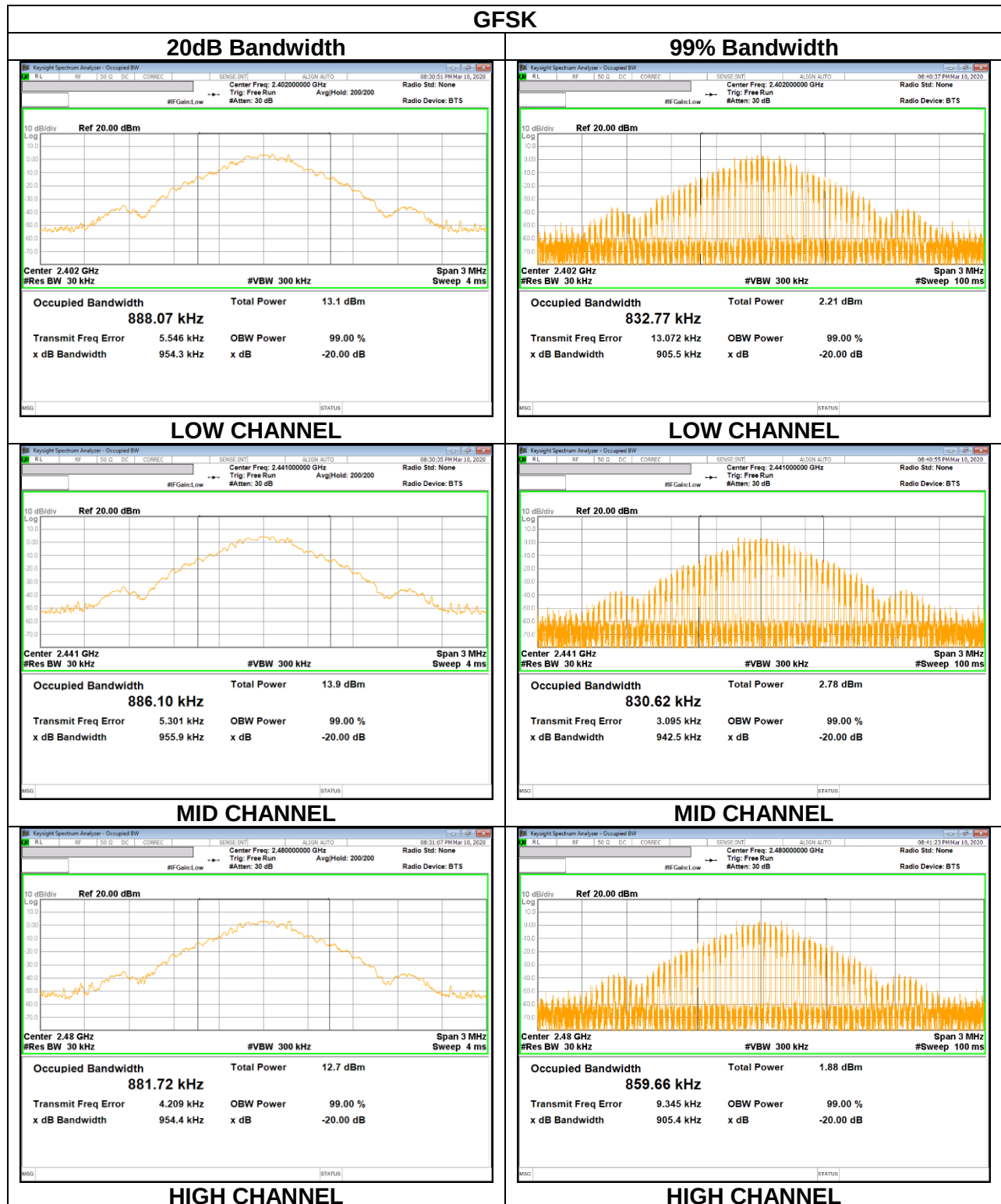
9.2.2. BLUETOOTH ENHANCED DATA RATE $\pi/4$ -DQPSK MODULATION

Channel	Frequency [MHz]	20 dB Bandwidth [MHz]	99% Bandwidth [MHz]
LOW	2402	1.342	1.163
MID	2441	1.346	1.163
HIGH	2480	1.337	1.162
WORST		1.346	1.163

9.2.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

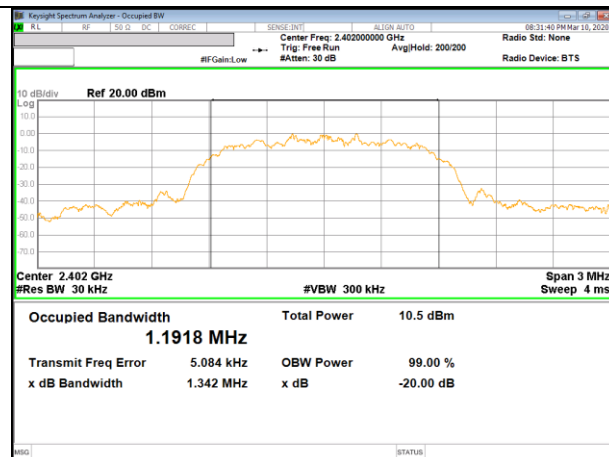
Channel	Frequency [MHz]	20 Db Bandwidth [MHz]	99% Bandwidth [MHz]
LOW	2402	1.308	1.163
MID	2441	1.322	1.163
HIGH	2480	1.326	1.164
WORST		1.326	1.164

9.2.4. 20 dB AND 99% BANDWIDTH PLOTS

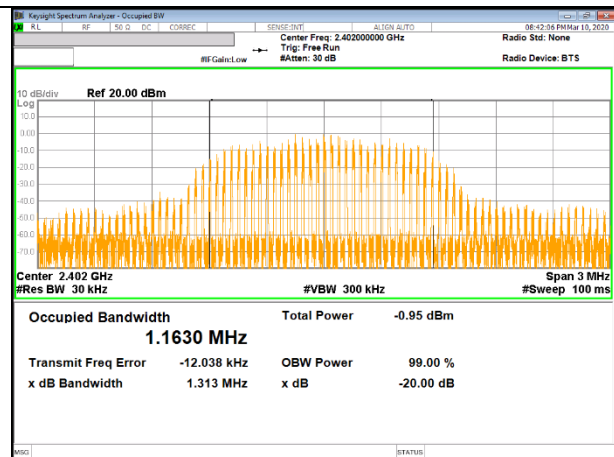


Pi/4-DQPSK

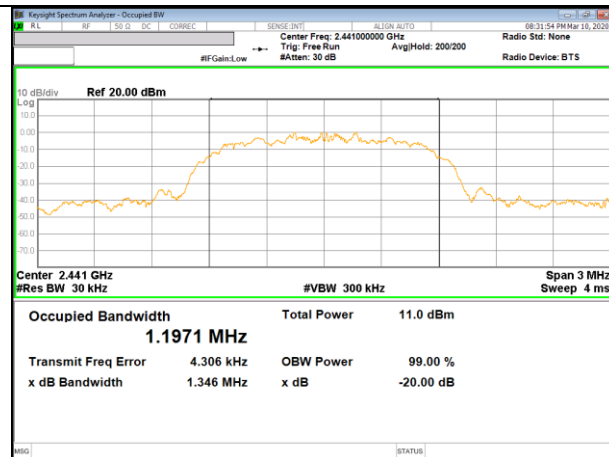
20dB Bandwidth



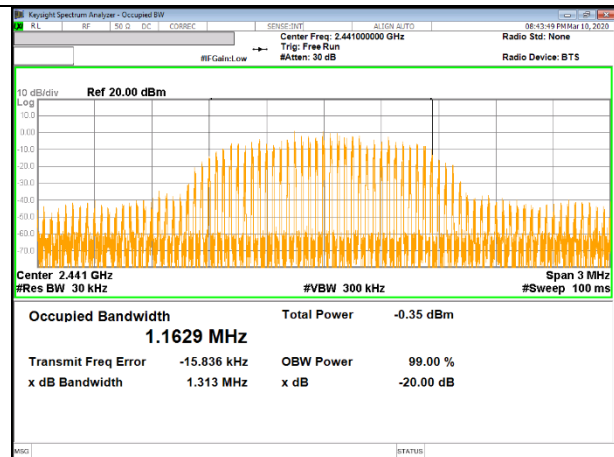
99% Bandwidth



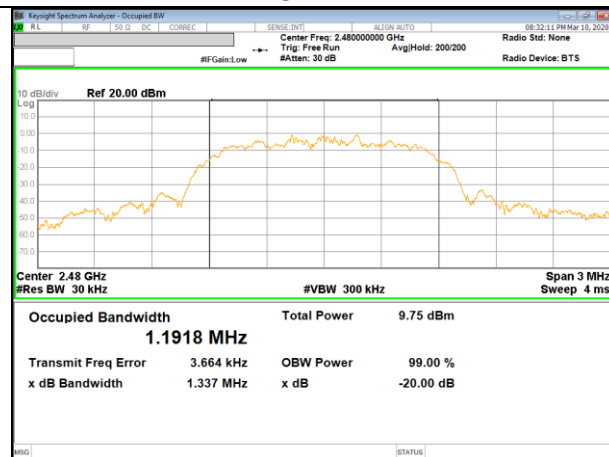
LOW CHANNEL



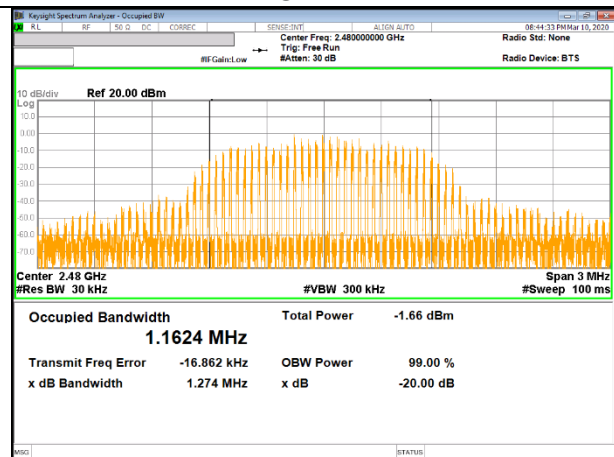
LOW CHANNEL



MID CHANNEL



MID CHANNEL

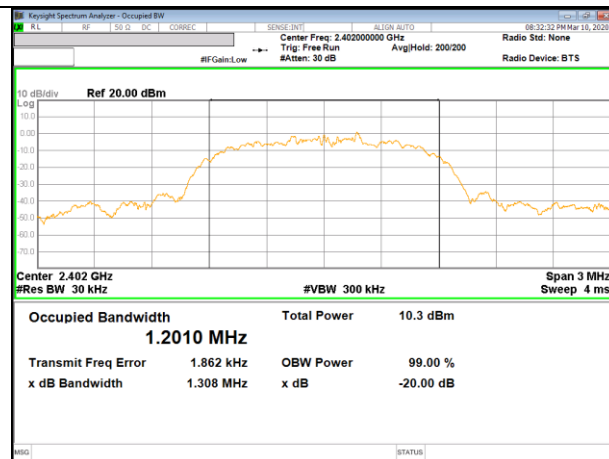


HIGH CHANNEL

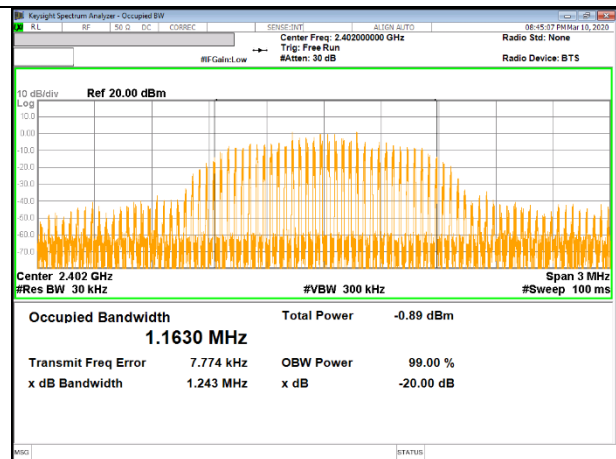
HIGH CHANNEL

8PSK

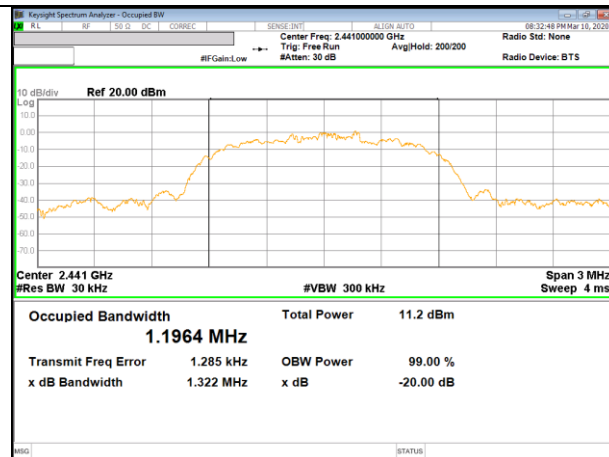
20dB Bandwidth



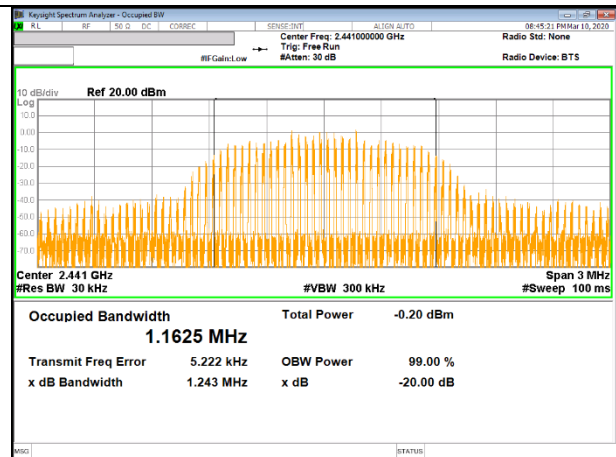
99% Bandwidth



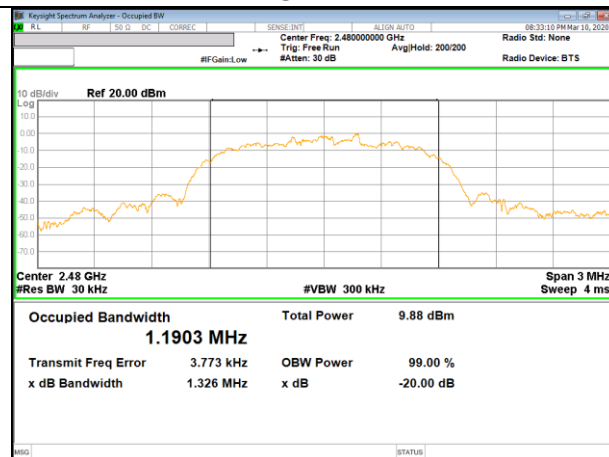
LOW CHANNEL



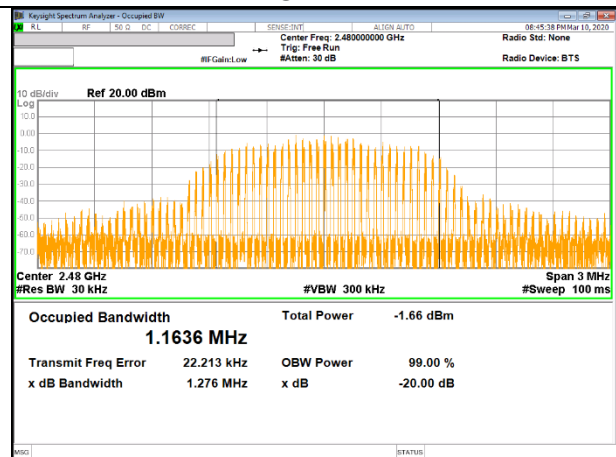
LOW CHANNEL



MID CHANNEL



MID CHANNEL



HIGH CHANNEL

HIGH CHANNEL

10. ANTENNA PORT TEST RESULTS

10.1. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

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

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.

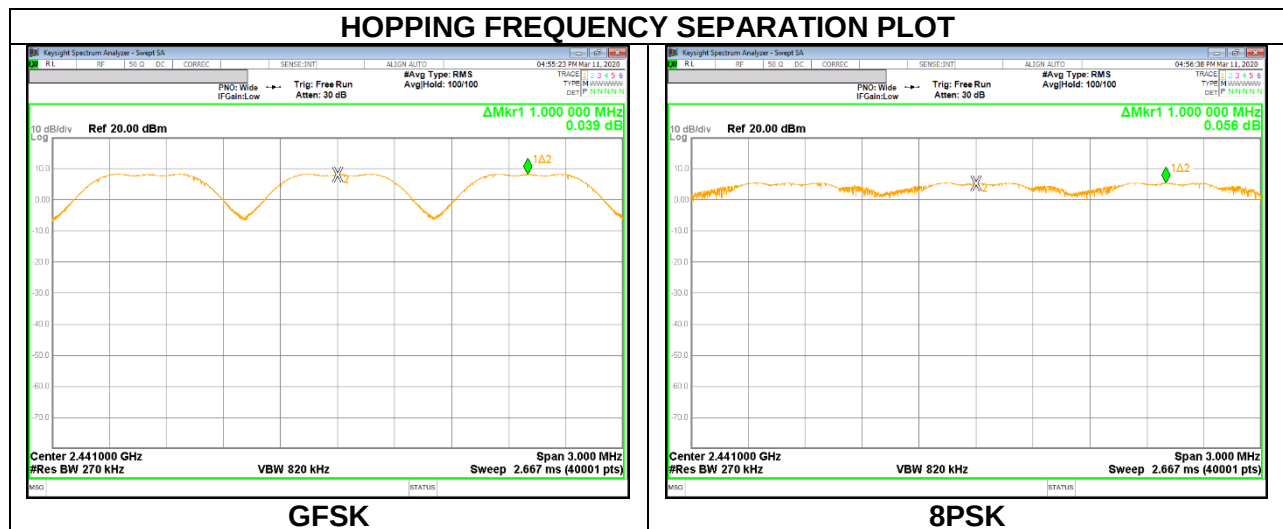
VBW $\geq$ RBW

Sweep = Auto

Detector function = Peak

Trace = Max hold

RESULTS



10.2. NUMBER OF HOPPING CHANNELS

LIMITS

FCC §15.247 (a) (1) (iii)

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

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

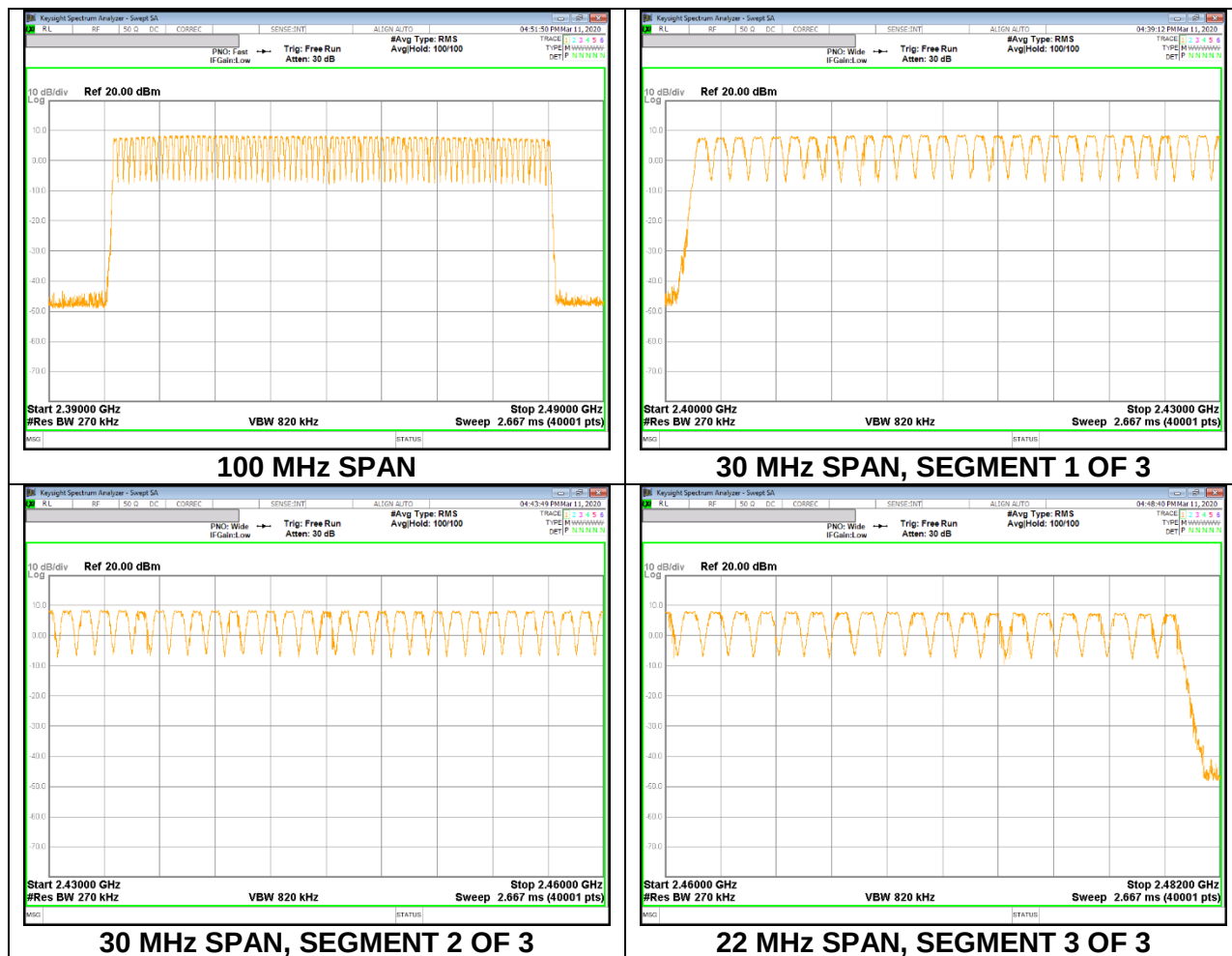
Detector function = Peak

Trace = Max hold

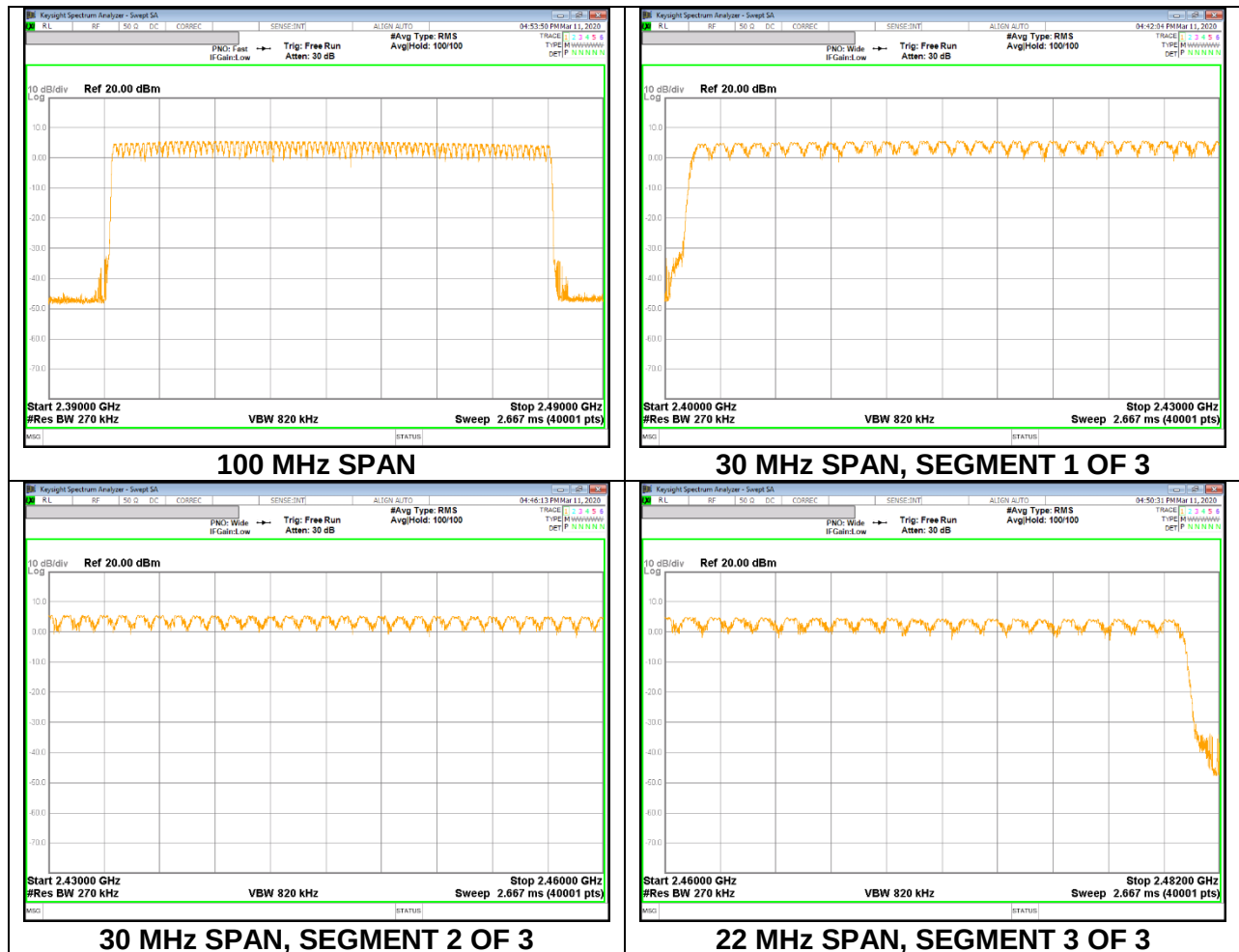
RESULTS

Normal Mode: 79 Channels Observed

10.2.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



10.2.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION



10.3. 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

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	0.373	32	0.119296	0.4	-0.2807
DH3	1.629	16	0.260640	0.4	-0.1394
DH5	2.877	12	0.345240	0.4	-0.0548
DH Packet	Pulse Width [msec]	Number of Pulses in 0.8 seconds	Average Time of Occupancy [sec]	Limit [sec]	Margin [sec]
GFSK AFH					
DH1	0.373	8	0.029824	0.4	-0.3702
DH3	1.629	4	0.065160	0.4	-0.3348
DH5	2.877	3	0.086310	0.4	-0.3137

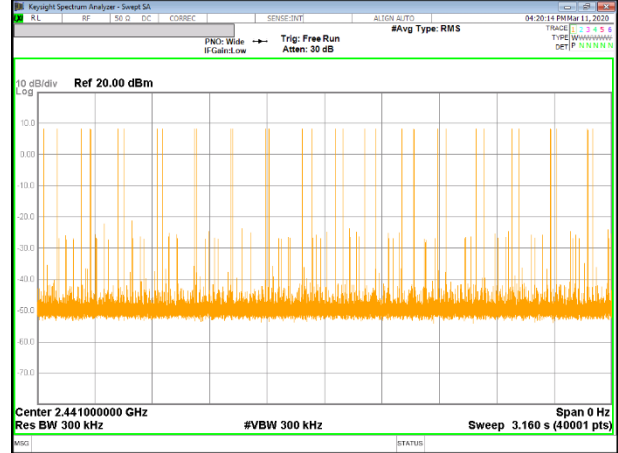
GFSK

PULSE WIDTH

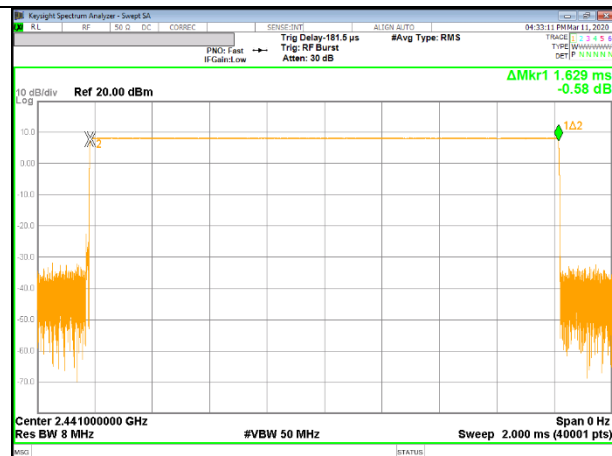


DH1

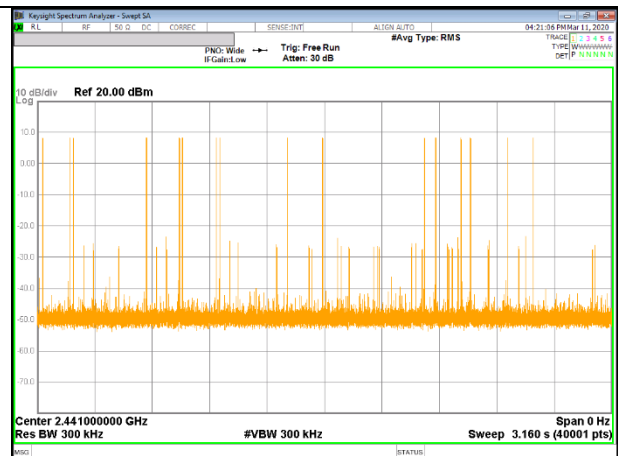
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD



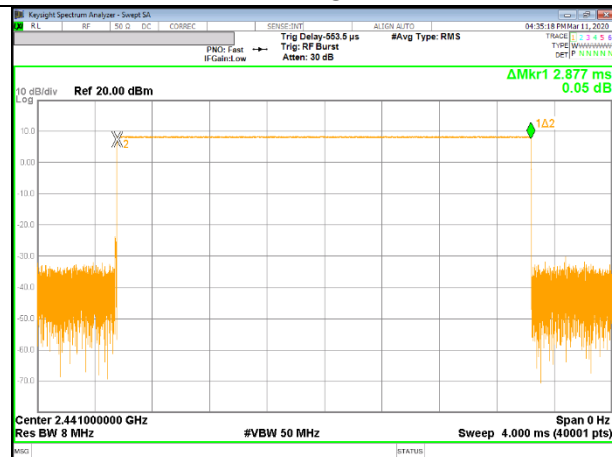
DH1



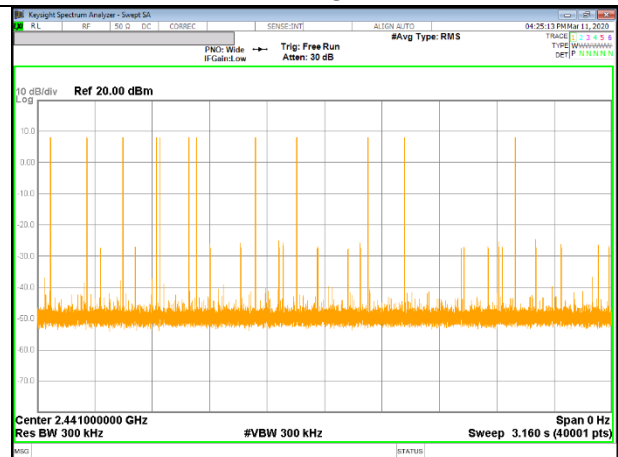
DH3



DH3



DH5



DH5

10.3.2. BLUETOOTH ENHANCED DATA RATE 8PSK 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	0.386	32	0.123584	0.4	-0.2764
DH3	1.636	16	0.261760	0.4	-0.1382
DH5	2.887	12	0.346440	0.4	-0.0536
DH Packet	Pulse Width [msec]	Number of Pulses in 0.8 seconds	Average Time of Occupancy [sec]	Limit [sec]	Margin [sec]
GFSK AFH					
DH1	0.386	8	0.030896	0.4	-0.3691
DH3	1.636	4	0.065440	0.4	-0.3346
DH5	2.887	3	0.086610	0.4	-0.3134



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

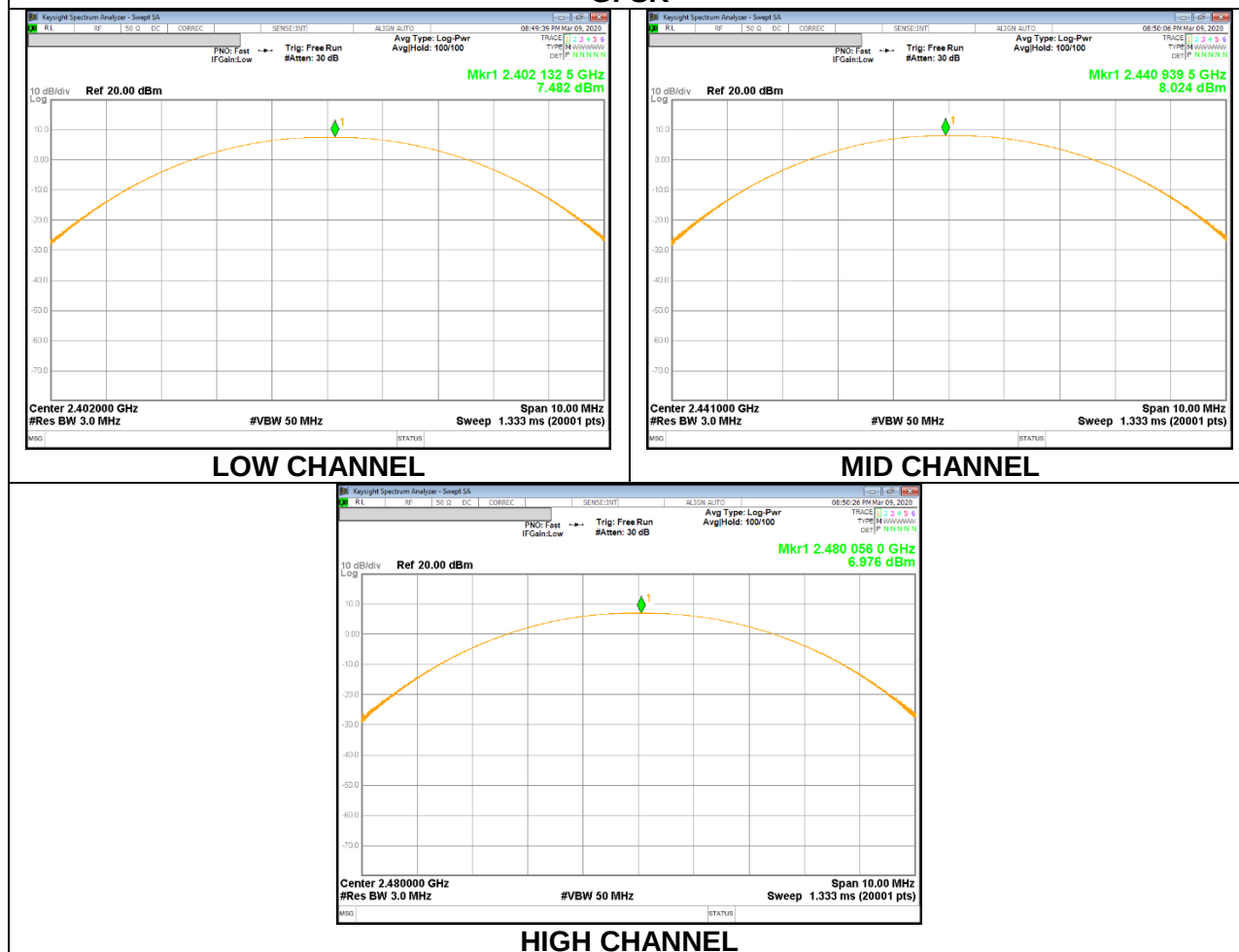
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

RESULTS

10.4.1. BASIC DATA RATE GFSK MODULATION

Channel	Frequency [MHz]	Output Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	7.482	21.000	-13.518
Mid	2441	8.024	21.000	-12.976
High	2480	6.976	21.000	-14.024
Worst		8.024	21.000	-12.976

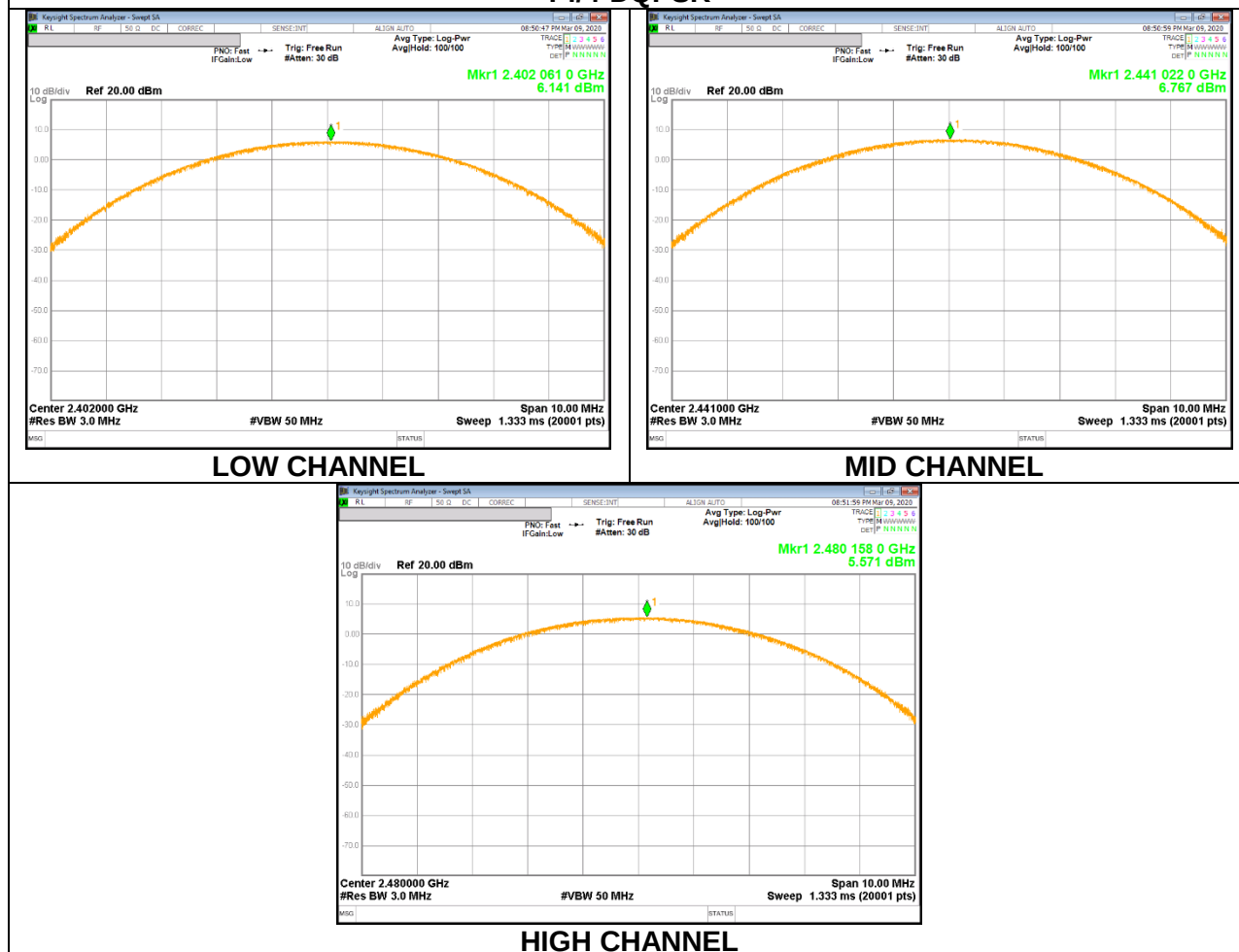
GFSK



10.4.2. ENHANCED DATA RATE Pi/4-DQPSK MODULATION

Channel	Frequency [MHz]	Output Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	6.141	21.000	-14.859
Mid	2441	6.767	21.000	-14.233
High	2480	5.571	21.000	-15.429
Worst		6.767	21.000	-14.233

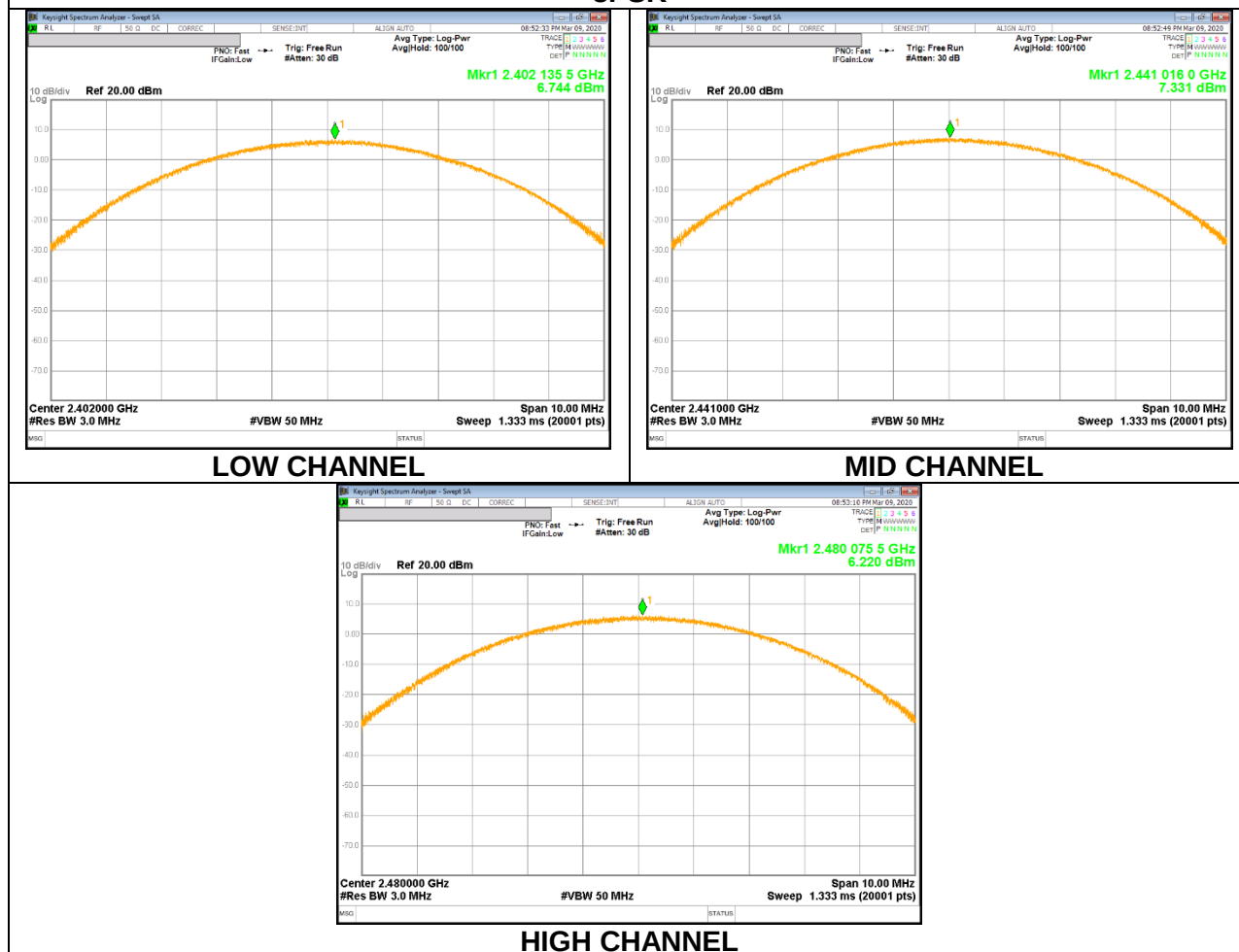
Pi/4-DQPSK



10.4.3. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency [MHz]	Output Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	6.744	21.000	-14.256
Mid	2441	7.331	21.000	-13.669
High	2480	6.220	21.000	-14.780
Worst		7.331	21.000	-13.669

8PSK



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	7.204	5.253
Mid	2441	7.788	6.009
High	2480	6.715	4.693

10.5.2. ENHANCED DATA RATE Pi/4-DQPSK MODULATION

Channel	Frequency [MHz]	Av Power [dBm]	Av Power [mW]
Low	2402	3.841	2.422
Mid	2441	4.505	2.822
High	2480	3.166	2.073

10.5.3. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency [MHz]	Av Power [dBm]	Av Power [mW]
Low	2402	3.846	2.424
Mid	2441	4.504	2.821
High	2480	3.177	2.078

10.6. 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 1 MHz. The video bandwidth is set to 3 MHz.

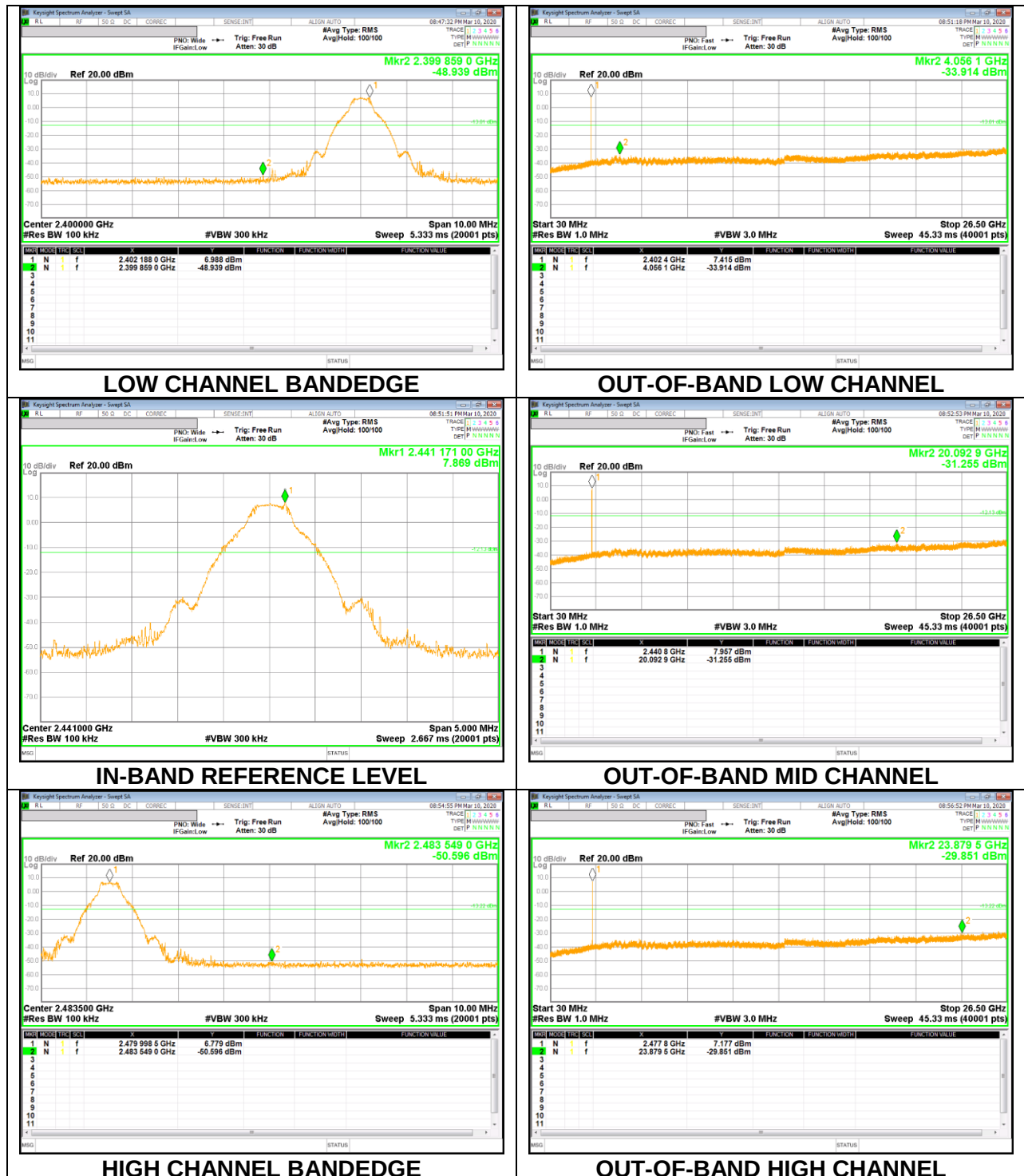
The spectrum from 30 MHz to 26.5 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The band-edges 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

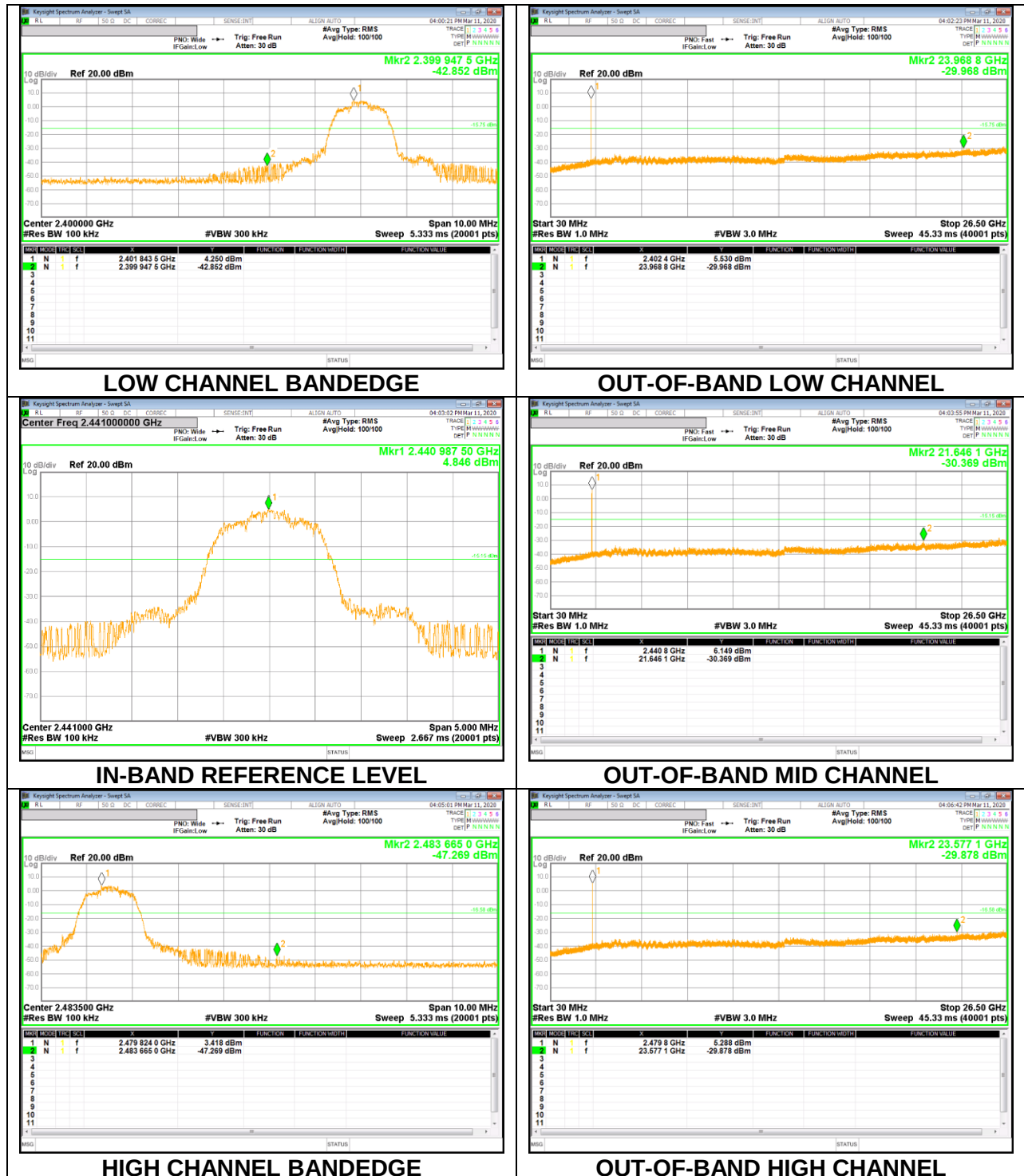


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



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

SPURIOUS EMISSIONS, NON-HOPPING

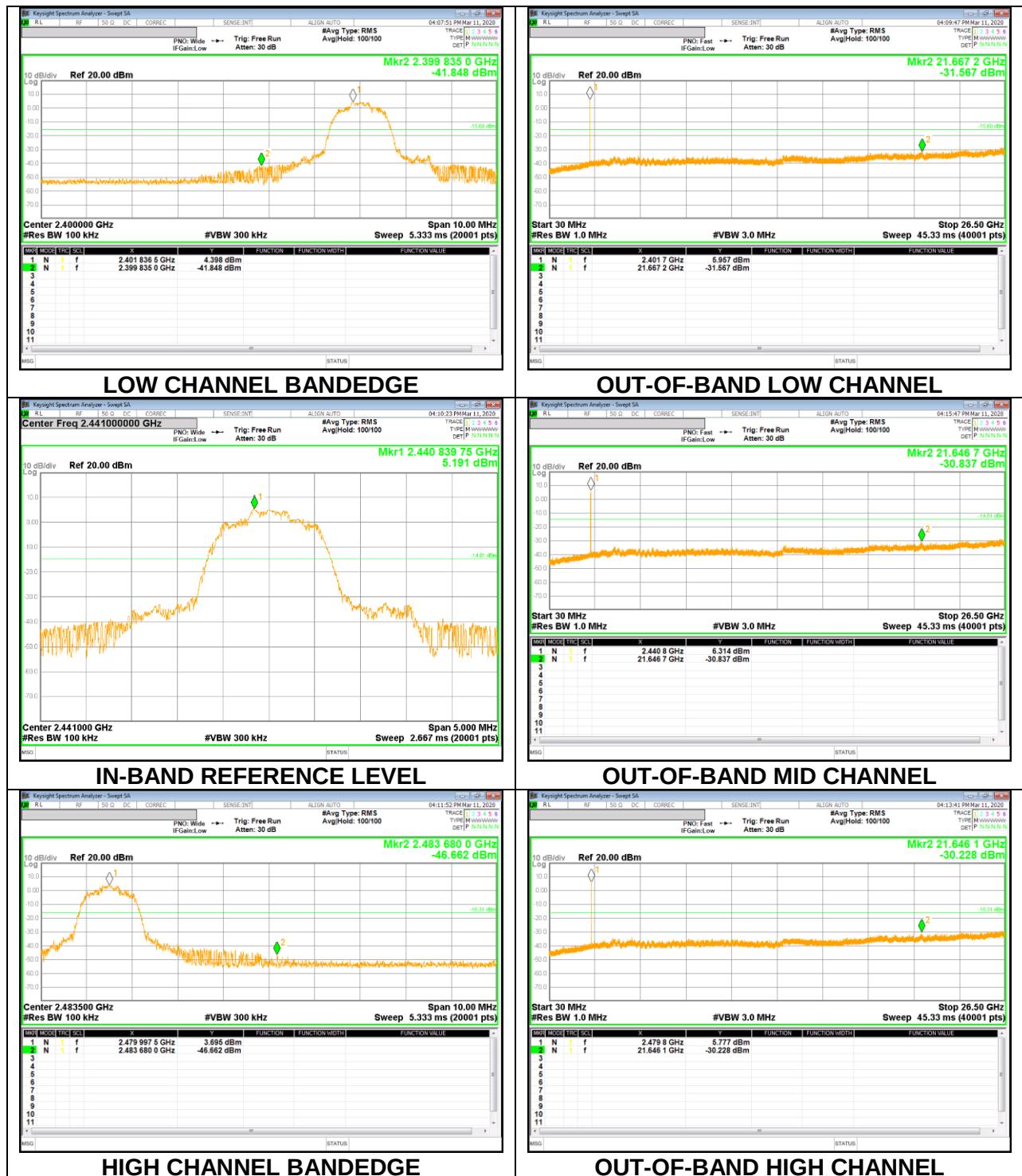


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



10.6.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

SPURIOUS EMISSIONS, NON-HOPPING



SPURIOUS BANDEGE 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.

$$\text{GFSK} = 1/T = 1 / 0.002878 \text{ s} = 347\text{Hz}.$$

The minimum VBW was 347Hz, but test receiver(ESU40) 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.

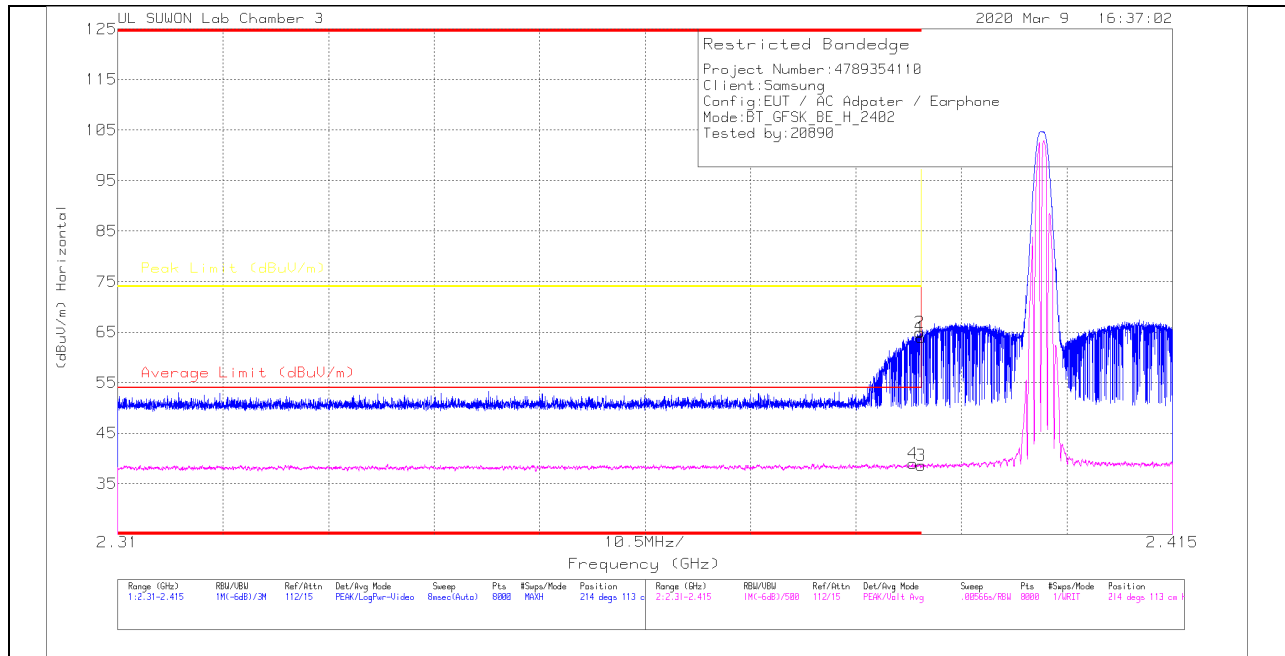
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

11.1. TRANSMITTER ABOVE 1 GHz

11.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



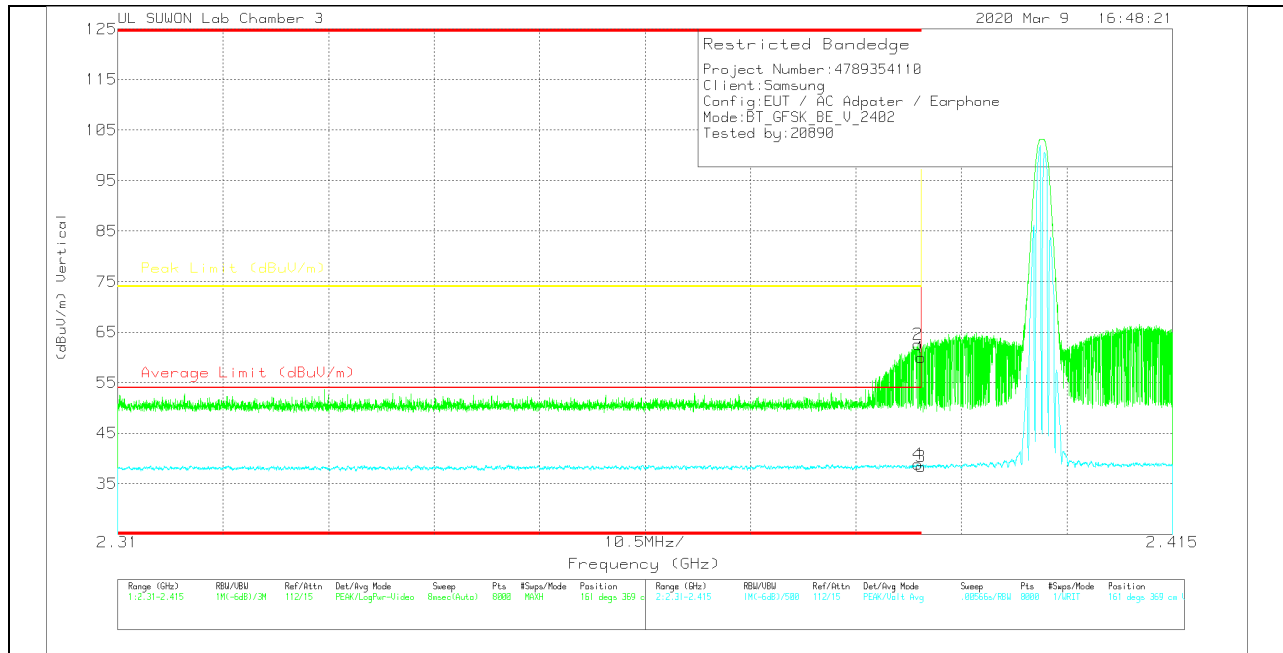
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	55.13	Pk	31.7	-22.9	63.93	-	-	74	-10.07	214	113	H
2	* 2.38985	56.17	Pk	31.7	-22.9	64.97	-	-	74	-9.03	214	113	H
3	* 2.39	29.8	VA1T	31.7	-22.9	38.6	54	-15.4	-	-	214	113	H
4	* 2.38916	30.21	VA1T	31.7	-22.9	39.01	54	-14.99	-	-	214	113	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	51.22	Pk	31.7	-22.9	60.02	-	-	74	-13.98	161	369	V
2	* 2.38969	53.75	Pk	31.7	-22.9	62.55	-	-	74	-11.45	161	369	V
3	* 2.39	29.52	VA1T	31.7	-22.9	38.32	54	-15.68	-	-	161	369	V
4	* 2.38964	30.03	VA1T	31.7	-22.9	38.83	54	-15.17	-	-	161	369	V

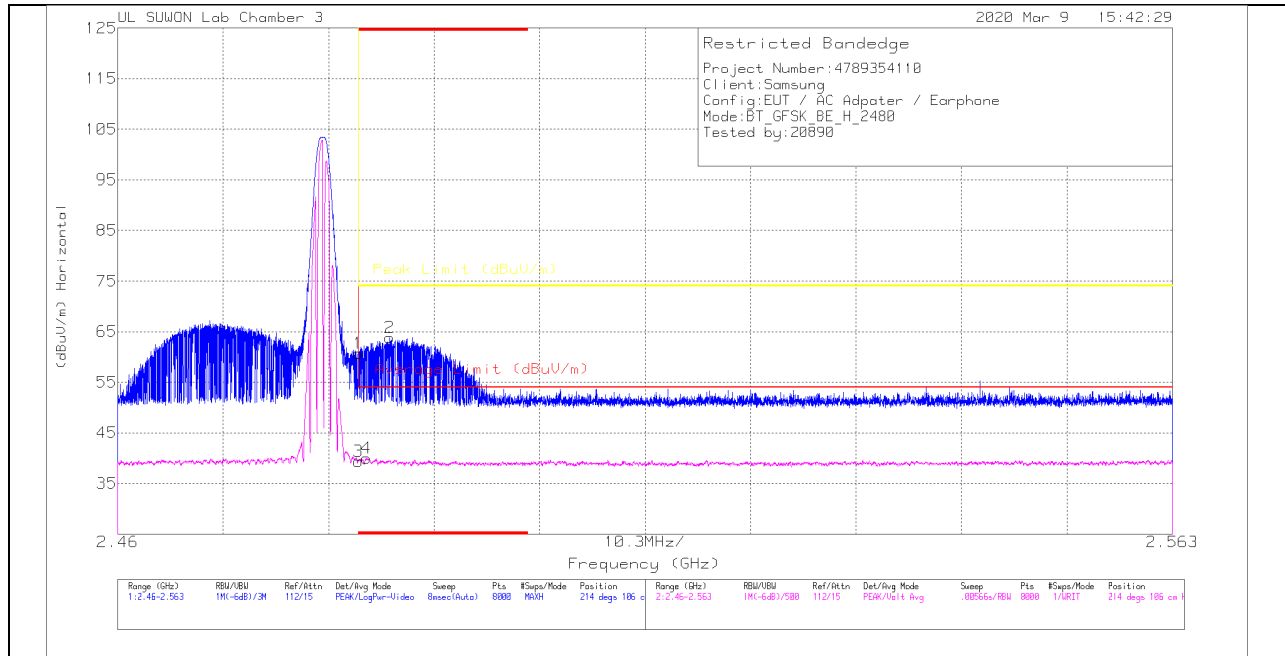
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



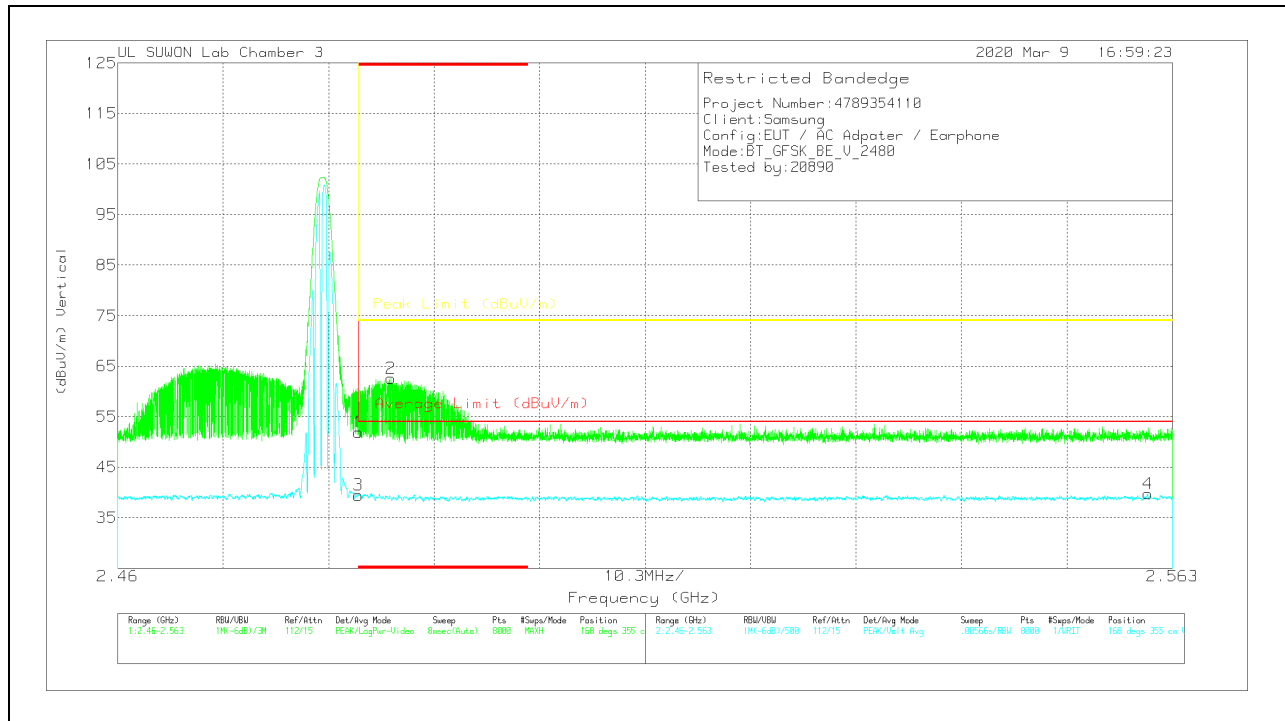
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	51.64	Pk	31.9	-22.8	60.74	-	-	74	-13.26	214	106	H
2	* 2.48653	54.7	Pk	31.9	-22.8	63.8	-	-	74	-10.2	214	106	H
3	* 2.4835	30.27	VA1T	31.9	-22.8	39.37	54	-14.63	-	-	214	106	H
4	* 2.48431	30.73	VA1T	31.9	-22.7	39.93	54	-14.07	-	-	214	106	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	* 2.4835	42.76	Pk	31.9	-22.8	51.86	-	-	74	-22.14	168	355	V
2	* 2.48666	53.43	Pk	31.9	-22.8	62.53	-	-	74	-11.47	168	355	V
3	* 2.4835	30.33	VA1T	31.9	-22.8	39.43	54	-14.57	-	-	168	355	V
4	2.5606	30.47	VA1T	32	-22.7	39.77	54	-14.23	-	-	168	355	V

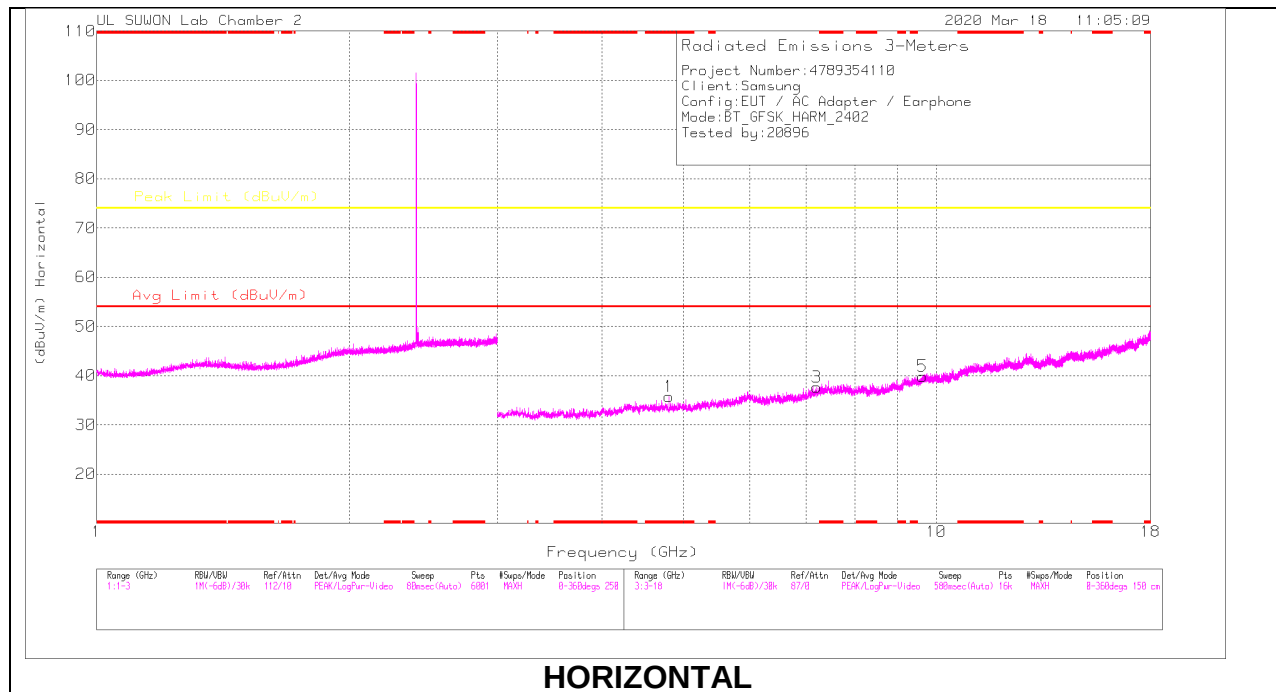
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

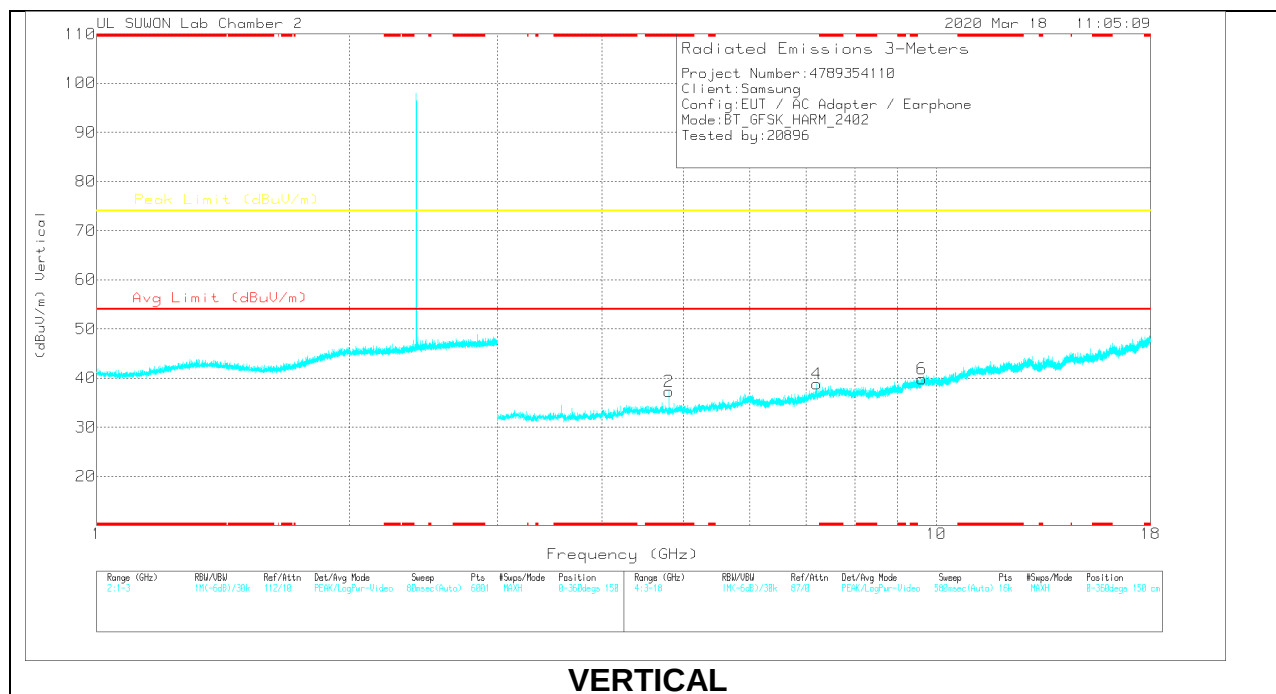
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



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.

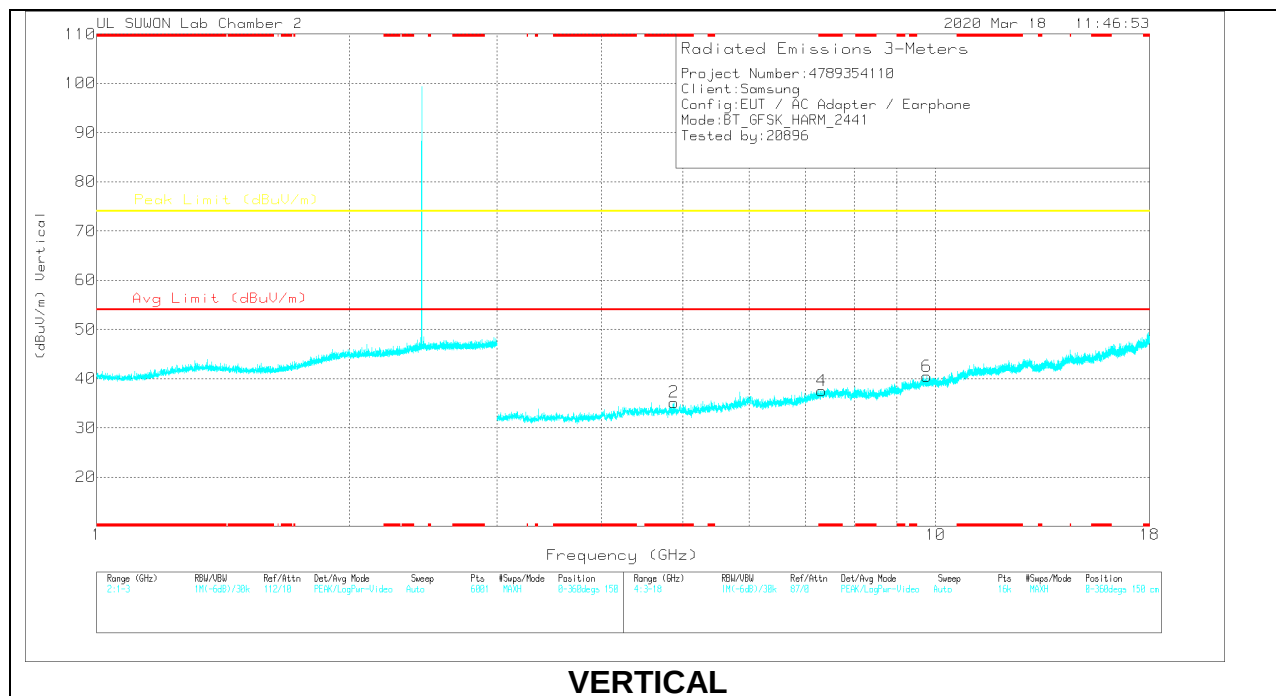
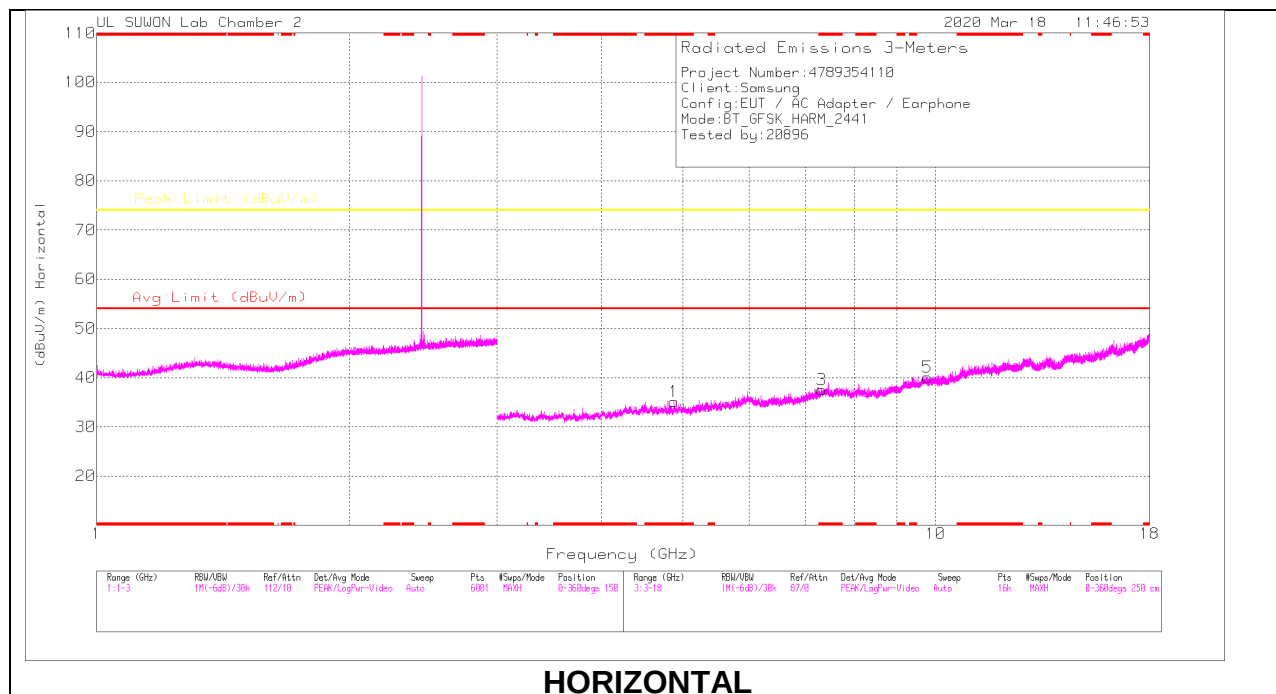
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80372	35.5	PKFH	34	-28	41.5	-	-	74	-32.5	189	100	H
* 4.80396	28.67	VA1T	34	-28	34.67	54	-19.33	-	-	189	100	H
* 4.8042	36.31	PKFH	34	-28	42.31	-	-	74	-31.69	171	281	V
* 4.8042	28.52	VA1T	34	-28	34.52	54	-19.48	-	-	171	281	V
7.19471	32.92	PKFH	36.1	-25.2	43.82	-	-	74	-30.18	161	103	H
7.21827	33.03	PKFH	36.1	-25.3	43.83	-	-	74	-30.17	57	370	V
9.6304	19.21	PKFH	37	-21.5	34.71	-	-	74	-39.29	0	100	H
9.6304	22.39	PKFH	37	-21.5	37.89	-	-	74	-36.11	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

MID 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.

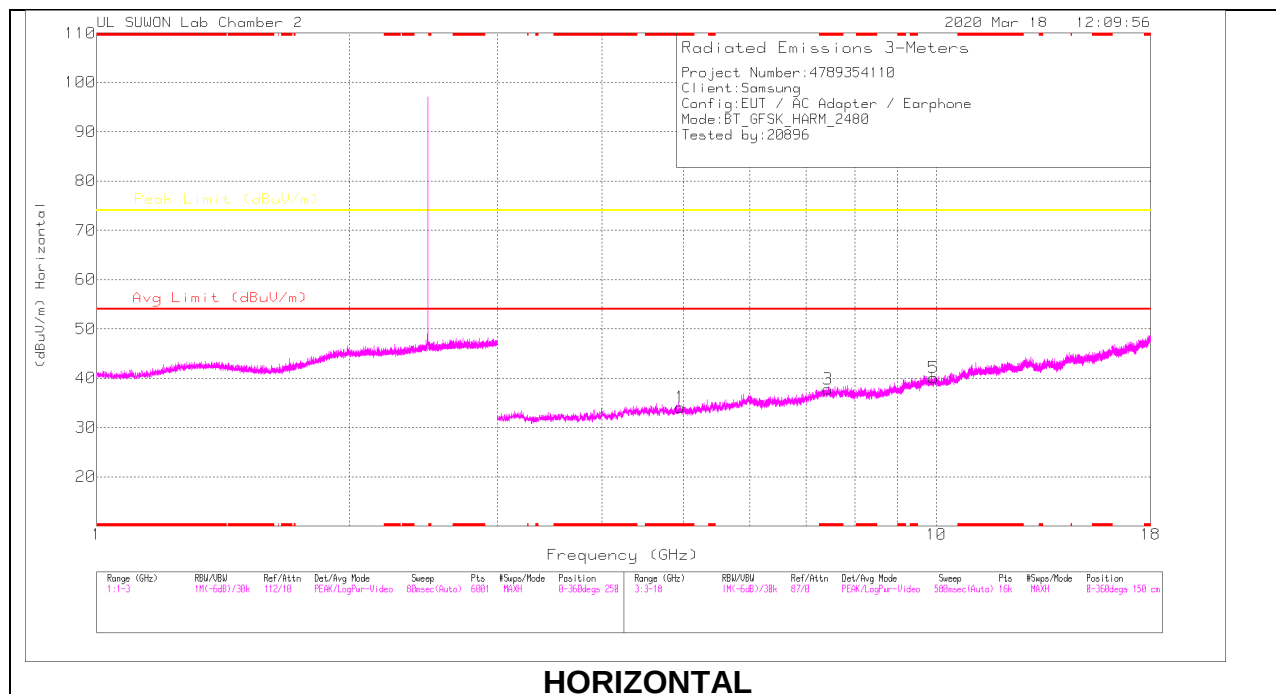
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.87132	34.78	PKFH	34	-27.9	40.88	-	-	74	-33.12	0	100	H
* 4.88368	34.96	PKFH	34	-27.8	41.16	-	-	74	-32.84	0	100	V
* 7.32412	33.44	PKFH	36.2	-24.8	44.84	-	-	74	-29.16	0	100	H
* 7.32337	34.37	PKFH	36.2	-24.8	45.77	-	-	74	-28.23	0	100	V
9.77732	30.96	PKFH	37.2	-21.4	46.76	-	-	74	-27.24	0	100	H
9.77431	31.02	PKFH	37.2	-21.3	46.92	-	-	74	-27.08	0	100	V

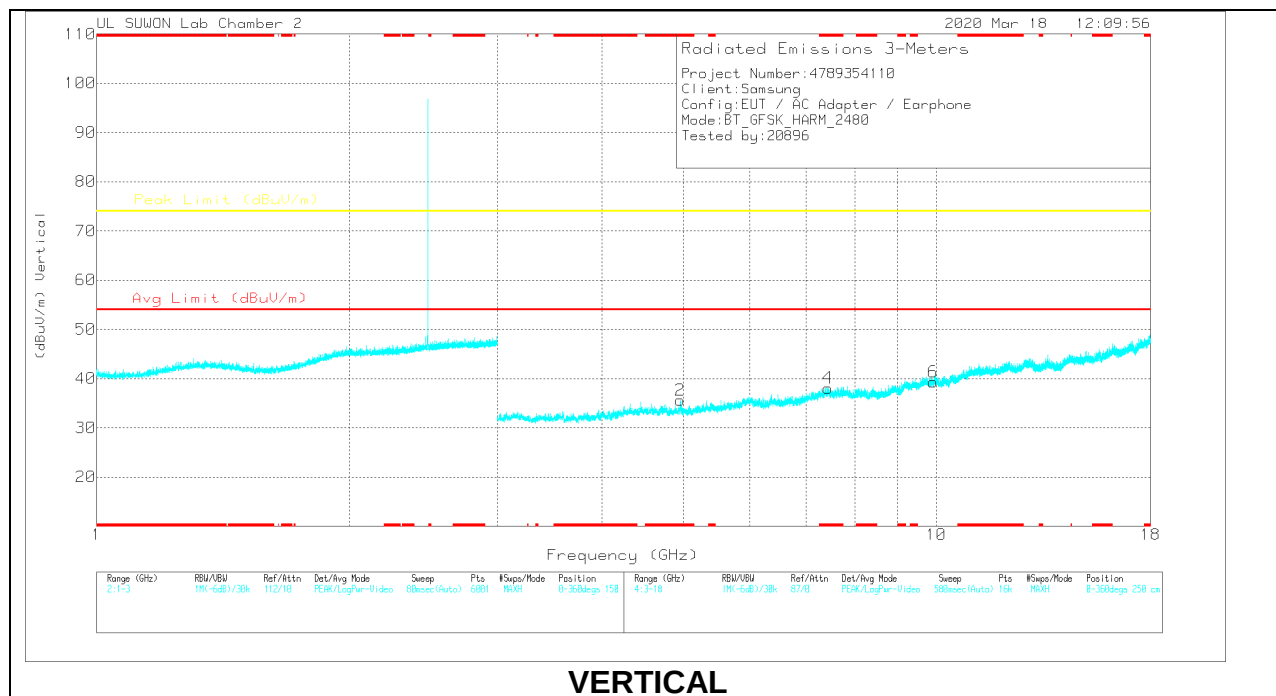
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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_0016872 4	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.94805	35.06	PKFH	34.1	-27	42.16	-	-	74	-31.84	45	101	H
* 4.95993	24.66	VA1T	34.1	-27	31.76	54	-22.24	-	-	45	101	H
* 4.95721	34.55	PKFH	34.1	-27	41.65	-	-	74	-32.35	156	286	V
* 4.96017	25.9	VA1T	34.1	-27	33	54	-21	-	-	156	286	V
* 7.43758	32.08	PKFH	36.2	-23.9	44.38	-	-	74	-29.62	0	100	H
* 7.43461	32.58	PKFH	36.2	-23.9	44.88	-	-	74	-29.12	0	100	V
9.92702	29.82	PKFH	37.4	-20.8	46.42	-	-	74	-27.58	0	100	H
9.92769	30.07	PKFH	37.4	-20.8	46.67	-	-	74	-27.33	0	100	V

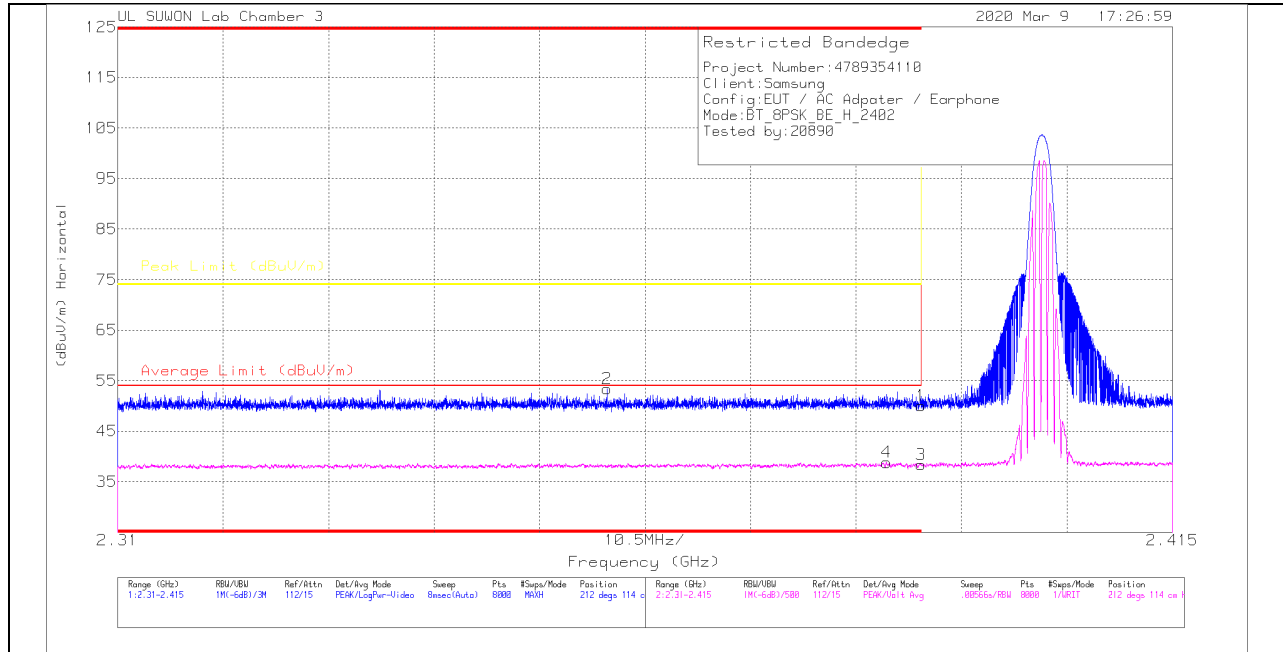
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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 8PSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



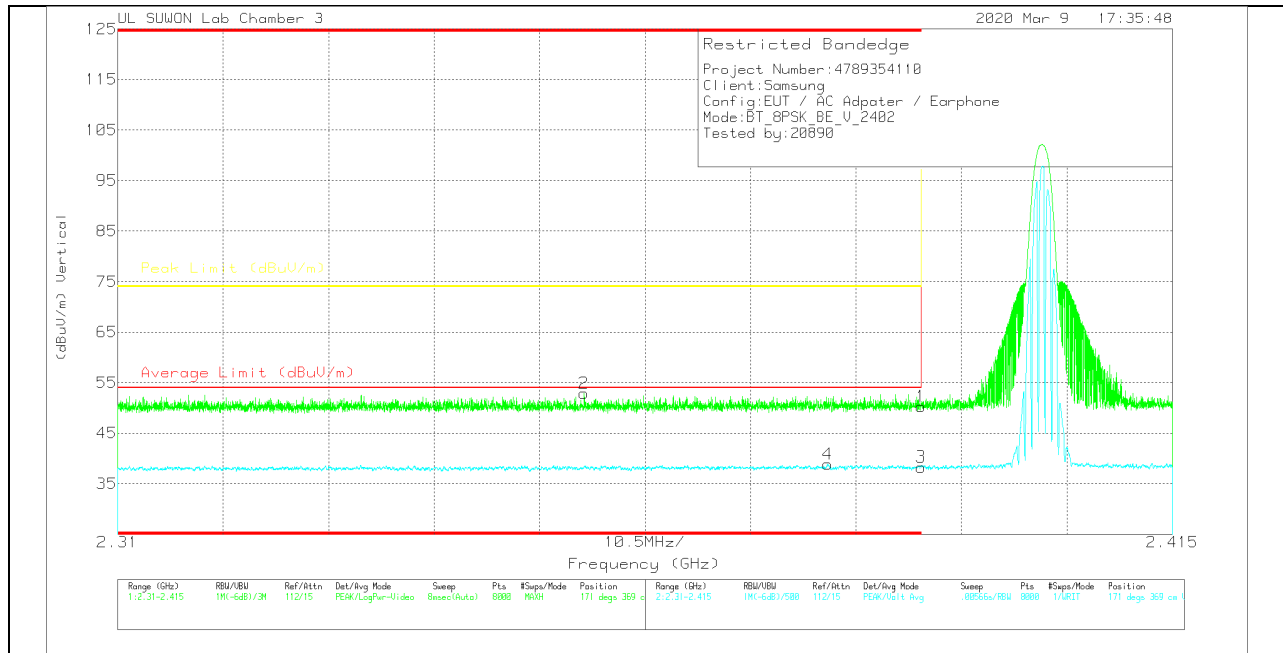
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.26	Pk	31.7	-22.9	50.06	-	-	74	-23.94	212	114	H
2	* 2.3587	44.71	Pk	31.6	-22.9	53.41	-	-	74	-20.59	212	114	H
3	* 2.39	29.6	VA1T	31.7	-22.9	38.4	54	-15.6	-	-	212	114	H
4	* 2.38652	30.01	VA1T	31.7	-22.9	38.81	54	-15.19	-	-	212	114	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	41.53	Pk	31.7	-22.9	50.33	-	-	74	-23.67	171	369	V
2	* 2.35643	44.23	Pk	31.6	-22.9	52.93	-	-	74	-21.07	171	369	V
3	* 2.39	29.51	VA1T	31.7	-22.9	38.31	54	-15.69	-	-	171	369	V
4	* 2.38066	30.13	VA1T	31.6	-22.9	38.83	54	-15.17	-	-	171	369	V

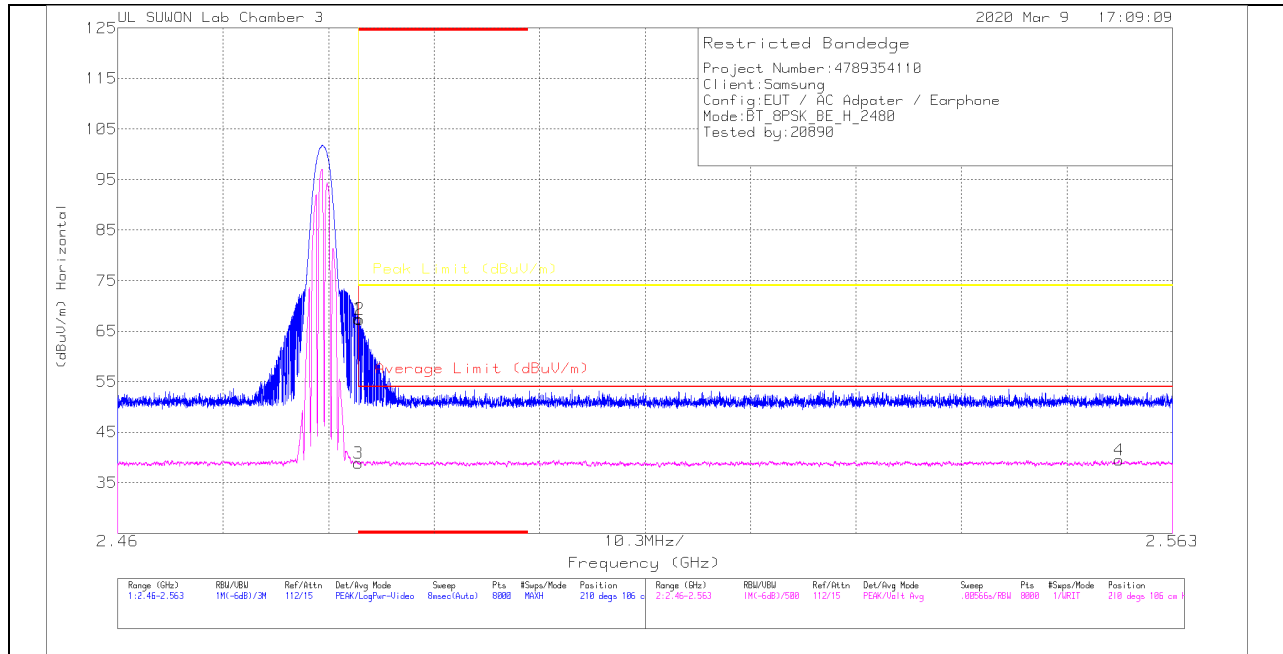
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



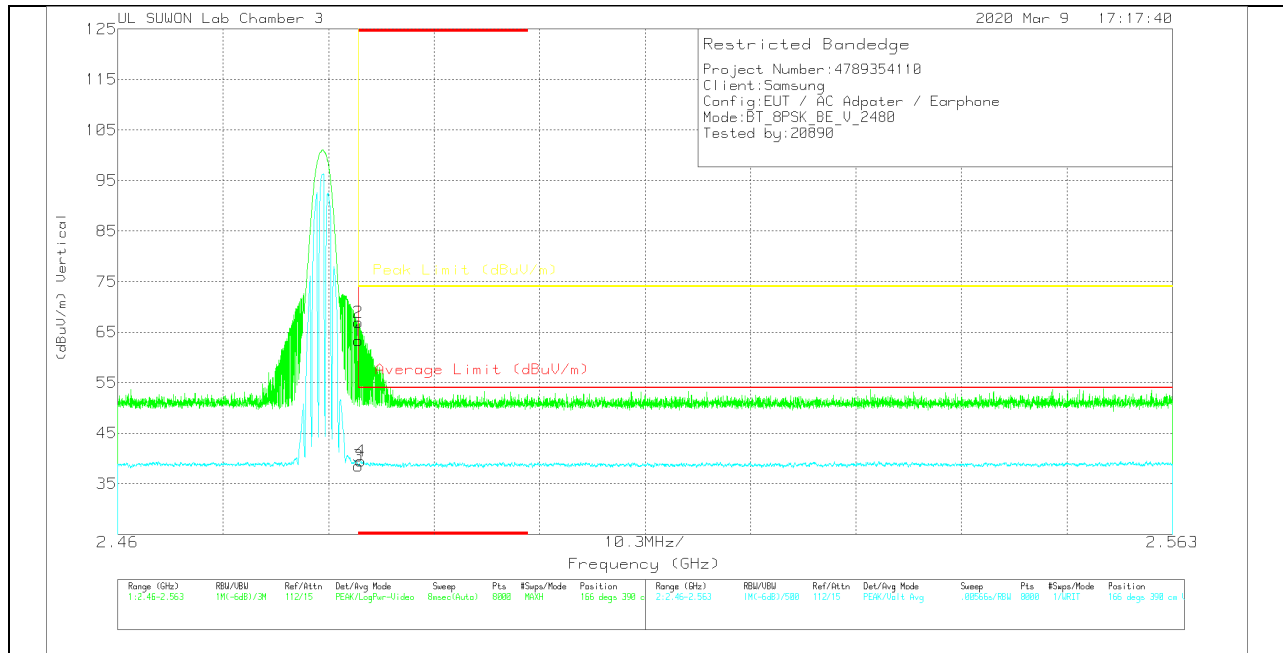
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	58.35	Pk	31.9	-22.8	67.45	-	-	74	-6.55	210	106	H
2	* 2.48363	58.26	Pk	31.9	-22.8	67.36	-	-	74	-6.64	210	106	H
3	* 2.4835	29.81	VA1T	31.9	-22.8	38.91	54	-15.09	-	-	210	106	H
4	2.55779	30.16	VA1T	32	-22.7	39.46	54	-14.54	-	-	210	106	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	* 2.4835	54.22	Pk	31.9	-22.8	63.32	-	-	74	-10.68	166	390	V
2	* 2.48351	57.86	Pk	31.9	-22.8	66.96	-	-	74	-7.04	166	390	V
3	* 2.4835	29.34	VA1T	31.9	-22.8	38.44	54	-15.56	-	-	166	390	V
4	* 2.48376	30.42	VA1T	31.9	-22.8	39.52	54	-14.48	-	-	166	390	V

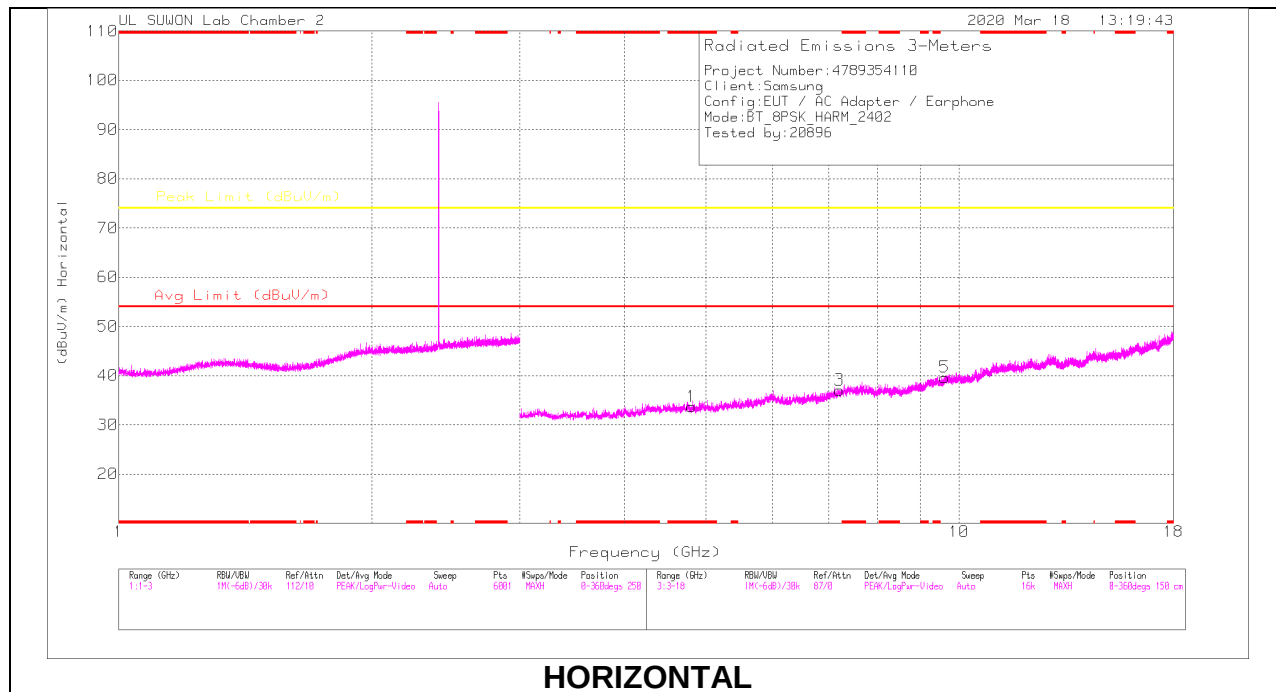
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

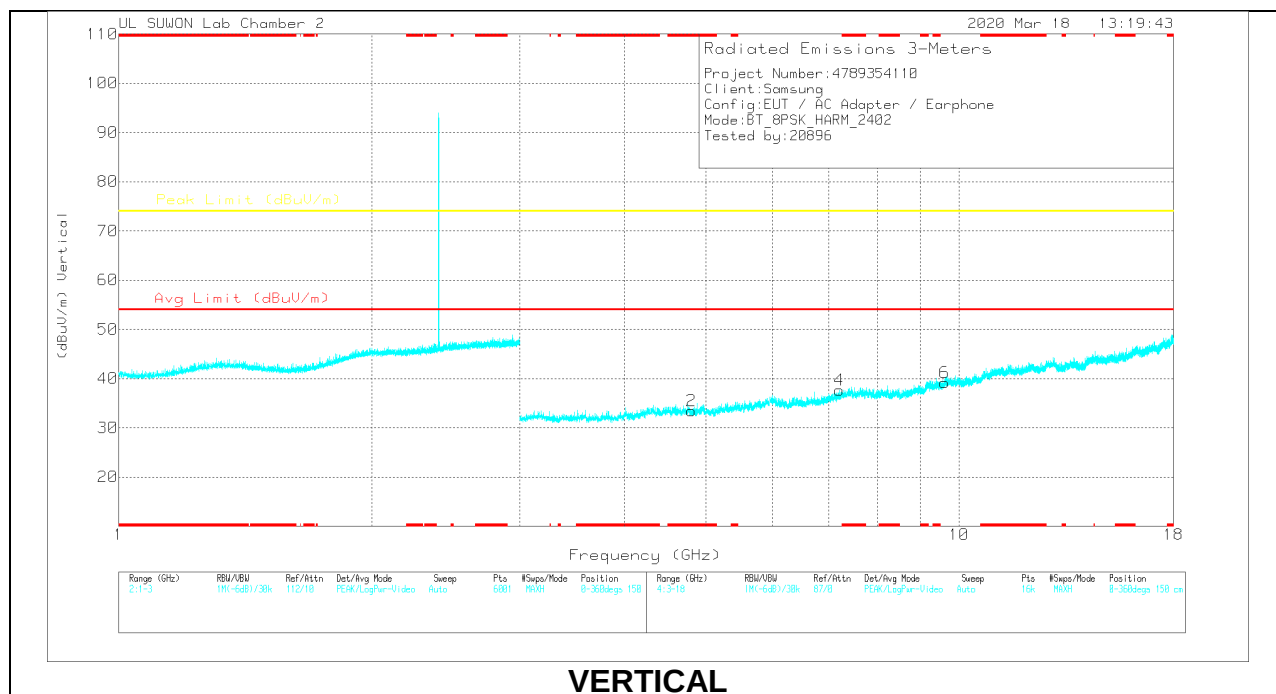
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



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.

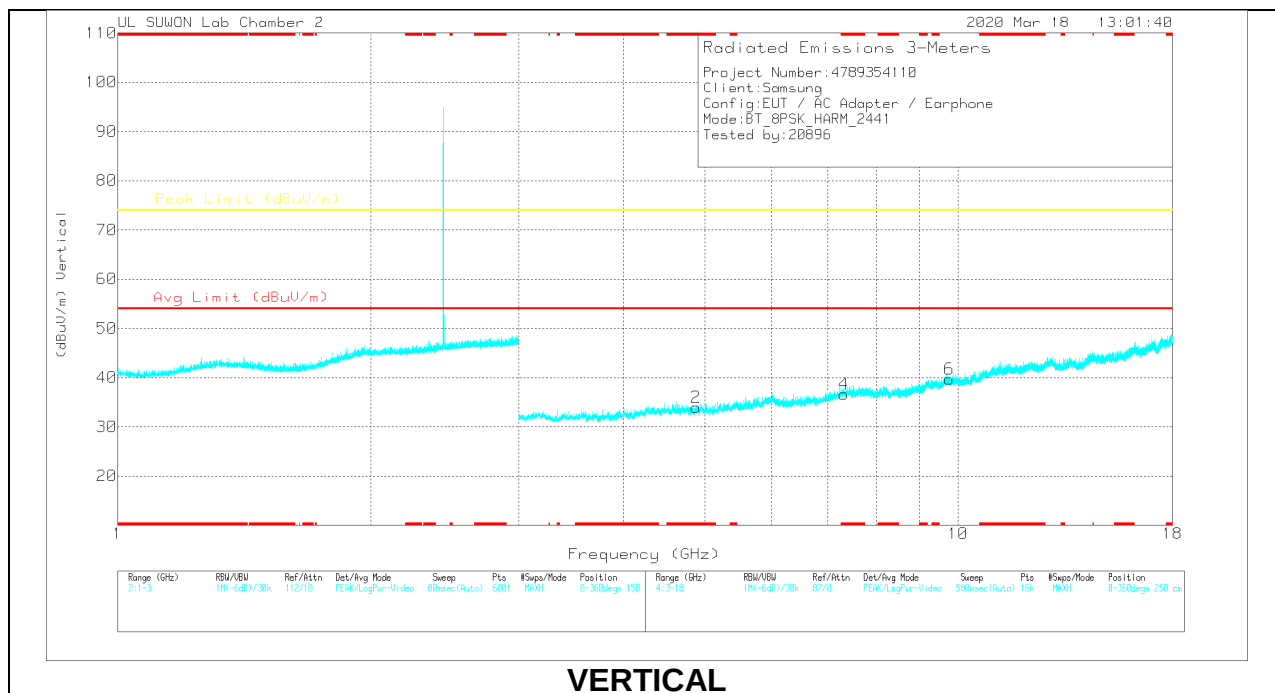
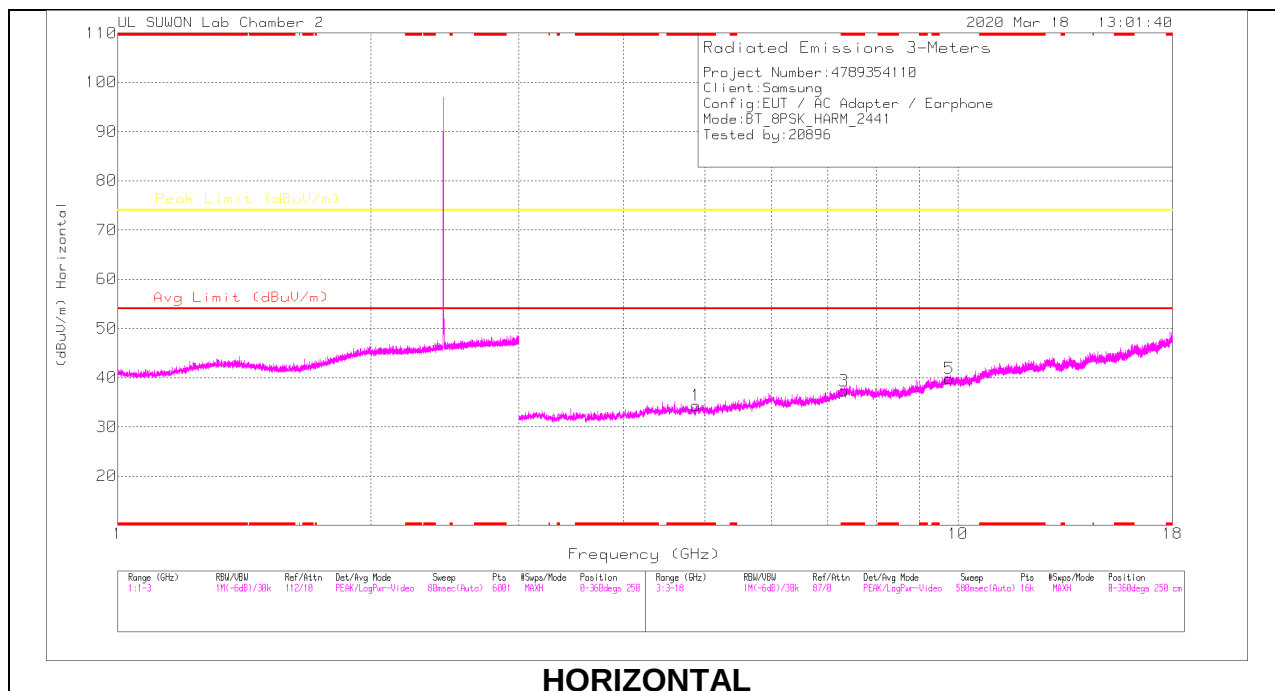
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80455	34.18	PKFH	34	-27.9	40.28	-	-	74	-33.72	0	100	H
* 4.80473	34.74	PKFH	34	-27.9	40.84	-	-	74	-33.16	0	100	V
7.20262	33.85	PKFH	36.1	-25.2	44.75	-	-	74	-29.25	0	100	H
7.20138	32.82	PKFH	36.1	-25.2	43.72	-	-	74	-30.28	0	100	V
9.61607	31.3	PKFH	37	-21.6	46.7	-	-	74	-27.3	0	100	H
9.61393	30.77	PKFH	37	-21.6	46.17	-	-	74	-27.83	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

MID 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.

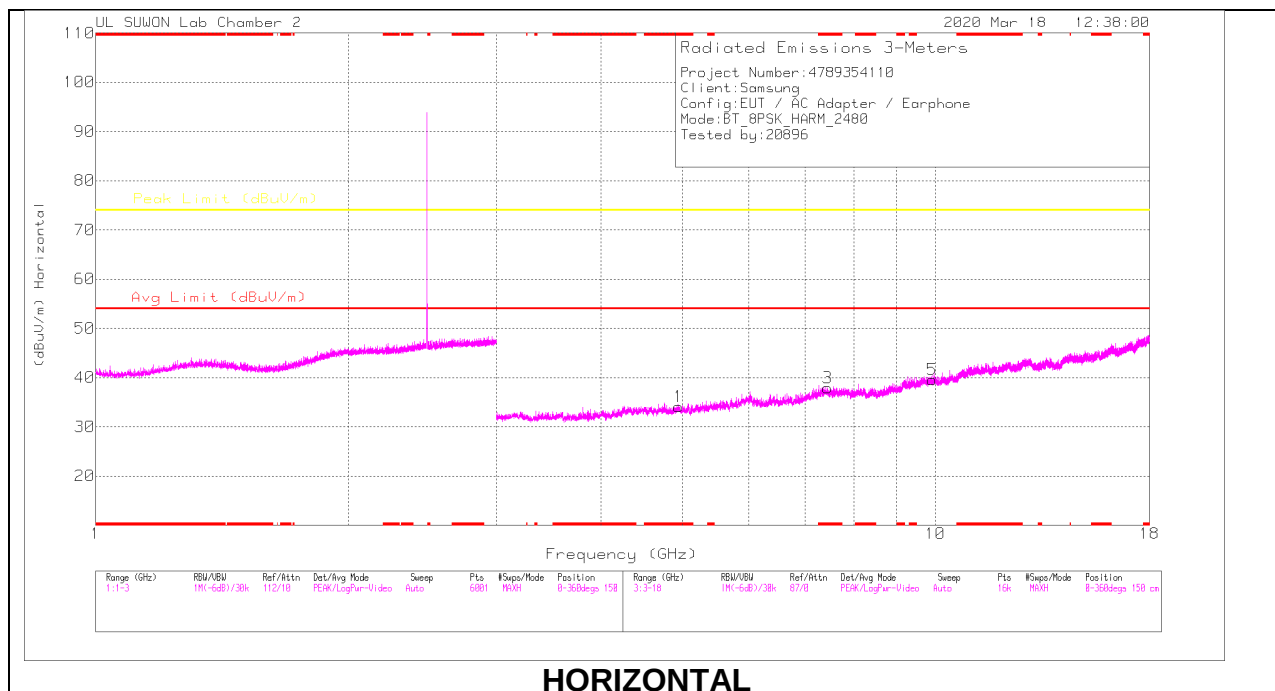
RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88846	35.13	PKFH	34	-27.7	41.43	-	-	74	-32.57	0	100	H
* 4.89844	34.62	PKFH	34	-27.6	41.02	-	-	74	-32.98	0	100	V
* 7.32433	33.48	PKFH	36.2	-24.8	44.88	-	-	74	-29.12	0	100	H
* 7.32395	33.06	PKFH	36.2	-24.8	44.46	-	-	74	-29.54	0	100	V
9.76586	31.08	PKFH	37.2	-21.3	46.98	-	-	74	-27.02	0	100	H
9.76521	30.51	PKFH	37.2	-21.3	46.41	-	-	74	-27.59	0	100	V

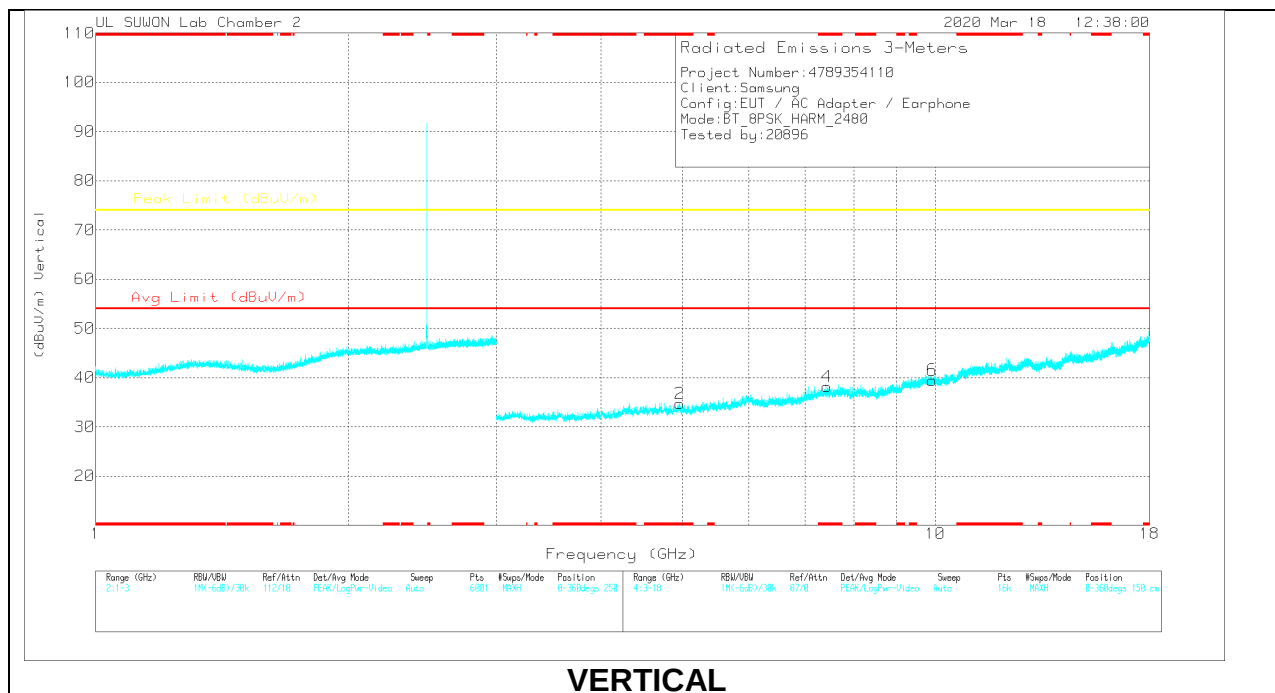
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

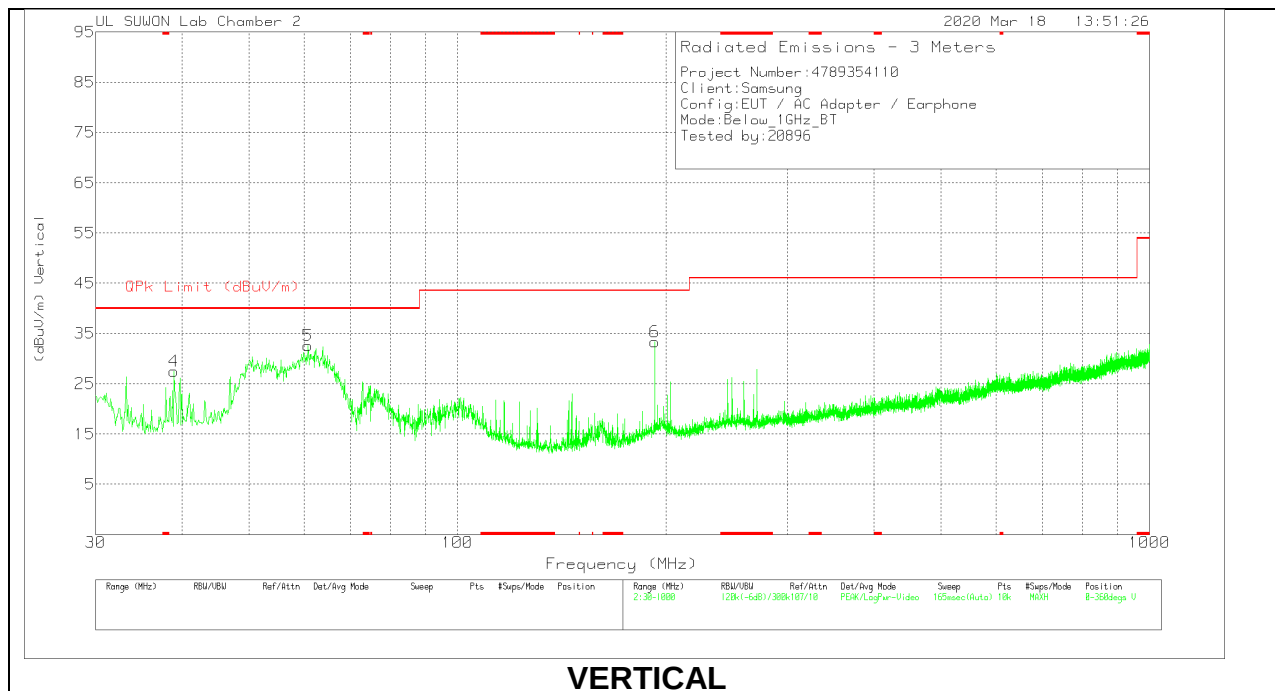
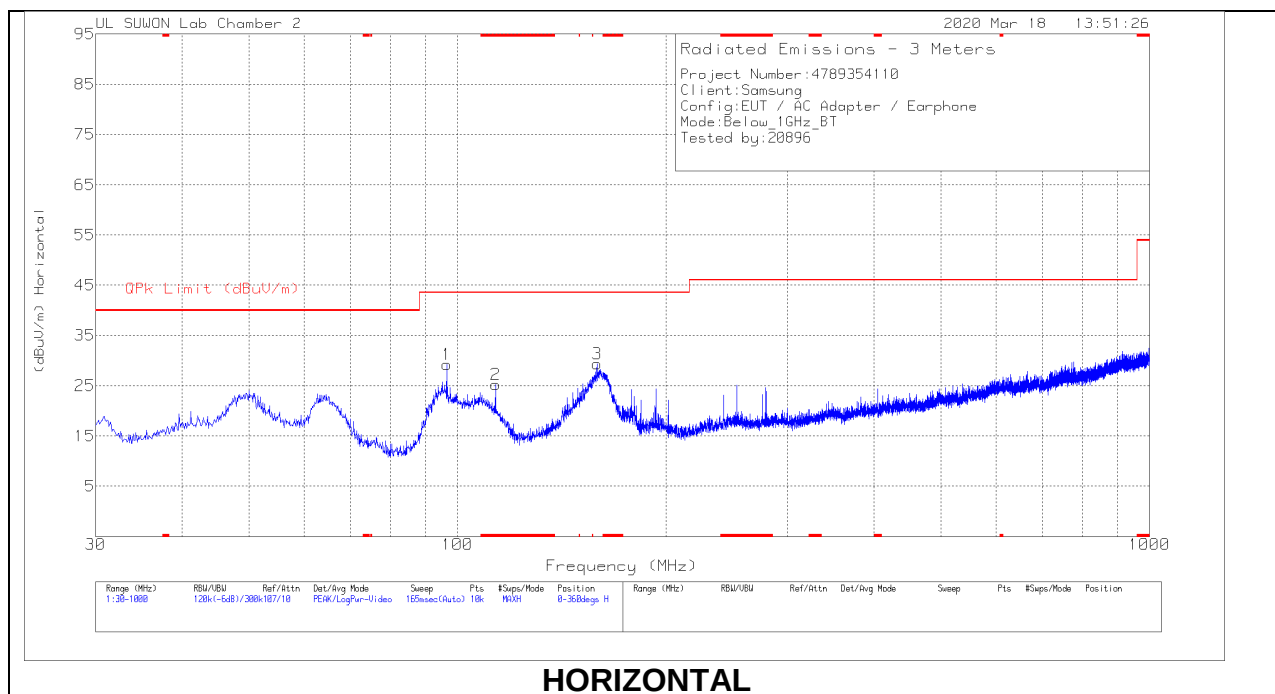
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.94885	34.55	PKFH	34.1	-27	41.65	-	-	74	-32.35	0	100	H
* 4.94932	34.63	PKFH	34.1	-27	41.73	-	-	74	-32.27	0	100	V
* 7.4458	32.29	PKFH	36.2	-23.9	44.59	-	-	74	-29.41	0	100	H
* 7.44389	32.77	PKFH	36.2	-23.9	45.07	-	-	74	-28.93	0	100	V
9.92495	30.2	PKFH	37.4	-20.9	46.7	-	-	74	-27.3	0	100	H
9.92424	29.83	PKFH	37.4	-20.9	46.33	-	-	74	-27.67	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

11.2. WORST CASE BELOW 1 GHZ

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



Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_749	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	96.445	43.27	Pk	17.4	-31.4	29.27	43.52	-14.25	0-360	300	H
2	* 113.517	40.06	Pk	16.5	-31.3	25.26	43.52	-18.26	0-360	200	H
3	159.107	45.76	Pk	14.5	-30.9	29.36	43.52	-14.16	0-360	200	H
4	38.924	41.06	Pk	18.4	-32	27.46	40	-12.54	0-360	100	V
5	60.749	45.86	Pk	18.3	-31.6	32.56	40	-7.44	0-360	100	V
6	192.863	46.59	Pk	17.6	-30.8	33.39	43.52	-10.13	0-360	100	V

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

Pk - Peak detector

12. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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.

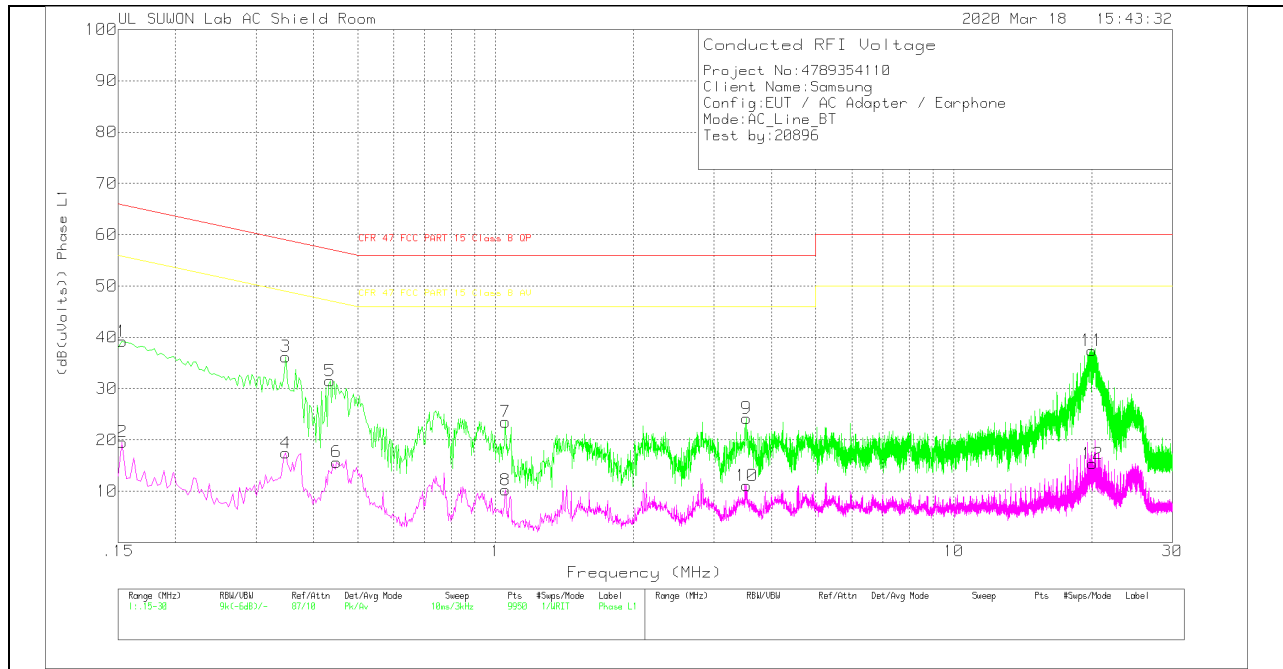
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

12.1.1. AC Power Line

LINE 1 RESULTS



Trace Markers

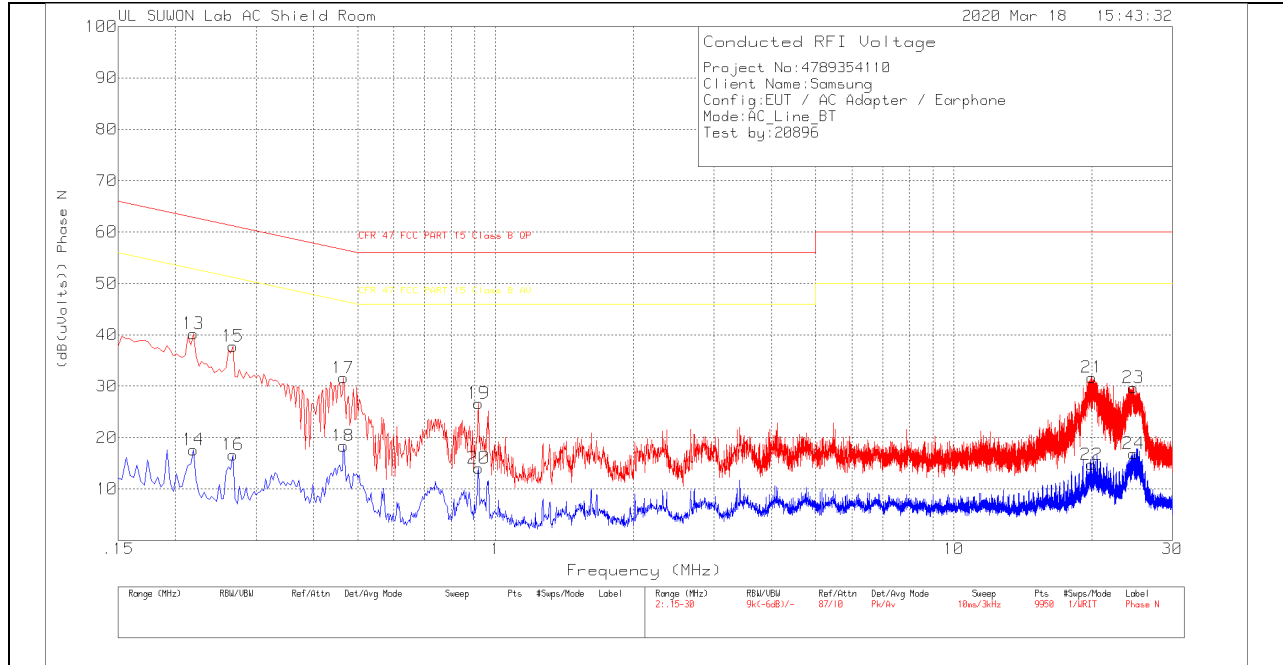
Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h Ex_L1[dB]	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.153	29.32	Pk	9.8	.1	39.22	65.84	-26.62	-	-
2	.153	9.7	Av	9.8	.1	19.6	-	-	55.84	-36.24
3	.348	26.12	Pk	9.9	.2	36.22	59.01	-22.79	-	-
4	.348	7.36	Av	9.9	.2	17.46	-	-	49.01	-31.55
5	.435	21.41	Pk	9.9	.2	31.51	57.16	-25.65	-	-
6	.45	5.58	Av	9.9	.2	15.68	-	-	46.88	-31.2
7	1.05	13.43	Pk	9.8	.3	23.53	56	-32.47	-	-
8	1.05	.14	Av	9.8	.3	10.24	-	-	46	-35.76
9	3.528	14.1	Pk	9.8	.3	24.2	56	-31.8	-	-
10	3.534	1	Av	9.8	.3	11.1	-	-	46	-34.9
11	20.022	26.73	Pk	10.3	.4	37.43	60	-22.57	-	-
12	20.079	4.66	Av	10.3	.4	15.36	-	-	50	-34.64

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836 With EX_N[dB]	CABLELOSS (dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
13	.219	30.22	Pk	9.8	.2	40.22	62.86	-22.64	-	-
14	.219	7.62	Av	9.8	.2	17.62	-	-	52.86	-35.24
15	.267	27.88	Pk	9.7	.2	37.78	61.21	-23.43	-	-
16	.267	6.76	Av	9.7	.2	16.66	-	-	51.21	-34.55
17	.465	21.53	Pk	9.9	.2	31.63	56.6	-24.97	-	-
18	.465	8.3	Av	9.9	.2	18.4	-	-	46.6	-28.2
19	.918	16.56	Pk	9.8	.3	26.66	56	-29.34	-	-
20	.918	3.95	Av	9.8	.3	14.05	-	-	46	-31.95
21	20.016	21	Pk	10.3	.4	31.7	60	-28.3	-	-
22	19.989	4.05	Av	10.3	.4	14.75	-	-	50	-35.25
23	24.663	18.73	Pk	10.6	.4	29.73	60	-30.27	-	-
24	24.702	5.88	Av	10.6	.4	16.88	-	-	50	-33.12

Pk - Peak detector

Av - Average detection

END OF TEST REPORT