TEST REPORT

Report Number. : 13583138-E2V2

Applicant	:	Samsung Electronics Co., Ltd. 129 Samsung-Ro, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, 16677, Korea
Model	:	SM-A526B/DS, SM-A526B
FCC ID	:	A3LSMA526B
EUT Description	:	GSM/WCDMA/LTE/5G Phablet with BT/BLE,DTS/UNII a/b/g/n/ac and NFC
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C

Date Of Issue:
February 01, 2021

Prepared by:
UL Verification Services Inc.
47173 Benicia Street
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NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	1/25/2021	Initial Issue	----
V2	2/1/2021	Updated Section 10 &11	Kiya Kedida

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TABLE OF CONTENTS

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	Samsung Electronics Co., Ltd. 129 Samsung-Ro, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, 16677, Korea
EUT DESCRIPTION:	GSM/WCDMA/LTE/5G Phablet with BT/BLE, DTS/UNII a/b/g/n/ac and NFC
MODEL:	SM-A526B/DS, SM-A526B
SERIAL NUMBER:	R3CN90Q16EZ (Conducted) R3CN90Q114D (Radiated)
DATE TESTED:	NOVEMBER 12, 2020 – DECEMBER 17, 2020

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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2. TEST RESULTS SUMMARY

FCC Clause	Requirement	Result	Comment
See Comment	Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 11.6.
See Comment	20dB BW/99% OBW	Reporting purposes only	ANSI C63.10 Sections 6.9.2 and 6.9.3
15.247 (a)(1)	Hopping Frequency Separation	Complies	None.
15.247 (a)(1)(iii)	Number of Hopping Channels	Complies	None.
15.247 (a)(1)(iii)	Average Time of Occupancy	Complies	None.
15.247 (b)(1)	Output Power	Complies	None.
See Comment	Average Power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (d)	Conducted Spurious Emissions	Complies	None.
15.209, 15.205	Radiated Emissions	Complies	None.
15.207	AC Mains Conducted Emissions	Complies	None.

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3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02 and KDB 414788 D01 Radiated Test Site v01r01.

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☐	Building 1: 47173 Benicia Street, Fremont, California 94538, USA	US0104	2324A	208313
☐	Building 2: 47266 Benicia Street, Fremont, California 94538, USA	US0104	22541	208313
☒	Building 4: 47658 Kato Rd, Fremont, California 94538, USA	US0104	2324B	208313

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5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{Lab}
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.84 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.84 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a GSM/WCDMA/LTE/5G Phablet with BT/BLE, DTS/UNII a/b/g/n/ac and NFC. The model SM-A526B/DS was used for final testing and is representative of the test results in this report.

6.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	14.94	31.19
2402 - 2480	Enhanced DQPSK	11.14	13.00
2402 - 2480	Enhanced 8PSK	11.62	14.52

Note: GFSK, DQPSK, 8PSK average power are all investigated, The GFSK & 8PSK Power are the worst case. Testing is based on these modes to showing compliance.

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an PIFA antenna, with a maximum gain of -2.56 dBi.

6.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was A526B.001.

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6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

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

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

GFSK mode : DH5
8PSK mode : 3-DH5

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6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	Samsung	EP-TA800	R37M3531XX1SE3	N/A
Earphone	Samsung	N/A	N/A	N/A

I/O CABLES (CONDUCTED TEST)

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Antenna	1	RF	Shielded	0.2	To PSA and BT Tester
2	USB	1	USB	Un-shielded	1	EUT to AC Mains

I/O CABLES (RADIATED AND AC LINE CONDUCTED EMISSIONS)

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB	1	USB	Shielded	1	N/A
2	Earphone	1	3.5mm	Un-shielded	1	N/A

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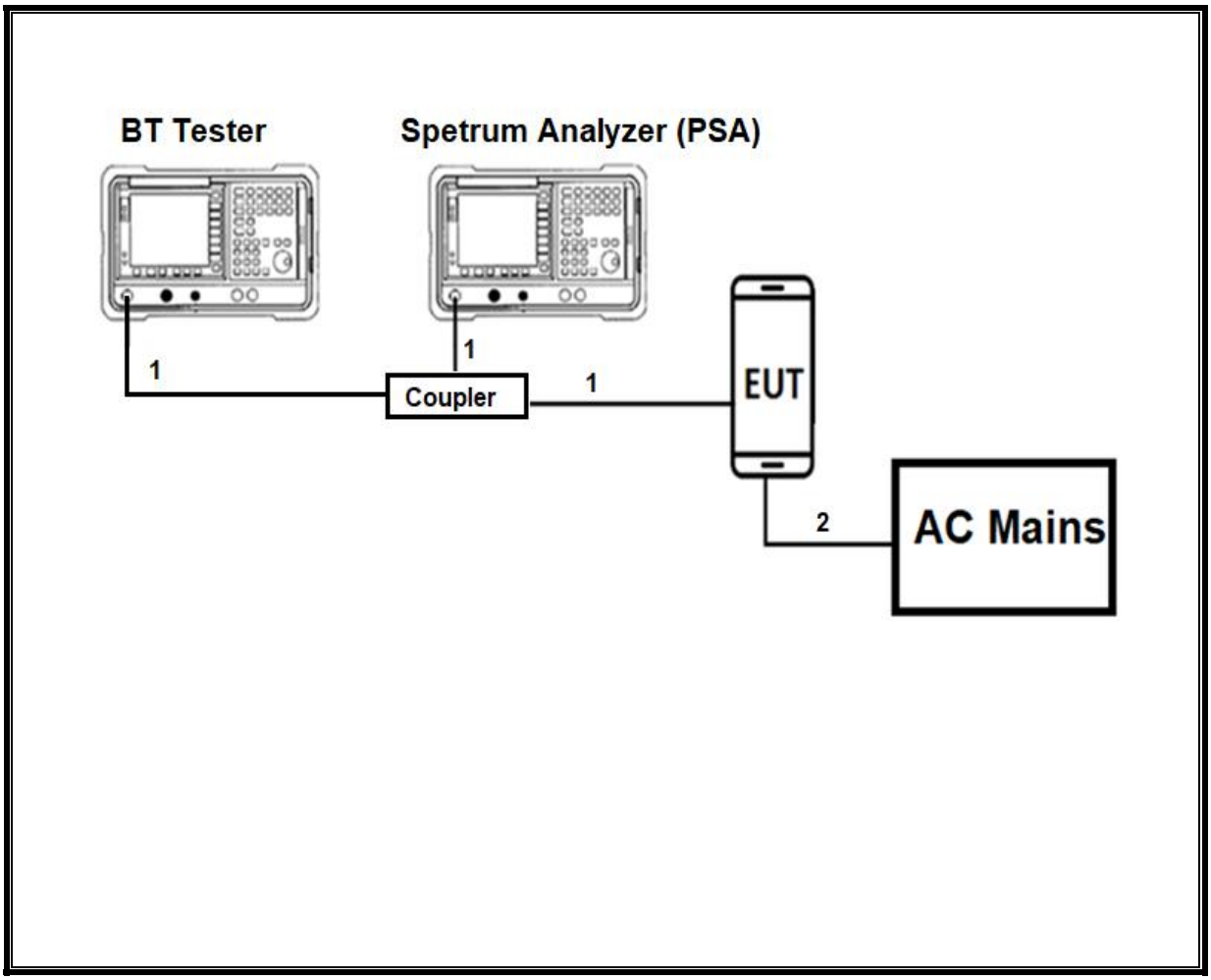
CONDUCTED TEST SETUP DIAGRAM



TEST SETUP

For conducted tests: the EUT was stand alone. The test software exercises the radio.

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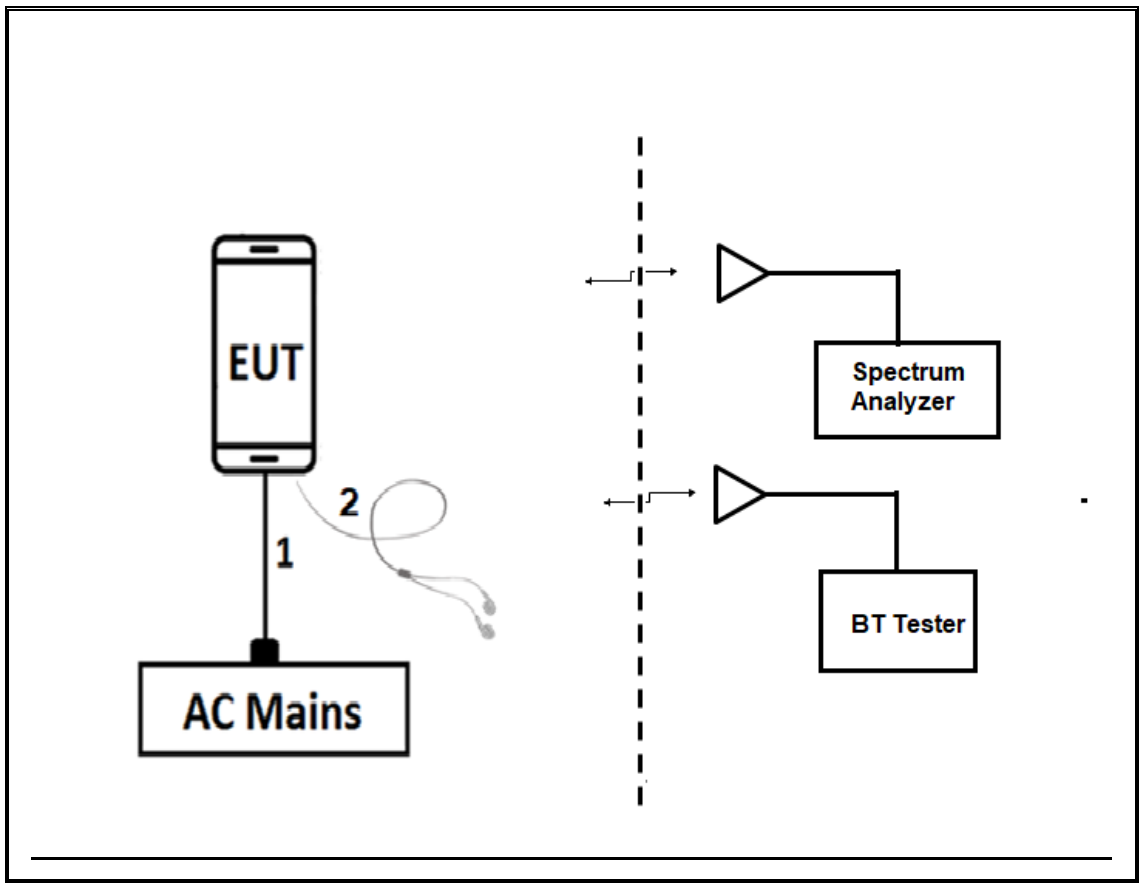
RADIATED AND AC LINE CONDUCTED EMISSIONS SETUP DIAGRAM



TEST SETUP

For radiated tests: EUT is connected to earphone. The test software exercises the radio.

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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**	**Asset**	**Cal Due**
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	PRE0179465	07/27/2021
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	PRE0179467	07/27/2021
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T346	07/20/2021
Amplifier, 100MHz-18GHz	MITEQ	AFS42-00101800-25-S-42	171460	09/29/2021
Antenna, Broadband Hybrid, 30MHz to 3GHz	Sunol Sciences Corp	JB3	PRE0184971	02/05/2021
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310N	T300	01/23/2021
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179522	02/20/2021
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179367	02/26/2021
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179372	02/25/2021
Antenna Horn, 18 to 26GHz	ARA	SWH-28	T447	09/24/2021
High Frequency Amplifier Switch Box	Agilent Technology	8449B	PRE0183142	04/08/2021
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	T1268	01/22/2021
Power Sensor, P-series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	T413	02/26/2021
AC Line Conducted				
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**
LISN	Fischer Custom Communications, Inc	FCC-LISN-50/250-25-2-01-480V	PRE0186446	01/21/2021
L.I.S.N	FCC INC.	FCC LISN 50/250	24	01/21/2021
EMI TEST RECEIVER	Rohde & Schwarz	ESR	T1436	02/20/2021
Transient Limiter	COM-POWER	LIT-930A	PRE0129246	01/23/2021
UL AUTOMATION SOFTWARE				
Radiated Software	UL	UL EMC	Rev 9.5, 30 Apr, 2020	
Antenna Port Software	UL	UL RF	AP2020.9.1	
AC Line Conducted Software	UL	UL EMC	Rev 9.5, 07 Jul 2020	

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8. MEASUREMENT METHODS

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

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

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

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

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

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

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

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

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

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

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

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

Radiated Band-edge: ANSI C63.10-2013 Section 6.10.5 & 13

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

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

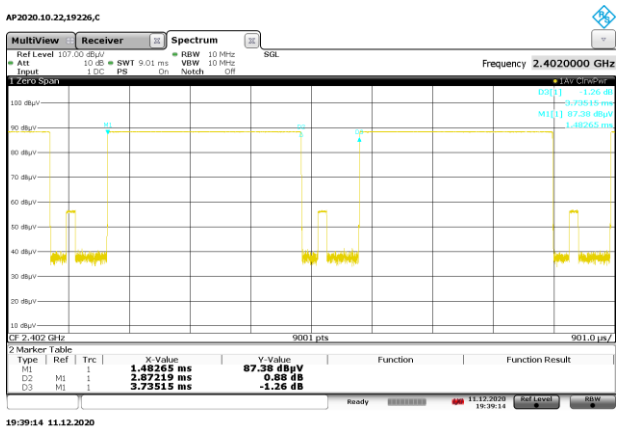
PROCEDURE

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

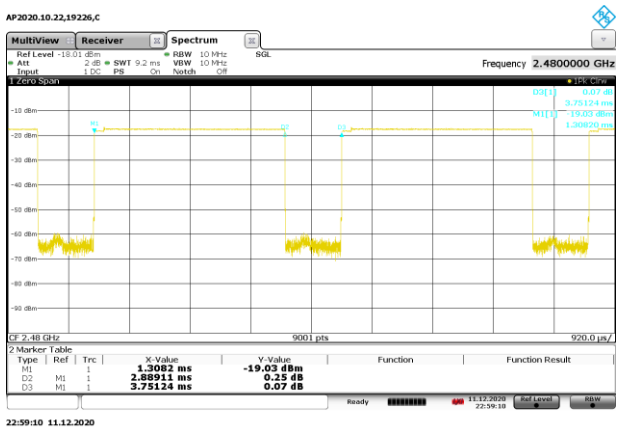
ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
Bluetooth GFSK	2.87	3.74	0.769	76.9%	1.14	0.348
Bluetooth 8PSK	2.89	3.75	0.770	77.0%	1.13	0.346

DUTY CYCLE PLOTS



BLUETOOTH GFSK



BLUETOOTH 8PSK

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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 ≥ 1% of the 20 dB bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

RESULTS

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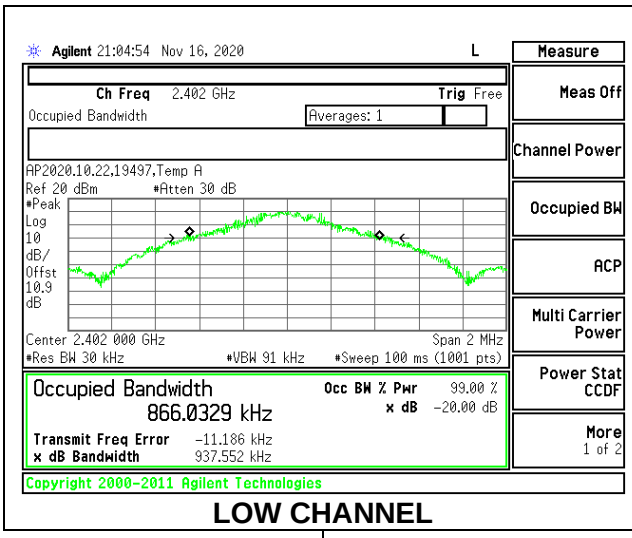
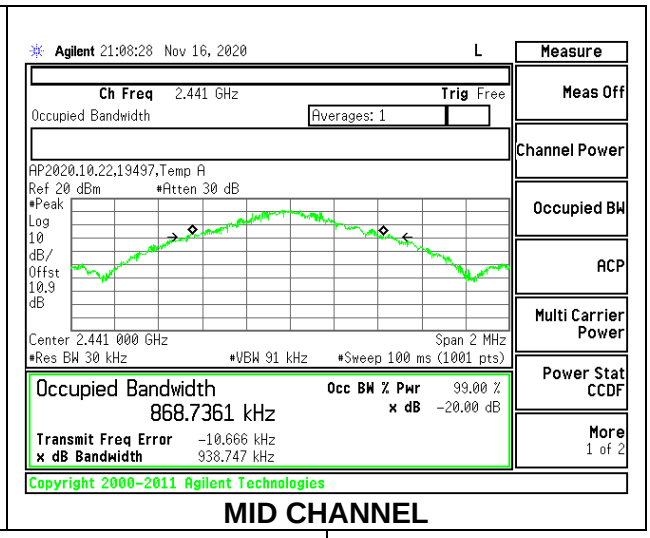
9.2.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

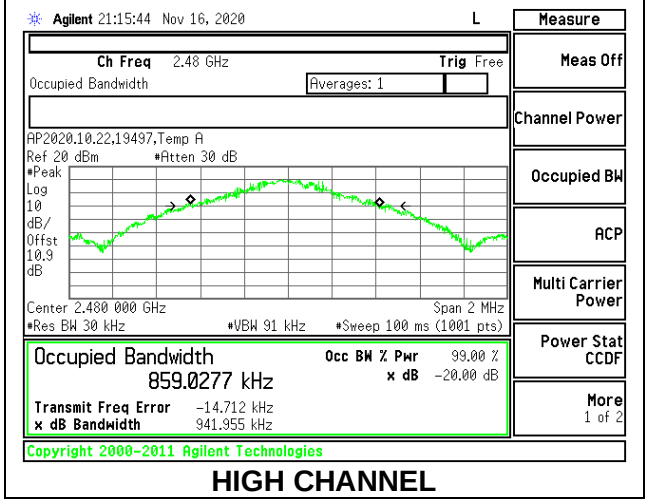
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.938	0.866
Mid	2441	0.939	0.869
High	2480	0.942	0.859



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

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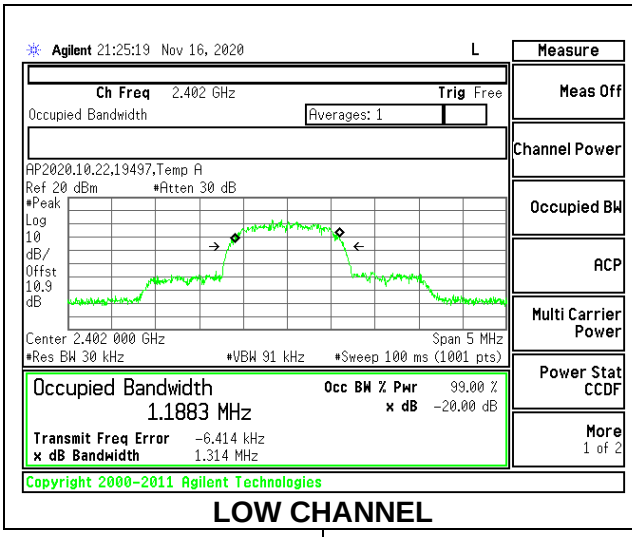
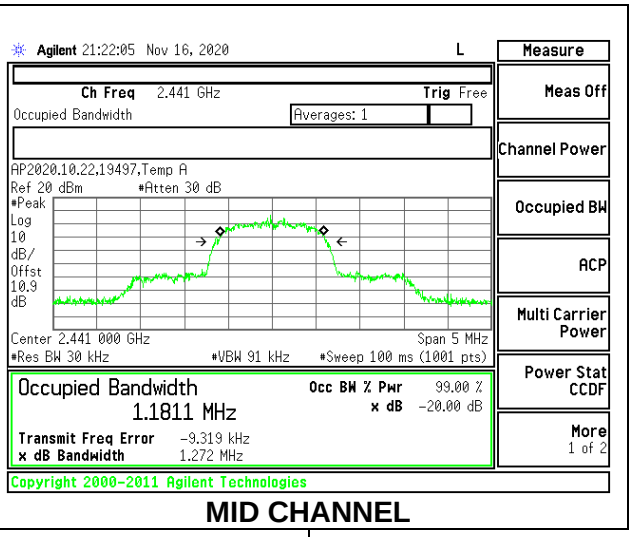
9.2.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

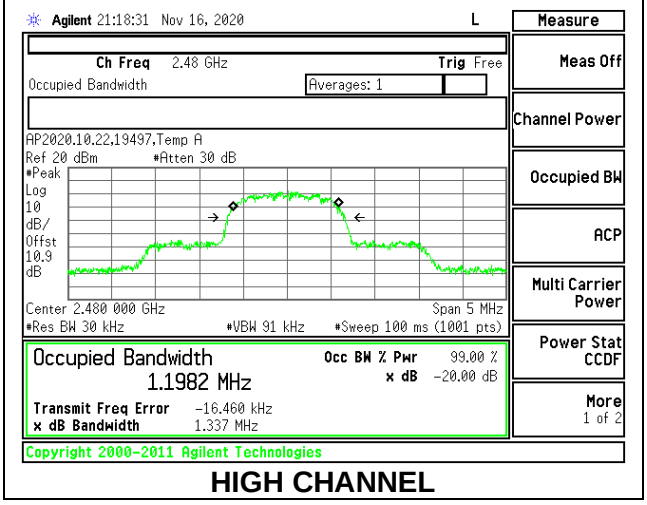
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.314	1.188
Mid	2441	1.272	1.181
High	2480	1.337	1.198



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

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9.3. 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 hoping channel, whichever is greater.

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

TEST PROCEDURE

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

RESULTS

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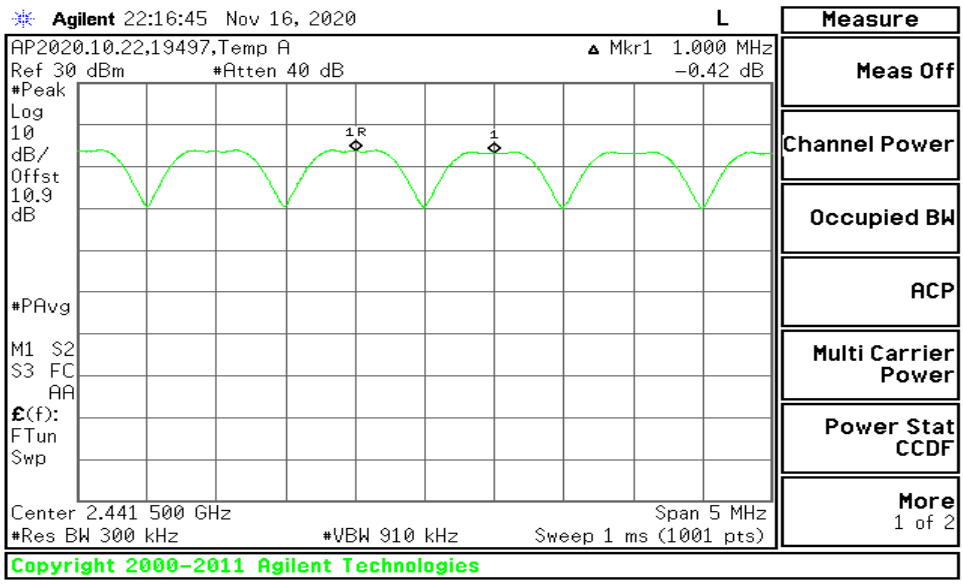
9.3.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



HOPPING FREQUENCY SEPARATION PLOT

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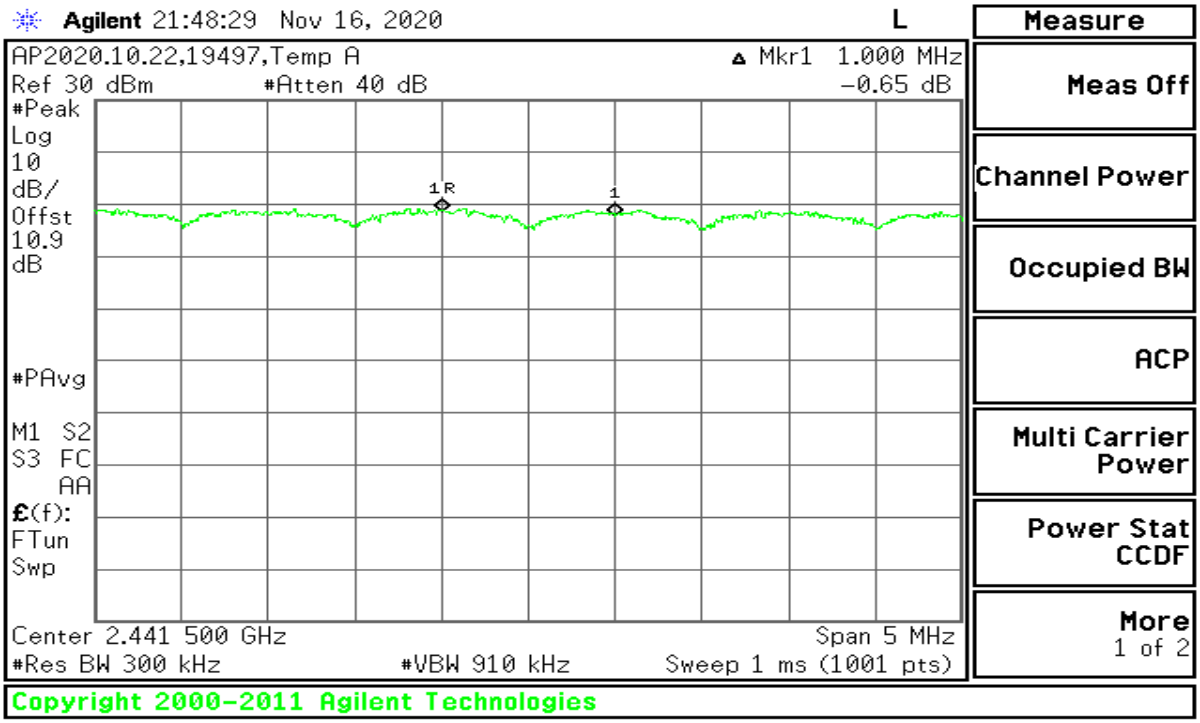
9.3.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION



HOPPING FREQUENCY SEPARATION PLOT

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9.4. 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

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

RESULTS

Normal Mode: 79 Channels Observed

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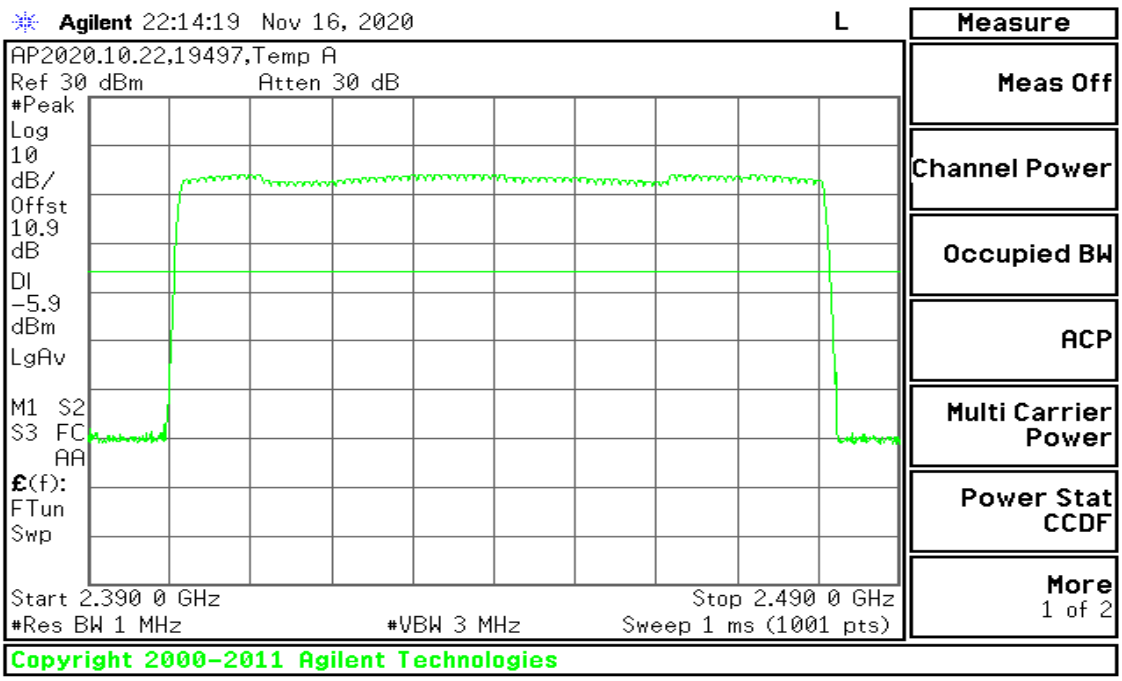
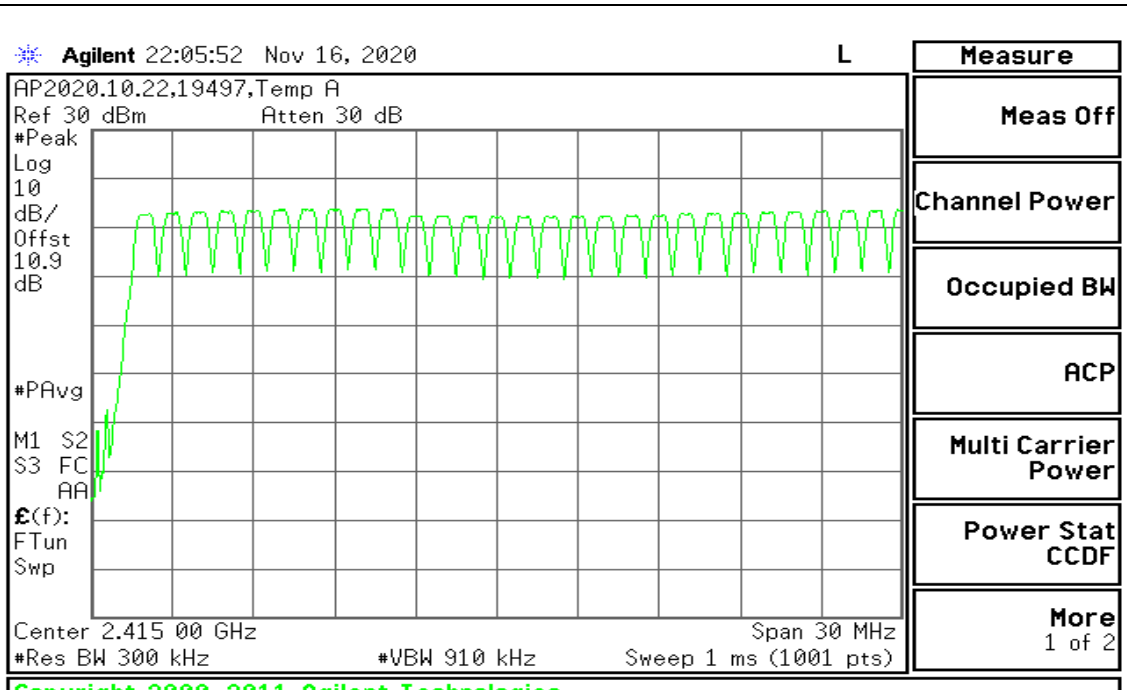
9.4.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



100MHz SPAN



30MHz SPAN, SEGMENT 1 OF 3

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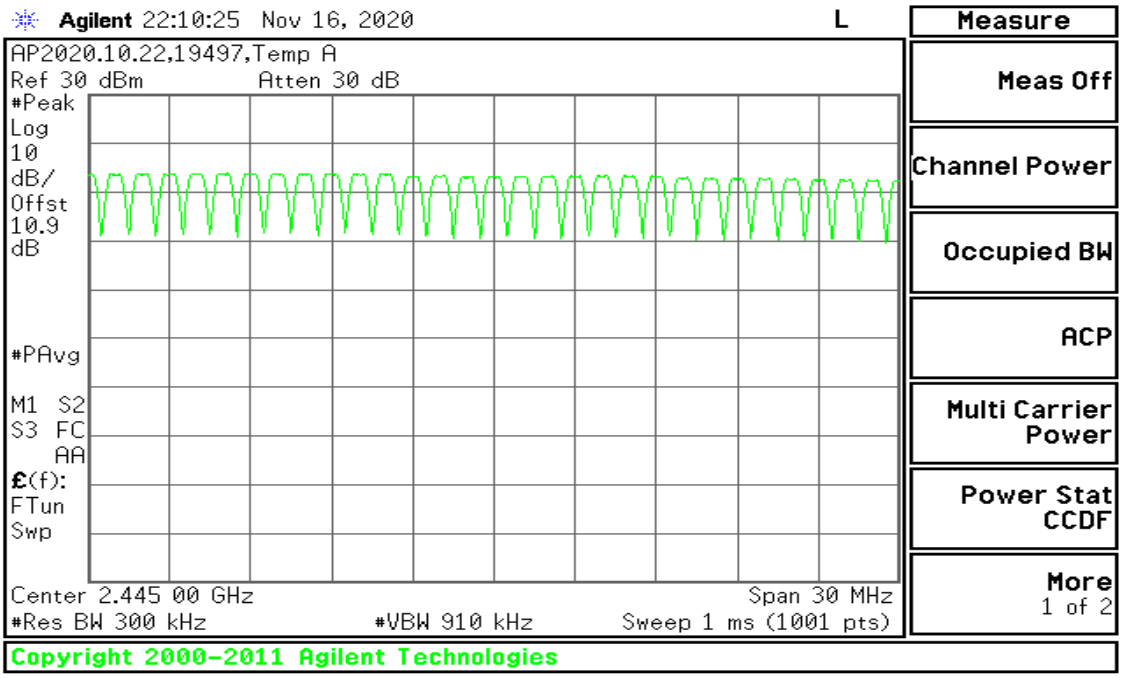
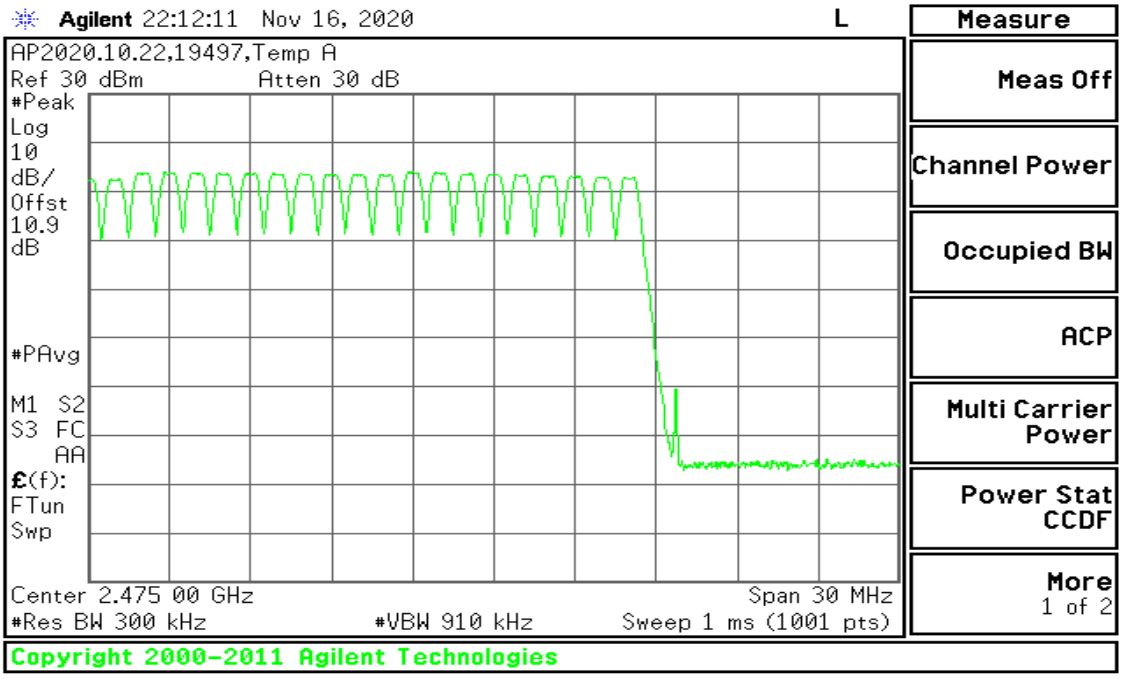


30MHz SPAN, SEGMENT 2 OF 3



30MHz SPAN, SEGMENT 3 OF 3

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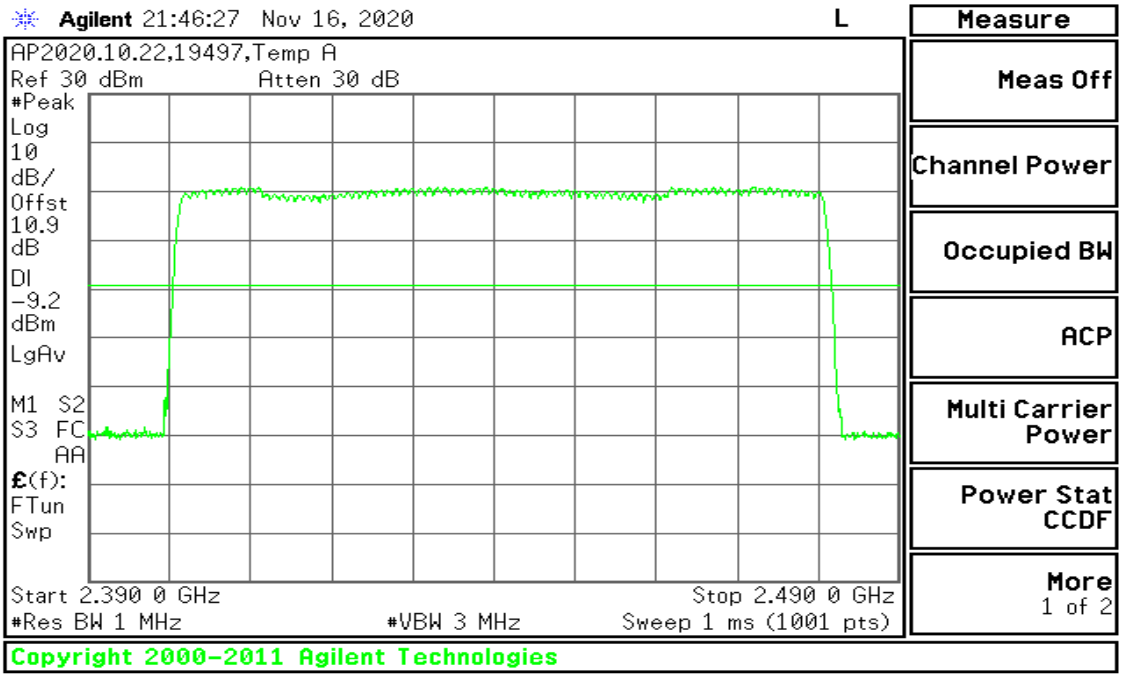
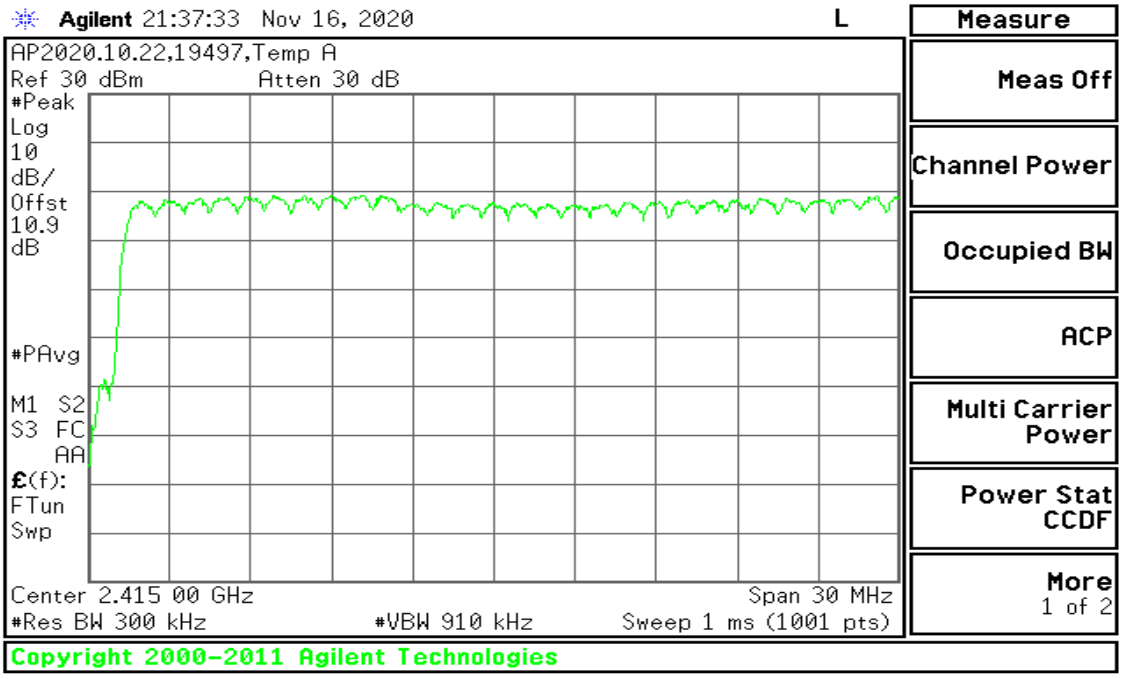
9.4.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION



100MHz SPAN



30MHz SPAN, SEGMENT 1 OF 3

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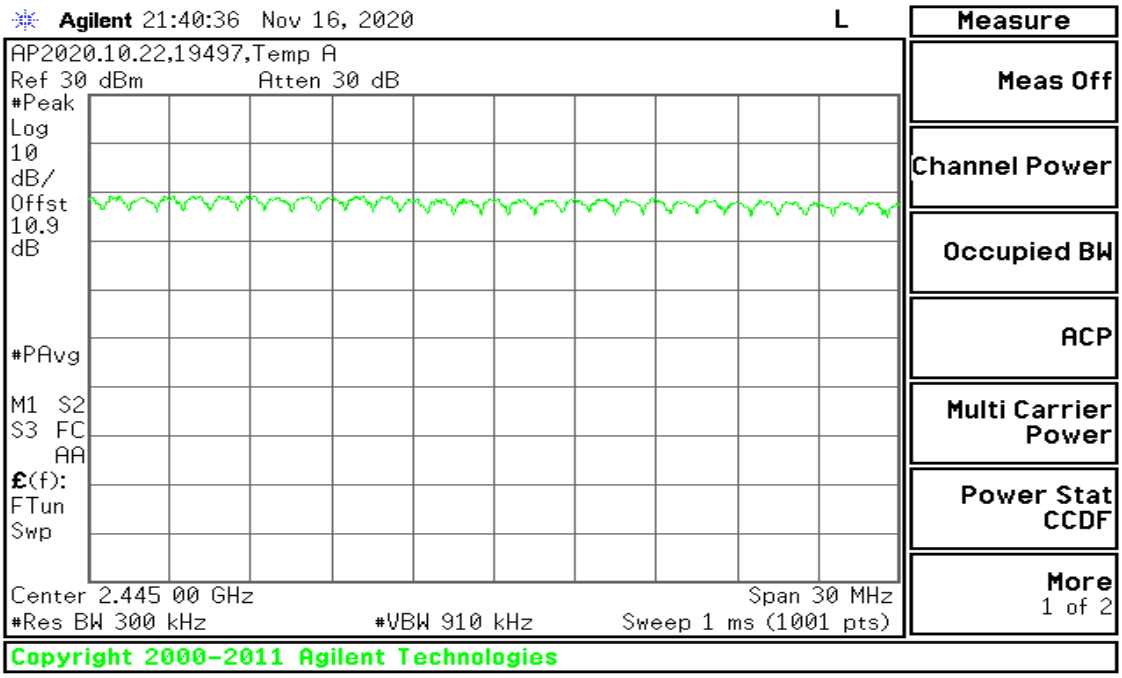
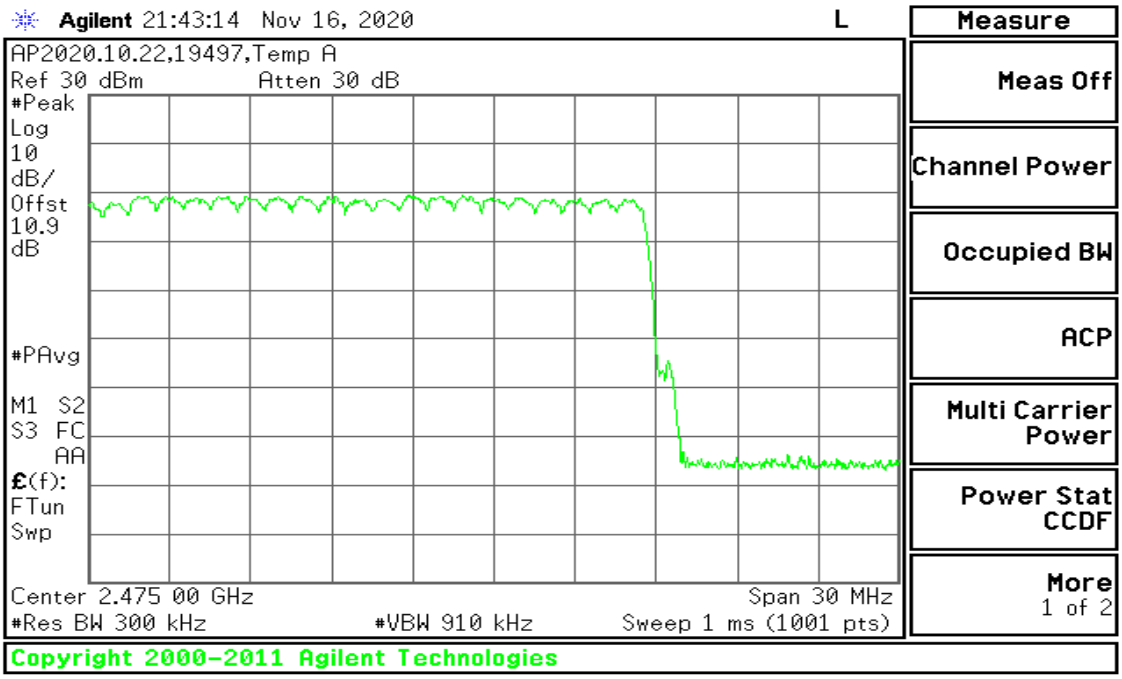


30MHz SPAN, SEGMENT 2 OF 3



30MHz SPAN, SEGMENT 3 OF 3

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9.5. 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 * (# of pulses in 3.16 s) * pulse width.

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

RESULTS

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9.5.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK Normal Mode					
DH1	0.377	30	0.1131	0.4	-0.2869
DH3	1.63	11	0.1793	0.4	-0.2207
DH5	2.876	9	0.2588	0.4	-0.1412
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH1	0.377	7.5	0.02828	0.4	-0.3717
DH3	1.63	2.75	0.04483	0.4	-0.3552
DH5	2.876	2.25	0.06471	0.4	-0.3353

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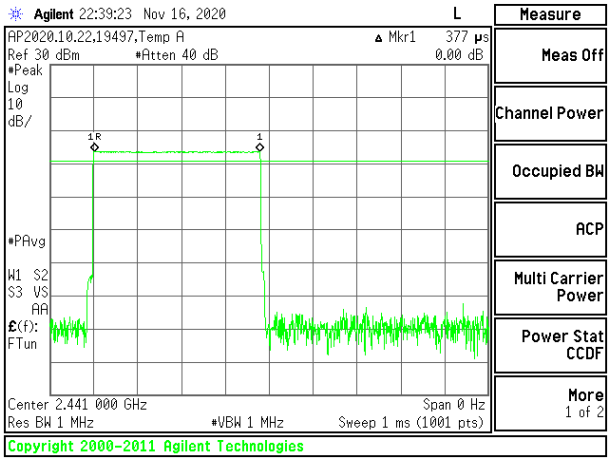
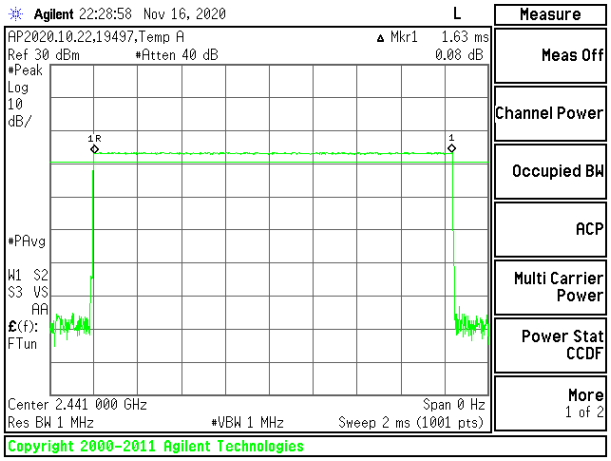
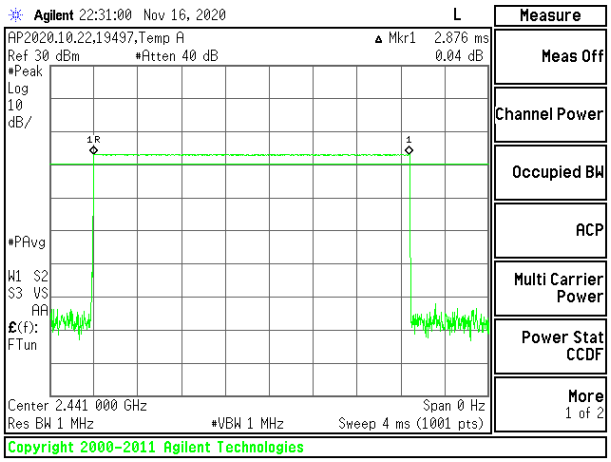


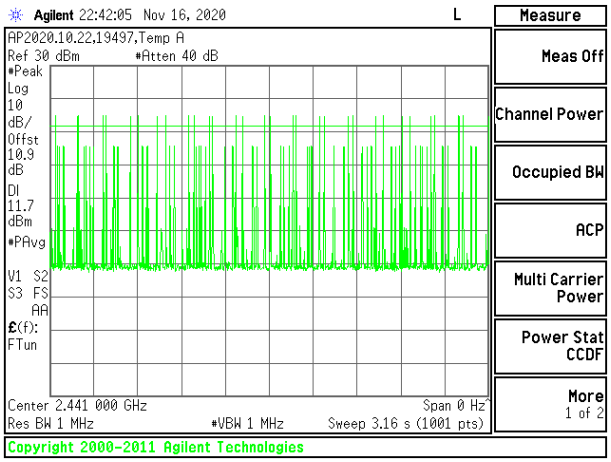
PULSE WIDTH – DH1



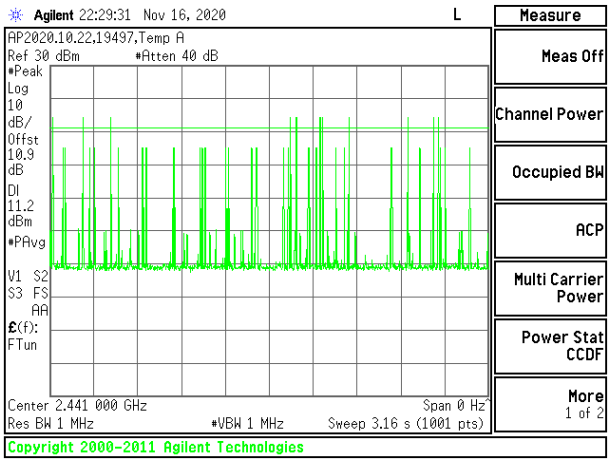
PULSE WIDTH – DH3



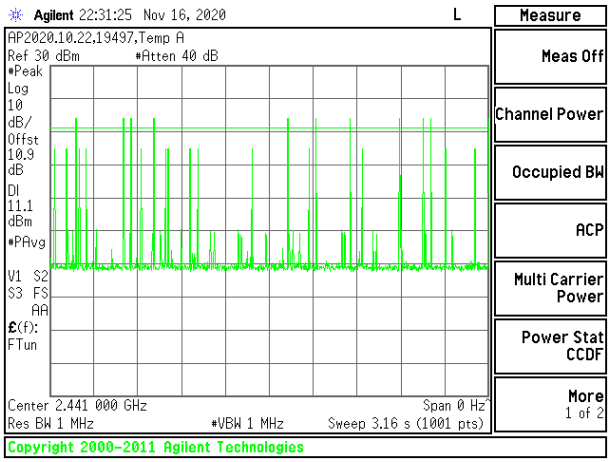
PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5

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9.5.2. 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)
8PSK Normal Mode					
3DH1	0.384	32	0.12288	0.4	-0.27712
3DH3	1.632	14	0.22848	0.4	-0.17152
3DH5	2.876	7	0.20132	0.4	-0.19868

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

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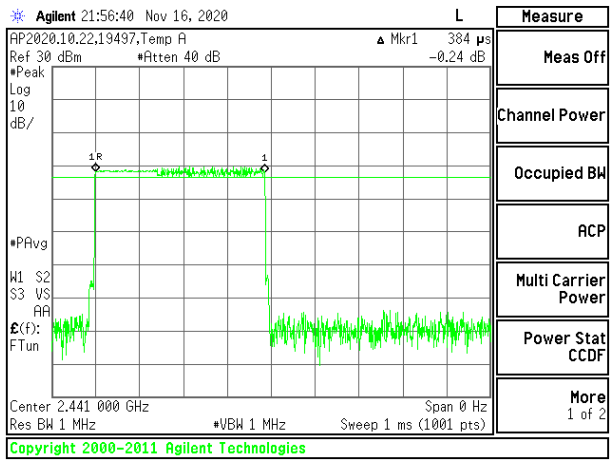
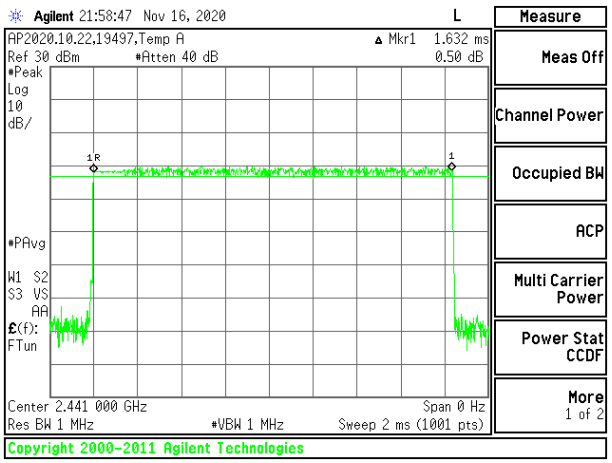
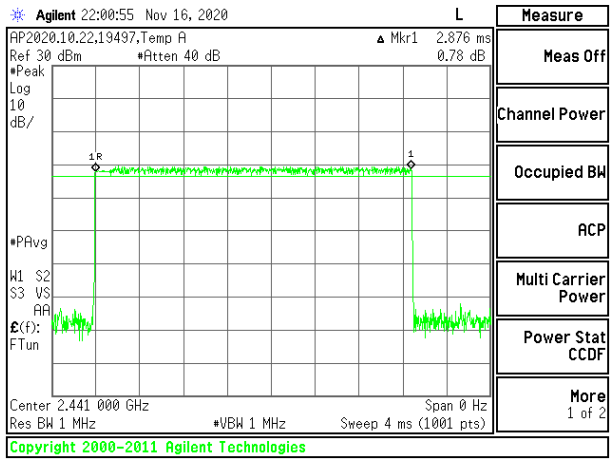


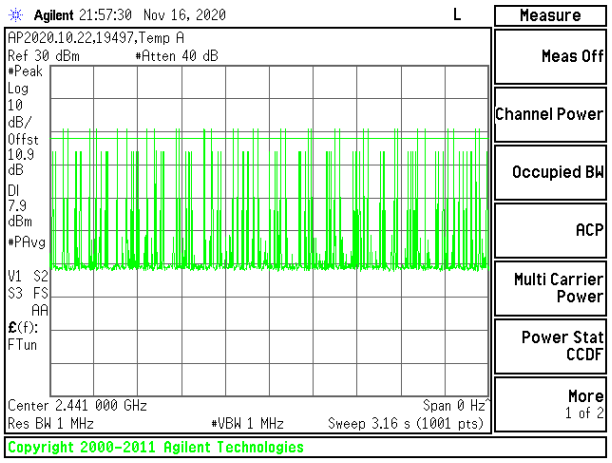
PULSE WIDTH – 3DH1



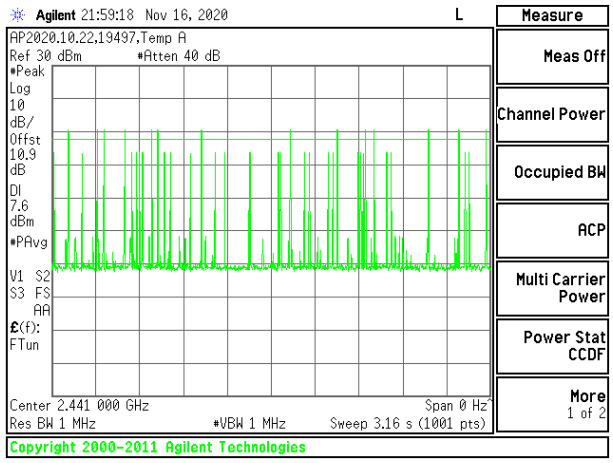
PULSE WIDTH – 3DH3



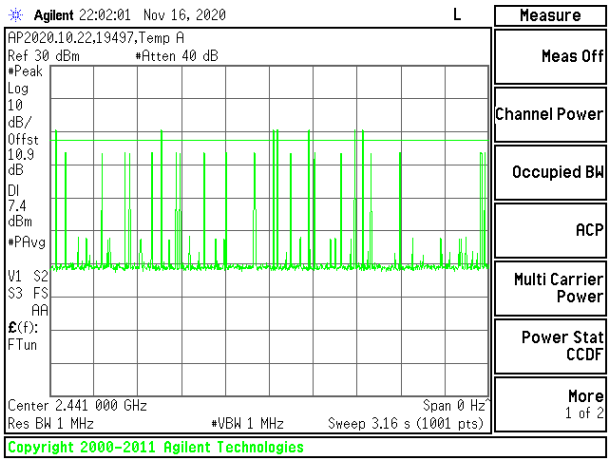
PULSE WIDTH – 3DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3DH1



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3DH3



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3DH5

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9.6. OUTPUT POWER

LIMITS

§15.247 (b) (1)

The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

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

TEST PROCEDURE

Measurements perform using a wideband gated RF power meter.

The cable assembly insertion loss was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

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9.6.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Tested By:	20792 KN
Date:	11/17/2020

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	14.27	21	-6.73
Middle	2441	14.94	21	-6.06
High	2480	14.48	21	-6.52

9.6.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Tested By:	20792 KN
Date:	11/17/2020

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.23	21	-9.77
Middle	2441	10.27	21	-10.73
High	2480	11.62	21	-9.38

9.6.3. BLUETOOTH ENHANCED DATA RATE DQPSK MODULATION

Tested By:	20792 KN
Date:	11/17/2020

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	10.61	21	-10.39
Middle	2441	10.21	21	-10.79
High	2480	11.14	21	-9.86

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9.7. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

Measurements perform using a wideband gated RF power meter.

The cable assembly insertion loss was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

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9.7.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Tested By:	20792 KN
Date	11/17/2020

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	13.88
Middle	2441	14.59
High	2480	14.16

9.7.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Tested By:	20792 KN
Date	11/17/2020

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	9.27
Middle	2441	9.99
High	2480	9.86

9.7.3. BLUETOOTH ENHANCED DATA RATE DQPSK MODULATION

Tested By:	20792 KN
Date	11/17/2020

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	8.92
Middle	2441	9.64
High	2480	9.41

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9.8. 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 band edges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

RESULTS

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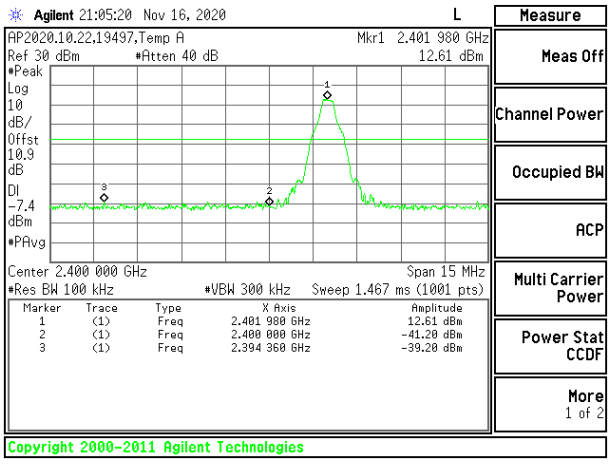
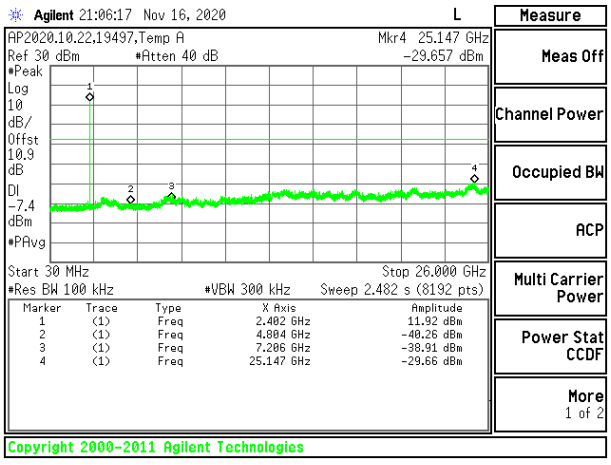
9.8.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

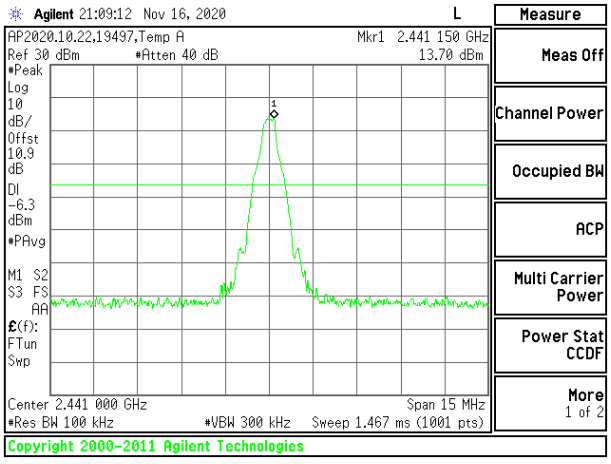
SPURIOUS EMISSIONS, NON-HOPPING



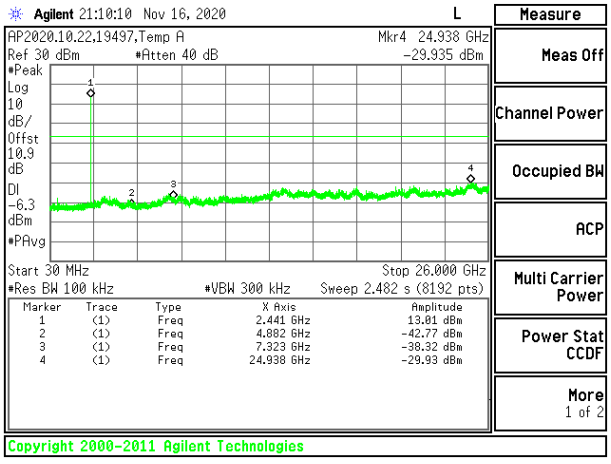
LOW CHANNEL BANDEDGE



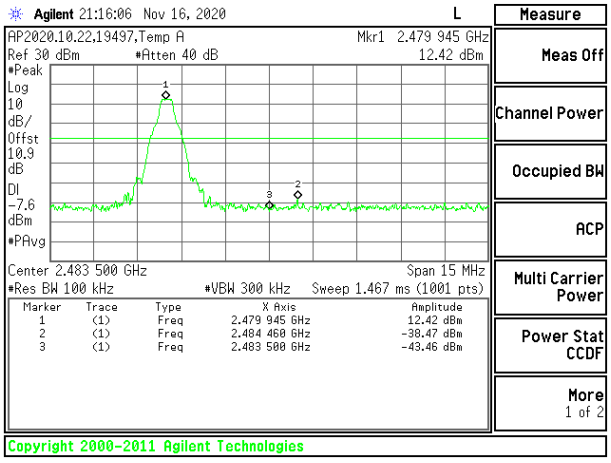
OUT-OF-BAND LOW CHANNEL



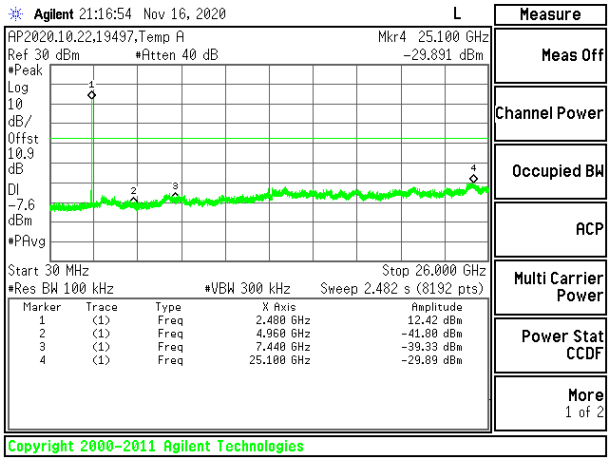
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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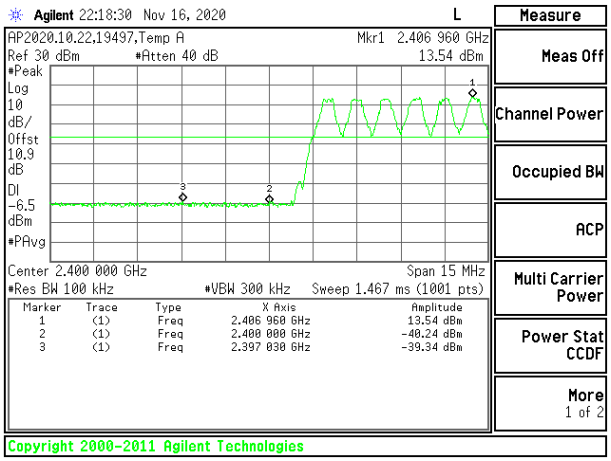
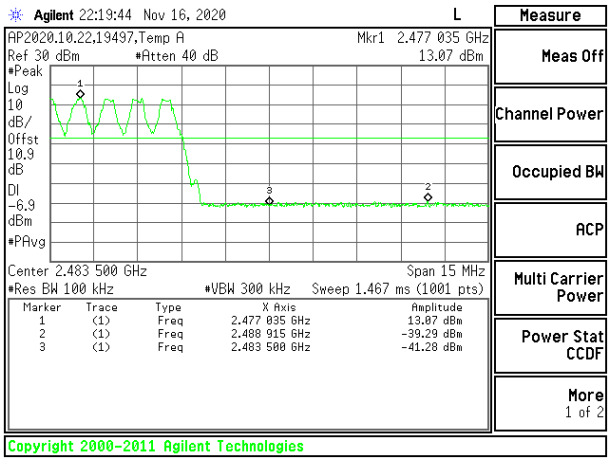
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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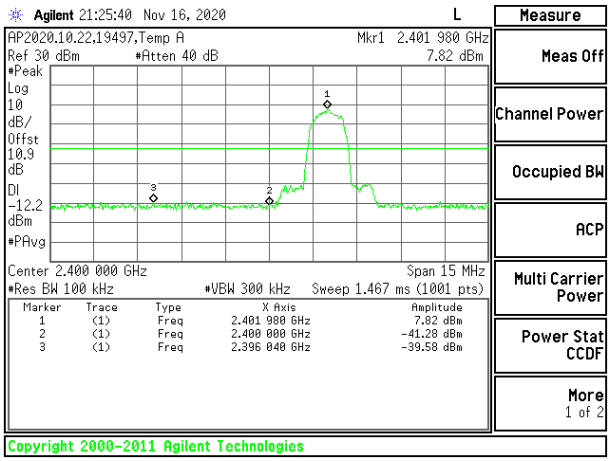
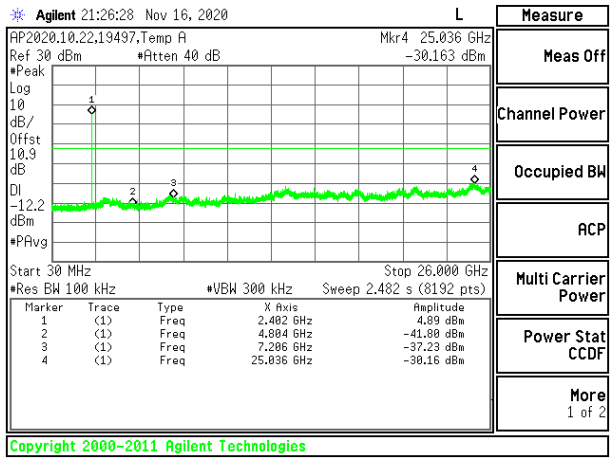
9.8.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

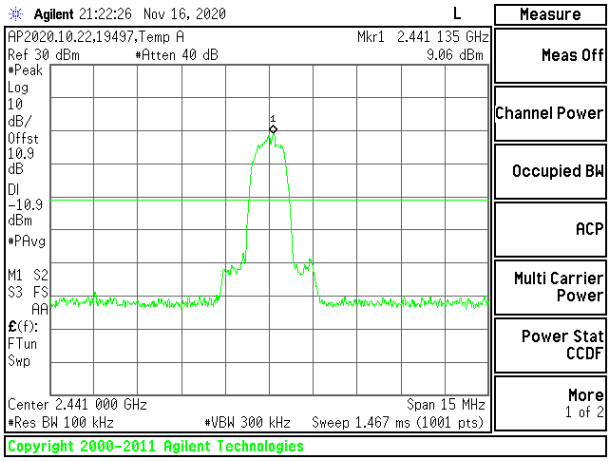
SPURIOUS EMISSIONS, NON-HOPPING



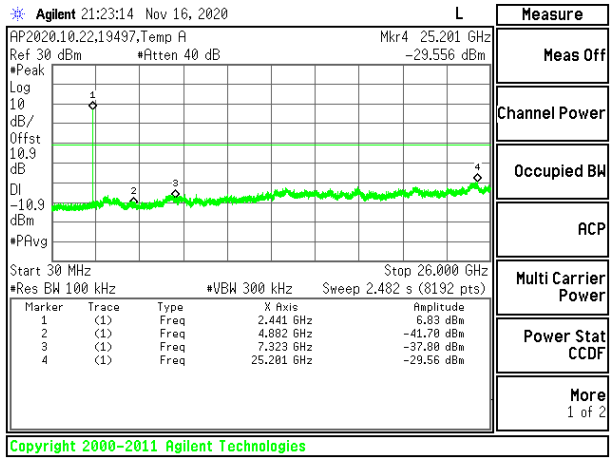
LOW CHANNEL BANDEDGE



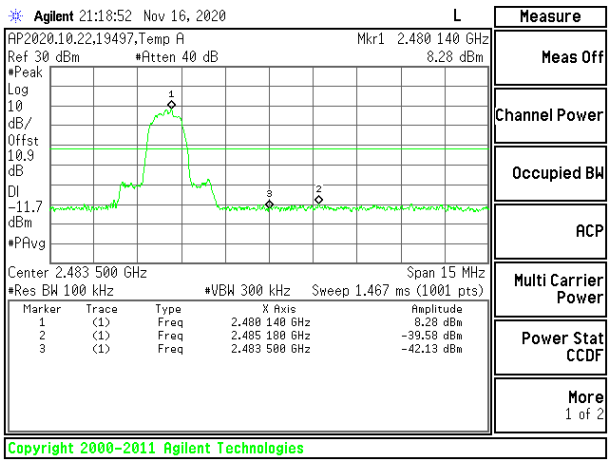
OUT-OF-BAND LOW CHANNEL



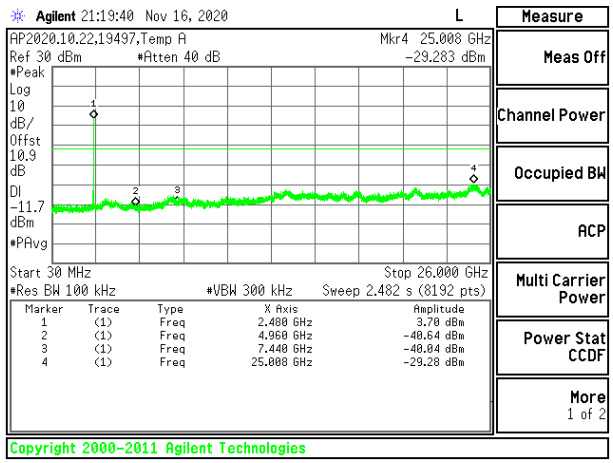
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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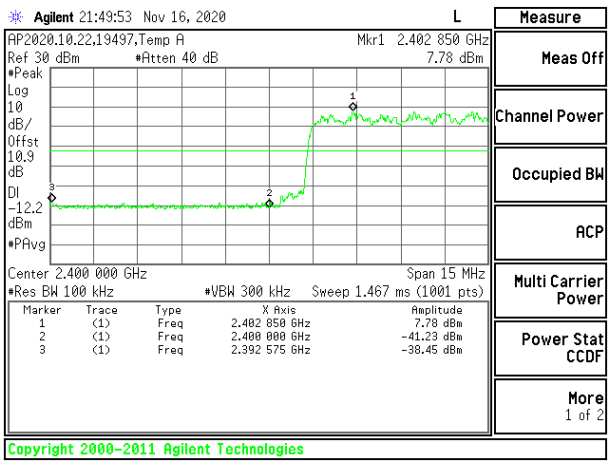
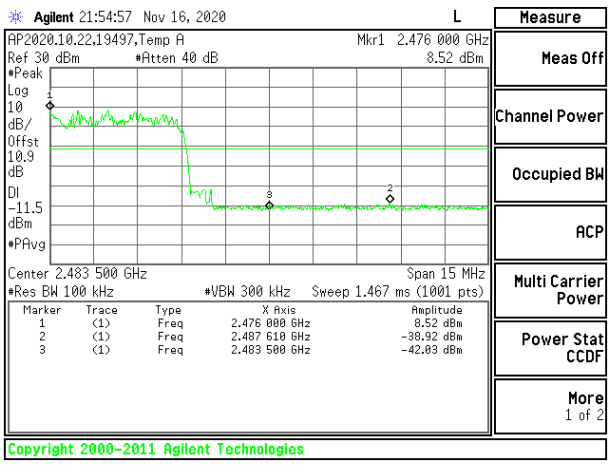
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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10. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

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

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

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T (500KHz) video bandwidth with peak detector for average measurements.

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

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

2D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.

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KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

KDB 558074 D01 15.247 Meas Guidance v05r01

Use of a duty cycle correction factor (DCCF) is permitted for calculating average radiated field strength emission levels for an FHSS device in 15.247. This DCCF can be applied when the field strength limit (e.g., within a Government Restricted band) and the conditions specified in Section 15.35(c) can be satisfied. The average radiated field strength is calculated by subtracting the DCCF from the maximum radiated field strength level as determined through measurement. The maximum radiated field strength level represents the worst-case (maximum amplitude) RMS measurement of the emission(s) during continuous transmission (i.e., not including any time intervals during which the transmitter is off or is transmitting at a reduced power level). It is also acceptable to apply the DCCF to a measurement performed with a peak detector instead of the specified RMS power averaging detector. Note that Section 15.35(c) specifies that the DCCF shall represent the worst-case (greatest duty cycle) over any 100 msec transmission period.

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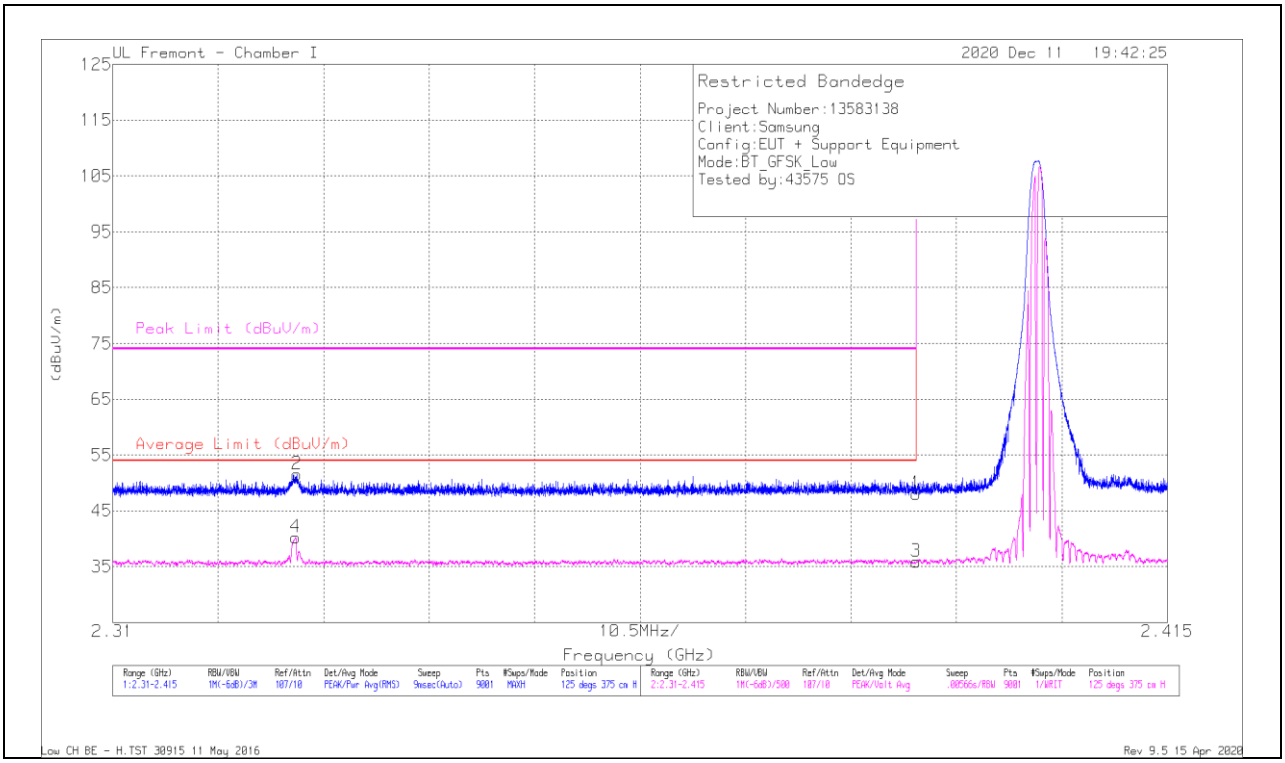
10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	35.91	Pk	32	-19.8	48.11	-	-	74	-25.89	125	375	H
2	* 2.32832	39.46	Pk	31.7	-19.6	51.56	-	-	74	-22.44	125	375	H
3	* 2.38999	23.69	VA1T	32	-19.8	35.89	54	-18.11	-	-	125	375	H
4	* 2.32822	28.19	VA1T	31.7	-19.6	40.29	54	-13.71	-	-	125	375	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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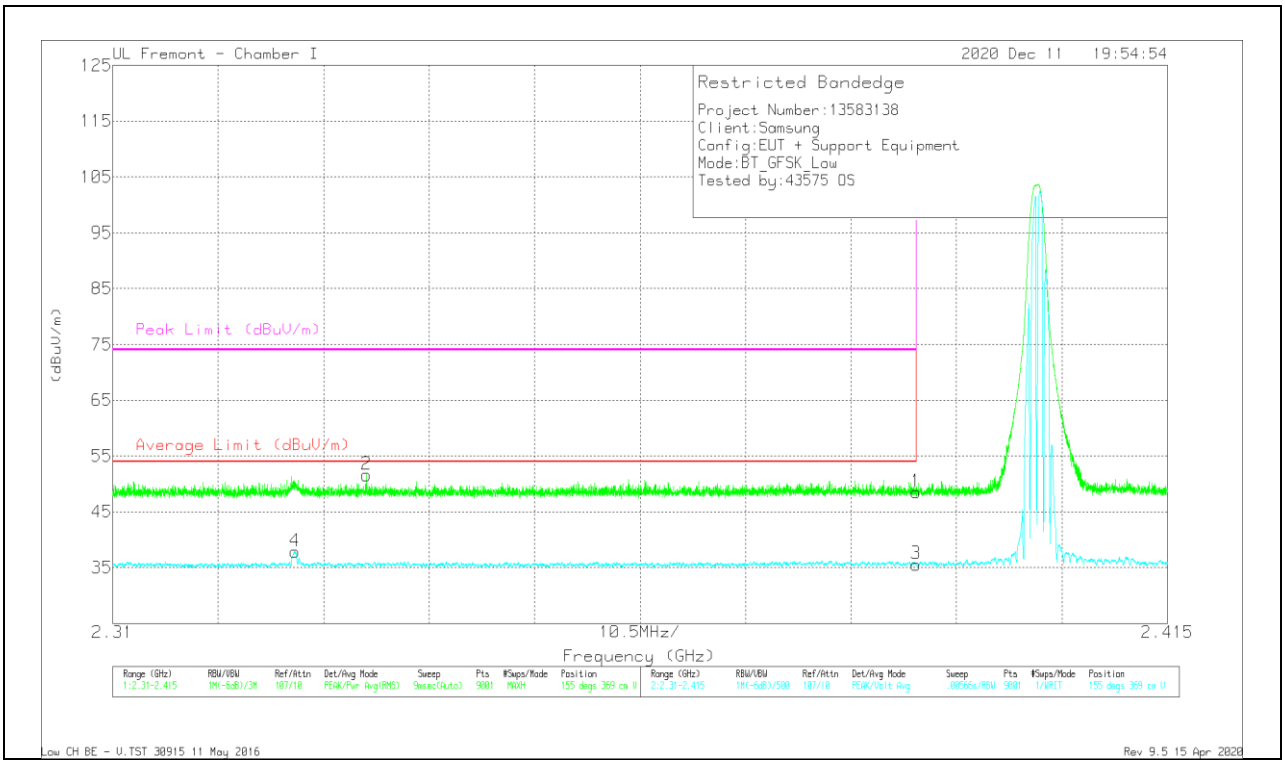
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	36.38	Pk	32	-19.8	48.58	-	-	74	-25.42	155	369	V
2	* 2.33524	39.4	Pk	31.8	-19.6	51.6	-	-	74	-22.4	155	369	V
3	* 2.38999	23.38	VA1T	32	-19.8	35.58	54	-18.42	-	-	155	369	V
4	* 2.32812	25.77	VA1T	31.7	-19.6	37.87	54	-16.13	-	-	155	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

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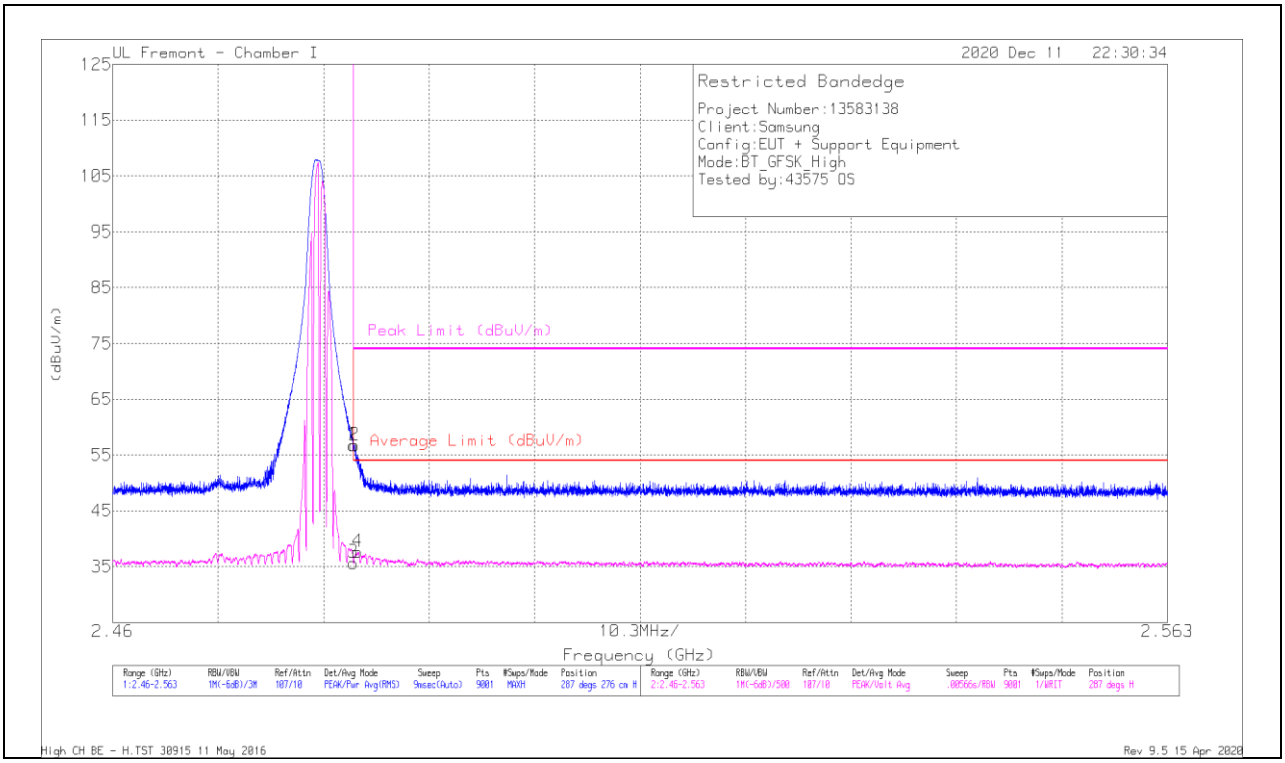
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	44.53	Pk	32.4	-20.2	56.73	-	-	74	-17.27	287	276	H
2	* 2.48364	44.6	Pk	32.4	-20.2	56.8	-	-	74	-17.2	287	276	H
3	* 2.48351	23.5	VA1T	32.4	-20.2	35.7	54	-18.3	-	-	287	276	H
4	* 2.48395	25.48	VA1T	32.4	-20.2	37.68	54	-16.32	-	-	287	276	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

UL VERIFICATION SERVICES INC.
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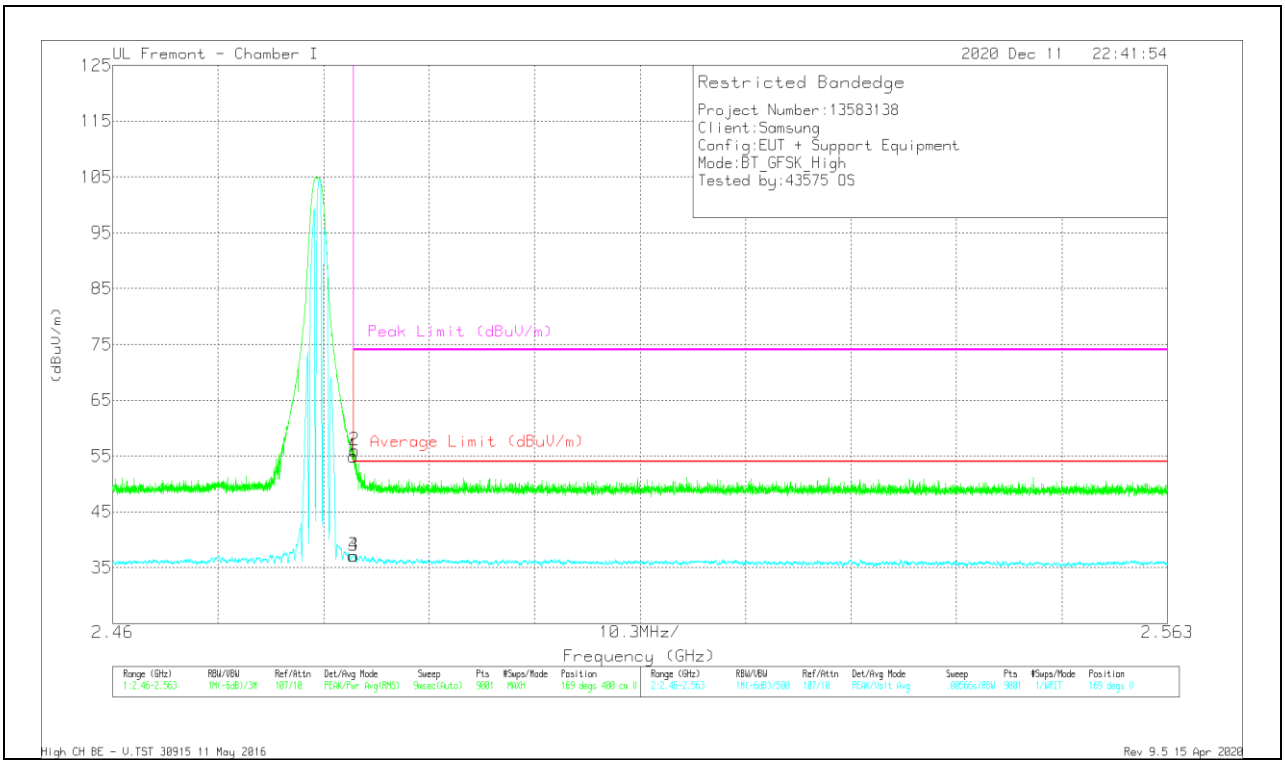
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	42.75	Pk	32.4	-20.2	54.95	-	-	74	-19.05	169	400	V
2	* 2.48361	43.83	Pk	32.4	-20.2	56.03	-	-	74	-17.97	169	400	V
3	* 2.48351	24.97	VA1T	32.4	-20.2	37.17	54	-16.83	-	-	169	400	V
4	* 2.48357	24.98	VA1T	32.4	-20.2	37.18	54	-16.82	-	-	169	400	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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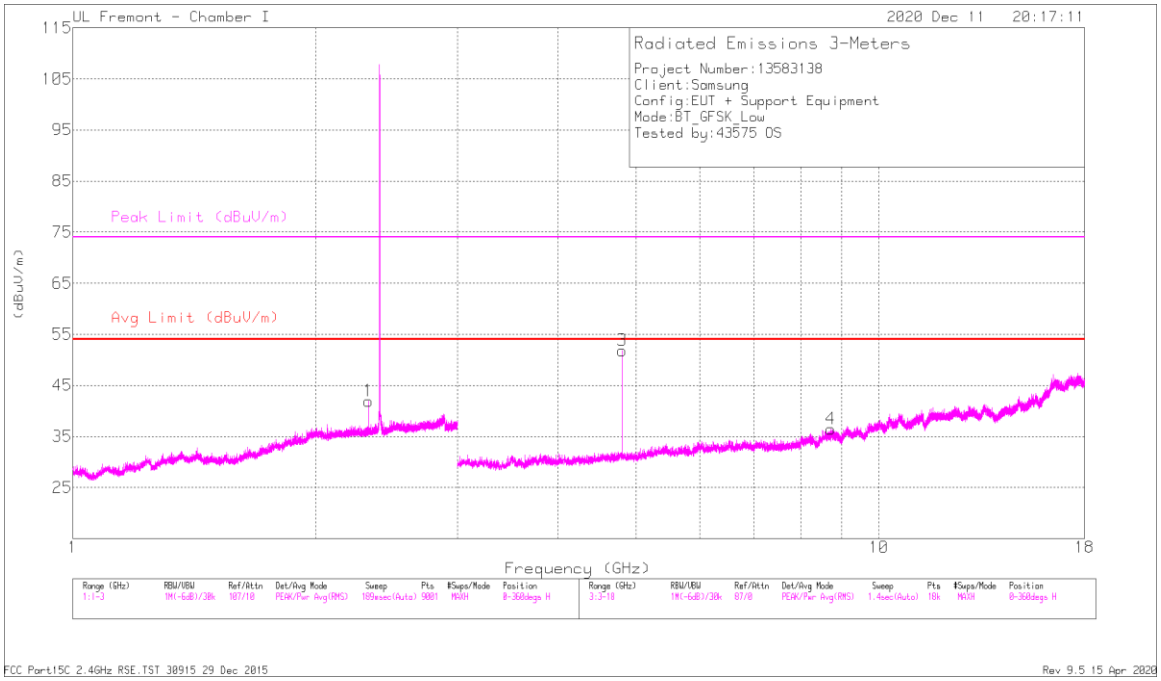
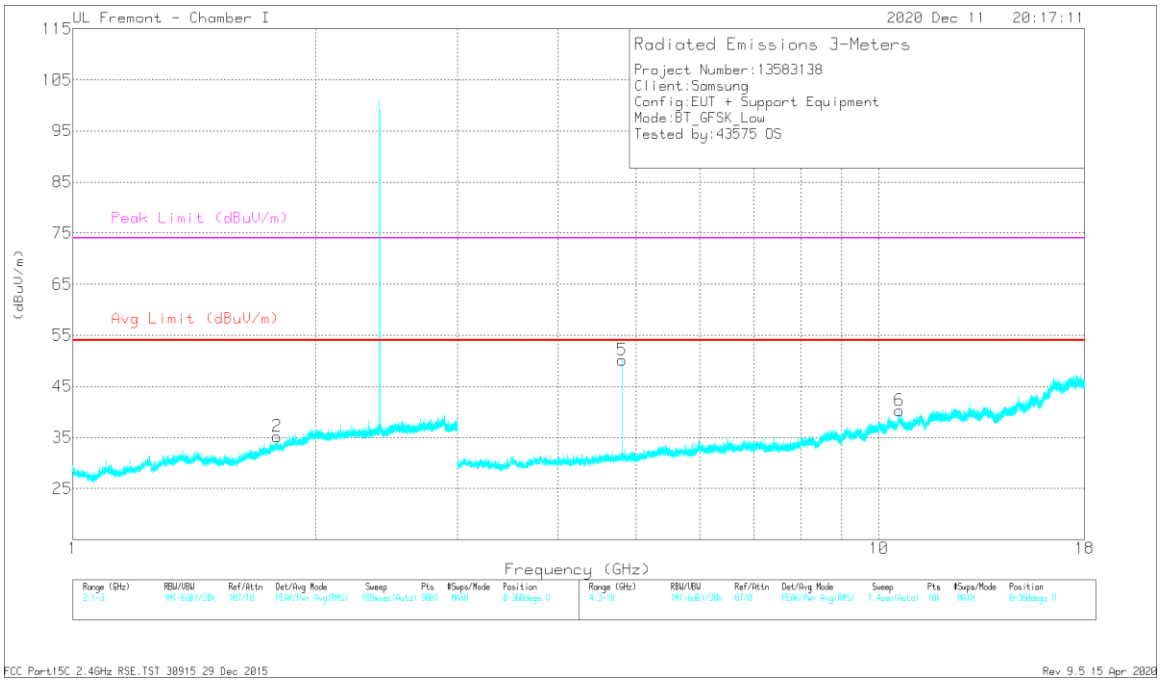
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.32819	32.11	PKFH	31.7	-18.2	45.61	-	-	74	-28.39	263	101	H
* 2.32797	25.29	VA1T	31.7	-18.2	38.79	54	-15.21	-	-	263	101	H
1.79481	29.77	PKFH	30.1	-18.7	41.17	-	-	-	-	209	184	V
1.79471	17.73	VA1T	30	-18.7	29.03	-	-	-	-	209	184	V
* 4.80431	45.35	PKFH	34.1	-26.6	52.85	-	-	74	-21.15	122	155	H
* 4.80424	44.12	VA1T	34.1	-26.6	51.62	54	-2.38	-	-	122	155	H
8.72124	29.1	PKFH	36.1	-22.7	42.5	-	-	-	-	104	118	H
8.71846	17.18	VA1T	36.1	-22.7	30.58	-	-	-	-	104	118	H
* 4.80447	45.29	PKFH	34.1	-26.6	52.79	-	-	74	-21.21	132	288	V
* 4.8043	44.11	VA1T	34.1	-26.6	51.61	54	-2.39	-	-	132	288	V
* 10.61304	27.9	PKFH	37.8	-19.4	46.3	-	-	74	-27.7	38	127	V
* 10.61169	15.88	VA1T	37.9	-19.4	34.38	54	-19.62	-	-	38	127	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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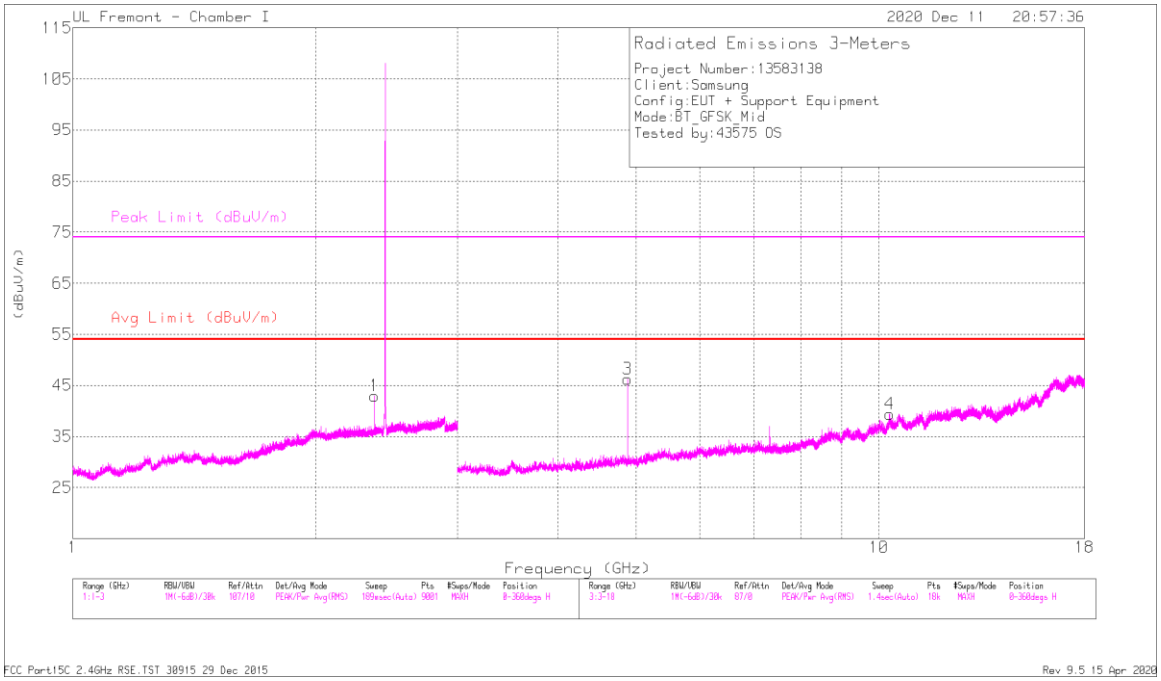
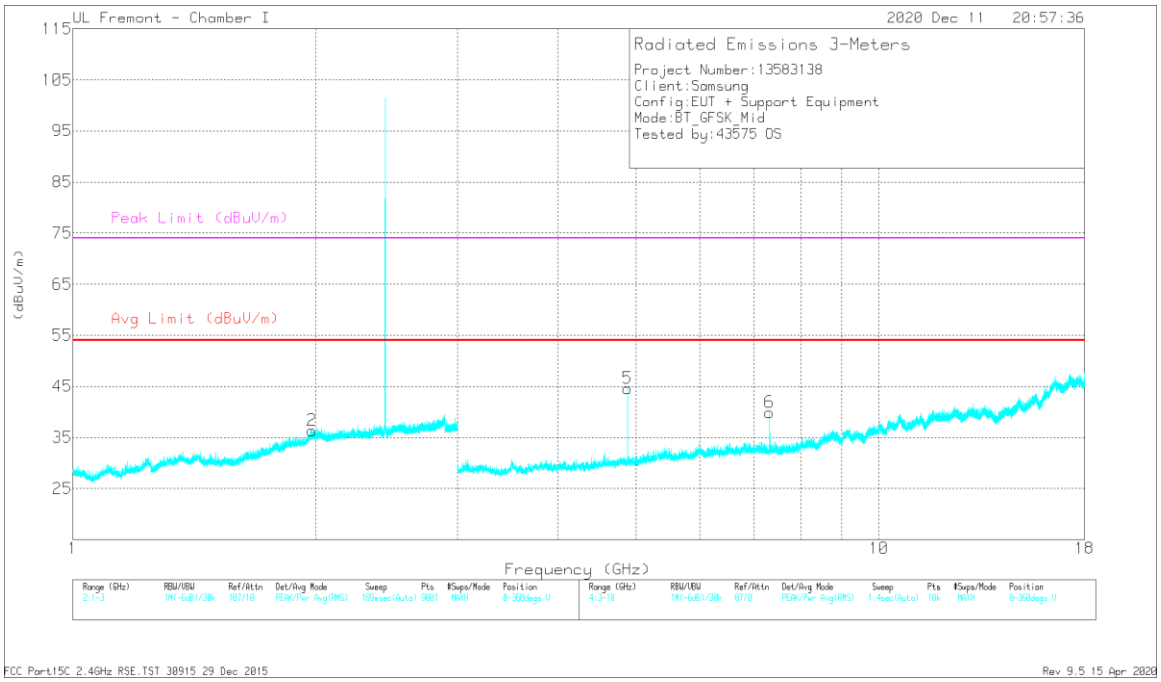
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.3676	34.7	PKFH	31.9	-18.3	48.3	-	-	74	-25.7	272	173	H
* 2.36761	28.03	VA1T	31.9	-18.3	41.63	54	-12.37	-	-	272	173	H
1.98095	30.33	PKFH	31.4	-18.3	43.43	-	-	-	-	318	186	V
1.98004	17.73	VA1T	31.4	-18.3	30.83	-	-	-	-	318	186	V
* 4.88241	41.8	PKFH	34	-27.1	48.7	-	-	74	-25.3	119	155	H
* 4.88231	39.86	VA1T	34	-27.1	46.76	54	-7.24	-	-	119	155	H
10.32158	28.3	PKFH	37.5	-19.1	46.7	-	-	-	-	221	177	H
10.32224	15.34	VA1T	37.5	-19.2	33.64	-	-	-	-	221	177	H
* 4.88159	42.07	PKFH	34	-27.1	48.97	-	-	74	-25.03	135	278	V
* 4.88228	40.03	VA1T	34	-27.1	46.93	54	-7.07	-	-	135	278	V
* 7.32323	32.78	PKFH	35.8	-24.7	43.88	-	-	74	-30.12	113	116	V
* 7.32335	26.38	VA1T	35.8	-24.7	37.48	54	-16.52	-	-	113	116	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

UL VERIFICATION SERVICES INC.
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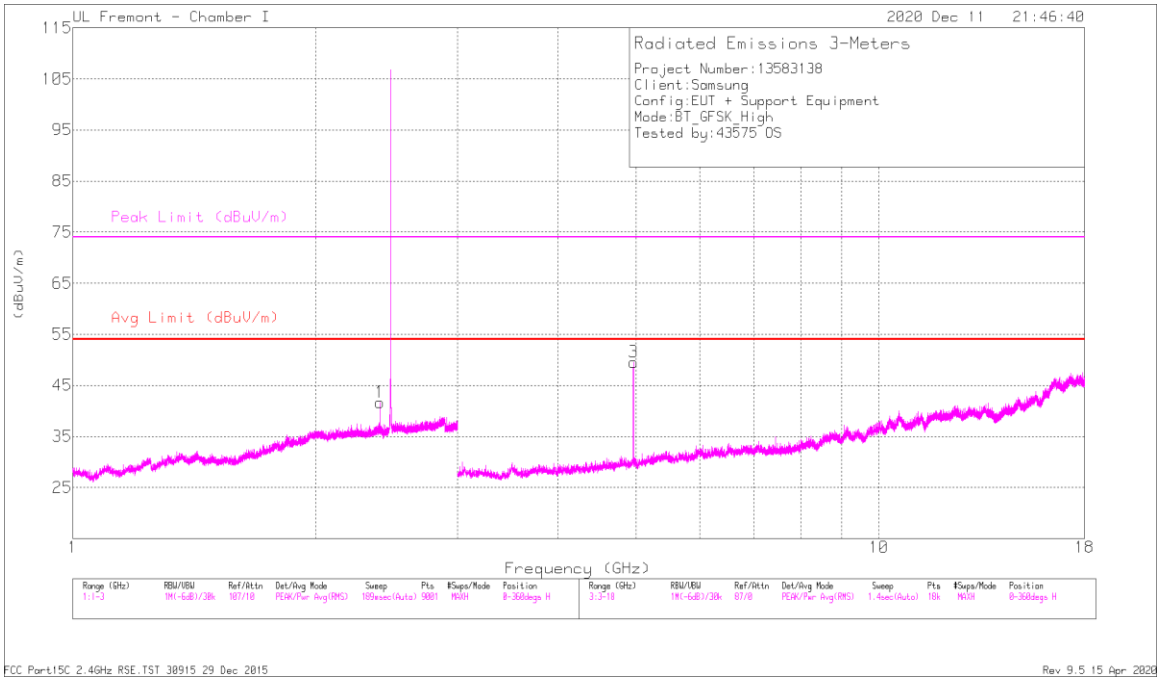
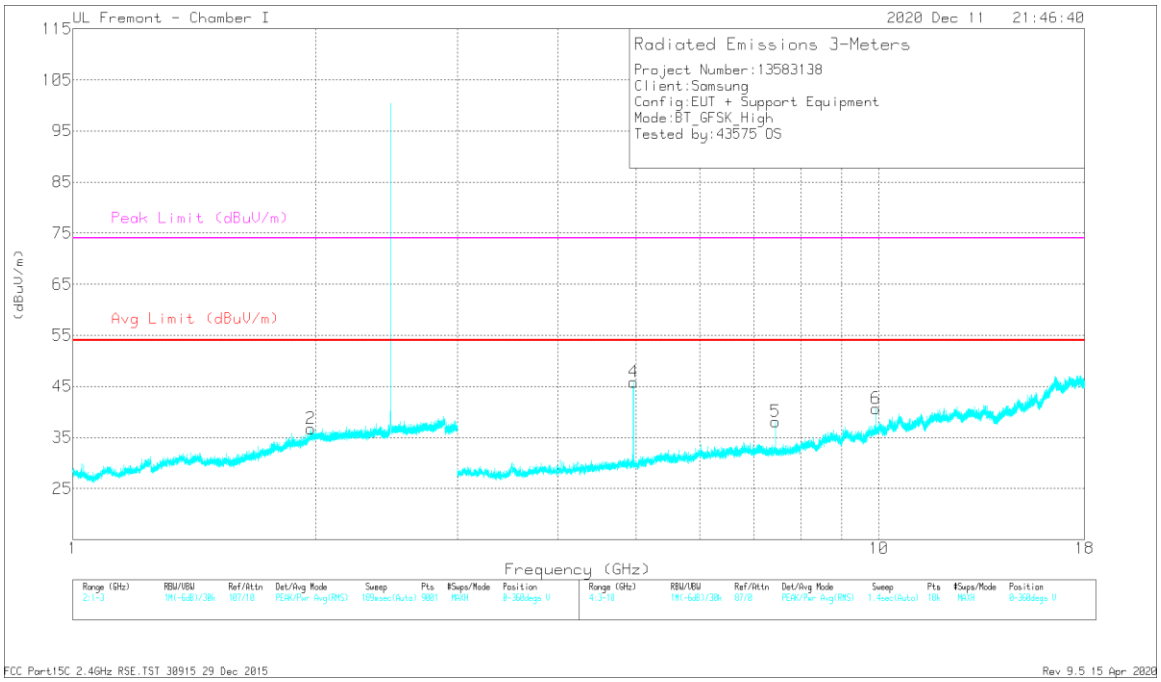
HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2.40587	33.24	PKFH	32.1	-18.2	47.14	-	-	-	-	270	274	H
2.40568	25.21	VA1T	32.1	-18.2	39.11	-	-	-	-	270	274	H
1.97364	30.14	PKFH	31.4	-18.3	43.24	-	-	-	-	4	173	V
1.97533	17.71	VA1T	31.4	-18.3	30.81	-	-	-	-	4	173	V
* 4.96025	43.83	PKFH	34.1	-27.7	50.23	-	-	74	-23.77	114	111	H
* 4.96039	41.69	VA1T	34	-27.7	47.99	54	-6.01	-	-	114	111	H
* 4.9602	42.13	PKFH	34.1	-27.7	48.53	-	-	74	-25.47	153	106	V
* 4.96028	40.26	VA1T	34.1	-27.7	46.66	54	-7.34	-	-	153	106	V
* 7.44018	31.32	PKFH	35.7	-23.8	43.22	-	-	74	-30.78	108	108	V
* 7.44047	25.17	VA1T	35.7	-23.8	37.07	54	-16.93	-	-	108	108	V
9.92056	31.46	PKFH	37	-21.3	47.16	-	-	-	-	70	101	V
9.92056	22.93	VA1T	37	-21.3	38.63	-	-	-	-	70	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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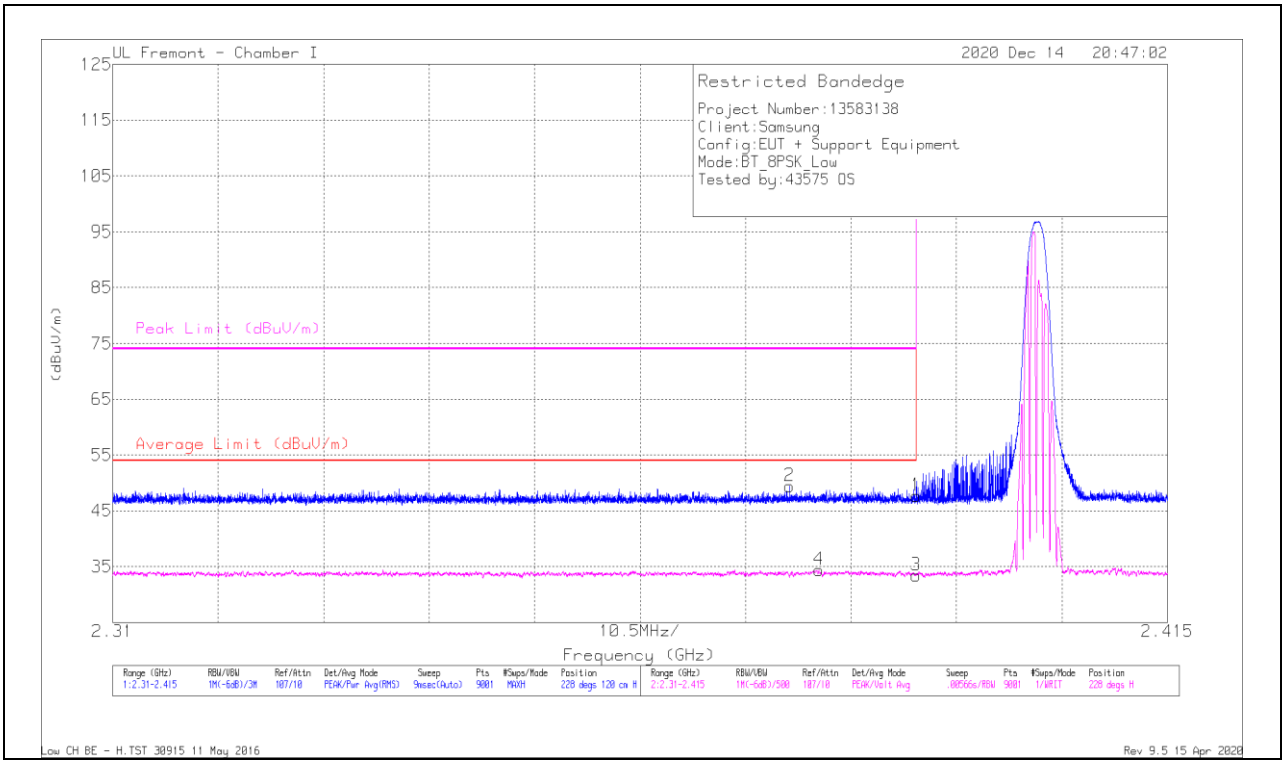
10.1.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	35.48	Pk	32	-19.8	47.68	-	-	74	-26.32	228	120	H
2	* 2.37739	37.08	Pk	32	-19.7	49.38	-	-	74	-24.62	228	120	H
3	* 2.38999	21.23	VA1T	32	-19.8	33.43	54	-20.57	-	-	228	120	H
4	* 2.38031	22.08	VA1T	32	-19.7	34.38	54	-19.62	-	-	228	120	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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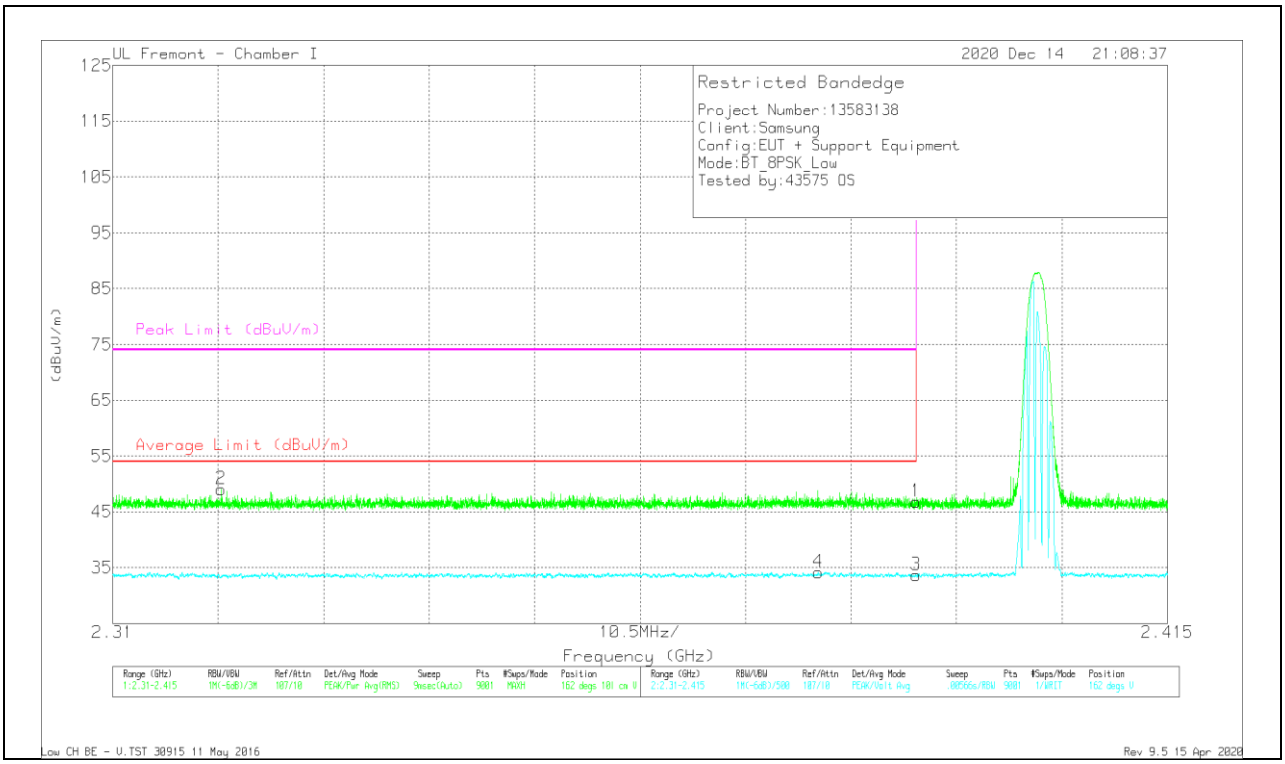
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	34.59	Pk	32	-19.8	46.79	-	-	74	-27.21	162	101	V
2	* 2.32078	36.87	Pk	31.7	-19.5	49.07	-	-	74	-24.93	162	101	V
3	* 2.38999	21.48	VA1T	32	-19.8	33.68	54	-20.32	-	-	162	101	V
4	* 2.38024	21.9	VA1T	32	-19.7	34.2	54	-19.8	-	-	162	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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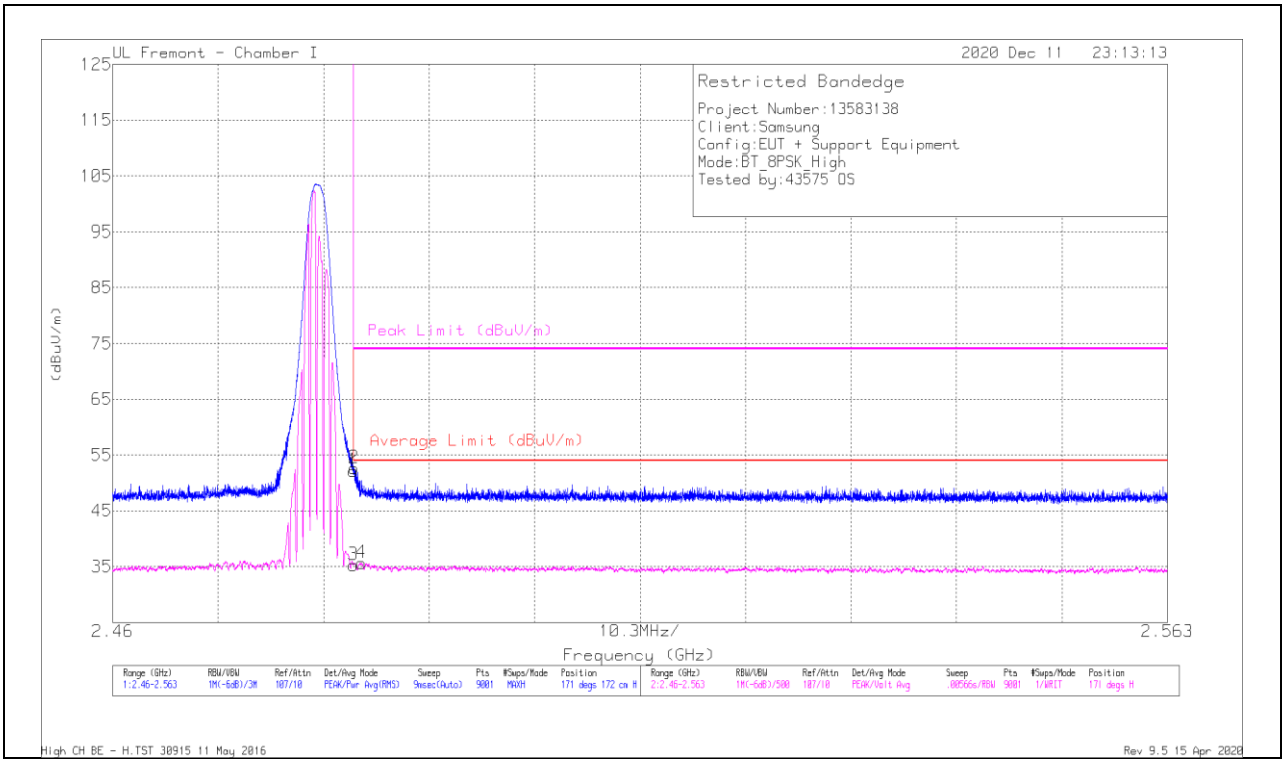
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	39.94	Pk	32.4	-20.2	52.14	-	-	74	-21.86	171	172	H
2	* 2.48356	40.41	Pk	32.4	-20.2	52.61	-	-	74	-21.39	171	172	H
3	* 2.48351	23.03	VA1T	32.4	-20.2	35.23	54	-18.77	-	-	171	172	H
4	* 2.48427	23.48	VA1T	32.4	-20.2	35.68	54	-18.32	-	-	171	172	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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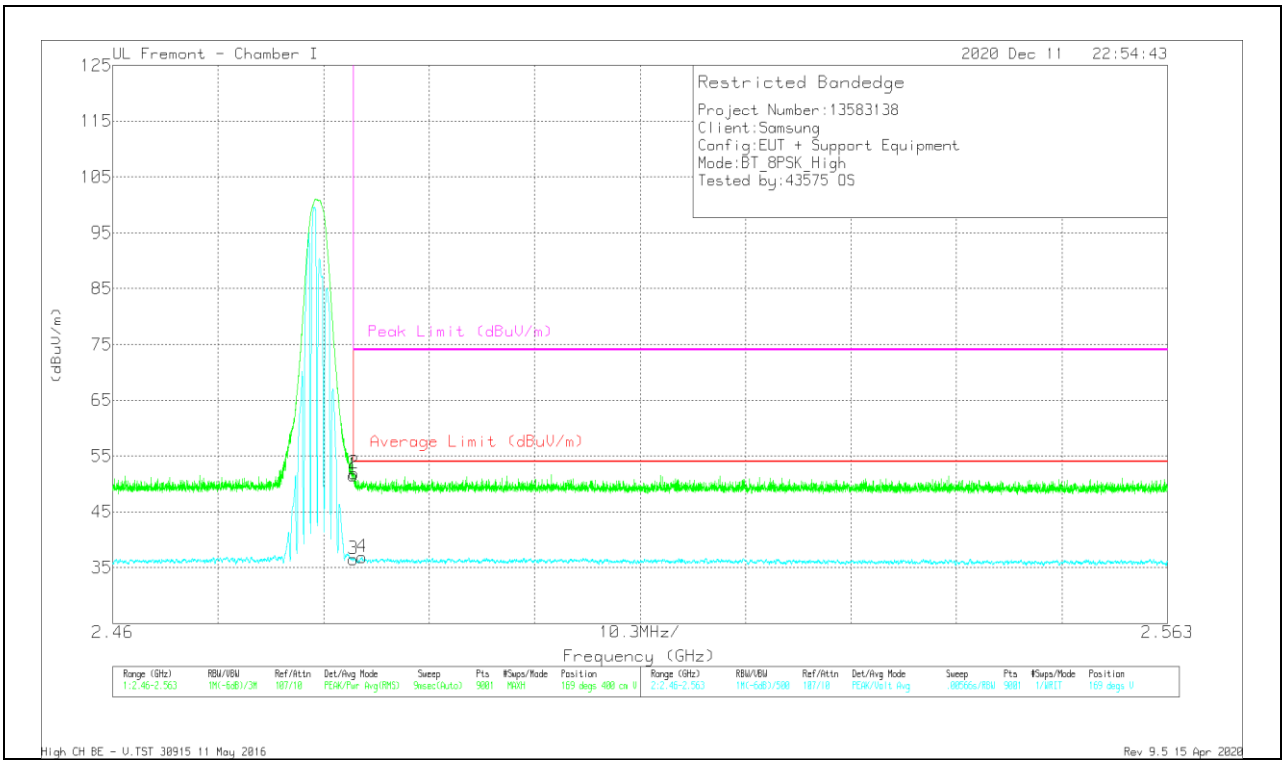
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	39.39	Pk	32.4	-20.2	51.59	-	-	74	-22.41	169	400	V
2	* 2.48357	39.69	Pk	32.4	-20.2	51.89	-	-	74	-22.11	169	400	V
3	* 2.48351	24.28	VA1T	32.4	-20.2	36.48	54	-17.52	-	-	169	400	V
4	* 2.48433	24.7	VA1T	32.4	-20.2	36.9	54	-17.1	-	-	169	400	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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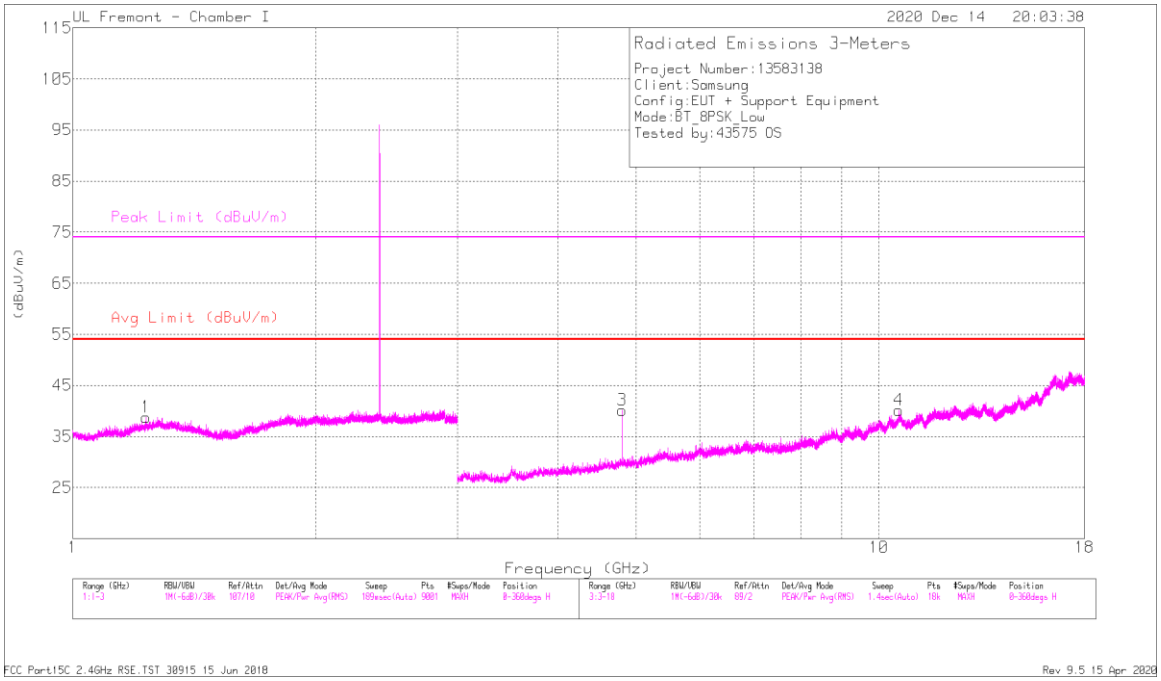
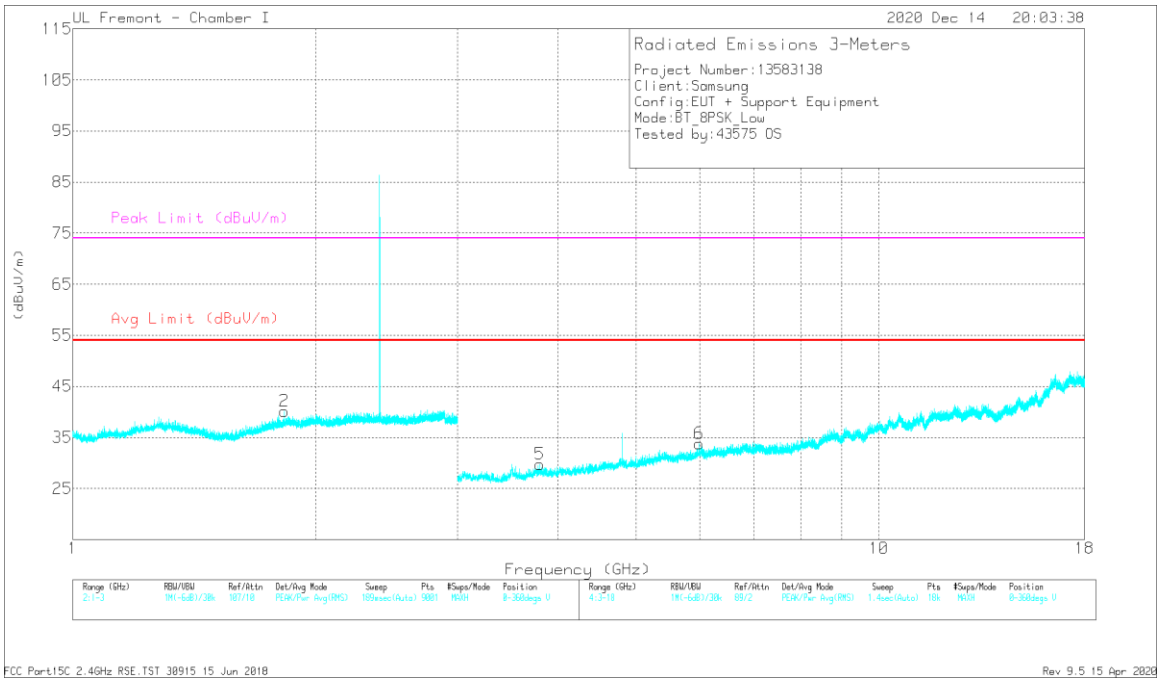
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.23469	37.54	PKFH	28.4	-20.4	45.54	-	-	74	-28.46	349	126	H
* 1.23333	24.69	VA1T	28.4	-20.4	32.69	54	-21.31	-	-	349	126	H
1.82975	36.22	PKFH	30.6	-20.1	46.72	-	-	-	-	210	160	V
1.83054	23.32	VA1T	30.6	-20.1	33.82	-	-	-	-	210	160	V
* 4.80388	37.34	PKFH	34.1	-26.6	44.84	-	-	74	-29.16	54	102	H
* 4.80323	32.78	VA1T	34.1	-26.6	40.28	54	-13.72	-	-	54	102	H
10.58846	28.91	PKFH	37.9	-19.4	47.41	-	-	-	-	257	295	H
10.58798	16.05	VA1T	37.9	-19.5	34.45	-	-	-	-	257	295	H
* 3.7985	30.82	PKFH	33.5	-27.8	36.52	-	-	74	-37.48	67	277	V
* 3.80106	18.93	VA1T	33.5	-27.8	24.63	54	-29.37	-	-	67	277	V
5.98773	29.29	PKFH	35.3	-24.7	39.89	-	-	-	-	216	120	V
5.98568	17.01	VA1T	35.3	-24.6	27.71	-	-	-	-	216	120	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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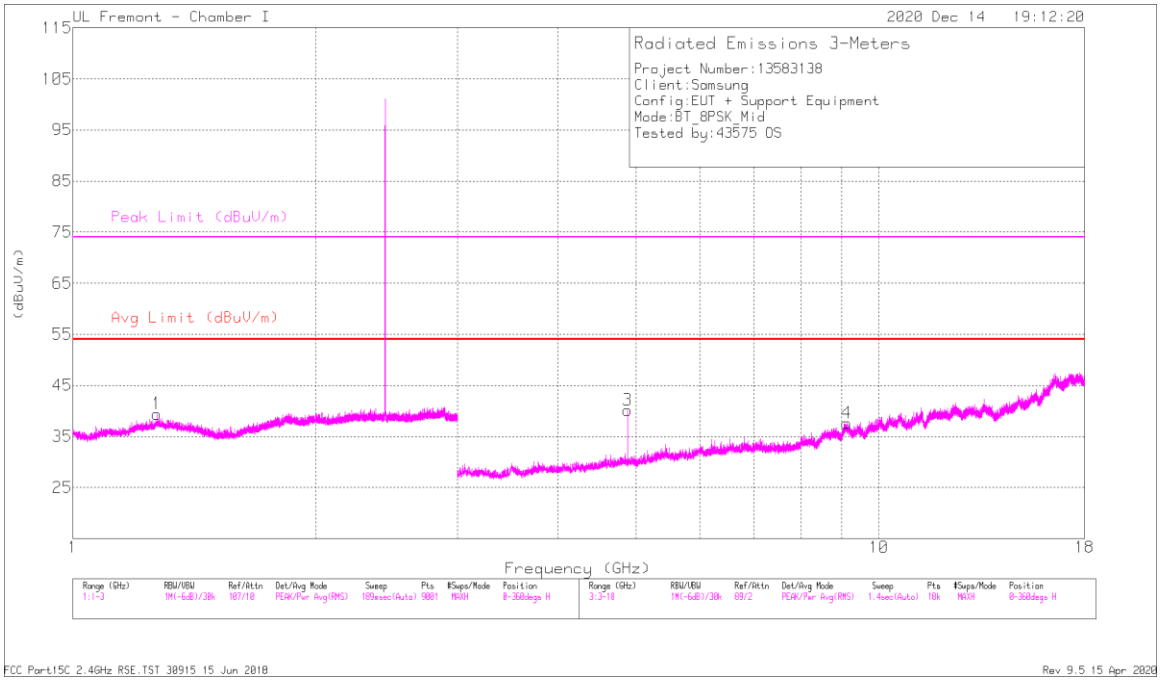
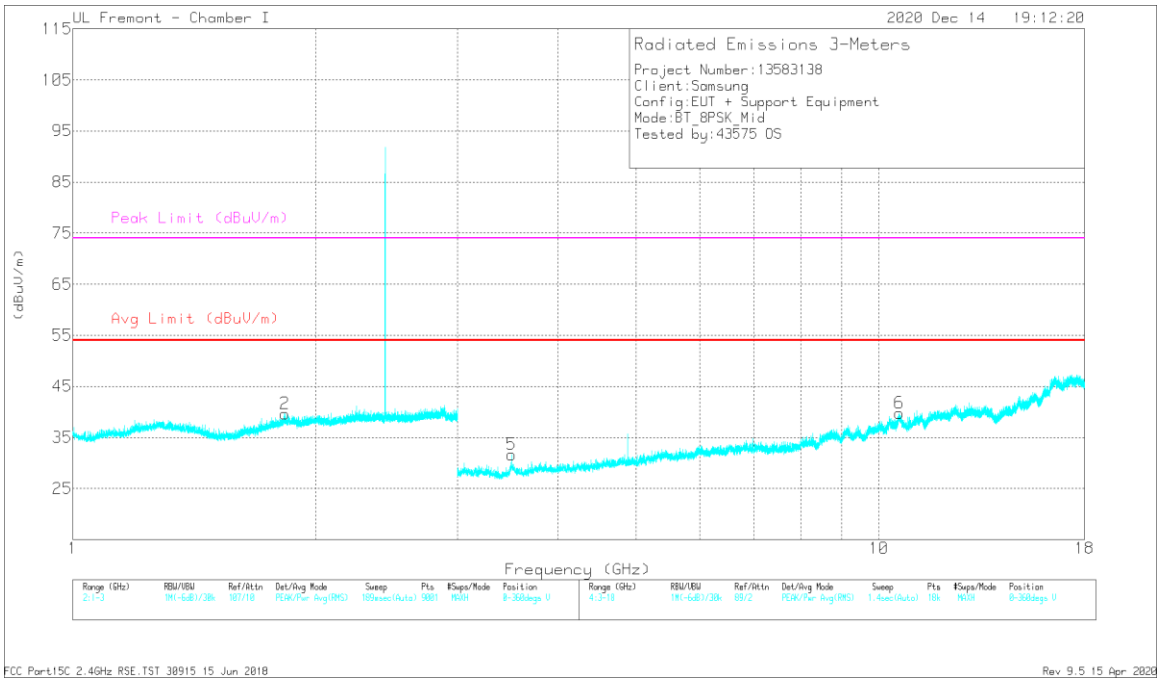
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.2737	36.62	PKFH	29.1	-20.4	45.32	-	-	74	-28.68	181	192	H
* 1.27122	24.42	VA1T	29	-20.4	33.02	54	-20.98	-	-	181	192	H
1.83229	37.03	PKFH	30.7	-20.1	47.63	-	-	-	-	46	271	V
1.83203	24.06	VA1T	30.7	-20.1	34.66	-	-	-	-	46	271	V
* 4.88181	38.37	PKFH	34	-27.1	45.27	-	-	74	-28.73	58	107	H
* 4.88129	33.09	VA1T	34	-27.1	39.99	54	-14.01	-	-	58	107	H
* 9.12446	28.23	PKFH	36.3	-20.6	43.93	-	-	74	-30.07	263	109	H
* 9.12477	15.71	VA1T	36.3	-20.6	31.41	54	-22.59	-	-	263	109	H
* 3.50187	31.16	PKFH	34.2	-27.9	37.46	-	-	74	-36.54	101	274	V
* 3.50192	19.41	VA1T	34.2	-27.9	25.71	54	-28.29	-	-	101	274	V
10.59635	28.23	PKFH	37.8	-19.3	46.73	-	-	-	-	297	301	V
10.5945	16.12	VA1T	37.8	-19.3	34.62	-	-	-	-	297	301	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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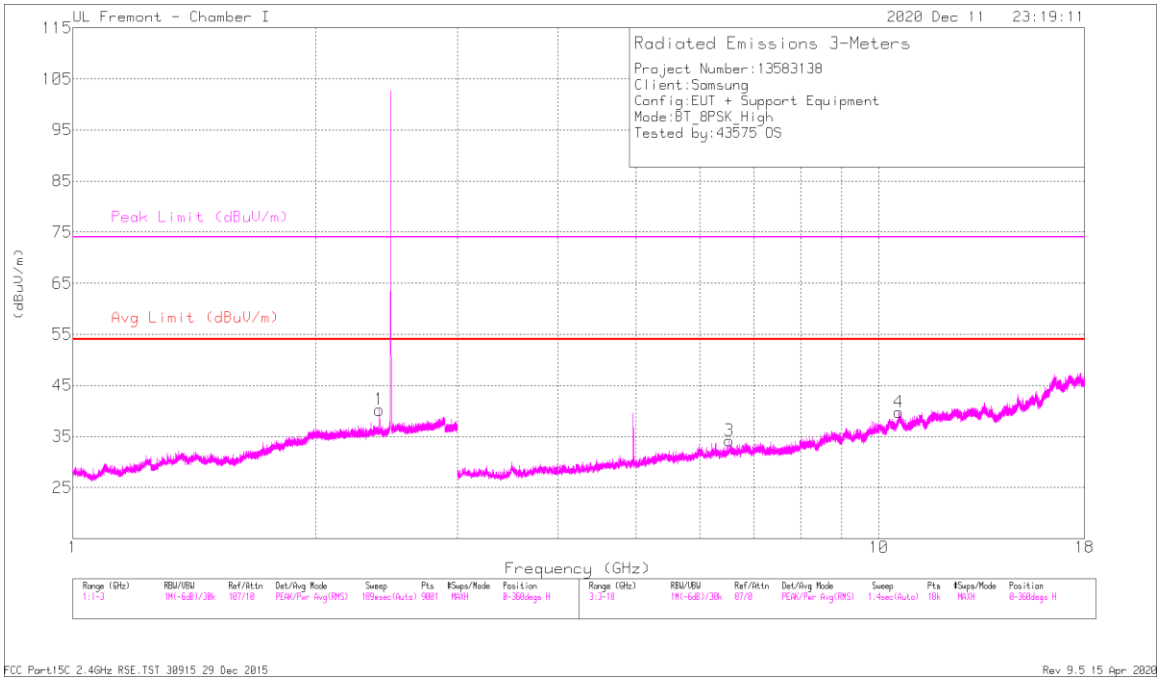
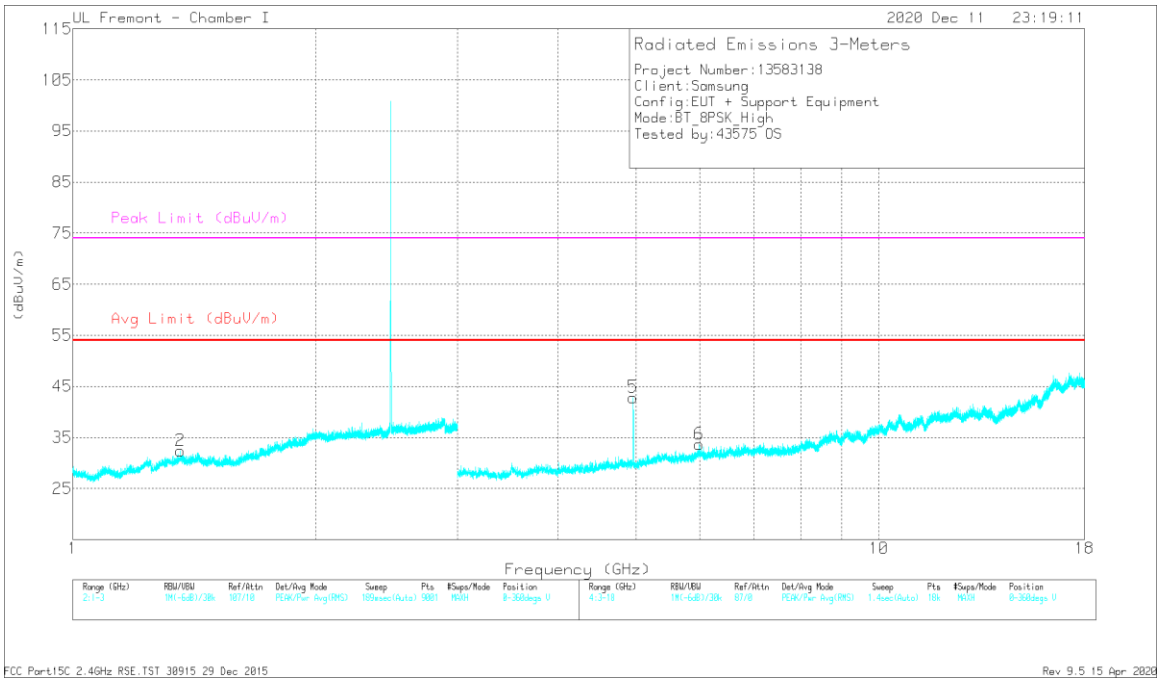
HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2.40415	30.23	PKFH	32.1	-18.2	44.13	-	-	-	-	142	268	H
2.40281	17.93	VA1T	32.1	-18.2	31.83	-	-	-	-	142	268	H
* 1.36239	30.59	PKFH	28.8	-20.3	39.09	-	-	74	-34.91	77	163	V
* 1.36066	18.12	VA1T	28.8	-20.3	26.62	54	-27.38	-	-	77	163	V
6.5197	29.14	PKFH	35.7	-24.7	40.14	-	-	-	-	244	101	H
6.51916	16.97	VA1T	35.7	-24.6	28.07	-	-	-	-	244	101	H
10.59029	27.94	PKFH	37.8	-19.4	46.34	-	-	-	-	18	102	H
10.59027	16.04	VA1T	37.8	-19.4	34.44	-	-	-	-	18	102	H
* 4.96022	41.83	PKFH	34.1	-27.7	48.23	-	-	74	-25.77	171	155	V
* 4.95923	38.73	VA1T	34.1	-27.6	45.23	54	-8.77	-	-	171	155	V
5.98618	30.08	PKFH	35.3	-24.6	40.78	-	-	-	-	178	154	V
5.98656	16.95	VA1T	35.3	-24.6	27.65	-	-	-	-	178	154	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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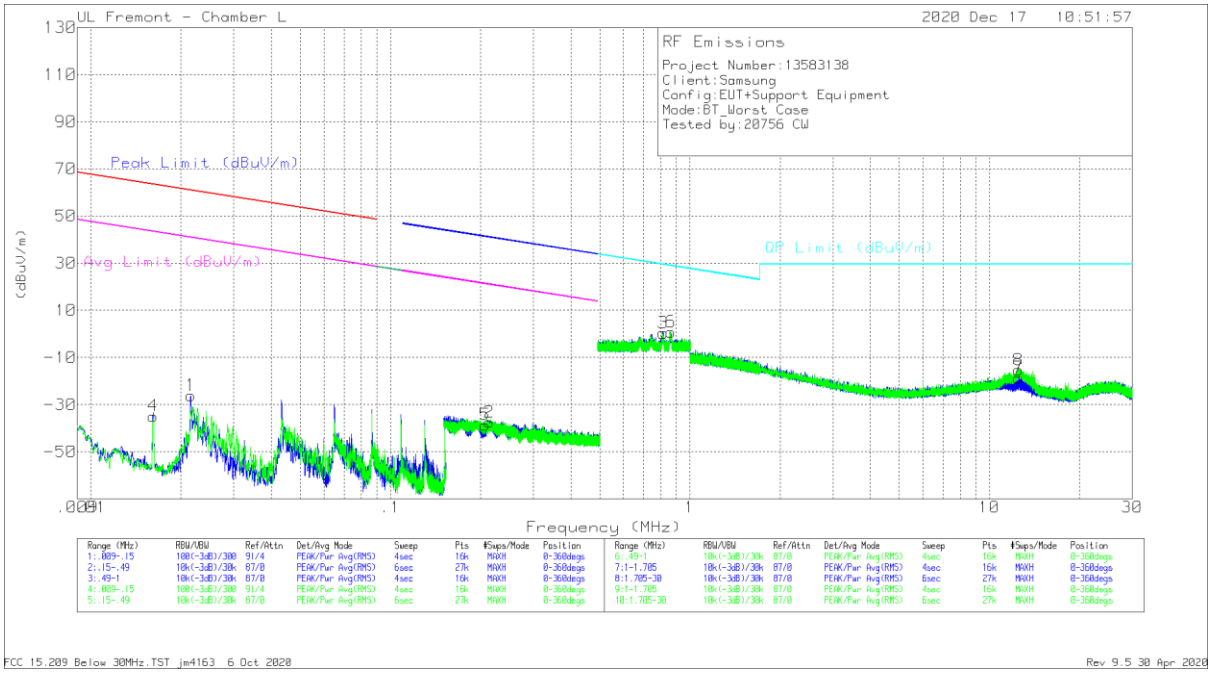
10.2. WORST CASE BELOW 30MHZ

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



ANTENNA- TWO ORIENTATIONS FACE ON/FACE OFF

Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Amp/Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.02154	27.63	Pk	58.6	-32.4	-80	-26.17	60.92	-87.09	40.92	-67.09	-	-	-	-	0-360
2	.2138	18.77	Pk	56.1	-32.3	-80	-37.43	-	-	-	-	41.02	-78.45	21.02	-58.45	0-360
4	.01616	18.22	Pk	59.3	-32.4	-80	-34.88	63.42	-98.3	43.42	-78.3	-	-	-	-	0-360
5	.2068	17.57	Pk	56.1	-32.3	-80	-38.63	-	-	-	-	41.31	-79.94	21.31	-59.94	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Amp/Cbl (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.8139	16.52	Pk	56.1	-32.2	-40	.42	29.4	-28.98	0-360
6	.86494	16.95	Pk	56.1	-32.2	-40	.85	28.88	-28.03	0-360
7	12.48578	18.93	Pk	34.3	-31.9	-40	-18.67	29.5	-48.17	0-360
8	12.50569	22.38	Pk	34.2	-31.9	-40	-15.32	29.5	-44.82	0-360

Pk - Peak detector

NOTE: The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table), using the free space impdedance of 377 Ohms. For example the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to Y – 51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

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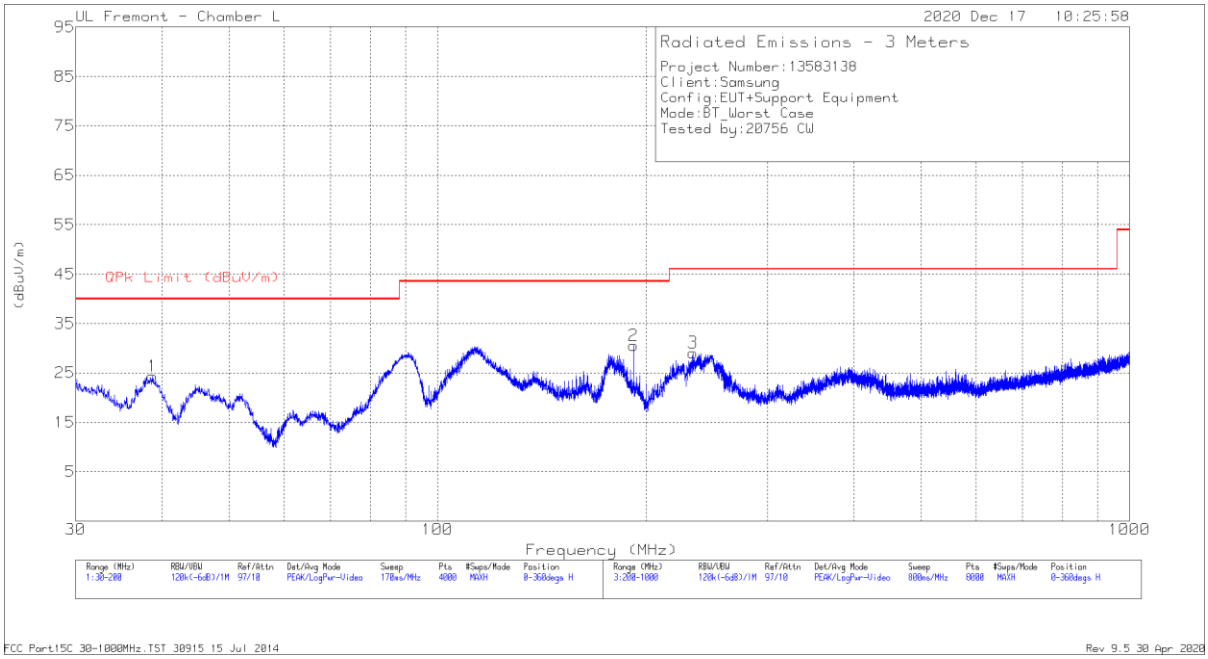
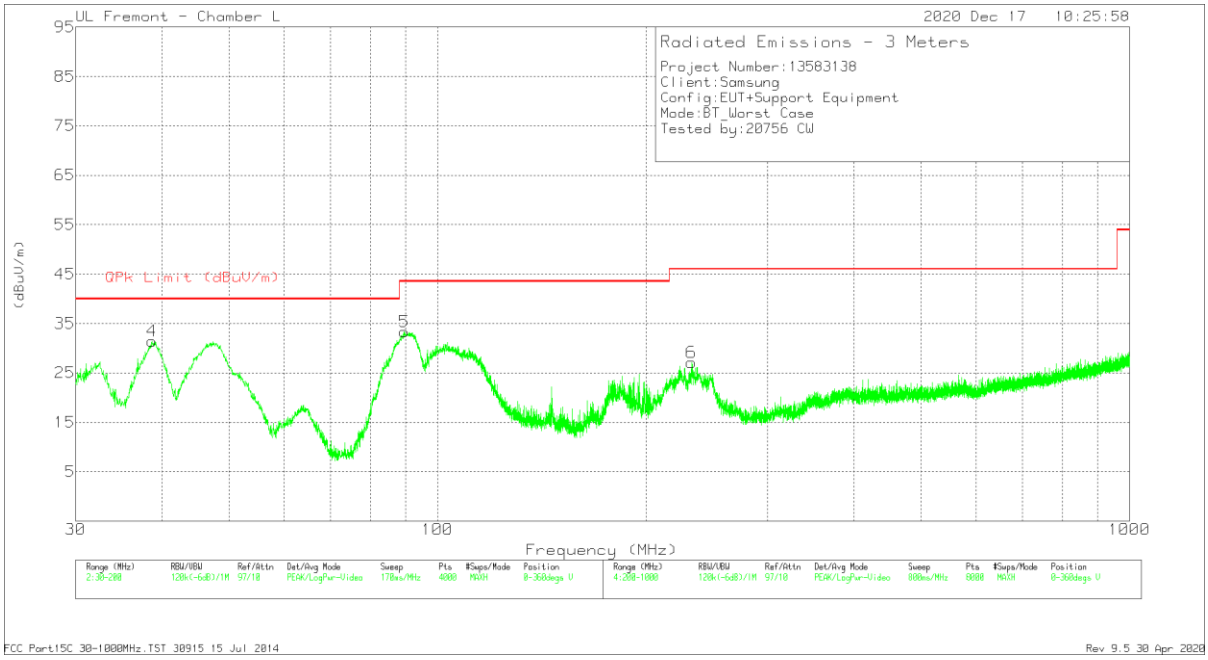
10.3. WORST CASE BELOW 1 GHZ

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



HORIZONTAL



VERTICAL

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Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184971 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	38.7148	34.94	Pk	20.7	-31.3	24.34	40	-15.66	0-360	399	H
2	192.0094	43.73	Pk	17	-30.2	30.53	43.52	-12.99	0-360	299	H
4	38.6722	42.04	Pk	20.7	-31.3	31.44	40	-8.56	0-360	101	V
5	89.4729	50.82	Pk	13.4	-30.9	33.32	43.52	-10.2	0-360	101	V
3	234.0044	41.89	Pk	17.2	-30	29.09	46.02	-16.93	0-360	101	H
6	232.8043	40.01	Pk	17.1	-30	27.11	46.02	-18.91	0-360	101	V

Pk - Peak detector

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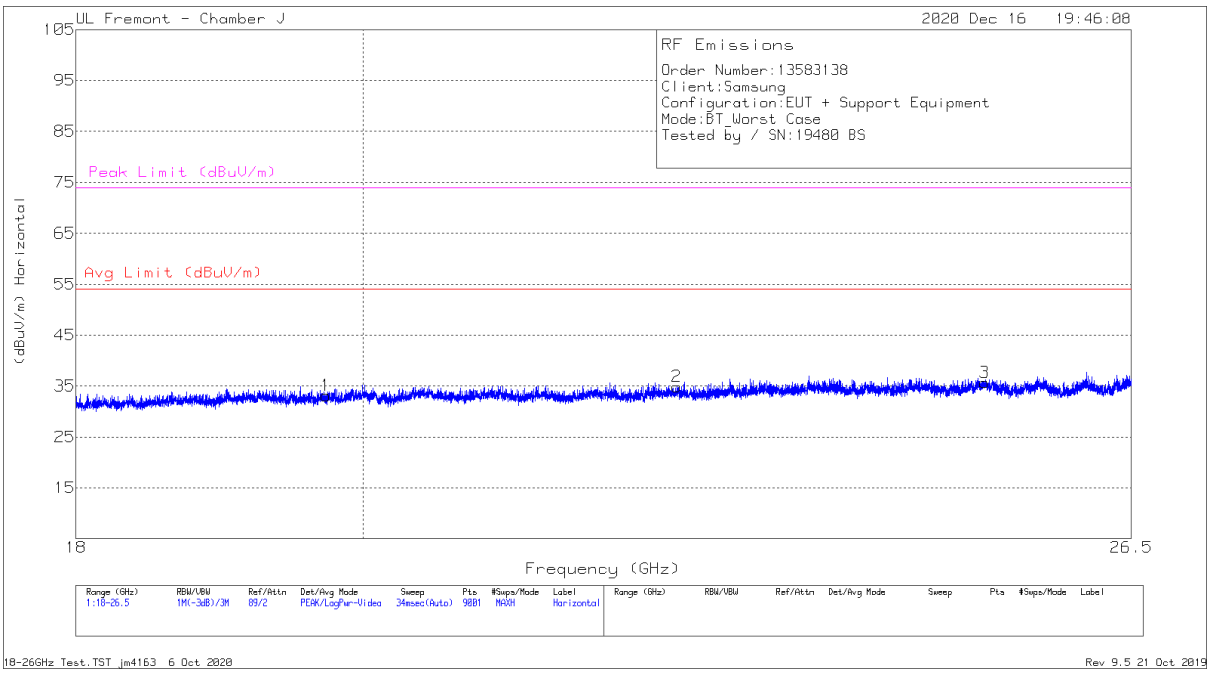
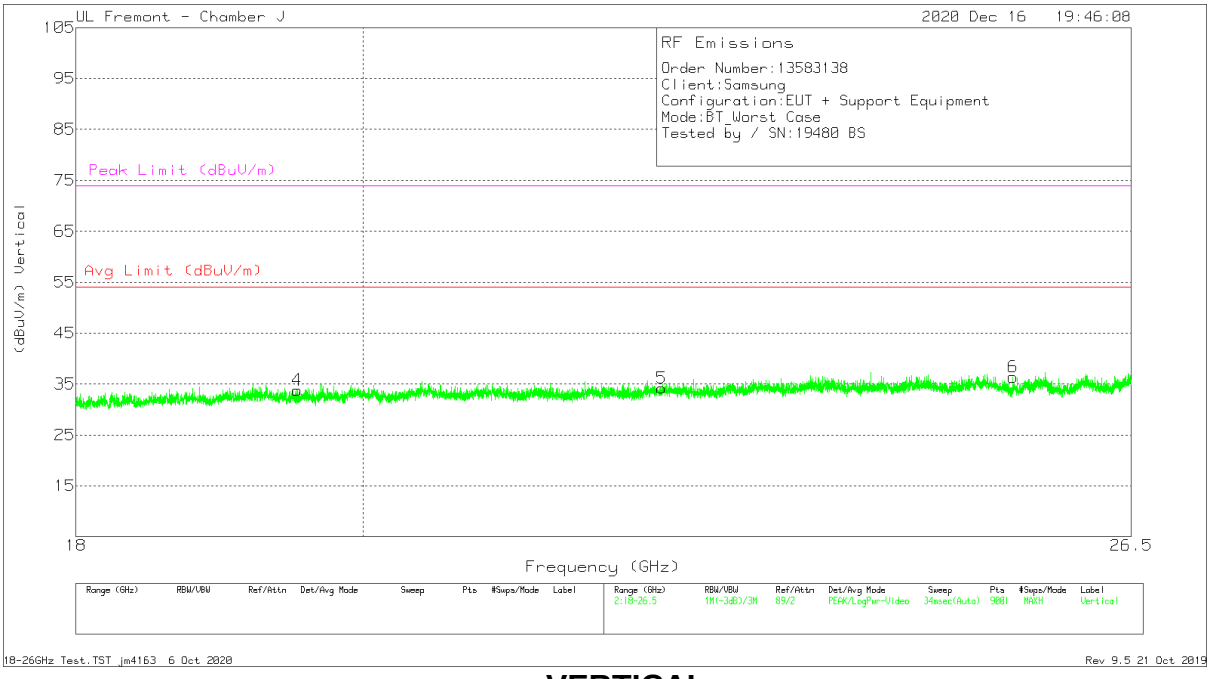
10.4. WORST CASE 18-26 GHZ

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



HORIZONTAL



VERTICAL

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18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T447 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.72739	66.84	Pk	32.8	-57	-9.5	33.14	54	-20.86	74	-40.86
2	22.43322	68.46	Pk	33.6	-57.7	-9.5	34.86	54	-19.14	74	-39.14
3	25.11261	65.7	Pk	34.6	-55.1	-9.5	35.7	54	-18.3	74	-38.3
4	19.51867	67.68	Pk	32.8	-57.2	-9.5	33.78	54	-20.22	74	-40.22
5	22.3095	67.9	Pk	33.6	-57.8	-9.5	34.2	54	-19.8	74	-39.8
6	25.37422	66.61	Pk	34.5	-55.2	-9.5	36.41	54	-17.59	74	-37.59

Pk - Peak detector

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11. 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

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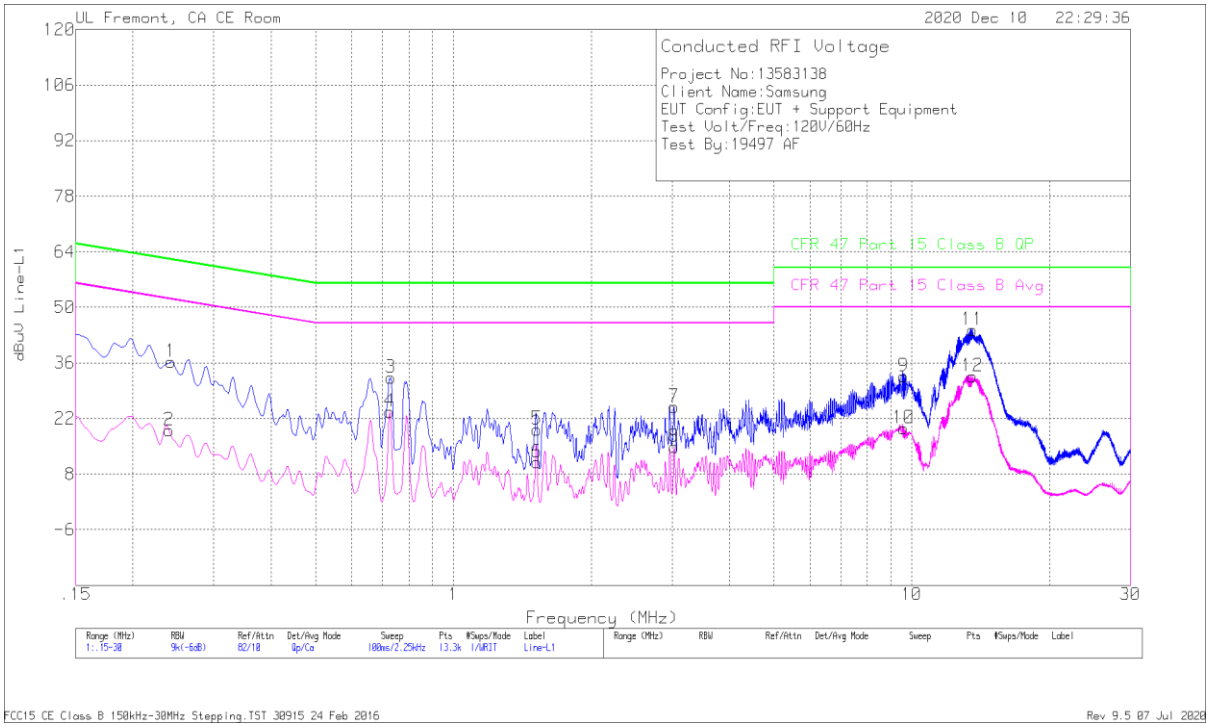
11.1.1. AC Power Line Norm

LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE018644 6 LISN L1	LC Cables C1&C3 dB	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)M argin (dB)
1	.24225	26.19	Qp	0	0	10.1	36.29	62.02	-25.73	-	-
2	.24	8.88	Ca	0	0	10.1	18.98	-	-	52.1	-33.12
3	.7305	22.24	Qp	0	0	10.1	32.34	56	-23.66	-	-
4	.726	13.56	Ca	0	0	10.1	23.66	-	-	46	-22.34
5	1.5225	9.08	Qp	0	.1	10.1	19.28	56	-36.72	-	-
6	1.5225	.85	Ca	0	.1	10.1	11.05	-	-	46	-34.95
7	3.02775	14.66	Qp	0	.1	10.2	24.96	56	-31.04	-	-
8	3.03	4.53	Ca	0	.1	10.2	14.83	-	-	46	-31.17
9	9.60675	22.2	Qp	0	.2	10.2	32.6	60	-27.4	-	-
10	9.60675	9.14	Ca	0	.2	10.2	19.54	-	-	50	-30.46
11	13.56	33.86	Qp	.1	.2	10.2	44.36	60	-15.64	-	-
12	13.56	22.2	Ca	.1	.2	10.2	32.7	-	-	50	-17.3

Qp - Quasi-Peak detector
Ca - CISPR average detection

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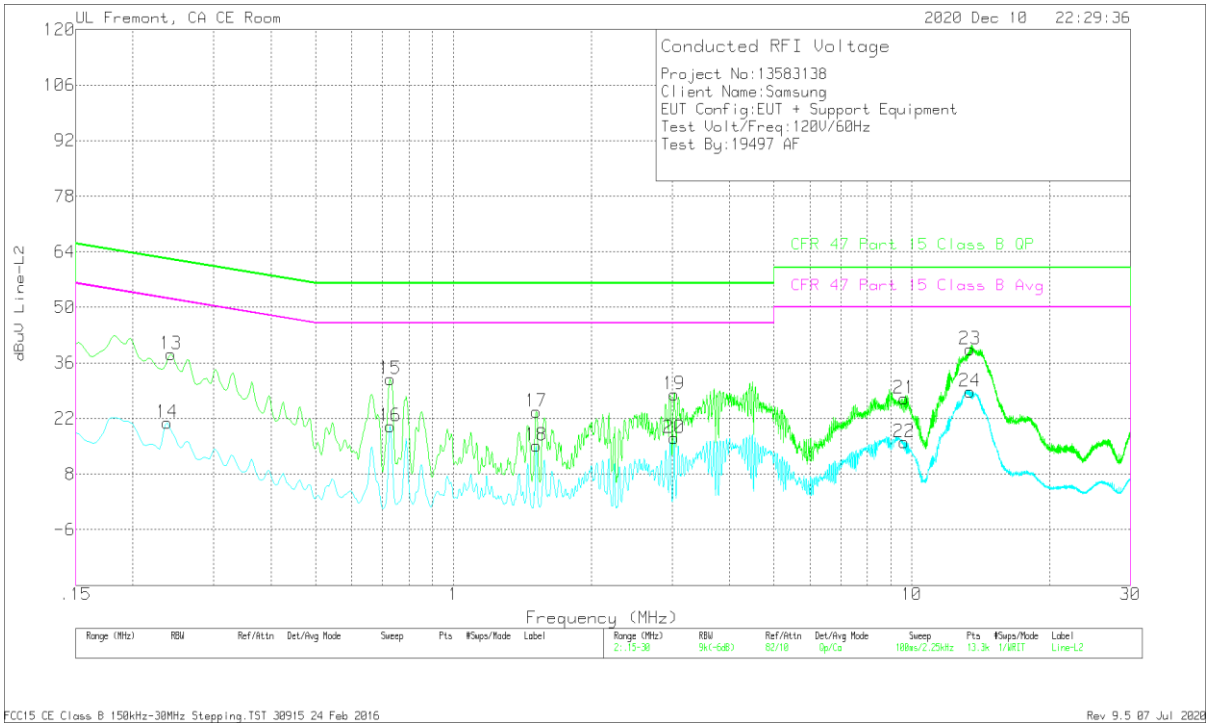
LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE018644 6 LISN L2	LC Cables C2&C3 dB	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
13	.24225	28.08	Qp	0	0	10.1	38.18	62.02	-23.84	-	-
14	.23775	10.82	Ca	0	0	10.1	20.92	-	-	52.17	-31.25
15	.72825	21.91	Qp	0	0	10.1	32.01	56	-23.99	-	-
16	.72825	10	Ca	0	0	10.1	20.1	-	-	46	-25.9
17	1.518	13.6	Qp	0	.1	10.1	23.8	56	-32.2	-	-
18	1.51575	4.96	Ca	0	.1	10.1	15.16	-	-	46	-30.84
19	3.03225	17.73	Qp	0	.1	10.2	28.03	56	-27.97	-	-
20	3.03225	6.83	Ca	0	.1	10.2	17.13	-	-	46	-28.87
21	9.6315	16.66	Qp	0	.2	10.2	27.06	60	-32.94	-	-
22	9.636	5.71	Ca	0	.2	10.2	16.11	-	-	50	-33.89
23	13.4025	28.89	Qp	.1	.2	10.2	39.39	60	-20.61	-	-
24	13.407	18.28	Ca	.1	.2	10.2	28.78	-	-	50	-21.22

Qp - Quasi-Peak detector
Ca - CISPR average detection

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