



CERTIFICATION TEST REPORT

Report Number. : 12563993-E3V2

Applicant : Samsung Electronics Co., Ltd.
129 Samsung-Ro, Yeongtong-Gu,
Suwon-Si, Gyeonggi-Do, 16677, Korea

Model : SM-G970N

FCC ID : A3LSMG970KOR

EUT Description : GSM/WCDMA/LTE phone with BT, DTS/UNII a/b/g/n/ac/11ax HE
20/40/80, ANT+ and NFC

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

Date Of Issue:
January 29, 2019

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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	1/24/2019	Initial Issue	
V2	1/29/2019	Updated Section 2.1, 2.2, 2.3, add section 2.4	Dan Corona

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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 phone with BT, DTS/UNII a/b/g/n/ac/11ax HE
20/40/80, ANT+ and NFC

MODEL: SM-G970N

SERIAL NUMBER: R38KA0H49TL (Conducted), R38KB05BJQB (Radiated) (Original)
R39KB0AHYCP, R39KB0AHYMF (Radiated) (Spot Check)

DATE TESTED: OCTOBER 30, 2018 TO JANUARY 7, 2019 (ORIGINAL)
DECEMBER 13, 2018 (SPOT CHECK)

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. INTRODUCTION OF TEST DATA REUSE

2.1. INTRODUCTION

According to the manufacturer, FCC ID: A3LSMG970F and FCC ID: A3LSMG970KOR non-licensed radios are electrically identical. The FCC ID: A3LSMG970F test data shall remain representative of FCC ID: A3LSMG970KOR.

The applicant takes full responsibility that the test data as referenced in this section represents compliance for this FCC ID.

2.2. DIFFERENCES

The FCC ID: A3LSMG970F, shares the same enclosure and circuit board as FCC ID: A3LSMG970KOR. The BLE antennas and surrounding circuitry and layout are identical between two models.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMG970F remains representative of FCC ID: A3LSMG970KOR. The test data of FCC ID: A3LSMG970F being submitted for this application to cover BLE features.

2.3. SPOT CHECK VERIFICATION RESULTS SUMMARY

Spot check verification has been done on device A3LSMG970KOR for radiated harmonic spurious and radiated band-edge. The data from the application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the summary below.

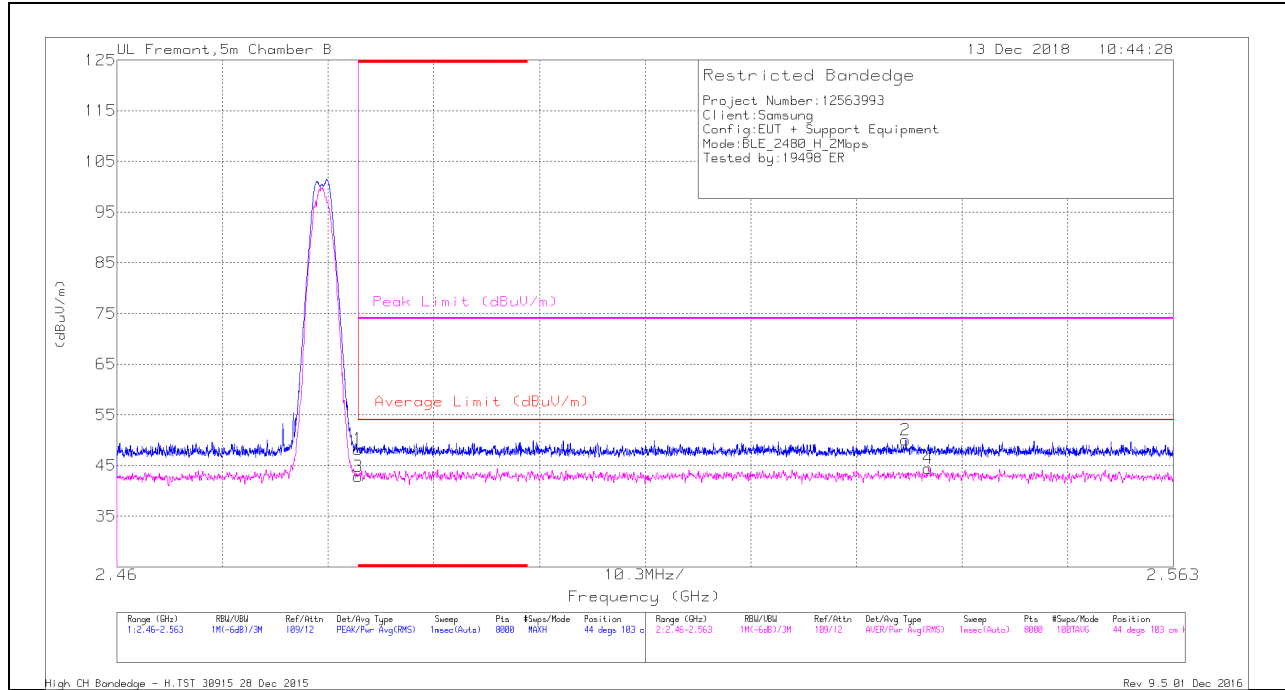
A3LSMG970KOR SPOT CHECK RESULTS										
Technology	Mode	Test Item	Channel	Measured Frequency	Original model		Spot check model		Delta (dB)	
					SM-G970F		SM-G970N			
					A3LSMG970F		A3LSMG970KOR			
					Peak	Ave	Peak	Ave	Peak	Ave
BLE	2Mbps	RBE	39	2488MHz	50.53	44.55	50.09	44.5	-0.44	-0.05
	2Mbps	RSE	39	12071MHz	50.61	44.36	50.45	43.52	-0.16	-0.84

Comparison of the models, upper deviation is within 3dB range and all test are under FCC Technical Limits.

2.3.1. SPOT CHECK DATA

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Trace Markers

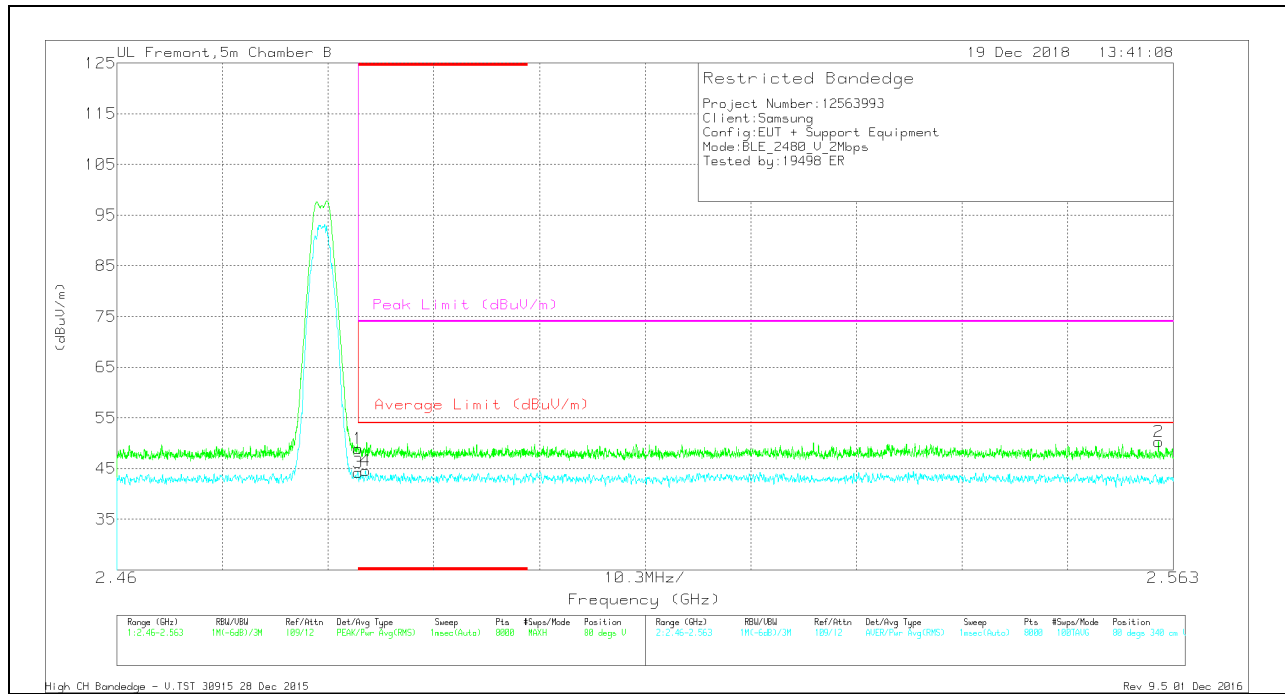
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb1/Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	35.94	Pk	32.6	-20.3	0	48.24	-	-	74	-25.76	44	103	H
3	* 2.484	25.48	RMS	32.6	-20.3	5.1	42.88	54	-11.12	-	-	44	103	H
2	2.537	37.69	Pk	32.7	-20.3	0	50.09	-	-	74	-23.91	44	103	H
4	2.539	27	RMS	32.7	-20.3	5.1	44.5	54	-9.5	-	-	44	103	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



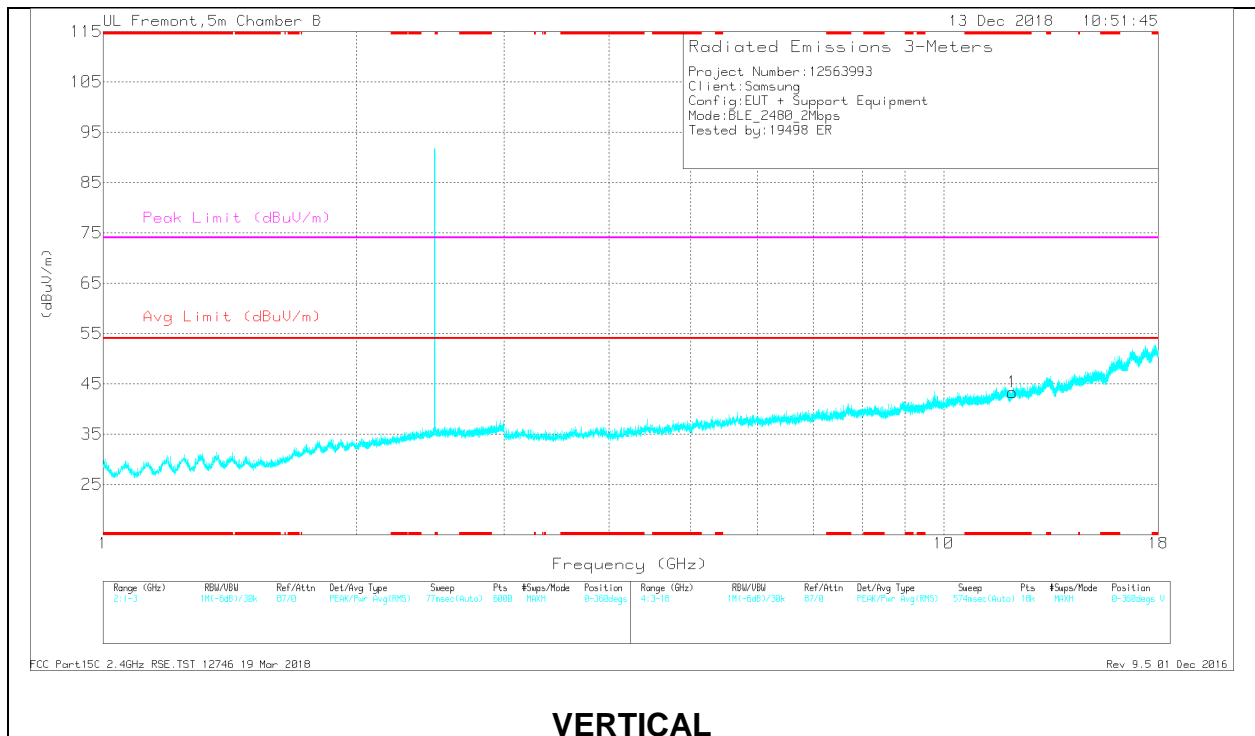
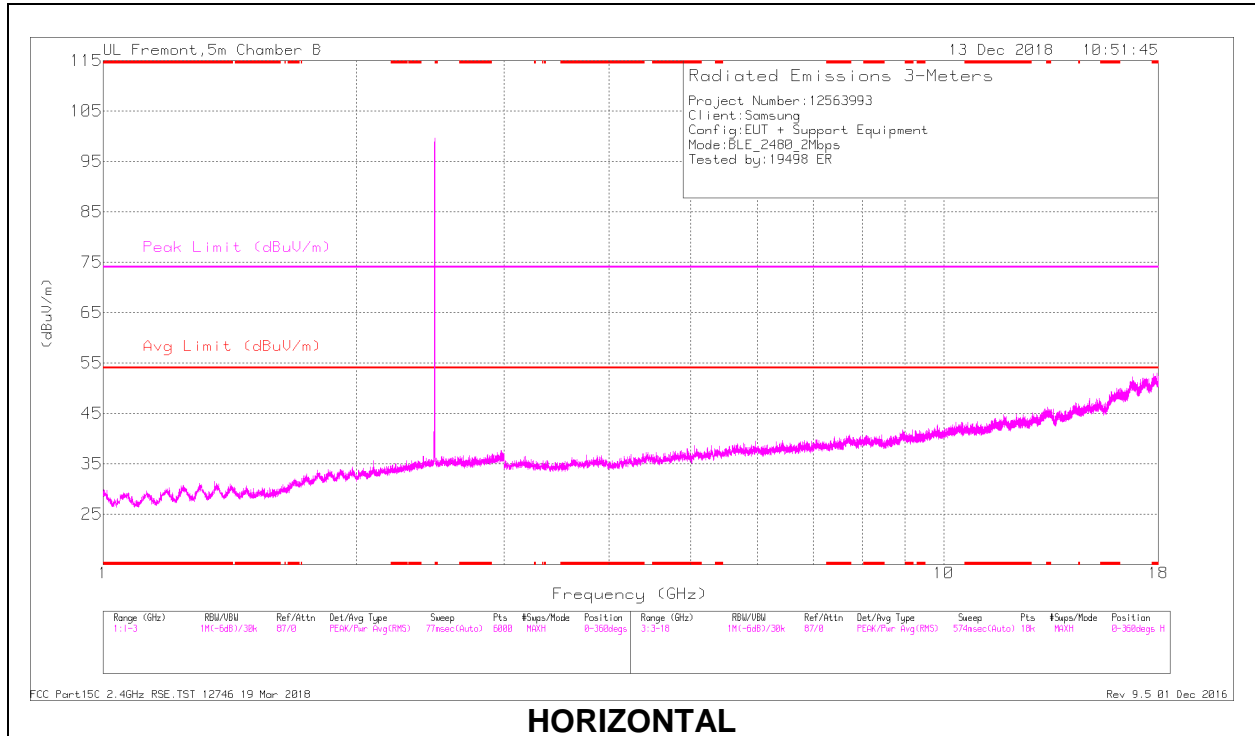
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.64	Pk	32.6	-20.3	0	48.94	-	-	74	-25.06	80	340	V
3	* 2.484	26.79	RMS	32.6	-20.3	5.1	44.19	54	-9.81	-	-	80	340	V
4	* 2.484	27.26	RMS	32.6	-20.4	5.1	44.56	54	-9.44	-	-	80	340	V
2	2.562	38.23	Pk	32.7	-20.6	0	50.33	-	-	74	-23.67	80	340	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 12.072	33.25	PK2	38.9	-21.7	0	50.45	-	-	74	-23.55	285	329	V
* 12.07	21.22	MAv1	38.9	-21.7	5.1	43.52	54	-10.48	-	-	285	329	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

2.4. REFERENCE DETAIL

Reference application that contains the reused reference data.

Equipment Class	Reference FCC ID	Type Grant/ Permissive Change	Reference Application	Folder Test/RF Exposure	Report Title/Section
PCE	A3LSMG970F	Grant	12563734-E1V6	Test	FCC Report WWAN / All sections except Appendix A
DSS	A3LSMG970F	Grant	12563734-E2V2	Test	FCC Report BT / All sections
DTS	A3LSMG970F	Grant	12563734-E3V3	Test	FCC Report BLE / All sections
			12563734-E4V4		FCC Report DTS WLAN / All sections
NII	A3LSMG970F	Grant	12563734-E5V3	Test	FCC Report UNII WLAN / All sections except DFS
DXX	A3LSMG970F	Grant	12563734-E7V3	Test	FCC Report ANT+ / All sections
			12563734-E8V3	Test	FCC Report NFC / All sections
DCD	A3LSMG970F	Grant	12563734-E9V3	Test	FCC Report Wireless Charging / All sections

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, and KDB 558074 D01 15.247 Meas Guidance v05.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd
<input checked="" type="checkbox"/> Chamber A (ISED:2324B-1)	<input type="checkbox"/> Chamber D (ISED:22541-1)	<input type="checkbox"/> Chamber I (ISED:2324A-5)
<input checked="" type="checkbox"/> Chamber B (ISED:2324B-2)	<input type="checkbox"/> Chamber E (ISED:22541-2)	<input type="checkbox"/> Chamber J (ISED:2324A-6)
<input type="checkbox"/> Chamber C (ISED:2324B-3)	<input type="checkbox"/> Chamber F (ISED:22541-3)	<input type="checkbox"/> Chamber K (ISED:2324A-1)
	<input type="checkbox"/> Chamber G (ISED:22541-4)	<input type="checkbox"/> Chamber L (ISED:2324A-3)
	<input type="checkbox"/> Chamber H (ISED:22541-5)	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

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

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)

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

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.

$$36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$$

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

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

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a GSM/WCDMA/LTE phone with BT, DTS/UNII a/b/g/n/ac/11ax HE 20/40/80, ANT+ and NFC. The test report addresses the BLE operational mode.

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	BLE (125kbps)	7.20	5.25
2402 - 2480	BLE (500kbps)	7.15	5.19
2402 - 2480	BLE (1Mbps)	7.34	5.42
2402 - 2480	BLE (2Mbps)	8.62	7.28

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -1.21 dBi.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was G970N.001

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

All radios that can be transmitted simultaneously have been evaluated for radiated for all possible combinations of transmission and found to be in compliance.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	EP-TA300	R3KB5B01S1SE3	N/A
USB Data Cable	Samsung	N/A	N/A	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 spectrum Analyzer
2	USB	1	USB	Un-shielded	1	EUT to AC Mains

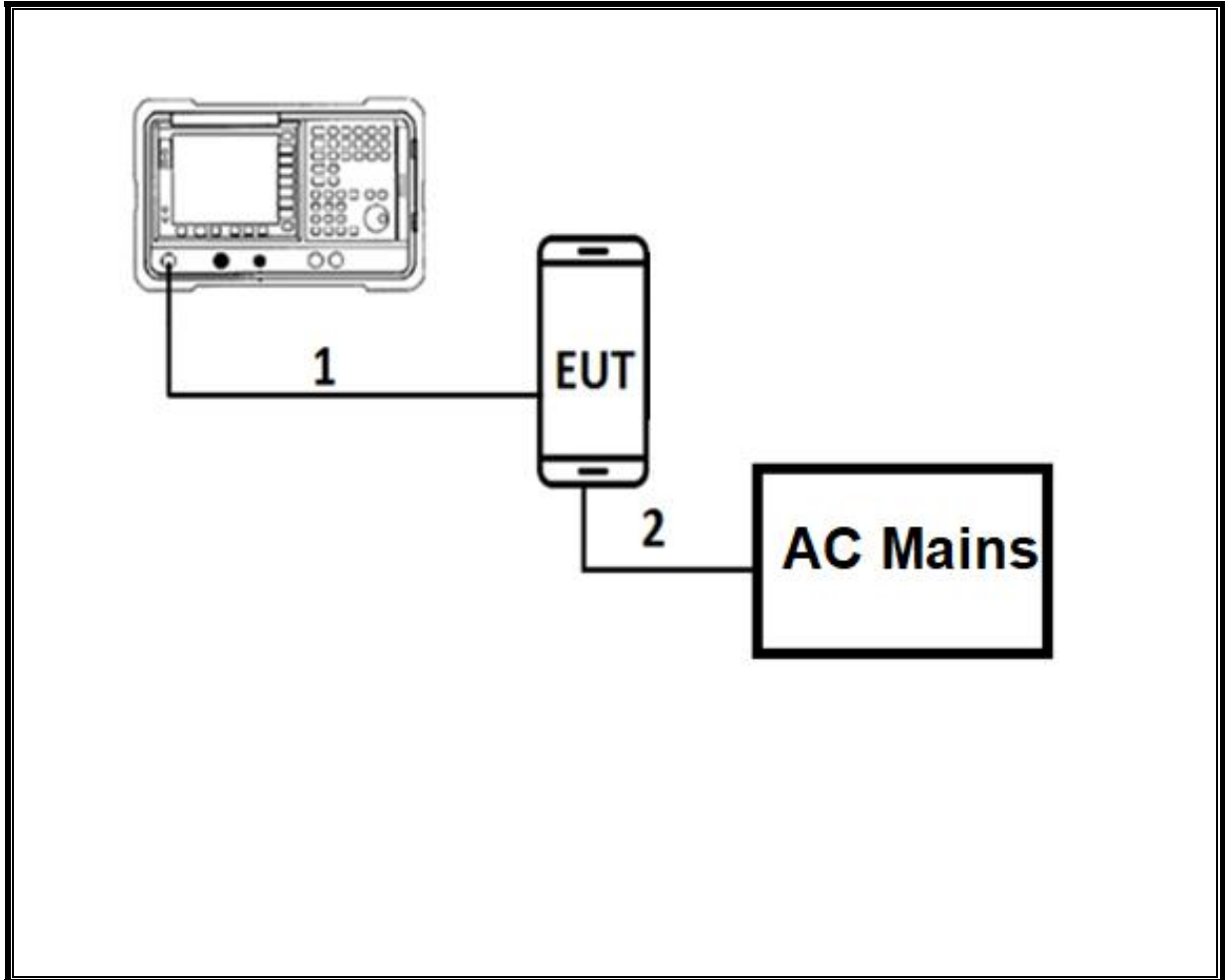
I/O CABLES (RADIATED AND CONDUCTED EMISSIONS)

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

TEST SETUP

The EUT is a stand alone. Test software exercised the radio card.

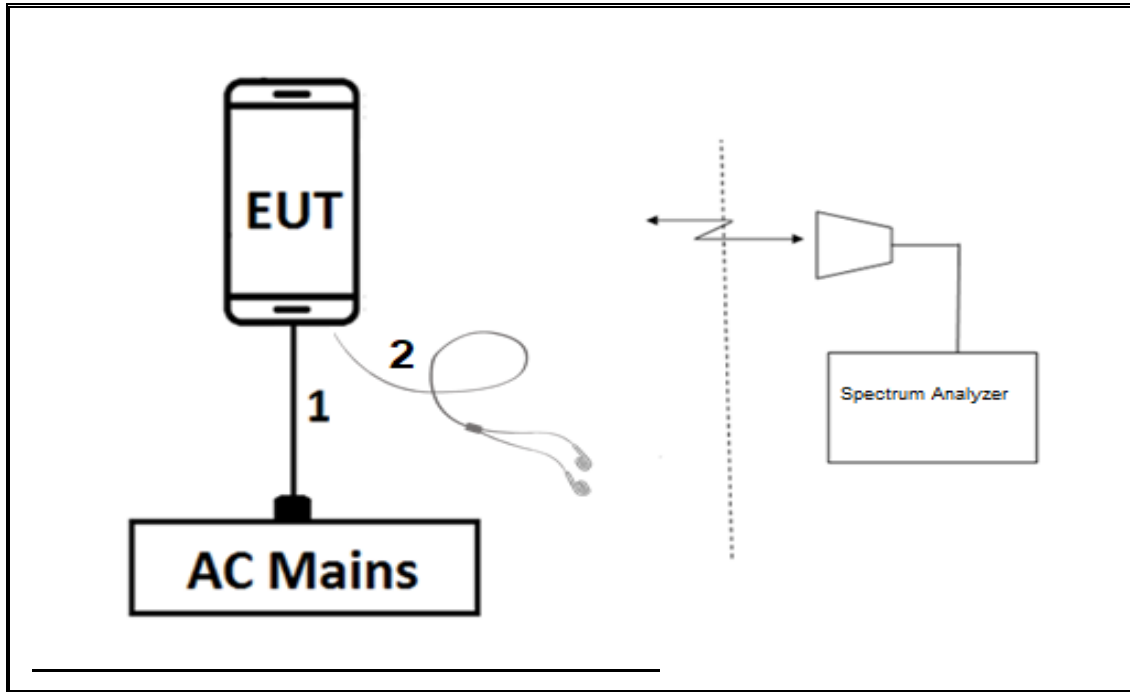
CONDCUTED TEST SETUP DIAGRAM



TEST SETUP

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

RADIATED AND AC LINE CONDUCTED EMISSIONS SETUP DIAGRAM



TEST SETUP

For radiated tests: EUT is Stand alone. The test software exercises the radio.

7. MEASUREMENT METHOD

6 dB BW: ANSI C63.10 Subclause -11.8.1

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

Output Power : ANSI C63.10 Subclause -11.9.1.3 Method Peak Power Meter
(Measurement using a broadband peak RF power meter)

Average Power: ANSI C63.10 Subclause -11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

PSD: ANSI C63.10 Subclause -11.10.2 Method PKPSD (peak PSD)

Radiated emissions non-restricted frequency bands: ANSI C63.10 Subclause -11.11

Radiated emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1

Conducted emissions in restricted frequency bands: ANSI C63.10 Subclause -11.12.2

Band-edge: ANSI C63.10 Subclause -11.13.3.4 Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

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

8. 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	ID Num	Cal Due	Last Cal
Amplifier, 100KHz to 1GHz,32dB	Agilent (Keysight) Technologies	8447D	T15	10/20/2019	10/20/2018
RF Amplifier	MITEQ	AFS42-00101800-25-S-42	T493	10/13/2019	10/13/2018
RF Amplifier, 1-18GHz	MITEQ	AFS42-00101800-25-S-42	T1165	10/20/2019	10/20/2018
Pre-Amp 1-26.5 GHz	Agilent	8449B	T404	03/09/2019	023/09/2018
Antenna, Broadband Hybrid, 30MHz to 3000MHz	Sunol Sciences Corp.	JB3	PRE0181574	08/01/2019	08/01/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T345	04/25/2019	04/25/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	06/21/2019	06/21/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T862	05/24/2019	05/24/2018
Antenna, Active Loop 9kHz-30MHz	Com-Power Corp.	AL-130R	PRE0165308	12/13/2018	12/13/2017
18 - 26.5 GHz Horn Antenna	ARA	MWH-1826/B	T477	06/16/2019	06/16/2018
Power Meter, P-series single channel	Agilent (Keysight) Technologies	N1911A	T1271	07/26/2019	07/26/2018
Power Sensor, P-series, 50MHz to 18GHz, Wideband	Agilent (Keysight) Technologies	N1921A	T1224	10/09/2019	10/09/2018
EMI Receiver	Rohde & Schwarz	ESR	T1436	02/21/2019	02/21/2018
L.I.S.N.	FCC INC.	FCC LISN 50/250	T1310	06/15/2019	06/15/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1113	12/21/2018	12/21/2017
Spectrum Analyzer	Agilent (Keysight) Technologies	E4446A	T146	08/13/2019	08/13/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1466	04/16/2019	04/16/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1454	01/08/2019	01/08/2018

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, Dec 01, 2016
Antenna Port Software	UL	UL RF	Ver 9.0, Oct 31, 2018

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

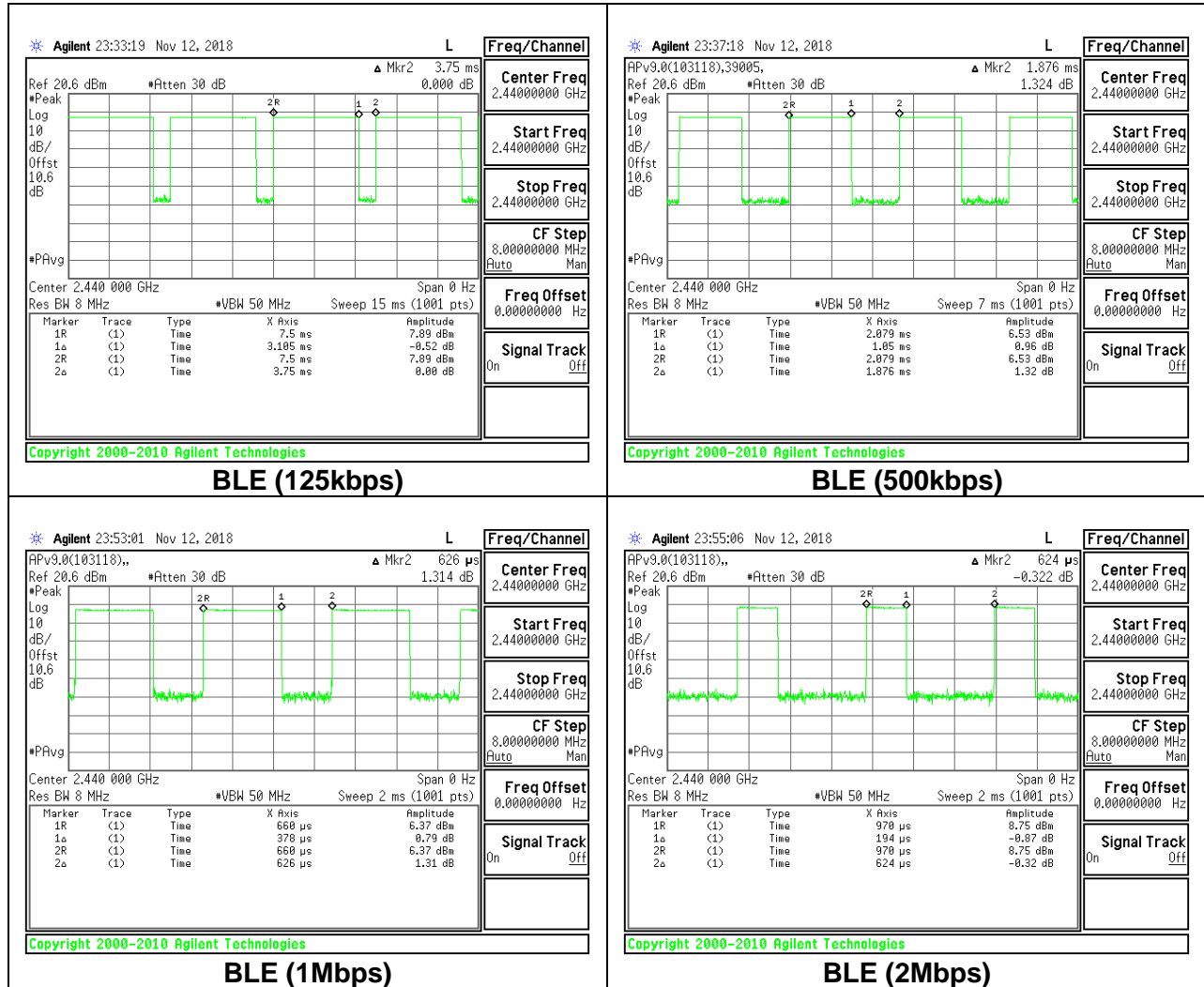
None; for reporting purposes only.

PROCEDURE

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/B Minimum VBW (kHz)
2.4GHz Band						
BLE (125kbps)	3.105	3.750	0.828	82.80%	0.82	0.322
BLE (500kbps)	1.050	1.876	0.560	55.97%	2.52	0.952
BLE (1Mbps)	0.378	0.626	0.604	60.38%	2.19	2.646
BLE(2Mbps)	0.194	0.624	0.311	31.09%	5.07	5.155

DUTY CYCLE PLOTS



9.2. 99% BANDWIDTH

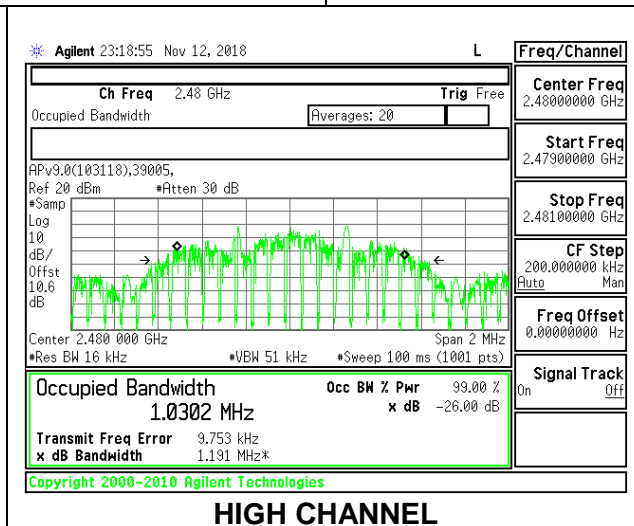
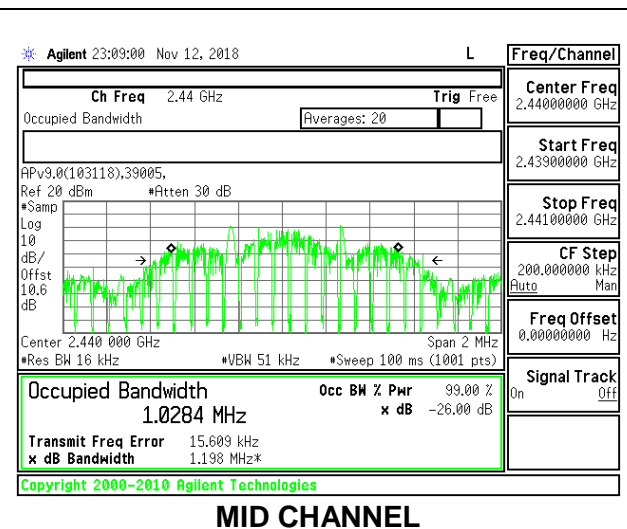
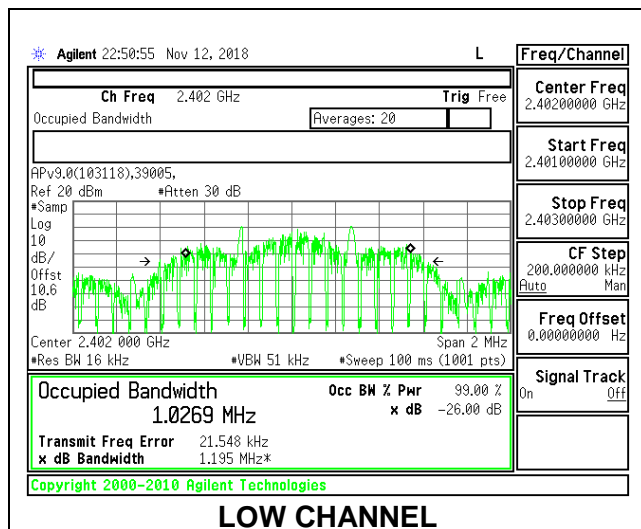
LIMITS

None; for reporting purposes only.

RESULTS

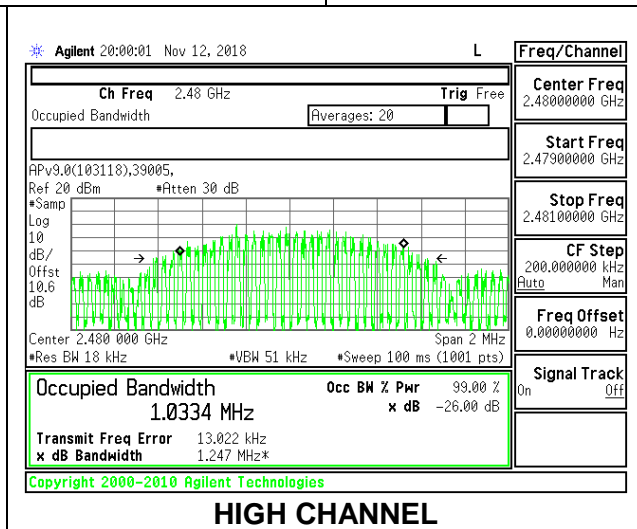
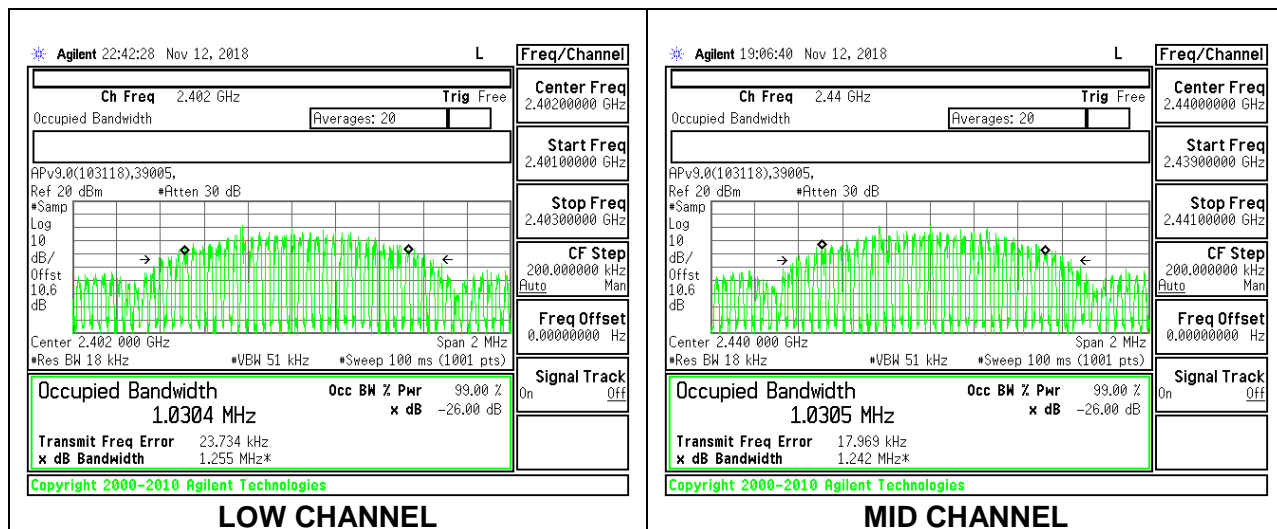
9.2.1. BLE (125kbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0269
Middle	2440	1.0284
High	2480	1.0302



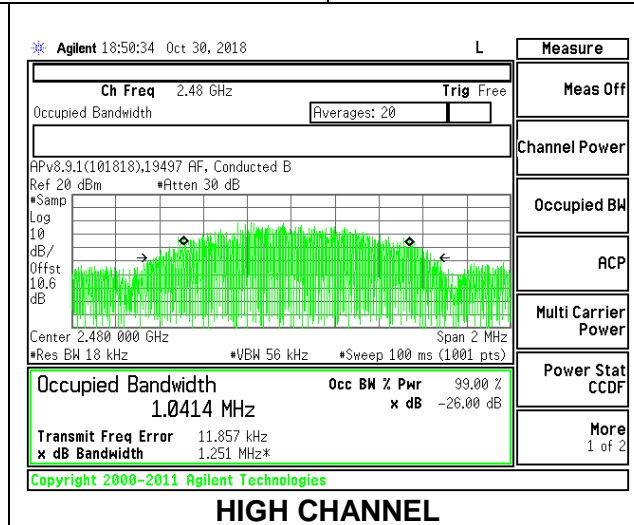
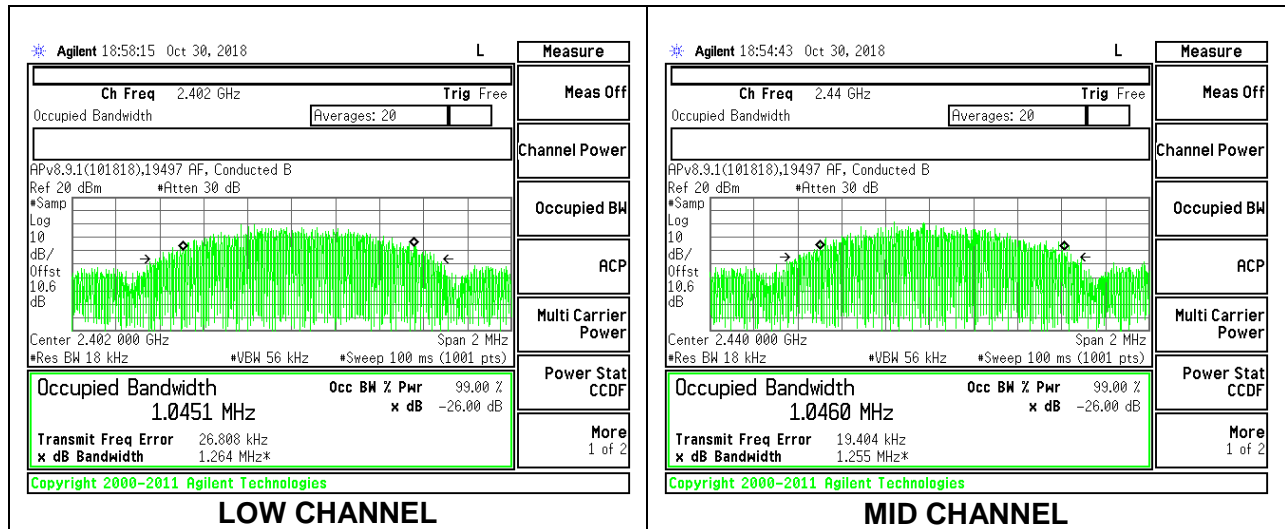
9.2.2. BLE (500kbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0304
Middle	2440	1.0305
High	2480	1.0334



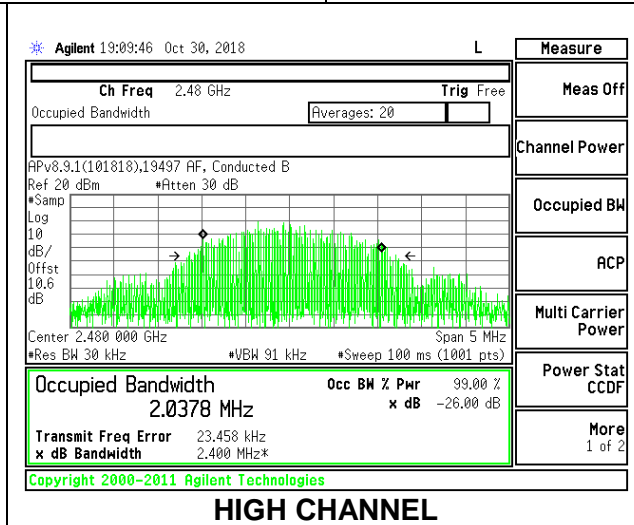
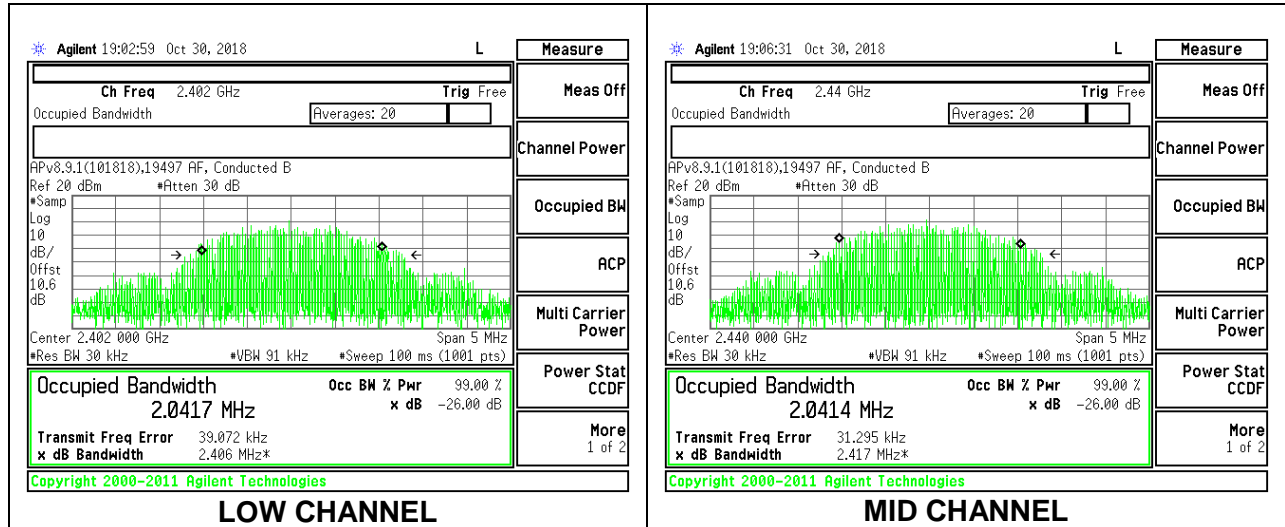
9.2.3. BLE (1Mbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0451
Middle	2440	1.0460
High	2480	1.0414



9.2.4. BLE (2Mbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	2.0417
Middle	2440	2.0414
High	2480	2.0378



9.3. 6 dB BANDWIDTH

LIMITS

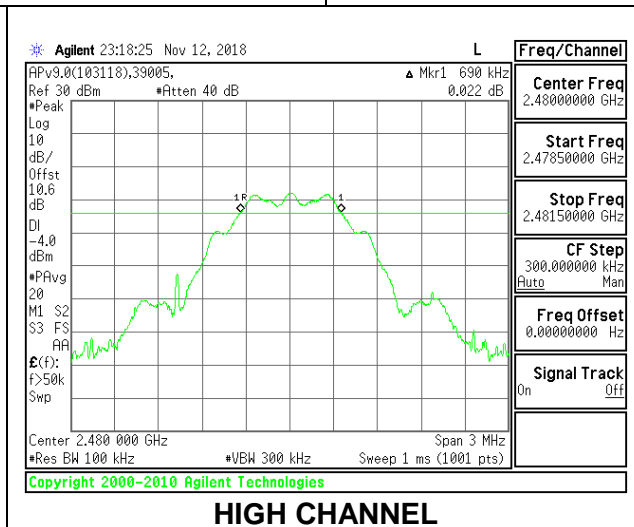
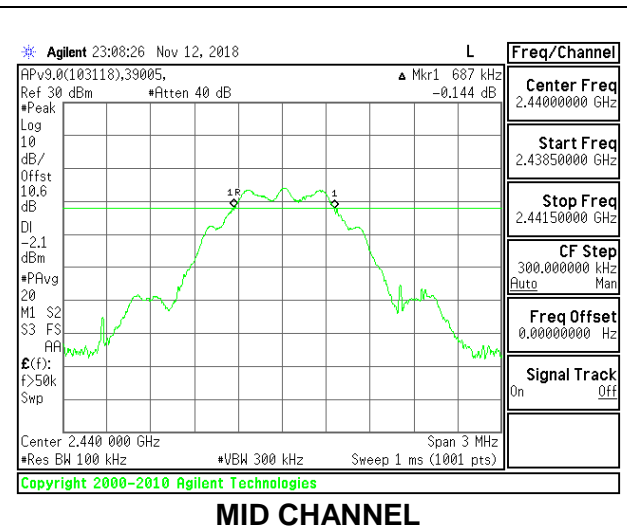
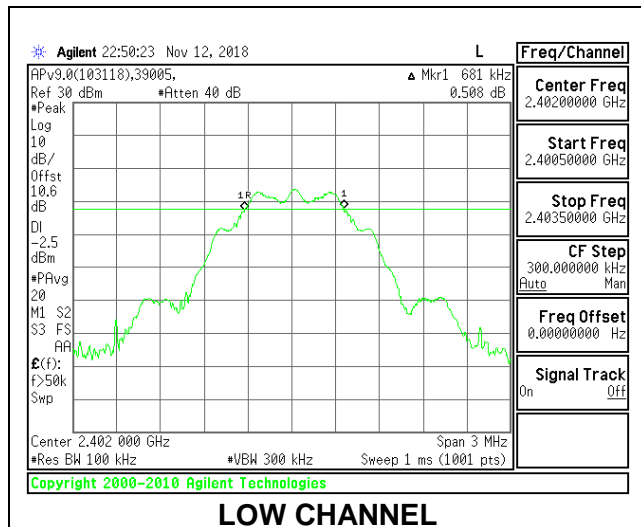
FCC §15.407 (e)

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

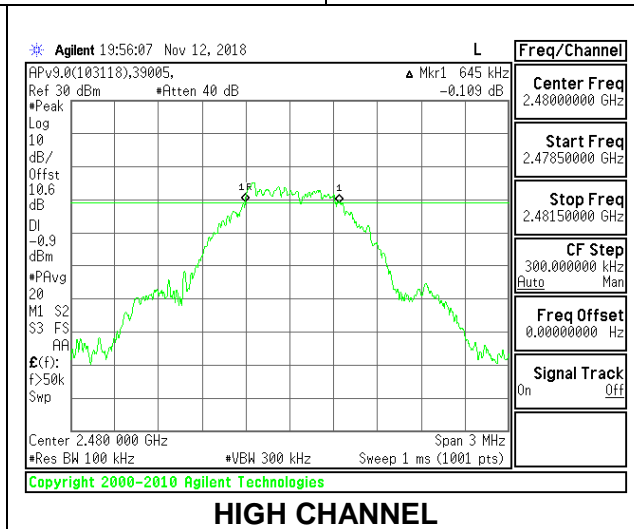
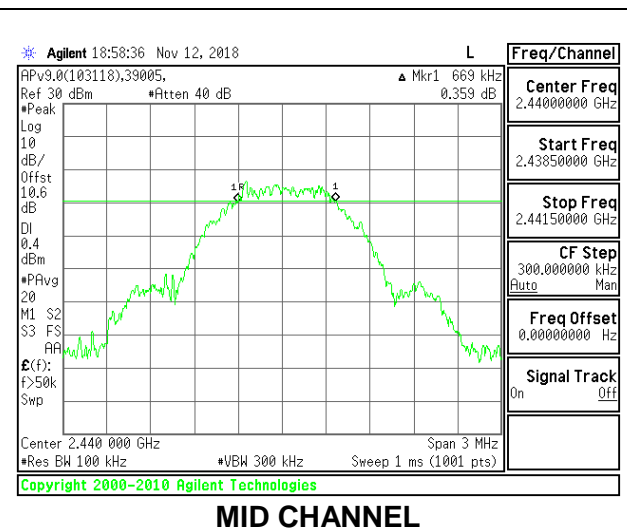
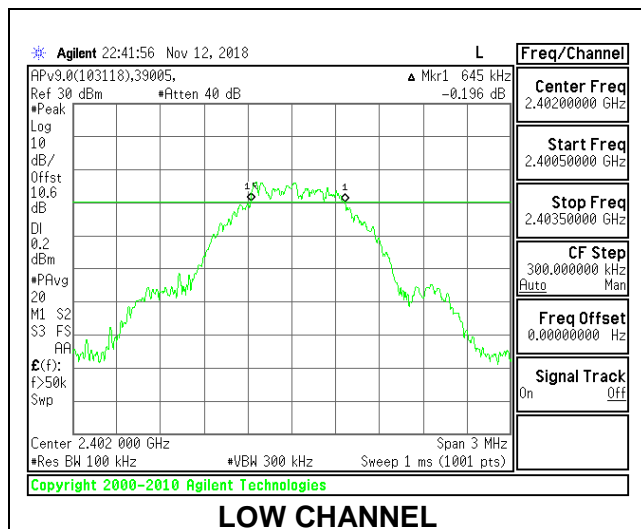
9.3.1. BLE (125kbps)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.6810	0.5
Middle	2440	0.6870	0.5
High	2480	0.6900	0.5



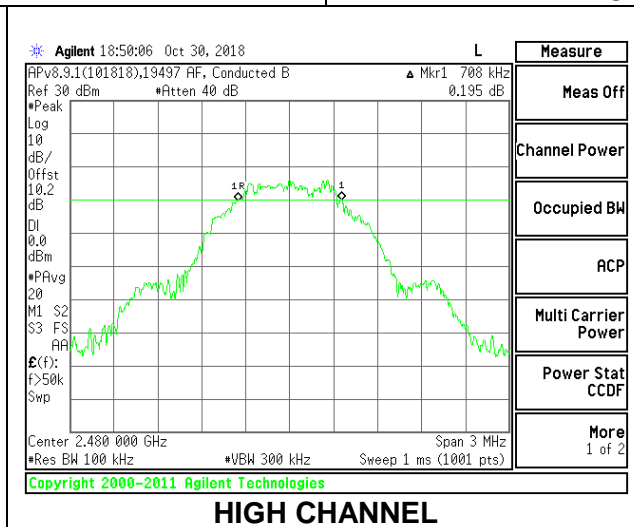
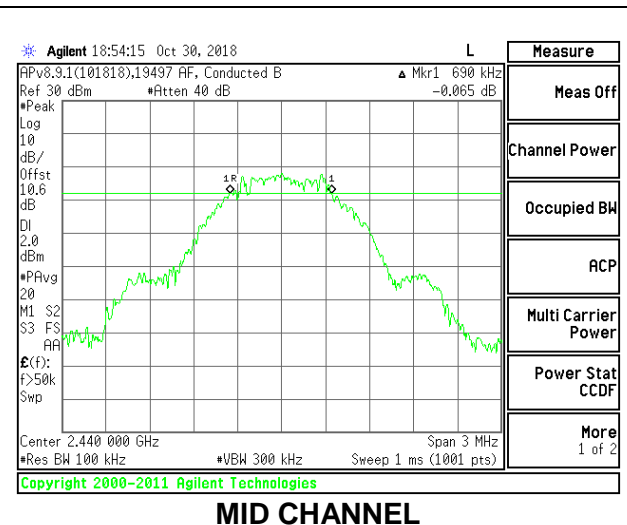
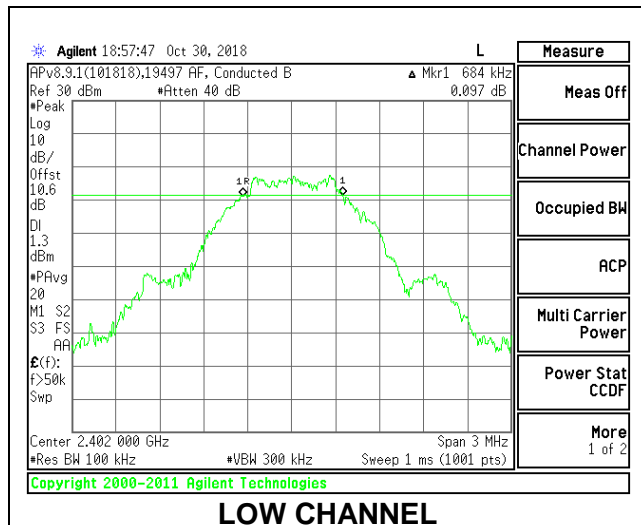
9.3.2. BLE (500kbps)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.6450	0.5
Middle	2440	0.6690	0.5
High	2480	0.6450	0.5



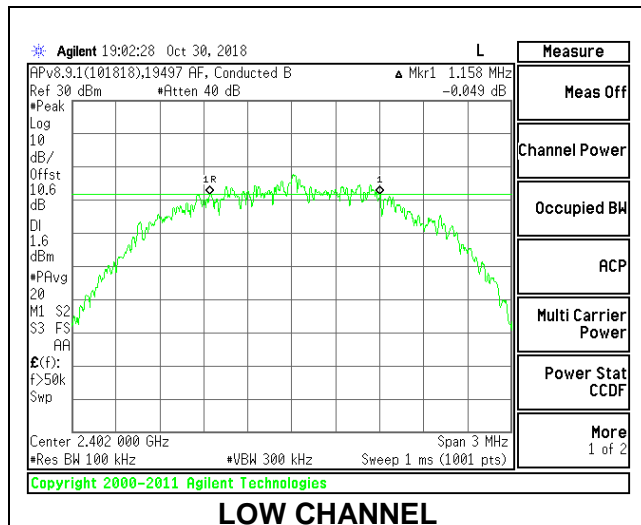
9.3.3. BLE (1Mbps)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.6840	0.5
Middle	2440	0.6900	0.5
High	2480	0.7080	0.5

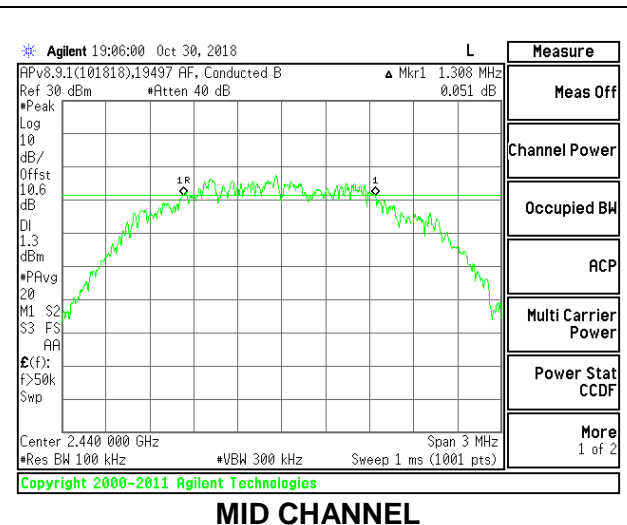


9.3.4. BLE (2Mbps)

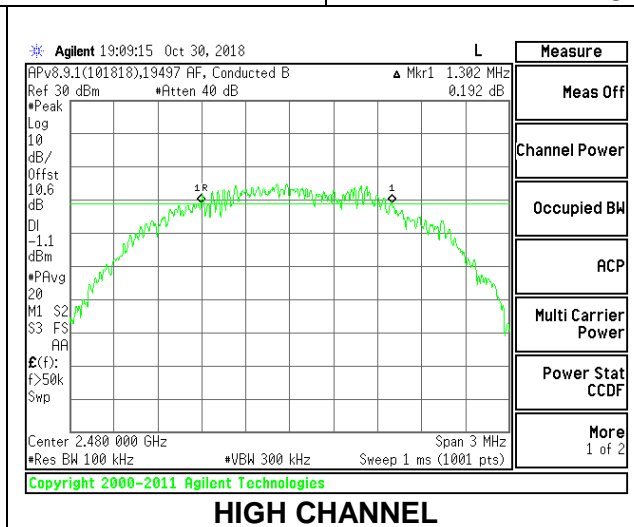
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	1.1580	0.5
Middle	2440	1.3080	0.5
High	2480	1.3020	0.5



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

9.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a 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

9.4.1. BLE (125kbps)

Tested By:	39005 RA
Date:	11/20/2018

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	6.260	30	-23.740
Middle	2440	7.200	30	-22.800
High	2480	5.600	30	-24.400

9.4.1. BLE (500kbps)

Tested By:	39005 RA
Date:	11/20/2018

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	6.650	30	-23.350
Middle	2440	7.150	30	-22.850
High	2480	6.770	30	-23.230

9.4.1. BLE (1Mbps)

Tested By:	39005 RA
Date:	11/20/2018

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	6.750	30	-23.250
Middle	2440	7.340	30	-22.660
High	2480	5.500	30	-24.500

9.4.2. BLE (2Mbps)

Tested By:	39005 RA
Date:	11/20/2018

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	7.950	30	-22.050
Middle	2440	8.620	30	-21.380
High	2480	7.010	30	-22.990

9.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a 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

9.5.1. BLE (125kbps)

Tested By:	39005 RA
Date:	11/20/2018

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	5.96
Middle	2440	6.91
High	2480	5.30

9.5.2. BLE (500kbps)

Tested By:	39005 RA
Date:	1/7/2018

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	6.34
Middle	2440	6.85
High	2480	6.14

9.5.3. BLE (1Mbps)

Tested By:	39005 RA
Date:	11/20/2018

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	6.40
Middle	2440	7.07
High	2480	5.18

9.5.4. BLE (2Mbps)

Tested By:	39005 RA
Date:	11/20/2018

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	7.23
Middle	2440	7.92
High	2480	6.25

9.6. POWER SPECTRAL DENSITY

LIMITS

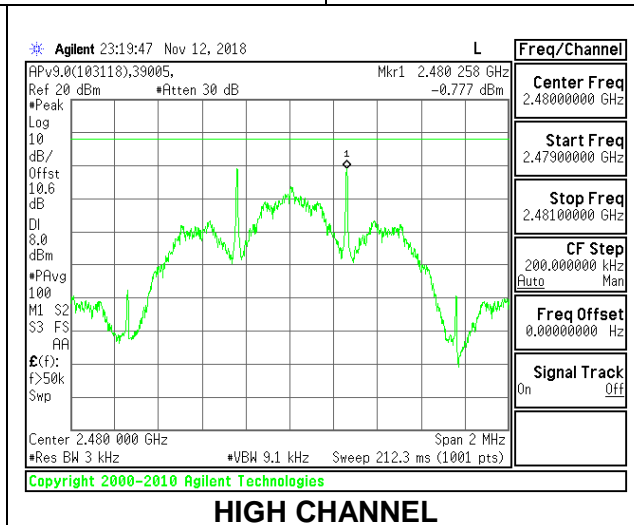
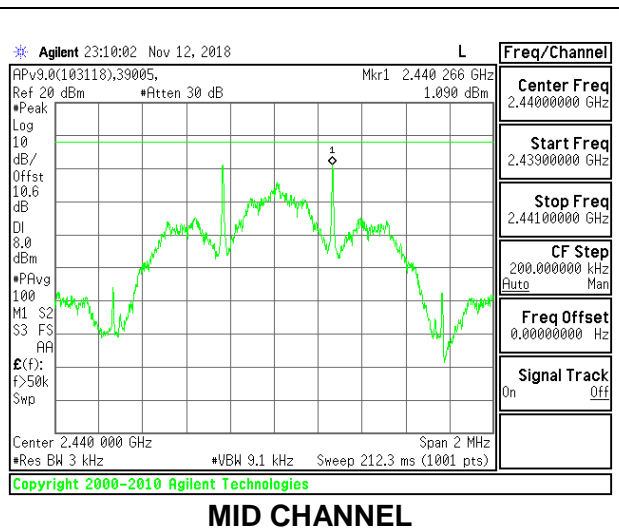
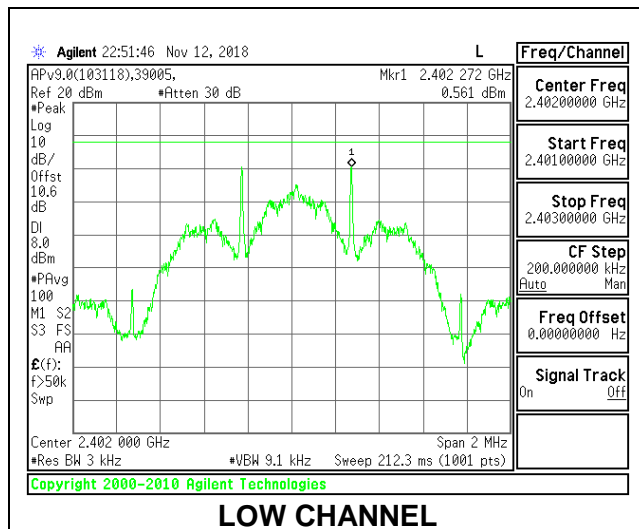
FCC §15.247 (e)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

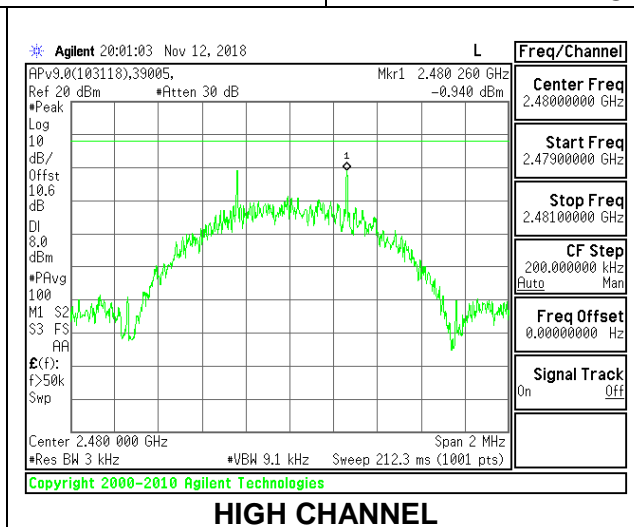
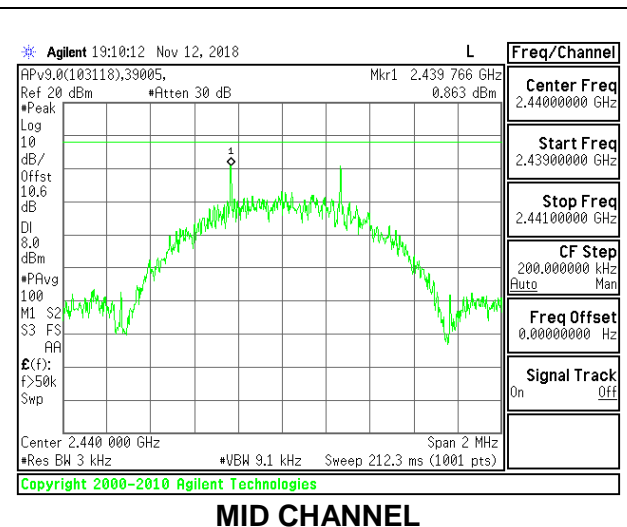
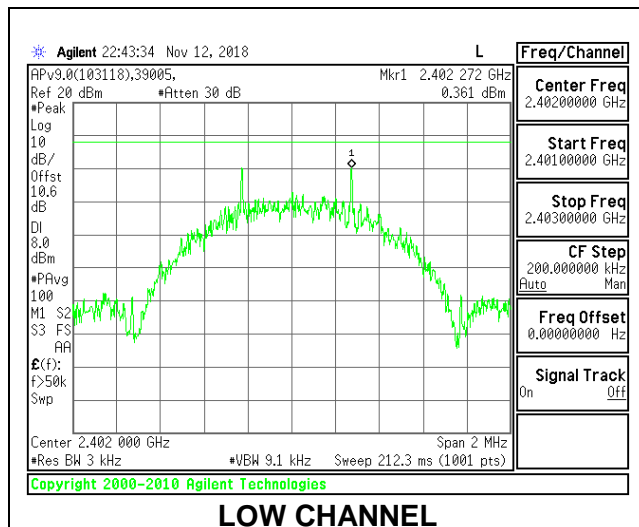
9.6.1. BLE (125kbps)

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	0.56	8	-7.44
Middle	2440	1.09	8	-6.91
High	2480	-0.78	8	-8.78



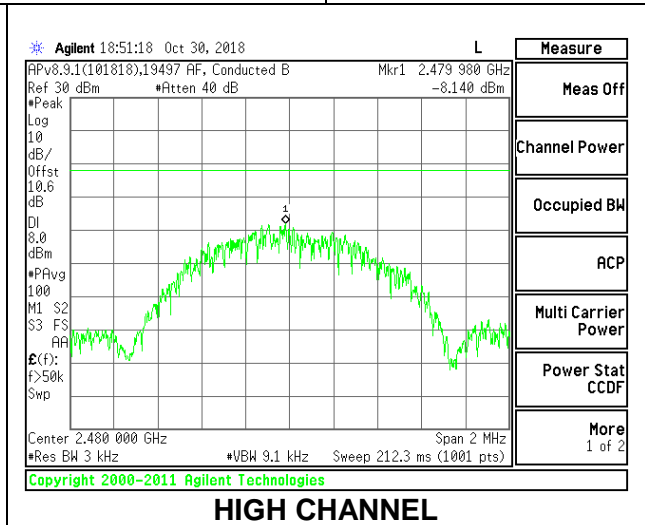
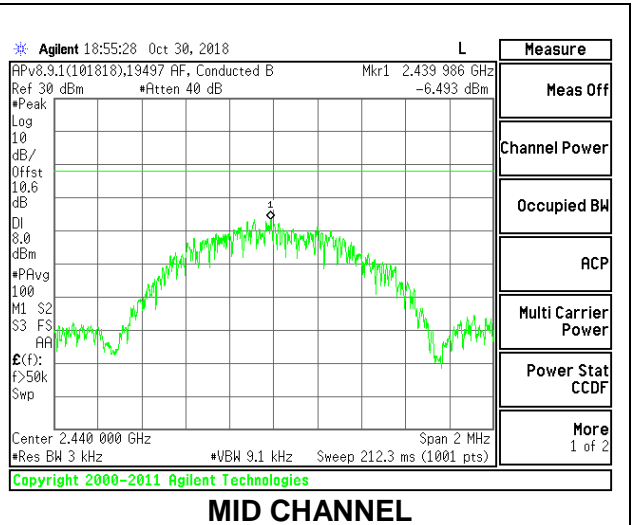
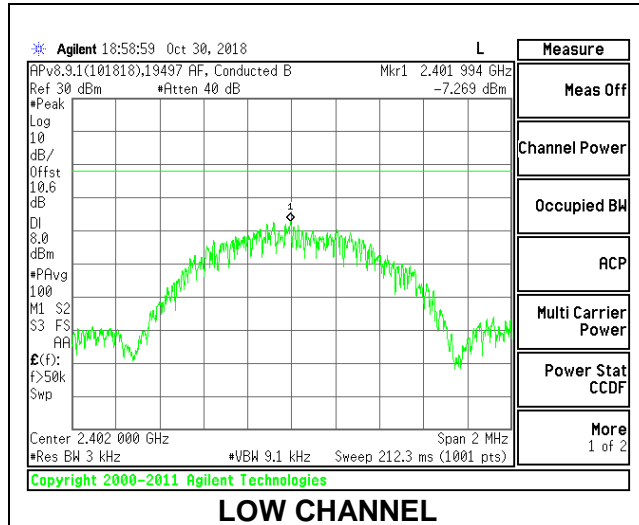
9.6.2. BLE (500kbps)

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	0.36	8	-7.64
Middle	2440	0.86	8	-7.14
High	2480	-0.94	8	-8.94



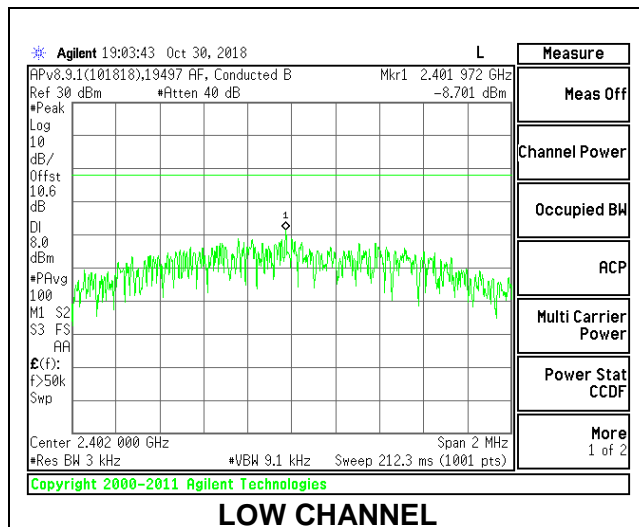
9.6.1. BLE (1Mbps)

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-7.27	8	-15.27
Middle	2440	-6.49	8	-14.49
High	2480	-8.14	8	-16.14

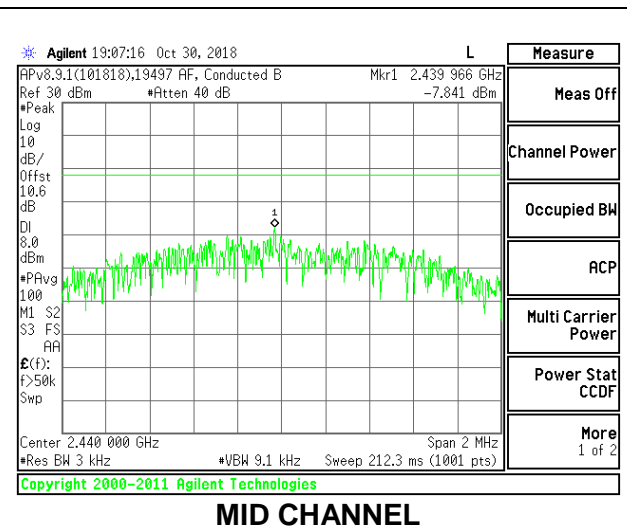


9.6.2. BLE (2Mbps)

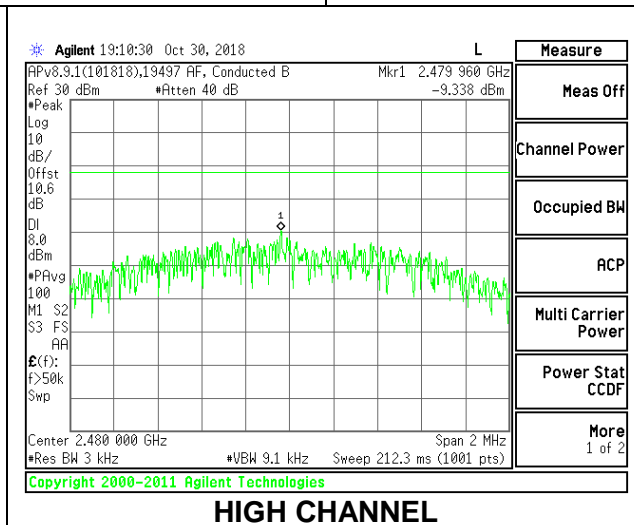
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-8.70	8	-16.70
Middle	2440	-7.84	8	-15.84
High	2480	-9.34	8	-17.34



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

9.7. CONDUCTED SPURIOUS EMISSIONS

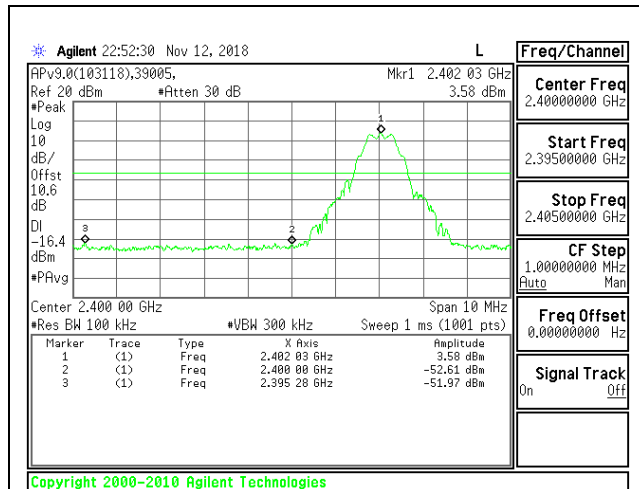
LIMITS

FCC §15.247 (d)

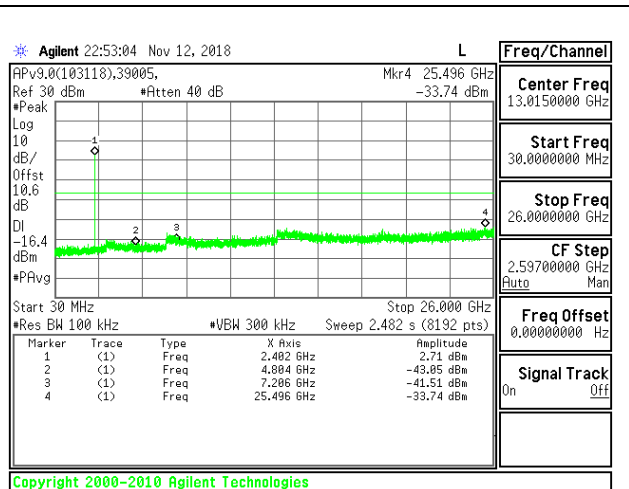
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

RESULTS

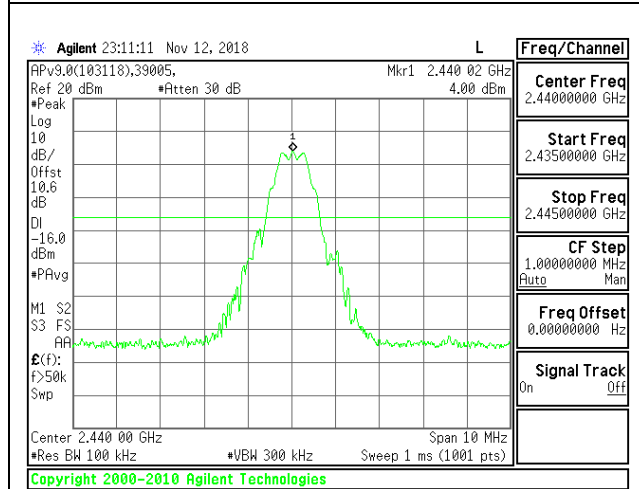
9.7.1. BLE (125kbps)



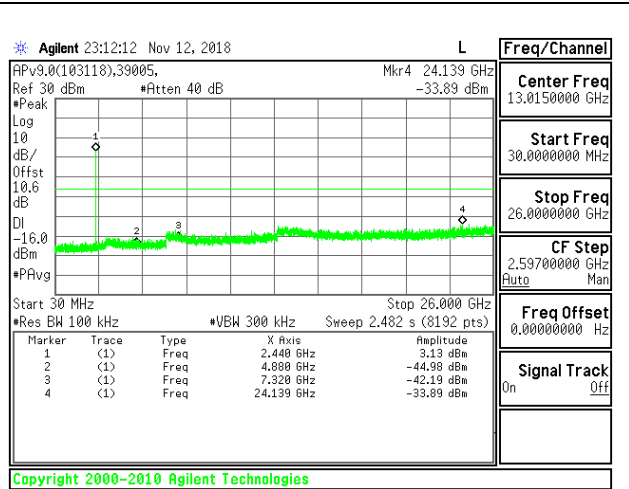
LOW CHANNEL BANDEDGE



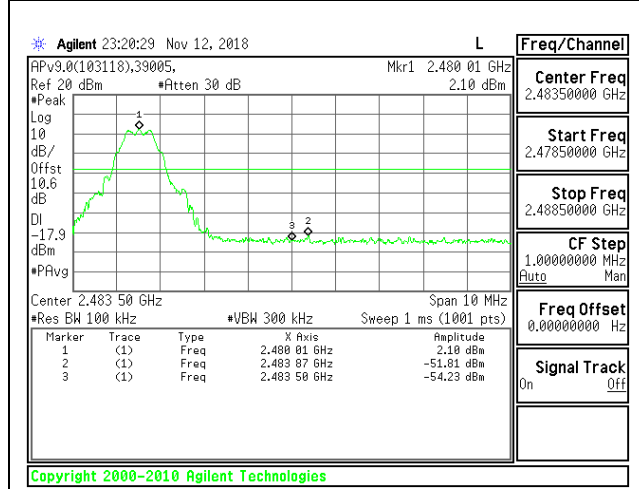
OUT-OF-BAND LOW CHANNEL



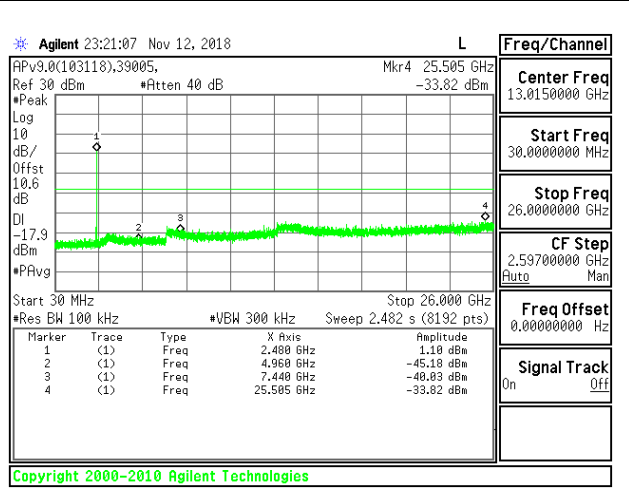
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL

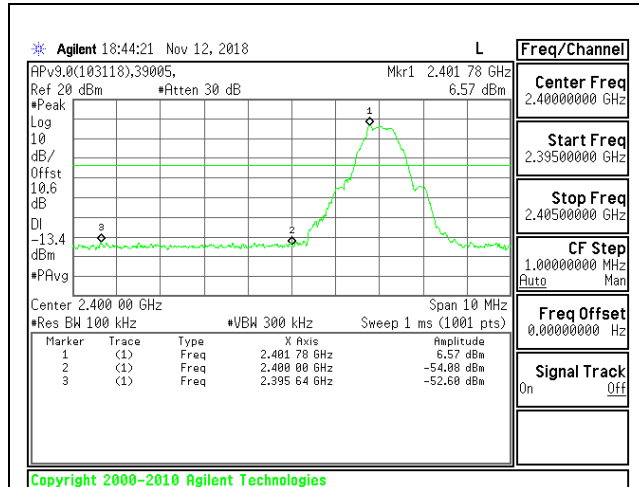


HIGH CHANNEL BANDEDGE

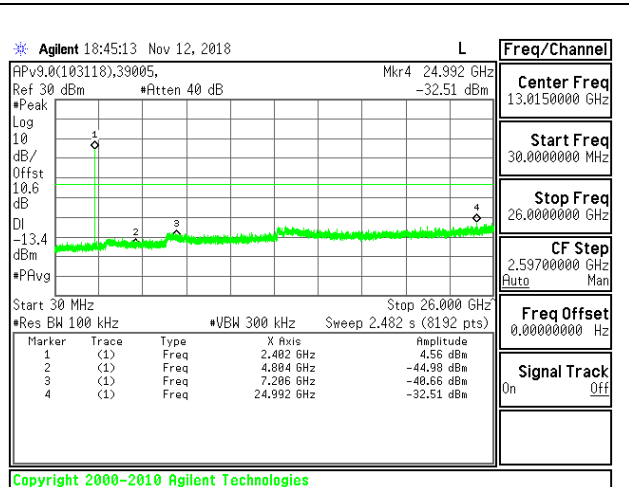


OUT-OF-BAND HIGH CHANNEL

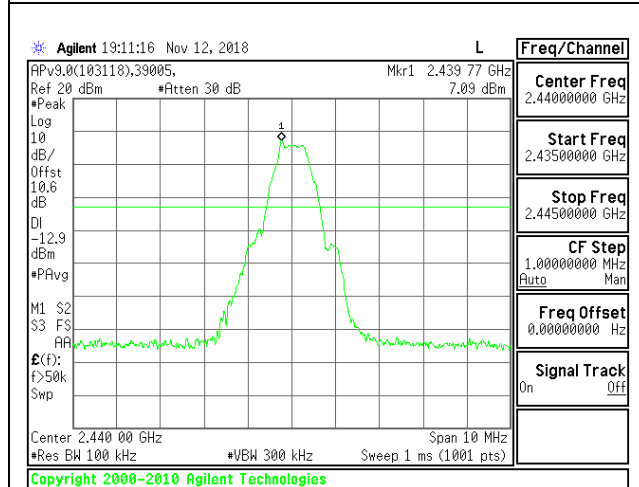
9.7.2. BLE (500kbps)



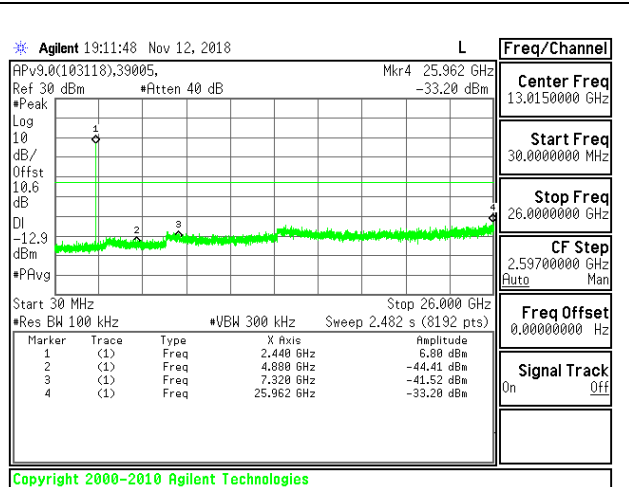
LOW CHANNEL BANDEDGE



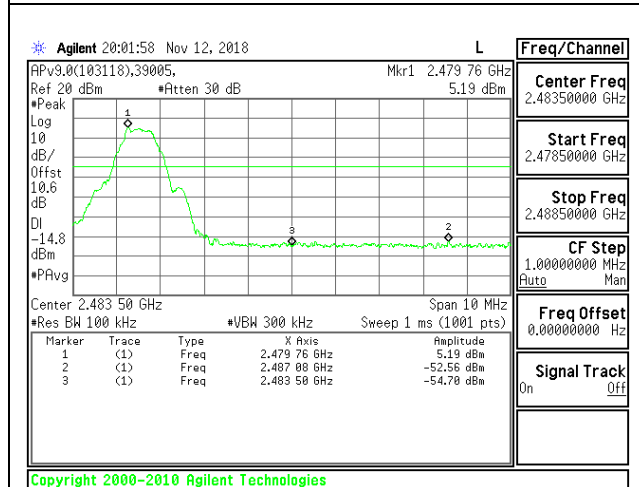
OUT-OF-BAND LOW CHANNEL



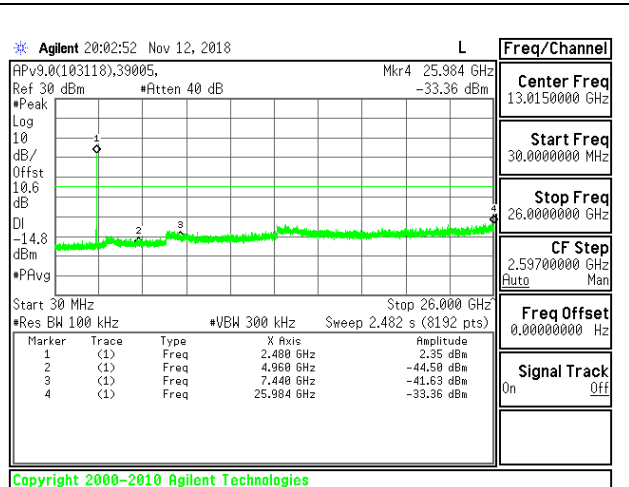
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL

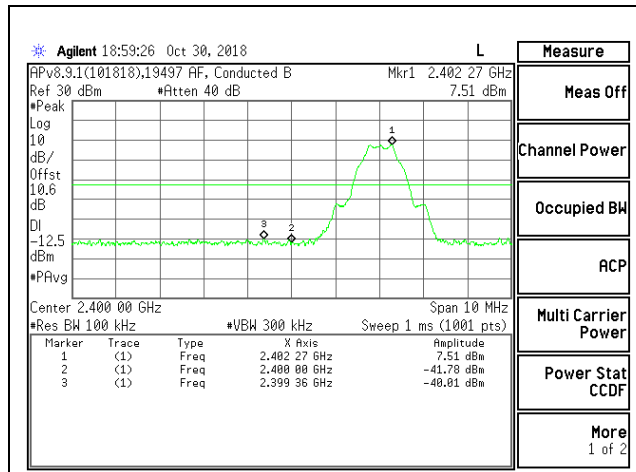


HIGH CHANNEL BANDEDGE

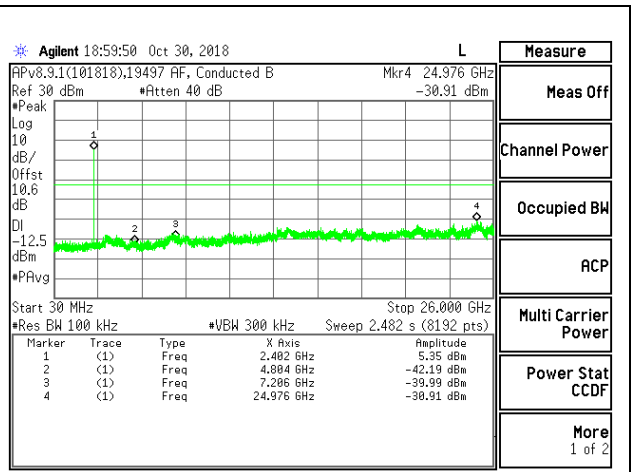


OUT-OF-BAND HIGH CHANNEL

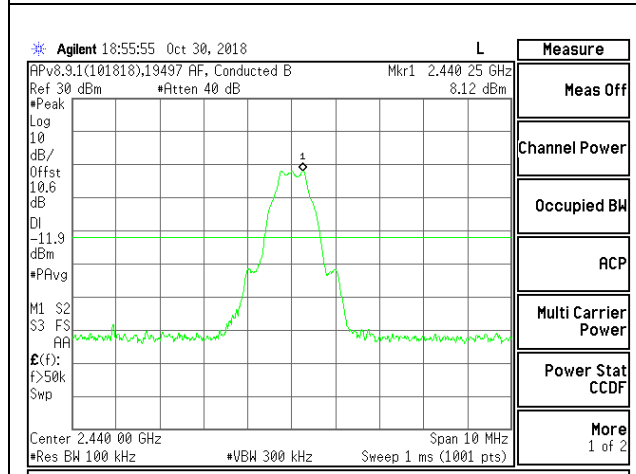
9.7.3. BLE (1Mbps)



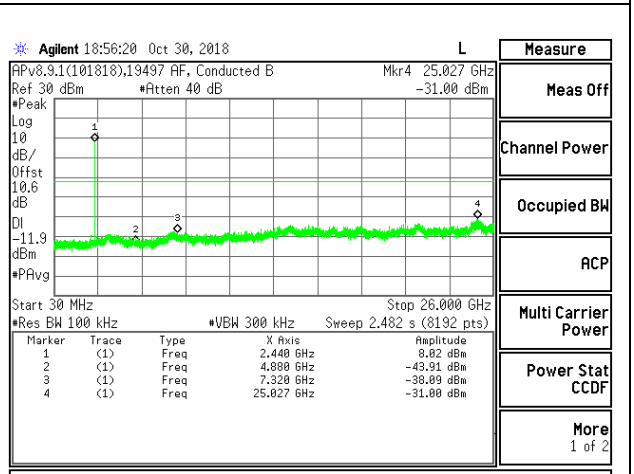
LOW CHANNEL BANDEDGE



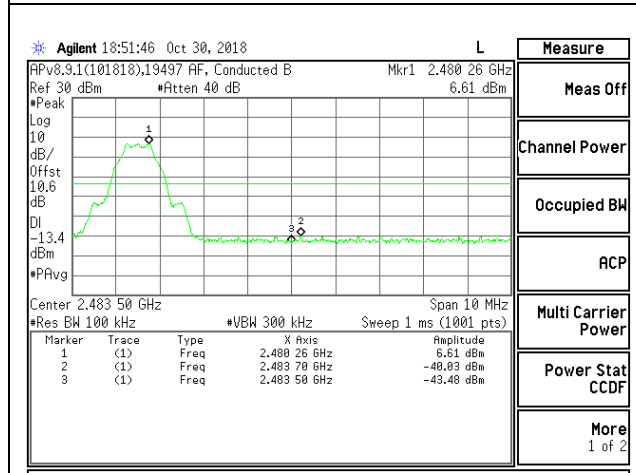
OUT-OF-BAND LOW CHANNEL



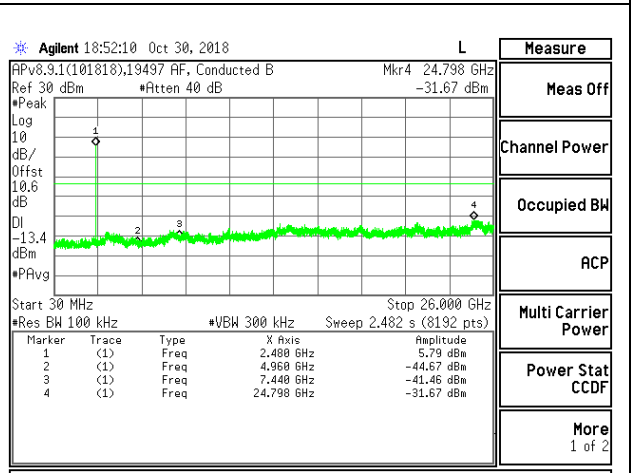
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL

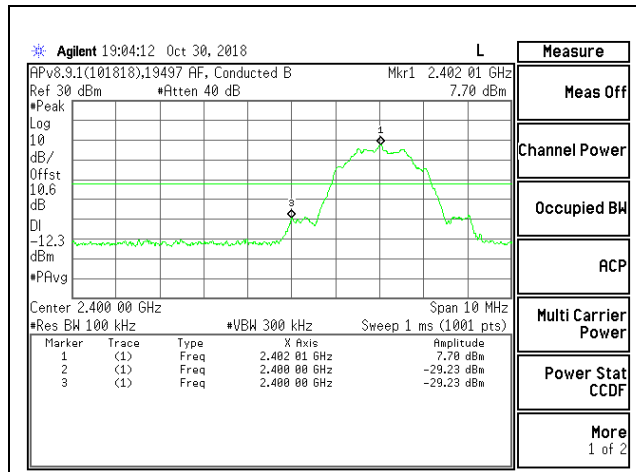


HIGH CHANNEL BANDEDGE

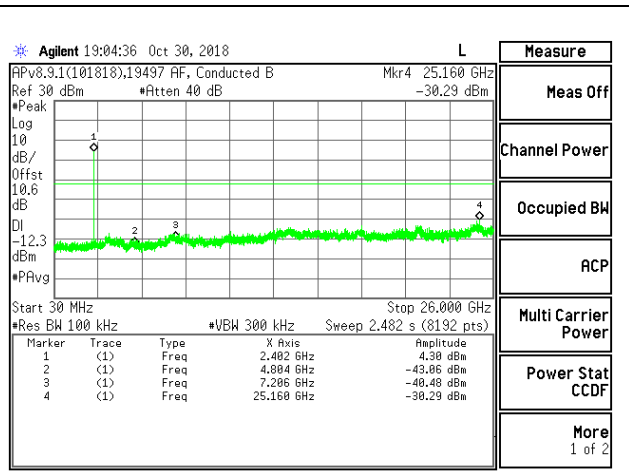


OUT-OF-BAND HIGH CHANNEL

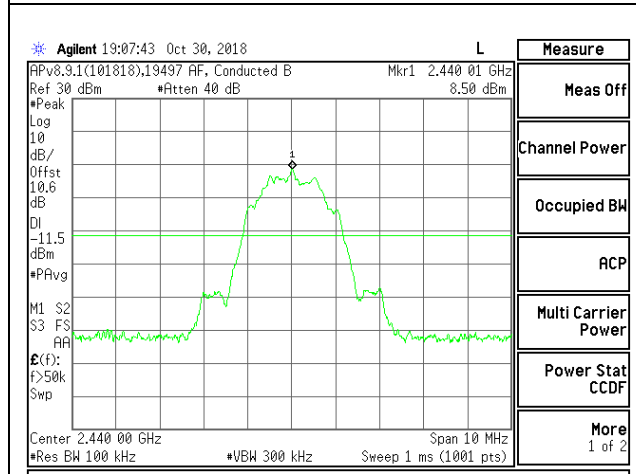
9.7.4. BLE (2Mbps)



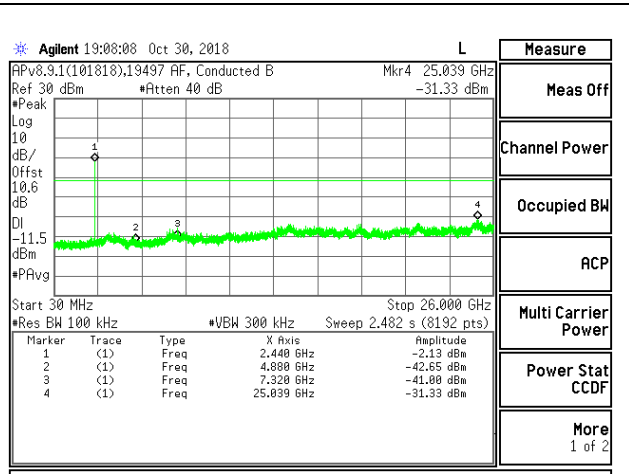
LOW CHANNEL BANDEDGE



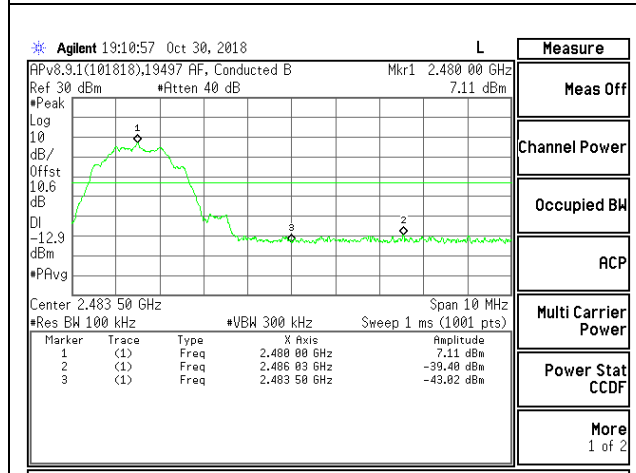
OUT-OF-BAND LOW CHANNEL



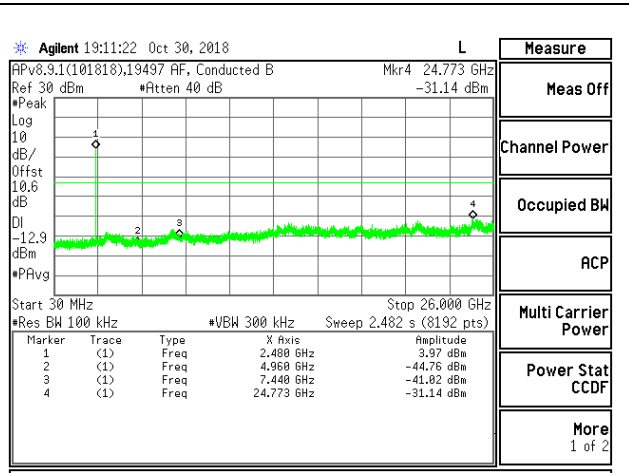
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10.

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

TEST PROCEDURE

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

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

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

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable 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.

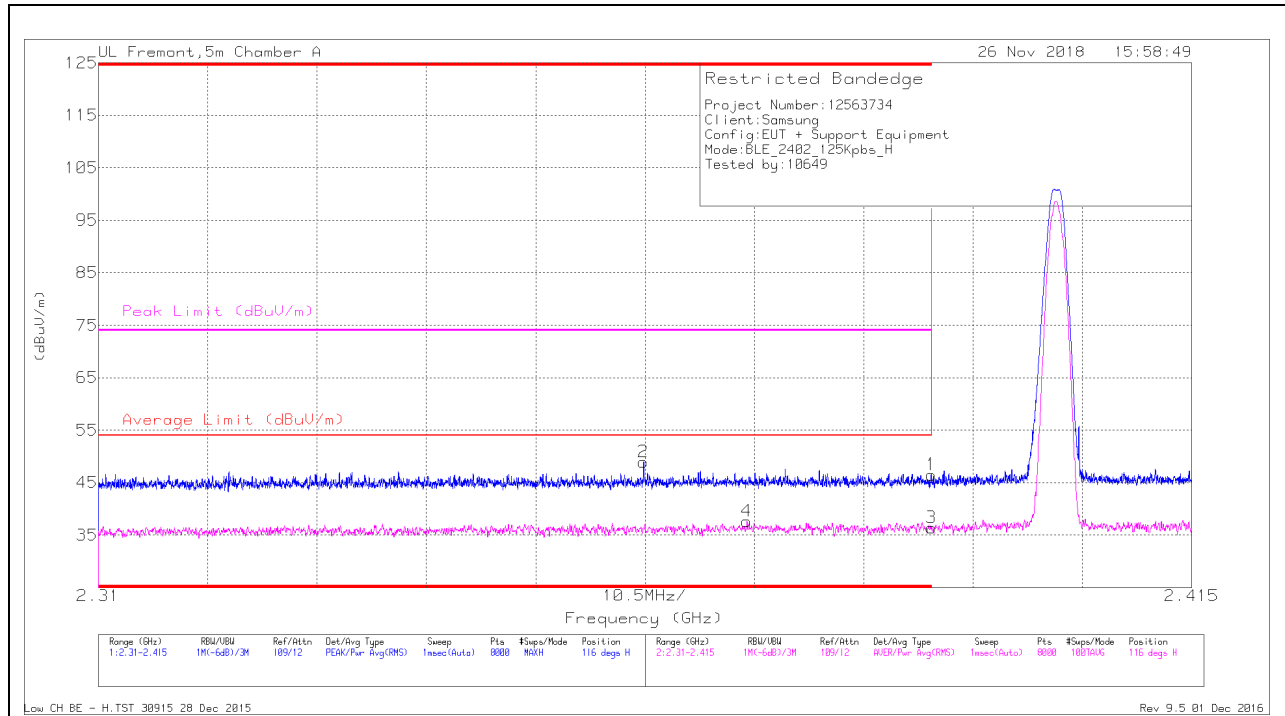
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. BLE (125kbps)

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

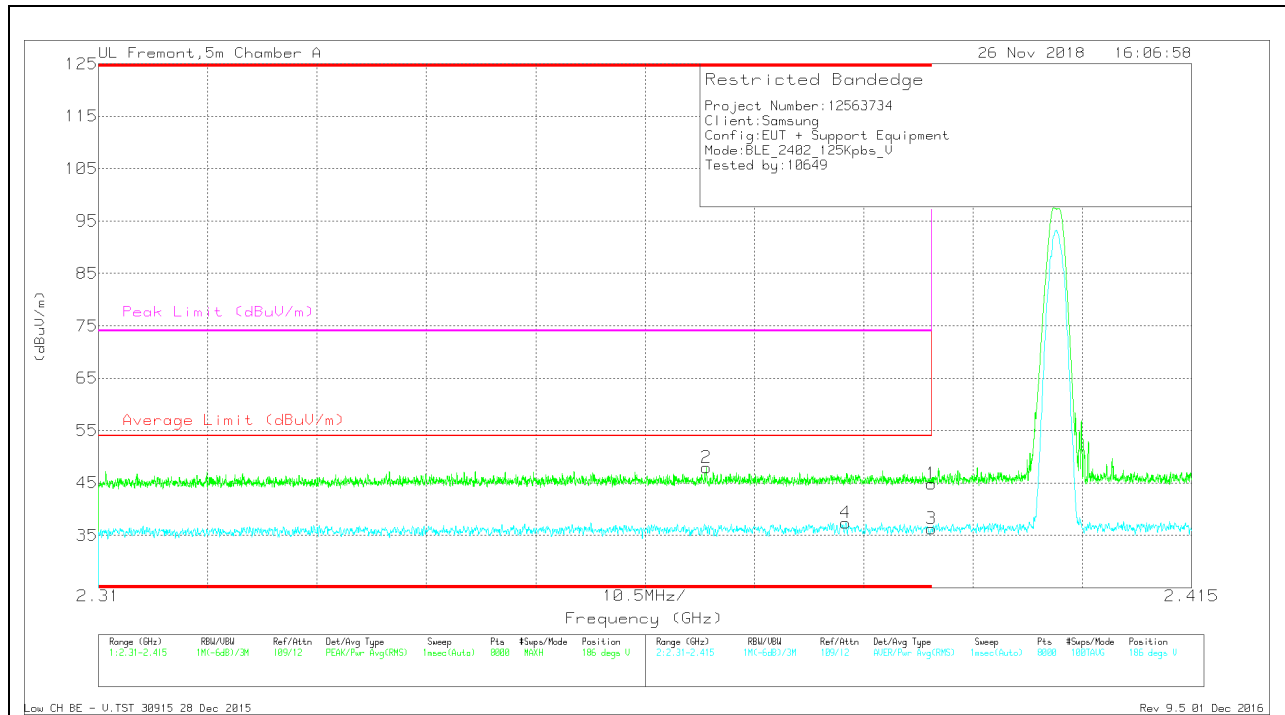
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	37.7	Pk	31.8	-23	0	46.5	-	-	74	-27.5	116	104	H
2	* 2.362	40.37	Pk	31.6	-23	0	48.97	-	-	74	-25.03	116	104	H
3	* 2.39	26.75	RMS	31.8	-23	.82	36.37	54	-17.63	-	-	116	104	H
4	* 2.372	28.09	RMS	31.7	-23	.82	37.61	54	-16.39	-	-	116	104	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.368	39.26	Pk	31.7	-23	0	47.96	-	-	74	-26.04	186	103	V
4	* 2.382	27.86	RMS	31.7	-23	.82	37.38	54	-16.62	-	-	186	103	V
1	* 2.39	36.06	Pk	31.8	-23	0	44.86	-	-	74	-29.14	186	103	V
3	* 2.39	26.62	RMS	31.8	-23	.82	36.24	54	-17.76	-	-	186	103	V

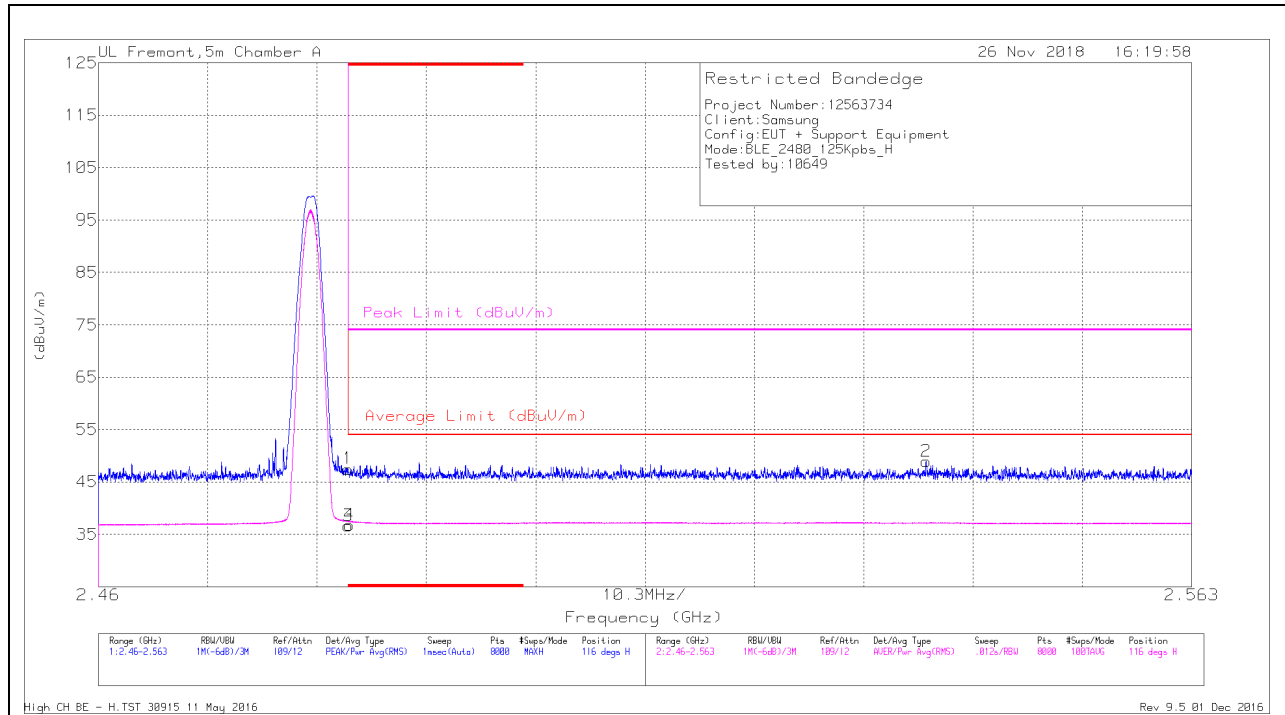
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Trace Markers

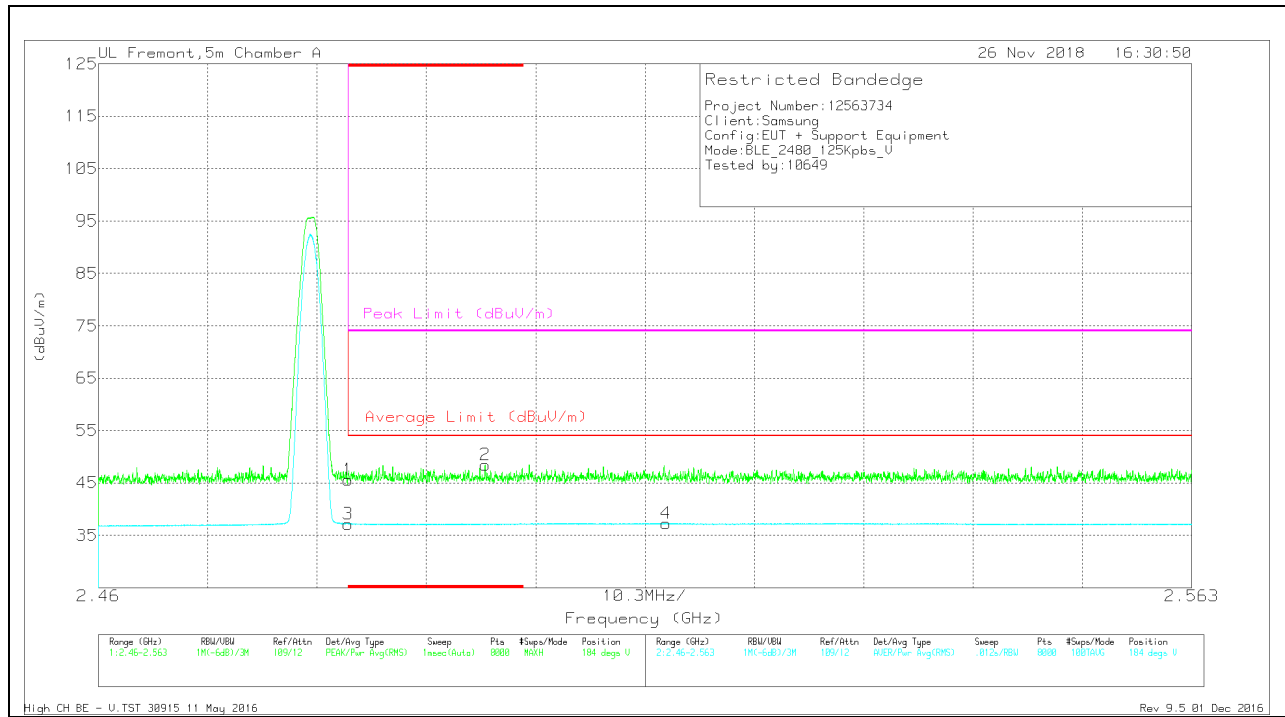
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	38.1	Pk	32.3	-22.9	0	47.5	-	-	74	-26.5	116	149	H
3	* 2.484	27.26	RMS	32.3	-22.9	.82	37.48	54	-16.52	-	-	116	149	H
4	* 2.484	27.32	RMS	32.3	-22.9	.82	37.54	54	-16.46	-	-	116	149	H
2	2.538	39.38	Pk	32.4	-22.8	0	48.98	-	-	74	-25.02	116	149	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AFT345 (dB/m)	Amp/Cb/Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.19	Pk	32.3	-22.9	0	45.59	-	-	74	-28.41	184	114	V
3	* 2.484	26.95	RMS	32.3	-22.9	.82	37.17	54	-16.83	-	-	184	114	V
2	* 2.496	38.96	Pk	32.4	-22.9	0	48.46	-	-	74	-25.54	184	114	V
4	2.513	26.87	RMS	32.4	-22.8	.82	37.29	54	-16.71	-	-	184	114	V

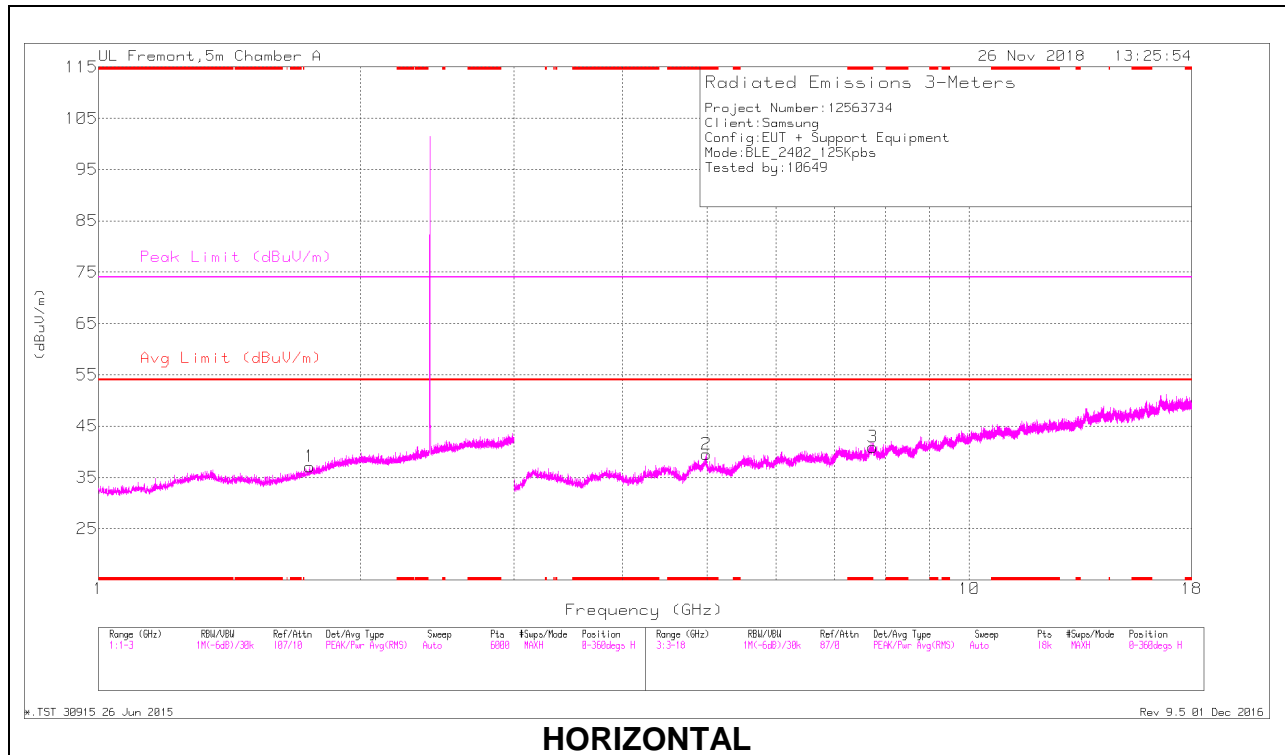
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

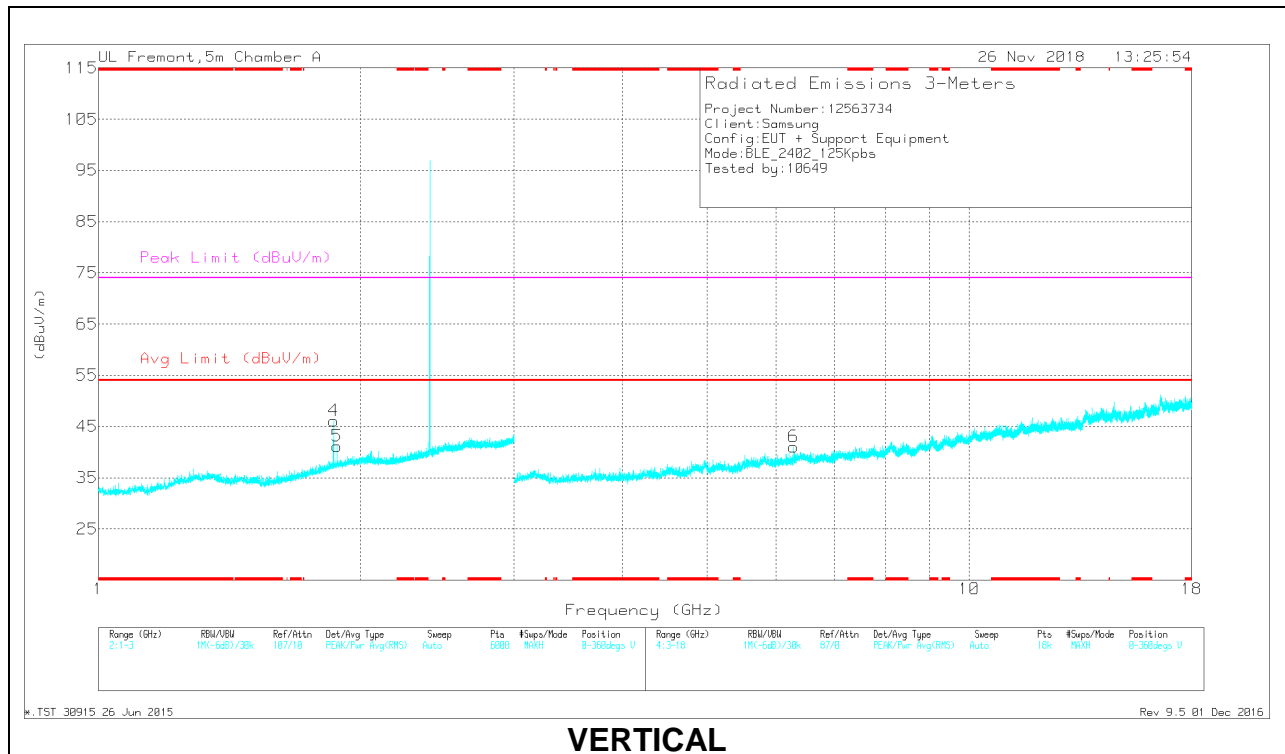
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Radiated Emissions

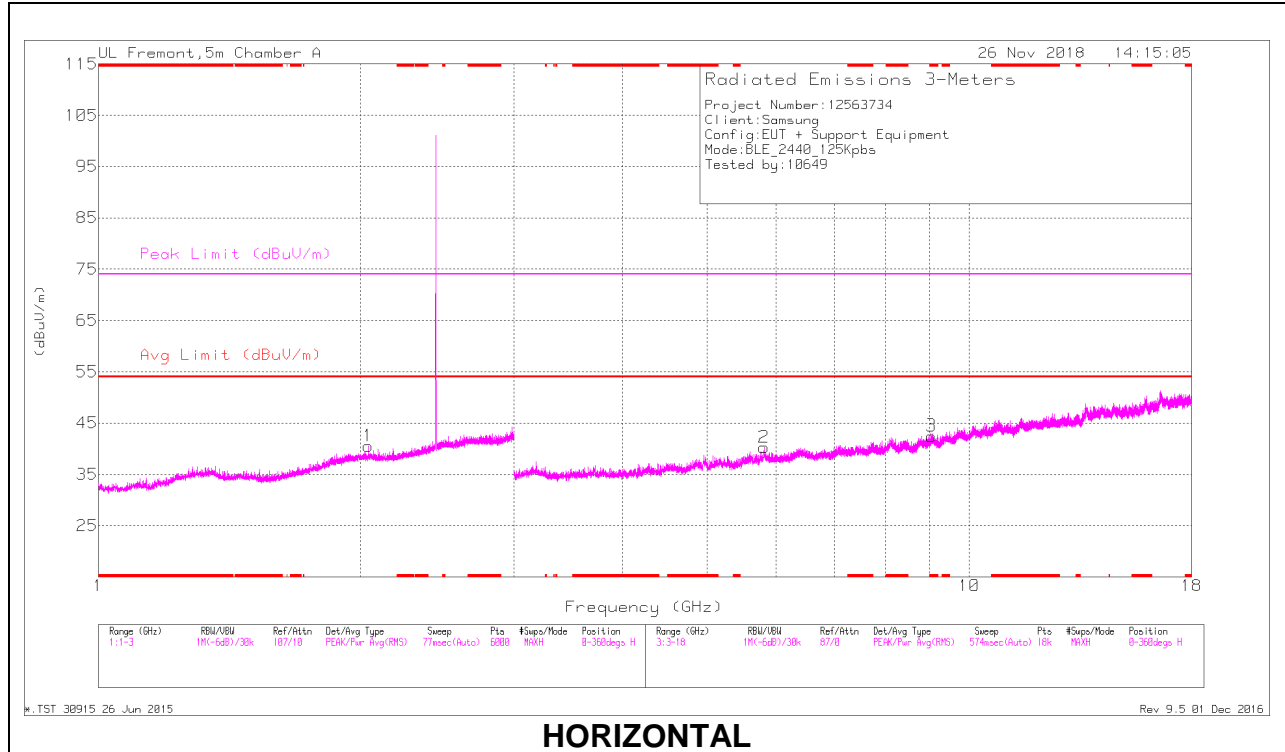
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Filtr/Par d (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.988	37.24	PK2	34.3	-27.2	0	44.34	-	-	74	-29.66	93	187	H
	* 4.994	26.39	MAv1	34.3	-27.2	.82	34.32	54	-19.68	-	-	93	187	H
1	1.749	36.12	PK2	29.8	-23	0	42.92	-	-	-	-	247	125	H
4	1.863	36	PK2	30.9	-22.9	0	44	-	-	-	-	324	106	V
5	1.878	35.95	PK2	31	-22.9	0	44.05	-	-	-	-	121	103	V
6	6.283	34.26	PK2	35.7	-25.1	0	44.86	-	-	-	-	33	132	V
4	7.752	33.4	PK2	35.8	-21.7	0	47.5	-	-	-	-	167	216	H

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

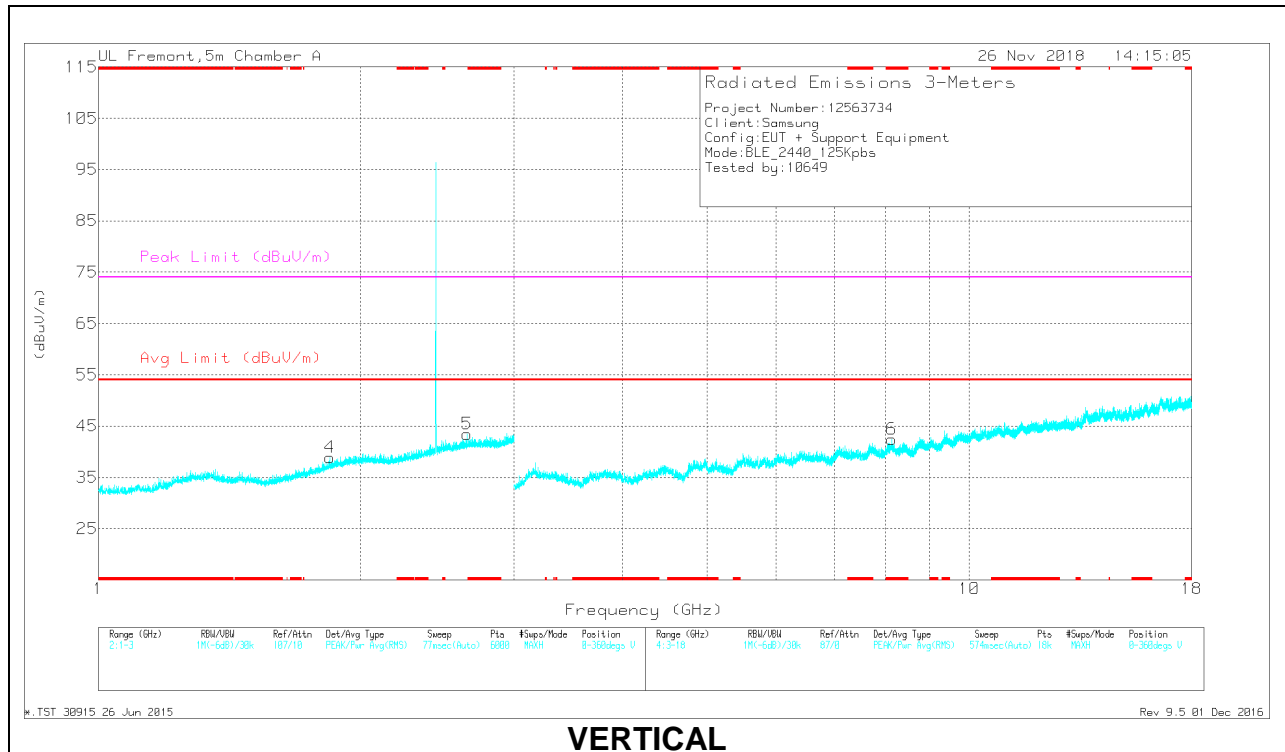
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

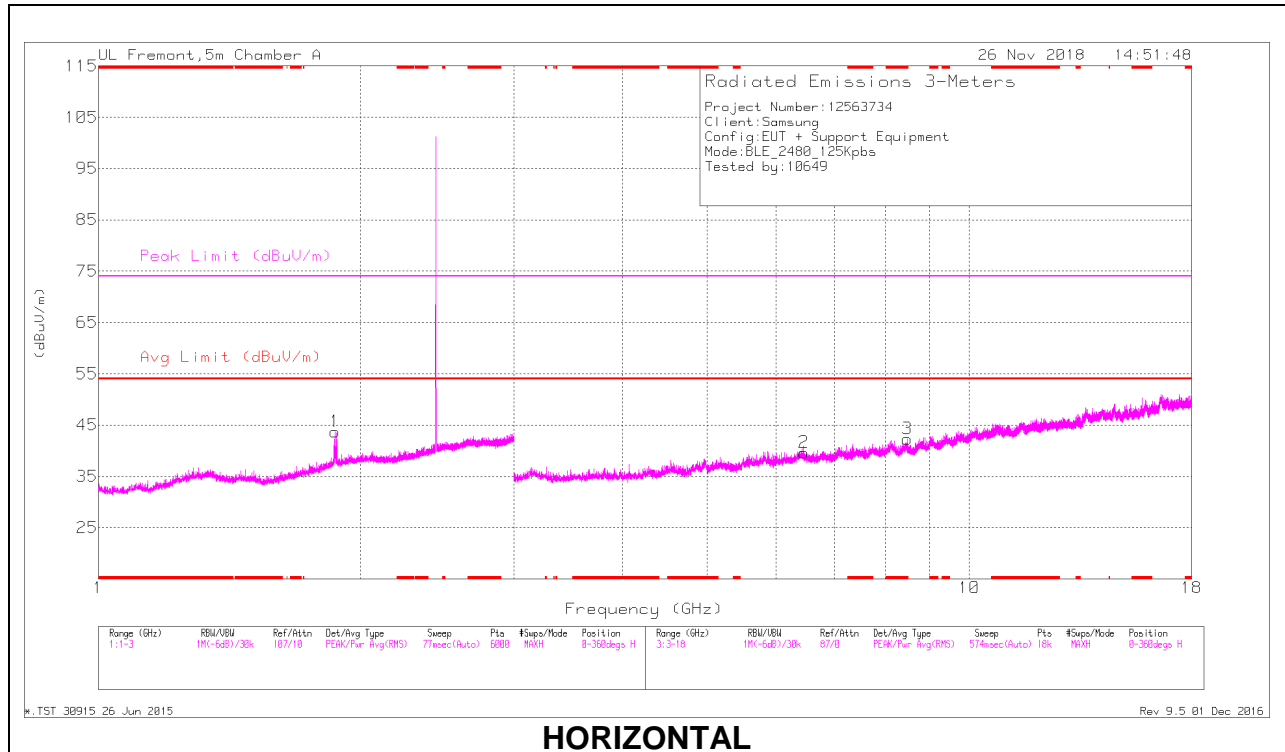
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filt/Paid (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 9.044	32.86	PK2	36.3	-20.4	0	48.76	-	-	74	-25.24	3	117	H
* 9.046	21.67	MAV1	36.3	-20.3	.82	38.5	54	-15.5	-	-	3	117	H
* 8.152	33.24	PK2	35.8	-20.8	0	48.24	-	-	74	-25.76	162	133	V
* 8.153	21.9	MAV1	35.8	-20.9	.82	37.63	54	-16.37	-	-	162	133	V
1.843	36.66	PK2	30.8	-23	0	44.46	-	-	-	-	239	193	V
2.041	37.04	PK2	31.4	-23.1	0	45.34	-	-	-	-	190	166	H
2.653	38.21	PK2	32.5	-22.5	0	48.21	-	-	-	-	79	115	V
5.808	35.14	PK2	35.1	-24.6	0	45.64	-	-	-	-	205	124	H

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

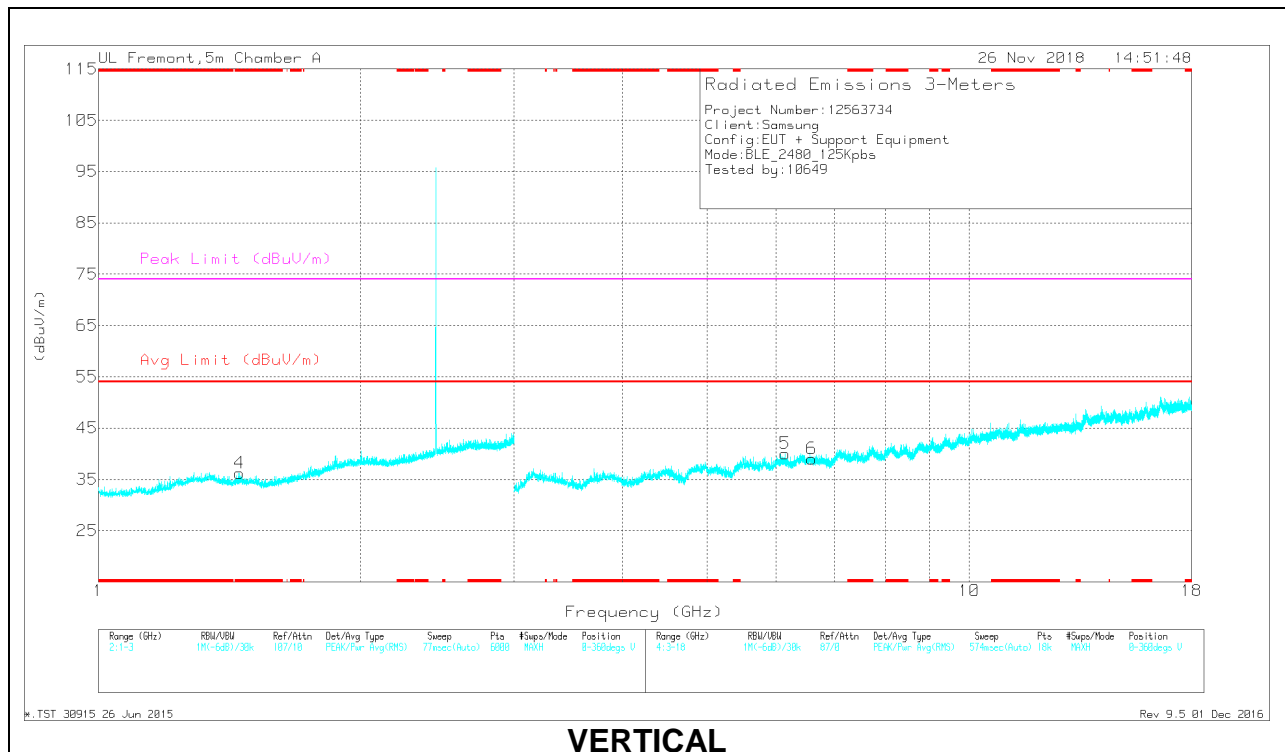
PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Fitr/Pa d (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 1.452	36.25	PK2	28.7	-23.2	0	41.75	-	-	74	-32.25	74	192	V
	* 1.453	24.04	MAv1	28.7	-23.1	.82	30.47	54	-23.53	-	-	74	192	V
3	* 8.487	32.68	PK2	35.8	-21.2	0	47.28	-	-	74	-26.72	253	162	H
	* 8.485	21.08	MAv1	35.8	-21.2	.82	36.51	54	-17.49	-	-	253	162	H
1	1.869	37.08	PK2	31	-22.9	0	45.18	-	-	-	-	335	155	H
5	6.144	34.6	PK2	35.5	-24.5	0	45.6	-	-	-	-	198	119	V
2	6.462	33.96	PK2	35.8	-23.8	0	45.96	-	-	-	-	154	278	H
6	6.589	33.25	PK2	35.6	-24.2	0	44.65	-	-	-	-	195	173	V

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

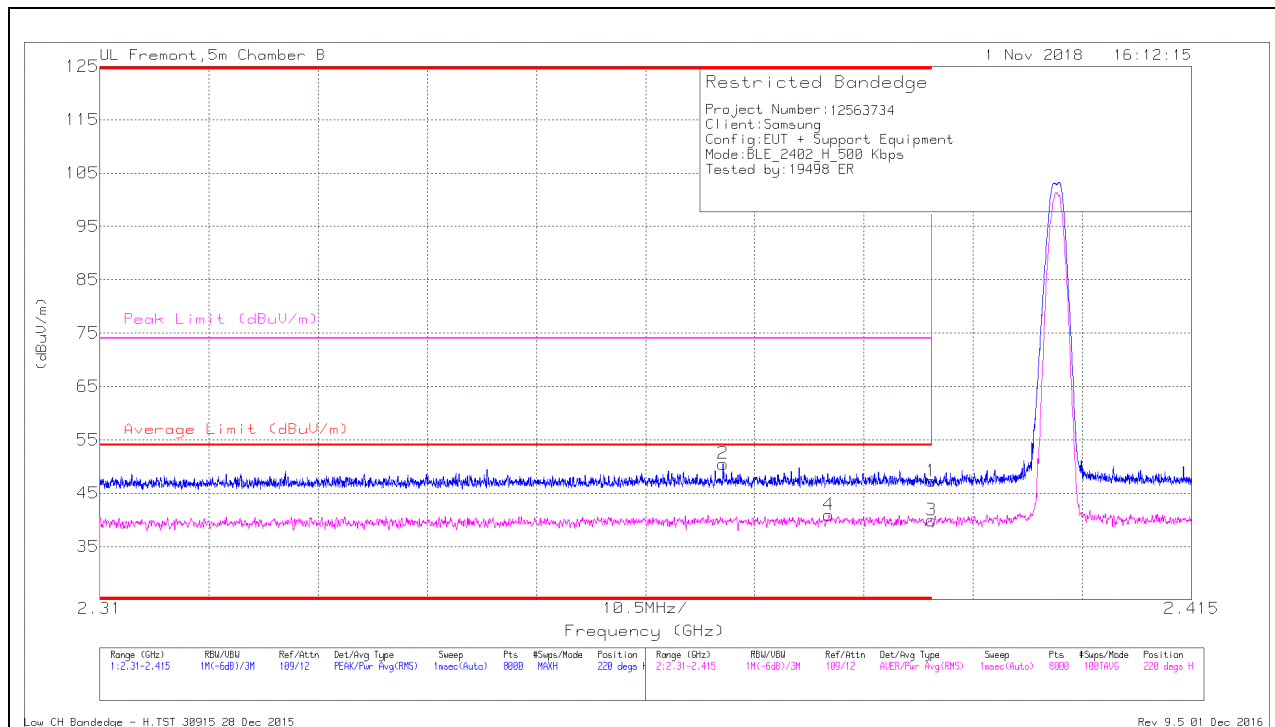
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

10.2.2. BLE (500kpbs)

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

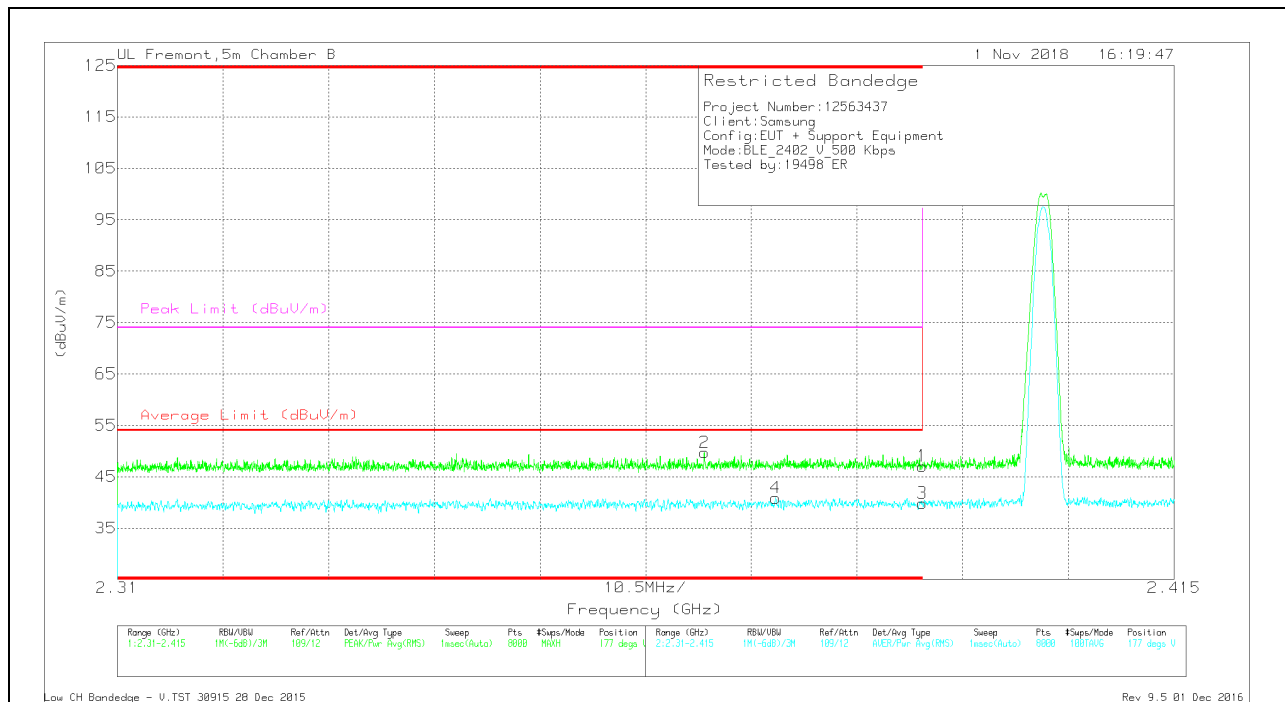
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.66	Pk	32.3	-20.7	0	47.26	-	-	74	-26.74	220	134	H
2	* 2.37	38.91	Pk	32.3	-20.7	0	50.51	-	-	74	-23.49	220	134	H
3	* 2.39	25.8	RMS	32.3	-20.7	2.52	39.92	54	-14.08	-	-	220	134	H
4	* 2.38	26.81	RMS	32.3	-20.7	2.52	40.93	54	-13.07	-	-	220	134	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.48	Pk	32.3	-20.7	0	47.08	-	-	74	-26.92	177	112	V
2	* 2.368	38.1	Pk	32.3	-20.7	0	49.7	-	-	74	-24.3	177	112	V
3	* 2.39	25.75	RMS	32.3	-20.7	2.52	39.87	54	-14.13	-	-	177	112	V
4	* 2.375	26.77	RMS	32.3	-20.7	2.52	40.89	54	-13.11	-	-	177	112	V

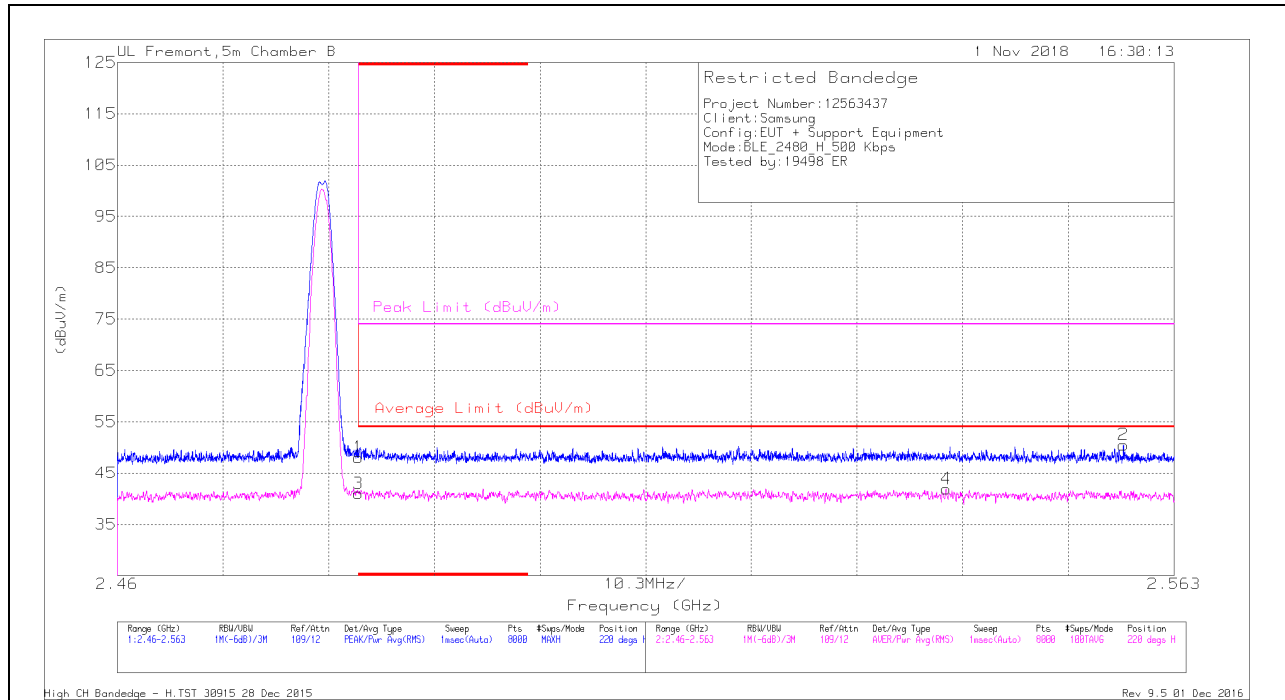
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Trace Markers

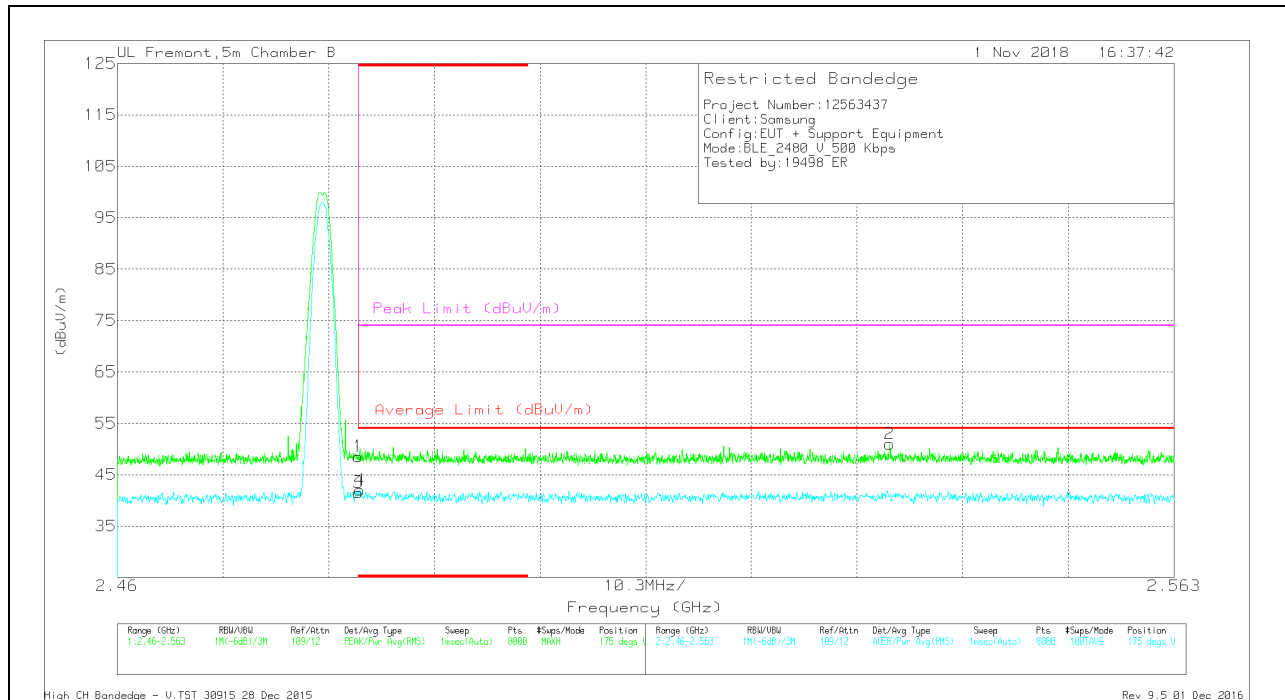
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb1/Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	35.76	Pk	32.6	-20.3	0	48.06	-	-	74	-25.94	220	164	H
3	* 2.484	26.25	RMS	32.6	-20.3	2.52	41.07	54	-12.93	-	-	220	164	H
4	2.541	27.12	RMS	32.7	-20.4	2.52	41.94	54	-12.06	-	-	220	164	H
2	2.558	38.41	Pk	32.7	-20.6	0	50.51	-	-	74	-23.49	220	164	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.24	Pk	32.6	-20.3	0	48.54	-	-	74	-25.46	175	139	V
3	* 2.484	26.76	RMS	32.6	-20.3	2.52	41.58	54	-12.42	-	-	175	139	V
4	* 2.484	27.22	RMS	32.6	-20.3	2.52	42.04	54	-11.96	-	-	175	139	V
2	2.535	38.62	Pk	32.7	-20.3	0	51.02	-	-	74	-22.98	175	139	V

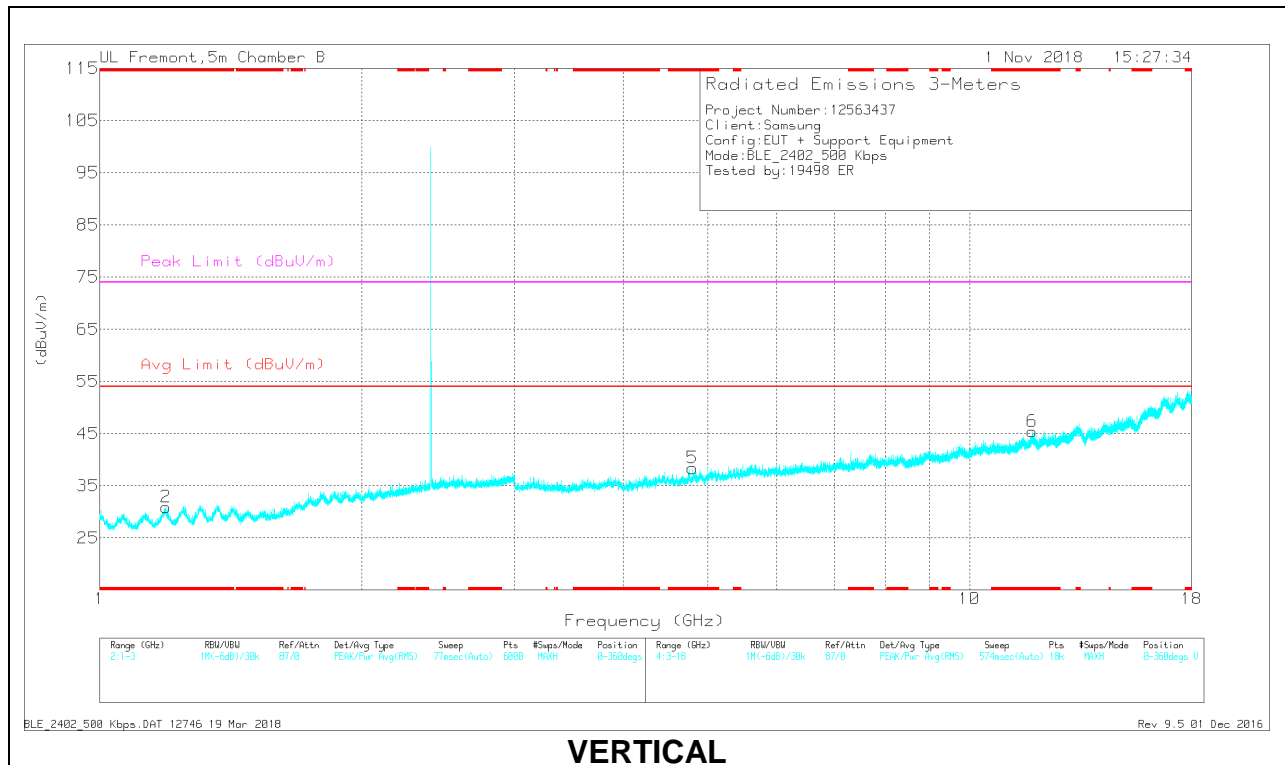
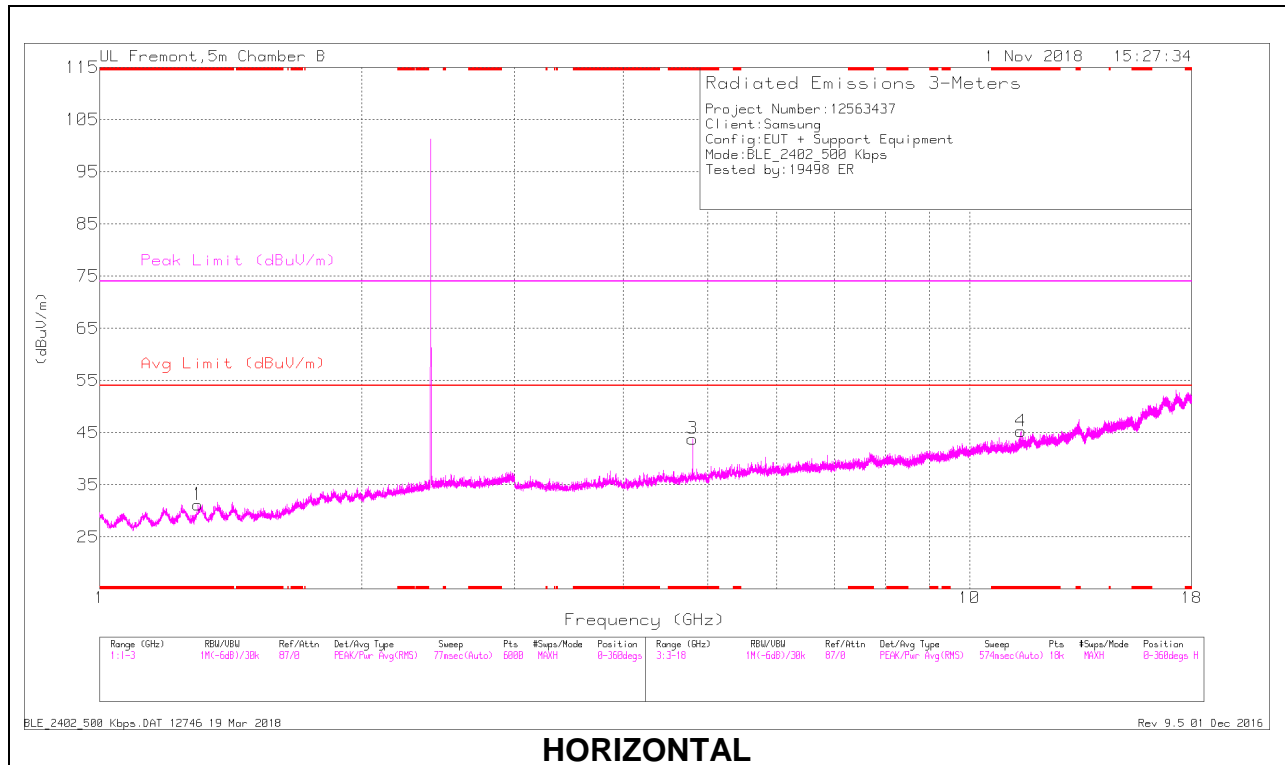
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

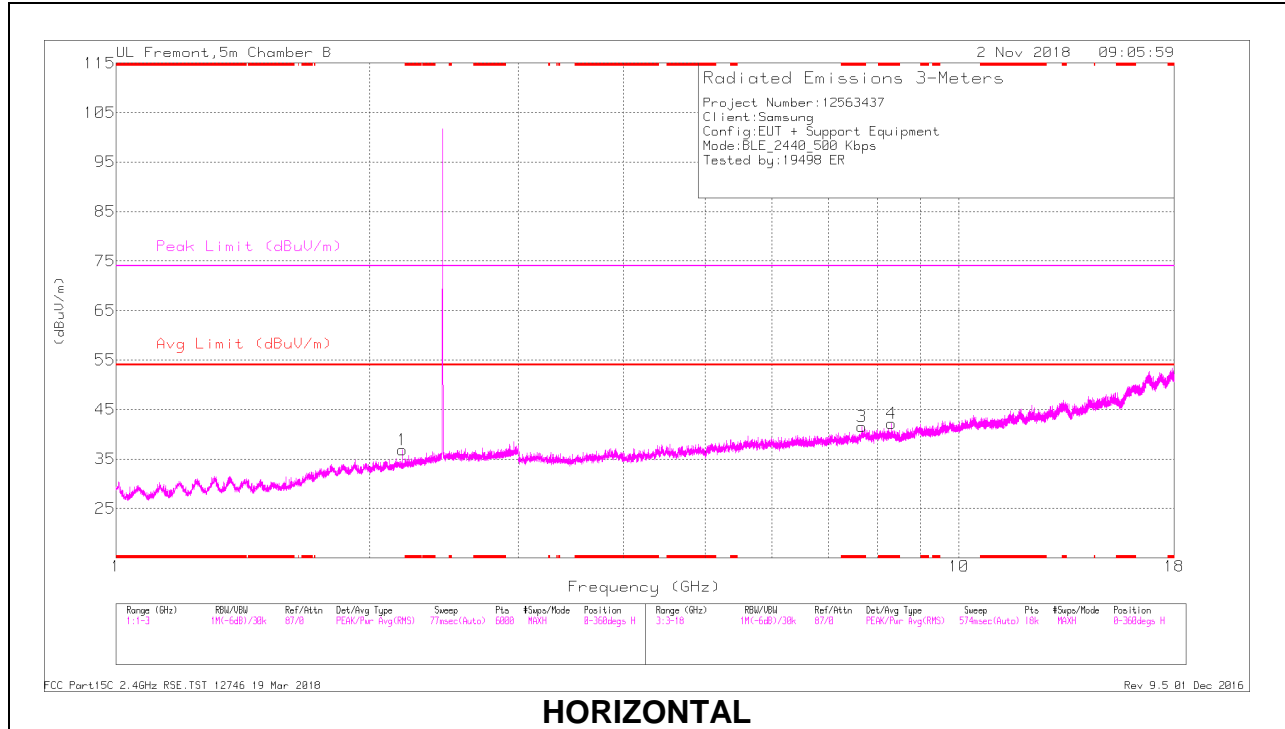
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Fltr/Paid (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.298	30.18	PK2	28.4	-21.5	0	37.08	-	-	74	-36.92	237	128	H
* 1.298	18.72	MAV1	28.4	-21.6	2.52	28.02	54	-25.98	-	-	237	128	H
* 1.19	30.89	PK2	28.1	-22.2	0	36.79	-	-	74	-37.21	156	160	V
* 1.19	19.54	MAV1	28.1	-22.2	2.52	27.94	54	-26.06	-	-	156	160	V
* 4.805	38.82	PK2	34	-29	0	43.82	-	-	74	-30.18	95	381	H
* 4.804	27.3	MAV1	34	-29	2.52	34.8	54	-19.2	-	-	95	381	H
* 11.455	33.78	PK2	38.4	-21.8	0	50.38	-	-	74	-23.62	200	344	H
* 11.456	22.34	MAV1	38.4	-21.8	2.52	41.44	54	-12.56	-	-	200	344	H
* 4.805	39.29	PK2	34	-29	0	44.29	-	-	74	-29.71	283	333	V
* 4.804	28.34	MAV1	34	-29	2.52	35.84	54	-18.16	-	-	283	333	V
* 11.81	33.92	PK2	39.1	-21.3	0	51.72	-	-	74	-22.28	336	178	V
* 11.81	21.99	MAV1	39.1	-21.3	2.52	42.29	54	-11.71	-	-	336	178	V

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

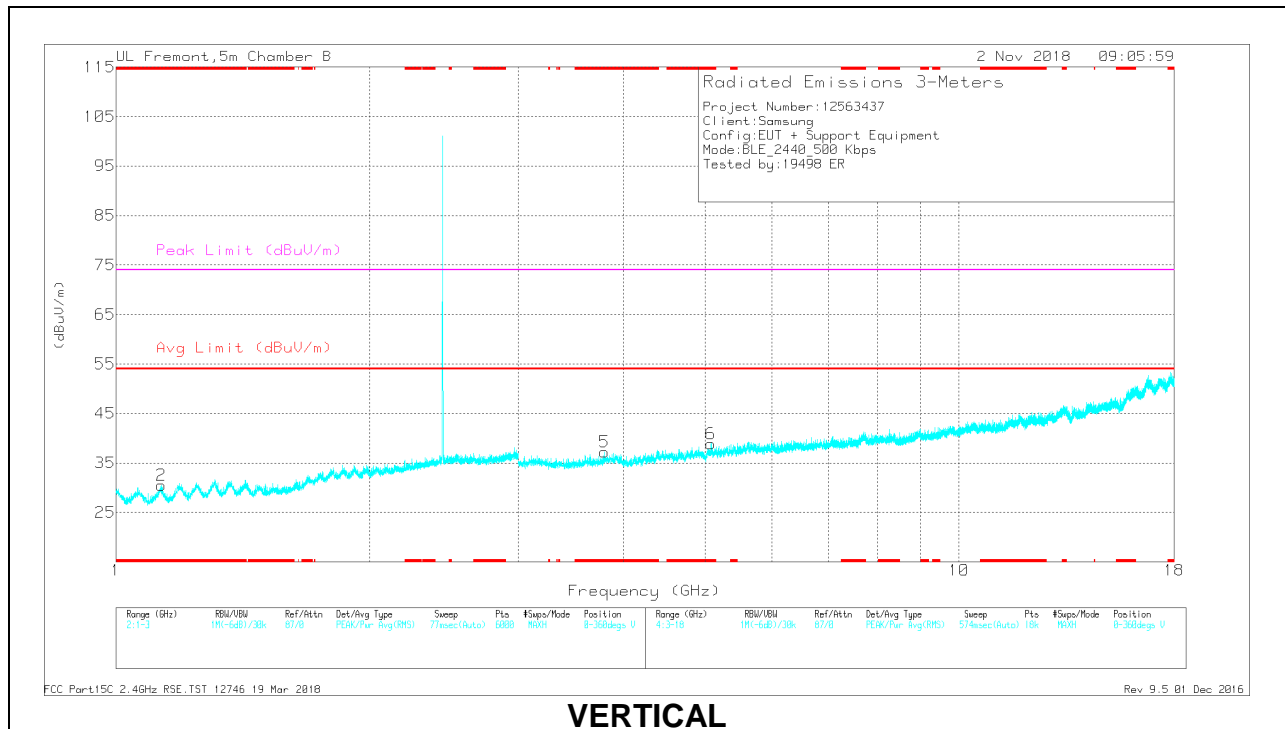
PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

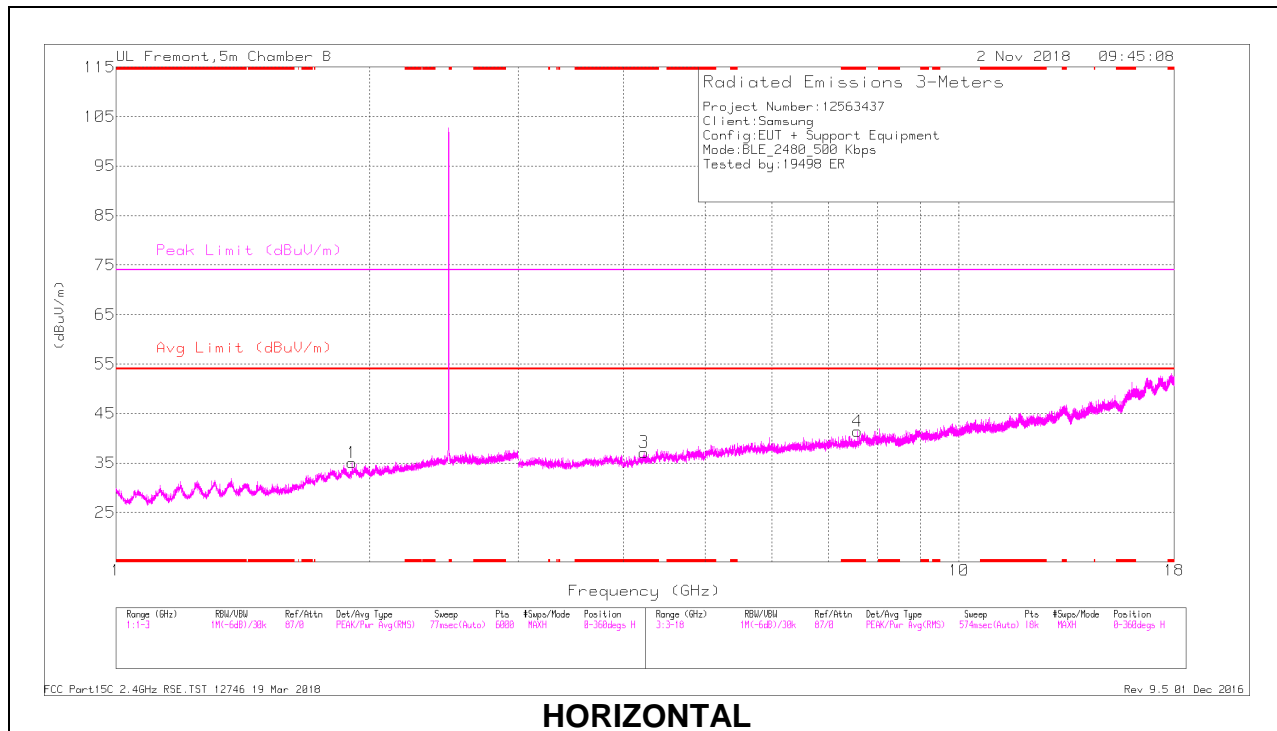
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.131	31.42	PK2	27.5	-22.5	0	36.42	-	-	74	-37.58	218	225	V
* 1.132	19.79	MAV1	27.5	-22.5	2.52	27.29	54	-26.71	-	-	218	225	V
* 7.669	36.25	PK2	36.4	-25.9	0	46.75	-	-	74	-27.25	149	276	H
* 7.67	25.69	MAV1	36.4	-25.9	2.52	38.69	54	-15.31	-	-	149	276	H
* 8.318	36.26	PK2	36.3	-24.9	0	47.66	-	-	74	-26.34	336	138	H
* 8.318	24.55	MAV1	36.3	-24.9	2.52	38.45	54	-15.55	-	-	336	138	H
* 3.799	39.83	PK2	33.4	-30.3	0	42.93	-	-	74	-31.07	251	180	V
* 3.799	28.98	MAV1	33.4	-30.3	2.52	34.58	54	-19.42	-	-	251	180	V
* 5.078	39.47	PK2	34.5	-28.6	0	45.37	-	-	74	-28.63	309	112	V
* 5.078	26.89	MAV1	34.5	-28.6	2.52	35.29	54	-18.71	-	-	309	112	V
2.188	29.95	PK2	31.4	-20.7	0	40.65	-	-	-	-	59	170	H

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

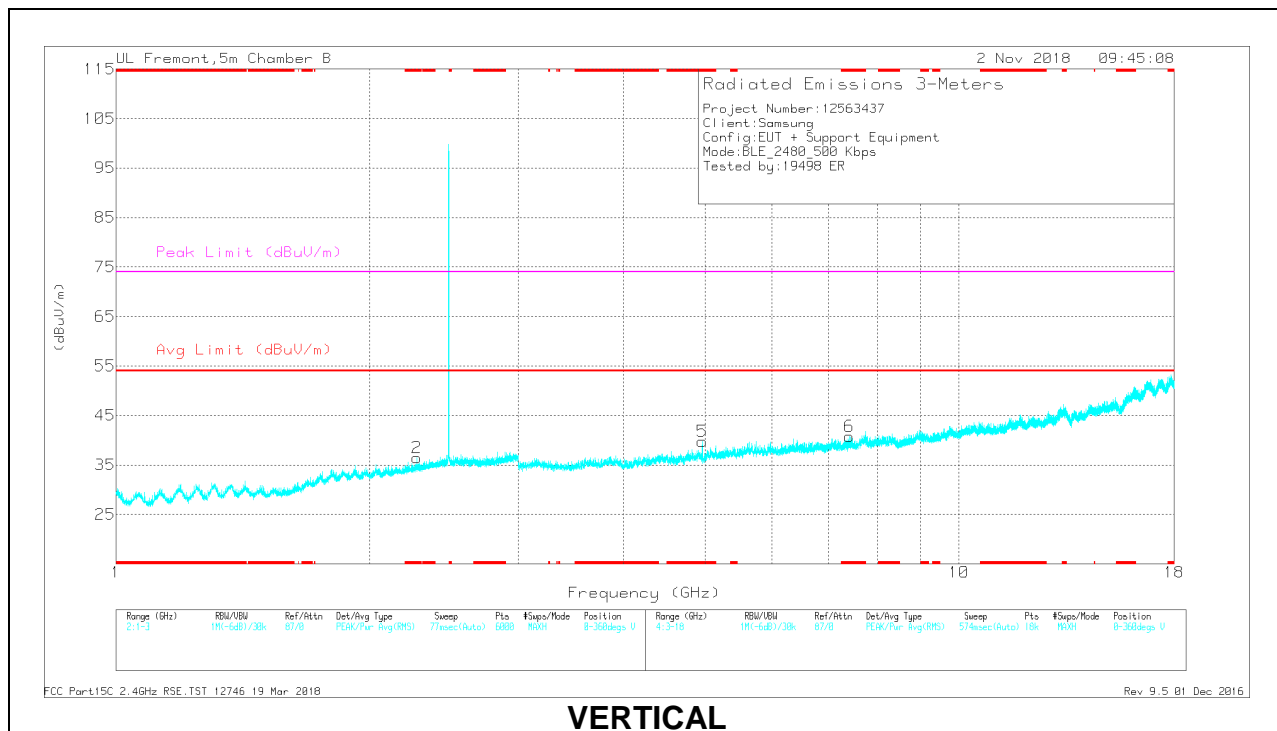
PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.276	30.05	PK2	31.8	-20.5	0	41.35	-	-	74	-32.65	148	187	V
* 2.274	18.53	MAV1	31.8	-20.6	2.52	32.23	54	-21.77	-	-	148	187	V
* 4.229	39.19	PK2	33.6	-29.3	0	43.49	-	-	74	-30.51	210	248	H
* 4.228	28.41	MAV1	33.6	-29.3	2.52	35.21	54	-18.79	-	-	210	248	H
* 7.577	37.99	PK2	36.3	-27.2	0	47.09	-	-	74	-26.91	117	241	H
* 7.577	26.02	MAV1	36.3	-27.2	2.52	37.62	54	-16.38	-	-	117	241	H
* 4.962	38.35	PK2	34.5	-29.4	0	43.45	-	-	74	-30.55	188	119	V
* 4.959	29.07	MAV1	34.5	-29.5	2.52	36.57	54	-17.43	-	-	188	119	V
* 7.405	36.76	PK2	36.2	-26.4	0	46.56	-	-	74	-27.44	145	310	V
* 7.404	24.98	MAV1	36.2	-26.4	2.52	37.28	54	-16.72	-	-	145	310	V
1.906	29.54	PK2	31.1	-20.6	0	40.04	-	-	-	-	257	149	H

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

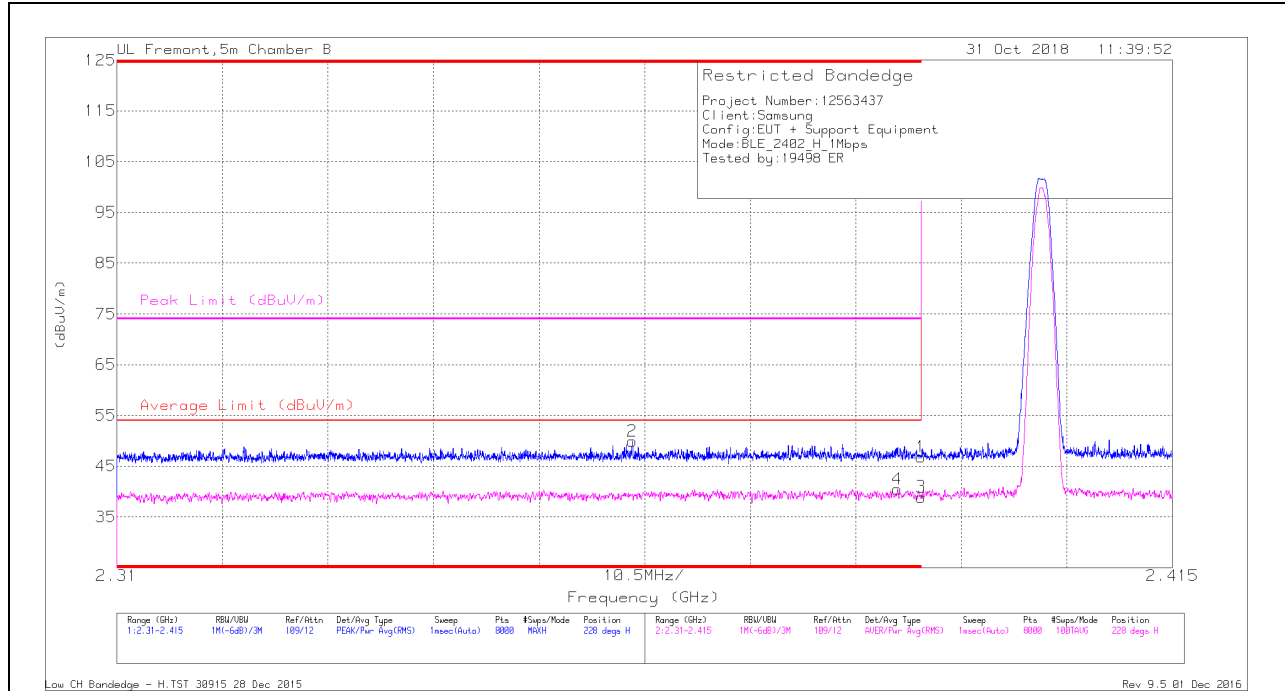
PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

10.2.3. BLE (1Mbps)

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.17	Pk	32.3	-20.7	0	46.77	-	-	74	-27.23	228	113	H
2	* 2.361	38.42	Pk	32.2	-20.7	0	49.92	-	-	74	-24.08	228	113	H
3	* 2.39	25.14	RMS	32.3	-20.7	2.19	38.93	54	-15.07	-	-	228	113	H
4	* 2.388	26.67	RMS	32.3	-20.7	2.19	40.46	54	-13.54	-	-	228	113	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.67	Pk	32.3	-20.7	0	47.27	-	-	74	-26.73	152	115	V
2	* 2.34	38.06	Pk	32.1	-20.7	0	49.46	-	-	74	-24.54	152	115	V
3	* 2.39	25.34	RMS	32.3	-20.7	2.19	39.13	54	-14.87	-	-	152	115	V
4	* 2.357	27.21	RMS	32.2	-20.8	2.19	40.8	54	-13.2	-	-	152	115	V

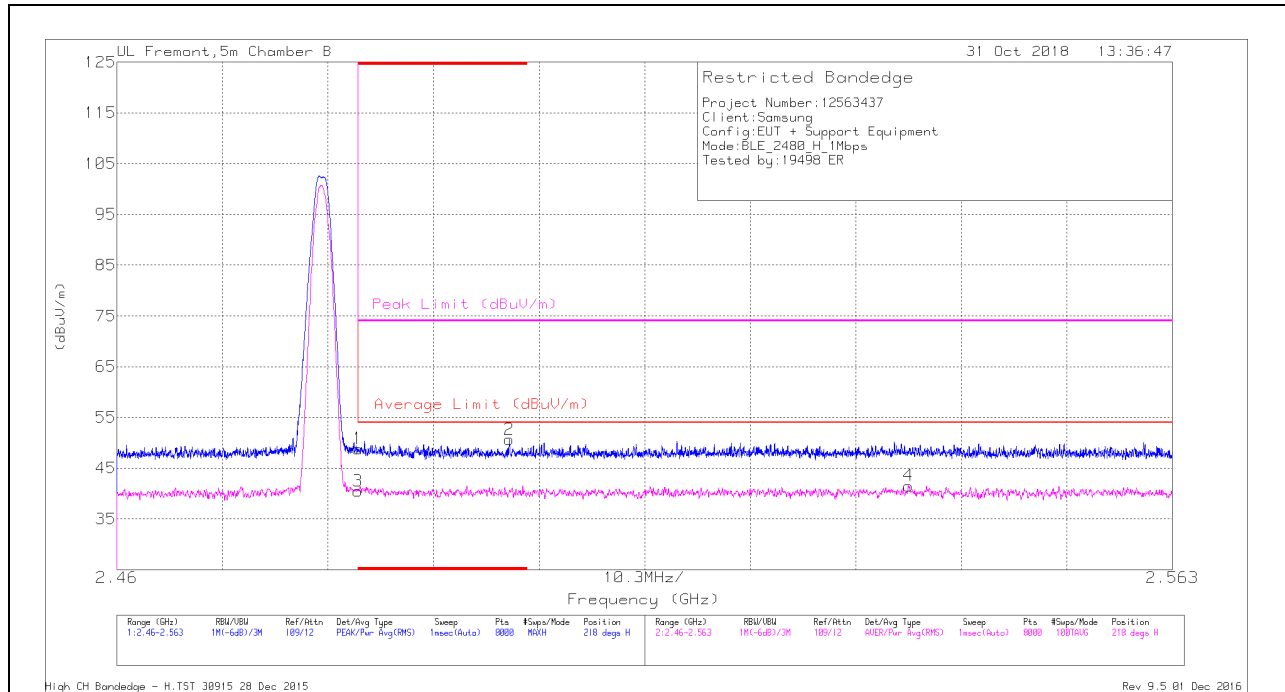
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Trace Markers

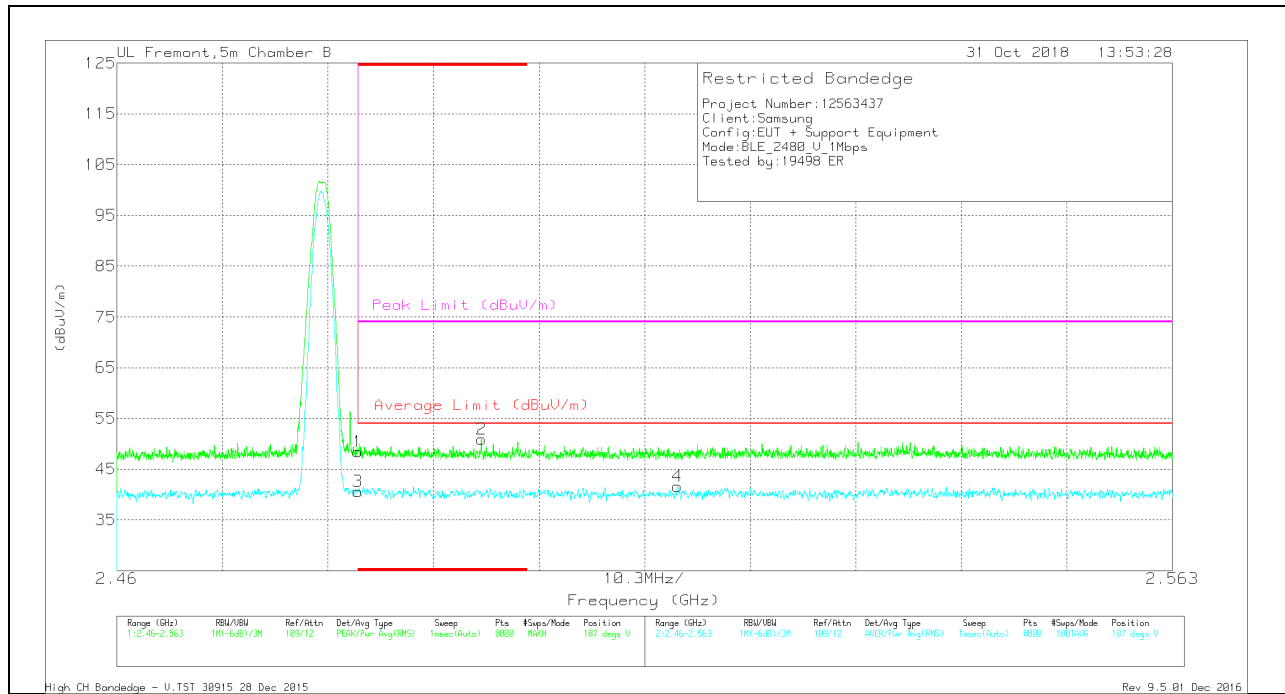
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.56	Pk	32.6	-20.3	0	48.86	-	-	74	-25.14	218	147	H
2	* 2.498	38.45	Pk	32.7	-20.5	0	50.65	-	-	74	-23.35	218	147	H
3	* 2.484	26.02	RMS	32.6	-20.3	2.19	40.51	54	-13.49	-	-	218	147	H
4	2.537	26.95	RMS	32.7	-20.3	2.19	41.54	54	-12.46	-	-	218	147	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.11	Pk	32.6	-20.3	0	48.41	-	-	74	-25.59	187	115	V
2	* 2.496	38.7	Pk	32.7	-20.5	0	50.9	-	-	74	-23.1	187	115	V
3	* 2.484	26.16	RMS	32.6	-20.3	2.19	40.65	54	-13.35	-	-	187	115	V
4	2.515	27.18	RMS	32.7	-20.5	2.19	41.57	54	-12.43	-	-	187	115	V

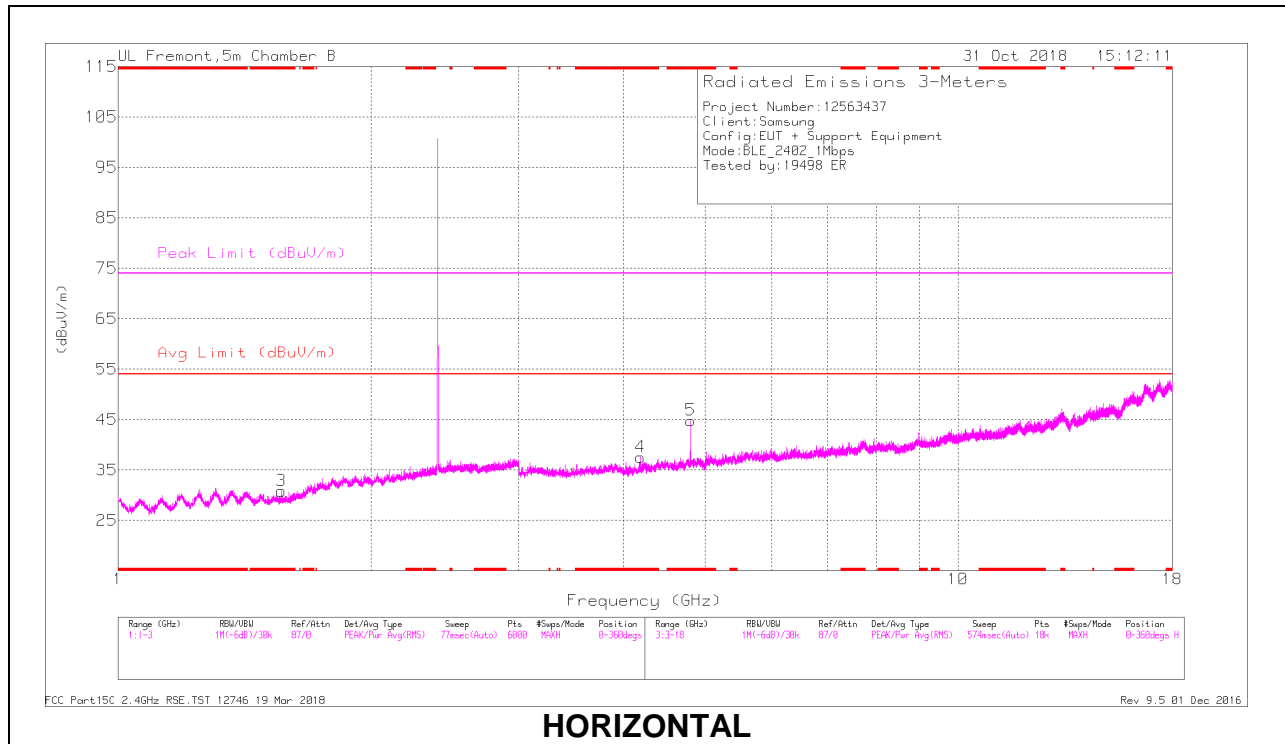
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

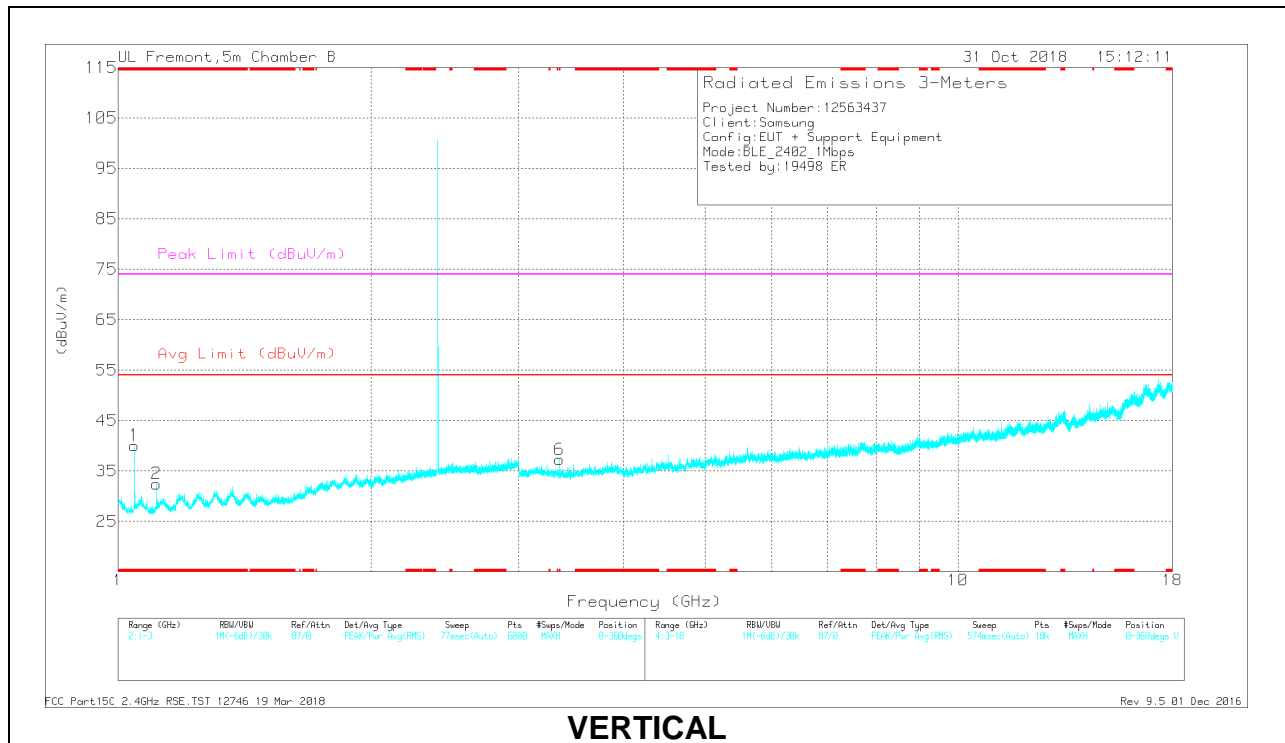
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

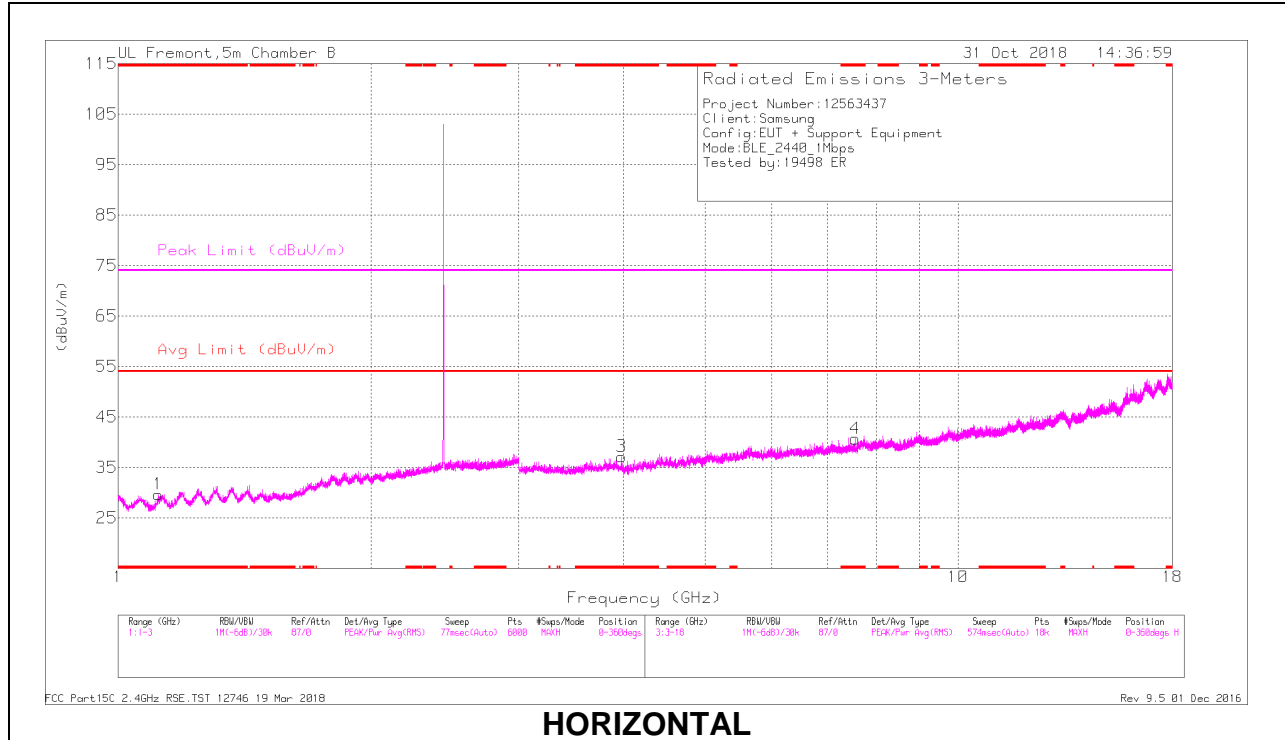
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.566	29	PK2	27.7	-20.9	0	35.8	-	-	74	-38.2	273	135	H
* 1.565	17.68	MAV1	27.7	-20.9	2.19	26.67	54	-27.33	-	-	273	135	H
* 1.046	30.08	PK2	27.5	-22.9	0	34.68	-	-	74	-39.32	217	157	V
* 1.048	18.88	MAV1	27.5	-22.9	2.19	25.67	54	-28.33	-	-	217	157	V
* 1.111	30.27	PK2	27.3	-22.7	0	34.87	-	-	74	-39.13	110	136	V
* 1.111	18.75	MAV1	27.3	-22.7	2.19	25.54	54	-28.46	-	-	110	136	V
* 4.19	39.71	PK2	33.6	-29.6	0	43.71	-	-	74	-30.29	29	269	H
* 4.19	26.96	MAV1	33.6	-29.6	2.19	33.15	54	-20.85	-	-	29	269	H
* 4.804	38.52	PK2	34	-29	0	43.52	-	-	74	-30.48	117	221	H
* 4.804	27.39	MAV1	34	-29	2.19	34.58	54	-19.42	-	-	117	221	H
* 3.355	39.6	PK2	32.9	-30.5	0	42	-	-	74	-32	170	130	V
* 3.355	28.08	MAV1	32.9	-30.5	2.19	32.67	54	-21.33	-	-	170	130	V

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

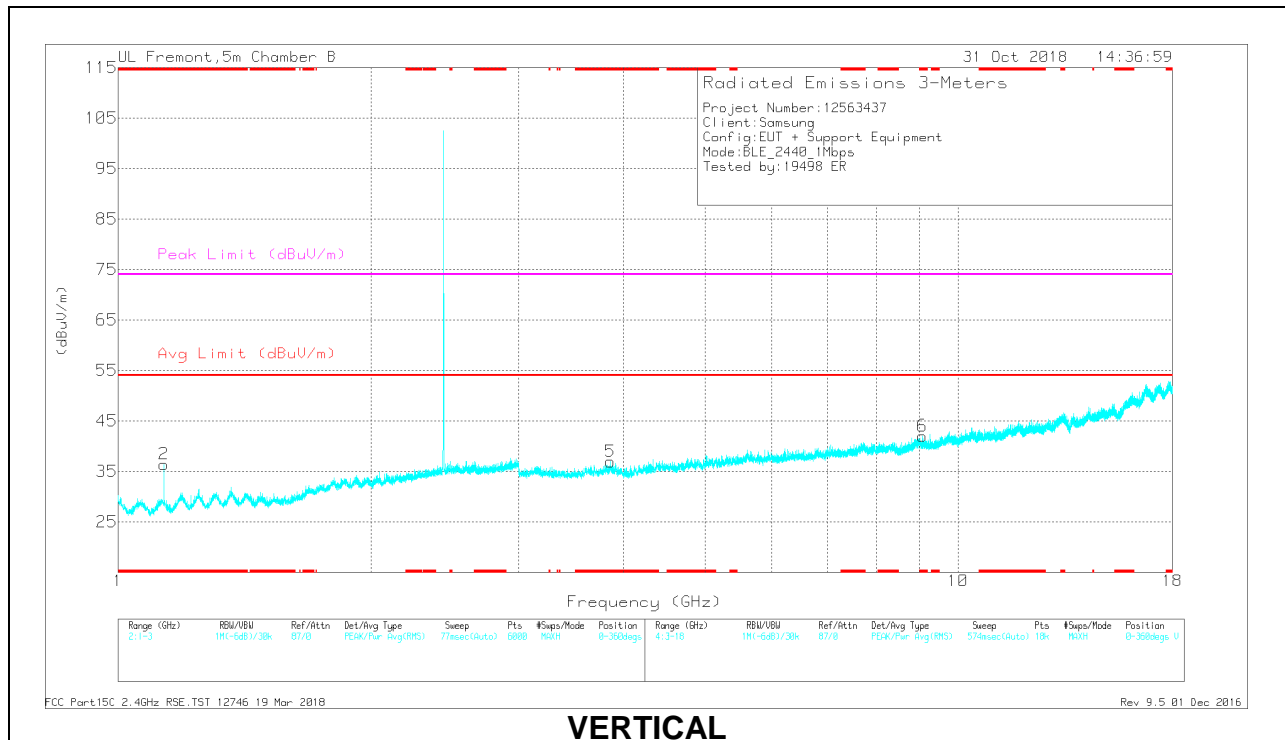
PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

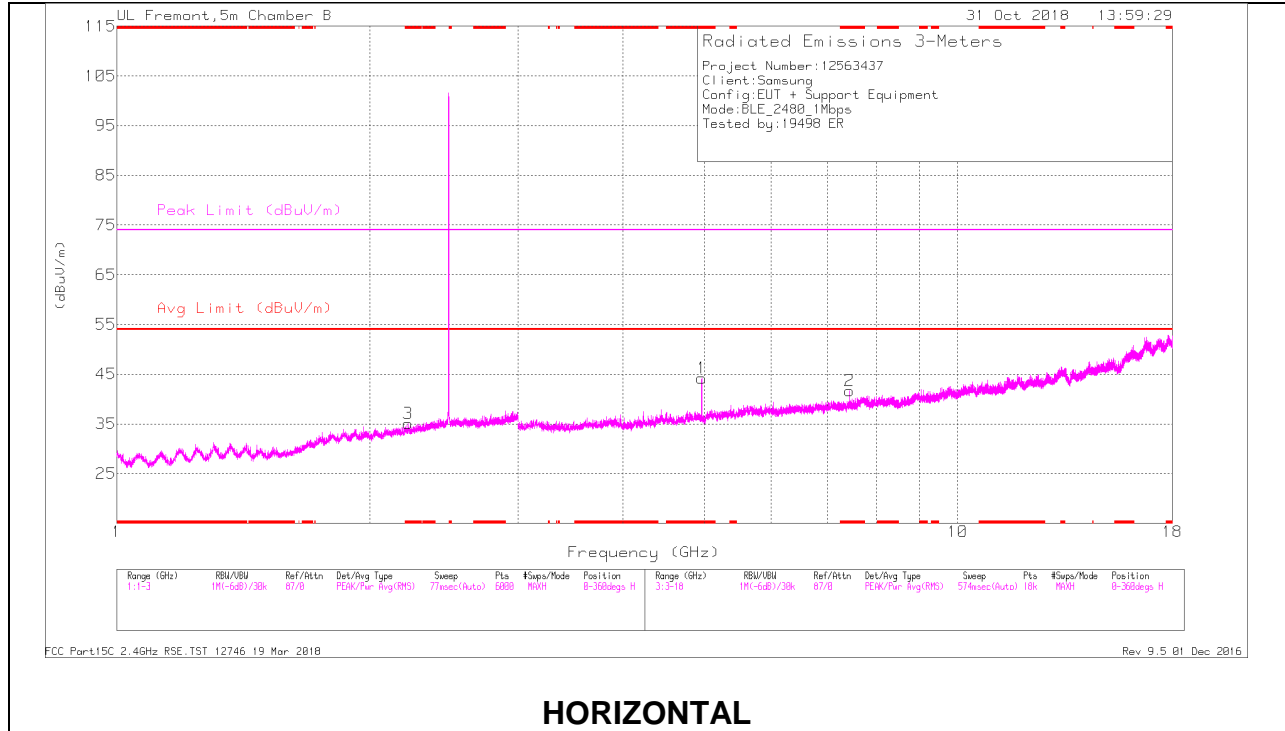
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Fitr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.116	30.68	PK2	27.4	-22.5	0	35.58	-	-	74	-38.42	290	178	H
* 1.117	19.18	MAV1	27.4	-22.4	2.19	26.37	54	-27.63	-	-	290	178	H
* 1.133	31.07	PK2	27.6	-22.5	0	36.17	-	-	74	-37.83	205	240	V
* 1.133	19.21	MAV1	27.6	-22.5	2.19	26.5	54	-27.5	-	-	205	240	V
* 3.977	38.69	PK2	33.4	-30.3	0	41.79	-	-	74	-32.21	119	139	H
* 3.98	28.13	MAV1	33.4	-30.4	2.19	33.32	54	-20.68	-	-	119	139	H
* 7.549	37.19	PK2	36.2	-27	0	46.39	-	-	74	-27.61	264	174	H
* 7.548	24.91	MAV1	36.2	-27	2.19	36.3	54	-17.7	-	-	264	174	H
* 3.859	39.59	PK2	33.4	-29.9	0	43.09	-	-	74	-30.91	193	138	V
* 3.859	28.3	MAV1	33.4	-29.8	2.19	34.09	54	-19.91	-	-	193	138	V
* 9.077	35.38	PK2	36.8	-24.7	0	47.48	-	-	74	-26.52	336	265	V
* 9.077	24.05	MAV1	36.8	-24.7	2.19	38.34	54	-15.66	-	-	336	265	V

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

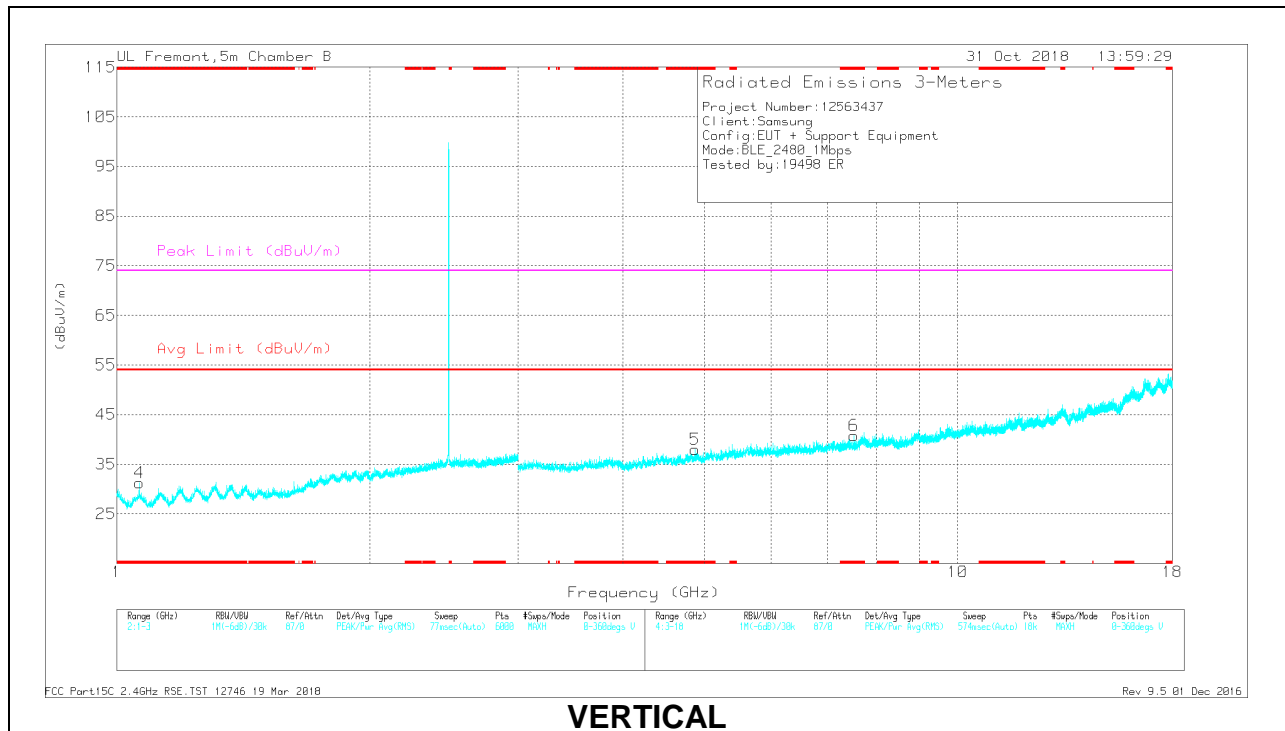
PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.221	29.37	PK2	31.6	-20.6	0	40.37	-	-	74	-33.63	236	124	H
* 2.222	18.07	MAv1	31.6	-20.5	2.19	31.36	54	-22.64	-	-	236	124	H
* 1.062	31.36	PK2	27.4	-22.9	0	35.86	-	-	74	-38.14	208	161	V
* 1.064	19.64	MAv1	27.4	-22.8	2.19	26.43	54	-27.57	-	-	208	161	V
* 4.96	39.36	PK2	34.5	-29.5	0	44.36	-	-	74	-29.64	134	107	H
* 4.96	27.47	MAv1	34.5	-29.5	2.19	34.66	54	-19.34	-	-	134	107	H
* 7.44	36.69	PK2	36.1	-26.5	0	46.29	-	-	74	-27.71	60	182	H
* 7.44	25.03	MAv1	36.1	-26.5	2.19	36.82	54	-17.18	-	-	60	182	H
* 4.875	39.91	PK2	34.3	-30.1	0	44.11	-	-	74	-29.89	0	191	V
* 4.875	28.82	MAv1	34.3	-30.1	2.19	35.21	54	-18.79	-	-	0	191	V
* 7.528	37.15	PK2	36.2	-26.9	0	46.45	-	-	74	-27.55	226	259	V
* 7.528	24.98	MAv1	36.2	-26.9	2.19	36.47	54	-17.53	-	-	226	259	V

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

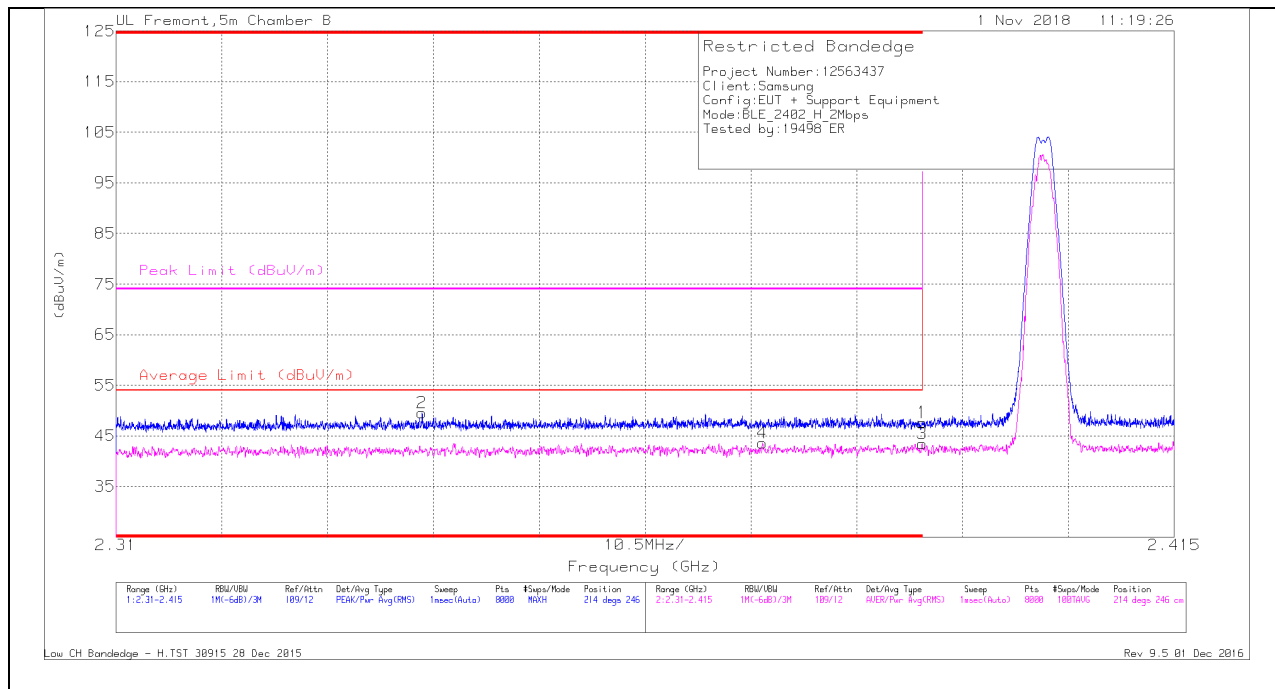
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

10.2.4. BLE (2Mbps)

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

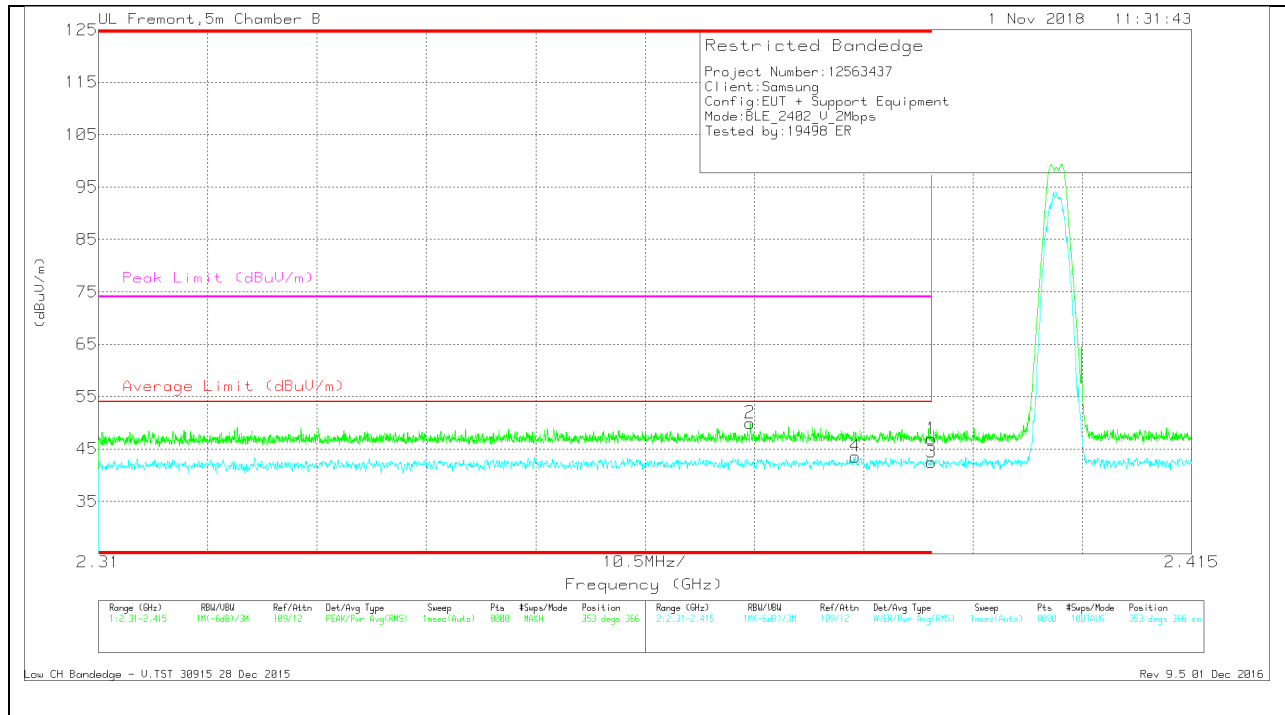
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Ch/Fix/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azmuth (Degs)	Height (cm)	Polarity
1	* 2.39	36.02	Pk	32.3	-20.7	0	47.62	-	-	74	-26.38	214	246	H
2	* 2.34	38.12	Pk	32.1	-20.7	0	49.52	-	-	74	-24.48	214	246	H
3	* 2.39	26.73	RMS	32.3	-20.7	5.07	43.43	54	-10.57	-	-	214	246	H
4	* 2.374	26.87	RMS	32.3	-20.7	5.07	43.57	54	-10.43	-	-	214	246	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.373	38.38	Pk	32.3	-20.7	0	49.98	-	-	74	-24.02	353	366	V
4	* 2.383	26.73	RMS	32.3	-20.6	5.07	43.53	54	-10.47	-	-	353	366	V
1	* 2.39	35.33	Pk	32.3	-20.7	0	46.93	-	-	74	-27.07	353	366	V
3	* 2.39	25.77	RMS	32.3	-20.7	5.07	42.47	54	-11.53	-	-	353	366	V

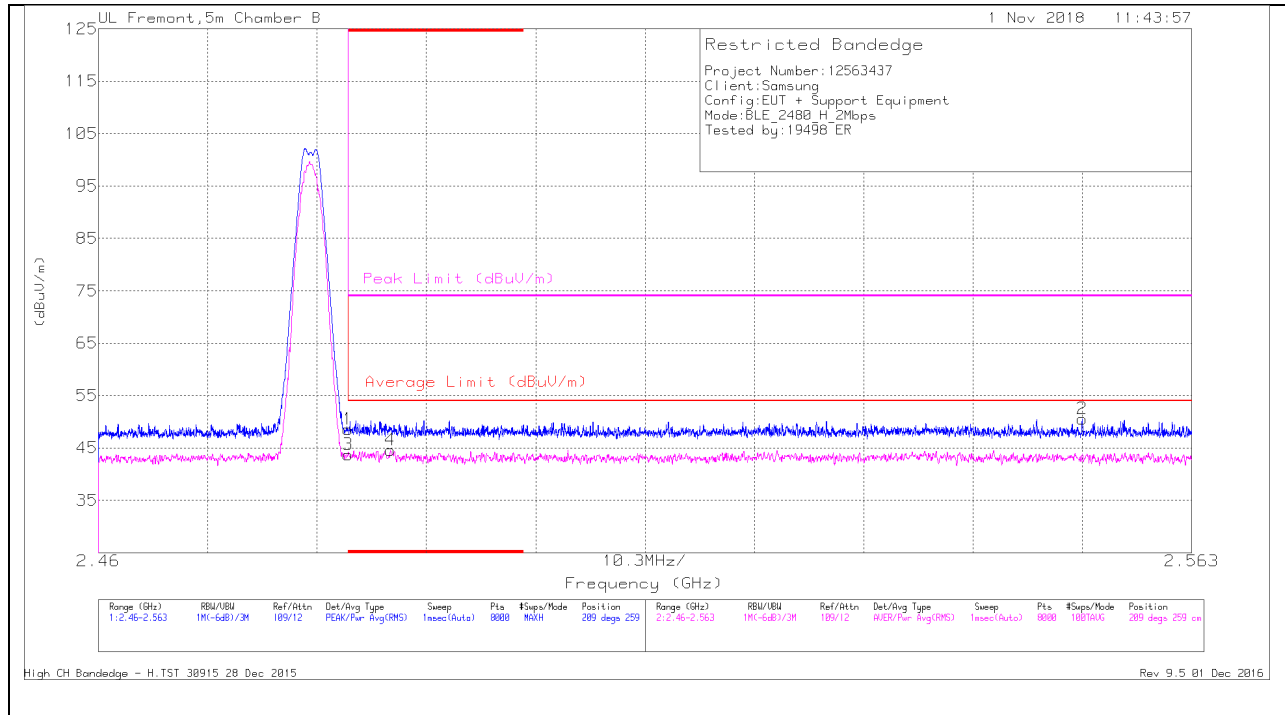
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

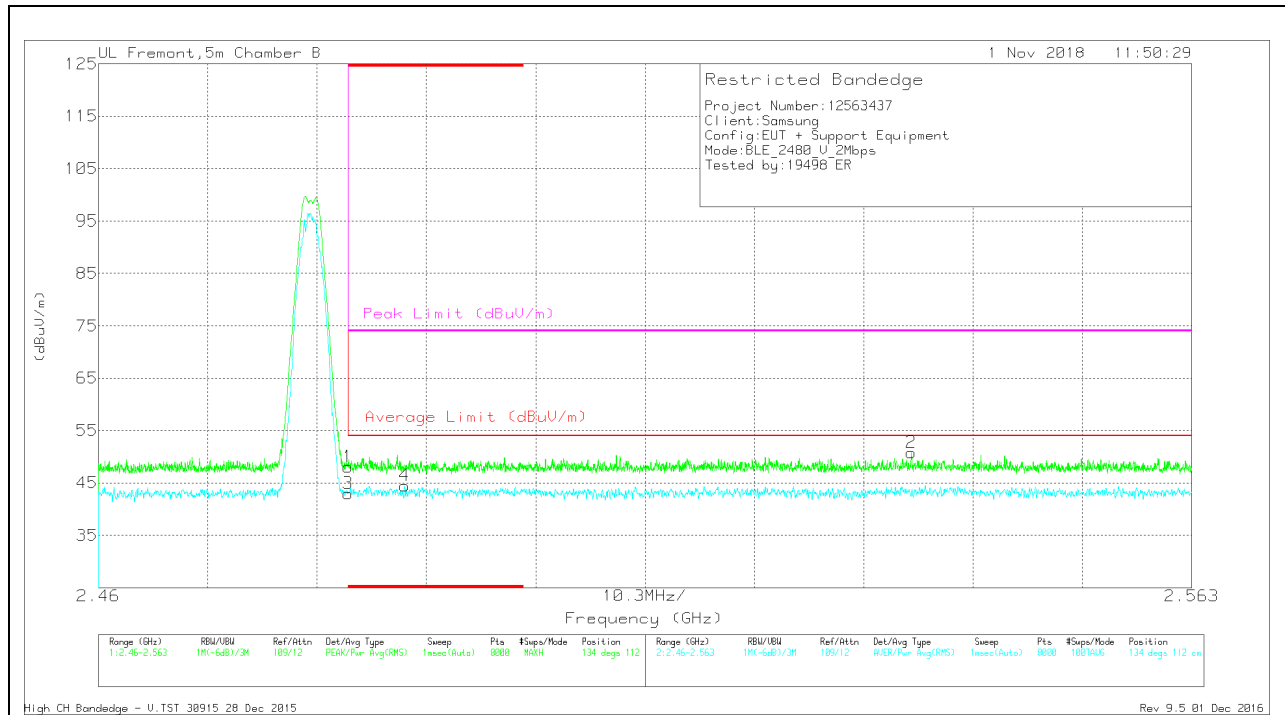


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.28	Pk	32.6	-20.3	0	48.58	-	-	74	-25.42	209	259	H
3	* 2.484	26.32	RMS	32.6	-20.3	5.07	43.72	54	-10.28	-	-	209	259	H
4	* 2.488	27.25	RMS	32.6	-20.4	5.07	44.55	54	-9.45	-	-	209	259	H
2	2.553	38.33	Pk	32.7	-20.5	0	50.53	-	-	74	-23.47	209	259	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection

VERTICAL RESULT



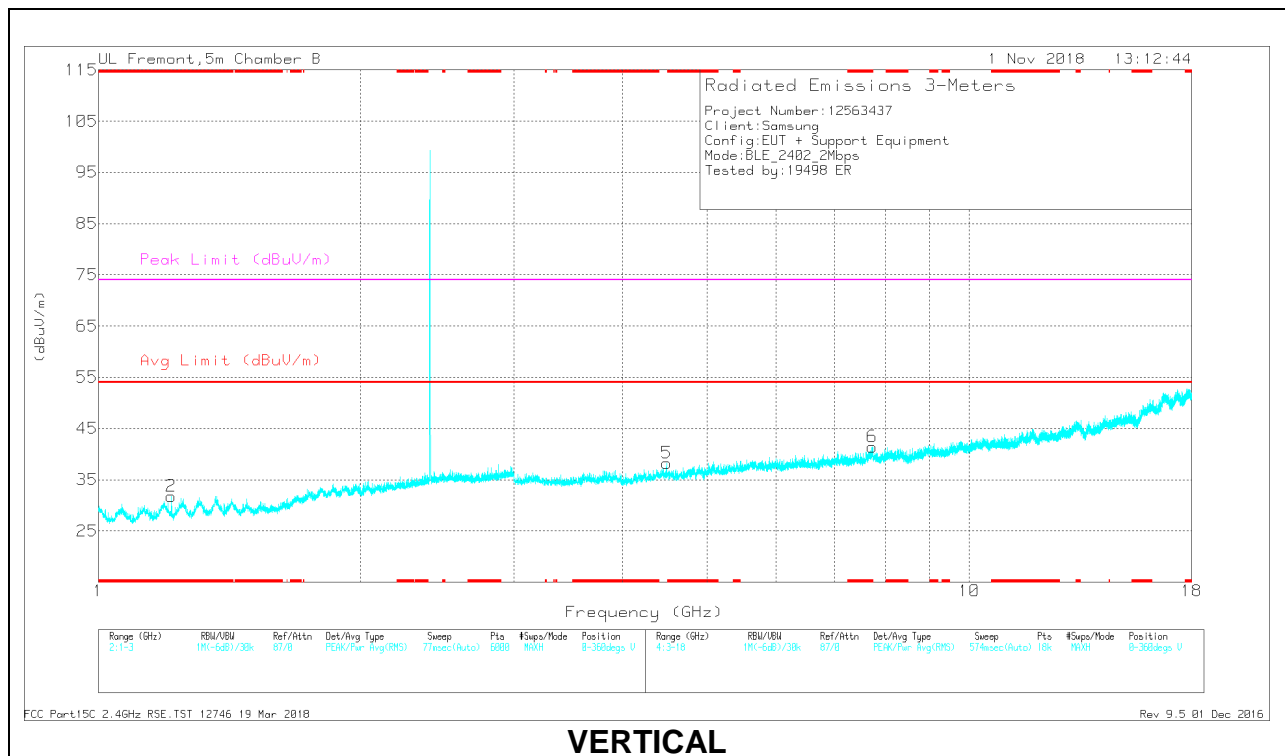
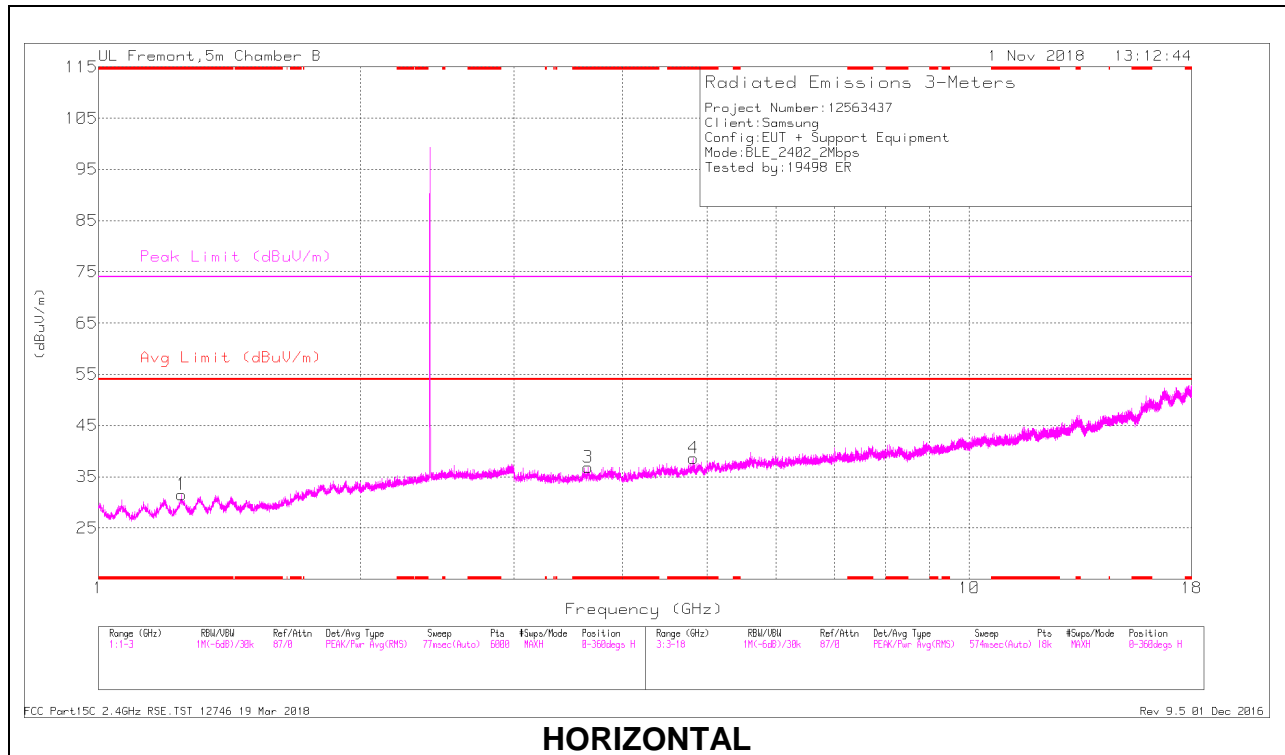
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	35.74	Pk	32.6	-20.3	0	48.04	-	-	74	-25.96	134	112	V
3	* 2.484	25.53	RMS	32.6	-20.3	5.07	42.93	54	-11.07	-	-	134	112	V
4	* 2.489	27.29	RMS	32.6	-20.5	5.07	44.49	54	-9.51	-	-	134	112	V
2	2.537	38.35	Pk	32.7	-20.3	0	50.75	-	-	74	-23.25	134	112	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

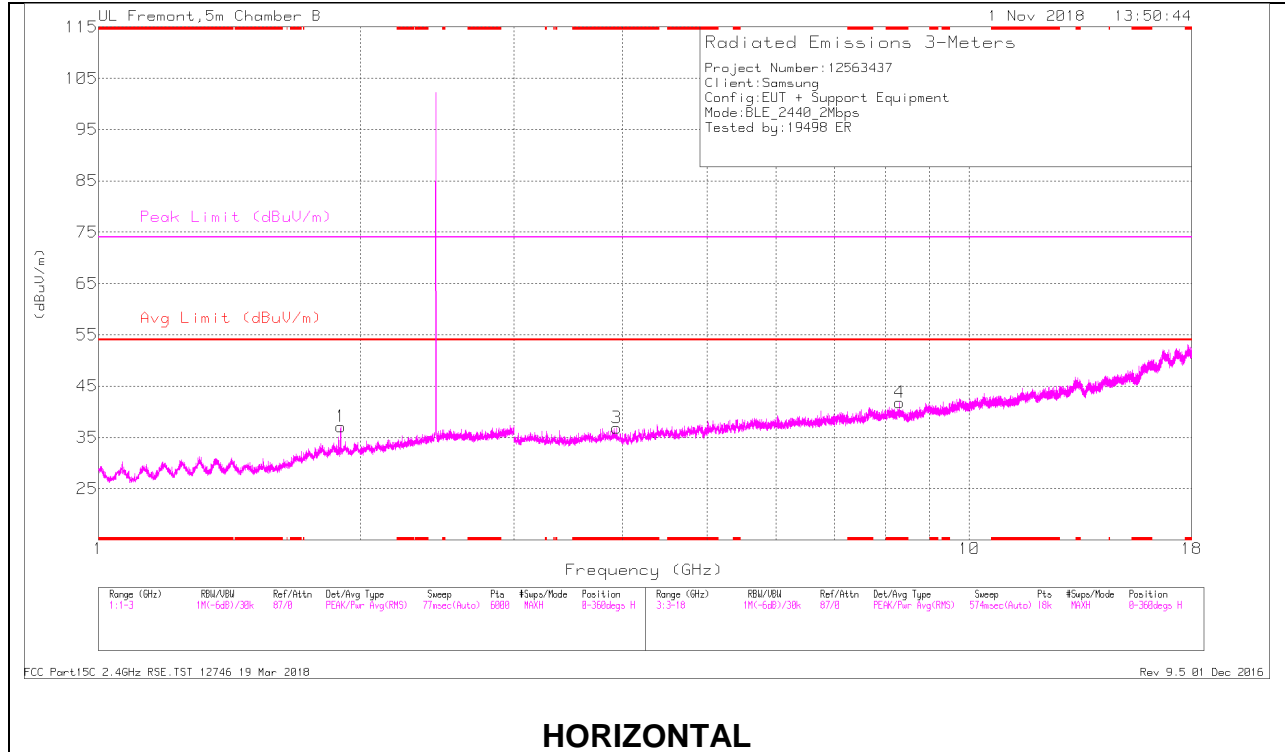
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Paid (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.244	31.17	PK2	28.3	-21.9	0	37.57	-	-	74	-36.43	112	157	H
* 1.244	19.54	MAv1	28.3	-21.9	5.07	31.04	54	-22.96	-	-	112	157	H
* 1.212	29.07	PK2	28.2	-22.1	0	35.17	-	-	74	-38.83	211	208	V
* 1.211	17.62	MAv1	28.2	-22.1	5.07	28.82	54	-25.18	-	-	211	208	V
* 3.651	39.33	PK2	33.3	-30.4	0	42.23	-	-	74	-31.77	121	172	H
* 3.651	28.55	MAv1	33.3	-30.4	5.07	36.55	54	-17.45	-	-	121	172	H
* 4.823	38.6	PK2	34.1	-29.2	0	43.5	-	-	74	-30.5	143	127	H
* 4.823	27.29	MAv1	34.1	-29.2	5.07	37.29	54	-16.71	-	-	143	127	H
* 7.73	36.71	PK2	36.5	-25.2	0	48.01	-	-	74	-25.99	324	179	V
* 7.73	24.96	MAv1	36.5	-25.2	5.07	41.36	54	-12.64	-	-	324	179	V
4.496	38.91	PK2	33.8	-29.1	0	43.61	-	-	-	-	274	210	V

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

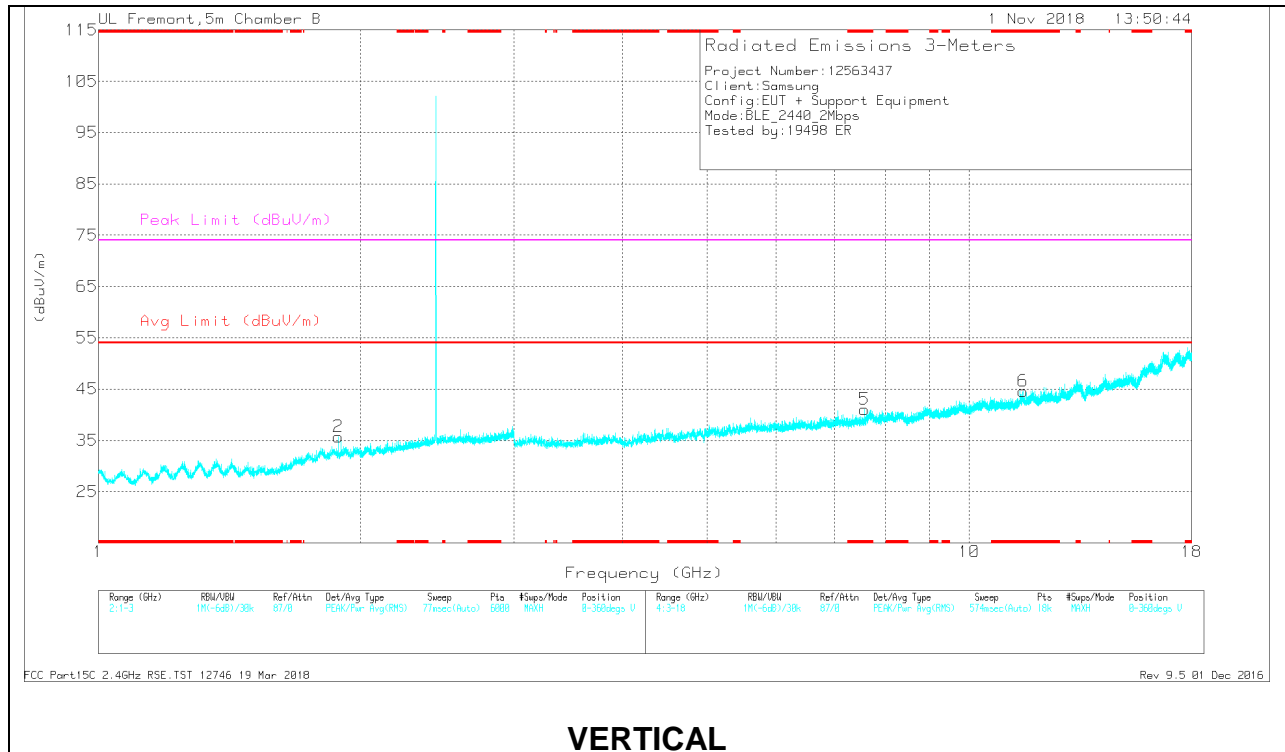
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL RESULTS



HORIZONTAL



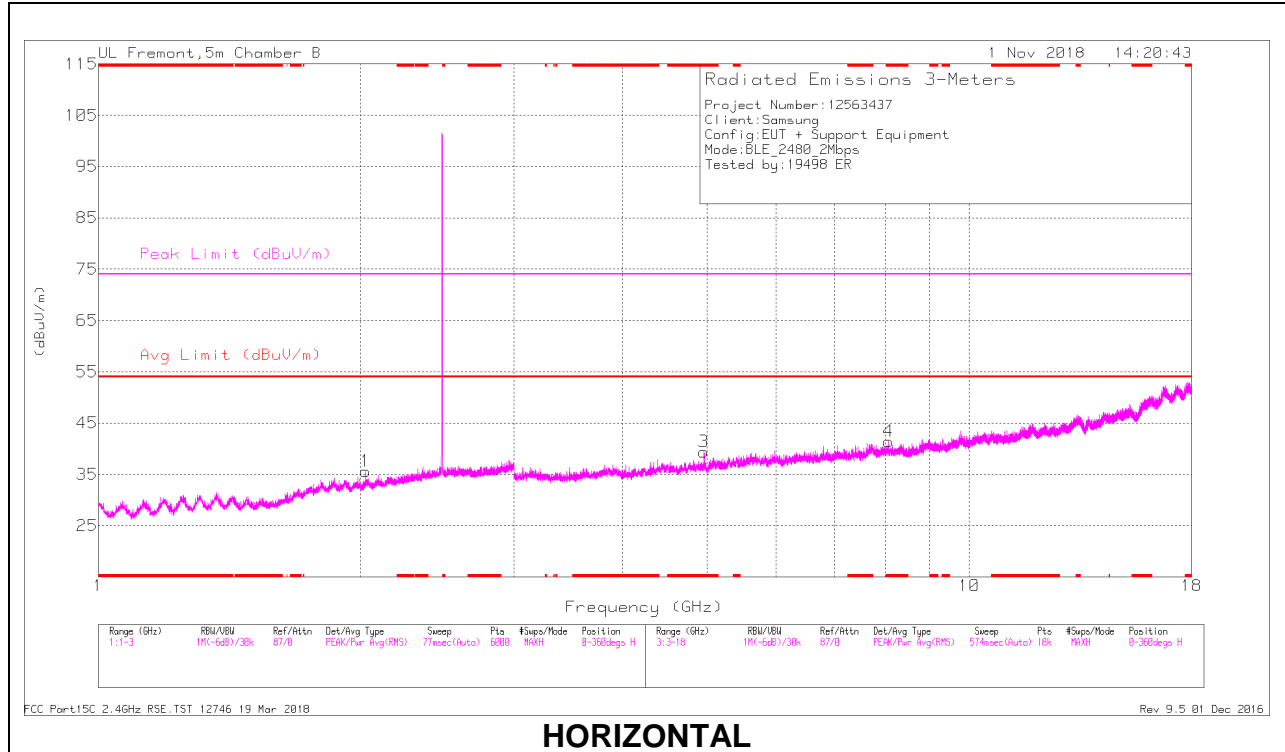
VERTICAL

RADIATED EMISSIONS

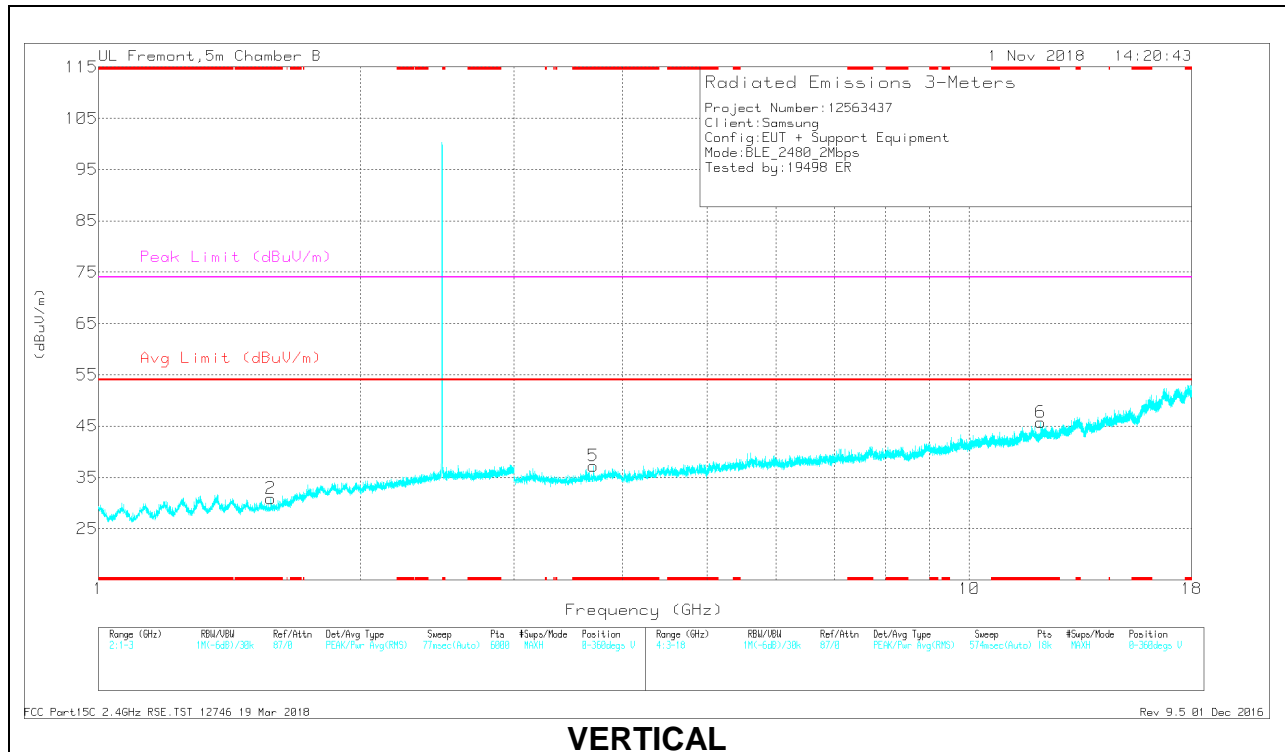
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Filt/Paid (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.937	39.28	PK2	33.4	-29.9	0	42.78	-	-	74	-31.22	179	237	H
* 3.936	28.06	MAv1	33.4	-29.9	5.07	36.66	54	-17.34	-	-	179	237	H
* 8.319	35.68	PK2	36.3	-24.9	0	47.08	-	-	74	-26.92	57	169	H
* 8.32	24.49	MAv1	36.3	-24.9	5.07	40.99	54	-13.01	-	-	57	169	H
* 7.579	36.55	PK2	36.3	-27.3	0	45.55	-	-	74	-28.45	351	191	V
* 7.575	25.07	MAv1	36.3	-27.1	5.07	39.37	54	-14.63	-	-	351	191	V
* 11.523	33.37	PK2	38.5	-21.6	0	50.27	-	-	74	-23.73	296	180	V
* 11.523	22.11	MAv1	38.5	-21.6	5.07	44.11	54	-9.89	-	-	296	180	V
1.885	28.53	PK2	31	-20.6	0	38.93	-	-	-	-	148	161	V
1.9	28.55	PK2	31.1	-20.6	0	39.05	-	-	-	-	283	138	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fitr/Paid (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.58	29.16	PK2	27.7	-20.7	0	36.16	-	-	74	-37.84	187	137	V
* 1.577	17.87	MAv1	27.7	-20.7	5.07	29.97	54	-24.03	-	-	187	137	V
* 4.961	45.46	PK2	34.5	-29.4	0	50.56	-	-	74	-23.44	246	186	H
* 4.961	26.84	MAv1	34.5	-29.5	5.07	36.94	54	-17.06	-	-	246	186	H
* 8.07	36.46	PK2	36.5	-25.7	0	47.26	-	-	74	-26.74	120	239	H
* 8.07	25.17	MAv1	36.5	-25.7	5.07	41.07	54	-12.93	-	-	120	239	H
* 3.702	39.58	PK2	33.2	-30.6	0	42.18	-	-	74	-31.82	165	296	V
* 3.704	28.95	MAv1	33.2	-30.7	5.07	36.55	54	-17.45	-	-	165	296	V
* 12.071	33.41	PK2	38.9	-21.7	0	50.61	-	-	74	-23.39	225	151	V
* 12.071	22.06	MAv1	38.9	-21.7	5.07	44.36	54	-9.64	-	-	225	151	V
2.002	29.12	PK2	30.9	-20.6	0	39.42	-	-	-	-	288	174	H

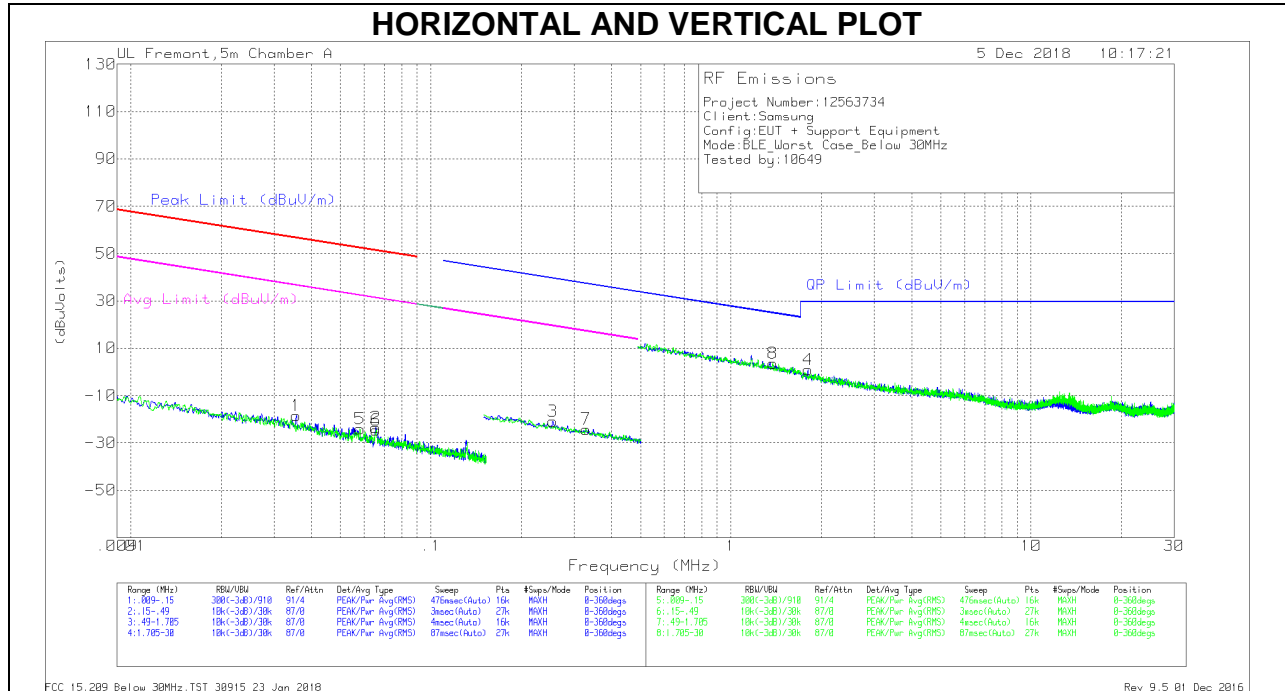
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

10.3. Worst Case Below 30 MHz

SPURIOUS EMISSIONS 9 kHz TO 30 MHz (WORST-CASE CONFIGURATION)



NOTE: KDB 414788 OATS and Chamber Correlation Justification

- Based 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.
- OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Below 30 MHz Data

Trace Markers

Trace Markers

	Frequenc y (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cable s (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	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	.03562	46.62	Pk	15	0	-80	-18.38	56.55	-74.93	36.55	-54.93	-	-	-	-	0-360
5	.05807	41.56	Pk	14.3	0	-80	-24.14	52.31	-76.45	32.31	-56.45	-	-	-	-	0-360
2	.06552	42.27	Pk	14.2	0	-80	-23.53	51.26	-74.79	31.26	-54.79	-	-	-	-	0-360
6	.06582	41.16	Pk	14.2	0	-80	-24.64	51.22	-75.86	31.22	-55.86	-	-	-	-	0-360
3	.25509	45.22	Pk	13.7	.1	-80	-20.98	-	-	-	-	39.48	-60.46	19.48	-40.46	0-360
7	.32854	41.99	Pk	13.7	.1	-80	-24.21	-	-	-	-	37.28	-61.49	17.28	-41.49	0-360

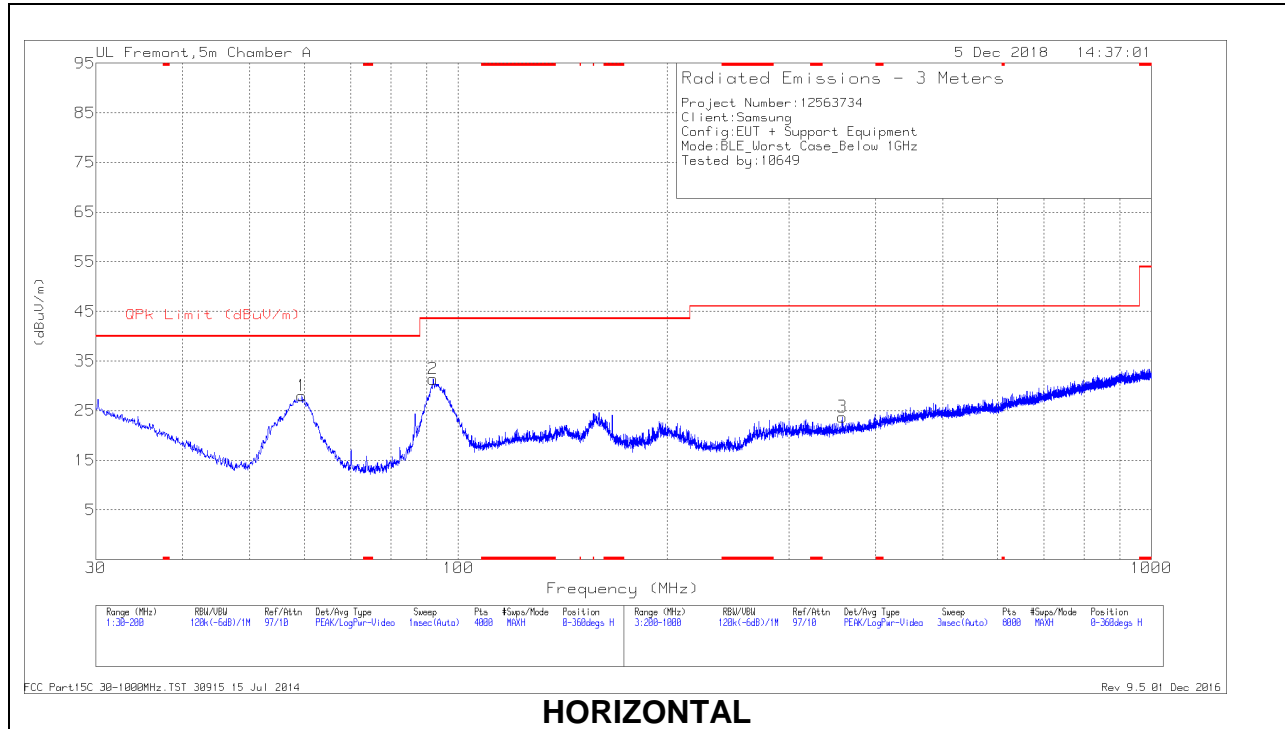
Pk - Peak detector

Mar ker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cable s (dB)	Dist Corr 30m	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
8	1.38019	29.17	Pk	14.2	.2	-40	3.57	24.83	-21.26	0-360
4	1.80561	26.44	Pk	14.2	.2	-40	.84	29.5	-28.66	0-360

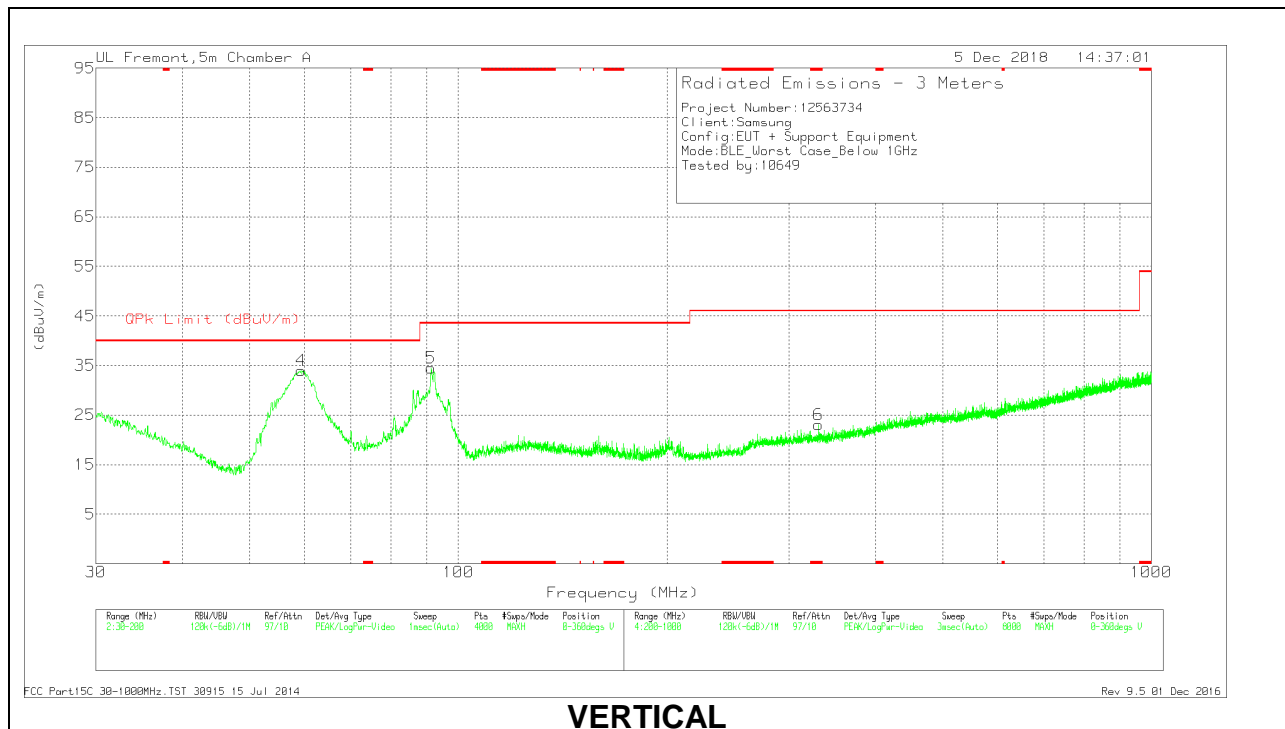
Pk - Peak detector

10.4. Worst Case Below 1 GHz

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



HORIZONTAL



VERTICAL

Below 1GHz Data

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0181574 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 331.2171	29.54	Pk	17.9	-24.4	23.04	46.02	-22.98	0-360	200	V
4	59.3326	49.3	Pk	11.5	-26.8	34	40	-6	0-360	100	V
1	59.4601	43.27	Pk	11.5	-26.8	27.97	40	-12.03	0-360	400	H
5	91.3859	48.83	Pk	12	-26.4	34.43	43.52	-9.09	0-360	100	V
2	92.0235	45.68	Pk	12.1	-26.4	31.38	43.52	-12.14	0-360	200	H
3	357.9205	29.66	Pk	18.6	-24.5	23.76	46.02	-22.26	0-360	101	H

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

Pk - Peak detector

Radiated Emissions

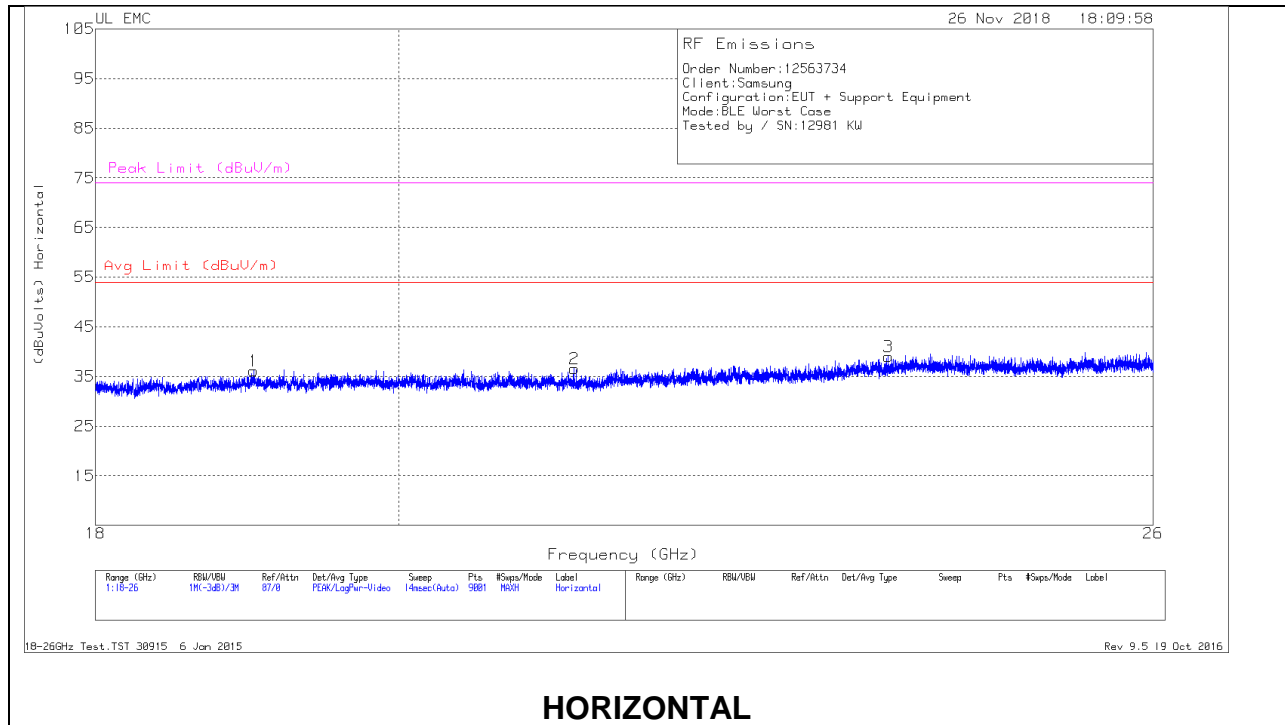
Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0181574 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
59.372	45.81	Qp	11.5	-26.8	30.51	40	-9.49	8	101	V

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

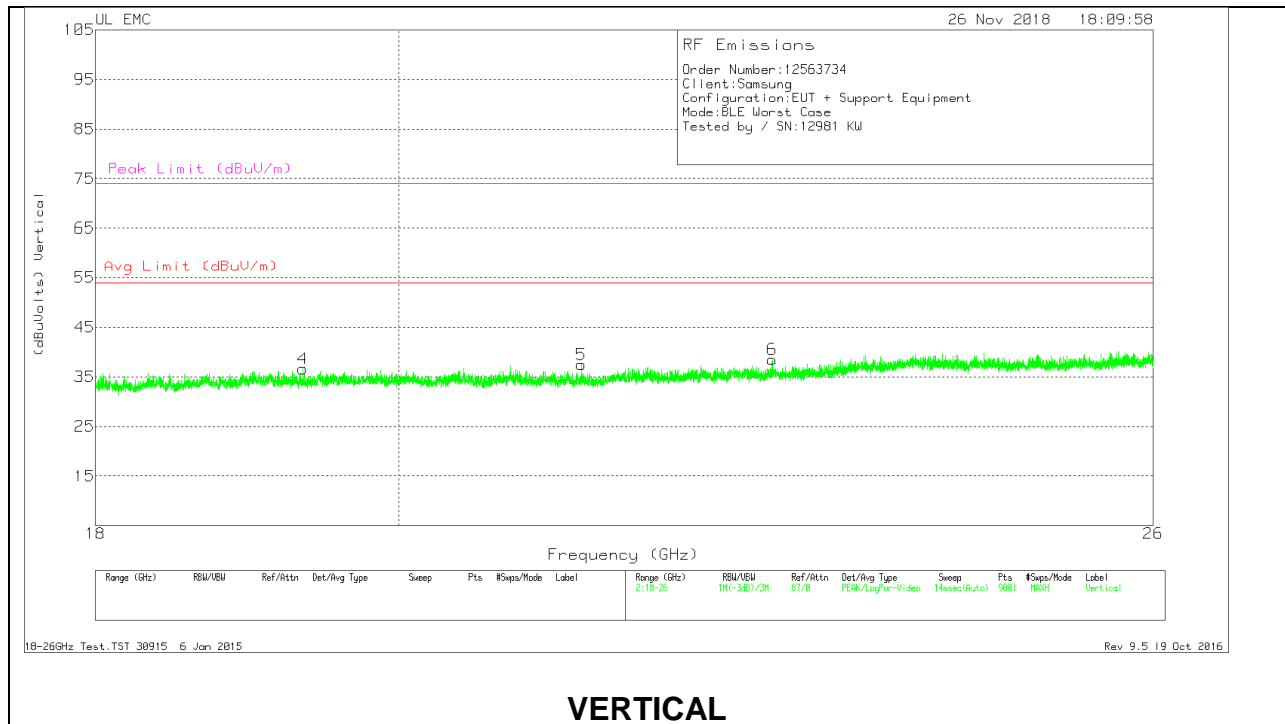
Qp - Quasi-Peak detector

10.5. Worst Case 18-26 GHz

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



HORIZONTAL



VERTICAL

18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T447 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.019	37.73	Pk	32.6	-24.7	-9.5	36.13	54	-17.87	74	-37.87
2	21.259	38.47	Pk	33	-25.4	-9.5	36.57	54	-17.43	74	-37.43
3	23.711	38.7	Pk	34.1	-24.3	-9.5	39	54	-15	74	-35
4	19.346	38.12	Pk	32.7	-24.7	-9.5	36.62	54	-17.38	74	-37.38
5	21.313	39.17	Pk	33	-25.2	-9.5	37.47	54	-16.53	74	-36.53
6	22.774	39.22	Pk	33.5	-24.7	-9.5	38.52	54	-15.48	74	-35.48

Pk - Peak detector

11. 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.

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.

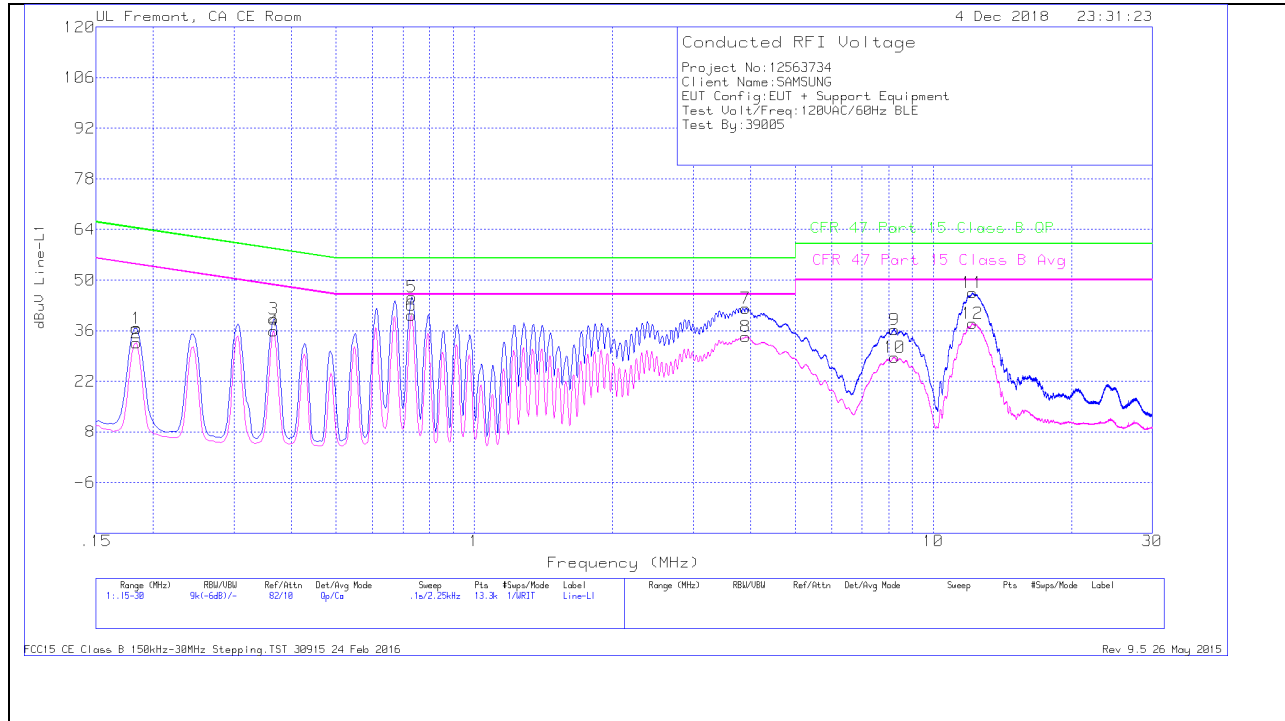
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1.1. AC Power Line Norm

LINE 1 RESULTS

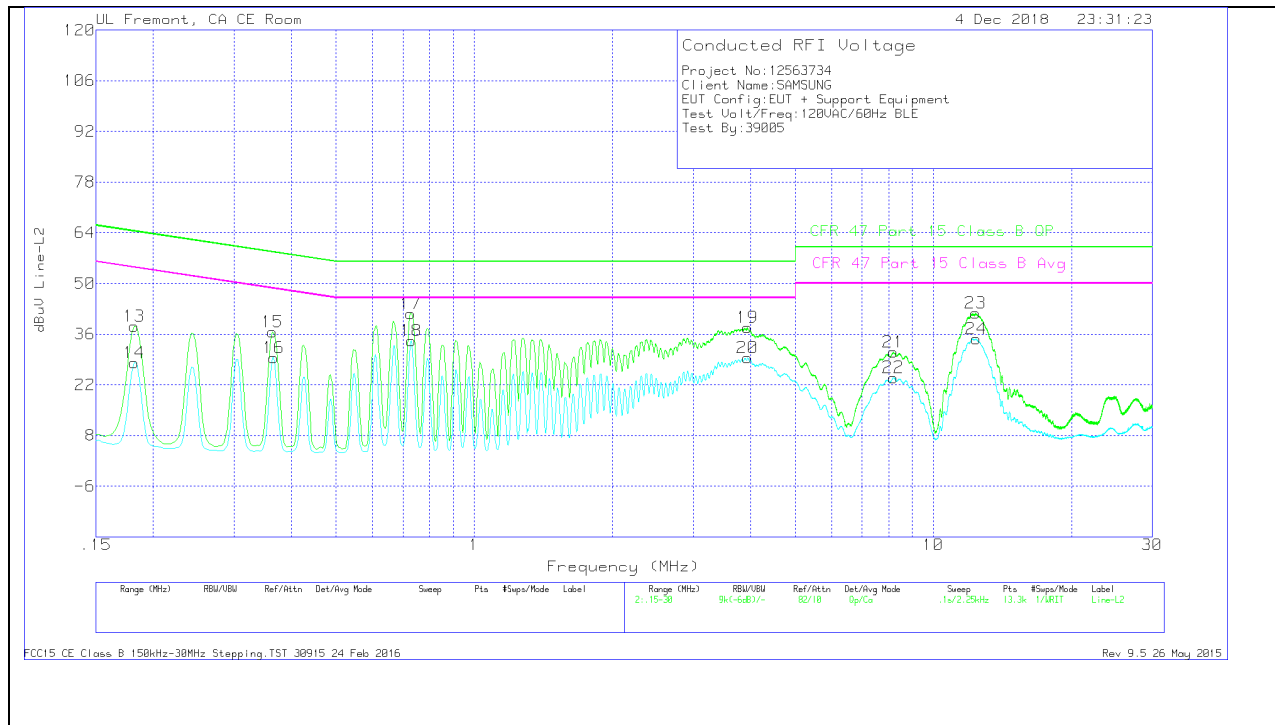


Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.18375	26.56	Qp	0	0	10.1	36.66	64.31	-27.65	-	-
2	.18375	22.44	Ca	0	0	10.1	32.54	-	-	54.31	-21.77
3	.366	29.07	Qp	0	0	10.1	39.17	58.59	-19.42	-	-
4	.366	25.8	Ca	0	0	10.1	35.9	-	-	48.59	-12.69
5	.73275	35.17	Qp	0	0	10.1	45.27	56	-10.73	-	-
6	.7305	30.22	Ca	0	0	10.1	40.32	-	-	46	-5.68
7	3.903	31.97	Qp	0	.1	10.1	42.17	56	-13.83	-	-
8	3.90413	24.12	Ca	0	.1	10.1	34.32	-	-	46	-11.68
9	8.22525	25.85	Qp	0	.2	10.2	36.25	60	-23.75	-	-
10	8.22525	18.23	Ca	0	.2	10.2	28.63	-	-	50	-21.37
11	12.183	35.98	Qp	.1	.2	10.2	46.48	60	-13.52	-	-
12	12.18075	27.46	Ca	.1	.2	10.2	37.96	-	-	50	-12.04

Qp - Quasi-Peak detector

Ca - CISPR average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	.1815	28.13	Qp	0	0	10.1	38.23	64.42	-26.19	-	-
14	.1815	17.98	Ca	0	0	10.1	28.08	-	-	54.42	-26.34
15	.36375	26.51	Qp	0	0	10.1	36.61	58.64	-22.03	-	-
16	.366	19.46	Ca	0	0	10.1	29.56	-	-	48.59	-19.03
17	.72825	31.62	Qp	0	0	10.1	41.72	56	-14.28	-	-
18	.7305	24.02	Ca	0	0	10.1	34.12	-	-	46	-11.88
19	3.93675	27.58	Qp	0	.1	10.1	37.78	56	-18.22	-	-
20	3.939	19.23	Ca	0	.1	10.1	29.43	-	-	46	-16.57
21	8.19375	20.64	Qp	0	.2	10.2	31.04	60	-28.96	-	-
22	8.1915	13.61	Ca	0	.2	10.2	24.01	-	-	50	-25.99
23	12.381	31.27	Qp	.1	.2	10.2	41.77	60	-18.23	-	-
24	12.4125	24.24	Ca	.1	.2	10.2	34.74	-	-	50	-15.26

Qp - Quasi-Peak detector

Ca - CISPR average detection