



CERTIFICATION TEST REPORT

Report Number. : 12132753-E2V2

Applicant : SONY MOBILE COMMUNICATIONS, INC.
4-12-3 HIGASHI-SHINAGAWA,
SHINAGAWA -KU, TOKYO, 140-0002, JAPAN

FCC ID : PY7-04685Z

EUT Description : GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac &
NFC

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

Date Of Issue:

May 18, 2018

Prepared by:

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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	05/15/18	Initial Issue	--
V2	05/18/18	Updated Section 2, 7 & Added Section 6.3	Kiya Kedida

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SONY MOBILE COMMUNICATIONS, INC.
4-12-3 HIGASHI-SHINAGAWA,
SHINAGAWA -KU, TOKYO, 140-0002, JAPAN

EUT DESCRIPTION: GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac &
NFC

SERIAL NUMBER: CB512FP0E0, CB512FP0ZK (RADIATED)

DATE TESTED: May 4 – 7, 2018

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. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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

Approved & Released For
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Project Engineer
UL Verification Services Inc.

2. 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 484596 D01 Referencing Test Data v01.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, 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
☐ Chamber A (ISED:2324B-1)	☐ Chamber D (ISED:22541-1)
☒ Chamber B (ISED:2324B-2)	☐ Chamber E (ISED:22541-2)
☐ Chamber C (ISED:2324B-3)	☐ Chamber F (ISED:22541-3)
	☐ Chamber G (ISED:22541-4)
	☐ Chamber H (ISED:22541-5)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through C are covered under ISED company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under ISED company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://nist.gov/standards/scopes/2000650.htm>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
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%.

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is a GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac & NFC.

6. REUSE OF TEST DATA

6.1. INTRODUCTION

According to the manufacturer, the WLAN/Bluetooth conducted and NFC hardware of PY7-04685Z are HW identical to PY7-68553C. In addition PY7-04685Z digital circuit is identical to PY7-68553C. Therefore the following report/data of PY7-04685Z may be represented from PY7-68553C.

- WLAN/Bluetooth conducted
- NFC
- 15B

6.2. DEVICES DIFFERENCES

Difference between PY7-04685Z and PY7-68553C:

Sony Mobile Communications Inc. hereby declares that the difference between PY7-04685Z and PY7-68553C is related only to the cellular part and WLAN/Bluetooth Antenna Gain. Therefore the WLAN/Bluetooth conducted and NFC report/data of PY7-68553C may represent for PY7-04685Z.

6.3. REFERENCE DETAIL

Equipment Class	Reference FCC ID	Report Title/Section
DSS (BT)	PY7-68553C	12132731-E2V1 FCC Report BT

This report covers radiated emissions portion. For antenna port data refer to report number 12132731-E2V1 FCC Report BT. FCC ID: PY7-68553C and PY7-04685Z has same output power values. Output power was confirmed before making radiated spurious measurements.

6.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes Loop Type antenna, with the following maximum gain:

Frequency Band (GHz)	Antenna Gain (dBi)
2402-2480	-0.60

6.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was s_atp_XXX_0_00403_A_9.
The test utility software used during testing was Tera Term Ver 4.79.

6.6. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 30MHz, below 1GHz and above 18GHz 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, and it was determined that X-Axis with AC/DC Adapter was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X-Axis with AC/DC Adapter orientation.

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

GFSK mode: DH5

8PSK mode: 3-DH5

6.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

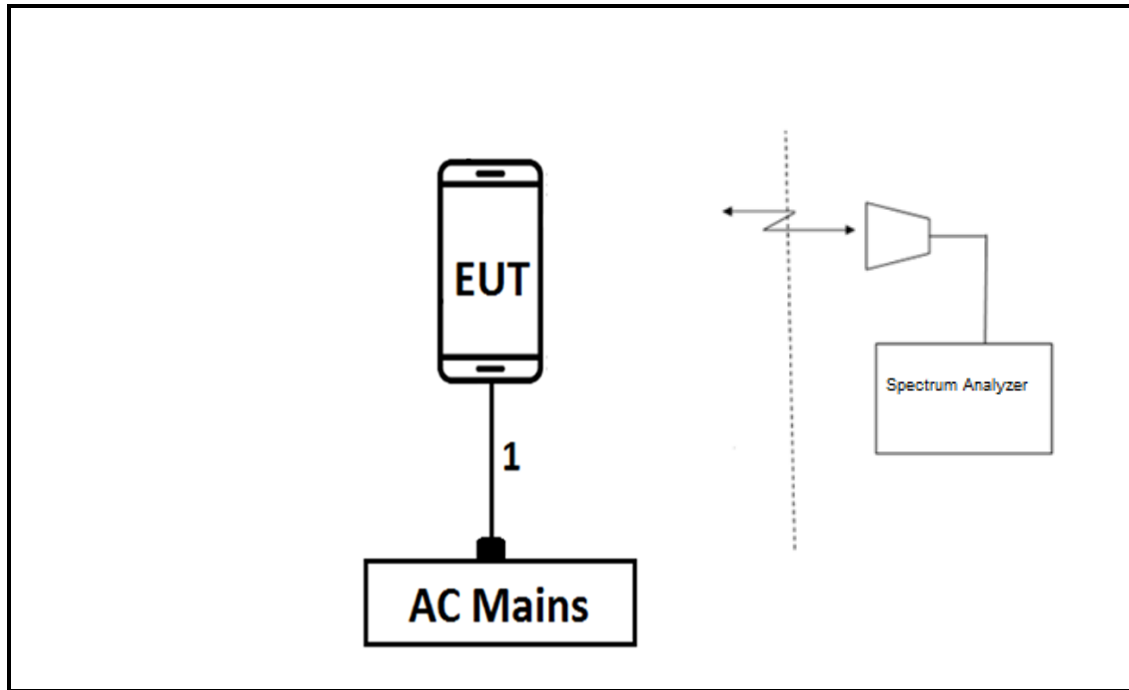
Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	20B7S0A200	PC015REW	NA
AC Adapter	SONY	UCH12	4016W40310044	NA
DC Power Supply	Ametek	XT 15-4	T463	N/A

I/O CABLES (RADIATED EMISSIONS)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	USB	Shielded	3	N/A

TEST SETUP

RADIATED EMISSIONS SETUP DIAGRAM



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
Amplifier, 10KHz to 1GHz, 32dB	Agilent (Keysight) Technologies	8447D	T15	08/14/2018
Amplifier, 1 - 18GHz	MITEQ	AFS42-00101800-25-S-42	T931	09/20/2018
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T493	04/03/2019
RF Preamplifier, 1 - 26GHz	Agilent	8449B	T404	07/23/2018
Antenna, Active Loop 9kHz-30MHz	Com-Power Corp.	AL-130R	T1866	10/10/2018
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB3	T130	06/15/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T862	06/09/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	06/09/2018
Antenna Horn, 18 to 26GHz	ARA	MWH-1826	T89	01/18/2019
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1466	04/16/2019
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T1454	01/08/2019
UL AUTOMATION SOFTWARE				
Radiated Software	UL	UL EMC	Ver 9.5, Dec 01, 2016	

NOTES:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

8. MEASUREMENT METHODS

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

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

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

9. 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 measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T (360 Hz) 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.

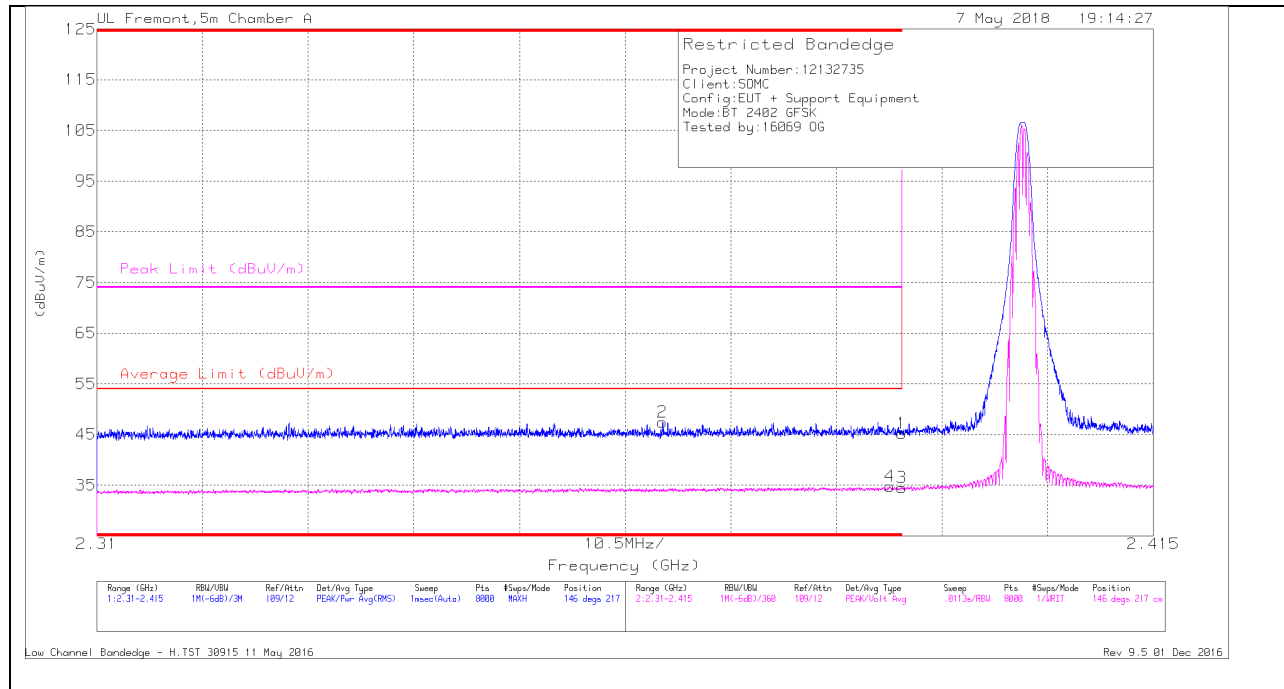
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

9.1. TRANSMITTER ABOVE 1 GHz

9.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



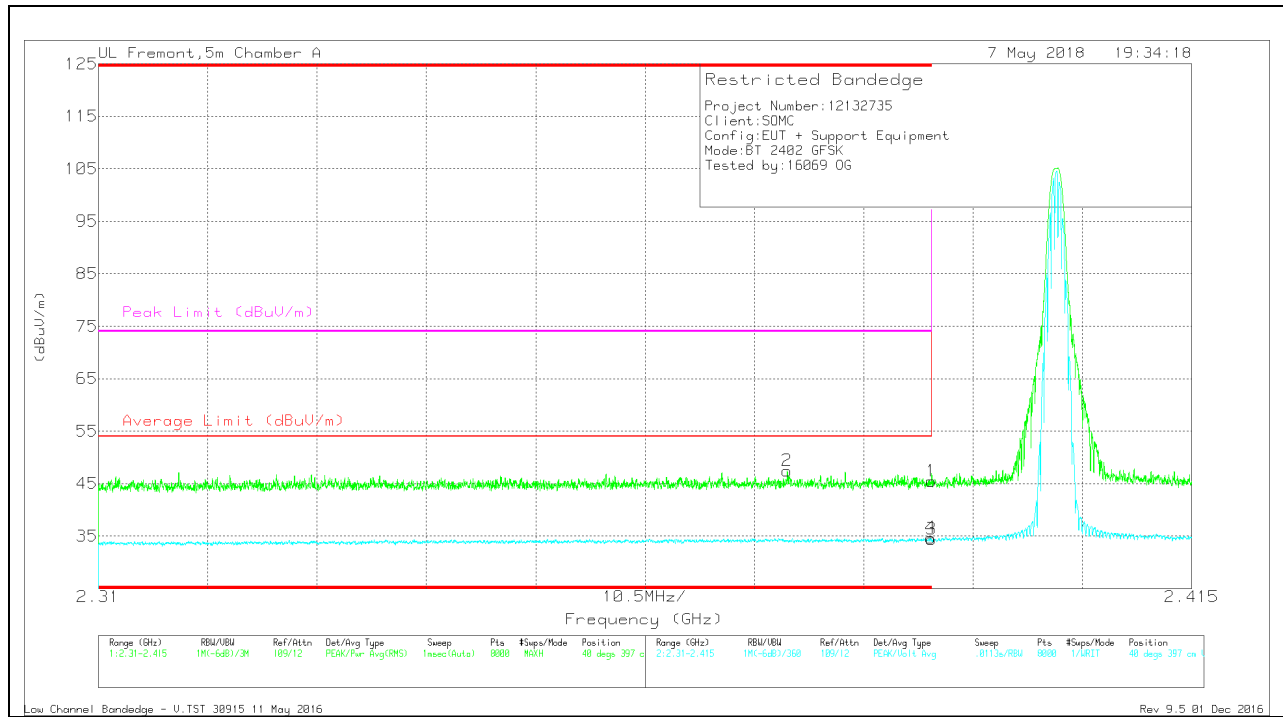
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Ftr/Pa d (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	36.77	Pk	31.8	-23.4	45.17	-	-	74	-28.83	146	217	H
2	* 2.366	39.28	Pk	31.6	-23.4	47.48	-	-	74	-26.52	146	217	H
3	* 2.39	26.12	VA1T	31.8	-23.4	34.52	54	-19.48	-	-	146	217	H
4	* 2.389	26.36	VA1T	31.8	-23.4	34.76	54	-19.24	-	-	146	217	H

Pk - Peak detector

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

VERTICAL RESULT



Trace Markers

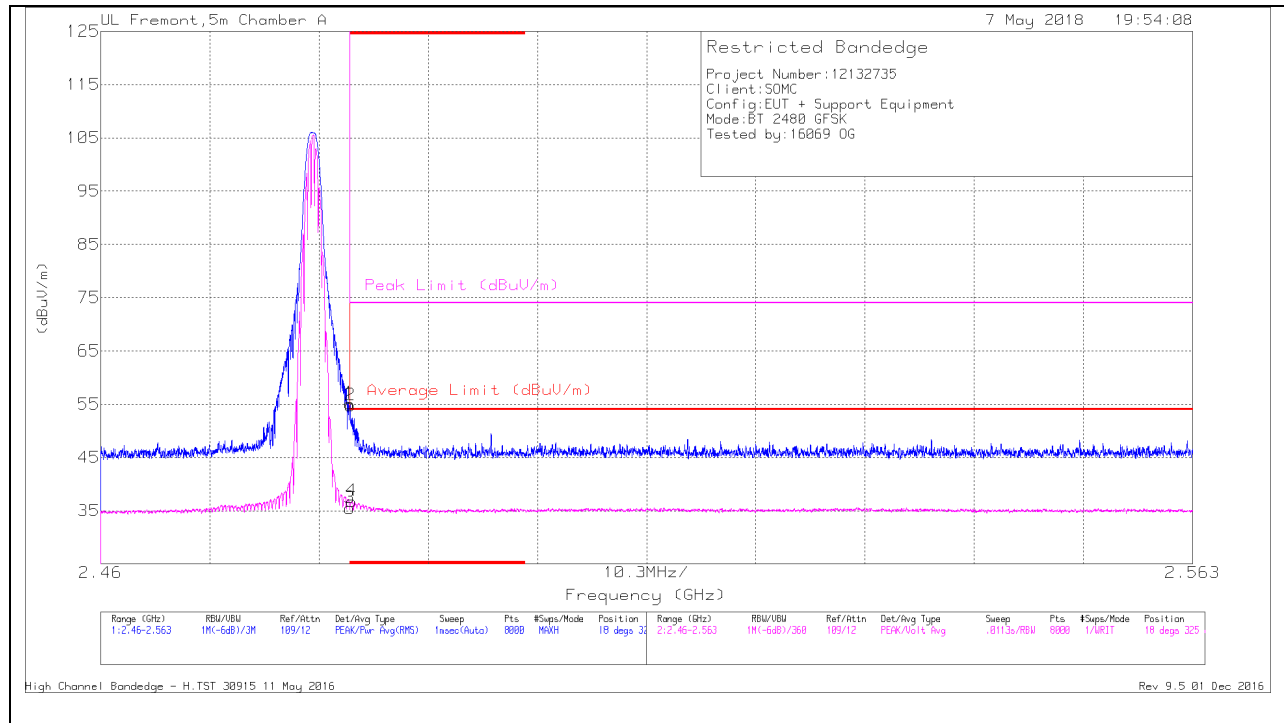
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.376	39.11	Pk	31.7	-23.4	47.41	-	-	74	-26.59	40	397	V
1	* 2.39	37.06	Pk	31.8	-23.4	45.46	-	-	74	-28.54	40	397	V
3	* 2.39	26.02	VA1T	31.8	-23.4	34.42	54	-19.58	-	-	40	397	V
4	* 2.39	26.3	VA1T	31.8	-23.4	34.7	54	-19.3	-	-	40	397	V

Pk - Peak detector

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



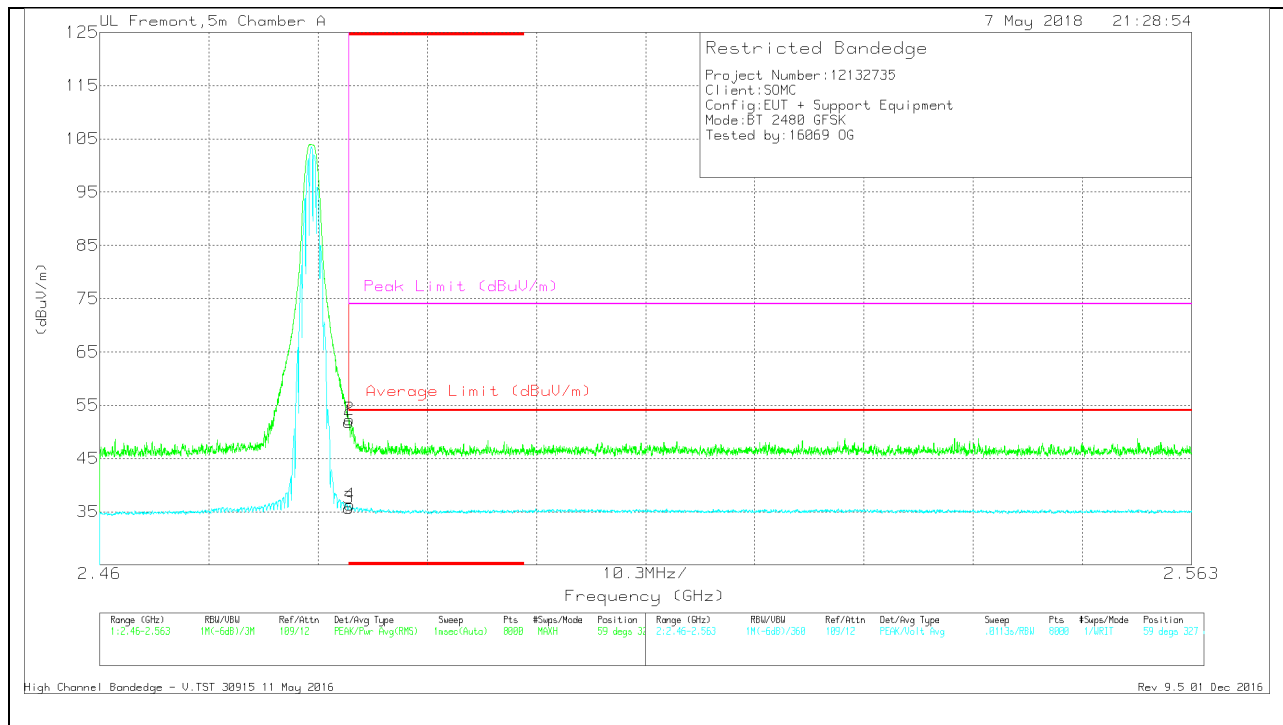
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Ftr/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	* 2.484	46.12	Pk	32.3	-23.3	55.12	-	-	74	-18.88	18	325	H
2	* 2.484	45.8	Pk	32.3	-23.3	54.8	-	-	74	-19.2	18	325	H
3	* 2.484	26.5	VA1T	32.3	-23.3	35.5	54	-18.5	-	-	18	325	H
4	* 2.484	27.83	VA1T	32.3	-23.3	36.83	54	-17.17	-	-	18	325	H

Pk - Peak detector

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

VERTICAL RESULT



Trace Markers

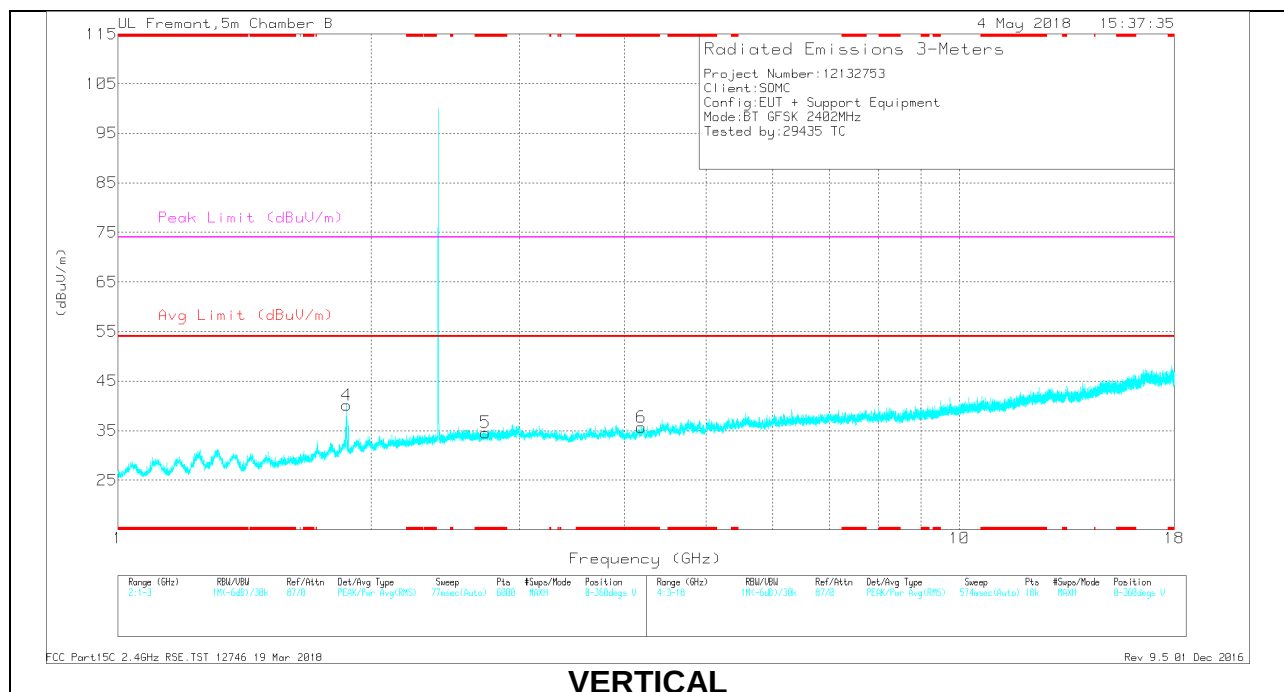
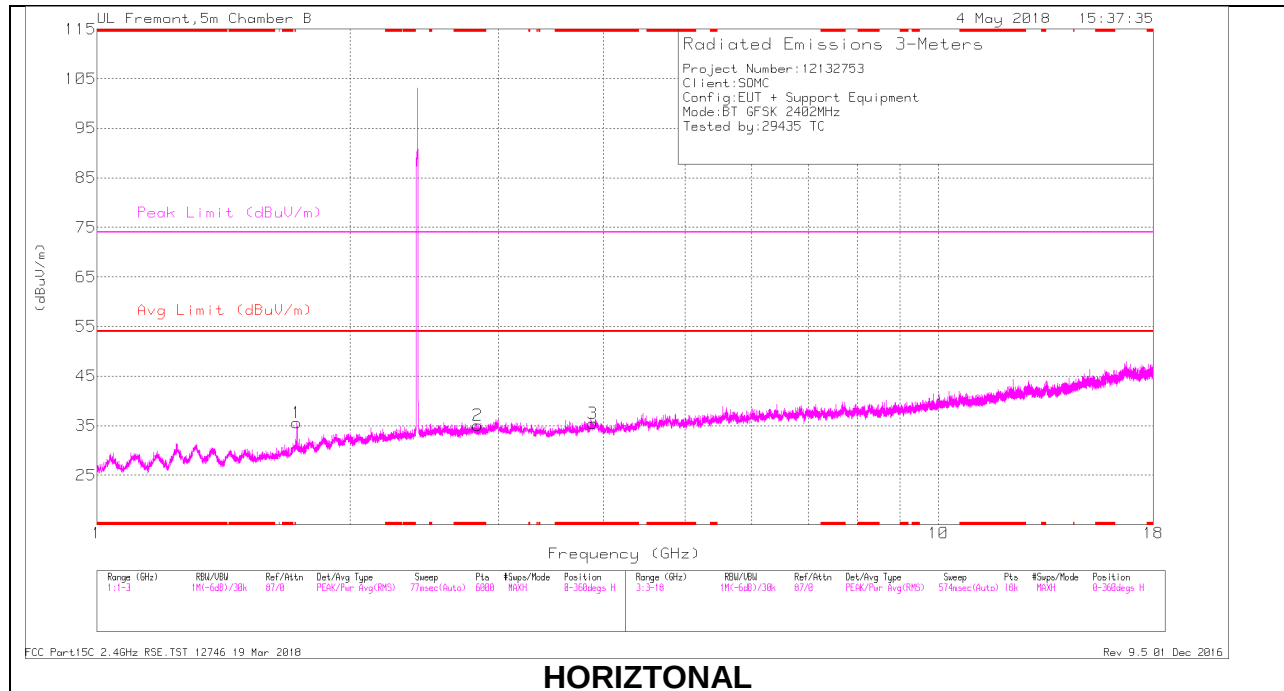
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42.81	Pk	32.3	-23.3	51.81	-	-	74	-22.19	59	327	V
2	* 2.484	43.33	Pk	32.3	-23.3	52.33	-	-	74	-21.67	59	327	V
3	* 2.484	26.66	VA1T	32.3	-23.3	35.66	54	-18.34	-	-	59	327	V
4	* 2.484	27.25	VA1T	32.3	-23.3	36.25	54	-17.75	-	-	59	327	V

Pk - Peak detector

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

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fitr/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	* 2.835	23.35	Pk	32.4	-20.7	35.05	-	-	74	-38.95	0-360	102	H
5	* 2.734	23.42	Pk	32.3	-21.1	34.62	-	-	74	-39.38	0-360	199	V
3	* 3.885	32.4	Pk	33.5	-30.5	35.4	-	-	74	-38.6	0-360	102	H
6	* 4.185	32.5	Pk	33.4	-30.2	35.7	-	-	74	-38.3	0-360	200	V
1	1.728	27.58	Pk	29.4	-21.4	35.58	-	-	-	-	0-360	199	H
4	1.868	30.64	Pk	30.9	-21.4	40.14	-	-	-	-	0-360	102	V

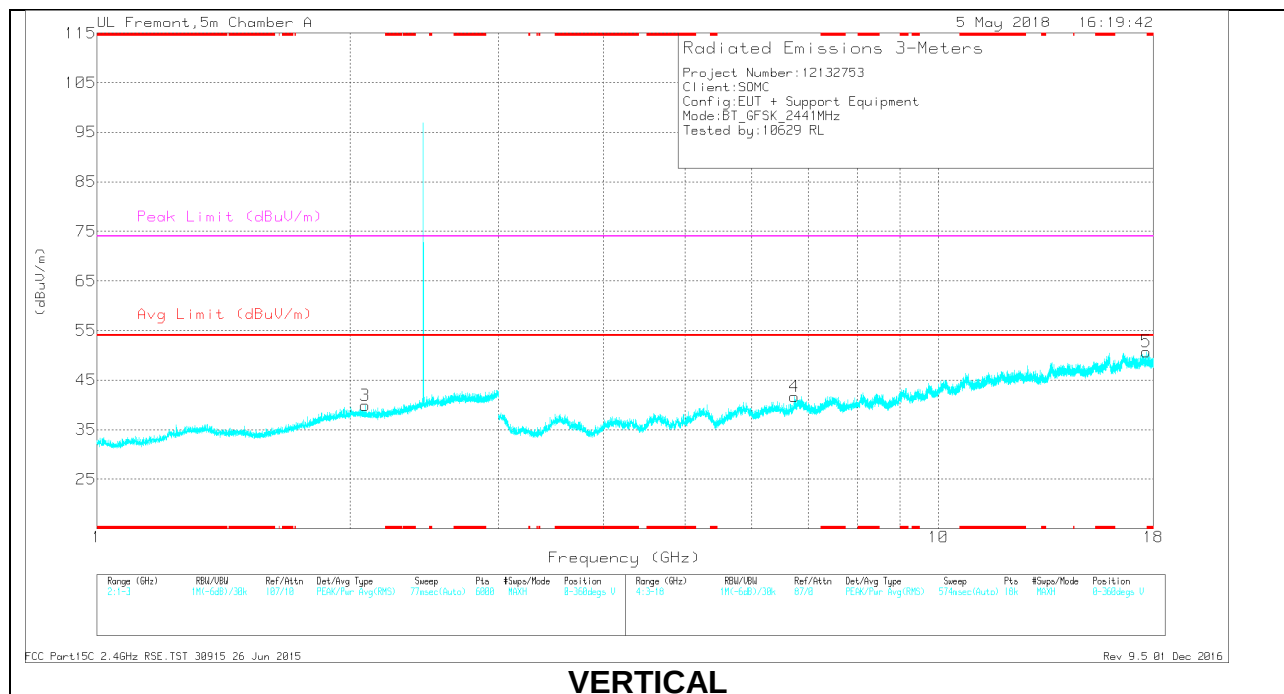
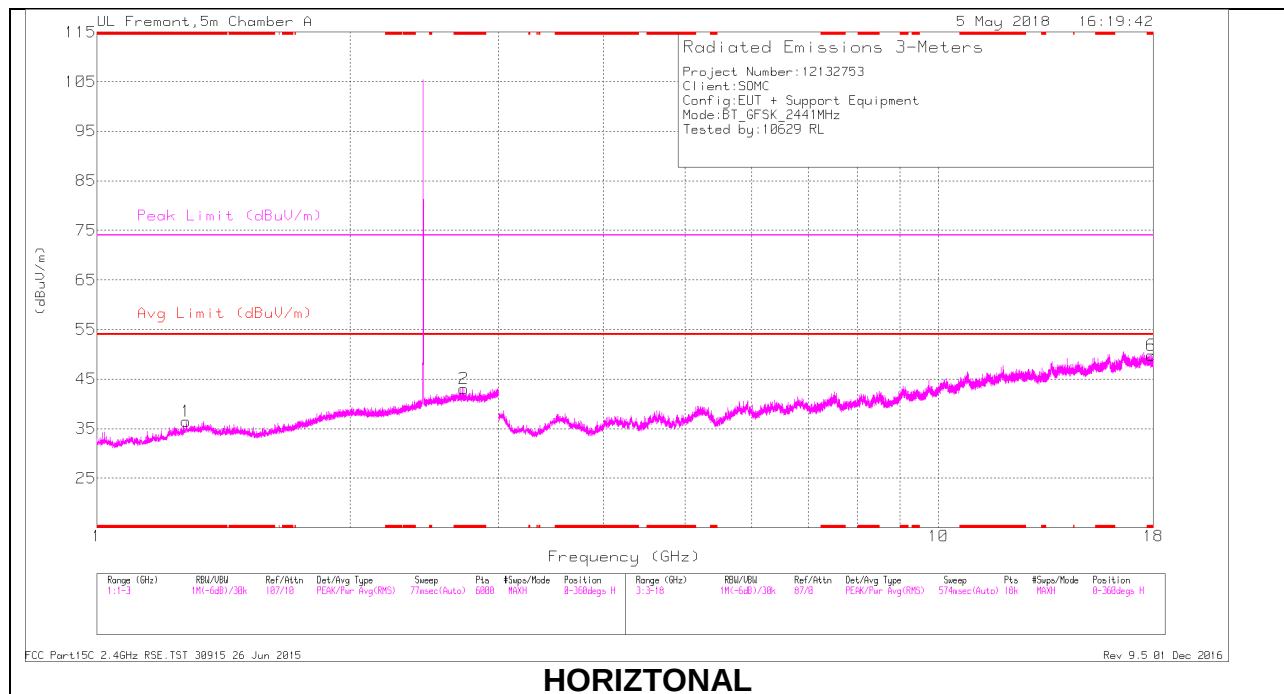
* - indicates frequency in CFR47 Pt 15 Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.837	28.53	PKFH	32.4	-20.7	40.23	-	-	74	-33.77	149	175	H
* 2.836	14.67	VA1T	32.4	-20.7	26.37	54	-27.63	-	-	149	175	H
* 2.736	30.05	PKFH	32.3	-21.1	41.25	-	-	74	-32.75	305	152	V
* 2.733	15.6	VA1T	32.3	-21.1	26.8	54	-27.2	-	-	305	152	V
* 3.885	37.68	PKFH	33.5	-30.5	40.68	-	-	74	-33.32	36	145	H
* 3.886	26.82	VA1T	33.5	-30.5	29.82	54	-24.18	-	-	36	145	H
* 4.185	37.16	PKFH	33.4	-30.2	40.36	-	-	74	-33.64	77	236	V
* 4.185	26.1	VA1T	33.4	-30.2	29.3	54	-24.7	-	-	77	236	V
1.727	28.28	PKFH	29.4	-21.4	36.28	-	-	-	-	181	151	H
1.727	16.54	VA1T	29.4	-21.4	24.54	-	-	-	-	181	151	H
1.867	27.46	PKFH	30.9	-21.4	36.96	-	-	-	-	287	162	V
1.867	15.54	VA1T	30.9	-21.4	25.04	-	-	-	-	287	162	V

* - indicates frequency in CFR47 Pt 15 Restricted Band
PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

MID CHANNEL RESULTS



RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fitr/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	* 1.277	30.81	Pk	29.3	-23.7	36.41	-	-	74	-37.59	0-360	101	H
2	* 2.728	33.25	Pk	32.4	-22.6	43.05	-	-	74	-30.95	0-360	101	H
6	* 17.895	26.74	Pk	41.2	-18.2	49.74	-	-	74	-24.26	0-360	199	H
3	2.083	32.18	Pk	31.2	-23.5	39.88	-	-	-	-	0-360	200	V
4	6.743	28.7	Pk	35.5	-22.5	41.7	-	-	-	-	0-360	200	V
5	17.653	27.34	Pk	41.3	-17.9	50.74	-	-	-	-	0-360	200	V

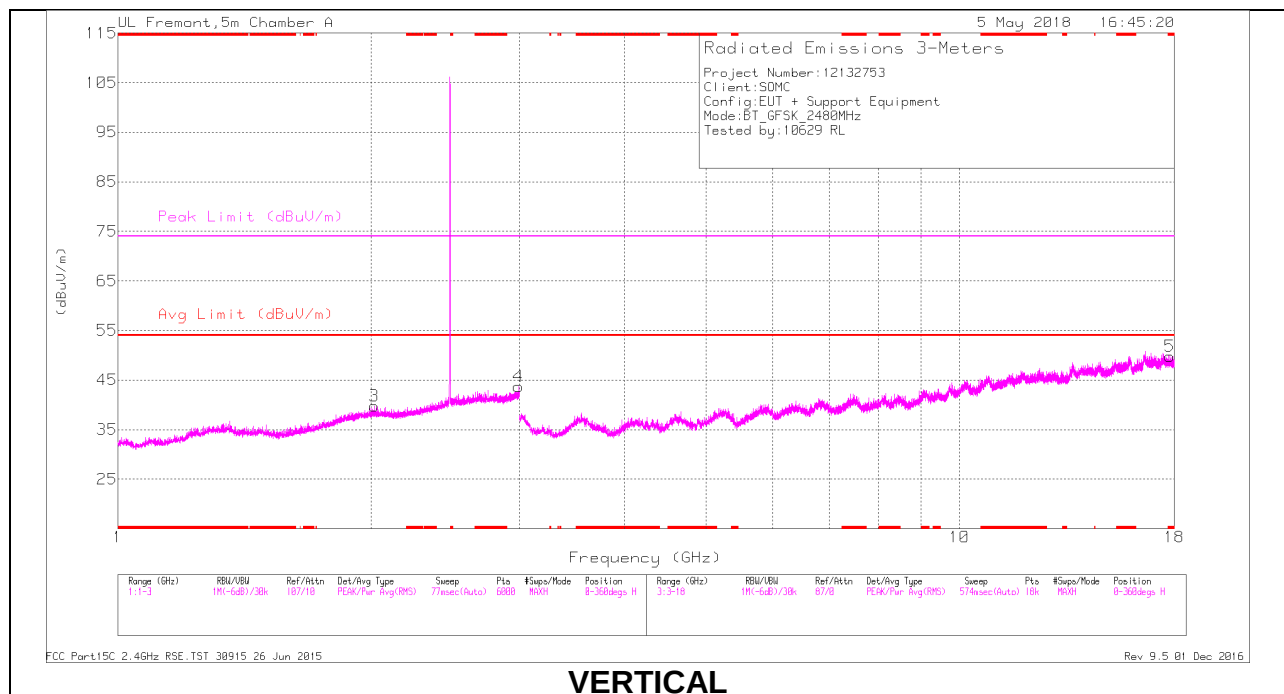
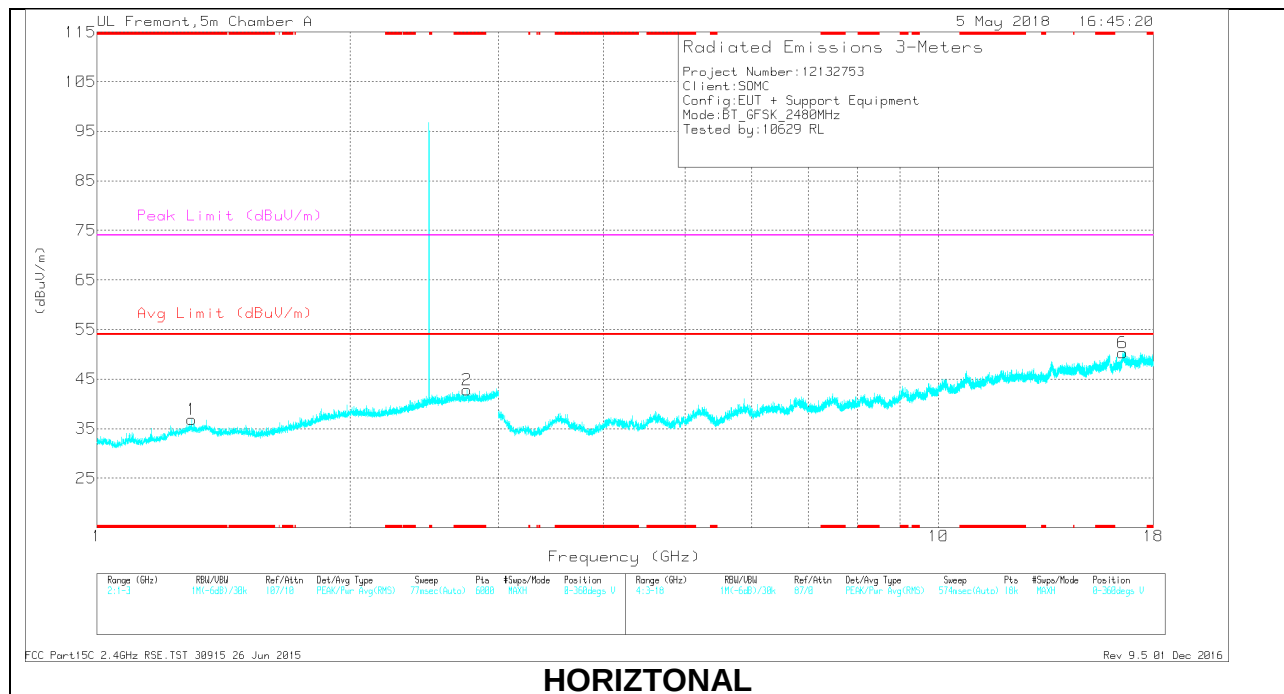
* - indicates frequency in CFR47 Pt 15 Restricted Band
Pk - Peak detector

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fitr/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	* 2.728	35.91	PKFH	32.4	-22.6	45.71	-	-	74	-28.29	256	260	H
	* 2.728	24.7	VA1T	32.4	-22.6	34.5	54	-19.5	-	-	256	260	H
2	* 1.276	34.61	PKFH	29.3	-23.7	40.21	-	-	74	-33.79	280	123	H
	* 1.275	23.24	VA1T	29.3	-23.7	28.84	54	-25.16	-	-	280	123	H
6	* 17.895	30.69	PKFH	41.2	-18.2	53.69	-	-	74	-20.31	84	110	H
	* 17.897	20.07	VA1T	41.2	-18.2	43.07	54	-10.93	-	-	84	110	H
3	2.083	32.18	Pk	31.2	-23.5	39.88	-	-	-	-	0-360	200	V
4	6.743	28.7	Pk	35.5	-22.5	41.7	-	-	-	-	0-360	200	V
5	17.653	27.34	Pk	41.3	-17.9	50.74	-	-	-	-	0-360	200	V

* - indicates frequency in CFR47 Pt 15 Restricted Band
PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fitr/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	* 1.296	31.08	Pk	29.4	-23.6	36.88	-	-	74	-37.12	0-360	200	V
2	* 2.752	33	Pk	32.3	-22.5	42.8	-	-	74	-31.2	0-360	101	V
5	* 17.778	26.85	Pk	41.2	-18.3	49.75	-	-	74	-24.25	0-360	101	H
3	2.016	31.69	Pk	31.4	-23.3	39.79	-	-	-	-	0-360	102	H
4	2.992	33.11	Pk	32.3	-21.7	43.71	-	-	-	-	0-360	199	H
6	16.555	25.55	Pk	41.3	-16.5	50.35	-	-	-	-	0-360	200	V

* - indicates frequency in CFR47 Pt 15 Restricted Band
Pk - Peak detector

Radiated Emissions

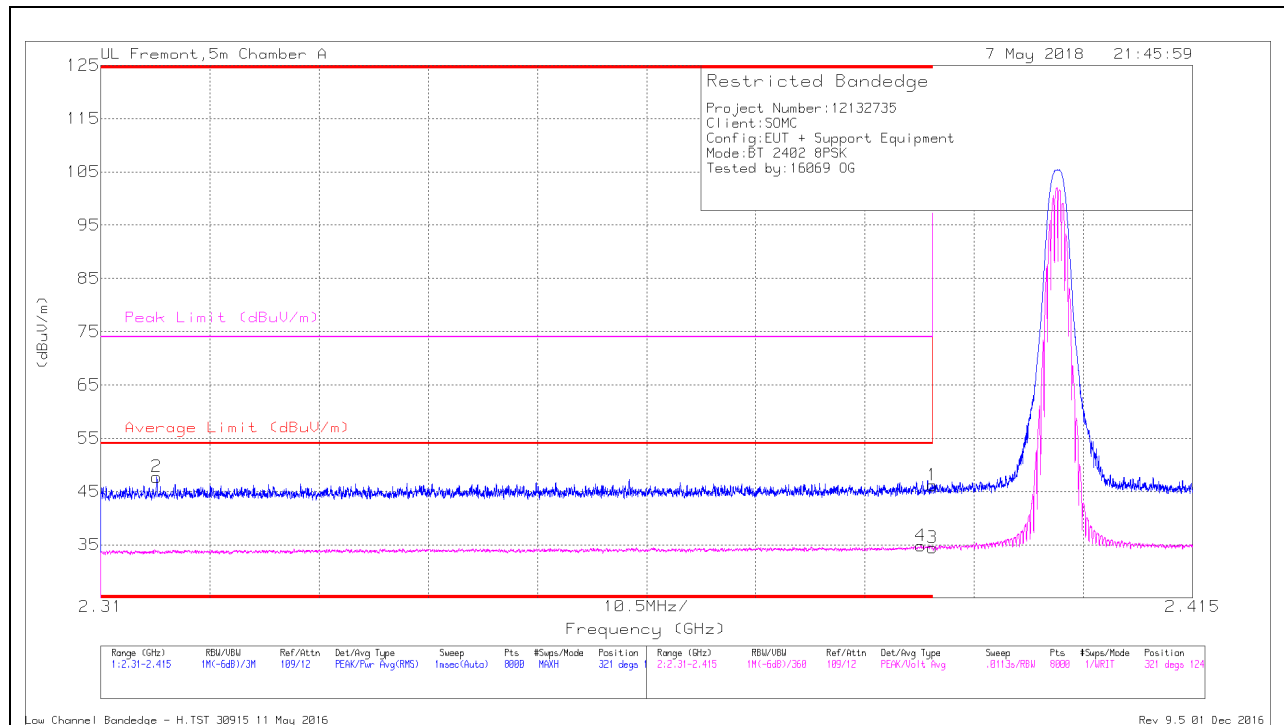
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.296	34.86	PKFH	29.4	-23.6	40.66	-	-	74	-33.34	179	259	V
	* 1.295	23.2	VA1T	29.4	-23.6	29	54	-25	-	-	179	259	V
2	* 2.753	35.21	PKFH	32.3	-22.5	45.01	-	-	74	-28.99	357	231	V
	* 2.753	24.67	VA1T	32.3	-22.5	34.47	54	-19.53	-	-	357	231	V
5	* 17.778	31.28	PKFH	41.2	-18.3	54.18	-	-	74	-19.82	244	309	H
	* 17.778	20.36	VA1T	41.2	-18.3	43.26	54	-10.74	-	-	244	309	H
3	2.016	31.69	Pk	31.4	-23.3	39.79	-	-	-	-	0-360	102	H
4	2.992	33.11	Pk	32.3	-21.7	43.71	-	-	-	-	0-360	199	H
6	16.555	25.55	Pk	41.3	-16.5	50.35	-	-	-	-	0-360	200	V

* - indicates frequency in CFR47 Pt 15 Restricted Band
PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

9.1.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pa d (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	37.77	Pk	31.8	-23.4	46.17	-	-	74	-27.83	321	124	H
2	* 2.315	39.71	Pk	31.5	-23.5	47.71	-	-	74	-26.29	321	124	H
3	* 2.39	26.01	VA1T	31.8	-23.4	34.41	54	-19.59	-	-	321	124	H
4	* 2.389	26.38	VA1T	31.8	-23.4	34.78	54	-19.22	-	-	321	124	H

Pk - Peak detector

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

VERTICAL RESULT



Trace Markers

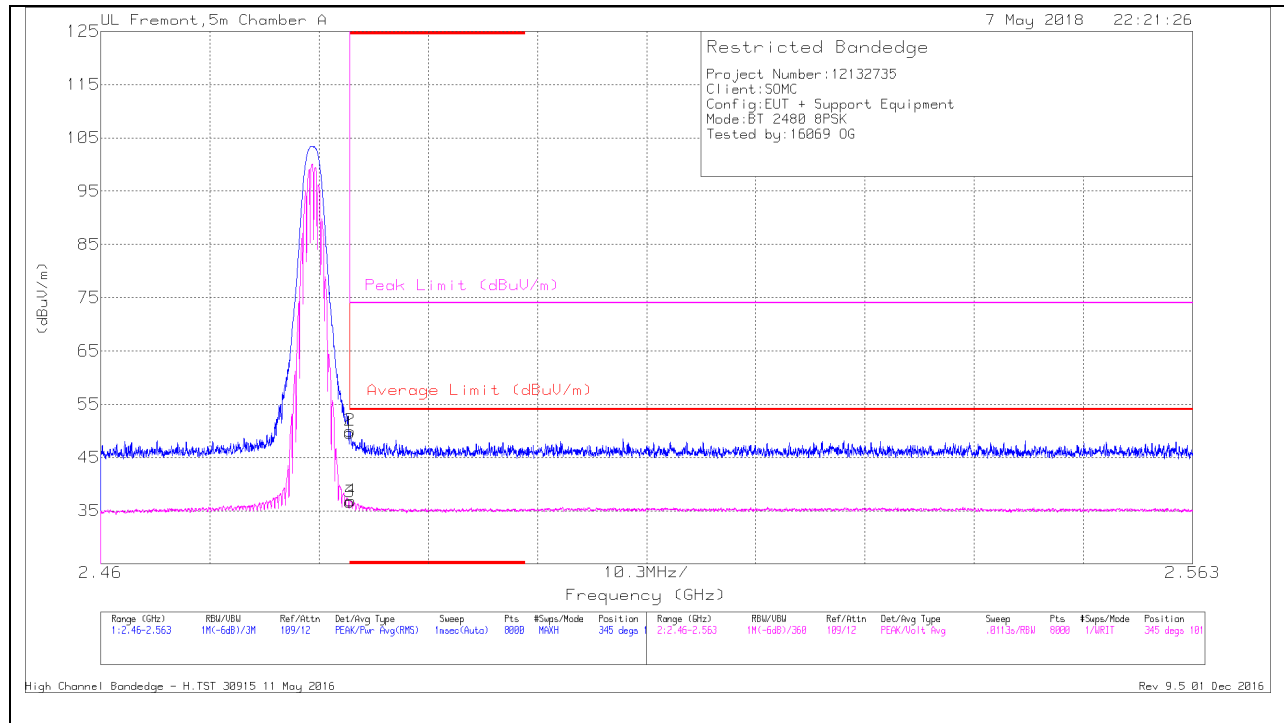
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.378	39.21	Pk	31.7	-23.4	47.51	-	-	74	-26.49	38	394	V
4	* 2.388	26.29	VA1T	31.8	-23.4	34.69	54	-19.31	-	-	38	394	V
1	* 2.39	36.69	Pk	31.8	-23.4	45.09	-	-	74	-28.91	38	394	V
3	* 2.39	26.18	VA1T	31.8	-23.4	34.58	54	-19.42	-	-	38	394	V

Pk - Peak detector

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Trace Markers

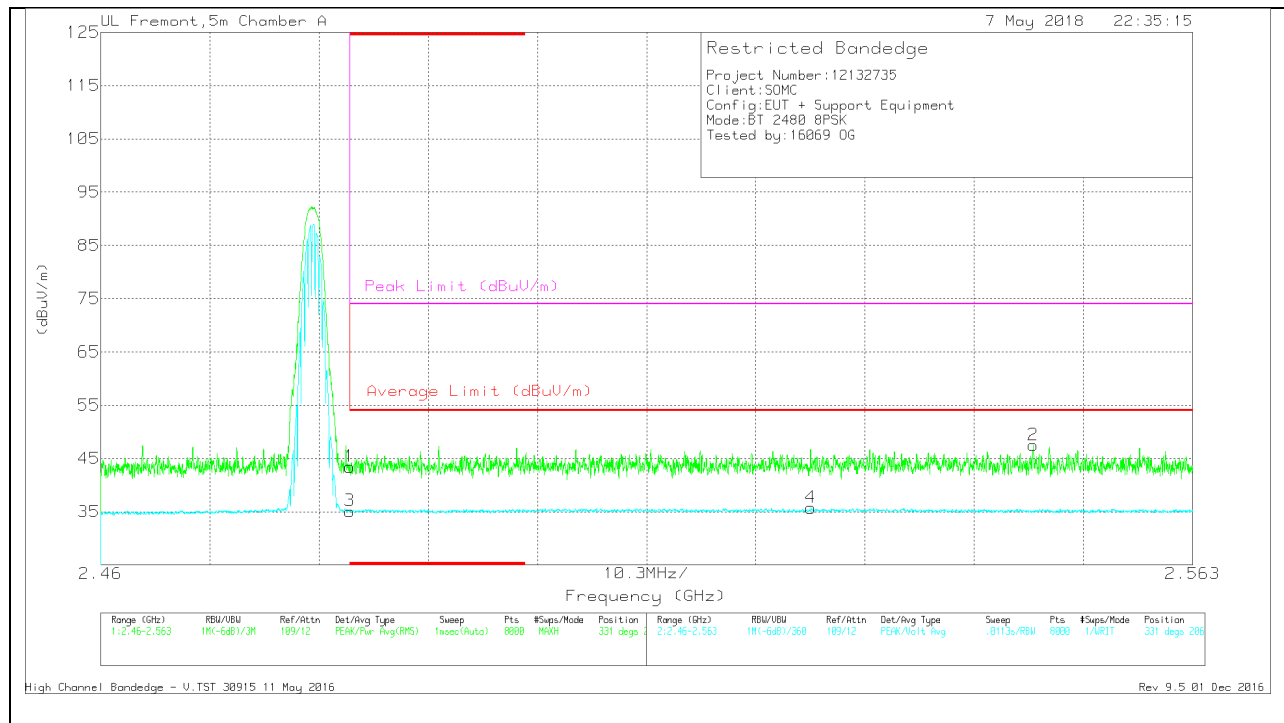
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.57	Pk	32.3	-23.3	49.57	-	-	74	-24.43	345	101	H
2	* 2.484	41.02	Pk	32.3	-23.3	50.02	-	-	74	-23.98	345	101	H
3	* 2.484	27.63	VA1T	32.3	-23.3	36.63	54	-17.37	-	-	345	101	H
4	* 2.484	27.87	VA1T	32.3	-23.3	36.87	54	-17.13	-	-	345	101	H

* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

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

VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Filt/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	* 2.484	34.45	Pk	32.3	-23.3	43.45	-	-	74	-30.55	331	206	V
3	* 2.484	26.11	VA1T	32.3	-23.3	35.11	54	-18.89	-	-	331	206	V
4	2.527	26.54	VA1T	32.4	-23.2	35.74	54	-18.26	-	-	331	206	V
2	2.548	38.42	Pk	32.3	-23.2	47.52	-	-	74	-26.48	331	206	V

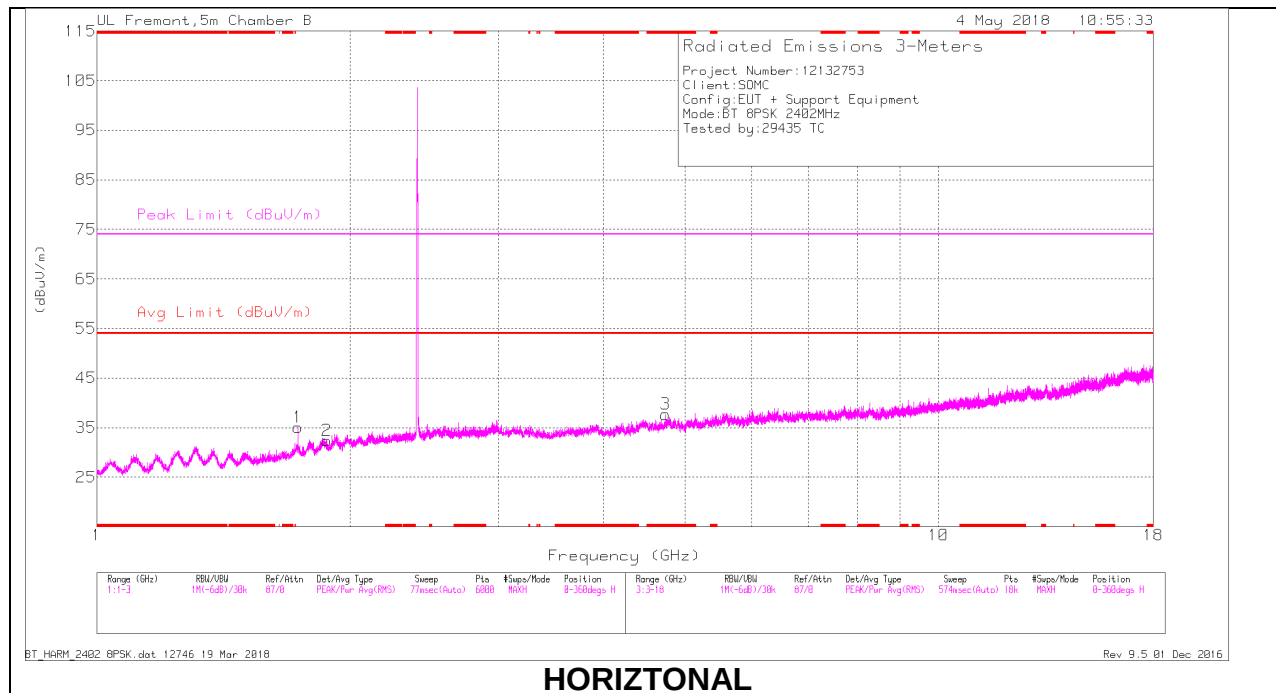
* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

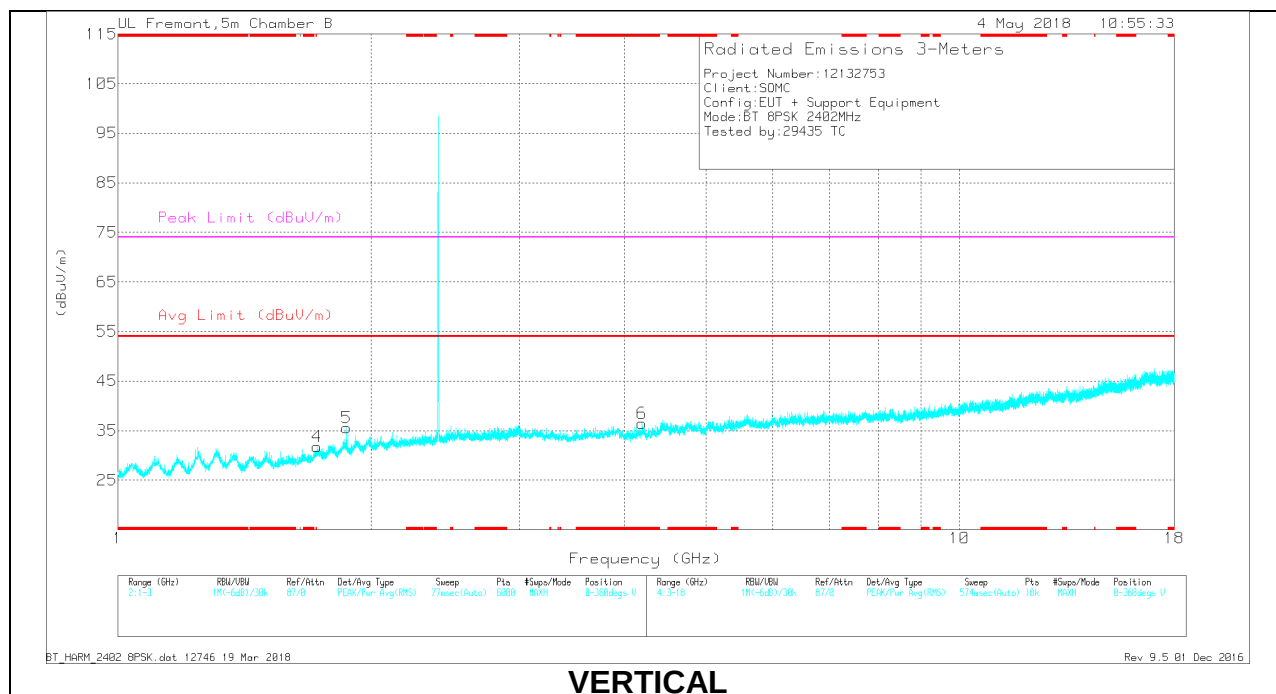
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.738	32.77	Pk	34.2	-29.3	37.67	-	-	74	-36.33	0-360	199	H
6	* 4.197	33.18	Pk	33.4	-30.1	36.48	-	-	74	-37.52	0-360	200	V
4	1.725	23.76	Pk	29.4	-21.4	31.76	-	-	-	-	0-360	199	V
1	1.733	27.09	Pk	29.5	-21.5	35.09	-	-	-	-	0-360	199	H
5	1.868	26.05	Pk	30.9	-21.4	35.55	-	-	-	-	0-360	199	V
2	1.877	23.19	Pk	30.9	-21.7	32.39	-	-	-	-	0-360	199	H

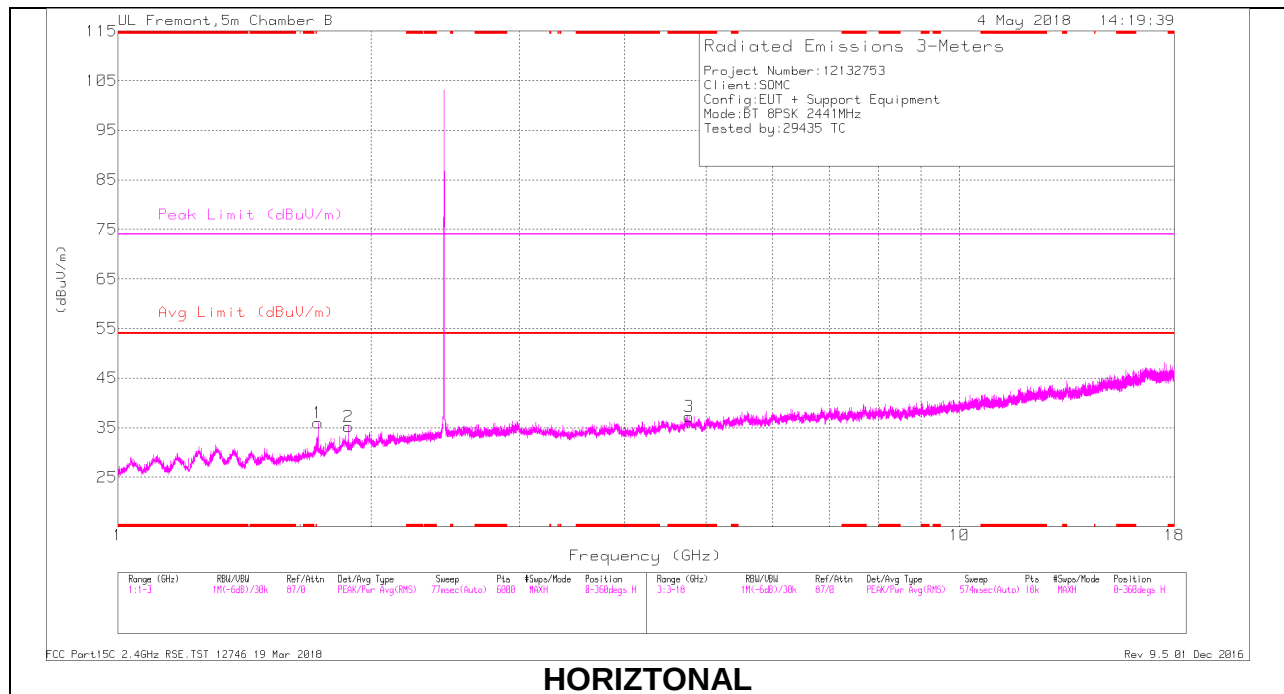
* - indicates frequency in CFR47 Pt 15 Restricted Band
Pk - Peak detector

Radiated Emissions

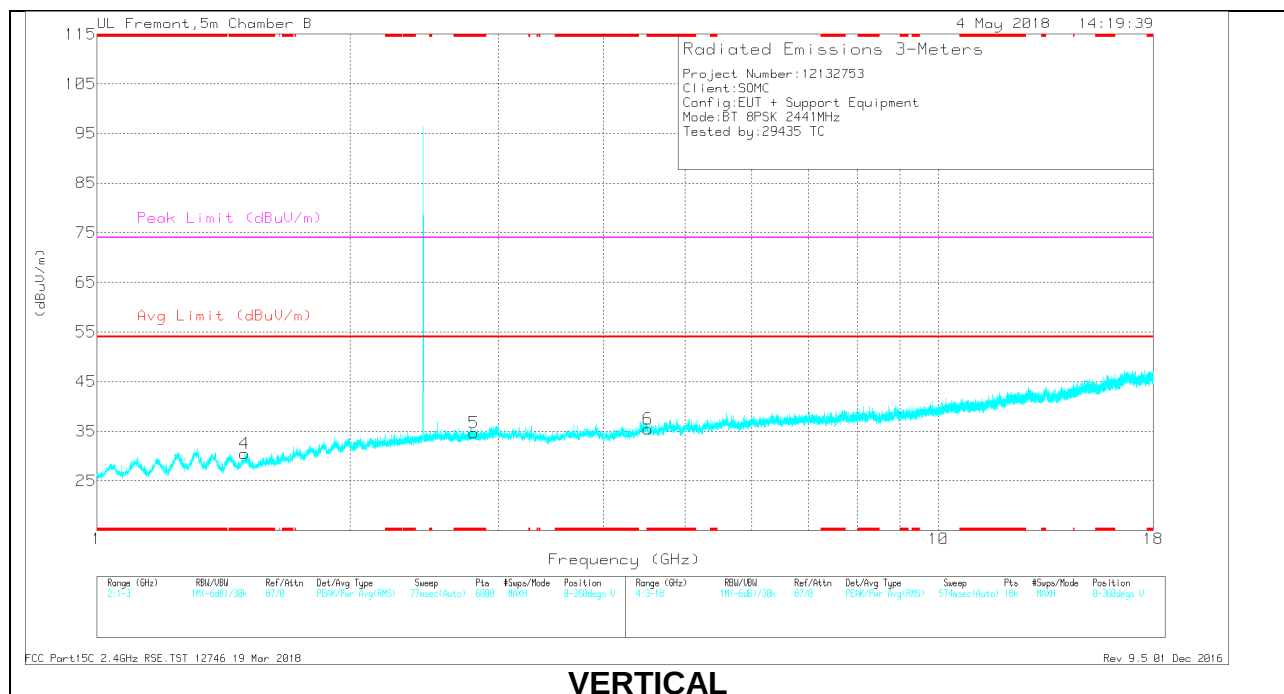
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.739	37.07	PKFH	34.2	-29.3	41.97	-	-	74	-32.03	37	188	H
* 4.737	25.52	VA1T	34.2	-29.3	30.42	54	-23.58	-	-	37	188	H
* 4.195	36.7	PKFH	33.4	-30.1	40	-	-	74	-34	229	138	V
* 4.196	25.98	VA1T	33.4	-30.1	29.28	54	-24.72	-	-	229	138	V
1.724	28.26	PKFH	29.4	-21.3	36.36	-	-	-	-	279	111	V
1.724	16.34	VA1T	29.4	-21.3	24.44	-	-	-	-	279	111	V
1.732	16.11	VA1T	29.5	-21.5	24.11	-	-	-	-	185	172	H
1.735	28.18	PKFH	29.5	-21.5	36.18	-	-	-	-	185	172	H
1.867	28.25	PKFH	30.9	-21.4	37.75	-	-	-	-	264	160	V
1.867	15.68	VA1T	30.9	-21.4	25.18	-	-	-	-	264	160	V
1.876	27.07	PKFH	30.9	-21.6	36.37	-	-	-	-	242	115	H
1.878	15.16	VA1T	30.9	-21.6	24.46	-	-	-	-	242	115	H

* - indicates frequency in CFR47 Pt 15 Restricted Band
PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 1.499	23.66	Pk	28.2	-21.4	30.46	-	-	74	-43.54	0-360	200	V
5	* 2.804	23.12	Pk	32.4	-20.8	34.72	-	-	74	-39.28	0-360	102	V
3	* 4.773	32.34	Pk	34.3	-29.4	37.24	-	-	74	-36.76	0-360	199	H
6	* 4.514	31.9	Pk	34	-30.4	35.5	-	-	74	-38.5	0-360	199	V
1	1.729	27.96	Pk	29.4	-21.4	35.96	-	-	-	-	0-360	199	H
2	1.878	25.92	Pk	30.9	-21.6	35.22	-	-	-	-	0-360	102	H

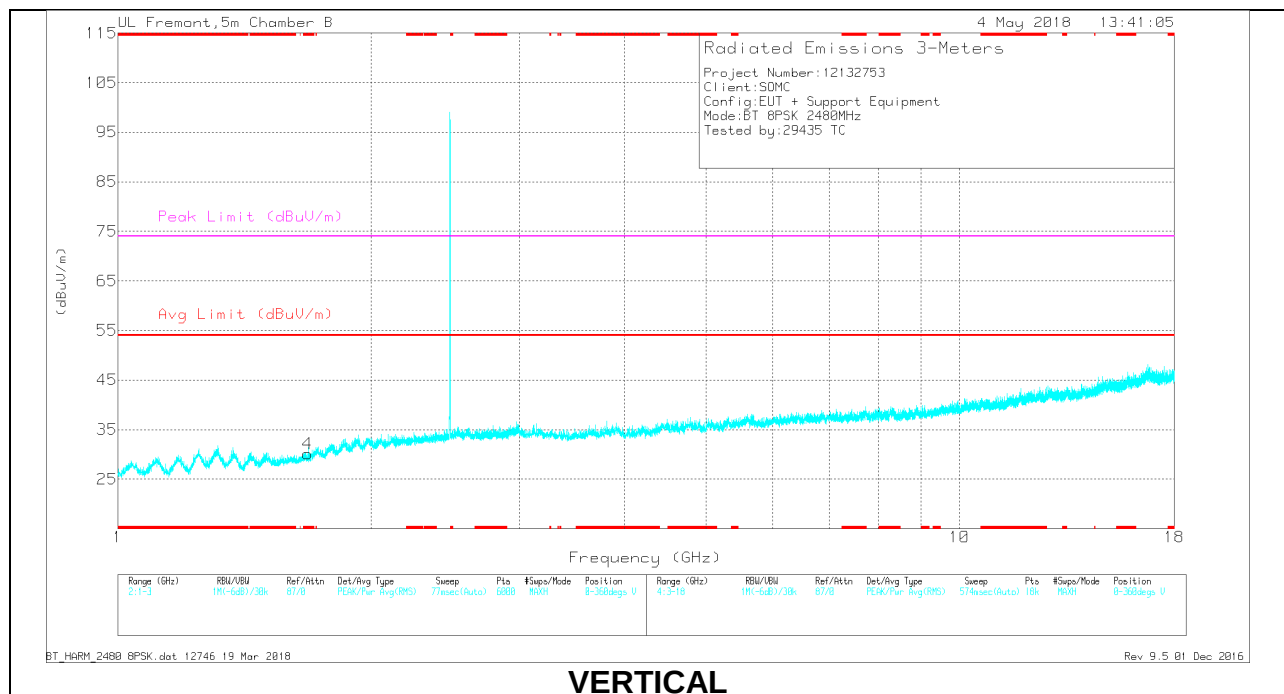
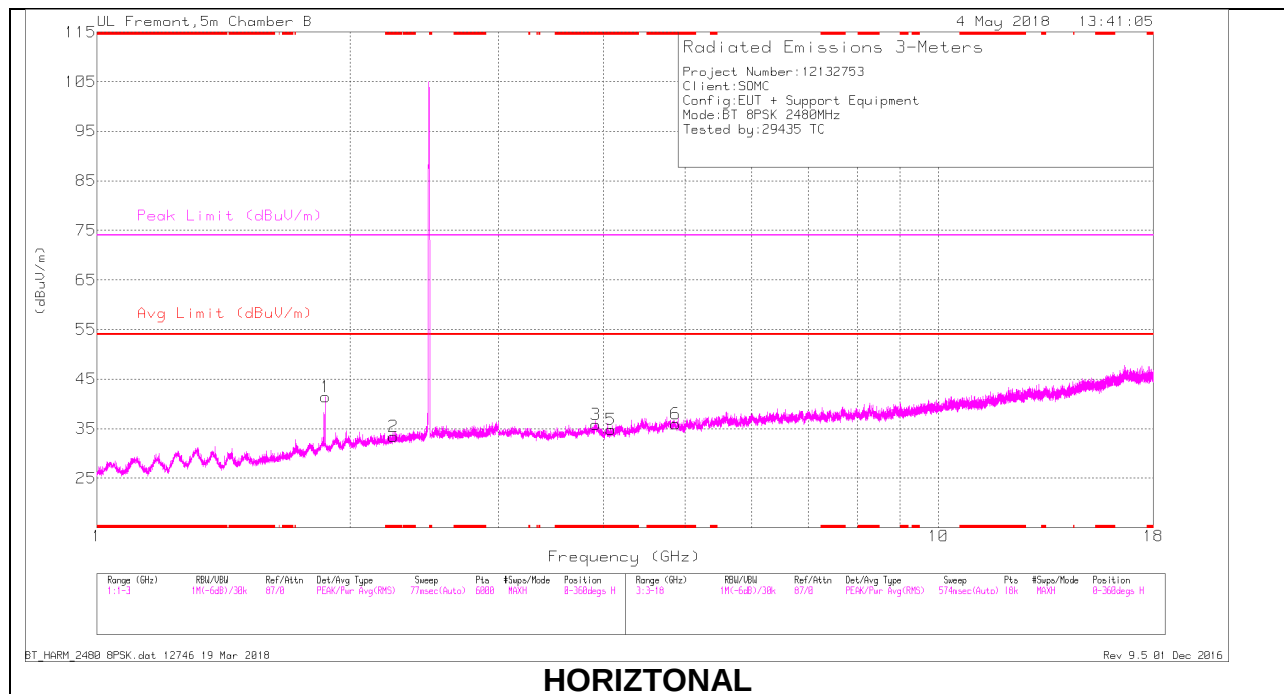
* - indicates frequency in CFR47 Pt 15 Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.499	28.35	PKFH	28.2	-21.4	35.15	-	-	74	-38.85	110	307	V
* 1.499	16.18	VA1T	28.2	-21.4	22.98	54	-31.02	-	-	110	307	V
* 2.804	28.1	PKFH	32.4	-20.7	39.8	-	-	74	-34.2	281	166	V
* 2.805	15.2	VA1T	32.4	-20.7	26.9	54	-27.1	-	-	281	166	V
* 4.773	36.98	PKFH	34.3	-29.4	41.88	-	-	74	-32.12	136	199	H
* 4.771	25.28	VA1T	34.3	-29.4	30.18	54	-23.82	-	-	136	199	H
* 4.516	39	PKFH	34	-30.5	42.5	-	-	74	-31.5	228	219	V
* 4.515	26.62	VA1T	34	-30.5	30.12	54	-23.88	-	-	228	219	V
1.729	28.47	PKFH	29.4	-21.4	36.47	-	-	-	-	120	309	H
1.73	16.43	VA1T	29.4	-21.6	24.23	-	-	-	-	120	309	H
1.877	15.14	VA1T	30.9	-21.6	24.44	-	-	-	-	255	239	H
1.878	26.55	PKFH	30.9	-21.6	35.85	-	-	-	-	255	239	H

* - indicates frequency in CFR47 Pt 15 Restricted Band
PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

HIGH CHANNEL RESULTS



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fitr/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	* 2.252	23.12	Pk	32	-21.7	33.42	-	-	74	-40.58	0-360	199	H
4	* 1.681	22.87	Pk	28.9	-21.7	30.07	-	-	74	-43.93	0-360	200	V
3	* 3.913	32.6	Pk	33.5	-30.3	35.8	-	-	74	-38.2	0-360	102	H
5	* 4.079	32.67	Pk	33.5	-31.4	34.77	-	-	74	-39.23	0-360	199	H
6	* 4.874	32.9	Pk	34.4	-31.3	36	-	-	74	-38	0-360	199	H
1	1.869	31.93	Pk	30.9	-21.4	41.43	-	-	-	-	0-360	199	H

* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

Radiated Emissions

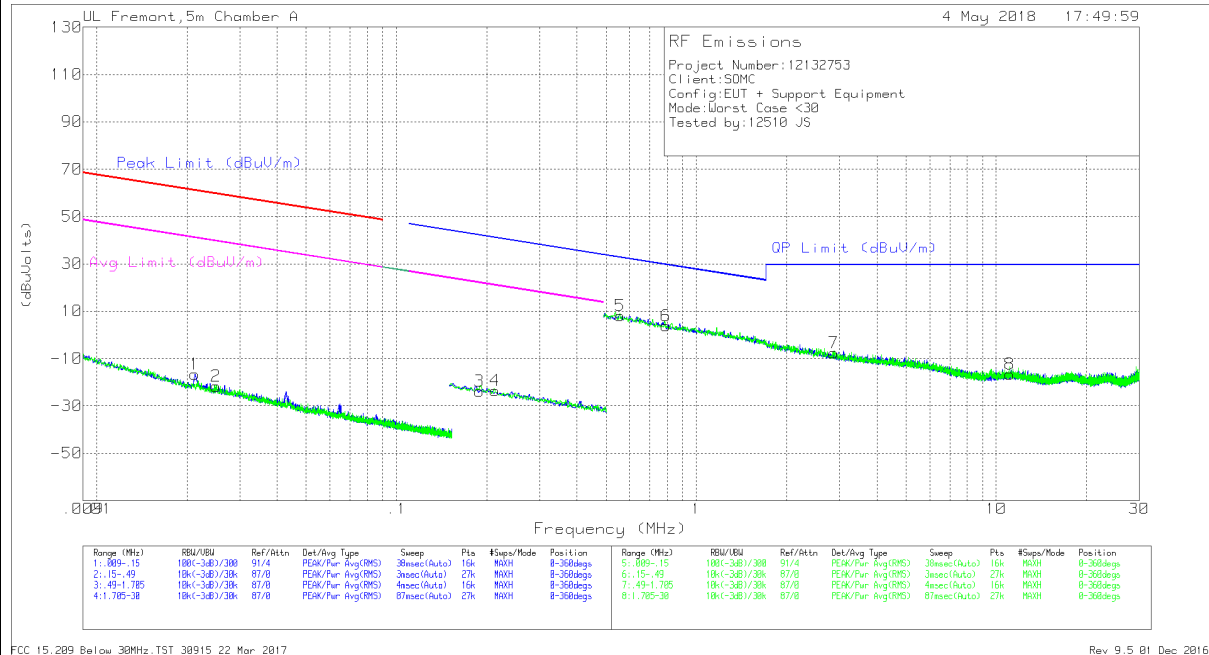
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fitr/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.253	27.93	PKFH	32	-21.7	38.23	-	-	74	-35.77	322	182	H
* 2.252	15.75	VA1T	32	-21.7	26.05	54	-27.95	-	-	322	182	H
* 1.681	26.9	PKFH	28.9	-21.7	34.1	-	-	74	-39.9	54	199	V
* 1.682	15.52	VA1T	28.9	-21.7	22.72	54	-31.28	-	-	54	199	V
* 3.912	38.22	PKFH	33.5	-30.3	41.42	-	-	74	-32.58	254	308	H
* 3.915	26.9	VA1T	33.5	-30.3	30.1	54	-23.9	-	-	254	308	H
* 4.078	39.06	PKFH	33.5	-31.4	41.16	-	-	74	-32.84	151	293	H
* 4.079	26.97	VA1T	33.5	-31.4	29.07	54	-24.93	-	-	151	293	H
* 4.875	38.4	PKFH	34.4	-31.3	41.5	-	-	74	-32.5	232	144	H
* 4.874	27.36	VA1T	34.4	-31.2	30.56	54	-23.44	-	-	232	144	H
1.869	27.82	PKFH	30.9	-21.4	37.32	-	-	-	-	230	180	H
1.869	15.5	VA1T	30.9	-21.4	25	-	-	-	-	230	180	H

* - indicates frequency in CFR47 Pt 15 Restricted Band

PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

9.2. SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL AND VERTICAL PLOTS



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.

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Chl (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	.02124	49.18	Pk	14.2	.1	-80	-16.52	61.04	-77.56	41.04	-57.56	-	-	-	-	0-360
2	.02507	44.19	Pk	14	.1	-80	-21.71	59.6	-81.31	39.6	-61.31	-	-	-	-	0-360
3	.18904	45.06	Pk	11	.1	-80	-23.84	-	-	-	-	42.09	-65.93	22.09	-45.93	0-360
4	.21314	45.34	Pk	11	.1	-80	-23.56	-	-	-	-	41.04	-64.6	21.04	-44.6	0-360

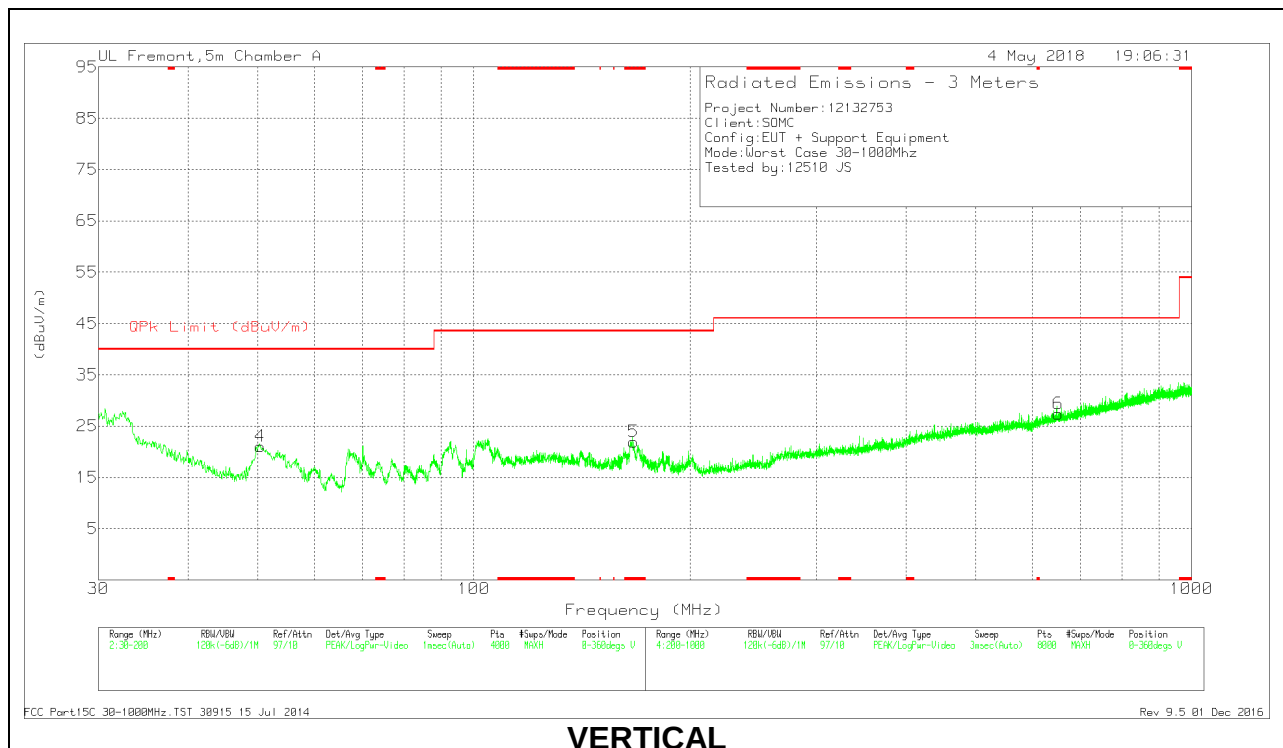
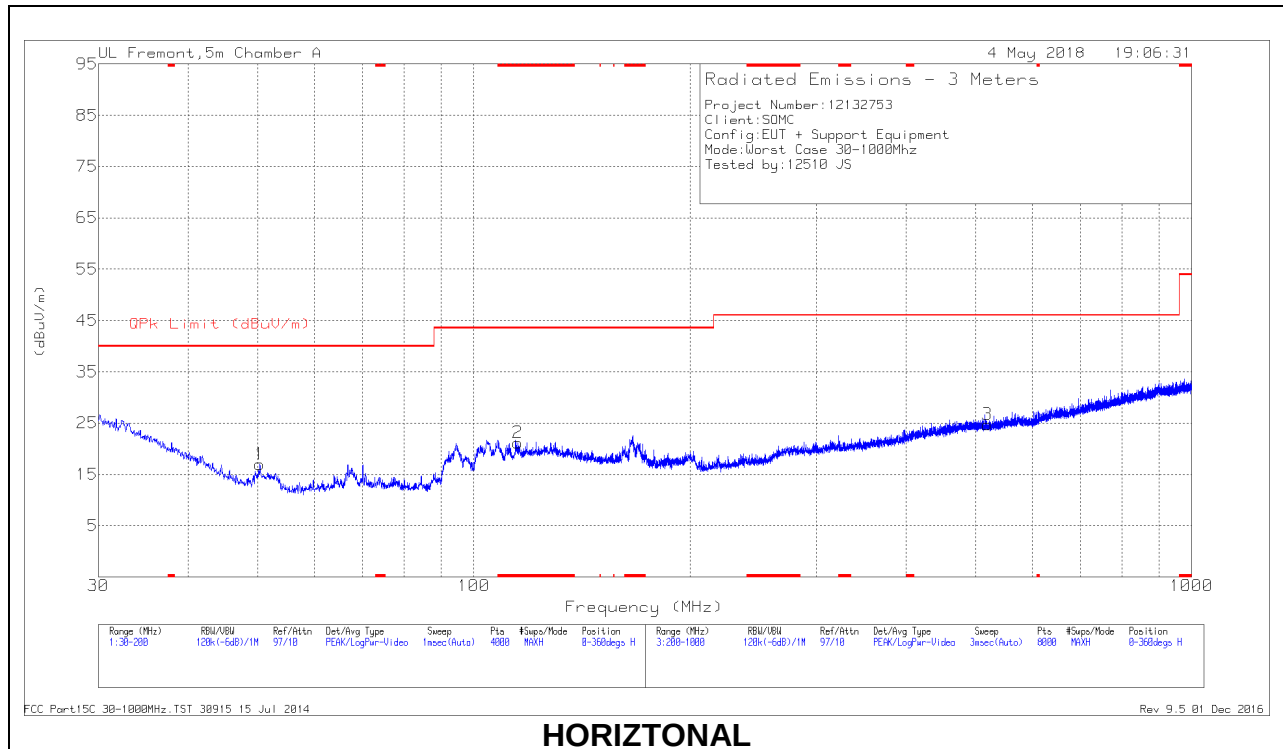
Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Chl (dB)	Dist Corr 30m	Corrected Reading (dBuV/m)	Margin (dB)	QP Limit (dBuV/m)	Azimuth (Degs)
5	.55658	36.94	Pk	11.1	.1	-40	8.14	32.7	-24.56	0-360
6	.79248	32.72	Pk	11	.1	-40	3.82	29.64	-25.82	0-360
7	2.87352	20.88	Pk	11.3	.3	-40	-7.52	29.5	-37.02	0-360
8	11.09927	11.7	Pk	11.1	.5	-40	-16.7	29.5	-46.2	0-360

Pk - Peak detector

9.3. WORST-CASE BELOW 1 GHz

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



Below 1GHz Data

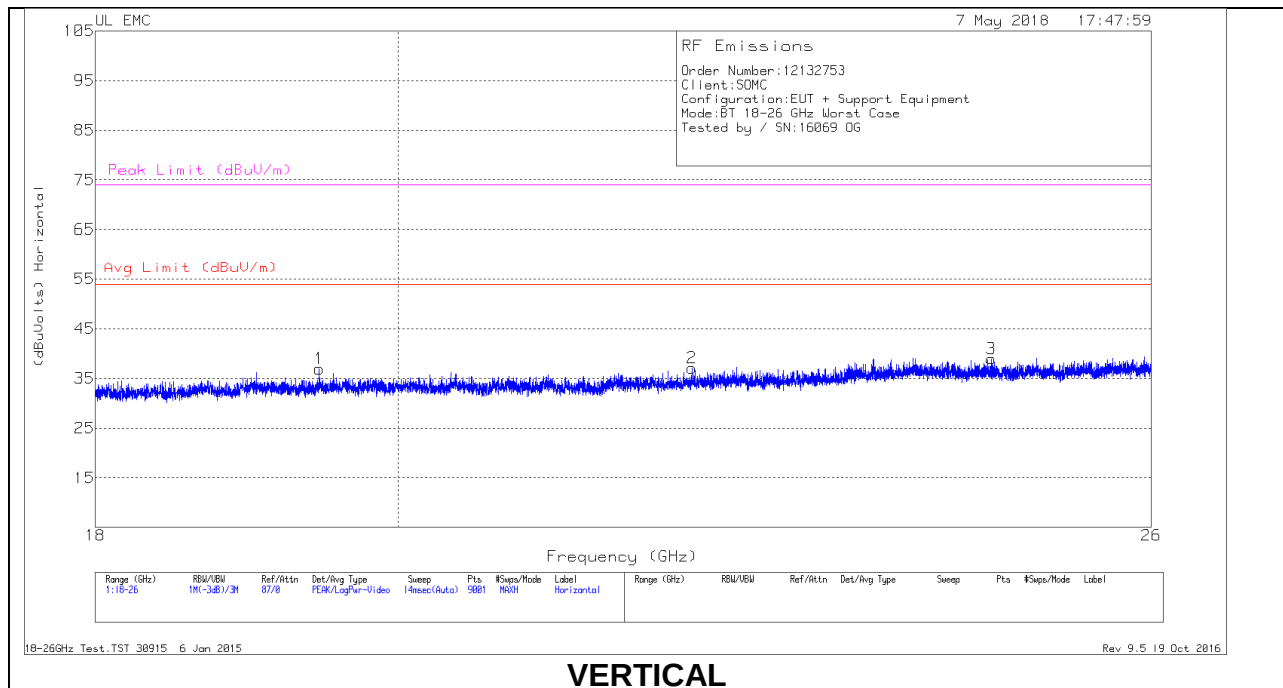
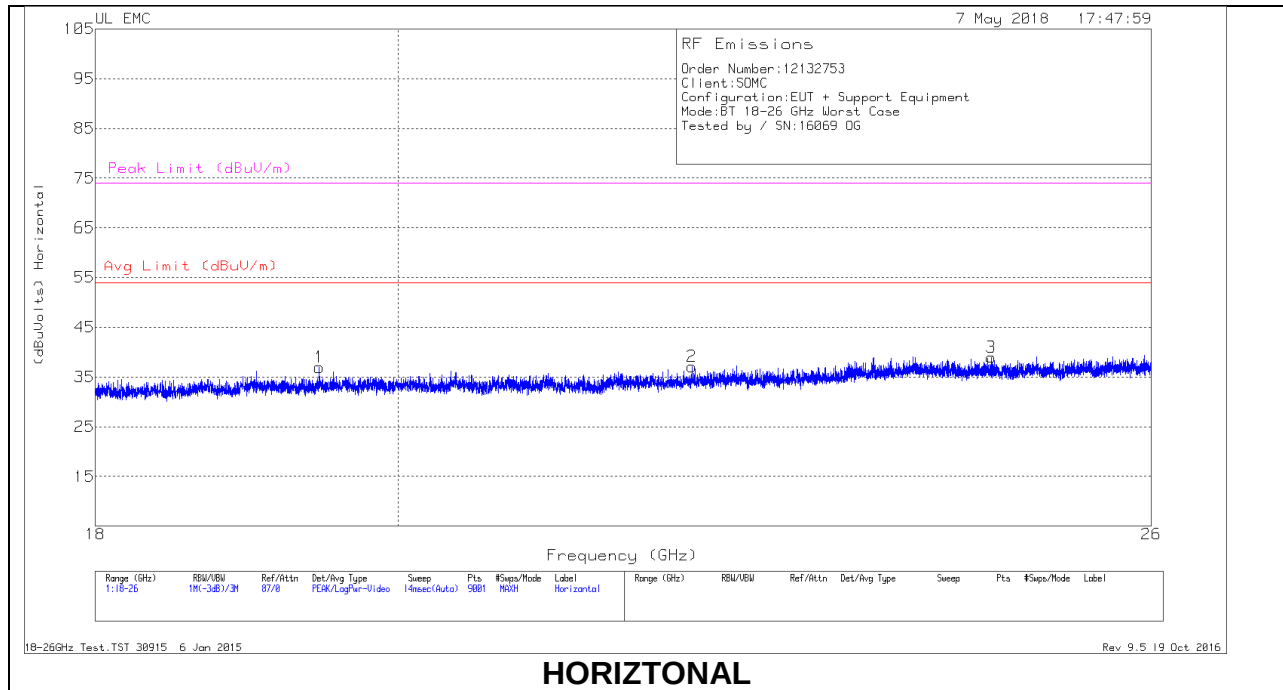
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 115.107	29.99	Pk	17.4	-26.2	21.19	43.52	-22.33	0-360	300	H
5	* 166.9492	31.77	Pk	15.9	-25.7	21.97	43.52	-21.55	0-360	100	V
1	50.3628	32.42	Pk	11.5	-27	16.92	40	-23.08	0-360	400	H
4	50.4053	36.49	Pk	11.5	-27	20.99	40	-19.01	0-360	100	V
3	518.9415	28.27	Pk	21.7	-25.3	24.67	46.02	-21.35	0-360	400	H
6	652.1588	28.33	Pk	23.8	-24.8	27.33	46.02	-18.69	0-360	300	V

* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

9.4. WORST-CASE 18-26 GHz

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



18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T449 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	19.46	38.33	Pk	32.7	-24.6	-9.5	36.93	54	-17.07	74	-37.07
2	22.155	37.89	Pk	33.4	-24.7	-9.5	37.09	54	-16.91	74	-36.91
3	24.59	38.48	Pk	34.1	-24.1	-9.5	38.98	54	-15.02	74	-35.02
4	19.125	37.99	Pk	32.5	-24.4	-9.5	36.59	54	-17.41	74	-37.41
5	20.094	37.99	Pk	32.8	-25	-9.5	36.29	54	-17.71	74	-37.71
6	24.959	39.66	Pk	34.3	-24.4	-9.5	40.06	54	-13.94	74	-33.94

Pk - Peak detector