FCC CFR47 PART 15 SUBPART C

C2PC CERTIFICATION TEST REPORT

FOR

GSM/CDMA/LTE PHONE WITH BT & DTS WLAN b/g/n

MODEL NUMBER: LG-L61AL, L61AL, LGL61AL

FCC ID: ZNFL61AL

REPORT NUMBER: 16I22652-E2V1

ISSUE DATE: 1/29/2016

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	1/29/2016	Initial Issue	D. CORONIA

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TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS 4

2. TEST METHODOLOGY 5

3. FACILITIES AND ACCREDITATION 5

4. CALIBRATION AND UNCERTAINTY 5

4.1. MEASURING INSTRUMENT CALIBRATION 5

4.2. SAMPLE CALCULATION 5

4.3. MEASUREMENT UNCERTAINTY 6

5. EQUIPMENT UNDER TEST 7

5.1. DESCRIPTION OF EUT 7

5.2. MAXIMUM OUTPUT POWER 7

5.3. DESCRIPTION OF AVAILABLE ANTENNAS 7

5.4. WORST-CASE CONFIGURATION AND MODE 7

5.5. DESCRIPTION OF TEST SETUP 8

6. TEST AND MEASUREMENT EQUIPMENT 10

7. SUMMARY TABLE 11

8. ANTENNA PORT TEST RESULTS 12

8.1. ON TIME, DUTY CYCLE 12

9. RADIATED EMISSION TEST 13

9.1. TRANSMITTER ABOVE 1 GHz 14

9.1.1. GFSK MODULATION 14

9.1.2. 8PSK MODULATION 24

9.2. WORST-CASE BELOW 1 GHz 34

10. SETUP PHOTOS 36

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC.
EUT DESCRIPTION: GSM/WCDMA/LTE PHONE WITH BT & DTS WLAN b/g/n
MODEL: LG-L61AL, L61AL, LGL61AL
SERIAL NUMBER: 601KPHG000625, 601KPPB000624
DATE TESTED: JANUARY 21-22, 2016

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

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 revision 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 any government.

Approved & Released For
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Tested By:

JEFFREY WU
WiSE ENGINEER
CONSUMER TECHNOLOGY DIVISION
UL VERIFICATION SERVICES INC

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, and FCC CFR 47 Part 15.

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	☐ Chamber D
☒ Chamber B	☐ Chamber E
☒ Chamber C	☐ Chamber F
	☐ Chamber G
	☐ Chamber H

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

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

Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Radiated Disturbance, 9KHz to 30 MHz	2.14 dB
Radiated Disturbance, 30 to 1000 MHz	4.98 dB
Radiated Disturbance,1000 to 6000 MHz	3.86 dB
Radiated Disturbance,6000 to 18000 MHz	4.23 dB
Radiated Disturbance,18000 to 26000 MHz	5.30 dB
Radiated Disturbance,26000 to 40000 MHz	5.23 dB

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE PHONE WITH BT & DTS WLAN b/g/n

5.2. MAXIMUM OUTPUT POWER

See original report for details.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB, with a maximum gain of 0.24 dBi.

5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit on the channel with higher output power as worst-case scenario.

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.

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	DC1507	EAD62377906	N/A
Earphone	LG	N/A	N/A	N/A

I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1m	N/A

TEST SETUP

The EUT is continuously communicating to the Bluetooth tester during the tests.
EUT was set in the Hidden menu mode to enable BT communications.

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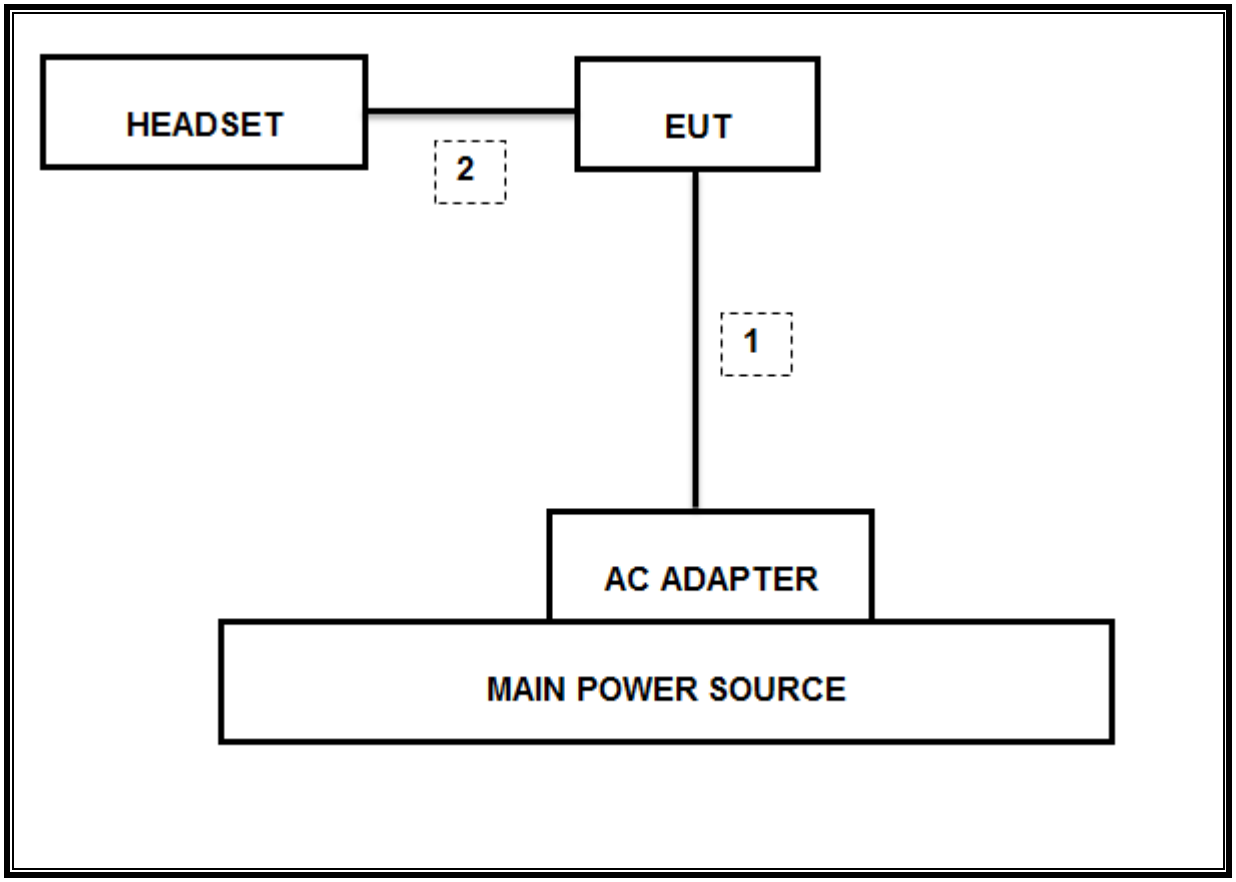
SETUP DIAGRAM FOR TESTS



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6. 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**	**T Number**	**Cal Due**
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	130	09/01/16
Antenna, Horn, 18GHz	ETS Lindgren	3117	345	03/03/16
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	447	05/12/16
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	88	04/07/16
RF Preamplifier, 1GHz - 26.5GHz	HP	8449B	404	06/29/16
Amplifier, 10KHz to 1 GHz	Keysight	8447D	15	08/14/16
Spectrum Analyzer, PXA, 3 Hz to 44 GHz	Keysight	N9030A	907	01/06/17
Bluetooth Tester	Rohde & Schwarz	CBT	438	04/24/16
Directional Coupler	Mini-Circuits	ZUDC10-183+	1140	CNR
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	417	05/04/16
High Pass Filter 6GHz	Micro-Tronics	HPS17542	893	04/25/16
High Pass Filter 3GHz	Micro-Tronics	HPS17543	898	04/25/16

Test Software List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	Ver 9.5, June 24, 2015

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7. SUMMARY TABLE

C2PC Reason: Please see LG-L61AL FCC Class II change description for details.

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result
2.1049	RSS-GEN 6.6	20 dB Occupied Bandwidth & (99%)	N/A	Conducted	See Original
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20dBc		See Original
15.247 (b)(1)	RSS-247 5.4.2	TX conducted output power	<21dBm		See Original
15.247 (a)(1)	RSS-247 5.1.2	Hopping frequency separation	> 25KHz		See Original
15.247 (a)(1)(iii)	RSS-247 5.1.4	Number of Hopping Channels	More than 15 non-overlapping channels		See Original
15.247 (a)(1)(iii)	RSS-247 5.1.4	Avg Time of Occupancy	< 0.4sec		See Original
15.207 (a)	RSS-GEN 8.8	AC Power Line conducted emissions	Section 10	Radiated	See Original
15.205, 15.209	RSS-GEN 8.9/7	Radiated Spurious Emission	< 54dBuV/m		Pass

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8. ANTENNA PORT TEST RESULTS

8.1. ON TIME, DUTY CYCLE

LIMITS

None; for reporting purposes only

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method

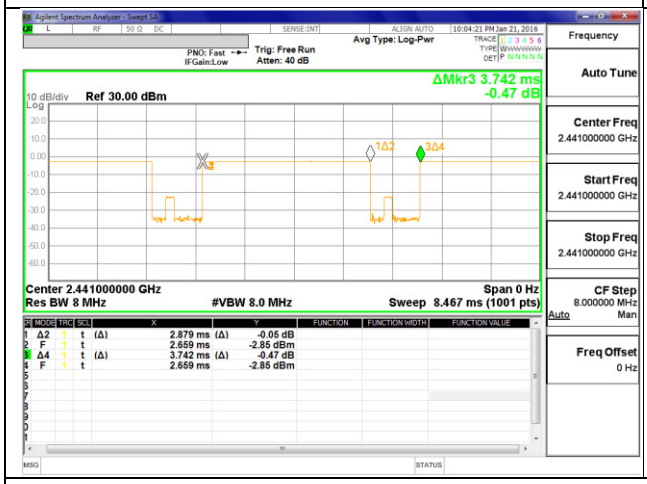
RESULTS

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
GFSK	2.879	3.742	0.769	76.94%	1.14	0.347
8PSK	2.887	3.751	0.770	76.97%	1.14	0.346

DUTY CYCLE PLOTS

GFSK



8PSK

NOTE: --

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9. RADIATED EMISSION TEST

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
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 below 1GHz and 150cm for 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 band edge measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 1/T (on time) for average measurement.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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.

RESULTS

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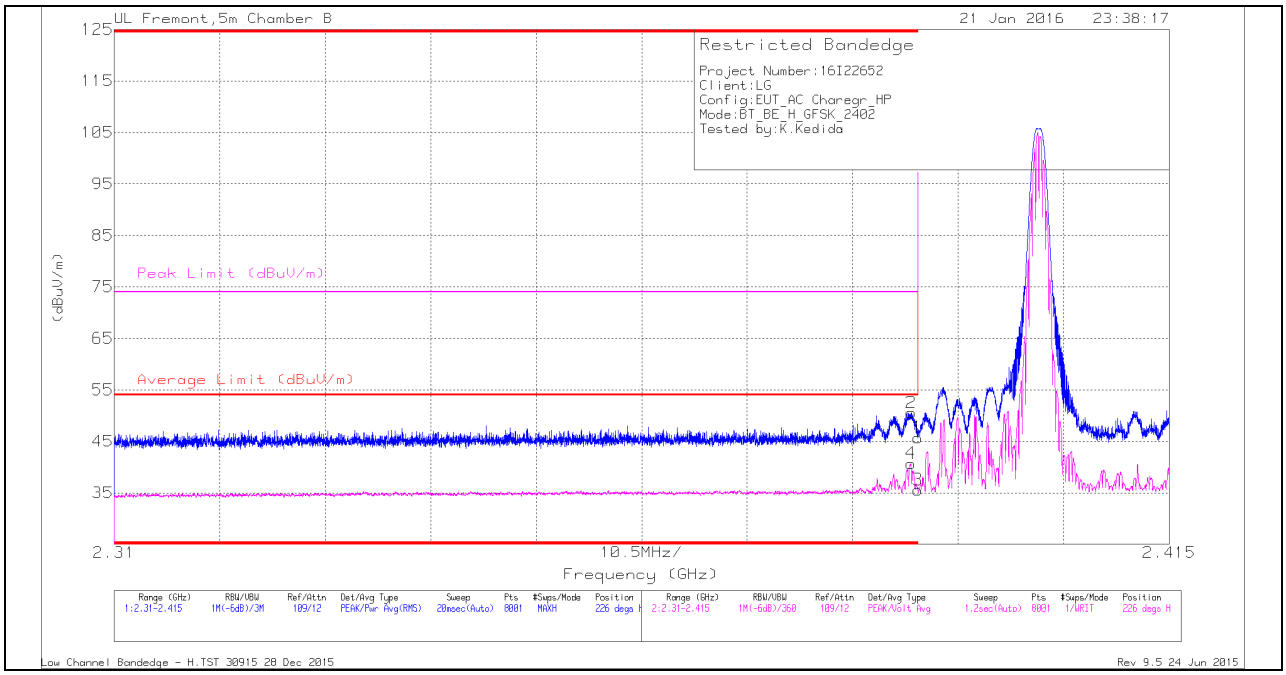
9.1. TRANSMITTER ABOVE 1 GHz

9.1.1. GFSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.64	Pk	32	-21.9	45.74	-	-	74	-28.26	226	376	H
2	* 2.389	40.48	Pk	32	-21.9	50.58	-	-	74	-23.42	226	376	H
3	* 2.39	25.47	VA1T	32	-21.9	35.57	54	-18.43	-	-	226	376	H
4	* 2.389	30.62	VA1T	32	-21.9	40.72	54	-13.28	-	-	226	376	H

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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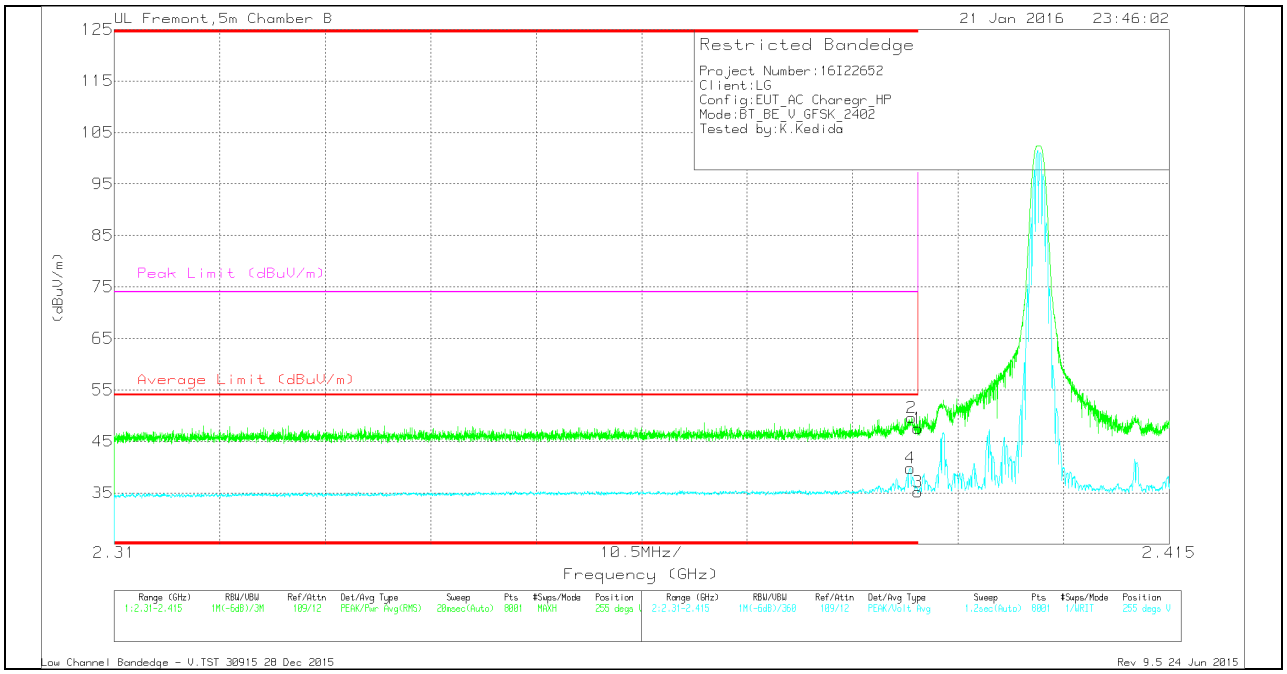
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	37.42	Pk	32	-21.9	47.52	-	-	74	-26.48	255	373	V
2	* 2.389	39.46	Pk	32	-21.9	49.56	-	-	74	-24.44	255	373	V
3	* 2.39	25.09	VA1T	32	-21.9	35.19	54	-18.81	-	-	255	373	V
4	* 2.389	29.68	VA1T	32	-21.9	39.78	54	-14.22	-	-	255	373	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector
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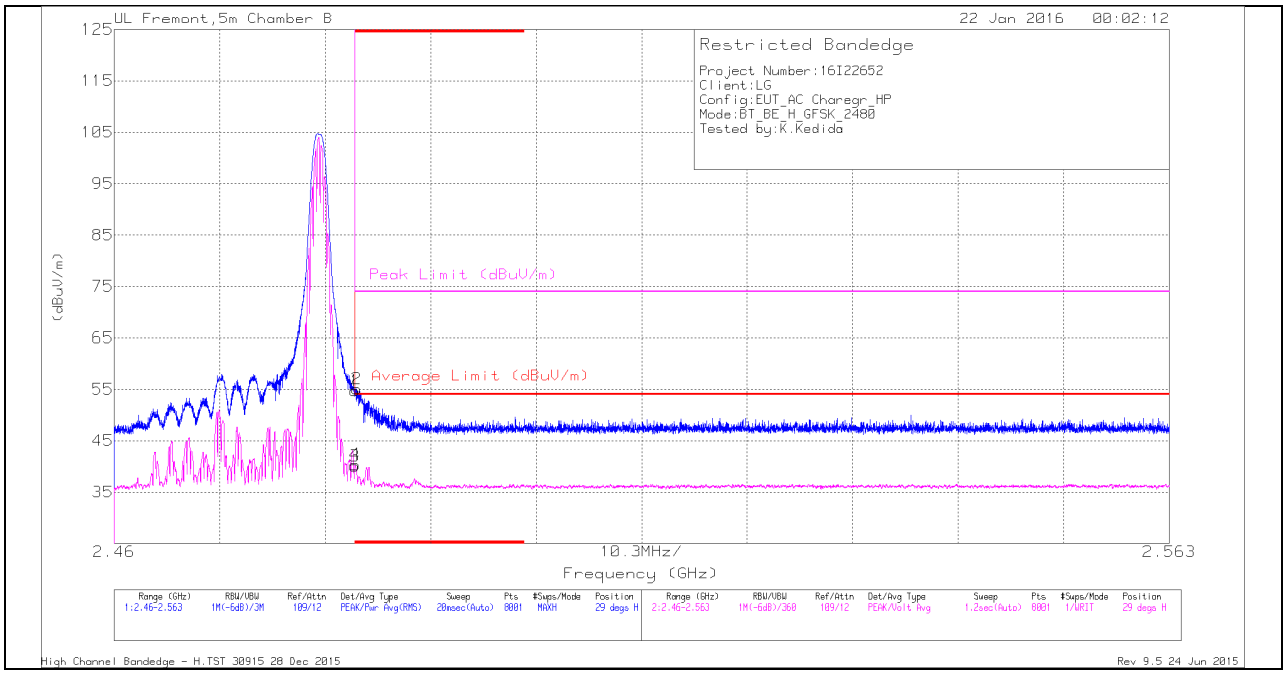
AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	44.02	Pk	32.5	-21.8	54.72	-	-	74	-19.28	29	184	H
2	* 2.484	44.4	Pk	32.5	-21.8	55.1	-	-	74	-18.9	29	184	H
3	* 2.484	29.36	VA1T	32.5	-21.8	40.06	54	-13.94	-	-	29	184	H
4	* 2.484	29.64	VA1T	32.5	-21.8	40.34	54	-13.66	-	-	29	184	H

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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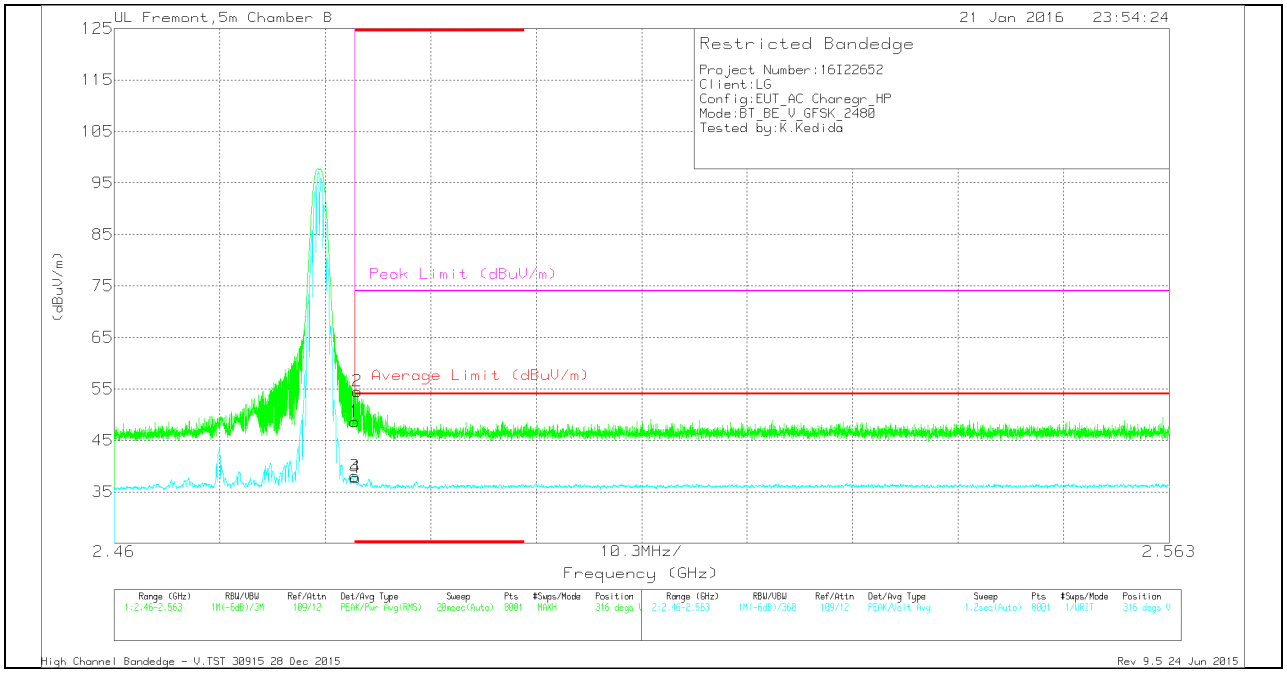
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	37.95	Pk	32.5	-21.8	48.65	-	-	74	-25.35	316	375	V
2	* 2.484	43.84	Pk	32.5	-21.8	54.54	-	-	74	-19.46	316	375	V
3	* 2.484	27.37	VA1T	32.5	-21.8	38.07	54	-15.93	-	-	316	375	V
4	* 2.484	27.08	VA1T	32.5	-21.8	37.78	54	-16.22	-	-	316	375	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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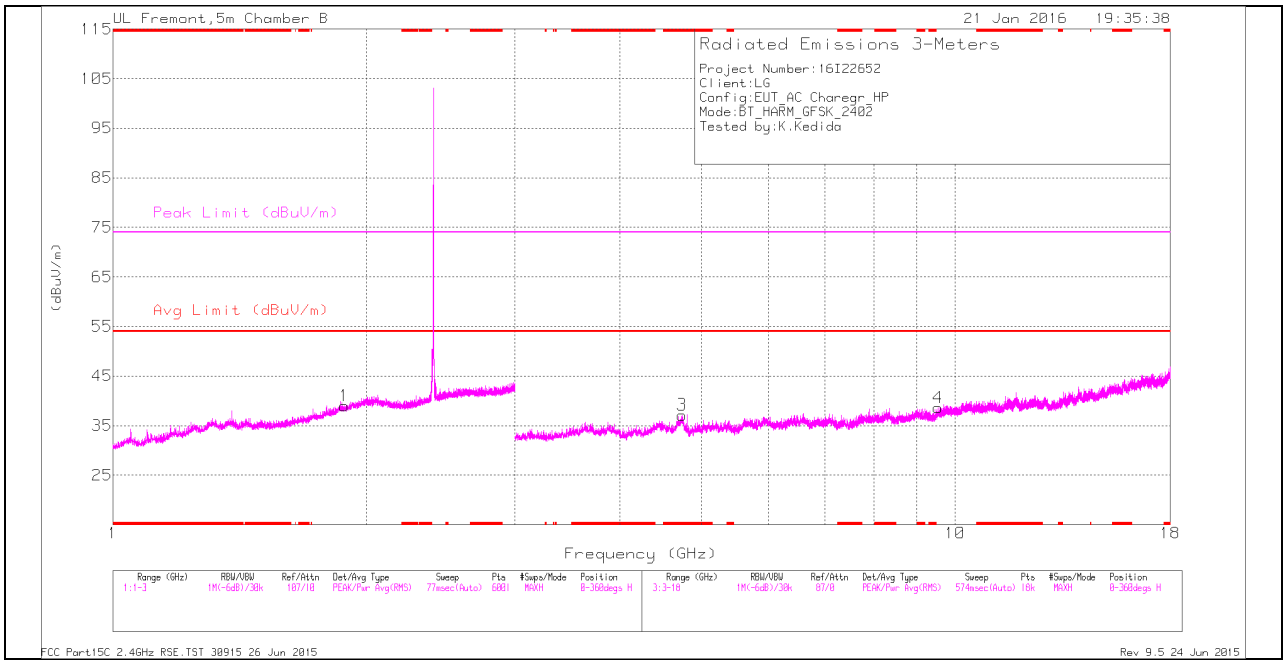
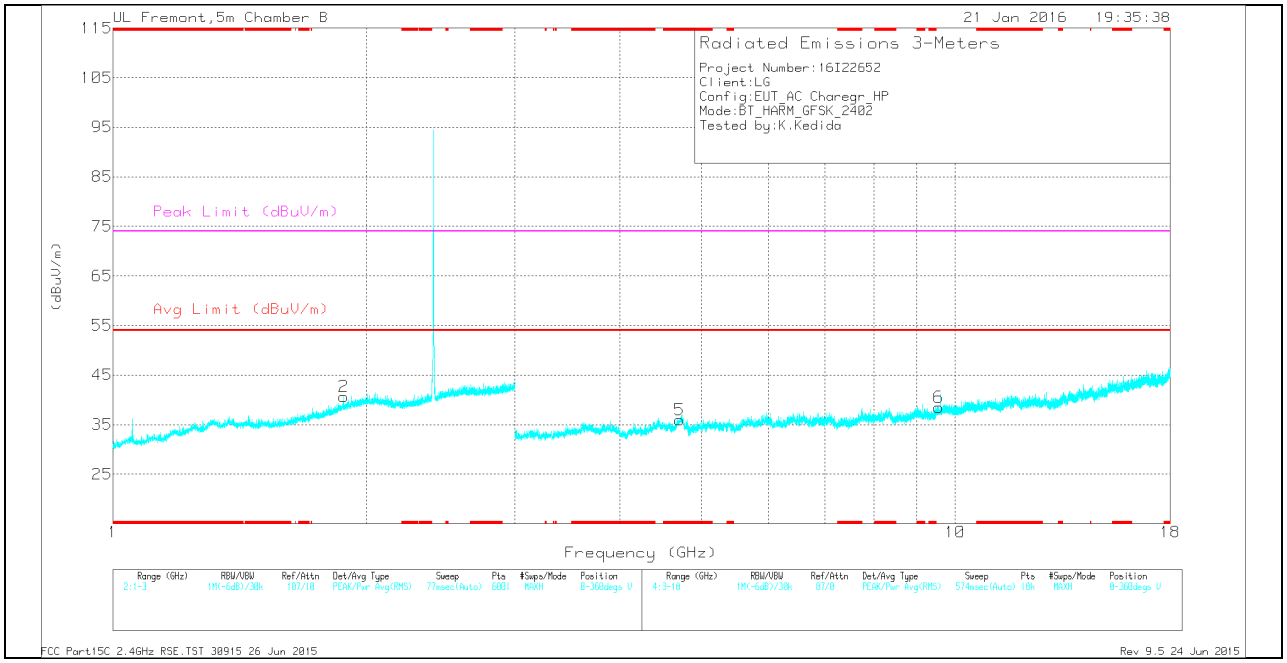
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



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

LOW CHANNEL VERTICAL



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

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LOW CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.739	33.56	Pk	34.3	-30.7	37.16	-	-	74	-36.84	0-360	199	H
5	* 4.71	32.97	Pk	34.2	-31.2	35.97	-	-	74	-38.03	0-360	199	V
2	1.878	30.72	Pk	31.6	-21.7	40.62	-	-	-	-	0-360	101	V
1	1.881	29.07	Pk	31.6	-21.7	38.97	-	-	-	-	0-360	101	H
4	9.54	28.17	Pk	36.6	-26.2	38.57	-	-	-	-	0-360	101	H
6	9.559	28.2	Pk	36.6	-26.3	38.5	-	-	-	-	0-360	101	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.739	41.72	PK2	34.3	-30.7	45.32	-	-	74	-28.68	360	198	H
* 4.741	28.65	VA1T	34.3	-30.7	32.25	54	-21.75	-	-	360	198	H
* 4.711	41.54	PK2	34.2	-31.2	44.54	-	-	74	-29.46	360	198	V
* 4.71	28.8	VA1T	34.2	-31.2	31.8	54	-22.2	-	-	360	198	V
1.876	37.29	PK2	31.5	-21.7	47.09	-	-	74	-26.91	360	101	V
1.876	23.92	VA1T	31.5	-21.7	33.72	54	-20.28	-	-	360	101	V
1.879	37.01	PK2	31.6	-21.7	46.91	-	-	74	-27.09	360	101	H
1.88	23.87	VA1T	31.6	-21.7	33.77	54	-20.23	-	-	360	101	H
9.54	23.3	VA1T	36.6	-26.2	33.7	54	-20.3	-	-	360	102	H
9.542	36.33	PK2	36.6	-26.1	46.83	-	-	74	-27.17	360	102	H
9.559	36.7	PK2	36.6	-26.3	47	-	-	74	-27	360	103	V
9.559	23.36	VA1T	36.6	-26.3	33.66	54	-20.34	-	-	360	103	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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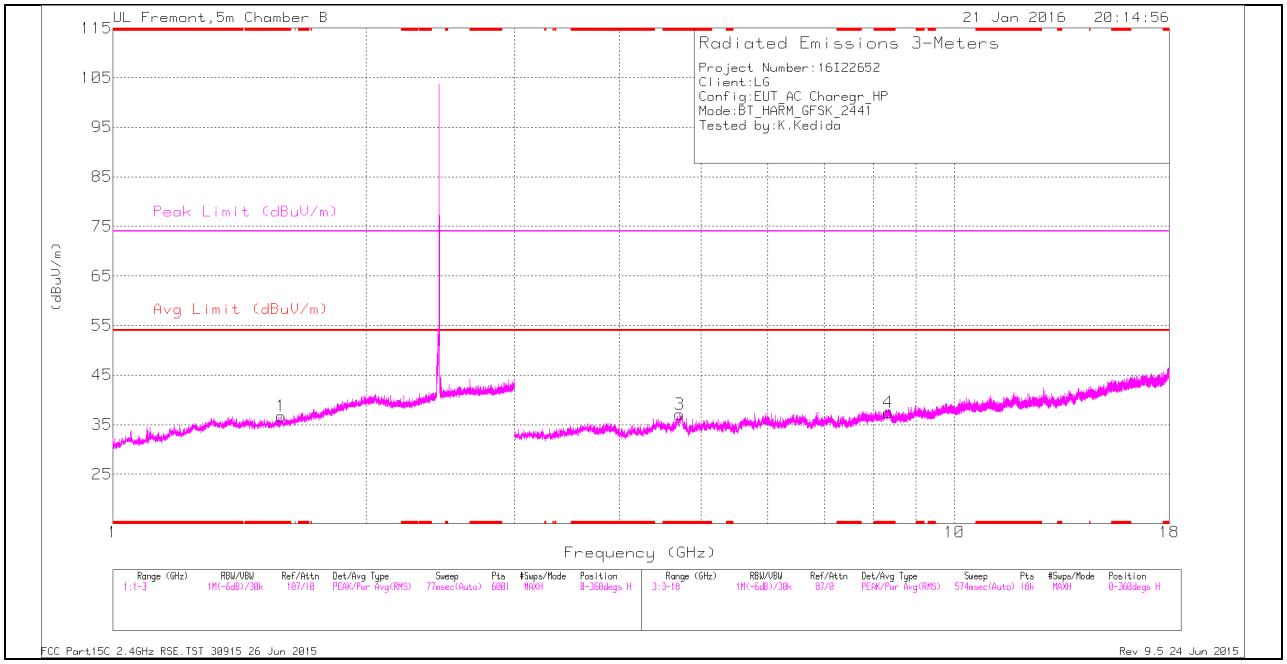
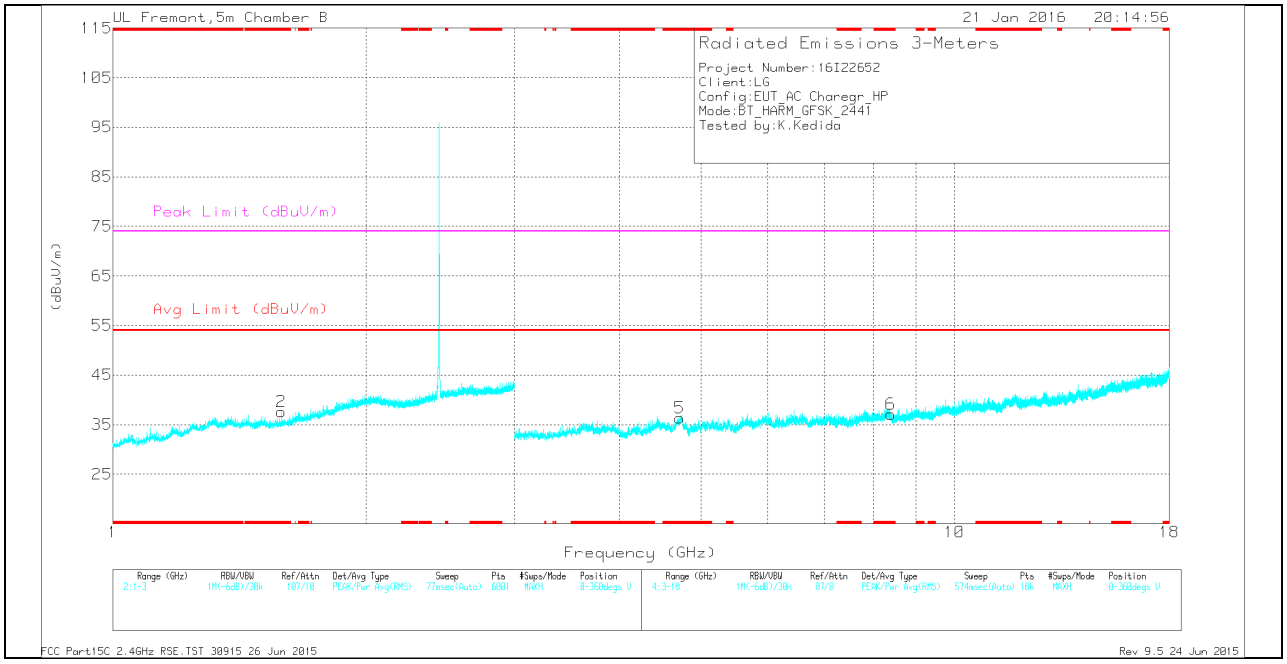
MID CHANNEL HORIZONTAL



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

MID CHANNEL VERTICAL



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

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MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.585	29.83	Pk	28.8	-21.9	36.73	-	-	74	-37.27	0-360	199	H
2	* 1.584	30.73	Pk	28.8	-21.9	37.63	-	-	74	-36.37	0-360	199	V
3	* 4.718	33.89	Pk	34.2	-31	37.09	-	-	74	-36.91	0-360	101	H
4	* 8.346	29.11	Pk	35.7	-27.3	37.51	-	-	74	-36.49	0-360	101	H
5	* 4.717	33.28	Pk	34.2	-31.1	36.38	-	-	74	-37.62	0-360	101	V
6	* 8.398	29.21	Pk	35.7	-27.8	37.11	-	-	74	-36.89	0-360	101	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.584	37.44	PK2	28.8	-21.9	44.34	-	-	74	-29.66	360	198	H
* 1.584	23.91	VA1T	28.8	-21.9	30.81	54	-23.19	-	-	360	198	H
* 1.585	37.28	PK2	28.8	-21.9	44.18	-	-	74	-29.82	360	198	V
* 1.584	23.85	VA1T	28.8	-21.9	30.75	54	-23.25	-	-	360	198	V
* 4.719	41.56	PK2	34.3	-31	44.86	-	-	74	-29.14	360	102	H
* 4.718	28.8	VA1T	34.2	-31	32	54	-22	-	-	360	102	H
* 8.347	37.96	PK2	35.7	-27.2	46.46	-	-	74	-27.54	360	102	H
* 8.345	25.06	VA1T	35.7	-27.3	33.46	54	-20.54	-	-	360	102	H
* 4.715	41.72	PK2	34.2	-31.1	44.82	-	-	74	-29.18	360	102	V
* 4.718	28.84	VA1T	34.3	-31	32.14	54	-21.86	-	-	360	102	V
* 8.398	38.28	PK2	35.7	-27.8	46.18	-	-	74	-27.82	360	102	V
* 8.398	24.8	VA1T	35.7	-27.8	32.7	54	-21.3	-	-	360	102	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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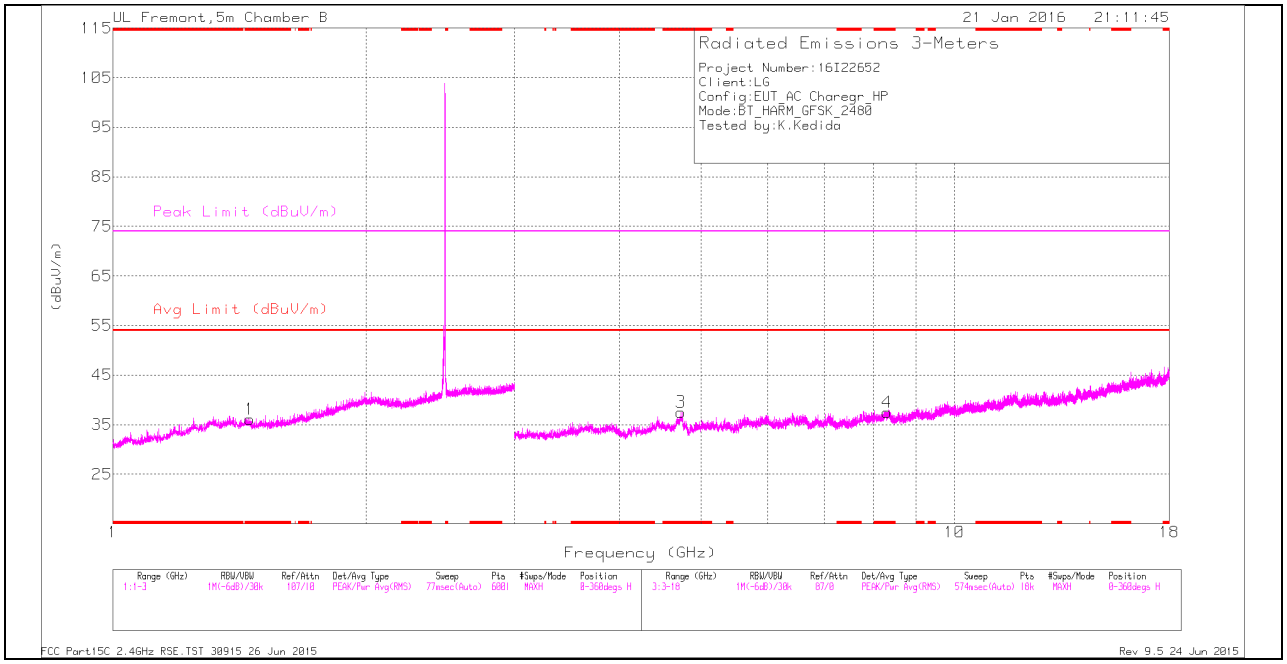
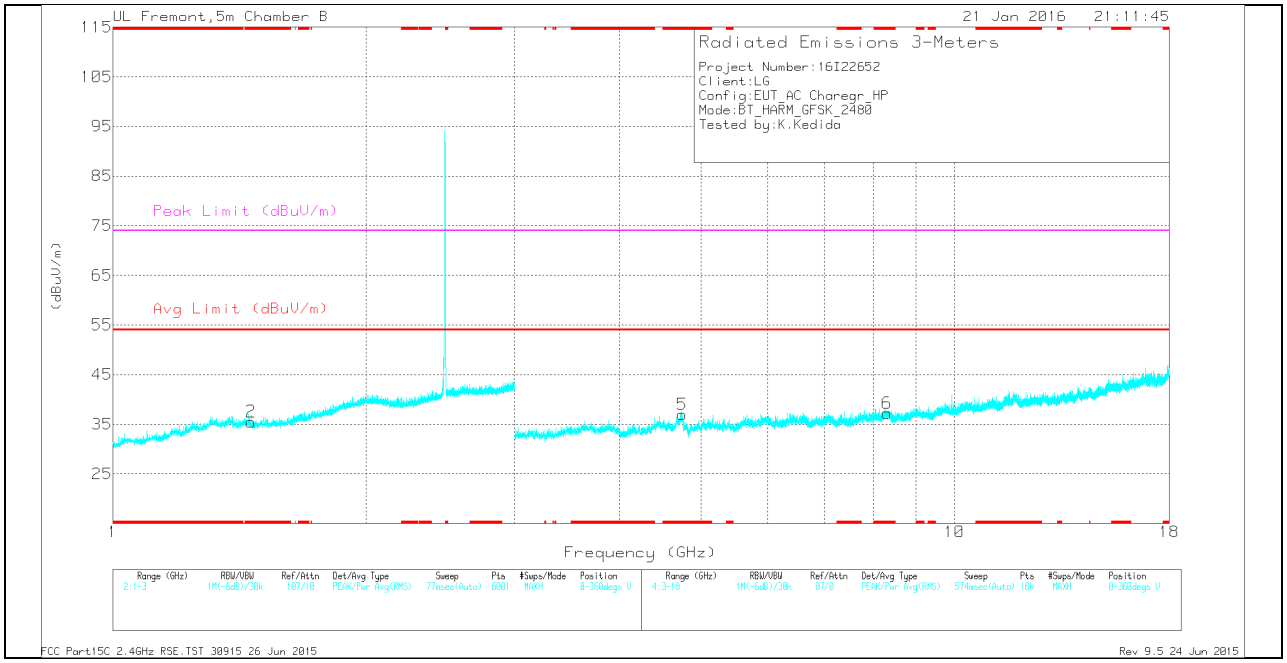
HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL VERTICAL



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

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HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.453	29.23	Pk	29	-22.1	36.13	-	-	74	-37.87	0-360	199	H
2	* 1.459	28.71	Pk	28.9	-22.1	35.51	-	-	74	-38.49	0-360	101	V
3	* 4.729	33.94	Pk	34.3	-30.7	37.54	-	-	74	-36.46	0-360	199	H
4	* 8.317	29.66	Pk	35.7	-27.9	37.46	-	-	74	-36.54	0-360	199	H
5	* 4.749	33.4	Pk	34.3	-30.7	37	-	-	74	-37	0-360	199	V
6	* 8.317	29.43	Pk	35.7	-27.9	37.23	-	-	74	-36.77	0-360	199	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.453	36.78	PK2	29	-22.1	43.68	-	-	74	-30.32	360	198	H
* 1.452	23.8	VA1T	29	-22.1	30.7	54	-23.3	-	-	360	198	H
* 1.459	37.85	PK2	28.9	-22.1	44.65	-	-	74	-29.35	360	102	V
* 1.457	23.69	VA1T	28.9	-22	30.59	54	-23.41	-	-	360	102	V
* 4.73	41.16	PK2	34.3	-30.7	44.76	-	-	74	-29.24	360	199	H
* 4.729	28.8	VA1T	34.3	-30.7	32.4	54	-21.6	-	-	360	199	H
* 8.319	38	PK2	35.7	-27.9	45.8	-	-	74	-28.2	360	199	H
* 8.319	24.94	VA1T	35.7	-27.9	32.74	54	-21.26	-	-	360	199	H
* 4.751	41.23	PK2	34.3	-30.7	44.83	-	-	74	-29.17	360	199	V
* 4.747	28.42	VA1T	34.3	-30.7	32.02	54	-21.98	-	-	360	199	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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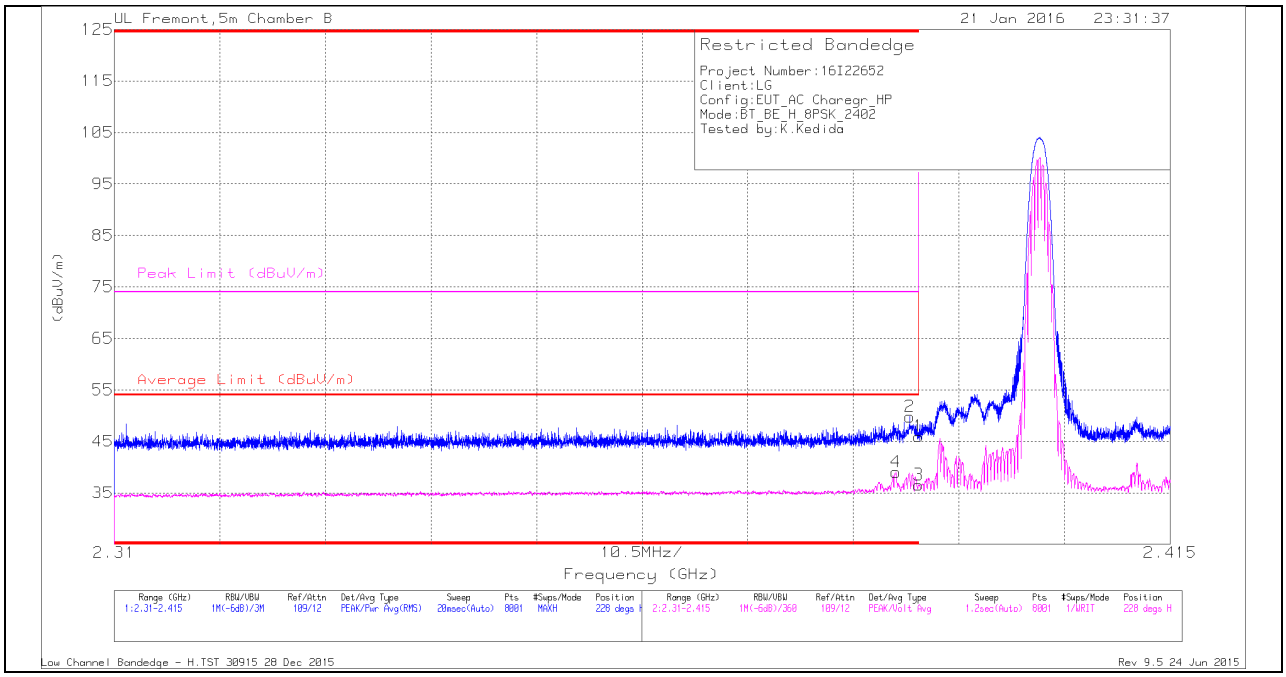
9.1.2. 8PSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.89	Pk	32	-21.9	45.99	-	-	74	-28.01	228	330	H
2	* 2.389	39.69	Pk	32	-21.9	49.79	-	-	74	-24.21	228	330	H
3	* 2.39	26.44	VA1T	32	-21.9	36.54	54	-17.46	-	-	228	330	H
4	* 2.388	28.94	VA1T	32	-21.9	39.04	54	-14.96	-	-	228	330	H

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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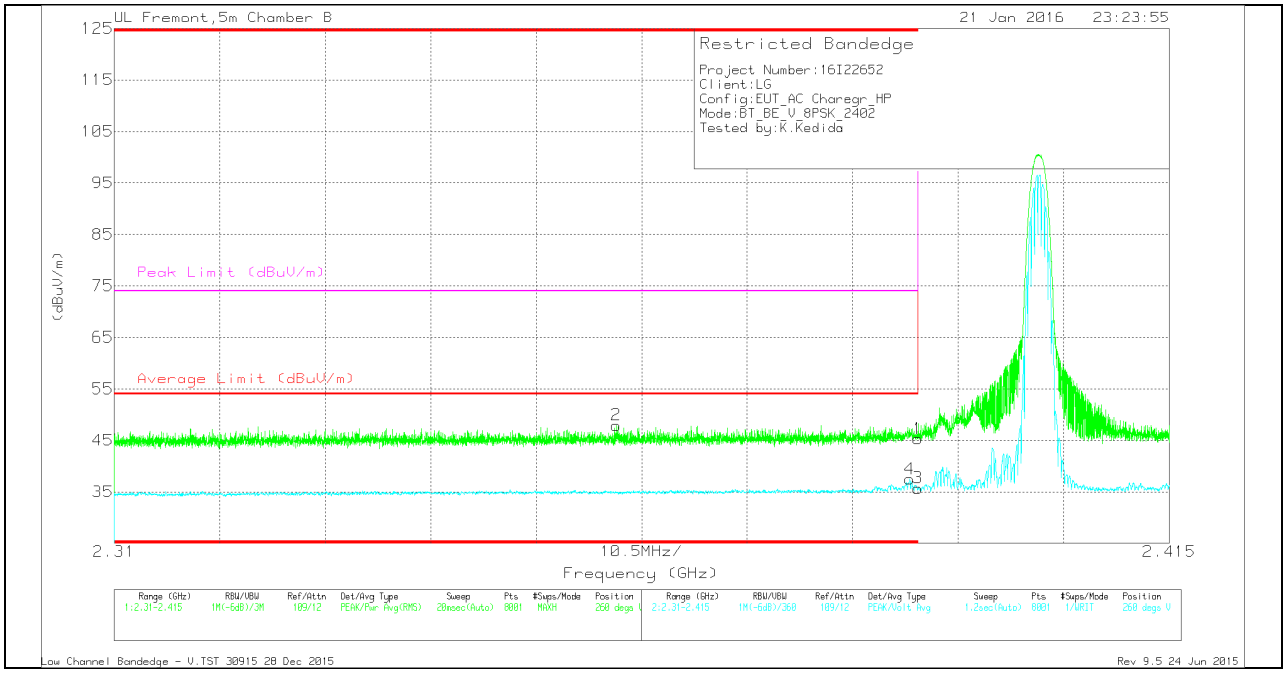
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.19	Pk	32	-21.9	45.29	-	-	74	-28.71	260	292	V
2	* 2.36	38.04	Pk	31.8	-21.9	47.94	-	-	74	-26.06	260	292	V
3	* 2.39	25.63	VA1T	32	-21.9	35.73	54	-18.27	-	-	260	292	V
4	* 2.389	27.38	VA1T	32	-21.9	37.48	54	-16.52	-	-	260	292	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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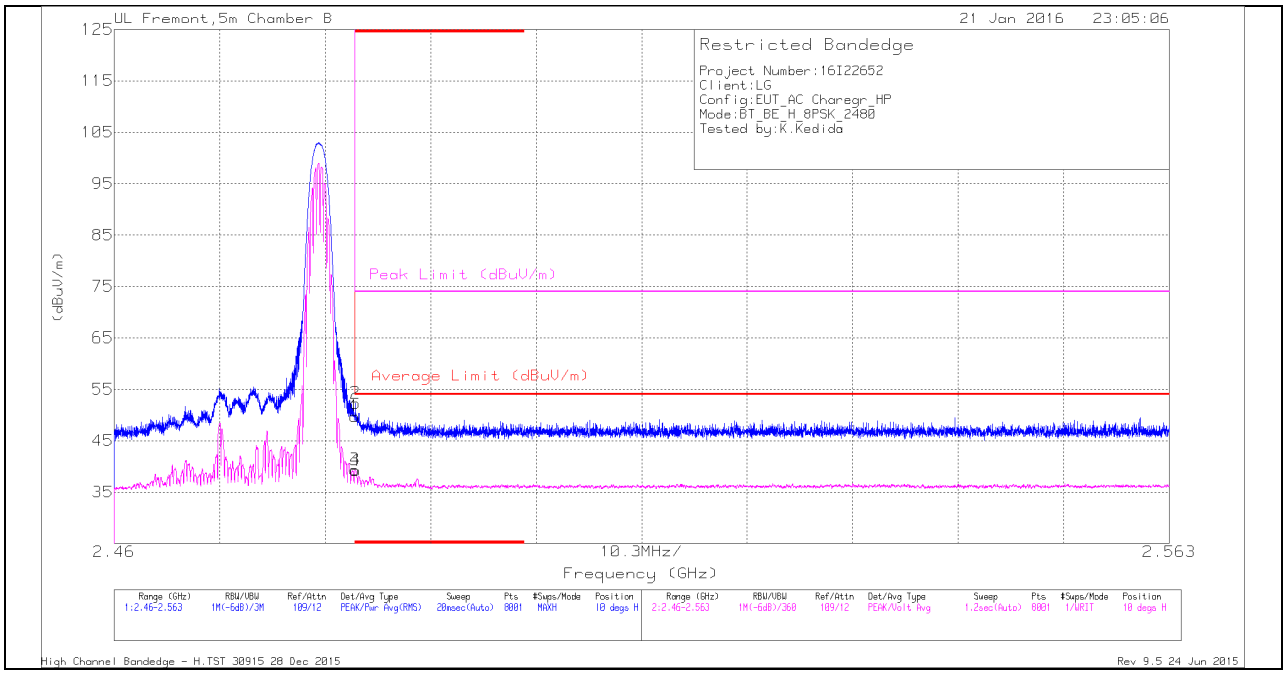
AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.08	Pk	32.5	-21.8	49.78	-	-	74	-24.22	10	205	H
2	* 2.484	41.61	Pk	32.5	-21.8	52.31	-	-	74	-21.69	10	205	H
3	* 2.484	28.67	VA1T	32.5	-21.8	39.37	54	-14.63	-	-	10	205	H
4	* 2.484	28.56	VA1T	32.5	-21.8	39.26	54	-14.74	-	-	10	205	H

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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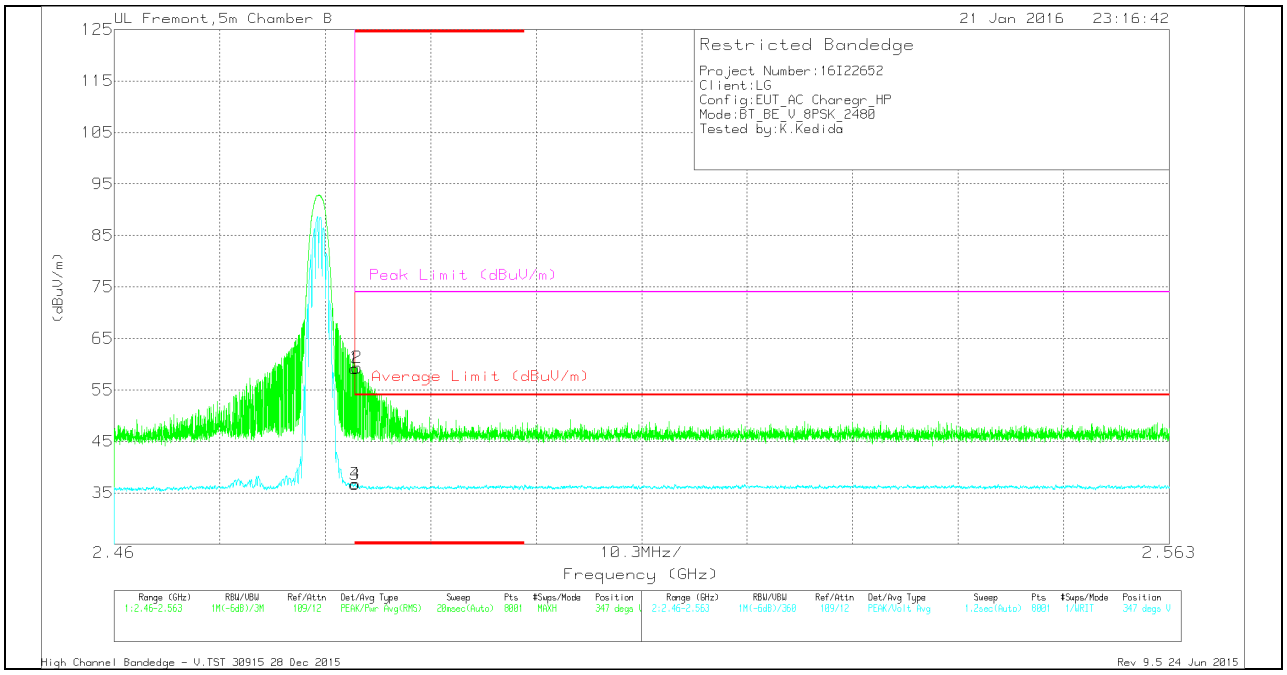
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	48.41	Pk	32.5	-21.8	59.11	-	-	74	-14.89	347	290	V
2	* 2.484	48.63	Pk	32.5	-21.8	59.33	-	-	74	-14.67	347	290	V
3	* 2.484	25.96	VA1T	32.5	-21.8	36.66	54	-17.34	-	-	347	290	V
4	* 2.484	26.05	VA1T	32.5	-21.8	36.75	54	-17.25	-	-	347	290	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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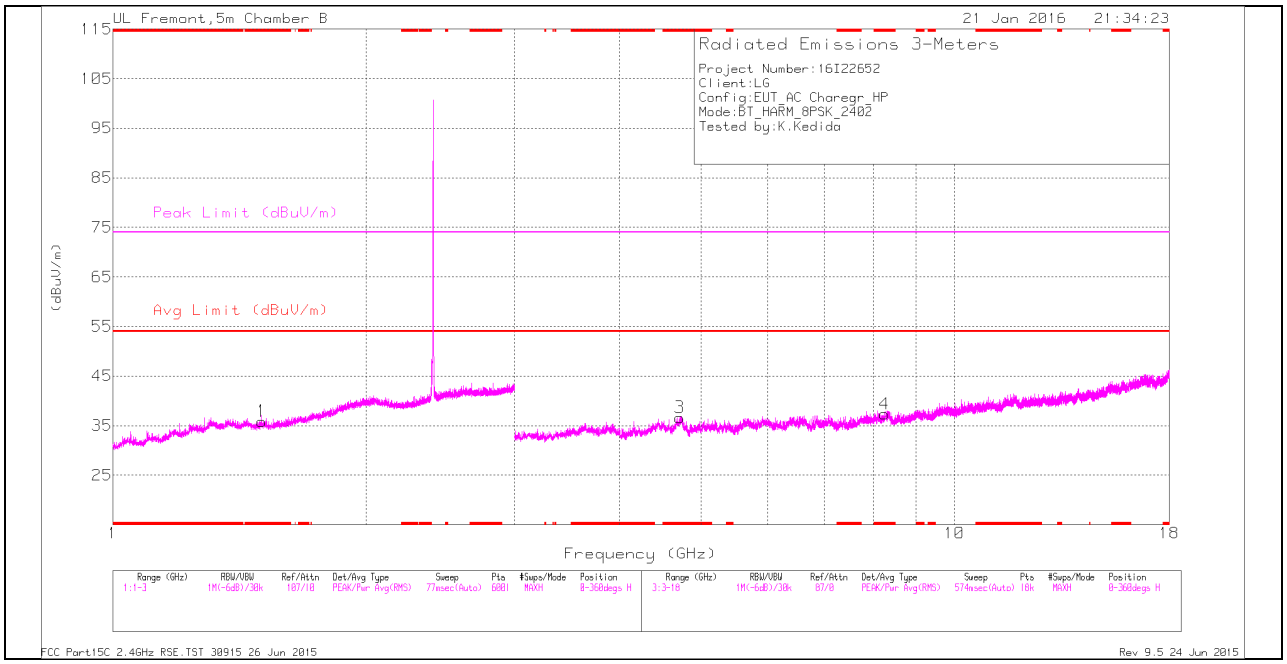
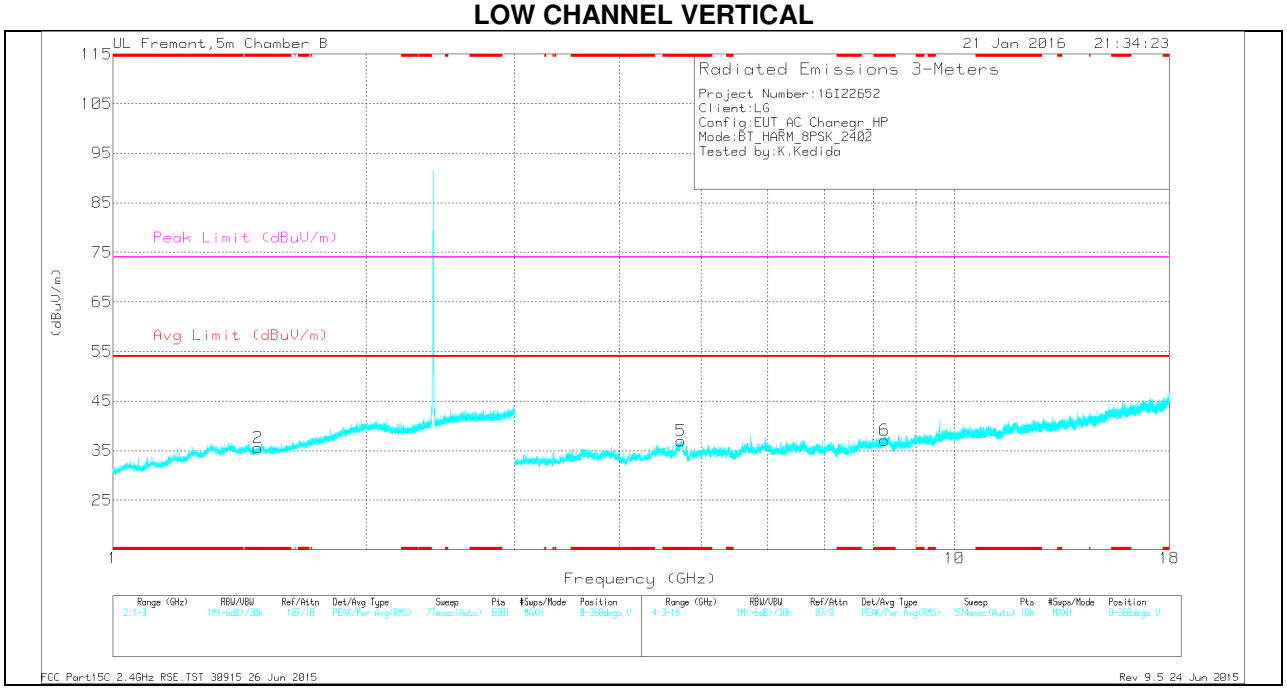
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



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

LOW CHANNEL VERTICAL



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

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LOW CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.502	29.29	Pk	28.6	-22	35.89	-	-	74	-38.11	0-360	101	H
2	* 1.486	28.95	Pk	28.7	-22.1	35.55	-	-	74	-38.45	0-360	199	V
3	* 4.717	33.55	Pk	34.2	-31.1	36.65	-	-	74	-37.35	0-360	101	H
4	* 8.261	29.92	Pk	35.7	-28.3	37.32	-	-	74	-36.68	0-360	101	H
5	* 4.729	33.41	Pk	34.3	-30.7	37.01	-	-	74	-36.99	0-360	101	V
6	* 8.256	29.87	Pk	35.7	-28.5	37.07	-	-	74	-36.93	0-360	200	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.503	36.83	PK2	28.6	-22	43.43	-	-	74	-30.57	359	101	H
* 1.501	23.64	VA1T	28.6	-22	30.24	54	-23.76	-	-	359	101	H
* 1.485	36.72	PK2	28.7	-22.1	43.32	-	-	74	-30.68	359	199	V
* 1.488	23.51	VA1T	28.7	-22.1	30.11	54	-23.89	-	-	359	199	V
* 4.717	41.38	PK2	34.2	-31	44.58	-	-	74	-29.42	359	102	H
* 4.719	28.82	VA1T	34.3	-31	32.12	54	-21.88	-	-	359	102	H
* 8.261	38.85	PK2	35.7	-28.2	46.35	-	-	74	-27.65	359	102	H
* 8.261	25.52	VA1T	35.7	-28.3	32.92	54	-21.08	-	-	359	102	H
* 4.729	41.87	PK2	34.3	-30.7	45.47	-	-	74	-28.53	359	102	V
* 4.729	28.84	VA1T	34.3	-30.7	32.44	54	-21.56	-	-	359	102	V
* 8.254	38.39	PK2	35.7	-28.5	45.59	-	-	74	-28.41	359	199	V
* 8.257	25.21	VA1T	35.7	-28.4	32.51	54	-21.49	-	-	359	199	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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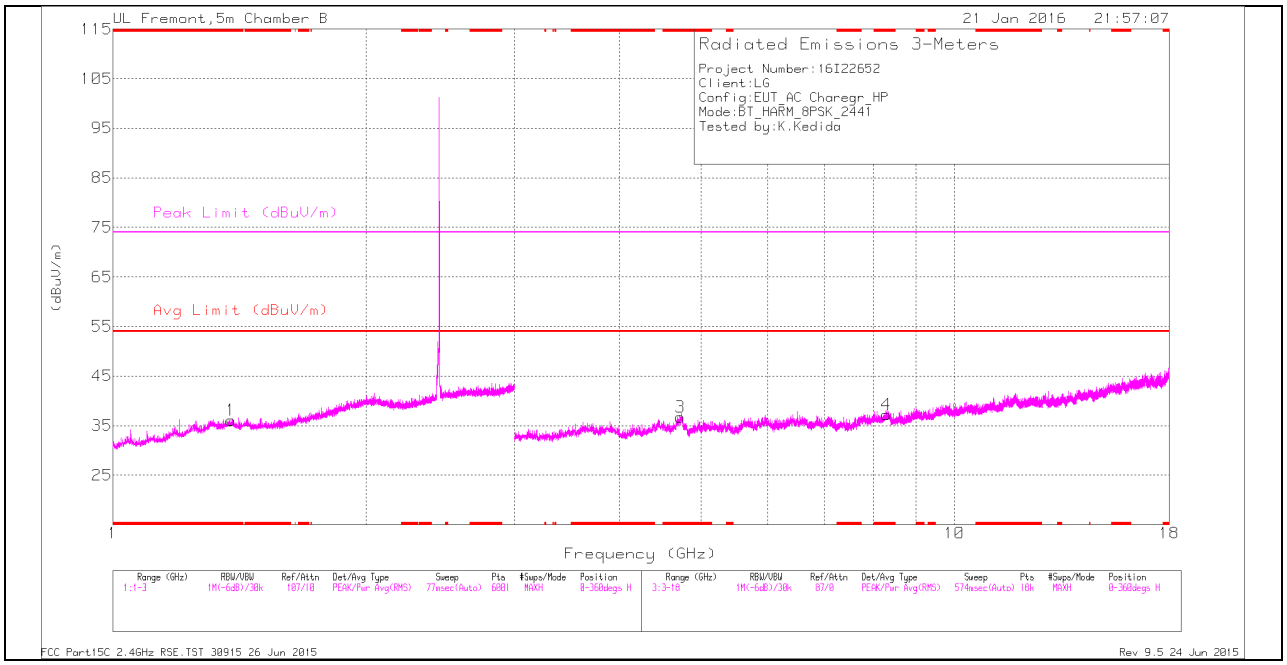
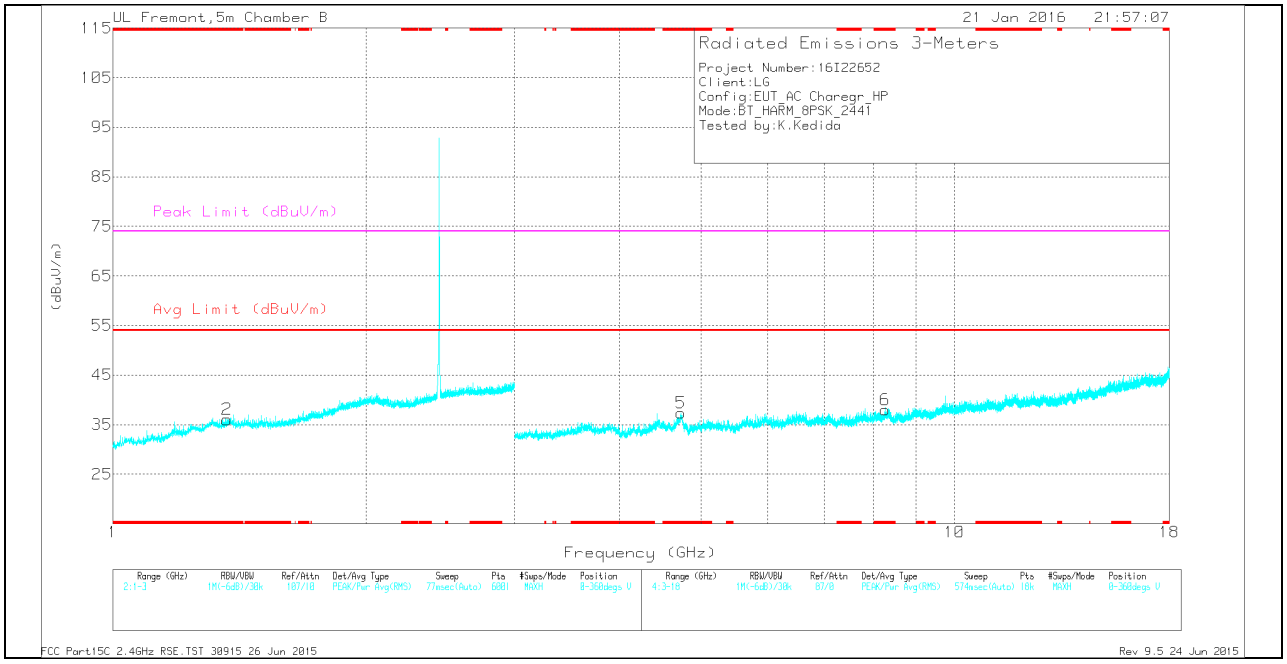
MID CHANNEL HORIZONTAL



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

MID CHANNEL VERTICAL



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

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MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.382	28.84	Pk	29.4	-22.2	36.04	-	-	74	-37.96	0-360	101	H
2	* 1.366	28.92	Pk	29.4	-22.3	36.02	-	-	74	-37.98	0-360	101	V
3	* 4.725	33.19	Pk	34.3	-30.8	36.69	-	-	74	-37.31	0-360	200	H
4	* 8.301	29.25	Pk	35.7	-27.7	37.25	-	-	74	-36.75	0-360	101	H
5	* 4.732	33.75	Pk	34.3	-30.7	37.35	-	-	74	-36.65	0-360	200	V
6	* 8.271	30.16	Pk	35.7	-27.9	37.96	-	-	74	-36.04	0-360	200	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.381	37.65	PK2	29.4	-22.3	44.75	-	-	74	-29.25	360	101	H
* 1.381	23.93	VA1T	29.4	-22.3	31.03	54	-22.97	-	-	360	101	H
* 1.366	36.97	PK2	29.4	-22.3	44.07	-	-	74	-29.93	360	101	V
* 1.367	23.8	VA1T	29.4	-22.3	30.9	54	-23.1	-	-	360	101	V
* 8.3	37.62	PK2	35.7	-27.6	45.72	-	-	74	-28.28	360	103	H
* 8.301	24.75	VA1T	35.7	-27.7	32.75	54	-21.25	-	-	360	103	H
* 4.733	41.57	PK2	34.3	-30.7	45.17	-	-	74	-28.83	360	200	V
* 4.732	28.61	VA1T	34.3	-30.7	32.21	54	-21.79	-	-	360	200	V
* 8.271	37.66	PK2	35.7	-27.9	45.46	-	-	74	-28.54	360	200	V
* 8.271	25.08	VA1T	35.7	-27.9	32.88	54	-21.12	-	-	360	200	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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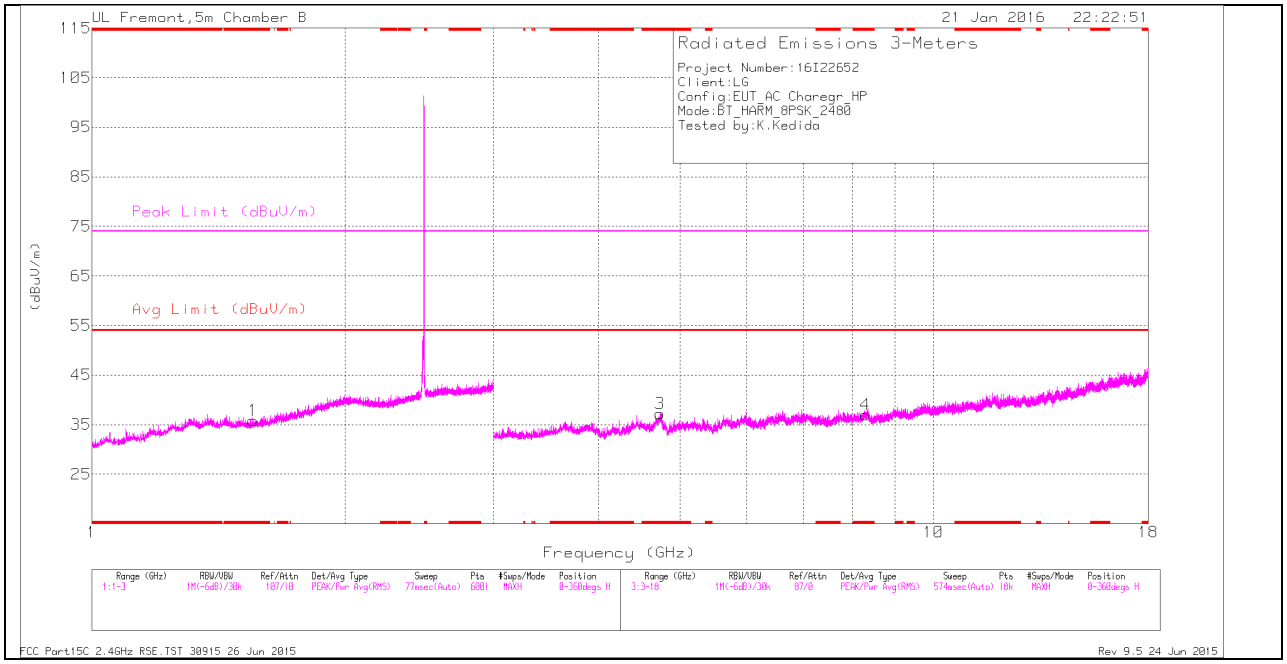
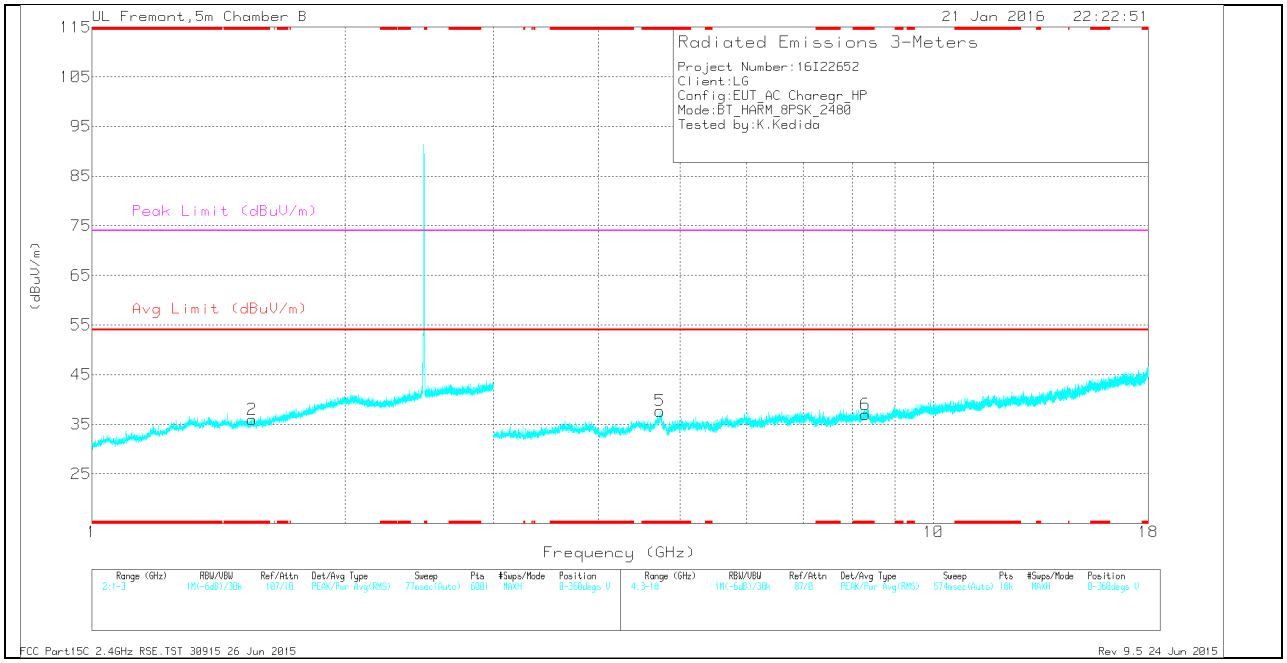
HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL VERTICAL



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

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HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.554	29.12	Pk	28.7	-22	35.82	-	-	74	-38.18	0-360	200	H
2	* 1.55	29.27	Pk	28.7	-22	35.97	-	-	74	-38.03	0-360	102	V
3	* 4.732	33.57	Pk	34.3	-30.7	37.17	-	-	74	-36.83	0-360	199	H
4	* 8.301	28.89	Pk	35.7	-27.6	36.99	-	-	74	-37.01	0-360	199	H
5	* 4.732	34.07	Pk	34.3	-30.7	37.67	-	-	74	-36.33	0-360	199	V
6	* 8.304	29	Pk	35.7	-27.7	37	-	-	74	-37	0-360	199	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.553	37.6	PK2	28.7	-22	44.3	-	-	74	-29.7	360	200	H
* 1.555	23.57	VA1T	28.7	-22	30.27	54	-23.73	-	-	360	200	H
* 1.551	37.43	PK2	28.7	-22	44.13	-	-	74	-29.87	360	103	V
* 1.55	24.1	VA1T	28.7	-22	30.8	54	-23.2	-	-	360	103	V
* 4.733	41.56	PK2	34.3	-30.7	45.16	-	-	74	-28.84	360	199	H
* 4.732	28.79	VA1T	34.3	-30.7	32.39	54	-21.61	-	-	360	199	H
* 8.301	37.97	PK2	35.7	-27.6	46.07	-	-	74	-27.93	360	199	H
* 8.3	24.87	VA1T	35.7	-27.6	32.97	54	-21.03	-	-	360	199	H
* 4.733	41.19	PK2	34.3	-30.7	44.79	-	-	74	-29.21	360	199	V
* 4.732	28.73	VA1T	34.3	-30.7	32.33	54	-21.67	-	-	360	199	V
* 8.303	37.55	PK2	35.7	-27.7	45.55	-	-	74	-28.45	360	199	V
* 8.304	24.79	VA1T	35.7	-27.7	32.79	54	-21.21	-	-	360	199	V

* - indicates frequency in 47 CFR §15.205/IC RSS-GEN §8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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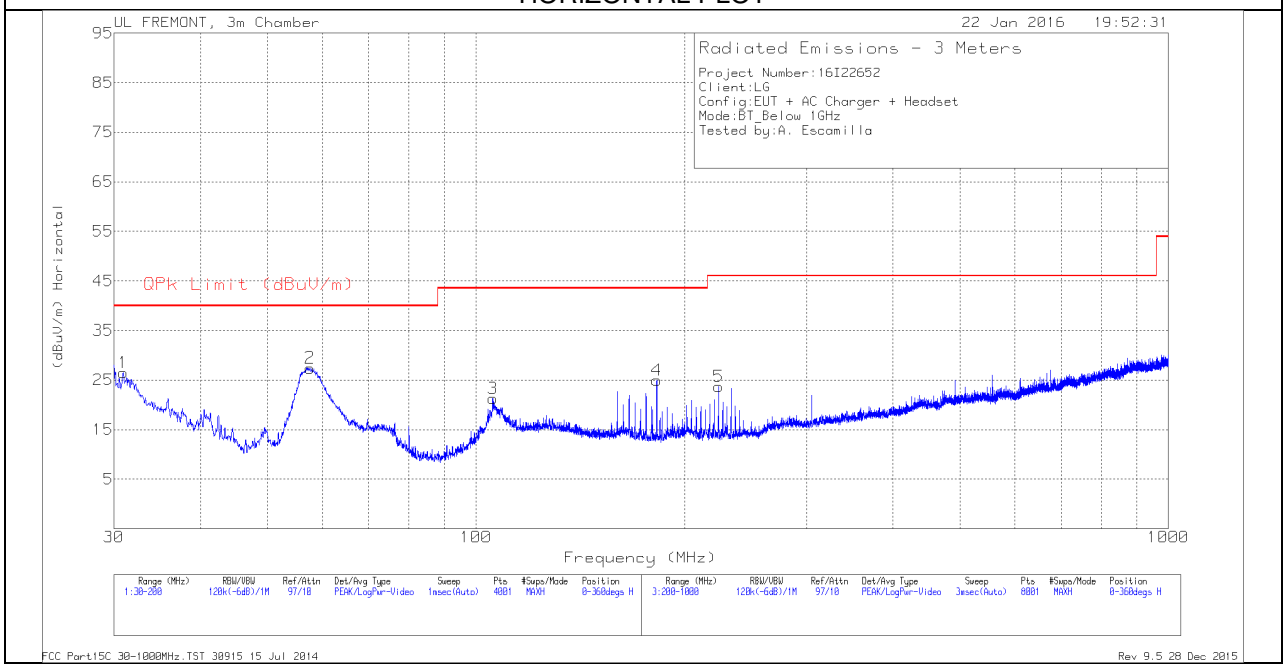
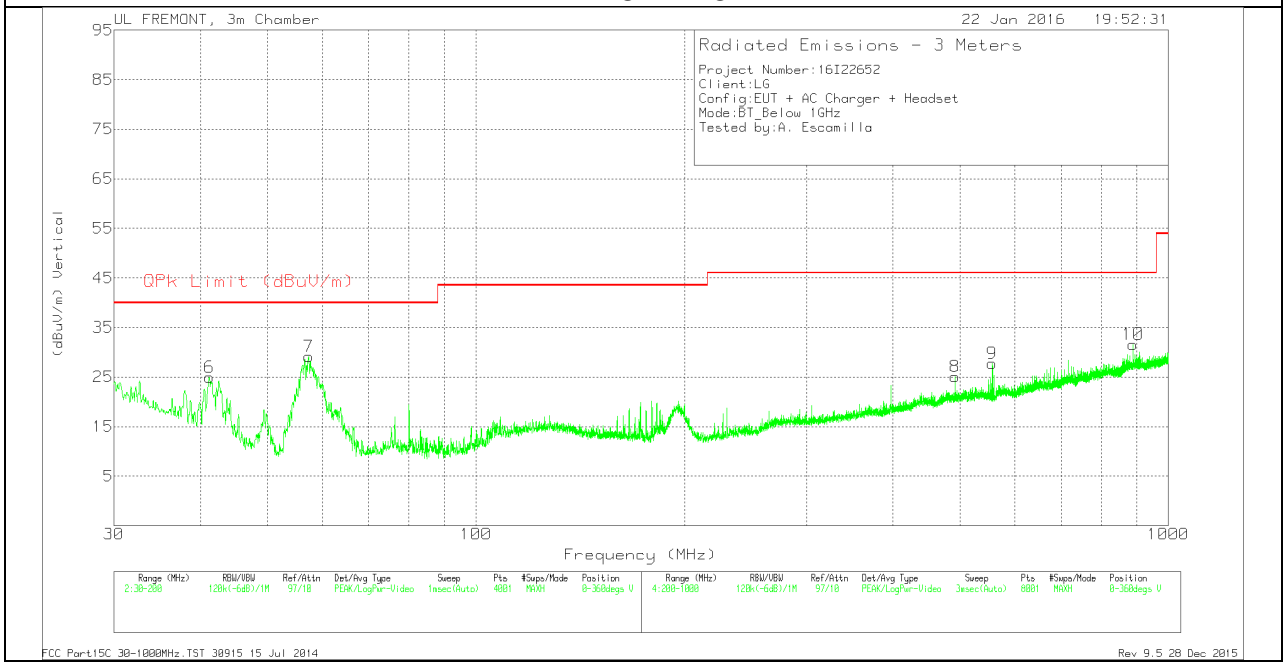
9.2. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



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BELOW 1 GHz TABLE

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	30.935	32.72	Pk	21	-27.2	26.52	40	-13.48	0-360	100	H
6	41.1775	38.51	Pk	13.4	-27	24.91	40	-15.09	0-360	100	V
7	57.3275	48.92	Pk	7.1	-26.9	29.12	40	-10.88	0-360	100	V
2	57.5825	47.14	Pk	7.2	-26.9	27.44	40	-12.56	0-360	400	H
3	105.735	36.52	Pk	11.1	-26.3	21.32	43.52	-22.2	0-360	200	H
4	182.405	39.33	Pk	11	-25.4	24.93	43.52	-18.59	0-360	100	H
5	224	37.9	Pk	10.7	-24.9	23.7	46.02	-22.32	0-360	100	H
8	492	32.72	Pk	17.4	-25	25.12	46.02	-20.9	0-360	100	V
9	556	35.14	Pk	17.5	-24.9	27.74	46.02	-18.28	0-360	100	V
10	888.9	32.33	Pk	22.1	-22.8	31.63	46.02	-14.39	0-360	100	V

Pk - Peak detector

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