



**FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8
CLASS II PERMISSIVE CHANGE
CERTIFICATION TEST REPORT**

BLUETOOTH LOW ENERGY

FOR

TABLET DEVICE

MODEL NUMBER: A1622, A1623

FCC ID: BCGA1489

IC: 579C-A1489

REPORT NUMBER: 14U18979-E7, VERSION C

ISSUE DATE: FEBRUARY 10, 2015

Prepared for

APPLE, INC.

1 INFINITE LOOP

CUPERTINO, CA 95014, U.S.A.

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	01/26/2015	Initial Issue	M.Mekuria
B	02/05/2015	Revised report per TCB's questions	C. Pang
C	02/10/2015	Revised Section 5.6 to address TCB's question	T. Chu

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. DESCRIPTION OF MODELS DIFFERENCES.....	7
5.3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE	7
5.4. DESCRIPTION OF AVAILABLE ANTENNAS	7
5.5. SOFTWARE AND FIRMWARE	7
5.6. WORST-CASE CONFIGURATION AND MODE.....	7
5.7. DESCRIPTION OF TEST SETUP.....	8
6. TEST AND MEASUREMENT EQUIPMENT	12
7. MEASUREMENT METHODS.....	13
8. DUTY CYCLE.....	14
9. ANTENNA PORT TEST RESULTS	15
10. RADIATED TEST RESULTS.....	16
10.1. TRANSMITTER ABOVE 1 GHz.....	17
10.1.1. MODEL: A1622.....	17
10.1.2. MODEL: A1623.....	27
10.2. WORST-CASE BELOW 1 GHz	37
10.2.1. MODEL: A1622.....	37
10.2.2. MODEL: A1623.....	39
10.3. WORST-CASE ABOVE 18 GHz	41
10.3.1. MODEL: A1622.....	41
10.3.2. MODEL: A1623.....	42
11. AC POWER LINE CONDUCTED EMISSIONS	43
11.1. MODEL: A1622.....	44
11.2. MODEL: A1623.....	47
12. SETUP PHOTOS	54

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: TABLET DEVICE

MODEL: A1622, A1623

SERIAL NUMBER: F4KNN01FGDKQ (A1622) & F4KNN00LGDKQ (A1623)

DATE TESTED: JANUARY 7 - JANUARY 25, 2015

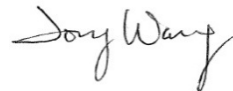
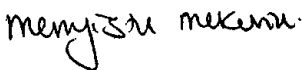
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 4	Pass

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 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 any government.

Approved & Released For
UL Verification Services Inc. By:

Tested By:



MENGISTU MEKURIA
SENIOR ENGINEER
UL VERIFICATION SERVICES INC.

TONY WANG
EMC ENGINEER
UL VERIFICATION SERVICES INC.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 4, and RSS-210 Issue 8.

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

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.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:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.52 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.94 dB
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Models A1622 and A1623 are tablet display accessories with IEEE 802.11a/b/g/n (SISO 1x1) and Bluetooth radios.

5.2. DESCRIPTION OF MODELS DIFFERENCES

EUT MODEL	Description
A1622	This is a portable device. It has additional internal battery packs and has a steel/rubber back cover.
A1623	This is a Non-portable device that does not have additional battery packs and has adhesives on bottom side of unit to adhere to a table surface.

5.3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

To add Models A1622 and A1623 to original Model A1489 grant (FCC ID: BCGA1489, IC: 579C-A1489).

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an IFA antenna, with a maximum gain as below table:

Frequency (MHz)	Antenna Peak Gain
2400 – 2480	0.812

5.5. SOFTWARE AND FIRMWARE

The software used in the EUT during Bluetooth BLE testing was version 12.3.748.1192.

5.6. WORST-CASE CONFIGURATION AND MODE

Radiated emissions and AC power line conducted emissions were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The watch is only used in the AC power line and receiver tests, not in the WLAN/BT transmitter testing.

Since the Model A1623 is a desktop device, the fundamental of the EUT was investigated in three orthogonal orientations X, Y, Z only on Model A1622 that is a portable device. Based on the baseline scan it was determined that Z orientation (Portrait) was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation (Portrait).

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	Latitude 3640	D49G802	DoC
Laptop Adapter	Dell	HA65NM130	CN-06TFFF-75661-426-03PG-A00	DoC
AC Adapter	Apple	MD836LL/A	N/A	N/A
AC Adapter	Apple	MD506LL/A	N/A	N/A
AC Adapter	Apple	MD592LL/A	N/A	N/A
Watch	Apple	A1638	FGNJ02AFY2F	BCG-E2871

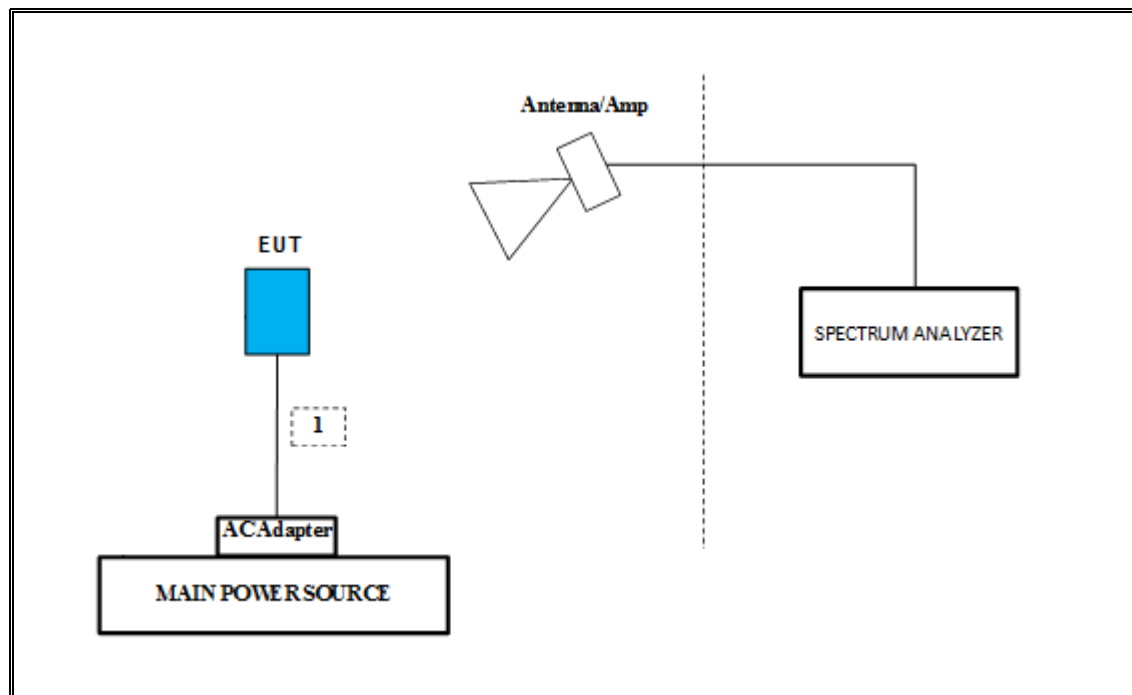
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	DC	1	DC	Un-shielded	2.0m	N/A
2	AC	1	AC	Un-shielded	2.0m	N/A
3	DC	1	DC	Un-shielded	1.0m	Custom Lightning Cable # LA0645649-1H

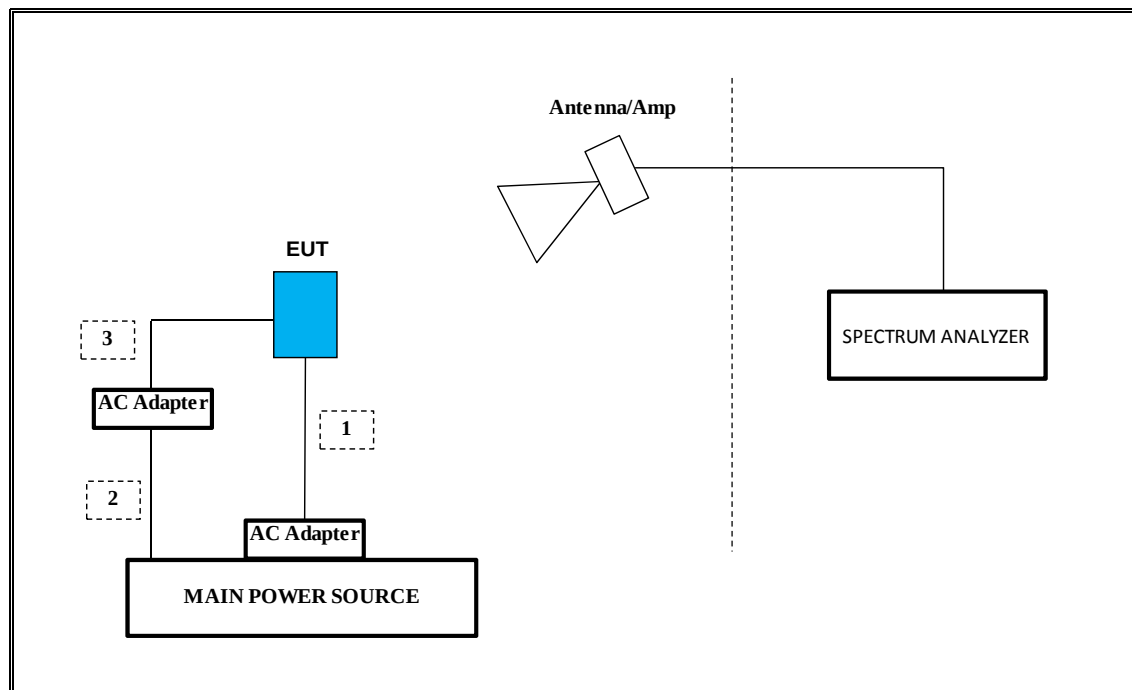
SETUP DIAGRAM – BELOW 1G RADIATED

The EUT is powered by AC/DC adapter. It is only connected to the support laptop computer to make any parameter change.

MODEL: A1622

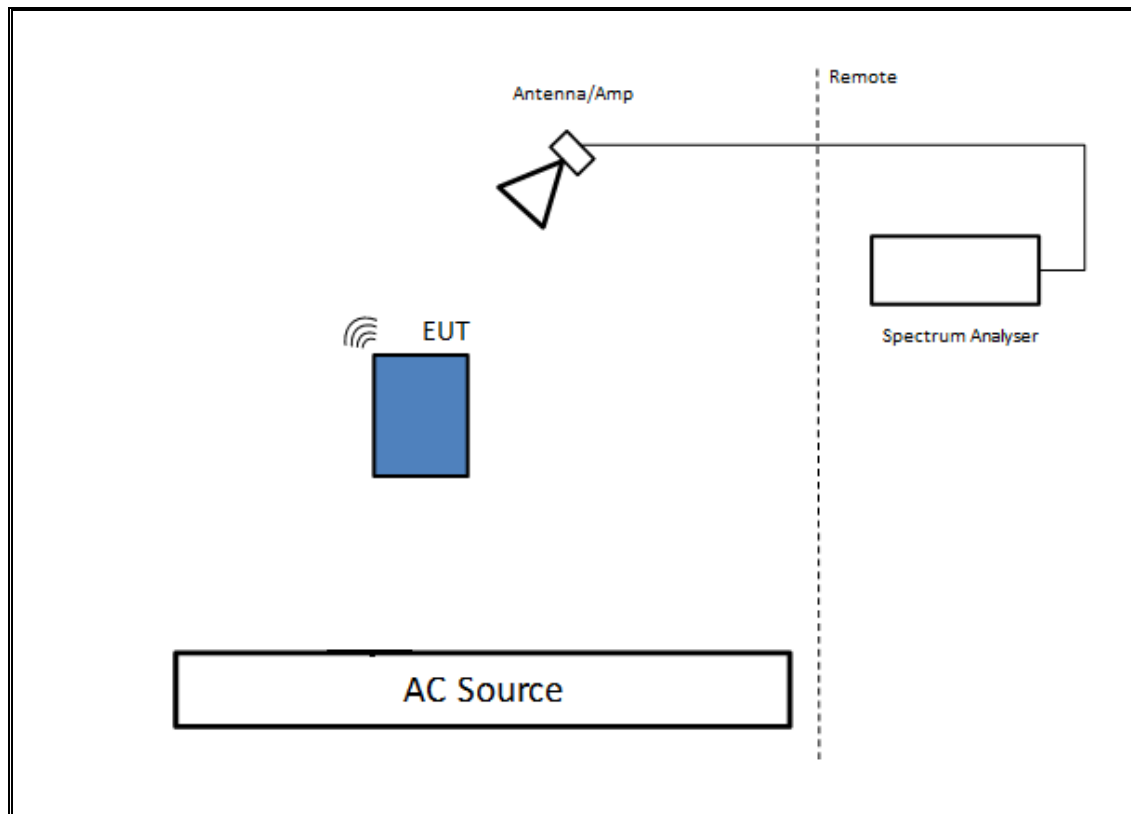


MODEL: A1623



SETUP DIAGRAM – ABOVE 1G RADIATED TEST

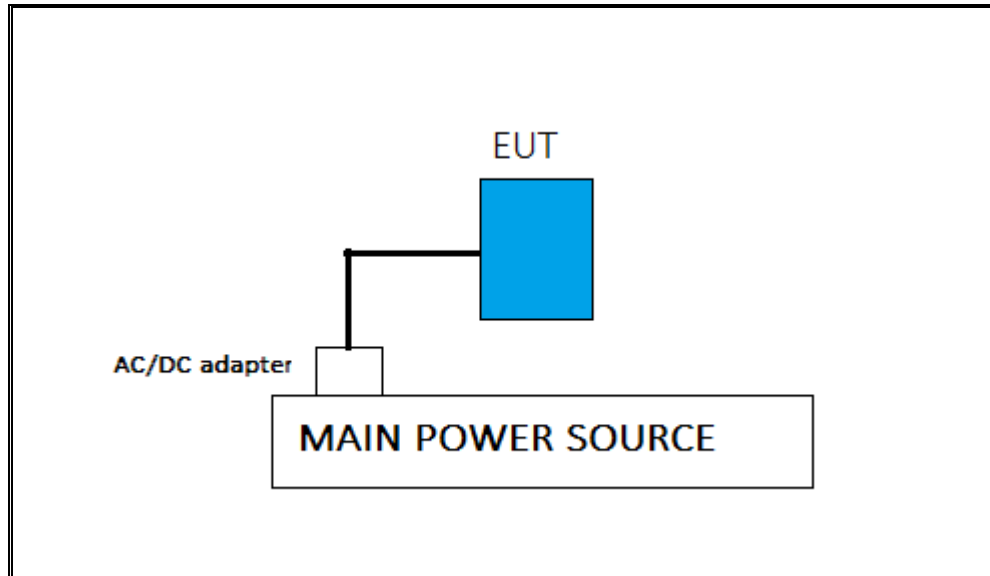
The EUT is a stand-alone unit. It is only connected to the support laptop computer to make any parameter change.



SETUP DIAGRAM – AC LINE EMISSION TESTS

The EUT is powered by AC/DC adapter. It is only connected to the support laptop computer to make any parameter change.

AC/DC ADAPTER MODEL NUMBER: MD506LL/A, MD836LL/A OR MD592LL/A



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	Serial Number	Cal Due
Antenna, Horn 1-18GHz	ETS Lindgren	3117	00165318	4/14/2015
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	A051314-2	4/27/2015
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	1818464	6/5/2015
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	325118	6/5/2015
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	MY53311010	5/17/2015
Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum	Agilent	8449B	3008A04710	3/25/2015
Antenna, Horn 18 to 26.5GHz	ARA	SWH-28	1007	5/9/2015
Spectrum Analyzer, 40 GHz	Agilent	8564E	3943A01643	8/6/2015

7. MEASUREMENT METHODS

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r02, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r02, Section 12.1.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r02, Section 12.2.

8. DUTY CYCLE

LIMITS

None; for reporting purposes only.

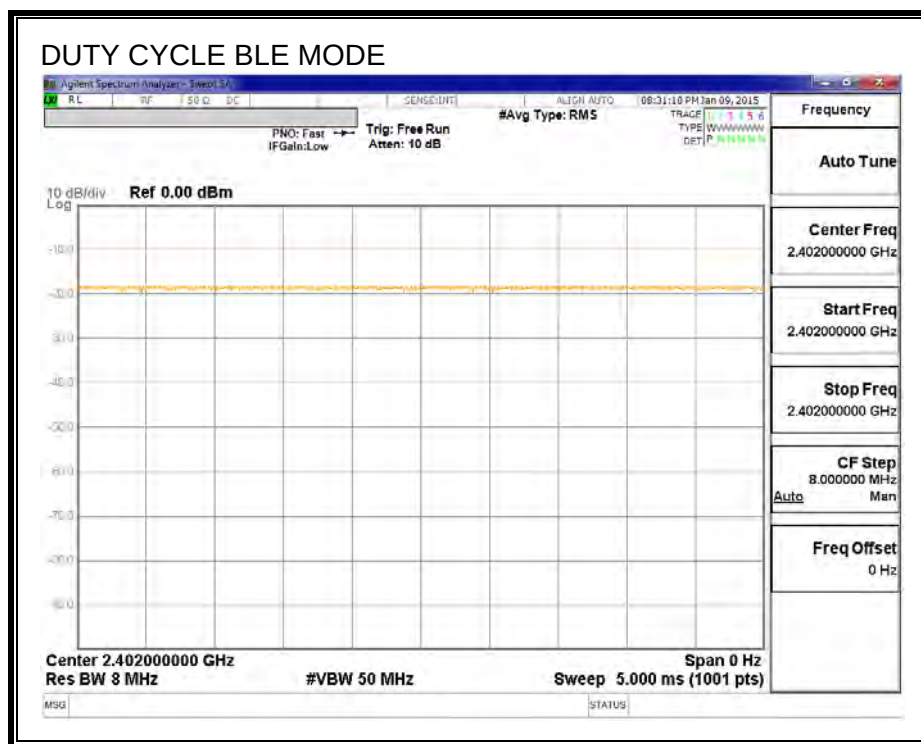
PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
BLE	1.000	1.000	1.000	100.00%	0.00	0.010

DUTY CYCLE PLOTS



9. ANTENNA PORT TEST RESULTS

For all antenna port results, refer the WLAN test report that has done by UL Verification Services INC. The report is 13U15668-4, FCC ID: BCGA1489, IC: 579C-A1489.

10. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.5 (Transmitter)

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. The antenna to EUT distance is 3 meters.

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

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

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

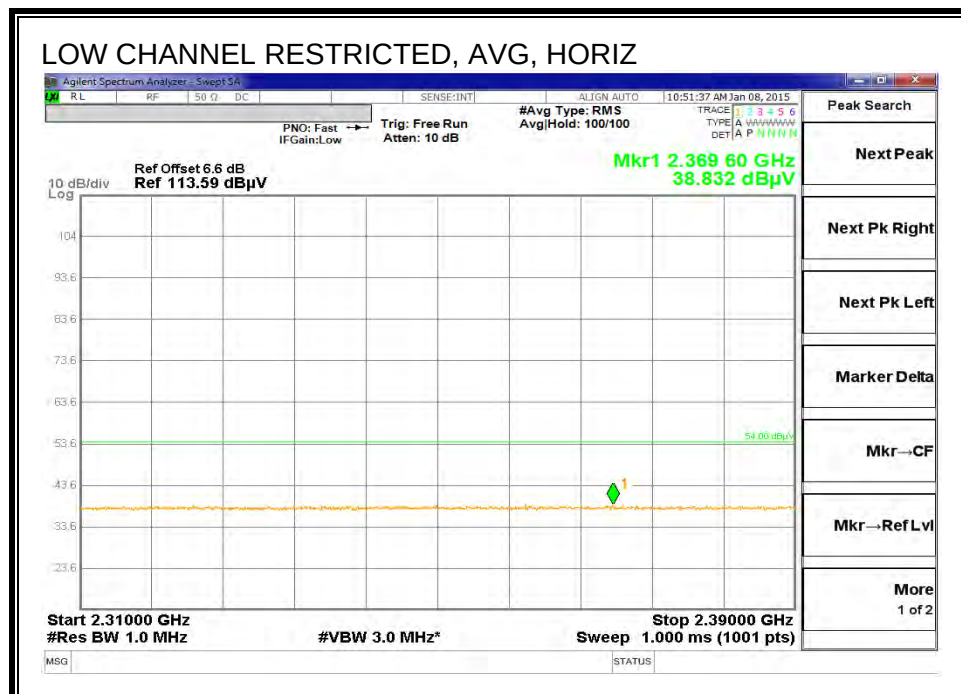
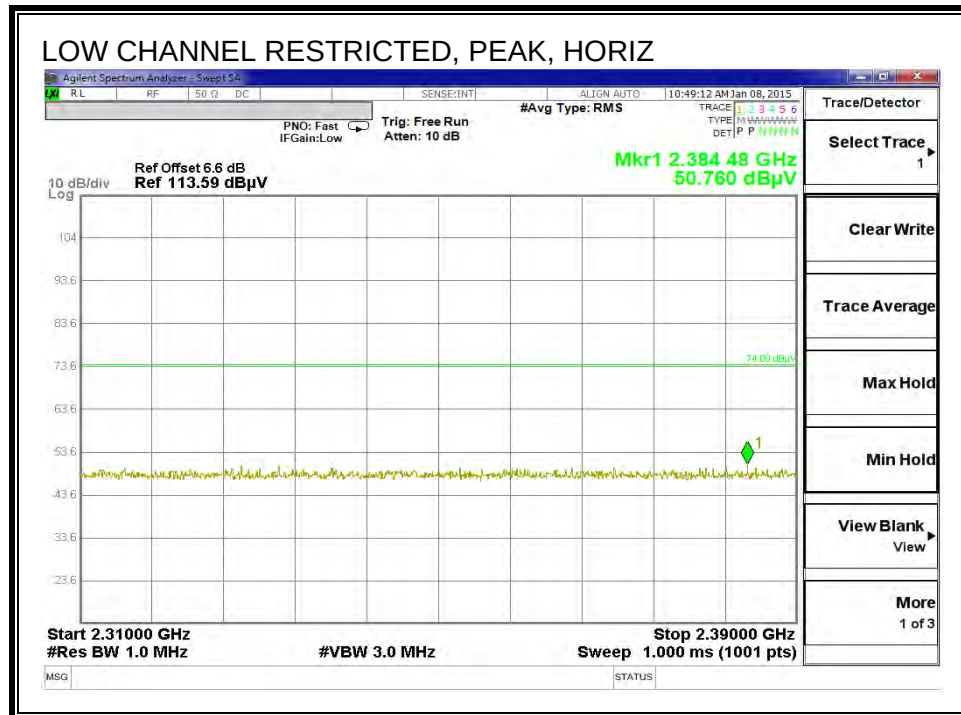
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

1TX mode indicates that only one antenna is transmitting.

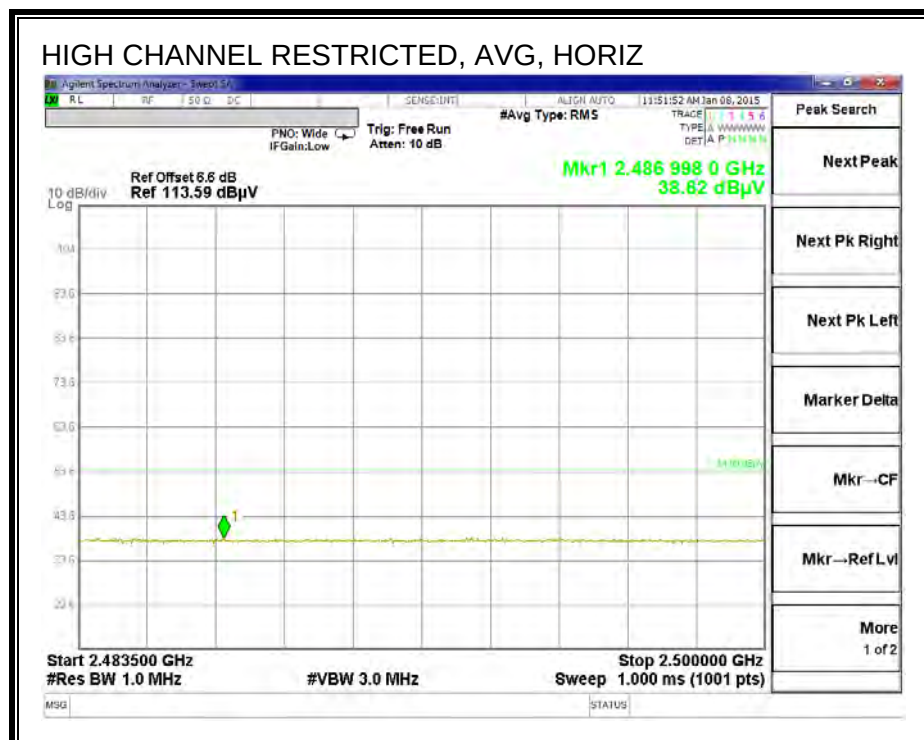
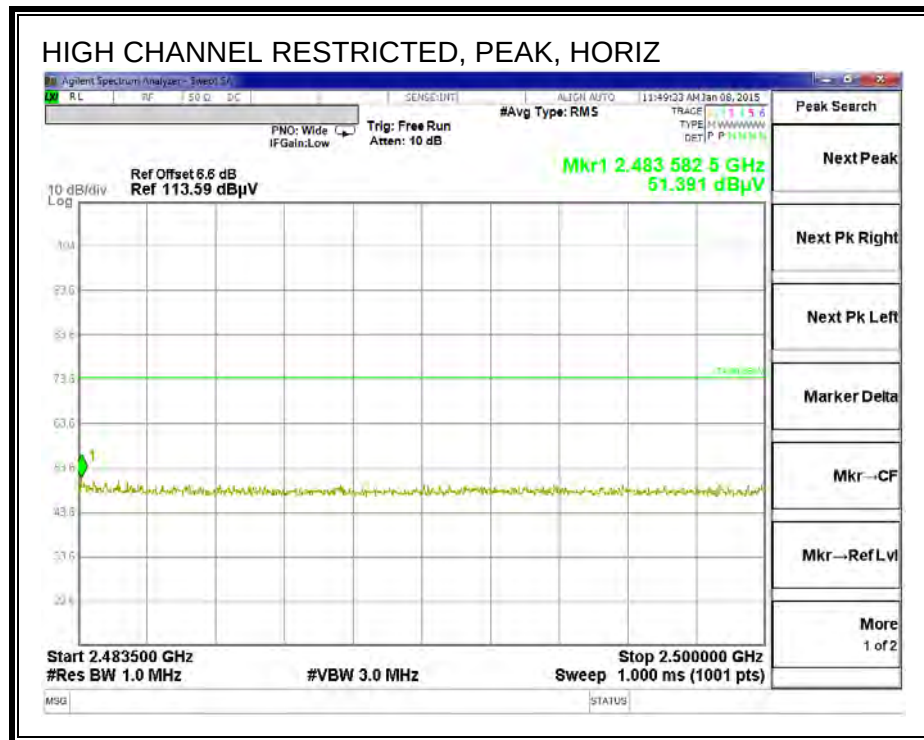
10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. MODEL: A1622

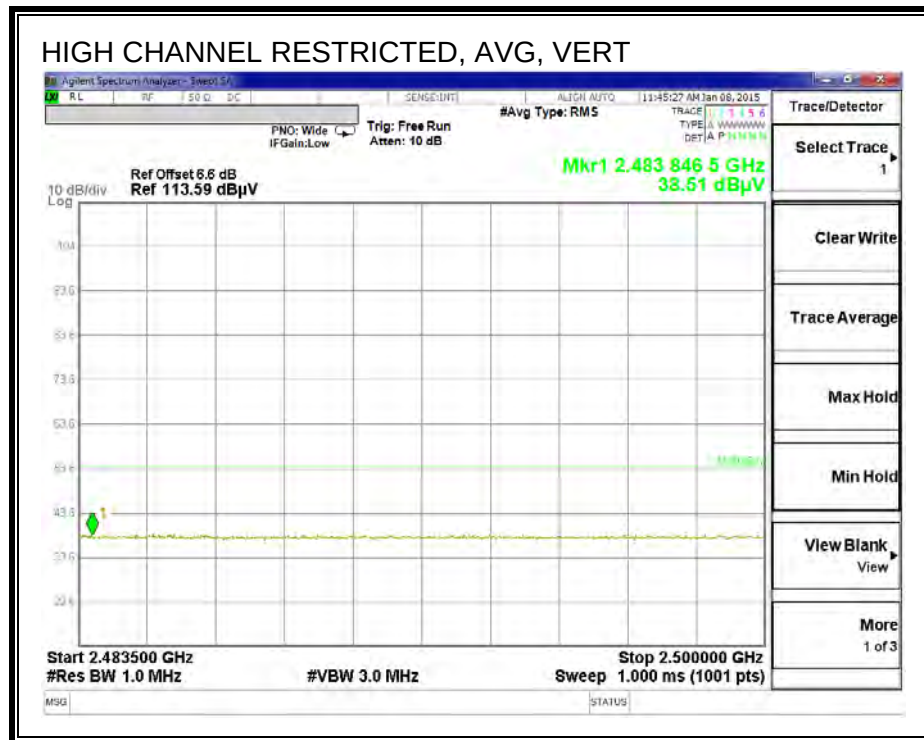
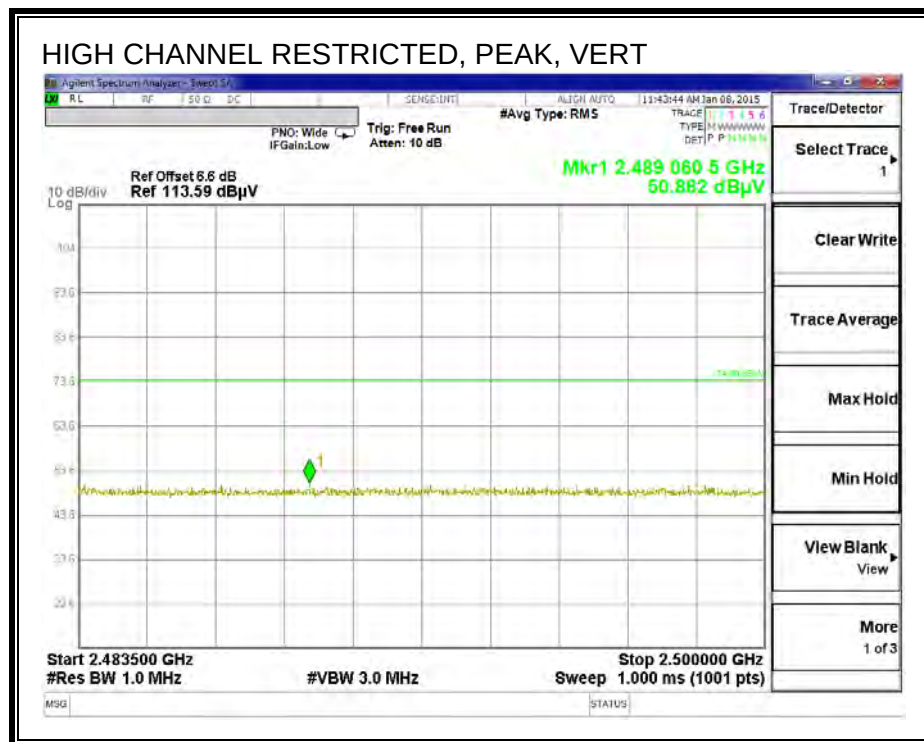
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

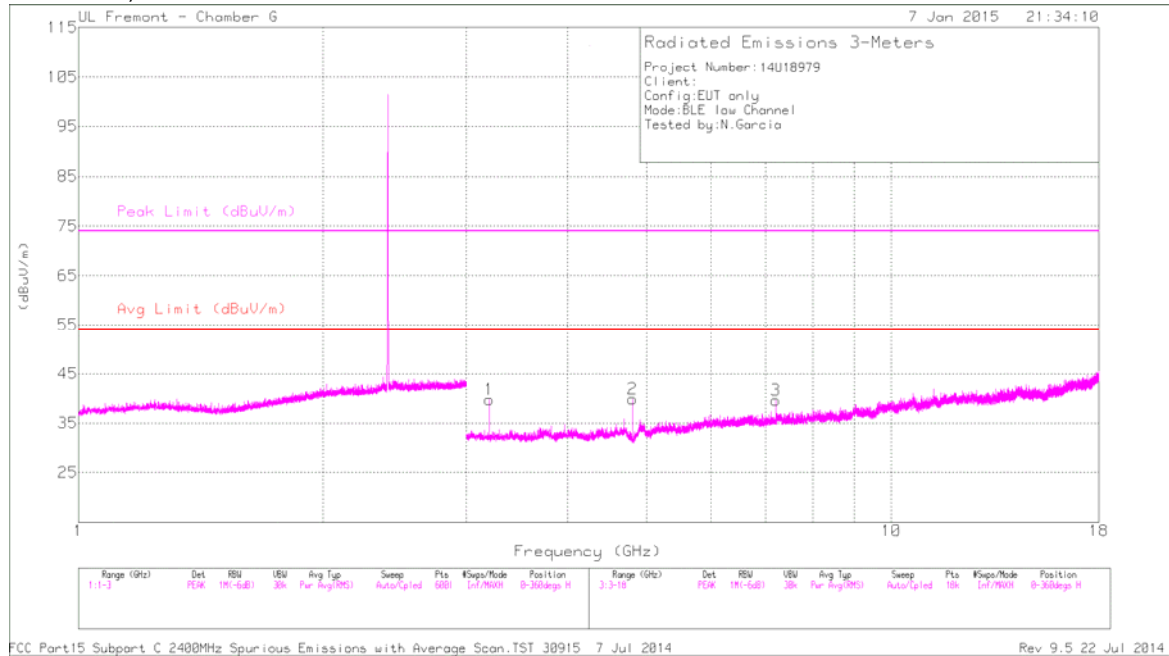


RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

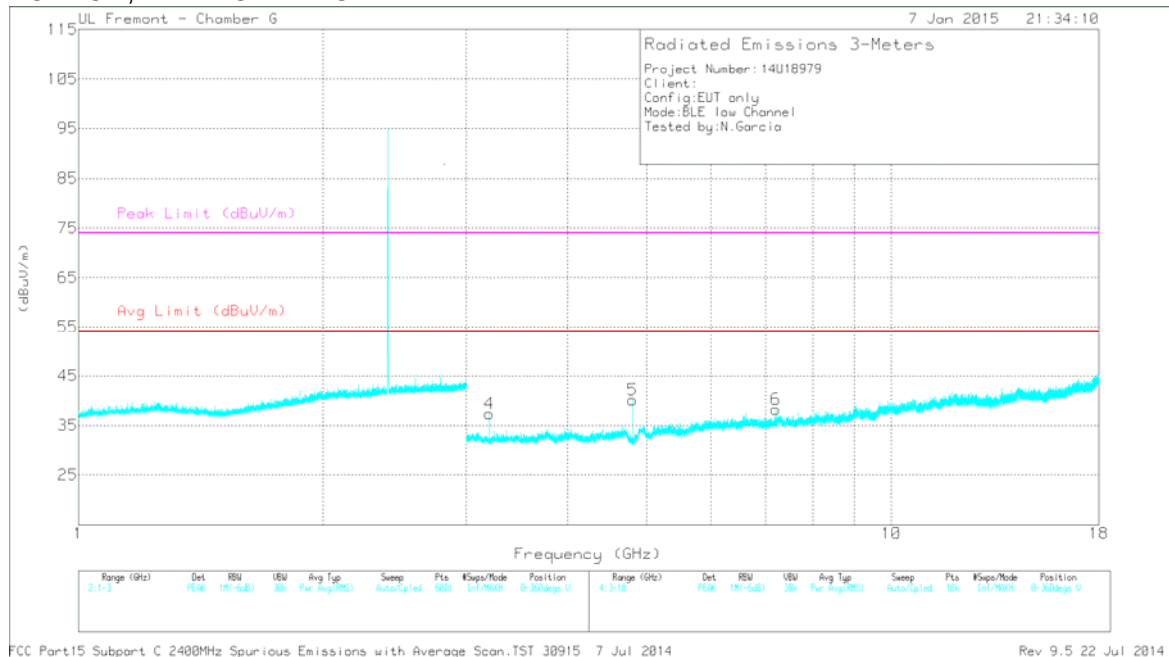


LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CH, HORIZONTAL PLOT



LOW CH, VERTICAL PLOT

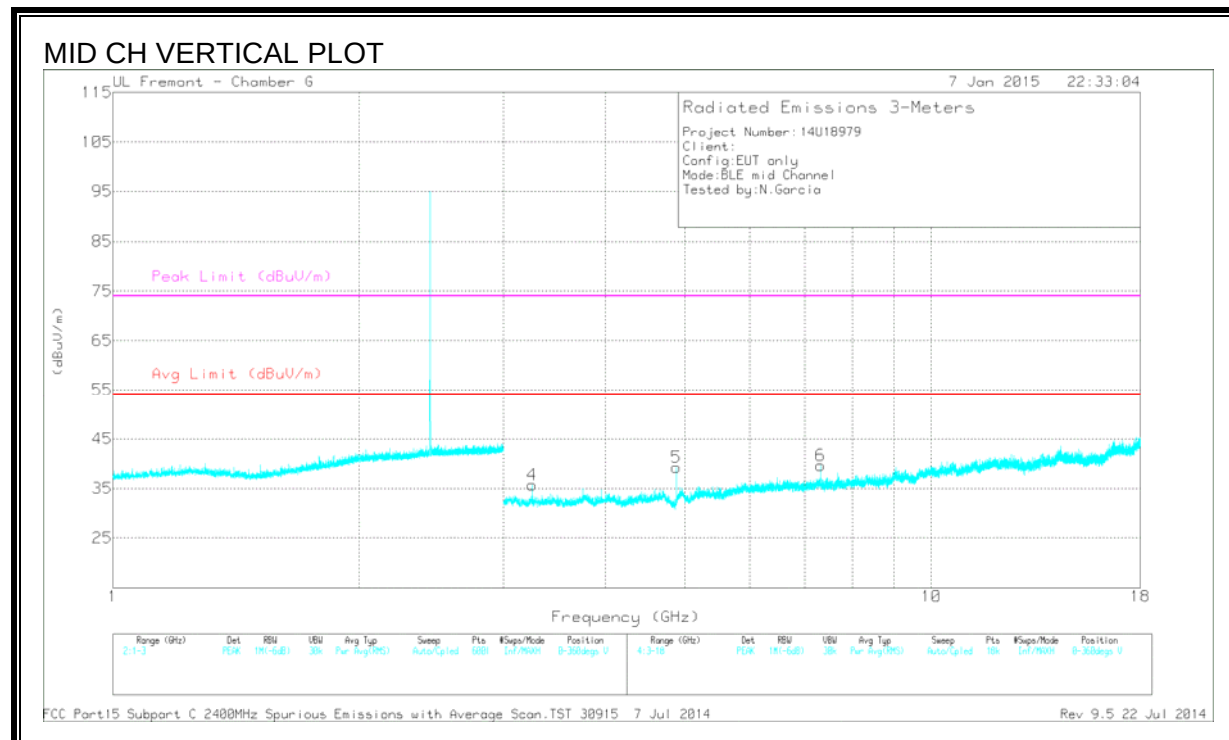
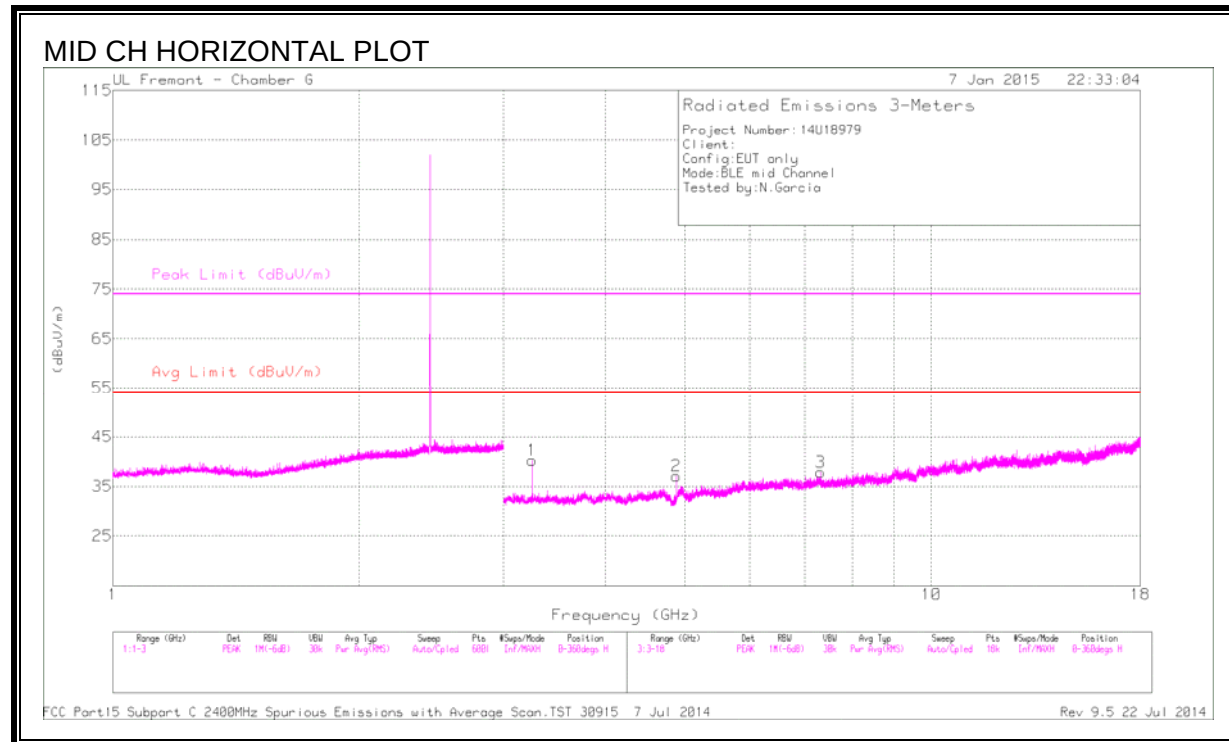


DATA

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (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
1	3.203	46.52	PK2	32.9	-34	45.42	-	-	-	-	327	101	H
2	* 4.804	47.10	PK2	34.1	-33.2	48.00	-	-	74	-26.00	334	182	H
	* 4.804	40.66	MAV1	34.1	-33.2	41.56	54	-12.44	-	-	334	182	H
3	7.206	42.92	PK2	35.6	-31.1	47.42	-	-	-	-	299	132	H
4	3.203	45.20	PK2	32.9	-34.0	44.10	-	-	-	-	319	236	V
5	* 4.804	47.68	PK2	34.1	-33.2	48.58	-	-	74	-25.42	285	213	V
	* 4.804	40.73	MAV1	34.1	-33.2	41.63	54	-12.37	-	-	285	213	V
6	7.206	44.94	PK2	35.6	-31.1	49.44	-	-	-	-	341	240	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAV1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS



DATA

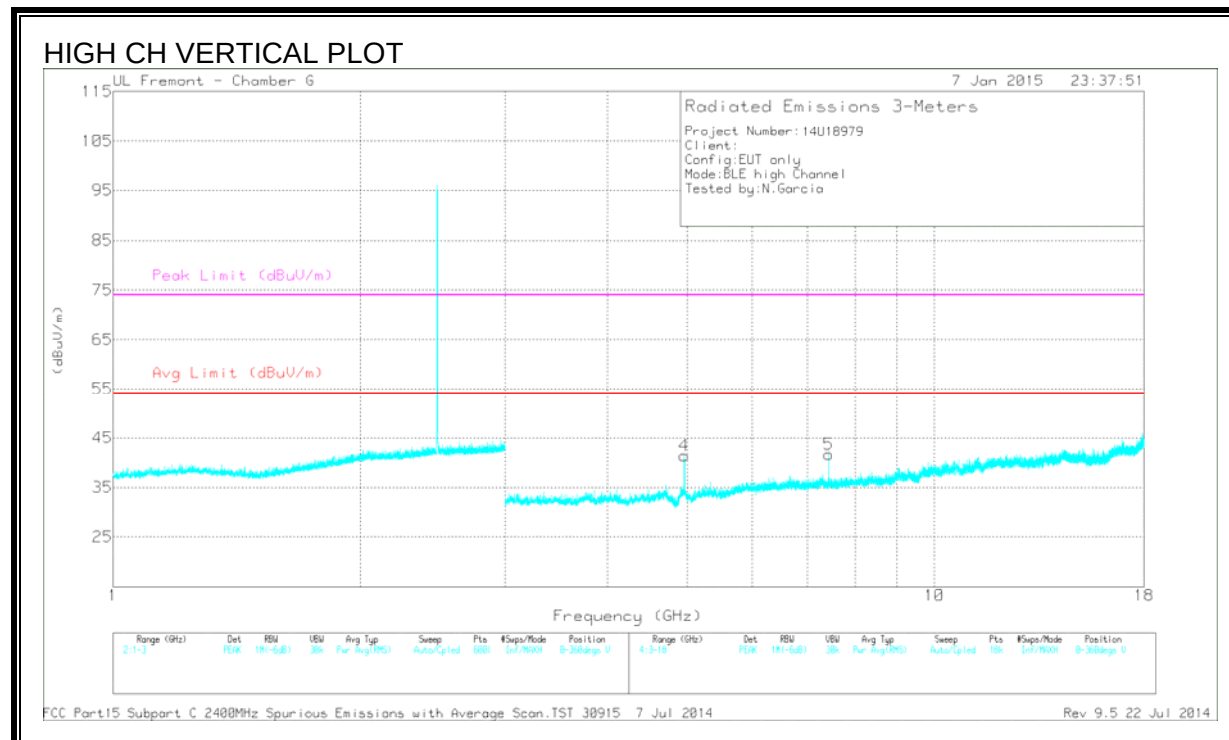
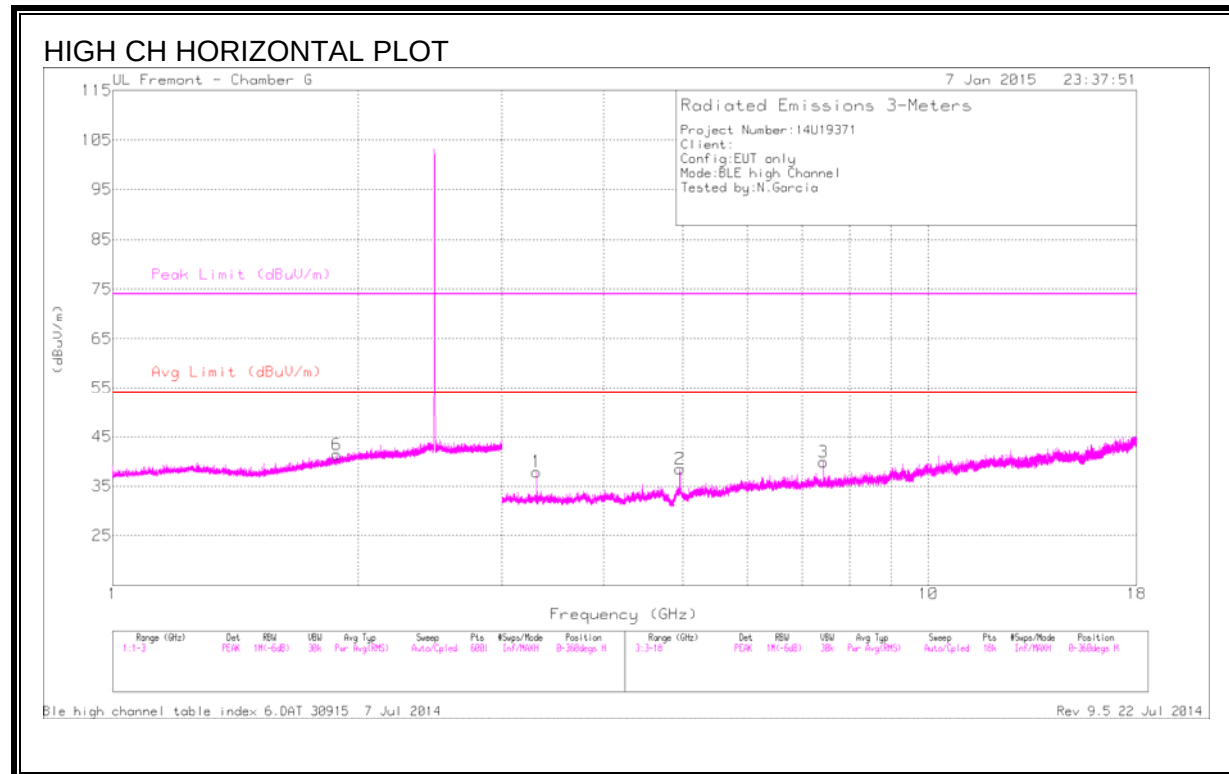
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.254	45.39	PK2	33.0	-33.7	44.69	-	-	-	-	330	103	H
2	* 4.880	42.46	PK2	34.1	-33.0	43.56	-	-	74	-30.44	296	179	H
	* 4.880	34.48	MAv1	34.1	-33.0	35.58	54	-18.42	-	-	296	179	H
3	* 7.319	42.10	PK2	35.6	-31.1	46.60	-	-	74	-27.40	303	101	H
	* 7.320	31.59	MAv1	35.6	-31.1	36.09	54	-17.91	-	-	303	101	H
4	3.253	44.53	PK2	33.0	-33.7	43.83	-	-	-	-	38	376	V
5	* 4.880	44.22	PK2	34.1	-33.0	45.32	-	-	74	-28.68	280	206	V
	* 4.880	36.63	MAv1	34.1	-33.0	37.73	54	-16.27	-	-	280	206	V
6	* 7.320	43.48	PK2	35.6	-31.1	47.98	-	-	74	-26.02	356	215	V
	* 7.320	33.80	MAv1	35.6	-31.1	38.30	54	-15.70	-	-	356	215	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS



DATA

Markers	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	3.307	44.7	PK2	33	-33.8	43.9	-	-	-	-	338	100	H
2	* 4.96	44.7	PK2	34.1	-32.9	45.9	-	-	74	-28.1	335	101	H
	* 4.96	36.14	MAv1	34.1	-32.9	37.34	54	-16.66	-	-	335	101	H
3	* 7.44	46.12	PK2	35.6	-31.4	50.32	-	-	74	-23.68	313	142	H
	* 7.44	37.61	MAv1	35.6	-31.4	41.81	54	-12.19	-	-	313	142	H
4	* 4.959	46.16	PK2	34.1	-32.9	47.36	-	-	74	-26.64	206	105	V
	* 4.96	38.58	MAv1	34.1	-32.9	39.78	54	-14.22	-	-	206	105	V
5	* 7.44	48.96	PK2	35.6	-31.4	53.16	-	-	74	-20.84	338	316	V
	* 7.44	39.94	MAv1	35.6	-31.4	44.14	54	-9.86	-	-	338	316	V
6	1.883	36.4	PK2	30.5	-25.5	41.4	-	-	-	-	251	100	H

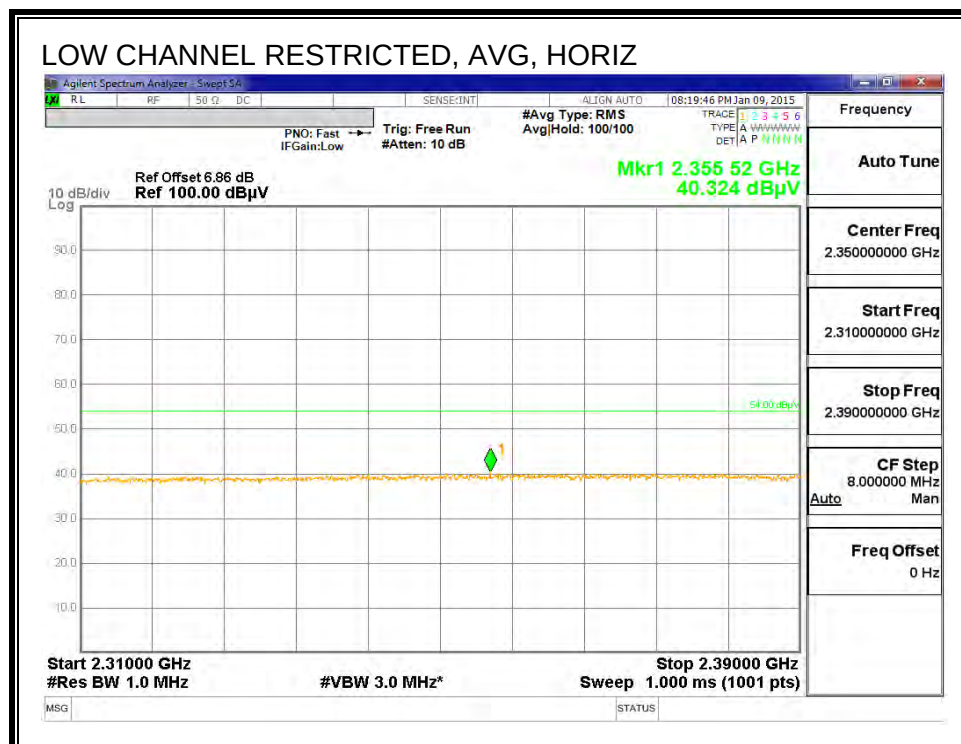
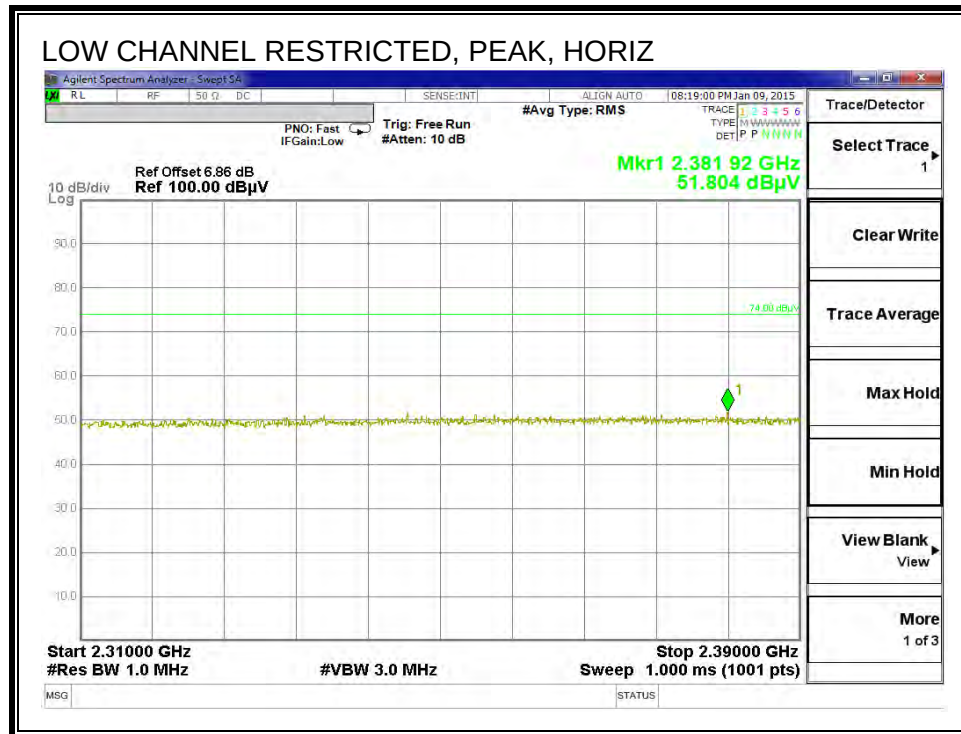
* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

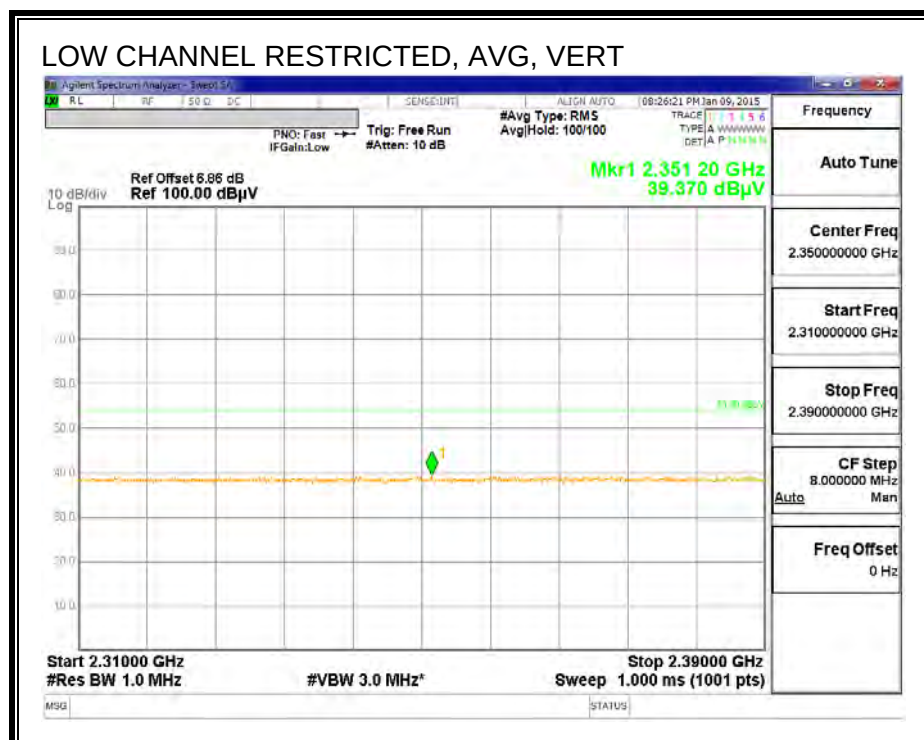
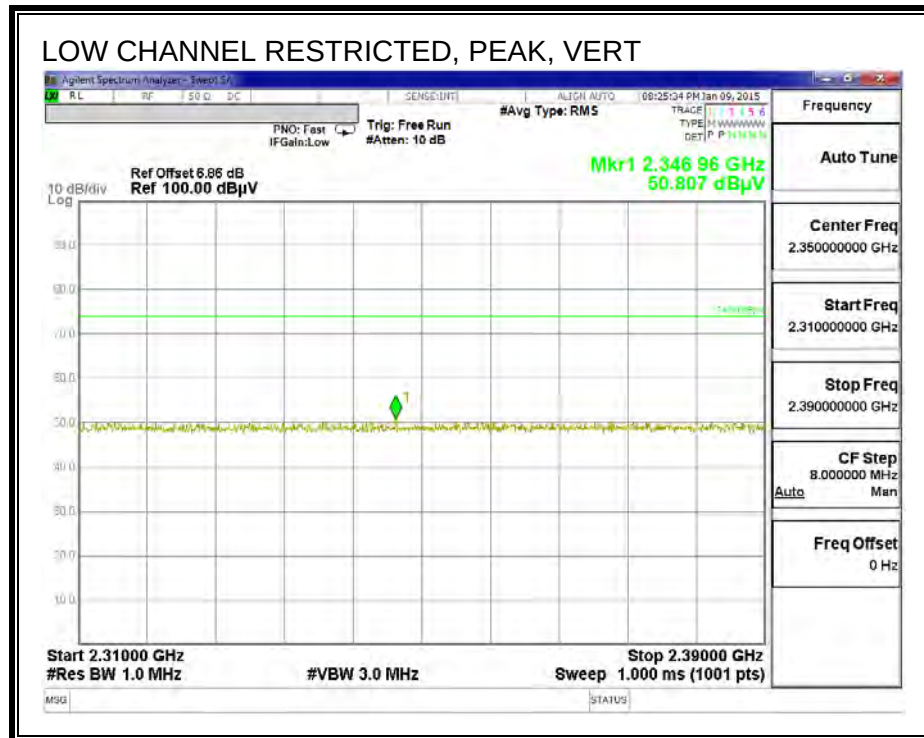
MAv1 - KDB558074 Option 1 Maximum RMS Average

10.1.2. MODEL: A1623

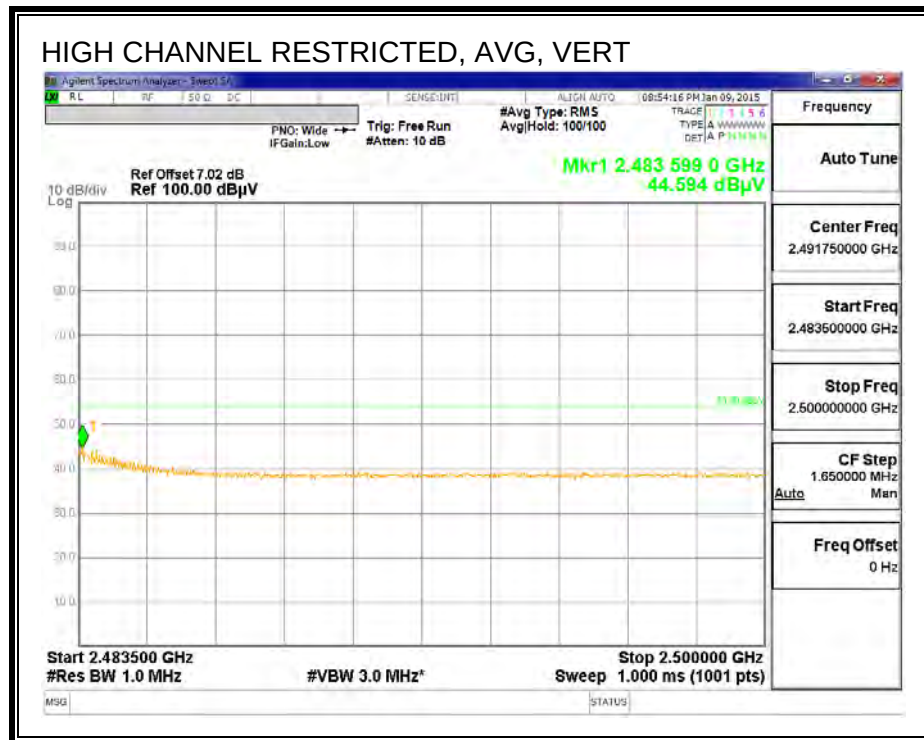
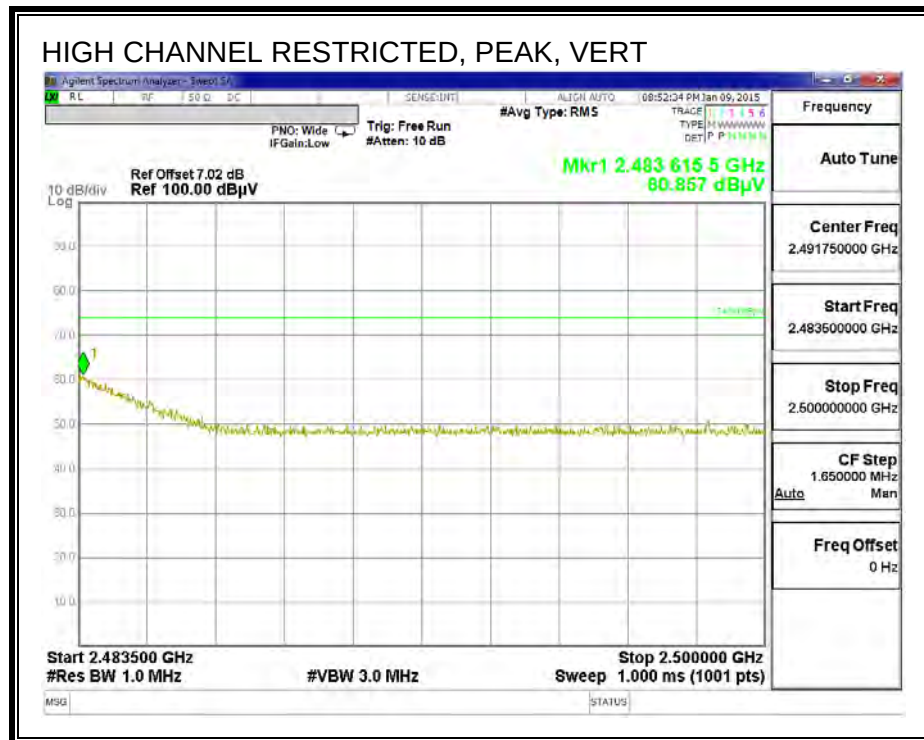
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



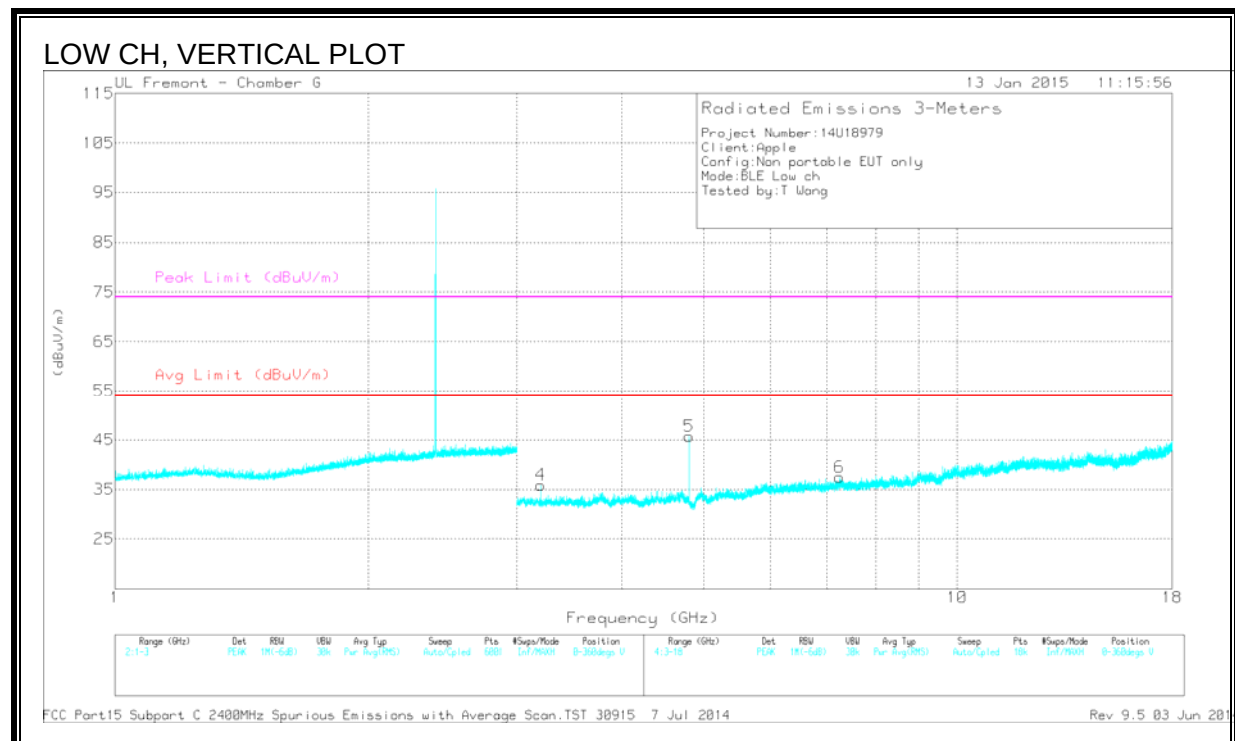
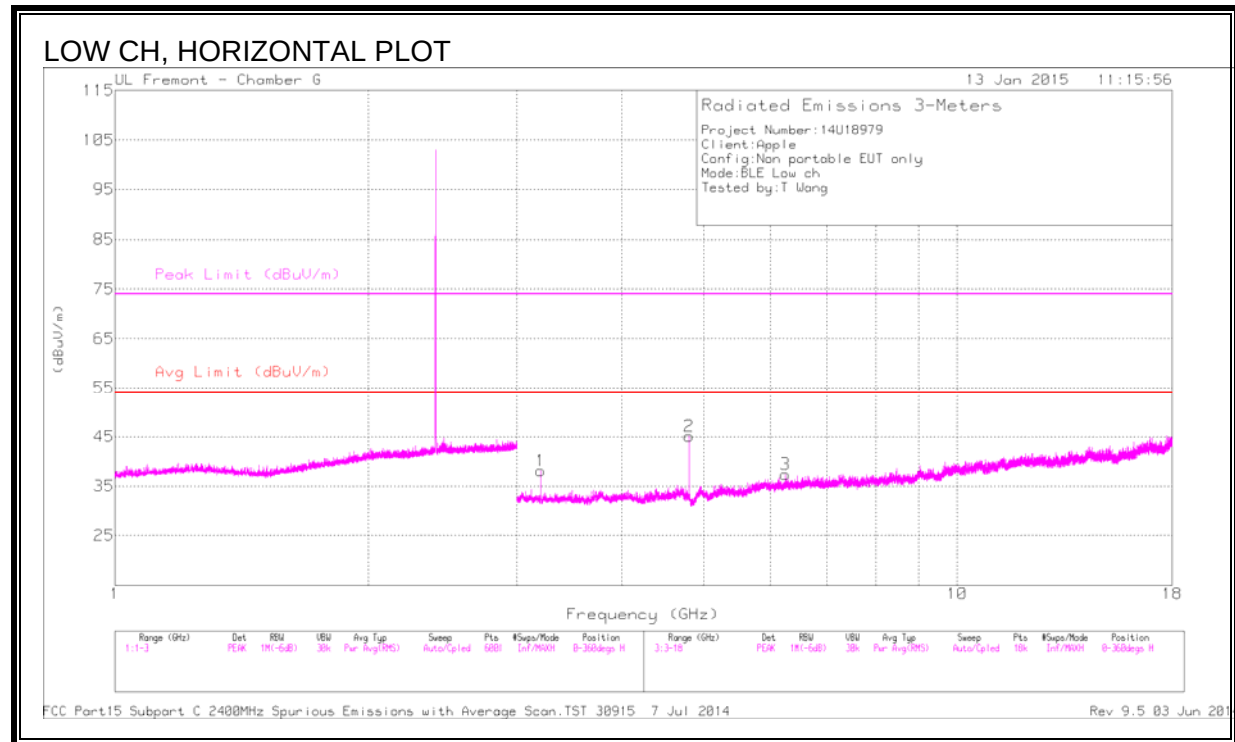
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS



DATA

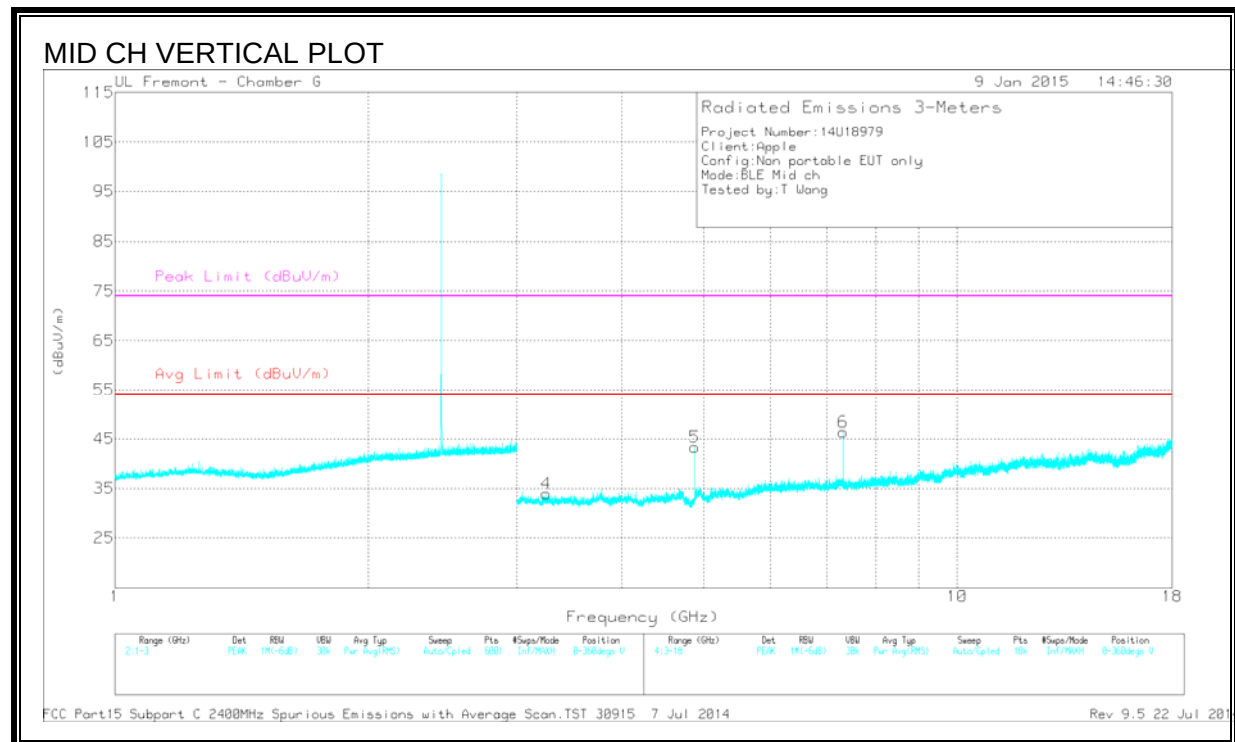
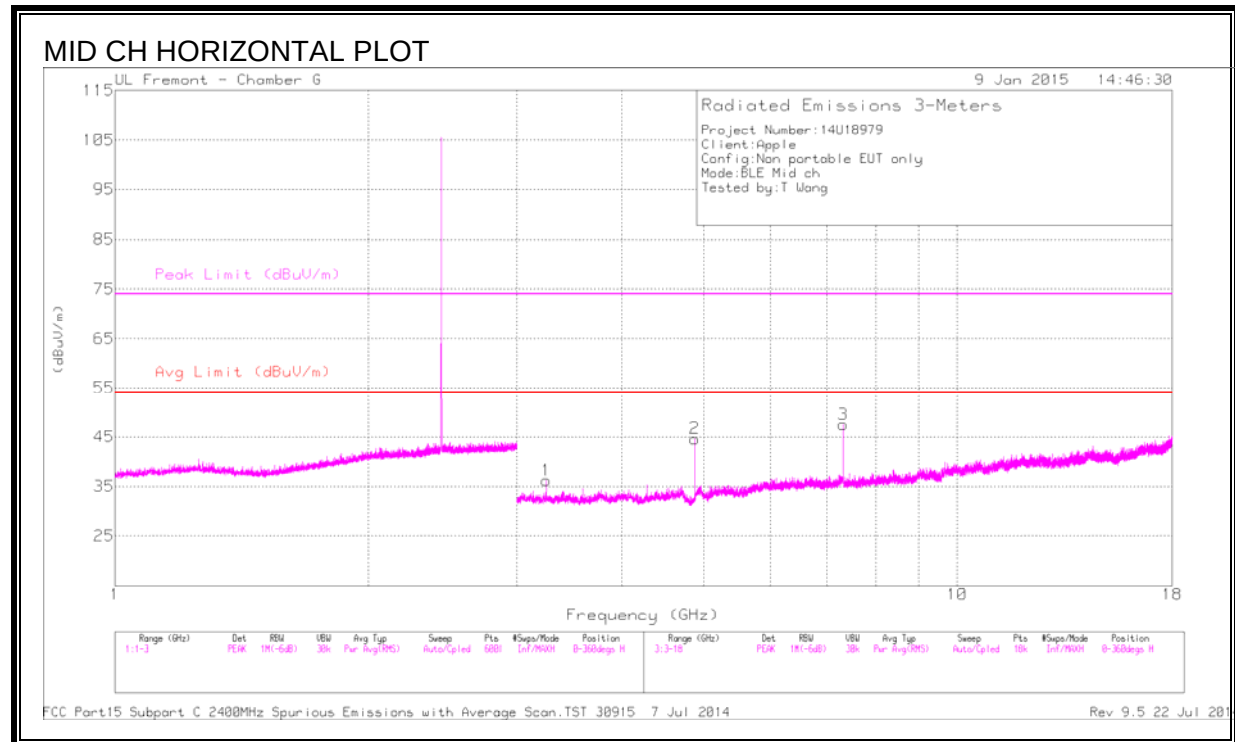
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.202	39.25	PK2	32.9	-34	38.15	-	-	-	-	0-360	201	H
2	* 4.804	49.01	PK2	34.1	-33.2	49.91	-	-	74	-24.09	140	117	H
	* 4.804	43.37	MAv1	34.1	-33.2	44.27	54	-9.73	-	-	140	117	H
3	6.256	33.61	PK2	35.7	-31.9	37.41	-	-	-	-	0-360	201	H
4	3.202	36.99	PK2	32.9	-34	35.89	-	-	-	-	0-360	101	V
5	* 4.804	50.76	PK2	34.1	-33.2	51.66	-	-	74	-22.34	110	129	V
	* 4.804	45.01	MAv1	34.1	-33.2	45.91	54	-8.09	-	-	110	129	V
6	7.243	32.87	PK2	35.6	-31	37.47	-	-	-	-	0-360	101	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS



DATA

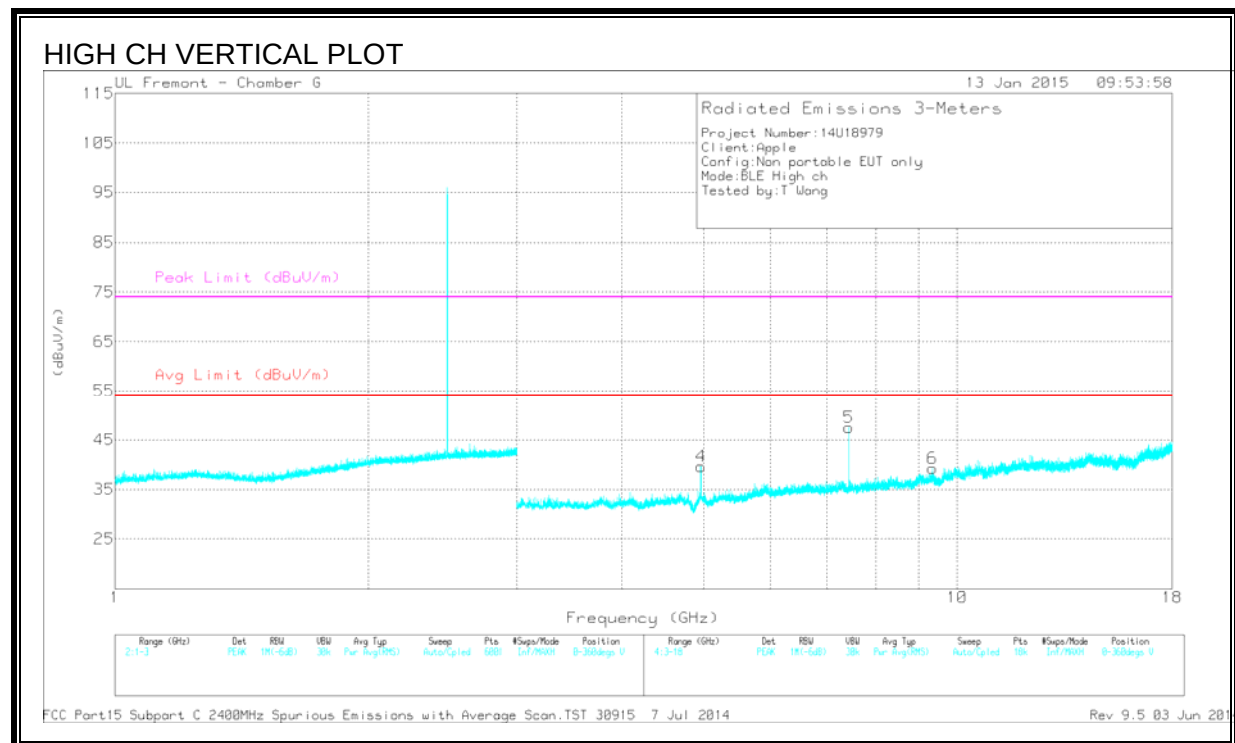
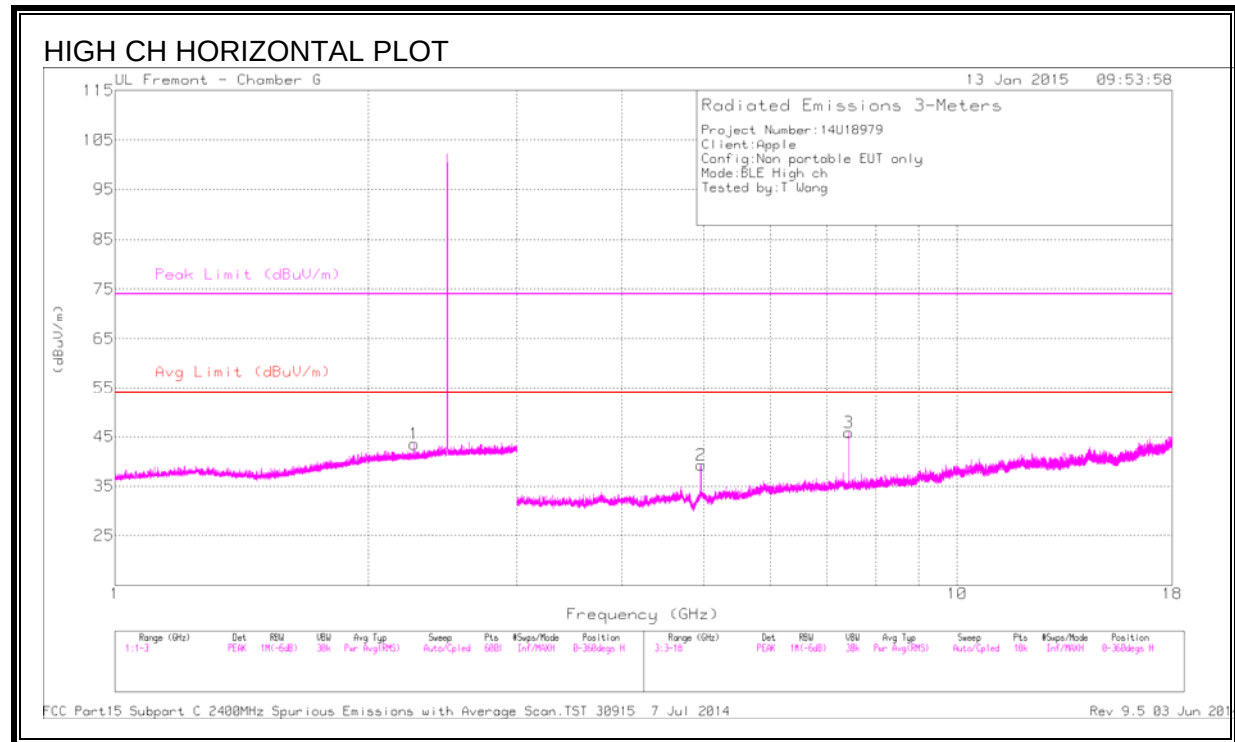
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.253	36.9	PK2	33	-33.7	36.2	-	-	-	-	0-360	100	H
2	* 4.881	47.7	PK2	34.1	-33	48.8	-	-	74	-25.2	155	186	H
	* 4.88	41.29	MAv1	34.1	-33	42.39	54	-11.61	-	-	155	186	H
3	* 7.321	48.01	PK2	35.6	-31.1	52.51	-	-	74	-21.49	127	137	H
	* 7.319	40.99	MAv1	35.6	-31.1	45.49	54	-8.51	-	-	127	137	H
4	3.253	34.62	PK2	33	-33.7	33.92	-	-	-	-	0-360	101	V
5	* 4.879	46.52	PK2	34.1	-33	47.62	-	-	74	-26.38	6	193	V
	* 4.88	39.86	MAv1	34.1	-33	40.96	54	-13.04	-	-	6	193	V
6	* 7.321	47.42	PK2	35.6	-31.1	51.92	-	-	74	-22.08	172	306	V
	* 7.319	40.3	MAv1	35.6	-31.1	44.8	54	-9.2	-	-	172	306	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS



DATA

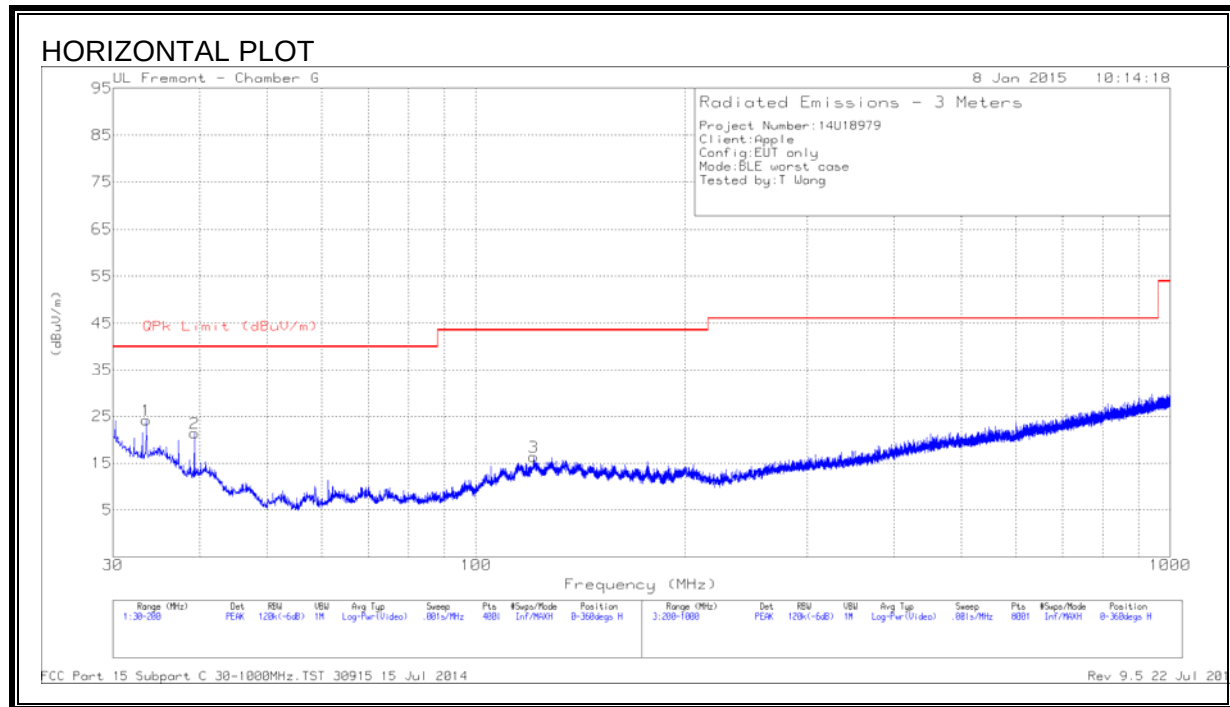
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.267	44.26	PK2	31.5	-25.1	50.66	-	-	74	-23.34	146	115	H
	* 2.269	31.85	MAv1	31.5	-25.1	38.25	54	-15.75	-	-	146	115	H
2	* 4.96	45.63	PK2	34.1	-32.9	46.83	-	-	74	-27.17	163	162	H
	* 4.96	37.6	MAv1	34.1	-32.9	38.8	54	-15.2	-	-	163	162	H
3	* 7.439	48.49	PK2	35.6	-31.4	52.69	-	-	74	-21.31	155	120	H
	* 7.439	40.6	MAv1	35.6	-31.4	44.8	54	-9.2	-	-	155	120	H
4	* 4.96	45.83	PK2	34.1	-32.9	47.03	-	-	74	-26.97	104	127	V
	* 4.96	37.05	MAv1	34.1	-32.9	38.25	54	-15.75	-	-	104	127	V
5	* 7.439	50.23	PK2	35.6	-31.4	54.43	-	-	74	-19.57	165	300	V
	* 7.439	41.91	MAv1	35.6	-31.4	47.11	54	-7.89	-	-	165	300	V
6	* 9.343	38.18	PK2	36.6	-28.6	46.18	-	-	74	-27.82	152	314	V
	* 9.342	26.78	MAv1	36.6	-28.6	34.78	54	-19.22	-	-	152	314	V

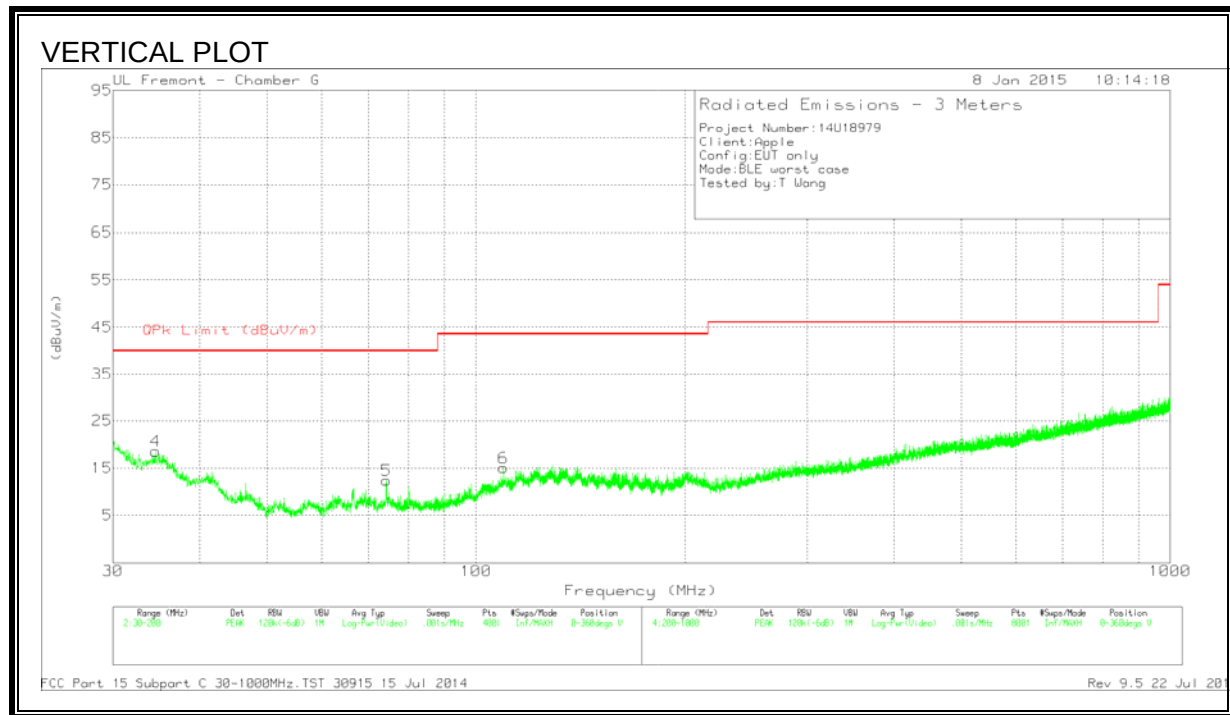
* - indicates frequency in CFR15.205/IC8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

10.2. WORST-CASE BELOW 1 GHz

10.2.1. MODEL: A1622

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





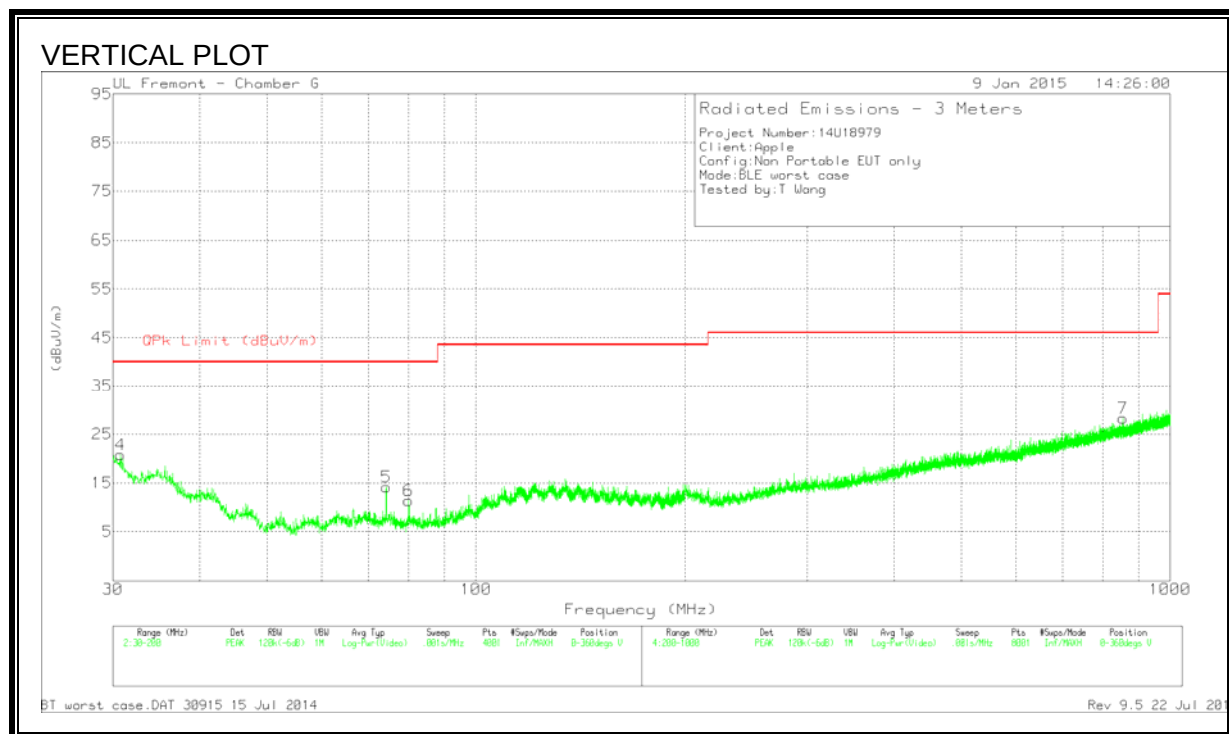
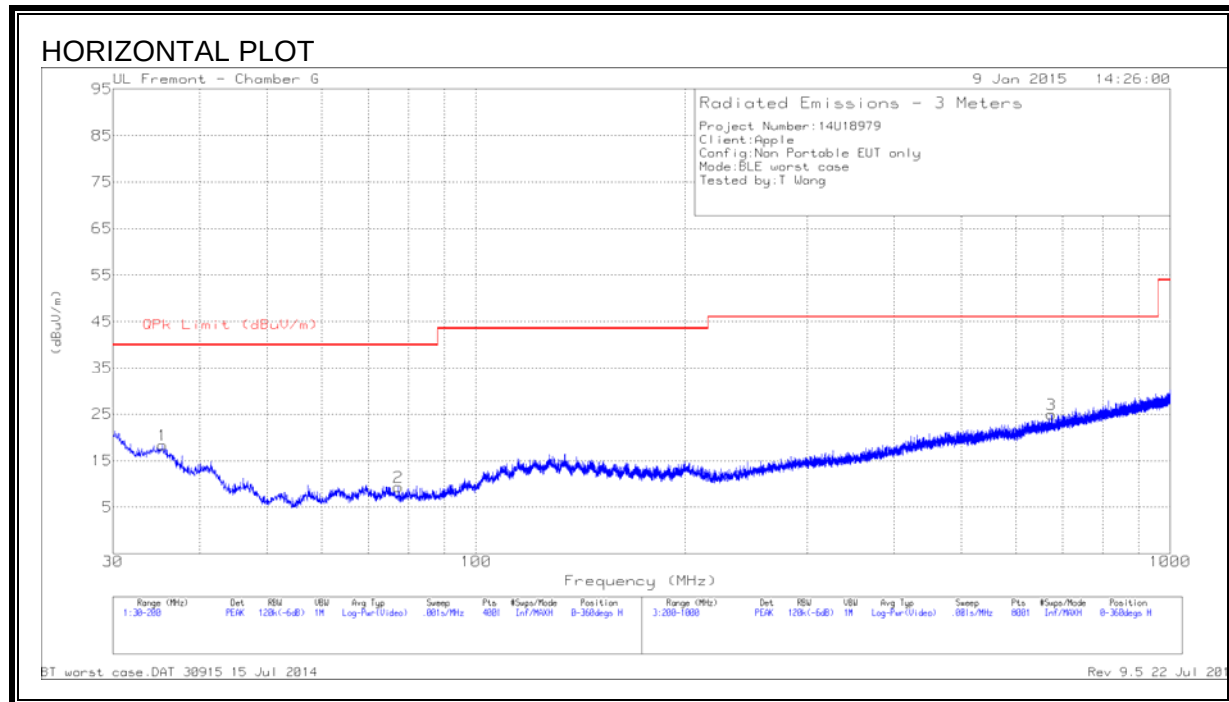
HORIZONTAL AND VERTICAL DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Hybrid	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	33.5275	33.63	PK	21.6	-31.0	24.23	40.00	-15.77	0-360	201	H
2	39.3075	34.41	PK	17.8	-30.8	21.41	40.00	-18.59	0-360	201	H
3	* 121.0775	29.67	PK	16.6	-29.9	16.37	43.52	-27.15	0-360	401	H
4	34.5475	28.56	PK	20.9	-30.9	18.56	40.00	-21.44	0-360	100	V
5	* 74.285	31.94	PK	10.9	-30.4	12.44	40.00	-27.56	0-360	100	V
6	* 109.475	29.79	PK	15.3	-30.0	15.09	43.52	-28.43	0-360	100	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band
PK - Peak detector

10.2.2. MODEL: A1623

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



HORIZONTAL AND VERTICAL DATA

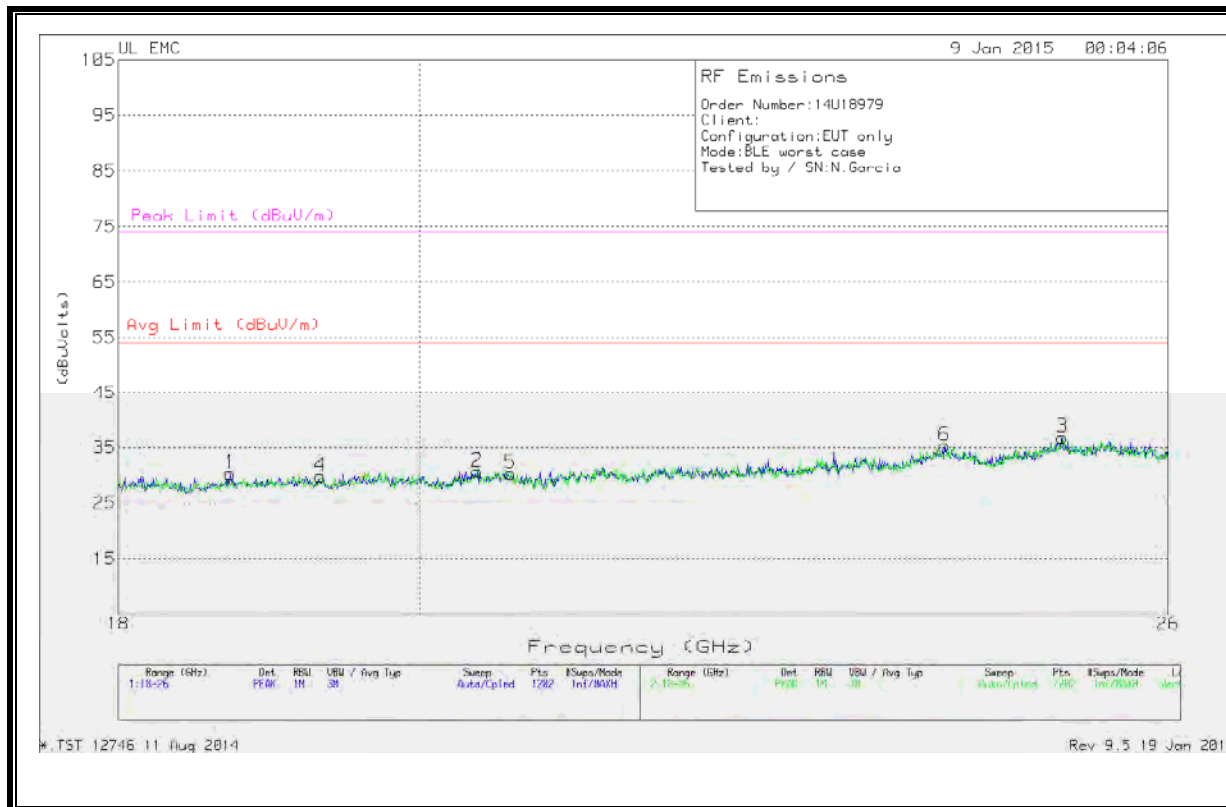
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Hybrid	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	35.3975	28.89	PK	20.4	-30.9	18.39	40.00	-21.61	0-360	401	H
2	77.3875	29.00	PK	10.6	-30.3	9.30	40.00	-30.70	0-360	103	H
3	674.000	28.96	PK	22.8	-26.8	24.96	46.02	-21.06	0-360	401	H
4	30.7225	28.09	PK	23.6	-30.9	20.79	40.00	-19.21	0-360	102	V
5	* 74.2425	33.63	PK	10.9	-30.4	14.13	40.00	-25.87	0-360	102	V
6	80.0225	31.34	PK	10.3	-30.3	11.34	40.00	-28.66	0-360	102	V
7	854.900	29.40	PK	24.8	-25.9	28.30	46.02	-17.72	0-360	100	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band
PK - Peak detector

10.3. WORST-CASE ABOVE 18 GHz

10.3.1. MODEL: A1622

SPURIOUS EMISSIONS 18 TO 26 GHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)



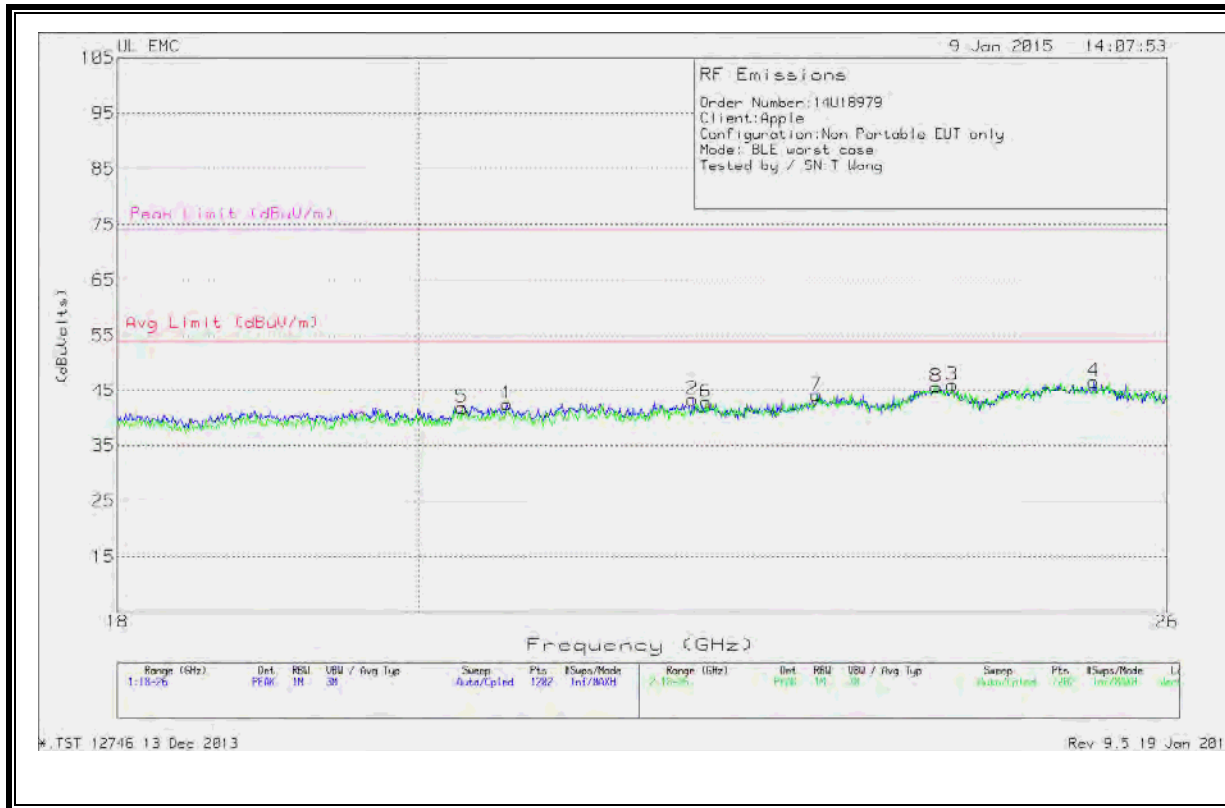
DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 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	18.719	41.73	PK	32.7	-24.1	-20	30.33	54	-23.66	74	-43.66
2	20.411	41.37	PK	32.9	-23.6	-20	30.66	54	-23.33	74	-43.33
3	25.054	44.93	PK	34.5	-22.6	-20	36.83	54	-17.16	74	-37.16
4	19.319	40.83	PK	32.8	-23.8	-20	29.83	54	-24.16	74	-44.16
5	20.651	40.63	PK	33.1	-23.4	-20	30.33	54	-23.66	74	-43.66
6	24.042	44.03	PK	34.2	-22.9	-20	35.33	54	-18.66	74	-38.66

PK - Peak detector

10.3.2. MODEL: A1623

SPURIOUS EMISSIONS 18 TO 26 GHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 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	20.631	42.30	PK	33.1	-23.4	-9.5	42.50	54	-11.50	74	-31.50
2	22.017	43.03	PK	33.7	-23.9	-9.5	43.33	54	-10.66	74	-30.66
3	24.115	44.10	PK	34.2	-22.8	-9.5	46.00	54	-8.00	74	-28.00
4	25.341	44.57	PK	34.5	-22.9	-9.5	46.66	54	-7.33	74	-27.33
5	20.311	42.73	PK	32.9	-24.3	-9.5	41.83	54	-12.16	74	-32.16
6	22.123	42.13	PK	33.7	-23.5	-9.5	42.83	54	-11.16	74	-31.16
7	22.996	42.87	PK	34.0	-23.2	-9.5	44.16	54	-9.83	74	-29.83
8	23.982	43.67	PK	34.2	-22.7	-9.5	45.66	54	-8.33	74	-28.33

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.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.2009.

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

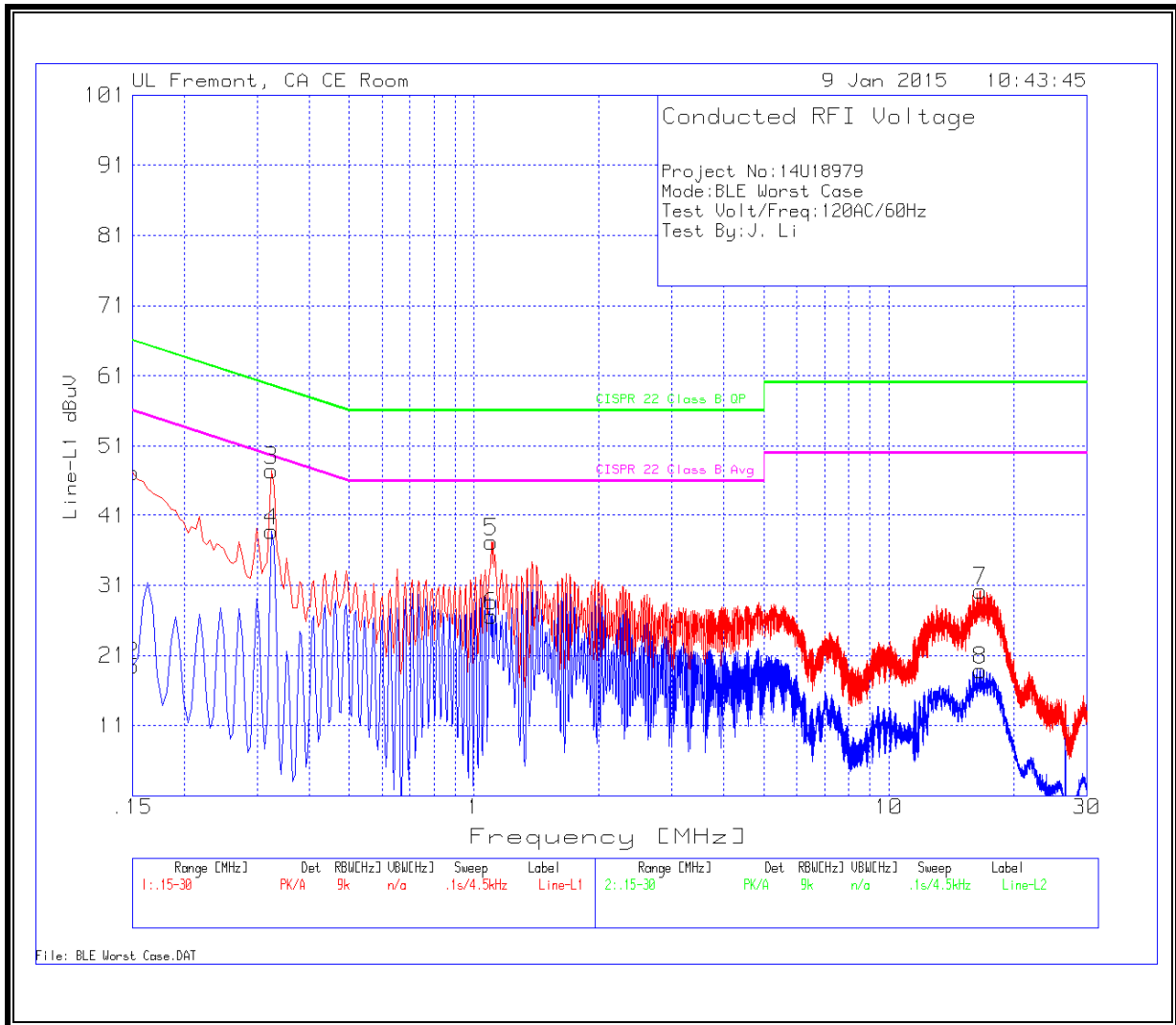
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

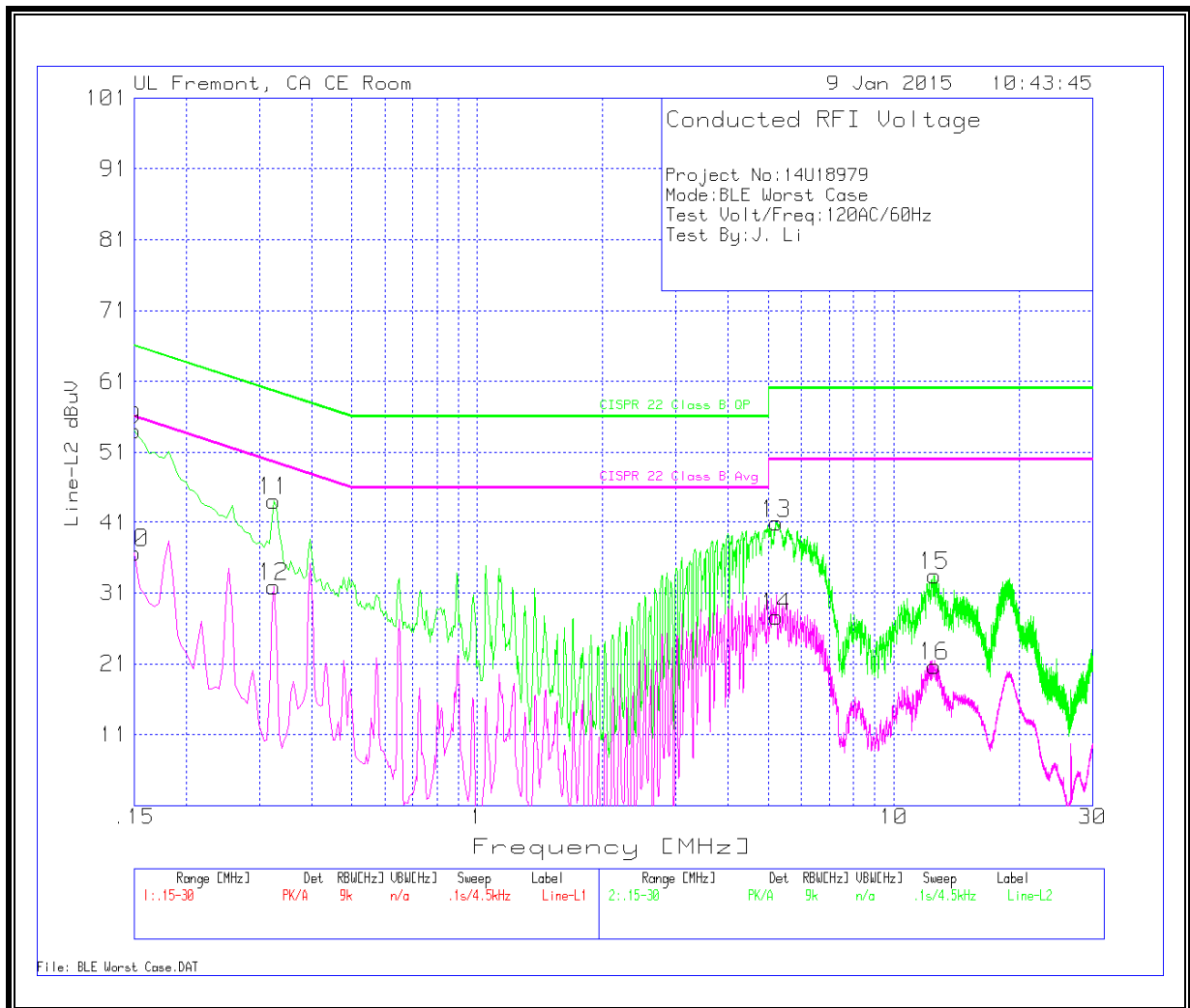
11.1. MODEL: A1622

AC/DC ADAPTER MODEL NUMBER: MD506LL/A

LINE 1 RESULT



LINE 2 RESULT



WORST EMISSIONS DATA

Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.1500	45.77	PK	1.4	0	47.17	66.0	-18.83	-	-
2	.1500	18.11	Av	1.4	0	19.51	-	-	56.0	-36.49
3	.3255	46.99	PK	.5	0	47.49	59.6	-12.11	-	-
4	.3255	38.22	Av	.5	0	38.72	-	-	49.6	-10.88
5	1.0995	37.04	PK	.2	0	37.24	56.0	-18.76	-	-
6	1.0995	26.39	Av	.2	0	26.59	-	-	46.0	-19.41
7	16.6065	29.74	PK	.3	.2	30.24	60.0	-29.76	-	-
8	16.6065	18.37	Av	.3	.2	18.87	-	-	50.0	-31.13

Line-L2 .15 - 30MHz

Trace Markers

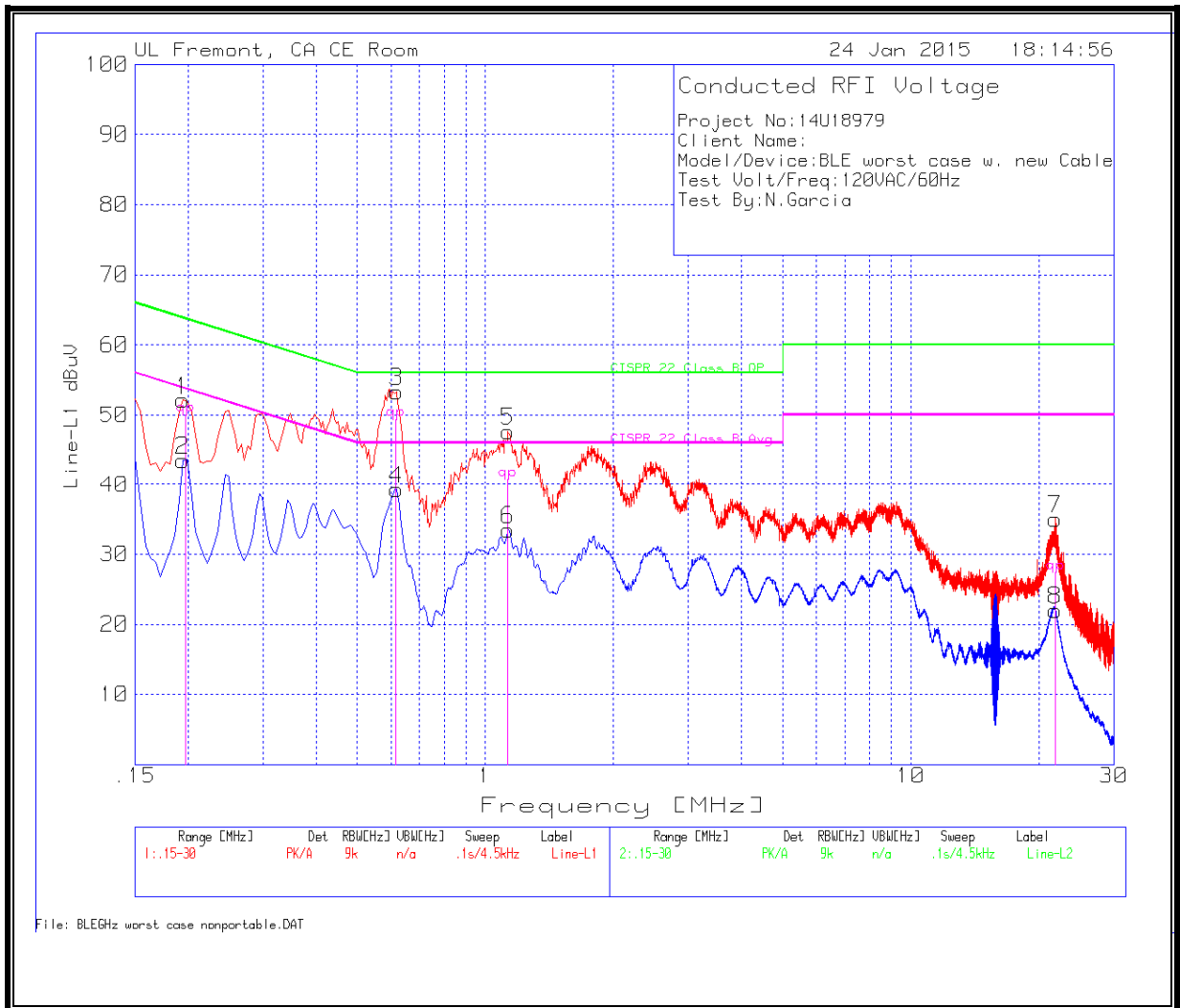
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
9	.1500	52.54	PK	1.5	0	54.04	66.0	-11.96	-	-
10	.1500	35.21	Av	1.5	0	36.71	-	-	56.0	-19.29
11	.3255	43.67	PK	.5	0	44.17	59.6	-15.43	-	-
12	.3255	31.41	Av	.5	0	31.91	-	-	49.6	-17.69
13	5.235	40.65	PK	.2	.1	40.95	60.0	-19.05	-	-
14	5.235	27.36	Av	.2	.1	27.66	-	-	50.0	-22.34
15	12.498	33.02	PK	.2	.2	33.42	60.0	-26.58	-	-
16	12.498	20.33	Av	.2	.2	20.73	-	-	50.0	-29.27

PK - Peak detector
Av - average detection

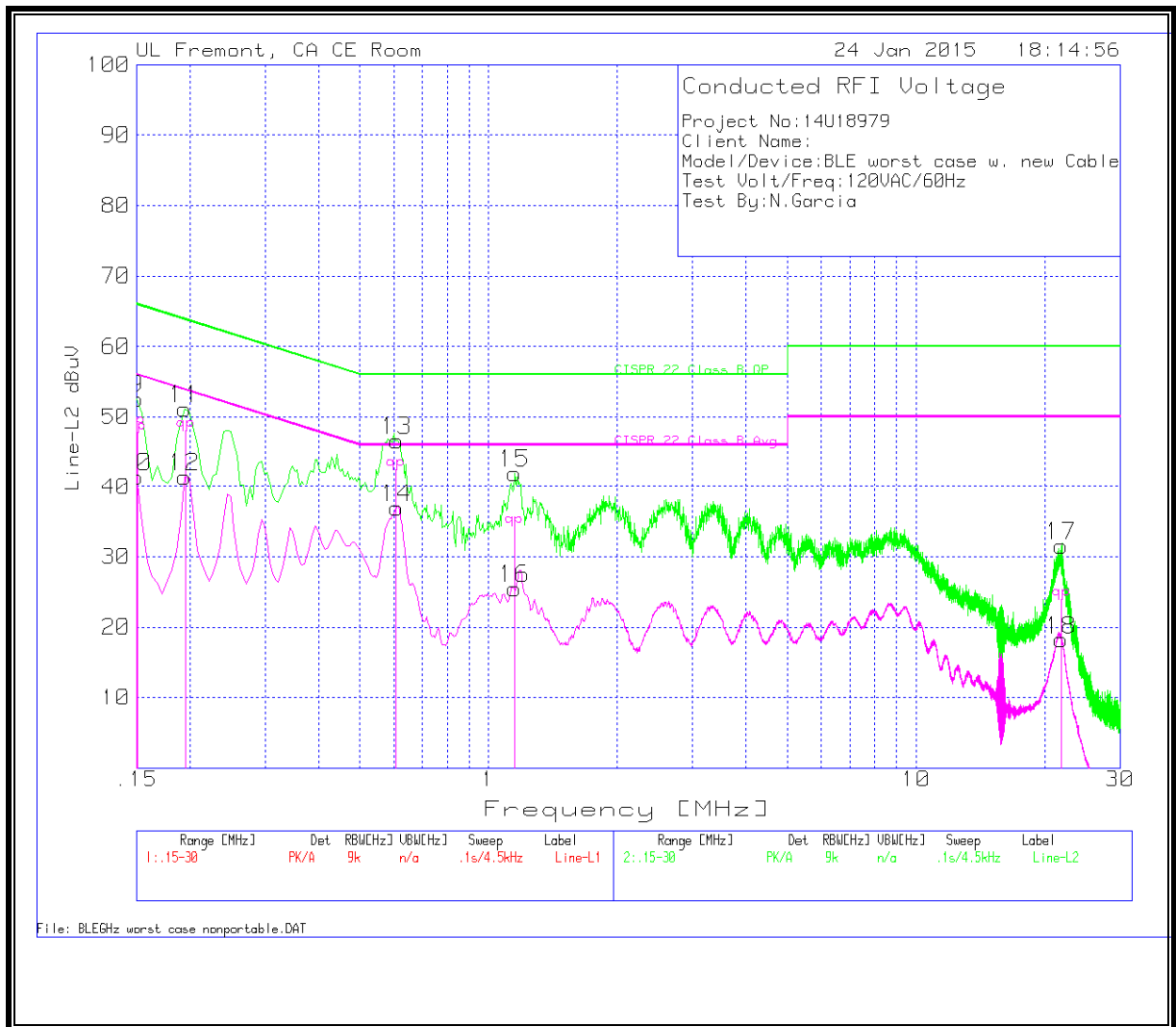
11.2. MODEL: A1623

AC/DC ADAPTER MODEL NUMBER: MD836LL/A

LINE 1 RESULT



LINE 2 RESULT



WORST EMISSIONS DATA

Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.195	51.1	PK	1	0	52.1	63.8	-11.7	-	-
2	.195	42.58	Av	1	0	43.58	-	-	53.8	-10.22
3	.618	53	PK	.3	0	53.3	56	-2.7	-	-
4	.618	38.98	Av	.3	0	39.28	-	-	46	-6.72
5	1.131	47.48	PK	.2	0	47.68	56	-8.32	-	-
6	1.131	33.24	Av	.2	0	33.44	-	-	46	-12.56
7	21.8805	34.55	PK	.3	.2	35.05	60	-24.95	-	-
8	21.8805	21.5	Av	.3	.2	22	-	-	50	-28

Quasi-Peak Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
.1977	49.08	QP	.9	0	49.98	63.7	-13.72	-	-
.6162	49.05	QP	.3	0	49.35	56	-6.65	-	-
1.1301	40.58	QP	.2	0	40.78	56	-15.22	-	-
21.8823	26.88	QP	.3	.2	27.38	60	-32.62	-	-

Line-L2 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
9	.15	51	PK	1.5	0	52.5	66	-13.5	-	-
10	.15	39.95	Av	1.5	0	41.45	-	-	56	-14.55
11	.195	50.11	PK	1	0	51.11	63.8	-12.69	-	-
12	.195	40.46	Av	1	0	41.46	-	-	53.8	-12.34
13	.609	46.33	PK	.3	0	46.63	56	-9.37	-	-
14	.609	36.66	Av	.3	0	36.96	-	-	46	-9.04
15	1.149	41.68	PK	.3	0	41.98	56	-14.02	-	-
16	1.149	25.2	Av	.3	0	25.5	-	-	46	-20.5
17	21.885	31.02	PK	.3	.2	31.52	60	-28.48	-	-
18	21.885	17.7	Av	.3	.2	18.2	-	-	50	-31.8

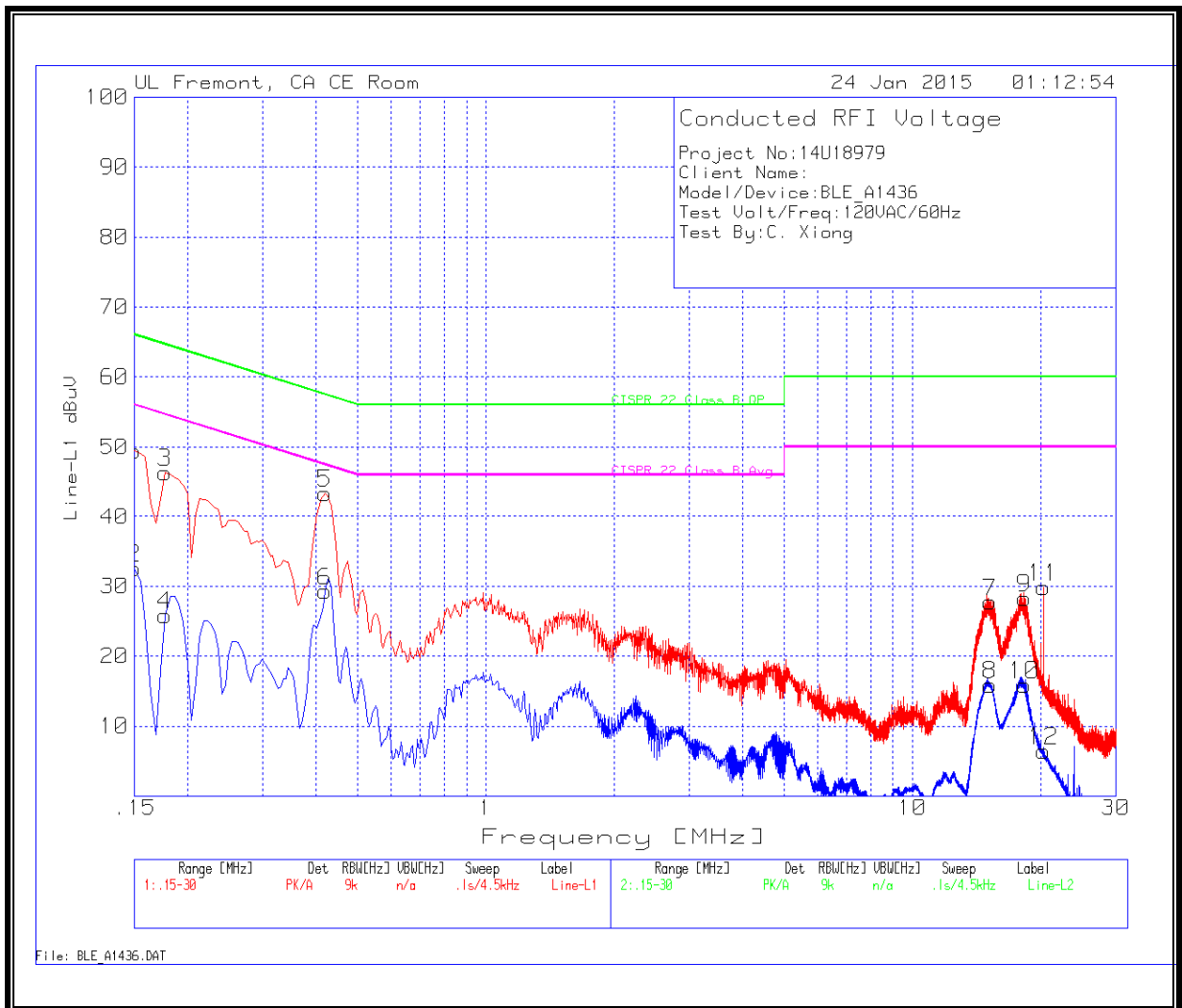
Quasi-Peak Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
.15	47.06	QP	1.5	0	48.56	66	-17.44	-	-
.1509	46.23	QP	1.5	0	47.73	66	-18.27	-	-
.1959	47.08	QP	1	0	48.08	63.8	-15.72	-	-
.6072	42.22	QP	.3	0	42.52	56	-13.48	-	-
1.149	34.05	QP	.3	0	34.35	56	-21.65	-	-
21.8814	23.45	QP	.3	.2	23.95	60	-36.05	-	-

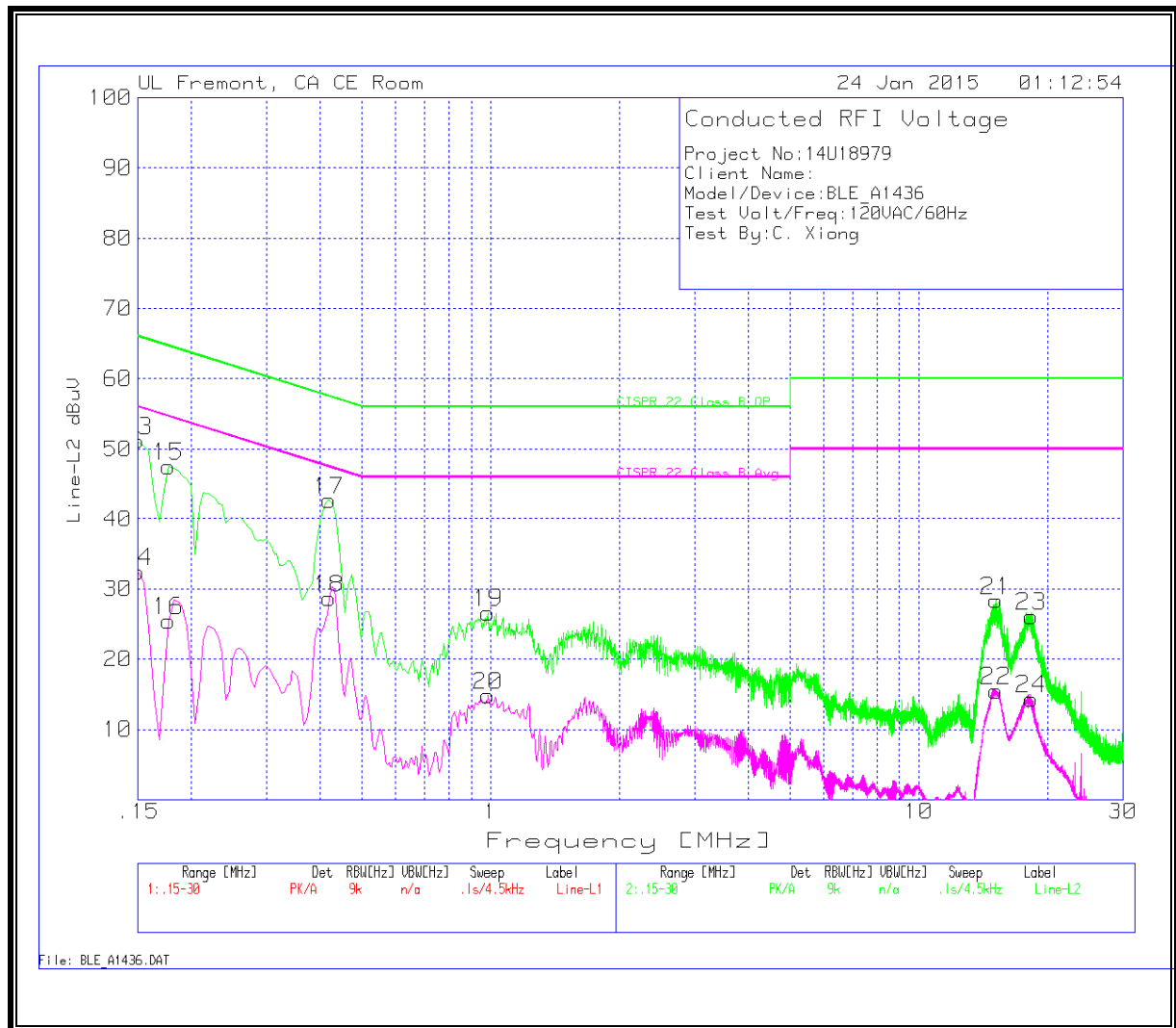
QP - Quasi-Peak detector

AC/DC ADAPTER MODEL NUMBER: MD592LL/A

LINE 1 RESULT



LINE 2 RESULT



WORST EMISSIONS DATA

Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.15	48.05	PK	1.4	0	49.45	66	-16.55	-	-
2	.15	31.17	Av	1.4	0	32.57	-	-	56	-23.43
3	.177	45.23	PK	1.1	0	46.33	64.6	-18.27	-	-
4	.177	24.76	Av	1.1	0	25.86	-	-	54.6	-28.74
5	.42	43	PK	.4	0	43.4	57.4	-14	-	-
6	.42	28.86	Av	.4	0	29.26	-	-	47.4	-18.14
7	15.198	27.22	PK	.3	.2	27.72	60	-32.28	-	-
8	15.198	15.37	Av	.3	.2	15.87	-	-	50	-34.13
9	18.33	27.8	PK	.3	.2	28.3	60	-31.7	-	-
10	18.33	15.38	Av	.3	.2	15.88	-	-	50	-34.12
11	20.265	29.33	PK	.3	.2	29.83	60	-30.17	-	-
12	20.265	5.95	Av	.3	.2	6.45	-	-	50	-43.55

Line-L2 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
13	.15	49.71	PK	1.5	0	51.21	66	-14.79	-	-
14	.15	30.89	Av	1.5	0	32.39	-	-	56	-23.61
15	.177	46.32	PK	1.2	0	47.52	64.6	-17.08	-	-
16	.177	24.24	Av	1.2	0	25.44	-	-	54.6	-29.16
17	.42	42.3	PK	.4	0	42.7	57.4	-14.7	-	-
18	.42	28.22	Av	.4	0	28.62	-	-	47.4	-18.78
19	.987	26.32	PK	.3	0	26.62	56	-29.38	-	-
20	.987	14.5	Av	.3	0	14.8	-	-	46	-31.2
21	15.135	27.85	PK	.3	.2	28.35	60	-31.65	-	-
22	15.135	15.01	Av	.3	.2	15.51	-	-	50	-34.49
23	18.3075	25.55	PK	.3	.2	26.05	60	-33.95	-	-
24	18.3075	13.81	Av	.3	.2	14.31	-	-	50	-35.69

PK - Peak detector
Av - average detection