FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

WIRELESS DEVICE

MODEL NUMBER: A1845

FCC ID: BCGA1845

REPORT NUMBER: 16U23820-E5V1

ISSUE DATE: JANUARY 23, 2017

Prepared for
APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

Prepared by
UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	01/23/2017	Initial Issue	Mengistu Mekuria

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: WIRELESS DEVICE

MODEL: A1845

SERIAL NUMBER: 3136

DATE TESTED: NOVEMBER 18 - 23, 2016

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC 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 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:

MENGISTU MEKURIA
SENIOR ENGINEER
UL VERIFICATION SERVICES INC.

Prepared By:

TOM CHEN
EMC ENGINEER
UL VERIFICATION SERVICES INC.

2. TEST METHODOLOGY

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

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Radiated Disturbance,1000 to 18000 MHz	4.32 dB
Radiated Disturbance,18000 to 26000 MHz	4.45 dB
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. DESCRIPTION OF EUT

The EUT is wireless device with BLE and NFC capability

5.2. MAXIMUM FIELD STRENGTH

The transmitter has a maximum peak radiated magnetic field strength as follows:

EUT WITH DC POWER SUPPLY

Frequency Range (MHz)	Mode	Kbps	E Field at 30m distance (dBuV/m)
13.56	14443A	848	42.34
		424	42.10
		212	42.26
		106	42.30
	14443B	848	41.71
		424	**42.48**
		212	40.55
		106	42.22
	15693	26.48	41.87

5.3. SOFTWARE AND FIRMWARE

The test utility software used during testing was Cool Term for Mac, version 1.4.6

5.4. WORST-CASE CONFIGURATION AND MODE

The fundamental of the EUT was investigated in three orthogonal orientations X (Flatbed), Y (Landscape) and Z (Portrait). It was determined that Z orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in Z orientation.

There is no significant difference between OAT and chamber readings by comparison based on KDB 937606.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Apple	MacBook Pro	73043BDQAGU	N/A
DC power supply	Metek	XHR 60-18	N/A	N/A

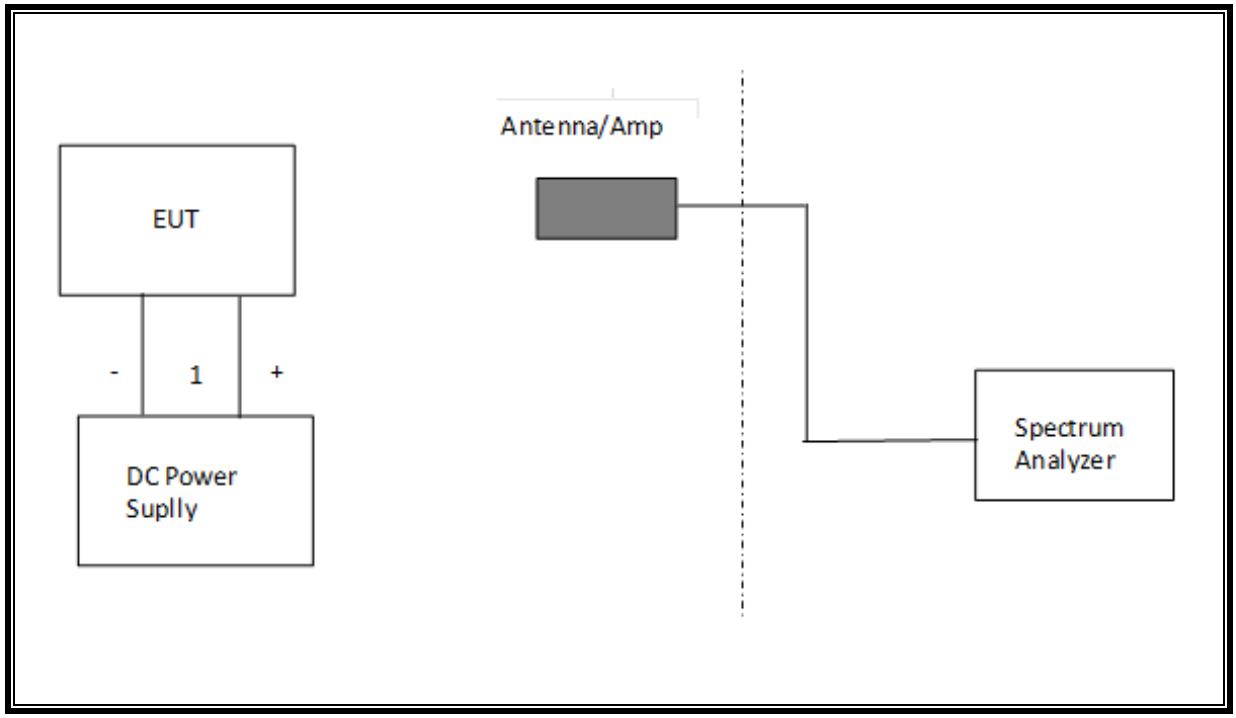
I/O CABLES (RADIATED BELOW 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	4 pins connector	Un-Shielded	1	N/A

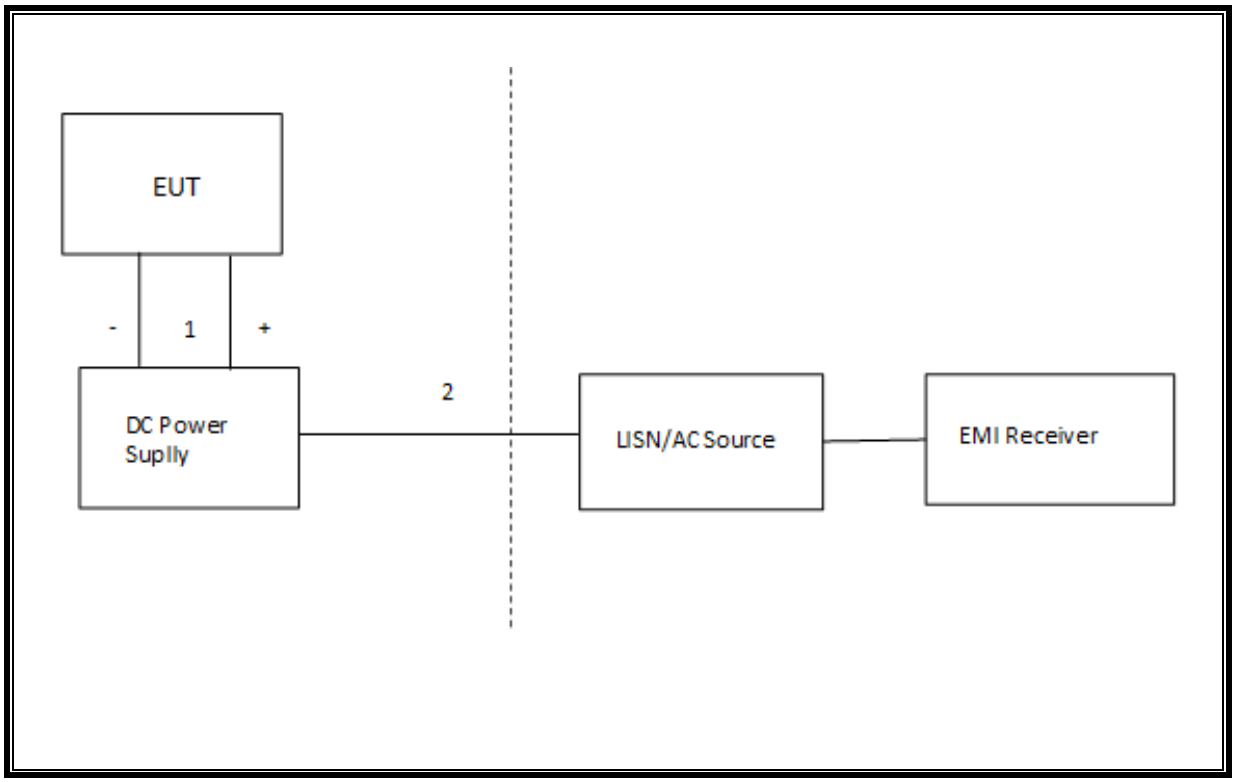
I/O CABLES (AC LINE CONDUCTED)

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Un-shielded	1	N/A
2	AC	1	AC	Un-shielded	3	N/A

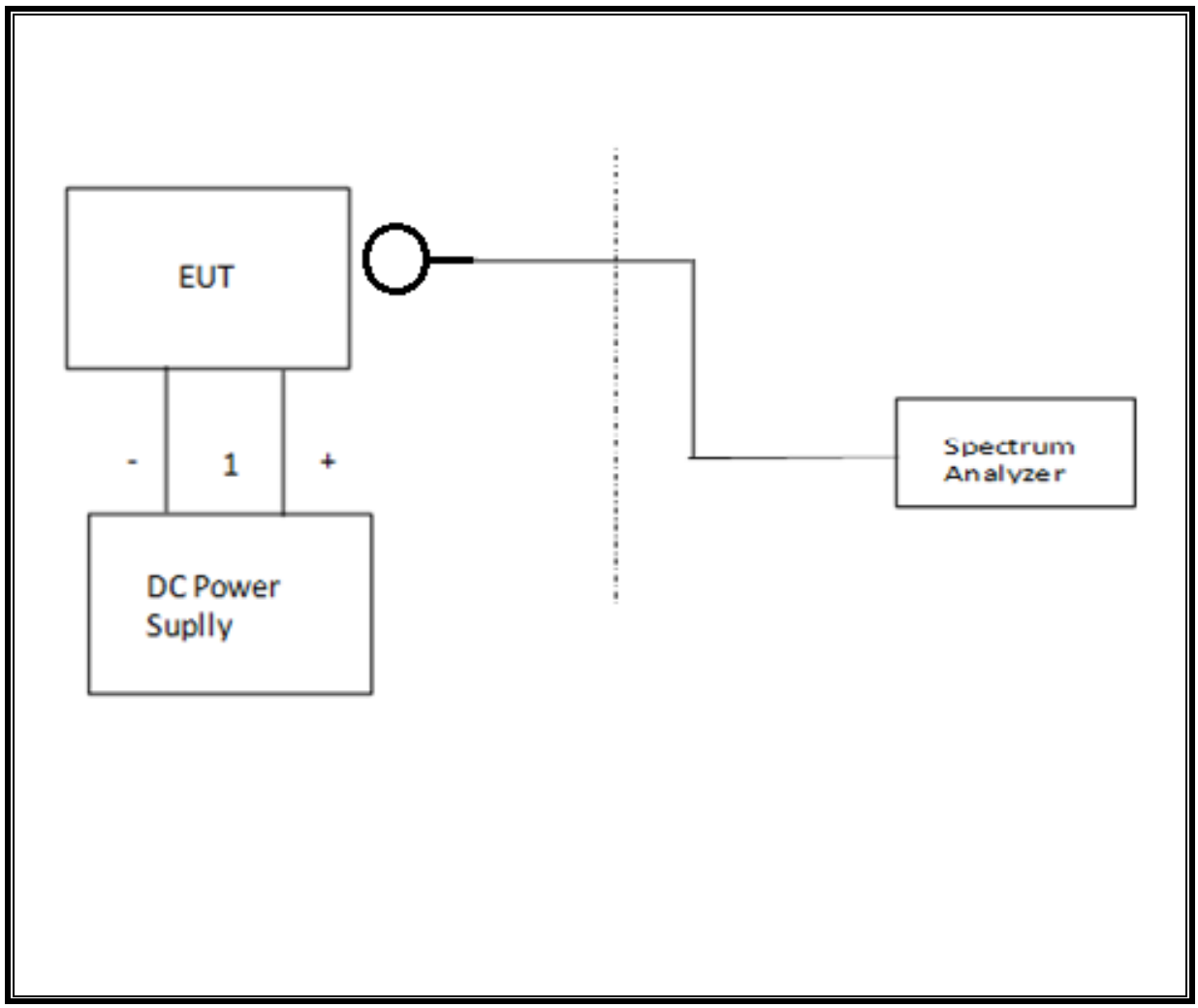
SETUP DIAGRAM RADIATED



SETUP DIAGRAM LINE CONDUCTED



SETUP DIAGRAM FREQUENCY STABILITY



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 No.**	**Cal Due**
Spectrum Analyzer	Agilent	N9030A	906	02/03/17
Antenna, Broadband Hybrid	Sunol Sciences	JB3	900	05/03/17
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	835	06/18/17
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	834	06/17/17
Antenna, Loop, 30 MHz	ETS Lindgren	6502	757	05/31/17
Chamber, Environmental	Cincinnati Sub Zero	ZPHS-8-3.5-SCT/WC	754	03/12/17
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	212	09/13/17
LISN for Conducted Emissions CISPR-16	FCC	LISN-50/250-25-2	24	02/09/17
Line conducted Power cable ANSI 63.4	UL	PG1	861	09/01/17
UL SOFTWARE				
*Radiated Software	UL	UL EMC	Fundamental mask, 5/7/15	
*Conducted Software	UL	UL EMC	Ver 2.2, March 31, 2015	
*Radiated Software	UL	UL EMC	Below 30Mhz, 6/24/15	
*Radiated Software	UL	UL EMC	Below 1Ghz, 7/15/14	
*AC Line Conducted Software	UL	UL EMC	Ver 9.5, April 3, 2015	

Note: * indicates automation software version used in the compliance certification testing

7. OCCUPIED BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 10kHz. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% and 20dB bandwidth function are utilized.

RESULTS

ID:	29435	Date:	11/22/16

99% and 20dB BW

14443A

Mode Kbps	Frequency (MHz)	99% Bandwidth (KHz)	20dB Bandwidth (KHz)
848	13.56	24.118	28.37
424	13.56	24.135	28.40
212	13.56	24.189	28.47
106	13.56	24.149	28.40

14443B

Mode Kbps	Frequency (MHz)	99% Bandwidth (KHz)	20dB Bandwidth (KHz)
848	13.56	24.152	28.46
424	13.56	24.165	28.49
212	13.56	24.156	28.46
106	13.56	24.155	28.49

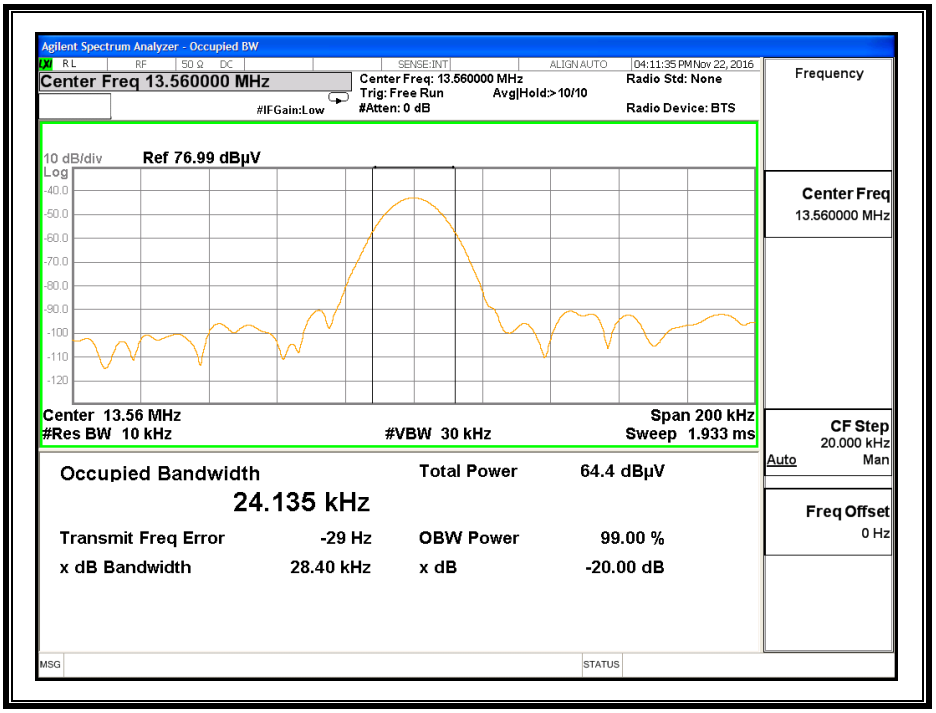
15693

Mode Kbps	Frequency (MHz)	99% Bandwidth (KHz)	20dB Bandwidth (KHz)
26.48	13.56	24.192	28.49

7.1. 14443A

848Kbps

424Kbps



212Kbps

106Kbps

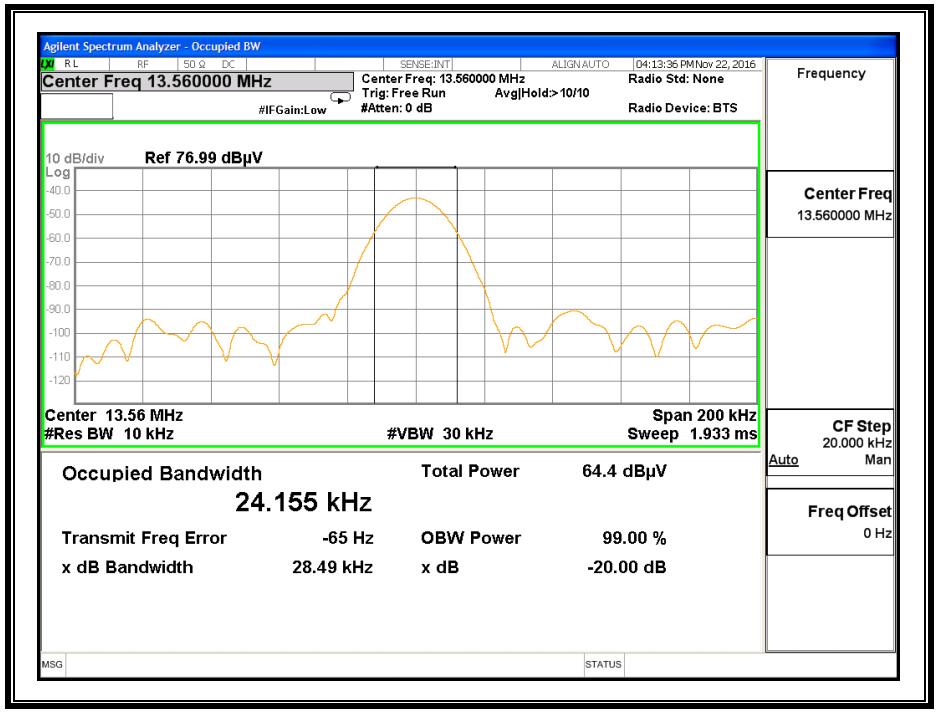
7.2. 14443B

848Kbps

424Kbps

212Kbps

106Kbps



7.3. 15693

26.48Kbps

8. RADIATED EMISSION TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMIT

§15.225

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:
§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.
§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the filed strength from uV/m to dBuV/m is:
Limit (dBuV/m) = 20 log limit (uV/m)

In addition:

§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in §§ 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

TEST PROCEDURE

ANSI C63.10, 2013

The EUT is an intentional radiator that incorporates a digital device, the highest fundamental frequency generated or used in the device is 13.56 MHz; therefore, the frequency range was investigated from 0.15 MHz to the 10th harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater.

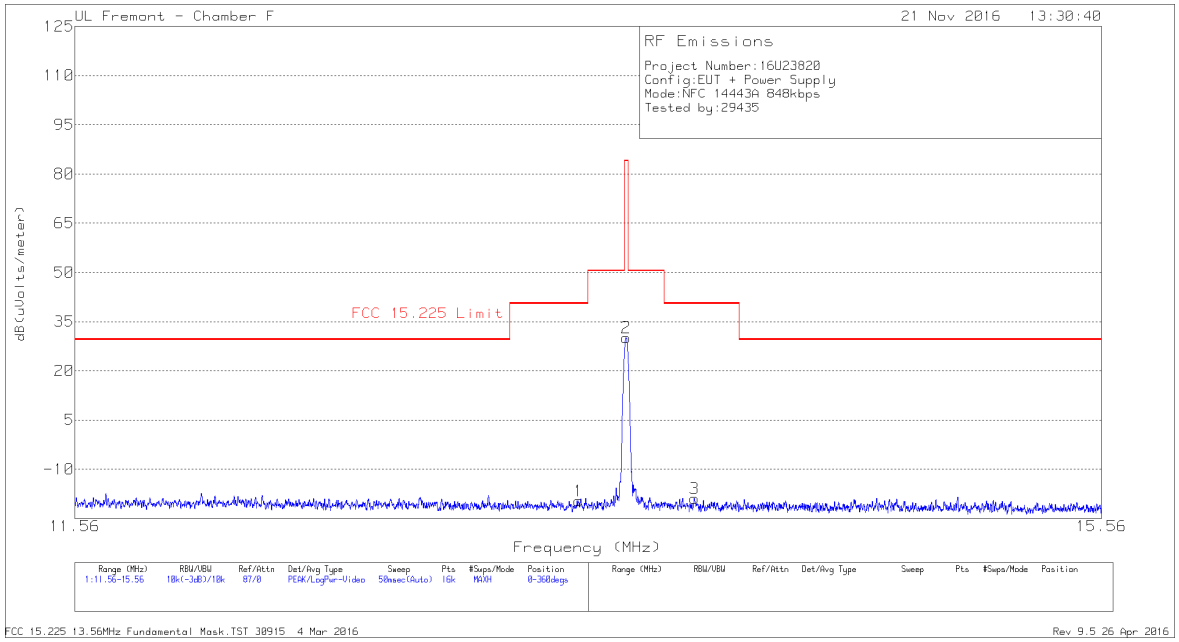
RESULTS

8.2. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz), EUT WITH DC POWER SUPPLY

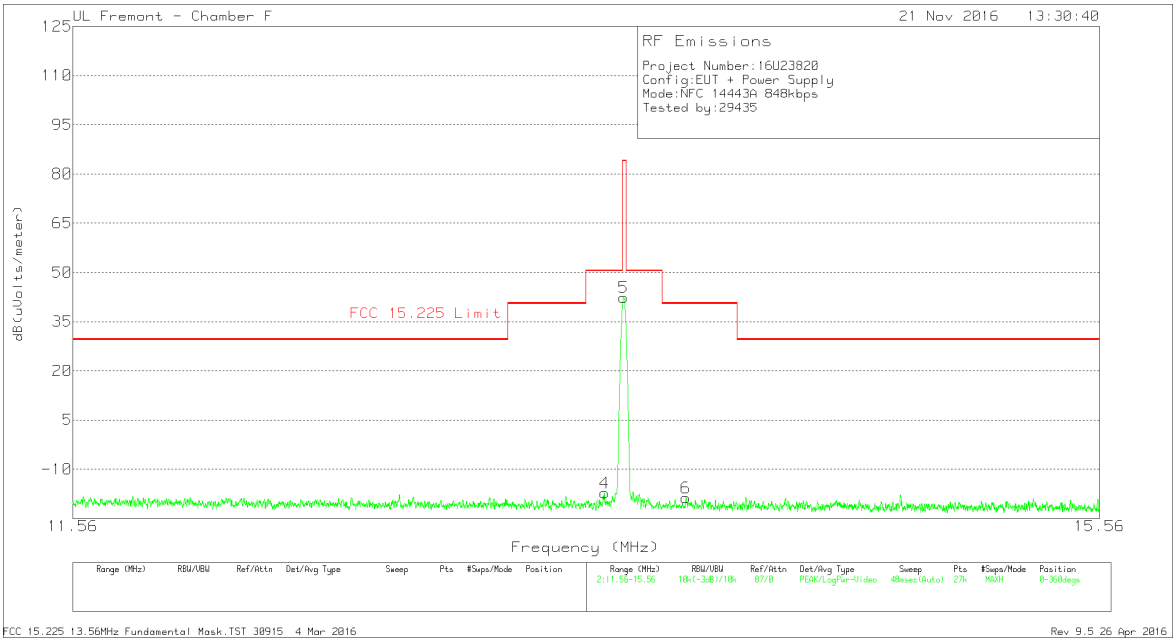
8.2.1. 14443A

FUNDAMENTAL 848Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



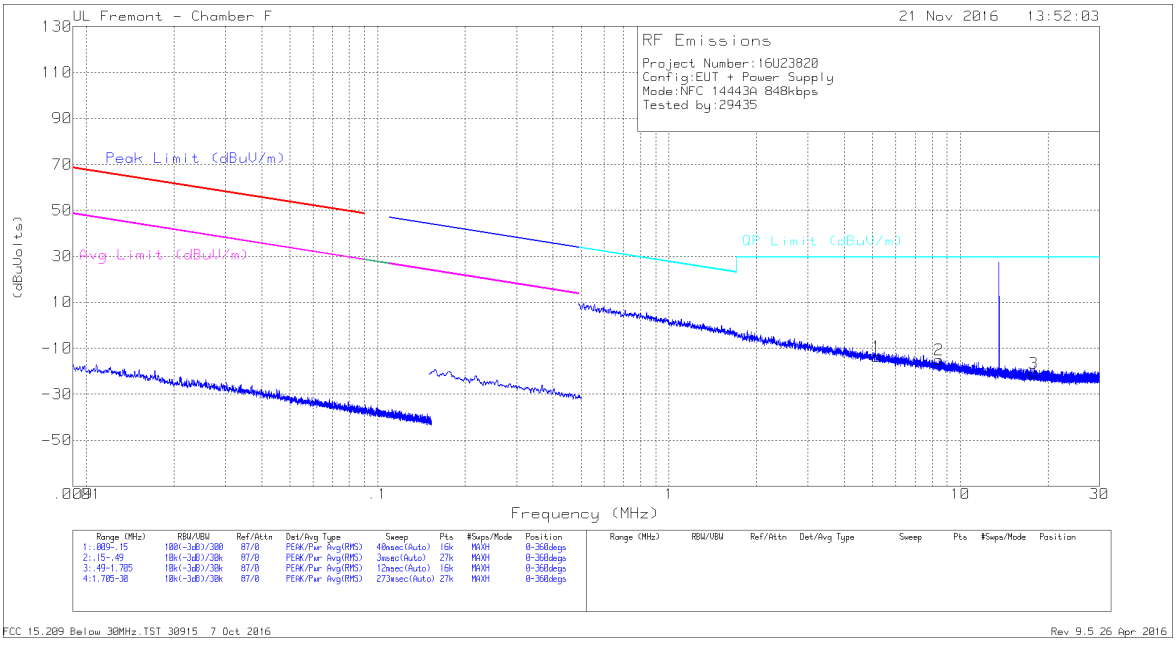
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)
1	13.37463	9.24	Pk	10.7	.4	-40	-19.66	40.51	-60.17	0-360
2	13.56013	59.16	Pk	10.6	.4	-40	30.16	84	-53.84	0-360
3	13.83063	10.16	Pk	10.6	.4	-40	-18.84	40.51	-59.35	0-360
4	13.48341	11.71	Pk	10.7	.4	-40	-17.19	50.5	-67.69	0-360
5	13.55822	71.34	Pk	10.6	.4	-40	42.34	84	-41.66	0-360
6	13.80427	10.25	Pk	10.6	.4	-40	-18.75	40.51	-59.26	0-360

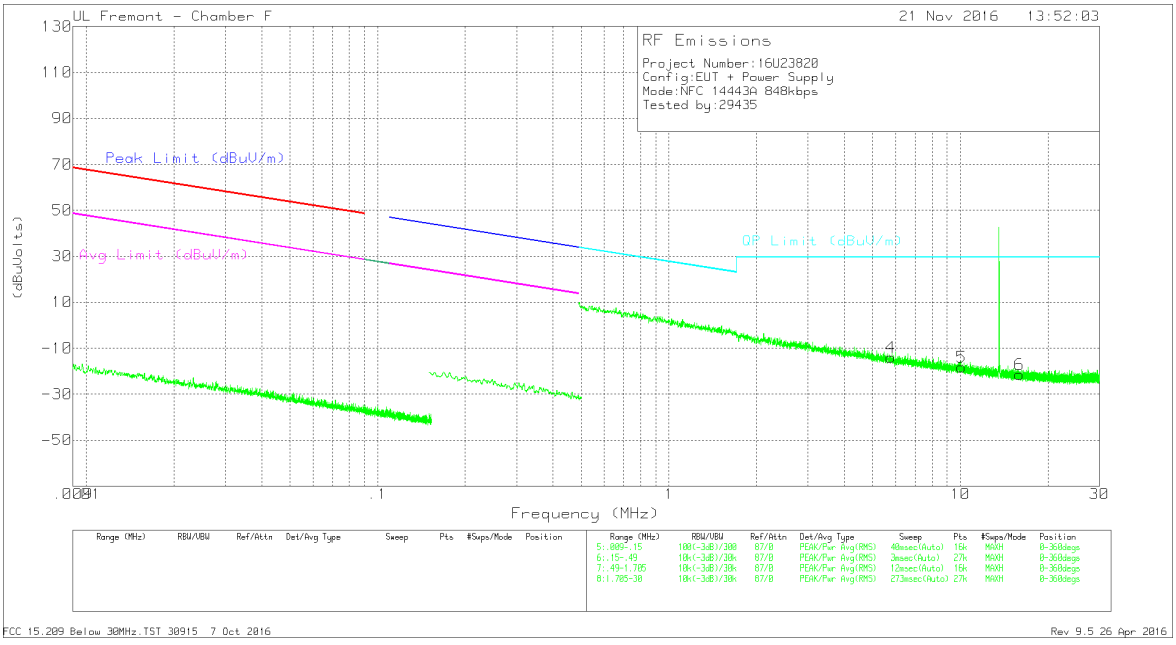
Pk - Peak detector

SPURIOUS EMISSIONS 848kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



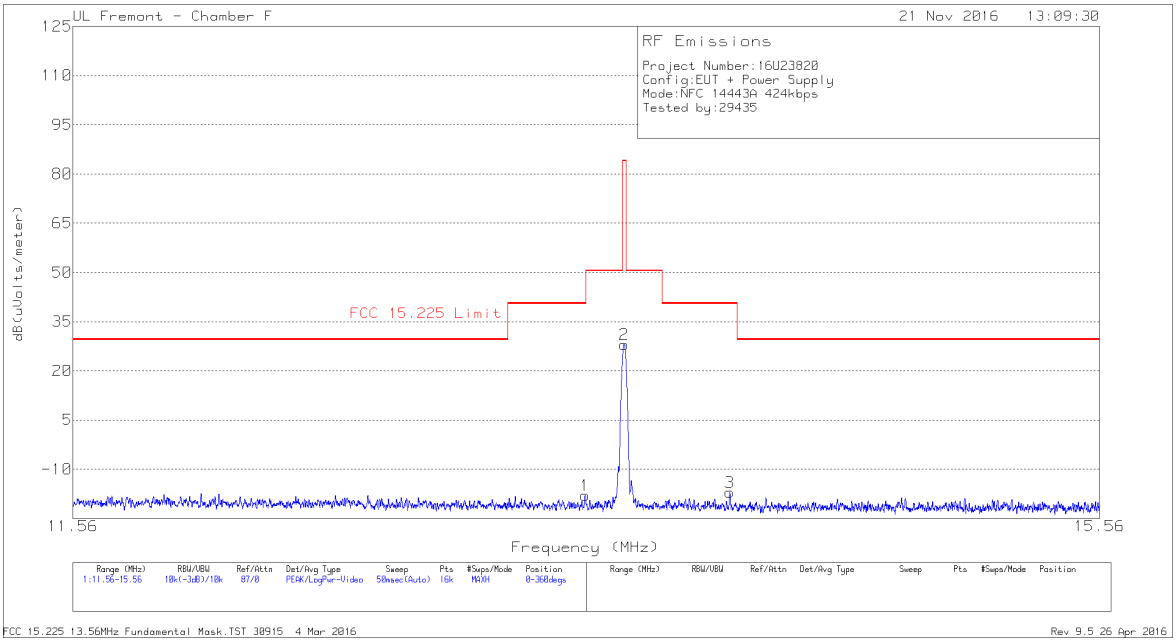
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	5.16969	14.6	Pk	11.5	.2	-40	-13.7	29.5	-43.2	0-360
2	8.4384	13.37	Pk	11.2	.3	-40	-15.13	29.5	-44.63	0-360
3	17.818	8.49	Pk	10.1	.5	-40	-20.91	29.5	-50.41	0-360
4	5.77281	14.34	Pk	11.4	.2	-40	-14.06	29.5	-43.56	0-360
5	10.08586	10.54	Pk	11	.3	-40	-18.16	29.5	-47.66	0-360
6	15.95675	7.9	Pk	10.4	.4	-40	-21.3	29.5	-50.8	0-360

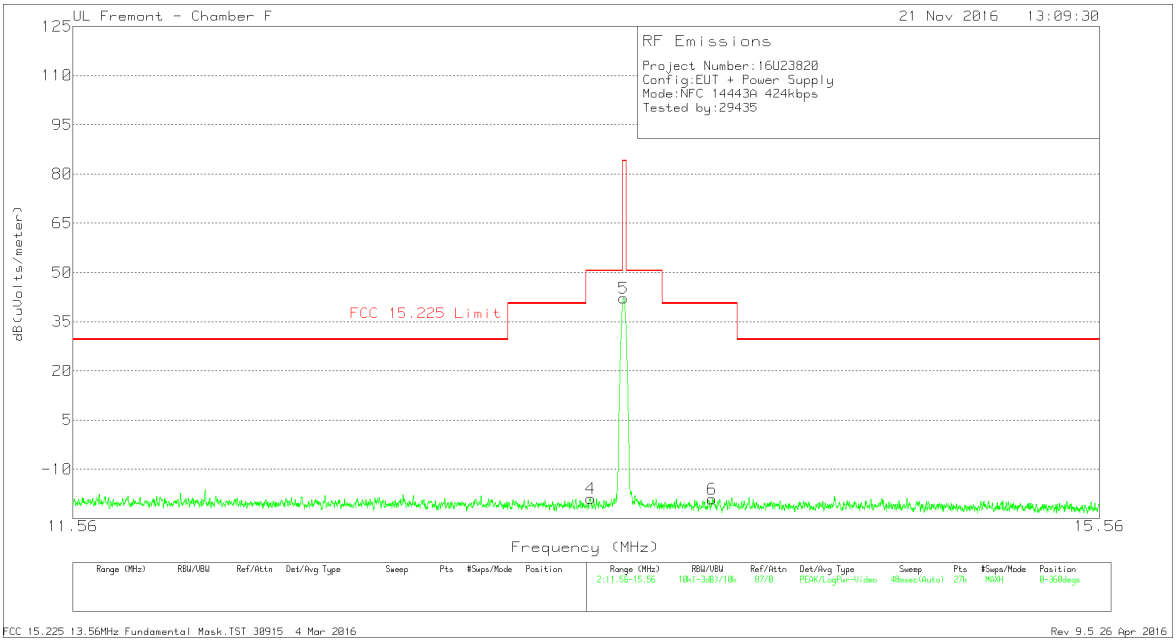
Pk - Peak detector

FUNDAMENTAL 424Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



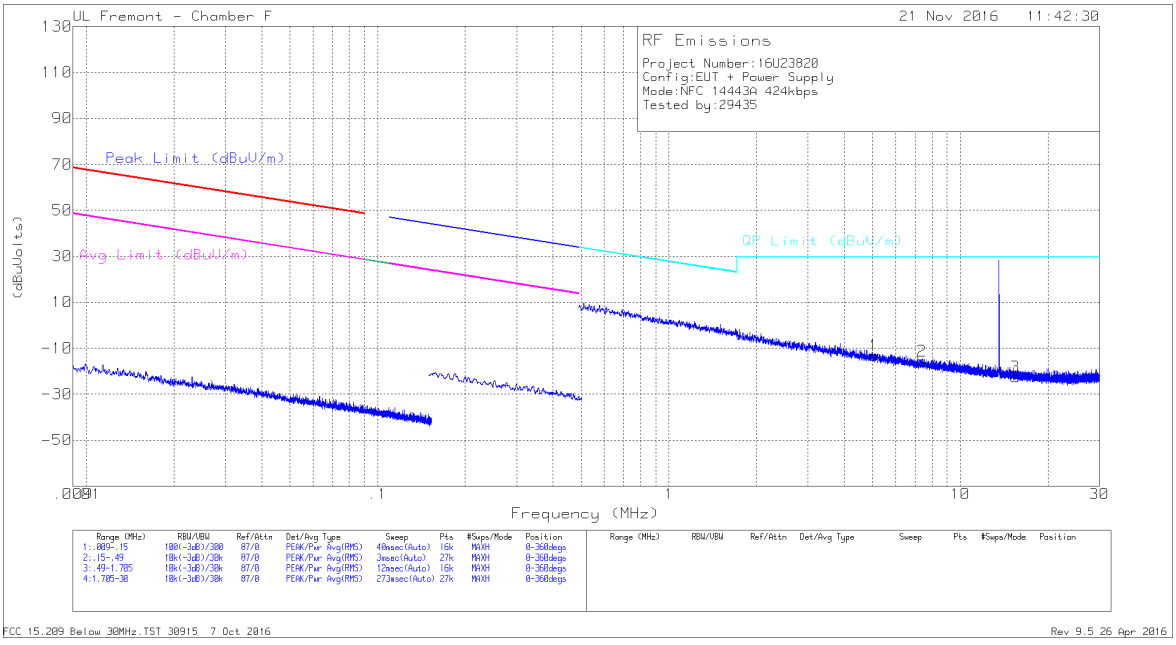
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)
1	13.40775	10.99	Pk	10.7	.4	-40	-17.91	40.51	-58.42	0-360
2	13.56025	57.05	Pk	10.6	.4	-40	28.05	84	-55.95	0-360
3	13.98088	11.95	Pk	10.6	.4	-40	-17.05	40.51	-57.56	0-360
4	13.42872	9.99	Pk	10.7	.4	-40	-18.91	50.5	-69.41	0-360
5	13.55793	71.1	Pk	10.6	.4	-40	42.1	84	-41.9	0-360
6	13.91017	9.96	Pk	10.6	.4	-40	-19.04	40.51	-59.55	0-360

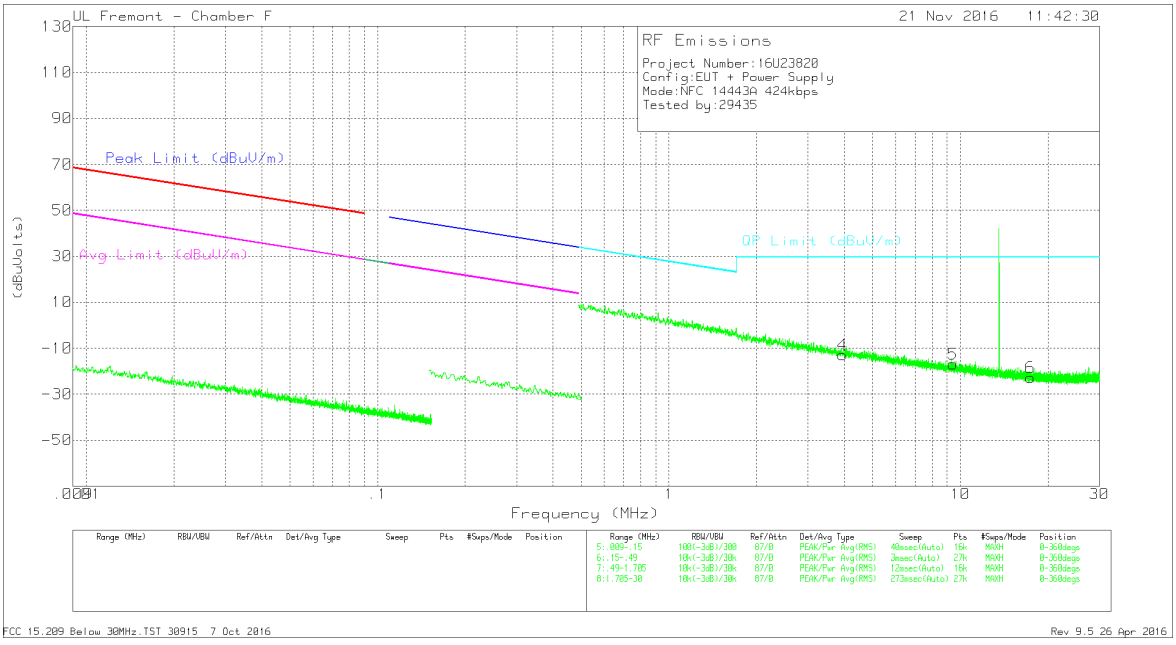
Pk - Peak detector

SPURIOUS EMISSIONS 424kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



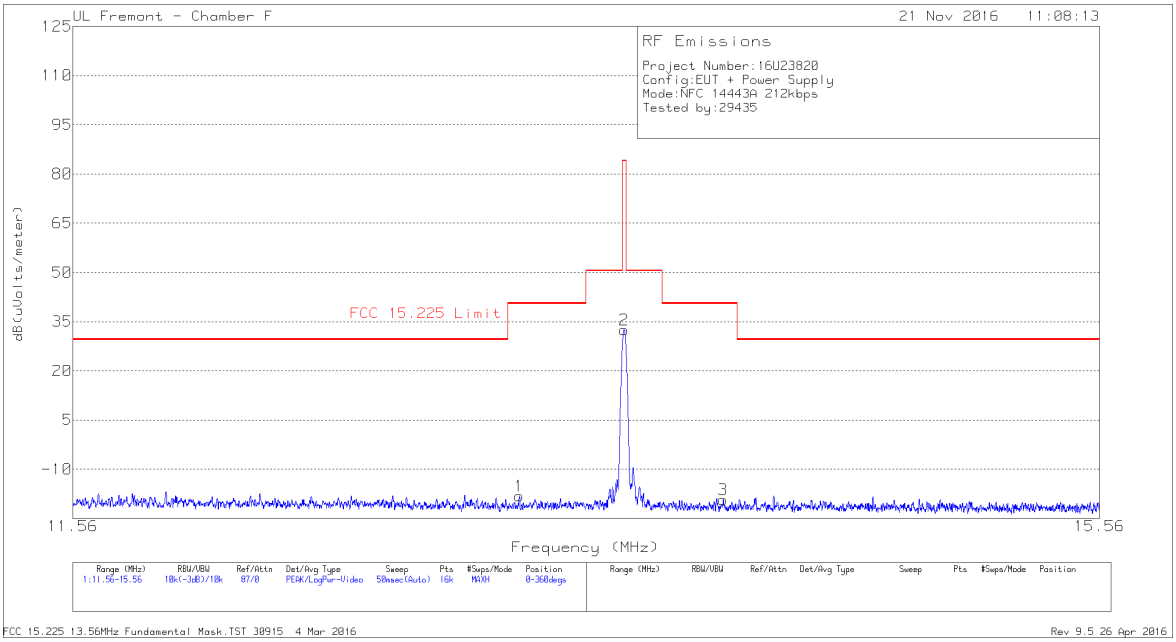
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	5.03607	15.08	Pk	11.5	.2	-40	-13.22	29.5	-42.72	0-360
2	7.38097	12.77	Pk	11.3	.3	-40	-15.63	29.5	-45.13	0-360
3	15.42018	6.83	Pk	10.4	.4	-40	-22.37	29.5	-51.87	0-360
4	3.94772	15.38	Pk	11.6	.2	-40	-12.82	29.5	-42.32	0-360
5	9.43295	11.73	Pk	11.1	.3	-40	-16.87	29.5	-46.37	0-360
6	17.39461	6.48	Pk	10.2	.5	-40	-22.82	29.5	-52.32	0-360

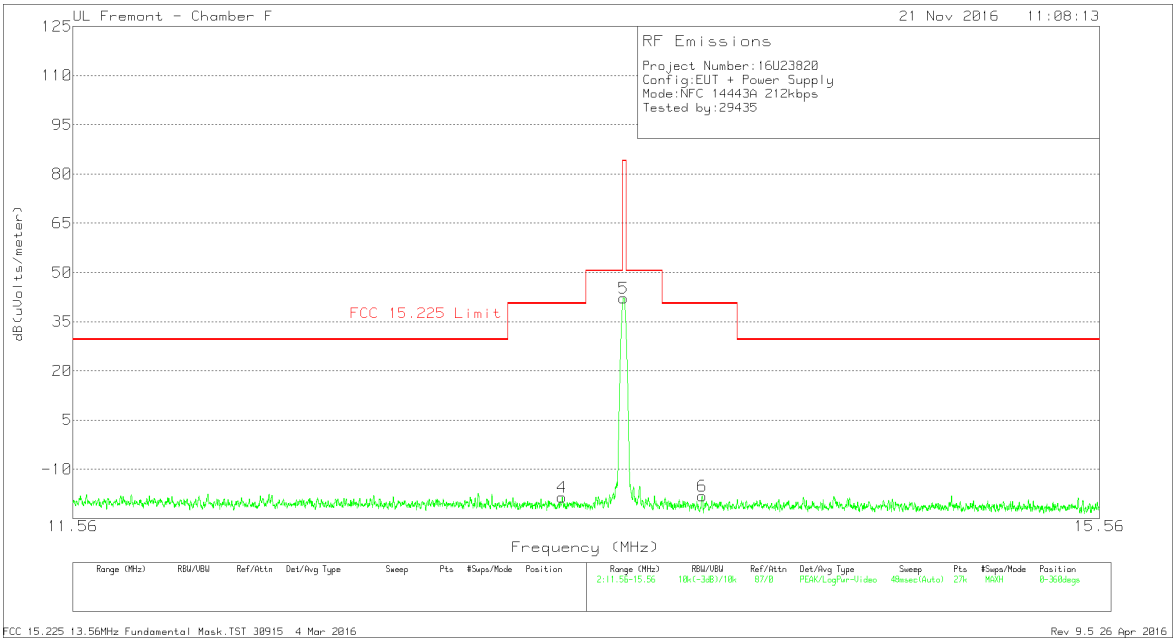
Pk - Peak detector

FUNDAMENTAL 212Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



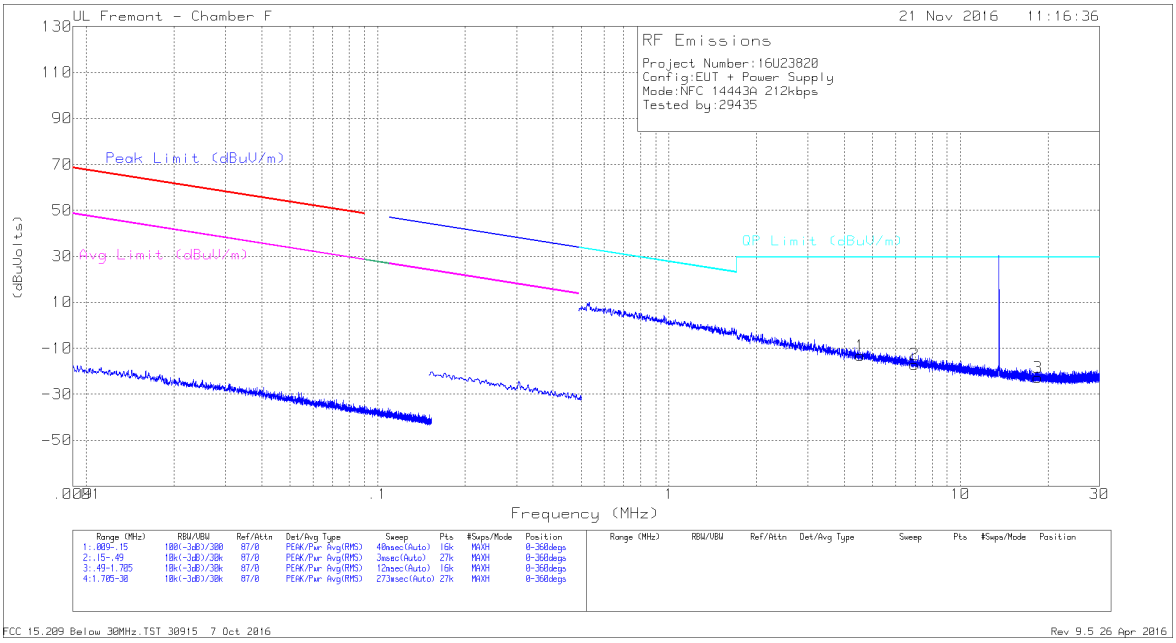
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)
1	13.15513	10.73	Pk	10.7	.4	-40	-18.17	40.51	-58.68	0-360
2	13.56025	61.51	Pk	10.6	.4	-40	32.51	84	-51.49	0-360
3	13.95475	9.71	Pk	10.6	.4	-40	-19.29	40.51	-59.8	0-360
4	13.3192	10.35	Pk	10.7	.4	-40	-18.55	40.51	-59.06	0-360
5	13.55793	71.26	Pk	10.6	.4	-40	42.26	84	-41.74	0-360
6	13.86961	10.77	Pk	10.6	.4	-40	-18.23	40.51	-58.74	0-360

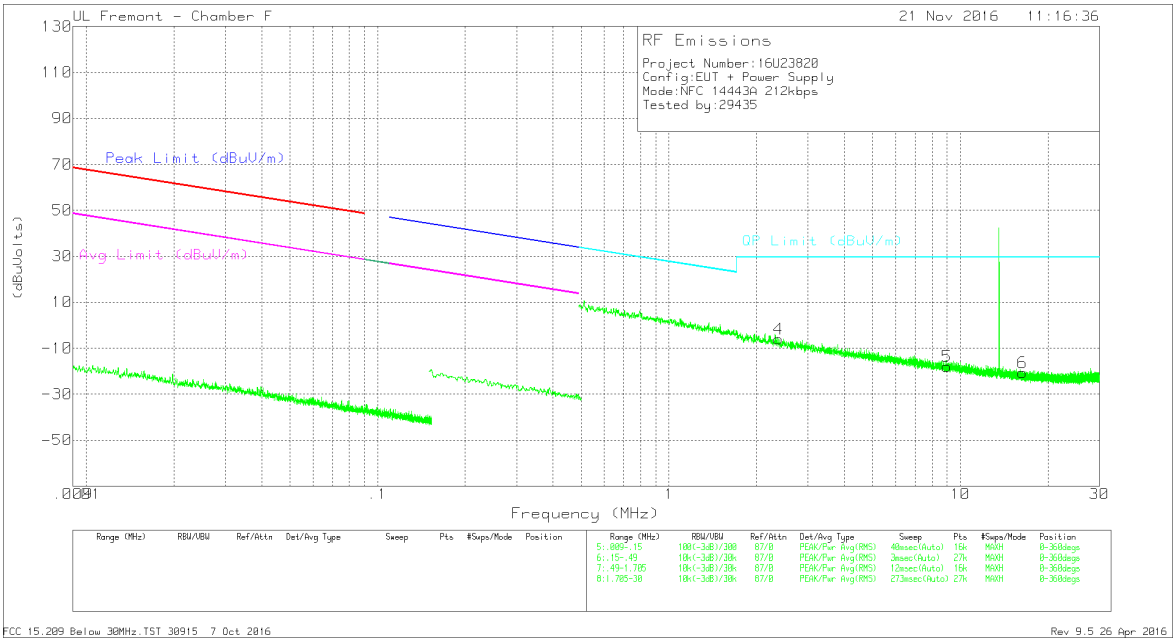
Pk - Peak detector

SPURIOUS EMISSIONS 212kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



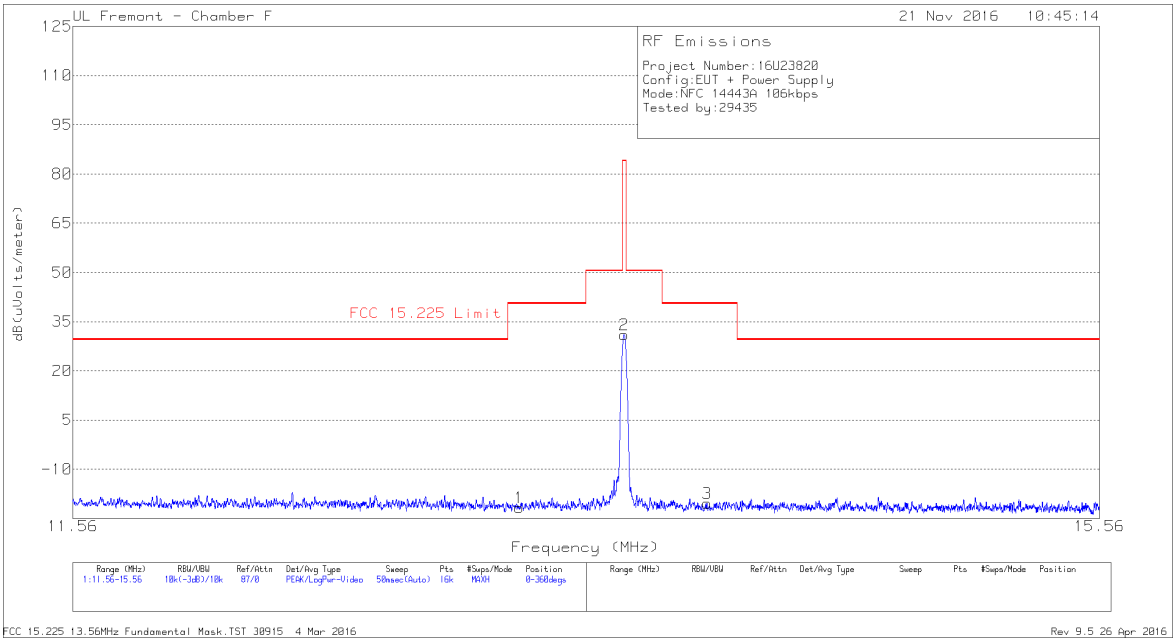
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	4.53355	15.15	Pk	11.5	.2	-40	-13.15	29.5	-42.65	0-360
2	6.96177	11.37	Pk	11.3	.3	-40	-17.03	29.5	-46.53	0-360
3	18.42951	6.69	Pk	10	.5	-40	-22.81	29.5	-52.31	0-360
4	2.38148	21.98	Pk	11.9	.2	-40	-5.92	29.5	-35.42	0-360
5	8.98441	10.72	Pk	11.1	.3	-40	-17.88	29.5	-47.38	0-360
6	16.33718	8.64	Pk	10.3	.4	-40	-20.66	29.5	-50.16	0-360

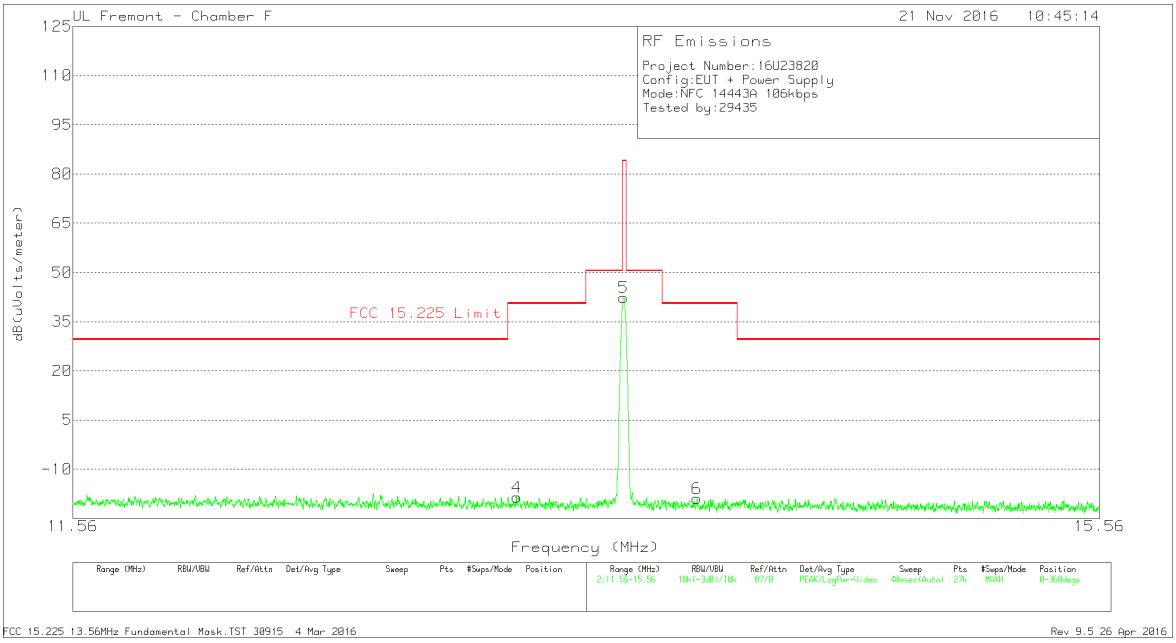
Pk - Peak detector

FUNDAMENTAL 106Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



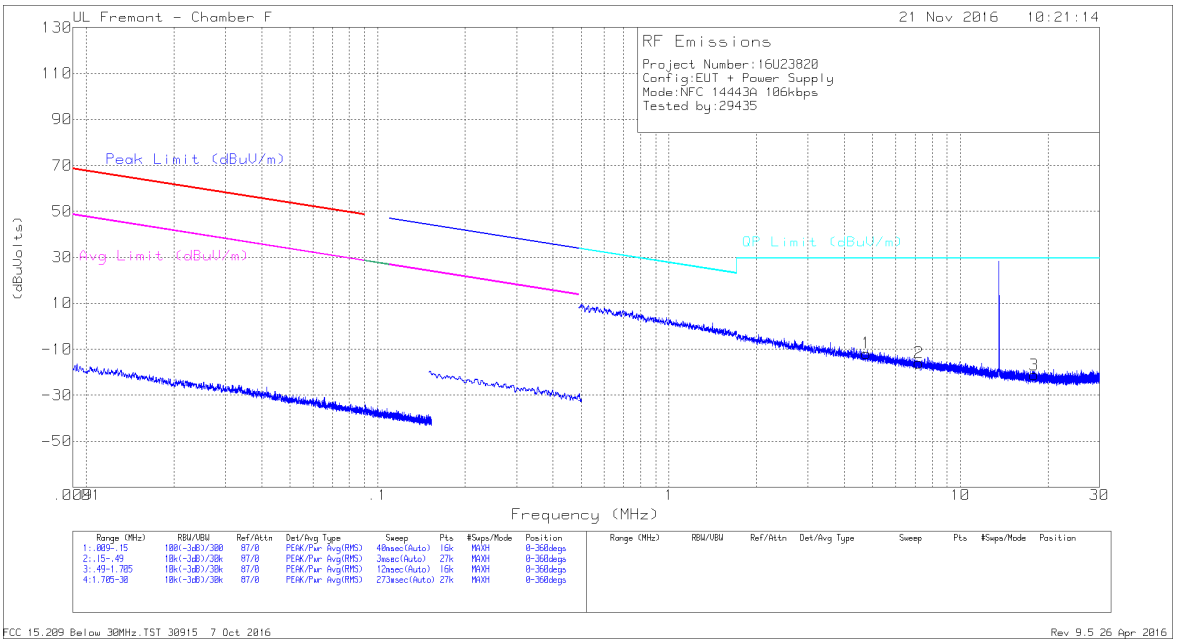
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)
1	13.15563	7.2	Pk	10.7	.4	-40	-21.7	40.51	-62.21	0-360
2	13.56025	59.98	Pk	10.6	.4	-40	30.98	84	-53.02	0-360
3	13.88913	8.65	Pk	10.6	.4	-40	-20.35	40.51	-60.86	0-360
4	13.14434	10.37	Pk	10.7	.4	-40	-18.53	40.51	-59.04	0-360
5	13.55807	71.3	Pk	10.6	.4	-40	42.3	84	-41.7	0-360
6	13.84875	10.02	Pk	10.6	.4	-40	-18.98	40.51	-59.49	0-360

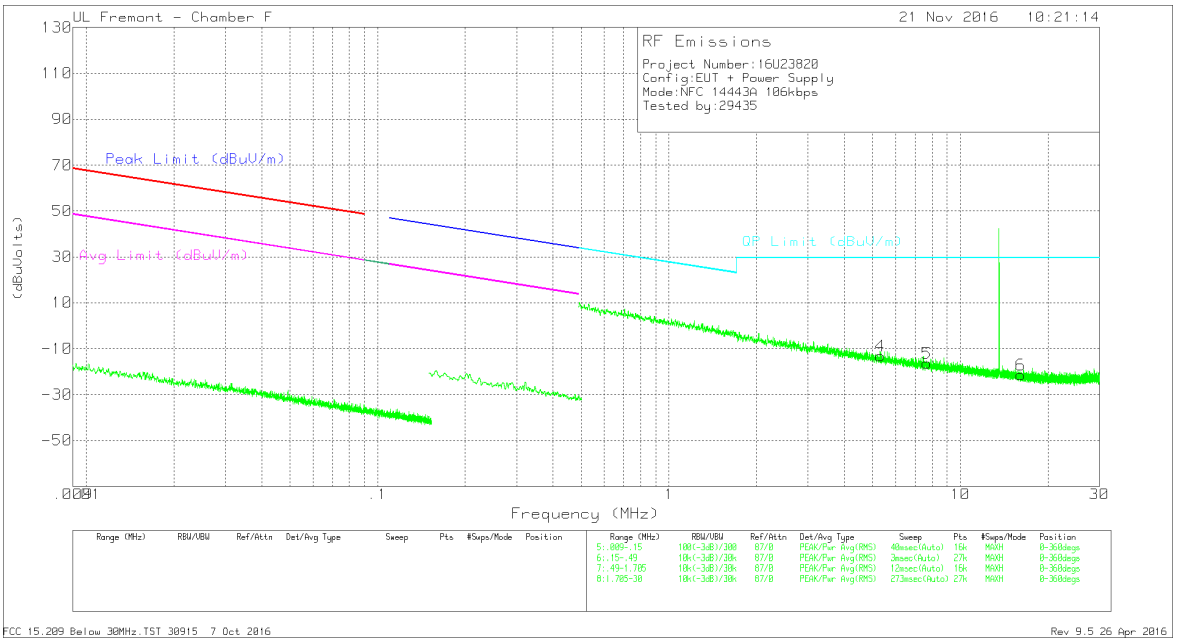
Pk - Peak detector

SPURIOUS EMISSIONS 106Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



DATA

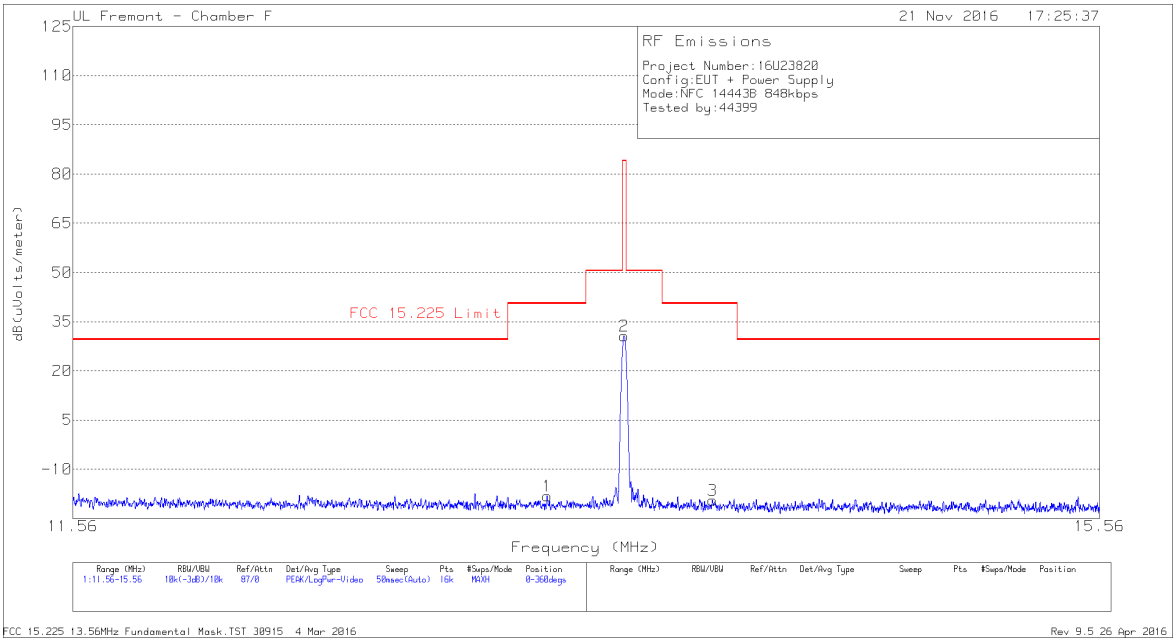
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	4.76306	16.59	Pk	11.5	.2	-40	-11.71	29.5	-41.21	0-360
2	7.19652	12.44	Pk	11.3	.3	-40	-15.96	29.5	-45.46	0-360
3	17.91337	8.23	Pk	10.1	.5	-40	-21.17	29.5	-50.67	0-360
4	5.31222	15.11	Pk	11.5	.2	-40	-13.19	29.5	-42.69	0-360
5	7.66393	12.11	Pk	11.2	.3	-40	-16.39	29.5	-45.89	0-360
6	16.10347	7.85	Pk	10.3	.4	-40	-21.45	29.5	-50.95	0-360

Pk - Peak detector

8.2.2. 14443B

FUNDAMENTAL 848Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF

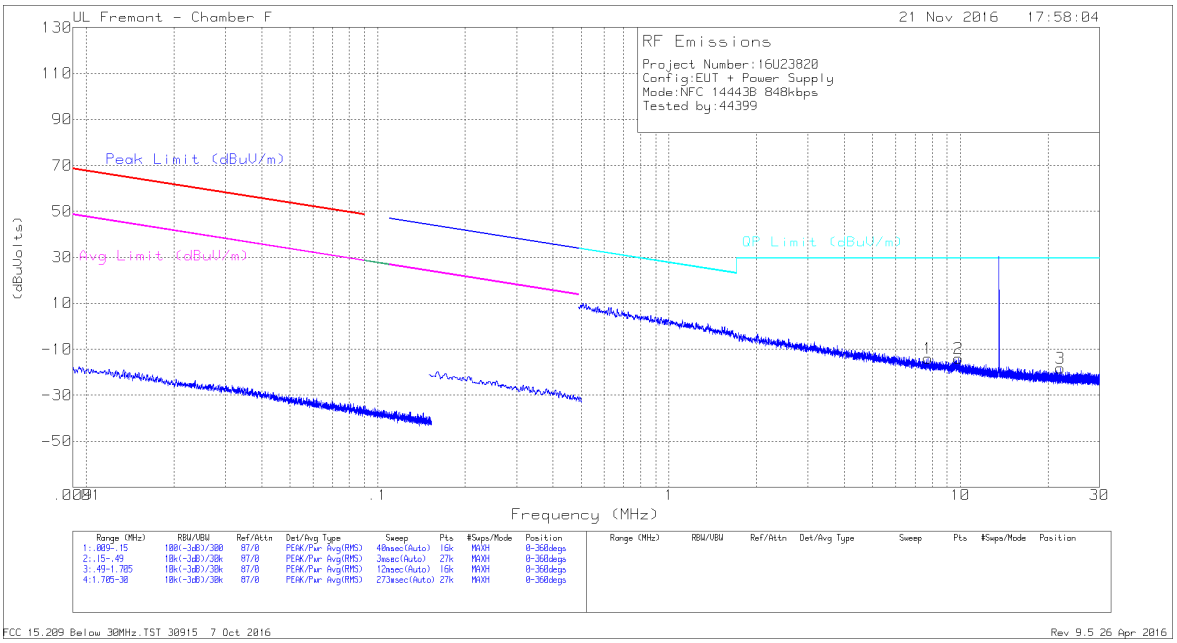
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)
1	13.261	10.8	Pk	10.7	.4	-40	-18.1	40.51	-58.61	0-360
2	13.55988	59.6	Pk	10.6	.4	-40	30.6	84	-53.4	0-360
3	13.91125	9.61	Pk	10.6	.4	-40	-19.39	40.51	-59.9	0-360
4	13.29086	9.84	Pk	10.7	.4	-40	-19.06	40.51	-59.57	0-360
5	13.55963	70.71	Pk	10.6	.4	-40	41.71	84	-42.29	0-360
6	13.88922	9.64	Pk	10.6	.4	-40	-19.36	40.51	-59.87	0-360

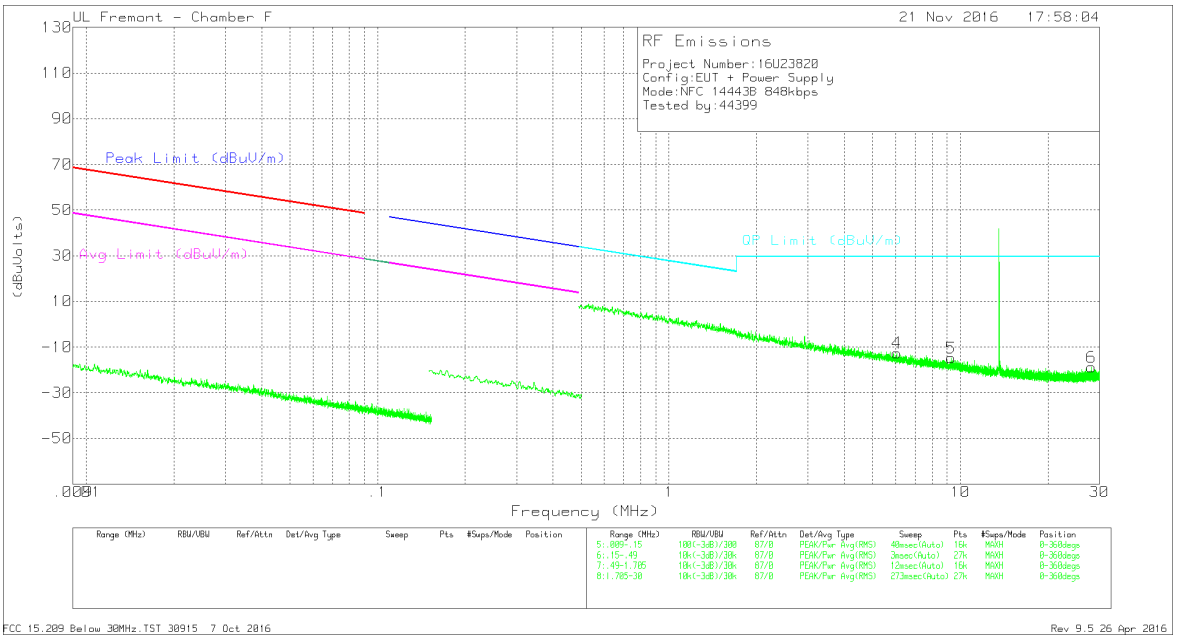
Pk - Peak detector

SPURIOUS EMISSIONS 848Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



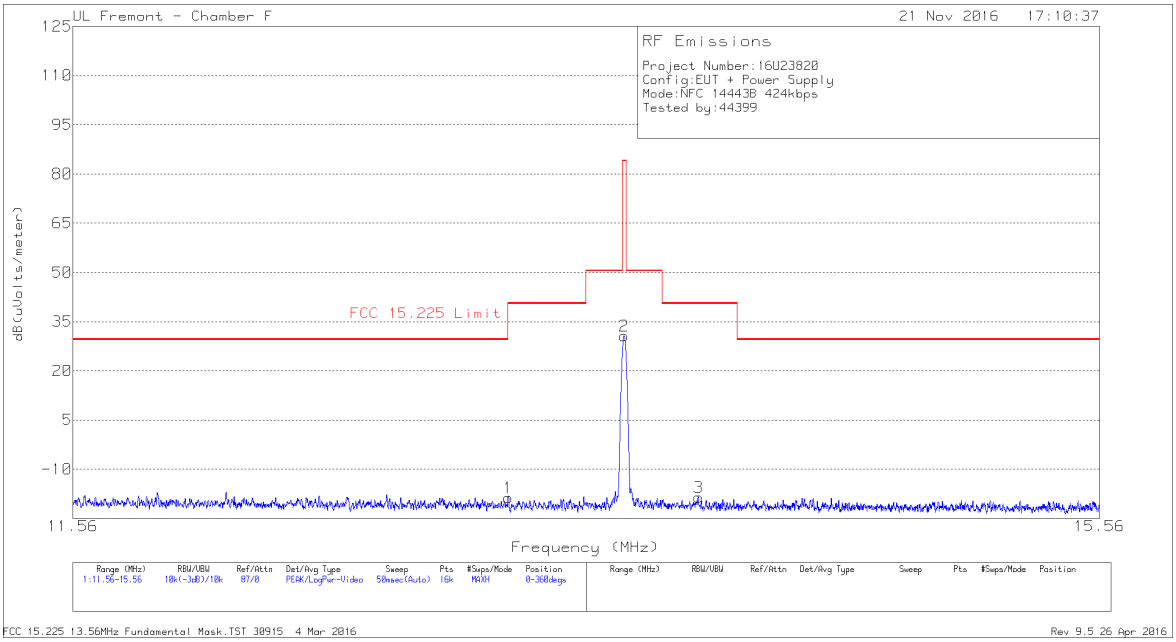
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	7.74672	14.49	Pk	11.2	.3	-40	-14.01	29.5	-43.51	0-360
2	9.84167	14.76	Pk	11	.3	-40	-13.94	29.5	-43.44	0-360
3	22.06554	11.77	Pk	9.5	.6	-40	-18.13	29.5	-47.63	0-360
4	6.05839	15.88	Pk	11.4	.2	-40	-12.52	29.5	-42.02	0-360
5	9.29252	13.88	Pk	11.1	.3	-40	-14.72	29.5	-44.22	0-360
6	28.14604	11.81	Pk	8.7	.7	-40	-18.79	29.5	-48.29	0-360

Pk - Peak detector

FUNDAMENTAL 424Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF

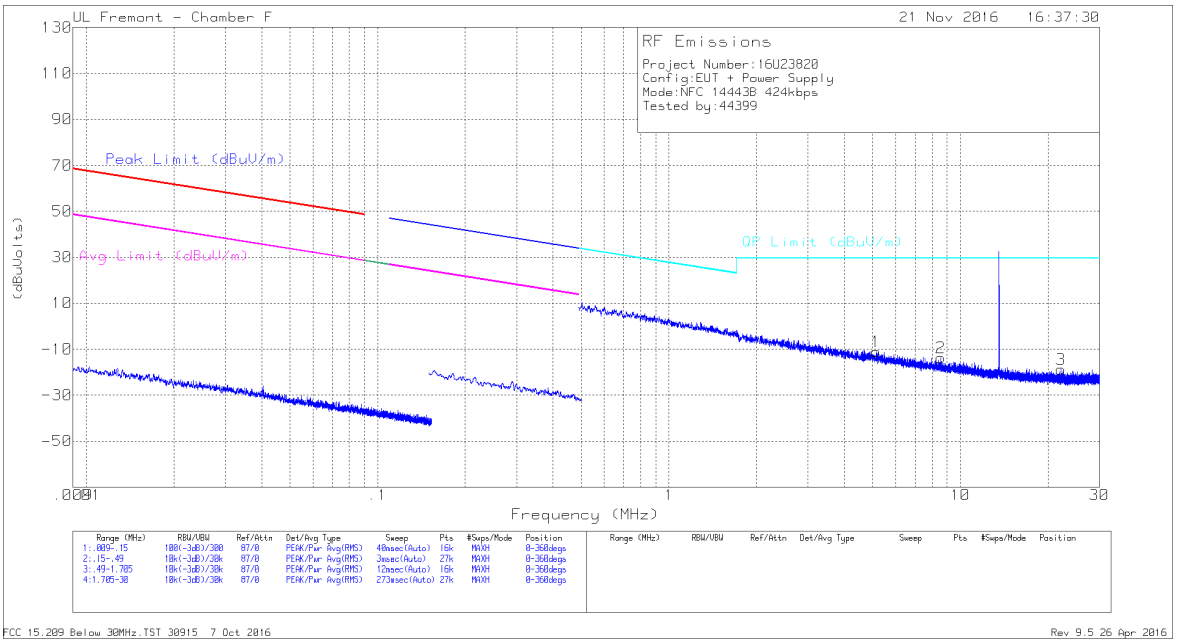
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)
1	13.114	10.22	Pk	10.7	.4	-40	-18.68	40.51	-59.19	0-360
2	13.55925	59.59	Pk	10.6	.4	-40	30.59	84	-53.41	0-360
3	13.8545	10.53	Pk	10.6	.4	-40	-18.47	40.51	-58.98	0-360
4	13.19222	9.14	Pk	10.7	.4	-40	-19.76	40.51	-60.27	0-360
5	13.55963	71.48	Pk	10.6	.4	-40	42.48	84	-41.52	0-360
6	14.01488	9.39	Pk	10.6	.4	-40	-19.61	29.54	-49.15	0-360

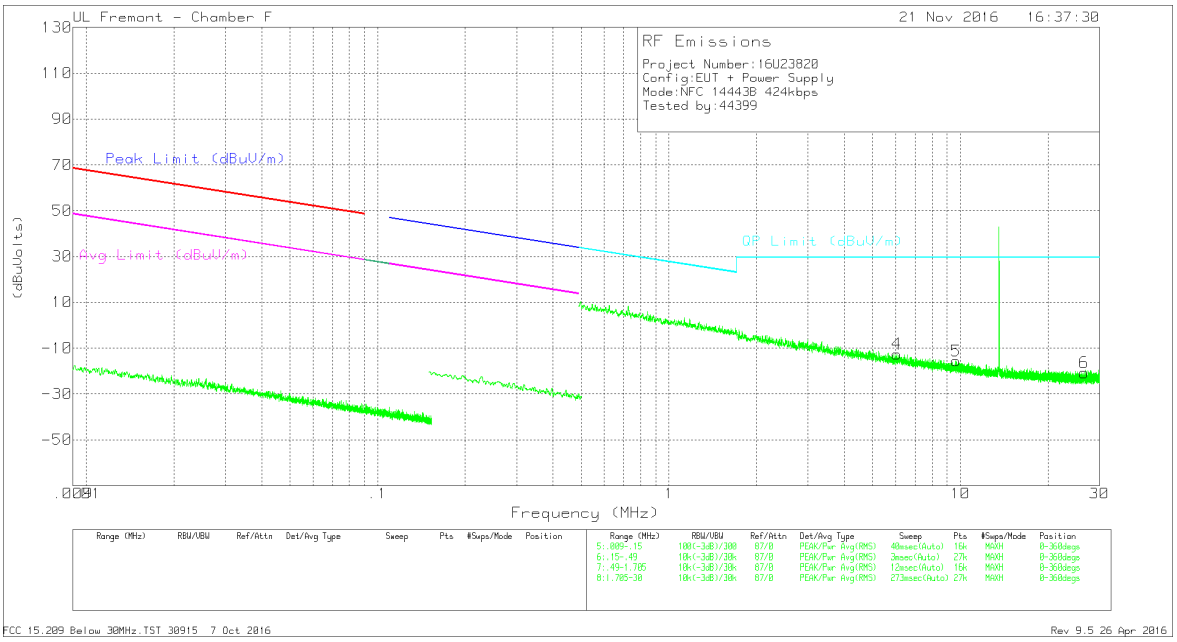
Pk - Peak detector

SPURIOUS EMISSIONS 424Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



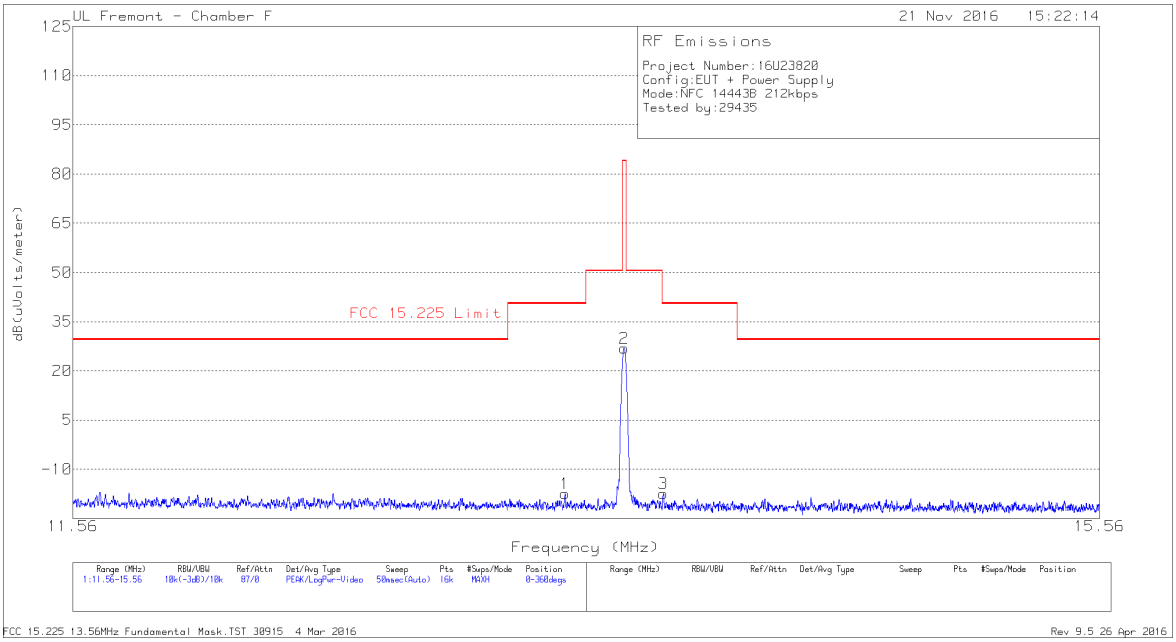
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	5.14768	17.33	Pk	11.5	.2	-40	-10.97	29.5	-40.47	0-360
2	8.54949	14.85	Pk	11.1	.3	-40	-13.75	29.5	-43.25	0-360
3	22.13157	11.16	Pk	9.5	.6	-40	-18.74	29.5	-48.24	0-360
4	6.0521	15.89	Pk	11.4	.2	-40	-12.51	29.5	-42.01	0-360
5	9.64674	13.12	Pk	11	.3	-40	-15.58	29.5	-45.08	0-360
6	26.55413	9.66	Pk	8.9	.7	-40	-20.74	29.5	-50.24	0-360

Pk - Peak detector

FUNDAMENTAL 212Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF

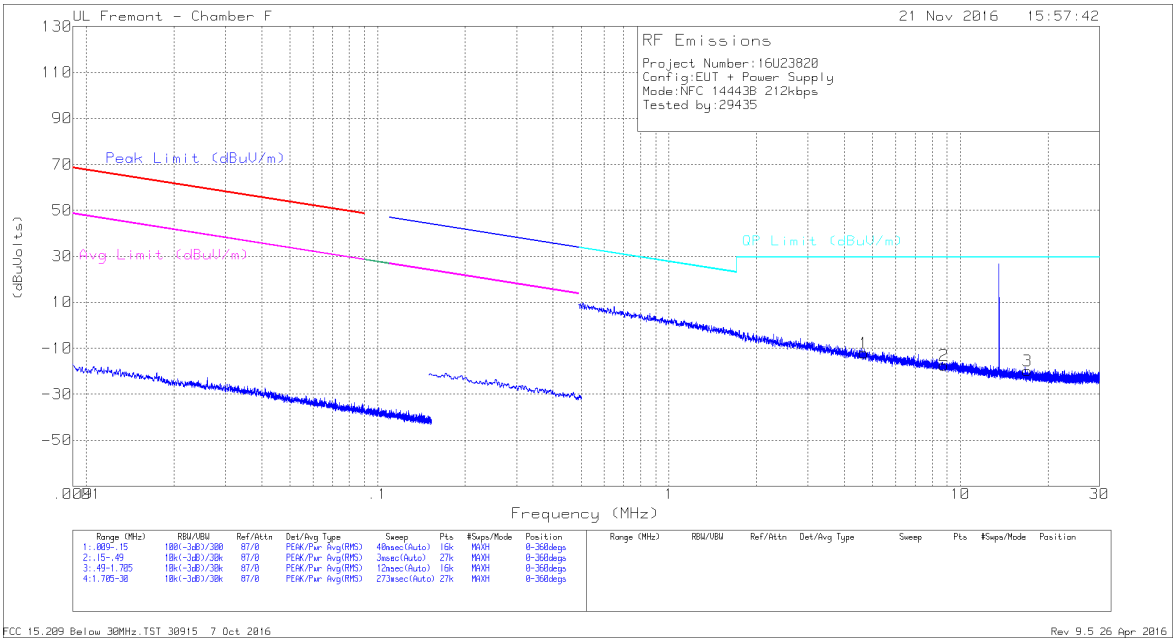
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)
1	13.33025	11.51	Pk	10.7	.4	-40	-17.39	40.51	-57.9	0-360
2	13.55988	55.9	Pk	10.6	.4	-40	26.9	84	-57.1	0-360
3	13.71463	11.59	Pk	10.6	.4	-40	-17.41	40.51	-57.92	0-360
4	13.34954	10.73	Pk	10.7	.4	-40	-18.17	40.51	-58.68	0-360
5	13.55807	69.55	Pk	10.6	.4	-40	40.55	84	-43.45	0-360
6	13.70778	10.99	Pk	10.6	.4	-40	-18.01	50.5	-68.51	0-360

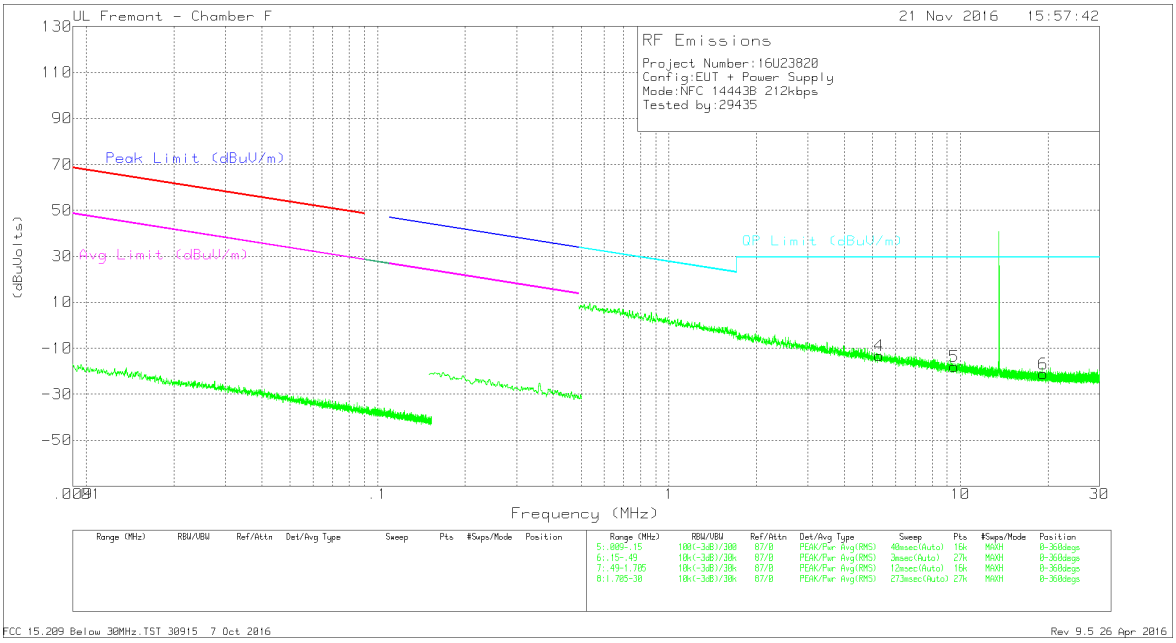
Pk - Peak detector

SPURIOUS EMISSIONS 212Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



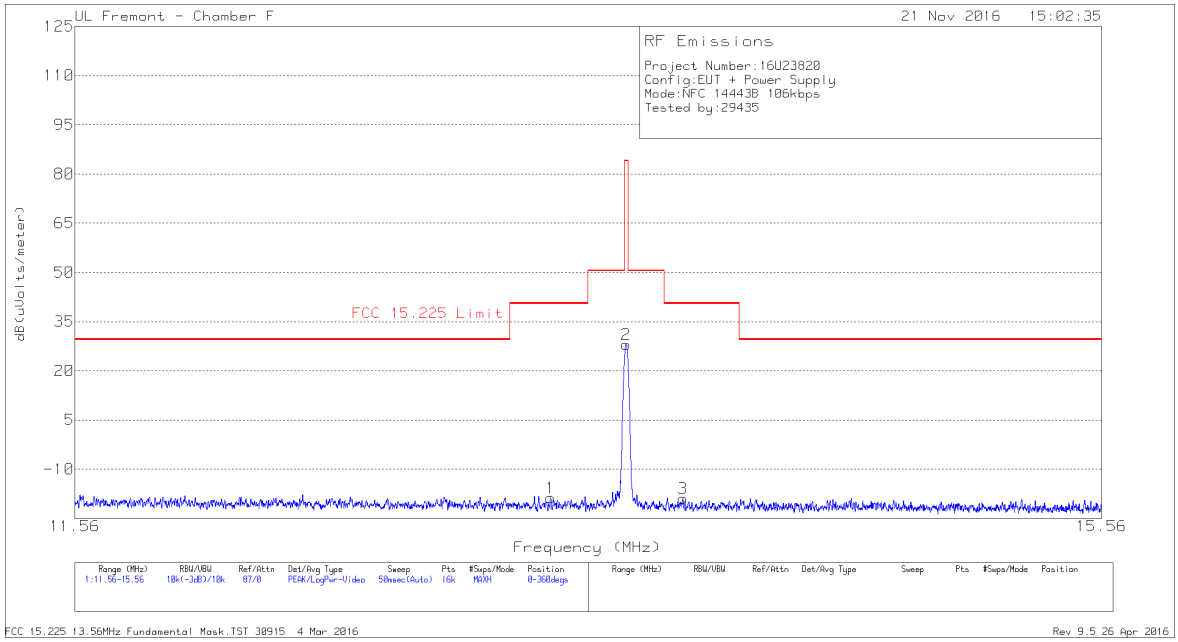
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	4.67084	16.18	Pk	11.5	.2	-40	-12.12	29.5	-41.62	0-360
2	8.77166	11.23	Pk	11.1	.3	-40	-17.37	29.5	-46.87	0-360
3	16.98851	9.37	Pk	10.2	.5	-40	-19.93	29.5	-49.43	0-360
4	5.25929	15.24	Pk	11.5	.2	-40	-13.06	29.5	-42.56	0-360
5	9.52937	10.83	Pk	11	.3	-40	-17.87	29.5	-47.37	0-360
6	19.24747	8.36	Pk	9.9	.5	-40	-21.24	29.5	-50.74	0-360

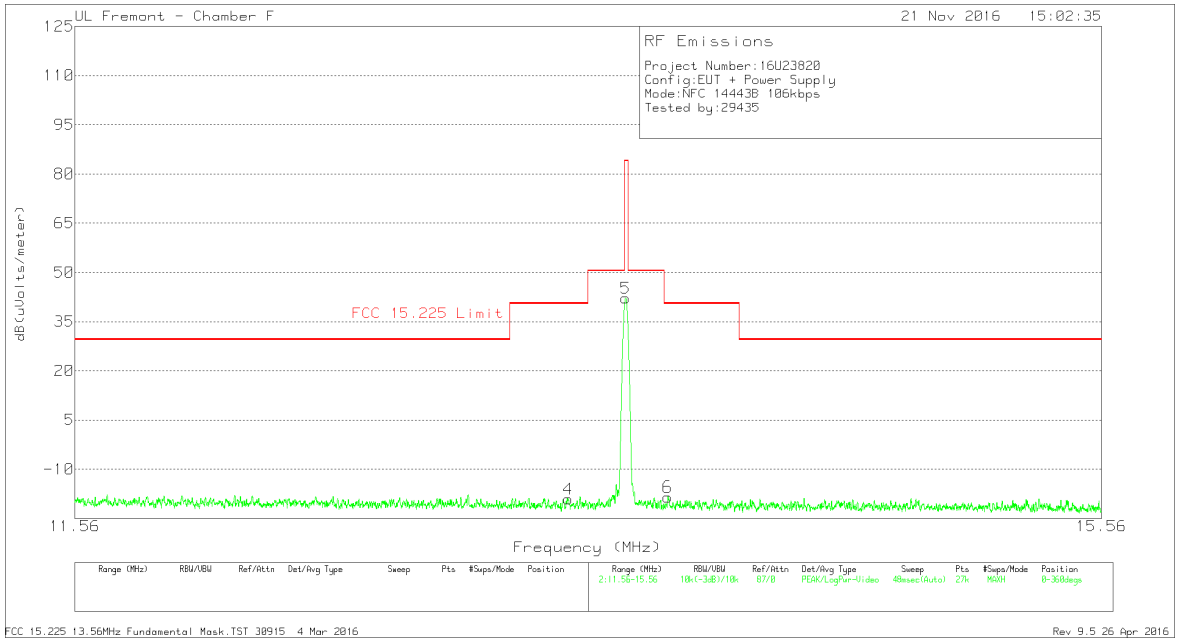
Pk - Peak detector

FUNDAMENTAL 106Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



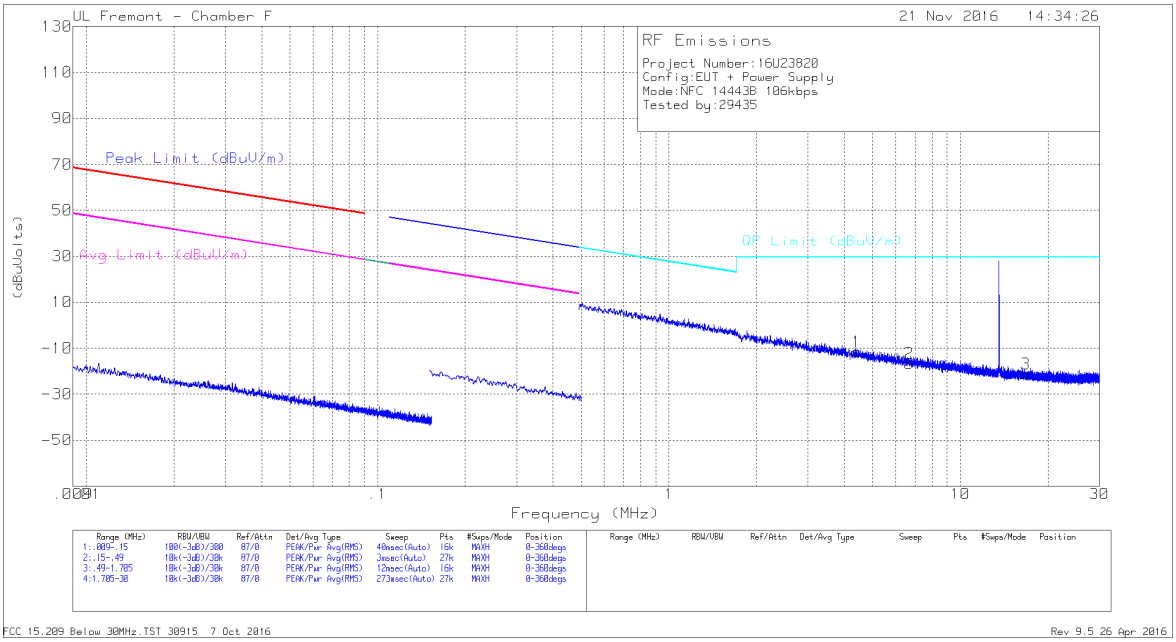
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)
1	13.26675	10.21	Pk	10.7	.4	-40	-18.69	40.51	-59.2	0-360
2	13.55988	57.08	Pk	10.6	.4	-40	28.08	84	-55.92	0-360
3	13.78488	10.16	Pk	10.6	.4	-40	-18.84	40.51	-59.35	0-360
4	13.33408	9.84	Pk	10.7	.4	-40	-19.06	40.51	-59.57	0-360
5	13.55807	71.22	Pk	10.6	.4	-40	42.22	84	-41.78	0-360
6	13.72494	10.55	Pk	10.6	.4	-40	-18.45	40.51	-58.96	0-360

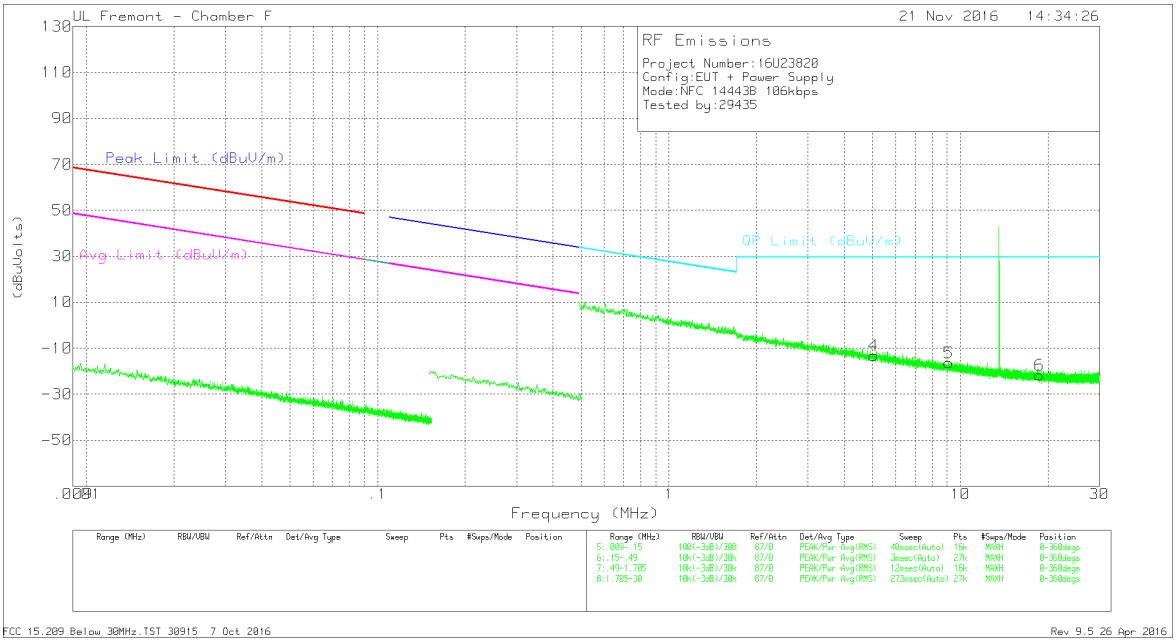
Pk - Peak detector

SPURIOUS EMISSIONS 106Kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



DATA

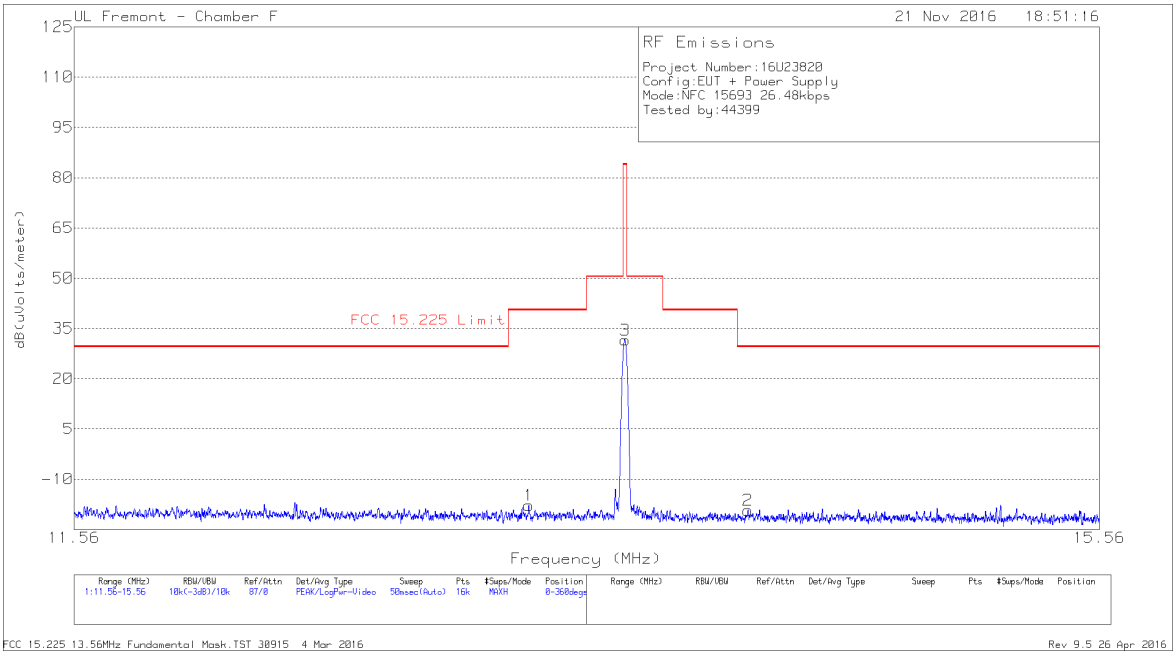
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	4.40884	16.51	Pk	11.6	.2	-40	-11.69	29.5	-41.19	0-360
2	6.66204	11.81	Pk	11.3	.2	-40	-16.69	29.5	-46.19	0-360
3	16.74118	7.95	Pk	10.3	.5	-40	-21.25	29.5	-50.75	0-360
4	5.03659	15.05	Pk	11.5	.2	-40	-13.25	29.5	-42.75	0-360
5	9.12484	12.26	Pk	11.1	.3	-40	-16.34	29.5	-45.84	0-360
6	18.70042	7.76	Pk	10	.5	-40	-21.74	29.5	-51.24	0-360

Pk - Peak detector

8.2.3. 15693

FUNDAMENTAL 26.48kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF

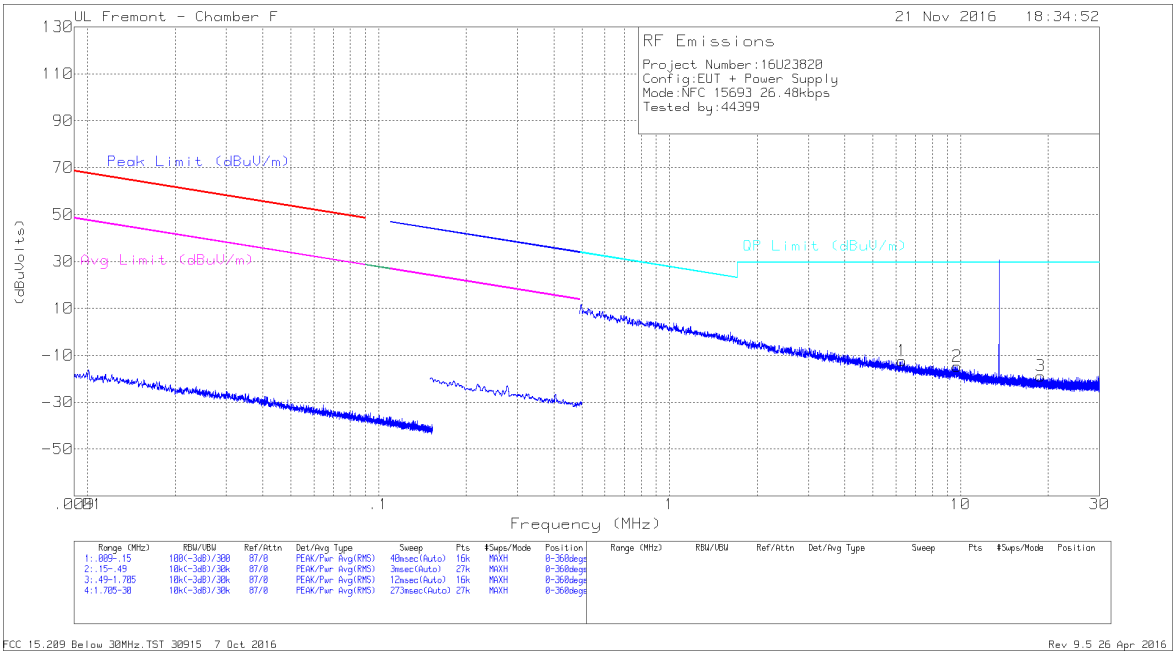
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit	PK Margin (dB)	Azimuth (Degs)
1	13.18788	11.09	Pk	10.7	.4	-40	-17.81	40.51	-58.32	0-360
2	14.05275	9.71	Pk	10.6	.4	-40	-19.29	29.54	-48.83	0-360
3	13.5615	60.51	Pk	10.6	.4	-40	31.51	84	-52.49	0-360
4	13.20916	10.74	Pk	10.7	.4	-40	-18.16	40.51	-58.67	0-360
5	13.55963	70.87	Pk	10.6	.4	-40	41.87	84	-42.13	0-360
6	13.87716	10.3	Pk	10.6	.4	-40	-18.7	40.51	-59.21	0-360

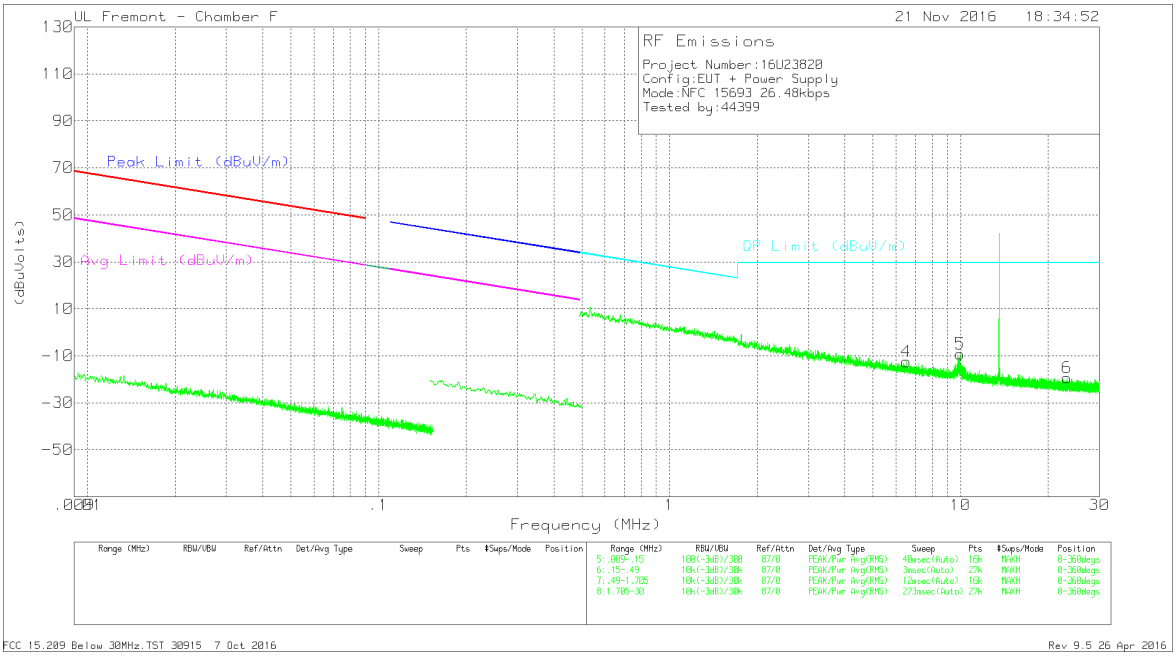
Pk - Peak detector

SPURIOUS EMISSIONS 26.48kbps

ANTENNA LOOP FACE ON



ANTENNA LOOP FACE OFF



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	6.29943	16.08	Pk	11.4	.2	-40	-12.32	29.5	-41.82	0-360
2	9.73163	14	Pk	11	.3	-40	-14.7	29.5	-44.2	0-360
3	18.88382	10.71	Pk	10	.5	-40	-18.79	29.5	-48.29	0-360
4	6.51584	16.04	Pk	11.3	.2	-40	-12.46	29.5	-41.96	0-360
5	9.96953	19.55	Pk	11	.3	-40	-9.15	29.5	-38.65	0-360
6	23.24821	10.81	Pk	9.3	.6	-40	-19.29	29.5	-48.79	0-360

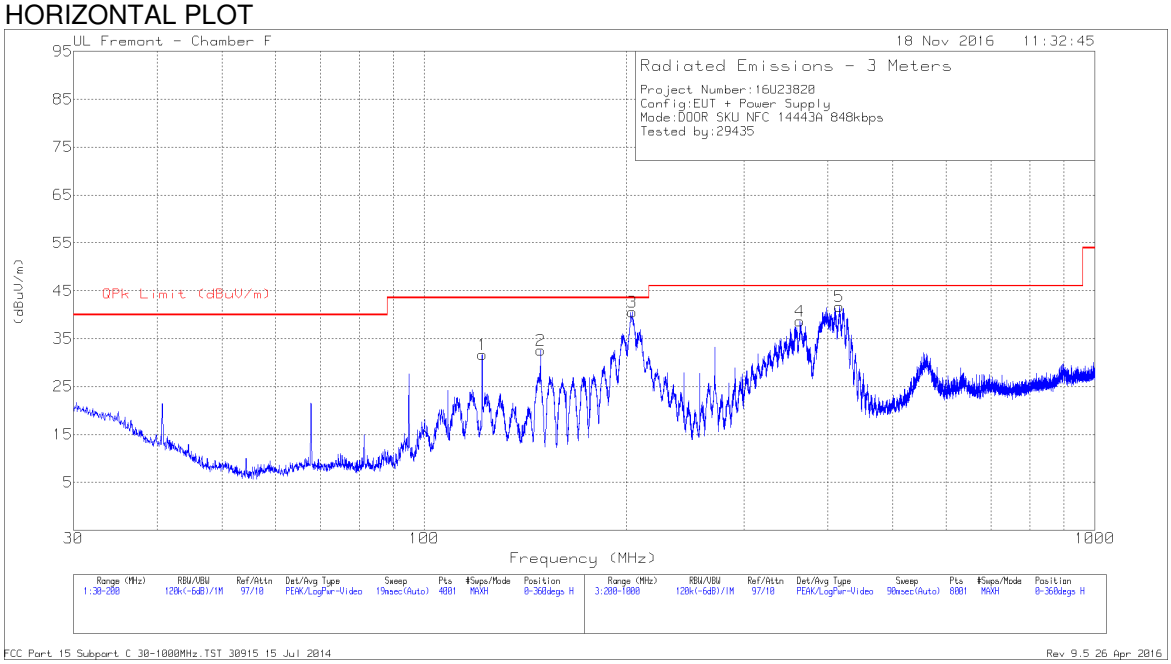
Pk - Peak detector

8.3. TX SPURIOUS EMISSION 30 TO 1000 MHz

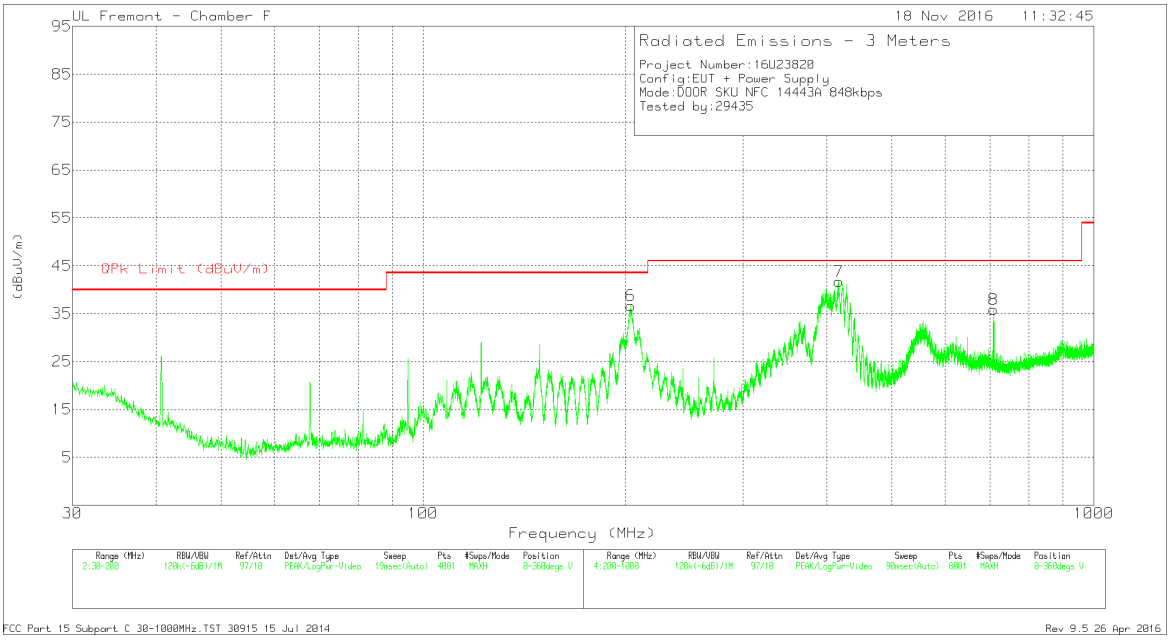
8.3.1. 14443A

848Kbps

HORIZONTAL PLOT



VERTICAL PLOT



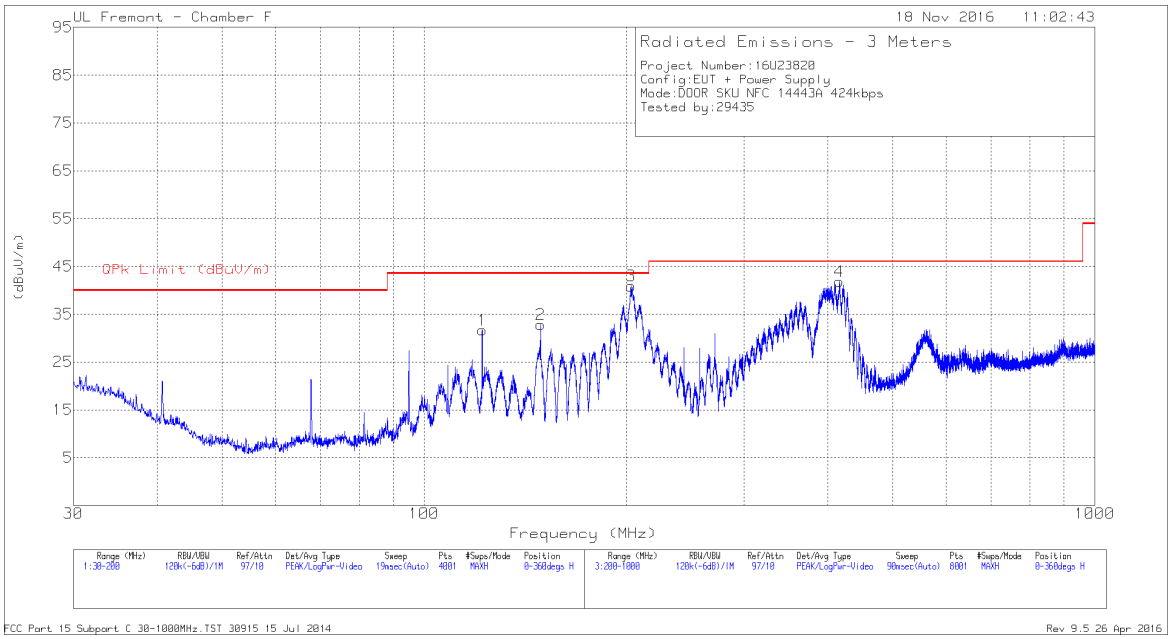
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 122.055	44.6	Pk	18	-30.9	31.7	43.52	-11.82	0-360	199	H
2	149.1275	46.92	Pk	16.5	-30.8	32.62	43.52	-10.9	0-360	199	H
3	204.079	52.63	Qp	15.6	-30.4	37.83	43.52	-5.69	104	111	H
4	363.2	49.35	Pk	18.9	-29.6	38.65	46.02	-7.37	0-360	99	H
5	416.2446	48.37	Qp	20.2	-29.4	39.17	46.02	-6.85	71	100	H
6	203.8	51.51	Pk	15.6	-30.4	36.71	43.52	-6.81	0-360	100	V
7	416.6682	47.95	Qp	20.2	-29.3	38.85	46.02	-7.17	41	104	V
8	709.6	40.02	Pk	24.3	-28.4	35.92	46.02	-10.1	0-360	100	V

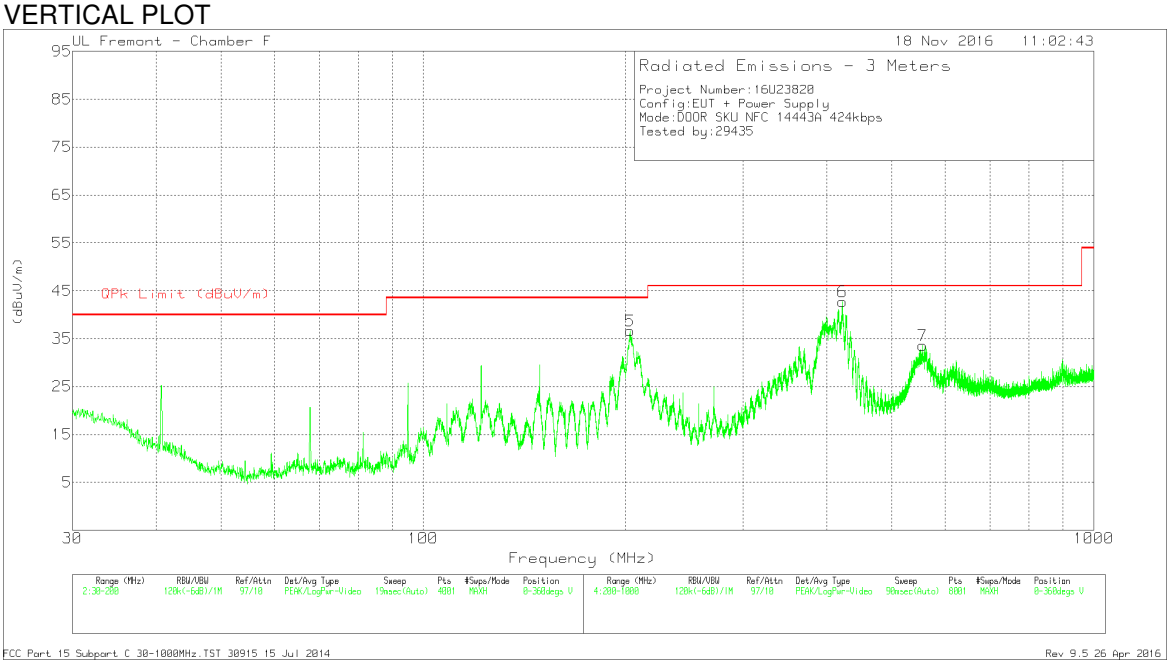
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Qp - Quasi-Peak detector

424Kbps

HORIZONTAL PLOT



VERTICAL PLOT



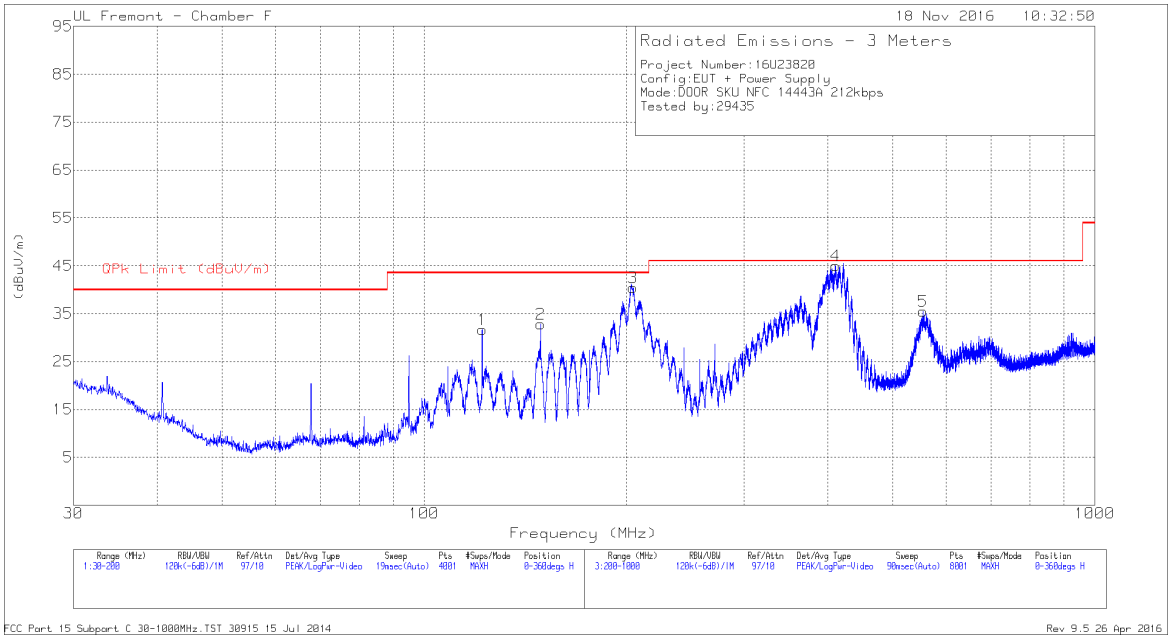
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 122.055	44.62	Pk	18	-30.9	31.72	43.52	-11.8	0-360	299	H
2	149.17	47.13	Pk	16.5	-30.8	32.83	43.52	-10.69	0-360	199	H
3	203.4014	54.47	Qp	15.7	-30.4	39.77	43.52	-3.75	308	159	H
4	416.2222	48.09	Qp	20.2	-29.4	38.89	46.02	-7.13	88	100	H
5	203.4	51.36	Pk	15.7	-30.4	36.66	43.52	-6.86	0-360	100	V
6	421.397	48.59	Qp	20.3	-29.4	39.49	46.02	-6.53	30	106	V
7	555.2	40.22	Pk	22.3	-28.9	33.62	46.02	-12.4	0-360	100	V

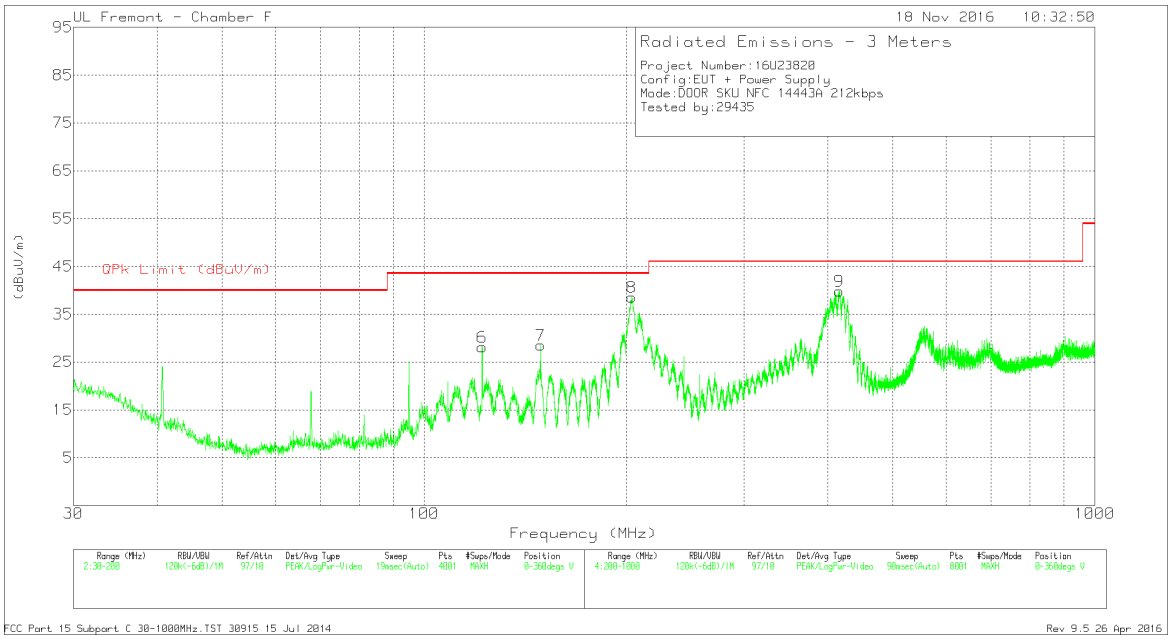
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Qp - Quasi-Peak detector

212Kbps

HORIZONTAL PLOT



VERTICAL PLOT



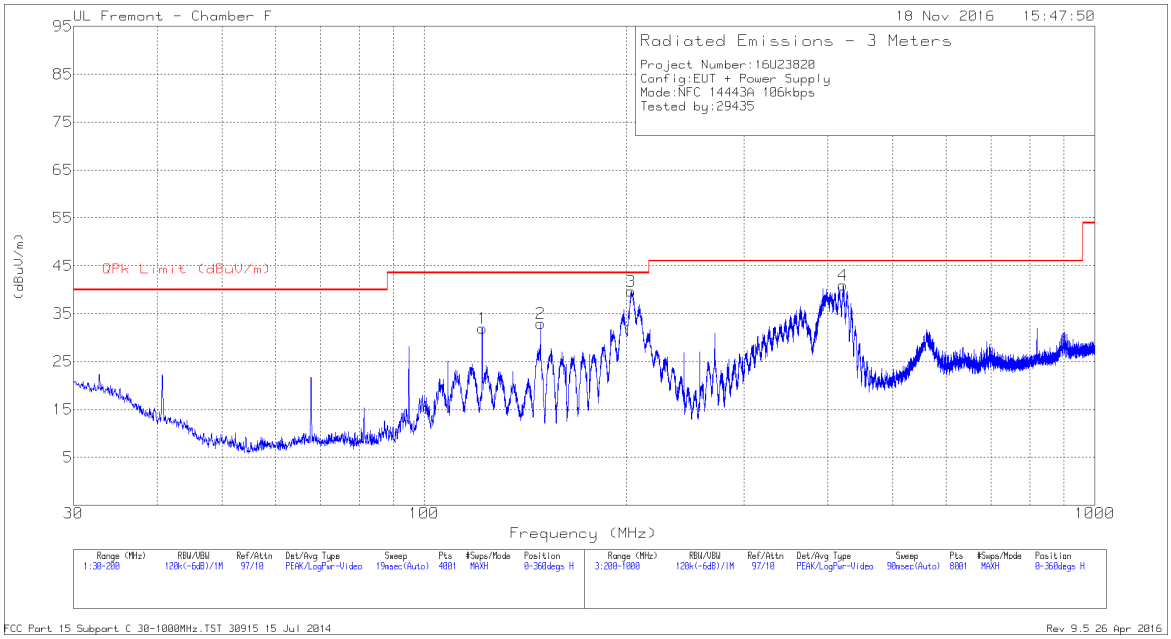
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 122.055	44.63	Pk	18	-30.9	31.73	43.52	-11.79	0-360	299	H
2	149.1275	47.12	Pk	16.5	-30.8	32.82	43.52	-10.7	0-360	199	H
6	* 122.0338	41.05	Pk	18	-30.9	28.15	43.52	-15.37	0-360	100	V
7	149.17	42.77	Pk	16.5	-30.8	28.47	43.52	-15.05	0-360	100	V
3	204.6907	53.34	Qp	15.5	-30.4	38.44	43.52	-5.08	97	126	H
4	410.7246	47.99	Qp	20	-29.4	38.59	46.02	-7.43	78	100	H
5	554.4	42.14	Pk	22.3	-28.9	35.54	46.02	-10.48	0-360	199	H
8	203.7744	48.89	Qp	15.6	-30.4	34.09	43.52	-9.43	358	181	V
9	416.2	49.06	Pk	20.2	-29.4	39.86	46.02	-6.16	0-360	202	V

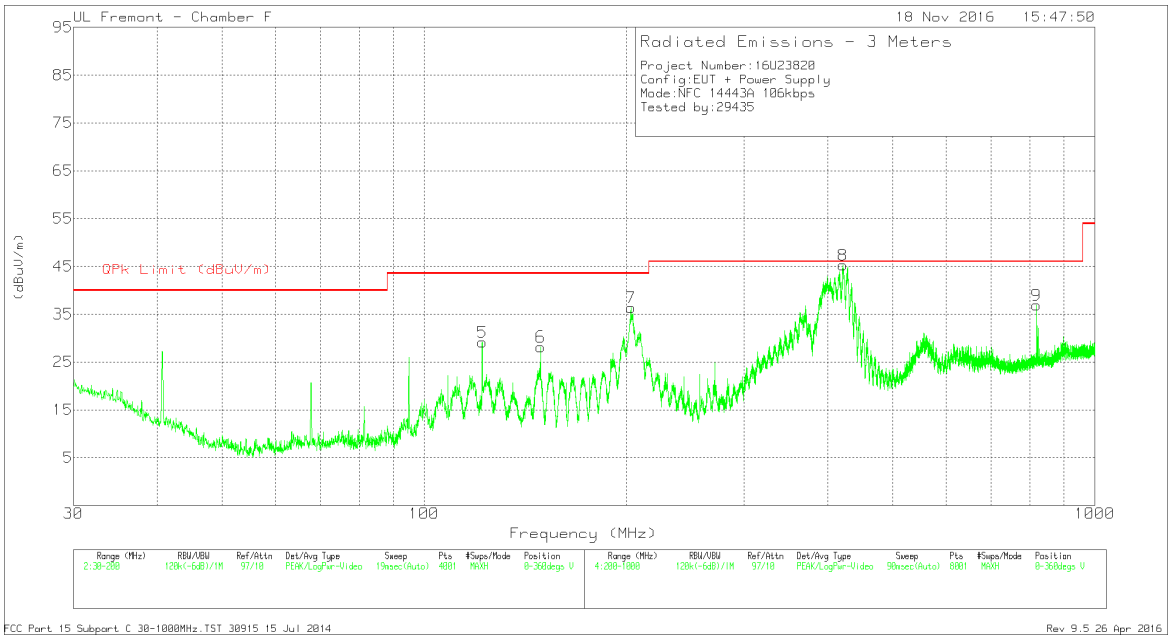
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Qp - Quasi-Peak detector

106Kbps

HORIZONTAL PLOT



VERTICAL PLOT



DATA

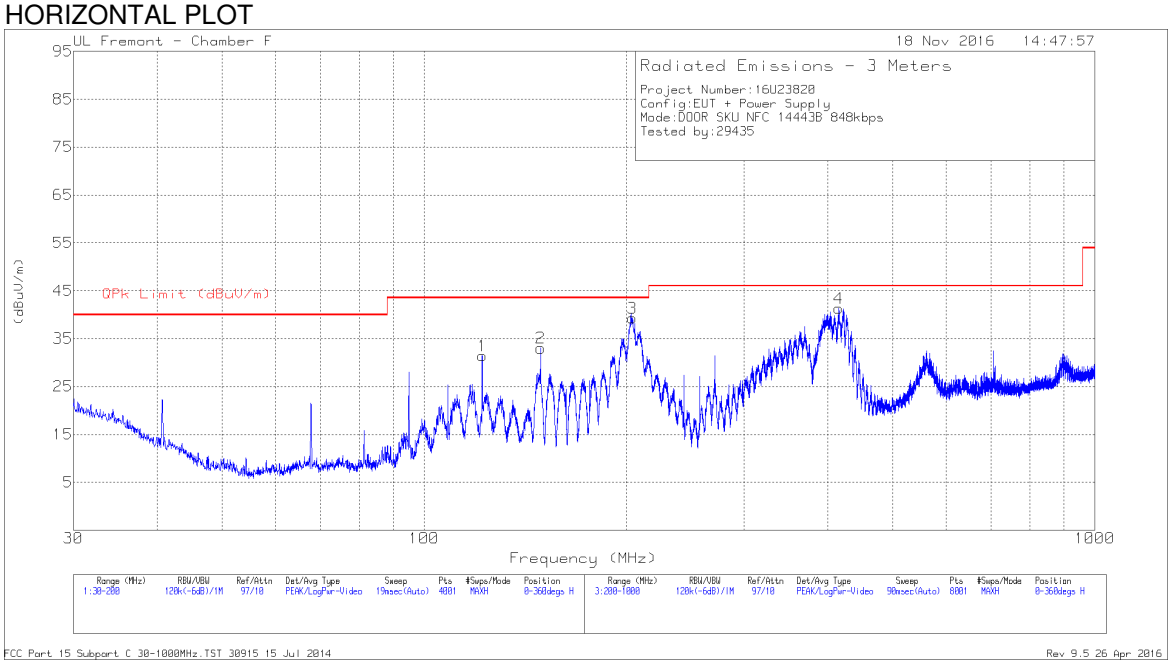
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 122.055	44.87	Pk	18	-30.9	31.97	43.52	-11.55	0-360	199	H
2	149.17	47.3	Pk	16.5	-30.8	33	43.52	-10.52	0-360	199	H
5	* 122.055	42	Pk	18	-30.9	29.1	43.52	-14.42	0-360	100	V
6	149.17	42.5	Pk	16.5	-30.8	28.2	43.52	-15.32	0-360	100	V
3	203.3842	54.36	Qp	15.7	-30.4	39.66	43.52	-3.86	95	116	H
4	421.3046	47.21	Qp	20.3	-29.4	38.11	46.02	-7.91	78	102	H
7	203.4	51.06	Pk	15.7	-30.4	36.36	43.52	-7.16	0-360	100	V
8	421.4773	51.24	Qp	20.3	-29.4	42.14	46.02	-3.88	40	120	V
9	819.1	38.66	Pk	25.8	-27.6	36.86	46.02	-9.16	0-360	100	V

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

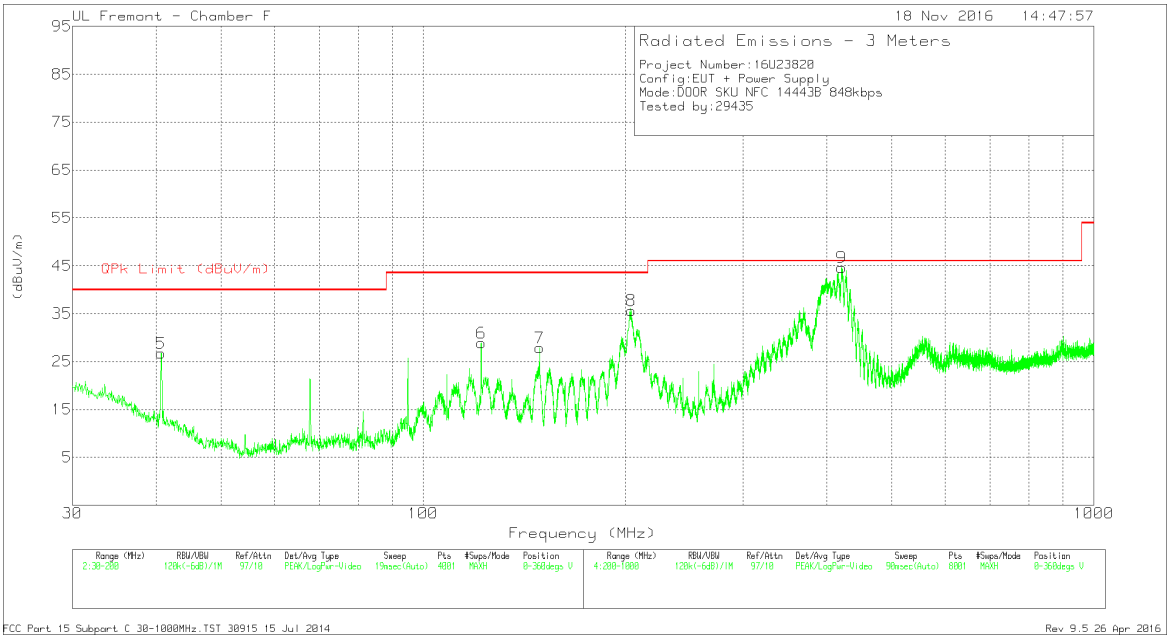
8.3.2. 14443B

848Kbps

HORIZONTAL PLOT



VERTICAL PLOT



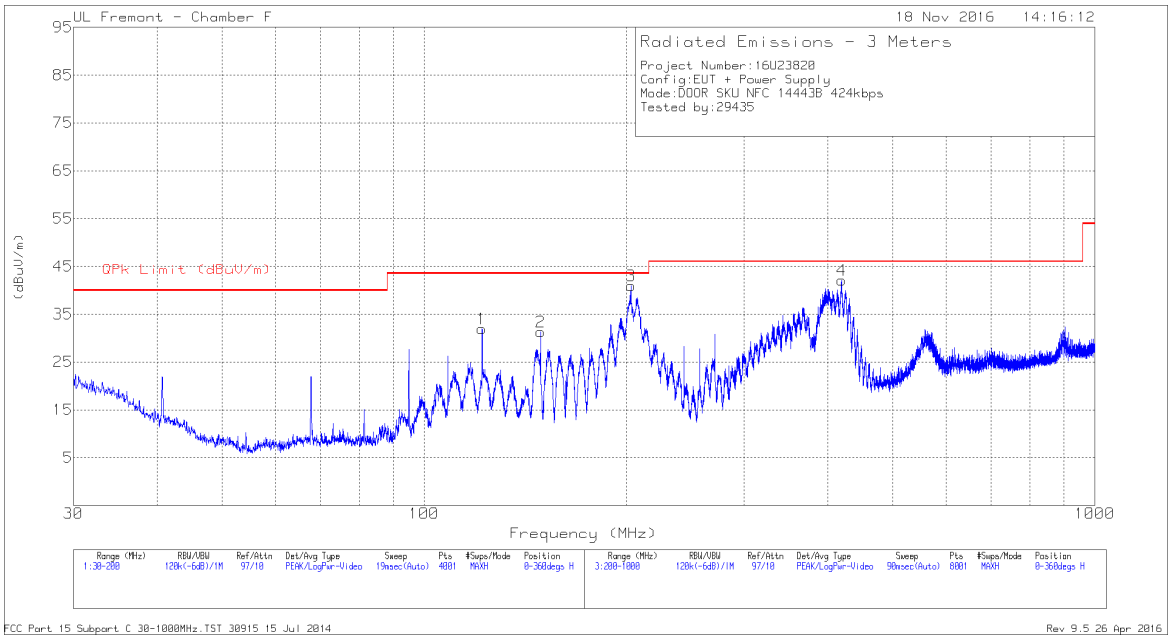
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 122.055	44.34	Pk	18	-30.9	31.44	43.52	-12.08	0-360	199	H
2	149.17	47.33	Pk	16.5	-30.8	33.03	43.52	-10.49	0-360	199	H
5	40.6675	41.28	Pk	17.2	-31.7	26.78	40	-13.22	0-360	100	V
6	* 122.055	41.81	Pk	18	-30.9	28.91	43.52	-14.61	0-360	100	V
7	149.17	42.2	Pk	16.5	-30.8	27.9	43.52	-15.62	0-360	100	V
3	204.3501	51.93	Qp	15.5	-30.4	37.03	43.52	-6.49	106	107	H
4	414.9347	47.16	Qp	20.2	-29.4	37.96	46.02	-8.06	65	100	H
8	204.2	50.49	Pk	15.6	-30.4	35.69	43.52	-7.83	0-360	100	V
9	420.6693	51.38	Qp	20.3	-29.4	42.28	46.02	-3.74	26	120	V

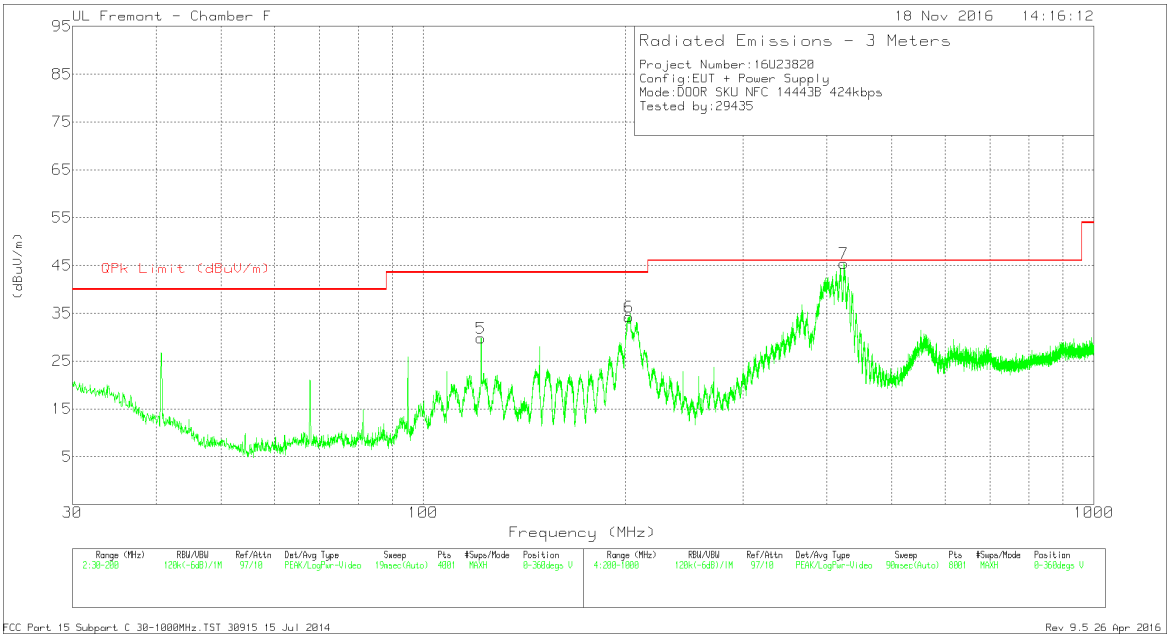
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Qp - Quasi-Peak detector

424Kbps

HORIZONTAL PLOT



VERTICAL PLOT



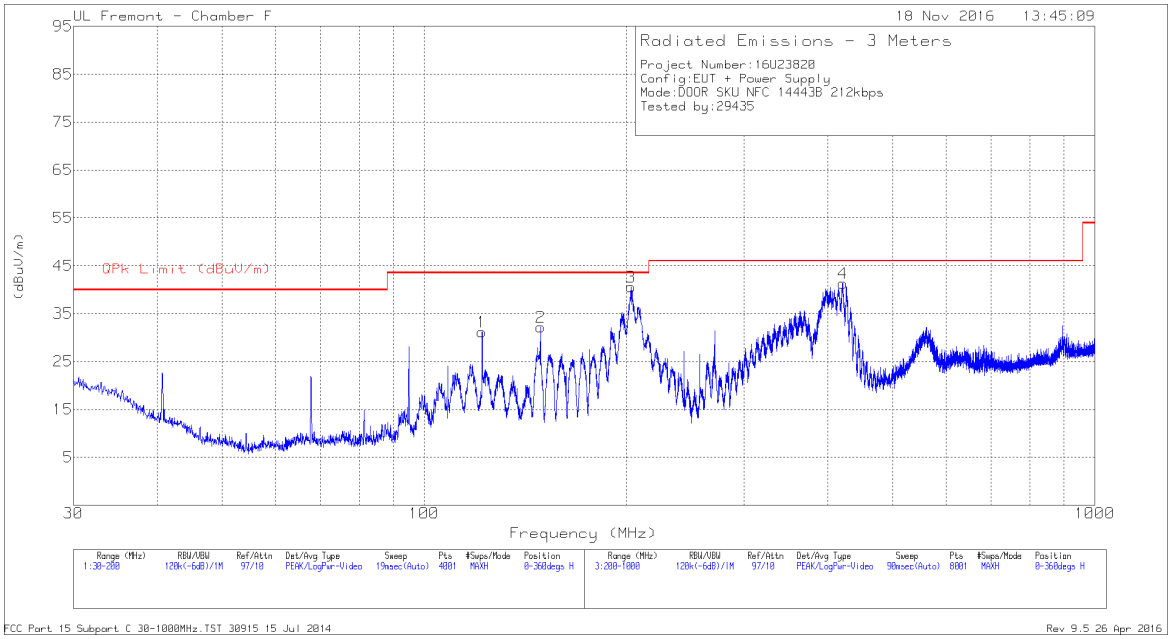
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 122.0125	44.81	Pk	18	-30.9	31.91	43.52	-11.61	0-360	199	H
2	149.17	45.64	Pk	16.5	-30.8	31.34	43.52	-12.18	0-360	100	H
5	* 122.0125	42.67	Pk	18	-30.9	29.77	43.52	-13.75	0-360	100	V
3	203.4182	52.88	Qp	15.7	-30.4	38.18	43.52	-5.34	122	153	H
4	419.4163	47.58	Qp	20.3	-29.3	38.58	46.02	-7.44	83	100	H
6	202.8	48.78	Pk	15.8	-30.4	34.18	43.52	-9.34	0-360	100	V
7	424.1467	50.97	Qp	20.4	-29.4	41.97	46.02	-4.05	29	100	V

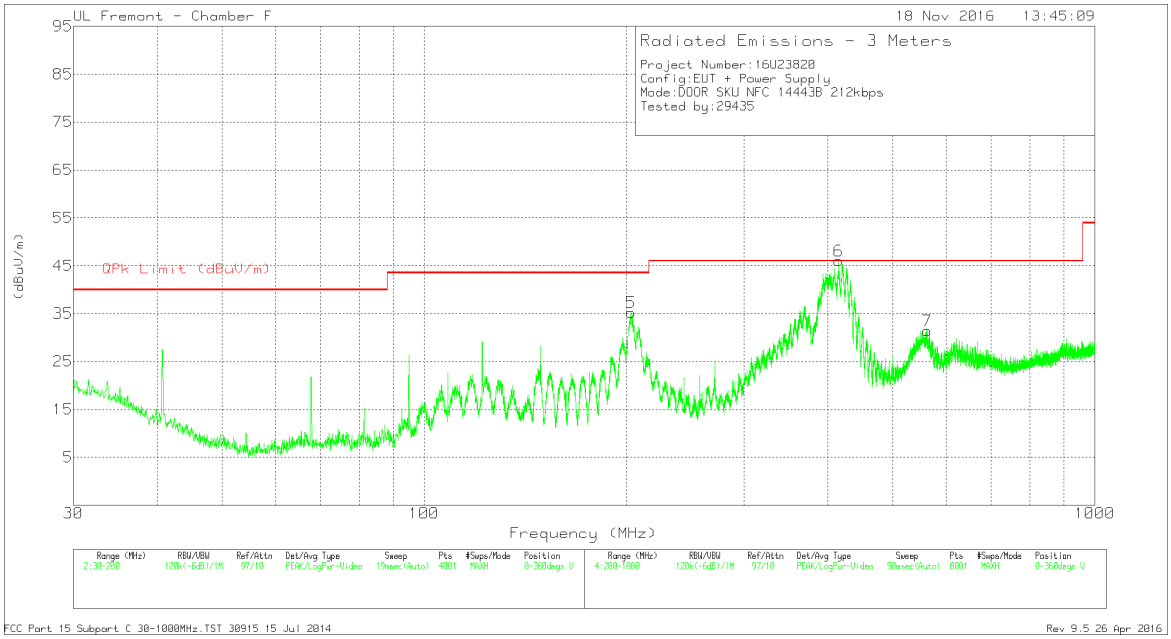
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Qp - Quasi-Peak detector

212Kbps

HORIZONTAL PLOT



VERTICAL PLOT



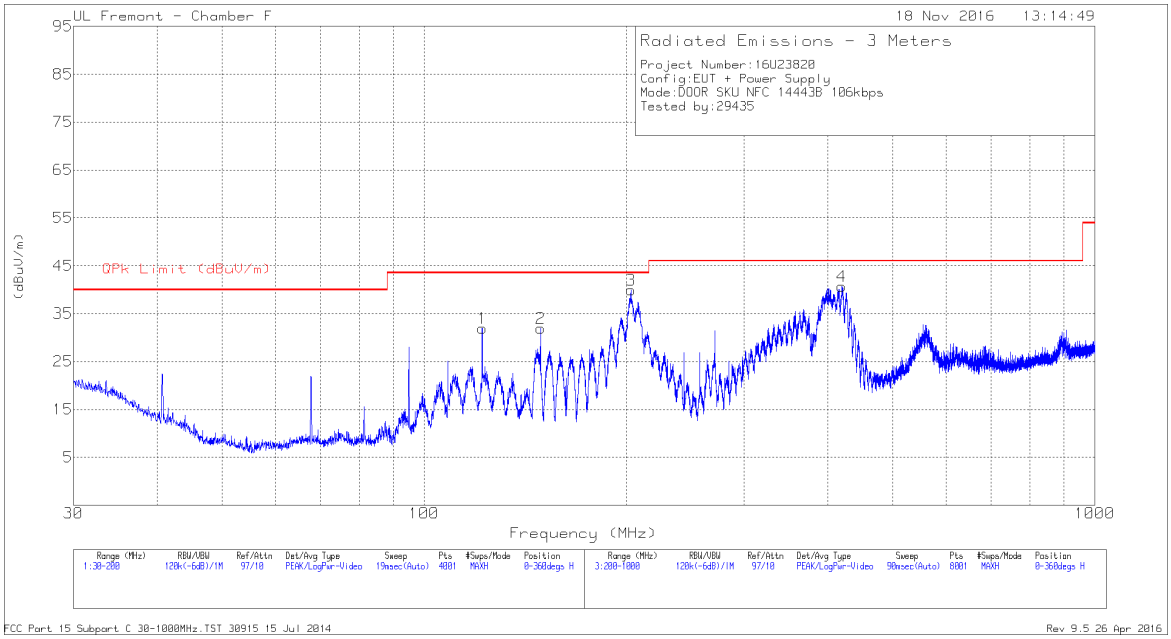
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 122.0125	44.07	Pk	18	-30.9	31.17	43.52	-12.35	0-360	199	H
2	149.17	46.52	Pk	16.5	-30.8	32.22	43.52	-11.3	0-360	199	H
3	203.3798	53.42	Qp	15.7	-30.4	38.72	43.52	-4.8	324	163	H
4	420.7918	47.62	Qp	20.3	-29.4	38.52	46.02	-7.5	79	101	H
5	203.4	49.99	Pk	15.7	-30.4	35.29	43.52	-8.23	0-360	201	V
6	415.1282	51.86	Qp	20.2	-29.4	42.66	46.02	-3.36	35	106	V
7	562.2	37.69	Pk	22.5	-28.8	31.39	46.02	-14.63	0-360	100	V

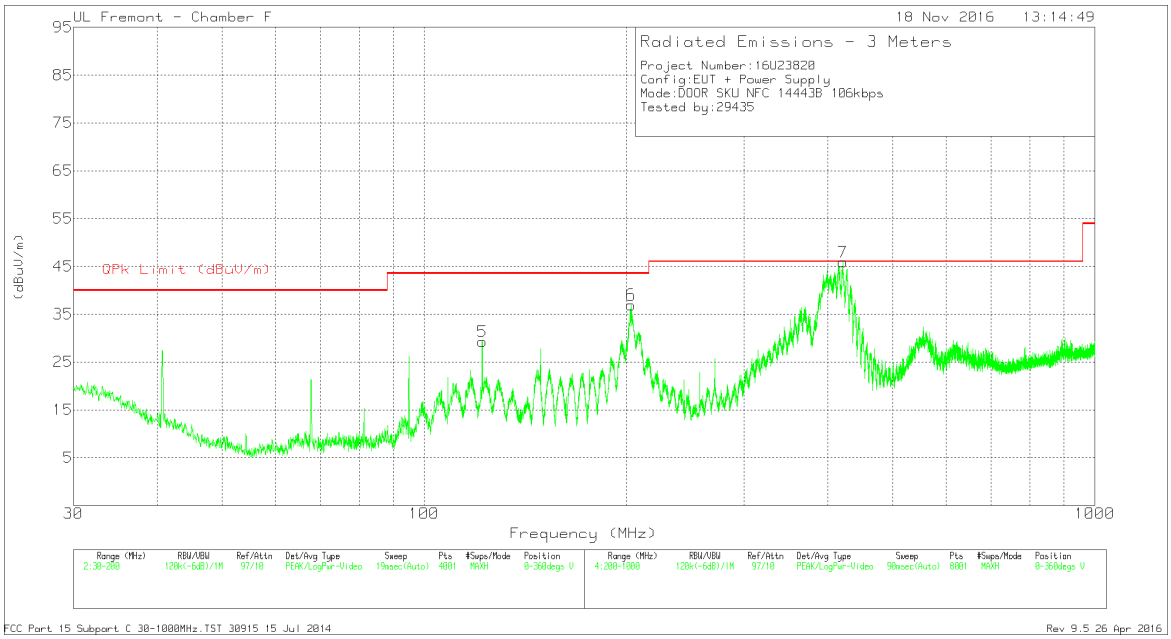
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Qp - Quasi-Peak detector

106Kbps

HORIZONTAL PLOT



VERTICAL PLOT



DATA

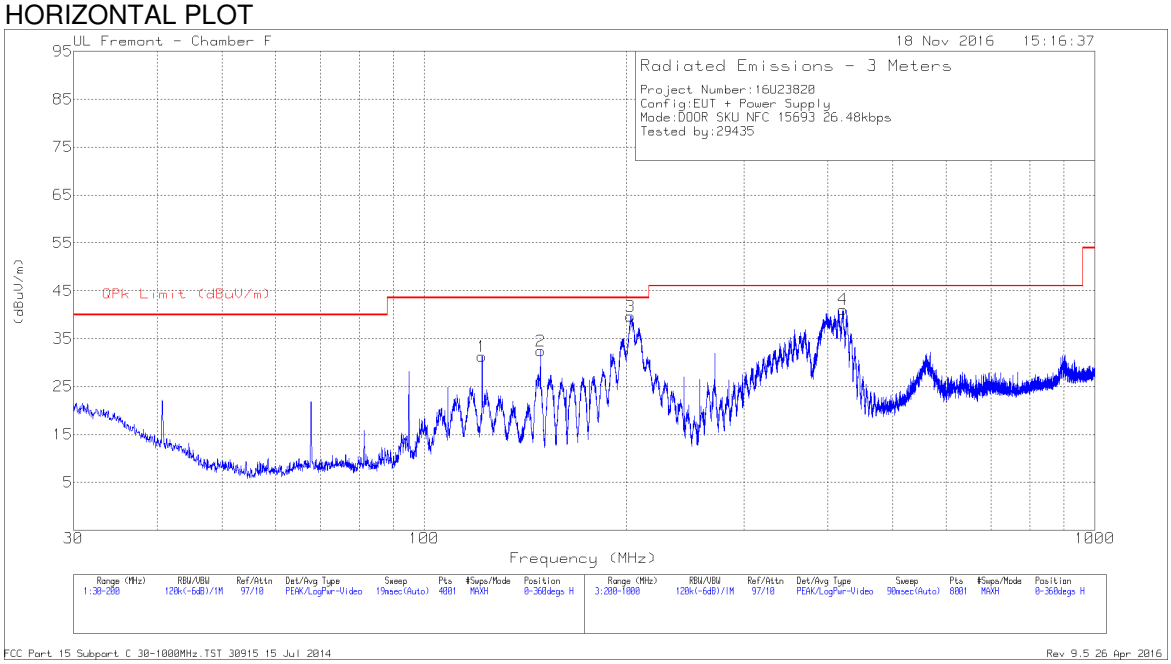
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 122.055	44.83	Pk	18	-30.9	31.93	43.52	-11.59	0-360	199	H
2	149.1275	46.21	Pk	16.5	-30.8	31.91	43.52	-11.61	0-360	199	H
5	* 122.055	42.22	Pk	18	-30.9	29.32	43.52	-14.2	0-360	100	V
3	203.3904	54.28	Qp	15.7	-30.4	39.58	43.52	-3.94	99	107	H
4	419.5128	44.04	Qp	20.3	-29.3	35.04	46.02	-10.98	79	205	H
6	203.4	51.66	Pk	15.7	-30.4	36.96	43.52	-6.56	0-360	100	V
7	421.1382	52.38	Qp	20.3	-29.4	43.28	46.02	-2.74	29	102	V

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

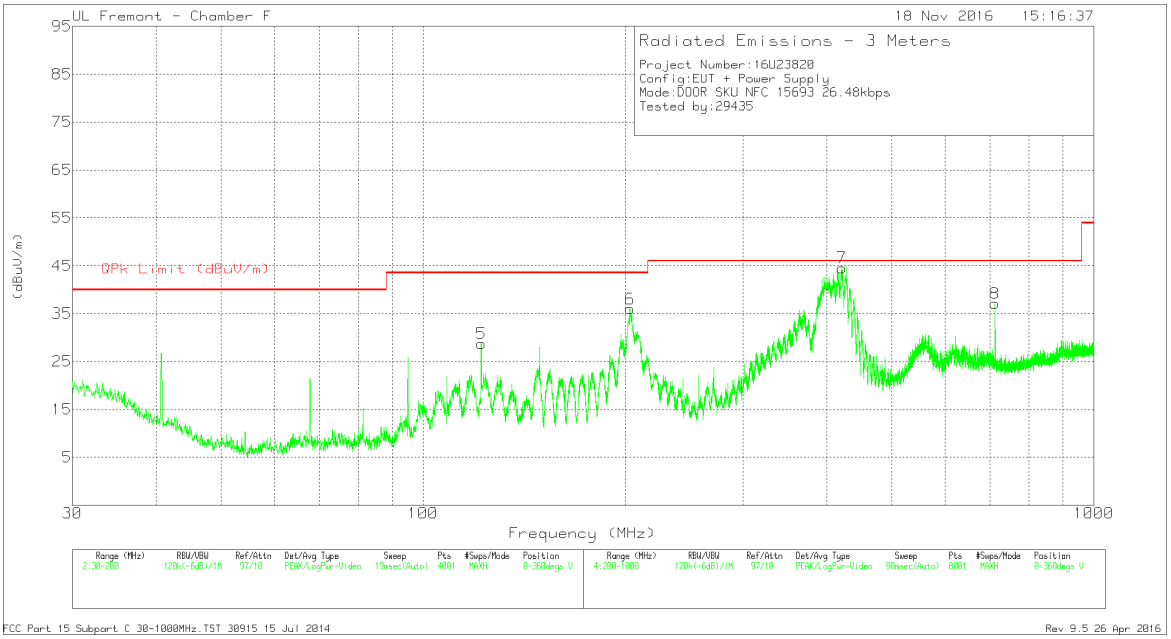
8.3.3. 15693

26.48Kbps

HORIZONTAL PLOT



VERTICAL PLOT



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 122.0125	44.24	Pk	18	-30.9	31.34	43.52	-12.18	0-360	199	H
2	149.1275	46.8	Pk	16.5	-30.8	32.5	43.52	-11.02	0-360	199	H
5	* 122.055	41.71	Pk	18	-30.9	28.81	43.52	-14.71	0-360	100	V
3	203.3984	54.44	Qp	15.7	-30.4	39.74	43.52	-3.78	112	153	H
4	421.2622	46.63	Qp	20.3	-29.4	37.53	46.02	-8.49	65	182	H
6	203.4	50.74	Pk	15.7	-30.4	36.04	43.52	-7.48	0-360	201	V
7	421.1299	51.95	Qp	20.3	-29.4	42.85	46.02	-3.17	30	107	V
8	712.55	40.83	Pk	24.4	-28.1	37.13	46.02	-8.89	0-360	299	V

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

9. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency, over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Carrier frequency stability shall be maintained to ±0.01% (±100 ppm).

TEST PROCEDURE

ANSI C63.10 Clause 6.8

RESULTS

9.1. 14443A

ID:	39004	Date:	11/23/16

848kbps

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC										
Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measureed with Time Elapse								
(VAC)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
	50	13.5594461	4.378	13.5594434	4.578	13.5594405	4.786	13.5594377	4.996	± 100
	40	13.5594405	4.791	13.5594421	4.673	13.5594439	4.541	13.5594461	4.376	± 100
	30	13.5594969	0.631	13.5594940	0.844	13.5594909	1.069	13.5594878	1.297	± 100
12.00	***20***	***13.5595054***	***0.000***	***13.5595070***	***-0.114***	***13.5595090***	***-0.267***	***13.5595121***	***-0.489***	***± 100***
	10	13.5595033	0.154	13.5595101	-0.344	13.5595192	-1.012	13.5595314	-1.915	± 100
	0	13.5596372	-9.717	13.5596371	-9.713	13.5596371	-9.710	13.5596371	-9.708	± 100
	-10	13.5596813	-12.970	13.5596822	-13.039	13.5596833	-13.118	13.5596848	-13.225	± 100
	-20	13.5597034	-14.598	13.5597079	-14.928	13.5597125	-15.274	13.5597174	-15.632	± 100
10.20	20	13.5595371	-2.336	13.5595364	-2.283	13.5595352	-2.194	13.5595334	-2.065	± 100
13.80	20	13.5595351	-2.188	13.5595344	-2.136	13.5595342	-2.120	13.5595324	-1.990	± 100

424kbps

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC										
Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measureed with Time Elapse								
(VAC)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
	50	13.5594462	2.967	13.5594432	3.191	13.5594401	3.421	13.5594372	3.631	± 100
	40	13.5594428	3.216	13.5594447	3.080	13.5594465	2.943	13.5594484	2.806	± 100
	30	13.5594550	2.319	13.5594598	1.962	13.5594645	1.621	13.5594693	1.261	± 100
12.00	***20***	***13.5594864***	***0.000***	***13.5594919***	***-0.401***	***13.5594955***	***-0.672***	***13.5594996***	***-0.971***	***± 100***
	10	13.5595383	-3.827	13.5595418	-4.081	13.5595465	-4.427	13.5595533	-4.928	± 100
	0	13.5596371	-11.111	13.5596372	-11.116	13.5596372	-11.119	13.5596373	-11.123	± 100
	-10	13.5596555	-12.467	13.5596609	-12.864	13.5596664	-13.271	13.5596723	-13.705	± 100
	-20	13.5597188	-17.136	13.5597200	-17.222	13.5597215	-17.333	13.5597235	-17.481	± 100
10.20	20	13.5595454	-4.347	13.5595437	-4.221	13.5595414	-4.051	13.5595382	-3.817	± 100
13.80	20	13.5595452	-4.336	13.5595417	-4.073	13.5595410	-4.028	13.5595380	-3.804	± 100

212kbps

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC										
Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measureed with Time Elapse								
(VAC)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
	50	13.5594368	6.950	13.5594362	7.000	13.5594354	7.058	13.5594345	7.126	± 100
	40	13.5594710	4.431	13.5594689	4.583	13.5594659	4.808	13.5595249	0.459	± 100
	30	13.5595032	2.057	13.5594994	2.336	13.5594954	2.635	13.5595249	0.459	± 100
12.00	***20***	***13.5595311***	***0.000***	***13.5595288***	***0.166***	***13.5595267***	***0.327***	***13.5595249***	***0.459***	***± 100***
	10	13.5595559	-1.826	13.5595581	-1.995	13.5595612	-2.222	13.5595654	-2.531	± 100
	0	13.5596033	-5.322	13.5596074	-5.631	13.5596122	-5.981	13.5596181	-6.416	± 100
	-10	13.5596740	-10.537	13.5596755	-10.649	13.5596774	-10.793	13.5596801	-10.989	± 100
	-20	13.5597241	-14.231	13.5597247	-14.276	13.5597255	-14.334	13.5597265	-14.415	± 100
10.20	20	13.5595985	-4.969	13.5595913	-4.440	13.5595620	-2.282	13.5595679	-2.711	± 100
13.80	20	13.5595988	-4.991	13.5595914	-4.447	13.5595820	-3.757	13.5595699	-2.859	± 100

106kbps

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC										
Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measureed with Time Elapse								
(VAC)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
	50	13.5595407	-0.156	13.5595355	0.225	13.5595298	0.646	13.5595243	1.052	± 100
	40	13.5595262	0.907	13.5595269	0.859	13.5595273	0.833	13.5595273	0.830	± 100
	30	13.5595345	0.295	13.5595374	0.085	13.5595415	-0.216	13.5595389	-0.025	± 100
12.00	***20***	***13.5595385***	***0.000***	***13.5595390***	***-0.037***	***13.5595391***	***-0.044***	***13.5595389***	***-0.029***	***± 100***
	10	13.5595399	-0.099	13.5595423	-0.274	13.5595468	-0.608	13.5595546	-1.181	± 100
	0	13.5595779	-2.904	13.5595878	-3.634	13.5595993	-4.482	13.5596133	-5.516	± 100
	-10	13.5596469	-7.991	13.5596564	-8.689	13.5596673	-9.495	13.5596802	-10.448	± 100
	-20	13.5597156	-13.058	13.5597223	-13.555	13.5597301	-14.126	13.5597390	-14.780	± 100
10.20	20	13.5595639	-1.874	13.5595604	-1.614	13.5595558	-1.276	13.5595495	-0.811	± 100
13.80	20	13.5595659	-2.021	13.5595614	-1.688	13.5595568	-1.350	13.5595595	-1.549	± 100

9.2. 14443B

848kbps

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC										
Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measureed with Time Elapse								
(VAC)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
	50	13.5595177	1.864	13.5595173	1.889	13.5595168	1.924	13.5595164	1.958	± 100
	40	13.5595386	0.323	13.5595367	0.457	13.5595348	0.600	13.5595326	0.759	± 100
	30	13.5595404	0.190	13.5595399	0.223	13.5595393	0.268	13.5595382	0.346	± 100
12.00	***20***	***13.5595429***	***0.000***	***13.5595429***	***0.003***	***13.5595429***	***0.005***	***13.5595428***	***0.011***	***± 100***
	10	13.5595370	0.437	13.5595414	0.113	13.5595433	-0.028	13.5595431	-0.014	± 100
	0	13.5595648	-1.611	13.5595924	-3.645	13.5595988	-4.116	13.5596034	-4.461	± 100
	-10	13.5596032	-4.445	13.5596099	-4.940	13.5596138	-5.227	13.5596190	-5.608	± 100
	-20	13.5596369	-6.928	13.5596698	-9.358	13.5596783	-9.986	13.5596990	-11.507	± 100
10.20	20	13.5595489	-0.442	13.5595420	0.067	13.5595410	0.142	13.5595406	0.174	± 100
13.80	20	13.5595405	0.178	13.5595405	0.181	13.5595404	0.184	13.5595404	0.186	± 100

424kbps

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC										
Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measureed with Time Elapse								
(VAC)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
	50	13.5595209	1.200	13.5595202	1.256	13.5595185	1.379	13.5595169	1.497	± 100
	40	13.5595366	0.046	13.5595346	0.191	13.5595326	0.339	13.5595305	0.496	± 100
	30	13.5595388	-0.117	13.5595380	-0.064	13.5595371	0.004	13.5595359	0.098	± 100
12.00	***20***	***13.5595372***	***0.000***	***13.5595389***	***-0.126***	***13.5595399***	***-0.199***	***13.5595403***	***-0.229***	***± 100***
	10	13.5595368	0.031	13.5595418	-0.338	13.5595436	-0.472	13.5595434	-0.455	± 100
	0	13.5595436	-0.475	13.5595555	-1.349	13.5595512	-1.037	13.5595535	-1.201	± 100
	-10	13.5595512	-1.037	13.5595632	-1.920	13.5595592	-1.626	13.5595603	-1.707	± 100
	-20	13.5595846	-3.499	13.5595936	-4.158	13.5595765	-2.901	13.5595941	-4.199	± 100
10.20	20	13.5595405	-0.242	13.5595404	-0.240	13.5595404	-0.240	13.5595404	-0.237	± 100
13.80	20	13.5595404	-0.237	13.5595404	-0.237	13.5595404	-0.235	13.5595404	-0.235	± 100

212kbps

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC										
Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measureed with Time Elapse								
(VAC)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
	50	13.5595235	1.091	13.5595219	1.210	13.5595196	1.375	13.5595183	1.475	± 100
	40	13.5595204	1.317	13.5595209	1.279	13.5595223	1.175	13.5595236	1.079	± 100
	30	13.5595282	0.741	13.5595306	0.564	13.5595335	0.353	13.5595371	0.084	± 100
12.00	***20***	***13.5595383***	***0.000***	***13.5595266***	***0.859***	***13.5595243***	***1.029***	***13.5595231***	***1.117***	***± 100***
	10	13.5595409	-0.192	13.5595402	-0.144	13.5595387	-0.032	13.5595354	0.210	± 100
	0	13.5595466	-0.617	13.5595494	-0.819	13.5595538	-1.148	13.5595576	-1.427	± 100
	-10	13.5595754	-2.737	13.5595937	-4.089	13.5595983	-4.428	13.5595998	-4.536	± 100
	-20	13.5596113	-5.383	13.5596342	-7.077	13.5596422	-7.667	13.5596541	-8.544	± 100
10.20	20	13.5595414	-0.230	13.5595412	-0.216	13.5595410	-0.201	13.5595407	-0.181	± 100
13.80	20	13.5595407	-0.180	13.5595407	-0.177	13.5595406	-0.170	13.5595405	-0.163	± 100

106kbps

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC										
Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measureed with Time Elapse								
(VAC)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
	50	13.5595355	1.234	13.5595349	1.280	13.5595343	1.322	13.5595393	0.952	± 100
	40	13.5595364	1.170	13.5595361	1.194	13.5595347	1.292	13.5595323	1.474	± 100
	30	13.5595410	0.827	13.5595256	1.965	13.5595233	2.136	13.5595267	1.881	± 100
12.00	***20***	***13.5595522***	***0.000***	***13.5595452***	***0.517***	***13.5595402***	***0.892***	***13.5595373***	***1.103***	***± 100***
	10	13.5595433	0.660	13.5595470	0.390	13.5595515	0.058	13.5595570	-0.352	± 100
	0	13.5595821	-2.203	13.5595901	-2.788	13.5595990	-3.450	13.5596097	-4.237	± 100
	-10	13.5596426	-6.660	13.5596510	-7.283	13.5596607	-7.995	13.5596720	-8.835	± 100
	-20	13.5597074	-11.439	13.5597140	-11.929	13.5597216	-12.487	13.5596720	-8.835	± 100
10.20	20	13.5595365	1.165	13.5595371	1.119	13.5595374	1.098	13.5595373	1.102	± 100
13.80	20	13.5595365	1.165	13.5595371	1.119	13.5595373	1.103	13.5595367	1.146	± 100

9.3. 15693

26.48kbps

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC										
Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measureed with Time Elapse								
(VAC)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
	50	13.5595221	1.518	13.5595208	1.613	13.5595192	1.727	13.5595178	1.829	± 100
	40	13.5595321	0.778	13.5595315	0.824	13.5595307	0.880	13.5595297	0.955	± 100
	30	13.5595428	-0.011	13.5595425	0.010	13.5595419	0.056	13.5595407	0.140	± 100
12.00	***20***	***13.5595426***	***0.000***	***13.5595426***	***0.001***	***13.5595426***	***0.003***	***13.5595426***	***0.005***	***± 100***
	10	13.5595957	-3.914	13.5595935	-3.753	13.5595908	-3.550	13.5595871	-3.279	± 100
	0	13.5595928	-3.698	13.5595778	-2.595	13.5595969	-4.000	13.5595902	-3.510	± 100
	-10	13.5595944	-3.814	13.5595889	-3.414	13.5595912	-3.585	13.5595991	-4.166	± 100
	-20	13.5596124	-5.144	13.5596189	-5.627	13.5596236	-5.970	13.5596349	-6.802	± 100
10.20	20	13.5595528	-0.752	13.5595497	-0.524	13.5595468	-0.304	13.5595871	-3.279	± 100
13.80	20	13.5595437	-0.077	13.5595431	-0.032	13.5595424	0.018	13.5595416	0.076	± 100

10. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dBµV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Notes: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

TEST PROCEDURE

ANSI C63.10:2013

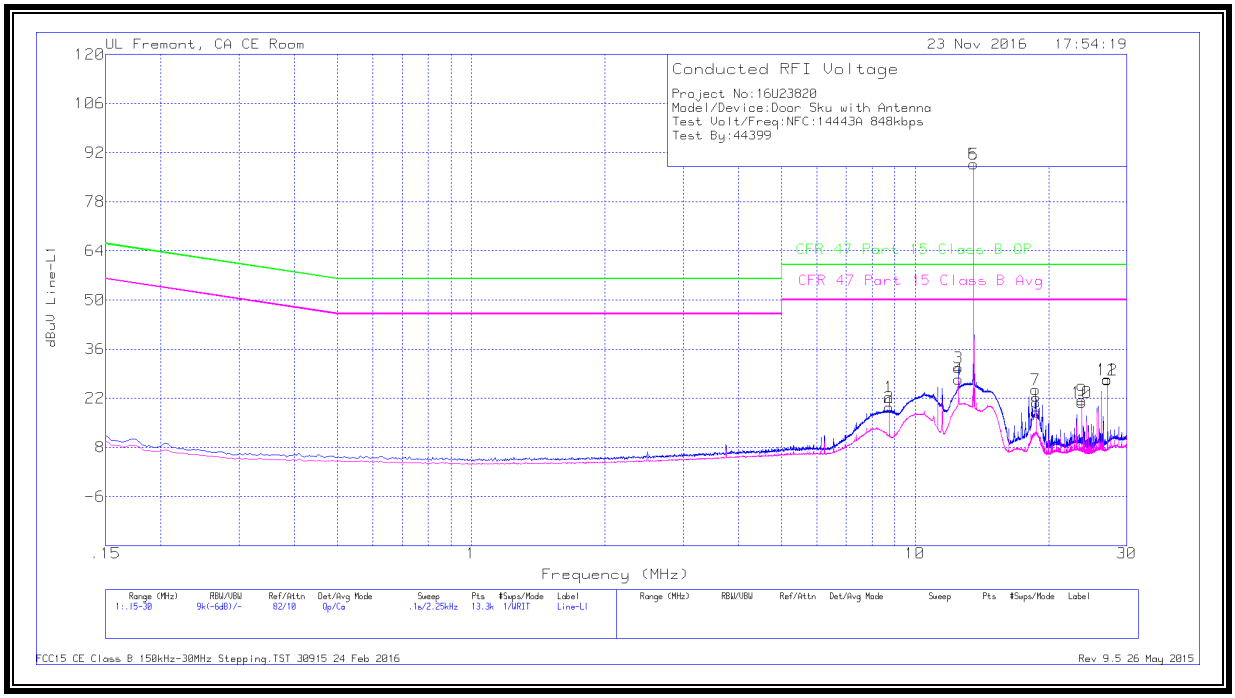
RESULTS

No non-compliance noted:

10.1. 14443A

NORMAL OPERATION, 848 KBPS

LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

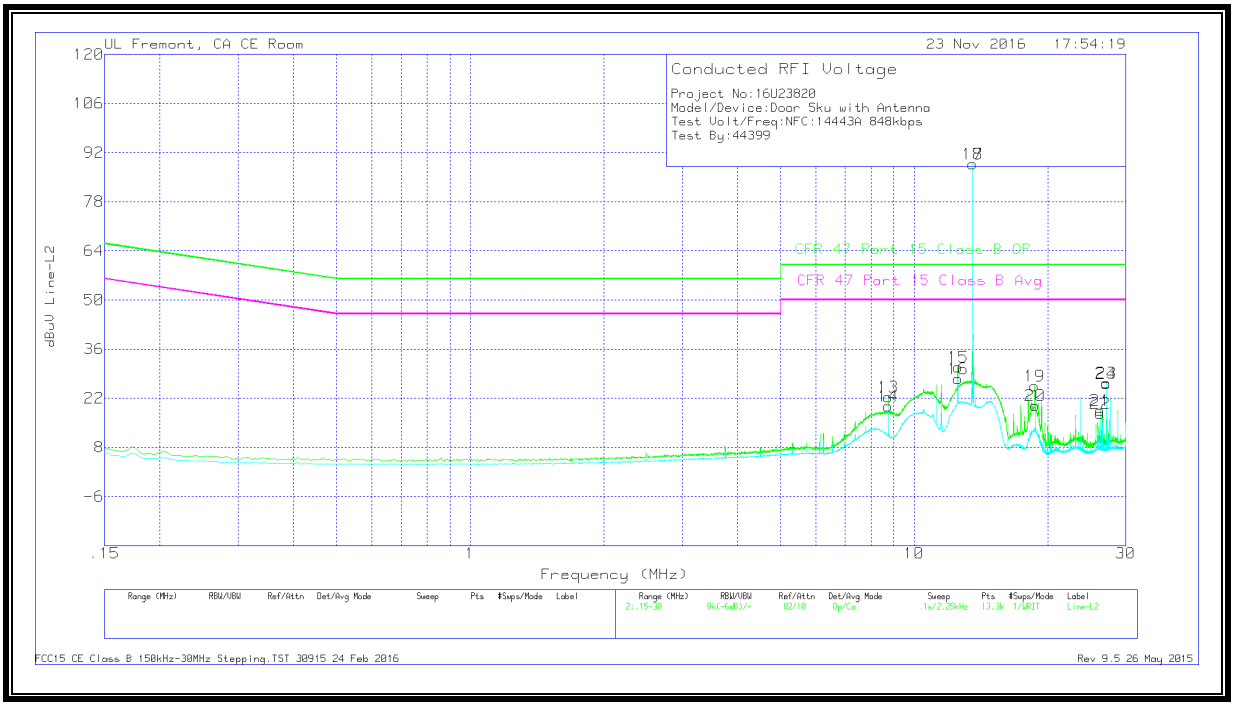
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	11.98	Qp	0	.1	10.2	22.28	60	-37.72	-	-
2	8.7495	9.17	Ca	0	.1	10.2	19.47	-	-	50	-30.53
3	12.53625	20.27	Qp	.1	.2	10.2	30.77	60	-29.23	-	-
4	12.53625	16.9	Ca	.1	.2	10.2	27.4	-	-	50	-22.6
5	13.56	78.27	Qp	.1	.2	10.2	88.77	**60**	**28.77**	-	-
6	13.56	78.26	Ca	.1	.2	10.2	88.76	-	-	**50**	**38.76**
7	18.69	13.88	Qp	0	.2	10.3	24.38	60	-35.62	-	-
8	18.75075	7.56	Ca	0	.2	10.3	18.06	-	-	50	-31.94
9	23.75025	10.72	Qp	.1	.2	10.4	21.42	60	-38.58	-	-
10	23.75025	10.16	Ca	.1	.2	10.4	20.86	-	-	50	-29.14
11	27.1185	16.5	Qp	.1	.3	10.5	27.4	60	-32.6	-	-
12	27.1185	16.39	Ca	.1	.3	10.5	27.29	-	-	50	-22.71

Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	12.07	Qp	0	.1	10.2	22.37	60	-37.63	-	-
14	8.7495	9.51	Ca	0	.1	10.2	19.81	-	-	50	-30.19
15	12.54525	20.4	Qp	.1	.2	10.2	30.9	60	-29.1	-	-
16	12.54525	17.04	Ca	.1	.2	10.2	27.54	-	-	50	-22.46
17	13.56	78.23	Qp	.1	.2	10.2	88.73	**60**	**28.73**	-	-
18	13.56	78.21	Ca	.1	.2	10.2	88.71	-	-	**50**	**38.71**
19	18.71475	14.96	Qp	0	.2	10.3	25.46	60	-34.54	-	-
20	18.75075	9.39	Ca	0	.2	10.3	19.89	-	-	50	-30.11
21	26.25	7.65	Qp	.1	.3	10.5	18.55	60	-41.45	-	-
22	26.25	6.74	Ca	.1	.3	10.5	17.64	-	-	50	-32.36
23	27.1185	15.4	Qp	.1	.3	10.5	26.3	60	-33.7	-	-
24	27.1185	15.29	Ca	.1	.3	10.5	26.19	-	-	50	-23.81

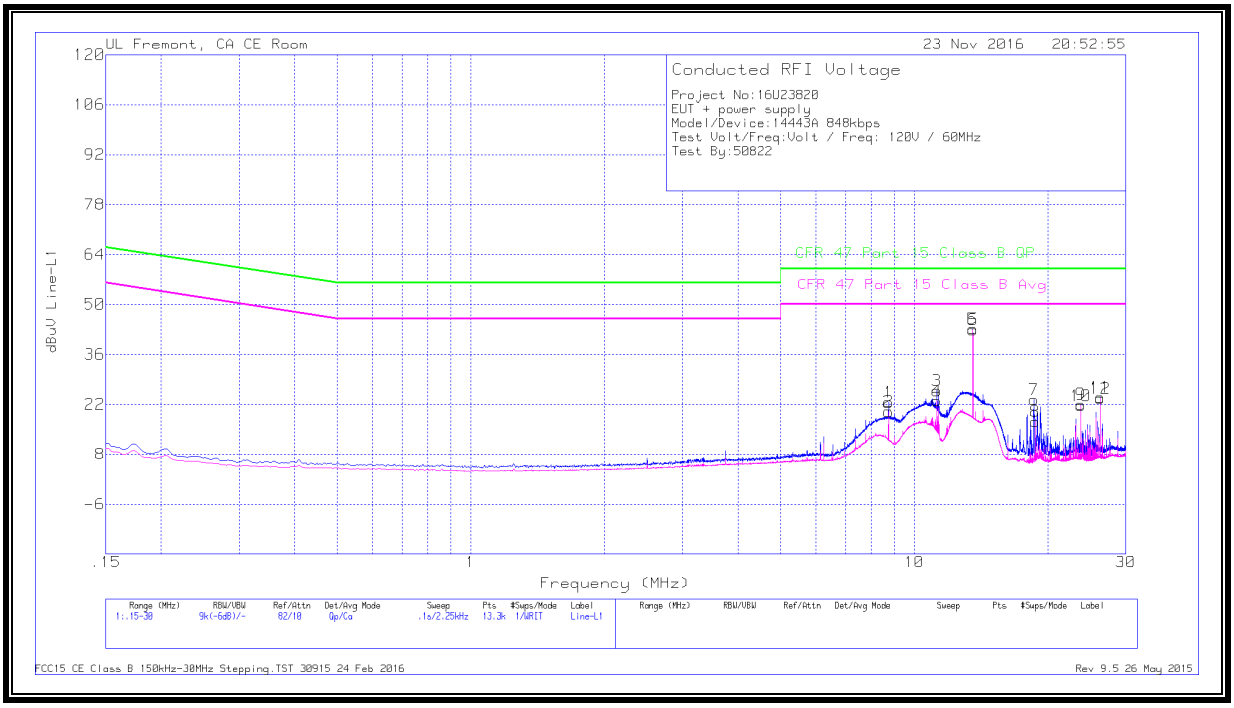
Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

NORMAL OPERATION WITH ANTENNA PORT TERMINATED, 848 KBPS

LINE 1 RESULTS

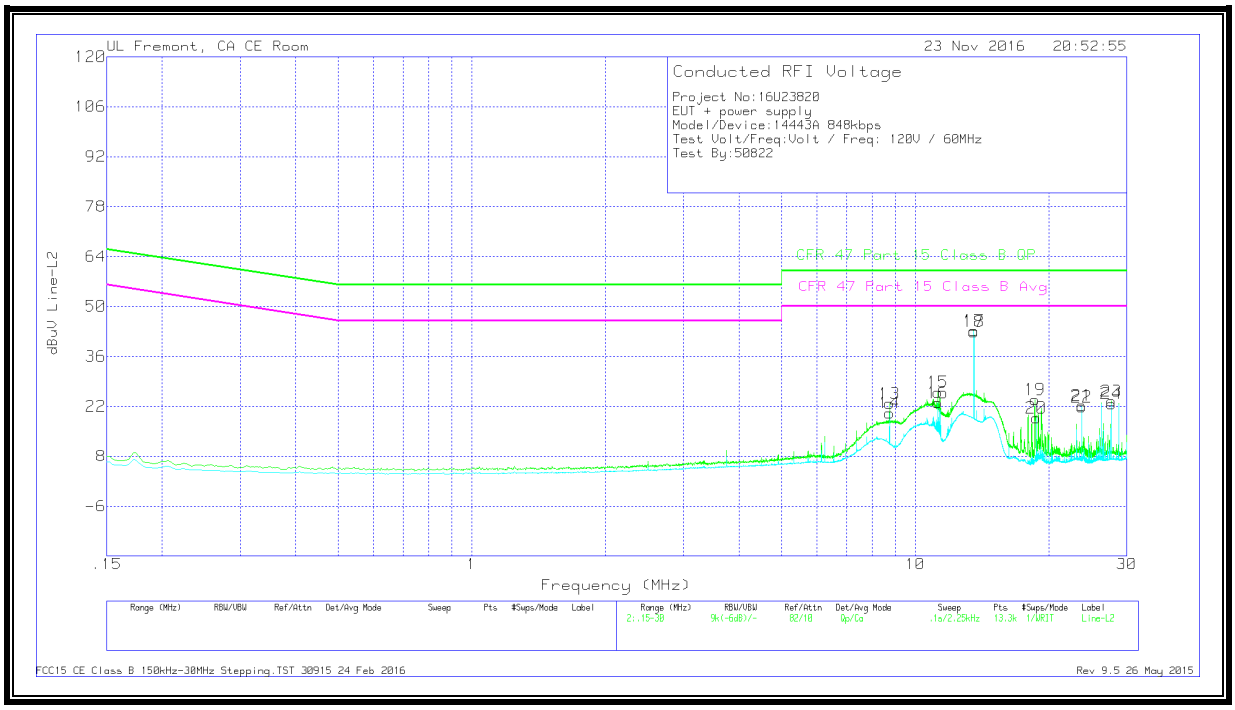


WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	12.27	Qp	0	.1	10.2	22.57	60	-37.43	-	-
2	8.7495	9.7	Ca	0	.1	10.2	20	-	-	50	-30
3	11.24925	15.42	Qp	0	.2	10.2	25.82	60	-34.18	-	-
4	11.24925	12.55	Ca	0	.2	10.2	22.95	-	-	50	-27.05
5	13.56	32.66	Qp	.1	.2	10.2	43.16	60	-16.84	-	-
6	13.56	32.4	Ca	.1	.2	10.2	42.9	-	-	50	-7.1
7	18.61575	12.79	Qp	0	.2	10.3	23.29	60	-36.71	-	-
8	18.75075	6.69	Ca	0	.2	10.3	17.19	-	-	50	-32.81
9	23.75025	11.28	Qp	.1	.2	10.4	21.98	60	-38.02	-	-
10	23.75025	10.87	Ca	.1	.2	10.4	21.57	-	-	50	-28.43
11	26.25	13.03	Qp	.1	.3	10.5	23.93	60	-36.07	-	-
12	26.25	12.76	Ca	.1	.3	10.5	23.66	-	-	50	-26.34

LINE 2 RESULTS

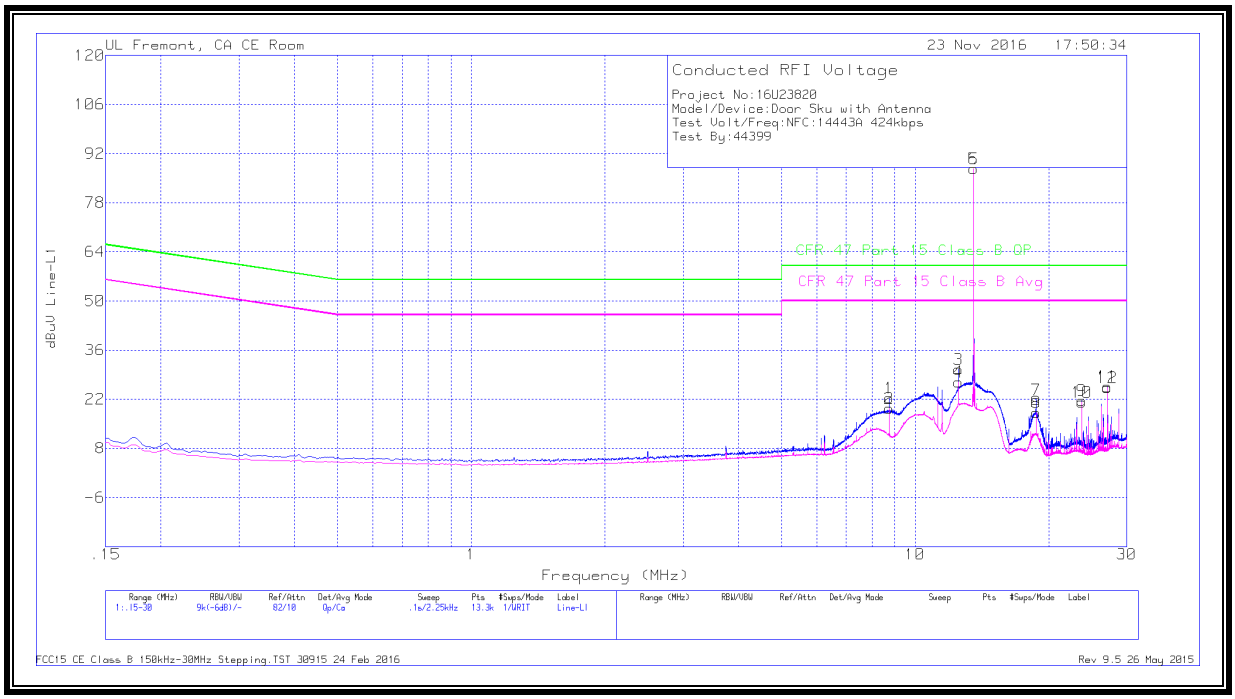


WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	12.52	Qp	0	.1	10.2	22.82	60	-37.18	-	-
14	8.7495	9.85	Ca	0	.1	10.2	20.15	-	-	50	-29.85
15	11.24925	15.56	Qp	0	.2	10.2	25.96	60	-34.04	-	-
16	11.24925	12.65	Ca	0	.2	10.2	23.05	-	-	50	-26.95
17	13.56	32.7	Qp	.1	.2	10.2	43.2	60	-16.8	-	-
18	13.56	32.43	Ca	.1	.2	10.2	42.93	-	-	50	-7.07
19	18.61575	13.4	Qp	0	.2	10.3	23.9	60	-36.1	-	-
20	18.75075	8.24	Ca	0	.2	10.3	18.74	-	-	50	-31.26
21	23.75025	11.52	Qp	.1	.2	10.4	22.22	60	-37.78	-	-
22	23.75025	11.14	Ca	.1	.2	10.4	21.84	-	-	50	-28.16
23	27.69225	12.57	Qp	.1	.3	10.5	23.47	60	-36.53	-	-
24	27.69225	11.83	Ca	.1	.3	10.5	22.73	-	-	50	-27.27

NORMAL OPERATION, 424 KBPS

LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

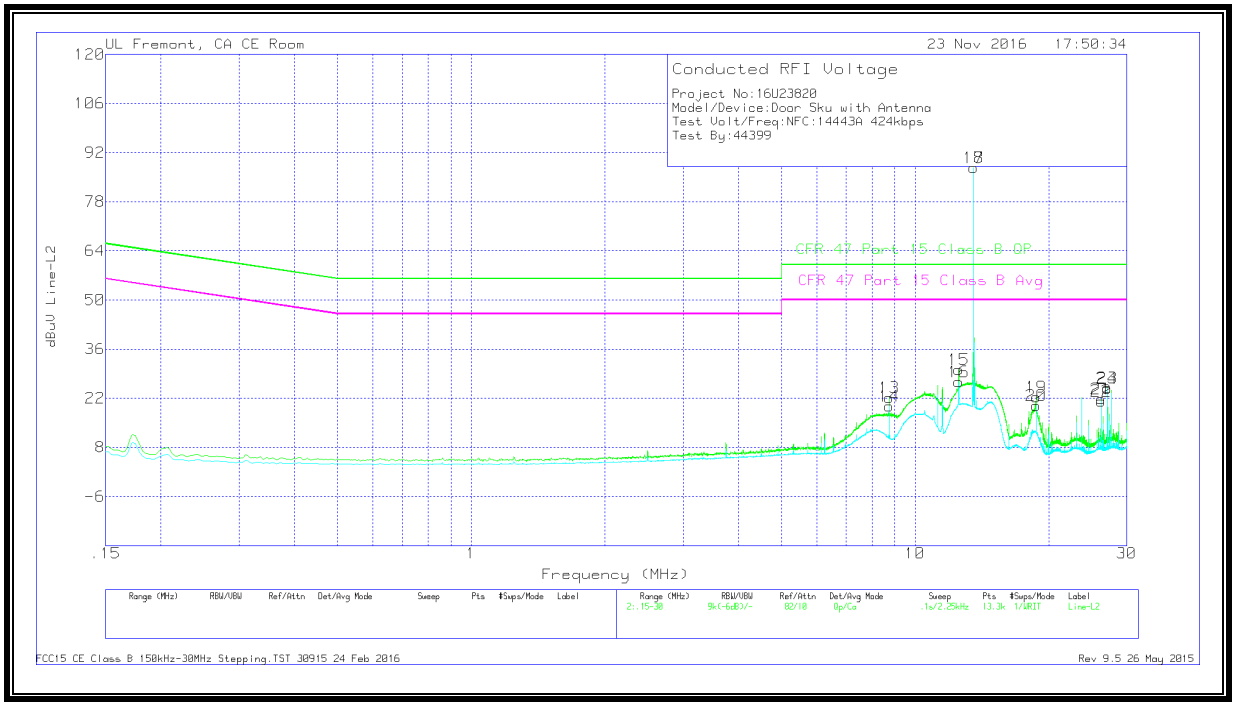
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	12	Qp	0	.1	10.2	22.3	60	-37.7	-	-
2	8.7495	9.12	Ca	0	.1	10.2	19.42	-	-	50	-30.58
3	12.534	19.98	Qp	.1	.2	10.2	30.48	60	-29.52	-	-
4	12.534	16.46	Ca	.1	.2	10.2	26.96	-	-	50	-23.04
5	13.56	77.18	Qp	.1	.2	10.2	87.68	**60**	**27.68**	-	-
6	13.56	77.17	Ca	.1	.2	10.2	87.67	-	-	**50**	**37.67**
7	18.75075	11.36	Qp	0	.2	10.3	21.86	60	-38.14	-	-
8	18.75075	7.77	Ca	0	.2	10.3	18.27	-	-	50	-31.73
9	23.75025	10.91	Qp	.1	.2	10.4	21.61	60	-38.39	-	-
10	23.75025	10.42	Ca	.1	.2	10.4	21.12	-	-	50	-28.88
11	27.1185	14.68	Qp	.1	.3	10.5	25.58	60	-34.42	-	-
12	27.1185	14.39	Ca	.1	.3	10.5	25.29	-	-	50	-24.71

Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
8.7495	11.85	Qp	0	.1	10.2	22.15	60	-37.85	-	-
8.7495	9.38	Ca	0	.1	10.2	19.68	-	-	50	-30.32
12.543	19.7	Qp	.1	.2	10.2	30.2	60	-29.8	-	-
12.543	16.25	Ca	.1	.2	10.2	26.75	-	-	50	-23.25
13.56	77.18	Qp	.1	.2	10.2	87.68	**60**	**27.68**	-	-
13.56	77.16	Ca	.1	.2	10.2	87.66	-	-	**50**	**37.66**
18.75075	11.93	Qp	0	.2	10.3	22.43	60	-37.57	-	-
18.75075	9.35	Ca	0	.2	10.3	19.85	-	-	50	-30.15
26.25	10.9	Qp	.1	.3	10.5	21.8	60	-38.2	-	-
26.25	10.33	Ca	.1	.3	10.5	21.23	-	-	50	-28.77
27.1185	14.14	Qp	.1	.3	10.5	25.04	60	-34.96	-	-
27.1185	13.84	Ca	.1	.3	10.5	24.74	-	-	50	-25.26

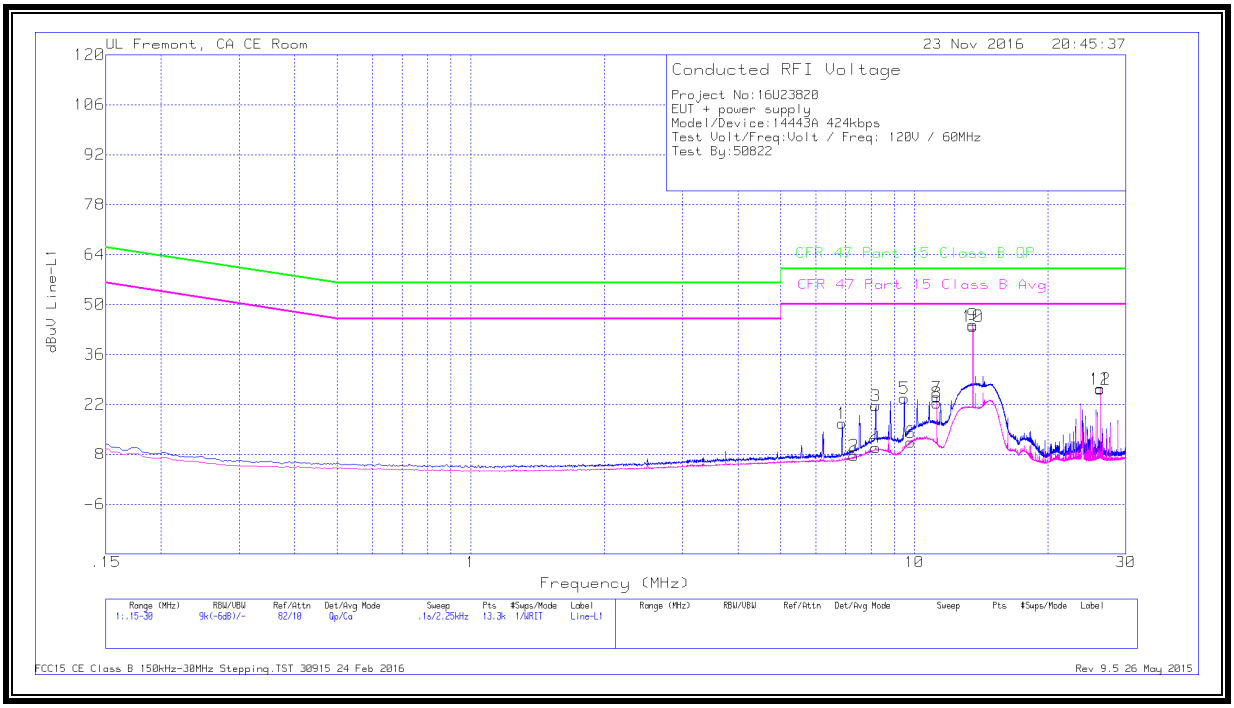
Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

NORMAL OPERATION WITH ANTENNA PORT TERMINATED, 424 KBPS

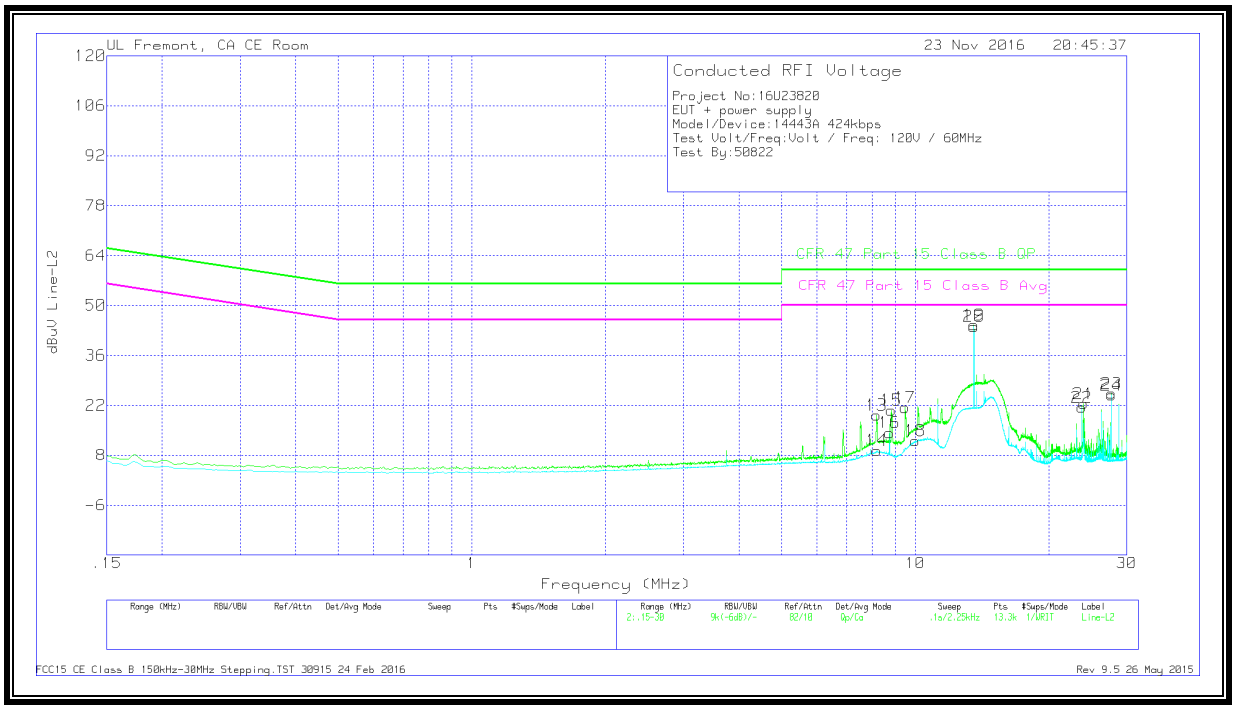
LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	6.8775	6.38	Qp	0	.1	10.2	16.68	60	-43.32	-	-
2	7.3095	-2.68	Ca	0	.1	10.2	7.62	-	-	50	-42.38
3	8.187	11.3	Qp	0	.1	10.2	21.6	60	-38.4	-	-
4	8.18925	-.4	Ca	0	.1	10.2	9.9	-	-	50	-40.1
5	9.49875	13.41	Qp	0	.1	10.2	23.71	60	-36.29	-	-
6	9.82275	.98	Ca	0	.2	10.2	11.38	-	-	50	-38.62
7	11.24925	13.62	Qp	0	.2	10.2	24.02	60	-35.98	-	-
8	11.24925	12.02	Ca	0	.2	10.2	22.42	-	-	50	-27.58
9	13.56	33.8	Qp	.1	.2	10.2	44.3	60	-15.7	-	-
10	13.56	33.37	Ca	.1	.2	10.2	43.87	-	-	50	-6.13
11	26.25	15.46	Qp	.1	.3	10.5	26.36	60	-33.64	-	-
12	26.25	15.36	Ca	.1	.3	10.5	26.26	-	-	50	-23.74

LINE 2 RESULTS

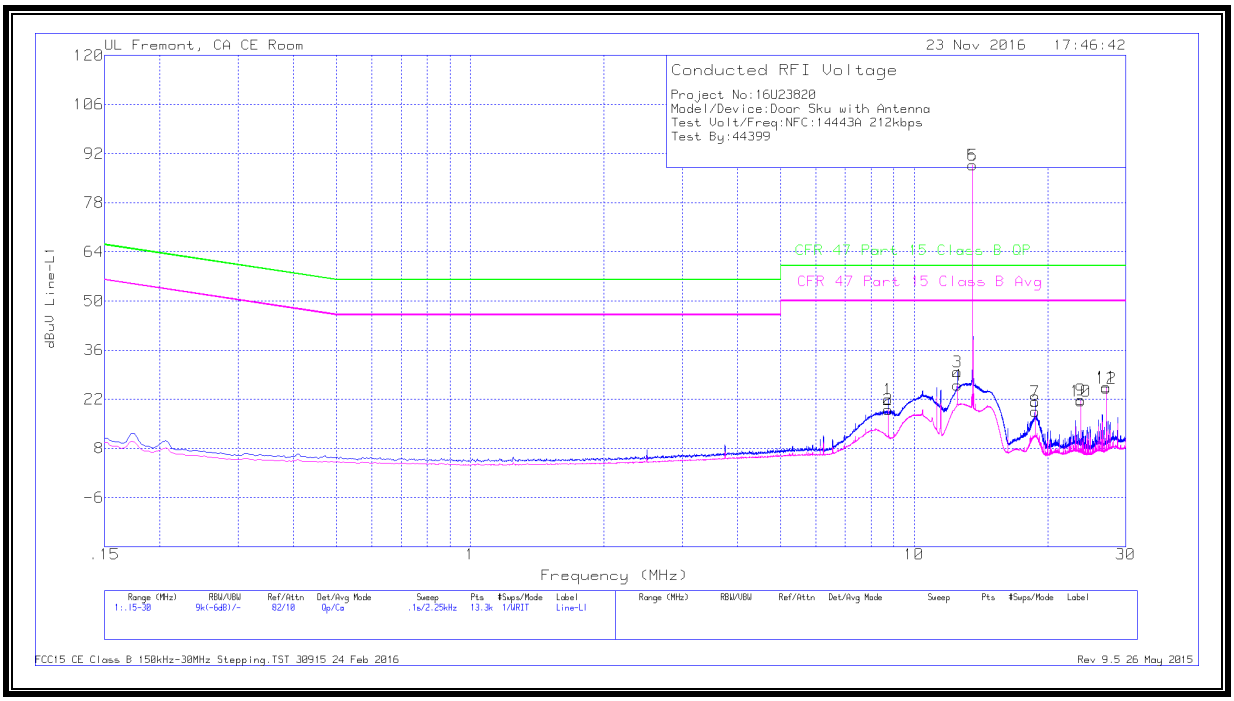


WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.18025	8.95	Qp	0	.1	10.2	19.25	60	-40.75	-	-
14	8.18925	-.93	Ca	0	.1	10.2	9.37	-	-	50	-40.63
15	8.83275	10.32	Qp	0	.1	10.2	20.62	60	-39.38	-	-
16	8.7495	4.05	Ca	0	.1	10.2	14.35	-	-	50	-35.65
17	9.4875	11.09	Qp	0	.1	10.2	21.39	60	-38.61	-	-
18	10.0005	1.7	Ca	0	.2	10.2	12.1	-	-	50	-37.9
19	13.56	34.03	Qp	.1	.2	10.2	44.53	60	-15.47	-	-
20	13.56	33.61	Ca	.1	.2	10.2	44.11	-	-	50	-5.89
21	23.94375	11.73	Qp	.1	.2	10.4	22.43	60	-37.57	-	-
22	23.75025	10.72	Ca	.1	.2	10.4	21.42	-	-	50	-28.58
23	27.69225	14.44	Qp	.1	.3	10.5	25.34	60	-34.66	-	-
24	27.69225	13.92	Ca	.1	.3	10.5	24.82	-	-	50	-25.18

NORMAL OPERATION, 212 KBPS

LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

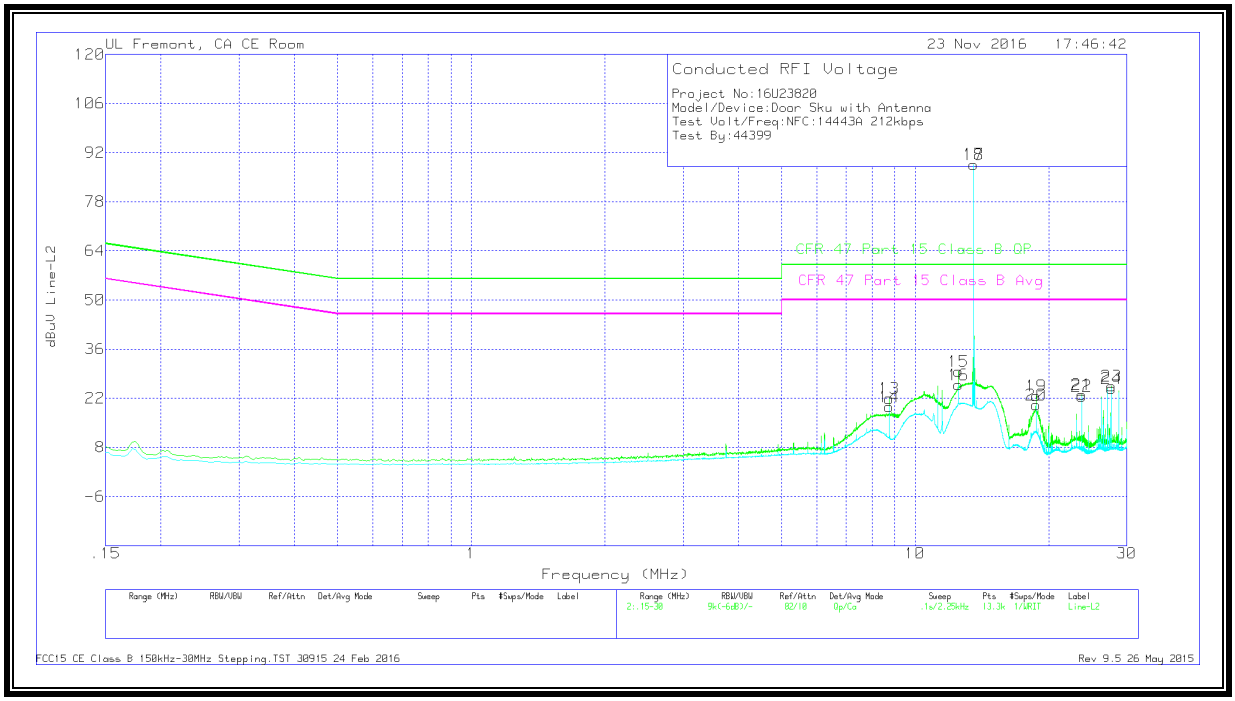
Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
8.7495	11.65	Qp	0	.1	10.2	21.95	60	-38.05	-	-
8.7495	8.74	Ca	0	.1	10.2	19.04	-	-	50	-30.96
12.52275	19.3	Qp	.1	.2	10.2	29.8	60	-30.2	-	-
12.52275	15.46	Ca	.1	.2	10.2	25.96	-	-	50	-24.04
13.56	78.32	Qp	.1	.2	10.2	88.82	**60**	**28.82**	-	-
13.56	78.31	Ca	.1	.2	10.2	88.81	-	-	**50**	**38.81**
18.75075	10.86	Qp	0	.2	10.3	21.36	60	-38.64	-	-
18.75075	8.12	Ca	0	.2	10.3	18.62	-	-	50	-31.38
23.75025	11.18	Qp	.1	.2	10.4	21.88	60	-38.12	-	-
23.75025	10.72	Ca	.1	.2	10.4	21.42	-	-	50	-28.58
27.1185	14.51	Qp	.1	.3	10.5	25.41	60	-34.59	-	-
27.1185	14.23	Ca	.1	.3	10.5	25.13	-	-	50	-24.87

Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	11.63	Qp	0	.1	10.2	21.93	60	-38.07	-	-
14	8.7495	9.21	Ca	0	.1	10.2	19.51	-	-	50	-30.49
15	12.534	19.18	Qp	.1	.2	10.2	29.68	60	-30.32	-	-
16	12.534	15.34	Ca	.1	.2	10.2	25.84	-	-	50	-24.16
17	13.56	78.17	Qp	.1	.2	10.2	88.67	**60**	**28.67**	-	-
18	13.56	78.15	Ca	.1	.2	10.2	88.65	-	-	**50**	**38.65**
19	18.75075	12.26	Qp	0	.2	10.3	22.76	60	-37.24	-	-
20	18.75075	9.55	Ca	0	.2	10.3	20.05	-	-	50	-29.95
21	23.75025	12.37	Qp	.1	.2	10.4	23.07	60	-36.93	-	-
22	23.75025	11.92	Ca	.1	.2	10.4	22.62	-	-	50	-27.38
23	27.69225	14.66	Qp	.1	.3	10.5	25.56	60	-34.44	-	-
24	27.69225	13.93	Ca	.1	.3	10.5	24.83	-	-	50	-25.17

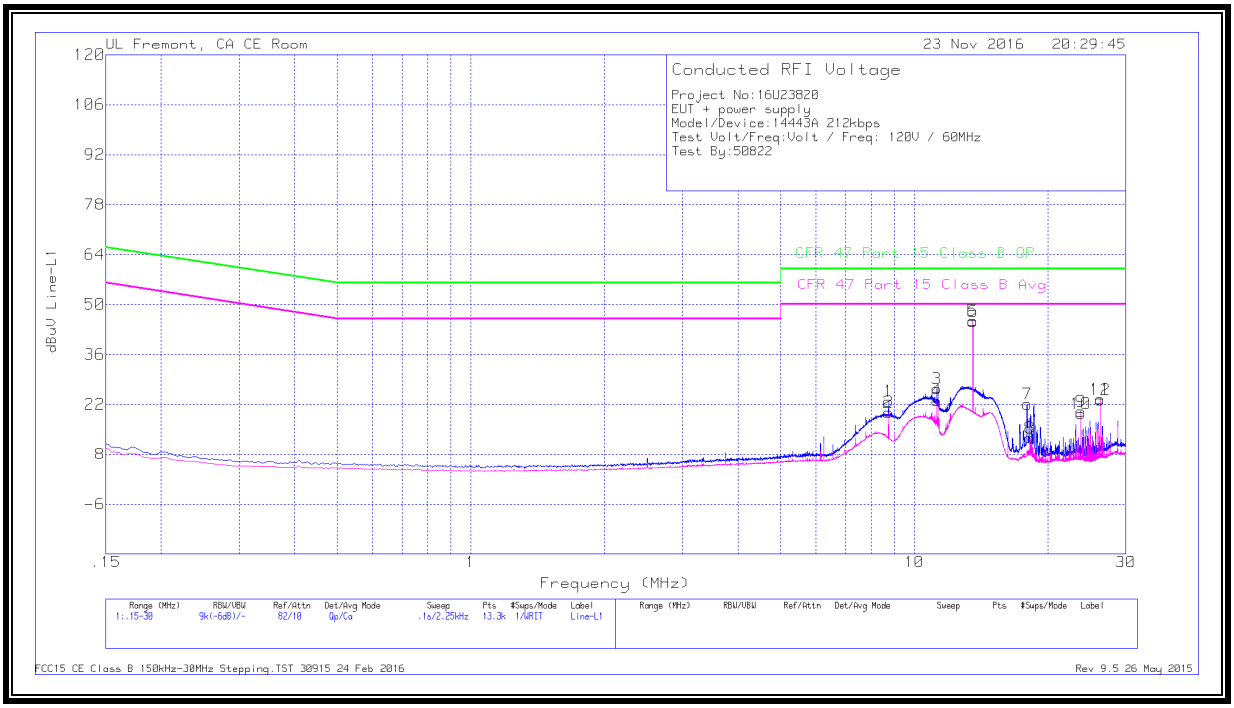
Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

NORMAL OPERATION WITH ANTENNA PORT TERMINATED, 212 KBPS

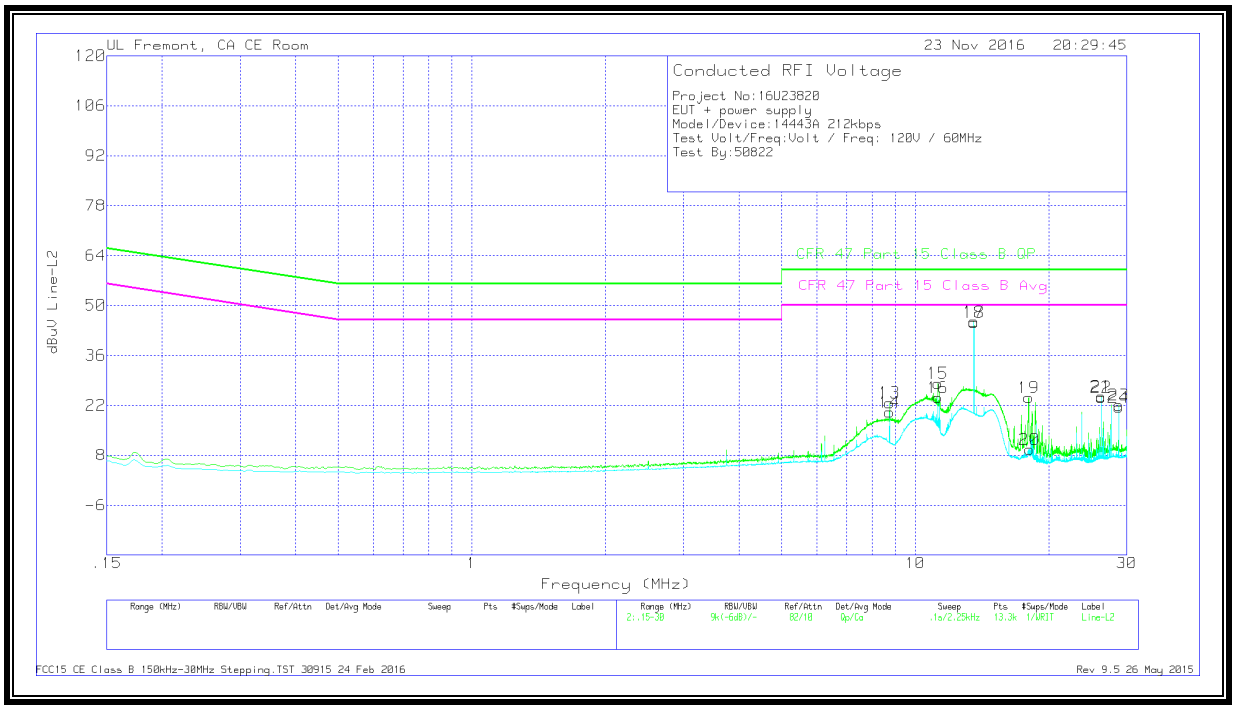
LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	12.55	Qp	0	.1	10.2	22.85	60	-37.15	-	-
2	8.7495	9.5	Ca	0	.1	10.2	19.8	-	-	50	-30.2
3	11.24925	15.96	Qp	0	.2	10.2	26.36	60	-33.64	-	-
4	11.24925	12.62	Ca	0	.2	10.2	23.02	-	-	50	-26.98
5	13.56	34.97	Qp	.1	.2	10.2	45.47	60	-14.53	-	-
6	13.56	34.71	Ca	.1	.2	10.2	45.21	-	-	50	-4.79
7	17.988	11.55	Qp	0	.2	10.3	22.05	60	-37.95	-	-
8	18.2445	2.07	Ca	0	.2	10.3	12.57	-	-	50	-37.43
9	23.75025	9.31	Qp	.1	.2	10.4	20.01	60	-39.99	-	-
10	23.75025	8.7	Ca	.1	.2	10.4	19.4	-	-	50	-30.6
11	26.25	12.6	Qp	.1	.3	10.5	23.5	60	-36.5	-	-
12	26.25	12.33	Ca	.1	.3	10.5	23.23	-	-	50	-26.77

LINE 2 RESULTS

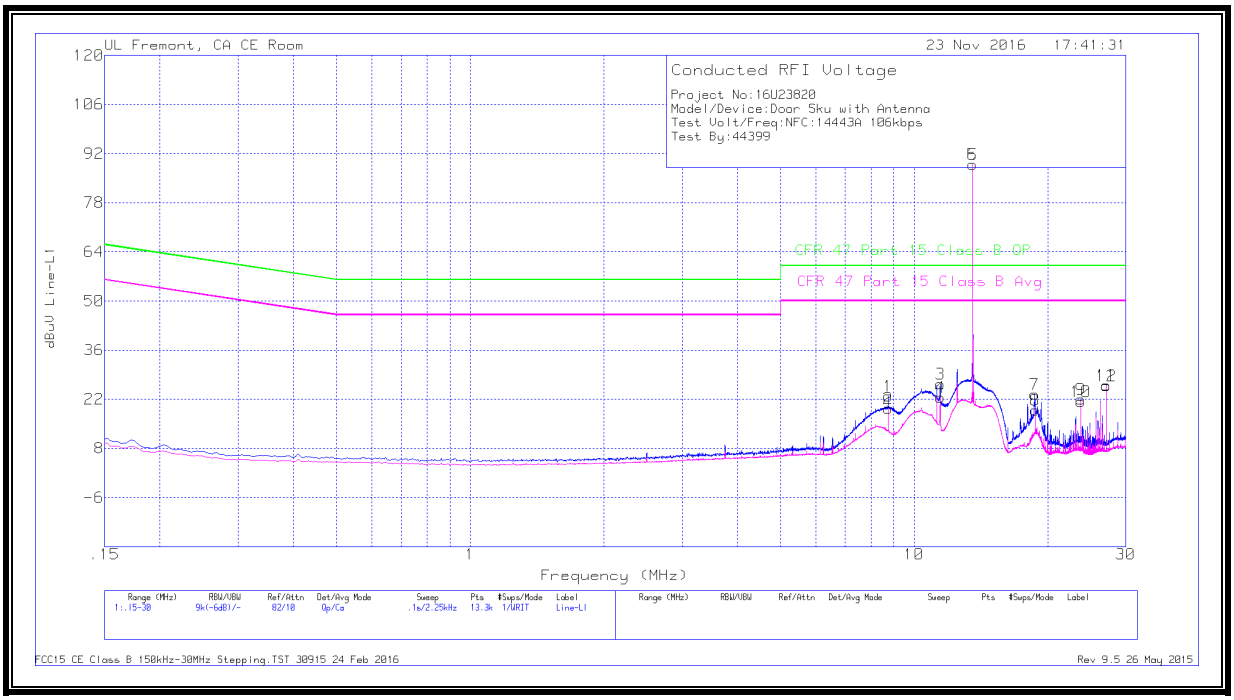


WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	12.41	Qp	0	.1	10.2	22.71	60	-37.29	-	-
14	8.7495	9.73	Ca	0	.1	10.2	20.03	-	-	50	-29.97
15	11.24925	17.75	Qp	0	.2	10.2	28.15	60	-31.85	-	-
16	11.24925	13.76	Ca	0	.2	10.2	24.16	-	-	50	-25.84
17	13.56	35	Qp	.1	.2	10.2	45.5	60	-14.5	-	-
18	13.56	34.76	Ca	.1	.2	10.2	45.26	-	-	50	-4.74
19	18.02175	13.64	Qp	0	.2	10.3	24.14	60	-35.86	-	-
20	18.10275	-.89	Ca	0	.2	10.3	9.61	-	-	50	-40.39
21	26.25	13.57	Qp	.1	.3	10.5	24.47	60	-35.53	-	-
22	26.25	13.31	Ca	.1	.3	10.5	24.21	-	-	50	-25.79
23	28.74975	11.27	Qp	.1	.3	10.4	22.07	60	-37.93	-	-
24	28.74975	10.63	Ca	.1	.3	10.4	21.43	-	-	50	-28.57

NORMAL OPERATION, 106 KBPS

LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

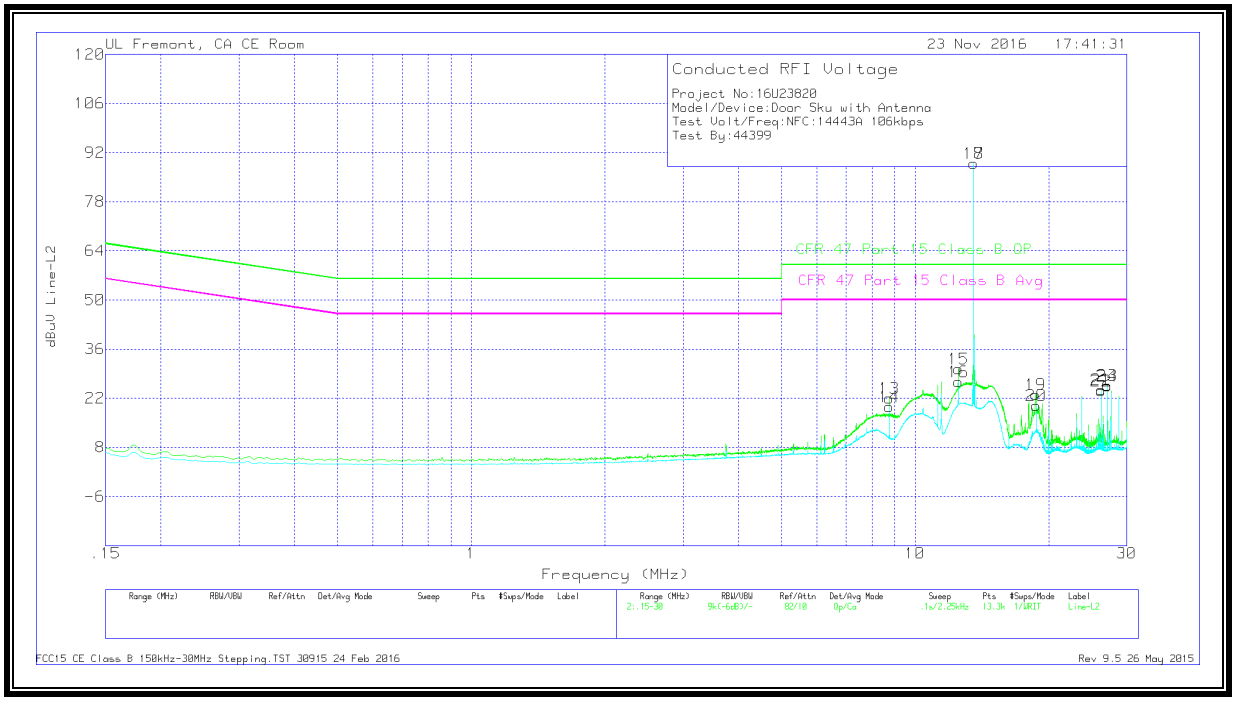
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	12.57	Qp	0	.1	10.2	22.87	60	-37.13	-	-
2	8.7495	9.17	Ca	0	.1	10.2	19.47	-	-	50	-30.53
3	11.45175	15.95	Qp	0	.2	10.2	26.35	60	-33.65	-	-
4	11.454	12.14	Ca	0	.2	10.2	22.54	-	-	50	-27.46
5	13.56	78.48	Qp	.1	.2	10.2	88.98	**60**	**28.98**	-	-
6	13.56	78.47	Ca	.1	.2	10.2	88.97	-	-	**50**	**38.97**
7	18.66975	12.96	Qp	0	.2	10.3	23.46	60	-36.54	-	-
8	18.75075	8.32	Ca	0	.2	10.3	18.82	-	-	50	-31.18
9	23.75025	11.26	Qp	.1	.2	10.4	21.96	60	-38.04	-	-
10	23.75025	10.62	Ca	.1	.2	10.4	21.32	-	-	50	-28.68
11	27.1185	15.09	Qp	.1	.3	10.5	25.99	60	-34.01	-	-
12	27.1185	14.98	Ca	.1	.3	10.5	25.88	-	-	50	-24.12

Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	11.66	Qp	0	.1	10.2	21.96	60	-38.04	-	-
14	8.7495	9.28	Ca	0	.1	10.2	19.58	-	-	50	-30.42
15	12.51375	19.86	Qp	.1	.2	10.2	30.36	60	-29.64	-	-
16	12.51375	16.15	Ca	.1	.2	10.2	26.65	-	-	50	-23.35
17	13.56	78.42	Qp	.1	.2	10.2	88.92	**60**	**28.92**	-	-
18	13.56	78.4	Ca	.1	.2	10.2	88.9	-	-	**50**	**38.9**
19	18.7035	12.59	Qp	0	.2	10.3	23.09	60	-36.91	-	-
20	18.75075	9.37	Ca	0	.2	10.3	19.87	-	-	50	-30.13
21	26.25	13.51	Qp	.1	.3	10.5	24.41	60	-35.59	-	-
22	26.25	13.22	Ca	.1	.3	10.5	24.12	-	-	50	-25.88
23	27.1185	14.71	Qp	.1	.3	10.5	25.61	60	-34.39	-	-
24	27.1185	14.57	Ca	.1	.3	10.5	25.47	-	-	50	-24.53

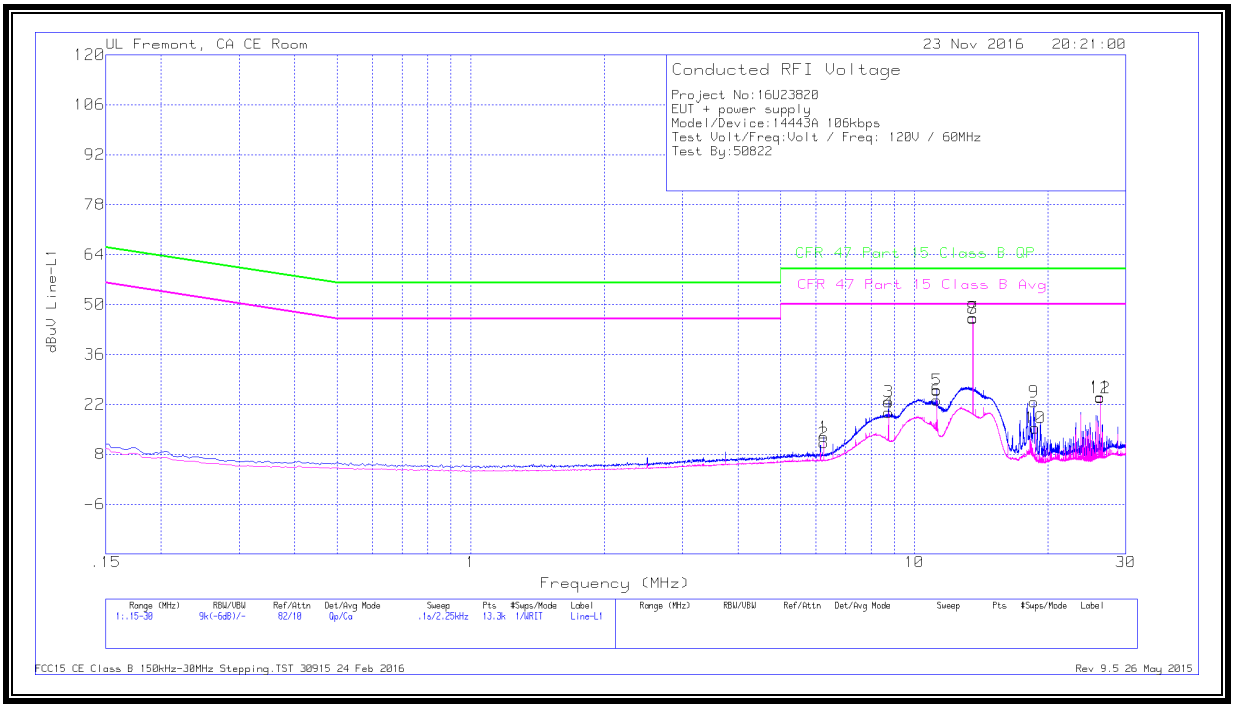
Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

NORMAL OPERATION WITH ANTENNA PORT TERMINATED, 106 KBPS

LINE 1 RESULTS

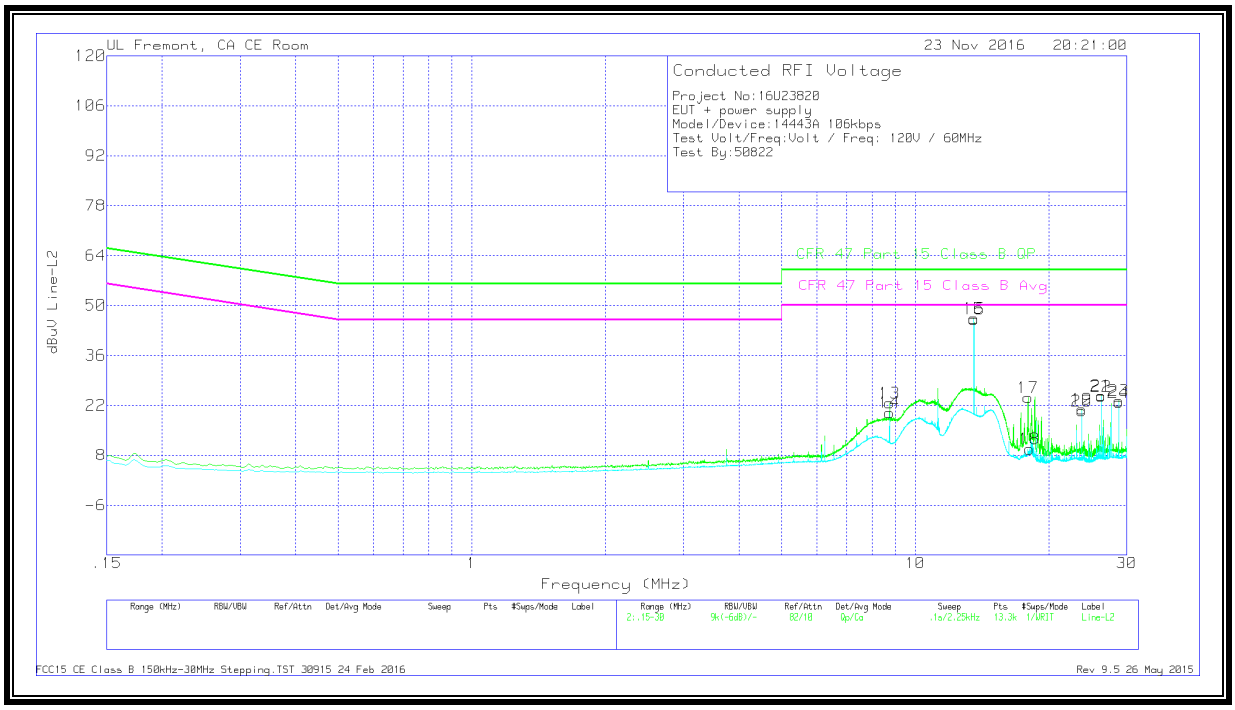


WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	6.24975	2.59	Qp	0	.1	10.2	12.89	60	-47.11	-	-
2	6.24975	.85	Ca	0	.1	10.2	11.15	-	-	50	-38.85
3	8.7495	12.44	Qp	0	.1	10.2	22.74	60	-37.26	-	-
4	8.7495	9.46	Ca	0	.1	10.2	19.76	-	-	50	-30.24
5	11.24925	15.65	Qp	0	.2	10.2	26.05	60	-33.95	-	-
6	11.24925	12.79	Ca	0	.2	10.2	23.19	-	-	50	-26.81
7	13.56	35.79	Qp	.1	.2	10.2	46.29	60	-13.71	-	-
8	13.56	35.6	Ca	.1	.2	10.2	46.1	-	-	50	-3.9
9	18.61575	12.2	Qp	0	.2	10.3	22.7	60	-37.3	-	-
10	18.75075	4.9	Ca	0	.2	10.3	15.4	-	-	50	-34.6
11	26.25	13.16	Qp	.1	.3	10.5	24.06	60	-35.94	-	-
12	26.25	12.93	Ca	.1	.3	10.5	23.83	-	-	50	-26.17

LINE 2 RESULTS



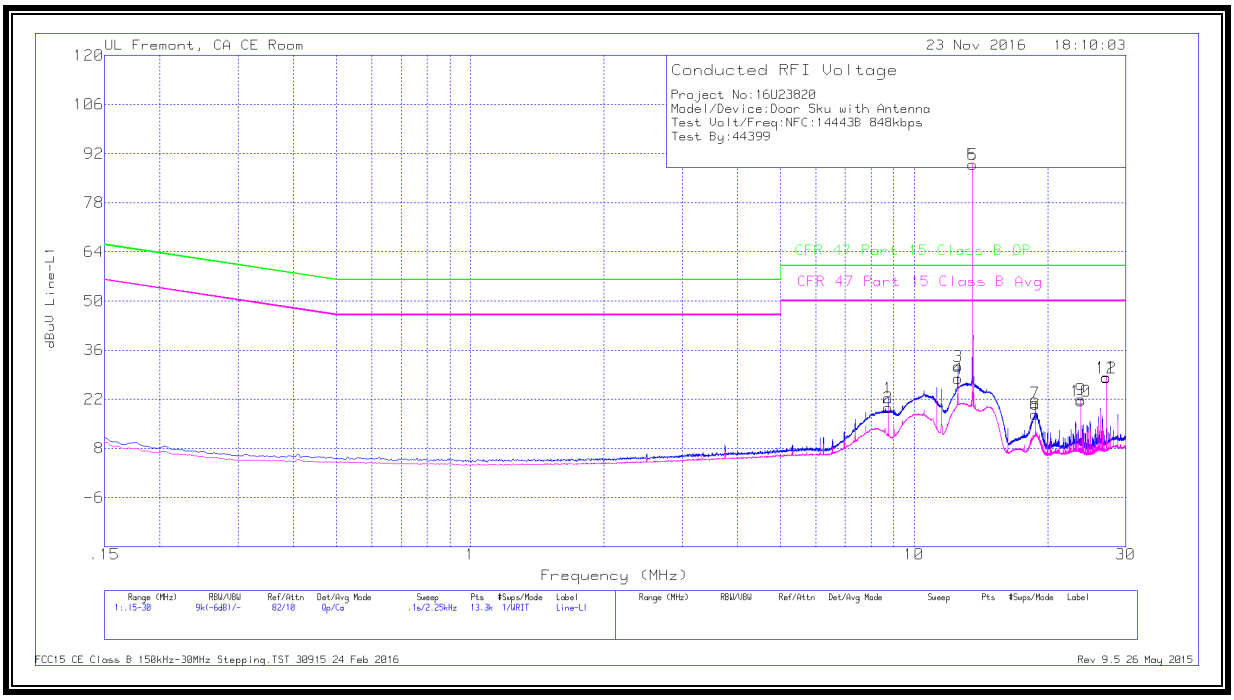
WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	12.35	Qp	0	.1	10.2	22.65	60	-37.35	-	-
14	8.7495	9.69	Ca	0	.1	10.2	19.99	-	-	50	-30.01
15	13.56	35.86	Qp	.1	.2	10.2	46.36	60	-13.64	-	-
16	13.56	35.66	Ca	.1	.2	10.2	46.16	-	-	50	-3.84
17	17.9655	13.65	Qp	0	.2	10.3	24.15	60	-35.85	-	-
18	18.10275	-.75	Ca	0	.2	10.3	9.75	-	-	50	-40.25
19	23.75025	10.2	Qp	.1	.2	10.4	20.9	60	-39.1	-	-
20	23.75025	9.67	Ca	.1	.2	10.4	20.37	-	-	50	-29.63
21	26.25	13.78	Qp	.1	.3	10.5	24.68	60	-35.32	-	-
22	26.25	13.58	Ca	.1	.3	10.5	24.48	-	-	50	-25.52
23	28.74975	12.46	Qp	.1	.3	10.4	23.26	60	-36.74	-	-
24	28.74975	12	Ca	.1	.3	10.4	22.8	-	-	50	-27.2

10.2. 14443B

NORMAL OPERATION, 848 KBPS

LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

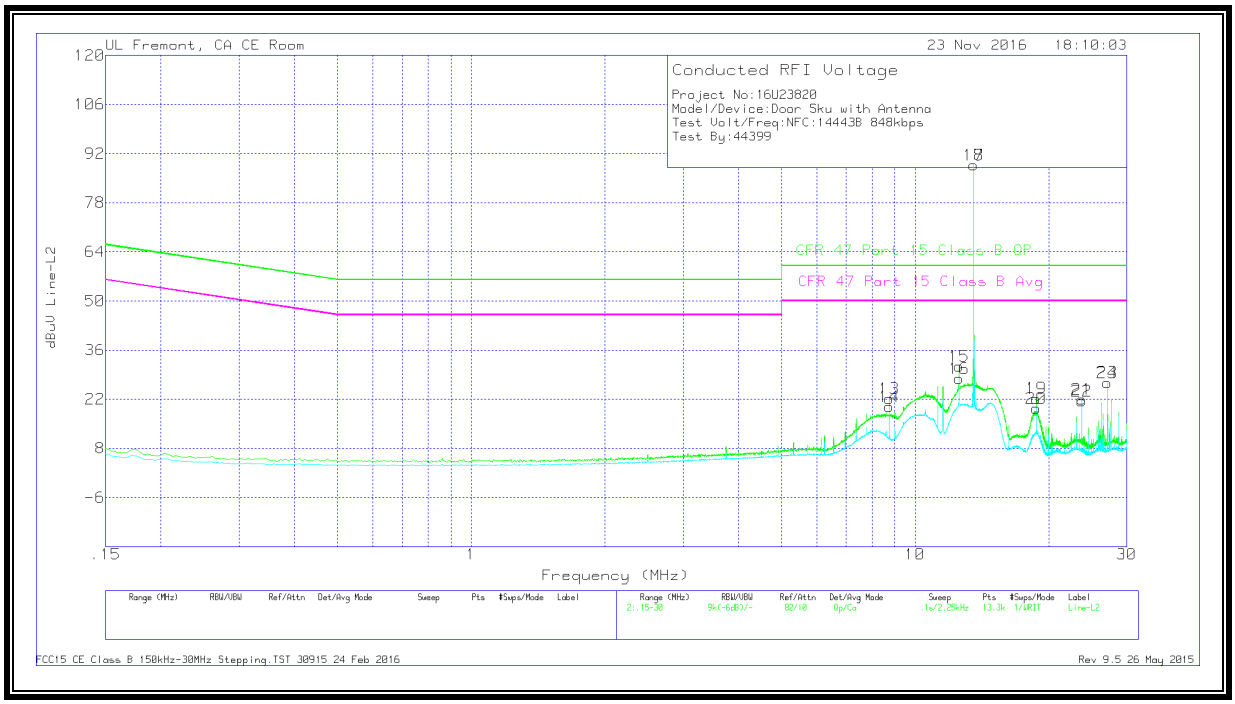
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	12.02	Qp	0	.1	10.2	22.32	60	-37.68	-	-
2	8.7495	9.23	Ca	0	.1	10.2	19.53	-	-	50	-30.47
3	12.54975	20.85	Qp	.1	.2	10.2	31.35	60	-28.65	-	-
4	12.54975	17.49	Ca	.1	.2	10.2	27.99	-	-	50	-22.01
5	13.56	78.37	Qp	.1	.2	10.2	88.87	**60**	**28.87**	-	-
6	13.56	78.36	Ca	.1	.2	10.2	88.86	-	-	**50**	**38.86**
7	18.75075	10.47	Qp	0	.2	10.3	20.97	60	-39.03	-	-
8	18.75075	7.25	Ca	0	.2	10.3	17.75	-	-	50	-32.25
9	23.75025	11.24	Qp	.1	.2	10.4	21.94	60	-38.06	-	-
10	23.75025	10.79	Ca	.1	.2	10.4	21.49	-	-	50	-28.51
11	27.1185	17.31	Qp	.1	.3	10.5	28.21	60	-31.79	-	-
12	27.1185	17.22	Ca	.1	.3	10.5	28.12	-	-	50	-21.88

Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	11.88	Qp	0	.1	10.2	22.18	60	-37.82	-	-
14	8.7495	9.57	Ca	0	.1	10.2	19.87	-	-	50	-30.13
15	12.55875	20.85	Qp	.1	.2	10.2	31.35	60	-28.65	-	-
16	12.55875	17.48	Ca	.1	.2	10.2	27.98	-	-	50	-22.02
17	13.56	78.32	Qp	.1	.2	10.2	88.82	**60**	**28.82**	-	-
18	13.56	78.31	Ca	.1	.2	10.2	88.81	-	-	**50**	**38.81**
19	18.75075	11.77	Qp	0	.2	10.3	22.27	60	-37.73	-	-
20	18.75075	8.86	Ca	0	.2	10.3	19.36	-	-	50	-30.64
21	23.75025	11.29	Qp	.1	.2	10.4	21.99	60	-38.01	-	-
22	23.75025	10.76	Ca	.1	.2	10.4	21.46	-	-	50	-28.54
23	27.1185	15.89	Qp	.1	.3	10.5	26.79	60	-33.21	-	-
24	27.1185	15.76	Ca	.1	.3	10.5	26.66	-	-	50	-23.34

Qp - Quasi-Peak detector

Ca - CISPR average detection

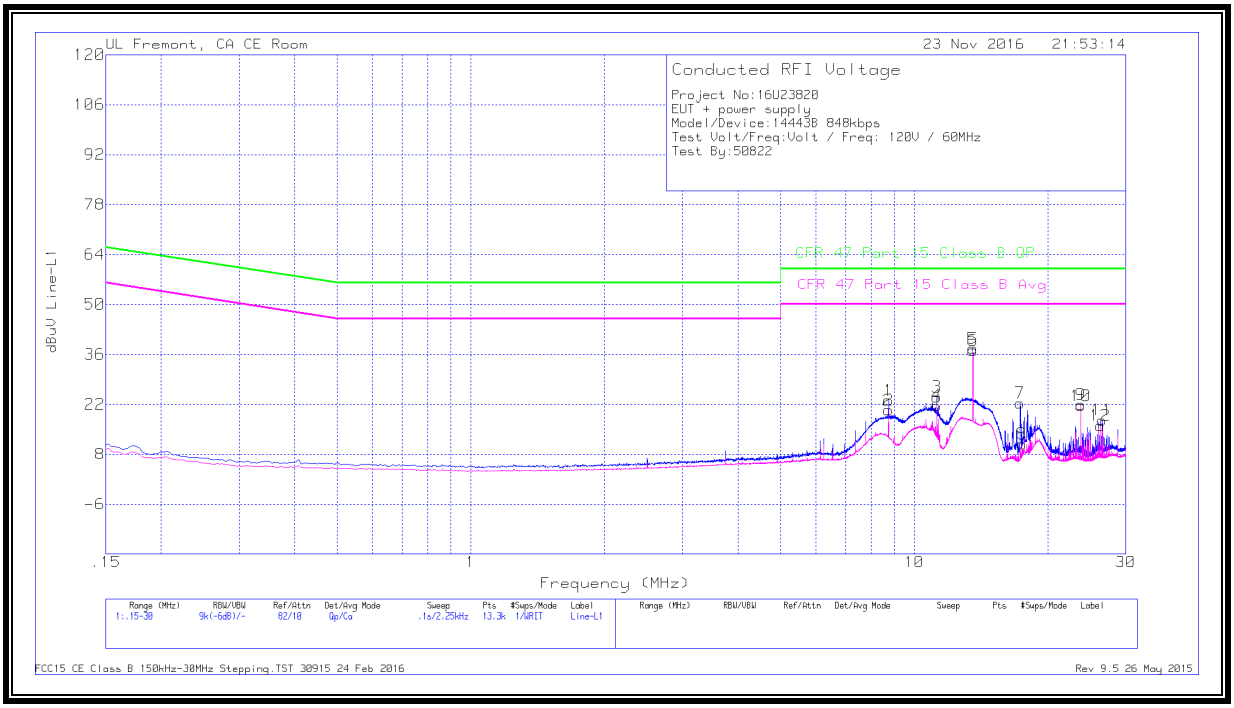
FCC15 CE Class B 150kHz-30MHz Stepping.TST 30915 24 Feb 2016

Rev 9.5 26 May 2015

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

NORMAL OPERATION WITH ANTENNA PORT TERMINATED, 848 KBPS

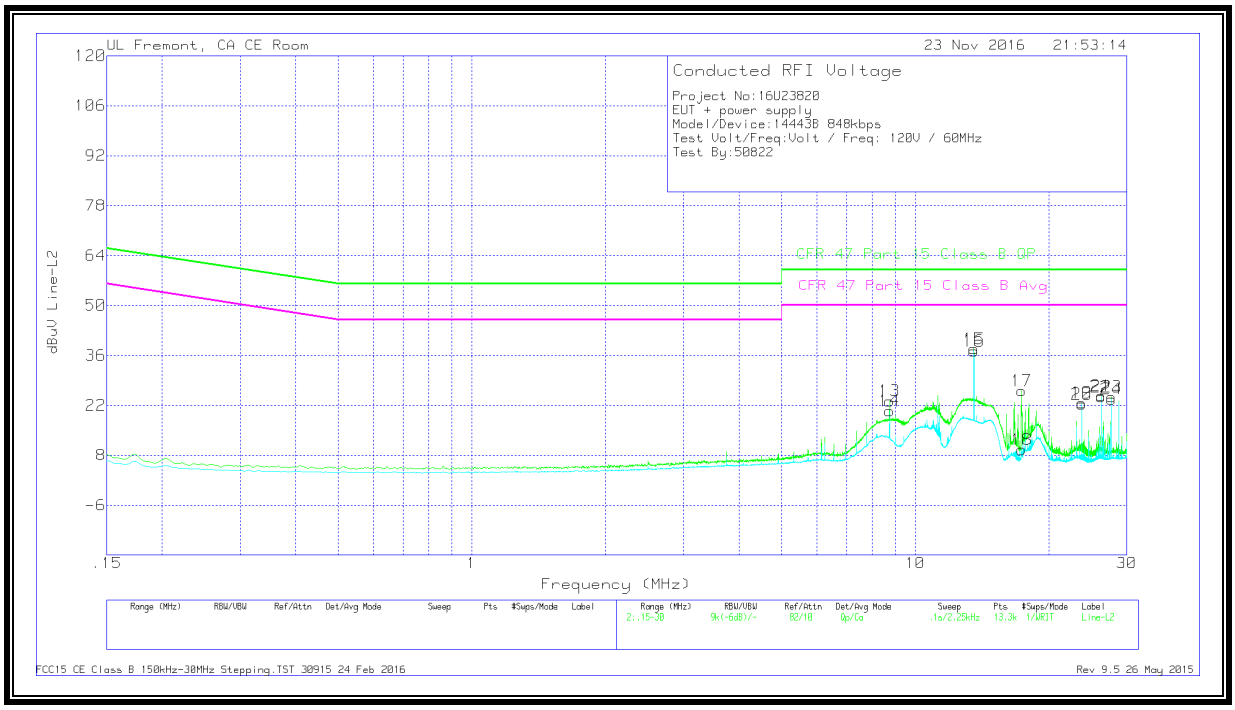
LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	12.87	Qp	0	.1	10.2	23.17	60	-36.83	-	-
2	8.7495	10.09	Ca	0	.1	10.2	20.39	-	-	50	-29.61
3	11.24925	13.67	Qp	0	.2	10.2	24.07	60	-35.93	-	-
4	11.24925	11.28	Ca	0	.2	10.2	21.68	-	-	50	-28.32
5	13.56	27.16	Qp	.1	.2	10.2	37.66	60	-22.34	-	-
6	13.56	26.6	Ca	.1	.2	10.2	37.1	-	-	50	-12.9
7	17.31975	11.84	Qp	0	.2	10.3	22.34	60	-37.66	-	-
8	17.49975	.41	Ca	0	.2	10.3	10.91	-	-	50	-39.09
9	23.75025	11.24	Qp	.1	.2	10.4	21.94	60	-38.06	-	-
10	23.75025	10.88	Ca	.1	.2	10.4	21.58	-	-	50	-28.42
11	26.49075	6.7	Qp	.1	.3	10.5	17.6	60	-42.4	-	-
12	26.25	5.15	Ca	.1	.3	10.5	16.05	-	-	50	-33.95

LINE 2 RESULTS



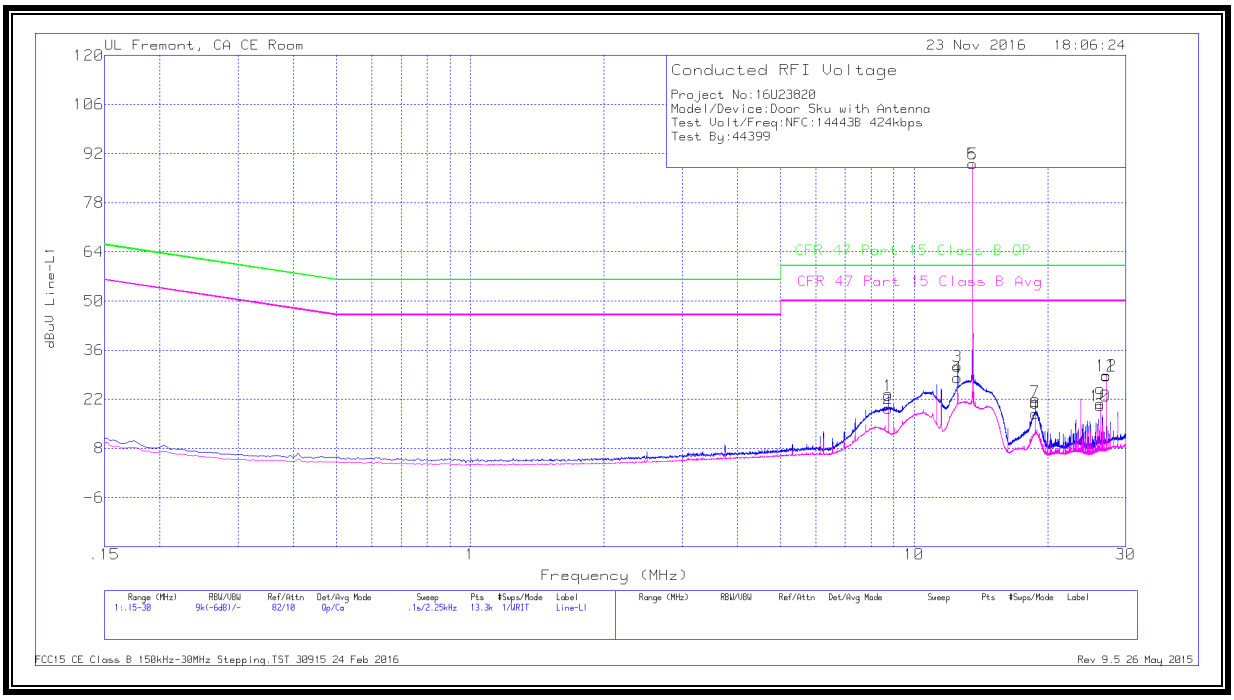
WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	12.94	Qp	0	.1	10.2	23.24	60	-36.76	-	-
14	8.7495	10.19	Ca	0	.1	10.2	20.49	-	-	50	-29.51
15	13.56	27.32	Qp	.1	.2	10.2	37.82	60	-22.18	-	-
16	13.56	26.72	Ca	.1	.2	10.2	37.22	-	-	50	-12.78
17	17.36475	15.58	Qp	0	.2	10.3	26.08	60	-33.92	-	-
18	17.3895	-.91	Ca	0	.2	10.3	9.59	-	-	50	-40.41
19	23.75025	11.99	Qp	.1	.2	10.4	22.69	60	-37.31	-	-
20	23.75025	11.63	Ca	.1	.2	10.4	22.33	-	-	50	-27.67
21	26.25	13.75	Qp	.1	.3	10.5	24.65	60	-35.35	-	-
22	26.25	13.5	Ca	.1	.3	10.5	24.4	-	-	50	-25.6
23	27.69225	13.49	Qp	.1	.3	10.5	24.39	60	-35.61	-	-
24	27.69225	12.85	Ca	.1	.3	10.5	23.75	-	-	50	-26.25

NORMAL OPERATION, 424 KBPS

LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

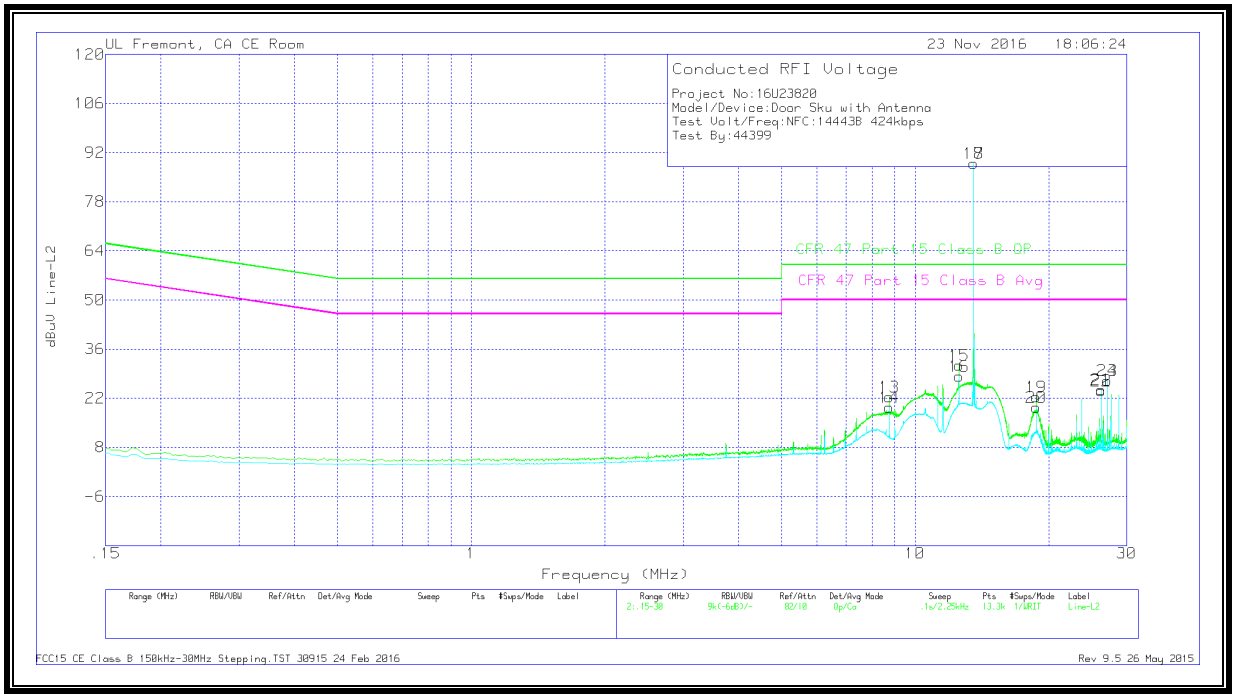
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	12.69	Qp	0	.1	10.2	22.99	60	-37.01	-	-
2	8.7495	9.13	Ca	0	.1	10.2	19.43	-	-	50	-30.57
3	12.5385	20.82	Qp	.1	.2	10.2	31.32	60	-28.68	-	-
4	12.5385	17.59	Ca	.1	.2	10.2	28.09	-	-	50	-21.91
5	13.56	78.67	Qp	.1	.2	10.2	89.17	**60**	**29.17**	-	-
6	13.56	78.66	Ca	.1	.2	10.2	89.16	-	-	**50**	**39.16**
7	18.75075	10.89	Qp	0	.2	10.3	21.39	60	-38.61	-	-
8	18.75075	7.43	Ca	0	.2	10.3	17.93	-	-	50	-32.07
9	26.25	9.91	Qp	.1	.3	10.5	20.81	60	-39.19	-	-
10	26.25	9.24	Ca	.1	.3	10.5	20.14	-	-	50	-29.86
11	27.1185	17.88	Qp	.1	.3	10.5	28.78	60	-31.22	-	-
12	27.1185	17.8	Ca	.1	.3	10.5	28.7	-	-	50	-21.3

Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	12.06	Qp	0	.1	10.2	22.36	60	-37.64	-	-
14	8.7495	9.17	Ca	0	.1	10.2	19.47	-	-	50	-30.53
15	12.5565	20.96	Qp	.1	.2	10.2	31.46	60	-28.54	-	-
16	12.5565	17.75	Ca	.1	.2	10.2	28.25	-	-	50	-21.75
17	13.56	78.48	Qp	.1	.2	10.2	88.98	**60**	**28.98**	-	-
18	13.56	78.47	Ca	.1	.2	10.2	88.97	-	-	**50**	**38.97**
19	18.75075	11.8	Qp	0	.2	10.3	22.3	60	-37.7	-	-
20	18.75075	8.86	Ca	0	.2	10.3	19.36	-	-	50	-30.64
21	26.25	13.56	Qp	.1	.3	10.5	24.46	60	-35.54	-	-
22	26.25	13.28	Ca	.1	.3	10.5	24.18	-	-	50	-25.82
23	27.1185	16.22	Qp	.1	.3	10.5	27.12	60	-32.88	-	-
24	27.1185	16.16	Ca	.1	.3	10.5	27.06	-	-	50	-22.94

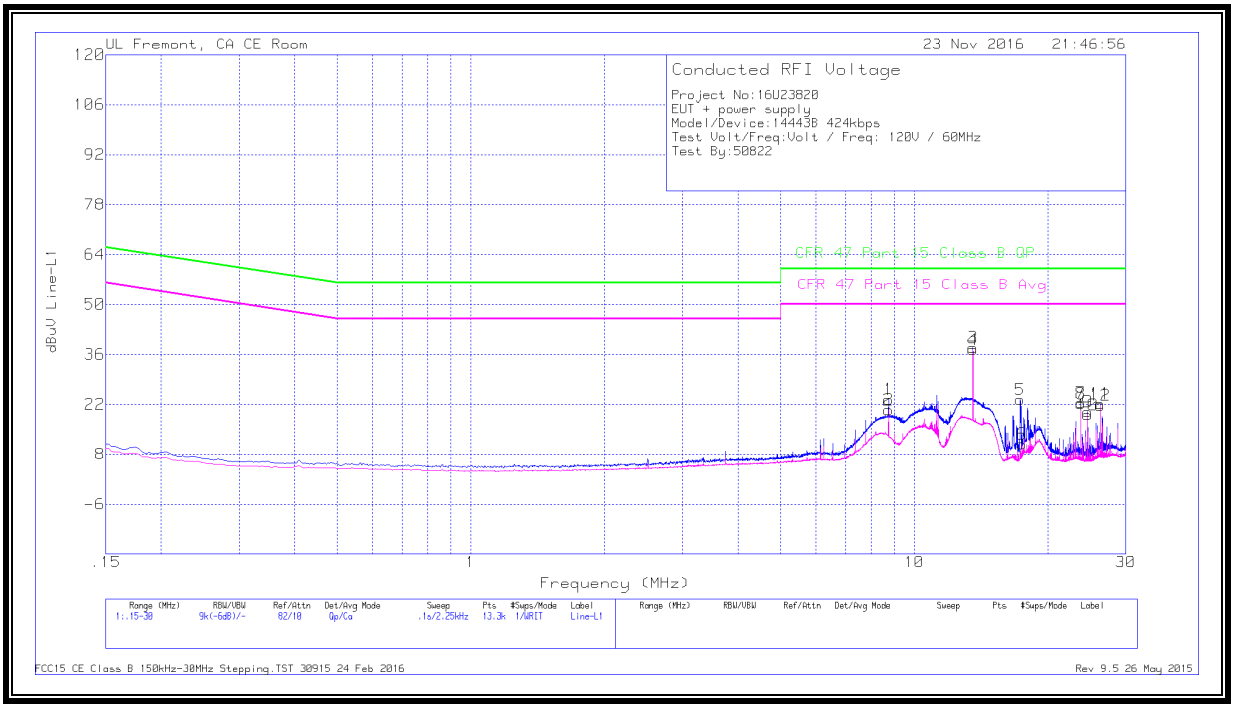
Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

NORMAL OPERATION WITH ANTENNA PORT TERMINATED, 424 KBPS

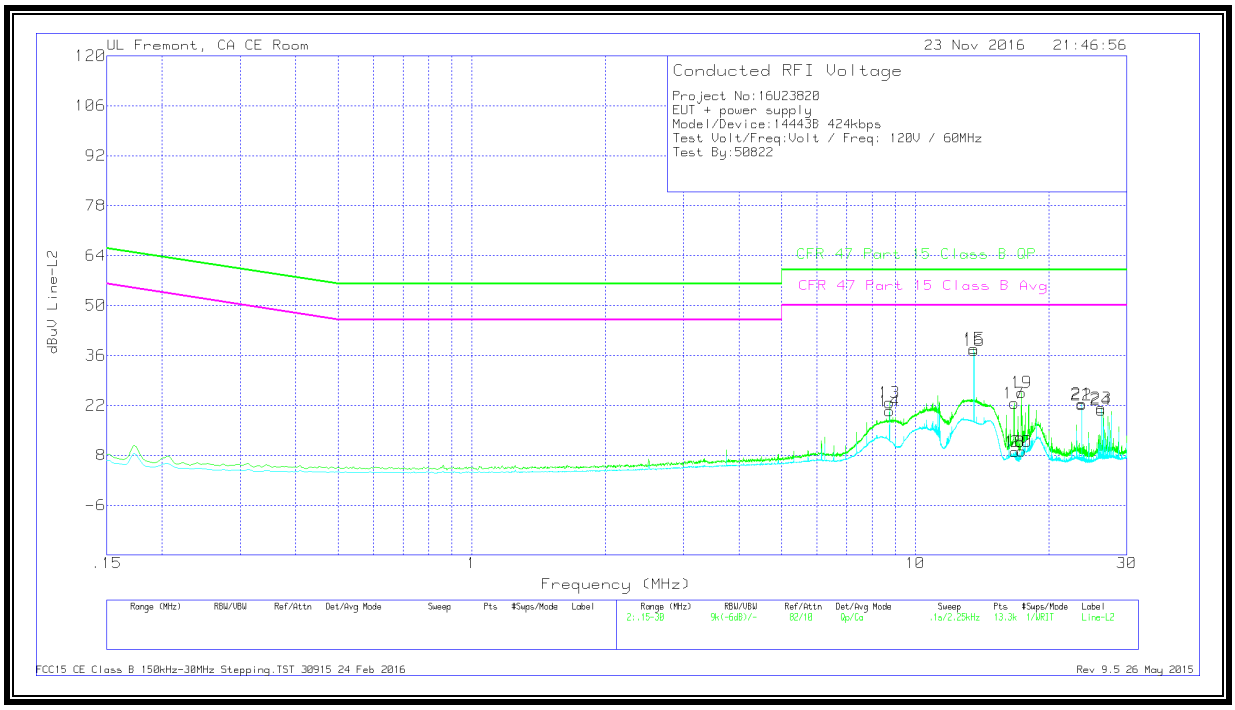
LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	13.06	Qp	0	.1	10.2	23.36	60	-36.64	-	-
2	8.7495	10.19	Ca	0	.1	10.2	20.49	-	-	50	-29.51
3	13.56	27.42	Qp	.1	.2	10.2	37.92	60	-22.08	-	-
4	13.56	26.84	Ca	.1	.2	10.2	37.34	-	-	50	-12.66
5	17.34	12.78	Qp	0	.2	10.3	23.28	60	-36.72	-	-
6	17.49975	.36	Ca	0	.2	10.3	10.86	-	-	50	-39.14
7	23.75025	11.74	Qp	.1	.2	10.4	22.44	60	-37.56	-	-
8	23.75025	11.49	Ca	.1	.2	10.4	22.19	-	-	50	-27.81
9	24.6165	9.03	Qp	.1	.3	10.5	19.93	60	-40.07	-	-
10	24.6165	8.15	Ca	.1	.3	10.5	19.05	-	-	50	-30.95
11	26.25	11.27	Qp	.1	.3	10.5	22.17	60	-37.83	-	-
12	26.25	10.83	Ca	.1	.3	10.5	21.73	-	-	50	-28.27

LINE 2 RESULTS



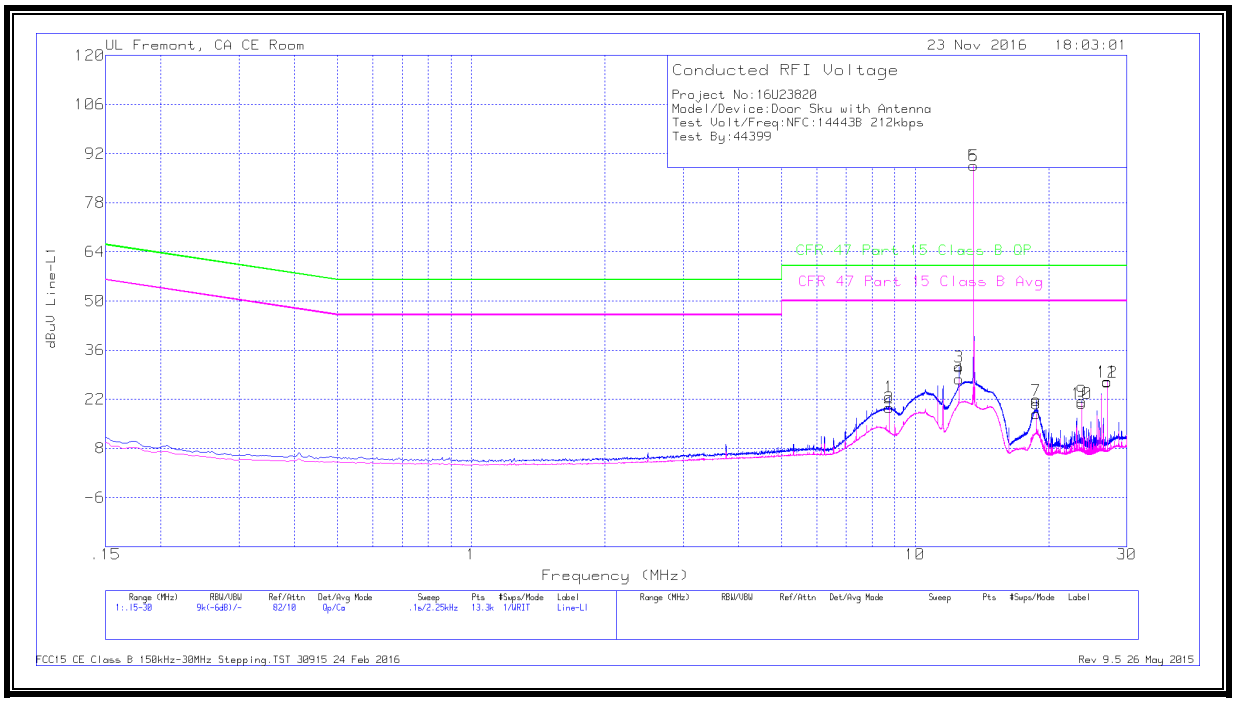
WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	12.46	Qp	0	.1	10.2	22.76	60	-37.24	-	-
14	8.7495	10.07	Ca	0	.1	10.2	20.37	-	-	50	-29.63
15	13.56	27.39	Qp	.1	.2	10.2	37.89	60	-22.11	-	-
16	13.56	26.85	Ca	.1	.2	10.2	37.35	-	-	50	-12.65
17	16.71	12.09	Qp	0	.2	10.3	22.59	60	-37.41	-	-
18	16.77975	-1.56	Ca	0	.2	10.3	8.94	-	-	50	-41.06
19	17.36475	15.08	Qp	0	.2	10.3	25.58	60	-34.42	-	-
20	17.38725	-1.36	Ca	0	.2	10.3	9.14	-	-	50	-40.86
21	23.75025	11.77	Qp	.1	.2	10.4	22.47	60	-37.53	-	-
22	23.75025	11.44	Ca	.1	.2	10.4	22.14	-	-	50	-27.86
23	26.25	10.34	Qp	.1	.3	10.5	21.24	60	-38.76	-	-
24	26.25	9.79	Ca	.1	.3	10.5	20.69	-	-	50	-29.31

NORMAL OPERATION, 212 KBPS

LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

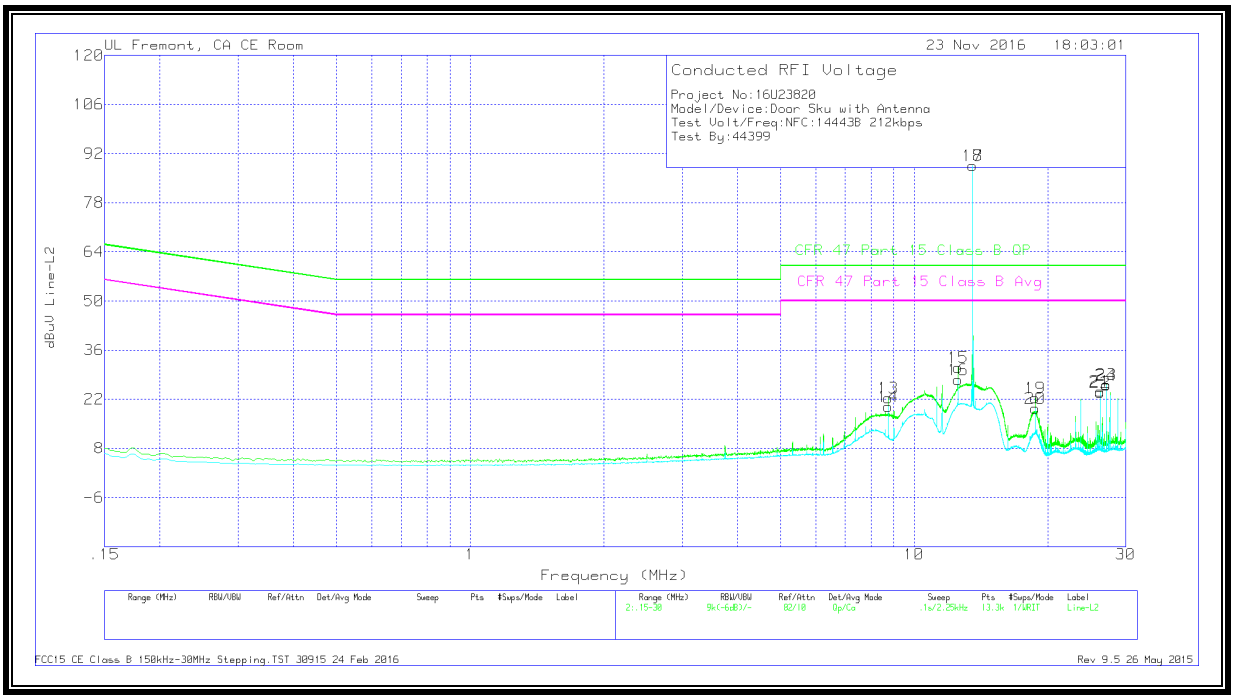
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	12.48	Qp	0	.1	10.2	22.78	60	-37.22	-	-
2	8.7495	9.33	Ca	0	.1	10.2	19.63	-	-	50	-30.37
3	12.561	20.67	Qp	.1	.2	10.2	31.17	60	-28.83	-	-
4	12.561	17.2	Ca	.1	.2	10.2	27.7	-	-	50	-22.3
5	13.56	78.05	Qp	.1	.2	10.2	88.55	**60**	**28.55**	-	-
6	13.56	78.03	Ca	.1	.2	10.2	88.53	-	-	**50**	**38.53**
7	18.75075	11.14	Qp	0	.2	10.3	21.64	60	-38.36	-	-
8	18.75075	7.42	Ca	0	.2	10.3	17.92	-	-	50	-32.08
9	23.75025	10.71	Qp	.1	.2	10.4	21.41	60	-38.59	-	-
10	23.75025	10.14	Ca	.1	.2	10.4	20.84	-	-	50	-29.16
11	27.1185	16.12	Qp	.1	.3	10.5	27.02	60	-32.98	-	-
12	27.1185	16.03	Ca	.1	.3	10.5	26.93	-	-	50	-23.07

Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	11.99	Qp	0	.1	10.2	22.29	60	-37.71	-	-
14	8.7495	9.55	Ca	0	.1	10.2	19.85	-	-	50	-30.15
15	12.56325	20.53	Qp	.1	.2	10.2	31.03	60	-28.97	-	-
16	12.56325	17.1	Ca	.1	.2	10.2	27.6	-	-	50	-22.4
17	13.56	78.14	Qp	.1	.2	10.2	88.64	**60**	**28.64**	-	-
18	13.56	78.13	Ca	.1	.2	10.2	88.63	-	-	**50**	**38.63**
19	18.75075	11.82	Qp	0	.2	10.3	22.32	60	-37.68	-	-
20	18.75075	8.86	Ca	0	.2	10.3	19.36	-	-	50	-30.64
21	26.25	13.35	Qp	.1	.3	10.5	24.25	60	-35.75	-	-
22	26.25	13.06	Ca	.1	.3	10.5	23.96	-	-	50	-26.04
23	27.1185	15.26	Qp	.1	.3	10.5	26.16	60	-33.84	-	-
24	27.1185	15.14	Ca	.1	.3	10.5	26.04	-	-	50	-23.96

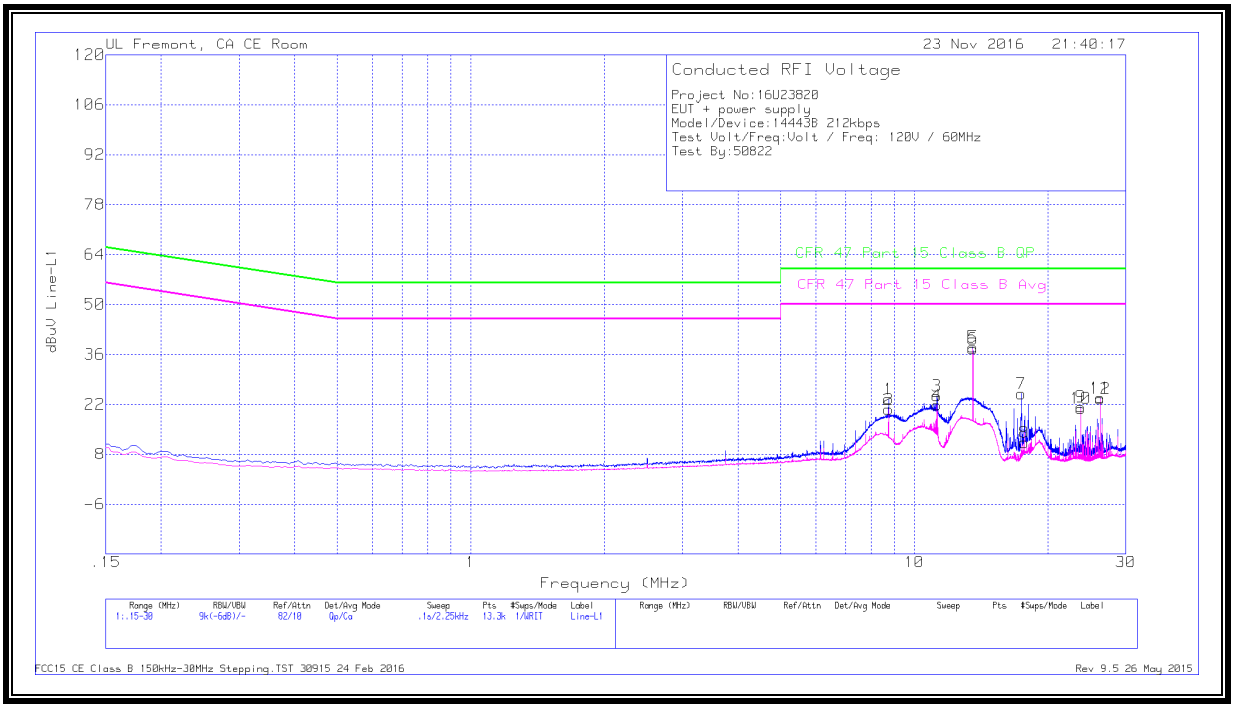
Qp - Quasi-Peak detector

Ca - CISPR average detection -

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

NORMAL OPERATION WITH ANTENNA PORT TERMINATED, 212 KBPS

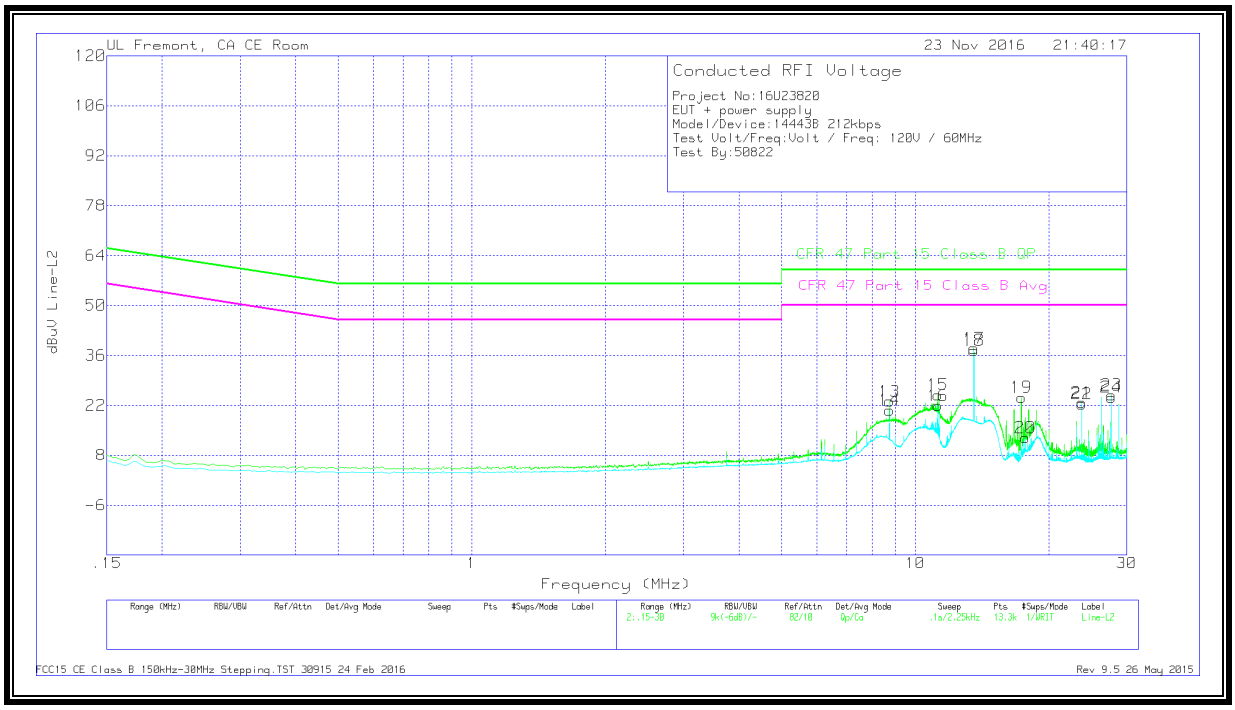
LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	13.15	Qp	0	.1	10.2	23.45	60	-36.55	-	-
2	8.7495	10.26	Ca	0	.1	10.2	20.56	-	-	50	-29.44
3	11.24925	13.99	Qp	0	.2	10.2	24.39	60	-35.61	-	-
4	11.24925	11.34	Ca	0	.2	10.2	21.74	-	-	50	-28.26
5	13.56	27.56	Qp	.1	.2	10.2	38.06	60	-21.94	-	-
6	13.56	27.04	Ca	.1	.2	10.2	37.54	-	-	50	-12.46
7	17.4255	14.47	Qp	0	.2	10.3	24.97	60	-35.03	-	-
8	17.691	.79	Ca	0	.2	10.3	11.29	-	-	50	-38.71
9	23.75025	10.63	Qp	.1	.2	10.4	21.33	60	-38.67	-	-
10	23.75025	10.15	Ca	.1	.2	10.4	20.85	-	-	50	-29.15
11	26.25	12.93	Qp	.1	.3	10.5	23.83	60	-36.17	-	-
12	26.25	12.67	Ca	.1	.3	10.5	23.57	-	-	50	-26.43

LINE 2 RESULTS



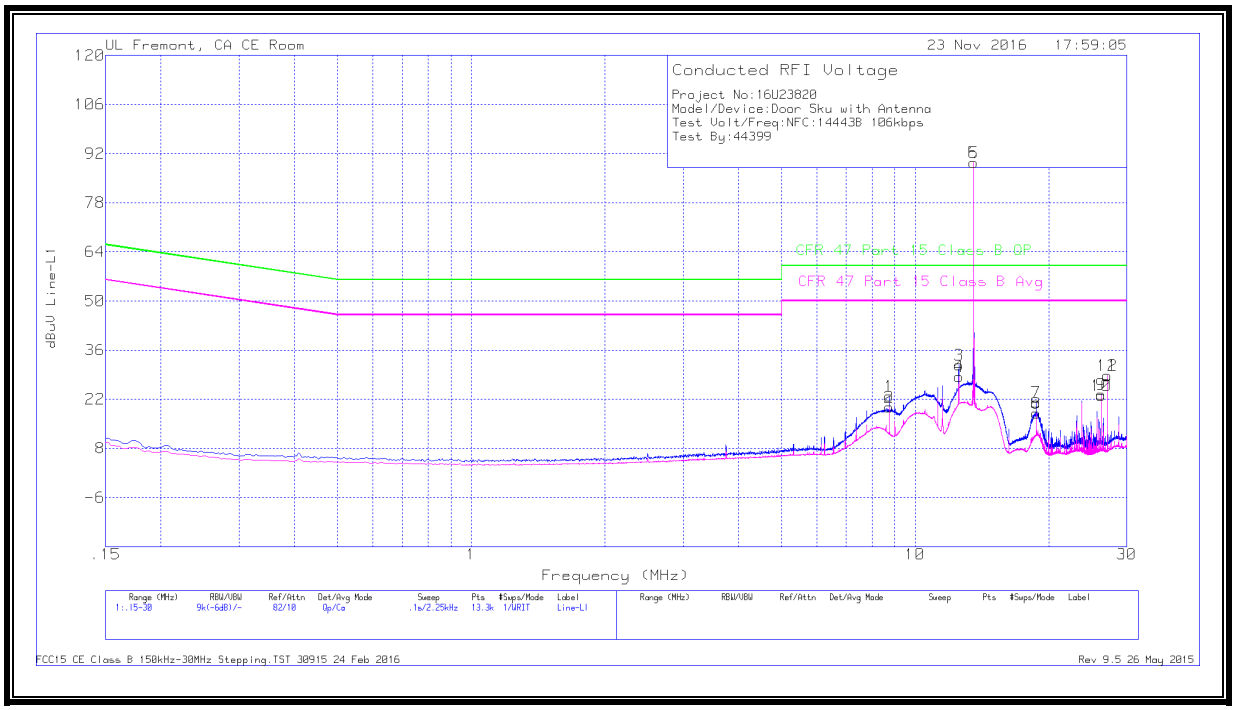
WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	12.83	Qp	0	.1	10.2	23.13	60	-36.87	-	-
14	8.7495	10.36	Ca	0	.1	10.2	20.66	-	-	50	-29.34
15	11.24925	14.54	Qp	0	.2	10.2	24.94	60	-35.06	-	-
16	11.24925	11.55	Ca	0	.2	10.2	21.95	-	-	50	-28.05
17	13.56	27.47	Qp	.1	.2	10.2	37.97	60	-22.03	-	-
18	13.56	26.9	Ca	.1	.2	10.2	37.4	-	-	50	-12.6
19	17.35575	13.75	Qp	0	.2	10.3	24.25	60	-35.75	-	-
20	17.6955	2.44	Ca	0	.2	10.3	12.94	-	-	50	-37.06
21	23.75025	12.12	Qp	.1	.2	10.4	22.82	60	-37.18	-	-
22	23.75025	11.71	Ca	.1	.2	10.4	22.41	-	-	50	-27.59
23	27.69225	14.02	Qp	.1	.3	10.5	24.92	60	-35.08	-	-
24	27.69225	13.36	Ca	.1	.3	10.5	24.26	-	-	50	-25.74

NORMAL OPERATION, 106 KBPS

LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

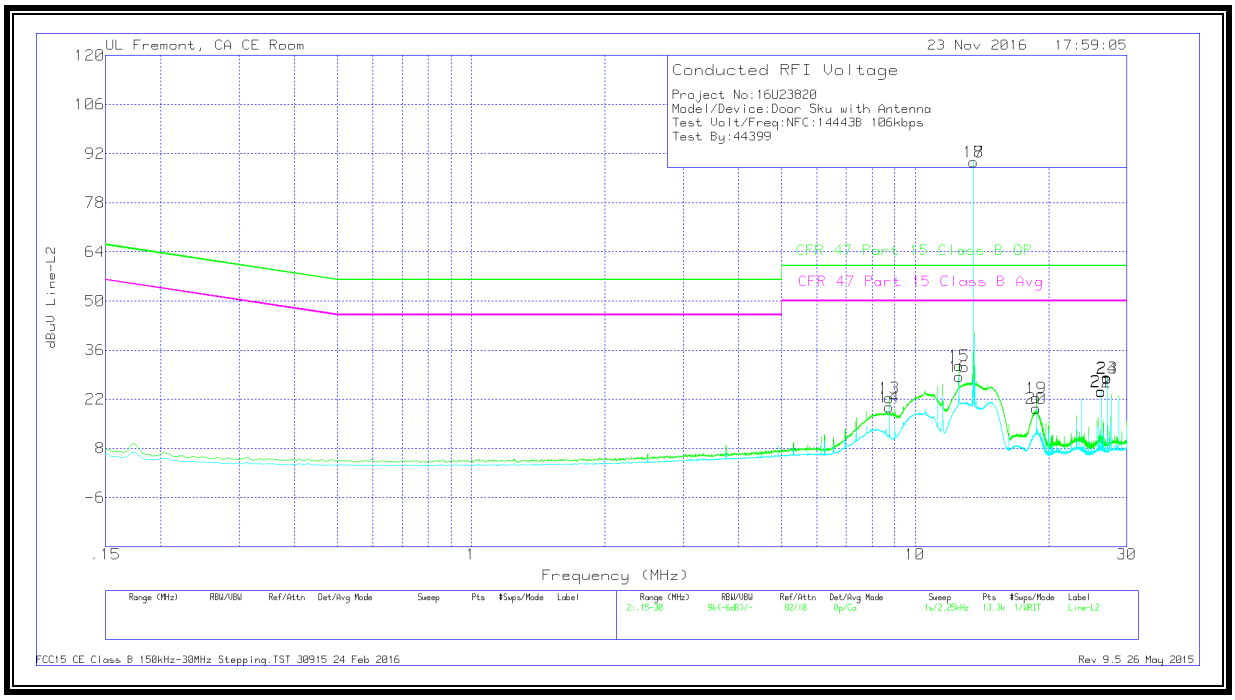
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	12.58	Qp	0	.1	10.2	22.88	60	-37.12	-	-
2	8.7495	9.41	Ca	0	.1	10.2	19.71	-	-	50	-30.29
3	12.5475	21.23	Qp	.1	.2	10.2	31.73	60	-28.27	-	-
4	12.5475	18.03	Ca	.1	.2	10.2	28.53	-	-	50	-21.47
5	13.56	78.94	Qp	.1	.2	10.2	89.44	**60**	**29.44**	-	-
6	13.56	78.93	Ca	.1	.2	10.2	89.43	-	-	**50**	**39.43**
7	18.75075	10.66	Qp	0	.2	10.3	21.16	60	-38.84	-	-
8	18.75075	7.58	Ca	0	.2	10.3	18.08	-	-	50	-31.92
9	26.25	12.45	Qp	.1	.3	10.5	23.35	60	-36.65	-	-
10	26.25	12.17	Ca	.1	.3	10.5	23.07	-	-	50	-26.93
11	27.1185	17.86	Qp	.1	.3	10.5	28.76	60	-31.24	-	-
12	27.1185	17.81	Ca	.1	.3	10.5	28.71	-	-	50	-21.29

Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	12.09	Qp	0	.1	10.2	22.39	60	-37.61	-	-
14	8.7495	9.53	Ca	0	.1	10.2	19.83	-	-	50	-30.17
15	12.552	21.14	Qp	.1	.2	10.2	31.64	60	-28.36	-	-
16	12.552	18.01	Ca	.1	.2	10.2	28.51	-	-	50	-21.49
17	13.56	79.08	Qp	.1	.2	10.2	89.58	**60**	**29.58**	-	-
18	13.56	79.07	Ca	.1	.2	10.2	89.57	-	-	**50**	**39.57**
19	18.75075	11.84	Qp	0	.2	10.3	22.34	60	-37.66	-	-
20	18.75075	8.85	Ca	0	.2	10.3	19.35	-	-	50	-30.65
21	26.25	13.44	Qp	.1	.3	10.5	24.34	60	-35.66	-	-
22	26.25	13.14	Ca	.1	.3	10.5	24.04	-	-	50	-25.96
23	27.1185	17.14	Qp	.1	.3	10.5	28.04	60	-31.96	-	-
24	27.1185	17.1	Ca	.1	.3	10.5	28	-	-	50	-22

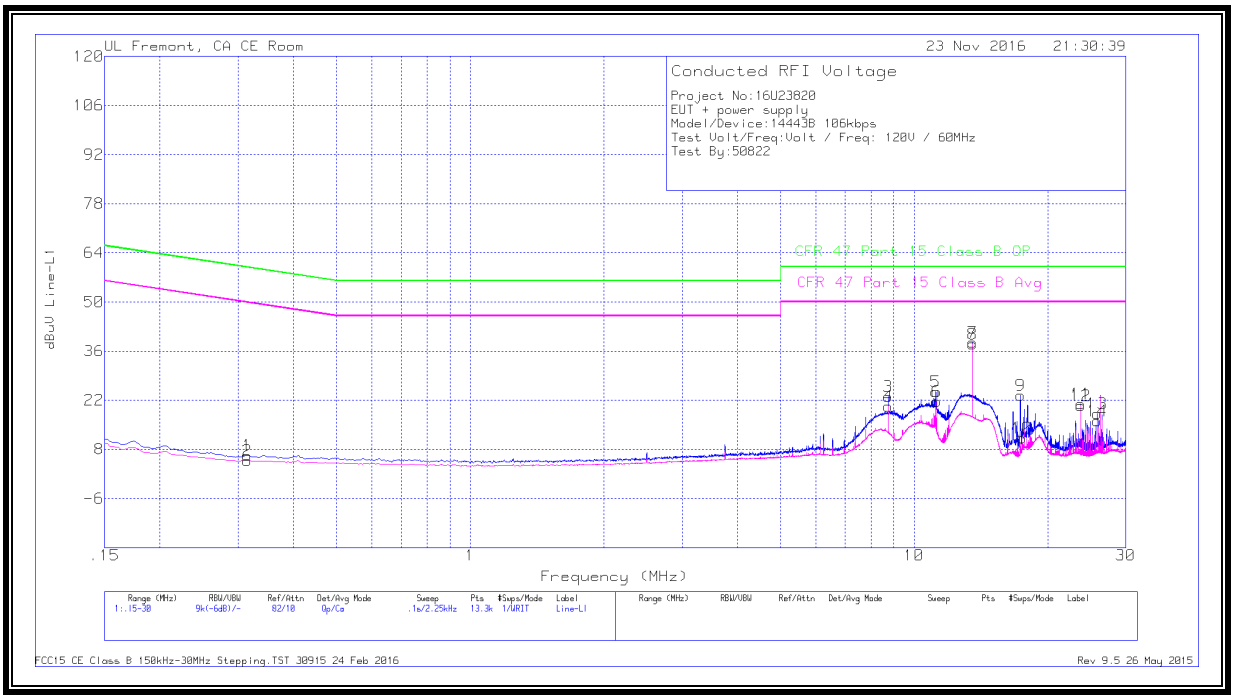
Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

NORMAL OPERATION WITH ANTENNA PORT TERMINATED, 106 KBPS

LINE 1 RESULTS

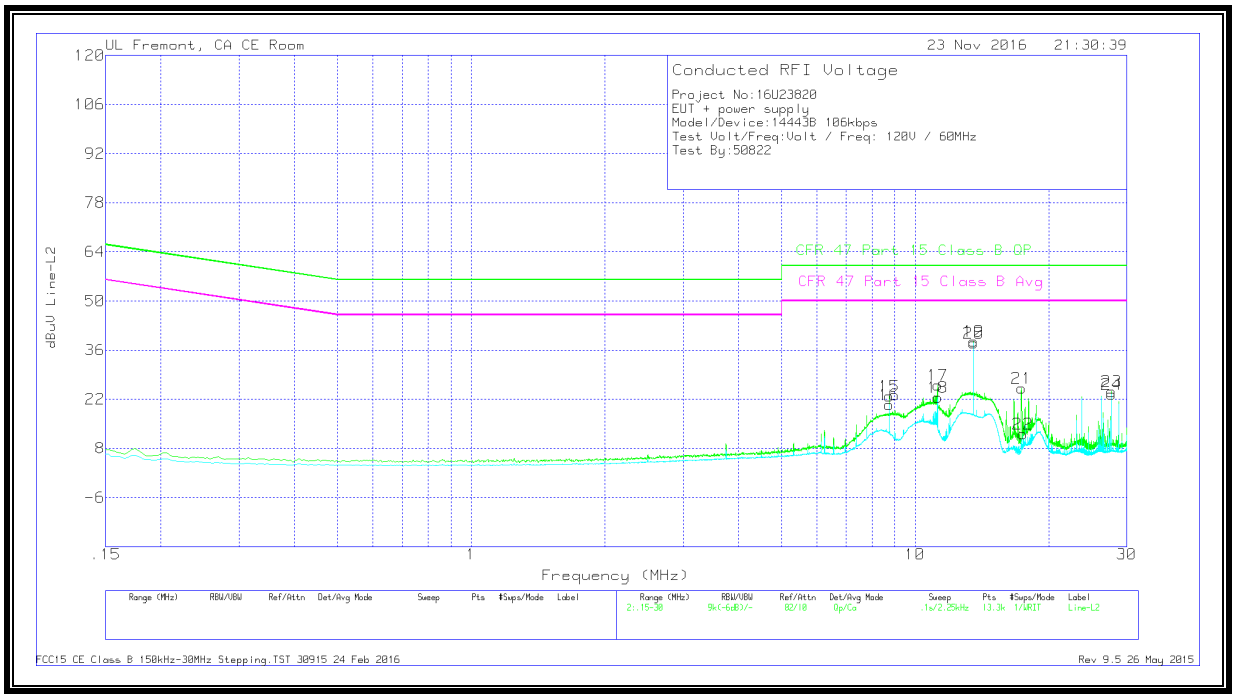


WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.31425	-3.82	Qp	0	0	10.1	6.28	59.86	-53.58	-	-
2	.31425	-5.23	Ca	0	0	10.1	4.87	-	-	49.86	-44.99
3	8.7495	12.78	Qp	0	.1	10.2	23.08	60	-36.92	-	-
4	8.7495	10.05	Ca	0	.1	10.2	20.35	-	-	50	-29.65
5	11.1705	14.11	Qp	0	.2	10.2	24.51	60	-35.49	-	-
6	11.24925	11.27	Ca	0	.2	10.2	21.67	-	-	50	-28.33
7	13.56	27.98	Qp	.1	.2	10.2	38.48	60	-21.52	-	-
8	13.56	27.49	Ca	.1	.2	10.2	37.99	-	-	50	-12.01
9	17.367	12.93	Qp	0	.2	10.3	23.43	60	-36.57	-	-
10	17.49975	.69	Ca	0	.2	10.3	11.19	-	-	50	-38.81
11	23.75025	10.31	Qp	.1	.2	10.4	21.01	60	-38.99	-	-
12	23.75025	9.77	Ca	.1	.2	10.4	20.47	-	-	50	-29.53
13	25.87875	7.21	Qp	.1	.3	10.5	18.11	60	-41.89	-	-
14	25.881	5.23	Ca	.1	.3	10.5	16.13	-	-	50	-33.87

LINE 2 RESULTS



WORST EMISSIONS

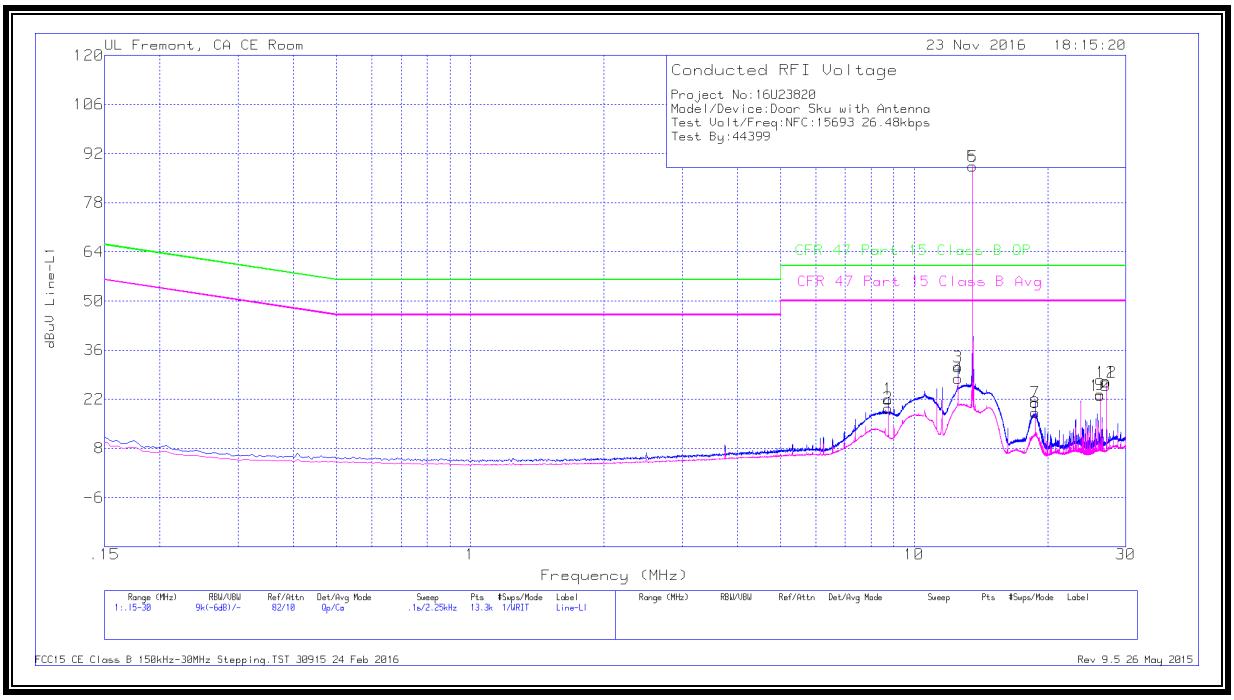
Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
15	8.7495	12.6	Qp	0	.1	10.2	22.9	60	-37.1	-	-
16	8.7495	10.1	Ca	0	.1	10.2	20.4	-	-	50	-29.6
17	11.24925	15.57	Qp	0	.2	10.2	25.97	60	-34.03	-	-
18	11.24925	12.1	Ca	0	.2	10.2	22.5	-	-	50	-27.5
19	13.56	28	Qp	.1	.2	10.2	38.5	60	-21.5	-	-
20	13.56	27.5	Ca	.1	.2	10.2	38	-	-	50	-12
21	17.3625	14.65	Qp	0	.2	10.3	25.15	60	-34.85	-	-
22	17.49975	1.56	Ca	0	.2	10.3	12.06	-	-	50	-37.94
23	27.69225	13.29	Qp	.1	.3	10.5	24.19	60	-35.81	-	-
24	27.69225	12.55	Ca	.1	.3	10.5	23.45	-	-	50	-26.55

10.3. 15693

NORMAL OPERATION, 26.48 KBPS

LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

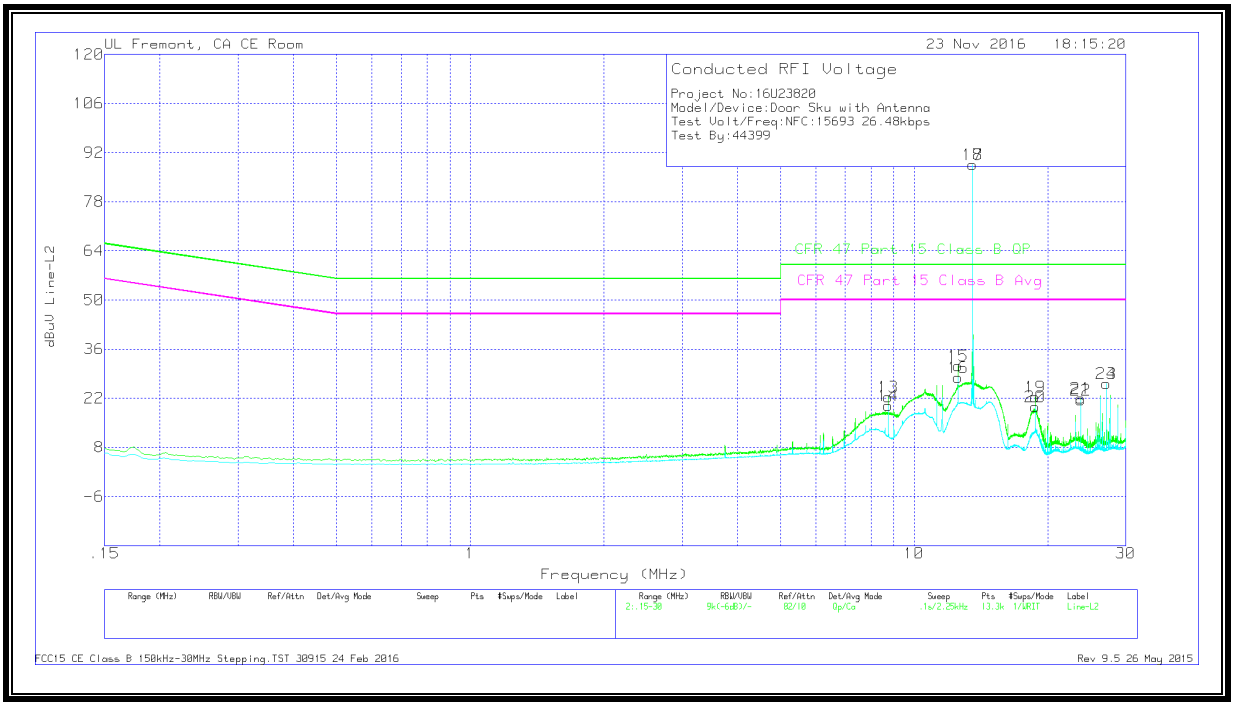
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	11.8	Qp	0	.1	10.2	22.1	60	-37.9	-	-
2	8.7495	9.19	Ca	0	.1	10.2	19.49	-	-	50	-30.51
3	12.56325	20.73	Qp	.1	.2	10.2	31.23	60	-28.77	-	-
4	12.5655	17.38	Ca	.1	.2	10.2	27.88	-	-	50	-22.12
5	13.56	77.97	Qp	.1	.2	10.2	88.47	**60**	**28.47**	-	-
6	13.56	77.96	Ca	.1	.2	10.2	88.46	-	-	**50**	**38.46**
7	18.75075	10.69	Qp	0	.2	10.3	21.19	60	-38.81	-	-
8	18.75075	7.61	Ca	0	.2	10.3	18.11	-	-	50	-31.89
9	26.25	12.47	Qp	.1	.3	10.5	23.37	60	-36.63	-	-
10	26.25	12.14	Ca	.1	.3	10.5	23.04	-	-	50	-26.96
11	27.1185	16.03	Qp	.1	.3	10.5	26.93	60	-33.07	-	-
12	27.1185	15.92	Ca	.1	.3	10.5	26.82	-	-	50	-23.18

Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	12.01	Qp	0	.1	10.2	22.31	60	-37.69	-	-
14	8.7495	9.63	Ca	0	.1	10.2	19.93	-	-	50	-30.07
15	12.56775	20.73	Qp	.1	.2	10.2	31.23	60	-28.77	-	-
16	12.56775	17.35	Ca	.1	.2	10.2	27.85	-	-	50	-22.15
17	13.56	78.13	Qp	.1	.2	10.2	88.63	**60**	**28.63**	-	-
18	13.56	78.12	Ca	.1	.2	10.2	88.62	-	-	**50**	**38.62**
19	18.75075	11.88	Qp	0	.2	10.3	22.38	60	-37.62	-	-
20	18.75075	9.01	Ca	0	.2	10.3	19.51	-	-	50	-30.49
21	23.75025	11.28	Qp	.1	.2	10.4	21.98	60	-38.02	-	-
22	23.75025	10.73	Ca	.1	.2	10.4	21.43	-	-	50	-28.57
23	27.1185	15.35	Qp	.1	.3	10.5	26.25	60	-33.75	-	-
24	27.1185	15.25	Ca	.1	.3	10.5	26.15	-	-	50	-23.85

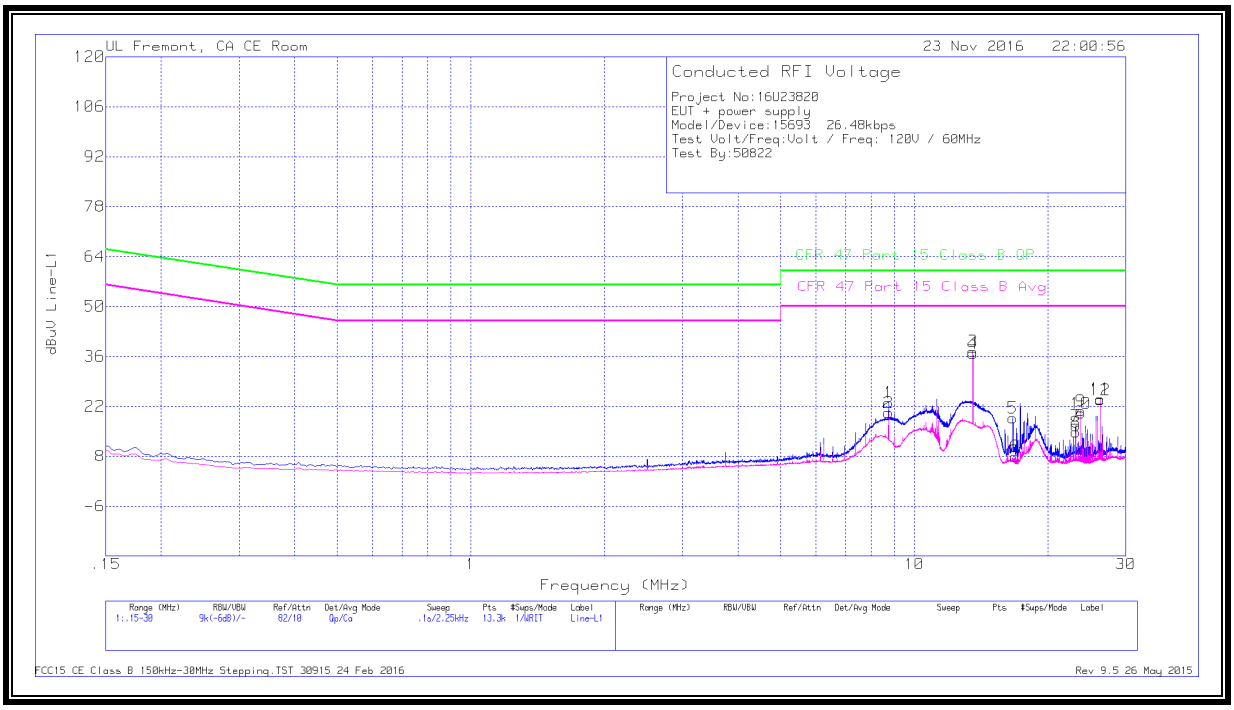
Qp - Quasi-Peak detector

Ca - CISPR average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowering below the limit line.

NORMAL OPERATION WITH ANTENNA PORT TERMINATED, 26.48KBPS

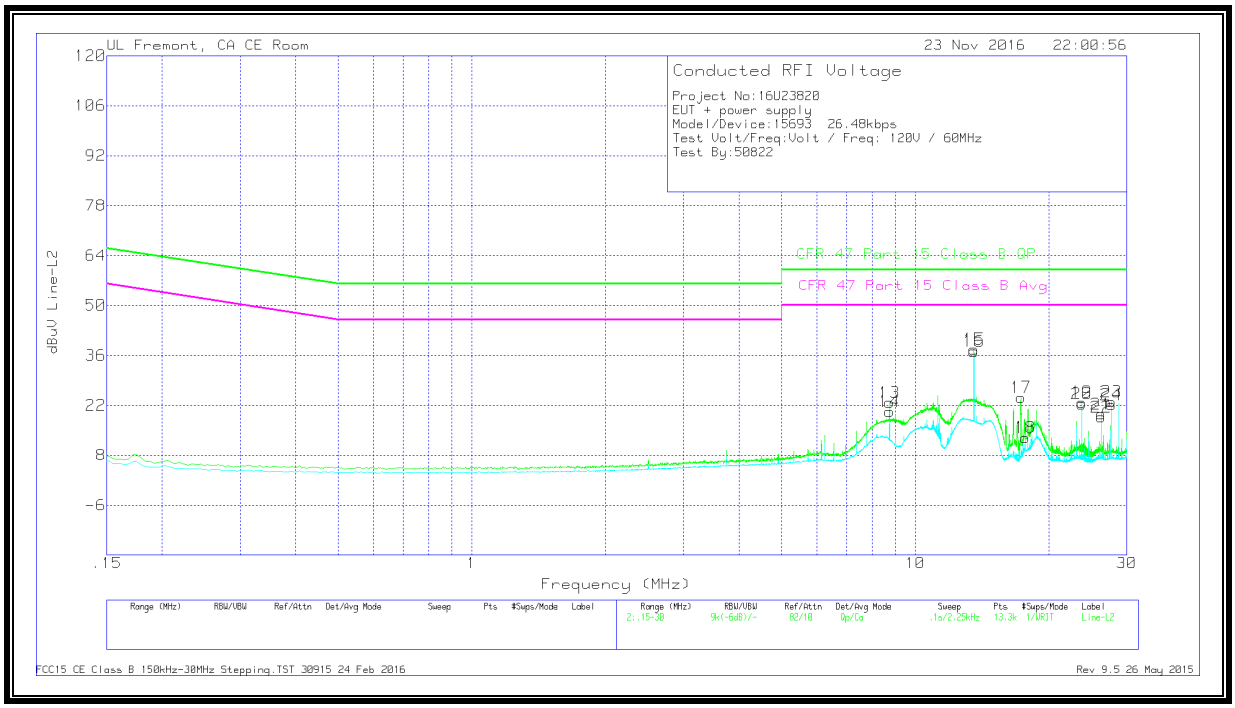
LINE 1 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	8.7495	12.74	Qp	0	.1	10.2	23.04	60	-36.96	-	-
2	8.7495	9.9	Ca	0	.1	10.2	20.2	-	-	50	-29.8
3	13.56	26.91	Qp	.1	.2	10.2	37.41	60	-22.59	-	-
4	13.56	26.36	Ca	.1	.2	10.2	36.86	-	-	50	-13.14
5	16.67175	8.23	Qp	0	.2	10.3	18.73	60	-41.27	-	-
6	16.90125	-2.5	Ca	0	.2	10.3	8	-	-	50	-42
7	23.1315	5.9	Qp	.1	.2	10.4	16.6	60	-43.4	-	-
8	23.1315	4.03	Ca	.1	.2	10.4	14.73	-	-	50	-35.27
9	23.75025	10.02	Qp	.1	.2	10.4	20.72	60	-39.28	-	-
10	23.75025	9.37	Ca	.1	.2	10.4	20.07	-	-	50	-29.93
11	26.25	13.16	Qp	.1	.3	10.5	24.06	60	-35.94	-	-
12	26.25	12.91	Ca	.1	.3	10.5	23.81	-	-	50	-26.19

LINE 2 RESULTS



WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	8.7495	12.48	Qp	0	.1	10.2	22.78	60	-37.22	-	-
14	8.7495	9.99	Ca	0	.1	10.2	20.29	-	-	50	-29.71
15	13.56	27.22	Qp	.1	.2	10.2	37.72	60	-22.28	-	-
16	13.56	26.63	Ca	.1	.2	10.2	37.13	-	-	50	-12.87
17	17.304	13.71	Qp	0	.2	10.3	24.21	60	-35.79	-	-
18	17.6955	2.46	Ca	0	.2	10.3	12.96	-	-	50	-37.04
19	23.75025	12.14	Qp	.1	.2	10.4	22.84	60	-37.16	-	-
20	23.75025	11.72	Ca	.1	.2	10.4	22.42	-	-	50	-27.58
21	26.25	8.67	Qp	.1	.3	10.5	19.57	60	-40.43	-	-
22	26.25	7.76	Ca	.1	.3	10.5	18.66	-	-	50	-31.34
23	27.69225	12.12	Qp	.1	.3	10.5	23.02	60	-36.98	-	-
24	27.69225	11.3	Ca	.1	.3	10.5	22.2	-	-	50	-27.8