FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

MIRA Fitness Band

MODEL NUMBER: mira

FCC ID: 2ADP2001

REPORT NUMBER: 10532962

ISSUE DATE: December 18, 2014
(Revised January 6, 2015)

Prepared for
Omron Healthcare Inc.
1925 W Field CT, Suite 100
Lake Forest
IL, 60045, U.S.A.

Prepared by
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NVLAP Lab code: 100414-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	December 18, 2014	Initial Issue	Joseph McWilliams
1.0	December 30, 2014	Corrected frequency range in section 5.2, Added calibration dates for the boms system and other gramerical corrections.	Joseph McWilliams
1.1	January 6, 2015	Updated AV measurements including duty cycle	M.Ferrer

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Omron Healthcare Inc
1925 W Field CT, Suite 100
Lake Forest
IL, 60045, U.S.A.

EUT DESCRIPTION: Activity tracker device

MODEL: mira

SERIAL NUMBER: No serial number was listed on the EUT at the time of testing.

DATE TESTED: December 18, 2014 (Revised January 6, 2014)

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

UL LLC 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 LLC 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 LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC 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:

Michael Ferrer
Program Manager
UL LLC

Tested By:

Joseph McWilliams
Senior Engineer
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003 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 333 Pfingsten Road, Northbrook, IL 60062 USA.

UL NBK is accredited by NVLAP, Laboratory Code 100414-0. The full scope of accreditation can be viewed at http://ts.nist.gov/Standards/scopes/1004140.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

Sample Calculations
Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:
Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)
Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)
Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

4.3. MEASUREMENT UNCERTAINTY

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

Test	Range	Equipment	Uncertainty k=2
Radiated Emissions	30-200MHz	Bicon 10m Horz	4.27dB
Radiated Emissions	30-200MHz	Bicon 10m Vert	4.28dB
Radiated Emissions	200-1000MHz	LogP 10m Horz	3.33dB
Radiated Emissions	200-1000MHz	LogP 10m Vert	3.39dB
Radiated Emissions	1-6GHz	Horn	5.02dB
Radiated Emissions	6-18GHz	Horn	5.34dB
Radiated Emissions	18-26GHz	Horn	6.60dB
Conducted Ant Port	30MHz-26GHz	Spectrum Analyzer	2.94

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Bluetooth v4.0 device

The radio module is integrated into the device

5.2. MAXIMUM OUTPUT E-FIELD STRENGTH

The transmitter has a maximum output peak E-field as follows:

Frequency Range (MHz)	Mode	Output PK E-field Strength (dBuV/m)
2402 to 2479	Operating	81.67

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an chip antenna, with a maximum gain of 1.7 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was DVT, rev. 1.0.

The EUT driver software installed during testing was DVT, rev. 1.0.

The test utility software used during testing was Docklight, rev. 2.0.5.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power.

With the EUT in position Y, the highest output power channel was middle channel with the antenna in the vertical position.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop Computer	IBM	T420	R8RF3E6	QDS-BRCM1046
USB Charger	FLOTV	PSAI05R-050Q	79H00074-05M	None

I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (in)**	**Remarks**
1	Charge	0	USB	Shielded	31.5	None
2	Com	0	USB	Shielded	64.5	Soldered wires to PCB

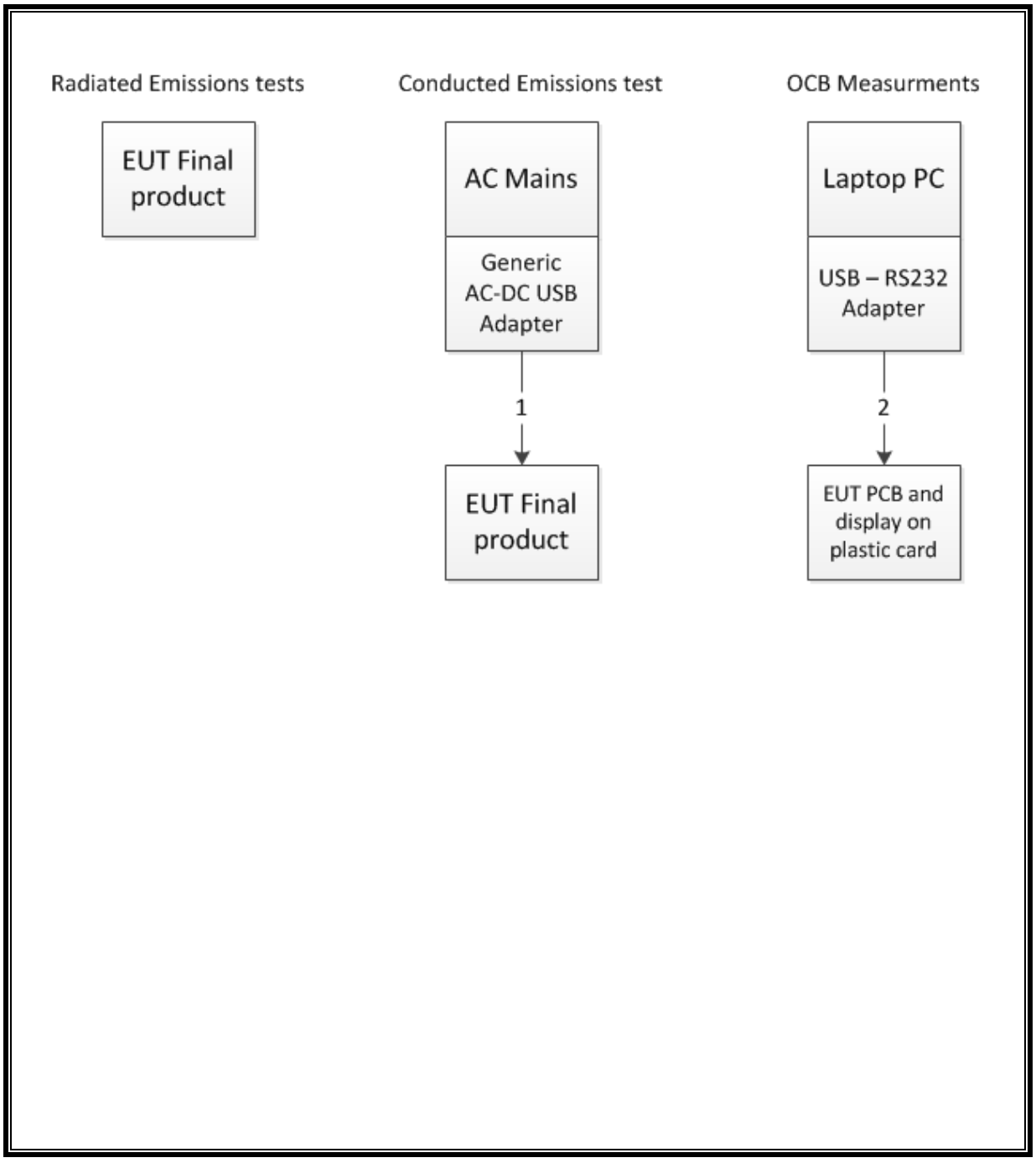
TEST SETUP

The EUT was tested in 3 different configurations:

1) Final product running end product software hopping channels (Low, Mid, High).
2) EUT PCB and display on a plastic card soldered to a USB to serial adapter cable for programming.
3) Charging while connected to an AC-DC USB charger

EUT was running in search mode looking for host for configuration 1 above. Test software exercised the radio card for setup #2 above by directly entering binary information into the product via a USB to RS232 interface cable (cable #2 above). For operation mode 3 the EUT was tested with a depleted battery (worst case charging condition).

SETUP DIAGRAM FOR TESTS



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 Date**	**Cal Due**
EMI Test Reciever	Rohde & Schwarz	ESCI	EMC4328	12/12/13	12/31/14
Bicon Antenna	Chase	VBA6106A	EMC4078	04/01/14	04/01/15
Log-P Antenna	Chase	UPA6109	EMC4258	12/11/13	12/31/14
EMI Test Reciever	Rohde & Schwarz	ESU	EMC4323	12/20/13	12/31/14
Antenna Array	UL	BOMS	EMC4276	12/31/13	12/31/14
EMI Test Reciever	Rohde & Schwarz	ESR	EMC4377	4/15/2014	12/30/2014
LISN - L1	Solar	8602-50-TS-50-N	EMC4052	1/16/2014	1/16/2015
LISN - L2	Solar	8602-50-TS-50-N	EMC4064	1/16/2014	1/16/2015

7. TEST RESULTS

7.1.1. 20dB BANDWIDTH

LIMITS

None; for reporting purposes only.

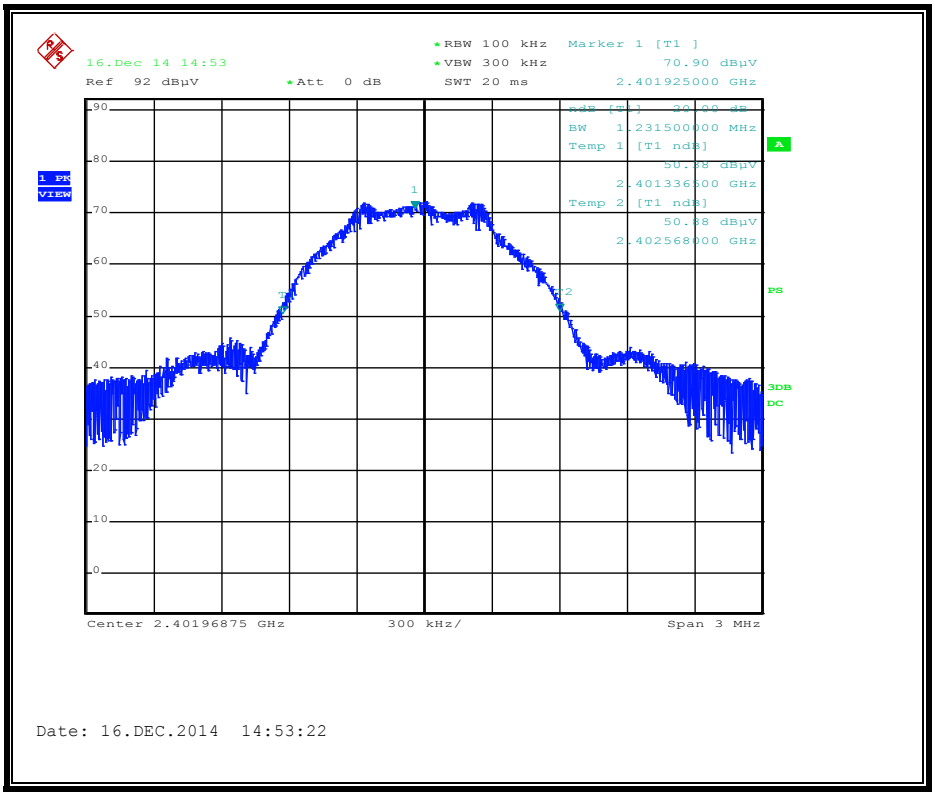
TEST PROCEDURE

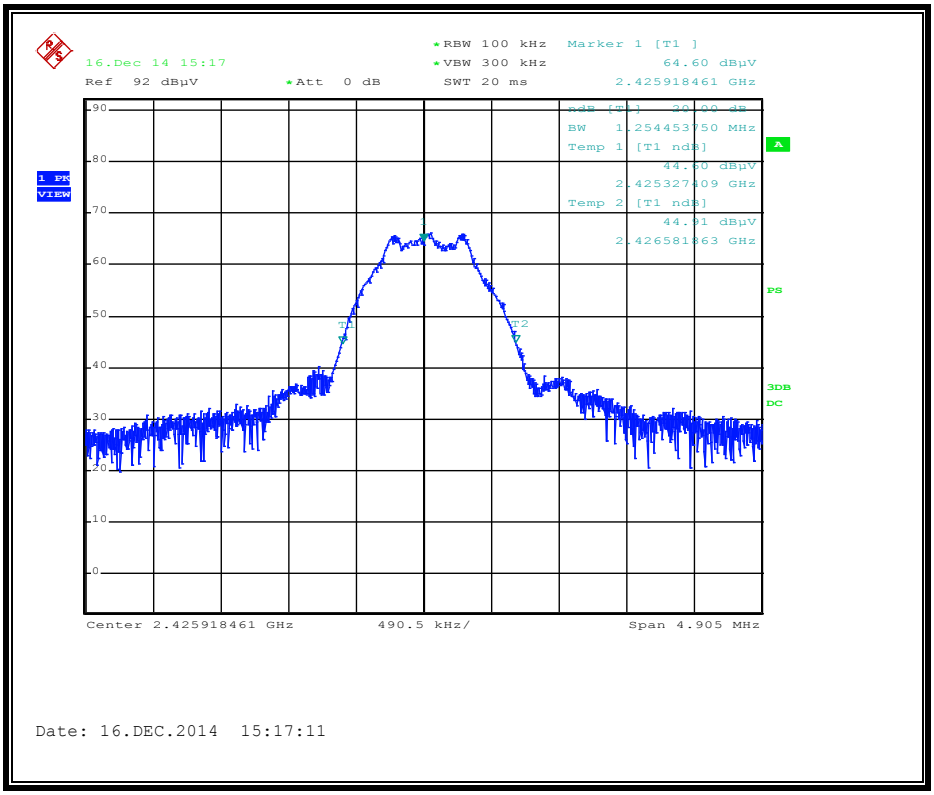
The transmitter output is connected to the spectrum analyzer. The RBW is set to 100kHz. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 20dB bandwidth function is utilized.

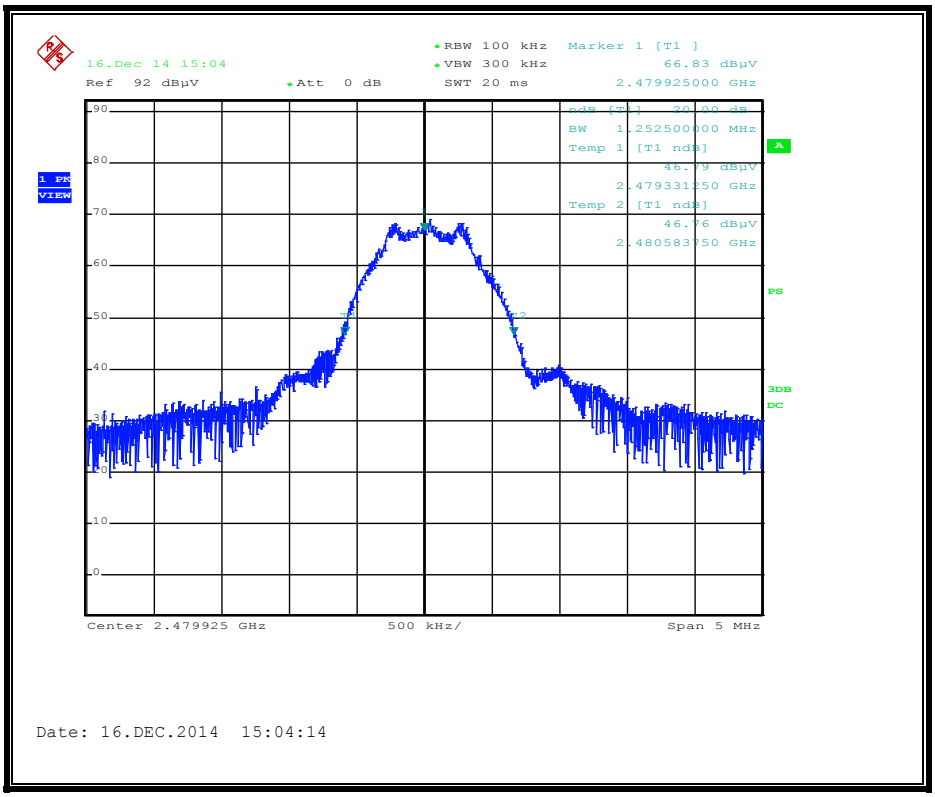
RESULTS

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
Low	2.4022	1.2315
Middle	2.425	1.2544
High	2.479	1.2525

20dB BANDWIDTH







7.2. RADIATED EMISSIONS

LIMIT

FCC 15.249

Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHZ, and 24.0–24.25 GHz.
(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
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

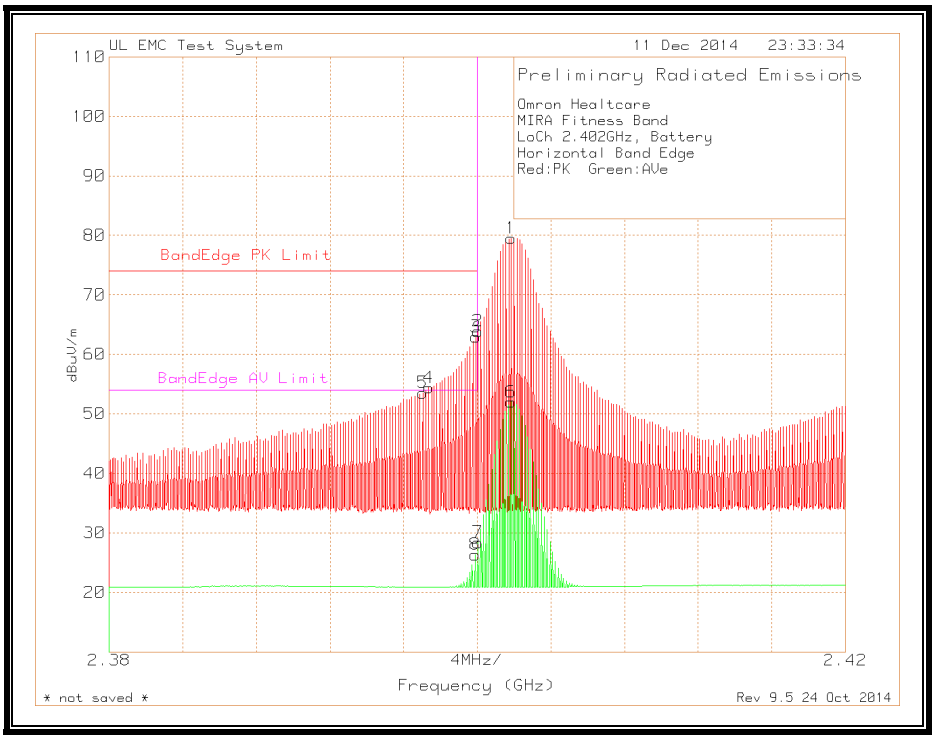
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

Average value was calculated using peak measurements and adding duty cycle relaxation. BTLE has declared transmission time of 3ms therefore, relaxation will be -30.45dB

RESULTS

7.2.1. TRANSMITTER RESTRICTED BAND EDGES

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



Trace Markers

No.	Test Frequency (GHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dBuV/m	Limit:1	2	3	4	5	6
Peak 2.38 - 2.42GHz ----------											
1	2.40184	109.07dBuV Pk	21.8	-51.34	79.53	-	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-	-	-	-	-	-
2	2.40004	93.42dBuV Pk	21.8	-51.34	63.88	-	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-	-	-	-	-	-
3	2.39992	92.48dBuV Pk	21.8	-51.34	62.94	74	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-11.06	-	-	-	-	-
4	2.39736	83.92dBuV Pk	21.8	-51.33	54.39	74	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-19.61	-	-	-	-	-
5	2.39704	83.06dBuV Pk	21.8	-51.33	53.53	74	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-20.47	-	-	-	-	-
Avearge 2.38 - 2.42GHz ----------											
6	2.40184	78.62dBuV Av	21.8	-51.91	48.51	-	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-	-	-	-	-	-
7	2.40004	62.97dBuV Av	21.8	-51.93	32.84	-	54	-	-	-	-
			Height:0 Horz		Margin (dB)	-	-21.16	-	-	-	-
8	2.39992	62.03dBuV Av	21.8	-51.34	32.49	-	54	-	-	-	-
			Height:0 Horz		Margin (dB)	-	-21.51	-	-	-	-

LIMIT 1: BandEdge PK Limit
LIMIT 2: BandEdge AV Limit

Pk - Peak detector
Av - Average detector(Peak value with duty cycle relaxation)

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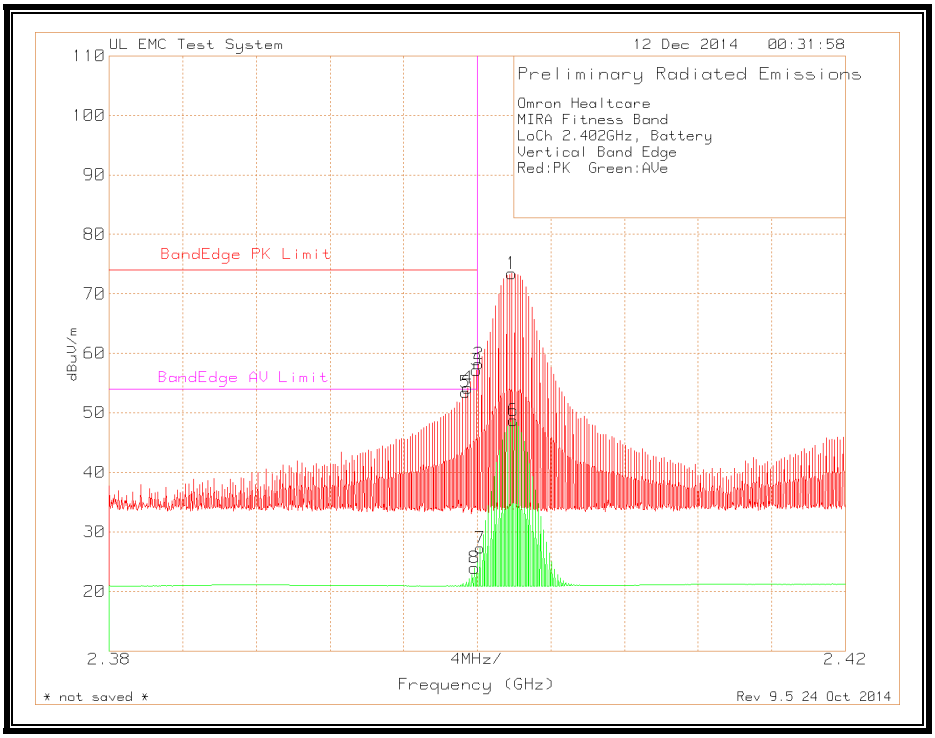
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



Trace Markers

No.	Test Frequency (GHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dBuV/m	Limit:1	2	3	4	5	6
Peak 2.38 - 2.42GHz ----------											
1	2.40188	102.96dBuV Pk	21.8	-51.34	73.42	-	-	-	-	-	-
			Height:0	Vert	Margin (dB)	-	-	-	-	-	-
2	2.40008	87.77dBuV Pk	21.8	-51.34	58.23	-	-	-	-	-	-
			Height:0	Vert	Margin (dB)	-	-	-	-	-	-
3	2.39996	86.73dBuV Pk	21.8	-51.34	57.19	74	-	-	-	-	-
			Height:0	Vert	Margin (dB)	-16.81	-	-	-	-	-
4	2.39948	83.72dBuV Pk	21.8	-51.33	54.19	74	-	-	-	-	-
			Height:0	Vert	Margin (dB)	-19.81	-	-	-	-	-
5	2.39936	82.98dBuV Pk	21.8	-51.33	53.45	74	-	-	-	-	-
			Height:0	Vert	Margin (dB)	-20.55	-	-	-	-	-
Avearge 2.38 - 2.42GHz ----------											
6	2.40188	72.51dBuV Av	21.8	-51.34	42.97	-	-	-	-	-	-
			Height:0	Vert	Margin (dB)	-	-	-	-	-	-
7	2.40008	57.32dBuV Av	21.8	-51.34	27.78	-	54	-	-	-	-
			Height:0	Vert	Margin (dB)	-	-26.22	-	-	-	-
8	2.39996	56.28dBuV Av	21.8	-51.34	26.74	-	54	-	-	-	-
			Height:0	Vert	Margin (dB)	-	-27.26	-	-	-	-

LIMIT 1: BandEdge PK Limit
LIMIT 2: BandEdge AV Limit

Pk - Peak detector
Av - Average detector(Peak value with duty cycle relaxation)

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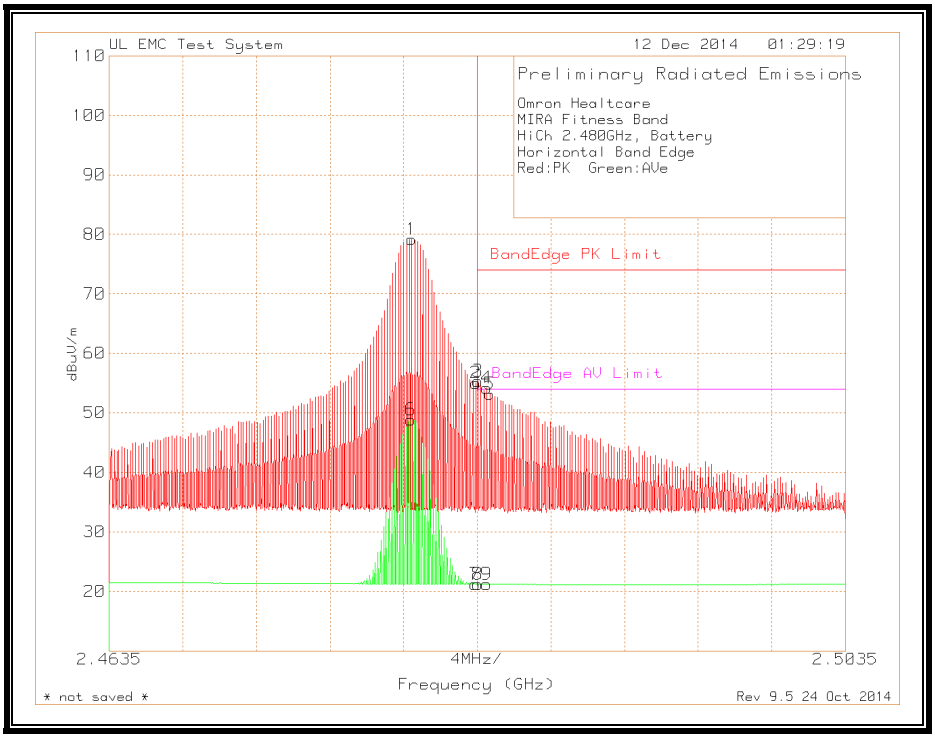
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



Trace Markers

No.	Test Frequency (GHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dBuV/m	Limit:1	2	3	4	5	6
Peak 2.4635 - 2.5035GHz ----------											
1	2.47994	108.86dBuV Pk	22	-51.67	79.19	-	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-	-	-	-	-	-
2	2.48342	84.65dBuV Pk	22.1	-51.74	55.01	-	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-	-	-	-	-	-
3	2.48354	84.96dBuV Pk	22.1	-51.74	55.32	74	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-18.68	-	-	-	-	-
4	2.48402	83.84dBuV Pk	22.1	-51.75	54.19	74	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-19.81	-	-	-	-	-
5	2.48418	82.79dBuV Pk	22.1	-51.75	53.14	74	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-20.86	-	-	-	-	-
Avearge 2.4635 - 2.5035GHz ----------											
6	2.47994	78.41dBuV Av	22	-51.67	48.74	-	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-	-	-	-	-	-
7	2.48342	54.2 dBuV Av	22.1	-51.74	24.87	-	-	-	-	-	-
			Height:0 Horz		Margin (dB)	-	-	-	-	-	-
8	2.48354	54.51dBuV Av	22.1	-51.74	24.87	-	54	-	-	-	-
			Height:0 Horz		Margin (dB)	-	-29.13	-	-	-	-
9	2.48402	53.39dBuV Av	22.1	-51.74	23.75	-	54	-	-	-	-
			Height:0 Horz		Margin (dB)	-	-30.25	-	-	-	-

LIMIT 1: BandEdge PK Limit
LIMIT 2: BandEdge AV Limit

Pk - Peak detector
Av - Average detector(Peak value with duty cycle relaxation)

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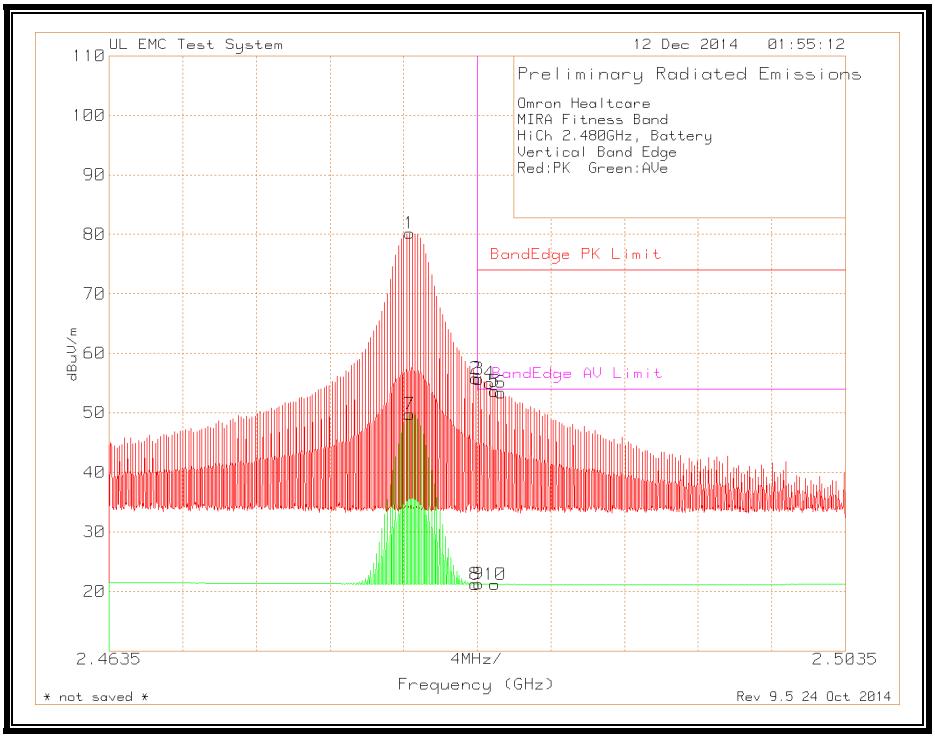
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



Trace Markers

No.	Test Frequency (GHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dBuV/m	Limit:1	2	3	4	5	6
Peak 2.4635 - 2.5035GHz ----------											
1	2.47982	109.87dBuV Pk	22	-51.67	80.2	-	-	-	-	-	-
			Height:0 Vert		Margin (dB)	-	-	-	-	-	-
2	2.48342	85.41dBuV Pk	22.1	-51.74	55.77	-	-	-	-	-	-
			Height:0 Vert		Margin (dB)	-	-	-	-	-	-
3	2.48358	85.29dBuV Pk	22.1	-51.74	55.65	74	-	-	-	-	-
			Height:0 Vert		Margin (dB)	-18.35	-	-	-	-	-
4	2.48418	84.62dBuV Pk	22.1	-51.75	54.97	74	-	-	-	-	-
			Height:0 Vert		Margin (dB)	-19.03	-	-	-	-	-
5	2.48446	83.25dBuV Pk	22.1	-51.75	53.6	74	-	-	-	-	-
			Height:0 Vert		Margin (dB)	-20.4	-	-	-	-	-
6	2.48478	83.09dBuV Pk	22.1	-51.76	53.43	74	-	-	-	-	-
			Height:0 Vert		Margin (dB)	-20.57	-	-	-	-	-
Avearge 2.4635 - 2.5035GHz ----------											
7	2.47982	79.42dBuV Av	22	-51.67	49.75	-	-	-	-	-	-
			Height:0 Vert		Margin (dB)	-	-	-	-	-	-
8	2.48342	54.96dBuV Av	22.1	-51.74	25.32	-	-	-	-	-	-
			Height:0 Vert		Margin (dB)	-	-	-	-	-	-
9	2.48358	54.84dBuV Av	22.1	-51.74	25.2	-	54	-	-	-	-
			Height:0 Vert		Margin (dB)	-	-28.8	-	-	-	-
10	2.48446	52.8dBuV Av	22.1	-51.75	23.15	-	54	-	-	-	-
			Height:0 Vert		Margin (dB)	-	-30.85	-	-	-	-

LIMIT 1: BandEdge PK Limit
LIMIT 2: BandEdge AV Limit

Pk - Peak detector
Av - Average detector(Peak value with duty cycle relaxation)

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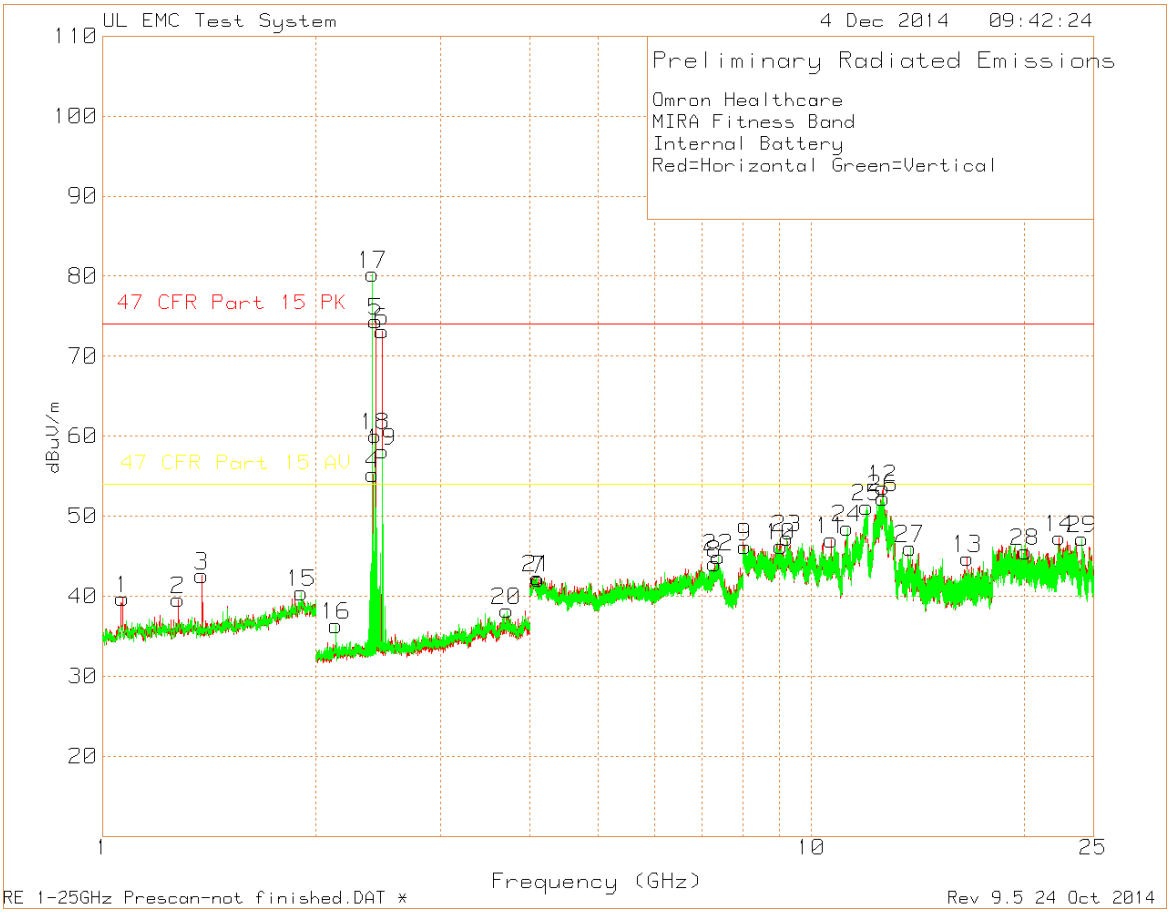
7.2.2. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz



Trace Markers

1 - 2GHz													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO3115 EMC4030 SN2638	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.066	71.63	Pk	24.6	-56.52	39.71	74	-34.29	54	-14.29	0-360	100	H
2	1.278	70.16	Pk	25.2	-55.77	39.59	74	-34.41	54	-14.41	0-360	100	H
3	1.379	73.27	Pk	25.1	-55.79	42.58	74	-31.42	54	-11.42	0-360	100	H

2 - 4GHz													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO3161-02 S/N 99061052 3m UL	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4	2.404	85.27	Pk	21.8	-51.84	55.23	74	-18.77	54	1.23	0	100	H
5	2.426	103.89	Pk	21.9	-51.41	74.38	74	0.38	54	20.38	0	100	H
6	2.479	102.79	Pk	22	-51.66	73.13	74	-0.87	54	19.13	0	100	H

4 - 8GHz													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO 3161-03 S/N 99051041 UL	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
7	4.119	64.47	Pk	28.4	-50.76	42.11	74	-31.89	54	-11.89	293	100	H
8	7.298	59.51	Pk	30.4	-45.87	44.04	74	-29.96	54	-9.96	293	100	H

8 - 12GHz													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO 3160-07 S/N 1114 UL	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
9	8.057	57.84	Pk	36.2	-47.84	46.2	74	-27.8	54	-7.8	0-360	150	H
10	9.061	58.72	Pk	36.2	-48.68	46.24	74	-27.76	54	-7.76	0-360	99	H
11	10.662	58.87	Pk	36.4	-48.23	47.04	74	-26.96	54	-6.96	0-360	150	H

Pk - Peak detector

Trace Markers

12 - 18GHz													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO 3160-08 S/N 9904-1100 UL	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
12	12.621	48.33	Pk	39.5	-34.26	53.57	74	-20.43	54	-0.43	0-360	100	H
13	16.59	45.3	Pk	39.8	-40.38	44.72	74	-29.28	54	-9.28	0-360	100	H

18-26.5GHz													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO 3160-09 S/N 22338 1M	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
14	22.383	52.47	Pk	40.5	-45.64	47.33	74	-26.67	54	-6.67	0-360	100	H

1 - 2GHz													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO3115 EMC4030 SN2638	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
15	1.906	66.17	Pk	27.6	-53.33	40.44	74	-33.56	54	-13.56	0-360	99	V

2 - 4GHz													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO3161-02 S/N 990610523m UL	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
16	2.133	67.56	Pk	21.5	-52.71	36.35	74	-37.65	54	-17.65	0	100	V
17	2.402	110.34	Pk	21.8	-51.91	80.23	74	6.23	54	26.23	0	100	V
18	2.423	89.61	Pk	21.9	-51.45	60.06	74	-13.94	54	6.06	0	100	V
19	2.477	87.74	Pk	22	-51.62	58.12	74	-15.88	54	4.12	0	100	V
20	3.716	64.47	Pk	23.6	-49.85	38.22	74	-35.78	54	-15.78	0	100	V

Pk - Peak detector

Trace Markers

4 - 8GHz													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO 3161-03 S/N 99051041 UL	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
21	4.104	64.64	Pk	28.4	-50.75	42.29	74	-31.71	54	-11.71	293	100	V
22	7.39	60.17	Pk	31.1	-46.36	44.91	74	-29.09	54	-9.09	293	100	V

8 - 12GHz													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO 3160-07 S/N 1114 UL	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
23	9.238	58.63	Pk	36.4	-47.74	47.29	74	-26.71	54	-6.71	0-360	99	V
24	11.233	56.59	Pk	36.8	-44.86	48.53	74	-25.47	54	-5.47	0-360	150	V
25	11.972	54.85	Pk	37.5	-41.19	51.16	74	-22.84	54	-2.84	0-360	150	V

12 - 18GHz													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO 3160-08 S/N 9904-1100 UL	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
26	12.628	46.96	Pk	39.5	-34.19	52.27	74	-21.73	54	-1.73	0-360	100	V
27	13.781	47.4	Pk	39.9	-41.32	45.98	74	-28.02	54	-8.02	0-360	100	V

18-26.5GHz													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO 3160-09 S/N 22338 1M	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
28	20.034	54.37	Pk	40.2	-48.99	45.58	74	-28.42	54	-8.42	0-360	100	V
29	24.098	52.77	Pk	40.3	-45.89	47.18	74	-26.82	54	-6.82	0-360	100	V

Pk - Peak detector

Radiated Emission Data

12 - 18GHz												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO 3160-08 S/N 9904-1100 UL	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
12.6209	57.91	Pk	39.5	-34.27	63.14	74	-10.86	-	-	292	100	H
12.6209	44.39	Avg	39.5	-34.27	49.62	-	-	54	-4.38	292	100	H

8 - 12GHz												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO 3160-07 S/N 1114 UL	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
11.2328	52.41	Pk	36.8	-44.85	44.36	74	-29.64	-	-	285	100	V
11.2335	45.44	Avg	36.8	-44.88	37.36	-	-	54	-16.64	285	100	V
11.972	50.06	Pk	37.5	-41.19	46.37	74	-27.63	-	-	281	100	V
11.972	44.67	Avg	37.5	-41.19	40.98	-	-	54	-13.02	281	100	V

12 - 18GHz												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO 3160-08 S/N 9904-1100 UL	Gain/Loss (dB)	Corrected Reading dBuV/m	47 CFR Part 15 PK	Margin (dB)	47 CFR Part 15 AV	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
12.682	51.76	Pk	39.5	-35.26	56	74	-18	-	-	293	100	V
12.682	44.08	Avg	39.5	-35.26	48.32	-	-	54	-5.68	293	100	V

Pk - Peak detector
Avg - Video < Resolution bandwidth Log IF

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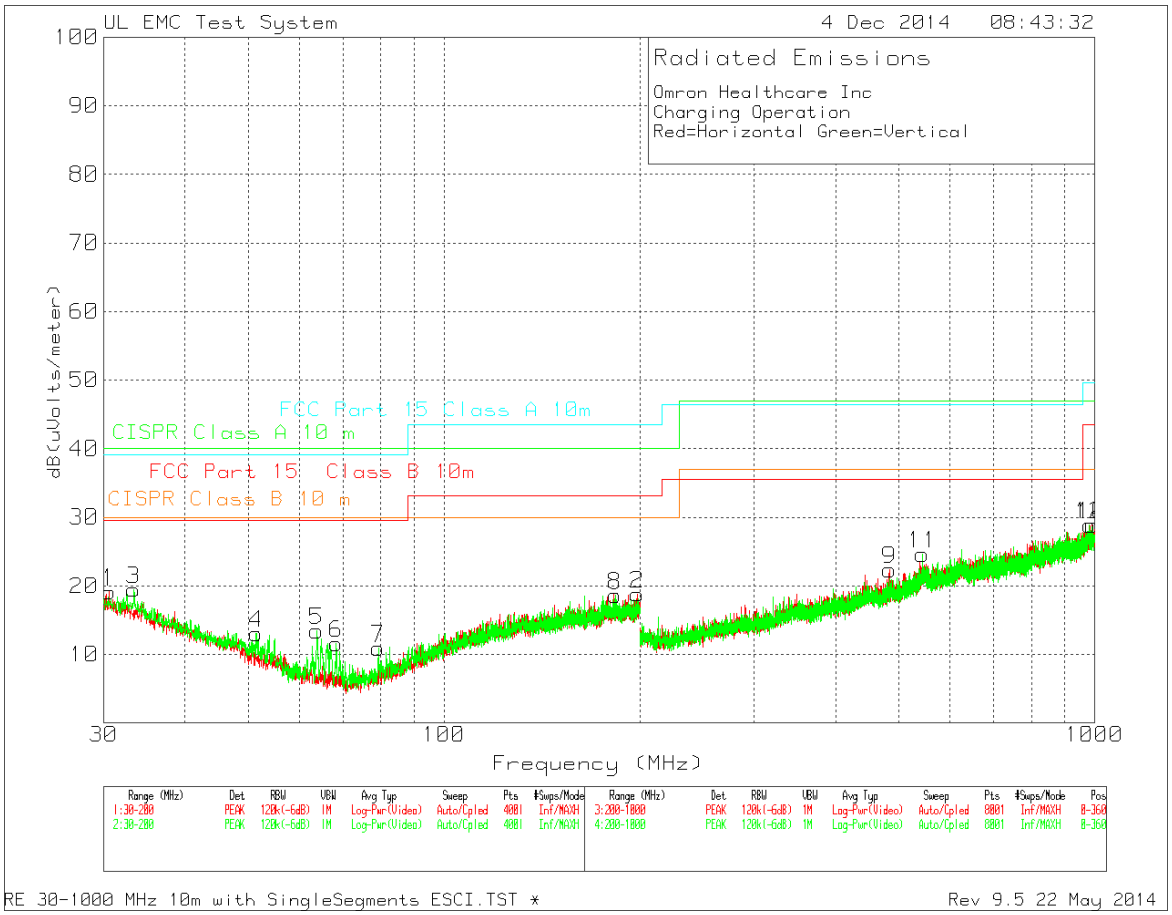
Fundimental Measurments

Radiated Emission Data										
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dBuV/m	Limit	Margin (dB)	Azimuth (CM)	Hight (CM)	Antenna Polarity
2.4019	53.74	Pk	21.8	4.58	80.12	113.38	-33.26	108	100	Horz
2.4019	53.74	Av	21.8	4.58	80.12	93.38	-13.26	108	100	Horz
2.4019	55.06	Pk	21.8	4.58	81.44	113.38	-31.94	336	100	Vert
2.4019	55.06	Av	21.8	4.58	81.44	93.38	-11.94	336	100	Vert
2.4257	53.94	Pk	21.9	4.54	80.38	113.38	-33	105	100	Horz
2.4257	53.94	Av	21.9	4.54	80.38	93.38	-13	105	100	Horz
2.4257	55.23	Pk	21.9	4.54	81.67	113.38	-31.71	342	100	Vert
2.4257	55.23	Av	21.9	4.54	81.67	93.38	-11.71	342	100	Vert
2.4802	53.86	Pk	22	4.36	80.22	113.38	-33.16	106	100	Horz
2.4802	53.86	Av	22	4.36	80.22	93.38	-13.16	106	100	Horz
2.4802	54.84	Pk	22	4.36	81.2	113.38	-32.18	347	100	Vert
2.4802	54.84	Av	22	4.36	81.2	93.38	-12.18	347	100	Vert

Peak measurements under AV limit, therefore no further measurement needed.

7.2.3. WORST-CASE BELOW 1 GHz Charging Mode

SPURIOUS EMISSIONS 30 TO 1000 MHz



Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 dB(uVolts/meter)	2	3	4	5	6
Bicon Horizonta 30 - 200MHz											
1	30.5525	31.62dBuV PK	17.6	-30.1	19.12	40	30	39.08	29.55	-	-
		Azimuth:0-360	Height:399 Horz		Margin (dB)	-20.88	-10.88	-19.96	-10.43	-	-
2	198.3	31.41dBuV PK	16.1	-28.7	18.81	40	30	43.52	33.07	-	-
		Azimuth:0-360	Height:250 Horz		Margin (dB)	-21.19	-11.19	-24.71	-14.26	-	-
Bicon Vertical 30 - 200MHz											
3	33.3575	33.17dBuV PK	16.4	-30.1	19.47	40	30	39.08	29.55	-	-
		Azimuth:0-360	Height:99 Vert		Margin (dB)	-20.53	-10.53	-19.61	-10.08	-	-
4	51.4625	33.45dBuV PK	9.6	-30	13.05	40	30	39.08	29.55	-	-
		Azimuth:0-360	Height:99 Vert		Margin (dB)	-26.95	-16.95	-26.03	-16.5	-	-
5	63.745	37.05dBuV PK	6.4	-30	13.45	40	30	39.08	29.55	-	-
		Azimuth:0-360	Height:249 Vert		Margin (dB)	-26.55	-16.55	-25.63	-16.1	-	-
6	68.2925	35.49dBuV PK	6.1	-30	11.59	40	30	39.08	29.55	-	-
		Azimuth:0-360	Height:400 Vert		Margin (dB)	-28.41	-18.41	-27.49	-17.96	-	-
7	79.2575	33.91dBuV PK	6.9	-29.9	10.91	40	30	39.08	29.55	-	-
		Azimuth:0-360	Height:99 Vert		Margin (dB)	-29.09	-19.09	-28.17	-18.64	-	-
8	183.2975	31.8dBuV PK	16	-29.2	18.6	40	30	43.52	33.07	-	-
		Azimuth:0-360	Height:400 Vert		Margin (dB)	-21.4	-11.4	-24.92	-14.47	-	-
LogP Horizontal 200 - 1000MHz											
9	484.4	29.98dBuV PK	17.5	-25.1	22.38	47	37	46.44	35.57	-	-
		Azimuth:0-360	Height:399 Horz		Margin (dB)	-24.62	-14.62	-24.06	-13.19	-	-
10	991.6	28.3dBuV PK	24.1	-23.5	28.9	47	37	49.54	43.52	-	-
		Azimuth:0-360	Height:299 Horz		Margin (dB)	-18.1	-8.1	-20.64	-14.62	-	-
LogP Vertical 200 - 1000MHz											
11	544.1	29.73dBuV PK	19.7	-24.8	24.63	47	37	46.44	35.57	-	-
		Azimuth:0-360	Height:100 Vert		Margin (dB)	-22.37	-12.37	-21.81	-10.94	-	-
12	982.5	28.5dBuV PK	24.3	-23.9	28.9	47	37	49.54	43.52	-	-
		Azimuth:0-360	Height:399 Vert		Margin (dB)	-18.1	-8.1	-20.64	-14.62	-	-

LIMIT 1: CISPR Class A 10 m
LIMIT 2: CISPR Class B 10 m
LIMIT 3: FCC Part 15 Class A 10m
LIMIT 4: FCC Part 15 Class B 10m

PK - Peak detector

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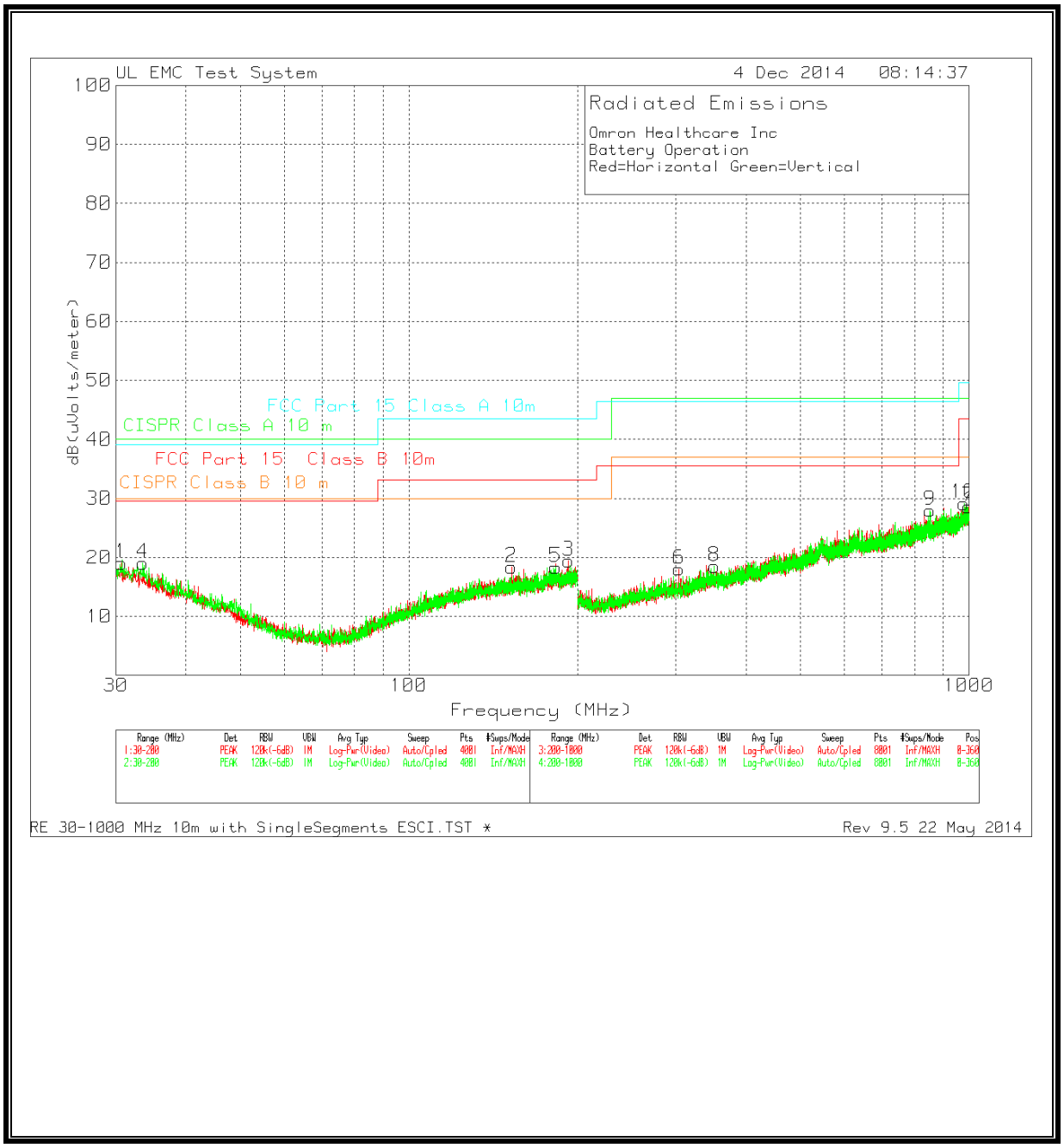
7.2.4. WORST-CASE BELOW 1 GHz TX Mode

SPURIOUS EMISSIONS 30 TO 1000 MHz



Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 dB(uVolts/meter)	2	3	4	5	6
Bicon Horizonta 30 - 200MHz											
1	30.6375	31.64dBuV PK	17.5	-30.1	19.04	40	30	39.08	29.55	-	-
		Azimuth:0-360	Height:400	Horz	Margin (dB)	-20.96	-10.96	-20.04	-10.51	-	-
2	152.5275	33.14dBuV PK	14.8	-29.6	18.34	40	30	43.52	33.07	-	-
		Azimuth:0-360	Height:400	Horz	Margin (dB)	-21.66	-11.66	-25.18	-14.73	-	-
3	192.86	32.31dBuV PK	16	-28.9	19.41	40	30	43.52	33.07	-	-
		Azimuth:0-360	Height:400	Horz	Margin (dB)	-20.59	-10.59	-24.11	-13.66	-	-
Bicon Vertical 30 - 200MHz											
4	33.485	32.73dBuV PK	16.4	-30.1	19.03	40	30	39.08	29.55	-	-
		Azimuth:0-360	Height:99	Vert	Margin (dB)	-20.97	-10.97	-20.05	-10.52	-	-
5	182.7875	31.42dBuV PK	16	-29.1	18.32	40	30	43.52	33.07	-	-
		Azimuth:0-360	Height:99	Vert	Margin (dB)	-21.68	-11.68	-25.2	-14.75	-	-
LogP Horizontal 200 - 1000MHz											
6	303.7	30.92dBuV PK	13.2	-26.1	18.02	47	37	46.44	35.57	-	-
		Azimuth:0-360	Height:299	Horz	Margin (dB)	-28.98	-18.98	-28.42	-17.55	-	-
7	999.5	28.13dBuV PK	24	-23.5	28.63	47	37	49.54	43.52	-	-
		Azimuth:0-360	Height:100	Horz	Margin (dB)	-18.37	-8.37	-20.91	-14.89	-	-
LogP Vertical 200 - 1000MHz											
8	351.3	29.48dBuV PK	14.9	-25.9	18.48	47	37	46.44	35.57	-	-
		Azimuth:0-360	Height:200	Vert	Margin (dB)	-28.52	-18.52	-27.96	-17.09	-	-
9	852.9	30.68dBuV PK	22.1	-24.8	27.98	47	37	46.44	35.57	-	-
		Azimuth:0-360	Height:99	Vert	Margin (dB)	-19.02	-9.02	-18.46	-7.59	-	-
10	979.9	29.04dBuV PK	24.2	-24.1	29.14	47	37	49.54	43.52	-	-
		Azimuth:0-360	Height:99	Vert	Margin (dB)	-17.86	-7.86	-20.4	-14.38	-	-

LIMIT 1: CISPR Class A 10 m
LIMIT 2: CISPR Class B 10 m
LIMIT 3: FCC Part 15 Class A 10m
LIMIT 4: FCC Part 15 Class B 10m

PK - Peak detector

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7.3. CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

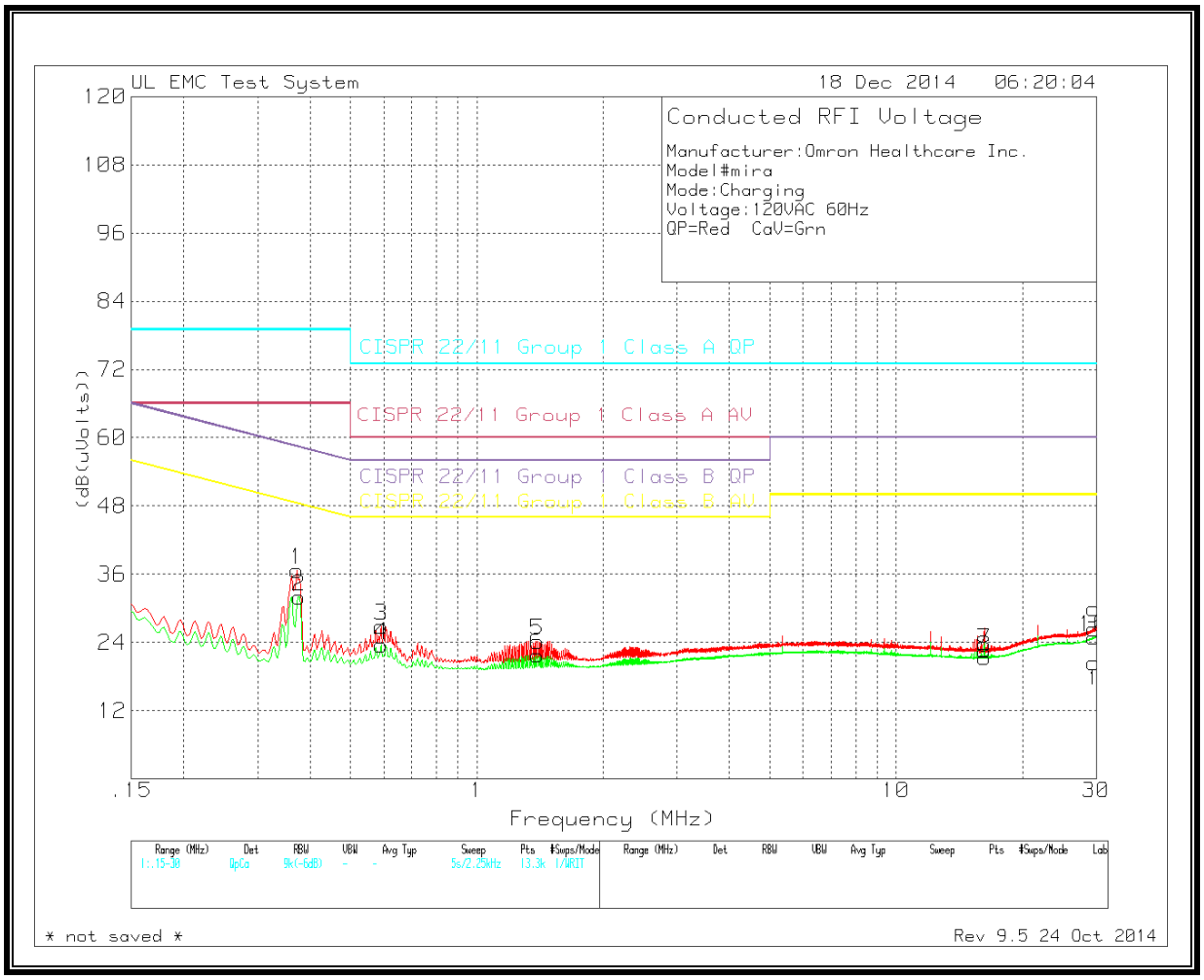
TEST PROCEDURE

ANSI C63.4

RESULTS

CONDUCTED EMISSIONS 150kHz TO 30 MHz

Line 1



Trace Markers

Line - L1 .15 - 30MHz														
Marker No.	Test Frequency (MHz)	Meter Reading(dBuV)	Detector	LISN 1 4052 Dongle	Line 1 Filter	Corrected Reading (dB(uVolts))	CISPR 22/11 Group 1 Class A QP	QP Margin (dB)	CISPR 22/11 Group 1 Class A AV	Margin (dB)	CISPR 22/11 Group 1 Class B QP	QP Margin (dB)	CISPR 22/11 Group 1 Class B AV	Margin (dB)
1	0.37275	25.8	Qp	0.1	10.8	36.7	79	-42.3	-	-	58.44	-21.74	-	-
2	0.37725	21.12	Ca	0.1	10.8	32.02	-	-	66	-33.98	-	-	48.34	-16.32
3	0.591	16.13	Qp	0.1	10.6	26.83	73	-46.17	-	-	56	-29.17	-	-
4	0.591	12.82	Ca	0.1	10.6	23.52	-	-	60	-36.48	-	-	46	-22.48
5	1.39425	13.51	Qp	0.1	10.6	24.21	73	-48.79	-	-	56	-31.79	-	-
6	1.39425	11.07	Ca	0.1	10.6	21.77	-	-	60	-38.23	-	-	46	-24.23
7	16.251	11.14	Qp	0.2	11.2	22.54	73	-50.46	-	-	60	-37.46	-	-
8	16.26	9.9	Ca	0.2	11.2	21.3	-	-	60	-38.7	-	-	50	-28.7
9	29.598	14.09	Qp	0.4	11.9	26.39	73	-46.61	-	-	60	-33.61	-	-
10	29.57775	12.59	Ca	0.4	11.9	24.89	-	-	60	-35.11	-	-	50	-25.11

Qp - Quasi-Peak detector
Ca - CISPR Average detection

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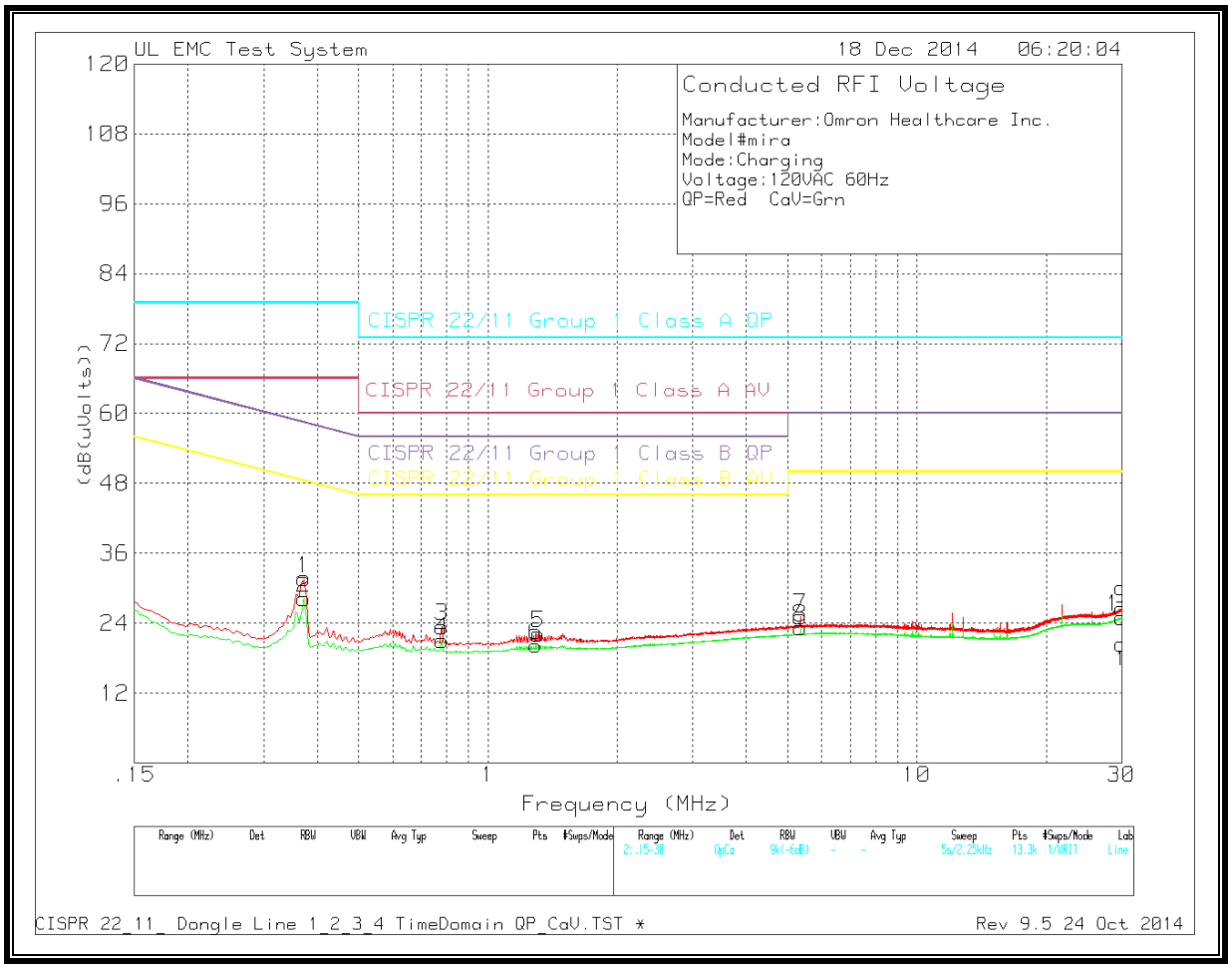
Line 2



Trace Markers

Line - L2 .15 - 30MHz														
Marker No.	Test Frequency (MHz)	Meter Reading(dBuV)	Detector	LISN 2 EMC4064 Dongle	Line 2 Filter	Corrected Reading (dB(uVolts))	CISPR 22/11 Group 1 Class A QP	QP Margin (dB)	CISPR 22/11 Group 1 Class A AV	Margin (dB)	CISPR 22/11 Group 1 Class B QP	QP Margin (dB)	CISPR 22/11 Group 1 Class B AV	Margin (dB)
1	0.37275	20.71	Qp	0.1	10.8	31.61	79	-47.39	-	-	58.44	-26.83	-	-
2	0.37275	17.38	Ca	0.1	10.8	28.28	-	-	66	-37.72	-	-	48.44	-20.16
3	0.78	12.74	Qp	0.1	10.6	23.44	73	-49.56	-	-	56	-32.56	-	-
4	0.78	10.36	Ca	0.1	10.6	21.06	-	-	60	-38.94	-	-	46	-24.94
5	1.311	11.49	Qp	0.1	10.6	22.19	73	-50.81	-	-	56	-33.81	-	-
6	1.293	9.51	Ca	0.1	10.6	20.21	-	-	60	-39.79	-	-	46	-25.79
7	5.34975	14.18	Qp	0.1	10.8	25.08	73	-47.92	-	-	60	-34.92	-	-
8	5.3475	12.32	Ca	0.1	10.8	23.22	-	-	60	-36.78	-	-	50	-26.78
9	29.9625	14.21	Qp	0.3	12	26.51	73	-46.49	-	-	60	-33.49	-	-
10	29.9535	12.68	Ca	0.3	12	24.98	-	-	60	-35.02	-	-	50	-25.02

Qp - Quasi-Peak detector
Ca - CISPR Average detection

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