



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

CDMA/2.4GHz ENABLED (SimTx) APPLIANCE MONITORING SYSTEM (Sensor 1, 2, 3)

MODEL NUMBER: 3004-1B

FCC ID: 2ABWB-4201967

REPORT NUMBER: 14U18550-E1 REVISION B

ISSUE DATE: AUGUST 29, 2014

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	8/22/14	Initial Issue	D. Coronia
A	8/28/14	Added Duty Cycle page 11, Added product equality page 31 and note page 15 & 19-21	D. Coronia
B	8/29/14	Added test procedure page 11	D. Coronia

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Evermind, Inc.
EUT DESCRIPTION: CDMA/2.4GHz ENABLED (SimTx) APPLIANCE MONITORING SYSTEM (Sensor 1, 2, 3)
MODEL: 3004-1A
SERIAL NUMBER: fffa62
DATE TESTED: AUGUST 14-23, 2014

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

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

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



DAN CORONIA
CONSUMER TECHNOLOGY DIVISION
PROJECT LEAD
UL Verification Services Inc.

Tested By:



CHARLES VERGONIO
CONSUMER TECHNOLOGY DIVISION
LAB ENGINEER
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 18000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a CDMA/2.4GHz ENABLED (SimTx) APPLIANCE MONITORING SYSTEM (Sensor 1, 2, 3). See page 31 for more details.

5.2. MAXIMUM OUTPUT FUNDAMENTAL FIELD STRENGTH

The maximum output fundamental field strength as follows:

Frequency Range (MHz)	Sample	Peak E-field Strength (dBuV/m)	Avg E-field Strength (dBuV/m)	Distance (m)
2466	Sensor 1	92.78	91.78	3
2466	Sensor 2	91.73	91.50	3
2466	Sensor 3	91.86	91.61	3

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain of 0dBi.

5.4. WORST-CASE CONFIGURATION AND MODE

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

The fundamental of the EUT was investigated in three orthogonal orientations X, Y, Z it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Not applicable; EUT plugs directly into the AC source.

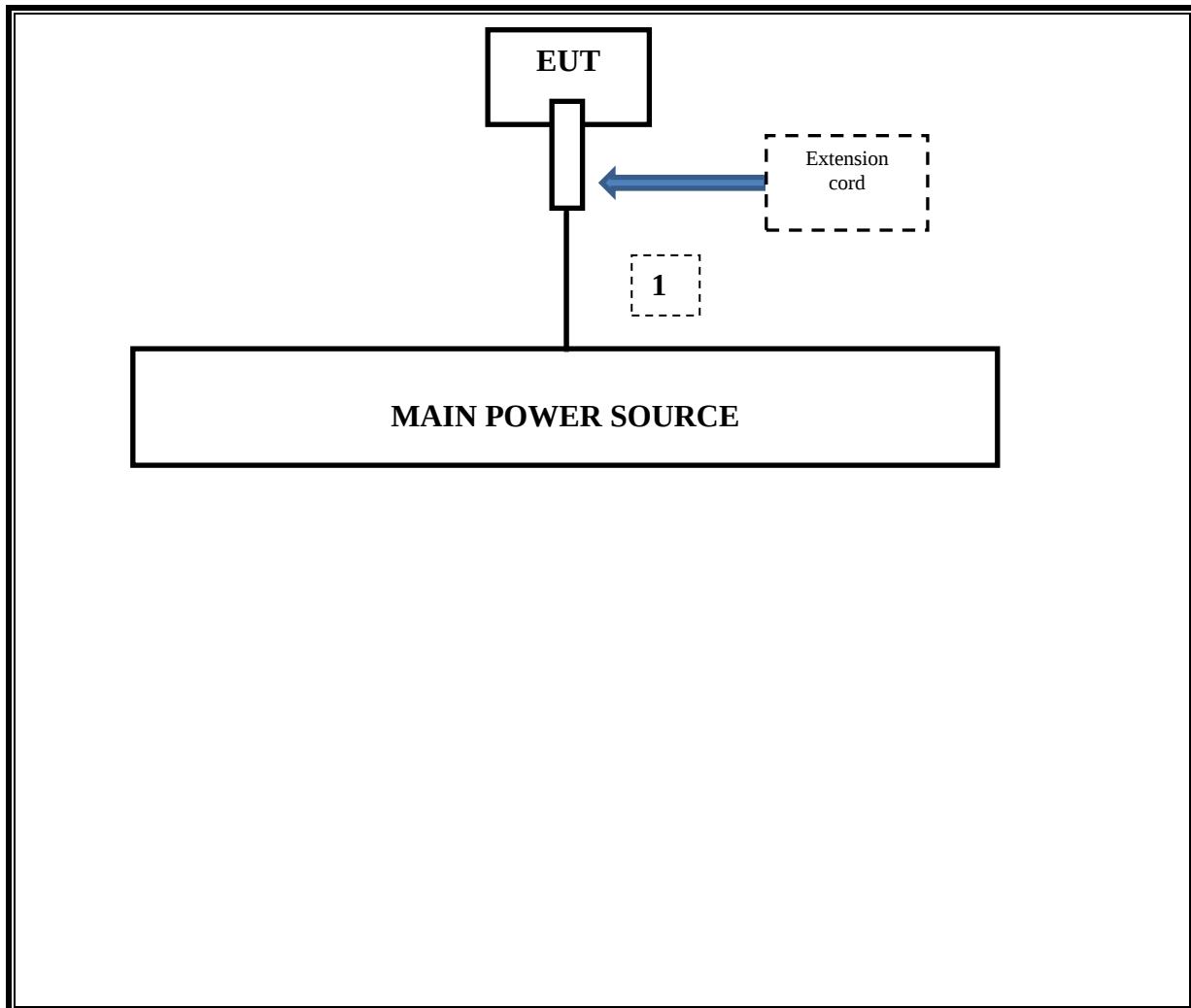
I/O CABLES

Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	3-Prong	Unshielded	1.5	Extension cord

TEST SETUP

The EUT is set to continuously transmit.

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	Asset	Cal Due
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/13/15
Antenna, Horn, 18GHz	EMCO	3115	C00783	10/25/14
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	11/14/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/28/15
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/14
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/14
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/15
Reject Filter, 2.4GHz		BRM50702	N02684	CNR

7. LIMITS AND RESULTS

7.1. TRANSMITTER RADIATED EMISSIONS

TEST METHOD

ANSI C63.4

LIMIT

FCC §15.205 and §15.209(a)

For intentional device, according to §15.209(a), the general requirement of field strength levels of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the below table.

Frequency (MHz)	Field strength (microvolts/meter)	Field strength (dBuV/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	--	3
0.490-1.705	24000/F(kHz)	--	3
1.705-30.0	30	29.5	3
30-88	100**	40.0	3
88-216	150**	43.5	3
216-960	200**	46.0	3
Above 960	500	54.0	3

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

FCC §15.249(a)(c)(d)(e)

(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:

Frequency (MHz)	Field strength Fundamental		Field strength of Harmonics		Distance (meters)
	(mV/m)	(dBuV/m)	(uV/m)	(dBuV/m)	
902-928	50	94	500	54	3
2400-2483.5	50	94	500	54	3
5725-5875	50	94	500	54	3
24.0-24.25	250	108	2500	68	3

(c) Field strength limits are specified at a distance of 3 meters.

(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.

(e) As shown in Sec. 15.35 (b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters.

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

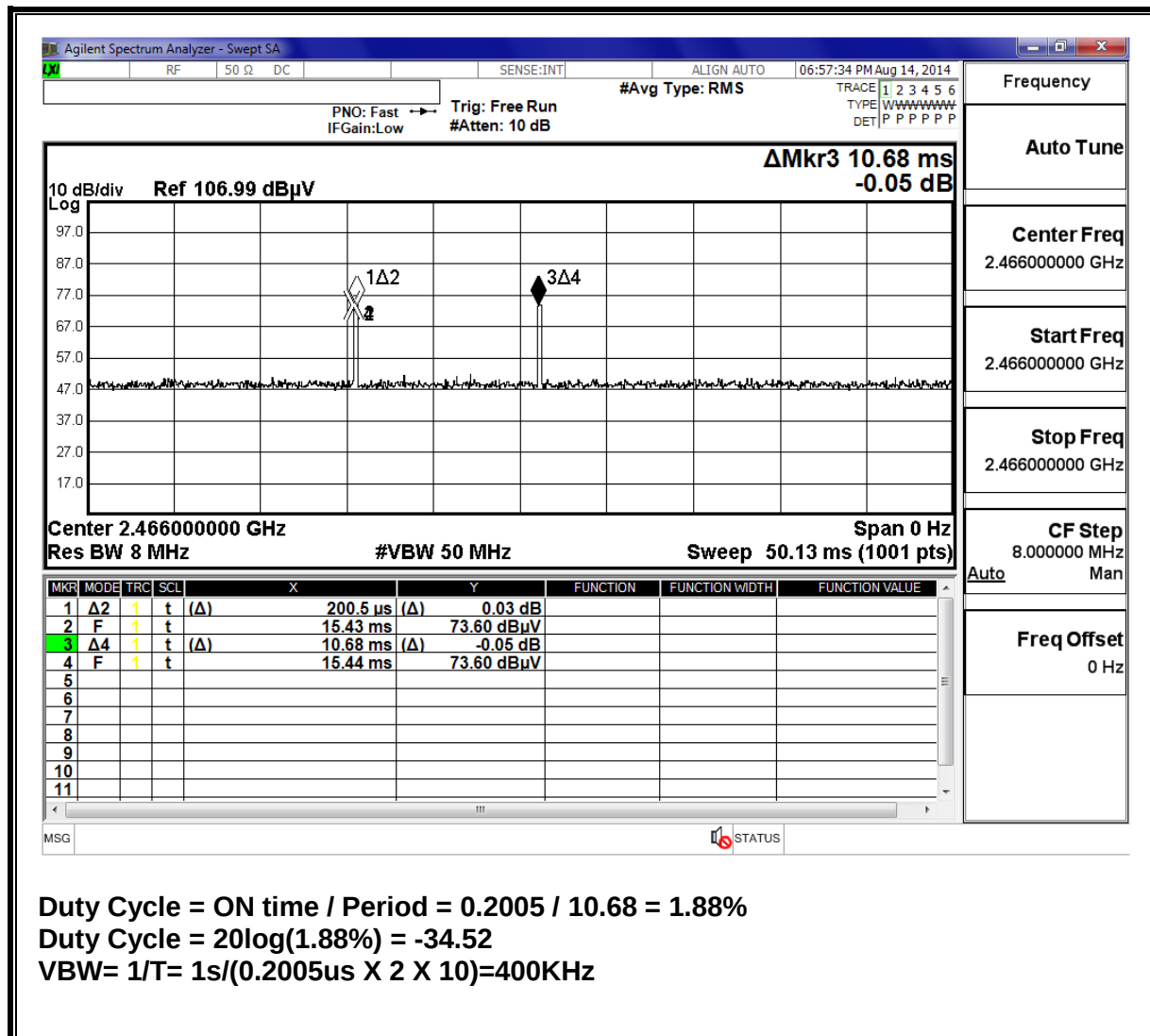
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor to the reading offset for average measurements.

The spectrum from 1GHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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

RESULTS

7.1.1. DUTY CYCLE



7.1.2. FUNDAMENTAL FREQUENCY RADIATED EMISSION



Project #: 14U18550
Report #: 14U18550
Date & Time: 08/23/14
Test Engr: Dan

FCC, VCCI, CISPR, CE, AUSTEL, NZ

UL, CSA, TUV, BSMI, DHHS, NVLAP

Company: Evermind

EUT Description: 2466MHz Tranceiver Sensor 1
Test Configuration : X POSITION
Type of Test: FCC
Mode of Operation: Transmitting

$M\% = ((t1+t2+t3+...)/T) * 66.83\% = 1.88\%$

Av Reading = Pk Reading + 20*log(M%)
20 * log (M%) = -34.52

Freq. (MHz)	Pk Rdg (dBuV)	AvRdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Pk Level (dBuV/m)	Av Level (dBuV/m)	Pk Limit FCC B	Av Limit FCC B	Pk Margin (dB)	Avg Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)
Mid channel														
2466.00	82.56	81.68	32.10	-22.70	0.00	91.96	91.08	114.00	94.00	-22.04	-2.92	3mV	0.00	1.00
2466.00	83.19	82.38	32.10	-22.70	0.00	92.59	91.78	114.00	94.00	-21.41	-2.22	3mH	0.00	2.00

AVG VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet



Project #: 14U18550
Report #: 14U18550
Date & Time: 08/23/14
Test Engr: Dan

FCC, VCCI, CISPR, CE, AUSTEL, NZ

UL, CSA, TUV, BSMI, DHHS, NVLAP

Company: Evermind

EUT Description: 2466MHz Transceiver Sensor 2

Test Configuration : X POSITION

Type of Test: FCC

Mode of Operation: Transmitting : ANT+ protocol

M% = ((t1+t2+t3+...)/T) * 66.83% = 1.88%

Av Reading = Pk Reading + 20*log(M%)
20 * log (M%) = -34.52

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Pk Level (dBuV/m)	Av Level (dBuV/m)	Pk Limit FCC B	Av Limit FCC B	Pk Margin (dB)	Avg Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)
Mid channel														
2466.00	82.33	82.10	32.10	-22.70	0.00	91.73	91.50	114.00	94.00	-22.27	-2.50	3mV	0.00	1.00
2466.00	82.23	82.07	32.10	-22.70	0.00	91.63	91.47	114.00	94.00	-22.37	-2.53	3mH	0.00	2.00

AVG VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet



Project #: 14U18550
Report #: 14U18550
Date & Time: 08/23/14
Test Engr: Dan

FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

Company: Evermind
EUT Description: 2466MHz Transceiver Sensor 3
Test Configuration: X POSITION
Type of Test: FCC
Mode of Operation: Transmitting

M% = ((t1+t2+t3+...)/T) * 66.83% = 1.88%

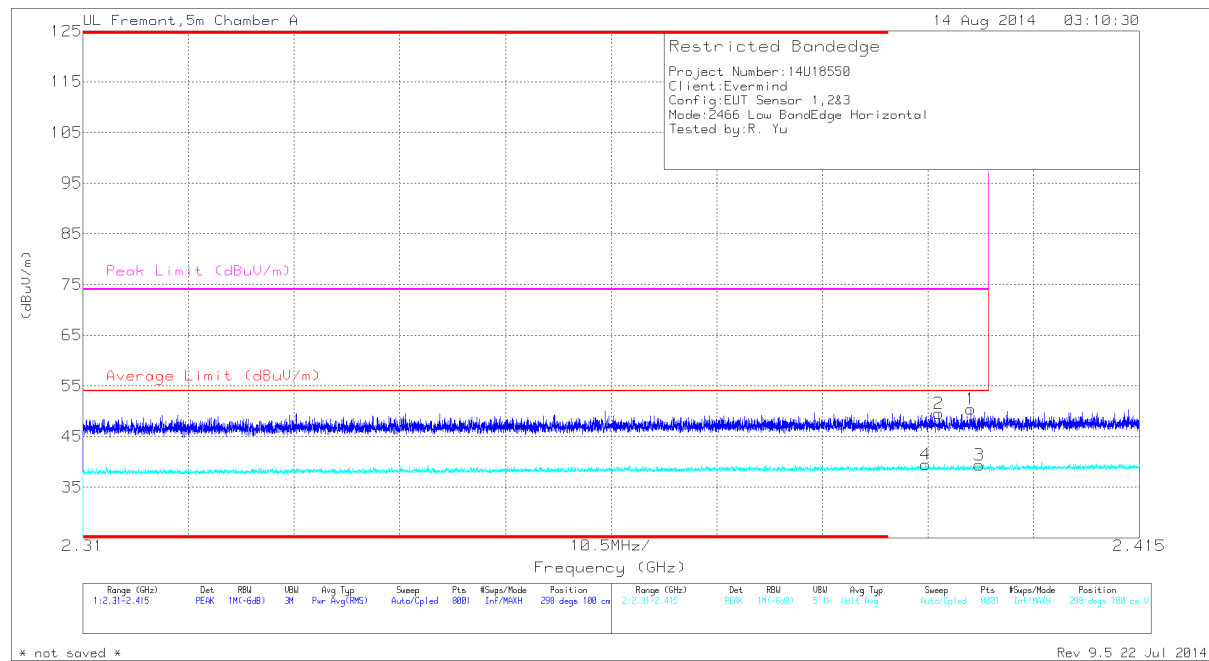
Av Reading = Pk Reading + 20*log(M%)
20 * log (M%) = -34.52

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Cross (dB)	Pre-amp (dB)	Pk Level (dBuV/m)	Av Level (dBuV/m)	Pk Limit FCC B	Av Limit FCC B	Pk Margin (dB)	Av Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)
Mid channel														
2466.00	82.46	82.21	32.10	-22.70	0.00	91.86	91.61	114.00	94.00	-22.14	-2.39	3mV	0.00	1.00
2466.00	82.45	82.24	32.10	-22.70	0.00	91.85	91.64	114.00	94.00	-22.15	-2.36	3mH	0.00	2.00

AVG VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

7.1.3. TRANSMITTER RESTRICTED BAND EDGES

RESTRICTED BANDEDGE (LOW FREQ, HORIZONTAL)



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Chl/F1 tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	2.394	30.2	VB1T	32.3	-23	0	39.5	54	-14.5	-	-	298	100	V
2	2.395	40.21	PK	32.3	-23	0	49.51	-	-	74	-24.49	298	100	V
1	2.398	41.07	PK	32.3	-23	0	50.37	-	-	74	-23.63	298	100	V
3	2.399	29.97	VB1T	32.3	-22.9	0	39.37	54	-14.63	-	-	298	100	V

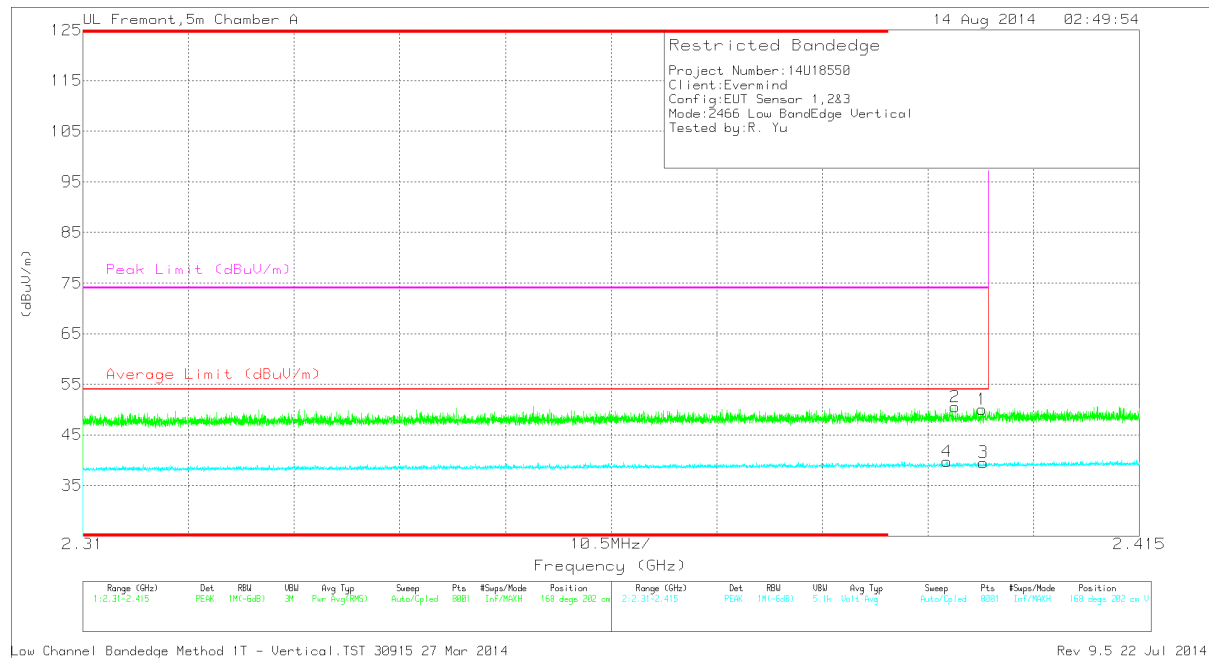
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

Remark: All Sensors (1, 2 & 3) band edge measurement has been investigated and the results are similar. Sensor 1 band edge data was presented on the report.

RESTRICTED BANDEDGE (LOW FREQ, VERTICAL)



Trace Markers

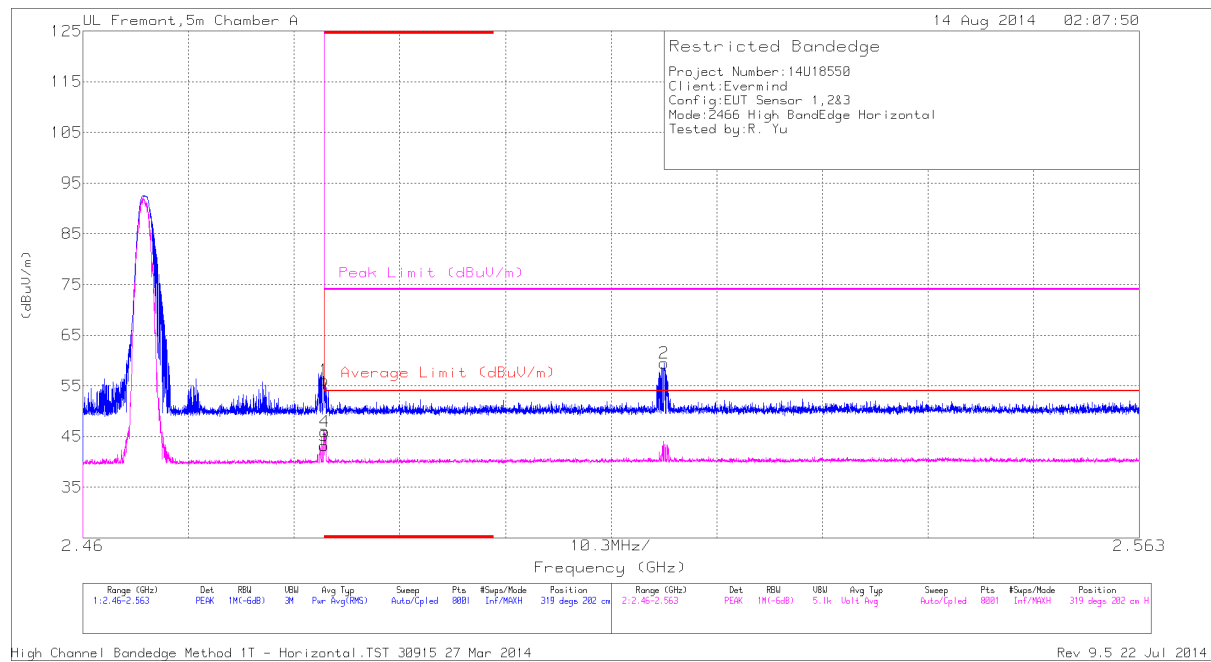
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cb/F1 tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	2.396	30.47	VB1T	32.3	-23	0	39.77	54	-14.23	-	-	168	202	V
2	2.397	41.28	PK	32.3	-23	0	50.58	-	-	74	-23.42	168	202	V
1	2.399	40.69	PK	32.3	-22.9	0	50.09	-	-	74	-23.91	168	202	V
3	2.4	30.15	VB1T	32.3	-22.9	0	39.55	54	-14.45	-	-	168	202	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

RESTRICTED BANDEDGE (HIGH FREQ, HORIZONTAL)



Trace Markers

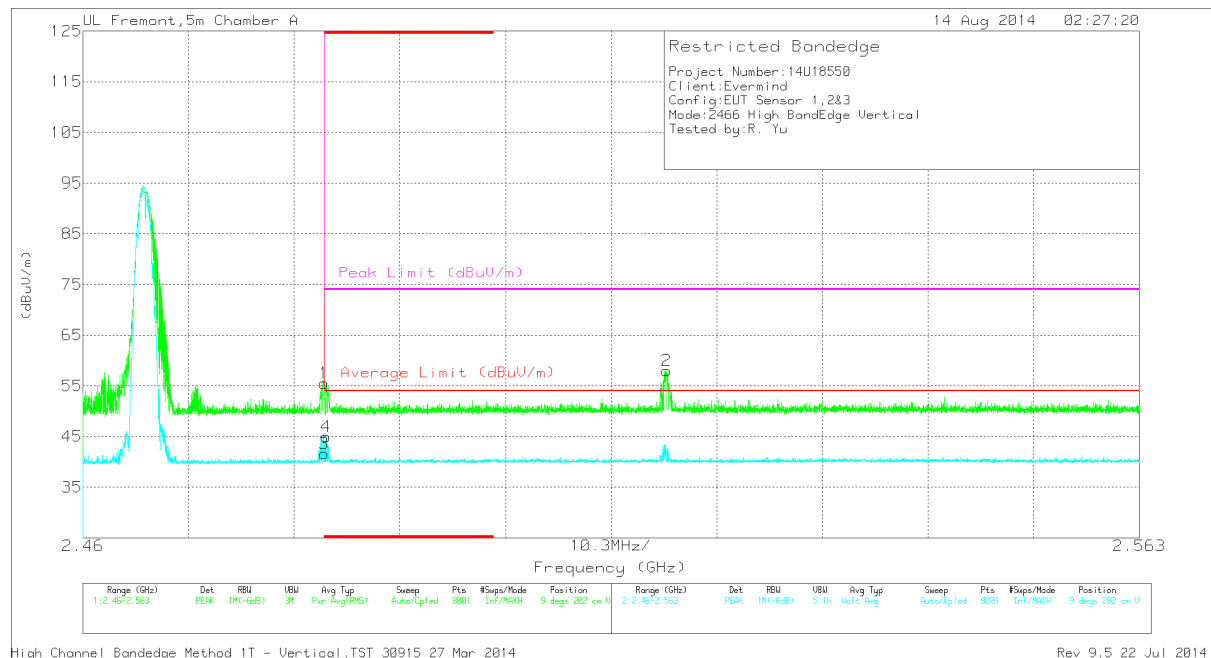
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Ch/El tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	46.09	PK	32.7	-22.7	0	56.09	-	-	74	-17.91	319	202	H
3	* 2.484	33.27	VB1T	32.7	-22.7	0	43.27	54	-10.73	-	-	319	202	H
4	* 2.484	35.94	VB1T	32.7	-22.7	0	45.94	54	-8.06	-	-	319	202	H
2	2.517	49.28	PK	32.8	-22.6	0	59.48	-	-	74	-14.52	319	202	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

RESTRICTED BANDEDGE (HIGH FREQ, VERTICAL)



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	45.56	PK	32.7	-22.7	55.56	-	-	74	-18.44	9	202	V
3	* 2.484	31.61	VB1T	32.7	-22.7	41.61	54	-12.39	-	-	9	202	V
4	* 2.484	34.99	VB1T	32.7	-22.7	44.99	54	-9.01	-	-	9	202	V
2	2.517	47.76	PK	32.8	-22.6	57.96	-	-	74	-16.04	9	202	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz

HARMONICS



FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

47173 BENICIA STREET, FREMONT, CA 94538, USA

Company: Evermind
EUT Description: 2466MHz transceiver Sensor 1
Test Configuration: X POSITION
Type of Test: FCC
Mode of Operation: Transmitting

Project #: 14U18550
Report #: 14U18550
Date & Time: 08/14/14
Test Engr: Ryan Yu

M% = ((t1+t2+t3+...)/T) * 66.83% = 1.88%

Av Reading = Pk Reading + 20*log(M%)
20 * log (M%) = -34.52

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Pk Level (dBuV/m)	Av Level (dBuV/m)	Pk Limit FCC_B	Av Limit FCC_B	Pk Margin (dB)	Av Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)
Mid channel														
4932.00	43.80	31.44	32.10	-22.70	0.00	53.20	40.84	74.00	54.00	-20.80	-13.16	3mV	0.00	1.00
4932.00	44.01	31.17	32.10	-22.70	0.00	53.41	40.57	74.00	54.00	-20.59	-13.44	3mH	0.00	2.00

NOTE: Emission was scanned up to 26GHz; no emissions were detected above the noise floor which was at least 20dB below the specification limit. If the emission PK level is within Average limit, then the maximization and average measurement are not performed; both horizontal and vertical polarization had been verified.

AVG VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

HARMONICS



FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

47173 BENICIA STREET, FREMONT, CA 94538, USA

Company: Evermind

EUT Description: 2466MHz transceiver Sensor 2

Test Configuration : X POSITION

Type of Test: FCC

Mode of Operation: Transmitting

Project #: 14U18550
Report #: 14U18550
Date & Time: 08/15/14
Test Engr: Ryan Yu

M% = ((t1+t2+t3+...)/T) * 66.83% = 1.88%

Av Reading = Pk Reading + 20*log(M%)

20 * log (M%) = -34.52

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Pk Level (dBuV/m)	Av Level (dBuV/m)	Pk Limit FCC_B	Av Limit FCC_B	Pk Margin (dB)	Avg Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)
Mid channel														
4932.00	44.46	33.58	32.10	-22.70	0.00	53.86	42.98	74.00	54.00	-20.14	-11.02	3mV	0.00	1.00
4932.00	43.92	37.23	32.10	-22.70	0.00	53.32	46.63	74.00	54.00	-20.68	-7.37	3mH	0.00	2.00

NOTE: Emission was scanned up to 26GHz; no emissions were detected above the noise floor which was at least 20dB below the specification limit. If the emission PK level is within Average limit, then the maximization and average measurement are not performed; both horizontal and vertical polarization had been verified.

AVG VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

HARMONICS



FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

47173 BENICIA STREET, FREMONT, CA 94538, USA

Company: Evermind

EUT Description: 2466MHz transceiver

Sensor 3

Test Configuration : X POSITION

Type of Test: FCC

Mode of Operation: Transmitting

Project #: 14U18550

Report #: 14U18550

Date & Time: 08/15/14

Test Engr: Ryan Yu

$M\% = ((t1+t2+t3+...)/T) * 66.83\% = 1.88\%$

$Av \text{ Reading} = Pk \text{ Reading} + 20 \log(M\%)$

$20 * \log(M\%) = -34.52$

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Pk Level (dBuV/m)	Av Level (dBuV/m)	Pk Limit FCC_B	Av Limit FCC_B	Pk Margin (dB)	Avg Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)
Mid channel														
4932.00	44.37	33.93	32.10	-22.70	0.00	53.77	43.33	74.00	54.00	-20.23	-10.67	3mV	0.00	1.00
4932.00	43.66	36.07	32.10	-22.70	0.00	53.06	45.47	74.00	54.00	-20.94	-8.54	3mH	0.00	2.00

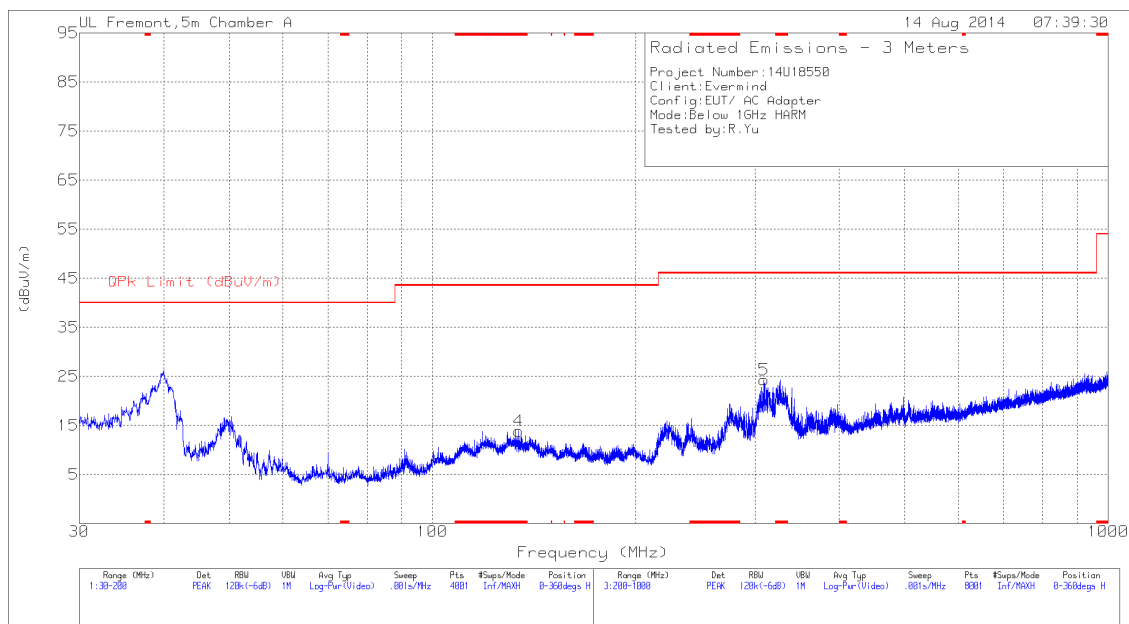
NOTE: Emission was scanned up to 26GHz; no emissions were detected above the noise floor which was at least 20dB below the specification limit. If the emission PK level is within Average limit, then the maximization and average measurement are not performed; both horizontal and vertical polarization had been verified.

AVG VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

7.1.4. WORST-CASE BELOW 1 GHz

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

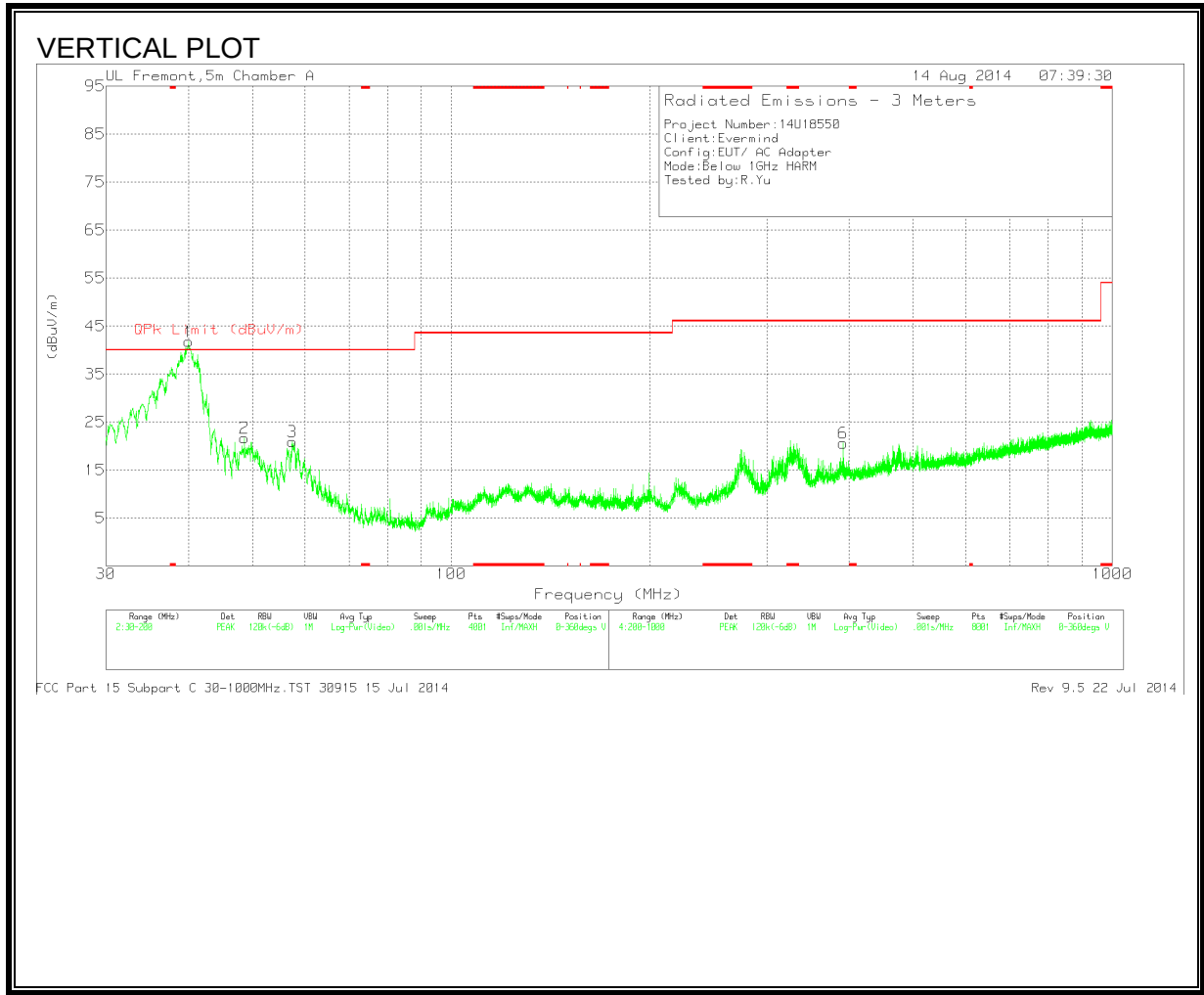
HORIZONTAL PLOT



FCC Part 15 Subpart C 30-1000MHz.TST 30915 15 Jul 2014

Rev 9.5 22 Jul 2014

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



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 134.0825	30.57	PK	13.7	-30.4	13.87	43.52	-29.65	0-360	300	H
1	40.03	58.43	PK	14.3	-31	41.73	40	1.73	0-360	101	V
2	48.615	44.3	PK	8.5	-31.1	21.7	40	-18.3	0-360	101	V
3	57.4125	44.02	PK	7.4	-30.5	20.92	40	-19.08	0-360	101	V
5	309.5	39.82	PK	13.8	-29.3	24.32	46.02	-21.7	0-360	101	H
6	391.5	34.31	PK	15.3	-29	20.61	46.02	-25.41	0-360	100	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
39.9032	52.59	QP	14.4	-31	35.99	40	-4.01	1	101	V

QP - Quasi-Peak detector

8. ANTENNA REQUIREMENT

Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Antenna Connector Construction

Please refer to section 5.3 in this test report the antenna information.

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

(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 50 μ H/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 boundary between the frequencies ranges.

Frequency range (MHz)	Limits (dB μ V)	
	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 0.50MHz.		

*Decreases with the logarithm of the frequency.

TEST METHOD

ANSI C63.4 - 2009

RESULTS

6 WORST EMISSIONS

Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.2085	43.21	PK	.9	0	44.11	63.3	-19.19	-	-
2	.2085	26.28	Av	.9	0	27.18	-	-	53.3	-26.12
3	.438	41.54	PK	.4	0	41.94	57.1	-15.16	-	-
4	.438	30.07	Av	.4	0	30.47	-	-	47.1	-16.63
5	.8925	49.04	PK	.3	0	49.34	56	-6.66	-	-
6	.8925	38.33	Av	.3	0	38.63	-	-	46	-7.37
7	1.8195	48.34	PK	.2	.1	48.64	56	-7.36	-	-
8	1.8195	31.49	Av	.2	.1	31.79	-	-	46	-14.21
9	7.0755	44.27	PK	.2	.1	44.57	60	-15.43	-	-
10	7.0755	26.08	Av	.2	.1	26.38	-	-	50	-23.62
11	13.4025	39.84	PK	.2	.2	40.24	60	-19.76	-	-
12	13.4025	23.98	Av	.2	.2	24.38	-	-	50	-25.62

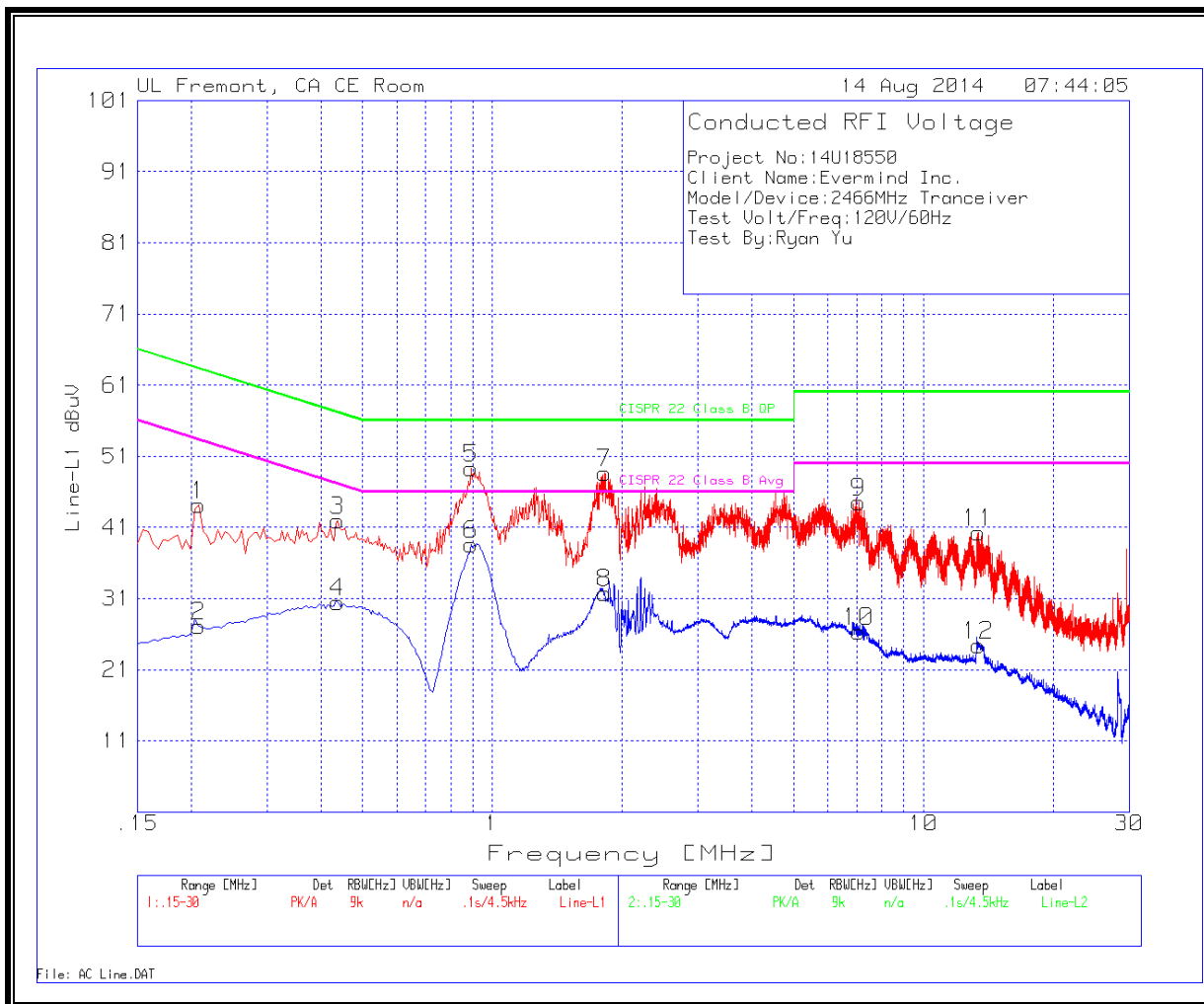
Line-L2 .15 - 30MHz

Trace Markers										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
13	.177	40.82	PK	1.2	0	42.02	64.6	-22.58	-	-
14	.177	23.34	Av	1.2	0	24.54	-	-	54.6	-30.06
15	.411	42.63	PK	.4	0	43.03	57.6	-14.57	-	-
16	.411	29.79	Av	.4	0	30.19	-	-	47.6	-17.41
17	.942	48.79	PK	.3	0	49.09	56	-6.91	-	-
18	.942	37.35	Av	.3	0	37.65	-	-	46	-8.35
19	1.815	48.17	PK	.2	.1	48.47	56	-7.53	-	-
20	1.815	29.56	Av	.2	.1	29.86	-	-	46	-16.14
21	5.766	45.24	PK	.2	.1	45.54	60	-14.46	-	-
22	5.766	24.18	Av	.2	.1	24.48	-	-	50	-25.52
23	18.213	35.03	PK	.3	.2	35.53	60	-24.47	-	-
24	18.213	17.9	Av	.3	.2	18.4	-	-	50	-31.6

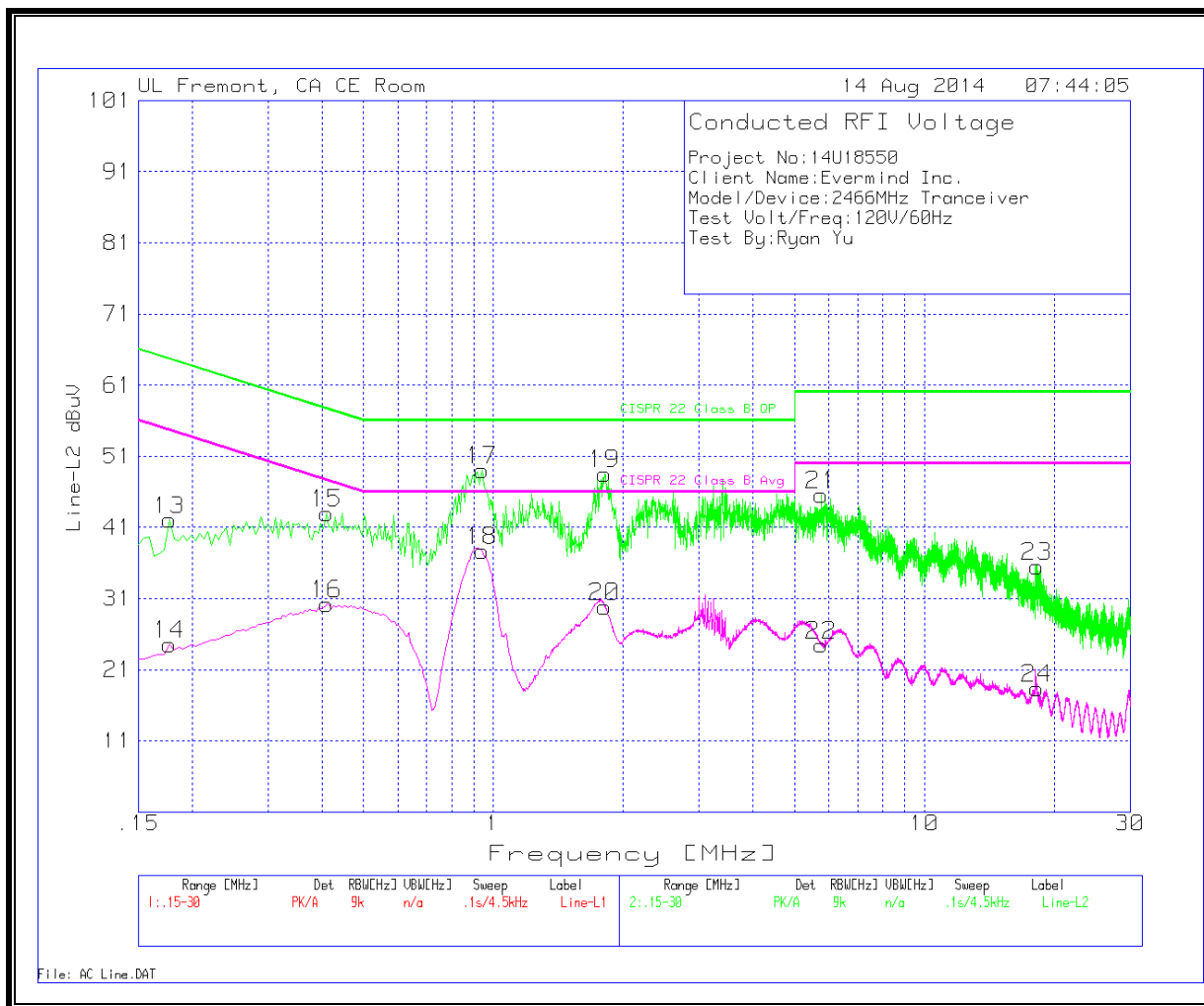
PK - Peak detector

Av - average detection

LINE 1 RESULTS



LINE 2 RESULTS



10. PRODUCT EQUALITY DECLARATION



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evermind.us

Evermind, Inc.
1200 Clinton Street, Suite 209
Nashville, TN 37203

8/28/2014

Subject: Product Equality Declaration

To Whom It May Concern:

The Evermind product includes three sensors for monitoring electrical appliance usage. All of the Sensors are electrically identical with the following exceptions.

Sensor #1: Includes a connector for a cell modem on the main PCB, the Huawei MC323 cell modem, and an antenna connected via a cable to the cell modem. Its 2.4GHz radio has one LED on it.

Sensor #2: Its 2.4GHz radio has two LEDs on it.

Sensor #3: Its 2.4GHz radio has three LEDs on it.

Sincerely,

Kip Lindsay
Director of Technical Services
Evermind, Inc.