FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8

BLUETOOTH LOW ENERGY CERTIFICATION TEST REPORT

FOR

Fitness Watch with integrated Radios 1) WCDMA (850/1800/2100/R99+HSDPA) 2) BT (v3.0+EDR+LE) 3) GPS

MODEL NUMBER: M061

FCC ID: EP9-TMXM061
IC: 3348A-TMXM061

REPORT NUMBER: 14U17447-3A

ISSUE DATE: August 19, 2014
Revision Date: August 20, 2014

Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
--	08/19/14	Initial Issue	M.Ferrer
A	08/20/14	Updated Conducted Emissions data	M.Ferrer

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Timex Group USA, INC.

EUT DESCRIPTION: Fitness Watch with integrated Radios 1) WCDMA (850/1800/2100/R99+HSDPA) 2) BT (v3.0+EDR+LE) 3) GPS

MODEL: M061

SERIAL NUMBER: P2a/D2-920, P2a/D2-921, P2a/D2-924

DATE TESTED: July 1, 2014 – August 20, 2014

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	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 LLC By:

Peng Zhang
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UL LLC

Tested By:

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EMC Program Manager
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

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

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:

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 transceiver.

The radio module is manufactured by Qualcomm

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	1.09	1.00

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an Monopole antenna, with a maximum gain of -2.0 dBi.

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

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
EUT	Qualcomm	M6021	-	-
Power Supply			-	DoC

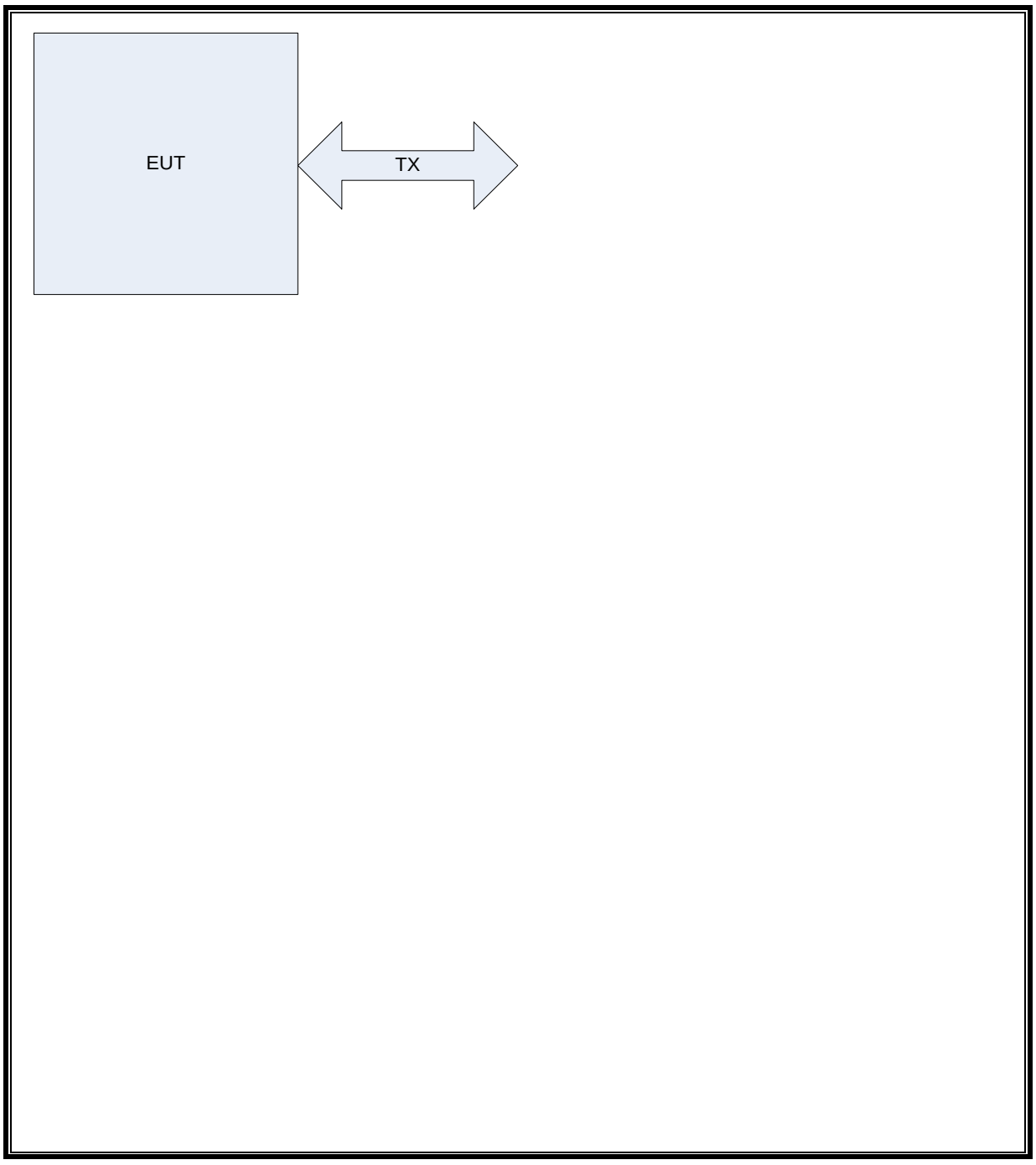
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB	1	1	USB	>3	none

TEST SETUP

EUT was setup in battery mode during Radiated Emissions

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 Date**	**Cal Due**	**Test**
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	20131220	20141231	RE
Bicon Antenna	Chase	VBA6106A	EMC4078	20140401	20150401	RE
Log-P Antenna	Chase	UPA6109	EMC4313	20131003	20141031	RE
Spectrum Analyzer	Rohde & Schwarz	FSEK	EMC4182	20131217	20143112	RE
Antenna Array	UL	BOMS	EMC4276	20130913	20140913	RE
EMI Test Receiver	Agilent	N9030A	EMC4360	20131221	20141221	OBW, Dwell
Antenna	EMCO	-	-	N/A	N/A	OBW, Dwell
Power Meter	Agilent	N1912A	EMC4362	20130606	20150606	AP
Power Sensor	Agilent	85481A	EMC4363	20131209	20141209	AP
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	20131217	20141231	CE
LISN	Solar	8602-50-TS-50-N	EMC4052	20140116	20150116	CE
LISN	Solar	8602-50-TS-50-N	EMC4064	20140116	20150116	CE

7. ANTENNA PORT TEST RESULTS

7.1. MEASUREMENT METHODS

6 dB BW: KDB 558074 D01 v03r01, Section 8.1.

Output Power: KDB 558074 D01 v03r01, Section 9.1.1.
Output Power: KDB 558074 D01 v03r01, Section 9.2.3.1.

Power Spectral Density: KDB 558074 D01 v03r01, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r01, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r01, Section 12.1.

Band-edge: KDB 558074 D01 v03r01, Section 13.3.3.

7.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

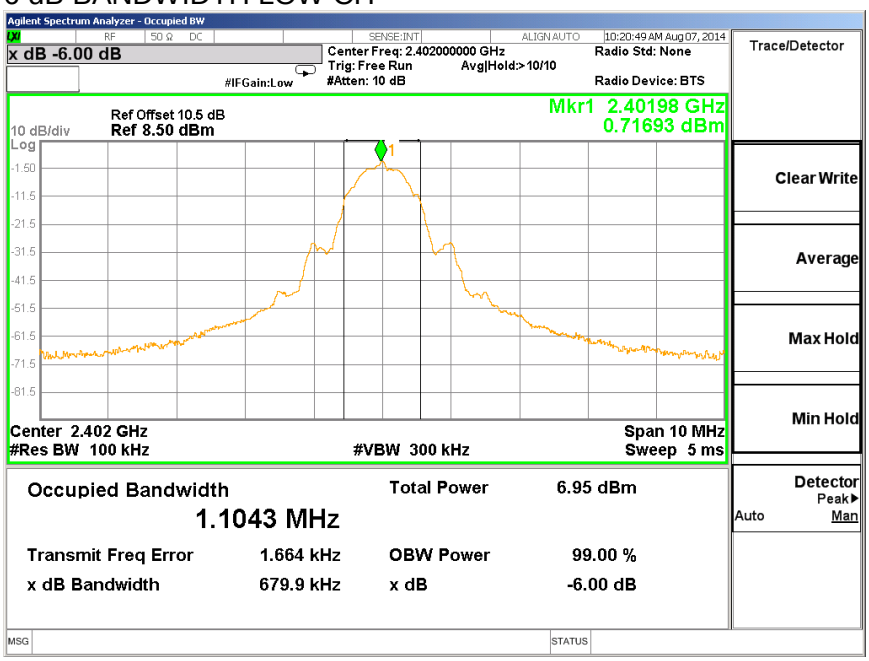
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

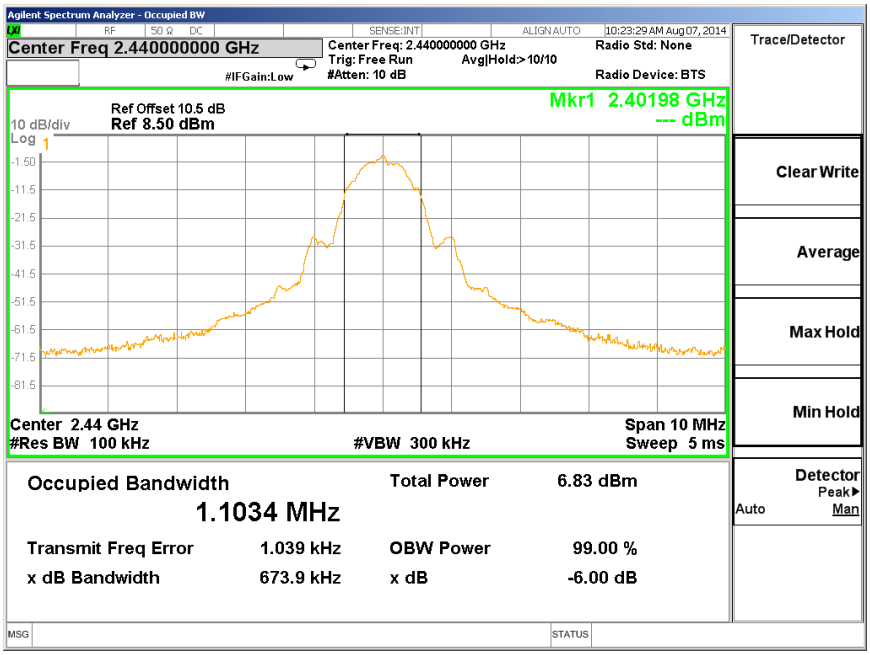
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.6799	0.5
Middle	2440	0.6739	0.5
High	2480	0.6735	0.5

6 dB BANDWIDTH

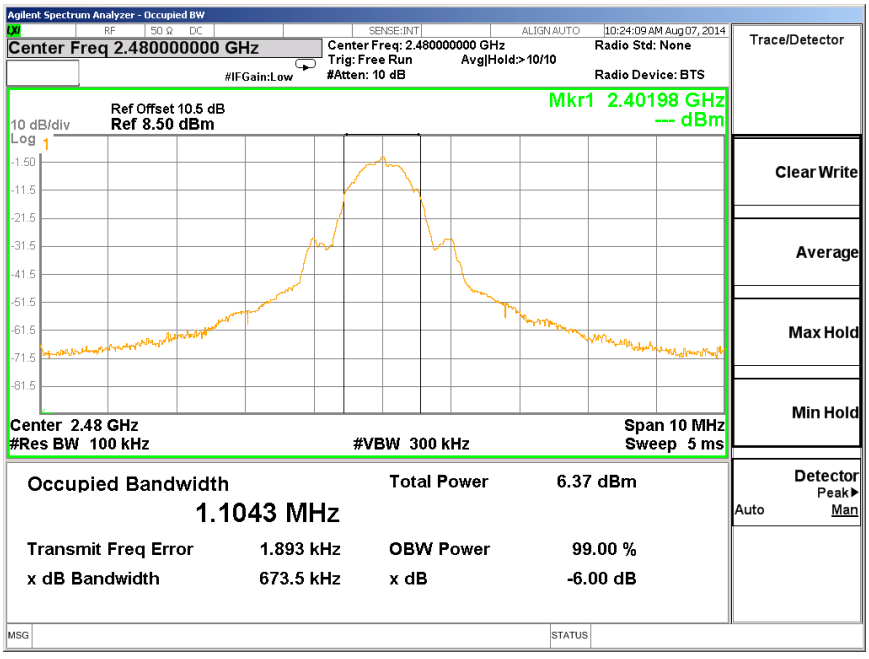
6 dB BANDWIDTH LOW CH



6 dB BANDWIDTH MID CH



6 dB BANDWIDTH HIGH CH



7.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

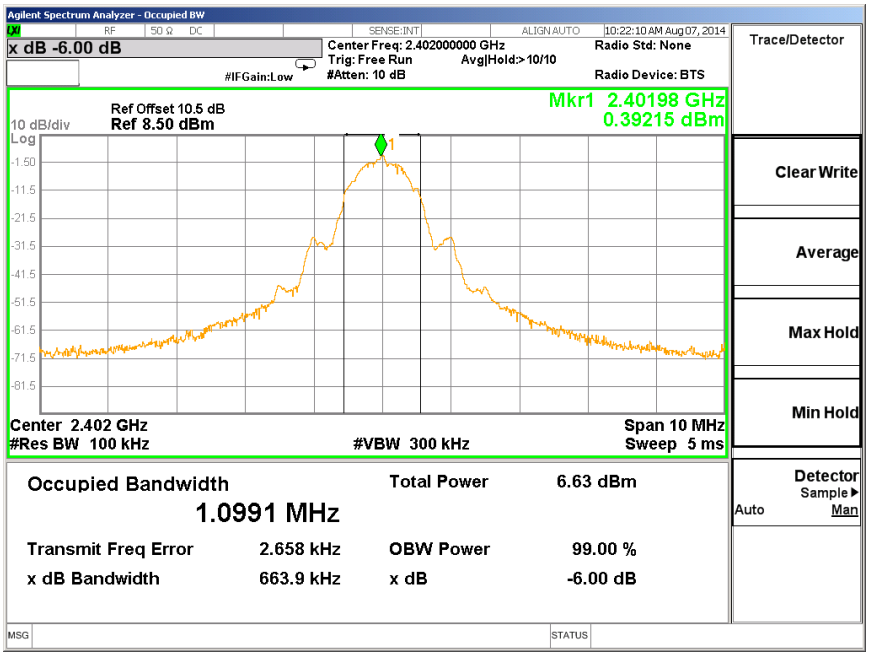
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

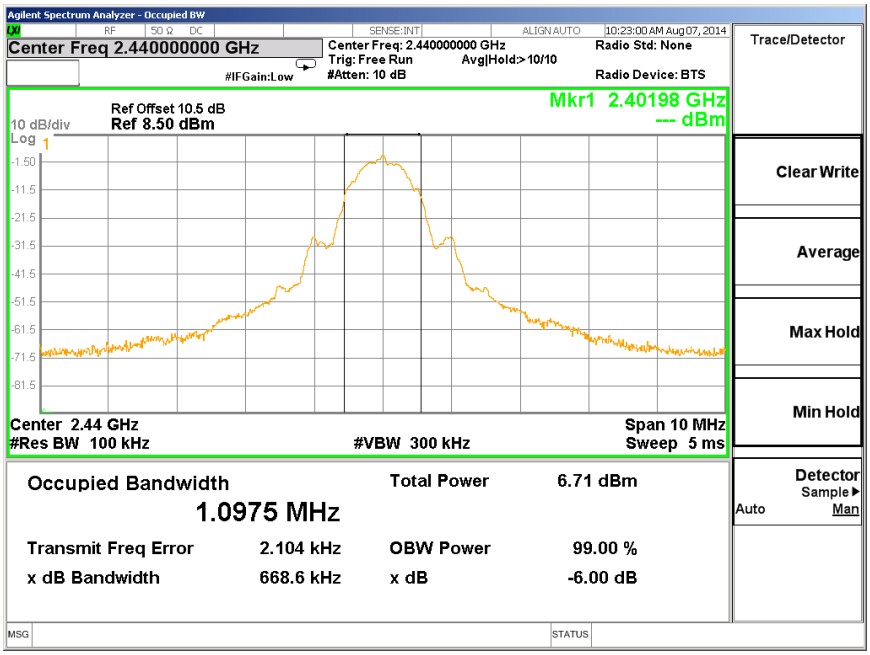
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0991
Middle	2440	1.0975
High	2480	1.0987

99% BANDWIDTH

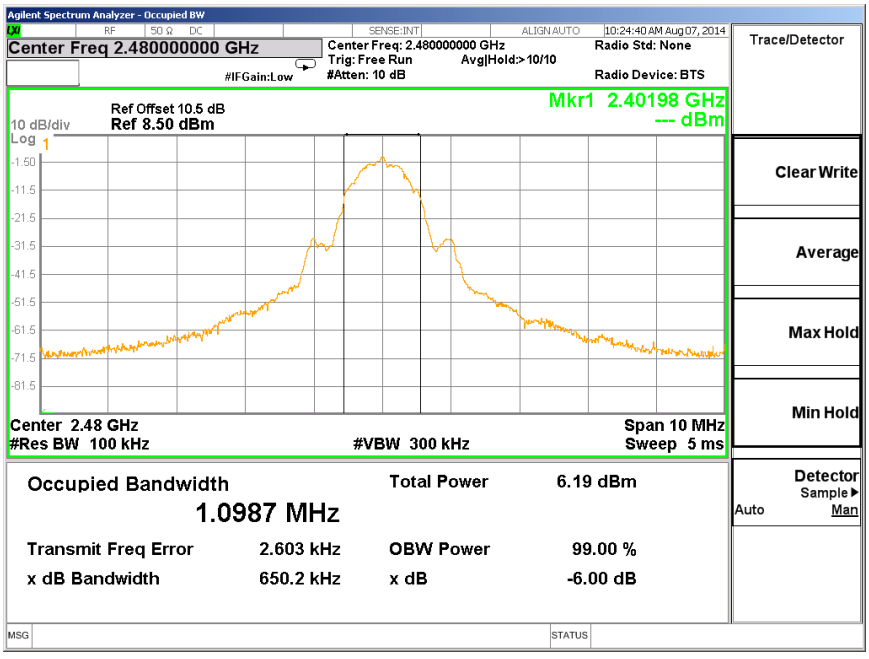
99% BANDWIDTH LOW CH



99% BANDWIDTH MID CH



99% BANDWIDTH HIGH CH



7.4. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

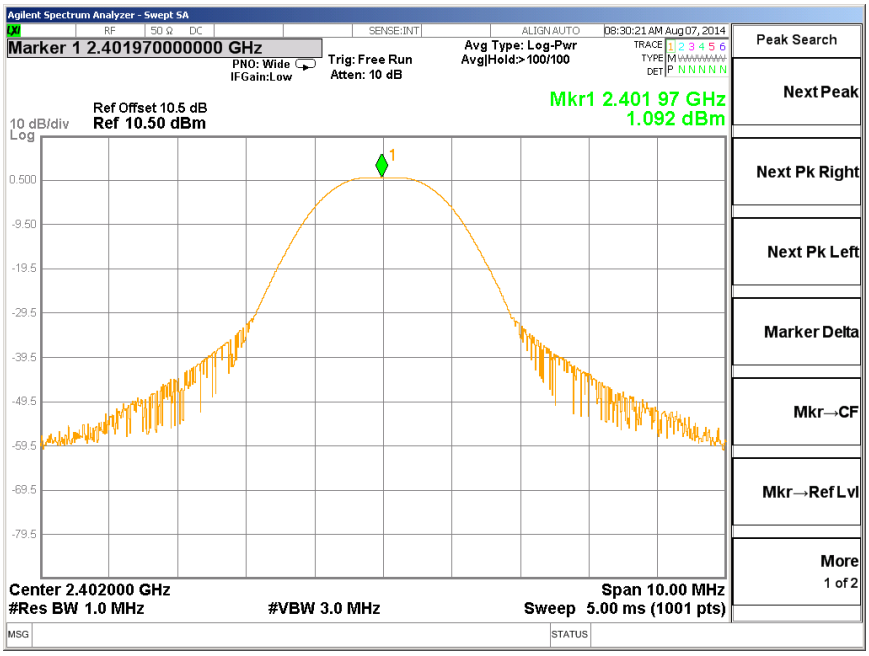
The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

RESULTS

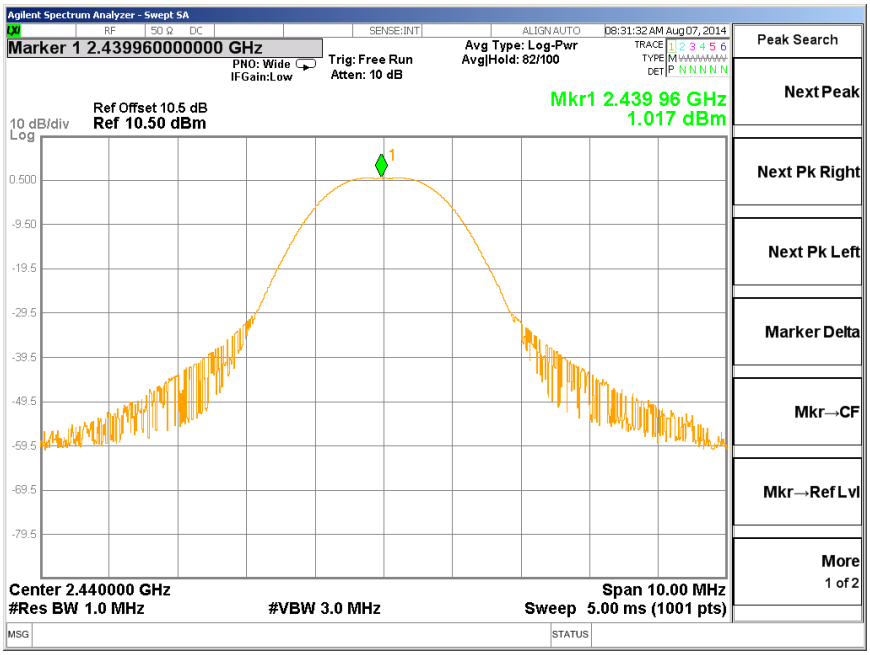
Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	1.092	30	-28.908
Middle	2440	1.017	30	-28.983
High	2480	0.583	30	-29.417

OUTPUT POWER

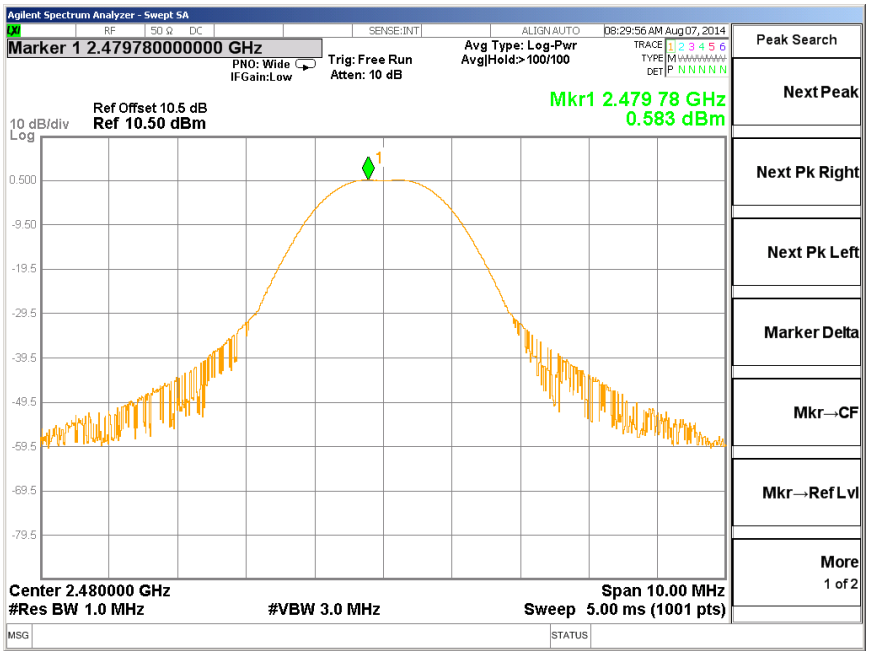
OUTPUT POWER LOW CH



OUTPUT POWER MID CH



OUTPUT POWER HIGH CH



7.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

The cable assembly insertion loss of 0 dB was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	-1.26
Middle	2440	-1.35
High	2480	-1.94

7.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

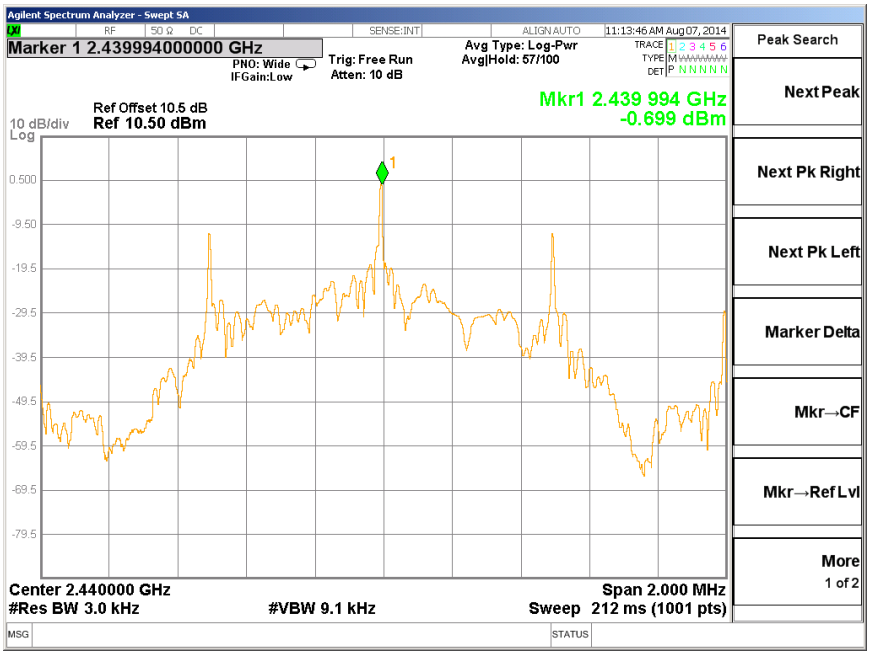
RESULTS

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-0.40	8	-8.40
Middle	2440	-0.70	8	-8.70
High	2480	-0.83	8	-8.83

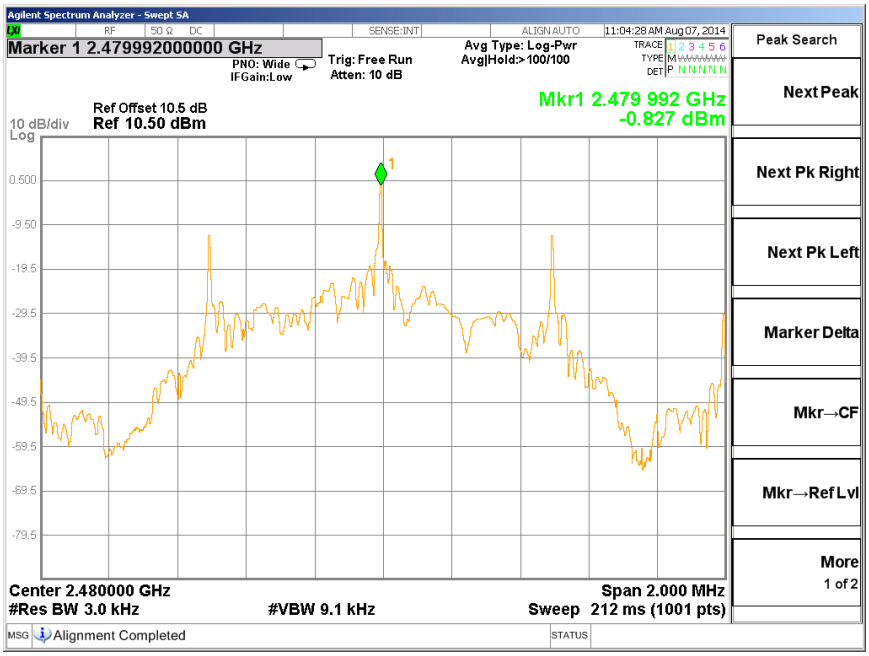
POWER SPECTRAL DENSITY

PSD LOW CH

PSD MID CH



PSD HIGH CH



7.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

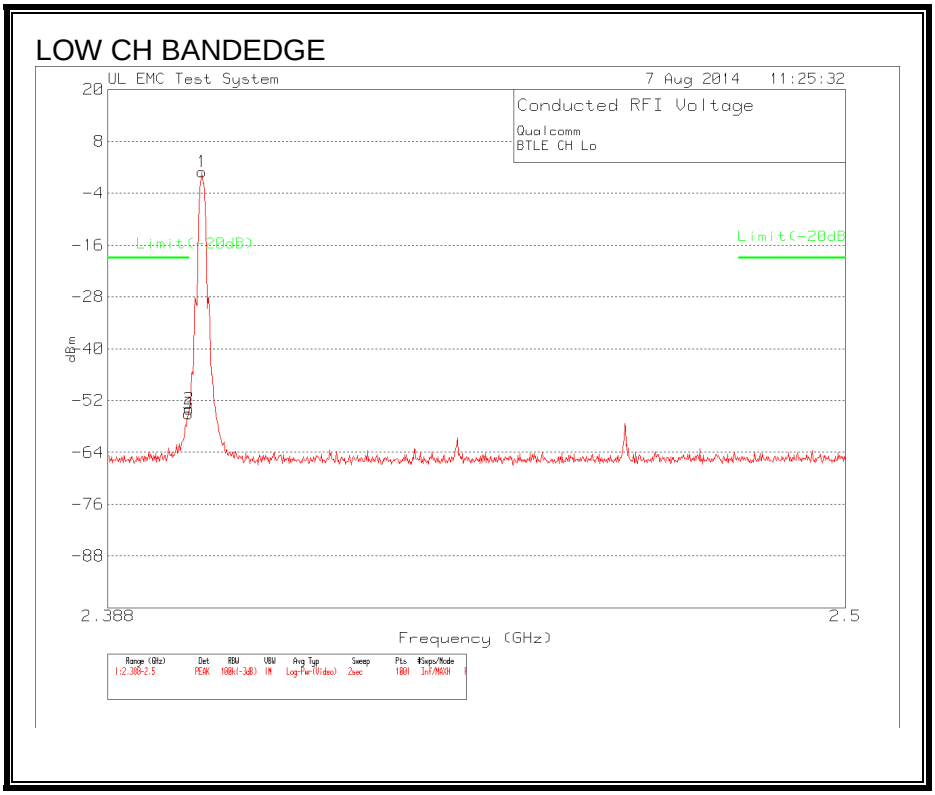
FCC §15.247 (d)

IC RSS-210 A8.5

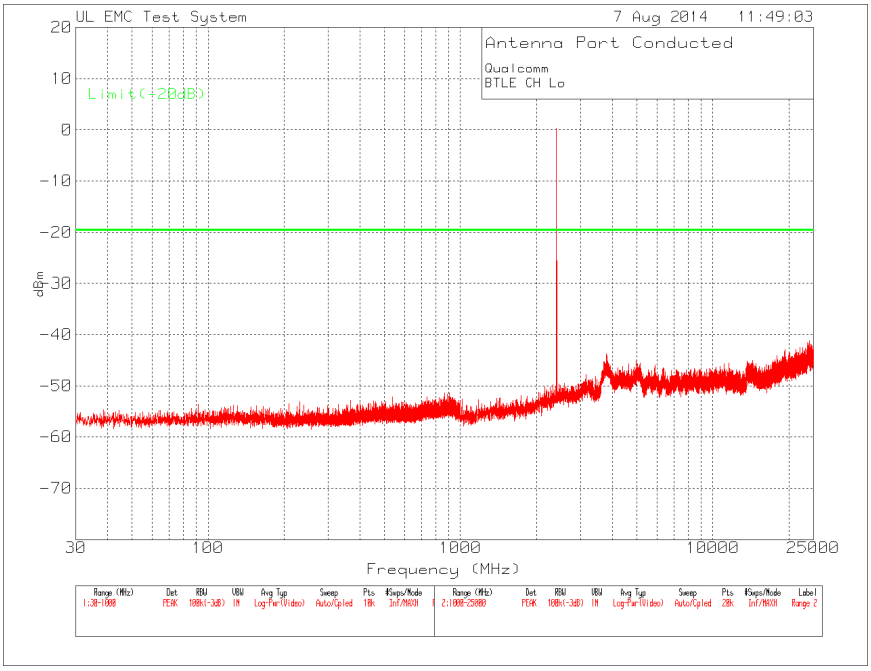
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

RESULTS

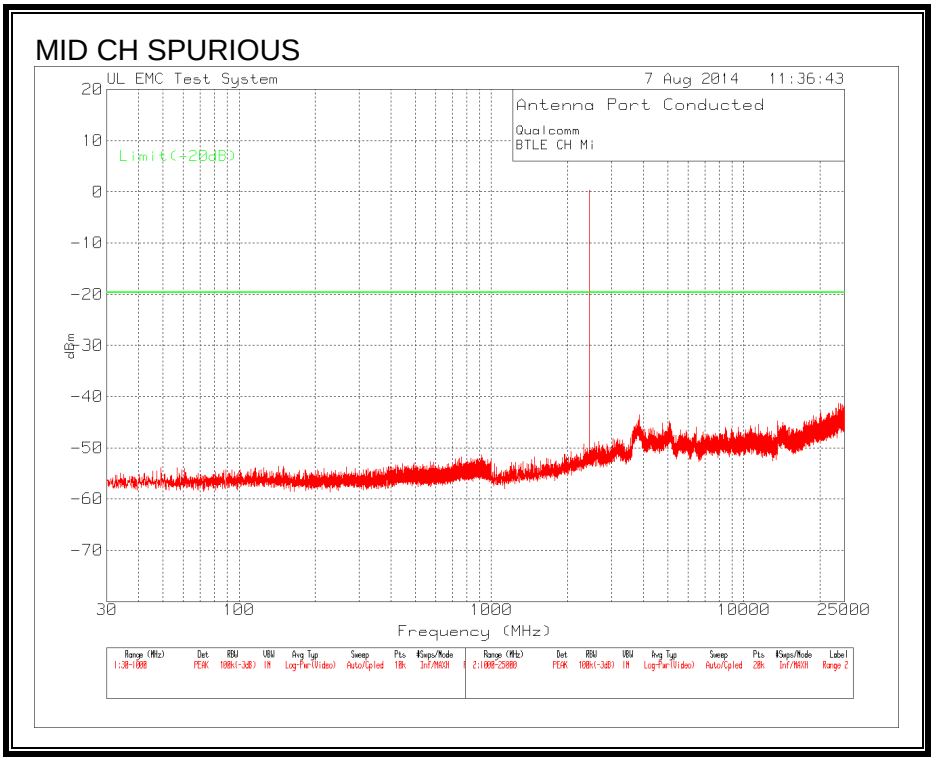
SPURIOUS EMISSIONS, LOW CHANNEL



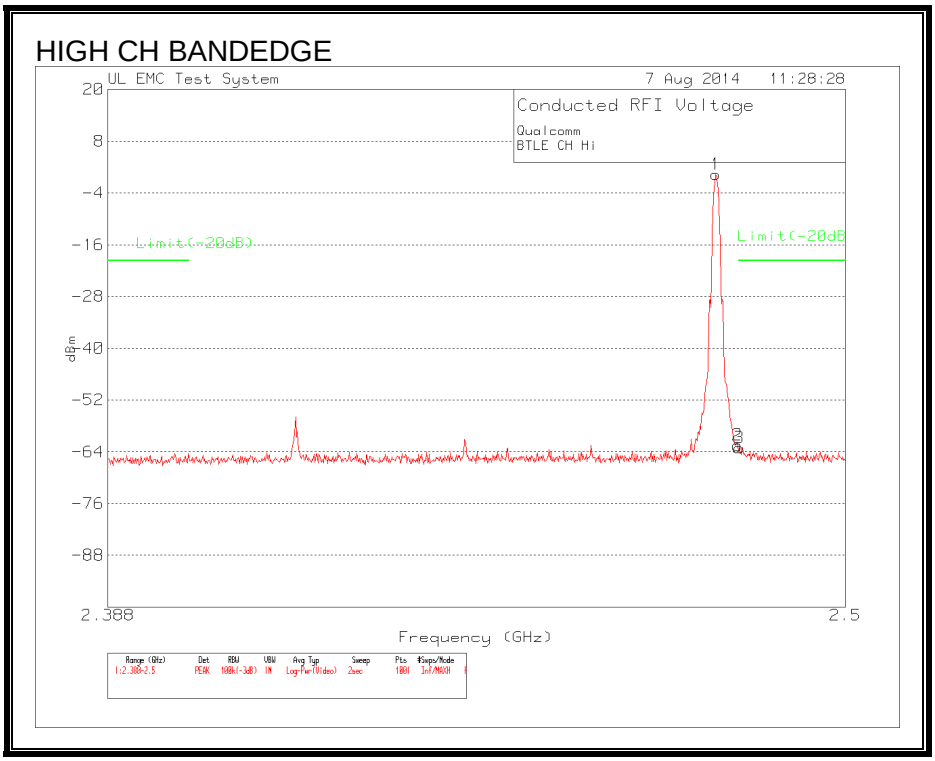
LOW CH SPURIOUS



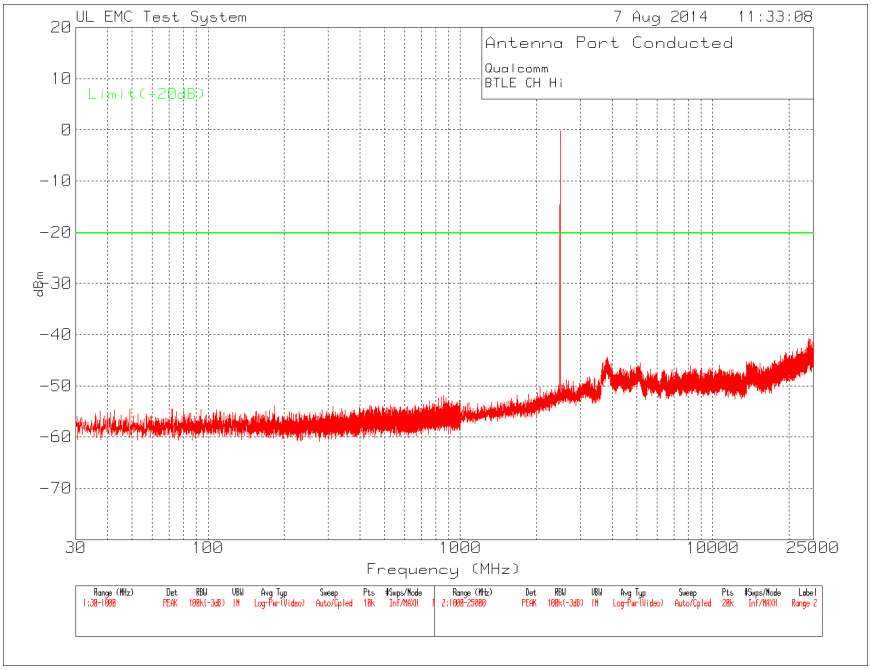
SPURIOUS EMISSIONS, MID CHANNEL



SPURIOUS EMISSIONS, HIGH CHANNEL



HIGH CH SPURIOUS



8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

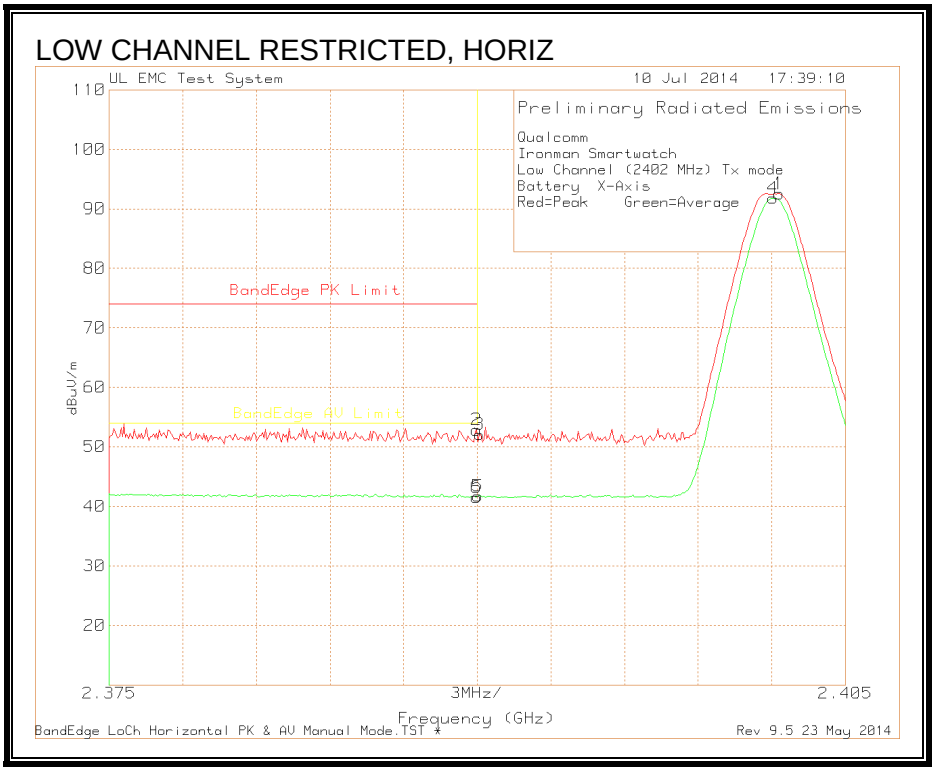
IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

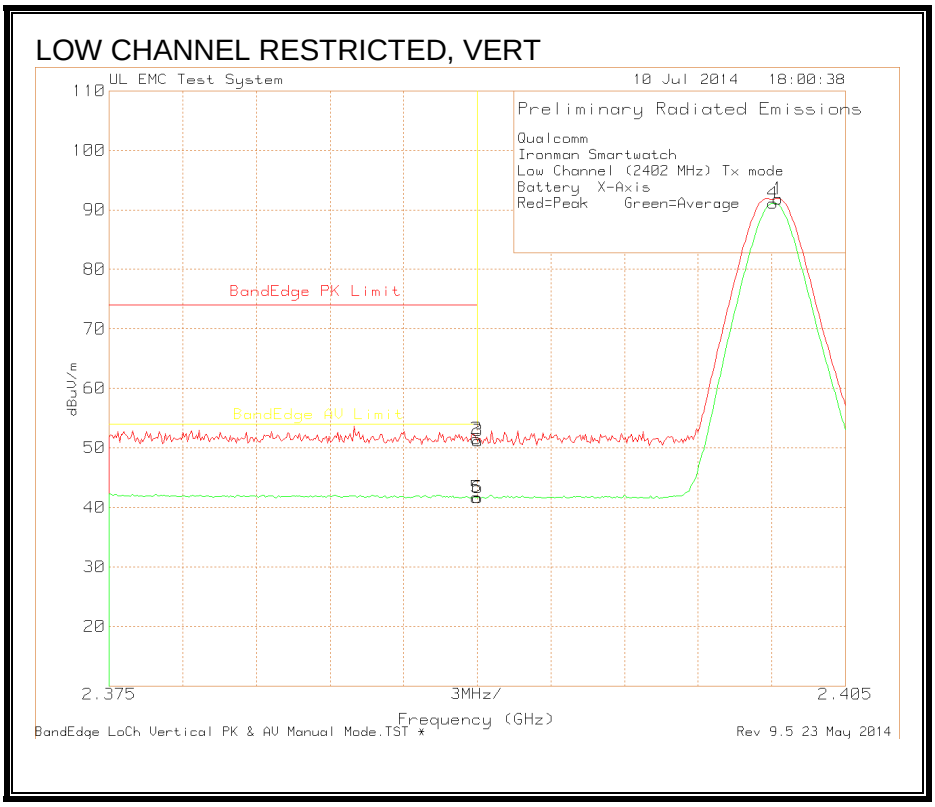
8.2. TRANSMITTER ABOVE 1 GHz

8.3. TX ABOVE 1 GHz FOR BLUETOOTH LOW ENERGY MODE IN THE 2.4 GHz BAND

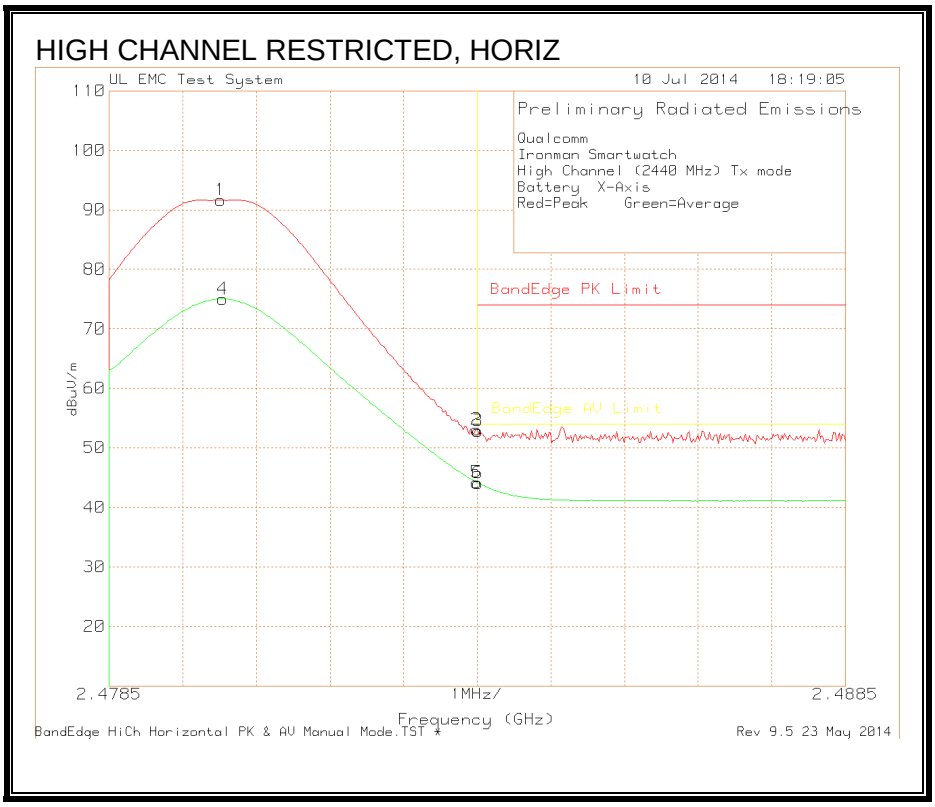
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

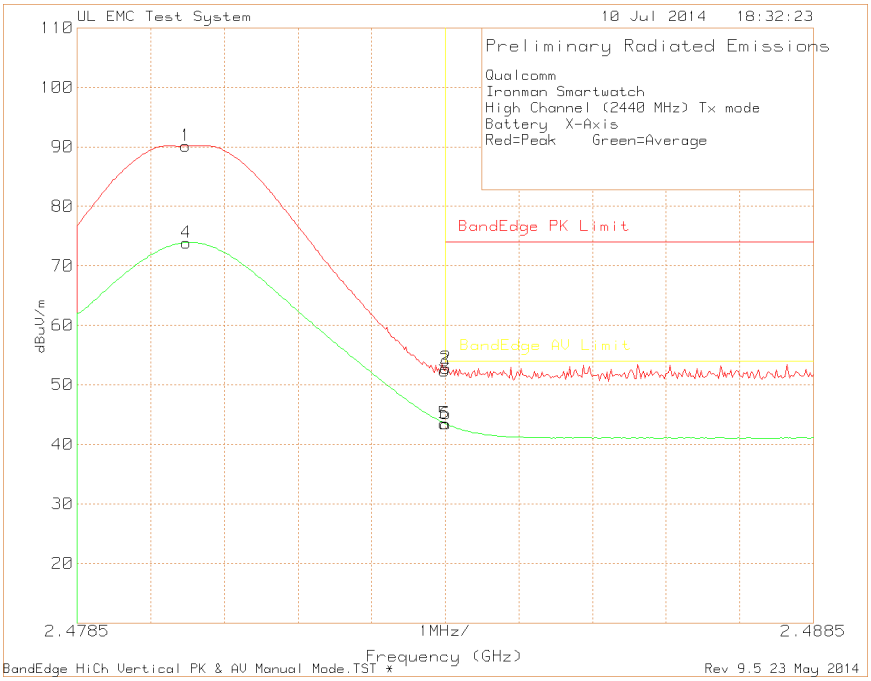


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

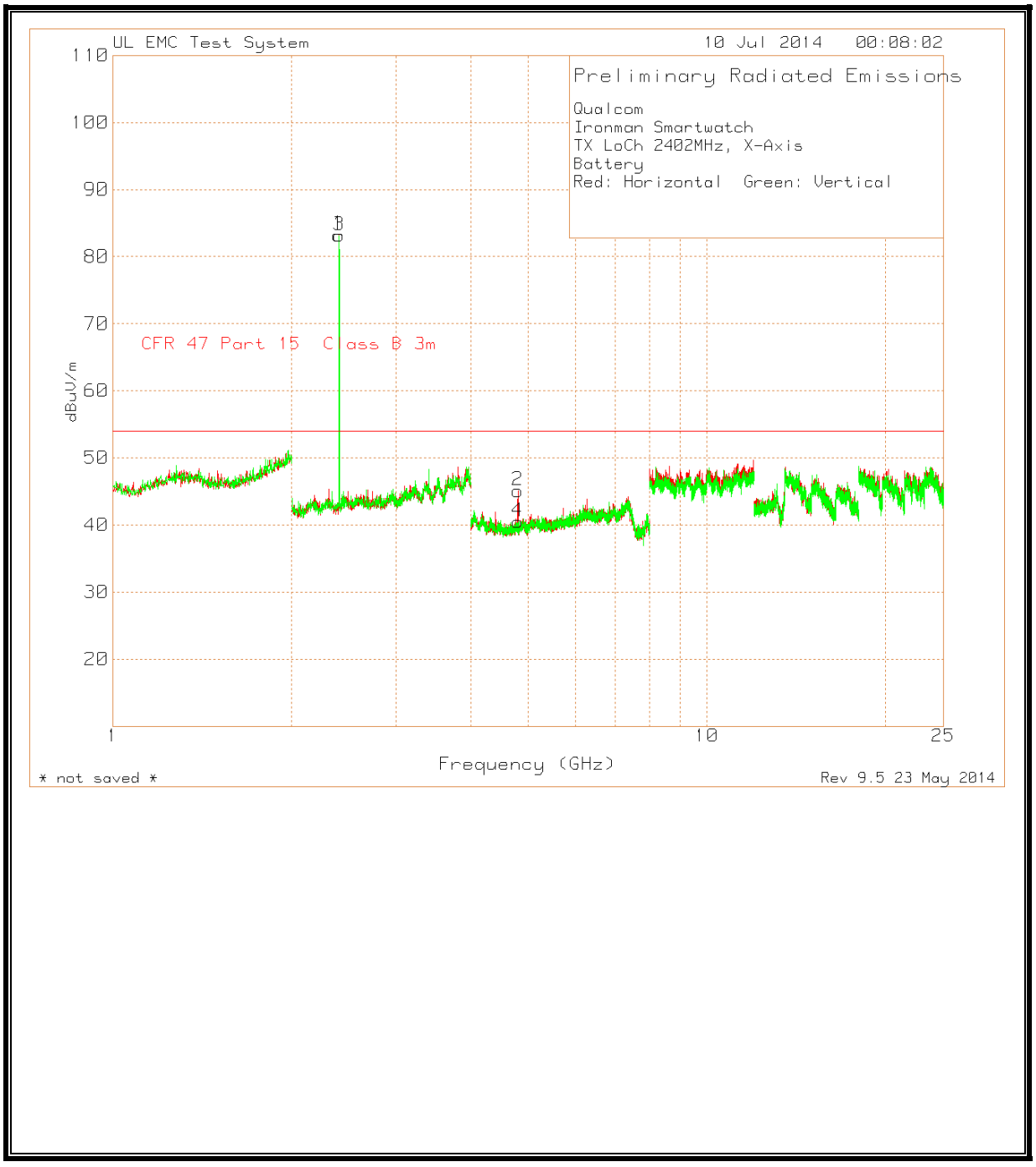


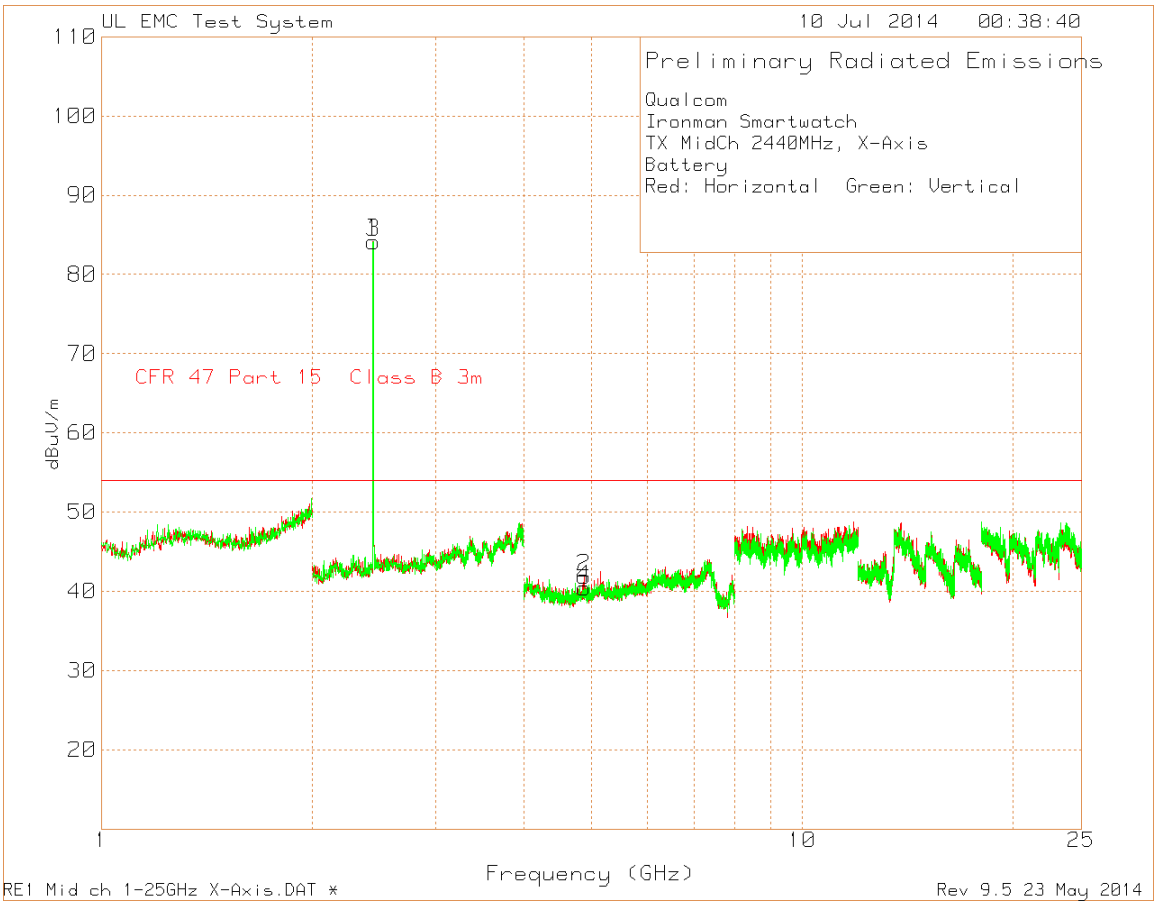
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

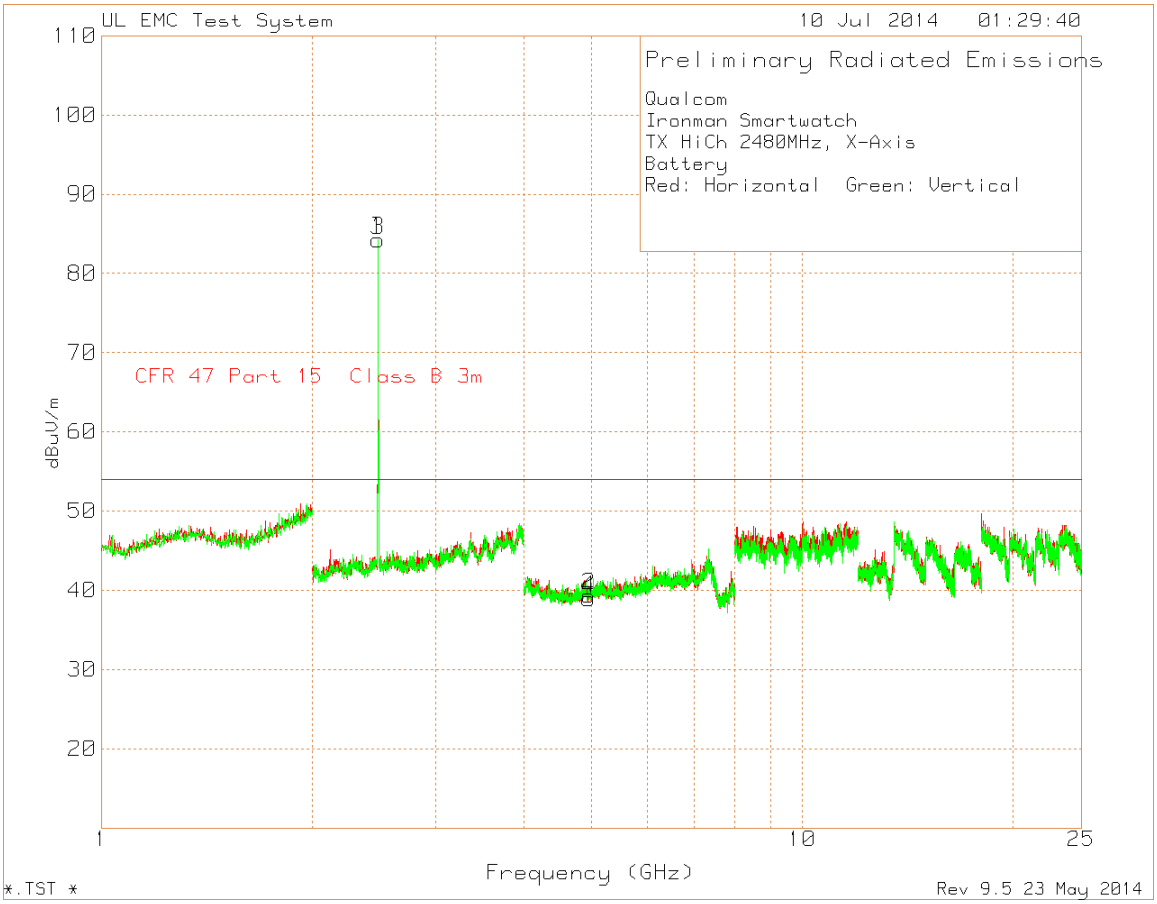
HIGH CHANNEL RESTRICTED, VERT



HARMONICS AND SPURIOUS EMISSIONS







Qualcom
Ironman Smartwatch
TX LoCh 2402MHz, X-Axis
Battery
Red: Horizontal Green: Vertical

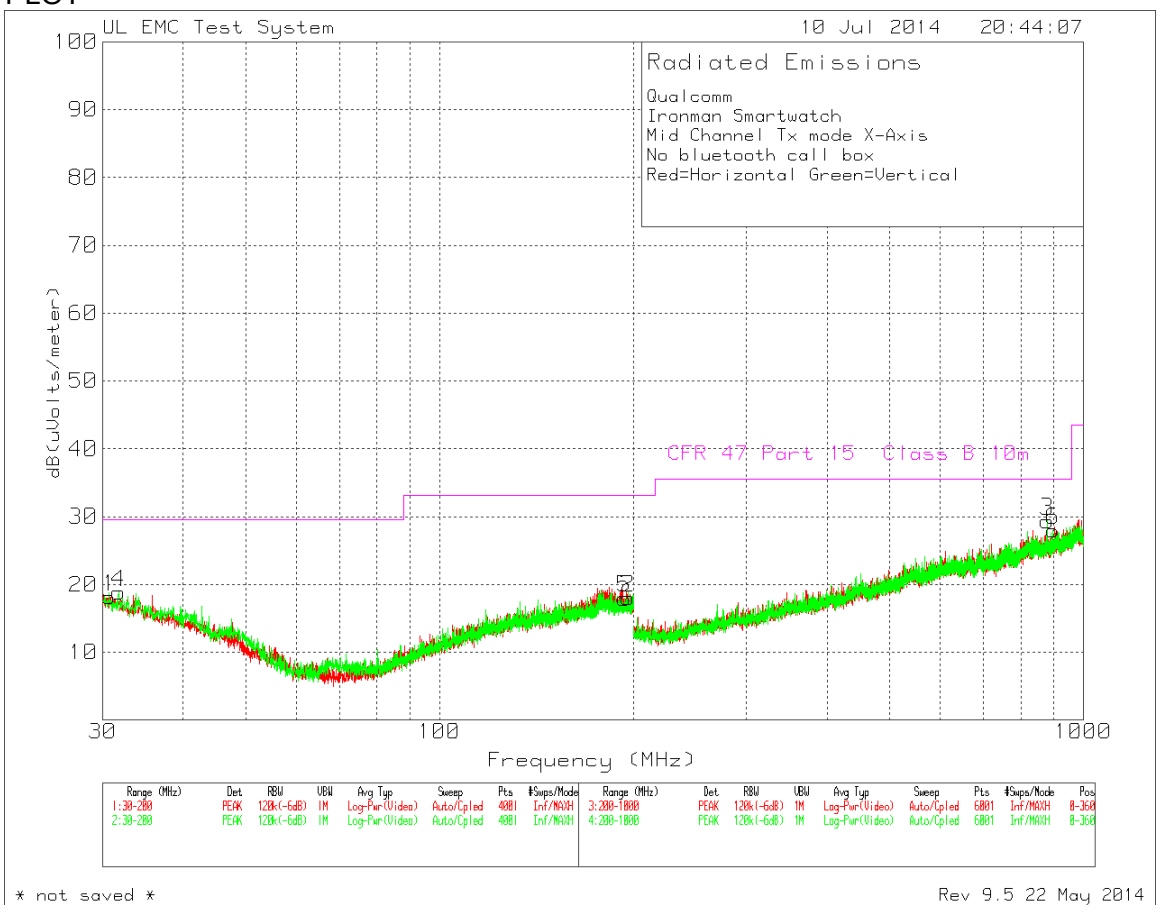
Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Factor dB/m	Cable Factor dB	Corrected Reading dBuV/m	CFR 47 Part 15 Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
* 4.8044	69.06	PK	27.7	-50.45	46.31	54	-7.69	41	107	H
* 4.804	59.63	LnAv	27.7	-50.46	36.87	54	-17.13	41	107	H
* 4.8038	65.15	PK	27.7	-50.46	42.39	54	-11.61	258	100	V
* 4.804	53.47	LnAv	27.7	-50.46	30.71	54	-23.29	258	100	V

PK - Peak detector
LnAv - Linear (voltage) average detector
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

8.4. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION TX -mode)

PLOT

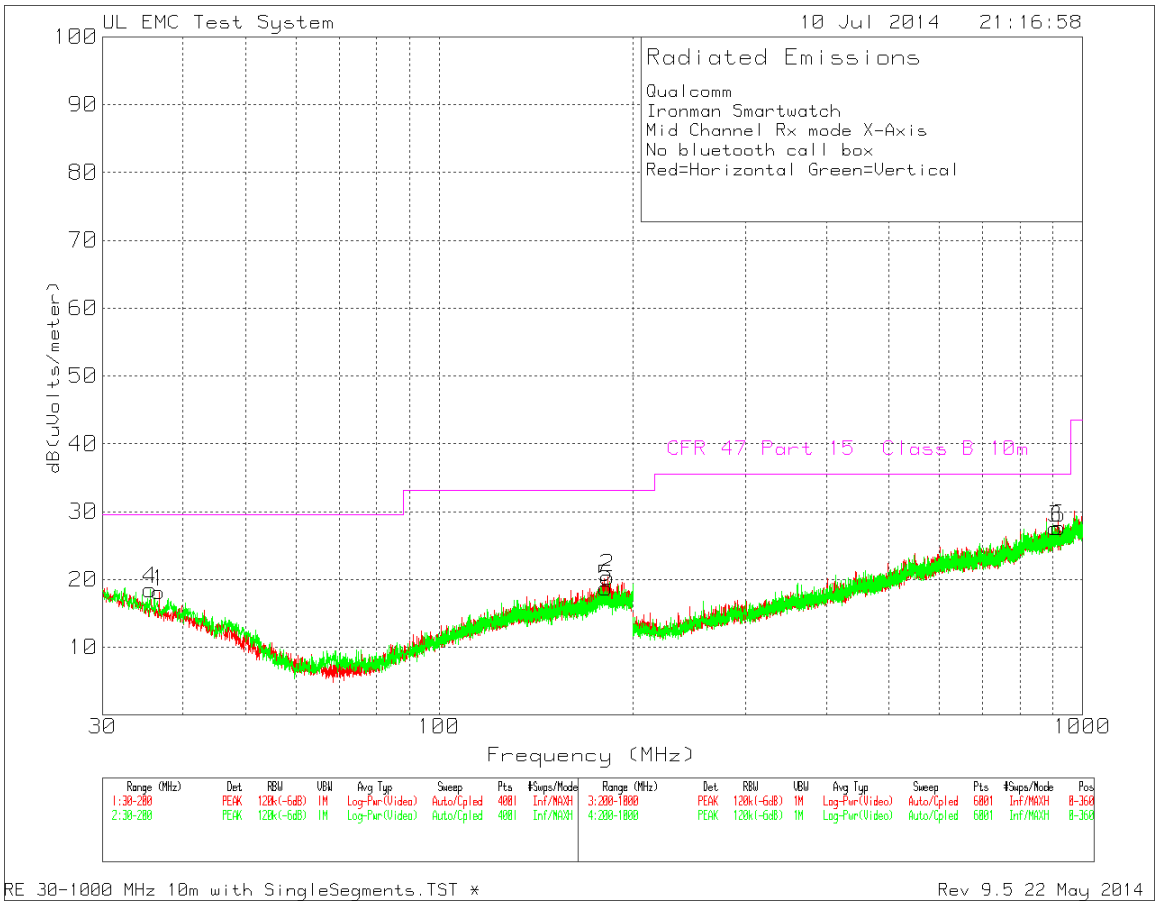


All Emissions at least 6dB below the limit, therefore no further measurement needed.

8.5. DIGITAL DEVICE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (DIGITAL DEVICE)

PLOT



All Emissions at least 6dB below the limit, therefore no further measurement needed.

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

6 WORST EMISSIONS

Manufacturer:Qualcomm
Model#
Mode:BTLE LO
Voltage:120V 60Hz
Red: Line Green: Neutral

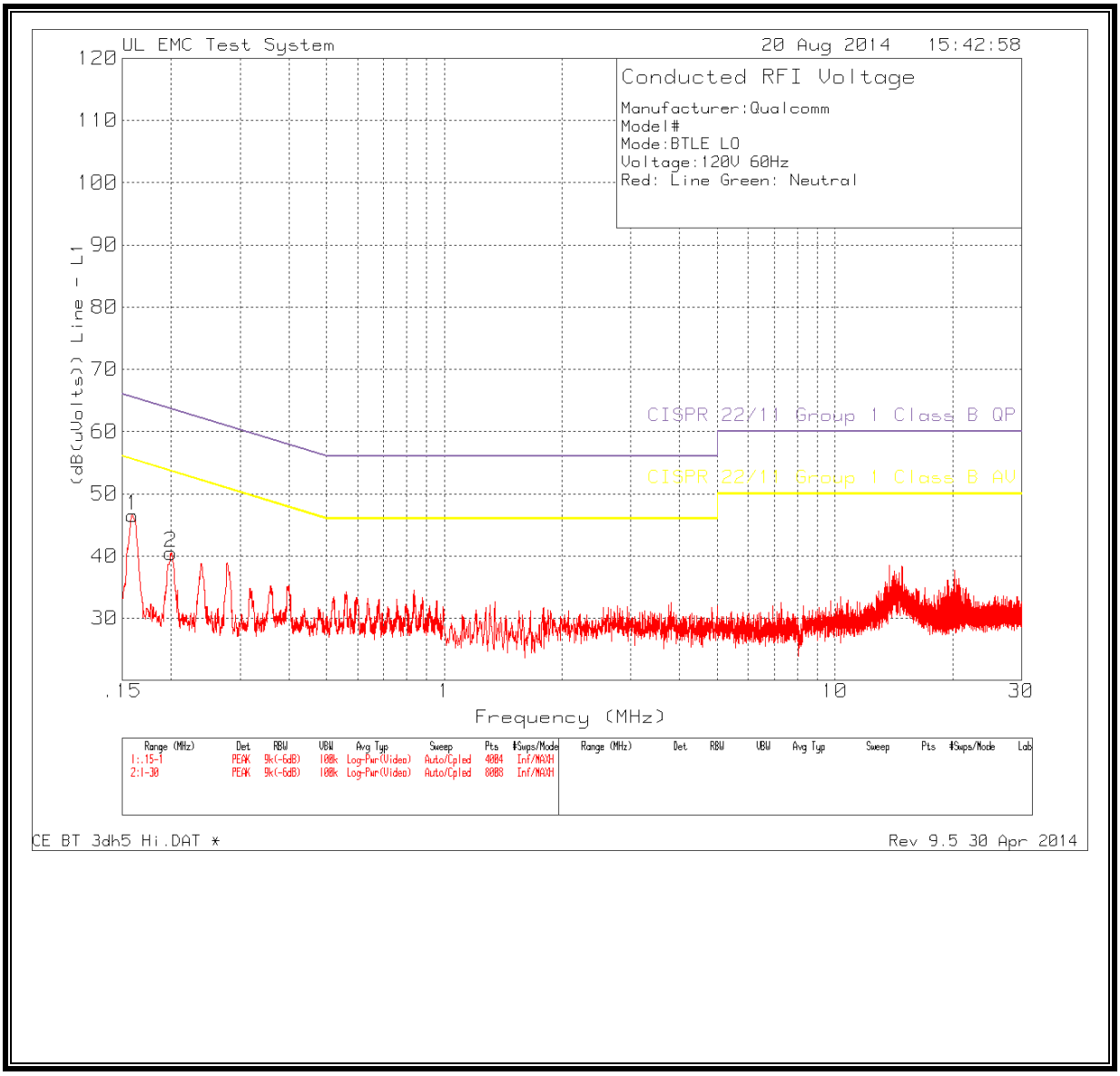
Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading (dB(uVolts))	Limit:1	2	3	4	5	6
Line - L1 .15 - 1MHz											
1	.15933	32.51dBuV PK	.2	13.8	46.51	-	-	65.5	55.5	-	-
					Margin (dB)	-	-	-18.99	-8.99	-	-
2	.1994	28.9dBuV PK	.1	11.5	40.5	-	-	63.64	53.64	-	-
					Margin (dB)	-	-	-23.14	-13.14	-	-
Line - L2 .15 - 1MHz											
3	.15848	29.81dBuV PK	.2	13.9	43.91	-	-	65.54	55.54	-	-
					Margin (dB)	-	-	-21.63	-11.63	-	-
4	.20099	29.42dBuV PK	.2	11.5	41.12	-	-	63.57	53.57	-	-
					Margin (dB)	-	-	-22.45	-12.45	-	-
Line - L2 1 - 30MHz											
5	13.93778	30.12dBuV PK	.8	11.2	42.12	-	-	60	50	-	-
					Margin (dB)	-	-	-17.88	-7.88	-	-
6	19.83802	30.23dBuV PK	1.1	11.5	42.83	-	-	60	50	-	-
					Margin (dB)	-	-	-17.17	-7.17	-	-

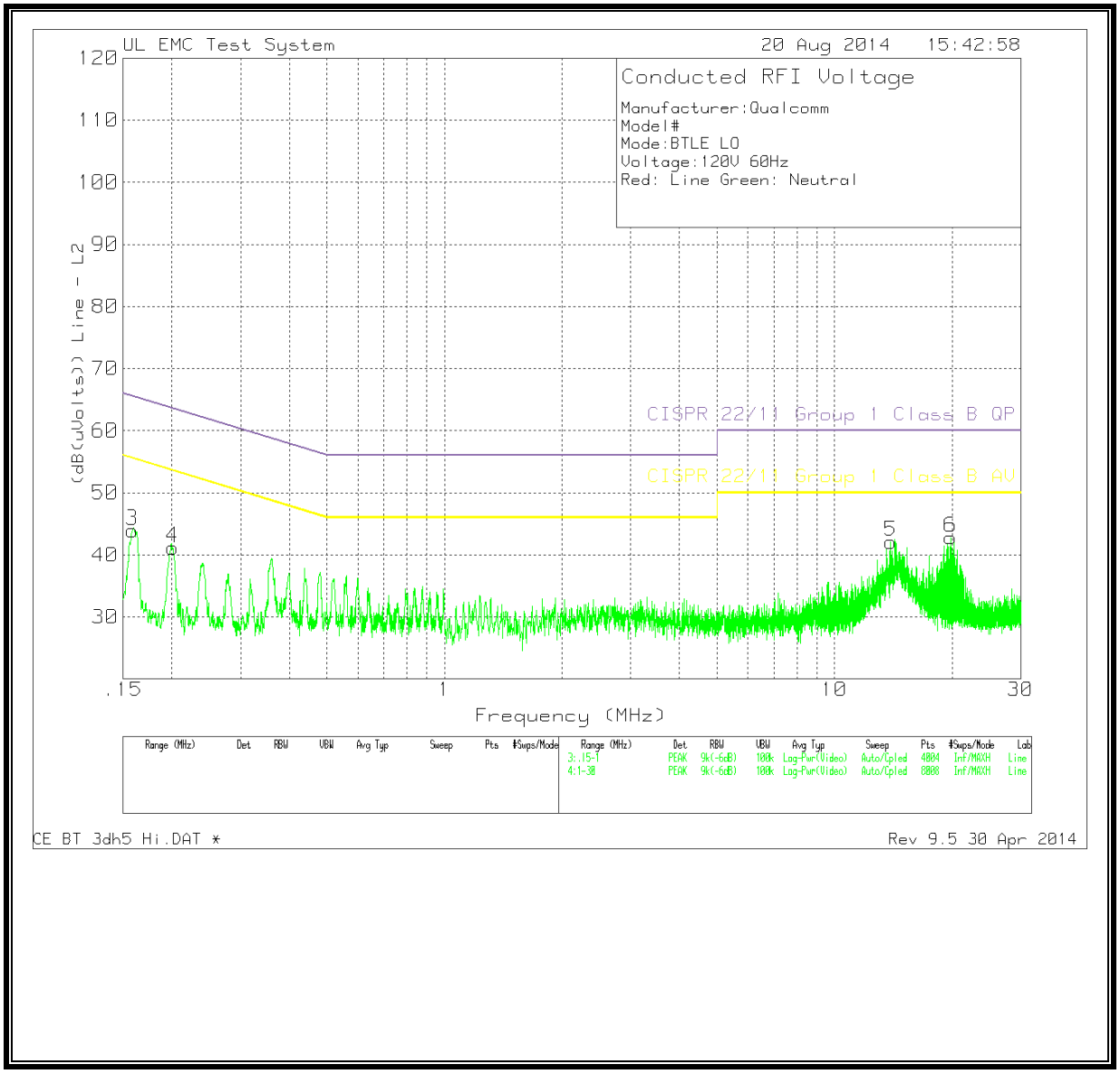
LIMIT 3: CISPR 22/11 Group 1 Class B QP
LIMIT 4: CISPR 22/11 Group 1 Class B AV

PK - Peak detector

LINE 1 RESULTS



LINE 2 RESULTS



6 WORST EMISSIONS

Manufacturer:Qualcomm
Model#
Mode:RX
Voltage:120V 60Hz
Red: Line Green: Neutral

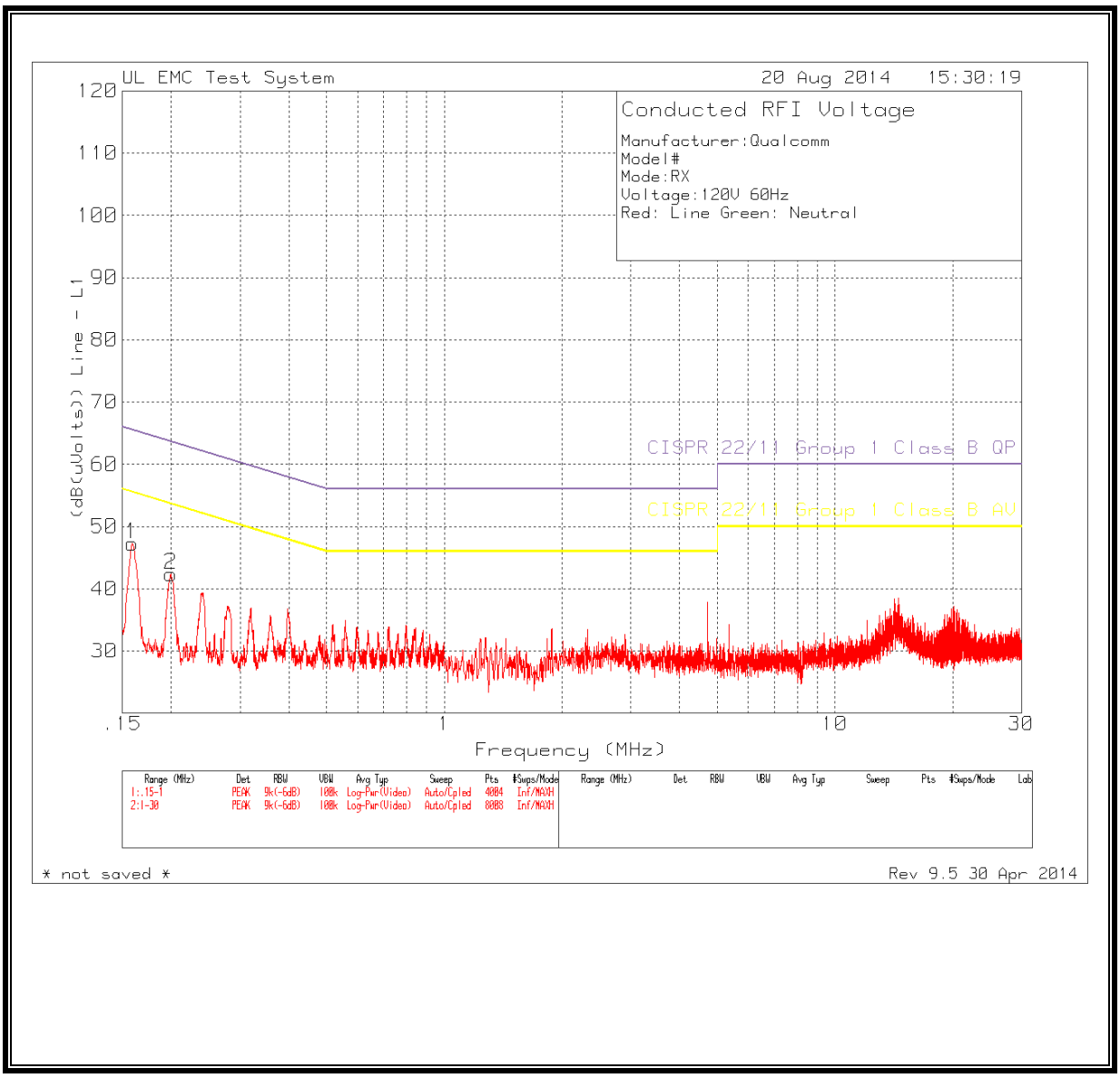
Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading (dB(uVolts))	Limit:1	2	3	4	5	6
Line - L1 .15 - 1MHz											
1	.15901	33.15dBuV PK	.2	13.9	47.25	-	-	65.52	55.52	-	-
					Margin (dB)	-	-	-18.27	-8.27	-	-
2	.1994	30.74dBuV PK	.1	11.5	42.34	-	-	63.64	53.64	-	-
					Margin (dB)	-	-	-21.3	-11.3	-	-
Line - L2 .15 - 1MHz											
3	.1589	32.75dBuV PK	.2	13.9	46.85	-	-	65.52	55.52	-	-
					Margin (dB)	-	-	-18.67	-8.67	-	-
4	.19876	31.08dBuV PK	.2	11.6	42.88	-	-	63.66	53.66	-	-
					Margin (dB)	-	-	-20.78	-10.78	-	-
5	.35914	29.92dBuV PK	.2	10.8	40.92	-	-	58.75	48.75	-	-
					Margin (dB)	-	-	-17.83	-7.83	-	-
Line - L2 1 - 30MHz											
6	14.19132	29.85dBuV PK	.8	11.2	41.85	-	-	60	50	-	-
					Margin (dB)	-	-	-18.15	-8.15	-	-
7	20.20022	29.49dBuV PK	1.2	11.5	42.19	-	-	60	50	-	-
					Margin (dB)	-	-	-17.81	-7.81	-	-

LIMIT 3: CISPR 22/11 Group 1 Class B QP
LIMIT 4: CISPR 22/11 Group 1 Class B AV

PK - Peak detector

LINE 1 RESULTS



LINE 2 RESULTS