



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

CERTIFICATION TEST REPORT

FOR

Pedometer

MODEL NUMBER: SC

**FCC ID: PT3-SC
IC: 10638A-SC**

REPORT NUMBER: 10629147A-1

**ISSUE DATE: March 24, 2015
Revision Date: March 27, 2015**

Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
--	03/24/15	Initial Issue	M.Ferrer
1	03/27/15	Updated OCBW, Duty cycle factor, RE data	M.Ferrer

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION	5
4. CALIBRATION AND UNCERTAINTY	5
4.1. MEASURING INSTRUMENT CALIBRATION	5
4.2. SAMPLE CALCULATION	5
4.3. MEASUREMENT UNCERTAINTY	6
5.5. DESCRIPTION OF TEST SETUP	8
6. TEST AND MEASUREMENT EQUIPMENT	10
7. TEST RESULTS	11
7.1. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS	11
7.2. ON TIME AND DUTY CYCLE RESULTS	11
7.3. DUTY CYCLE PLOTS	12
7.3.1. 99% 20DB BANDWIDTH	13
7.4. RADIATED EMISSIONS	17
7.4.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION	18
7.4.2. TRANSMITTER RESTRICTED BAND EDGES	19
7.4.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz	27
7.4.4. WORST-CASE BELOW 1 GHz	32
8. SETUP PHOTOS	33

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Misfit
839 Mitten Rd. Suite 100
Burlingame, CA 94010

EUT DESCRIPTION: Pedometer

MODEL: SC

SERIAL NUMBER: Prototype

DATE TESTED: March 20, 2015 – March 27, 2015

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex A2.9	Pass
INDUSTRY CANADA RSS-GEN Issue 4	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:



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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 4, 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

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 pedometer. The EUT contains a wireless BTLE transceiver. The EUT is battery powered

The radio module is manufactured by Misfit.

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)
2400-2483.5	TX	80.90

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

5.4. WORST-CASE CONFIGURATION AND MODE

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

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
EUT	Misfits Wearables	SC	-	PT3-SC

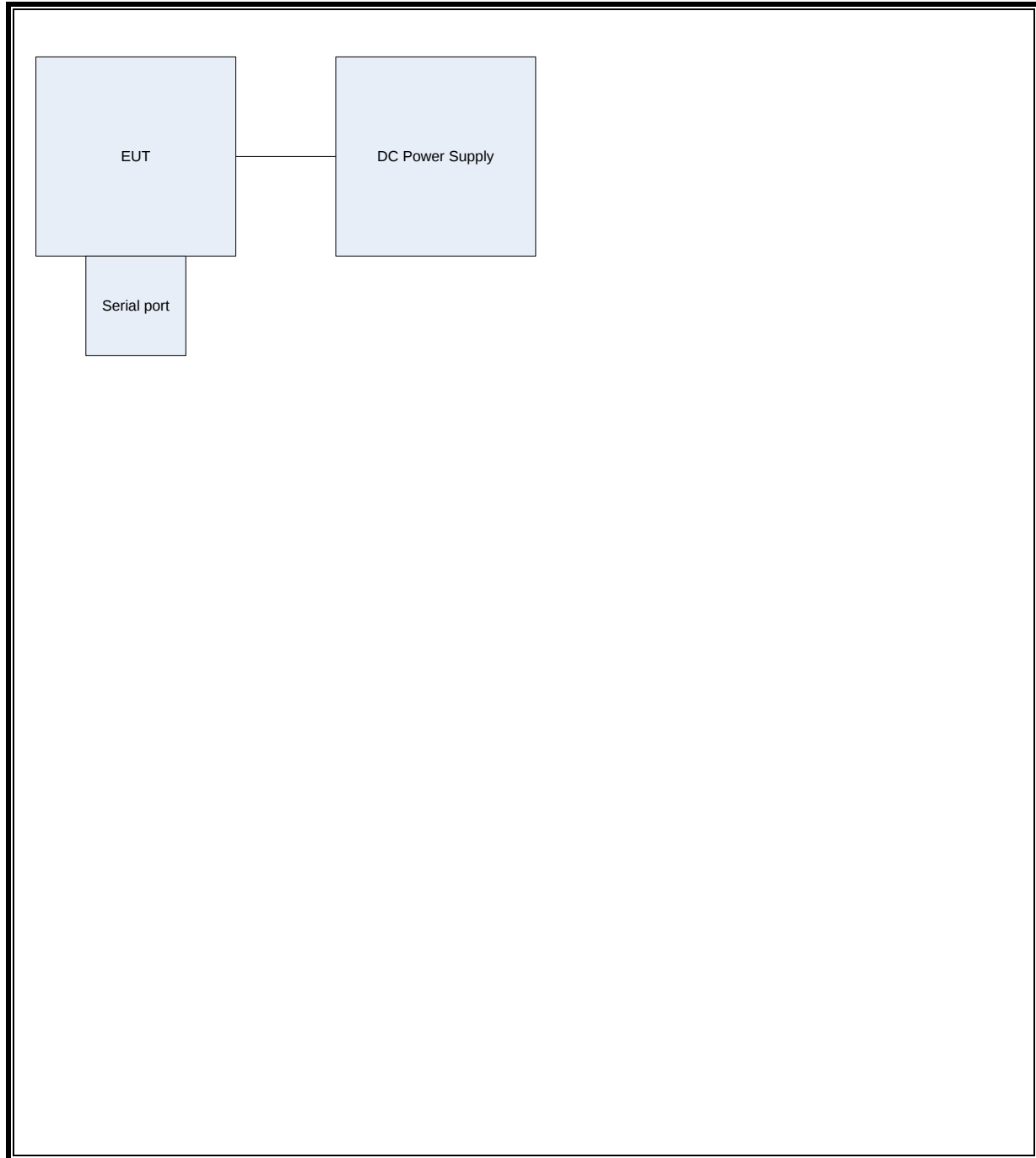
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Wire	0.1	Only for testing purposes
2	Serial	1	IO	Wire	0.1	Only for testing purposes

TEST SETUP

The EUT was programmed using a PC connected via serial port. The EUT was powered via DC power supply to maintain constant 3VDC. Normally EUT is battery powered internally and no external connection accessible.

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
Radiated Software	UL	UL EMC	Ver 9.5, Jan 30, 2015		
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	20141230	20151231
Bicon Antenna	Chase	VBA6106A	EMC4078	20140401	20150401
Log-P Antenna	Chase	UPA6109	EMC4313	24141119	20151130
Spectrum Analyzer	Rohde & Schwarz	ESU	EMC4323	20141216	20151231
Antenna Array	UL	BOMS	EMC4276	20141201	20151231
EMI Test Receiver	Agilent	N9030A	EMC4360	20141219	20151219

7. TEST RESULTS

7.1. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

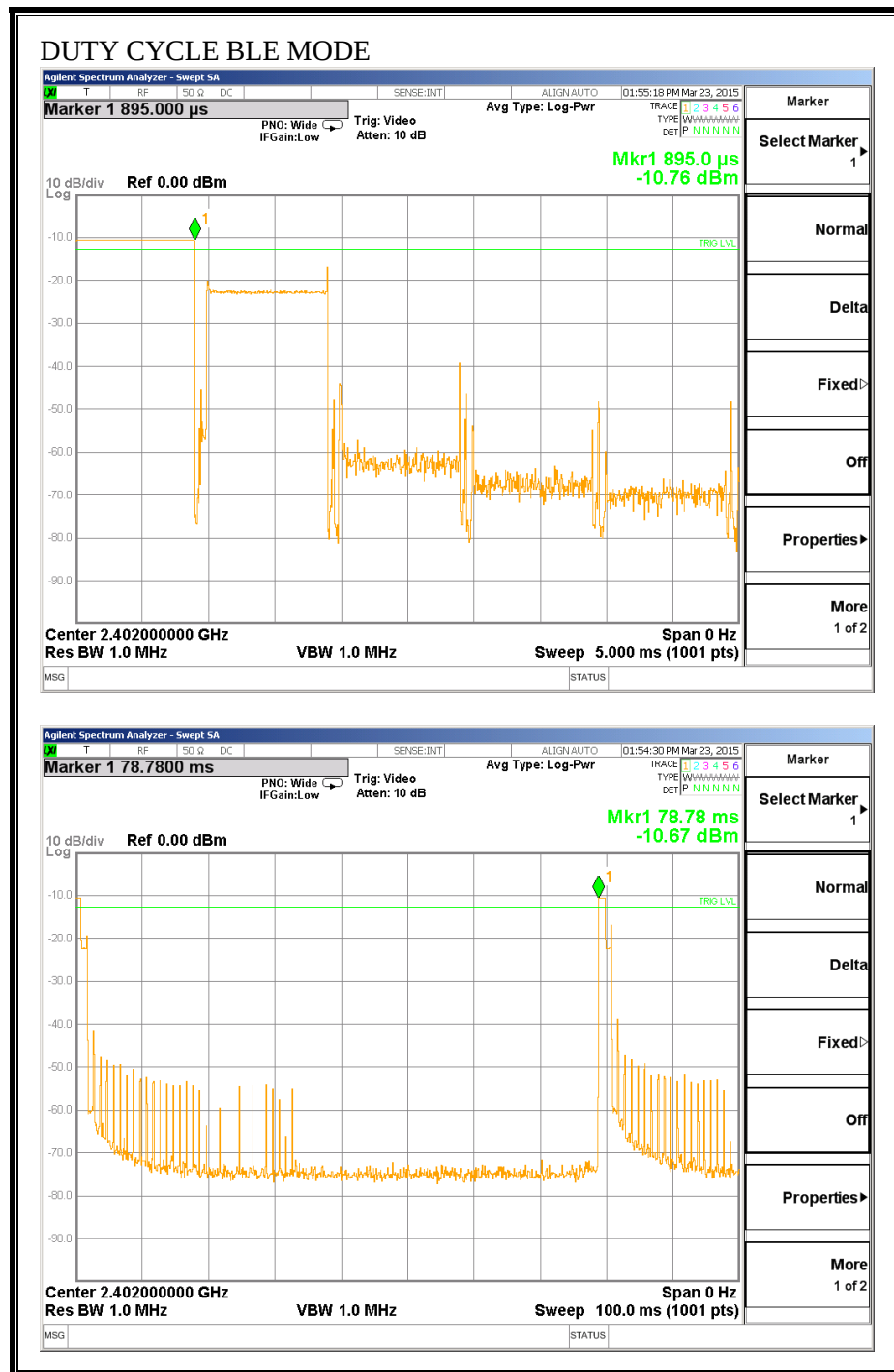
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

7.2. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
BLE	0.895	78.780	0.011	1.14%	38.89	1.117

7.3. DUTY CYCLE PLOTS



7.3.1. 99% 20DB BANDWIDTH

LIMITS

None; for reporting purposes only.

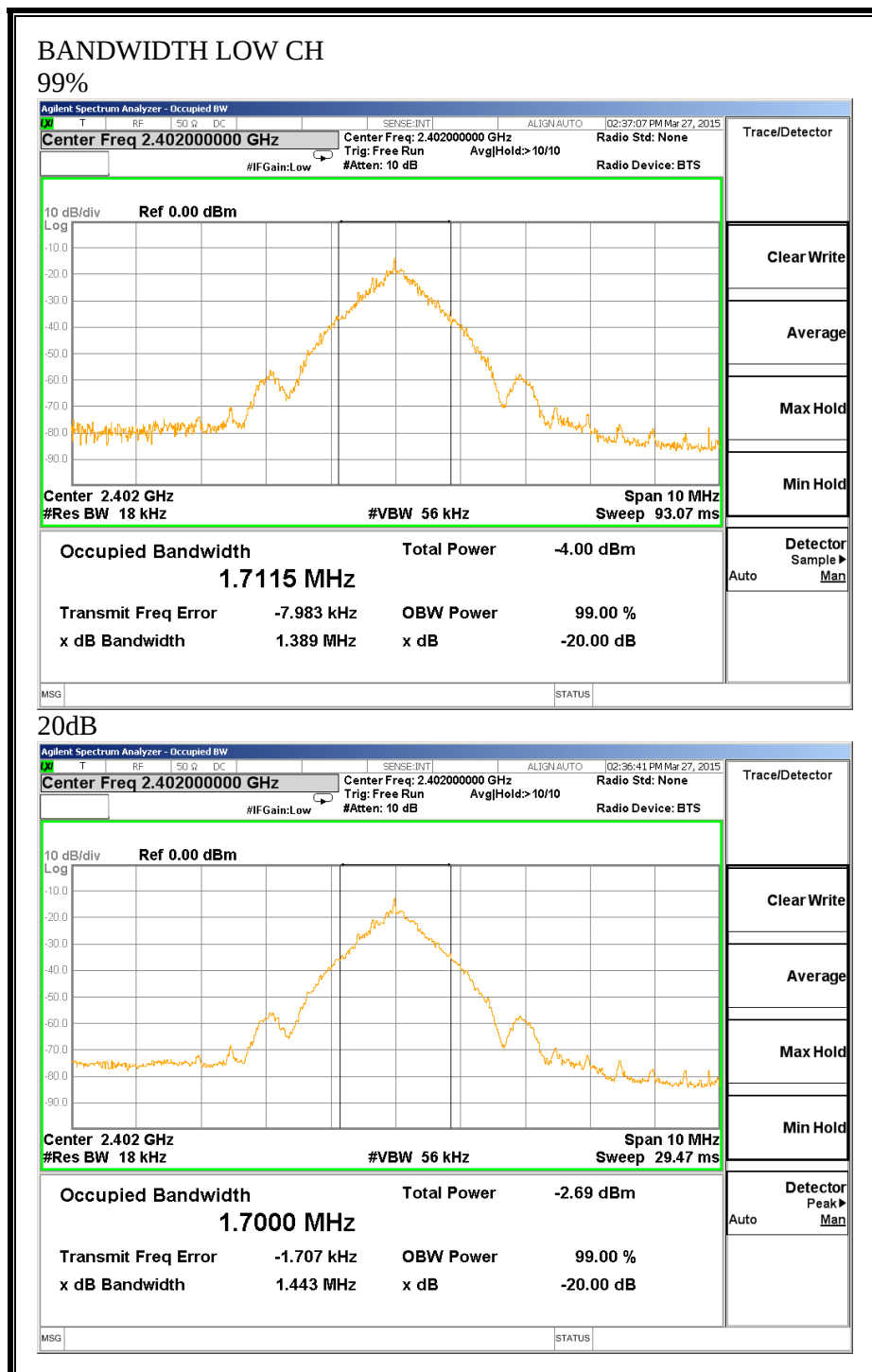
TEST PROCEDURE

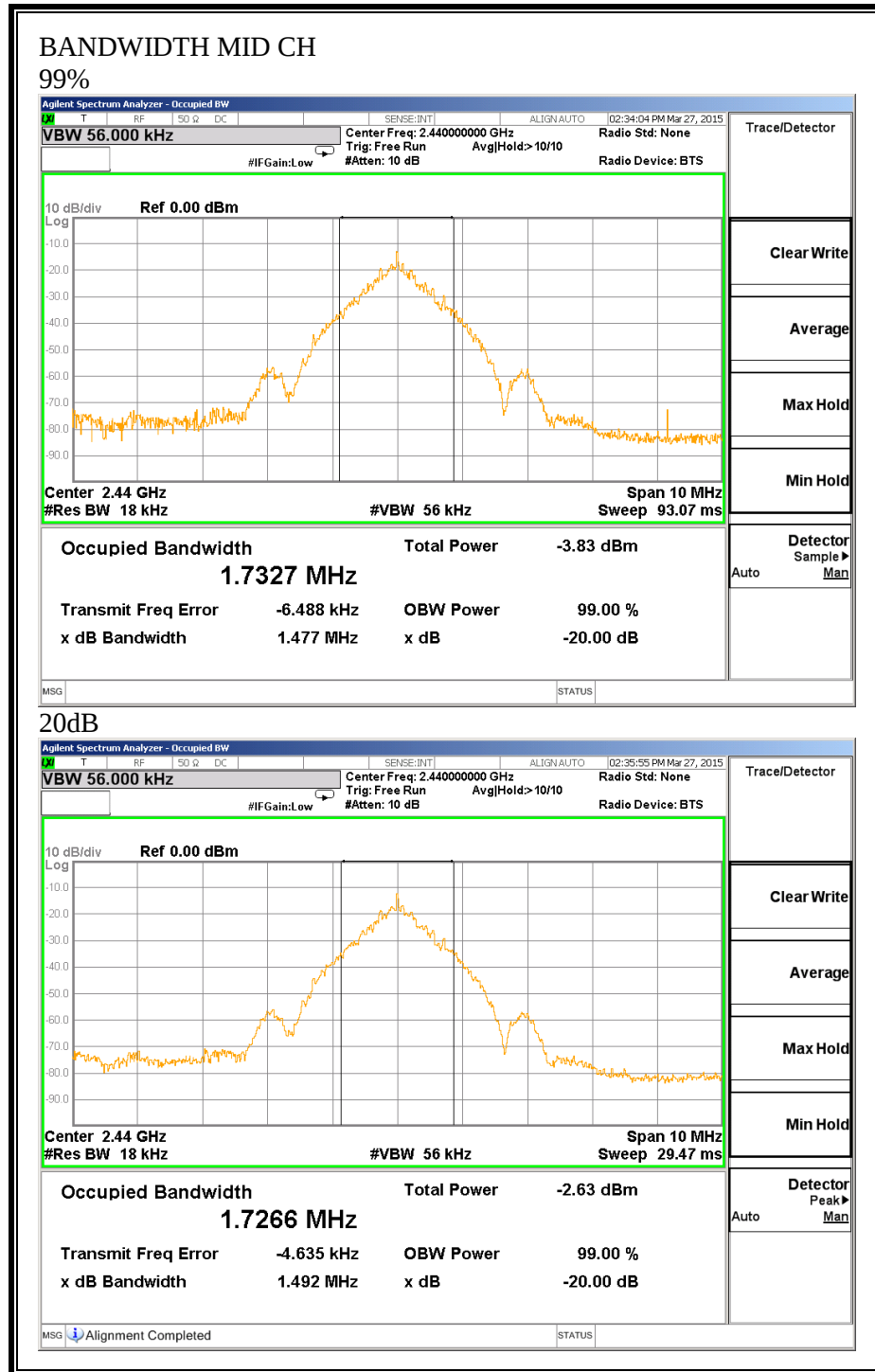
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

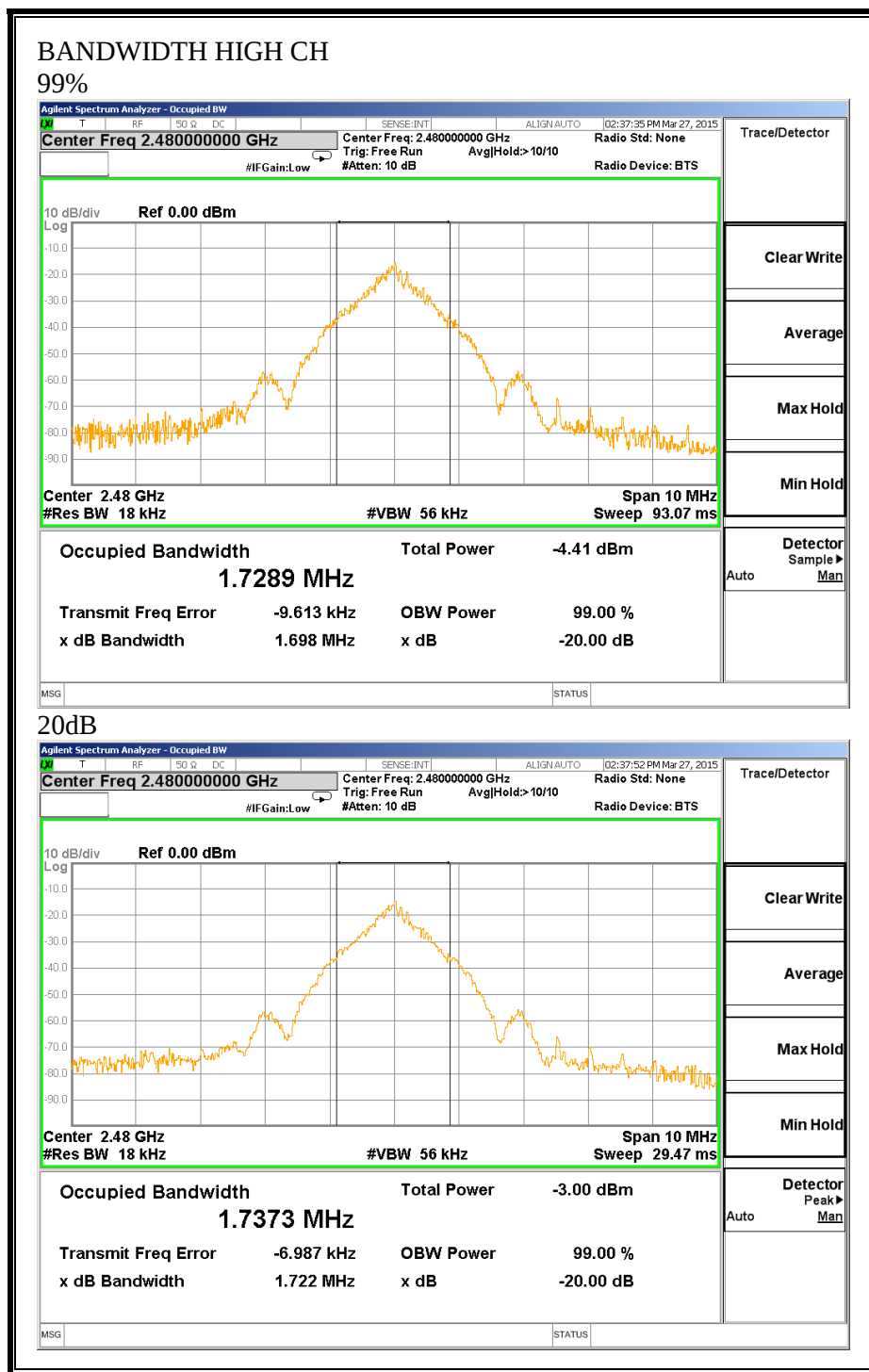
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (MHz)
Low	2402	1.712	1.443
Middle	2442	1.732	1.492
High	2480	1.729	1.722

99% and 20dB BANDWIDTH







7.4. RADIATED EMISSIONS

LIMIT

IC RSS-210, A2.9
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.

Peak 1MHz RBW, 1MHz VBW

Duty cycle -38.89dB used with Peak measurement to determine AV measurement.

RESULTS

7.4.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION

TX Transmitter

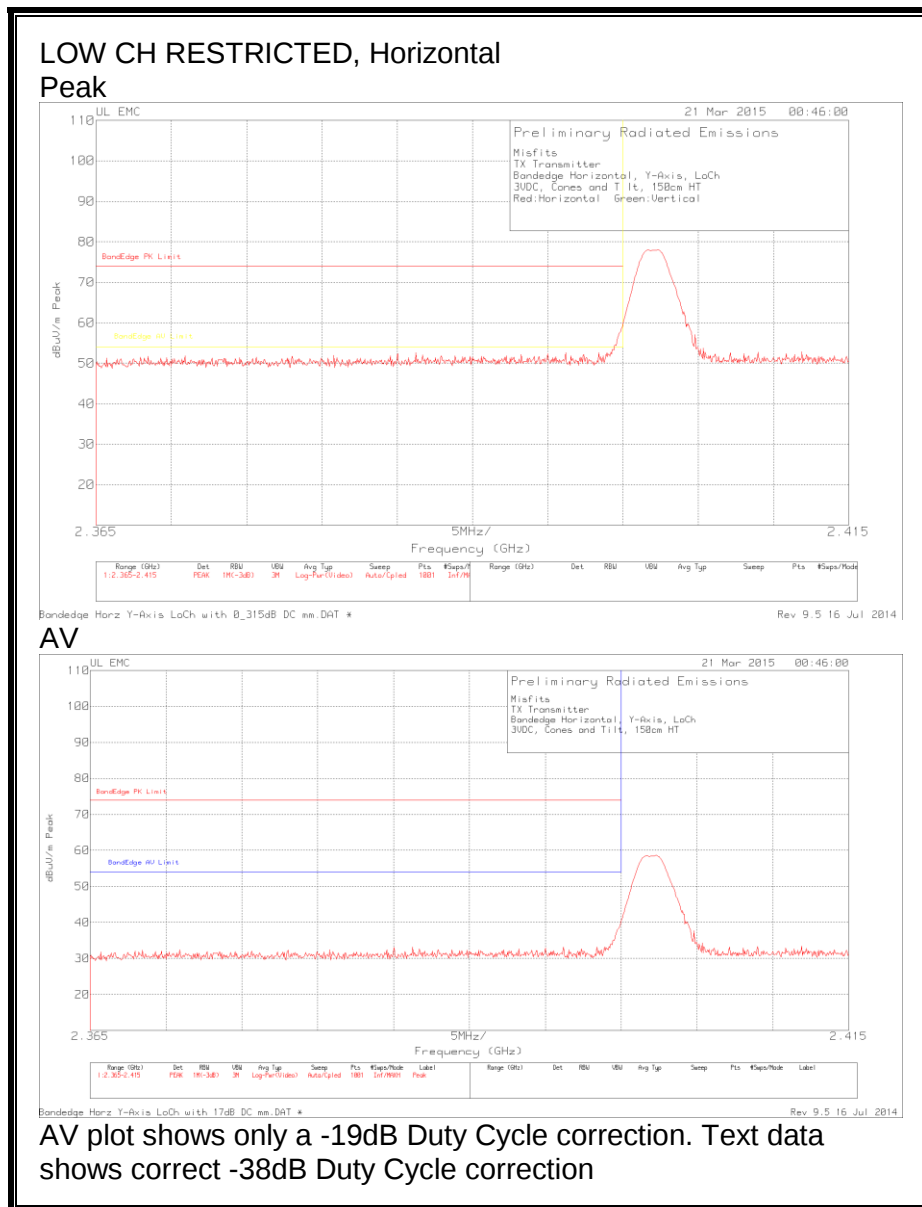
Worst Case and Fundamental

3VDC

Test	Meter	Antenna	Corrected	Duty Cycle	AV								
Frequency	Reading	Factor	Gain/Loss	Reading	Margin	Correction	Correction	Margin	AV Limit	Margin	Azimuth	Height	Polarity
(GHz)	(dBuV)	Detector	dB/m	(dB)	dBuV/m	Peak Limit (dB)	dB	dBuV/m	AV Limit	(dB)	[Degs]	[cm]	
2.4399	54.42 Pk		21.9	4.58	80.9	114	-92.1	-38.89	42.01	94	-51.99	305	109 H
2.44	52.11 Pk		21.9	4.58	78.59	114	-92.1	-38.89	39.7	94	-54.3	325	116 V
2.4023	52.47 Pk		21.8	4.58	78.85	114	-92.2	-38.89	39.96	94	-54.04	285	100 H
2.4023	47.87 Pk		21.8	4.58	74.25	114	-92.2	-38.89	35.36	94	-58.64	324	119 V
2.4776	54.34 Pk		22	4.36	80.7	114	-92	-38.89	41.81	94	-52.19	288	100 H
2.4783	47.7 Pk		22	4.36	74.06	114	-92	-38.89	35.17	94	-58.83	309	119 V

7.4.2. TRANSMITTER RESTRICTED BAND EDGES

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



Misfits

TX Transmitter

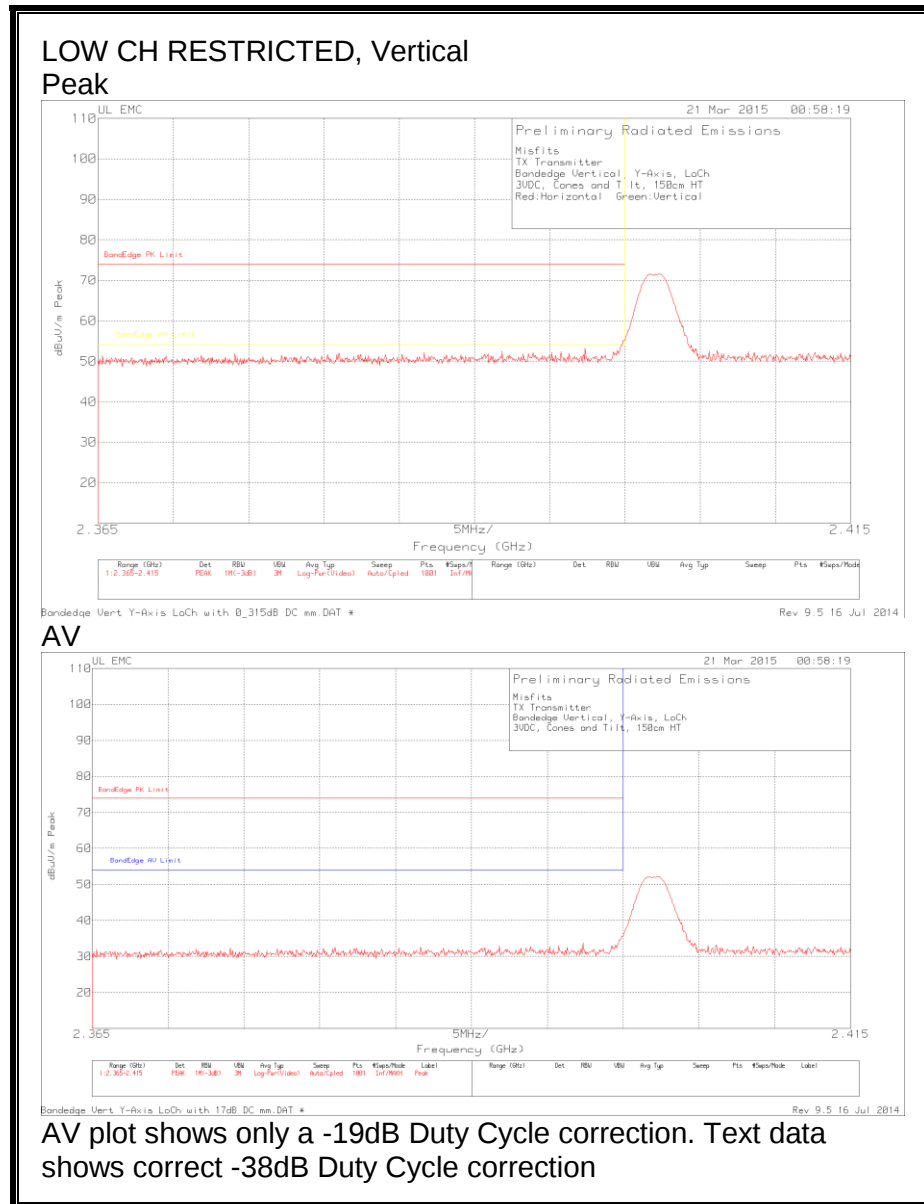
Bandedge Horizontal, Y-Axis, LoCh

3VDC, Cones and Tilt, 150cm HT

Test	Meter		Antenna	Corrected							
Frequency	Reading(d		Factor	Reading	BandEdge	Margin	BandEdge	Margin	Azimuth	Height	
(GHz)	BuV)	Detector	dB/m	dBuV/m	PK Limit	(dB)	AV Limit	(dB)	[Degs]	[cm]	Polarity
2.4	38.15	PK	21.8	59.95	74	-14.05	-	-	302	100	H
2.4017	56.19	PK	21.8	77.99	-	-	-	-	302	100	H
2.3923	30	PK	21.8	51.8	74	-22.2	54	-2.2	302	100	H

Test	Meter	Antenna	Corrected								
Frequency	Reading(d	Factor	Duty	Reading	BandEdge	Margin	BandEdge	Margin	Azimuth	Height	
(GHz)	BuV)	Detector	Cycle	dBuV/m	PK Limit	(dB)	AV Limit	(dB)	[Degs]	[cm]	Polarity
2.4	38.15	PK	21.8	-38.89	21.06	74	-52.94	54	-32.94	302	100 H
2.4017	56.19	PK	21.8	-38.89	39.1	-	-	-	-	302	100 H
2.3923	30	PK	21.8	-38.89	12.91	74	-61.09	54	-41.09	302	100 H

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



Misfits

TX Transmitter

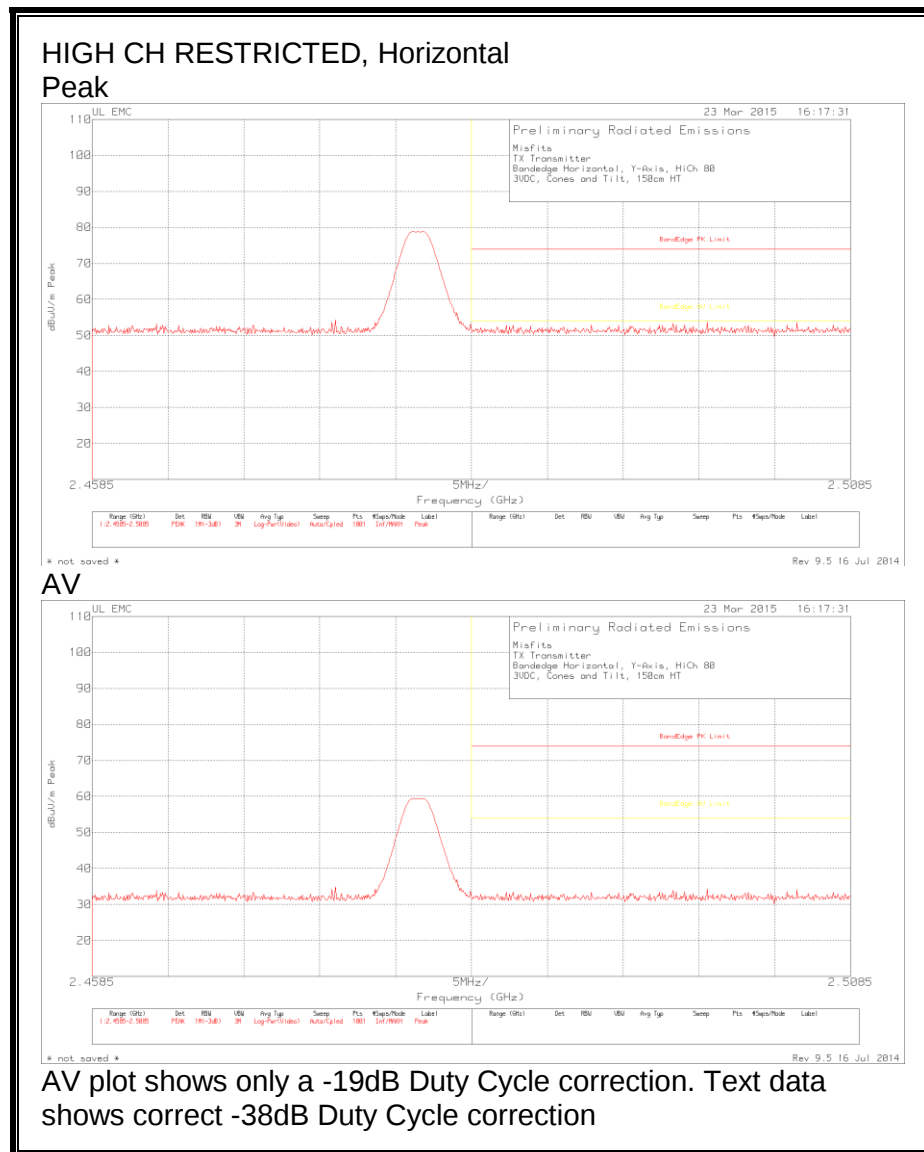
Bandedge Vertical, Y-Axis, LoCh

3VDC, Cones and Tilt, 150cm HT

Test	Meter		Antenna	Corrected							
Frequency	Reading		Factor	Reading	BandEdge	Margin	BandEdge	Margin	Azimuth	Height	
(GHz)	(dBuV)	Detector	dB/m	dBuV/m	PK Limit	(dB)	AV Limit	(dB)	[Degs]	[cm]	Polarity
2.4016	49.73	PK	21.8	71.53	-	-	-	-	154	100	V
2.4	33.43	PK	21.8	55.23	74	-18.77	-	-	154	100	V
2.3882	29.86	PK	21.8	51.66	74	-22.34	54	-2.34	154	100	V

Test	Meter	Antenna	Duty	Corrected							
Frequency	Reading	Factor	Cycle	Reading	BandEdge	Margin	BandEdge	Margin	Azimuth	Height	
(GHz)	(dBuV)	Detector	correction	dBuV/m	PK Limit	(dB)	AV Limit	(dB)	[Degs]	[cm]	Polarity
2.4016	49.73	PK	21.8	-38.89	32.64	-	-	-	-	154	100 V
2.4	33.43	PK	21.8	-38.89	16.34	74	-57.66	54	-37.66	154	100 V
2.3882	29.86	PK	21.8	-38.89	12.77	74	-61.23	54	-41.23	154	100 V

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



Misfits

TX Transmitter

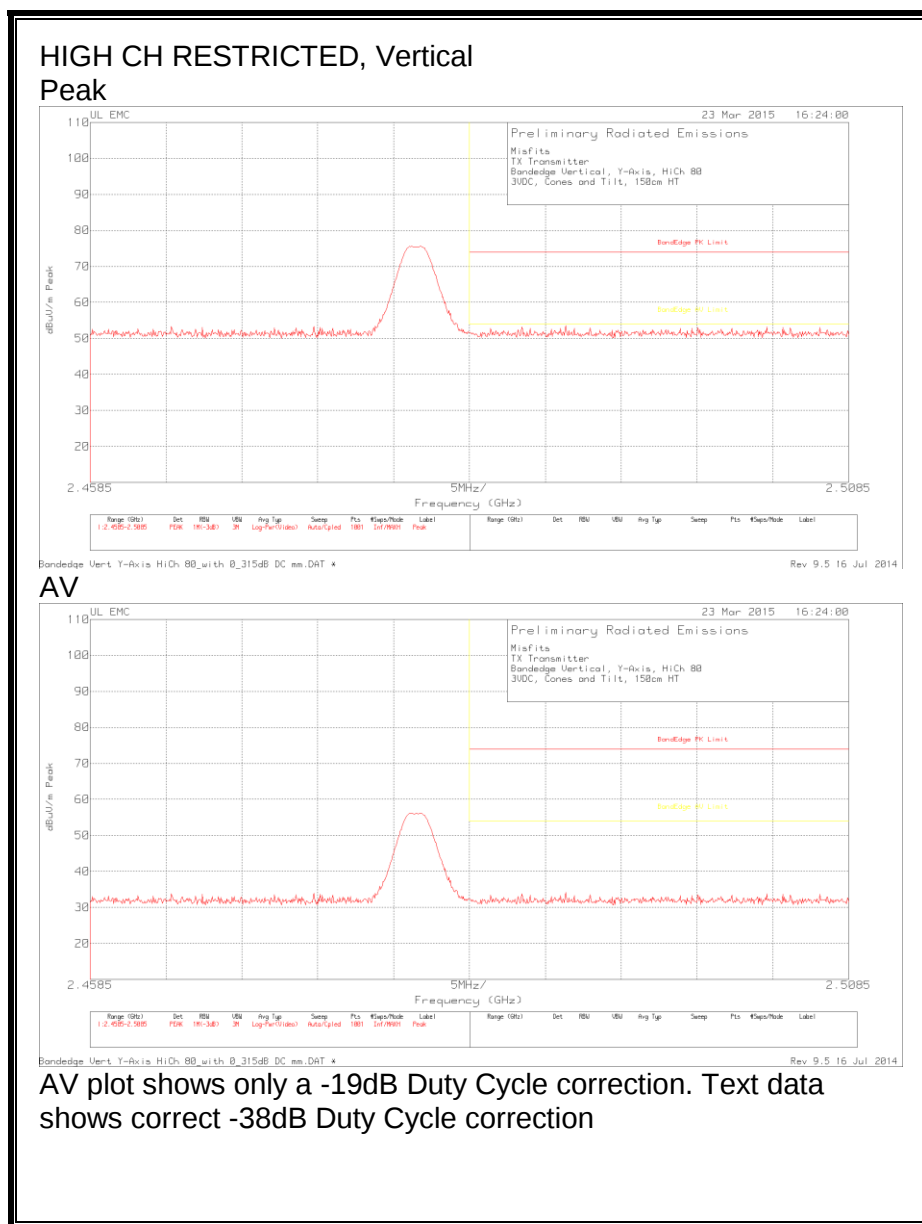
Bandedge Horizontal, Y-Axis, HiCh 80

3VDC, Cones and Tilt, 150cm HT

Test	Meter	Antenna	Corrected								
Frequency	Reading(d	Factor	Reading	BandEdge	Margin	BandEdge	Margin	Azimuth	Height		
(GHz)	BuV)	Detector	dB/m	dBuV/m	PK Limit	(dB)	AV Limit	(dB)	[Degs]	[cm]	Polarity
2.4804	56.85 PK		22	78.85	-	-	-	-	292	99	H
2.4835	31.11 PK		22.1	53.21	-	-	-	-	292	99	H
2.4868	30.19 PK		22.1	52.29	74	-21.71	54	-1.71	292	99	H

Test	Meter	Antenna		Corrected								
Frequency	Reading(d	Factor	Duty	Reading	BandEdge	Margin	BandEdge	Margin	Azimuth	Height		
(GHz)	BuV)	Detector	dB/m	Cycle	dBuV/m	PK Limit	(dB)	AV Limit	(dB)	[Degs]	[cm]	Polarity
2.4804	56.85 PK		22	-38.89	39.96 -	-	-	-	-	292	99	H
2.4835	31.11 PK		22.1	-38.89	14.32 -	-	-	-	-	292	99	H
2.4868	30.19 PK		22.1	-38.89	13.4	74	-60.6	54	-40.6	292	99	H

RESTRICTED BANDEGE (HIGH CHANNEL, VERTICAL)



Misfits

TX Transmitter

Bandedge Vertical, Y-Axis, HiCh 80

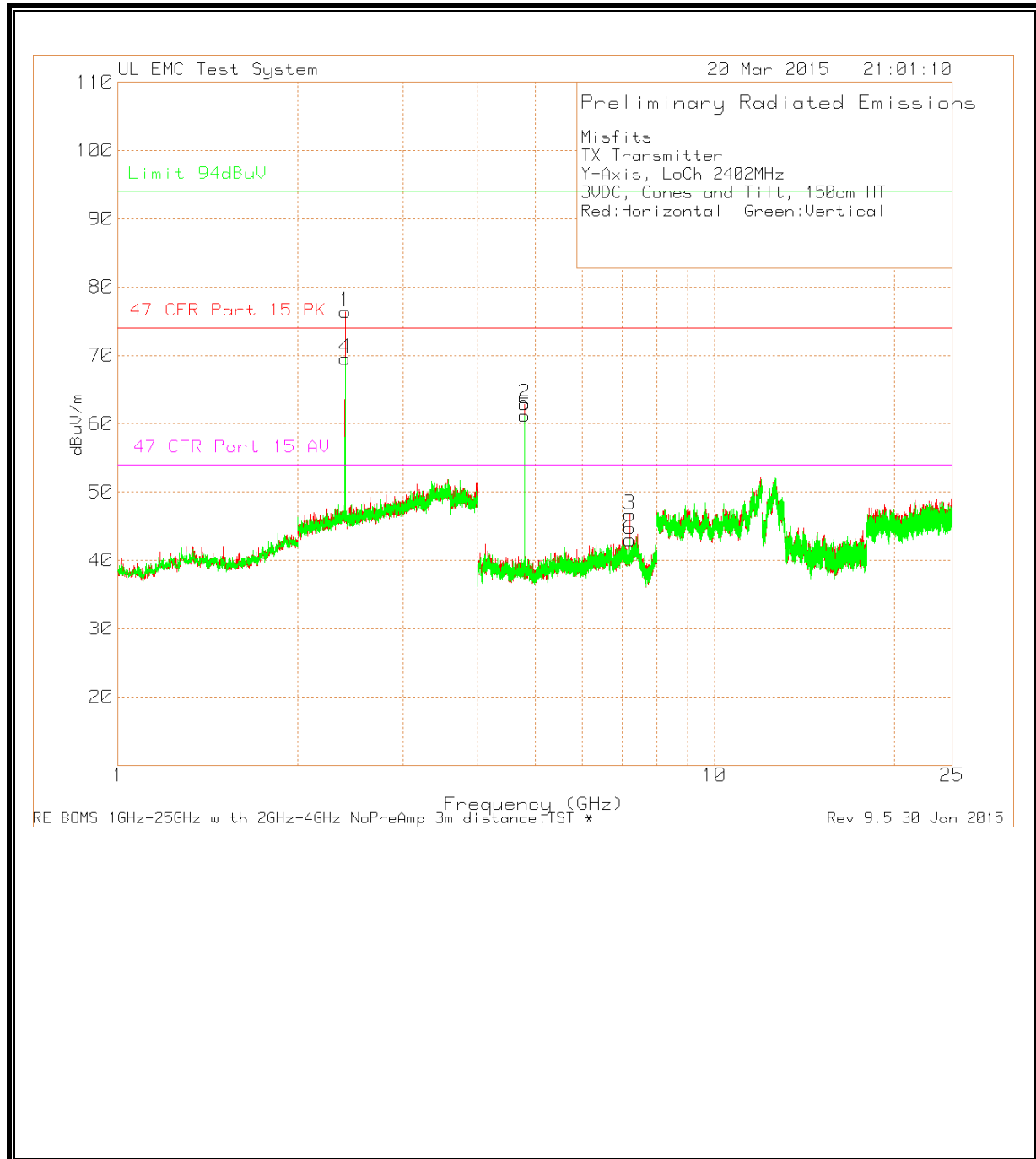
3VDC, Cones and Tilt, 150cm HT

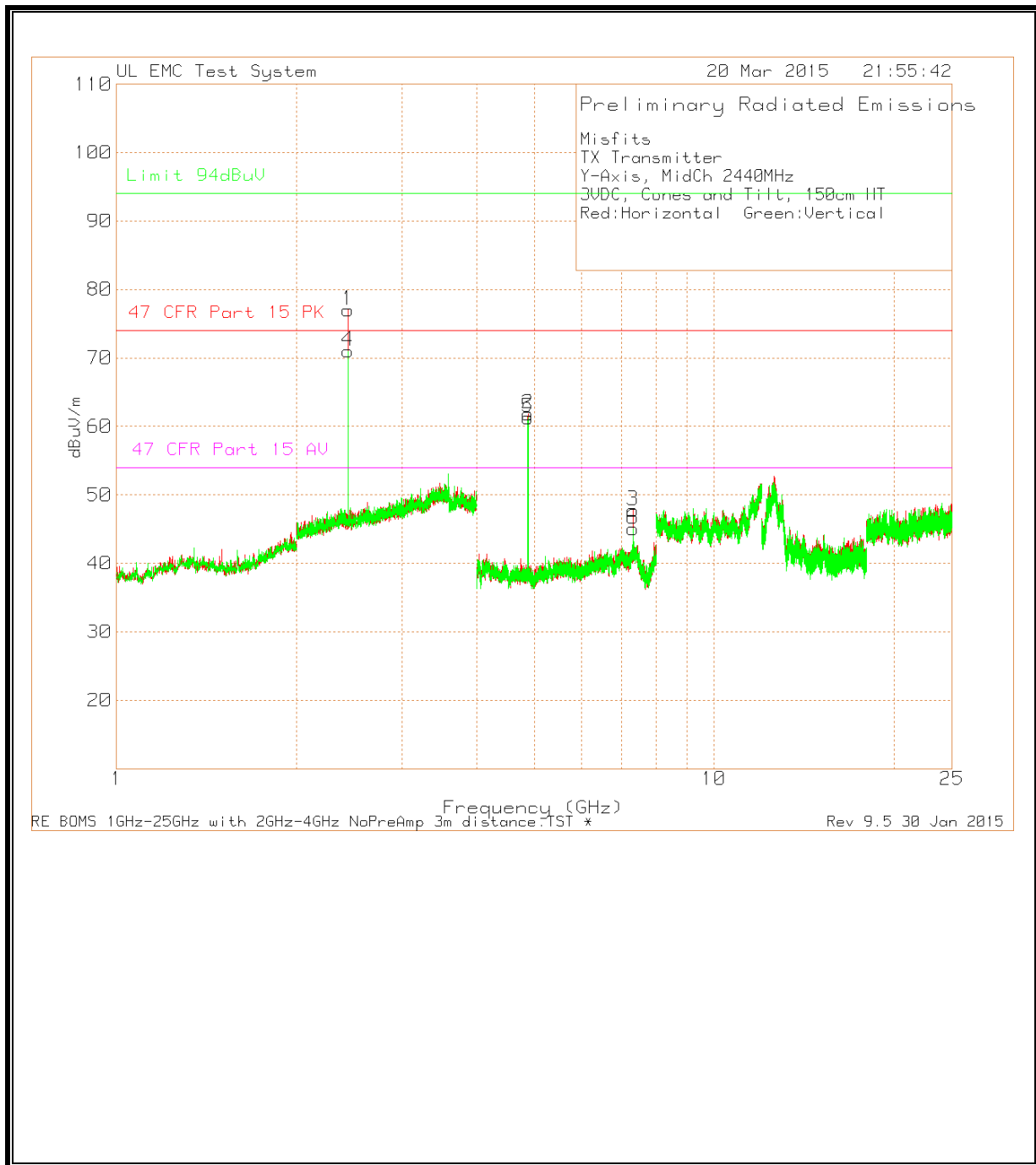
Test	Meter		Antenna	Corrected							
Frequency	Reading(d		Factor	Reading	BandEdge	Margin	BandEdge	Margin	Azimuth	Height	
(GHz)	BuV)	Detector	dB/m	dBuV/m	PK Limit	(dB)	AV Limit	(dB)	[Deps]	[cm]	Polarity
2.4804	53.43	PK	22	75.43	-	-	-	-	173	122	V
2.4835	29.66	PK	22.1	51.76	74	-22.24	54	-2.24	173	122	V
2.487	31.11	PK	22.1	53.21	74	-20.79	54	-0.79	173	122	V

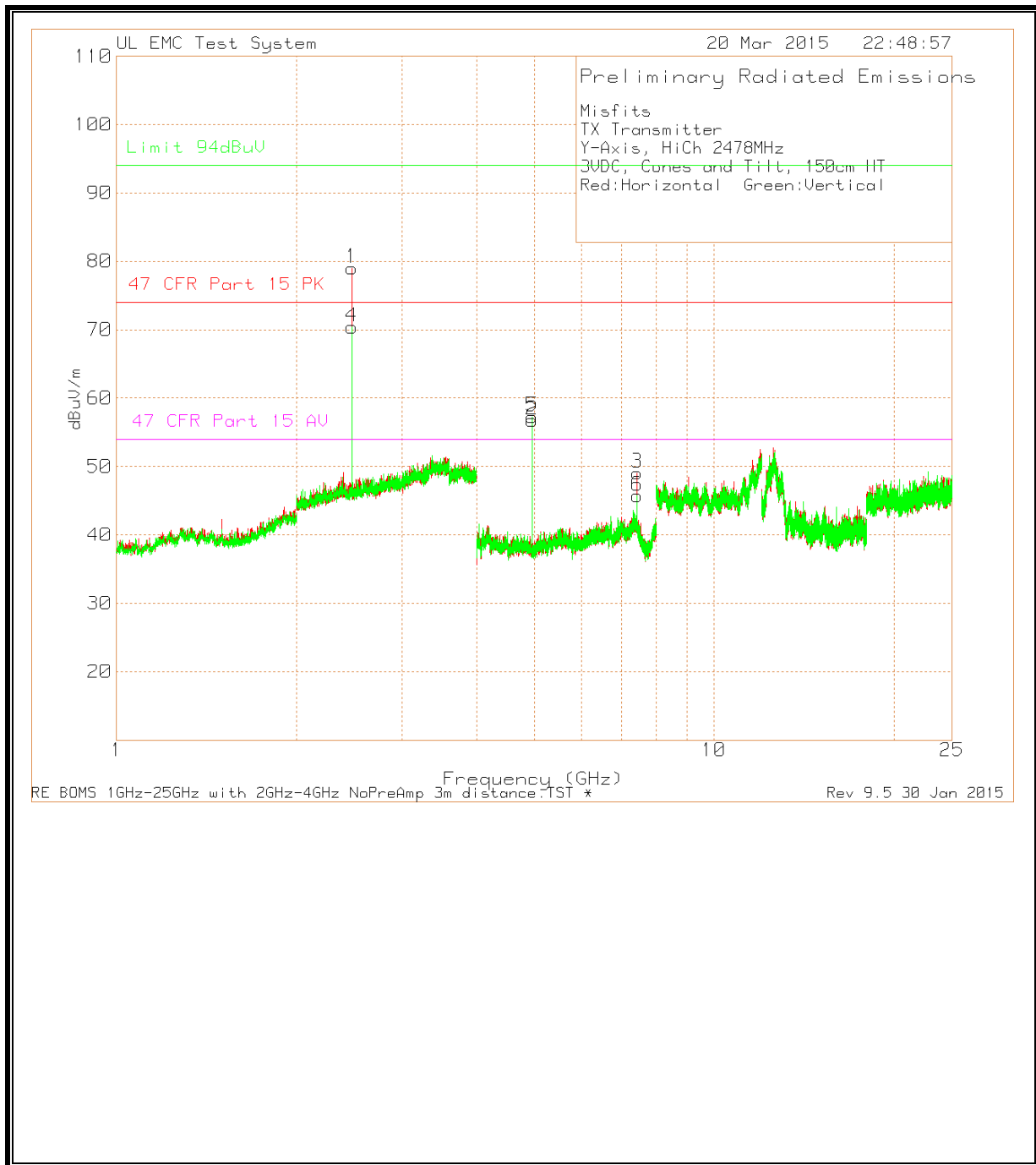
Test	Meter		Antenna		Corrected							
Frequency	Reading(d		Factor	Duty	Reading	BandEdge	Margin	BandEdge	Margin	Azimuth	Height	
(GHz)	BuV)	Detector	dB/m	Cycle	dBuV/m	PK Limit	(dB)	AV Limit	(dB)	[Deps]	[cm]	Polarity
2.4804	53.43	PK	22	-38.89	36.54	-	-	-	-	173	122	V
2.4835	29.66	PK	22.1	-38.89	12.87	74	-61.13	54	-41.13	173	122	V
2.487	31.11	PK	22.1	-38.89	14.32	74	-59.68	54	-39.68	173	122	V

7.4.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz

SPURIOUS EMISSIONS 1 TO 25 GHz (TX mode)







Misfits

TX Transmitter

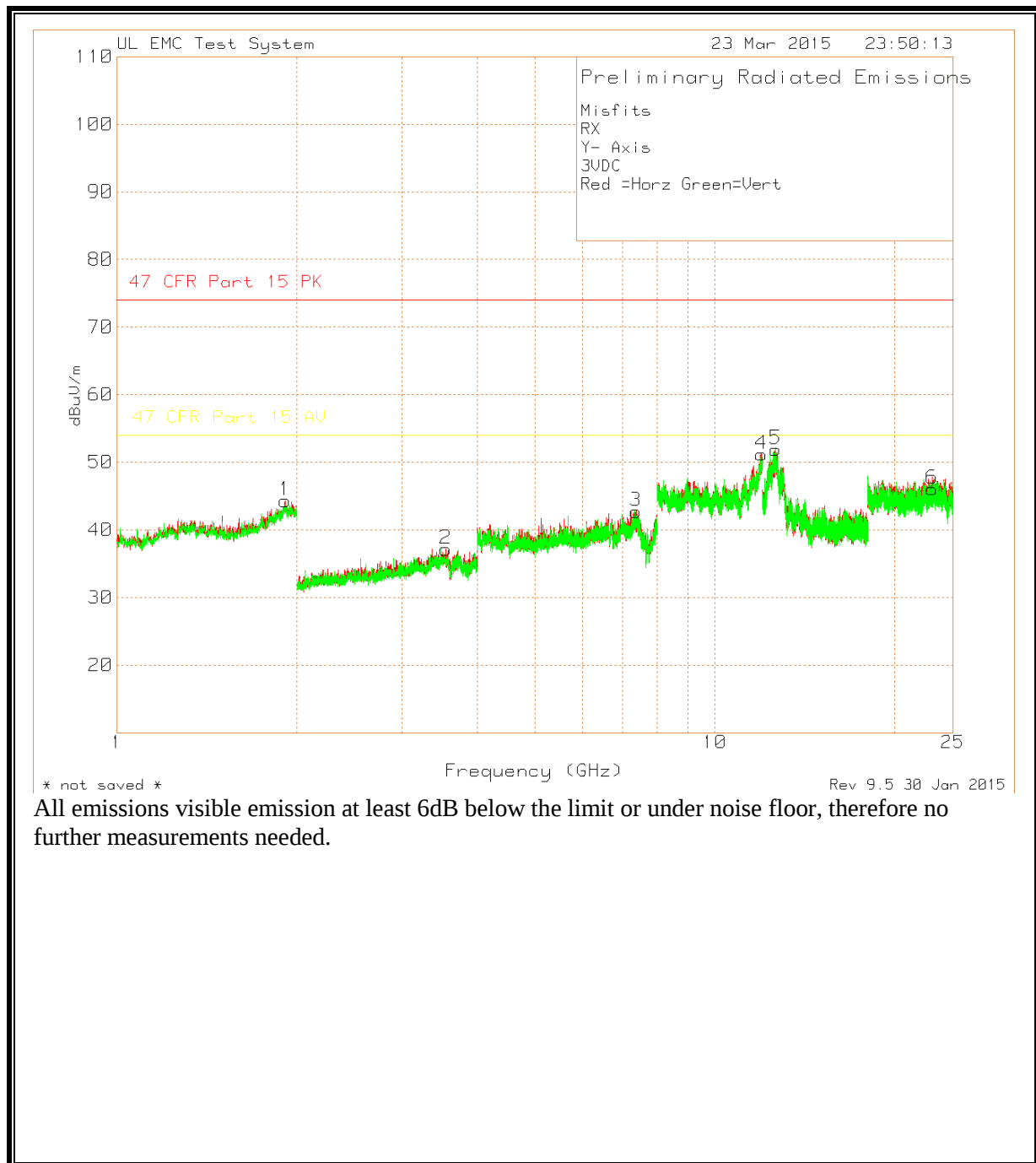
Y-Axis,

3VDC, Cones and Tilt, 150cm HT

Red:Horizontal Green:Vertical

Test	Meter	Antenna	Corrected				Duty Cycle	AV	47 CFR				
Frequency	Reading	Factor	Gain/Loss	Reading	47 CFR	Margin	correction	Reading	Part 15	Margin	Azimuth	Height	
(GHz)	(dBuV)	Detector	dB/m	(dB)	dBuV/m	Part 15 PK (dB)	dB	dBuV/m	AV	(dB)	[Degs]	[cm]	Polarity
4.8032	86.47 Pk		27.7	-50.66	63.51	74	-10.49	-38.89	24.62	54	-29.38	13	100 H
4.8032	84.85 Pk		27.7	-50.66	61.89	74	-12.11	-38.89	23	54	-31	165	100 V
7.2048	65.4 Pk		29.7	-46.66	48.44	74	-25.56	-38.89	9.55	54	-44.45	235	100 H
7.2049	62.53 Pk		29.7	-46.66	45.57	74	-28.43	-38.89	6.68	54	-47.32	153	100 V
4.8792	84.98 Pk		27.7	-50.34	62.34	74	-11.66	-38.89	23.45	54	-30.55	260	100 H
4.8792	84.53 Pk		27.7	-50.34	61.89	74	-12.11	-38.89	23	54	-31	183	100 V
7.3191	65.21 Pk		30.6	-45.88	49.93	74	-24.07	-38.89	11.04	54	-42.96	232	100 H
7.3189	63.81 Pk		30.6	-45.87	48.54	74	-25.46	-38.89	9.65	54	-44.35	146	100 V
4.9593	81.95 Pk		27.8	-50.74	59.01	74	-14.99	-38.89	20.12	54	-33.88	0	100 H
4.9592	81.56 Pk		27.8	-50.74	58.62	74	-15.38	-38.89	19.73	54	-34.27	174	100 V
7.4395	66.2 Pk		30.6	-46.8	50	74	-24	-38.89	11.11	54	-42.89	253	100 H
7.4394	65.5 Pk		30.6	-46.8	49.3	74	-24.7	-38.89	10.41	54	-43.59	152	100 V

SPURIOUS EMISSIONS 1 TO 25 GHz (RX mode)



7.4.4. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz

