FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

Vigor Wireless Dongle

MODEL NUMBER: 1002

FCC ID: 2AES41002

REPORT NUMBER: 10723179A-2

ISSUE DATE: June 12, 2015
REVISION DATE: July 9, 2015

Prepared for
Valve Corporation
10900 NE 4th St.
Suite 500
Bellevue, WA 98004

Prepared by
UL LLC
333 Pfingsten Rd.
Northbrook, IL 60062
TEL: (847) 272-8800

NVLAP Lab code: 100414-0

Revision History

Rev.	Issue Date	Revisions	Revised By
1	06/12/15	Initial Issue	M.Ferrer
2	07/09/15	Updated data Low and High Channel	M.Ferrer

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Valve Corporation
10900 NE 4th St
Suite 500
Bellevue, WA 98004

EUT DESCRIPTION: Vigor Wireless Dongle

MODEL: 1002

SERIAL NUMBER: Prototype

DATE TESTED: April 28, 2015 – June 12, 2015
June 29, 2015 – July 9, 2015

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 LLC By:

Bart Mucha
Staff Engineer
UL LLC

Tested By:

MICHAEL FERRER
Program Manager
UL LLC

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.

Testing Deviation - EUT was tested 1.5m height for above 1GHz Radiated Emissions in accordance TCB Conference call Dec 2014.

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	9k-30MHz	E-Field Loop	2.14dB
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	30-200MHz	Bicon 3m Horz	3.30dB
Radiated Emissions	30-130MHz	Bicon 3m Vert	4.84dB
Radiated Emissions	130-200MHz	Bicon 3m Vert	4.94dB
Radiated Emissions	200-1000MHz	LogP 3m Horz	3.46dB
Radiated Emissions	200-1000MHz	LogP 3m Vert	4.98dB
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 USB Dongle that communicates with a wireless controller. It contains a 2.4GHz transmitter.

5.2. MAXIMUM OUTPUT E-FIELD STRENGTH

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

Frequency Range (MHz)	Mode	Output PK E-field Strength (dBuV/m)	Output AV E-field Strength (dBuV/m)
2402-2480	TX	100.99	88.76

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an attached PCB monopole Antenna, with a maximum gain of 2.15 dBi.

5.4. WORST-CASE CONFIGURATION AND MODE

The worst-case axis is X-axis. The EUT was programmed with a power table.

Channel	Power Setting
2	-12
3	-6
4-79	0
80	-6

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List		
Description	**Manufacturer**	**Model**
EUT	Valve	1002
Laptop	Lenovo	T420

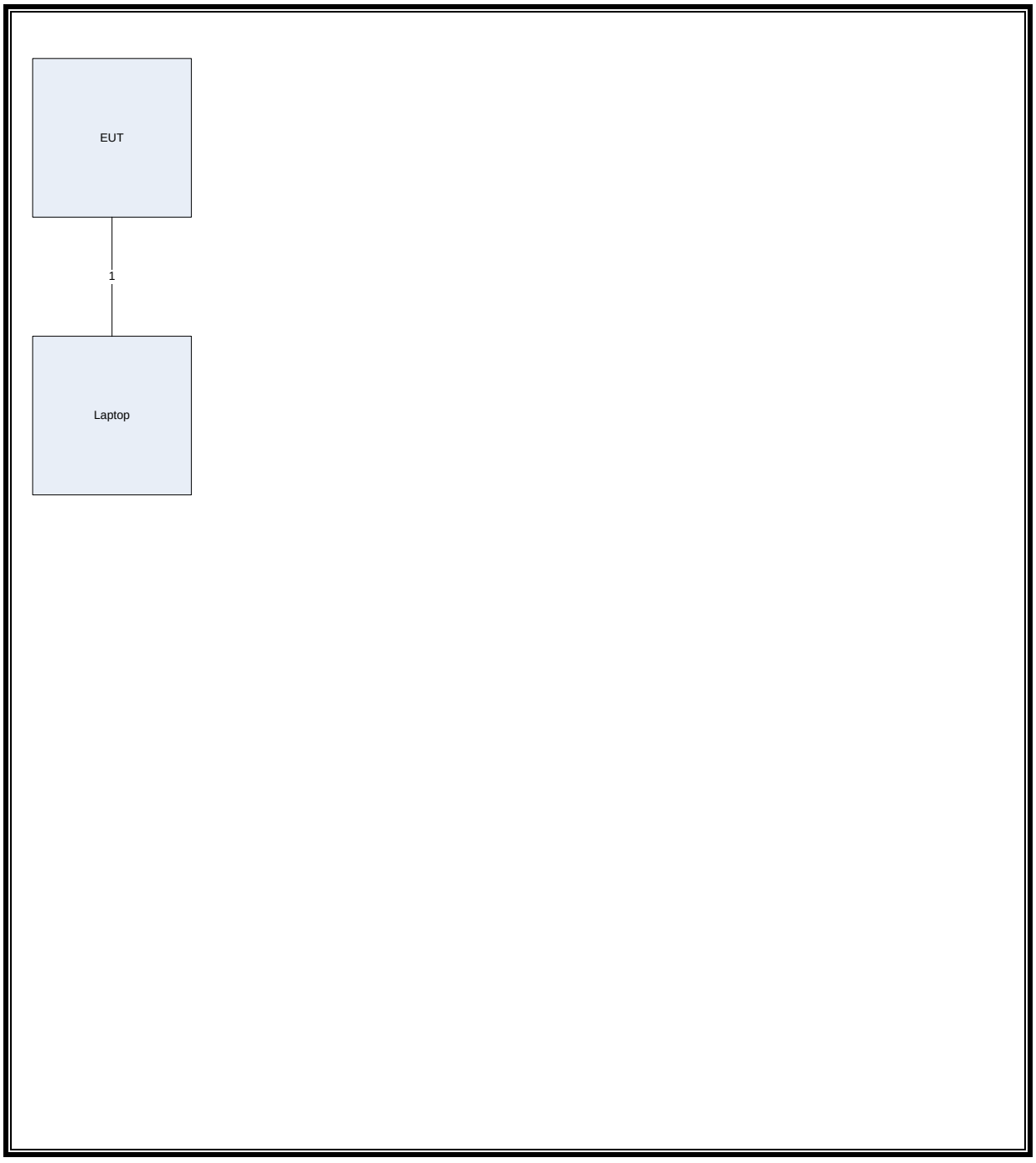
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB	1	USB	IO	<3m	Only used for testing

TEST SETUP

The EUT is connected to a laptop with a USB extension cable. Extension cable used to isolate EUT from Laptop.

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, May 20, 2015		
Conducted Software	UL	UL EMC	Ver 9.5, Oct 24 2014		
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	20141230	20151231
Bicon Antenna	Electro-Metrics	EM-6912A	EMC4070	20141014	20151030
Log-P Antenna	Chase	UPA6109	EMC4313	20141119	20151130
Spectrum Analyzer	Rohde & Schwarz	ESU	EMC4323	20141216	20151231
Antenna Array	UL	BOMS	EMC4276	20141201	20151231
EMI Test Receiver	Agilent	N9030A	EMC4360	20141219	20151219
EMI Test Receiver	Rohde & Schwarz	ESR	EMC4377	20150401	20160430
LISN	Solar	8602-50-TS-50-N	EMC4052	20150109	20160109
LISN	Solar	8602-50-TS-50-N	EMC4064	20150109	20160109
Loop Antenna	EMCO	6502/1	EMC4026	20150420	20160430

7. TEST RESULTS

7.1.1. OCCUPIED BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

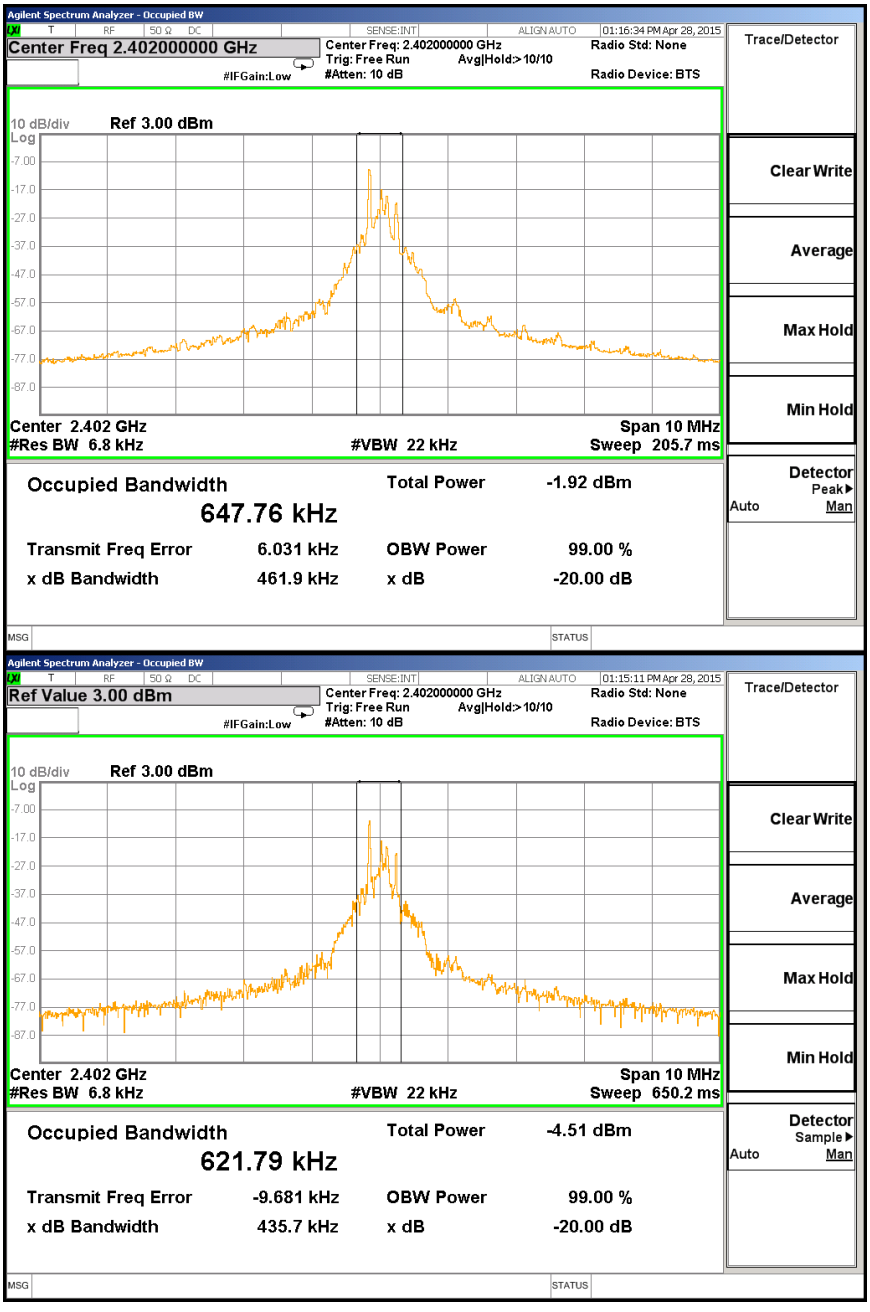
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 5% of the Occupied bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

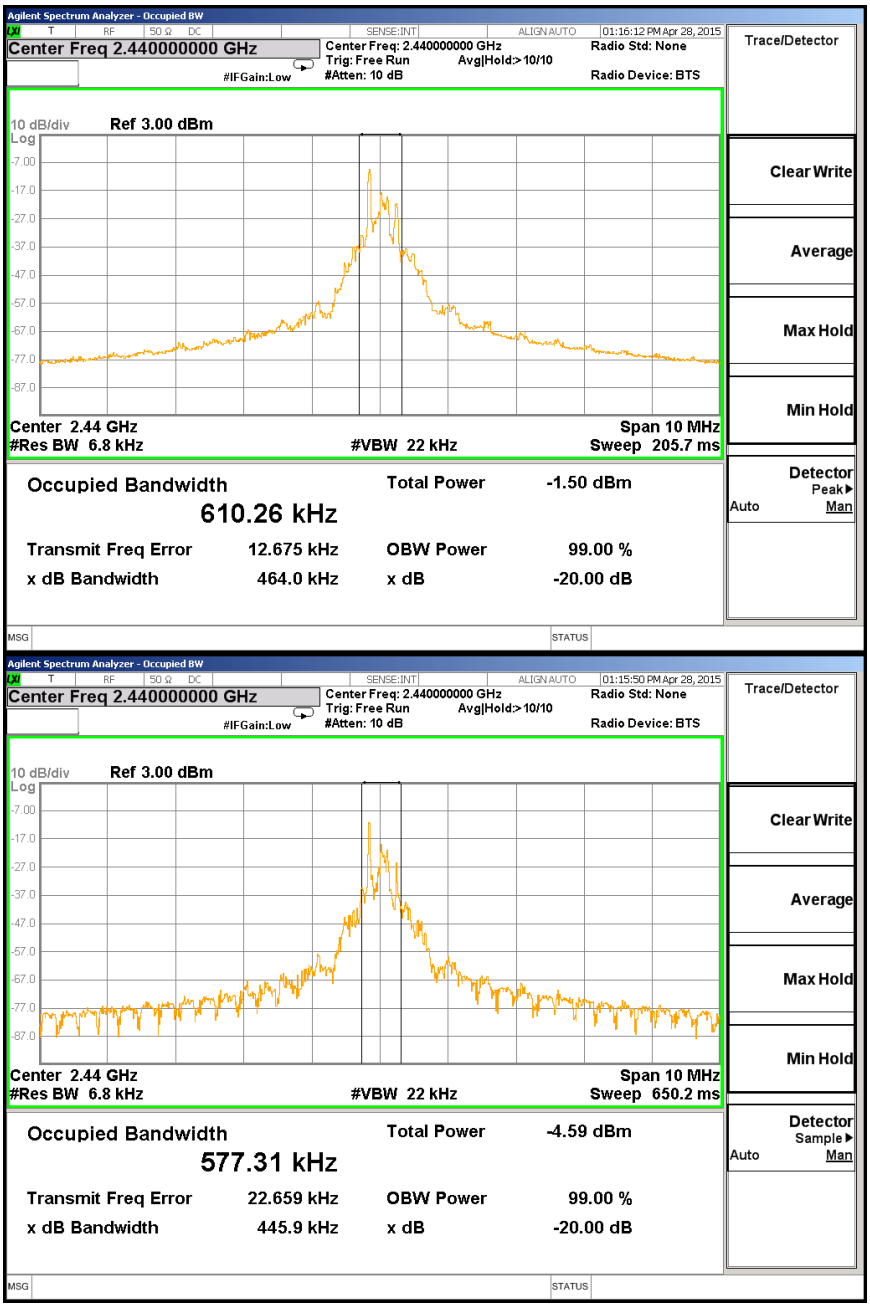
Channel	Frequency (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (MHz)
Low	2402	0.622	0.462
Middle	2440	0.577	0.464
High	2480	0.555	0.465

99% BANDWIDTH

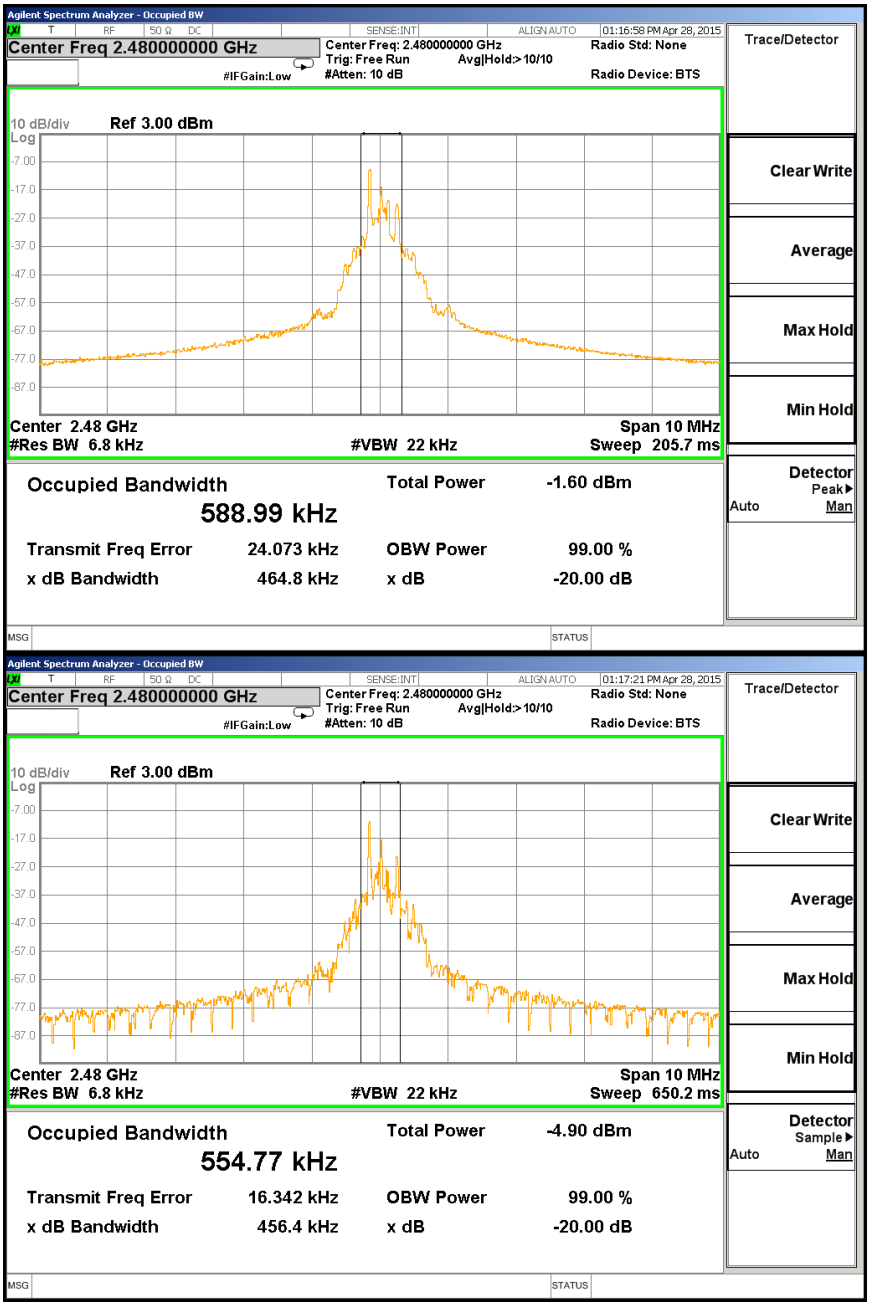
BANDWIDTH LOW CH



99% BANDWIDTH MID CH



99% BANDWIDTH HIGH CH



7.2. 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.

RESULTS

C63.4 sect. 4.2.2(e) Average voltage measurements using spectrum analyzer reduced video bandwidth

PK: RBW 1MHz, VBW 1MHz
AV: RBW 1MHz, VBW 10Hz

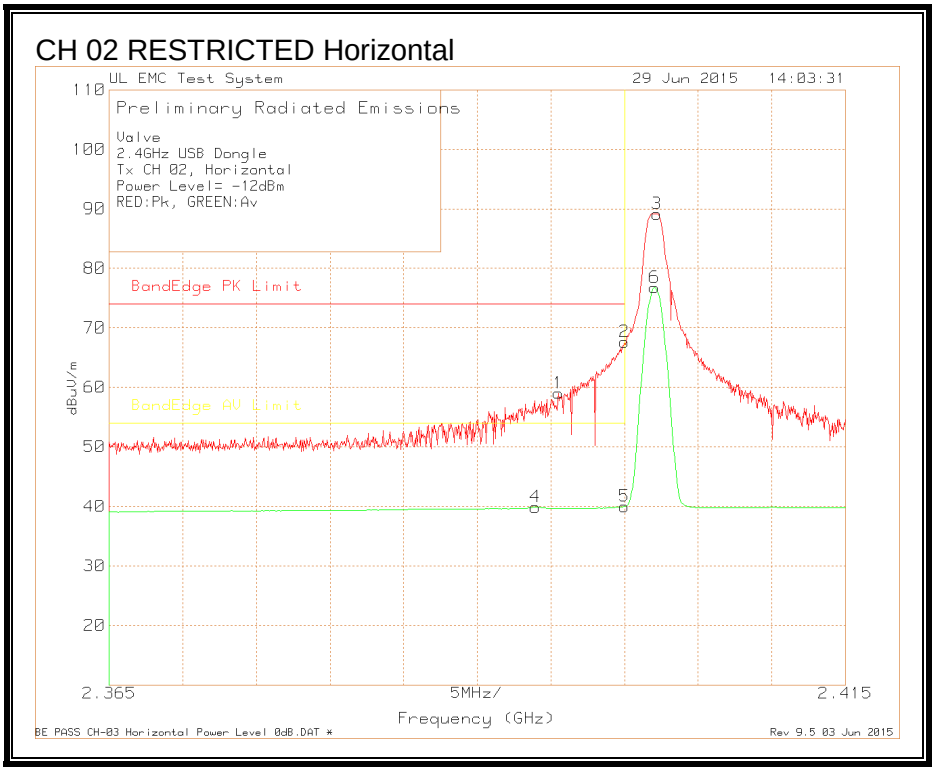
7.2.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION

Valve
usb Dongle

Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	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
2.4401	74.51	Pk	21.9	4.58	100.99	114	-13.01	-	-	245	114	H
2.44	62.28	Av	21.9	4.58	88.76	114	-25.24	94	-5.24	245	114	H
2.4401	72.77	Pk	21.9	4.58	99.25	114	-14.75	-	-	240	100	V
2.44	60.52	Av	21.9	4.58	87	114	-27	94	-7	240	100	V
2.4022	65.53	Pk	21.8	4.58	91.91	114	-22.09	-	-	32	99	V
2.4021	49.76	Av	21.8	4.58	76.14	114	-37.86	94	-17.86	32	99	V
2.4022	68.3	Pk	21.8	4.58	94.68	114	-19.32	-	-	329	101	H
2.4021	55.91	Av	21.8	4.58	82.29	114	-31.71	94	-11.71	329	101	H
2.48	69.03	Pk	22	4.36	95.39	114	-18.61	-	-	329	100	H
2.48	56.71	Av	22	4.36	83.07	114	-30.93	94	-10.93	329	100	H
2.4799	65.88	Pk	22	4.36	92.24	114	-21.76	-	-	327	99	V
2.4801	53.5	Av	22	4.36	79.86	114	-34.14	94	-14.14	327	99	V

7.2.2. TRANSMITTER RESTRICTED BAND EDGES

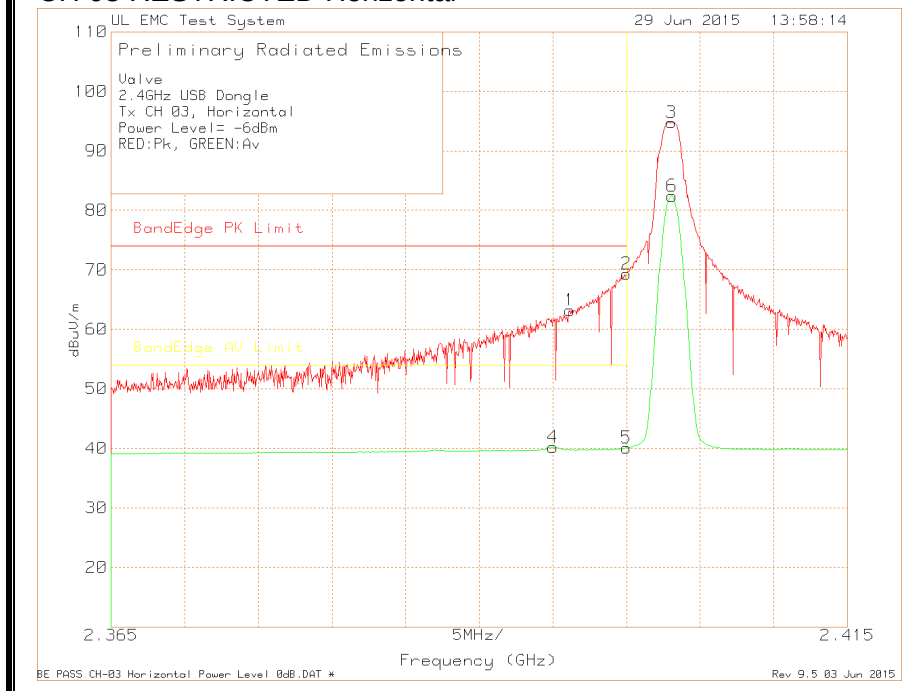
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



Valve
2.4GHz USB Dongle
Tx CH 02, Horizontal
Power Level= -12dBm
RED:Pk, GREEN:Av

Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Gain dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	BandEdge PK Limit	PK Margin (dB)	BandEdge AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.3955	32.56	Pk	21.8	4.67	59.03	74	-14.97	-	-	329	100	H
2	2.4	41.24	Pk	21.8	4.61	67.65	74	-6.35	-	-	329	100	H
3	2.4022	62.76	Pk	21.8	4.58	89.14	-	-	-	-	329	100	H
4	2.394	13.4	AV	21.8	4.69	39.89	74	-34.11	54	-14.11	329	100	H
5	2.4	13.57	AV	21.8	4.61	39.98	74	-34.02	54	-14.02	329	100	H
6	2.4021	50.4	AV	21.8	4.58	76.78	-	-	-	-	329	100	H

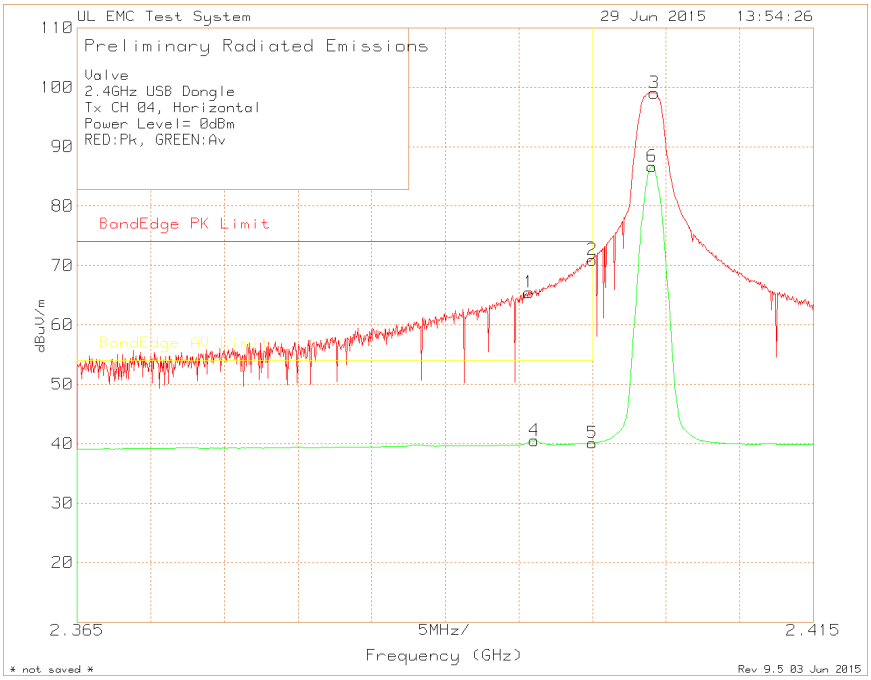
CH 03 RESTRICTED Horizontal



Valve
2.4GHz USB Dongle
Tx CH 03, Horizontal
Power Level= -6dBm
RED:Pk, GREEN:Av

Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Gain dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	BandEdge PK Limit	PK Margin (dB)	BandEdge AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.3962	36.76	Pk	21.8	4.66	63.22	74	-10.78	-	-	329	100	H
2	2.4	42.9	Pk	21.8	4.61	69.31	74	-4.69	-	-	329	100	H
3	2.4031	68.39	Pk	21.8	4.58	94.77	-	-	-	-	329	100	H
4	2.395	13.7	AV	21.8	4.68	40.18	74	-33.82	54	-13.82	329	100	H
5	2.4	13.67	AV	21.8	4.61	40.08	74	-33.92	54	-13.92	329	100	H
6	2.4031	56.03	AV	21.8	4.58	82.41	-	-	-	-	329	100	H

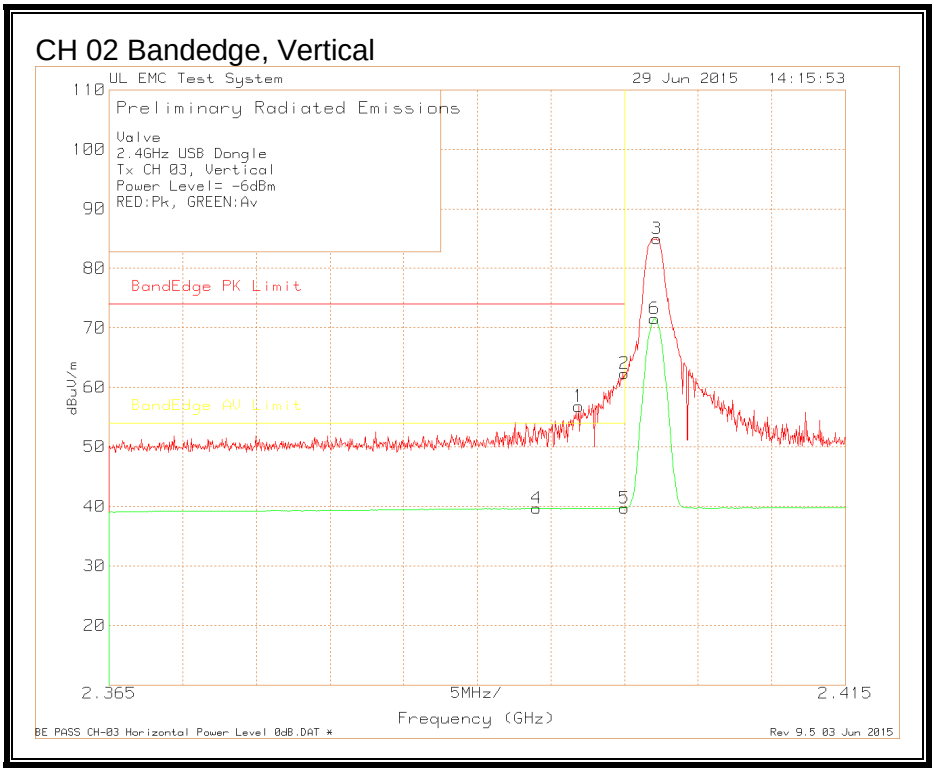
CH 04 RESTRICTED Horizontal



Valve
2.4GHz USB Dongle
Tx CH 04, Horizontal
Power Level= 0dBm
RED:Pk, GREEN:Av

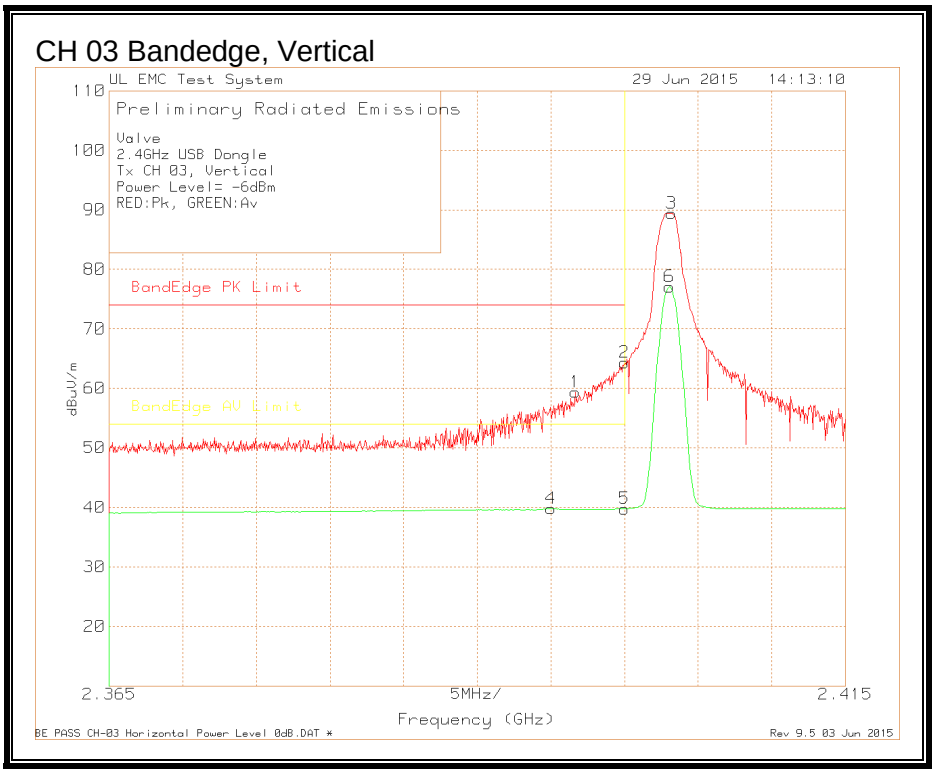
Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Gain dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	BandEdge PK Limit	PK Margin (dB)	BandEdge AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.3957	39.02	Pk	21.8	4.67	65.49	74	-8.51	-	-	329	100	H
2	2.4	44.52	Pk	21.8	4.61	70.93	74	-3.07	-	-	329	100	H
3	2.4042	72.66	Pk	21.8	4.58	99.04	-	-	-	-	329	100	H
4	2.3961	14.07	AV	21.8	4.66	40.53	74	-33.47	54	-13.47	329	100	H
5	2.4	13.72	AV	21.8	4.61	40.13	74	-33.87	54	-13.87	329	100	H
6	2.4041	60.29	AV	21.8	4.58	86.67	-	-	-	-	329	100	H

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



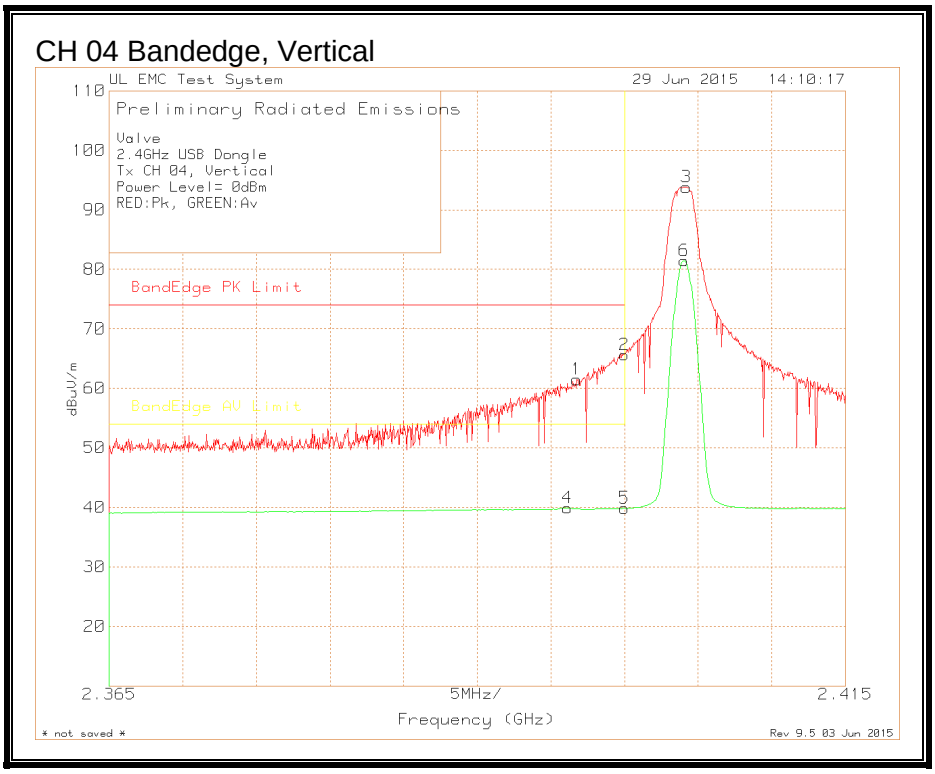
Valve
2.4GHz USB Dongle
Tx CH 02, Vertical
Power Level= -12dBm
RED:Pk, GREEN:Av

Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Gain dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	BandEdge PK Limit	PK Margin (dB)	BandEdge AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.3969	30.35	Pk	21.8	4.65	56.8	74	-17.2	-	-	34	103	V
2	2.4	35.94	Pk	21.8	4.61	62.35	74	-11.65	-	-	34	103	V
3	2.4022	58.61	Pk	21.8	4.58	84.99	-	-	-	-	34	103	V
4	2.394	13.2	AV	21.8	4.69	39.69	74	-34.31	54	-14.31	34	103	V
5	2.4	13.3	AV	21.8	4.61	39.71	74	-34.29	54	-14.29	34	103	V
6	2.4021	45.16	AV	21.8	4.58	71.54	-	-	-	-	34	103	V



Valve
2.4GHz USB Dongle
Tx CH 03, Vertical
Power Level= -6dBm
RED:Pk, GREEN:Av

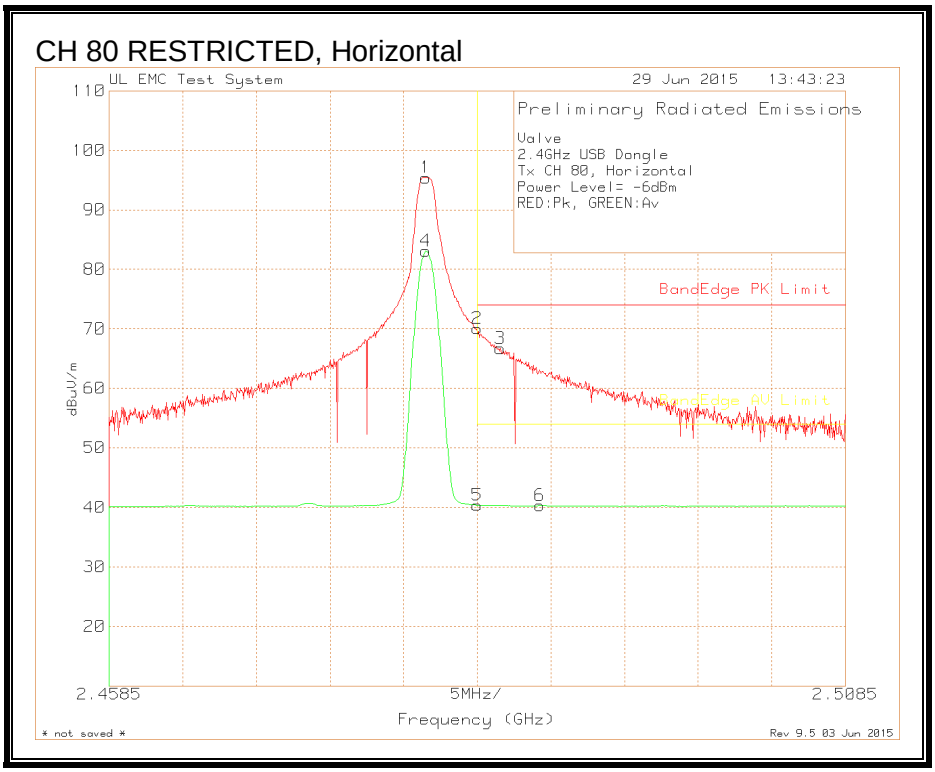
Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Gain dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	BandEdge PK Limit	PK Margin (dB)	BandEdge AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.3967	32.92	Pk	21.8	4.65	59.37	74	-14.63	-	-	34	103	V
2	2.4	37.93	Pk	21.8	4.61	64.34	74	-9.66	-	-	34	103	V
3	2.4032	63.03	Pk	21.8	4.58	89.41	-	-	-	-	34	103	V
4	2.395	13.32	AV	21.8	4.68	39.8	74	-34.2	54	-14.2	34	103	V
5	2.4	13.37	AV	21.8	4.61	39.78	74	-34.22	54	-14.22	34	103	V
6	2.4031	50.69	AV	21.8	4.58	77.07	-	-	-	-	34	103	V



Valve
2.4GHz USB Dongle
Tx CH 04, Vertical
Power Level= 0dBm
RED:Pk, GREEN:Av

Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Gain dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	BandEdge PK Limit	PK Margin (dB)	BandEdge AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.3968	35.06	Pk	21.8	4.65	61.51	74	-12.49	-	-	34	103	V
2	2.4	39.23	Pk	21.8	4.61	65.64	74	-8.36	-	-	34	103	V
3	2.4042	67.43	Pk	21.8	4.58	93.81	-	-	-	-	34	103	V
4	2.3961	13.44	AV	21.8	4.66	39.9	74	-34.1	54	-14.1	34	103	V
5	2.4	13.42	AV	21.8	4.61	39.83	74	-34.17	54	-14.17	34	103	V
6	2.4041	55.07	AV	21.8	4.58	81.45	-	-	-	-	34	103	V

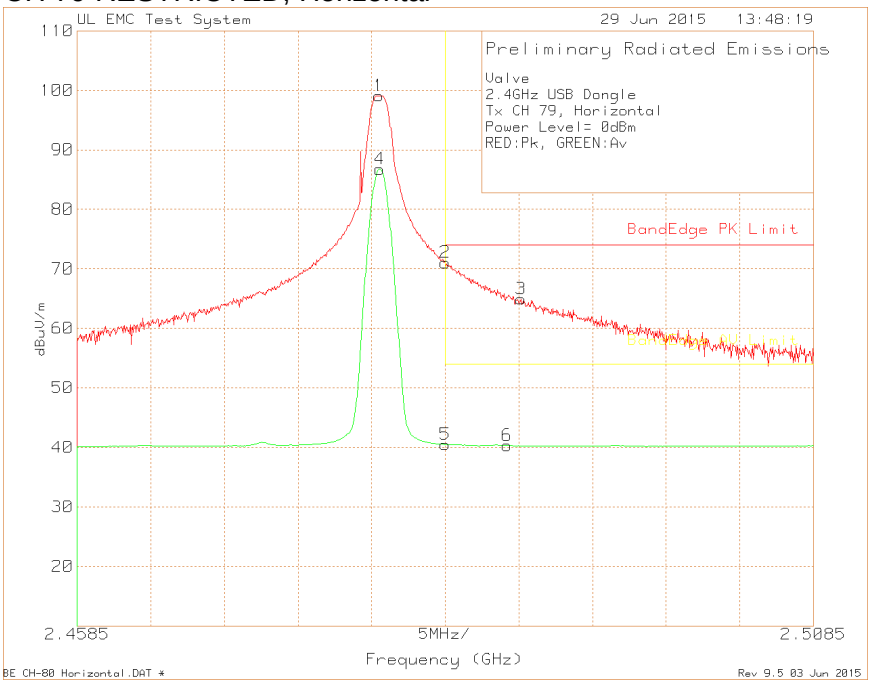
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



Valve
2.4GHz USB Dongle
Tx CH 80, Horizontal
Power Level= -6dBm
RED:Pk, GREEN:Av

Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Gain dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	BandEdge PK Limit	Margin (dB)	BandEdge AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.48	69.03	Pk	22	4.36	95.39	-	-	-	-	329	100	H
2	2.4835	43.6	Pk	22.1	4.37	70.07	74	-3.93	-	-	329	100	H
3	2.4851	40.24	Pk	22.1	4.37	66.71	74	-7.29	-	-	329	100	H
4	2.48	56.71	AV	22	4.36	83.07	-	-	-	-	329	100	H
5	2.4835	13.89	AV	22.1	4.37	40.36	74	-33.64	54	-13.64	329	100	H
6	2.4878	13.82	AV	22.1	4.38	40.3	74	-33.7	54	-13.7	329	100	H

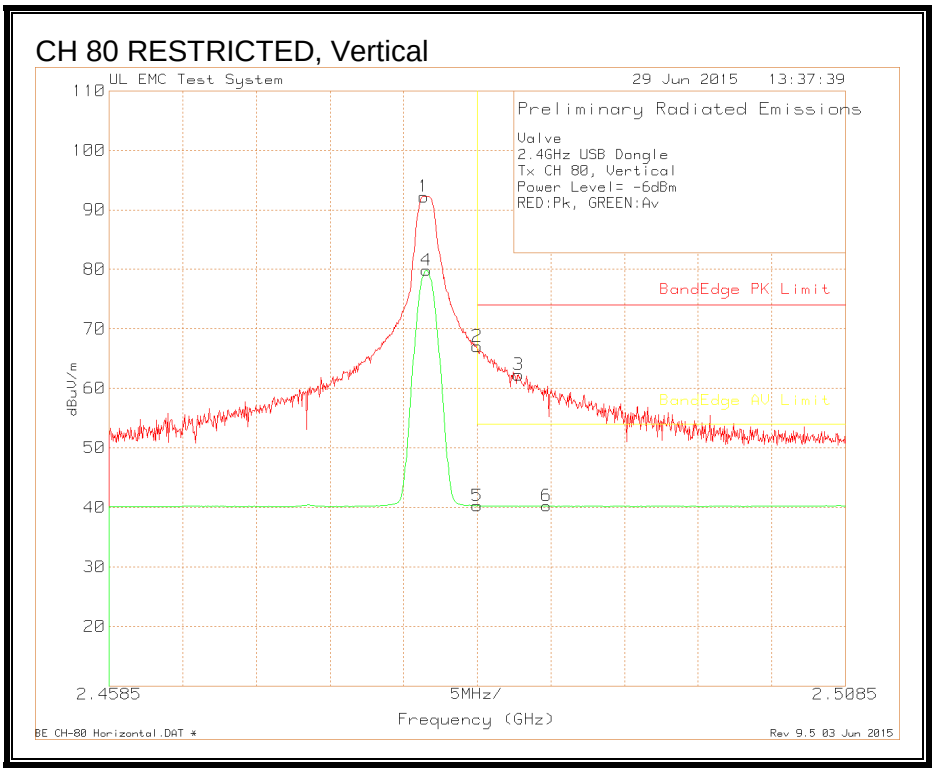
CH 79 RESTRICTED, Horizontal



Valve
2.4GHz USB Dongle
Tx CH 79, Horizontal
Power Level= 0dBm
RED:Pk, GREEN:Av

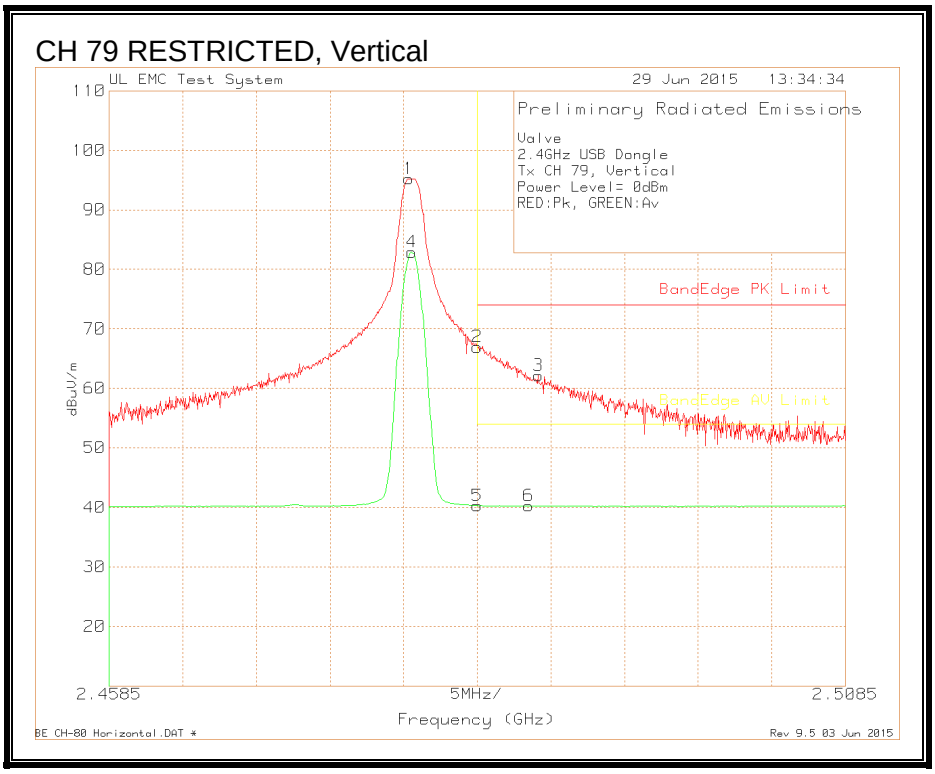
Marker No	Test Frequ	Meter Rea	Detector	EMCO3161	Gain/Loss	Corrected	BandEdge	Margin (dB	BandEdge	Margin (dB	Azimuth [D	Height [cm	Polarity
1	2.479	72.73	Pk	22	4.36	99.09	-	-	-	-	329	100	H
2	2.4835	44.59	Pk	22.1	4.37	71.06	74	-2.94	-	-	329	100	H
3	2.4887	38.47	Pk	22.1	4.37	64.94	74	-9.06	-	-	329	100	H
4	2.4791	60.4	AV	22	4.36	86.76	-	-	-	-	329	100	H
5	2.4835	14.01	AV	22.1	4.37	40.48	74	-33.52	54	-13.52	329	100	H
6	2.4877	13.83	AV	22.1	4.38	40.31	74	-33.69	54	-13.69	329	100	H

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



Valve
2.4GHz USB Dongle
Tx CH 80, Horizontal
Power Level= -6dBm
RED:Pk, GREEN:Av

Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Gain dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	BandEdge PK Limit	Margin (dB)	BandEdge AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.48	69.03	Pk	22	4.36	95.39	-	-	-	-	329	100	H
2	2.4835	43.6	Pk	22.1	4.37	70.07	74	-3.93	-	-	329	100	H
3	2.4851	40.24	Pk	22.1	4.37	66.71	74	-7.29	-	-	329	100	H
4	2.48	56.71	AV	22	4.36	83.07	-	-	-	-	329	100	H
5	2.4835	13.89	AV	22.1	4.37	40.36	74	-33.64	54	-13.64	329	100	H
6	2.4878	13.82	AV	22.1	4.38	40.3	74	-33.7	54	-13.7	329	100	H

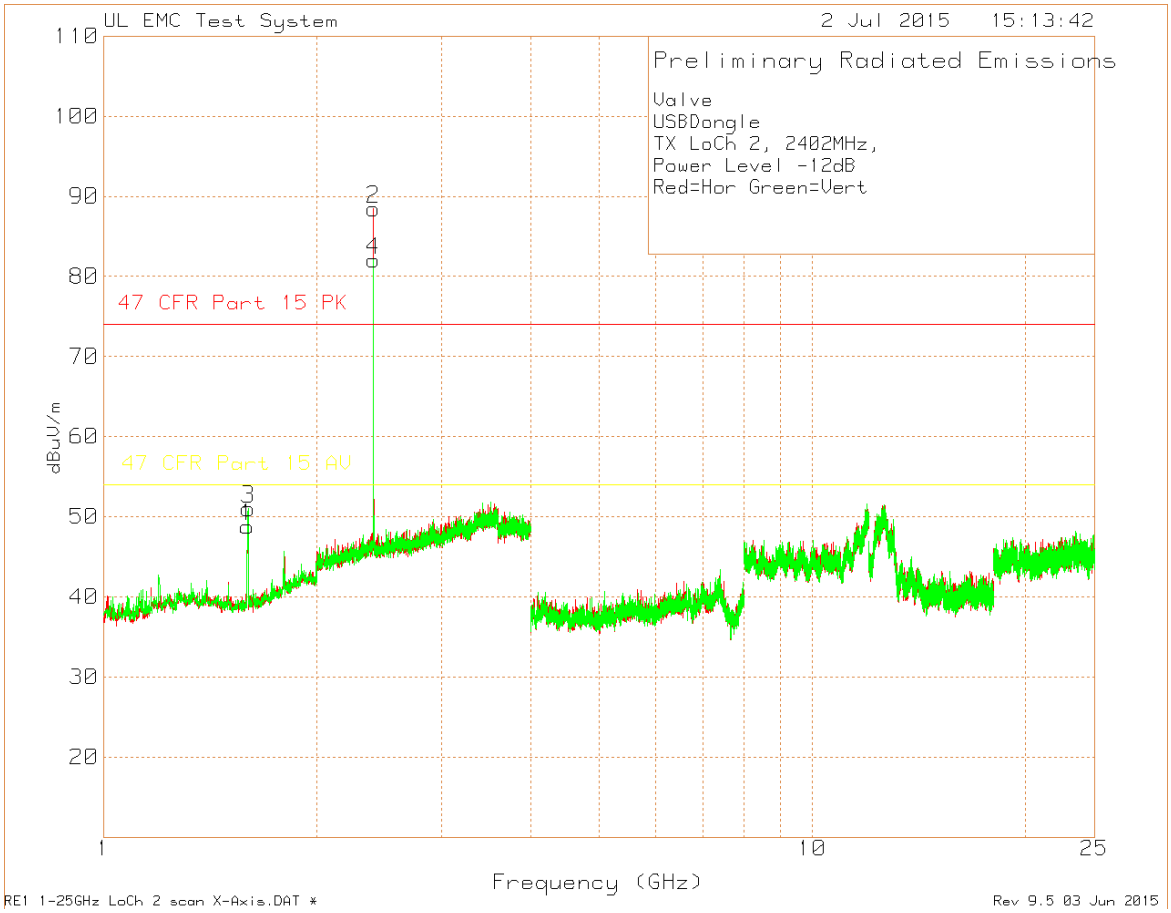


Valve
2.4GHz USB Dongle
Tx CH 79, Vertical
Power Level= 0dBm
RED:Pk, GREEN:Av

Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Gain dB/m	Gain/Loss (dB)	Corrected Reading dBuV/m	BandEdge PK Limit	Margin (dB)	BandEdge AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.4789	68.87	Pk	22	4.36	95.23	-	-	-	-	327	99	V
2	2.4835	40.48	Pk	22.1	4.37	66.95	74	-7.05	-	-	327	99	V
3	2.4877	35.65	Pk	22.1	4.38	62.13	74	-11.87	-	-	327	99	V
4	2.4791	56.53	AV	22	4.36	82.89	-	-	-	-	327	99	V
5	2.4835	13.81	AV	22.1	4.37	40.28	74	-33.72	54	-13.72	327	99	V
6	2.487	13.79	AV	22.1	4.38	40.27	74	-33.73	54	-13.73	327	99	V

7.2.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz

CH 02

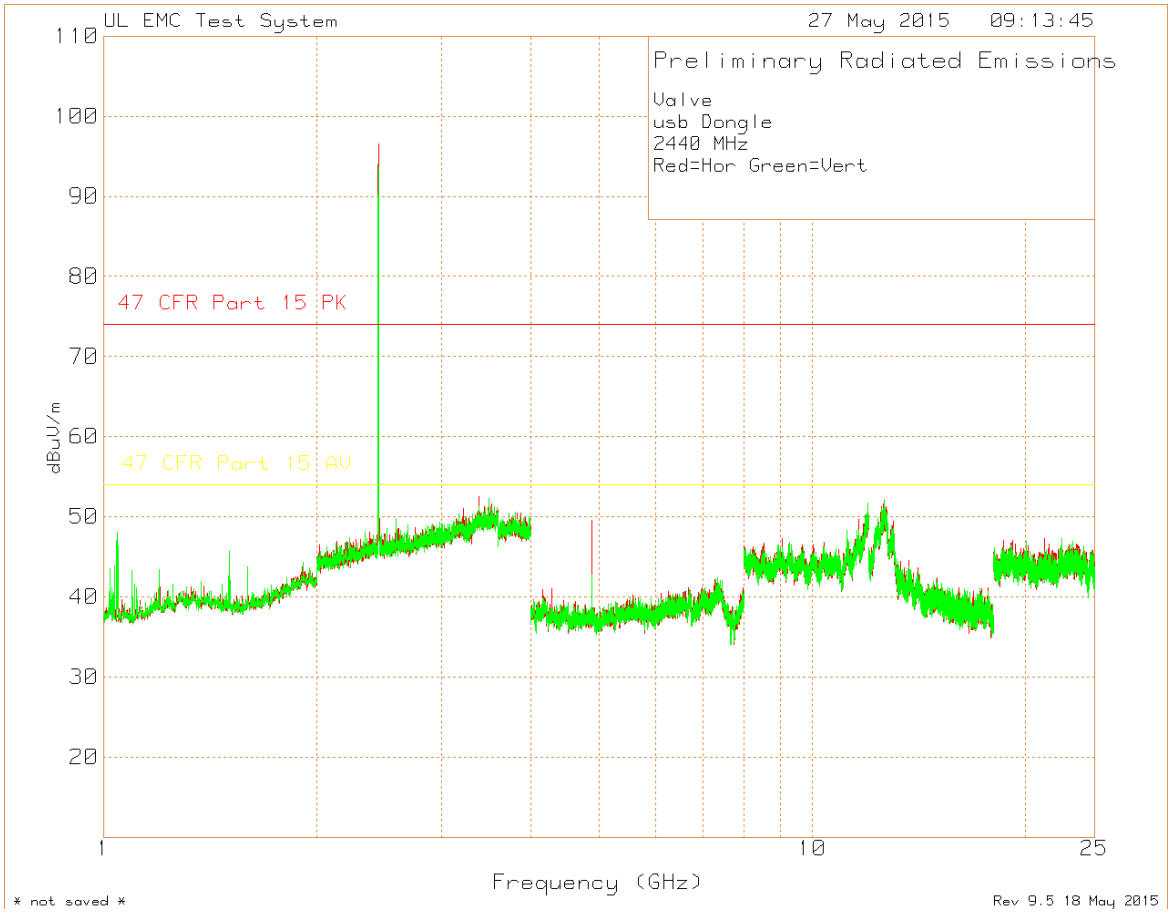


Valve
USBDongle
TX LoCh 2, 2402MHz,
Power Level -12dB
Red=Hor Green=Vert

Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Gain dB/m	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
1.5995	77.97	Pk	28.2	-54.33	51.84	74	-22.16	-	-	143	100	V
1.5985	56.86	Av	28.2	-54.34	30.72	74	-43.28	54	-23.28	143	100	V

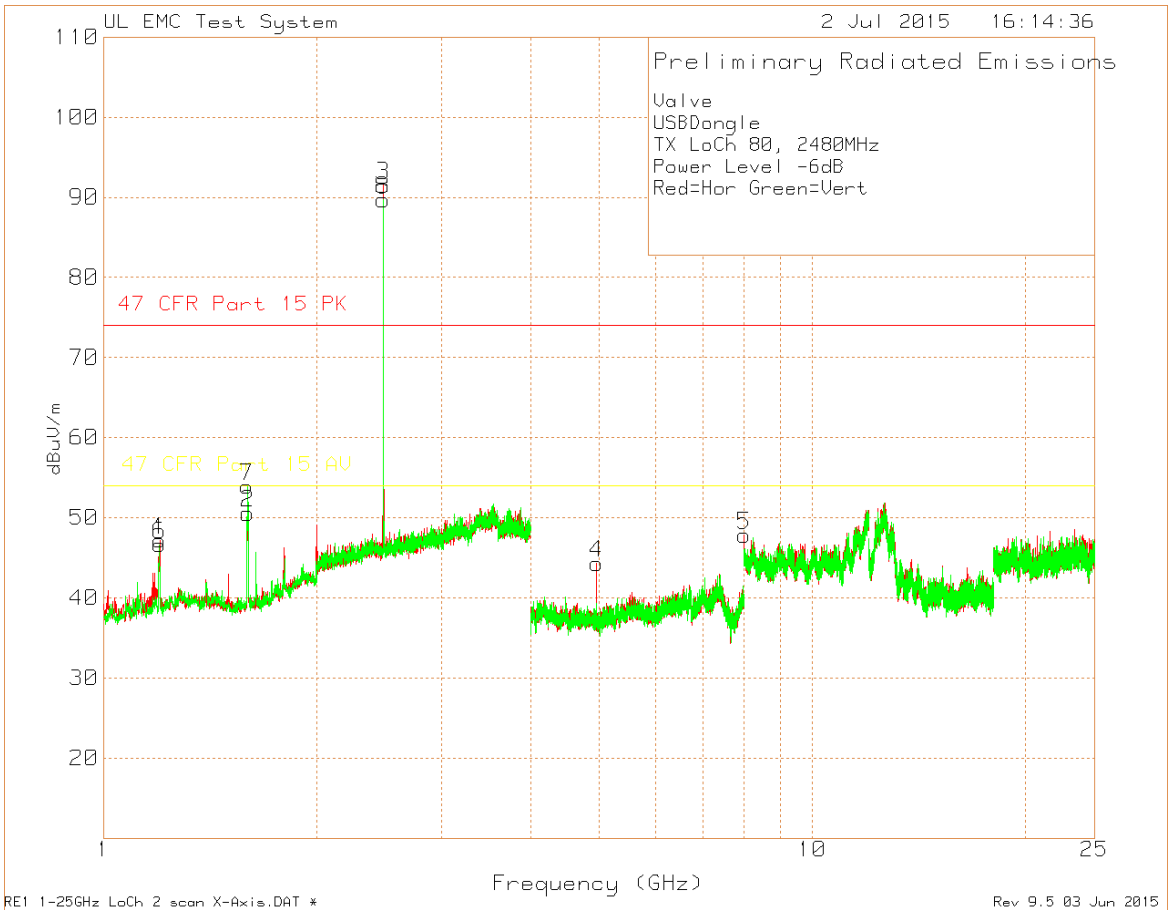
Pk - Peak detector
Av - Average detection

CH 40



During prescan, no Emissions found within 5dB of the limit, therefore no further measurements needed.

CH 80



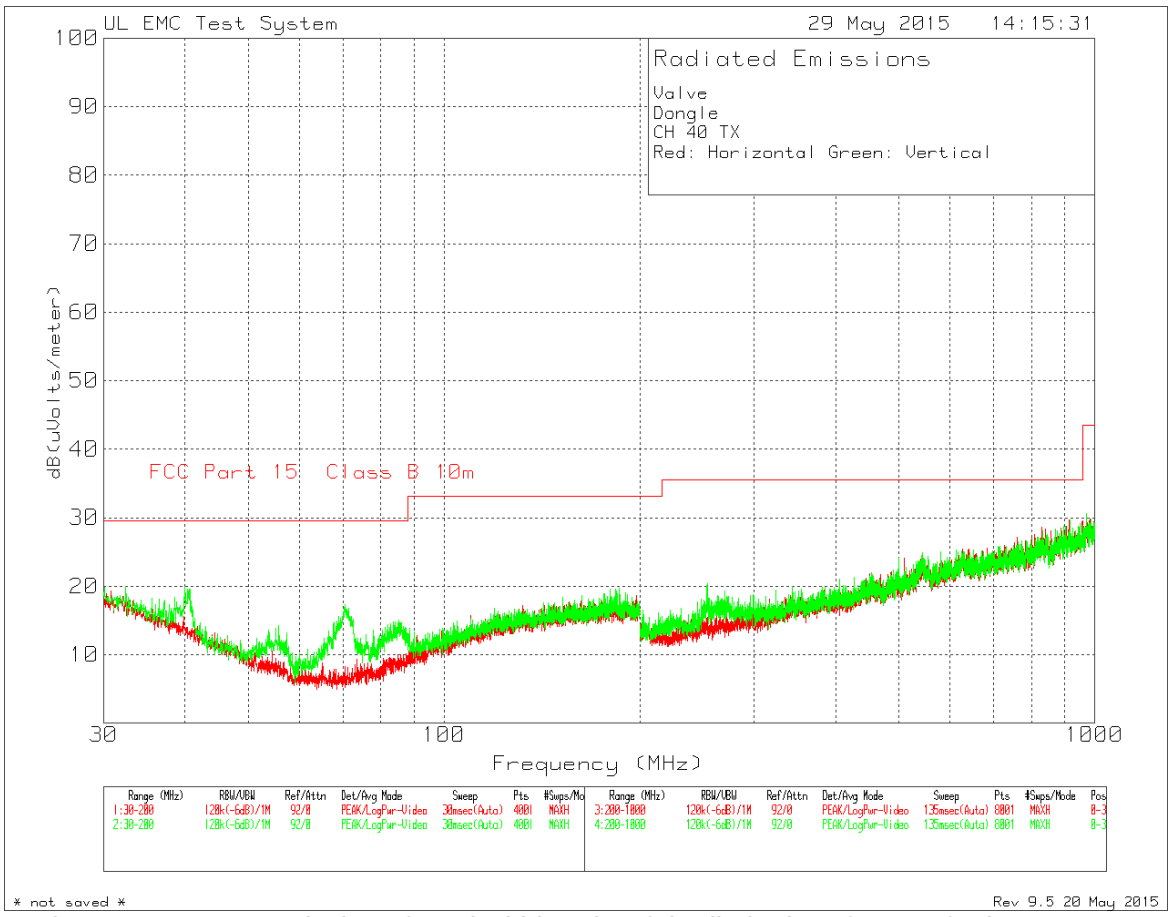
Valve
USBDongle
TX LoCh 80, 2480MHz
Power Level -6dB
Red=Hor Green=Vert

Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Gain dB/m	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
1.5931	78.91	Pk	28.2	-54.42	52.69	74	-21.31	-	-	278	148	H
1.5994	72.09	Av	28.2	-54.33	45.96	74	-28.04	54	-8.04	278	148	H
1.5963	81.05	Pk	28.2	-54.35	54.9	74	-19.1	-	-	139	127	V
1.5931	75.19	Av	28.2	-54.41	48.98	74	-25.02	54	-5.02	139	127	V

7.2.4. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz

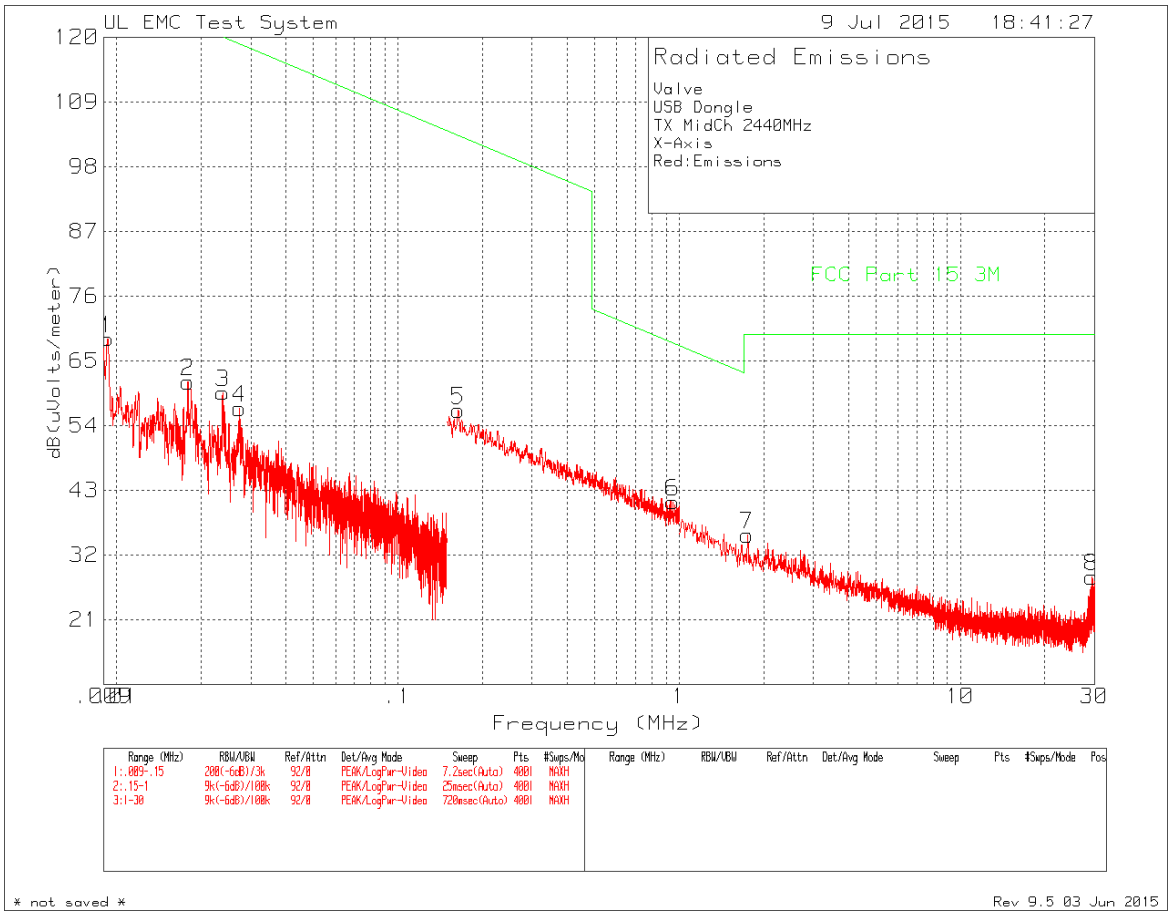
PLOT



During Prescan, no emissions found within 5dB of the limit, therefore no further measurements needed.

SPURIOUS EMISSIONS 9kHz TO 30 MHz

PLOT



During Prescan, no emissions found within 5dB of the limit, therefore no further measurements needed.

8. 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

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS

Manufacturer:Valve
Model#Dongle
Mode:TX CH 40
Voltage:120V 60Hz
QP=Red CaV=Grn

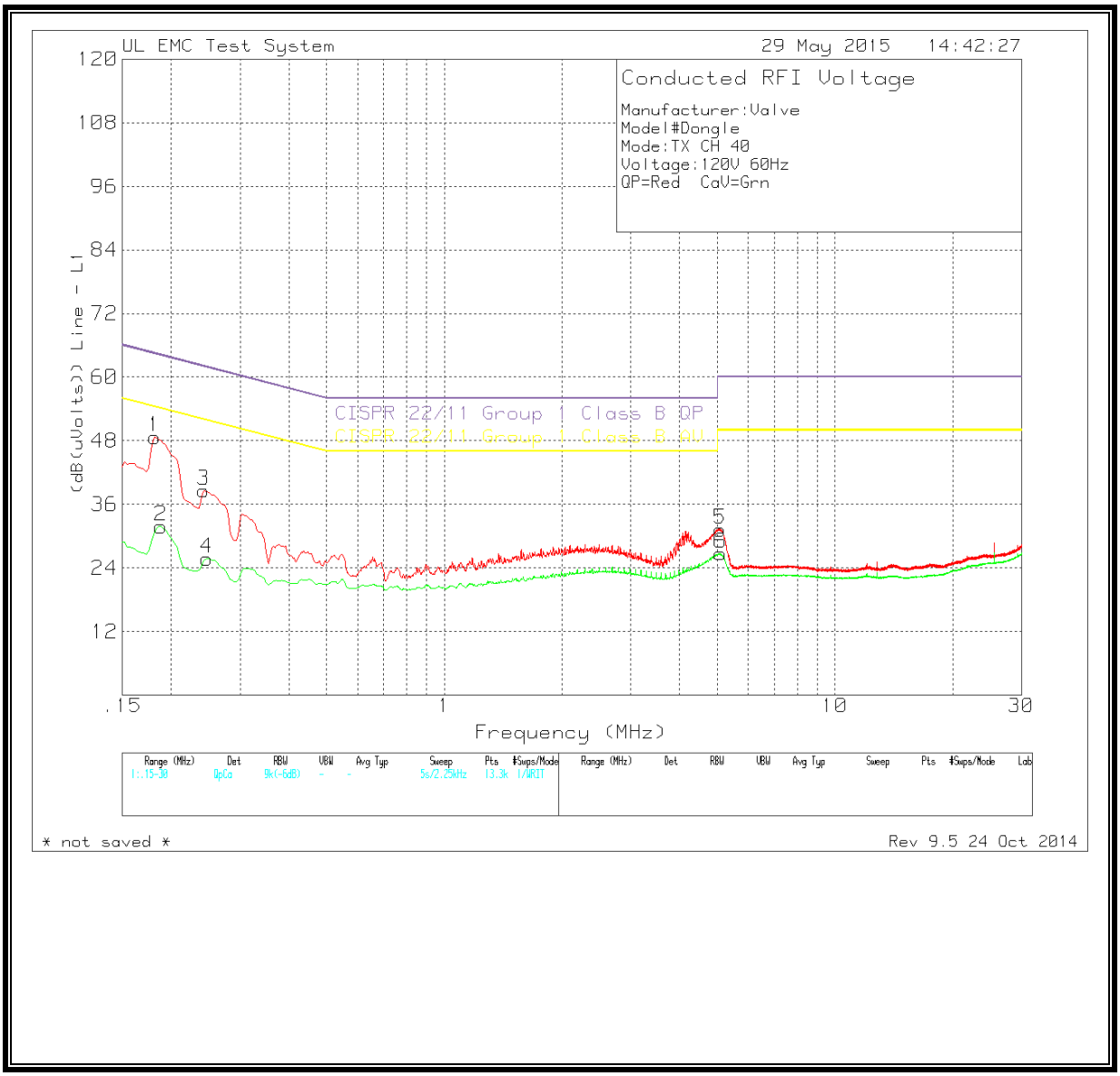
Trace Markers

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 - 30MHz											
1	.1815	36.67dBuV Qp	.1	11.9	48.67	-	-	64.42	-	-	-
					Margin (dB)	-	-	-15.75	-	-	-
2	.18825	20.04dBuV Ca	.1	11.7	31.84	-	-	-	54.11	-	-
					Margin (dB)	-	-	-	-22.27	-	-
3	.24225	27.23dBuV Qp	.1	11.3	38.63	-	-	62.02	-	-	-
					Margin (dB)	-	-	-23.39	-	-	-
4	.24675	14.48dBuV Ca	.1	11.2	25.78	-	-	-	51.87	-	-
					Margin (dB)	-	-	-	-26.09	-	-
5	5.0865	20.44dBuV Qp	.1	10.7	31.24	-	-	60	-	-	-
					Margin (dB)	-	-	-28.76	-	-	-
6	5.091	15.93dBuV Ca	.1	10.7	26.73	-	-	-	50	-	-
					Margin (dB)	-	-	-	-23.27	-	-
Line - L2 .15 - 30MHz											
7	.1815	36.36dBuV Qp	.1	12	48.46	-	-	64.42	-	-	-
					Margin (dB)	-	-	-15.96	-	-	-
8	.186	19.66dBuV Ca	.1	11.8	31.56	-	-	-	54.21	-	-
					Margin (dB)	-	-	-	-22.65	-	-
9	.24225	28.74dBuV Qp	.1	11.4	40.24	-	-	62.02	-	-	-
					Margin (dB)	-	-	-21.78	-	-	-
10	.24675	14.04dBuV Ca	.1	11.3	25.44	-	-	-	51.87	-	-
					Margin (dB)	-	-	-	-26.43	-	-
11	5.127	22.19dBuV Qp	.1	10.9	33.19	-	-	60	-	-	-
					Margin (dB)	-	-	-26.81	-	-	-
12	5.12475	17.68dBuV Ca	.1	10.9	28.68	-	-	-	50	-	-
					Margin (dB)	-	-	-	-21.32	-	-

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

Qp - Quasi-Peak detector
Ca - CISPR Average detection

LINE 1 RESULTS



LINE 2 RESULTS