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

CERTIFICATION TEST REPORT

FOR

Fibaro Double Switch 2

MODEL NUMBER: FGS-223

FCC ID: 2AA9MFGS223
IC: 20430-FGS223

REPORT NUMBER: 11291477B

ISSUE DATE: July 15, 2016

Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
--	July 12, 2016	Initial Issue	V Sabalvaro
REV1	July 15, 2016	Editorial Changes	V Sabalvaro

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Fibar Group S.A.
Ul. Lotnicza 1
Poznań, Poland 60-421

EUT DESCRIPTION: Fibaro Double Switch 2

MODEL: FGS-223

SERIAL NUMBER: Non-serialized

DATE TESTED: June 27 – July 7, 2016

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:

Bart Mucha
Staff Engineer

UL LLC

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Vincent Sabalvaro
EMC WISE Engineer
Consumer Technology
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, 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

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
Conducted Emissions	150k-30MHz	LISN	3.65dB
Radiated Emissions	9k-30MHz	H-Field Loop	3.15dB
Radiated Emissions	30-200MHz	Bicon 3m Horz	3.64dB
Radiated Emissions	30-200MHz	Bicon 3m Vert	5.10dB
Radiated Emissions	200-1000MHz	LogP 3m Horz	4.00dB
Radiated Emissions	200-1000MHz	LogP 3m Vert	5.36dB
Radiated Emissions	30-200MHz	Bicon 10m Horz	4.48dB
Radiated Emissions	30-200MHz	Bicon 10m Vert	4.49dB
Radiated Emissions	200-1000MHz	LogP 10m Horz	3.79dB
Radiated Emissions	200-1000MHz	LogP 10m Vert	3.84dB
Radiated Emissions	1-18GHz	Horn	4.32dB
Conducted Ant Port	30MHz-26GHz	Spectrum Analyzer	2.94dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a 908.4MHz, 908.42MHz, and 916MHz transceiver. It is AC powered. The transmitter utilizes Z-wave technologies to communicate with other devices for home automation.
The device is manufactured by Fibar Group S.A

5.2. MAXIMUM OUTPUT E-FIELD STRENGTH

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

Frequency Range (MHz)	Mode	Output QK E-field Strength (dBuV/m)
908.4 - 916	TX	92.59

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an isolated copper wire type whip antenna.

5.4. WORST-CASE CONFIGURATION AND MODE

The EUT was set in worst axis as found in preliminary testing. The Y-axis was determined to be the worst axis.
For radiated emissions, the worst-case configuration is determined to be the transmitting channel with the highest measured output power.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
None	-	-	-	-

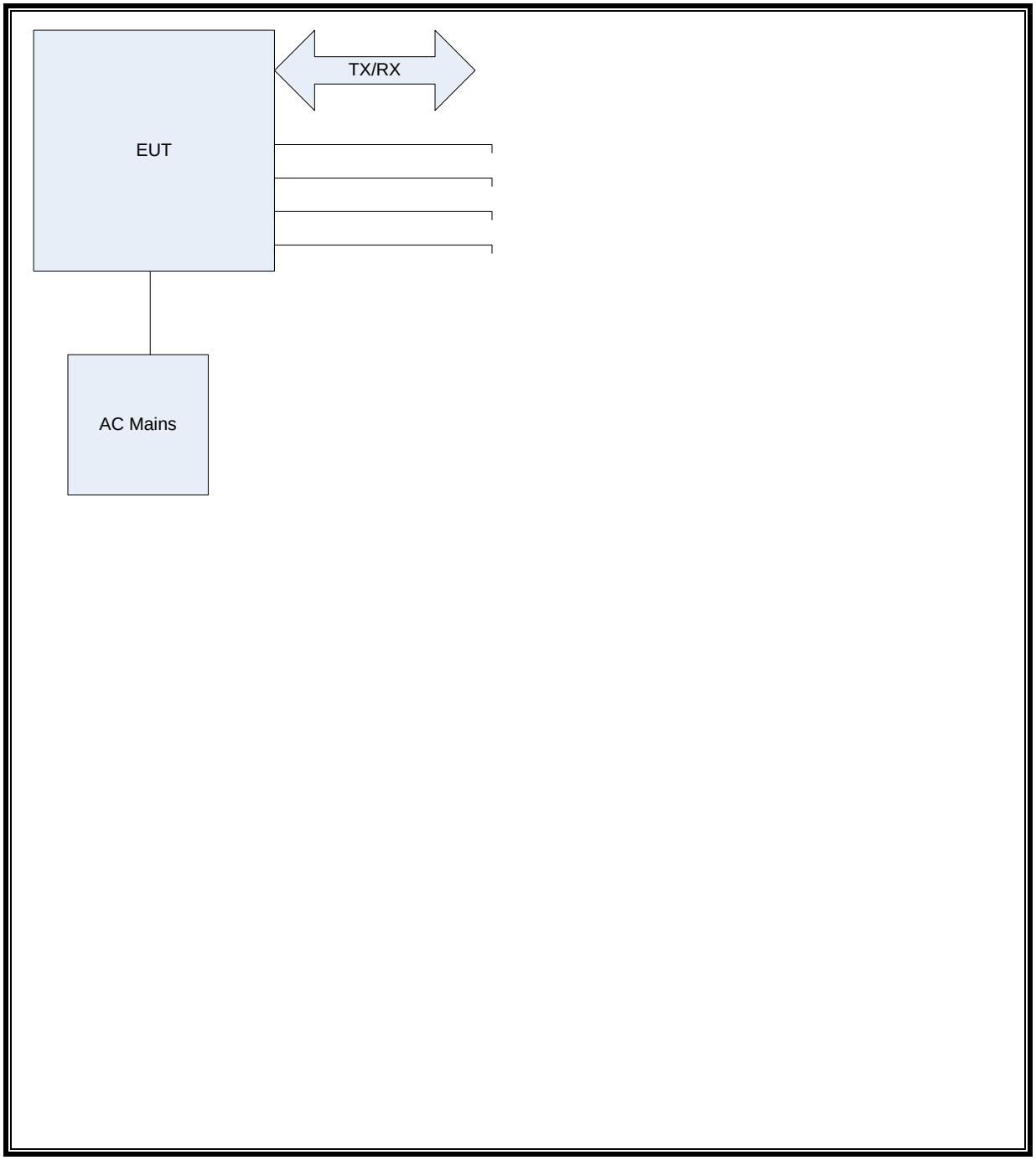
I/O CABLES

Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
0	Enclosure	-	Non-Electrical	-	-	None
1	AC	2	Wire	AC	>3m	None
2	IO Lines	4	Wire	AC	>3m	Wires connected to all IO ports

TEST SETUP

The EUT is programmed for continuous TX mode

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, Nov, 2015		
Conducted Software	UL	UL EMC	Ver 9.5, Nov 2015		
EMI Test Receiver	Rohde & Schwarz	ESR	EMC4377	4/26/2016	4/30/2017
Transient Limiter	Electro-Metrics	EM7600-2	EMC4224	N/A	N/A
HighPass Filter	Solar Electronics	2803-150	EMC4327	N/A	N/A
Attenuator	HP	8494B	2831A0083	N/A	N/A
LISN - L1	Solar	8602-50-TS-50-N	EMC4052	2/16/2016	2/28/2017
LISN - L2	Solar	8602-50-TS-50-N	EMC4064	2/16/2016	2/28/2017
Signal Analyzer	Agilent	PXA	EMC4360	1/8/2016	1/31/2017
Test Receiver	Rhode & Schwarz	ESCI	EMC4328	11/18/2015	11/30/2016
Log-P Antenna	Chase	UPA6109	EMC4313	1/22/2016	1/31/2017
Bicon Antenna	Chase	UPA6106A	EMC4078	12/28/2015	12/31/2016
Antenna Array	UL	BOMS	EMC4276	12/1/2015	12/31/2016
Test Receiver	Rhode & Schwarz	ESU	EMC4323	1/2/2016	1/31/2017

7. TEST RESULTS

7.1. 20 dB AND 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

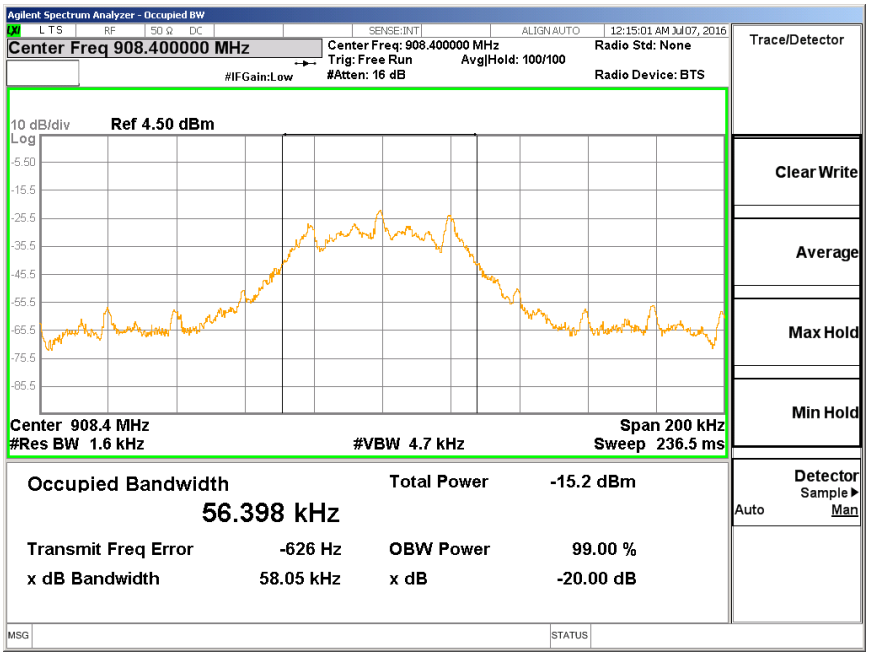
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 5% of the Occupied bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

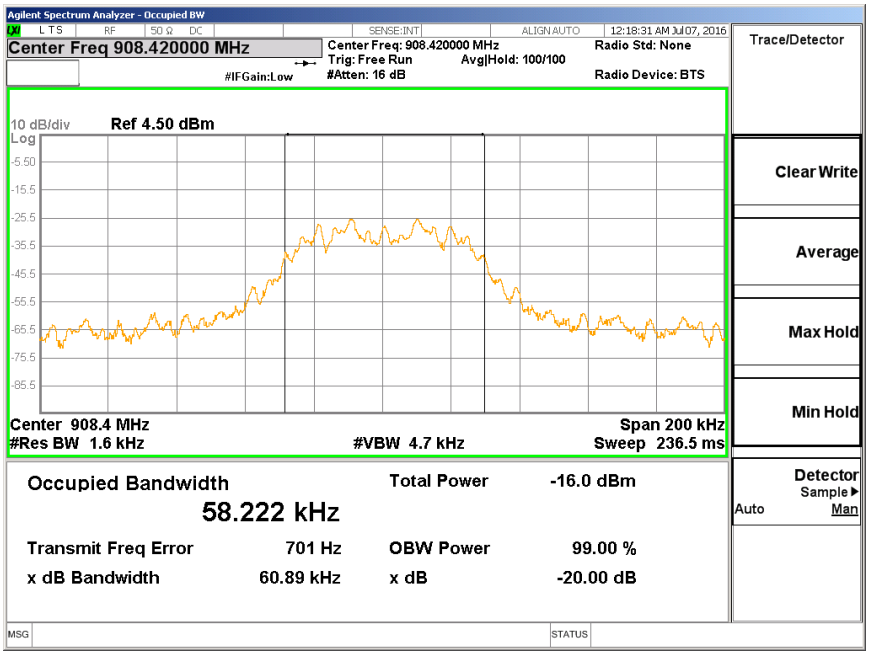
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	908.4	58.62	56.398
Middle	908.42	61.81	58.222
High	916	74.8	74.804

99% BANDWIDTH

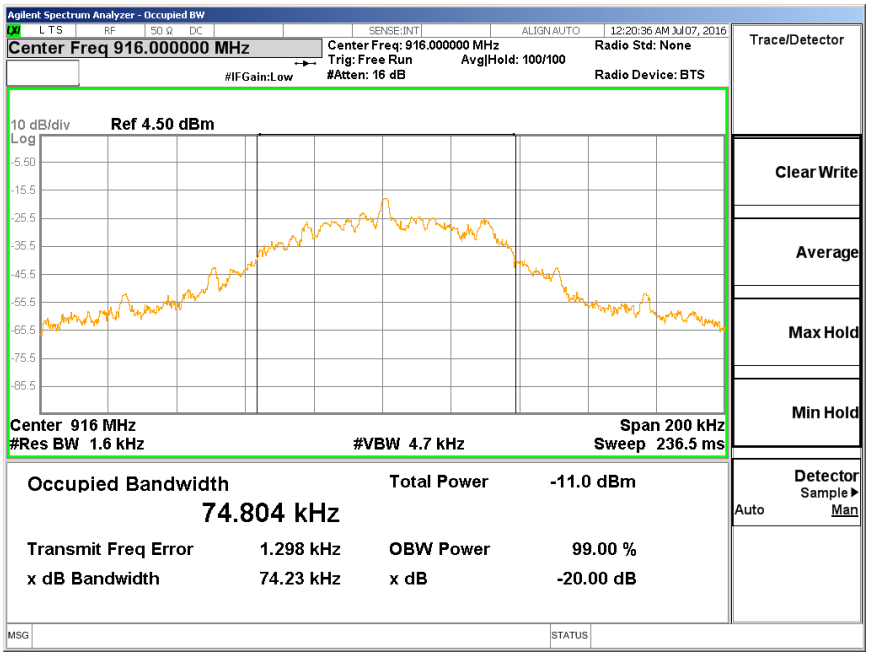
99% BANDWIDTH LOW CH



99% BANDWIDTH MID CH

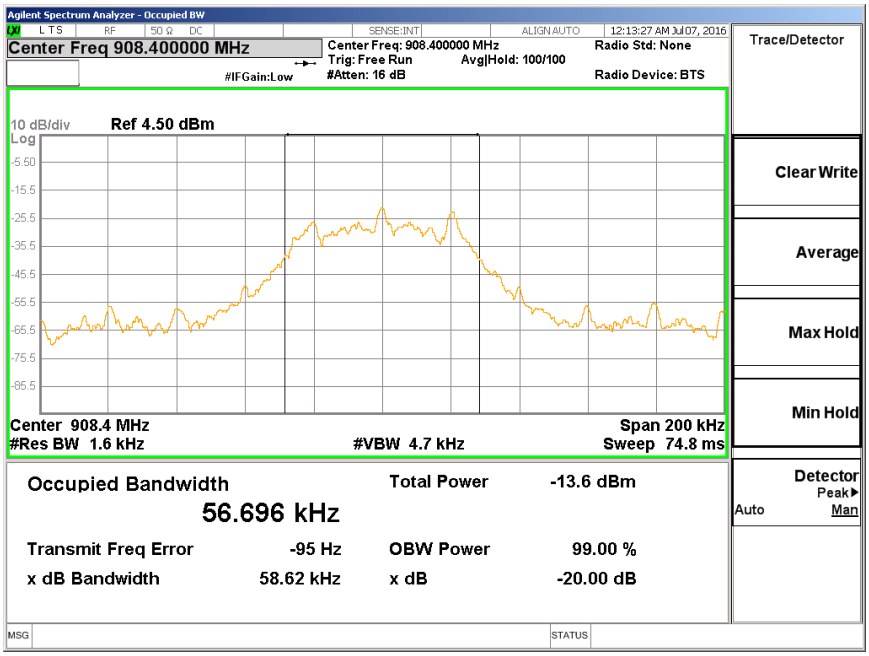


99% BANDWIDTH HIGH CH

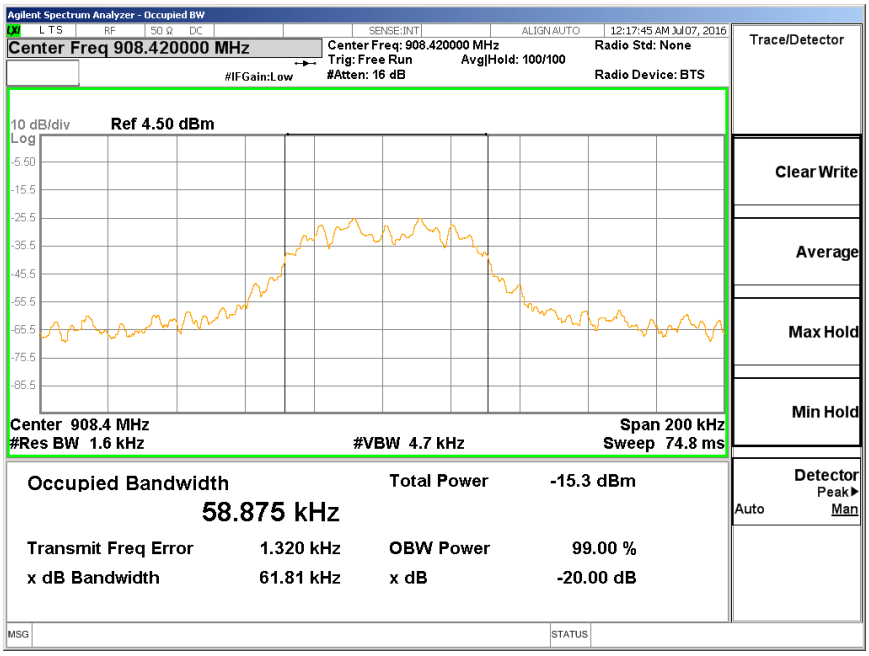


20dB BANDWIDTH

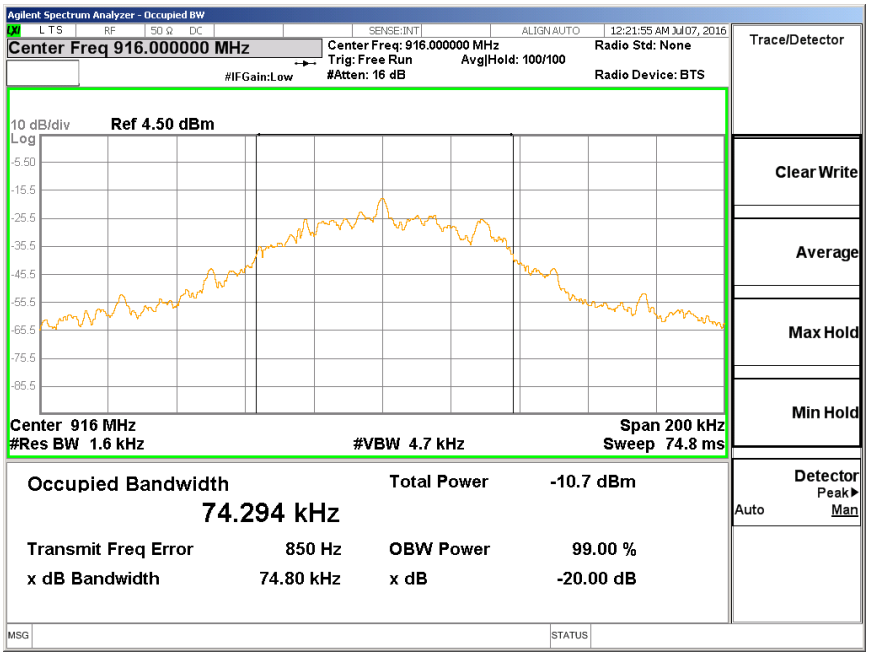
20dB BANDWIDTH LOW CH



20dB BANDWIDTH MID CH



20dB 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

7.2.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION

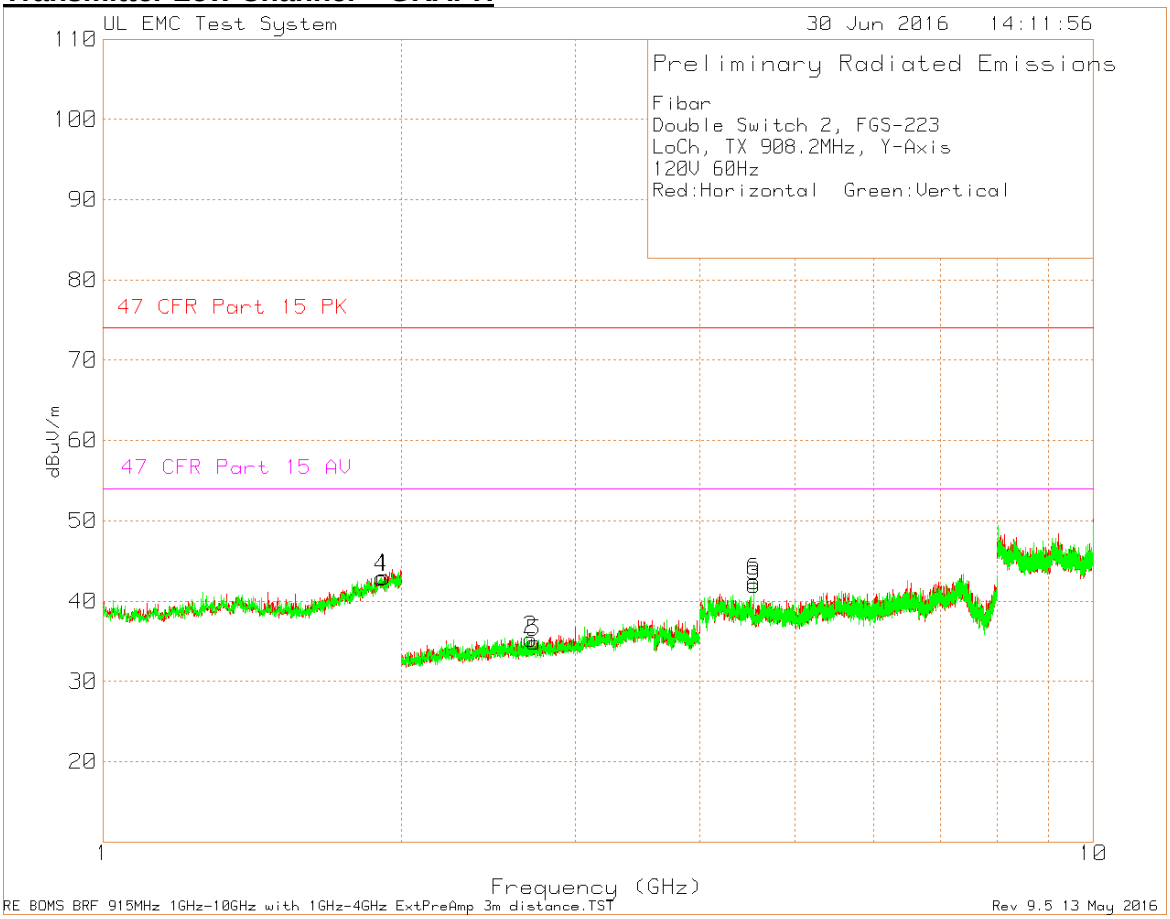
Fibar
Double Switch 2, FGS-223
Worst Axis Fundamental Measurement
120V 60Hz
Radiated Emission Data

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path dB	Corrected Reading dB(uVolts/meter)	Peak Limit 3m	Margin (dB)	QP Limit 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
908.4145	54.47	Pk	23.1	9.5	87.07	114	-26.93	-	-	340	101	H
908.4006	54.27	Qp	23.1	9.5	86.87	-	-	94	-7.13	340	101	H
908.4208	56.99	Pk	23.1	9.5	89.59	114	-24.41	-	-	323	121	V
908.401	56.84	Qp	23.1	9.5	89.44	-	-	94	-4.56	323	121	V
908.4417	56.77	Pk	23.1	9.5	89.37	114	-24.63	-	-	137	102	H
908.4246	56.63	Qp	23.1	9.5	89.23	-	-	94	-4.77	137	102	H
908.4373	56.22	Pk	23.1	9.5	88.82	114	-25.18	-	-	295	121	V
908.4168	56.03	Qp	23.1	9.5	88.63	-	-	94	-5.37	295	121	V
915.9669	58.8	Pk	23.3	9.6	91.7	114	-22.3	-	-	163	101	H
916.0009	58.65	Qp	23.3	9.6	91.55	-	-	94	-2.45	163	101	H
915.9956	59.8	Pk	23.3	9.6	92.7	114	-21.3	-	-	277	115	V
916.0003	59.69	Qp	23.3	9.6	92.59	-	-	94	-1.41	277	115	V

Pk - Peak detector
Qp - Quasi-Peak detector

7.2.2. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz

Transmitter Low Channel – GRAPH



All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter Low Channel – DATA

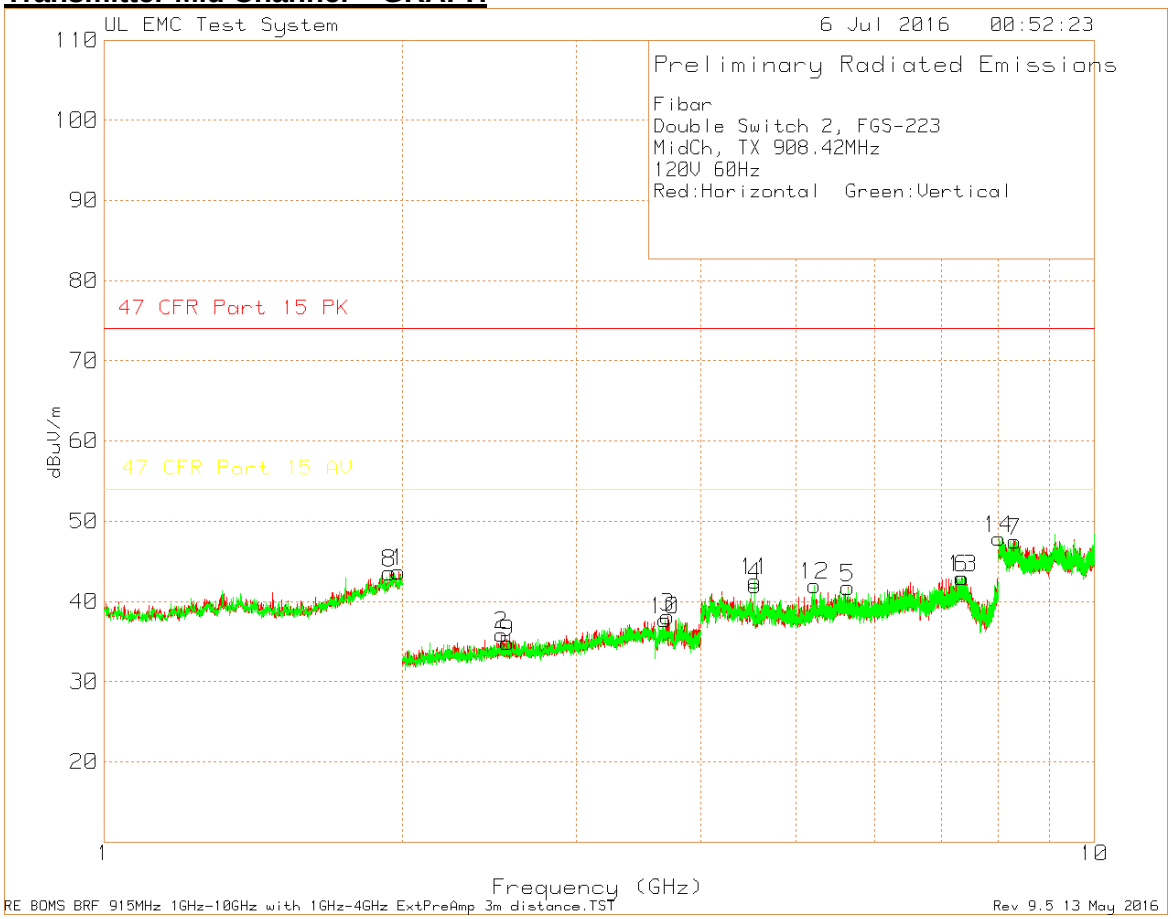
Fibar
Double Switch 2, FGS-223
LoCh, TX 908.2MHz, Y-Axis
120V 60Hz
Trace Markers

Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path (dB)	Corrected Reading dBuV/m	PK Limit	PK Margin (dB)	AV Limit	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.922	65.8	Pk	31.8	-54.6	43	74	-31	54	-11	0-360	150	H
2	2.704	64.09	Pk	22.1	-50.94	35.25	74	-38.75	54	-18.75	0-360	150	H
3	4.542	65.99	Pk	27.8	-51.81	41.98	74	-32.02	54	-12.02	0-360	100	H
4	1.911	65.8	Pk	31.8	-54.68	42.92	74	-31.08	54	-11.08	0-360	100	V
5	2.725	63.75	Pk	22.1	-50.96	34.89	74	-39.11	54	-19.11	0-360	100	V
6	4.542	66.46	Pk	27.8	-51.81	42.45	74	-31.55	54	-11.55	0-360	150	V

Pk - Peak detector

All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter Mid Channel – GRAPH



All visible emissions are at least 5dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter Mid Channel – DATA

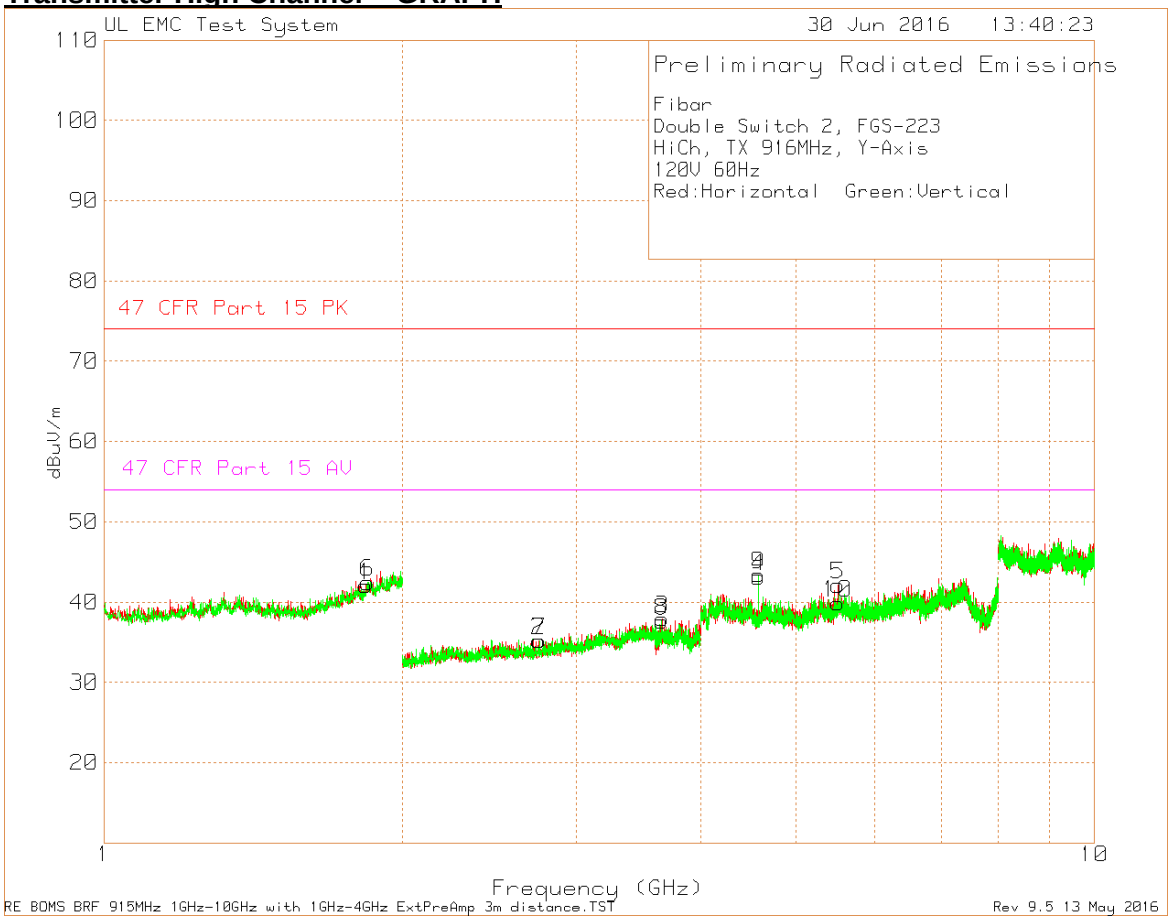
Fibar
Double Switch 2, FGS-223
MidCh, TX 908.42MHz
120V 60Hz
Trace Markers

Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path (dB)	Corrected Reading dBuV/m	PK Limit	PK Margin (dB)	AV Limit	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.984	65.5	Pk	32.3	-54.08	43.72	74	-30.28	54	-10.28	0-360	100	H
2	2.52	64.79	Pk	22.1	-51.02	35.87	74	-38.13	54	-18.13	0-360	100	H
3	3.708	64.21	Pk	23.5	-49.62	38.09	74	-35.91	54	-15.91	0-360	150	H
4	4.542	65.99	Pk	27.8	-51.81	41.98	74	-32.02	54	-12.02	0-360	100	H
5	5.637	62.81	Pk	28.5	-49.55	41.76	74	-32.24	54	-12.24	0-360	100	H
6	7.345	58.4	Pk	30.8	-46.23	42.97	74	-31.03	54	-11.03	0-360	100	H
7	8.31	58.85	Pk	36.5	-47.85	47.5	74	-26.5	54	-6.5	0-360	150	H
8	1.942	66.03	Pk	31.9	-54.37	43.56	74	-30.44	54	-10.44	0-360	100	V
9	2.554	63.55	Pk	22.2	-50.88	34.87	74	-39.13	54	-19.13	0-360	100	V
10	3.685	63.47	Pk	23.5	-49.24	37.73	74	-36.27	54	-16.27	0-360	150	V
11	4.542	66.59	Pk	27.8	-51.81	42.58	74	-31.42	54	-11.42	0-360	150	V
12	5.218	63.27	Pk	28.3	-49.56	42.01	74	-31.99	54	-11.99	0-360	150	V
13	7.363	58.37	Pk	30.9	-46.32	42.95	74	-31.05	54	-11.05	0-360	150	V
14	8.006	58.8	Pk	36.1	-47.04	47.86	74	-26.14	54	-6.14	0-360	150	V

Pk - Peak detector

All visible emissions are at least 5dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter High Channel – GRAPH



All visible emissions are at least 5dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter High Channel – DATA

Fibar
Double Switch 2, FGS-223
HiCh, TX 916MHz, Y-Axis
120V 60Hz
Trace Markers

Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path (dB)	Corrected Reading dBuV/m	PK Limit	PK Margin (dB)	AV Limit	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.838	65.6	Pk	31.1	-54.63	42.07	74	-31.93	54	-11.93	0-360	150	H
2	2.747	63.99	Pk	22.1	-50.87	35.22	74	-38.78	54	-18.78	0-360	100	H
3	3.66	63.91	Pk	23.4	-49.37	37.94	74	-36.06	54	-16.06	0-360	150	H
4	4.58	67.28	Pk	27.7	-51.85	43.13	74	-30.87	54	-10.87	0-360	100	H
5	5.506	63.77	Pk	28.2	-49.86	42.11	74	-31.89	54	-11.89	0-360	100	H
6	1.846	65.88	Pk	31.2	-54.6	42.48	74	-31.52	54	-11.52	0-360	100	V
7	2.753	63.84	Pk	22.2	-50.83	35.21	74	-38.79	54	-18.79	0-360	99	V
8	3.657	63.63	Pk	23.4	-49.41	37.62	74	-36.38	54	-16.38	0-360	149	V
9	4.58	67.58	Pk	27.7	-51.85	43.43	74	-30.57	54	-10.57	0-360	150	V
10	5.506	61.54	Pk	28.2	-49.86	39.88	74	-34.12	54	-14.12	0-360	150	V

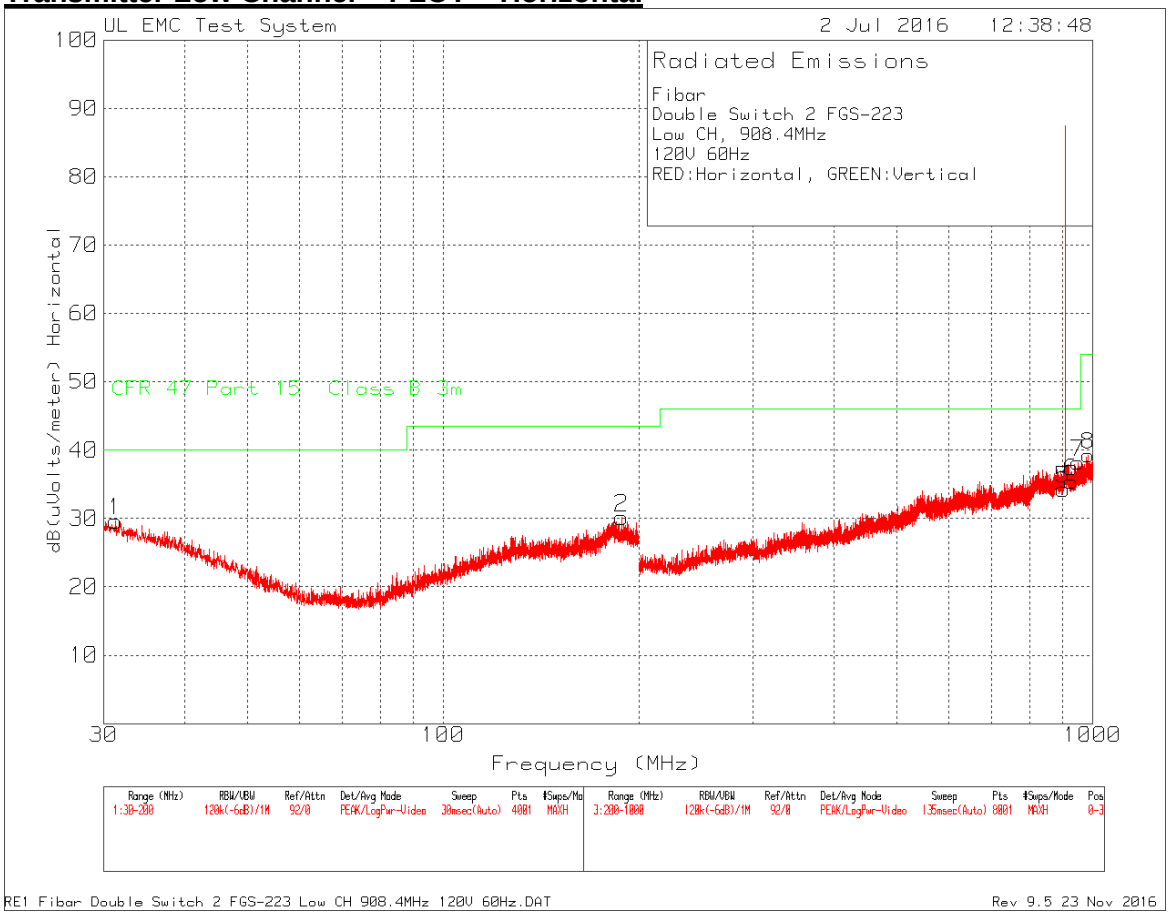
Pk - Peak detector

All visible emissions are at least 5dB below the limit or under the noise floor, therefore no further measurement needed.

7.2.3. WORST-CASE BELOW 1 GHz

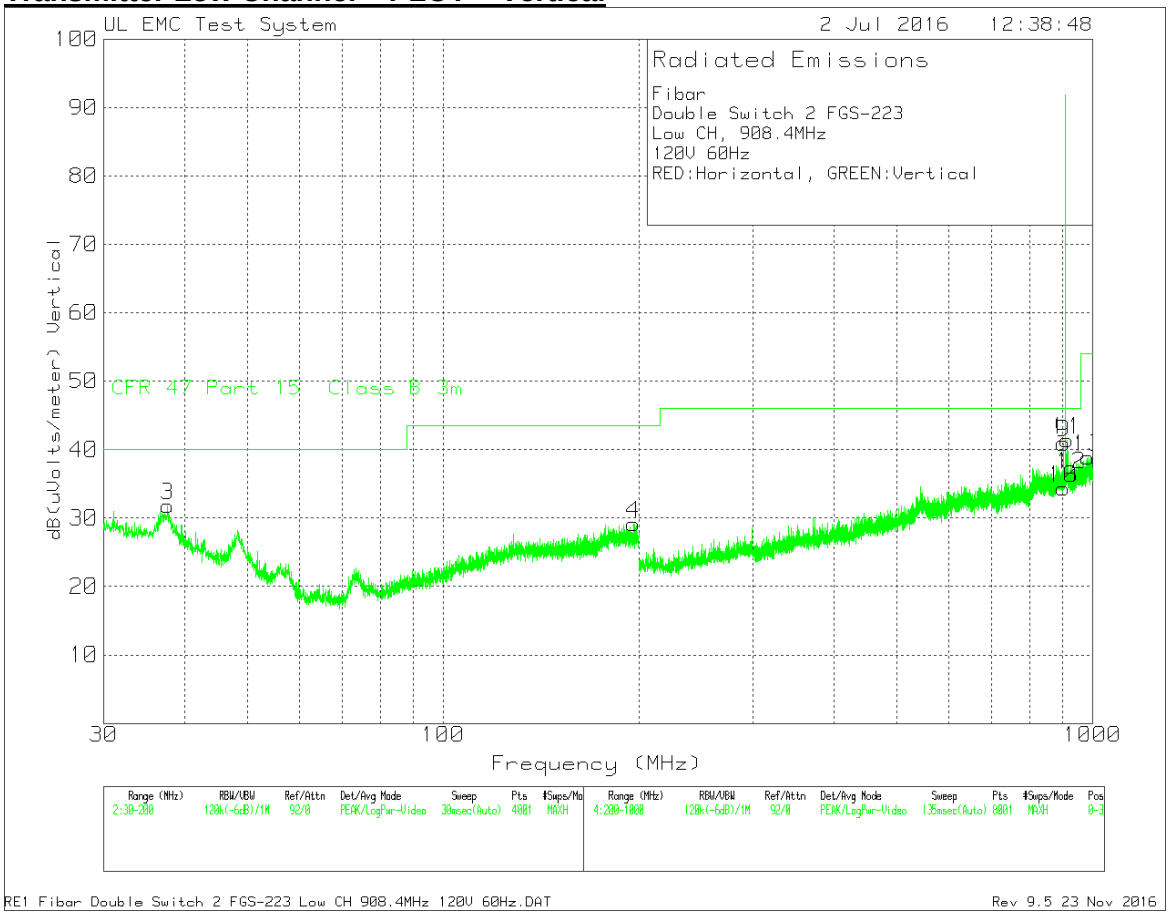
SPURIOUS EMISSIONS 30 TO 1000 MHz

Transmitter Low Channel – PLOT – Horizontal



All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter Low Channel – PLOT – Vertical



All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter Low Channel – DATA

Fibar
Double Switch 2 FGS-223
Low CH, 908.4MHz
120V 60Hz
Trace Markers

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path dB	10M to 3M Factor dB	Corrected Reading dB(uVolts/ meter)	QP Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	31.275	31.44	Pk	17.7	-30	10.5	29.64	40	-10.36	0-360	398	H
2	188.355	32.75	Pk	15.9	-29	10.5	30.15	43.52	-13.37	0-360	248	H
3	37.65	36.11	Pk	15.2	-30	10.5	31.81	40	-8.19	0-360	251	V
4	196.5575	31.46	Pk	16	-28.8	10.5	29.16	43.52	-14.36	0-360	101	V
5*	902	29.12	Pk	22.7	-28	10.5	34.32	46.02	-11.7	0-360	399	H
6*	928	29.81	Pk	22.7	-27.6	10.5	35.41	46.02	-10.61	0-360	199	H
7	950.1	31.62	Pk	23.5	-27.4	10.5	38.22	46.02	-7.8	0-360	299	H
8	985.7	31.1	Pk	24.3	-26.6	10.5	39.3	53.97	-14.67	0-360	299	H
9	901.3	35.75	Pk	22.6	-27.9	10.5	40.95	46.02	-5.07	0-360	102	V
10*	902	29.17	Pk	22.7	-28	10.5	34.37	46.02	-11.65	0-360	198	V
11	913.7	35.31	Pk	23.3	-27.7	10.5	41.41	46.02	-4.61	0-360	102	V
12*	928	30.74	Pk	22.7	-27.6	10.5	36.34	46.02	-9.68	0-360	399	V
13	984.1	30.76	Pk	24.3	-26.7	10.5	38.86	53.97	-15.11	0-360	102	V

Pk - Peak detector
* - Bandedge Markers

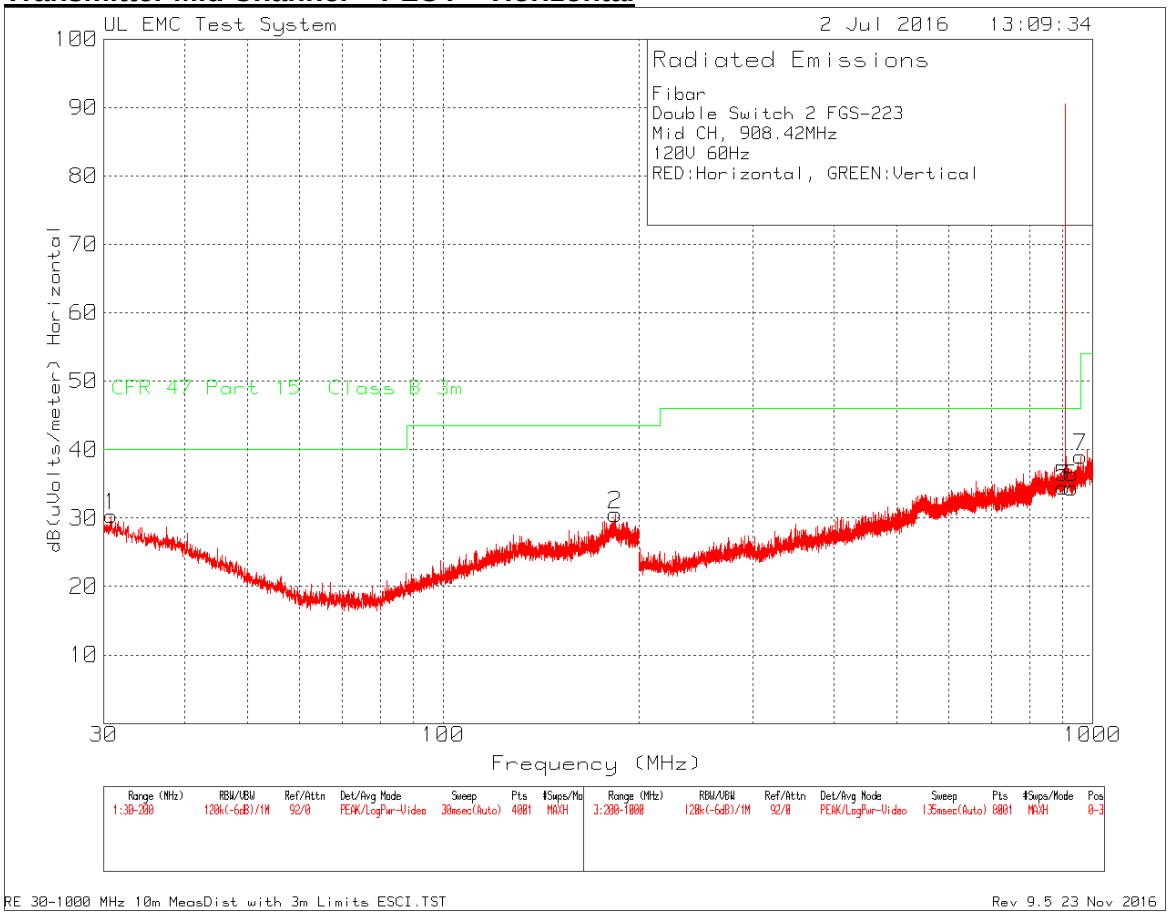
Radiated Emission Data

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path dB	10M to 3M Factor dB	Corrected Reading dB(uVolts/ meter)	QP Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
913.5308	36.44	Qp	23.3	-27.6	10.5	42.64	46.02	-3.38	166	178	V
901.15042	33.47	Qp	22.6	-27.9	10.5	38.67	46.02	-7.35	168	179	V

Qp - Quasi-Peak detector

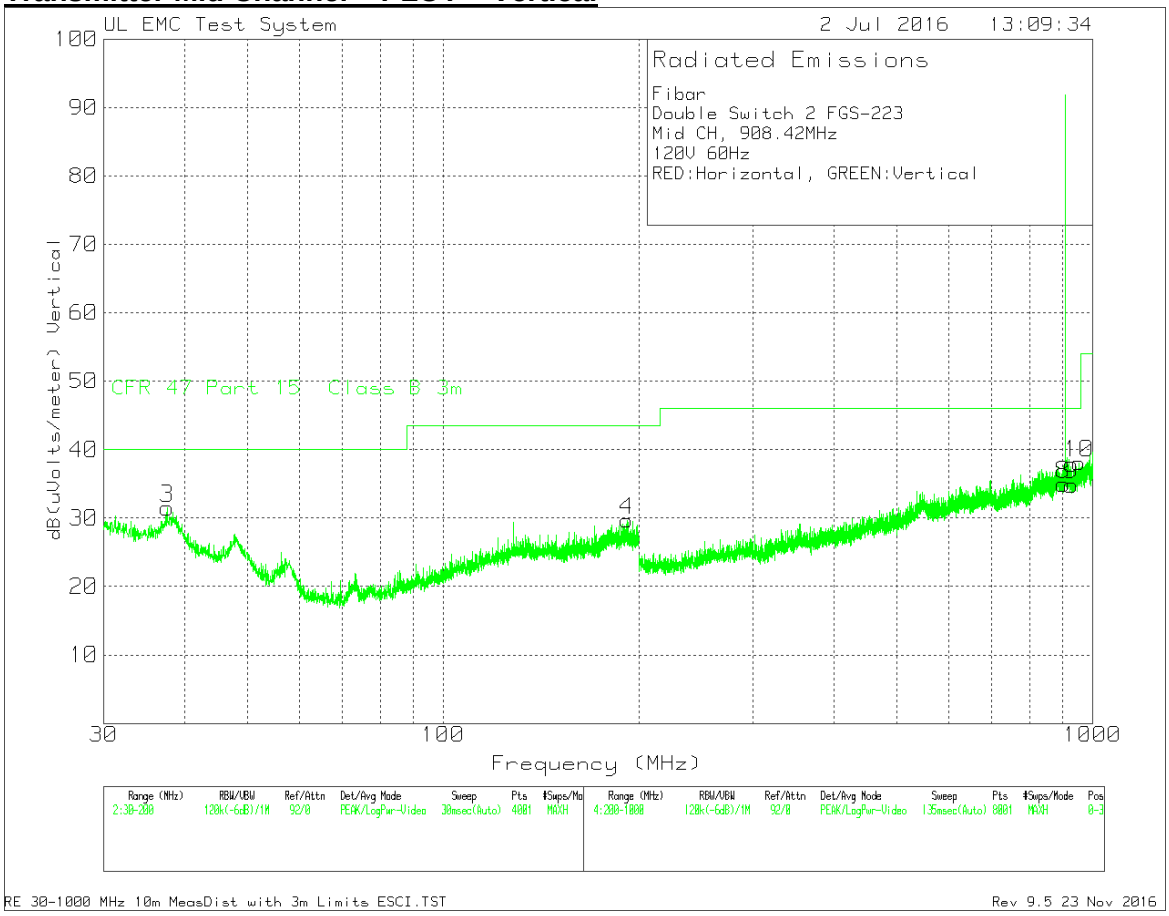
All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter Mid Channel – PLOT – Horizontal



All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter Mid Channel – PLOT – Vertical



All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter Mid Channel – DATA

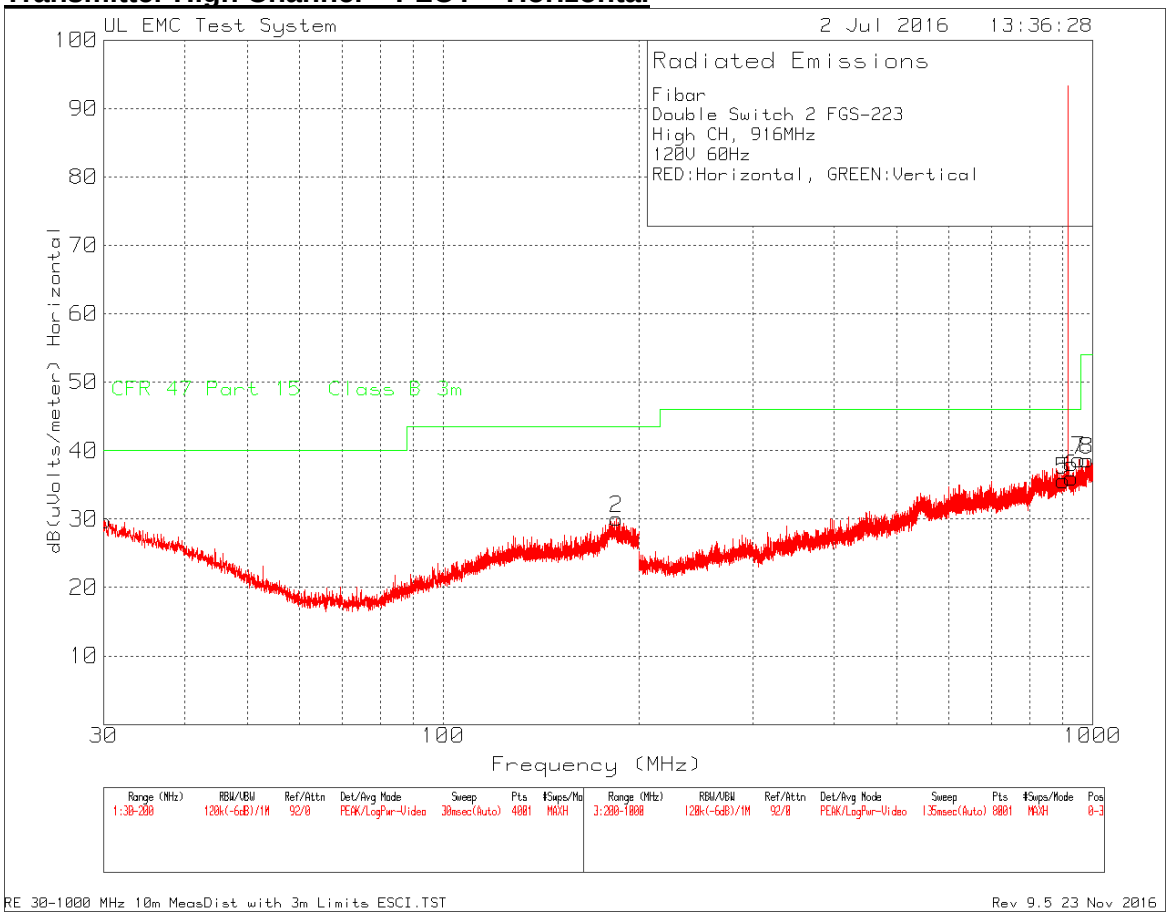
Fibar
Double Switch 2 FGS-223
Mid CH, 908.42MHz
120V 60Hz
Trace Markers

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path dB	10M to 3M Factor dB	Corrected Reading dB(uVolts/ meter)	QP Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	30.8075	31.98	Pk	17.9	-30	10.5	30.38	40	-9.62	0-360	398	H
2	184.02	33.45	Pk	15.7	-29.1	10.5	30.55	43.52	-12.97	0-360	248	H
3	37.565	35.68	Pk	15.3	-30	10.5	31.48	40	-8.52	0-360	101	V
4	191.84	32.09	Pk	16	-28.9	10.5	29.69	43.52	-13.83	0-360	101	V
5*	902	29.29	Pk	22.7	-28	10.5	34.49	46.02	-11.53	0-360	100	H
6*	928	28.83	Pk	22.7	-27.6	10.5	34.43	46.02	-11.59	0-360	399	H
7	958.1	32.23	Pk	23.6	-27.3	10.5	39.03	46.02	-6.99	0-360	199	H
8*	902	29.75	Pk	22.7	-28	10.5	34.95	46.02	-11.07	0-360	399	V
9*	928	29.24	Pk	22.7	-27.6	10.5	34.84	46.02	-11.18	0-360	98	V
10	953.6	31.28	Pk	23.5	-27.2	10.5	38.08	46.02	-7.94	0-360	199	V

Pk - Peak detector
* - Bandedge Markers

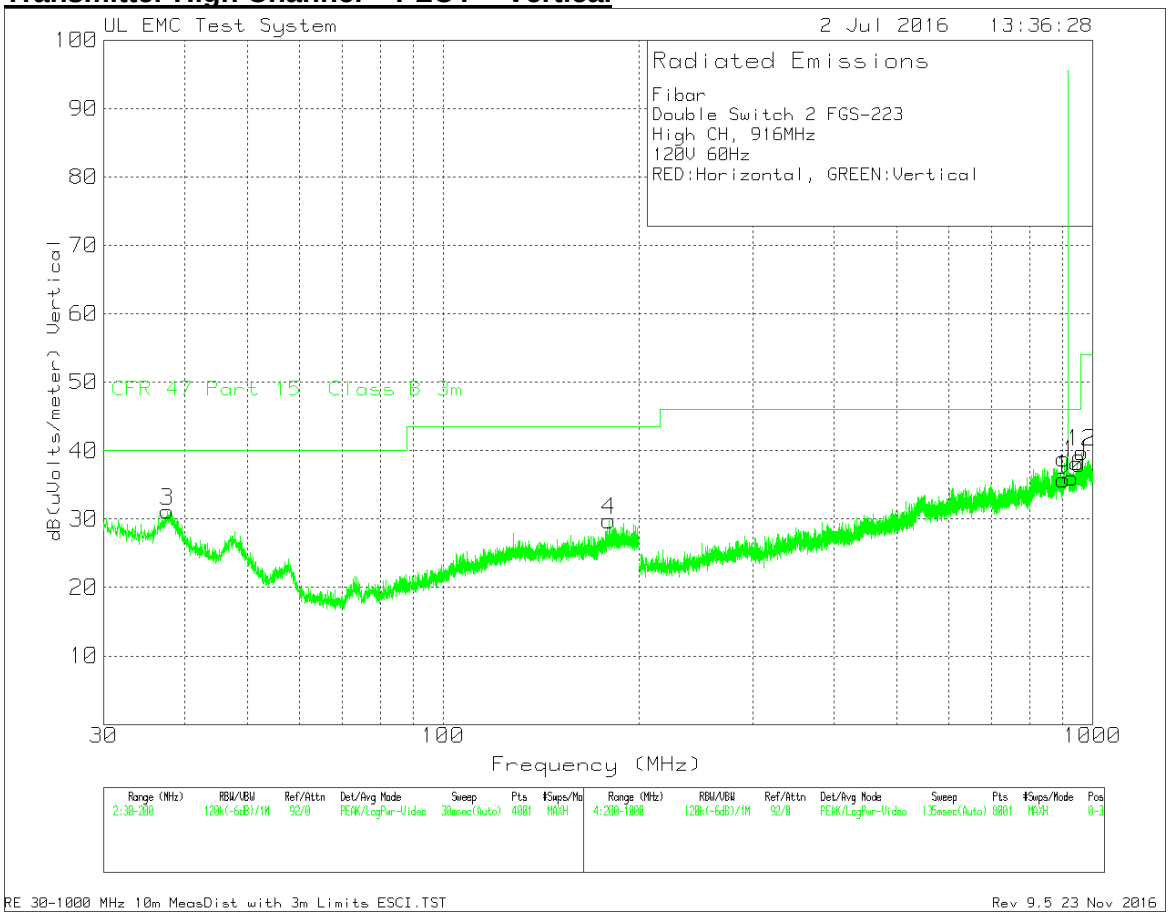
All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter High Channel – PLOT – Horizontal



All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter High Channel – PLOT – Vertical



All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter High Channel – DATA

Fibar
Double Switch 2 FGS-223
High CH, 916MHz
120V 60Hz
Trace Markers

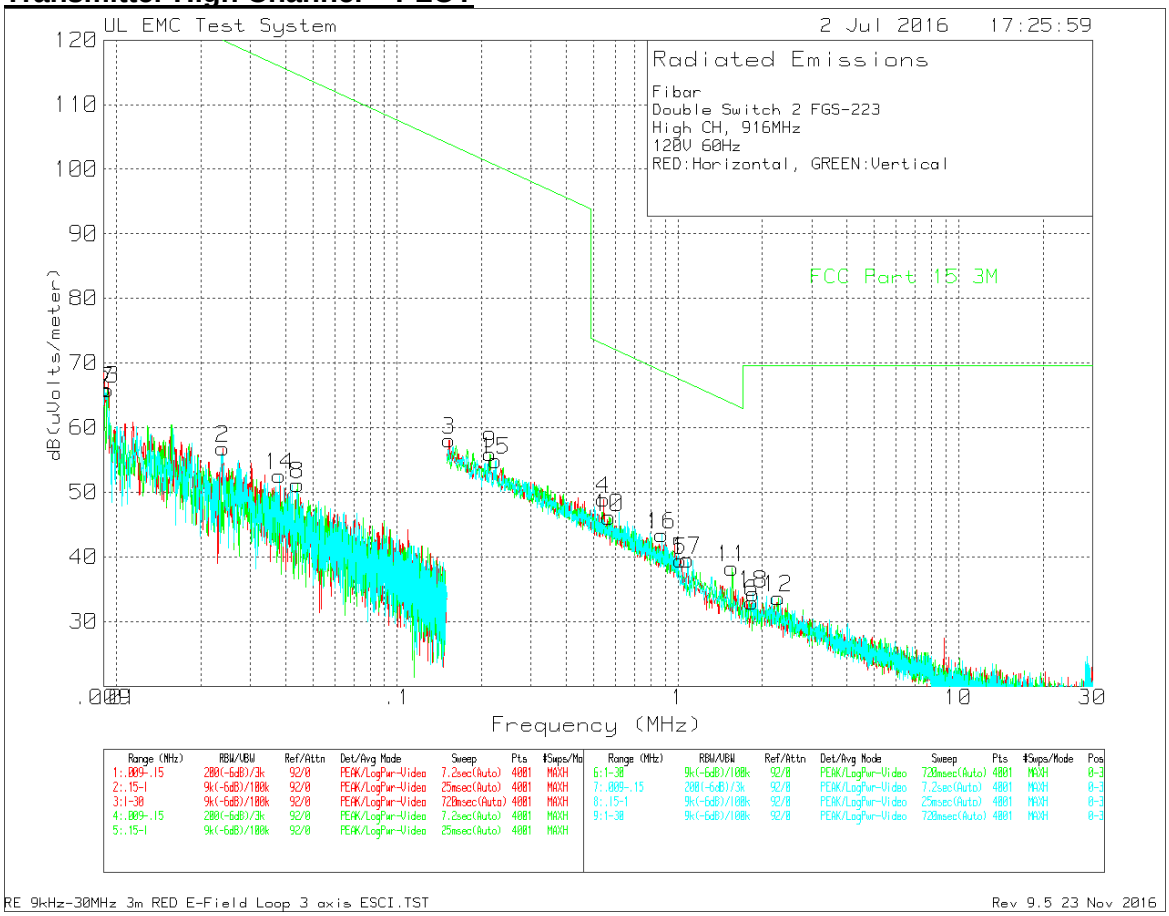
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path dB	10M to 3M Factor dB	Corrected Reading dB(uVolts/ meter)	QP Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	30.085	31.06	Pk	18.2	-30	10.5	29.76	40	-10.24	0-360	398	H
2	184.955	32.88	Pk	15.8	-29.1	10.5	30.08	43.52	-13.44	0-360	248	H
3	37.565	35.37	Pk	15.3	-30	10.5	31.17	40	-8.83	0-360	101	V
4	179.94	33.1	Pk	15.4	-29.2	10.5	29.8	43.52	-13.72	0-360	252	V
5*	902	30.44	Pk	22.7	-28	10.5	35.64	46.02	-10.38	0-360	98	H
6*	928	30.43	Pk	22.7	-27.6	10.5	36.03	46.02	-9.99	0-360	199	H
7	951.9	31.87	Pk	23.5	-27.2	10.5	38.67	46.02	-7.35	0-360	299	H
8	981.4	30.84	Pk	24.2	-26.9	10.5	38.64	53.97	-15.33	0-360	299	H
9*	902	30.52	Pk	22.7	-28	10.5	35.72	46.02	-10.3	0-360	399	V
10*	928	30.39	Pk	22.7	-27.6	10.5	35.99	46.02	-10.03	0-360	199	V
11	946.9	31.9	Pk	23.4	-27.6	10.5	38.2	46.02	-7.82	0-360	302	V
12	962.7	33.19	Pk	23.5	-27.4	10.5	39.79	53.97	-14.18	0-360	399	V

Pk - Peak detector
* - Bandedge Markers

All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

SPURIOUS EMISSIONS 9 kHz TO 30 MHz

Transmitter High Channel – PLOT



All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter High Channel – DATA

Fibar
Double Switch 2 FGS-223
High CH, 916MHz
120V 60Hz
Trace Markers

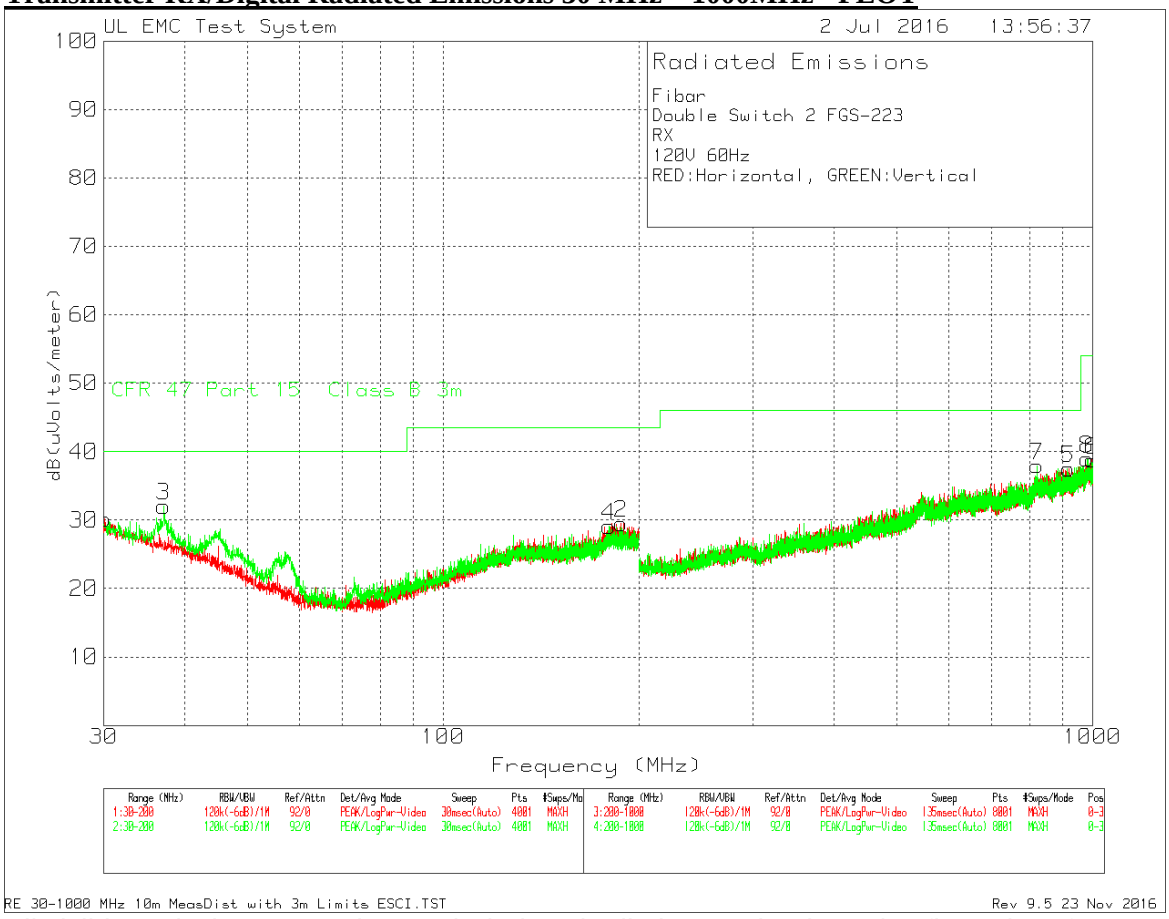
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path dB	Corrected Reading dB(uVolts/ meter)	AV Limit	Margin (dB)	Azimuth [Degs]
1	0.009	48.93	Pk	19.6	0	68.53	128.5	-59.97	0-360
2	0.023945	42.6	Pk	14.2	0	56.8	120.01	-63.21	0-360
3	0.15298	46.49	Pk	11.6	0	58.09	103.91	-45.82	0-360
4	0.54394	37.29	Pk	11.6	0	48.89	72.89	-24	0-360
5	1.02175	27.74	Pk	11.6	0.1	39.44	67.42	-27.98	0-360
6	1.83375	21.15	Pk	11.7	0.1	32.95	69.54	-36.59	0-360
7	0.00928	46.44	Pk	19.4	0	65.84	128.23	-62.39	0-360
8	0.044105	38.59	Pk	12.6	0	51.19	114.7	-63.51	0-360
9	0.21433	44.34	Pk	11.6	0	55.94	100.98	-45.04	0-360
10	0.56855	34.53	Pk	11.6	0	46.13	72.51	-26.38	0-360
11	1.55825	26.49	Pk	11.7	0.1	38.29	63.75	-25.46	0-360
12	2.276	21.85	Pk	11.7	0.1	33.65	69.54	-35.89	0-360
13	0.00907	46.5	Pk	19.5	0	66	128.43	-62.43	0-360
14	0.038085	39.49	Pk	13.1	0	52.59	115.98	-63.39	0-360
15	0.22434	43.32	Pk	11.6	0	54.92	100.58	-45.66	0-360
16	0.8759	31.7	Pk	11.6	0.1	43.4	68.76	-25.36	0-360
17	1.07975	27.8	Pk	11.6	0.1	39.5	66.94	-27.44	0-360
18	1.8555	22.48	Pk	11.7	0.1	34.28	69.54	-35.26	0-360

Pk - Peak detector

All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

7.2.4. Transmitter RX/Digital Radiated Emissions

Transmitter RX/Digital Radiated Emissions 30 MHz – 1000MHz - PLOT



All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter RX/Digital Radiated Emissions 30 MHz – 1000MHz - DATA

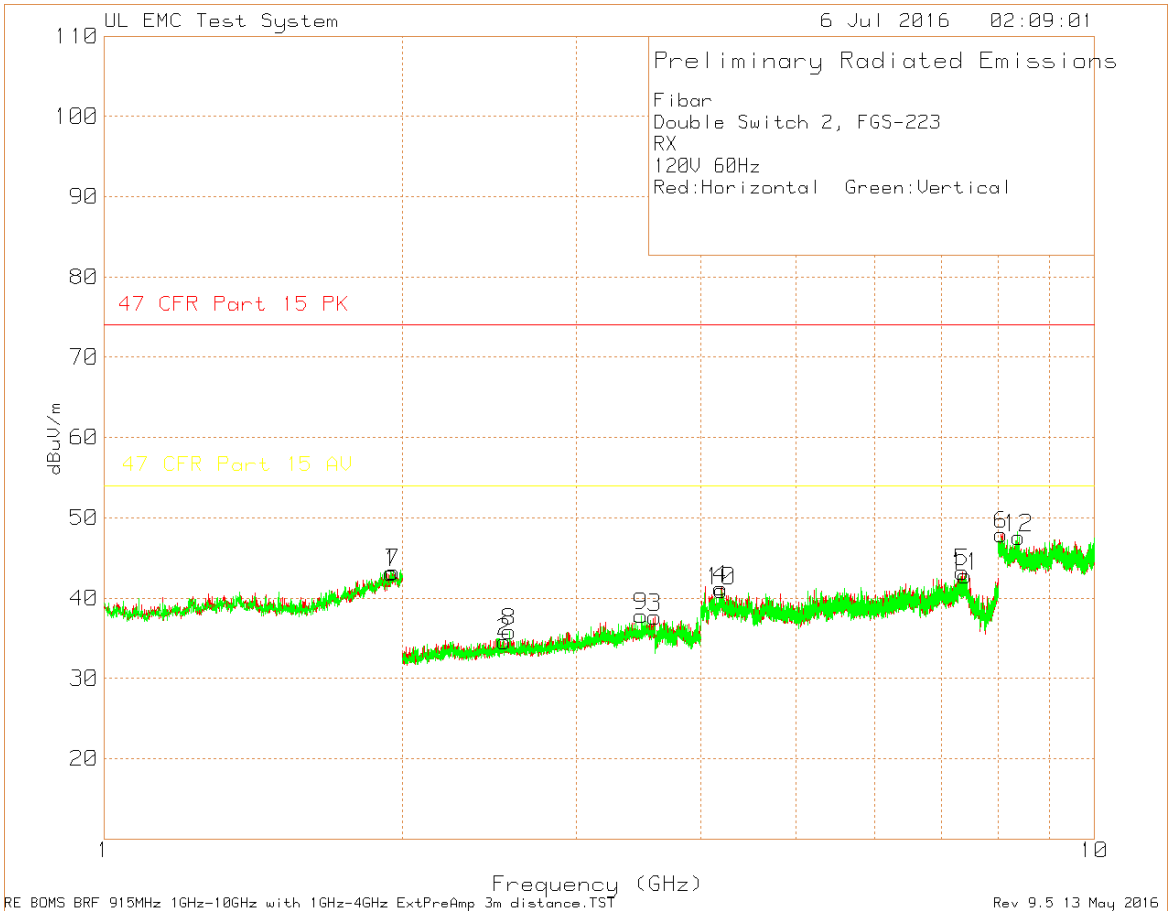
Fibar
Double Switch 2 FGS-223
High CH, 916MHz
120V 60Hz
Trace Markers

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path dB	10M to 3M Factor dB	Corrected Reading dB(uVolts/ meter)	QP Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	30.1275	31.6	Pk	18.1	-30	10.5	30.2	40	-9.8	0-360	101	H
2	187.93	32.2	Pk	15.9	-29.1	10.5	29.5	43.52	-14.02	0-360	248	H
3	37.14	36.04	Pk	15.4	-29.9	10.5	32.04	40	-7.96	0-360	101	V
4	180.0675	32.4	Pk	15.4	-29.2	10.5	29.1	43.52	-14.42	0-360	251	V
5	918.5	31.61	Pk	23.2	-27.8	10.5	37.51	46.02	-8.51	0-360	299	H
6	998.5	30.77	Pk	23.8	-26.3	10.5	38.77	53.97	-15.2	0-360	102	H
7	821.2	32.37	Pk	22.8	-27.7	10.5	37.97	46.02	-8.05	0-360	399	V
8	980.6	31.22	Pk	24.1	-26.9	10.5	38.92	53.97	-15.05	0-360	102	V

Pk - Peak detector

All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter RX/Digital Radiated Emissions 1 GHz – 10GHz - PLOT



All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Transmitter RX/Digital Radiated Emissions 1 GHz – 10GHz - DATA

Fibar
Double Switch 2, FGS-223
RX
120V 60Hz
Trace Markers

Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path (dB)	Corrected Reading dBuV/m	PK Limit	PK Margin (dB)	AV Limit	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.95	65.42	Pk	32	-54.27	43.15	74	-30.85	54	-10.85	0-360	100	H
2	2.536	63.34	Pk	22.2	-50.93	34.61	74	-39.39	54	-19.39	0-360	150	H
3	3.599	64.94	Pk	23.2	-50.49	37.65	74	-36.35	54	-16.35	0-360	150	H
4	4.195	64.4	Pk	28.3	-51.47	41.23	74	-32.77	54	-12.77	0-360	100	H
5	7.36	58.68	Pk	30.9	-46.31	43.27	74	-30.73	54	-10.73	0-360	100	H
6	8.052	58.24	Pk	36.2	-46.49	47.95	74	-26.05	54	-6.05	0-360	100	H
7	1.959	65.5	Pk	32	-54.23	43.27	74	-30.73	54	-10.73	0-360	150	V
8	2.567	64.58	Pk	22.2	-50.93	35.85	74	-38.15	54	-18.15	0-360	150	V
9	3.487	64.75	Pk	23.5	-50.44	37.81	74	-36.19	54	-16.19	0-360	100	V
10	4.199	64.11	Pk	28.3	-51.47	40.94	74	-33.06	54	-13.06	0-360	100	V
11	7.407	58.75	Pk	31.1	-47.09	42.76	74	-31.24	54	-11.24	0-360	150	V
12	8.387	58.97	Pk	36.6	-48.02	47.55	74	-26.45	54	-6.45	0-360	150	V

Pk - Peak detector

All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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 C63.10.

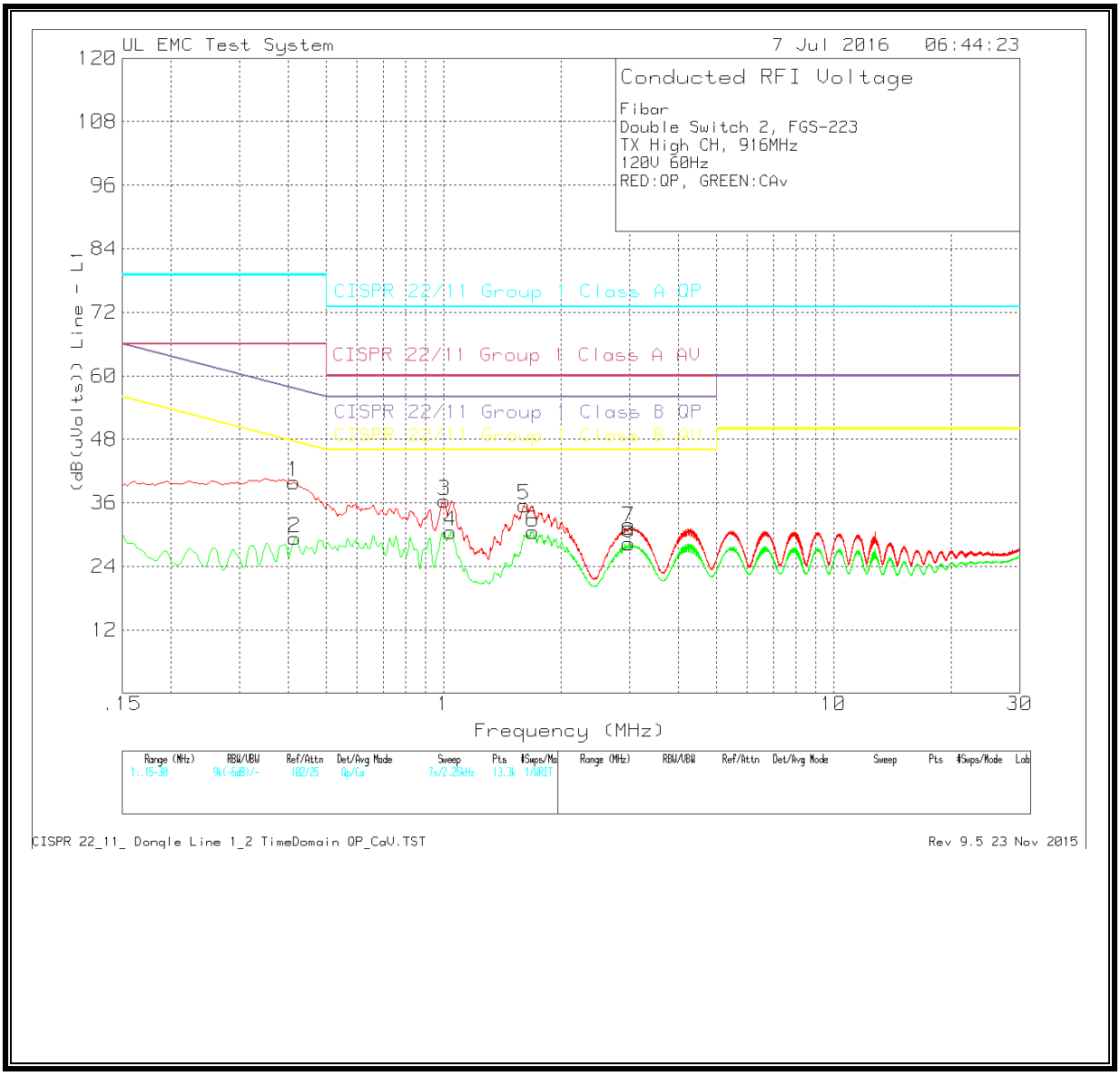
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

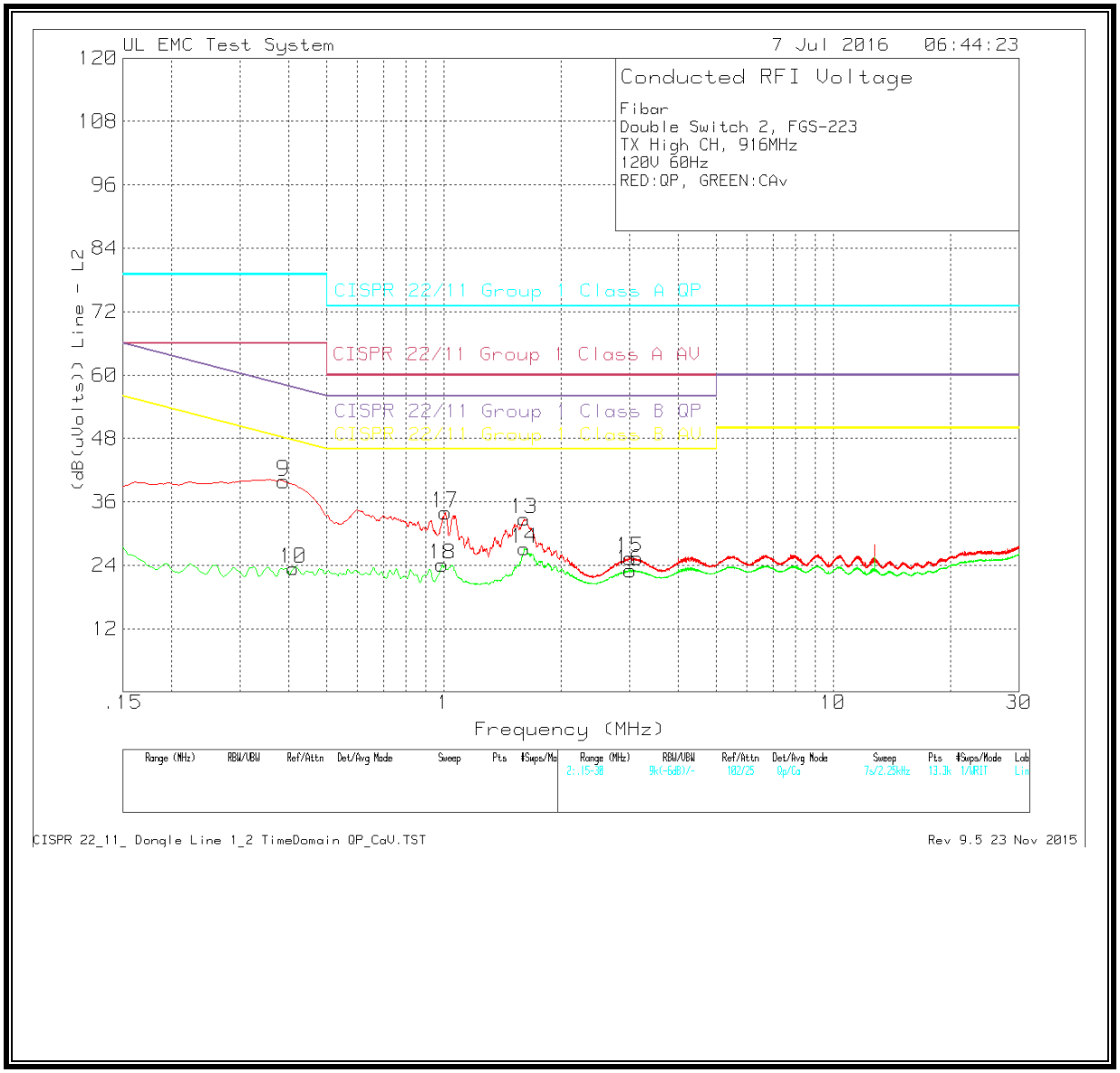
RESULTS

8.1. TRANSMITTER – CONDUCTED EMISSIONS

LINE 1 PLOT – TX Mode



LINE 2 PLOT – TX Mode



LINE 1 & 2 DATA – TX Mode

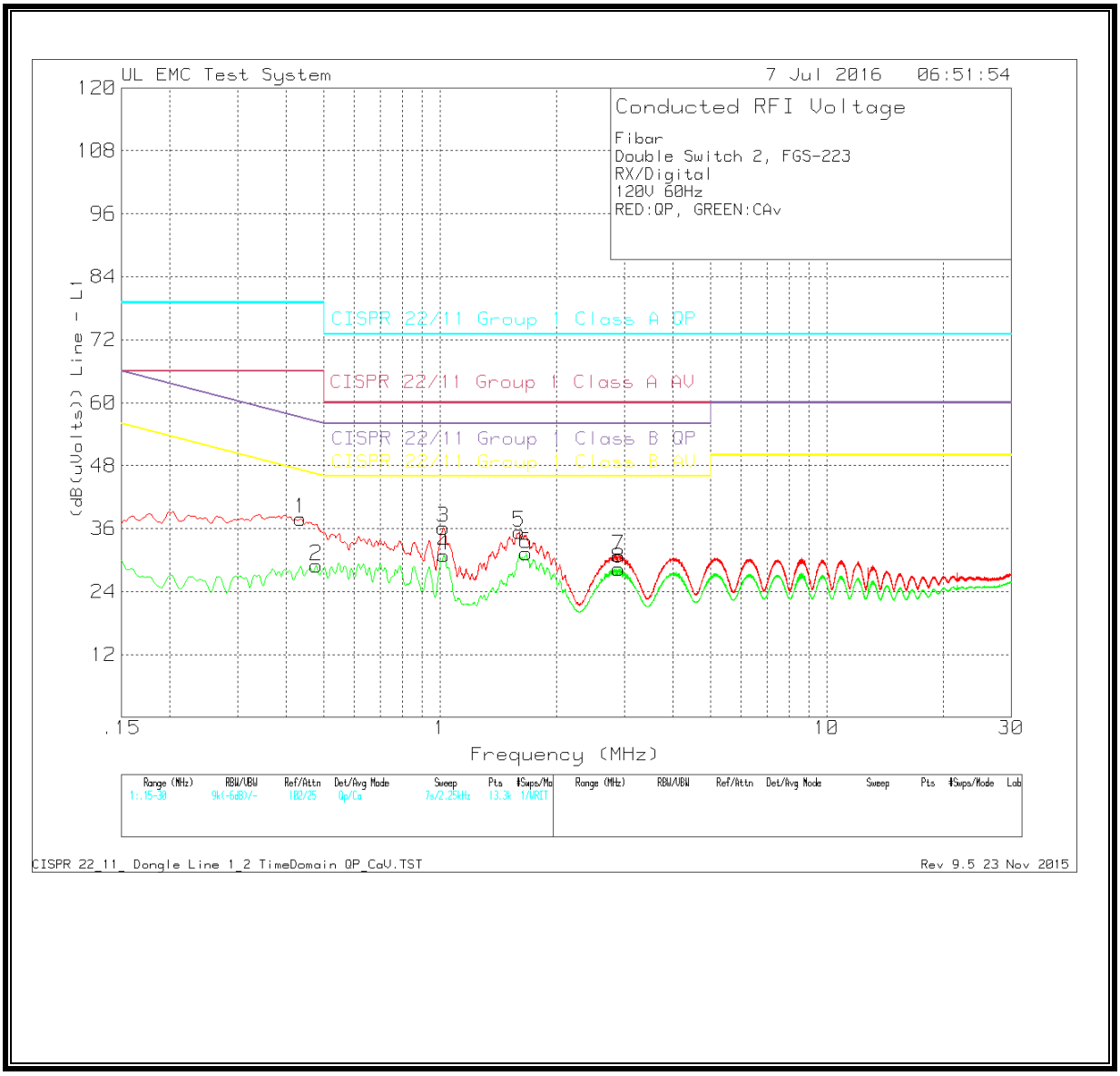
Fibar
Double Switch 2, FGS-223
TX High CH, 916MHz
120V 60Hz
Trace Markers

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Transducer Factor dB	Path dB	Corrected Reading (dB(uVolts))	QP Limit	QP Margin (dB)	AV Limit	AV Margin (dB)
Line - L1										
1	0.41325	29.23	Qp	0	10.7	39.93	57.58	-17.65	-	-
2	0.4155	18.68	Ca	0	10.7	29.38	-	-	47.54	-18.16
3	1.005	25.8	Qp	0	10.6	36.4	56	-19.6	-	-
4	1.04325	19.96	Ca	0	10.6	30.56	-	-	46	-15.44
5	1.61025	24.94	Qp	0	10.6	35.54	56	-20.46	-	-
6	1.69575	19.92	Ca	0	10.6	30.52	-	-	46	-15.48
7	2.98275	20.76	Qp	0	10.6	31.36	56	-24.64	-	-
8	2.98275	17.78	Ca	0	10.6	28.38	-	-	46	-17.62
Line - N										
9	0.3885	28.59	Qp	0	11.3	39.89	58.1	-18.21	-	-
10	0.411	12.11	Ca	0	11.3	23.41	-	-	47.63	-24.22
13	1.61025	21.67	Qp	0	11.1	32.77	56	-23.23	-	-
14	1.61025	16.06	Ca	0	11.1	27.16	-	-	46	-18.84
15	3.012	14.3	Qp	0	11.1	25.4	56	-30.6	-	-
16	3.012	11.91	Ca	0	11.1	23.01	-	-	46	-22.99
17	1.0095	22.86	Qp	0	11.1	33.96	56	-22.04	-	-
18	0.9915	13.03	Ca	0	11.1	24.13	-	-	46	-21.87

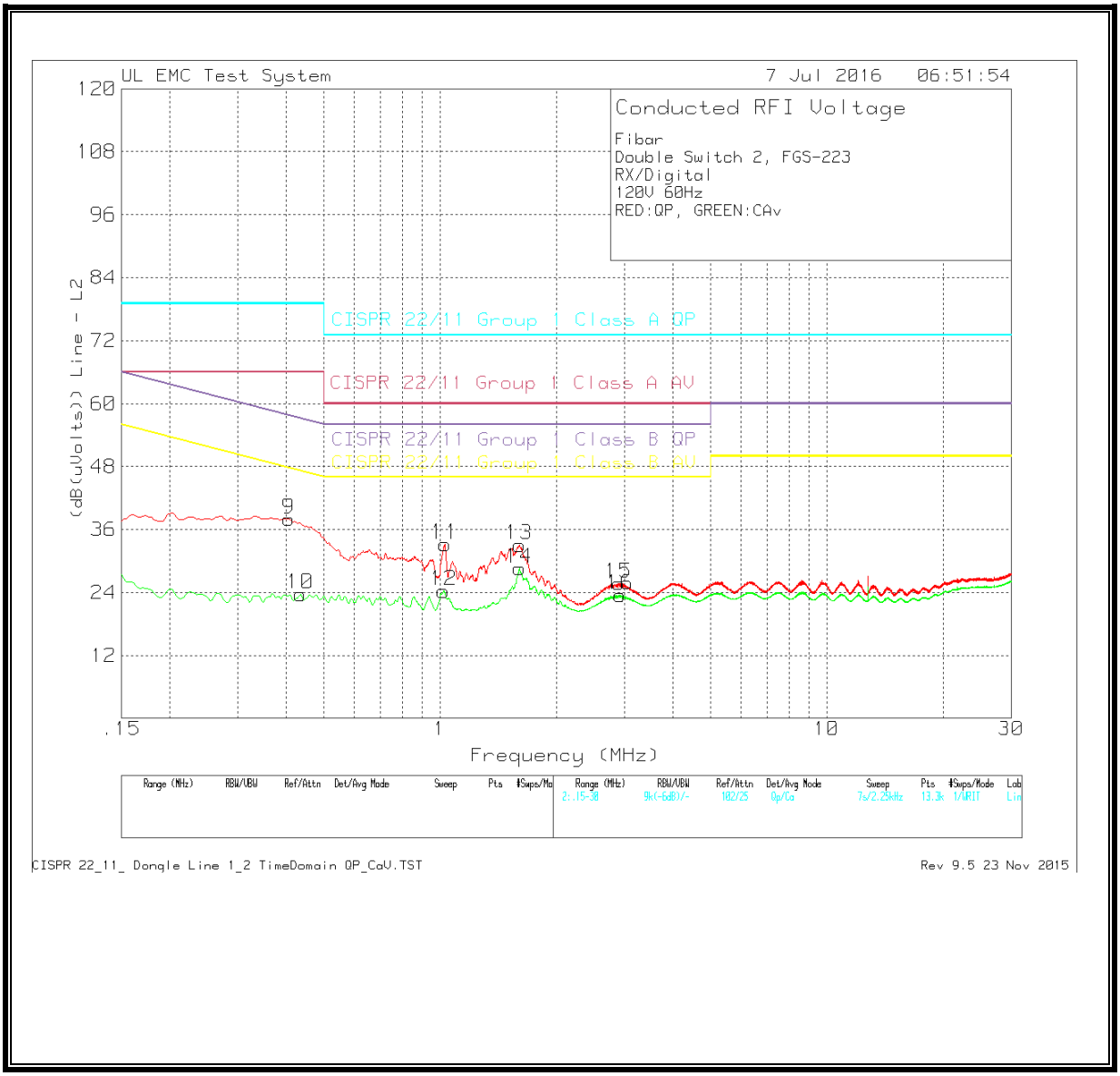
Qp - Quasi-Peak detector
Ca - CISPR Average detection

8.2. RECEIVER / DIGITAL – CONDUCTED EMISSIONS

LINE 1 RESULTS – RX Mode



LINE 2 RESULTS – RX Mode



LINE 2 DATA – RX Mode

Fibar
Double Switch 2, FGS-223
TX High CH, 916MHz
120V 60Hz
Trace Markers

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Transducer Factor dB	Path dB	Corrected Reading (dB(uVolts))	QP Limit	QP Margin (dB)	AV Limit	AV Margin (dB)
Line - L1										
1	0.43575	27.22	Qp	0	10.7	37.92	57.14	-19.22	-	-
2	0.4785	18.23	Ca	0	10.7	28.93	-	-	46.37	-17.44
3	1.02075	25.59	Qp	0	10.6	36.19	56	-19.81	-	-
4	1.023	20.3	Ca	0	10.6	30.9	-	-	46	-15.1
5	1.6035	24.76	Qp	0	10.6	35.36	56	-20.64	-	-
6	1.671	20.69	Ca	0	10.6	31.29	-	-	46	-14.71
7	2.89725	20.3	Qp	0	10.6	30.9	56	-25.1	-	-
8	2.8995	17.78	Ca	0	10.6	28.38	-	-	46	-17.62
Line - N										
9	0.4065	26.68	Qp	0	11.3	37.98	57.72	-19.74	-	-
10	0.43575	12.46	Ca	0	11.2	23.66	-	-	47.14	-23.48
11	1.02975	22.05	Qp	0	11.1	33.15	56	-22.85	-	-
12	1.02075	13.18	Ca	0	11.1	24.28	-	-	46	-21.72
13	1.60463	21.97	Qp	0	11.1	33.07	56	-22.93	-	-
14	1.60575	17.5	Ca	0	11.1	28.6	-	-	46	-17.4
15	2.89725	14.68	Qp	0	11.1	25.78	56	-30.22	-	-
16	2.922	12.4	Ca	0	11.1	23.5	-	-	46	-22.5

Qp - Quasi-Peak detector
Ca - CISPR Average detection