



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

CERTIFICATION TEST REPORT

FOR

Fibar Swipe

MODEL NUMBER: FGGC-001

**FCC ID: 2AA9MFFGGC001
IC: 20430-FGGC001**

REPORT NUMBER: 10937760A

ISSUE DATE: May 13, 2016

Prepared for
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NVLAP Lab code: 100414-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	April 27, 2016	Initial Issue	V Sabalvaro
REV1	May 2, 2016	Editorial Changes	V Sabalvaro

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. <i>MEASURING INSTRUMENT CALIBRATION</i>	5
4.2. <i>SAMPLE CALCULATION</i>	5
4.3. <i>MEASUREMENT UNCERTAINTY</i>	6
5.5. <i>DESCRIPTION OF TEST SETUP</i>	8
6. TEST AND MEASUREMENT EQUIPMENT	10
7. TEST RESULTS	11
7.1. <i>20 dB AND 99% BANDWIDTH</i>	11
7.1.1. RESULTS	11
7.1.2. 99% BANDWIDTH.....	12
7.1.3. 20dB BANDWIDTH	15
7.2. <i>RADIATED EMISSIONS</i>	18
7.2.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION	20
7.2.2. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz	21
7.2.3. WORST-CASE BELOW 1 GHz	33
7.2.4. TRACSMITTER RX RADIATED EMISSIONS	47
8. AC POWER LINE CONDUCTED EMISSIONS	52
9. SETUP PHOTOS	69

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Fibar Group sp. z.o.o
Ul. Lotnicza 1
Poznań, Poland 60-453

EUT DESCRIPTION: Radio Controller

MODEL: FGGC-001

SERIAL NUMBER: Non serialized

DATE TESTED: February 26 – April 15, 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:

Tested By:



Bart Mucha
Staff Engineer

Vincent Sabalvaro
EMC WISE Engineer
Consumer Technology
UL LLC

UL LLC

2. TEST METHODOLOGY

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

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	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
Conducted Emissions	150k-30MHz	LISN	2.29dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a 916MHz transceiver. It is DC powered. The transmitter utilizes Z-wave technologies to communicate with other devices for home automation. The radio 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	Configuration	Output QP E-field Strength (dBuV/m)
908.4-916	TX	Battery	87.62
908.4-916	TX	External 5VDC	88.06

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an impedance matched quarter-wave embedded antenna designed as a trace on the PCB.

5.4. WORST-CASE CONFIGURATION AND MODE

The EUT, Swipe, was set in worst axis as found in preliminary testing. Z-axis is the worst axis.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Power Supply (Generic)	Volgen	HK-U-050A120-US	-	-

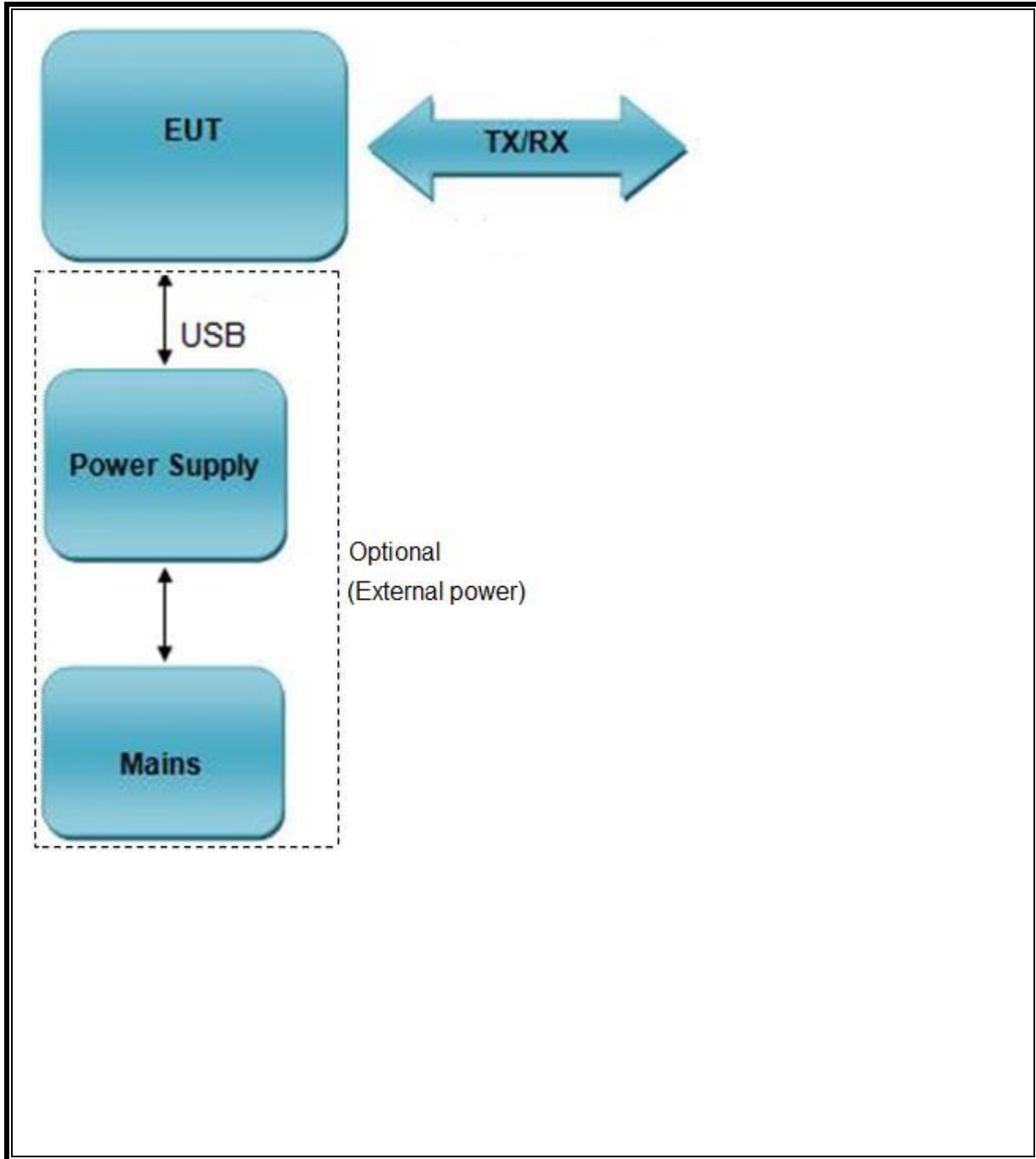
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
0	Enclosure	-	Non-Electrical	-	-	None
1	DC	2	Wire	USB	>3m	None

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	4/20/2015	4/20/2016
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
Near Field Probe	EMCO	7405	1270	N/A	N/A
Test Receiver	Rhode & Schwarz	ESCI	EMC4328	11/18/2015	11/30/2016
Log-P Antenna	Chase	UPA6109	EMC4258	4/27/2015	4/30/2016
Bicon Antenna	Chase	UPA6106A	EMC4078	12/28/2015	12/31/2016
Loop Antenna	ETS-Lindgren	6502	0021021	7/31/2015	7/31/2016
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.

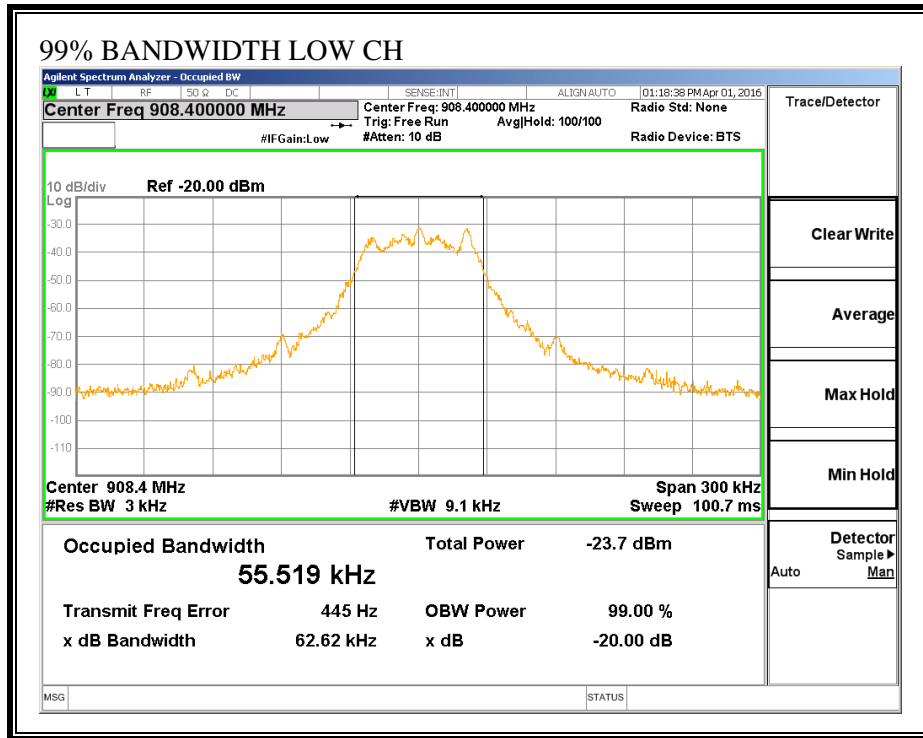
TEST PROCEDURE

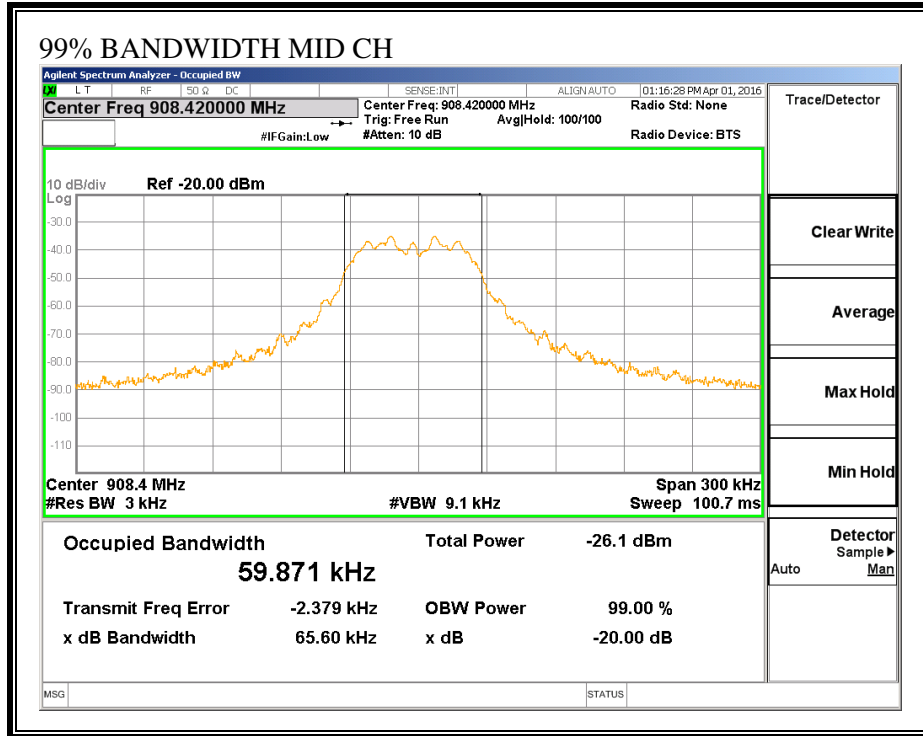
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the Occupied bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

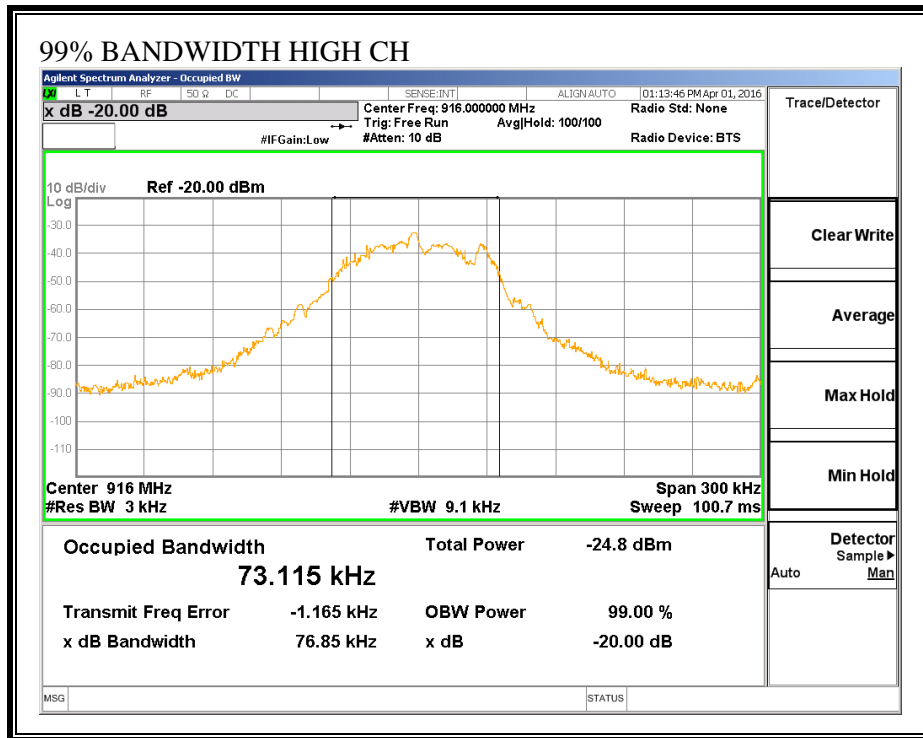
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	908.4	55.995	55.519
Middle	908.42	59.602	59.871
High	916	78.410	73.115

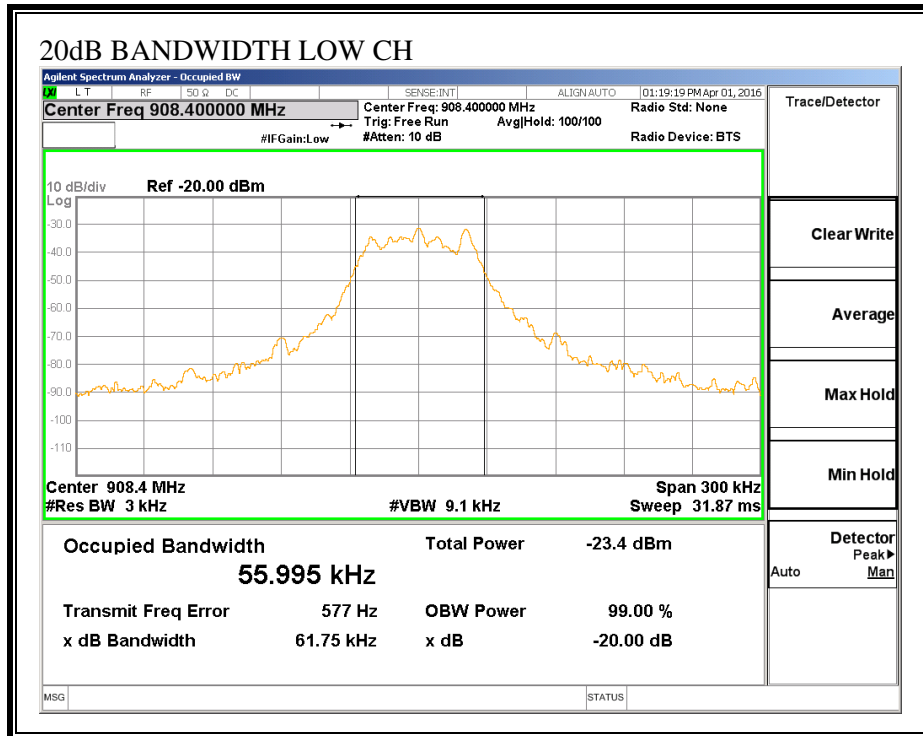
7.1.1. 99% BANDWIDTH

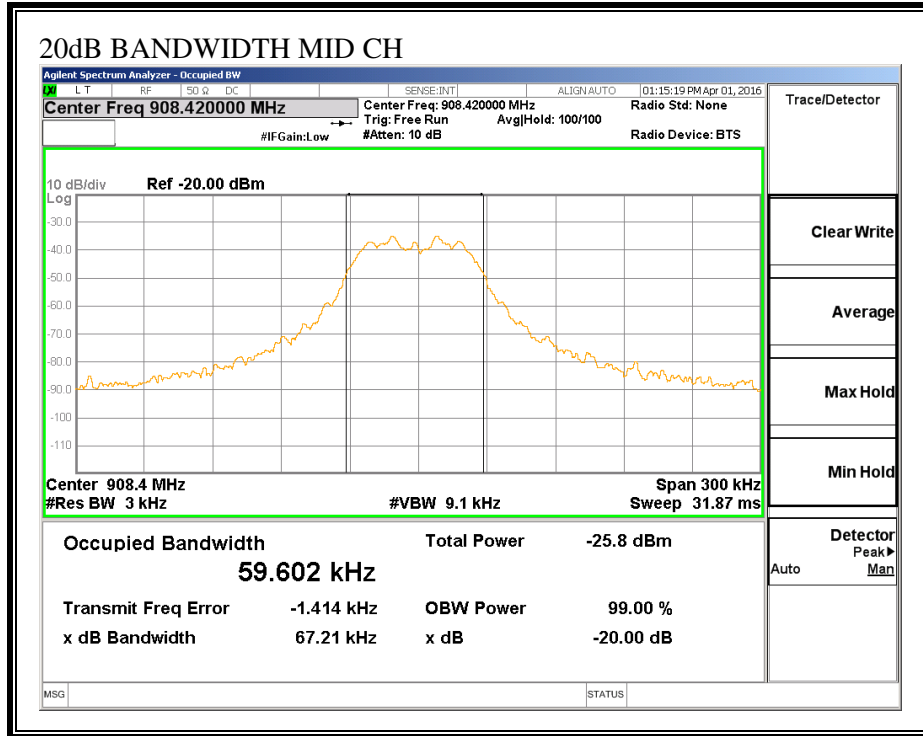


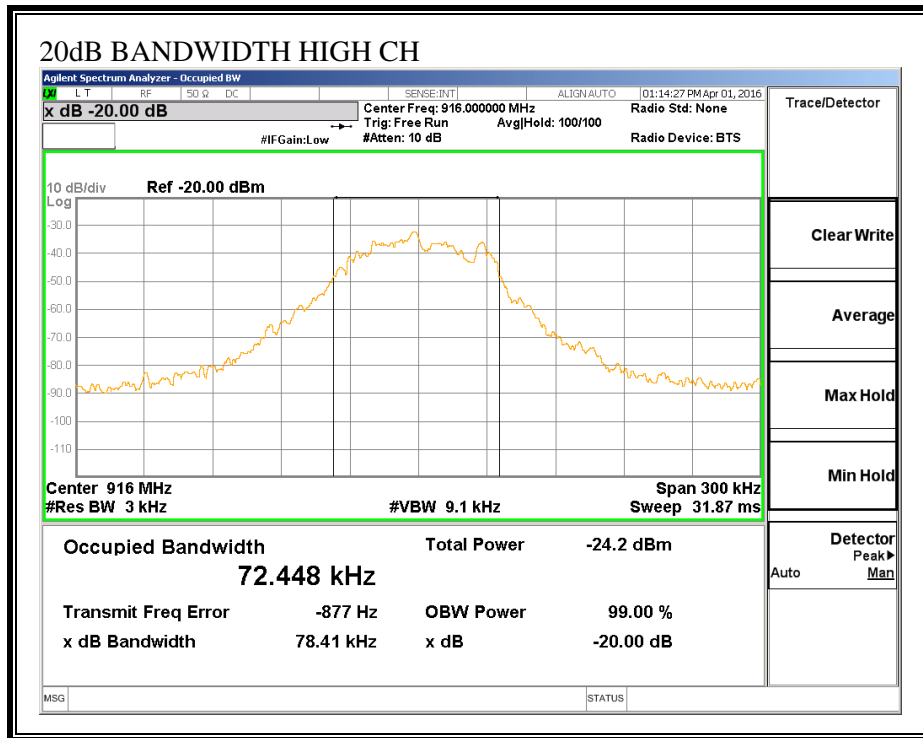




7.1.2. 20dB BANDWIDTH







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

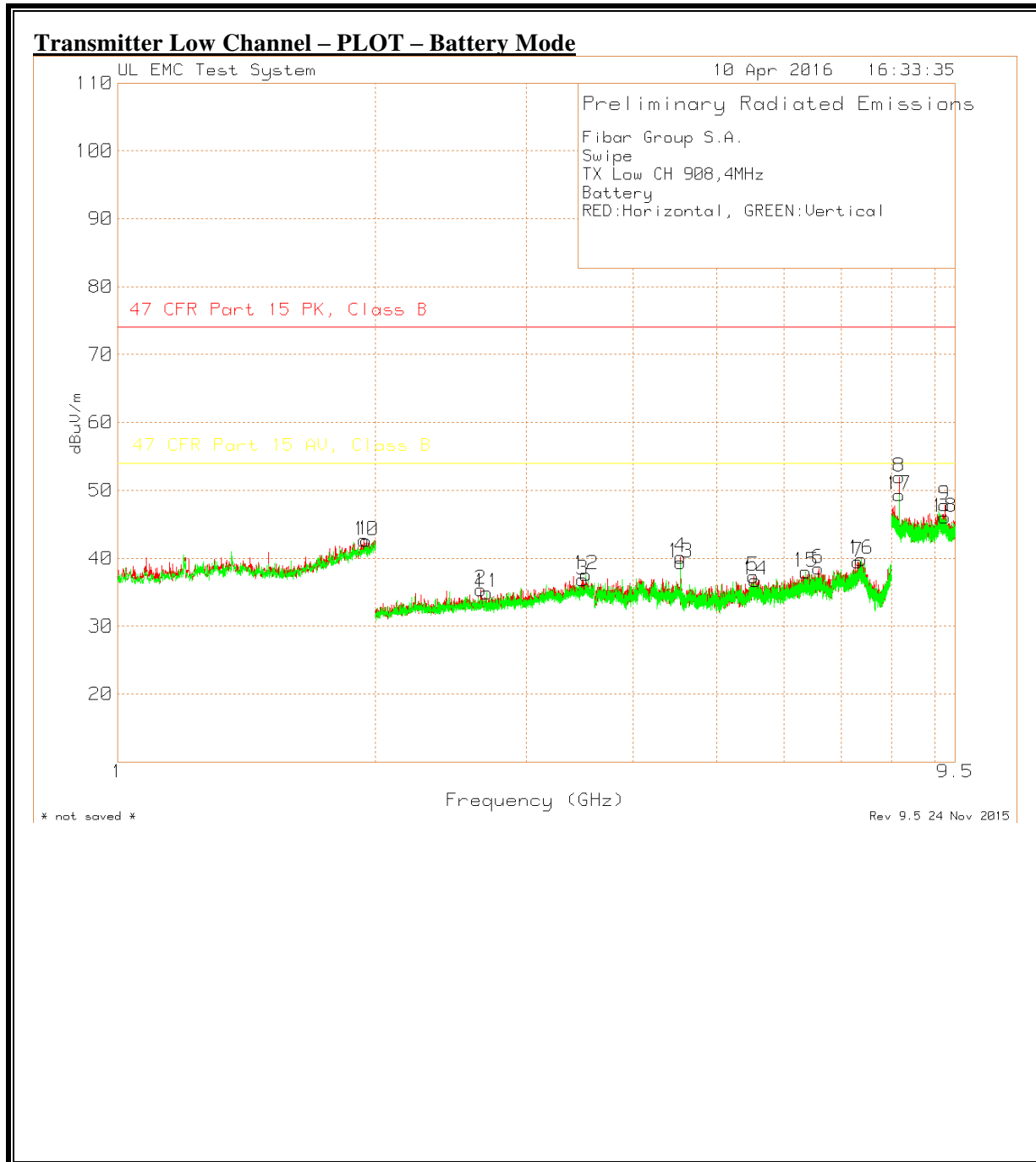
7.2.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION

Fibar
 Swipe
 Z-Axis
 TX Fundamentals, Power Setting: -16dBm

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Gain/Loss (dBm)	Corrected Reading dB(uVolts/meter)	TX PK Limit	Margin (dB)	TX Avg Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
Battery Mode												
908.404813	53.07	Pk	23.4	9.8	86.27	114	-27.73	-	-	144	101	H
908.404813	52.95	Qp	23.4	9.8	86.15	-	-	94	-7.85	144	101	H
908.372	42.46	Pk	23.4	9.8	75.66	114	-38.34	-	-	107	176	V
908.372	42.08	Qp	23.4	9.8	75.28	-	-	94	-18.72	107	176	V
908.436563	53.47	Pk	23.4	9.8	86.67	114	-27.33	-	-	146	102	H
908.436563	53.35	Qp	23.4	9.8	86.55	-	-	94	-7.45	146	102	H
908.437125	42.62	Pk	23.4	9.8	75.82	114	-38.18	-	-	100	176	V
908.437125	42.5	Qp	23.4	9.8	75.7	-	-	94	-18.3	100	176	V
915.976375	51.86	Pk	23.4	9.8	85.06	114	-28.94	-	-	146	101	H
915.976375	51.66	Qp	23.4	9.8	84.86	-	-	94	-9.14	146	101	H
915.999063	41.62	Pk	23.4	9.8	74.82	114	-39.18	-	-	22	179	V
915.999063	41.33	Qp	23.4	9.8	74.53	-	-	94	-19.47	22	179	V
External 5VDC Mode												
908.413925	53.68	Pk	23.4	9.8	86.88	114	-27.12	-	-	309	101	H
908.413925	53.56	Qp	23.4	9.8	86.76	-	-	94	-7.24	309	101	H
908.3928	41.39	Pk	23.4	9.8	74.59	114	-39.41	-	-	49	190	V
908.3928	41.09	Qp	23.4	9.8	74.29	-	-	94	-19.71	49	190	V
908.429613	53.4	Pk	23.4	9.8	86.6	114	-27.4	-	-	305	101	H
908.429613	53.29	Qp	23.4	9.8	86.49	-	-	94	-7.51	305	101	H
908.4188	41.68	Pk	23.4	9.8	74.88	114	-39.12	-	-	47	188	V
908.4188	41.36	Qp	23.4	9.8	74.56	-	-	94	-19.44	47	188	V
915.98425	52.42	Pk	23.4	9.8	85.62	114	-28.38	-	-	307	167	H
915.98425	52.26	Qp	23.4	9.8	85.46	-	-	94	-8.54	307	167	H
915.988688	39.9	Pk	23.4	9.8	73.1	114	-40.9	-	-	47	182	V
915.988688	39.72	Qp	23.4	9.8	72.92	-	-	94	-21.08	47	182	V

Pk - Peak detector

7.2.2. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz



Transmitter Low Channel – DATA – Battery Mode

Fibar Group S.A.
 Swipe
 TX Low CH 908,4MHz
 Battery
 Trace Markers

Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dBm)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	PK Limit (dB)	PK Margin (dB)	AV Limit (dB)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.939	65.72 Pk	31.4	-54.43	42.69	74	-31.31	54	-11.31	0-360	100	H
2	2.655	64.06 Pk	22.2	-50.87	35.39	74	-38.61	54	-18.61	0-360	100	H
3	3.491	63.7 Pk	23.5	-50.36	36.84	74	-37.16	54	-17.16	0-360	100	H
4	4.542	64.17 Pk	27.8	-51.81	40.16	74	-33.84	54	-13.84	0-360	101	H
5	5.525	58.83 Pk	28.2	-49.71	37.32	74	-36.68	54	-16.68	0-360	101	H
6	6.578	56.71 Pk	28.9	-47.08	38.53	74	-35.47	54	-15.47	0-360	101	H
7	7.315	54.89 Pk	30.6	-46.01	39.48	74	-34.52	54	-14.52	0-360	149	H
8	8.1755	64.34 Pk	36.3	-48.68	51.96	74	-22.04	54	-2.04	0-360	150	H
9	9.2353	59.29 Pk	36.4	-47.84	47.85	74	-26.15	54	-6.15	0-360	100	H
10	1.952	65.37 Pk	31.5	-54.26	42.61	74	-31.39	54	-11.39	0-360	150	V
11	2.698	63.72 Pk	22.1	-50.9	34.92	74	-39.08	54	-19.08	0-360	100	V
12	3.522	64.07 Pk	23.4	-49.89	37.58	74	-36.42	54	-16.42	0-360	150	V
13	4.542	63.36 Pk	27.8	-51.81	39.35	74	-34.65	54	-14.65	0-360	100	V
14	5.552	57.99 Pk	28.3	-49.52	36.77	74	-37.23	54	-17.23	0-360	100	V
15	6.359	56.39 Pk	29.2	-47.61	37.98	74	-36.02	54	-16.02	0-360	150	V
16	7.381	55.41 Pk	31.1	-46.66	39.85	74	-34.15	54	-14.15	0-360	150	V
17	8.1755	61.71 Pk	36.3	-48.68	49.33	74	-24.67	54	-4.67	0-360	150	V
18	9.2428	57.66 Pk	36.4	-48.01	46.05	74	-27.95	54	-7.95	0-360	150	V

Pk - Peak detector

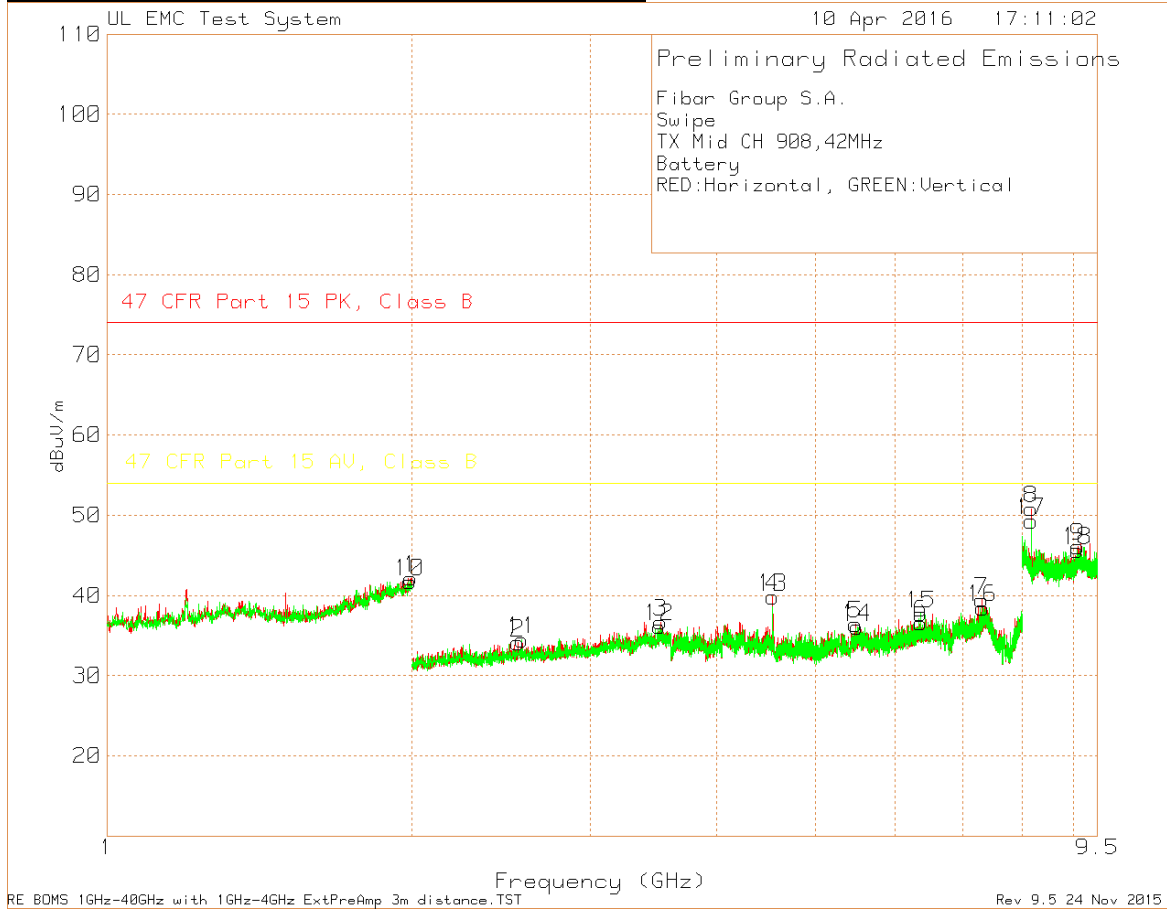
Measurement Data

Test Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dBm)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	PK Limit (dB)	PK Margin (dB)	AV Limit (dB)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
8.1756	67.44 Pk	36.3	-48.68	55.06	74	-18.94	-	-	232	140	H
8.1756	62.77 Av	36.3	-48.68	50.39	-	-	54	-3.61	232	140	H
8.1757	66.93 Pk	36.3	-48.68	54.55	74	-19.45	-	-	146	228	V
8.1756	61.76 Av	36.3	-48.68	49.38	-	-	54	-4.62	146	228	V

Pk - Peak detector

Av - Linear Average detection

Transmitter Mid Channel – PLOT – Battery Mode



Transmitter Mid Channel – DATA – Battery Mode

Fibar Group S.A.
 Swipe
 TX Mid CH 908,42MHz
 Battery
 Trace Markers

Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dBm)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	PK Limit (dB)	PK Margin (dB)	AV Limit (dB)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.995	64.49 Pk	31.7	-54.02	42.17	74	-31.83	54	-11.83	0-360	100	H
2	2.545	62.85 Pk	22.2	-50.93	34.12	74	-39.88	54	-19.88	0-360	150	H
3	3.519	63.19 Pk	23.4	-49.9	36.69	74	-37.31	54	-17.31	0-360	100	H
4	4.542	63.82 Pk	27.8	-51.81	39.81	74	-34.19	54	-14.19	0-360	101	H
5	5.484	58.42 Pk	28.1	-50.1	36.42	74	-37.58	54	-17.58	0-360	149	H
6	6.358	54.99 Pk	29.2	-47.61	36.58	74	-37.42	54	-17.42	0-360	101	H
7	7.304	54.95 Pk	30.5	-46	39.45	74	-34.55	54	-14.55	0-360	101	H
13	4.542	63.82 Pk	27.8	-51.81	39.81	74	-34.19	54	-14.19	0-360	101	H
8	8.1755	63.2 Pk	36.3	-48.68	50.82	74	-23.18	54	-3.18	0-360	100	H
9	9.0913	58.5 Pk	36.2	-48.57	46.13	74	-27.87	54	-7.87	0-360	100	H
10	1.99	64.07 Pk	31.7	-54.04	41.73	74	-32.27	54	-12.27	0-360	100	V
11	2.568	63.21 Pk	22.2	-50.94	34.47	74	-39.53	54	-19.53	0-360	100	V
12	3.51	62.66 Pk	23.5	-50.03	36.13	74	-37.87	54	-17.87	0-360	100	V
14	5.502	57.74 Pk	28.2	-49.89	36.05	74	-37.95	54	-17.95	0-360	100	V
15	6.359	56.15 Pk	29.2	-47.61	37.74	74	-36.26	54	-16.26	0-360	150	V
16	7.317	53.88 Pk	30.6	-46.01	38.47	74	-35.53	54	-15.53	0-360	150	V
17	8.1755	61.68 Pk	36.3	-48.68	49.3	74	-24.7	54	-4.7	0-360	100	V
18	9.0748	58.38 Pk	36.2	-48.96	45.62	74	-28.38	54	-8.38	0-360	100	V

Pk - Peak detector

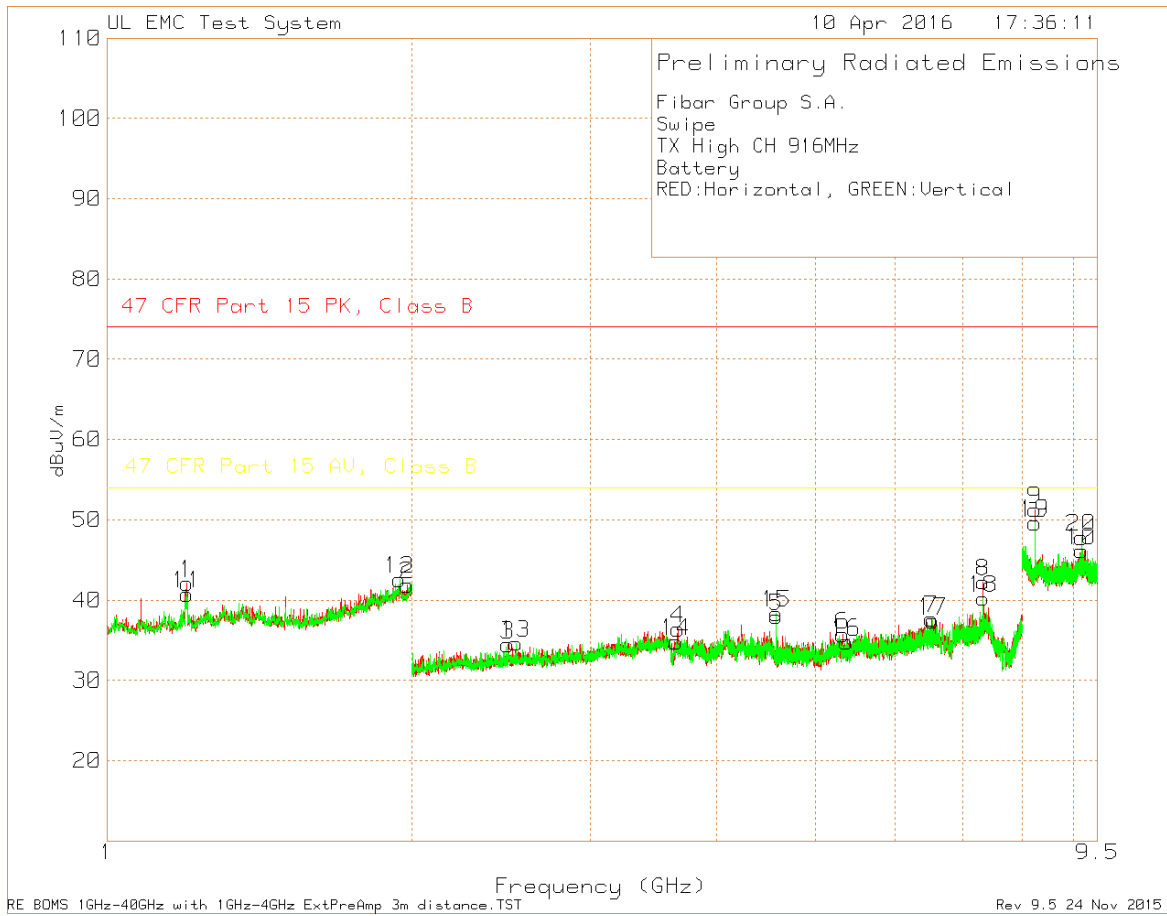
Measurement Data

Test Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dBm)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	PK Limit (dB)	PK Margin (dB)	AV Limit (dB)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
8.1761	66.68 Pk	36.3	-48.69	54.29	74	-19.71	-	-	229	100	H
8.1757	61.66 Av	36.3	-48.68	49.28	-	-	54	-4.72	229	100	H
8.1759	66.07 Pk	36.3	-48.69	53.68	74	-20.32	-	-	169	100	V
8.1757	60.73 Av	36.3	-48.68	48.35	-	-	54	-5.65	169	100	V

Pk - Peak detector

Av - Linear Average detection

Transmitter High Channel – PLOT – Battery Mode



Transmitter High Channel – DATA – Battery Mode

Fibar Group S.A.

Swipe

TX High CH 916MHz

Battery

Trace Markers

Marker No.	Test Frequency (GHz)	Meter Reading dBuV	Detector	Antenna Factor dBm	Gain/Loss (dB)	Corrected Reading dBuV/m	PK Limit	PK Margin (dB)	AV Limit	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.199	71.11	Pk	28.3	-57.31	42.1	74	-31.9	54	-11.9	0-360	150	H
2	1.979	64.31	Pk	31.7	-54.12	41.89	74	-32.11	54	-12.11	0-360	100	H
3	2.487	63.64	Pk	22.1	-51.3	34.44	74	-39.56	54	-19.56	0-360	150	H
4	3.661	62.38	Pk	23.4	-49.36	36.42	74	-37.58	54	-17.58	0-360	150	H
5	4.58	62.09	Pk	27.7	-51.85	37.94	74	-36.06	54	-16.06	0-360	100	H
6	5.327	57.32	Pk	28	-49.63	35.69	74	-38.31	54	-18.31	0-360	149	H
7	6.516	55.92	Pk	29	-47.25	37.67	74	-36.33	54	-16.33	0-360	149	H
8	7.329	57.62	Pk	30.7	-46.06	42.26	74	-31.74	54	-11.74	0-360	149	H
9	8.2438	63.37	Pk	36.4	-48.49	51.28	74	-22.72	54	-2.72	0-360	150	H
10	9.1603	58.26	Pk	36.3	-48.39	46.17	74	-27.83	54	-7.83	0-360	100	H
11	1.199	69.75	Pk	28.3	-57.31	40.74	74	-33.26	54	-13.26	0-360	150	V
12	1.944	65.5	Pk	31.4	-54.34	42.56	74	-31.44	54	-11.44	0-360	100	V
13	2.533	63.36	Pk	22.2	-50.94	34.62	74	-39.38	54	-19.38	0-360	150	V
14	3.646	61.08	Pk	23.3	-49.57	34.81	74	-39.19	54	-19.19	0-360	100	V
15	4.58	62.52	Pk	27.7	-51.85	38.37	74	-35.63	54	-15.63	0-360	150	V
16	5.369	56.74	Pk	28	-49.94	34.8	74	-39.2	54	-19.2	0-360	150	V
17	6.533	55.66	Pk	29	-47.24	37.42	74	-36.58	54	-16.58	0-360	100	V
18	7.328	55.58	Pk	30.7	-46.04	40.24	74	-33.76	54	-13.76	0-360	150	V
19	8.2438	61.71	Pk	36.4	-48.49	49.62	74	-24.38	54	-4.38	0-360	100	V
20	9.1603	59.91	Pk	36.3	-48.39	47.82	74	-26.18	54	-6.18	0-360	100	V

Pk - Peak detector

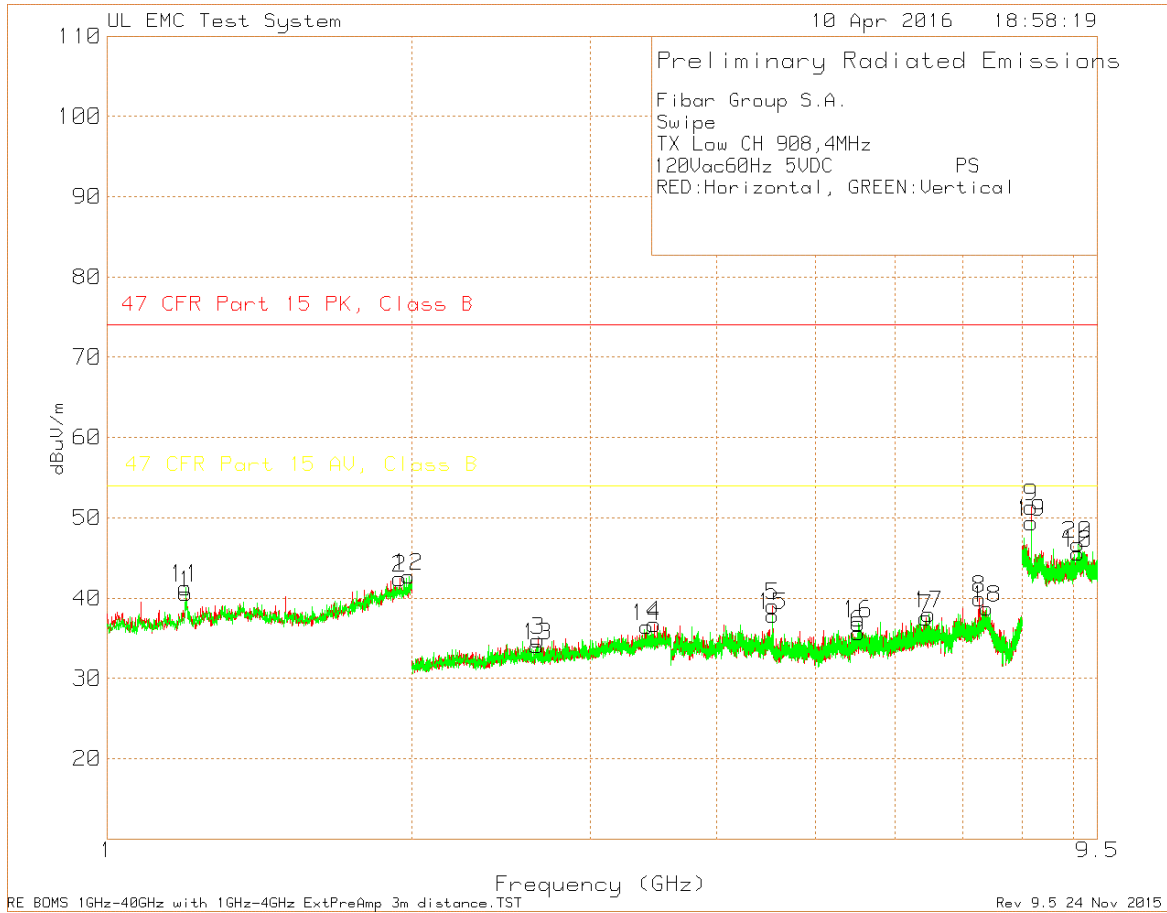
Measurement Data

Test Frequency (GHz)	Meter Reading dBuV	Detector	Antenna Factor dBm	Gain/Loss (dB)	Corrected Reading dBuV/m	PK Limit	PK Margin (dB)	AV Limit	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
8.244	66.76	Pk	36.4	-48.48	54.68	74	-19.32	-	-	234	111	H
8.244	62.03	Av	36.4	-48.48	49.95	-	-	54	-4.05	234	111	H
8.2438	65.71	Pk	36.4	-48.49	53.62	74	-20.38	-	-	168	100	V
8.244	59.63	Av	36.4	-48.48	47.55	-	-	54	-6.45	168	100	V

Pk - Peak detector

Av - Linear Average detection

Transmitter Low Channel – PLOT – EXT 5VDC Mode



Transmitter Low Channel – DATA – External 5VDC Mode

Fibar Group S.A.
 Swipe
 TX Low CH 908,4MHz
 120Vac60Hz 5VDC PS
 Trace Markers

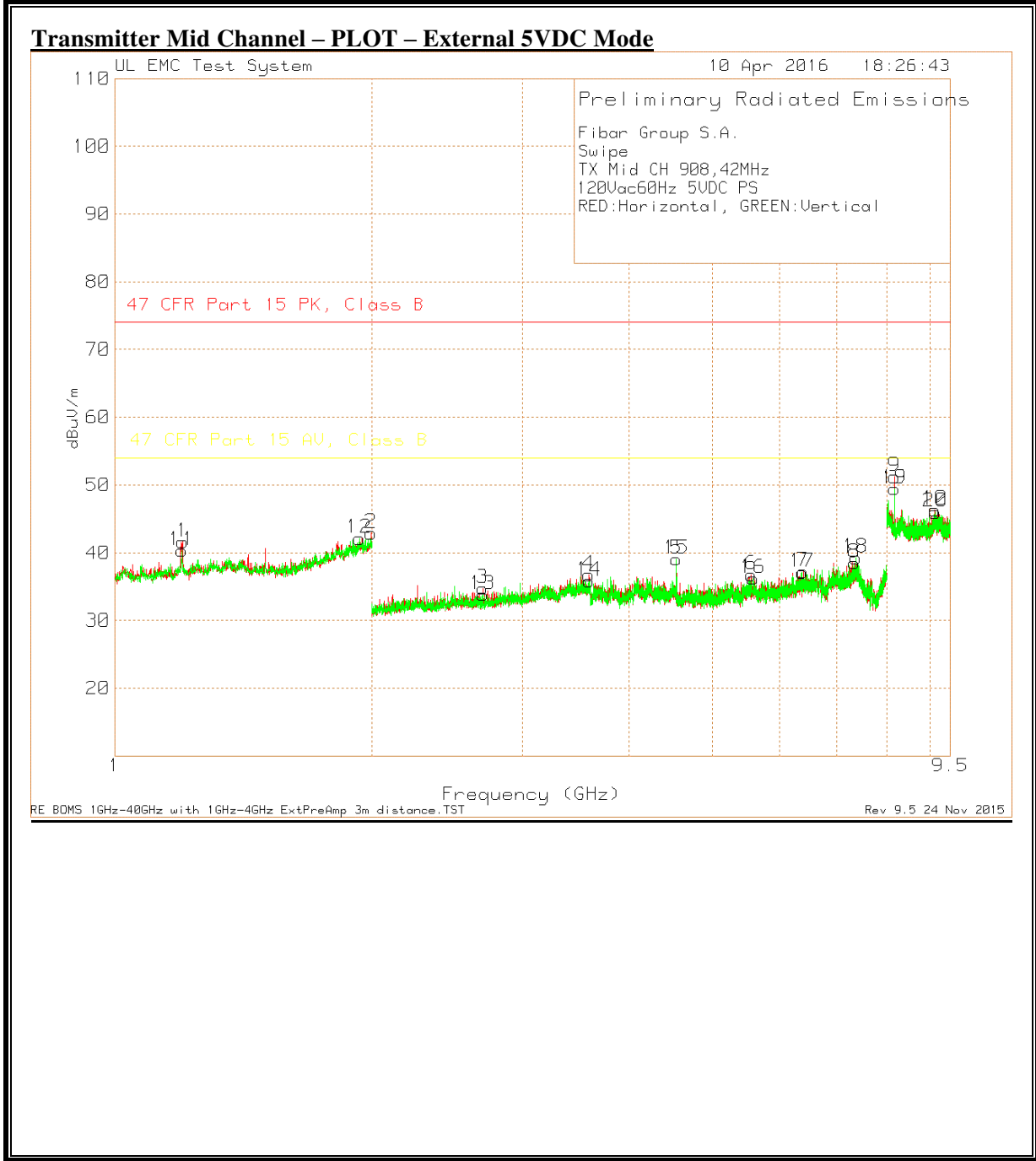
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dBm)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	PK Limit	PK Margin (dB)	AV Limit	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.196	69.61 Pk	28.3	-57.32	40.59	74	-33.41	54	-13.41	0-360	150	H
2	1.946	65.27 Pk	31.5	-54.31	42.46	74	-31.54	54	-11.54	0-360	100	H
3	2.663	63.41 Pk	22.2	-50.84	34.77	74	-39.23	54	-19.23	0-360	100	H
4	3.47	63.87 Pk	23.5	-50.6	36.77	74	-37.23	54	-17.23	0-360	150	H
5	4.542	63.07 Pk	27.8	-51.81	39.06	74	-34.94	54	-14.94	0-360	100	H
6	5.518	57.19 Pk	28.2	-49.72	35.67	74	-38.33	54	-18.33	0-360	149	H
7	6.433	55.93 Pk	29.2	-47.59	37.54	74	-36.46	54	-16.46	0-360	100	H
8	7.268	55.75 Pk	30.2	-46.02	39.93	74	-34.07	54	-14.07	0-360	100	H
9	8.1755	63.74 Pk	36.3	-48.68	51.36	74	-22.64	54	-2.64	0-360	150	H
10	9.0845	58.09 Pk	36.2	-48.7	45.59	74	-28.41	54	-8.41	0-360	150	H
11	1.195	70.32 Pk	28.3	-57.32	41.3	74	-32.7	54	-12.7	0-360	150	V
12	1.985	65.1 Pk	31.7	-54.07	42.73	74	-31.27	54	-11.27	0-360	150	V
13	2.659	62.7 Pk	22.2	-50.85	34.05	74	-39.95	54	-19.95	0-360	150	V
14	3.411	63.33 Pk	23.5	-50.38	36.45	74	-37.55	54	-17.55	0-360	150	V
15	4.542	61.85 Pk	27.8	-51.81	37.84	74	-36.16	54	-16.16	0-360	150	V
16	5.515	58.39 Pk	28.2	-49.74	36.85	74	-37.15	54	-17.15	0-360	150	V
17	6.476	56.32 Pk	29.1	-47.42	38	74	-36	54	-16	0-360	100	V
18	7.387	54.47 Pk	31.1	-46.82	38.75	74	-35.25	54	-15.25	0-360	150	V
19	8.1755	61.79 Pk	36.3	-48.68	49.41	74	-24.59	54	-4.59	0-360	100	V
20	9.0845	59.22 Pk	36.2	-48.7	46.72	74	-27.28	54	-7.28	0-360	100	V

Pk - Peak detector

Measurement Data

Test Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dBm)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	PK Limit	PK Margin (dB)	AV Limit	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
8.1755	67.61 Pk	36.3	-48.68	55.23	74	-18.77	-	-	227	125	H
8.1756	63.34 Av	36.3	-48.68	50.96	-	-	54	-3.04	227	125	H
8.1758	65.64 Pk	36.3	-48.68	53.26	74	-20.74	-	-	164	100	V
8.1756	60.19 Av	36.3	-48.68	47.81	-	-	54	-6.19	164	100	V

Pk - Peak detector
 Av - Average detection



Transmitter Mid Channel – DATA – External 5VDC Mode

Fibar Group S.A.
 Swipe
 TX Mid CH 908.42MHz
 120Vac60Hz 5VDC PS
 Trace Markers

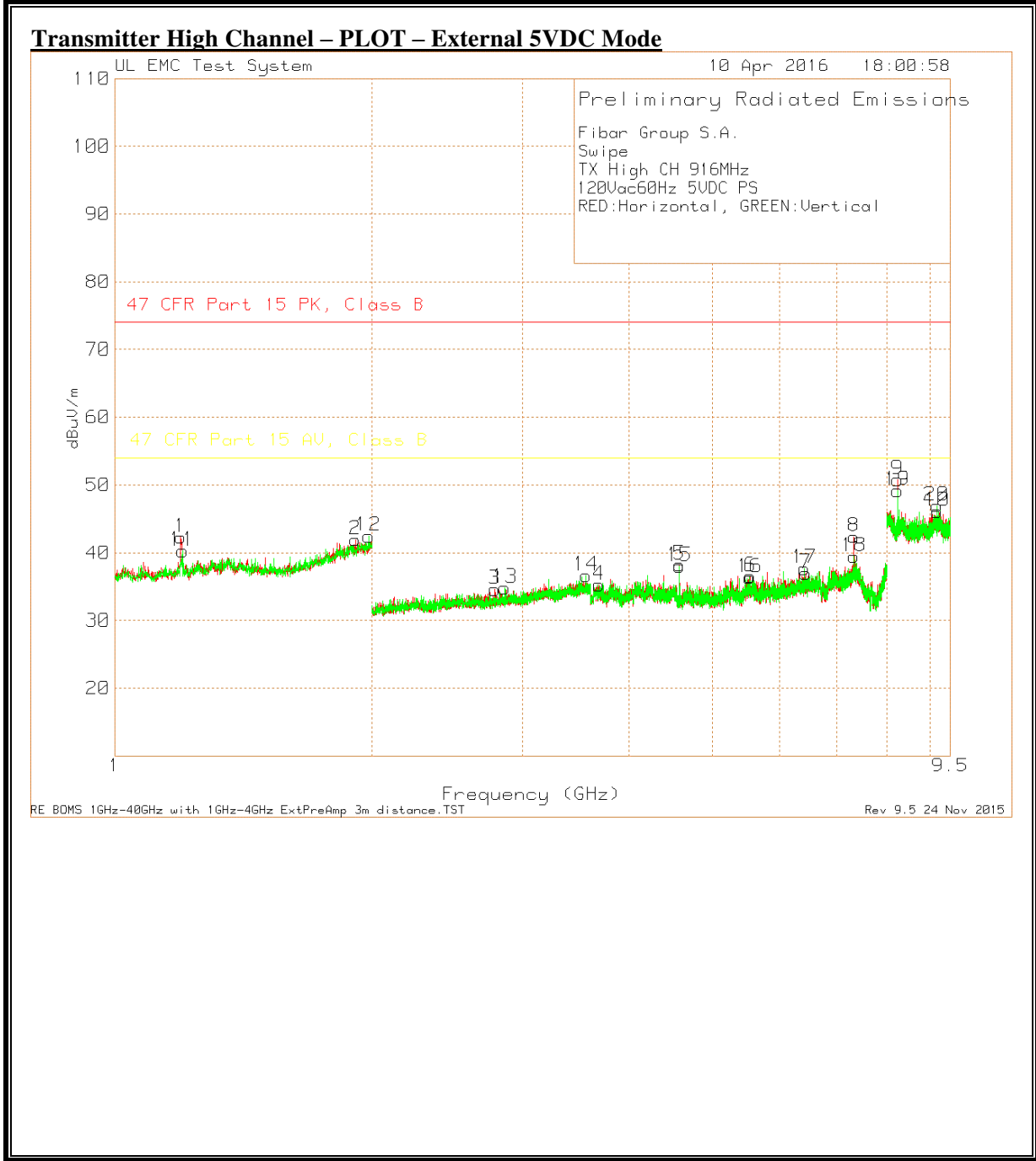
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dBm)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	PK Limit	PK Margin (dB)	AV Limit	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.2	70.62 Pk	28.3	-57.31	41.61	74	-32.39	54	-12.39	0-360	150	H
2	1.995	65.22 Pk	31.7	-54.02	42.9	74	-31.1	54	-11.1	0-360	100	H
3	2.695	63.53 Pk	22.1	-50.88	34.75	74	-39.25	54	-19.25	0-360	150	H
4	3.586	64.03 Pk	23.2	-50.49	36.74	74	-37.26	54	-17.26	0-360	100	H
5	4.542	63.08 Pk	27.8	-51.81	39.07	74	-34.93	54	-14.93	0-360	100	H
6	5.556	57.96 Pk	28.3	-49.49	36.77	74	-37.23	54	-17.23	0-360	149	H
7	6.389	55.68 Pk	29.2	-47.67	37.21	74	-36.79	54	-16.79	0-360	100	H
8	7.339	54.01 Pk	30.7	-46.19	38.52	74	-35.48	54	-15.48	0-360	100	H
9	8.1755	63.64 Pk	36.3	-48.68	51.26	74	-22.74	54	-2.74	0-360	99	H
10	9.1123	58.44 Pk	36.2	-48.32	46.32	74	-27.68	54	-7.68	0-360	99	H
11	1.198	69.34 Pk	28.3	-57.31	40.33	74	-33.67	54	-13.67	0-360	150	V
12	1.933	65.21 Pk	31.4	-54.49	42.12	74	-31.88	54	-11.88	0-360	150	V
13	2.696	62.62 Pk	22.1	-50.89	33.83	74	-40.17	54	-20.17	0-360	150	V
14	3.589	63.12 Pk	23.2	-50.5	35.82	74	-38.18	54	-18.18	0-360	100	V
15	4.542	63.1 Pk	27.8	-51.81	39.09	74	-34.91	54	-14.91	0-360	100	V
16	5.585	57.31 Pk	28.4	-49.49	36.22	74	-37.78	54	-17.78	0-360	100	V
17	6.374	55.51 Pk	29.2	-47.6	37.11	74	-36.89	54	-16.89	0-360	150	V
18	7.365	54.67 Pk	30.9	-46.34	39.23	74	-34.77	54	-14.77	0-360	150	V
19	8.1755	61.83 Pk	36.3	-48.68	49.45	74	-24.55	54	-4.55	0-360	150	V
20	9.1265	57.98 Pk	36.3	-48.27	46.01	74	-27.99	54	-7.99	0-360	100	V

Pk - Peak detector

Measurement Data

Test Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dBm)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	PK Limit	PK Margin (dB)	AV Limit	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
8.1758	66.92 Pk	36.3	-48.68	54.54	74	-19.46	-	-	229	125	H
8.1757	62.41 Av	36.3	-48.68	50.03	-	-	54	-3.97	229	125	H
8.1756	66.27 Pk	36.3	-48.68	53.89	74	-20.11	-	-	98	122	V
8.1757	60.58 Av	36.3	-48.68	48.2	-	-	54	-5.8	98	122	V

Pk - Peak detector
 Av - Average detection



Transmitter High Channel – DATA – External 5VDC Mode

Fibar Group S.A.
 Swipe
 TX High CH 916MHz
 120Vac60Hz 5VDC PS
 Trace Markers

Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dBm)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	PK Limit (dB)	PK Margin (dB)	AV Limit (dB)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.194	71.33 Pk	28.3	-57.33	42.3	74	-31.7	54	-11.7	0-360	150	H
2	1.912	65.34 Pk	31.3	-54.69	41.95	74	-32.05	54	-12.05	0-360	150	H
3	2.784	63.1 Pk	22.2	-50.72	34.58	74	-39.42	54	-19.42	0-360	150	H
4	3.687	60.99 Pk	23.5	-49.24	35.25	74	-38.75	54	-18.75	0-360	150	H
5	4.58	62.35 Pk	27.7	-51.85	38.2	74	-35.8	54	-15.8	0-360	100	H
6	5.543	57.78 Pk	28.3	-49.58	36.5	74	-37.5	54	-17.5	0-360	100	H
7	6.432	55.35 Pk	29.2	-47.59	36.96	74	-37.04	54	-17.04	0-360	100	H
8	7.328	57.71 Pk	30.7	-46.04	42.37	74	-31.63	54	-11.63	0-360	149	H
9	8.2445	62.86 Pk	36.4	-48.48	50.78	74	-23.22	54	-3.22	0-360	100	H
10	9.1693	58.09 Pk	36.3	-48.27	46.12	74	-27.88	54	-7.88	0-360	150	H
11	1.2	69.28 Pk	28.3	-57.31	40.27	74	-33.73	54	-13.73	0-360	150	V
12	1.982	64.88 Pk	31.7	-54.1	42.48	74	-31.52	54	-11.52	0-360	150	V
13	2.86	63.04 Pk	22.4	-50.64	34.8	74	-39.2	54	-19.2	0-360	100	V
14	3.56	63.76 Pk	23.3	-50.45	36.61	74	-37.39	54	-17.39	0-360	100	V
15	4.58	62.13 Pk	27.7	-51.85	37.98	74	-36.02	54	-16.02	0-360	150	V
16	5.531	57.84 Pk	28.2	-49.67	36.37	74	-37.63	54	-17.63	0-360	100	V
17	6.412	56.05 Pk	29.2	-47.58	37.67	74	-36.33	54	-16.33	0-360	150	V
18	7.329	54.81 Pk	30.7	-46.06	39.45	74	-34.55	54	-14.55	0-360	100	V
19	8.2438	61.27 Pk	36.4	-48.49	49.18	74	-24.82	54	-4.82	0-360	150	V
20	9.1603	59.05 Pk	36.3	-48.39	46.96	74	-27.04	54	-7.04	0-360	100	V

Pk - Peak detector

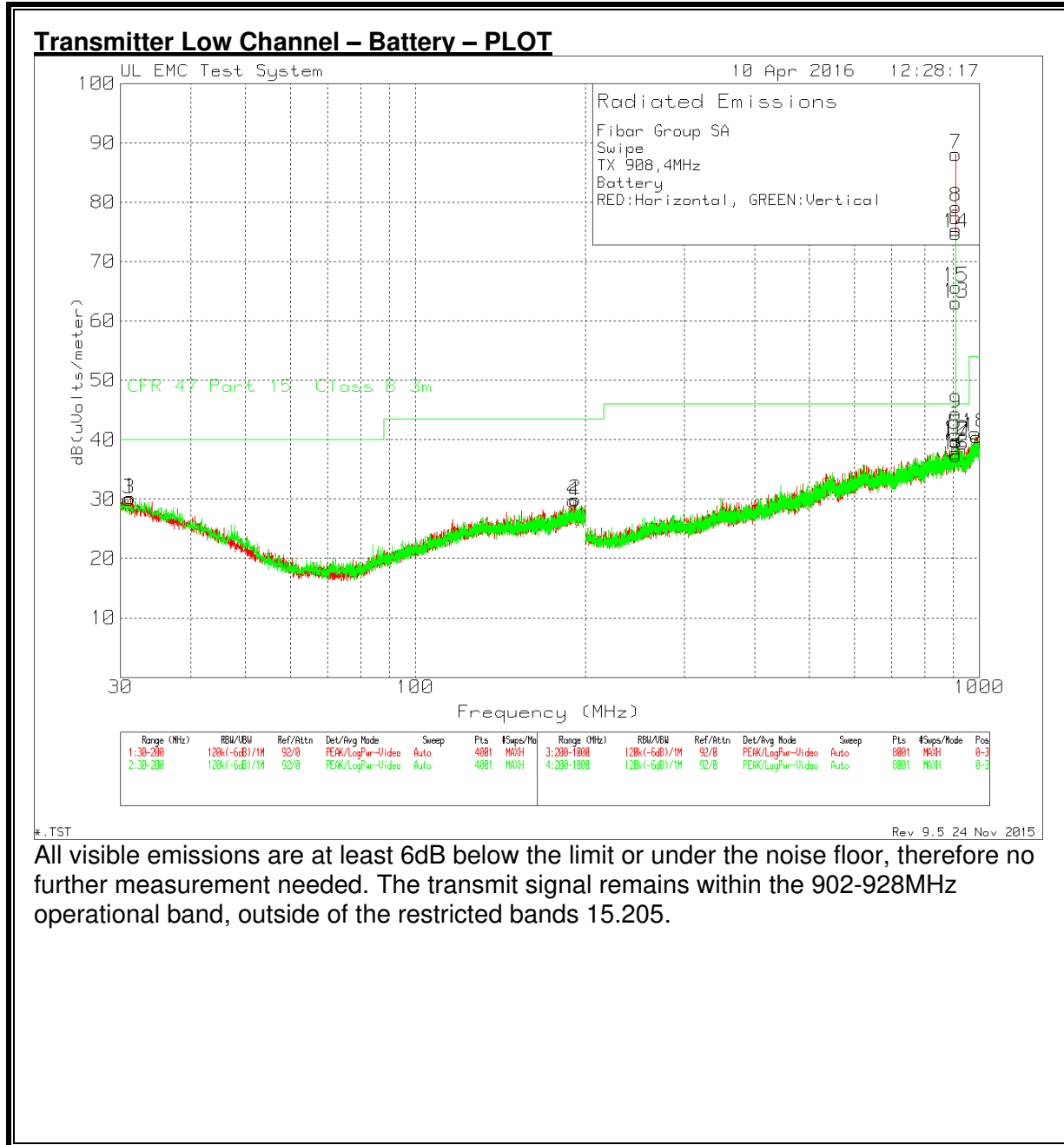
Measurement Data

Test Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dBm)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	PK Limit (dB)	PK Margin (dB)	AV Limit (dB)	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
8.2438	67.15 Pk	36.4	-48.49	55.06	74	-18.94	-	-	231	119	H
8.244	62.36 Av	36.4	-48.48	50.28	-	-	54	-3.72	231	119	H
8.244	66.25 Pk	36.4	-48.48	54.17	74	-19.83	-	-	92	118	V
8.244	60.19 Av	36.4	-48.48	48.11	-	-	54	-5.89	92	118	V

Pk - Peak detector
 Av - Average detection

7.2.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz



Transmitter Low Channel – Battery – DATA

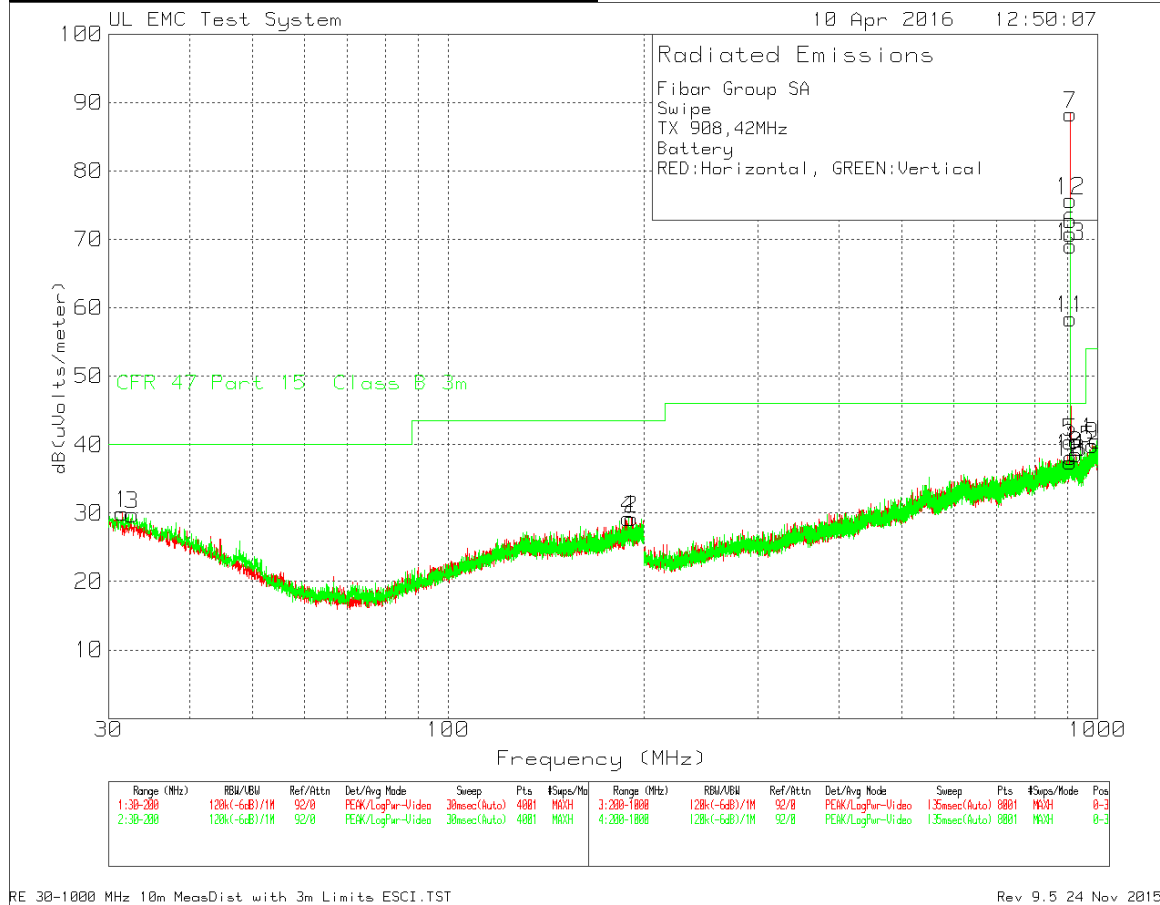
Fibar Group S.A.
 Swipe
 TX 908.4MHz
 Battery
 Trace Markers

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor dBm	Gain/Loss (dBm)	10M to 3M Factor dB	Corrected Reading		Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
						dB(uVolts/ meter)	Qp Limit				
1	31.2325	32.04 Pk	17.7	-30	10.5	30.24	40	-9.76	0-360	241	H
2	192.18	32.38 Pk	16	-28.9	10.5	29.98	43.52	-13.54	0-360	241	H
3	31.0625	31.74 Pk	17.8	-30	10.5	30.04	40	-9.96	0-360	251	V
4	190.82	32.11 Pk	16	-28.9	10.5	29.71	43.52	-13.81	0-360	398	V
5*	908.2	33.83 Pk	23.2	-26.7	10.5	40.83	*	*	0-360	100	H
6*	908.3	68.39 Pk	23.2	-26.7	10.5	75.39	*	*	0-360	100	H
7	908.5	81.09 Pk	23.2	-26.7	10.5	88.09	46.02	42.07	0-360	100	H
8*	908.6	72.25 Pk	23.2	-26.7	10.5	79.25	*	*	0-360	100	H
9*	908.7	37.42 Pk	23.2	-26.7	10.5	44.42	*	*	0-360	100	H
10	909.7	32.77 Pk	23.2	-26.6	10.5	39.87	46.02	-6.15	0-360	100	H
11	989	30.97 Pk	24.6	-25.6	10.5	40.47	53.97	-13.5	0-360	100	H
12*	908.2	30.77 Pk	23.2	-26.7	10.5	37.77	*	*	0-360	199	V
13*	908.3	56.03 Pk	23.2	-26.7	10.5	63.03	*	*	0-360	299	V
14	908.5	67.8 Pk	23.2	-26.7	10.5	74.8	46.02	28.78	0-360	299	V
15*	908.6	58.71 Pk	23.2	-26.7	10.5	65.71	*	*	0-360	399	V
16*	908.7	30.39 Pk	23.2	-26.7	10.5	37.39	*	*	0-360	299	V
17	911.1	32.46 Pk	23.2	-26.5	10.5	39.66	46.02	-6.36	0-360	199	V
18	983.6	31.75 Pk	24.6	-25.7	10.5	41.15	53.97	-12.82	0-360	103	V

Pk - Peak detector
 * - Transmit Signal Bandedge Markers

All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed. The transmit signal remains within the 902-928MHz operational band, outside of the restricted bands 15.205.

Transmitter Mid Channel – Battery – PLOT



All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed. The transmit signal remains within the 902-928MHz operational band, outside of the restricted bands 15.205.

Transmitter Mid Channel – Battery – DATA

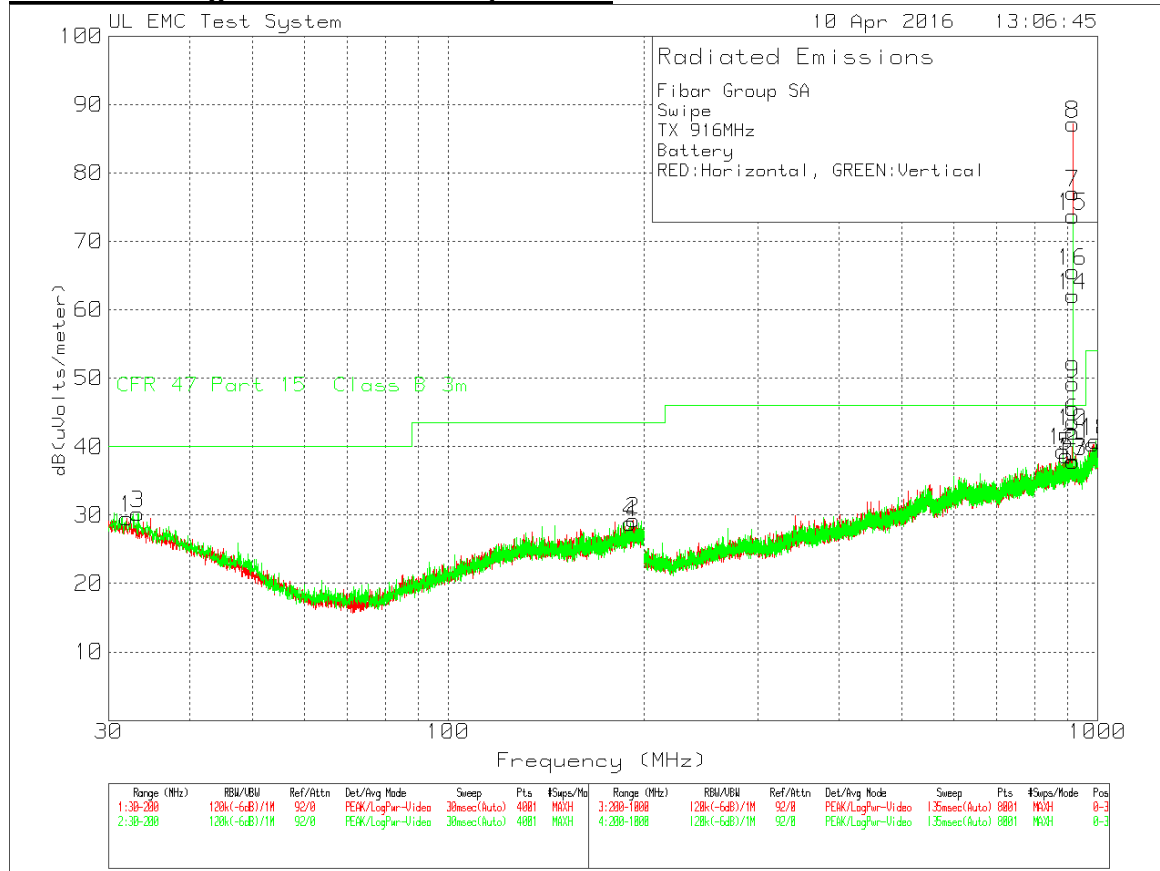
Fibar Group S.A.
 Swipe
 TX 908,42MHz
 Battery
 Trace Markers

Marker No.	Test Frequency (MHz)	Meter Reading (dBUV)	Antenna Factor dBm	Gain/Loss (dBm)	10M to 3M Factor dB	Corrected Reading		Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
						dB(uVolts/ meter)	Qp Limit				
1	31.4875	31.89 Pk	17.6	-30	10.5	29.99	40	-10.01	0-360	398	H
2	191.585	31.59 Pk	16	-28.9	10.5	29.19	43.52	-14.33	0-360	398	H
3	32.5925	32.16 Pk	17.1	-30	10.5	29.76	40	-10.24	0-360	398	V
4	189.5875	31.7 Pk	16	-29	10.5	29.2	43.52	-14.32	0-360	101	V
5*	908.2	33.39 Pk	23.2	-26.7	10.5	40.39	*	*	0-360	299	H
6*	908.3	63.74 Pk	23.2	-26.7	10.5	70.74	*	*	0-360	100	H
7	908.5	81.31 Pk	23.2	-26.7	10.5	88.31	46.02	42.29	0-360	100	H
8*	926.2	31.52 Pk	23.1	-26.6	10.5	38.52	*	*	0-360	399	H
9	981.9	30.7 Pk	24.5	-25.8	10.5	39.9	53.97	-14.07	0-360	399	H
10*	908.2	30.44 Pk	23.2	-26.7	10.5	37.44	*	*	0-360	102	V
11*	908.3	51.39 Pk	23.2	-26.7	10.5	58.39	*	*	0-360	399	V
12	908.5	68.67 Pk	23.2	-26.7	10.5	75.67	46.02	29.65	0-360	299	V
13*	908.6	62.02 Pk	23.2	-26.7	10.5	69.02	*	*	0-360	299	V
14*	908.7	31.19 Pk	23.2	-26.7	10.5	38.19	*	*	0-360	299	V
15	940.1	32.92 Pk	22.5	-26.5	10.5	39.42	46.02	-6.6	0-360	199	V
16	995.7	31.18 Pk	24.4	-25.5	10.5	40.58	53.97	-13.39	0-360	199	V

Pk - Peak detector
 * - Transmit Signal Bandedge Markers

All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed. The transmit signal remains within the 902-928MHz operational band, outside of the restricted bands 15.205.

Transmitter High Channel – Battery – PLOT



RE 30-1000 MHz 10m MeasDist with 3m Limits ESCI.TST

Rev 9.5 24 Nov 2015

All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed. The transmit signal remains within the 902-928MHz operational band, outside of the restricted bands 15.205.

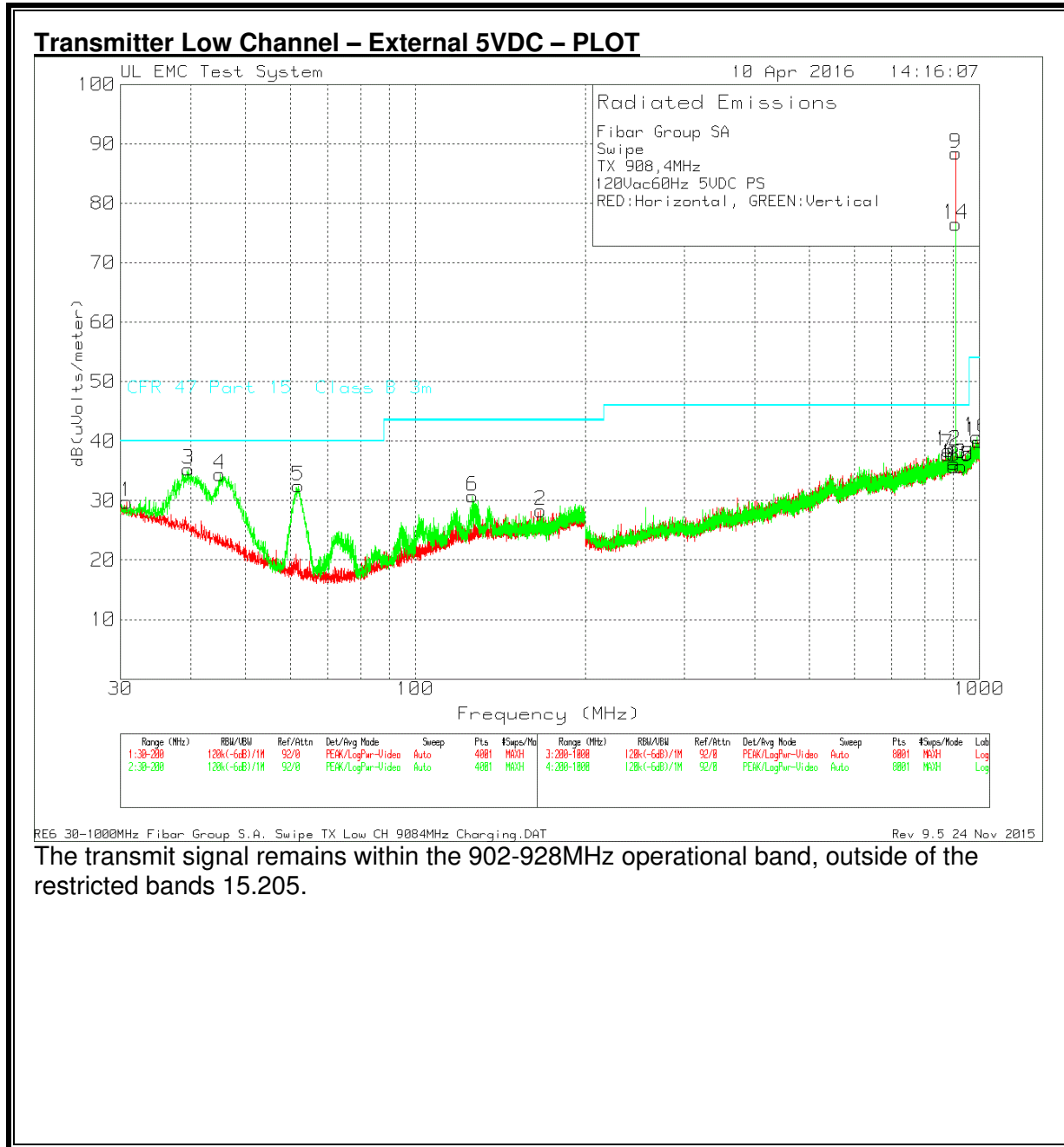
Transmitter High Channel – Battery – DATA

Fibar Group S.A.
 Swipe
 TX 916MHz
 Battery
 Trace Markers

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor dBm	Gain/Loss (dBm)	10M to 3M Factor dB	Corrected Reading		Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
						dB(uVolts/ meter)	Qp Limit				
1	31.9975	31.77 Pk	17.3	-30	10.5	29.57	40	-10.43	0-360	251	H
2	192.945	31.58 Pk	16	-28.8	10.5	29.28	43.52	-14.24	0-360	101	H
3	33.2725	32.81 Pk	16.9	-30	10.5	30.21	40	-9.79	0-360	251	V
4	190.6075	31.33 Pk	16	-29	10.5	28.83	43.52	-14.69	0-360	251	V
5	895.2	31.95 Pk	22.9	-26.7	10.5	38.65	46.02	-7.37	0-360	199	H
6	915.8	36.99 Pk	23	-26.9	10.5	43.59	*	*	0-360	299	H
7	915.9	70.52 Pk	23	-26.9	10.5	77.12	*	*	0-360	299	H
8	916.1	80.65 Pk	23	-27	10.5	87.15	46.02	41.13	0-360	102	H
9	916.3	42.7 Pk	23	-27	10.5	49.2	*	*	0-360	102	H
10	916.4	35.68 Pk	23	-27	10.5	42.18	*	*	0-360	299	H
11	984.3	30.84 Pk	24.7	-25.7	10.5	40.34	53.97	-13.63	0-360	199	H
12	885	33.07 Pk	22.6	-26.8	10.5	39.37	46.02	-6.65	0-360	103	V
13*	915.8	31.26 Pk	23	-26.9	10.5	37.86	*	*	0-360	299	V
14*	915.9	55.48 Pk	23	-26.9	10.5	62.08	*	*	0-360	399	V
15	916.1	67.2 Pk	23	-27	10.5	73.7	46.02	27.68	0-360	299	V
16*	916.2	59.11 Pk	23	-27	10.5	65.61	*	*	0-360	299	V
17*	916.3	31.31 Pk	23	-27	10.5	37.81	*	*	0-360	299	V
18	994.1	31.49 Pk	24.4	-25.6	10.5	40.79	53.97	-13.18	0-360	199	V

Pk - Peak detector
 * - Transmit Signal Bandedge Markers

All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed. The transmit signal remains within the 902-928MHz operational band, outside of the restricted bands 15.205.



Transmitter Low Channel – External 5VDC – DATA

Fibar Group S.A.
 Swipe
 TX 908,4MHz
 120Vac60Hz 5VDC PS
 Trace Markers

Marker No.	Test Frequency (MHz)	Meter		Antenna		Corrected Reading		Qp Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
		Reading (dBuV)	Detector	Factor dBm	Gain/Loss (dBm)	10M to 3M Factor dB	dB(uVolts/ meter)					
1	30.765	31.39	Pk	17.9	-30	10.5	29.79	40	-10.21	0-360	398	H
2	166.85	32.31	Pk	14.9	-29.4	10.5	28.31	43.52	-15.21	0-360	398	H
3	39.605	40.27	Pk	14.5	-30	10.5	35.27	40	-4.73	0-360	101	V
4	45.0025	41.49	Pk	12.4	-30	10.5	34.39	40	-5.61	0-360	101	V
5	62.0025	45.19	Pk	6.7	-29.9	10.5	32.49	40	-7.51	0-360	251	V
6	126.305	36.15	Pk	13.8	-29.7	10.5	30.75	43.52	-12.77	0-360	101	V
7	877.8	31.64	Pk	22.7	-26.9	10.5	37.94	46.02	-8.08	0-360	399	H
8*	908.2	36.89	Pk	23.2	-26.7	10.5	43.89	*	*	0-360	100	H
9*	908.3	68.93	Pk	23.2	-26.7	10.5	75.93	*	*	0-360	299	H
10	908.4	81.45	Pk	23.2	-26.7	10.5	88.45	46.02	42.43	0-360	100	H
11*	908.6	71.16	Pk	23.2	-26.7	10.5	78.16	*	*	0-360	100	H
12*	908.7	38.55	Pk	23.2	-26.7	10.5	45.55	*	*	0-360	100	H
13	990.8	30.36	Pk	24.6	-25.6	10.5	39.86	53.97	-14.11	0-360	299	H
14	881.9	31.99	Pk	22.7	-26.8	10.5	38.39	46.02	-7.63	0-360	199	V
15*	908.2	31.33	Pk	23.2	-26.7	10.5	38.33	*	*	0-360	299	V
16*	908.3	57.54	Pk	23.2	-26.7	10.5	64.54	*	*	0-360	399	V
17	908.4	69.47	Pk	23.2	-26.7	10.5	76.47	46.02	30.45	0-360	299	V
18*	908.6	59.23	Pk	23.2	-26.7	10.5	66.23	*	*	0-360	399	V
19*	908.7	30.8	Pk	23.2	-26.7	10.5	37.8	*	*	0-360	299	V
20	990.1	31.15	Pk	24.6	-25.6	10.5	40.65	53.97	-13.32	0-360	299	V

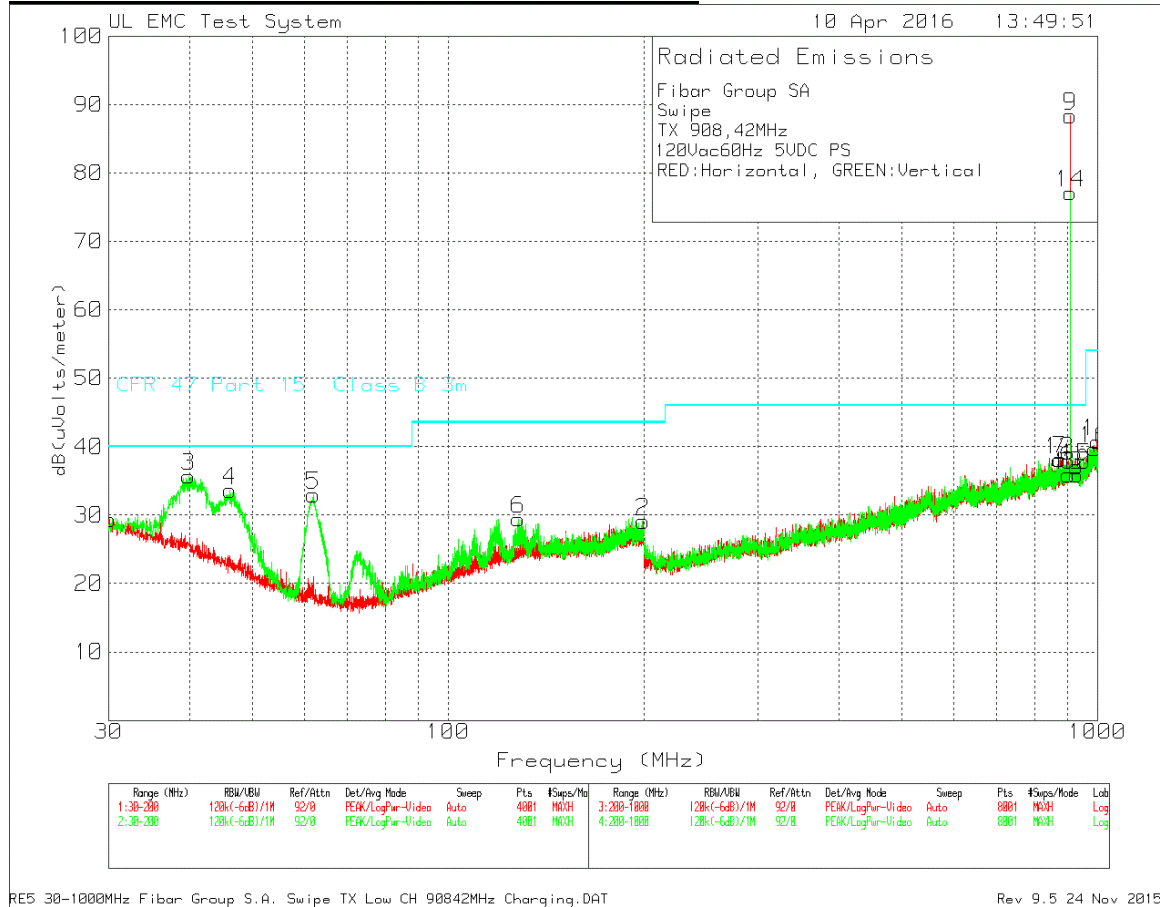
Pk - Peak detector
 * - Transmit Singal Bandedge Markers

Test Frequency (MHz)	Meter		Antenna		Corrected Reading		Qp Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
	Reading (dBuV)	Detector	Factor dBm	Gain/Loss (dBm)	10M to 3M Factor dB	dB(uVolts/ meter)					
40.2513	34.24	Qp	14.3	-30	10.5	29.04	40	-10.96	26	104	V
45.76875	37.34	Qp	12.1	-30	10.5	29.94	40	-10.06	0	104	V

Qp - Quasi-Peak detector

The transmit signal remains within the 902-928MHz operational band, outside of the restricted bands 15.205.

Transmitter Mid Channel – External 5VDC – PLOT



The transmit signal remains within the 902-928MHz operational band, outside of the restricted bands 15.205.

Transmitter Mid Channel – External 5VDC – DATA

Fibar Group S.A.
 Swipe
 TX 908.42MHz
 120Vac60Hz 5VDC PS
 Trace Markers

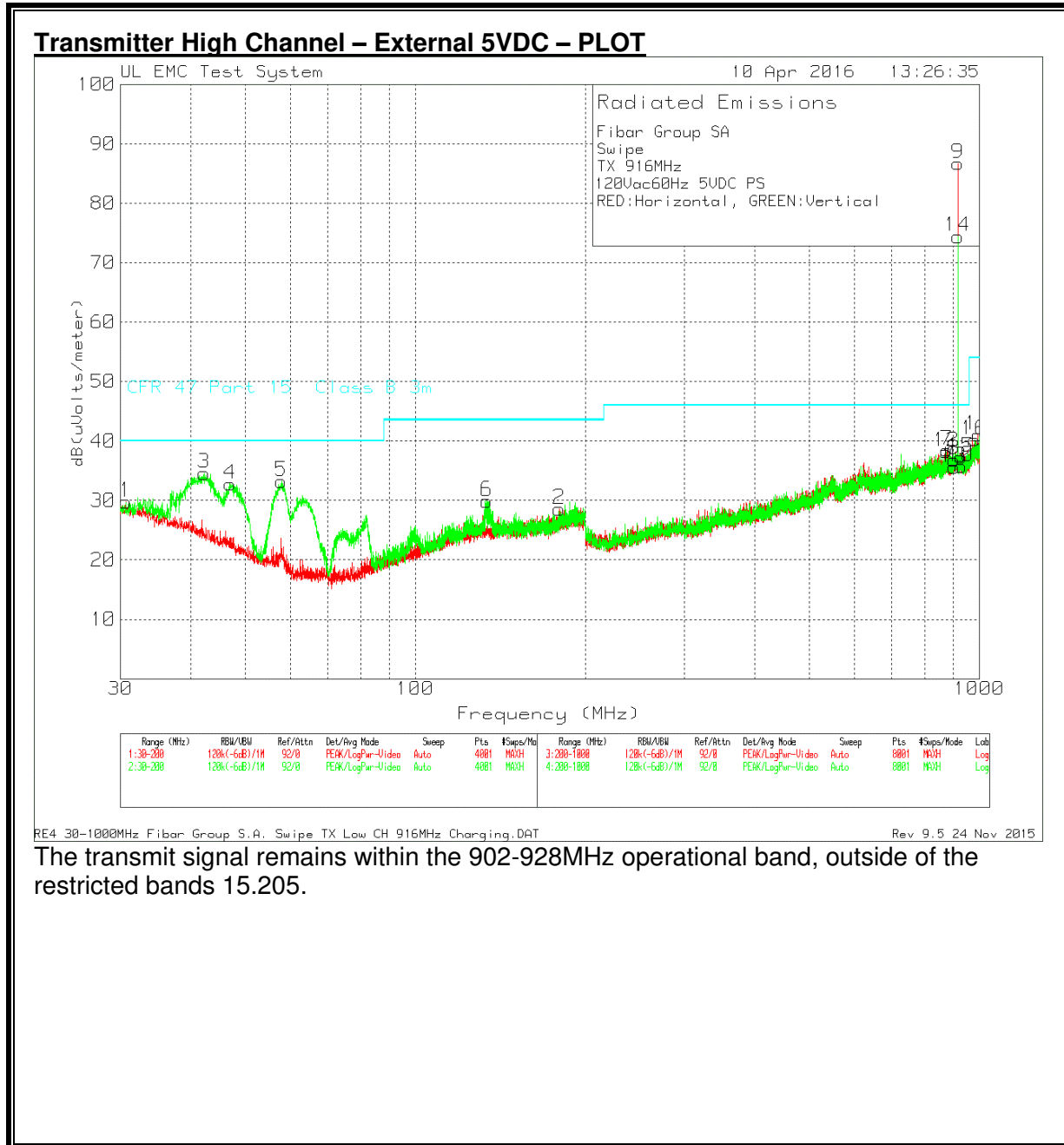
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor dBm	Gain/Loss (dBm)	10M to 3M Factor dB	Corrected Reading		Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
						dB(uVolts/ meter)	Qp Limit				
1	30.085	30.65 Pk	18.2	-30	10.5	29.35	40	-10.65	0-360	100	H
2	199.49	31.29 Pk	16	-28.7	10.5	29.09	43.52	-14.43	0-360	251	H
3	39.86	40.79 Pk	14.4	-30	10.5	35.69	40	-4.31	0-360	101	V
4	46.15	41.19 Pk	11.9	-30	10.5	33.59	40	-6.41	0-360	101	V
5	62.045	45.63 Pk	6.7	-29.9	10.5	32.93	40	-7.07	0-360	251	V
6	128.2175	34.62 Pk	14	-29.7	10.5	29.42	43.52	-14.1	0-360	101	V
7	875.1	31.95 Pk	22.8	-27.1	10.5	38.15	46.02	-7.87	0-360	299	H
8*	908	31.58 Pk	23.2	-26.7	10.5	38.58	*	*	0-360	100	H
9*	908.1	42.62 Pk	23.2	-26.7	10.5	49.62	*	*	0-360	100	H
10	908.5	81.34 Pk	23.2	-26.7	10.5	88.34	46.02	42.32	0-360	100	H
11*	908.9	41.6 Pk	23.2	-26.7	10.5	48.6	*	*	0-360	100	H
12*	909	32.55 Pk	23.2	-26.6	10.5	39.65	*	*	0-360	100	H
13	998.3	31.36 Pk	24.3	-25.4	10.5	40.76	53.97	-13.21	0-360	100	H
14	873.7	31.77 Pk	22.8	-27	10.5	38.07	46.02	-7.95	0-360	199	V
15*	908.2	33.77 Pk	23.2	-26.7	10.5	40.77	*	*	0-360	199	V
16*	908.3	53.22 Pk	23.2	-26.7	10.5	60.22	*	*	0-360	399	V
17	908.5	70.11 Pk	23.2	-26.7	10.5	77.11	46.02	31.09	0-360	399	V
18*	908.6	64.14 Pk	23.2	-26.7	10.5	71.14	*	*	0-360	399	V
19*	908.7	35.8 Pk	23.2	-26.7	10.5	42.8	*	*	0-360	299	V
20	974.8	31.15 Pk	24.2	-26.1	10.5	39.75	53.97	-14.22	0-360	199	V

Pk - Peak detector
 * - Transmit Singal Bandedge Markers

Test Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor dBm	Gain/Loss (dBm)	10M to 3M Factor dB	Corrected Reading dB(uVolts/ meter)	Qp Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
40.4263	34.19	14.2	-30	10.5	28.89	40	-11.11	54	105	V

Qp - Quasi-Peak detector

The transmit signal remains within the 902-928MHz operational band, outside of the restricted bands 15.205.



The transmit signal remains within the 902-928MHz operational band, outside of the restricted bands 15.205.

Transmitter High Channel – External 5VDC – DATA

Fibar Group S.A.
 Swipe
 TX 916MHz
 120Vac60Hz 5VDC PS
 Trace Markers

Marker No.	Test Frequency (MHz)	Meter		Antenna		Corrected Reading		Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
		Reading (dBuV)	Detector	Factor dBm	Gain/Loss (dBm)	10M to 3M Factor dB	dB(uVolts/ meter)				
1	30.68	31.33 Pk		17.9	-30	10.5	29.73	40	-10.27	0-360	250 H
2	179.8975	31.84 Pk		15.4	-29.2	10.5	28.54	43.52	-14.98	0-360	398 H
3	42.1975	40.58 Pk		13.5	-30	10.5	34.58	40	-5.42	0-360	101 V
4	47	40.76 Pk		11.5	-30	10.5	32.76	40	-7.24	0-360	101 V
5	57.88	45.11 Pk		7.6	-30	10.5	33.21	40	-6.79	0-360	398 V
6	133.87	34.87 Pk		14.2	-29.7	10.5	29.87	43.52	-13.65	0-360	101 V
7*	915.7	37.32 Pk		23	-26.9	10.5	43.92 *	*	0-360		299 H
8*	915.8	41.74 Pk		23	-26.9	10.5	48.34 *	*	0-360		299 H
9	916.1	80.2 Pk		23	-27	10.5	86.7	46.02	40.68	0-360	299 H
10*	916.3	42.24 Pk		23	-27	10.5	48.74 *	*	0-360		299 H
11*	916.4	36.76 Pk		23	-27	10.5	43.26 *	*	0-360		103 H
12	952.8	31.28 Pk		23	-26.3	10.5	38.48	46.02	-7.54	0-360	299 H
13	994.3	31.74 Pk		24.4	-25.6	10.5	41.04	53.97	-12.93	0-360	299 H
14	873.9	31.92 Pk		22.8	-27	10.5	38.22	46.02	-7.8	0-360	103 V
15*	915.8	31.7 Pk		23	-26.9	10.5	38.3 *	*	0-360		299 V
16*	915.9	56.12 Pk		23	-26.9	10.5	62.72 *	*	0-360		399 V
17	916.1	67.89 Pk		23	-27	10.5	74.39	46.02	28.37	0-360	399 V
18*	916.2	60.24 Pk		23	-27	10.5	66.74 *	*	0-360		399 V
19*	916.3	33 Pk		23	-27	10.5	39.5 *	*	0-360		199 V
20	979.9	31.29 Pk		24.4	-26	10.5	40.19	53.97	-13.78	0-360	199 V

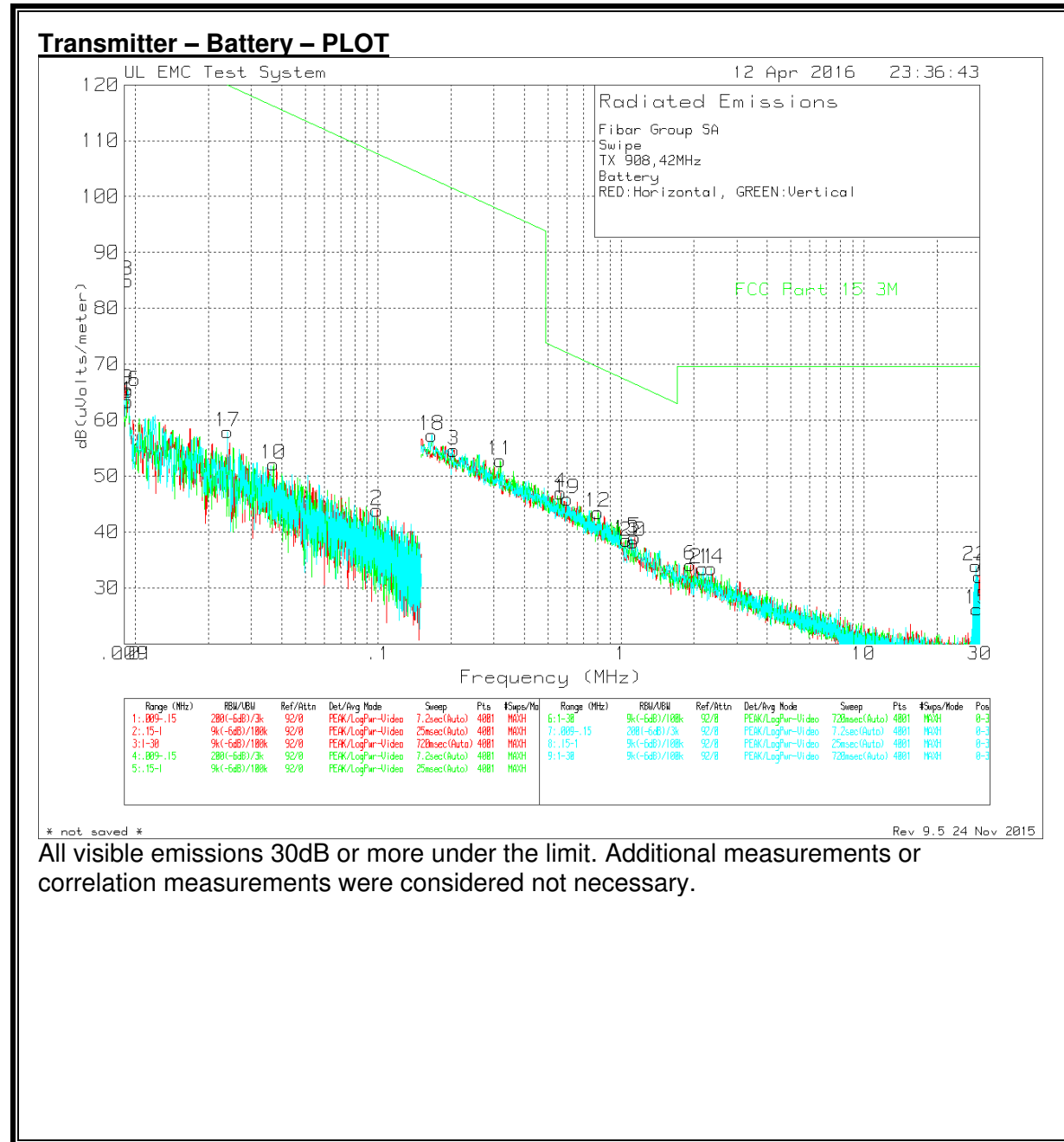
Pk - Peak detector
 * - Transmit Signal Bandedge Markers

Test Frequency (MHz)	Meter		Antenna		Corrected Reading		Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
	Reading (dBuV)	Detector	Factor dBm	Gain/Loss (dBm)	10M to 3M Factor dB	dB(uVolts/ meter)				
42.2525	34.86 Qp		13.5	-30	10.5	28.86	40	-11.14	1	104 V

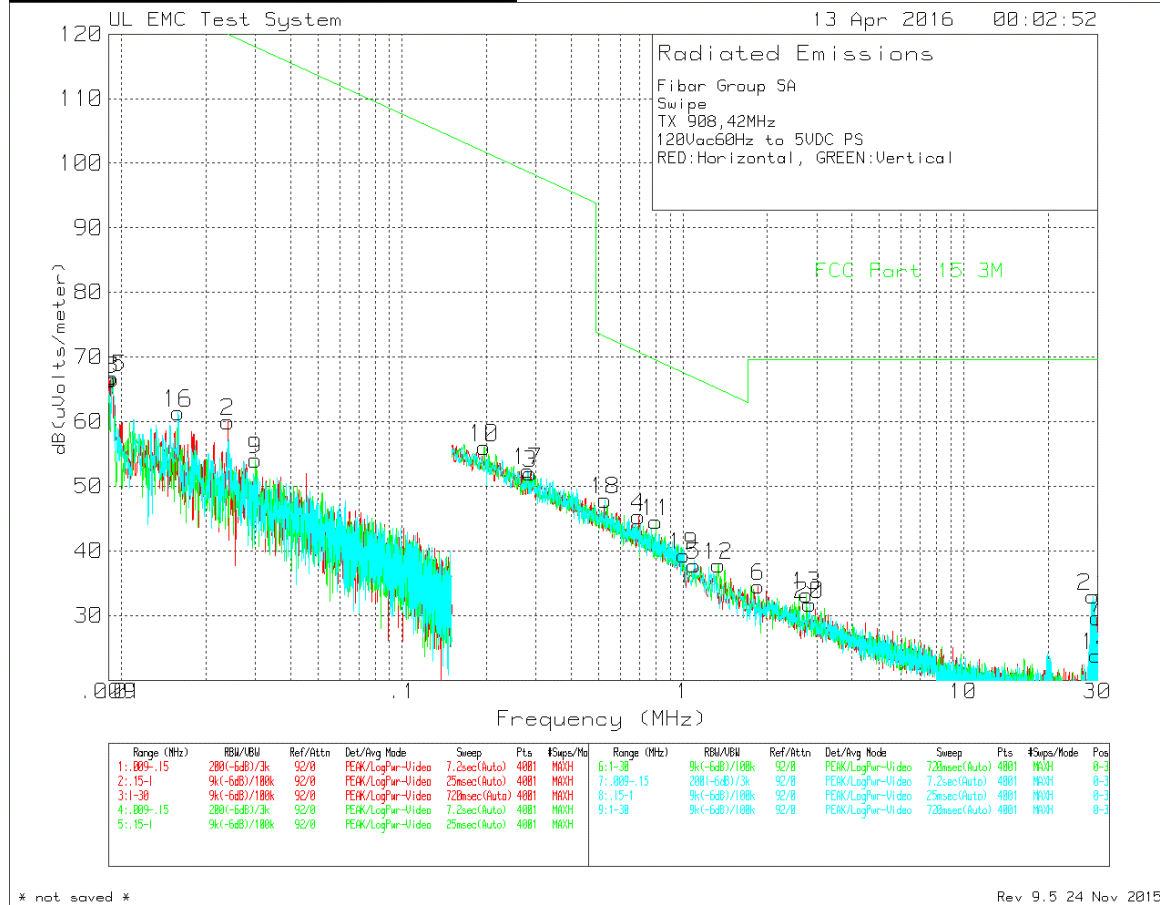
Qp - Quasi-Peak detector

The transmit signal remains within the 902-928MHz operational band, outside of the restricted bands 15.205.

SPURIOUS EMISSIONS 9k TO 30 MHz (Worst Case)

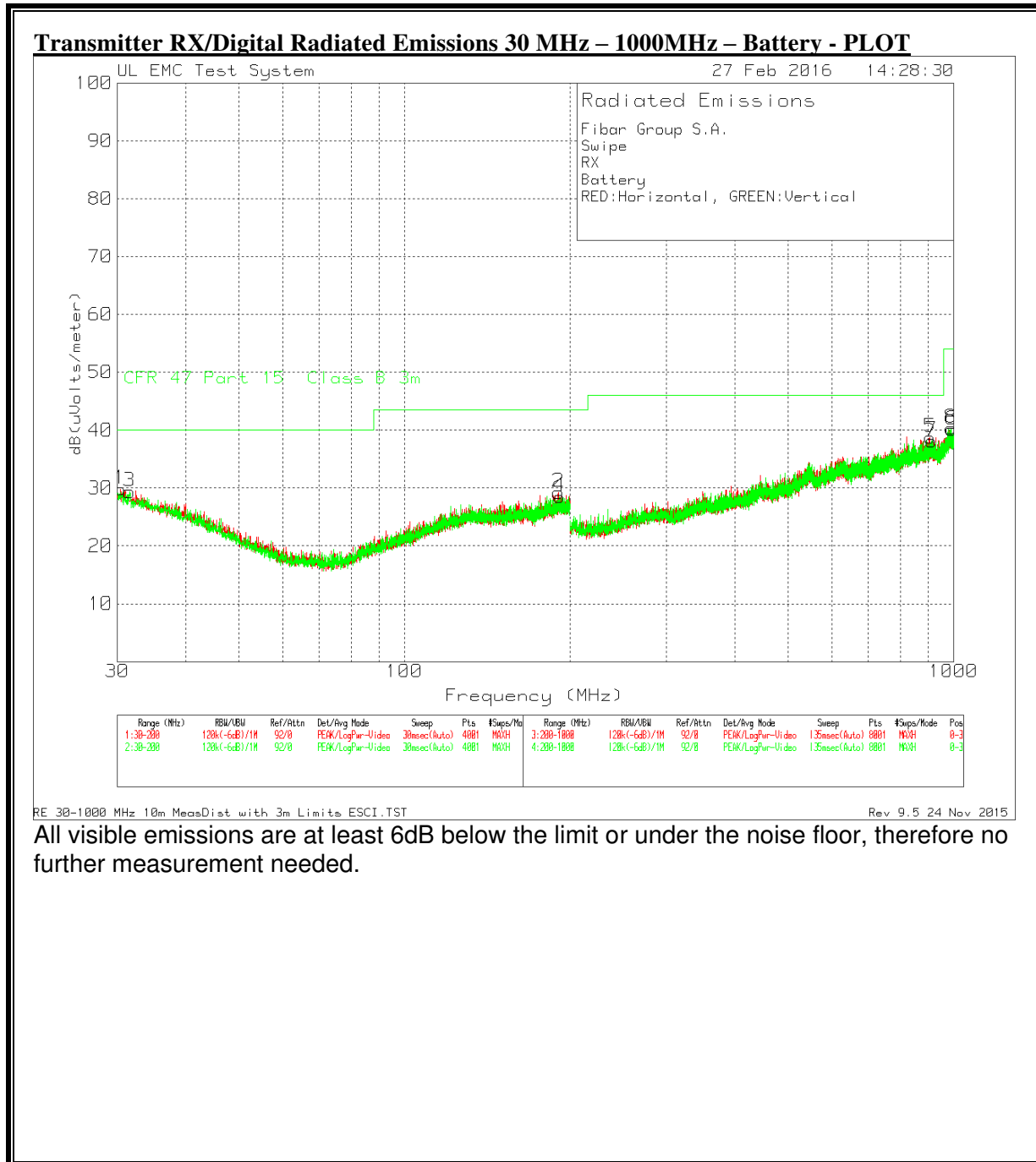


Transmitter – External 5VDC – PLOT

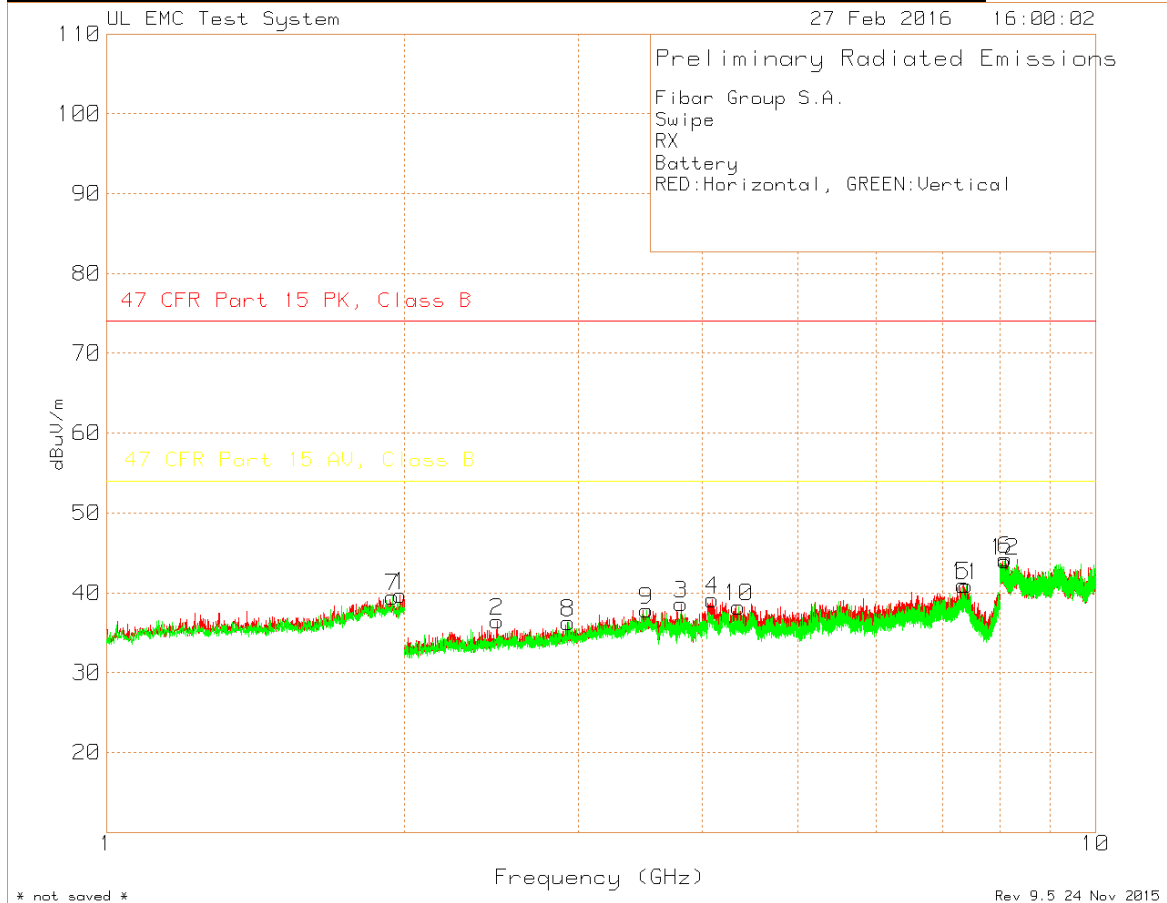


All visible emissions 30dB or more under the limit. Additional measurements or correlation measurements were considered not necessary.

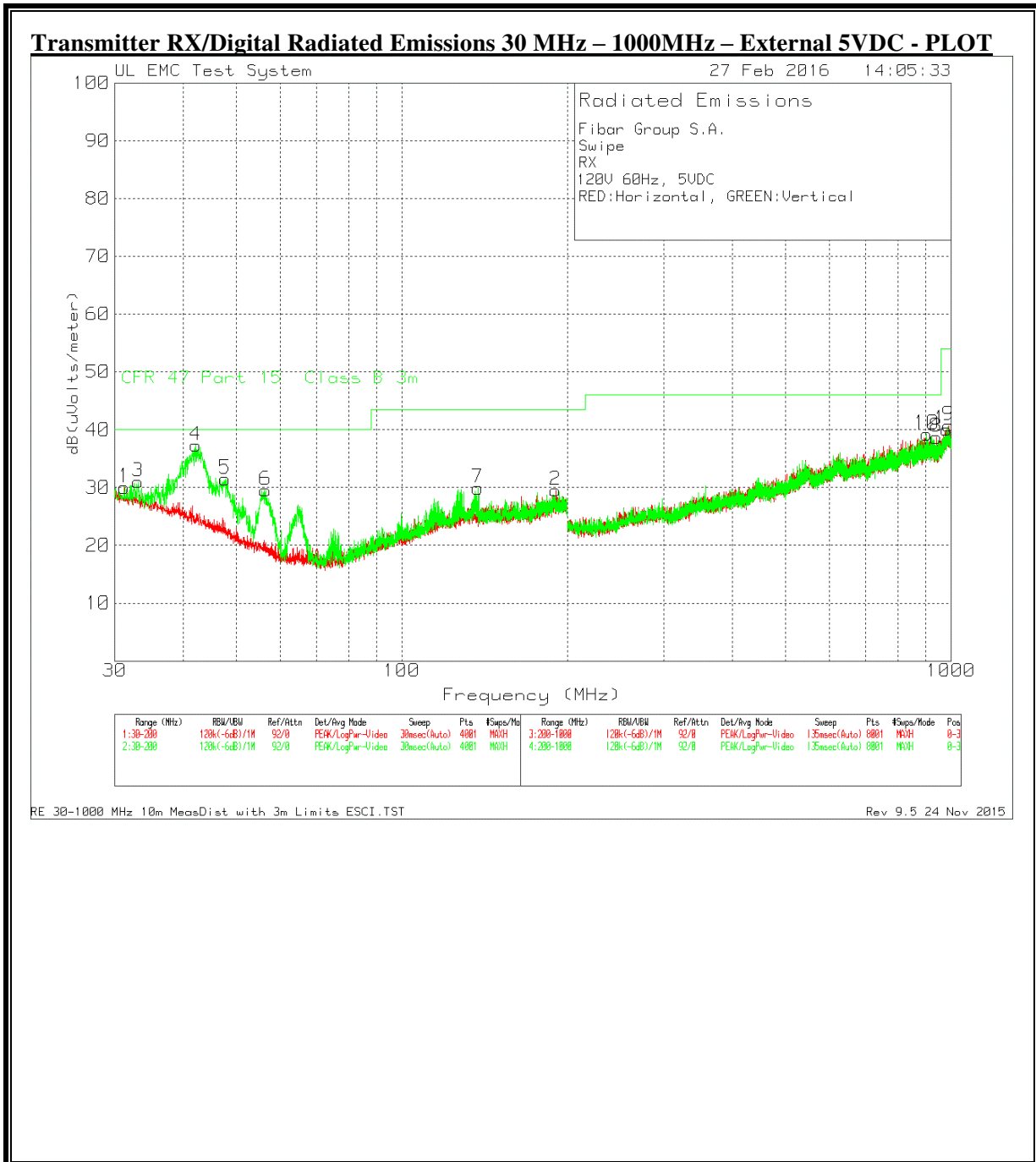
7.2.4. TRANSMITTER RX/DIGITAL RADIATED EMISSIONS



Transmitter RX/Digital Radiated Emissions 1 GHz – 10GHz - Battery - 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 - External 5VDC - DATA

Fibar Group S.A.
 Swipe
 RX
 120Vac60Hz 5VDC PS
 Trace Markers

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna		10M to 3M Factor dB	Corrected Reading dB(uVolts/meter)	Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
				Factor dBm	Gain/Loss (dBm)							
1	31.2325	31.82	Pk	17.7	-30	10.5	30.02	40	-9.98	0-360	240	H
2	190.5225	32.04	Pk	16	-29	10.5	29.54	43.52	-13.98	0-360	398	H
3	33.1025	33.51	Pk	17	-30	10.5	31.01	40	-8.99	0-360	102	V
4	42.155	43.21	Pk	13.6	-30	10.5	37.31	40	-2.69	0-360	102	V
5	47.68	39.67	Pk	11.3	-30	10.5	31.47	40	-8.53	0-360	102	V
6	56.435	41.04	Pk	8	-30	10.5	29.54	40	-10.46	0-360	245	V
7	137.5675	34.91	Pk	14.2	-29.7	10.5	29.91	43.52	-13.61	0-360	102	V
8	940.5	32.19	Pk	22.5	-26.5	10.5	38.69	46.02	-7.33	0-360	103	H
9	990.3	31.26	Pk	24.6	-25.6	10.5	40.76	53.97	-13.21	0-360	103	H
10	902.9	32.71	Pk	23.1	-27.1	10.5	39.21	46.02	-6.81	0-360	199	V
11	981.6	30.98	Pk	24.5	-25.9	10.5	40.08	53.97	-13.89	0-360	299	V

Pk - Peak detector

Measurements

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna		10M to 3M Factor dB	Corrected Reading dB(uVolts/meter)	Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
			Factor dBm	Gain/Loss (dBm)							
42.2785	36.34	Qp	13.5	-30	10.5	30.34	40	-9.66	52	107	V

Qp - Quasi-Peak detector

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

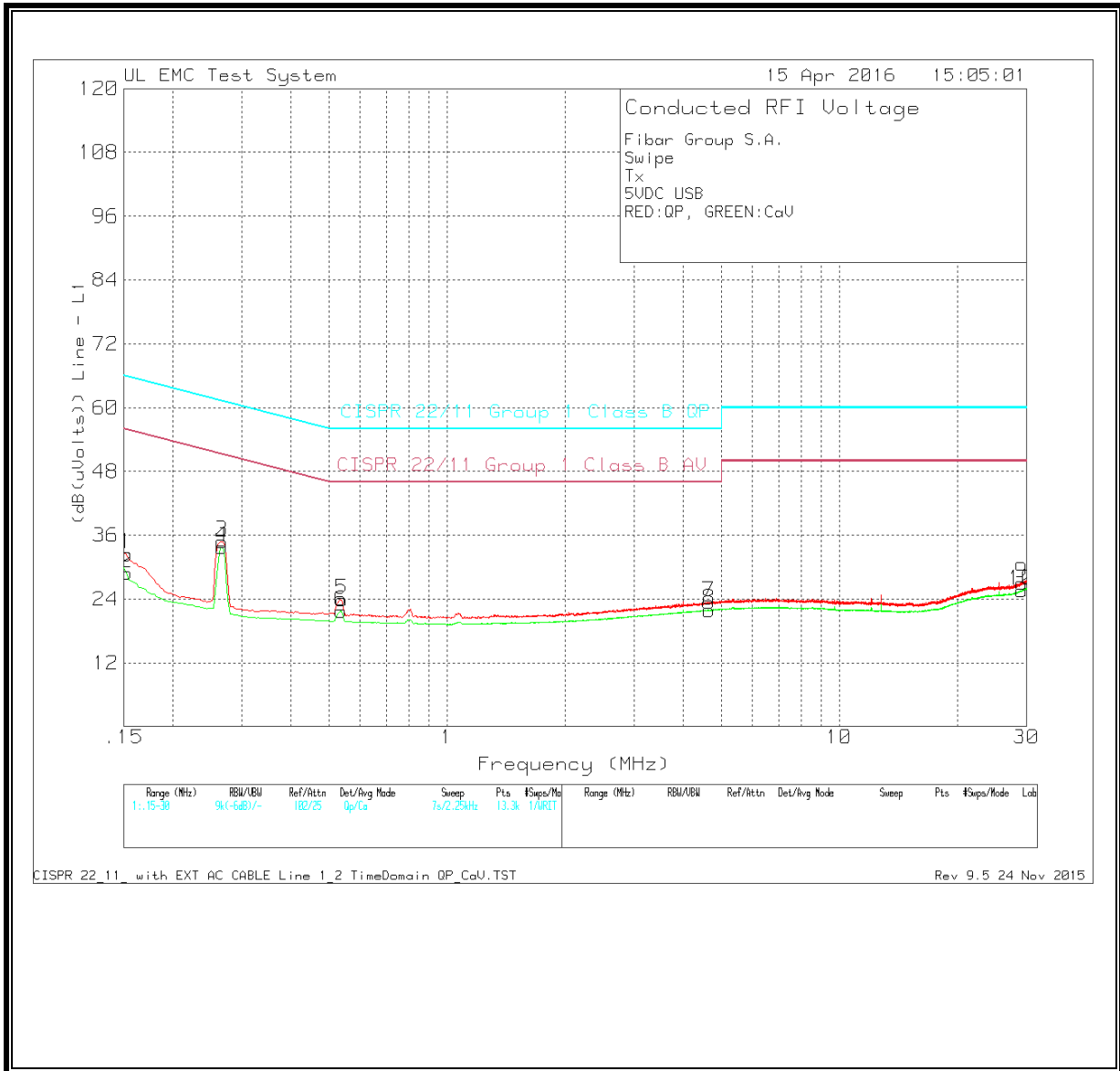
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

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

LINE 1 PLOT – TX Mode – 5VDC USB



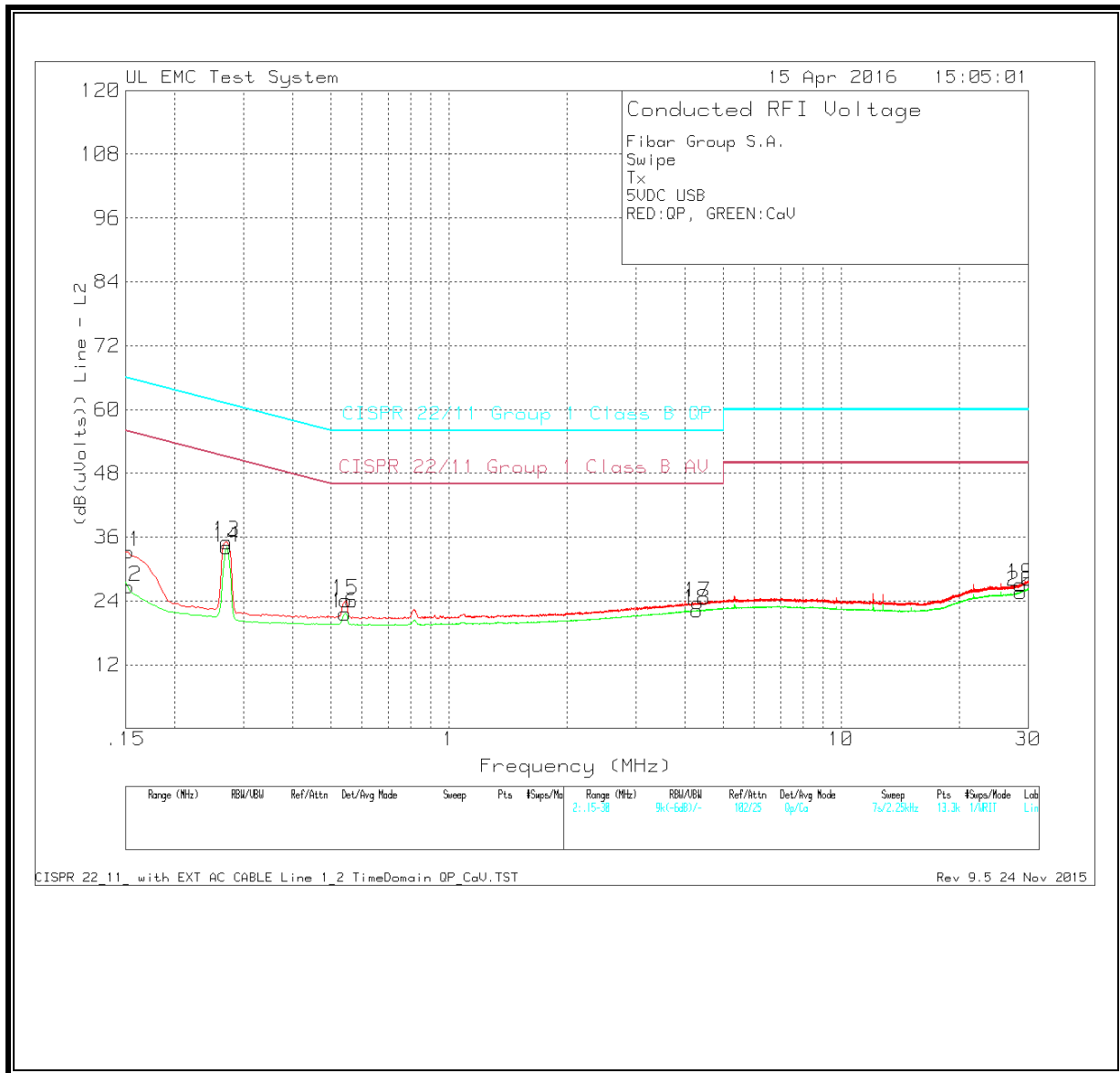
LINE 1 DATA – TX Mode – 5VDC USB

Manufacturer:Fibar
 Model#Swipe
 Mode:TX Low CH -16dB
 Voltage:5VDC USB
 QP=Red CaV=Grn

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 1			Corrected Reading dB(uVolts)	CISPR 22/11		CISPR 22/11	
				LISN Factors dBm	Cable Gain/Loss dBm	EXT Cable Gain/Loss dBm		Group 1 QP (dB)	Group 1 AV (dB)	Class B Margin (dB)	Class B Margin (dB)
1	0.15225	18.71	Qp	0.1	13.6	0	32.41	65.88	-33.47	-	-
2	0.15225	15.22	Ca	0.1	13.6	0	28.92	-	-	55.88	-26.96
3	0.267	23.71	Qp	0	11.1	0	34.81	61.21	-26.4	-	-
4	0.267	22.62	Ca	0	11.1	0	33.72	-	-	51.21	-17.49
5	0.53925	13.27	Qp	0	10.6	0	23.87	56	-32.13	-	-
6	0.537	11.13	Ca	0	10.6	0	21.73	-	-	46	-24.27
7	4.64775	12.61	Qp	0	10.7	0	23.41	56	-32.59	-	-
8	4.659	11.11	Ca	0	10.7	0	21.91	-	-	46	-24.09
9	29.17275	13.69	Qp	0	11.9	0.1	26.99	60	-33.01	-	-
10	29.16825	12.28	Ca	0	11.9	0.1	25.58	-	-	50	-24.42

Qp - Quasi-Peak detector
 Ca - CISPR Average detection

LINE 2 PLOT – TX Mode – 5VDC USB



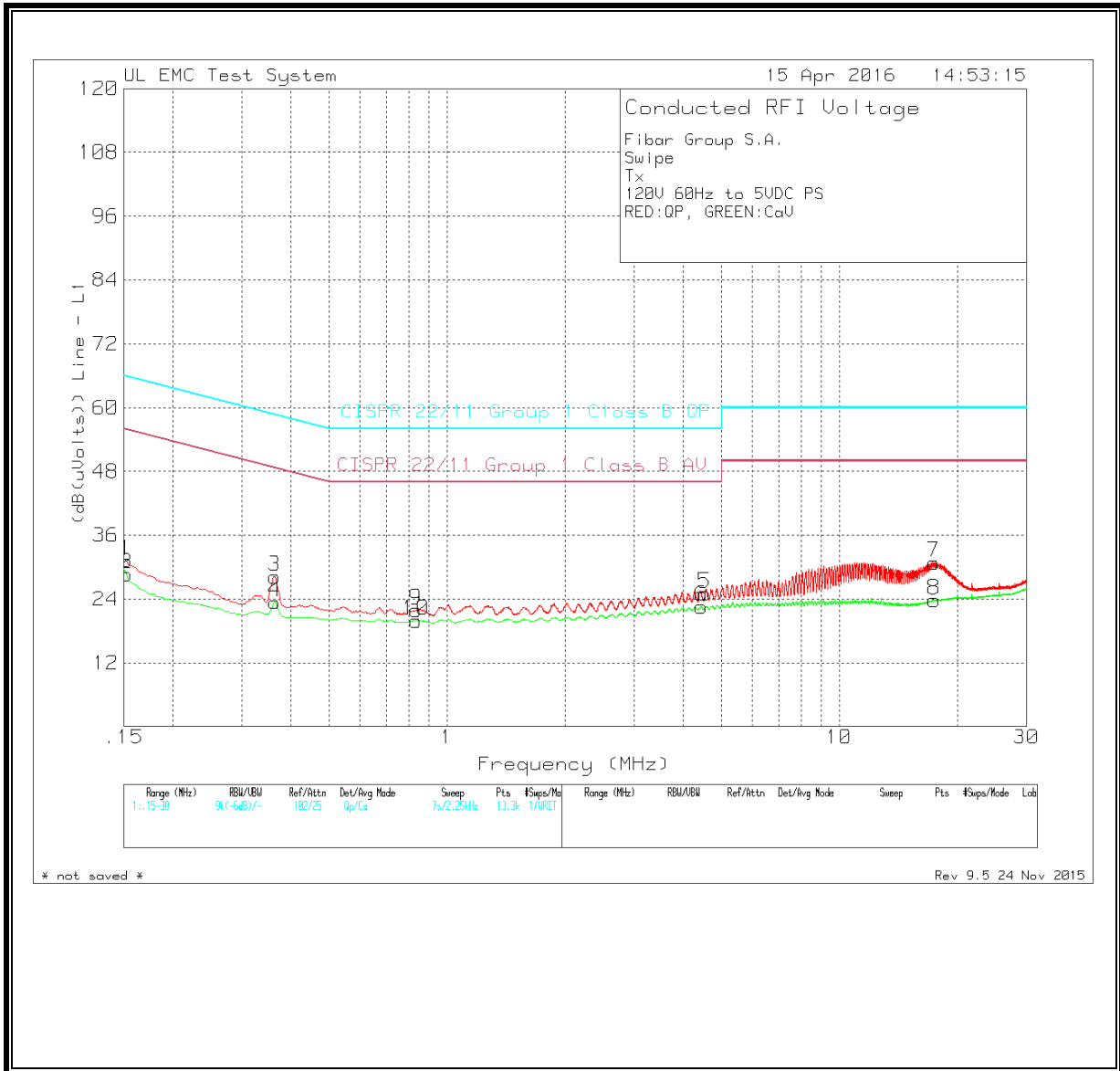
LINE 2 DATA – TX Mode – 5VDC USB

Manufacturer:Fibar
 Model#Swipe
 Mode:TX Low CH -16dB
 Voltage:5VDC USB
 QP=Red CaV=Grn

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 2			Corrected Reading dB(uVolts)	CISPR 22/11		CISPR 22/11	
				LISN Factors dBm	Cable Gain/Loss dBm	EXT Cable Gain/Loss dBm		Group 1 QP (dB)	Group 1 AV (dB)	Class B Margin (dB)	Class B Margin (dB)
11	0.15225	18.96	Qp	0.1	14.2	0	33.26	65.88	-32.62	-	-
12	0.15225	12.39	Ca	0.1	14.2	0	26.69	-	-	55.88	-29.19
13	0.2715	23.4	Qp	0.1	11.6	0	35.1	61.07	-25.97	-	-
14	0.2715	22.39	Ca	0.1	11.6	0	34.09	-	-	51.07	-16.98
15	0.546	12.89	Qp	0	11.2	0	24.09	56	-31.91	-	-
16	0.54375	10.47	Ca	0	11.2	0	21.67	-	-	46	-24.33
17	4.31025	12.43	Qp	0	11.2	0	23.73	56	-32.27	-	-
18	4.29225	10.93	Ca	0	11.2	0	22.23	-	-	46	-23.77
19	28.68675	13.6	Qp	-0.1	12.4	0.1	27.1	60	-32.9	-	-
20	28.6935	12.23	Ca	-0.1	12.4	0.1	25.73	-	-	50	-24.27

Qp - Quasi-Peak detector
 Ca - CISPR Average detection

LINE 1 PLOT – TX Mode – 120Vac60Hz to Power Supply



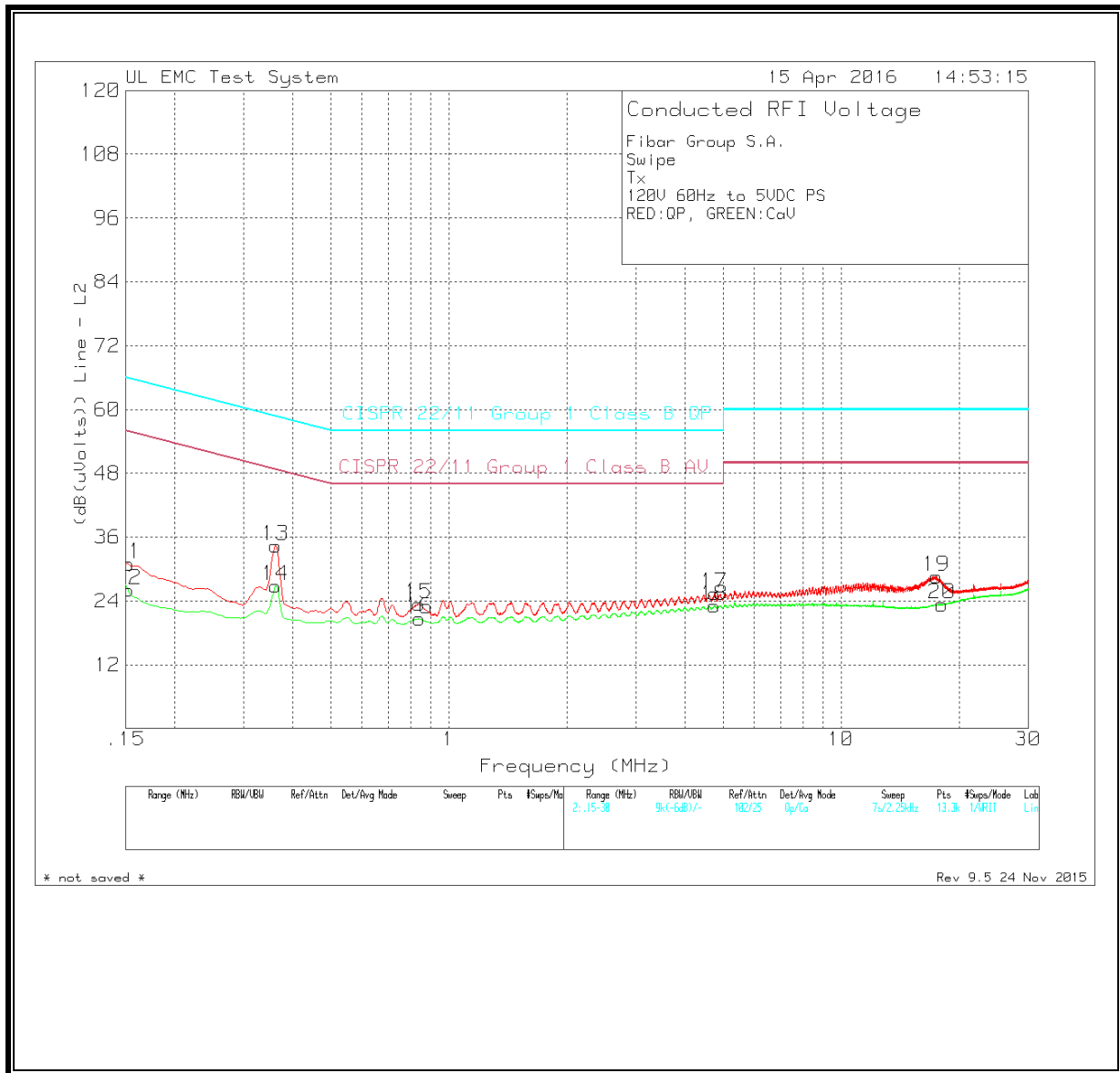
LINE 1 DATA – TX Mode – 120Vac60Hz to Power Supply

Manufacturer:Fibar
 Model#Swipe
 Mode:TX
 Voltage:120V 60Hz to 5VDC PS
 QP=Red CaV=Grn

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 1			Corrected Reading dB(uVolts)	CISPR 22/11		CISPR 22/11	
				LISN Factors dBm	Cable Gain/Loss dBm	EXT Cable Gain/Loss dBm		Group 1 QP	Margin (dB)	Group 1 AV	Margin (dB)
1	0.15225	17.53	Qp	0.1	13.6	0	31.23	65.88	-34.65	-	-
2	0.15225	14.97	Ca	0.1	13.6	0	28.67	-	-	55.88	-27.21
3	0.36375	17.4	Qp	0	10.8	0	28.2	58.64	-30.44	-	-
4	0.36375	12.64	Ca	0	10.8	0	23.44	-	-	48.64	-25.2
5	4.542	14.24	Qp	0	10.7	0	25.04	56	-30.96	-	-
6	4.452	11.76	Ca	0	10.7	0	22.56	-	-	46	-23.44
7	17.4255	18.85	Qp	0	11.3	0.1	30.85	60	-29.15	-	-
8	17.44125	11.8	Ca	0	11.3	0.1	23.8	-	-	50	-26.2
9	0.834	11.32	Qp	0	10.6	0	21.92	56	-34.08	-	-
10	0.834	9.32	Ca	0	10.6	0	19.92	-	-	46	-26.08

Qp - Quasi-Peak detector
 Ca - CISPR Average detection

LINE 2 PLOT – TX Mode – 120Vac60Hz to Power Supply



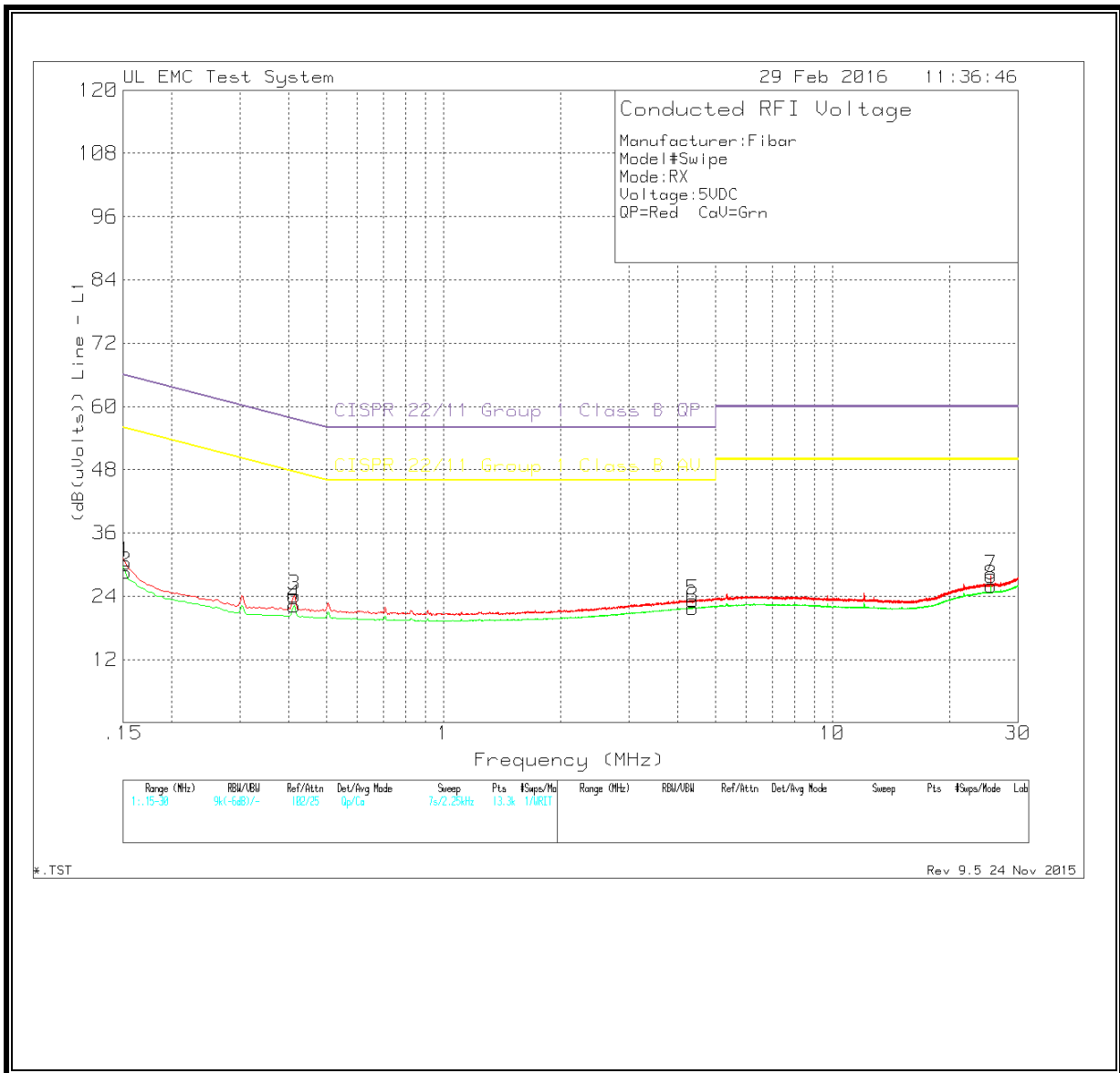
LINE 2 DATA – TX Mode – 120Vac60Hz to Power Supply

Manufacturer:Fibar
 Model#Swipe
 Mode:TX
 Voltage:120V 60Hz to 5VDC PS
 QP=Red CaV=Grn

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 2			Corrected Reading dB(uVolts)	CISPR 22/11		CISPR 22/11	
				LISN Factors dBm	Cable Gain/Loss dBm	EXT Cable Gain/Loss dBm		Group 1 QP	Group 1 AV	Margin (dB)	Margin (dB)
11	0.15225	16.69	Qp	0.1	14.2	0	30.99	65.88	-34.89	-	-
12	0.15225	11.78	Ca	0.1	14.2	0	26.08	-	-	55.88	-29.8
13	0.3615	23.09	Qp	0	11.3	0	34.39	58.69	-24.3	-	-
14	0.3615	15.54	Ca	0	11.3	0	26.84	-	-	48.69	-21.85
15	0.8385	12.34	Qp	0	11.1	0	23.44	56	-32.56	-	-
16	0.84075	9.58	Ca	0	11.1	0	20.68	-	-	46	-25.32
17	4.7535	14.03	Qp	0	11.3	0	25.43	56	-30.57	-	-
18	4.749	11.69	Ca	0	11.3	0	23.09	-	-	46	-22.91
19	17.49975	16.2	Qp	0	11.8	0.1	28.6	60	-31.4	-	-
20	18.08025	10.88	Ca	0	11.9	0.1	23.38	-	-	50	-26.62

Qp - Quasi-Peak detector
 Ca - CISPR Average detection

LINE 1 DATA – RX Mode – 5VDC USB



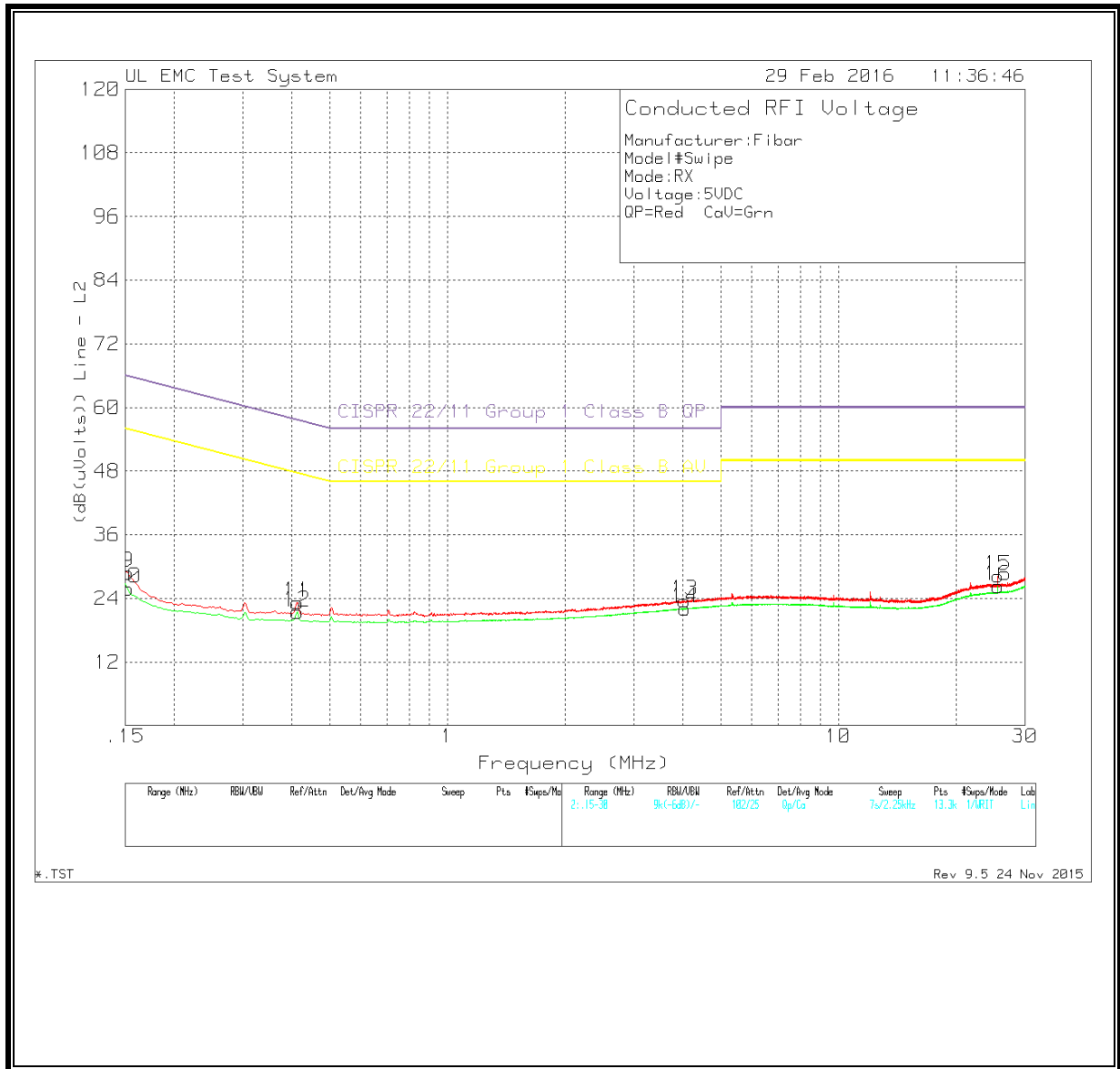
LINE 1 DATA – RX Mode – 5VDC USB

Manufacturer:Fibar
 Model#Swipe
 Mode:RX
 Voltage:5VDC USB
 QP=Red CaV=Grn

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 1			Corrected Reading dB(uVolts)	CISPR 22/11		CISPR 22/11	
				LISN Factors dBm	Cable Gain/Loss dBm	EXT Cable Gain/Loss dBm		Group 1 QP	Group 1 AV	Class B Margin (dB)	Class B Margin (dB)
1	0.15225	16.72	Qp	0.1	13.6	0	0	30.42	65.88	-35.46	-
2	0.15225	14.87	Ca	0.1	13.6	0	0	28.57	-	-	55.88 -27.31
3	0.41325	13.44	Qp	0	10.7	0	0	24.14	57.58	-33.44	-
4	0.41325	11.58	Ca	0	10.7	0	0	22.28	-	-	47.58 -25.3
5	4.37325	12.4	Qp	0	10.7	0	0.1	23.2	56	-32.8	-
6	4.371	11.01	Ca	0	10.7	0	0.1	21.81	-	-	46 -24.19
7	25.59975	14.99	Qp	0	11.7	0.1	1.1	27.89	60	-32.11	-
8	25.59975	13.11	Ca	0	11.7	0.1	1.1	26.01	-	-	50 -23.99

Qp - Quasi-Peak detector
 Ca - CISPR Average detection

LINE 2 DATA – RX/Digital Mode – 5VDC USB



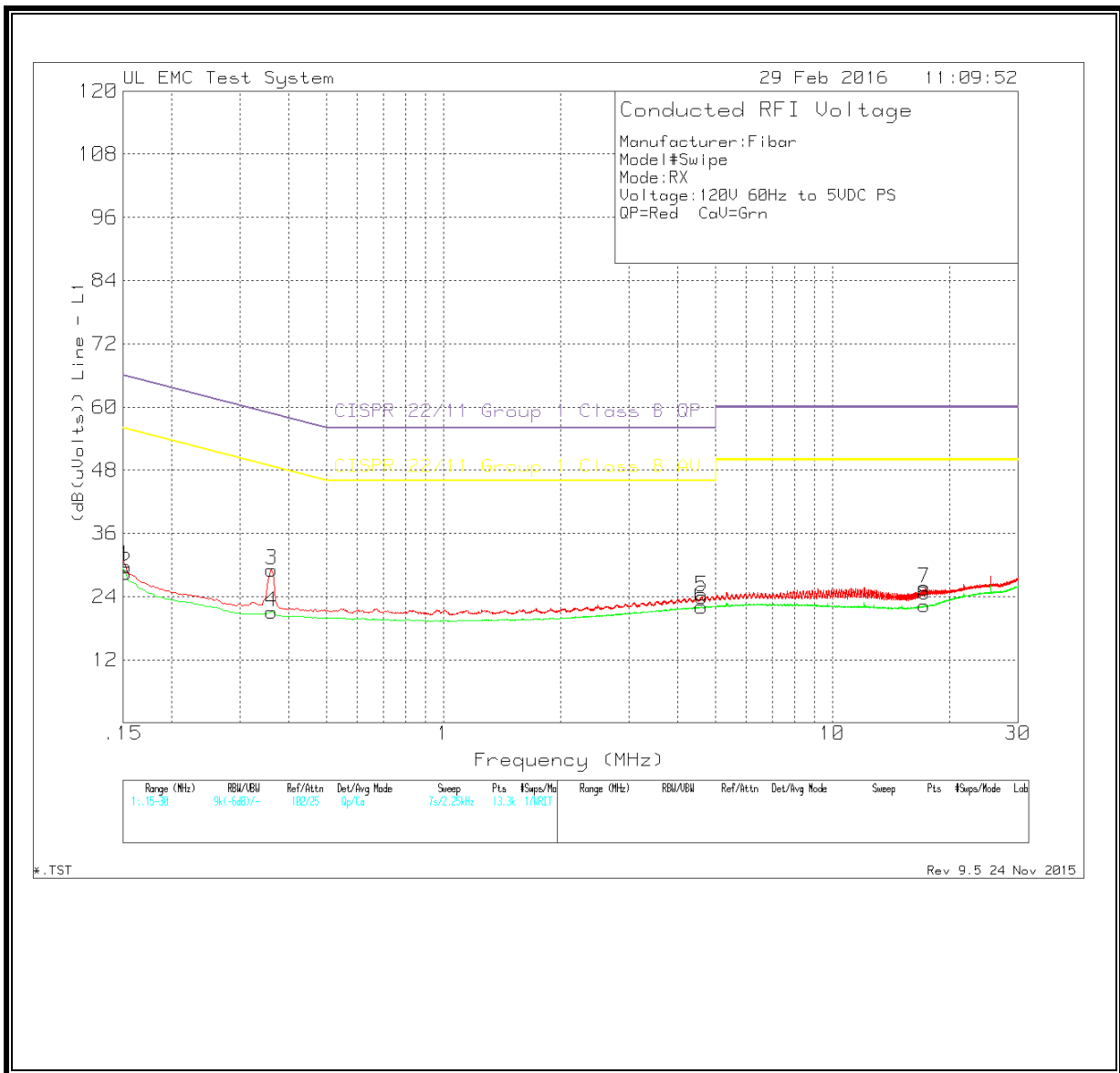
LINE 2 DATA – RX/Digital Mode – 5VDC USB

Manufacturer:Fibar
 Model#Swipe
 Mode:RX
 Voltage:5VDC USB
 QP=Red CaV=Gm

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 2			Corrected Reading dB(uVolts)	CISPR 22/11		CISPR 22/11	
				LISN Factors dBm	Cable Gain/Loss dBm	EXT Cable Gain/Loss dBm		Group 1 QP	Margin (dB)	Group 1 AV	Margin (dB)
9	0.15225	14.51	Qp	0.1	14.2	0	0	28.81	65.88	-37.07	-
10	0.15225	11.59	Ca	0.1	14.2	0	0	25.89	-	-	55.88 -29.99
11	0.41325	11.94	Qp	0	11.3	0	0	23.24	57.58	-34.34	-
12	0.41325	10.14	Ca	0	11.3	0	0	21.44	-	-	47.58 -26.14
13	4.0425	12.27	Qp	0	11.2	0	0.1	23.57	56	-32.43	-
14	4.0515	10.79	Ca	0	11.2	0	0.1	22.09	-	-	46 -23.91
15	25.59975	14.98	Qp	0	12.2	0.1	1	28.28	60	-31.72	-
16	25.59975	13.05	Ca	0	12.2	0.1	1	26.35	-	-	50 -23.65

Qp - Quasi-Peak detector
 Ca - CISPR Average detection

LINE 1 DATA – RX/Digital Mode – 120Vac60Hz to Power Supply



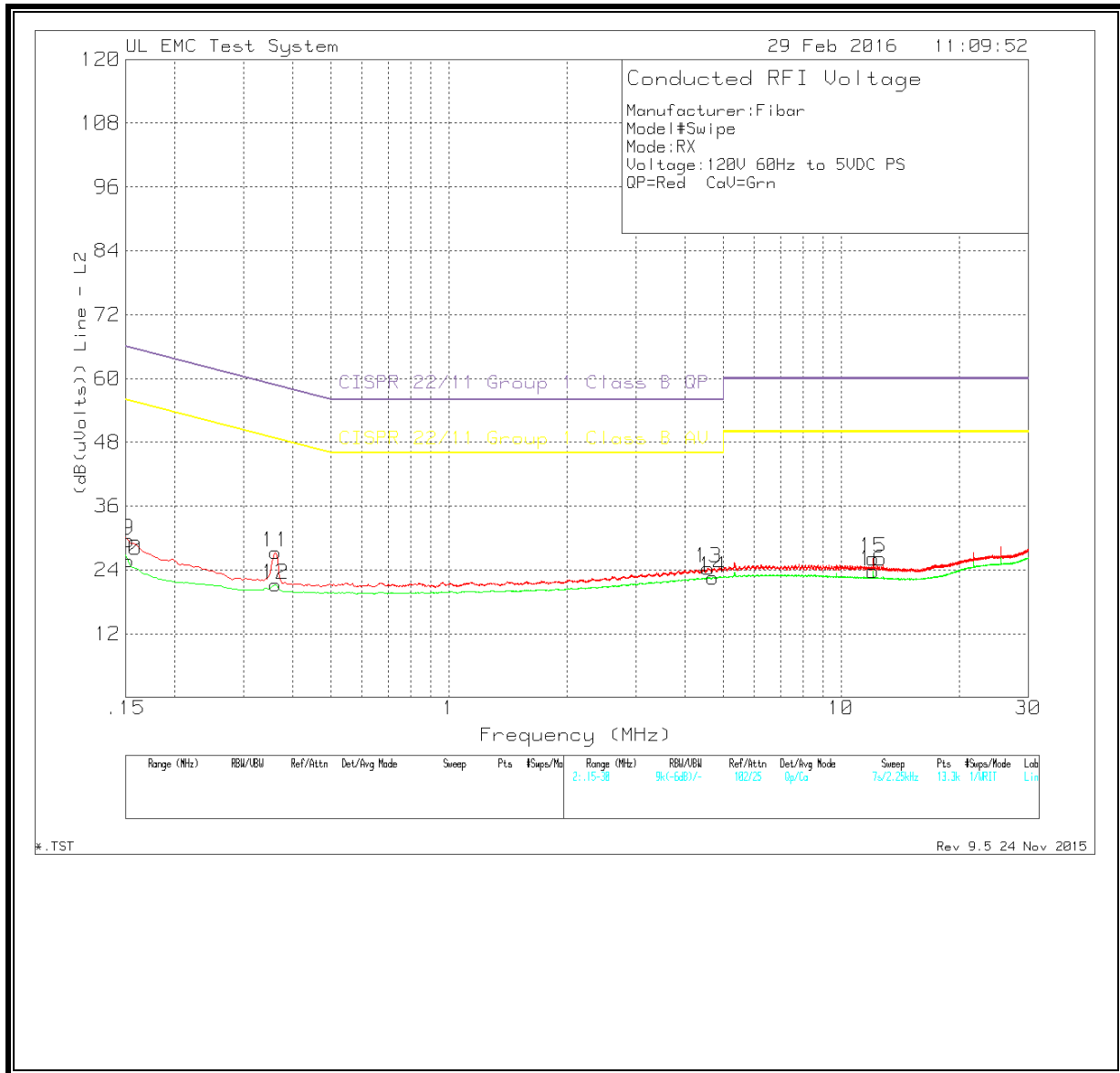
LINE 1 DATA – RX/Digital Mode – 120Vac60Hz to Power Supply

Manufacturer:Fibar
 Model#Swipe
 Mode:RX
 Voltage:120V 60Hz to 5VDC PS
 QP=Red CaV=Grn

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 1		Line 1 EXT		Line 1 Dongle Gain/Loss dBm	Corrected Reading dB(uVolts)	CISPR 22/11		CISPR 22/11	
				LISN Factors dBm	Cable Gain/Loss dBm	Cable Gain/Loss dBm	Group 1 Class B QP Margin (dB)			Group 1 Class B AV Margin (dB)			
1	0.15225	16.04	Qp	0.1	13.6	0	0	29.74	65.88	-36.14	-	-	-
2	0.15225	14.77	Ca	0.1	13.6	0	0	28.47	-	-	-	55.88	-27.41
3	0.3615	18.28	Qp	0	10.8	0	0	29.08	58.69	-29.61	-	-	-
4	0.3615	10.3	Ca	0	10.8	0	0	21.1	-	-	-	48.69	-27.59
5	4.62075	13.14	Qp	0	10.7	0	0.1	23.94	56	-32.06	-	-	-
6	4.60275	11.3	Ca	0	10.7	0	0.1	22.1	-	-	-	46	-23.9
7	17.25225	13.57	Qp	0	11.3	0.1	0.6	25.57	60	-34.43	-	-	-
8	17.24775	10.43	Ca	0	11.3	0.1	0.5	22.33	-	-	-	50	-27.67

Qp - Quasi-Peak detector
 Ca - CISPR Average detection

LINE 2 DATA – RX/Digital Mode – 120Vac60Hz to Power Supply



LINE 2 DATA – RX/Digital Mode – 120Vac60Hz to Power Supply

Manufacturer:Fibar
 Model#Swipe
 Mode:RX
 Voltage:120V 60Hz to 5VDC PS
 QP=Red CaV=Grn

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 2		Line 2 EXT		Line 2 Dongle Gain/Loss dBm	Corrected Reading dB(uVolts)	CISPR 22/11		CISPR 22/11	
				LISN Factors dBm	Cable Gain/Loss dBm	Cable Gain/Loss dBm	Group 1 QP			Group 1 AV	Class B Margin (dB)	Class B Margin (dB)	
9	0.15225	15.28	Qp	0.1	14.2	0	0	29.58	65.88	-36.3	-	-	-
10	0.15225	11.48	Ca	0.1	14.2	0	0	25.78	-	-	-	55.88	-30.1
11	0.3615	16.01	Qp	0	11.3	0	0	27.31	58.69	-31.38	-	-	-
12	0.3615	9.92	Ca	0	11.3	0	0	21.22	-	-	-	48.69	-27.47
13	4.58925	13.03	Qp	0	11.2	0	0.1	24.33	56	-31.67	-	-	-
14	4.7085	11.25	Ca	0	11.2	0	0.1	22.55	-	-	-	46	-23.45
15	12.05925	14.07	Qp	0.1	11.6	0.1	0.3	26.17	60	-33.83	-	-	-
16	12.05925	11.67	Ca	0.1	11.6	0.1	0.3	23.77	-	-	-	50	-26.23

Qp - Quasi-Peak detector
 Ca - CISPR Average detection