FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

Door Window Sensor

MODEL NUMBER: FGK001

FCC ID: 2AA9MFGK10X

REPORT NUMBER: 10044158B

ISSUE DATE: December 18, 2013

Prepared for
Fibar Group sp. z.o.o
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Poznań, Poland 60-453

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	12/18/13	Initial Issue	M.Ferrer

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: Door Window Sensor

MODEL: FGK001

SERIAL NUMBER: Prototype

DATE TESTED: September 12, 2013 – December 4, 2013

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C Part 15.249	Pass

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out byUL Verification Services Inc. 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.

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Tested By:

MICHAEL FERRER
WiSE Project Lead
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 333 Pfingsten Road, Northbrook, IL 60062, USA.
UL NBK is accredited by NVLAP, Laboratory Code 100414-0.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus: (MU shows 10m, but Emissions were extrapolated to 3m)

Test	Range	Equipment	Uncertainty k=2
Radiated Emissions	30-200MHz	Bicon 10m Horz	4.27dB
Radiated Emissions	30-200MHz	Bicon 10m Vert	4.28dB
Radiated Emissions	200-1000MHz	LogP 10m Horz	3.33dB
Radiated Emissions	200-1000MHz	LogP 10m Vert	3.39dB
Radiated Emissions	1-6GHz	Horn	5.02dB
Radiated Emissions	6-18GHz	Horn	5.34dB
Radiated Emissions	18-26GHz	Horn	6.60dB
Conducted Ant Port	30MHz-26GHz	Spectrum Analyzer	2.94
RF Power	dB	Power Meter	0.45dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a door window sensor that contains a 908MHz transceiver. It is battery powered. The EUT contains a 4 aux inputs. 3 are used for a temperature sensor. The other one can be used as a door input sensor.

The radio is manufactured by Fibar Group

5.2. MAXIMUM OUTPUT E-FIELD STRENGTH

The transmitter has a maximum output quasi-peak E-field as follows:
Data from section 7.2

Frequency Range (MHz)	Mode	Output QP E-field Strength (dBuV/m)
908	TX	81.24

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.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Use	Product Type	Manufacturer	Model	Comments
EUT	Door Window Sensor	Fibar	FGK001	None
AE	Temp Sensor	-	-	Connected internal to case
Note: **EUT** - Equipment Under Test, **AE** - Auxiliary/Associated Equipment, or **SIM** - Simulator (Not Subjected to Test)				

I/O CABLES

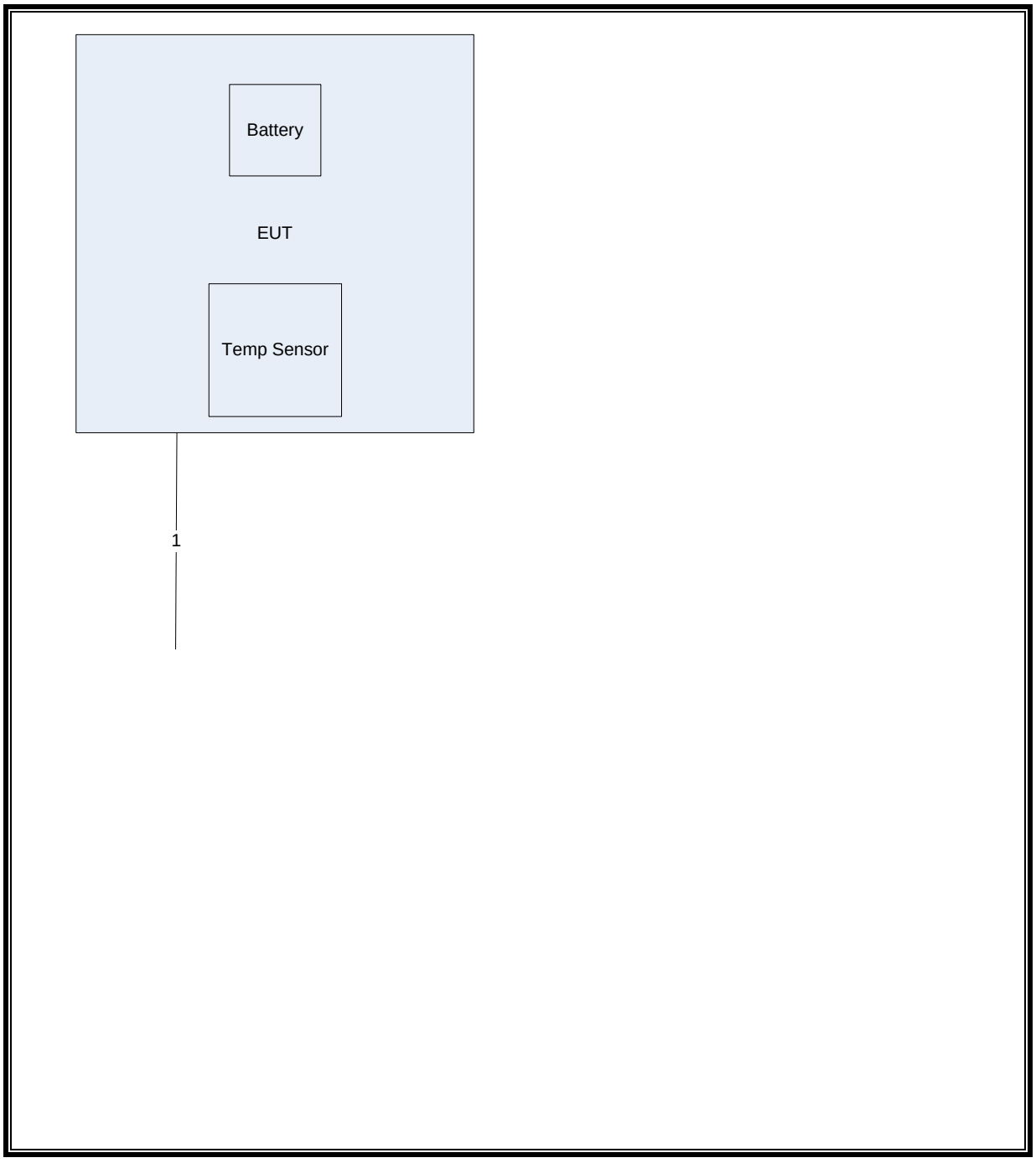
Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
1	Aux input	IO	N	N	1m length

Note:
AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
I/O = Signal Input or Output Port (Not Involved in Process Control)
TP = Telecommunication 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**	**Asset**	**Cal Date**	**Cal Due**
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	20121227	20131231
Bicon Antenna	Chase	VBA6106A	EMC4078	20130213	20140228
Log-P Antenna	Chase	UPA6109	EMC4258	20121015	20131030
Spectrum Analyzer	Rhode & Schwarz	FSEK	EMC4182	20121226	20131231
Antenna Array	UL	BOMS	EMC4276	20111227	20131231
Spectrum Analyzer	Agilient	N9030A	EMC4360	20121226	20131226
Near Field Antenna	EMCO	-	-	-	-
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	20121230	20131230
LISN	Solar	8602-50-TS-50-N	EMC4052	20130115	20140116
LISN	Solar	8602-50-TS-50-N	EMC4064	20130115	20140116

Log-P Antenna was used during testing in September before cal due date.

7. TEST RESULTS

7.1.1. 99%, 20dB BANDWIDTH

LIMITS

None; for reporting purposes only.

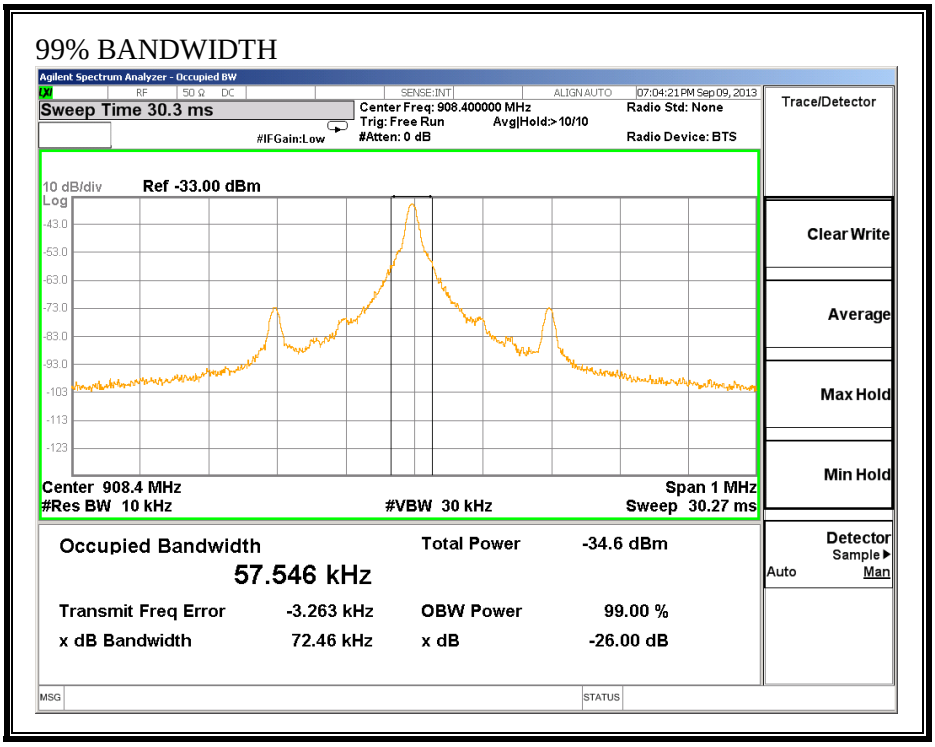
TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 10kHz bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth and 20dB function is utilized.

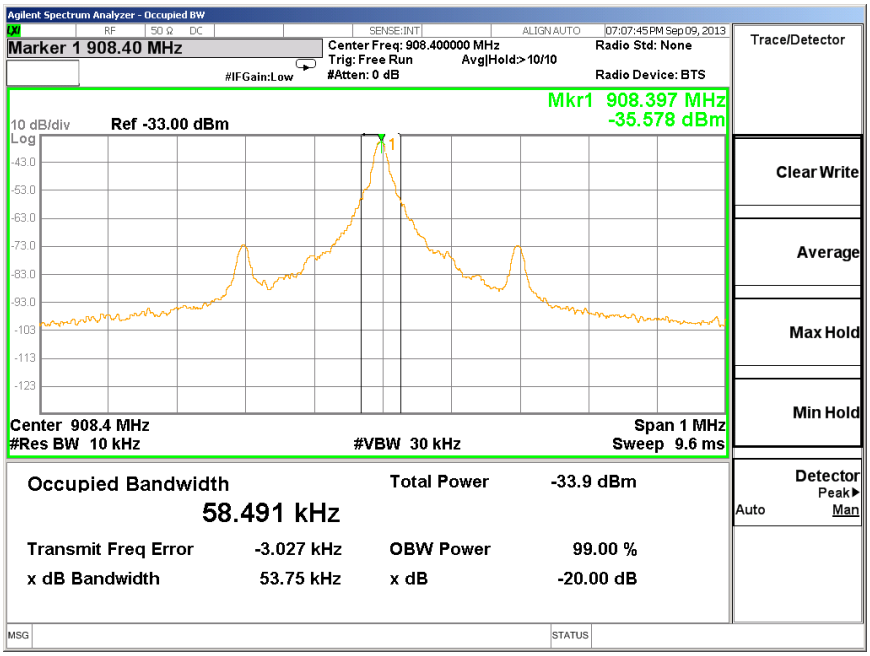
RESULTS

Channel	Frequency (kHz)
99%	57.55
20dB	53.75

99% BANDWIDTH



20dB BANDWIDTH



7.2. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.4

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:

Limit is 3m

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

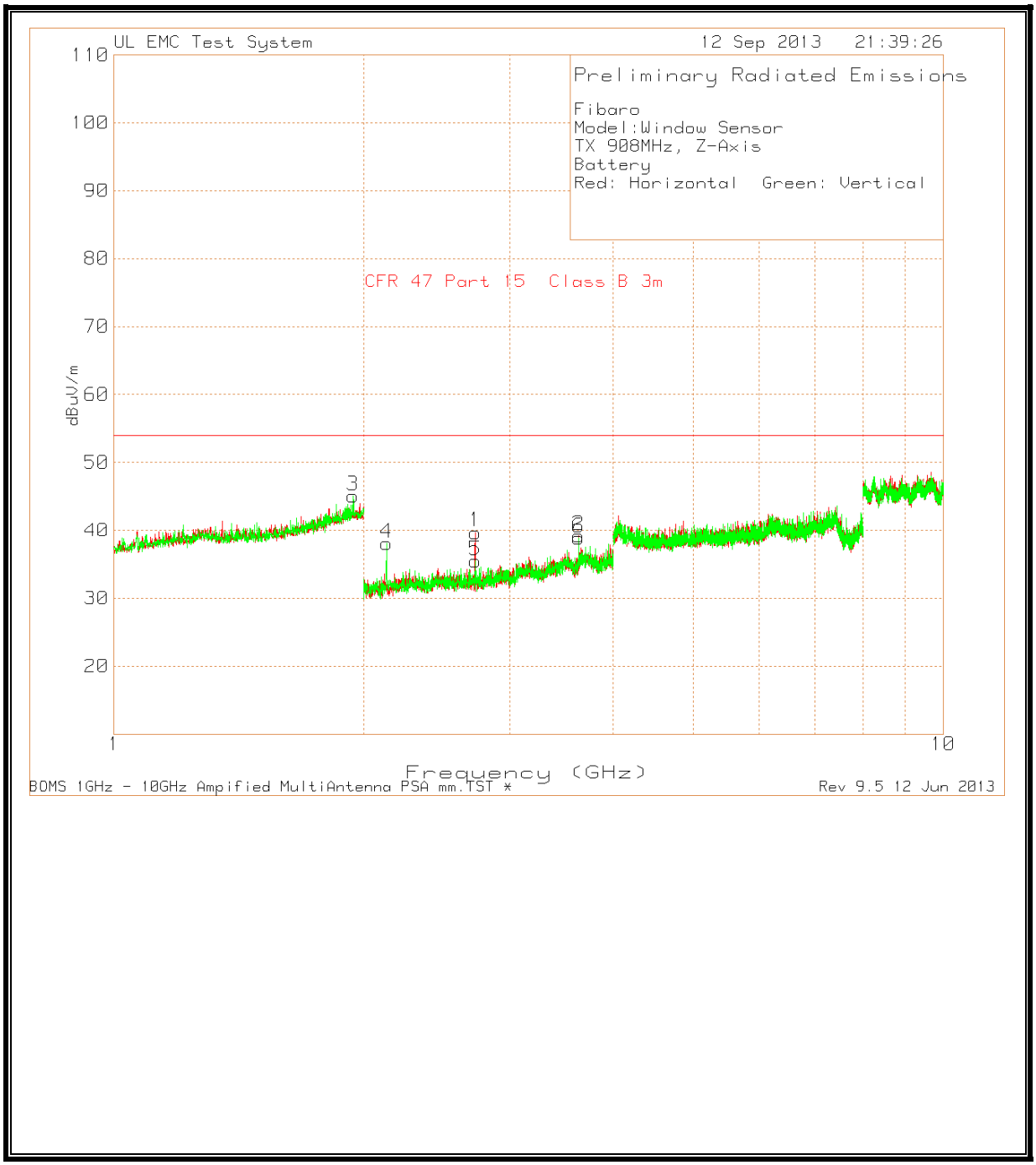
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

RESULTS

Manufacturer:Fibar											
Model#Window Sensor											
Mode:TX											
Voltage:Batttery											
Red:Hoz Green:Vert											
Test Frequency	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Cable Factor dB	Corrected Reading dB(uVolts/ meter)	FCC Part 15 Class B 3 m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity	Notes
908.39441	38.34	QP	23	10	71.34	94	-22.66	258	103	Horz	1
908.39441	40.4	QP	23	10	73.4	94	-20.6	103	127	Vert	1
908.39441	40.03	QP	23	10	73.03	94	-20.97	283	125	Vert	2
908.39441	37.01	QP	23	10	70.01	94	-23.99	39	113	Horz	2
908.3968	45.65	QP	23	10	78.65	94	-15.35	275	151	Vert	3
908.3968	48.24	QP	23	10	81.24	94	-12.76	262	102	Horz	3
Notes:											
1 - X-axis											
2 - Y-axis											
3 - Z-axis											
PK - Peak detector											
QP - Quasi-Peak detector											

Measurements for above data were conducted at 3m.

7.2.1. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz

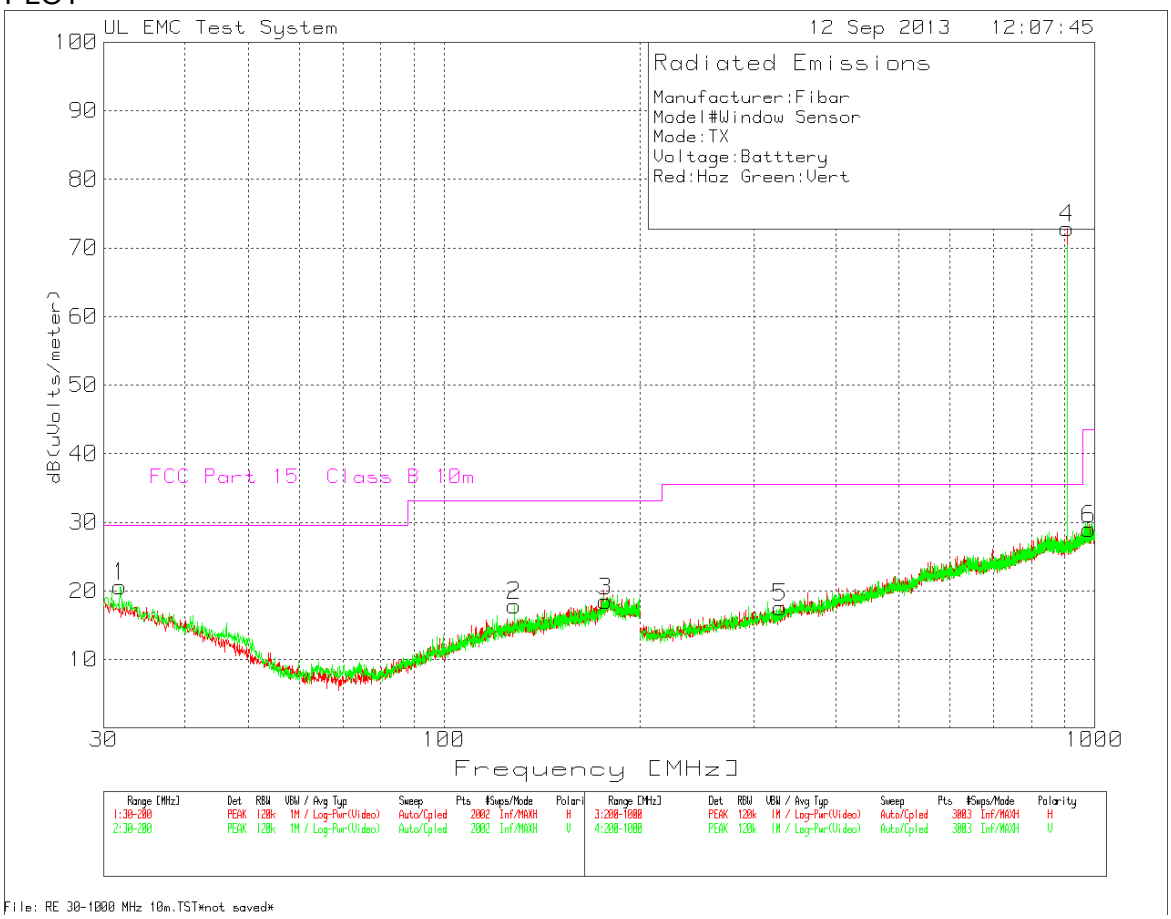


Fibaro											
Model:Window Sensor											
TX 908MHz, Z-Axis											
Battery											
Red: Horizontal Green: Vertical											
	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	BOMS Factor (dB)	Corrected Reading dBuV/m	CFR 47 Part 15 Class B 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.725	68.29	PK	22.1	-50.66	39.73	54	-14.27	0-360	100	H
2	3.6335	65.62	PK	23.3	-49.74	39.18	54	-14.82	0-360	100	H
3	1.943	13.71	PK	27.3	4.09	45.1	54	-8.9	0-360	100	V
4	2.131	68.68	PK	21.5	-52.11	38.07	54	-15.93	0-360	149	V
5	2.725	64.06	PK	22.1	-50.66	35.5	54	-18.5	0-360	100	V
6	3.634	65.33	PK	23.3	-49.72	38.91	54	-15.09	0-360	100	V
PK - Peak detector											

7.2.2. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz

PLOT



Emissions were measured at 10m and Limit was extrapolated to 10m.

Manufacturer:Fibar										
Model#Window Sensor										
Mode:TX										
Voltage:Batttery										
Red:Hoz Green:Vert										
Marker No.	Test Frequency	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Cable Factor (dB)	Corrected Reading dB(uVolts/ meter)	FCC Part 15 Class B 10m	Margin (dB)	Height [cm]	Polarity
1	31.7841	33.73	PK	17	-30.1	20.63	29.55	-8.92	99	Vert
2	128.2109	33.76	PK	13.8	-29.7	17.86	33.07	-15.21	99	Vert
3	177.3163	32.27	PK	15.5	-29.3	18.47	33.07	-14.6	399	Vert
4	908.5943	74.66	PK	23	-24.8	72.86	35.57	37.29	99	Horz
5	329.2472	29.44	PK	14.1	-25.9	17.64	35.57	-17.93	199	Vert
6	981.6123	28.58	PK	24.4	-24	28.98	43.52	-14.54	299	Vert
PK - Peak detector										

Emissions were measured at 10m and Limit was extrapolated to 10m.