

RR051-14-105388-3-A Ed. 1

This test report cancels and replaces test report RR051-14-105388-3-A Ed. 0

Certification test report

According to the standard:
CFR47 FCC PART 15

Equipment under test:
LOOP INTELLITAG 915MHz

Model: BU2002

FCCID:
2ADLABU2002

Company:
MYFOX

DISTRIBUTION: Mr Chafik

(Company: MYFOX)

Number of pages: 25 with 6 appendixes

Ed.	Date	Modified pages	Written by		Technical Verification and Quality Approval	
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1	21-May-2015	See Vertical Line	S. LOUIS	SL		

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This document is the result of testing a specimen or a sample of the product submitted. It does not imply an assessment of the conformity of the whole manufactured products of the tested sample.



DESIGNATION OF PRODUCT: LOOP INTELLITAG 915MHz

Serial number (S/N): BTAG2-0000001

Reference / model (P/N): BU2002

Software version: 1.0

MANUFACTURER: MYFOX

COMPANY SUBMITTING THE PRODUCT:

Company: MYFOX

Address: RUE DU LAC 2460 L'OCCITANE
REGENT PARK II
31670 LABEGE
FRANCE

Responsible: Mr CHAFIK

DATE(S) OF TEST: 12, 14, 17, 18, 25, 26 and 27 November 2014

TESTING LOCATION: EMITECH ANGERS laboratory at JUIGNE SUR LOIRE (49) FRANCE
EMITECH ANGERS open area test site in JUIGNE SUR LOIRE (49)
FRANCE
21 rue de la Fuye
49610 Juigne sur Loire
France
FCC 2.948 Listed Site Registration Number: 90469
FCC Accredited under US-EU MRA Designation Number: FR0009
Test Firm Registration Number: 873677

TESTED BY: S. LOUIS

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1. INTRODUCTION

This document presents the result of Certification tests carried out on the following equipment: LOOP INTELLITAG 915MHz, in accordance with normative reference.

2. PRODUCT DESCRIPTION

ITU Emission code: 68K5F1D

Class: B (residential) / Utilization: Alarm system

Antenna type and gain: Internal helicoidal antenna: gain not communicated

Operating frequency range: from 902 MHz to 928 MHz

Number of channels: 1

Channel spacing: Not concerned

Modulation: FSK

Power source: 1.5Vdc by internal lithium battery. type FR03 (AAA size)

Power level, frequency range and channels characteristics are not user adjustable.
The details pictures of the product and the circuit boards are joined with this file.

5 samples were tested in emission to determine the maximum power level allowed by the standard:

Sample 1: TAG 0x14 => power level higher than the standard limit

Sample 2: TAG 0x0F => power level higher than the standard limit

Sample 3: TAG 0x0B => power level higher than the standard limit

Sample 4: TAG 0x09 => power level higher than the standard limit

Sample 5: TAG 0x07 => power level **lower** than the standard limit

Full tests described in this report were performed on sample 5 except "Radiated emission limits" tests performed on sample 6: TAG RX915

3. NORMATIVE REFERENCE

The standards and testing methods related throughout this report are those listed below.

They are applied on the whole test report even though the extensions (version, date and amendment) are not repeated.

CFR 47 FCC Part 15 (2014) Radio Frequency Devices

| ANSI C63.4 (2009) Methods of Measurement of Radio-Noise Emissions from Low-voltage Electrical and Electronics Equipment in the range of 9 kHz to 40 GHz.

4. TEST METHODOLOGY

Radio performance tests procedures given in CFR 47 part 15:

Subpart B –Unintentional Radiators

Paragraph 109: Radiated emission limits

Subpart C – Intentional Radiators

Paragraph 203: Antenna requirement

Paragraph 205: Restricted bands of operation

Paragraph 209: Radiated emission limits; general requirements

Paragraph 215: Additional provisions to the general radiated emission limitations

Paragraph 249: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0-24.25 GHz.

5. TEST EQUIPMENT CALIBRATION DATES

Equipment	Model	Type	Last verification	Next verification	Validity
0000	BAT-EMC	Software	/	/	/
1922	Microwave DB C020180F-4B1	Low-noise amplifier 1 to 18 GHz	20/08/2014	20/08/2015	20/10/2015
4088	R&S FSP40	Spectrum Analyzer	22/08/2013	22/08/2015	22/10/2015
6609	MICRO-TRONICS HPM11630	high-pass filter	24/02/2014	24/02/2016	24/04/2016
8511	Hewlett Packard 8447D	Low noise amplifier	20/08/2014	20/08/2015	20/10/2015
8526	Schwarzbeck VHBB 9124	Biconical antenna	12/06/2012	12/06/2016	12/08/2016
8530	Bilog CBL5112A	Bilog antenna	05/03/2013	05/03/2017	05/05/201
8533	R&S HFH2-Z2	Loop antenna	11/02/2014	11/02/2016	11/04/2016
8535	Emco 3115	Horn antenna	29/10/2012	29/10/2016	29/12/2016
8543	Schwarzbeck UHALP 9108A	Log periodic antenna	12/06/2012	12/06/2016	12/08/2016
8593	SIDT Cage 2	Full anechoic room	/	/	/
8675	AOIP MN5102B	Multimeter	15/01/2013	15/01/2015	15/03/2015
8707	R&S ESI7	Test receiver	03/10/2012	03/10/2014	03/12/2014
8732	Emitech	OATS	23/08/2013	23/08/2016	23/10/2016
8749	La Crosse Technology WS-9232	Meteo station	03/09/2014	03/09/2016	03/11/2016
8750	La Crosse Technology WS-9232	Meteo station	03/09/2014	03/09/2016	03/11/2016
8896	ACQUISYS GPS8	Satellite synchronized frequency standard	/	/	/
/	GPIBShot V2.4	Software	/	/	/

6. TESTS AND CONCLUSIONS

6.1 unintentional radiator (subpart B)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.107	CONDUCTED LIMITS			X		
FCC Part 15.109	RADIATED EMISSION LIMITS	X				
FCC Part 15.111	ANTENNA POWER CONDUCTED LIMITS FOR RECEIVER			X		

NAP: Not Applicable

NAs: Not Asked

6.2 intentional radiator (subpart C)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.203	ANTENNA REQUIREMENT	X				
FCC Part 15.205	RESTRICTED BANDS OF OPERATION	X				
FCC Part 15.207	CONDUCTED LIMITS			X		
FCC Part 15.209	RADIATED EMISSION LIMITS; general requirements	X				Note 1
FCC Part 15.212	MODULAR TRANSMITTERS			X		
FCC part 15.215	ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSION LIMITATIONS					
	(a) Alternative to general radiated emission limits	X				
	(b) Unwanted emissions outside of §15.249 frequency bands	X				Note 2
	(c) 20 dB bandwidth and band-edge compliance	X				
FCC Part 15.249	OPERATION WITHIN THE BANDS 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz AND 24.0-24.25 GHz					
	(a) Fundamental and harmonics field strength	X				
	(b) Fixed point-to-point operation		X			
	(c) Measurement distance	X				
	(d) Out-of-band emissions	X				
	(e) Field strength limits above 1 GHz	X				

NAP: Not Applicable

NAs: Not Asked

Note 1: See FCC part 15.249 (d).

Note 2: See FCC part 15.209. Unwanted emissions levels are all below the fundamental emission field strength level.

RF EXPOSURE:

Maximum measured power = 82.7 dB μ V/m = 0.055 mW

($P = (E \times d)^2 / (30 \times G_p)$ with $d = 3$ m and $G_p = 1$)

In accordance with KDB 447498 D01 General RF Exposure Guidance v05r02

$PSD = EIRP / (4 \times \pi \times R^2) = 0.055 / 4 \times \pi \times (20 \text{ cm})^2 = 44.4 \times 10^{-6} \text{ mW/cm}^2$ (limit= 0.612 mW/cm²).

The equipment fulfils the requirements on power density for general population/uncontrolled exposure and therefore fulfils the requirements of 47 CFR §1.1310.

To declare, or not, the compliance with the specifications, it was not explicitly taken into account of uncertainty associated with the results

7. RADIATED EMISSION LIMITS

Standard: FCC Part 15

Test procedure: Paragraph 109

Limit class: Class B

Test set up:

First an exploratory radiated measurement was performed. During this phase the product is oriented in three orthogonal planes.

Then the final measurement is realized with the product on the most critical orientation.

The measure is realized on open area test site under 1 GHz and in anechoic chamber above 1 GHz.

When the system is tested in an open area test site (OATS), the EUT is placed on a rotating table, 0.8m from a ground plane.

When the system is tested in anechoic chamber, the EUT is placed on a rotating table, 1.5m from a ground plane.

Zero degree azimuths correspond to the front of the device under test.

See photos in appendix 2.

Frequency range: From 30 MHz to 5th harmonic of the highest frequency used (915 MHz).

Detection mode: Quasi-peak (F < 1 GHz) Average (F > 1 GHz)

Bandwidth: 120 kHz (F < 1 GHz) 1 MHz (F > 1 GHz)

Distance of antenna: 10 meters (in open area test site) / 3 meters (in anechoic room)

Antenna height: 1 to 4 meters (in open area test site) / 1.5 meter (in anechoic room)

Antenna polarization: vertical and horizontal (only the highest level is recorded)

Equipment under test operating condition:

The equipment is blocked in reception mode.

Results:

Ambient temperature (°C): 22.3
Relative humidity (%): 50

Power source:

We used for power source the internal battery of the equipment and we noted:

Voltage at the beginning of test (V): 1.8V
Voltage at the end of test (V): 1.77V
Percentage of voltage drop during the test (%): 1.7

Sample N° 6

Not any spurious has been detected.

Applicable limits:	for $30 \text{ MHz} \leq F \leq 88 \text{ MHz}$:	40 dB μ V/m at 3 meters
	for $88 \text{ MHz} < F \leq 216 \text{ MHz}$:	43.5 dB μ V/m at 3 meters
	for $216 \text{ MHz} < F \leq 960 \text{ MHz}$:	46 dB μ V/m at 3 meters
	above 960 MHz :	54 dB μ V/m at 3 meters

Note: any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

Test conclusion:

RESPECTED STANDARD

8. ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSION LIMITATIONS

Standard: FCC Part 15

Test procedure: Paragraph 15.215

Test set up:

Test realized in near field. All field strength measurements are correlated with the radiated maximum peak output power

Test operating condition of the equipment:

The equipment under test is blocked in continuous transmission mode, modulated by internal data signal, at the highest output power level which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 21.9
Relative humidity (%): 46

Power source: Lithium battery 1.5Vdc.

Lower Band Edge: band from 900 MHz to 902 MHz

Upper Band Edge: band from 928 MHz to 930 MHz

Sample N° 5:

Fundamental frequency (MHz)	Field strength level of fundamental (dBμV/m)	Detector (peak or average)	Frequency of maximum band-edges emission (MHz)	Delta marker (dB)*	Calculated max out-of-band emission level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
915.02	82.90	peak	900.108	-58.20	24.70	62.90	38.20
915.02	82.90	peak	929.844	-59.33	23.57	62.90	39.33

* Marker-Delta method

The 20 dB bandwidth curves are given in appendix 6 ; band-edge curves are given in appendix 4.

Test conclusion:

RESPECTED STANDARD

9. FUNDAMENTAL AND HARMONICS FIELD STRENGTH

Standard: FCC Part 15

Test procedure: paragraph 15.249 (a)

Test set up:

First an exploratory radiated measurement was performed. During this phase the product is oriented in three orthogonal planes.

Then the final measurement is realized with the product on the most critical orientation.

The measure is realized on open area test site under 1 GHz and in anechoic chamber above 1 GHz.

The system is tested in an open area test site (OATS). The EUT is placed on a rotating table, 0.8m from a ground plane. Zero degree azimuth corresponds to the front of the device under test.

The system is tested in anechoic chamber. The EUT is placed on a rotating table, 1.5m from a ground plane. Zero degree azimuth corresponds to the front of the device under test.

The measurement of the electro-magnetic field is realized, with a calibrated peak power responding power meter.

Frequency range: From 9 kHz to 10th harmonic of the highest fundamental frequency (915 MHz).

Distance of antenna: 10 meters (in open area test site) / 3 meters (in anechoic room)

Antenna height: 1 to 4 meters (in open area test site) / 1.5 meter (in anechoic room)

Antenna polarization: vertical and horizontal

Equipment under test operating condition:

The equipment under test is blocked in continuous transmission mode, modulated by internal data signal, at the highest output power level which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 21.9
Relative humidity (%): 46

Power source:

We used for power source the internal battery of the equipment and we noted:

Voltage at the beginning of test (V): 1.70
Voltage at the end of test (V): 1.66
Percentage of voltage drop during the test (%): 2.35

Sample N° 5

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi- Peak	Antenna height (cm)	Azimuth (degree)	Resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
915	QP	100	171	120	H	82.7*	83.6	0.9
1829.5	P	150	275	1000	H	38.3**	74	35.7
2745	P	150	157	1000	H	39.2**	74	34.8

* Fundamental emission

** The peak level is lower than the average limit (54 dB μ V/m).

Note: any spurious which has more than 20 dB of margin compared to the limit is not necessarily reported.

Test conclusion:

RESPECTED STANDARD

10. OUT OF BAND EMISSIONS

Standard: FCC Part 15

Test procedure: paragraph 15.205
paragraph 15.209
paragraph 15.249 (d)

Test set up:

First an exploratory radiated measurement was performed. During this phase the product is oriented in three orthogonal planes.

Then the final measurement is realized with the product on the most critical orientation.

The measure is realized on open area test site under 1 GHz and in anechoic chamber above 1 GHz.

When the system is tested in an open area test site (OATS), the EUT is placed on a rotating table, 0.8m from a ground plane.

When the system is tested in anechoic chamber, the EUT is placed on a rotating table, 1.5m from a ground plane.

Zero degree azimuths correspond to the front of the device under test.

See photos in appendix 2.

Frequency range: From 9 kHz to 10th harmonic of the highest fundamental frequency (915 MHz).

Detection mode: Quasi-peak ($F < 1 \text{ GHz}$) Average ($F > 1 \text{ GHz}$)

Bandwidth: 200Hz ($9 \text{ kHz} < F < 150\text{kHz}$)
9 kHz ($150 \text{ kHz} < F < 30\text{MHz}$)
120 kHz ($30 \text{ MHz} < F < 1 \text{ GHz}$)
1 MHz ($F > 1 \text{ GHz}$)

Distance of antenna: 10 meters (in open area test site) / 3 meters (in anechoic room)

Antenna height: 1 to 4 meters (in open area test site) / 1.5 meter (in anechoic room)

Antenna polarization: vertical and horizontal (only the highest level is recorded)

Equipment under test operating condition:

The equipment under test is blocked in continuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 21.4
Relative humidity (%): 48

Power source:

We used for power source the internal battery of the equipment and we noted:

Voltage at the beginning of test (V): 1.57
Voltage at the end of test (V): 1.53
Percentage of voltage drop during the test (%): 2.55

Sample N° 5

Not any spurious has been detected.

Applicable limits:	for $30 \text{ MHz} \leq F \leq 88 \text{ MHz}$:	40 dB μ V/m at 3 meters
	for $88 \text{ MHz} < F \leq 216 \text{ MHz}$:	43.5 dB μ V/m at 3 meters
	for $216 \text{ MHz} < F \leq 960 \text{ MHz}$:	46 dB μ V/m at 3 meters
	above 960 MHz :	54 dB μ V/m at 3 meters

Note: any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

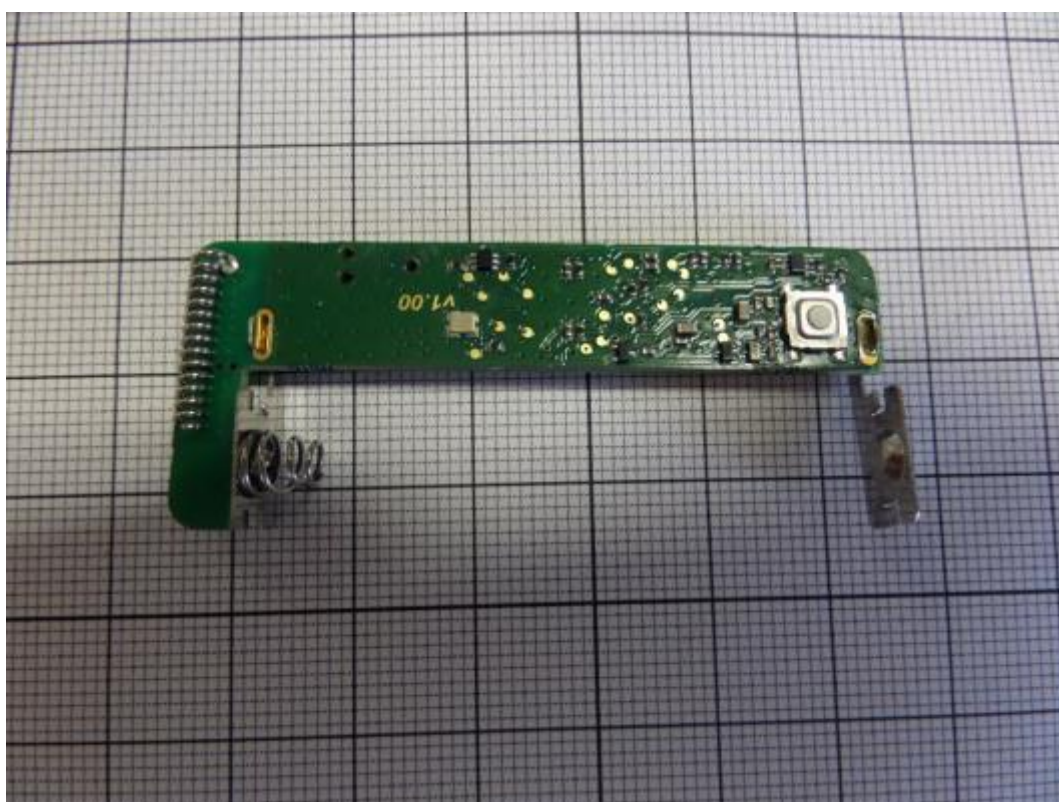
Test conclusion:

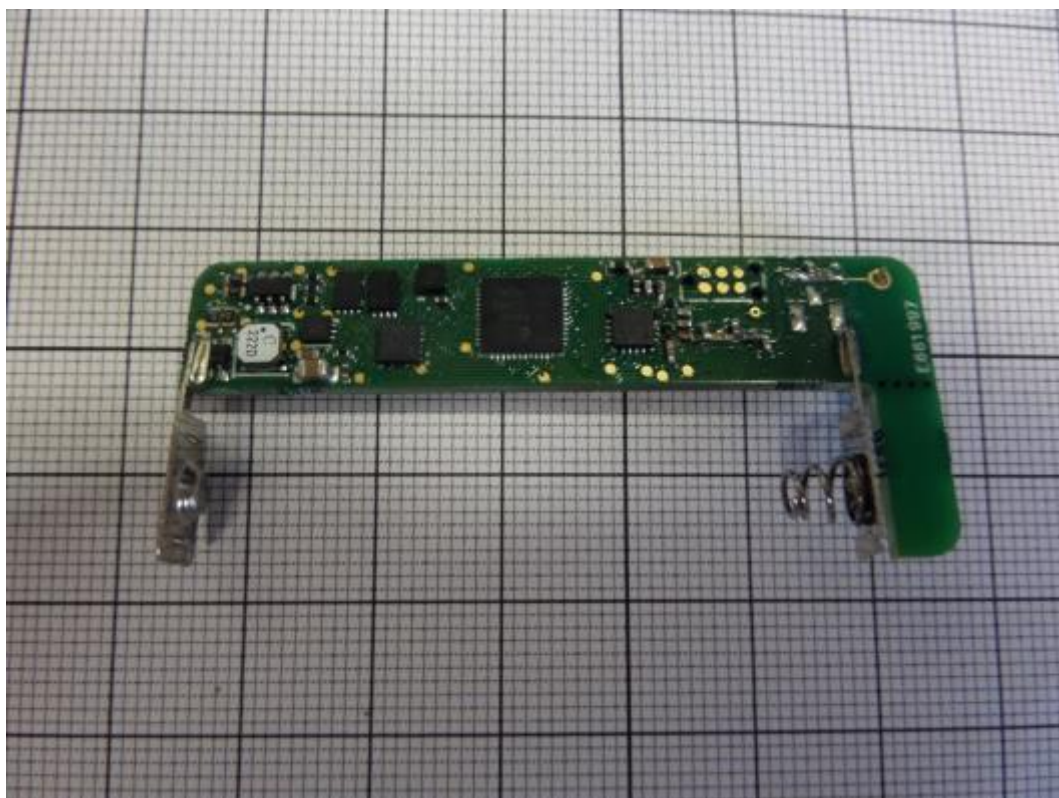
RESPECTED STANDARD

□□□ End of report, 6 appendixes to be forwarded □□□

APPENDIX 1: Photos of the equipment under test

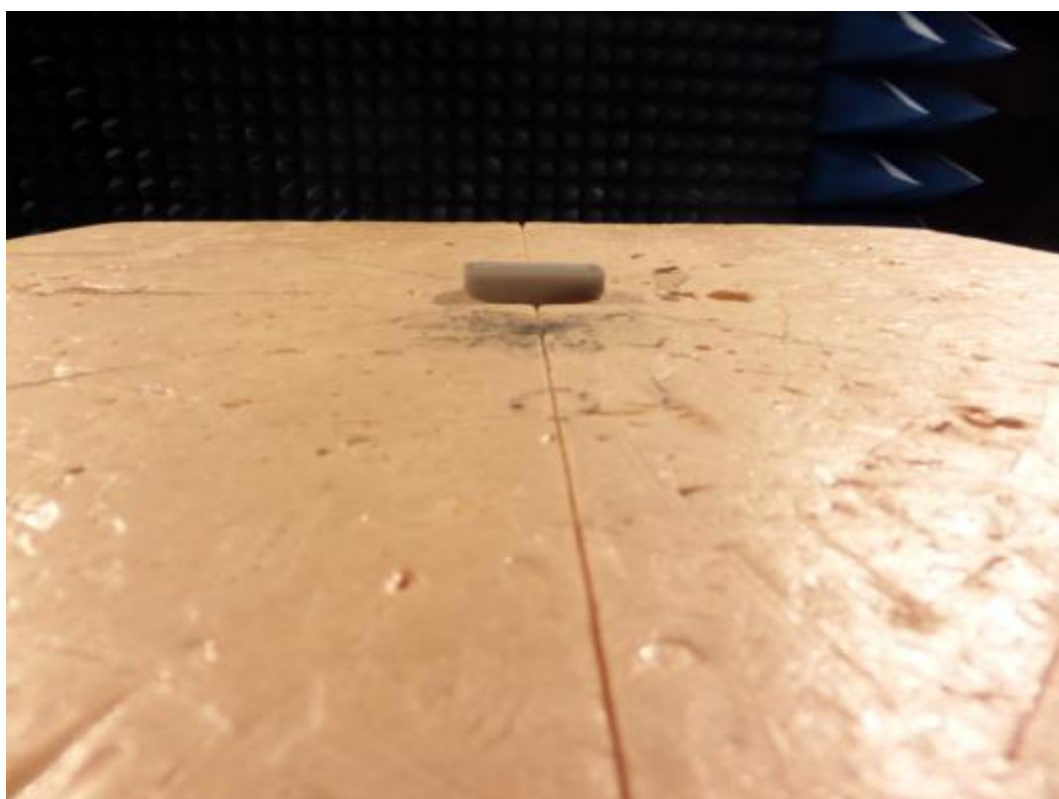
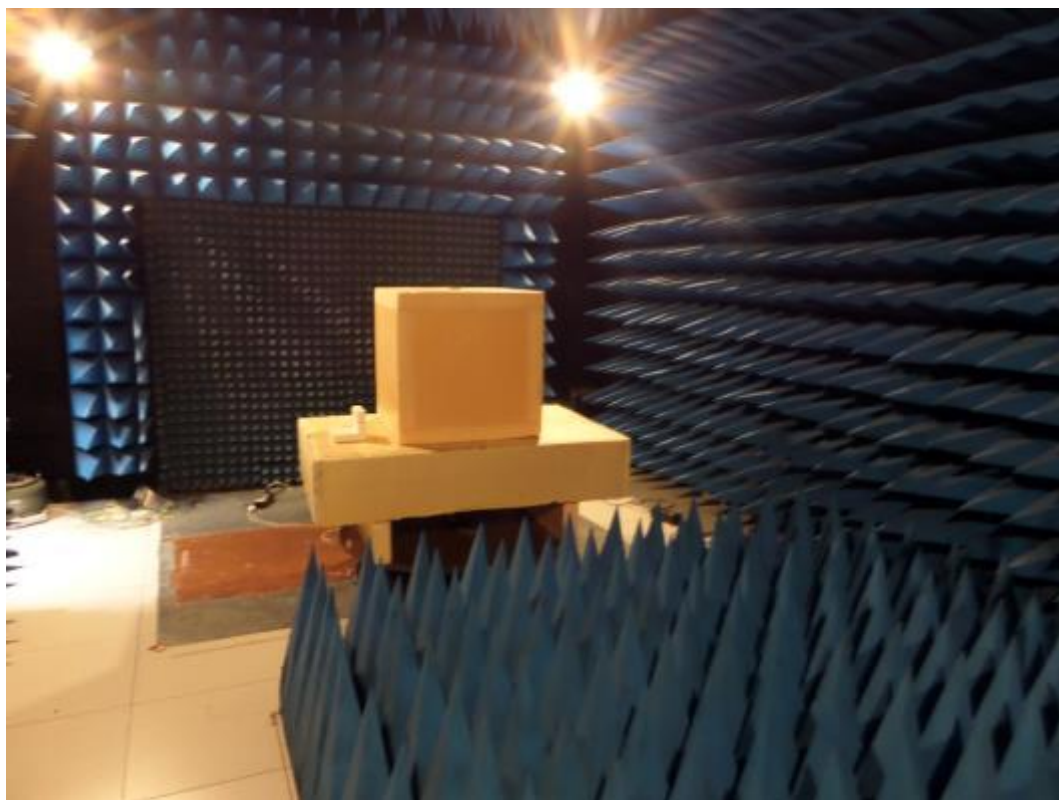






APPENDIX 2: Test set up

Anechoic room



Open area test site



APPENDIX 3: Test equipment list

Radiated emission limits

TYPE	MANUFACTURER	EMITECH NUMBER
Open test site	EMITECH	8732
Anechoic Chamber	EMITECH	8593
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Biconical antenna VHBB 9124	Schwarzbeck	8526
Log periodic antenna UHALP 9108A	Schwarzbeck	8543
Bi-log antenna CBL6112A	Chase	8530
Antenna 3115	Electrometrics	8535
Low-noise amplifier 8447D	Hewlett Packard	8511
Low-noise amplifier C020180F-4B1	Microwave DB	1922
High pass filter HPM11630	Hewlett Packard	6609
Multimeter MN5102B	AOIP	8675
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.6.0.32	0000

Additional provisions to the general radiated emission limitations

TYPE	MANUFACTURER	EMITECH NUMBER
Anechoic Chamber	EMITECH	8593
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Log periodic antenna UHALP 9108A	Schwarzbeck	8543
Multimeter MN5102B	AOIP	8675
Meteo station WS-9232	La Crosse Technology	8750
Software	GPBShot V2.4	-

Fundamental and harmonics field strength

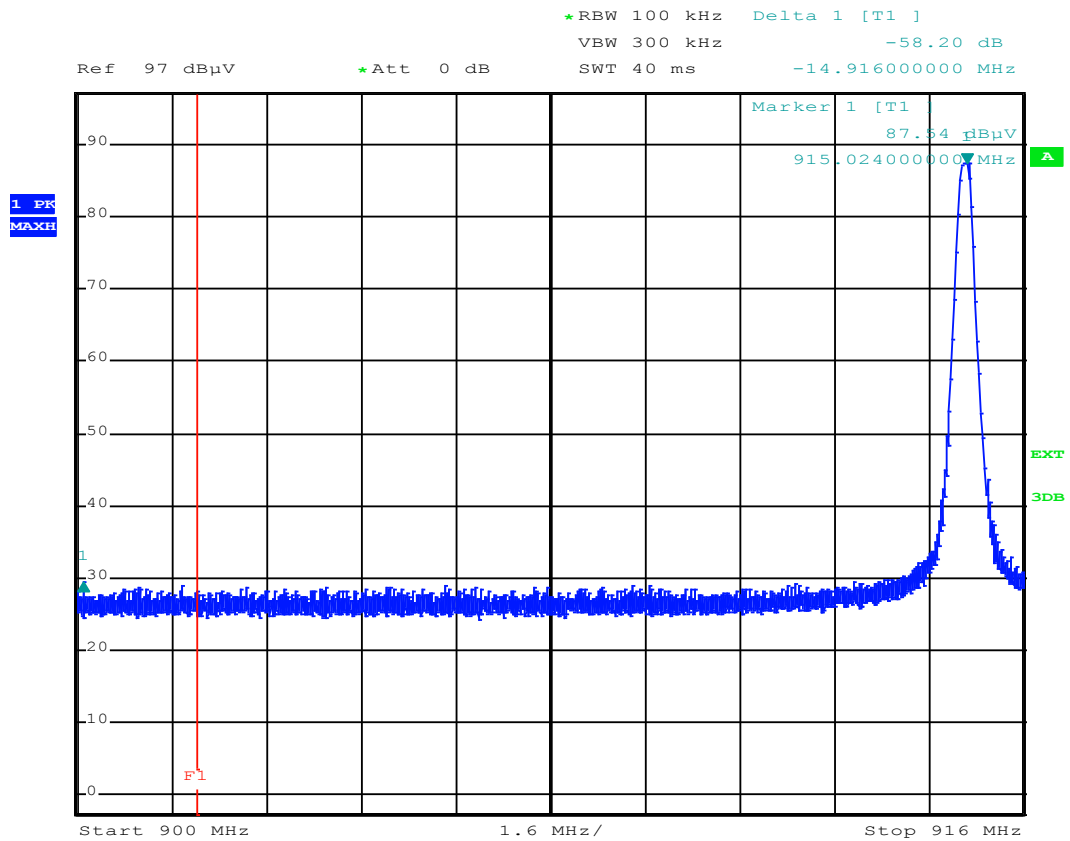
TYPE	MANUFACTURER	EMITECH NUMBER
Open test site	EMITECH	8732
Anechoic Chamber	EMITECH	8593
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver ESI7	Rohde & Schwarz	8707
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Bi-log antenna CBL6112A	Chase	8530
Antenna 3115	Electrometrics	8535
Low-noise amplifier C020180F-4B1	Microwave DB	1922
High pass filter HPM11630	Hewlett Packard	6609
Multimeter MN5102B	AOIP	8675
Meteo station WS-9232	La Crosse Technology	8749
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.6.0.32	0000

Out of band emissions

TYPE	MANUFACTURER	EMITECH NUMBER
Open test site	EMITECH	8732
Anechoic Chamber	EMITECH	8593
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver ESI7	Rohde & Schwarz	8707
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Loop antenna HFH2-Z2	Rohde & Schwarz	8533
Biconical antenna VHBB 9124	Schwarzbeck	8526
Log periodic antenna UHALP 9108A	Schwarzbeck	8543
Bi-log antenna CBL6112A	Chase	8530
Antenna 3115	Electrometrics	8535
Low-noise amplifier 8447D	Hewlett Packard	8511
Low-noise amplifier C020180F-4B1	Microwave DB	1922
High pass filter HPM11630	Hewlett Packard	6609
Multimeter MN5102B	AOIP	8675
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.6.0.32	0000

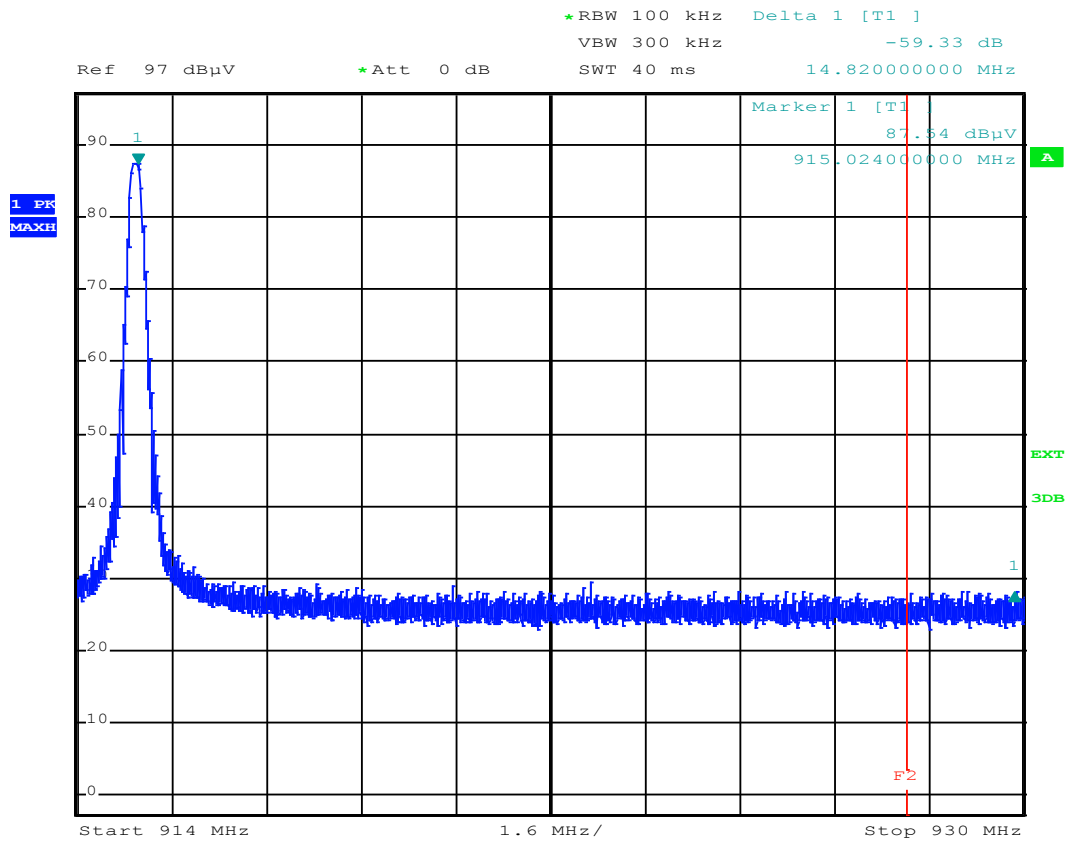
APPENDIX 4: Band edge

Lower band edge



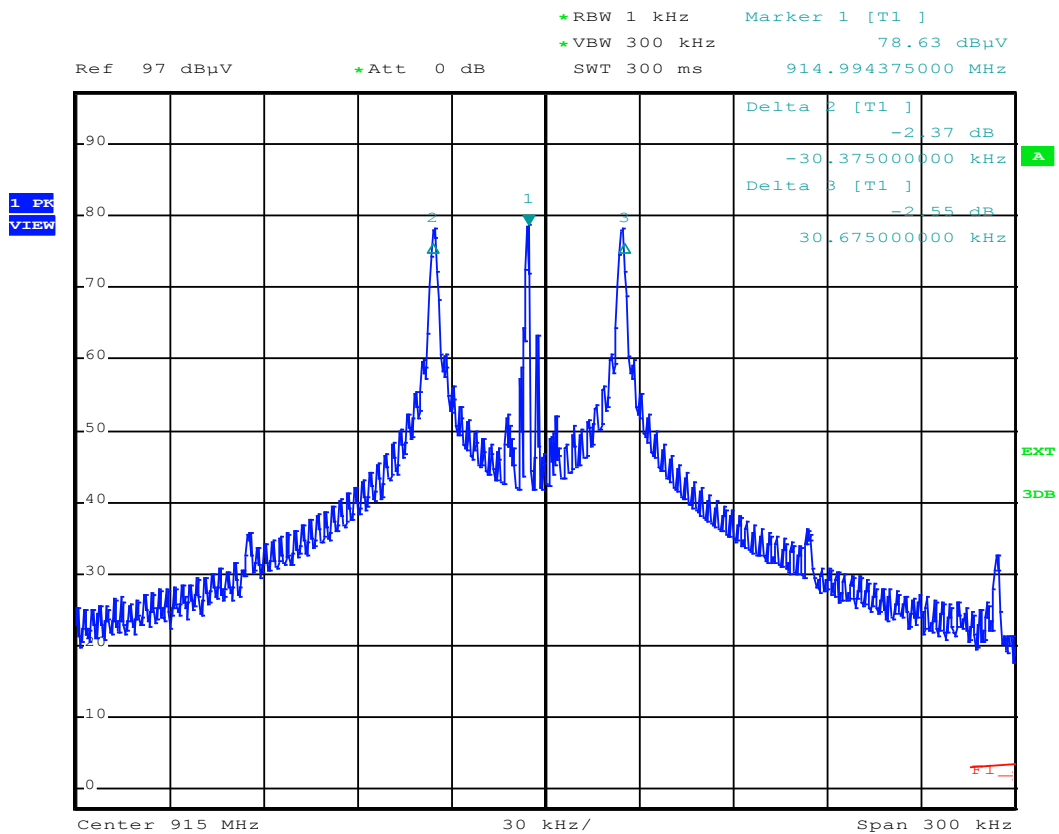
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Upper band edge



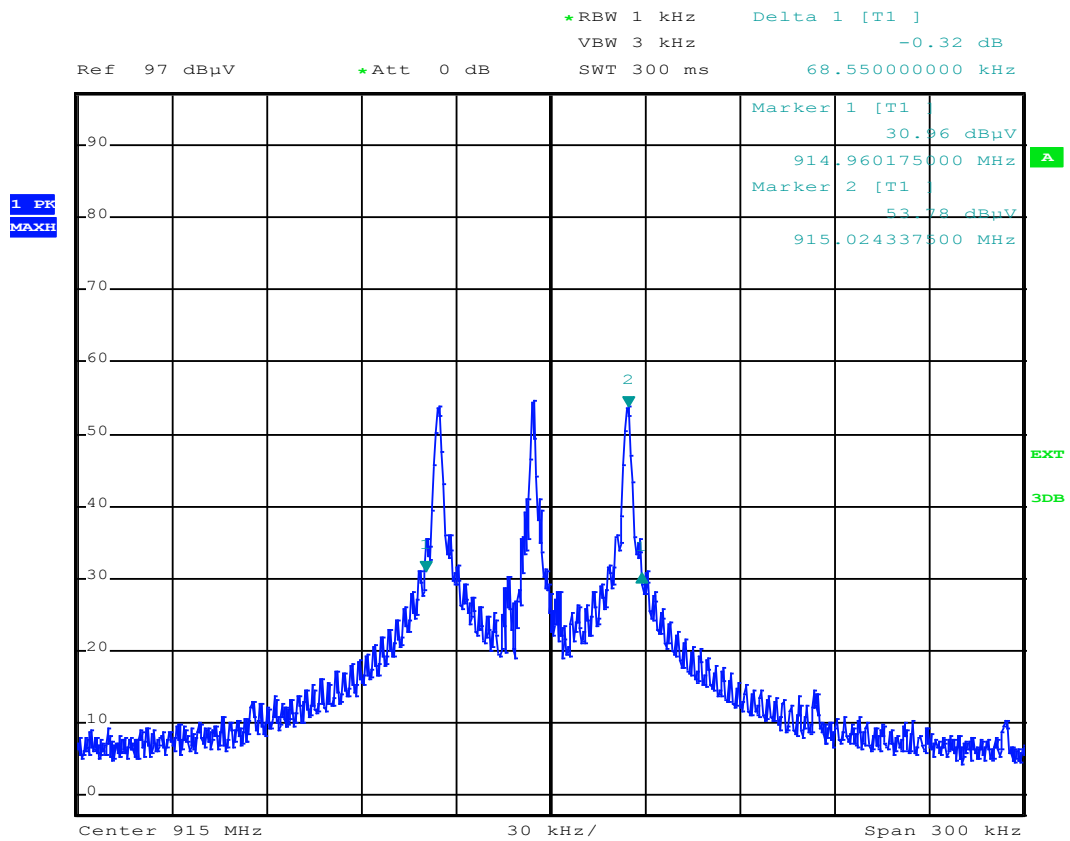
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APPENDIX 5: 6 dB bandwidth



Date: 17.NOV.2014 10:41:14

APPENDIX 6: 20 dB bandwidth



Date: 12.NOV.2014 11:56:03