RR051-14-105547-6-A Ed. 1

This test report cancels and replaces test report RR051-14-105547-6-A Ed. 0

Collocation Radio test report

According to the standard:
CFR47 FCC part 15

Equipment under test:
LOOP LINK

MODEL: BU0211

FCCID:
2ADLABU0211

Company:
MYFOX

DISTRIBUTION: Mr CHAFIK **(Company: MYFOX)**

Number of pages: 20 with 3 appendixes

Ed.	Date	Modified pages	Written by Name	Written by Visa	Technical Verification and Quality Approval Name	Technical Verification and Quality Approval Visa
1	21-May-2015	See vertical line	S. LOUIS	SL	DUMESNIL M.	

Duplication of this test report is only permitted for an integral photographic facsimile. It includes the number of pages referenced here above.
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 LINK**
Serial number (S/N):	BLINK-0000025
Reference / model (P/N):	BU0211
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:	04 February 2015
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

CONTENTS

1. INTRODUCTION

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

The device under test integrates a modular approved WiFi module (FCC ID: COFWMNBM11).
The host device of certified module(s) shall be properly labeled to identify the module(s) within.

All radio modules (WiFi, Bluetooth Low Energy, 915MHz Radio modules) are activated under different configurations to check there is no disturbance between each radio modules.

2. PRODUCT DESCRIPTION

Class:	B (residential)
Utilization:	Alarm system
Power source:	120VAC / 60Hz

915 MHz radio part description:

Antenna type and gain:	Helicoidal antenna: gain not communicated
Operating frequency range:	from 900 MHz to 928 MHz
Number of channels:	1
Modulation:	O.O.K.

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.

WIFI 2.4G module description:

Antenna type and gain:	PCB antenna: gain not communicated
Operating frequency range:	From 2412MHz to 2472MHz
Number of channels:	13
Channel spacing:	5 MHz
Modulation:	D.S.S.S./O.F.D.M.

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

Bluetooth Low Energy radio part description:

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

Operating frequency range: from 2402 MHz to 2480 MHz

Number of channels: 40

Channel spacing: 2MHz

Modulation: Bluetooth Low Energy

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

Test frequencies:

Sample 1:
The EUT used can produce different test mode:

- Mode 1: RX BLE + RX 915MHz => Limited tests (15.107+15.109)
- Mode 2: RX WIFI => Limited tests (15.107+15.109)
- Mode 3: TX BLE (Low channel) + WIFI + TX 915MHz (Frame data)
- Mode 4: TX 915MHz
- Mode 7: TX BLE (Low channel) => Limited tests (15.207+15.209+15.215+15.247)
- Mode 8: TX BLE (Central channel) => Limited tests (15.209+15.215+15.247)
- Mode 9: TX BLE (High channel) => Limited tests (15.209+15.215+15.247)

In this report, only the Mode 3 is used.

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 Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI C63.10	2013 Testing Unlicensed Wireless Devices.

4. TEST METHODOLOGY

Radio performance tests procedures given in CFR 47 part 15:

Subpart A –General
- Paragraph 19: labelling requirements
- Paragraph 21: information to user

Subpart B –Unintentional Radiators
- Paragraph 105: information to the user
- Paragraph 107: conducted limits
- Paragraph 109: radiated emission limits
- Paragraph 111: antenna power conduction limits for receivers

Subpart C – Intentional Radiators
- Paragraph 203: Antenna requirement
- Paragraph 207: Conducted limits
- Paragraph 209: Radiated emission limits; general requirements
- Paragraph 212: Modular transmitter

5. TEST EQUIPMENT CALIBRATION DATES

Equipment	Model	Type	Last verification	Next verification	Validity
0000	BAT-EMC V3.6.0.32	Software	/	/	/
1406	EMCO 6502	Loop antenna	26/06/2013	26/03/2015	26/05/2015
1922	Microwave DB C020180F-4B1	Low-noise amplifier	20/08/2014	20/08/2015	20/10/2015
1939	IMC WR42	Antenna	20/04/2012	20/04/2016	20/06/2016
1940	IMC WR42	Antenna	20/04/2012	20/04/2016	20/06/2016
3036	ALC Microwave ALN02-0102	Low-noise amplifier	14/05/2014	14/05/2015	14/07/2015
4088	R&S FSP40	Spectrum Analyzer	22/08/2013	22/08/2015	22/10/2015
4393	Wainwright WLJS800-C11/60EE	Low Pass Filter	24/02/2014	24/02/2016	24/04/2016
7299	Microtronics BR50702	Reject band filter	25/10/2013	25/10/2015	25/12/2015
8508	California instruments 1251RP	Power source	22/08/2014	22/08/2015	22/10/2015
8511	HP 8447D	Low noise preamplifier	20/08/2014	20/08/2015	20/10/2015
8524	HP 8591EM	Test receiver	30/07/2013	30/07/2015	30/09/2015
8526	Schwarzbeck VHBB 9124	Biconical antenna	12/06/2012	12/06/2016	12/08/2016
8535	EMCO 3115	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	Anechoic chamber	/	/	/
8635	R&S EZ-25	High-pass filter	05/08/2014	05/08/2016	05/10/2016
8671	HUGER	Meteo station	04/09/2014	04/09/2016	04/11/2016
8675	AOIP MN5102B	Multimeter	15/01/2013	15/01/2015	15/03/2015
8719	Thurbly Thandar Instruments 1600	LISN	23/06/2014	23/06/2016	23/08/2016
8750	La Crosse Technology WS-9232	Meteo station	03/09/2014	03/09/2016	03/11/2016
8893	Emitech	Outside room Hors cage	/	/	/
8896	ACQUISYS GPS8	Satellite synchronized frequency standard	/	/	/
10651	Absorber sheath current	Emitech	17/10/2013	17/10/2015	17/12/2015

6. TESTS RESULTS SUMMARY

6.1 general (subpart A)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.19	LABELLING REQUIREMENTS				X	*See certification documents*
FCC Part 15.21	INFORMATION TO USER				X	*See certification documents*

NAp: Not Applicable NAs: Not Asked

LABEL SHALL CONTAIN

The label shall be located in a conspicuous location on the device
The label shall not be a stick-on, paper label. The label on these products shall be permanently affixed to the product and shall be readily visible to the purchaser at the time of purchase

§15.19: (can be placed in the user manual if the product is too small)
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

USER NOTICE SHALL CONTAIN

The user notice, not provided during tests, shall include the following informations:

§15.21:
Any changes or modifications to this equipment not expressly approved by MYFOX may cause, harmful interference and void the FCC authorization to operate this equipment

6.2 unintentional radiator (subpart B)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.105	INFORMATION TO THE USER				X	*See certification documents*
FCC Part 15.107	CONDUCTED LIMITS				X	*Collocation report*
FCC Part 15.109	RADIATED EMISSION LIMITS				X	*Collocation report*
FCC Part 15.111	ANTENNA POWER CONDUCTED LIMITS FOR RECEIVER			X		

NAp: Not Applicable NAs: Not Asked

USER NOTICE SHALL CONTAIN

The user notice, not provided during tests, shall include the following informations:

§ 15.105:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference's by one or more of the following measures:

-Reorient or relocate the receiving antenna.

-Increase the separation between the equipment and the receiver.

-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-Consult the dealer or an experienced radio/TV technician for help.

6.3 intentional radiator (subpart C)

Test procedure	Description of test	Criteria respected ?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.203	ANTENNA REQUIREMENTS	X				*Note 1*
FCC Part 15.207	CONDUCTED LIMITS	X				*Collocation*
FCC Part 15.209	RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS	X				*Note 2 Collocation*
FCC Part 15.212	MODULAR TRANSMITTER				X	*See certification documents*

NAp: Not Applicable NAs: Not Asked

Note 1: Integral / dedicated antenna. Professionally installed equipment.

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

LABEL SHALL CONTAIN

The label shall be located in a conspicuous location on the device
The label shall not be a stick-on, paper label. The label on these products shall be permanently affixed to the product and shall be readily visible to the purchaser at the time of purchase

§15.212

Contains FCC ID: COFWMNBM11

7. CONDUCTED LIMITS

Standard: FCC Part 15

Test procedure: Paragraph 15.207

Software used: BAT-EMC V3.6.0.32

Test set up:

The EUT is isolated and placed on a wooden table, 0.8 m over a horizontal reference plane and 0.4 m from a vertical reference plane. It is powered by an artificial main network placed on the ground reference plane.
The equipment is powered with the AC power operating voltage of 120 V / 60 Hz.

See photos in appendix 2

Frequency range: 150 kHz - 30 MHz

Detection mode: Peak / Average

Bandwidth: 9 KHz / 10 KHz

Equipment under test operating condition:

The equipment under test is blocked in continuous modulated transmission mode in Mode 3: TX BLE (Low channel) + WIFI + TX 915MHz (Frame data), at the highest output power level at which the transmitter is intended to operate.

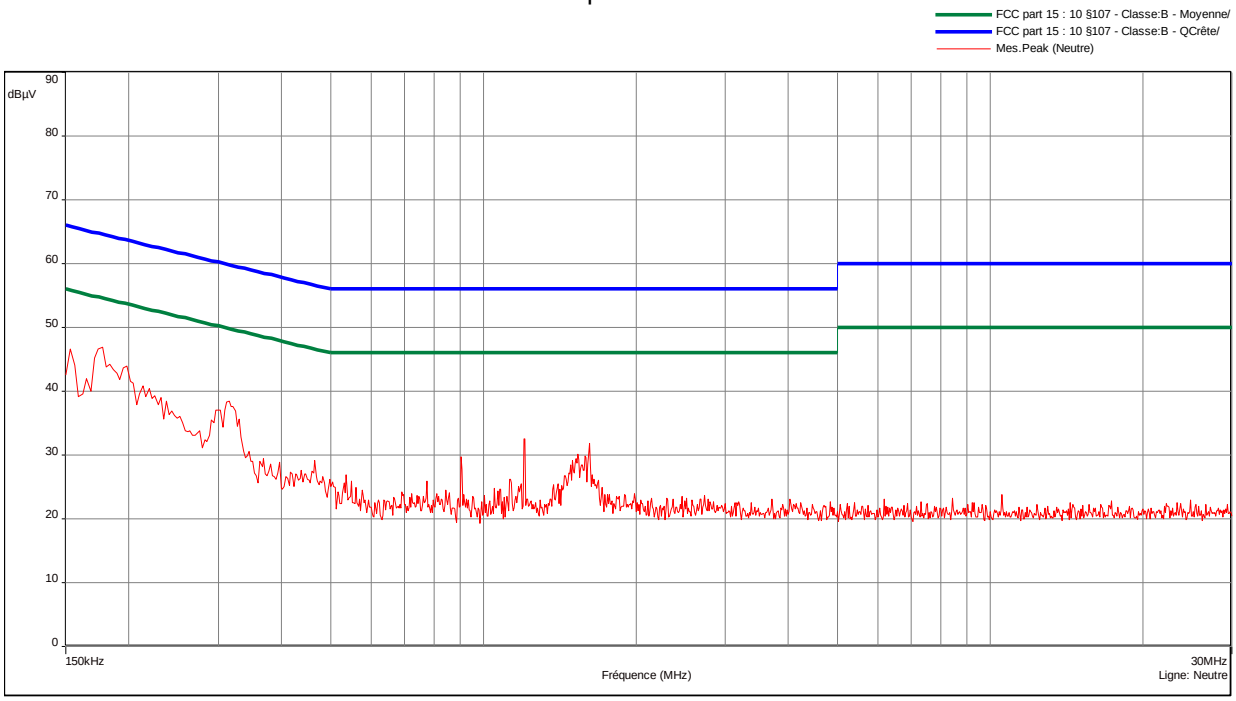
Results:

Ambient temperature (°C):	20.9
Relative humidity (%):	24

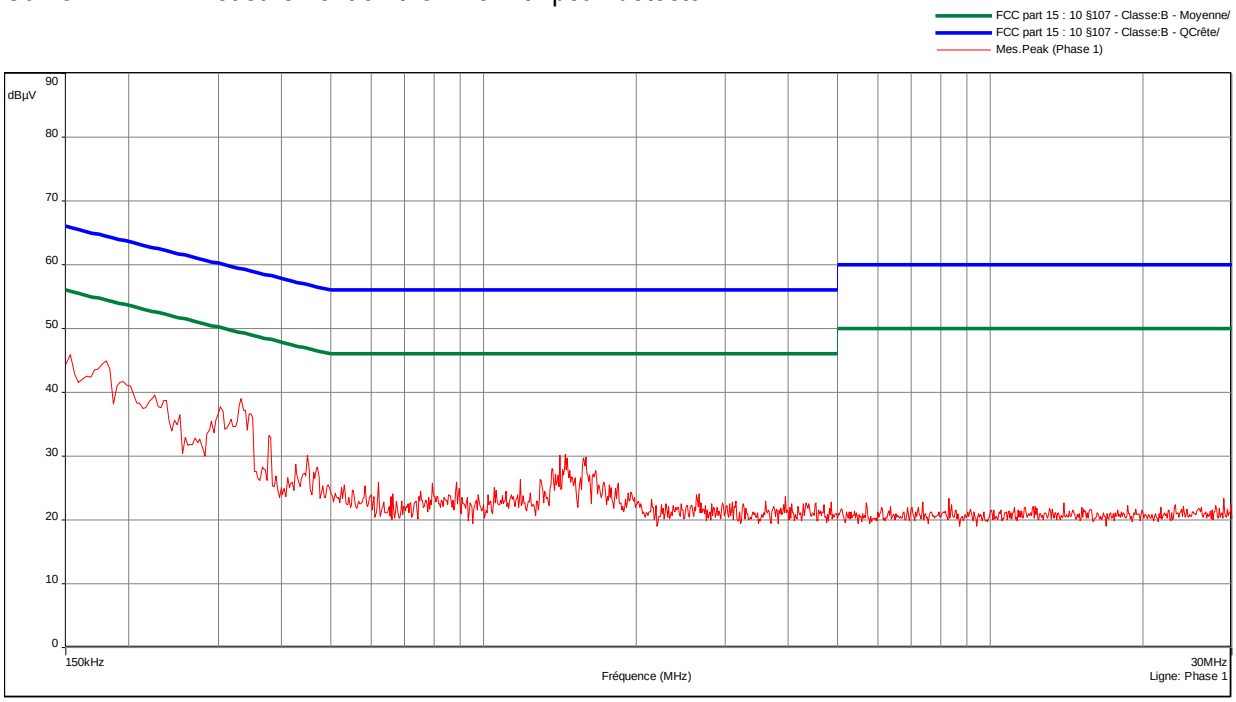
Measurement on the mains power supply: Mode 3: TX BLE + WIFI + TX 915MHz (Frame data)

The measurement is first realized with Peak detector.

Curve N° 1: measurement on the Neutral with peak detector



Curve N° 2: measurement on the Line with peak detector



Test conclusion:

RESPECTED STANDARD

8. RADIATED EMISSION LIMITS; general requirements

Standard: FCC Part 15

Test procedure: paragraph 209

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 (2480 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 under test is blocked in continuous modulated transmission mode in Mode 3: TX BLE (Low channel) + WIFI + TX 915MHz (Frame data), at the highest output power level at which the transmitter is intended to operate.

Results:

Ambient temperature (°C): 20.4
Relative humidity (%): 33

Power source:
We used for power source an external power supply regulated to 120VAC / 60Hz.

Sample N° 1:

No spurious has been detected.

Applicable limits: for 9 kHz ≤ F ≤ 490 kHz :		2400/F(kHz) at 300 meters
	for 490 kHz < F ≤ 1.705 MHz :	24000/F(kHz) at 30 meters
	for 1.705 MHz < F ≤ 30 MHz :	29.5 dBµV/m at 30 meters
	for 30 MHz < F ≤ 88 MHz :	40 dBµV/m at 3 meters
	for 88 MHz < F ≤ 216 MHz :	43.5 dBµV/m at 3 meters
	for 216 MHz < F ≤ 960 MHz :	46 dBµV/m at 3 meters
	Above 960 MHz :	54 dBµV/m at 3 meters

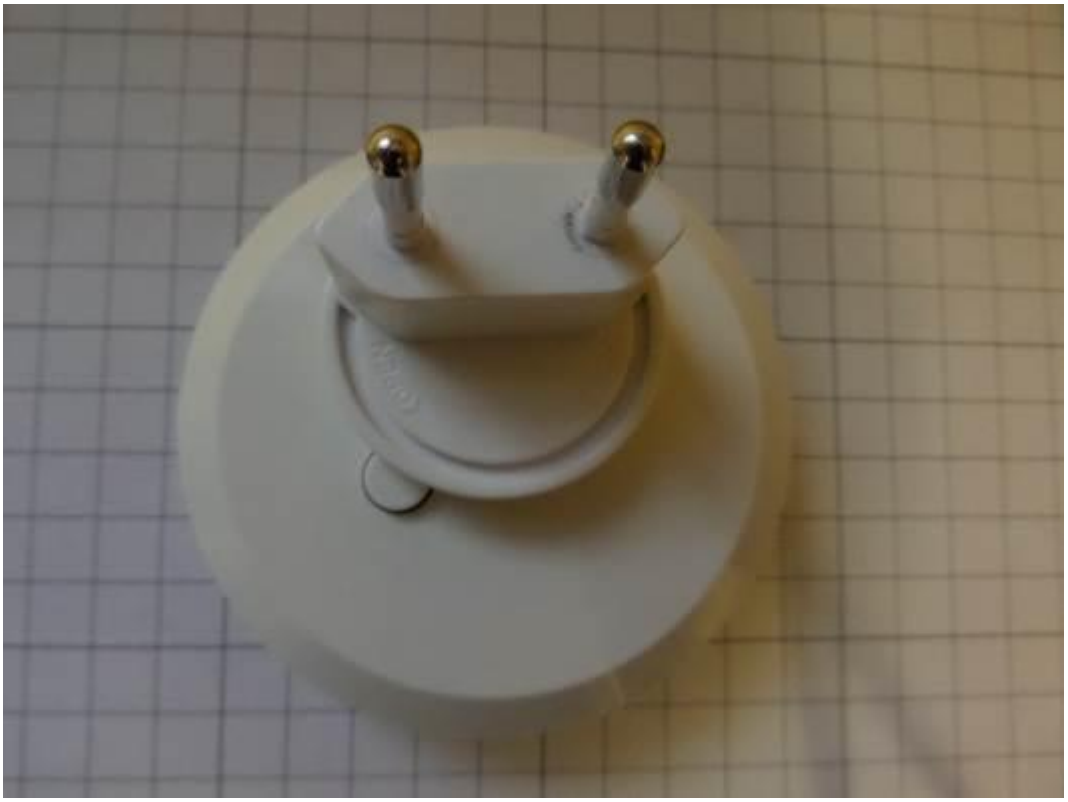
Note: any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

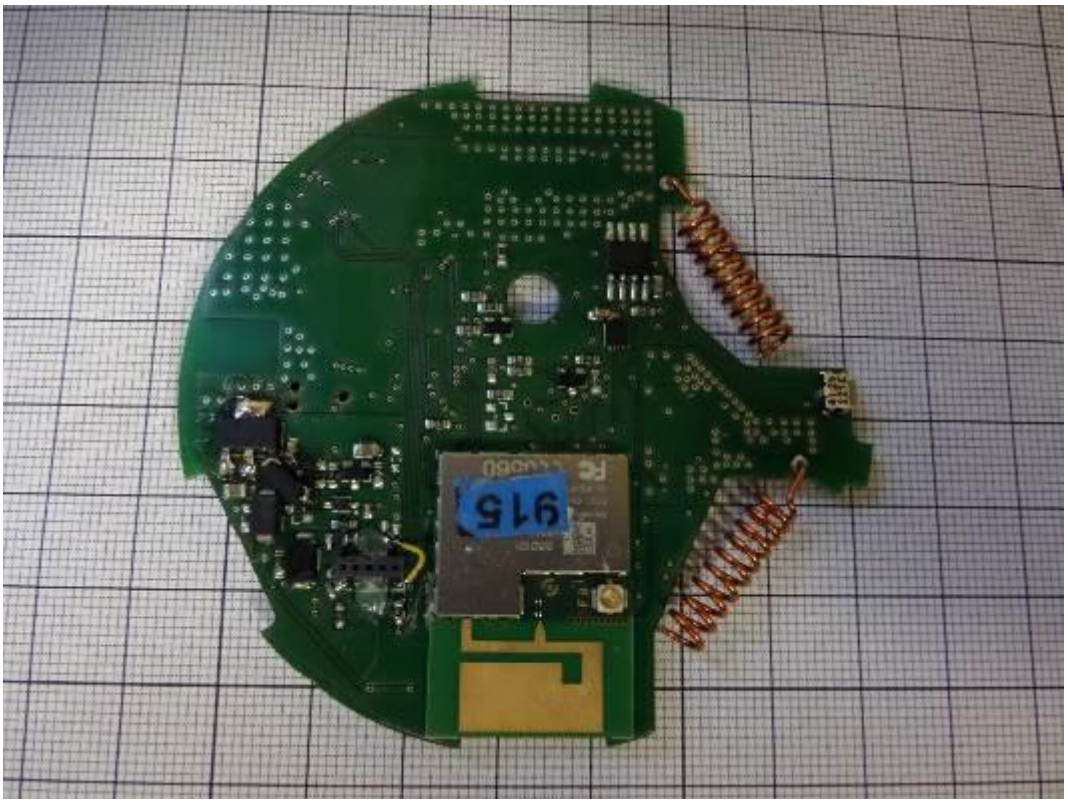
Test conclusion:

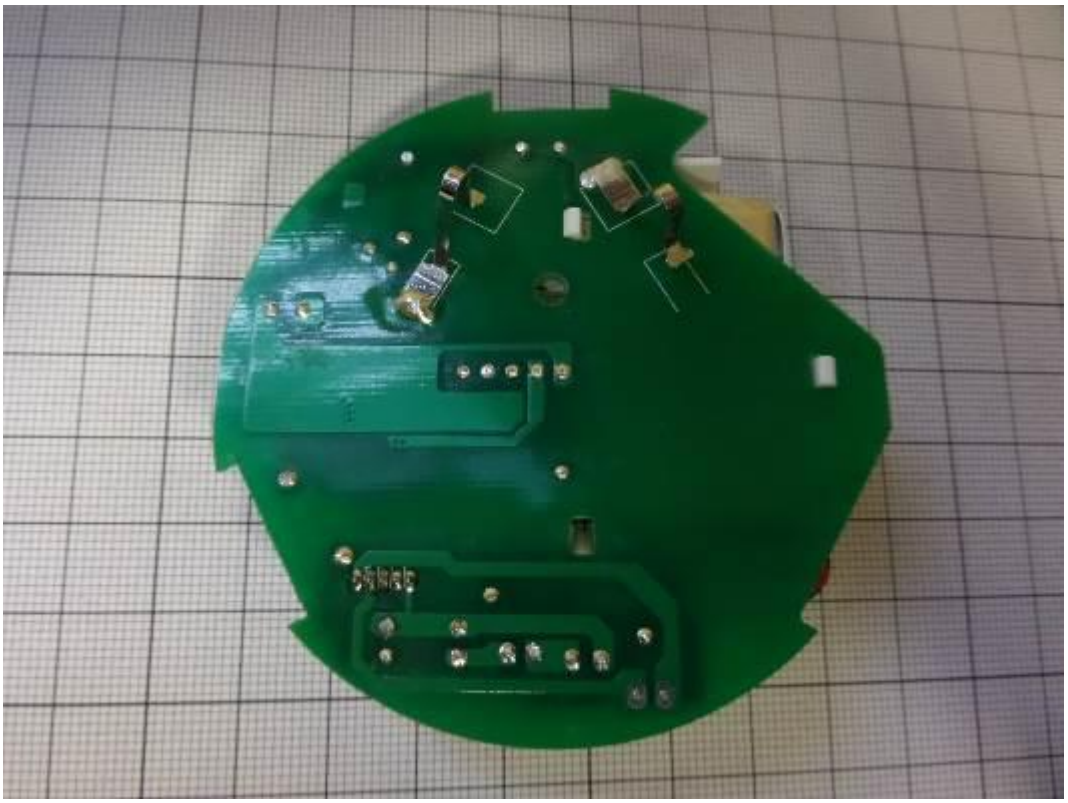
RESPECTED STANDARD

□□□ End of report, 3 appendixes to be forwarded □□□

APPENDIX 1: Photos of the equipment under test

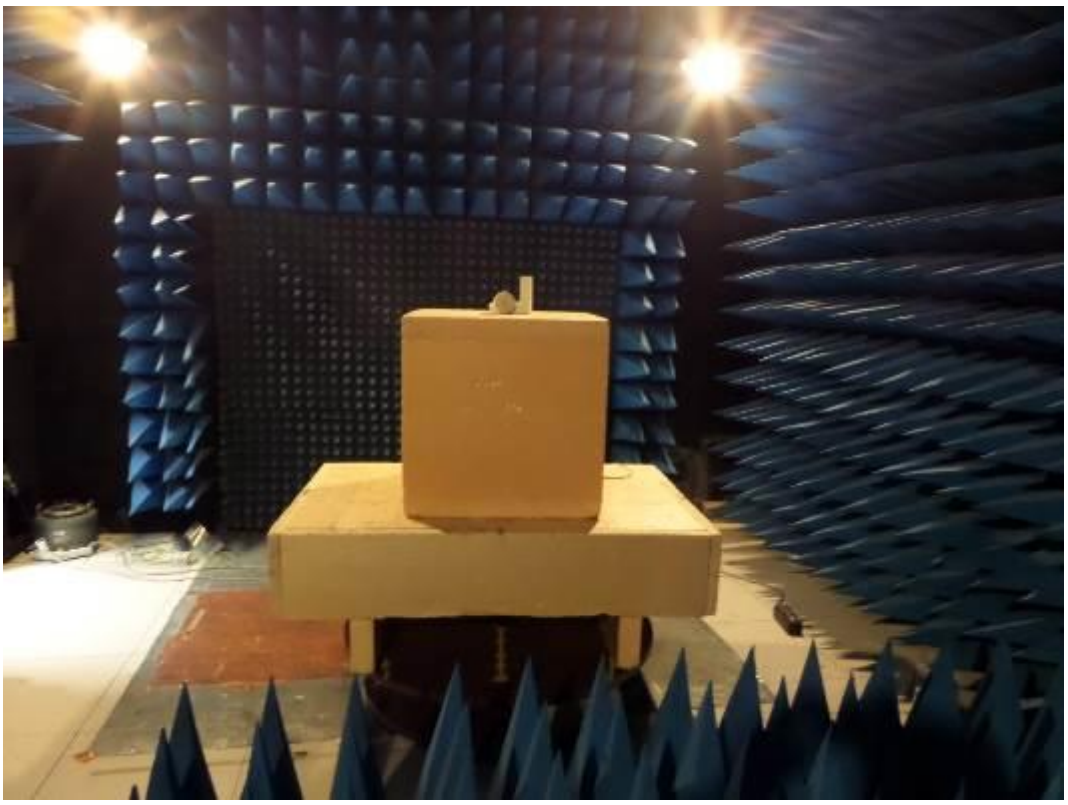



915



APPENDIX 2: Test set up

Radiated measurements



Conducted measurements

APPENDIX 3: Test equipment list

Conducted limits

TYPE	MANUFACTURER	EMITECH NUMBER
Outside room Hors cage	Emitech	8893
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver HP 8591EM	Hewlett Packard	8524
LISN 1600	Thurbly Thandar Instruments	8719
High-pass filter EZ-25	Rohde & Schwarz	8635
Absorber sheath current	Emitech	10651
Power source 1251RP	California instruments	8508
Multimeter MN5102B	AOIP	8675
Meteo station	HUGER	8671
Software	BAT-EMC V3.6.0.32	0000

Radiated emission limits; general requirements

TYPE	MANUFACTURER	EMITECH NUMBER
Anechoic Chamber	EMITECH	8593
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Loop antenna 6502	EMCO	1406
Biconical antenna VHBB 9124	Schwarzbeck	8526
Log periodic antenna UHALP 9108A	Schwarzbeck	8543
Antenna 3115	EMCO	8535
Antenna WR42	IMC	1939
Antenna WR42	IMC	1940
Low-noise amplifier 8447D	Hewlett Packard	8511
Low-noise amplifier C020180F-4B1	Microwave DB	1922
Low-noise amplifier ALN02-0102	ALC Microwave	3036
Low pass filter WLJS800-C11/60EE	Wainwright	4393
Reject band filter BRM50702	Microtronics	7299
Power source 1251RP	California instruments	8508
Multimeter MN5102B	AOIP	8675
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.6.0.32	0000