RR051-12-106522-2-A Ed. 0

Certification test report

According to the standards:
CFR 47, FCC Part 15

Equipment under test:
Emitter Labguard 3 radio

FCC ID: 2AA8Y-416015

Company:
BIOMERIEUX

DISTRIBUTION: Mr BOUQUET (Company: BIOMERIEUX)

Number of pages: 34 with 5 appendixes

Ed.	Date	Modified pages	Written by Name Visa	Technical Verification and Quality Approval Name Visa
0	30-Dec-13	Creation	T. LEDRESSEUR T.L	DUMESNIL M.

Duplication of this document 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:	Emitter Labguard 3 radio
Serial number (S/N):	1343902120
Reference / model (P/N):	Emitter radio
Software version:	not communicated
MANUFACTURER:	BIOMERIEUX
COMPANY SUBMITTING THE PRODUCT:	
Company:	BIOMERIEUX
Address:	RUE MARYSE BASTIE KER LANN CS 17219 35172 BRUZ CEDEX
Responsible:	Mr BOUQUET
Persons presents during the tests:	Mr BOUQUET
DATES OF TEST:	08-JUL-2013; 09-JUL-2013; 16-JUL-2013; 17-JUL-2013;
TESTING LOCATION:	EMITECH ANGERS laboratory at JUIGNE SUR LOIRE (49) FRANCE EMITECH ANGERS open area test site in JUIGNE SUR LOIRE (49) FRANCE FCC 2.948 Listed Site Registration Number: 90469
TESTED BY:	T. LEDRESSEUR

CONTENTS

1. INTRODUCTION

This document presents the result of certification test carried out on the following equipment: Emitter Labguard 3 Radio in accordance with normative reference.

2. PRODUCT DESCRIPTION

ITU Emission code:	500KF7D
Class:	A (commercial, industrial or business environment)
Utilization:	Indoor use
Antenna type and gain:	Integrated antenna, -1dBi
Operating frequency range:	902-928MHz
Number of channels:	18
Channel spacing:	500kHz
Frequency generation:	P.L.L
Modulation:	F.S.K
Power source:	120 Vac -60 Hz

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.

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 (2013)	Radio Frequency Devices
ANSI C63.4 (2003)	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 107: Conducted limits
- Paragraph 109: Radiated emission limits

Subpart C – Intentional Radiators
- Paragraph 203: Antenna requirement
- Paragraph 205: Restricted bands of operation
- Paragraph 207: Conducted limits
- Paragraph 209: Radiated emission limits; general requirements
- Paragraph 212: Modular transmitter
- 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
1922	Microwave DB C020180F-4B1	Low-noise amplifier 1 to 18 GHz	01/08/2012	01/08/2013	01/10/2013
1939	IMC WR42	Horn antenna	20/04/2012	20/04/2016	20/06/2016
3036	ALC Microwave ALN02-0102	Low-noise amplifier	04/04/2013	04/04/2014	04/06/2014
7998	Dipole antenna VHAP	Schwarzbeck	22/10/2012	22/10/2014	22/12/2014
7999	Dipole antenna UHAP	Schwarzbeck	22/10/2012	22/10/2014	22/12/2014
8508	Alternative power supply 1000VA 1251RP	California instruments	18/05/2011	18/05/2013	18/07/2013
8511	Préamplificateur 8447D	Hewlett Packard	28/06/2012	28/06/2013	28/08/2013
8523	R&S FSEM30	Spectrum analyser	07/09/2012	07/09/2014	07/11/2014
8524	Test receiver HP8591EM	Hewlett Packard	18/05/2013	18/05/2013	18/07/2013
8526	Schwarzbeck VHBB 9124	Biconical antenna	12/06/2012	12/06/2016	12/08/2016
8533	HFH2-Z2	Loop antenna	01/05/2013	01/05/2014	01/07/2014
8534	Emco 3115	Horn antenna	30/10/2012	30/10/2016	30/12/2016
8535	Emco 3115	Horn antenna	30/10/2012	30/10/2016	30/12/2016
8543	Schwarzbeck UHALP 9108A	Log periodic antenna	12/06/2012	12/06/2016	12/08/2016
8593	SIDT Cage 2	Full anechoic room	06/09/2011	06/09/2013	06/11/2013
8671	Meteo station WS-9232	La Crosse Technology	20/07/2012	20/07/2014	20/09/2014
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
8719	RSIL 16A LISN 1600	THURLBY THANDAR	28/05/2012	28/05/2014	28/07/2014
8730	Radiofrequency generator SMR20	Rohde & Schwarz	17/05/2011	17/05/2013	17/07/2013
8732	Emitech	OATS	09/06/2011	09/06/2013	09/08/2013
8750	La Crosse Technology WS-9232	Meteo station	20/07/2012	20/07/2014	20/09/2014
8955	HP SMA-1m	Cable	10/01/2013	10/01/2015	10/03/2015
9237	N-5m	Cable	06/04/2012	06/04/2014	06/06/2014
9239	N-2m	Cable	04/04/2012	04/04/2014	04/06/2014
9243	N-7m	Cable	04/04/2012	04/04/2014	04/06/2014
9489	Absorber sheath current	EMITECH	14/09/2012	14/09/2014	14/11/2014

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				

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				Note 1
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 2
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 4
	(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: Integral antenna.

Note 2: See FCC part 15.249 (d).

Note 3: See FCC part 15.209. Unwanted emissions levels are all below the fundamental emission field strength level.

Conclusion:

The sample of Emitter Labguard 3 Radio submitted to the tests complies with the technical prescriptions of CFR 47 FCC Part 15 in accordance with the limits or criteria defined in this report.

7. MEASUREMENT OF THE CONDUCTED DISTURBANCES

Standard: FCC Part 15

Test procedure: Paragraph 15.107

Limits: Class A

Software used: BAT-EMC V3.6.0.32

Test set up:

The EUT is placed on a wooden table, 0.8 m over an 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: 10 kHz / 9kHz

Equipment under test operating condition:

The equipment is blocked in reception mode.
.

Results:

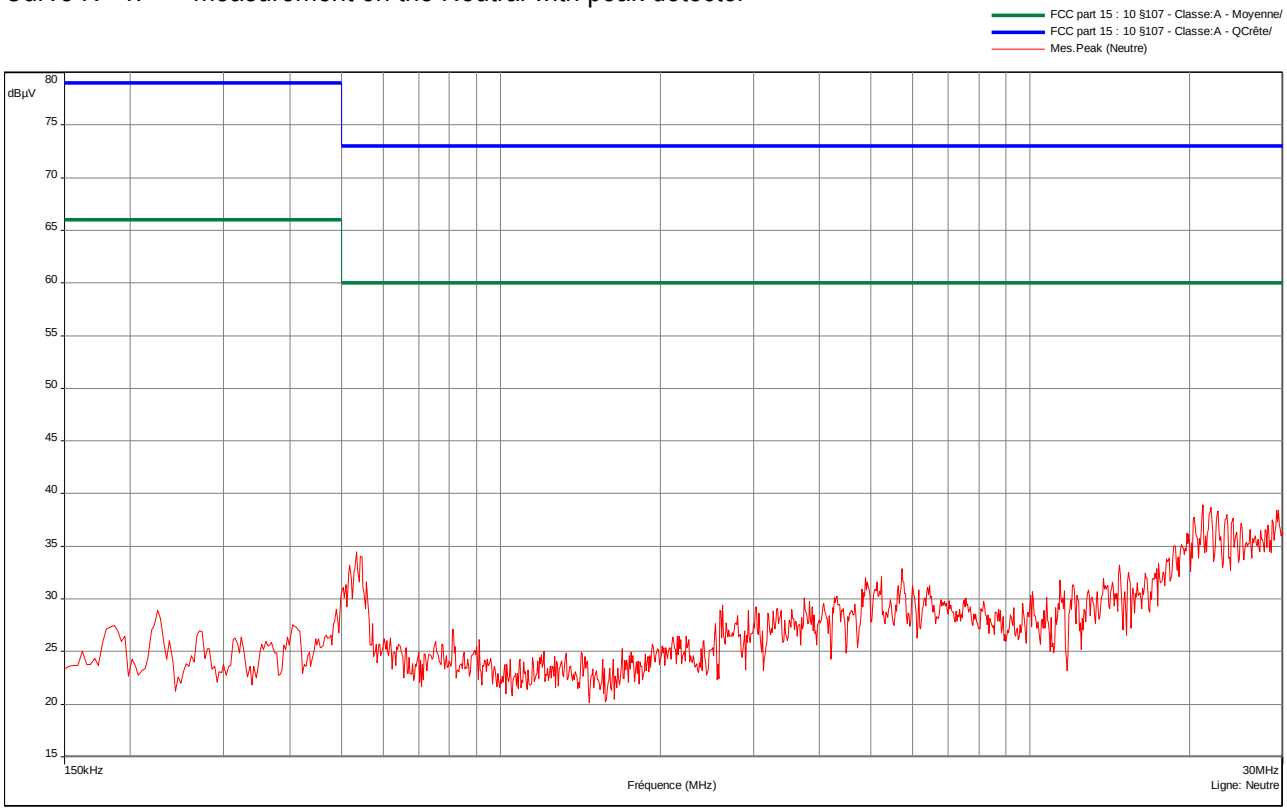
Ambient temperature (°C): 25.5
Relative humidity (%): 46

Sample N° 1:

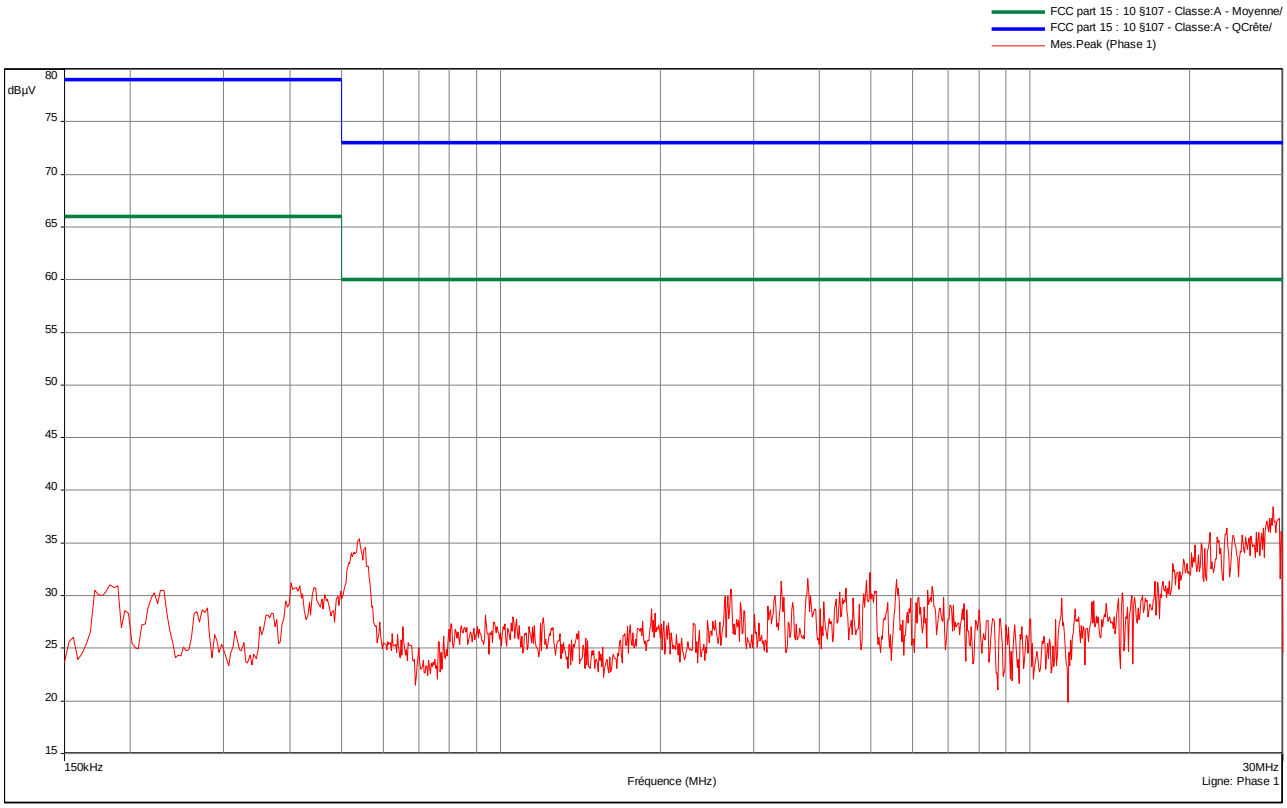
Measurement on the mains power supply:

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

Standard: FCC Part 15

Test procedure: paragraph 109

Limit class: Class A

Test set up:

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 azimuths correspond to the front of the device under test.

See photos in appendix 2.

Frequency range: From 30 MHz to 5 GHz.

Detection mode:	Quasi-peak (F < 1 GHz)	Average (F > 1 GHz)
Bandwidth:	120 kHz (F < 1 GHz)	1 MHz (F > 1 GHz)
Video bandwidth:		3 MHz (F > 1 GHz)

Distance of antenna: 3 meters

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): 23.3
Relative humidity (%): 59

Power source: 120 Vac – 60 Hz

Sample N° 1:

Not any spurious has been detected.

Applicable limits:	for 30 MHz ≤ F ≤ 88 MHz :	39.1 dBµV/m at 10 meters
	for 88 MHz < F ≤ 216 MHz :	43.5 dBµV/m at 10 meters
	for 216 MHz < F ≤ 960 MHz :	46.4 dBµV/m at 10 meters
	above 960 MHz :	49.5 dBµV/m at 10 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

9. MEASUREMENT OF THE CONDUCTED DISTURBANCES

Standard: FCC Part 15

Test procedure: Paragraph 15.207

Software used: BAT-EMC V3.6.0.32

Test set up:

The EUT is placed on a wooden table, 0.8 m over an 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: 10 kHz / 9kHz

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:

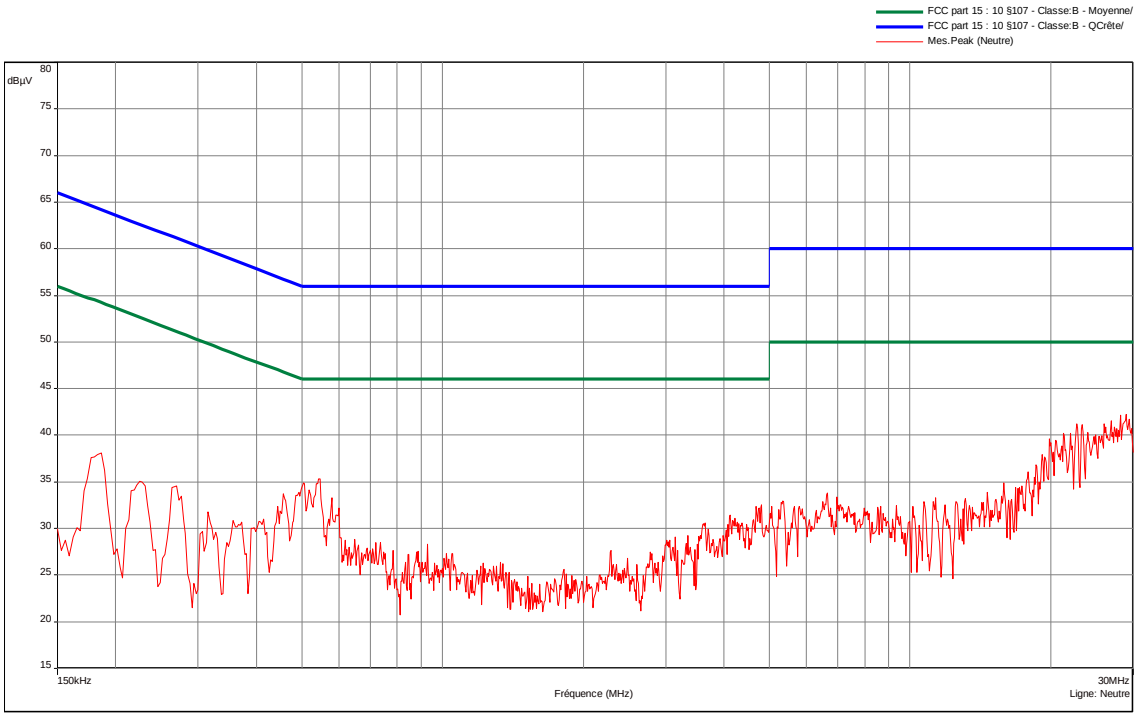
Ambient temperature (°C): 25.5
Relative humidity (%): 46

Measurement on the mains power supply:

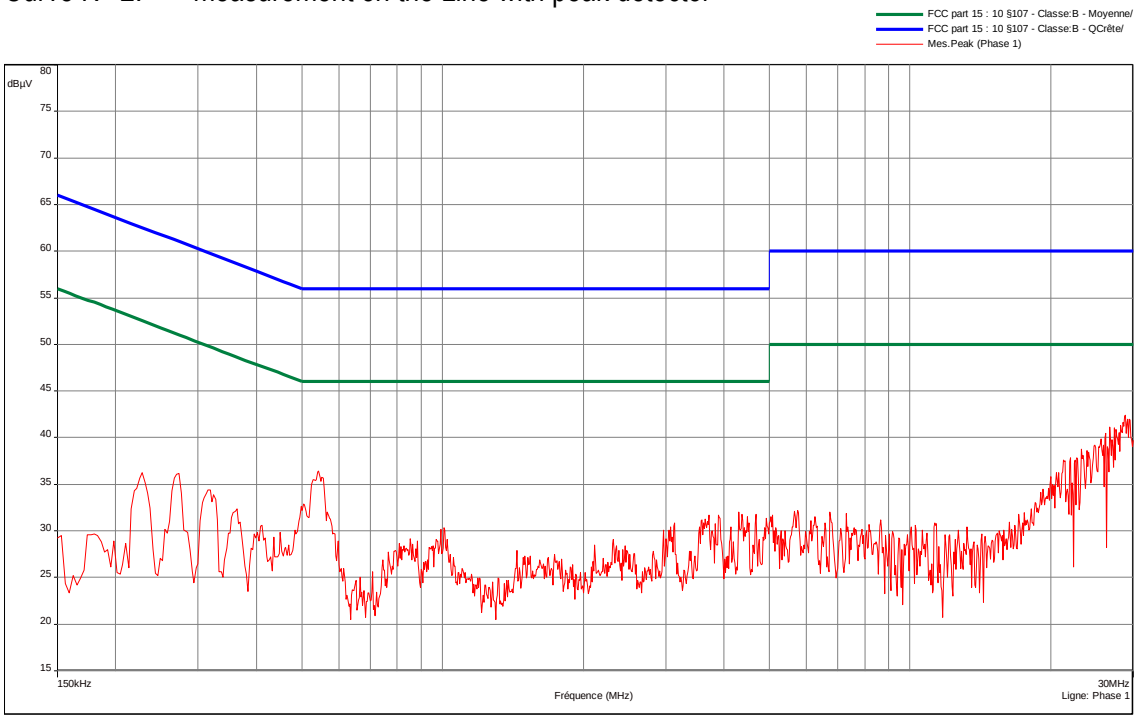
Sample N° 1: Low channel (2)

The measurement is first realized with Peak detector.

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



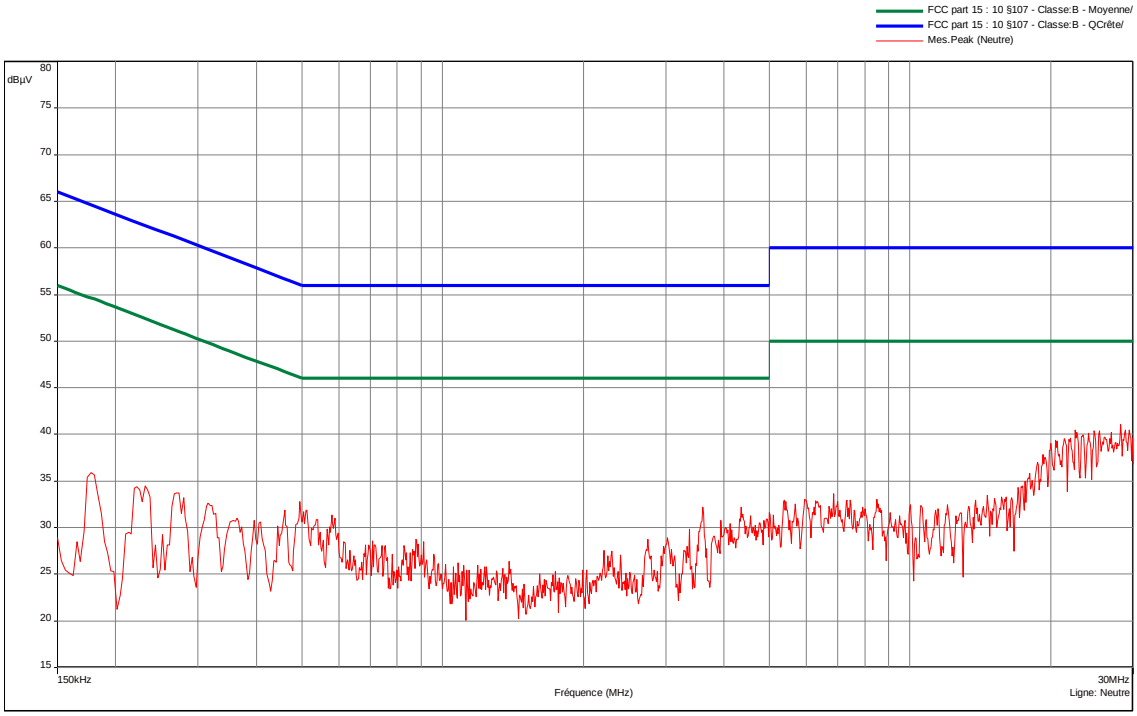
Curve N° 2: measurement on the Line with peak detector



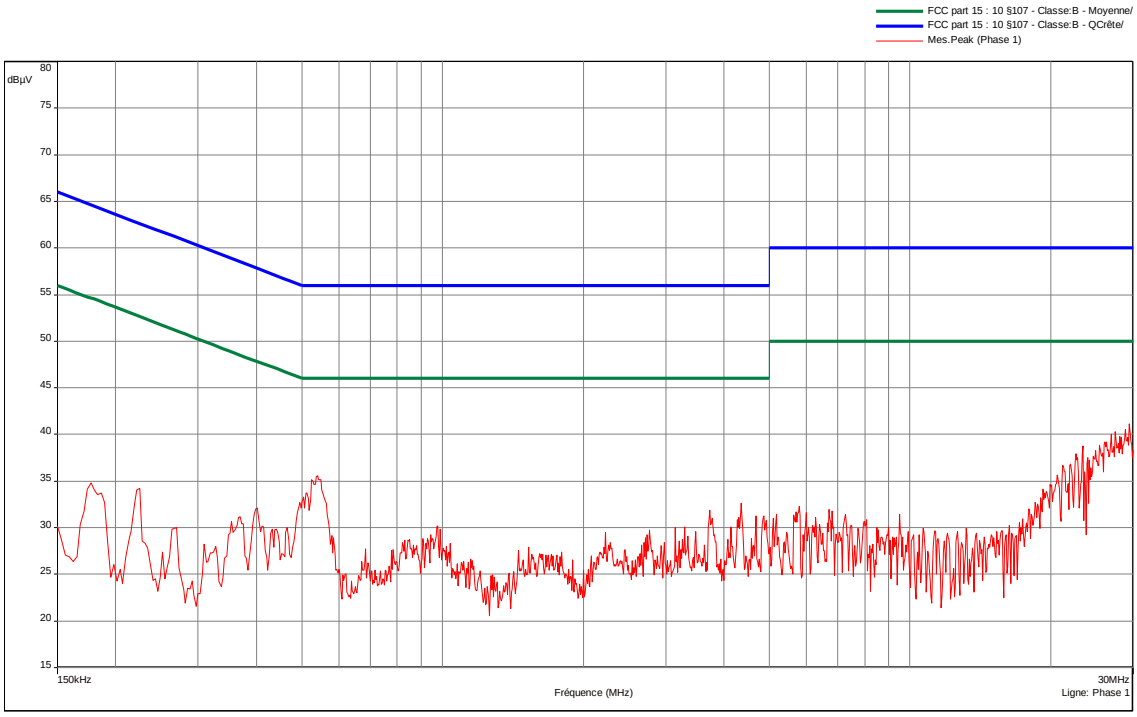
Sample N° 1: Central channel (10)

The measurement is first realized with Peak detector.

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



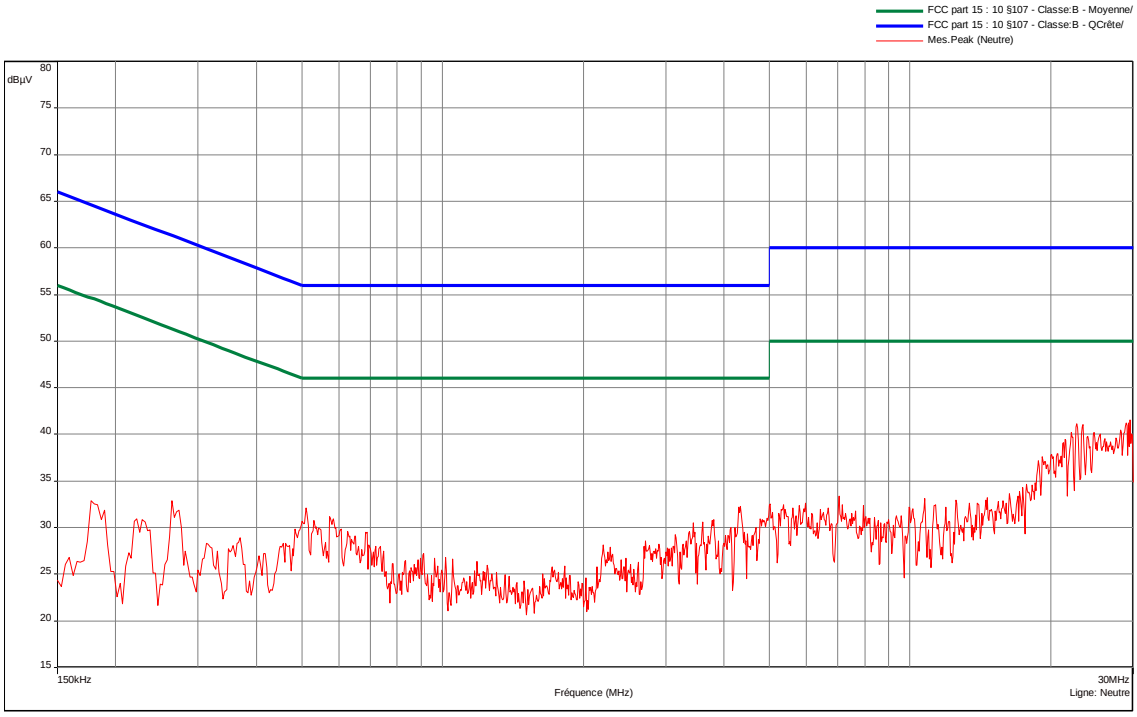
Curve N° 2: measurement on the Line with peak detector



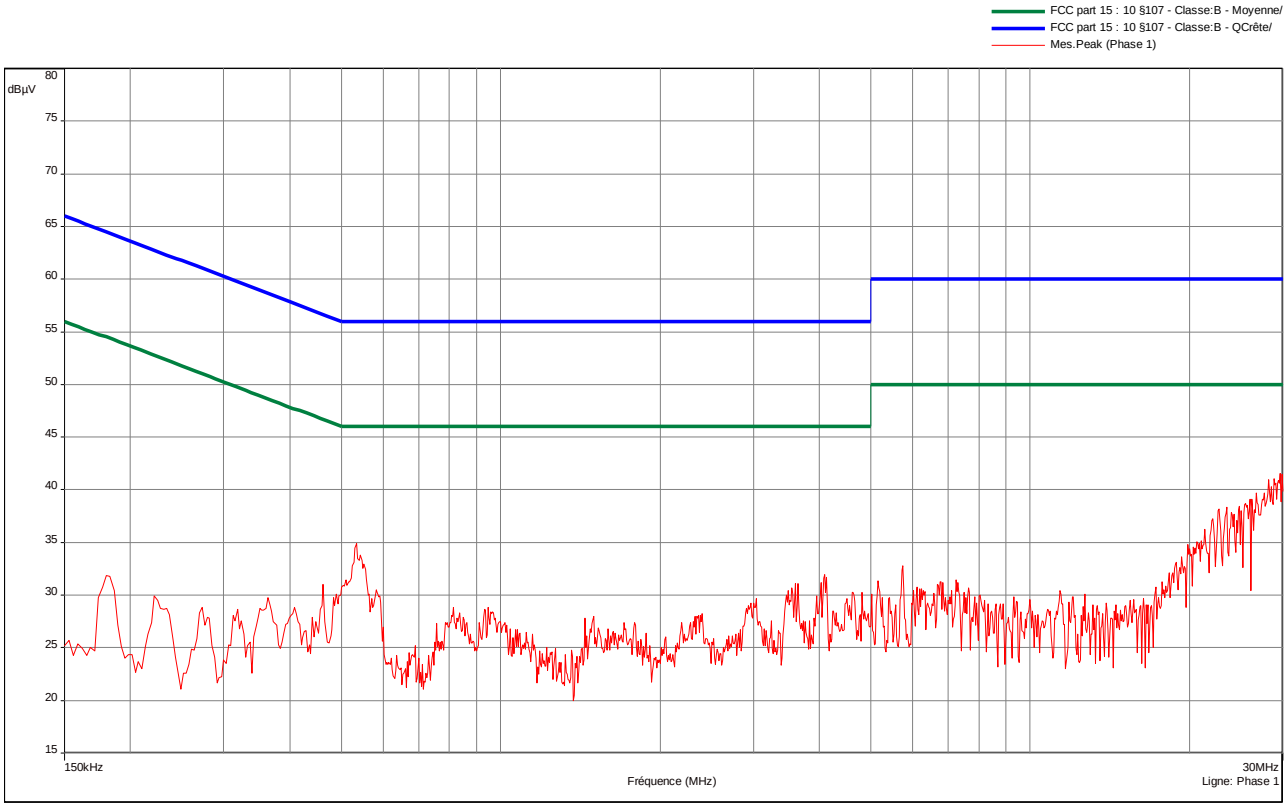
Sample N° 1: High channel (19)

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

10. 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): 24.1
Relative humidity (%): 52

Lower Band Edge: 900 to 902 MHz
Upper Band Edge: 928 to 930 MHz

Sample N° 1:

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)
903.25	93	Peak	901.910	53.82	39.18	74	34.82
911.75	93	Peak	928.515	54.91	38.09	74	35.91

* Marker-Delta method

The 20 dB bandwidth curves are given in appendix 4; band-edge curves are given in appendix 5.

Test conclusion:

RESPECTED STANDARD

11. FUNDAMENTAL AND HARMONICS FIELD STRENGTH

Standard: FCC Part 15

Test procedure: paragraph 15.249 (a)

Test set up:

The measure is realized on open area test site from 9 kHz to 1 GHz and in anechoic chamber above 1 GHz.
The EUT is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.
The measuring distance between the equipment and the test antenna is 3 m. The test antenna has been oriented in the two polarizations, we have recorded only the highest level.

Detection mode:	Quasi-peak (F < 1 GHz)	Peak (F > 1 GHz)
Bandwidth:	120 kHz (F < 1 GHz)	1 MHz (F > 1 GHz)
Video bandwidth:		3 MHz (F > 1 GHz)

Frequency range: From 9 kHz to 10GHz (10^{th} harmonic of the highest fundamental frequency – 911.75 MHz)

Distance of antenna: 3 meters

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): 27.2
Relative humidity (%): 55

Power source: 120 Vac – 60 Hz

Sample N° 1: channel 2

FREQUENCIES (MHz)	Detector	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
903.25(1)	QP	100	71	120	H	93	94	1
5420	P	150	X	1000	H	49.1(2)	74	24.9

Sample N° 1: channel 10

FREQUENCIES (MHz)	Detector	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
907.25(1)	QP	108	1	120	V	93	94	1
5444.8	P	150	X	1000	H	48.2(2)	74	25.8

Sample N° 1: channel 19

FREQUENCIES (MHz)	Detector	Antenna height (cm)	Azimuth (degree)	resolution bandwidth (kHz)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
911.72(1)	QP	114	2	120	V	93	94	1
5469	P	150	X	1000	H	47.7(2)	74	26.3

(1) Fundamental emission
(2) Peak level detected below average limit

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

Test conclusion:

RESPECTED STANDARD

12. OUT-OF-BAND EMISSIONS

Standard: FCC Part 15

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

Test set up:

The measure is realized on open area test site from 9 kHz to 1 GHz and in anechoic chamber above 1 GHz. The EUT is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

Frequency range: From 9 kHz to 10 GHz (10^{th} harmonic of the highest fundamental frequency)

Detection mode:	Quasi-peak (F < 1 GHz)	Average (F > 1 GHz)
Bandwidth:	120 kHz (F < 1 GHz)	1 MHz (F > 1 GHz)
Video bandwidth:		3 MHz (F > 1 GHz)

Distance of antenna: 3 / 10 meters

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

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):	27.2
Relative humidity (%):	55
Power source:	120 Vac - 60 Hz

Sample N° 1: channel 2

Not any spurious has been detected.

Sample N° 1: channel 10

Not any spurious has been detected.

Sample N° 1: channel 19

Not any spurious has been detected.

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

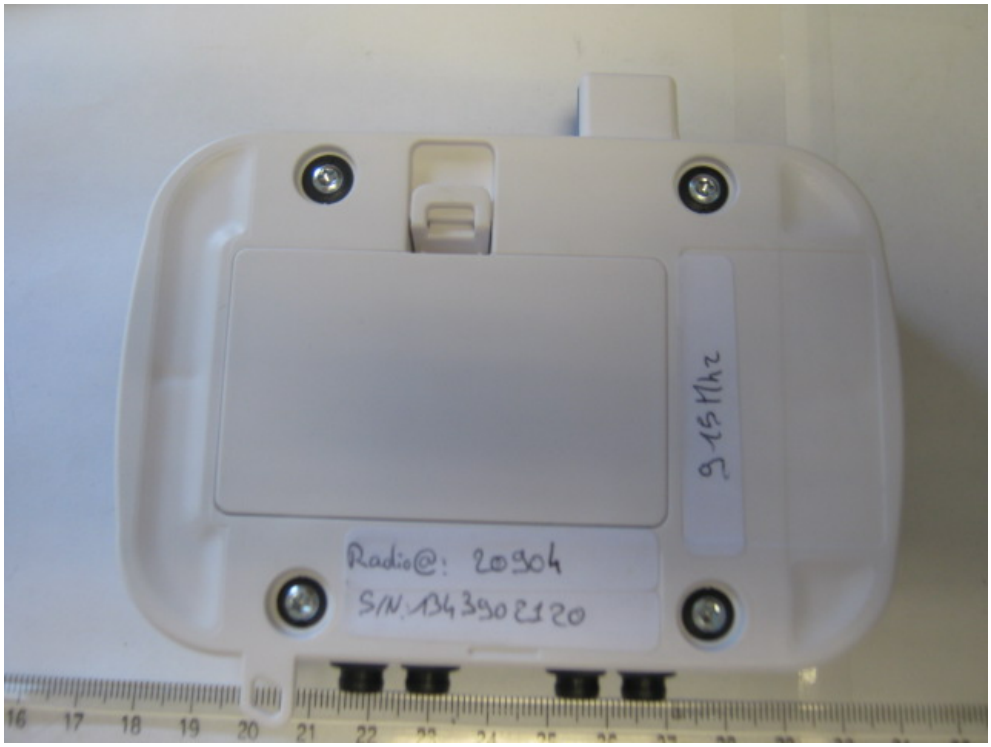
Test conclusion:

RESPECTED STANDARD

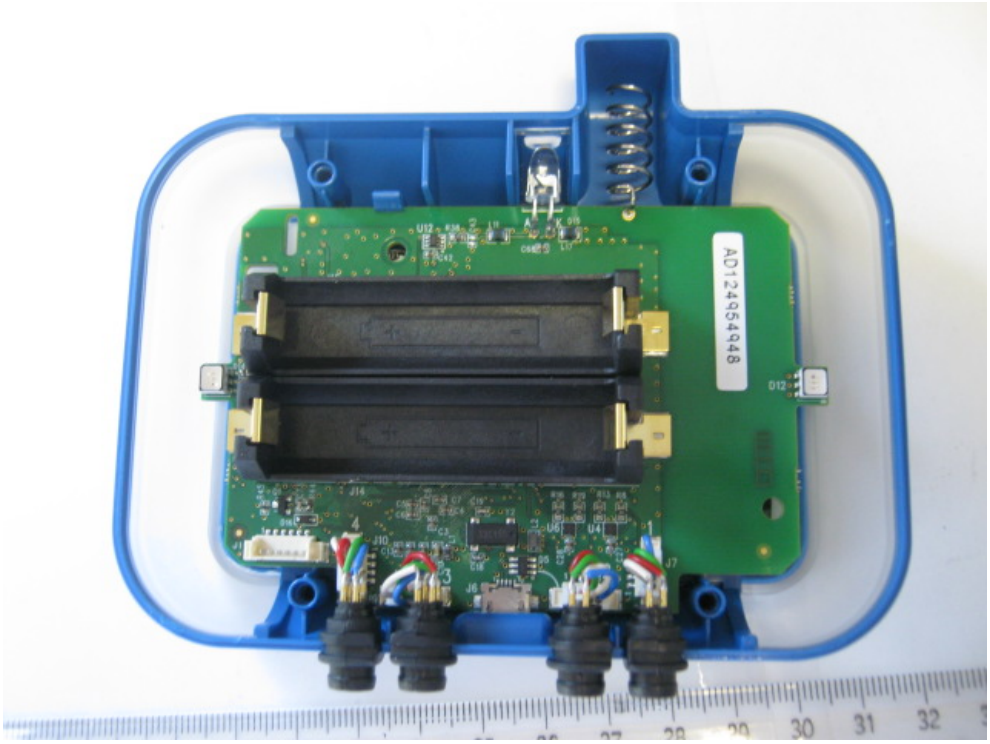
□□□ End of report, 5 appendixes to be forwarded □□□

APPENDIX 1: Photos of the equipment under test

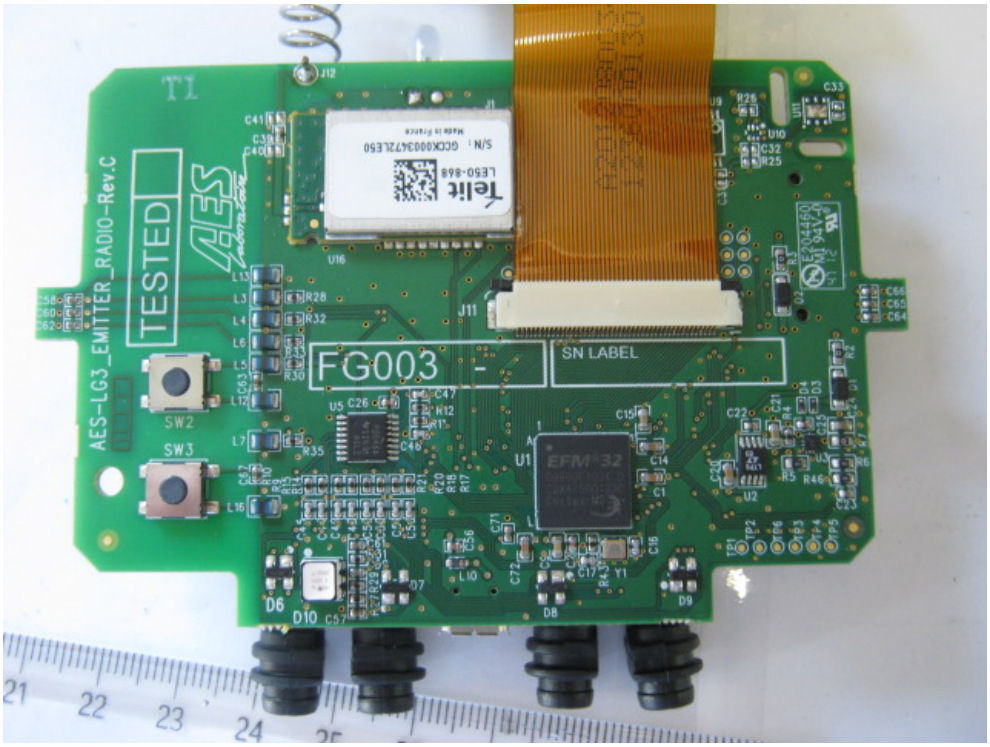
General view

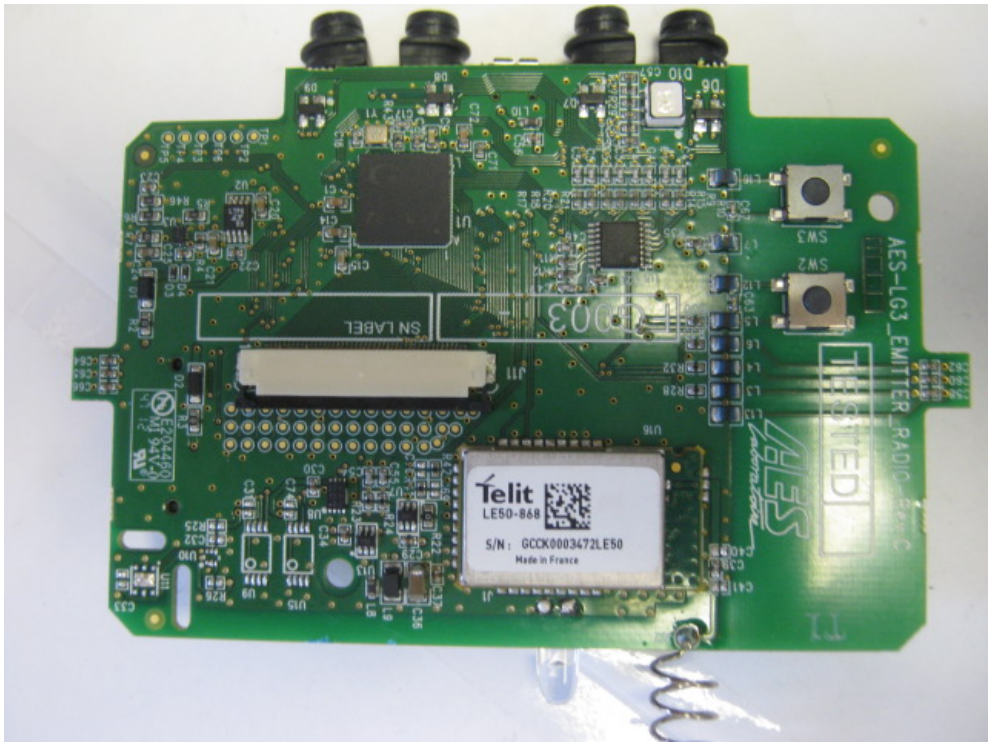


Internal view



Printed board

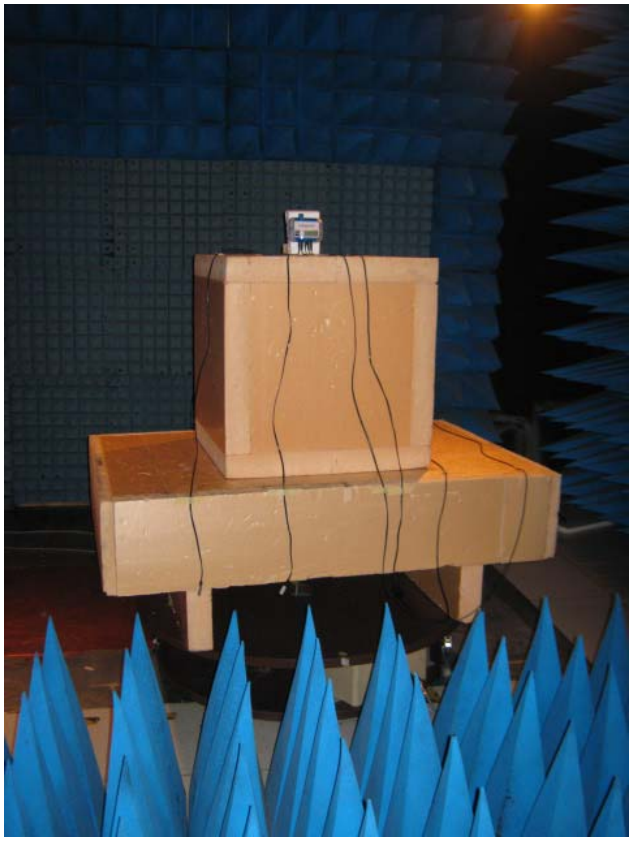


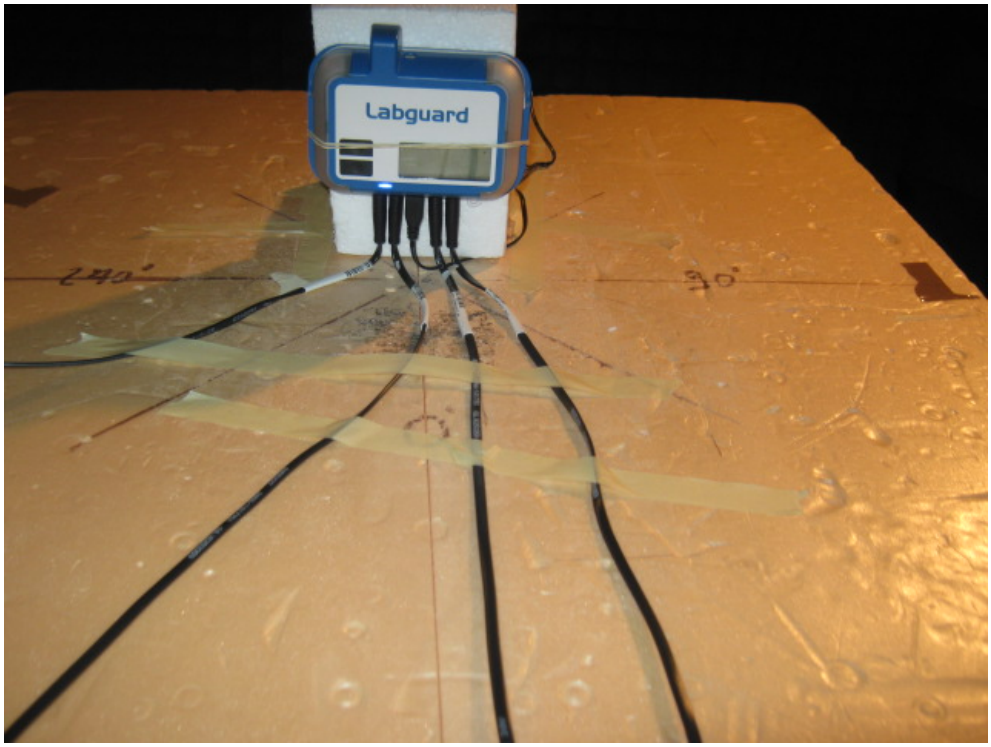


Radio module

APPENDIX 2: Test set up

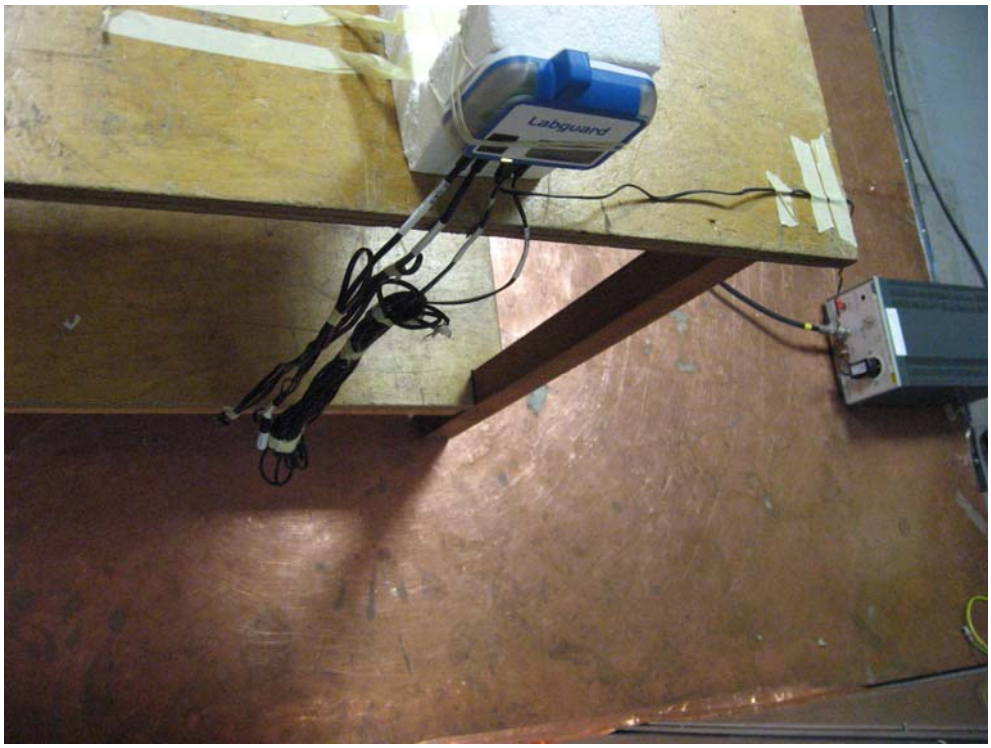
Anechoic chamber test site





Open area test site

Set up for conducted disturbances



APPENDIX 3: Test equipment list

MEASUREMENT OF THE CONDUCTED DISTURBANCES

TYPE	MANUFACTURER	EMITECH NUMBER
RSIL 16A LISN 1600	THURLBY THANDAR	8719
Alternative power supply 1000VA 1251RP	California instruments	8508
High pass filter ETP232	SECRE	8641
Absorber sheath current	EMITECH	9489
Test receiver HP8591EM	Hewlett Packard	8524
Meteo station WS-9232	La Crosse Technology	8671
Multimeter MN5102B	AOIP	8675

RADIATED EMISSION LIMITS

TYPE	MANUFACTURER	EMITECH NUMBER
Spectrum analyzer FSEM30	Rohde & Schwarz	8523
Biconical antenna VHBB 9124	Schwarzbeck	8526
Log periodic antenna UHALP 9108A	Schwarzbeck	8543
Antenna 3115	Electrometrics	8535
Préamplificateur 8447D	Hewlett Packard	8511
Low-noise amplifier 1 to 18 GHz	Microwave DB	1922
Alternative power supply 1000VA 1251RP	California instruments	8508
Multimeter MN5102B	AOIP	8675
Meteo station WS-9232	La Crosse Technology	8750
Anechoic Chamber	EMITECH	8593
Open test site	EMITECH	8732

MEASUREMENT OF THE CONDUCTED DISTURBANCES

TYPE	MANUFACTURER	EMITECH NUMBER
RSIL 16A LISN 1600	THURLBY THANDAR	8719
Alternative power supply 1000VA 1251RP	California instruments	8508
High pass filter ETP232	SECRE	8641
Absorber sheath current	EMITECH	9489
Test receiver HP8591EM	Hewlett Packard	8524
Meteo station WS-9232	La Crosse Technology	8671
Multimeter MN5102B	AOIP	8675

Additional provisions to the general radiated emission limitations

TYPE	MANUFACTURER	EMITECH NUMBER
Spectrum analyzer FSEM30	Rohde & Schwarz	8523
Antenna 3115	Electrometrics	8535
Alternative power supply 1000VA 1251RP	California instruments	8508
Multimeter MN5102B	AOIP	8675
Meteo station WS-9232	La Crosse Technology	8750
Anechoic Chamber	EMITECH	8593

Fundamental and harmonics field strength

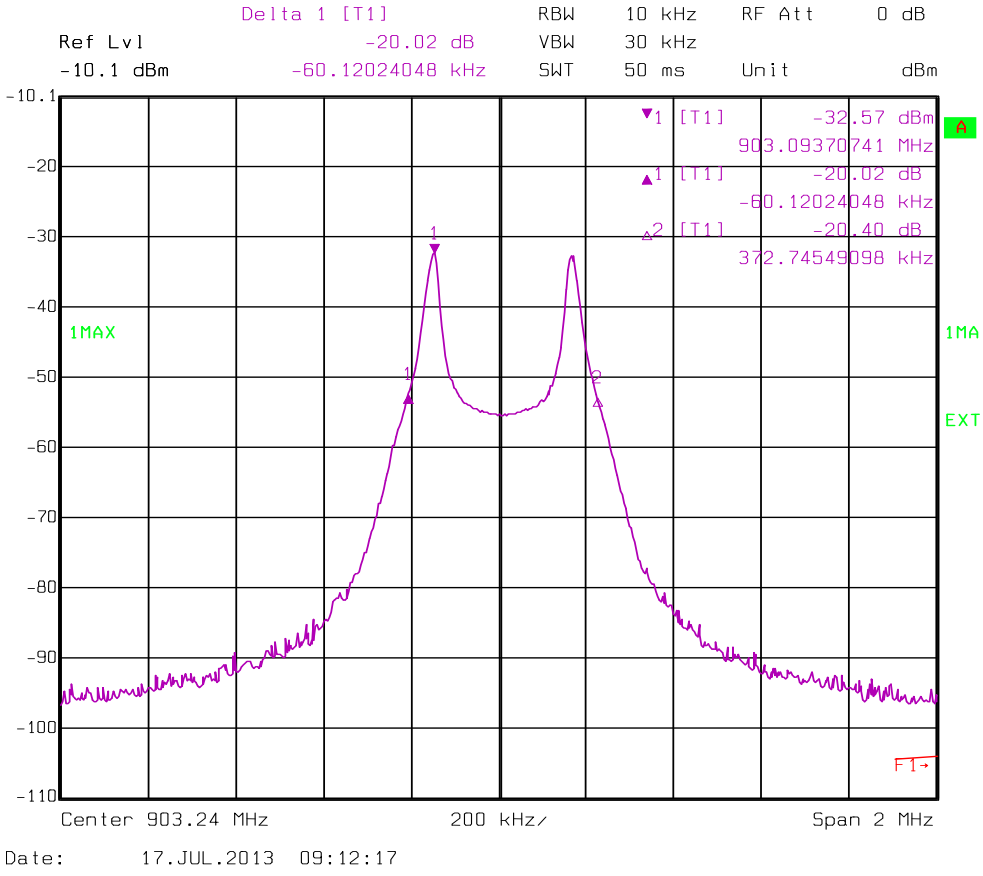
TYPE	MANUFACTURER	EMITECH NUMBER
Spectrum analyzer FSEM30	Rohde & Schwarz	8523
Active loop antenna HFH2-Z2	Rohde & Schwarz	8533
Biconical antenna VHBB 9124	Schwarzbeck	8526
Log periodic antenna UHALP 9108A	Schwarzbeck	8543
Antenna 3115	Electrometrics	8535
Préamplificateur 8447D	Hewlett Packard	8511
Low-noise amplifier 1 to 18 GHz	Microwave DB	1922
Low pass filter 1 GHz	Filtek	4087
rejector filter 2400 MHz BRM50702	Microtronics	7299
3.225GHz High pass filter	Filtek	8262
Alternative power supply 1000VA 1251RP	California instruments	8508
Multimeter MN5102B	AOIP	8675
Meteo station WS-9232	La Crosse Technology	8750
Anechoic Chamber	EMITECH	8593
Open test site	EMITECH	8732

Out-of-band emissions

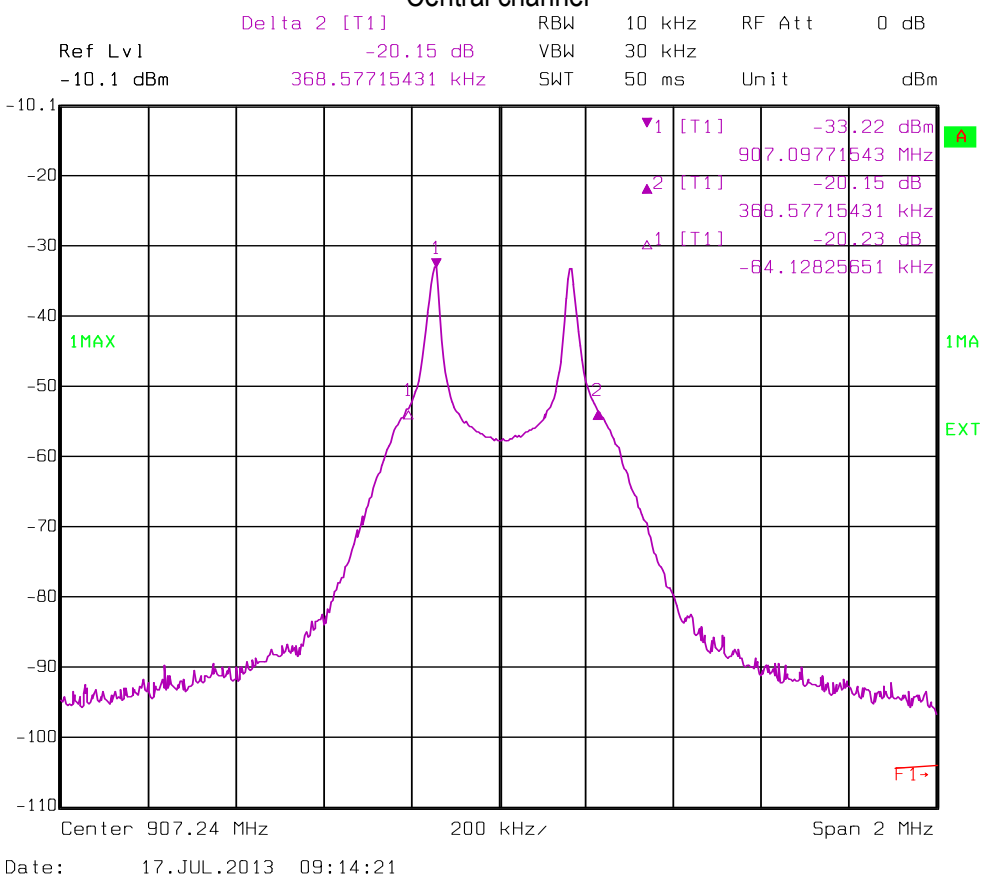
TYPE	MANUFACTURER	EMITECH NUMBER
Spectrum analyzer FSEM30	Rohde & Schwarz	8523
Active loop antenna HFH2-Z2	Rohde & Schwarz	8533
Biconical antenna VHBB 9124	Schwarzbeck	8526
Log periodic antenna UHALP 9108A	Schwarzbeck	8543
Antenna 3115	Electrometrics	8535
Préamplificateur 8447D	Hewlett Packard	8511
Low-noise amplifier 1 to 18 GHz	Microwave DB	1922
Low pass filter 1 GHz	Filtek	4087
rejector filter 2400 MHz BRM50702	Microtronics	7299
3.225GHz High pass filter	Filtek	8262
Alternative power supply 1000VA 1251RP	California instruments	8508
Multimeter MN5102B	AOIP	8675
Meteo station WS-9232	La Crosse Technology	8750
Anechoic Chamber	EMITECH	8593
Open test site	EMITECH	8732

APPENDIX 4: 20 dB bandwidth

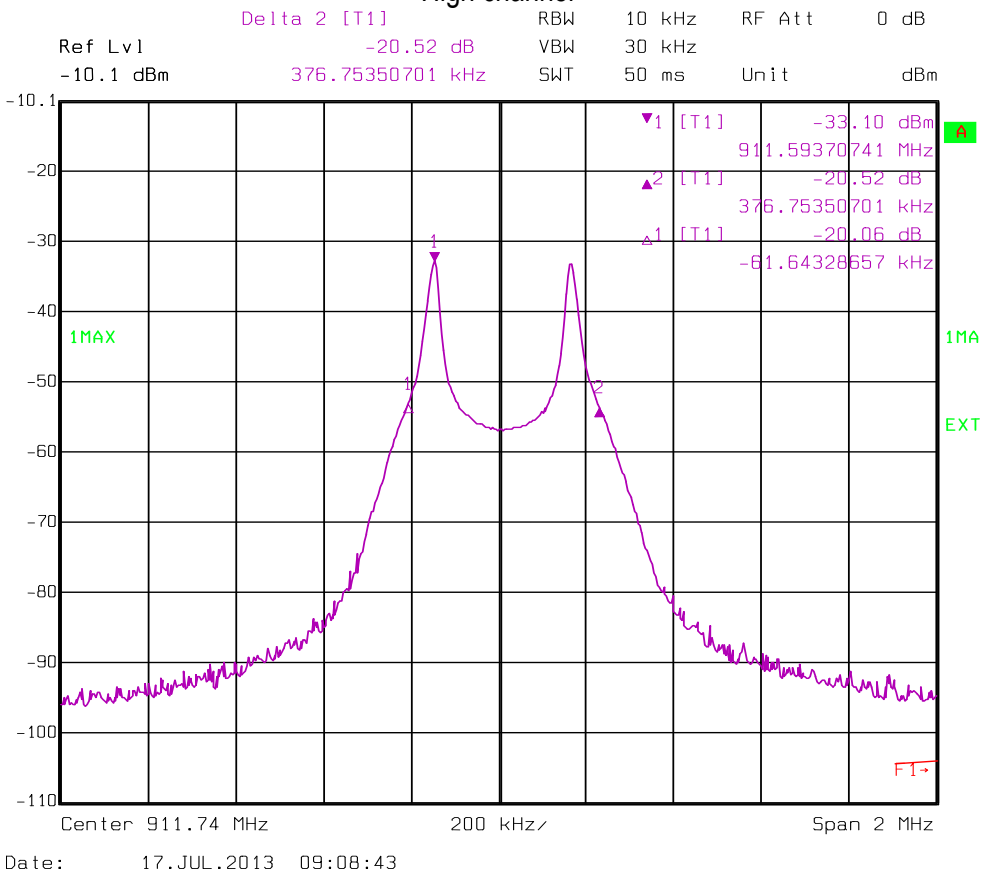
Low channel



Central channel

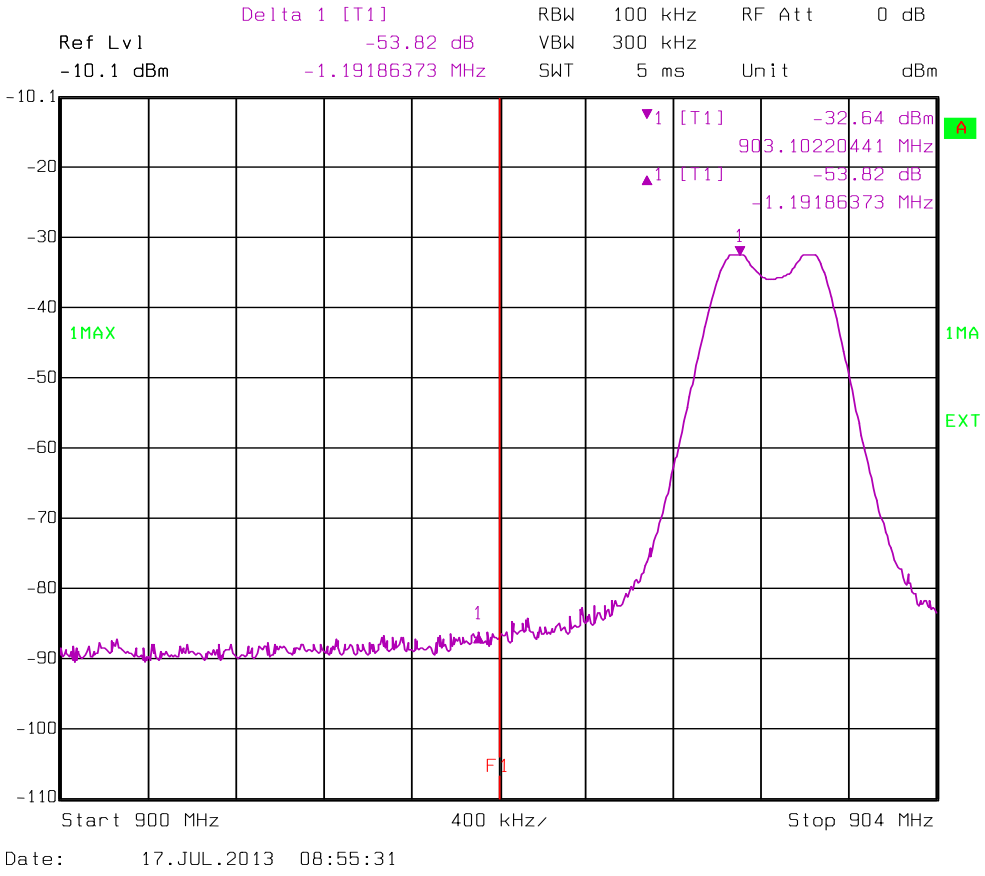


High channel



APPENDIX 5: Band edge

Low channel



High channel