



R051-24-11-105832-4/A Ed. 1

RADIO test report

according to standard:
FCC Part 15
2012

Equipment under test:
PORTABLE EID READER
MODEL: RS420-60

FCC ID:
NQY-30002

Company:
ALLFLEX EUROPE

DISTRIBUTION: Mr LANGOUET

Company: ALLFLEX EUROPE

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PRODUCT: PORTABLE EID READER

1 | **Reference / model:** RS420-60

Serial number: /

MANUFACTURER: ALLFLEX EUROPE

COMPANY SUBMITTING THE PRODUCT:

Company: ALLFLEX EUROPE

Address: Route des eaux
BP90219
35502 VITRE Cedex
France

Responsible: Mr LANGOUET

DATE(S) OF TEST: 24 February 2012
27 March 2012

TESTING LOCATION: EMITECH ATLANTIQUE laboratory at ANGERS (49) FRANCE
EMITECH ATLANTIQUE open area test site in LA POUEZE (49)
FRANCE
FCC 2.948 Listed Site Registration Number: 101696

TESTED BY: L. BERTHAUD

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1. INTRODUCTION

This report presents the results of radio test carried out on the following equipment: PORTABLE EID READER-MODEL: RS420, in accordance with normative reference.

The equipment under test integrates an already “modular approval” certified Bluetooth module (FCC ID: X3ZBTMOD3)

2. PRODUCT DESCRIPTION

Class:	B (residential environment)
Utilization:	EID reader for livestock counting integrating a Bluetooth module
Antenna type and gain:	ferrite coiled antenna, unknown gain
Operating frequency range:	134.2 kHz
Number of channels:	1
Channel spacing:	not concerned
Frequency generation:	not communicated
Modulation:	not communicated
Power source:	7.2 Vd.c Li-Ion rechargeable battery + 110-240 Va.c. mains adapter

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.

FCC Part 15 (2012) 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 part 15:

Subpart B –Unintentional Radiators

 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

5. TEST EQUIPMENT CALIBRATION DATES

Emitech Number	Model	Type	Last verification	Next verification	Validity
728	HP 11966C	Biconical antenna	18/11/2008	18/11/2012	18/01/2013
812	Luke 77-2	Multimeter	22/03/2011	22/03/2013	22/05/2013
834	PMM L3-25	LISN	01/02/2012	01/02/2014	01/04/2014
1058	R&S ESH3	Test receiver	24/01/2011	24/01/2013	24/03/2013
1204	Electrometrics EM-6961	Guide antenna	30/05/2008	30/05/2012	30/07/2012
1219	R&S ESVS10	Test receiver	14/06/2011	14/06/2013	14/08/2013
1274	Emitech	OATS	28/01/2010	28/01/2013	28/03/2013
1406	Emco 6502	Loop antenna	13/01/2011	13/01/2013	13/03/2013
1419	Dereix R213	Variac	*	*	*
1999	R&S HL223	Logperiodic antenna	18/11/2008	18/11/2012	18/01/2013
2152	Proflin 2115-400	Power source	16/04/2010	16/04/2012	16/06/2012
2565	HP 11947A	Transient limiter	25/01/2012	25/01/2014	25/03/2014
2648	DBS 97-1852	low-noise amplifier	19/07/2011	19/07/2012	19/09/2012
4088	R&S FSP40	Spectrum analyzer	19/04/2012	19/04/2014	19/06/2014
5071	R&S FSEA	Spectrum analyzer	05/07/2011	05/07/2013	05/09/2013
6609	Microtronics HPM11630	High-pass filter	24/01/2012	24/01/2014	24/03/2014

* The equipment is not verified; instead, the output voltage is checked before each measurement with the calibrated multimeter.

6. TESTS RESULTS SUMMARY

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	Criteria respected ?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.203	ANTENNA REQUIREMENTS	X				<i>Note 1</i>
FCC Part 15.207	CONDUCTED LIMITS	X				
FCC Part 15.209	RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS	X				<i>Note 2</i>

NAp: Not Applicable

NAs: Not Asked

Note 1: *Integral antenna.*

Note2: *Unwanted emissions levels are all below the fundamental emission field strength level. Integrates co-location measurements.*

Conclusion:

The sample of PORTABLE EID READER - MODEL: RS420 submitted to the tests complies with the regulations of the standard FCC Part 15 in accordance with the limits or criteria defined in this report.

7. CONDUCTED LIMITS

Standard: FCC Part 15

Test procedure: Paragraph 15.107

Limits: Class B

Test equipments:

TYPE	BRAND	EMITECH NUMBER
AC Power supply Proflin 2115-400	Schaffner	2152
Test receiver ESH3	Rohde & Schwarz	1058
Spectrum analyzer FSEA	Rohde & Schwarz	5071
Artificial main network L3-25	PMM	0834
Transient limiter 11947A	Hewlett Packard	2565

Software used: BAT-EMC V3.5.0.2

Test set up:

The test unit 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.

Frequency range: 150 kHz - 30 MHz

Detection mode: Peak / Average

Bandwidth: 10 kHz / 9 kHz

Equipment under test operating condition:

The equipment is blocked in standby / reception mode.

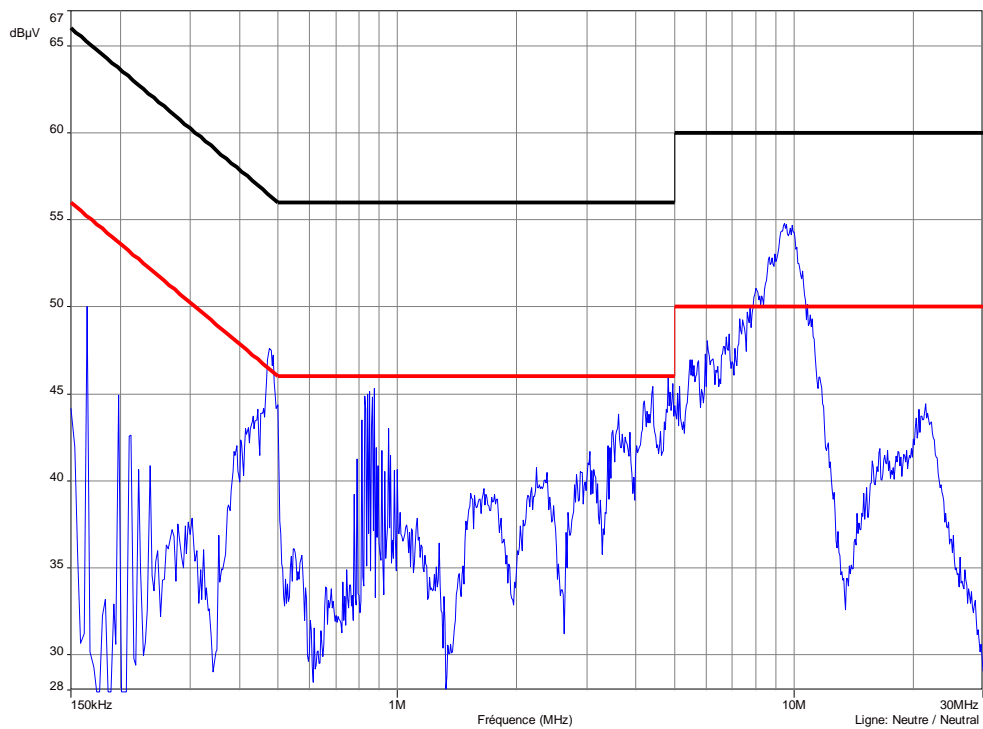
Results:

Ambient temperature (°C): 22
Relative humidity (%): 32

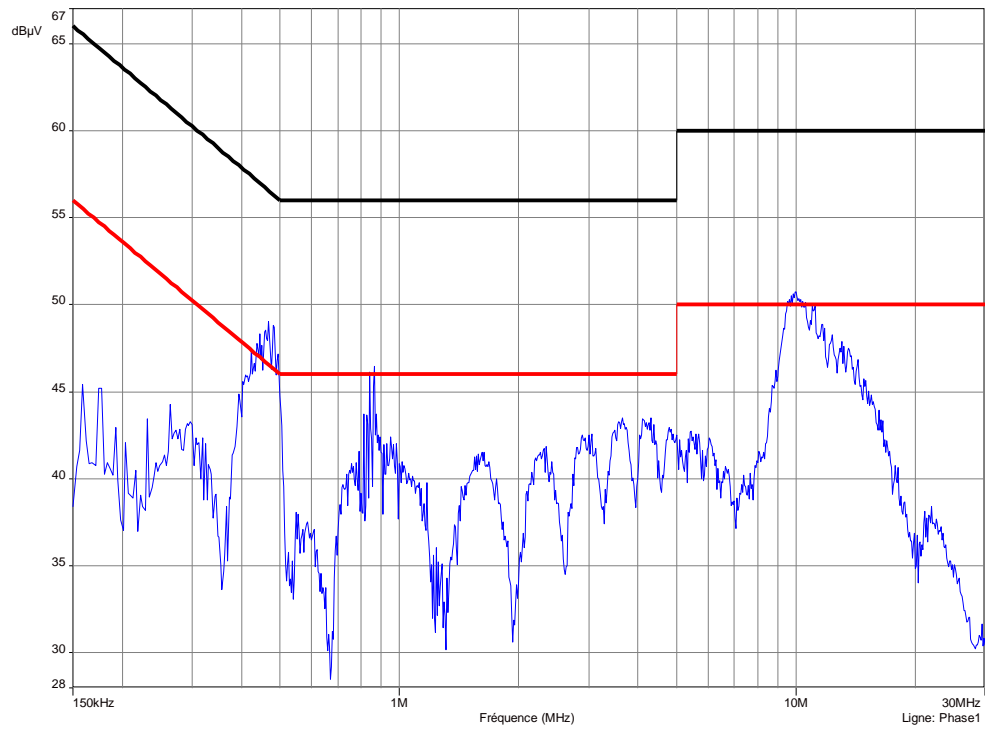
Measurement on the mains power supply:

The measurement is first realized with Peak detector.

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

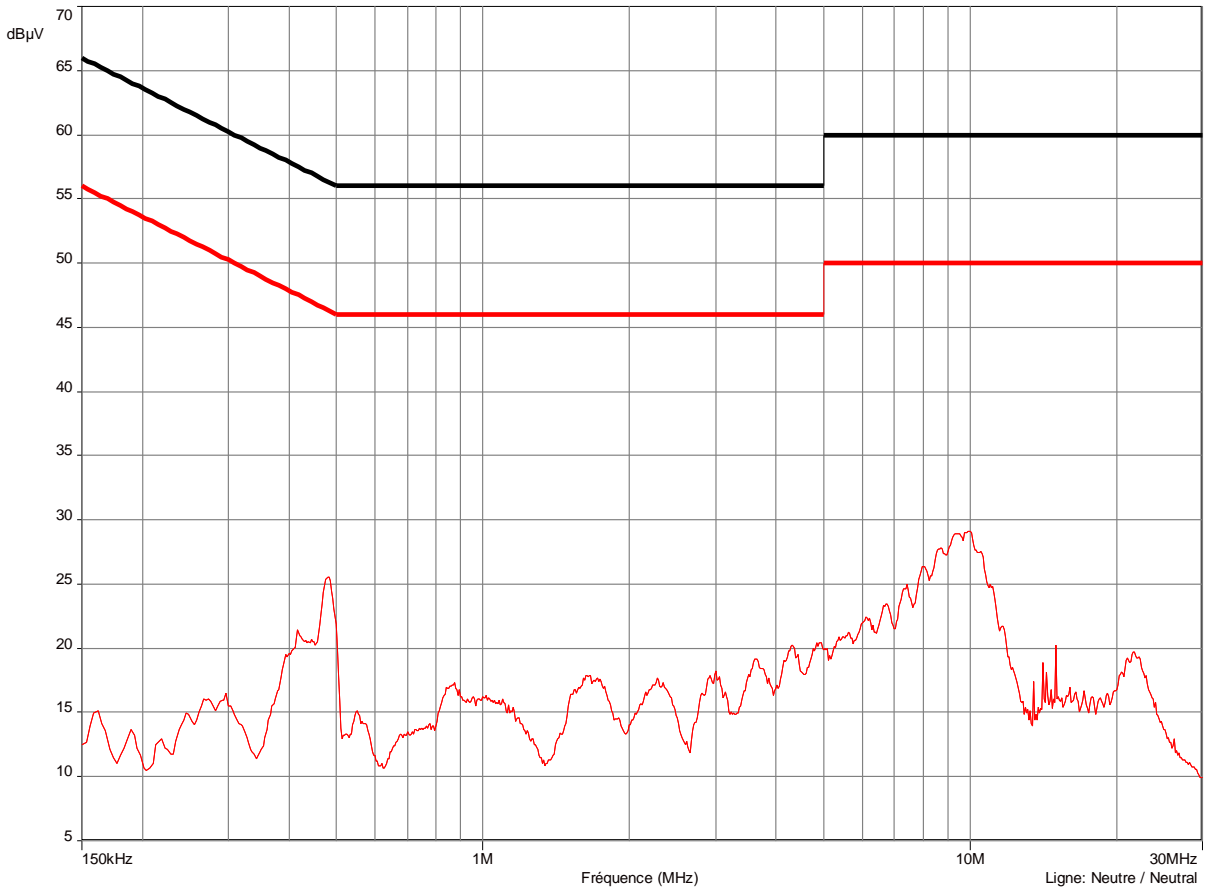


Curve N° 2: measurement on the Line with peak detector:

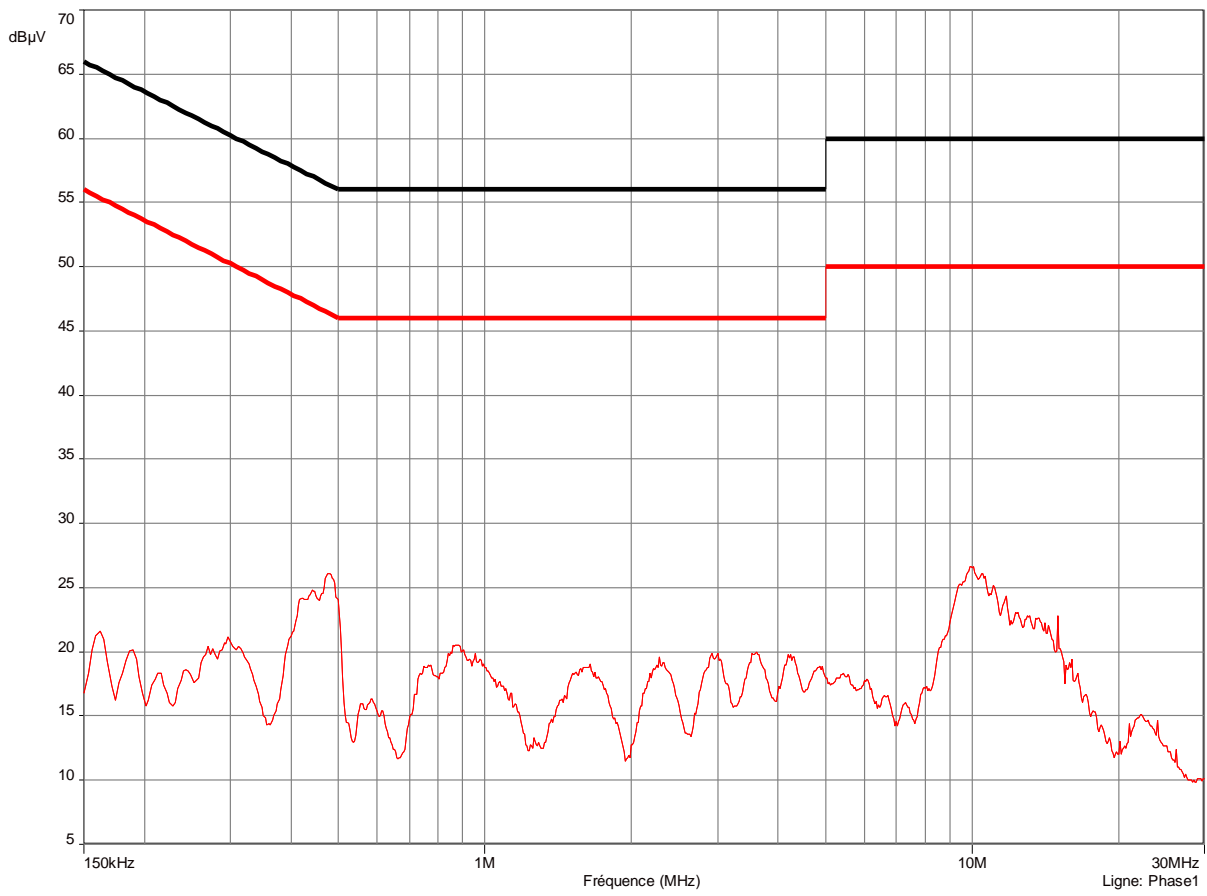


The frequencies which are not 6 dB under the Average limit are then analyzed with Average detector.

Curve N° 3: average measurement on the Neutral:



Curve N° 4: average measurement on the Line:



Test conclusion:

RESPECTED STANDARD

8. RADIATED EMISSION LIMITS

Standard: FCC Part 15

Test procedure: paragraph 109

Limit class: Class B

Test equipments:

TYPE	BRAND	EMITECH NUMBER
Test receiver ESH3	Rohde & Schwarz	1058
Test receiver ESVS10	Rohde & Schwarz	1219
Spectrum analyzer FSP40	Rohde & Schwarz	4088
Loop antenna 6502	EMCO	1406
Biconical antenna 11966 C	Hewlett Packard	0728
Log periodic antenna HL 223	Rohde & Schwarz	1999
Double ridged guide antenna EM 6961	Electrometrics	1204
Preamplifier 1 to 18 GHz DB97-1852	DBS Microwave	2648
High pass filter HPM11630	Micro-tronics	6609
Open area test site	Emitech	1274
Multimeter 77-2	Fluke	0812
Variac R213	Dereix	1419

Test set up:

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

Frequency range: From 9 kHz to 5th harmonic of the highest frequency used (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: 3 meters / 10 meters

Antenna height: 1 to 4 meters

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

Equipment under test operating condition:

The equipment is blocked in standby / reception mode.

The equipment under test is supplied by mains voltage with its internal battery in charging mode.

Results:

Ambient temperature (°C): 19.5
Relative humidity (%): 56

Power source: 120 Va.c through a variac + battery in charging mode

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

9. CONDUCTED LIMITS

Standard: FCC Part 15

Test procedure: Paragraph 15.207

Test equipments:

TYPE	BRAND	EMITECH NUMBER
AC Power supply Proflin 2115-400	Schaffner	2152
Test receiver ESH3	Rohde & Schwarz	1058
Spectrum analyzer FSEA	Rohde & Schwarz	5071
Artificial main network L3-25	PMM	0834
Transient limiter 11947A	Hewlett Packard	2565

Software used: BAT-EMC V3.5.0.2

Test set up:

The test unit 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.

Frequency range: 150 kHz - 30 MHz

Detection mode: Peak / Average

Bandwidth: 10 kHz/ 9 kHz

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.

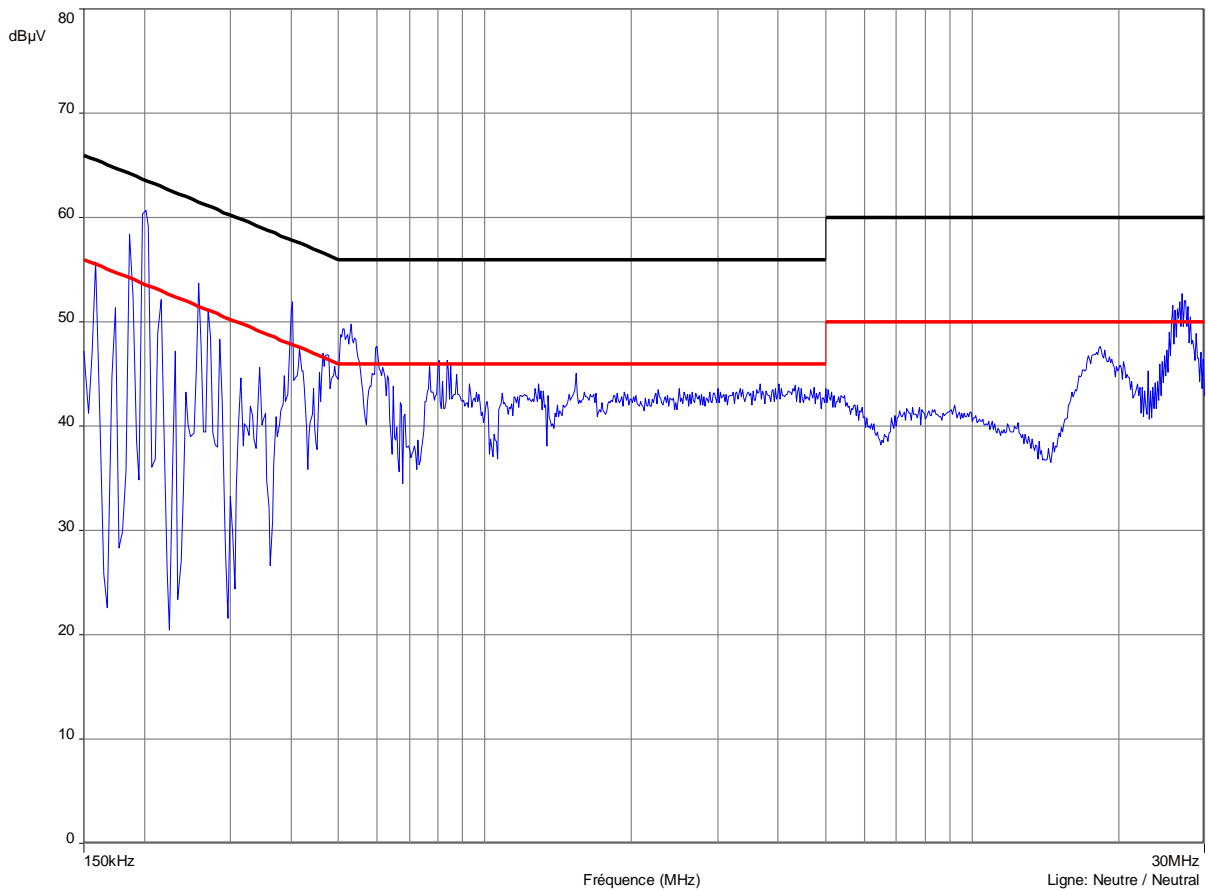
Results:

Ambient temperature (°C): 22
 Relative humidity (%): 32

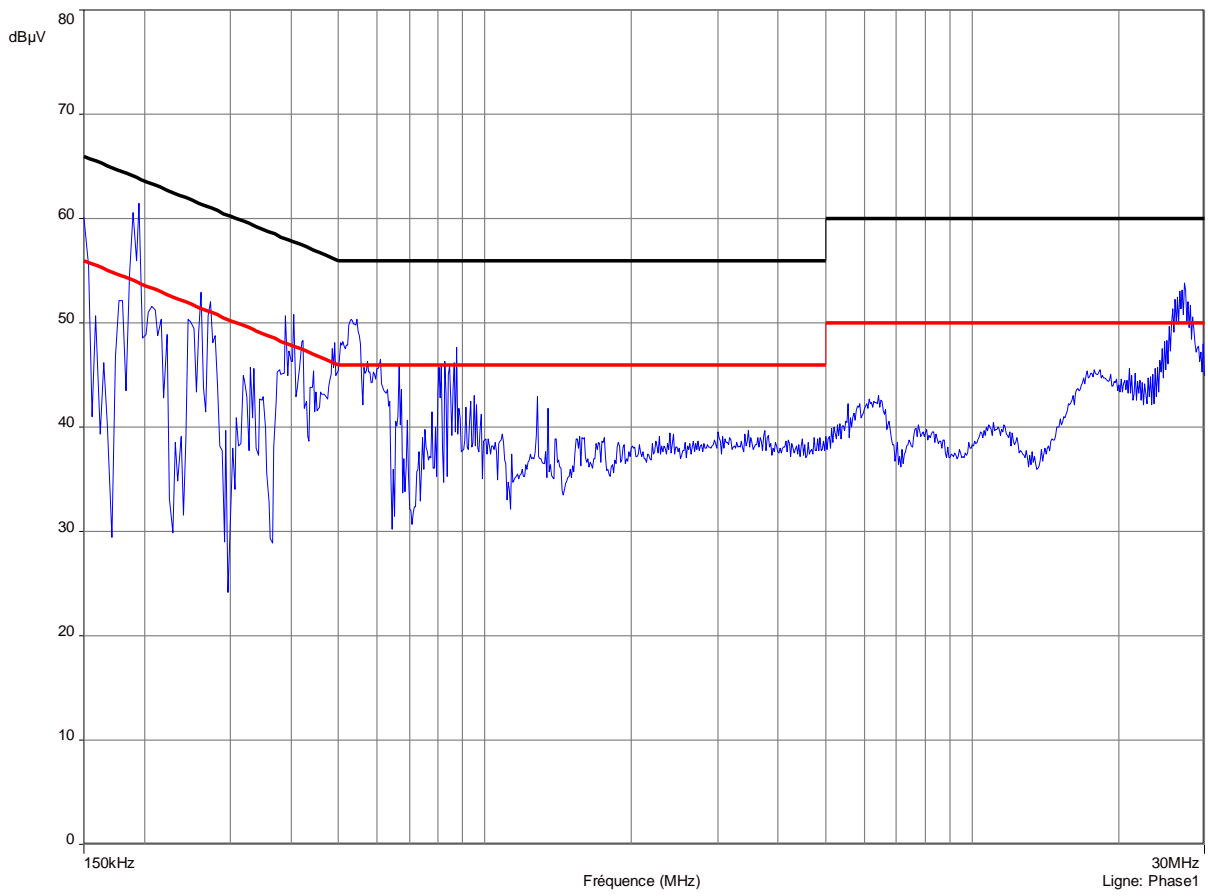
Measurement on the mains power supply:

The measurement is first realized with Peak detector.

Curve N° 5: measurement on the Neutral with peak detector:

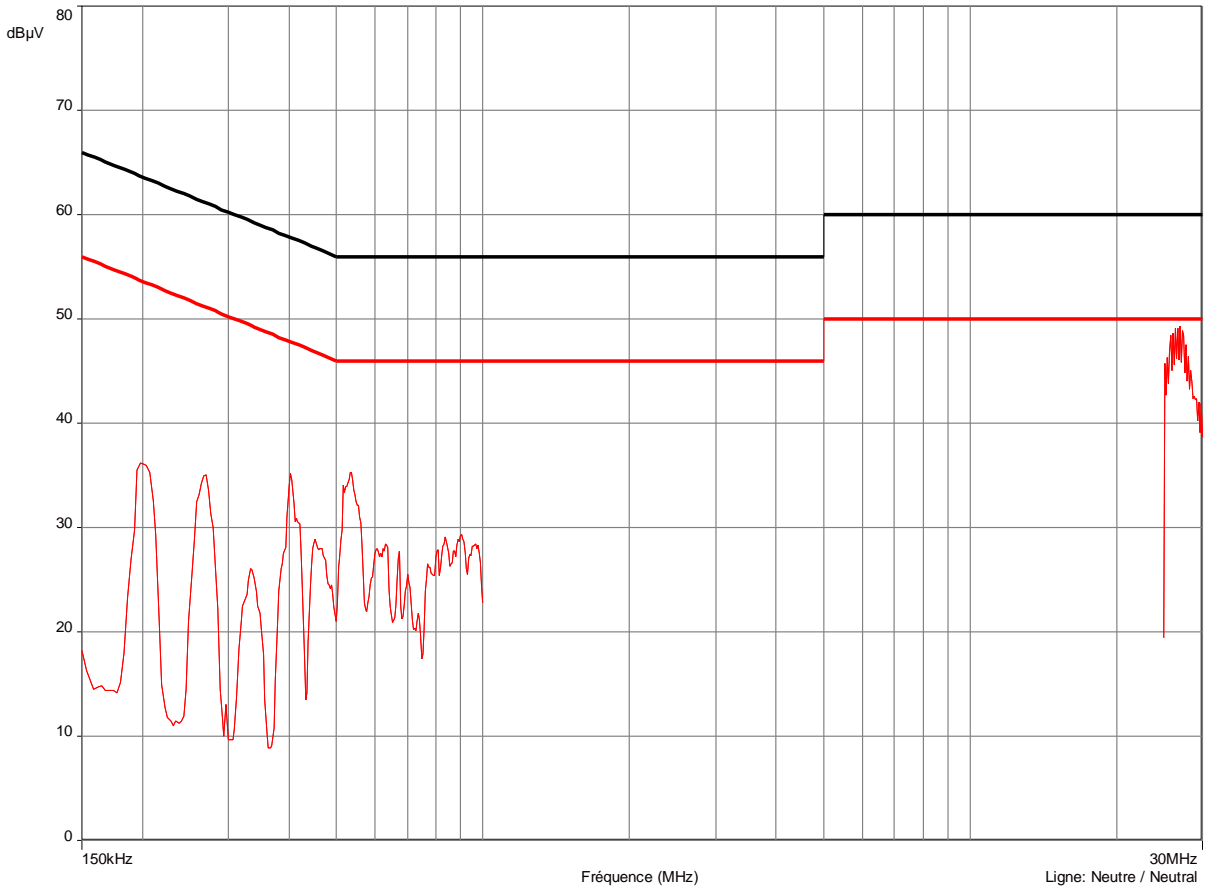


Curve N° 6: measurement on the Line with peak detector:

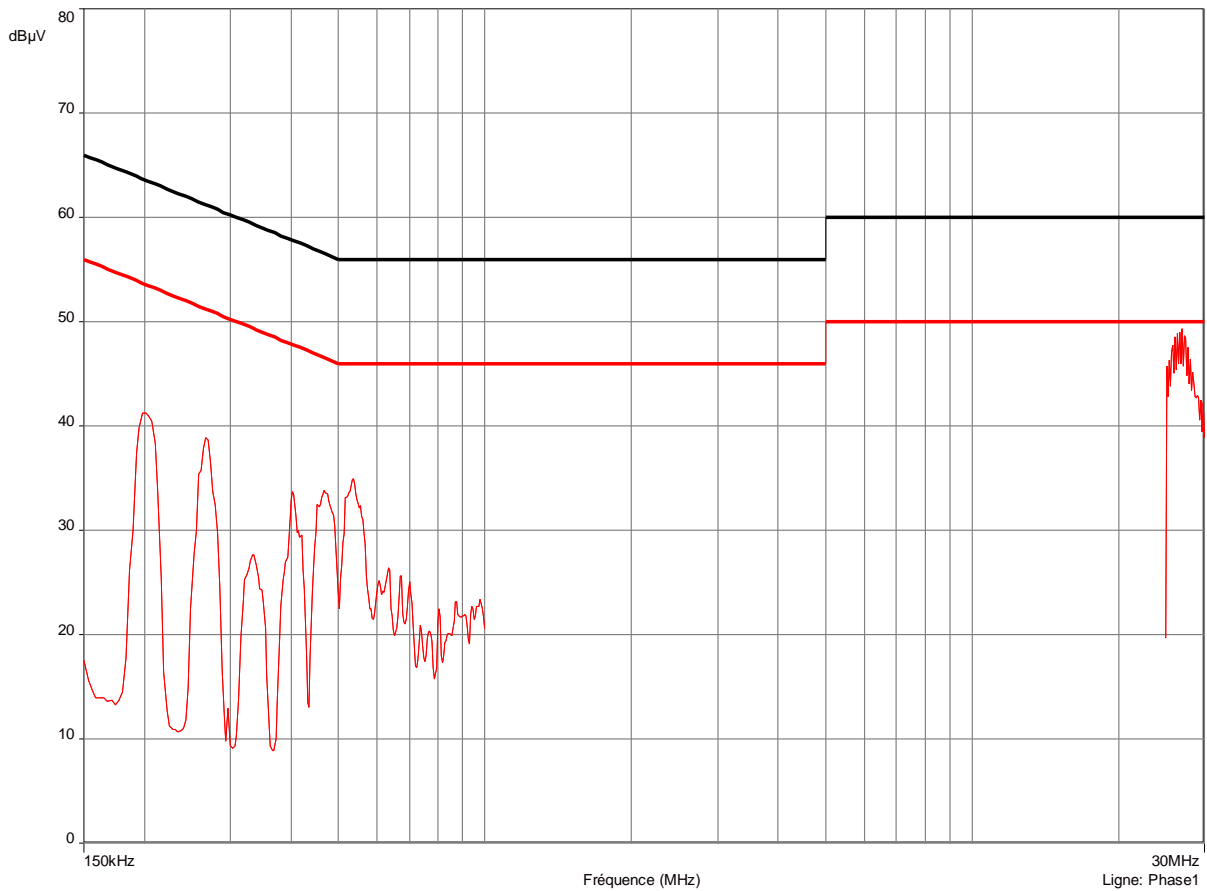


The frequencies which are not 6 dB under the Average limit are then analyzed with Average detector.

Curve N° 7: average measurement on the Neutral, for the frequency range 150 kHz-1 MHz / 25 MHz-30 MHz:



Curve N° 8: average measurement on the Line, for the frequency range 150 kHz-1 MHz / 25 MHz-30 MHz:



Test conclusion:

RESPECTED STANDARD

10. RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS

Standard: FCC Part 15

Test procedure: paragraph 209

Test equipments:

TYPE	BRAND	EMITECH NUMBER
Test receiver ESH3	Rohde & Schwarz	1058
Test receiver ESVS10	Rohde & Schwarz	1219
Spectrum analyzer FSP40	Rohde & Schwarz	4088
Loop antenna 6502	EMCO	1406
Biconical antenna 11966 C	Hewlett Packard	0728
Log periodic antenna HL 223	Rohde & Schwarz	1999
Double ridged guide antenna EM 6961	Electrometrics	1204
Preamplifier 1 to 18 GHz DB97-1852	DBS Microwave	2648
High pass filter HPM11630	Micro-tronics	6609
Open area test site	Emitech	1274
Multimeter 77-2	Fluke	0812
Variac R213	Dereix	1419

Test set up:

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

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: 3 and 10 meters depending of frequencies (only the highest level is recorded).

Antenna height: 1 to 4 meters

1 | **Antenna polarization:** The EUT has been tested in 3 orthogonal planes (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.

The equipment under test is supplied by mains voltage with its internal battery in charging mode.

Results:

Ambient temperature (°C): 19.5
 Relative humidity (%): 56

Power source: 120 Va.c. through a variac

FREQUENCIES (MHz)	Detector P: Peak QP: Quasi-Peak	Antenna height (cm)	Azimuth (degree)	Polarization H: Horizontal V: Vertical	Field strength (dBµV/m)	Limits (dBµV/m)	Margin (dB)
0.1342	QP	100	0	V	17.5*	25	7.5
0.2684	QP	100	0	V	-19.7*	19	38.7
0.4026	QP	100	0	V	-20.7*	15.5	36.2
0.5368	QP	100	0	V	-14.8**	33	47.8

* 10 m level extrapolated at 300m.

** 10 m level extrapolated at 30m.

The measured levels have been extrapolated using an inverse linear distance extrapolation factor of 40 dB/decade (see §15.31 f) 2) of CFR 47 FCC Part 15).

The limits levels have been calculated using formulas given in §15.209 a).

Test conclusion:

RESPECTED STANDARD

□□□ End of report, 2 annexes to be forwarded □□□

ANNEX 1: PHOTOS OF THE EQUIPMENT UNDER TEST

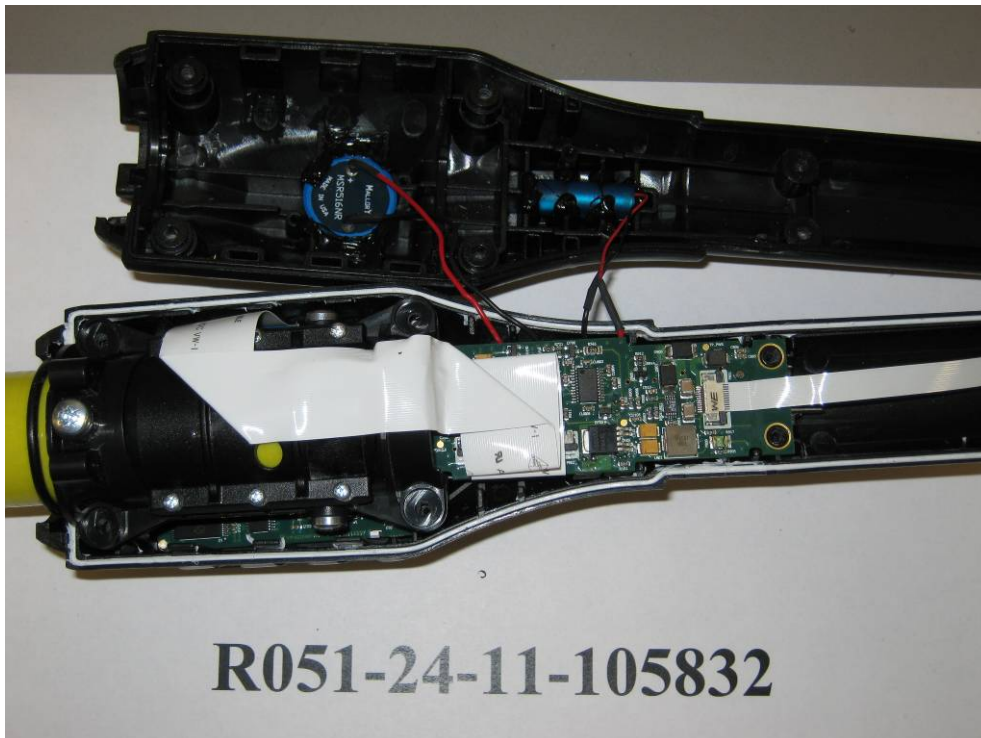
GENERAL VIEW



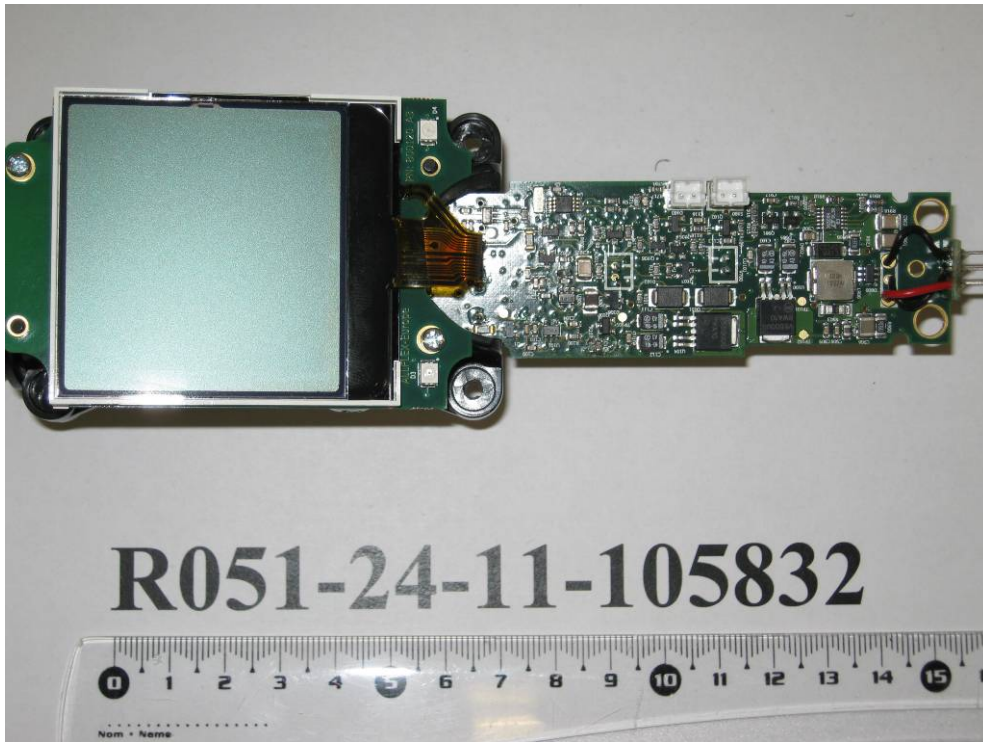
GENERAL VIEW



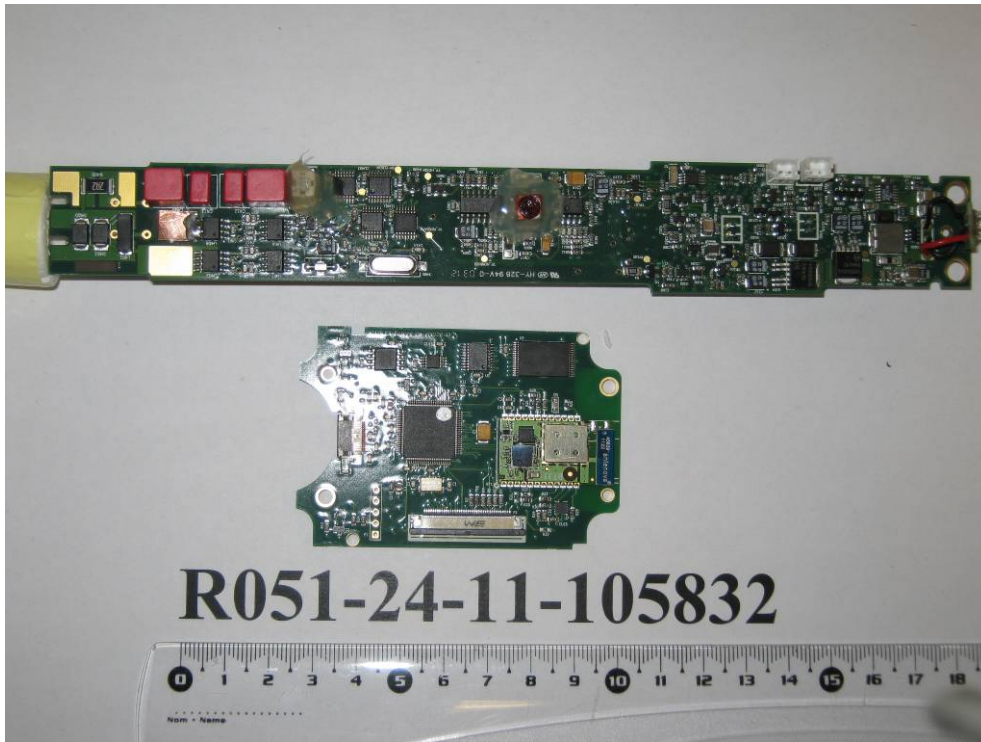
INTERNAL VIEW



INTERNAL VIEW



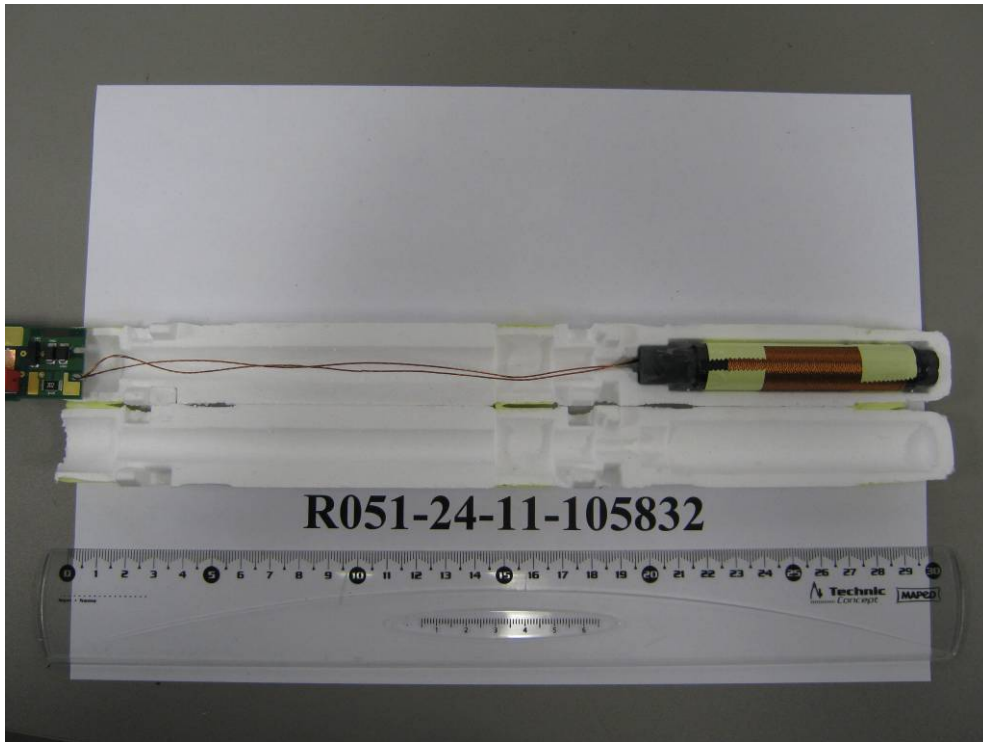
PRINTED CIRCUIT BOARD: FACE 1



PRINTED CIRCUIT BOARD: FACE 2



ANTENNA



ANNEX 2: TEST SET UP AND OPEN AREA TEST SITE

RADIATED MEASUREMENTS



CONDUCTED MEASUREMENTS



OPEN AREA TEST SITE

