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TEST REPORT

N°76783-565439-Cr 2008-03-17

FCC REGISTRATION NUMBER: 888863
INDUSTRY CANADA NUMBER: 6231A

ISSUED TO : LUTRONIC INTERNATIONAL
1, rue de l'industrie
BP 51
L-4801 RODANGE
LUXEMBOURG

SUBJECT : **ELECTROMAGNETIC COMPATIBILITY TESTS ACCORDING TO THE STANDARD 47 CFR PART 15, SUBPART C, 15.225 and RSS-GEN, RSS-210, RSS-102**

Apparatus under test	:	
Product	:	TRANSPONDER READER
Trade mark	:	NONATEC
Manufacturer	:	LUTRONIC
Model	:	LAB BENCH *
Reference	:	NONA06LS05-B
Serial number	:	061003X 00001102
FCC ID	:	VU4LABV21
IC	:	7912A-LABV21
Test date	:	September, 2007
Composition of document	:	20 pages

* Information given by the customer

Initially released on the January 10th, 2008
Corrected on the March 17th, 2008

Fontenay-Aux-Roses, March 17th, 2008

The technical manager,

Eric ROUSSEL

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FCC ID : VU4LABV21
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1 – GENERAL

1.1 – Summary of test results

Radiated emissions are made on open area test site located "rue Théo Bonhomme, Moret-Sur-Loing (77, France)". A description of the test facility is on file with the FCC.

47 CFR Part 15			
Paragraph No.	**Name of test**	**Remarks**	**Result**
§ 15.207 (a)	Power line conducted limits		YES
§15.225 (a) (b) (c)	Field strength within the band 13.110-14.010 MHz		YES
§15.225 (d)	Field strength outside of the bands 13.110-14.010 MHz		YES
§15.225 (e)	Frequency stability over extreme temperature and voltage conditions		YES

NA : Not Applicable

1.2 – References

Measurements were performed in accordance with the following standards :

47 CFR Part 15 of September 9, 200 7: Code of federal regulations – Telecommunication –Radiofrequency devices

ANSI C63.4 of December 11, 2003 : American national standard for methods of measurement of radio noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.

CISPR 16-4-2 of November, 2003 : International electrotechnical commission - Specification for radio disturbance and immunity measuring apparatus and methods – Uncertainties, statistics and limit modeling – Uncertainty in EMC measurements.

RSS-Gen of June 2007: General Requirements and Information for the Certification of Radiocommunication Equipment

RSS-102 of November 2005: Radio Frequency Exposure Compliance of Radiocommunication Apparatus

RSS-210 of June 2007 - Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

1.3 - Equipment under test specification

1.3.1 – General equipment information

Applicant : LUTRONIC
1, rue de l'industrie
BP51 - L 4830 RODANGE

Manufacturer : LUTRONIC
1, rue de l'industrie
BP51 - L 4830 RODANGE

Dimensions :
Frequency band : 13.110-14.010 MHz
Number of channel : 1
Channel spacing : /
User frequency adjustment : NO
User power adjustment : NO
Type of antenna : Integrated
Is the operation point to point? NO
Power supply - AC/DC power source (trade mark MASCOT and model : 2240) for loading mode
- by an internal battery for permanently emission

Cables :

Type	EUT port	Long (m)	Shielded	Number of wire
Power	DC	2m	NO	2

This product includes a Bluetooth module referenced BISMS02BI-01 SOIC of trademark EZURIO (FCC Id : PI403B). This module is integrated without any change in the equipment object of this test report.

1.3.2 – Description of modifications

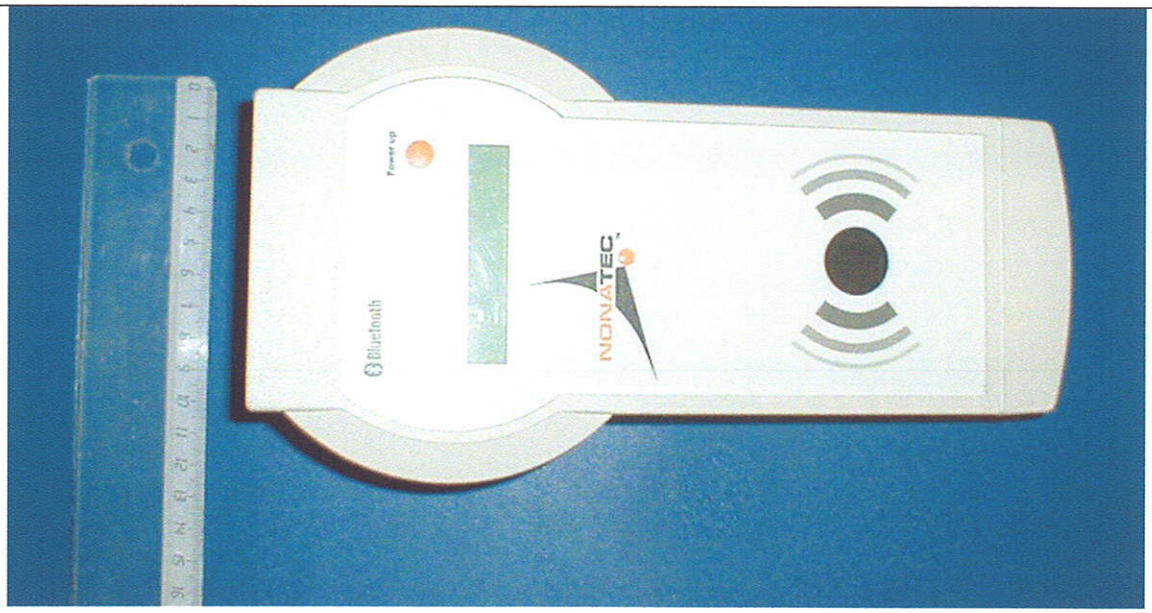
The equipment has not been modified during tests.

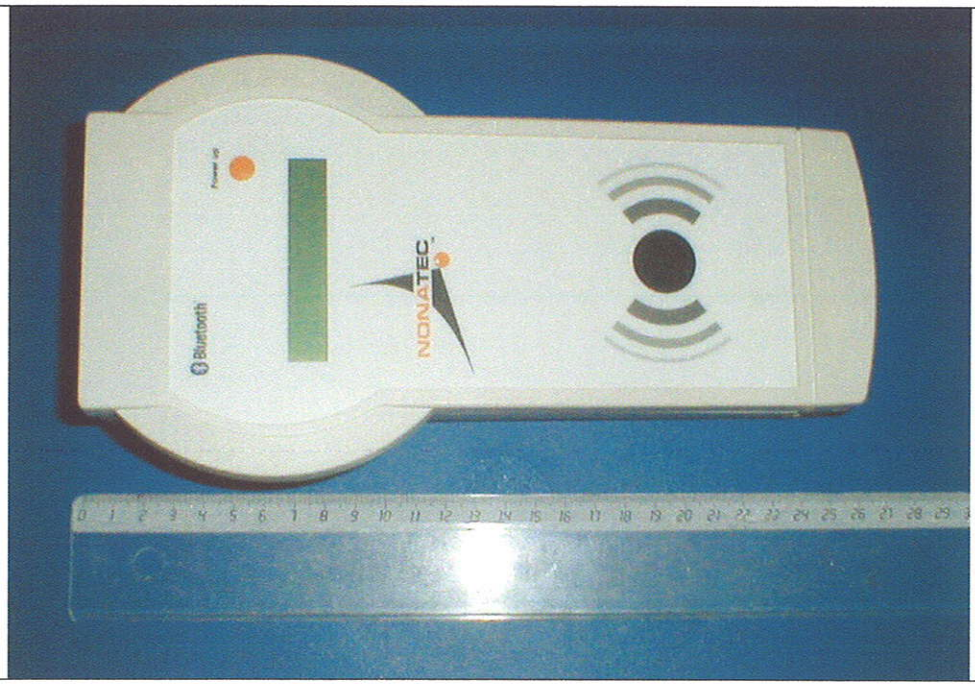
1.3.3 – Description of operation

The equipment was configured in the following operation mode:

- Maximum transmission power : Permanently emission (reading and writing a tag) for radiated emissions
- Loading mode without transmission for conducted emissions
- The operating mode is performed by using Nonatec PRO software, as described in the user's guide.

1.3.4 – Photographs of the sample





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Charger photos

2– TEST RESULTS

2.1 Power line conducted emission test

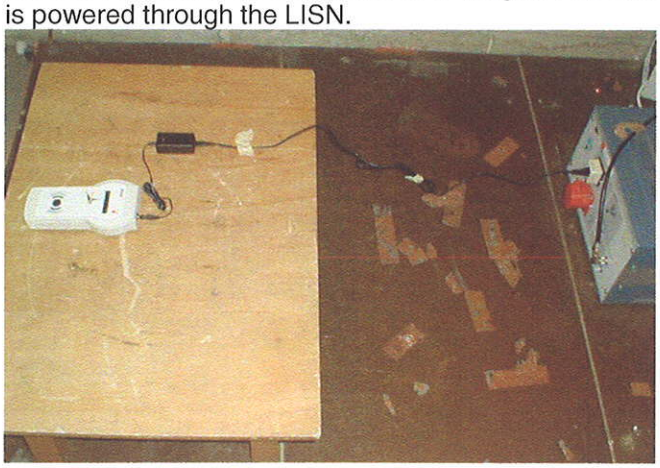
2.1.1 - General

The product has been tested with 110 V/60 Hz power line voltage and compared to the FCC part 15 subpart C § 15.207 limits.

The 6 dB resolution bandwidth was 9 kHz from 150 kHz to 30 MHz.

2.1.2 – Test setup

The EUT is placed on a table at 0.8 m height. The cable of the power port has been shorted to 1 meter length. The EUT is powered through the LISN.



2.1.3 – Equipment list

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyseur	HEWLETT PACKARD	8566B	A4060004	07/2007	07/2008
Preselector	HEWLETT PACKARD	85685A	A4069001	07/2007	07/2008
Quasi-Peak adaptator	HEWLETT PACKARD	85650A	A4069003	07/2007	07/2008
V ISLN	HEWLETT PACKARD	ESH2-Z5	A4069002	19/03/2007	03/2008

2.1.4 – Uncertainty

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR 16-4-2. The conformity of the sample is directly established by the applicable limits values.

Kind of measurement	**Wide uncertainty laboratory (k=2) ± x**	**CISPR uncertainty limit ± y**
Measurement of conducted disturbances in voltage on the power port	3.57 dB	3.6 dB

2.1.5 – Test results

Conducted measurement on conductor 1

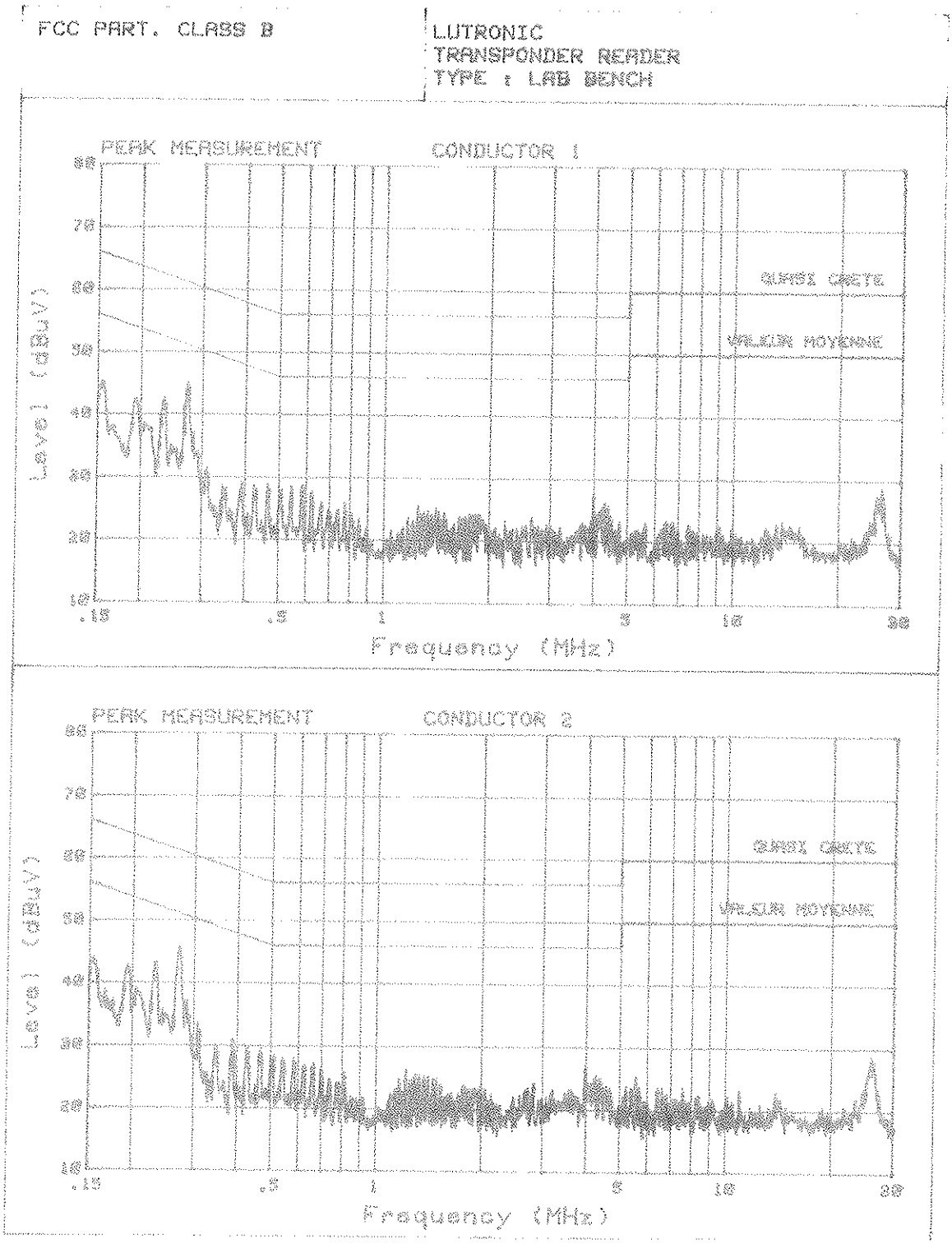
Frequency (MHz)	Peak measurements (dBµV)	Q-Peak measurements (dBµV)	Q-Peak limits (dBµV)	Average measurements (dBµV)	Average limits (dBµV)
0.15	45.1	-	66	44.5	56
0.19	42.3	-	64	41.6	54
0.24	42.1	-	65.1	41.5	52.1
0.27	45.7	45.4	61.1	44.8	51.1
4.02	27.1	-	56	26.0	46
26.38	28.8	-	60	-	50

Conducted measurement on conductor 2

Frequency (MHz)	Peak measurements (dBµV)	Q-Peak measurements (dBµV)	Q-Peak limits (dBµV)	Average measurements (dBµV)	Average limits (dBµV)
0.15	44.6	-	66	43.9	56
0.19	42.1	-	64	41.2	54
0.24	42.2	-	62.1	41.2	52.1
0.27	46.0	45.8	61.1	45.3	51.1
4.02	26.8	-	56	25.9	46
26.38	29.1	-	60	-	50

Q-peak and average measurements with more than 20 dB under their limits are not listed in the tables above.

Power line 1 and 2



2.2 – Field strength within the band 13.110-14.010MHz

2.2.1 – General

The product has been tested with internal battery and compared to the FCC part 15 subpart C §15.225 (a) (b) and (c) limits.

The 6dB resolution bandwidth was :

- 9 KHz from 150 kHz to 30 MHz

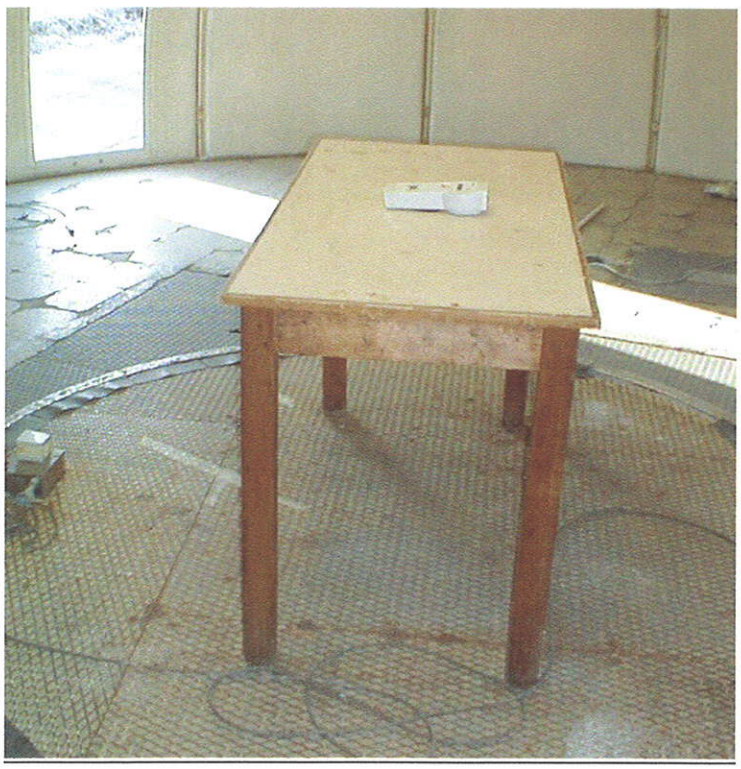
2.2.2 – Test setup

The EUT is placed at 3m distance of the loop antenna on a table 80cm height. The level has been maximised by turning the EUT with the rotating table and with the antenna at 0° and 90° around its vertical and horizontal axes. Antenna height was 1m.
As hand-held equipment the EUT was tested in 3 orthogonal planes.

The measuring value has been extrapolated to a 30m distance measured level according to § 15.31 (f) (2) by the following formula:

$$E_{30m} = E_d \times \left(\frac{d}{30}\right)^2$$

E_{30m} is the field strength at 30m in µV/m
E_d is the field strength at the measured distance in µV/m
D is the used distance between antenna and EUT in m



2.2.3 – Equipment list

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyseur	HEWLETT PACKARD	8566B	A4060004	07/2007	07/2008
Preselector	HEWLETT PACKARD	85685A	A4069001	07/2007	07/2008
Quasi-Peak adaptator	HEWLETT PACKARD	85650A	A4069003	07/2007	07/2008
V LISN	HEWLETT PACKARD	ESH2-Z5	A4069002	19/03/2007	03/2008
Loop antenna	ROHDE & SHWARZ	HFH H2 Z2	C2040007	14/09/07	09/2008

2.2.4 – Uncertainty

Kind of measurement	**Wide uncertainty laboratory (k=2) ± x**	**CISPR uncertainty limit ± y**
E field measurement	4.75 dB	Not defined

2.2.5 – Test results

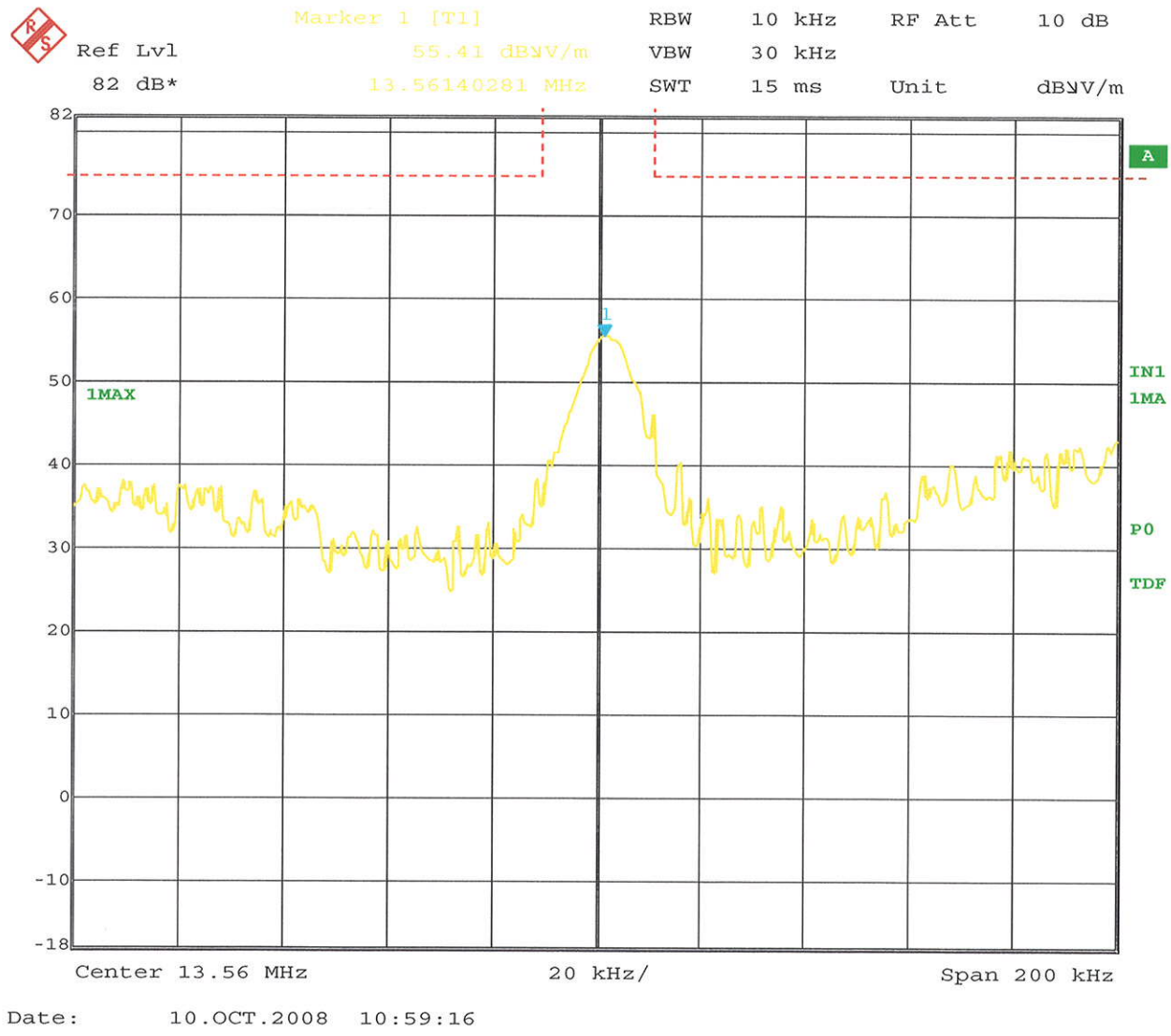
The measure result at 3 m is 54 dBµV/m for 13.56 MHz with the antenna orientation vertical at 0°
The 30 m measure corrected is M@3m – 40dB

Frequency MHz	**Maximum Quasi Peak (30m) dBµV/m**	**Quasi Peak Limit (30m) dBµV/m**
13.56	14	84

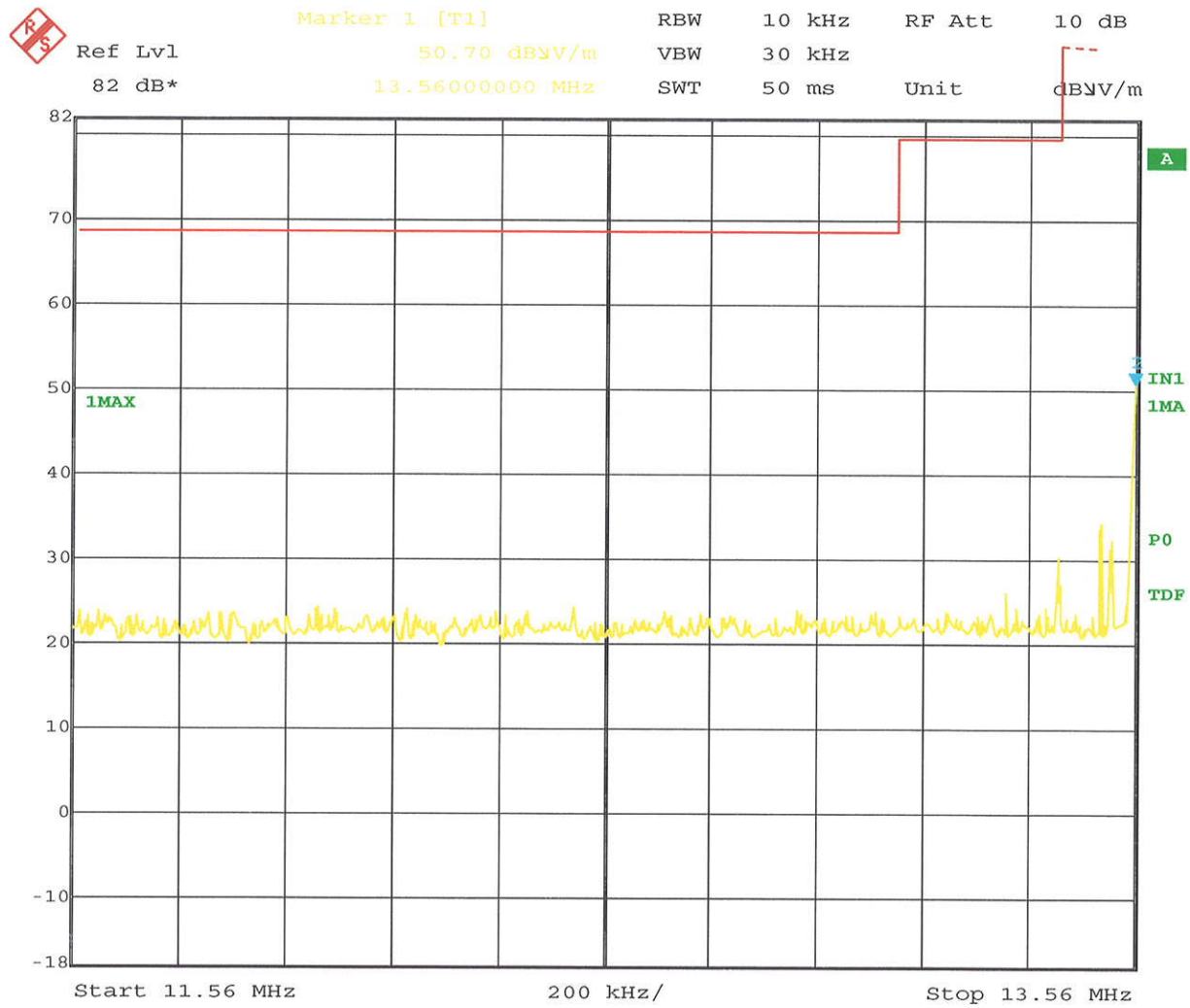
2.2.6 – Band-edge compliance

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
13.553-13.567	15848 84 dBµV/m	30
13.410-13.553 13.567-13.710	334 50.5 dBµV/m	30
13.110-13.410 13.710-14.010	106 40.5 dBµV/m	30
Outside 13.110-14.010	30 29.5 dBµV/m	30

Graphs from 11.5 to 15.5 MHz with RBW=10kHz and VBW=30kHz (measurement @ 3m)



The 99% occupied bandwidth is 22.5 kHz



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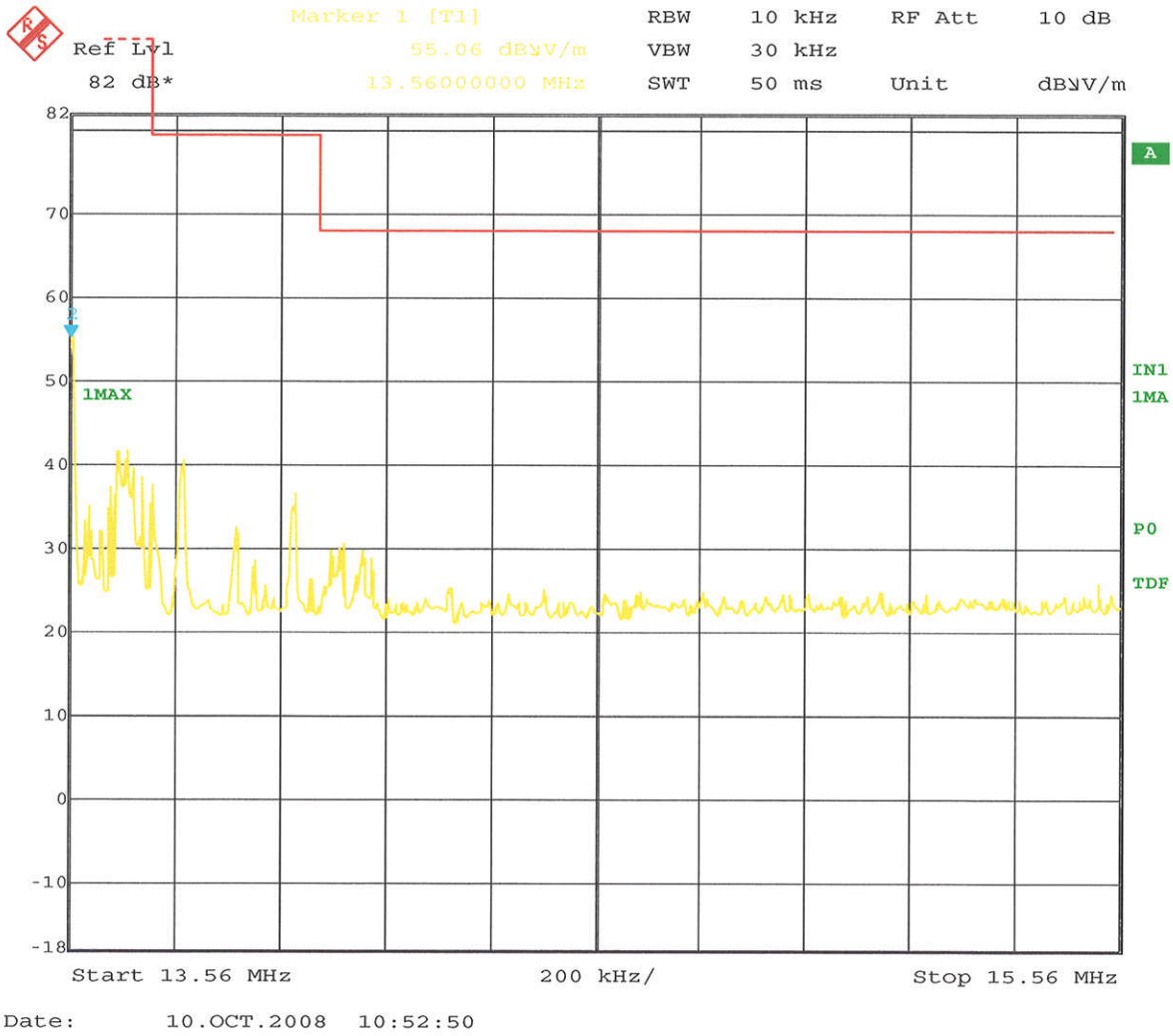


2.3 – Field strength outside the 13.110-14010MHz band

2.3.1 – General

The product has been tested with internal battery and compared to the FCC part 15 subpart C § 15.209 limits.

The 6dB resolution bandwidth was:

- 200 Hz from 9 kHz to 150 kHz.
- 9 kHz from 150 kHz to 30 MHz.
- 120 kHz from 30 MHz to 1000 MHz.
- 1 MHz from 1 GHz to 18 GHz.

-Frequency range: 9 kHz to 30 MHz
Measuring Distance: **3 m**
Antenna:

- Loop antenna (9 KHz to 30 MHz)

-Frequency range: 30 MHz to 18000 MHz
Measuring Distance: **10 m**
Antenna:

- bilog (30 MHz to 1000 MHz)
- horn (1000 MHz to 18000 MHz)

The EUT is placed at 3m distance of the loop antenna (0.009 to 30MHz) on a table 80cm height. The level has been maximised by turning the EUT with the rotating table and with the antenna at 0° and 90° around its vertical and horizontal axes. Antenna height was 1m.

The EUT is placed at 10m distance of the bilog (30 to 1000MHz) or horn (above 1GHz) antenna on a table 80cm height. The level has been maximised by turning the EUT with the rotating table and with the antenna in horizontal and vertical polarity. Antenna height search was performed from 1 to 4m.

As hand-held equipment the EUT was tested in 3 orthogonal planes.

2.3.2 – Equipment list

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyseur	HEWLETT PACKARD	8566B	A4060004	07/2007	07/2008
Preselector	HEWLETT PACKARD	85685A	A4069001	07/2007	07/2008
Quasi-Peak adaptator	HEWLETT PACKARD	85650A	A4069003	07/2007	07/2008
V ISLN	HEWLETT PACKARD	ESH2-Z5	A4069002	19/03/2007	03/2008
Bilog antenna	CHASE	CBL 6112A	C2040040	06/09/2007	09/2008
Horn antenna	EMCO	3115	C2042016	11/09/07	09/2008
Rod antenna	ROHDE & SHWARZ	HFH H2 Z6	C2040005	19/06/07	06/2009
Loop antenna	ROHDE & SHWARZ	HFH H2 Z2	C2040007	13/09/07	09/2008

2.3.3 – Uncertainty

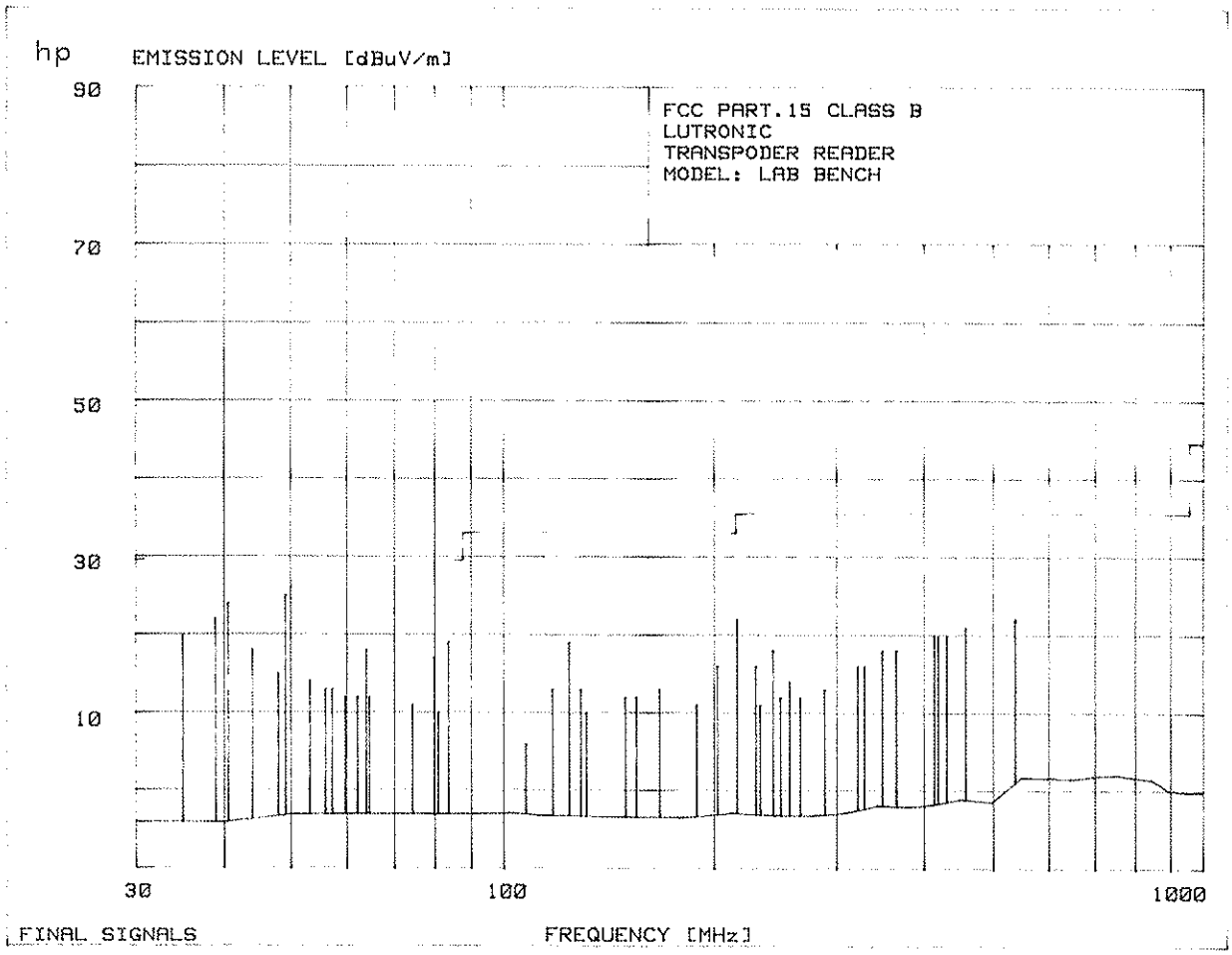
The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR 16-4-2. The conformity of the sample is directly established by the applicable limits values.

Kind of measurement	Wide uncertainty laboratory (k=2) ± x	CISPR uncertainty limit ± y
E field measurement within the band 150kHz-30MHz	4.75 dB	Not defined
Measurement of radiated electric field on the open area test site	5.07 dB	5.2 dB

2.3.4 – Test results

Frequency (MHz)	Level @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
0.019	53	120.0
0.025	50	119.6
0.450	36	94.5
0.604	50	72.0
0.873	55	68.8
0.973	53	67.8
0.863	60	68.9
1.008	44	67.5
1.790	39	69.5
2.260	46	69.5
2.330	41	69.5
2.75	56	69.5
3.140	30	69.5
4.022	30	69.5
4.300	36	69.5
8.702	40	69.5
6.78	41	69.5
11.619	38	69.5
16.63	38	69.5
17.85	45	69.5
20.21	46	69.5
27.149	58	69.5

The highest levels at 0.87, 2.75 and 27.14MHz are found with the antenna orientation vertical at 0°



10 m radiated measurement graph from 30 to 1000 MHz

Frequency (MHz)	Quasi-peak measurements @ 10m (dBµV/m)	Limits @ 10m (dBµV/m)
39.7	22.4	29.5
40.1	23.8	29.5
40.9	25.2	29.5
212.4	22.9	33.0
458.3	21.5	35.5
530.7	22.6	35.5

No frequency from the equipment higher than 1GHz.

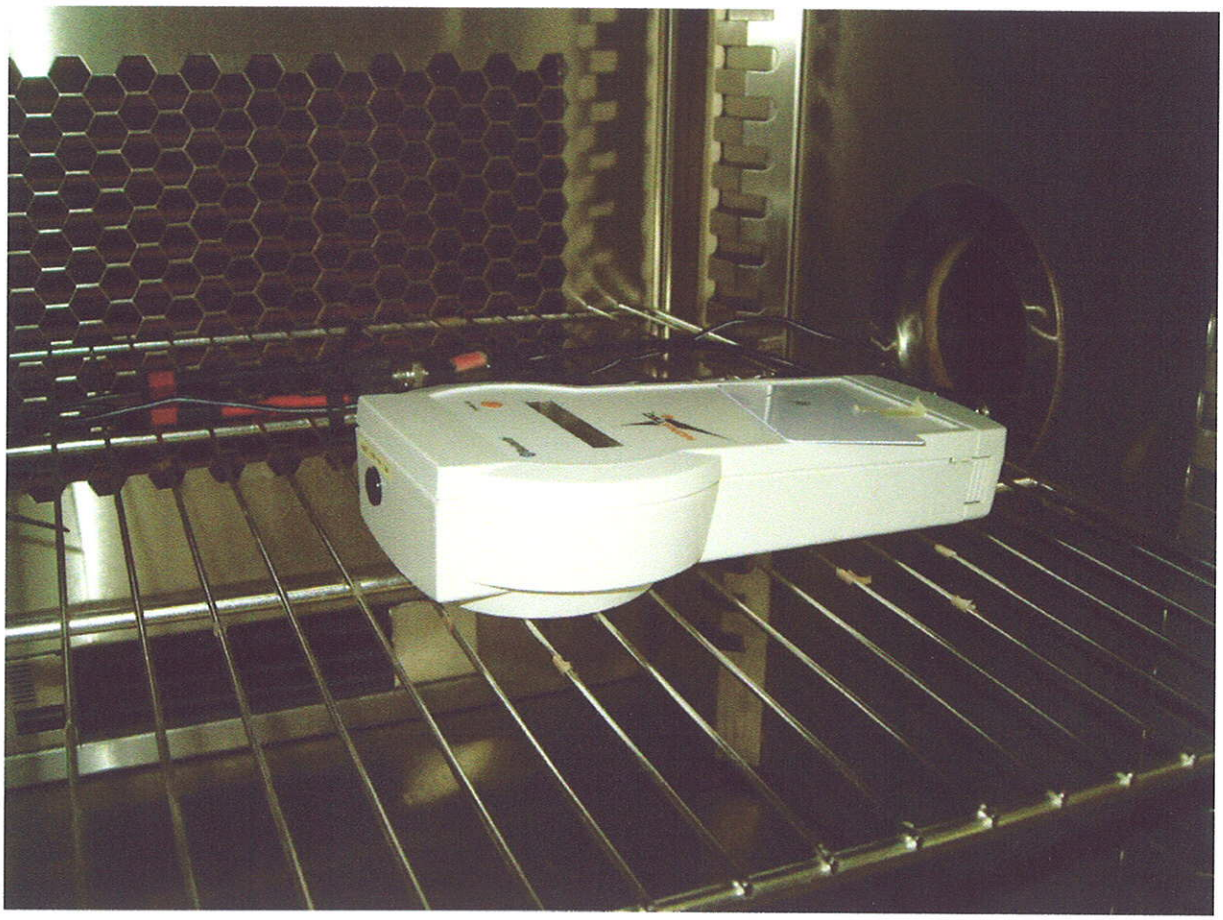
The spurious emissions of the receiver are the same as the transmitter spurious.

2.4 – Frequency stability over extreme voltage and temperature condition

2.4.1 – General

The product has been tested with DC power supply replacing internal battery inside a climatic chamber and compared to the FCC part 15 subpart C § 15.225 (e) limits.

2.4.2 – Test setup



The DC power cables are connected specifically on the equipment to allow the emission at 13.56MHz.

2.4.3 – Equipment list

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyseur	ROHDE & SCHWARZ	ESCI	A2642016	12/2006	12/2007
Voltmeter	KEITHLEY	2000	A1241084	10/2007	10/2008
Climatic chamber	CLIMATS	343H65	D1024024	07/2006	07/2008
DC power supply	Tektronic	PS280	A7042052	Inspected before test	/

2.4.4 – Uncertainty

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR 16-4-2. The conformity of the sample is directly established by the applicable limits values.

Kind of measurement	Wide uncertainty laboratory (k=2) ± x
Frequency stability	$\pm 10^{-7}$ of frequency

2.4.5 – Test results

Temperature	Voltage	Frequency	Limits
22 °C	8.4 V	13.56079 MHz	Reference
22 °C	7.1 V	13.56079 MHz	13.55943 MHz – 13.56215 MHz
22 °C	9.7 V	13.56079 MHz	
- 20 °C	8.4 V	13.56074 MHz	
+ 50 °C	8.4 V	13.56074 MHz	
- 20 °C	7.1 V	13.56074 MHz	
+ 50 °C	7.1 V	13.56074 MHz	
- 20 °C	9.7 V	13.56074 MHz	
+ 50 °C	9.7 V	13.56074 MHz	

End of test report