TEST REPORT

According to FCC, CFR 47 Part 15

IER 602 Reader

N°060151-CC-1-b

GYL technologies
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Summary

OTHER ASSOCIATED FILES:

060151 Exhibit 1 ID label FCC ID WGO602-1356-06
060151 Exhibit 3 External Photographs FCC ID WGO602-1356-06
060151 Exhibit 4 RFID Bloc diagram FCC ID WGO602-1356-06
060151 Exhibit 5a RFID Schematics FCC ID WGO602-1356-06
060151 Exhibit 5b RFID Schematics FCC ID WGO602-1356-06
060151 Exhibit 5c d33317a_graphical display card FCC ID WGO602-1356-06
060151 Exhibit 5d d33321a_Bar code managing card FCC ID WGO602-1356-06
060151 Exhibit 5e d93030b_application_board FCC ID WGO602-1356-06
060151 Exhibit 7 Test set up photos FCC ID WGO602-1356-06
060151 Exhibit 8 User's Manual N0F8SEA1_RF FCC ID WGO602-1356-06
060151 Exhibit 8a User's Guide IER602 FCC ID WGO602-1356-06
060151 Exhibit 9 Internal Photographs FCC ID WGO602-1356-06
060151 Exhibit 12 Operational description FCC ID WGO602-1356-06
060151 Exhibit 13 cover letter FCC ID WGO602-1356-06

1 Reference and record of revisions of the test report:

Test report number :	**Revision :**	**Number of pages**	**Modification reasons :**
060151-CC-1-a	a	17	Creation, February 1, 2011
060151-CC-1-b	b	18	Addition of 20 dB BW data, March 16, 2011
060151-CC-1-c	c	18	Correction of frequency tol p18
Redactor : Jean-Luc JAMET			**Date of writing** : March 18,2011
Technical control: O. ROY 			**Quality Control: D. Dauzon** 

2 Interpretation and remarks:

2.1 RESULTS:

This equipment complies with the rules of the FCC part 15.225 and related sections for RFID function.
This equipment complies with the rules of the FCC section 15.107, 15.109 class B and related sections concerning its non intentional radiator functions (ITE).
This equipment complies with the rules of the FCC part 18 concerning the metal detection function.

3 GENERAL INFORMATION:

3.1 APPLICANT:

IER
3 rue Salomon de Rothschild
BP 320
92156 SURESNES
France

3.2 TEST DATE:

November 5, 2010 to February 1, 2011

3.3 TEST SITE:

GYL Technologies
Parc d'activités de Lanserre
49610 Juigné sur Loire – France
FCC registration Number: 90469
IC registration IC 4452

4 INTRODUCTION:

The following test report for bar code and contact less card reader is written in accordance with Part 15 of the Federal Communications Commissions. The Equipment under Test (EUT) was a bar code and contact less card reader. To adjust luminosity for bar code reading on LCD screen, the equipment uses a metal detection function at a frequency around 600kHz. The test results reported in this document relate only to the item that was tested IER 602 A.

All measurements contained in this Application were conducted in accordance with ANSI C63.4 Methods of Measurement of Radio Noise Emissions of 2009. The instrumentation utilized for the measurements conforms to the ANSI C63.4 standard for EMI and Field Strength Instrumentation. Some accessories are used to increase sensitivity and prevent overloading of the measuring instrument. These are explained in this report. Calibration checks are performed regularly on the instruments, and all accessories including the high pass filter, preamplifier and cables.

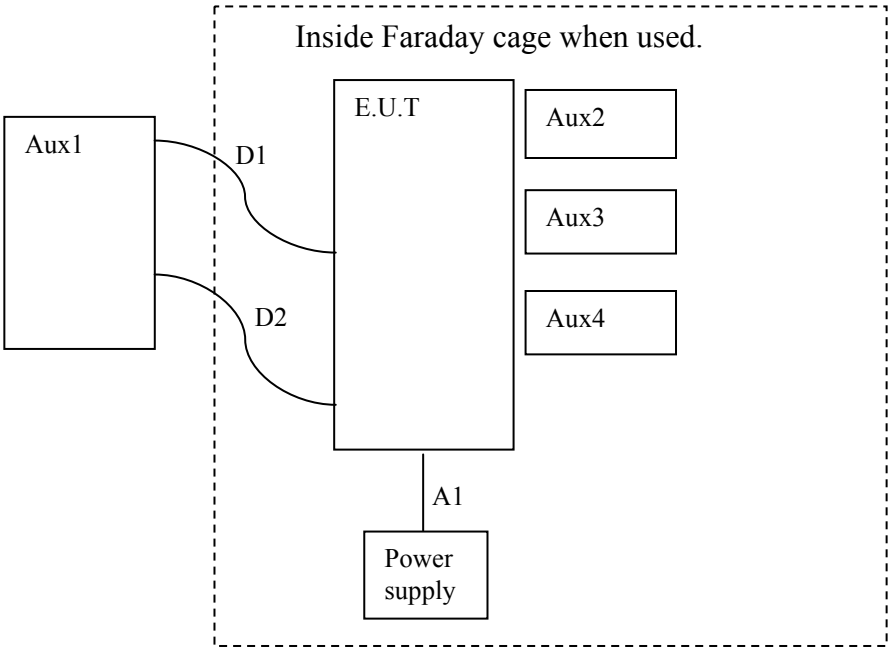
All conducted and radiated emissions measurements were performed manually at GYL TECHNOLOGIES. The radiated emissions measurements required by the rules were performed on the three to ten meters, open field, test site maintained by GYL Technologies Parc d'activités de Lanserre, 49610 Juigné sur Loire , France. Complete description and site attenuation measurement data have been placed on file with the Federal Communications Commission.

5 MEASUREMENT EQUIPMENT LIST:

PART TYPE	MANUFACTURER	MODEL	GYL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
RECEIVERS					
Receiver	Rohde & Schwarz	ESI 7	M02020	June-10	June-11
Receiver	HP	HP8591EM	M96005	June-10	June-11
Spectrum analyzer	Rohde & Schwarz	FSEM 30	M02021	June-10	June-11
Filter 150 KHz	SECRE	ETP232	M02061	March-10	March-11
Satellite synchronized frequency standard	Acquisis	GPS8	M06013	without	without
ARTIFICIAL MAINS NETWORKS					
LISN (50µH / 5/50Ω)	Rohde & Schwarz	ESH3-Z5	M02027	July-10	July-11
LISN (50µH / 5/50Ω)	THURLBY THANDAR	LISN 1600	M95010	July-10	July-11
ANTENNAS					
Bilog (30-2000MHz)	CHASE	CBL-6112	M02031	Aug.-10	Aug.-11
Bilog (30-2000MHz)	CHASE	CBL-6112	M02032	Aug.-10	Aug.-11
Active loop antenna	Rohde & Schwarz	HFH2-Z2	M01128	April-10	April-11
Horn antenna	EMCO	3115	M02045	March-10	March-11

All equipments where within their calibration period when used

CONFIGURATION OF TESTED SYSTEM:

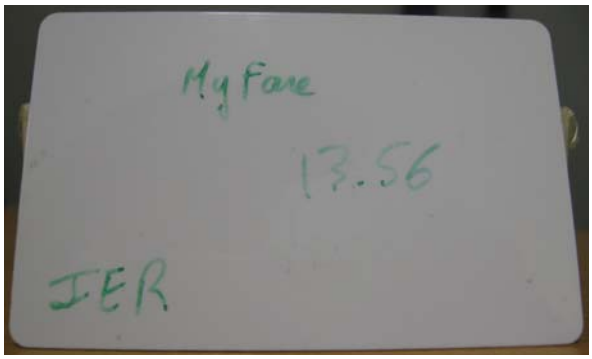


E.U.T.: Equipment under Test

5.1 Auxiliary equipment:

Aux1: Laptop
Model: NEC Ref: Versa S940 Serial number: 104337220138

Aux2: 13.56 MHz RFID card



Aux3: Bar code

Aux4: Metal detection: A metal piece has been used.

5.2 List of cables:

	AC power input Name	Nb phase	N Y/N	PE Y/N	test voltage1			
A1	Power cord	1	Y	Y	120			
	Data I/O Name	Shielded Y/N	Max length (m)	surge Y/N	local network Y/N	connected to AC power Y/N	telecom with on/off hook Y/N	Length for test
D1	Ethernet	Y	100	N	Y	N	N	20m
D2	USB	Y	3	N	N	N	N	3m

6 EXERCISING TEST CONDITIONS:

RFID mode:
The product is connected to the laptop (aux1) via the USB link. On the laptop we launch the "simu" software. The EUT reads continuously the 13.56 MHz RFID card. The reading is displayed on the screen of the laptop.

Bar code mode:
The product is connected to the laptop (aux1) via the USB link. On the laptop we launch the "simu" software. The EUT reads continuously the barcode all four seconds. The reading is displayed on the screen of the laptop.

Metal detection mode:
Always active, use a frequency around 600 kHz

7 CONFORMANCE STATEMENT:

7.1 STANDARDS REFERENCED FOR THIS REPORT:

PART 2: 2004	Frequency allocations and Radio Treaty Matters General Rules and Regulations
PART 15: 2008	Radio frequency devices
ANSI C63.4-2009	Standard format measurements/technical report personal computer and peripherals
PART 18: 2007	ISM Devices

7.2 JUSTIFICATION:

As mentioned in paragraph 4 of this report, the equipment is a bar code and contact less card reader. It can be installed in residential commercial or light industry areas the following sub clause of the standard mentioned above are:

- Part 15.225 for Operation within the band 13.110 – 14.010 MHz.
- Part 15.107 and 15.109 (subpart C) for respectively conducted and radiated emission for none intentional radiator.
- Part 18 for metal detection function around 600kHz

8 TEST ACCORDING TO CFR 47 Part 15 and part 18

Tests performed by Aziz ABBASSI and Jean-Luc JAMET at GYL Technologies laboratories on November 05, 2010 January 28, 2011 and February 01, 2011.

8.1 CONDUCTED EMISSIONS MEASUREMENTS:

The power line conducted emission measurements were performed in a semi anechoic chamber manufactured by SIDT. The EUT was assembled on a non conductive 80 centimeters high wooden table. Power was fed to the EUT through a 50 ohm / 50 micro-Henry Line Impedance Stabilization Network (EUT LISN). The EUT LISN was fed power through an A.C. filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. The spectrum analyzer was connected to the A.C. line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input through a Rohde and Schwartz 150 kHz high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 150 kHz. Conducted emission levels were measured on each current-carrying line with the receiver operating in the CISPR quasi-peak mode (or average mode if applicable).

8.1.1 RESULTS:

The conducted emissions initial measurement consists of a pre-scan, in order to determine the maximum quasi peak and average values.

- If the conducted emissions have limits showing a margin lower than 20dB, data collection measurement is performed on the six (6) highest frequencies to determine the compliance of the EUT.
- If the conducted emissions have limits showing a margin greater than 20dB, data collection measurement is not performed and the curves are given as evidence of compliance.

The following table lists worst-case conducted emission data. Specifically: emission frequency, measurement level (including cable loss and transducer factors) in quasi-peak and average mode and margin.

The conducted test was performed with the EUT exercise program loaded, and the emissions were scanned between 150 kHz to 30 MHz on the NEUTRAL SIDE and LIVE SIDE, herein referred to as Neutral, and Live respectively.

Receiver Configuration	
Resolution, Band With	9 kHz
Final Quasi Peak measurement time	1 s minimum
Final average measurement time	1 sec minimum

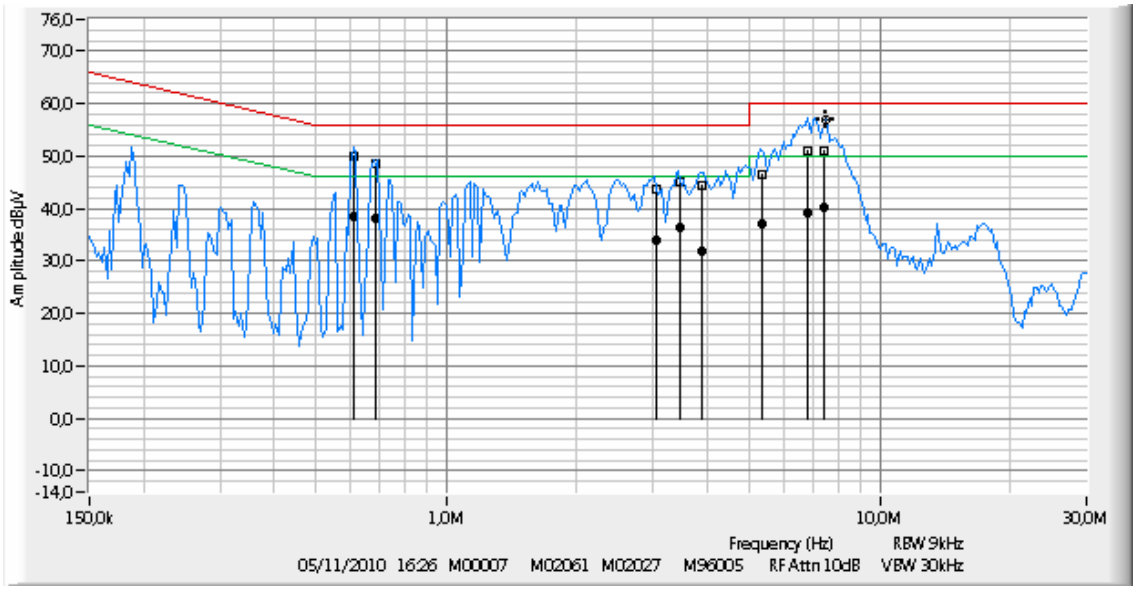
Measurement with Class B limits.

Neutral:

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0,61	49,9	56,0	6,1
0,684	48,5	56,0	7,6
3,049	43,6	56,0	12,4
3,446	45,2	56,0	10,8
3,899	44,4	56,0	11,6
5,355	46,3	60,0	13,7
6,794	51,0	60,0	9,0
7,454	51,1	60,0	8,9

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average margin (dB)
0,61	38,4	46,0	7,6
0,684	38,0	46,0	8,0
3,049	34,0	46,0	12,0
3,446	36,5	46,0	9,5
3,899	31,9	46,0	14,1
5,355	37,2	50,0	12,8
6,794	39,2	50,0	10,9
7,454	40,2	50,0	9,8

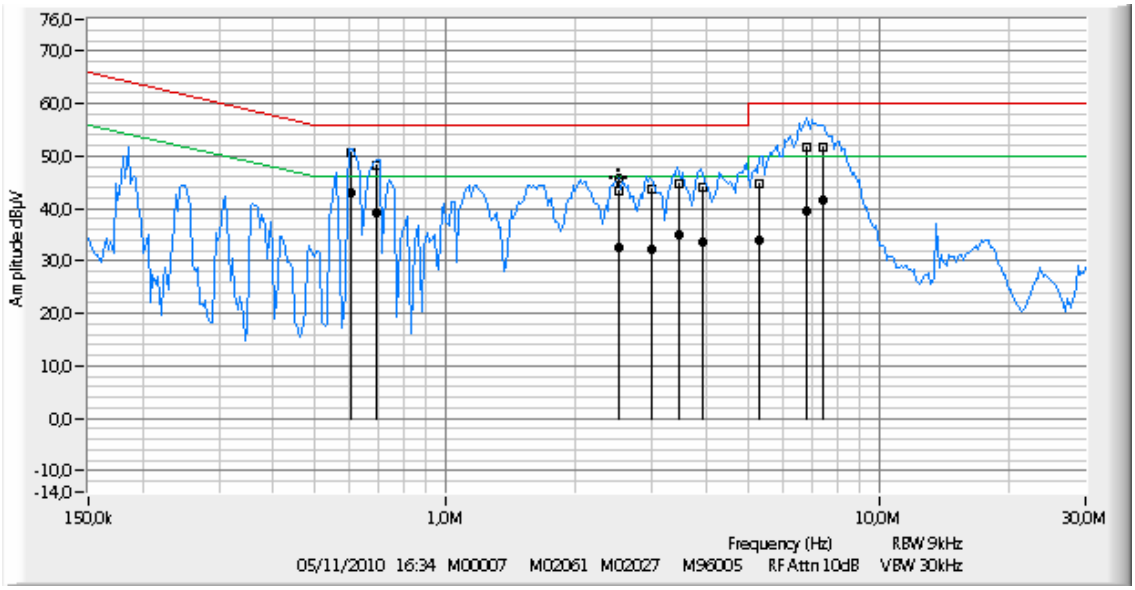
Legend: Curve represents the peak values



Live:

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0,605	50,5	56,0	5,5
0,692	48,3	56,0	7,7
2,503	43,5	56,0	12,5
3,005	43,8	56,0	12,2
3,453	44,7	56,0	11,3
3,924	44,0	56,0	12,1
5,317	44,9	60,0	15,1
6,799	51,7	60,0	8,3
7,445	51,5	60,0	8,5

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average margin (dB)
0,605	43,0	46,0	3,0
0,692	39,2	46,0	6,8
2,503	32,4	46,0	13,6
3,005	32,1	46,0	13,9
3,453	35,0	46,0	11,0
3,924	33,5	46,0	12,5
5,317	33,8	50,0	16,2
6,799	39,5	50,0	10,5
7,445	41,7	50,0	8,3



8.1.2 INTERPRETATION AND REMARKS:

The equipment complies with the §15.107 Class B and §15.207 requirements.

8.2 INTENTIONAL RADIATOR OPERATION FCC PART 15.225:

Maximization is performed in three orthogonal axes of the E.U.T.

8.2.1 Field strength for the emitter

According to the §15.31 f (2) the distance extrapolation factor (40dB/decade) is used.
Measurement performed in open area.

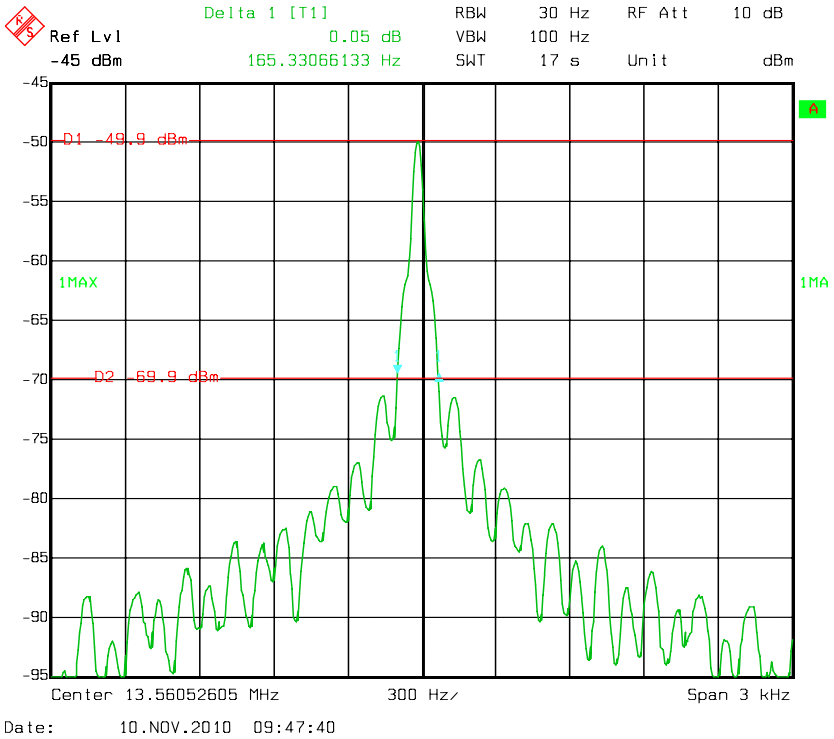
Measured with RBW = 9kHz (larger than 20dB BW) and VBW = 30kHz.

Frequency MHz	3m measurement dB(µV/m)	30 m (computed) dB(µV/m)	30 m limit dB(µV/m)	Margin dB
13.56	48.2	8.2	84	75.8

With G = 1 (worst case) that gives a radiated power of 20nW.

Computed from 3 m measurement: 48.2 dBµV/m – 95.2 gives -47.0 dBm (equ 20nW).

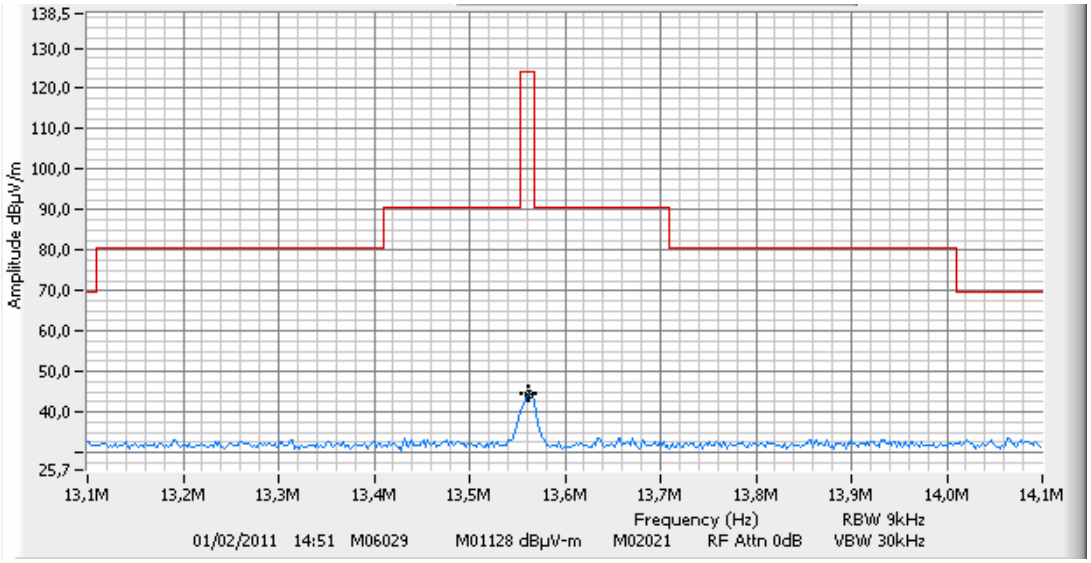
8.2.2 20 dB BW



The 20dB BW is 165 Hz

8.2.3 Field strength around the emitter (15.225)

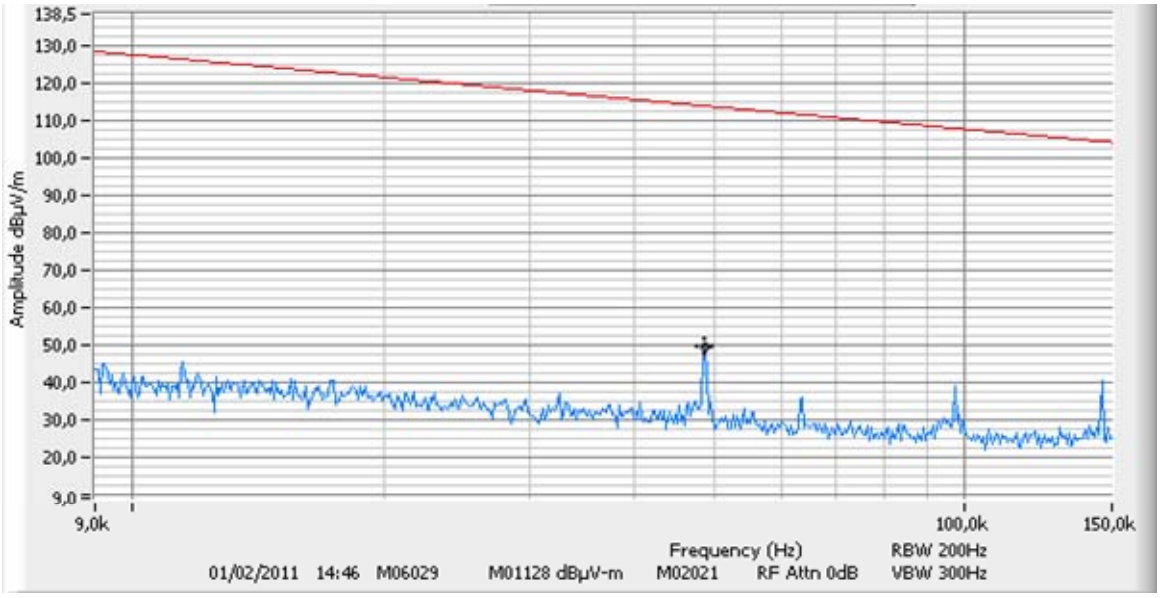
The maximization has been done in shielded enclosure at 3m. No emission needs to be maximized in open area test site excepted for the 13.56MHz voluntary emission.



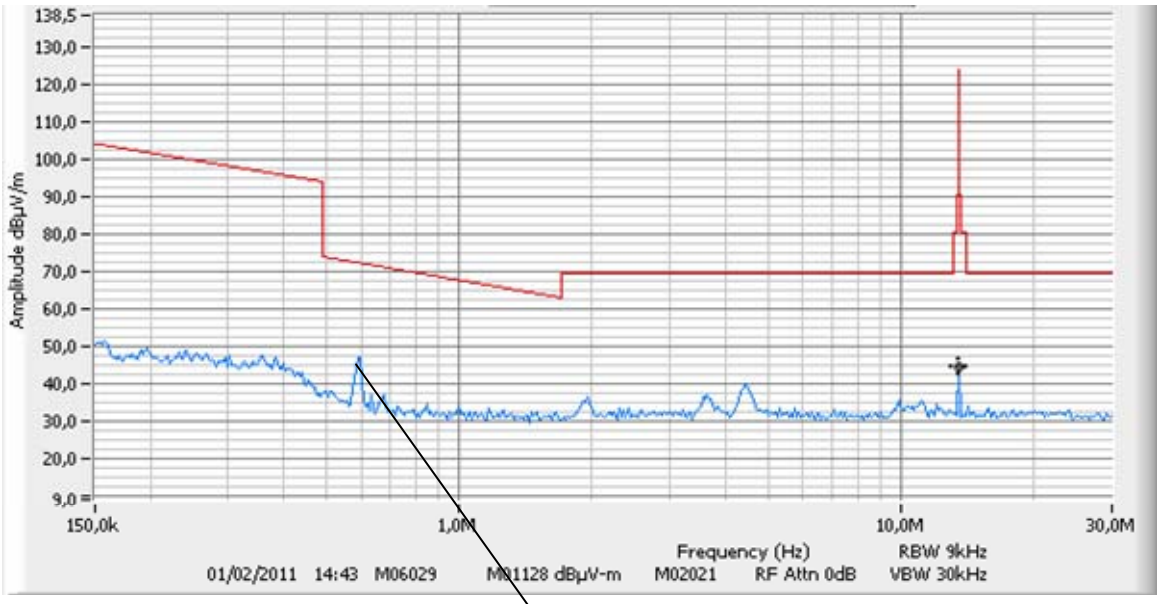
8.3 SPURIOUS EMISSIONS (15.225 and 15.209)

The maximization for the frequency from 9 kHz to 30 MHz has been done in shielded enclosure at 3 m. No emission needs to be maximized in open area test site excepted for the 13.56MHz voluntary emission.

8.3.1 Measurement from 9 kHz to 150 kHz



8.3.2 Measurement from 150 kHz to 30 MHz



Spurious emissions measurement results from 30MHz to 1GHz:

Before final measurements of radiated emissions were made on the open-field three/ten meter range; the EUT was pre-scanned in the semi anechoic at one meter distance. This was done in order to determine its emissions spectrum signature. The physical arrangement of the test system was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to insure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made on the three/ten-meter, open-field test site. The EUT was placed on a conductive turntable on isolated support, table, 0.8 meter above the ground plane. At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters in order to determine the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarizations. The spectrum analyzer's 6 dB bandwidth was set to 100 kHz for peak measurement and 120 kHz for quasi-peak, and the analyzer was operated in the CISPR quasi-peak detection mode when needed. No video filter less than 10 times the resolution bandwidth was used. The range of the frequency spectrum to be investigated is specified in FCC Part 15. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

Summary of settings for measurements in restricted bands below 1GHz

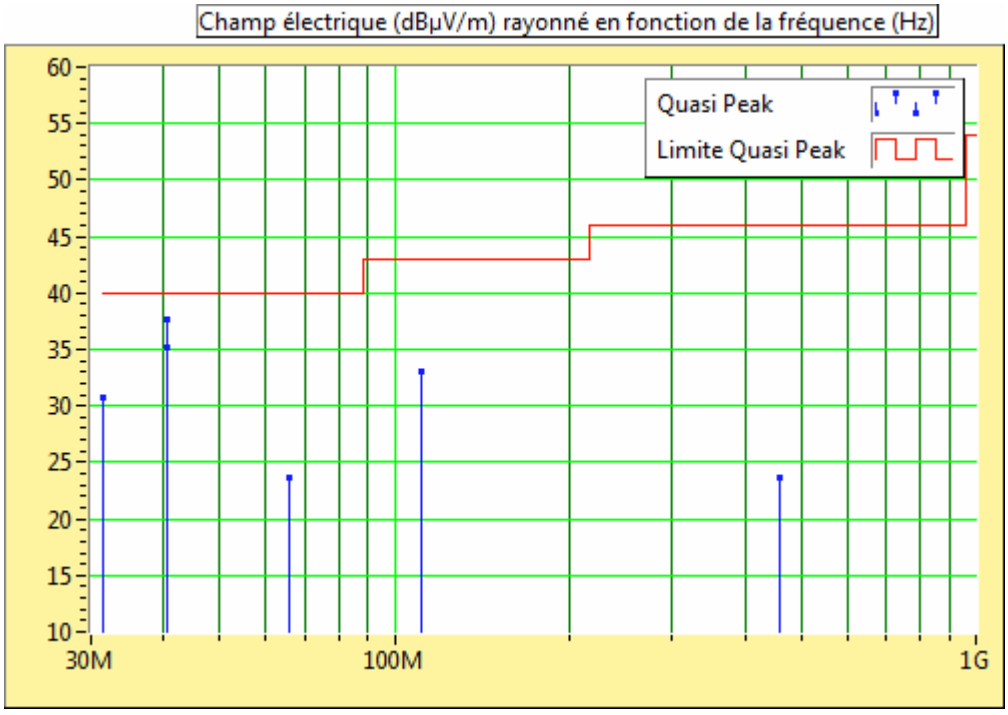
ESI 7 EMI TEST RECEIVER IN RECEIVER MODE	
Peak measurement time	5 ms
step size	40 kHz
Preamplifier	ON
Pre-selector	ON
Resolution, Band Width	120 kHz
Final Quasi Peak measurement time	1 s minimum
Final average measurement time	1 s minimum

8.3.2.1 Spurious RESULTS:

The following data table lists the most significant emission frequencies, measured level, correction factor (includes cable and antenna corrections), corrected reading and the limit.

3 m open area test site final measurements results

Frequency in MHz	Peak Value in dBµV/m	Quasi-Peak Value in dBµV/m	Quasi-Peak Limit in dBµV/m	Margin in dB	Pol	Height in cm	Angles in °	Correction Factors in dB
31,560	31,8	30,7	40,0	9,3	V	107	4	18,9
40,646	36,4	35,2	40,0	4,8	V	116	360	14,1
40,676	38,7	37,6	40,0	2,4	V	108	360	14,1
65,712	26,0	23,7	40,0	16,3	V	119	277	7,6
111,295	33,5	33,1	43,0	9,9	V	111	201	14,6
461,021	28,0	23,6	46,0	22,4	V	133	138	21,7



8.4 Exposition of public to radio frequency energy

This kind of mobile device is not subject to routine evaluation according to bulletin 65 and FCC part 2.1091 and 2.1093

8.5 Antenna requirements

Not applicable because the antenna is located inside the equipment and is not replaceable without modifying the product.

8.6 Measurement of frequency stability

The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Measurements were performed according to the operating temperature range given in the § 15.225.

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency (13.563312 MHz)
The frequency limits are 13.561956 MHz and 13.564668 MHz.

Frequencies measurement (MHz)

Temperature	20°C		-20°C		50°C	
Power Supply (V)	102	138	102	138	102	138
Measured frequency : 13.56 MHz	13,563312	13,563312	13,564509	13,564509	13,563703	13,563703

Neither voltage nor temperature variations affect the frequency stability that is better than ±100ppm.