



TEST REPORT

According to FCC, CFR 47 Part 15

IER 602 Reader

FCC ID : WGO602-1356-07

N°060151-CC-2-a

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OTHER ASSOCIATED FILES:

060151b Exhibit 1 ID label FCC ID WGO602-1356-07
060151b Exhibit 3 External Photographs FCC ID WGO602-1356-07
060151b Exhibit 4 RFID Bloc diagram FCC ID WGO602-1356-07
060151b Exhibit 5a schematics d33317b_1_graphical display card
060151b Exhibit 5b schematics d33342a_2_memory_extend
060151b Exhibit 5c schematics d93030b_application_board
060151b Exhibit 5d schematics D33355A1_Bar code managing card
060151b Exhibit 7 Test set up photos FCC ID WGO602-1356-07
060151b Exhibit 8 User's Manual N0F8SEA1_RF FCC ID WGO602-1356-07
060151b Exhibit 8a User's Guide IER602 FCC ID WGO602-1356-07
060151b Exhibit 9 Internal Photographs FCC ID WGO602-1356-07
060151b Exhibit 12 Operational description FCC ID WGO602-1356-07
060151b Exhibit 13 cover letter FCC ID WGO602-1356-07

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1 Reference and record of revisions of the test report:

Test report number :	Revision :	Number of pages	Modification reasons :
060151-CC-2-a	a	18	Creation, June 30, 2011
Redactor : O. ROY			Date of writing : August 26,2011
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.

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3 GENERAL INFORMATION:

3.1 APPLICANT:

IER SAS
3 Rue Salomon de Rothschild
92150 SURESNES
France

3.2 TEST DATE:

June 6, 2011 to June30, 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

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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.

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.

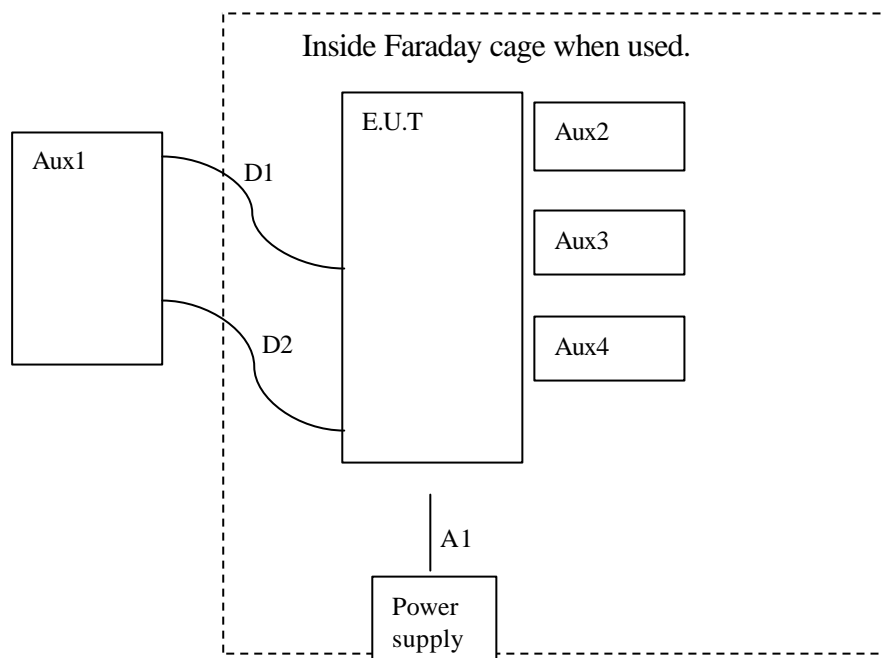
All conducted and radiated emissions measurements were performed manually at GYL TECHNOLOGIES. The radiated emissions measurements required by the rules were performed on the three to ten meters, open field, test site maintained by GYL Technologies Parc d'activités de Lanserre, 49610 Juigné sur Loire , 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	June-11/June-12
Receiver	HP	HP8591EM	M96005	June-10/May-11	June-11/May-12
Spectrum analyzer	Rohde & Schwarz	FSEM 30	M02021	June-10/ June-11	June-11/June-12
Filter 150 KHz	SECRE	ETP232	M02061	Feb-11	Feb-12
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
ANTENNAS					
Bilog (30-2000MHz)	CHASE	CBL-6112	M02031	Aug.-10/June-11	Aug.-11/June-12
Bilog (30-2000MHz)	CHASE	CBL-6112	M02032	Aug.-10/June-11	Aug.-11/June-12
Active loop antenna	Rohde & Schwarz	HFH2-Z2	M01128	April-10	April-12
Horn antenna	EMCO	3115	M02045	March-11	March-12

All equipments where within their calibration period when used

CONFIGURATION OF TESTED SYSTEM:



E.U.T.: Equipment under Test

5.1 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	connecte d 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

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5.2 Auxiliary equipment:

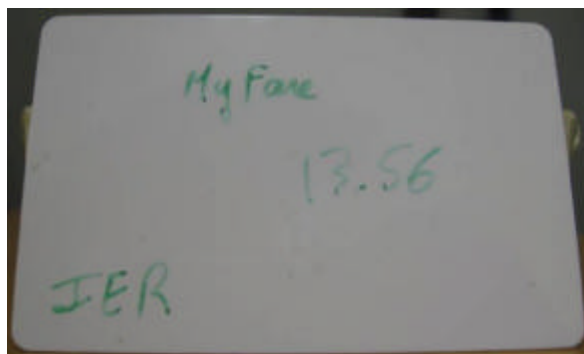
Aux1: Laptop

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.

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 Olivier ROY at GYL Technologies laboratories on June 2011.

8.1 CONDUCTED EMISSIONS MEASUREMENTS:

The power line conducted emission measurements were performed in a semi anechoic chamber. 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



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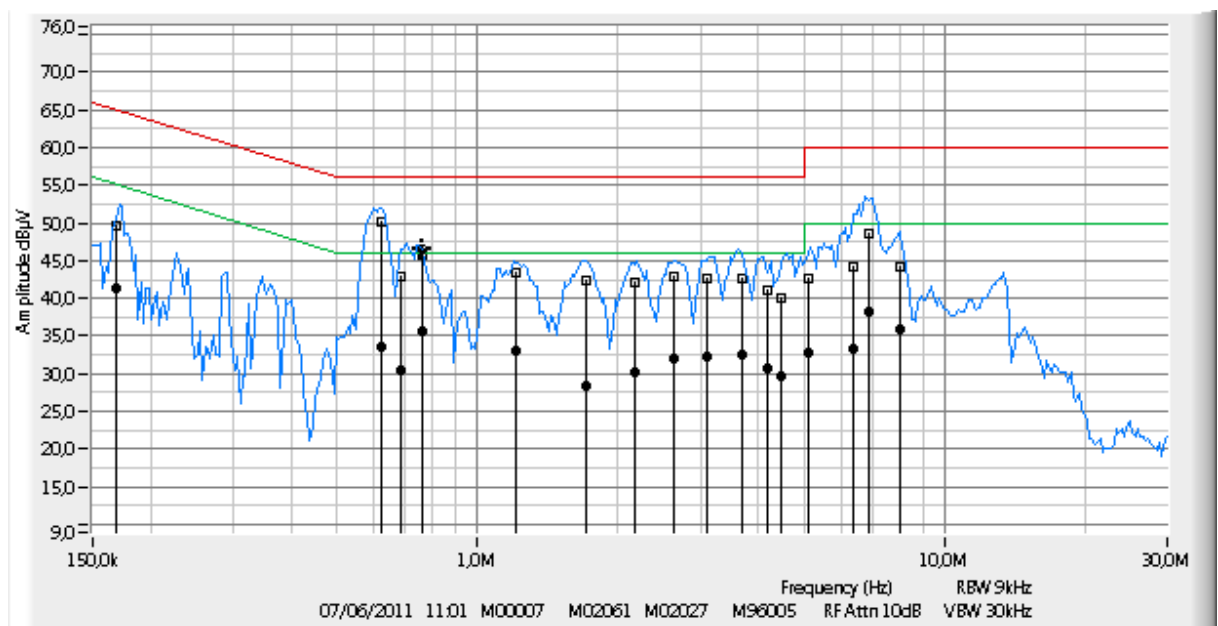
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Measurement with Class B limits.

Neutral:

Frequency (MHz)	Quasi-peak (dBμV)	QP Limit (dBμV)	QP margin (dB)	Frequency (MHz)	Average (dBμV)	Average Limit (dBμV)	Average margin (dB)
0.169	49.7	65.0	15.3	0.169	41.2	55.0	13.8
0.625	50.2	56.0	5.8	0.625	33.6	46.0	12.4
0.685	42.9	56.0	13.1	0.685	30.4	46.0	15.6
0.762	45.8	56.0	10.2	0.762	35.7	46.0	10.3
1.210	43.4	56.0	12.7	1.210	33.1	46.0	12.9
1.706	42.5	56.0	13.5	1.706	28.5	46.0	17.5
2.164	42.2	56.0	13.8	2.164	30.3	46.0	15.7
2.638	43.0	56.0	13.1	2.638	31.9	46.0	14.1
3.091	42.7	56.0	13.3	3.091	32.2	46.0	13.8
3.671	42.7	56.0	13.3	3.671	32.4	46.0	13.6
4.189	41.1	56.0	14.9	4.189	30.8	46.0	15.2
4.475	40.2	56.0	15.9	4.475	29.7	46.0	16.3
5.107	42.5	60.0	17.5	5.107	32.9	50.0	17.1
6.394	44.1	60.0	15.9	6.394	33.4	50.0	16.6
6.921	48.5	60.0	11.5	6.921	38.1	50.0	11.9
8.004	44.2	60.0	15.8	8.004	36.0	50.0	14.0

Legend: Curve represents the peak values





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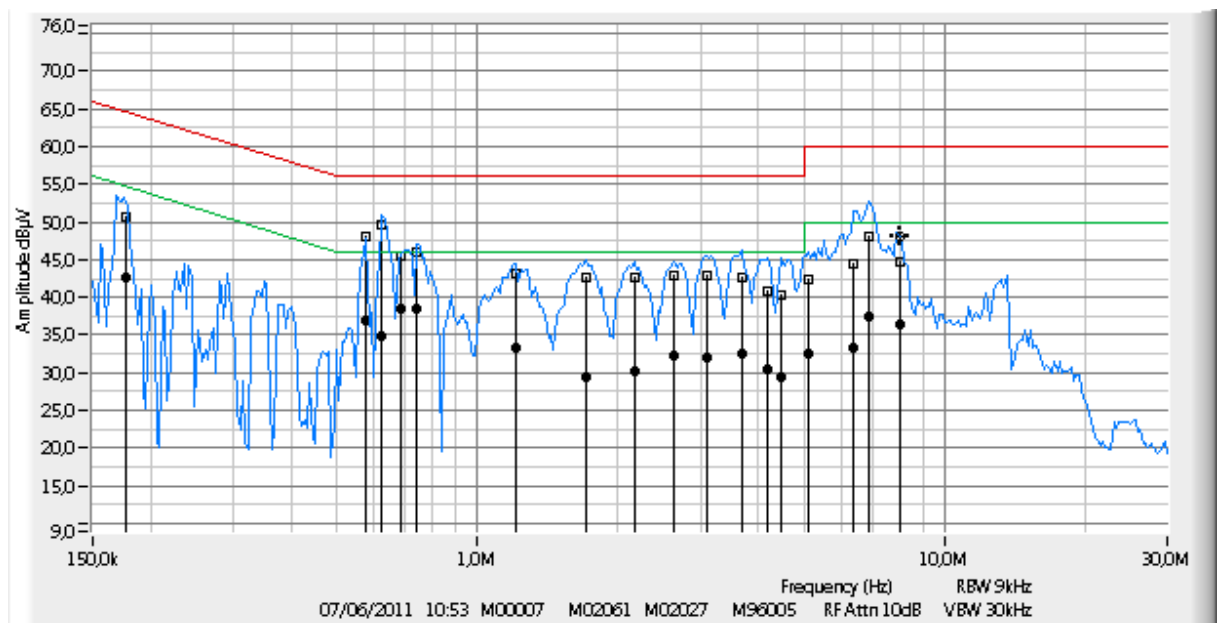
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Live:

Frequency (MHz)	Quasi-peak (dBμV)	QP Limit (dBμV)	QP margin (dB)	Frequency (MHz)	Average (dBμV)	Average Limit (dBμV)	Average margin (dB)
0.176	50.8	64.7	13.9	0.176	42.7	54.7	12.0
0.577	48.0	56.0	8.0	0.577	36.9	46.0	9.1
0.625	49.7	56.0	6.3	0.625	34.9	46.0	11.1
0.685	45.6	56.0	10.4	0.685	38.5	46.0	7.6
0.742	46.0	56.0	10.0	0.742	38.6	46.0	7.4
1.210	43.3	56.0	12.8	1.210	33.2	46.0	12.8
1.706	42.6	56.0	13.5	1.706	29.6	46.0	16.5
2.164	42.6	56.0	13.4	2.164	30.1	46.0	15.9
2.638	42.9	56.0	13.1	2.638	32.4	46.0	13.6
3.091	42.8	56.0	13.2	3.091	32.1	46.0	13.9
3.671	42.6	56.0	13.5	3.671	32.5	46.0	13.5
4.189	40.9	56.0	15.1	4.189	30.6	46.0	15.4
4.475	40.2	56.0	15.8	4.475	29.4	46.0	16.6
5.107	42.3	60.0	17.7	5.107	32.5	50.0	17.5
6.394	44.4	60.0	15.6	6.394	33.4	50.0	16.6
6.921	48.0	60.0	12.0	6.921	37.5	50.0	12.5



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.

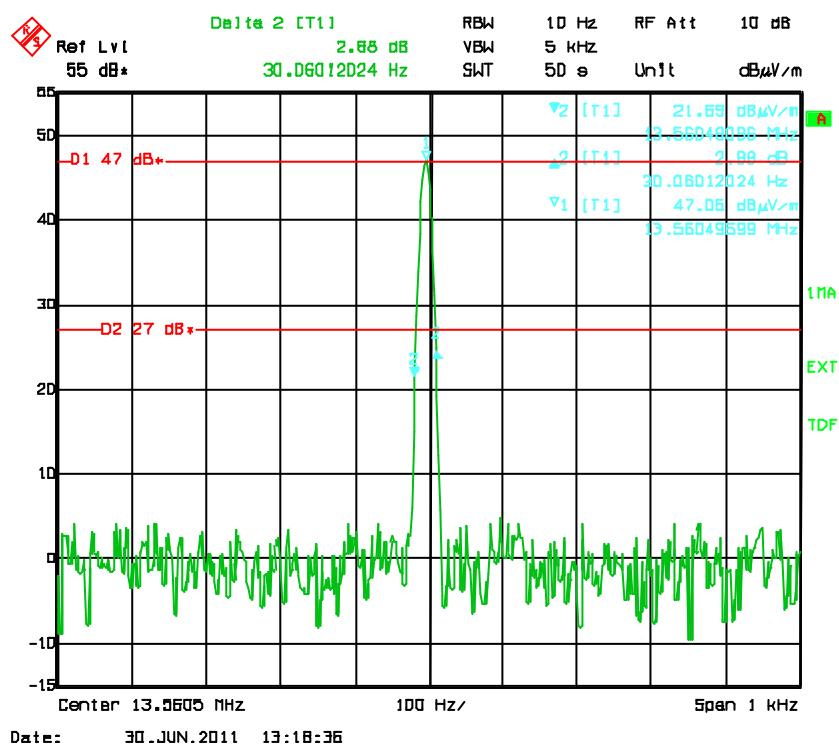
Measured with RBW = 9kHz (larger than 20dB BW) and VBW = 30kHz.

Frequency MHz	10m measurement dB(μV/m)	30 m (computed) dB(μV/m)	30 m limit dB(μV/m)	Margin dB
13.56	35.9	16.8	84	67.2

With $G = 1$ (worst case) that gives a radiated power of 13nW.

Computed from 10 m measurement: 35.9 dBμV/m with $P = (E.d)^2/30$.

8.2.2 20 dB BW



The 20dB BW is 30 Hz



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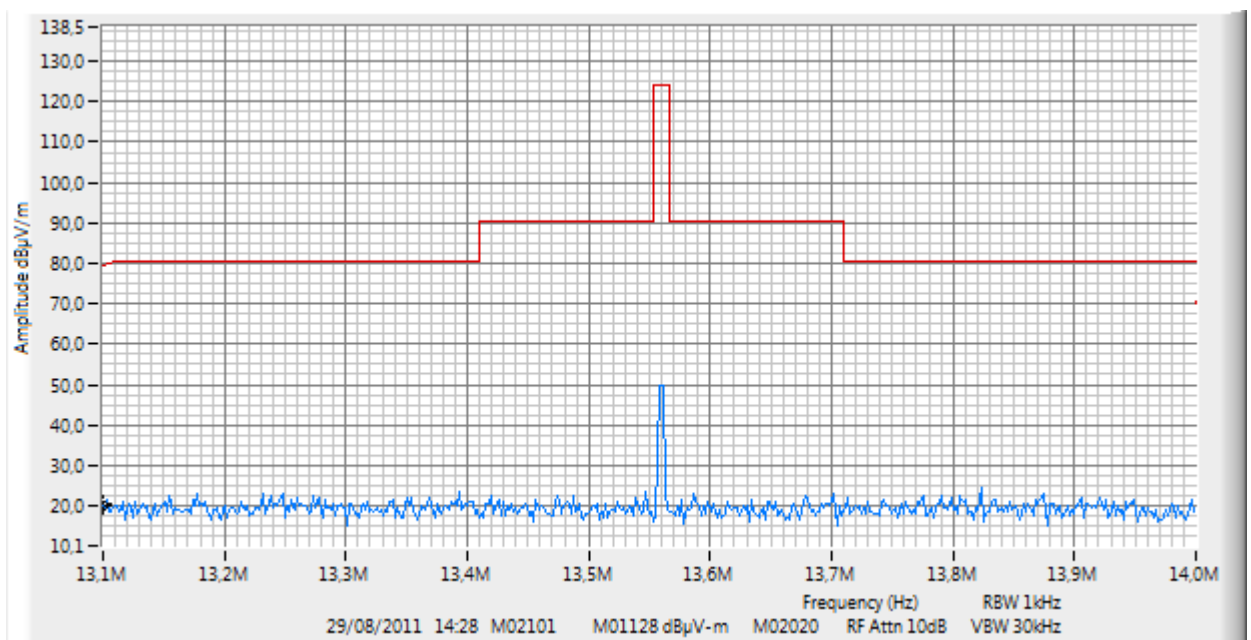
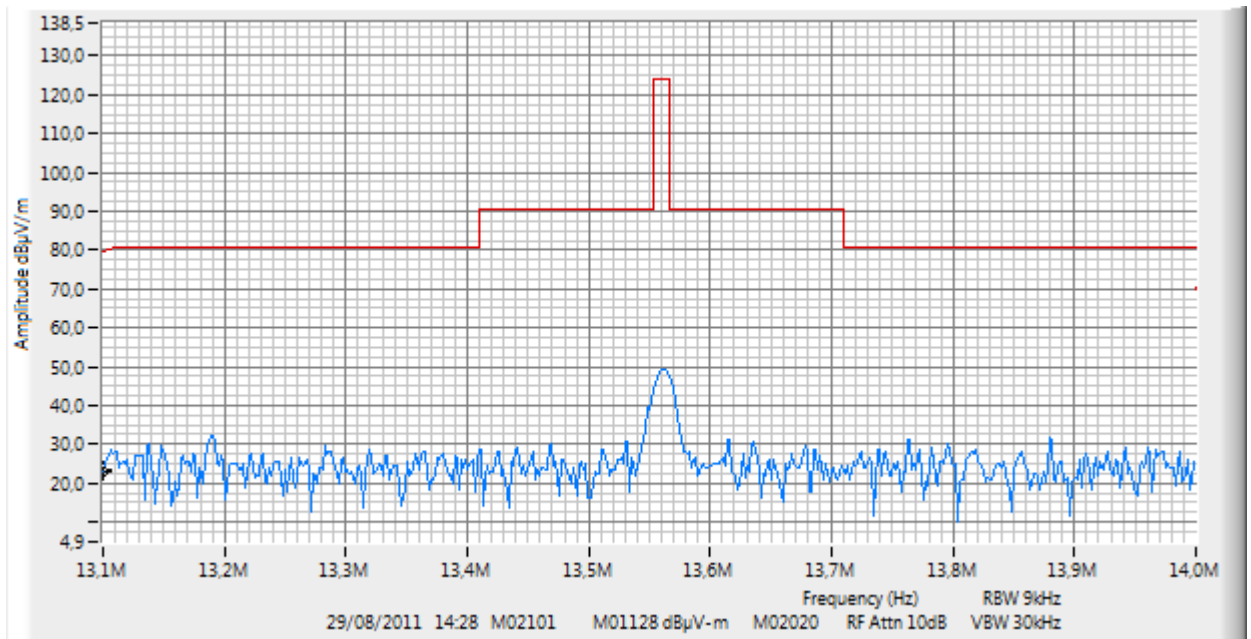
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8.2.3 Field strength around the emitter (15.225)

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.





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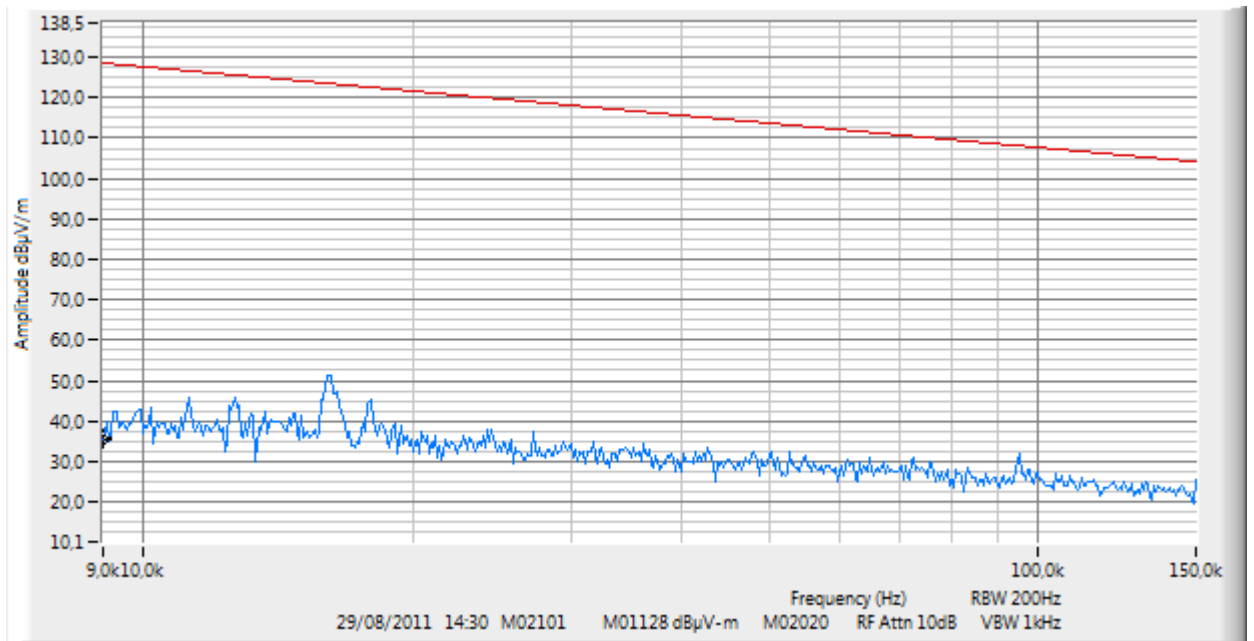
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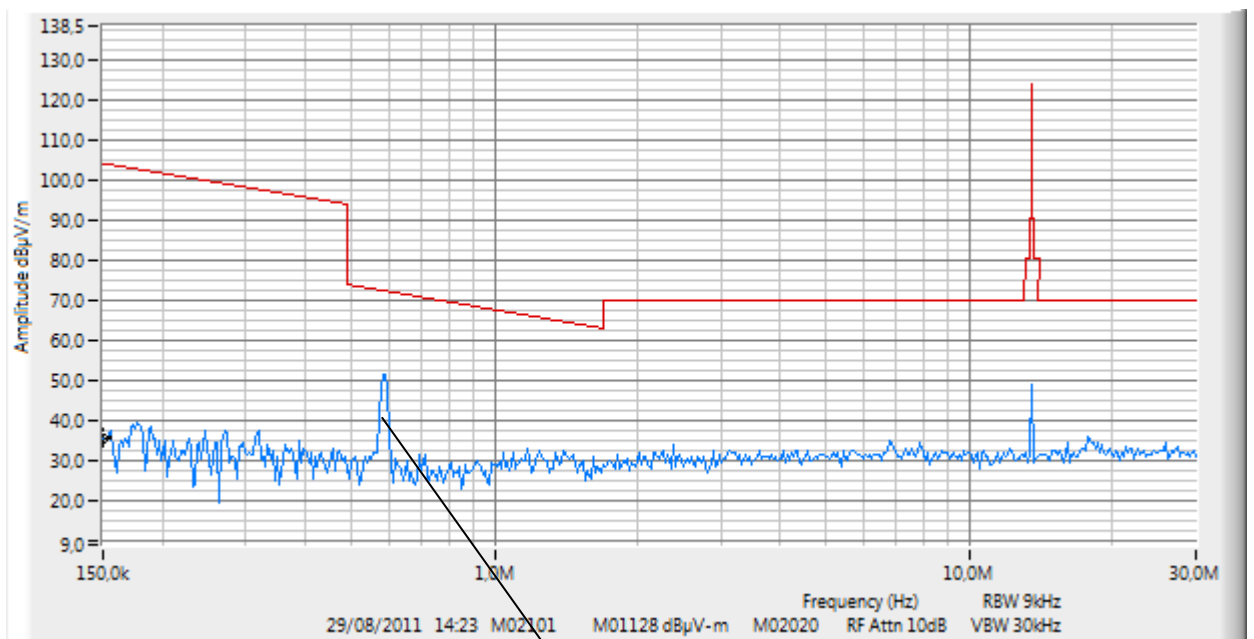
8.3 SPURIOUS EMISSIONS (15.225 and 15.209)

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



Voluntary emission for metal detection

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



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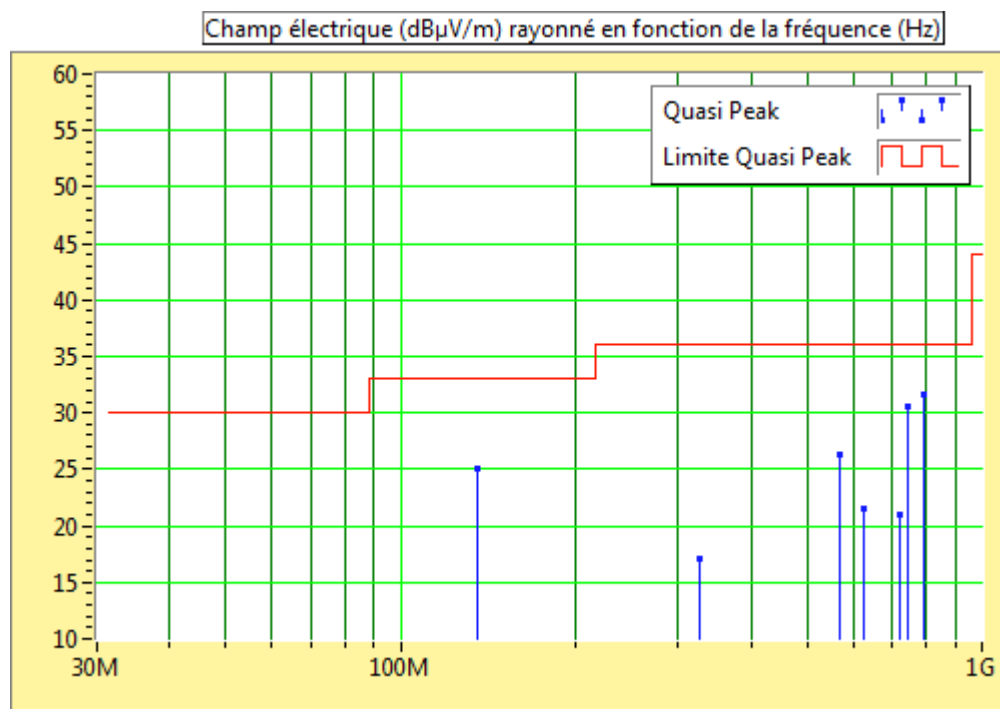
8.3.2.1 Spurious RESULTS:

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

No harmonics (other than those in the next table) have been identified over the noise floor.

10 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
135.610	26.3	25.0	33.0	8.0	V	103	0	14.2
325.458	18.7	17.1	36.0	19.0	V	121	360	17.2
569.540	28.0	26.4	36.0	9.6	H	142	0	23.3
624.868	23.7	21.6	36.0	14.4	V	257	360	22.8
720.983	24.0	21.0	36.0	15.0	H	119	0	22.9
745.035	32.3	30.6	36.0	5.4	H	182	360	23.5
793.085	34.4	31.7	36.0	4.3	V	182	0	24.6



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 $\pm 100\text{ppm}$.