TEST REPORT

According to FCC, CFR 47 Part 15
And Industry Canada RSS 210 Issue 8

N°099130-CC-1-b

GYL technologies
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Summary

OTHER ASSOCIATED FILES:

099130 Exhibit 1 ID label ZFX0010
099130 Exhibit 3 Internal-External Photographs ZFX0010
099130 Exhibit 4 RFID Block diagram ZFX0010
099130 Exhibit 5 RFID schematic ZFX0010
099130 Exhibit 6 test report ZFX0010
099130 Exhibit 7 Test set up photos ZFX0010
099130 Exhibit 8 notice ZFX0010
099130 Exhibit 12 Operational description ZFX0010
099130 Exhibit 13 cover letter ZFX0010
099130 (RSS-102_C for RSS-210A1.1)
099130 App-001supp-IC Test Report Cover sheet
099130 app-003 FCC form 731
099130 Modular_Cover_Letter_FCC
099130 Modular_Cover_Letter_RSS
confidentiality request IC 9609A-0010
FCC Request for Confidentiality ZFX0010

1 Reference and record of revisions of the test report:

Test report number :	Revision :	Number of pages	Modification reasons :
099130-CC-1-a	a	19	Creation, October 2011
099130-CC-1-b	b	19	ANSI C63.4 date and addition of ppm datas for stability, December 27, 2011
Redactor : O.ROY			
			Technical and 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.

This equipment complies with the rules of the IC RSS-210 and related sections for RFID.

3 GENERAL INFORMATION:

3.1 APPLICANT:

EVOLIS
14 avenue de la Fontaine
ZI Angers Beaucouzé
49070 BEAUCOUZE
France

3.2 TEST DATE:

January 21, 2011 & October 12 and 13, 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 RFID restricted modular approval is written in accordance with Part 15 of the Federal Communications Commission's and RSS-Gen of the Industry Canada. The Equipment under Test (EUT) was a RFID Board including antenna. The test results reported in this document relate only to the item that was tested.

All measurements contained in this Application were conducted in accordance with ANSI C63.4 Methods of Measurement of Radio Noise Emissions of 2003. 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.

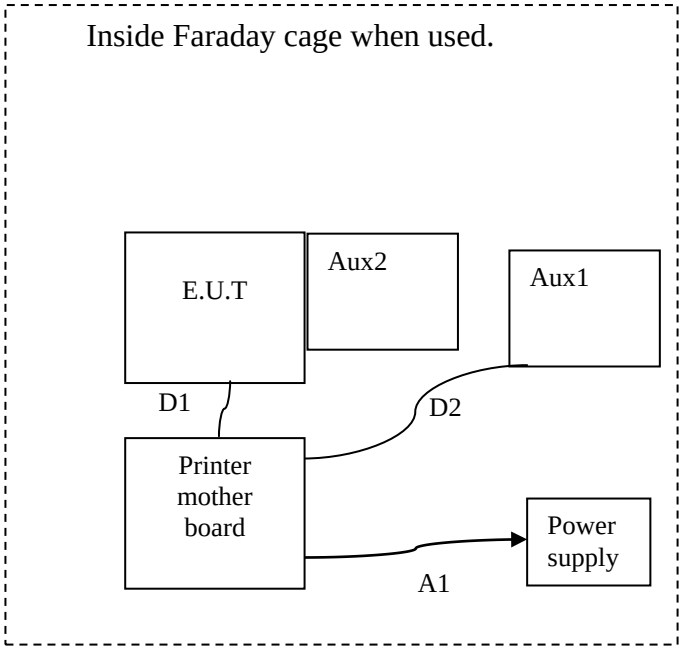
All conducted and radiated emissions measurements were performed manually at GYL TECHNOLOGIES. The radiated emissions measurements required by the rules were performed on the three to ten meters, open field, test site maintained by GYL Technologies Parc d'activités de Lanserre, 49610 Juigné sur Loire , 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-12
Receiver	HP	HP8591EM	M96005	June 10/May-11	May-12
Satellite synchronized frequency standard	Acquisis	GPS8	M06013	without	without
ARTIFICIAL MAINS NETWORKS					
LISN (50µH / 5/50Ω)	Rohde & Schwarz	ESH3-Z5	M02027	Sept 10/Sept-11	Sept-12
ANTENNAS					
Bilog (30-2000MHz)	CHASE	CBL-6112	M02031	Aug.-11	Aug.-12
Bilog (30-2000MHz)	CHASE	CBL-6112	M02032	Aug.-11	Aug.-12
Active loop antenna	Rohde & Schwarz	HFH2-Z2	M01128	April-10	April-12

All equipments where within their calibration period when used

CONFIGURATION OF TESTED SYSTEM:



E.U.T.: Equipment under Test

5.1 Auxiliary equipment:

Aux1: PC

Aux2: RFID tag

5.2 List of cables:

	AC power input Name	Nb phase	N Y/N	PE Y/N	test voltage1
A1	power input	1	Y	Y	120

	Data I/O Name	Shielded Y/N	Max length (m)	Length for test
D1	Ethernet	Y	0.2	10m
D2	USB	Y	2	2 m

6 EXERCISING TEST CONDITIONS:

For the purpose of the test, the tag reader is continuously reading the tag.

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 C63.4-2003	Standard format measurements/technical report personal computer and peripherals
RSS210 Issue 8 : June 2007	Low-power License-exempt Radio communication Devices (All Frequency Bands): Category II Equipment
RSS-GEN Issue 3 : 2007	General Requirements and Information for the Certification of Radio communication Equipment

7.2 JUSTIFICATION:

As mentioned in paragraph 4 of this report, the equipment is a Point Of Sales Terminal. It can be installed in residential commercial or light industry areas the following sub clause of the standard mentioned above are:

- Part 15.207 and 15.209 (subpart C) for respectively conducted and radiated emission for intentional radiator.
- Part 15.225 for Operation within the band 13.110 – 14.010 MHz.
- RSS-210 Issue 7 §A2.6 for intentional radiator within the band 13.110 – 14.010 MHz.

8 TEST ACCORDING TO CFR 47 Part 15

Tests performed by JL JAMET at GYL Technologies laboratories on January 21, 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 tables 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.

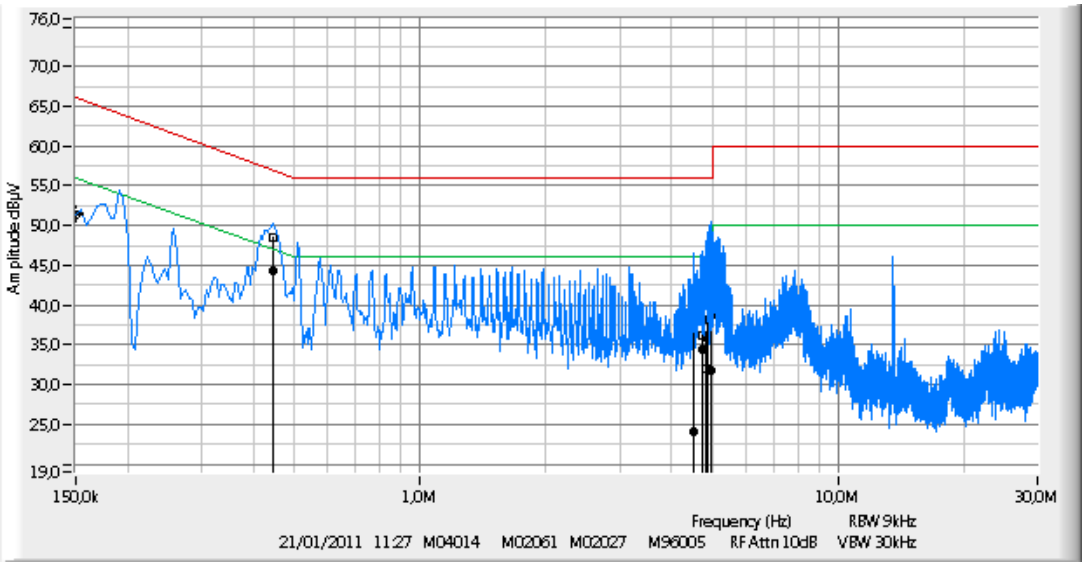
The conducted test was performed with the EUT exercise program loaded, and the emissions were scanned between 150 kHz to 30 MHz on the NEUTRAL SIDE and LIVE SIDE, herein referred to as Neutral, and Live respectively.

8.1.1 A1 Neutral:

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0.443	48.5	57.0	8.5
4.499	36.6	56.0	19.4
4.751	36.2	56.0	19.8
4.819	32.1	56.0	23.9
4.878	41.2	56.0	14.8
4.950	38.9	56.0	17.1

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average margin (dB)
0.443	44.3	47.0	2.7
4.499	24.2	46.0	21.9
4.751	34.4	46.0	11.6
4.819	35.9	46.0	10.1
4.878	38.2	46.0	7.8
4.950	31.7	46.0	14.3

Legend: Curve represents the peak values

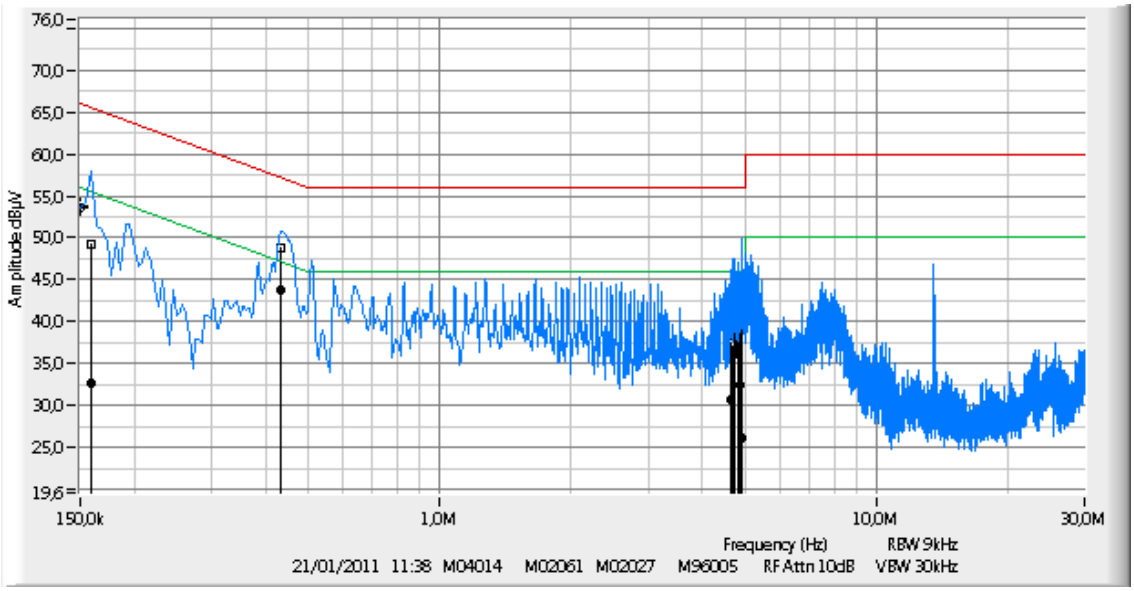


8.1.2 A1 LIVE:

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0.159	49.3	65.5	16.2
0.434	48.8	57.2	8.4
4.63	37.6	56.0	18.4
4.679	36.2	56.0	19.8
4.756	43.0	56.0	13.0
4.81	39.2	56.0	16.8
4.882	40.6	56.0	15.4
4.936	42.1	56.0	13.9

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average margin (dB)
0.159	32.8	55.5	22.8
0.434	43.8	47.2	3.4
4.63	30.7	46.0	15.3
4.679	35.9	46.0	10.1
4.756	36.4	46.0	9.7
4.81	37.3	46.0	8.7
4.882	32.5	46.0	13.5
4.936	26.2	46.0	19.8

Legend: Curve represents the peak values



8.2 INTERPRETATION AND REMARKS:

The equipment complies with the §15.207 requirements,

The equipment complies with the RSS-GEN requirements.

8.3 INTENTIONAL RADIATOR OPERATION RSS-210 A2.6 AND FCC PART 15.225:

8.3.1 Field strength for the emitter

According to the §15.31 f (2) the distance extrapolation factor (40dB/decade) is used.

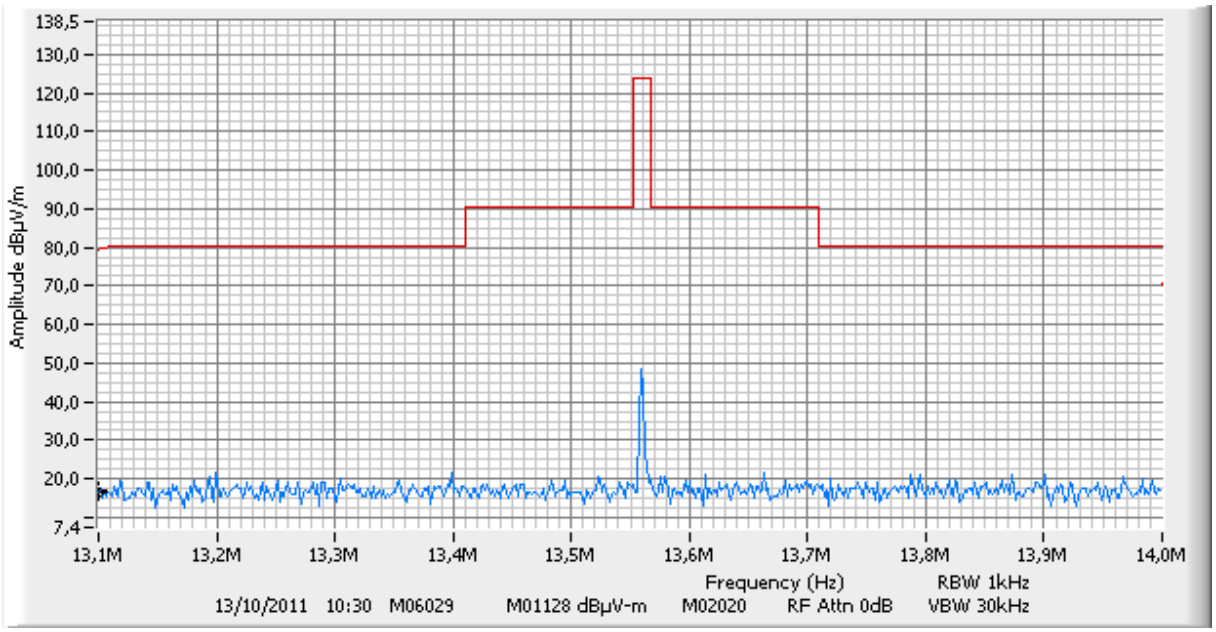
Frequency MHz	3m measurement dB(µA/m)	30 m (computed) dB(µA/m)
13.56	9.6	-30.4

Frequency MHz	3m measurement dB(µV/m)	30 m (computed) dB(µV/m)	30 m limit dB(µV/m)	Margin dB
13.56	61.1	21.1	84	62.9

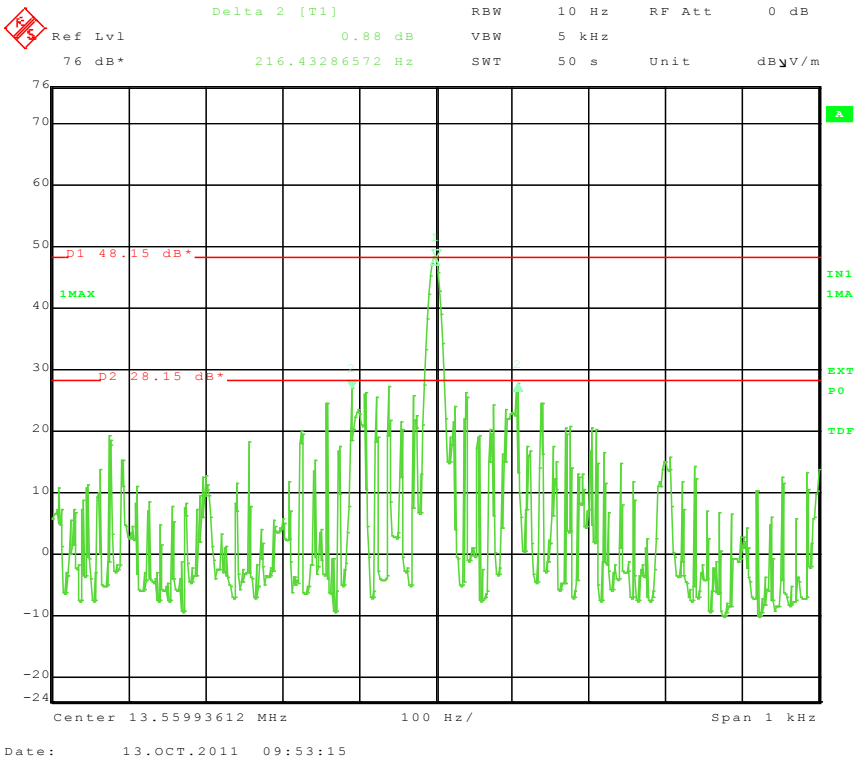
With G = 1 (worst case) that gives a radiated power of 390nW.

Computed from 3 m measurement: 61.1 dBµV/m – 95.2 gives -34.1 dBm (equ 390nW).

8.3.2 Field strength around the emitter



20dB bandwidth or 99% bandwidth (relative measurement with close loop antenna)



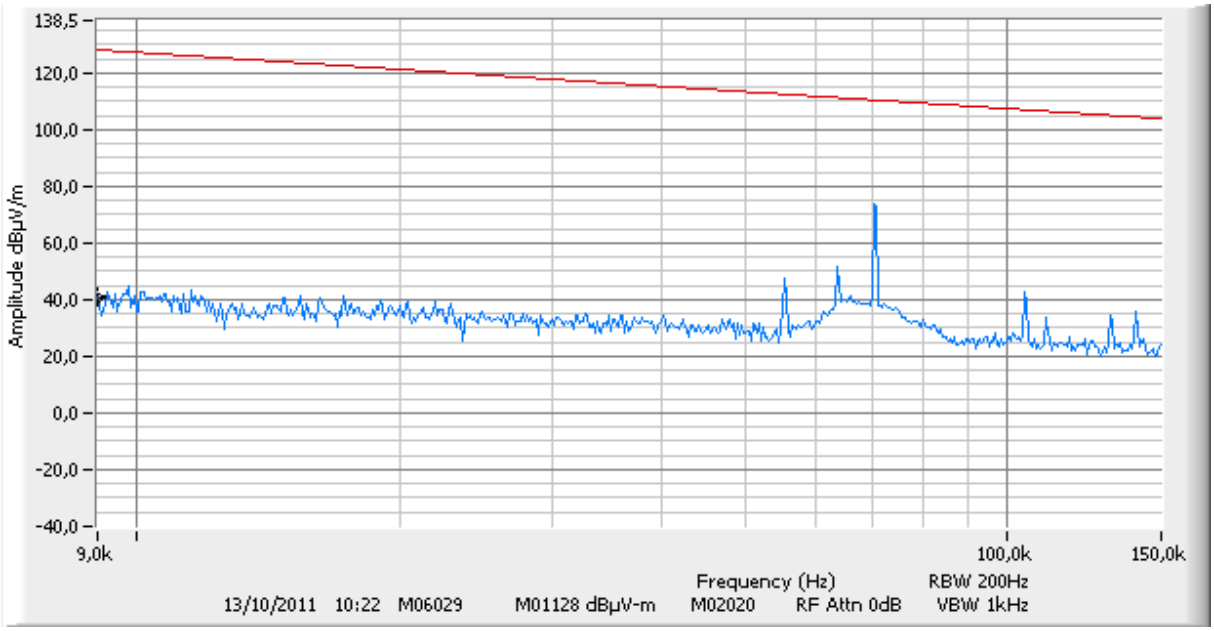
20 dB bandwidth or 99% bandwidth is 220Hz.

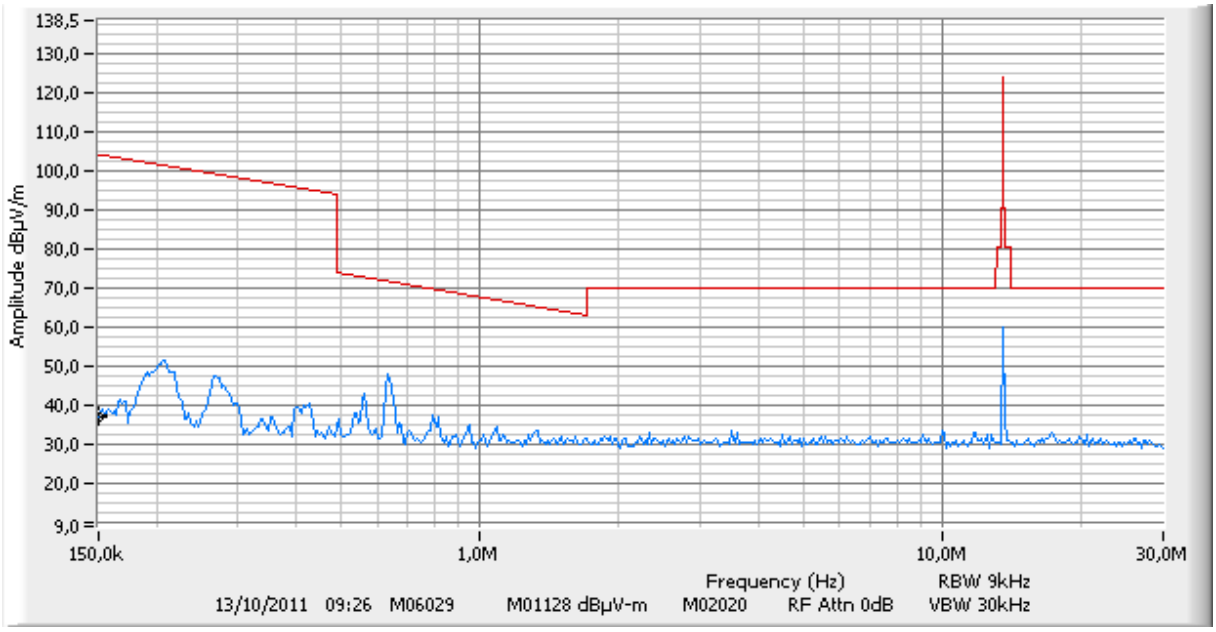
8.4 SPURIOUS EMISSIONS (15.209)

Measurements are performed from 9 kHz to 1000 MHz (intentional radiator at 13.56 MHz)
With receiver and transmitter active.

8.4.1 Measurement from 9 kHz to 30MHz

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




138,5
130,0
120,0
110,0
100,0
90,0
80,0
70,0
60,0
50,0
40,0
30,0
20,0
9,0
Amplitude dBµV/m
150,0k
1,0M
10,0M
30,0M
Frequency (Hz)
RBW 9kHz
13/10/2011 09:26 M06029
M01128 dBµV-m
M02020
RF Attn 0dB
VBW 30kHz

8.4.2 Measurement 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 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

8.4.2.1 Spurious RESULTS:

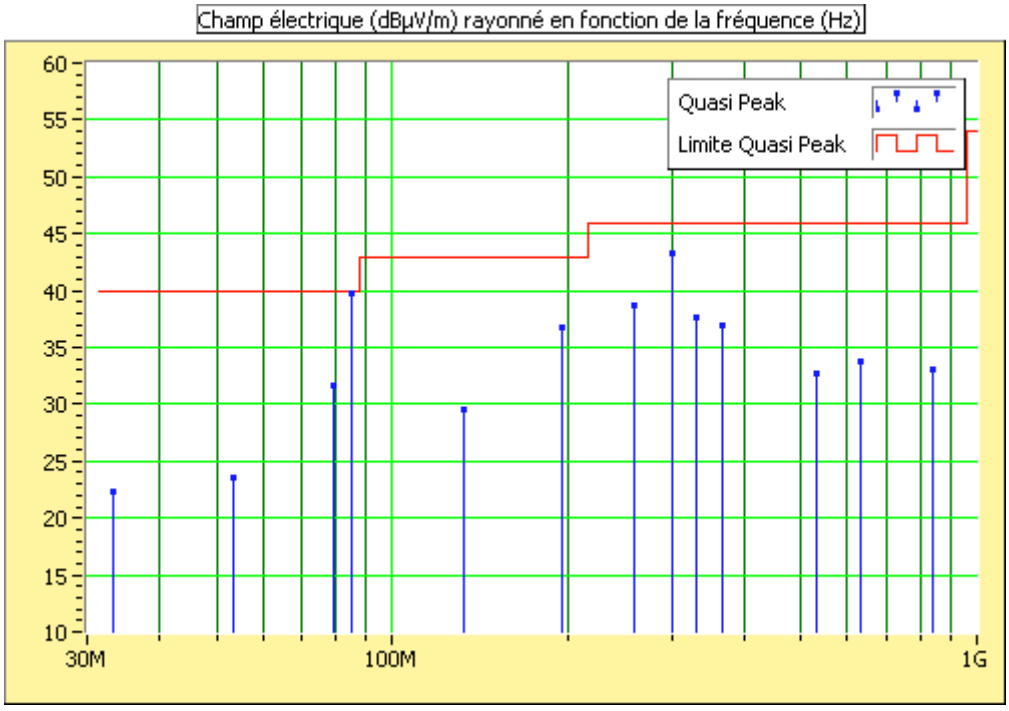
The following data table lists the most significant emission frequencies, measured level, correction factor (includes cable and antenna corrections), corrected reading and the limit.

Measurement according to the FCC 15.209 concerning only the RFID function, highest lines table with transmitter and receiver active:

Measurement at 3 m distance.

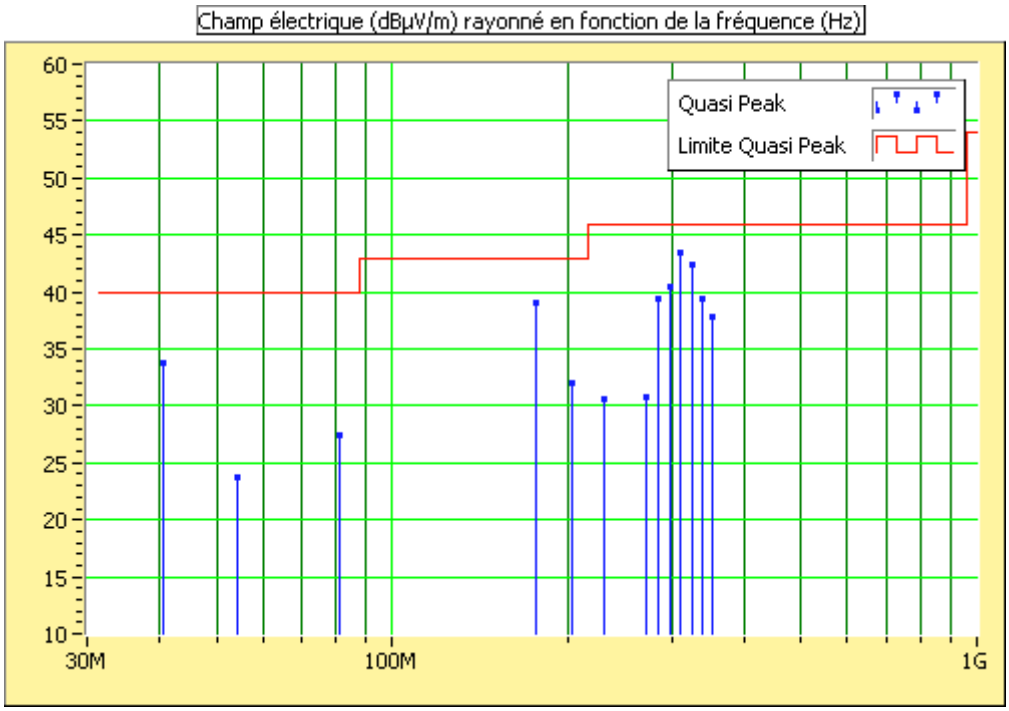
Frequencies out of harmonics :

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
33,270	26,6	22,4	40,0	17,6	V	100	43	17,0
53,386	27,9	23,6	40,0	16,4	V	98	24	8,0
79,209	22,3	31,6	40,0	8,4	V	98	213	8,7
84,829	42,7	39,8	40,0	0,2	V	138	265	9,7
132,777	35,5	29,5	43,0	13,5	V	177	361	13,7
194,903	40,1	36,8	43,0	6,2	V	103	347	11,6
259,877	41,8	38,8	46,0	7,2	V	98	8	15,3
300,579	41,4	43,2	46,0	2,8	V	98	361	16,7
331,602	35,6	37,7	46,0	8,3	V	99	9	17,4
366,123	41,9	36,9	46,0	9,1	H	141	361	18,2
531,674	38,3	32,8	46,0	13,2	V	134	212	22,2
630,091	36,8	33,8	46,0	12,2	V	135	257	22,9
837,379	36,2	33,0	46,0	13,0	H	124	347	25,3



Harmonics :

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
40,636	37,0	33,8	40,0	6,2	V	97	362	14,3
54,266	28,7	23,8	40,0	16,2	V	98	14	7,7
81,360	30,9	27,4	40,0	12,7	V	200	12	9,0
176,296	40,4	39,1	43,0	3,9	H	168	317	11,3
203,371	33,1	31,9	43,0	11,1	H	175	12	12,1
230,494	32,6	30,6	46,0	15,4	H	145	11	13,7
271,172	31,7	30,9	46,0	15,1	H	145	185	15,7
284,732	39,9	39,4	46,0	6,6	H	98	11	16,2
298,298	41,4	40,4	46,0	5,6	H	98	360	16,6
311,871	43,5	43,5	46,0	2,5	H	97	362	17,0
325,416	42,4	42,4	46,0	3,6	H	97	20	17,3
339,017	40,2	39,5	46,0	6,6	H	99	194	17,6
352,584	38,3	37,8	46,0	8,2	H	98	207	17,9



8.5 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

8.6 Antenna requirements

Not applicable because the antenna is located and is not replaceable.

8.7 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 conducted according to the operating temperature range given in the standard.

120 V is the rated voltage for US and Canada. +/-15% gives 102 to 138V.
At 120V and 20°C the frequency is 13.559953MHz.
Frequencies (MHz)

Temperature	**20°C**		**-20°C**		**50°C**	
Power Supply	102	138	102	138	102	138
13.56MHz	13.559949	13.559948	13.559803	13.559779	13.559949	13.559949
ppm	-0.3	-0.4	-11.1	-12.8	-0.3	-0.3

Neither voltage nor temperature variations affect the frequency stability that is better than ±15 ppm.