

R041-07-103831-9A - RG / CHB

This report cancels and replace report R041-07-103831-9A Ed0

RADIO TEST REPORT

According to the standard(s):

FCC part 15: 02/2006
and
RSS-210: 06/2007

Equipment under test:

RFID Module LF-AH1-G2
FCC ID: GM3LFAH1G2
IC: 2739D-LFAH1G2
Company:

PSION TEKLOGIX

Diffusion: Mr PORTE

(Company: PSION TEKLOGIX)

Number of pages: 18 including 1 annex

Ed.	Date	Modified page(s)	Written by		Technical verification and Quality approval	
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1	8-Oct-07	10, 12 to 15	Regis GONZALEZ		Olivier HEYER	

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NAME OF THE EQUIPMENT UNDER TEST (E.U.T.) : RFID Module LF-AH1-G2

Serial number : None

Part number : None

Software Version : None

MANUFACTURER'S NAME : PSION TEKLOGIX

APPLICANT'S ADDRESS:

Company : PSION TEKLOGIX

Address : 135 rue de la Duranne
BP 421000
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FRANCE

Person(s) present during the tests : Mr PORTE

Responsible : Mr PORTE

DATE(S) OF TESTS : 15th of June, 2007 and 10th, 11th and 12th of July, 2007

TESTS LOCATION(S) : Emitech Grand Sud Laboratory in Vendargues (34)
Open area test site in Salinelles (30)
FCC Registration number: 8127-19
IC Filling number : 6290

TESTS SUPERVISOR(S) : None

TESTS OPERATOR(S) : Regis GONZALEZ

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1. INTRODUCTION

This document submits the results of Electromagnetic Compatibility tests performed on the equipment **RFID Module LF-AH1-G2** (denominated hereafter E.U.T.: equipment under test) according to document(s) listed below.

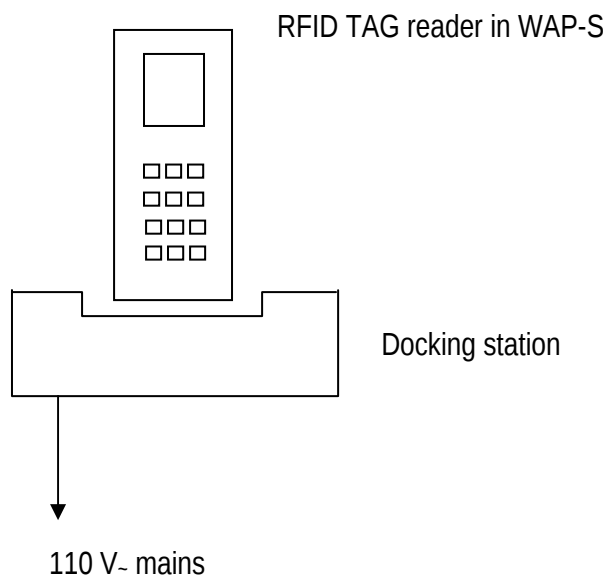
Worst case configuration is used between WAP-C, WAP-S and with or without docking station.
Bluetooth is active but not tested.

2. REFERENCE DOCUMENT(S)

RSS-210 Issue 7 (June 2007)	Low-power – Licence exempt Radiocommunication devices (all frequency bands): category 1 equipment
FCC Part 15 (February 2006)	Code of Federal Regulations Title 47 – Telecommunications Chapter 1 – Federal Communications Commission Part 15 – Radio frequency devices Subpart C – Intentional Radiators
RSS-Gen Issue 2 (June 2007)	General requirements and information for the Certification of radiocommunication equipment
ANSI C 63.4 (2003)	American National Standard for Methods of measurement of Radio-Noise from low-voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

3. EQUIPMENT UNDER TEST CONFIGURATION

<u>Product description:</u>	IC: 2739D-LFAH1G2 FCC ID: GM3LFAH1G2 ITU emission code: / Utilization: RFID TAG reader Antenna type: Incorporated antenna Antenna gain: Unknown Operating frequency range: 125 KHz and 134.2 KHz Number of channels: 2 (simultaneous) Channel spacing: 9.2 kHz Modulation: / Power source: 5 Vdc (stand alone) or mains voltage (with docking) Power level and frequency range are not user adjustable
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4. EQUIPMENT UNDER TEST CONFIGURATION SCHEME

5. SUMMARY OF TEST RESULTS

Tests designation	Results satisfying?	Comments
Conducted emissions - section 15.207 and table 2 of RSS-Gen	YES.	
Radiated emissions - section 15-209 (below 30MHz) and table 3 of RSS-210	YES	
Radiated emissions - section 15-209 (above 30MHz) and table 2 of RSS-210	YES	

N.P.: Not Performed.

N.A.: Not Applicable.

- **In emission:**

Sample subject to the test complies with prescriptions of the standard(s) FCC part 15: 02/2006 and RSS-210: 06/2007 according to limits specified in this test report.

6. CONDUCTED EMISSIONS – SECTION 15.207 & TABLE 2 OF RSS-Gen

Standard: FCC part 15: 02/2006 / RSS-210: 06/2007

Test method: ANSI C63.4:2003

Test configuration:

Tested cable(s)	Measure with	E.U.T. height
Mains 110 Vac/60 Hz-WAP color/50 Ohms load	L.I.S.N.	80 cm

Frequency band	Tested cable(s)	Resolution bandwidth	Video bandwidth	Detection mode
150kHz-1MHz	Mains 110Vac/60Hz-WAP color/50 Ohms load	10KHz	30kHz	Peak/Average
1MHz-10MHz	Mains 110Vac/60Hz-WAP color/50 Ohms load	10kHz	30kHz	Peak
10MHz-30MHz	Mains 110Vac/60Hz-WAP color/50 Ohms load	10KHz	30kHz	Peak

Test method deviation: No

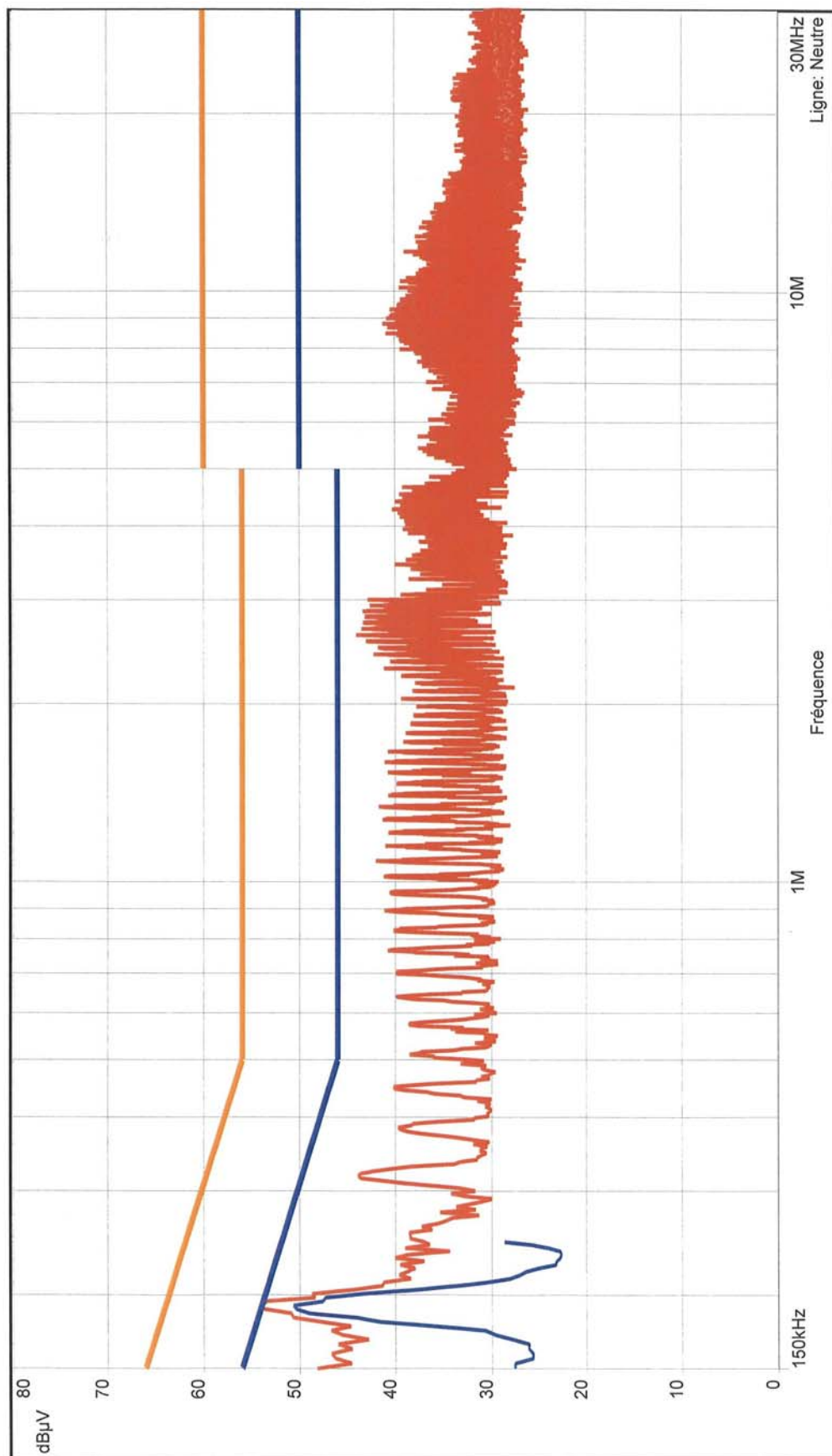
Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH
Cable			2724
Cable			2703
LISN	PMM	L3-25	0833
Receiver	Agilent Technologies	E7405A	2161
Shielding enclosure	RAY PROOF	C.GS3	1123
Software	Nexio	BAT EMC v.3.1.7.1	0000
Surges Suppressor	Hewlett Packard	11947A	0239

Results: See **Graph(s)** hereafter. Limits on the graphs are average and quasi-peak limits (upper limit).

Conducted voltage emission - LF-AH1-G2 WAPc

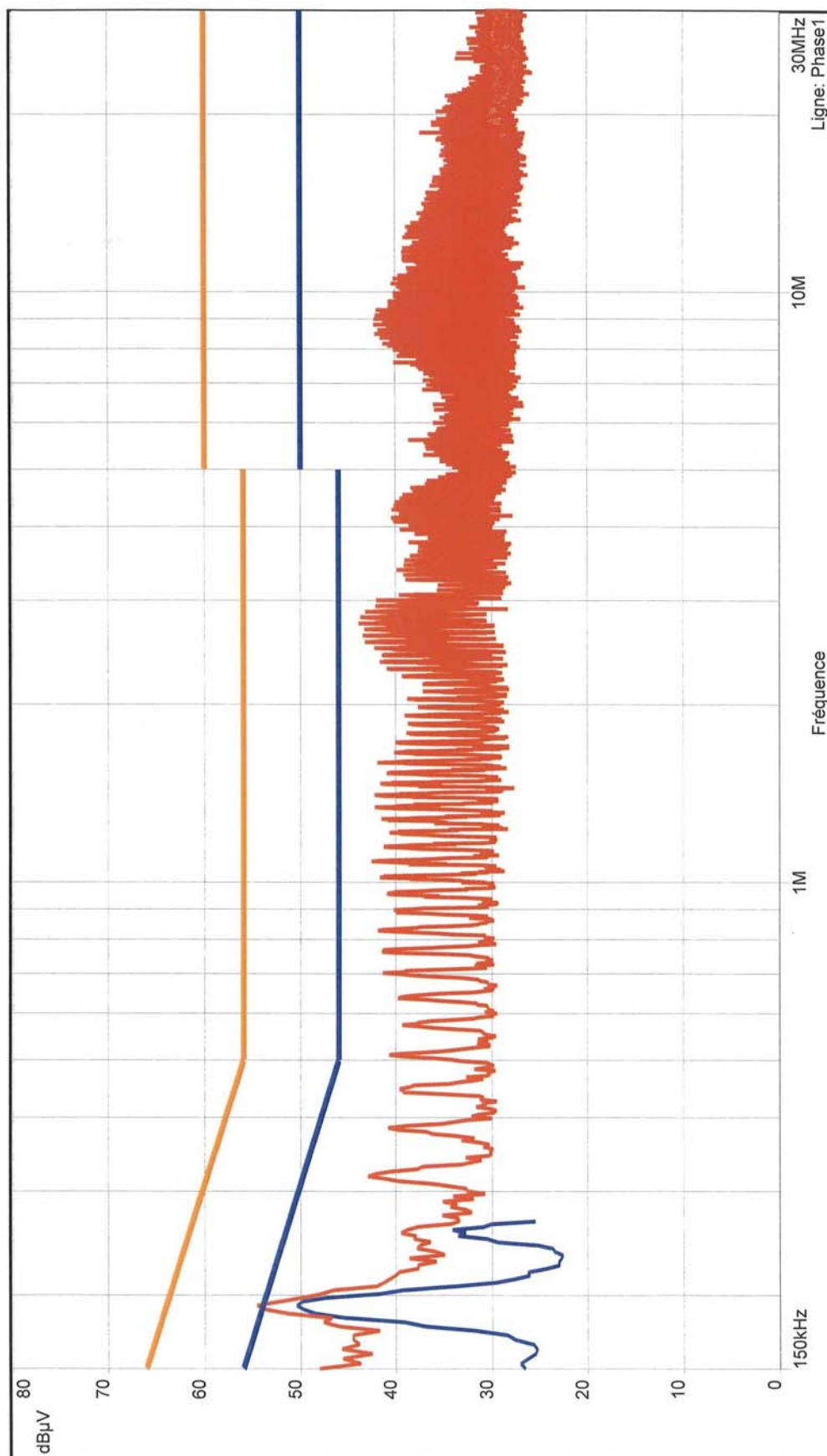
EN 55022 Ed.98 - Class B - Average /
 EN 55022 Ed.98 - Class B - Qpeak /
 Mes. Peak (Neutre)
 Mes. Avg (Neutre)



Alimentation 110Vac/60Hz-WAP color - 10/07/2007 16:24 - 41

Conducted voltage emission - LF-AH1-G2 WAPc

- EN 55022 Ed.98 - Class B - Average /
- EN 55022 Ed.98 - Class B - Opeak/
- Mes. Peak (Phase1)
- Mes. Avg (Phase1)



Alimentation 110Vac/60Hz-WAP color - 10/07/2007 16:24 - 41

7. RADIATED EMISSIONS - SECTION 15-209 & TABLE 2.3 OF RSS-210

a) Radiated emissions (below 30MHz)

Standard: FCC part 15: 02/2006 /RSS-210: 06/2007

Test method: ANSI C63.4:2003

Test configuration:

Frequency band	Tested side	Resolution bandwidth	Video bandwidth	Detection mode	E.U.T. height
9kHz-35kHz	Front side	100Hz	300Hz	Peak	80cm
35kHz-75kHz	Front side	100Hz	300Hz	Peak	80cm
75kHz-150kHz	Front side	100Hz	300Hz	Peak	80cm
150kHz-240kHz	Front side	10kHz	30kHz	Peak	80cm
240kHz-500kHz	Front side	10kHz	30kHz	Peak	80cm
500kHz-1.1MHz	Front side	10kHz	30kHz	Peak	80cm
1.1MHz-2.4MHz	Front side	10kHz	30kHz	Peak	80cm
2.4MHz-5.5MHz	Front side	10kHz	30kHz	Peak	80cm
5.5MHz-12.5MHz	Front side	10kHz	30kHz	Peak	80cm
12.5MHz-30MHz	Front side	10kHz	30kHz	Peak	80cm

Test method deviation:

Measurements are made in peak detection instead of average mode:

- Measurements are given in dBμA/m instead of μV/m
- Measuring distance is 3 or 10 meters instead of 30 and 300 meters

Radiated emissions limits in this frequency band are specified at 30 or 300 meters. Measurement distance used during the test, subject of this report, is 3 meters for indoor measurements and 10 meters for OATS measurements. Then published limits come from a theoretical conversion using an extrapolation factor of 20dB / decade (worst case) for indoor levels and 40dB / decade for OATS level.

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH
Antenna	Electro-Metrics	ALR-25	0263
Cable			2702
Cable			2704
Cable			2711
Cable		N-5m	2898
Preamplifier	Miteq	AU-1447	3199
Receiver	Agilent Technologies	E7405A	2161
Shielded enclosure	Ray Proof	C.GS3	1123

Results: See **Graph(s)** (pre-measurement) and **Board(s)** hereafter

b) Radiated emissions (above 30MHz)**Standard:** FCC part 15: 02/2006 / RSS-210: 06/2007**Test method:** ANSI C63.4:2003**Test configuration:**

Frequency band	Configuration	Resolution bandwidth	Video bandwidth	Detection mode	E.U.T. height
30MHz-200MHz	Back side (pre-measurement in semi anechoic chamber)	100kHz	300kHz	Peak	80cm
200MHz-1GHz	Back side (pre-measurement in semi anechoic chamber)	100kHz	300kHz	Peak	80cm
30MHz-1GHz	Open area measurement	120kHz	300kHz	Quasi peak	80cm

Test method deviation: No**Measuring distance:** 3 meters**Test equipment list:**

CATEGORY	BRAND	MODEL NUMBER	N° EMITECH
Antenna	Electro-Metrics	BIA-30HF	0824
Cable		N-17m	3620
Log-periodic antenna	Rohde & Schwarz	HL223	3126
OATS	Emitech	Salinelles	3482
Receiver	Rohde & Schwarz	ESVS10	3211

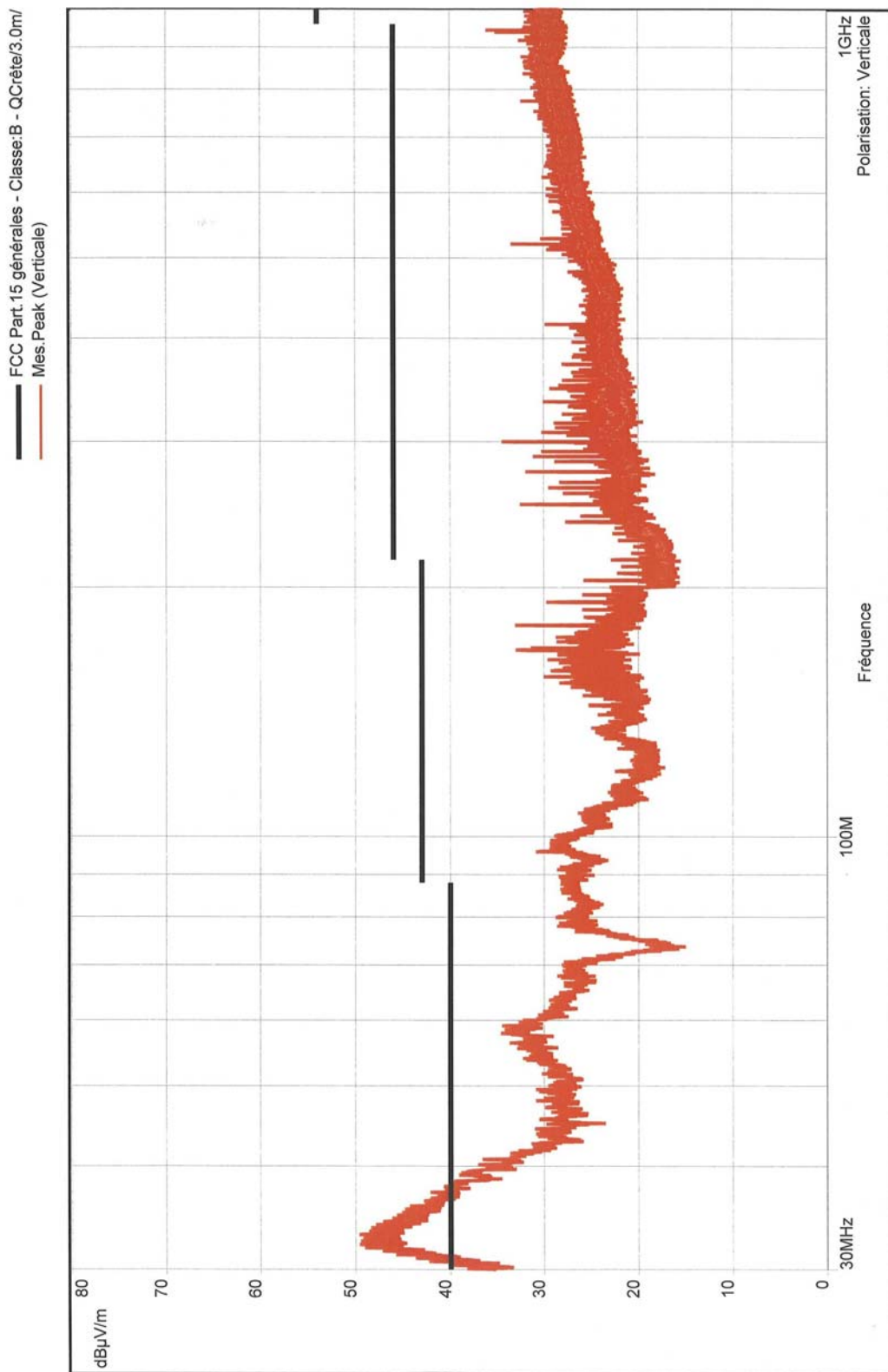
Results: See **Graph(s)** (indoor pre-measurements) and **Board(s)** hereafter

Ed1

LF-AH1-G2 (CE FCC CANADA)

Radiated electric emission (pre-measurement): back side – peak detection - Distance: 3m - Vertical Pol.
15/06/2007

Emission rayonnée électrique - LF-AH1-G2 WAPs



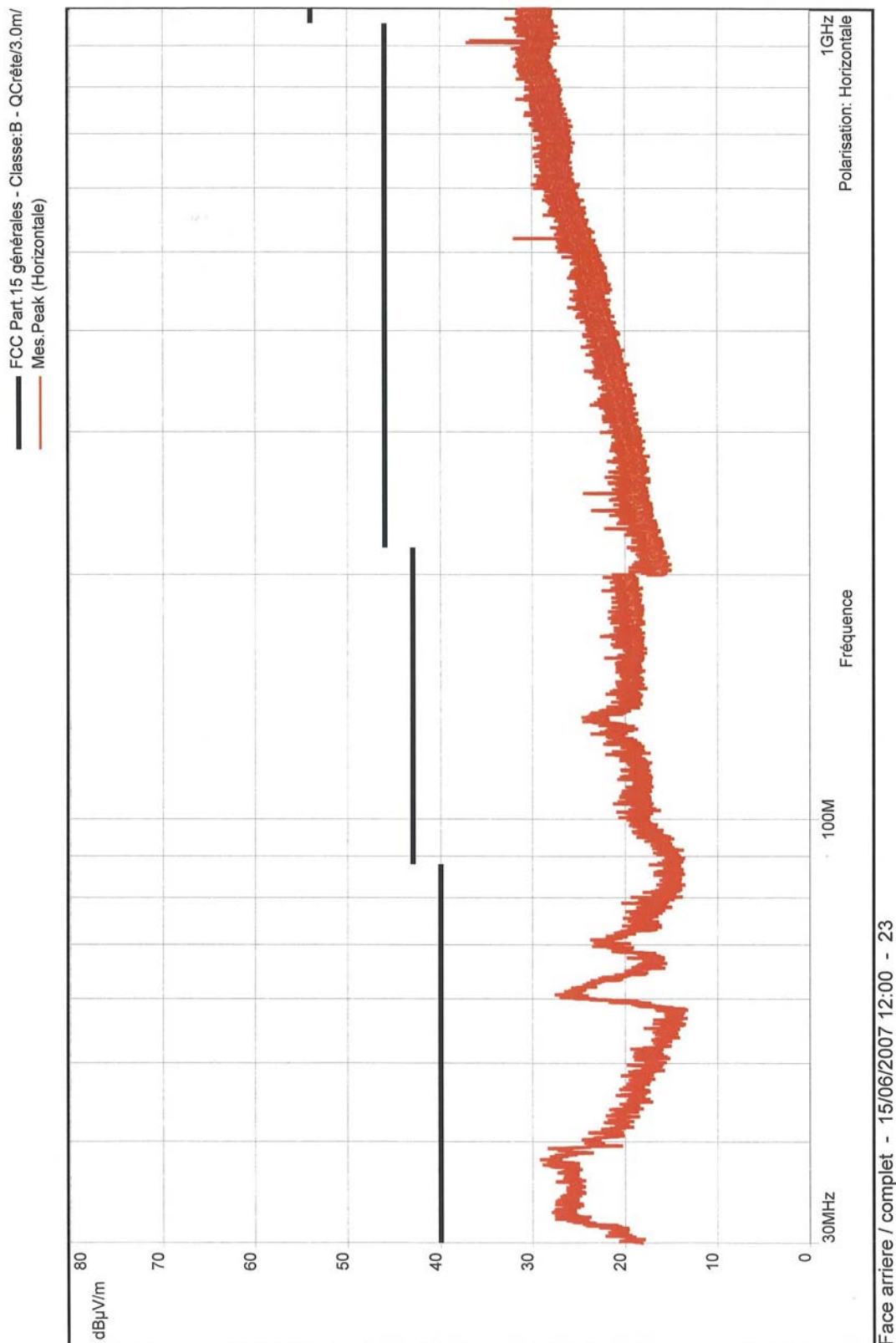
Face arrière / complet - 15/06/2007 12:00 - 23

Ed1

LF-AH1-G2 (CE FCC CANADA)

Radiated electric emission (pre-measurement): back side – peak detection - Distance: 3m - Horizontal Pol.
15/06/2007

Emission rayonnée électrique - LF-AH1-G2 WAPs



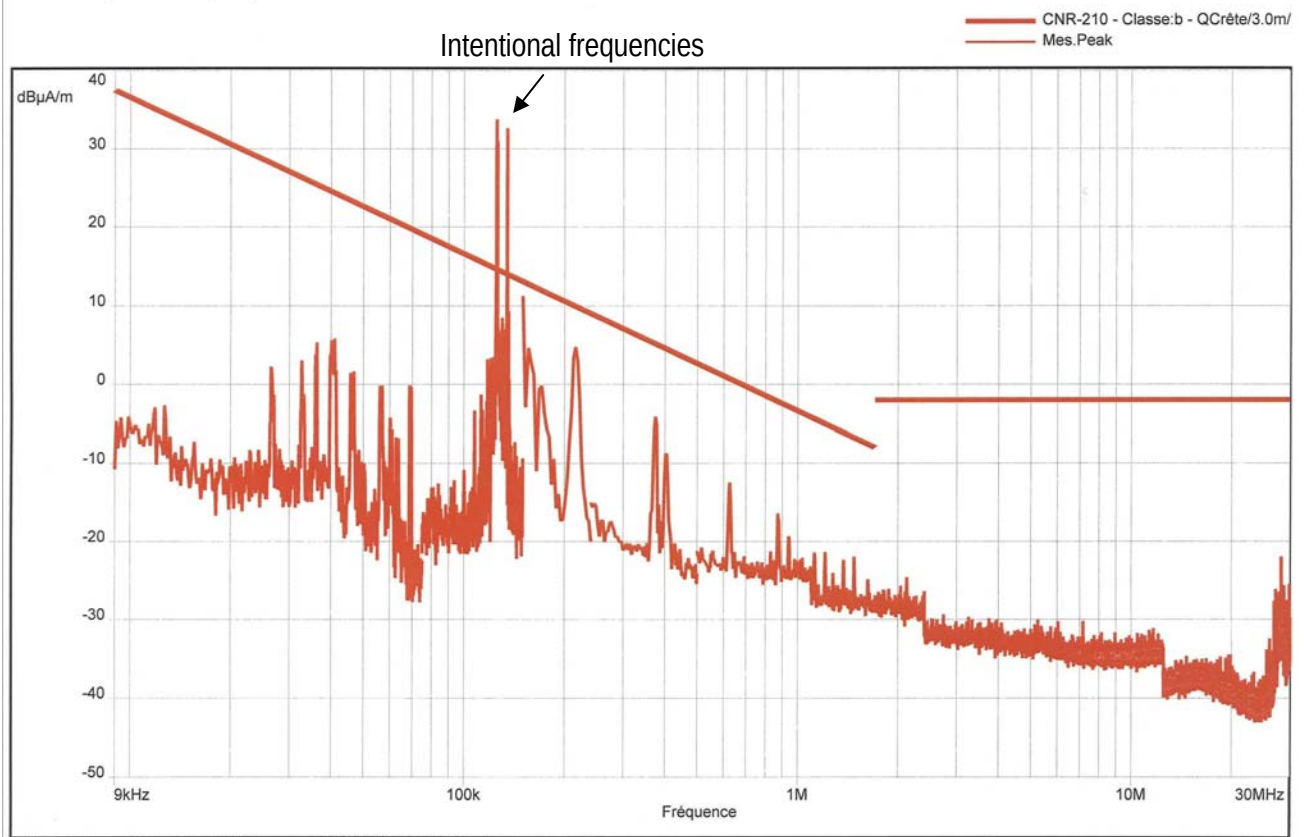
Ed1

LF-AH1-G2 (CE FCC CANADA)

Radiated magnetic emission: 90°acw – peak detection - Distance: 3m

15/06/2007

Emission rayonnée magnétique - LF-AH1-G2 WAPc



90°cw / complet / cadre à 90°cw - 15/06/2007 17:32 - 36

Limit indicated on this plot is calculated with 20 dB/decade extrapolation factor and 51.5 dB conversion factor.

$$L = 20 \log(L_s) - 51.5 + 40 \quad (F < 490 \text{ kHz})$$

$$L = 20 \log(L_s) - 51.5 + 20 \quad (F > 490 \text{ kHz})$$

with L : limit of this graph (in dBμA/m) and Ls : limit of the standard (in μV/m)

For a 40 dB/decade extrapolation factor, please add 40 dB on graph limit below 490 kHz and 20 dB above.

Ed1

Radiated electric emission on Open Area Test Site – Quasi peak detection - Distance: 3m

VERTICAL POLARIZATION

Frequency (MHz)	Azimut (degrees)	Antenna height (cm)	Measure (dB μ V/m)	Standard limit (dB μ V/m)	Comments
32.30	0	100	16.73	40	C
59.16	0	100	1,95	40	C
168.00	250	100	24.69	43	C
180.00	250	100	20.69	43	C
520.00	290	100	32.98	46	C

C= Compliant

NC= Not compliant

HORIZONTAL POLARIZATION

Frequency (MHz)	Azimut (degrees)	Antenna height (cm)	Measure (dB μ V/m)	Standard limit (dB μ V/m)	Comments
61.29	0	100	-1.05	40	C

C= Compliant

NC= Not compliant

All other radiated emissions are very lower than limit.

Radiated magnetic emission on Open Area Test Site – Quasi peak detection - Distance: 10m

MAGNETIC EMISSION

Frequency (kHz)	Azimut (degrees)	Antenna height (cm)	Measure (dB μ A/m)	Standard limit (dB μ A/m)	Comments
125.00	0	150	4.40	34.16	C
134.20	0	150	3.00	33.50	C

C= Compliant

NC= Not compliant

Limit indicated on this plot is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.

$$L = 20 \log(L_s) - 51.5 + 60$$

with L : limit of this board (in dB μ A/m) and Ls : limit of the standard (in μ V/m)

All other radiated emissions are very lower than limit.

□□□ End of report – 1 annex to be forwarded □□□

ANNEX: PHOTOGRAPH(S)

EQUIPEMENT UNDER TEST (E.U.T.) PHOTOGRAPH(S)

RFID Module LF-AH1-G2

E.U.T. Photograph(s)	
Radiated electric field emission on OATS	

Conducted emission

