



R041-09-102559-1A - DM / OH

## RADIO TEST REPORT

According to the standard(s):

FCC part 15: 07/2008  
and  
RSS-210: 06/2007

Equipment under test:


RFID Module HF-AM1-IKON  
FCC ID: GM3HFAM1IKON  
IC: 2739D-HFAMIKON  
Company:

PSION TEKLOGIX

Diffusion: Mr FORNIER

(Company: PSION TEKLOGIX)

Number of pages: 17 including 1 annex

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*NAME OF THE EQUIPMENT UNDER TEST (E.U.T.)* : RFID Module HF-AM1-IKON

*Serial number* : None

*Part number* : None

*Software Version* : None

*MANUFACTURER'S NAME* : PSION TEKLOGIX

*APPLICANT'S ADDRESS:*

*Company* : PSION TEKLOGIX

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FRANCE

*Person(s) present during the tests* : Mr FORNIER

*Responsible* : Mr FORNIER

*DATE(S) OF TESTS* : 6<sup>th</sup> of April, 2009 and 11<sup>th</sup> of May, 2009

*TESTS LOCATION(S)* : Emitech Grand Sud Laboratory in  
Vendargues (34)  
Open area test site in Salinelles (30)  
FCC Registration number: 812719  
IC Filing number : 4379C-1

*TESTS SUPERVISOR(S)* : None

*TESTS OPERATOR(S)* : David MONTAULON

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### 1. INTRODUCTION

This document submits the results of Electromagnetic Compatibility tests performed on the equipment RFID Module HF-AM1-IKON (denominated hereafter E.U.T.: equipment under test) according to document(s) listed below.

Bluetooth is active but not tested.

RFID module already tested (FCC ID : RJPRDHC-0202N0-0X).

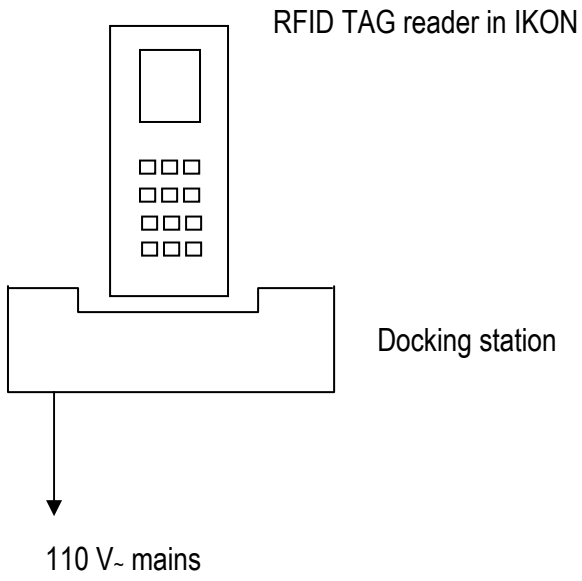
### 2. REFERENCE DOCUMENT(S)

RSS-210 Issue 7 (June 2007)	Low-power – Licence exempt Radiocommunication devices (All frequency bands): category 1 equipment
FCC Part 15 (July 2008)	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-HFAMIKON FCC ID: GM3HFAM1IKON ITU emission code: / Utilization: RFID TAG reader Antenna type: Incorporated antenna Antenna gain: Unknown Operating frequency range: 13.56 MHz Number of channels: 1 Channel spacing: / 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 & table 2 of RSS-Gen	YES.	
Radiated emissions - section 15-209 (below 30MHz) & table 3 of RSS-210	YES	
Radiated emissions - section 15-209 (above 30MHz) & table 2 of RSS-210	YES	
Field strength - section 15-225 & A 2.6 of RSS-210	YES	
Frequency tolerance - section 15.225 & A 2.6. of RSS-210	NP	(1)

N.P.: Not Performed.

N.A.: Not Applicable.

(1) RFID module already tested (FCC ID: RJPRDHC-0202N0-0X)

- In emission:

Sample subject to the test complies with prescriptions of the standard(s) FCC part 15: 07/2008 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: 07/2008 / 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	L.I.S.N.	80 cm

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

Test method deviation: No

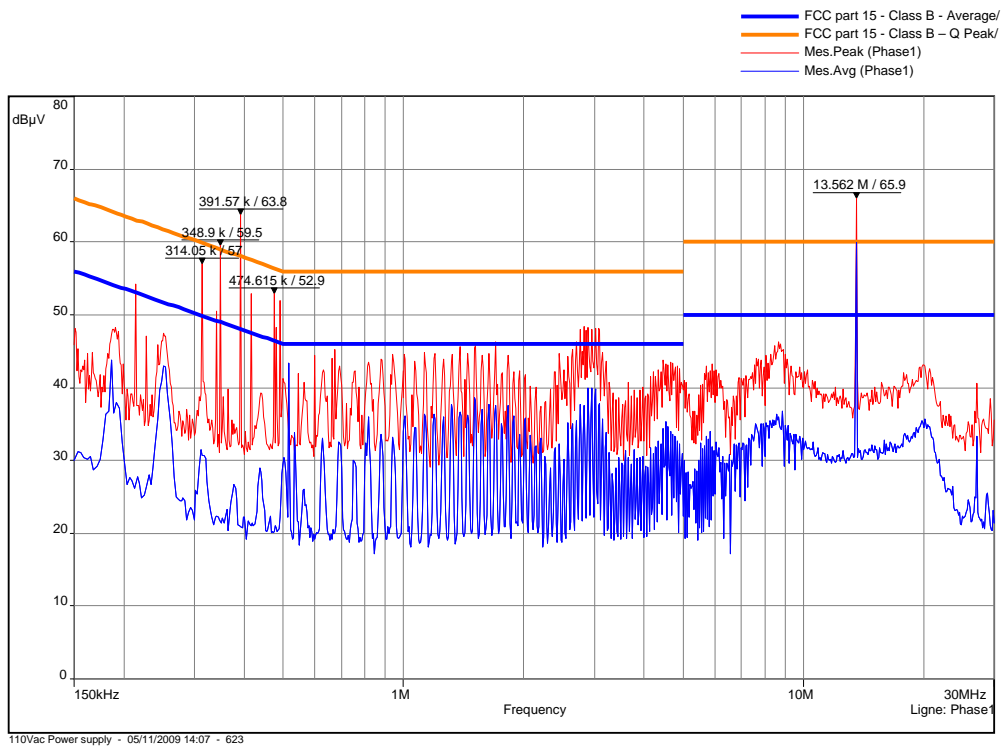
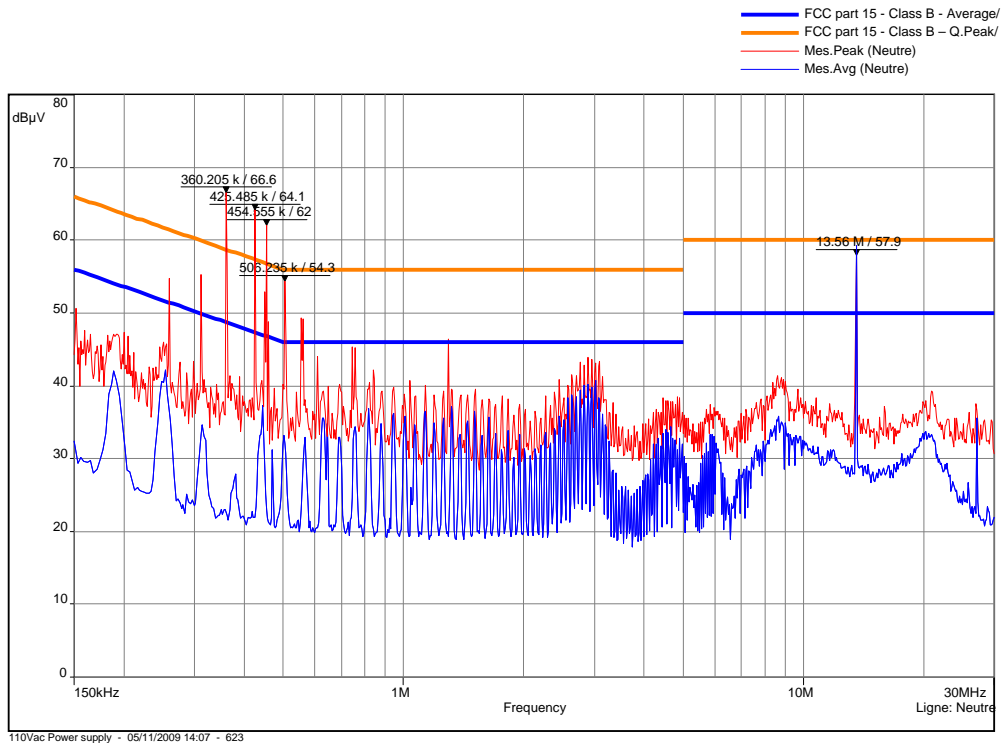
Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH
Cable			2724
Cable			2713
LISN	PMM	L3-25	0833
Receiver	Agilent Technologies	E7405A	2161
Shielding enclosure	RAY PROOF	C.GS3	1123
Software	Nexio	BAT EMC v.3.5.0.2.	0000
Surges Suppressor	Hewlett Packard	11947A	0239

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

**HF-AM1-IKON**

Conducted voltage emission (measurement): Mains 110Vac/60Hz.



Class: B of the standard



**7. RADIATED EMISSIONS - SECTION 15-209 AND TABLE 2.3 OF RSS-210**
**a) Radiated emissions (below 30MHz)**

Standard: FCC part 15: 07/2008 /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 dB $\mu$ A/m instead of  $\mu$ V/m
- Measuring distance is 3 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. Then published limits come from a theoretical conversion using an extrapolation factor of 20dB / decade (worst case).

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH
Antenna	Rohde & Schwarz	HFH2-Z2	5825
Cable			3239
Cable			2716
Cable		N-5m	2898
Receiver	Agilent Technologies	E7405A	2161
Shielded enclosure	Ray Proof	C.GS3	1123

Results: See Graph(s) (pre-measurement).

*b) Radiated emissions (above 30MHz)*

Standard: FCC part 15: 07/2008 / 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

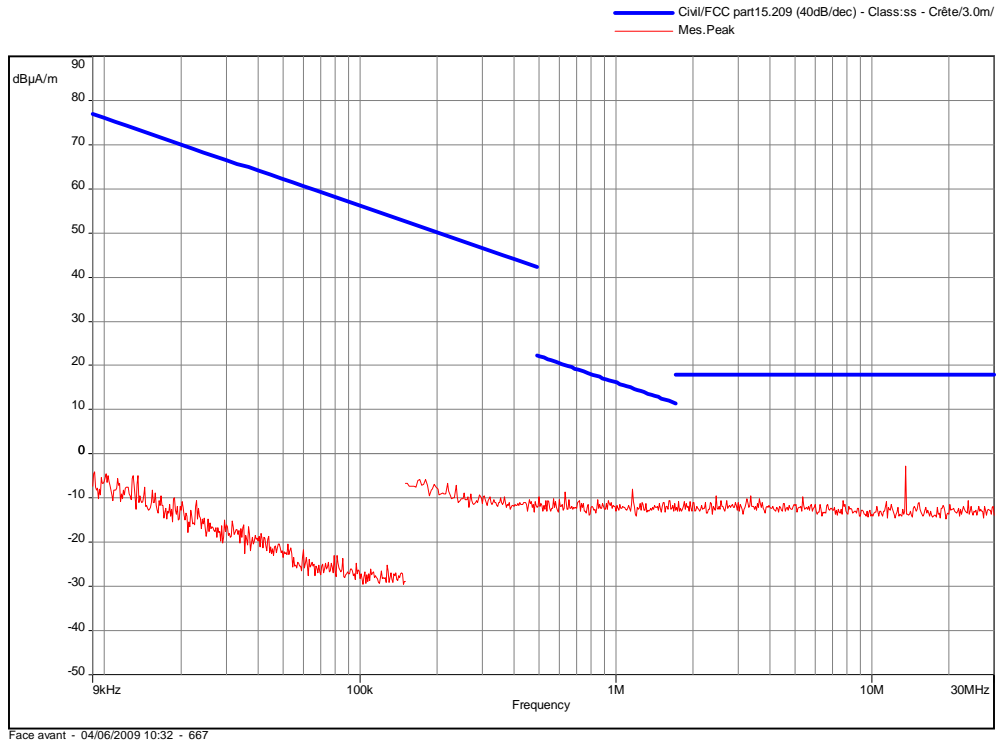
Test equipment list:

CATEGORY	BRAND	MODEL NUMBER	N° EMITECH
Antenna	Electro-Metrics	BIA-30HF	1107
Cable		N-1m	2706
Cable		N-2m	3239
Cable		N-5m	2716
Log-periodic antenna	Rohde & Schwarz	HL223	1137
OATS	Emitech	Salinelles	3482
Preamplifier	Mini-Circuits	26 dB	0524
Receiver	Agilent Technologies	E7405A	2161

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

**HF-AM1-IKON**

Radiated magnetic emission: 45°acw – peak detection - Distance: 3m



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

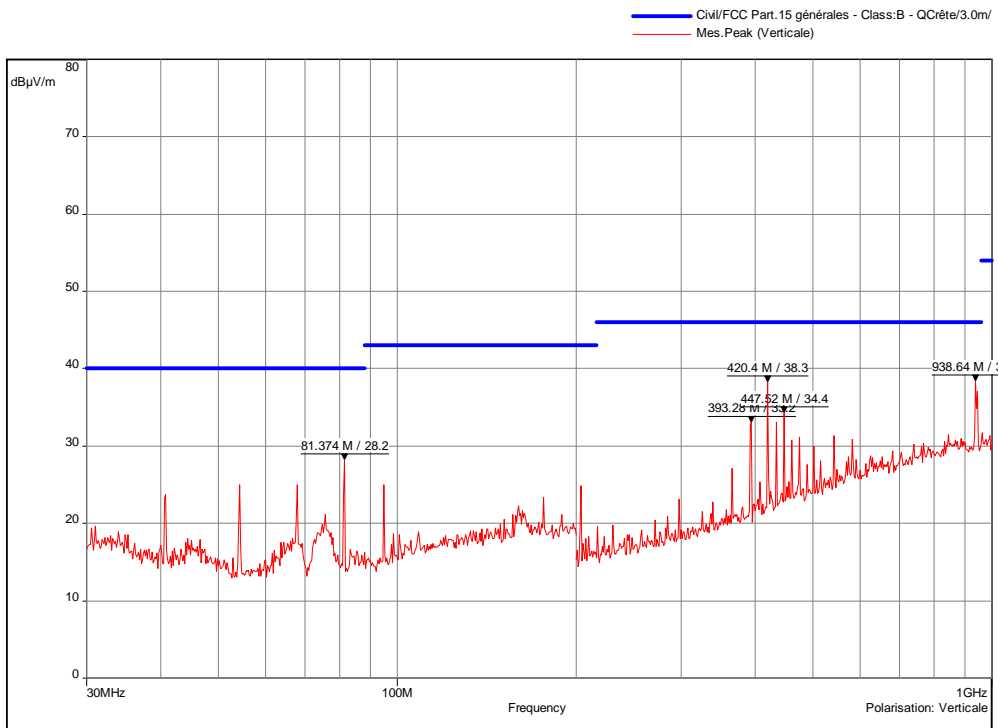
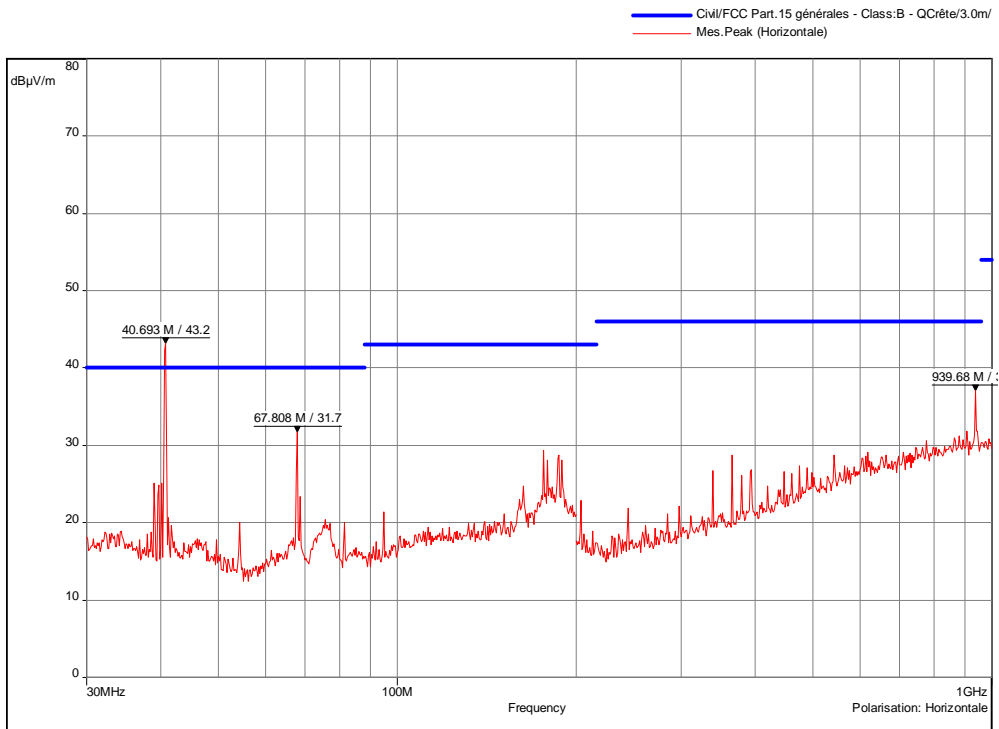
$$L = 20 \log(Ls) - 51.5 + 80 \quad (F < 490 \text{ kHz})$$

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

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

**HF-AM1-IKON**

Radiated electric emission (pre-measurement): back side – peak detection - Distance: 3m



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

*VERTICAL POLARIZATION*

Frequency (MHz)	Azimut (degrees)	Antenna height (cm)	Measure (dB $\mu$ V/m)	Standard limit (dB $\mu$ V/m)	Comments
40.68	0	100	26.58	40	C
54.24	0	100	33.91	40	C
67.80	0	100	19.59	40	C
81.36	0	100	24.99	40	C
383.28	0	150	27.48	46	C
420.40	0	200	34.08	46	C
447.52	0	200	30.07	46	C
528.84	0	201	31.52	46	C

C= Compliant

NC= Not compliant

*HORIZONTAL POLARIZATION*

Frequency (MHz)	Azimut (degrees)	Antenna height (cm)	Measure (dB $\mu$ V/m)	Standard limit (dB $\mu$ V/m)	Comments
40.68	135	400	26.48	40	C
67.80	0	100	17.99	40	C

C= Compliant

NC= Not compliant

All other radiated emissions are very lower than limit.

**8. OPERATION WITHIN THE BAND 13.110-14.010 MHz - SECTION 15-225 AND A 2.6 OF RSS-210**
**a) Field strength**

Standard: FCC part 15: 07/2008 / 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
13.11MHz-14.01MHz	Front side	10kHz	30kHz	Peak	80cm

Test method deviation:

Measurements are given in dB $\mu$ A/m instead of dB $\mu$ V/m (conversion factor: 51.5 dB)

Measuring distance is 10 meters instead of 30 m

Test equipment list:

CATEGORY	BRAND	MODEL NUMBER	N° EMITECH
Antenna	Electro-Metrics	BIA-30HF	1107
Cable		N-1m	2706
Cable		N-2m	3239
Cable		N-5m	2716
Log-periodic antenna	Rohde & Schwarz	HL223	1137
Preamplifier	Mini-Circuits	26 dB	0524
OATS	Emitech	Salinelles	3482
Receiver	Agilent Technologies	E7405A	2161

Results: See Graph(s) hereafter.

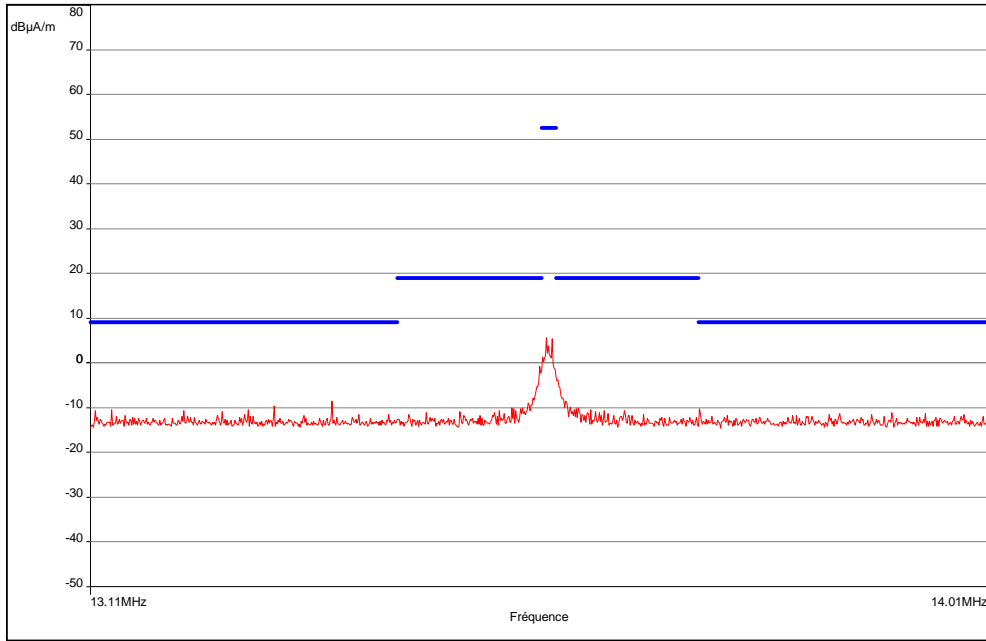
Carrier measurement at 10m: -4.36 dB $\mu$ A/m ( $\approx$  47.14 dB $\mu$ V/m)

Using an extrapolation factor of 40 dB/decade (as described in section 15.31 (f)), the level is about 27.14 dB $\mu$ V/m (15 $\mu$ V/m) at 30m for a limit at 15.848 mV/m.

**HF-AM1-IKON**

Radiated magnetic field emission: in peak detection - Distance: 3m

Fréquence : 13.11 MHz - 14.01 MHz (Mode analyseur) — Civil/FCC Part.15 (13.56MHz) - Classe:em - QCrête/3.0m/  
 Réglage: RBW: 10 kHz, VBW: 30 kHz, Temps de mesure : 5 ms/Pts, nombre de Balayages 10 — Mes.Peak  
 Polarisation : Circulaire  
 Distance: 3 m



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

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

with L : limit of this graph (in dBµA/m) and L<sub>s</sub> : limit of the standard (in µV/m)

For a 40 dB/decade extrapolation factor, please add 20 dB on graph limit.



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

# **ANNEX: PHOTOGRAPH(S)**



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

RFID Module HF-AM1-IKON

<p>E.U.T. Photograph(s)</p>	 A photograph of the IKON RFID module HF-AM1-IKON. The device is a handheld, ruggedized unit with a large screen at the top and a full QWERTY keyboard below. The brand name 'IKON' is visible at the top of the device. It is standing upright on a wooden surface.
<p>Radiated electric field emission on OATS</p>	 A photograph showing the IKON RFID module HF-AM1-IKON on a wooden table. The device is connected to a power source and a small antenna. A black power supply unit is visible on the right side of the table. The background shows a workshop or laboratory setting with a concrete wall and a window.