



R041-07-104508-1A - DM / CHB

RADIO TEST REPORT

According to the standard(s):

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

Equipment under test:

RFID PADDLE HF-T2-A3
FCC ID: GM3HFT2A3
IC: 2739D-HFT2A3
Company:

PSION TEKLOGIX

Diffusion: Mr PORTE

(Company: PSION TEKLOGIX)

Number of pages: 24 including 1 annex

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NAME OF THE EQUIPMENT UNDER TEST (E.U.T.) : RFID PADDLE HF-T2-A3

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
13591 AIX EN PROVENCE CEDEX 3
FRANCE

Person(s) present during the tests : Mr PORTE

Responsible : Mr PORTE

DATE(S) OF TESTS : September, the 24th of 2007

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

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 PADDLE HF-T2-A3 (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.

Test was also performed with 7535/PDM and PADDLE HF-T2-A3 connected to a PC

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

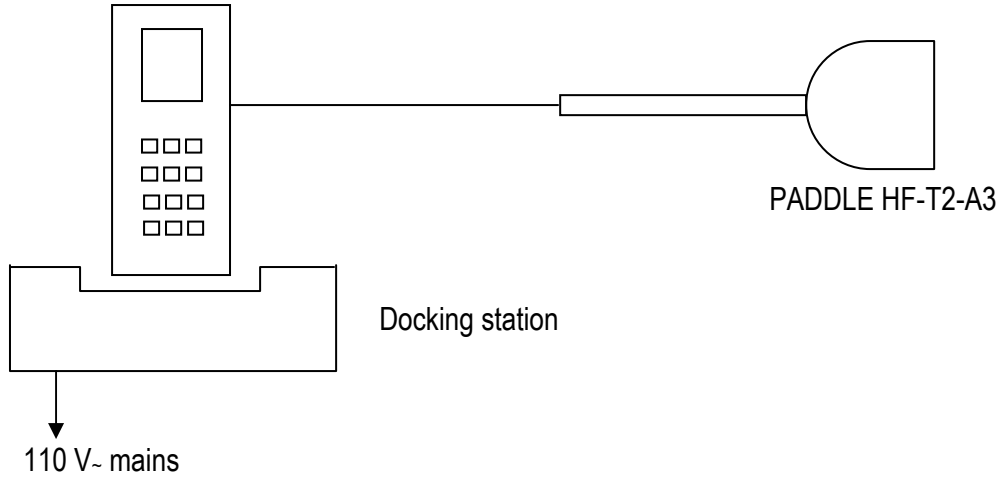
<u>Product description:</u>	IC: 2739D-HFT2A3 FCC ID: GM3HFT2A3 ITU emission code: / Utilization: RFID TAG reader Antenna type: Incorporated antenna Antenna gain: Unknown Operating frequency range: 13.56 MHz Number of channels: 1 Channel spacing: / Modulation: / Power source: 5 Vdc (stand alone) or mains voltage (with docking) Power level and frequency range are not user adjustable
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Equipment modifications applied before tests:

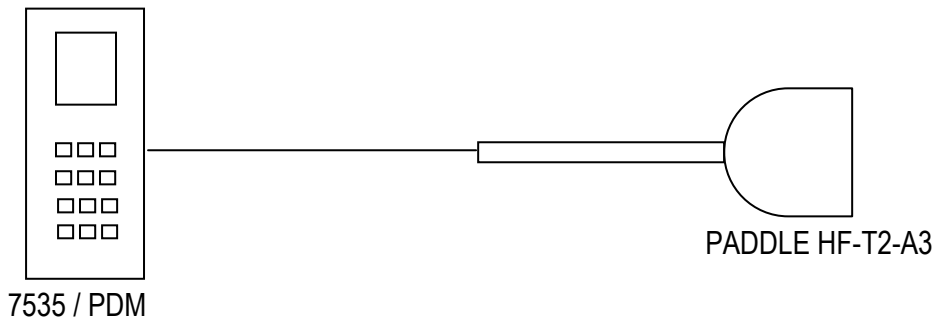
Place two ferrite 742 700 44 (Würth Elektronik) on PADDLE cable (Inside paddle)

4. EQUIPMENT UNDER TEST CONFIGURATION SCHEME

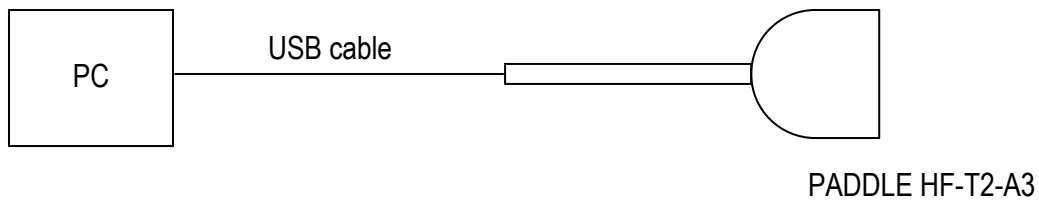
① RFID PADDLE HF6T2-A3 in WAPC with docking station:



② RFID PADDLE HF-T2-A3 mounted in 7535/PDM:



③ RFID PADDLE HF-T2-A3 connected to PC:



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.

(1) RFID module already tested

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 110Vac/60Hz on WAP C G2 with 50 Ohms load	L.I.S.N.	80 cm
Mains 110Vac/60Hz on 7535/PDM with 50 Ohms load	L.I.S.N.	80 cm

Frequency band	Tested cable(s)	Resolution bandwidth	Video bandwidth	Detection mode
150kHz-30MHz	Mains 110Vac/60Hz on WAP C G2 with 50 Ohms load	10KHz	30kHz	Peak
150kHz-30MHz	Mains 110Vac/60Hz on 7535/PDM with 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

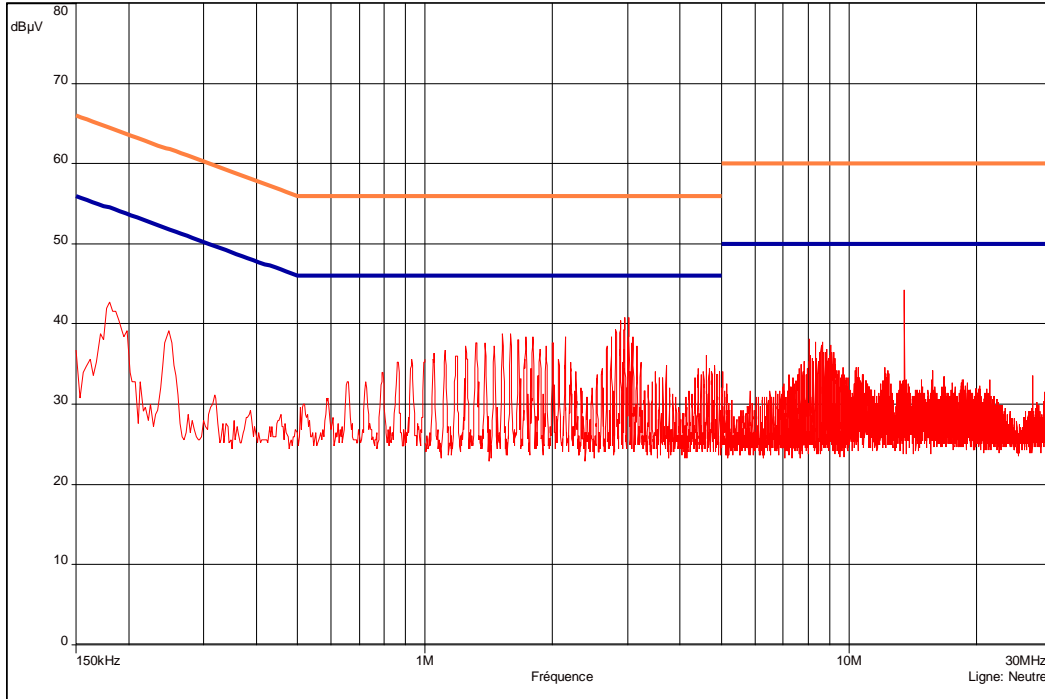
Results: See Graph(s) hereafter. Limits on the graphs are average and quasi-peak limits (upper limit).

RFID PADDLE HF-T2-A3

Conducted voltage emission (measurement): mains 110Vac/60Hz on WAP C G2
with 50 Ohms load in peak detection

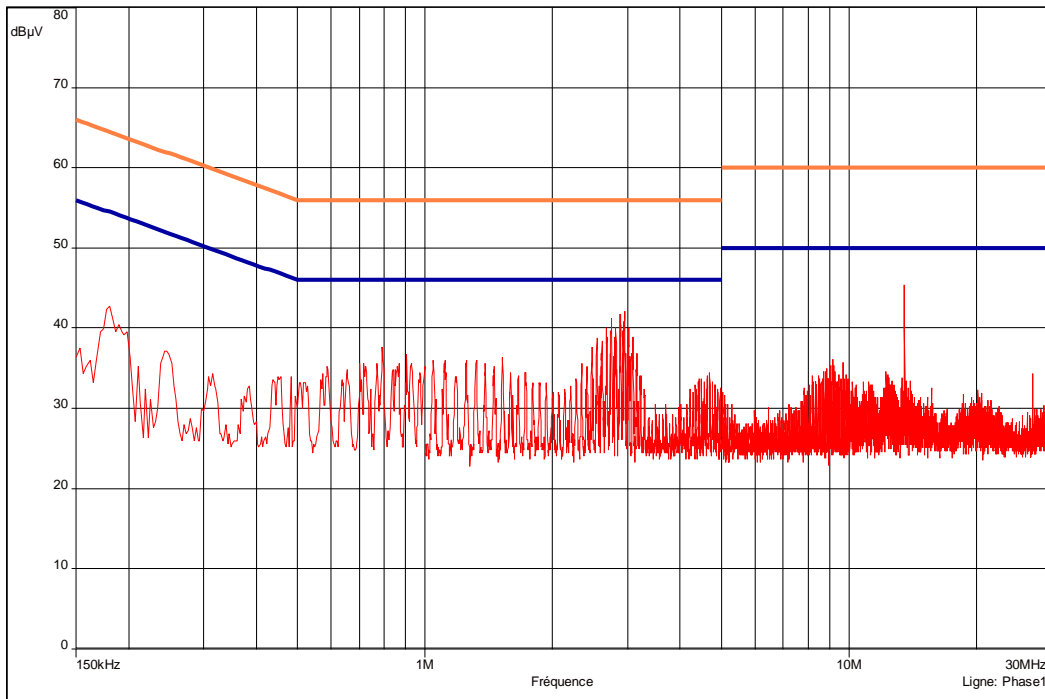
24/07/2007

- EN 55022 Ed.98 - Classe:B - Moyenne/
- EN 55022 Ed.98 - Classe:B - QCrête/
- Mes.Peak (Neutre)



Mains 110Vac/60Hz on WAP C G2 with 50 Ohms load - 24/07/2007 14:57 - 625

- EN 55022 Ed.98 - Classe:B - Moyenne/
- EN 55022 Ed.98 - Classe:B - QCrête/
- Mes.Peak (Phase1)



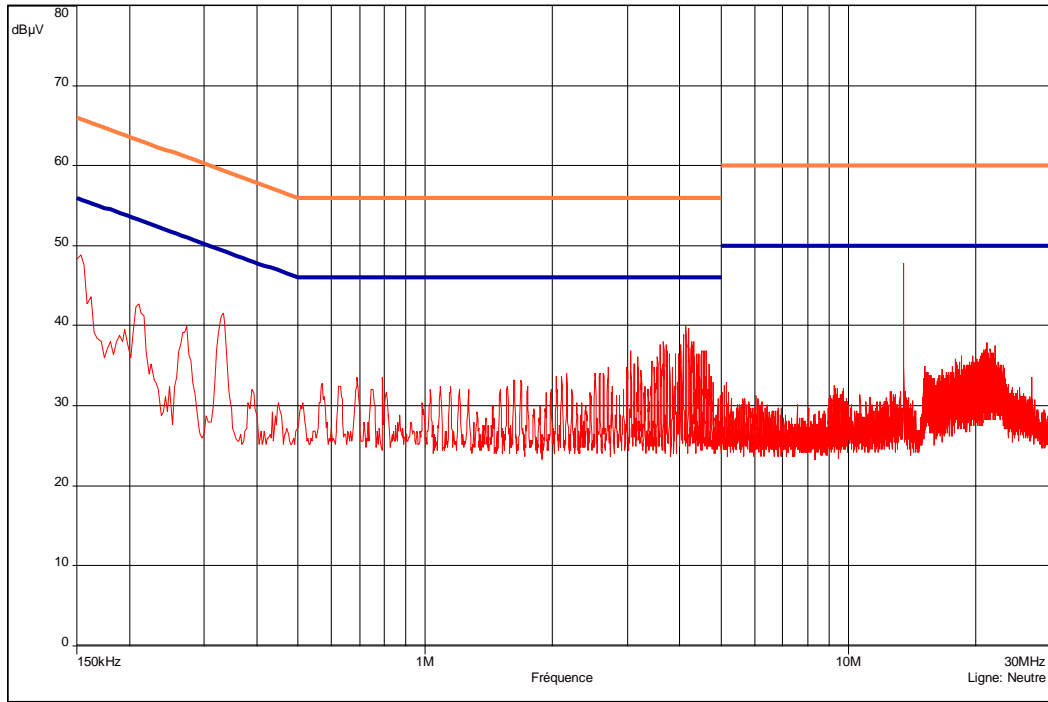
Mains 110Vac/60Hz on WAP C G2 with 50 Ohms load - 24/07/2007 14:57 - 625

RFID PADDLE HF-T2-A3

Conducted voltage emission (measurement): mains 110Vac/60Hz on 7535/PDM
with 50 Ohms load in peak detection

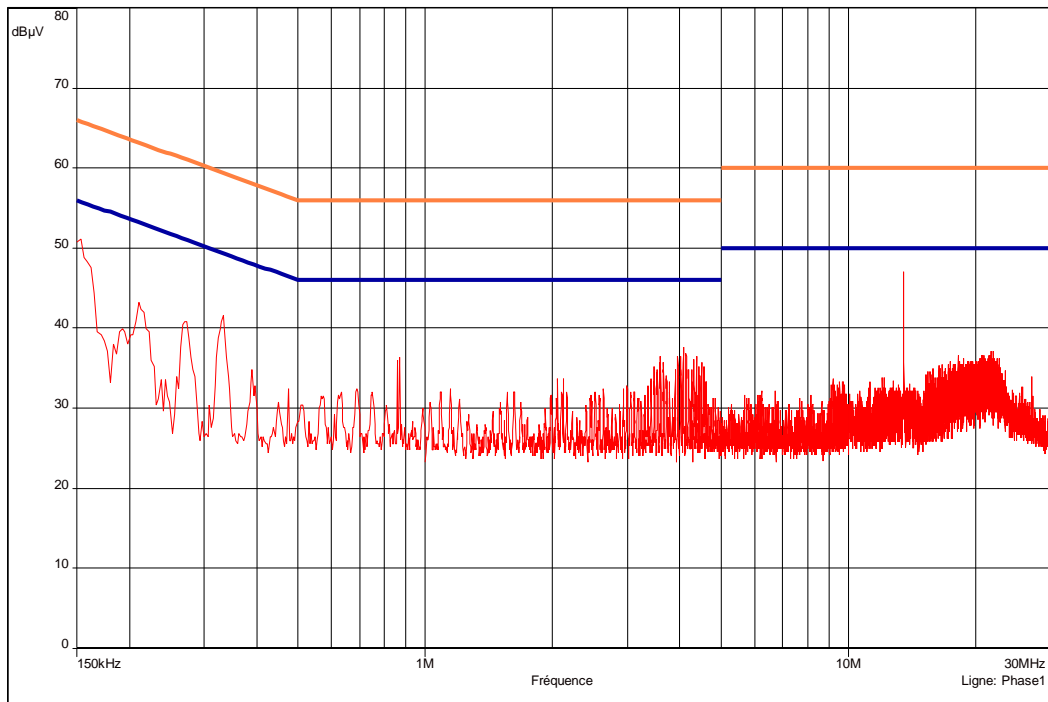
24/07/2007

- EN 55022 Ed.98 - Classe:B - Moyenne/
- EN 55022 Ed.98 - Classe:B - QCrête/
- Mes.Peak (Neutre)



Mains 110Vac/60Hz on 7535/PDM with 50 Ohms load - 24/07/2007 15:17 - 626

- EN 55022 Ed.98 - Classe:B - Moyenne/
- EN 55022 Ed.98 - Classe:B - QCrête/
- Mes.Peak (Phase1)



Mains 110Vac/60Hz on 7535/PDM with 50 Ohms load - 24/07/2007 15:17 - 626

7. RADIATED EMISSIONS - SECTION 15-209 AND 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	1kHz	3kHz	Peak	80cm
35kHz-75kHz	Front side	1kHz	3kHz	Peak	80cm
75kHz-150kHz	Front side	1kHz	3kHz	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 was performed in 3 configurations: HF-T2-A3 mounted on WAP-C-G2 with docking station, on 7535/PDM and with a PC (connected by USB)

Test method deviation:

- Measurements are made in peak detection instead of average mode
- Measurements are given in dB μ A/m instead of μ 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	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) (measurement).

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-1GHz	Front side on WAP-C-G2 with docking station (pre-measurement in semi anechoic chamber)	100kHz	300kHz	Peak	80cm
30MHz-1GHz	Front side on 7535/PDM (pre-measurement in semi anechoic chamber)	100kHz	300kHz	Peak	80cm
30MHz-1GHz	Front side/connected to a PC (by USB) (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:

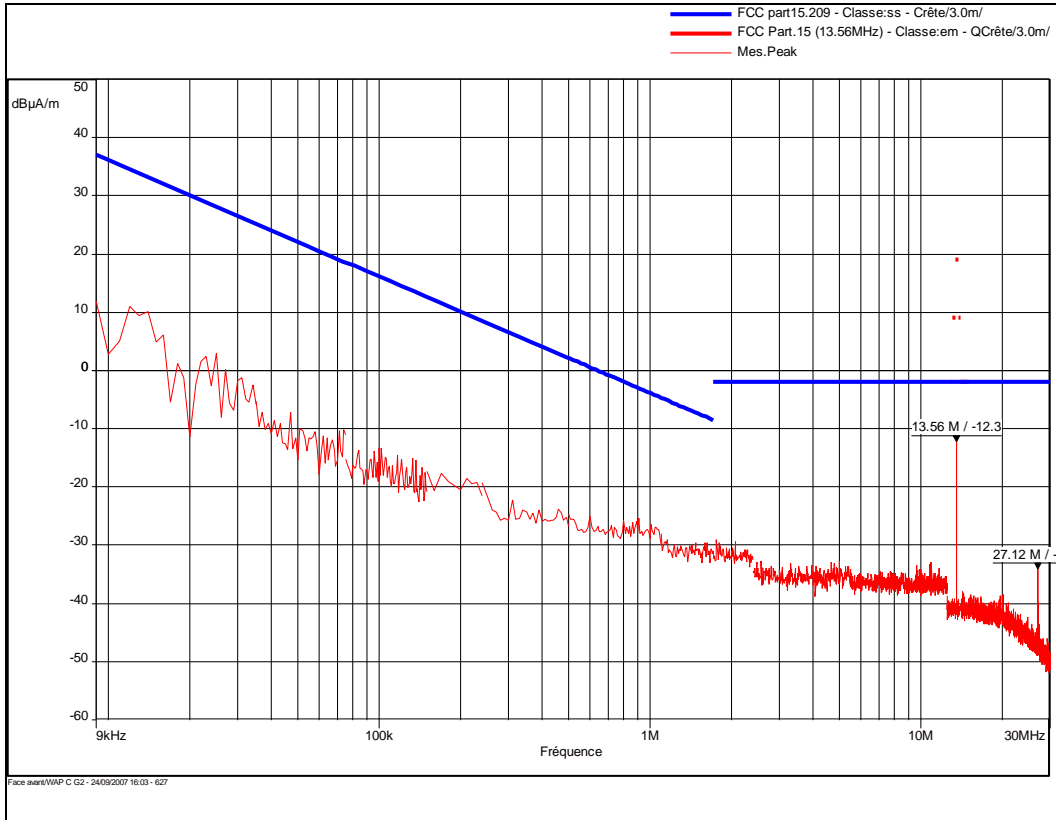
CATEGORY	BRAND	MODEL NUMBER	N° EMITECH
Antenna	Electro-Metrics	BIA-30HF	0824
Cable		N-17m	3620
Cable		N-8m	3694
Cable		N-8m	2715
Log-periodic antenna	Rohde & Schwarz	HL223	3126
OATS	Emitech	Salinelles	3482
Receiver	Rohde & Schwarz	ESVS10	3211

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

RFID PADDLE HF-T2-A3

Radiated magnetic emission: front side on WAP-C-G2 with docking station
(pre-measurement in semi anechoic chamber) 45°acw – peak detection - distance: 3m

24/09/2007



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)

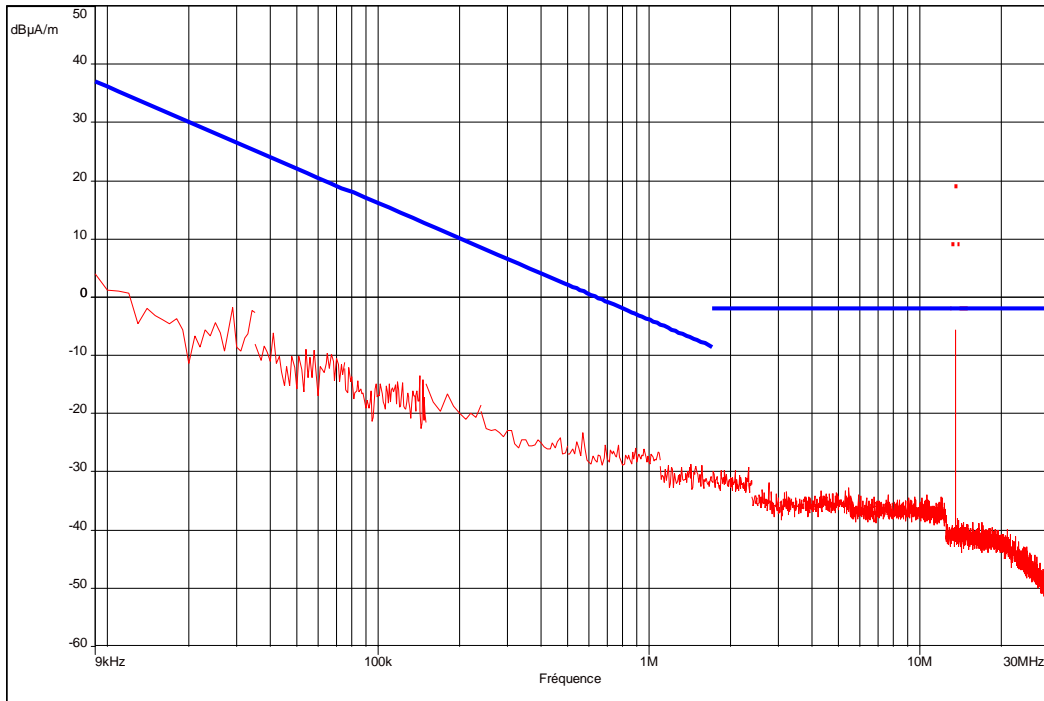
For a 40 dB/decade extrapolation factor, please add 40 dB on graph limit below 490 kHz and 20 dB above.

RFID PADDLE HF-T2-A3

Radiated magnetic emission: front side on 7535/PDM
 (Pre-measurement in semi anechoic chamber) 45°acw – peak detection - distance: 3m

24/09/2007

— FCC part15.209 - Classe:ss - Crête/3.0m/
 — FCC Part.15 (13.56MHz) - Classe:em - QCrête/3.0m/
 — Mes.Peak



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)

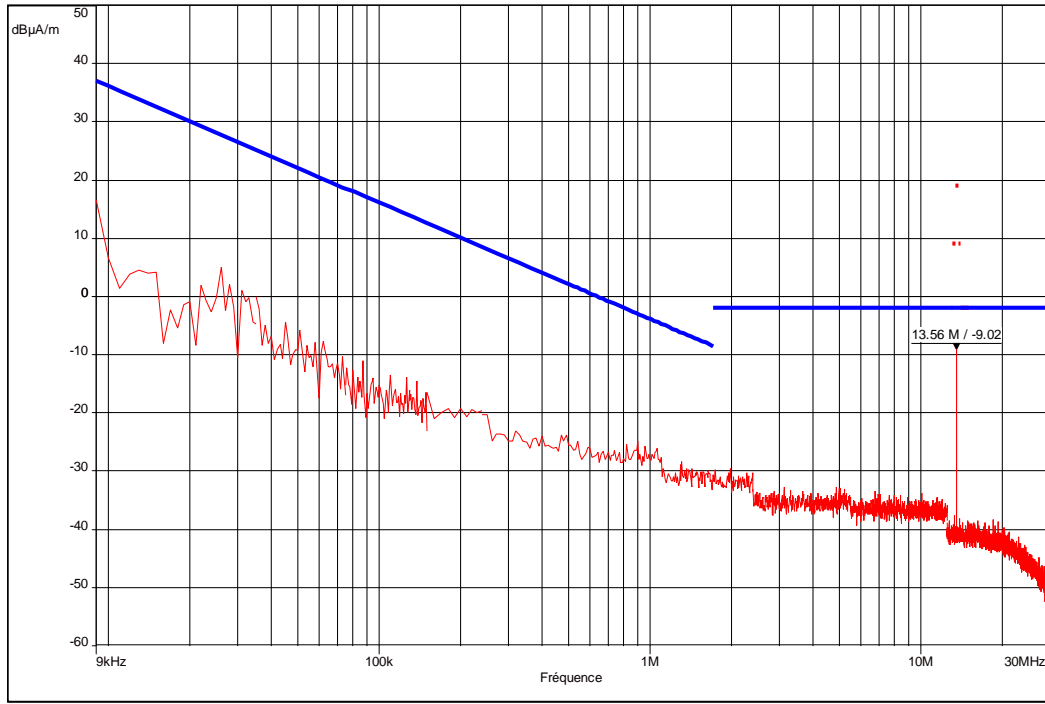
For a 40 dB/decade extrapolation factor, please add 40 dB on graph limit below 490 kHz and 20 dB above.

RFID PADDLE HF-T2-A3

Radiated magnetic emission: front side/connected to a PC (by USB)
 (Pre-measurement in semi anechoic chamber) 45° acw – peak detection - distance: 3m

24/09/2007

— FCC part15.209 - Classe:ss - Crête/3.0m/
 — FCC Part.15 (13.56MHz) - Classe:em - QCrête/3.0m/
 — Mes.Peak



Fichier:PC - 24/09/2007 10:21 - 631

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

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

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

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

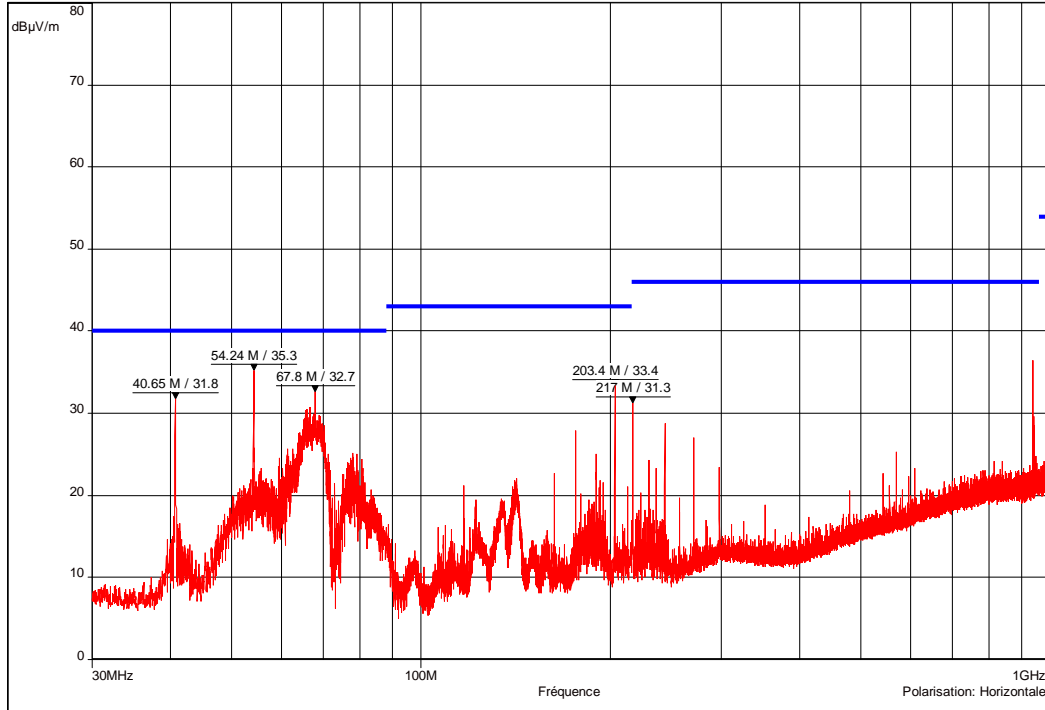
For a 40 dB/decade extrapolation factor, please add 40 dB on graph limit below 490 kHz and 20 dB above.

RFID PADDLE HF-T2-A3

Front side on WAP-C-G2 with docking station (pre-measurement):
 peak detection - distance : 3m

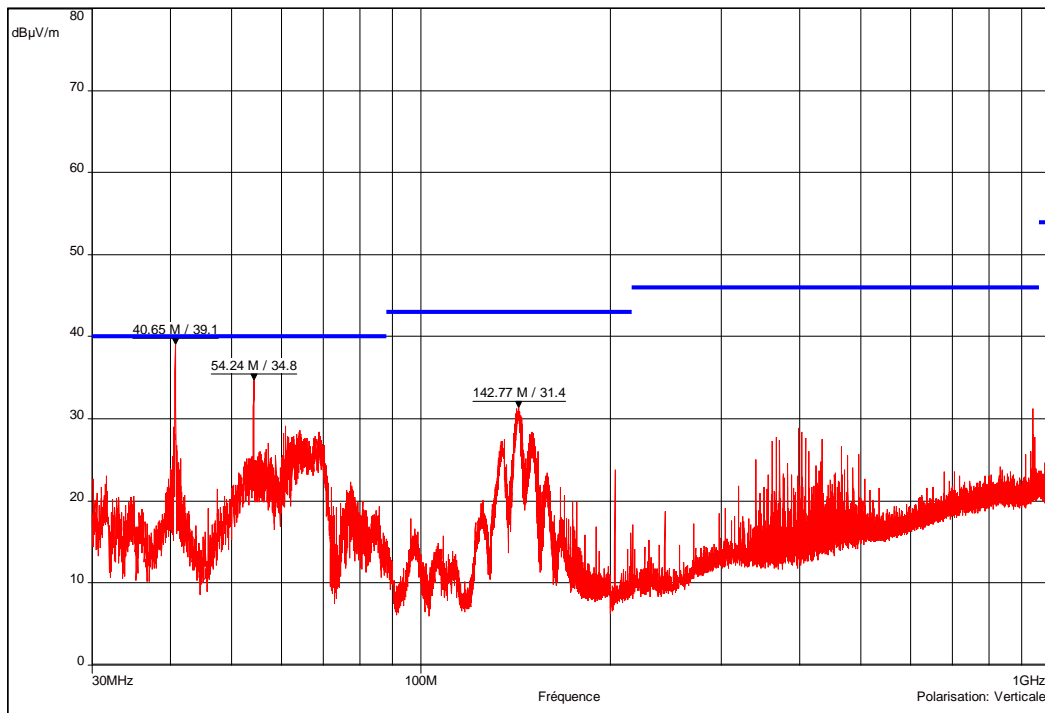
24/09/2007

— FCC Part.15 - Classe:B - QCrête/3.0m/
 — Mes.Peak (Horizontale)



Face avant/WAP C G2/docking/2 F 742 700 44 on RF paddle cable (middle) - 24/09/2007 11:38 - 619

— FCC Part.15 - Classe:B - QCrête/3.0m/
 — Mes.Peak (Verticale)

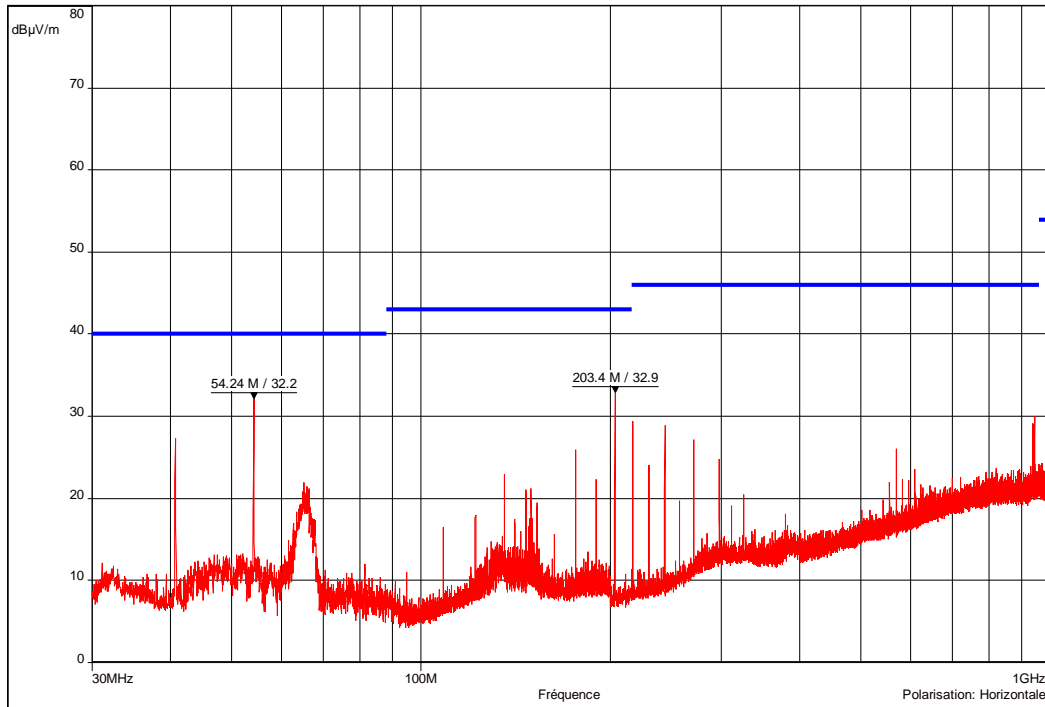


Face avant/WAP C G2/docking/2 F 742 700 44 on RF paddle cable (middle) - 24/09/2007 11:38 - 619

RFID PADDLE HF-T2-A3
 Front side on 7535/PDM (pre-measurement):
 peak detection - distance: 3m

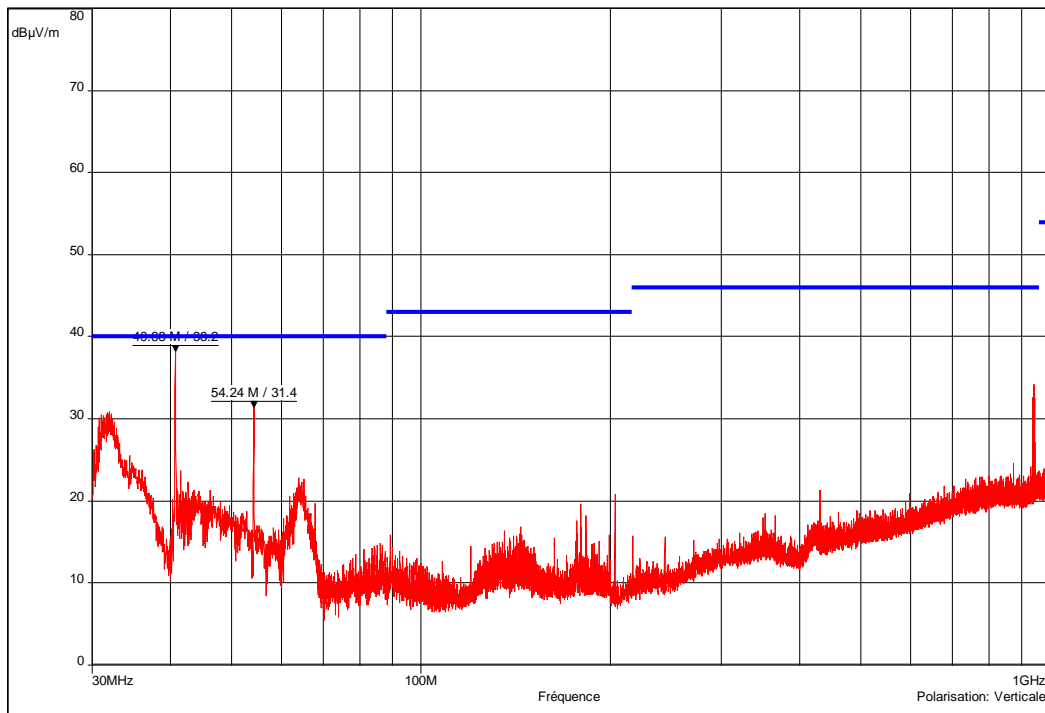
24/09/2007

— FCC Part.15 - Classe:B - QCrête/3.0m/
 — Mes.Peak (Horizontale)



Face avant/7535/PDM/2 F 742 700 44 on RF paddle cable (middle) + shielded link to frame(other board) - 24/09/2007 13:32 - 622

— FCC Part.15 - Classe:B - QCrête/3.0m/
 — Mes.Peak (Verticale)

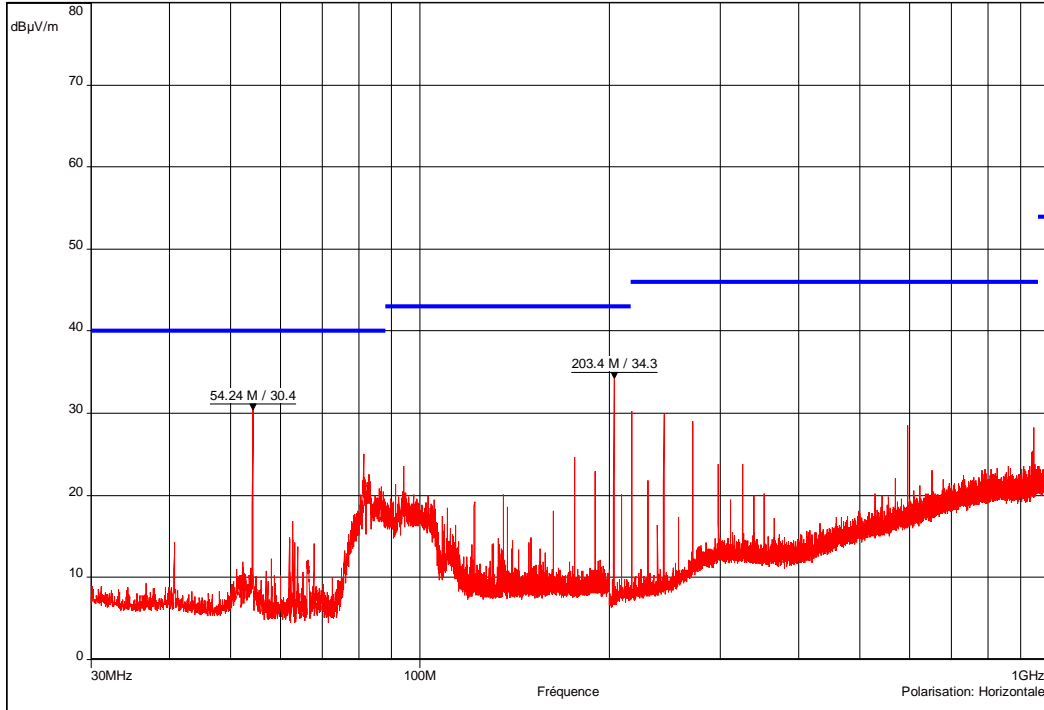


Face avant/7535/PDM/2 F 742 700 44 on RF paddle cable (middle) + shielded link to frame(other board) - 24/09/2007 13:32 - 622

RFID PADDLE HF-T2-A3
 Front side/connected to a PC (by USB) (pre-measurement):
 peak detection - distance: 3m

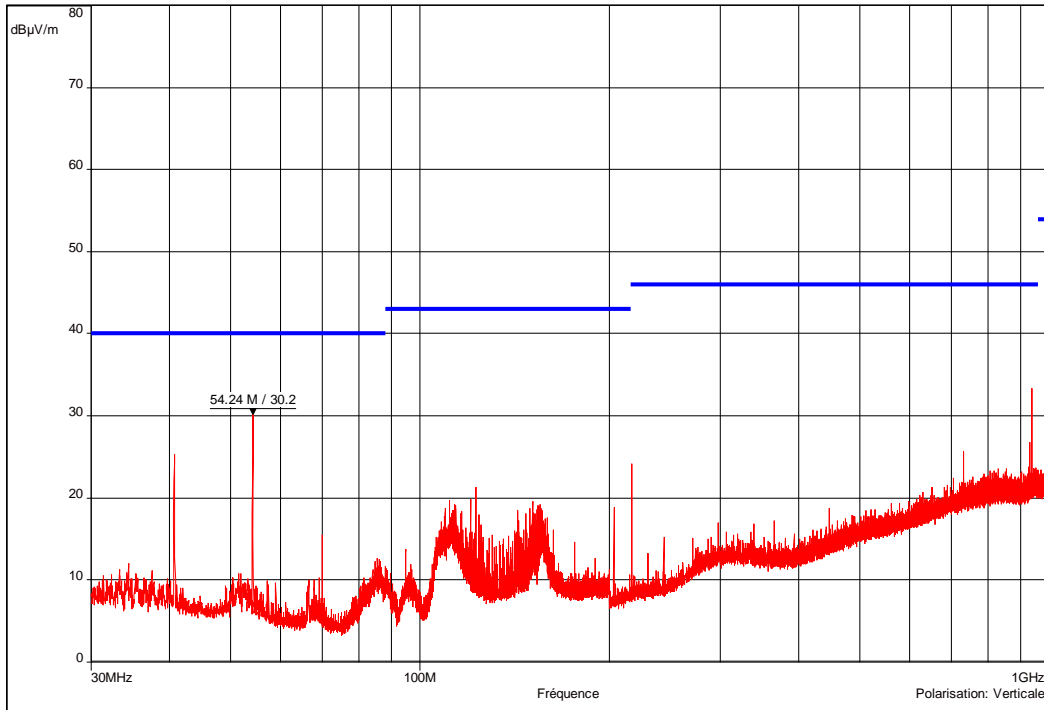
24/09/2007

— FCC Part.15 - Classe:B - QCrête/3.0m/
 — Mes.Peak (Horizontale)



Face avant/PC/2 F 742 700 44 on RF paddle cable (middle) - 24/09/2007 13:57 - 624

— FCC Part.15 - Classe:B - QCrête/3.0m/
 — Mes.Peak (Verticale)



Face avant/PC/2 F 742 700 44 on RF paddle cable (middle) - 24/09/2007 13:57 - 624

c) Final radiated electric emission on Open Area Test Site – Quasi peak detection - Distance: 3m

RFID PADDLE HF-T2-A3 ON WAP-C-G2 WITH DOCKING STATION

Frequency (MHz)	Polarization	Azimuth (degrees)	Antenna height (cm)	Measure (dB μ V/m)	Standard limit (dB μ V/m)	Comments
40.68	Vertical	238	100	37.72	40	C
54.24	Vertical	135	100	31.81	40	C
67.80	Vertical	0	100	24.57	40	C
142.77	Vertical	0	100	18.70	43	C
40.68	Horizontal	180	350	27.36	40	C
54.24	Horizontal	0	350	28.44	40	C
203.40	Horizontal	180	150	40.23	43	C
217.00	Horizontal	180	144	39.43	46	C

C= Compliant

NC= Not compliant

RFID PADDLE HF-T2-A3 ON 7535/PDM

Frequency (MHz)	Polarization	Azimuth (degrees)	Antenna height (cm)	Measure (dB μ V/m)	Standard limit (dB μ V/m)	Comments
40.68	Vertical	83	100	39.84	40	C
54.24	Vertical	180	150	33.20	40	C
54.24	Horizontal	140	400	28.31	40	C
203.40	Horizontal	150	150	38.85	43	C

C= Compliant

NC= Not compliant

RFID PADDLE HF-T2-A3 CONNECTED TO A PC(BY USB)

Frequency (MHz)	Polarization	Azimuth (degrees)	Antenna height (cm)	Measure (dB μ V/m)	Standard limit (dB μ V/m)	Comments
54.24	Vertical	89	184	29.94	40	C
54.24	Horizontal	180	400	29.96	40	C
203.40	Horizontal	141	154	38.97	43	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: 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
13.11MHz-14.01MHz	Front side	10kHz	30kHz	Peak	80cm

Test was performed in 3 configurations: HF-T2-A3 mounted on WAP-C-G2 with docking station, on 7535/PDM and with a PC (connected by USB)

Test method deviation:

Measurements are given in dB μ A/m instead of dB μ V/m (conversion factor: 51.5 dB)
Measuring distance is 3 or 10 meters instead of 30 m

Test equipment list:

CATEGORY	BRAND	MODEL NUMBER	N° EMITECH
Antenna	Electro-Metrics	ALR-25	0263
Cable		N-5m	2898
Cable		N-17m	3620
OATS	Emitech	Salinelles	3482
Preamplifier	MINI-CIRCUITS	RF	1321
Receiver	Agilent Technologies	Agilent E7405A	2161

Results: See Graph(s) hereafter.

RFID PADDLE HF-T2-A3 on WAP-C-G2 with docking station:

Carrier measurement at 10m: -10 dB μ A/m (\approx 41.5 dB μ V/m)

Using an extrapolation factor of 40 dB/decade (as described in section 15.31 (f)), the level is about 21.5 dB μ V/m (12 μ V/m) for a limit at 15.848 mV/m.

RFID PADDLE HF-T2-A3 on 7535/PDM:

Carrier measurement at 10m: -8 dB μ A/m (\approx 43.5 dB μ V/m)

Using an extrapolation factor of 40 dB/decade (as described in section 15.31 (f)), the level is about 23.5 dB μ V/m (15 μ V/m) for a limit at 15.848 mV/m.

RFID PADDLE HF-T2-A3 on PC:

Carrier measurement at 10m: -11 dB μ A/m (\approx 40.5 dB μ V/m)

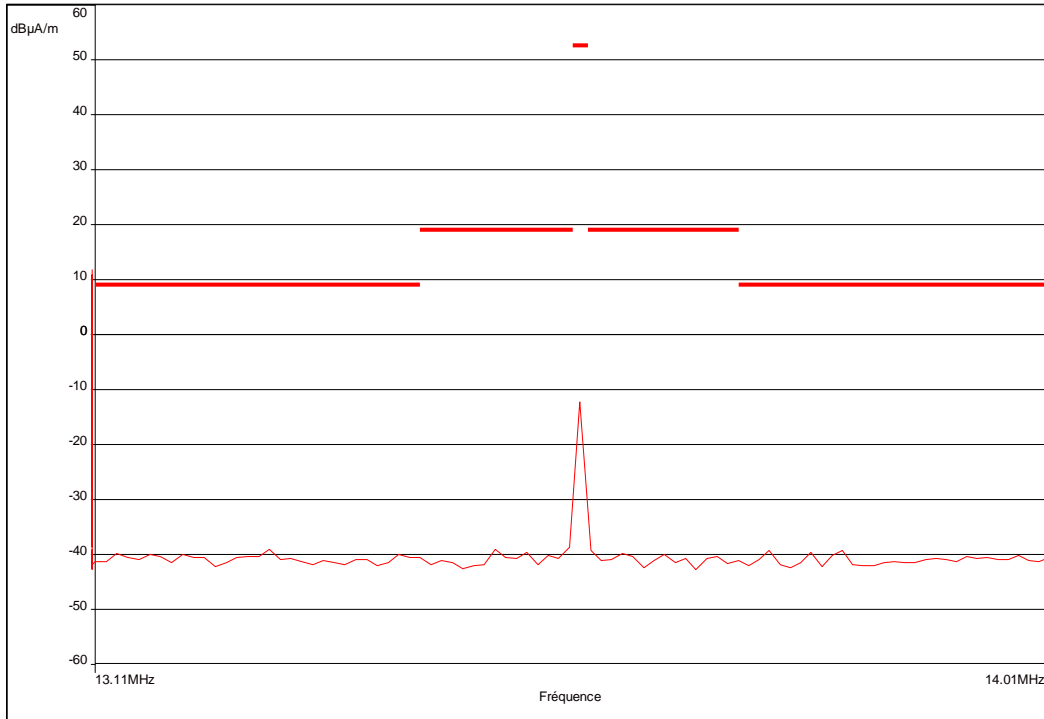
Using an extrapolation factor of 40 dB/decade (as described in section 15.31 (f)), the level is about 20.5 dB μ V/m (10.6 μ V/m) for a limit at 15.848 mV/m.

RFID PADDLE HF-T2-A3

Radiated magnetic emission: front side on WAP-C-G2 with docking station
(Pre-measurement in semi anechoic chamber) 45°acw – peak detection - distance: 3m

24/09/2007

— FCC Part.15 (13.56MHz) - Classe:em - QCrête/3.0m/
— Mes.Peak



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

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

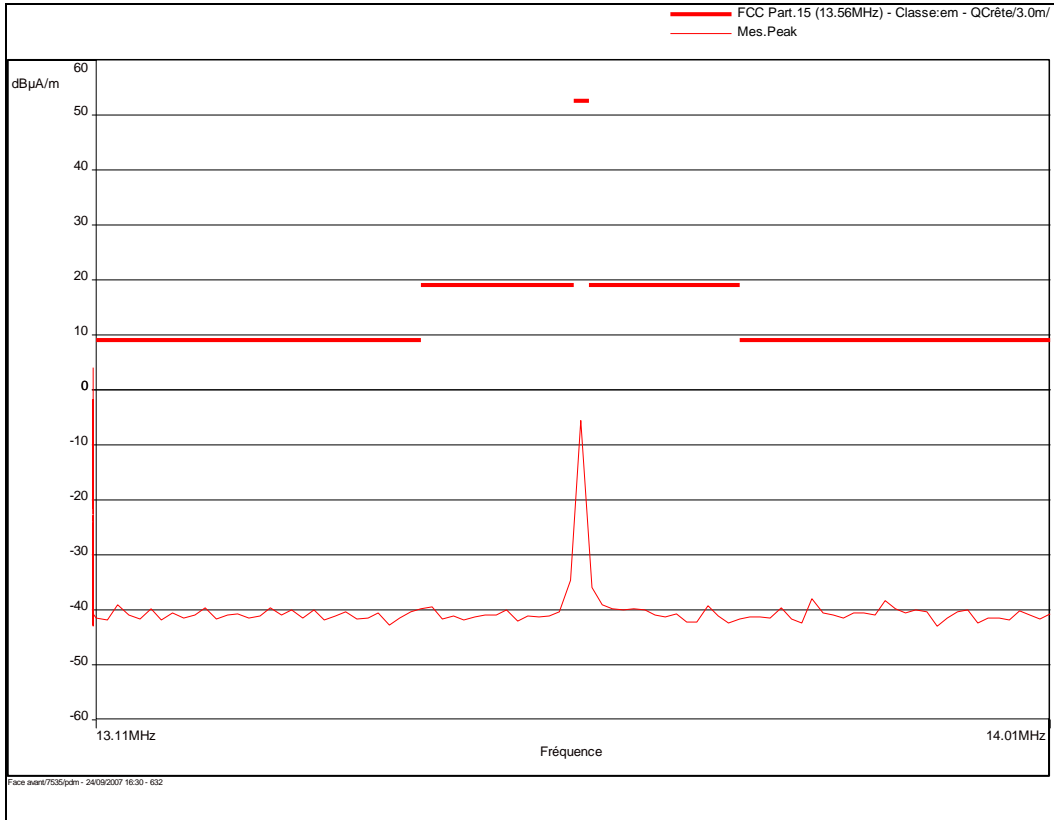
with L: limit of this graph (in dBµA/m) and L_s: limit of the standard (in µV/m)

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

RFID PADDLE HF-T2-A3

Radiated magnetic emission: front side on 7535/PDM
 (Pre-measurement in semi anechoic chamber) 45°acw – peak detection - distance: 3m

24/09/2007



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

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

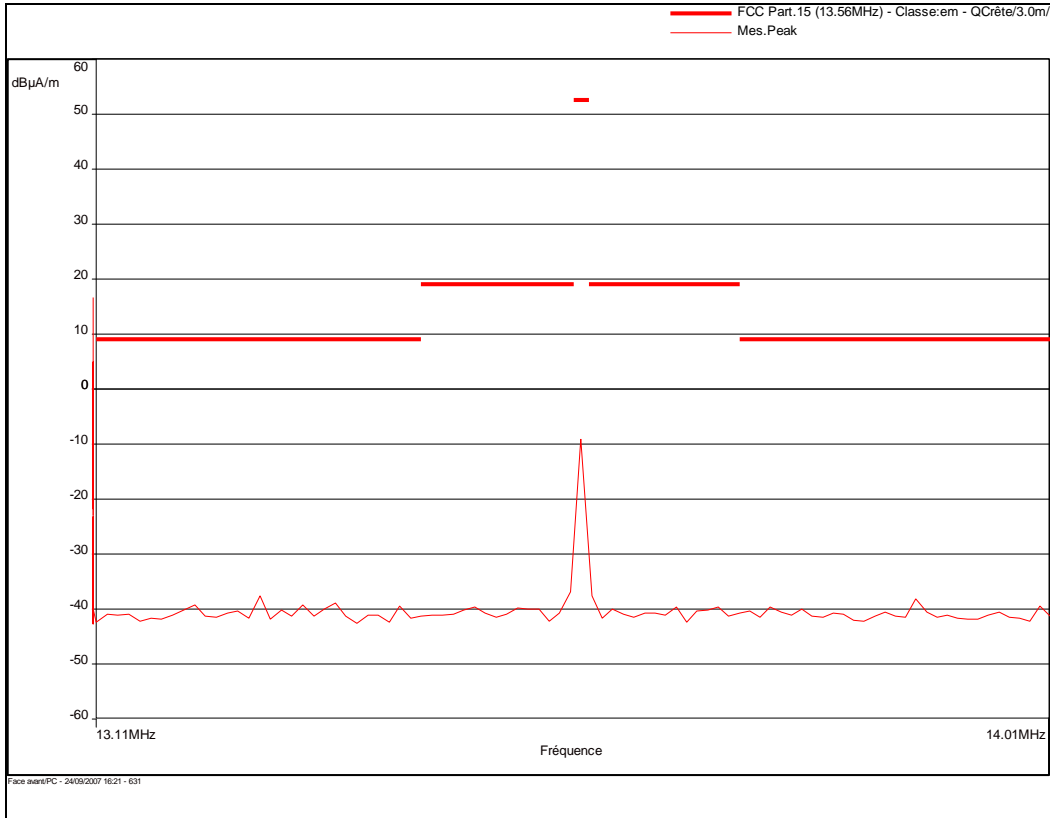
with L: limit of this graph (in dBµA/m) and Ls: limit of the standard (in µV/m)

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

RFID PADDLE HF-T2-A3

Radiated magnetic emission: Front side/connected to a PC (by USB)
 (Pre-measurement in semi anechoic chamber) 45°acw – peak detection - distance: 3m

24/09/2007



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

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

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 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 PADDLE HF-T2-A3

Radiated electric field emission on OATS

