

R041-10-101358-4A - DM / CHB

RADIO TEST REPORT

According to the standard(s):

FCC part 15 Subpart C

RSS-Gen:2010

RSS-210:2010

Equipment under test:

TAG READER A-NFC2

DeskRead

FCC ID: Q45DESKREAD

IC: 4717A - DESKREAD

Company:

INSIDE SECURE

Diffusion: Mr DEMANGE

(Company: INSIDE SECURE)

Number of pages: 29 including 1 annex

Ed.	Date	Modified page(s)	Written by		Technical verification and Quality approval	
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3	29-Jun-12	3, 6 to 9, 26 to 28	David MONTAULON		Regis GONZALEZ	

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NAME OF THE EQUIPMENT UNDER TEST (E.U.T.) : TAG READER A-NFC2

Serial number : 1

Part number : /

Software Version : /

MANUFACTURER'S NAME : INSIDE SECURE

APPLICANT'S ADDRESS:

Company : INSIDE SECURE

Address : ZAC de Pichaury - 41 Parc du Club du Golf
13856 AIX EN PROVENCE CDX 3
FRANCE

Person(s) present during the tests : Mr DEMANGE

Responsible : Mr DEMANGE

DATE(S) OF TESTS : October, the 4th and 5th of 2011 and June,
the 20th of 2012

TESTS LOCATION(S) : Emitech Grand Sud Laboratory in
Vendargues (34) - France
Open area test site in Salinelles (30) - France
FCC Registration number: 8127-19
IC Filling number : 4379C-1

TESTS SUPERVISOR(S) : None

TESTS OPERATOR(S) : David MONTAULON and Régis
GONZALEZ

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1. INTRODUCTION

This document submits the results of Electromagnetic Compatibility tests performed on the equipment **TAG READER A-NFC2** (denominated hereafter E.U.T.: equipment under test) according to document(s) listed below.

2. REFERENCE DOCUMENT(S)

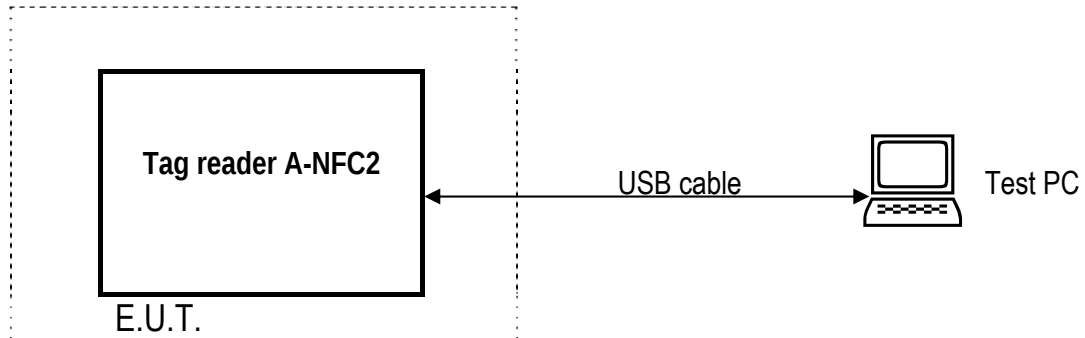
FCC Part 15	Code of Federal Regulations Title 47 – Telecommunications Chapter 1 – Federal Communications Commission Part 15 – Radio frequency devices Subpart C – Intentional Radiators
ANSI C 63.4 (2003)	American National Standard for Methods of measurement of Radio-Noise from low-voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
RSS-210:2010 Issue 8, December 2010	Low-power – Licence exempt Radiocommunication devices (all frequency bands): category 1 equipment
RSS-Gen: 2010	General requirements and information for the Certification of radiocommunication equipment

3. EQUIPMENT UNDER TEST CONFIGURATION

Product description:

The TAG READER A-NFC2 is radio equipment with a contactless card interface (13.56MHz with an internal antenna):

FCC ID: Q45DESKREAD
IC: 4717A - DESKREAD
ITU emission code: /
Utilization: RFID TAG reader
Antenna type: Incorporated antennas
Antenna gain: Unknown
Operating frequency range: 13.56 MHz
Number of channels: 1
Channel spacing: /
Power source: USB
Power level and frequency range are not user adjustable

4. EQUIPMENT UNDER TEST CONFIGURATION SCHEME

5. SUMMARY OF TEST RESULTS

Tests designation	Results satisfying?	Comments
Antenna requirement - section 15.203	YES	Integrated antenna
Restricted band of operation - section 15.205	YES	
Conducted emissions - section 15.207, RSS-Gen: 2010 § 7.2.2.	YES	
Radiated emissions (below 30MHz) - section 15.209 & RSS-210: 2010 (§2.7 table 3)	YES	
Radiated emissions (above 30MHz) - section 15.209, RSS-210: 2010 (§2.7 table 2)	YES	
Field strength - section 15.225, RSS-210: 2010 (annex A.2.6)	YES	
Frequency tolerance - section 15.225	YES	
Occupied bandwidth - CNR-Gen § 4.6	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 Subpart C 15.225, RSS-Gen: 2010 & RSS-210:2010 according to limits specified in this test report.

6. CONDUCTED EMISSION

Temperature (°C): 25

Humidity (%HR): 50

Pressure (hPa): 1005

Standard: FCC Part 15 Subpart C 15.109 & RSS-GEN: 2010 (§7.2.4)

Test method: ANSI C63.4:2003

Test configuration:

Tested cable(s)	Measure with	E.U.T. height
115Vac/60Hz power supply	L.I.S.N.	40cm
115Vac/60Hz power supply / 12 ohms load instead of antenna	L.I.S.N.	40cm

Frequency band	Tested cable(s)	Resolution bandwidth	Video bandwidth	Detection mode
150kHz-30MHz	115Vac/60Hz power supply	10kHz	30kHz	Peak
150kHz--30MHz	115Vac/60Hz power supply / 12 ohms load instead of antenna	10kHz	30kHz	Peak

Test method deviation: No

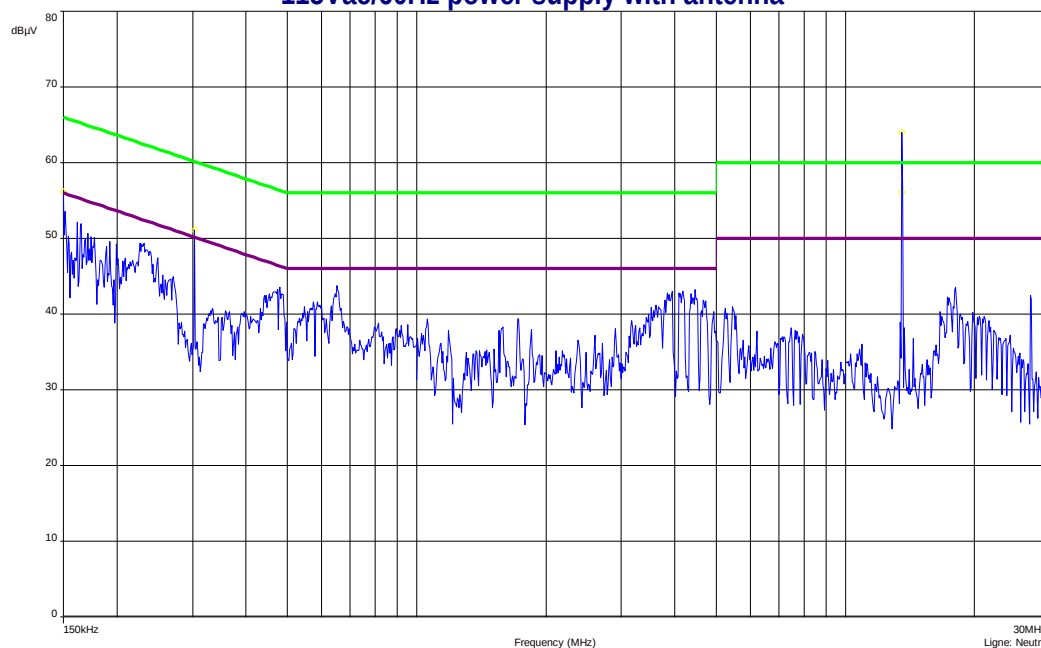
Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH
Software	Nexio	BAT EMC	0000
Cable		N-1m	2701
Cable		N-5m	2713
Limiter	Hewlett Packard	11947A	0238
Receiver	Agilent	E4440A	5824
LSIN	PMM	L2-16	1209

BAT-EMC software version: V3.6.0.24

Results: See Graph(s) hereafter.

Limits on the graphs are average and quasi-peak limits (upper limit).

Conducted voltage emission (measurement)
EMI924
115Vac/60Hz power supply with antenna


Date: 20/06/12 10:07:18

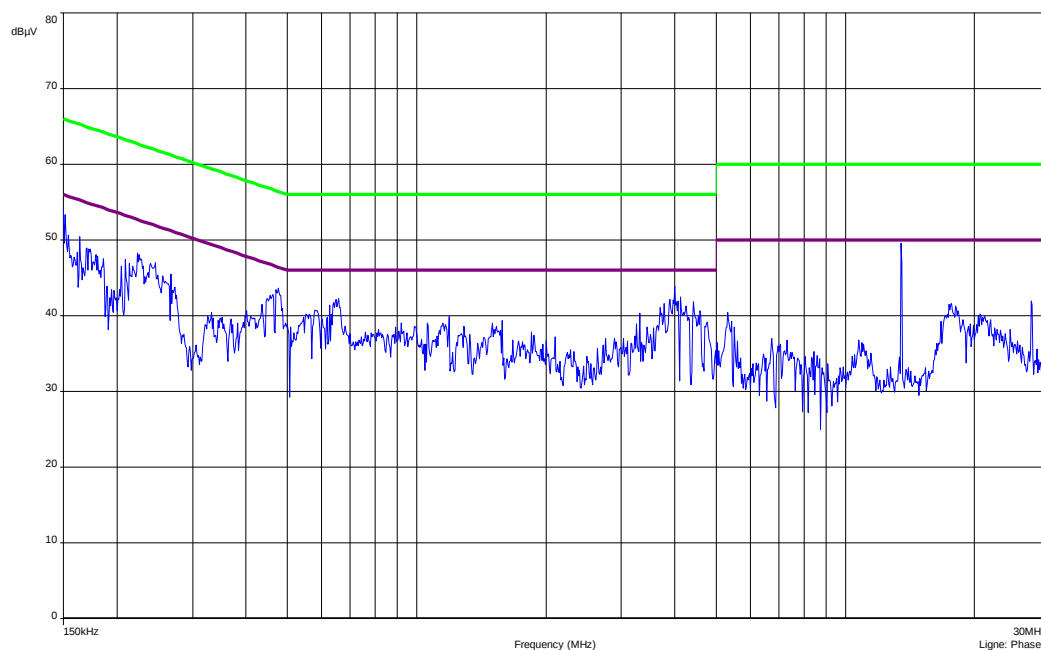
Technician: RG

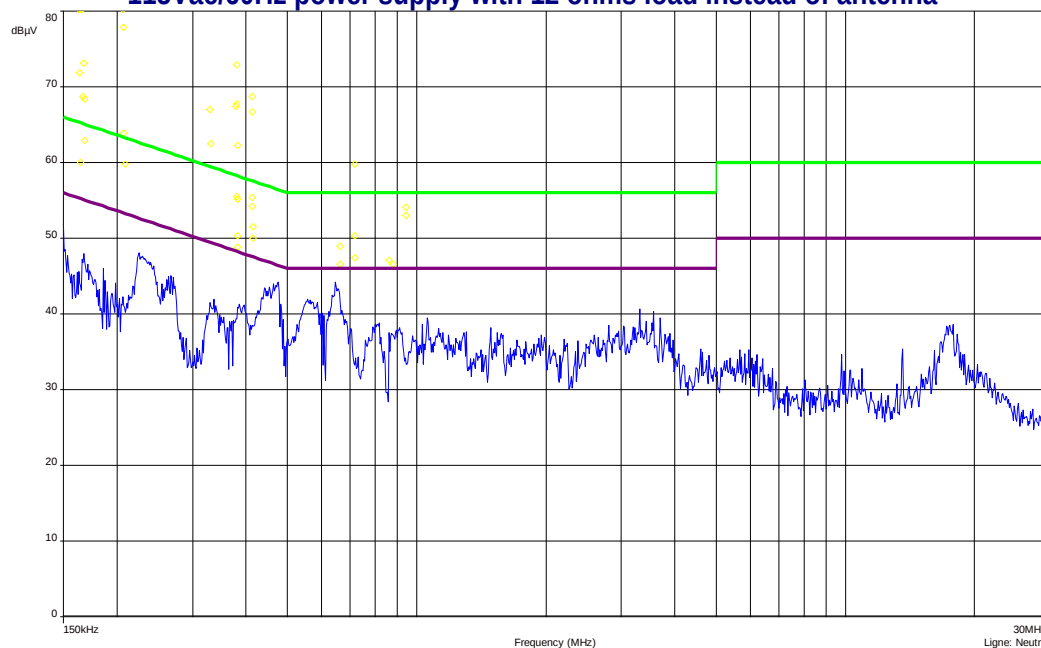
Class: B of the standard

Detection:
Peak

T (°C): 25
H (%): 50
P (hpa): 1005

Modification(s) during test:



Conducted voltage emission (measurement)
EMI930
115Vac/60Hz power supply with 12 ohms load instead of antenna


Date: 20/06/12 10:36:17

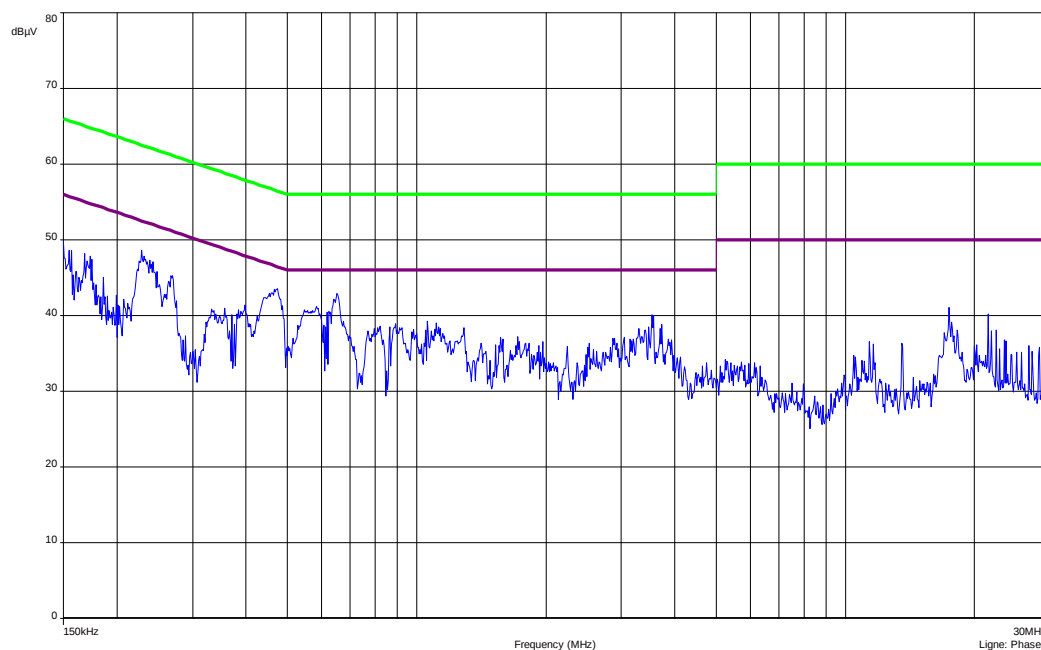
Technician: RG

Class: B of the standard

Detection:
Peak

T (°C): 25
H (%): 50
P (hpa): 1005

Modification(s) during test:



7. RADIATED EMISSIONS – SECTION 15.209 – RSS-210:2010 (§2.7 TABLE 2 & 3)

Temperature (°C): 26

Humidity (%HR): 42

Pressure (hPa): 1002

a) Radiated emissions (below 30MHz)
Standards: FCC part 15 Subpart C 15.209 & RSS-210: 2010 (§2.7)

Tests methods: ANSI C63.4:2003 & RSS-Gen: 2010

Test configuration:

Frequency band	Tested side	Resolution bandwidth	Video bandwidth	Detection mode	E.U.T. height
9kHz-150kHz	Front side / antenna 90°	200Hz	1kHz	Peak	150cm
9kHz-150kHz	Front side / antenna 45°	200Hz	1kHz	Peak	150cm
9kHz-150kHz	Front side / antenna 90°	200Hz	1kHz	Peak	150cm
150kHz-30MHz	Front side / antenna 90°	10kHz	30kHz	Peak	150cm
150kHz-30MHz	Front side / antenna 45°	10kHz	30kHz	Peak	150cm
150kHz-30MHz	Front side / antenna 90°	10kHz	30kHz	Peak	150cm

During tests RFID is in permanent modulated emission mode, Measure is done with an antenna position of 0°, 90° and 45°.

Test method deviation:

Measurements are made in peak detection instead of average mode in frequency band 9kHz - 90kHz & 110kHz to 490 kHz

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

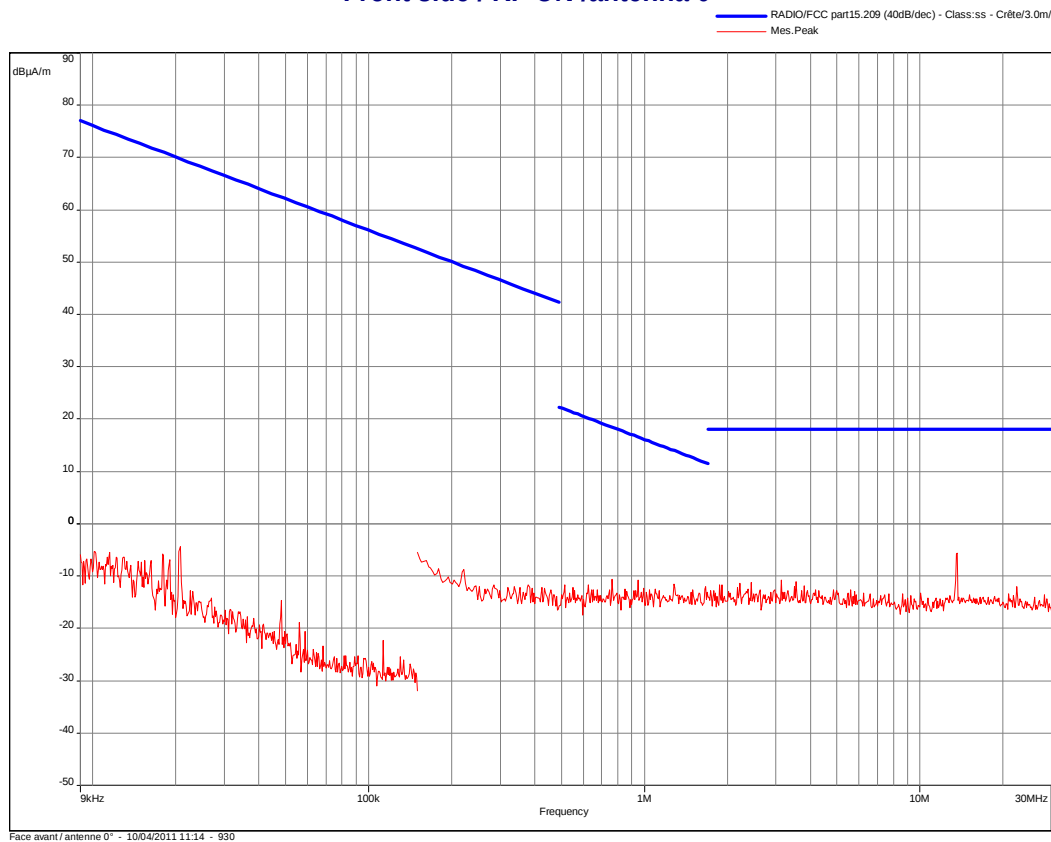
Radiated emissions limits in this frequency band are specified at 30 or 300 meters. Measurement distance used during the test, subject of this report, is 3 meters. Then published limits come from a theoretical conversion using an extrapolation factor of 40dB / decade.

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	DUE DATE
Antenna	Rohde & Schwarz	HFH2-Z2	5825	20/08/10	19/10/12
Cable		N-1m	2703	18/08/10	17/10/12
Cable	C&C	N-6m	5015	11/10/10	10/12/12
Receiver	Agilent Technologies	E7405A	2161	30/12/10	28/02/13
Shielded enclosure	RAY PROOF	C.GS3	1123	-	-
Software	Nexio	BAT EMC	0000	-	-

BAT-EMC software version: V3.5.0.2

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

Radiated magnetic field emission (measurement)
EMI930
Front side / RF ON / antenna 0°

Date: **04/10/2011**

Technician: **DM**

Class: **ss of the standard**

Detection:
Peak

T (°C): **26**

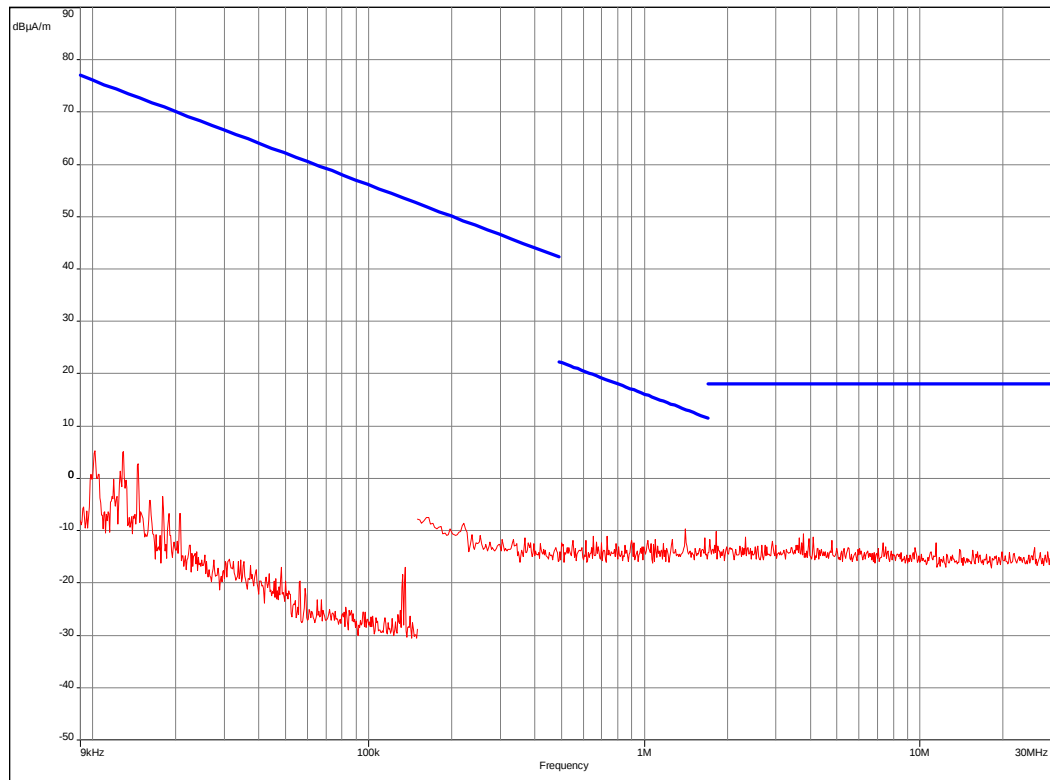
H (%): **42**

P (hpa): **1002**

Modification(s) during test:

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

Radiated magnetic field emission (measurement)
EMI948
Front side / RF ON / antenna 45°

— RADIO/FCC part15.209 (40dB/dec) - Class:ss - Crête/3.0m/
— Mes.Peak

Date: **04/10/2011**

Technician: **DM**

Class: **ss of the standard**

Detection:
Peak

T (°C): **26**

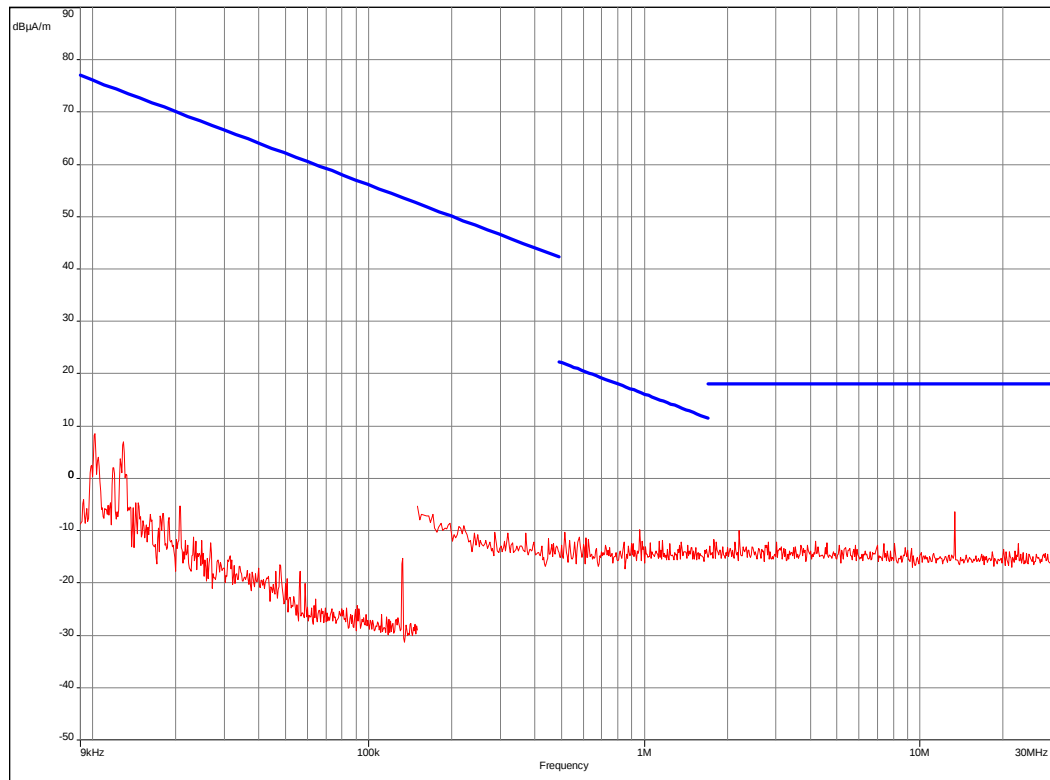
H (%): **42**

P (hpa): **1002**

Modification(s) during test:

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

Radiated magnetic field emission (measurement)
EMI949
Front side / RF ON / antenna 90°

— RADIO/FCC part15.209 (40dB/dec) - Class:ss - Crête/3.0m/
— Mes.Peak

Date: **04/10/2011**

Technician: **DM**

Class: **ss of the standard**

Detection:
Peak

T (°C): **26**

H (%): **42**

P (hpa): **1002**

Modification(s) during test:

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

b) Radiated emissions pre-measurement (above 30MHz)

Standards: FCC part 15 Subpart C 15.209 & RSS-210: 2010 (§2.7)

Tests methods: ANSI C63.4:2003 & RSS-Gen: 2010

Test configuration:

Frequency band	Tested side	Resolution bandwidth	Video bandwidth	Detection mode	E.U.T. height
30MHz-200MHz	Front side / RF ON	100kHz	300kHz	Peak	150cm
30MHz-200MHz	Front side / Stand by	100kHz	300kHz	Peak	150cm
200MHz-1GHz	Front side / RF ON	100kHz	300kHz	Peak	150cm
200MHz-1GHz	Front side / Stand by	100kHz	300kHz	Peak	150cm

Measurements are done in modulated and stand-by modes.

Test method deviation: No

Measuring distance: 3 meters

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	DUE DATE
Antenna	Electro-Metrics	BIA-30HF	1107	03/03/11	02/05/15
Antenna	Rohde & Schwarz	HL223	0855	03/03/11	02/05/15
Cable	C& Connetiques	N-1.5m	4203	06/10/09	05/12/11
Cable	C&C	N-8m	5015	11/10/10	10/12/12
Receiver	Agilent Technologies	E7405A	2161	30/12/10	28/02/12
Shielded enclosure	RAY PROOF	C.GS3	1123	-	-
Software	Nexio	BAT EMC	0000	-	-

BAT-EMC software version: V3.5.0.2

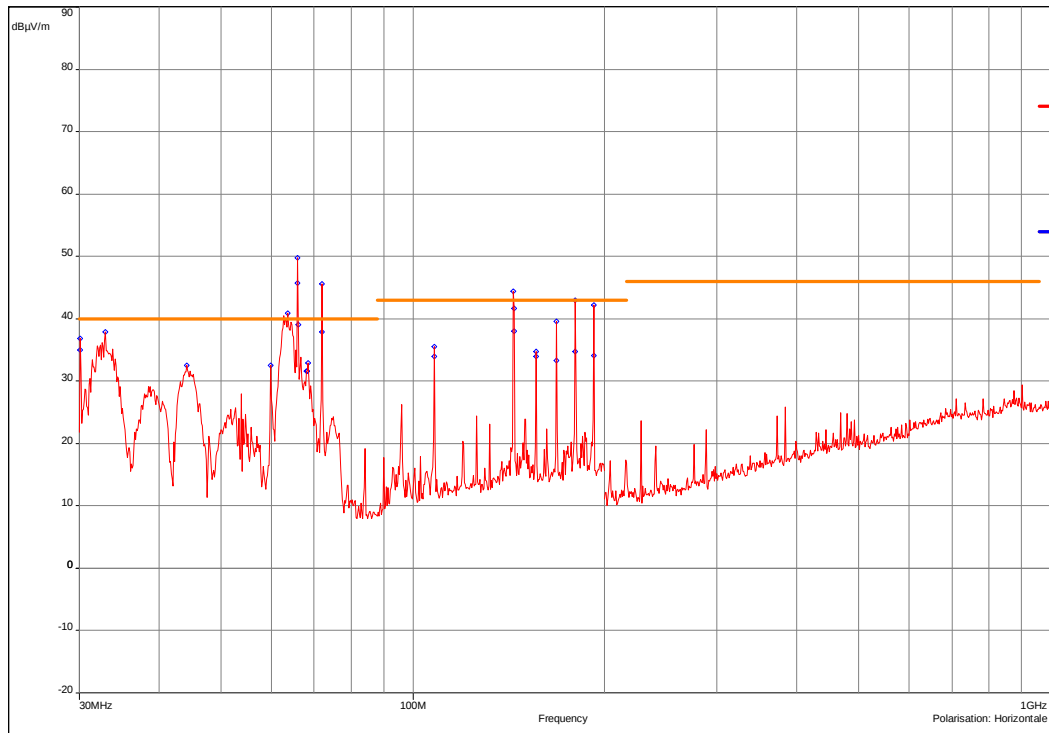
Results: See Graph(s) (indoor pre-measurement)

Radiated electric emission (measurement)

EMI931

Front side / stand by

- C.E.M. (civil)/FCC Part.15 - Class:B - Moyenne/3.0m/
- C.E.M. (civil)/FCC Part.15 - Class:B - QCrête/3.0m/
- C.E.M. (civil)/FCC Part.15 - Class:B - Crête/3.0m/
- Mes.Peak (Horizontale)
- ◊ Peak/LimQ-Peak (Horizontale)



Front side / stand by - 10/04/2011 10:43 - 931

Date: 04/10/2011

Technician: DM

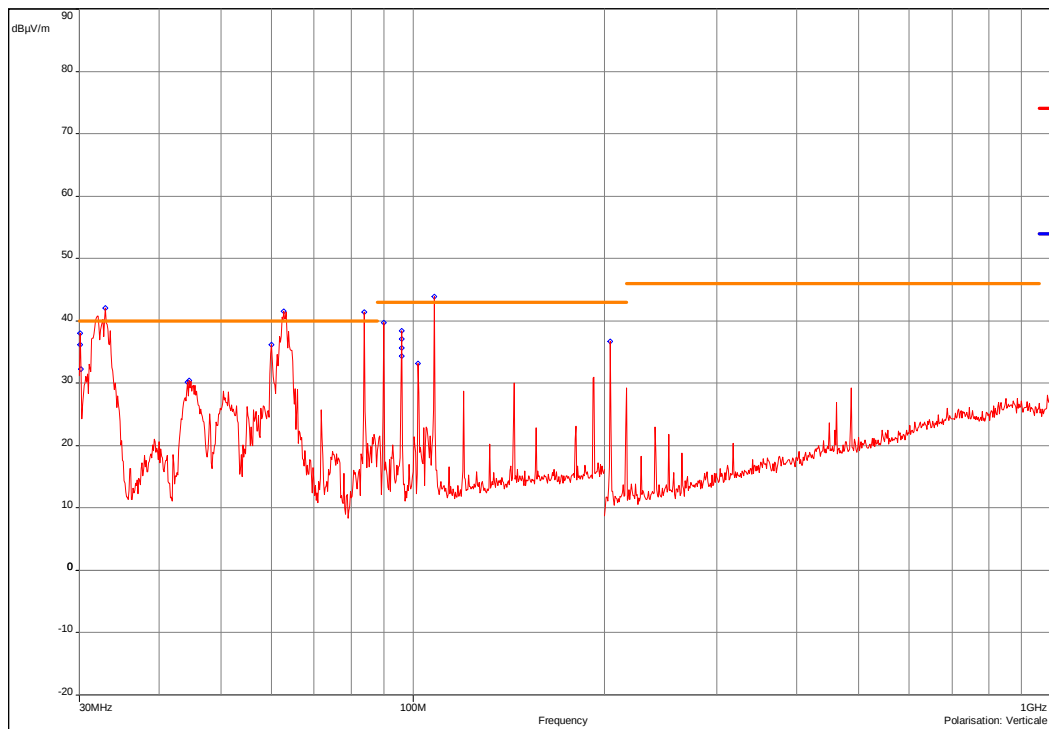
Class: B of the standard

Detection:
Peak

T (°C): 23
H (%): 42
P (hpa): 1002

Modification(s) during test:

- C.E.M. (civil)/FCC Part.15 - Class:B - Moyenne/3.0m/
- C.E.M. (civil)/FCC Part.15 - Class:B - QCrête/3.0m/
- C.E.M. (civil)/FCC Part.15 - Class:B - Crête/3.0m/
- Mes.Peak (Verticale)
- ◊ Peak/LimQ-Peak (Verticale)



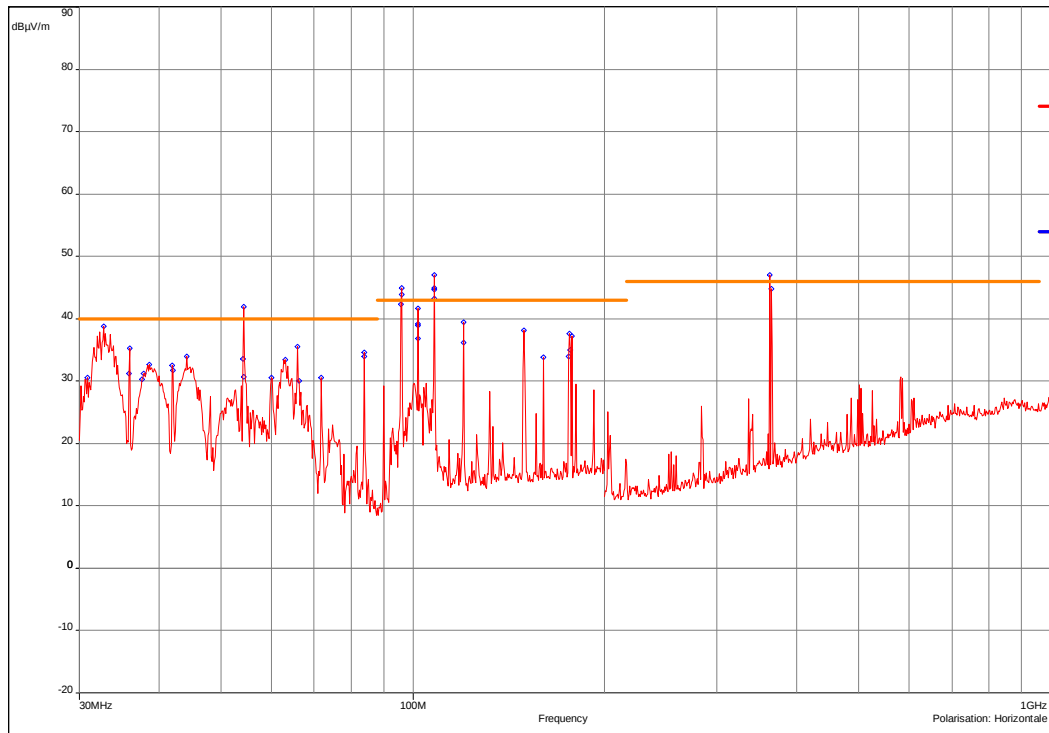
Front side / stand by - 10/04/2011 10:43 - 931

Radiated electric emission (measurement)

Front side / RF ON

EMI945

- C.E.M. (civil)/FCC Part 15 - Class: B - Moyenne/3.0m/
- C.E.M. (civil)/FCC Part 15 - Class: B - QCrête/3.0m/
- C.E.M. (civil)/FCC Part 15 - Class: B - Crête/3.0m/
- Mes.Peak (Horizontale)
- Peak/LimQ-Peak (Horizontale)



Front side / RF ON - 10/04/2011 10:56 - 945

Date: 04/10/2011

Technician: DM

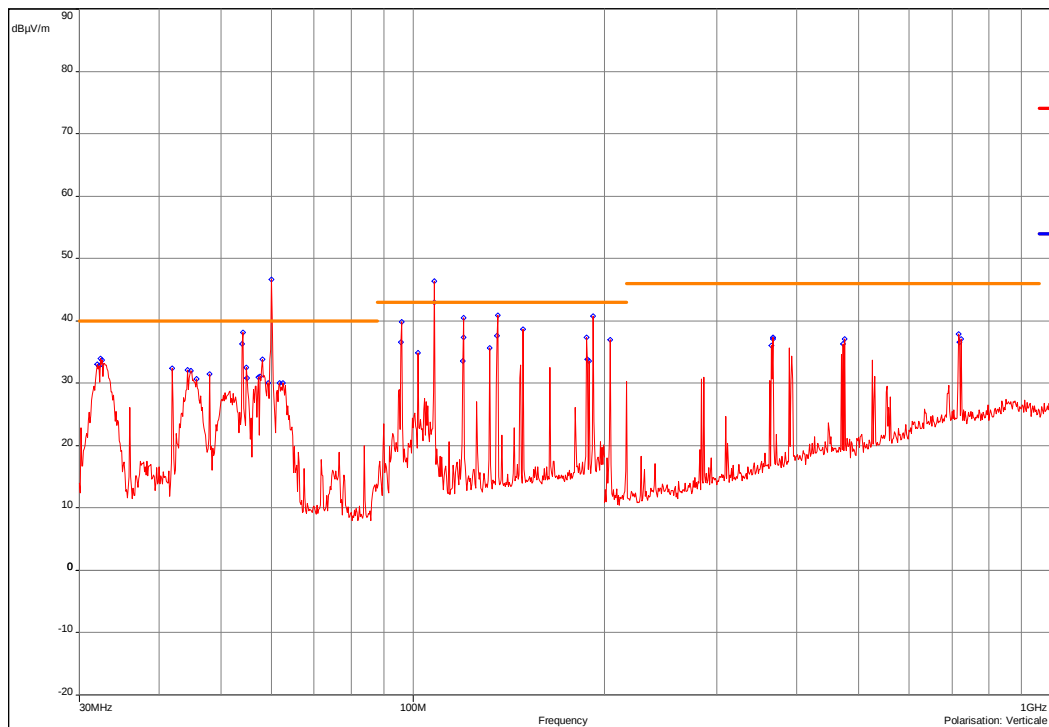
Class: B of the standard

Detection:
Peak

T (°C): 23
H (%): 42
P (hpa): 1002

Modification(s) during test:

- C.E.M. (civil)/FCC Part 15 - Class: B - Moyenne/3.0m/
- C.E.M. (civil)/FCC Part 15 - Class: B - QCrête/3.0m/
- C.E.M. (civil)/FCC Part 15 - Class: B - Crête/3.0m/
- Mes.Peak (Verticale)
- Peak/LimQ-Peak (Verticale)



Front side / RF ON - 10/04/2011 10:56 - 945

c) Final radiated electric emission on Open Area Test Site**Test configuration:**

Frequency band	E.U.T. Configuration	Resolution bandwidth	Video bandwidth	Detection mode	E.U.T. height
30MHz-1GHz	Front side / RF ON	120kHz	300kHz	Quasi peak	80cm
30MHz-1GHz	Front side / Stand by	120kHz	300kHz	Quasi peak	80cm

For each measured frequencies, E.U.T. is set via a turntable in order to find the highest level. Test antenna is set between 1m and 4m in order to find the highest level in vertical and horizontal polarization.

Only highest levels are recorded. Essentials perturbations shown on the curves are transient disturbances.

Measuring distance: 3 meters

Test equipment list (Open area measurement):

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	DUE DATE
Antenna	Electro-Metrics	BIA-30HF	0824	03/03/2011	02/05/2015
Antenna	Rohde & Schwarz	HL223	3126	03/03/2011	02/05/2015
Antenna mast	Heinrich Deisel	HD100	4036	-	-
Antenna mast	Heinrich Deisel	MA240	4037	-	-
Cable	N	14m	8146	09/03/2011	08/05/2013
Open area test site	Emitech	Salinelles	3482	04/03/2011	03/05/2013
Spectrum analyzer	Agilent Technologies	E7405A	2161	30/12/2010	28/02/2013
Turntable	Heinrich Deisel	D4420	4038	-	-

Results: See **Board(s)** hereafter

RF ON & STAND BY MODES (MAXIMUM VALUES)

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dBµV/m)	Limit (dBµV/m)	Comments
35.03 (30-40M)	Horizontal	0	400	23.36	40	C
46.07 (40-50M)	Horizontal	0	400	28.66	40	C
54.08 (50-60M)	Horizontal	0	100	22.41	40	C
69.20 (60-70M)	Horizontal	0	400	30.33	40	C
85.53 (70-80M)	Horizontal	0	400	19.27	40	C
95.98	Horizontal	0	400	36.08	43	C
108.06	Horizontal	0	400	17.46	43	C
119.10	Horizontal	0	250	20.80	43	C
150.00	Horizontal	0	250	27.03	43	C
162.00	Horizontal	0	400	24.26	43	C
176.00	Horizontal	0	100	25.41	43	C
32.27 (30-40M)	Vertical	0	100	15.58	40	C
44.24 (40-50M)	Vertical	8	100	19.19	40	C
54.24 (50-60M)	Vertical	0	100	33.49	40	C
60.09 (60-70M)	Vertical	0	100	28.42	40	C
95.92	Vertical	0	100	31.47	43	C
108.00	Vertical	0	100	23.93	43	C
120.07	Vertical	0	100	21.84	43	C
150.00	Vertical	0	100	24.13	43	C
160.20	Vertical	0	150	23.27	43	C
176.60	Vertical	0	100	23.33	43	C
203.82	Vertical	0	102	15.88	43	C
367.20	Vertical	0	100	27.24	46	C
472.92	Vertical	0	100	21.57	46	C
724.08	Vertical	0	100	23.81	46	C
362.90	Horizontal	0	400	17.23	46	C

C= Compliant

NC= Not compliant

8. OPERATION WITHIN THE BAND 13.110-14.010 MHZ – SECTION 15.225 & RSS-210 ANNEX 2.6
a) Field strength

Standards: FCC part 15 Subpart C 15.225 & RSS-210 Annex 2.6

Tests methods: ANSI C63.4:2003 & RSS-Gen: 2010

Test configuration:

Frequency band	Tested side	Resolution bandwidth	Video bandwidth	Detection mode	E.U.T. height
13.11MHz-14.01MHz	Front side / antenna 0°	10kHz	30kHz	Peak	80cm
13.11MHz-14.01MHz	Front side / antenna 45°	10kHz	30kHz	Peak	80cm
13.11MHz-14.01MHz	Front side / antenna 90°	10kHz	30kHz	Peak	80cm

Measure is done with an antenna position of 0°, 90° and 45°.

Test method deviation: Measurements are given in dBμA/m instead of dBμV/m (conversion factor: 51.5 dB). Final measuring distance is 10 meters instead of 30 m. Pre measurement distance is 3m.

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	DUE DATE
Antenna	Rohde & Schwarz	HL223	3126	03/03/2011	02/05/2015
Cable	N	20m	8385	25/08/2011	24/10/2013
Open area test site	Emitech	Salinelles	3482	04/03/2011	03/05/2013
Shielded enclosure	RAY PROOF	C.GS3	1123 (*)		
Spectrum analyzer	Agilent Technologies	E7405A	2161	30/12/2010	28/02/2013
Turntable	Heinrich Deisel	D4420	4038	-	-

(*) for indoor measurement

BAT-EMC software version: V3.5.0.2

Results: See **Graph(s)** of pre-measurements hereafter

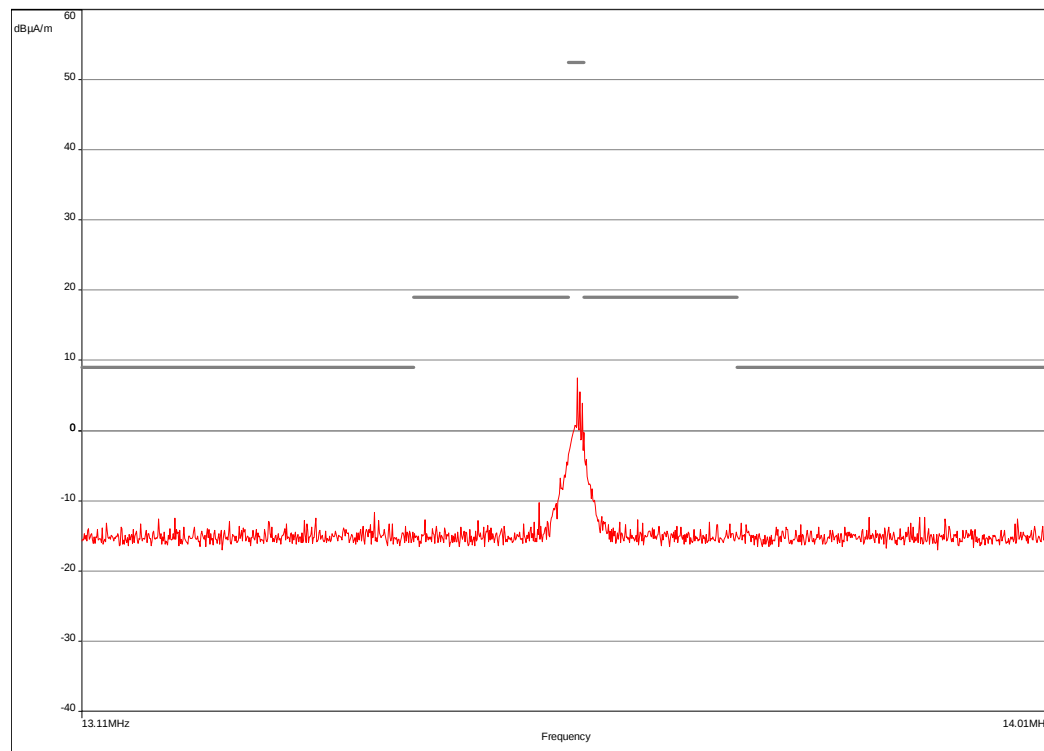
Carrier outdoor measurement at 10m: -7.916 dBμA/m (≈ 43.6 dBμV/m)

Using an extrapolation factor of 40 dB/decade (as described in section 15.31 (f)), the level is about 23.6 dBμV/m (15.10μV/m) at 30m for a limit at 15.848 mV/m.

Radiated magnetic field emission (indoor 3m measurement)
EMI1010
Carrier / 90°

Frequency : 13.11 MHz - 14.01 MHz (Analyzer mode)
 Settings: RBW: 10 kHz, VBW: 30 kHz, Holding time: 1 ms/Pt, sweep count 10
 Polarisation : Circulaire
 Distance: 3 m

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



Carrier / 90° - 11/18/2010 10:33 - 1010

Date: **18/11/2010**

Technician: **DM**

Detection:
Peak

T (°C): **22.5**

H (%): **33**

P (hpa): **996**

Modification(s) during test:

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.

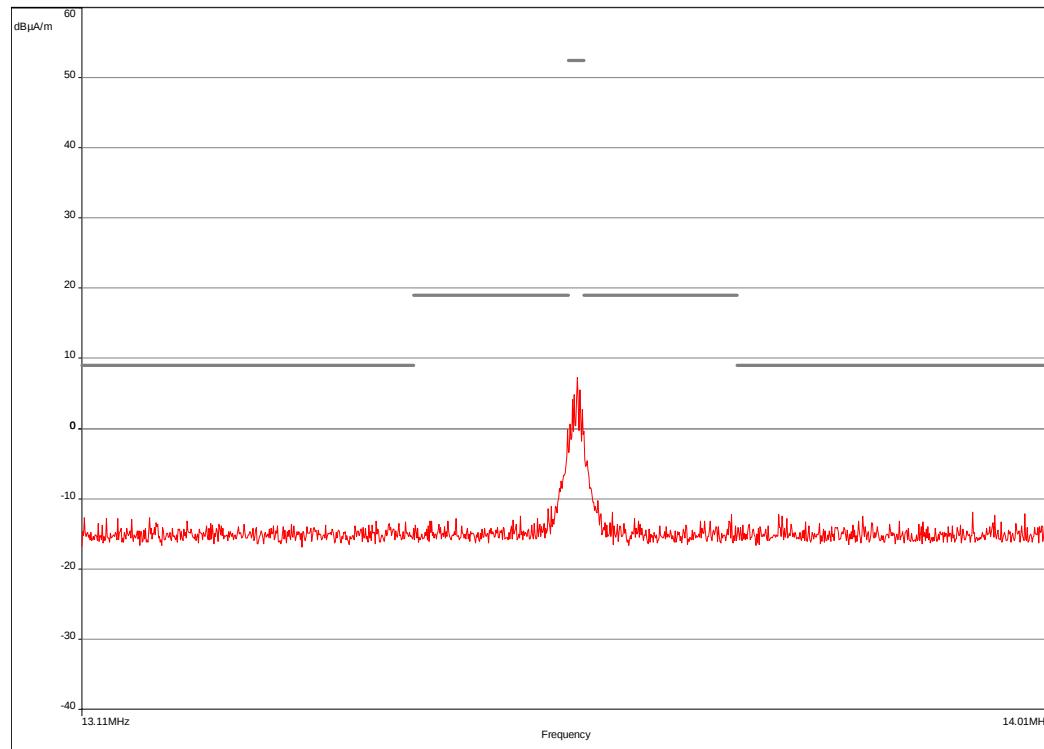
Radiated magnetic field emission (indoor 3m measurement)

EMI1011

Carrier / 45°

Frequency : 13.11 MHz - 14.01 MHz (Analyzer mode)
 Settings: RBW: 10 kHz, VBW: 30 kHz, Holding time: 1 ms/Pt, sweep count 10
 Polarisation : Circulaire
 Distance: 3 m

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



Carrier / 45° - 11/18/2010 10:39 - 1011

Date: 18/11/2010

Technician: DM

Detection:
 Peak

T (°C): 22.5

H (%): 33

P (hpa): 996

Modification(s) during test:

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

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

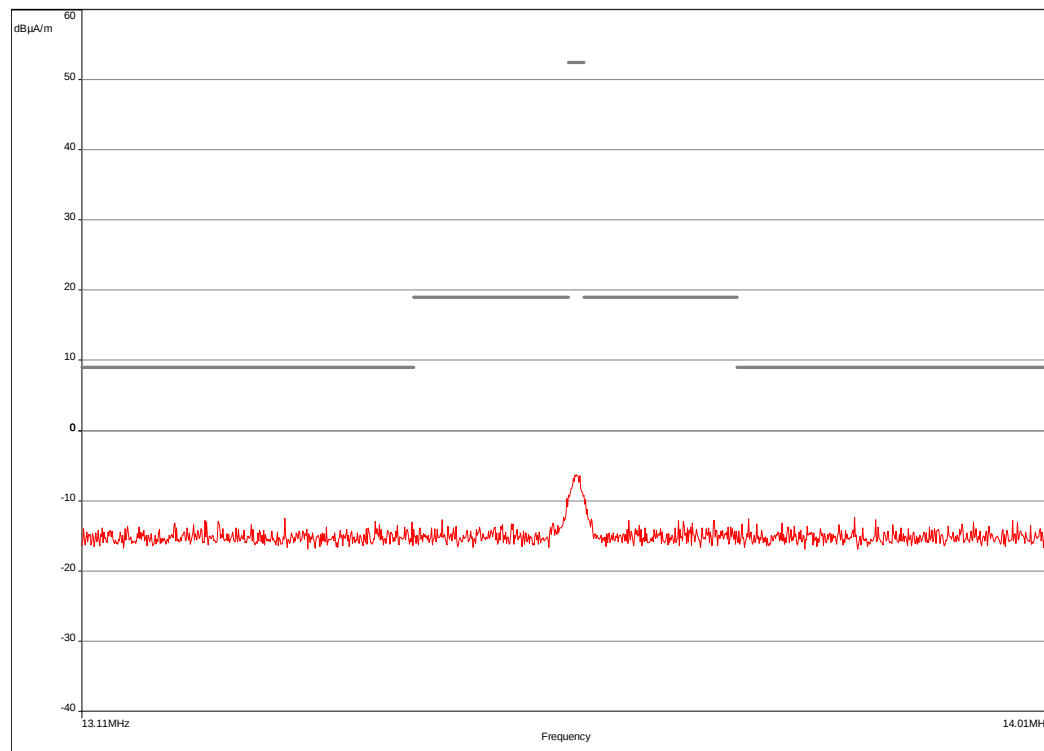
With L: limit of this graph (in dBμA/m) and Ls: limit of the standard (in μV/m)

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

Radiated magnetic field emission (indoor 3m measurement)
EMI1012
Carrier / 0°

Frequency : 13.11 MHz - 14.01 MHz (Analyzer mode)
 Settings: RBW: 10 kHz, VBW: 30 kHz, Holding time: 1 ms/Pt, sweep count 10
 Polarisation : Circulaire
 Distance: 3 m

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



Carrier / 0° - 11/18/2010 10:43 - 1012

Date: **18/11/2010**

Technician: **DM**

Detection:
Peak

T (°C): **22.5**

H (%): **33**

P (hpa): **996**

Modification(s) during test:

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.

9. FREQUENCY TOLERANCE – SECTION 15.225

Standard: FCC part 15 Subpart C 15.225

Test method: FCC part 15 Subpart C 15.225

Test configuration: A near field probe detects field near equipment (relative measurement).

Resolutions:

Frequency	Resolution bandwidth	Video bandwidth
13.56MHz	3Hz	10Hz

Test method deviation: E.U.T. is powered by USB (external PC) which cannot be submitted by external power supply; due to this E.U.T. configuration no power supply variations were done.

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	DUE DATE
Antenna	Emitech	3.5 cm	4653	-	-
Climatic enclosure	Secasi	SM600C	1670	10/10/08	09/12/10
Receiver	Agilent	E4440A	5824	19/04/10	18/06/12

Standard limits: +/- 0.01% of the operating frequency

Results: See **Board(s)** below

E.U.T. operating mode: with modulation

	Temperature	Power supply	Measured Frequency (MHz)	Frequency tolerance (kHz)	Limit (kHz)
Normal condition	20°C Humidity 32%	No variations	13.560000	-	+/-1.35606
	-20°C	No variations	13.560330	-0.330	
	+50°C	No variations	13.560130	-0.130	

10. OCCUPIED BANDWIDTH – CNR-Gen § 4.6

Standard: CNR-Gen § 4.6

Test method: CNR-Gen § 4.6

Test configuration: A near field probe detects field near equipment (relative measurement).

Resolutions:

Frequency	Resolution bandwidth	Video bandwidth
13.56MHz	300Hz	1kHz

Test method deviation: E.U.T. is powered by USB (external PC).

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	DUE DATE
Antenna	Emitech	3.5 cm	4653	-	-
Spectrum analyser	Agilent Technologies	E4440A	5824	19/04/10	18/06/10

Standard limits: 14 kHz

Results: Occupied bandwidth = 6.20 kHz

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

ANNEX: PHOTOGRAPH(S)

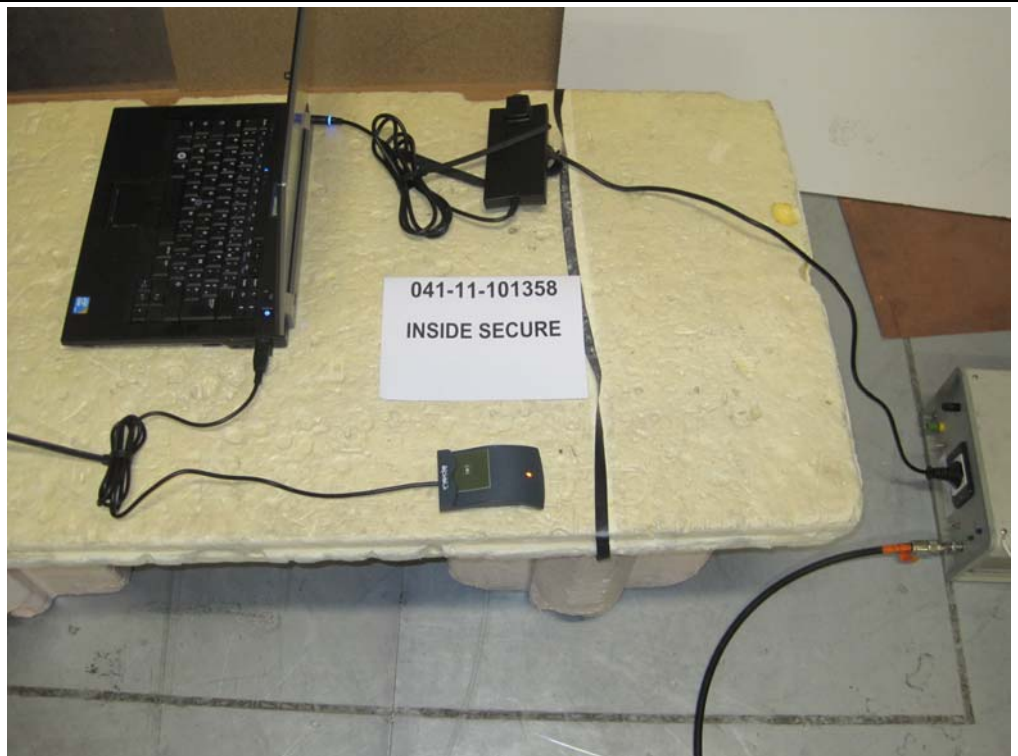
EQUIPMENT UNDER TEST (E.U.T.) PHOTOGRAPH(S)

TAG READER A-NFC2

E.U.T. photograph



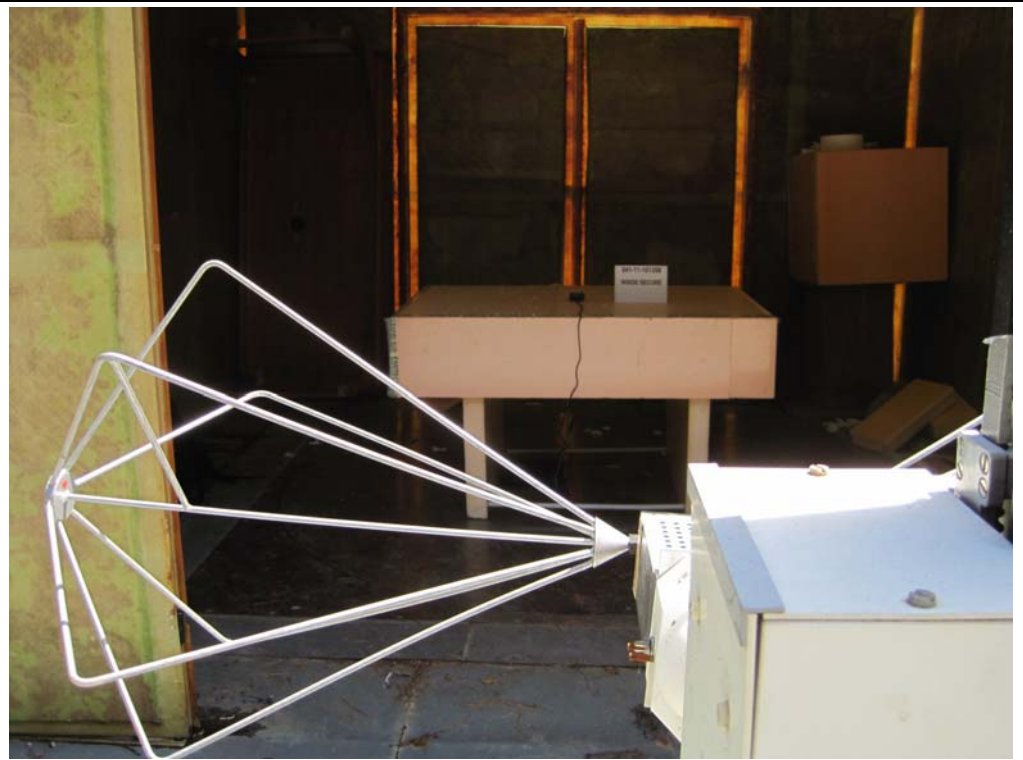
Conducted voltage emission



Radiated electric
field emission on
OATS



Radiated electric
field emission on
OATS



Frequency Tolerance

