

RADIO TEST REPORT

According to the standard(s):

FCC part 15 Subpart C

Equipment under test:

AUTOREEZ

FCC ID: R8T-AUTOREEZ

Company:

ADVEEZ

Diffusion: Mr CREMOUX

(Company: ADVEEZ)

Number of pages: 27 including 1 annex

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NAME OF THE EQUIPMENT UNDER TEST (E.U.T.) : AUTOREEZ

Serial number : None

Part number : FCC ID: R8T-AUTOREEZ

Software Version : None

MANUFACTURER'S NAME : ADVEEZ

APPLICANT'S ADDRESS:

Company : ADVEEZ

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31027 TOULOUSE CEDEX 3
FRANCE

Person(s) present during the tests : Mr CREMOUX

Responsible : Mr BENDHIA

DATE(S) OF TESTS : October 3rd to 8th of 2013

TESTS LOCATION(S) : EMITECH MONTPELLIER laboratory in
VENDARGUES (34) - FRANCE
Open area test site in SALINELLES (30) -
FRANCE
FCC Registration number: 8127-19

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 AUTOREEZ (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 9kHz to
40GHz

3. EQUIPMENT UNDER TEST CONFIGURATION

Equipment under test (E.U.T.) description:

The Central manager module "AUTOREEZ" is the main controller of an installation. All readers are connected in a mesh network to the manager module. This module can have two enclosures with the same electronic inside (presented in external photo).

The Central primary functions are:

- Manage access control
- Communicate with stations via a bus communication
- Communicate with a wireless network
- Enrols tags
- Provision of visual and audio information to the user

1 Manage access control

To manage access control: enrol (part 4) or delete tags, choice of time slot, choice of access zone, control events... the Central manager module is connected via USB & FTDI port to a PC with a dedicated software: ORGANEEZ. Go back to the notice for more information.

2 Communicate with a remote system via a bus communication

To link the Central manager to the installation stations, a communication with bus network is carried in 3 different standards: RS485 RS232 and Ethernet

3 Communicate with a wireless network

To link the Central manager to the installation stations, a communication with a wireless network is carried by a module (with an integrated antenna) inside the central. This module is certified by the FCC to use it with other products without any further certification (as per FCC section 2.1091). Its FCC-ID: OUR-XBEEPRO, it's written on the reader label (confer AUTOREEZLabelSmpl).

AUTOREEZ-OpDes Page 2

4 Enrols tags

3 types of tags can be entered to the Central:

- Mifare (13,56 MHz)
- EM or marin (125 KHz)
- Free hand tag (PE3LR-T, PE3LR-TCH, AD-CARE-W)

User can enter this tag directly with tag number or by passing tag on the central manager.

AUTOREEZ emits (125KHz and 13.56 MHz) only in this mode ("add a new tag"). During the FCC measures, Central is fixed in this mode.

5 Provision of visual and audio information to the user

A buzzer and several LED inside the central provide visual and audio information. To interpret this information, go back to the notice.

FCC ID: R8T-AUTOREEZ

Transmitter frequency range: 125 kHz, 13.56 MHz

Receiver frequency range: /

Number of channels: 1 per frequencies

Tested frequencies: 125 kHz, 13.56 MHz

Power supply: 12/24Vdc

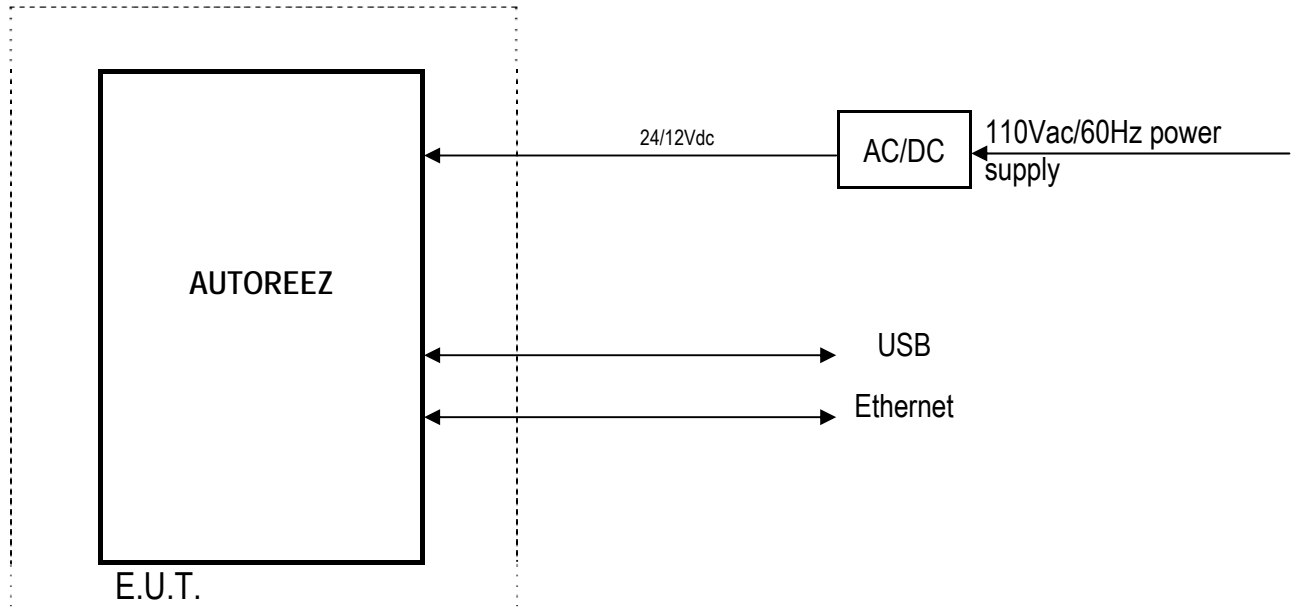
Consumption: 0.2/1A peak

Mounting: Wall or desk mounting

Antennas: integrated and external

Cycle and operating mode during emission tests: Permanent emission mode

Equipment modifications applied during tests: No

4. EQUIPMENT UNDER TEST CONFIGURATION SCHEME

Tests were performed on 12Vdc only.

5. SUMMARY OF TEST RESULTS

Tests designation	Results satisfying?	Comments
Antenna requirement - FCC part 15.203	YES	Integrated antenna
Restricted band of operation - FCC part 15.205	YES	
Conducted power lines - FCC part 15.107 and 15.207	YES	
Unwanted radiated emissions - FCC part 15.209	YES	
Field strength - FCC part 15.225 a) to d)	YES	
Frequency tolerance - FCC part 15.225 e)	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 Radio part 15.225 according to limits specified in this test report.

6. CONDUCTED EMISSIONS – SECTION 15.207, 15.107

Standard: FCC part 15 Subpart C 15.107, 15.207

Test method: ANSI C63.4:2003

Test configuration:

Tested cable(s)	Measure with	E.U.T. height
115Vac/60Hz power supply on 50 Ohms load	L.I.S.N.	80cm

Frequency band	Tested cable(s)	Resolution bandwidth	Video bandwidth	Detection mode
150kHz-30MHz	115Vac/60Hz power supply on 50 Ohms load	10KHz	30kHz	Peak / Average

Integrated antenna is replaced by an equivalent 50Ohms load.

Test method deviation: No

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Cable	Emitech	Current absorber sheath	9491	14/09/2012	14/11/2014
Cable		N-0.5m	3237	29/06/2012	29/08/2014
Cable		N-1m	2704	04/10/2012	04/12/2014
Cable		N-5m	2713	27/03/2013	27/05/2015
Ground choke	EMITECH	CISPR 16-2-1 : 2008	10071	#	#
Ground choke	EMITECH	CISPR 16-2-1 : 2008	10080	#	#
Limiter	Hewlett Packard	11947A	0239	22/10/2013	22/12/2015
LISN	PMM	L3-25	0821	04/11/2011	04/01/2014
Receiver	Agilent	E4440A	5824	22/10/2013	22/12/2015
Software	Nexio	BAT EMC	0000	#	#

#: Permanent validity

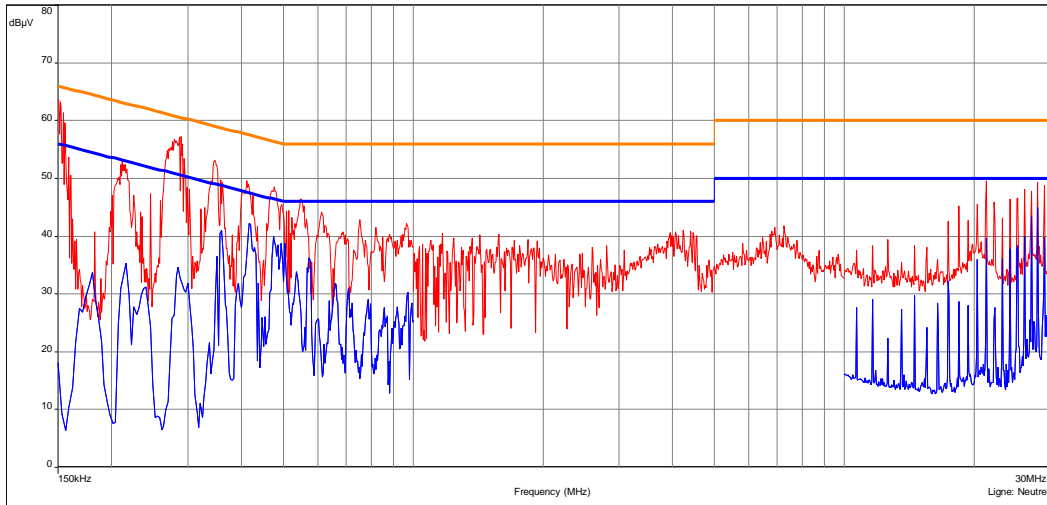
BAT-EMC software version: V3.6.0.32

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

Conducted voltage emission (measurement)
115Vac/60Hz power supply / HF on 50 Ohms load

EMI1833

— RADIO/FCC Part 15 §207 - Class B - Moyenne/
— RADIO/FCC Part 15 §207 - Class B - QCréte/
— Mes.Peak (Neutre)
— Mes.Avg (Neutre)



115Vac/60Hz power supply / HF on 50 OHms load - 10/07/2013 14:18 - 1833

Date: 07/10/2013 14:18:50

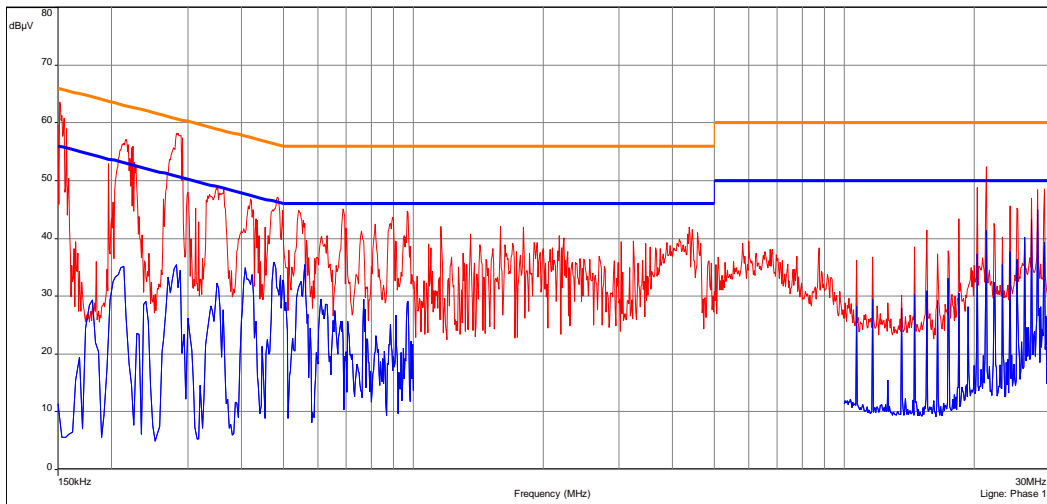
Technician: DM

Class: B of the standard

 Detection:
 Peak and average

 Modification(s) during test:
 No

— RADIO/FCC Part 15 §207 - Class B - Moyenne/
— RADIO/FCC Part 15 §207 - Class B - QCréte/
— Mes.Peak (Phase 1)
— Mes.Avg (Phase 1)



115Vac/60Hz power supply / HF on 50 OHms load - 10/07/2013 14:18 - 1833

7. UNWANTED RADIATED EMISSIONS – SECTION 15.209, 15.109

Standards: FCC part 15 Radio part 15.209

Tests methods: FCC part 15.109, 15.209 and ANSI C63.4:2003

a) Pre-measurement in semi anechoic chamber:

Frequency band	Tested side	Resolution bandwidth	Video bandwidth	Detection mode	E.U.T. height
9kHz-150kHz	Front side	200Hz	1kHz	Peak	80cm
150kHz-30MHz	Front side	10kHz	30kHz	Peak	80cm
30MHz-1GHz	Front side	100kHz	300kHz	Peak	80cm

Measurements below 30MHz are done with a loop antenna as describe in the standard.
 Measurements are done in semi anechoic chamber at 3m. E.U.T. is set on a wooden table.
 E.U.T. measurements are maximized at 360° in max-hold peak detection.

Limits:

From 9kHz to 30MHz: limit indicated on the curves is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.

From 30MHz to 1GHz: quasi peak limit provided is the limit given in 15.209.

Test method deviation:

From 9 kHz to 30MHz: measurements are made in peak detection instead of average mode in frequency band 9 kHz-500 kHz

- 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 40dB / decade.

Measuring distance: 3 meters

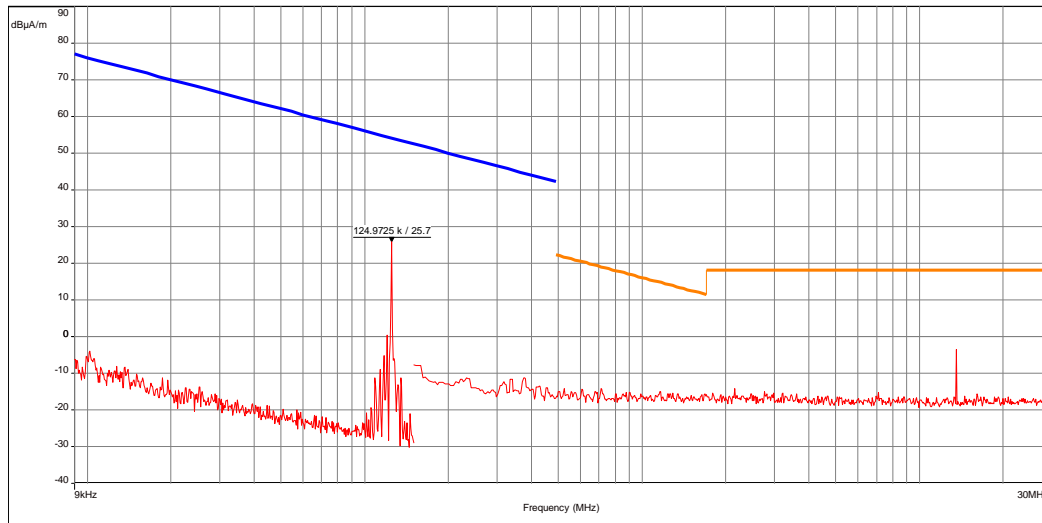
Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Antenna	Electro-Metrics	BIA-30HF	1107	03/03/2011	03/05/2015
Antenna	Rohde & Schwarz	HL223	1137	03/03/2011	03/05/2015
Antenna	Rohde & Schwarz	HFH2-Z2	5825	22/10/2012	22/12/2014
Cable	STORM MICROWAVE	N-1.5m	10263	04/06/2013	04/08/2015
Cable	C&C	N-1.5m	10553	27/09/2013	27/11/2015
Cable	Câbles & Connetiques	N-1.5m	4203	04/06/2013	04/08/2015
Cable		N-5m	2713	27/03/2013	27/05/2015
Cable	C&C	N-6m	5015	27/12/2012	27/02/2015
Receiver	Agilent	E4440A	5824	24/08/2011	24/10/2013
Software	Nexio	BAT EMC	0000	#	#

#: Permanent validity

BAT-EMC software version: V3.6.0.32
Results: See Graphs hereafter.

Radiated magnetic field emission (measurement)
Front side / antenna 0°
EMI1819

 — RADIO/FCC Part 15 §209 - Class:Tx - Moyenne/3.0m/
 — RADIO/FCC Part 15 §209 - Class:Tx - QCRéle/3.0m/
 — Mes.Peak


Date: 04/10/2013 10:48:06

Technician: DM

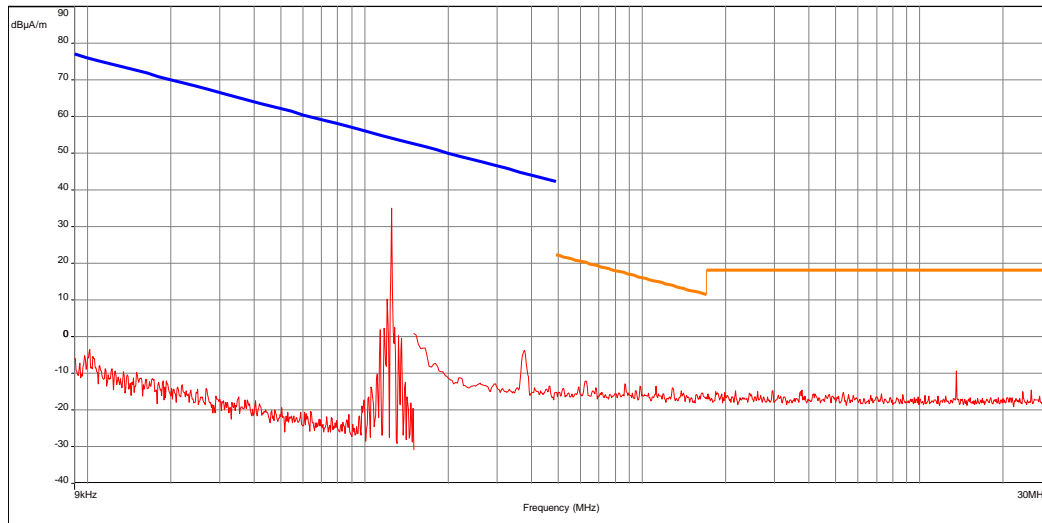
Class: Tx of the standard

 Detection:
 Peak

 Modification(s) during test:
 No

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

Radiated magnetic field emission (measurement)
Front side / antenna 45°
EMI1821

 — RADIO/FCC Part 15 §209 - Class:Tx - Moyenne/3.0m/
 — RADIO/FCC Part 15 §209 - Class:Tx - QCRéte/3.0m/
 — Mes.Peak


Front side / antenna 45° - 10/04/2013 10:58 - 1821

Date: 04/10/2013 10:58:56

Technician: DM

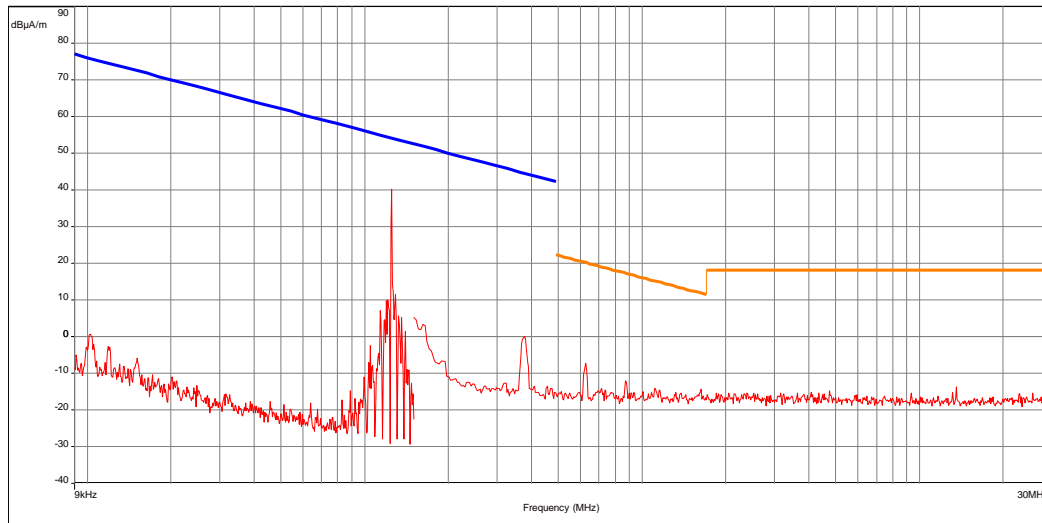
Class: Tx of the standard

 Detection:
 Peak

 Modification(s) during test:
 No

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

Radiated magnetic field emission (measurement)
Front side / antenna 90°
EMI1823

 RADIO/FCC Part 15 §209 - Class:Tx - Moyenne/3.0m/
 RADIO/FCC Part 15 §209 - Class:Tx - QCRéle/3.0m/
 Mes.Peak


Date: 04/10/2013 11:06:12

Technician: DM

Class: Tx of the standard

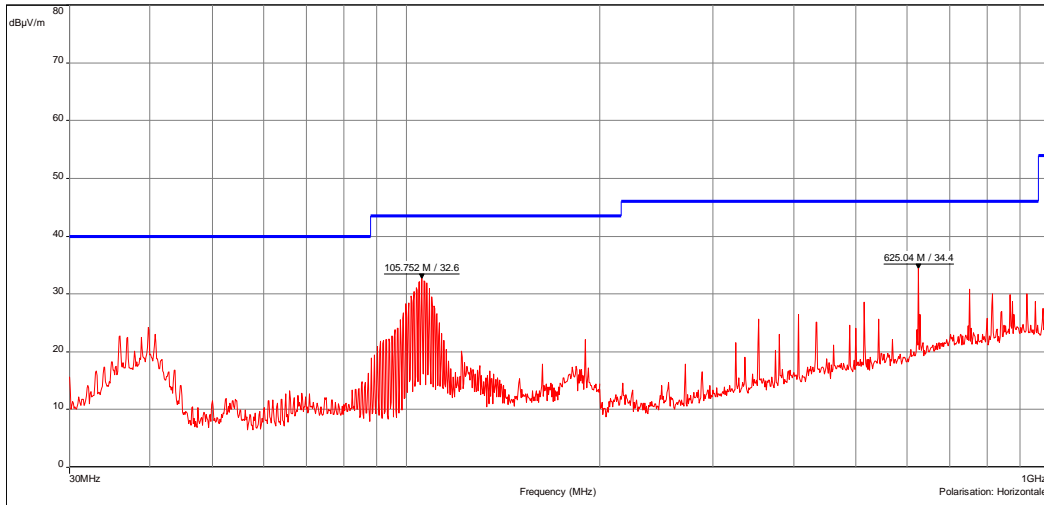
 Detection:
 Peak

 Modification(s) during test:
 No

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

Radiated electric emission (measurement)
Front side / 12Vdc power supply
EMI1817

- RADIO/FCC Part 15 §209 - Class:Tx - Moyenne/3.0m/
- RADIO/FCC Part 15 §209 - Class:Tx - QCrête/3.0m/
- RADIO/FCC Part 15 §209 - Class:Tx - Crête/3.0m/
- Mes.Peak (Horizontale)



Date: 04/10/2013 10:36:00

Technician: DM

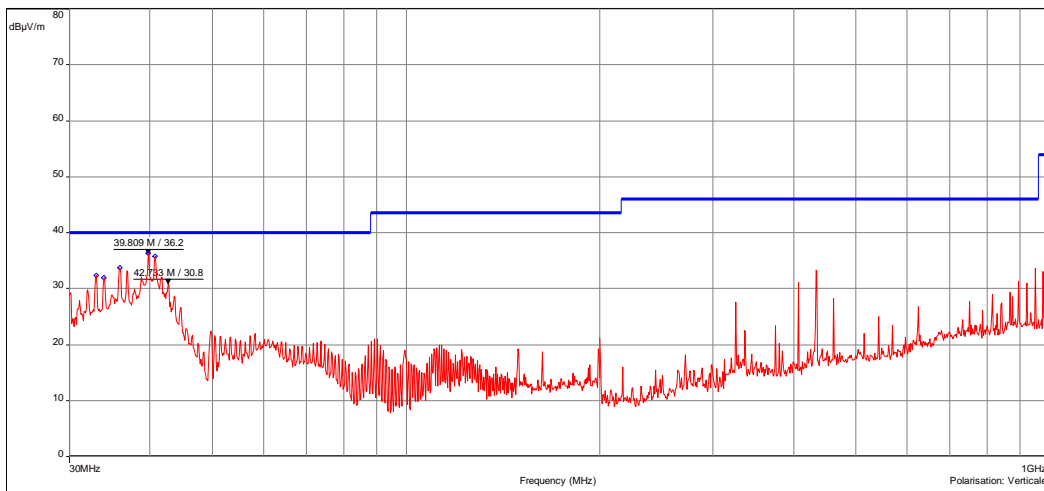
Class: Tx of the standard

 Detection:
 Peak

 Modification(s) during test:
 No

Front side / 12Vdc power supply - 10/04/2013 10:36 - 1817

- RADIO/FCC Part 15 §209 - Class:Tx - Moyenne/3.0m/
- RADIO/FCC Part 15 §209 - Class:Tx - QCrête/3.0m/
- RADIO/FCC Part 15 §209 - Class:Tx - Crête/3.0m/
- Mes.Peak (Verticale)
- Peak/LimQ-Peak (Verticale)



Front side / 12Vdc power supply - 10/04/2013 10:36 - 1817

b) Measurement at 3 meters on open area test site:

Temperature (°C): 20

Humidity (%HR): 35

Pressure (hPa): 1003

Test configuration: 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.

Frequency band	Initial position (0°)	Resolution bandwidth	Measuring distance	Detection mode	E.U.T. height
9kHz-150kHz	Front side	200Hz	3m	Peak	80cm
150kHz-30MHz	Front side	10kHz	3m	Peak	80cm
30MHz-1GHz	Front side	120kHz	3m	Quasi-peak	80cm

Test method deviation: Between 9 kHz to 30MHz: measurements are given in dB μ A/m instead of dB μ V/m (conversion factor: 51.5dB) and measuring distance is 10 meters instead of 300m.

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	DUE DATE
Antenna	Rohde & Schwarz	HL223	3126	03/03/2011	03/05/2015
Antenna	Rohde & Schwarz	HFH2-Z2	5825	22/10/2012	22/12/2014
Antenna	Electro-Metrics	BIA-30HF	1107	03/03/2011	03/05/2015
Antenna mast	INNCO	MA4000-EP-O	10261	#	#
Cable	Cables & Connetiques	N-1.5m	4203	04/06/2013	04/08/2015
Cable	Huber Sumner	N-14m	8146	04/06/2013	04/08/2015
Cable	Huber Sumner	N-20m	8385	04/06/2013	04/08/2015
Mast controller	INNCO	CO3000	10260	#	#
Open area test site	Emitech	Salinelles	3482	04/03/2011	04/05/2014
Receiver	Agilent	E4440A	5824	22/10/2013	22/12/2015
Turntable	Heinrich Deisel	D4420	4038	#	#
Turntable controller	Heinrich Deisel	HD100	4036	#	#

#: Permanent validity

Results: See Boards hereafter.

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dB μ A/m)	Limit (dB μ A/m) (*)	Comments
0.125	Circular 0°	0	100	8.34	33.24	C
0.125	Circular 45°	290	100	11.93	33.24	C
0.125	Circular 90°	270	100	14.00	33.24	C

C=Compliant

Carrier measurement at 10m: -2.64 dB μ A/m (\approx 65.50dB μ V/m)

(*) Using an extrapolation factor of 40 dB/decade (as described in section 15.31 (f)), the level at 300m is about 6.42dB μ V/m (2.09 μ V/m) for a limit at 19.2 μ V/m.

Frequency (MHz)	Polarization	Azimuth (degree)	Antenna Height (cm)	Measure (dB μ V/m)	Limit (dB μ V/m)	Comments
39,78	Vertical	0	100	19,54	40	C
42,71	Vertical	0	100	22,12	40	C
108,66	Horizontal	102	400	22,81	43	C
625,04	Horizontal	140	400	28,96	46	C

C=Compliant

All other unwanted radiated spurious are at least 20dB below specified limits

8. OPERATION WITHIN THE BAND 13.110-14.010 MHZ – SECTION 15.225
a) Field strength

Standard: FCC Part 15 Radio part 15.225 a) to d)

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 / 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 dB μ A/m instead of dB μ V/m (conversion factor: 51.5 dB). Final measuring distance is 10m instead of 30 m. Pre measurement distance is 3m.

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Antenna	Rohde & Schwarz	HFH2-Z2	5825	22/10/2012	22/12/2014
Cable		N-1.5m	3621	04/06/2013	04/08/2015
Cable		N-5m	2716	11/02/2013	11/04/2015
Receiver	Agilent	E4440A	5824	24/08/2011	24/10/2013
Shielded enclosure	RAY PROOF	C.GS3	1123	#	#
Software	Nexio	BAT EMC	0000	#	#

#: Permanent validity

BAT-EMC software version: V3.6.0.32

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

Frequency (MHz)	Polarization	Azimet (degree)	Antenna Height (cm)	Measure (dB μ A/m)	Limit (dB μ A/m) (*)	Comments
13.56	Circular 0°	90	100	-14.40	51.58	C
13.56	Circular 45°	90	100	-18.16	51.58	C
13.56	Circular 90°	0	100	-20.19	51.58	C

C=Compliant

Carrier measurement at 10m: -14.40 dB μ A/m (\approx 37.10dB μ V/m)

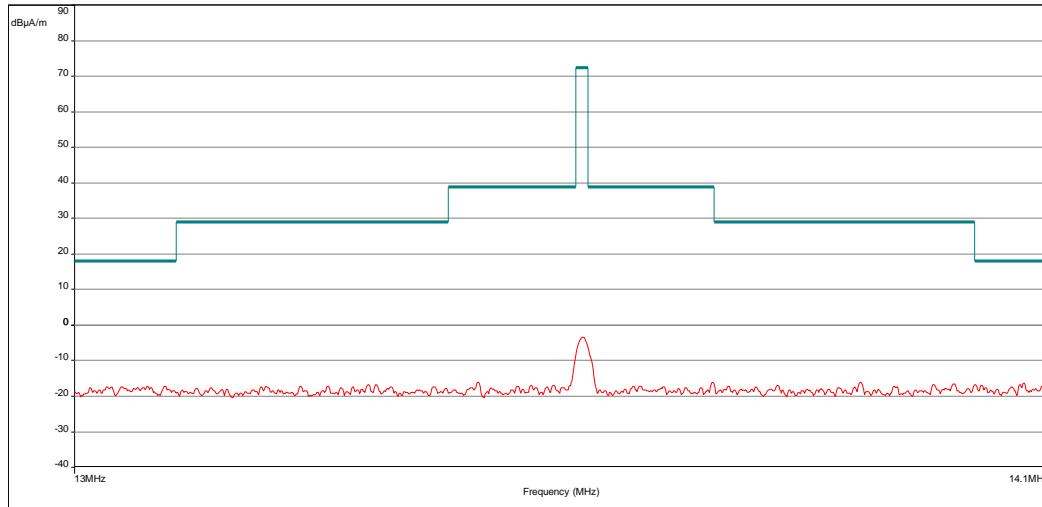
(*) Using an extrapolation factor of 40 dB/decade (as described in section 15.31 (f)), the level at 30m is about 18.01dB μ V/m (7.95 μ V/m) for a limit at 15.848 mV/m.

Radiated magnetic field emission (measurement)
Front side / antenna 0° / 13.56MHz

EMI1820

Frequency (MHz) : 13 MHz - 14.1 MHz (Analyzer mode)
 Settings: RBW: 10 kHz, VBW: 30 kHz, Holding time: 1 ms/Pt, sweep count 1
 Polarisation : Circulaire
 Distance: 3 m

— RADIO/FCC Part 15 §225 - Class:Tx - QCrête/3.0m/
 Mes. Peak



Date: 04/10/2013 10:56:57

Technician: DM

Class: Tx of the standard

Detection:
 Peak

Modification(s) during test:
 No

Front side / antenna 0° / 13.56MHz - 10/04/2013 10:56 - 1820

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

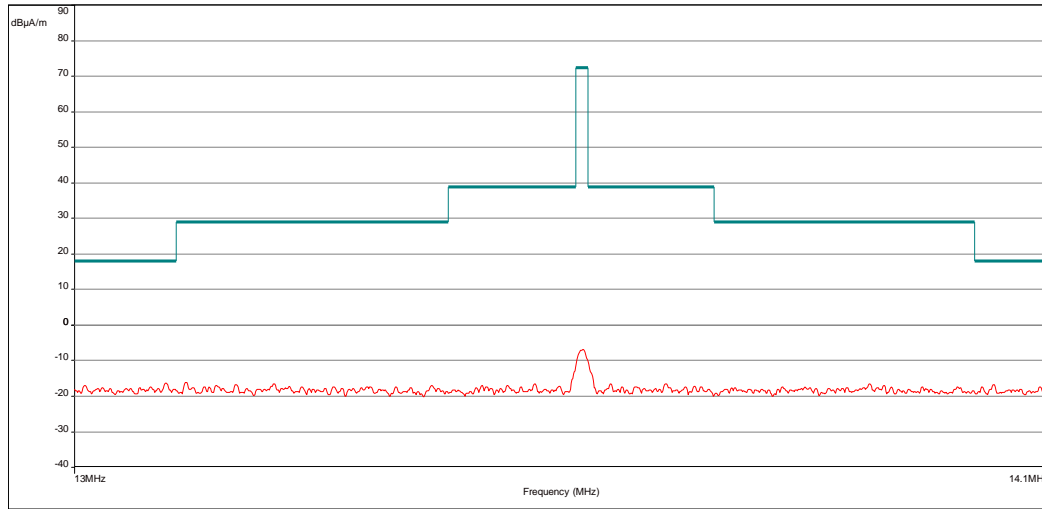
Radiated magnetic field emission (measurement)

EMI1822

Front side / antenna 45° / 13.56MHz

Frequency (MHz) : 13 MHz - 14.1 MHz (Analyzer mode)
 Settings: RBW: 10 kHz, VBW: 30 kHz, Holding time: 1 ms/Pt, sweep count 1
 Polarisation : Circulaire
 Distance: 3 m

— RADIO/FCC Part 15 §225 - Class:Tx - QCrête/3.0m/
 Mes. Peak



Date: 04/10/2013 11:02:18

Technician: DM

Class: Tx of the standard

Detection:
Peak

Modification(s) during test:
No

Front side / antenna 45° / 13.56MHz - 10/04/2013 11:02 - 1822

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

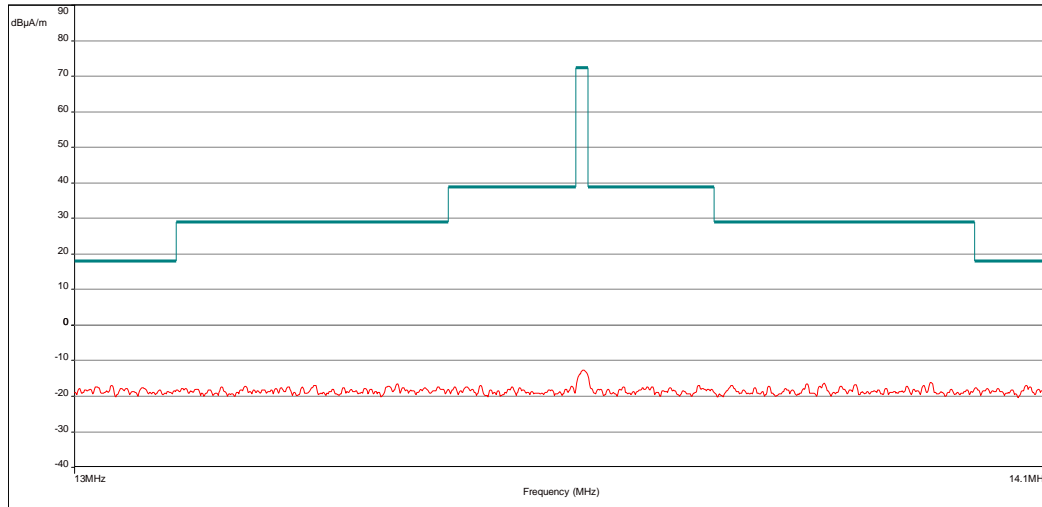
Radiated magnetic field emission (measurement)

EMI1824

Front side / antenna 90° / 13.56MHz

Frequency (MHz) : 13 MHz - 14.1 MHz (Analyzer mode)
 Settings: RBW: 10 kHz, VBW: 30 kHz, Holding time: 1 ms/Pt, sweep count 1
 Polarisation : Circulaire
 Distance: 3 m

— RADIO/FCC Part 15 §225 - Class:Tx - QCrête/3.0m/
 Mes. Peak



Date: 04/10/2013 11:05:12

Technician: DM

Class: Tx of the standard

Detection:
Peak

Modification(s) during test:
No

Front side / antenna 90° / 13.56MHz - 10/04/2013 11:05 - 1824

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

9. FREQUENCY TOLERANCE – SECTION 15.225

Standard: FCC Part 15 Radio part 15.225

Test method: FCC Part 15 Radio part 15.225 e)

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 internal batteries which cannot be submitted by external power supply (smart batteries); 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	20/01/2012	20/03/2014
Multimeter	Agilent	U1252A	6138	11/03/2011	16/10/2013
Power supply	KIKUSUI	PCR2000L	0800	#	#
Receiver	Agilent	E4440A	5824	24/08/2011	24/10/2013

#: Permanent validity

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

Results: See Board(s) below

E.U.T. operating mode: with modulation

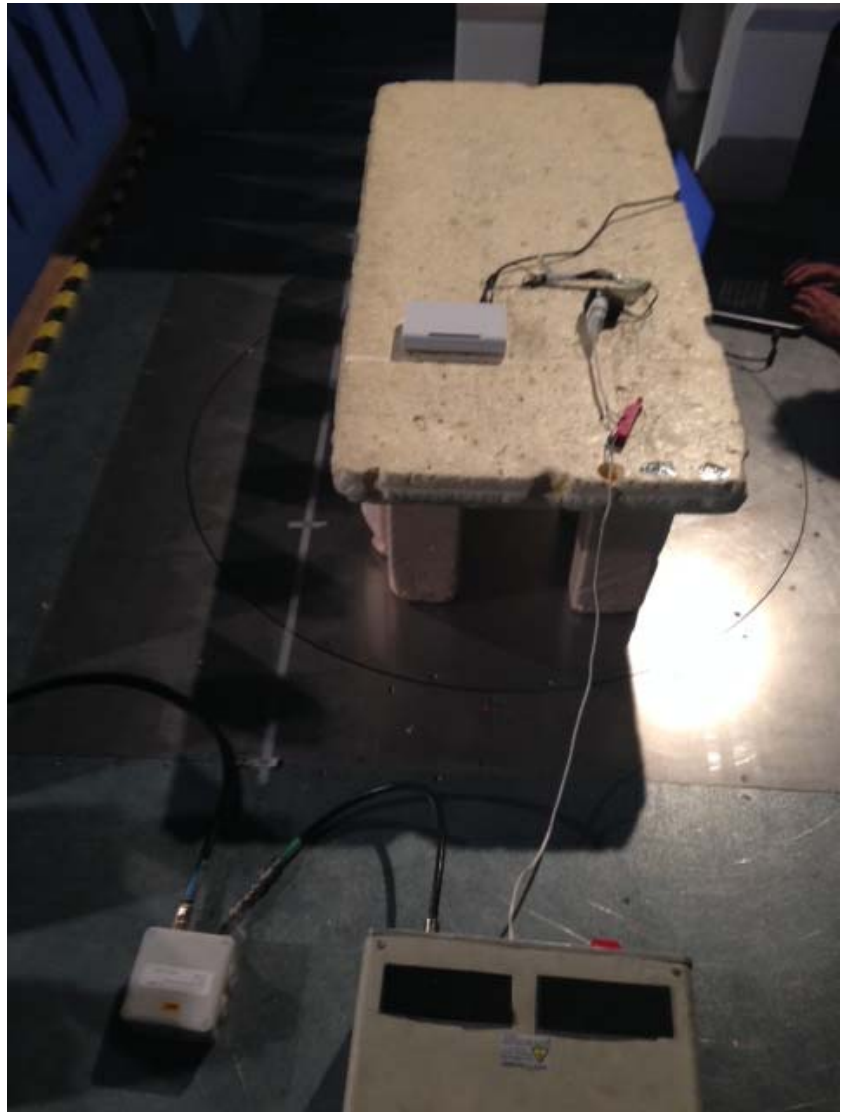
	Temperature	Power supply (Vdc)	Measured Frequency (MHz)	Frequency tolerance (%)	Limit (kHz)
Normal condition	20°C Humidity 32%	12	13,560903	0,00000%	+/-0.01%
		10,2	13,560903	0,00000%	
		13,8	13,560903	0,00000%	
Extremes conditions	-20°C	12	13,560873	0,00022%	
		10,2	13,560873	0,00022%	
		13,8	13,560873	0,00022%	
	+50°C	12	13,560863	0,00029%	
		10,2	13,560863	0,00029%	
		13,8	13,560863	0,00029%	

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

ANNEX: PHOTOGRAPH(S)

AUTOREEZ

Conducted emissions



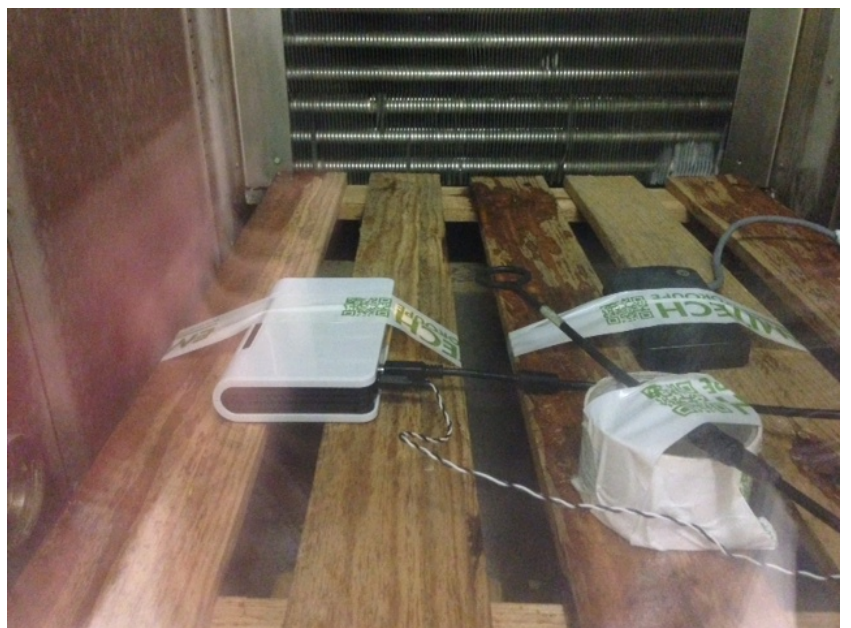
Radiated measurement on open area test site



Radiated measurement on open
area test site (carriers
measurements)



Frequency tolerance (climatic
enclosure)



Ac power supply used for 115Vac
power supply measurement

