

R041-14-100372-1A - DM / CBU

⇒ This test report cancels and replaces the report R041-14-100372-1A Ed.0

RADIO TEST REPORT

According to the standard(s):

FCC part 15 Subpart C

Equipment under test:

ARC X3XA READER

FCC ID: OVNAC1

Company:

STID

Diffusion: Mr POITRAT

(Company: STID)

Number of pages: 25 including 1 annex

Ed.	Date	Modified page(s)	Written by		Technical verification	
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1	05 Dec. 14	Refer to lines in the margin	David MONTAULON 		Olivier HEYER	

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NAME OF THE EQUIPMENT UNDER TEST (E.U.T.) : ARC X3XA READER

Serial number : None

Part number : FCC ID: OVNAC1

Software Version : None

MANUFACTURER'S NAME : STID

APPLICANT'S ADDRESS:

Company : STID

Address : 20PA des Pradeaux
Boulevard Salvador Allende
13850 GREASQUE
FRANCE

Person(s) present during the tests : Mr SILVE

Responsible : Mr POITRAT

DATE(S) OF TESTS : September, the 11th and 12th of 2014
December, the 04th of 2014

TESTS LOCATION(S) : EMITECH MONTPELLIER laboratory in
VENDARGUES (34) - FRANCE
Open area test site in SALINELLES (30) -
FRANCE
FCC Test Firm Registration Number: 954701
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 **ARC X3XA READER** (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

3. EQUIPMENT UNDER TEST CONFIGURATION

Equipment under test (E.U.T.) description: Standard evolutive readers range for all secure access control applications.

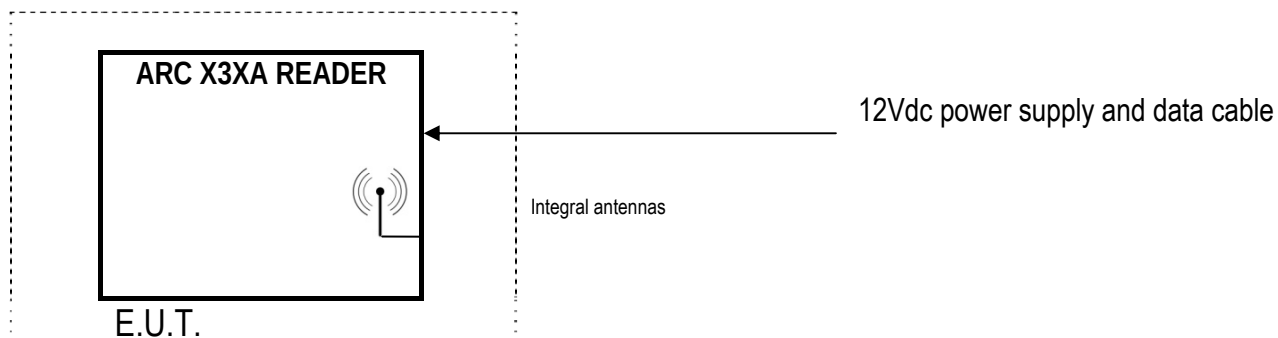
X3XA READER

- Permanent transmitter emission with a loop coil antenna
- Integral antenna, dedicated antenna supplied with the equipment
- Maximum frequency range used by E.U.T.: 13.56MHz (RFID)
- Tested frequency: 13.56MHz (RFID)
- Equipment: single frequency
- Total channel available: 1 (For RFID module)
- Power supply: 12Vdc

Applicant: STID

Model:

FCC ID: OVNAC1

4. EQUIPMENT UNDER TEST CONFIGURATION SCHEME

Cycle and operating mode during emission tests: Permanent emission mode.

Equipment modifications applied during tests: No

5. SUMMARY OF TEST RESULTS

Tests designation	Results satisfying?	Comments
Antenna requirement - FCC part 15.203 Restricted band of operation - FCC part 15.205 Conducted power lines - FCC part 15.207 Unwanted radiated emissions - FCC part 15.209 Field strength - FCC part 15.225 a) to d) Frequency tolerance - FCC part 15.225 e)	YES YES YES YES YES YES	Integrated antennas

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 according to limits specified in this test report.

6. CONDUCTED EMISSION

Temperature (°C): 22

Humidity (%HR): 34

Pressure (hPa): 1006

Standard: FCC part 15

Test method: FCC part 15.207

Test configuration:

Tested cable(s)	Measure with	E.U.T. height
110Vac/60Hz power supply	L.I.S.N.	40cm
110Vac/60Hz power supply / without antenna	L.I.S.N.	40cm

Frequency band	Tested cable(s)	Resolution bandwidth	Video bandwidth	Detection mode
150kHz-30MHz	110Vac/60Hz power supply	10kHz	30kHz	Peak
150kHz-30MHz	110Vac/60Hz power supply / without antenna	10kHz	30kHz	Peak

Test method deviation: No

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Cable	Emitech	Current absorber sheath	10653	17/10/2013	17/12/2015
Cable	Micro-coax	N-1.5m	10532	05/09/2013	05/11/2015
Cable	Micro-coax	N-5m	10530	05/09/2013	05/11/2015
Ground choke	EMITECH	CISPR 16-2-1 : 2008	10081	#	#
Ground choke	Emitech	CISPR 16-2-1 : 2008	11042	#	#
Limiter	Hewlett Packard	11947A	0239	22/10/2013	22/12/2015
LISN	PMM	L3-25	0833	15/11/2013	15/01/2016
Receiver	Agilent Technologies	E7405A	2161	20/01/2014	20/03/2016
Shielded enclosure	RAY PROOF	C.GS1	1423	#	#
Software	Nexio	BAT EMC	0000	#	#
Thermohygrometer	Bioblock Scientific	Météostar	0963	31/10/2014	31/12/2016

#: Permanent validity

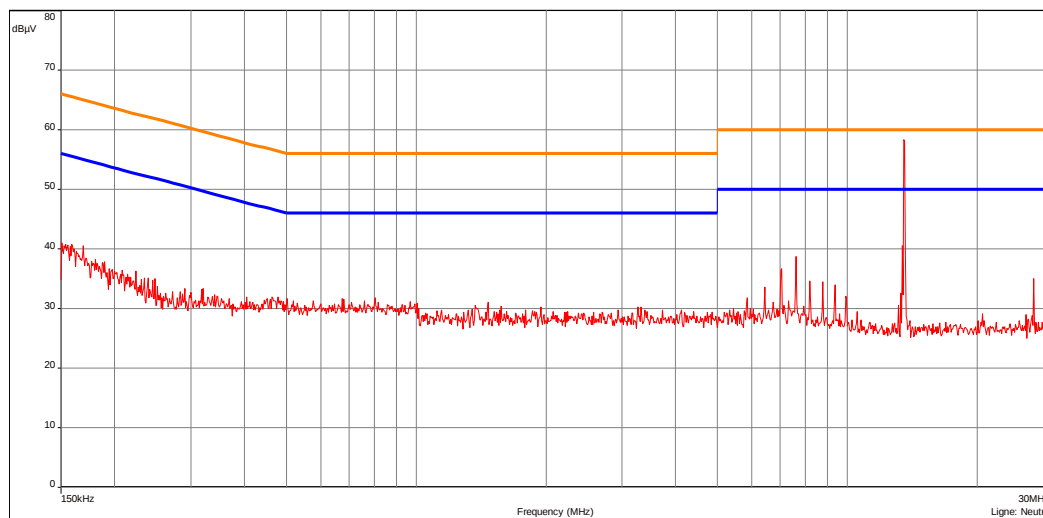
BAT-EMC software version: V3.6.0.32

Results: See **Graph(s)** hereafter.

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

Conducted voltage emission (measurement)
EMI2444
110Vac/60Hz power supply

— C.E.M. (cM)/EN 55022 : 10 95.1 - Class B - Moyenne/
 — C.E.M. (cM)/EN 55022 : 10 95.1 - Class B - QCRite/
 — Mes. Peak (Neutre)


 Date: **04/12/2014 16:00:36**

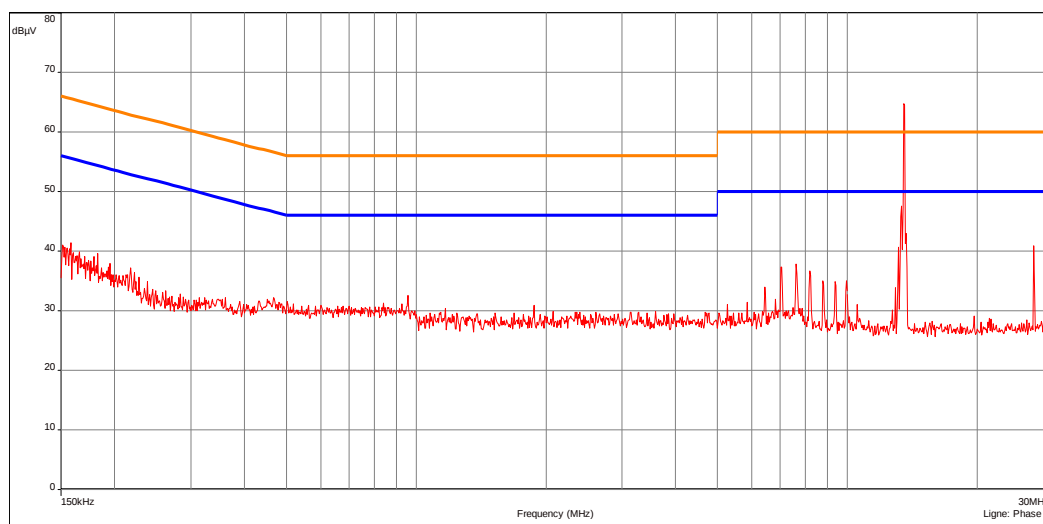
 Technician: **RB**

 Classe: **B of the standard**

 Detection:
Peak

 Modification(s) during test:
No

— C.E.M. (cM)/EN 55022 : 10 95.1 - Class B - Moyenne/
 — C.E.M. (cM)/EN 55022 : 10 95.1 - Class B - QCRite/
 — Mes. Peak (Phase 1)

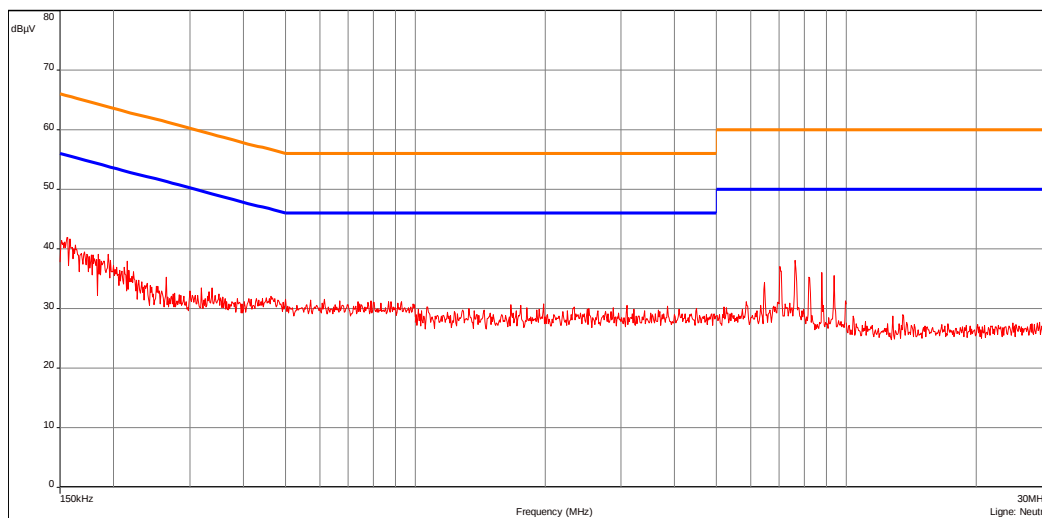


Conducted voltage emission (measurement)

110Vac/60Hz power supply / without antenna

EMI2458

— C.E.M. (cM)/EN 55022 : 10 95.1 - Class B - Moyenne/
 — C.E.M. (cM)/EN 55022 : 10 95.1 - Class B - QCRite/
 — Mes. Peak (Neutre)



Date: 04/12/2014 16:15:12

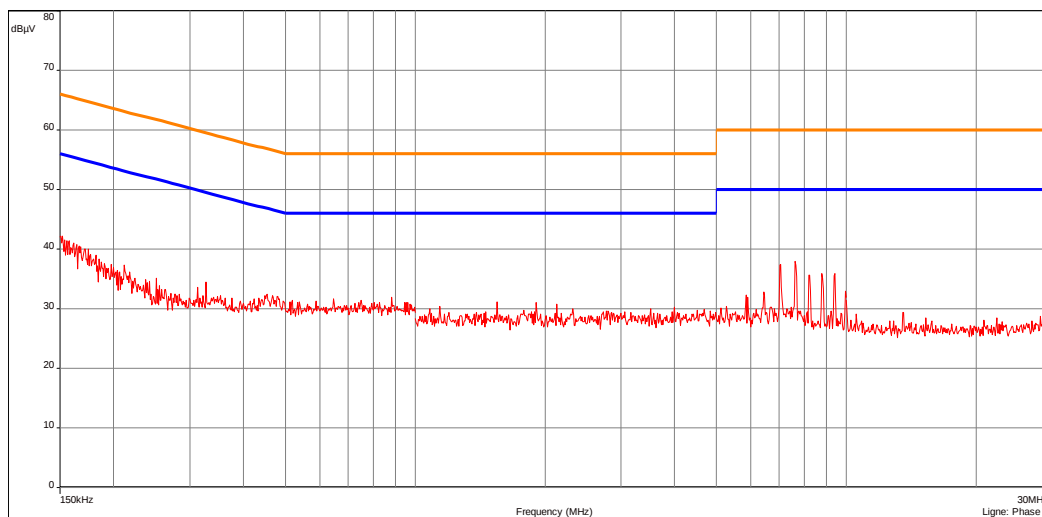
Technician: RB

Classe: B of the standard

Detection:
Peak

Modification(s) during test:
No

— C.E.M. (cM)/EN 55022 : 10 95.1 - Class B - Moyenne/
 — C.E.M. (cM)/EN 55022 : 10 95.1 - Class B - QCRite/
 — Mes. Peak (Phase 1)



7. UNWANTED RADIATED EMISSIONS – SECTION 15.209

Standard: FCC part 15 Radio part 15.209

Tests methods: FCC part 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 9 kHz 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 reported in 15.209 and RSS Gen.

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 expressed 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. Pre 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:

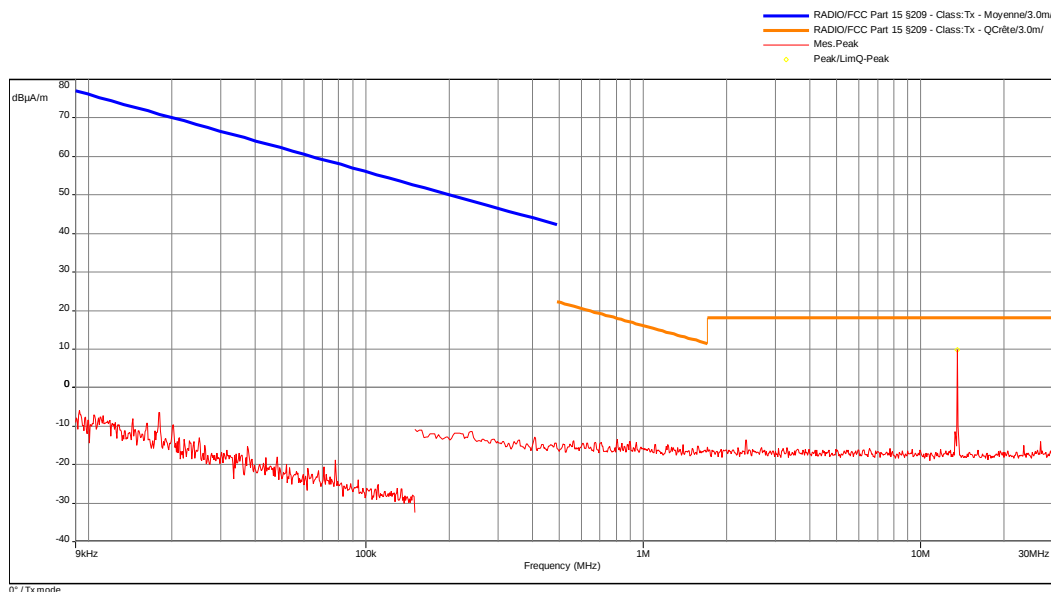
CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Antenna	Electro-Metrics	BIA-30HF	1107	03/03/2011	03/05/2015
Antenna	Rohde & Schwarz	HFH2-Z2	5825	22/10/2012	22/12/2014
Antenna	Rohde & Schwarz	HL223	1137	03/03/2011	03/05/2015
Cable	C&C	N-3m	10557	27/09/2013	27/11/2015
Cable	C&C	N-3m	10558	27/09/2013	27/11/2015
Cable	C&C	N-5m	10561	27/09/2013	27/11/2015
Receiver	Agilent	E4440A	5824	22/10/2013	22/12/2015
Shielded enclosure	RAY PROOF	C.GS3	1123	17/10/2013	17/12/2016
Software	Nexio	BAT EMC	0000	#	#

#: Permanent validity

BAT-EMC software version: V3.6.0.32

Results: See **Graphs** hereafter.

Radiated field strength 0° / Tx mode

EMI2415


Date: 11/09/2014 09:47:03

Technician: DM

Detection:
Peak

T (°C): 23.5

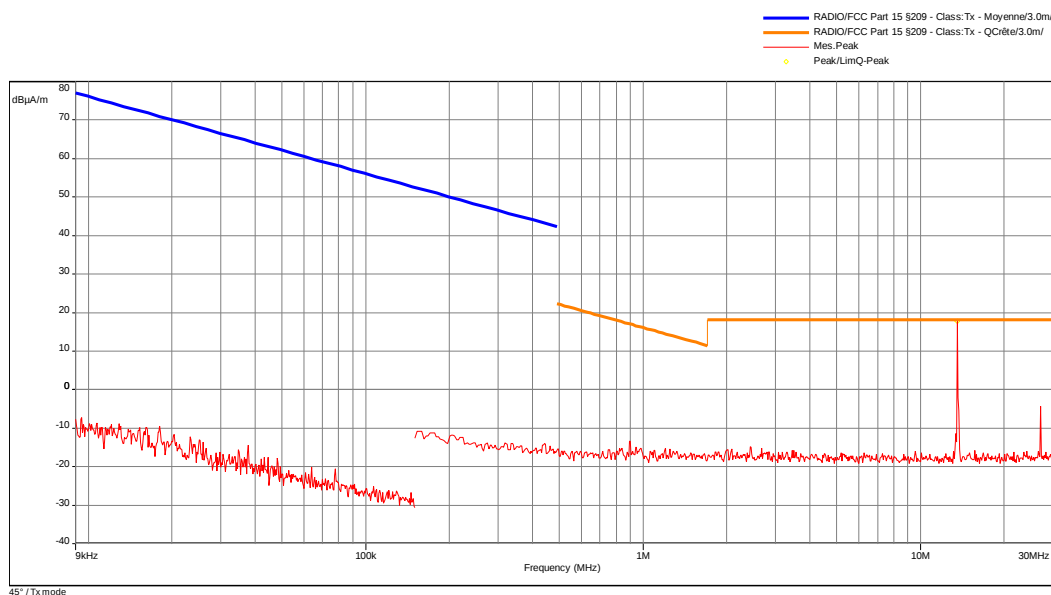
H (%): 56

P (hpa): 1005

Comments:
Pre measurement - maximized
at 360°

Modification(s) during test:
None

Radiated field strength 45° / Tx mode

EMI2416


Date: 11/09/2014 09:58:37

Technician: DM

Detection:
Peak

T (°C): 23.5

H (%): 56

P (hpa): 1004

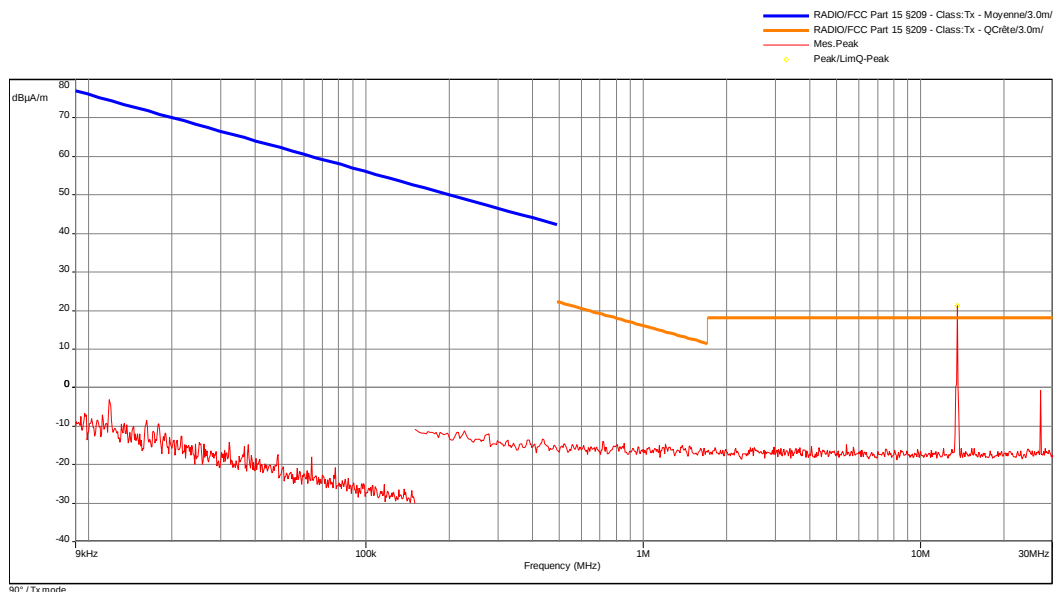
Comments:
Pre measurement - maximized
at 360°

Modification(s) during test:
None

Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor.

Radiated field strength 90° / Tx mode

EMI2417



Date: 11/09/2014 10:07:16

Technician: DM

Detection:
Peak

T (°C): 23.5
H (%): 56
P (hpa): 1005

Comments:
Pre measurement - maximized
at 360°

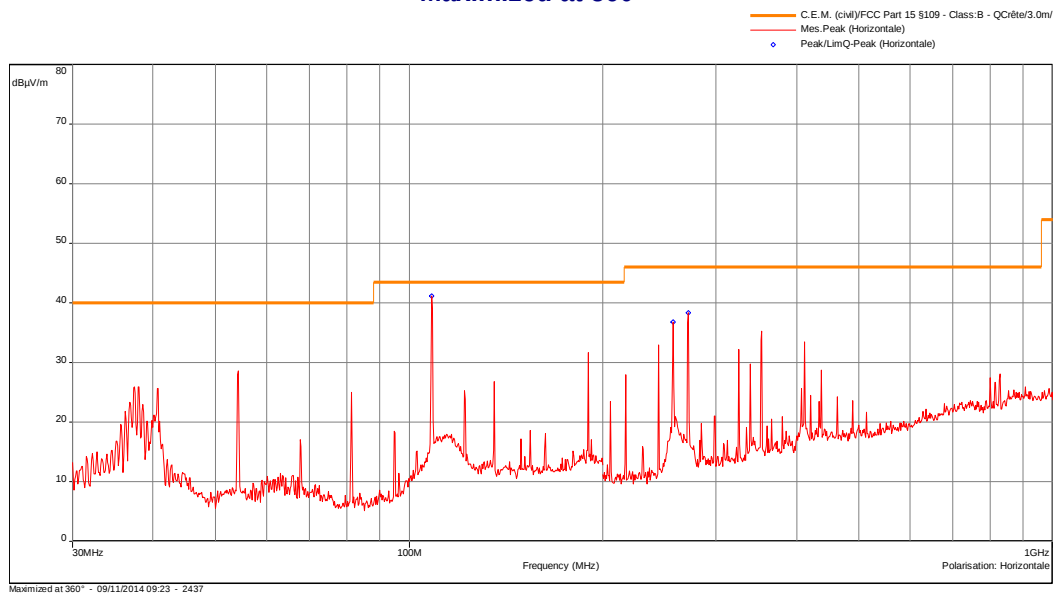
Modification(s) during test:
None

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

Radiated electric emission (measurement)

EMI2437

Maximized at 360°



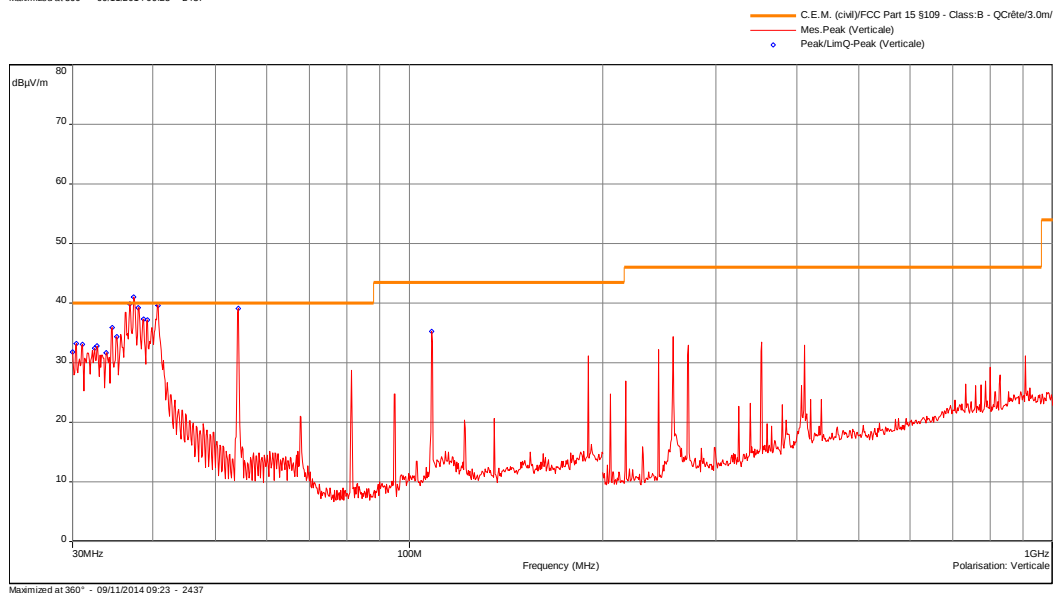
Date: 11/09/2014 09:23:09

Technician: DM

Class: B of the standard

Detection:
Peak

Comments:
Pre measurement - maximized
at 360°

Modification(s) during test:
None


b) Measurement at 3 meters on open area test site:
Temperature (°C): 23
Humidity (%HR): 52
Pressure (hPa): 1004

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	10m	Quasi-peak	80cm
150kHz-30MHz	Front side	10kHz	10m	Quasi-peak	80cm
30MHz-1GHz	Front side	120kHz	3m	Quasi-peak	80cm

Test method deviation: Between 9 kHz to 30MHz: measurements are expressed in dBμA/m instead of dBμV/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	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	22/04/2014	22/06/2017
Receiver	Agilent	7405A	2161	28/01/2014	28/03/2016
Receiver	Rohde & Schwarz	ESVS10	3211	26/11/2012	26/01/2015
Receiver	Rohde & Schwarz	ESHS10	3371	26/11/2012	26/01/2015
Turntable	Heinrich Deisel	D4420	4038	#	#
Turntable controller	Heinrich Deisel	HD100	4036	#	#

#: Permanent validity

Results: See **Boards** hereafter.

Frequency (MHz)	Polarization	Azimet (degree)	Antenna Height (cm)	Measure (dBμA/m)	Limit (dBμA/m)	Comments
27.12	Horizontal	285	90°	-13.95	-2.87	C

C= Compliant

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dB μ V/m)	Limit (dB μ V/m)	Comments
40.68	Vertical	280	100	36.68	40	C
54.24	Vertical	280	100	36.73	40	C
81.34	Vertical	280	252	28.24	40	C
108.40	Vertical	330	252	33.83	43	C
189.83	Horizontal	52	100	30.09	43	C
108.47	Horizontal	200	172	40.67	43	C
189.83	Vertical	272	192	28.95	43	C
81.37	Horizontal	325	262	28.43	40	C
54.24	Horizontal	0	163	28.84	40	C
271.18	Horizontal	295	100	40.93	46	C
257.69	Horizontal	310	100	38.83	46	C
244.08	Horizontal	294	100	35.76	46	C
352.54	Horizontal	283	100	43.16	46	C
244.07	Vertical	193	100	30.72	46	C
257.73	Vertical	198	100	35.11	46	C
271.18	Vertical	209	100	36.02	46	C
352.55	Vertical	221	100	38.85	46	C
412.51	Vertical	220	100	36.11	46	C

C= Compliant

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

8. OPERATION WITHIN THE BAND 13.110-14.010 MHZ – SECTION 15.225

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

Tests methods: 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°. Only higher level is recorded

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

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	Huber Sumner	N-20m	8385	04/06/2013	04/08/2015
Open area test site	EMITECH	Salinelles	3482	22/04/2014	22/06/2017
Receiver	Agilent	7405A	2161	28/01/2014	28/03/2016
Receiver	Rohde & Schwarz	ESHS10	3371	26/11/2012	26/01/2015
Software	Nexio	BAT EMC	0000	#	#
Turntable	Heinrich Deisel	D4420	4038	#	#
Turntable controller	Heinrich Deisel	HD100	4036	#	#

#: Permanent validity

BAT-EMC software version: V3.6.0.32

Results: See Graph(s) hereafter

Frequency (MHz)	Polarization	Azimet (degree)	Antenna Height (cm)	Measure (dBμV/m)	Limit (dBμV/m)	Comments
13.56	Horizontal	0	0°	-3.36	51.58	C
13.56	Horizontal	0	45°	3.80	51.58	C
13.56	Horizontal	285	90°	6.67	51.58	C

C= Compliant

Carrier measurement at 10m: 7.64 dBμA/m (≈ 58.17dBμV/m)

Using an extrapolation factor of 40 dB/decade (as described in section 15.31 (f)), the level at 30m is about 39.09dBμV/m (90.05μV/m) for a limit at 15.848 mV/m.

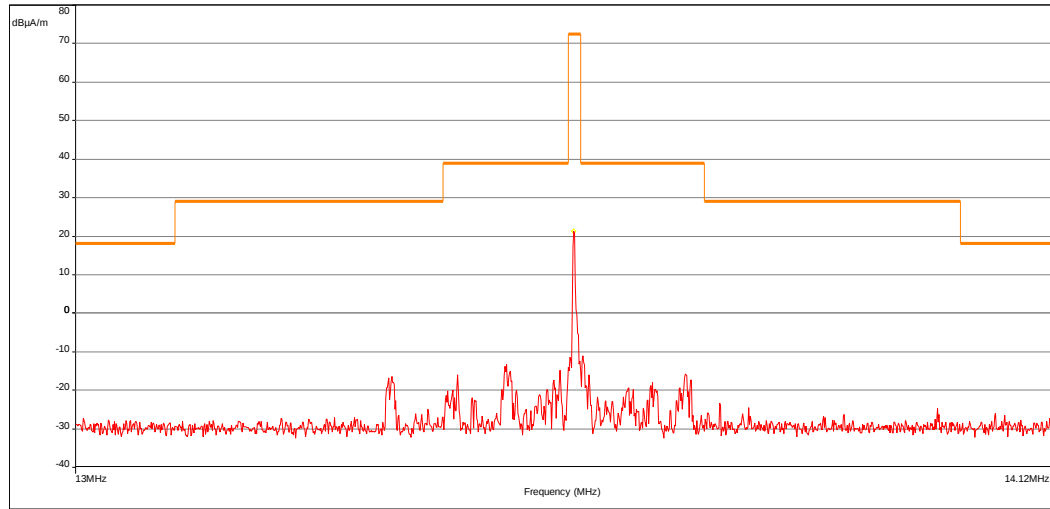
Radiated magnetic field emission at 3m (maximum measurement)

EMI2440

90° / RF

Frequency (MHz) : 13 MHz - 14.12 MHz (Analyzer mode)
Settings: RBW: 1 kHz, VBW: 3 kHz, Auto, sweep count 1
Polarisation : Circulaire
Distance: 3 m

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



Date: 11/09/2014 10:10:55

Technician: DM

Detection:
Peak

T (°C): 23.5
H (%): 56
P (hpa): 1005

Comments:

Modification(s) during test:
No

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

9. FREQUENCY TOLERANCE – SECTION 15.225

Standards: FCC Part 15 Radio part 15.225

Tests methods: 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: No

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	DUE DATE
Antenna	EMITECH	3.5 cm	4653	#	#
Climatic enclosure	Secasi	SM600C	1670	20/09/2012	20/11/2014
Multimeter	Agilent	U1252A	6138	16/10/2013	16/12/2015
Power supply	KIKUSUI	PCR2000L	0800	#	#
Receiver	Agilent	E4440A	5824	22/10/2013	22/12/2015

#: Permanent validity

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

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

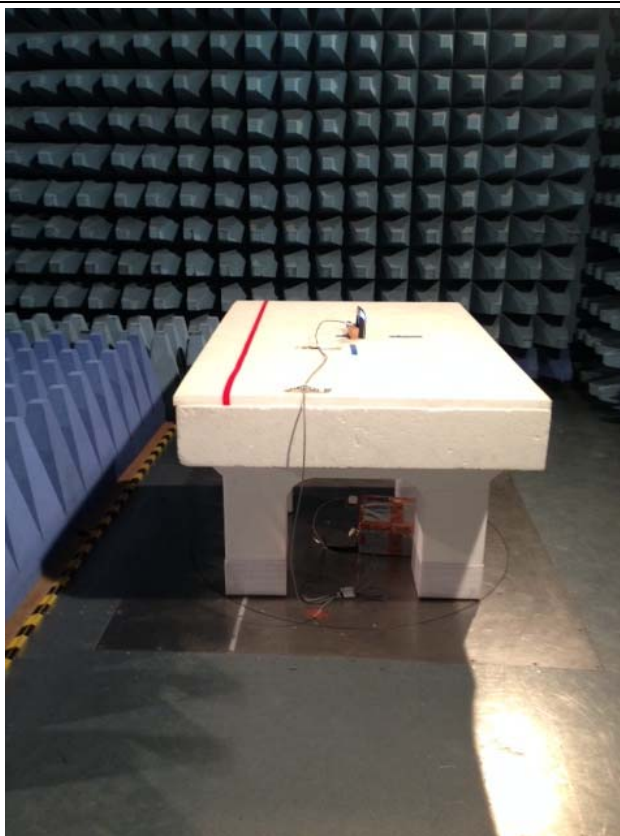
E.U.T. operating mode: with modulation

	Temperature	Power supply (Vac)	Measured Frequency (MHz)	Frequency tolerance (%)	Limit (%)
Normal condition	+20°C (Humidity 50%)	12.0	13.559555	-	+/-0.01
		10.2	13.559554	0.00001	
		13.8	13.559555	0.00000	
Extremes conditions	-20°C	12.0	13.559516	0.00029	
		10.2	13.559516	0.00029	
		13.8	13.559517	0.00028	
	+50°C	12.0	13.559558	-0.00002	
		10.2	13.559555	0.00000	
		13.8	13.559558	-0.00002	

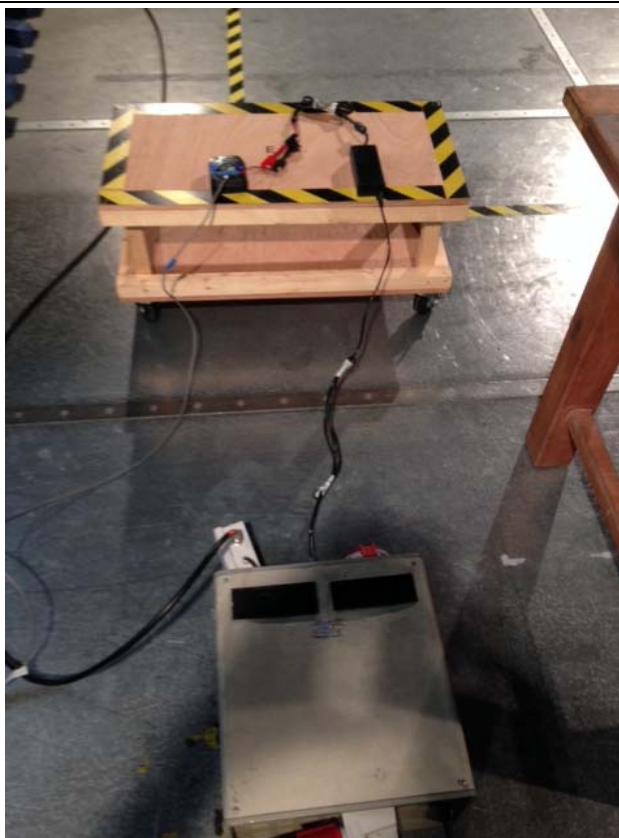
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ANNEX: PHOTOGRAPH(S)

Radiated measurements pre
measurements



Conducted emissions



Power supply used for
conducted emissions



Radiated measurement on open
area test site



**Radiated measurement on open
area test site**



**Radiated measurement on open
area test site (carriers
measurements)**



Frequency tolerance (climatic enclosure)

