

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 |      |
|-----|------------|------------------------------|-----------------|-------------------------------------------------------------------------------------|------------------------|------|
|     |            |                              | Name            | Visa                                                                                | Name                   | Visa |
| 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 11<sup>th</sup> and 12<sup>th</sup> of 2014  
December, the 04<sup>th</sup> 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)

|                         |                                                                                                                                                                                         |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FCC Part 15</b>      | Code of Federal Regulations<br>Title 47 – Telecommunications<br>Chapter 1 – Federal Communications Commission<br>Part 15 – Radio frequency devices<br>Subpart C – Intentional Radiators |
| <b>ANSI C 63.4:2003</b> | 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.

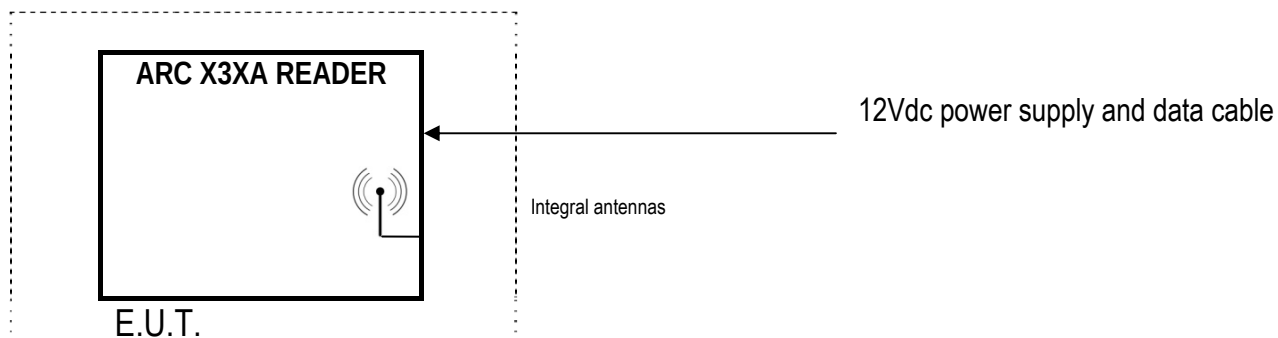
### **X3XA READER**

- 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            |
|----------------------------------------------------------|---------------------|---------------------|
| <b>Antenna requirement</b><br>- FCC part 15.203          | YES                 | Integrated antennas |
| <b>Restricted band of operation</b><br>- FCC part 15.205 | YES                 |                     |
| <b>Conducted power lines</b><br>- FCC part 15.207        | YES                 |                     |
| <b>Unwanted radiated emissions</b><br>- FCC part 15.209  | YES                 |                     |
| <b>Field strength</b><br>- FCC part 15.225 a) to d)      | YES                 |                     |
| <b>Frequency tolerance</b><br>- 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 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

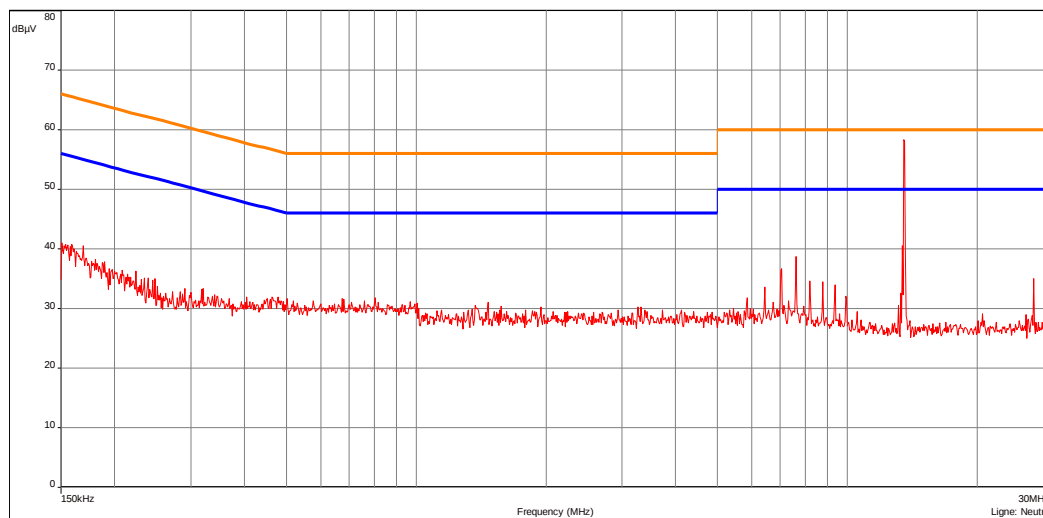
BAT-EMC software version: V3.6.0.32

**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

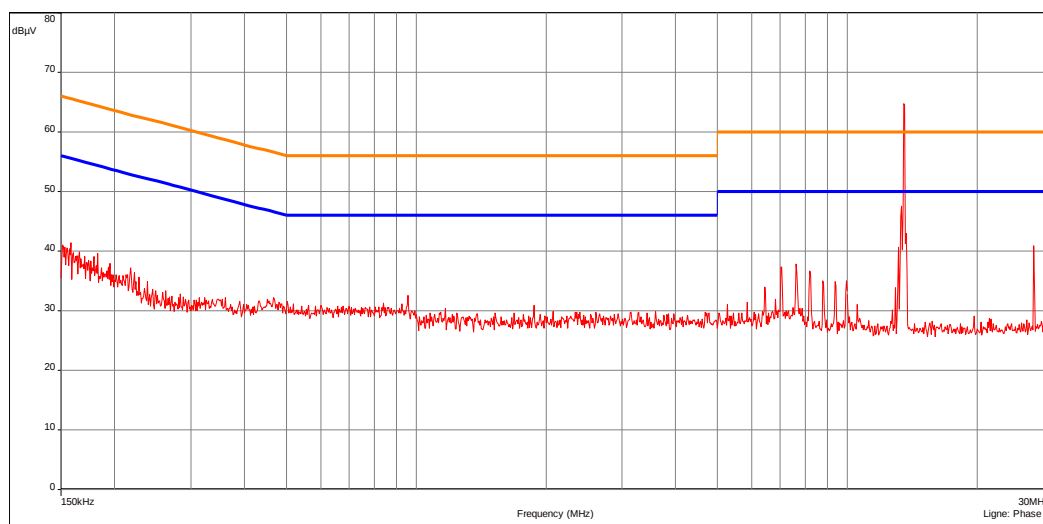
Technician: RB

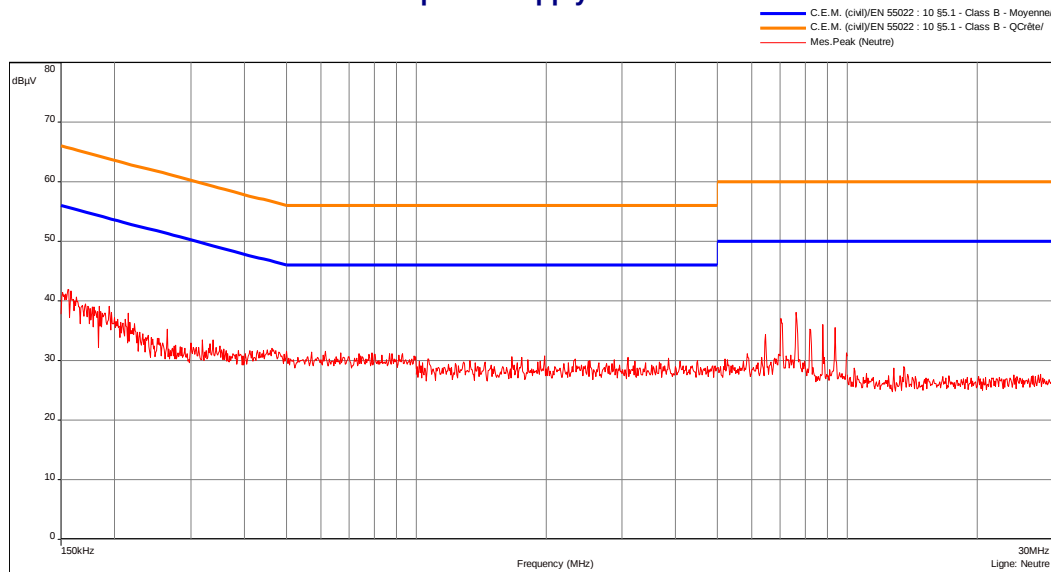
Classe: B of the standard

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)

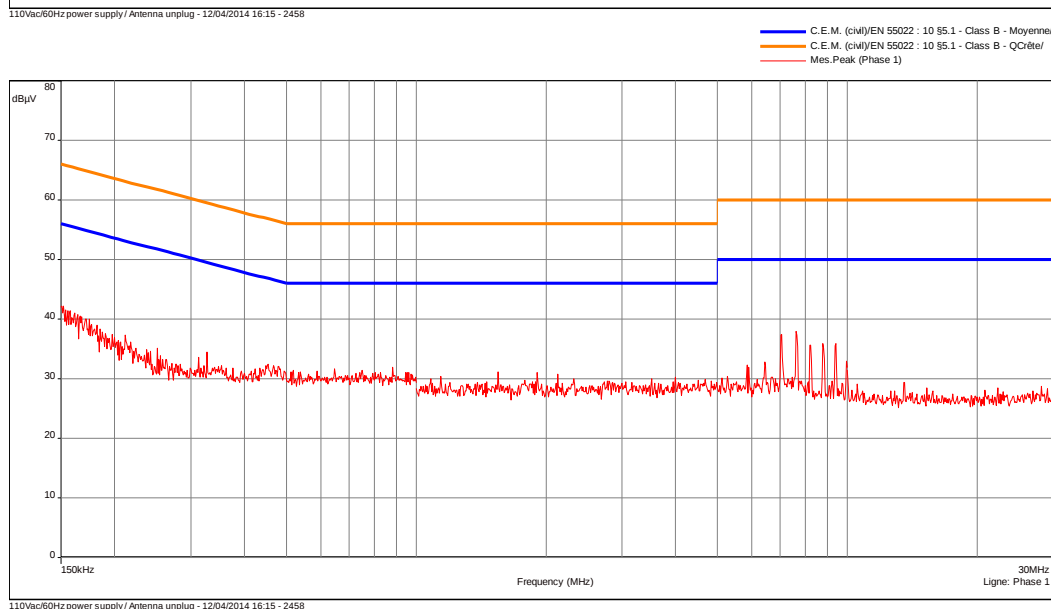


**Conducted voltage emission (measurement)**  
**110Vac/60Hz power supply / without antenna**
**EMI2458**

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

 Technician: **RB**

 Classe: **B of the standard**

 Detection:  
**Peak**

 Modification(s) during test:  
**No**


110Vac/60Hz power supply / Antenna unplug - 12/04/2014 16:15 - 2458

## 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 $\mu$ 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. 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:**

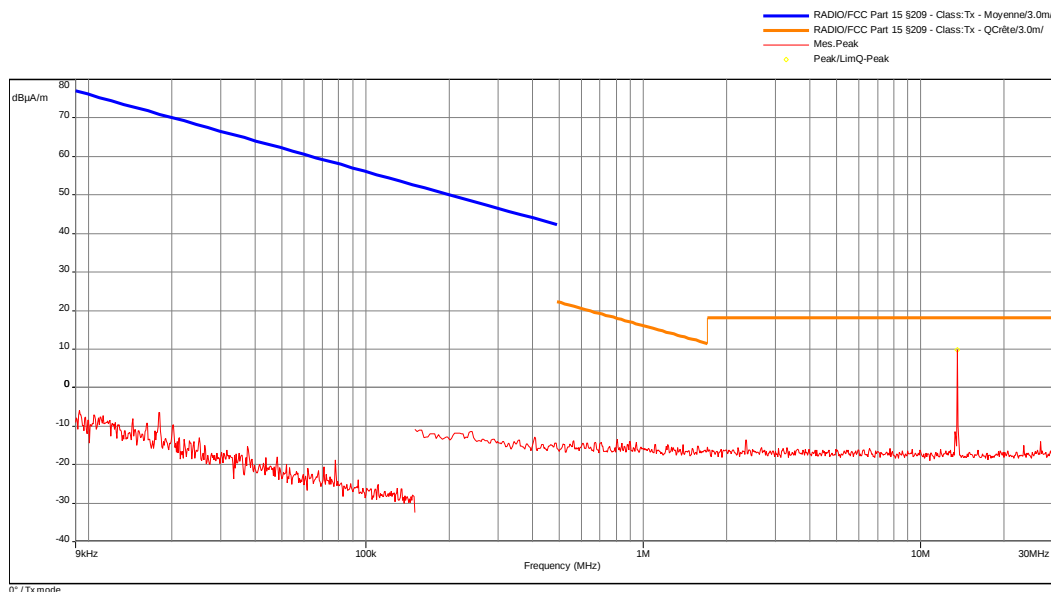
| CATEGORY           | BRAND           | TYPE     | N° EMITECH | DATE CAL.  | DATE VAL   |
|--------------------|-----------------|----------|------------|------------|------------|
| Antenna            | Electro-Metrics | BIA-30HF | 1107       | 03/03/2011 | 03/05/2015 |
| Antenna            | Rohde & 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

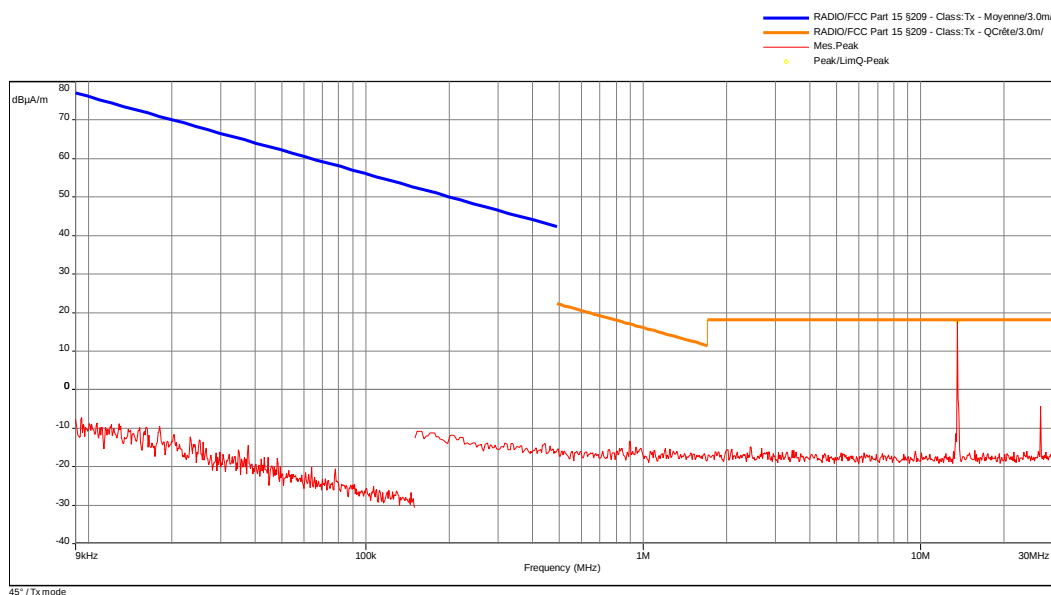
H (%): 56

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

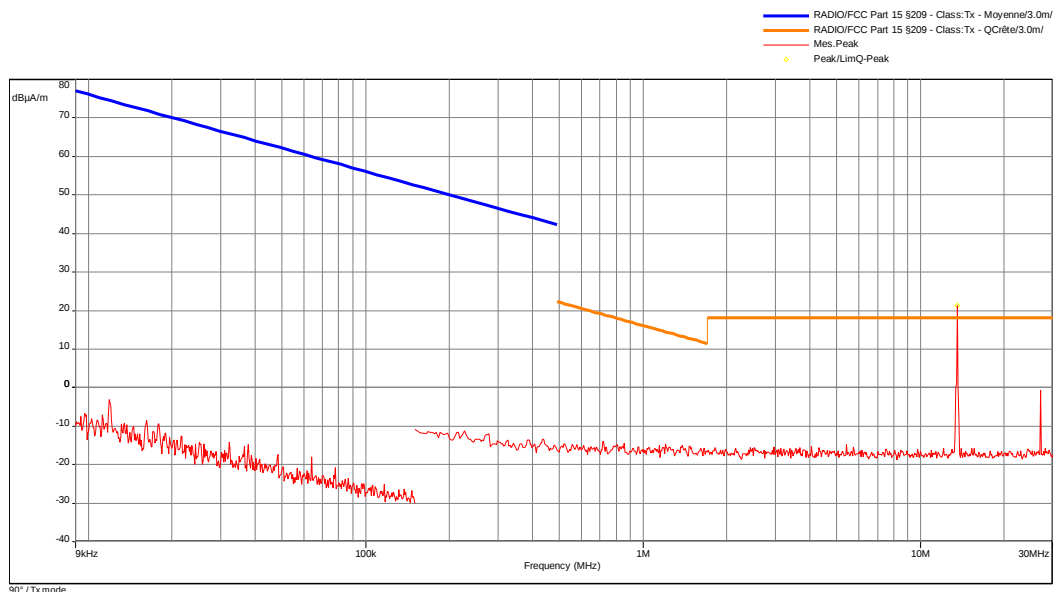
Comments:  
Pre measurement - maximized  
at 360°

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°

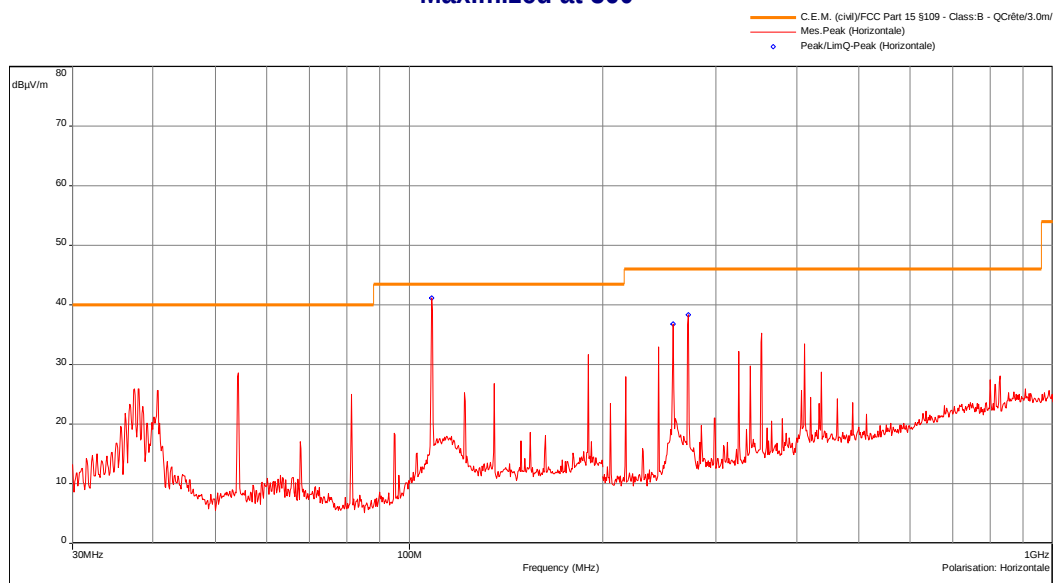
Modification(s) during test:  
None

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°



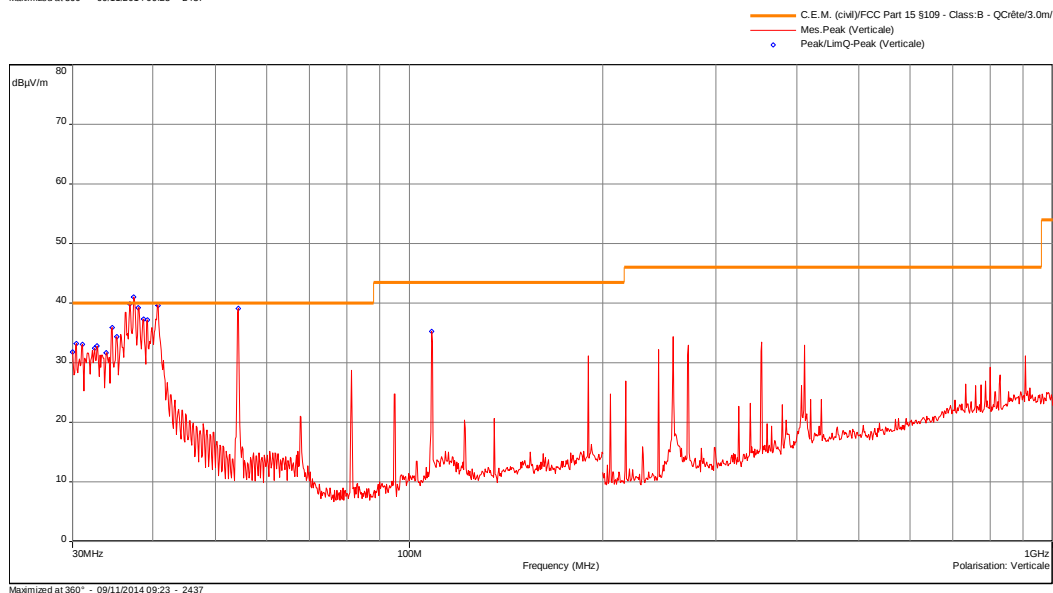
Date: 11/09/2014 09:23:09

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 $\mu$ V/m) | Limit (dB $\mu$ 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.

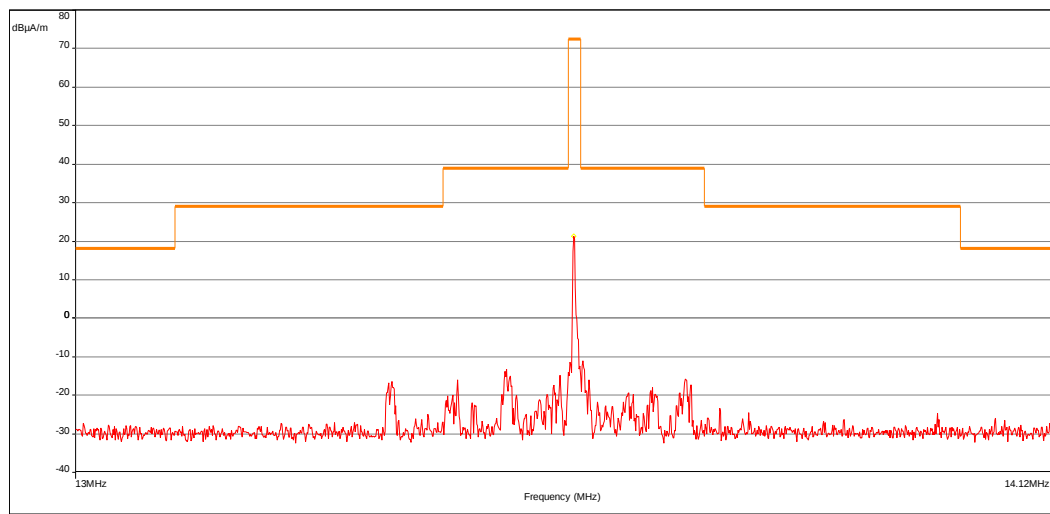
## Radiated magnetic field emission at 3m (maximum measurement)

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

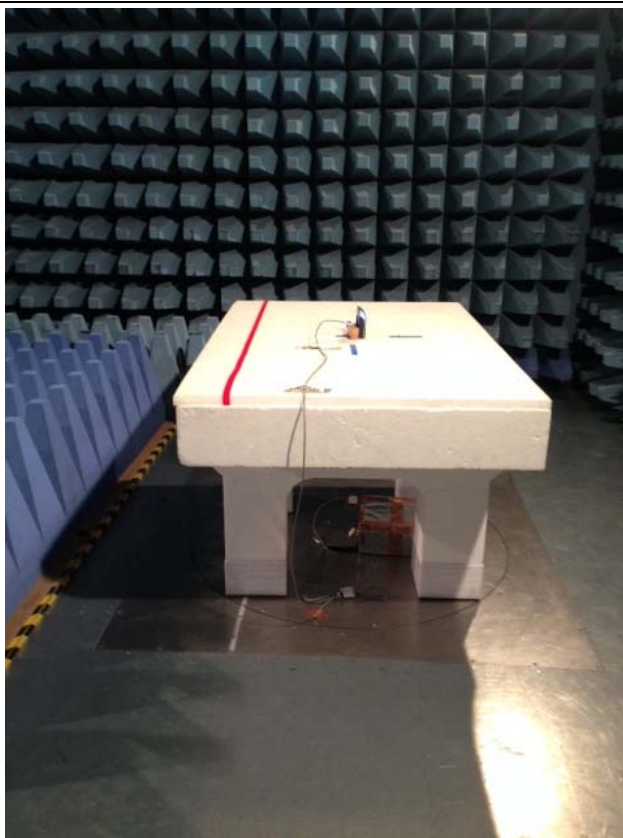
E.U.T. operating mode: with modulation

|                     | Temperature             | Power supply (Vac) | Measured Frequency (MHz) | Frequency tolerance (%) | Limit (%) |
|---------------------|-------------------------|--------------------|--------------------------|-------------------------|-----------|
| Normal condition    | +20°C<br>(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                |           |

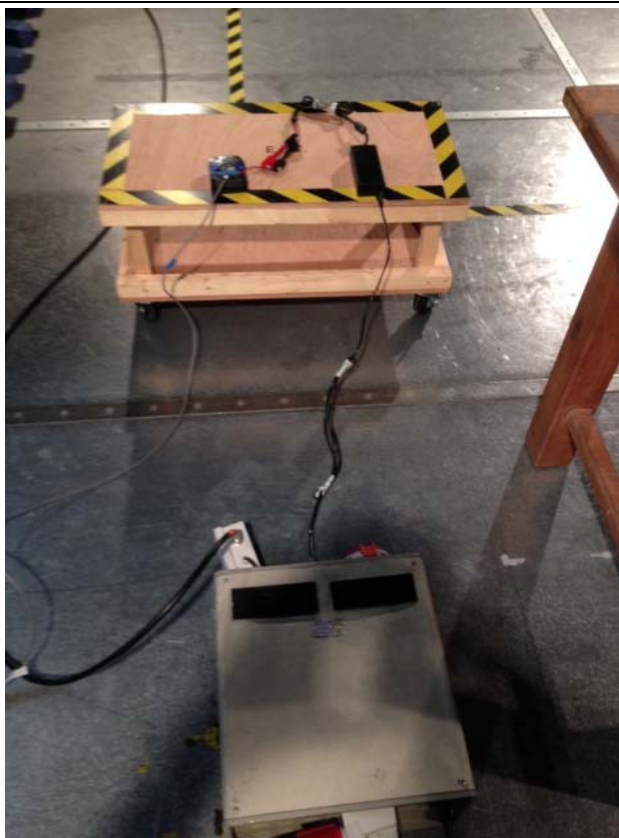
□□□ End of report – 1 annex to be forwarded □□□

# **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)

