

R041-15-101239-1A - RB / CBU

⇒ This test report cancels and replaces the report R041-15-101239-1A Ed.0

RADIO TEST REPORT

According to the standard(s):

FCC part 15 Subpart C

Equipment under test:

ARC-x3x-X READERS

FCC ID: OVNAC1

Company:

STID

Diffusion: Mr POITRAT

(Company: STID)

Number of pages: 44 including 1 annex

Ed.	Date	Modified page(s)	Written by		Technical verification Quality approval	
			Name	Visa	Name	Visa
1	16 Jun. 15	Refer to lines in the margin	Rémi BLANQUE		David MONTAULON	

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

: ARC-x3x-X Readers

Serial number: ARC-x3x-B: G1411043
ARC-x3x-C: G1411044
ARC-x3x-D: G1411045
ARC-x3x-E: G1411046
ARC-x3x-F: G1411047**P/N**

: FCC ID : OVNAC1

Software version

: None

MANUFACTURER'S NAME

: STID

APPLICANT'S ADDRESS:**Company**

: STID

Address: 20 PA Des Pradeaux
Boulevard Salvador Allende
13850 GREASQUE
FRANCE**Person(s) present during the
tests**

: Mr SILVE

Responsible

: Mr POITRAT

DATE(S) OF TESTS: March, the 19th, 20th and 23rd of 2015**TESTS LOCATION(S)**: EMITECH MONTPELLIER laboratory in VENDARGUES (34)
Open area test site in SALINELLES (30)
FRANCE
FCC Test Firm Registration Number: 954701**TESTS SUPERVISOR(S)**

: None

TESTS OPERATOR(S)

: Rémi BLANQUE and David MONTAULON

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1. INTRODUCTION

This document submits the results of Radio tests performed on the equipment **ARC-x3x-X readers** (denominated hereafter E.U.T.: equipment under test) according to document(s) listed below.

2. REFERENCE DOCUMENT(S)

FCC part 15 Subpart C

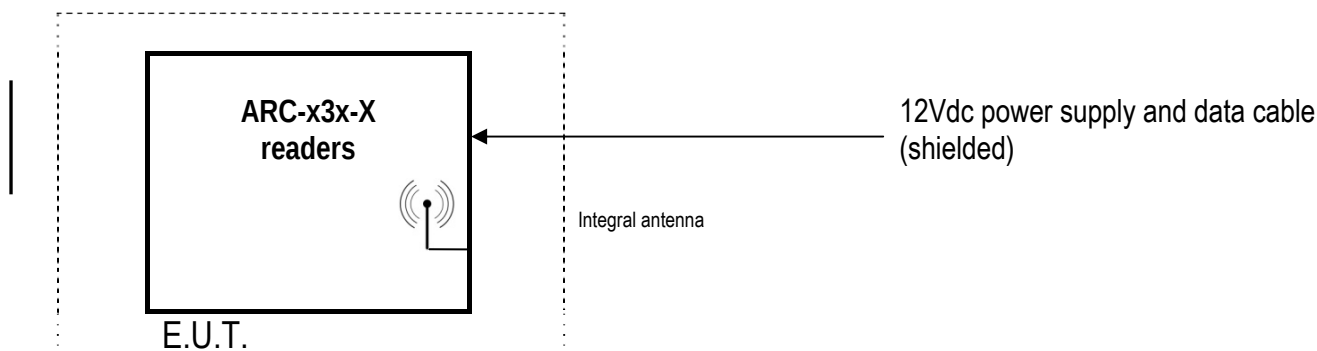
Code of Federal Regulations
Title 47 – Telecommunications
Chapter 1 – Federal Communications Commission
Part 15 – Radio frequency devices
Subpart C – Intentional Radiators

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

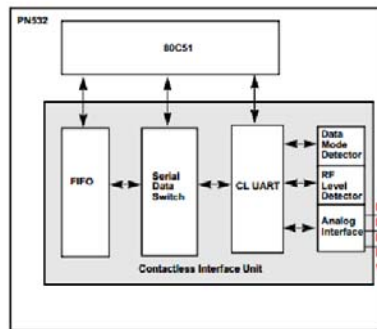
3. EQUIPMENT UNDER TEST CONFIGURATION SCHEME

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

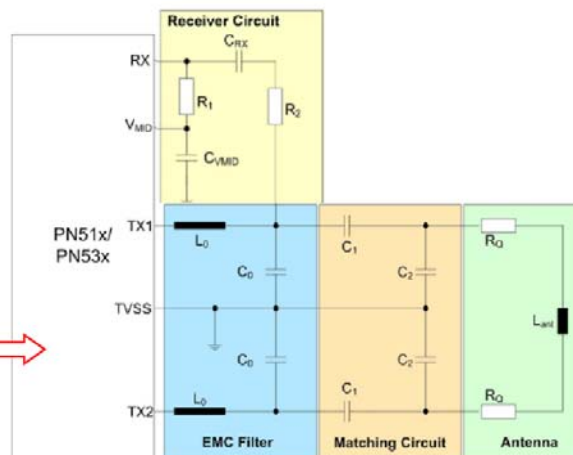


Cycle and operating mode during emission tests: Permanent reading.

ARC HF block diagram



The **PN532** is a highly integrated transceiver module for contactless communication at 13.56MHz based on the 80C51 microcontroller core



The **EMC Filter** reduces 13.56MHz harmonics and performs an impedance transformation.

The **Matching Circuit** acts as an impedance transformation block.

The **Antenna** coil itself generates the magnetic field.

The **Receiver Circuit** provides the received signal to the PN532 internal receiving stage.

Equipment modifications applied during tests: The value of a capacitor changed to reduce harmonics generated by the RFID part.

4. FREQUENCY IDENTIFICATION**Equipment characteristics:****ARC-x3x-X readers**

Permanent transmitter emission with a loop coil antenna:

- Integral antenna
- Dedicated antenna supplied with the equipment

Frequency range used by E.U.T.: 13.56MHz

Test frequency: 13.56 MHz

Equipment: single frequency

Total channel available: 1 (For RFID module)

Power supply: 12Vdc

Applicant: STID

FCC ID: OVNAC1

5. SUMMARY OF TEST RESULTS

Tests designation	Results satisfying?	Comments
Antenna requirement - FCC part 15.203	YES	Integral antenna
Restricted band of operation - FCC part 15.205	YES	
Conducted power lines - FCC part 15.207	YES	
Unwanted radiated emissions - FCC part 15.209 and 15.215	YES	
Field strength - FCC part 15.225 a) to d)	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 EMISSIONS - SECTION 15.207

Temperature (°C): 23

Humidity (%HR): 39

Pressure (hPa): -

Standard: FCC part 15 Subpart C

Test method: Section 15.207

Test configuration:

Tested cable(s)	Measure with	E.U.T. height
115Vac/60Hz power supply / ARC X3XB	L.I.S.N.	40cm
115Vac/60Hz power supply / ARC X3XC	L.I.S.N.	40cm
115Vac/60Hz power supply / ARC X3XD	L.I.S.N.	40cm
115Vac/60Hz power supply / ARC X3XE	L.I.S.N.	40cm
115Vac/60Hz power supply / ARC X3XE / without antenna	L.I.S.N.	40cm
115Vac/60Hz power supply / ARC X3XF	L.I.S.N.	40cm

Frequency band	Tested cable(s)	Resolution bandwidth	Video bandwidth	Detection mode
150kHz-30MHz	115Vac/60Hz power supply / ARC X3XB	10kHz	30kHz	Peak
150kHz-30MHz	115Vac/60Hz power supply / ARC X3XC	10kHz	30kHz	Peak
150kHz-30MHz	115Vac/60Hz power supply / ARC X3XD	10kHz	30kHz	Peak
150kHz-30MHz	115Vac/60Hz power supply / ARC X3XE	10kHz	30kHz	Peak
150kHz-30MHz	115Vac/60Hz power supply / ARC X3XE / without antenna	10kHz	30kHz	Peak
150kHz-30MHz	115Vac/60Hz power supply / ARC X3XF	10kHz	30kHz	Peak

E.U.T. is powered in DC. In order to show compliance with section 15.207 E.U.T. was tested with a standard main power supply converter in 115Vac/60Hz.

In order to show compliance with conducted emissions and to avoid radiated phenomenon on power supply cable, an additional test is done without integral antenna.

Test method deviation: Only the equipment ARC-X3XE has been measured on phase line and neutral line. Just the neutral line has been measured on the others equipments.

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Cable	Emitech	Absorber	9491	25/09/2014	25/11/2016
Cable	Micro-coax	N-3m	10535	05/09/2013	05/11/2015
Cable	Micro-coax	N-5m	10529	05/09/2013	05/11/2015
Limiter	Hewlett Packard	11947A	0239	22/10/2013	22/12/2015
LISN	PMM	L3-25	0821	13/03/2014	13/05/2016
PE inductor	EMITECH	CISPR 16-2-1 : 2008	10071	#	#
PE inductor	EMITECH	CISPR 16-2-1 : 2008	10081	#	#

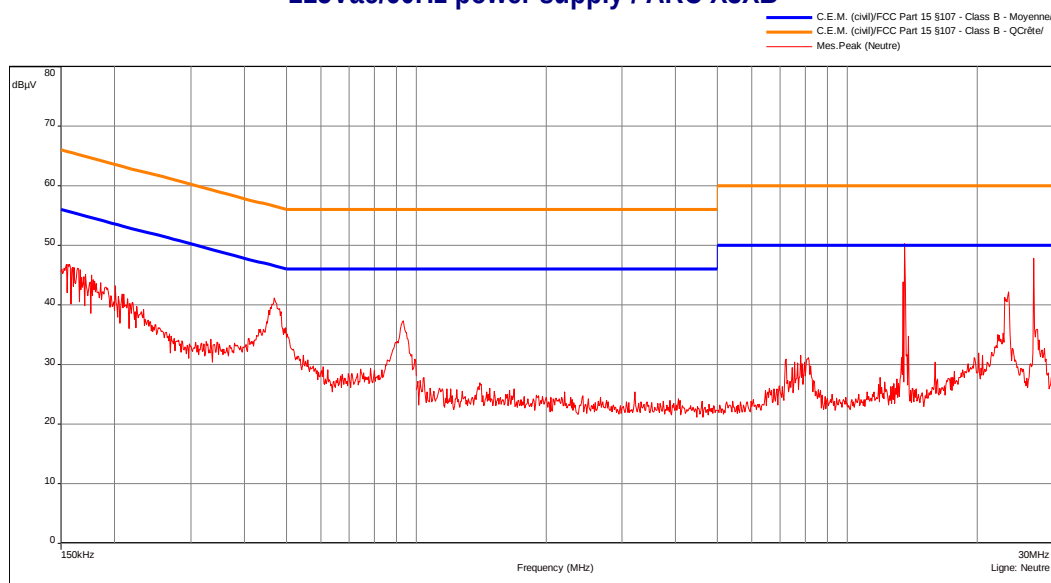
CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Receiver	Agilent	E4440A	5824	01/05/2014	01/07/2016
Shielded enclosure	RAY PROOF	C.GS3	1123	17/10/2013	17/12/2016
Software	Nexio	BAT EMC	0000	#	#
thermohygrometer	Testo	608-H1	7561	26/09/2014	26/11/2016

#: 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)
115Vac/60Hz power supply / ARC X3XB


115Vac/60Hz power supply / ARC X3XB - 03/19/2015 16:32 - 2449

EMI2449

Date: 19/03/2015 16:32:35

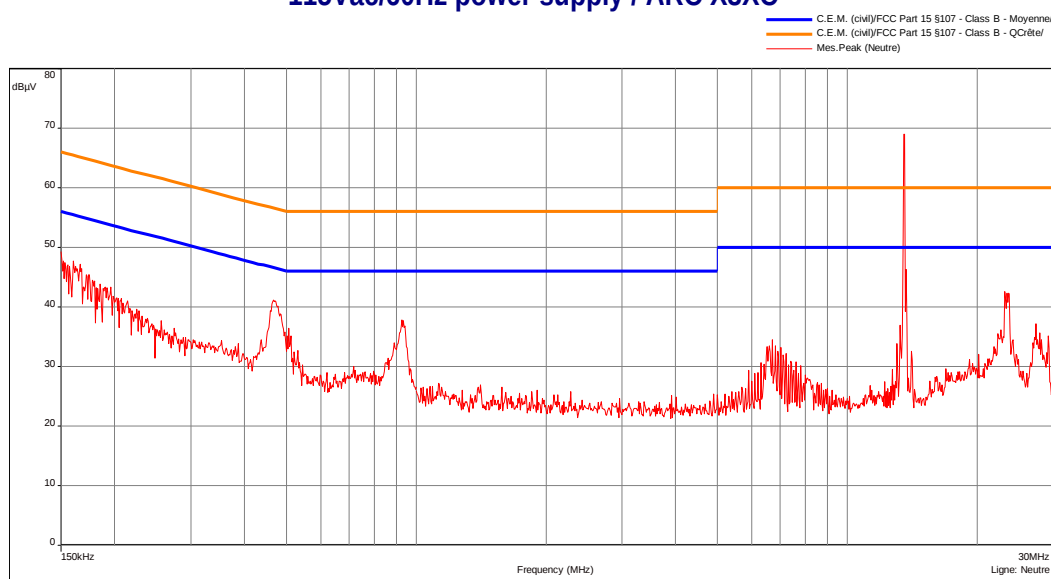
Technician: RB

Class: B of the standard

Detection:
Peak

Frequency identification:
13.56MHz : Util frequency

Modification(s) during test:
No

Conducted voltage emission (measurement)
115Vac/60Hz power supply / ARC X3XC


115Vac/60Hz power supply / ARC X3XC - 03/19/2015 16:50 - 2451

EMI2451

Date: 19/03/2015 16:50:35

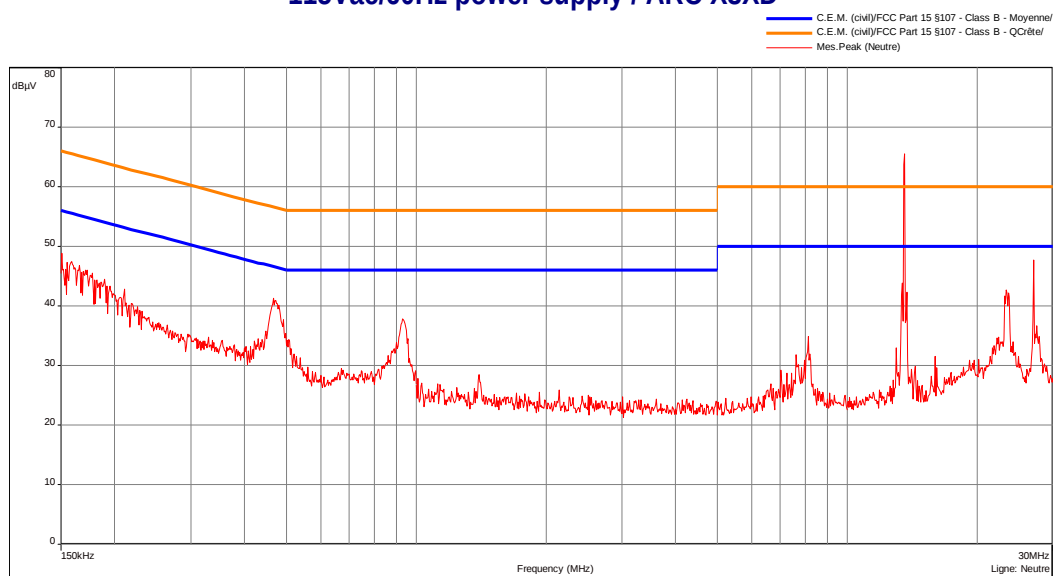
Technician: RB

Class: B of the standard

Detection:
Peak

Frequency identification:
13.56MHz : Util frequency

Modification(s) during test:
No

Conducted voltage emission (measurement)
EMI2448
115Vac/60Hz power supply / ARC X3XD


115Vac/60Hz power supply / ARC X3XD - 03/19/2015 16:27 - 2448

Date: 19/03/2015 16:27:20

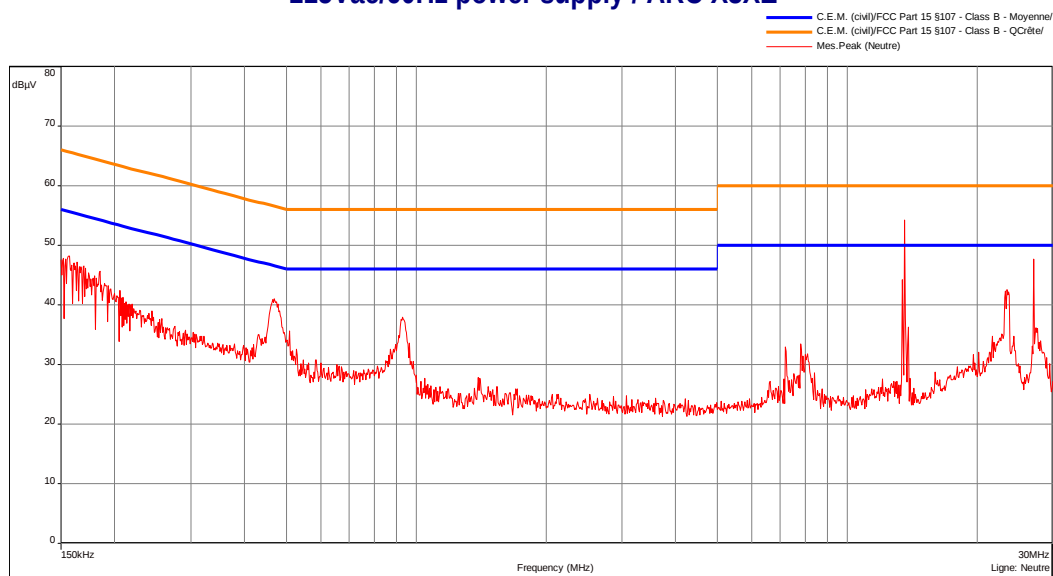
Technician: RB

Class: B of the standard

Detection:
Peak

Frequency identification:
13.56MHz : Util frequency

Modification(s) during test:
No

Conducted voltage emission (measurement)
EMI2453
115Vac/60Hz power supply / ARC X3XE


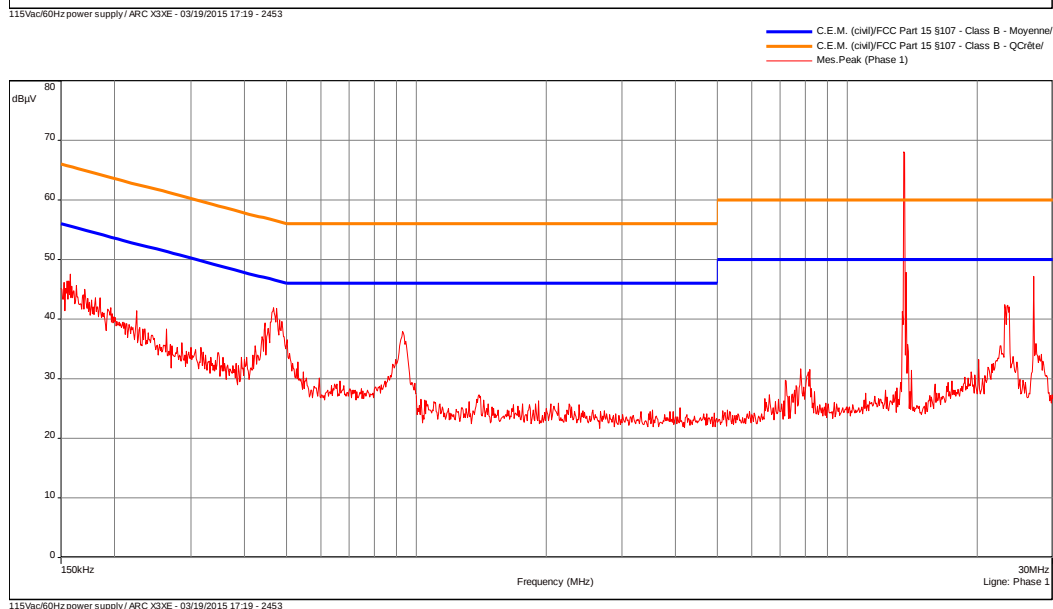
Date: 19/03/2015 17:19:25

Technician: RB

Class: B of the standard

Detection:
Peak

Frequency identification:
13.56MHz : Util frequency

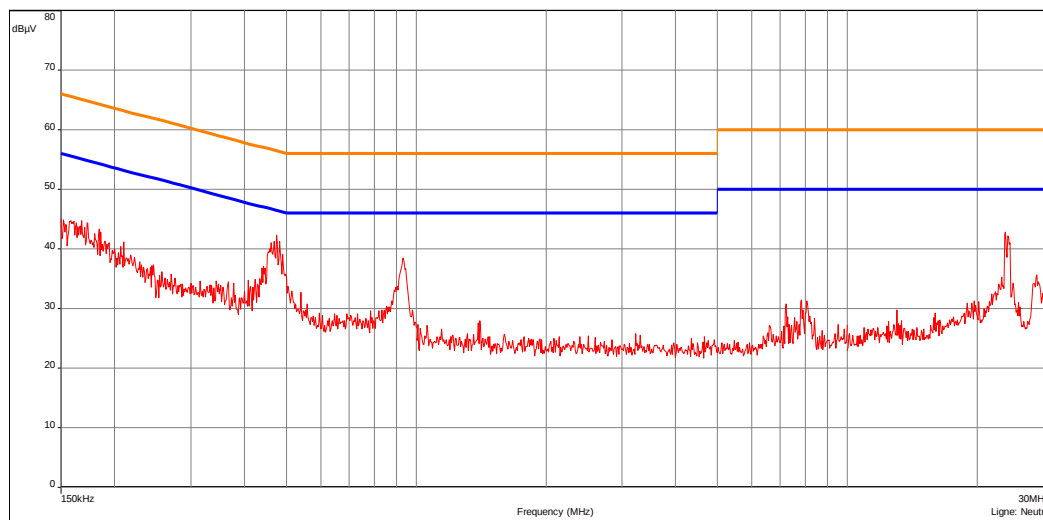
Modification(s) during test:
No


115Vac/60Hz power supply / ARC X3XE - 03/19/2015 17:19 - 2453

Conducted voltage emission (measurement)
115Vac/60Hz power supply / ARC X3XE / without antenna

EMI2454

— C.E.M. (cnv)/FCC Part 15 §107 - Class B - Moyenne/
 — C.E.M. (cnv)/FCC Part 15 §107 - Class B - QCrête/
 — Mes.Peak (Neutre)



115Vac/60Hz power supply / ARC X3XE / without antenna - 03/19/2015 17:32 - 2454

Date: 19/03/2015 17:32:26

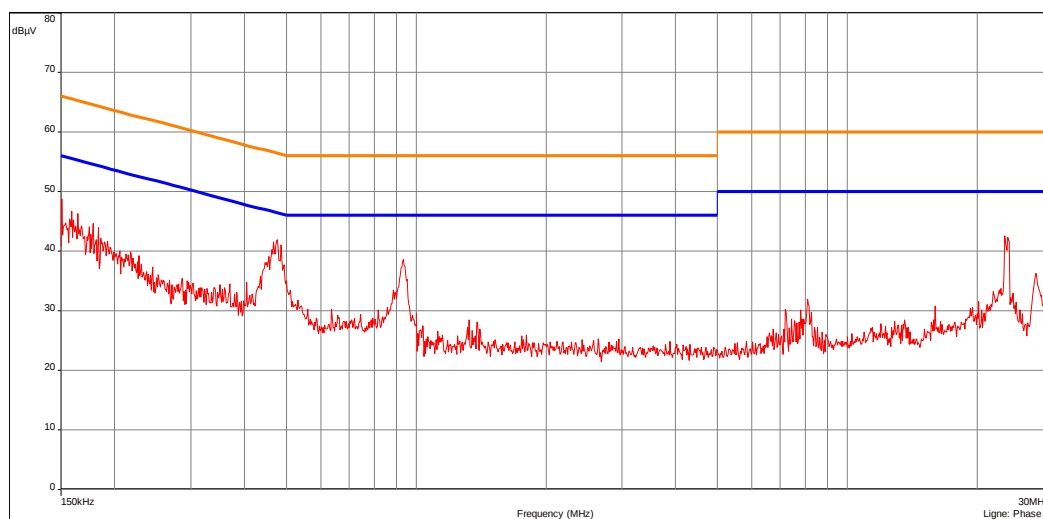
Technician: RB

Class: B of the standard

Detection:
Peak

Modification(s) during test:
No

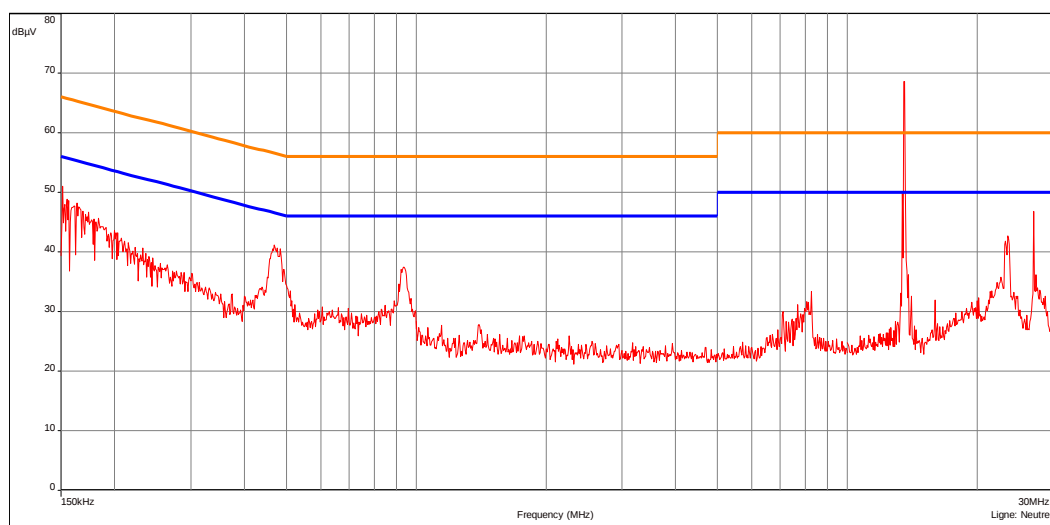
— C.E.M. (cnv)/FCC Part 15 §107 - Class B - Moyenne/
 — C.E.M. (cnv)/FCC Part 15 §107 - Class B - QCrête/
 — Mes.Peak (Phase 1)



115Vac/60Hz power supply / ARC X3XE / without antenna - 03/19/2015 17:32 - 2454

Conducted voltage emission (measurement)
EMI2452
115Vac/60Hz power supply / ARC X3XF

— C.E.M. (civl)/FCC Part 15 §107 - Class B - Moyenne/
 — C.E.M. (civl)/FCC Part 15 §107 - Class B - QOréal/
 — Mes.Peak (Neutre)



115Vac/60Hz power supply / ARC X3XF - 03/19/2015 16:56 - 2452

Date: 19/03/2015 16:56:56

Technician: RB

Class: B of the standard

Detection:
Peak

Frequency identification:
13.56MHz : Util frequency

Modification(s) during test:
No

7. UNWANTED RADIATED EMISSIONS - SECTION : 15.209

Standard: FCC part 15 Radio part 15.209

Tests methods: FCC part 15.209 and ANSI C63.4:2009

a) **Pre-measurement in semi anechoic chamber:**

Temperature (°C): 23

Humidity (%HR): 39.7

Pressure (hPa): -

Test configuration:

Frequency band	Tested side	Resolution bandwidth	Video bandwidth	Detection mode	E.U.T. height
9kHz-150kHz	ARC X3XB / antenna 0°	200Hz	1kHz	Peak	80cm
9kHz-150kHz	ARC X3XB / antenna 45°	200Hz	1kHz	Peak	80cm
9kHz-150kHz	ARC X3XB / antenna 90°	200Hz	1kHz	Peak	80cm
150kHz-30MHz	ARC X3XB / antenna 0°	10kHz	30kHz	Peak	80cm
150kHz-30MHz	ARC X3XB / antenna 45°	10kHz	30kHz	Peak	80cm
150kHz-30MHz	ARC X3XB / antenna 90°	10kHz	30kHz	Peak	80cm
30MHz-200MHz	ARC X3XB	100kHz	300kHz	Peak	80cm
200MHz-1GHz	ARC X3XB	100kHz	300kHz	Peak	80cm
9kHz-150kHz	ARC X3XC / antenna 0°	200Hz	1kHz	Peak	80cm
9kHz-150kHz	ARC X3XC / antenna 45°	200Hz	1kHz	Peak	80cm
9kHz-150kHz	ARC X3XC / antenna 90°	200Hz	1kHz	Peak	80cm
150kHz-30MHz	ARC X3XC / antenna 0°	10kHz	30kHz	Peak	80cm
150kHz-30MHz	ARC X3XC / antenna 45°	10kHz	30kHz	Peak	80cm
150kHz-30MHz	ARC X3XC / antenna 90°	10kHz	30kHz	Peak	80cm
30MHz-200MHz	ARC X3XC	100kHz	300kHz	Peak	80cm
200MHz-1GHz	ARC X3XC	100kHz	300kHz	Peak	80cm
9kHz-150kHz	ARC X3XD / antenna 0°	200Hz	1kHz	Peak	80cm
9kHz-150kHz	ARC X3XD / antenna 45°	200Hz	1kHz	Peak	80cm
9kHz-150kHz	ARC X3XD / antenna 90°	200Hz	1kHz	Peak	80cm
150kHz-30MHz	ARC X3XD / antenna 0°	10kHz	30kHz	Peak	80cm
150kHz-30MHz	ARC X3XD / antenna 45°	10kHz	30kHz	Peak	80cm
150kHz-30MHz	ARC X3XD / antenna 90°	10kHz	30kHz	Peak	80cm
30MHz-200MHz	ARC X3XD	100kHz	300kHz	Peak	80cm
200MHz-1GHz	ARC X3XD	100kHz	300kHz	Peak	80cm

Frequency band	Tested side	Resolution bandwidth	Video bandwidth	Detection mode	E.U.T. height
9kHz-150kHz	ARC X3XE / antenna 0°	200Hz	1kHz	Peak	80cm
9kHz-150kHz	ARC X3XE / antenna 45°	200Hz	1kHz	Peak	80cm
9kHz-150kHz	ARC X3XE / antenna 90°	200Hz	1kHz	Peak	80cm
150kHz-30MHz	ARC X3XE / antenna 0°	10kHz	30kHz	Peak	80cm
150kHz-30MHz	ARC X3XE / antenna 45°	10kHz	30kHz	Peak	80cm
150kHz-30MHz	ARC X3XE / antenna 90°	10kHz	30kHz	Peak	80cm
30MHz-200MHz	ARC X3XE	100kHz	300kHz	Peak	80cm
200MHz-1GHz	ARC X3XE	100kHz	300kHz	Peak	80cm
9kHz-150kHz	ARC X3XF / antenna 0°	200Hz	1kHz	Peak	80cm
9kHz-150kHz	ARC X3XF / antenna 45°	200Hz	1kHz	Peak	80cm
9kHz-150kHz	ARC X3XF / antenna 90°	200Hz	1kHz	Peak	80cm
150kHz-30MHz	ARC X3XF / antenna 0°	10kHz	30kHz	Peak	80cm
150kHz-30MHz	ARC X3XF / antenna 45°	10kHz	30kHz	Peak	80cm
150kHz-30MHz	ARC X3XF / antenna 90°	10kHz	30kHz	Peak	80cm
30MHz-200MHz	ARC X3XF	100kHz	300kHz	Peak	80cm
200MHz-1GHz	ARC X3XF	100kHz	300kHz	Peak	80cm

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

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 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. 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:

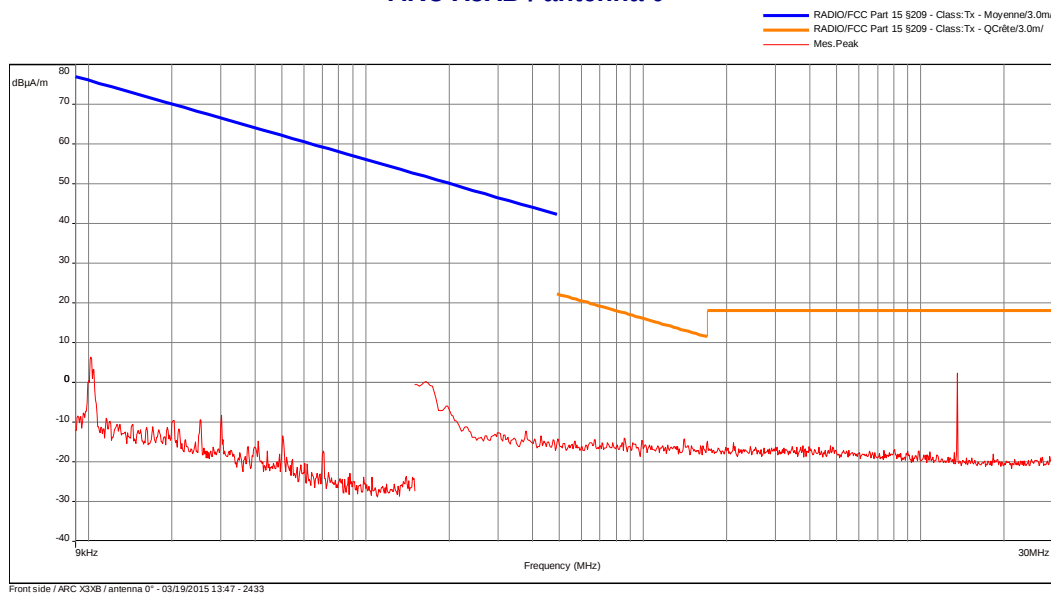
CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Antenna	Rohde & Schwarz	HFH2-Z2	5825	27/01/2015	27/03/2017
Antenna	Electro-Metrics	BIA-30HF	1107	03/03/2011	03/05/2015
Antenna	Rohde & Schwarz	HL223	1137	03/03/2011	03/05/2015
Cable	C&C	N-3m	10558	27/09/2013	27/11/2015
Cable	C&C	N-5m	10560	27/09/2013	27/11/2015

CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Receiver	Agilent	E4440A	5824	01/05/2014	01/07/2016
Shielded enclosure	RAY PROOF	C.GS3	1123	17/10/2013	17/12/2016
Software	Nexio	BAT EMC	0000	#	#
Thermohygrometer	Testo	608-H1	7561	26/09/2014	26/11/2016

#: Permanent validity

BAT-EMC software version: V3.6.0.32

Results: See Graph(s) hereafter.

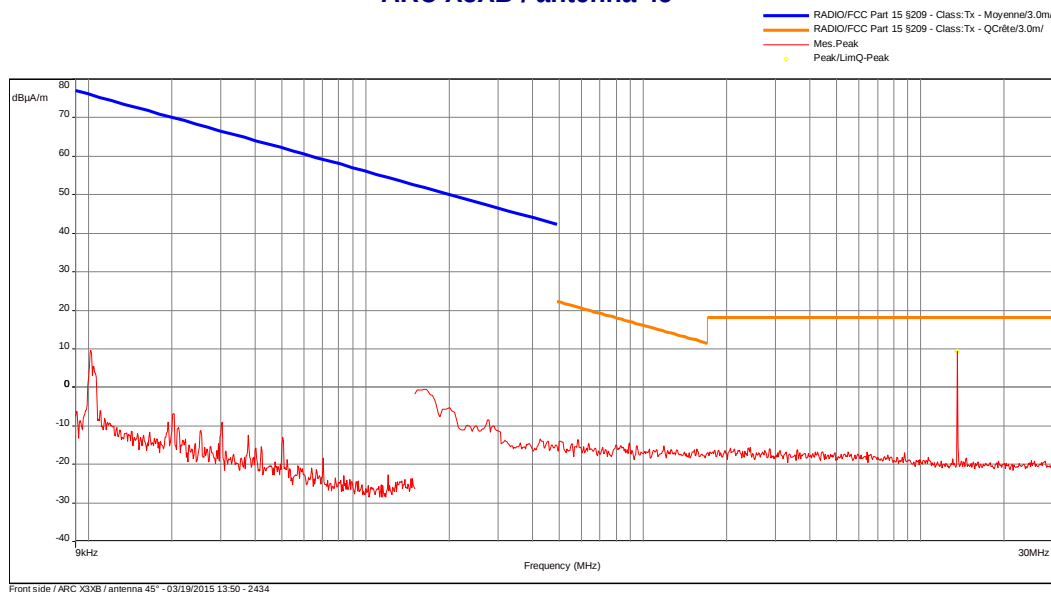
Radiated magnetic field emission (measurement)
ARC X3XB / antenna 0°
EMI2433


Date: 19/03/2015 13:47:47

Technician: RB

Comments:
Pre measurement - maximized at 360°

Detection:
Peak

Modification(s) during test:
No
Radiated magnetic field emission (measurement)
ARC X3XB / antenna 45°
EMI2434


Date: 19/03/2015 13:50:51

Technician: RB

Comments:
Pre measurement - maximized at 360°

Detection:
Peak

Modification(s) during test:
No

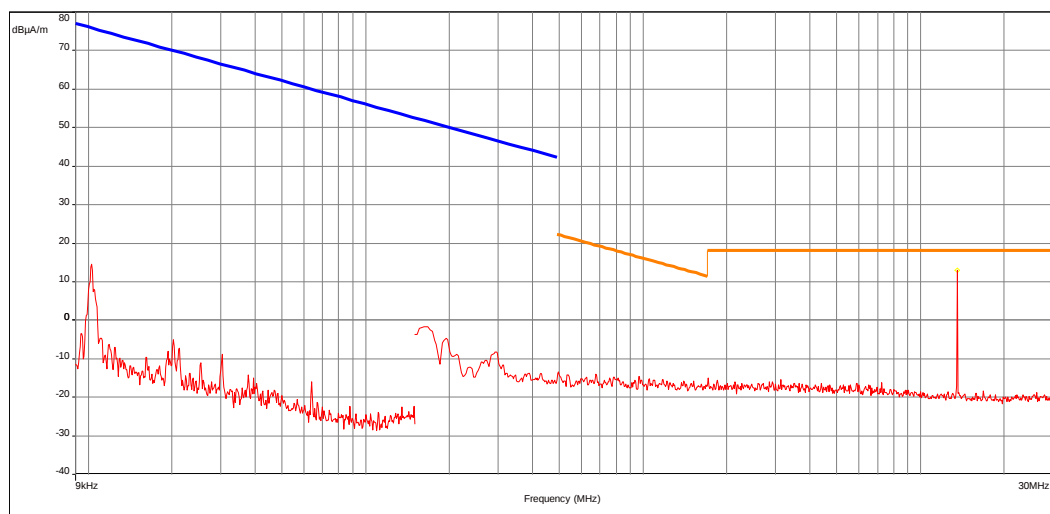
Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor.

Radiated magnetic field emission (measurement)

EMI2435

ARC X3XB / antenna 90°

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



Front side / ARC X3XB / antenna 90° - 03/19/2015 13:54 - 2435

Date: 19/03/2015 13:54:46

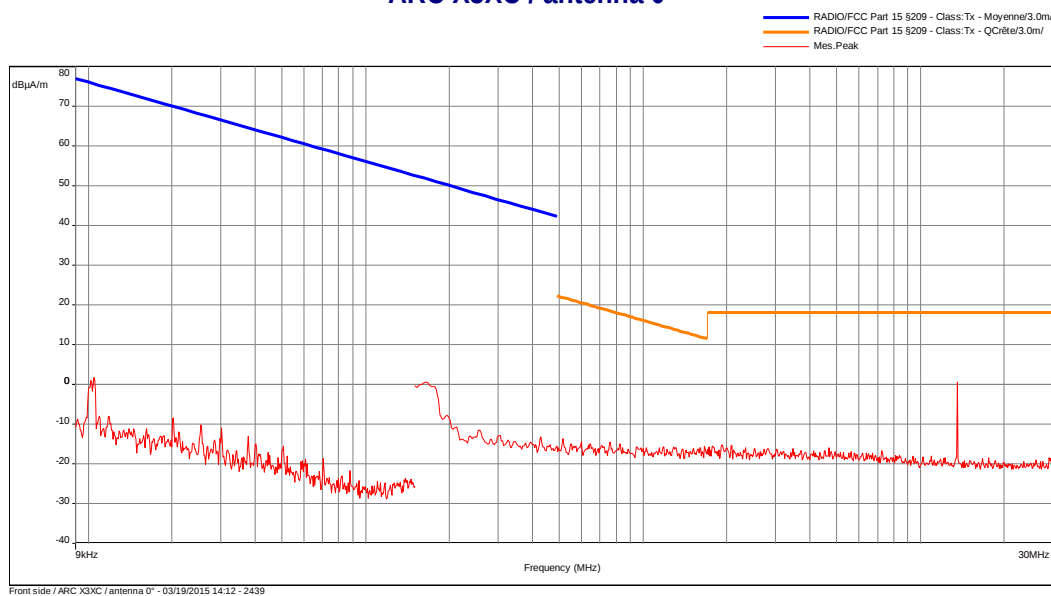
Technician: RB

Comments:
 Pre measurement - maximized
 at 360°

Detection:
 Peak

Modification(s) during test:
 No

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

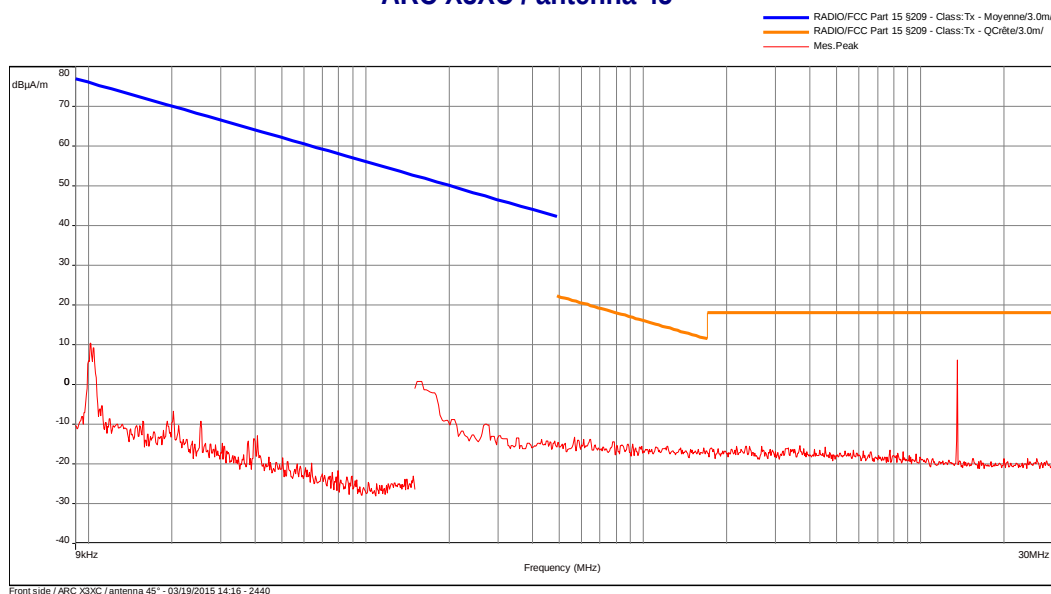
Radiated magnetic field emission (measurement)
ARC X3XC / antenna 0°
EMI2439


Date: 19/03/2015 14:12:22

Technician: RB

Comments:
Pre measurement - maximized at 360°

Detection:
Peak

Modification(s) during test:
No
Radiated magnetic field emission (measurement)
ARC X3XC / antenna 45°
EMI2440


Date: 19/03/2015 14:16:34

Technician: RB

Comments:
Pre measurement - maximized at 360°

Detection:
Peak

Modification(s) during test:
No

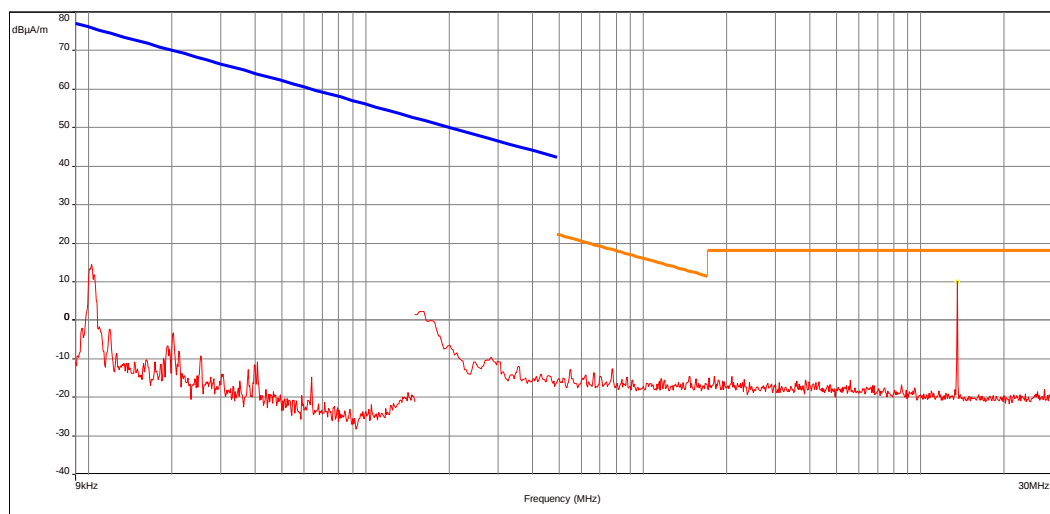
Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor.

Radiated magnetic field emission (measurement)

EMI2441

ARC X3XC / antenna 90°

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



Front side / ARC X3XC / antenna 90° - 09/19/2015 14:21 - 2441

Date: 19/03/2015 14:21:20

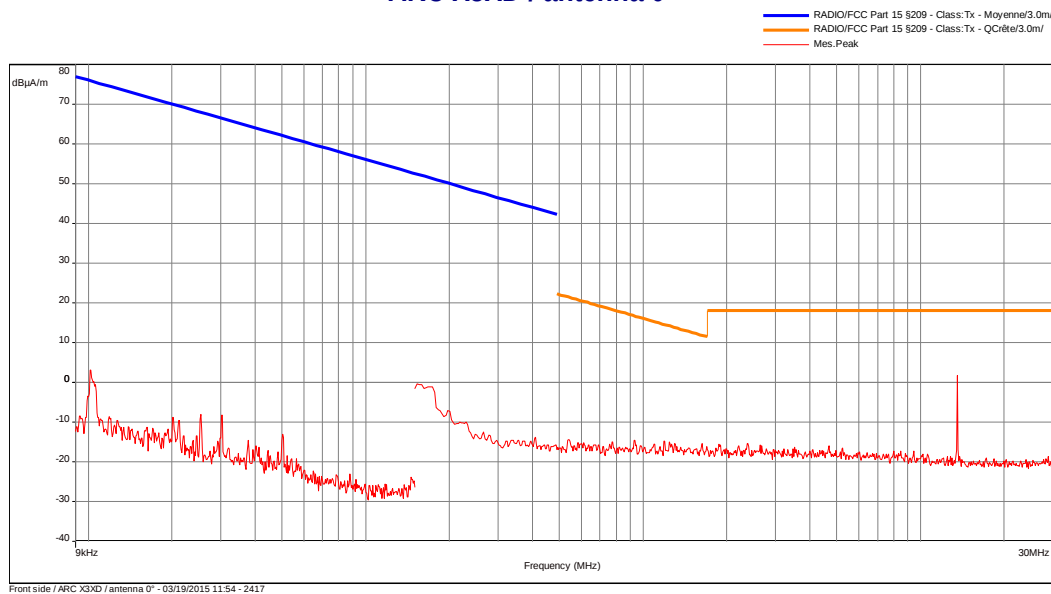
Technician: RB

Comments:
 Pre measurement - maximized
 at 360°

Detection:
 Peak

Modification(s) during test:
 No

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

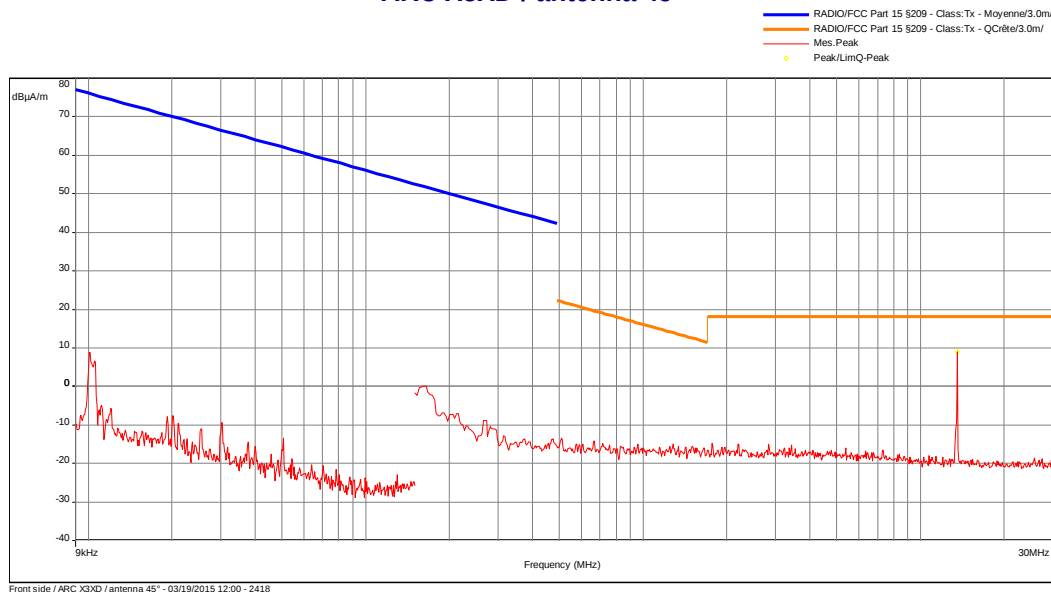
Radiated magnetic field emission (measurement)
ARC X3XD / antenna 0°
EMI2417


Date: 19/03/2015 11:54:57

Technician: RB

Comments:
Pre measurement - maximized at 360°

Detection:
Peak

Modification(s) during test:
No
Radiated magnetic field emission (measurement)
ARC X3XD / antenna 45°
EMI2418


Date: 19/03/2015 12:00:48

Technician: RB

Comments:
Pre measurement - maximized at 360°

Detection:
Peak

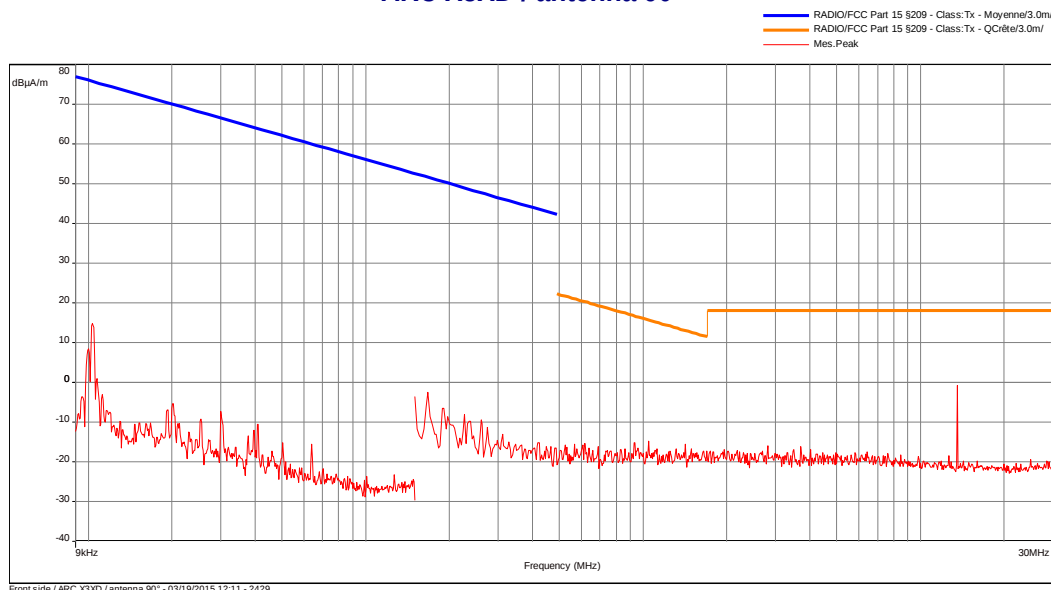
Modification(s) during test:
No

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

Radiated magnetic field emission (measurement)

EMI2429

ARC X3XD / antenna 90°



Date: 19/03/2015 12:11:32

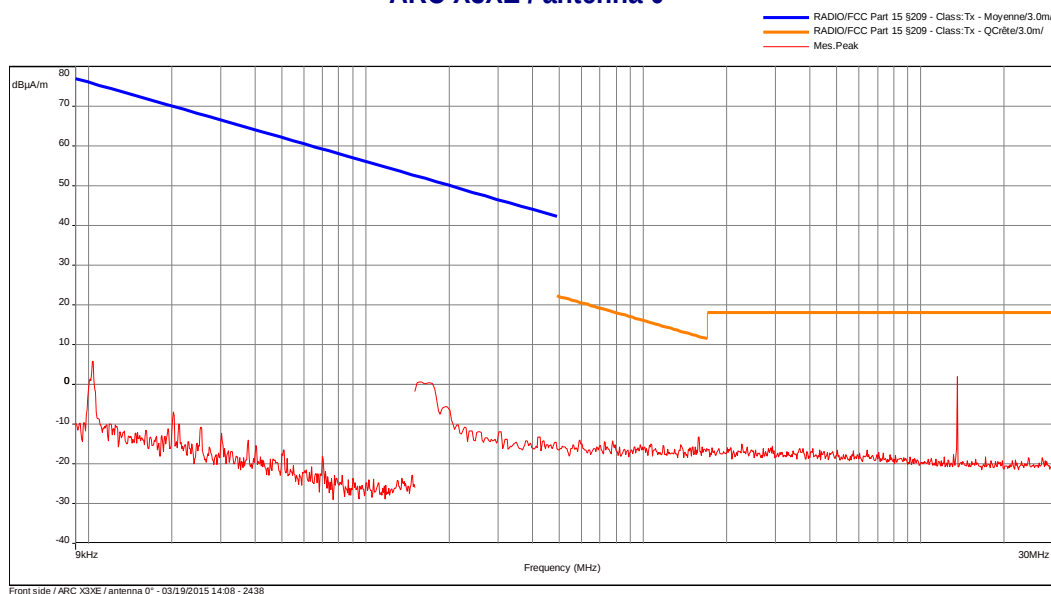
Technician: RB

Comments:
Pre measurement - maximized
at 360°

Detection:
Peak

Modification(s) during test:
No

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

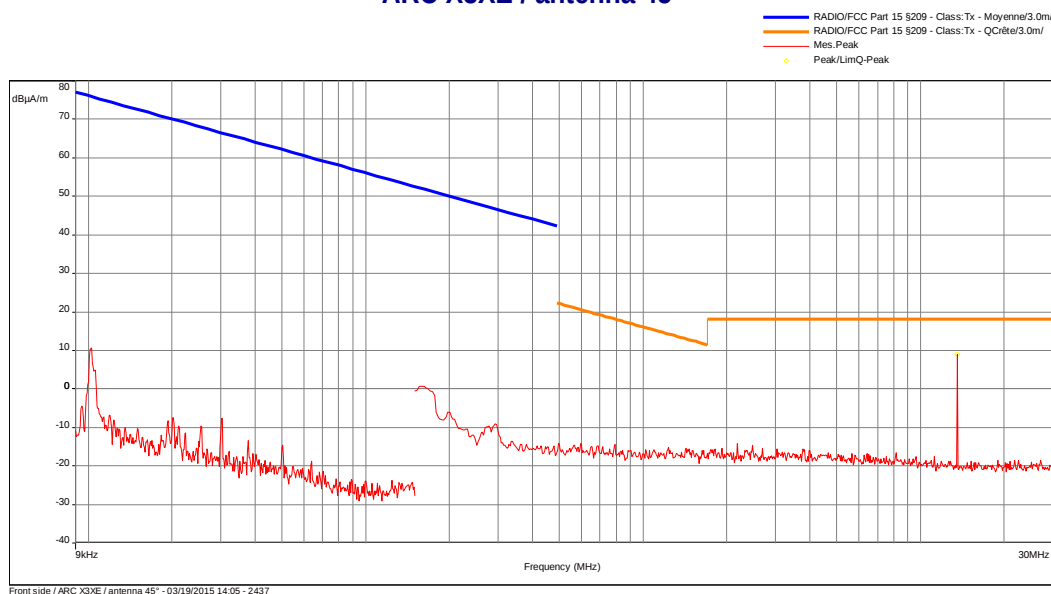
Radiated magnetic field emission (measurement)
ARC X3XE / antenna 0°
EMI2438


Date: 19/03/2015 14:08:25

Technician: RB

Comments:
Pre measurement - maximized at 360°

Detection:
Peak

Modification(s) during test:
No
Radiated magnetic field emission (measurement)
ARC X3XE / antenna 45°
EMI2437


Date: 19/03/2015 14:05:13

Technician: RB

Comments:
Pre measurement - maximized at 360°

Detection:
Peak

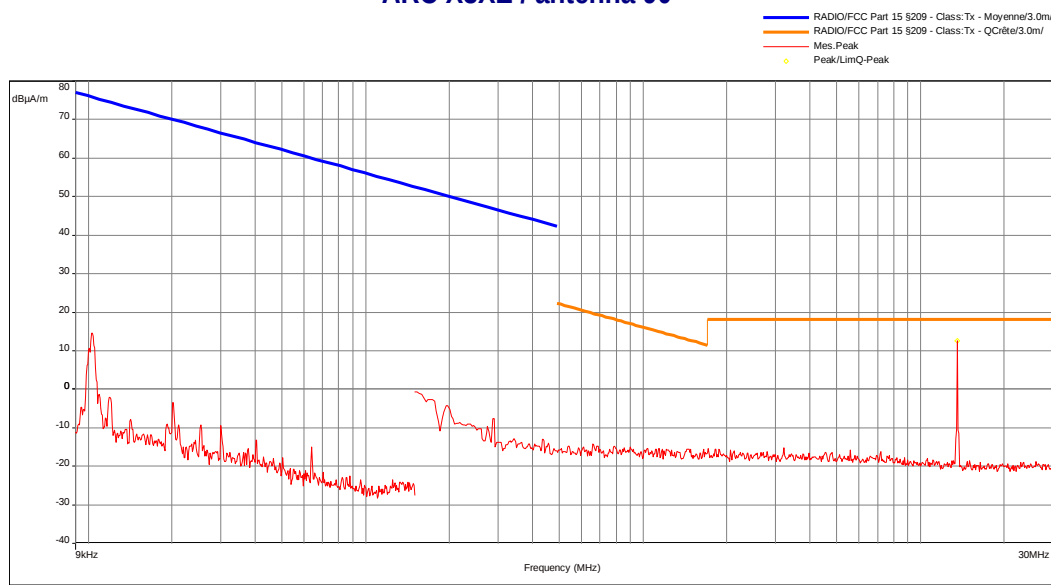
Modification(s) during test:
No

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

Radiated magnetic field emission (measurement)

EMI2436

ARC X3XE / antenna 90°



Date: 19/03/2015 14:00:56

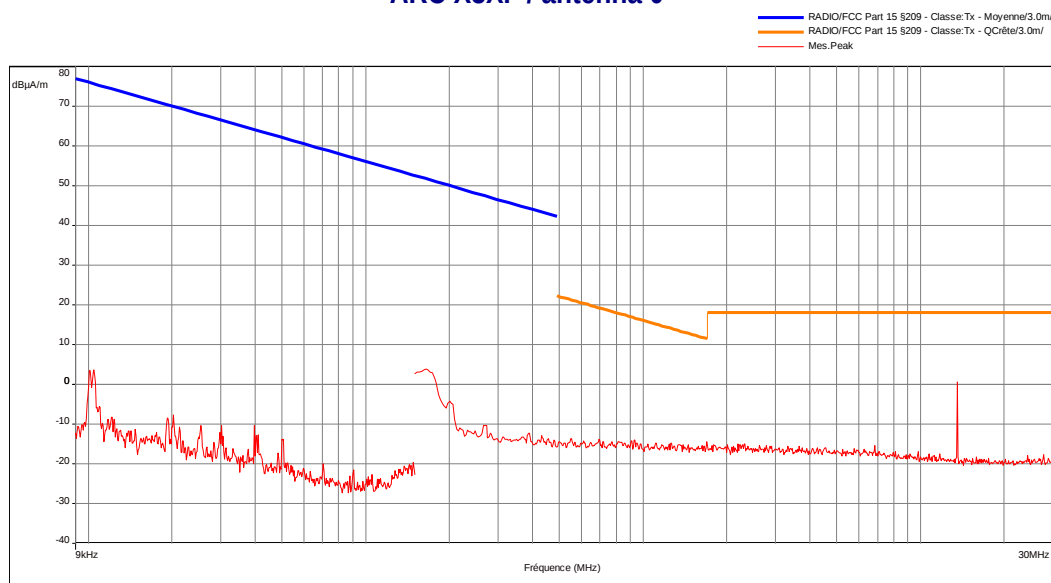
Technician: RB

Comments:
Pre measurement - maximized
at 360°

Detection:
Peak

Modification(s) during test:
No

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

Radiated magnetic field emission (measurement)
ARC X3XF / antenna 0°
EMI2444


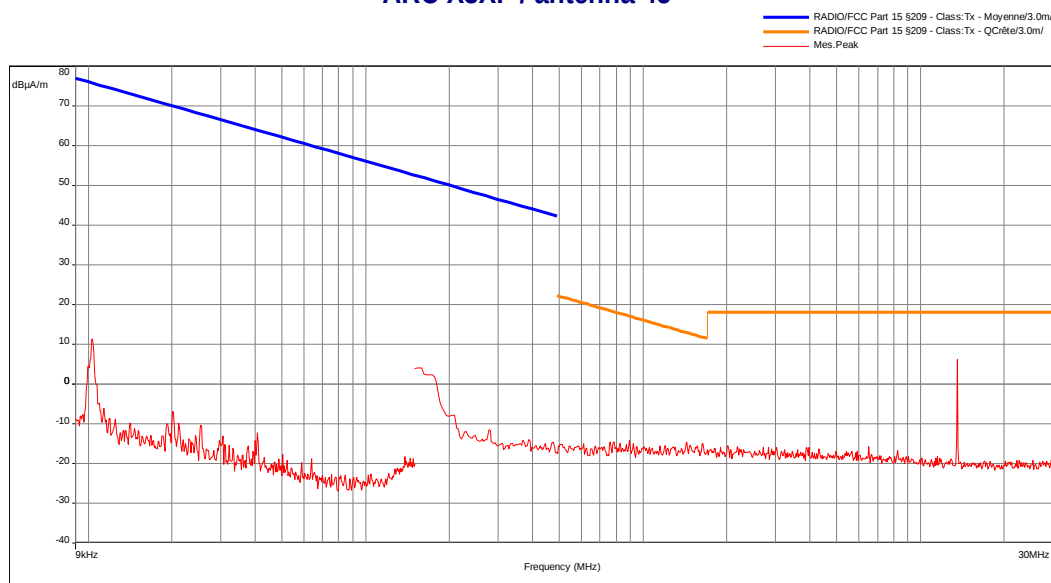
Date: 19/03/2015 14:32:24

Technician: RB

Comments:
Pre measurement - maximized
at 360°

Detection:
Peak

Modification(s) during test:
No

Radiated magnetic field emission (measurement)
ARC X3XF / antenna 45°
EMI2443


Date: 19/03/2015 14:28:47

Technician: RB

Comments:
Pre measurement - maximized
at 360°

Detection:
Peak

Modification(s) during test:
No

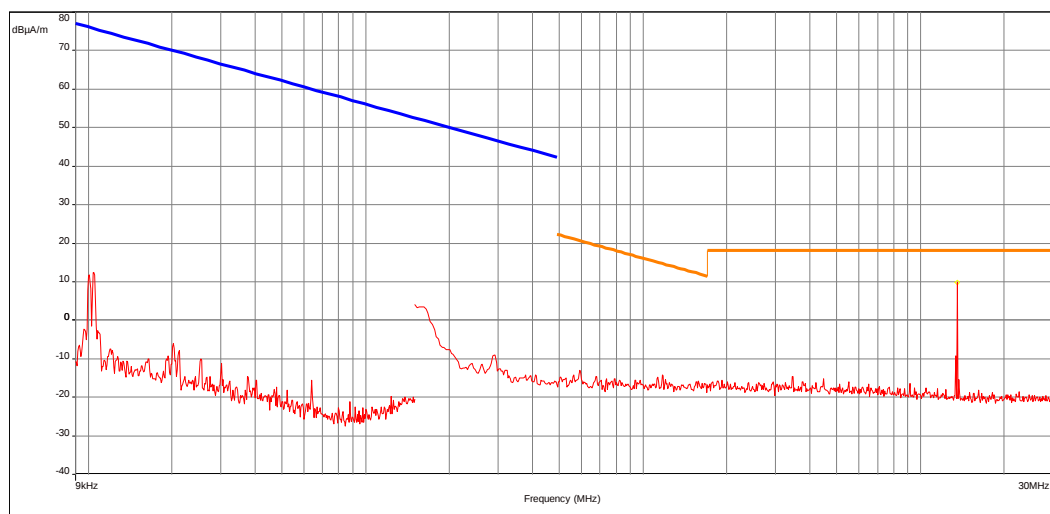
Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor.

Radiated magnetic field emission (measurement)

EMI2442

ARC X3XF / antenna 90°

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



Front side / ARC X3XF / antenna 90° - 03/19/2015 14:25 - 2442

Date: 19/03/2015 14:25:21

Technician: RB

Comments:
 Pre measurement - maximized
 at 360°

Detection:
 Peak

Modification(s) during test:
 No

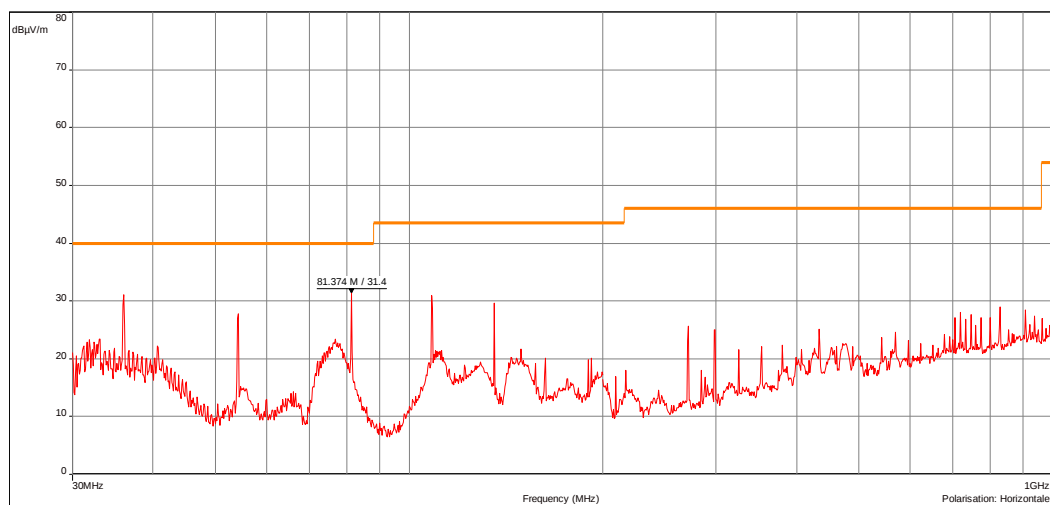
Limit indicated on these plots are calculated with 40 dB/decade extrapolation factor and 51.5dB conversion factor.

Radiated electric emission (measurement)

EMI2423

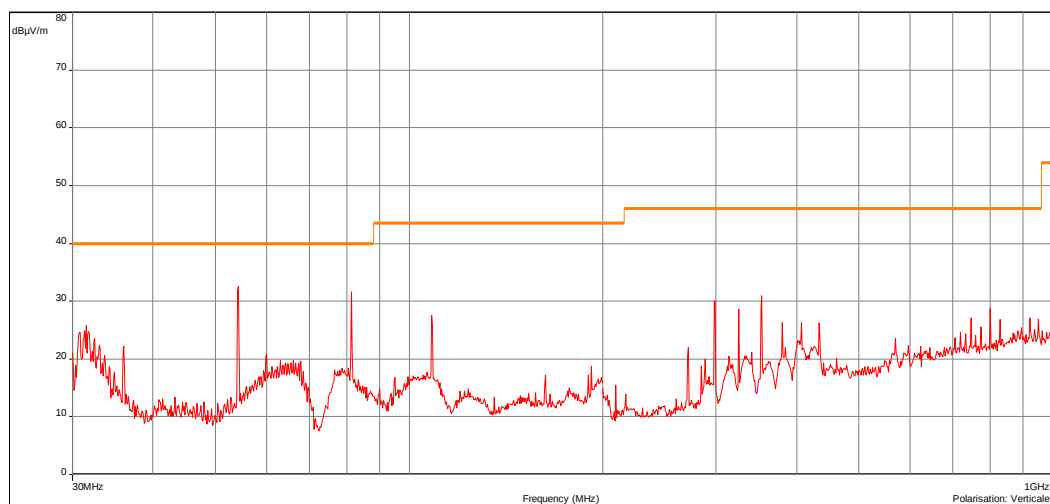
ARC X3XB

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)



Front side / ARC X3XB - 03/19/2015 09:08 - 2423

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)



Front side / ARC X3XB - 03/19/2015 09:08 - 2423

Date: 19/03/2015 09:08:34

Technician: RB

Class: Tx of the standard

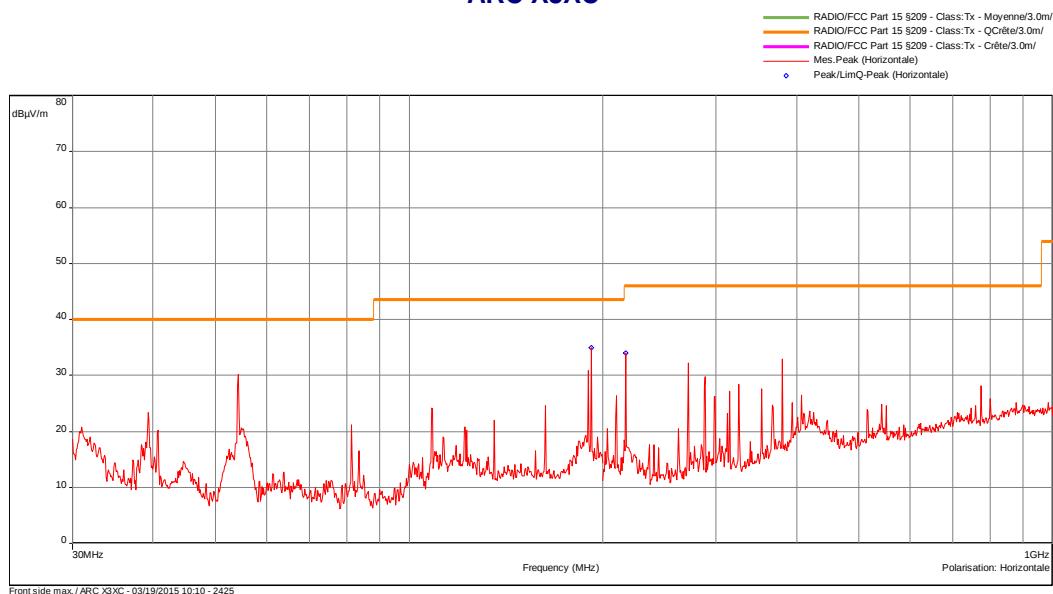
Detection:
Peak

Modification(s) during test:
No

Radiated electric emission (measurement)

EMI2425

ARC X3XC

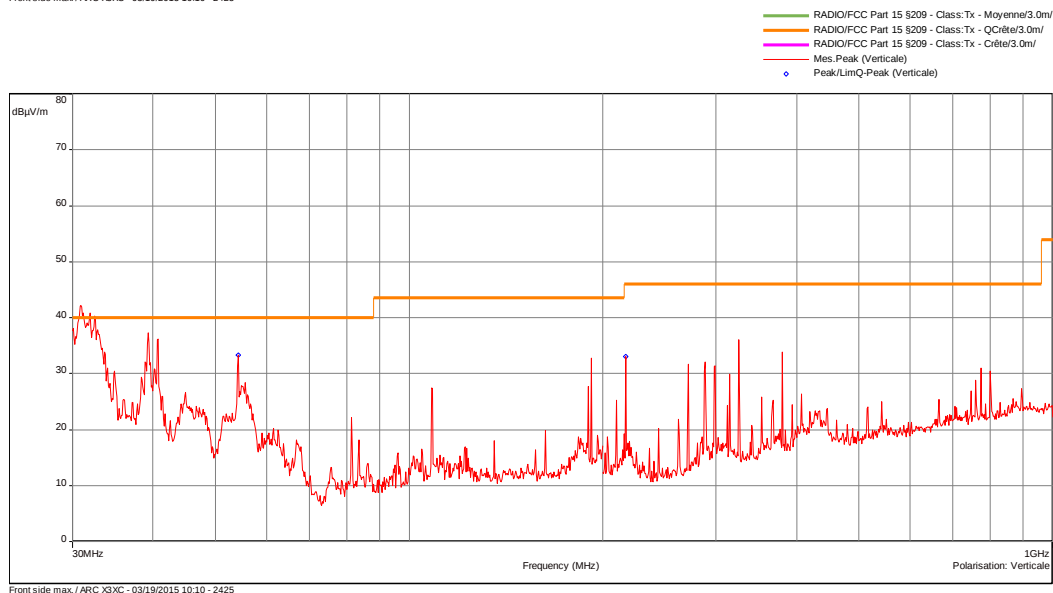


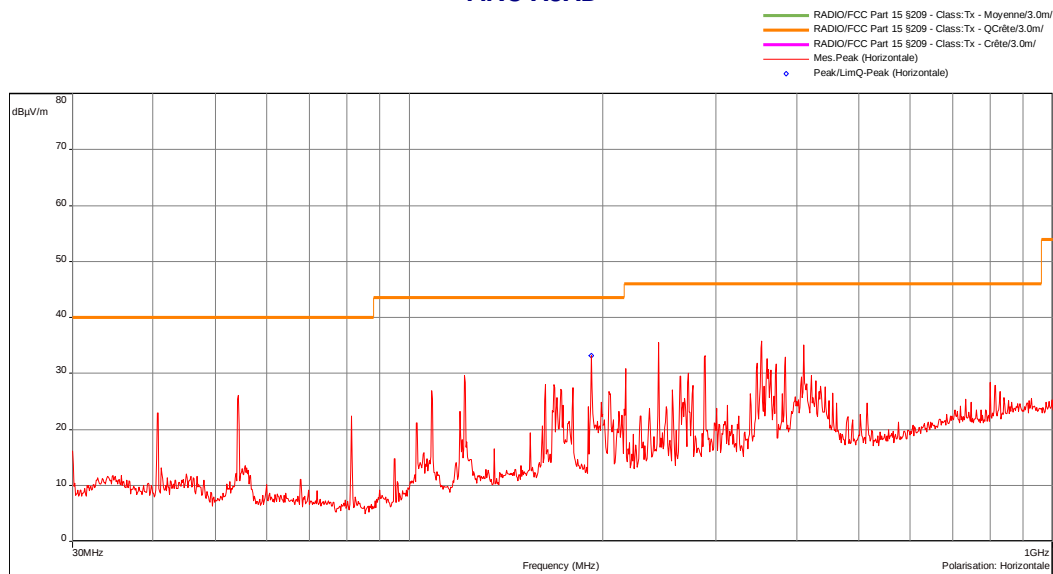
Date: 19/03/2015 10:10:28

Technician: RB

Class: Tx of the standard

Detection:
Peak

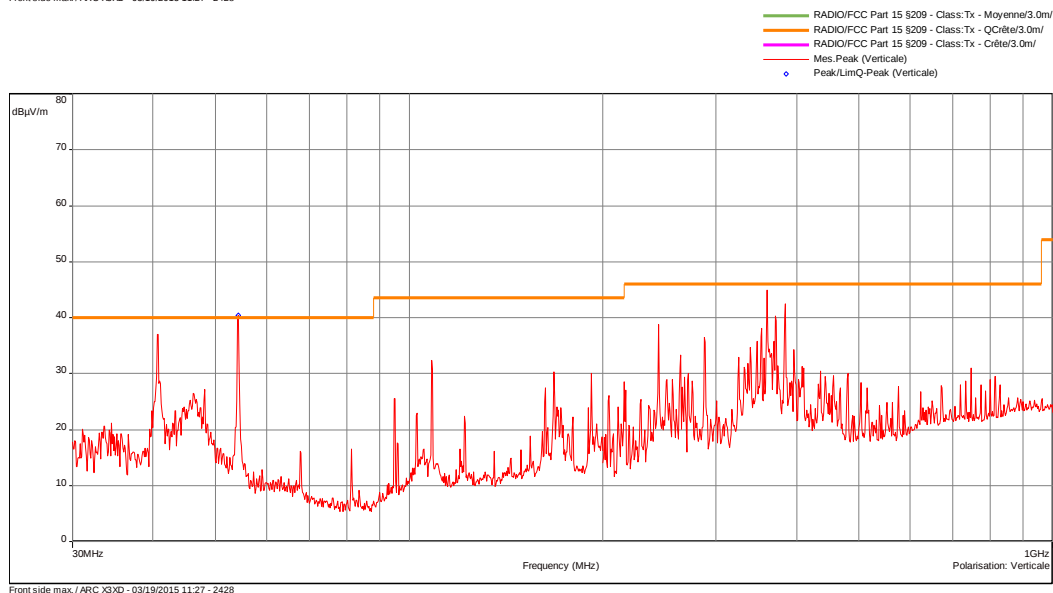
Modification(s) during test:
No


Radiated electric emission (measurement)
EMI2428
ARC X3XD

 Date: **19/03/2015 11:27:45**

 Technician: **RB**

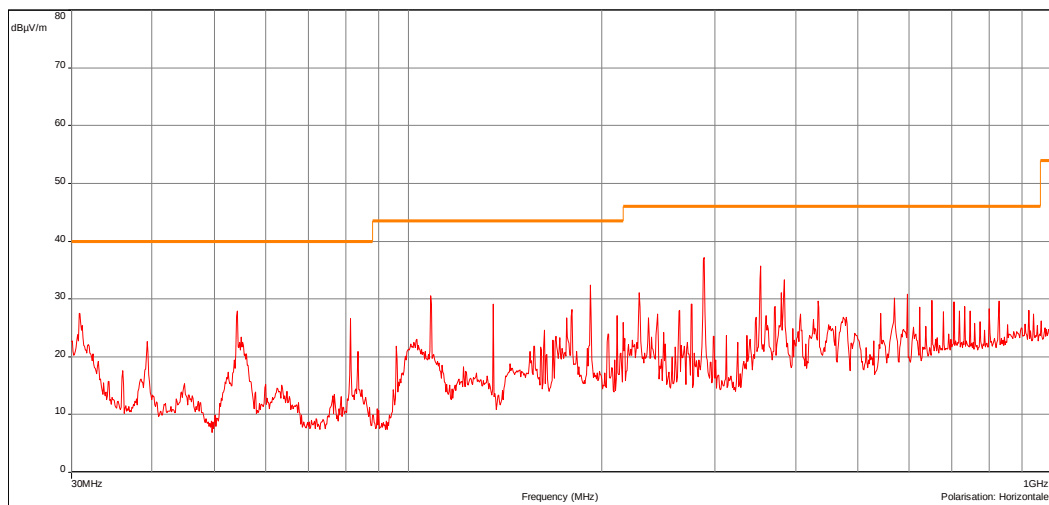
 Class: **Tx of the standard**

 Detection:
Peak

 Modification(s) during test:
No


Radiated electric emission (measurement)
EMI2424
ARC X3XE

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: **19/03/2015 09:34:51**

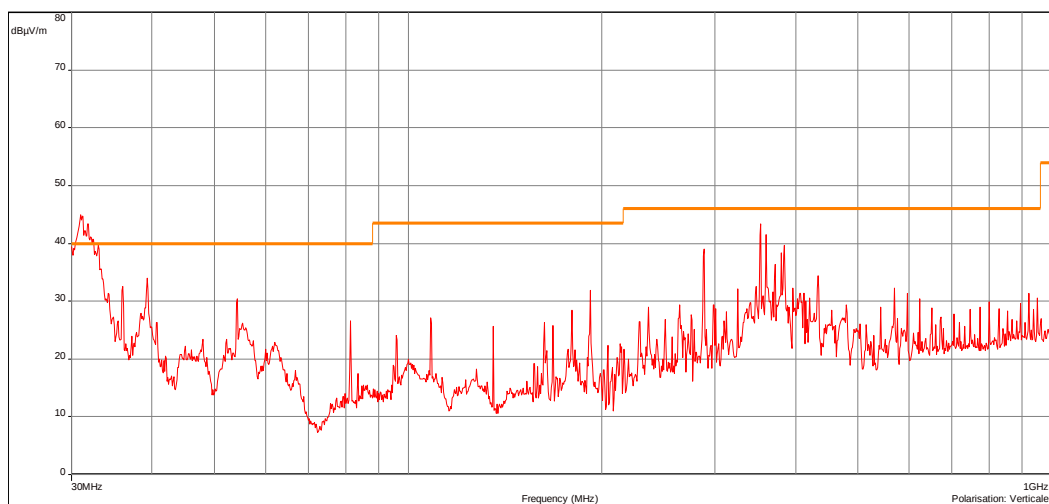
 Technician: **RB**

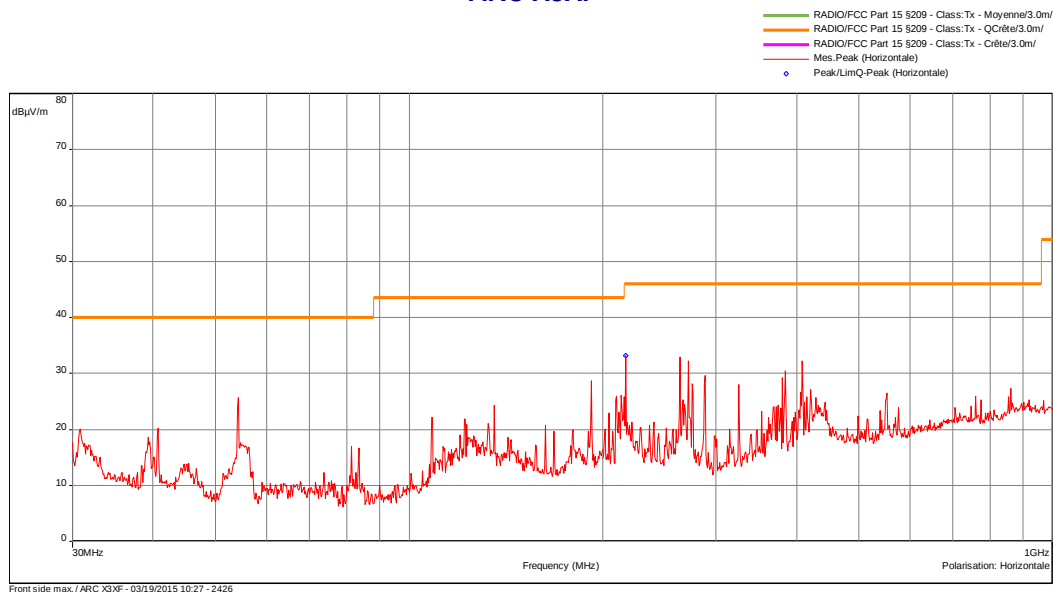
 Class: **Tx of the standard**

 Detection:
Peak

 Modification(s) during test:
No

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)

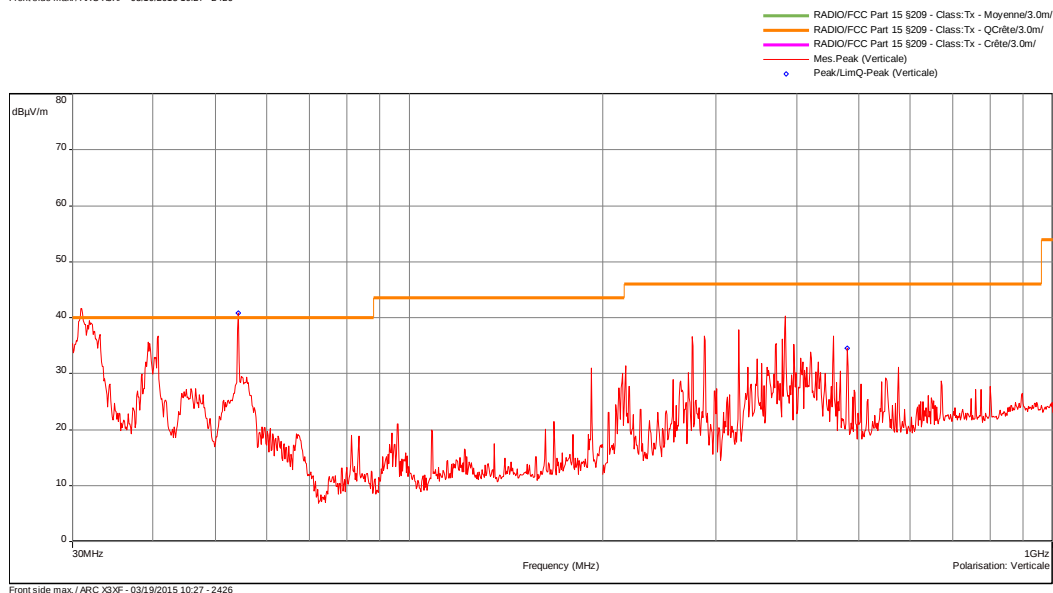


Radiated electric emission (measurement)
EMI2426
ARC X3XF

 Date: **19/03/2015 10:27:55**

 Technician: **RB**

 Class: **Tx of the standard**

 Detection:
Peak

 Modification(s) during test:
No


b) Measurement on open area test site:

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	10m	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. Between 30MHz to 1GHz, the measuring distance is 10 meters instead of 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	3126	03/03/2011	03/05/2015
Antenna	Rohde & Schwarz	HFH2-Z2	5825	27/01/2015	27/03/2017
Antenna mast	INNCO	MA4000-EP-O	10261	#	#
Cable	Huber Suhner	N-20m	8385	04/06/2013	04/08/2015
Mast controller	INNCO	CO-3000-1D	10260	#	#
Open area test site	Emitech	Salinelles	3482	18/04/2014	18/06/2017
Preamplifier	Mini-Circuits	26 dB	0524	26/09/2014	26/11/2015
Receiver	Rohde & Schwarz	ESVS10	3211	26/11/2012	23/07/2015
Spectrum analyzer	Agilent	E4440A	5824	01/05/2014	01/07/2016
Turntable	Heinrich Deisel	D4420	4038	#	#
Turntable controller	Heinrich Deisel	HD100	4036	#	#

#: Permanent validity

Results: See table(s) below.

ARC X3XB

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dB μ V/m)	Limit (dB μ V/m)	Comments
54,24	Vertical	0	240	27,76	30	C
81,37	Vertical	0	150	10,98	30	C
38,90	Horizontal	0	250	20,99	30	C
81,34	Horizontal	220	400	10,98	30	C

C: Compliant

ARC X3XC

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dB μ V/m)	Limit (dB μ V/m)	Comments
44,27	Vertical	0	100	29,64	30	C (1)
54,25	Vertical	160	240	29,06	30	C
192,01	Vertical	120	280	21,34	33	C
191,97	Horizontal	260	280	15,64	33	C
54,25	Horizontal	140	350	19,46	30	C
217,00	Horizontal	290	400	19,59	36	C
271,27	Horizontal	225	320	11,39	36	C
379,19	Horizontal	130	230	9,24	36	C
217,02	Horizontal	160	100	20,39	36	C
325,52	Horizontal	290	100	13,36	36	C
298,39	Horizontal	250	100	13,18	36	C (2)
379,78	Horizontal	270	140	9,54	36	C

C: Compliant

(1) Maximum value between 30MHz to 50MHz.

(2) Maximum value between 265MHz to 325MHz.

ARC X3XD

Frequency (MHz)	Polarization	Azimet (degree)	Antenna Height (cm)	Measure (dBμV/m)	Limit (dBμV/m)	Comments
40,66	Vertical	260	250	13,31	30	C
54,23	Vertical	240	100	29,66	30	C
108,62	Vertical	0	100	12,56	33	C
195,52	Horizontal	0	300	11,60	33	C (*)
244,08	Horizontal	240	330	13,28	36	C
287,99	Horizontal	230	330	4,96	36	C
352,55	Horizontal	145	300	11,35	36	C
410,93	Horizontal	240	250	4,23	36	C
216,95	Vertical	145	300	11,99	36	C
244,07	Vertical	280	100	14,18	36	C
271,18	Vertical	275	100	10,89	36	C
325,44	Vertical	180	100	9,46	36	C
352,53	Vertical	300	100	14,55	36	C
379,68	Vertical	270	100	5,74	36	C
385,03	Vertical	290	100	1,66	36	C
396,14	Vertical	270	100	-2,31	36	C

C: Compliant

(*) Maximum level between 190MHz to 200MHz.

ARC X3XE

Frequency (MHz)	Polarization	Azimet (degree)	Antenna Height (cm)	Measure (dBμV/m)	Limit (dBμV/m)	Comments
36,01	Vertical	240	250	15,83	30	C
40,66	Vertical	260	250	13,31	30	C
54,25	Vertical	290	100	13,76	30	C
54,25	Horizontal	280	120	16,26	30	C
287,97	Vertical	280	100	9,76	36	C
352,55	Vertical	130	100	12,55	36	C
360,00	Vertical	300	100	2,78	36	C
383,89	Vertical	300	100	5,65	36	C
288,00	Horizontal	240	360	16,66	36	C
352,57	Horizontal	140	270	7,55	36	C

C: Compliant

ARC X3XF

Frequency (MHz)	Polarization	Azimut (degree)	Antenna Height (cm)	Measure (dB μ V/m)	Limit (dB μ V/m)	Comments
54,25	Vertical	200	200	26,56	30	C
40,66	Vertical	200	100	27,31	30	C
192,00	Vertical	120	100	20,34	33	C
215,69	Vertical	170	100	3,38	33	C
217,00	Vertical	316	100	15,29	36	C
287,99	Vertical	170	100	6,76	36	C
325,51	Vertical	280	100	16,26	36	C
379,77	Vertical	280	100	15,44	36	C
384,00	Vertical	0	100	-1,95	36	C
461,18	Vertical	240	100	3,19	36	C
217,01	Horizontal	100	300	14,39	36	C
271,27	Horizontal	248	300	10,39	36	C
425,17	Horizontal	0	300	1,18	36	C (*)

C: Compliant

(*) Maximum level between 400MHz to 450MHz.

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

8. INTENTIONAL RADIATED EMISSIONS IN THE BAND 13.110 - 14.010 MHZ – SECTION 15.225

Standard: FCC part 15 Subpart C

Test method: ANSI C63.4:2003

a) Pre-measurement in semi anechoic chamber:

Temperature (°C): 23

Humidity (%HR): 39.7

Pressure (hPa): -

Test configuration:

Frequency band	Tested side	Resolution bandwidth	Video bandwidth	Detection mode	E.U.T. height
13MHz-14.12MHz	ARC X3XE / antenna 0°	1kHz	3kHz	Peak	80cm
13MHz-14.12MHz	ARC X3XE / antenna 45°	1kHz	3kHz	Peak	80cm
13MHz-14.12MHz	ARC X3XE / antenna 90°	1kHz	3kHz	Peak	80cm

Measure is done with an antenna position of 0°, 90° and 45°. Only higher level is recorded.
No stand-by mode is available on E.U.T.

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	27/01/2015	27/03/2017
Cable	C&C	N-3m	10558	27/09/2013	27/11/2015
Cable	C&C	N-5m	10560	27/09/2013	27/11/2015
Receiver	Agilent	E4440A	5824	01/05/2014	01/07/2016
Shielded enclosure	RAY PROOF	C.GS3	1123	17/10/2013	17/12/2016
Software	Nexio	BAT EMC	0000	#	#

#: Permanent validity

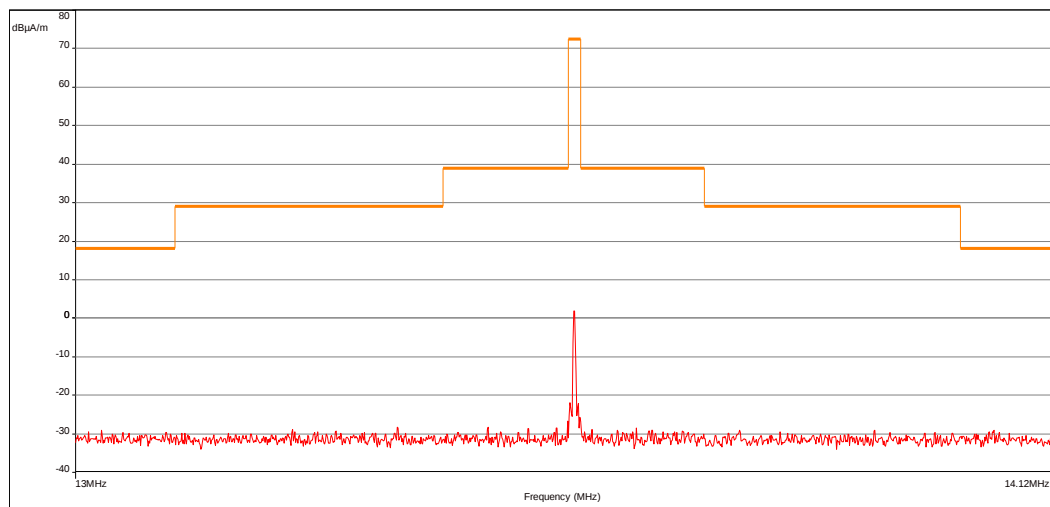
BAT-EMC software version: V3.6.0.32

Results: See Graph(s) hereafter.

Emission rayonnée magnétique
EMI2447
ARC X3XE / antenna 0°

Frequency (MHz) : 13 MHz - 14.12 MHz (Analyzer mode)
 Settings: RBW: 1 kHz, VBW: 3 kHz, Holding time: 1 ms/Pt, sweep count 2
 Polarisation : Circulaire
 Distance: 3 m

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



ARC X3XE / antenna 0° - 03/19/2015 15:16 - 2447

 Date: **19/03/2015 15:16:50**

 Technician: **RB**

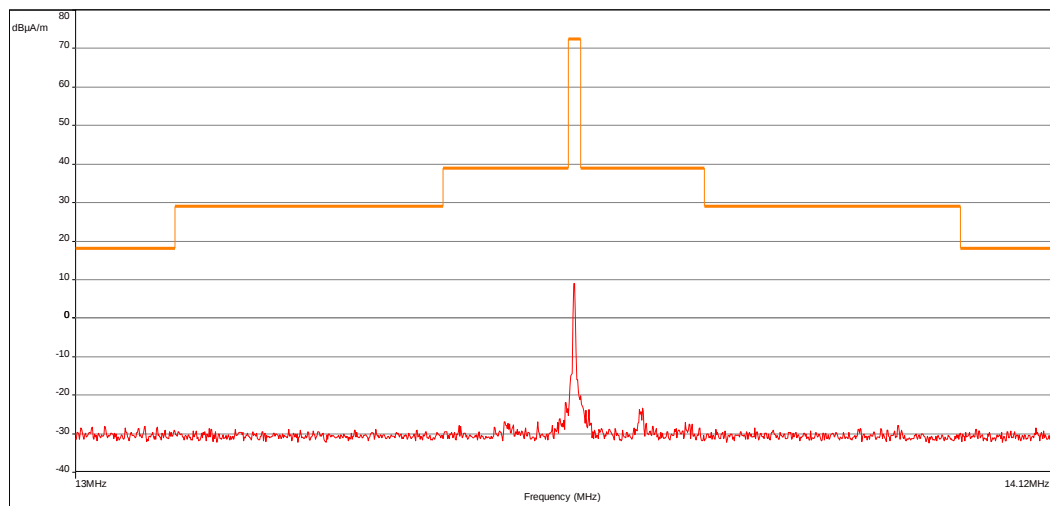
 Class: **Tx of the standard**

 Detection:
Crête

 Modification(s) during test:
No
Emission rayonnée magnétique
EMI2446
ARC X3XE / antenna 45°

Frequency (MHz) : 13 MHz - 14.12 MHz (Analyzer mode)
 Settings: RBW: 1 kHz, VBW: 3 kHz, Holding time: 1 ms/Pt, sweep count 2
 Polarisation : Circulaire
 Distance: 3 m

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



ARC X3XE / antenna 45° - 03/19/2015 15:14 - 2446

 Date: **19/03/2015 15:14:03**

 Technician: **RB**

 Class: **Tx of the standard**

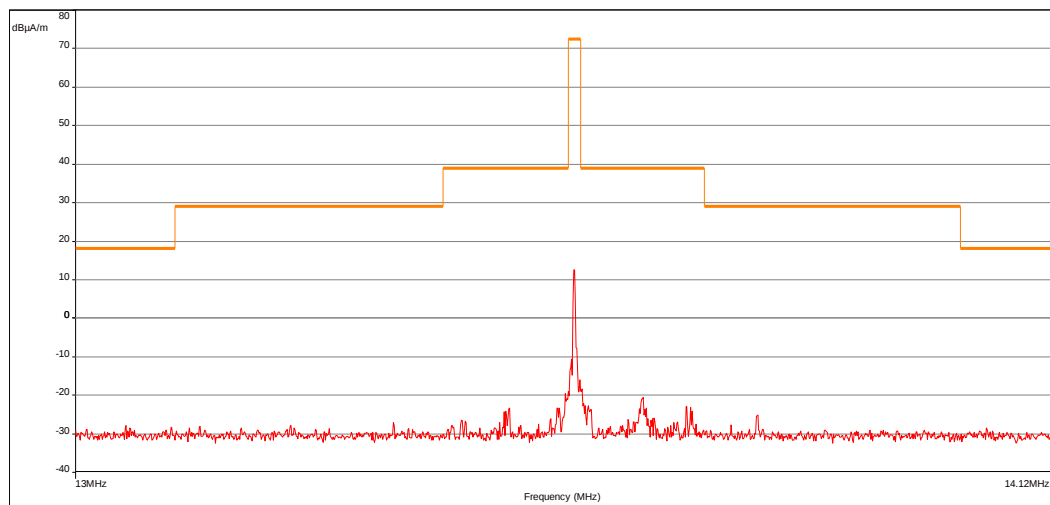
 Detection:
Crête

 Modification(s) during test:
No

Emission rayonnée magnétique
EMI2445
ARC X3XE / antenna 90°

Frequency (MHz) : 13 MHz - 14.12 MHz (Analyzer mode)
 Settings: RBW: 1 kHz, VBW: 3 kHz, Holding time: 1 ms/PT, sweep count 2
 Polarisation : Circulaire
 Distance: 3 m

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



ARC X3XE / antenna 90° - 03/19/2015 14:59 - 2445

Date: **19/03/2015 14:59:11**

Technician: **RB**

Class: **Tx of the standard**

Detection:
Crête

Modification(s) during test:
No

b) Measurement on open area test site:
Temperature (°C): 23
Humidity (%HR): 39.7
Pressure (hPa): -

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

Frequency band	Initial position (0°)	Resolution bandwidth	Measuring distance	Detection mode	E.U.T. height
13MHz-14.12MHz	ARC X3XE / antenna 0°	1kHz	10m	Quasi peak	80cm
13MHz-14.12MHz	ARC X3XE / antenna 45°	1kHz	10m	Quasi peak	80cm
13MHz-14.12MHz	ARC X3XE / antenna 90°	1kHz	10m	Quasi peak	80cm

Test method deviation: No

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	DATE VAL
Antenna	Rohde & Schwarz	HFH2-Z2	5825	27/01/2015	27/03/2017
Cable	Huber Suhner	N-20m	8385	04/06/2013	04/08/2015
Open area test site	Emitech	Salinelles	3482	18/04/2014	18/06/2017
Receiver	Rohde & Schwarz	ESHS10	3371	26/11/2012	26/07/2015
Spectrum analyzer	Agilent	E4440A	5824	01/05/2014	01/07/2016
Turntable	Heinrich Deisel	D4420	4038	#	#

#: Permanent validity

Results: See table(s) below.

ARC X3XE

Frequencies (MHz)	Azimut (degrees)	Antenne (degrees)	Measure (dBμA/m)	Standard limit (dBμA/m)	Comments
13.56	0	0	1.02	51.58	C
13.56	260	45	2.32	51.58	C
13.56	260	45	6.62	51.58	C

C: Compliant

NC: Not Compliant

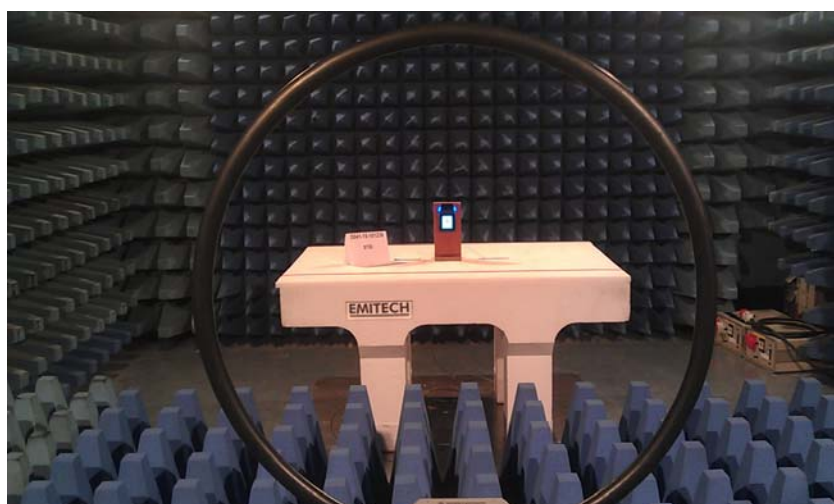
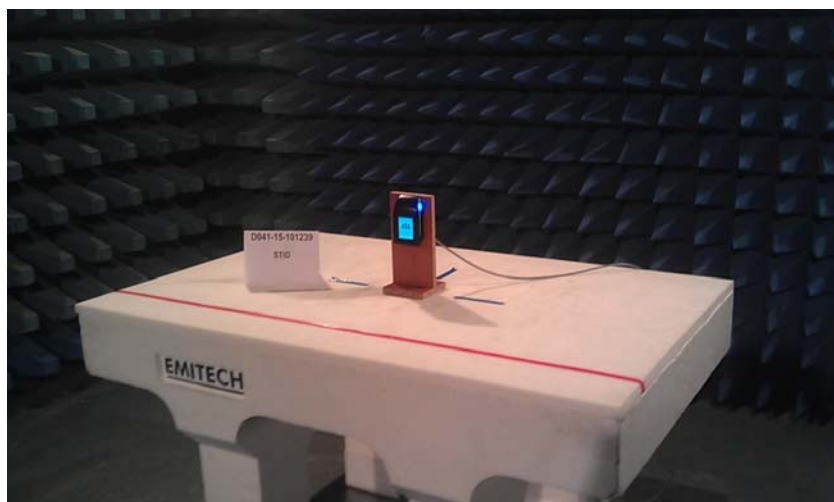
Carrier measurement at 10m is 6.62 dBμA/m (≈ 58.12dBμV/m)

Using an extrapolation factor of 40 dB/decade (as described in section 15.31 (f)), the level at 30m is about 39.04dBμV/m (89.53μV/m) for a limit at 15.848 mV/m.

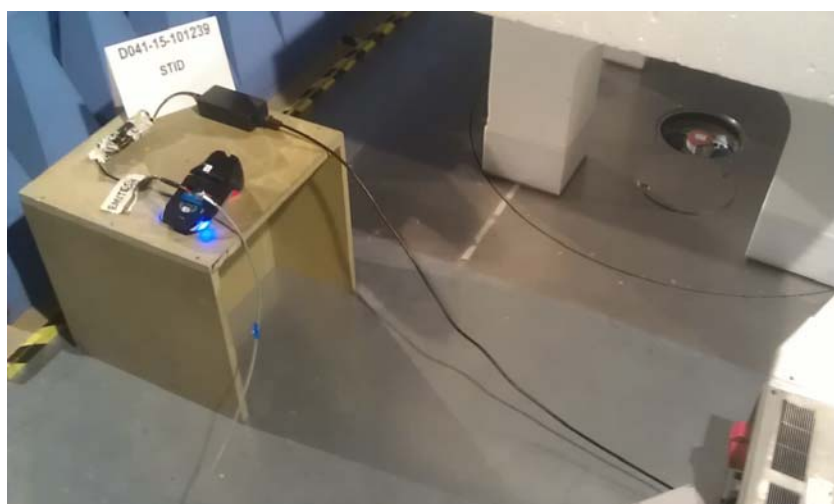
End of report – 1 annex to be forwarded

ANNEX: PHOTOGRAPH(S)

**Radiated measurements
Pre-measurements**



Conducted emissions



Radiated measurement on open
area test site



Radiated measurement on open
area test site

