R041-15-105213-1A - DM / CBU

⇨ This test report cancels and replaces the report R041-15-105213-1A Ed.1

RADIO TEST REPORT

According to the standard(s):

FCC Part 15 Radio part 15.247

Equipment under test:

UHF READER GAN-X5X

FCC ID: OVNGAN

Company:

STID

Diffusion: Mr POITRAT (Company: STID)

Number of pages: 38 including 1 annex

Ed.	Date	Modified page(s)	Technical verification Quality approval Name / Visa
2	07 Jun. 16	Refer to lines in the margin	Olivier HEYER

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NAME OF THE EQUIPMENT UNDER TEST (E.U.T.)	:	UHF READER GAN-X5X
Serial number	:	/
P/N	:	FCC ID: OVNGAN
Software version	:	/
MANUFACTURER'S NAME	:	STID

APPLICANT'S ADDRESS:

Company	:	STID
Address	:	20 Parc d'Activités des Pradeaux 13850 GREASQUE FRANCE
Person(s) present during the tests	:	Mr SOGOYAN & Mr BOALLAL
Responsible	:	Mr POITRAT

DATE(S) OF TESTS	:	September 24th of 2015, January 6th and 21st and May 20th of 2016
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)	:	David MONTAULON

CONTENTS

1. INTRODUCTION

This document submits the results of Radio tests performed on the equipment UHF READER GAN-X5X (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- Telecommunication Chapter 1- Federal Communication Commission. Part 15- Radio frequency devices Subpart B- Unintentional Radiators. Limits and methods of measurement of radio disturbance. Characteristic of information technology equipment.
FCC part 15.247	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850MHz. (frequency hopping and digitally modulated)
ANSI C 63.4:2014	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
Public Notice DA 00-705	Filing and Measurement Guideline for Frequency Hopping Spread Spectrum Systems

3. EQUIPMENT UNDER TEST CONFIGURATION

Equipment under test (E.U.T.) description: The GAN-X5X is an extremely compact high performance UHF reader. It has been developed for hands-free access control applications and can identify people moving with a total coverage area up to 2 m. Can be installed indoors or outdoors.

The system can use several standard communication interfaces (TTL, RS232 and RS485).

FCC ID: OVNGAN
Frequency range: 902MHz – 928MHz
Number of channels: 50
Tested frequencies: 902MHz-928MHz (hopping mode)
RF max conducted output power: 1W

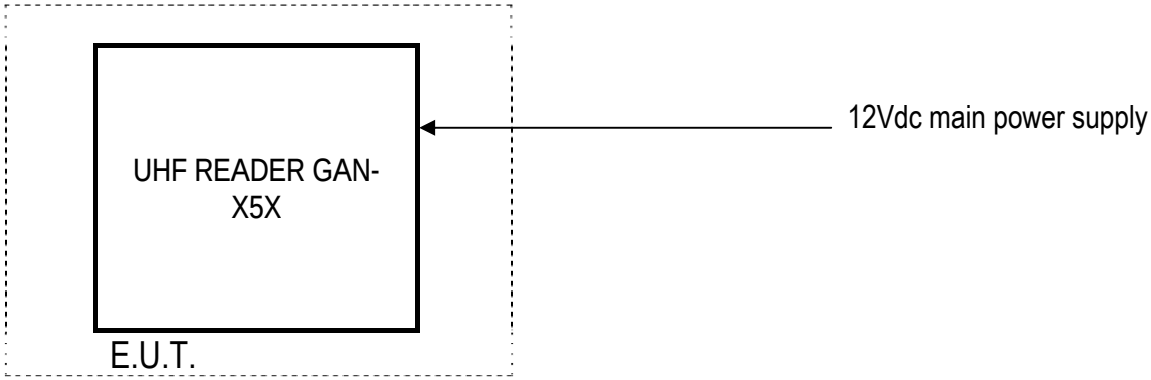
Power supply: +9 Vdc up to +36 Vdc (+12 Vdc Typical)
Consumption: Under +12 Vdc: typ 500mA, max 750mA
Dimensions 20.8 x 21.8 x 3.57 cm (without fixation)
Operating temperatures: - 20°C to + 55°C - Inside / outside use
Mounting: Free-standing or wall-mounted

Antenna: Custom and dedicated integral antenna with maximum gain declared less than 6dBi (5.5dBi)

Cycle and operating mode during emission tests: Frequency hopping emission mode. Non hopping mode is not available.

Equipment modifications applied during tests: No

4. EQUIPMENT UNDER TEST CONFIGURATION SCHEME



5. SUMMARY OF TEST RESULTS

Tests designation	Results satisfying?	Comments
Conducted power lines FCC part 15.107 and 15.207	YES	
Frequency hopping and digitally modulated FCC part 15 Radio part 15.247 a)	YES	
Maximum peak conducted FCC part 15.247 b)	YES	
Intentional radiator FCC part 15.247 d)	YES	
Unwanted emissions outside of §15.247 frequency bands FCC part 15.215 b)	YES	
Measurement of frequency stability §15.215 (c)	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 15.247 according to limits, specified in this test report.

- RF exposure:

Maximum measured power = 1.03 W (eirp) at 924.2482MHz (channel 44)

In accordance with KDB 447498 D01 General RF Exposure Guidance v06:
PSD= EIRP/(4*π*R2)=1030/(4*π*(20 cm)²)= 0.21 mW/cm²
Limit= 0.62 mW/cm² (f /1500 if 300<f< 1500 MHz)

6. CONDUCTED EMISSION

Temperature (°C): 22 *Humidity (%HR):* 35.1 *Pressure (hPa):* 1001

Standard: FCC part 15.207

Test method: ANSI C63.4: 2014

Test configuration:

Tested cable(s)	Measure with	E.U.T. height
110Vac/60Hz power supply	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

Test is done on a standard power supply (see photos in annex).

Test method deviation: No

Test equipment list:

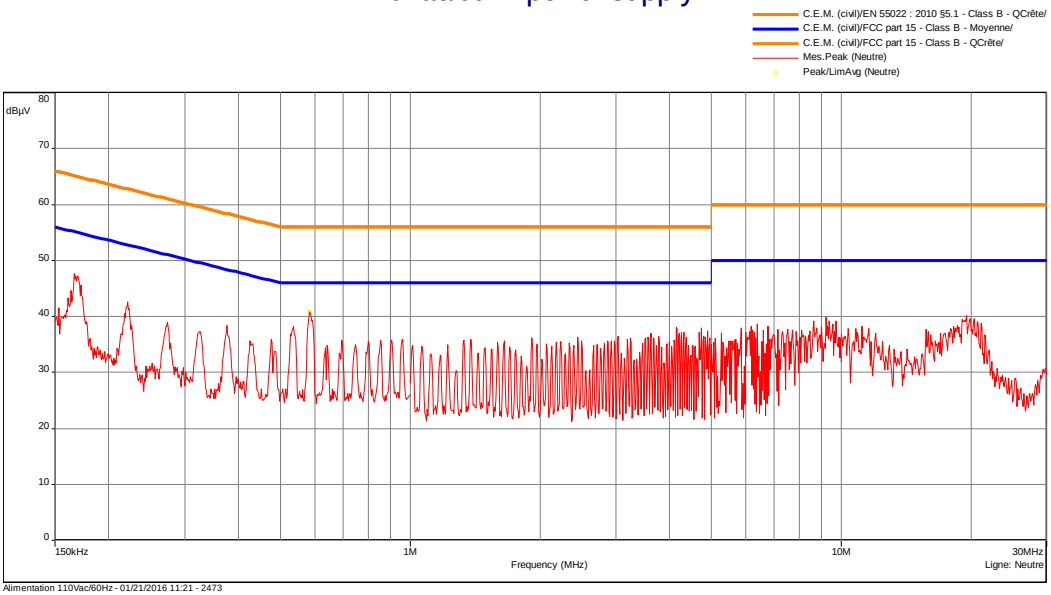
CATEGORY	BRAND	TYPE	N° EMITECH	DATE CAL.	CAL. INTERVAL
Cable	Emitech	Current absorber sheath	9491	25/09/2014	24 months
Cable	MICRO-COAX	N-3m	10535	24/11/2015	24 months
Cable	MICRO-COAX	N-5m	10529	24/11/2015	24 months
LISN	AFJ	LT42C\10	12007	04/05/2015	12 months
Receiver	Agilent Technologies	E4440A	5824	01/05/2014	24 months
Software	Nexio	BAT EMC	0000	#	#

#: Permanent validity *BAT-EMC software version: V3.6.0.32*

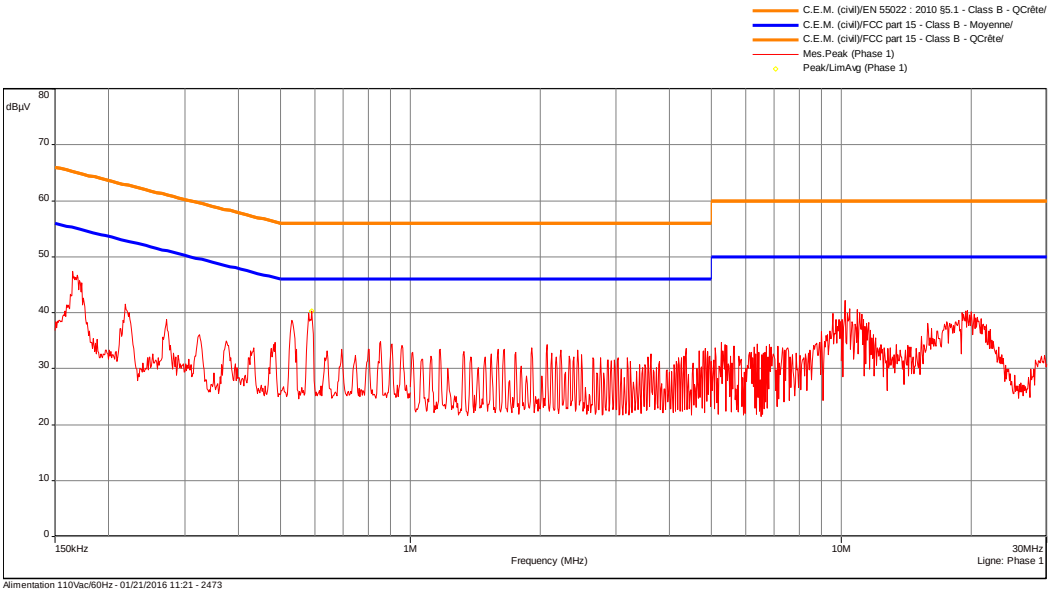
Results: See Graph(s) hereafter.
Limits on the graphs are average and quasi-peak limits (upper limit).

Conducted voltage emission (measurement) | EMI2473

110Vac/60Hz power supply



Alimentation 110Vac/60Hz - 01/21/2016 11:21 - 2473



Alimentation 110Vac/60Hz - 01/21/2016 11:21 - 2473

Date: 21/01/2016 11:21:41

Technician:

Classe: B of the standard

Detection:
Peak

Modification(s) during test:
No

7. *FREQUENCY HOPPING AND DIGITALLY MODULATED*

Standard: FCC part 15 Radio part 15.247

Test method: FCC part 15.247 a) (1) & a) (1) (i) and Public Notice DA 00-705

7.1) Frequency hopping channel separation (15.247 a) (1)

The system uses 50 channels numbered in hexadecimal from 1 to 50.Tests are done in peak max-hold mode in order to capture all hopping channels. Measurements are done with a test antenna.

Test method deviation: There is no correlation between carrier levels and curve shown below; these plots are only for showing the number of channels, 20dB bandwidth and channel spacing.

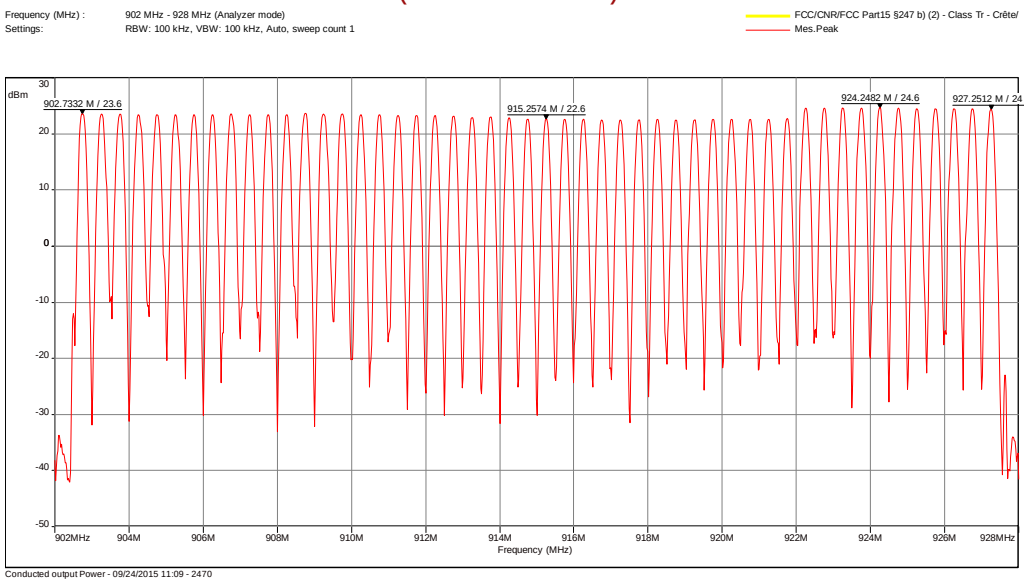
Test equipment list:

CATEGORIE	MARQUE	TYPE	N° EMITECH	DATE CAL.	CAL. INTERVAL
Attenuator	Radiall	R412710124	4390	21/01/2014	24 months
Attenuator	Radiall	R412720124	4391	21/01/2014	24 months
Cable	C&C	N-3m	10557	27/09/2013	24 months
Receiver	Agilent Technologies	E4440A	5824	01/05/2014	24 months
Software	Nexio	BAT EMC	0000	#	#
Thermohygrometer	Bioblock Scientific	Météostar	0963	31/10/2014	24 months
Thermohygrometer	Testo	608-H1	7561	26/09/2014	24 months

#: Permanent validity *BAT-EMC software version: V3.6.0.32*

Antenna base emission (measurement) EMI2470

Intentional radiator (902MHz-928MHz) number of channels



Test date :
24/09/2015 09:32:10

Technician :
DM

Detection:
Peak max hold mode

T (°C) : 22.8
H (%) : 38.7
P (hPa) : 1011

Modification(s) during test:
None

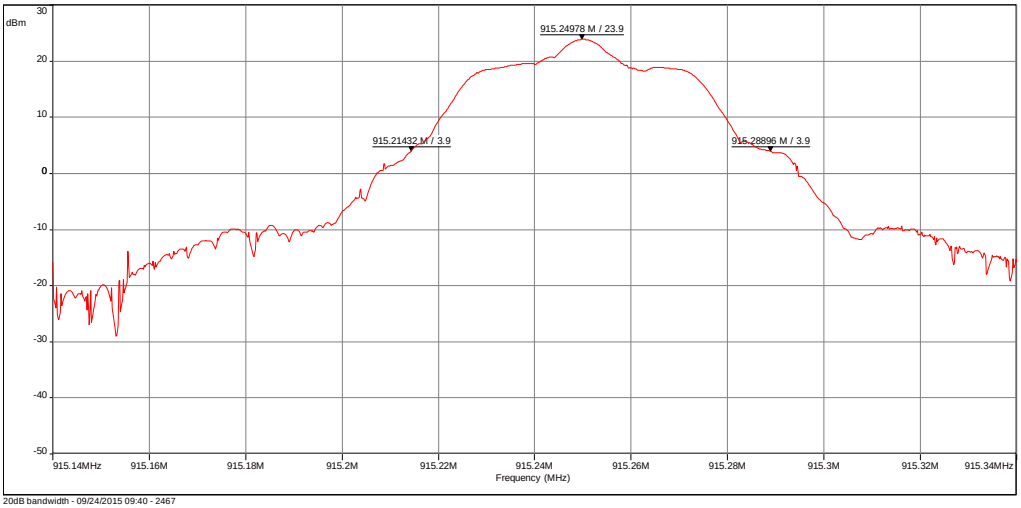
The system uses 50 channels numbered in hexadecimal from 1 to 50.

Antenna base emission (measurement) | EMI2467

20dB bandwidth

Frequency (MHz) : 915.14 MHz - 915.34 MHz (Analyzer mode)
Settings: RBW: 10 kHz, VBW: 10 kHz, Auto, sweep count 1

RADIO/EN 300 220-1 V2.4.1 §7.3 - Class c - QCrête/
Mes.Peak



20dB bandwidth - 09/24/2015 09:40 - 2467

Test date :
24/09/2015 09:40:20

Technician :
DM

Detection:
Peak max hold mode

T (°C) : 22.8
H (%) : 38.7
P (hPa) : 1011

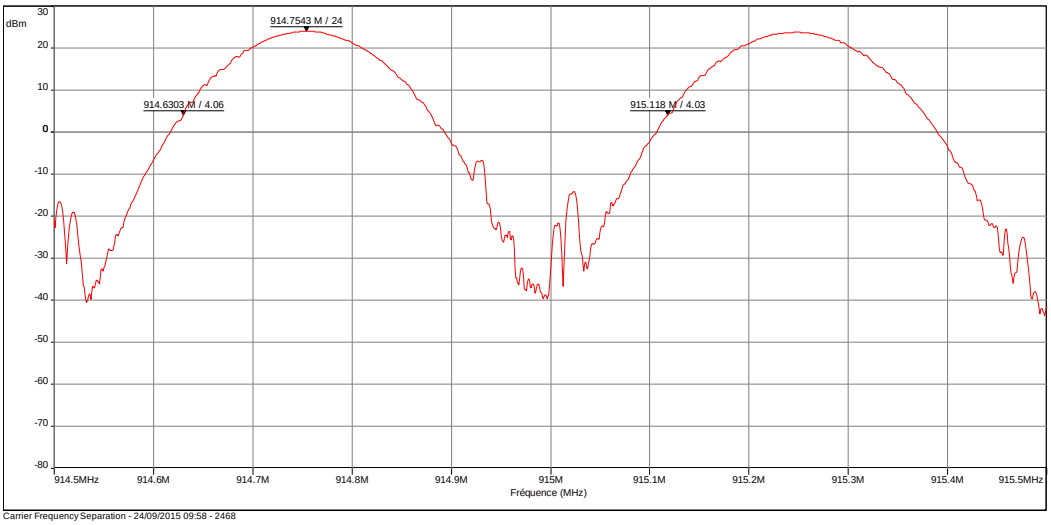
The 20dB bandwidth of each hopping channel is 74.64kHz (in RBW=10kHz).That is less than 500kHz.

Antenna base emission (measurement) | EMI2468

Carrier Frequency Separation

Fréquence (MHz) : 914.5 MHz - 915.5 MHz (Mode analyseur)
Réglage: RBW: 100 kHz, VBW: 300 kHz, Auto, nombre de Balayages 1

RADIO/EN 300 220-1 V2.4.1 §7.3 - Classe:c - QCrête/
Mes.Peak



Carrier Frequency Separation - 24/09/2015 09:58 - 2468

Test date :
24/09/2015 09:58:47

Technician :
DM

Detection:
Peak max hold mode

T (°C) : 22.8
H (%) : 38.7
P (hPa) : 1011

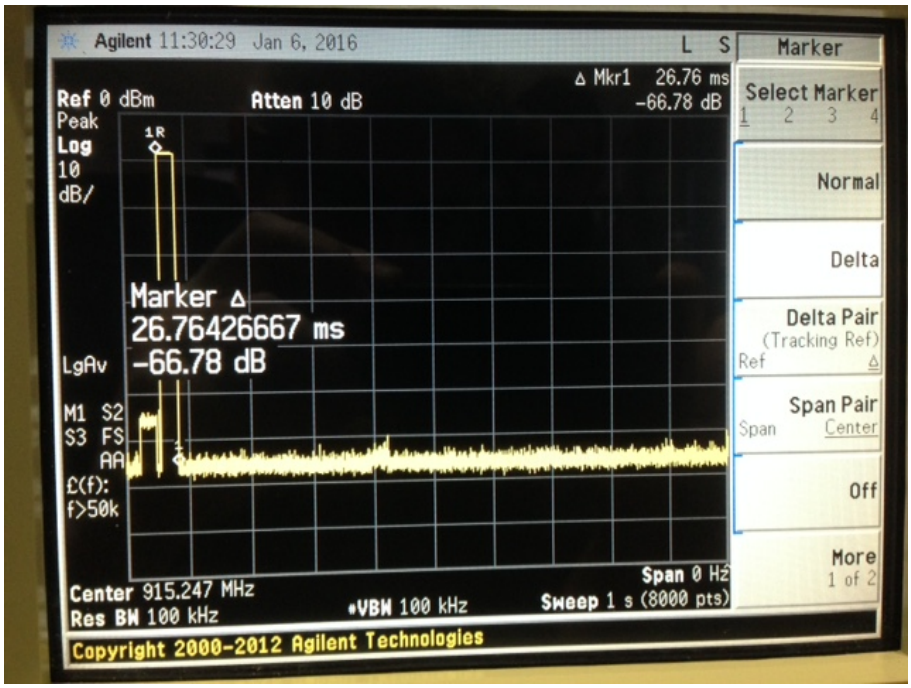
The channel separation is almost 487.7kHz which is greater than the 20dB bandwidth

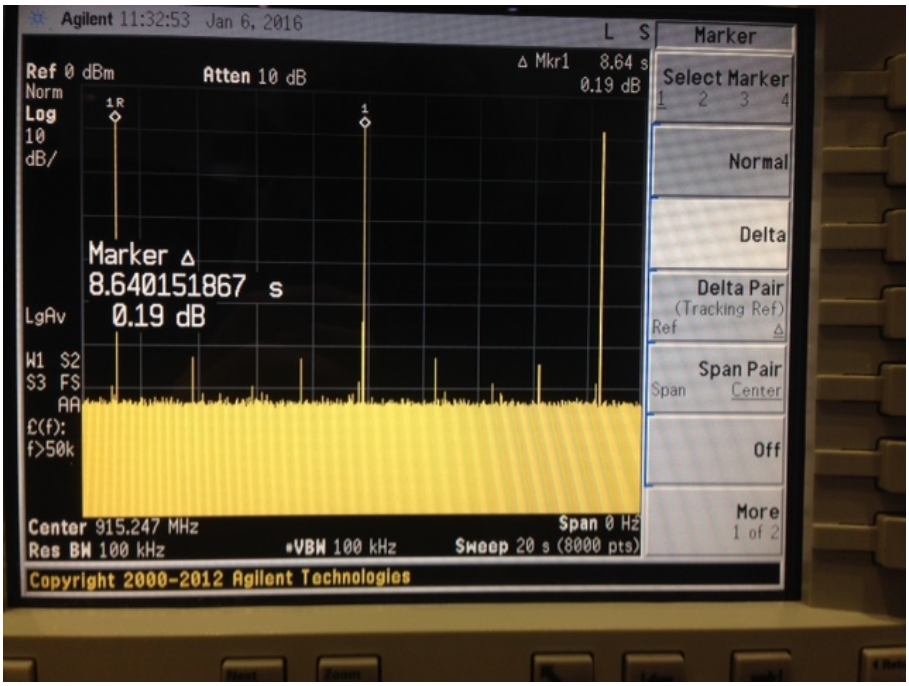
7.2) Frequency hopping channel separation (15.247 a) (1) (i)

The system uses 50 channels in any conditions and the averaging time of occupancy on any channel is less than 0.4 seconds within a period of 20.0 seconds.

The measurement during a long transmission gives 26.76ms every 8.64s on each channel, so the average time within a period of 20.0 second is 61.94ms which is less than the 400ms limit.

Thus the duty cycle correction factor is 20 log (26.76/100) = -11.45dB





8. MAXIMUM PEAK CONDUCTED POWER

Standard: FCC part 15 Radio part 15.247

Test method: FCC part 15.247 b) (2)

Test configuration:

Frequency band	Tested side	Resolution bandwidth	Video bandwidth	Detection mode
902MHz-928MHz	RF ON CH1, CH24 and CH 50	100kHz	300kHz	Max-hold Peak

Test is done in max-hold peak detection. E.U.T. output is directly connected to a spectrum analyzer.
Measurements are performed on channels 1, 24, 44 and 50.

Test method deviation: No

Test equipment list:

CATEGORIE	MARQUE	TYPE	N° EMITECH	DATE CAL.	CAL. INTERVAL
Attenuator	Radiall	R412710124	4390	21/01/2014	24 months
Attenuator	Radiall	R412720124	4391	21/01/2014	24 months
Cable	C&C	N-3m	10557	27/09/2013	24 months
Receiver	Agilent Technologies	E4440A	5824	01/05/2014	24 months
Software	Nexio	BAT EMC	0000	#	#
Thermohygrometer	Bioblock Scientific	Météostar	0963	31/10/2014	24 months
Thermohygrometer	Testo	608-H1	7561	26/09/2014	24 months

BAT-EMC software version: V3.6.0.32

Results:

b) (2) Maximum peak conducted: See Board below.

Frequency (MHz)	Channel	Maximum peak power (dBm)	Power limit (dBm)
902.75	1	23.60	30
915.25	24	22.60	30
924.2482	44	24.60	30
927.25	50	24.36	30

Calculated radiated electric field at 3m distance:

Maximum Radiated electric field is calculated using the formula:

E(V/m) = $\frac{\sqrt{30 \times P(W) \times G(dB)}}{d(m)}$ where G is the declared antenna gain.

Channel	Gain (dB)	Radiated power (dBµV/m)
902.75 (CH1)	5.5	126.23
915.75 (CH24)	5.5	125.23
924.2482 (CH 44)	5.5	127.23
927.25 (CH50)	5.5	126.99

9. INTENTIONAL RADIATOR

Standard: FCC part 15 Radio part 15.247

Test method: FCC part 15.247 d)

Test configuration:

Frequency band	Tested	Resolution bandwidth	Video bandwidth	Detection mode	E.U.T. height
900MHz-905MHz	Band Edge (Lower channels)	100kHz	300kHz	Max-hold Peak	0cm
925MHz-930MHz	Band Edge (Upper channels)	100kHz	300kHz	Max-hold Peak	0cm

Test is done in max-hold peak detection; transmitter output is directly connected to a spectrum analyzer. Measurements are performed on lower and upper channels.

The purpose of this test is to demonstrate in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

Test method deviation: Non hopping mode is not available on the E.U.T.

Test equipment list:

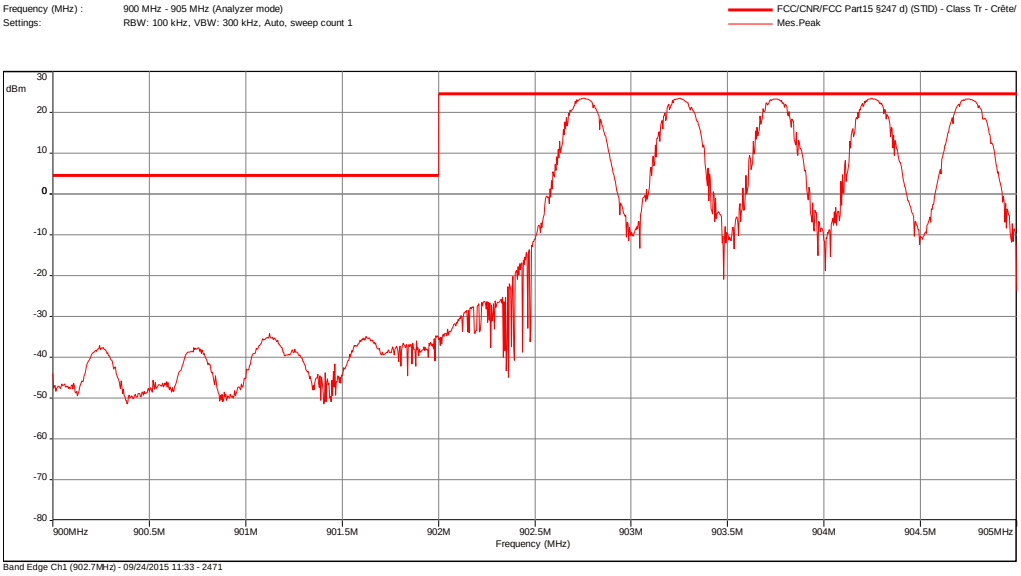
CATEGORIE	MARQUE	TYPE	N° EMITECH	DATE CAL.	CAL. INTERVAL
Attenuator	Radiall	R412710124	4390	21/01/2014	24 months
Attenuator	Radiall	R412720124	4391	21/01/2014	24 months
Cable	C&C	N-3m	10557	27/09/2013	24 months
Receiver	Agilent Technologies	E4440A	5824	01/05/2014	24 months
Software	Nexio	BAT EMC	0000	#	#
Thermohygrometer	Bioblock Scientific	Météostar	0963	31/10/2014	24 months
Thermohygrometer	Testo	608-H1	7561	26/09/2014	24 months

BAT-EMC software version: V3.6.0.32

Results: See Graph(s) hereafter.

Antenna base emission (measurement) — EMI2471

Band Edge Ch1 (902.7MHz)



Band Edge Ch1 (902.7MHz) - 09/24/2015 11:33 - 2471

Test date :
24/09/2015 11:33:55

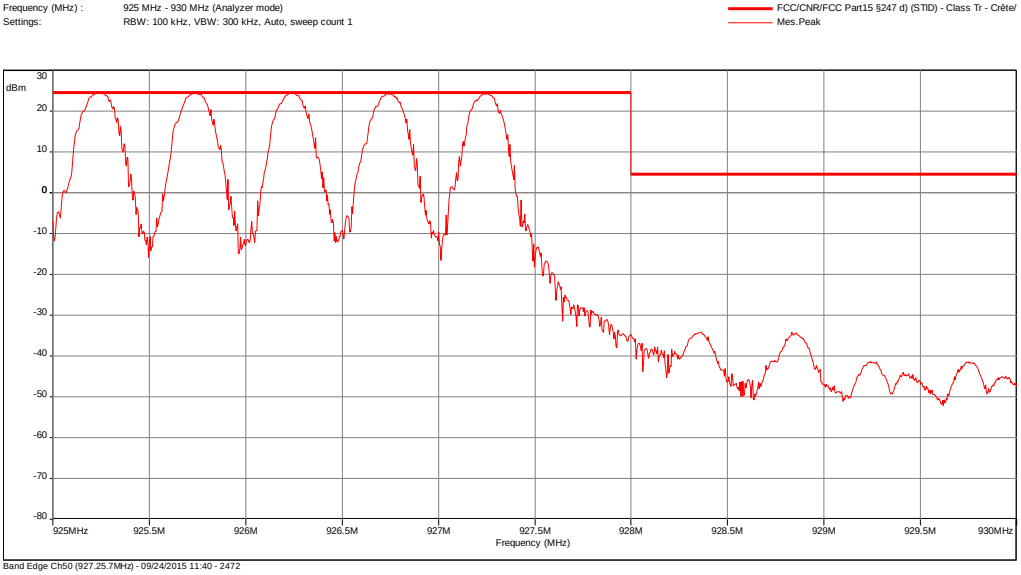
Technician :
DM

Detection:
Peak max hold mode

T (°C) : 22.8
H (%) : 38.7
P (hPa) : 1011

Antenna base emission (measurement) — EMI2472

Band Edge Ch50 (927.25MHz)



Band Edge Ch50 (927.25.7MHz) - 09/24/2015 11:40 - 2472

Test date :
24/09/2015 11:33:55

Technician :
DM

Detection:
Peak max hold mode

T (°C) : 22.8
H (%) : 38.7
P (hPa) : 1011

10. UNWANTED EMISSIONS OUTSIDE OF §15.247 FREQUENCY BANDS

Standard: FCC part 15 Radio part 15.247

Test method: FCC part 15.109, 15.209, 15.215 b), 15.247

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
1GHz-10GHz	Front side	1MHz	3MHz	Peak	80cm

Measurements are done in semi anechoic chamber at 3m. E.U.T. is set on a wooden table
Measurements are done in max-hold peak detection in hopping mode maximized at 360°.

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 given in §15.209.

Above 1GHz average limit in restricted bands §15.205 is 54dBµV/m. Otherwise, the limit is 20dB under carrier emission level at 3m (107.23dBµV/m) without averaging with duty cycle factor.

The averaging correction factor of -11.45dB is used only when necessary in restricted bands as defined in 15.205.

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 dBµA/m instead of µV/m
- Measuring distance is 3 meters instead of 30 and 300 meters

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

Measuring distance: 3 meters

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	CAL. INTERVAL
Software	Nexio	BAT EMC	0000	#	#
Antenna	Electro Metrics	BIA-30HF	0824	25/04/2015	36 months
Antenna	Rohde & Schwarz	HFH2-Z2	5825	27/01/2015	24 months
Antenna	Rohde & Schwarz	HL223	1137	25/04/2015	36 months
Antenna	ETS-Lindgren	3117	5456	17/08/2012	36 months

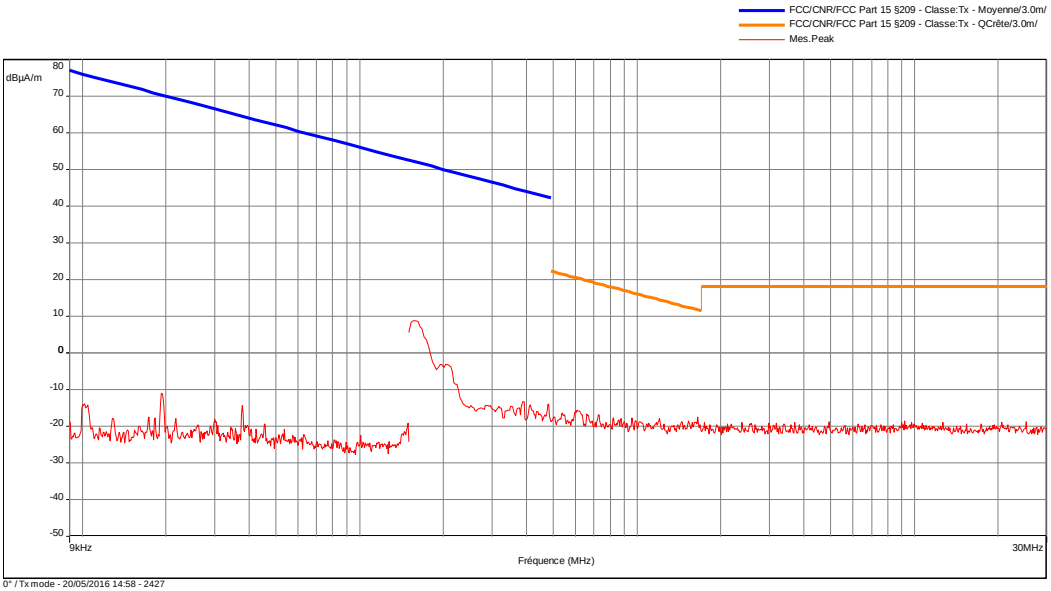
CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	CAL. INTERVAL
Cable	MICRO-COAX	N-3m	10535	24/11/2015	24 months
Cable	MICRO-COAX	N-3m	10537	24/11/2015	24 months
Cable	MICRO-COAX	N-5m	10529	24/11/2015	24 months
Cable	C&C	N-3m	10557	25/11/2015	24 months
Cable	C&C	N-3m	10558	25/11/2015	24 months
Cable	C&C	N-5m	10560	25/11/2015	24 months
Filter	Micro-Tronics	HPM 11630	4392	07/08/2014	24 months
Filter	Wainright	WTRCTV5-700-1000	-	-	-
Pre amplifier	IMPULSE	CA118-546ACN	9169	11/08/2015	12 months
Receiver	Agilent Technologies	E4440A	5824	01/05/2014	24 months
Shielded room	RAY PROOF	C.V1	1123	#	#
Thermohygrometer	Bioblock Scientific	Météostar	0963	31/10/2014	24 months
Thermohygrometer	Testo	608-H1	7561	26/09/2014	24 months

BAT-EMC software version: V3.6.0.32

Results: See Boards and Graphs hereafter.

Radiated magnetic field	EMI2427

0° / Tx mode



0° / Tx mode - 20/05/2016 14:58 - 2427

Date: 20/05/2016 14:58:46

Technician: DMO

Detection:
Crête

T (°C): 27.1
H (%): 40.3
P (hpa): 1008

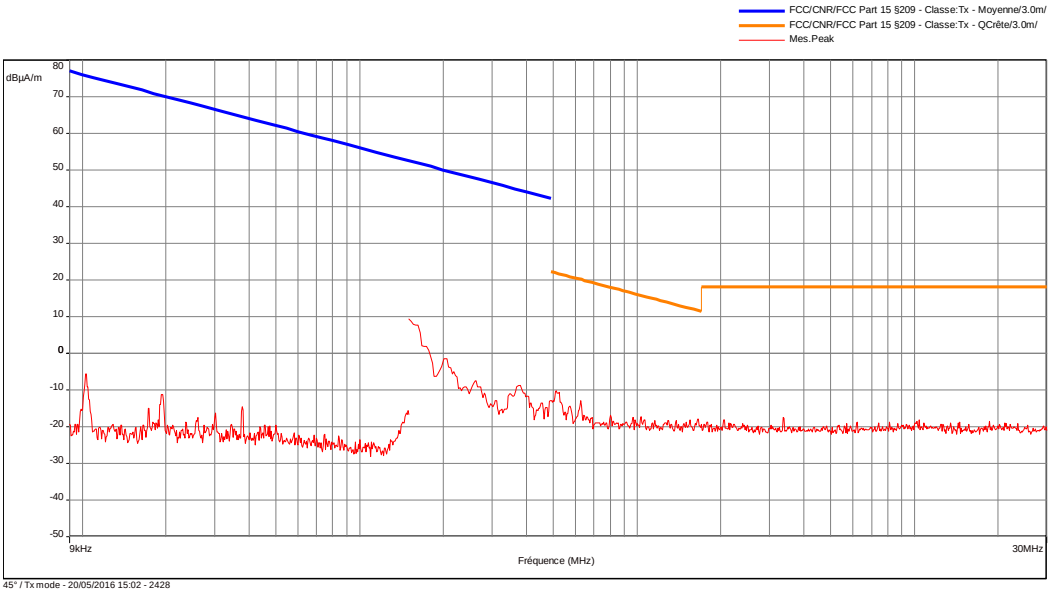
Comments:

Modification(s) during test:
None

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

Radiated magnetic field	EMI2428

45° / Tx mode



45° / Tx mode - 20/05/2016 15:02 - 2428

Date: 20/05/2016 15:02:27

Technician: DMO

Detection:
Crête

T (°C): 27.1
H (%): 40.3
P (hpa): 1008

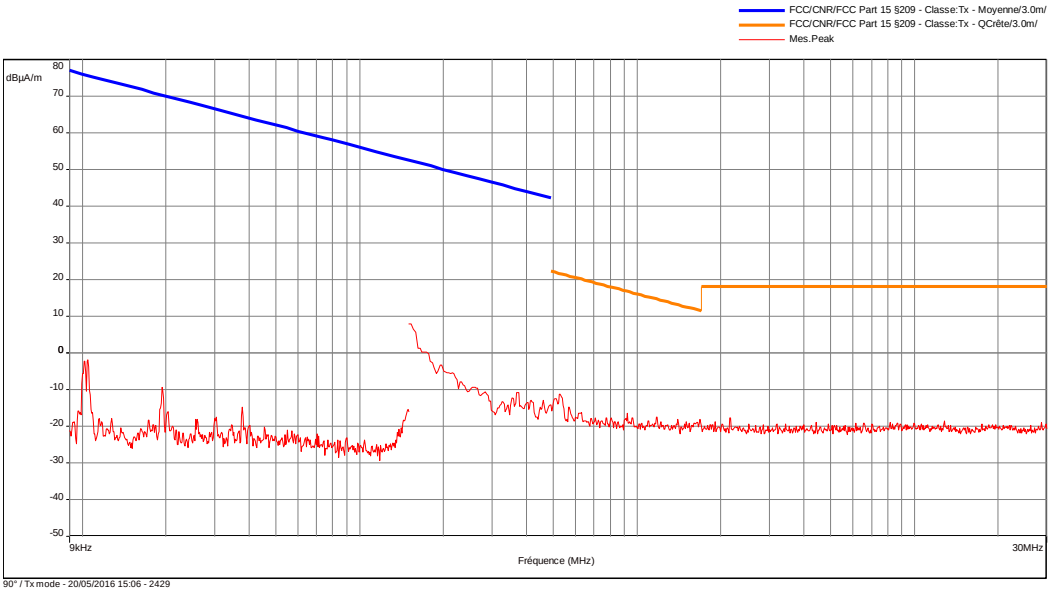
Comments:

Modification(s) during test:
None

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

Radiated magnetic field	EMI2429

90° / Tx mode



Date: 20/05/2016 15:06:23

Technician: DMO

Detection:
Crête

T (°C): 27.1
H (%): 40.3
P (hpa): 1008

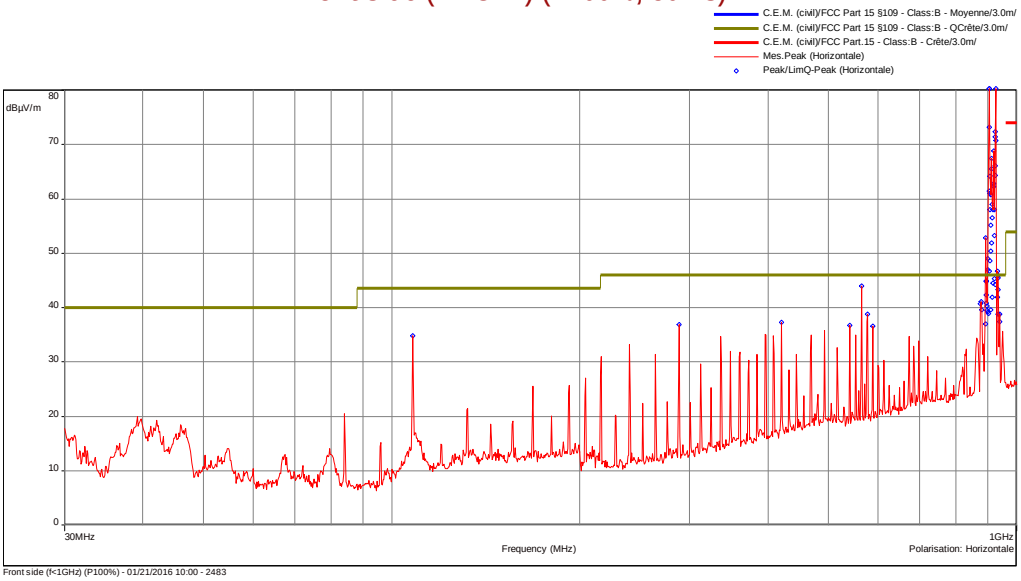
Comments:

Modification(s) during test:
None

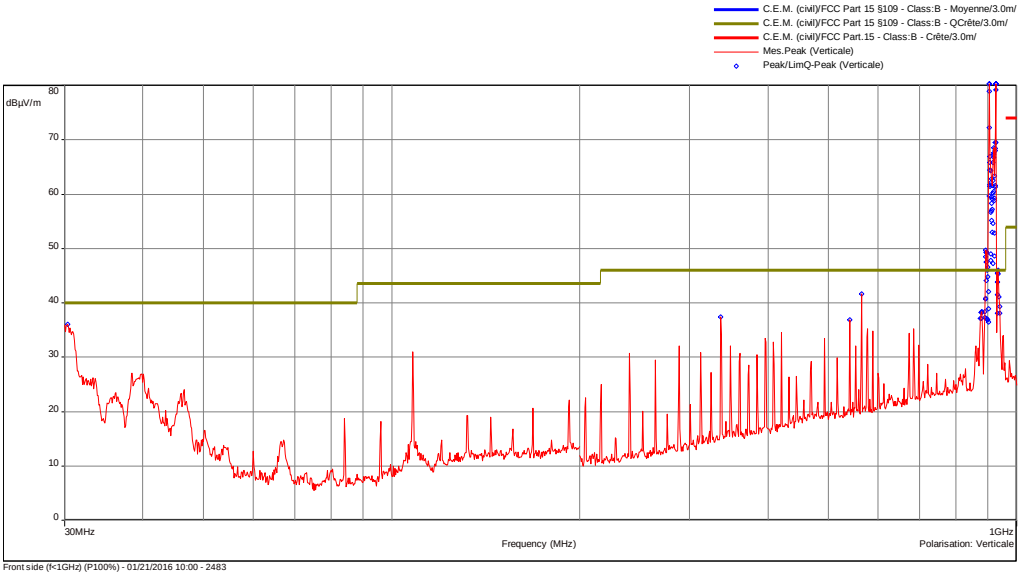
Limit indicated on this plot is calculated with 40 dB/decade extrapolation factor and 51.5 dB conversion factor.

Radiated electric emission (measurement) | EMI2483

Front side (f<1GHz) (P100%; 30ms)



Front side (f<1GHz) (P100%) - 01/21/2016 10:00 - 2483



Front side (f<1GHz) (P100%) - 01/21/2016 10:00 - 2483

Test date :
21/01/2016 10:00:01

Technician :
DMO

Detection:
Peak max hold mode

Detection:
902-928MHz: Rejected carrier

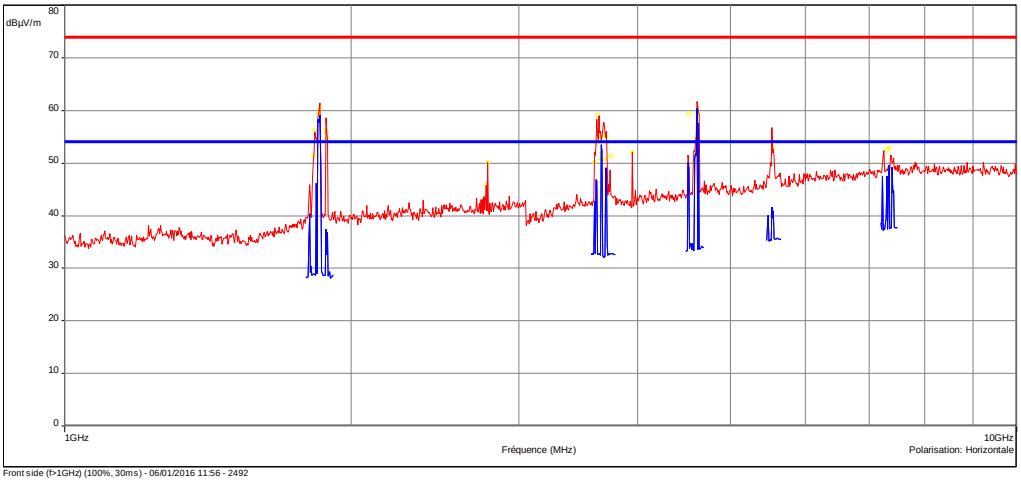
T (°C) : 24.4
H (%) : 27.4
P (hPa) : 1012

Radiated electric emission (measurement) | EMI2492

Front side (f>1GHz) (P100%; 30ms)

Fréquence (MHz) : 1 GHz - 10 GHz (Mode analyseur)
Réglage: RBW: 1 MHz, VBW: 3 MHz, Auto, nombre de Balayages 1
Polarisation : Horizontale
Distance: 3 m

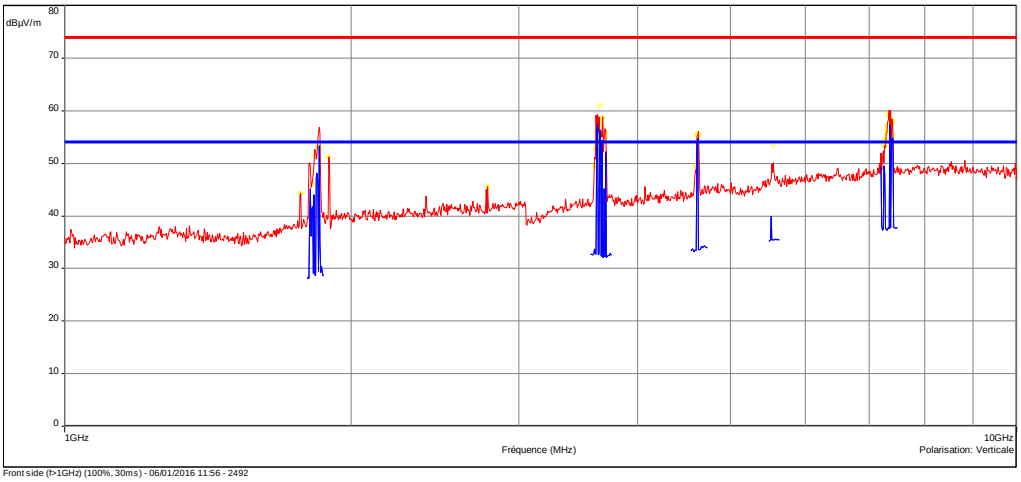
RADIO/FCC Part 15 §209 - Classe:Tx - Moyenne/3.0m/
RADIO/FCC Part 15 §209 - Classe:Tx - QCrête/3.0m/
RADIO/FCC Part 15 §209 - Classe:Tx - Crête/3.0m/
Mes.Peak (Horizontale)
Mes.Avg (Horizontale)
Peak/LimAvg (Horizontale)



Front side (f>1GHz) (100%, 30ms) - 06/01/2016 11:56 - 2492

Fréquence (MHz) : 1 GHz - 10 GHz (Mode analyseur)
Réglage: RBW: 1 MHz, VBW: 3 MHz, Auto, nombre de Balayages 1
Polarisation : Verticale
Distance: 3 m

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



Front side (f>1GHz) (100%, 30ms) - 06/01/2016 11:56 - 2492

Date :
06/01/2016 11:56:15

Technician :
DMO

Detection:
Peak max hold mode

T (°C) : 23.1
H (%) : 35.5
P (hPa) : 997

b) Measurement at 3 meters on normalized test site:

Temperature (°C): 21 *Humidity (%HR):* 39 *Pressure (hPa):* 1004

Test configuration: For each measured frequencies, E.U.T. is set via a turntable in order to find the highest level. Below 1GHz, test antenna is set between 1m and 4m in order to find the highest level in vertical and horizontal polarization. Above 1GHz test is done in fully anechoic shielded chamber. Only highest levels are recorded on each configurations of E.U.T.

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

Test method deviation: No

Test equipment list:

CATEGORY	BRAND	TYPE	N° EMITECH	CAL DATE	CAL INTERVAL
Antenna	Electro Metrics	BIA-30HF	1107	25/04/2015	36 months
Antenna	Rohde & Schwarz	HL223	3126	25/04/2015	36 months
Antenna	ETS-Lindgren	3117	5456	17/08/2012	36 months
Antenna	Rohde & Schwarz	HFH2-Z2	5825	27/01/2015	24 months
Cable	Huber Suhner		8146	25/09/2015	24 months
Cable	C&C	N-3m	10557	25/11/2015	24 months
Cable	C&C	N-3m	10558	25/11/2015	24 months
Cable	C&C	N-5m	10560	25/11/2015	24 months
Filter	Micro-Tronics	HPM 11630	4392	07/08/2014	24 months
Filter	Wainright	WTRCTV5-700-1000	-	-	-
Mast controller	INNCO	CO3000	10260	#	#
Open area test site	Emitech	Salinelles	3482	18/04/2014	36 months
Pre amplifier	IMPULSE	CA118-546ACN	9169	11/08/2015	12 months
Receiver	Agilent Technologies	E4440A	5824	01/05/2014	24 months
Receiver	Rohde & Schwarz	ESVS10	3211	17/04/2015	24 months
Shielded room	RAY PROOF	C.V1	1123	#	#
Thermohygrometer	Bioblock Scientific	Météostar	0963	31/10/2014	24 months
Thermohygrometer	Testo	608-H1	7561	26/09/2014	24 months
Turntable	Heinrich Deisel	D4420	4038	#	#
Turntable controller	Heinrich Deisel	HD100	4036	#	#

Results: See Board(s) below.

Frequency (MHz)	Polarization	Level (dBµV/m)	Averaging (with duty cycle correction factor of -11.45dB)	Limit (dBµV/m)	Margin (dB)
30.36	Vertical	25.91	-	40	-14.09
40.04	Vertical	20.67	-	40	-19.33
108.13	Vertical	26.94	-	43	-16.06
108.13	Horizontal	32.14	-	43	-10.86
288.32	Horizontal	37.93	-	46	-8.07
420.48	Horizontal	38.34	-	46	-7.66
540.56	Horizontal	38.33	-	46	-7.67
564.64	Horizontal	42.61	-	46	-3.39
576.64	Horizontal	37.63	-	46	-8.37
588.64	Horizontal	35.29	-	46	-10.71
564.64	Vertical	40.61	-	46	-5.39
540.56	Vertical	37.13	-	46	-8.87
336.32	Vertical	35.89	-	46	-10.11
1855	Horizontal	61.38		107.23	-45.85
2780.2	Horizontal	50.17	-	54	-3.83
3640.6	Horizontal	53.53	42.08	54	-11.92
4616.2	Horizontal	60.38	48.93	54	-5.07
5533.3	Horizontal	56.786	-	107.23	-50.44
7254.1	Horizontal	49.558	38.108	54	-15.89
1849.6	Vertical	56.91	-	107.23	-50.32
2780.2	*Vertical*	*45.25*	-	*54*	-8.75
3617.2	Vertical	57.38	45.93	54	-8.07
4628.8	Vertical	54.82	42.75	54	-11.25
5548.6	Vertical	50.03	-	107.23	-57.20
7341.4	Vertical	57.32	45.87	54	-8.13

Italic values: Restricted bands of operation defined in §15.205

Note: Any spurious which has more than 20 dB of margin compared to the applicable limit is not necessarily reported.

11. MEASUREMENT OF FREQUENCY STABILITY §15.215 (C) AND RSS-GEN

Standard: FCC part 15 Radio part 15.215 c)

Test method: FCC part 15.215 c)

The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Measurements were conducted according to the operating temperature range and voltage range given in the user guide.
Measure is performed in relative measurement with a near field probe.

Test method deviation: Measurement in maxhold mode with modulation.

Test equipment list:

CATEGORIE	MARQUE	TYPE	N° EMITECH	DATE CAL.	CAL INTERVAL
Attenuator	Radiall	R412710124	4390	21/01/2014	24 months
Attenuator	Radiall	R412720124	4391	21/01/2014	24 months
Cable	C&C	N-3m	10557	27/09/2013	24 months
Receiver	Agilent Technologies	E4440A	5824	01/05/2014	24 months
Software	Nexio	BAT EMC	0000	#	#
Thermohygrometer	Bioblock Scientific	Météostar	0963	31/10/2014	24 months
Thermohygrometer	Testo	608-H1	7561	26/09/2014	24 months

Results: See Board(s) below.

E.U.T. operating mode: Hopping mode

Conditions	Temperature °C	Power supply Vdc	Frequency MHz	Frequency error kHz
Normal conditions	23	12	902.75016	0
		9	902.75016	0
		36	902.75016	0
Extremes tests conditions	-20	12	902.74914	-1.02
		9	902.74914	-1.02
		36	902.74914	-1.02
	55	12	902.74973	-0.43
		9	902.74973	-0.43
		36	902.74973	-0.43

Conclusion: No out of band operation under extremes tests conditions.

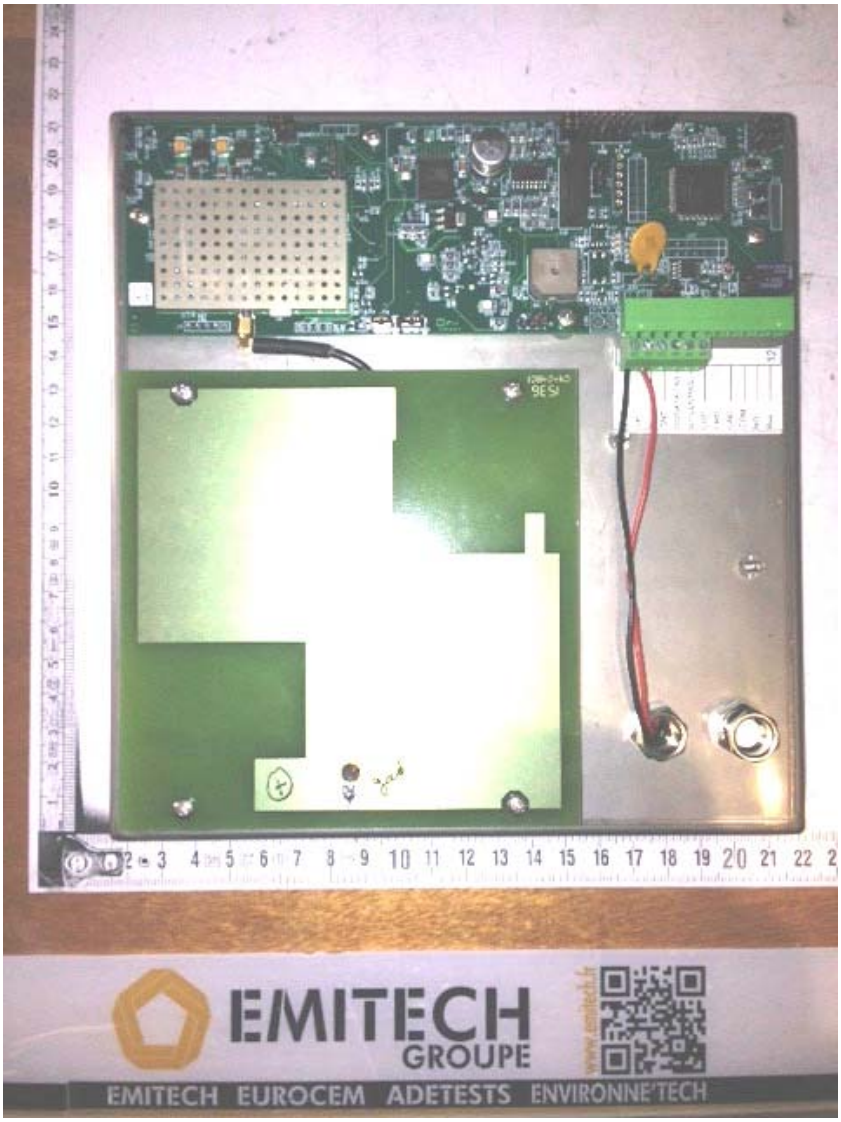
End of report – 1 annex to be forwarded

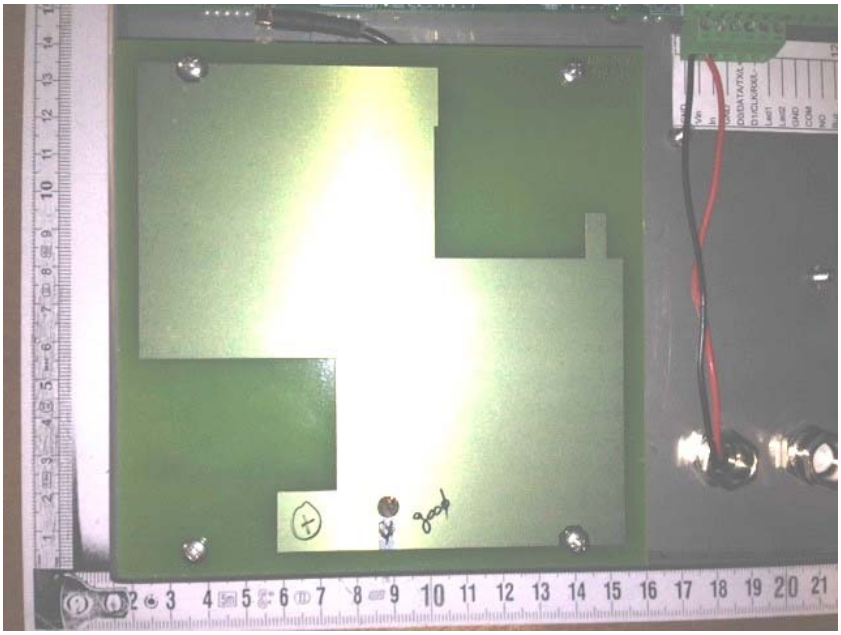
ANNEX: PHOTOGRAPH(S)

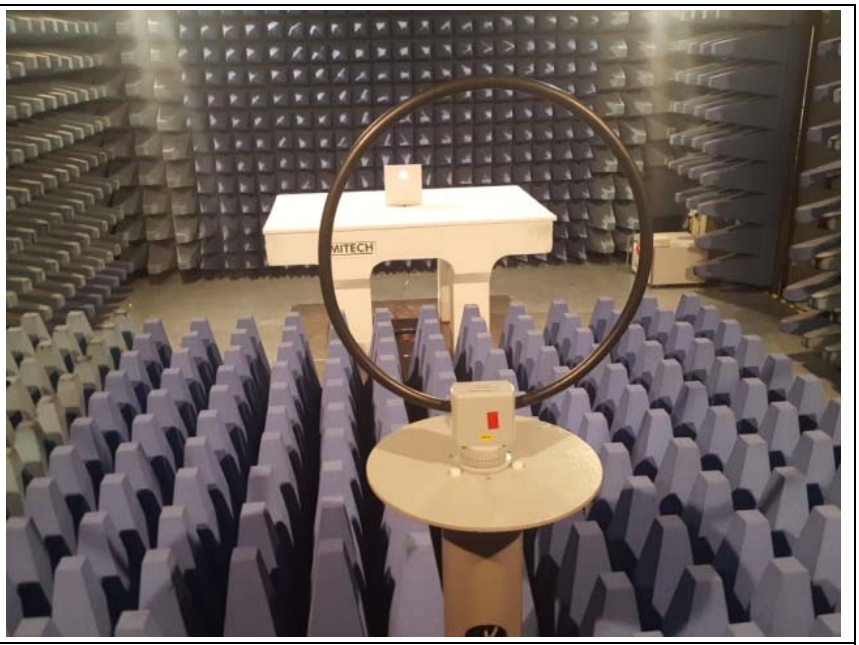
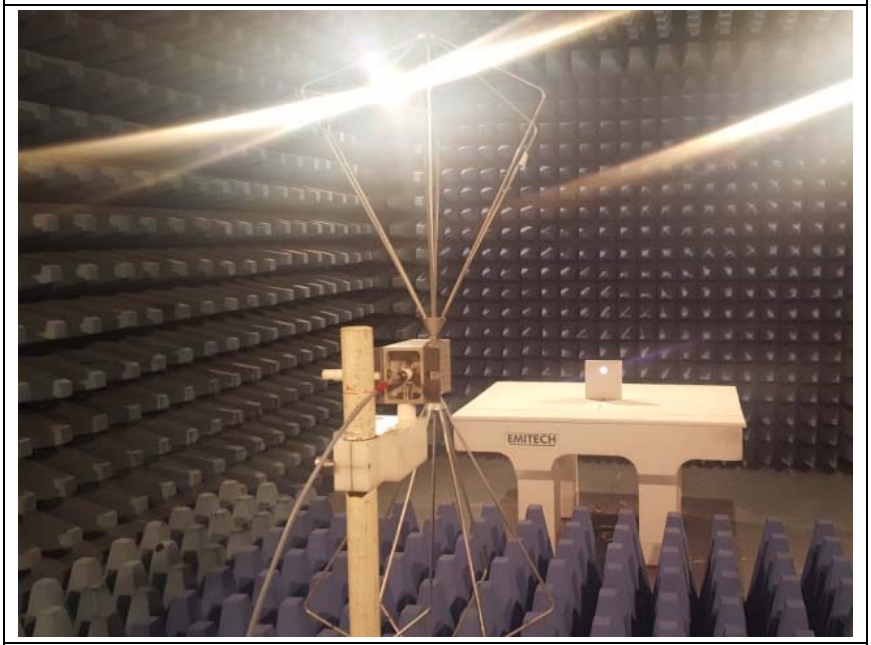
EQUIPMENT UNDER TEST (E.U.T.) PHOTOGRAPH(S)

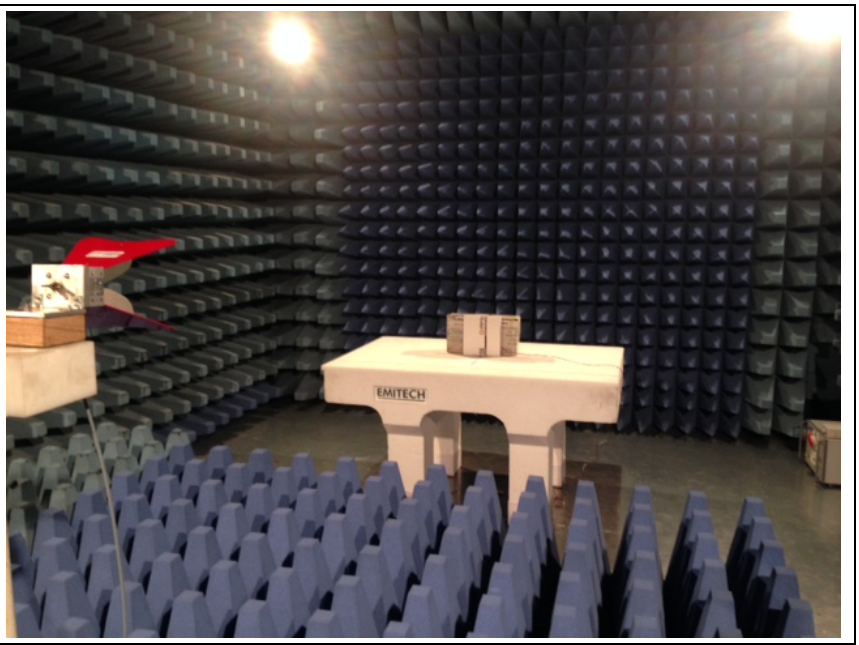
UHF READER GAN-X5X

General external view	

Internal general view	

Internal view: top antenna	
Internal view: Main board with RF part	

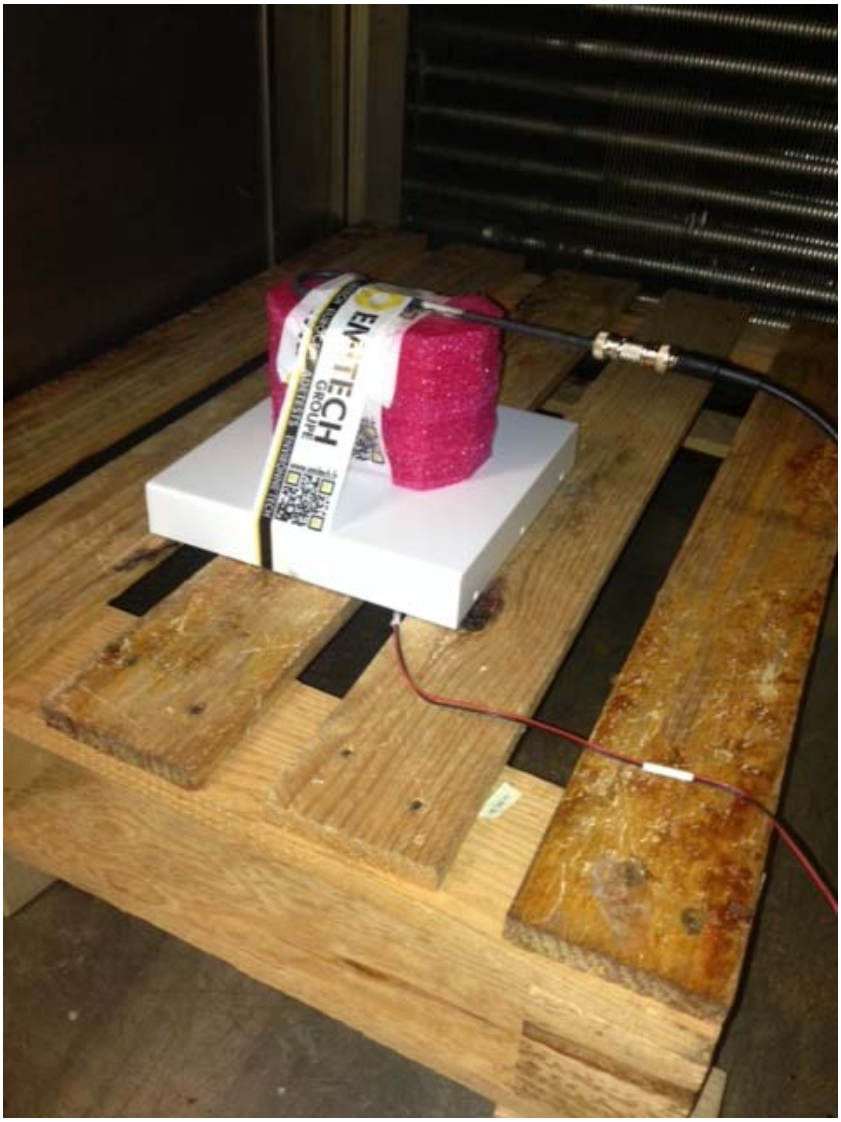
Unwanted emissions (pre measurement)	  

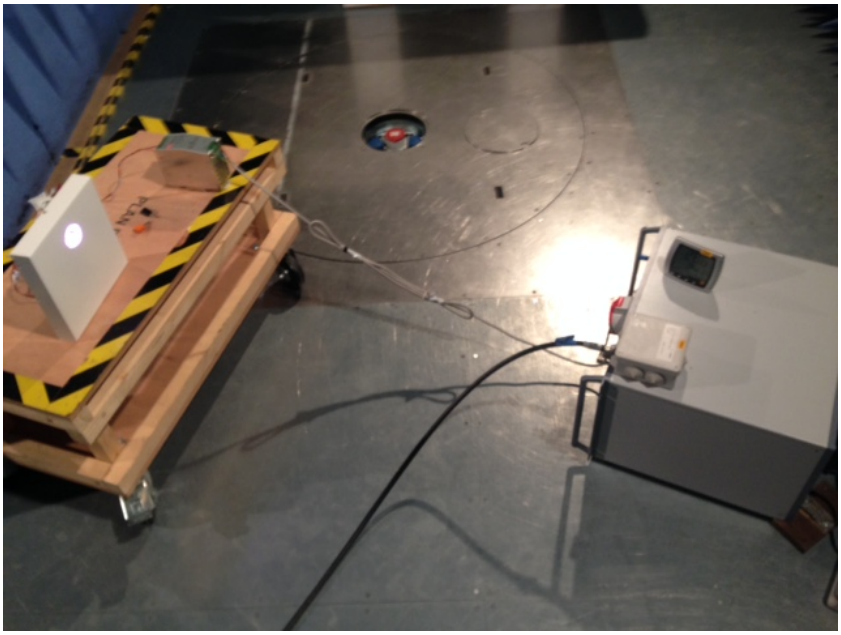
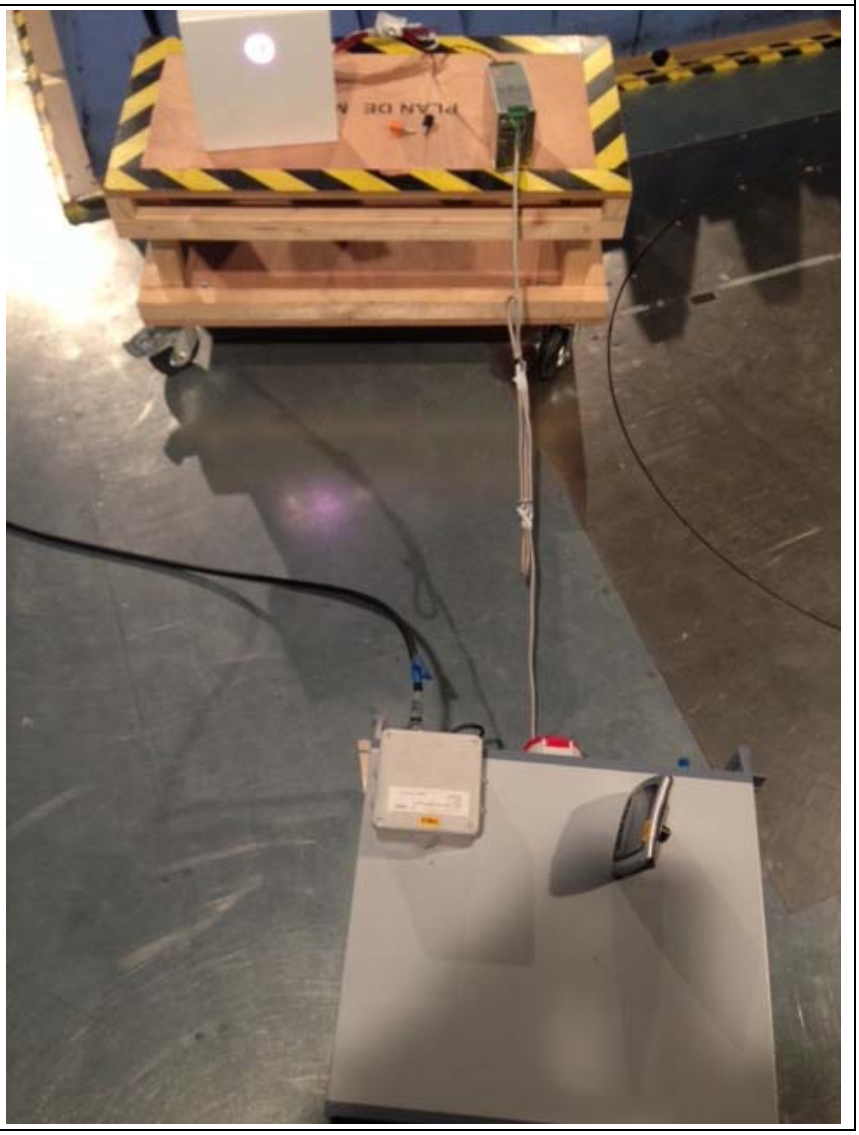
Unwanted emissions (final measurement)	
Unwanted emissions E.U.T. position (OATS mesaurements)	

Unwanted emissions E.U.T. position (OATS mesaurements)	

Unwanted emissions E.U.T. position (OATS mesaurements)	

Unwanted emissions E.U.T. position (OATS mesaurements)	

Frequency deviation in extremes conditions test setup	

Conducted emission	
	

Standard power supply used for conducted emissions