LCIE
Etablissement de Moirans
ZI Centr'alp
170, rue de Chatagnon
38430 Moirans

RCS Grenoble 408 363 174

Tél. : +33 4 76 07 36 36
Fax : +33 4 76 55 90 88

TEST REPORT

N°: 838088-R1-E **JDE : 134907**

Subject **Electromagnetic compatibility and Radio spectrum Matters (ERM) tests according to standards: FCC CFR 47 Part 15, Subpart B et C RSS-210 Issue 8.1**

Issued to	**INGENICO** 9 avenue de la Gare BP 25156 26958- VALENCE - FRANCE
Apparatus under test	
Product	**IUC150B**
Trade mark	**INGENICO**
Manufacturer	**INGENICO**
Model under test	**IUC150B-01T3045A**
Serial number	**15160UN00000713**
FCCID	**XKB-IUC15ZCL**
ICID	**2586D-IUC15ZCL**
Test date	From June 19th to 30th, 2015
Test location	Moirans
IC Test site	6500A-1 & 6500A-3
Test performed by	G.Deschamps
Composition of document	34 pages
Modification of the last version	None
Document issued on	Spetember 4th, 2015

Written by :
Gaëtan Deschamps
Tests operator

Approved by :
Anthony Merlin
Technical manager

LABORATOIRE CENTRAL DES INDUSTRIES ELECTRIQUES
LCIE SUD-EST
170, Rue de Chatagnon
38430 MOIRANS
Tél. 04 76 07 36 36
Fax 04 76 55 90 88

SUMMARY

1. TEST PROGRAM

Standard:

- **FCC Part 15, Subpart B (Digital Devices)**
- **FCC Part 15, Subpart C**
- **ANSI C63.4 (2003)**
- **RSS-210 Issue 8.1 – Feb 2015**
- **RSS-Gen Issue 4 – Nov 2014**

EMISSION TEST	LIMITS			RESULTS (Comments)
Limits for conducted disturbance at mains ports 150kHz-30MHz *CFR 47 §15.207*	**Frequency**	**Quasi-peak value (dBµV)**	**Average value (dBµV)**	☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP**
	150-500kHz	66 to 56	56 to 46	
	0.5-5MHz	56	46	
	5-30MHz	60	50	
Radiated emissions 9kHz-30MHz *CFR 47 §15.209 (a)* *CFR 47 §15.225* *RSS-Gen §4.9*	**Measure at 300m** 9kHz-490kHz : 67.6dBµV/m /F(kHz) **Measure at 30m** 490kHz-1.705MHz : 87.6dBµV/m /F(kHz) 1.705MHz-30MHz : 29.5 dBµV/m			☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP**
Radiated emissions 30MHz-1GHz* *CFR 47 §15.209 (a)* *CFR 47 §15.225* *RSS-Gen §4.9* ***Highest frequency : <108MHz (Declaration of provider)***	**Measure at 3m** 30MHz-88MHz : 40 dBµV/m 88MHz-216MHz : 43.5 dBµV/m 216MHz-960MHz : 46.0 dBµV/m Above 960MHz : 54.0 dBµV/m			☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP**
Fundamental field strength limit *CFR 47 §15.225* *RSS-210 §A2.6*	**Operation within the band 13.110-14.010 MHz**			☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP**
Fundamental frequency tolerance *CFR 47 §15.225* *RSS-210 §A2.6*	**Operation within the band 13.110-14.010 MHz**			☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP**
Band edge compliance *CFR 47 §15.225* *RSS-210 §A2.6*	**Operation within the band 13.110-14.010 MHz**			☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP**
Occupied bandwidth *RSS-Gen §4.6.1*	**No limit**			☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP**
Receiver Spurious Emission** *RSS-Gen §4.10*	**See RSS-Gen §4.10**			☐ **PASS** ☐ **FAIL** ☑ **NA** ☐ **NP**

***§15.33:** The highest internal source of a testing device is defined like more the highest frequency generated or used in the testing device or on which the testing device works or agrees.

- If the highest frequency of the internal sources of the testing device is lower than 108 MHz, measurement must be only performed until 1GHz.
- If the highest frequency of the internal sources of the testing device ranges between 108 MHz and 500 MHz, measurement must be only performed until 2GHz.
- If the highest frequency of the internal sources of the testing device ranges between 500 MHz and 1 GHz, measurement must be only performed until 5GHz.

If the highest frequency of the internal sources of the testing device is above 1 GHz, measurement must be only performed until 5 times the highest frequency or 40 GHz, while taking smallest of both.

****Testing covered the receive mode, and receiver spurious emissions are considered to be the same as transmitter.

2. SYSTEM TEST CONFIGURATION

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):
IUC150B-01T3045A
Serial Number: 15160UN00000713

Photography of EUT

Power supply:
During all the tests, EUT is supplied by V_{nom}: 5VDC
For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference / Sn	Comments
Supply1	☐ AC ☑ DC ☐ Battery	5VDC	-	-

Inputs/outputs – Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Access1	USB	2, 1 or 0.2	☐	☑	☑	See EUT configuration §2.2
Access2	RS232	1	☐	☐	☑	-
Access3	Weak-UP	0.3	☐	☐	☑	-

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Contactless Card	-	-	-
Antenna Loop	C2040052	-	-
Spectrum Analyser	A4060049	-	-
Laptop	DELL	-	

Frequency band:	[13.553-13.567] MHz			
RF mode:	☐Transmitter	☑Transceiver	☐Receiver	☐Standby
Antenna type:	☐External:		☑Internal:	
Antenna gain:	0 dBi			
Extreme temperature range:	☑Category: -30°C to +55°C			
Extreme test source voltage:	☐±10%:		☑other: Vmin 4.75 VDC Vmax 5.25VDC	

2.2. EUT CONFIGURATION

Firmware / Software version of EUT: NC

There are 2 configurations tests:

- Configuration 1:
  The EUT is tested and powered by USB cable (Laptop Dell). The USB cable length is 0.2m. The reading “Cless” is activated. The others accesses are linked (RS232 and Weak-Up)
- Configuration 2:
  The EUT is tested and powered by USB cable (Laptop Dell). The USB cable length is 2m. The reading “Cless” is activated. The others accesses are linked (RS232 and Weak-Up)

The configuration with the 1 meter USB cable is not tested. The USB cables (extreme category) 0.2 and 2 meters are tested in pre-characterization.

2.3. EQUIPMENT MODIFICATIONS

☑ None ☐ Modification:

2.4. FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:

FS = RA + AF + CF – AG

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5dBµV is obtained. The antenna factor of 7.4 and a cable factor of 1.1 are added. The amplifier gain of 29dB is subtracted, giving a field strength of 32 dBµV/m.
FS = 52.5 + 7.4 + 1.1 – 29 = 32 dBµV/m
The 32 dBµV/m value can be mathematically converted to its corresponding level in µV/m.
Level in µV/m = Common Antilogarithm [(32dBµV/m)/20] = 39.8 µV/m.

3. CONDUCTED EMISSION DATA

3.1. ENVIRONMENTAL CONDITIONS

Date of test : June 22nd, 2015
Test performed by : G.Deschamps
Atmospheric pressure (hPa) : 991
Relative humidity (%) : 41
Ambient temperature (°C) : 23

3.2. TEST SETUP

Mains terminals
The EUT and auxiliaries are set:
☑ 80cm above the ground on the non-conducting table (Table-top equipment)
☐ 10cm above the ground on isolating support (Floor standing equipment)
The distance between the EUT and the LISN is 80cm. The EUT is 40cm away for the vertical ground plane.

The EUT is powered by Laptop.
The EUT is powered through a LISN (measure). Auxiliaries are powered by another LISN.



Test setup

3.3. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable + self	-	-	A5329578	05/14	05/15
LISN	TELEMETER ELECTRONIC	NNB-2/16Z	C2320061	-	-
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	04/15	04/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	04/14	04/15
Transient limiter	RHODE & SCHWARZ	ESH3-Z2	A7122204	11/14	11/15

3.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

3.5. TEST RESULTS

Mains terminals:

Laptop Power Supply:
Measurements are performed on the phase (L1) and neutral (N) of Laptop power line.
Results: (PEAK detection)

Graph identifier		Line	Comments	
Emc#	1	Phase	-	See annex 1
Emc#	2	Neutral	-	See annex 1

3.6. CONCLUSION

The sample of the equipment **IUC150B-01T3045A**, Sn: 15160UN00000713, tested in the configuration presented in this test report **satisfies** to requirements of class B limits of the standard FCC Part15B, for conducted emissions.

4. RADIATED EMISSION DATA (15.209)

4.1. ENVIRONMENTAL CONDITIONS

Date of test	:	June 19th, 2015
Test performed by	:	G.Deschamps
Atmospheric pressure (hPa)	:	991
Relative humidity (%)	:	41
Ambient temperature (°C)	:	23

4.2. TEST SETUP

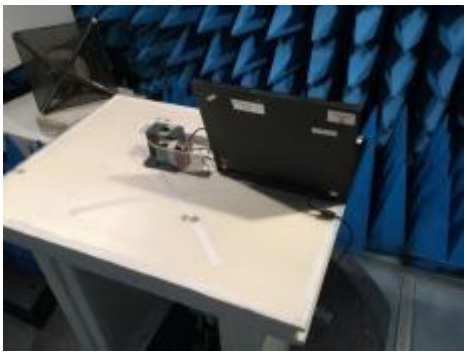
The installation of EUT is identical for pre-characterization measures in a 3 meters semi- anechoic chamber and for measures on the 10 meters Open site.
The EUT and auxiliaries are set:
☑ 80cm above the ground on the non-conducting table (Table-top equipment)
☐ 10cm above the ground on isolating support (Floor standing equipment)
The EUT is powered by V_{nom}.



Test setup on OATS



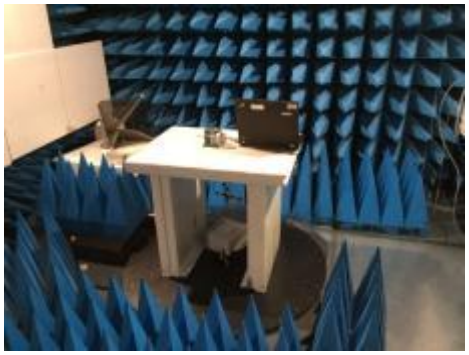
Test setup in anechoic chamber (Configuration1 and axis Z)


Test setup in anechoic chamber (Configuration1 and axis Z)



Test setup in anechoic chamber (Configuration2 and axis XZ)



Test setup in anechoic chamber (Configuration2 and axis Z)

4.3. TEST METHOD

Pre-characterisation measurement: (9kHz – 1GHz)
A pre-scan of all the setup has been performed in a 3 meters semi-anechoic chamber for frequency from 30MHz to 1GHz. Test is performed in horizontal (H) and vertical (V) polarization, the loop antenna was rotated during the test for maximized the emission measurement. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on all axis of EUT used in normal configuration.

Characterization on 10 meters open site from 9kHz to 1GHz:
The product has been tested according to ANSI C63.4 (2003), FCC part 15 subpart C. Radiated Emissions were measured on an open area test site. A description of the facility is on file with the FCC. The product has been tested at a distance of **10 meters** from the antenna and compared to the FCC part 15 subpart C §15.225 limits in the frequency range 13.553MHz 13.567MHz. Measurement bandwidth was 9kHz below 30MHz and 120kHz from 30 MHz to 1GHz. Test is performed in horizontal (H) and vertical (V) polarization, the loop antenna was rotated during the test for maximized the emission measurement. The height antenna is varied from 1m to 4m. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on all axis of EUT used in normal configuration. A summary of the worst case emissions found in all test configurations and modes is shown.
Frequency list has been created with anechoic chamber pre-scan results.

4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Antenna Loop	ELECTRO-METRICS	EM-6879	C2040052	10/13	10/15
Cable	SUCOFLEX	106G	A5329061	03/15	03/16
Cable (OATS)	-	-	A5329623	10/14	10/15
Radiated emission comb generator	BARDET	-	A3169050	-	-
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	04/15	04/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	04/14	04/15
Turntable / Mast controller (OATS)	ETS Lindgren	Model 2066	F2000372	-	-
Antenna mast (OATS)	ETS Lindgren	2071-2	F2000392	-	-
Turntable (OATS)	ETS Lindgren	Model 2187	F2000403	-	-
Table	MATURO Gmbh	-	F2000437	-	-
Antenna Bi-log	CHASE	CBL6111A	C2040051	04/14	04/16
Cable Measure @3m	-	-	A5329038	08/14	08/15
Cable Measure @3m	-	-	A5329206	04/15	04/16
Semi-Anechoic chamber #3	SIEPEL	-	D3044017	-	-
Radiated emission comb generator	BARDET	-	A3169050	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	01/15	01/16
OATS	-	-	F2000409	09/14	09/15

4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

4.6. TEST RESULTS

4.6.1. Pre-characterization at 3 meters [9kHz-30MHz]

See graph for 9kHz-30MHz band:

Configuration1:

Graph identifier		Polarization	EUT position	Comments	
Emr#	1	0°	Axis XY	-	See annex 1
Emr#	2	90°	Axis XY	-	See annex 1
Emr#	3	0°	Axis Z	-	See annex 1
Emr#	4	90°	Axis Z	-	See annex 1

Configuration2:

Graph identifier		Polarization	EUT position	Comments	
Emr#	5	0°	Axis XY	-	See annex 1
Emr#	6	90°	Axis XY	-	See annex 1
Emr#	7	0°	Axis Z	-	See annex 1
Emr#	8	90°	Axis Z	-	See annex 1

4.6.2. Pre-characterization at 3 meters [30MHz-1GHz]

See graphs for 30MHz-1GHz:

Configuration 1:

Graph identifier		Polarization	EUT position	Comments	
Emr#	9	H/V	Axis XY	-	See annex 1
Emr#	10	H/V	Axis Z	-	See annex 1

Configuration 2:

Graph identifier		Polarization	EUT position	Comments	
Emr#	11	H/V	Axis XY	-	See annex 1
Emr#	12	H/V	Axis Z	-	See annex 1

4.6.3. Characterization on 10 meters open site below 30 MHz

Worst case final data result:

Frequency list has been created with semi-anechoic chamber pre-scan results.
Measurements are performed using a QUASI-PEAK detection.

No	Frequency (MHz)	QPeak Limit (dBµV/m) @ 30m	Qpeak (dBµV/m) @ 30m	Margin (Mes-Lim) (dB)	Angle Table (deg)	Pol Ant.	Ht Ant. (cm)	Correc. Factor (dB)	Comments
1	0.618	31.8	11.3	**-20.5**	0	0°	100	42.8	**-**
2	0.824	29.2	8.7	**-20.5**	300	0°	100	41.0	**-**
3	1.218	25.8	7.2	**-18.6**	132	0°	100	39.4	**-**
4	1.603	23.4	6.1	**-17.3**	330	0°	100	38.4	**-**
5	1.815	29.5	5.7	**-23.8**	0	0°	100	37.9	**-**
6	13.56	84.0	41.6	**-42.4**	300	0°	300	35.1	-
7	27.12	29.5	19.9	**-9.6**	227	0°	335	44.7	-

Note: Measure have been done at 10m distance and corrected according to requirements of 15.209.e) (M@30m = M@10m-19.1dB)

Limits Sub clause §15.225

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
13.553-13.567	15 848 84 dBµV/m	30

See following chapter of this test report for band edge measurements.

4.6.4. Characterization on 10 meters open site from 30MHz to 1GHz

Worst case final data result:

Frequency list has been created with semi-anechoic chamber pre-scan results.
Measurements are performed using a QUASI-PEAK detection.

No	Frequency (MHz)	Limit QPeak (dBµV/m)	Measure QPeak (dBµV/m)	Margin QPeak (dB)	Angle Table (°)	Pol. Ant.	Ht. Ant. (cm)	FC (dB)	Remark
1	37.191	40.0	34.3	**-5.7**	270	V	100	15.8	
2	39.826	40.0	37.9	**-2.1**	119	V	100	14.4	
3	40.680	40.0	36.4	**-3.6**	100	V	100	13.9	3m CFG2
4	41.504	40.0	35.1	**-4.9**	50	V	100	13.5	
5	67.795	40.0	33.9	**-6.1**	152	V	100	7.8	
6	81.357	40.0	27.6	**-12.4**	135	V	100	9.0	

Note: Measure have been done at 10m distance and corrected according to requirements of 15.209.e (M@3m = M@10m+10.5dB)

4.7. CONCLUSION

The sample of the equipment **IUC150B-01T3045A**, Sn: 15160UN00000713, tested in the configuration presented in this test report **satisfies** to requirements of class B limits of the standard FCC Part15B and C, for radiated emissions.

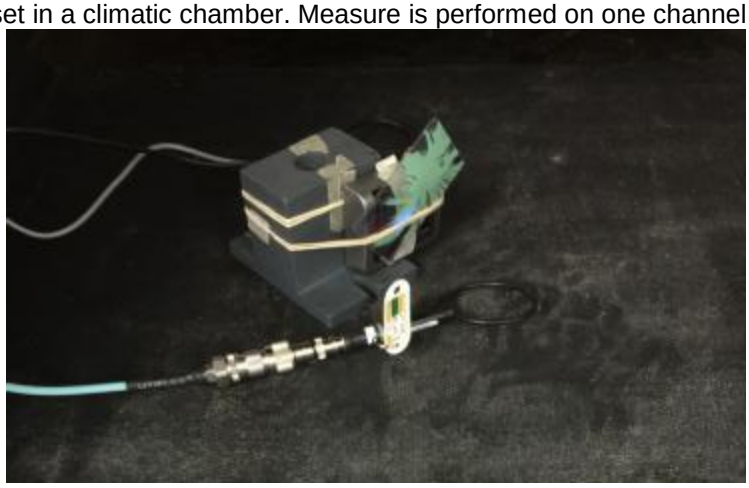
5. FUNDAMENTAL FREQUENCY TOLERANCE (15.225E)

5.1. ENVIRONMENTAL CONDITIONS

Date of test	:	June 24th, 2015
Test performed by	:	G.Deschamps
Atmospheric pressure (hPa)	:	987
Relative humidity (%)	:	35
Ambient temperature (°C)	:	22

5.2. TEST SETUP

Frequency of carrier: 13.56 MHz
Upper limit: 13.561356 MHz
Lower limit: 13.558644 MHz
The equipment (RF box) is set in a climatic chamber. Measure is performed on one channel of RF module.



Test setup

5.3. TEST METHOD

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency when the temperature is varied from -30°C to +55°C at the nominal power voltage and the primary power voltage is varied from 85% to 115% of the rated supply voltage at 20°C.

5.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Antenna Loop	ELECTRO-METRICS	EM-6993	C2040210	09/14	09/15
Attenuator 10dB	JFW	-	A7122166	10/14	10/15
Power supply DC 100V	HEWLETT PACKARD	6634B	A704282	-	-
Cable	-	-	A5329191	06/15	06/16
Climatic chamber	BIA CLIMATIC	CL 6-25	D1022117	12/13	12/15
Data Logger	AGILENT	34970A	A6440068	-	-
Data Logger card	AGILENT	34970A	A6449036	-	-
Multimeter	FLUKE	87	A1240170	-	-
Power supply DC 100V	HEWLETT PACKARD	6634B	A704282	-	-
Spectrum Analyzer 9kHz - 6GHz	ROHDE & SCHWARZ	FSL6	A2642049	11/14	11/15
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	04/14	04/15

5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

5.6. TEST RESULTS

Temperature / **Voltage**	**-30°C**	**-20°C**	**20°C**	**+70°C**
Mains voltage: 5V				
Frequency Drift (MHz)	- 0.000200	- 0.000100	**REF**	+ 0.000001
Carrier level (dBc)	- 0.53	- 0.72	**REF**	- 2.67
Mains voltage: 4.75V				
Frequency Drift (MHz)	- 0.000200	- 0.000200	+ 0.0	+ 0.000001
Carrier level (dBc)	- 0.72	- 0.72	0.0	- 2.72
Mains voltage: 5.25V				
Frequency Drift (MHz)	- 0.000100	- 0.000100	+ 0.0	+ 0.000001
Carrier level (dBc)	- 0.59	- 0.59	0.0	- 2.65

Frequency drift measured is **-200Hz** when the temperature is varied from -30°C to +70°C and voltage is varied.

5.7. CONCLUSION

The sample of the equipment **IUC150B-01T3045A**, Sn: 15160UN00000713, tested in the configuration presented in this test report **satisfies** to requirements of the standard FCC Part15C, for fundamental frequency tolerance.

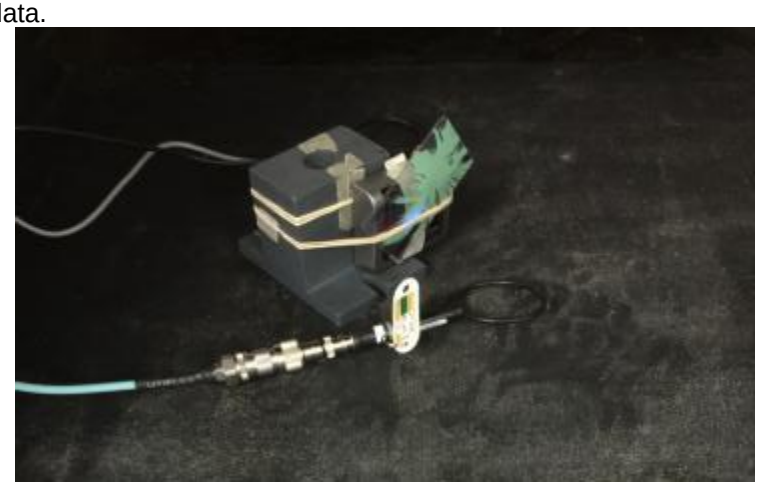
6. BAND-EDGE COMPLIANCE §15.209

6.1. ENVIRONMENTAL CONDITIONS

Date of test : June 24th, 2015
Test performed by : G.Deschamps
Atmospheric pressure (hPa) : 987
Relative humidity (%) : 35
Ambient temperature (°C) : 22

6.2. TEST SETUP

For measurement, the power level calibration of the spectrum analyzer is related to the field strength measured in chapter radiated emission data.



Test setup

6.3. TEST METHOD

Frequency band 13.110-14.010MHz
Following plots show radiated emission level in the frequency band 13.110-14.010MHz with a RBW of 9kHz and a quasi-peak detector. The graphs are obtained with a measuring receiver.

6.4. TEST EQUIPMENT LIST

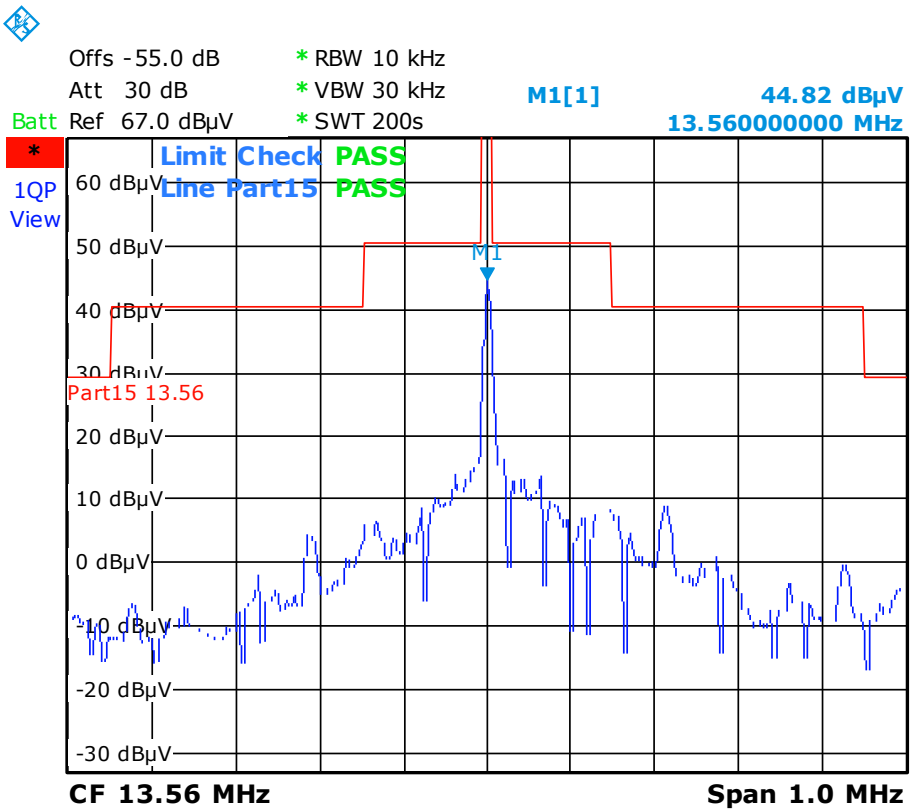
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Antenna Loop	ELECTRO-METRICS	EM-6993	C2040210	09/14	09/15
Attenuator 10dB	JFW	-	A7122166	10/14	10/15
Power supply DC 100V	HEWLETT PACKARD	6634B	A704282	-	-
Cable	-	-	A5329191	06/15	06/16
Climatic chamber	BIA CLIMATIC	CL 6-25	D1022117	12/13	12/15
Data Logger	AGILENT	34970A	A6440068	-	-
Data Logger card	AGILENT	34970A	A6449036	-	-
Multimeter	FLUKE	87	A1240170	-	-
Power supply DC 100V	HEWLETT PACKARD	6634B	A704282	-	-
Spectrum Analyzer 9kHz - 6GHz	ROHDE & SCHWARZ	FSL6	A2642049	11/14	11/15
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	04/14	04/15

6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

6.6. TEST RESULTS

Frequency band 13.110-14.010MHz



6.7. CONCLUSION

The sample of the equipment **IUC150B-01T3045A**, Sn: 15160UN00000713, tested in the configuration presented in this test report **satisfies** to requirements of the standard FCC Part15C, for band-edge compliance.

7. OCCUPIED BANDWIDTH

7.1. ENVIRONMENTAL CONDITIONS

Date of test : June 30th, 2015
Test performed by : G.Deschamps
Atmospheric pressure (hPa) : 991
Relative humidity (%) : 41
Ambient temperature (°C) : 22

7.1. SETUP

☐ ***Conducted measurement:***
The EUT is turned ON and connected to measurement instrument; the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

☑ ***Radiated measurement:***
The EUT is turned ON and connected to measurement instrument; the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

Measurement Procedure:
1. RBW used should not be lower than 1% of the selected span
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. OBW 99% function of spectrum analyzer used

7.2. TEST EQUIPMENT LIST

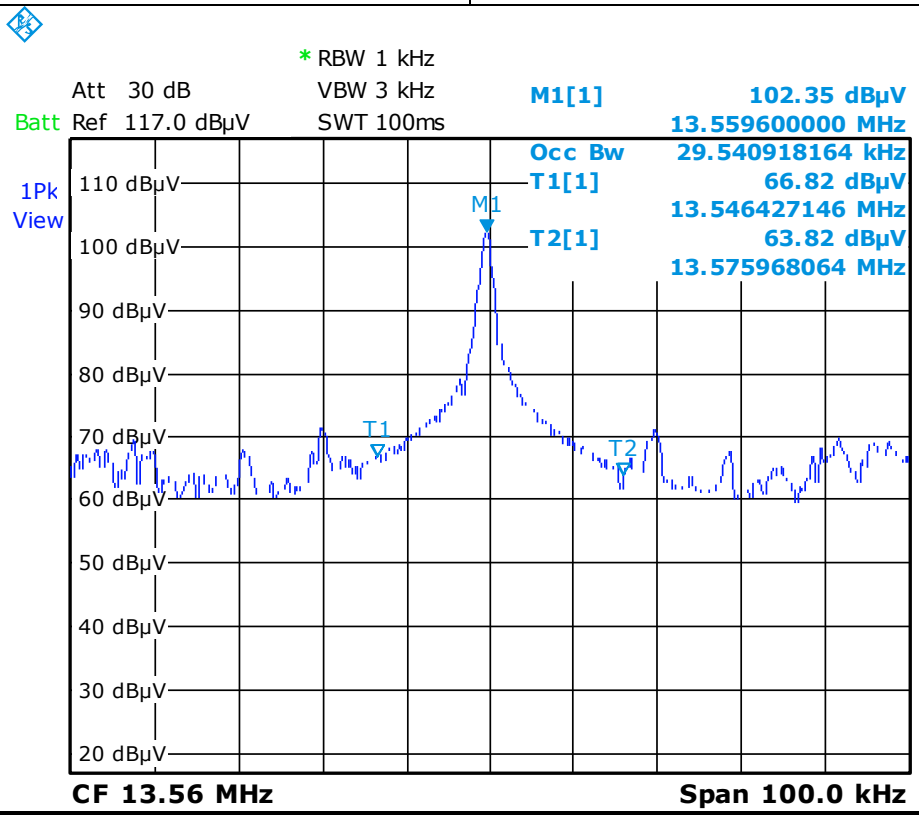
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Antenna Loop	ELECTRO-METRICS	EM-6993	C2040210	09/14	09/15
Attenuator 10dB	JFW	-	A7122166	10/14	10/15
Power supply DC 100V	HEWLETT PACKARD	6634B	A704282	-	-
Cable	-	-	A5329191	06/15	06/16
Climatic chamber	BIA CLIMATIC	CL 6-25	D1022117	12/13	12/15
Data Logger	AGILENT	34970A	A6440068	-	-
Data Logger card	AGILENT	34970A	A6449036	-	-
Multimeter	FLUKE	87	A1240170	-	-
Power supply DC 100V	HEWLETT PACKARD	6634B	A704282	-	-
Spectrum Analyzer 9kHz - 6GHz	ROHDE & SCHWARZ	FSL6	A2642049	11/14	11/15
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	04/14	04/15

7.3. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

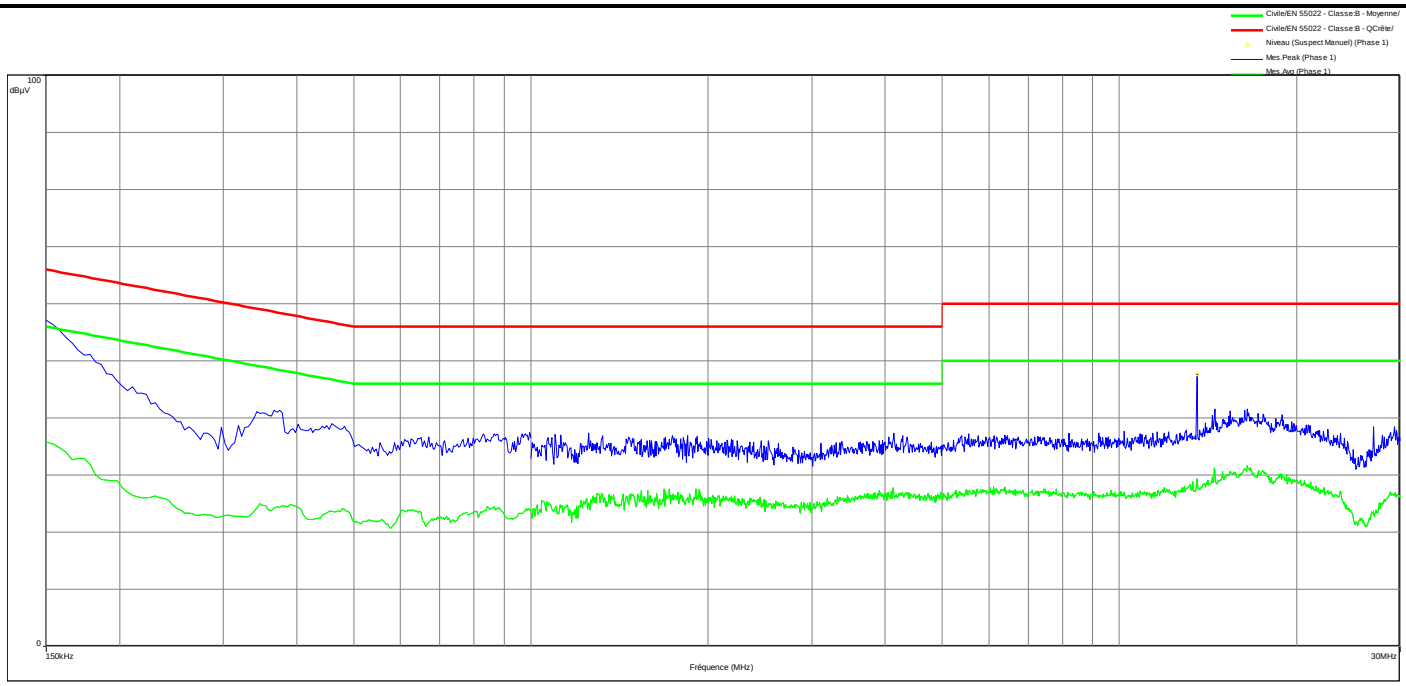
7.4. TEST SEQUENCE AND RESULTS

Channel Frequency (MHz)	99% Occupied Bandwidth (kHz)
13.56	**29.54**



8. ANNEX 1 (GRAPHS)

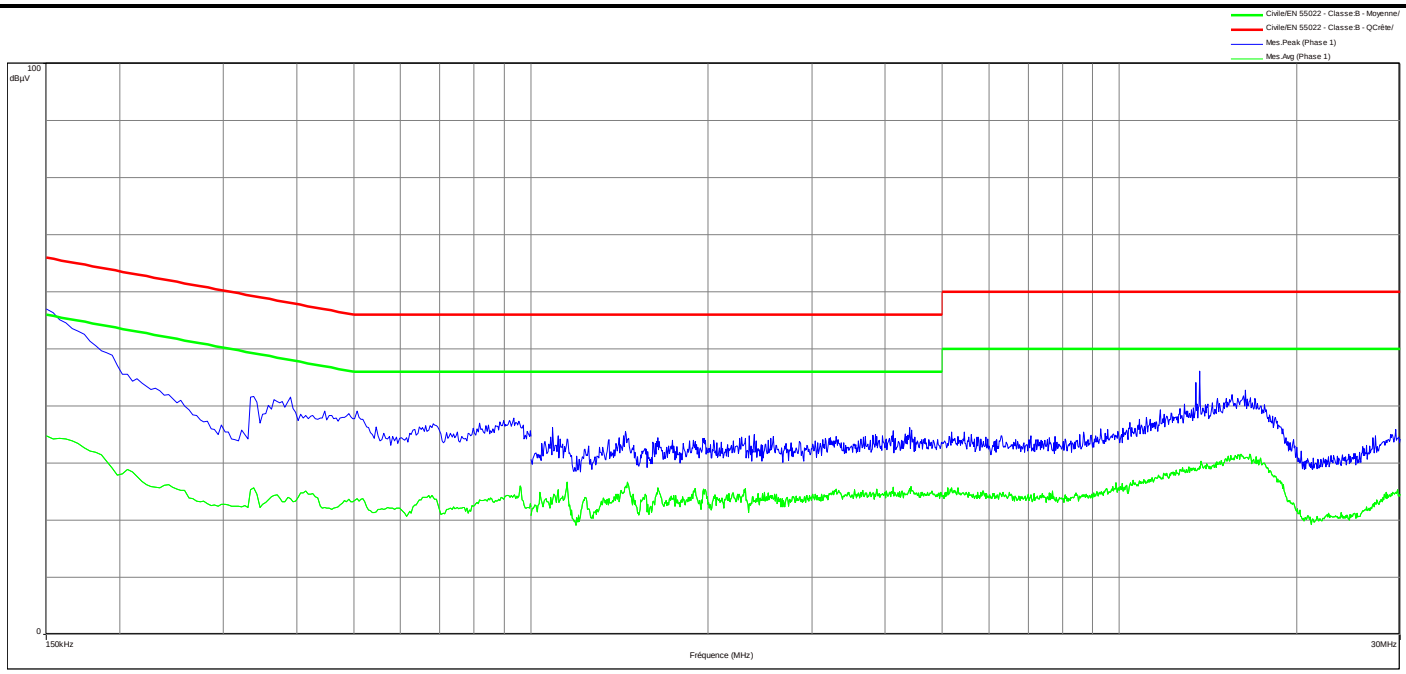
CONDUCTED EMISSIONS			
Graph name:	Emc#1	**Test configuration:**	
Limit:	EN 55022	Configuration 2 Line	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	110VAC / 60Hz	**RBW :**	10kHz
Line:	Line	**VBW :**	30kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV)
0.15	57.14
13.54	47.68
27.044	38.46

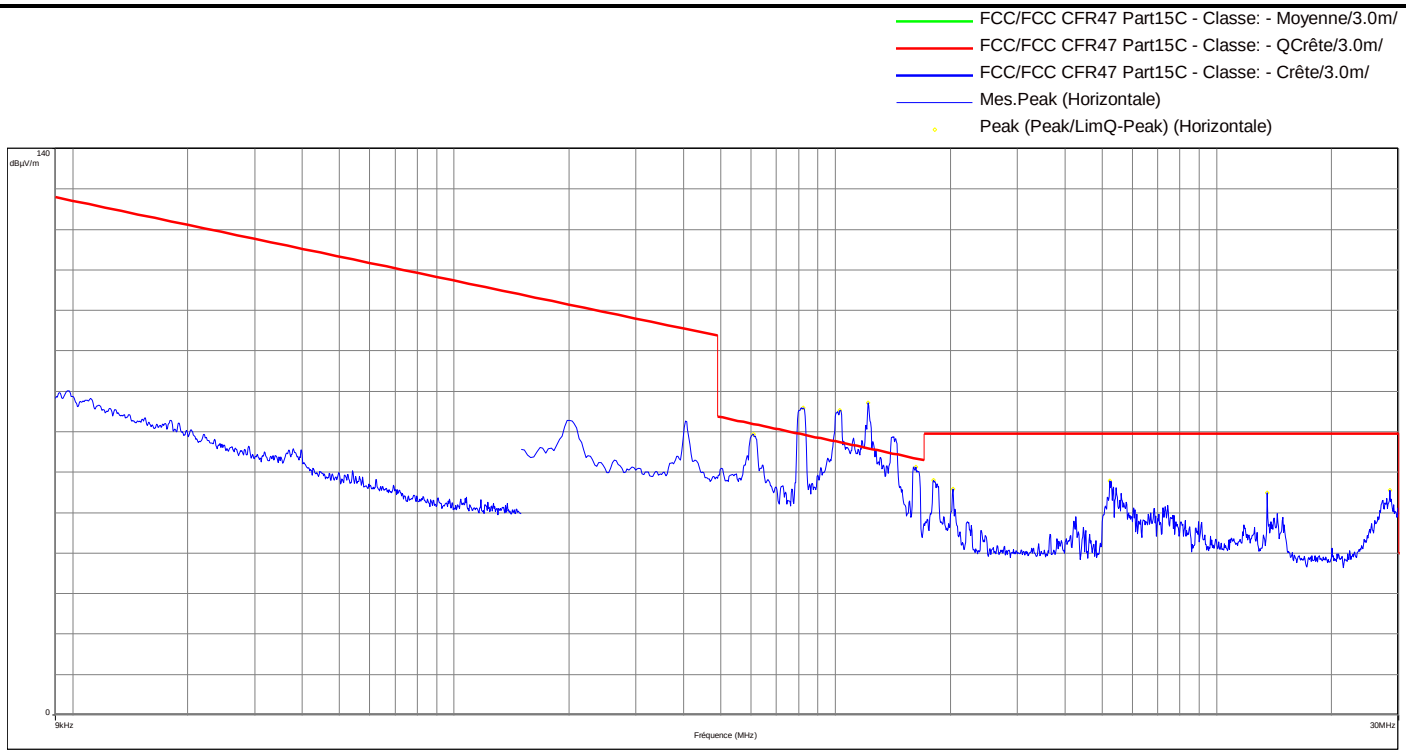
CONDUCTED EMISSIONS			
Graph name:	Emc#2	**Test configuration:**	
Limit:	EN 55022	Configuration 2 Neutral	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	110VAC / 60Hz	**RBW :**	10kHz
Line:	Phase	**VBW :**	30kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV)
0.15	56.98
13.688	46.1
29.512	35.85

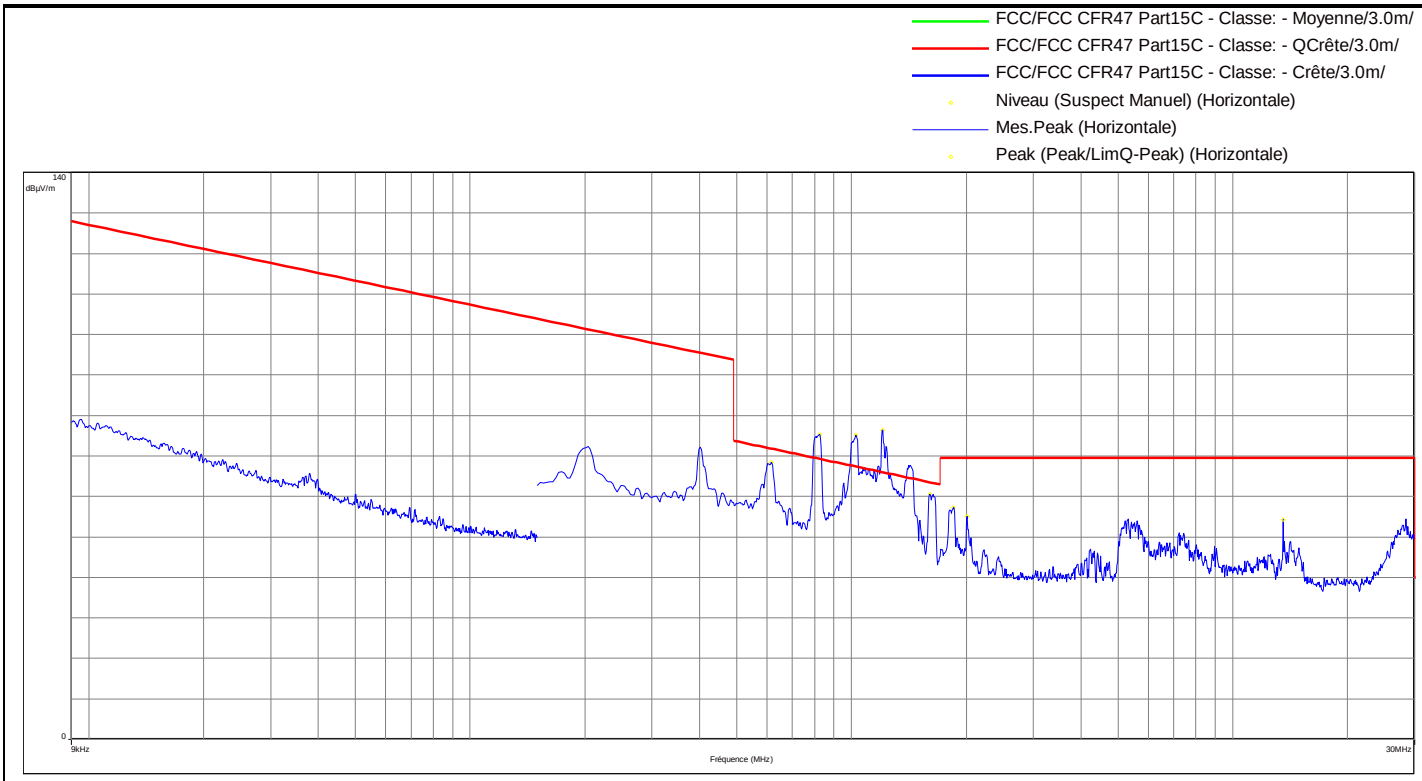
RADIATED EMISSIONS			
Graph name:	Emr#1	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration 1 - (0°) - Axis XY	
Class:			
Frequency range: [9kHz - 30MHz]			
Antenna polarization:	Horizontal	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)
0.60969	69.43
0.821625	75.92
1.02759	75.35
1.21863	77.2
1.62459	61.28
1.80966	57.96
2.03055	55.77
5.239425	57.82
13.55862	54.86
28.403025	55.58

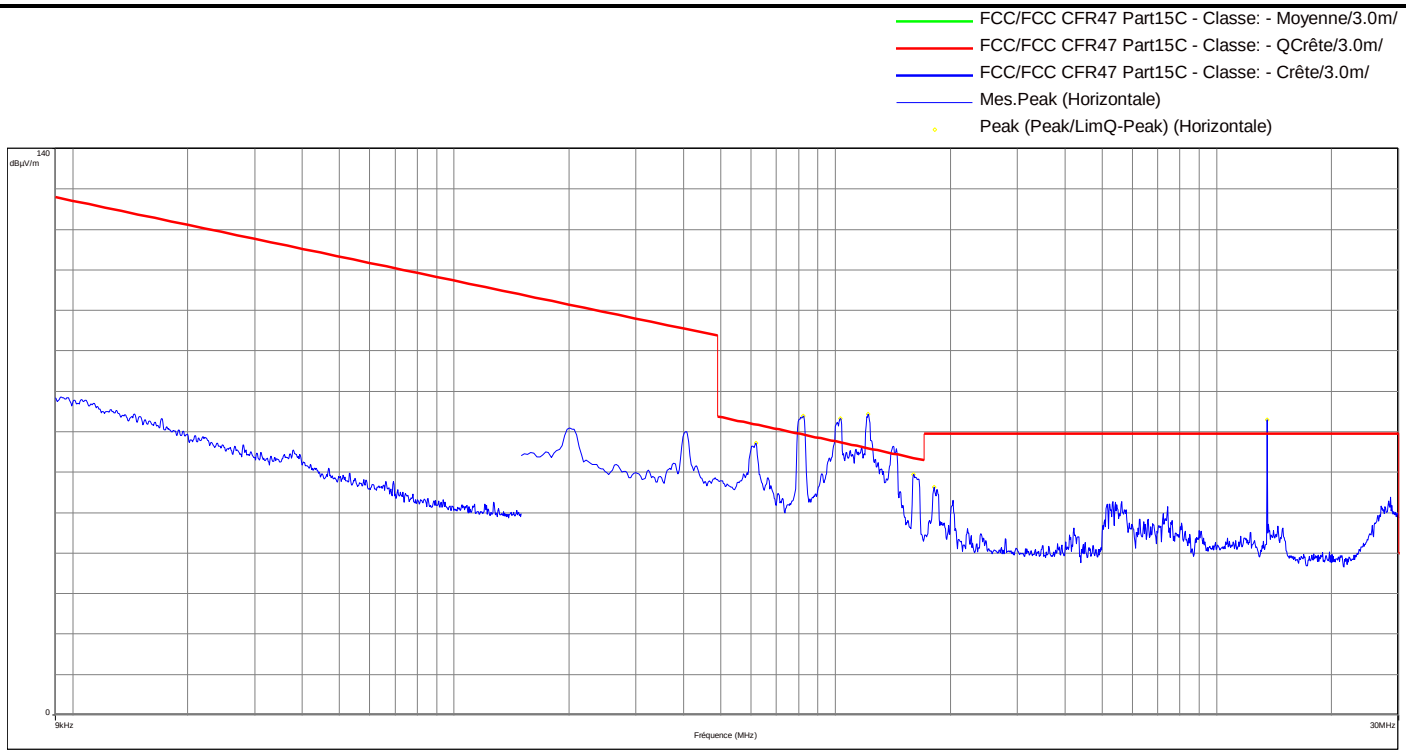
RADIATED EMISSIONS			
Graph name:	Emr#2	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration 1 - (90°) - Axis XY	
Class:			
Frequency range: [9kHz - 30MHz]			
Antenna polarization:	Horizontal	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)
0.61566	68.45
0.827595	75.32
1.02759	75.13
1.20669	76.43
1.60668	60.52
1.85145	57.3
2.009655	55.1
13.55862	54.24

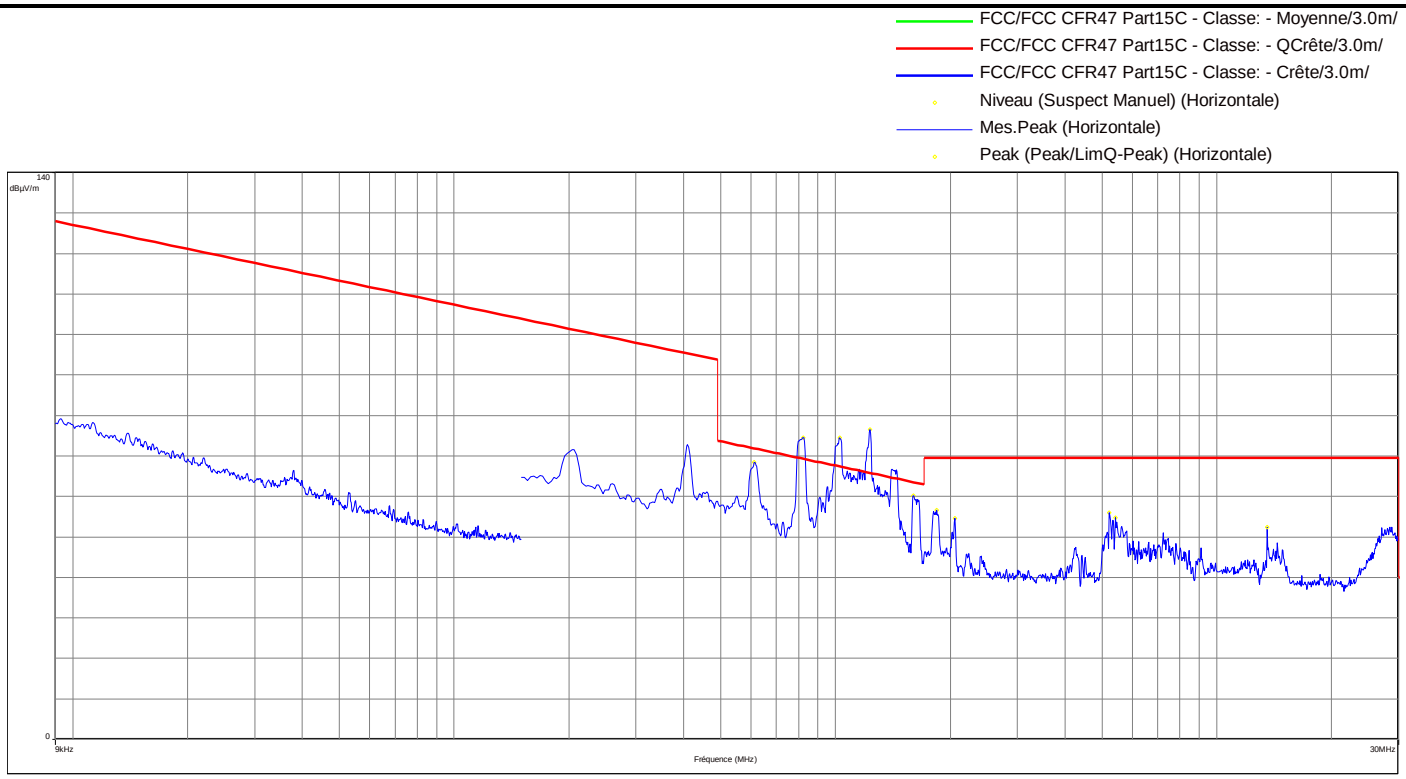
RADIATED EMISSIONS			
Graph name:	Emr#3	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration 1 - (0°) - Axis Z	
Class:			
Frequency range: [9kHz - 30MHz]			
Antenna polarization:	Horizontal	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)
0.618645	67.22
0.82461	73.83
1.030575	73.21
1.21863	74.34
1.603695	59.42
1.81563	56.29
13.55862	72.89

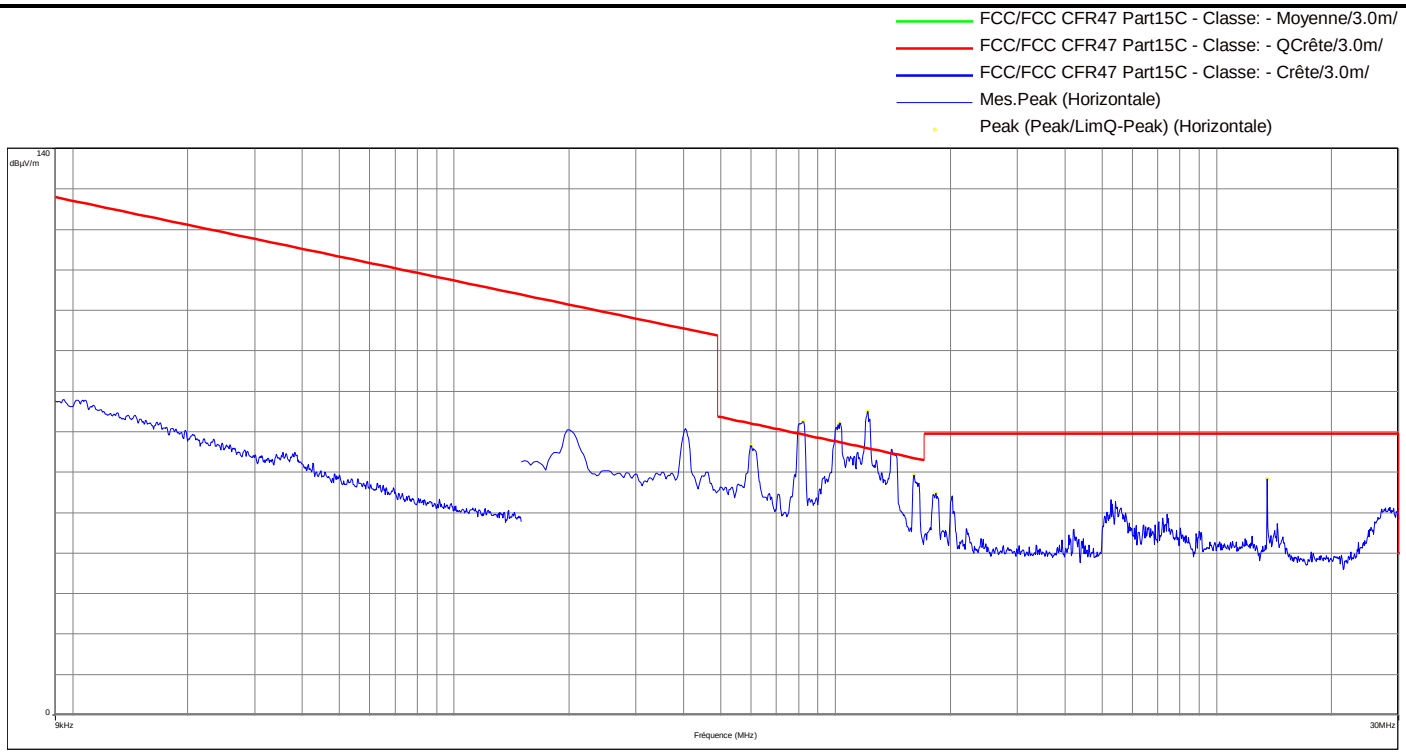
RADIATED EMISSIONS			
Graph name:	Emr#4	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration 1 - (90°) - Axis Z	
Class:			
Frequency range: [9kHz - 30MHz]			
Antenna polarization:	Horizontal	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)
0.612675	68.44
0.82461	74.53
1.024605	74.56
1.23057	76.59
1.60071	60.19
1.84548	56.65
2.057415	54.59
5.23047	56.02
5.430465	54.69
13.55862	52.35

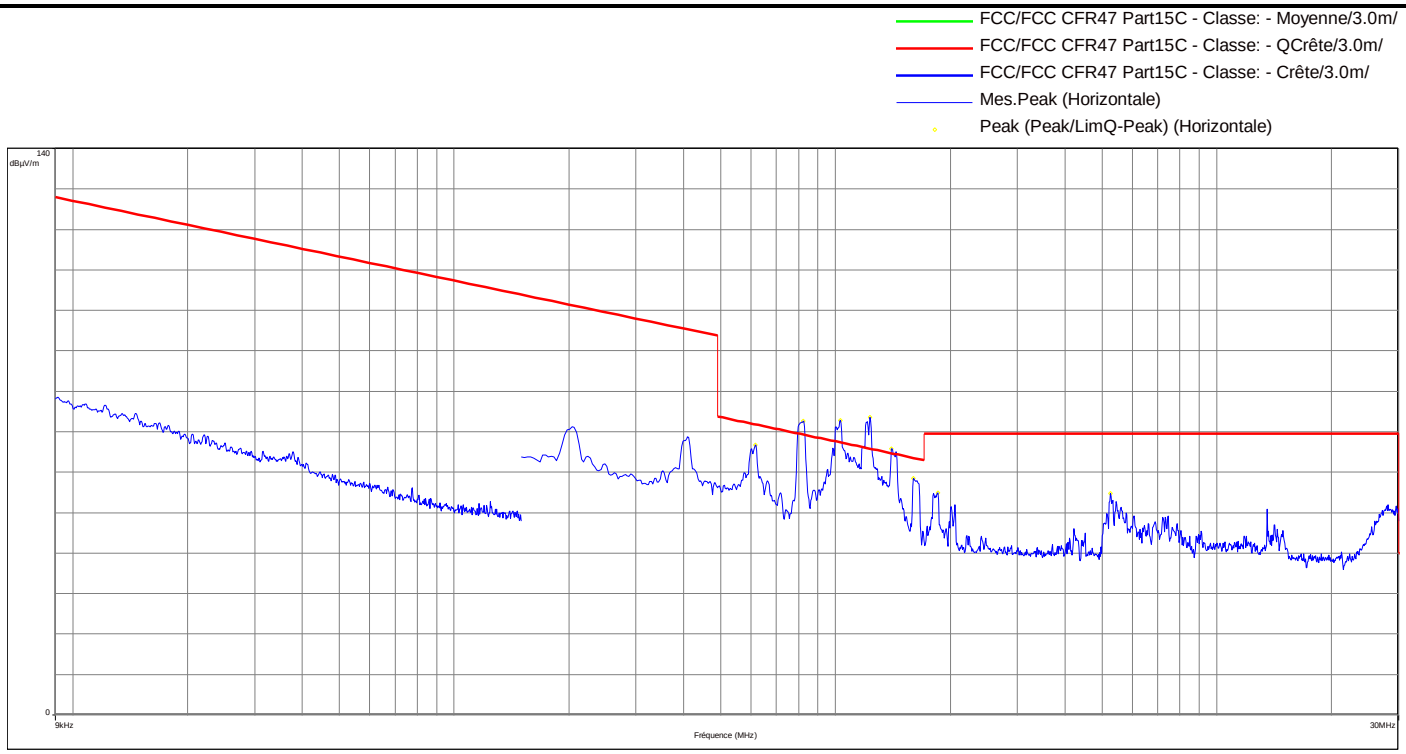
RADIATED EMISSIONS			
Graph name:	Emr#5	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration 2 - (0°) - Axis XY	
Class:			
Frequency range: [9kHz - 30MHz]			
Antenna polarization:	Horizontal	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)
0.600735	66.64
0.821625	72.53
1.02759	72.17
1.21266	75.04
1.60668	59.19
1.83354	54.79
13.55862	58.41

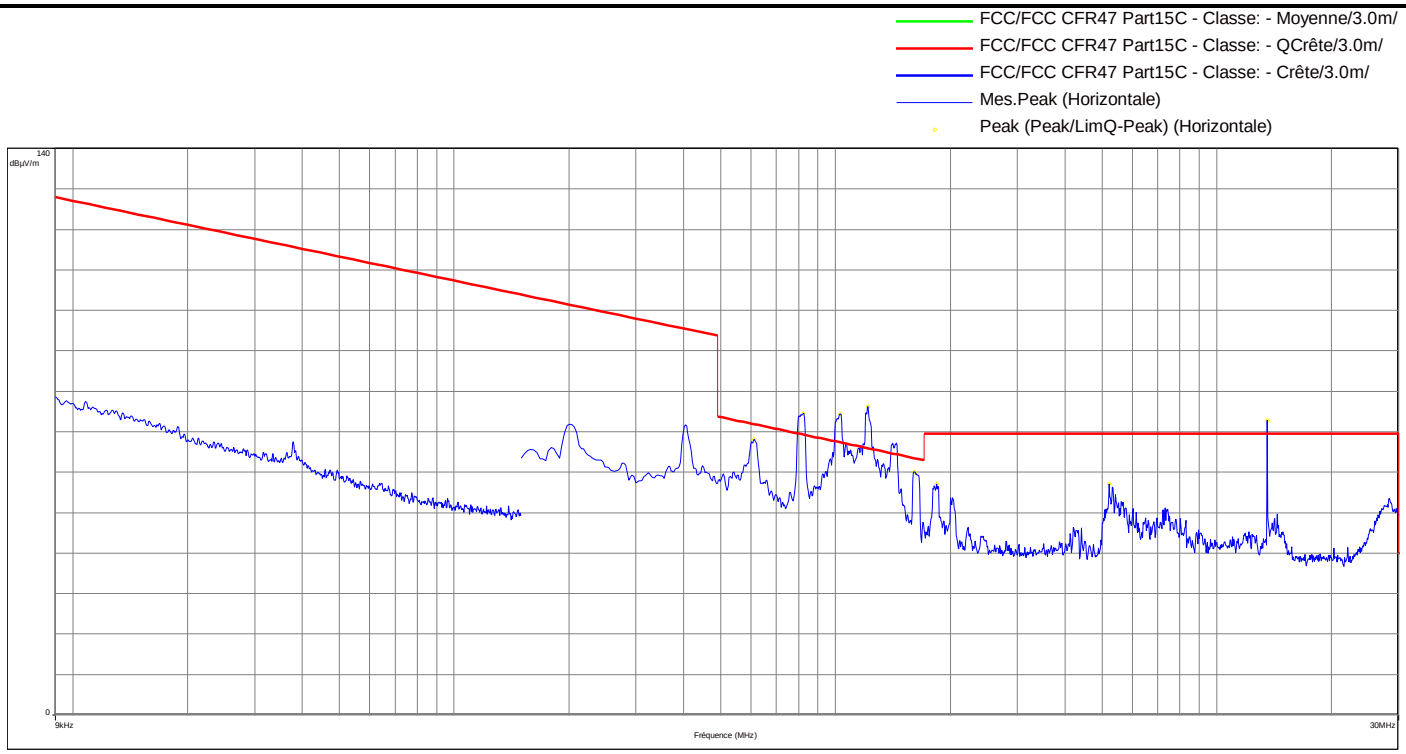
RADIATED EMISSIONS			
Graph name:	Emr#6	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration 2 - (90°) - Axis XY	
Class:			
Frequency range: [9kHz - 30MHz]			
Antenna polarization:	Horizontal	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)
0.61566	66.7
0.82461	72.67
1.030575	72.78
1.233555	73.51
1.4037	65.8
1.603695	58.53
1.854435	54.98
5.257335	54.77

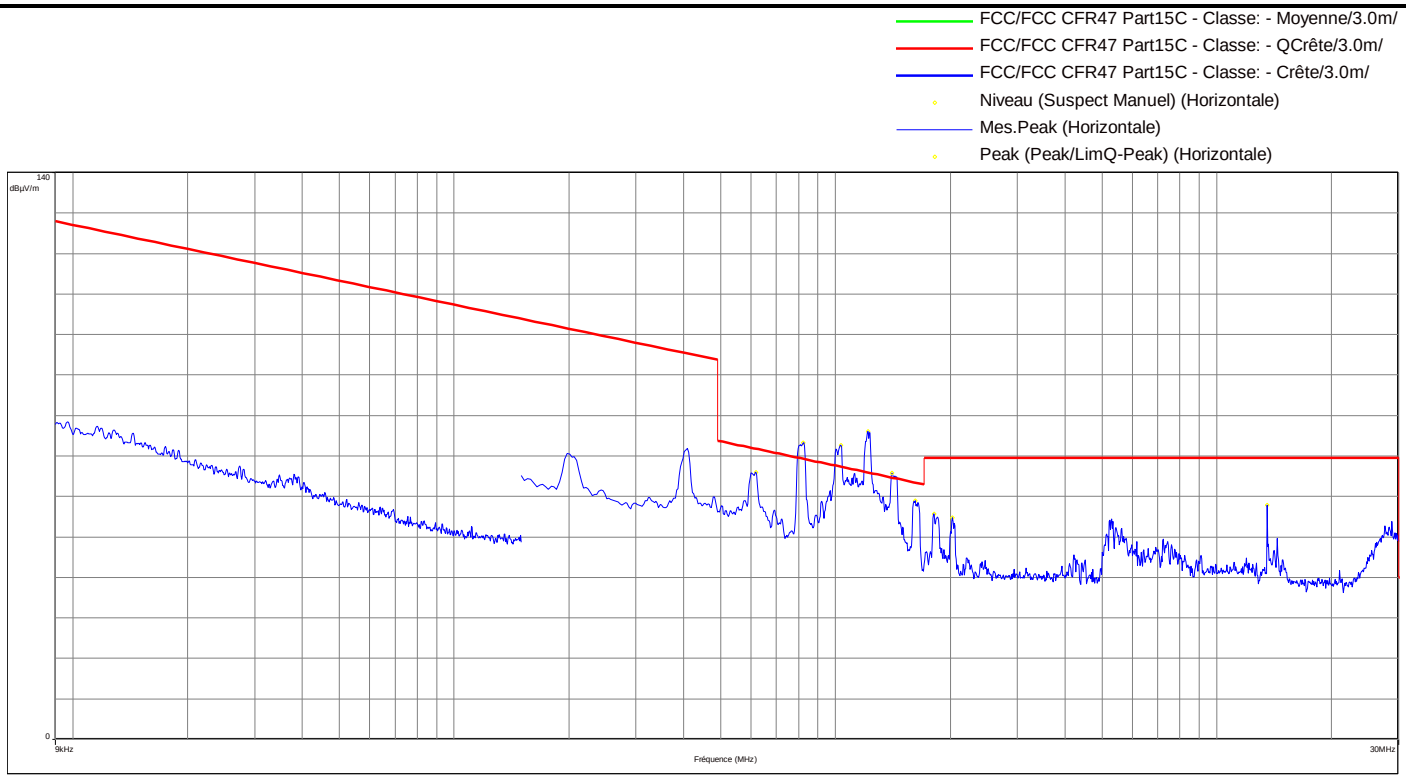
RADIATED EMISSIONS			
Graph name:	Emr#7	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration 2 - (0°) - Axis Z	
Class:			
Frequency range: [9kHz - 30MHz]			
Antenna polarization:	Horizontal	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)
0.612675	68.21
0.82461	74.54
1.030575	74.43
1.215645	76.2
1.61265	60.09
1.842495	57.05
5.221515	57.1
13.55862	72.77

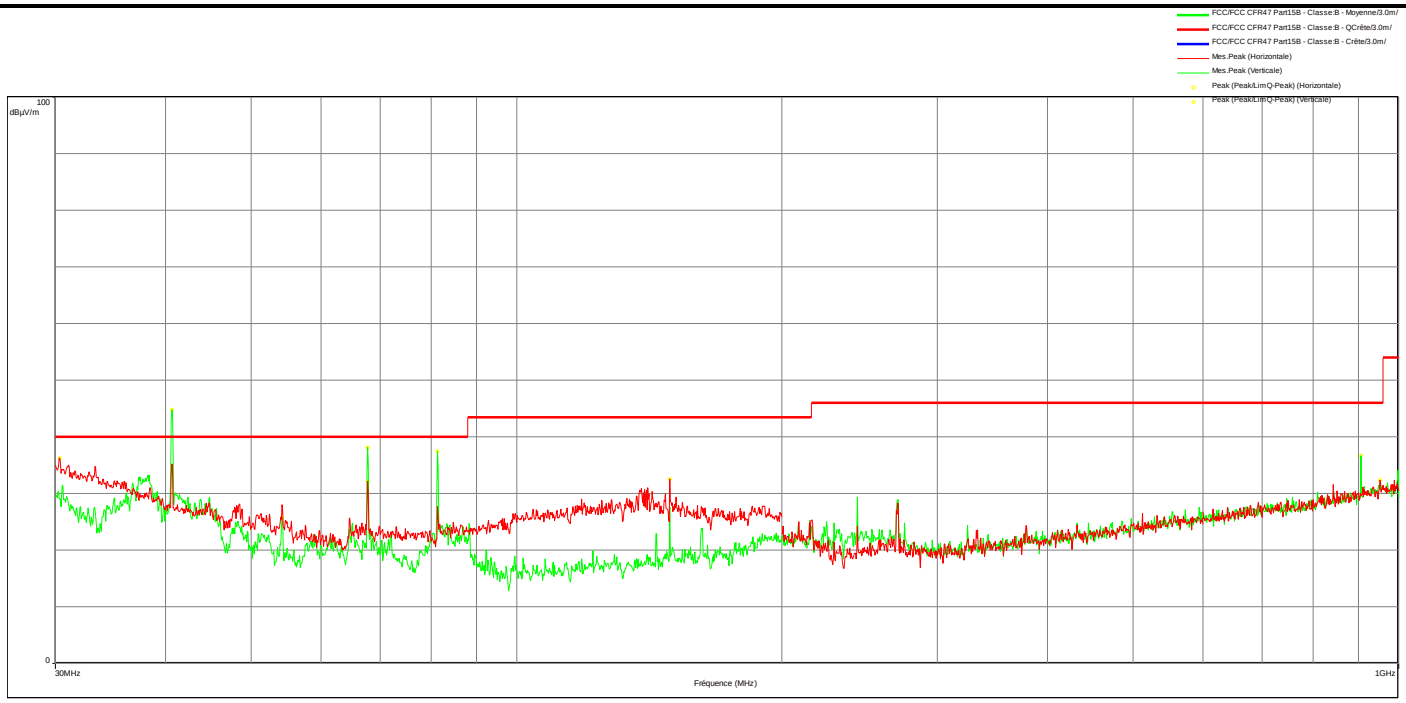
RADIATED EMISSIONS			
Graph name:	Emr#8	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration 2 - (90°) - Axis Z	
Class:			
Frequency range: [9kHz - 30MHz]			
Antenna polarization:	Horizontal	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)
0.618645	65.97
0.82461	73.24
1.03356	72.65
1.215645	76.05
1.406685	65.82
1.61862	58.91
1.812645	55.7
2.02458	54.82
13.55862	57.81

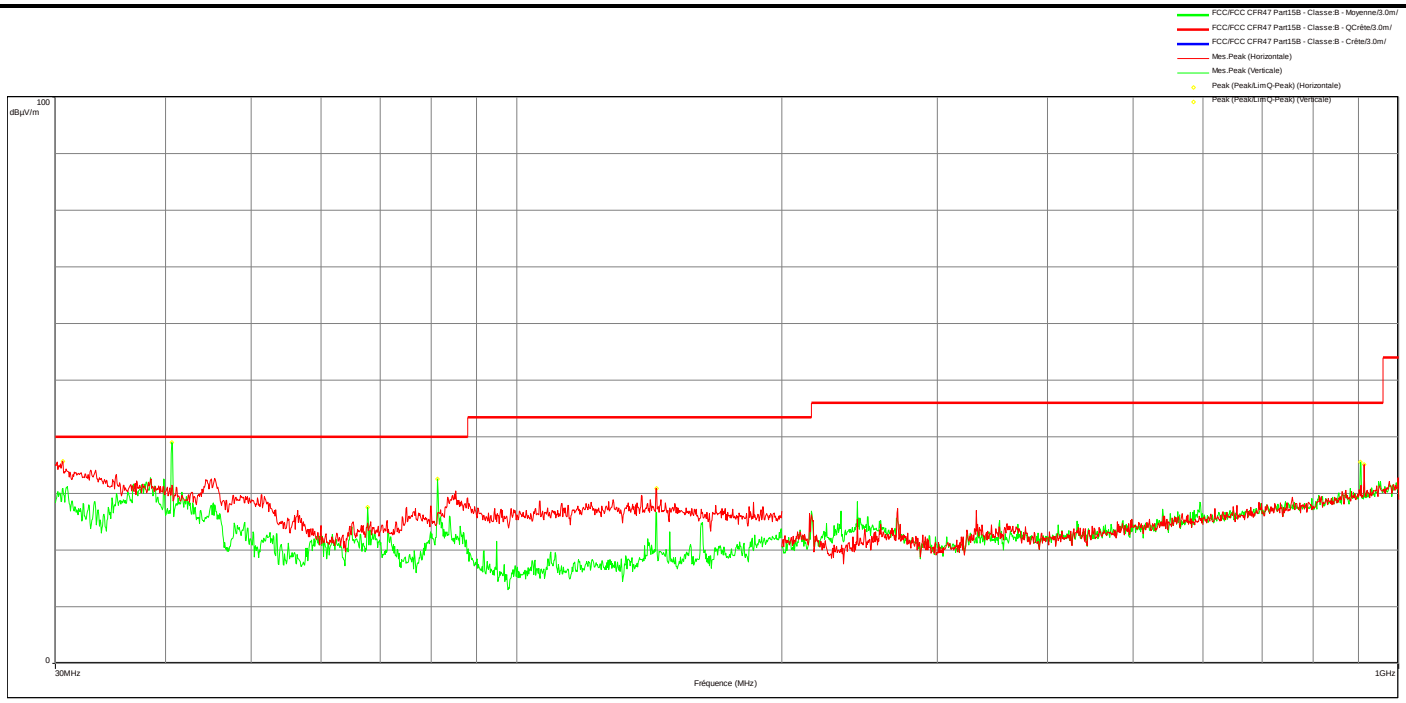
RADIATED EMISSIONS			
Graph name:	Emr#9	**Test configuration:**	
Limit:	FCC CFR47 Part15B	Configuration 1 - (H+V) - Axis XY	
Class:	B		
Frequency range: [30MHz - 1GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	Polarization
30.34	36.27	Horizontal
67.791	32.08	Horizontal
149.153	32.51	Horizontal
951.4	32.38	Horizontal
40.676	44.77	Vertical
54.208	25.82	Vertical
67.791	38.08	Vertical
81.357	37.43	Vertical
906.28	36.71	Vertical

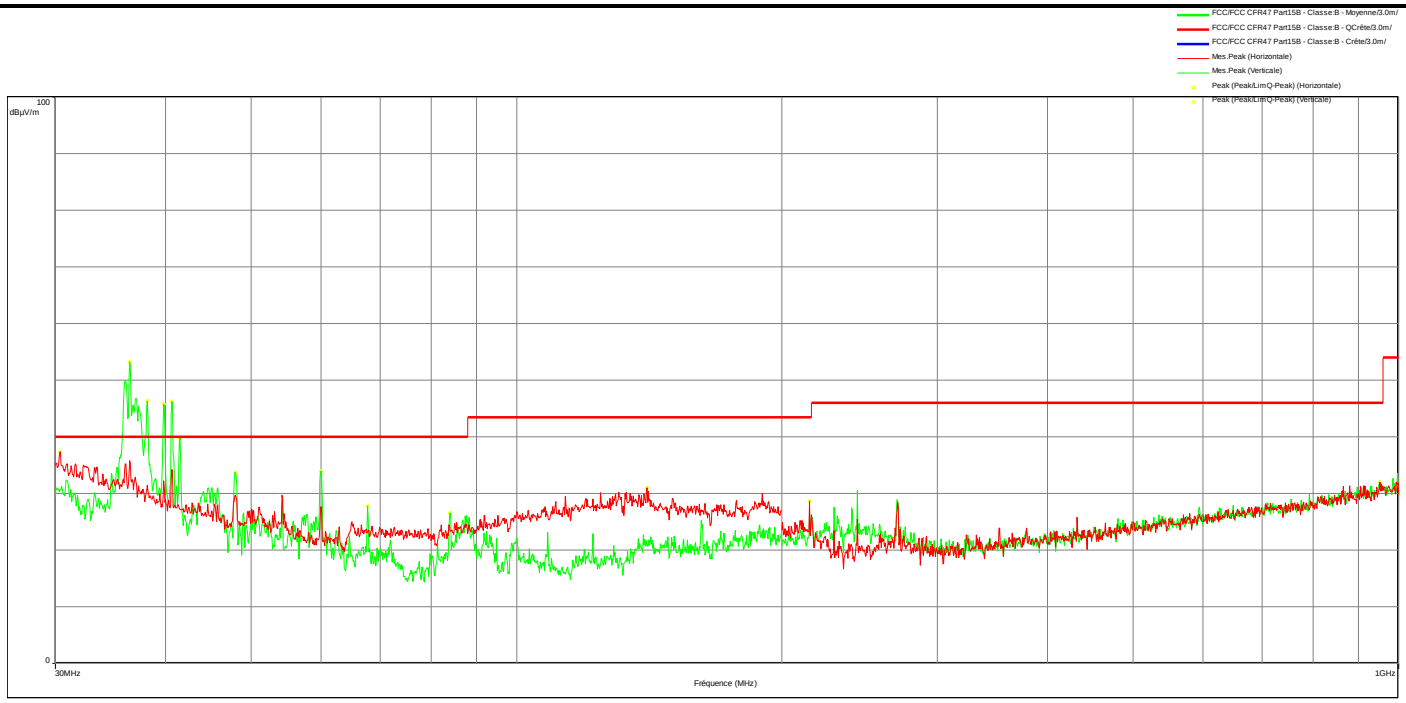
RADIATED EMISSIONS			
Graph name:	Emr#10	**Test configuration:**	
Limit:	FCC CFR47 Part15B	Configuration 1 - (H+V) - Axis Z	
Class:	B		
Frequency range: [30MHz - 1GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	Polarization
30.578	35.62	Horizontal
144.002	30.92	Horizontal
914.16	35.1	Horizontal
40.676	39.02	Vertical
67.791	27.51	Vertical
81.357	32.55	Vertical
905.08	35.6	Vertical

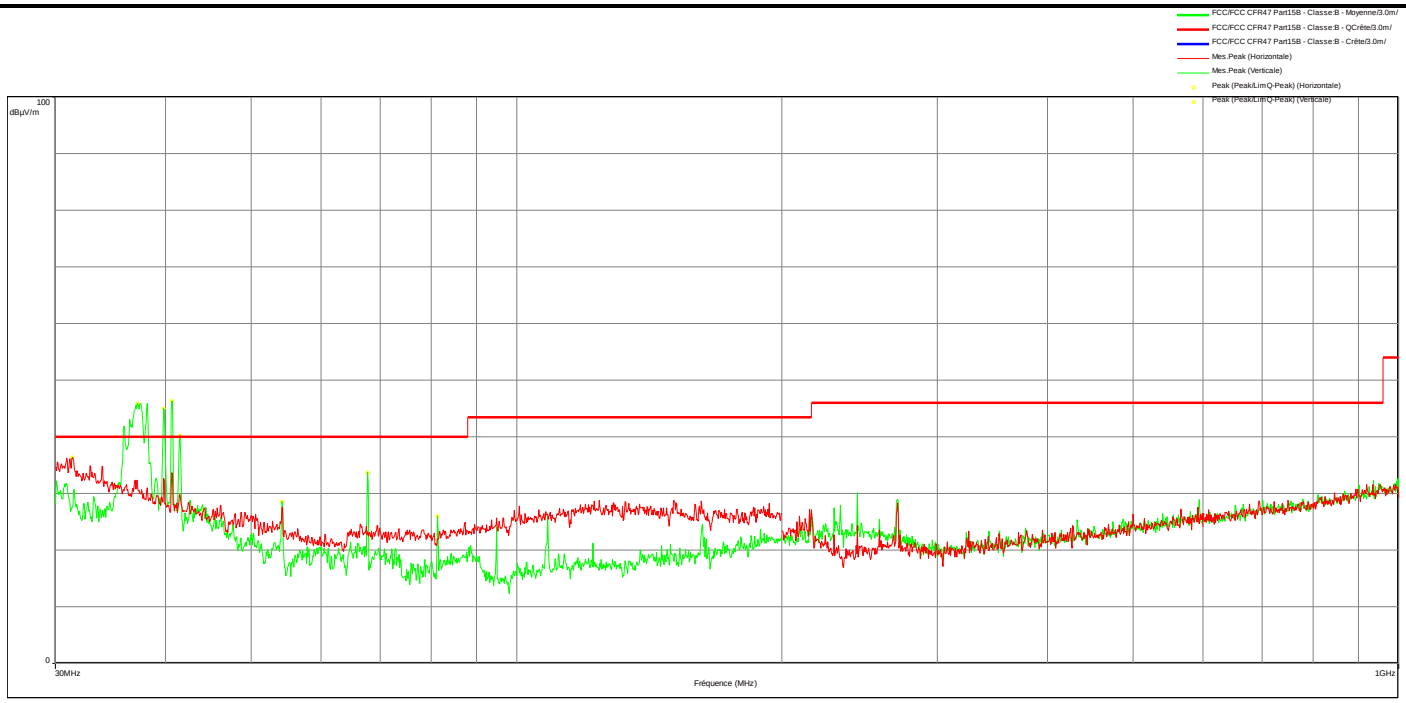
RADIATED EMISSIONS			
Graph name:	Emr#11	**Test configuration:**	
Limit:	FCC CFR47 Part15B	Configuration 2 - (H+V) - Axis XY	
Class:	B		
Frequency range: [30MHz - 1GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	Polarization
30.357	37.37	Horizontal
140.619	31.03	Horizontal
214.76	28.66	Horizontal
952.6	31.98	Horizontal
36.426	53.18	Vertical
38.126	46.33	Vertical
39.826	45.73	Vertical
40.676	46.22	Vertical
41.509	39.75	Vertical
47.986	33.72	Vertical
59.988	33.88	Vertical
67.791	27.81	Vertical
84.026	26.58	Vertical

RADIATED EMISSIONS			
Graph name:	Emr#12	**Test configuration:**	
Limit:	FCC CFR47 Part15B	Configuration 2 - (H+V) - Axis Z	
Class:	B		
Frequency range: [30MHz - 1GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	Polarization
31.36	36.39	Horizontal
37.191	45.92	Vertical
39.826	45.02	Vertical
40.676	46.37	Vertical
41.509	40.2	Vertical
54.225	28.58	Vertical
67.791	33.68	Vertical
81.357	25.96	Vertical

9. UNCERTAINTIES CHART

Type de mesure / *Kind of measurement*	**Incertitude élargie laboratoire / *Wide uncertainty laboratory* (k=2) ± x**	**Incertitude limite du CISPR / *CISPR uncertainty limit* ± y**
Mesure des perturbations conduites en tension sur le réseau d'énergie *Measurement of conducted disturbances in voltage on the power port*	3.57 dB	3.6 dB
Mesure des perturbations conduites en tension sur le réseau de télécommunication *Measurement of conducted disturbances in voltage on the telecommunication port.*	3.28 dB	A l'étude / Under consid.
Mesure des perturbations discontinues conduites en tension *Measurement of discontinuous conducted disturbances in voltage*	3.47 dB	3.6 dB
Mesure des perturbations conduites en courant *Measurement of conducted disturbances in current*	2.90 dB	A l'étude / Under consid.
Mesure du champ électrique rayonné sur le site en espace libre de Moirans *Measurement of radiated electric field on the Moirans open area test site*	5.07 dB	5.2 dB

Les valeurs d'incertitudes calculées du laboratoire étant inférieures aux valeurs d'incertitudes limites établies par la norme, la conformité de l'échantillon est établie directement par les niveaux limites applicables. / *The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the standard. The conformity of the sample is directly established by the applicable limits values.*