TEST REPORT

N°: 162144-738709-C (FILE#1020981) **Version : 03**

Subject	**Electromagnetic compatibility and Radio spectrum Matters (ERM) tests according to standards: FCC CFR 47 Part 15, Subpart C RSS-247 Issue 2.0**
Issued to	**Schneider Electric Industrie SAS** 31 rue Pierre Mendès France, eybens grenoble cedex 9 FRANCE
Apparatus under test	
↳ Product	Powertag 2P
↳ Trade mark	**Schneider Electric**
↳ Manufacturer	**Schneider Electric**
↳ Model under test	**PLTE602P**
↳ Serial number	**None**
↳ FCCID	**2AH7LPLT2P**
↳ IC	**21522-PLT2P**
Conclusion	See Test Program chapter
Test date	August 6, 2019 to August 20, 2019
Test location	MOIRANS
FCC Test site	FR0008 - 197516
ISED Test site	FR0008 - 6500A
Composition of document	53 pages
Document issued on	October 26, 2021

Written by :
Majid MOURZAGH
Tests operator

Approved by :
Anthony MERLIN
Technical manager

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

PUBLICATION HISTORY

Version	Date	Author	Modification
01	November 12,2019	Majid MOURZAGH	Creation of the document
02	April 12, 2021	Majid MOURZAGH	Adding FCC/IC informations
03	October 26, 2021	Majid MOURZAGH	Correction FCC Name and Mailing Address

SUMMARY

1. TEST PROGRAM

Standard:

- **FCC Part 15, Subpart C 15.247**
- **ANSI C63.10 (2013)**
- **RSS-247 Issue 2.0**
- **RSS-Gen Issue 5**
- **558074 D01 DTS Measurement Guidance v05**

EMISSION TEST	LIMITS			RESULTS
Limits for conducted disturbance at mains ports 150kHz-30MHz	**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 §15.247 (d)* *RSS-247 §5.5*	**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-25GHz* *CFR 47 §15.209 (a)* *CFR 47 §15.247 (d)* *RSS-247 §5.5* ***Highest frequency : 16MHz*** ***(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**
Bandwidth 6dB *CFR 47* §15.247 (a) (2) *RSS-247 §5.2*	**At least 500kHz**			☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP**
Power spectral Density *CFR 47 §15.247 (e)* *RSS-247 §5.2*	**Limit: 8dBm/3kHz**			☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP**
Maximum Peak Output Power *CFR 47 §15.247 (b)* *RSS-247 §5.4*	**Limit: 30dBm** Conducted or Radiated measurement			☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP**
Band Edge Measurement *CFR 47 §15.209 (a)* *CFR 47 §15.247 (d)* *RSS-247 §5.5*	**Limit: -20dBc or** **Radiated emissions limits in restricted bands**			☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP**
Occupied bandwidth *RSS-Gen §6.7*	**No limit**			☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP**
Receiver Spurious Emission** *RSS-Gen §7.3*	**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**

***§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.

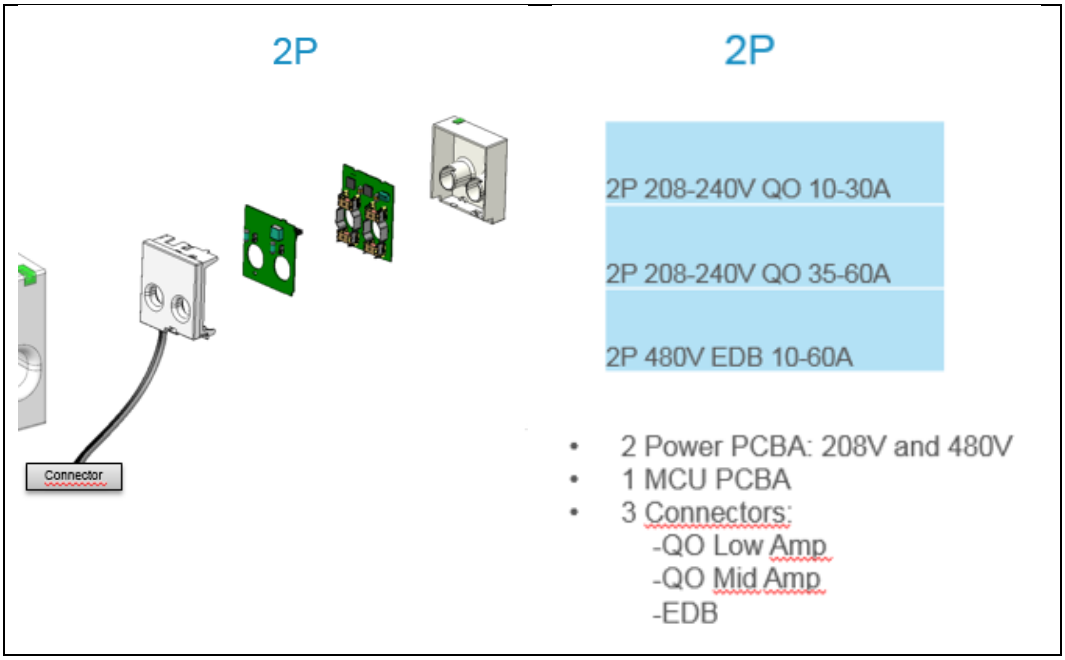
If the highest frequency of the internal sources of the testing device is above 1 GHz, measurement must be only performed until 5 times the highest frequency or 40 GHz, while taking smallest of both.

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

2. SYSTEM TEST CONFIGURATION

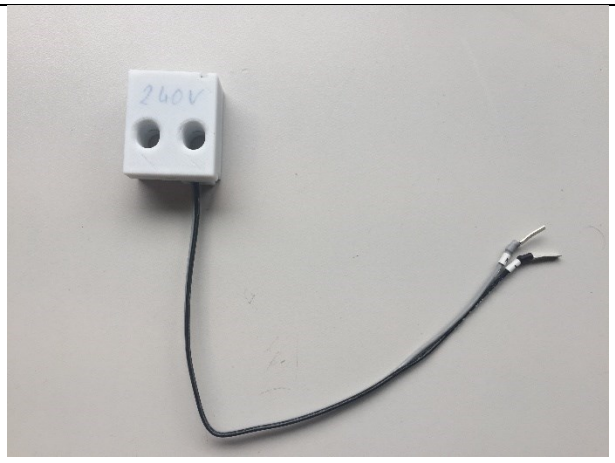
2.1. JUSTIFICATION

All test are performed on the product powered by 240Vac.
See below for details of the “Powertag 2P” range :



2.2. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):
PLTE602P
Serial Number: None



Photography of EUT

Power supply:
During all the tests, EUT is supplied by V_{nom}: 480VAC or 240Vac according to configuration.
For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference / Sn	Comments
Supply1	☑ AC ☐ DC ☐ Battery ☐USB	**480Vac 50- 60Hz**	/	Configuration n°1
Supply2	☑ AC ☐ DC ☐ Battery ☐USB	**240Vac 50 – 60Hz**	/	Configuration n°2
Supply3	☐ AC ☑ DC ☐ Battery ☐USB	**48Vdc**	/	Configuration n°3 for conducted method

Voltage table used:

Type	Measurement performed:	
☑ AC	☑ **480VAC/60Hz**	☑ **240VAC/50Hz**

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply1	2 Lines	0.3	☐	☐	☑	Configuration n°1
Supply2	2 Lines	0.3	☐	☐	☑	Configuration n°2

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop	Lenovo P52	/	/
Interface Board	SmartRF05EB	0x61E7	/
AC source	EMTEST	NetWave 20/400	A7043058
Power supply DC	AFX	0	A7044292

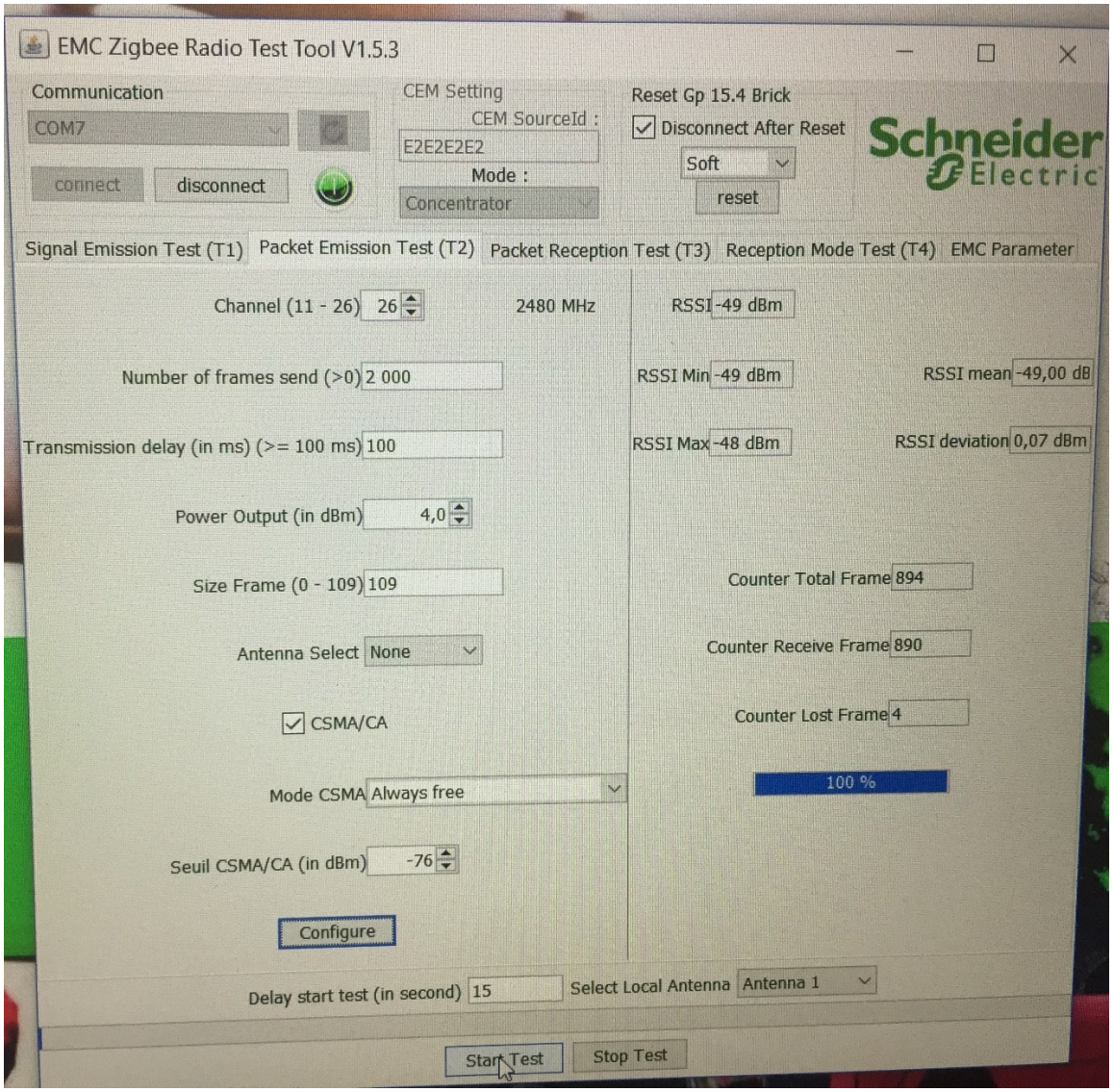
Equipment information:

Type:	☑ **ZIGBEE**	☐ **RF4CE**	
Frequency band:	[2400 – 2483.5] MHz		
Spectrum Modulation:	☑ DSSS		
Number of Channel:	16		
Spacing channel:	5MHz		
Channel bandwidth:	2MHz		
Antenna Type:	☑ Integral	☐ External	☐ Dedicated
Antenna connector:	☐ Yes	☐ No	☑ Temporary for test
Transmit chains:	1		
	Single antenna		
	Gain :4.4dBi		
Antenna requirements §15.203	*The transmitter uses an integral antenna and it permanently connected. Therefore, the transmitter meets the requirements of 15.203.*		
Beam forming gain:	No		
Receiver chains	1		
Type of equipment:	☑ Stand-alone	☐ Plug-in	☐ Combined
Ad-Hoc mode:	☐ Yes	☑ No	
Adaptivity mode:	☑ Yes (Load Based)	☑ Off mode	☐ No
	Clear Channel Assessment Time:		Xµs
Duty cycle:	☑ Continuous duty	☐ Intermittent duty	☐ 100% duty
Equipment type:	☑ Production model	☐ Pre-production model	
Operating temperature range:	Tmin:	☐ -20°C	☐ 0°C	☑ NC
	Tnom:	20°C		
	Tmax:	☐ 35°C	☐ 55°C	☑ NC
Type of power source:	☑ AC power supply	☐ DC power supply	☐ Battery
Operating voltage range:	Vnom:	☑ 240V/60Hz ☑ 480V/60Hz	☑ 48Vdc(modification used during conducted tests)
Geo-location capability:	☐ Yes (The geographical location determined by the equipment is not accessible to the end user as defined in section 4.3.2.12.2 of ETSI EN 300 328 V2.1.1 standard)	☑ No	
Minimum performance criteria for Receiver blocking test:	☑ PER less than or equal to 10%	☐ Alternative performance criteria (4)	

2.3. EUT CONFIGURATION

The EUT is set in the following modes during tests with simulator / software:
- Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
- Permanent reception
All tests are performed at Cmin, Cmid and Cmax.

Following commands with the specific test software “EMC Zigbee Radio Test Tool V1.5.3” are used to set the product:



2.4. EQUIPMENT MODIFICATIONS

☑ None ☐ Modification:

2.5. 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.

2.6. CALIBRATION DATE

The calibration intervals are extended at 12+2 months. This extended interval is based on the fact that there is sufficient calibration data to statistically establish a trend or based on experience of use of the test equipment to assure good measurement results for a longer period

3. CONDUCTED EMISSION DATA

3.1. ENVIRONMENTAL CONDITIONS

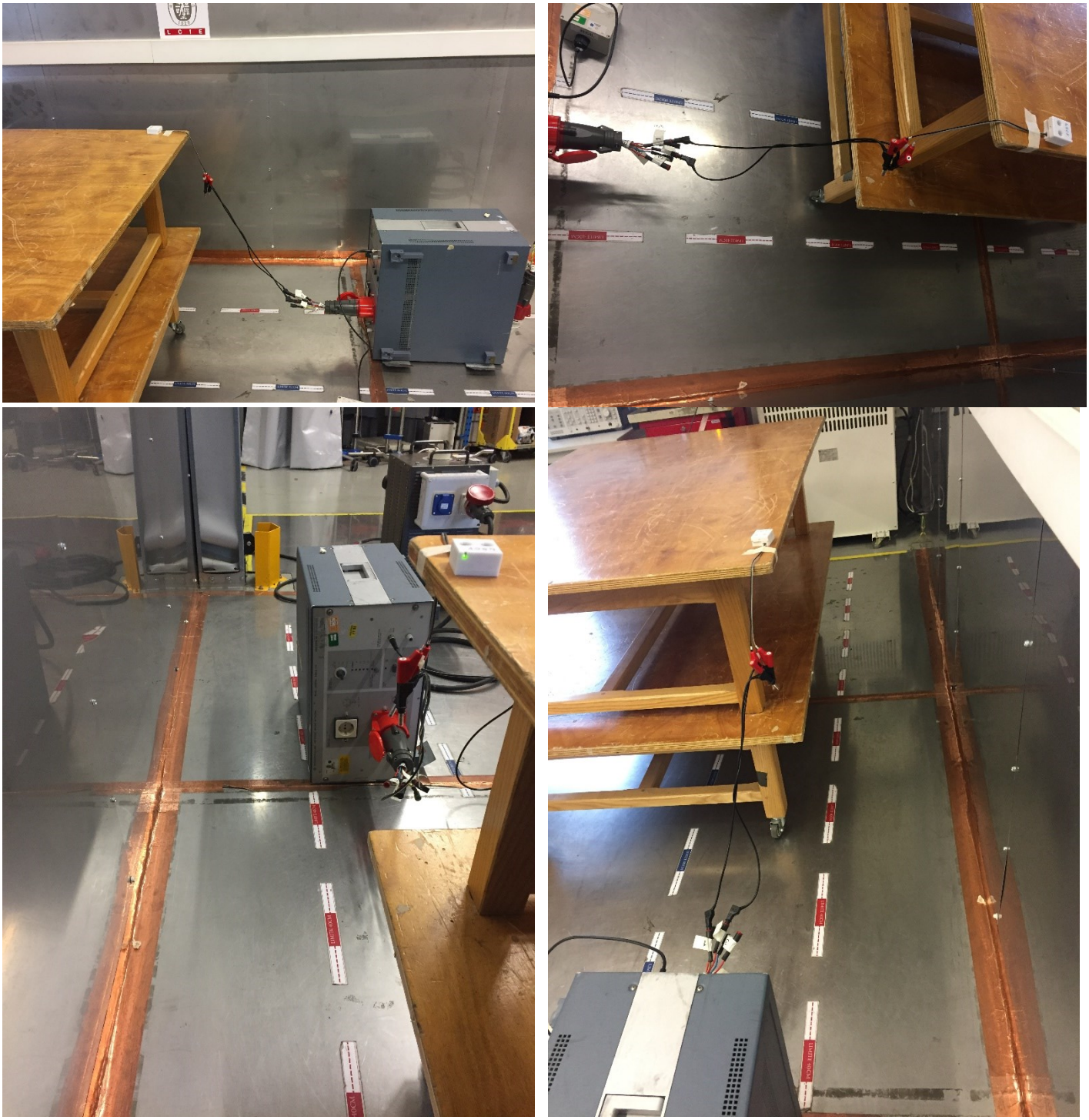
Date of test	:	August 20, 2019
Test performed by	:	Majid MOURZAGH
Atmospheric pressure (hPa)	:	994
Relative humidity (%)	:	51
Ambient temperature (°C)	:	22

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 V_{nom}.
The EUT is powered through a LISN (measure). Auxiliaries are powered by another LISN.



Test setup

3.3. TEST METHOD

The product has been tested according to ANSI C63.10 and FCC Part 15 subpart C. The product has been tested with a voltage sets (see the table voltage in §2.2) and compared to the FCC Part 15 limits. Measurement bandwidth was 9kHz from 150kHz to 30MHz. This was followed by a Quasi-Peak, i.e. CISPR measurement for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary. The LISN (measure) is 50Ω / 50µH. The Peak data are shown on plots in annex 1. Quasi-Peak and Average measurements are detailed in a table with frequencies and levels measured. Interconnecting cables and equipment's were moved to position that maximized emission. A summary of the worst case emissions found in all test configurations and modes is shown on the following page.
Measurements are performed on the phase (L1) and neutral (N) of power line voltage (for example). Graphs are obtained in PEAK detection. Measures are also performed in Quasi-Peak and Average for any strong signal.

3.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable + self	-	-	A5329578	10/18	10/19
EMC comb generator	LCIE SUD EST	-	A3169098	-	-
LISN tri-phase ESH2-Z5	RHODE & SCHWARZ	33852.19.53	C2320062	11/18	11/19
Receiver 9kHz - 30MHz	ROHDE & SCHWARZ	ESHS10	A2642028	11/18	11/19
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Transient limiter	RHODE & SCHWARZ	ESH3-Z2	A7122204	02/19	02/20

3.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

3.6. TEST RESULTS

AC tests Results:
Measurements are performed on the phase (L1) and neutral (L2) of the power line.
Results: (PEAK detection)

Graph identifier		Line	Comments	Configuration	
Emc#	1	Line 1	480VAC/60Hz	Configuration n°1	See Annex
Emc#	2	Line 2	480VAC/60Hz	Configuration n°1	See Annex
Emc#	3	Line 1	480VAC/50Hz	Configuration n°1	See Annex
Emc#	4	Line 2	480VAC/50Hz	Configuration n°1	See Annex
Emc#	5	Line 1	240VAC/50Hz	Configuration n°2	See Annex
Emc#	6	Line 2	240VAC/50Hz	Configuration n°2	See Annex
Emc#	7	Line 1	240VAC/60Hz	Configuration n°2	See Annex
Emc#	8	Line 2	240VAC/60Hz	Configuration n°2	See Annex

3.7. CONCLUSION

Conducted emission data measurement performed on the sample of the product **PLTE602P**, SN: None, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

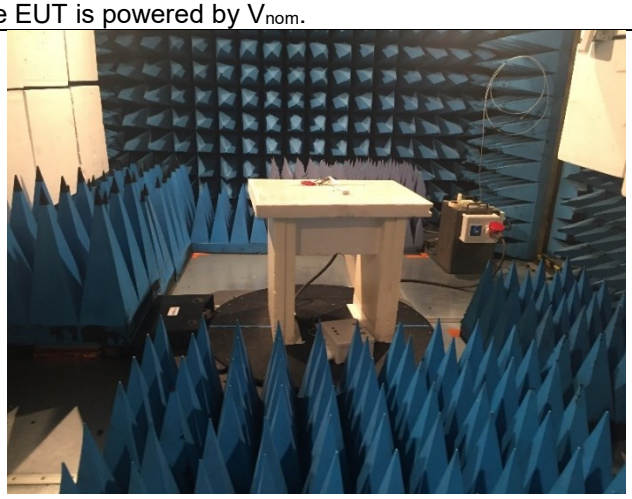
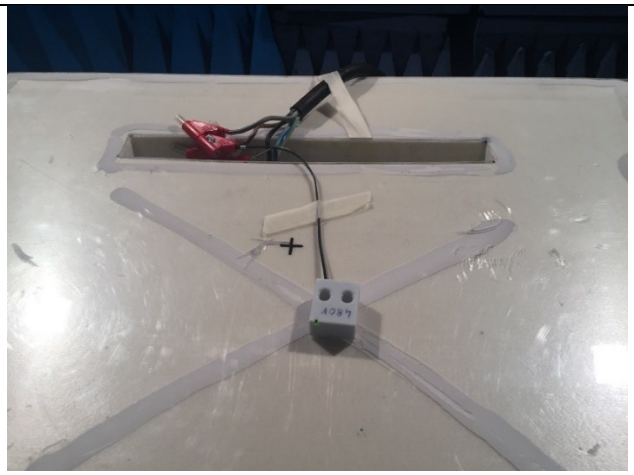
4. RADIATED EMISSION DATA

4.1. ENVIRONMENTAL CONDITIONS

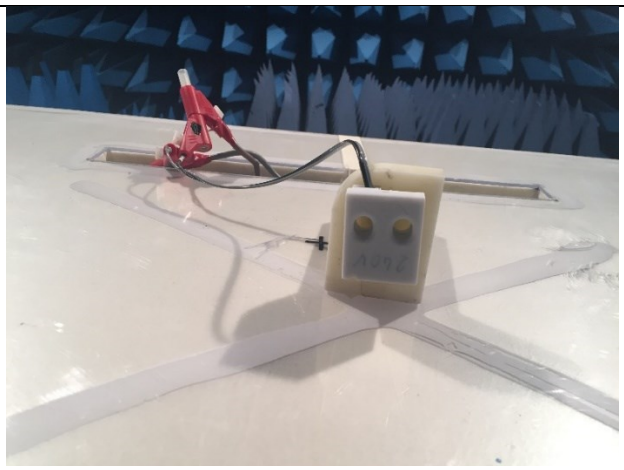
Date of test	:	August 20, 2019
Test performed by	:	Majid MOURZAGH
Atmospheric pressure (hPa)	:	994
Relative humidity (%)	:	51
Ambient temperature (°C)	:	22

4.2. TEST SETUP

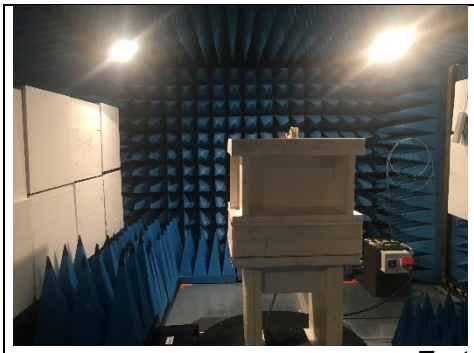
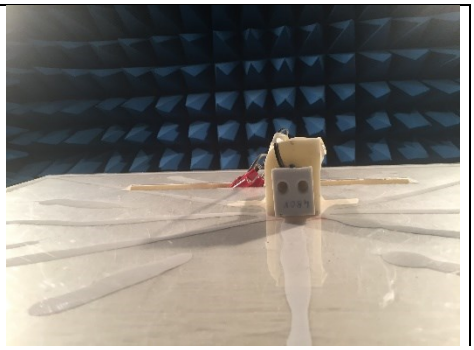
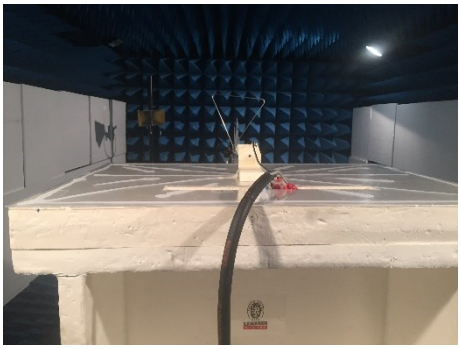
The installation of EUT is identical for pre-characterization measures in a 3 meters semi- anechoic chamber and for measures on the 10 meters Open site.
The EUT and auxiliaries are set:
☑ 80cm above the ground on the non-conducting table (Table-top equipment) - Below 1GHz
☑ 150cm above the ground on the non-conducting table (Table-top equipment) - Above 1GHz
☐ 10cm above the ground on isolating support (Floor standing equipment)
The EUT is powered by V_{nom}.

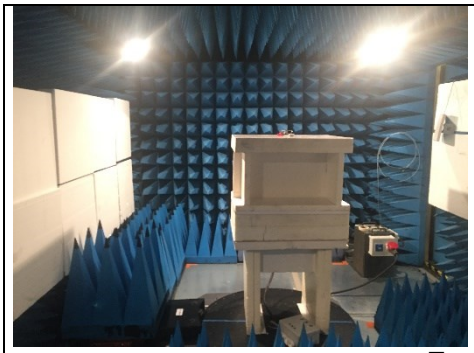
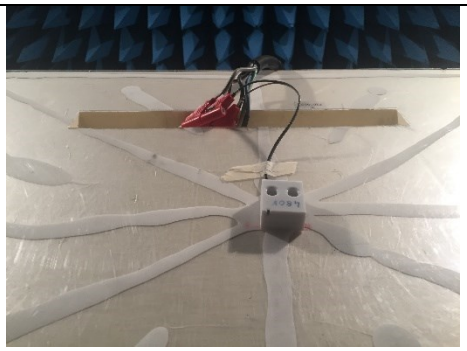
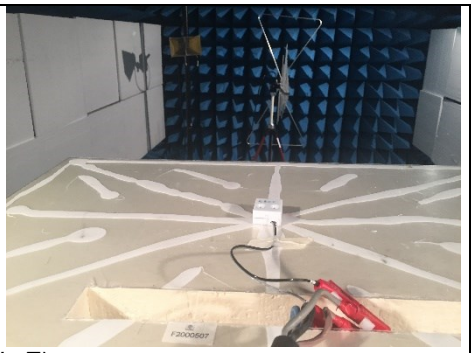
Test setup in anechoic chamber < 1GHz (Axis XY)

Test setup in anechoic chamber < 1GHz (AxisZ)

Test setup in anechoic chamber > 1GHz (Axis XY)

Test setup in anechoic chamber > 1GHz (Axis Z)

4.3. TEST METHOD

The product has been tested according to ANSI C63.10, FCC part 15 subpart C.

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 to maximize 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:
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 limits. 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 to maximize 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.

Characterization on 3 meters full anechoic chamber from 1GHz to 26GHz:
The product has been tested at a distance of **3 meters** from the antenna and compared to the FCC part 15 subpart C limits. Measurement bandwidth was 1MHz from 1GHz to 26GHz.
Test is performed in horizontal (H) and vertical (V) polarization. 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.The height antenna is
☐ On mast, varied from 1m to 4m
☑ Fixed and centered on the EUT (EUT smaller than the beamwidth of the measurement antenna, ANSI C63.10 §6.6.5)
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
Amplifier 9kHz - 40GHz	LCIE SUD EST	_	A7102082	10/18	10/19
Antenna Bi-Log	CHASE	UPA6192	C2040221	01/18	01/20
Antenna horn 18GHz	EMCO	3115	C2042029	09/18	09/20
Emission Cable C3	-	6GHz	A5329069	11/18	11/19
Emission Cable C3	-	6GHz	A5329637	02/19	02/20
Emission Cable (SMA 30cm)	TELEDYNE	26GHz	A5329873	01/19	01/20
Emission Cable (SMA 1m)	TELEDYNE	26GHz	A5329874	01/19	01/20
Emission Cable (SMA 3.3m)	TELEDYNE	26GHz	A5329875	01/19	01/20
Semi-Anechoic chamber #3	SIEPEL	-	D3044017	03/17	03/20
Radiated emission comb generator	BARDET	-	A3169050	-	-
Comb RADIO	YORK	25MHz - 26GHz	A3169114	-	-
High Pass (4.8-18GHz)	BL Microwave	SH4800-1800	A7484076	07/19	07/20
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	03/18	03/20
BAT EMC	NEXIO	v3.17.0.10	L1000115	-	-
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Turntable chamber (Cage#3)	ETS Lingren	Model 2165	F2000371	-	-
Table C3	LCIE	-	F2000461	-	-
Rehausse Table C3	LCIE	-	F2000511	-	-
Turntable controller (Cage#3)	ETS Lingren	Model 2090	F2000444	-	-

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 graphs for 9k-30MHz:

Graph identifier		Polarization	Mode	EUT position	Configuration	Comments
Emr#	1	0°/90°	TX	Axis XY	**Configuration n°2**	See annex 1
Emr#	2	180°	TX	Axis Z	**Configuration n°2**	See annex 1
Emr#	3	0°/90°	TX	Axis XY	**Configuration n°2**	See annex 1
Emr#	4	180°	TX	Axis Z	**Configuration n°2**	See annex 1

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

See graphs for 30MHz-1GHz:

Graph identifier		Polarization	Mode	EUT position	Configuration	Comments
Emr#	5	H/V	TX	Axis XY	**Configuration n°1**	See annex 1
Emr#	6	H/V	TX	Axis Z	**Configuration n°1**	See annex 1
Emr#	7	H/V	TX	Axis XY	**Configuration n°2**	See annex 1
Emr#	8	H/V	TX	Axis Z	**Configuration n°2**	See annex 1

4.6.3. Pre-characterization at 3 meters [1GHz-14GHz]

See graphs for 1MHz-14GHz:

Graph identifier		Polarization	Mode	EUT position	Configuration	Comments
Emr#	9	H/V	TX	Axis XY	**Configuration n°2**	See annex 1
Emr#	10	H/V	TX	Axis Z	**Configuration n°2**	See annex 1

4.6.4. Pre-characterization at 3 meters [14GHz-26GHz]

See graphs for 14MHz-26GHz:

Graph identifier		Polarization	Mode	EUT position	Configuration	Comments
Emr#	11	H/V	TX	Axis XY	**Configuration n°2**	See annex 1
Emr#	12	H/V	TX	Axis Z	**Configuration n°2**	See annex 1

4.6.5. 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 Quasi-Peak (dBµV/m)	Measure Quasi-Peak (dBµV/m)	Margin (Mes-Lim) (dB)	Angle Table (deg)	Pol Ant.	Ht Ant. (cm)	Correc. Factor (dB)	Comments
No significant frequency observed									

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

4.6.6. Characterization on anechoic chamber

Worst case final data result:

Measurements are performed using a PEAK and AVERAGE detection.

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Avg Level (dBµV/m)	Avg Limit (dBµV/m)	Margin (dB)	Polarization	Correction (dB)
4650.794	56.8	74	**-17.2**	46.1	54	**-7.9**	Horizontal	38.6
4880.689	50.2	74	**-23.8**	43.2	54	**-10.8**	Horizontal	-24.5
7321.106	56.2	74	**-17.8**	48.3	54	**-5.7**	Horizontal	-19.5
13594.497	54.9	74	**-19.1**	41.9	54	**-12.1**	Horizontal	-12.8
3993.823	56.8	74	**-17.2**	43.4	54	**-10.6**	Vertical	38.5
4879.689	49.6	74	**-24.4**	43.6	54	**-10.4**	Vertical	-24.5
5183.484	51.4	74	**-22.6**	39.8	54	**-14.2**	Vertical	-24
7321.373	56.5	74	**-17.5**	43.1	54	**-10.9**	Vertical	-19.5
13455.286	54.6	74	**-19.4**	42.1	54	**-11.9**	Vertical	-12.6

Note: Measures have been done at 3m distance.

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Avg Level (dBµV/m)	Avg Limit (dBµV/m)	Margin (dB)	Polarization	Correction (dB)
14047.5	57.5	83.5	**-26**	47.1	63.5	**-16.4**	Vertical	5.4
15436	51.3	83.5	**-32.2**	40.1	63.5	**-23.4**	Vertical	-1.8
17850	51.6	83.5	**-31.9**	40.5	63.5	**-23**	Vertical	-2
19001	45.4	83.5	**-38.1**	34.8	63.5	**-28.7**	Vertical	-2
23182	48.4	83.5	**-35.1**	37.1	63.5	**-26.4**	Vertical	-0.4
25603	47.9	83.5	**-35.6**	37.6	63.5	**-25.9**	Vertical	0.4

Note: Measures have been done at 1m distance

4.7. CONCLUSION

Radiated emission data measurement performed on the sample of the product **PLTE602P**, SN: None, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

5. BANDWIDTH (15.247)

5.1. TEST CONDITIONS

Date of test	:	August 6, 2019
Test performed by	:	Majid MOURZAGH
Atmospheric pressure (hPa)	:	992
Relative humidity (%)	:	35
Ambient temperature (°C)	:	24

5.2. 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.
Offset: Attenuator+cable 10.65dB

☐ ***Radiated measurement:***
The EUT is placed in an anechoic chamber; 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, a delta marker is used to measure the frequency difference as the emission bandwidth.

Measurement Procedure: §8.1 Option 1 (DTS Measurement Guidance)
1. Set resolution bandwidth (RBW) = 100kHz.
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. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer.

5.3. TEST EQUIPMENT LIST

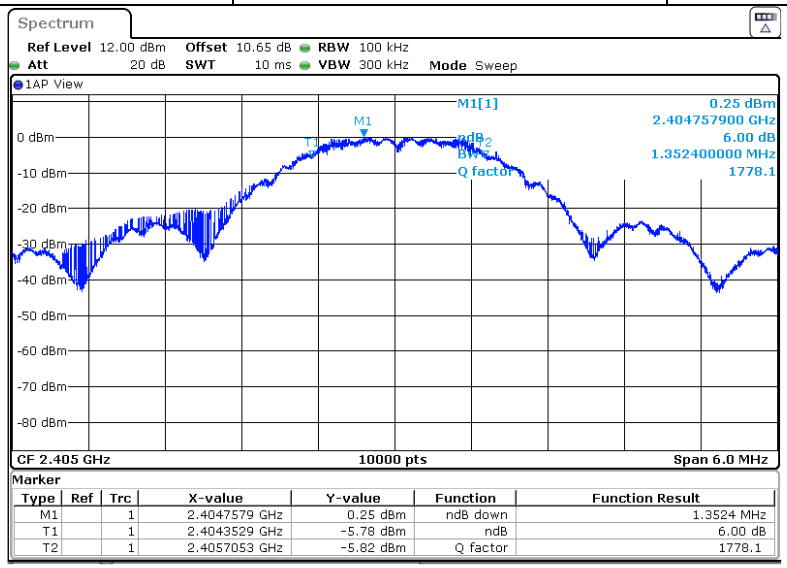
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable SMA	-	18GHz	A5329863	11/18	11/19
Attenuator 10dB	TECHNIWAVE	-	A7122273	06/18	06/20
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	12/17	12/19
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20

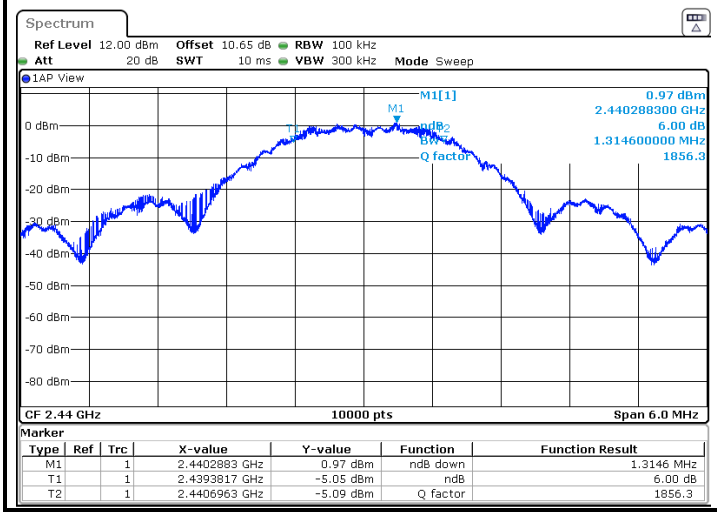
5.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

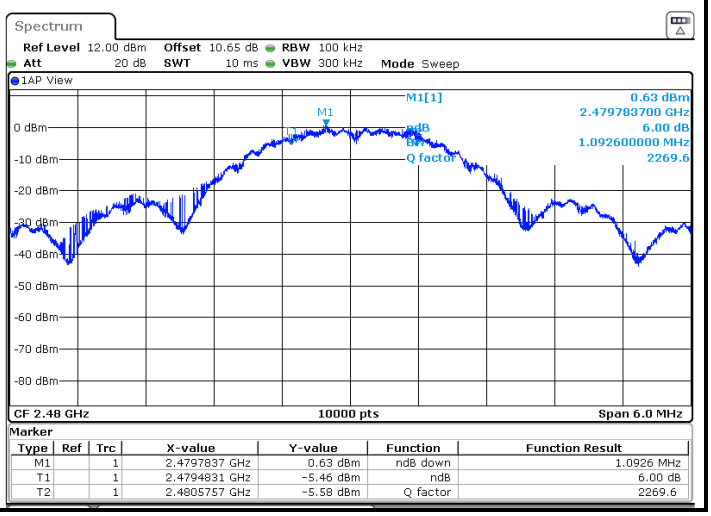
☑ None ☐ Divergence:

5.5. TEST SEQUENCE AND RESULTS

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Bandwidth Limit (MHz)
Cmin	2405	**1.3524**	**>0.5**
Cmid	2440	**1.3146**	**>0.5**
Cmax	2480	**1.0926**	**>0.5**







5.6. CONCLUSION

Bandwidth measurement performed on the sample of the product **PLTE602P**, SN: None, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

6. MAXIMUM PEAK OUTPUT POWER (15.247)

6.1. TEST CONDITIONS

Date of test	:	August 6, 2019
Test performed by	:	Majid MOURZAGH
Atmospheric pressure (hPa)	:	992
Relative humidity (%)	:	35
Ambient temperature (°C)	:	24

6.2. 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.
Offset: Attenuator+cable 10.65dB

☐ ***Radiated measurement:***
The EUT is placed in an anechoic chamber; the center frequency of the spectrum analyzer is set to the fundamental frequency.
The product has been tested at a distance of 3 meters from the antenna. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on 3 axis of EUT. A summary of the worst case emissions found in all test configurations and modes is shown on following table. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.
To demonstrate compliance with peak output power requirement of section 15.247 (b), the transmitter's peak output power is calculated using the following equation:

$$E = \frac{\sqrt{30PG}}{d}$$

Where:
- E is the measured maximum fundamental field strength in V/m.
- G is the numeric gain of the transmitting antenna with reference to an isotropic radiator.
- d is the distance in meters from which the field strength was measured.
- P is the power in watts for which you are solving:

$$P = \frac{(E\,d)^2}{30G}$$

Maximum peak conducted output power

One of the following procedures may be used to determine the maximum peak conducted output power of a DTS EUT.

- ☑ ***RBW ≥ DTS bandwidth §9.1.1 (DTS Measurement Guidance)***

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

a) Set the RBW ≥ DTS bandwidth.
b) Set VBW ≥ 3 x RBW.
c) Set span ≥ 3 x RBW
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

- ☐ ***Integrated band power method***

This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.

a) Set the RBW = 1 MHz.
b) Set the VBW ≥ 3 x RBW
c) Set the span ≥ 1.5 x DTS bandwidth.
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges

6.3. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable SMA	-	18GHz	A5329863	11/18	11/19
Attenuator 10dB	TECHNIWAVE	-	A7122273	06/18	06/20
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	12/17	12/19
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20

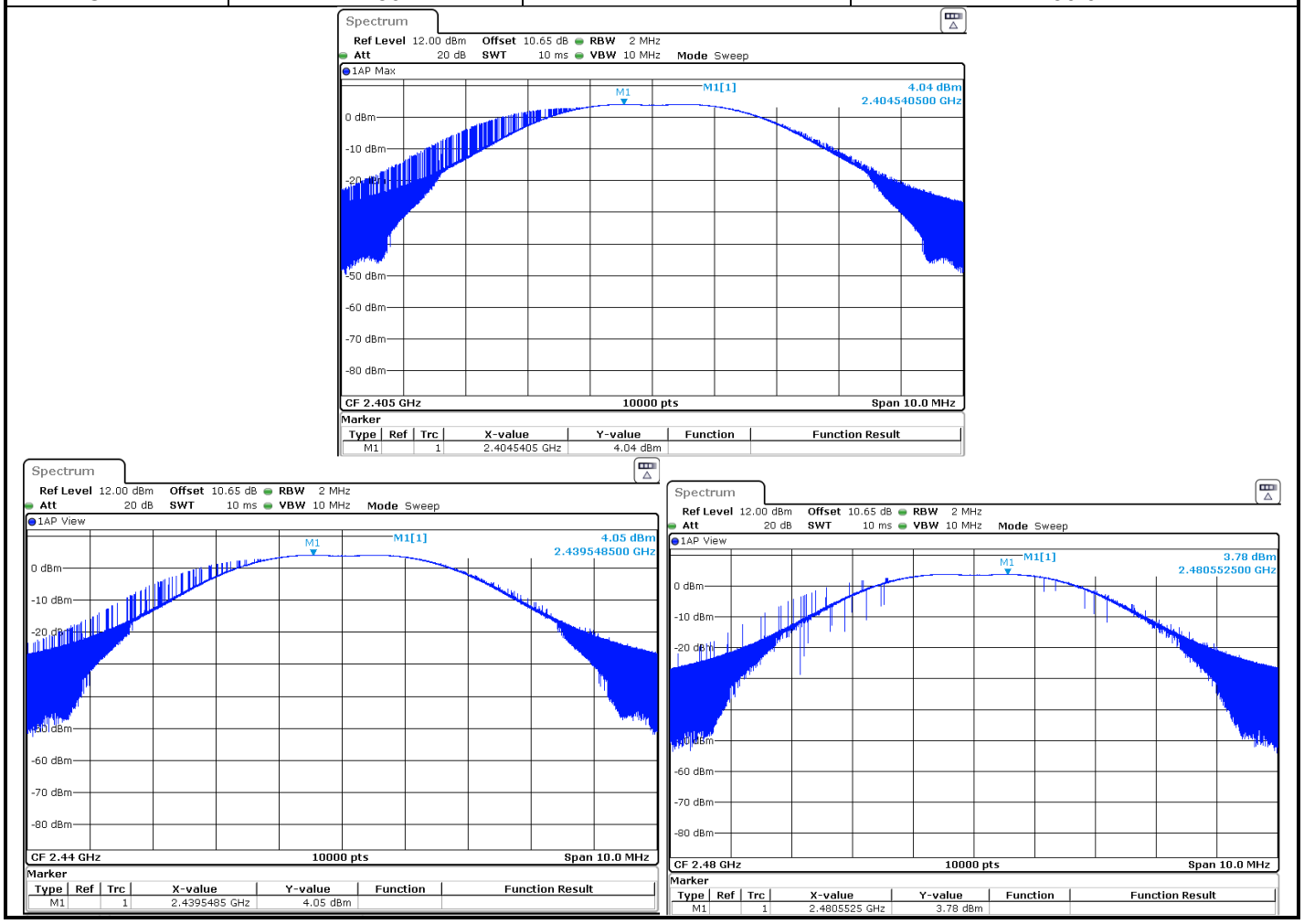
6.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

6.5. TEST SEQUENCE AND RESULTS

Modulation:

Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Power Limit (dBm)
Cmin	2405	**4.04**	30.0
Cmid	2440	**4.05**	30.0
Cmax	2480	**3.78**	30.0



6.6. CONCLUSION

Maximum Peak Output Power measurement performed on the sample of the product **PLTE602P**, SN: None, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

7. POWER SPECTRAL DENSITY (15.247)

7.1. TEST CONDITIONS

Date of test	:	August 20, 2019
Test performed by	:	Majid MOURZAGH
Atmospheric pressure (hPa)	:	994
Relative humidity (%)	:	51
Ambient temperature (°C)	:	22

7.2. 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.
Offset: Attenuator+cable 10.65dB

☐ ***Radiated measurement:***
The EUT is placed in an anechoic chamber; the center frequency of the spectrum analyzer is set to the fundamental frequency.
The product has been tested at a distance of 3 meters from the antenna. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on 3 axis of EUT. A summary of the worst case emissions found in all test configurations and modes is shown on following table. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.
To demonstrate compliance with peak output power requirement of section 15.247 (b), the transmitter's peak output power is calculated using the following equation:

$$E = \frac{\sqrt{30PG}}{d}$$

Where:
- E is the measured maximum fundamental field strength in V/m.
- G is the numeric gain of the transmitting antenna with reference to an isotropic radiator.
- d is the distance in meters from which the field strength was measured.
- P is the power in watts for which you are solving:

$$P = \frac{(E\,d)^2}{30G}$$

Measurement Procedure PKPSD: §10.2 (DTS Measurement Guidance)
a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to: 3 kHz.
d) Set the VBW ≥ 3 x RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.
j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

7.3. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable SMA	-	18GHz	A5329863	11/18	11/19
Attenuator 10dB	TECHNIWAVE	-	A7122273	06/18	06/20
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	12/17	12/19
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20

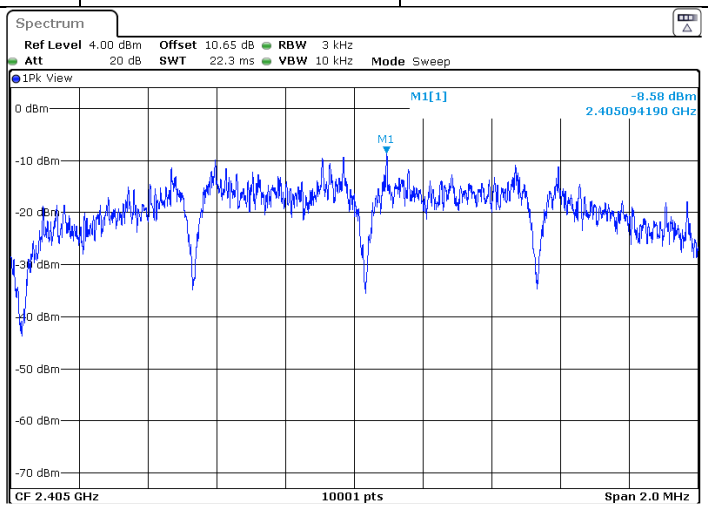
7.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

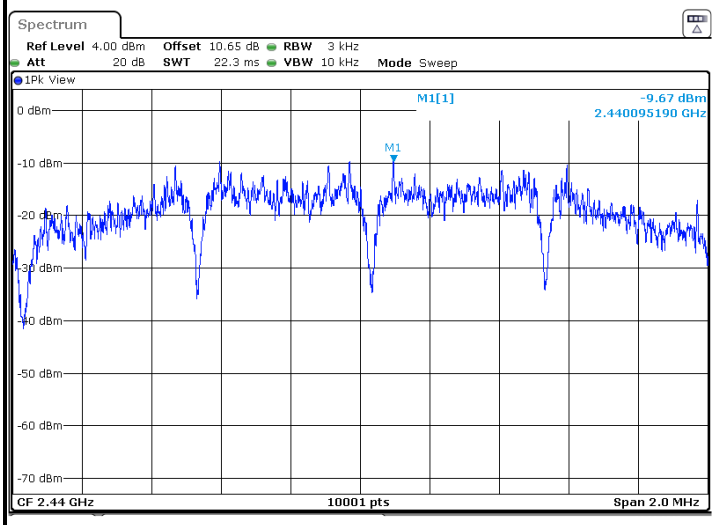
☑ None ☐ Divergence:

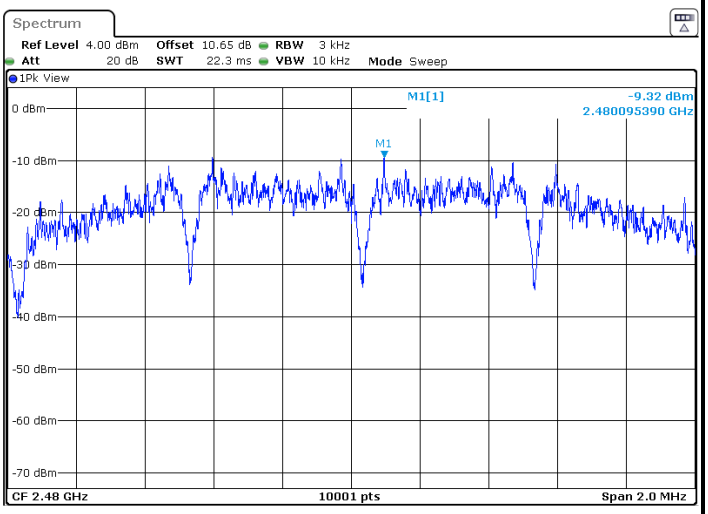
7.5. TEST SEQUENCE AND RESULTS

Modulation:

Channel	Channel Frequency (MHz)	Power Spectral Density (dBm)	PSD Limit (dBm)
Cmin	2405	**-8.58**	8.0
Cmid	2440	**-9.67**	8.0
Cmax	2480	**-9.32**	8.0







7.6. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **PLTE602P**, SN: None, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

8. BAND EDGE MEASUREMENT (15.247)

8.1. TEST CONDITIONS

Date of test	:	August 6, 2019
Test performed by	:	Majid MOURZAGH
Atmospheric pressure (hPa)	:	992
Relative humidity (%)	:	35
Ambient temperature (°C)	:	24

8.2. LIMIT

RF antenna conducted test: § 11 (DTS Measurement Guidance)
Set RBW = 100 kHz, Video bandwidth (VBW) > RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB. *For -20dBc limit, lowest power output level is considered, worst case.*

Radiated emission test: § 12 (DTS Measurement Guidance)
Applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See results in Radiated emissions section before.

8.3. SETUP

The EUT is placed in an anechoic chamber; levels have been corrected to be in compliant with Peak Output Power measurement. The EUT is turn ON; the graphs of the restrict frequency band are recorded with a display line indicating the highest level and other the 20dB offset below to show compliance with 15.247 (d) and 15.205. The emissions in restricted bands are compared to 15.209 limits.
RBW: 100kHz
VBW: 300kHz

8.4. TEST EQUIPMENT LIST

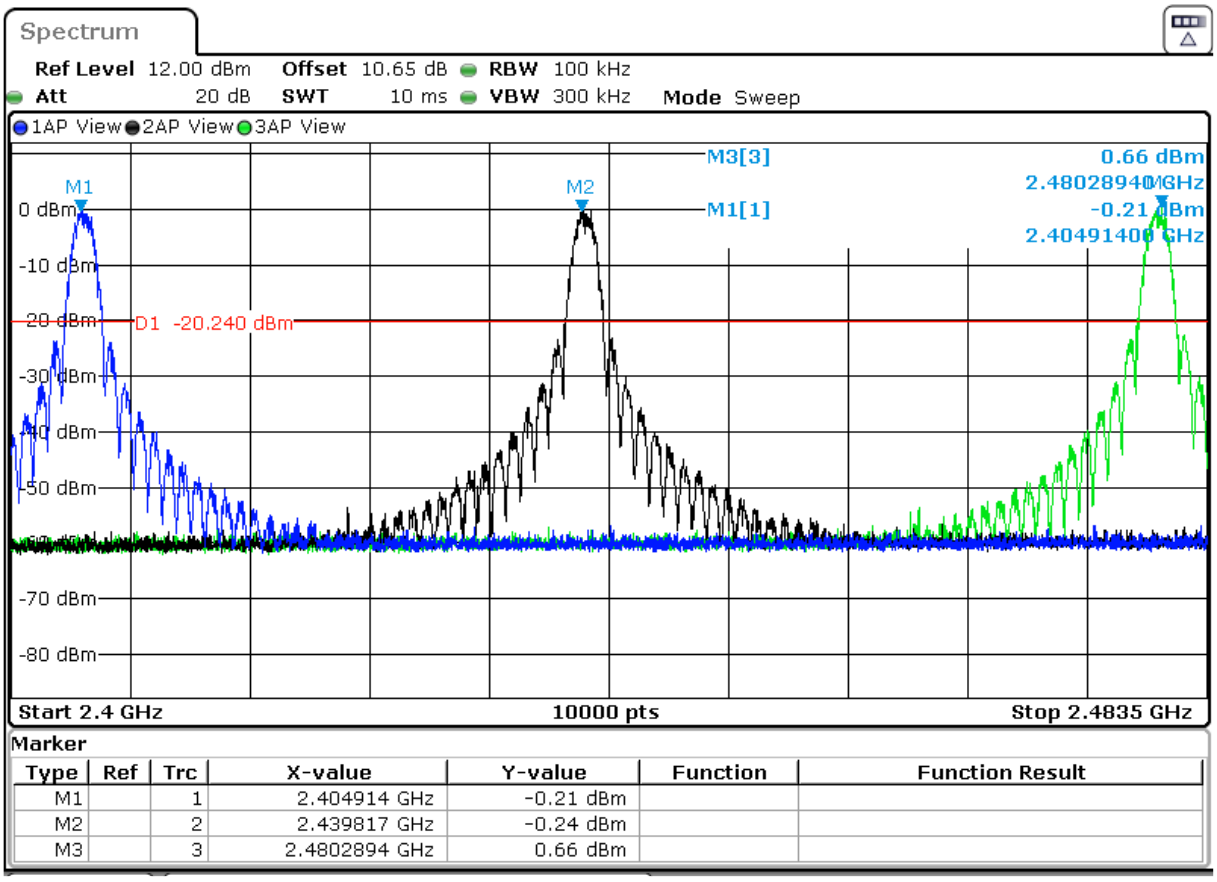
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable SMA	-	18GHz	A5329863	11/18	11/19
Attenuator 10dB	TECHNIWAVE	-	A7122273	06/18	06/20
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	12/17	12/19
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20

8.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

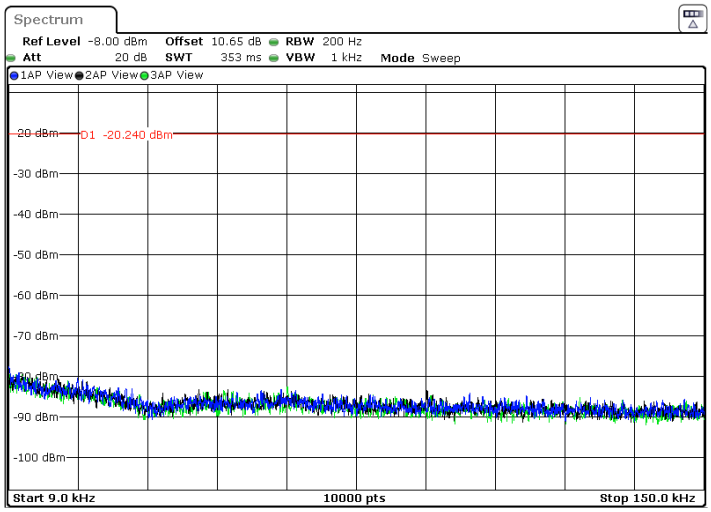
☑ None ☐ Divergence:

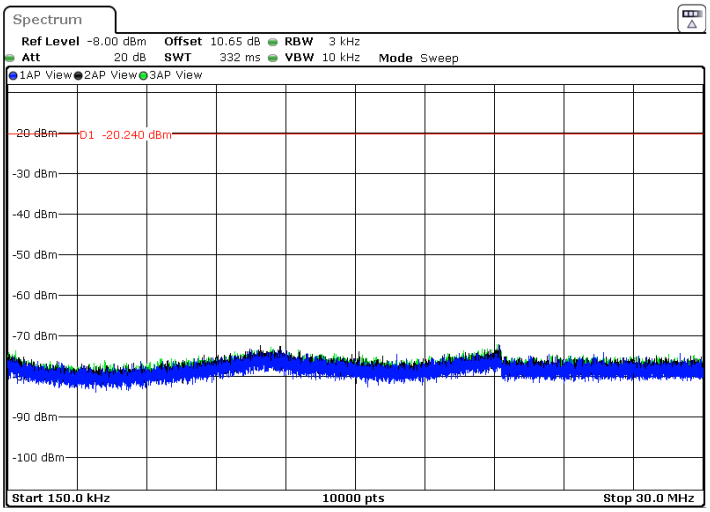
8.6. TEST SEQUENCE AND RESULTS

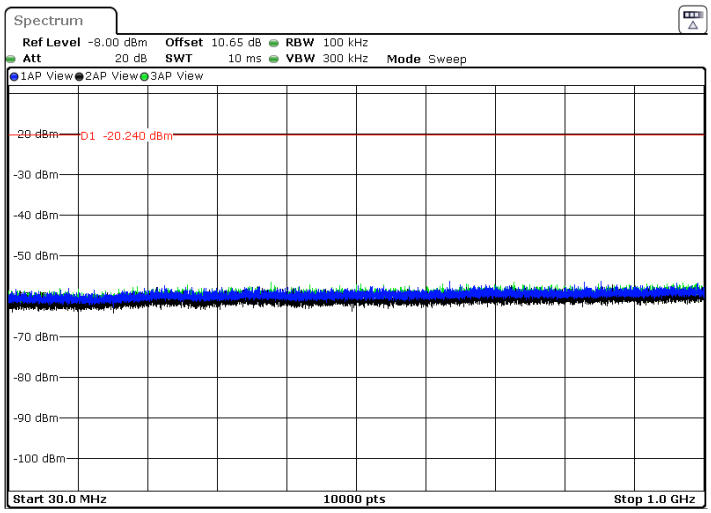
Offset: Attenuator+cable 10.65dB
GRAPH / MODULATION.

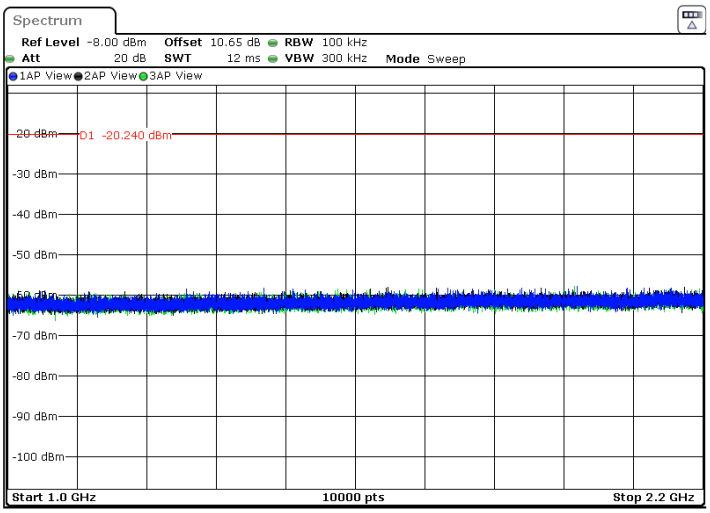


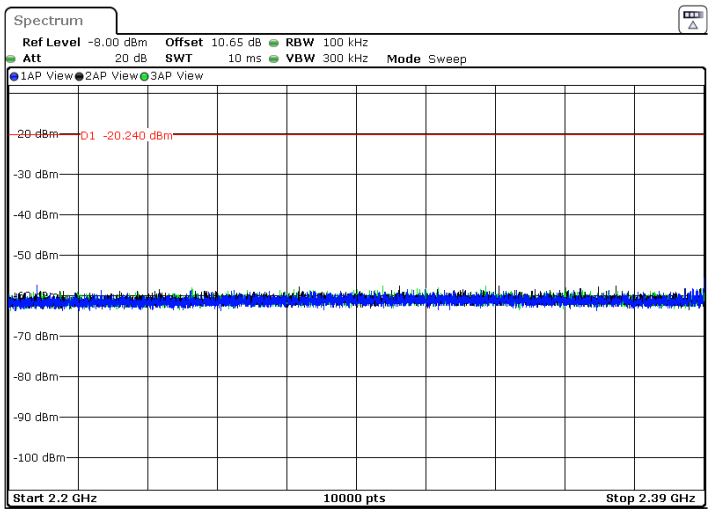
-20dBc limit used: **Worst case : Channel Med, limit at : -20.24dBm**

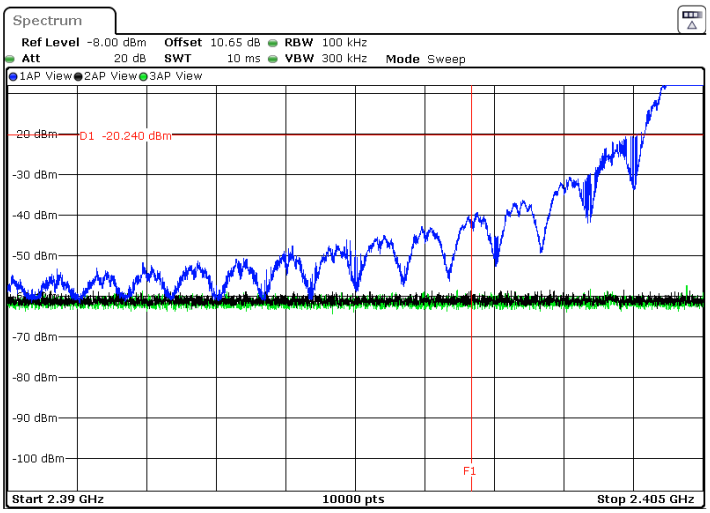

Spectrum
Ref Level -8.00 dBm Offset 10.65 dB RBW 200 Hz
Att 20 dB SWT 353 ms VBW 1 kHz Mode Sweep
1AP View 2AP View 3AP View
D1 -20.240 dBm
Start 9.0 kHz 10000 pts Stop 150.0 kHz

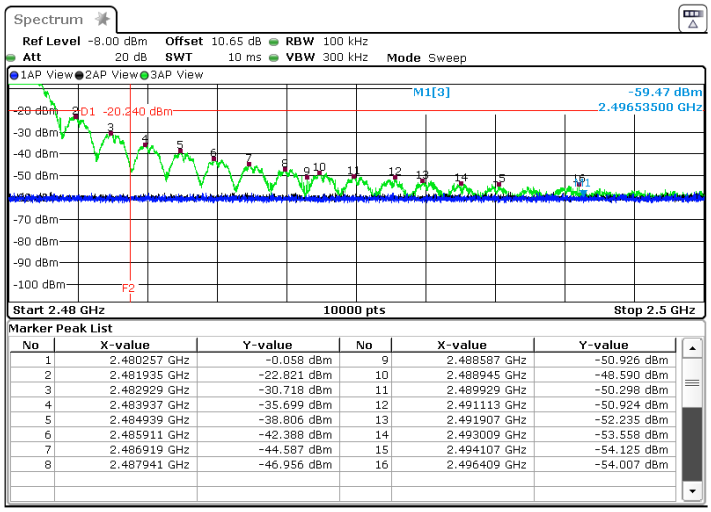

Spectrum
Ref Level -8.00 dBm Offset 10.65 dB RBW 3 kHz
Att 20 dB SWT 332 ms VBW 10 kHz Mode Sweep
1AP View 2AP View 3AP View
D1 -20.240 dBm
Start 150.0 kHz 10000 pts Stop 30.0 MHz

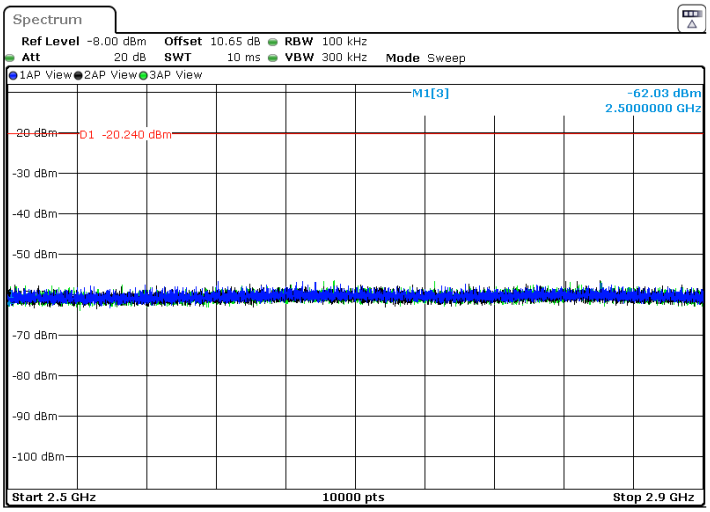

Spectrum
Ref Level -8.00 dBm Offset 10.65 dB RBW 100 kHz
Att 20 dB SWT 10 ms VBW 300 kHz Mode Sweep
1AP View 2AP View 3AP View
D1 -20.240 dBm
Start 30.0 MHz 10000 pts Stop 1.0 GHz

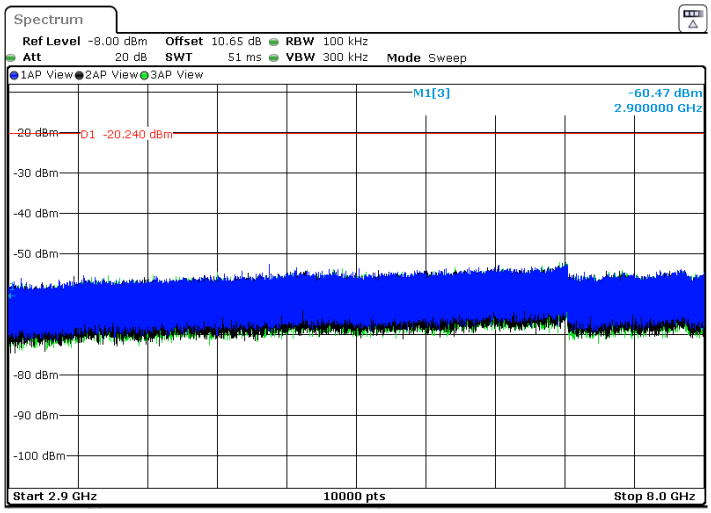

Spectrum
Ref Level -8.00 dBm Offset 10.65 dB RBW 100 kHz
Att 20 dB SWT 12 ms VBW 300 kHz Mode Sweep
1AP View 2AP View 3AP View
D1 -20.240 dBm
Start 1.0 GHz 10000 pts Stop 2.2 GHz

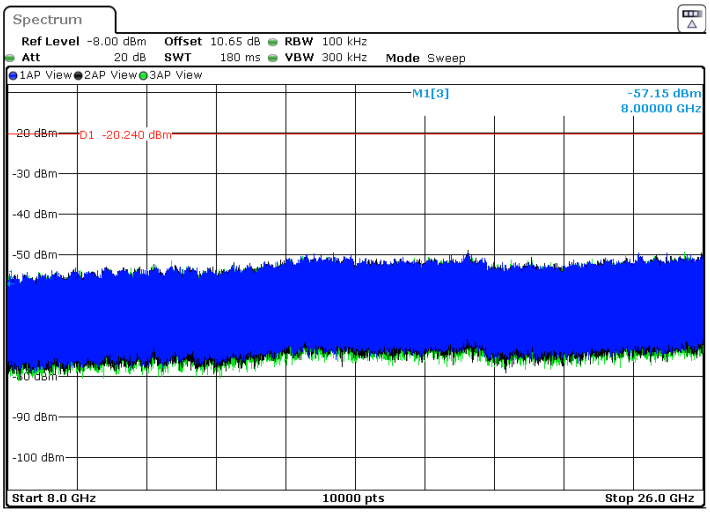

Spectrum
Ref Level -8.00 dBm Offset 10.65 dB RBW 100 kHz
Att 20 dB SWT 10 ms VBW 300 kHz Mode Sweep
1AP View 2AP View 3AP View
D1 -20.240 dBm
Start 2.2 GHz 10000 pts Stop 2.39 GHz


Spectrum
Ref Level -8.00 dBm Offset 10.65 dB RBW 100 kHz
Att 20 dB SWT 10 ms VBW 300 kHz Mode Sweep
1AP View 2AP View 3AP View
D1 -20.240 dBm
F1
Start 2.39 GHz 10000 pts Stop 2.405 GHz









Measurement from 8GHz to 26GHz: See Radiated emission §4.6.3 for frequencies observed

8.7. CONCLUSION

Band Edge Measurement performed on the sample of the product **PLTE602P**, SN: None, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

9. OCCUPIED BANDWIDTH

9.1. TEST CONDITIONS

Date of test	:	August 6, 2019
Test performed by	:	Majid MOURZAGH
Atmospheric pressure (hPa)	:	992
Relative humidity (%)	:	35
Ambient temperature (°C)	:	24

9.2. 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.
Offset: Attenuator+cable 10.65dB

☐ ***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:

a) RBW shall be in the range of 1% to 5% of the anticipated occupied bandwidth
b) Set the video bandwidth (VBW) ≥ 3 x RBW
c) SPAN = Capture all products of the modulation process
d) Detector = Peak.
e) Trace mode = max hold.
f) Sweep = auto couple.
g) Allow the trace to stabilize.
h) OBW 99% function of spectrum analyzer used

9.3. TEST EQUIPMENT LIST

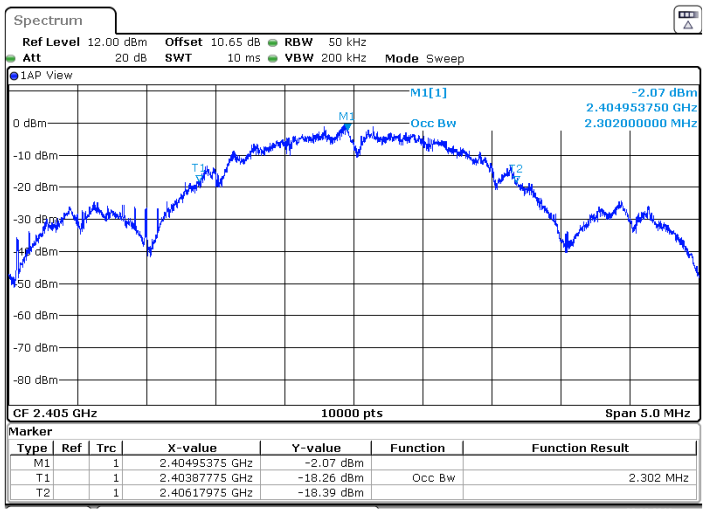
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable SMA	-	18GHz	A5329863	11/18	11/19
Attenuator 10dB	TECHNIWAVE	-	A7122273	06/18	06/20
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	12/17	12/19
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20

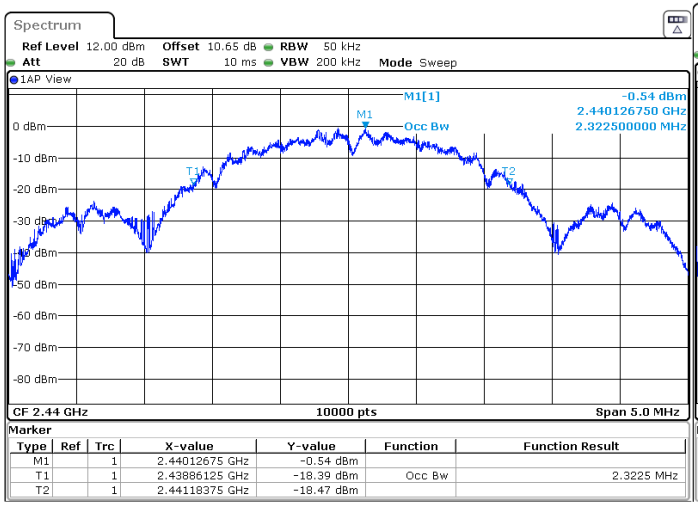
9.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

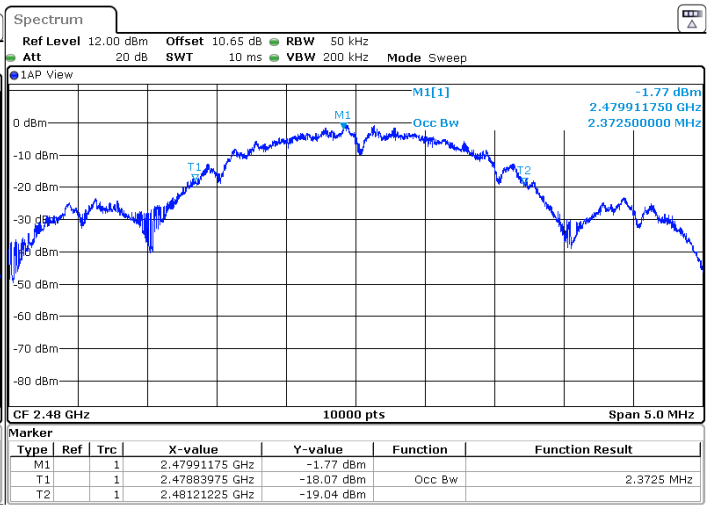
☑ None ☐ Divergence:

9.5. TEST SEQUENCE AND RESULTS

Channel	Channel Frequency (MHz)	99% Occupied Bandwidth (MHz)
Cmin	2405	**2.3020**
Cmid	2440	**2.3225**
Cmax	2480	**2.3725**

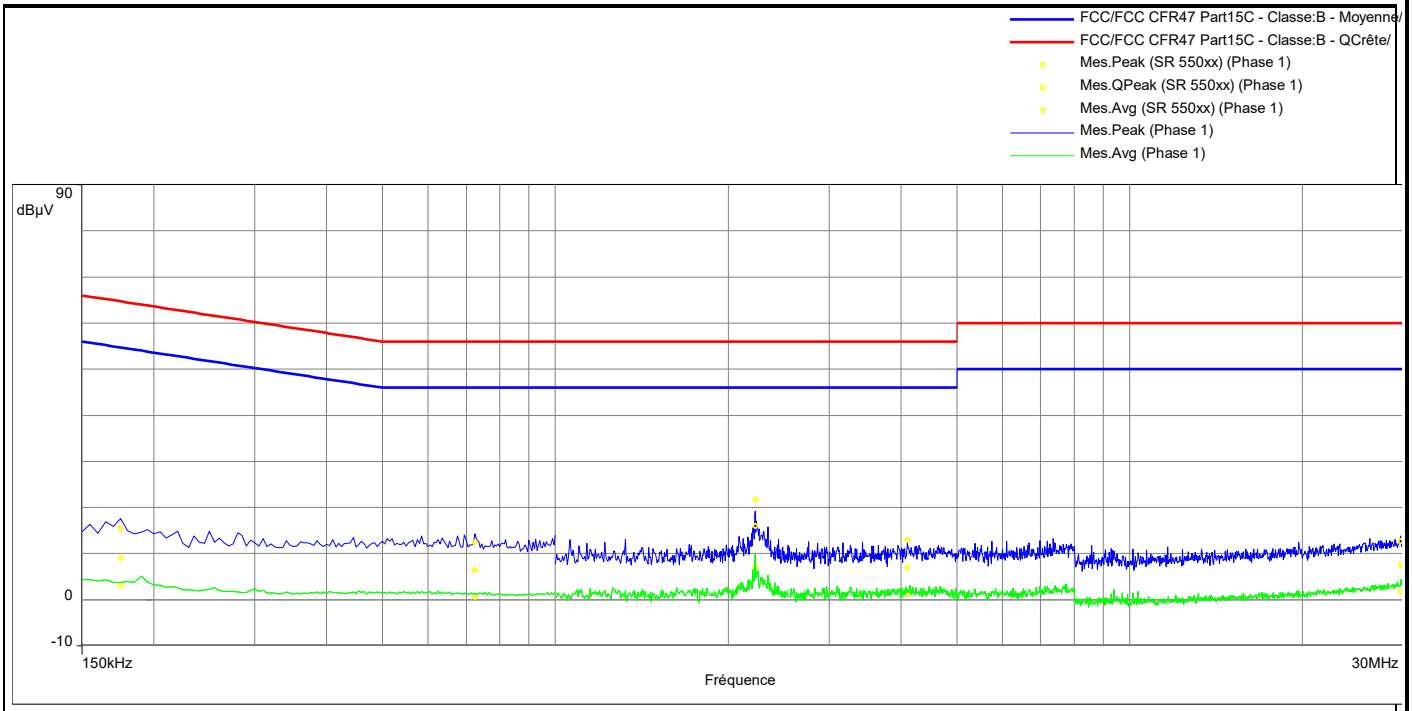






ANNEX 1 (GRAPHS)

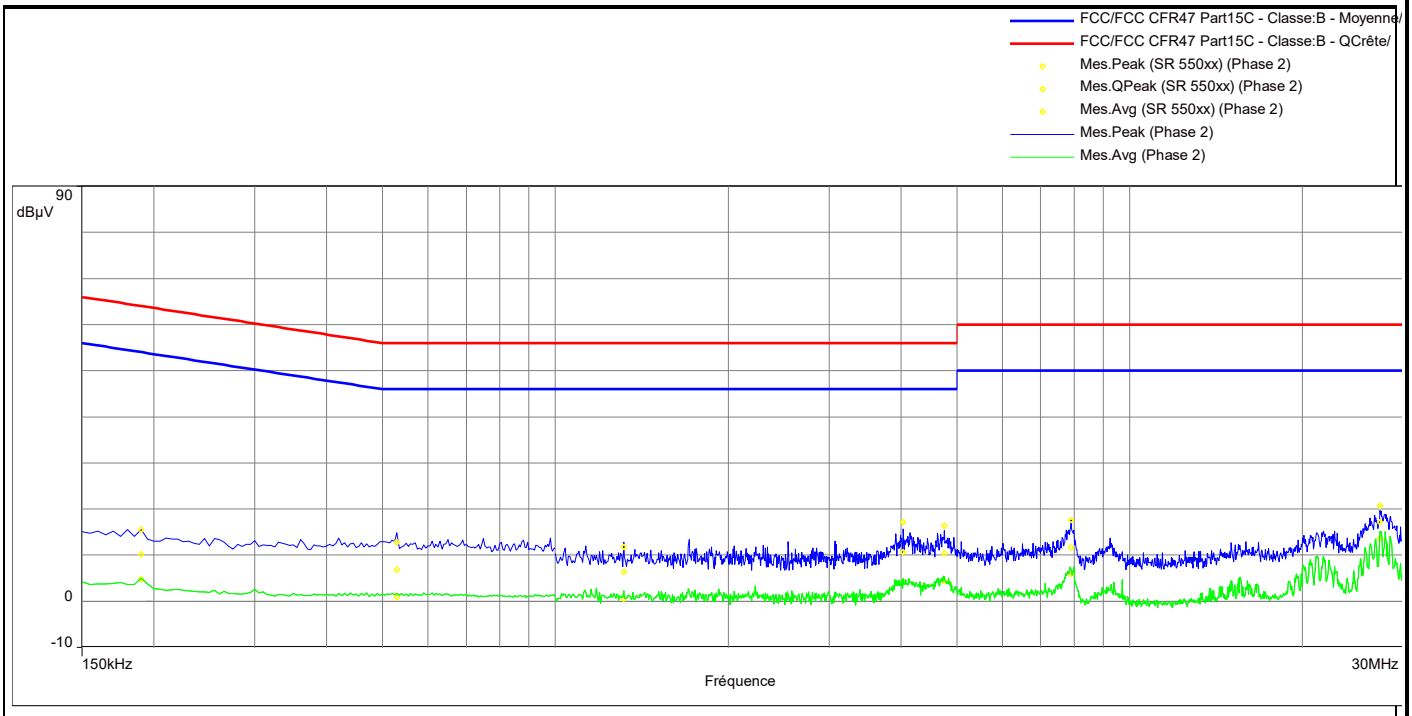
CONDUCTED EMISSIONS			
Graph name:	Emc#1	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration n°1: L1- A9 F63 480Vac/60Hz	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	480VAC / 60Hz	**RBW :**	10kHz
Line:	Phase 1	**VBW :**	30kHz



Spurious emissions

Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.175	15.5	9.0	64.7	-55.7	3.2	54.7	-51.6	Phase 1	10.1
0.725	12.4	6.5	56.0	-49.5	0.7	46.0	-45.3	Phase 1	10.2
2.230	21.8	16.0	56.0	-40.0	7.2	46.0	-38.8	Phase 1	10.4
4.105	13.1	7.0	56.0	-49.0	1.2	46.0	-44.8	Phase 1	10.6
29.595	12.8	7.5	60.0	-52.5	1.8	50.0	-48.2	Phase 1	13.3

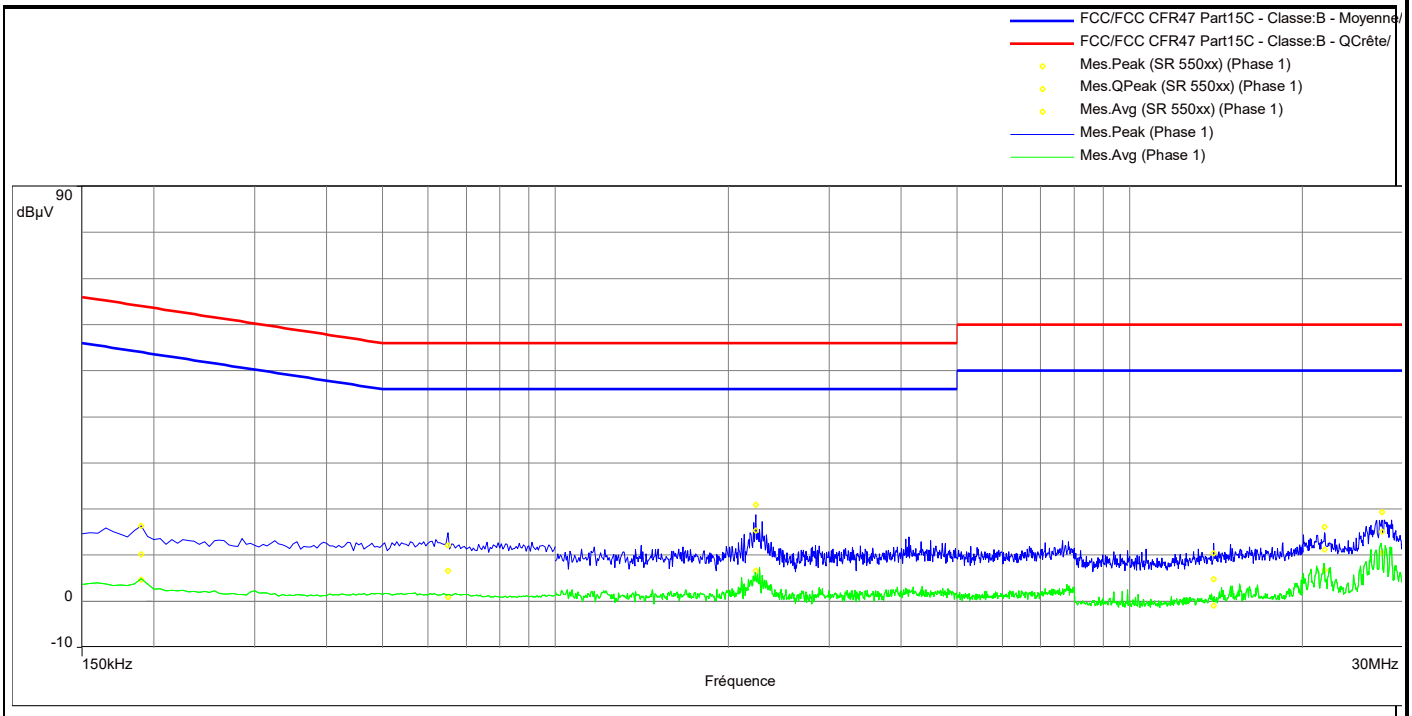
CONDUCTED EMISSIONS			
Graph name:	Emc#2	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration n°1: L2- A9 F63 480Vac/60Hz	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	480VAC / 60Hz	**RBW :**	10kHz
Line:	Phase 2	**VBW :**	30kHz



Spurious emissions

Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.190	15.5	10.2	64.0	-53.8	4.8	54.0	-49.3	Phase 2	10.1
0.530	12.8	6.8	56.0	-49.2	0.9	46.0	-45.1	Phase 2	10.2
1.315	11.8	6.3	56.0	-49.7	0.6	46.0	-45.4	Phase 2	10.3
4.035	17.2	10.7	56.0	-45.3	4.0	46.0	-42.0	Phase 2	10.6
4.755	16.4	10.4	56.0	-45.6	4.3	46.0	-41.7	Phase 2	10.6
7.910	17.7	11.7	60.0	-48.3	5.9	50.0	-44.1	Phase 2	10.9
27.280	20.7	17.2	60.0	-42.8	13.6	50.0	-36.4	Phase 2	13.1

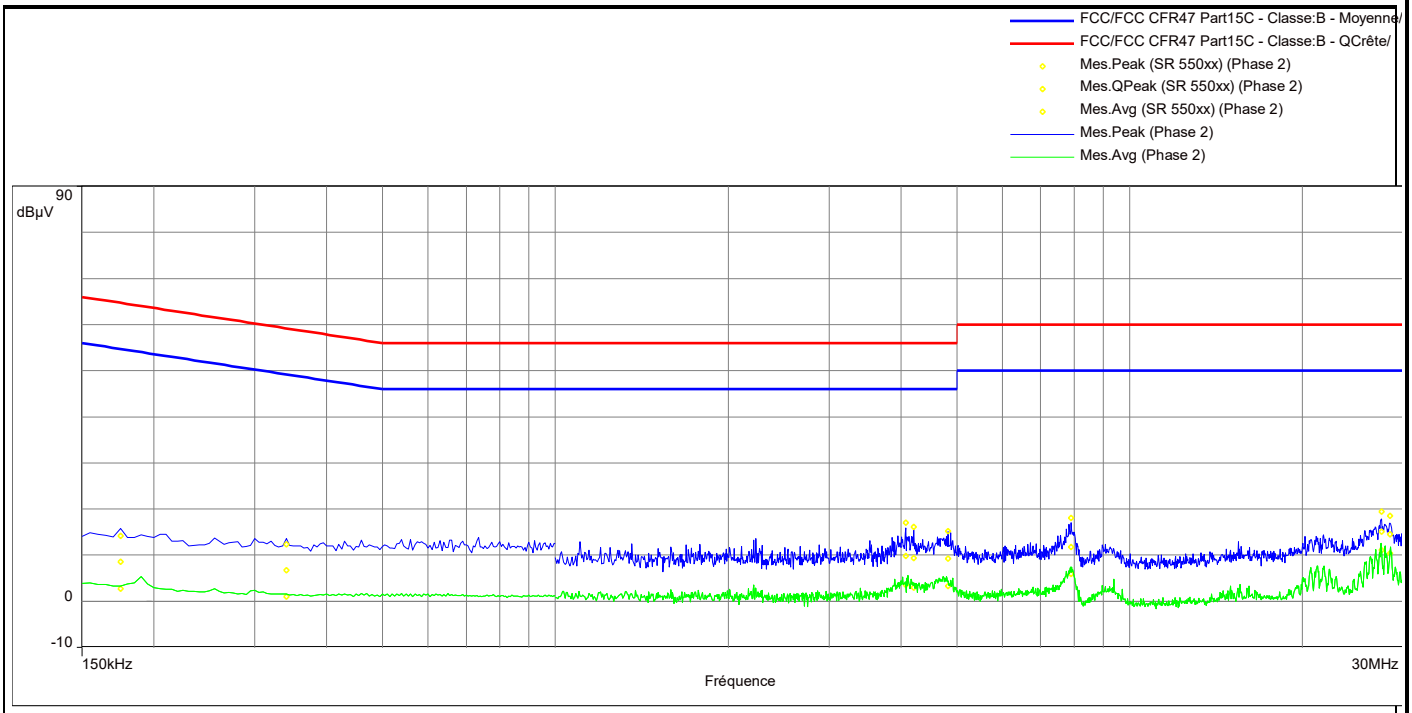
CONDUCTED EMISSIONS			
Graph name:	Emc#3	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration n°1: L1- A9 F63 480Vac/50Hz	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	480VAC / 50Hz	**RBW :**	10kHz
Line:	Phase 1	**VBW :**	30kHz



Spurious emissions

Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.190	16.3	10.2	64.0	-53.8	4.7	54.0	-49.3	Phase 1	10.1
0.650	12.1	6.6	56.0	-49.4	0.8	46.0	-45.2	Phase 1	10.2
2.235	21.0	15.3	56.0	-40.7	6.6	46.0	-39.4	Phase 1	10.4
14.015	10.4	4.8	60.0	-55.2	-1.0	50.0	-51.0	Phase 1	11.8
21.840	16.1	11.2	60.0	-48.8	6.7	50.0	-43.3	Phase 1	12.6
27.480	19.3	15.1	60.0	-44.9	10.5	50.0	-39.5	Phase 1	13.1

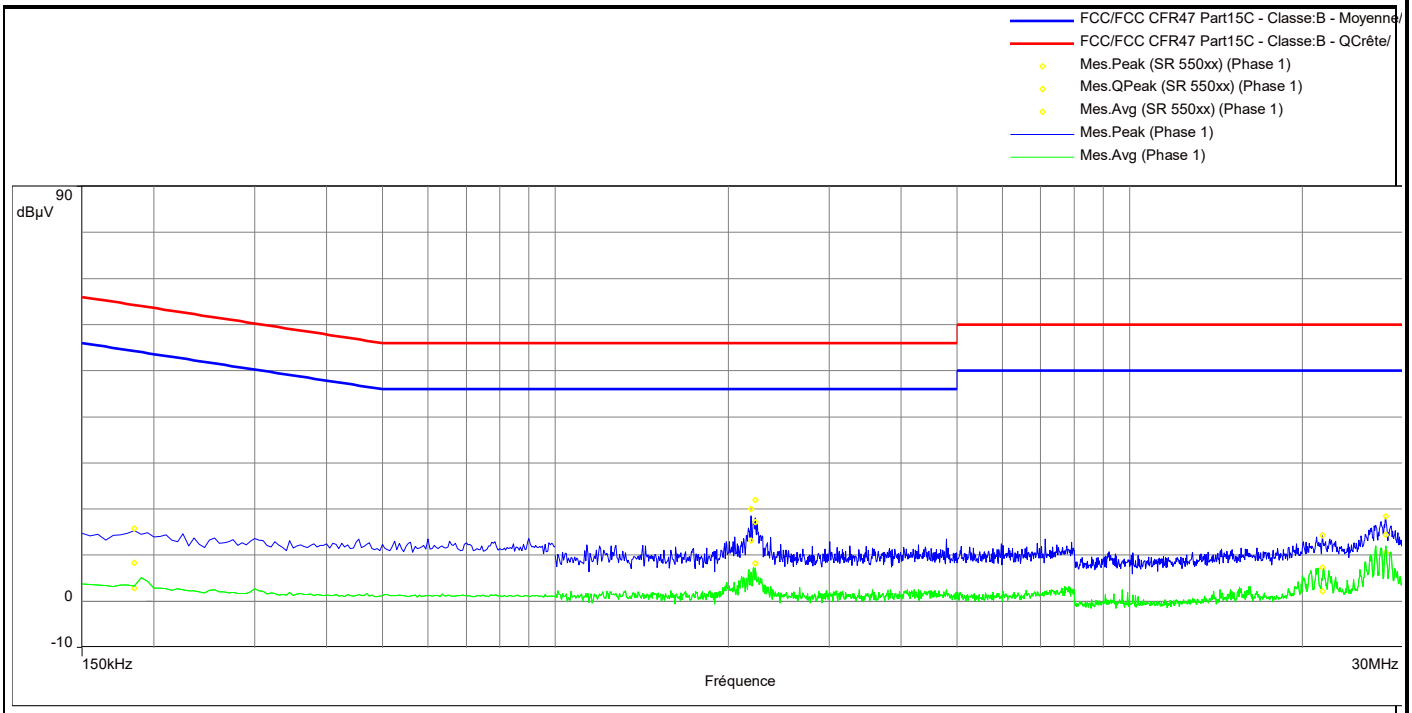
CONDUCTED EMISSIONS			
Graph name:	Emc#4	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration n°1: L2- A9 F63 480Vac/50Hz	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	480VAC / 50Hz	**RBW :**	10kHz
Line:	Phase 2	**VBW :**	30kHz



Spurious emissions

Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.175	14.2	8.6	64.7	-56.2	2.7	54.7	-52.0	Phase 2	10.1
0.340	12.3	6.7	59.2	-52.5	1.0	49.2	-48.2	Phase 2	10.1
4.075	17.1	9.9	56.0	-46.1	3.6	46.0	-42.4	Phase 2	10.6
4.205	16.2	9.3	56.0	-46.7	3.0	46.0	-43.0	Phase 2	10.6
4.825	15.2	9.3	56.0	-46.7	3.3	46.0	-42.7	Phase 2	10.6
7.910	18.1	11.7	60.0	-48.3	5.9	50.0	-44.1	Phase 2	10.9
27.440	19.5	15.1	60.0	-44.9	11.0	50.0	-39.0	Phase 2	13.1
28.400	18.6	14.6	60.0	-45.4	10.4	50.0	-39.6	Phase 2	13.2

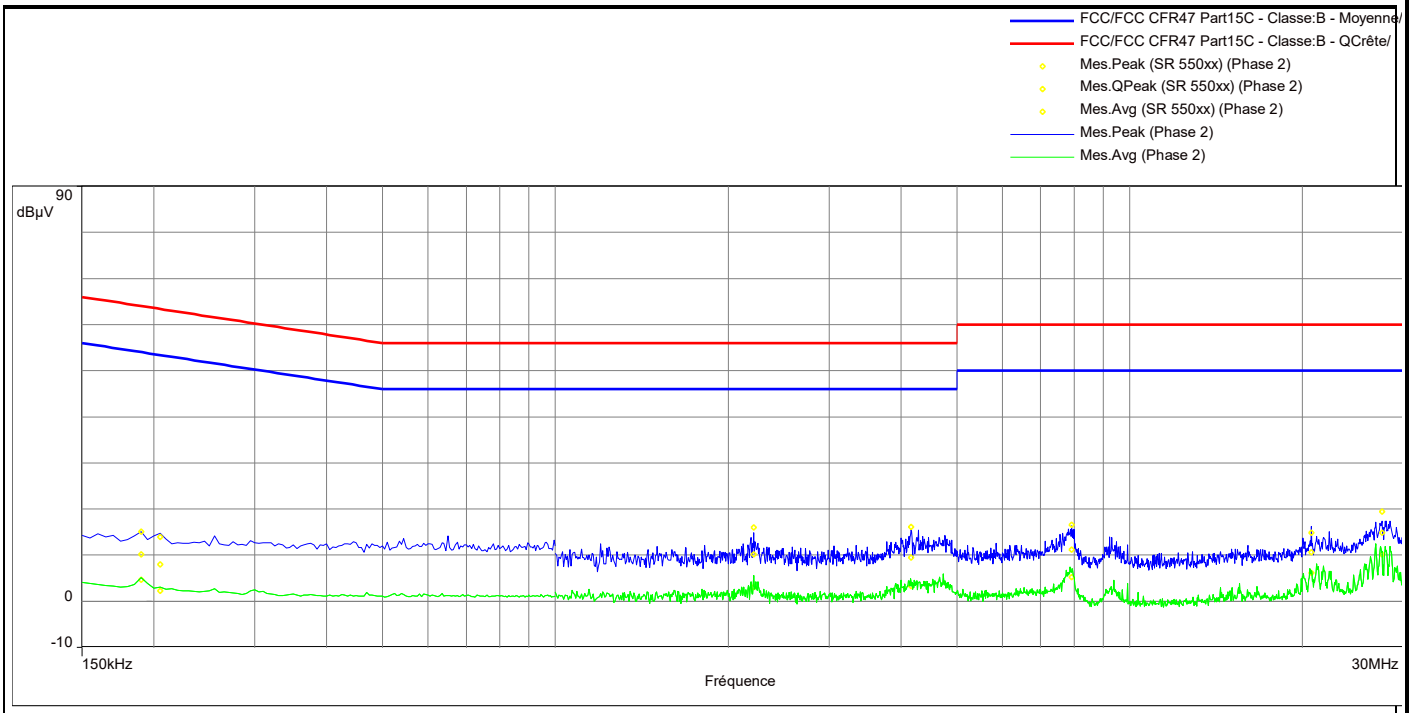
CONDUCTED EMISSIONS			
Graph name:	Emc#5	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration n°2: L1- A9 F63 240Vac/50Hz	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	240VAC / 50Hz	**RBW :**	10kHz
Line:	Phase 1	**VBW :**	30kHz



Spurious emissions

Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.185	15.8	8.4	64.3	-55.9	2.8	54.3	-51.4	Phase 1	10.1
2.190	20.0	13.2	56.0	-42.8	5.2	46.0	-40.8	Phase 1	10.4
2.230	22.0	17.1	56.0	-38.9	8.2	46.0	-37.8	Phase 1	10.4
21.675	14.3	7.3	60.0	-52.7	2.2	50.0	-47.8	Phase 1	12.6
27.920	18.5	14.4	60.0	-45.6	10.5	50.0	-39.5	Phase 1	13.1

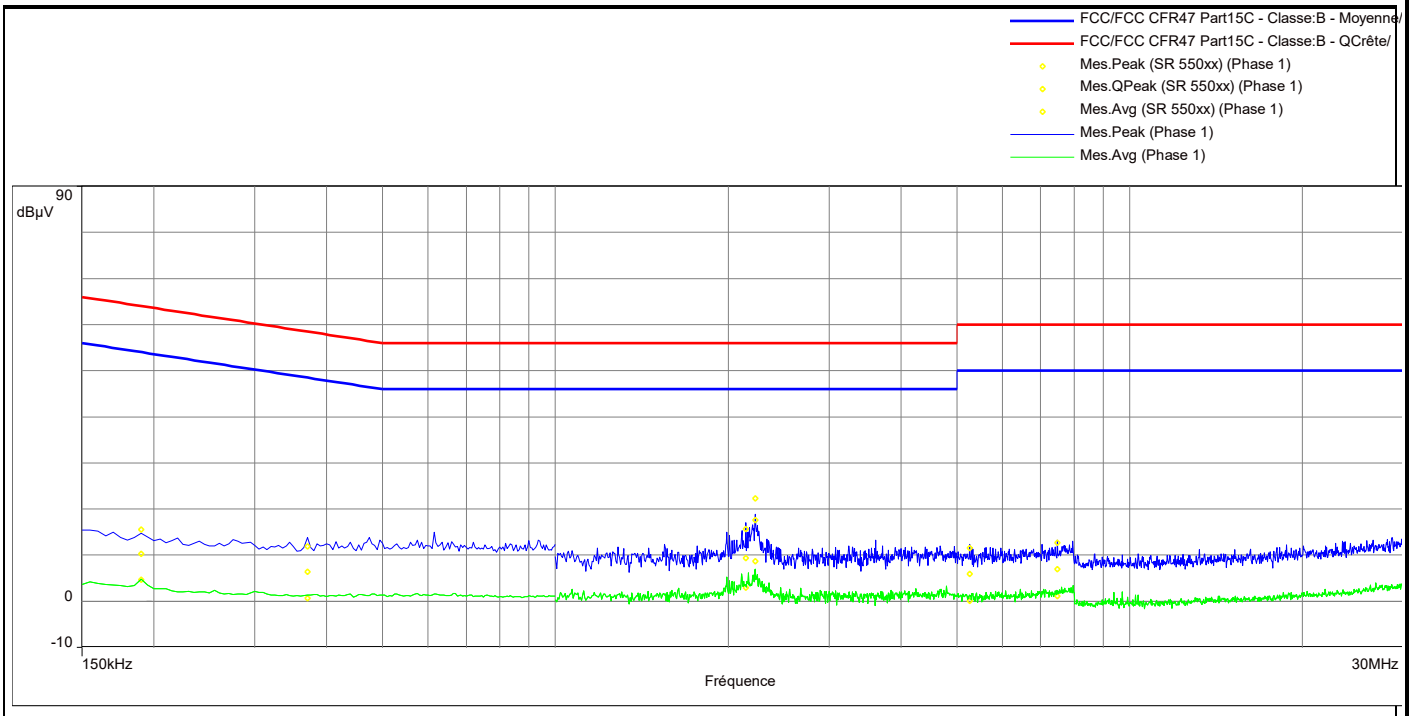
CONDUCTED EMISSIONS			
Graph name:	Emc#6	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration n°2: L2- A9 F63 240Vac/50Hz	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	240VAC / 50Hz	**RBW :**	10kHz
Line:	Phase 2	**VBW :**	30kHz



Spurious emissions

Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.190	15.0	10.2	64.0	-53.9	4.7	54.0	-49.4	Phase 2	10.1
0.205	13.9	8.0	63.4	-55.4	2.3	53.4	-51.1	Phase 2	10.1
2.215	16.0	10.2	56.0	-45.8	3.1	46.0	-42.9	Phase 2	10.4
4.160	16.1	9.5	56.0	-46.5	3.3	46.0	-42.7	Phase 2	10.6
7.925	16.6	11.2	60.0	-48.8	5.3	50.0	-44.7	Phase 2	10.9
20.720	14.8	10.6	60.0	-49.4	6.1	50.0	-43.9	Phase 2	12.5
27.480	19.5	14.9	60.0	-45.1	10.2	50.0	-39.8	Phase 2	13.1

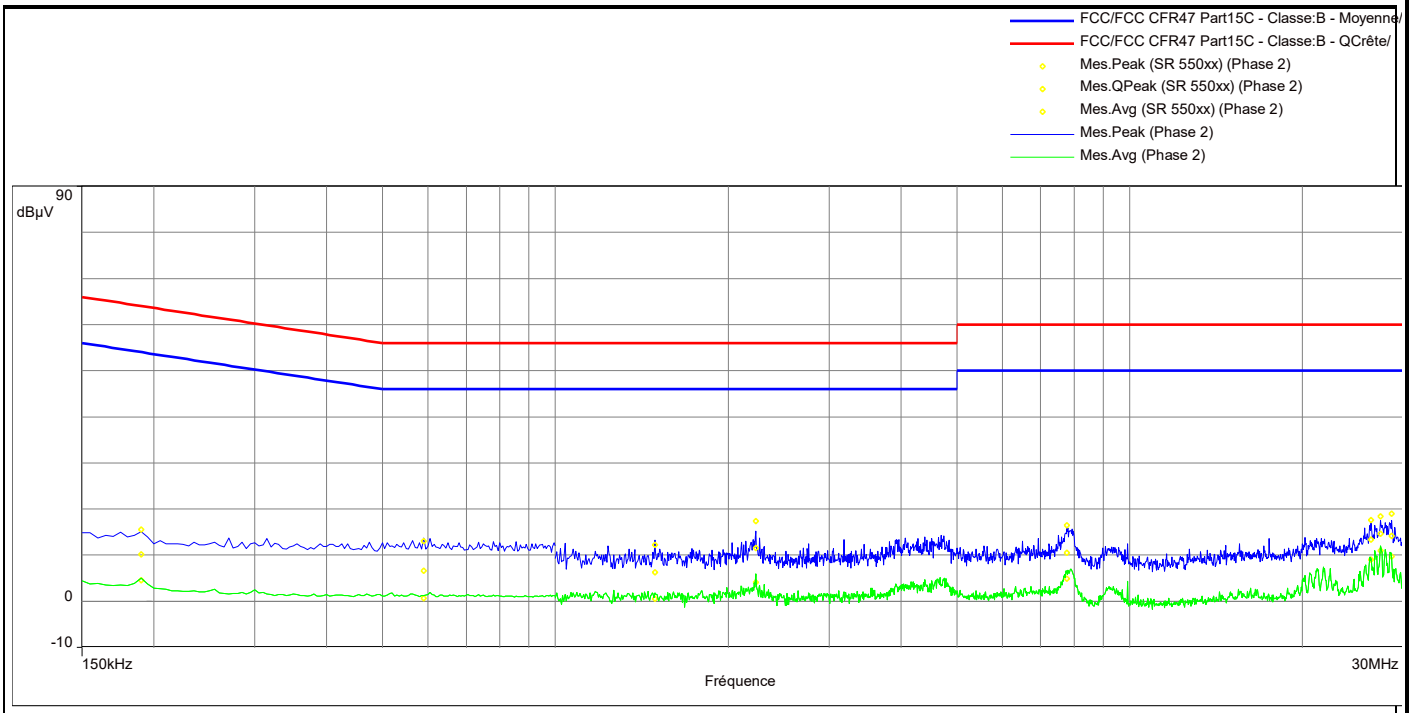
CONDUCTED EMISSIONS			
Graph name:	Emc#7	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration n°2: L1- A9 F63 240Vac/60Hz	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	240VAC / 60Hz	**RBW :**	10kHz
Line:	Phase 1	**VBW :**	30kHz



Spurious emissions

Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.190	15.5	10.2	64.0	-53.8	4.6	54.0	-49.4	Phase 1	10.1
0.370	11.9	6.4	58.5	-52.1	0.7	48.5	-47.8	Phase 1	10.1
2.145	15.7	9.3	56.0	-46.7	2.9	46.0	-43.1	Phase 1	10.4
2.230	22.3	17.6	56.0	-38.4	8.7	46.0	-37.3	Phase 1	10.4
5.265	11.6	5.9	60.0	-54.1	0.1	50.0	-49.9	Phase 1	10.7
7.485	12.6	7.0	60.0	-53.0	1.2	50.0	-48.8	Phase 1	10.9

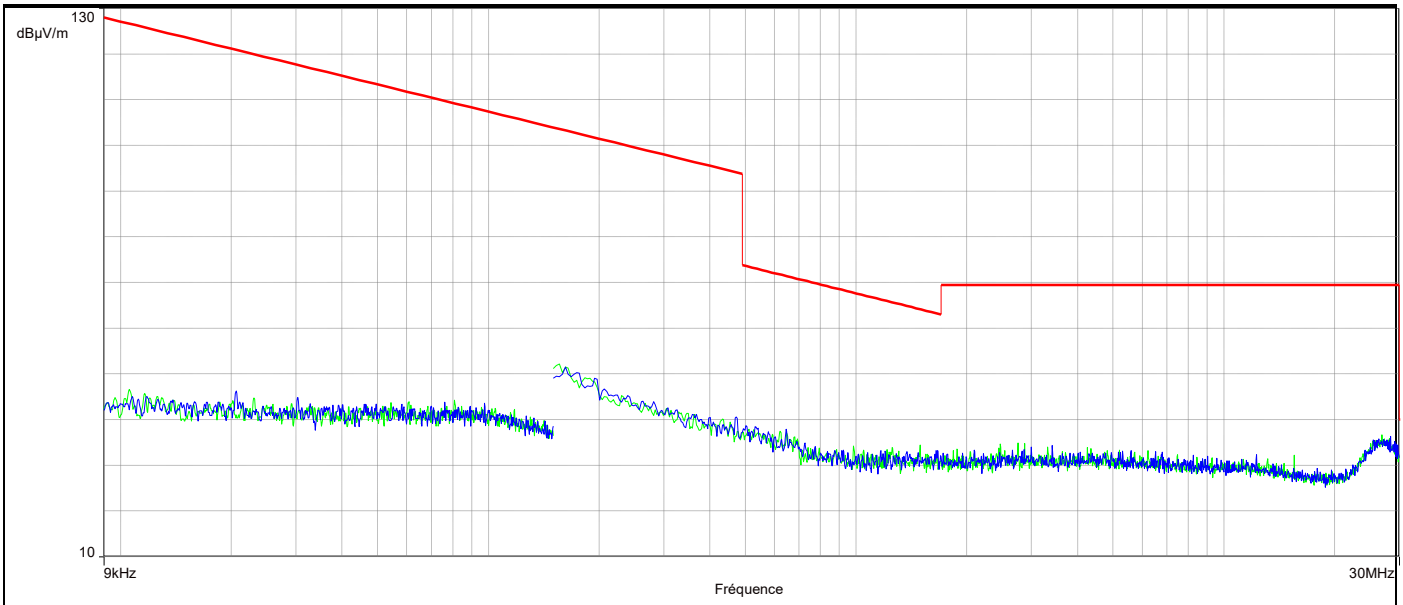
CONDUCTED EMISSIONS			
Graph name:	Emc#8	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Configuration n°2: L2- A9 F63 240Vac/60Hz	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	240VAC / 60Hz	**RBW :**	10kHz
Line:	Phase 2	**VBW :**	30kHz



Spurious emissions

Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.190	15.6	10.2	64.0	-53.8	4.6	54.0	-49.4	Phase 2	10.1
0.590	13.0	6.6	56.0	-49.4	0.7	46.0	-45.3	Phase 2	10.2
1.490	12.2	6.3	56.0	-49.7	0.5	46.0	-45.5	Phase 2	10.3
2.235	17.4	11.5	56.0	-44.5	4.1	46.0	-41.9	Phase 2	10.4
7.780	16.5	10.5	60.0	-49.5	4.9	50.0	-45.1	Phase 2	10.9
26.320	17.6	13.3	60.0	-46.7	9.0	50.0	-41.0	Phase 2	13.0
27.320	18.4	14.7	60.0	-45.3	11.0	50.0	-39.0	Phase 2	13.1
28.560	19.0	14.1	60.0	-45.9	9.7	50.0	-40.3	Phase 2	13.2

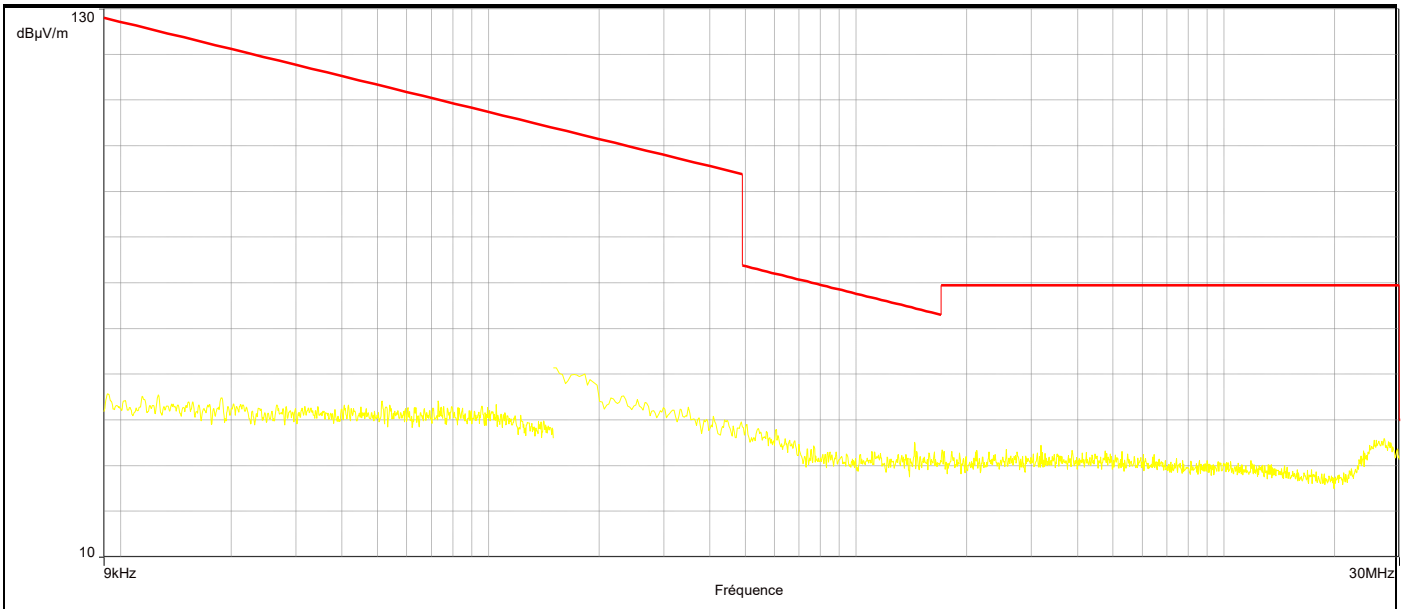
RADIATED EMISSIONS			
Graph name:	Emr#1	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Worst case presented Configuration n°2 (0°/90°) - Cmid - TX mode - Axis XY	
Class:			
Frequency range: [9kHz - 30MHz]			
Antenna polarization:	0° & 90°	**RBW :**	500Hz & 10kHz
Azimuth:	0° - 360°	**VBW :**	2kHz & 30kHz



Spurious emissions

No significative frequency observed

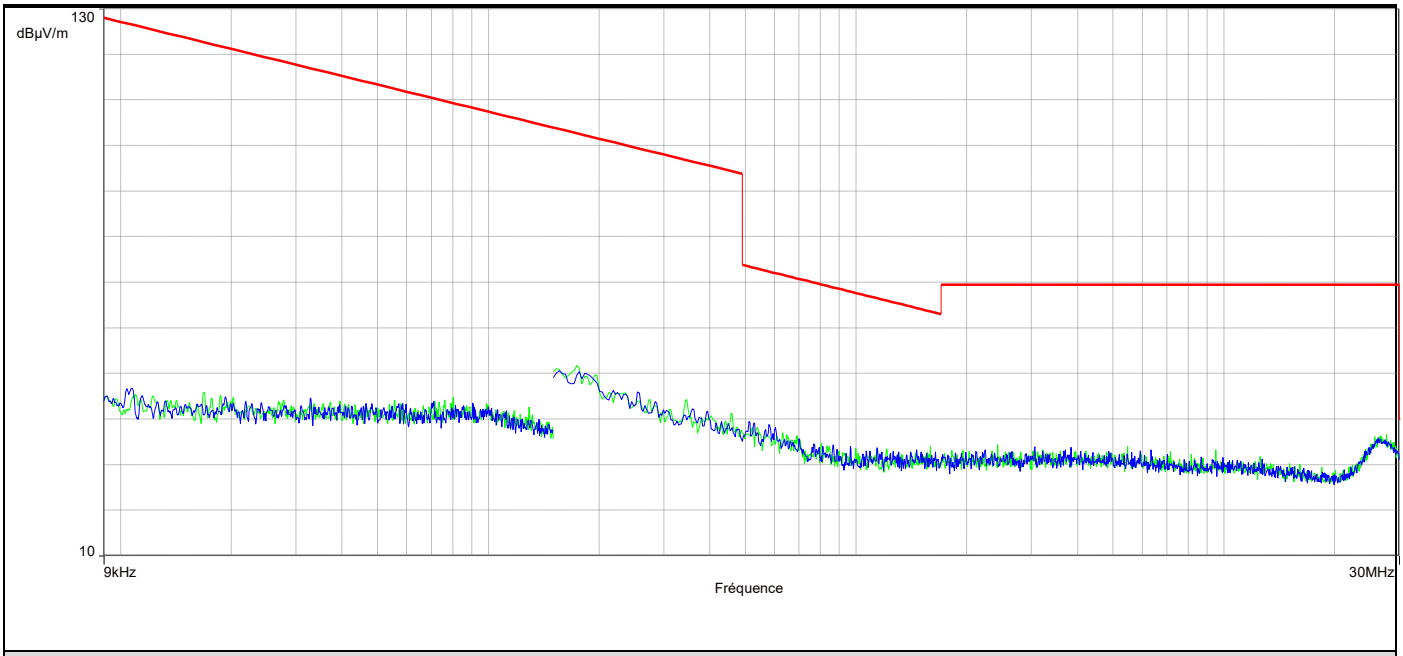
RADIATED EMISSIONS			
Graph name:	Emr#2	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Worst case presented Configuration n°2 (180°) Cmid - TX mode - Axis XY	
Class:			
Frequency range: [9kHz - 30MHz]			
Antenna polarization:	180°	**RBW :**	500Hz & 10kHz
Azimuth:	0° - 360°	**VBW :**	2kHz & 30kHz



Spurious emissions

No significative frequency observed

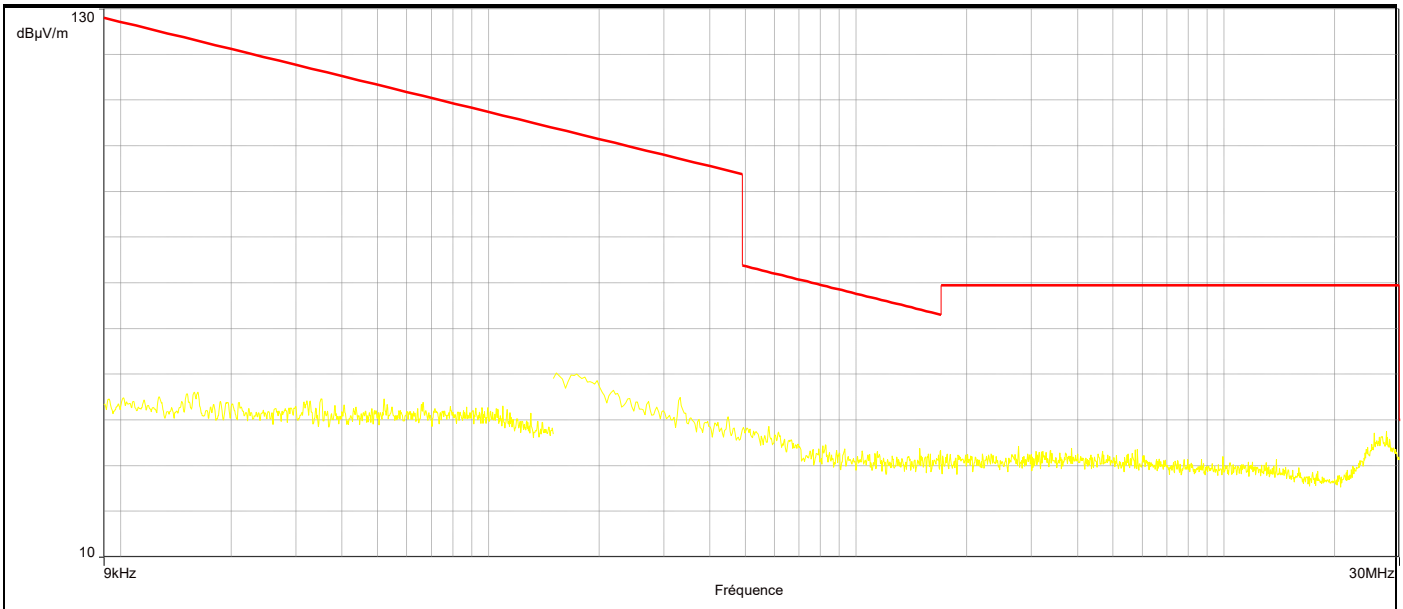
RADIATED EMISSIONS			
Graph name:	Emr#3	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Worst case presented Configuration n°2	
Class:		(0°/90°) - Cmid - TX mode - Axis Z	
Frequency range: [9kHz - 30MHz]			
Antenna polarization:	0° & 90°	**RBW :**	500Hz & 10kHz
Azimuth:	0° - 360°	**VBW :**	2kHz & 30kHz



Spurious emissions

No significative frequency observed

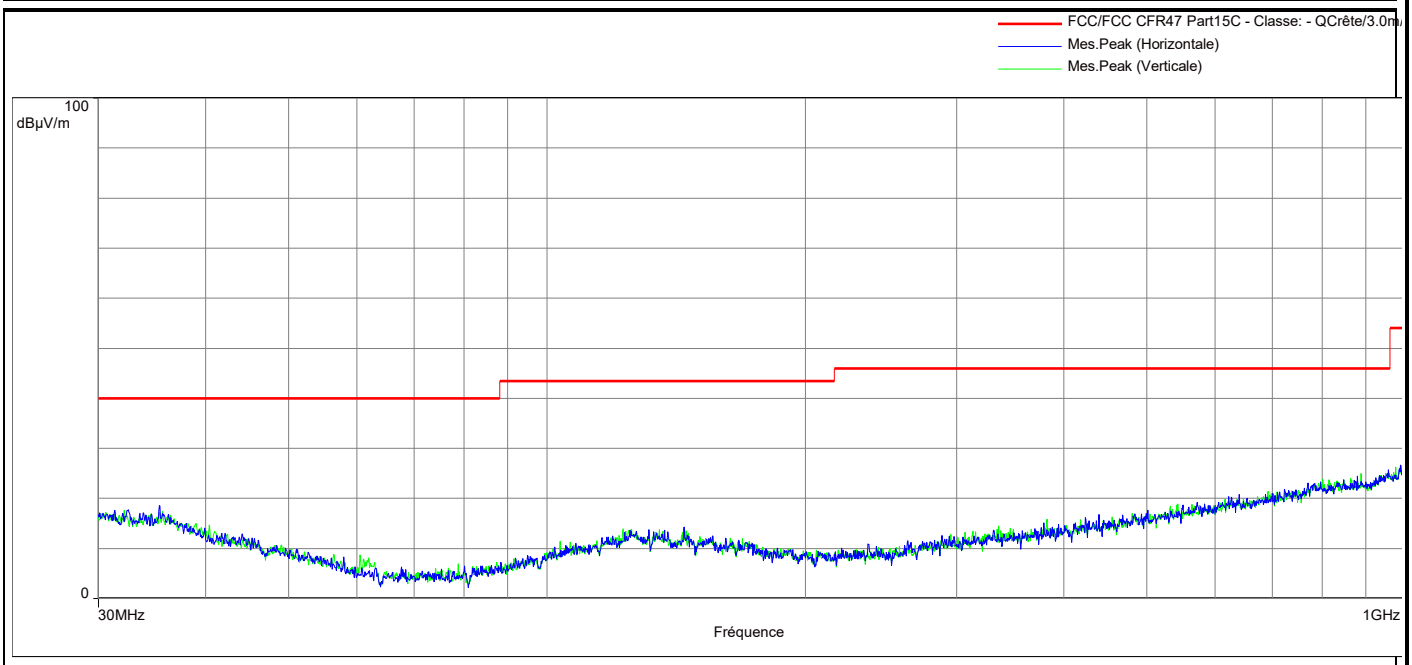
RADIATED EMISSIONS			
Graph name:	Emr#4	**Test configuration:**	
Limit:	FCC CFR47 Part15C	Worst case presented Configuration n°2 (180°) - Cnom - TX mode - Axis Z	
Class:			
Frequency range: [9kHz - 30MHz]			
Antenna polarization:	180°	**RBW :**	500Hz & 10kHz
Azimuth:	0° - 360°	**VBW :**	2kHz & 30kHz



Spurious emissions

No significative frequency observed

RADIATED EMISSIONS			
Graph name:	Emr#5	**Test configuration:**	
Limit:	FCC CFR47 Part15C	C3 - FSV(H+V)[0.03-1]GHz - Cfg n°1: 480Vac Axis XY	
Class:			
Frequency range: [30MHz - 1GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz

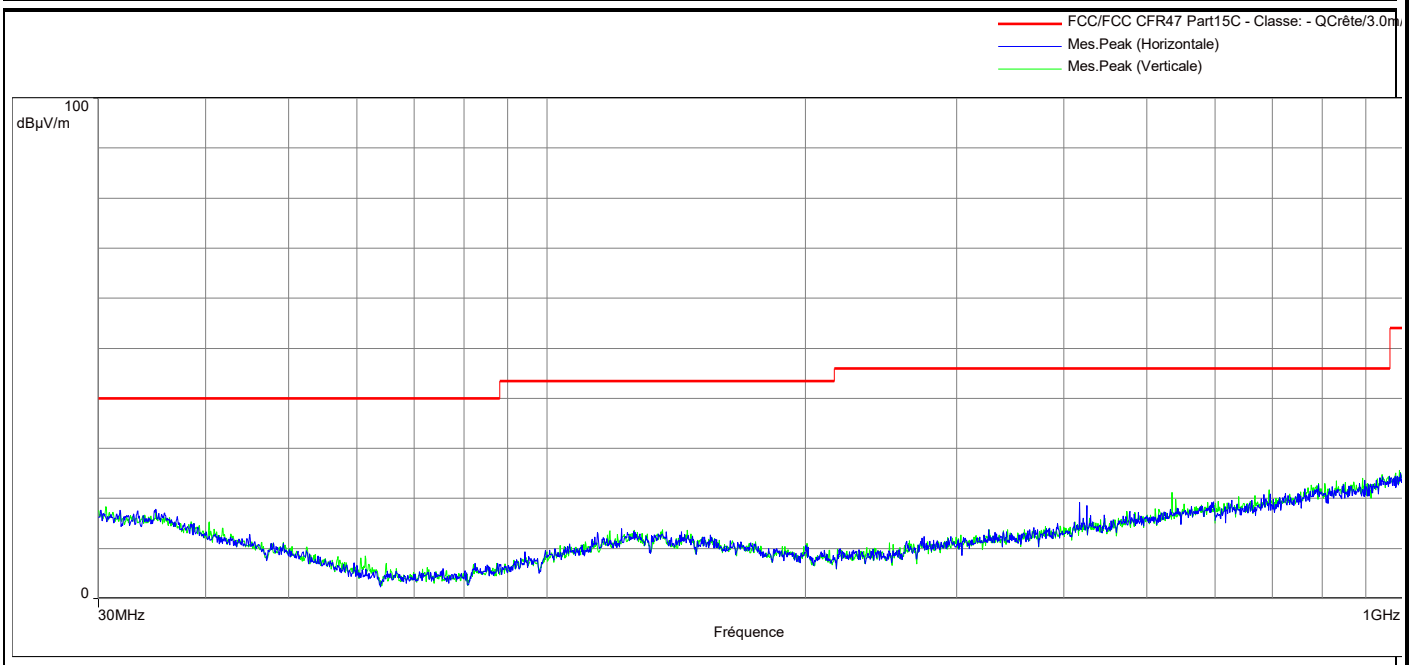


Spurious emissions

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

No significative frequency observed

RADIATED EMISSIONS			
Graph name:	Emr#6	**Test configuration:**	
Limit:	FCC CFR47 Part15C	C3 - FSV(H+V)[0.03-1]GHz - Cfg n°1: 480Vac Axis Z	
Class:			
Frequency range: [30MHz - 1GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz

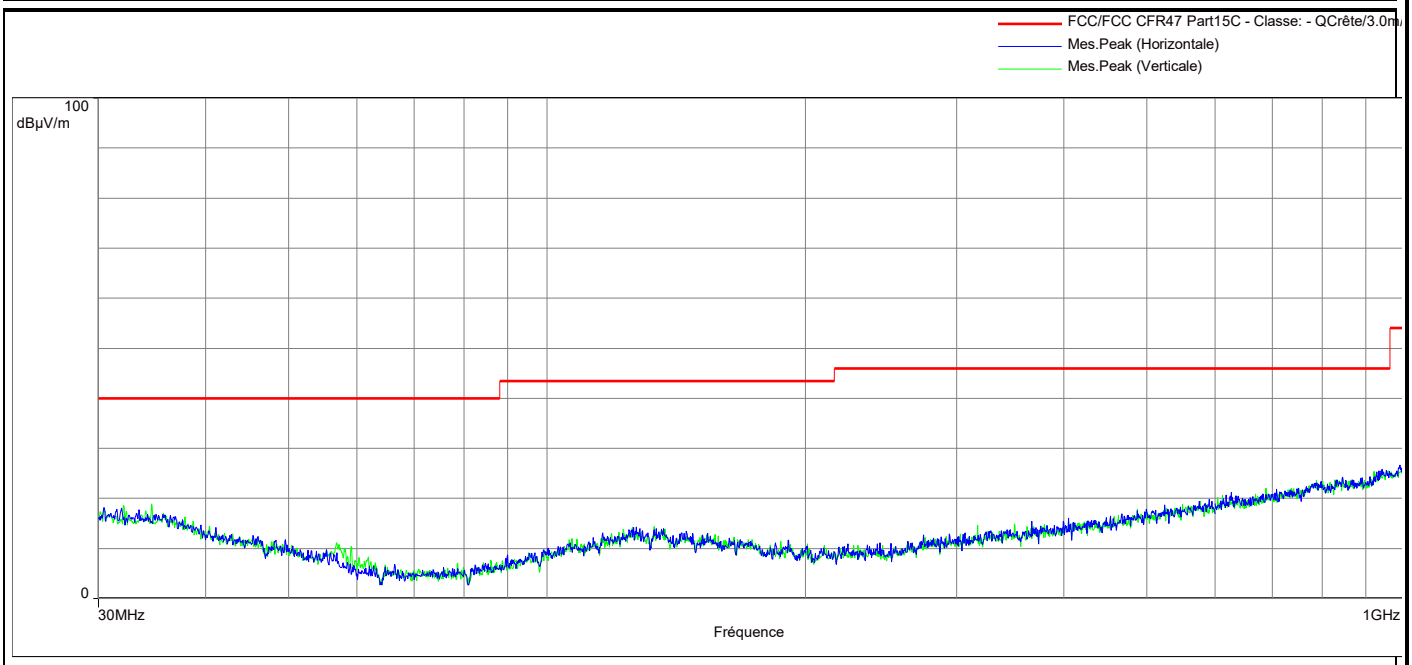


Spurious emissions

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

No significative frequency observed

RADIATED EMISSIONS			
Graph name:	Emr#7	**Test configuration:**	
Limit:	FCC CFR47 Part15C	C3 - FSV(H+V)[0.03-1]GHz - Cfg n°2: 240Vac Axis XY	
Class:			
Frequency range: [30MHz - 1GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz

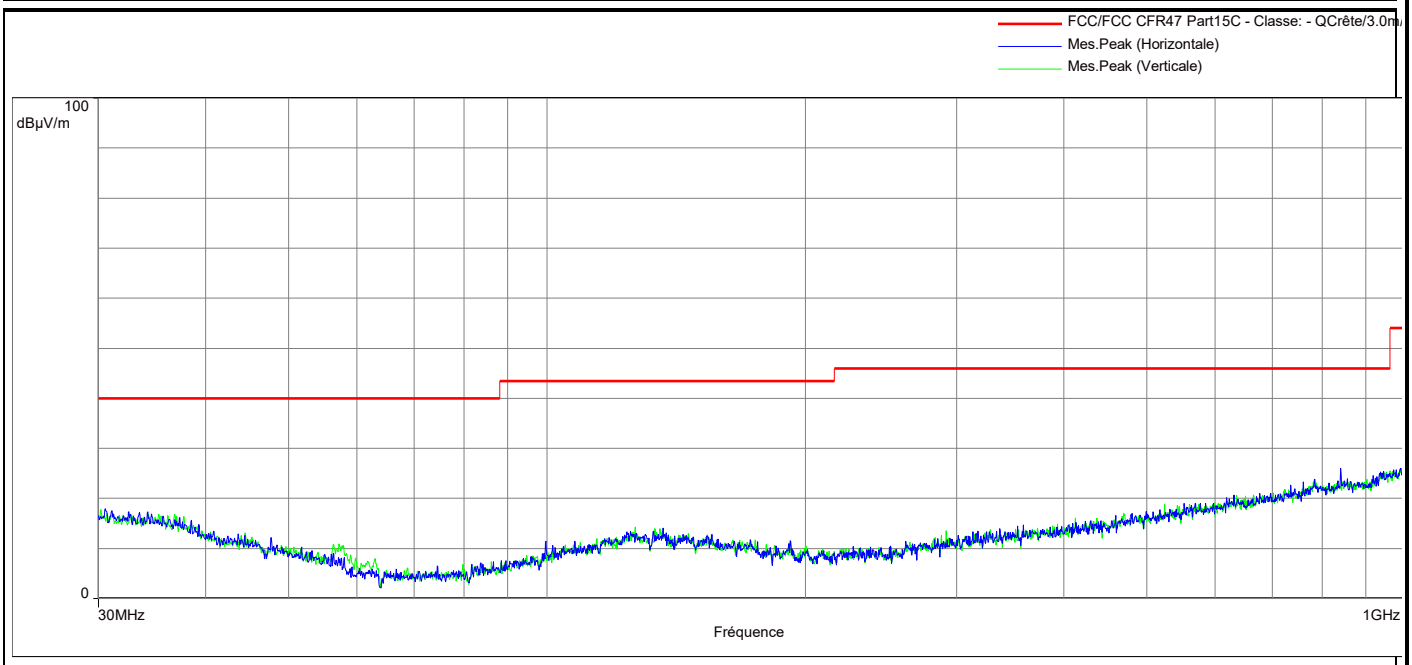


Spurious emissions

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

No significative frequency observed

RADIATED EMISSIONS			
Graph name:	Emr#8	**Test configuration:**	
Limit:	FCC CFR47 Part15C	C3 - FSV(H+V)[0.03-1]GHz - Cfg n°2: 240Vac Axis Z	
Class:			
Frequency range: [30MHz - 1GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	100kHz
Azimuth:	0° - 360°	**VBW :**	300kHz

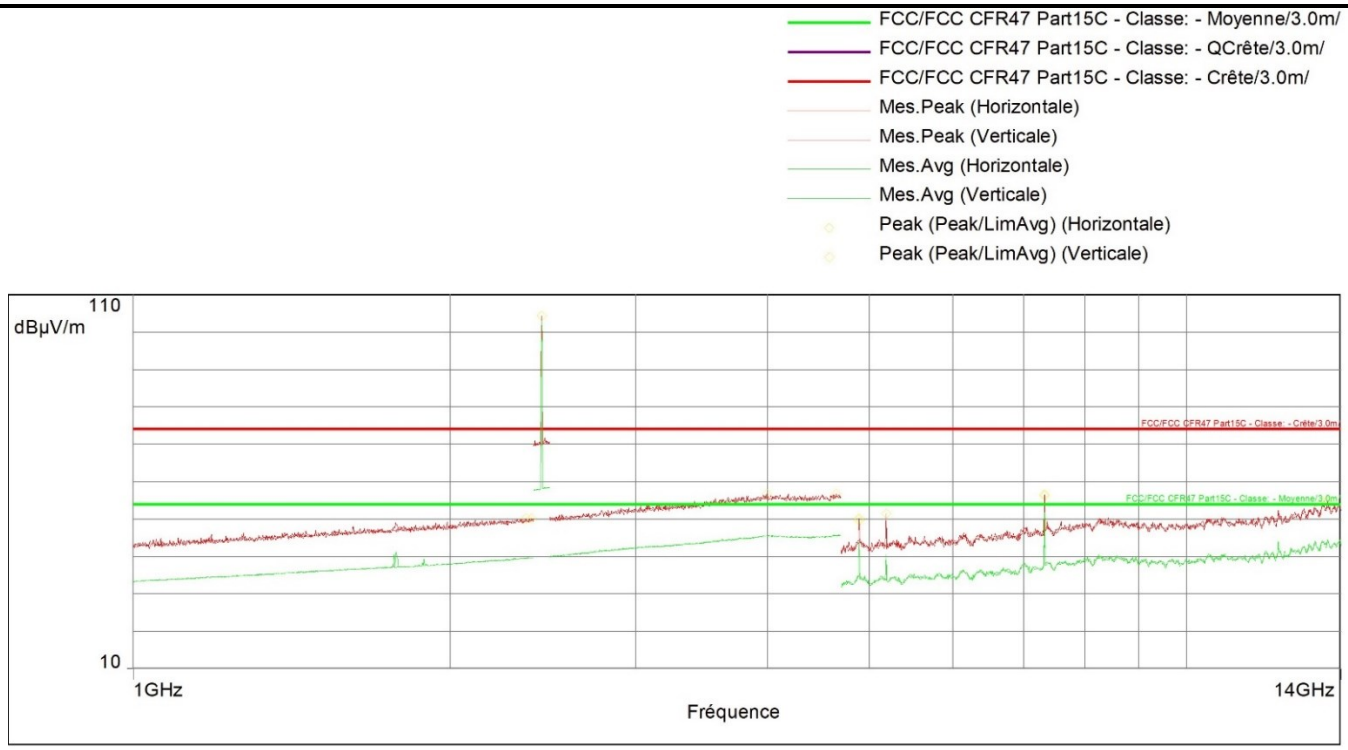


Spurious emissions

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

No significative frequency observed

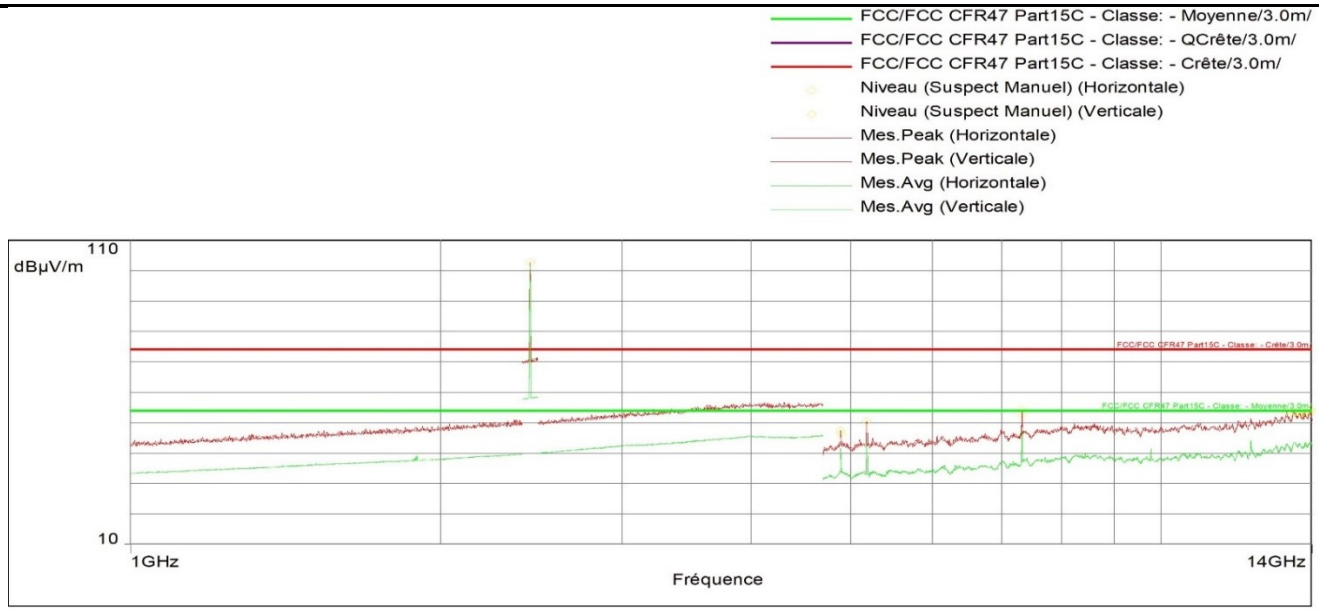
RADIATED EMISSIONS			
Graph name:	Emr#9	**Test configuration:**	
Limit:	FCC CFR47 Part15C	(H+V) - CMid - TX mode - Axis XY	
Class:			
Frequency range: [1GHz - 14GHz]			
Antenna polarization:		**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Avg Level (dBµV/m)	Avg Limit (dBµV/m)	Margin (dB)	Polarization	Correction (dB)
4650.794	56.8	74	**-17.2**	46.1	54	**-7.9**	Horizontal	38.6
4880.689	50.2	74	**-23.8**	43.2	54	**-10.8**	Horizontal	-24.5
7321.106	56.2	74	**-17.8**	48.3	54	**-5.7**	Horizontal	-19.5
13594.497	54.9	74	**-19.1**	41.9	54	**-12.1**	Horizontal	-12.8
3993.823	56.8	74	**-17.2**	43.4	54	**-10.6**	Vertical	38.5
4879.689	49.6	74	**-24.4**	43.6	54	**-10.4**	Vertical	-24.5
5183.484	51.4	74	**-22.6**	39.8	54	**-14.2**	Vertical	-24
7321.373	56.5	74	**-17.5**	43.1	54	**-10.9**	Vertical	-19.5
13455.286	54.6	74	**-19.4**	42.1	54	**-11.9**	Vertical	-12.6

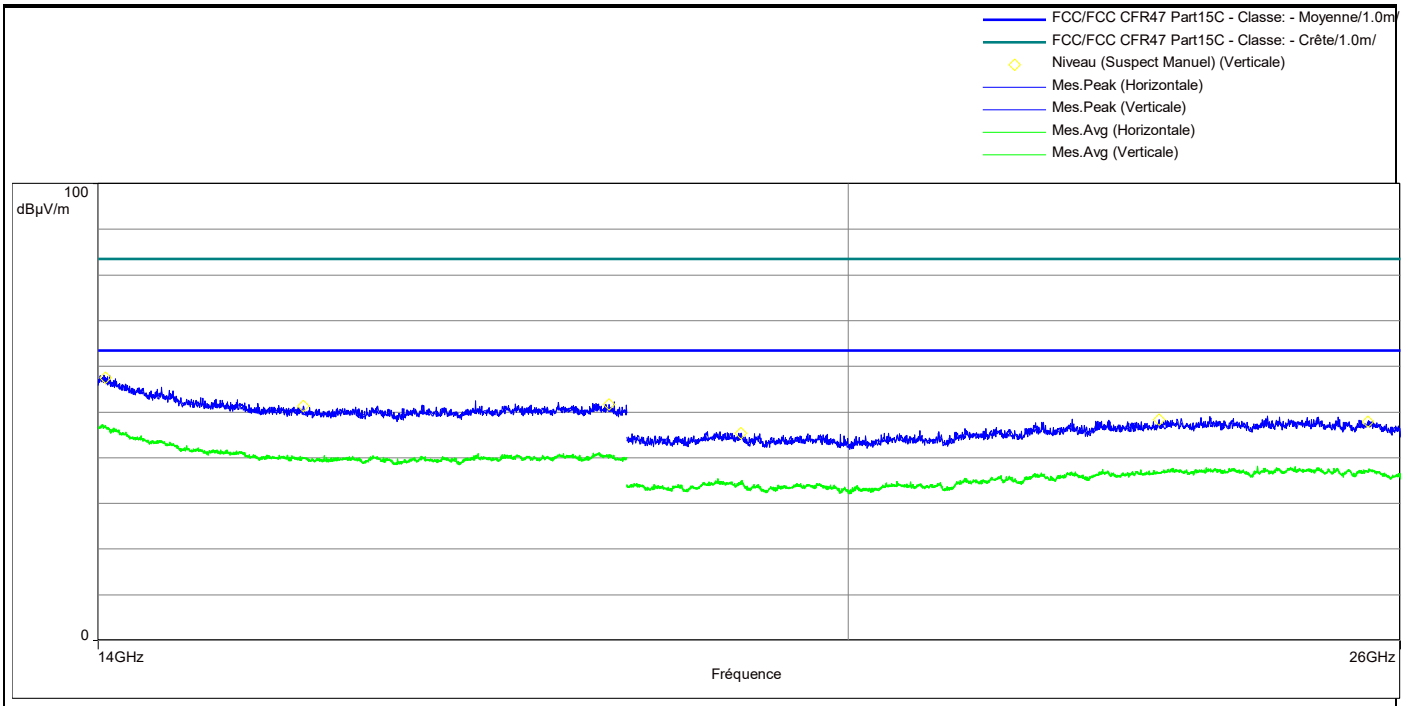
RADIATED EMISSIONS			
Graph name:	Emr#10	**Test configuration:**	
Limit:	FCC CFR47 Part15C	(H+V) - CMid - TX mode - Axis Z	
Class:			
Frequency range: [1GHz - 14GHz]			
Antenna polarization:		**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Avg Level (dBµV/m)	Avg Limit (dBµV/m)	Margin (dB)	Polarization	Correction (dB)
4880.689	46.3	74	**-27.7**	41.3	54	**-12.7**	Horizontal	-24.5
5174.82	50.5	74	**-23.5**	42.1	54	**-11.9**	Horizontal	-24
7320.106	54.3	74	**-19.7**	47.9	54	**-6.1**	Horizontal	-19.5
13439.112	53.6	74	**-20.4**	40.7	54	**-13.3**	Horizontal	-12.8
13638.975	53.3	74	**-20.7**	40.9	54	**-13.1**	Horizontal	-13
13780.497	53	74	**-21**	41.1	54	**-12.9**	Horizontal	-13.2
13950.323	54.3	74	**-19.7**	41.3	54	**-12.7**	Horizontal	-12.5
4880.689	47.4	74	**-26.6**	41.4	54	**-12.6**	Vertical	-24.5
7320.373	52.6	74	**-21.4**	47.4	54	**-6.6**	Vertical	-19.5
13495.72	53.2	74	**-20.8**	40.2	54	**-13.8**	Vertical	-12.2
13622.224	53.1	74	**-20.9**	40.3	54	**-13.7**	Vertical	-13
13777.031	53.4	74	**-20.6**	40.4	54	**-13.6**	Vertical	-13.3
13989.025	53.4	74	**-20.6**	41.1	54	**-12.9**	Vertical	-12.4

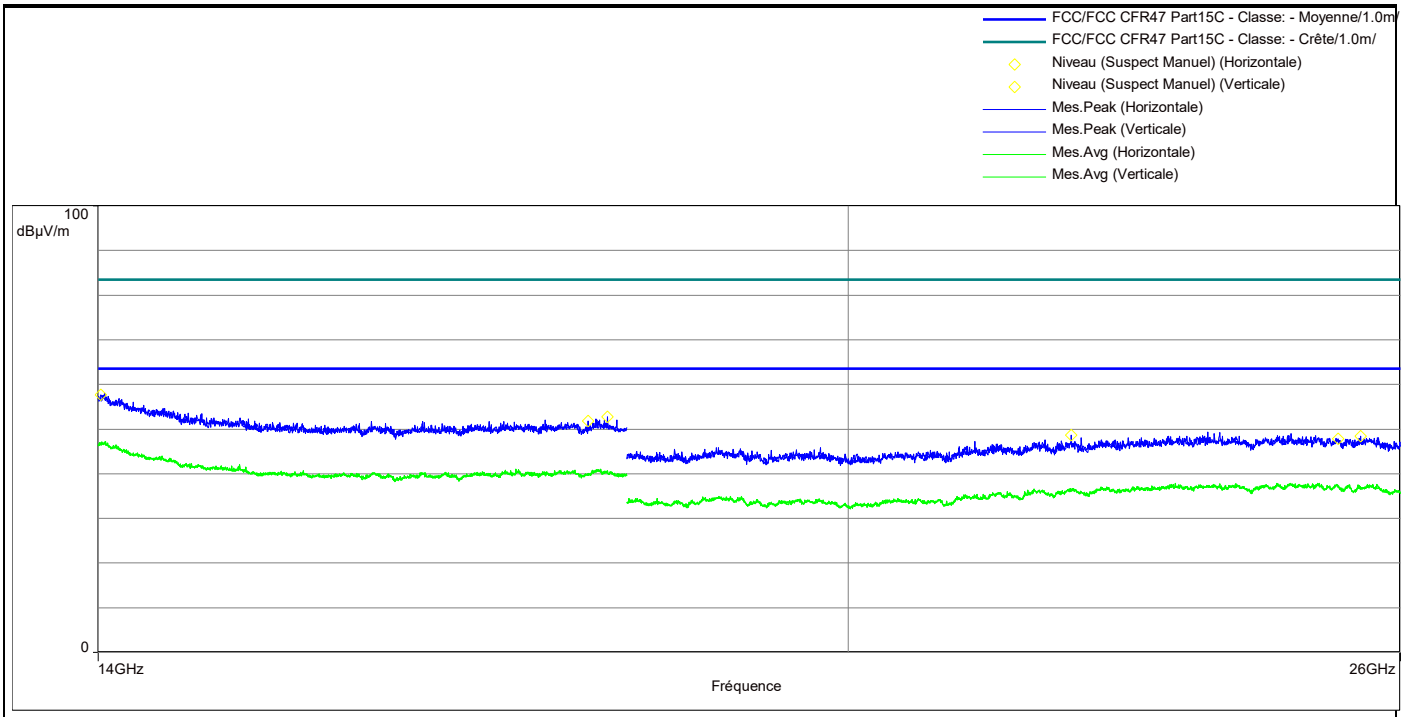
RADIATED EMISSIONS			
Graph name:	Emr#11	**Test configuration:**	
Limit:	FCC CFR47 Part15C	(H+V) - CMid - TX mode - Axis XY	
Class:			
Frequency range: [14GHz - 26GHz]			
Antenna polarization:		**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Avg Level (dBµV/m)	Avg Limit (dBµV/m)	Margin (dB)	Polarization	Correction (dB)
14047.5	57.5	83.5	**-26**	47.1	63.5	**-16.4**	Vertical	5.4
15436	51.3	83.5	**-32.2**	40.1	63.5	**-23.4**	Vertical	-1.8
17850	51.6	83.5	**-31.9**	40.5	63.5	**-23**	Vertical	-2
19001	45.4	83.5	**-38.1**	34.8	63.5	**-28.7**	Vertical	-2
23182	48.4	83.5	**-35.1**	37.1	63.5	**-26.4**	Vertical	-0.4
25603	47.9	83.5	**-35.6**	37.6	63.5	**-25.9**	Vertical	0.4

RADIATED EMISSIONS			
Graph name:	Emr#12	**Test configuration:**	
Limit:	FCC CFR47 Part15C	(H+V) - CMid - TX mode - Axis Z	
Class:			
Frequency range: [14GHz - 26GHz]			
Antenna polarization:		**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Avg Level (dBµV/m)	Avg Limit (dBµV/m)	Margin (dB)	Polarization	Correction (dB)
17836.5	52.7	83.5	**-30.8**	40.7	63.5	**-22.8**	Horizontal	-1.9
14017	57.7	83.5	**-25.8**	47	63.5	**-16.5**	Vertical	5.6
17671	51.8	83.5	**-31.7**	40.8	63.5	**-22.7**	Vertical	-2.3
22235	48.7	83.5	**-34.8**	36.7	63.5	**-26.8**	Horizontal	-0.9
25239	47.8	83.5	**-35.7**	37.7	63.5	**-25.8**	Vertical	0.5
25514	48.4	83.5	**-35.1**	37.5	63.5	**-26**	Vertical	0.4

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*	3.51 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.*	3.26 dB	A l'étude / Under consid.
Mesure des perturbations discontinues conduites en tension *Measurement of discontinuous conducted disturbances in voltage*	3.45 dB	3.6 dB
Mesure des perturbations conduites en courant *Measurement of conducted disturbances in current*	3.09 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*	5.20 dB	6.3 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.*