Accreditation
N°1-1633
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Template : February 22th, 2023

TEST REPORT

N°: **18348762-787335-A(FILE#4712035)** Version: **01**

Subject Electromagnetic compatibility tests according to the standards:
FCC CFR 47 Part 15, Subpart B / C
ANSI C63.4 / ANSI C63.4a
ICES-003

Issued to
INGENICO
9 avenue de la gare – Rovaltain TGV BP25156
26958 - VALENCE Cedex 9
France

Apparatus under test

Product	**Payment terminal**
Trade mark	**INGENICO**
Manufacturer	**INGENICO**
Model under test	**Desk/2600**
Serial number	**23058731708132772981691 8**
FCCID	**XKB-D2600CLW**
IC	**2586D-D2600CLW**

Conclusion See Test Program chapter

Test date	March 15, 2023 to March 17, 2023
Test location	LCIE Grenoble
FCC Test site	FR0008 - 197516 (MOI)
ISED Test site	6500A (MOI)
Sample receipt date	March 16, 2023
Composition of document	38 pages
Document issued on	May 24, 2023

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PUBLICATION HISTORY

Version	Date	Author	Modification
01	May 24, 2023	Akram HAKKARI	Creation of the document

Each new edition of this test report replaces and cancels the previous edition. The control of the old editions of report is under responsibility of client.

SUMMARY

1. TEST PROGRAM

Standard:

- ✓ **FCC Part 15, Subpart B (Digital Devices)**
- ✓ **ANSI C63.4 (2014) / ANSI C63.4a (2017)**
- ✓ **ICES-003 (2020)**

Requirements for disturbance emissions – Class B

EMISSION TEST	LIMITS			RESULTS (Comments)
Limits for conducted disturbance 150kHz-30MHz **FCC §15.107 / ICES-003**	**Access: AC power**			**PASS**
	Frequency	**Quasi-peak**	**Average**	
	150-500kHz	66 to 56 dBµV	56 to 46 dBµV	
	0.5-5MHz	56 dBµV	46 dBµV	
	5-30MHz	60 dBµV	50 dBµV	
Radiated emissions 30MHz-1GHz **FCC §15.109**	**Access: Enclosure port of ancillary equipment**			**PASS**
	Frequency	**Quasi-peak @3m**		
	30MHz-88MHz	40.0 dBµV/m		
	88MHz-216MHz	43.5 dBµV/m		
	216MHz-960MHz	46.0 dBµV/m		
	Above 960MHz	54.0 dBµV/m		
Radiated emissions 30MHz-1GHz **ICES-003**	**Access: Enclosure port of ancillary equipment**			**PASS**
	Frequency	**Quasi-peak @3m**		
	30MHz-88MHz	40.0 dBµV/m		
	88MHz-216MHz	43.5 dBµV/m		
	216MHz-230MHz	46.0 dBµV/m		
	230MHz-960MHz	47.0 dBµV/m		
	Above 960MHz	54.0 dBµV/m		
Radiated emissions 1GHz-40GHz* **FCC §15.109 / ICES-003**	**Access: Enclosure port of ancillary equipment**			**PASS**
	Frequency	**Peak @3m**	**Average @3m**	
	1- 6GHz	74.0 dBµV/m	54.0 dBµV/m	

NA: Not Applicable / NP: Not Performed, not requested by the customer (It cannot be taken into account for the declaration of conformity)
D: Divergence, the last version is used to make it possible to test the product with the standard which describes the current state of the art and thus to answer as well as possible his environment of final use.
***§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.

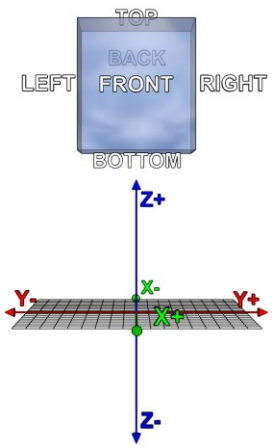
If the highest frequency of the internal sources of the testing device is above 1 GHz, measurement must be only performed until 5 times the highest frequency or 40 GHz, while taking smallest of both.
Special condition for intentional radiator:

- For a composite system comprised of a digital device using a clock frequency of 1 GHz as the highest frequency for the digital logic and an intentional radiator operating at 2.4 GHz, the composite is required to be investigated to the upper frequency of 24 GHz (in this case, 10 times the intentional radiator frequency is the higher frequency).

- For a composite system comprised of a digital device using a clock frequency of 2 GHz as the highest frequency for the digital logic and an intentional radiator operating at 913 MHz, the composite is required to be investigated to the upper frequency of 10 GHz (in this case, 5 times the unintentional radiator clock frequency is the higher frequency).

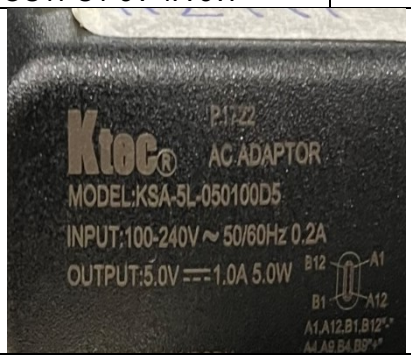
1.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES)

Equipment under test (EUT):

Model under test:	**Desk/2600**
Serial Number:	**23058731708132772981691 8**
	
Dimensions:	7.6cm x 5.6cm x 16.7cm (Length x Width x Height)
Type:	Table-Top

Power supply:

All test are performed with Supply 3 and battery worst case

Name	Type	Rating	Reference / Sn	Comments
Supply1	AC	100-240VAC 0.2A 50-60Hz OUTPUT 5V 1A 5W	PHIHONG AM05R-050CK	/
				
Supply2	AC	100-240VAC 0.2A 50-60Hz OUTPUT 5V 1A 5W	PHIHONG AM05x-050D	/
				
Supply3	AC	100-240VAC 50/60Hz 0.2A OUTPUT 5V 1A 5W	Ktec KSA-5L-050100D5	/
				
Supply4	Battery	3.7Vdc Li-Ion 500mAH /1.85Wh	Springower Technology Model 562542	/

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Comments
Supply1	AC	1.2	Yes	No	/
Supply2	AC	1.2	Yes	No	/
Supply3	AC	1.2	Yes	No	/
RJ 45	Ethernet	3	/	/	/
USB	USB C	0.5	/	/	/
USB	USB B	3	/	/	/
USB	USB A	3	/	/	/

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
LAPTOP	DELL E4750	/	/
ROUTER	ASUS RT-AC68U	/	/
USB C Adaptor	MAGIC BOX Eth/USB	230577317571324829797915	/

1.2. EUT CONFIGURATION

Hardware information			
Highest internal frequency (PLL, Quartz, Clock, Microprocessor…):	**$F_{Highest}$:**	**6000MHz**	**MHz**
Firmware (if applicable):	**V. :**	150051	
Software (if applicable):	**V. :**	031600	

NC: Not communicated by provider

Running mode n°1	
Auto EMC	***ON***
Block on fault	***NO***
Generate report	***ON***
Time between cycles	***400ms***
Backlight	***ON***
Buzzer	***ON***
Cam0	***ON***
Cless	***ON***
GPRS	***ON***
Printer	***ON***
Sam1	***ON***
Swipe	***ON***
WIFI	***ON***

1.3. EQUIPMENT MODIFICATIONS DURING THE TESTS

None

1.4. 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

1.5. TEST DISTANCE EXTRAPOLATION – FCC/ISED

The field strength is extrapolated to the new measurement distance using formula from FCC Part15.31 (f) and §6.5-6.6 RSS-GEN:

Below 30MHz,

$$FS_{\text{limit}} = FS_{\max} - 40\log\left(\frac{d_{\text{limit}}}{d_{\text{measure}}}\right)$$

Above 30MHz,

$$FS_{\text{limit}} = FS_{\max} - 20\log\left(\frac{d_{\text{limit}}}{d_{\text{measure}}}\right)$$

Where:
FS_{limit} is the calculation of field strength at the limit distance, expressed in dBµV/m
FS_{max} is the measured field strength, expressed in dBµV/m
$d_{measure}$ is the distance of the measurement point from the EUT
d_{limit} is the reference limit distance

1.6. 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

2. MEASUREMENT OF CONDUCTED EMISSION

2.1. TEST CONDITIONS

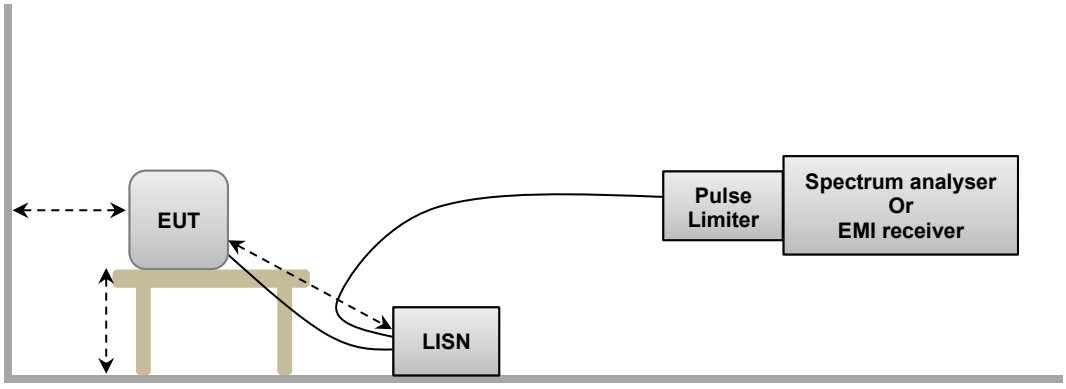
Date of test	:	March 15, 2023
Test performed by	:	Majid MOURZAGH
Atmospheric pressure (hPa)	:	998
Relative humidity (%)	:	39
Ambient temperature (°C)	:	21

2.2. TEST SETUP

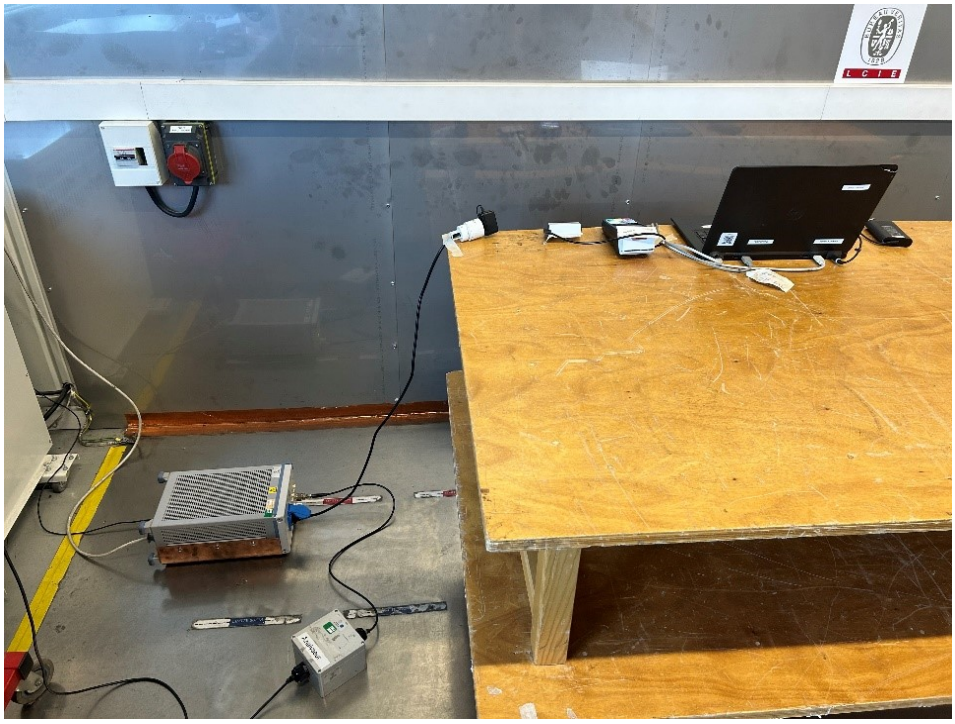
Test procedure:
☑ ANSI C63.10 & FCC Part 15 subpart C

The EUT and auxiliaries are set 80cm above the ground on the non-conducting table (Table-top equipment) at 80cm from the LISN, the cable has been shorted to 1meter length. The distance between the EUT and the vertical ground plane is 40cm. Measurement is made with a receiver in peak mode. 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. Interconnecting cables and equipment's were moved to position that maximized emission. The EUT is powered like specified in following table, through a LISN (measure); auxiliaries are powered by another LISN.

Type	Measurement performed:	
☑ AC / ☐ DC (Auxiliary used)	☑ 120VAC/60Hz	☑ 240VAC/50Hz
☐ USB (Laptop auxiliary)	☐ 120VAC/60Hz (Laptop auxiliary)	☐ 240VAC/50Hz (Laptop auxiliary)



Test setup of AC Power Line Conducted Emissions



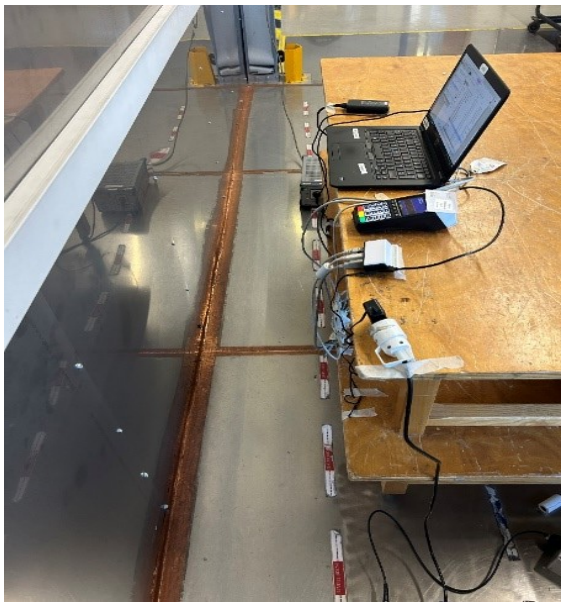


Photo of AC Power Line Conducted Emissions

2.3. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	**Manufacturer**	**Model**	**Identifier**	**Cal_Date**	**Cal_Due**
BAT EMC	NEXIO	v3.21.0.32	L1000115		
Cable + self	_	_	A5329578	05/22	05/23
EMC comb generator	LCIE SUD EST	_	A3169098		
LISN	ROHDE & SCHWARZ	ENV216	C2320291	08/22	08/23
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	03/23	03/25
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	01/21	05/23
Transient limiter	ROHDE & SCHWARZ	ESH3-Z2	A7122204	08/22	08/24

2.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

2.5. TEST RESULTS – RUNNING MODE N°1

Mains terminals:

SUPPLY1

Measurements are performed on the phase (L1) and neutral (N) of the power line.

Results: (PEAK detection)

Graph identifier		Line	Comments	
Emc#	1	Phase	120VAC/60Hz	See below
Emc#	2	Neutral	120VAC/60Hz	See below
Emc#	3	Phase	240VAC/50Hz	See below
Emc#	4	Neutral	240VAC/50Hz	See below

SUPPLY2

Measurements are performed on the phase (L1) and neutral (N) of the power line.

Results: (PEAK detection)

Graph identifier		Line	Comments	
Emc#	5	Phase	120VAC/60Hz	See below
Emc#	6	Neutral	120VAC/60Hz	See below
Emc#	7	Phase	240VAC/50Hz	See below
Emc#	8	Neutral	240VAC/50Hz	See below

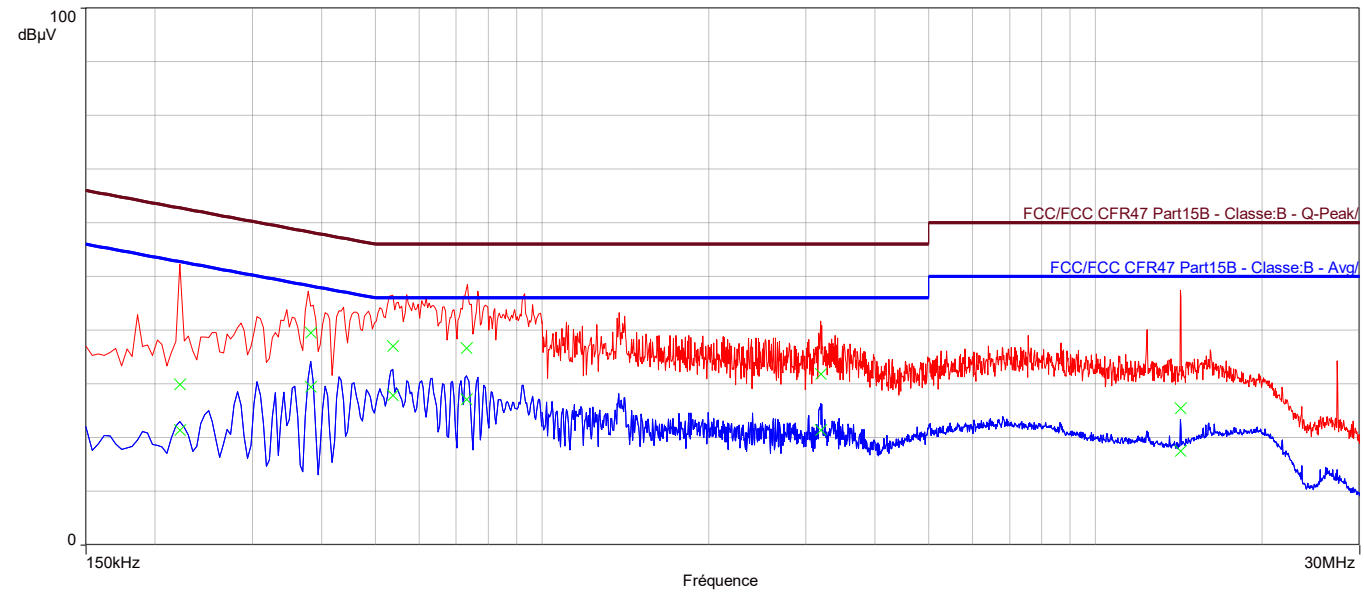
SUPPLY3

Measurements are performed on the phase (L1) and neutral (N) of the power line.

Results: (PEAK detection)

Graph identifier		Line	Comments	
Emc#	9	Phase	120VAC/60Hz	See below
Emc#	10	Neutral	120VAC/60Hz	See below
Emc#	11	Phase	240VAC/50Hz	See below
Emc#	12	Neutral	240VAC/50Hz	See below

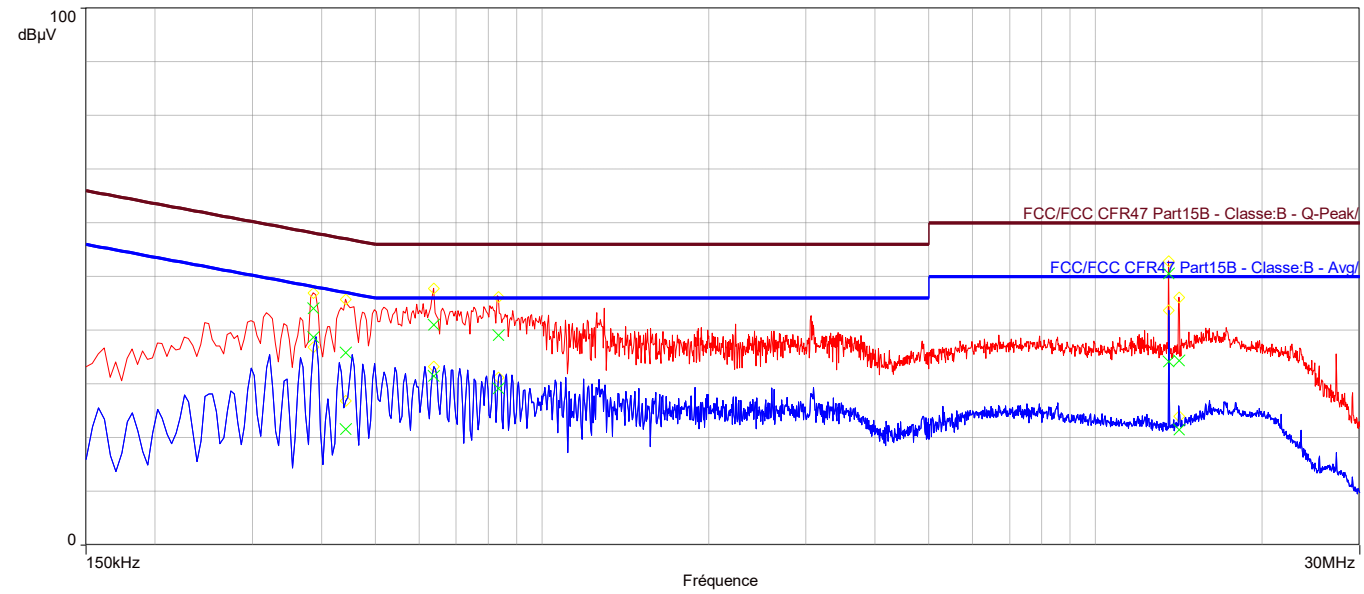
CONDUCTED EMISSIONS			
Graph name:	Emc#1	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) - Supply1 LINE120VAC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		**RBW:** 10kHz	**VBW:** 30kHz
Line:		**Trace color & detector:**	PEAK AVG



Spurious emissions

Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.222	29.9	62.7	-32.8	21.4	52.7	-31.4
0.382	39.5	58.2	-18.7	29.4	48.2	-18.8
0.538	37.0	56.0	-19.0	27.8	46.0	-18.2
0.730	36.6	56.0	-19.4	27.2	46.0	-18.8
3.188	31.8	56.0	-24.2	21.4	46.0	-24.6
14.236	25.5	60.0	-34.5	17.5	50.0	-32.5

CONDUCTED EMISSIONS			
Graph name:	Emc#2	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) - Supply1 Neutral 120VAC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		**RBW:** 10kHz	**VBW:** 30kHz
Line:		**Trace color & detector:**	PEAK AVG

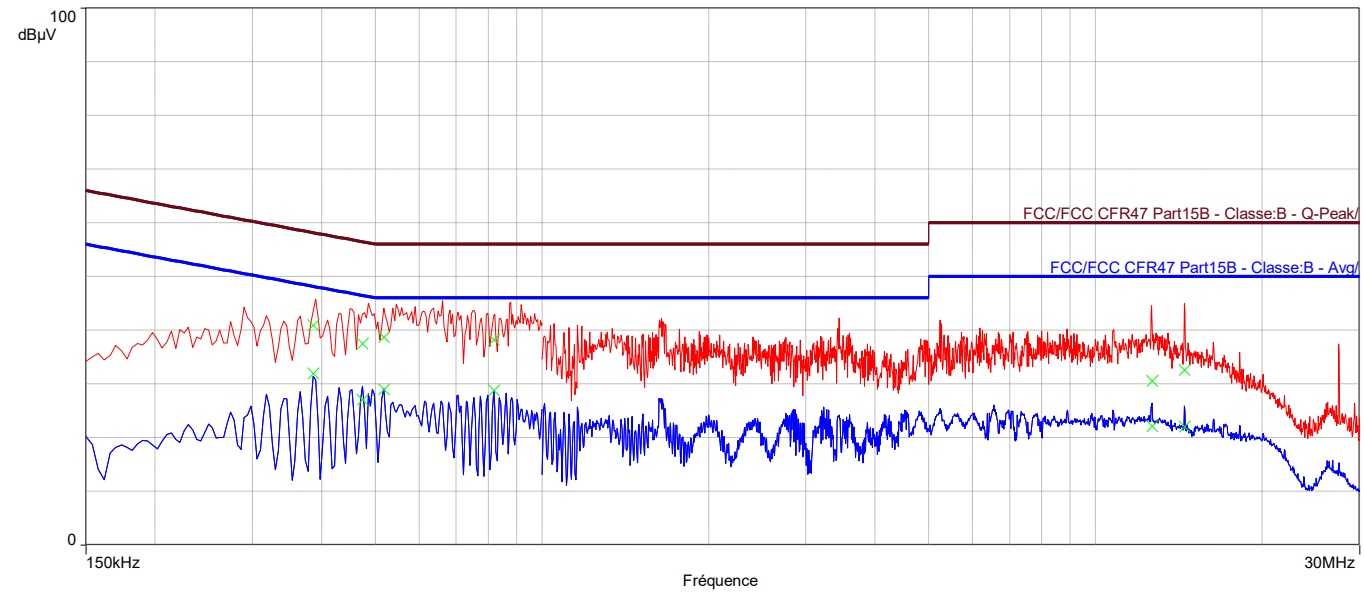


Spurious emissions

Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.386	44.0	58.2	-14.1	38.7	48.2	-9.5
0.442	35.9	57.0	-21.2	21.6	47.0	-25.4
0.638	41.0	56.0	-15.0	31.5	46.0	-14.5
0.834	39.1	56.0	-16.9	29.1	46.0	-16.9
13.564	50.6	60.0	-9.4	34.2	50.0	-15.8
14.152	34.3	60.0	-25.7	21.5	50.0	-28.5

Frequency (MHz)	Peak (dBµV)	Avg (dBµV)	Lim.Avg (dBµV)	Lim.Q-Peak (dBµV)	Ligne
0.386	46.9	36.8	48.2	58.2	Neutre
0.442	45.8	26.9	47.0	57.0	Neutre
0.638	47.8	33.2	46.0	56.0	Neutre
0.834	46.2	31.2	46.0	56.0	Neutre
13.564	52.9	43.7	50.0	60.0	Neutre
14.152	46.2	23.9	50.0	60.0	Neutre

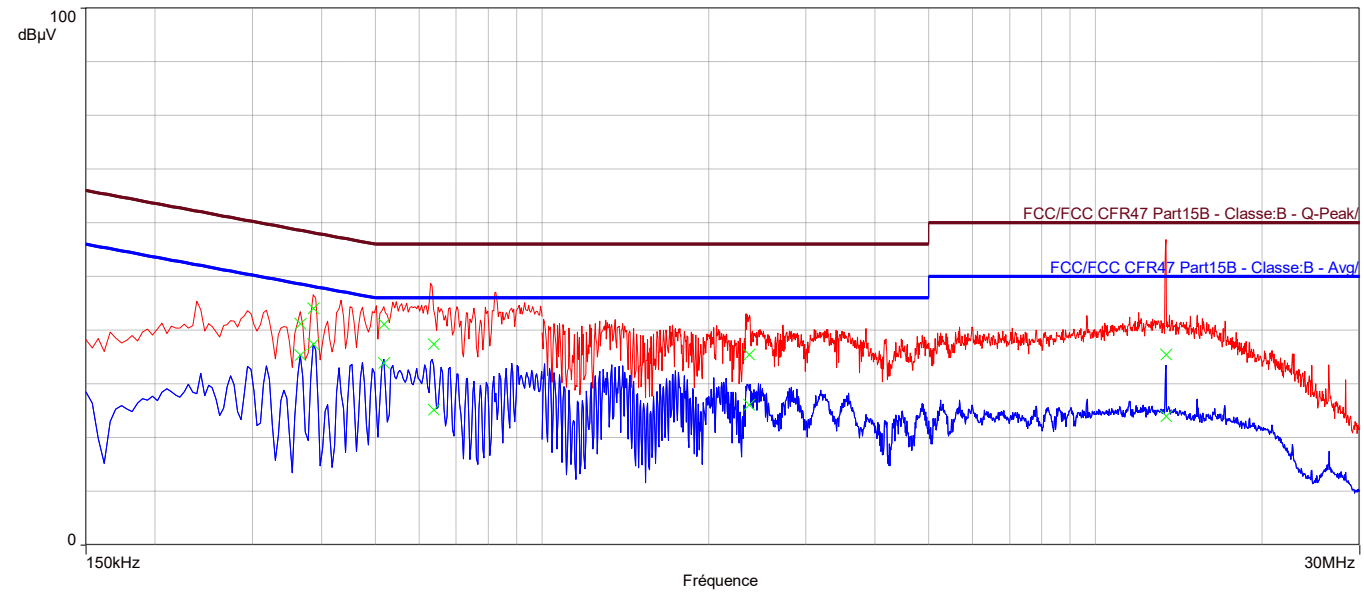
CONDUCTED EMISSIONS			
Graph name:	Emc#3	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) - Supply1 LINE240VAC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		**RBW:** 10kHz	**VBW:** 30kHz
Line:		**Trace color & detector:**	PEAK AVG



Spurious emissions

Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.386	41.0	58.2	-17.2	31.9	48.2	-16.2
0.474	37.6	56.4	-18.9	27.0	46.4	-19.4
0.518	38.7	56.0	-17.3	29.0	46.0	-17.0
0.818	38.2	56.0	-17.8	28.8	46.0	-17.2
12.660	30.6	60.0	-29.4	22.2	50.0	-27.8
14.492	32.6	60.0	-27.4	22.0	50.0	-28.0

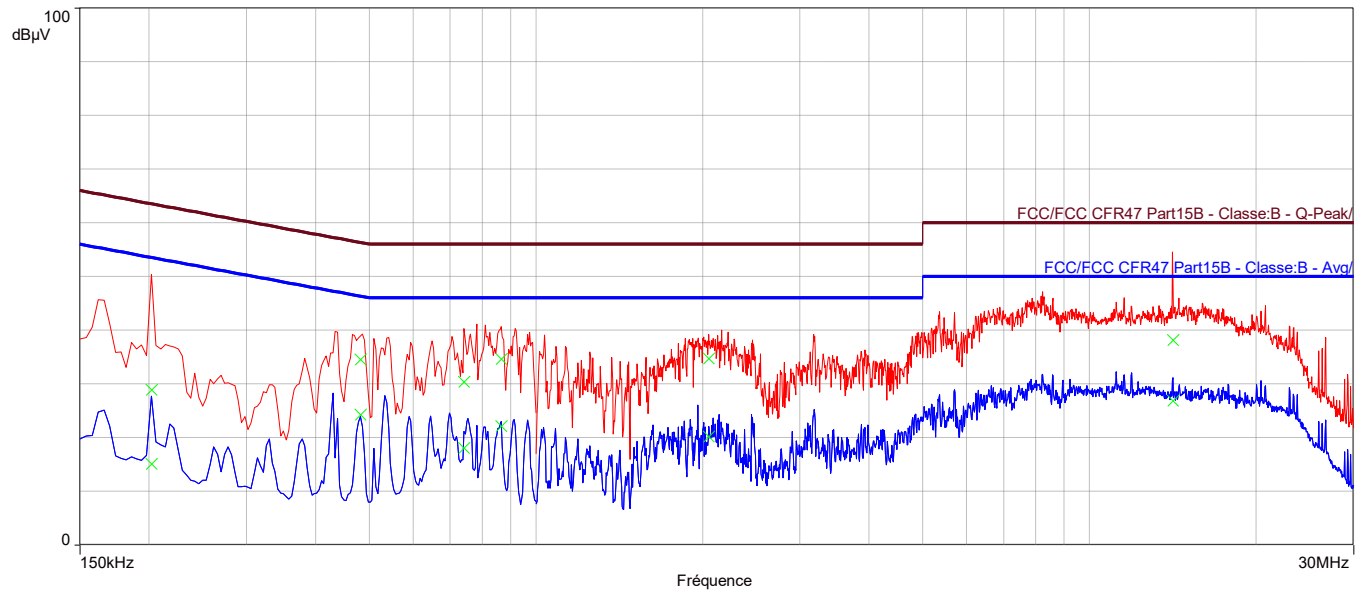
CONDUCTED EMISSIONS			
Graph name:	Emc#4	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) - Supply1 Neutral 240VAC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		**RBW:** 10kHz	**VBW:** 30kHz
Line:		**Trace color & detector:**	PEAK AVG



Spurious emissions

Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.366	41.2	58.6	-17.4	35.4	48.6	-13.2
0.386	44.1	58.2	-14.0	37.4	48.2	-10.8
0.518	41.1	56.0	-14.9	33.9	46.0	-12.1
0.638	37.4	56.0	-18.6	25.2	46.0	-20.8
2.368	35.4	56.0	-20.6	26.1	46.0	-19.9
13.412	35.5	60.0	-24.5	24.0	50.0	-26.0

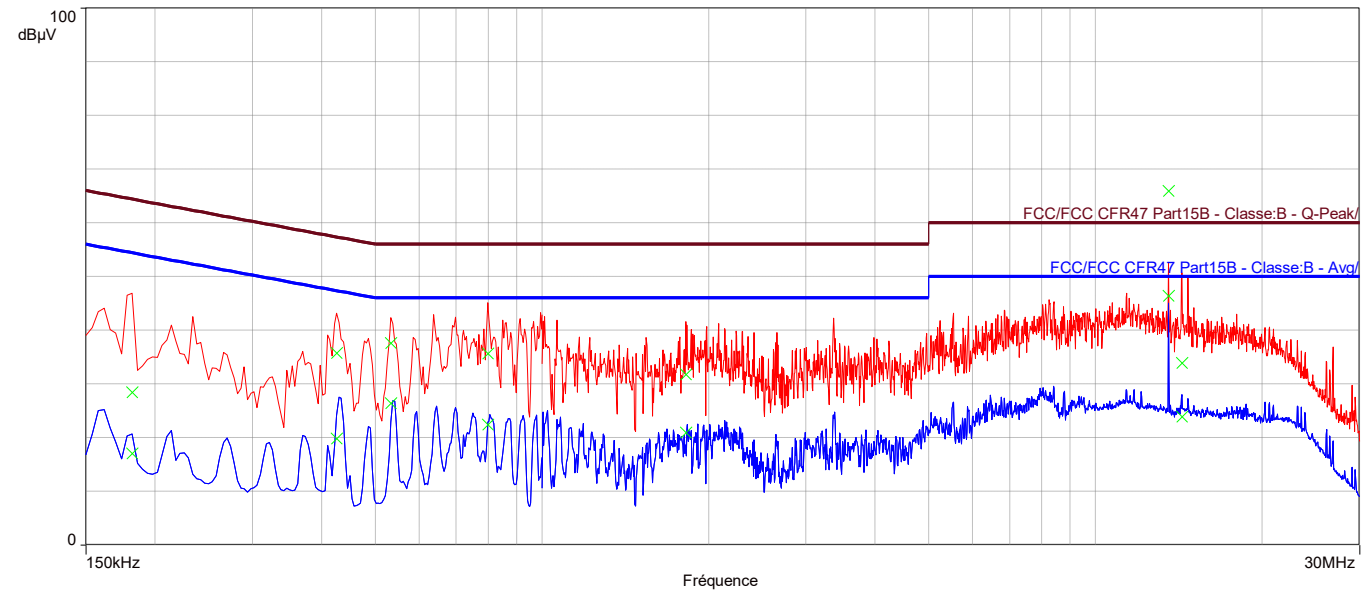
CONDUCTED EMISSIONS			
Graph name:	Emc#5	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) - Supply2 LINE 120VAC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		**RBW:** 10kHz	**VBW:** 30kHz
Line:		**Trace color & detector:**	PEAK AVG



Spurious emissions

Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.202	28.9	63.5	-34.7	15.1	53.5	-38.5
0.482	34.6	56.3	-21.7	24.3	46.3	-22.0
0.742	30.4	56.0	-25.6	18.1	46.0	-27.9
0.866	34.7	56.0	-21.3	22.1	46.0	-23.9
2.052	34.7	56.0	-21.3	20.2	46.0	-25.8
14.152	38.2	60.0	-21.8	26.9	50.0	-23.1

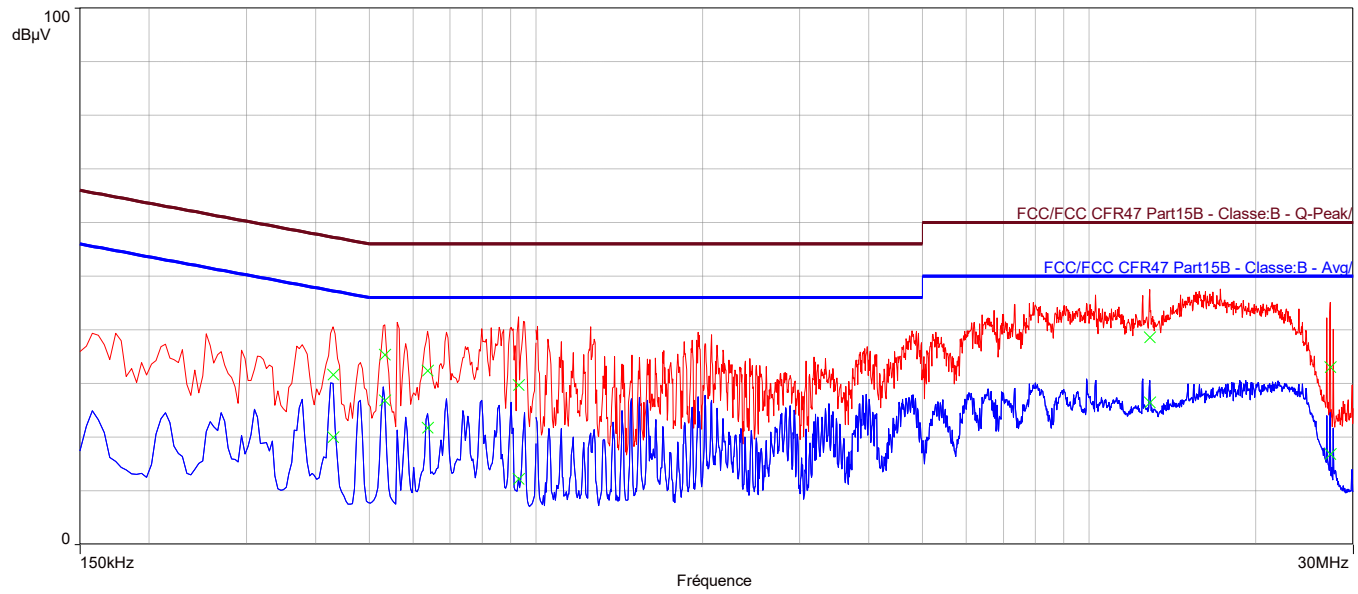
CONDUCTED EMISSIONS			
Graph name:	Emc#6	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) - Supply2 Neutral 120VAC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		**RBW:** 10kHz	**VBW:** 30kHz
Line:		**Trace color & detector:**	PEAK AVG



Spurious emissions

Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.182	28.4	64.4	-36.0	17.0	54.4	-37.4
0.426	35.8	57.3	-21.6	19.9	47.3	-27.5
0.534	37.6	56.0	-18.4	26.4	46.0	-19.6
0.798	35.7	56.0	-20.3	22.4	46.0	-23.6
1.820	31.8	56.0	-24.2	21.0	46.0	-25.0
13.560	65.9	60.0	5.9	46.4	50.0	-3.6
14.336	33.9	60.0	-26.1	23.9	50.0	-26.1

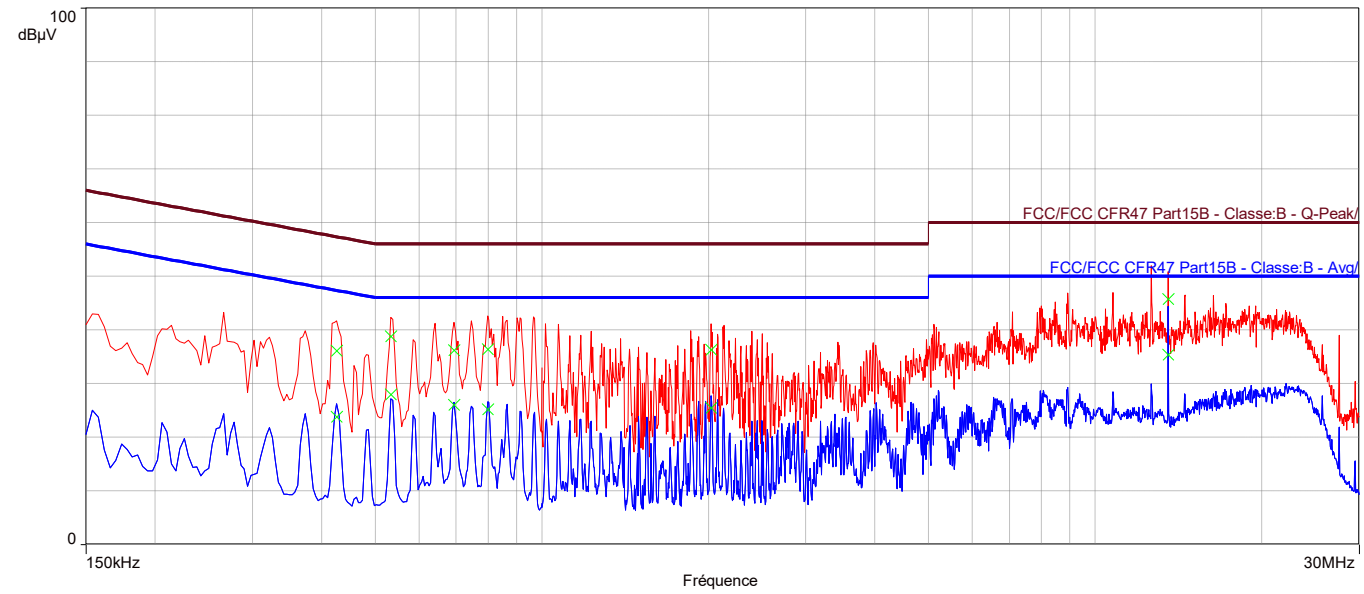
CONDUCTED EMISSIONS			
Graph name:	Emc#7	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) - Supply2 LINE 240VAC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		**RBW:** 10kHz	**VBW:** 30kHz
Line:		**Trace color & detector:**	PEAK AVG



Spurious emissions

Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.430	31.7	57.2	-25.6	20.0	47.2	-27.3
0.534	35.4	56.0	-20.6	26.8	46.0	-19.2
0.638	32.4	56.0	-23.6	21.8	46.0	-24.2
0.930	29.7	56.0	-26.3	12.2	46.0	-33.8
12.864	38.6	60.0	-21.4	26.4	50.0	-23.6
27.252	33.0	60.0	-27.0	16.8	50.0	-33.2

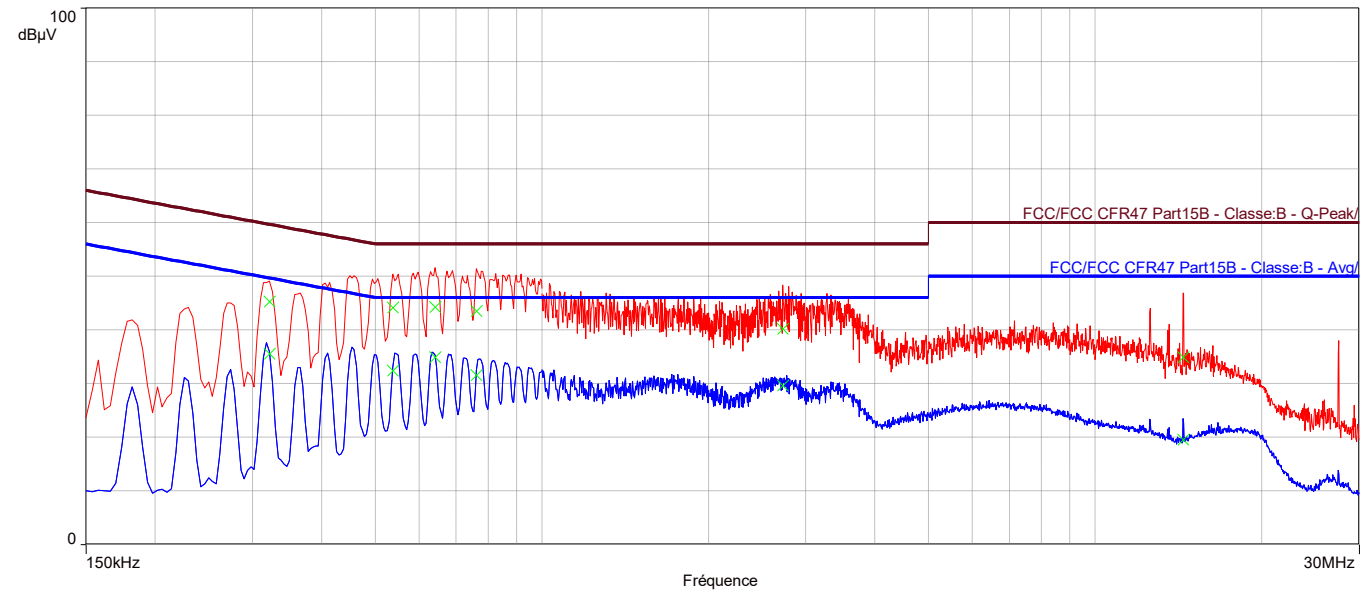
CONDUCTED EMISSIONS			
Graph name:	Emc#8	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) - Supply2 Neutral 240VAC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		**RBW:** 10kHz	**VBW:** 30kHz
Line:		**Trace color & detector:**	PEAK AVG



Spurious emissions

Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.426	36.1	57.3	-21.2	23.8	47.3	-23.6
0.534	38.8	56.0	-17.2	28.0	46.0	-18.0
0.694	36.2	56.0	-19.8	26.0	46.0	-20.0
0.798	36.4	56.0	-19.6	25.2	46.0	-20.8
2.024	36.3	56.0	-19.7	25.4	46.0	-20.6
13.560	45.8	60.0	-14.2	35.4	50.0	-14.6

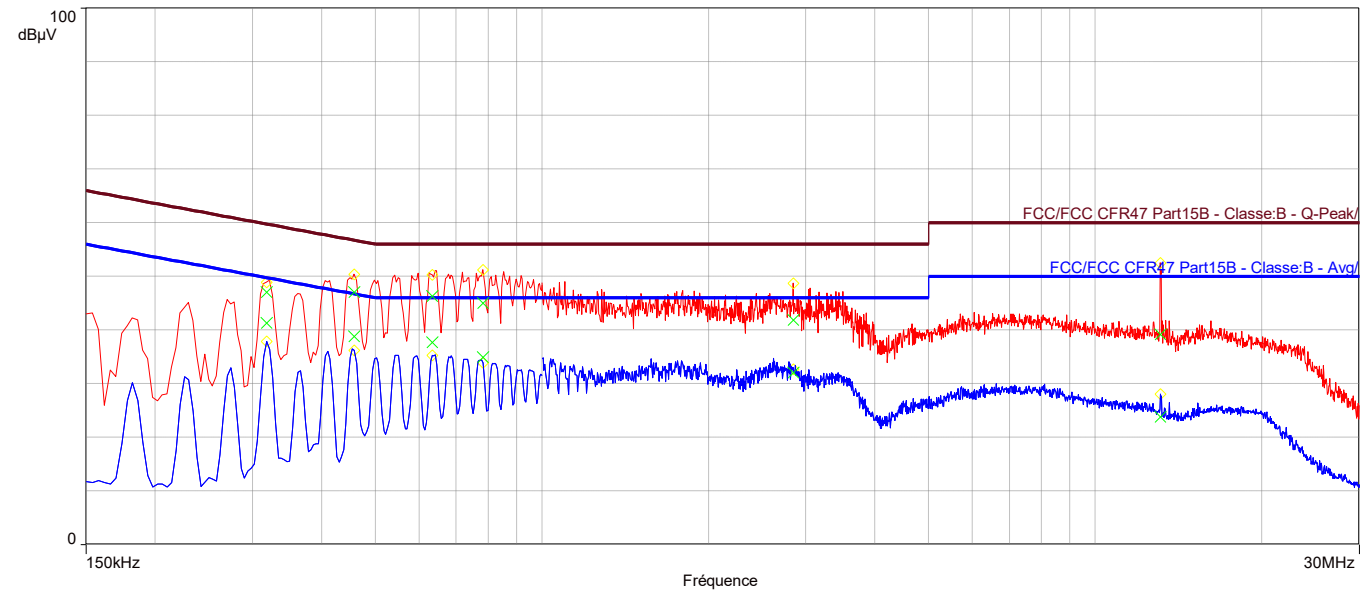
CONDUCTED EMISSIONS			
Graph name:	Emc#9	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) - Supply3 LINE 120VAC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		**RBW:** 10kHz	**VBW:** 30kHz
Line:		**Trace color & detector:**	PEAK AVG



Spurious emissions

Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.322	45.3	59.7	-14.3	35.6	49.7	-14.1
0.538	44.2	56.0	-11.8	32.4	46.0	-13.6
0.642	44.3	56.0	-11.7	35.0	46.0	-11.0
0.762	43.5	56.0	-12.5	31.6	46.0	-14.4
2.724	40.2	56.0	-15.8	29.7	46.0	-16.3
14.432	34.9	60.0	-25.1	19.5	50.0	-30.5

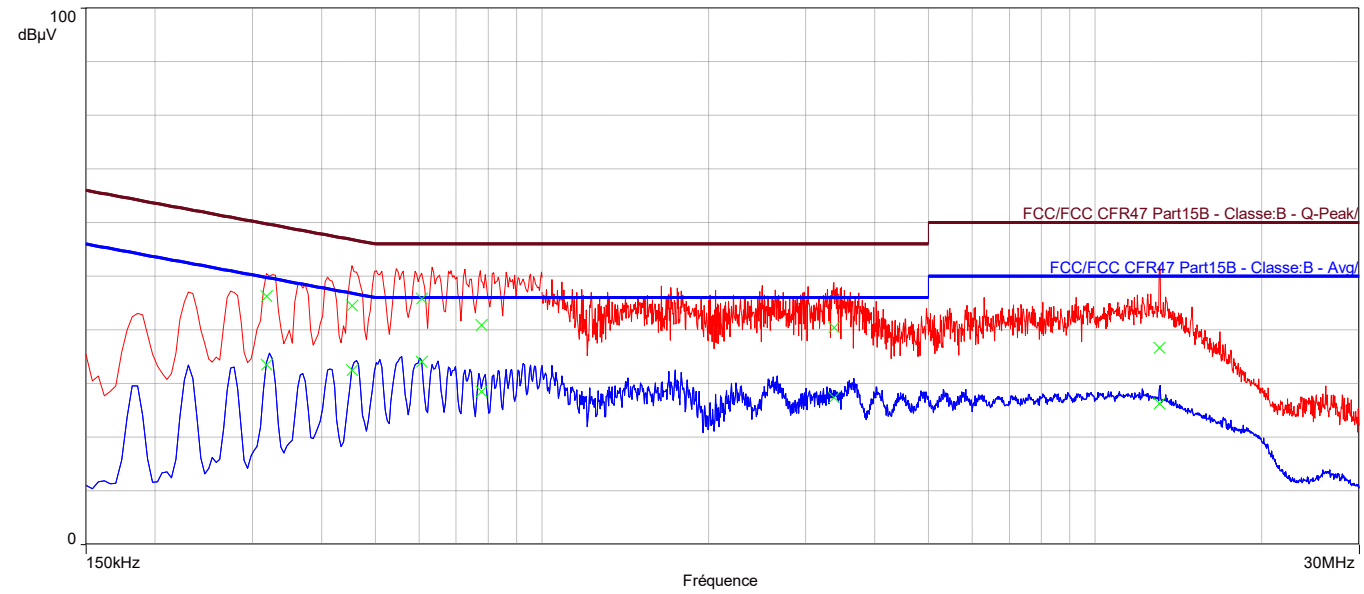
CONDUCTED EMISSIONS			
Graph name:	Emc#10	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) - Supply3 Neutral 120VAC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		**RBW:** 10kHz	**VBW:** 30kHz
Line:		**Trace color & detector:**	PEAK AVG



Spurious emissions

Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.318	47.1	59.8	-12.7	41.3	49.8	-8.4
0.458	47.0	56.7	-9.7	38.8	46.7	-7.9
0.634	46.3	56.0	-9.7	37.7	46.0	-8.3
0.782	45.0	56.0	-11.0	35.0	46.0	-11.0
2.848	41.9	56.0	-14.1	32.0	46.0	-14.0
13.112	39.2	60.0	-20.8	23.8	50.0	-26.2

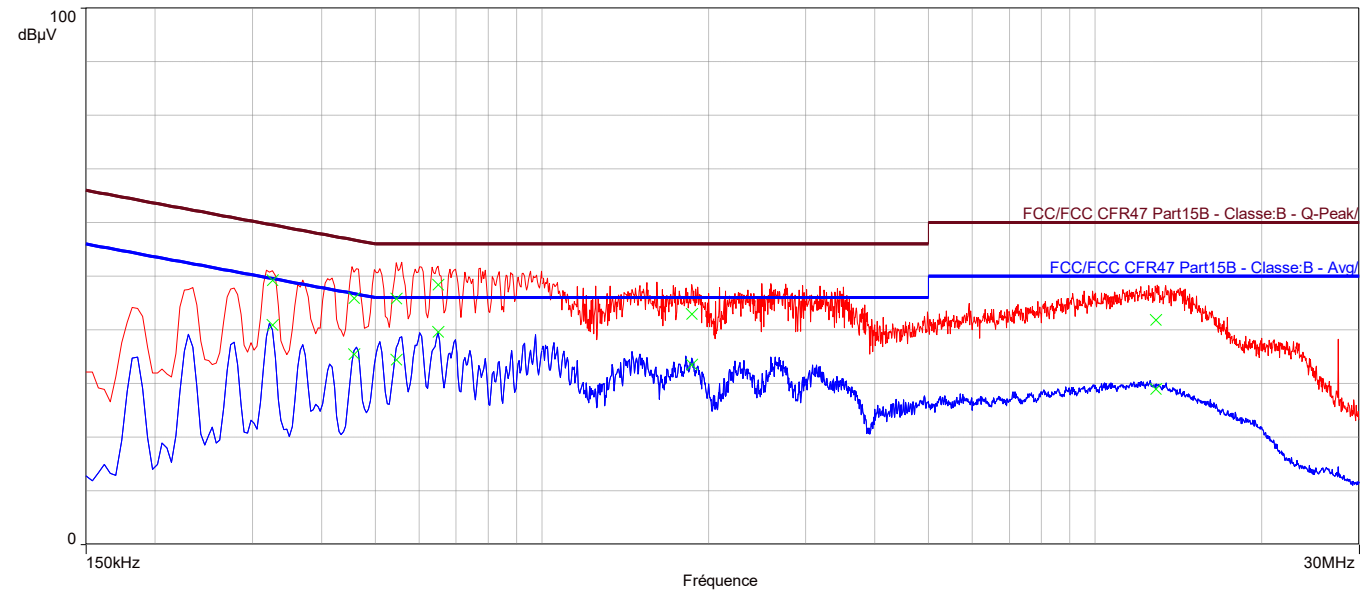
CONDUCTED EMISSIONS			
Graph name:	Emc#11	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) - Supply3 LINE240VAC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		**RBW:** 10kHz	**VBW:** 30kHz
Line:		**Trace color & detector:**	PEAK AVG



Spurious emissions

Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.318	46.3	59.8	-13.4	33.5	49.8	-16.2
0.454	44.5	56.8	-12.3	32.5	46.8	-14.3
0.606	45.8	56.0	-10.2	34.0	46.0	-12.0
0.778	40.9	56.0	-15.1	28.6	46.0	-17.4
3.372	40.4	56.0	-15.6	27.4	46.0	-18.6
13.060	36.7	60.0	-23.3	26.3	50.0	-23.7

CONDUCTED EMISSIONS			
Graph name:	Emc#12	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) - Supply3 Neutral 240VAC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		**RBW:** 10kHz	**VBW:** 30kHz
Line:		**Trace color & detector:**	PEAK AVG



Spurious emissions

Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.326	49.3	59.6	-10.3	40.9	49.6	-8.6
0.458	45.9	56.7	-10.8	35.4	46.7	-11.3
0.546	45.9	56.0	-10.1	34.4	46.0	-11.6
0.650	48.4	56.0	-7.6	39.7	46.0	-6.3
1.868	43.0	56.0	-13.0	33.5	46.0	-12.5
12.868	41.8	60.0	-18.2	29.0	50.0	-21.0

2.6. CONCLUSION

The sample of the equipment **Desk/2600**, Sn : **230587317081327729816918**, tested in the configuration presented in this test report **satisfies** to requirements of the product family standard applied (See §Test Program) for conducted emissions.

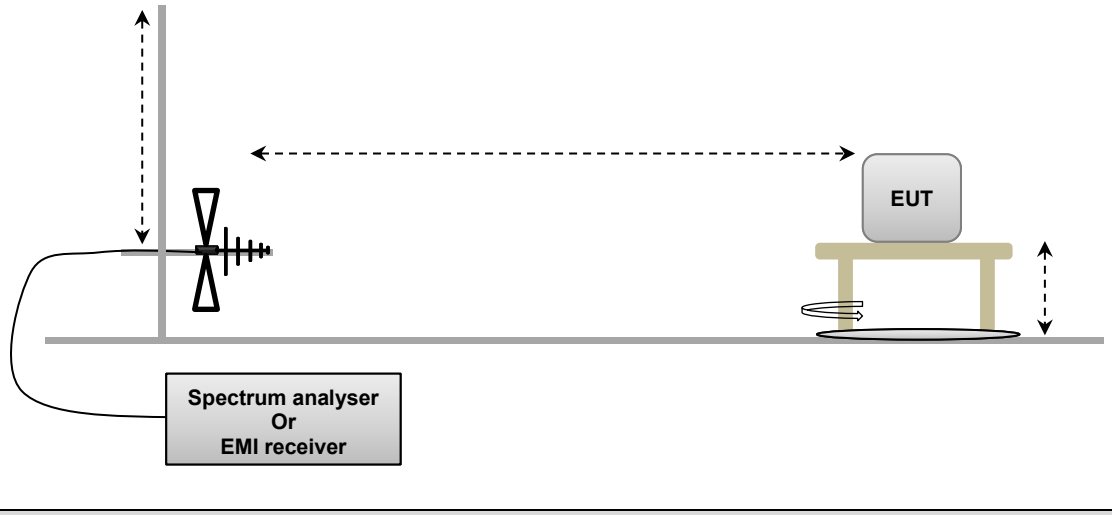
3. MEASUREMENT OF RADIATED EMISSION

3.1. TEST CONDITIONS

Date of test	:	March 17, 2023
Test performed by	:	Akram HAKKARI
Relative humidity (%)	:	37
Ambient temperature (°C)	:	21

3.2. TEST SETUP

The EUT and auxiliaries are set 80cm above the ground on the non-conducting table (Table-top equipment).
The EUT is powered by V_{nom}.



Test setup of Radiated Emission

Same setup is used in semi anechoic chamber during pre-characterization, with a distance of 3m between EUT and antenna.

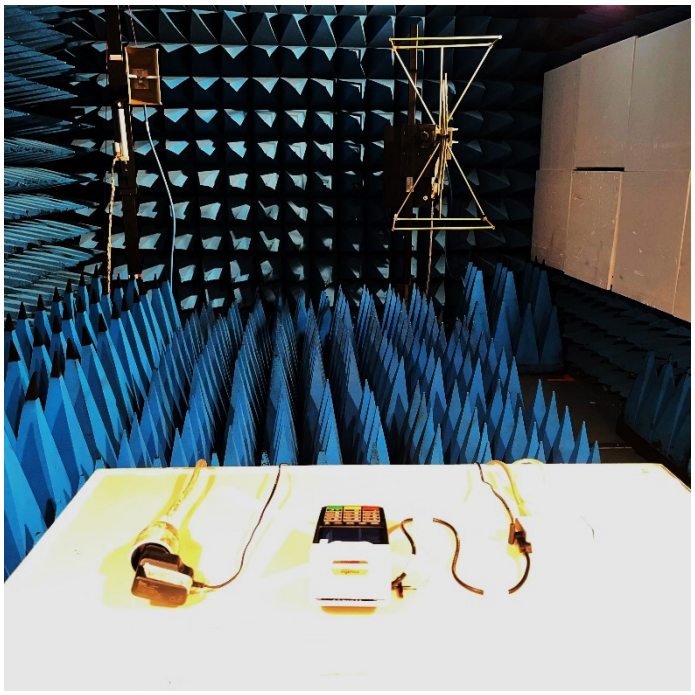


Photo in anechoic chamber – Frequency <1GHz

Photo on OATS

3.3. TEST METHOD

3.3.1. 30MHz –1GHz

Pre-qualification measurement

A pre-scan of all the setup has been performed in a 3 meters semi-anechoic chamber. Test is performed with antenna centered on EUT in horizontal (H) and vertical (V) polarization, continuous linear turntable azimuth search was performed with 360 degrees range. Measurements are performed on all axis of EUT used in normal configuration. The pre-characterization graphs are obtained in PEAK detection.

Qualification

The installation of EUT is identical than for pre-qualification measurements on an Open Area Test Site with a 10 meters distance between EUT and antenna. In this case, it corrected according to requirements of 15.209.e), M@3m = M@10m+10.5dB. Test is performed in horizontal (H) and vertical (V) polarization and the height antenna is varied from 1m to 4m. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurements are 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.

3.3.2. 1GHz – 40GHz:

Pre-qualification measurement

A pre-scan of all the setup has been performed in a 3 meters full anechoic chamber. Test is performed with antenna centered on EUT in horizontal (H) and vertical (V) polarization, continuous linear turntable azimuth search was performed with 360 degrees range. Measurements are performed on all axis of EUT used in normal configuration. The pre-characterization graphs are obtained in PEAK and AVERAGE detection.

Qualification

The installation of EUT is identical for pre-characterization measurements. Test is performed in horizontal (H) and vertical (V) polarization and the height antenna is fixed and centered on the EUT, EUT smaller than the beamwidth of the measurement antenna.

Minimal beamwidth of the measurement antenna used: ETS3115 / w@3m=2.1m<14GHz / w@3m=0.9m<18GHz

Continuous linear turntable azimuth search was performed with 360 degrees range. Measurements are 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.

3.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	**Manufacturer**	**Model**	**Identifier**	**Cal_Date**	**Cal_Due**
Amplifier 10MHz - 18GHz	LCIE SUD EST	_	A7102082	05/22	05/24
Antenna Bi-log	AH System	SAS-521-7	C2040180	02/21	02/23
Antenna horn 18GHz	EMCO	3115	C2042029	03/22	03/25
Antenna loop	ELECTRO-METRICS	EM-6879	C2040294	08/22	08/24
BAT EMC	NEXIO	v3.21.0.32	L1000115		
Cable 0.75m	-	18GHz	A5329900	08/22	08/24
Comb EMR HF	YORK	CGE01	A3169114		
CONTROLLER	INNCO	CO3000	D3044034		
Filtre 0.8GHz-18GHz	PASTERNACK	PE87FL1018	A7484075	12/22	12/24
Multimeter - CEM	FLUKE	189	A1240171	09/21	09/23
Rehausse Table C3	LCIE	_	F2000511		
Rehausse Table C3	LCIE	_	F2000507		
Semi-Anechoic chamber #3 (BF)	SIEPEL	_	D3044017_BF	04/22	04/25
Semi-Anechoic chamber #3 (VSWR)	SIEPEL	_	D3044017_VSWR	04/22	04/25
SMA Cable 18GHz 0.5m	TELEDYNE	18GHz	A5330059	02/23	02/24
SMA Cable 18GHz 0.5m	TELEDYNE	18GHz	A5330060	02/23	02/24
SMA Cable 18GHz 0.6m	TELEDYNE	18GHz	A5330055	02/23	02/24
SMA Cable 18GHz 3.5m	TELEDYNE	18GHz	A5330058	02/23	02/24
SMA Cable 18GHz 6m	TELEDYNE	18GHz	A5330057	02/23	02/24
Spectrum analyzer	ROHDE & SCHWARZ	FSU 26	A4060058	09/21	09/23
Table C3	LCIE	_	F2000461		
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	01/21	05/23
TILT	INNCO	TILT	D3044033		
Turntable chamber (Cage#3)	ETS Lingren	Model 2165	F2000371		
Turntable controller (Cage#3)	ETS Lingren	Model 2090	F2000444		
Antenna Mat (OATS)	ETS Lingren	2071-2	F2000392		
Biconic Antenna	EATON	94455-1	C2040234	03/21	03/23
Cable (OATS)	_	1GHz	A5329623	09/22	09/23
Emission Cable	CABELTEL	6GHz	A5329069	05/22	05/23
Emission Cable	MICRO-COAX	1GHz	A5329656	08/22	08/23
Emission Cable	RADIALEX		A5329061	08/22	08/23
OATS	_	_	F2000409	07/22	07/23
Table C1/OATS	LCIE	_	F2000445		
Turntable (OATS)	ETS Lingren	Model 2187	F2000403		

3.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

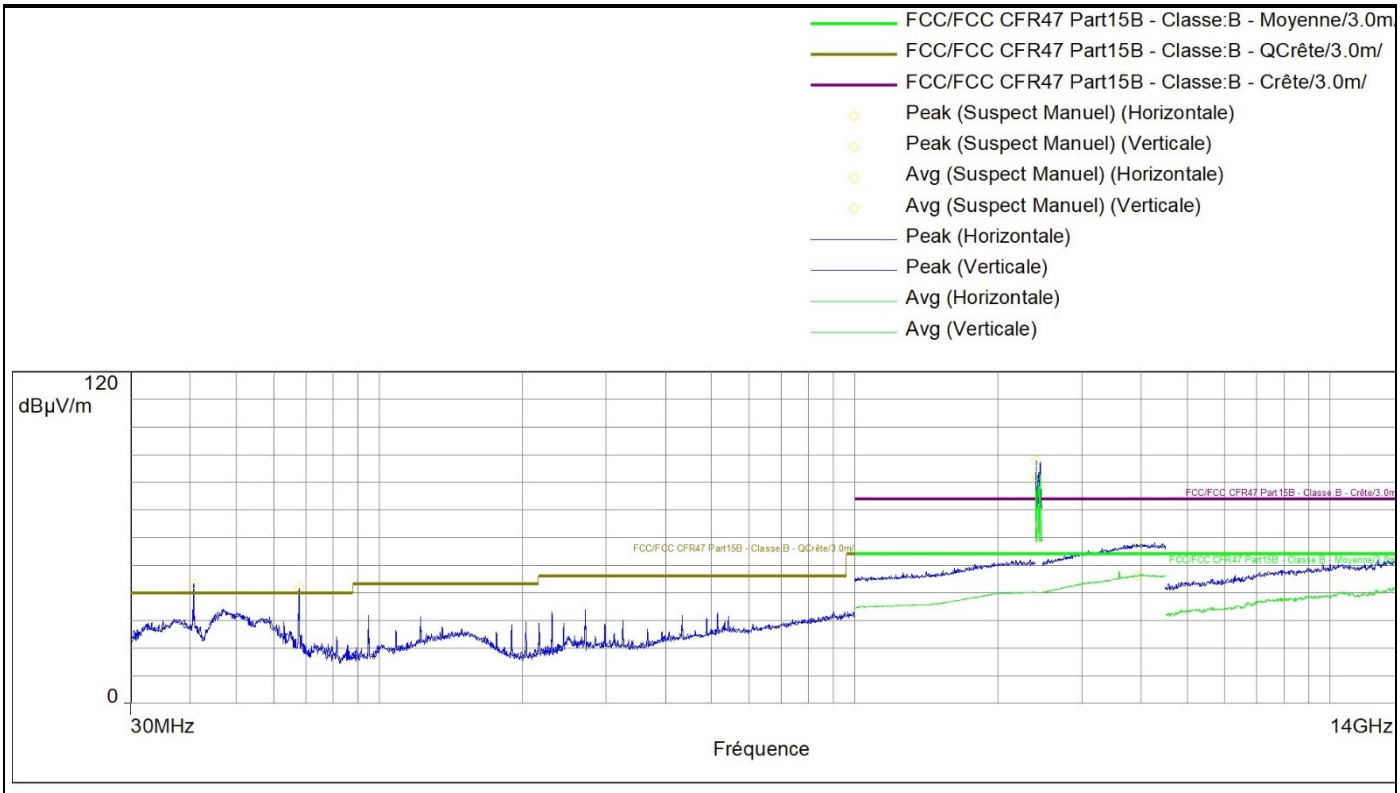
3.6. TEST RESULTS – RUNNING MODE N°1

3.6.1. 30MHz –14GHz

Pre-qualification measurement

Graph identifier		Polarization	EUT position	Comments	
Emr#	1	Vertical / Horizontal	Axis XY/Z	Supply 1	See below
Emr#	2	Vertical / Horizontal	Axis XY/Z	Supply 2	See below
Emr#	3	Vertical / Horizontal	Axis XY/Z	Supply 3	See below

RADIATED EMISSIONS			
Graph name:	Emr#1	**Test configuration:**	
Limit:	FCC CFR47 Part15B	Part15B (H+V) -Supply1- TX mode - Automatic Axis	
Class:	B		
Frequency range: [30MHz - 14GHz]			
Antenna polarization:		**RBW :**	100kHz to 1MHz
Azimuth:	0° - 360°	**VBW :**	300kHz to 3MHz

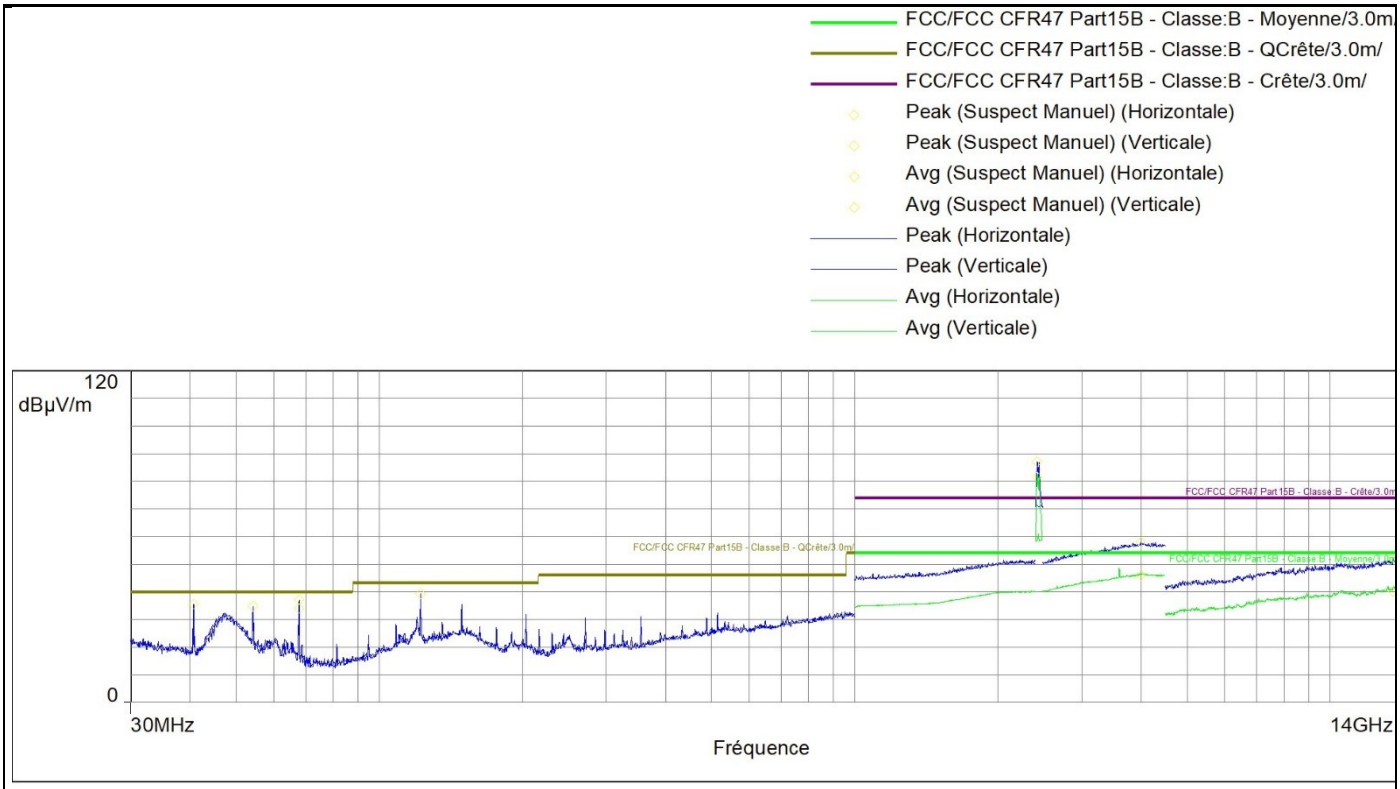


Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Lim.Q-Peak (dBµV/m)	Polarization	Correction (dB)
40.670	43.3	/	/	/	40.0	Vertical	16.0
67.782	42.0	/	/	/	40.0	Vertical	9.9
3932.557	57.5	74.0	45.9	54.0	/	Horizontal	39.2
2410.980*	87.7	/	82.0	54.0	/	Vertical	34.0
13985.156	52.4	74.0	40.2	54.0	/	Vertical	-10.6

* :Carrier frequency

RADIATED EMISSIONS			
Graph name:	Emr#2	**Test configuration:**	
Limit:	FCC CFR47 Part15B	Part15B (H+V) -Supply2- TX mode - Automatic Axis	
Class:	B		
Frequency range: [30MHz - 14GHz]			
Antenna polarization:		**RBW :**	100kHz to 1MHz
Azimuth:	0° - 360°	**VBW :**	300kHz to 3MHz

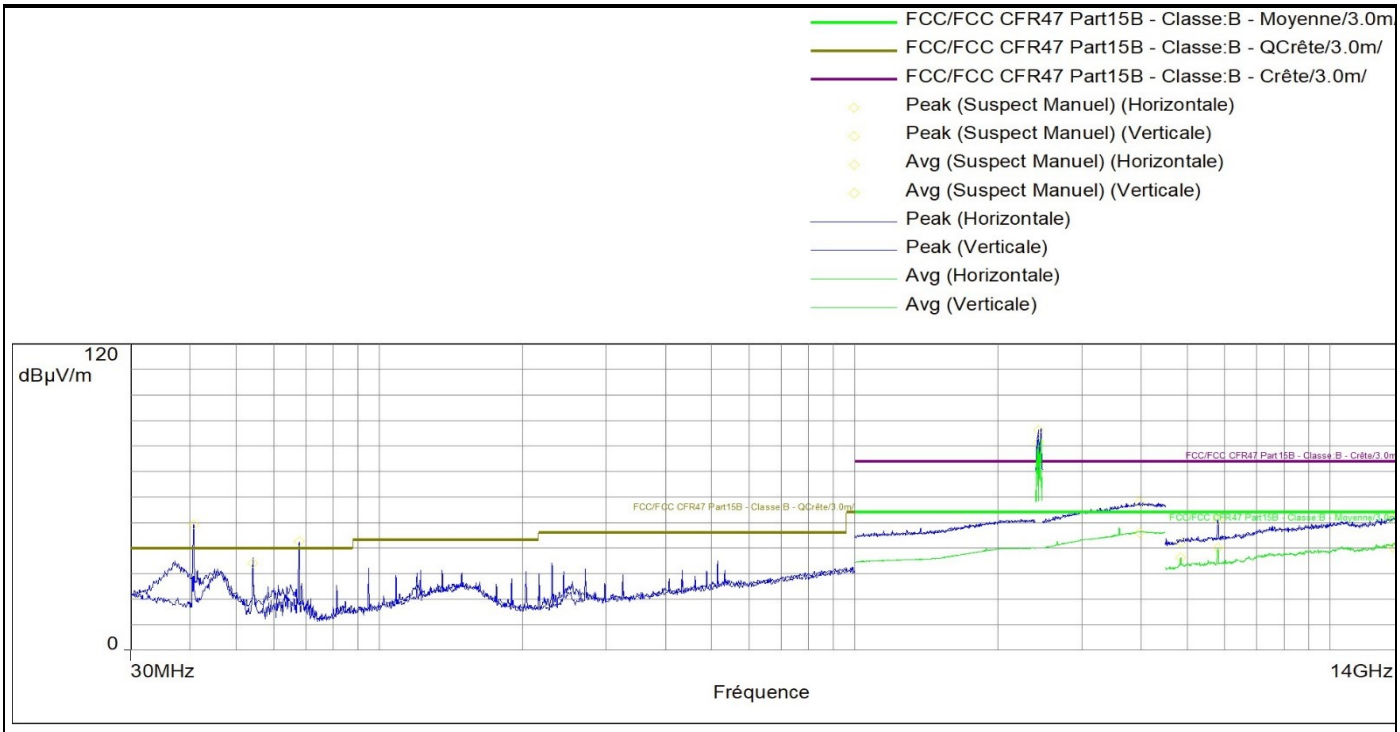


Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Lim.Q-Peak (dBµV/m)	Polarization	Correction (dB)
2417.911*	87.0	/	81.5	54.0	/	Horizontal	34.0
67.782	37.2	/	/	/	40.0	Horizontal	9.9
13572.500	52.3	74.0	40.2	54.0	/	Horizontal	-11.4
4001.118	58.0	74.0	46.0	54.0	/	Vertical	39.4
40.670	35.6	/	/	/	40.0	Vertical	16.0
54.202	34.8	/	/	/	40.0	Vertical	10.2
67.782	33.9	/	/	/	40.0	Vertical	9.9
122.004	39.1	/	/		43.5	Vertical	20.0

* :Carrier frequency

RADIATED EMISSIONS			
Graph name:	Emr#3	**Test configuration:**	
Limit:	FCC CFR47 Part15B	Part15B (H+V) -Supply 3- TX mode - Automatic Axis	
Class:	B		
Frequency range: [30MHz - 14GHz]			
Antenna polarization:		**RBW :**	100kHz to 1MHz
Azimuth:	0° - 360°	**VBW :**	300kHz to 3MHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Lim.Q-Peak (dBµV/m)	Polarization	Correction (dB)
2431.062*	86.2	/	81.2	54.0	/	Horizontal	34.0
3967.644	57.9	74.0	46.1	54.0	/	Horizontal	39.3
13582.000	51.7	74.0	40.4	54.0	/	Horizontal	-11.4
4853.875	42.3	74.0	36.4	54.0	/	Vertical	-21.3
5806.844	51.0	74.0	39.9	54.0	/	Vertical	-19.9
40.670	49.0	/	/	/	40.0	Vertical	16.0
54.250	34.0	/	/	/	40.0	Vertical	10.2
67.782	42.6	/	/	/	40.0	Vertical	9.9

* :Carrier frequency

Qualification

The frequency list is created from the results obtained during the pre-qualification.
Measurements are performed using a QUASI-PEAK detection.

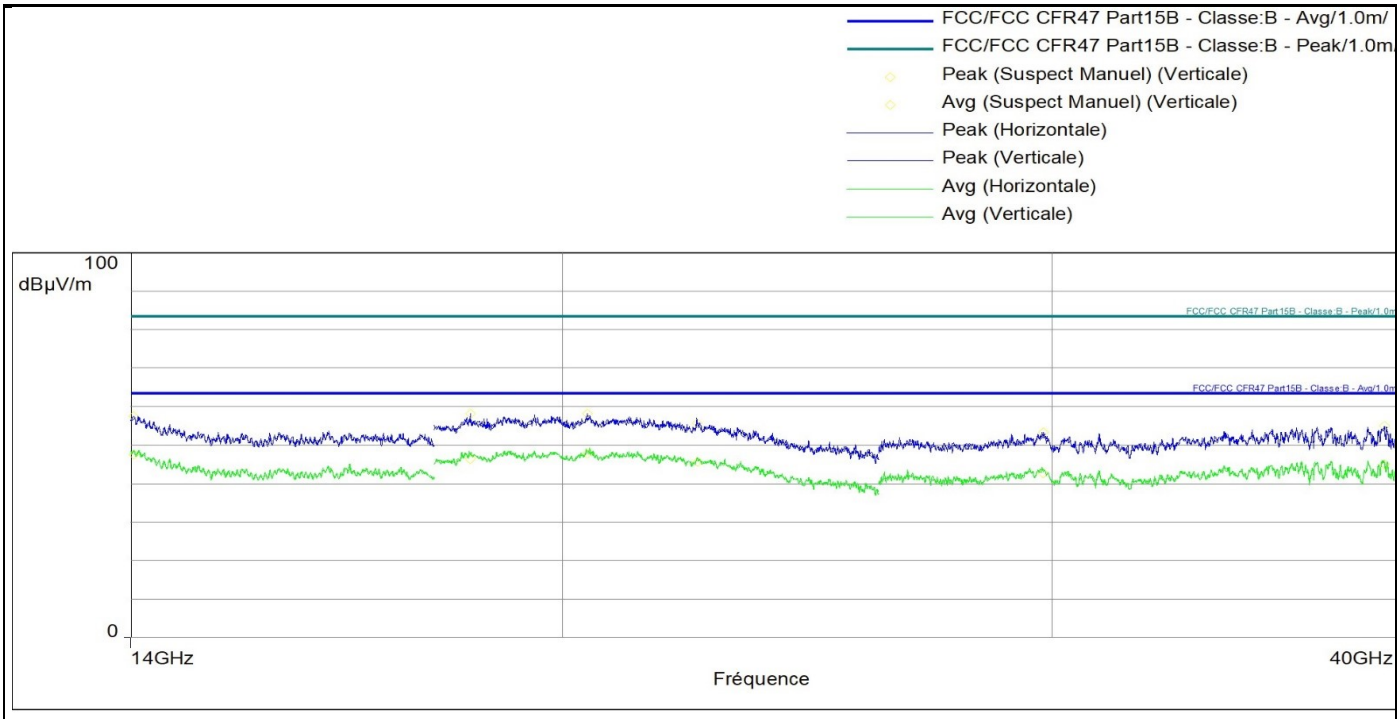
No significant frequency observed

3.6.2. 14GHz - 40GHz

Pre-qualification measurement

Graph identifier	Polarization	EUT position	Comments	
Emr# 4	Horizontal / Vertical	Axis XY/Z		See below
Emr# 5	Horizontal / Vertical	Axis XY/Z		See below
Emr# 6	Horizontal / Vertical	Axis XY/Z		

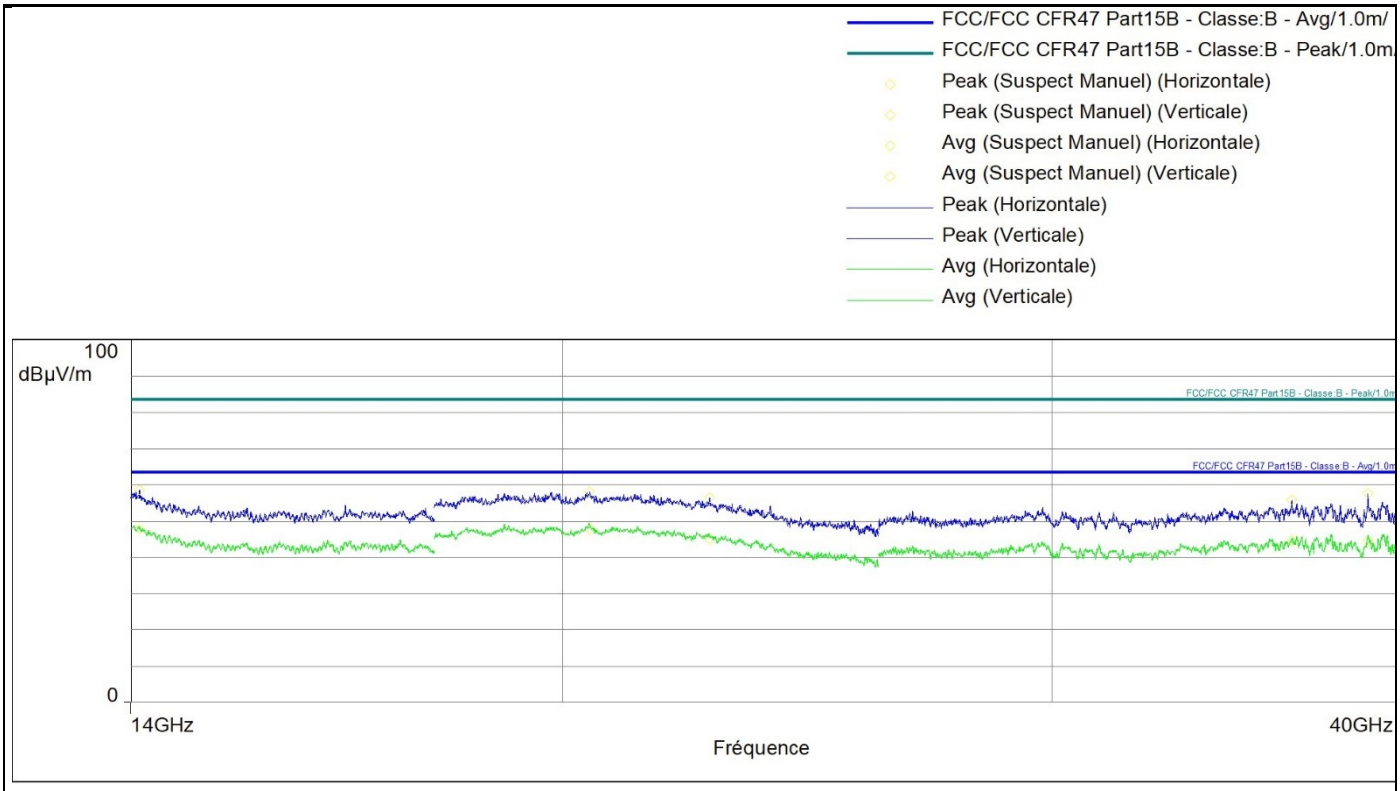
RADIATED EMISSIONS			
Graph name:	Emr#4	**Test configuration:**	
Limit:	FCC CFR47 Part15B	FCC Part 15B ALIM 1(14GHz-40GHz) - TX mode - Axis 0° (Worst case presented)	
Class:	B		
Frequency range: [14GHz - 40GHz]			
Antenna polarization:		**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Polarization	Correction (dB)
14030.000	57.5	83.5	47.5	63.5	Vertical	5.0
18544.000	58.1	83.5	46.4	63.5	Vertical	3.3
20428.000	58.2	83.5	47.7	63.5	Vertical	3.9
22373.000	55.6	83.5	45.7	63.5	Vertical	2.8
29794.000	53.3	83.5	42.7	63.5	Vertical	9.0
39494.250	54.9	83.5	45.0	63.5	Vertical	12.9

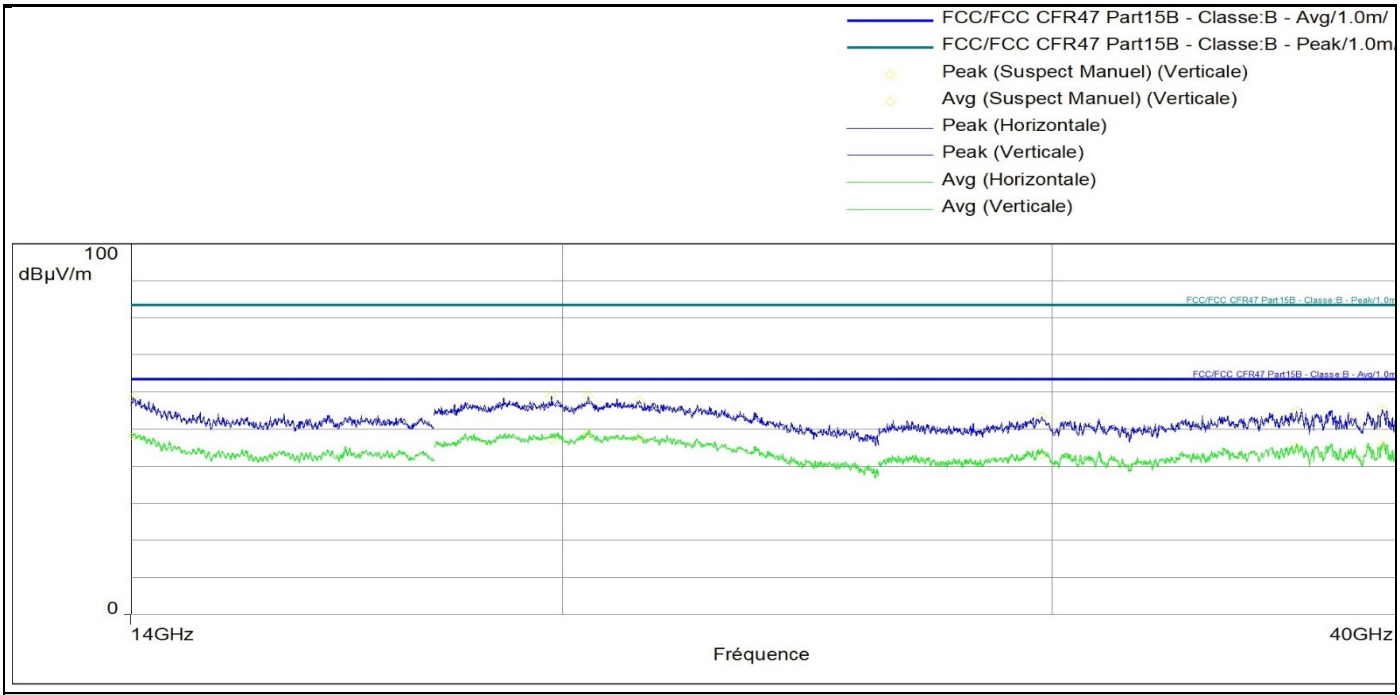
RADIATED EMISSIONS			
Graph name:	Emr#5	**Test configuration:**	
Limit:	FCC CFR47 Part15B	FCC Part 15B ALIM 2(14GHz-40GHz) - TX mode - Axis 0° (Worst case presented)	
Class:	B		
Frequency range: [14GHz - 40GHz]			
Antenna polarization:		**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Polarization	Correction (dB)
38958.750	57.6	83.5	44.6	63.5	Horizontal	12.3
14101.500	58.6	83.5	47.8	63.5	Vertical	4.6
20461.000	58.0	83.5	47.7	63.5	Vertical	3.8
22598.000	56.4	83.5	45.0	63.5	Vertical	3.0
36598.000	55.8	83.5	44.5	63.5	Vertical	11.5

RADIATED EMISSIONS			
Graph name:	Emr#6	**Test configuration:**	
Limit:	FCC CFR47 Part15B	FCC Part 15B ALIM 3(14GHz-40GHz) - TX mode - Axis 0° (Worst case presented)	
Class:	B		
Frequency range: [14GHz - 40GHz]			
Antenna polarization:		**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Polarization	Correction (dB)
14029.000	58.5	83.5	48.0	63.5	Vertical	5.1
19831.000	58.9	83.5	47.2	63.5	Vertical	4.1
20446.000	58.8	83.5	48.7	63.5	Vertical	3.9
21329.000	57.6	83.5	47.5	63.5	Vertical	3.0
29753.750	53.3	83.5	43.2	63.5	Vertical	8.9
36725.750	54.8	83.5	45.3	63.5	Vertical	11.7
39440.000	55.4	83.5	45.9	63.5	Vertical	12.8

Qualification

The frequency list is created from the results obtained during the pre-qualification.
Measurements are performed using a PEAK and AVERAGE detection.

No significant frequency observed

3.7. CONCLUSION

The sample of the equipment **Desk/2600**, Sn : **230587317081327729816918**, tested in the configuration presented in this test report **satisfies** to requirements of the product family standard applied (See §Test Program) for radiated emissions.

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 (monophasé /triphasé) 9kHz-150kHz *Measurement of conducted disturbances in voltage on the power port (single & three phases)9kHz-150kHz*	3.7dB	3.8dB
Mesure des perturbations conduites en tension sur le réseau d'énergie (monophasé /triphasé) 150kHz-30MHz *Measurement of conducted disturbances in voltage on the power port (single & three phases)150kHz-30MHz* LISN 50Ω/50µH Capacitive Voltage Probe	 3.3dB 3.7dB	 3.4dB 3.9dB
Mesure des perturbations conduites en courant *Measurement of conducted disturbances in current*	2.9dB	2.9dB
Mesure du champ électrique rayonné en cage de Faraday semi-anéchoïque de 30MHz à 1GHz *Measurement of radiated electric field in half-anechoic Faraday room From 30MHz to 1GHz*	6.3dB	6.3dB
Mesure du champ électrique rayonné en cage de Faraday anéchoïque de 1GHz à 6GHz *Measurement of radiated electric field in full-anechoic Faraday room From 1GHz à 6GHz*	5.2dB	5.2dB
Mesure du champ électrique rayonné en cage de Faraday anéchoïque de 6GHz à 18GHz *Measurement of radiated electric field in full-anechoic Faraday room From 6GHz to 18GHz*	5.5dB	5.5dB
Mesure du champ électrique rayonné sur le site en espace libre de Moirans 30MHz – 1GHz. *Measurement of radiated electric field on the Moirans open area test site 30MHz – 1GHz.*	6.3dB	6.3dB
Mesure du champ électrique rayonné IN SITU de 30 à 1000 MHz *IN SITU measurement of radiated electric field from 30 to 1000MHz*	A l'étude / Under consideration	5.2dB

Les valeurs d'incertitudes calculées du laboratoire étant inférieures aux valeurs d'incertitudes limites établies par le CISPR, la conformité de l'échantillon est établie directement par les niveaux limites applicables. Ce tableau regroupe l'ensemble des incertitudes maximales pour les essais réalisables dans le laboratoire, qu'ils aient été ou non réalisés dans le cadre du présent rapport */ The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR. The conformity of the sample is directly established by the applicable limits values. This table includes all uncertainties maximum feasible for testing in the laboratory, whether or not made in this report*

Note - L'incertitude de mesure instrumentale est déterminée selon la CISPR 16-4-2. / *The instrumentation measurement uncertainty is determined according to CISPR16-4-2*