Accreditation
N°1-1633
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Template : May 28th, 2024

TEST REPORT

N°: **23489160-804370-A (FILE#7873609)** Version: **02**

Subject	**Electromagnetic compatibility tests according to the standards: FCC CFR 47 Part 15, Subpart B**
Issued to	**SYCLOPE ELECTRONIQUE** **RUE DU BRUSCOS** **64230 - SAUVAGNON** **FRANCE**
Apparatus under test	
Product	**in-situ trichloramine measurement**
Trade mark	**SYCLOPE**
Manufacturer	**SYCLOPE**
Model under test	**PAT0000**
Serial number	**232232458 & 240101619**
FCCID	**2AS3B-TRIKLOLIVE**
Conclusion	See Test Program chapter
Test date	September 10, 2024 to September 17, 2024
Test location	LCIE Grenoble
FCC Test site	FR0008 - 197516 (MOI)
ISED Test site	6500A (MOI)
Sample receipt date	September 09, 2024
Composition of document	24 pages
Document issued on	April 16, 2025

Written by :
Majid MOURZAGH
Tests operator

Approved by :
Nathalie BUGANZA
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 04,2024	Mounir BOUAMARA	Creation of the document
02	April 16, 2025	Majid MOURZAGH	Correction applicant address and Add FCC ID on page 1

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

1.1.1. 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**			**NA**
	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-13GHz* **FCC §15.109 / ICES-003**	**Access: Enclosure port of ancillary equipment**			**PASS**
	Frequency	**Peak @3m**	**Average @3m**	
	1- 13GHz	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. If this test is covered by the COFRAC accreditation, the declaration of conformity for product standard only are carried out outside the framework of accreditation.
***§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:

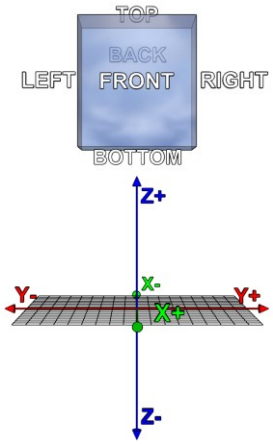
- For a composite system comprised of a digital device using a clock frequency of 1 GHz as the highest frequency for the digital logic and an intentional radiator operating at 2.4 GHz, the composite is required to be investigated to the upper frequency of 24 GHz (in this case, 10 times the intentional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

2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES)

Equipment under test (EUT):

Model under test :	**PAT0000**
Serial Number:	**232232458**
  	
Dimensions:	25cm x 20cm x 50cm (Length x Width x Height)
Type :	Table-Top

Power supply:
During all the tests, EUT is supplied by V_{nom}: **12 VDC**
For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference / Sn	Comments
Supply1	DC	12V	--	With AC/DC adaptor XP Power VEL24US120-EU-JA

NC: Not communicated by provider

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply1	2 WIRES	2	Yes	No	Yes	-
Access1	ETHERNET RJ45	3	Yes	No	Yes	-
Access2	CAPTEUR	10	No	No	Yes	-
Access3	RELAY	3	Yes	No	Yes	-
Access4	4-20mA	3	Yes	No	Yes	-

NC: Not communicated by provider

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop	--	--	--
Mulitmiter	Fluke	--	--
AC/DC adaptor	XP Power VEL24US120-EU-JA	--	--

NC: Not communicated by provider

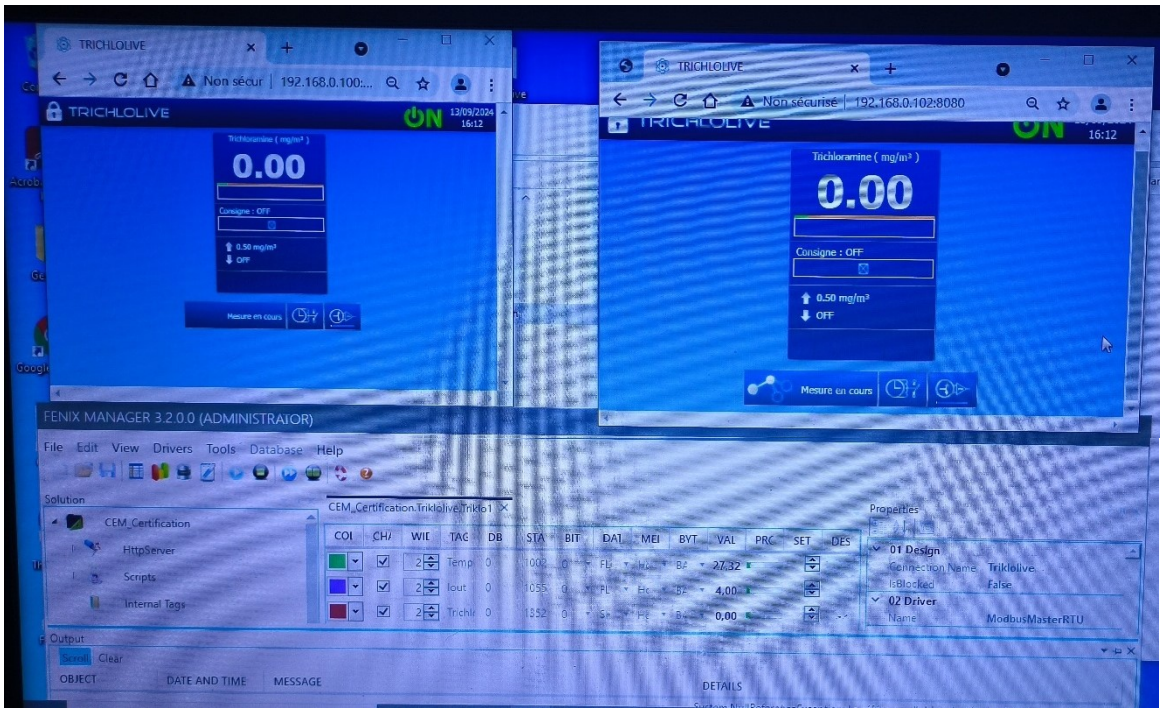
2.2. EUT CONFIGURATION

Hardware information			
Highest internal frequency (PLL, Quartz, Clock, Microprocessor…):	**$F_{Highest}$:**	**2400**	**MHz**
Firmware (if applicable):	**V. :**	NC	
Software (if applicable):	**V. :**	NC	
Time necessary for the EUT to be exercised and to respond:	**Dwell:**	**1**	**s**

NC: Not communicated by provider

Running mode n°1:

Setup:



Control:

Check if there is no loss of communications or change in the value of the "trichloramine". The max value tolerable is 0.5

2.3. EQUIPMENT MODIFICATIONS DURING THE TESTS

None

2.4. FIELD STRENGTH CALCULATION

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

FS = RA + AF + CF – AG

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

2.5. 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

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. The symbol -/- replaces the date for equipment checking before test or that have none impact on the test or that have no calibration required by the standard.

3. MEASUREMENT OF CONDUCTED EMISSION

3.1. TEST CONDITIONS

Date of test	:	September 16, 2024
Test performed by	:	Mounir BOUAMARA
Atmospheric pressure (hPa)	:	999
Relative humidity (%)	:	39
Ambient temperature (°C)	:	23

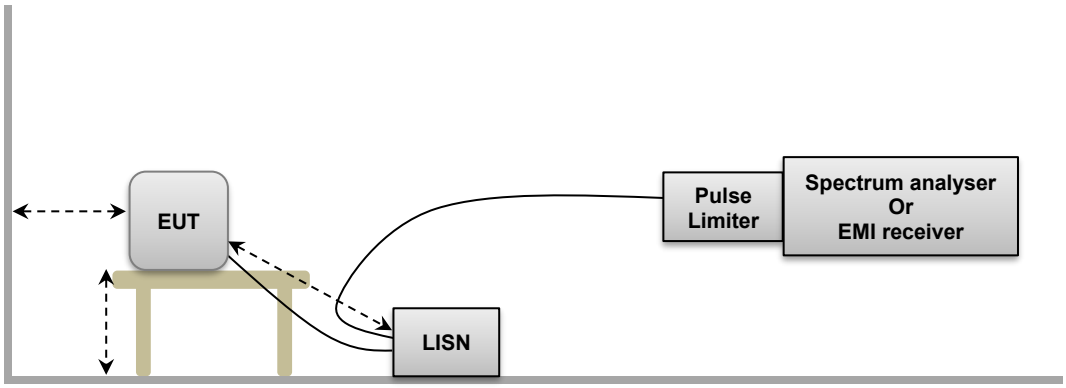
3.2. TEST SETUP

Test procedure:
ANSI C63.4 & FCC Part 15 subpart B

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 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.

Frequency range:	**150kHz to 30MHz**	
Test:	**Pre-Characterization**	**Qualification**
RBW Filter:	10kHz	9kHz
Detector:	Peak & Average	QPeak & Cispr Average
Mode:	Linear Scan	

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

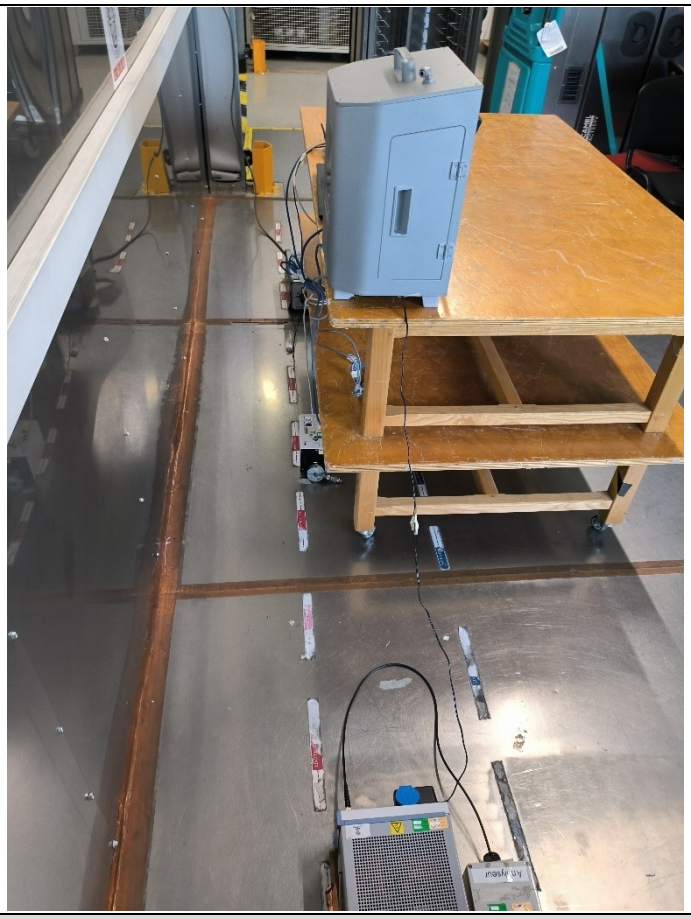
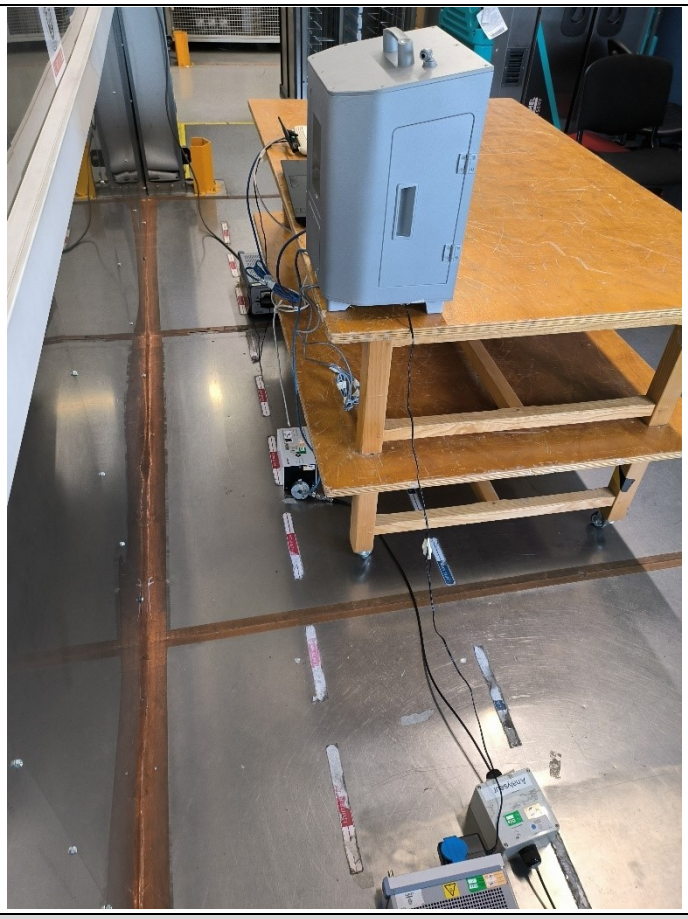



Photo of AC Power Line Conducted Emissions

3.3. 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	05/24	05/26
EMC comb generator	LCIE SUD EST	_	A3169098		
LISN	ROHDE & SCHWARZ	ESH3-Z5	C2320314	08/24	08/25
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	03/23	03/25
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	05/23	05/25
Transient limiter	ROHDE & SCHWARZ	ESH3-Z2	A7122204	07/24	07/26

3.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

3.5. TEST RESULTS – RUNNING MODE N°1

Mains terminals:

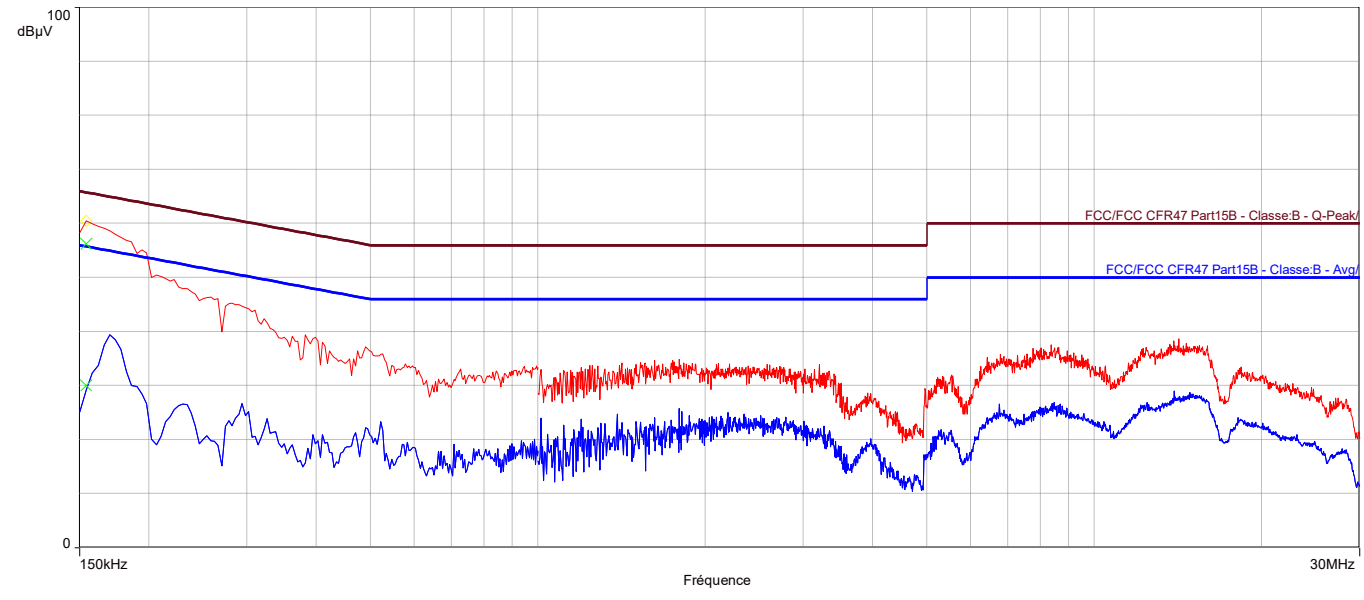
SUPPLY1

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 (AC supply of AC/DC adaptor)	See below
Emc#	2	Neutral	120VAC/60Hz (AC supply of AC/DC adaptor)	See below
Emc#	3	Phase	240VAC/50Hz (AC supply of AC/DC adaptor)	See below
Emc#	4	Neutral	240VAC/50Hz (AC supply of AC/DC adaptor)	See below

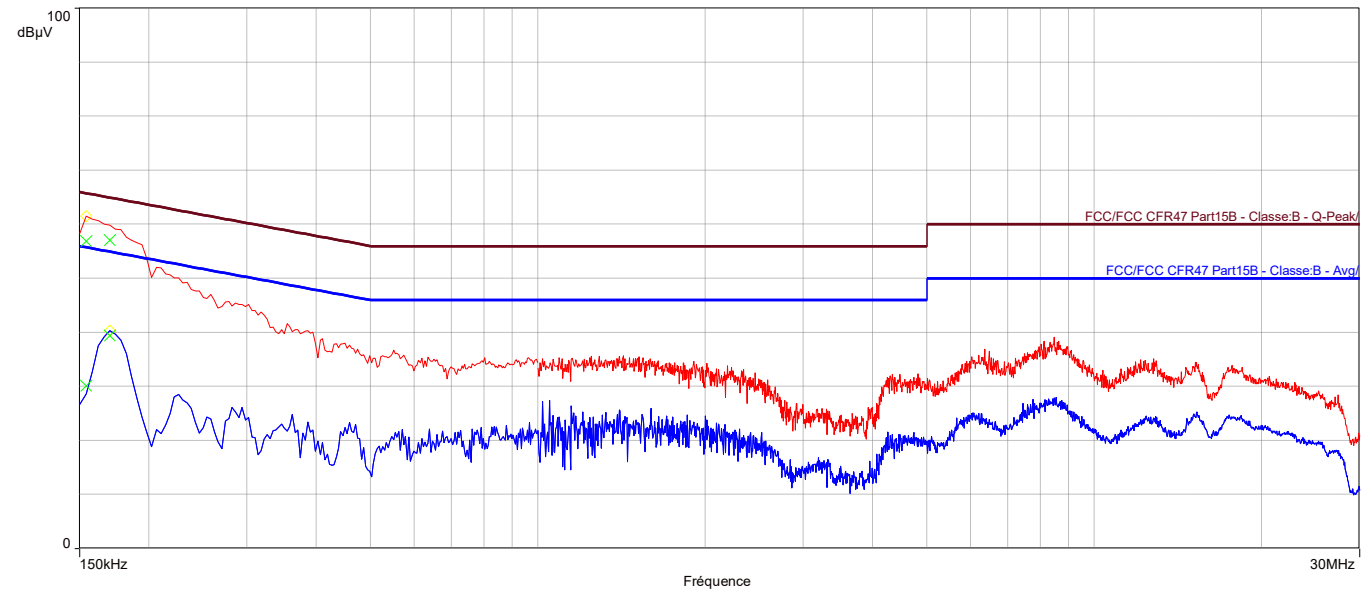
CONDUCTED EMISSIONS			
Graph name:	Emc#1	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) [150k-30M]Hz - P 120 60 HZ	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	120 VAC/ 60Hz	**RBW:** 10kHz	**VBW:** 30kHz
Line:	**Phase**	**Trace color & detector:**	PEAK AVG



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)	Correction (dB)
0.154	56.2	65.8	-9.6	30.0	55.8	-25.8	19.7

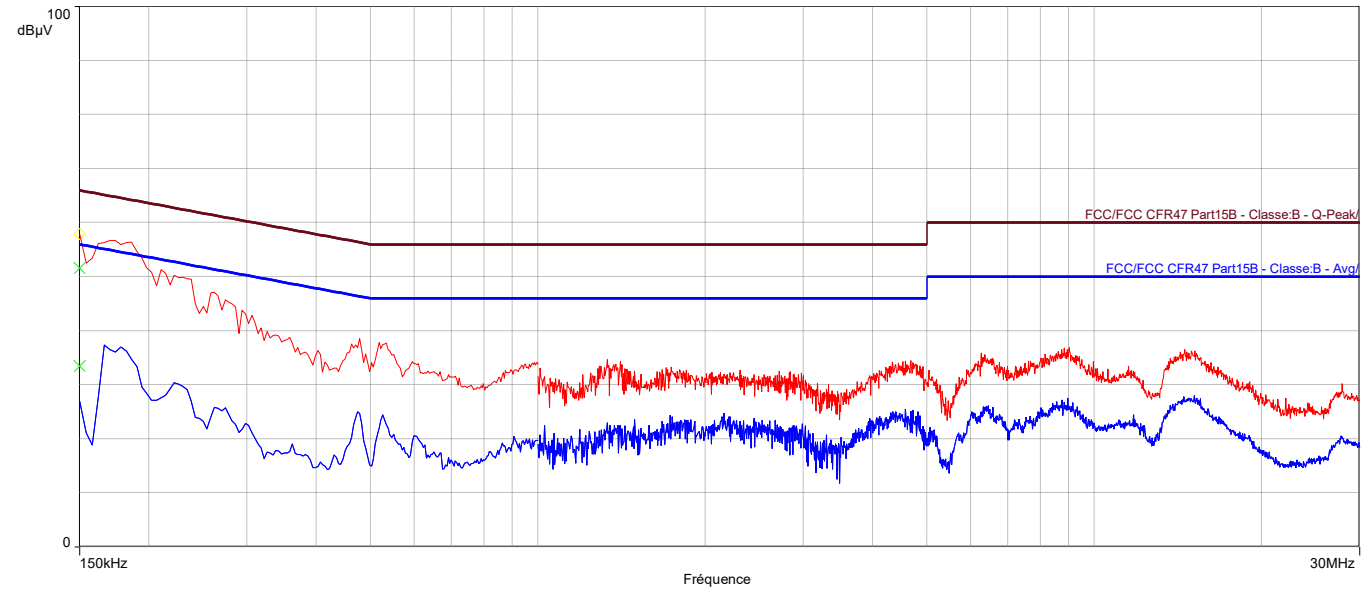
CONDUCTED EMISSIONS			
Graph name:	Emc#2	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) [150k-30M]Hz - N 120 60 HZ	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	120 VAC/ 60Hz	**RBW:** 10kHz	**VBW:** 30kHz
Line:	**Neutral**	**Trace color & detector:**	PEAK AVG



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)	Correction (dB)
0.154	56.9	65.8	-8.9	30.2	55.8	-25.6	19.7
0.170	57.1	65.0	-7.9	39.4	55.0	-15.6	20.0

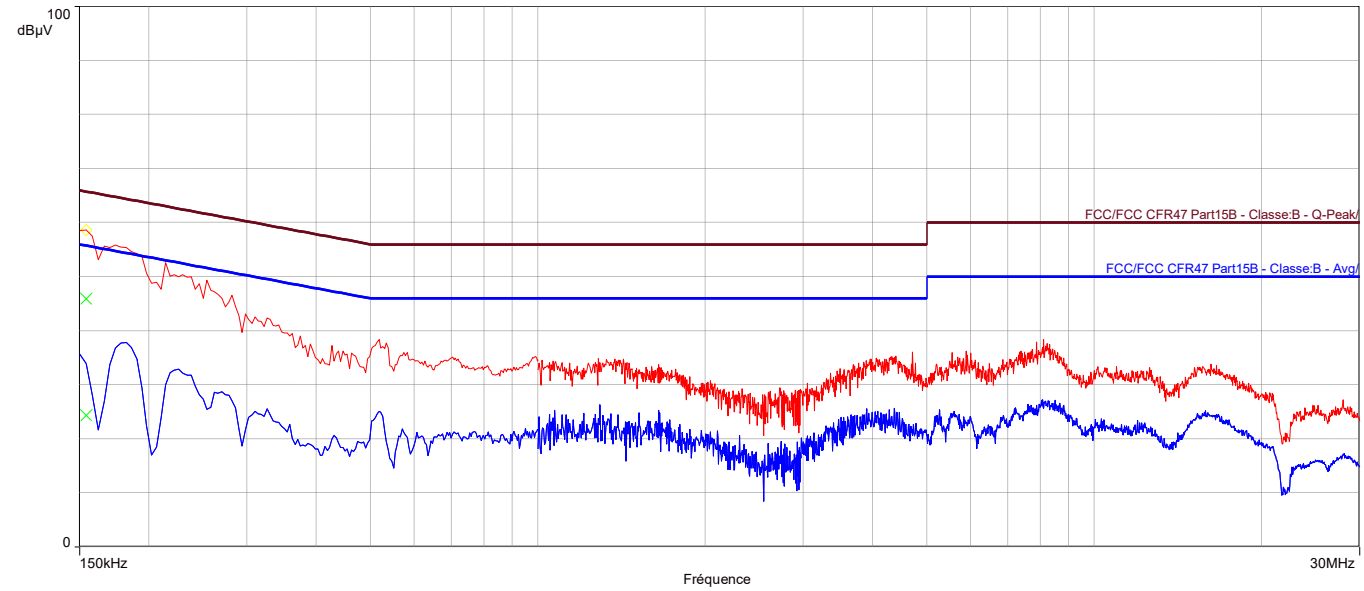
CONDUCTED EMISSIONS			
Graph name:	Emc#3	**Test configuration:**	
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) [150k-30M]Hz - P 240 50 HZ	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	240 VAC/ 50Hz	**RBW:** 10kHz	**VBW:** 30kHz
Line:	**Phase**	**Trace color & detector:**	PEAK AVG



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)	Correction (dB)
0.150	51.6	66.0	-14.4	33.4	56.0	-22.6	19.6

CONDUCTED EMISSIONS					
Graph name:	Emc#4	**Test configuration:**			
Limit:	FCC CFR47 Part15B	ESU8 - (RSIL) [150k-30M]Hz - N 240 50 HZ			
Class:	B				
Frequency range: [150kHz - 30MHz]					
Voltage / Frequency:	240 VAC/ 50Hz	**RBW:**	10kHz	**VBW:**	30kHz
Line:	**Neutral**	**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)	Correction (dB)
0.154	46.0	65.8	-19.8	24.4	55.8	-31.4	19.7

3.6. CONCLUSION

The sample of the equipment **PAT0000**, Sn : **232232458** , tested in the configuration presented in this test report **satisfies** to requirements of the product family standard applied (See §Test Program) for conducted emissions.

4. MEASUREMENT OF RADIATED EMISSION

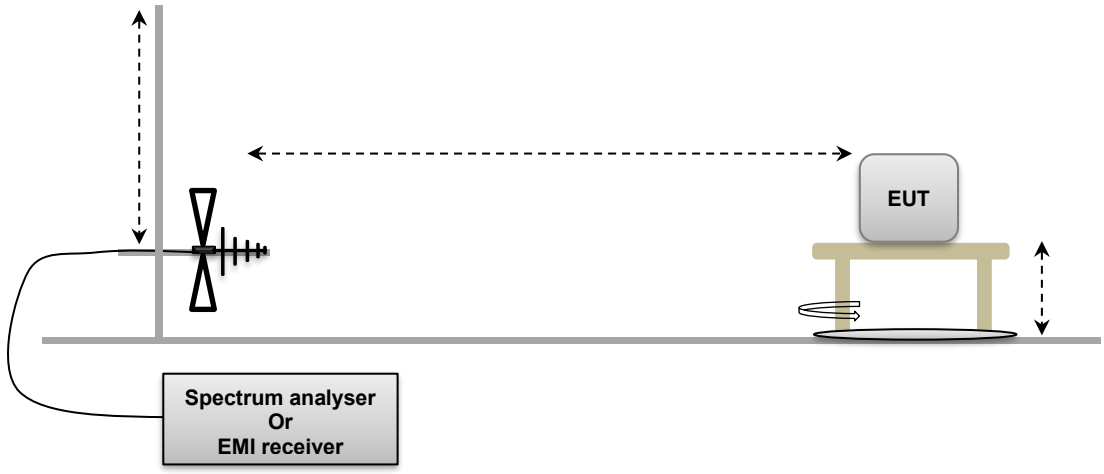
4.1. TEST CONDITIONS

Date of test	:	September 10, 2024
Test performed by	:	Mounir BOUAMARA
Atmospheric pressure (hPa)	:	999
Relative humidity (%)	:	40
Ambient temperature (°C)	:	23

4.2. TEST SETUP

Test procedure:
ANSI C63.4 & FCC Part 15 subpart B

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

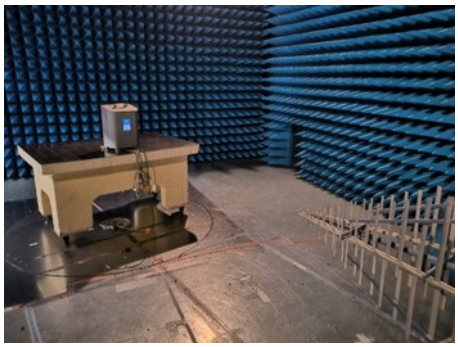


Photo in semi-anechoic chamber – Frequency < 1GHz



Photo on OATS

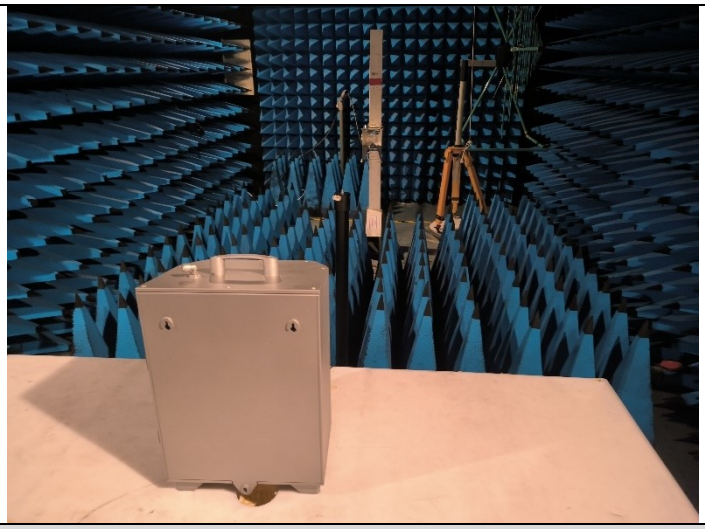
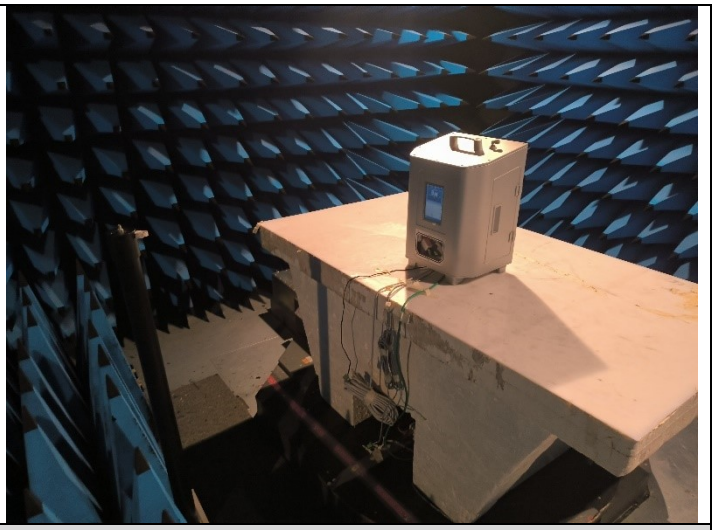



Photo in anechoic chamber – Frequency >1GHz

4.3. TEST METHOD

During pre-characterization, a pre-scan of all the setup has been performed on all axis of EUT used in normal configuration. The pre-characterization graphs are obtained in PEAK detection, and AVERAGE detection for frequencies above 1GHz. A summary of the worst case emissions found in all test configurations and modes is shown. Spurious or frequency band are measured with qualification method to show compliance with limits.
Following frequency ranges, test setup parameters are different and specified in tables below.

4.3.1. 30MHz –1GHz

Frequency range:	**30MHz to 1GHz**	
Test:	**Pre-Characterization**	**Qualification**
Antenna Polarization:	Horizontal and Vertical	
Antenna Height:	1.55m	Varied continously from 1m to 4m
Antenna Type:	Bi-Log	Biconical & Bi-Log
Min. Antenna Beamwidth:	Teseq CBL 6144 / w@3m - 3.5m<1GHz	Eaton 94455 / w@10m - 2.6m<200MHz Teseq CBL 6111 / w@10m - 14m<1GHz R&S HL562E / w@3m - 3.1m<1GHz
RBW Filter:	100kHz	120kHz
Maximization:	Turntable rotation of 360 degrees range	
Test site:	Full Anechoic Chamber	Open Aera Test Site
Distance EUT - Antenna:	3m	10m
Detector:	Peak	QPeak
Mode:	Linear Scan	Linear Scan

4.3.2. 1GHz – 13GHz:

Frequency range:	**1GHz to 13GHz**	
Test:	**Pre-Characterization**	**Qualification**
Antenna Polarization:	Horizontal and Vertical	
Antenna Height:	Centered on EUT	Centered on EUT
Antenna Type:	Bi-Log & Horn	Bi-Log & Horn
Min. Antenna Beamwidth:	A-INFO LB-10180 / w@3m - 2.0m<14GHz / 0.7m<18GHz	A-INFO LB-10180 / w@3m - 2.0m<14GHz / 0.7m<18GHz
RBW Filter:	1MHz	1MHz
Maximization:	Turntable rotation of 360 degrees range	
Test site:	Full Anechoic Chamber	Full Anechoic Chamber
Distance EUT - Antenna:	3m	3m
Detector:	Peak & Average	Peak & Cispr Average
Mode:	Linear Scan	Linear Scan

4.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	**Manufacturer**	**Model**	**Identifier**	**Cal_Date**	**Cal_Due**
Amplifier 10kHz - 13.5GHz	LCIE SUD EST	_	A7085028	04/23	04/25
Antenna Bi-Log XWing	TESEQ	CBL6144	C2040146		
Antenna horn 18GHz	AINFO	LB	C2042078	07/24	07/27
BAT EMC	NEXIO	v3.21.0.32	L1000115		
Cable 0.75m	SUCOFLEX	18GHz	A5329919	08/24	08/25
Cable 2.2m N	SUCOFLEX	SF118A/2x11N/2.2M	A5329990	08/24	08/25
Cable 5m	SUCOFLEX	18GHz	A5329918	08/24	08/25
Comb EMR HF	YORK	CGE01	A3169114		
Diameter 1.2m / Height 2.25m	LCIE	VSWR 1GHz - 18GHz	D3044015_VSWR	08/22	08/25
Radiated emission comb generator	BARDET	_	A3169050		
RECEIVER	KEYSIGHT	E4440A	A4060035	06/24	06/26
Semi-Anechoic chamber #2	SIEPEL	_	D3044015	09/23	09/24
Spectrum Analyzer 9kHz - 6GHz	ROHDE & SCHWARZ	FSL6	A4060049	09/22	01/25
Table C2	LCIE	_	F2000438		
Thermo-hygrometer (C2)	LACROSS Techn.	WS-2357	B4206015	03/23	03/25
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	05/23	05/25
Turntable chamber (Cage#2)	ETS Lingren	Model 2165	F2000404		
Turntable controller (Cage#2)	ETS Lingren	Model 2066	F2000393		
Amplifier 100kHz - 18GHz	LCIE SUD EST	_	A7085027	07/23	07/25
Antenna Bi-log	ROHDE & SCHWARZ	HL562E	C2040287	02/24	02/26
Antenna mast (Cage#1)	MATURO Gmbh	AM 4.0	F2000407		
Cable 0.75m	SUCOFLEX	18GHz	A5329920	08/24	08/25
Cable 2.2m N	SUCOFLEX	SF118A/2x11N/2.2M	A5329989	08/24	08/25
Diameter 2m / Height 2.5m	LCIE	VSWR 1GHz - 18GHz	D3044016_VSWR	09/22	09/25
Emission Cable	SUCOFLEX	18GHz	A5329899	08/24	08/25
Semi-Anechoic chamber #1	SIEPEL	ANE	D3044016_ANE	07/24	07/27
Semi-Anechoic chamber #1	SIEPEL	_	D3044016	09/23	09/24
Table C1/OATS	MATURO Gmbh	_	F2000437		
Thermo-hygrometer (C1)	OREGON	WMR 80	B4206013	03/23	03/25
Turntable chamber (Cage#1)	MATURO Gmbh	TT 2.0 SI	F2000406		
Turntable controller (Cage#1)	MATURO Gmbh	Control Unit	F2000408		
Antenna Bi-log	CHASE	CBL6111A	C2040051	09/22	01/25
Antenna Mat (OATS)	ETS Lingren	2071-2	F2000392		
Biconic Antenna	EATON	94455-1	C2040234	05/23	05/25

TEST EQUIPMENT USED					
Description	**Manufacturer**	**Model**	**Identifier**	**Cal_Date**	**Cal_Due**
Cable (OATS)	_	1GHz	A5329623	09/24	09/25
CALCUL_FACTEURS	LCIE SUD EST	V4	L2000035		
Emission Cable	RADIALEX		A5329061	07/24	07/25
Emission Cable	MICRO-COAX	1GHz	A5329656	09/24	09/25
OATS	_	_	F2000409	07/24	07/25
Table C1/OATS	LCIE	_	F2000445		
Turntable (OATS)	ETS Lingren	Model 2187	F2000403		
Turntable / Mast controller (OATS)	ETS Lingren	Model 2066	F2000372		

4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

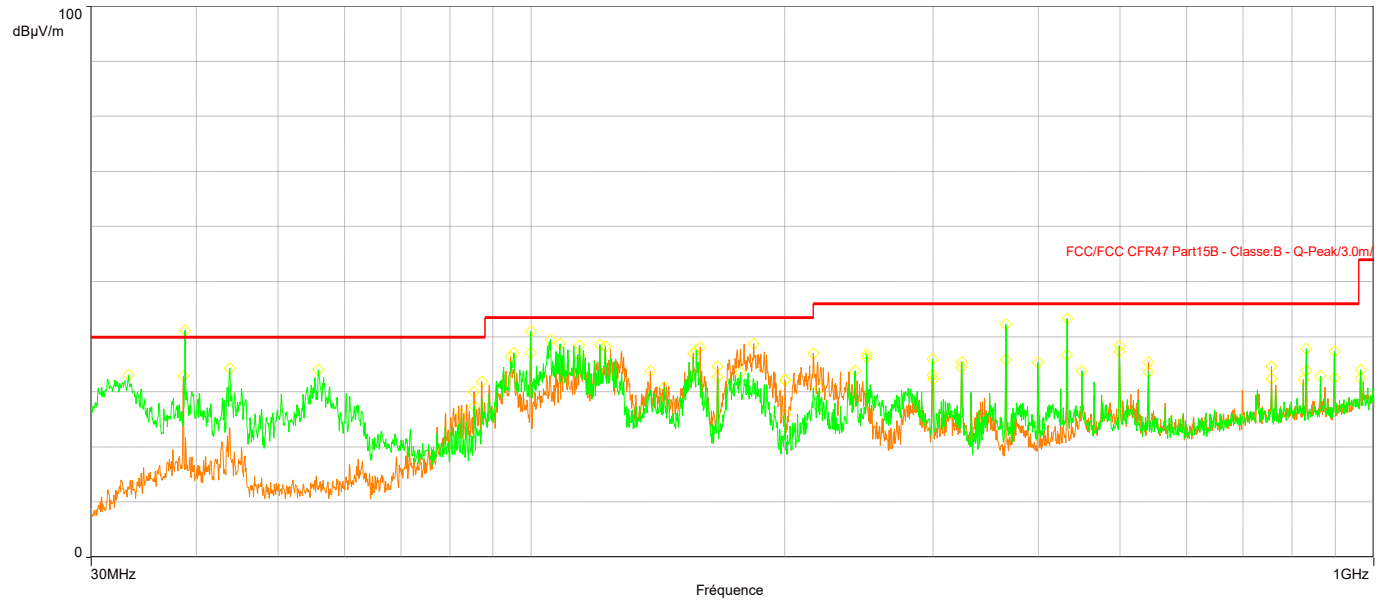
4.6. TEST RESULTS – RUNNING MODE N°1

4.6.1. 30MHz –1GHz

Pre-qualification measurement

Graph identifier	Polarization	EUT position	Comments
Emr# 1	Vertical & Horizontal	Axis XY	See below

RADIATED EMISSIONS			
Graph name:	Emr#1	**Test configuration:**	
Limit:	FCC CFR47 Part15B	-------C2 - FSL (H+V) [0.03-1]GHz	
Class:	B		
Frequency range: [30MHz - 1GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW:** 100kHz	**VBW:** 300kHz
Azimuth:	**Trace color & detector:** F<GHz: Only Peak detector: Antenna Polarization: Vertical Horizontal		
0° - 360°	**Trace color & detector:** F>GHz: for both Antenna Polarization: detector: PEAK AVG		



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	Lim.Q-Peak (dBµV/m)	Peak-Lim.Q-Peak (dB)	Polarization
33.230	33.1	40.0	-6.9	Vertical
38.585	32.9	40.0	-7.1	Horizontal
38.789	41.2	40.0	1.2	Vertical
43.821	34.3	40.0	-5.7	Vertical
55.823	34.0	40.0	-6.0	Vertical
82.547	25.9	40.0	-14.1	Vertical
85.420	30.0	40.0	-10.0	Horizontal
85.505	27.4	40.0	-12.6	Vertical
87.273	31.9	40.0	-8.1	Horizontal
94.498	36.3	43.5	-7.2	Horizontal

Frequency (MHz)	Peak (dBµV/m)	Lim.Q-Peak (dBµV/m)	Peak-Lim.Q-Peak (dB)	Polarization
95.297	37.1	43.5	-6.4	Vertical
99.751	37.0	43.5	-6.4	Horizontal
99.768	41.0	43.5	-2.5	Vertical
105.259	39.5	43.5	-4.0	Vertical
108.047	38.8	43.5	-4.7	Vertical
113.997	36.7	43.5	-6.8	Horizontal
113.997	38.5	43.5	-5.0	Vertical
120.542	38.6	43.5	-4.9	Vertical
122.327	38.2	43.5	-5.2	Horizontal
138.392	33.9	43.5	-9.6	Horizontal
143.798	30.9	43.5	-12.6	Vertical
155.596	37.0	43.5	-6.5	Horizontal
156.888	37.5	43.5	-6.0	Vertical
158.588	38.1	43.5	-5.4	Horizontal
166.255	34.7	43.5	-8.8	Horizontal
166.289	32.7	43.5	-10.8	Vertical
176.948	33.6	43.5	-9.9	Vertical
183.544	38.8	43.5	-4.7	Horizontal
200.000	32.2	43.5	-11.3	Horizontal
200.000	25.9	43.5	-17.6	Vertical
200.000	32.3	43.5	-11.2	Horizontal
216.000	37.0	43.5	-6.6	Horizontal
219.520	30.8	46.0	-15.2	Vertical
242.120	33.8	46.0	-12.2	Vertical
250.000	36.8	46.0	-9.2	Vertical
250.000	36.3	46.0	-9.7	Horizontal
299.280	36.0	46.0	-10.0	Vertical
299.320	33.1	46.0	-12.9	Horizontal
300.000	32.3	46.0	-13.7	Vertical
323.880	34.5	46.0	-11.5	Horizontal
324.080	35.4	46.0	-10.6	Vertical
365.760	42.3	46.0	-3.7	Vertical
365.800	35.8	46.0	-10.2	Horizontal
399.080	35.3	46.0	-10.7	Vertical
432.160	36.7	46.0	-9.3	Horizontal
432.280	43.3	46.0	-2.7	Vertical
450.000	33.8	46.0	-12.2	Vertical
498.800	38.4	46.0	-7.6	Vertical
498.880	37.4	46.0	-8.6	Horizontal
540.080	33.7	46.0	-12.3	Vertical
540.080	35.4	46.0	-10.6	Horizontal
755.920	32.4	46.0	-13.6	Vertical
756.000	34.6	46.0	-11.4	Horizontal
825.040	32.2	46.0	-13.8	Horizontal
831.320	37.9	46.0	-8.1	Vertical
831.360	33.9	46.0	-12.1	Horizontal
864.160	32.9	46.0	-13.1	Vertical
897.720	37.4	46.0	-8.6	Vertical

Frequency (MHz)	Peak (dBµV/m)	Lim.Q-Peak (dBµV/m)	Peak-Lim.Q-Peak (dB)	Polarization
897.840	32.6	46.0	-13.4	Horizontal
964.200	34.0	54.0	-20.0	Vertical
964.360	32.6	54.0	-21.4	Horizontal

Qualification

The frequency list is created from the results obtained during the pre-qualification.

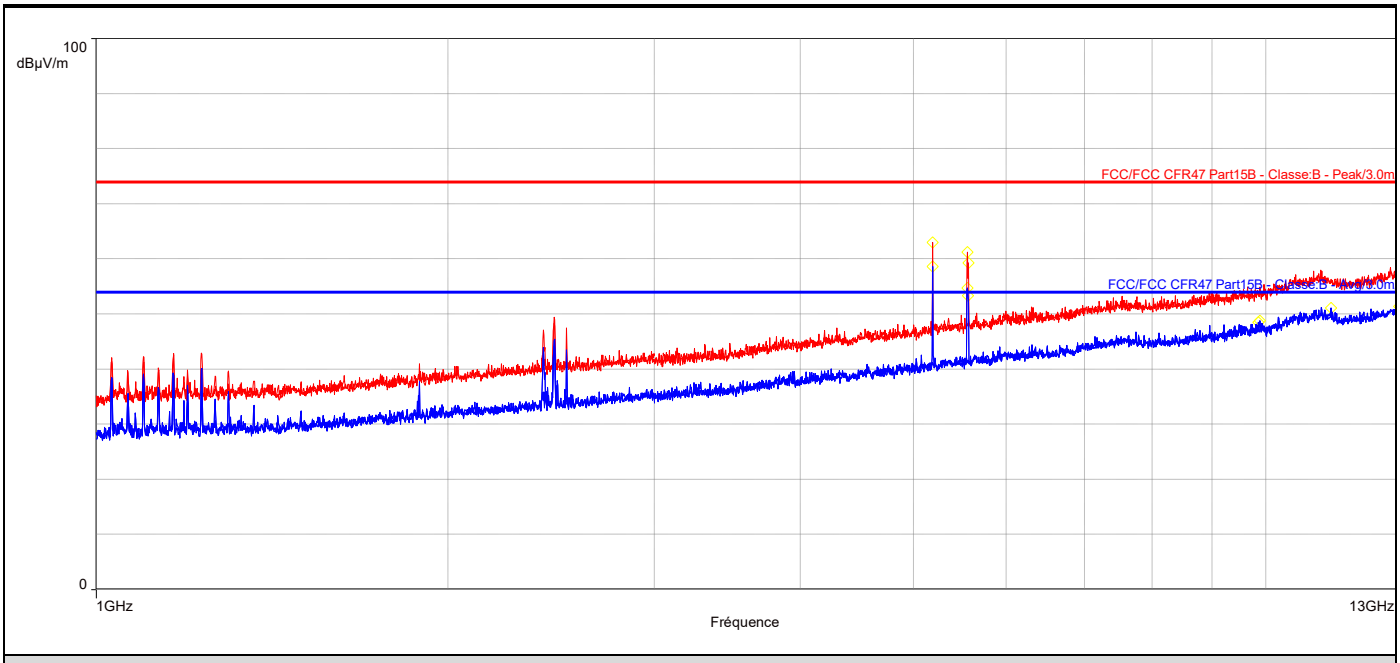
Test Frequency (MHz)	Detector (Pk/QP/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
54.1740	QP	V	300	100	10.9	35.4	40.0	**-4.6**	
60.2200	QP	V	330	100	9.1	35.6	40.0	**-4.4**	
108.0000	QP	V	360	100	12.9	40.4	43.5	**-3.1**	
110.4400	QP	V	0	100	12.8	36.9	43.5	**-6.6**	
124.2200	QP	V	0	100	13.5	34.0	43.5	**-9.5**	
156.9700	QP	V	0	100	19.4	29.9	43.5	**-13.6**	
166.2500	QP	V	0	100	19.3	29.8	43.5	**-13.7**	
38.7800	QP	V	0	100	14.0	37.6	40.0	**-2.4**	
114.0000	QP	V	0	100	12.7	32.2	43.5	**-11.3**	
120.0000	QP	V	0	100	12.9	36.9	43.5	**-6.6**	
200.1000	QP	V	108	100	11.7	38.1	43.5	**-5.4**	
216.0000	QP	V	0	100	12.3	37.1	43.5	**-6.4**	
365.7600	QP	H	0	400	19.4	44.4	46.0	**-1.6**	
432.2800	QP	H	0	400	21.8	45.0	46.0	**-1.0**	
500.0000	QP	V	0	400	23.8	37.3	46.0	**-8.7**	
99.9500	QP	H	0	400	-12	37.78	43.5	**-5.72**	@3m
118.0000	QP	V	0	140	-11.22	36.58	43.5	**-6.92**	@3m
190.0000	QP	V	0	100	-13.22	36.78	43.5	**-6.72**	@3m

4.6.2. 1GHz - 13GHz

Pre-qualification measurement

Graph identifier	Polarization	EUT position	Comments
Emr# 2	Vertical & Horizontal	Axis XY	See below

RADIATED EMISSIONS			
Graph name:	Emr#3	**Test configuration:**	
Limit:	FCC CFR47 Part15B	C2 - FSL (H+V) [1-13]GHz	
Class:	B		
Frequency range: [1GHz - 13GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW:** 1MHz	**VBW:** 3MHz
Azimuth:	**Trace color & detector:** F<GHz: Only Peak detector: Antenna Polarization: Vertical Horizontal		
0° - 360°	**Trace color & detector:** F>GHz: for both Antenna Polarization: detector: PEAK AVG		



Spurious emissions

Frequency (MHz)	Average (dBµV/m)	Lim.Average (dBµV/m)	Average-Lim.Average (dB)	Polarization
5188.200*	58.6	54.0	4.6	Vertical
5554.200*	54.7	54.0	0.7	Vertical
5565.000*	53.4	54.0	-0.6	Vertical
9878.800	48.8	54.0	-5.2	Vertical

* not due to the EUT

Qualification

No frequency observed

4.7. CONCLUSION

The sample of the equipment **PAT0000**, Sn : **232232458** , tested in the configuration presented in this test report **satisfies** to requirements of the product family standard applied (See §Test Program) for radiated emissions.

5. 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* **RSIL / *LISN* - 50Ω/50µH**		
9kHz - 150kHz	3.71 dB	3.8 dB
150kHz - 30MHz	3.36 dB	3.4 dB
Mesure des perturbations conduites en tension sur le réseau d'énergie *Measurement of conducted disturbances in voltage on the power port* **Sonde de tension / *Voltage Probe***		
9kHz - 30MHz	2.74 dB	2.9 dB
Mesure des perturbations conduites en tension sur le réseau de télécommunication *Measurement of conducted disturbances in voltage on the telecommunication port* **RSI / *AAN***		
150kHz - 30MHz - aLCL = 55 … 40 dBc	4.17 dB	5.0 dB
150kHz - 30MHz - aLCL = 65 … 50 dBc	4.55 dB	5.0 dB
150kHz - 30MHz - aLCL = 75 … 60 dBc	4.99 dB	5.0 dB
Mesure des perturbations conduites en tension sur le réseau de télécommunication *Measurement of conducted disturbances in voltage on the telecommunication port* **Sonde de tension / *Capacitive Voltage Probe***		
150kHz - 30MHz	3.73 dB	3.9 dB
Mesure des perturbations conduites en courant sur le réseau de télécommunication *Measurement of conducted disturbances in current on the telecommunication port* **Sonde de courant / *Current Probe***		
9kHz - 30MHz	2.88 dB	2.9 dB
Mesure des perturbations discontinues conduites en tension *Measurement of discontinuous conducted disturbances in voltage* **Récépteur / *Receiver***		
150kHz - 30MHz	3.36 dB	3.4 dB
Mesure des harmoniques de courant *Measurement of current harmonics*		
I_{harm} ±5% du calibre / *range*	0.93 A	-
I_{harm} ±0.15% du calibre / range	0.03 A	-
Mesure du flicker *Flicker measurement*		
Mesure du P_{ST} / Measurement of P_{ST}	6.0 %	-
Mesure des perturbations rayonnées *Measurement of radiated disturbances* **OATS & SAC @3m**		
30MHz - 200MHz, Antenne biconique / *Biconical antenna*	5.79 dB	6.3 dB
30MHz - 1GHz, Antenne hybride / *Hybrid antenna*	6.26 dB	6.3 dB
Mesure des perturbations rayonnées *Measurement of radiated disturbances* **OATS @10m**		
30MHz - 200MHz, Antenne biconique / *Biconical antenna*	5.77 dB	6.3 dB
30MHz - 1GHz, Antenne hybride / *Hybrid antenna*	5.99 dB	6.3 dB
Mesure des perturbations rayonnées *Measurement of radiated disturbances* **FAR @3m**		
1GHz - 6GHz, Antenne cornet / *Horn antenna*	5.19 dB	5.2 dB
6GHz - 18GHz, Antenne cornet / *Horn antenna*	5.48 dB	5.5 dB
1GHz - 6GHz, Antenne hybride / *Hybrid antenna*	5.20 dB	5.2 dB

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*