



LCIE



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Template : November 10th, 2022

TEST REPORT

N°: 16191787-782480-B

Version: 01

Subject Electromagnetic compatibility tests according to the standards:
FCC CFR 47 Part 15.225 & ANSI C63.10
RSS 210 & RSS-Gen

Issued to IDEMIA Identity & Security France
2, place Samuel De Champlain
9240 - COURBEVOIE

Apparatus under test

↪ Product MorphoAcces SIGMA Lite + series
↪ Trade mark IDEMIA
↪ Manufacturer IDEMIA Identity & Security France
↪ Model under test MPH-AC001B
↪ Serial number 2247SML0000014
↪ FCCID ZBW-MPHAC001B
↪ IC 11472A-MPHAC001B

Conclusion See Test Program chapter

Test date December 02, 2022 to December 12, 2022
Test location LCIE Ecuelles
FCC Test site FR0010 - 166175 (FAR)
ISED Test site 6230B (FAR)
Sample receipt date December 02, 2022
Composition of document 41 pages
Document issued on January 05, 2023

Written by :
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Tests operator

Approved by :
Julien Boutaud
Technical manager





PUBLICATION HISTORY

Version	Date	Author	Modification
01	January 05, 2023	Laurent Deneux	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	4
2.	EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)	5
3.	AC POWER LINE CONDUCTED EMISSIONS	10
4.	FIELD STRENGTH OUTSIDE OF THE BANDS 13.110-14.010 MHZ	26
5.	FIELD STRENGTH WITHIN THE BAND 13.110-14.010MHZ	36
6.	UNCERTAINTIES CHART	41



1. TEST PROGRAM

References

- 47 CFR Part 15.225 (2022)
- RSS 210 Issue 10
- RSS Gen Issue 5
- ANSI C63.10 (2013)

Radio requirement:

Clause - Test Description	Test result - Comments
Occupied Bandwidth	NP(1)
20dB Bandwidth	NP(1)
AC Power Line Conducted Emission	PASS
Frequency Tolerance	NP(1)
Field strength within the band [13.110-14.010] MHz	PASS
Field strength outside of the bands [13.110-14.010] MHz	PASS
Receiver Radiated Emissions	PASS(3)

This table is a summary of test report, see conclusion of each clause of this test report for detail.

(1): Limited program

(2): EUT not directly or indirectly connected to the AC Power Public Network

(3): Testing covered the receive mode, and receiver spurious emissions are considered to be the same as transmitter.

PASS: EUT complies with standard's requirement

FAIL: EUT does not comply with standard's requirement

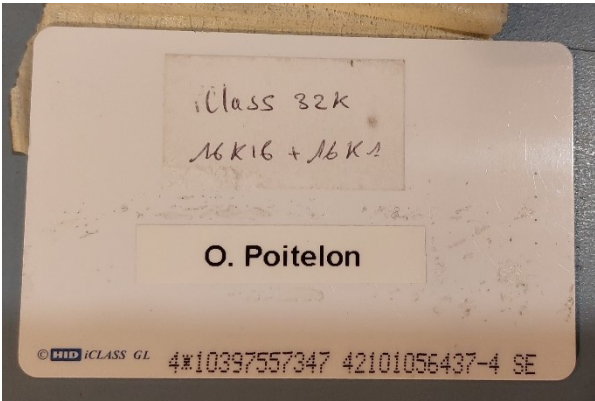
NA: Not Applicable

NP: Test Not Performed

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

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):

Model under test:	MPH-AC001B
Serial Number:	2247SML0000014
 	
	
Dimensions:	-
Type:	Table-Top

Power supply:

Name	Type	Rating	Reference / Sn	Comments
Supply1	Power Supply - FRIWO	100-240V~ 50/60Hz	PHIHONG reference POE29U-1AT(PL)	Not sold with the product
Supply2	POE Injector - PHIHONG	Input:100-240V~50-60Hz	FRIWO model : FW7362/12	Not sold with the product

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
POE	PHIHONG reference POE29U-1AT(PL)	2	☐	☒	☒	100-240V~ 50/60Hz
AC/DC Power supply	FRIWO model : FW7362/12	1.8	☐	☐	☒	Input:100-240V~50-60Hz Output: 12Vdc 2.5A
DC Power supply	12Vdc	1.8	☐	☐	☒	-
Ethernet	RJ45	10	☐	☒	☒	Between POE and EUT when powered through POE or Between EUT and Laptop when powered through DC power supply.

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
LapTop	LENOVO R500	-	Not under test / just to send ping command



Equipment information (declaration of provider):

Type:	RFID		
Frequency band:	[13.553 to 13.567] MHz		
Number of Channel:	1		
Antenna Type:	Internal		
Transmit chains:	1		
Receiver chains	1		
Operating temperature range:	T _{nom} :	20°C	
Operating voltage:	Mode DC - Vnom:	☐ 120V/60Hz	☒ 12Vdc
	Mode POE - Vnom:	☐ 120V/60Hz	☒ 56Vdc

Antenna Characteristic			
Antenna assembly	Gain (dBi)	Frequency Band (MHz)	Impedance(Ω)
NC	NC	NC	NC

Modulation Type
NC
NC

Hardware information			
Highest internal frequency (PLL, Quartz, Clock, Microprocessor...):	F _{Highest} :	NC	MHz
Firmware (if applicable):	V:	NC	
Software (if applicable):	V:	NC	

NC: Not communicated by provider

2.2. RUNNING MODE

Test mode	Description of test mode
Test mode 1	Permanent emission with modulation on a fixed channel in the data rate that produced the highest power.
Test mode 2	Permanent reception

Test	Running mode
AC Power Line Conducted Emission	Test mode 1
Field strength within the band 13.110-14.010MHz	Test mode 1
Field strength outside of the bands 13.110-14.010 MHz	Test mode 1
Receiver Radiated Emissions	Test mode 2 (1)

- (1) The test can't be performed because the transmitter and receiver are operating at the same frequency and the transmitter cannot be switched off as the carrier is used as receiver injection signal

2.3. EQUIPMENT LABELLING

Label	
	 IDEMIA Made in France FCC ID: ZBW-MPHAC001B Compliant IP65 ID: 11472A-MPHAC001B MorphoAccess SIGMA Lite + iClass Model : MPH-AC001B P/N : 293667807 S/N : 2247SML0000014 ANATEL 04585-19-10550 MAC adr : 00:24:AE:07:C5:6B Licence ID : 293673201-22300510618-03689199122 Ratings : See Quick Installation Guide Approved
 FIT MAINS INPUT PLUG BEFORE USE AC/DC ADAPTER Type: FW7362/12 Input: 100-240V~/ 50-60Hz/ 700mA Output: 12V~/ 2.5A CAUTION: RISK OF ELECTRICAL SHOCK DRY LOCATION USE ONLY Made in Germany 220-240V Q02734 100V IP40 T40/F Class 2 L.T.E. Power Supply LISTED 6P85	 PHIHONG SINGLE PORT POWER OVER ETHERNET INJECTOR 2.5 Gigabit Compatible 电源适配器/电源分离器 MODEL / 机型 / 機型: POEA30U-560-2 INPUT / 输入 / 輸入: 100-240V~ 0.8A, 50-60Hz OUTPUT / 输出 / 輸出: 56V 0.536A PIN 3,6 +56V PIN 1,2 Return Philhong No. 368, Guishan



2.4. EQUIPMENT MODIFICATIONS DURING THE TESTS

None

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

Example:

Assume a receiver reading of 52.5dB μ V 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 dB μ V/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dB}\mu\text{V/m}$$

The 32 dB μ V/m value can be mathematically converted to its corresponding level in μ V/m.

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32\text{dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}.$$

2.6. 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,

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

Above 30MHz,

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

Where:

FS_{limit} is the calculation of field strength at the limit distance, expressed in dB μ V/m

FS_{max} is the measured field strength, expressed in dB μ V/m

d_{measure} is the distance of the measurement point from the EUT

d_{limit} is the reference limit distance

2.7. 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. AC POWER LINE CONDUCTED EMISSIONS

3.1. TEST CONDITIONS

Date of test : December 02, 2022
 Test performed by : Laurent Deneux
 Atmospheric pressure (hPa) : -
 Relative humidity (%) : 22
 Ambient temperature (°C) : 38

3.2. 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)

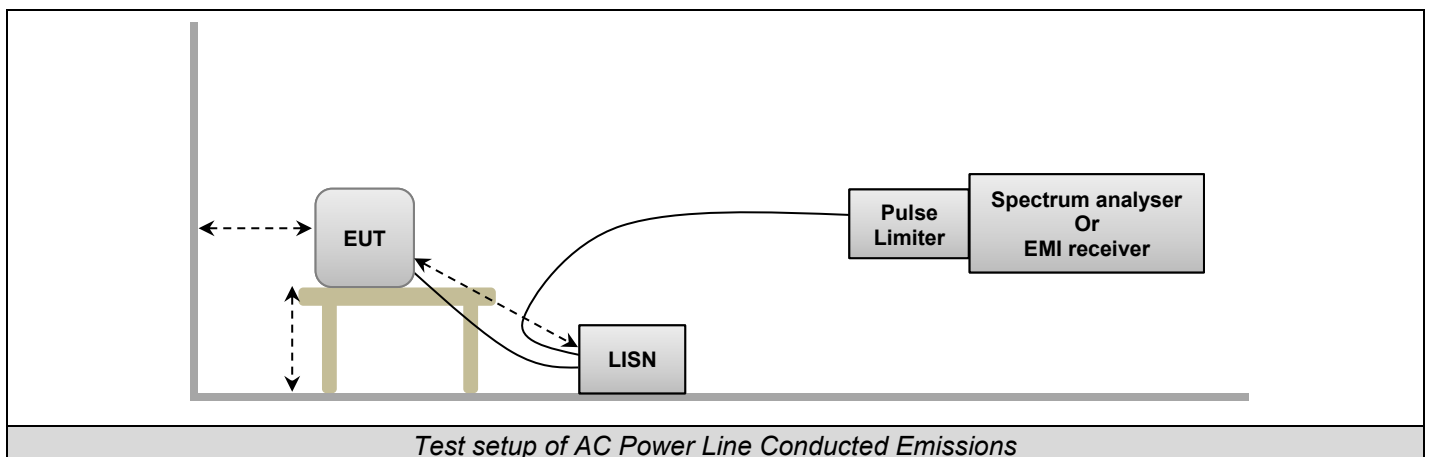




Photo of AC Power Line Conducted Emissions



Photo of AC Power Line Conducted Emissions



3.3. LIMIT

Frequency range	Level	Detector
0,15kHz to 0,5MHz	66dB μ V to 56 μ V*	QPeak
	56dB μ V to 46 μ V*	Average
0,5MHz to 5MHz	56dB μ V	QPeak
	46dB μ V	Average
5MHz to 30MHz	60B μ V	QPeak
	50dB μ V	Average

*Decreases with the logarithm of the frequency

3.4. TEST EQUIPMENT LIST

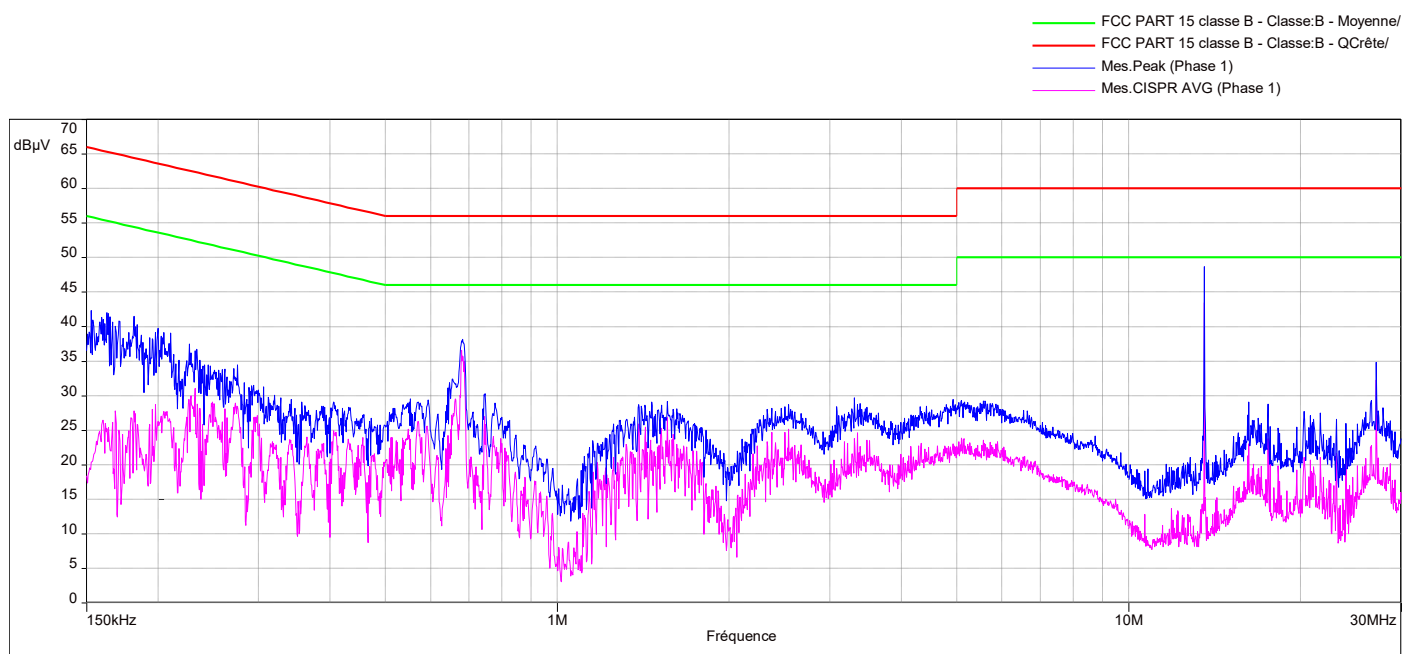
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Receiver	ROHDE & SCHWARZ	ESU	A2642018	2020/10	2022/12
Limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	2022/06	2024/06
Network V / V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322002	2022/10	2023/11
Absorber cable	LCIE	-	A5329589	2021/11	2023/11
Cable N(6m)	-	-	A5329417	2022/11	2023/11
Power supply	DANA	DSC5000	A7044076	-	-
Software V3.19.1.21	NEXIO	BAT-EMC	-	-	-

3.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

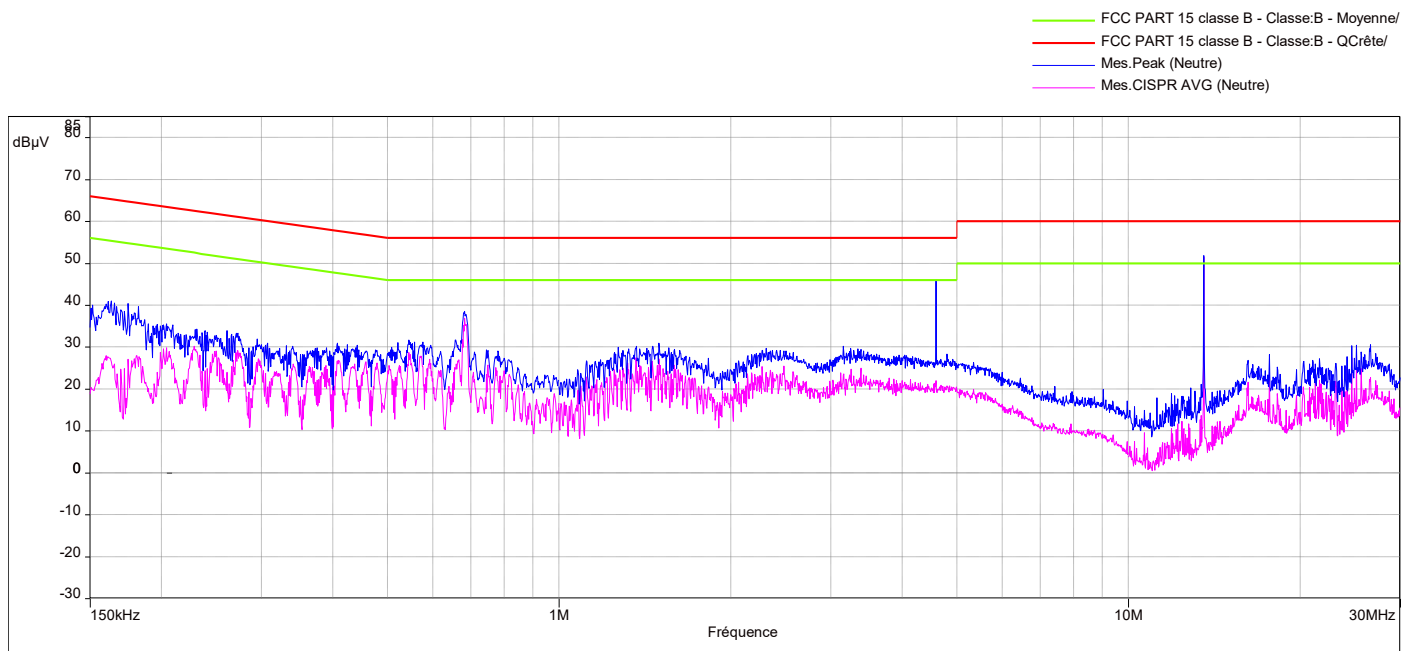
3.6. TEST RESULTS

Diagram N°1
Mode DC with RF antenna
Phase 240V/50Hz



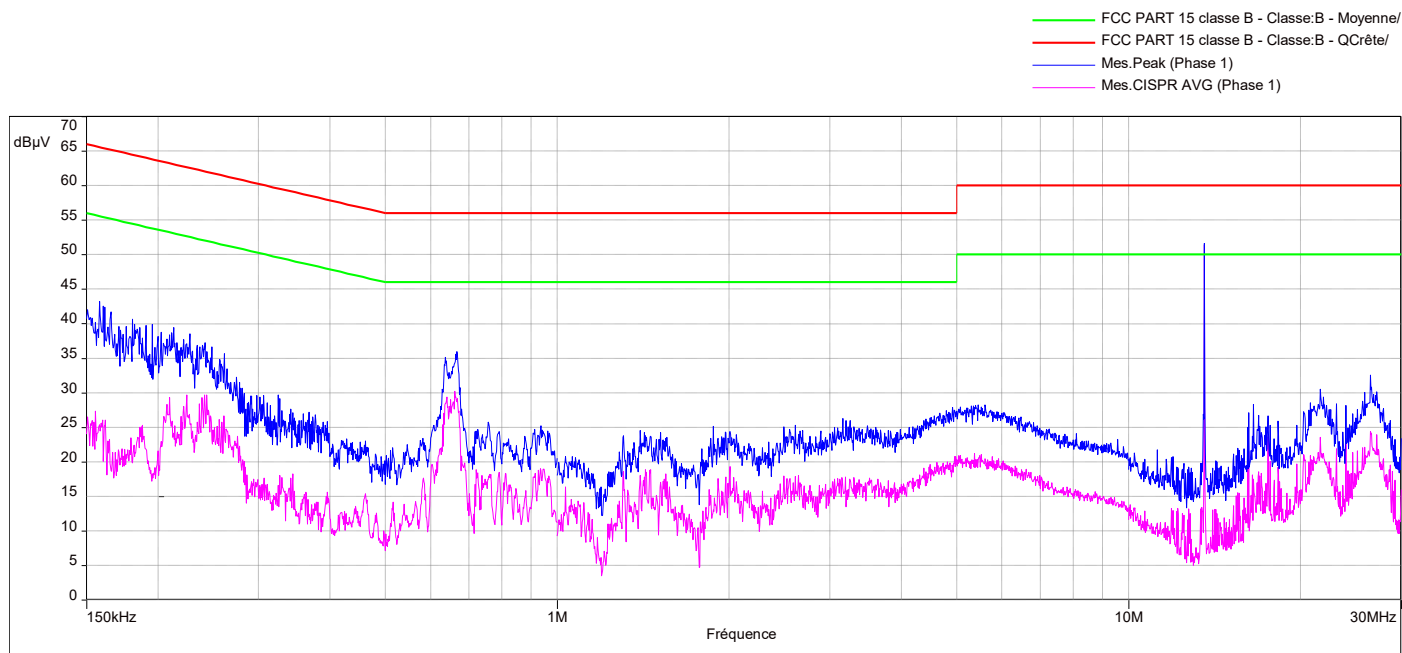
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.161	41	-	65.4	24.4	26.4	55.4	29
0.681	37.8	-	56	18.2	36.5	46	9.5
1.55	29.2	-	56	26.8	26.8	46	19.2
13.56	48.6	-	60	11.4	43.5	50	6.5
27.12	34.7	-	60	25.3	22.2	50	27.8

Diagram N°2
Mode DC with RF antenna
Neutral 240V/50Hz



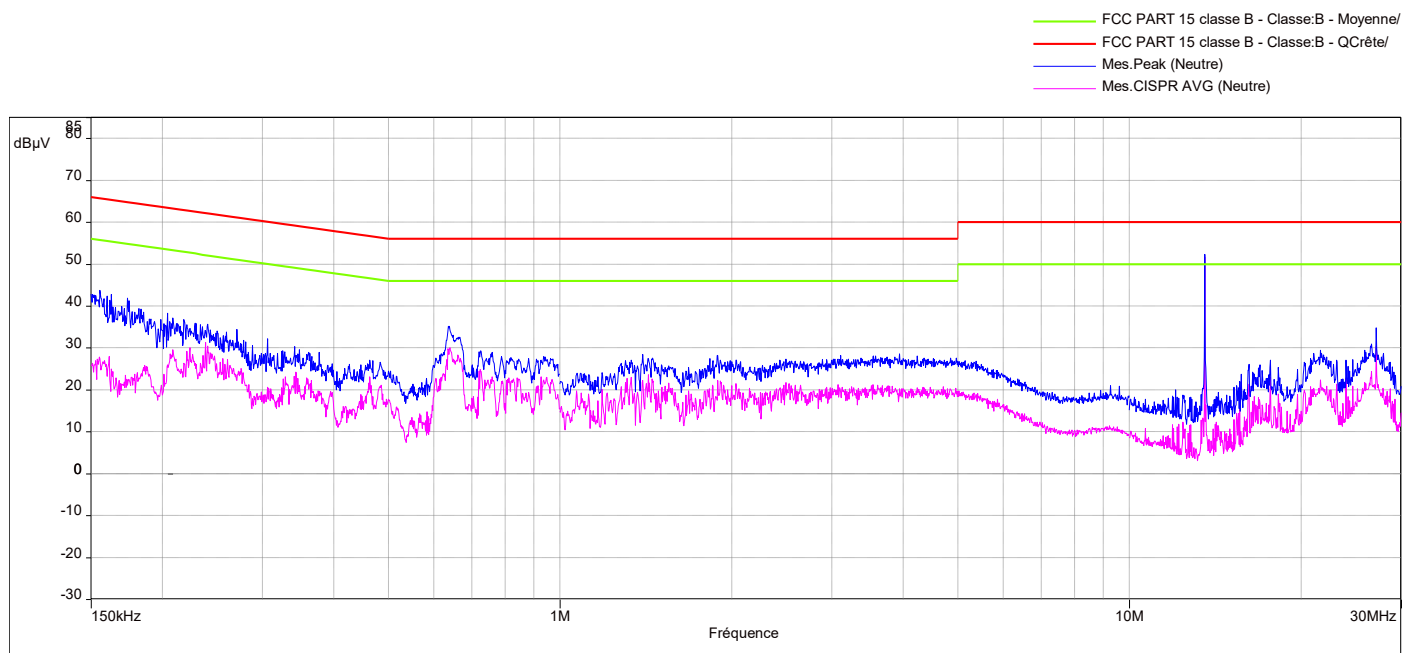
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.161	41	-	65.4	24.4	27.6	55.4	27.8
0.682	38.5	-	56	17.5	37	46	9
1.5	31	-	56	25	27.3	46	18.7
13.56	51.8	-	60	8.2	51.4	50	-1.4
23.63	28.8	-	60	31.2	24.8	50	25.2

Diagram N°3
Mode DC with RF antenna
Phase 120/60Hz



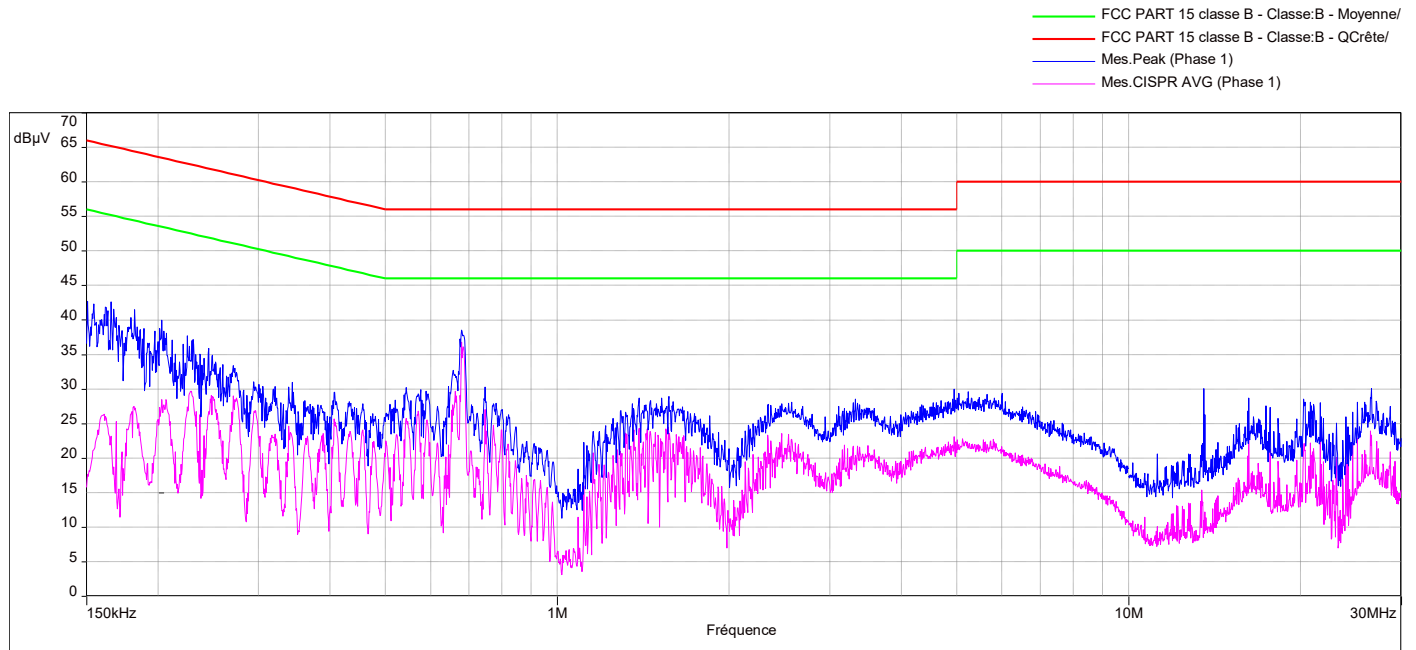
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.161	43.2	-	65.4	22.2	26	55.4	29.4
0.64	34.5	-	56	21.5	28.7	46	17.3
2	25	-	56	31	19.4	46	26.6
13.56	51.6	-	60	8.4	51.3	50	-1.3
24	28.2	-	60	31.8	23.5	50	26.5

Diagram N°4
Mode DC with RF antenna
Neutral 120/60Hz



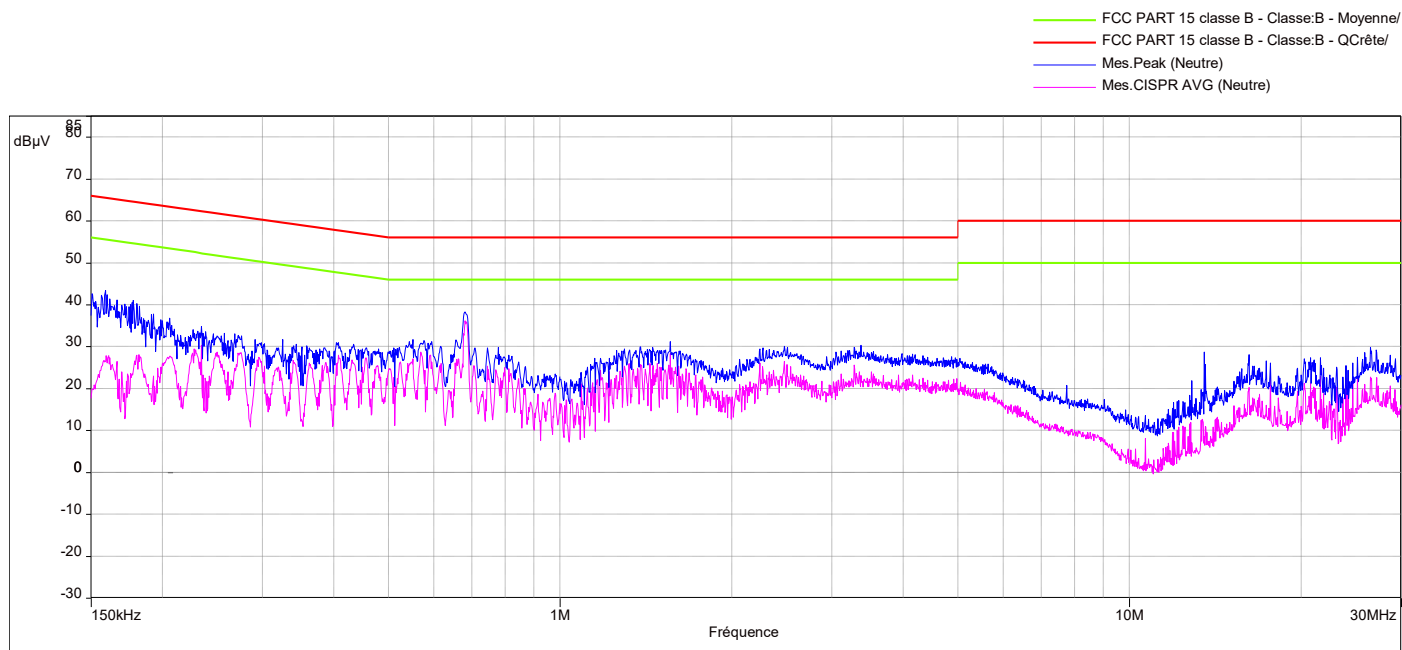
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.161	43.6	-	65.4	21.8	27.5	55.4	27.9
0.64	34.6	-	56	21.4	29.7	46	16.3
1.89	28.2	-	56	27.8	22.2	46	23.8
13.56	52.3	-	60	7.7	51.7	50	-1.7
27.12	34.7	-	60	25.3	20.3	50	29.7

Diagram N°5
Mode DC without RF antenna
Phase 240V/50Hz



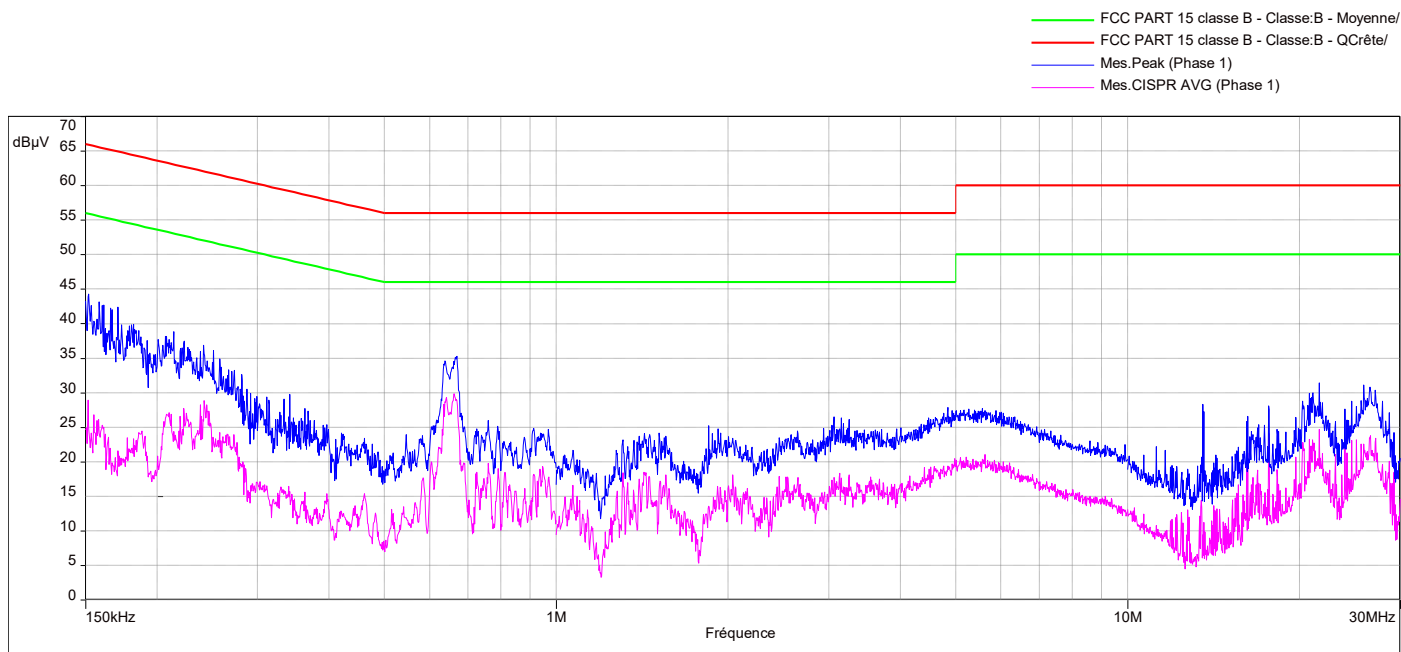
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.161	40.7	-	65.4	24.7	26.3	55.4	29.1
0.681	37.8	-	56	18.2	36	46	10
1.55	28.3	-	56	27.7	25	46	21
13.56	30.1	-	60	29.9	15.9	50	34.1
21.66	28	-	60	32	22.8	50	27.2

Diagram N°6
Mode DC without RF antenna
Neutral 240V/50Hz



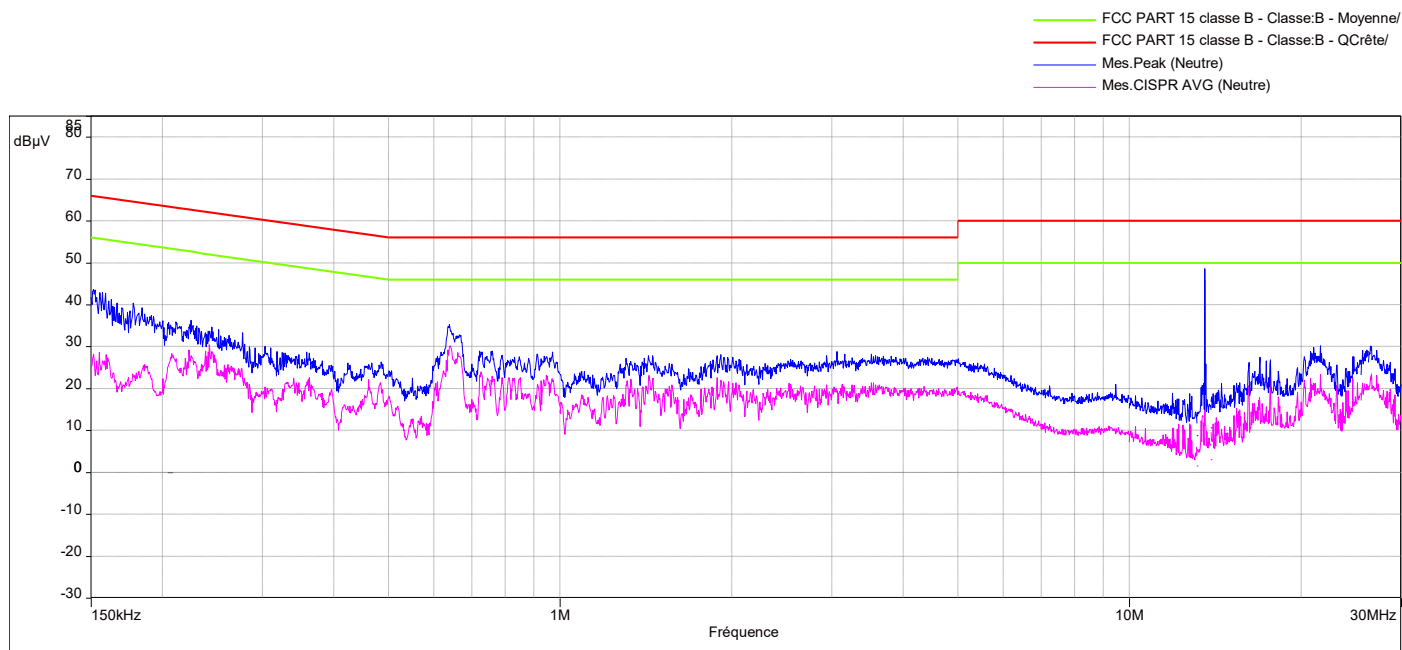
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.161	43.3	-	65.4	22.1	27.5	55.4	27.9
0.682	37.7	-	56	18.3	35.6	46	10.4
1.5	31.1	-	56	24.9	28.3	46	17.7
13.56	28.6	-	60	31.4	12.4	50	37.6
23.63	26	-	60	34	21.5	50	28.5

Diagram N°7
Mode DC without RF antenna
Phase 120/60Hz



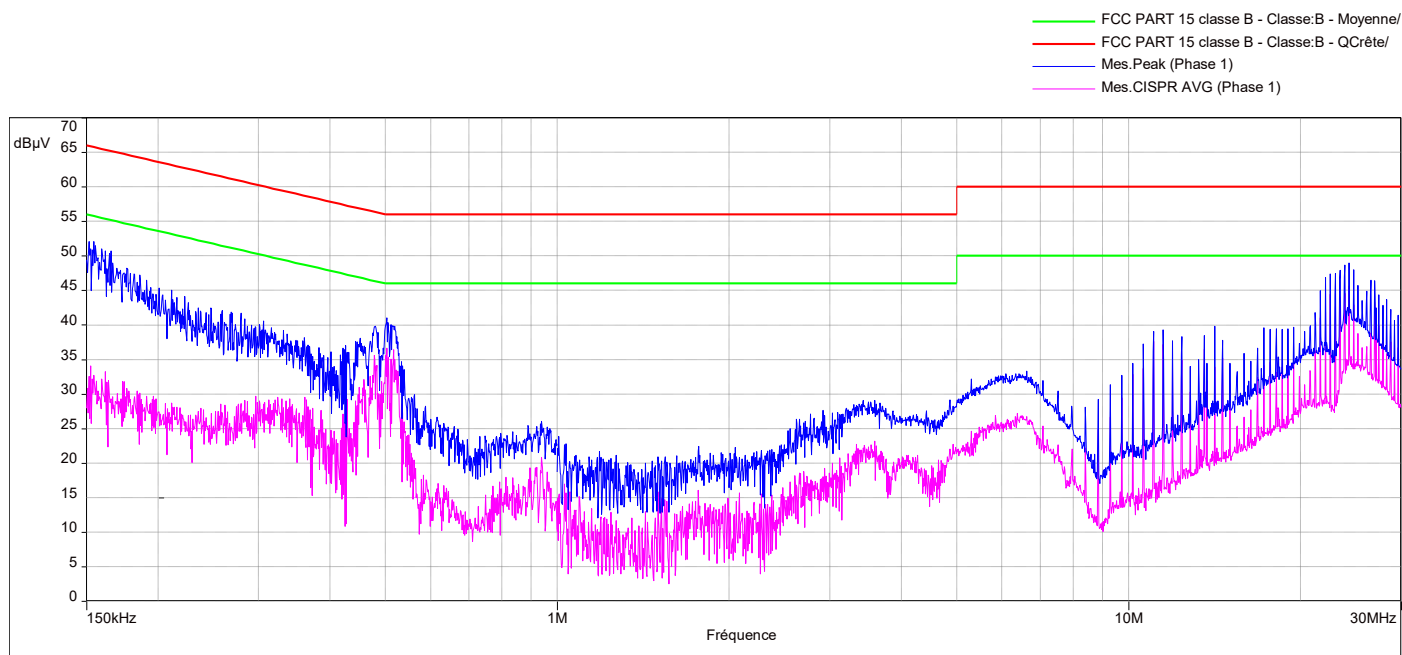
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.15	43.8	-	66	22.2	29	56	27
0.64	34	-	56	22	29.7	46	16.3
5.1	26.5	-	60	33.5	50	46	-4
13.56	27.2	-	60	32.8	14.5	50	35.5
21.66	31.4	-	60	28.6	21.6	50	28.4

Diagram N°8
Mode DC without RF antenna
Neutral 120/60Hz



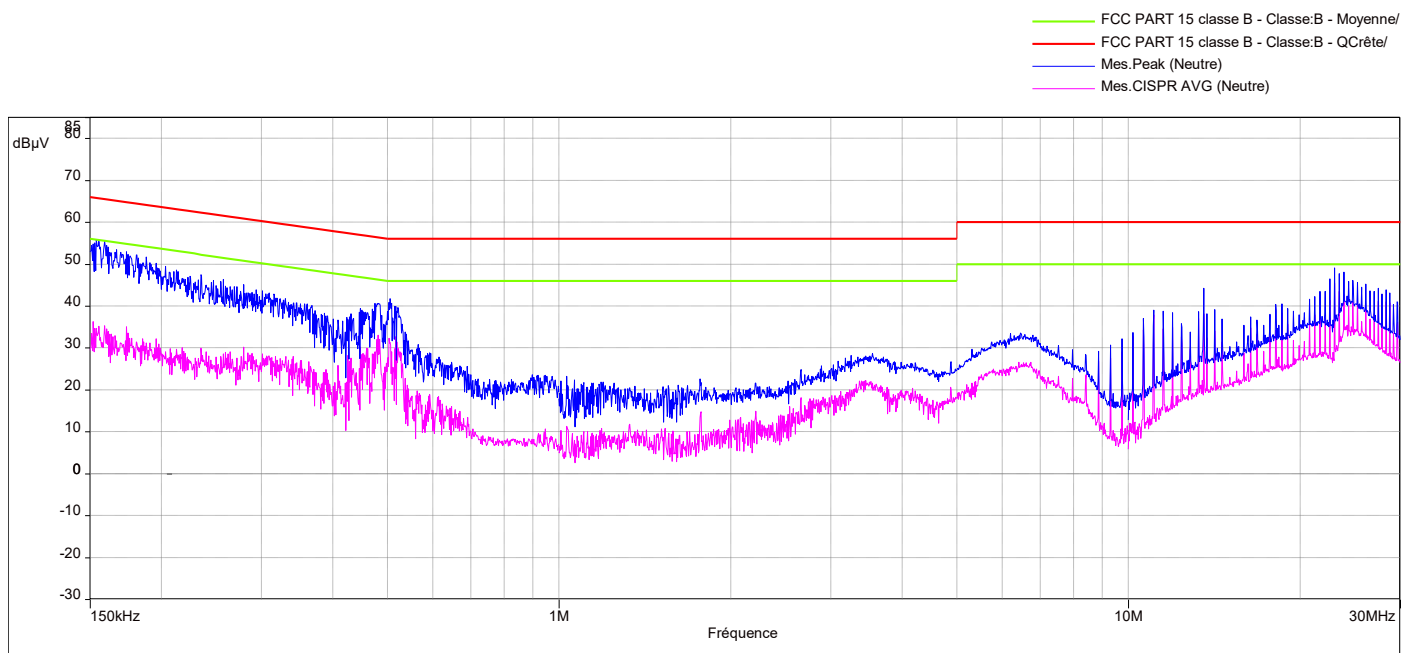
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.161	41	-	65.4	24.4	28.5	55.4	26.9
0.64	35.3	-	56	20.7	30	46	16
1.89	28	-	56	28	21.7	46	24.3
13.56	48.5	-	60	11.5	45.8	50	4.2
24.6	27.6	-	60	32.4	22.4	50	27.6

Diagram N°9
Mode POE with RF antenna
Phase 240V/50Hz



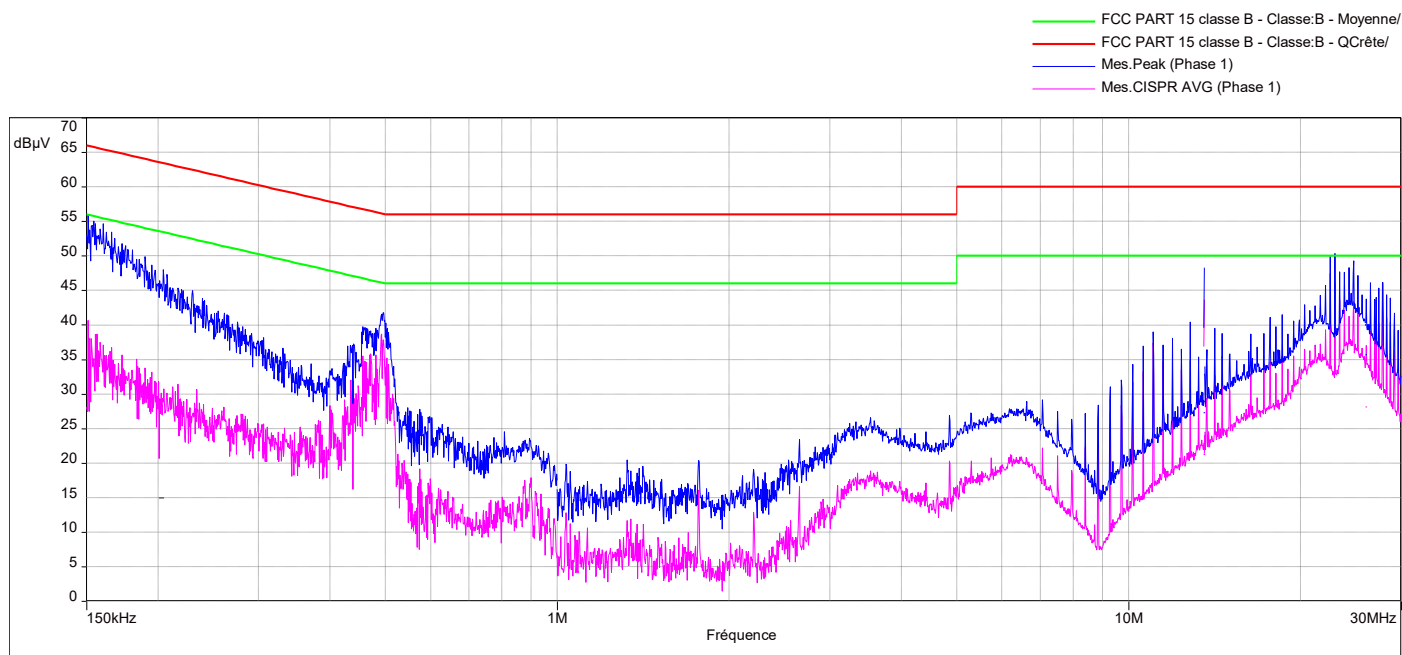
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.15	52.1	-	66	13.9	34.2	56	21.8
0.503	41	-	56	15	36.6	46	9.4
6.63	33.3	-	60	26.7	26.7	50	23.3
13.56	38.4	-	60	21.6	26.4	50	23.6
24.3	49	-	60	11	45.6	50	4.4

Diagram N°10
Mode POE with RF antenna
Neutral 240V/50Hz



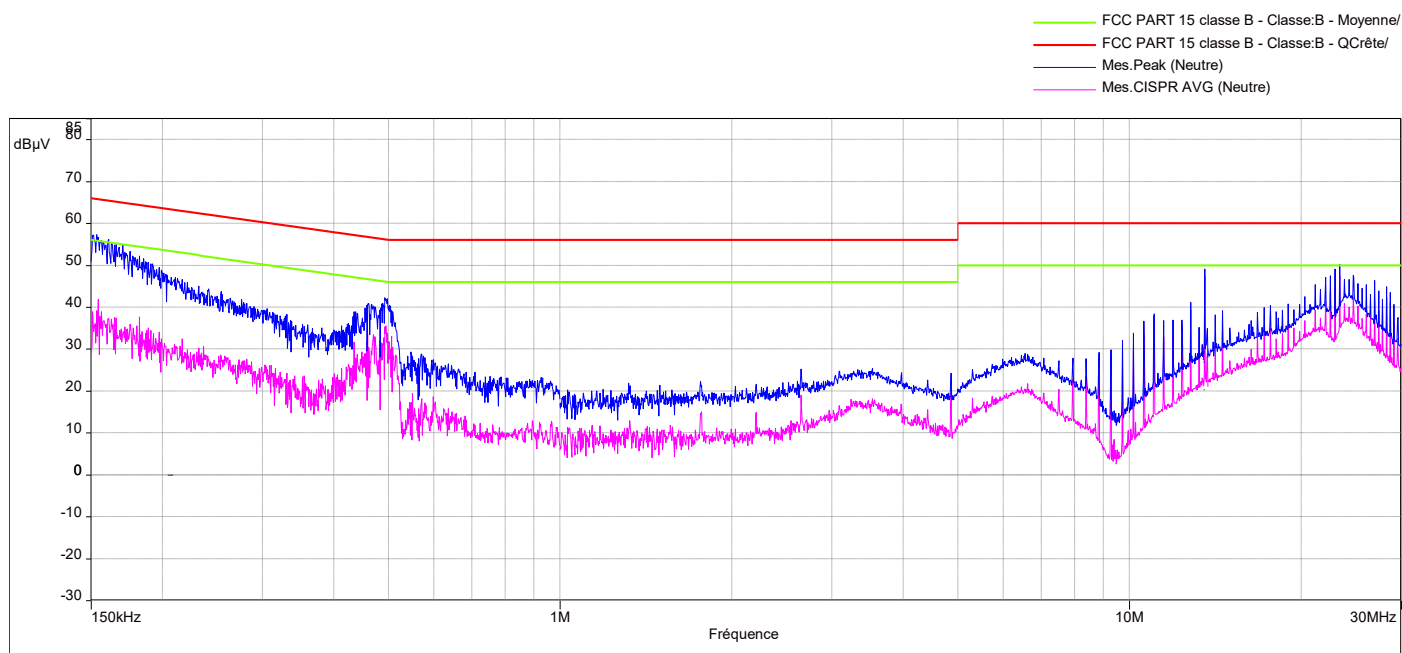
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.15	52.1	-	66	13.9	34.2	56	21.8
0.503	41	-	56	15	36.6	46	9.4
6.63	33.3	-	60	26.7	26.7	50	23.3
13.56	38.4	-	60	21.6	26.4	50	23.6
24.3	49	-	60	11	45.6	50	4.4

Diagram N°11
Mode POE with RF antenna
Phase 120/60Hz



Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.15	55.9	-	66	10.1	40.6	56	15.4
0.501	41.8	-	56	14.2	37.8	46	8.2
4.86	26.7	-	56	29.3	20.3	46	25.7
13.56	48.3	-	56	7.7	43.7	46	2.3
27.12	49.8	-	60	10.2	47.4	50	2.6

Diagram N°12
Mode POE with RF antenna
Neutral 120/60Hz



Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.161	56.6	-	65.4	8.8	41.8	55.4	13.6
0.682	42	-	56	14	35.6	46	10.4
4.85	24.2	-	56	31.8	19.5	46	26.5
13.56	49	-	60	11	47.3	50	2.7
23.63	50.2	-	60	9.8	47.3	50	2.7

3.7. CONCLUSION

AC Power Line Conducted Emission measurement performed on the sample of the product **MPH-AC001B**, Sn: **2247SML0000014**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.225 & RSS Gen** limits.



4. FIELD STRENGTH OUTSIDE OF THE BANDS 13.110-14.010 MHz

4.1. TEST CONDITIONS

Date of test : December 09, 2022
Test performed by : Laurent Deneux
Atmospheric pressure (hPa) : -
Relative humidity (%) : 17
Ambient temperature (°C) : 45

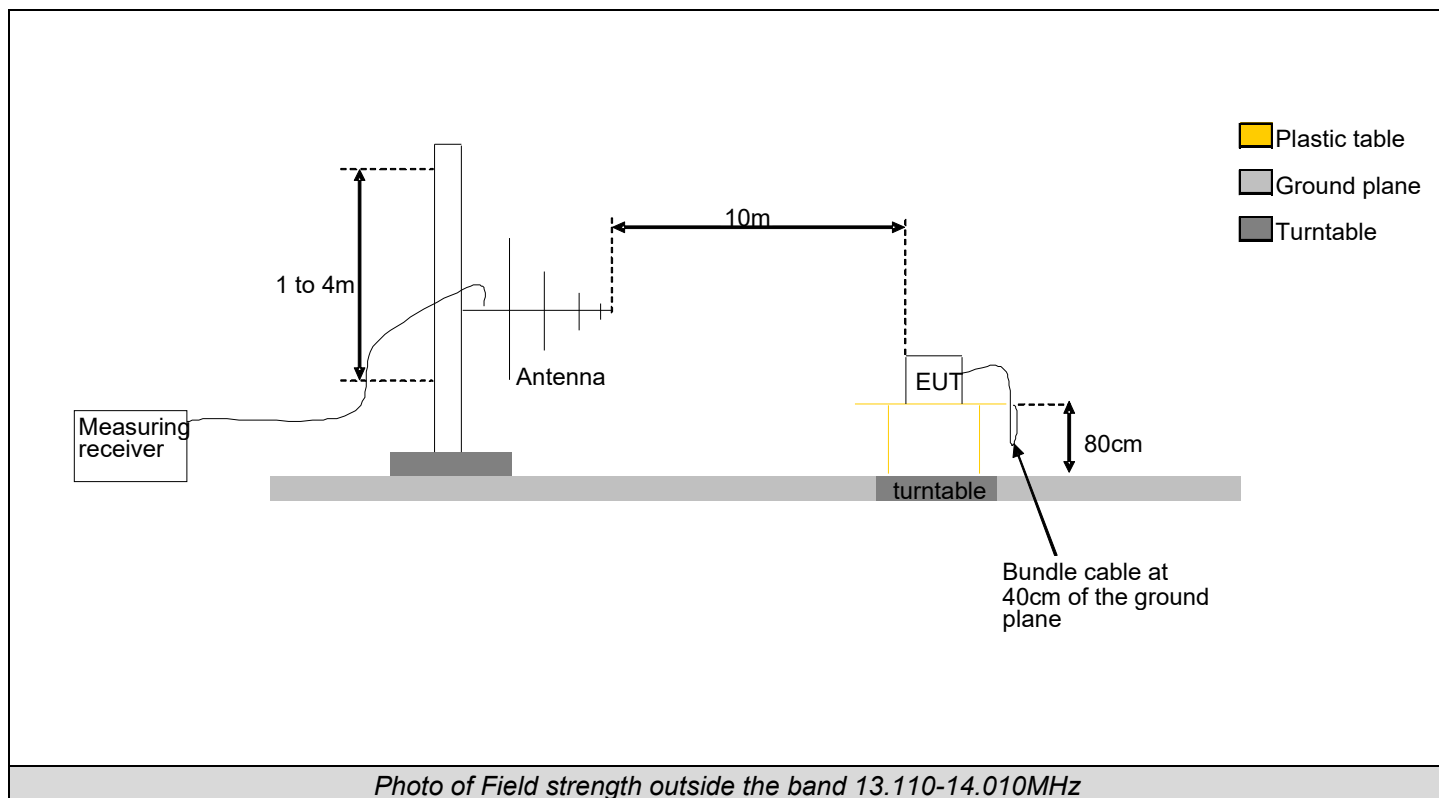
4.2. TEST SETUP

Test procedure:

☒ ANSI C63.10 & FCC Part 15 subpart C

Following frequency ranges, test setup parameters are different and specified in this table:

Frequency range:	Below 30MHz	From 30MHz to 1GHz
Antenna Polarization:	Parallel, Perpendicular And Ground parallel	Horizontal And Vertical
Antenna Height:	1m	Varied from 1m to 4m
Antenna Type:	Loop	Bi-Log
RBW Filter:	200Hz below 150kHz 9kHz above 150kHz	120kHz
Maximization:	Turntable rotation of 360 degrees range	
EUT height:	0.8m	
Qualification site:	Open Aera Test Site	Open Aera Test Site
Distance EUT - Antenna:	3m	10m



4.3. LIMIT

Measure at 300m		
Frequency range	Level	Detector
9kHz-490kHz	67.6dB μ V/m /F(kHz)	QPeak
Measure at 30m		
Frequency range	Level	Detector
490kHz-1.705MHz	87.6dB μ V/m /F(kHz)	QPeak
1.705MHz-30MHz	29.5dB μ V/m	QPeak
Measure at 10m		
Frequency range	Level	Detector
30MHz to 88MHz	29.5dB μ V/m	QPeak
88MHz to 216MHz	33dB μ V/m	QPeak
216MHz to 960MHz	35.5dB μ V/m	QPeak
960MHz to 1000MHz	43.5dB μ V/m	QPeak
Above 1000MHz	63.5dB μ V/m	Peak
	43.5dB μ V/m	Average
Measure at 3m		
Frequency range	Level	Detector
30MHz to 88MHz	40dB μ V/m	QPeak
88MHz to 216MHz	43.5dB μ V/m	QPeak
216MHz to 960MHz	46B μ V/m	QPeak
960MHz to 1000MHz	54dB μ V/m	QPeak
Above 1000MHz	74dB μ V/m	Peak
	54dB μ V/m	Average



4.4. TEST EQUIPMENT LIST

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Receiver	ROHDE & SCHWARZ	ESU	A2642018	2020/10	2022/12
Cable	-	-	A5329442	2022/11	2023/11
Loop antenna	SCHWARZBECK	FMZB1513	C2040209	2022/10	2024/10
Preamplifier	BONN	BLNA 3018-8F305	A7080053	2021/11	2023/11
Cable	-	-	A5329416	2022/02	2023/02
Horn antenna	ETS	3115	C2042016	2021/04	2023/04
Antenna bilog	CHASE	CBL 6112A	C2040040	2021/04	2023/04
Cable			A5329368	2021/12	2022/12
Cable	-	-	A5330032	2022/08	2023/08
Software V3.19.1.21	NEXIO	BAT-EMC	-	-	-

4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None



4.6. RESULTS

4.6.1. 9kHz to 30MHz

Mode DC

9kHz to 30MHz					
Polarization	Frequency (MHz)	Peak Level (dB μ V/m)	QPeak Level (dB μ V/m)	Limit (dB μ V/m)	Margin QPeak (dB μ V/m)
Parallel	27.12	-	37.9	69.5	31.6
Perpendicular	27.12	-	32.5	69.5	37
Ground parallel	27.12	-	31	69.5	38.5

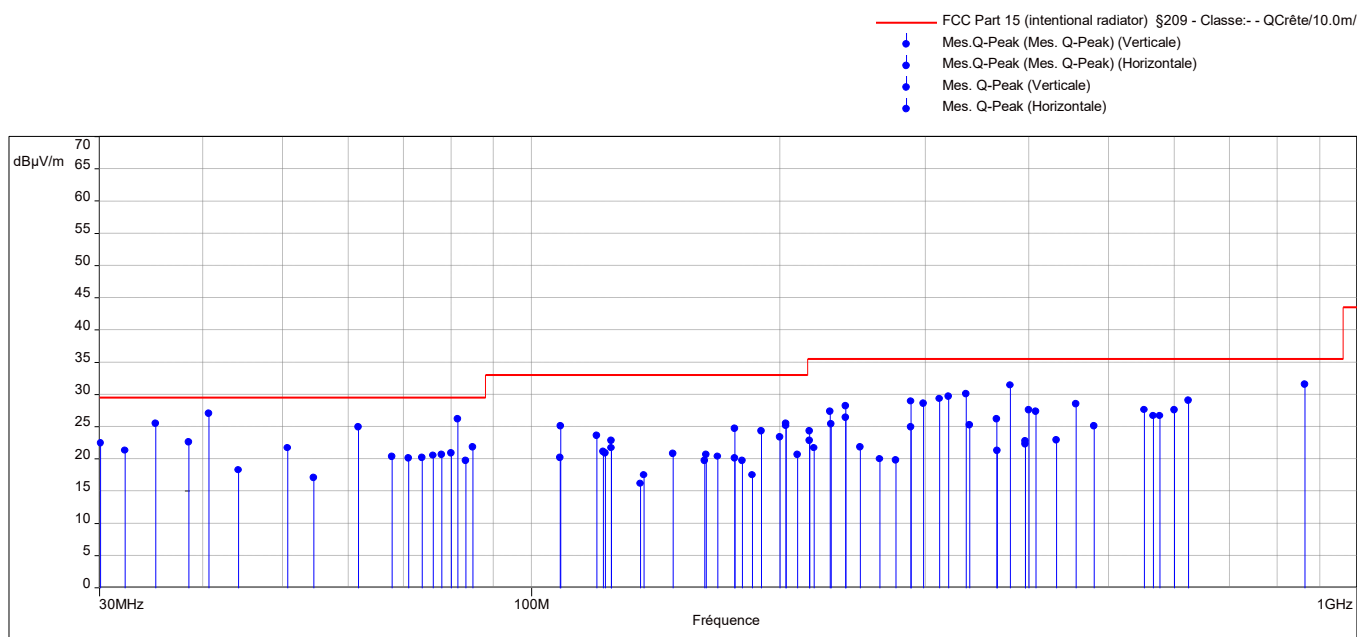
Mode POE

9kHz to 30MHz					
Polarization	Frequency (MHz)	Peak Level (dBμV/m)	QPeak Level (dBμV/m)	Limit (dBμV/m)	Margin QPeak (dBμV/m)
Parallel	7.512	-	33.67	69.5	35.83
Parallel	7.9585	-	30.05	69.5	39.45
Parallel	8.848	-	32.73	69.5	36.77
Parallel	9.2735	-	36.46	69.5	33.04
Parallel	9.745	-	32.81	69.5	36.69
Parallel	10.1395	-	36.99	69.5	32.51
Parallel	10.624	-	37.56	69.5	31.94
Parallel	11.465	-	42.41	69.5	27.09
Parallel	11.9045	-	41.72	69.5	27.78
Parallel	12.395	-	33.86	69.5	35.64
Parallel	12.8095	-	33.42	69.5	36.08
Parallel	13.9875	-	35.77	69.5	33.73
Parallel	14.595	-	32.33	69.5	37.17
Parallel	14.997	-	34.4	69.5	35.1
Parallel	15.9235	-	30.34	69.5	39.16
Parallel	16.333	-	28.08	69.5	41.42
Parallel	16.8085	-	35.36	69.5	34.14
Parallel	17.2415	-	30.24	69.5	39.26
Parallel	17.69	-	41.42	69.5	28.08
Parallel	18.0995	-	38.18	69.5	31.32
Parallel	18.555	-	28.28	69.5	41.22
Parallel	19.004	-	30.04	69.5	39.46
Parallel	19.4355	-	33.04	69.5	36.46
Parallel	19.8805	-	33.19	69.5	36.31
Parallel	20.3425	-	33.24	69.5	36.26
Parallel	20.7485	-	34.48	69.5	35.02
Parallel	21.2235	-	30.38	69.5	39.12
Parallel	21.675	-	32.53	69.5	36.97
Parallel	22.112	-	35.58	69.5	33.92
Parallel	22.5295	-	33.61	69.5	35.89
Parallel	22.951	-	33.12	69.5	36.38
Parallel	24.3035	-	30.63	69.5	38.87
Parallel	24.7555	-	32.64	69.5	36.86
Parallel	25.207	-	38.53	69.5	30.97
Parallel	25.6305	-	41.68	69.5	27.82
Parallel	26.0465	-	32.93	69.5	36.57
Parallel	26.5235	-	30.88	69.5	38.62
Parallel	26.937	-	31.75	69.5	37.75
Parallel	27.12	-	39.72	69.5	29.78
Parallel	27.3885	-	28.7	69.5	40.8
Parallel	27.84	-	29.97	69.5	39.53
Parallel	28.265	-	32.03	69.5	37.47
Parallel	28.711	-	34.08	69.5	35.42
Parallel	29.176	-	34.52	69.5	34.98

9kHz to 30MHz					
Polarization	Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit (dBµV/m)	Margin QPeak (dBµV/m)
Perpendicular	0.4425	-	47.54	94.7	47.16
Perpendicular	0.8785	-	45.57	68.7	23.13
Perpendicular	1.7455	-	39.75	69.5	29.75
Perpendicular	2.218	-	39.76	69.5	29.74
Perpendicular	2.669	-	39.34	69.5	30.16
Perpendicular	3.1125	-	36.89	69.5	32.61
Perpendicular	3.5525	-	37.45	69.5	32.05
Perpendicular	3.949	-	36.93	69.5	32.57
Perpendicular	4.409	-	39.32	69.5	30.18
Perpendicular	5.2755	-	44.52	69.5	24.98
Perpendicular	7.074	-	44.83	69.5	24.67
Perpendicular	7.4955	-	39.99	69.5	29.51
Perpendicular	7.9655	-	37.52	69.5	31.98
Perpendicular	8.8465	-	35.11	69.5	34.39
Perpendicular	9.274	-	40.43	69.5	29.07
Perpendicular	9.7085	-	46.19	69.5	23.31
Perpendicular	10.1385	-	42.84	69.5	26.66
Perpendicular	10.6075	-	35.51	69.5	33.99
Perpendicular	11.459	-	45.41	69.5	24.09
Perpendicular	11.9445	-	44.06	69.5	25.44
Perpendicular	12.433	-	49.21	69.5	20.29
Perpendicular	12.835	-	40.41	69.5	29.09
Perpendicular	13.265	-	44.35	69.5	25.15
Perpendicular	13.79	-	38.79	69.5	30.71
Perpendicular	14.115	-	40.31	69.5	29.19
Perpendicular	14.5805	-	41	69.5	28.5
Perpendicular	16.317	-	43.03	69.5	26.47
Perpendicular	20.314	-	40.3	69.5	29.2
Perpendicular	21.22	-	38.08	69.5	31.42
Perpendicular	21.653	-	36.17	69.5	33.33
Perpendicular	22.5165	-	34.74	69.5	34.76
Perpendicular	22.959	-	37.68	69.5	31.82
Perpendicular	23.426	-	38.4	69.5	31.1
Perpendicular	23.8285	-	39.57	69.5	29.93
Perpendicular	24.281	-	41.25	69.5	28.25
Perpendicular	24.7445	-	39.27	69.5	30.23
Perpendicular	25.159	-	38.71	69.5	30.79
Perpendicular	25.5985	-	40.36	69.5	29.14
Perpendicular	26.0665	-	39.92	69.5	29.58
Perpendicular	26.4905	-	40.82	69.5	28.68
Perpendicular	26.944	-	43.8	69.5	25.7
Perpendicular	27.12	-	49.7	69.5	19.8
Perpendicular	28.2925	-	40.27	69.5	29.23
Perpendicular	28.719	-	40	69.5	29.5
Perpendicular	29.1365	-	40.2	69.5	29.3
Perpendicular	29.617	-	41.16	69.5	28.34

4.6.2. 30MHz to 1GHz

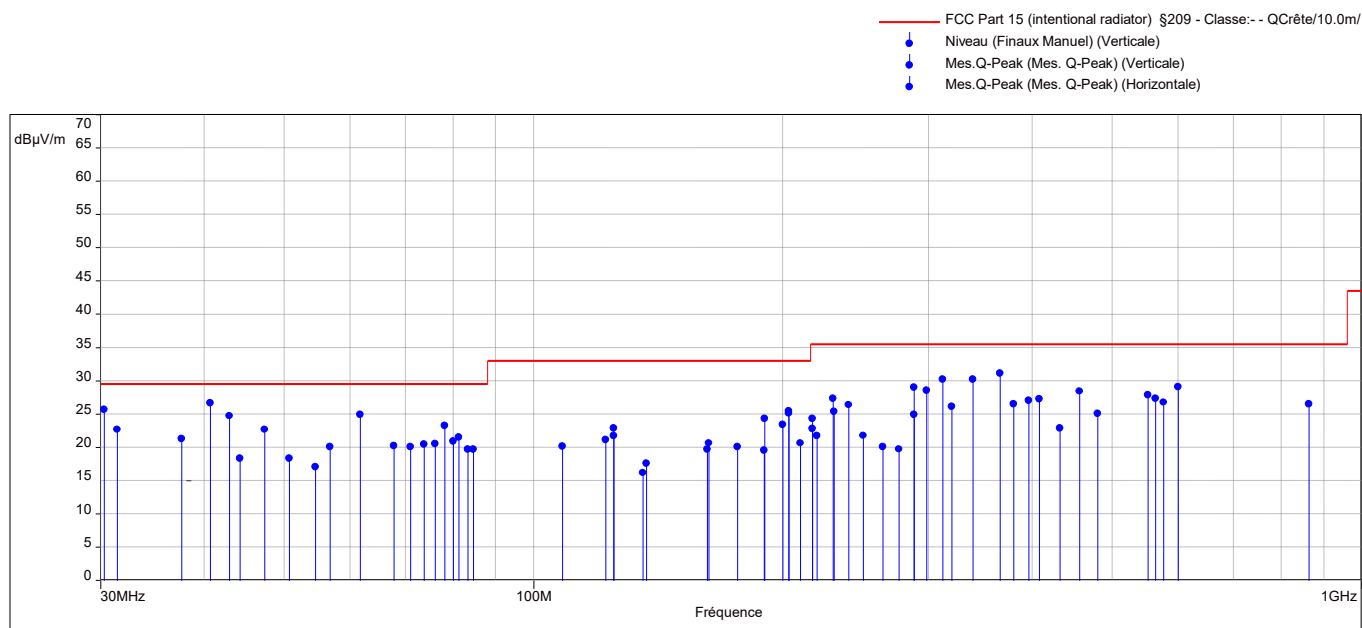
Mode DC



	Frequency (MHz)	level (dBµV/m)	limit FCC class B	Margin Fcc Part class B
Vertical	35.1	25.46	29.5	4.04
Vertical	38.5	22.56	29.5	6.94
Vertical	40.67	27.02	29.5	2.48
Vertical	61.7	24.93	29.5	4.57
Vertical	81.35	26.16	29.5	3.34
Vertical	84.85	21.79	29.5	7.71
Vertical	298.31	28.56	35.5	6.94
Vertical	320	29.64	35.5	5.86
Vertical	456.06	28.47	35.5	7.03
Vertical	552	27.65	35.5	7.85
horizontal	108.5	25.04	33	7.96
horizontal	240	28.22	35.5	7.28
horizontal	311.99	29.38	35.5	6.12
horizontal	379.8	31.47	35.5	4.03
horizontal	400	27.59	35.5	7.91
horizontal	864	31.57	35.5	3.93

Above 1GHz, no significant spurious has been observed

Mode POE



	Frequency (MHz)	level (dBµV/m)	limit FCC class B	Margin Fcc Part class B
Vertical	40.7	26.62	29.5	2.88
Vertical	61.66	24.91	29.5	4.59
Vertical	78.06	23.2	29.5	6.3
Vertical	80	20.85	29.5	8.65
Vertical	81.216	21.48	29.5	8.02
Vertical	203.4	25.5	33	7.5
Vertical	298.3	28.51	35.5	6.99
Vertical	339	30.2	35.5	5.3
Vertical	366	31.09	35.5	4.41
Vertical	576	26.8	35.5	8.7
Vertical	600	29.04	35.5	6.46
horizontal	190	24.33	33	8.67
horizontal	203.4	25.16	33	7.84
horizontal	230	27.34	35.5	8.16
horizontal	288	29	35.5	6.5
horizontal	312.11	30.19	35.5	5.31

Above 1GHz, no significant spurious has been observed



4.7. CONCLUSION

Field strength outside of the bands 13.110-14.010 MHz measurement performed on the sample of the product **MPH-AC001B**, Sn: **2247SML0000014**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.225 & RSS-Gen** limits.



5. FIELD STRENGTH WITHIN THE BAND 13.110-14.010MHz

5.1. TEST CONDITIONS

Date of test : December 02, 2022
Test performed by : Laurent Deneux
Atmospheric pressure (hPa) : -
Relative humidity (%) : 17
Ambient temperature (°C) : 45

5.2. TEST SETUP

The Equipment Under Test is installed **on an Open Area Test Site..**
Measurement is performed with a spectrum analyzer in **radiated method.**

Test Procedure:

☒ ANSI C63.10

The EUT is placed **on an open area test site**. Distance between measuring antenna and the EUT is **10m**. Test is performed in parallel, perpendicular, and ground parallel axis with a loop antenna below 30MHz. Measurement bandwidth was 9kHz between 150kHz & 30MHz. The level has been maximized by the turntable rotation of 360 degrees range on all axis of EUT used in normal configuration. Antenna height search was performed from 1 to 4m. The EUT is place at **0.8m**.

Ambient temperature: 17 °C

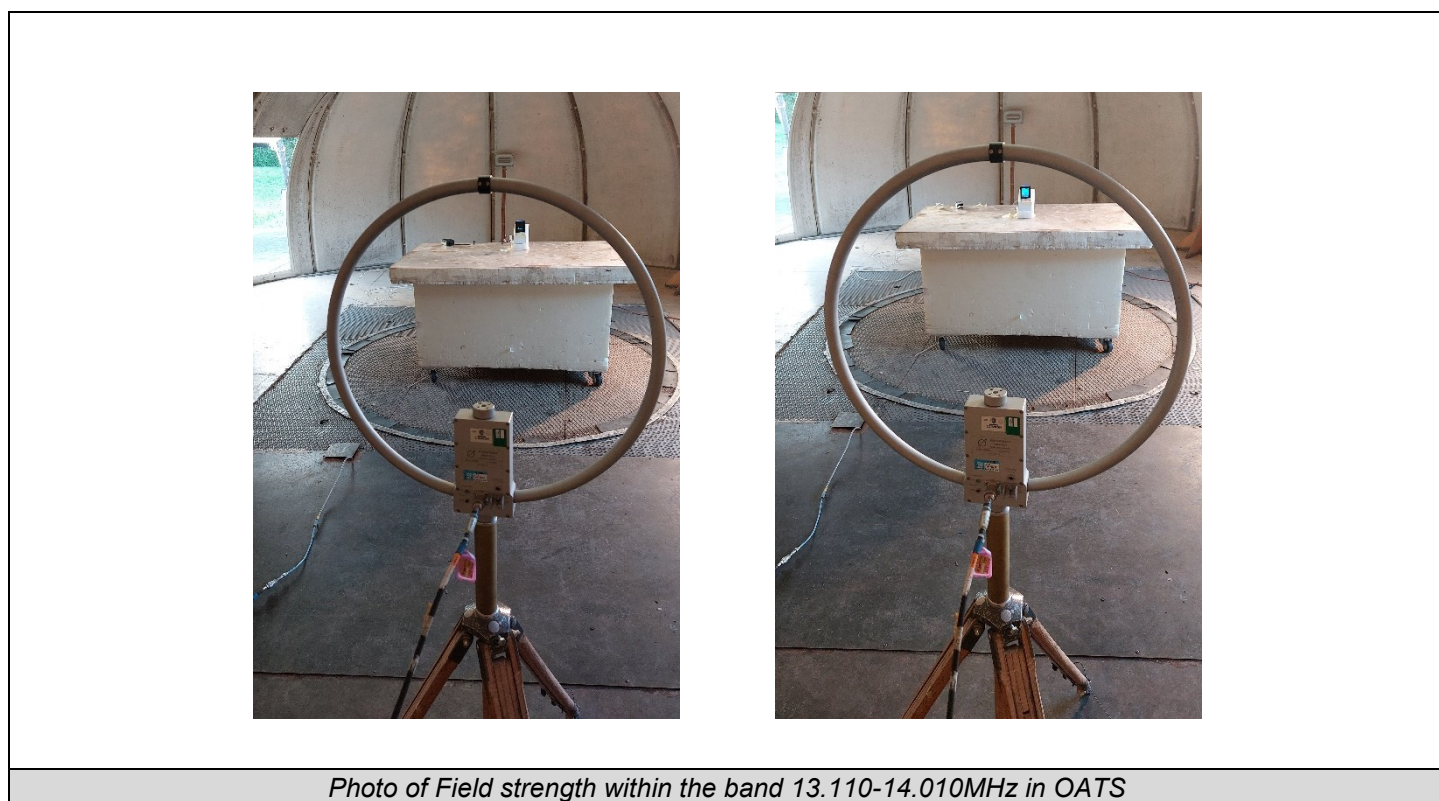
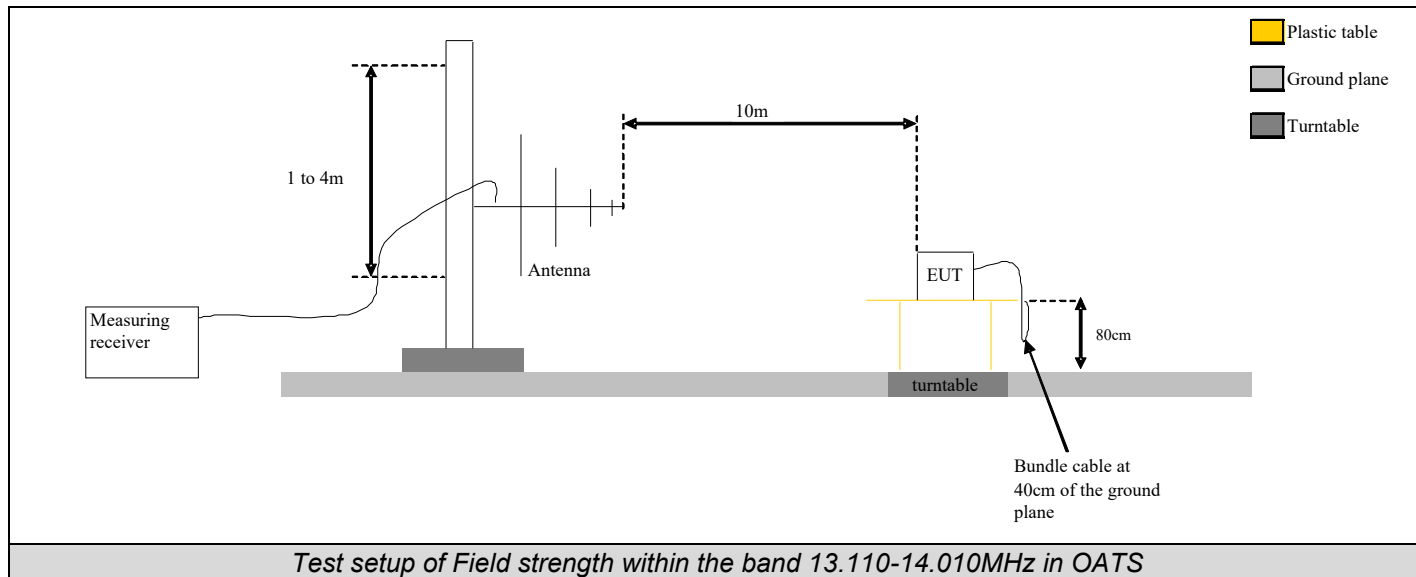
Relative humidity: 45 %

Note: It is impracticable to carry out tests under normal condition as specified in standard.

When measurement with test fixture is used, the power level calibration of the spectrum analyzer shall then be related to the power level or field strength measured with temperature during OATS measure taking in consideration in climatic chamber. The calculation will be used to calculate the absolute level of the sideband power.

Frequency band 13.110-14.010MHz

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





5.3. LIMIT

Frequency (MHz)	Field strength ($\mu\text{V/m}$) @30m	Field strength ($\text{dB}\mu\text{V/m}$) @30m	Field strength ($\text{dB}\mu\text{V/m}$) @3m
13.553-13.567	15 848	84.0	124.0
13.410-13.553 13.567-13.710	334.0	50.5	90.5
13.110-13.410 13.710-14.010	106.0	40.5	80.5
Below 13.110MHz Above 14.010MHz	30.0	29.5	69.5

5.4. TEST EQUIPMENT LIST

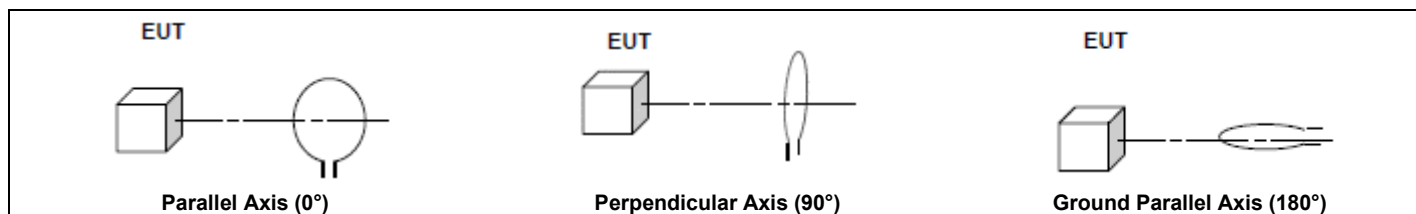
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Receiver	ROHDE & SCHWARZ	ESU	A2642018	2020/10	2022/12
Cable	-	-	A5329442	2022/11	2023/11
Loop antenna	SCHWARZBECK	FMZB1513	C2040209	2022/10	2024/10
Cable	-	-	A5329416	2022/02	2023/02
Software V3.19.1.21	NEXIO	BAT-EMC	-	-	-

5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

5.6. RESULTS

5.6.1. Results on OATS test conditions:



Mode DC

Parallel

Frequency (MHz)	QPeak Level (dBμV/m) (3m)	Limit (dBμV/m) (3m)
Below 13.110	32.47	69.5
13.110 to 13.410	34.2	80.5
13.410 to 13.553	42.3	90.5
13.553 to 13.567	62.5	124.0
13.567 to 13.710	40.6	90.5
13.710 to 14.010	32.3	80.5
Above 14.010	32.4	69.5

perpendicular

Frequency (MHz)	QPeak Level (dBμV/m) (3m)	Limit (dBμV/m) (3m)
Below 13.110	29.8	69.5
13.110 to 13.410	31.4	80.5
13.410 to 13.553	39.4	90.5
13.553 to 13.567	53.9	124.0
13.567 to 13.710	39.4	90.5
13.710 to 14.010	32.4	80.5
Above 14.010	29.4	69.5

Ground Parallel Axis

Frequency (MHz)	QPeak Level (dBμV/m) (3m)	Limit (dBμV/m) (3m)
Below 13.110	30.9	69.5
13.110 to 13.410	31.1	80.5
13.410 to 13.553	42.1	90.5
13.553 to 13.567	57.2	124
13.567 to 13.710	39.2	90.5
13.710 to 14.010	31.7	80.5
Above 14.010	30.4	69.5

Mode POE

Parallel

Frequency (MHz)	QPeak Level (dBμV/m) (3m)	Limit (dBμV/m) (3m)
Below 13.110	29.7	69.5
13.110 to 13.410	32.5	80.5
13.410 to 13.553	41.8	90.5
13.553 to 13.567	63.7	124.0
13.567 to 13.710	38.9	90.5
13.710 to 14.010	35.1	80.5
Above 14.010	32.4	69.5

perpendicular

Frequency (MHz)	QPeak Level (dBμV/m) (3m)	Limit (dBμV/m) (3m)
Below 13.110	31.4	69.5
13.110 to 13.410	33.5	80.5
13.410 to 13.553	39.7	90.5
13.553 to 13.567	58.6	124
13.567 to 13.710	39.9	90.5
13.710 to 14.010	33.4	80.5
Above 14.010	30.1	69.5

Ground Parallel Axis

Frequency (MHz)	QPeak Level (dBμV/m) (3m)	Limit (dBμV/m) (3m)
Below 13.110	30.8	69.5
13.110 to 13.410	32.4	80.5
13.410 to 13.553	39.9	90.5
13.553 to 13.567	55.4	124.0
13.567 to 13.710	41.6	90.5
13.710 to 14.010	32.7	80.5
Above 14.010	30.4	69.5

5.7. CONCLUSION

Field strength within the band 13.110-14.010MHz measurement performed on the sample of the product **MPH-AC001B**, Sn: **2247SML0000014**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.225 & RSS 210** limits.



6. UNCERTAINTIES CHART

<i>Kind of measurement</i>	<i>Wide uncertainty laboratory</i>
Occupied Channel Bandwidth	±2.8 %
Humidity	±3.2 %
Power Spectral Density, Conducted	±1.7 dB
Radio frequency	±0.3 ppm
RF power, conducted	±1.2 dB
RF power, radiated (Full anechoic chamber above 1GHz)	±3.7 dB
RF power, radiated (Semi anechoic chamber & open test site)	±5.6 dB
Spurious emission, conducted	±2.3 dB
Spurious emission, radiated (Full anechoic chamber above 1GHz)	±3.8 dB
Spurious emission, radiated (Semi anechoic chamber & open test site)	±5.7 dB
Temperature	±0.75 °C
Time	±2.3 %
Voltage	±1.7 %

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 limit values. This table includes all uncertainties maximum feasible for testing in the laboratory, whether or not made in this report.