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TEST REPORT

N°: 23803002-805257-B

Version: 02

Subject Electromagnetic compatibility tests according to the standards:
FCC CFR 47 Part 15.225 & ANSI C63.10
RSS 210 Issue 11 & RSS-Gen Issue 5.2

Issued to IDEMIA PUBLIC SECURITY FRANCE
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Apparatus under test

↳ Product MorphoAccess SIGMA WR series
↳ Trade mark IDEMIA
↳ Manufacturer IDEMIA PUBLIC SECURITY FRANCE
↳ Model under test MPH-AC003B
↳ Serial number 2445SMS0000048
↳ FCCID ZBW-MASIGMA13M
↳ IC 11472A-MASIGMA13M

Conclusion See Test Program chapter

Test date February 06, 2025 to February 13, 2025
Test location LCIE Ecuelles
FCC Test site FR0010 - 166175 (FAR)
ISED Test site 6230B (FAR)
Sample receipt date February 06, 2025
Composition of document 39 pages
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PUBLICATION HISTORY

Version	Date	Author	Modification
01	March 28, 2025	Laurent Deneux	Creation of the document
02	March 28, 2025	Laurent Deneux	Modifications to FCCID and IC numbers (on page 1) Changes to RSS 210 issue number : 11 (on pages 1 &4)

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

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1. TEST PROGRAM

References

- 47 CFR Part 15.225 (2022)
- RSS 210 Issue 11
- RSS Gen Issue 5.2
- 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. INFORMATIONS

The purpose of this test is to verify whether the modifications to the RFID electronic card of the product have not had an impact on the product's compliance with the FCC en IC standards (FCC CFR 47 Part 15.225, RSS 210 Issue11 & RSS-Gen Issue 5.2).

Below are the changes:

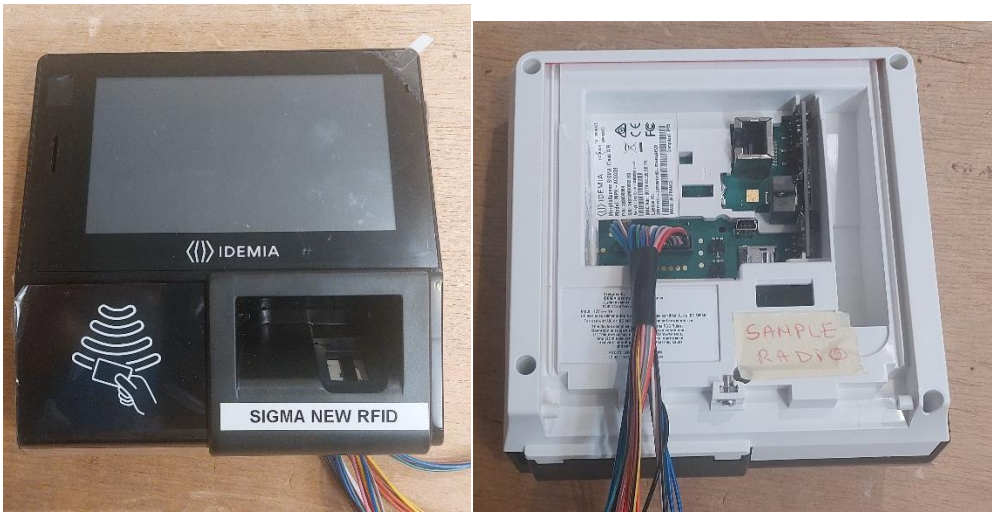
RFID Reader CLRC66302 replaced by CLRC66303, Smart Card Reader AT90SCR100 replaced by AT90SCR200, SIO Processor SE3100A00 replaced by Secure Element SEL55100000.

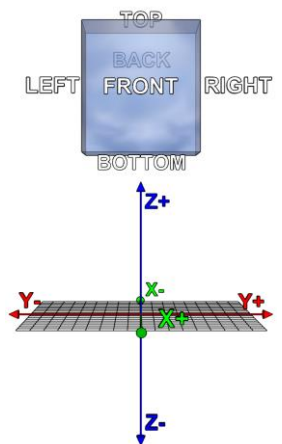
There are 2 variants for the product with model name MPH-AC003B : MorphoAccess SIGMA iClass WR and MorphoAccess SIGMA Multi WR.

The iClass version is the most complete and the tests were carried out on the Iclass version.

2.2. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):

Model under test:	MPH-AC003B
Serial Number:	2445SMS0000048
	
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 L490	-	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 _{min} :	☐ -20°C	☐ X°C*
	T _{nom} :	20°C	
	T _{max} :	☐ 50°C	☐ X°C*
Operating voltage:	Mode DC - Vnom:	☐ 120V/60Hz	☒ 12Vdc
	Mode POE - Vnom:	☐ 120V/60Hz	☒ 56Vdc

*Ask from provider

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} :	13.56	MHz
Firmware (if applicable):	V:	MA4.18.3	
Software (if applicable):	V:	-	

NC: Not communicated by provider



2.3. 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. Tests are performed with "TAG".
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)

2.4. EQUIPMENT LABELLING

Label



2.5. EQUIPMENT MODIFICATIONS DURING THE TESTS

None



2.6. 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 52.5dBμV is obtained. The antenna factor of 7.4 and a cable factor of 1.1 are added. The amplifier gain of 29dB is subtracted, giving a field strength of 32 dBμV/m.

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

The 32 dBμV/m value can be mathematically converted to its corresponding level in μV/m.

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

2.7. 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 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

2.8. 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 : February 06, 2025
 Test performed by : Laurent Deneux
 Atmospheric pressure (hPa) : -
 Relative humidity (%) : 43
 Ambient temperature (°C) : 21

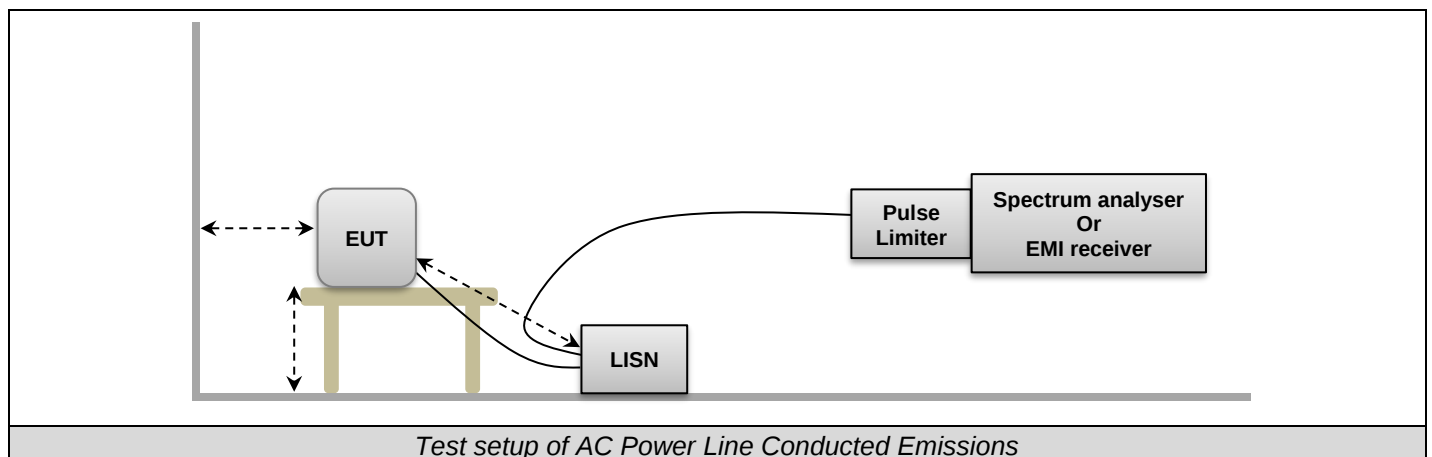
3.2. TEST SETUP

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)



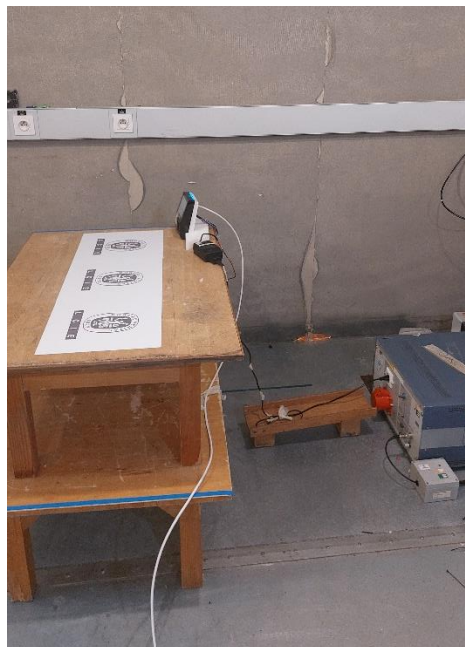


Photo of AC Power Line Conducted Emissions

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

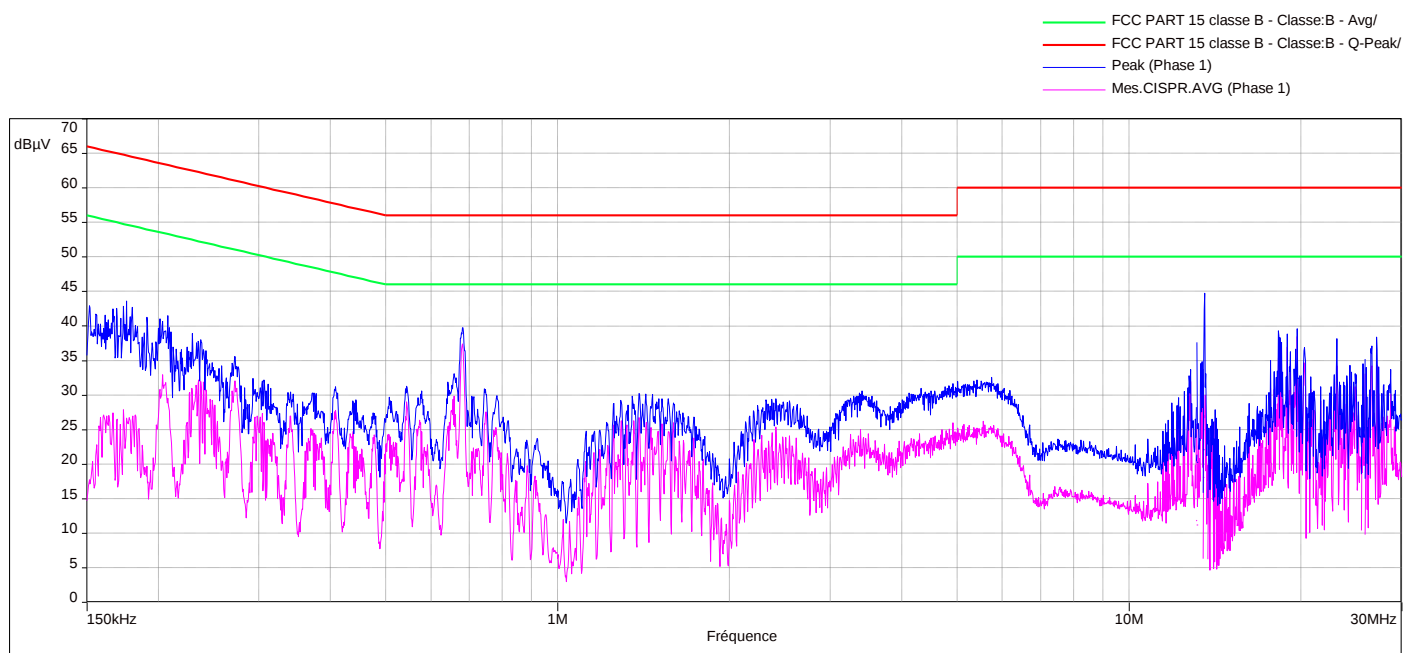
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Receiver	ROHDE & SCHWARZ	ESU	A2642018	2023/03	2025/03
Limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	2024/08	2025/08
Network V / V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322002	2025/01	2026/01
Cable	LCIE	-	A5329589	2023/11	2025/11
Cable	-	-	A5329417	2024/11	2025/11
Power supply	DANA	DSC5000	A7044076	-	-
Software V3.21.0.9	NEXIO	BAT-EMC	-	-	-

3.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

3.6. TEST RESULTS

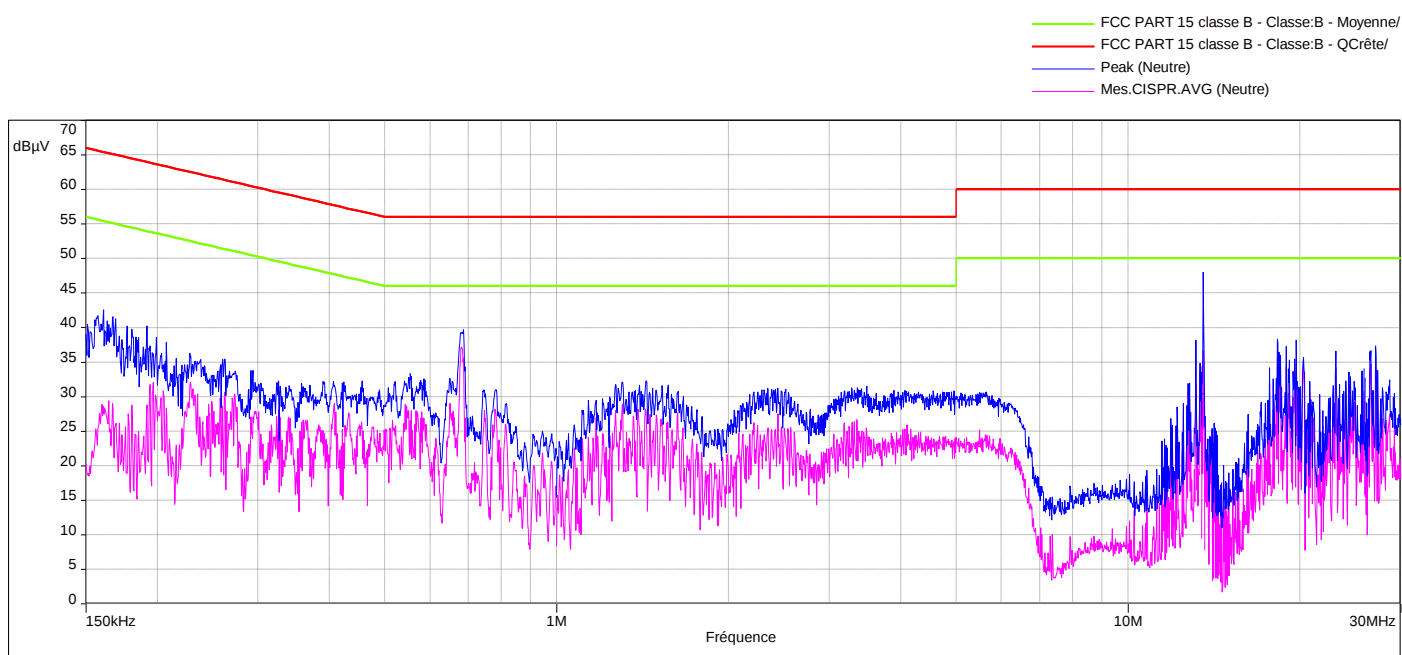
Diagram N°1
Mode DC
Phase 240V/50Hz



Fréquences: 150kHz-30MHz(Mode :lin, Pas :5kHz)Réglages :RBW :9kHz, VBW :Auto, Durée balayage : 20ms/pts, Atténuation :auto, Nombre de balayage :1, Préamp :On , LN preamp : Off, Préselecteur : On

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	42,7	-	66	23,3	27,2	66	38,8
0,68	39,66	-	56	16,34	37,4	46	8,6
13,56	44,7	-	60	15,3	29,9	50	20,1
19,7	39,5	-	60	20,5	38,4	50	11,6
27,12	36	-	60	24	30,6	50	19,4

Diagram N°2
Mode DC
Neutral 240V/50Hz

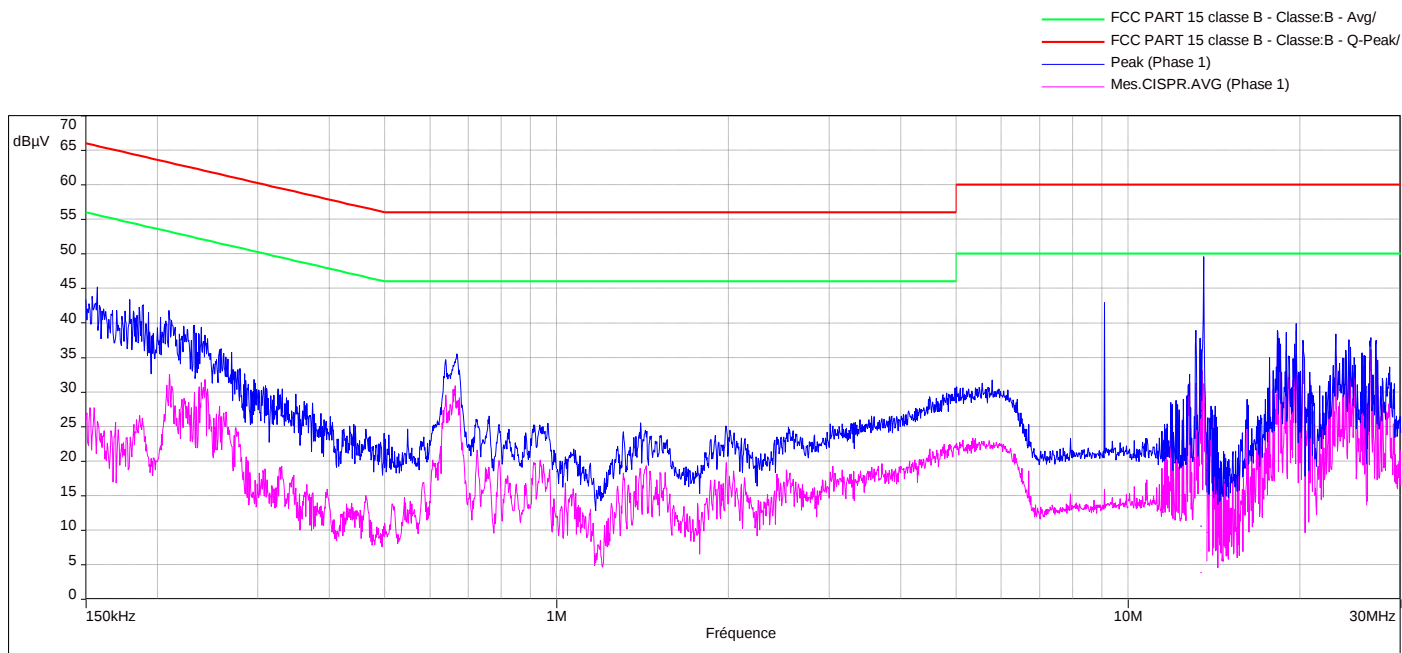


Fréquences: 150kHz-30MHz(Mode :lin, Pas :5kHz)

Réglages :RBW :9kHz, VBW :Auto, Durée balayage : 20ms/pts, Atténuation :auto, Nombre de balyage :1, Préamp :On , LN preamp : Off, Préselecteur : On

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	41,1	-	66	24,9	28,3	56	27,7
0,68	39,3	-	56	16,7	37	46	9
13,56	48	-	60	12	37	50	13
19,7	38,2	-	60	21,8	34,7	50	15,3
27,12	36	-	60	24	33,8	50	16,2

Diagram N°3
Mode DC
Phase 120/60Hz

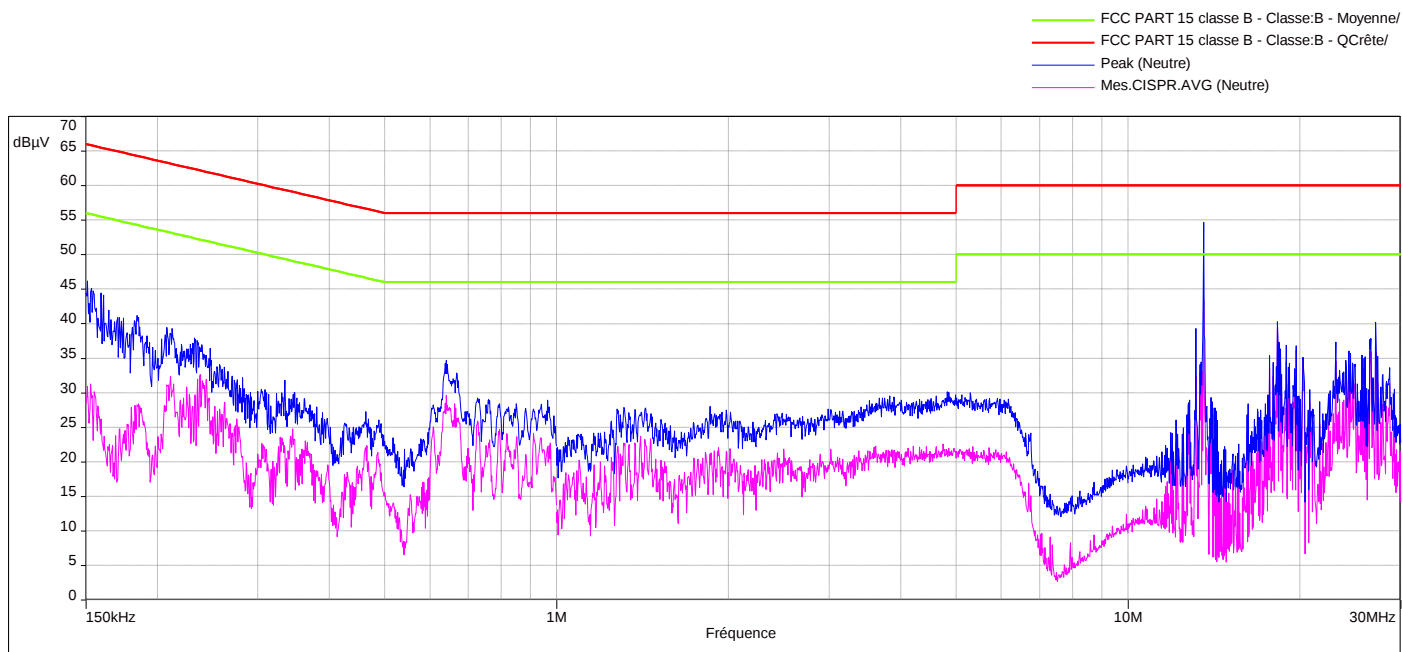


Fréquences: 150kHz-30MHz(Mode :lin, Pas :5kHz)

Réglages :RBW :9kHz, VBW :Auto, Durée balayage : 20ms/pts, Atténuation :auto, Nombre de balayage :1, Préamp :On , LN preamp : Off, Préselecteur : On

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	41,8	-	66	24,2	27,8	56	28,2
0,668	35,4	-	56	20,6	30,1	46	15,9
13,56	49,6	-	60	10,4	31,2	50	18,8
18,91	38,6	-	60	21,4	36	50	14
26,6	37,8	-	60	22,2	36,2	50	13,8

Diagram N°4
Mode DC
Neutral 120/60Hz

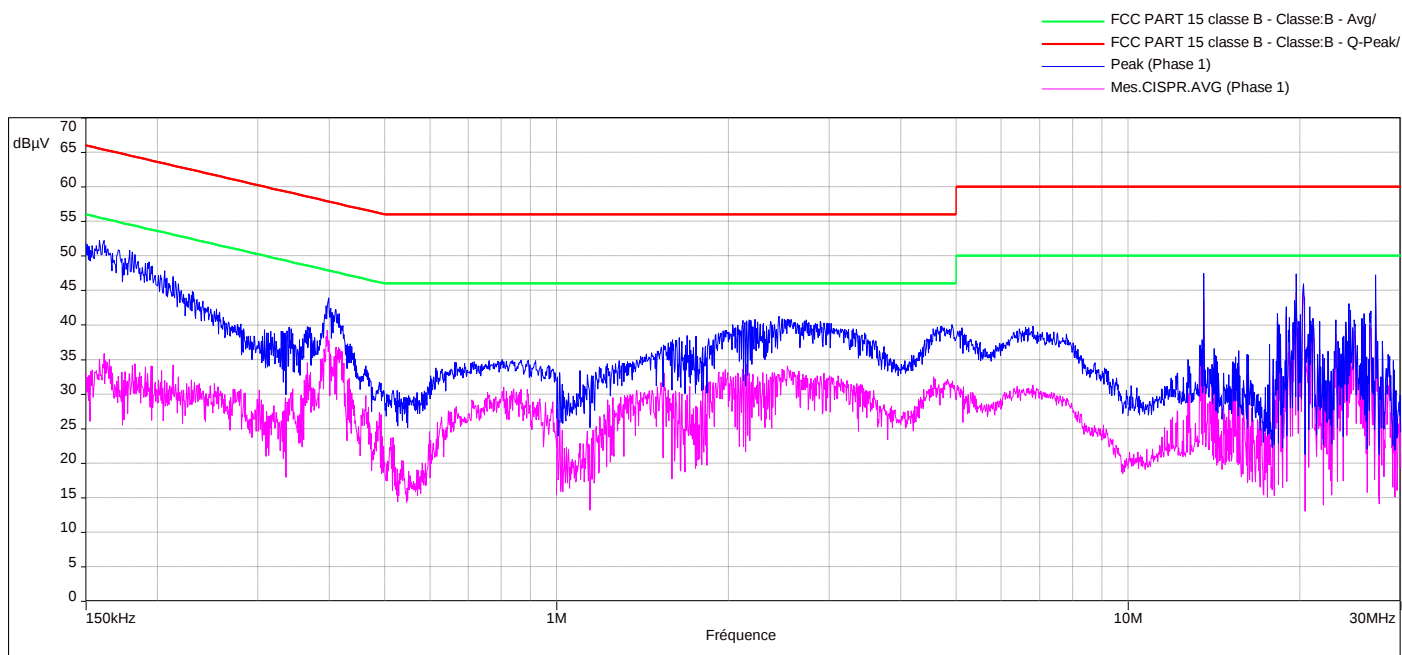


Fréquences: 150kHz-30MHz(Mode :lin, Pas :5kHz)

Réglages :RBW :9kHz, VBW :Auto, Durée balayage : 20ms/pts, Atténuation :auto, Nombre de balyage :1, Préamp :On , LN preamp : Off, Préselecteur : On

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	46,2	-	66	19,8	30,8	56	25,2
0,64	34,7	-	56	21,3	29,6	46	16,4
13,56	54,6	-	60	5,4	43,47	50	6,53
18,24	39,24	-	60	20,76	37	50	13
27,15	37,4	-	60	22,6	35,9	50	14,1

Diagram N°5
 Mode POE
 Phase 240V/50Hz

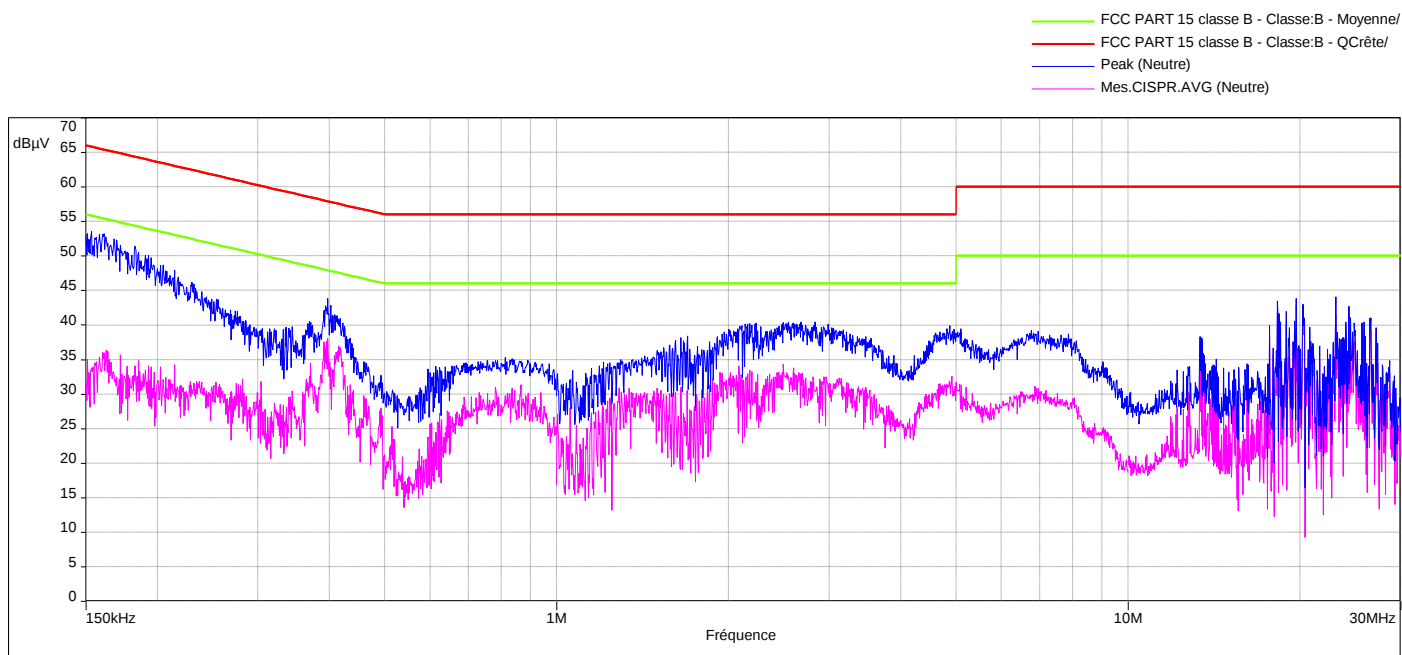


Fréquences: 150kHz-30MHz(Mode :lin, Pas :5kHz)

Réglages :RBW :9kHz, VBW :Auto, Durée balayage : 20ms/pts, Atténuation :auto, Nombre de balyage :1, Préamp :On , LN preamp : Off, Préselecteur : On

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	50,7	-	66	15,3	33,2	66	32,8
0,39	43,9	-	58	14,1	37,6	48	10,4
13,56	47,5	-	60	12,5	43,5	50	6,5
19,7	47	-	60	13	44,74	50	5,26
27,12	47,25	-	60	12,75	42,8	50	7,2

Diagram N°6
Mode POE
Neutral 240V/50Hz

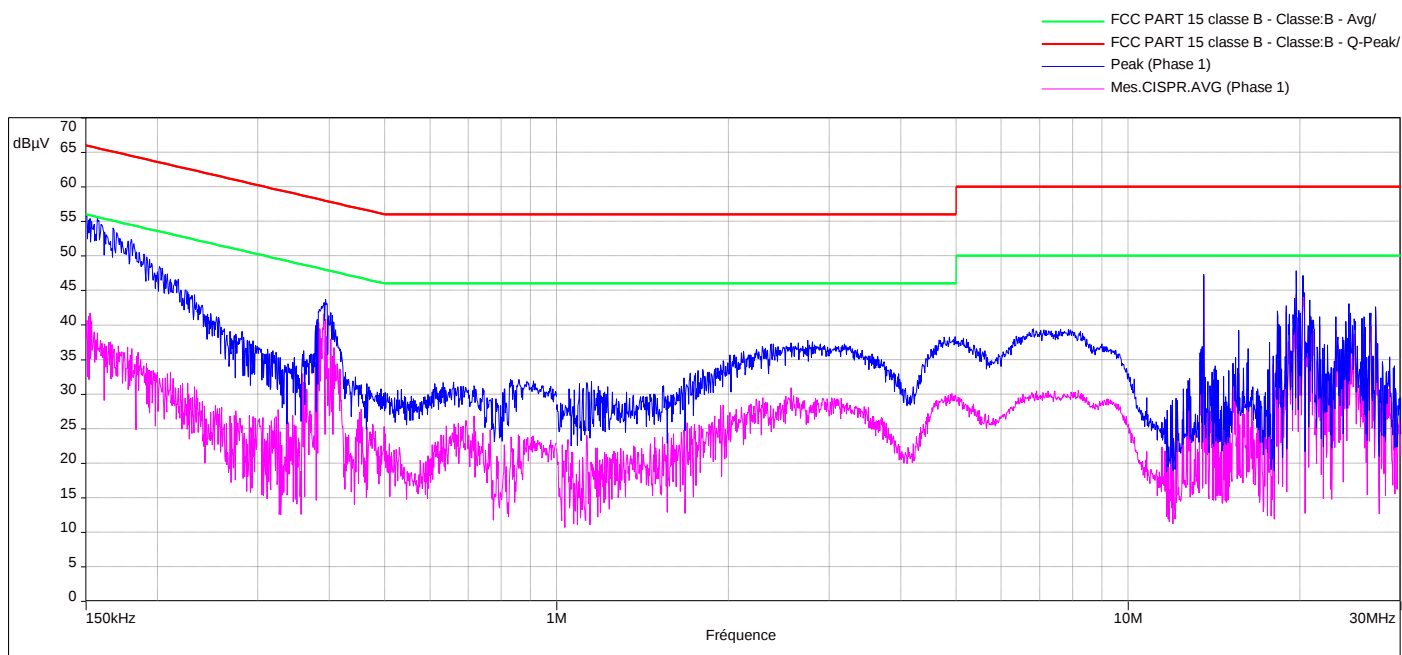


Fréquences: 150kHz-30MHz(Mode :lin, Pas :5kHz)

Réglages :RBW :9kHz, VBW :Auto, Durée balayage : 20ms/pts, Atténuation :auto, Nombre de balyage :1, Préamp :On , LN preamp : Off, Préselecteur : On

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	53,2	-	66	12,8	35	56	21
0,39	44	-	58	14	38	48	10
13,56	38,1	-	60	21,9	35,7	50	14,3
19,7	43,85	-	60	16,15	42,8	50	7,2
23,12	44	-	60	16	41,4	50	8,6

Diagram N°7
 Mode POE
 Phase 120/60Hz

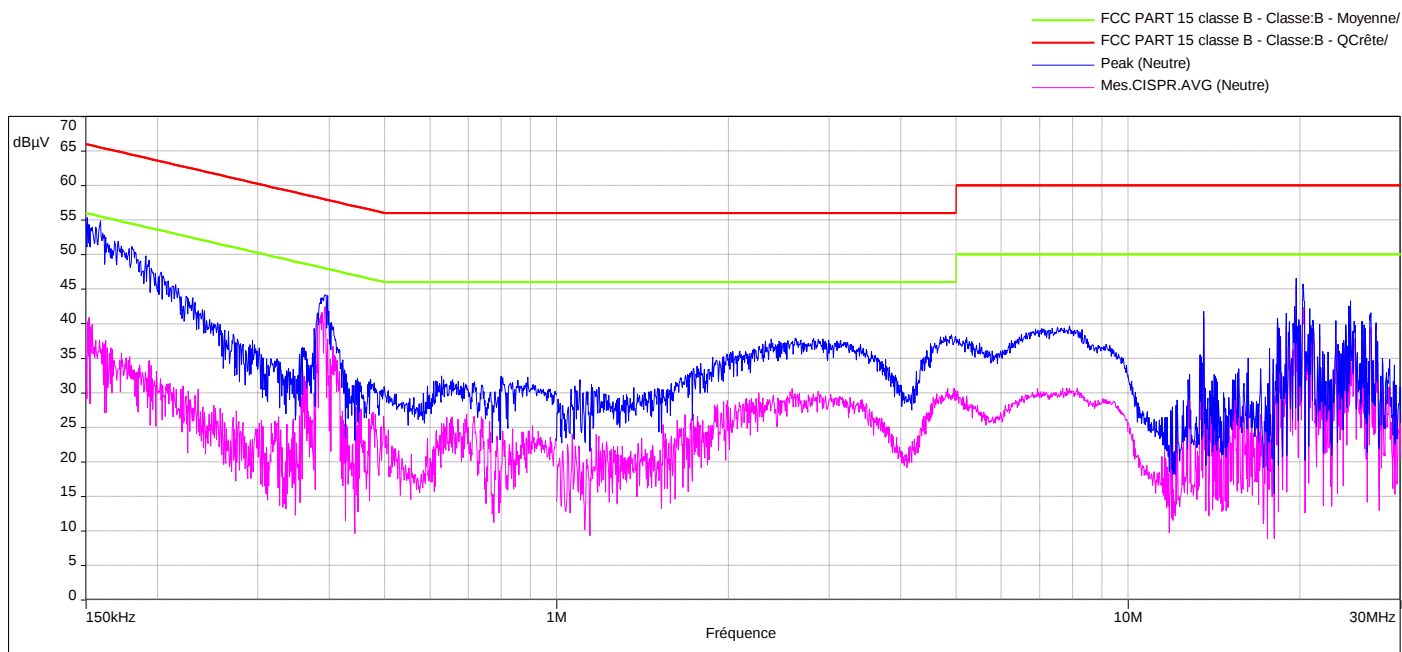


Fréquences: 150kHz-30MHz(Mode :lin, Pas :5kHz)

Réglages :RBW :9kHz, VBW :Auto, Durée balayage : 20ms/pts, Atténuation :auto, Nombre de balyage :1, Préamp :On , LN preamp : Off, Préselecteur : On

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	55,2	-	66	10,8	41,3	56	14,7
0,398	43,2	-	56	12,8	41,6	46	4,4
13,56	47,3	-	60	12,7	47	50	3
18,91	47,8	-	60	12,2	44,5	50	5,5
27,11	42,6	-	60	17,4	42,2	50	7,8

Diagram N°8
 Mode POE
 Neutral 120/60Hz



Fréquences: 150kHz-30MHz(Mode :lin, Pas :5kHz)

Réglages :RBW :9kHz, VBW :Auto, Durée balayage : 20ms/pts, Atténuation :auto, Nombre de balyage :1, Préamp :On , LN preamp : Off, Préselecteur : On

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	55,5	-	66	10,5	40,3	56	15,7
0,39	44,1	-	56	11,9	42,5	46	3,5
13,56	41,8	-	60	18,2	40,9	50	9,1
19,7	46,5	-	60	13,5	45,5	50	4,5
27,15	40	-	60	20	38,2	50	11,8



3.7. CONCLUSION

AC Power Line Conducted Emission measurement performed on the sample of the product **MPH-AC003B**, Sn: **2445SMS0000048**, 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 : February 13, 2025
Test performed by : Laurent Deneux
Atmospheric pressure (hPa) : -
Relative humidity (%) : 41
Ambient temperature (°C) : 17

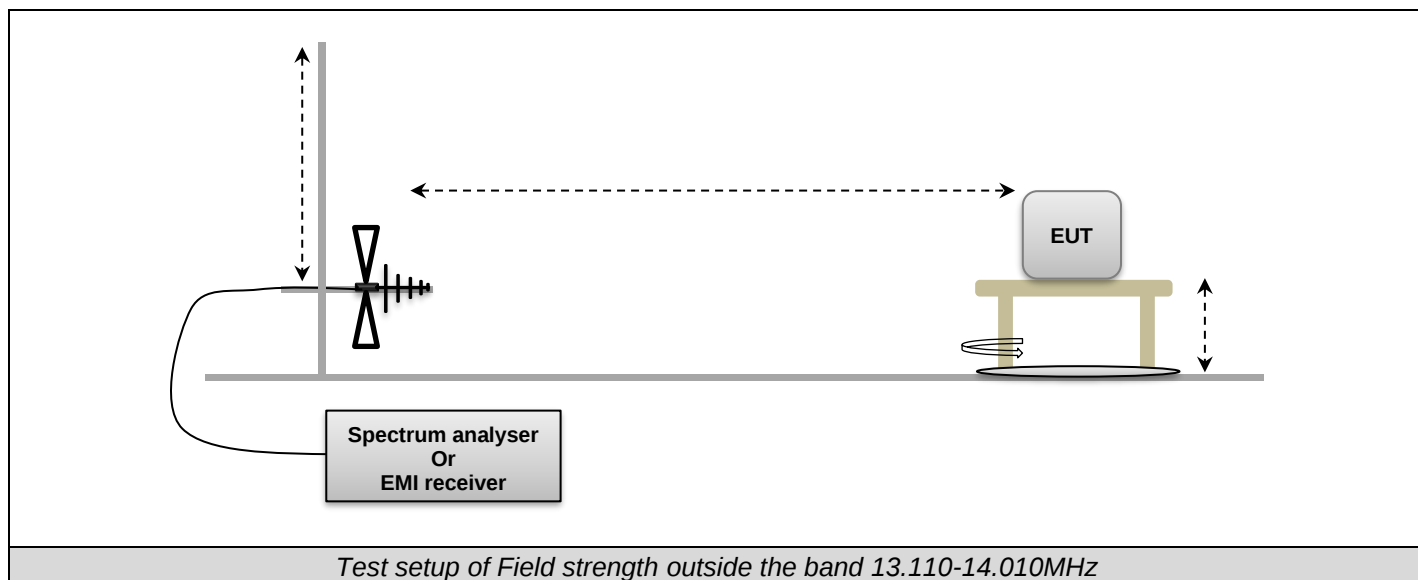
4.2. TEST SETUP

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	Horizontal And Vertical
Antenna Polarization:	Parallel, Perpendicular And Ground parallel	Horizontal And Vertical	HorizontalAnd Vertical
Antenna Height:	1m	Varied from 1m to 4m	Centered on EUT (§6.6.5 ANSI C63-10)
Antenna Type:	Loop	Bi-Log	Horn
RBW Filter:	200Hz below 150kHz 9kHz above 150kHz	120kHz	1MHz
Maximization:	Turntable rotation of 360 degrees range		Turntable rotation of 360 degrees range
EUT height:	0.8m		1.5
Pre-Characterization site:	Open Aera Test Site	Open Aera Test Site	Open Aera Test Site
Qualification site:	Open Aera Test Site	Open Aera Test Site	Open Aera Test Site
Distance EUT - Antenna:	3m	10m	3m



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

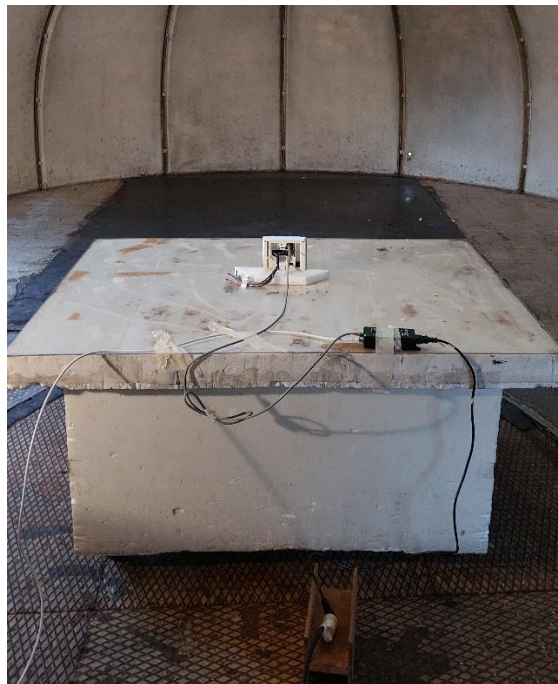


Photo of Field strength outside the band 13.110-14.010MHz

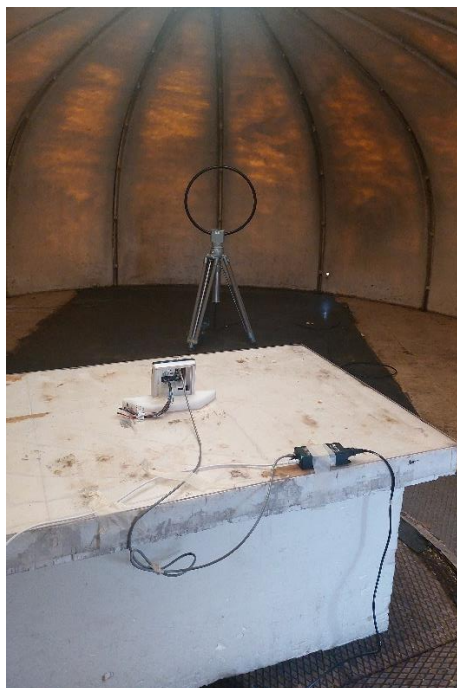


Photo of Field strength outside the band 13.110-14.010MHz

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
OATS	-	-	F2000400	2024/03	2025/03
Receiver	ROHDE & SCHWARZ	ESU	A2642018	2023/03	2025/03
Preamplifier	BONN	BLNA 3018-8F305	A7080053	2023/11	2025/11
Antenna bilog	Schwarzbeck	VULB9160	C2040150	2023/09	2025/09
Horn antenna	ETS	3115	C2042016	2023/09	2025/09
Cable	-	-	A5329449	2024/11	2025/11
Cable	-	-	A5330051	2024/12	2025/12
Cable			A5329368	2024/02	2025/02
Antenne bico	Schwarzbeck	VHBB9124 + BBA 9106	C2040295	2023/02	2025/02
Cable			A5330084	2024/11	2025/11
Cable			A5330052	2024/12	2025/12
Cable			A5330053	2024/12	2025/12
Cable	-	-	A5329418	2024/12	2025/12
Loop antenna	R&S	HFH2-Z2	C2040269	2025/01	2027/01
Software V3.21.0.9	NEXIO	BAT-EMC	-	-	-

4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

4.6. RESULTS

4.6.1. 9kHz to 30MHz

Mode POE

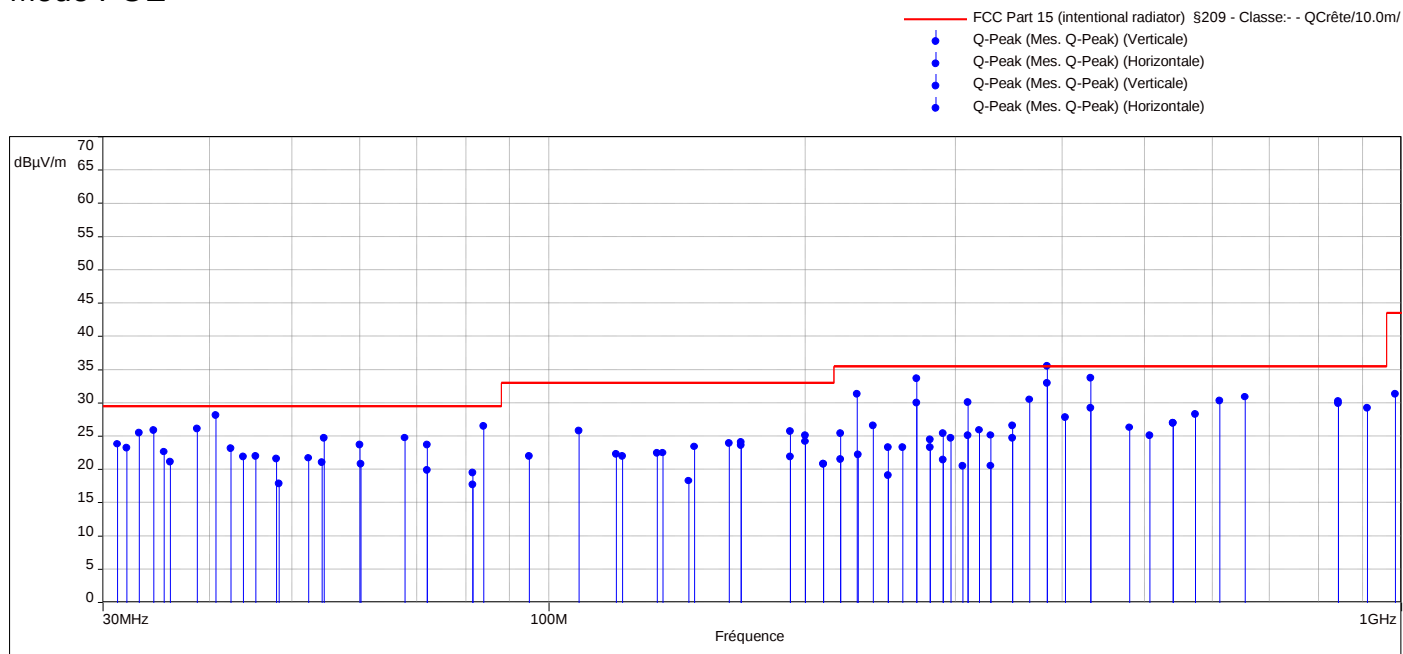
9kHz to 30MHz					
Polarization	Frequency (MHz)	Peak Level (dB μ V/m)	QPeak Level (dB μ V/m)	Limit (dB μ V/m)	Margin QPeak (dB μ V/m)
Parallel	7.59	-	24.7	69.5	44.8
Parallel	27.12	-	35.13	69.5	34.37
Perpendicular	7.54	-	27.7	69.5	41.79
Perpendicular	27.12	-	35.37	69.5	34.13
Ground parallel	27.12	-	26.13	69.5	43.37

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	18.9	-	26.1	69.5	43.42
Parallel	19.68	-	29.12	69.5	40.38
Parallel	27.12	-	34.55	69.5	34.95
Perpendicular	18.94	-	26.07	69.5	43.43
Perpendicular	19.68	-	31	69.5	38.5
Perpendicular	20.25	-	27.7	69.5	41.8
Perpendicular	27.12	-	36.89	69.5	32.61
Ground parallel	27.12	-	35.03	69.5	34.47

4.6.2. 30MHz to 1GHz

Mode POE



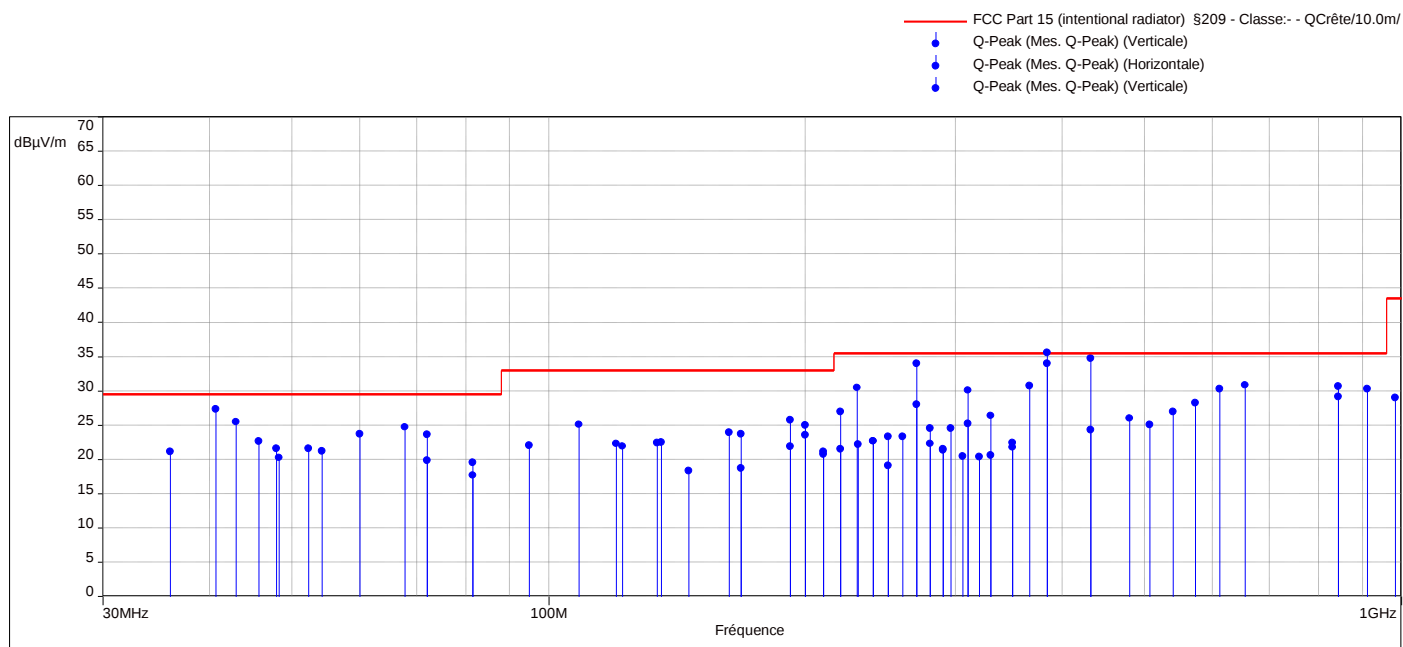
Fréquences: 30 MHz - 1 GHz (Mode: Lin, Pas: 100 kHz)

Réglages: RBW: 120kHz, VBW: Auto, Durée balayage : 50 ms/Pts, Atténuation : Auto, Nombre de Balayages : 1, Preamp : On: 10 dB, LN Preamp : Off, Preselecteur: On

Polarity	Frequency (MHz)	level (dBμV/m)	limit FCC class B	Margin/ Fcc Part class B
Vertical	34,35	25,84	29,5	3,66
Vertical	38,67	26,09	29,5	3,41
Vertical	40,68	28,09	29,5	1,41
Vertical	230	31,34	35,5	4,16
Vertical	270	33,67	35,5	1,83
Vertical	310	30,06	35,5	5,44
Vertical	384	35,3	35,5	0,2
Vertical	432	33,7	35,5	1,8
Vertical	843,5	30,2	35,5	5,3
Horizontal	54,5	24,73	29,5	4,77
Horizontal	83,9	26,45	29,5	3,05
Horizontal	384	32,9	35,5	2,6
Horizontal	612	30,28	35,5	5,22
Horizontal	655,4	30,9	35,5	4,6

Above 1GHz, no significant spurious has been observed.

Mode DC



Fréquences: 30 MHz - 1 GHz (Mode: Lin, Pas: 100 kHz)

Réglages: RBW: 120kHz, VBW: Auto, Durée balayage : 50 ms/Pts, Atténuation : Auto, Nombre de Balayages : 1, Preamp : On: 10 dB, LN Preamp : Off, Preselecteur: On

Polarity	Frequency (MHz)	level (dBμV/m)	limit FCC class B	Margin/ Fcc Part class B
Vertical	40,7	27,33	29,5	2,17
Vertical	43	25,5	29,5	4
Vertical	60	23,69	29,5	5,81
Vertical	230	30,52	35,5	4,98
Vertical	270	34,02	35,5	1,48
Vertical	310	30,16	35,5	5,34
Vertical	432	34,72	35,5	0,78
Vertical	384	35,45	35,5	0,05
Vertical	843,5	30,68	35,5	4,82
Vertical	911,6	30,26	35,5	5,24
Horizontal	366,1	30,71	35,5	4,79
Horizontal	384	33,98	35,5	1,52
Horizontal	612	30,29	35,5	5,21
Horizontal	655,4	30,85	35,5	4,65
Horizontal	843,5	29,16	35,5	6,34

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-AC003B**, Sn: **2445SMS0000048**, 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 : February 13, 2025
Test performed by : Laurent Deneux
Atmospheric pressure (hPa) : -
Relative humidity (%) : 41
Ambient temperature (°C) : 17

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

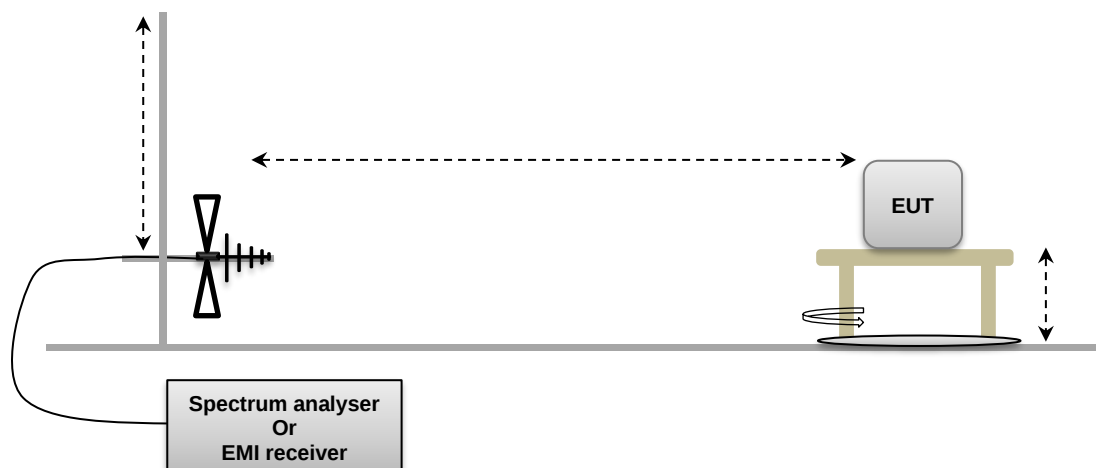
Relative humidity: 41 %

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.



Test setup of Field strength within the band 13.110-14.010MHz in OATS



Photo of Field strength within the band 13.110-14.010MHz in OATS



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

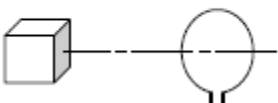
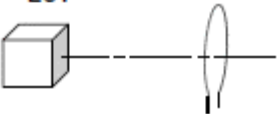
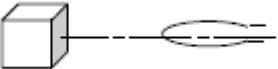
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
OATS	-	-	F2000400	2024/03	2025/03
Receiver	ROHDE & SCHWARZ	ESU	A2642018	2023/03	2025/03
Cable	-	-	A5329418	2024/12	2025/12
Loop antenna	R&S	HFH2-Z2	C2040269	2025/01	2027/01
Cable			A5330084	2024/11	2025/11
Software V3.21.0.9	NEXIO	BAT-EMC	-	-	-

5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

5.6. RESULTS

5.6.1. Results on OATS test conditions:

Frequency (MHz)	QPeak Limit (dB μ V/m) @ 30m	QPeak (dB μ V/m) @ 30m	Margin (Mes-Lim) (dB)	Angle Table (deg)	Pol Ant.	Ht Ant. (cm)	Correc. Factor (dB)	Comments
13.56								
 Parallel Axis (0°)  Perpendicular Axis (90°)  Ground Parallel Axis (180°)								

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

5.6.2. Results under Normal condition

Mode POE

Parallel Axis			
Frequency (MHz)	Peak Level (dB μ V/m) (3m)	QPeak Level (dB μ V/m) (3m)	Limit (dB μ V/m) (3m)
Below 13.110	-	31.2	69.5
13.110 to 13.410	-	35.3	80.5
13.410 to 13.553	-	43.5	90.5
13.553 to 13.567	-	61.6	124.0
13.567 to 13.710	-	43.2	90.5
13.710 to 14.010	-	38.7	80.5
Above 14.010	-	32.8	69.5

Ground Parallel Axis			
Frequency (MHz)	Peak Level (dB μ V/m) (3m)	QPeak Level (dB μ V/m) (3m)	Limit (dB μ V/m) (3m)
Below 13.110	-	31.8	69.5
13.110 to 13.410	-	36.5	80.5
13.410 to 13.553	-	39.8	90.5
13.553 to 13.567	-	52.75	124.0
13.567 to 13.710	-	37.8	90.5
13.710 to 14.010	-	34	80.5
Above 14.010	-	31.4	69.5

Perpendicular Axis			
Frequency (MHz)	Peak Level (dB μ V/m) (3m)	QPeak Level (dB μ V/m) (3m)	Limit (dB μ V/m) (3m)
Below 13.110	-	32.4	69.5
13.110 to 13.410	-	38.7	80.5
13.410 to 13.553	-	41.2	90.5
13.553 to 13.567	-	55.3	124
13.567 to 13.710	-	42.5	90.5
13.710 to 14.010	-	39.5	80.5
Above 14.010	-	34.5	69.5

Mode DC

Parallel Axis			
Frequency (MHz)	Peak Level (dB μ V/m) (3m)	QPeak Level (dB μ V/m) (3m)	Limit (dB μ V/m) (3m)
Below 13.110	-	33.5	69.5
13.110 to 13.410	-	35.8	80.5
13.410 to 13.553	-	43.5	90.5
13.553 to 13.567	-	61.7	124.0
13.567 to 13.710	-	41.5	90.5
13.710 to 14.010	-	38.4	80.5
Above 14.010	-	32.5	69.5

Ground Parallel Axis			
Frequency (MHz)	Peak Level (dB μ V/m) (3m)	QPeak Level (dB μ V/m) (3m)	Limit (dB μ V/m) (3m)
Below 13.110	-	31.8	69.5
13.110 to 13.410	-	33.6	80.5
13.410 to 13.553	-	36.5	90.5
13.553 to 13.567	-	55.1	124.0
13.567 to 13.710	-	35.1	90.5
13.710 to 14.010	-	33.4	80.5
Above 14.010	-	31.1	69.5

Perpendicular Axis			
Frequency (MHz)	Peak Level (dB μ V/m) (3m)	QPeak Level (dB μ V/m) (3m)	Limit (dB μ V/m) (3m)
Below 13.110	-	32.2	69.5
13.110 to 13.410	-	35.4	80.5
13.410 to 13.553	-	42.5	90.5
13.553 to 13.567	-	55.4	124
13.567 to 13.710	-	40.8	90.5
13.710 to 14.010	-	37.7	80.5
Above 14.010	-	34.6	69.5

5.7. CONCLUSION

Field strength within the band 13.110-14.010MHz measurement performed on the sample of the product **MPH-AC003B**, Sn: **2445SMS0000048**, 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.