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TEST REPORT

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Version : 04

Subject

Radio spectrum matters
tests according to standards:
47 CFR Part 15.247 & RSS-247 Issue 2 & RSS-Gen Issue 5

Issued to

SCHNEIDER ELECTRIC 38EQI
31 rue Pierre Mendès
38320 - EYBENS
France

Apparatus under test

- Product
- Trade mark
- Manufacturer
- Model under test
- Serial number
- FCC ID
- IC

Heat Tag
SCHNEIDER ELECTRIC
SCHNEIDER ELECTRIC
SMT10020
RN20245010004 / RN20245010005
2AH7L-HTAGV2
21522-HTAGV2

Conclusion

See Test Program chapter

Test date

June 22, 2020 to June 29, 2020

Test location

Moirans

Test Site

6500A-1 & 6500A-3

Sample receipt date

June 22, 2020

Composition of document

68 pages

Document issued on

February 19, 2021

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PUBLICATION HISTORY

Version	Date	Author	Modification
01	July 6 , 2020	Majid MOURZAGH	Creation of the document
02	July 8 , 2020	Majid MOURZAGH	Correction of test operator name
03	July 15, 2020	Majid MOURZAGH	Add Setting used during test for Power output(in dBm) at 5,0 (see §2.2)
04	February 19, 2021	Majid MOURZAGH	Adding COFRAC Accreditation

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 15.247
- RSS 247 Issue 2
- RSS Gen Issue 5
- KDB 558074 D01 DTS Meas Guidance v05r02
- ANSI C63.10-2013

Radio requirement:

Clause (47CFR Part 15.247 & RSS-247 Issue 2 & RSS-Gen Issue 5) Test Description	Test result - Comments
Occupied Bandwidth	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
6dB Bandwidth	☒ PASS ☐ FAIL ☐ NA() ☐ NP(1)
Duty Cycle P	☐ PASS ☐ FAIL ☒ NA ☐ NP(1)
Maximum Conducted Output Power	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
Power Spectral Density	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
Conducted Spurious Emission at the Band Edge	☒ PASS ☐ FAIL ☐ NA() ☐ NP(1)
Unwanted Emissions into Non-Restricted Frequency Bands	☒ PASS ☐ FAIL ☐ NA() ☐ NP(1)
AC Power Line Conducted Emission	☒ PASS ☐ FAIL ☐ NA(2) ☐ NP(1)
Unwanted Emissions into Restricted Frequency Bands	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
Receiver Radiated emissions P	☐ PASS ☐ FAIL ☒ NA ☐ NP(1)
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

PASS: EUT complies with standard's requirement

FAIL: EUT does not comply with standard's requirement

NA: Not Applicable

NP: Test Not Performed

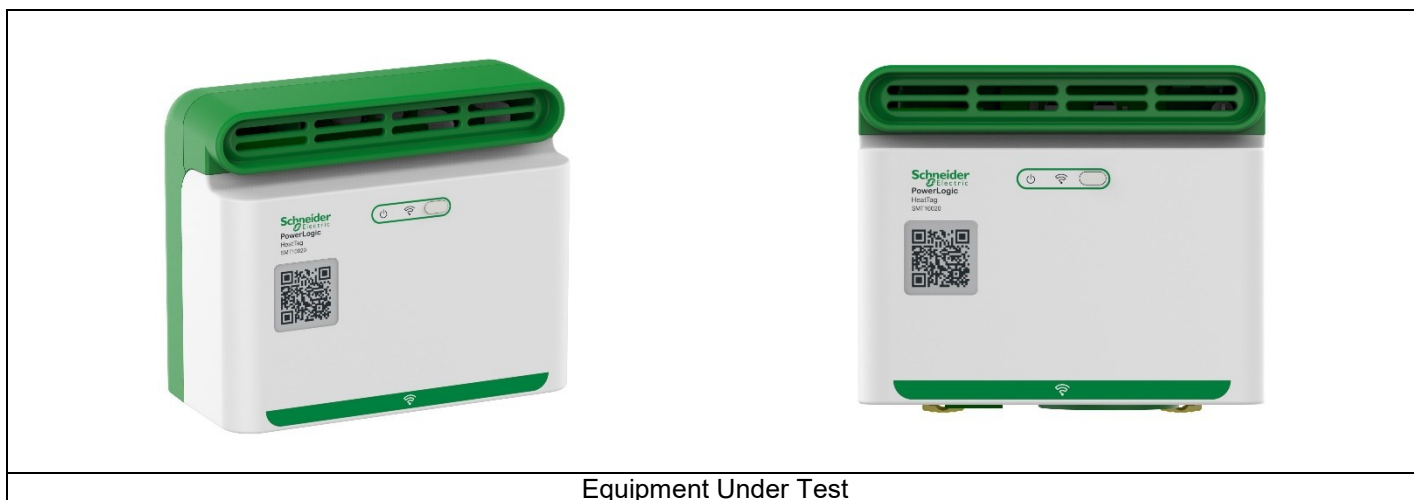
2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):

SCHNEIDER ELECTRIC SMT10020

Serial Number: RN20245010004 / RN20245010005



Power supply:

During all the tests, EUT is supplied by V_{nom} : 110Vac/60Hz

For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference / Sn	Comments
Supply1	☒ AC ☐ DC ☐ Battery	110-277Vac 50-60Hz 0.1A	/	/

Voltage table used (for Power Line Conducted Emissions):

Type	Measurement performed:	
☒ AC	☒ 110VAC/60Hz	☒ 240VAC/50Hz Used only for test:AC Power Line Conducted Emissions.

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Line+Neutral	1	☐	☐	☒	/

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop LENOVO	P51	LVSE074700	/
Interface Board	SMARTRF05EB	0x4708	Rev.:1.8.1.2

Equipment information:

Type:	☒ ZIGBEE		☐ RF4CE
Frequency band:	[2400 – 2483.5] MHz		
Number of Channel:	16		
Spacing channel:	5MHz		
Channel bandwidth:	2MHz		
Antenna Type:	☒ Integral	☐ External	☐ Dedicated
Antenna connector:	☐ Yes	☒ No	☐ Temporary for test
Transmit chains:	1		
	Single antenna		
	Gain: 4dBi		
Beam forming gain:	No		
Receiver chains	1		
Type of equipment:	☒ Stand-alone	☐ Plug-in	☐ Combined
Ad-Hoc mode:	☐ Yes		☒ No
Adaptivity mode:	☐ Yes (Load Based)	☐ Off mode	☒ No
	Clear Channel Assessment Time:		Xps
Duty cycle:	☐ Continuous duty	☐ Intermittent duty	☐ 100% duty
Equipment type:	☒ Production model		☐ Pre-production model
Operating temperature range:	Tmin:	☐ -20°C	☐ 0°C ☒ -15°C
	Tnom:	20°C	
	Tmax:	☐ 35°C	☐ 55°C ☒ +70°C
Type of power source:	☒ AC power supply	☐ DC power supply	☐ Battery
Operating voltage range:	Vnom:	☒ 110V/60Hz	☐ 24Vdc

CHANNEL PLAN	
Channel	Frequency (MHz)
Cmin: 11	2405
12	2410
13	2415
14	2420
15	2425
16	2430
17	2435
Cmid: 18	2440
19	2445
20	2450
21	2455
22	2460
23	2465
24	2470
25	2475
Cmax: 26	2480

DATA RATE		
Data Rate (Mbps)	Modulation Type	Worst Case Modulation
0.25	O-QPSK	☒

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
Occupied Bandwidth	☒ Test mode 1 (1) ☐ Alternative test mode()
6dB Bandwidth	☒ Test mode 1 (1) ☐ Alternative test mode()
Maximum Conducted Output Power	☒ Test mode 1 (1) ☐ Alternative test mode()
Power Spectral Density	☒ Test mode 1 (1) ☐ Alternative test mode()
Conducted Spurious Emission at the Band Edge	☒ Test mode 1 (1) ☐ Alternative test mode()
Unwanted Emissions into Non-Restricted Frequency Bands	☒ Test mode 1 (1) ☐ Alternative test mode()
AC Power Line Conducted Emission	☒ Test mode 1 (1) ☐ Alternative test mode()
Unwanted Emissions into Restricted Frequency Bands	☒ Test mode 1 (1) ☐ Alternative test mode()

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

- a. – See document “X”(provided by customer) for the command used during test.

Hardware information		
Software (if applicable):	V. :	EMC Zigbee Radio Test Tool V1.5.3
Communication COM6 connect disconnect CEM Setting CEM SourceId : 87654321 Mode : Concentrator Reset Gp 15.4 Brick ☒ Disconnect After Reset Soft reset Signal Emission Test (T1) Packet Emission Test (T2) Packet Reception Test (T3) Reception Mode Test (T4) EMC Parameter Carrier Type ☐ Pure Carrier ☒ Modulated Carrier Channel Test (11 - 26) 18 2440 MHz Power Output (in dBm) 5,0 Channel Gap 0 Time execution test (in ms) ☒ infinite 360 000 Antenna Select Antenna 1 Configure Delay start test (in second) 0 Select Local Antenna Antenna 1 Start Test Stop Test		

Setting used during test for Power output(in dBm) at 5,0

2.3. EQUIPMENT LABELLING

None

2.4. EQUIPMENT MODIFICATION

☒ None ☐ Modification:

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : June 25, 2020
Ambient temperature : 21 °C
Relative humidity : 38 %

3.2. TEST SETUP

- The Equipment under Test is installed:

- ☐ On a table
☒ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

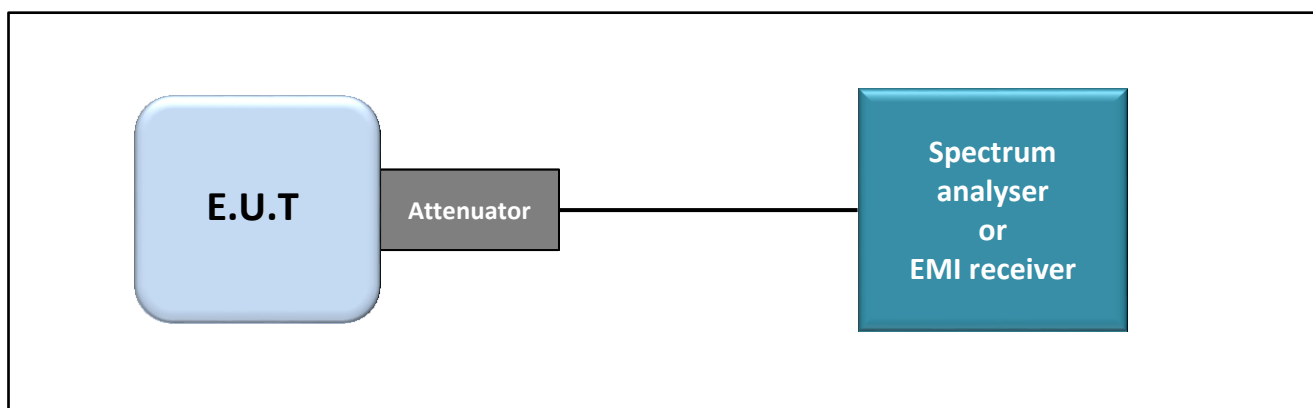
- ☒ Conducted Method
☐ Radiated Method

- Test Procedure:

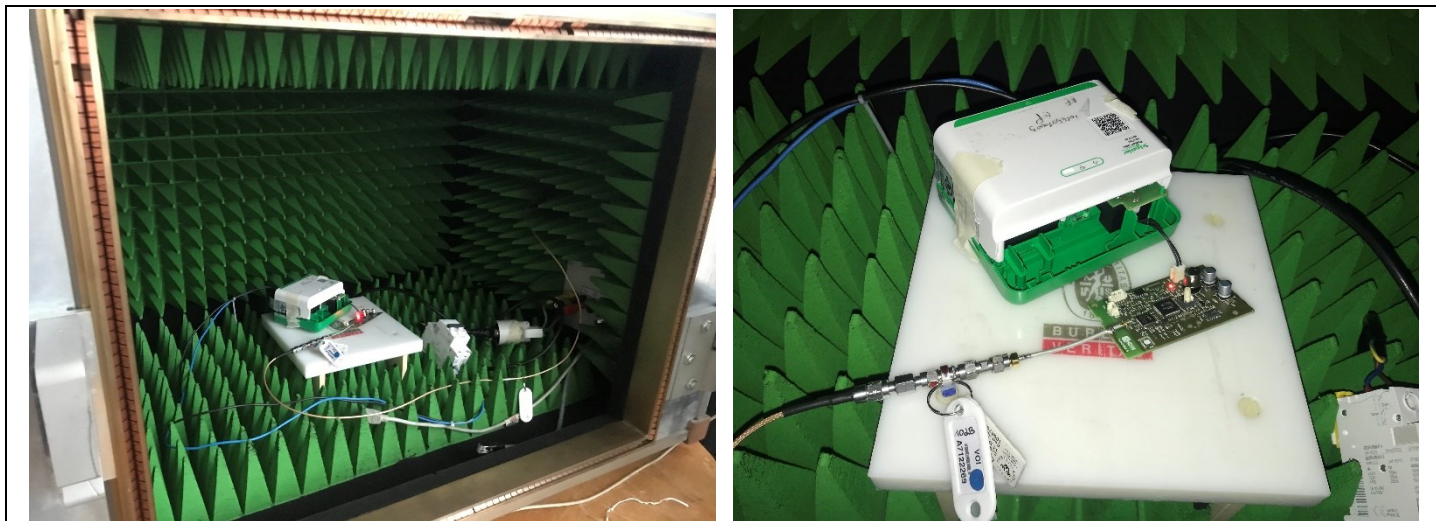
- ☒ RSS-Gen Issue 5 § 6.7
☐ ANSI C63.10 § 6.9.2

Measurement Procedure:

- RBW shall be in the range of 1% to 5% of the anticipated occupied bandwidth
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW
- SPAN = Capture all products of the modulation process
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- OBW 99% function of spectrum analyzer used



Test set up of Occupied Bandwidth



Photograph for Occupied bandwidth

3.3. *LIMIT*

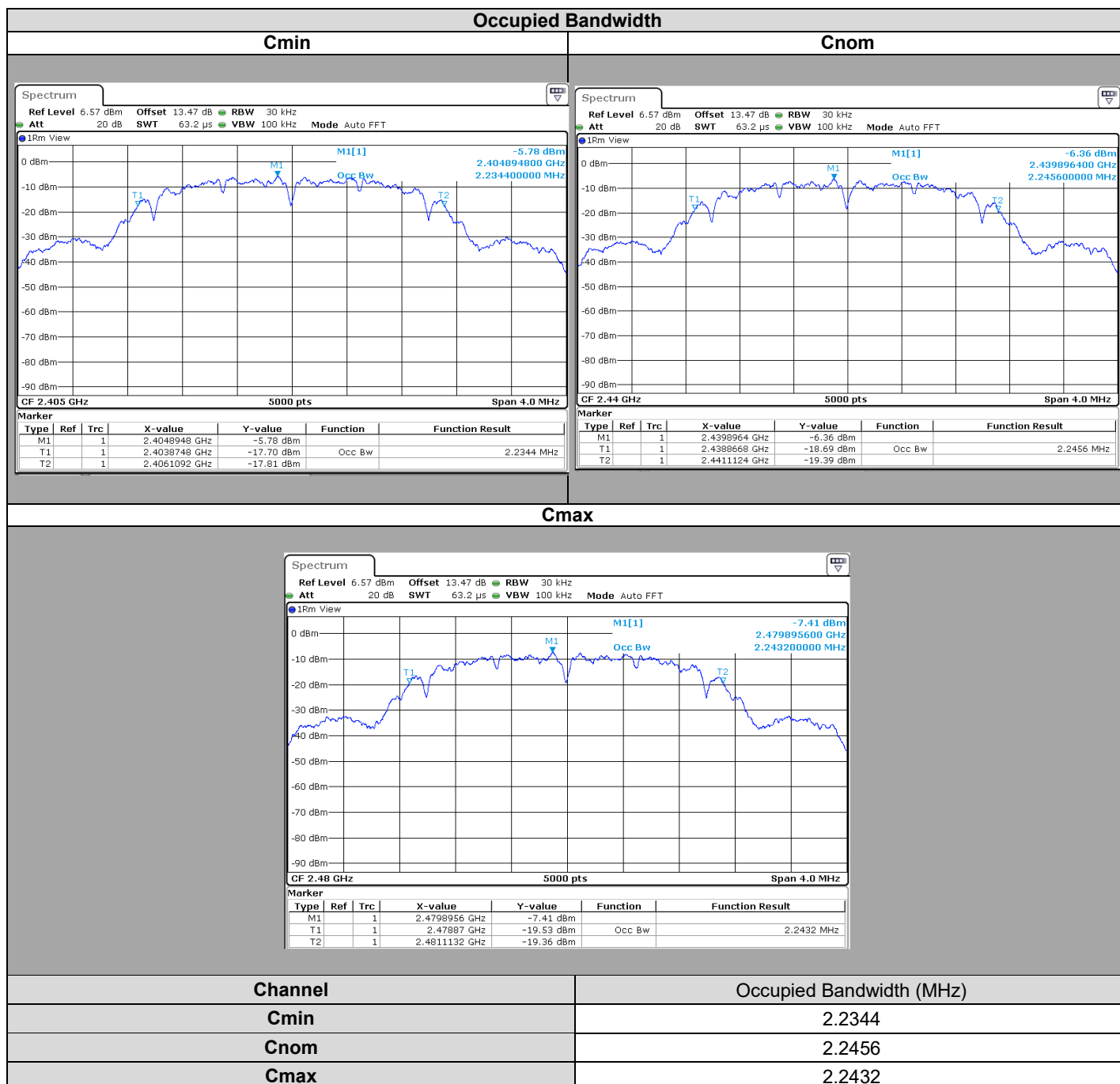
None

3.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
CABLE SMA 1m	RADIAL	18GHz	A5329862	11/18	05/20
Full Anechoic Room	SIEPEL	—	D3044024		
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	05/21	05/23
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
SMA 1.5m	SUCOFLEX	18GHz	A5329864	11/18	09/20
Attenuator 10dB	AEROFLEX	—	A7122269	12/18	06/20

Note: In our quality system, the test equipment calibration due is more & less 2 months

3.5. RESULTS



4. 6dB EMISSION BANDWIDTH

4.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : June 25, 2020
Ambient temperature : 21 °C
Relative humidity : 38 %

4.2. TEST SETUP

- The Equipment under Test is installed:

- ☐ On a table
- ☒ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

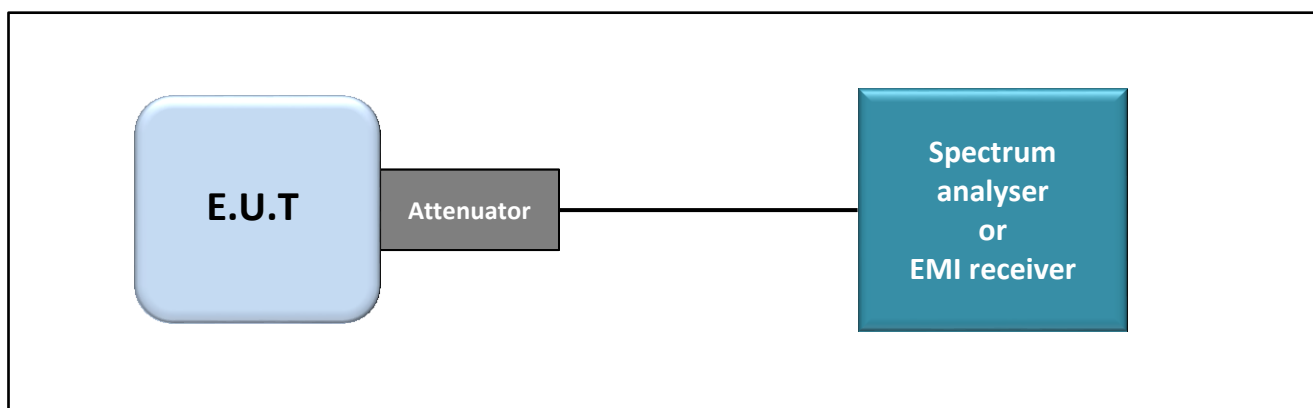
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

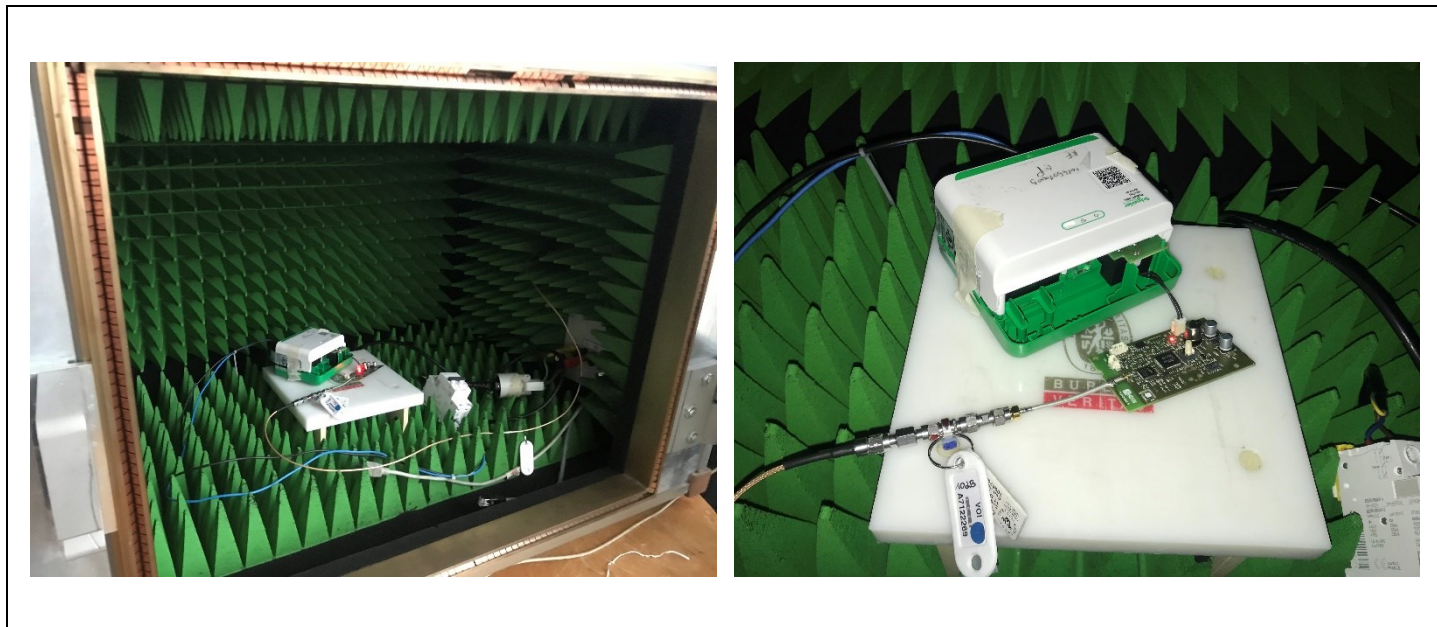
- ☒ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.2

Measurement Procedure:

1. Set resolution bandwidth (RBW) = 100kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer.



Test set up of 6dB Emission Bandwidth



Photograph for 6dB emission bandwidth

4.3. LIMIT

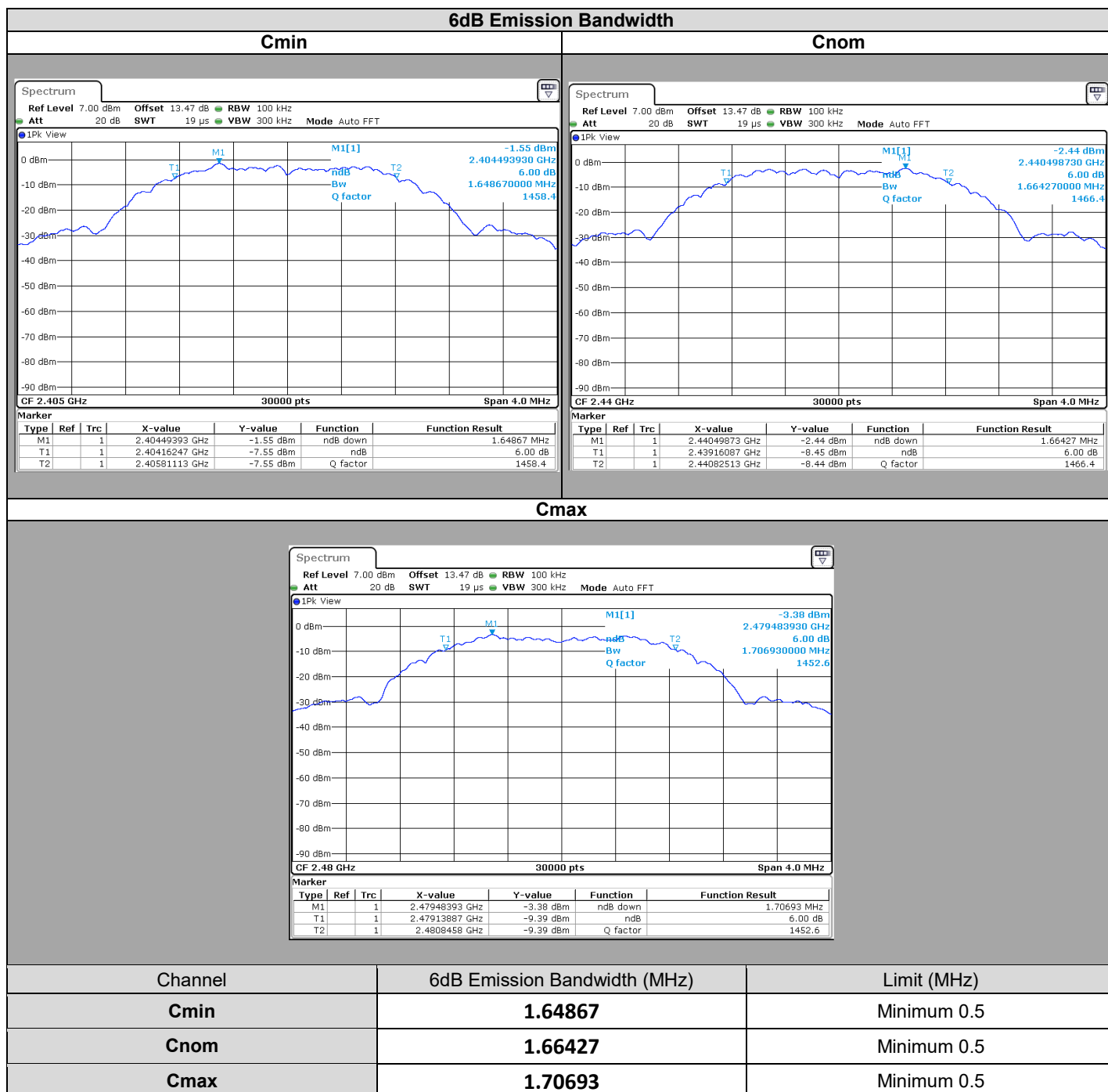
The 6dB bandwidth shall be at least 500kHz

4.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
CABLE SMA 1m	RADIALL	18GHz	A5329862	11/18	05/20
Full Anechoic Room	SIEPEL	—	D3044024		
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	05/21	05/23
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
SMA 1.5m	SUCOFLEX	18GHz	A5329864	11/18	09/20
Attenuator 10dB	AEROFLEX	—	A7122269	12/18	06/20

Note: In our quality system, the test equipment calibration due is more & less 2 months

4.5. RESULTS



4.6. CONCLUSION

6dB Emission Bandwidth measurement performed on the sample of the product **SCHNEIDER ELECTRIC SMT10020**, SN: **RN20245010005**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

5. MAXIMUM CONDUCTED OUTPUT POWER

5.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : June 25, 2020
Ambient temperature : 21 °C
Relative humidity : 38 %

5.2. TEST SETUP

- The Equipment under Test is installed:

- ☐ On a table
- ☒ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.3.1.1

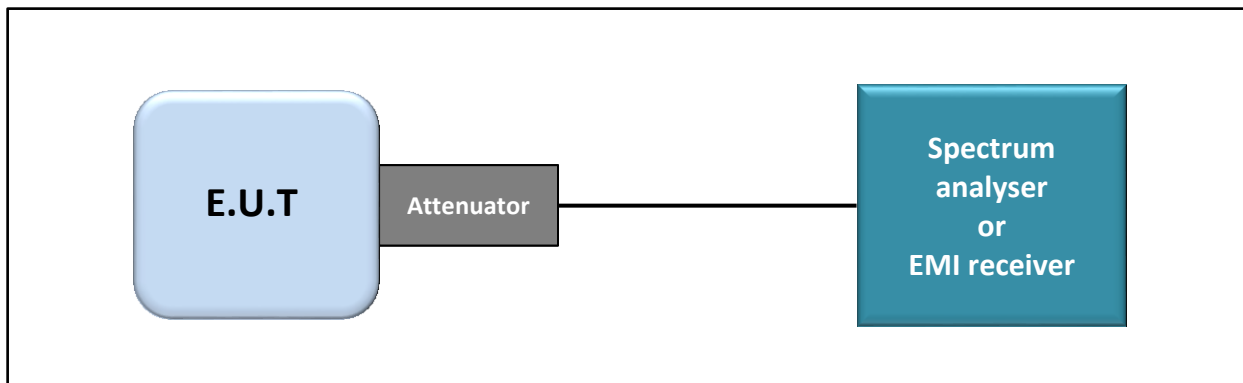
This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

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

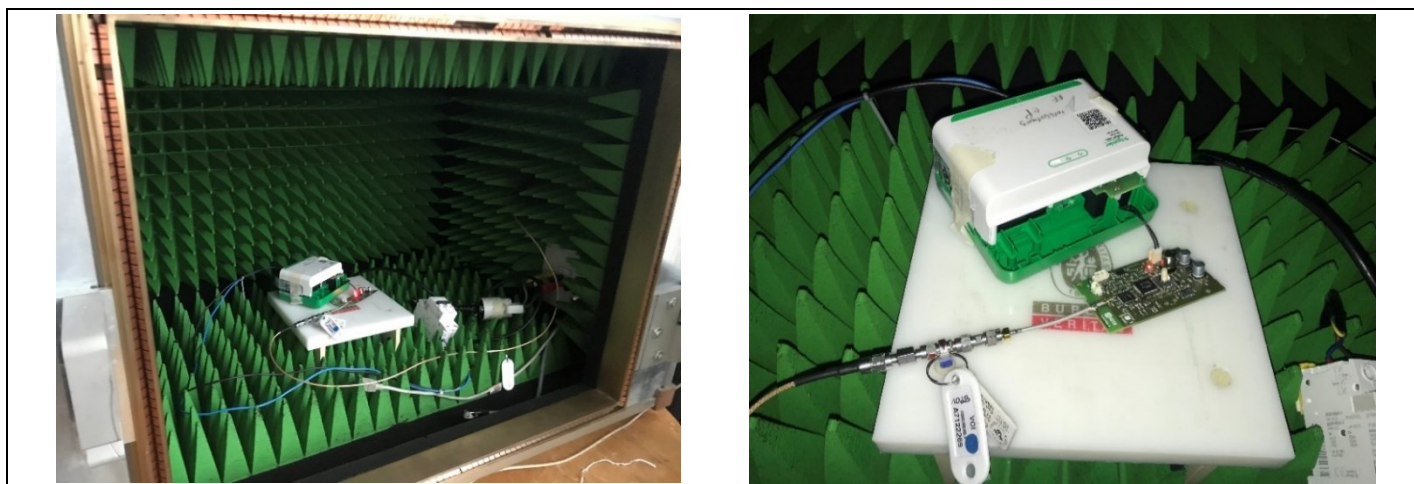
- ☐ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.3.1.2

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

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



Test set up of Maximum Conducted Output Power



Photograph for Maximum Conducted Output Power

5.3. LIMIT

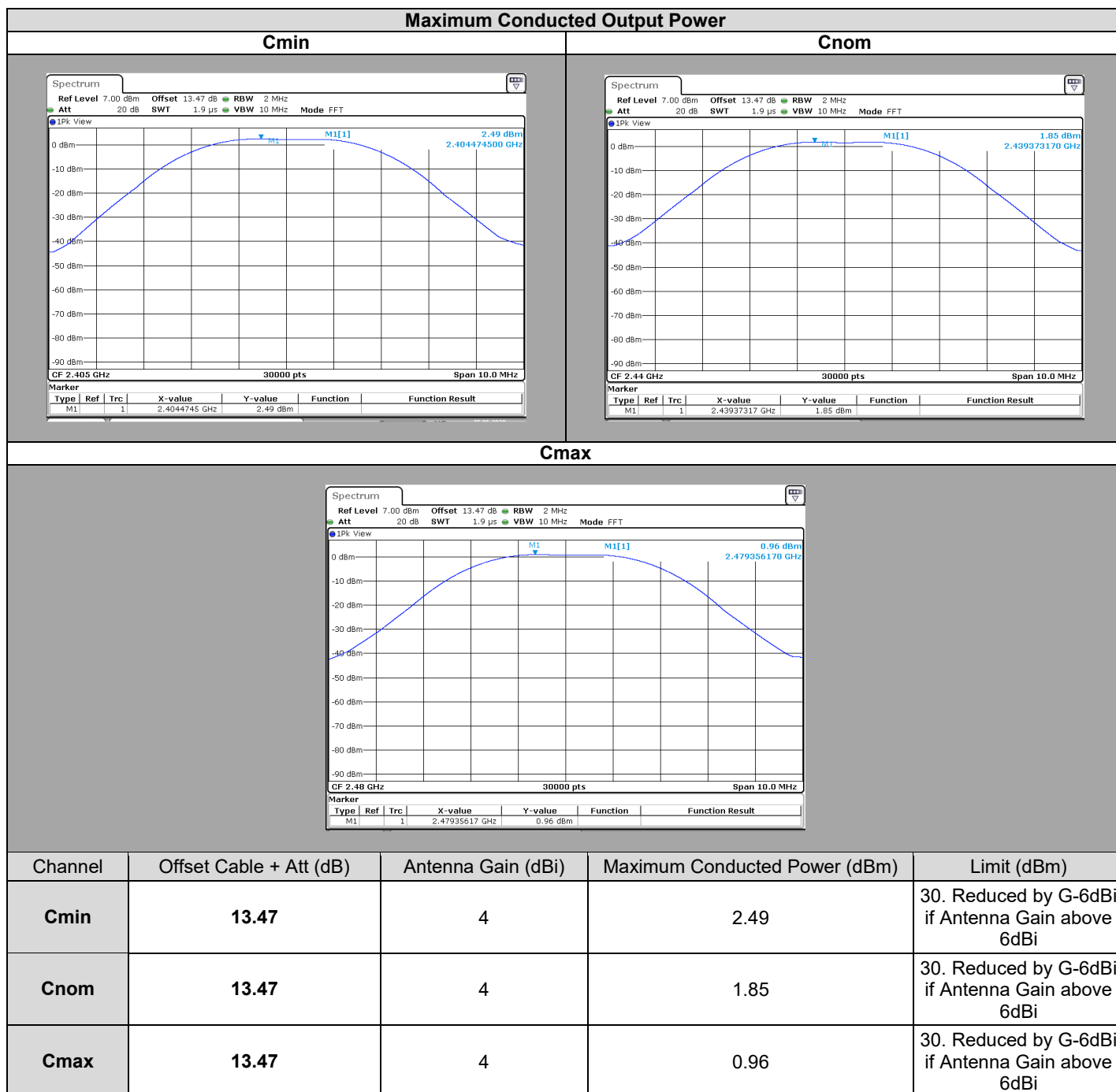
Maximum Conducted Output power:
 2400MHz-2483.5MHz: Shall not exceed 30dBm
 Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

5.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
CABLE SMA 1m	RADIALL	18GHz	A5329862	11/18	05/20
Full Anechoic Room	SIEPEL	—	D3044024		
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	05/21	05/23
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
SMA 1.5m	SUCOFLEX	18GHz	A5329864	11/18	09/20
Attenuator 10dB	AEROFLEX	—	A7122269	12/18	06/20

Note: In our quality system, the test equipment calibration due is more & less 2 months

5.5. RESULTS



5.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **SCHNEIDER ELECTRIC SMT10020**, SN: **RN20245010005**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

6. POWER SPECTRAL DENSITY

6.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : June 25, 2020
Ambient temperature : 21 °C
Relative humidity : 38 %

6.2. TEST SETUP

- The Equipment Under Test is installed:

- ☐ On a table
- ☒ In an anechoic chamber

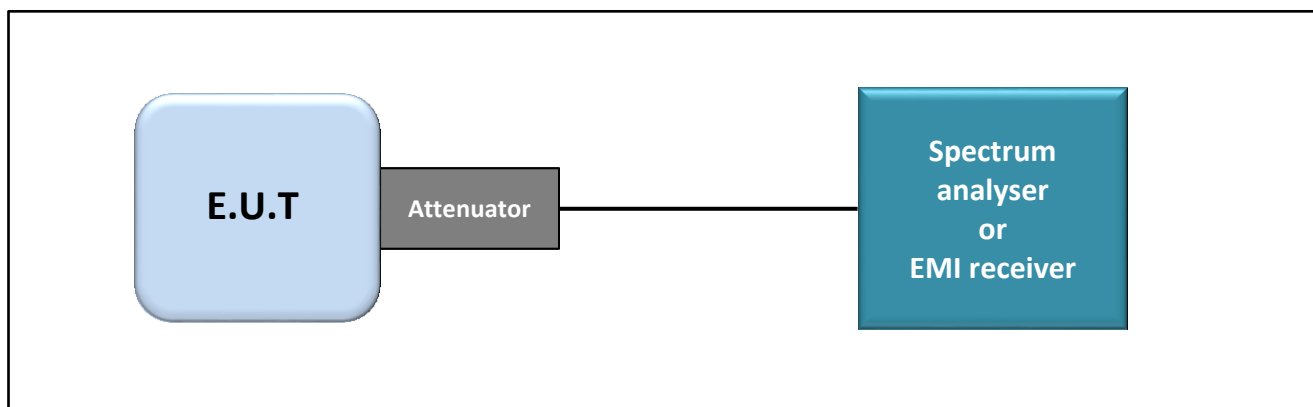
- Measurement is performed with a spectrum analyzer in:

- ☒ Conducted Method
- ☐ Radiated Method

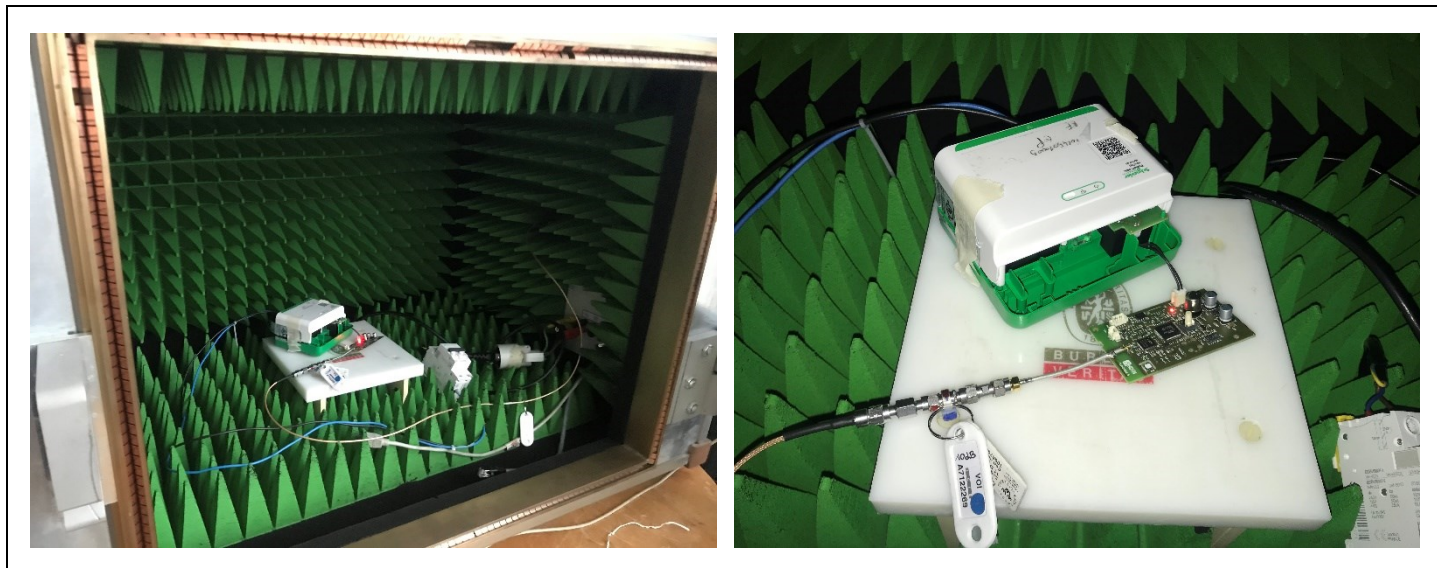
- Test Procedure:

- ☒ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.4 (Method PKPSD)

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



Test set up of Power Spectral Density



Photograph for Power Spectral Density

6.3. LIMIT

Power Spectral Density:

2400MHz-2483.5MHz: Shall not exceed 8dBm/3kHz

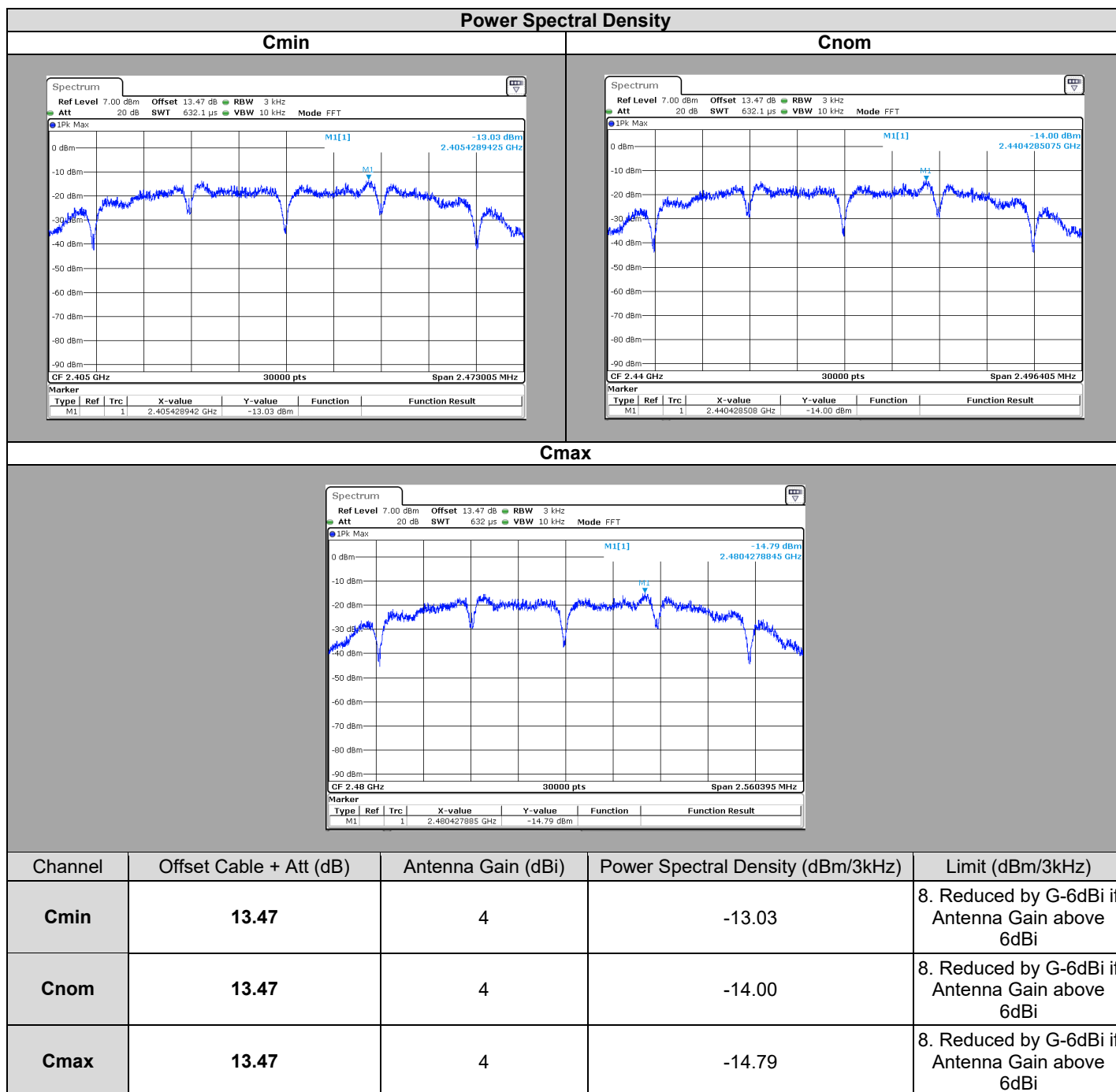
Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

6.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
CABLE SMA 1m	RADIAL	18GHz	A5329862	11/18	05/20
Full Anechoic Room	SIEPEL	—	D3044024		
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	05/21	05/23
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
SMA 1.5m	SUCOFLEX	18GHz	A5329864	11/18	09/20
Attenuator 10dB	AEROFLEX	—	A7122269	12/18	06/20

Note: In our quality system, the test equipment calibration due is more & less 2 months

6.5. RESULTS



6.6. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **SCHNEIDER ELECTRIC SMT10020**, SN: **RN20245010005**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

7. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS AT THE BAND EDGE

7.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : June 25, 2020
Ambient temperature : 21 °C
Relative humidity : 38 %

7.2. TEST SETUP

- The Equipment Under Test is installed:

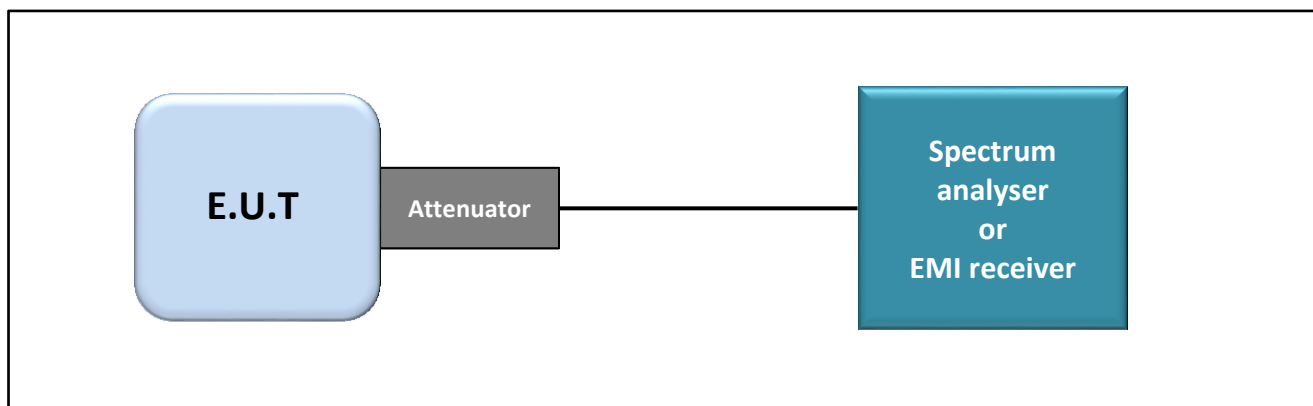
- ☐ On a table
- ☒ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

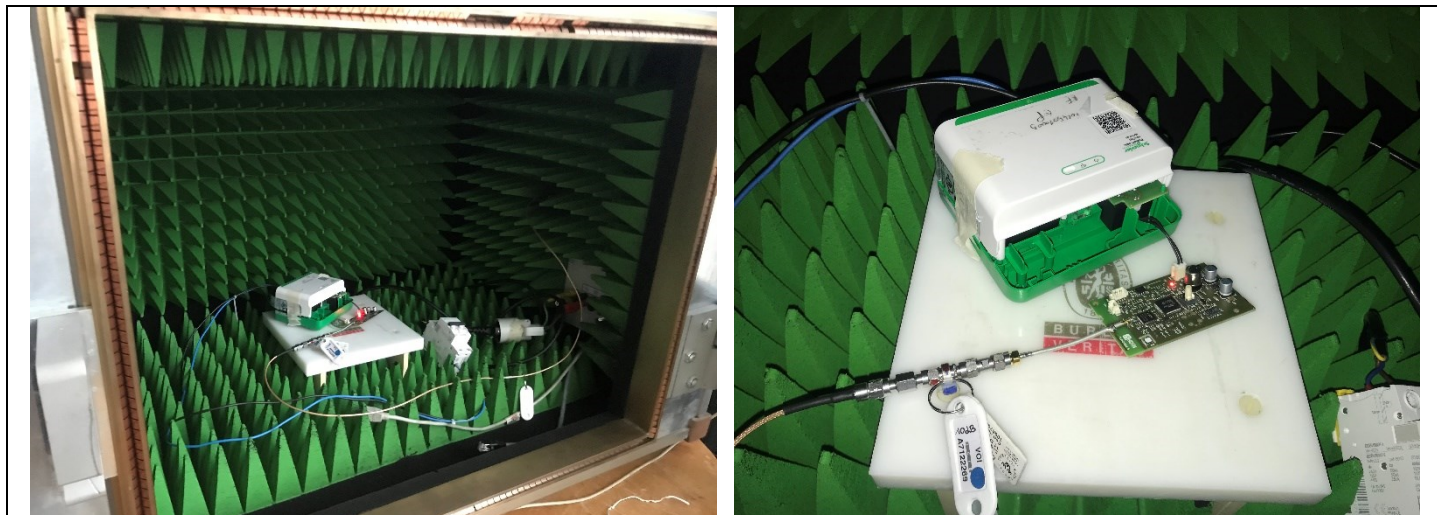
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.5



Test set up of Unwanted Emissions into Non-Restricted Frequency Bands at the Band Edge



Photograph for Unwanted Emission into non-restricted frequency bands at the band edge

7.3. LIMIT

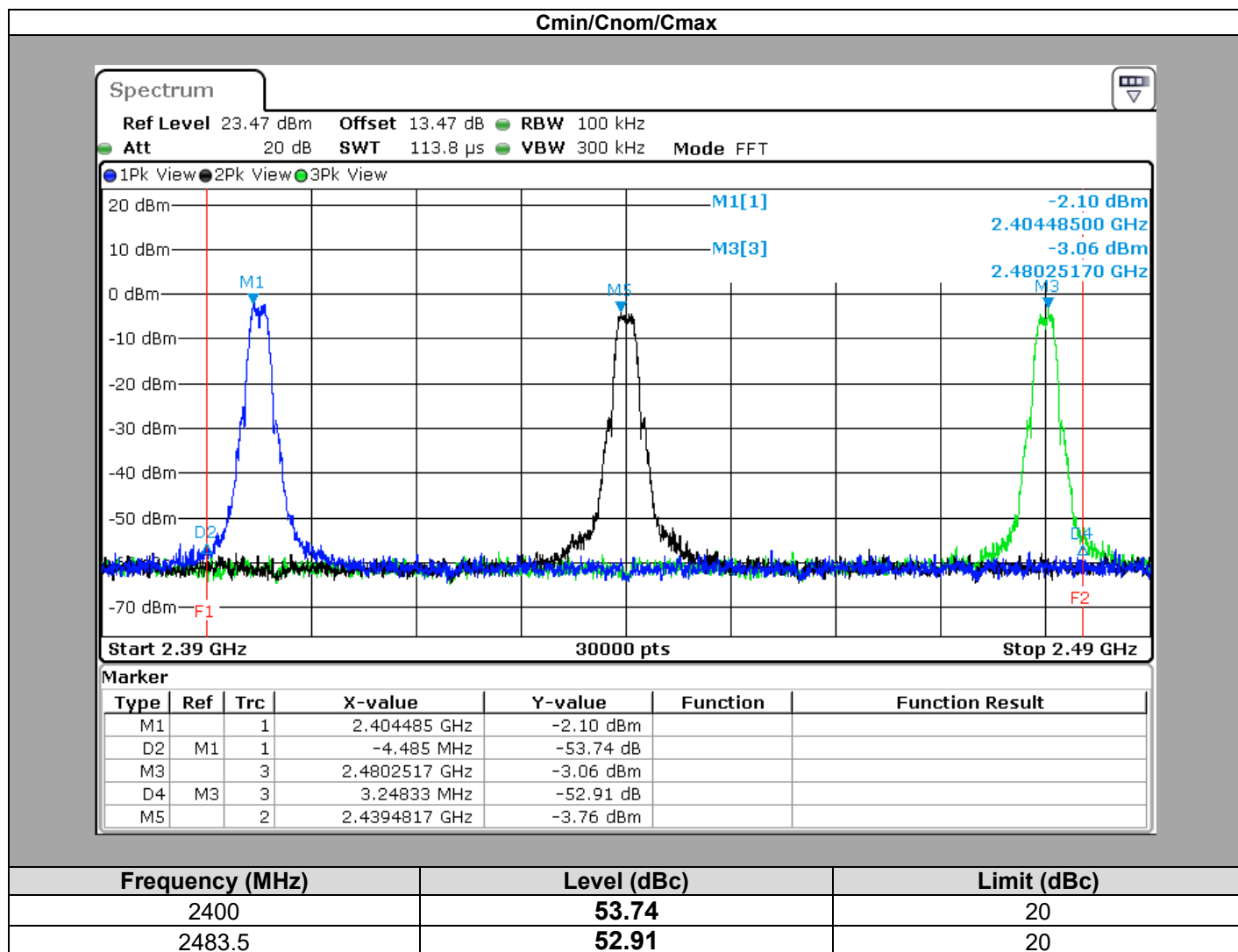
All Spurious Emissions must be at least 20dB below the Fundamental Radiator Level at the Band Edge Edge “2400MHz & 2483,5MHz”

7.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
CABLE SMA 1m	RADIAL	18GHz	A5329862	11/18	05/20
Full Anechoic Room	SIEPEL	—	D3044024		
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	05/21	05/23
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
SMA 1.5m	SUCOFLEX	18GHz	A5329864	11/18	09/20
Attenuator 10dB	AEROFLEX	—	A7122269	12/18	06/20

Note: In our quality system, the test equipment calibration due is more & less 2 months

7.5. RESULTS



7.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands at the band edge measurement performed on the sample of the product **SCHNEIDER ELECTRIC SMT10020**, SN: **RN20245010005**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

8. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS

8.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : June 25, 2020
Ambient temperature : 21 °C
Relative humidity : 38 %

8.2. TEST SETUP

- The Equipment under Test is installed:

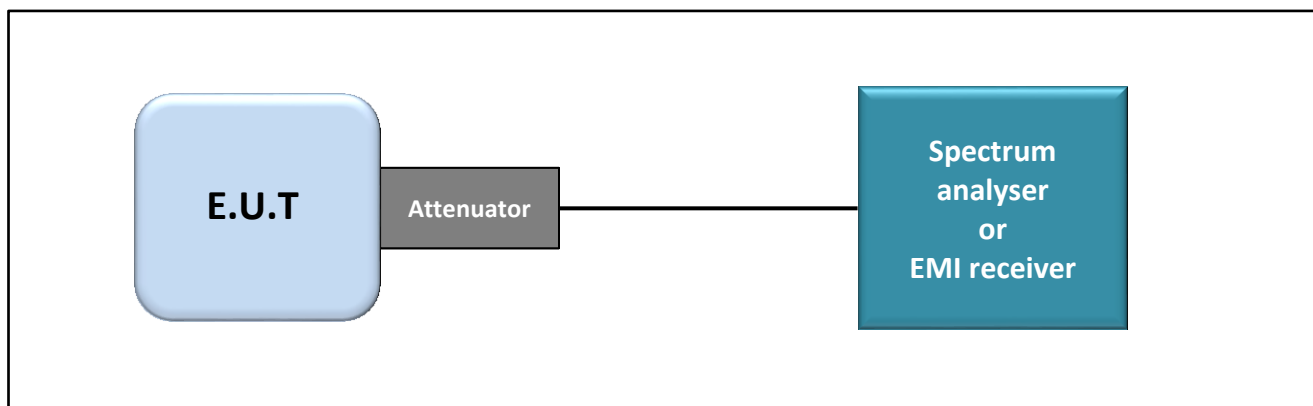
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

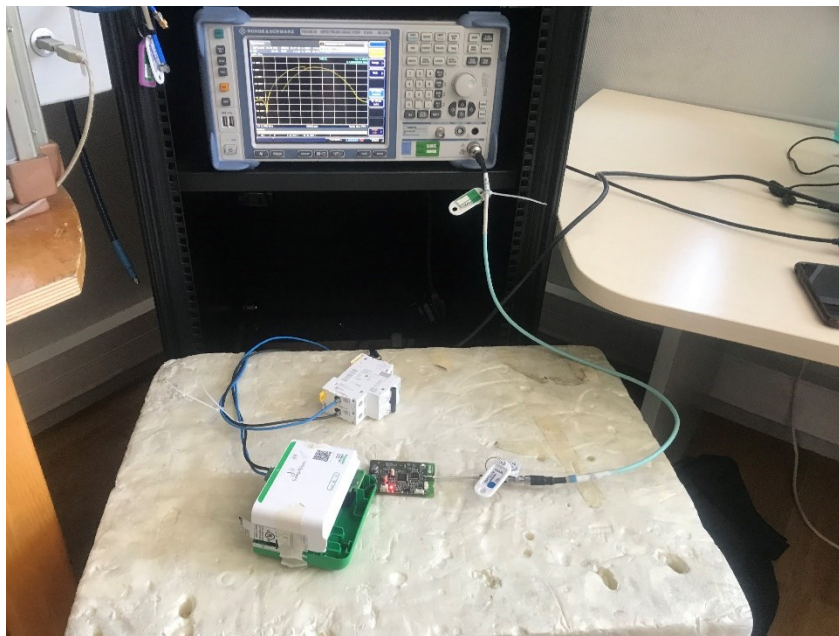
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.5



Test set up of Unwanted Emissions into Non-Restricted Frequency Bands



Photograph for Unwanted Emission into non-restricted frequency bands

8.3. LIMIT

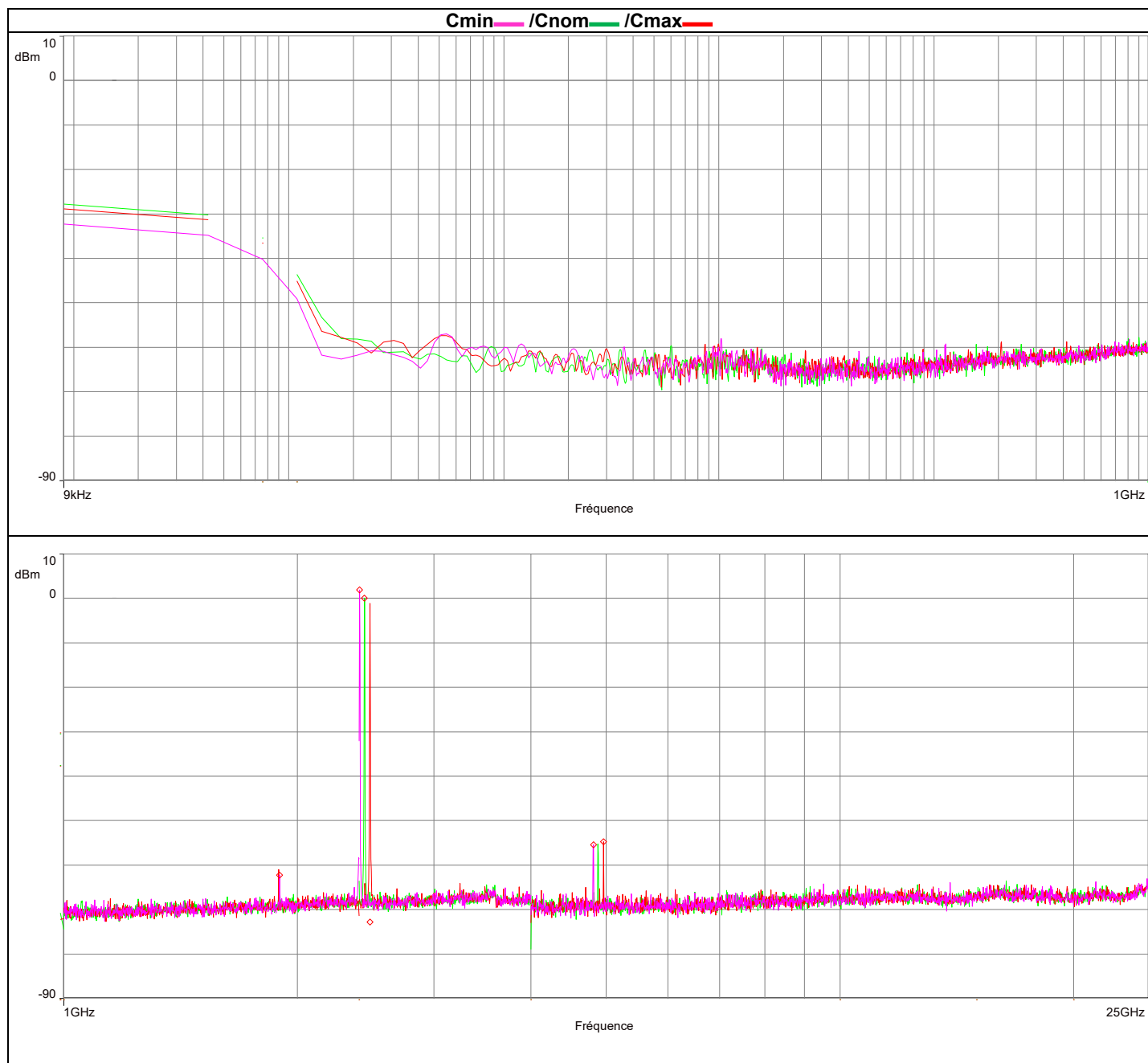
All Spurious Emissions must be at least 20 below the Fundamental Radiator Level

8.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Cable Measure	—	36G	A5329604	02/19	08/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	05/21	05/23
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Attenuator 10dB	AEROFLEX	—	A7122269	12/18	06/20

Note: In our quality system, the test equipment calibration due is more & less 2 months

8.5. RESULTS





Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2405.00	1.90		
1897.12	-62.25	64.15	20
2410.08	-55.44	57.34	20
2440.00	0.88		
1893.10	-68.13	69.01	20
4880.	-55.19	56.07	20
2480.00	-1.13		
4960.8	-54.76	53.63	20
1892.10	-62.03	60.90	20

8.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands measurement performed on the sample of the product **SCHNEIDER ELECTRIC SMT10020**, SN: **RN20245010005**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

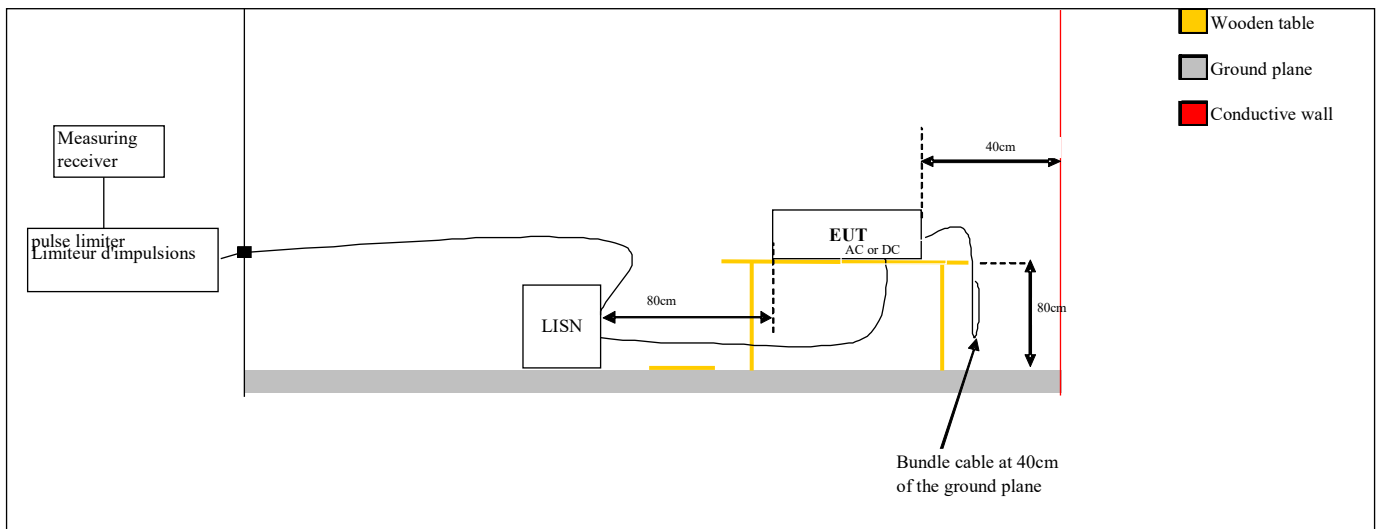
9. AC POWER LINE CONDUCTED EMISSIONS

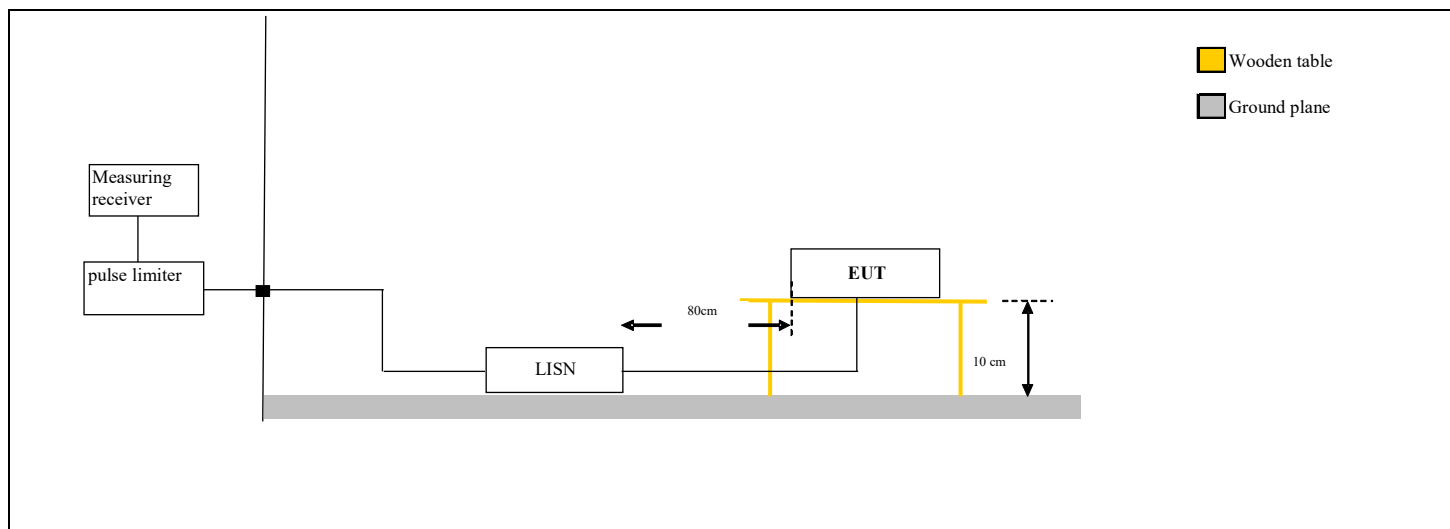
9.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
 Date of test : June 29, 2020
 Ambient temperature : 22 °C
 Relative humidity : 40 %

9.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013) method. The EUT is placed on the ground reference plane, at 80cm from the LISN. The distance between the EUT and the vertical ground plane is 40cm. Auxiliaries are powered by another LISN. The cable has been shorted to 1meter length. The EUT is powered through the LISN. 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. The LISN (measure) is $50\Omega / 50\mu\text{H}$. Interconnecting cables and equipment's were moved to position that maximized emission.





Test set up of AC Power Line Conducted Emissions



Photograph for AC Power Line Conducted Emissions (Front view)



9.3. 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

9.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
BAT EMC	NEXIO	v3.19.1.18	L1000115		
Cable + self	—	—	A5329578	02/20	02/21
Spectrum Analyzer 9kHz - 30MHz	ROHDE & SCHWARZ	ESHS10	A2642028	01/20	01/22
LISN	ROHDE & SCHWARZ	ESH3-Z5	C2320314	04/19	08/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20

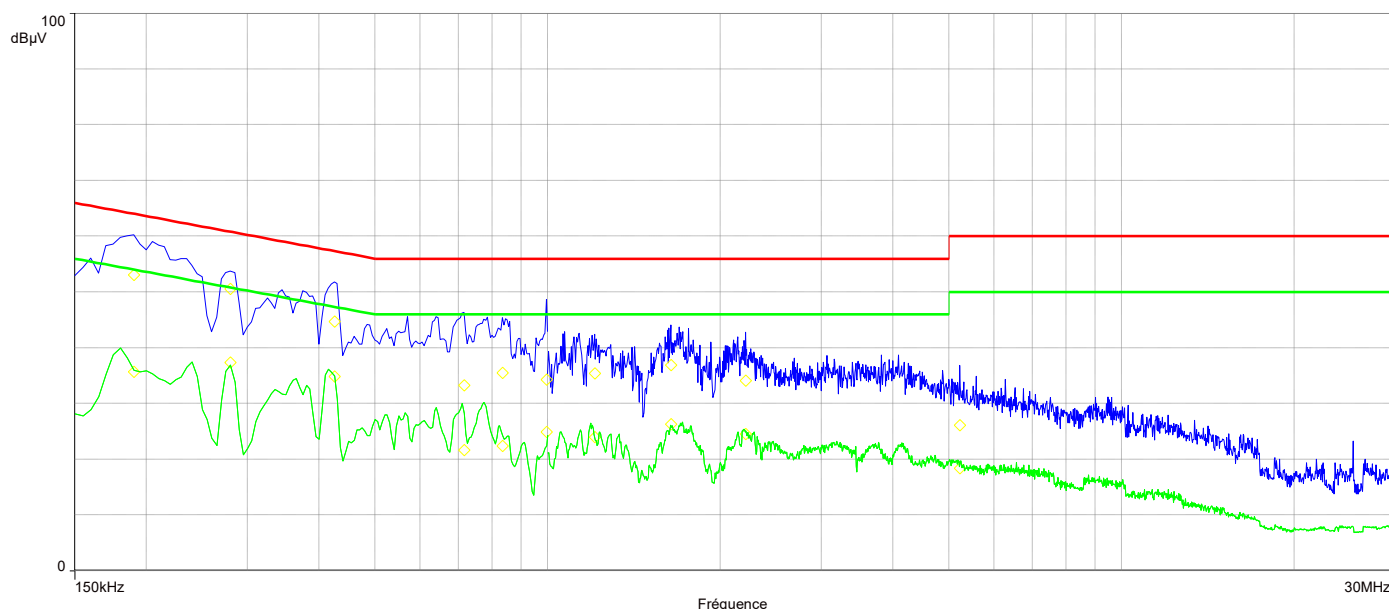
Note: In our quality system, the test equipment calibration due is more & less 2 months

9.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None ☐ Divergence:

9.6. RESULTS

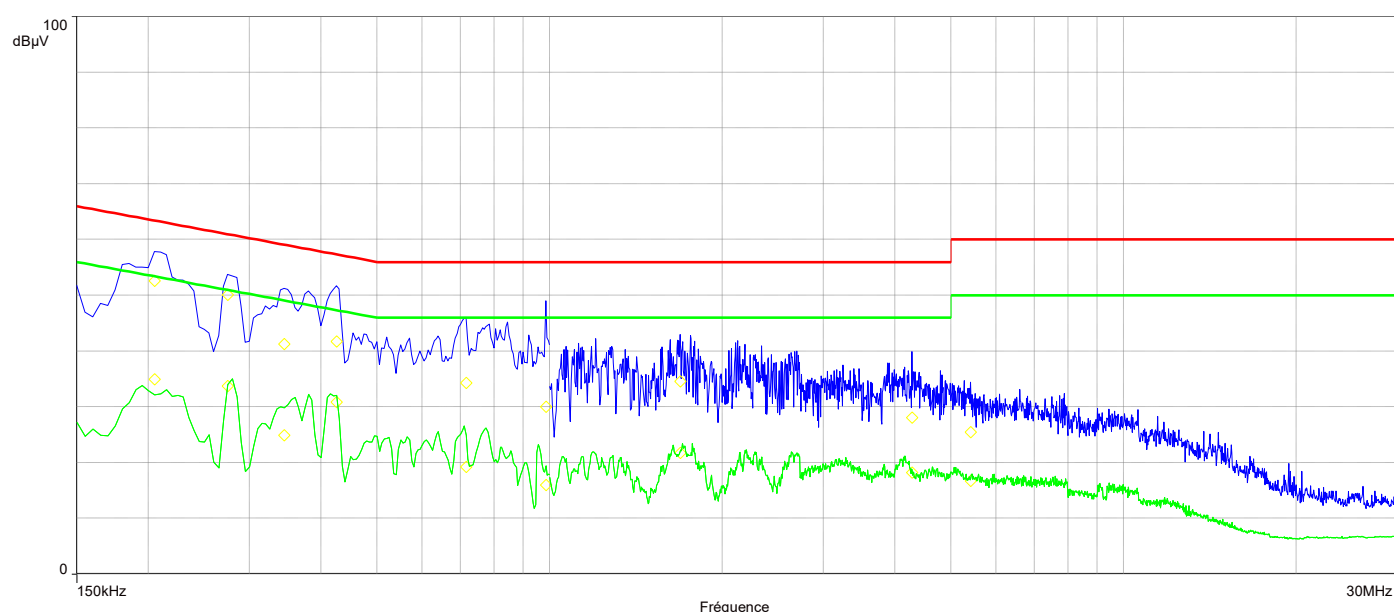
CONDUCTED EMISSIONS			
Graph name:	Emc#1	Test configuration:	
Limit:	EN 55032	110V/60Hz _Line	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		RBW :	10kHz
Line:	Phase	VBW :	30kHz



Spurious emissions

Frequency (MHz)	Mes.QPeak (dBμV)	LimQP (dBμV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBμV)	LimAvg (dBμV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.190	53.1	64.0	-10.9	35.7	54.0	-18.3	Phase 1	10.0
0.280	50.6	60.8	-10.2	37.3	50.8	-13.5	Phase 1	10.1
0.425	44.7	57.4	-12.6	34.9	47.4	-12.5	Phase 1	10.1
0.715	33.3	56.0	-22.7	21.7	46.0	-24.3	Phase 1	10.1
0.835	35.5	56.0	-20.5	22.4	46.0	-23.6	Phase 1	10.1
0.995	34.3	56.0	-21.7	24.9	46.0	-21.1	Phase 1	10.1
1.208	35.4	56.0	-20.6	24.0	46.0	-22.0	Phase 1	10.2
1.640	36.9	56.0	-19.1	26.3	46.0	-19.7	Phase 1	10.2
2.212	34.1	56.0	-21.9	24.5	46.0	-21.5	Phase 1	10.2
5.232	26.1	60.0	-33.9	18.4	50.0	-31.6	Phase 1	10.6

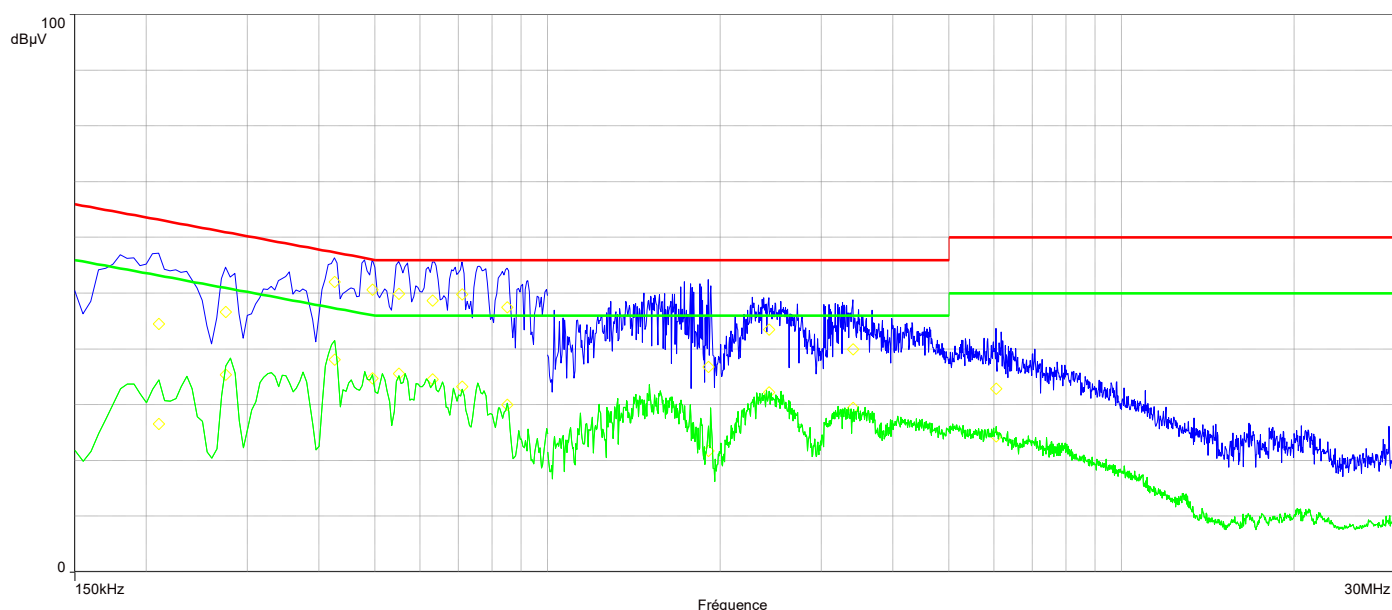
CONDUCTED EMISSIONS			
Graph name:	Emc#2	Test configuration: 110V/60Hz _Neutral	
Limit:	EN 55032		
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		RBW :	10kHz
Line:	Neutral	VBW :	30kHz



Spurious emissions

Frequency (MHz)	Mes.QPeak (dBμV)	LimQP (dBμV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBμV)	LimAvg (dBμV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.205	52.6	63.4	-10.8	34.9	53.4	-18.5	Neutre	10.0
0.275	50.1	61.0	-10.9	33.8	51.0	-17.2	Neutre	10.1
0.345	41.3	59.1	-17.8	24.9	49.1	-24.2	Neutre	10.1
0.425	41.7	57.4	-15.6	30.8	47.4	-16.5	Neutre	10.1
0.715	34.3	56.0	-21.7	19.2	46.0	-26.8	Neutre	10.1
0.985	30.0	56.0	-26.0	16.0	46.0	-30.0	Neutre	10.1
1.688	34.6	56.0	-21.4	21.8	46.0	-24.2	Neutre	10.2
4.284	28.1	56.0	-27.9	18.3	46.0	-27.7	Neutre	10.5
5.412	25.5	60.0	-34.5	16.8	50.0	-33.2	Neutre	10.6

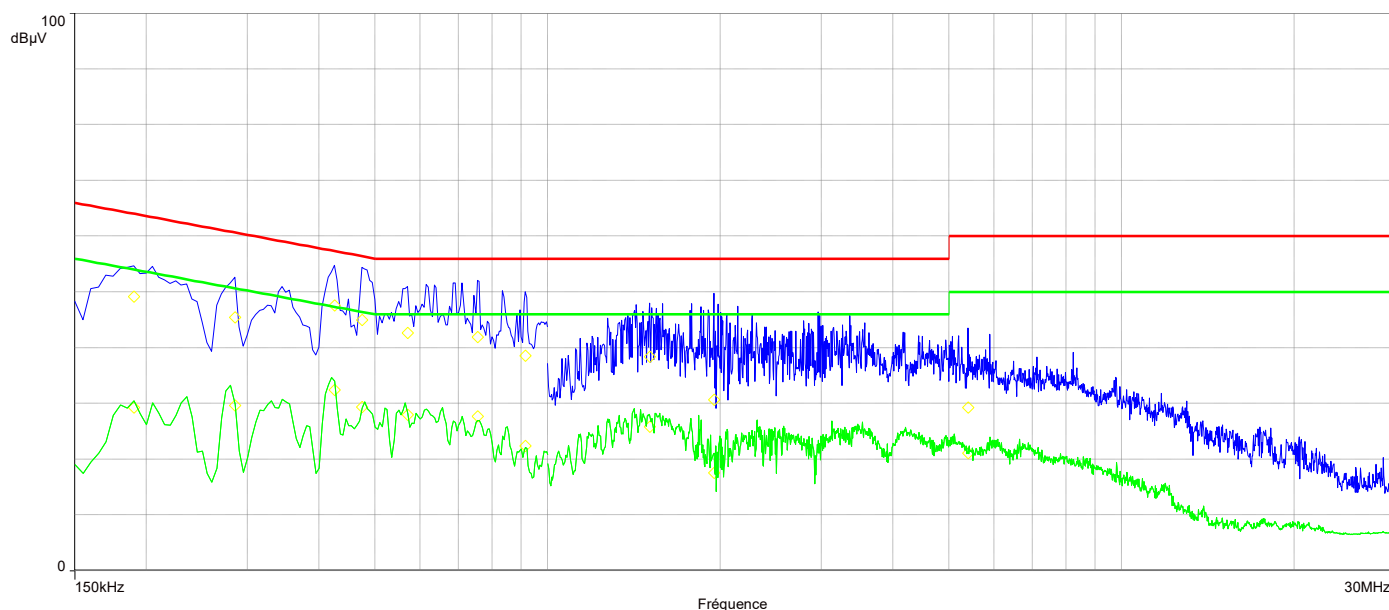
CONDUCTED EMISSIONS			
Graph name:	Emc#3	Test configuration:	
Limit:	FCC CFR47 Part15C	240V/50Hz _Line	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		RBW :	10kHz
Line:	Phase	VBW :	30kHz



Spurious emissions

Frequency (MHz)	Mes.QPeak (dBμV)	LimQP (dBμV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBμV)	LimAvg (dBμV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.210	44.6	63.2	-18.6	26.6	53.2	-26.6	Phase 1	10.1
0.275	46.7	61.0	-14.3	35.5	51.0	-15.5	Phase 1	10.1
0.425	52.1	57.4	-5.3	38.2	47.4	-9.2	Phase 1	10.1
0.495	50.6	56.1	-5.5	34.8	46.1	-11.3	Phase 1	10.1
0.550	49.9	56.0	-6.1	35.6	46.0	-10.4	Phase 1	10.1
0.630	48.7	56.0	-7.3	34.6	46.0	-11.4	Phase 1	10.1
0.710	49.8	56.0	-6.2	33.2	46.0	-12.8	Phase 1	10.1
0.850	47.5	56.0	-8.5	30.0	46.0	-16.0	Phase 1	10.1
1.904	36.8	56.0	-19.2	21.8	46.0	-24.2	Phase 1	10.2
2.432	43.5	56.0	-12.5	32.2	46.0	-13.8	Phase 1	10.3
3.408	40.0	56.0	-16.0	29.5	46.0	-16.5	Phase 1	10.4
6.048	32.9	60.0	-27.1	24.4	50.0	-25.6	Phase 1	10.7

CONDUCTED EMISSIONS			
Graph name:	Emc#4	Test configuration:	
Limit:	FCC CFR47 Part15C	240V/50Hz _Neutral	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:		RBW :	10kHz
Line:	Neutral	VBW :	30kHz



Spurious emissions

Frequency (MHz)	Mes.QPea k (dBμV)	LimQP (dBμV)	Mes.QPea k-LimQP (dB)	Mes.Avg (dBμV)	LimAvg (dBμV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.190	49.2	64.0	-14.8	29.3	54.0	-24.8	Neutre	10.0
0.285	45.5	60.7	-15.2	29.6	50.7	-21.0	Neutre	10.1
0.425	47.6	57.4	-9.8	32.5	47.4	-14.9	Neutre	10.1
0.475	45.0	56.4	-11.4	29.4	46.4	-17.0	Neutre	10.1
0.570	42.7	56.0	-13.3	28.0	46.0	-18.0	Neutre	10.1
0.755	41.9	56.0	-14.1	27.7	46.0	-18.3	Neutre	10.1
0.915	38.6	56.0	-17.4	22.4	46.0	-23.6	Neutre	10.1
1.508	38.4	56.0	-17.6	25.8	46.0	-20.2	Neutre	10.2
1.948	30.7	56.0	-25.3	17.5	46.0	-28.5	Neutre	10.2
5.400	29.3	60.0	-30.7	21.1	50.0	-28.9	Neutre	10.6

9.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product **SCHNEIDER ELECTRIC SMT10020**, SN: **RN20245010004**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.247 & RSS 247 ISSUE 2 limits.

10. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS

10.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
 Date of test : June 22, 2020
 Ambient temperature : 21 °C
 Relative humidity : 39 %

10.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013) and FCC part15 subpart C.

Test is performed in parallel, perpendicular and ground parallel axis with a loop antenna below 30MHz. Measurement bandwidth was 200Hz below 150kHz and 9kHz between 150kHz & 30MHz. The level has been maximised by the turntable rotation of 360 degrees range on all axis of EUT used in normal configuration. Antenna height was 1m. The EUT is placed **in a semi-anechoic chamber**. Distance between measuring antenna and the EUT is **3m**.

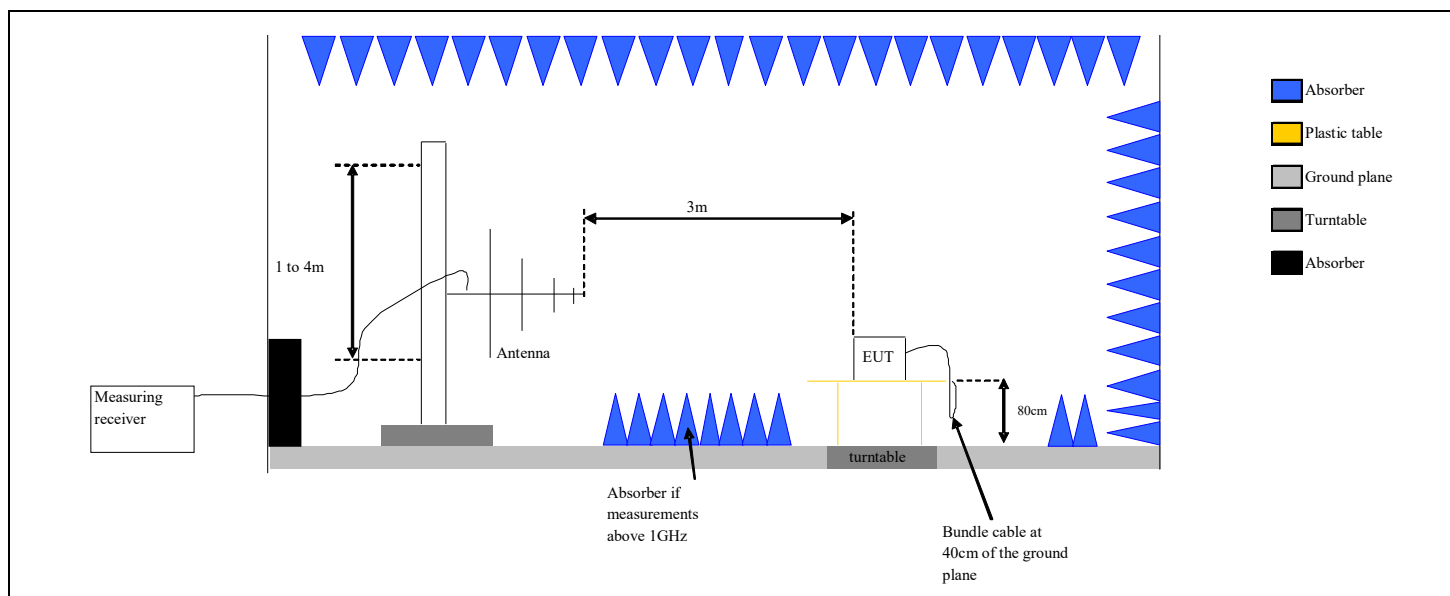
Test is performed in horizontal (H) and vertical (V) polarization with **bilog** between 30MHz & 1GHz and with a horn antenna above 1GHz. Measurement bandwidth was 120kHz below 1GHz and 1MHz above 1GHz. The level has been maximised by the turntable rotation of 360 degrees range on all axis of EUT used in normal configuration. The EUT is placed at 1.5m high above 1GHz and at 0.8m high under 1GHz. The EUT is placed **in a full anechoic chamber** above 1GHz and **on an open area test site** from 30MHz to 1GHz. Distance between measuring antenna and the EUT is **3m**.

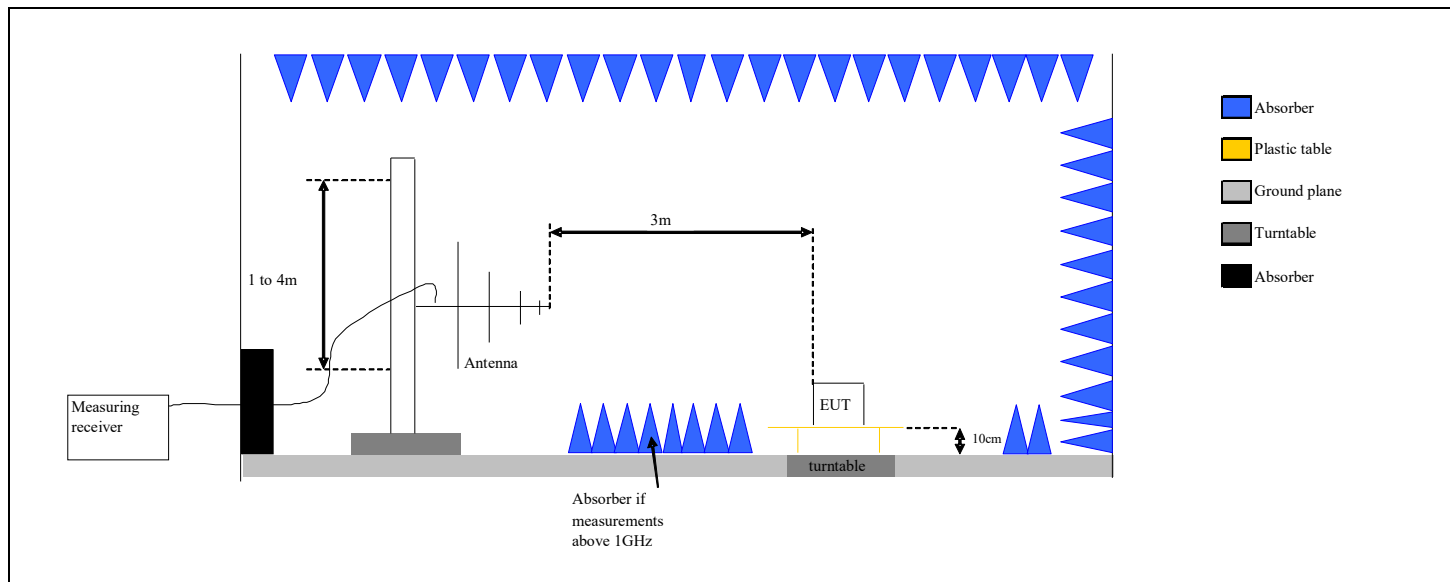
The height antenna is varied from 1m to 4m from 30MHz to 1GHz and above 1GHz is:

☐ On mast, varied from 1m to 4m

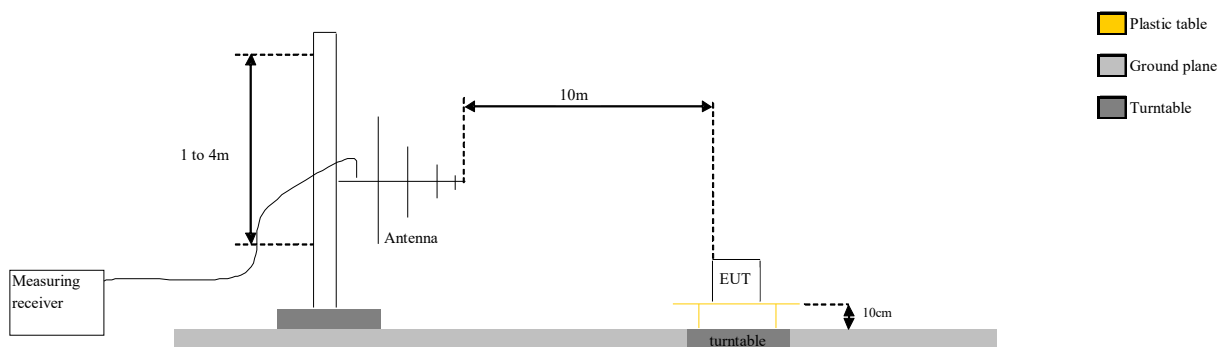
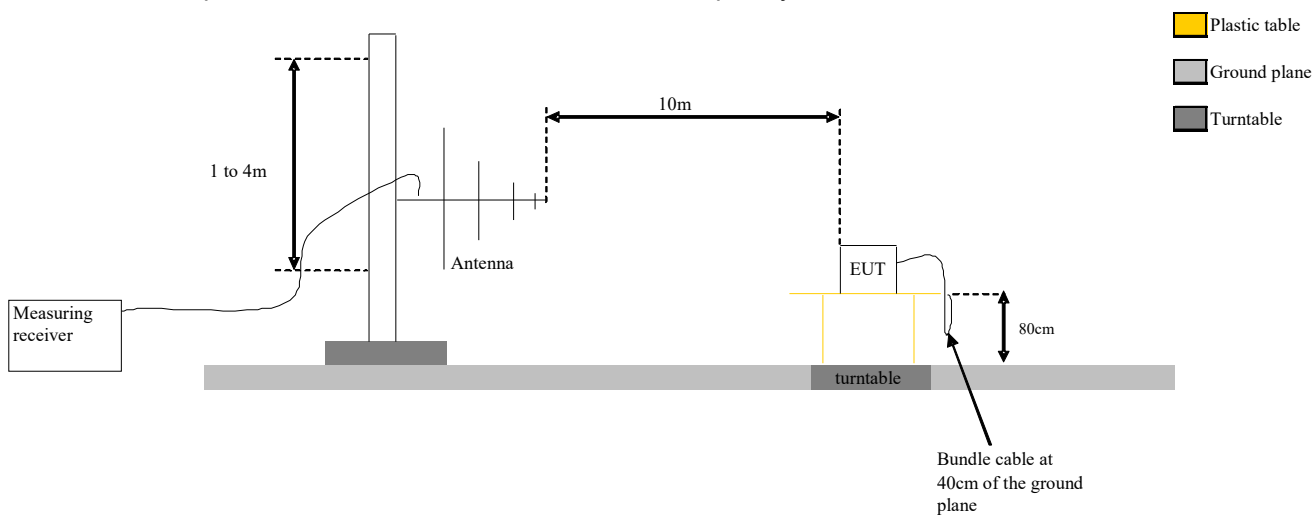
X Fixed and centered on the EUT (EUT smaller than the beamwidth of the measurement antenna, ANSI C63.10 §6.6.5)

Frequency list has been created with anechoic chamber pre-scan results.

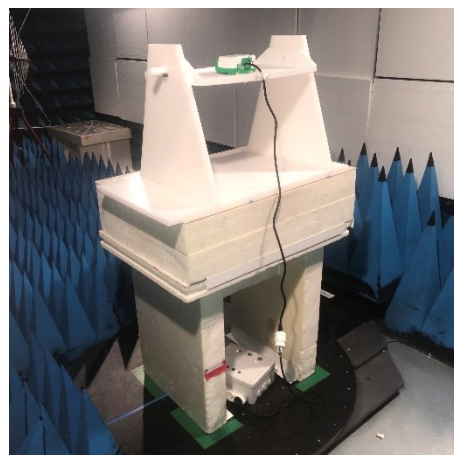
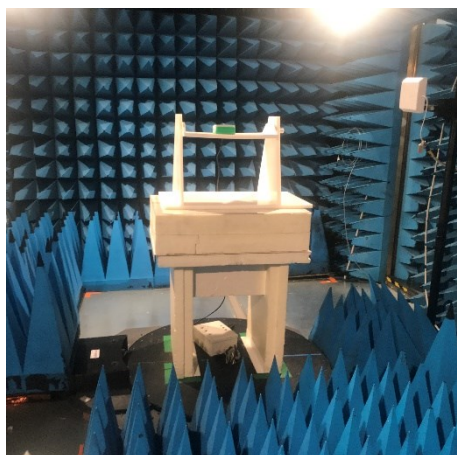




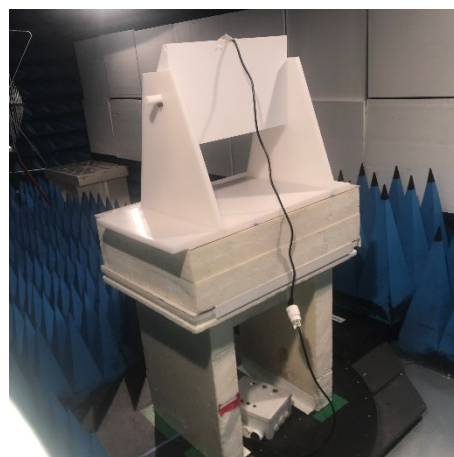
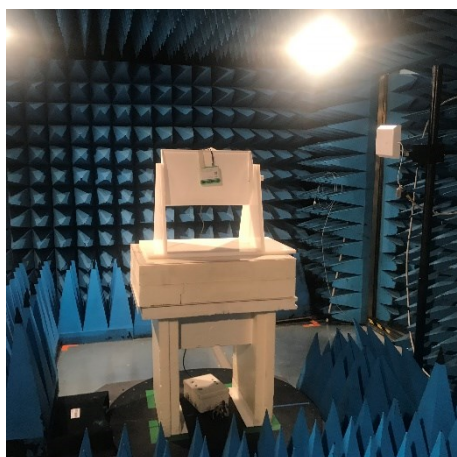
Test set up of Unwanted Emissions in Restricted Frequency Bands in semi anechoic chamber



Test Set up for radiated measurement in open area test site



Axis XY on FAR



Axis Z on FAR

Photograph for Unwanted Emission in restricted frequency bands

10.3. 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	35.5B 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

10.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Antenna Bi-Log	CHASE	UPA6192	C2040221	01/18	06/20
BAT EMC	NEXIO	v3.19.1.18	L1000115		
Comb EMR HF	YORK	CGE01	A3169114		
Emission Cable (SMA 1m)	TELEDYNE	26GHz	A5329874	01/19	07/20
Emission Cable (SMA 3.3m)	TELEDYNE	26GHz	A5329875	01/19	07/20
Emission Cable (SMA 30cm)	TELEDYNE	26GHz	A5329873	01/19	07/20
Emission Cable <1GHz (Ampl <-> Cage)	-	18GHz	A5329907	08/19	08/20
Emission Cable <1GHz (Ampl <-> Cage)	-	18GHz	A5329562	08/19	08/20
Radiated emission comb generator	BARDET	—	A3169050		
Semi-Anechoic chamber #3 (BF)	SIEPEL	—	D3044017_BF	12/19	12/22
Semi-Anechoic chamber #3 (VSWR)	SIEPEL	—	D3044017_VSWR	12/19	12/22
Table C3	LCIE	—	F2000461		
Thermo-hygrometer (C3)	OREGON	BAR206	B4204078	10/18	10/20
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Turntable chamber (Cage#3)	ETS Lingren	Model 2165	F2000371		
Turntable controller (Cage#3)	ETS Lingren	Model 2090	F2000444		
Amplifier 100kHz - 18GHz	LCIE SUD EST	—	A7085027	07/19	07/20
Antenna horn 18GHz	EMCO	3115	C2042029	09/17	09/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
Rehausse Table C3	LCIE	—	F2000507		
Rehausse Table C3	LCIE	—	F2000511		
Spectrum analyzer	ROHDE & SCHWARZ	FSU 26	A4060058	09/19	09/21

Note: In our quality system, the test equipment calibration due is more & less 2 months

10.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None ☐ Divergence:

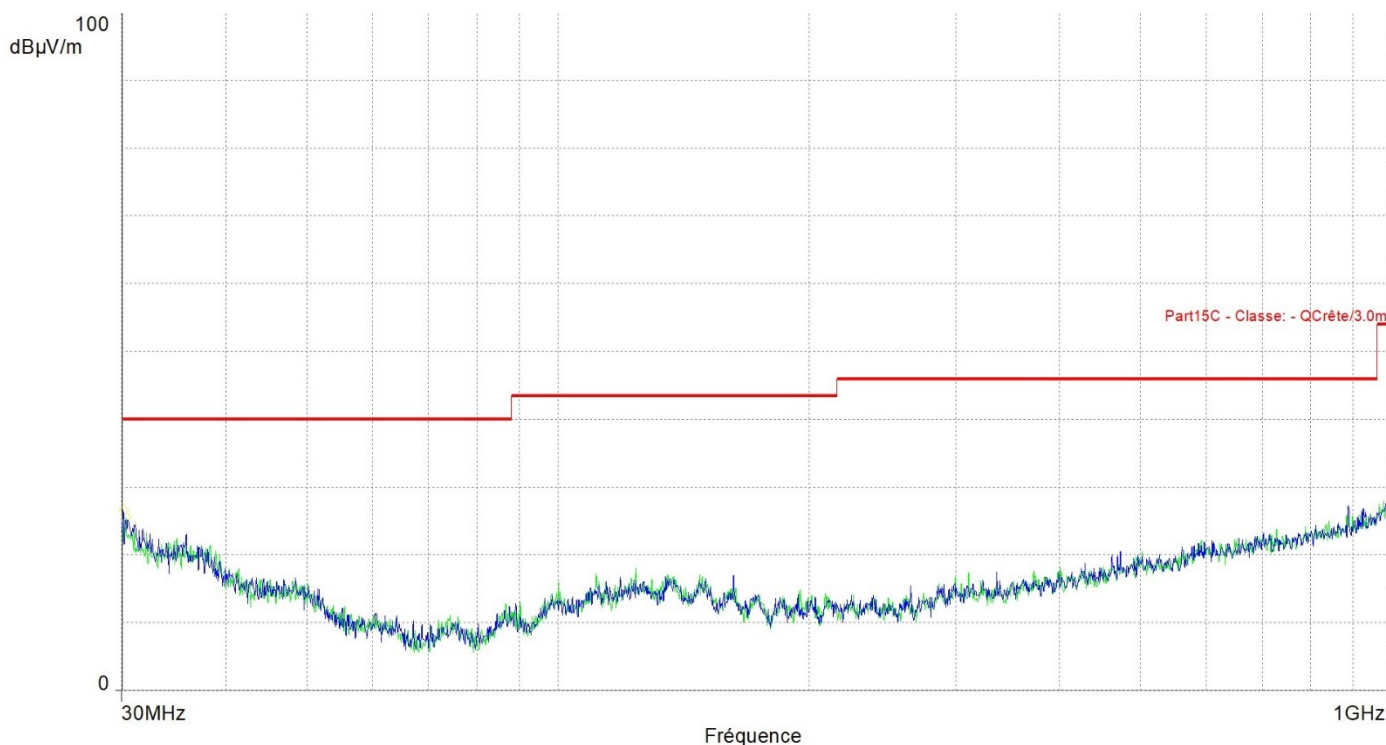
10.6. RESULTS

Results in the frequency band [0.009-30] MHz:

No significant frequency observed due to RF module (See test results in §8.5).

Results in the frequency band [30-1000] MHz: Worst case presented see test results in §8.5(Cmin, Cmid or Cmax):

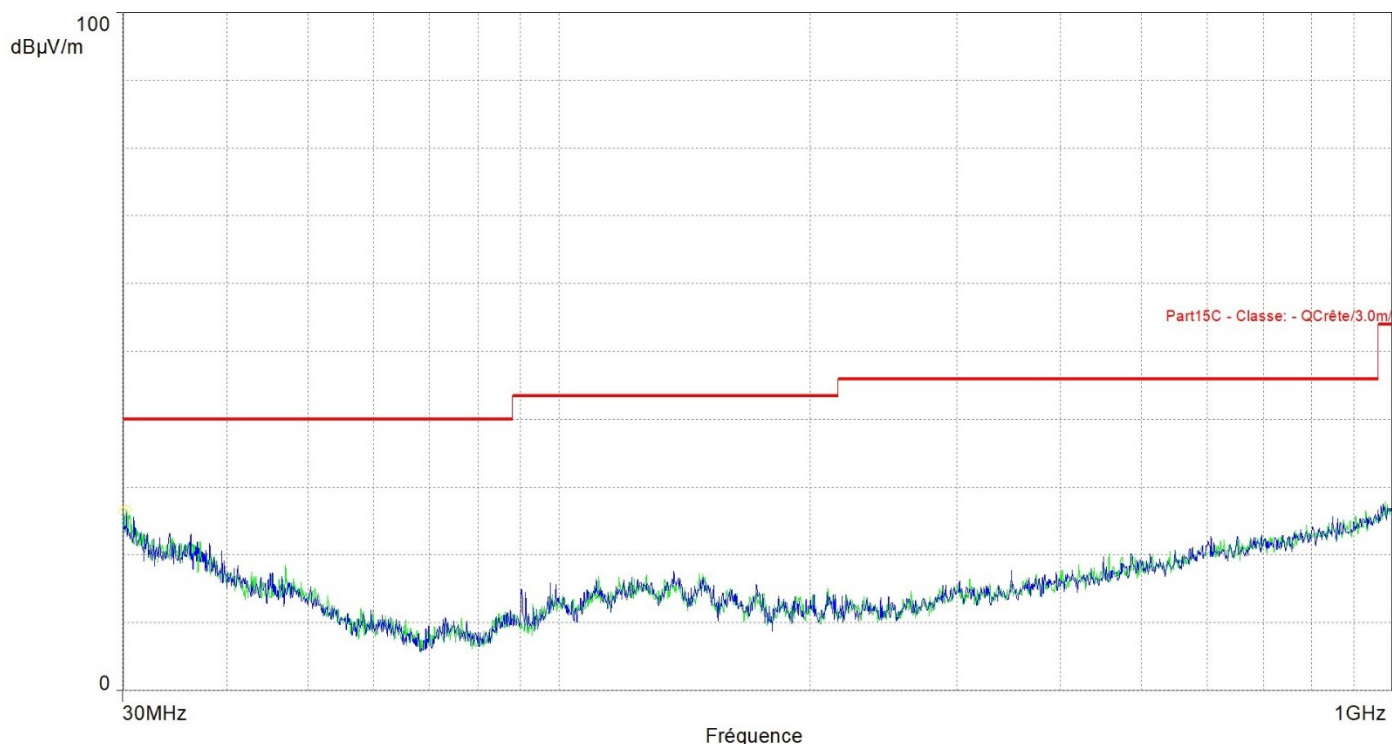
RADIATED EMISSIONS			
Graph name:	Emr#1	Test configuration:	
Limit:	FCC CFR47 Part15C	Cmax XY TX [0.03-1]GHz	
Class:			
Frequency range: [30MHz - 1GHz]			
Antenna polarization:		RBW :	100kHz
Azimuth:	0° - 360°	VBW :	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBμV/m)	LimQP (dBμV/m)	Peak-LimQP (dB)	Polarization	Correction (dB)
30.097	26.6	40.0	-13.4	Horizontal	-5.2
30.388	25.5	40.0	-14.5	Vertical	-5.3

RADIATED EMISSIONS			
Graph name:	Emr#2	Test configuration:	
Limit:	FCC CFR47 Part15C	Cmax_XY TX [0.03-1]GHz	
Class:			
Frequency range: [30MHz - 1GHz]			
Antenna polarization:		RBW :	100kHz
Azimuth:	0° - 360°	VBW :	300kHz



Spurious emissions

Frequency (MHz)	Peak (dBμV/m)	LimQP (dBμV/m)	Peak-LimQP (dB)	Polarization	Correction (dB)
30.000	26.5	40.0	-13.5	Horizontal	-5.2
30.291	26.6	40.0	-13.4	Vertical	-5.3

QUALIFICATION (30MHz-1GHz): 10 meters measurement on the Open Area Test Site.

Frequency list has been created with semi-anechoic chamber pre-scan results.

Measurements are performed using a QUASI-PEAK detection.

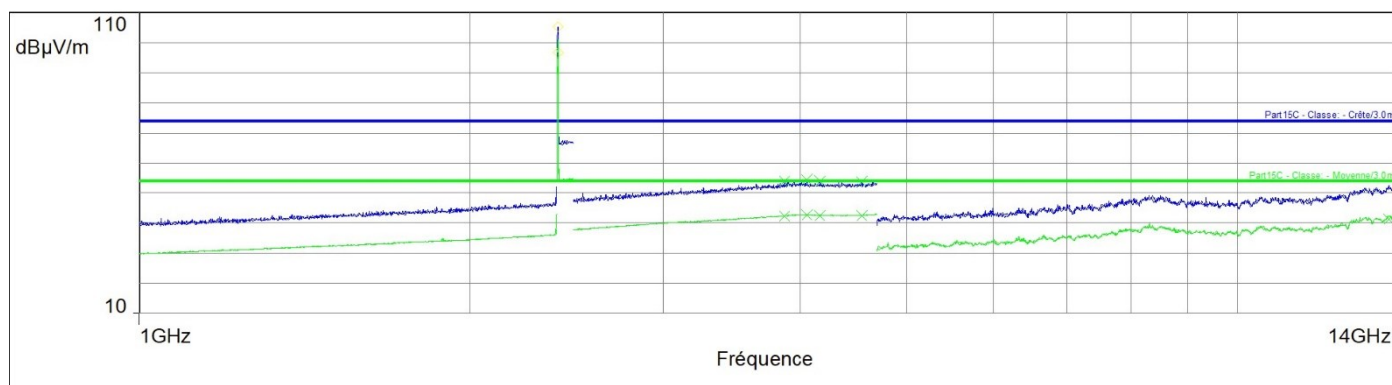
Test Frequency (MHz)	Meter Reading dB(μV)	Detector (Pk/QP/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
No significant frequency observed										

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

Results in the frequency band [1-25] GHz:

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

- Part15C - Classe: - Moyenne/3.0m/
- Part15C - Classe: - Crête/3.0m/
- Niveau (Suspect Manuel) (Horizontale)
- Niveau (Suspect Manuel) (Verticale)
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- × Peak (Peak /Lim. Peak) (Horizontale)
- × Peak (Peak /Lim. Peak) (Verticale)
- × Average (Average /Lim. Average) (Horizontale)
- × Average (Average /Lim. Average) (Verticale)



Spurious emissions

Frequency (MHz)	Peak Level (dBμV/m)	Polarization	Correction (dB)
2405.469	105.2	Horizontal	29.9
2405.553	96.5	Vertical	29.9

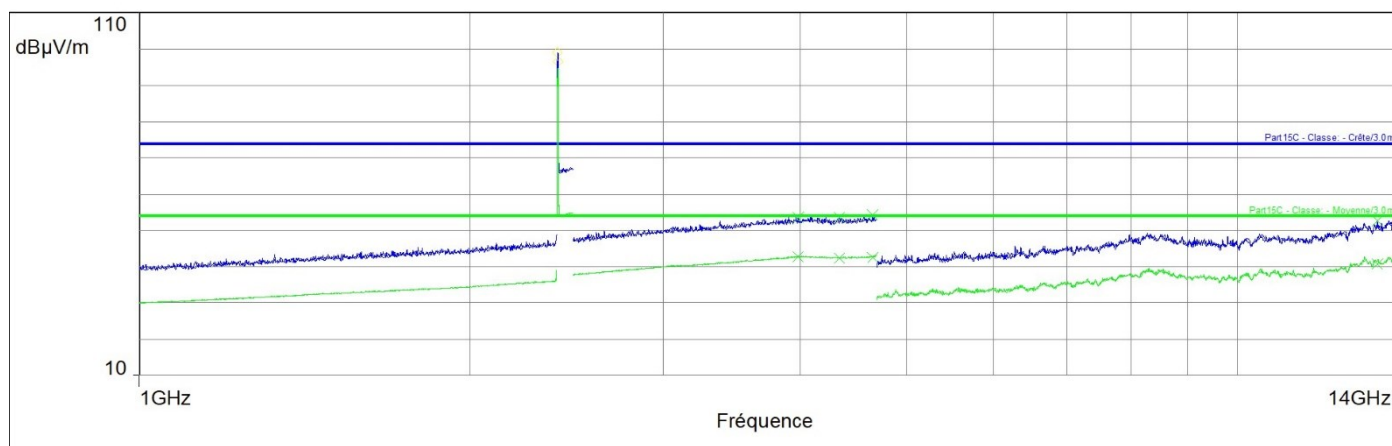
Frequency (MHz)	Average (dBμV/m)	Lim. Average (dBμV/m)	Average-Lim (dB)	Commentaire	Correction (dB)
4166.710	42.6	54.0	-11.4	Horizontal	34.6
3867.039	42.2	54.0	-11.8	Vertical	34.3
4055.885	42.6	54.0	-11.4	Vertical	34.6
4552.824	42.4	54.0	-11.6	Vertical	34.4
13750.460	41.4	54.0	-12.6	Horizontal	-13.4



Frequency (MHz)	Peak (dB μ V/m)	Lim. Peak (dB μ V/m)	Peak-Lim (dB)	Commentaire	Correction (dB)
4166.710	54.0	74.0	-20.0	Horizontal	34.6
3867.039	53.9	74.0	-20.1	Vertical	34.3
4055.885	54.4	74.0	-19.6	Vertical	34.6
4552.824	53.6	74.0	-20.4	Vertical	34.4

RADIATED EMISSIONS			
Graph name:	Emr#4	Test configuration: (H+V) - CMin - TX mode - Axis Z	
Limit:	FCC CFR47 Part15C		
Class:			
Frequency range: [1GHz - 14GHz]			
Antenna polarization:	Horizontal & Vertical	RBW :	1MHz
Azimuth:	0° - 360°	VBW :	3MHz

- Part15C - Classe: - Moyenne/3.0m/
- Part15C - Classe: - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- ♦ Peak (Peak/LimAvg) (Horizontale)
- ♦ Peak (Peak/LimAvg) (Verticale)
- x Peak (Peak /Lim. Peak) (Verticale)
- x Average (Average /Lim. Average) (Verticale)



Spurious emissions

Frequency (MHz)	Peak (dBμV/m)	LimM (dBμV/m)	Peak-LimM (dB)	Polarization	Correction (dB)
2405.511	96.6	54.0	42.6	Horizontal	29.9
2404.426	99.1	54.0	45.1	Vertical	29.9

Frequency (MHz)	Average (dBμV/m)	Lim. Average (dBμV/m)	Average-Lim (dB)	Commentaire	Correction (dB)
3980.967	42.6	54.0	-11.4	Vertical	34.6
4340.040	42.2	54.0	-11.8	Vertical	34.4
4653.454	42.6	54.0	-11.4	Vertical	34.6
13428.137	40.8	54.0	-13.2	Vertical	-14.0

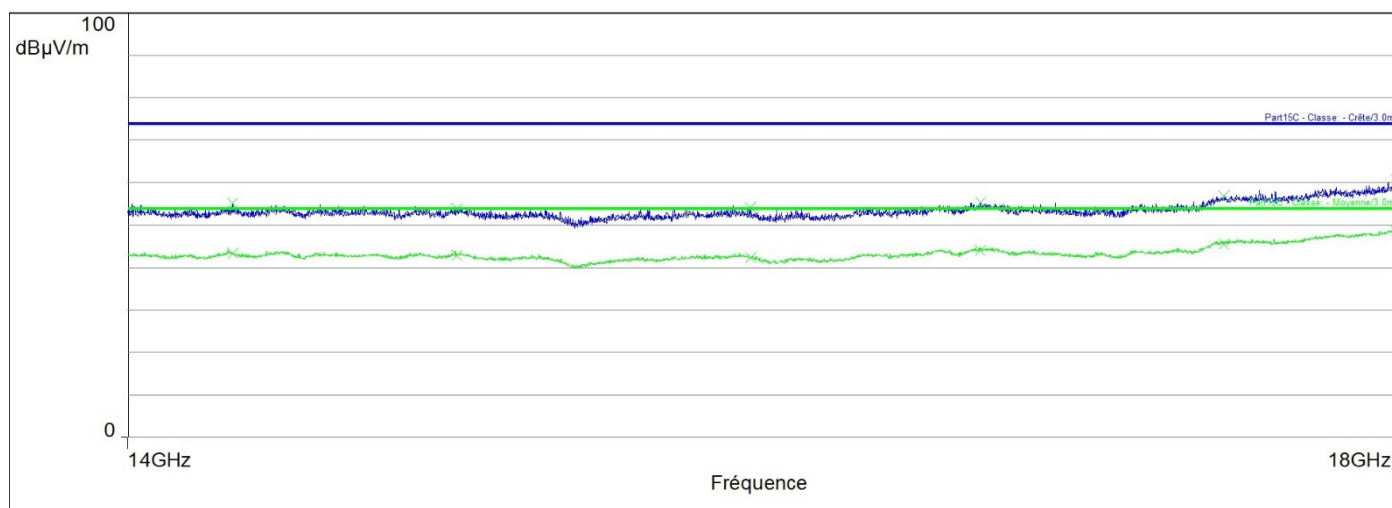
Frequency (MHz)	Peak (dBμV/m)	Lim. Peak (dBμV/m)	Peak-Lim (dB)	Commentaire	Correction (dB)
3980.967	53.6	74.0	-20.4	Vertical	34.6



Frequency (MHz)	Peak (dB μ V/m)	Lim. Peak (dB μ V/m)	Peak-Lim (dB)	Commentaire	Correction (dB)
4340.040	53.6	74.0	-20.4	Vertical	34.4
4653.454	54.2	74.0	-19.8	Vertical	34.6
13428.137	52.6	74.0	-21.4	Vertical	-14.0

RADIATED EMISSIONS			
Graph name:	Emr#5	Test configuration:	
Limit:	FCC CFR47 Part15C	(H+V) - CMin - TX mode - Axis XY	
Class:			
Frequency range: [14GHz - 18GHz]			
Antenna polarization:	Horizontal & Vertical	RBW :	1MHz
Azimuth:	0° - 360°	VBW :	3MHz

- Part15C - Classe: - Moyenne/3.0m/
- Part15C - Classe: - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- × Peak (Peak /Lim. Peak) (Horizontale)
- × Average (Average /Lim. Average) (Horizontale)



Spurious emissions

Frequency (MHz)	Average (dBμV/m)	Lim.Average (dBμV/m)	Average-Lim.Average (dB)	Commentaire	Polarization	Correction (dB)
14293.500	43.3	54.0	-10.7	Horizontal	Horizontal	1.7
14942.000	42.8	54.0	-11.2	Horizontal	Horizontal	1.5
15835.000	42.4	54.0	-11.6	Horizontal	Horizontal	1.2
16572.500	44.0	54.0	-10.0	Horizontal	Horizontal	2.6
17392.500	45.6	54.0	-8.4	Horizontal	Horizontal	3.4
17996.500	48.5	54.0	-5.5	Horizontal	Horizontal	6.4

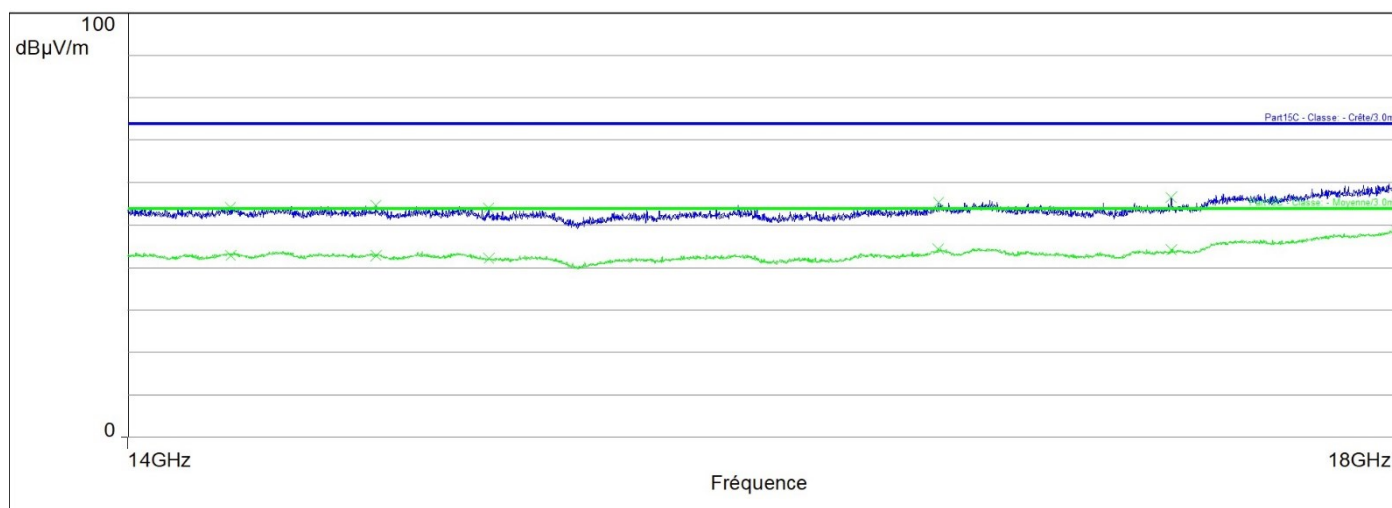
Frequency (MHz)	Peak (dBμV/m)	Lim.Peak (dBμV/m)	Peak-Lim.Peak (dB)	Commentaire	Polarization	Correction (dB)
14293.500	55.1	74.0	-18.9	Horizontal	Horizontal	1.7
14942.000	53.8	74.0	-20.2	Horizontal	Horizontal	1.5
15835.000	54.1	74.0	-19.9	Horizontal	Horizontal	1.2



Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak- Lim.Peak (dB)	Commentaire	Polarization	Correction (dB)
16572.500	55.3	74.0	-18.7	Horizontal	Horizontal	2.6
17392.500	56.9	74.0	-17.1	Horizontal	Horizontal	3.4
17996.500	60.3	74.0	-13.7	Horizontal	Horizontal	6.4

RADIATED EMISSIONS			
Graph name:	Emr#6	Test configuration: (H+V) - CMin - TX mode - Axis Z	
Limit:	FCC CFR47 Part15C		
Class:			
Frequency range: [14GHz - 18GHz]			
Antenna polarization:	Horizontal & Vertical	RBW :	1MHz
Azimuth:	0° - 360°	VBW :	3MHz

- Part15C - Classe: - Moyenne/3.0m/
- Part15C - Classe: - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- × Peak (Peak /Lim. Peak) (Horizontale)
- × Average (Average /Lim. Average) (Horizontale)



Spurious emissions

Frequency (MHz)	Average (dBμV/m)	Lim.Average (dBμV/m)	Average-Lim.Average (dB)	Commentaire	Polarization	Correction (dB)
14286.500	42.8	54.0	-11.2	Horizontal	Horizontal	1.7
14703.500	42.9	54.0	-11.1	Horizontal	Horizontal	1.9
15037.000	42.1	54.0	-11.9	Horizontal	Horizontal	0.6
16437.500	44.4	54.0	-9.6	Horizontal	Horizontal	1.8
17212.500	44.2	54.0	-9.8	Horizontal	Horizontal	2.0
17999.000	48.5	54.0	-5.5	Horizontal	Horizontal	6.4

Frequency (MHz)	Peak (dBμV/m)	Lim.Peak (dBμV/m)	Peak-Lim.Peak (dB)	Commentaire	Polarization	Correction (dB)
14286.500	54.2	74.0	-19.8	Horizontal	Horizontal	1.7
14703.500	54.7	74.0	-19.3	Horizontal	Horizontal	1.9
15037.000	54.1	74.0	-19.9	Horizontal	Horizontal	0.6



Frequency (MHz)	Peak (dBμV/m)	Lim.Peak (dBμV/m)	Peak-Lim.Peak (dB)	Commentaire	Polarization	Correction (dB)
16437.500	55.3	74.0	-18.7	Horizontal	Horizontal	1.8
17212.500	56.5	74.0	-17.5	Horizontal	Horizontal	2.0
17999.000	59.3	74.0	-14.7	Horizontal	Horizontal	6.4

QUALIFICATION (1GHz- 25GHz): 3 meters measurement in full anechoic chamber. The frequency list is created from the results obtained during the pre-characterization in anechoic chamber.
Measurements are performed using a PEAK and AVERAGE detection.

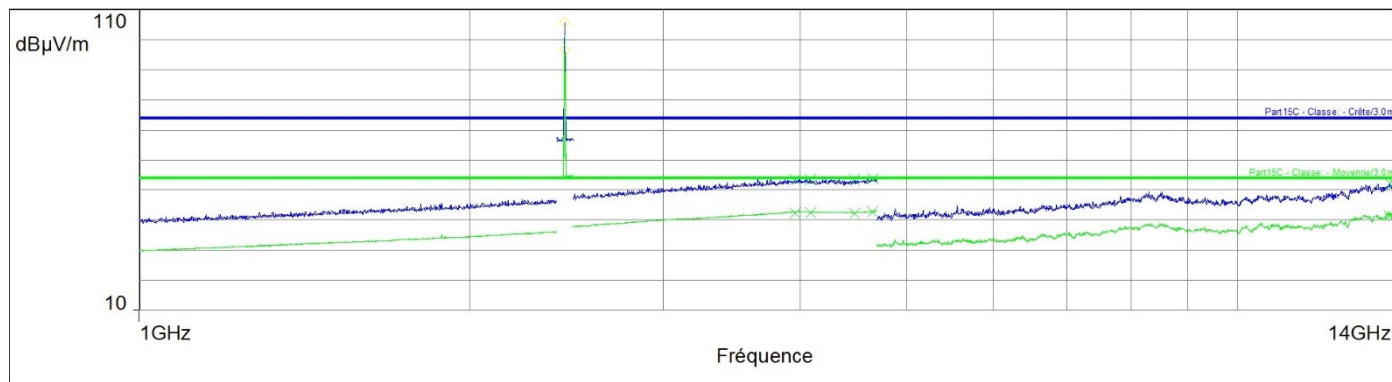
Test Frequency (MHz)	Meter Reading dB(μV)	Detector (Pk/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
No significant frequency observed										

CMID

RADIATED EMISSIONS

Graph name:	Emr#7	Test configuration:	
Limit:	FCC CFR47 Part15C	(H+V) - CMid - TX mode - Axis XY	
Class:			
Frequency range: [1GHz - 14GHz]			
Antenna polarization:	Horizontal & Vertical	RBW :	1MHz
Azimuth:	0° - 360°	VBW :	3MHz

- Part15C - Classe: - Moyenne/3.0m/
- Part15C - Classe: - Crête/3.0m/
- Niveau (Suspect Manuel) (Horizontale)
- Niveau (Suspect Manuel) (Verticale)
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- × Peak (Peak /Lim. Peak) (Horizontale)
- × Peak (Peak /Lim. Peak) (Verticale)
- × Average (Average /Lim. Average) (Horizontale)
- × Average (Average /Lim. Average) (Verticale)



Spurious emissions

Frequency (MHz)	Peak Level (dBμV/m)	Polarization	Correction (dB)
2440.498	105.7	Horizontal	30.0
2440.539	96.5	Vertical	30.0

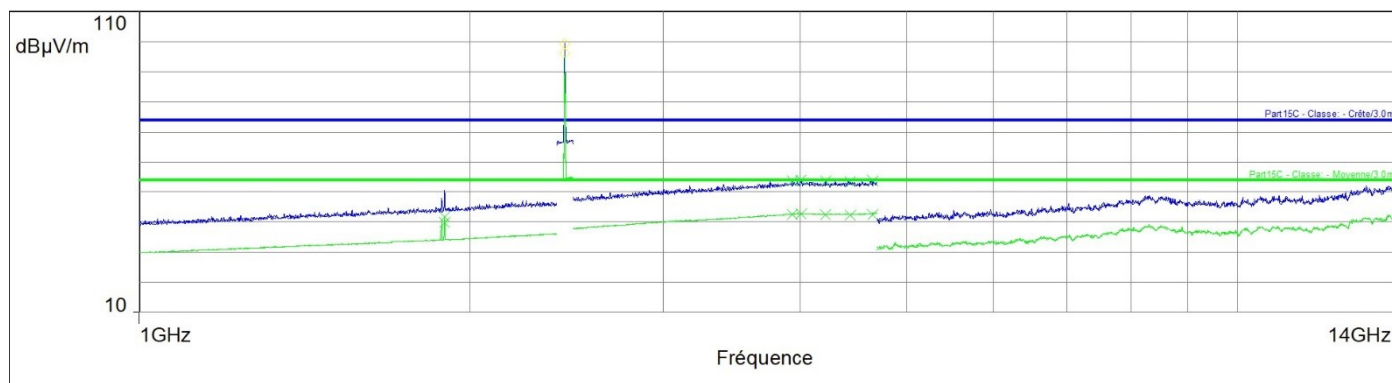
Frequency (MHz)	Average (dBμV/m)	Lim. Average (dBμV/m)	Average-Lim (dB)	Commentaire	Correction (dB)
3960.576	42.4	54.0	-11.6	Horizontal	34.6
4085.143	42.6	54.0	-11.4	Horizontal	34.6
4652.567	42.6	54.0	-11.4	Horizontal	34.6
4478.793	42.3	54.0	-11.7	Vertical	34.4
13898.335	41.2	54.0	-12.8	Horizontal	-13.2
13770.099	41.2	54.0	-12.8	Vertical	-13.4



Frequency (MHz)	Peak (dB μ V/m)	Lim. Peak (dB μ V/m)	Peak-Lim (dB)	Commentaire	Correction (dB)
3960.576	53.4	74.0	-20.6	Horizontal	34.6
4085.143	53.5	74.0	-20.5	Horizontal	34.6
4652.567	53.6	74.0	-20.4	Horizontal	34.6
4478.793	53.5	74.0	-20.5	Vertical	34.4
13898.335	52.0	74.0	-22.0	Horizontal	-13.2
13770.099	52.2	74.0	-21.8	Vertical	-13.4

RADIATED EMISSIONS			
Graph name:	Emr#8	Test configuration:	
Limit:	FCC CFR47 Part15C	(H+V) - CMid - TX mode - Axis Z	
Class:			
Frequency range: [1GHz - 14GHz]			
Antenna polarization:	Horizontal & Vertical	RBW :	1MHz
Azimuth:	0° - 360°	VBW :	3MHz

- Part15C - Classe: - Moyenne/3.0m/
- Part15C - Classe: - Crête/3.0m/
- ◆ Niveau (Suspect Manuel) (Horizontale)
- ◆ Niveau (Suspect Manuel) (Verticale)
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- × Peak (Peak /Lim. Peak) (Horizontale)
- × Peak (Peak /Lim. Peak) (Verticale)
- × Average (Average /Lim. Average) (Horizontale)
- × Average (Average /Lim. Average) (Verticale)



Spurious emissions

Frequency (MHz)	Peak Level (dBμV/m)	Polarization	Correction (dB)
2440.498	96.3	Horizontal	30.0
2440.539	99.4	Vertical	30.0

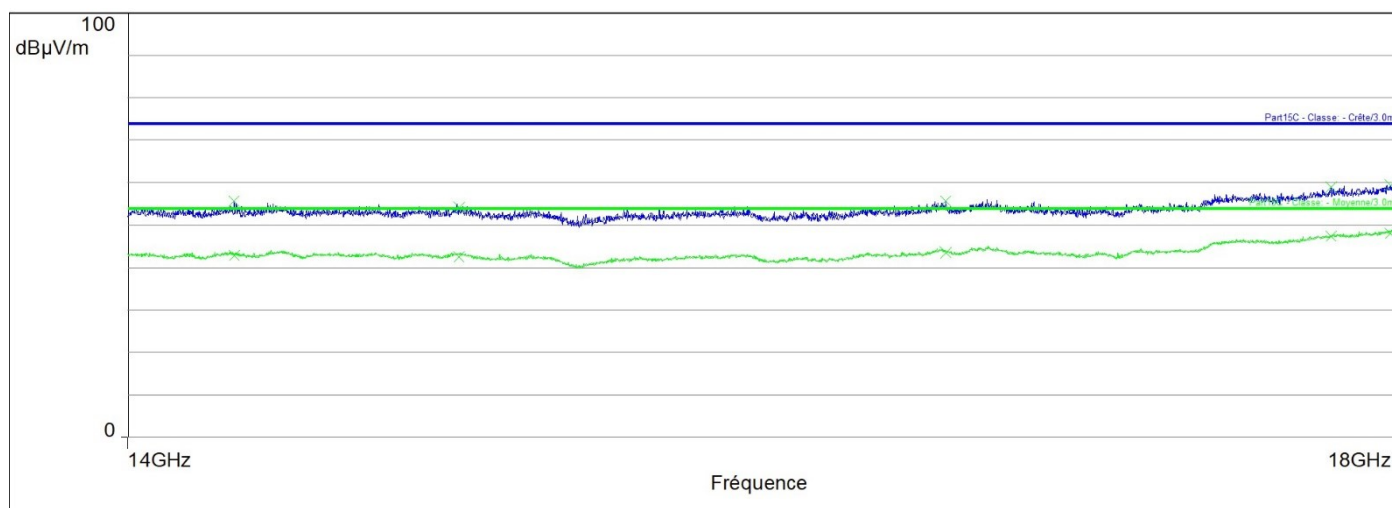
Frequency (MHz)	Average (dBμV/m)	Lim. Average (dBμV/m)	Average-Lim (dB)	Commentaire	Correction (dB)
1897.400	39.9	54.0	-14.1	Horizontal	28.2
4003.132	42.7	54.0	-11.3	Horizontal	34.7
4441.999	42.3	54.0	-11.7	Horizontal	34.4
4654.783	42.5	54.0	-11.5	Horizontal	34.6
1897.050	41.7	54.0	-12.3	Vertical	28.2
3934.864	42.4	54.0	-11.6	Vertical	34.5
4215.030	42.4	54.0	-11.6	Vertical	34.5



Frequency (MHz)	Peak (dB μ V/m)	Lim. Peak (dB μ V/m)	Peak-Lim (dB)	Commentaire	Correction (dB)
4003.132	54.0	74.0	-20.0	Horizontal	34.7
4441.999	53.5	74.0	-20.5	Horizontal	34.4
4654.783	53.8	74.0	-20.2	Horizontal	34.6
3934.864	53.7	74.0	-20.3	Vertical	34.5
4215.030	53.7	74.0	-20.3	Vertical	34.5

RADIATED EMISSIONS			
Graph name:	Emr#9	Test configuration:	
Limit:	FCC CFR47 Part15C	(H+V) - CMid - TX mode - Axis XY	
Class:			
Frequency range: [14GHz - 18GHz]			
Antenna polarization:	Horizontal & Vertical	RBW :	1MHz
Azimuth:	0° - 360°	VBW :	3MHz

- Part15C - Classe: - Moyenne/3.0m/
- Part15C - Classe: - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- x Peak (Peak /Lim. Peak) (Verticale)
- x Average (Average /Lim. Average) (Verticale)



Spurious emissions

Frequency (MHz)	Average (dBμV/m)	Lim.Average (dBμV/m)	Average-Lim.Average (dB)	Commentaire	Polarization	Correction (dB)
14298.500	42.8	54.0	-11.2	Vertical	Vertical	1.7
14949.500	42.6	54.0	-11.4	Vertical	Vertical	1.6
16461.000	43.5	54.0	-10.5	Vertical	Vertical	1.9
17765.500	47.4	54.0	-6.6	Vertical	Vertical	5.2
17975.000	48.1	54.0	-5.9	Vertical	Vertical	6.2

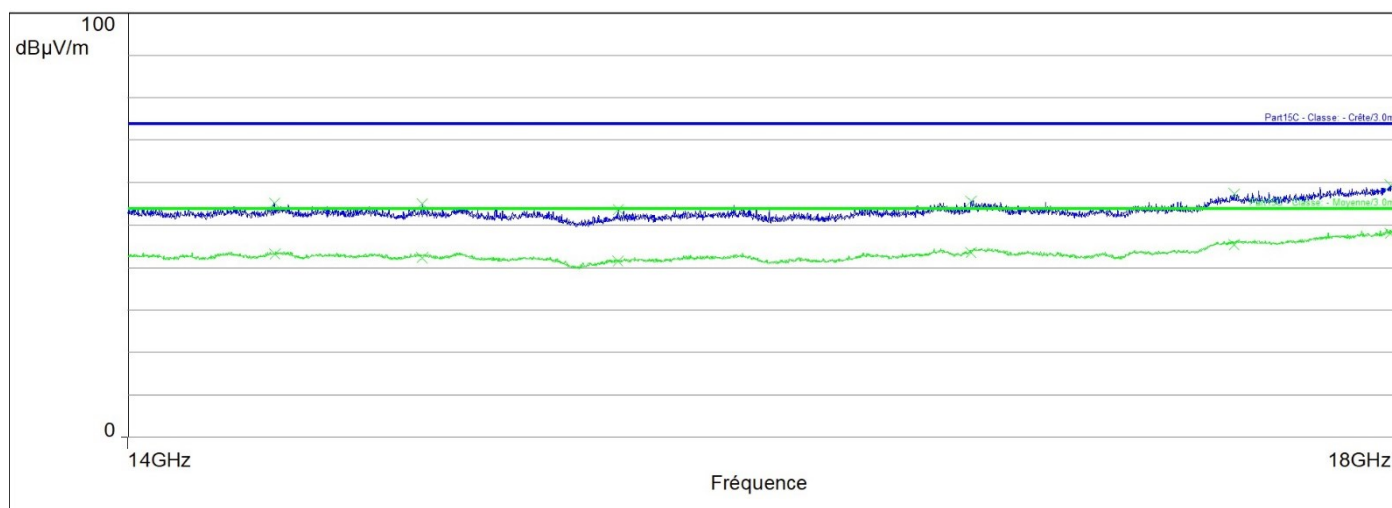
Frequency (MHz)	Peak (dBμV/m)	Lim.Peak (dBμV/m)	Peak-Lim.Peak (dB)	Commentaire	Polarization	Correction (dB)
14298.500	55.7	74.0	-18.3	Vertical	Vertical	1.7
14949.500	54.2	74.0	-19.8	Vertical	Vertical	1.6
16461.000	55.6	74.0	-18.4	Vertical	Vertical	1.9
17765.500	59.0	74.0	-15.0	Vertical	Vertical	5.2



Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak- Lim.Peak (dB)	Commentaire	Polarization	Correction (dB)
17975.000	59.5	74.0	-14.5	Vertical	Vertical	6.2

RADIATED EMISSIONS			
Graph name:	Emr#10	Test configuration:	
Limit:	FCC CFR47 Part15C	(H+V) - CMid - TX mode - Axis Z	
Class:			
Frequency range: [14GHz - 18GHz]			
Antenna polarization:	Horizontal & Vertical	RBW :	1MHz
Azimuth:	0° - 360°	VBW :	3MHz

- Part15C - Classe: - Moyenne/3.0m/
- Part15C - Classe: - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- × Peak (Peak /Lim. Peak) (Horizontale)
- × Average (Average /Lim. Average) (Horizontale)



Spurious emissions

Frequency (MHz)	Average (dBμV/m)	Lim.Average (dBμV/m)	Average-Lim.Average (dB)	Commentaire	Polarization	Correction (dB)
14412.000	43.2	54.0	-10.8	Horizontal	Horizontal	2.0
14840.000	42.3	54.0	-11.7	Horizontal	Horizontal	1.7
15426.000	41.5	54.0	-12.5	Horizontal	Horizontal	0.3
16543.500	43.4	54.0	-10.6	Horizontal	Horizontal	2.6
17426.000	45.4	54.0	-8.6	Horizontal	Horizontal	3.6
17975.000	48.1	54.0	-5.9	Horizontal	Horizontal	6.2

Frequency (MHz)	Peak (dBμV/m)	Lim.Peak (dBμV/m)	Peak-Lim.Peak (dB)	Commentaire	Polarization	Correction (dB)
14412.000	55.2	74.0	-18.8	Horizontal	Horizontal	2.0
14840.000	55.1	74.0	-18.9	Horizontal	Horizontal	1.7
15426.000	53.6	74.0	-20.4	Horizontal	Horizontal	0.3



Frequency (MHz)	Peak (dBμV/m)	Lim.Peak (dBμV/m)	Peak-Lim.Peak (dB)	Commentaire	Polarization	Correction (dB)
16543.500	55.7	74.0	-18.3	Horizontal	Horizontal	2.6
17426.000	57.4	74.0	-16.6	Horizontal	Horizontal	3.6
17975.000	59.5	74.0	-14.5	Horizontal	Horizontal	6.2

QUALIFICATION (1GHz- 25GHz): 3 meters measurement in full anechoic chamber. The frequency list is created from the results obtained during the pre-characterization in anechoic chamber.

Measurements are performed using a PEAK and AVERAGE detection.

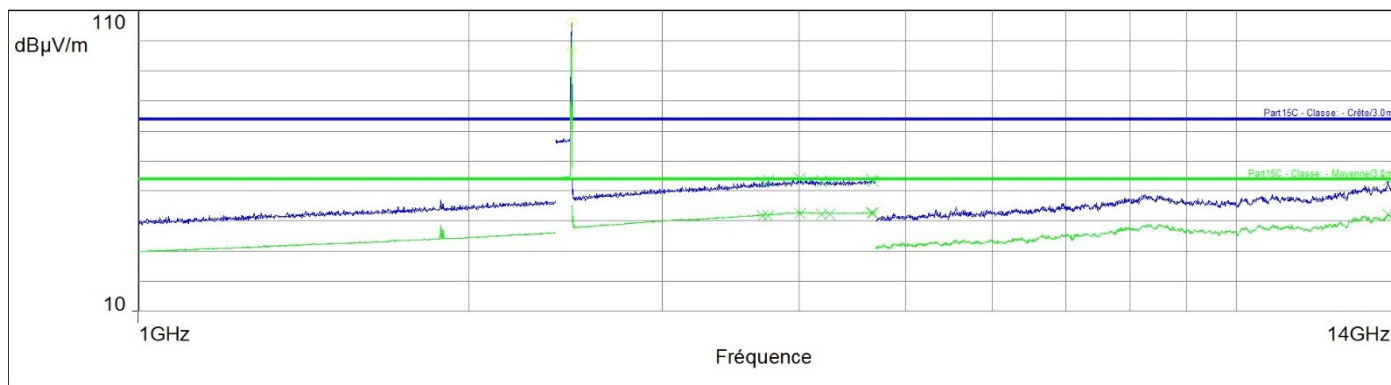
Test Frequency (MHz)	Meter Reading dB(μV)	Detector (Pk/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
No significant frequency observed										

CMAX

RADIATED EMISSIONS

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

- Part15C - Classe: - Moyenne/3.0m/
- Part15C - Classe: - Crête/3.0m/
- ◇ Niveau (Suspect Manuel) (Horizontale)
- ◇ Niveau (Suspect Manuel) (Verticale)
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- × Peak (Peak /Lim. Peak) (Horizontale)
- × Peak (Peak /Lim. Peak) (Verticale)
- × Average (Average /Lim. Average) (Horizontale)
- × Average (Average /Lim. Average) (Verticale)



Spurious emissions

Frequency (MHz)	Peak Level (dBμV/m)	Polarization	Correction (dB)
2480.536	106.0	Horizontal	30.2
2480.494	97.0	Vertical	30.2

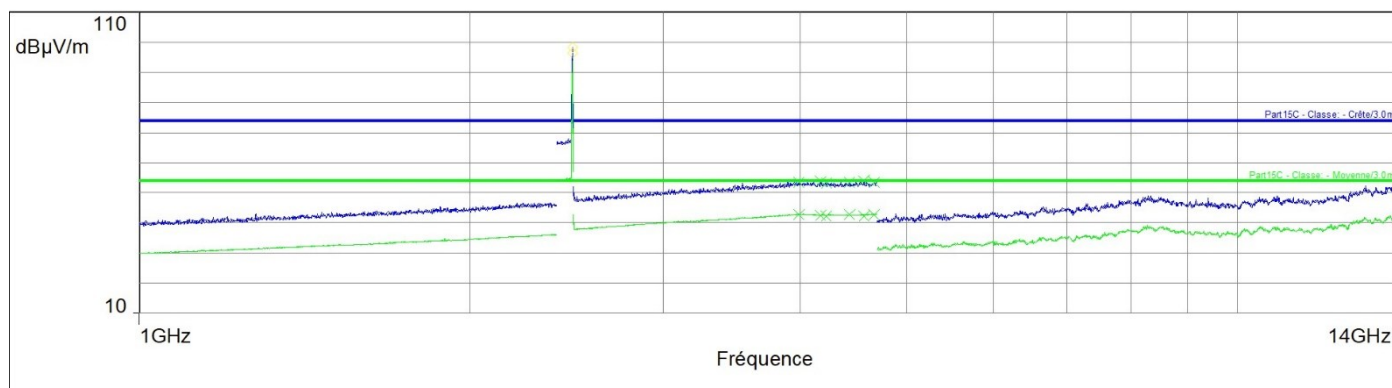
Frequency (MHz)	Average (dBμV/m)	Lim. Average (dBμV/m)	Average-Lim (dB)	Commentaire	Correction (dB)
3745.575	41.8	54.0	-12.2	Horizontal	33.9
4261.576	42.3	54.0	-11.7	Horizontal	34.5
4656.557	42.7	54.0	-11.3	Horizontal	34.6
3699.915	41.8	54.0	-12.2	Vertical	33.8
4007.565	42.4	54.0	-11.6	Vertical	34.6
4191.978	42.3	54.0	-11.7	Vertical	34.5
4668.969	42.7	54.0	-11.3	Vertical	34.7
13743.528	42.2	54.0	-11.8	Vertical	-13.4



Frequency (MHz)	Peak (dB μ V/m)	Lim. Peak (dB μ V/m)	Peak-Lim (dB)	Commentaire	Correction (dB)
3745.575	53.4	74.0	-20.6	Horizontal	33.9
4261.576	53.3	74.0	-20.7	Horizontal	34.5
4656.557	53.8	74.0	-20.2	Horizontal	34.6
3699.915	53.0	74.0	-21.0	Vertical	33.8
4007.565	54.2	74.0	-19.8	Vertical	34.6
4191.978	53.3	74.0	-20.7	Vertical	34.5
4668.969	53.1	74.0	-20.9	Vertical	34.7
13743.528	53.5	74.0	-20.5	Vertical	-13.4

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

- Part15C - Classe: - Moyenne/3.0m/
- Part15C - Classe: - Crête/3.0m/
- ◇ Niveau (Suspect Manuel) (Horizontale)
- ◇ Niveau (Suspect Manuel) (Verticale)
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- × Peak (Peak /Lim. Peak) (Horizontale)
- × Peak (Peak /Lim. Peak) (Verticale)
- × Average (Average /Lim. Average) (Horizontale)
- × Average (Average /Lim. Average) (Verticale)



Spurious emissions

Frequency (MHz)	Peak Level (dBμV/m)	Polarization	Correction (dB)
2479.492	96.3	Horizontal	30.2
2480.494	98.2	Vertical	30.2

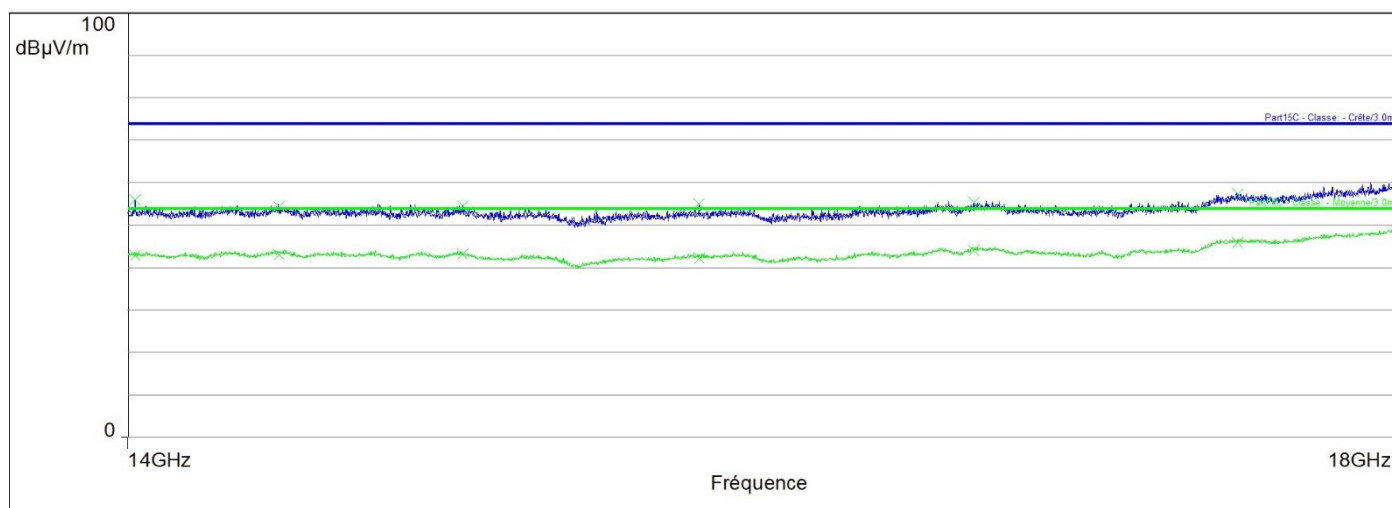
Frequency (MHz)	Average (dBμV/m)	Lim. Average (dBμV/m)	Average-Lim (dB)	Commentaire	Correction (dB)
3988.947	42.8	54.0	-11.2	Horizontal	34.6
4224.339	42.4	54.0	-11.6	Horizontal	34.5
4572.773	42.2	54.0	-11.8	Horizontal	34.5
4176.019	42.4	54.0	-11.6	Vertical	34.6
4434.020	42.7	54.0	-11.3	Vertical	34.4
4668.969	42.6	54.0	-11.4	Vertical	34.7



Frequency (MHz)	Peak (dB μ V/m)	Lim. Peak (dB μ V/m)	Peak-Lim (dB)	Commentaire	Correction (dB)
3988.947	53.4	74.0	-20.6	Horizontal	34.6
4224.339	53.1	74.0	-20.9	Horizontal	34.5
4572.773	54.0	74.0	-20.0	Horizontal	34.5
4176.019	53.7	74.0	-20.3	Vertical	34.6
4434.020	53.4	74.0	-20.6	Vertical	34.4
4668.969	53.5	74.0	-20.5	Vertical	34.7

RADIATED EMISSIONS			
Graph name:	Emr#13	Test configuration:	
Limit:	FCC CFR47 Part15C	(H+V) - CMax - TX mode - Axis XY	
Class:			
Frequency range: [14GHz - 18GHz]			
Antenna polarization:	Horizontal & Vertical	RBW :	1MHz
Azimuth:	0° - 360°	VBW :	3MHz

- Part15C - Classe: - Moyenne/3.0m/
- Part15C - Classe: - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- × Peak (Peak /Lim. Peak) (Horizontale)
- × Average (Average /Lim. Average) (Horizontale)



Spurious emissions

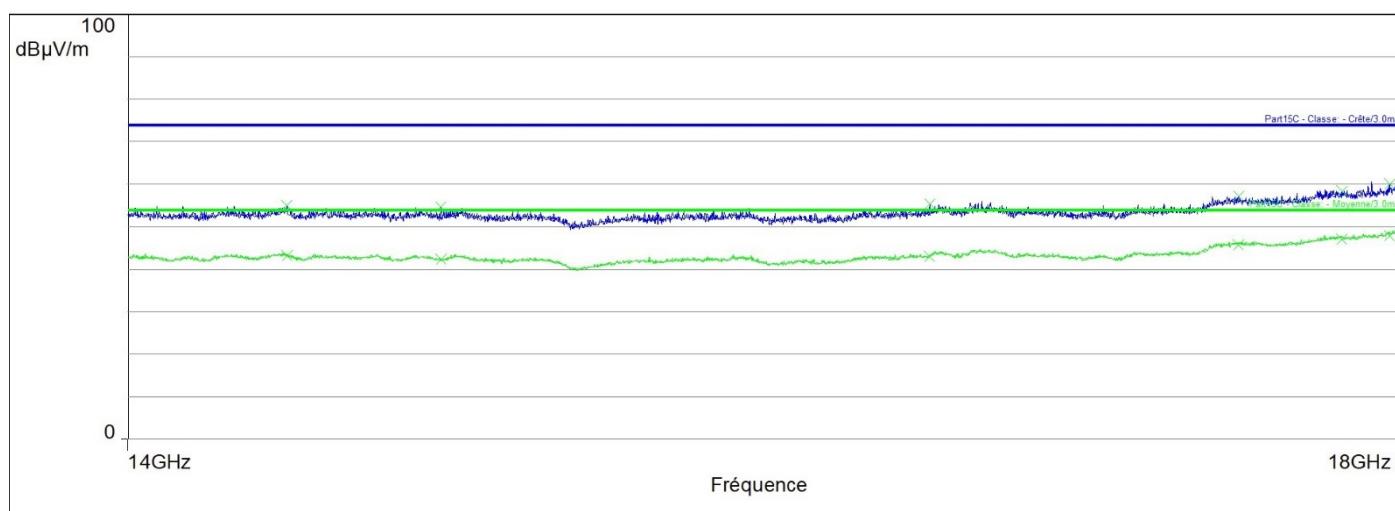
Frequency (MHz)	Average (dBμV/m)	Lim.Average (dBμV/m)	Average-Lim.Average (dB)	Commentaire	Polarization	Correction (dB)
14020.500	42.8	54.0	-11.2	Horizontal	Horizontal	1.7
14424.500	43.1	54.0	-10.9	Horizontal	Horizontal	2.0
14958.500	43.2	54.0	-10.8	Horizontal	Horizontal	1.5
15677.000	42.1	54.0	-11.9	Horizontal	Horizontal	0.7
16553.000	44.0	54.0	-10.0	Horizontal	Horizontal	2.6
17438.500	45.9	54.0	-8.1	Horizontal	Horizontal	3.6
17999.000	48.4	54.0	-5.6	Horizontal	Horizontal	6.4



Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak- Lim.Peak (dB)	Commentaire	Polarization	Correction (dB)
14020.500	56.0	74.0	-18.0	Horizontal	Horizontal	1.7
14424.500	54.4	74.0	-19.6	Horizontal	Horizontal	2.0
14958.500	54.5	74.0	-19.5	Horizontal	Horizontal	1.5
15677.000	55.0	74.0	-19.0	Horizontal	Horizontal	0.7
16553.000	55.3	74.0	-18.7	Horizontal	Horizontal	2.6
17438.500	57.4	74.0	-16.6	Horizontal	Horizontal	3.6
17999.000	59.6	74.0	-14.4	Horizontal	Horizontal	6.4

RADIATED EMISSIONS			
Graph name:	Emr#14	Test configuration:	
Limit:	FCC CFR47 Part15C	(H+V) - CMax - TX mode - Axis Z	
Class:			
Frequency range: [14GHz - 18GHz]			
Antenna polarization:	Horizontal & Vertical	RBW :	1MHz
Azimuth:	0° - 360°	VBW :	3MHz

- Part15C - Classe: - Moyenne/3.0m/
- Part15C - Classe: - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- x Peak (Peak /Lim. Peak) (Verticale)
- x Average (Average /Lim. Average) (Verticale)



Spurious emissions

Frequency (MHz)	Average (dBμV/m)	Lim. Average (dBμV/m)	Average-Lim (dB)	Commentaire	Correction (dB)
14447.000	43.2	54.0	-10.8	Vertical	2.2
14895.500	42.2	54.0	-11.8	Vertical	1.1
16407.000	42.9	54.0	-11.1	Vertical	1.8
17441.500	45.8	54.0	-8.2	Vertical	3.6
17803.000	47.0	54.0	-7.0	Vertical	5.4
17972.500	47.9	54.0	-6.1	Vertical	6.2

Frequency (MHz)	Peak (dBμV/m)	Lim. Peak (dBμV/m)	Peak-Lim (dB)	Commentaire	Correction (dB)
14447.000	55.1	74.0	-18.9	Vertical	2.2
14895.500	54.6	74.0	-19.4	Vertical	1.1
16407.000	55.3	74.0	-18.7	Vertical	1.8
17441.500	57.1	74.0	-16.9	Vertical	3.6
17803.000	58.4	74.0	-15.6	Vertical	5.4
17972.500	60.1	74.0	-13.9	Vertical	6.2



QUALIFICATION (1GHz- 25GHz): 3 meters measurement in full anechoic chamber. The frequency list is created from the results obtained during the pre-characterization in anechoic chamber.
Measurements are performed using a PEAK and AVERAGE detection.

Test Frequency (MHz)	Meter Reading dB(μV)	Detector (Pk/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
No significant frequency observed										

10.7. CONCLUSION

Unwanted Emission in restricted frequency bands measurement performed on the sample of the product **SCHNEIDER ELECTRIC SMT10020**, SN: **RN20245010004**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.247 & RSS 247 ISSUE 2 limits.

11. UNCERTAINTIES CHART

Type de mesure / Kind of measurement	Incertitude élargie laboratoire / Wide uncertainty laboratory (k=2) $\pm x$	Incertitude limite du CISPR / CISPR uncertainty limit $\pm y$
Measurement of conducted disturbances in voltage on the power port	3.29dB	3.4 dB
Measurement of conducted disturbances in voltage on the telecommunication port.	3.26 dB	5dB
Measurement of discontinuous conducted disturbances in voltage	3.33 dB	3.4 dB
Measurement of conducted disturbances in current	2.67 dB	2.9dB
Spurious emission, radiated (Semi anechoic chamber & open test site)	5.60 dB	6 dB
Spurious emission, radiated (Full anechoic chamber above 1GHz)	± 3.8 dB	± 6 dB
Occupied Channel Bandwidth	± 2.8 %	± 5 %
RF power, conducted	± 1.2 dB	± 1.5 dB
Power Spectral Density, Conducted	± 1.7 dB	± 3 dB
Spurious emission, conducted	± 2.3 dB	± 3 dB
Temperature	± 0.75 °C	± 3 °C
Supply Voltages	± 1.7 %	± 3 %

Les valeurs d'incertitudes calculées du laboratoire étant inférieures aux valeurs d'incertitudes limites établies par la norme, la conformité de l'échantillon est établie directement par les niveaux limites applicables. / The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the standard. The conformity of the sample is directly established by the applicable limits values.