



L C I E

RFID 125kHz Template: Release February 06th, 2020

TEST REPORT

N°: 164767-750687

Version : 01

Subject

Radio spectrum matters
tests according to standards:
47 CFR Part 15.209 & Part 15.207 & RSS-Gen Issue 5 [P](#)

Issued to

MICROPORT CRM (SORIN CRM S.A.S)
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Apparatus under test

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

Inductive Head
MICROPORT CRM
MICROPORT CRM
CPR4BR
AA1908008E
YSG KC861
10270A-KC841

Conclusion

See Test Program chapter

Test date

: April 30, 2020 to May 11, 2020

Test location

Fontenay Aux Roses & Ecuelles

Test Site

6230B-1

Sample receipt date

April 30, 2020

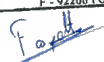

Composition of document

26 pages

Document issued on

June 3, 2020

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01	June 03 rd ,2020	Select Author	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

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1. TEST PROGRAM

References

- 47 CFR Part 15.209 & 15.207
- RSS Gen Issue 5
- ANSI C63.10-2013

Radio requirement:

Clause (47CFR Part 15.209 & 15.207 & RSS-Gen Issue 5) Test Description	Test result - Comments			
Occupied Bandwidth f	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
AC Power Line Conducted Emission f	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA(2)	<input type="checkbox"/> NP(1)
Transmitter Radiated Emission f	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Receiver Radiated Emissions f	<input checked="" type="checkbox"/> PASS (3)	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> 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
 (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):

CPR4BR

Serial Number: AA1908008E



Equipment Under Test



Auxiliary Equipment

Power supply:

During all the tests, EUT is supplied by V_{nom} : 5,0VDC

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



Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Power supply	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-
2	RS232	0.3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop	LATITUDE E5330	-	DELL
Power supply	GTM96180-1507-2.0	-	GLOBTEK
Implant	DDR IS-1 BI	843ZK042	SORIN

Equipment information:

Frequency band:	[9-315] kHz		
Number of Channel:	1		
Antenna Type:	<input checked="" type="checkbox"/> Integral	<input type="checkbox"/> External	<input type="checkbox"/> Dedicated
Transmit chains:	1		
Receiver chains:	1		
Type of equipment:	<input type="checkbox"/> Stand-alone	<input checked="" type="checkbox"/> Plug-in	<input type="checkbox"/> Combined
Equipment type:	<input checked="" type="checkbox"/> Production model		<input type="checkbox"/> Pre-production model
Operating temperature range:	Tmin:	<input type="checkbox"/> -20°C	<input type="checkbox"/> 0°C <input type="checkbox"/> X°C
	Tnom:	20°C	
	Tmax:	<input type="checkbox"/> 35°C	<input type="checkbox"/> 55°C <input type="checkbox"/> X°C
Type of power source:	<input checked="" type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input type="checkbox"/> Battery
Operating voltage range:	Vnom:	<input checked="" type="checkbox"/> 120V/60Hz	<input checked="" type="checkbox"/> 5,0Vdc

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	Running mode
Occupied Bandwidth	<input checked="" type="checkbox"/> Test mode 1 <input type="checkbox"/> Alternative test mode()
AC Power Line Conducted Emission	<input checked="" type="checkbox"/> Test mode 1 <input type="checkbox"/> Alternative test mode()
Transmitter Radiated Emission	<input checked="" type="checkbox"/> Test mode 1 <input type="checkbox"/> Alternative test mode()

2.3. EQUIPMENT LABELLING



2.4. EQUIPMENT MODIFICATION

None Modification:

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : May 11, 2020
Ambient temperature : 24°C
Relative humidity : 44%

3.2. TEST SETUP

- The Equipment Under Test is installed:

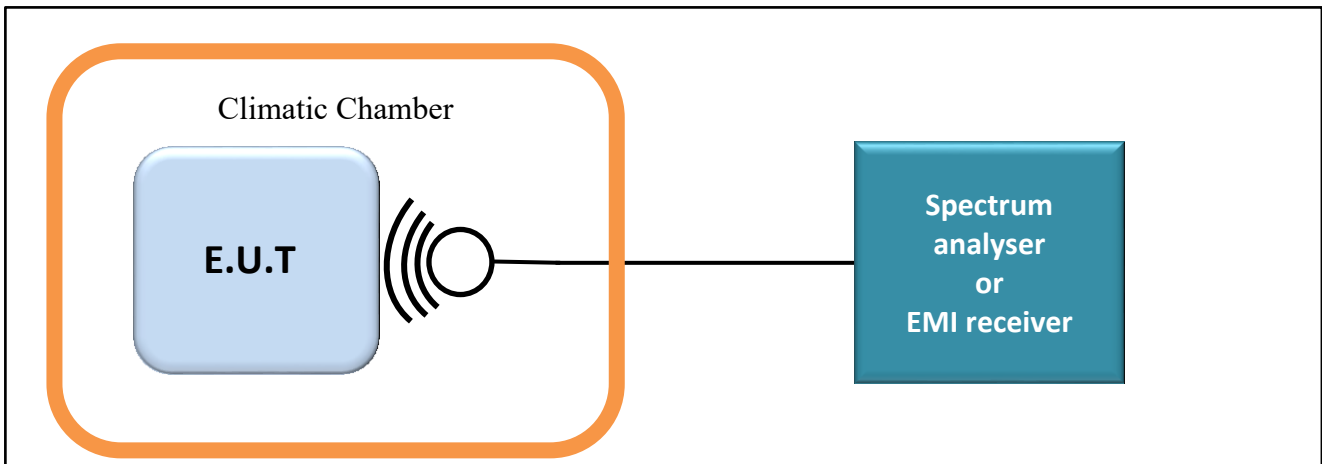
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

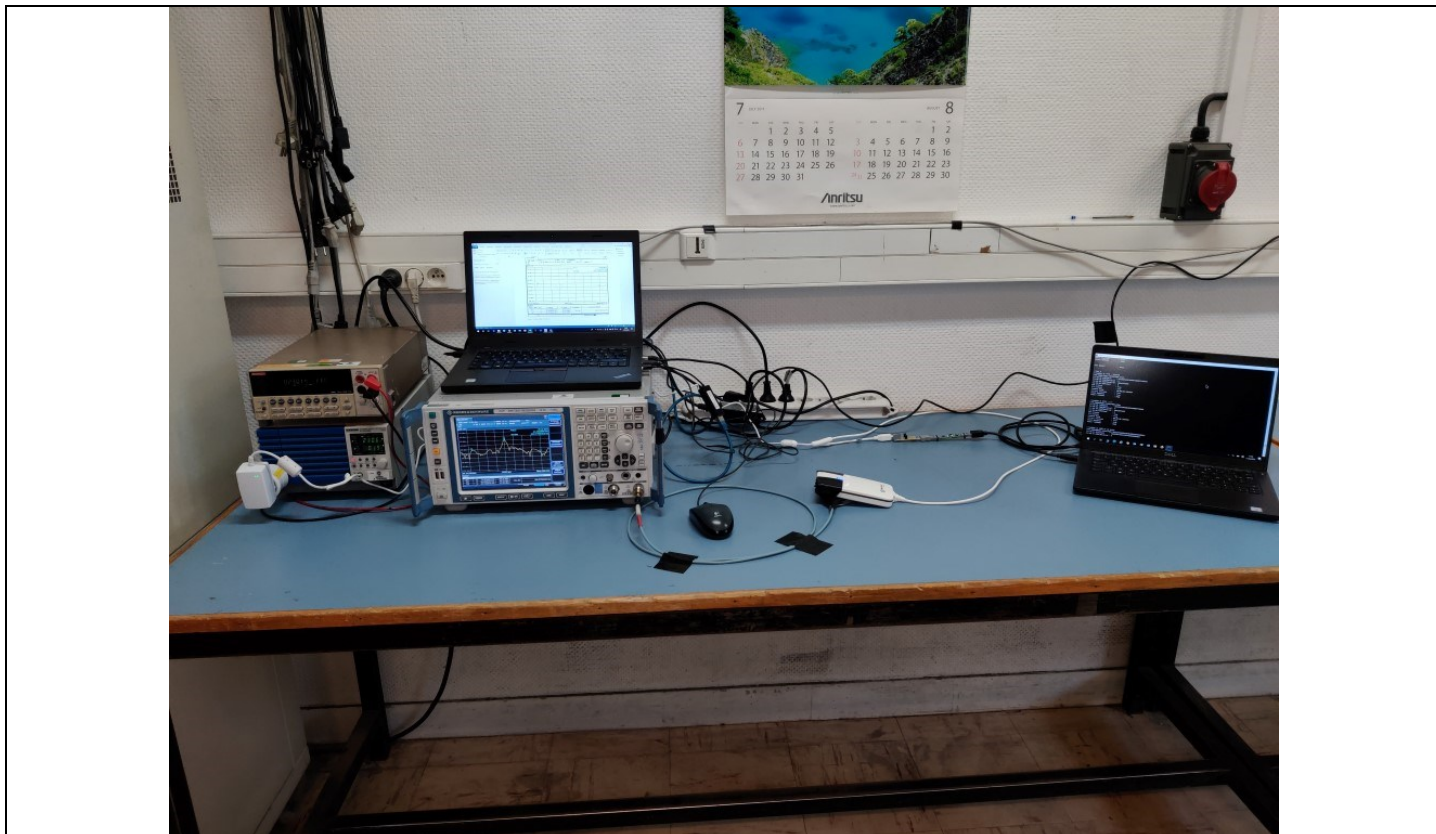
- Conducted Method
- Radiated Method

- Test Procedure:

- RSS-Gen Issue 5 § 6.7



Test set up of Occupied Bandwidth



Photograph for Occupied bandwidth

3.3. LIMIT

None

3.4. TEST EQUIPMENT LIST

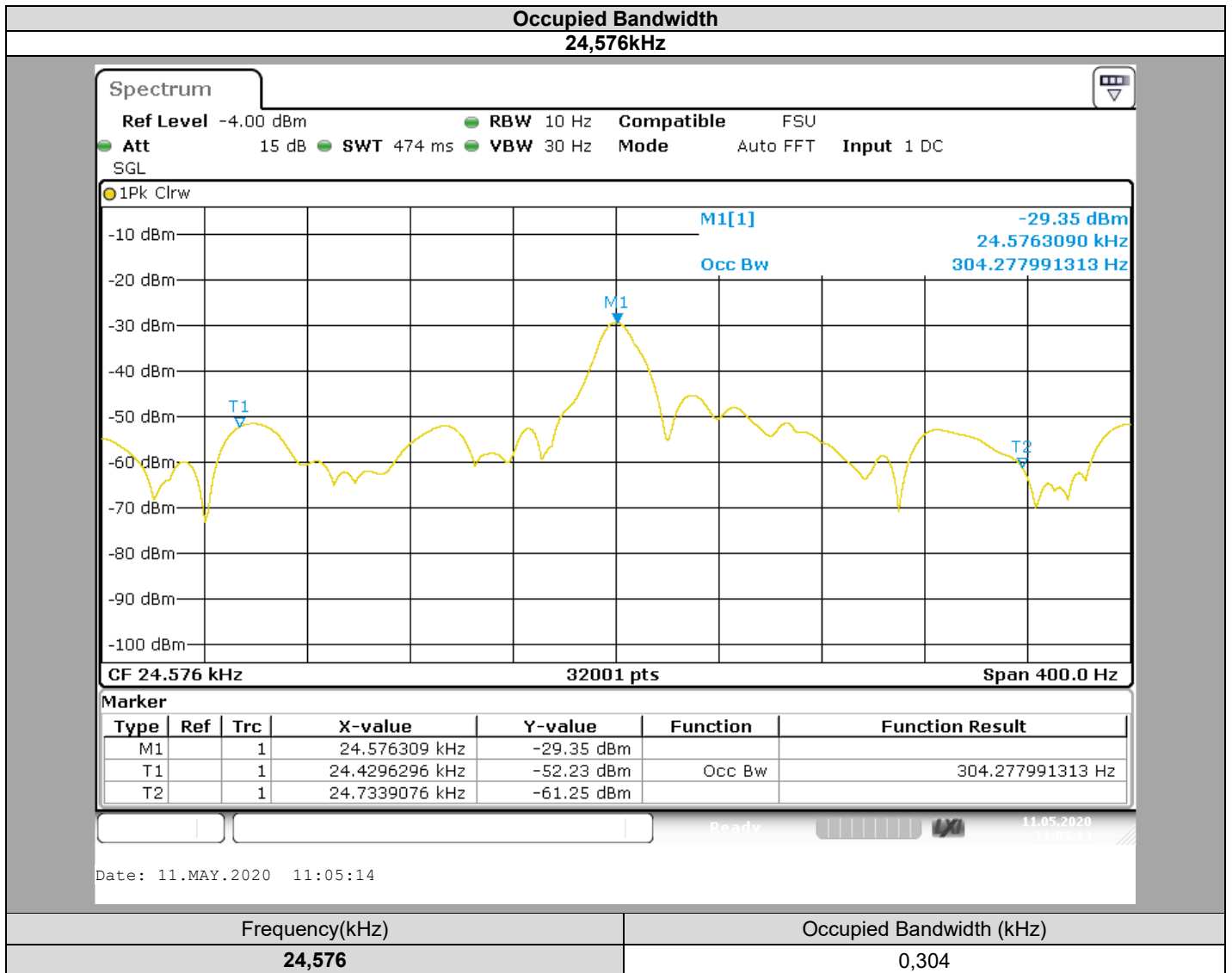
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2019/01	2021/01
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7040079	See Multimeter	See Multimeter
13,56MHz Test fixture Antenna	-	-	A5329422	Cal with EMI receiver	

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



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3.5. RESULTS



3.6. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product CPR4BR, SN: **AA1908008E**, in configuration and description presented in this test report, show levels **compliant** to the **RSS-GEN ISSUE 5** limits.

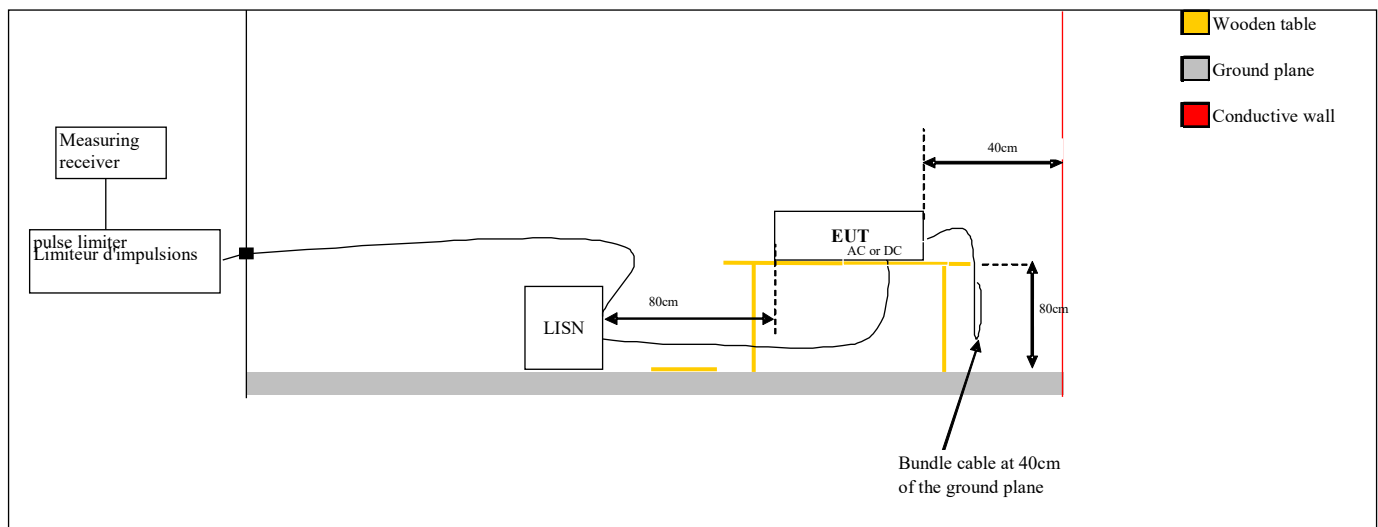
4. AC POWER LINE CONDUCTED EMISSIONS

4.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
 Date of test : April 30, 2020
 Ambient temperature : 21 °C
 Relative humidity : 48 %

4.2. 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 50Ω / 50μH. Interconnecting cables and equipment's were moved to position that maximized emission.

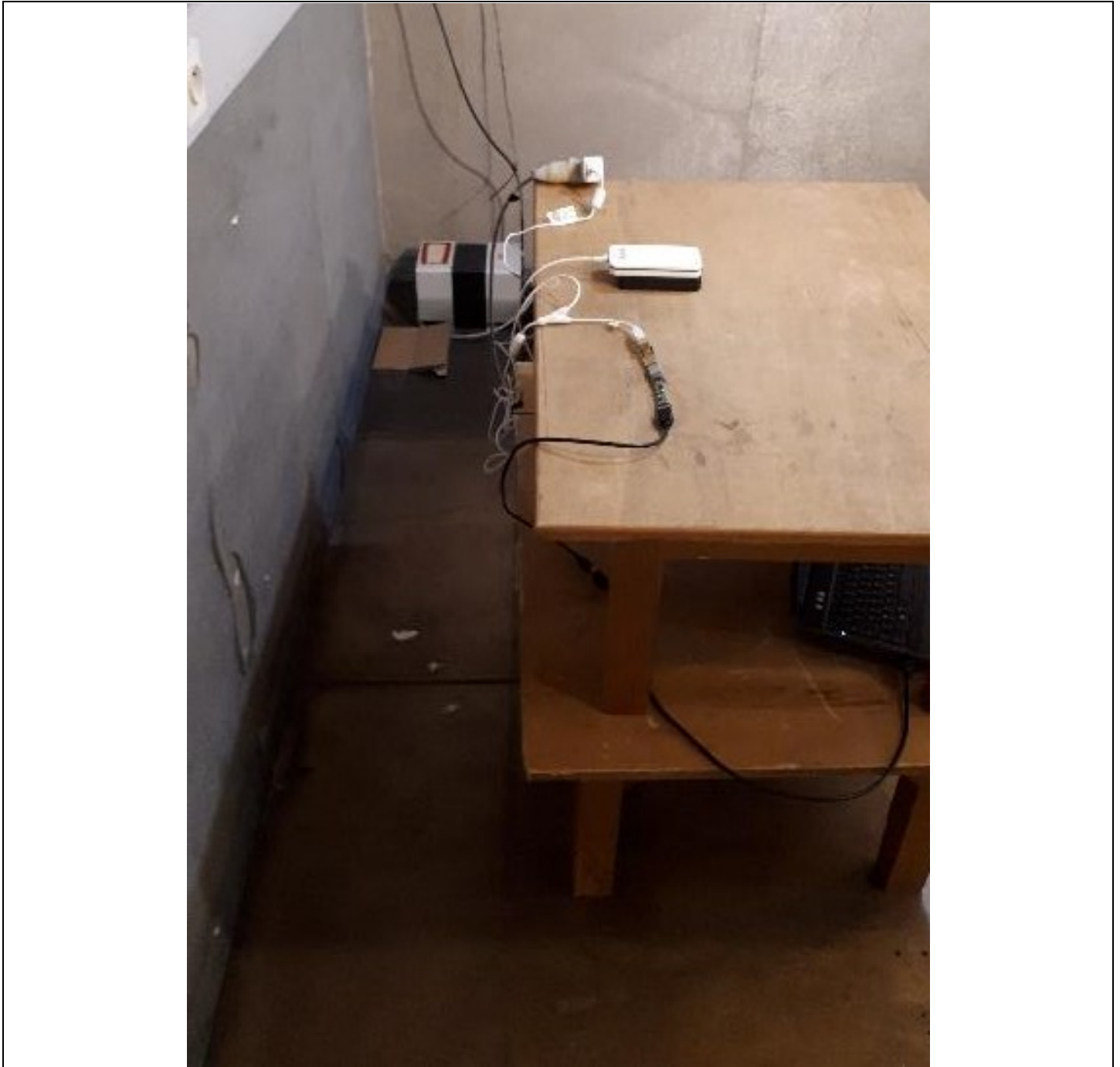




Photograph for AC Power Line Conducted Emissions (Front view)



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Photograph for AC Power Line Conducted Emissions (Rear view)



4.3. 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

4.4. TEST EQUIPMENT LIST

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	10/2018	10/2020
V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322001	08/2019	08/2020
Pulse limiter	R&S	ESH3-Z2	A2649008	03/2019	03/2020
Cable	-	-	A5329417	12/2018	12/2020
Cable	-	-	A5329589	10/2019	10/2020
Ground plane	LCIE	-	-	-	-

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

4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None Divergence:

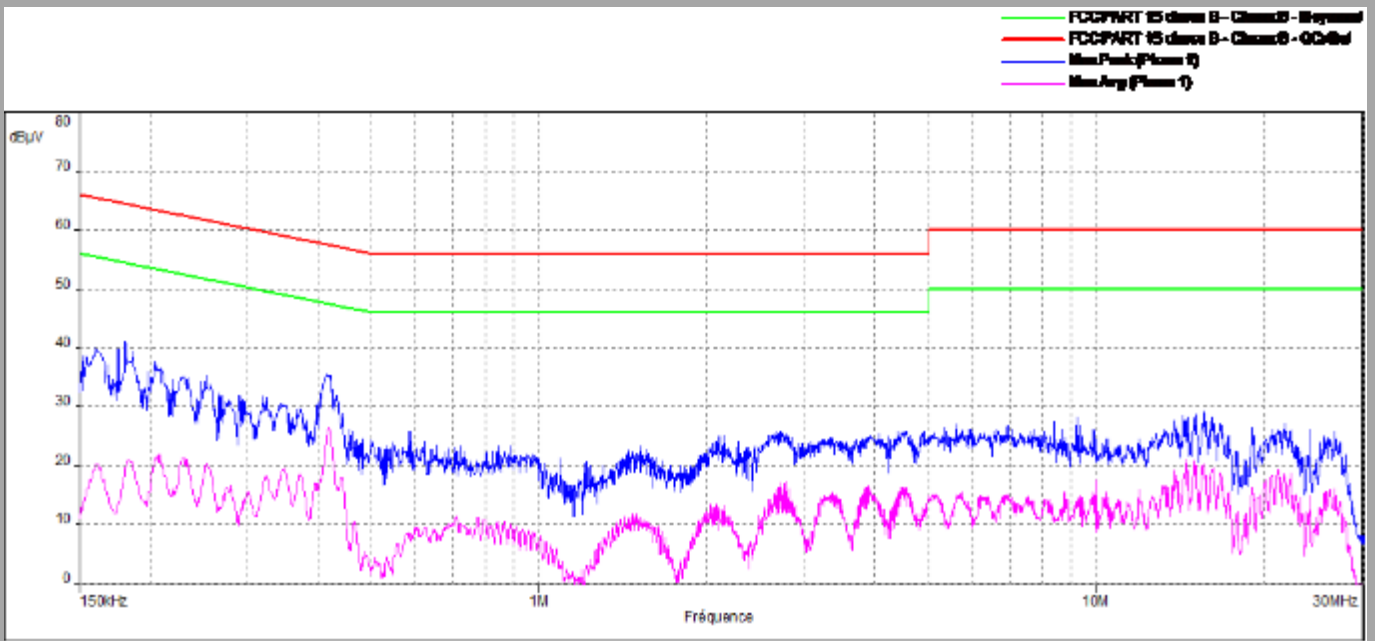


L C I E

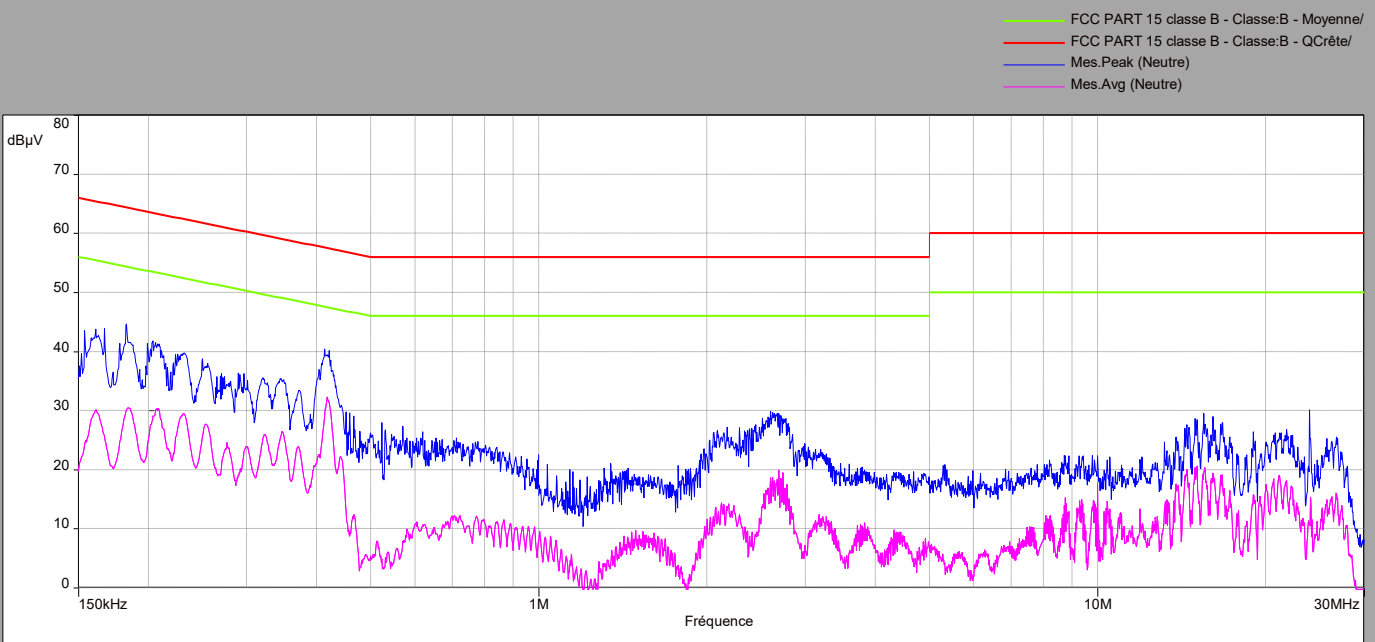
4.6. RESULTS

AC Power Line Conducted Emission 120v-60Hz

Phase



Line



Phase line

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)
0.162	42.7	-	65.4	22.7	24.7	55.4	30.7
0.391	36.3	-	58	21.7	31.2	48	16.8
1.57	19.3	-	56	36.7	8.3	46	37.7
14.4	29.3	-	60	30.7	20.6	50	29.4
24	24.8	-	60	35.2	14.6	50	35.4

Neutral line

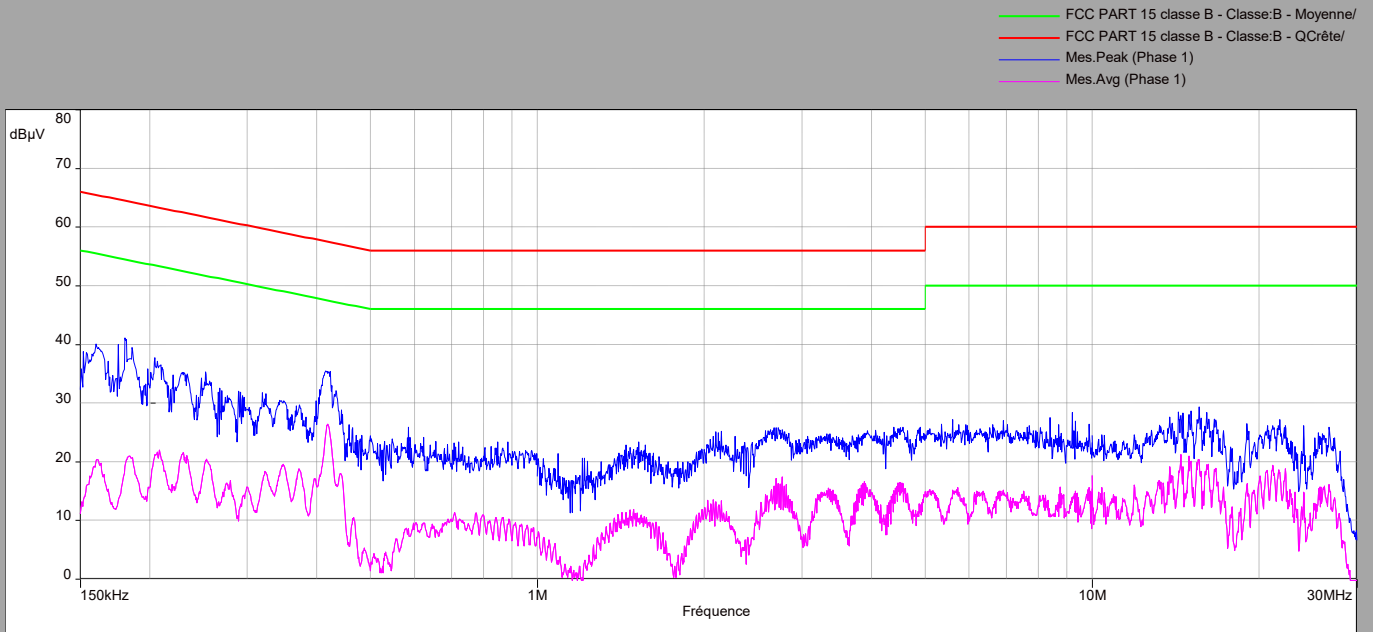
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.162	45.6	-	65.4	19.8	30.2	55.4	25.2
0.391	40.8	-	58	17.2	36.2	48	11.8
2.59	24.6	-	56	31.4	16.6	46	29.4
15.56	25.9	-	60	34.1	19.5	50	30.5
24	22.5	-	60	37.5	14	50	36



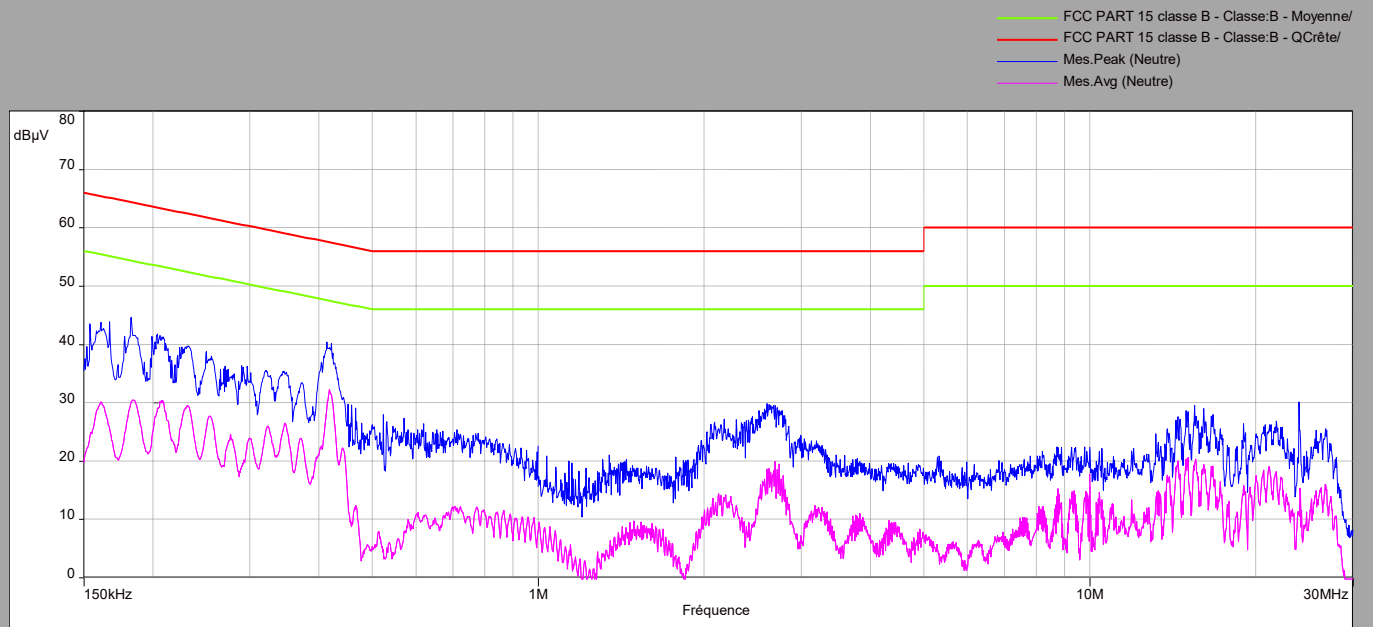
L C I E

AC Power Line Conducted Emission 240V-50Hz

Phase



Line





L C I E

Phase line

Frequency (MHz)	Peak Level (dB μ V)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Margin peak/Quasi Peak (dB)	Average Level (dB μ V)	Average Limit (dB μ V)	Margin Avg/Avg (dB)
0,162	43,7	-	65,4	21,7	30	55,4	25,4
0,419	39,3	-	57,5	18,2	31,7	47,5	15,8
2,69	29,5	-	56	26,5	20	46	26
16	28,6	-	56	27,4	19,3	46	26,7
24	30,1	-	60	29,9	15,3	50	34,7

Neutral line

Frequency (MHz)	Peak Level (dB μ V)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Margin peak/Quasi Peak (dB)	Average Level (dB μ V)	Average Limit (dB μ V)	Margin Avg/Avg (dB)
0,162	39,7	-	65,4	25,7	20,3	55,4	35,1
0,419	35	-	57,5	22,5	26,3	47,5	21,2
2,14	25,2	-	56	30,8	12,3	46	33,7
15,58	28,8	-	60	31,2	19,6	50	30,4
24	26,2	-	60	33,8	14,8	50	35,2

4.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product CPR4BR, SN: **AA1908008E**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.207 & RSS Gen ISSUE 5 limits.

5. TRANSMITTER RADIATED EMISSION

5.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
 Date of test : April 30, 2020
 Ambient temperature : 21 °C
 Relative humidity : 48 %

5.2. TEST SETUP

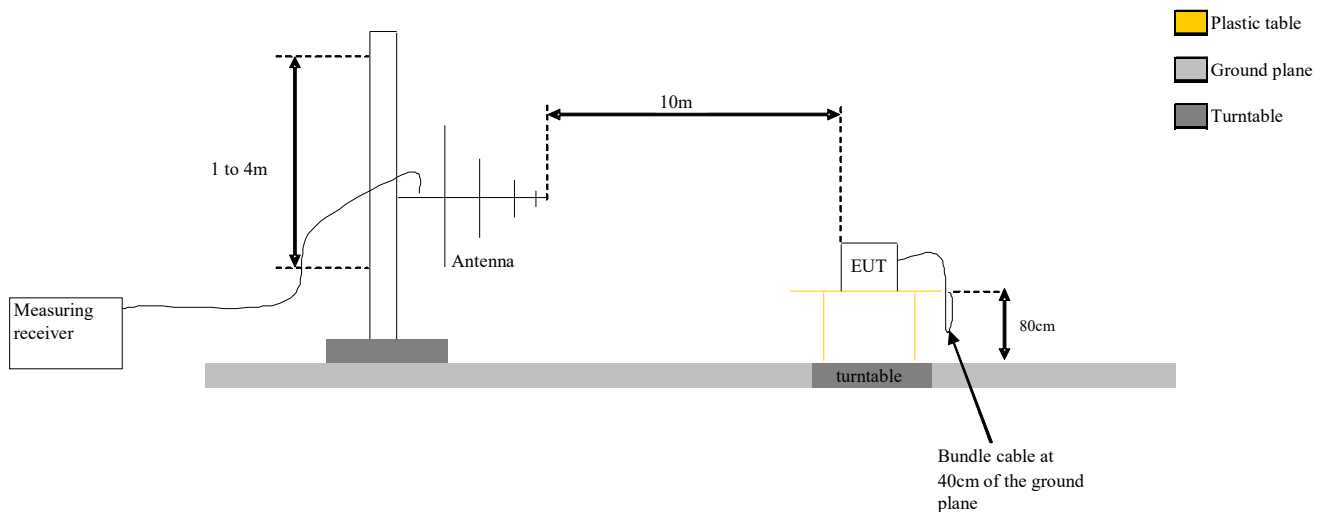
The product has been tested according to ANSI C63.10 (2013) and FCC part 15 subpart C.

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 **on an open area test site**. 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 place at 1.5m high above 1GHz and at 0.8m high under 1GHz. The EUT is placed **in a semi-anechoic chamber** above 1GHz and **on an open area test site** from 30MHz to 1GHz. Distance between measuring antenna and the EUT is **10m**. The height antenna is varied from 1m to 4m from 30MHz to 1GHz and above 1GHz is :

On mast, varied from 1m to 4m

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



Test Set up for radiated measurement in open area test site



Photograph for Transmitter Radiated Emission



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5.3. 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



5.4. TEST EQUIPMENT LIST

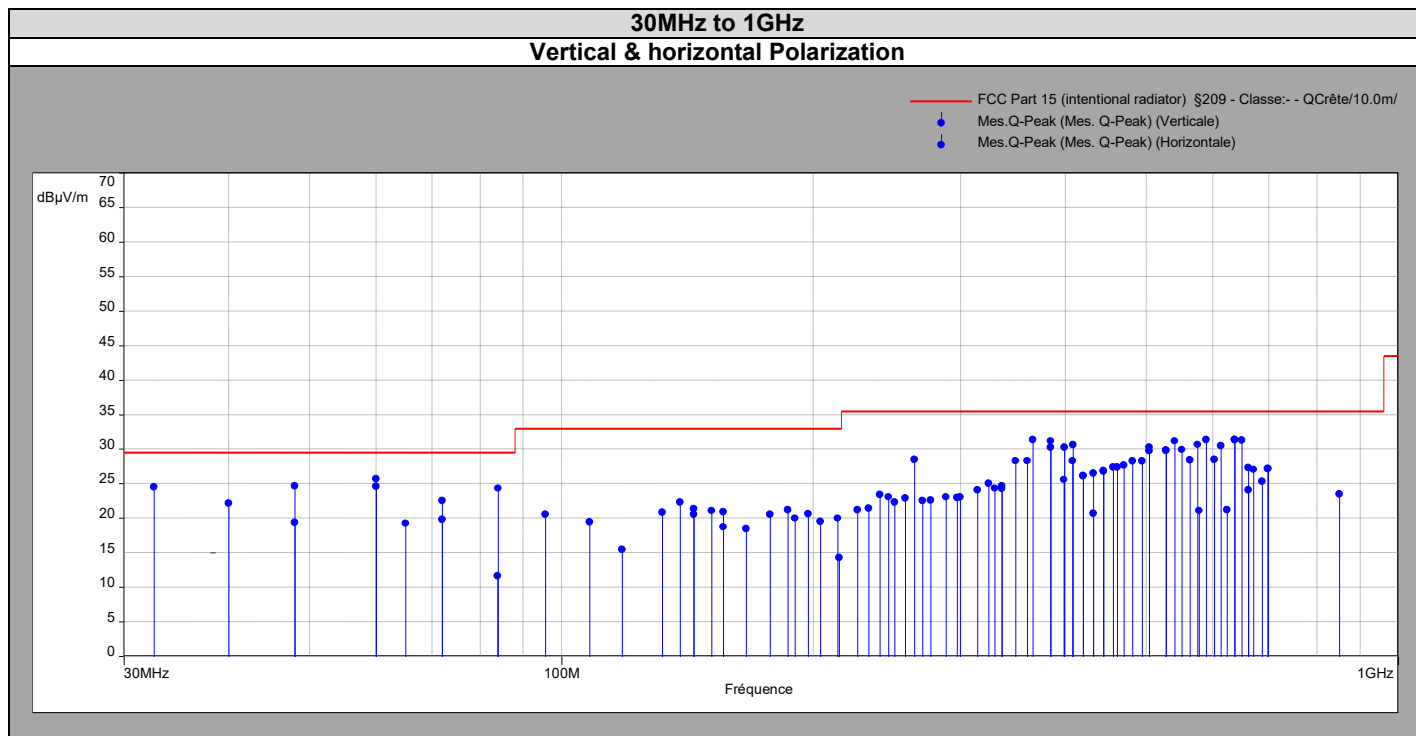
Test equipment used					
Description	Manufacturer	Model	Identifier	Last Calibration date	Calibration due date
Open test site	LCIE	-	F2000400	2019-06	2020-06
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2018-10	2020-10
Cable	-	-	A5329444	2019-12	2020-12
Bilog antenna	CHASE	CBL 6112A	C2040040	2019-04	2020-04
Preamplifier	HEWLETT PACKARD	8449B	A4069002	2018-04	2020-04
Horn	EMCO	3115	C2042016	2019-06	2020-06
Cable	-	-	A5329449	2019-12	2020-12
Cable	-	-	A5329876	2019-12	2020-12
Cable	-	-	A5329542	2019-08	2020-08
Cable	-	-	A5329368	2019-12	2020-12
Cable	-	-	A5329416	2019-12	2020-12
Loop antenna	Scharzbeck	FMZB	C2040209	2018-03	2020-03

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

5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None Divergence:

5.6. RESULTS





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9kHz to 30MHz				
Polarization	Frequency (MHz)	Peak Level (dB μ V/m)	QPeak Level (dB μ V/m)	Limit (dB μ V/m)
parallel	0.01605	-	58,3	183.5
parallel	0.0246	-	83,52	181.3
parallel	0.0321	-	58,04	177.5
parallel	0.04755	-	51,93	174.1
parallel	0.0621	-	48,09	171.7
parallel	0.08655	-	39,85	168.9
parallel	0.10035	-	33,55	167.6
parallel	0.1311	-	32,96	165.3
parallel	0.161	-	39,2	163.5
parallel	0.2345	-	53,8	160.2
parallel	0.2965	-	50,73	158.2
parallel	0.394	-	35,08	155.7
parallel	0.5885	-	49,86	132.2
parallel	0.701	-	32,26	130.7
parallel	0.791	-	28,5	129.6
parallel	0.898	-	36,52	128.5
parallel	1.182	-	39,33	126.2
parallel	1.488	-	32,45	124.2
parallel	1.766	-	37,67	69.5
parallel	2.086	-	30,24	69.5
parallel	2.388	-	30,97	69.5
parallel	2.682	-	27,21	69.5
parallel	2.946	-	32,31	69.5
parallel	3.534	-	22,98	69.5



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9kHz to 30MHz				
Polarization	Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit (dBµV/m)
Perpendicular	0.01545	-	46,61	183.8
Perpendicular	0.02085	-	96,87	181.2
Perpendicular	0.0246	-	51,74	179.4
Perpendicular	0.04605	-	51,42	174.3
Perpendicular	0.0696	-	39,26	170.8
Perpendicular	0.08595	-	38,8	168.9
Perpendicular	0.0933	-	35,71	168.2
Perpendicular	0.11475	-	32,28	166.4
Perpendicular	0.13815	-	40,28	164.8
Perpendicular	0.1625	-	41,47	163.4
Perpendicular	0.232	-	40,05	160.3
Perpendicular	0.299	-	34,22	158.1
Perpendicular	0.587	-	30,49	132.2
Perpendicular	0.895	-	25,4	128.6
Perpendicular	1.176	-	23,62	69.5
Perpendicular	1.49	-	22,35	69.5
Perpendicular	1.766	-	21,54	69.5
Perpendicular	2.088	-	23,75	69.5
Perpendicular	2.356	-	25,62	69.5
Perpendicular	2.684	-	29,54	69.5
Perpendicular	2.944	-	24,69	69.5
Perpendicular	3.28	-	23,9	69.5
Perpendicular	3.536	-	20,29	69.5

30MHz to 1GHz				
Polarization	Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit (dBµV/m)
Vertical	60	25.69	29.5	3.81
Vertical	504	29.77	35.5	5.73
Vertical	637.7	31.39	35.5	4.11
Horizontal	365.8	31.35	35.5	4.15
Horizontal	384	31.25	35.5	4.25
Horizontal	637.7	31.39	35.5	4.11

Above 1GHz						
Polarization	Frequency (MHz)	Duty cycle correction (dB)	Average Level (dBµV/m)	Average Limit (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)
all emissions were greater than 20 dB below the limit						

5.7. CONCLUSION

Unwanted Emission in restricted frequency bands measurement performed on the sample of the product CPR4BR, SN: AA1908008E, in configuration and description presented in this test report, show levels compliant to the 47 CFR PART 15.209 & RSS-Gen ISSUE 5 limits.

6. UNCERTAINTIES CHART

47 CFR Part 15.209 & 15.207 Kind of test	Wide uncertainty laboratory (k=2) ±x(dB) / (Hz)/ ms	Uncertainty limit
Measurement of conducted disturbances in voltage on the AC power port (9 kHz – 150 kHz)	2,67	3.8
Measurement of conducted disturbances in voltage on the AC power port (150 kHz – 30 MHz)	2,67	3.4
Measurement of conducted disturbances in voltage on the telecommunication port. (AAN)	3,67	5.0
Measurement of conducted disturbances in current (current clamp)	2,73	2.9
Measurement of disturbance power	2,67	4.5
Measurement of radiated magnetic field from 10kHz to 30MHz in SAC V01	4,48	/
Measurement of radiated magnetic field from 10kHz to 30MHz in SAC C01	4,48	/
Measurement of radiated electric field from 30 to 1000MHz in horizontal position on the OATS (Ecuelles)	4,88	6.3
Measurement of radiated electric field from 1 to 18GHz on the Ecuelles site	5.16	/
Measurement of radiated electric field from 30 to 1000MHz in vertical position on the OATS (Ecuelles)	4,99	6.3
Measurement of radiated electric field from 30 to 1000MHz in horizontal position in SAC C01	5,08	6.3
Measurement of radiated electric field from 30 to 1000MHz in vertical position in SAC C01	5,16	6.3
Measurement of radiated electric field from 30 to 1000MHz in horizontal position in SAC V01	5,08	6.3
Measurement of radiated electric field from 30 to 1000MHz in vertical position in SAC V01	5,15	6.3
Measurement of radiated electric field from 1 to 6 GHz C01	5,1	5.2
Measurement of radiated electric field from 1 to 6 GHz V01	4,85	5.2
Measurement of radiated magnetic field from 10kHz to 30MHz on the OATS (Ecuelles)	4,48	/

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR. The conformity of the sample is directly established by the applicable limits values. This table includes all uncertainties maximum feasible for testing in the laboratory, whether or not made in this report