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ZIGBEE Template: Release February 6, 2020

TEST REPORT

N°: 166092-748231-A(FILE#1040131)

Version : 02

Subject

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

Issued to

ASTEEL FLASH DEVELOPPEMENT
43 Chemin du Vieux Chêne
38240 - MEYLAN
FRANCE

Apparatus under test

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

Home automation gateway module
OVERKIZ / SOMFY
OVERKIZ
Smartziz PCBA / TaHoma Beacon PCBA
O17196101F22180055
DWNBEECONPCB

Conclusion

See Test Program chapter

Test date

February 19, 2020 to February 21, 2020

Test location

Moirans

Test Site

6500A-1 & 6500A-3

Sample receipt date

February 19, 2020

Composition of document

60 pages

Document issued on

April 7, 2020

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PUBLICATION HISTORY

Version	Date	Author	Modification
01	February 24th	Majid MOURZAGH	Creation of the document
02	April 7, 2020	Majid MOURZAGH	Correction on Page 1 Trade Mark & Manufacturer informations

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	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP(1)
6dB Bandwidth	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA() <input type="checkbox"/> NP(1)
Duty Cycle	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NA <input type="checkbox"/> NP(1)
Maximum Conducted Output Power	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP(1)
Power Spectral Density	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP(1)
Conducted Spurious Emission at the Band Edge	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA() <input type="checkbox"/> NP(1)
Unwanted Emissions into Non-Restricted Frequency Bands	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA() <input type="checkbox"/> NP(1)
AC Power Line Conducted Emission	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA(2) <input type="checkbox"/> NP(1)
Unwanted Emissions into Restricted Frequency Bands	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP(1)
Receiver Radiated emissions	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" 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

PASS: EUT complies with standard's requirement

FAIL: EUT does not comply with standard's requirement

NA: Not Applicable

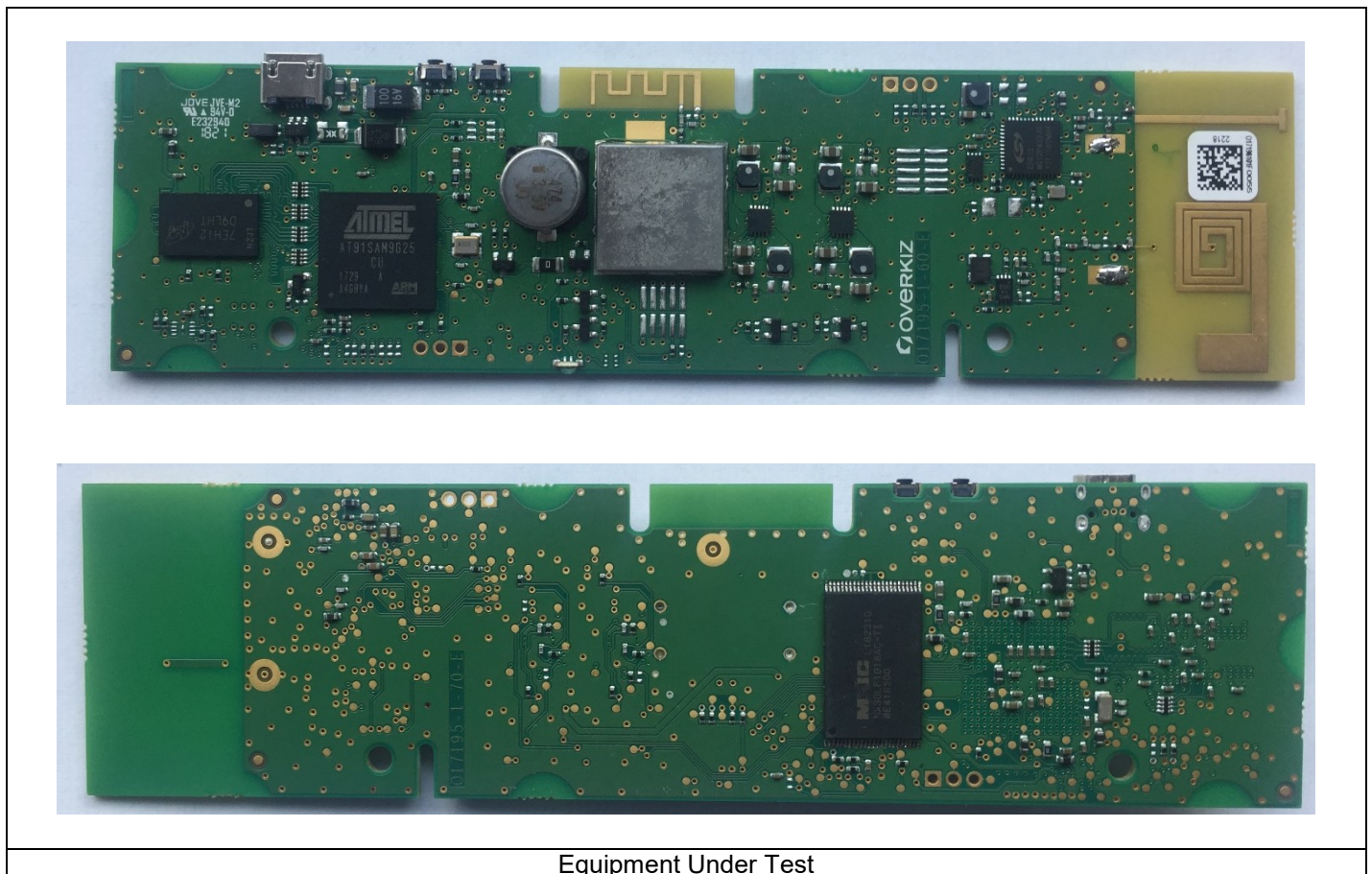
NP: Test Not Performed

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

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):

OVERKIZ / SOMFY Smartkiz PCBA / TaHoma Beecon PCBA
Serial Number: O17196101F22180055



Equipment Under Test

Power supply:

During all the tests, EUT is supplied by V_{nom} : 5VDC
 For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference / Sn	Comments
Supply1	<input type="checkbox"/> AC <input checked="" type="checkbox"/> DC <input type="checkbox"/> Battery	5Vusb	/	/

Voltage table used (for Power Line Conducted Emissions):

Type	Measurement performed:	
<input checked="" type="checkbox"/> AC	<input checked="" type="checkbox"/> 120VAC/60Hz	<input checked="" type="checkbox"/> 240VAC/50Hz

Inputs/outputs - Cable:

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

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop	DELL	/	Use to set the EUT
DUB-E100 USB 2.0 Ethernet Adapter	D-Link DUB-E100	S7291J3002309	/
USB 2.0 7-Port Mobile Powered Hub	/	D14-00015584	/
USB Testeur	/	/	/-

Equipment information:

Type:	<input checked="" type="checkbox"/> ZIGBEE		<input type="checkbox"/> RF4CE	
Number of Channel:	16			
Spacing channel:	5MHz			
Channel bandwidth:	2MHz			
Antenna Type:	<input checked="" type="checkbox"/> Integral	<input type="checkbox"/> External	<input type="checkbox"/> Dedicated	
Antenna connector:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Temporary for test	
Transmit chains:	1			
	Single antenna			
	Gain: 0dBi			
Beam forming gain:	No			
Type of equipment:	<input checked="" type="checkbox"/> Stand-alone	<input type="checkbox"/> Plug-in	<input type="checkbox"/> Combined	
Ad-Hoc mode:	<input type="checkbox"/> Yes		<input checked="" type="checkbox"/> No	
Duty cycle:	<input checked="" type="checkbox"/> Continuous duty	<input type="checkbox"/> Intermittent duty	<input type="checkbox"/> 100% duty	
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 checked="" type="checkbox"/> -10°C
	Tnom:	20°C		
	Tmax:	<input type="checkbox"/> 35°C	<input type="checkbox"/> 55°C	<input checked="" type="checkbox"/> 40°C
Type of power source:	<input type="checkbox"/> AC power supply	<input checked="" type="checkbox"/> DC power supply		<input type="checkbox"/> Battery
Operating voltage range:	Vnom:	<input type="checkbox"/> 230V/50Hz		<input checked="" type="checkbox"/> 5Vdc



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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	<input checked="" type="checkbox"/>



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	<input checked="" type="checkbox"/> Test mode 1 (1) <input type="checkbox"/> Alternative test mode()
6dB Bandwidth	<input checked="" type="checkbox"/> Test mode 1 (1) <input type="checkbox"/> Alternative test mode()
Maximum Conducted Output Power	<input checked="" type="checkbox"/> Test mode 1 (1) <input type="checkbox"/> Alternative test mode()
Power Spectral Density	<input checked="" type="checkbox"/> Test mode 1 (1) <input type="checkbox"/> Alternative test mode()
Conducted Spurious Emission at the Band Edge	<input checked="" type="checkbox"/> Test mode 1 (1) <input type="checkbox"/> Alternative test mode()
Unwanted Emissions into Non-Restricted Frequency Bands	<input checked="" type="checkbox"/> Test mode 1 (1) <input type="checkbox"/> Alternative test mode()
AC Power Line Conducted Emission	<input checked="" type="checkbox"/> Test mode 1 (1) <input type="checkbox"/> Alternative test mode()
Unwanted Emissions into Restricted Frequency Bands	<input checked="" type="checkbox"/> Test mode 1 (1) <input type="checkbox"/> Alternative test mode()

- (1) Following commands with the specific test software "X" 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. :	KIZOS: kizos-P000503-2019.6.4-14i.tar
-		

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 : February 20, 2020
Ambient temperature : 22 °C
Relative humidity : 35 %

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:

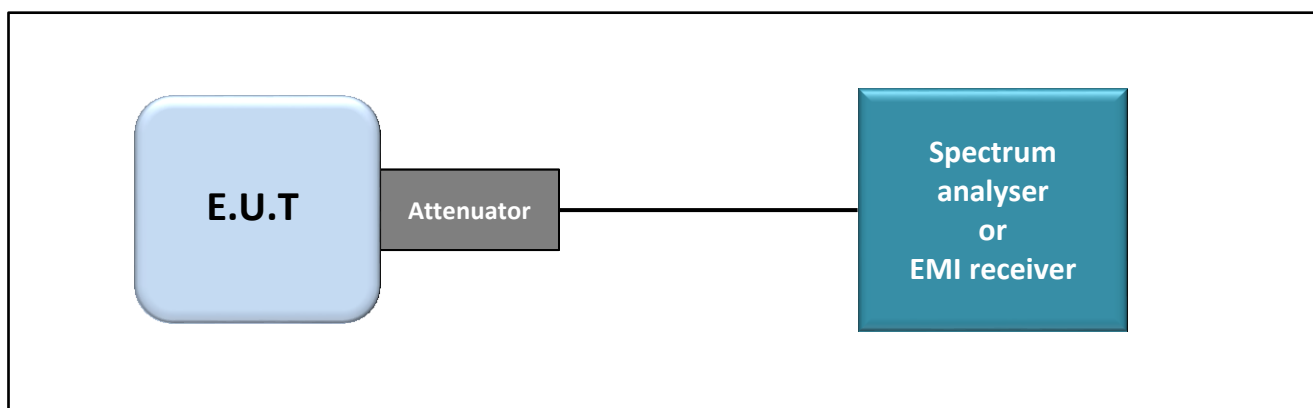
- Conducted Method
- Radiated Method

- Test Procedure:

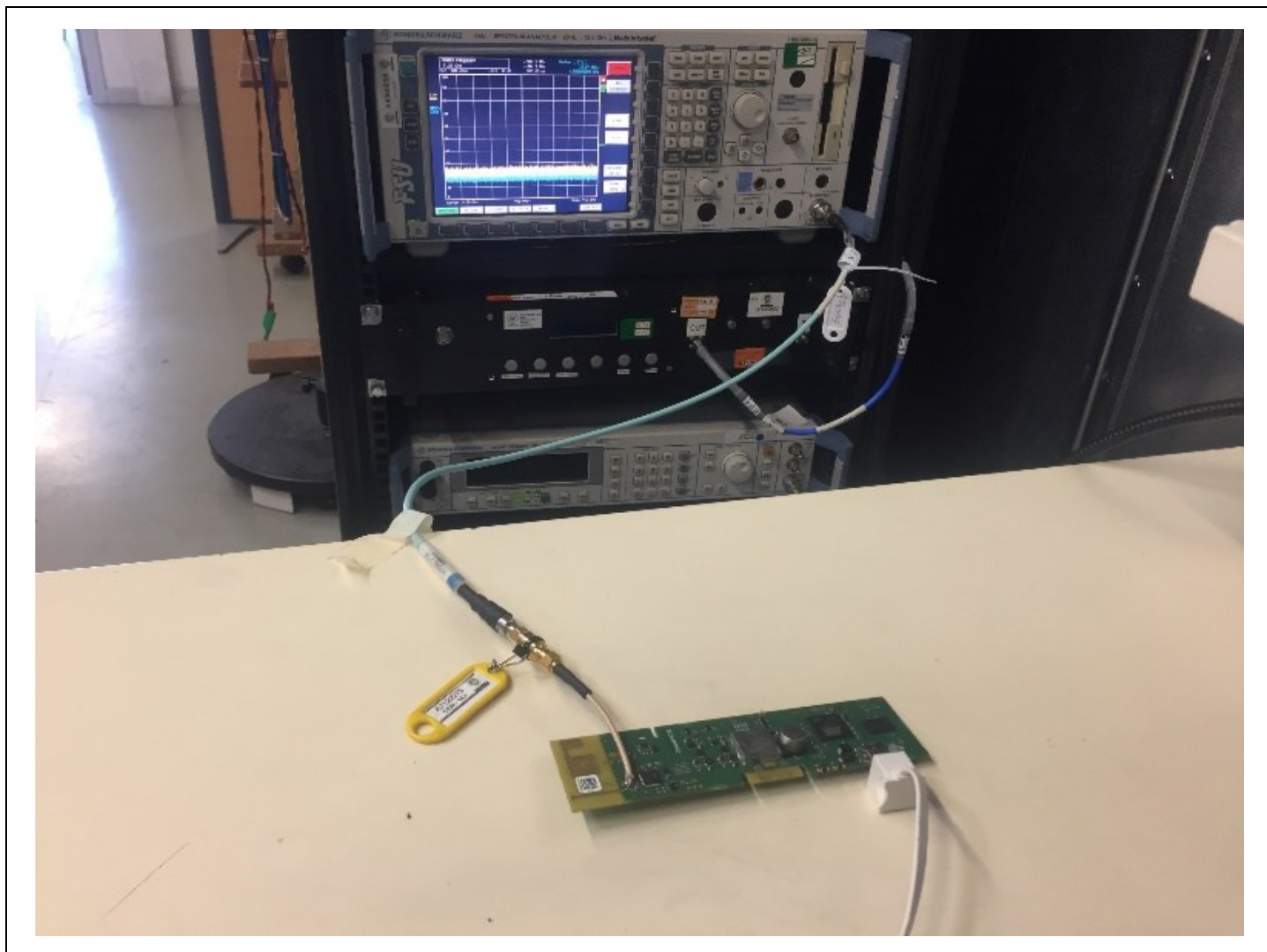
- RSS-Gen Issue 5 § 6.7
- ANSI C63.10 § 6.9.2

Measurement Procedure:

- a) RBW shall be in the range of 1% to 5% of the anticipated occupied bandwidth
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW
- c) SPAN = Capture all products of the modulation process
- d) Detector = Peak.
- e) Trace mode = max hold.
- f) Sweep = auto couple.
- g) Allow the trace to stabilize.
- h) 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

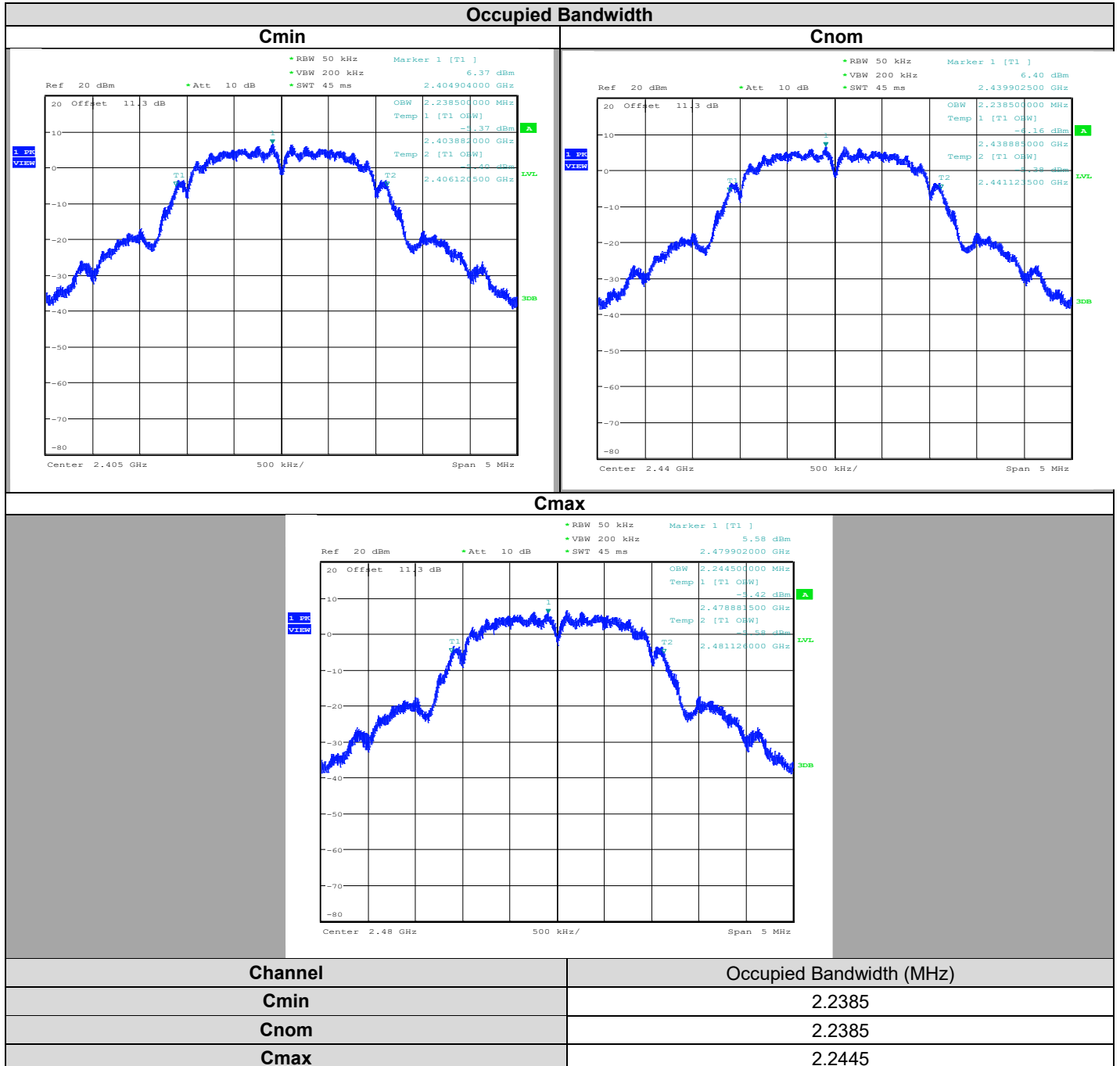
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Spectrum analyzer	ROHDE & SCHWARZ	FSU 26	A4060058	09/19	09/21
Attenuator 10dB	TECHNIWAVE	_	A7122273	06/18	06/20
Cable Measure	_	36G	A5329604	02/19	02/20
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20

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



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3.5. RESULTS



3.6. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **OVERKIZ / SOMFY Smartkiz PCBA / TaHoma Beecon PCBA**, SN: **O17196101F22180055**, in configuration and description presented in this test report, show levels **compliant to the 47 CFR PART 15.247 & RSS-GEN ISSUE 5** limits.

4. 6dB EMISSION BANDWIDTH

4.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : February 20, 2020
Ambient temperature : 22 °C
Relative humidity : 35 %

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:

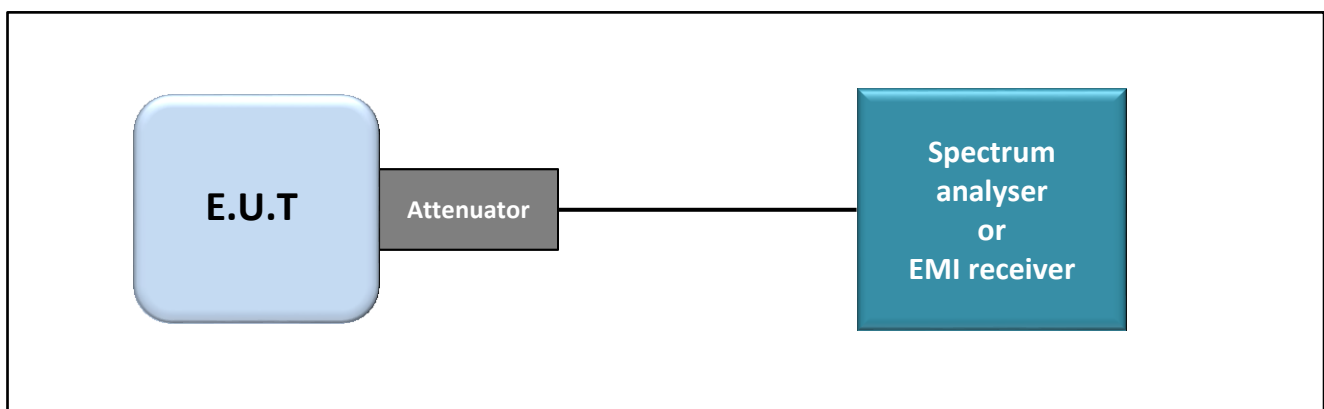
- Conducted Method
- Radiated Method

- Test Procedure:

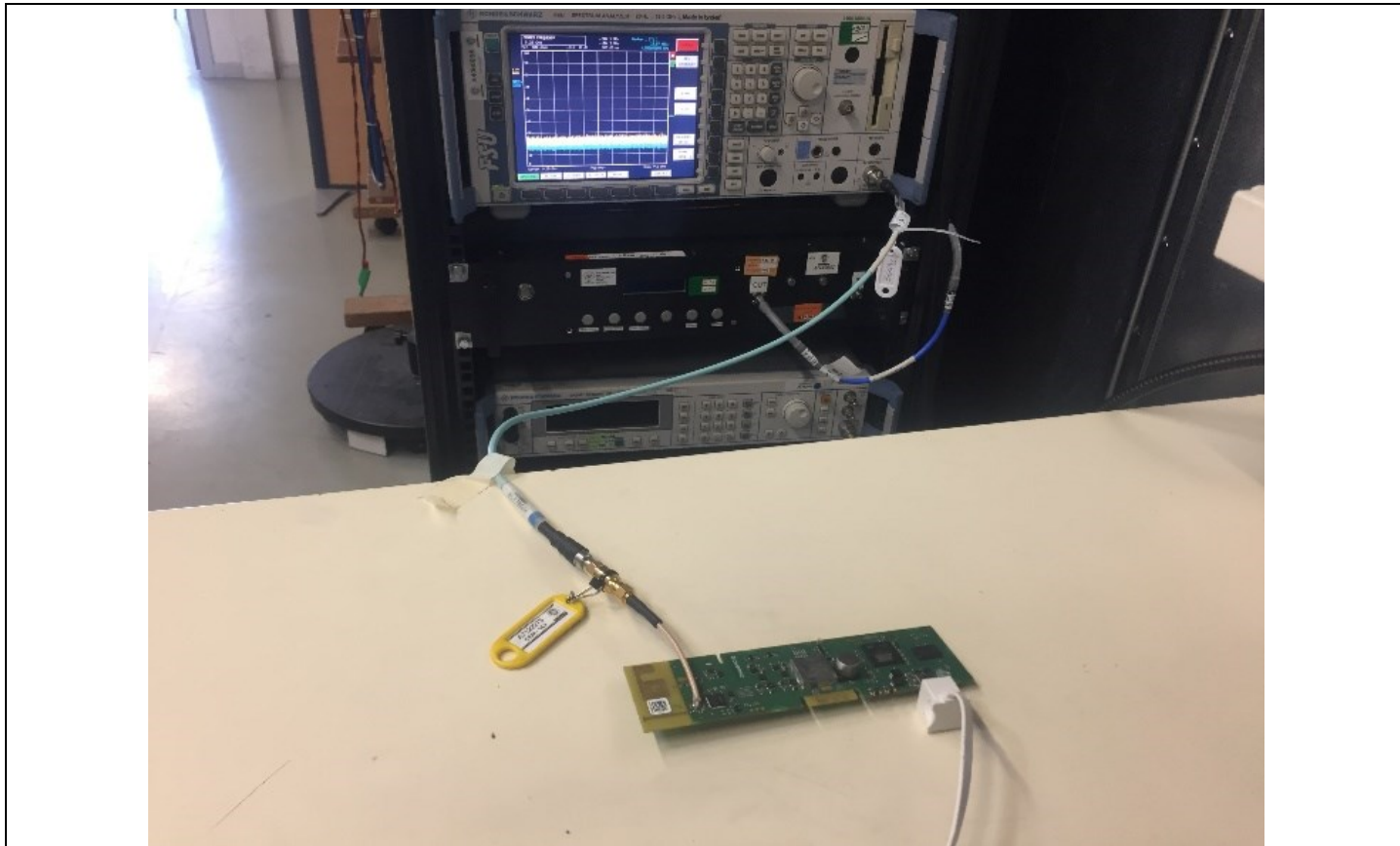
- KDB 558074 D01 DTS Meas Guidance v05r02 § 8.2

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

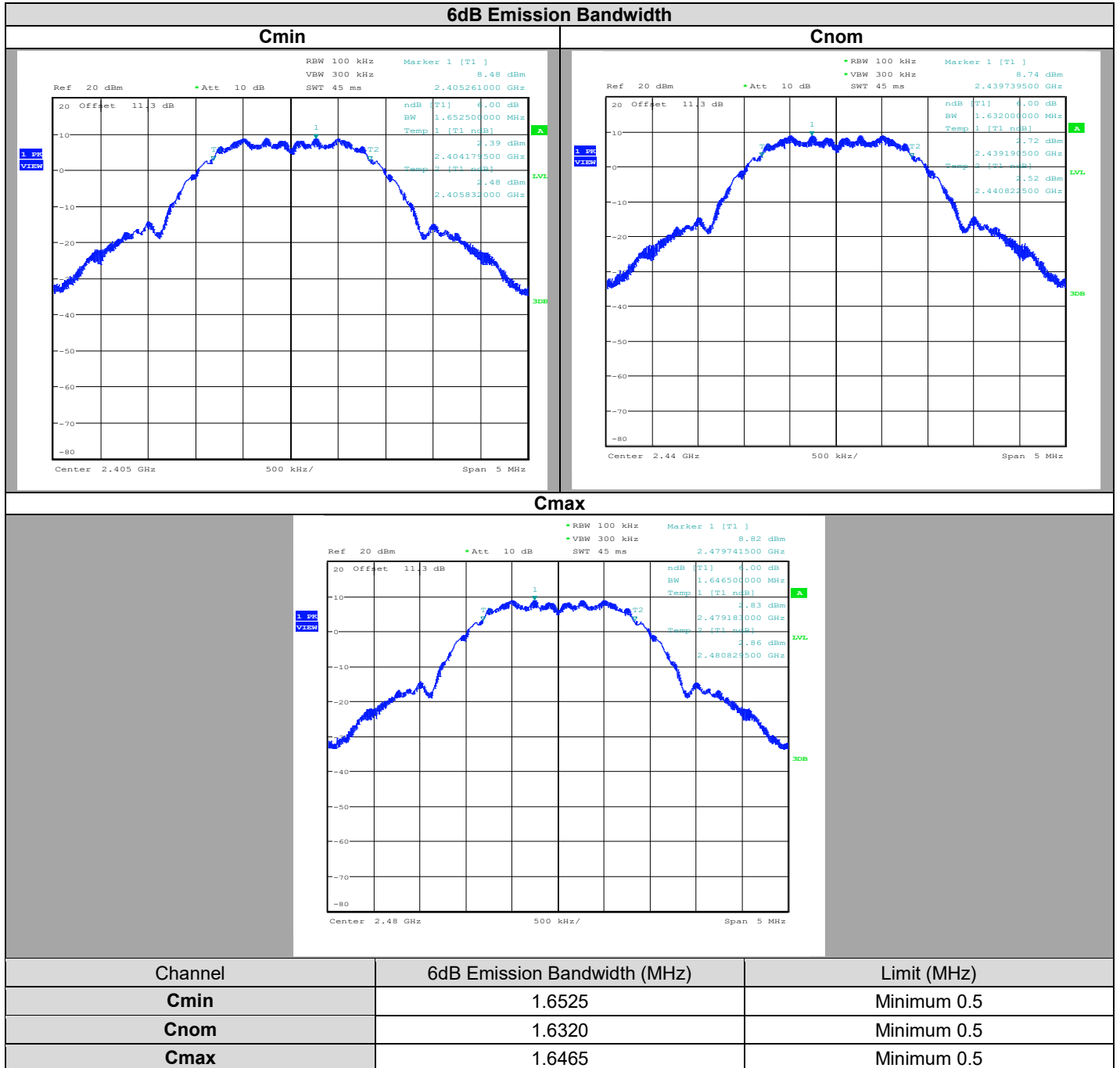
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Spectrum analyzer	ROHDE & SCHWARZ	FSU 26	A4060058	09/19	09/21
Attenuator 10dB	TECHNIWAVE	_	A7122273	06/18	06/20
Cable Measure	_	36G	A5329604	02/19	02/20
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20

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



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4.5. RESULTS



4.6. CONCLUSION

6dB Emission Bandwidth measurement performed on the sample of the product **OVERKIZ / SOMFY Smartkiz PCBA / TaHoma Beacon PCBA**, SN: **O17196101F22180055**, 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 : February 20, 2020
Ambient temperature : 22 °C
Relative humidity : 35 %

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

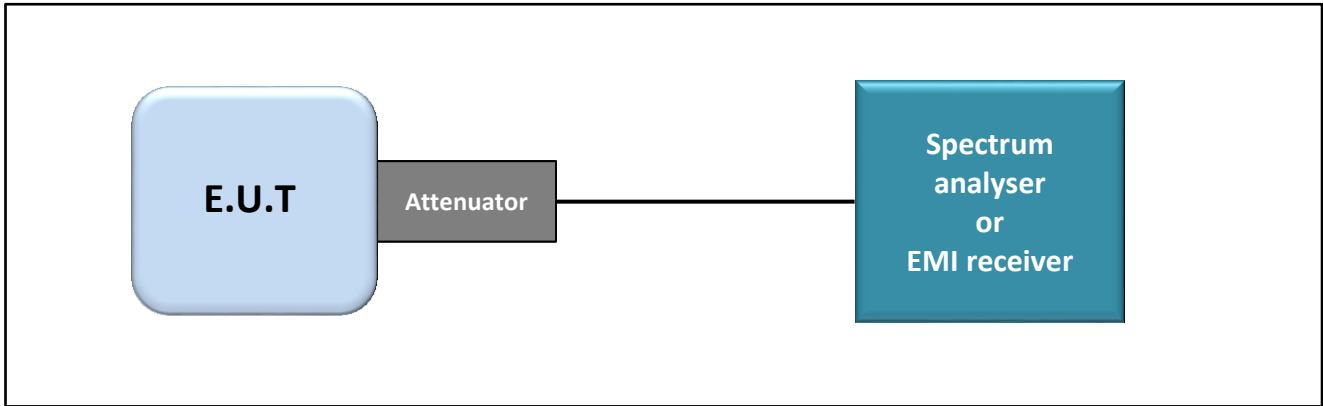
This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

- a) Set the RBW \geq DTS bandwidth.
- b) Set VBW \geq 3 x RBW.
- c) Set span \geq 3 x 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.

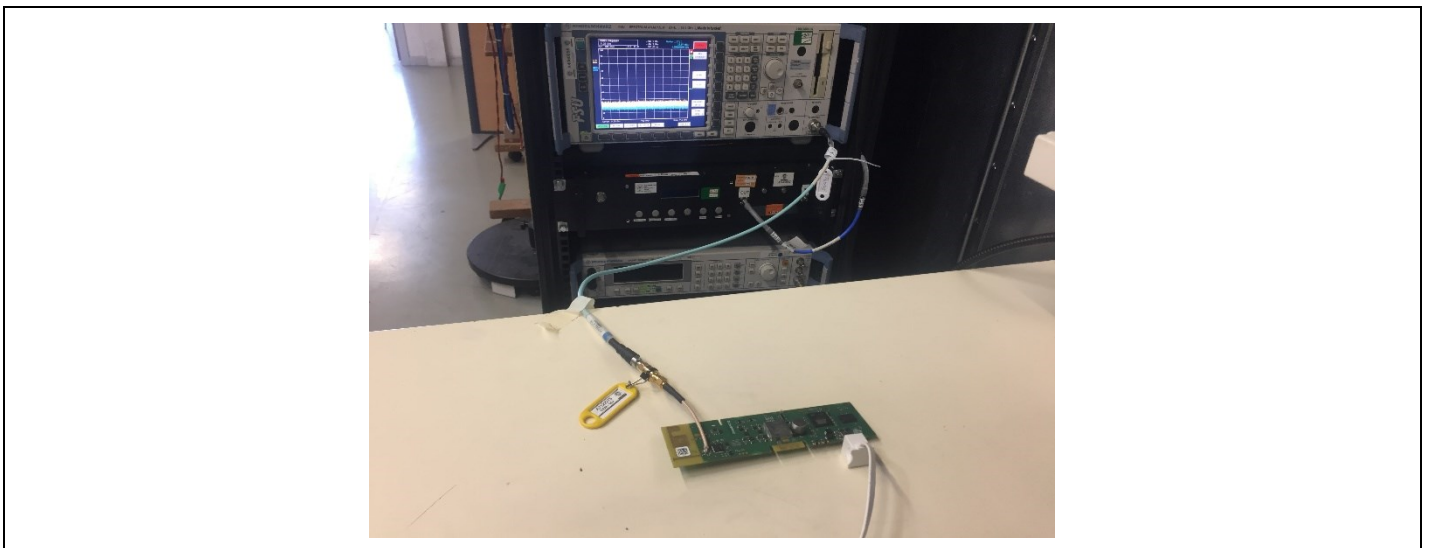
- KDB 558074 D01 DTS Meas Guidance v05r02 § 8.3.1.2

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 x RBW
- c) Set the span \geq 1.5 x 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

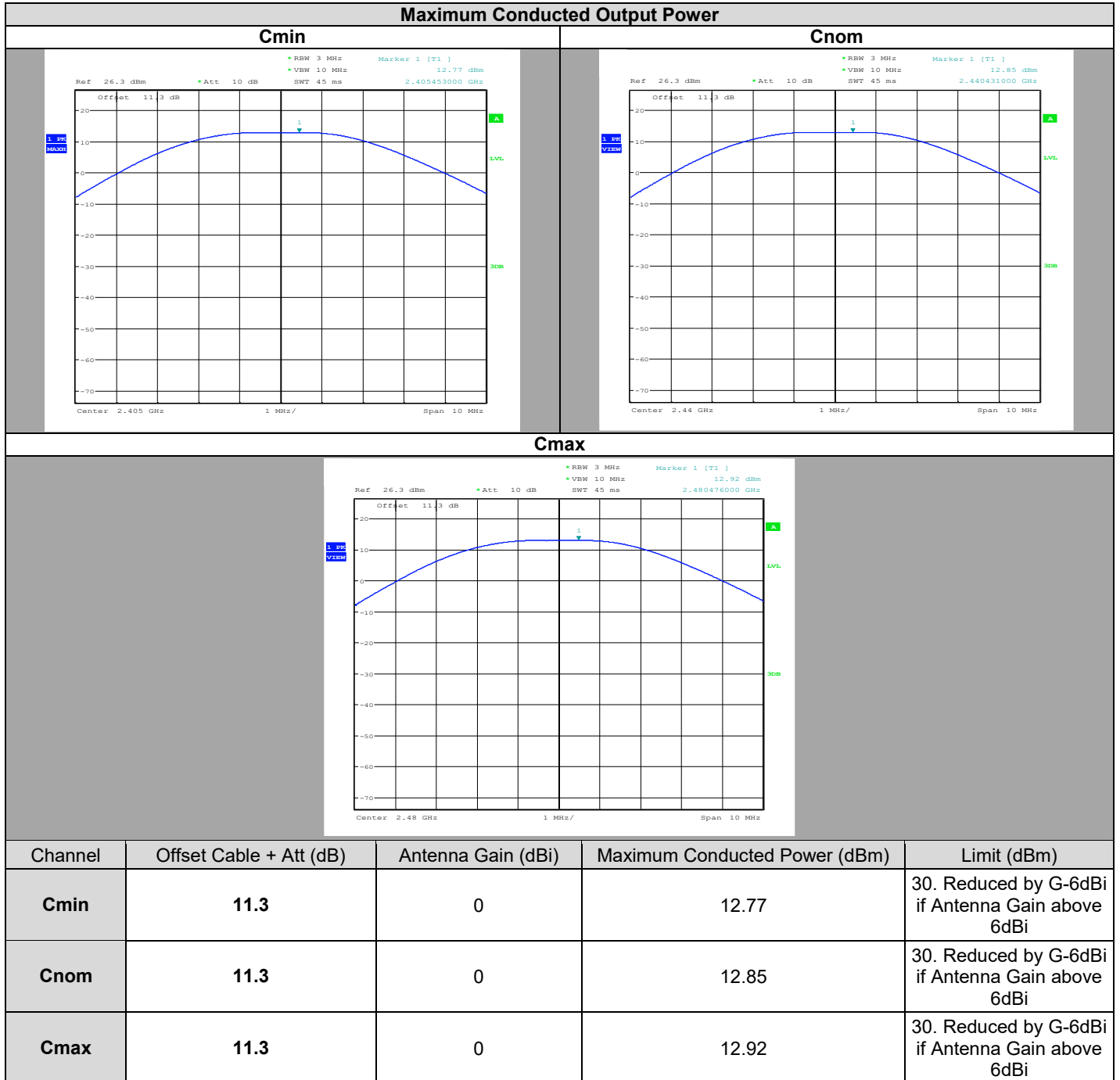
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Spectrum analyzer	ROHDE & SCHWARZ	FSU 26	A4060058	09/19	09/21
Attenuator 10dB	TECHNIWAVE	_	A7122273	06/18	06/20
Cable Measure	_	36G	A5329604	02/19	02/20
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20

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



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5.5. RESULTS



5.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **OVERKIZ / SOMFY Smartkiz PCBA / TaHoma Beacon PCBA**, SN: **017196101F22180055**, 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 : February 20, 2020
Ambient temperature : 22 °C
Relative humidity : 35 %

6.2. TEST SETUP

- The Equipment Under Test is installed:

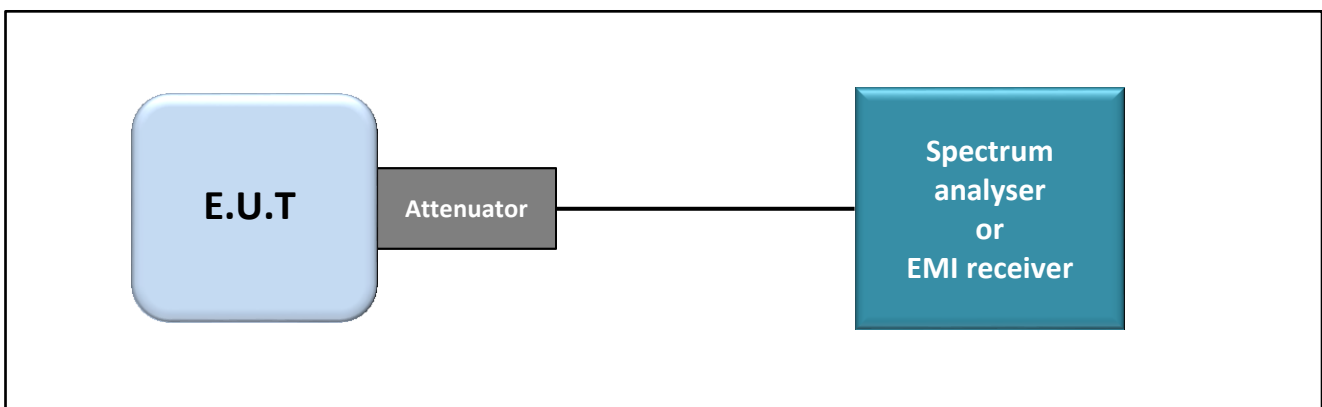
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

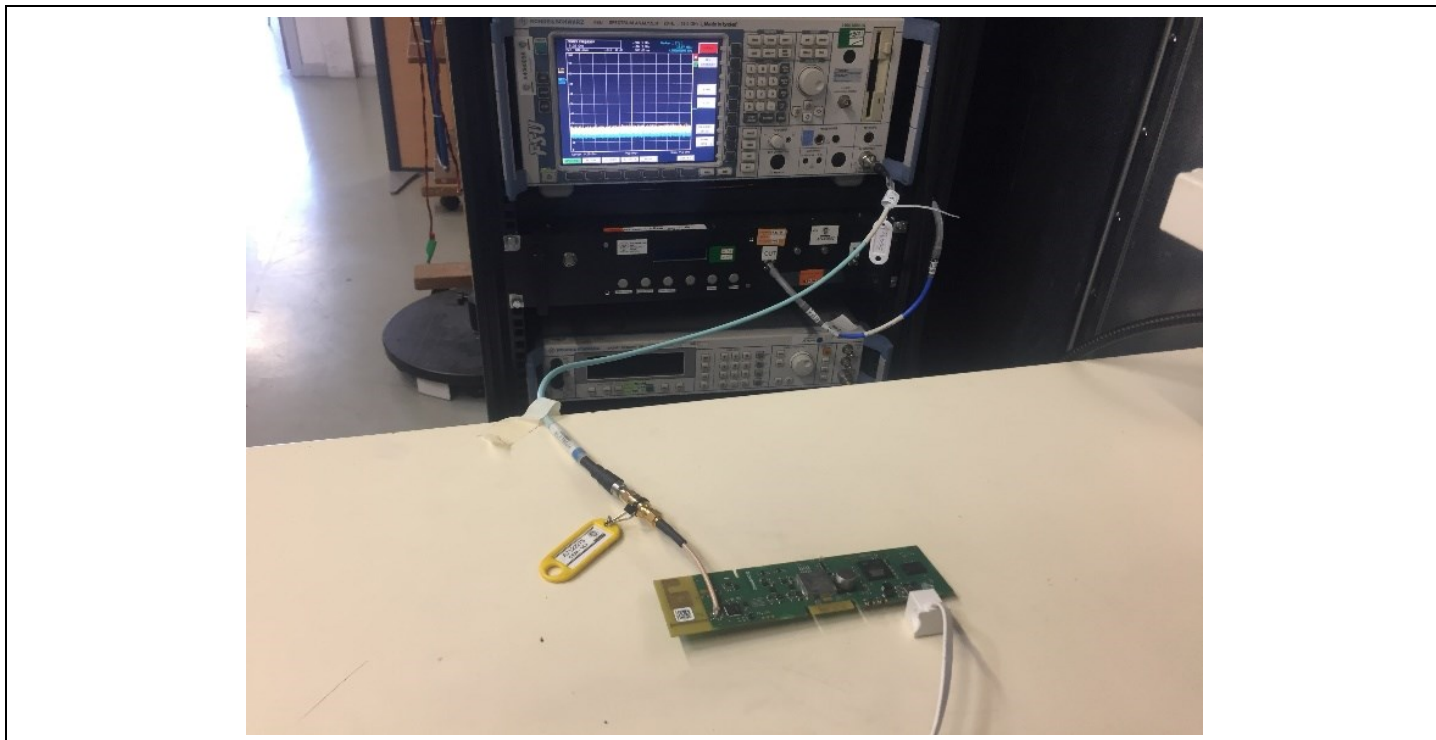
- Conducted Method
- Radiated Method

- 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

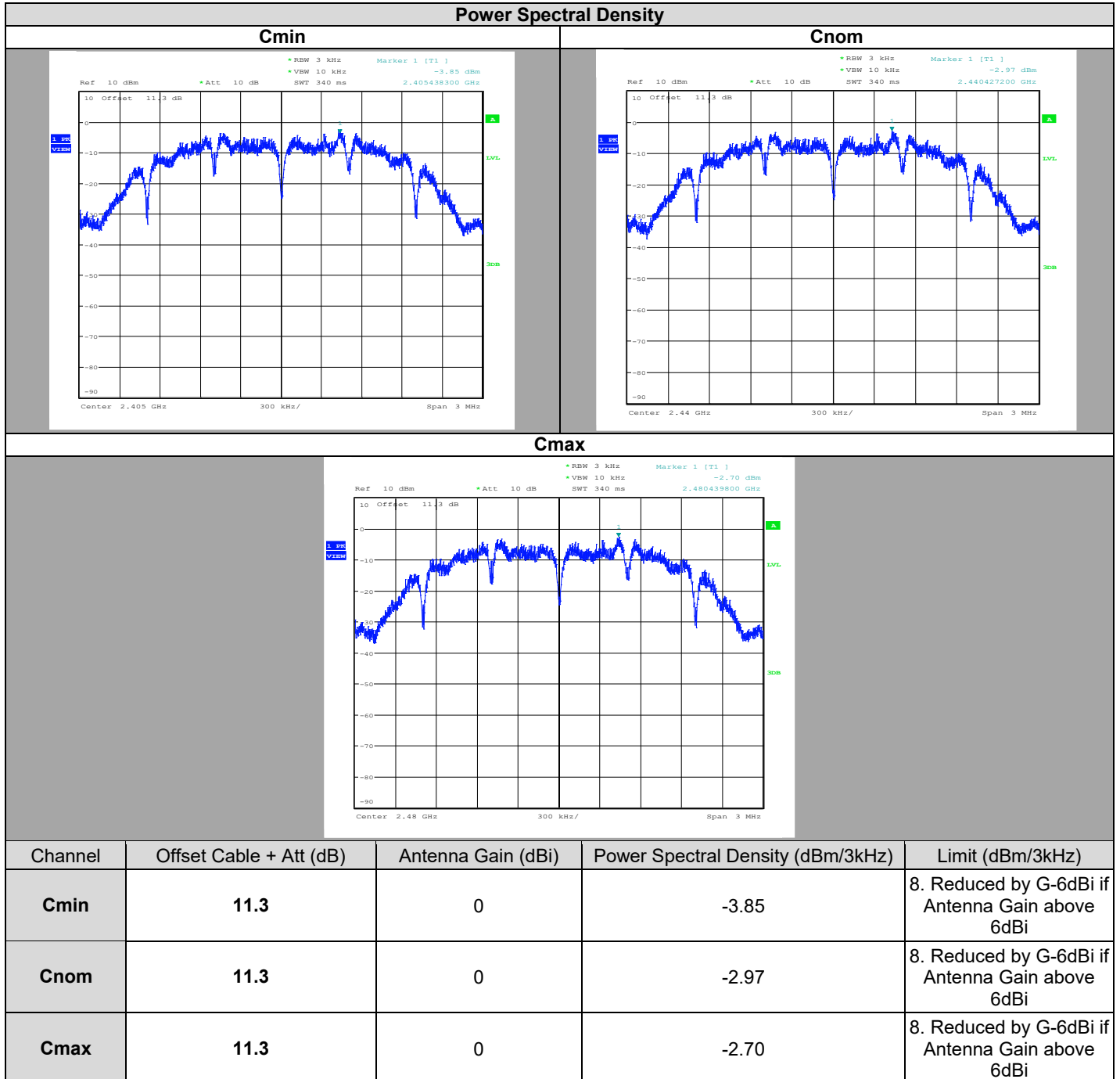
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Spectrum analyzer	ROHDE & SCHWARZ	FSU 26	A4060058	09/19	09/21
Attenuator 10dB	TECHNIWAVE	_	A7122273	06/18	06/20
Cable Measure	_	36G	A5329604	02/19	02/20
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20

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



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6.5. RESULTS



6.6. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **OVERKIZ / SOMFY Smartkiz PCBA / TaHoma Beacon PCBA**, SN: **O17196101F22180055**, 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 : February 20, 2020
Ambient temperature : 22 °C
Relative humidity : 35 %

7.2. TEST SETUP

- The Equipment Under Test is installed:

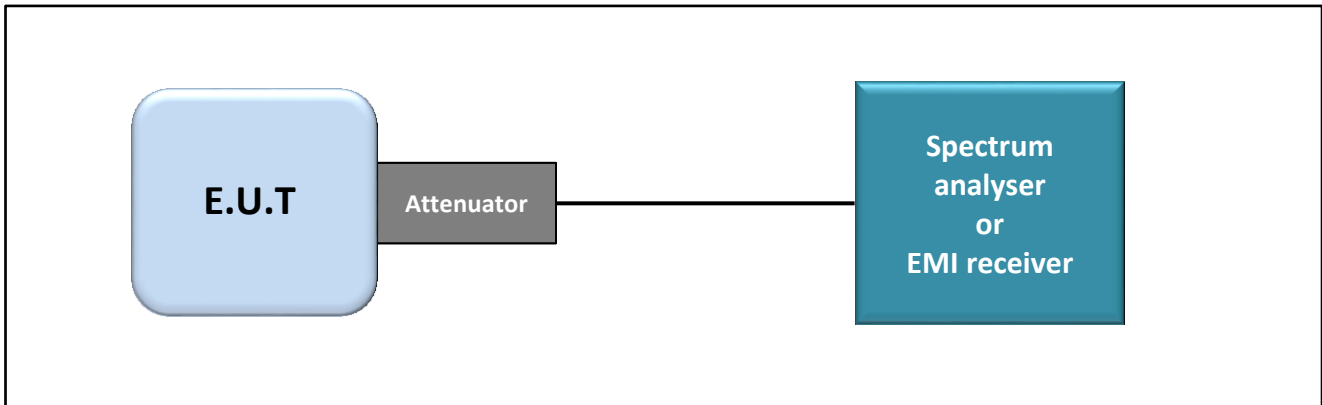
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

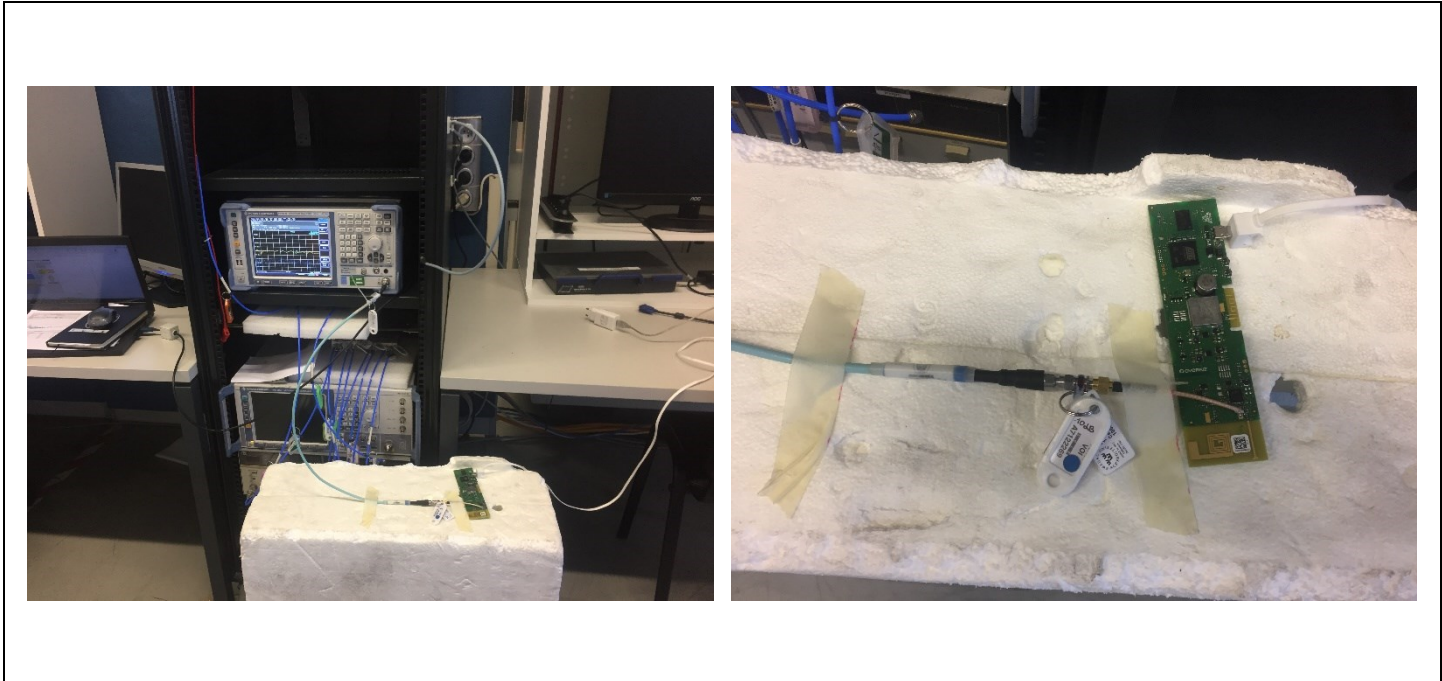
- Conducted Method
- Radiated Method

- 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

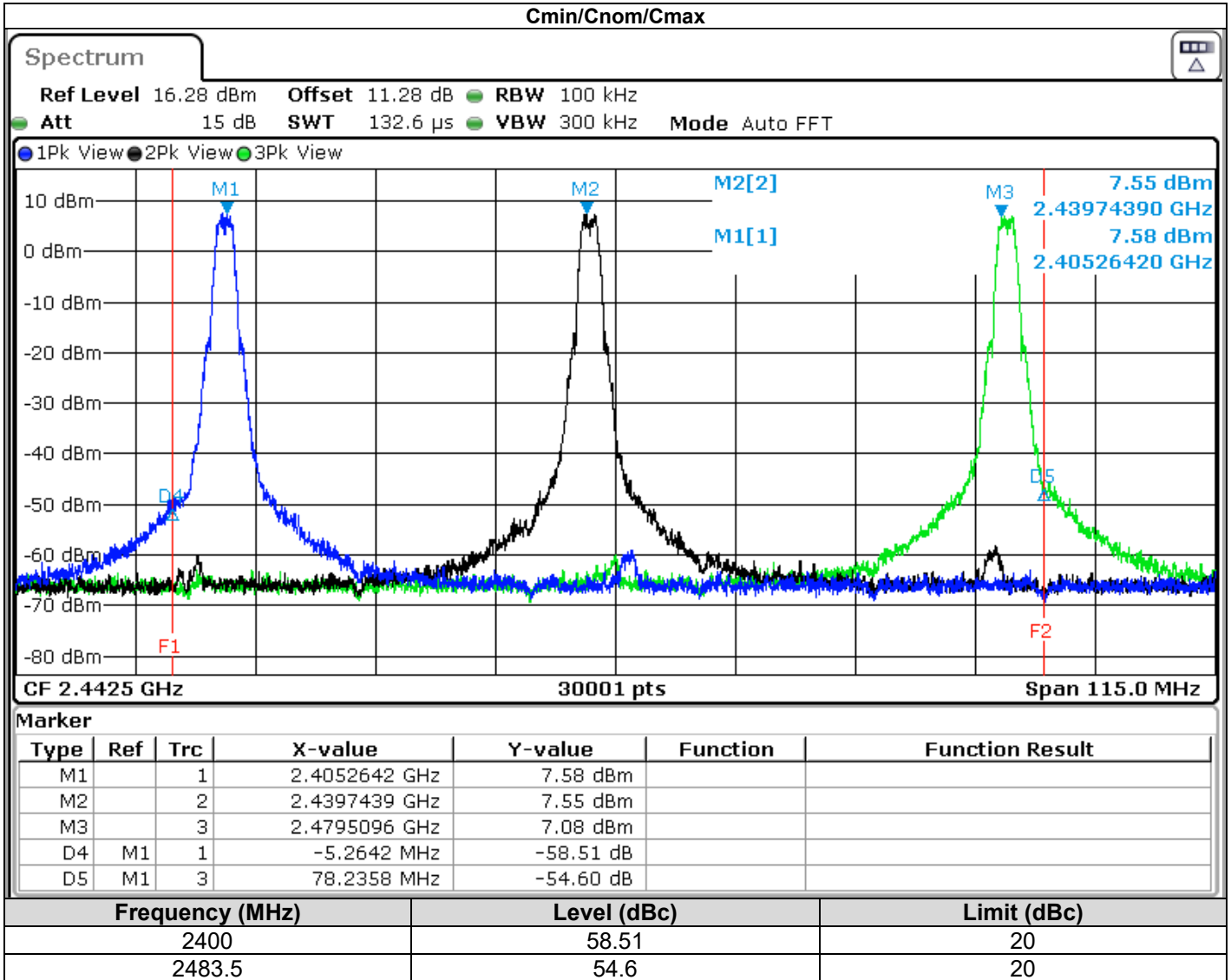
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	05/21	05/23
Attenuator 10dB	AEROFLEX	_	A7122269	12/17	04/20
Cable Measure	_	36G	A5329604	02/19	02/20
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20

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



L C I E

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 **OVERKIZ / SOMFY Smartkiz PCBA / TaHoma Beacon PCBA**, SN: **O17196101F22180055**, 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 : February 20, 2020
Ambient temperature : 22 °C
Relative humidity : 35 %

8.2. TEST SETUP

- The Equipment under Test is installed:

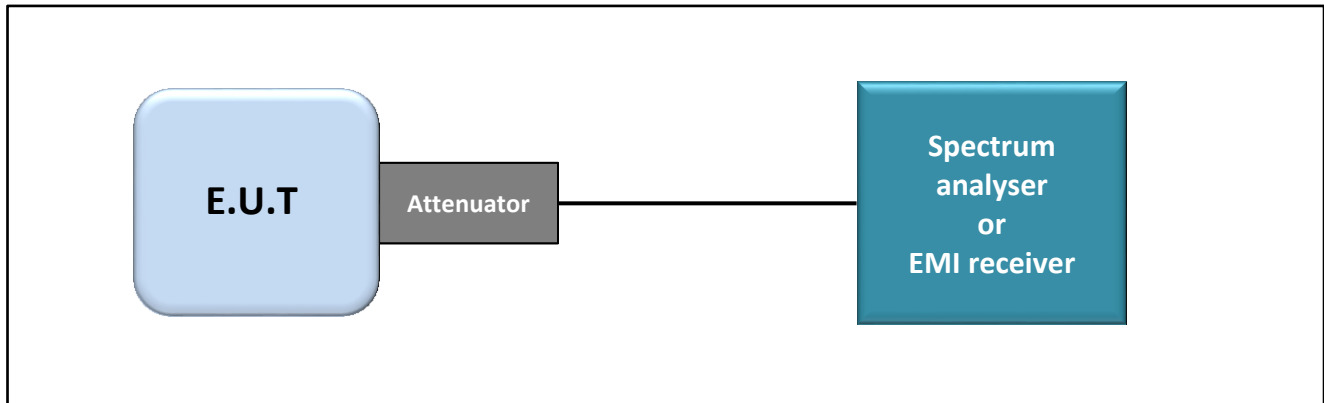
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

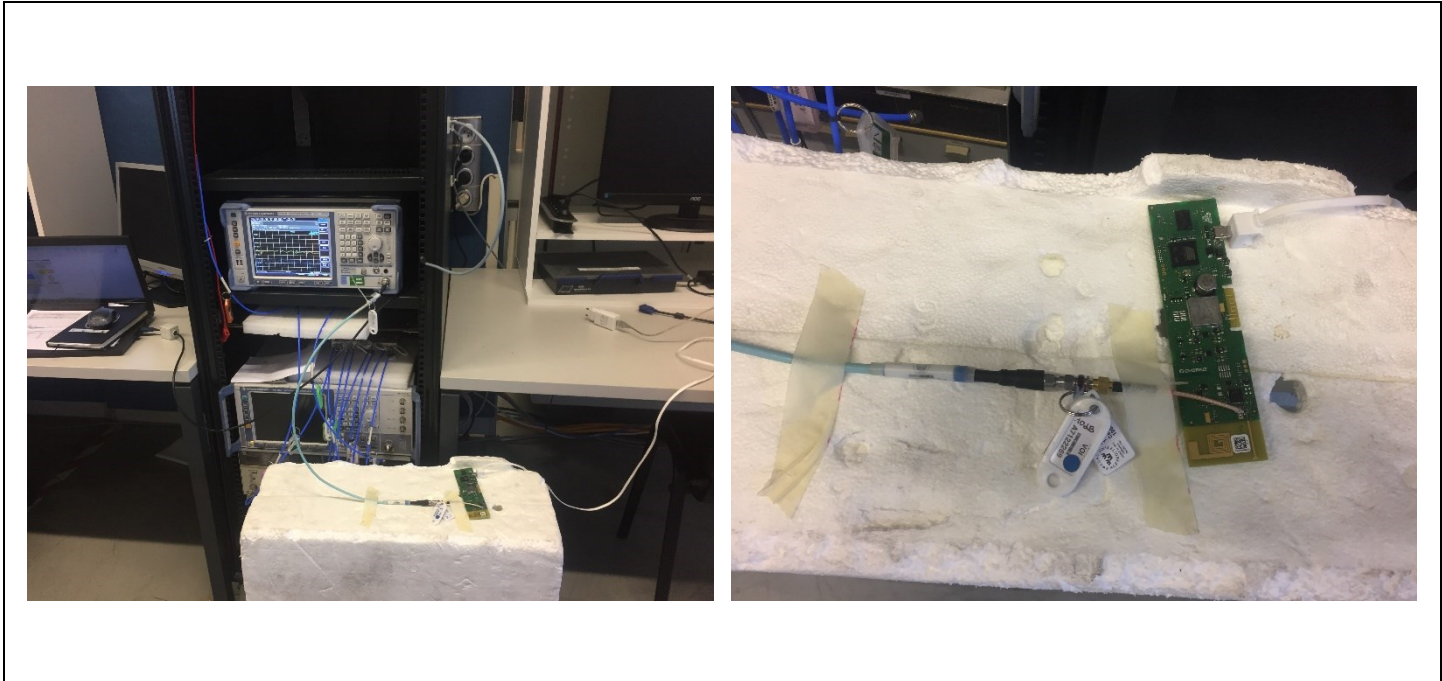
- Conducted Method
- Radiated Method

- 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

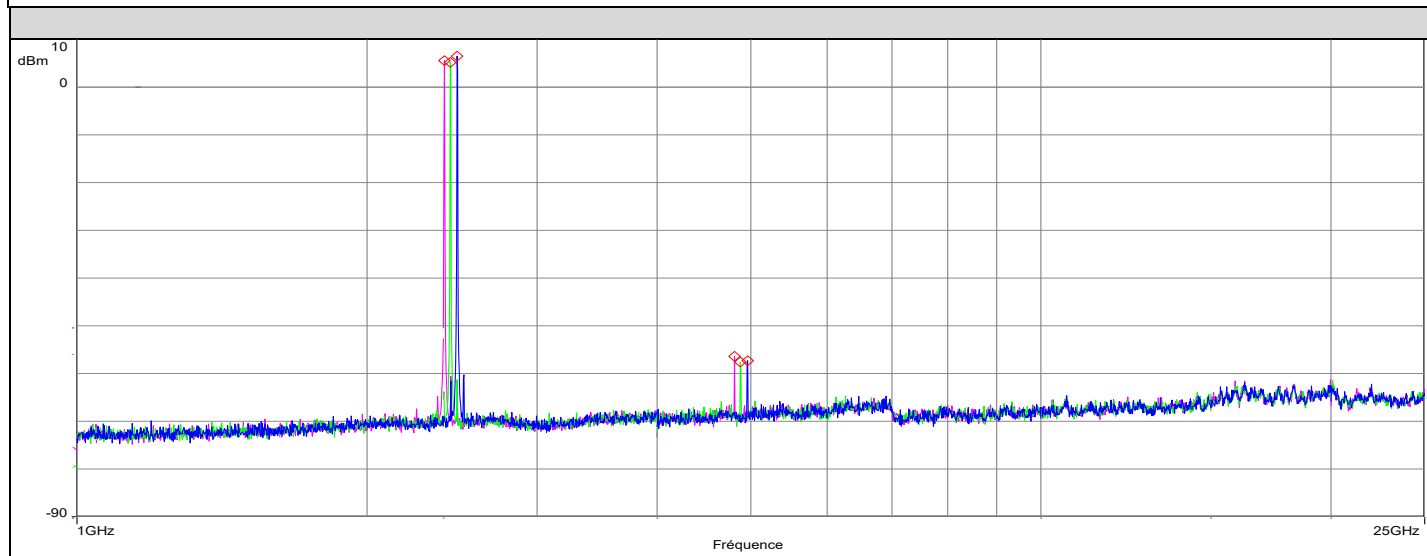
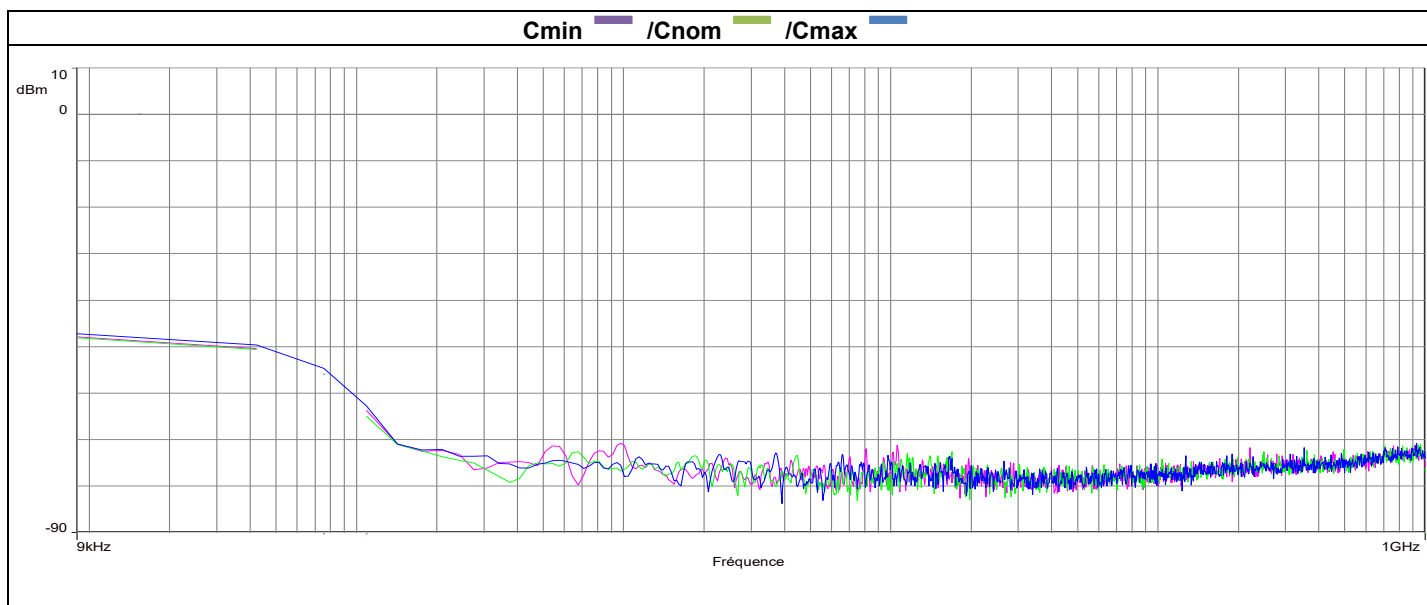
All Spurious Emissions must be at least 20 below the Fundamental Radiator Level

8.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	05/21	05/23
Attenuator 10dB	AEROFLEX	-	A7122269	12/17	04/20
Cable Measure	-	36G	A5329604	02/19	02/20
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	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

8.5. RESULTS



Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2405.00	5.56		
4810	-56.36	61.92	20
2440.00	5.2		
4880	-57.56	62.76	20
2480.00	6.46		
4960	-57.34	63.8	20



8.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands measurement performed on the sample of the product **OVERKIZ / SOMFY Smartkiz PCBA / TaHoma Beacon PCBA**, SN: **017196101F22180055**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

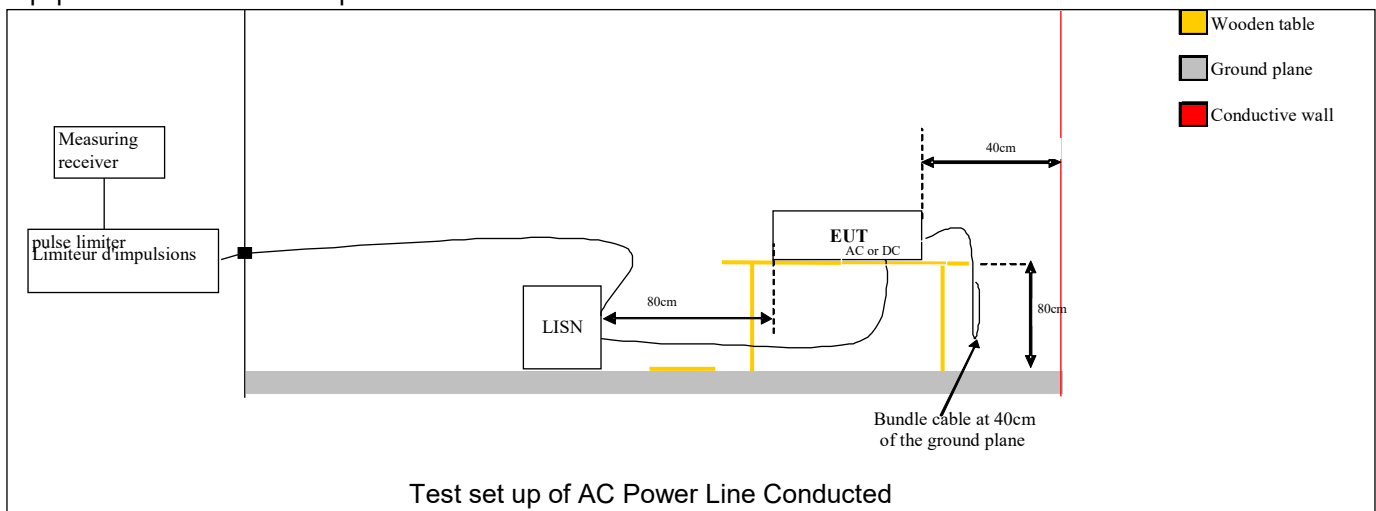
9. AC POWER LINE CONDUCTED EMISSIONS

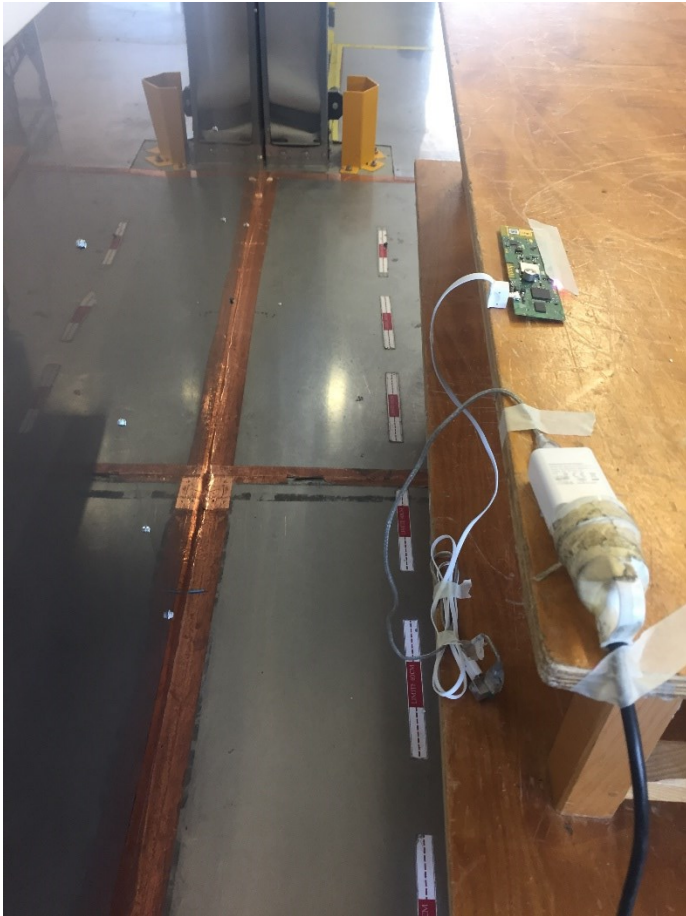
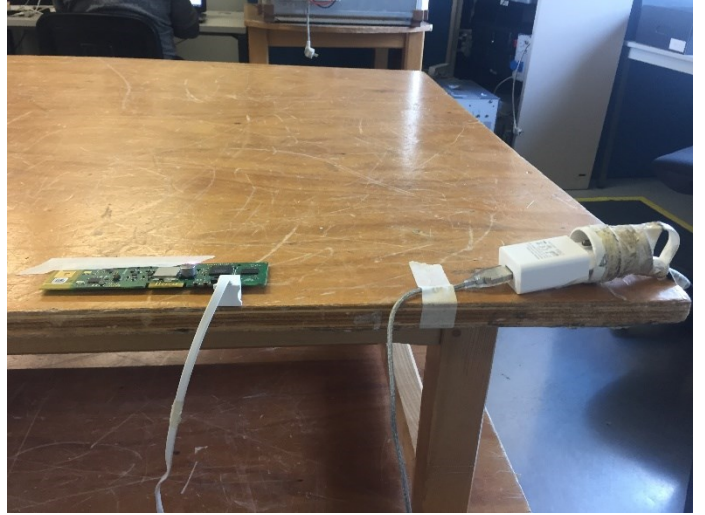
9.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
 Date of test : February 21, 2020
 Ambient temperature : 20 °C
 Relative humidity : 36 %

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.





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	–	–	A5329585	12/18	02/20
EMC comb generator	LCIE SUD EST	–	A3169098		
LISN	ROHDE & SCHWARZ	ENV216	C2320291	02/19	02/20
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	12/17	02/20
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Transient limiter	ROHDE & SCHWARZ	ESH3-Z2	A7122204	02/19	02/20

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

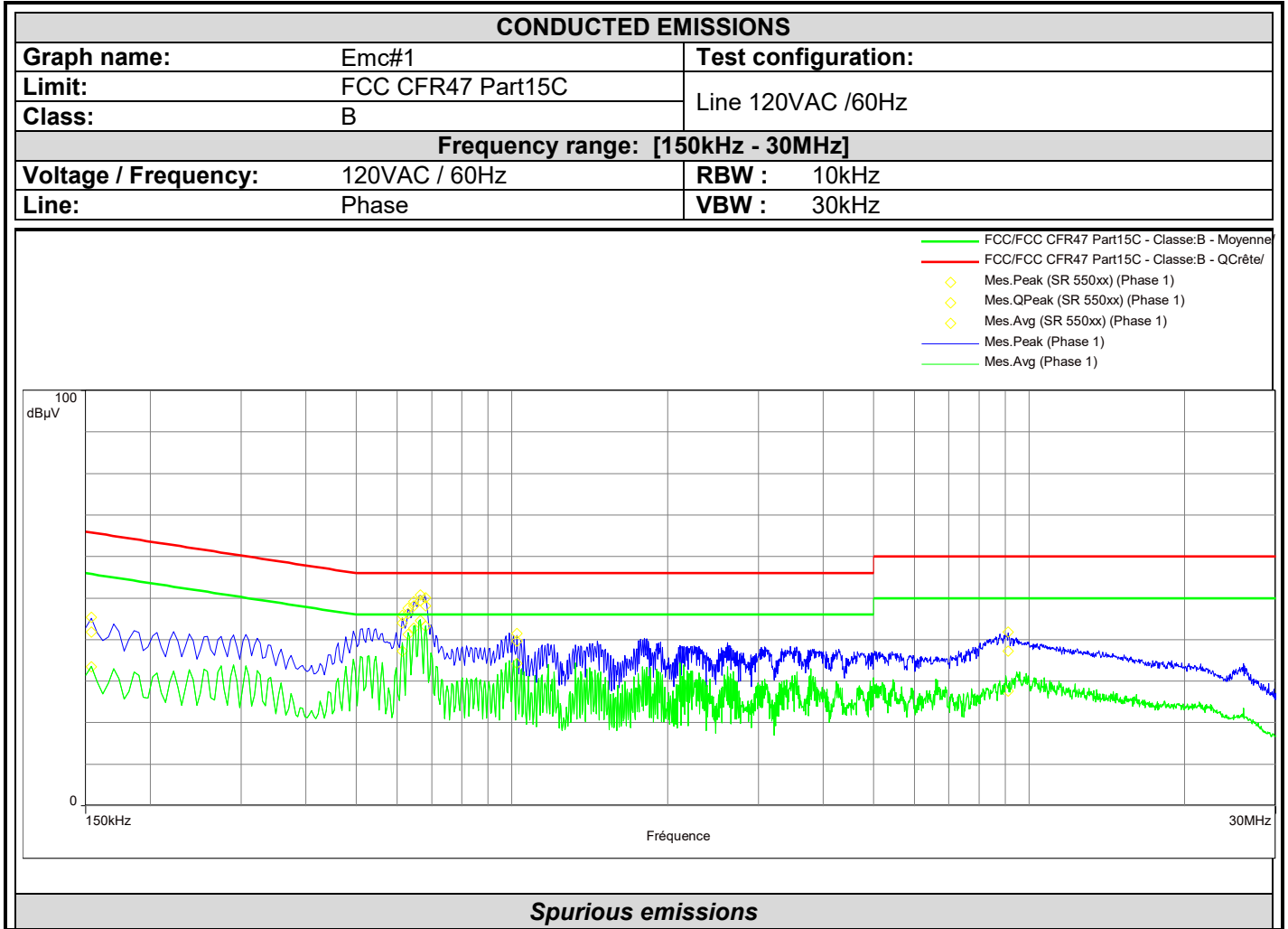
9.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None Divergence:



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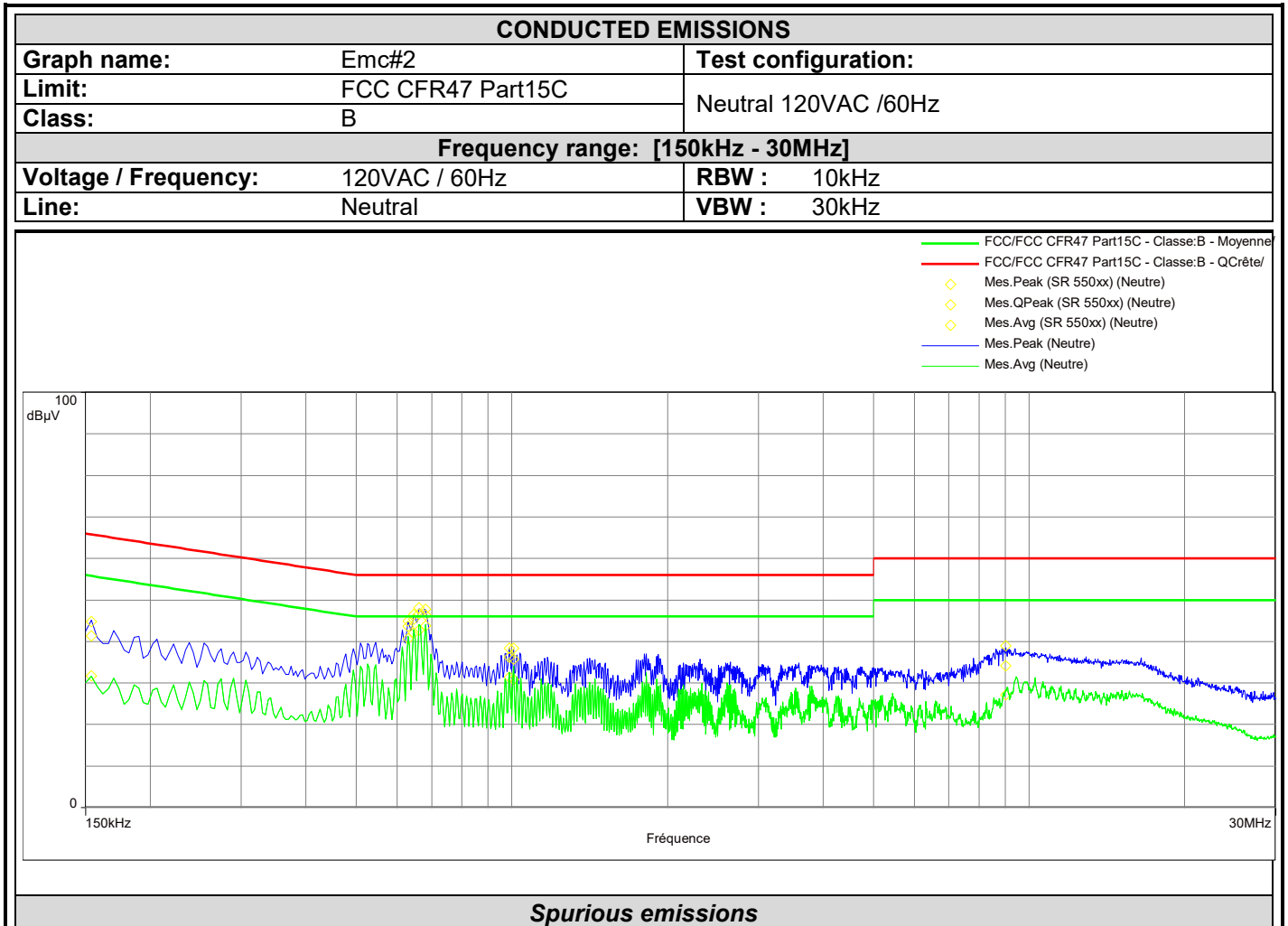
9.6. RESULTS



Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.154	45.4	41.9	65.8	-23.9	33.4	55.8	-22.4	Phase 1	19.4
0.614	45.8	44.0	56.0	-12.0	37.3	46.0	-8.7	Phase 1	19.7
0.630	47.5	46.3	56.0	-9.7	41.2	46.0	-4.8	Phase 1	19.7
0.646	49.2	48.1	56.0	-7.9	42.7	46.0	-3.3	Phase 1	19.6
0.666	50.8	49.4	56.0	-6.6	44.5	46.0	-1.5	Phase 1	19.6
0.682	50.1	48.1	56.0	-7.9	43.2	46.0	-2.8	Phase 1	19.6
1.024	41.4	39.7	56.0	-16.3	34.2	46.0	-11.8	Phase 1	19.6
9.104	41.8	37.2	60.0	-22.8	27.6	50.0	-22.4	Phase 1	20.2



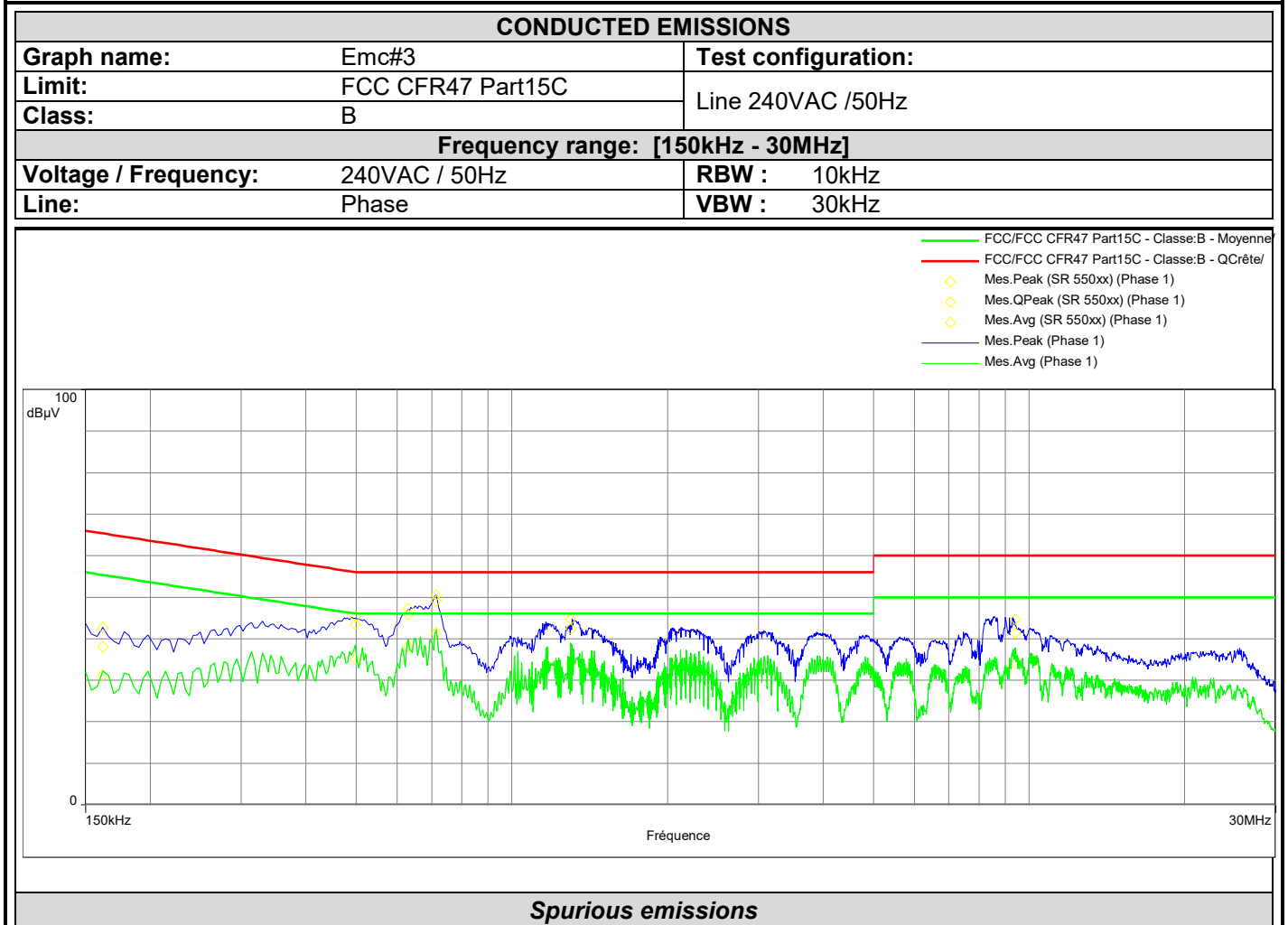
L C I E



Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.154	44.8	41.4	65.8	-24.4	31.7	55.8	-24.1	Neutre	19.4
0.630	44.9	43.6	56.0	-12.4	40.7	46.0	-5.3	Neutre	19.7
0.646	46.5	45.3	56.0	-10.7	42.0	46.0	-4.0	Neutre	19.6
0.662	48.2	46.6	56.0	-9.4	42.7	46.0	-3.3	Neutre	19.6
0.682	47.8	46.4	56.0	-9.6	43.8	46.0	-2.2	Neutre	19.6
0.990	38.4	36.2	56.0	-19.8	31.4	46.0	-14.6	Neutre	19.6
1.008	38.4	35.8	56.0	-20.2	30.8	46.0	-15.2	Neutre	19.6
9.020	39.0	34.1	60.0	-25.9	27.1	50.0	-22.9	Neutre	20.1



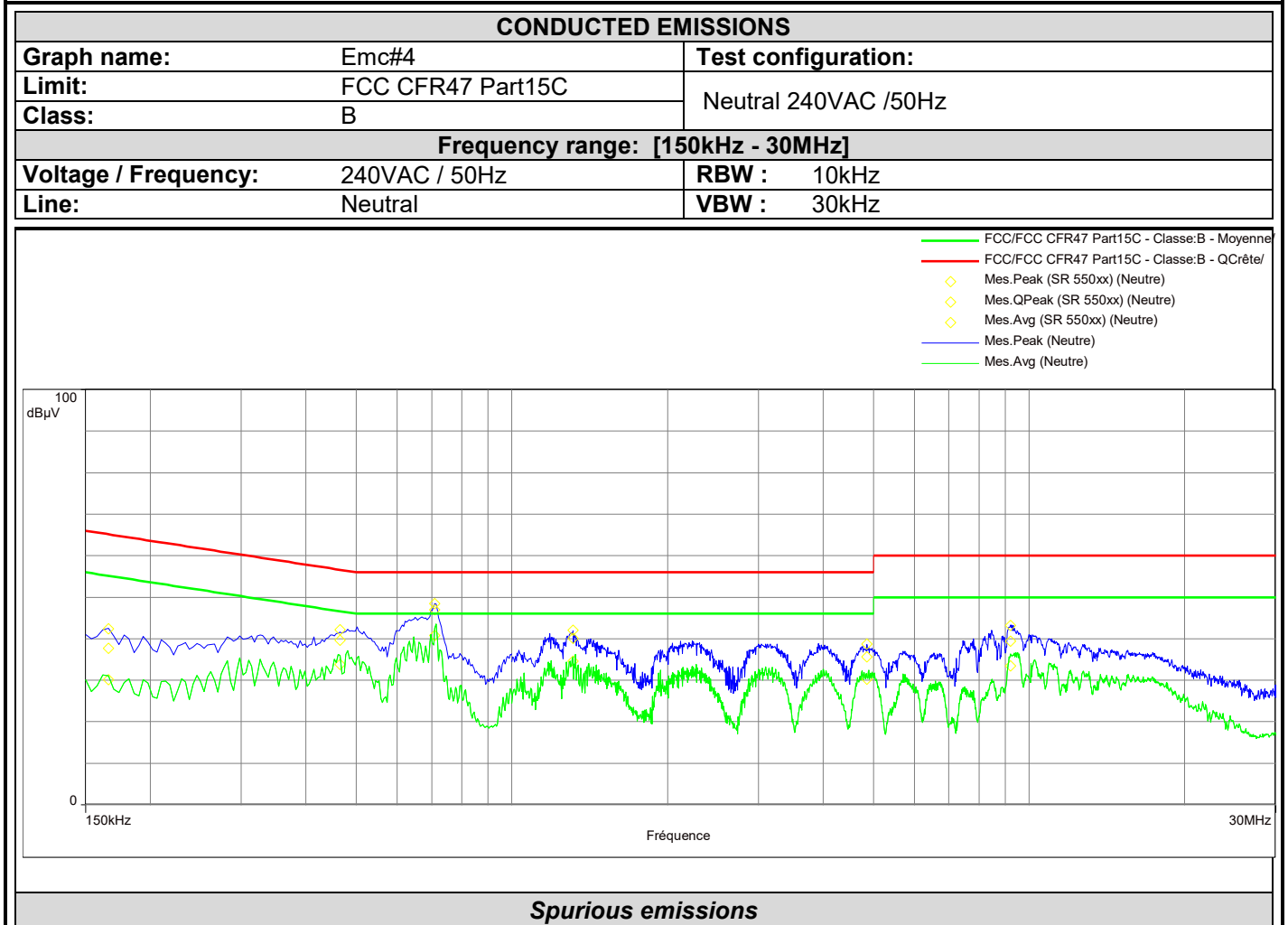
L C I E



Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.162	42.7	38.0	65.4	-27.3	31.3	55.4	-24.0	Phase 1	19.5
0.498	45.3	43.4	56.0	-12.6	35.1	46.0	-10.9	Phase 1	19.6
0.630	47.3	45.8	56.0	-10.2	38.1	46.0	-7.9	Phase 1	19.7
0.714	50.5	49.2	56.0	-6.8	41.4	46.0	-4.6	Phase 1	19.6
1.300	44.7	42.4	56.0	-13.6	34.0	46.0	-12.0	Phase 1	19.6
9.400	44.6	41.3	60.0	-18.7	33.9	50.0	-16.1	Phase 1	20.2



L C I E



Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.166	42.4	37.6	65.2	-27.5	30.2	55.2	-25.0	Neutre	19.5
0.466	42.1	39.6	56.6	-17.0	33.8	46.6	-12.8	Neutre	19.6
0.710	48.4	46.9	56.0	-9.1	40.8	46.0	-5.2	Neutre	19.6
1.312	42.0	40.1	56.0	-15.9	34.6	46.0	-11.4	Neutre	19.6
4.860	38.7	35.6	56.0	-20.4	30.3	46.0	-15.7	Neutre	19.8
9.200	43.2	39.5	60.0	-20.5	33.5	50.0	-16.5	Neutre	20.2



9.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product **OVERKIZ / SOMFY Smartkiz PCBA / TaHoma Beacon PCBA**, SN: **017196101F22180055**, 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	: Majid MOURZAGH
Date of test	: February 19, 2020	: February 20, 2020
Ambient temperature	: 21 °C	: 22 °C
Relative humidity	: 38 %	: 35 %

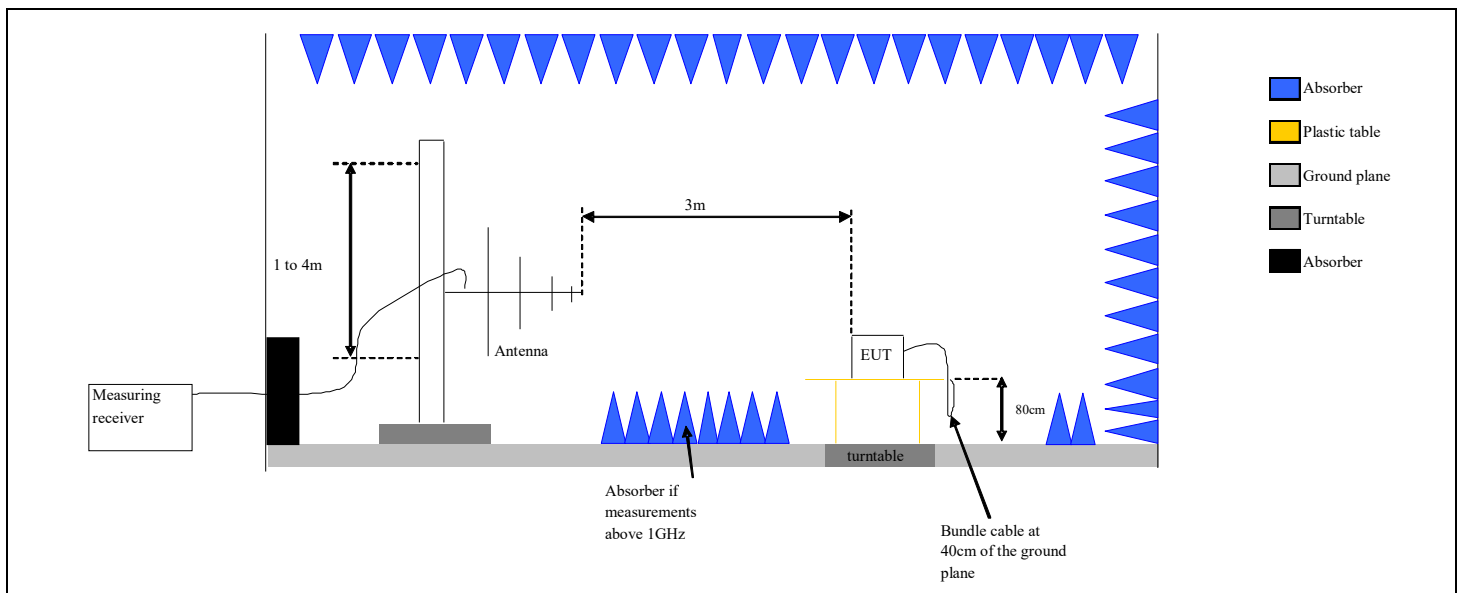
10.2. TEST SETUP

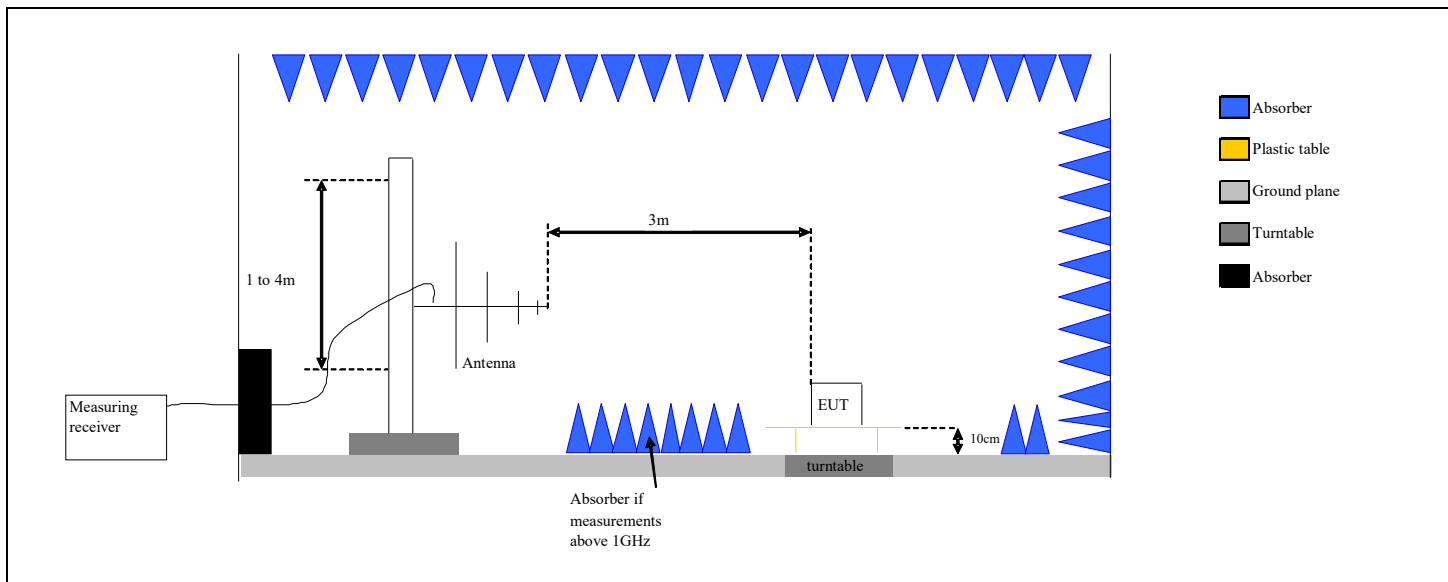
The product has been tested according to ANSI C63.10 (2013) and FCC part15 subpart C.

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 **Select Test Site**. Distance between measuring antenna and the EUT is **Distance**.

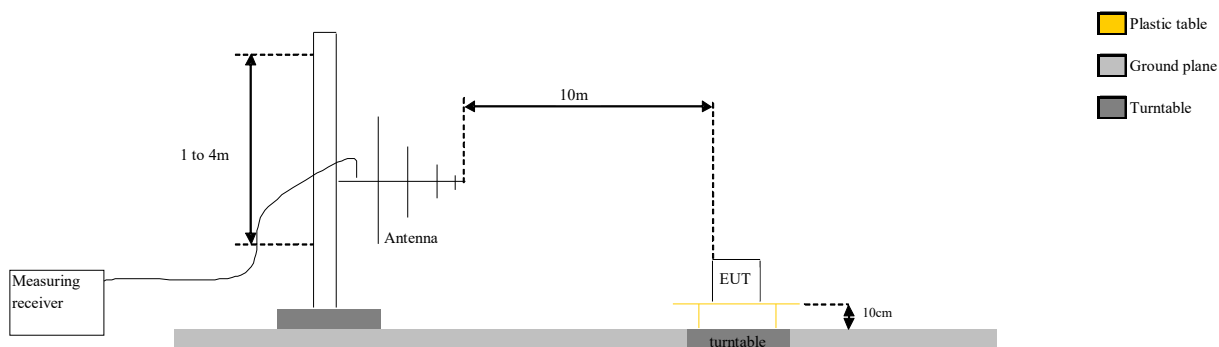
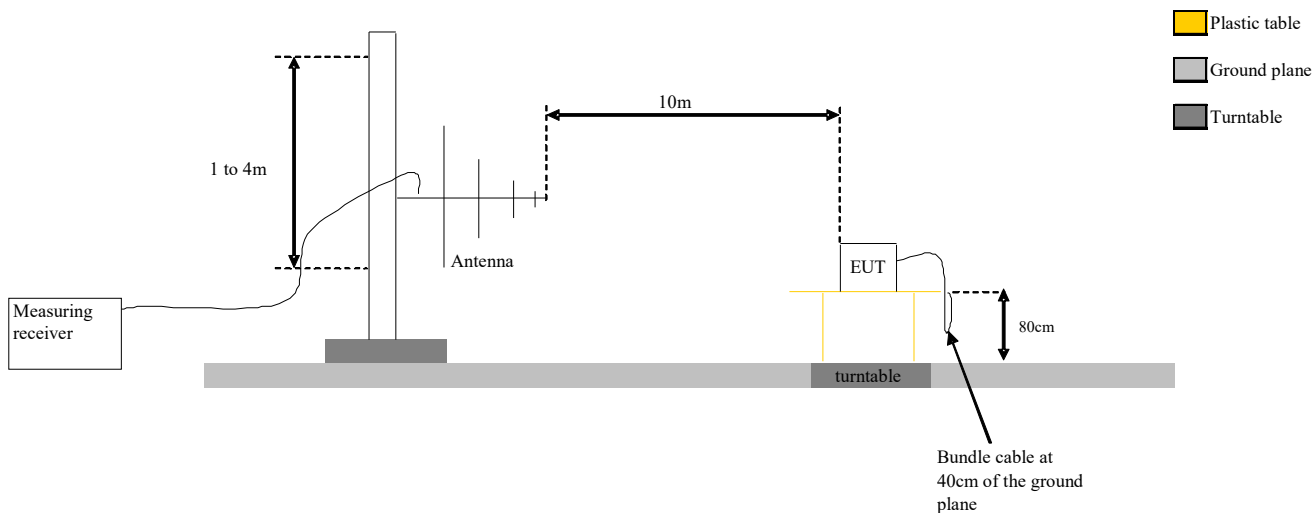
Test is performed in horizontal (H) and vertical (V) polarization with **bilog** between 30MHz & 1GHz and with a horn antenna above 1GHz. Measurement bandwidth was 120kHz below 1GHz and 1MHz above 1GHz. The level has been maximised by the turntable rotation of 360 degrees range on all axis of EUT used 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
 - 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.

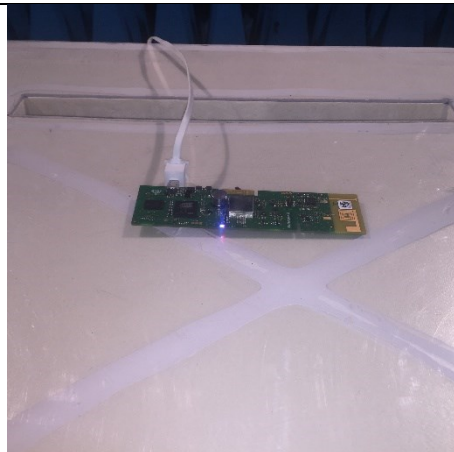
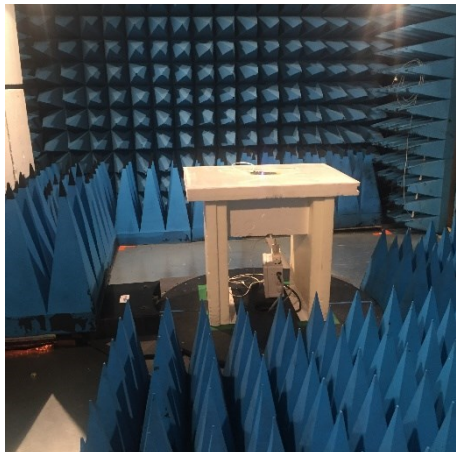




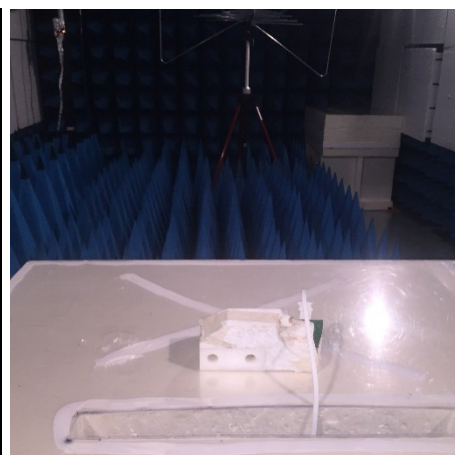
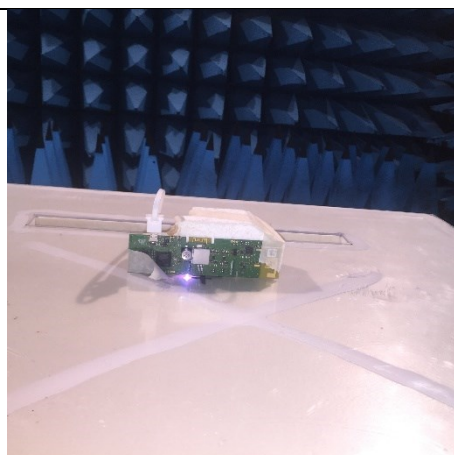
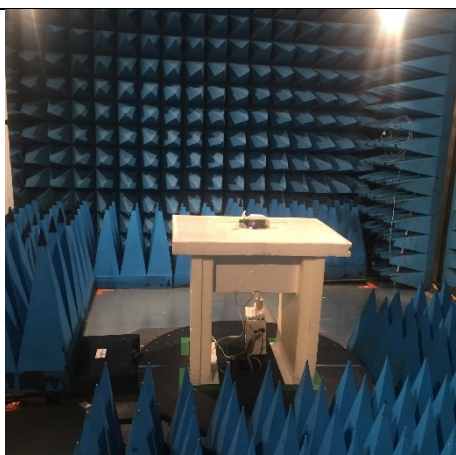
Test set up of Unwanted Emissions in Restricted Frequency Bands in semi anechoic chamber



Test Set up for radiated measurement in open area test site

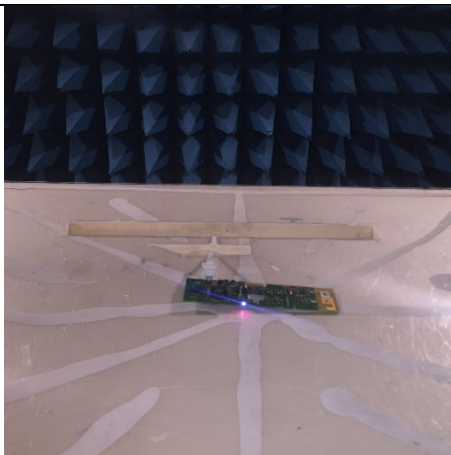
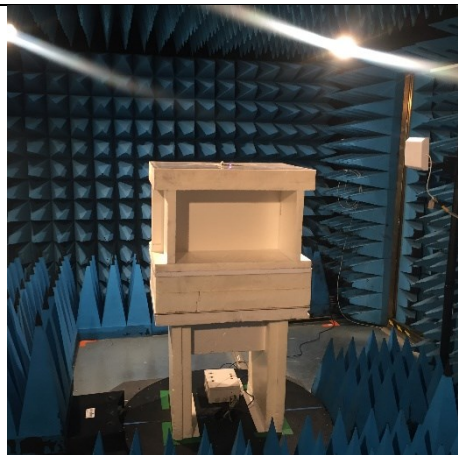


Axis XY on FAR (30MHz-1GHz)

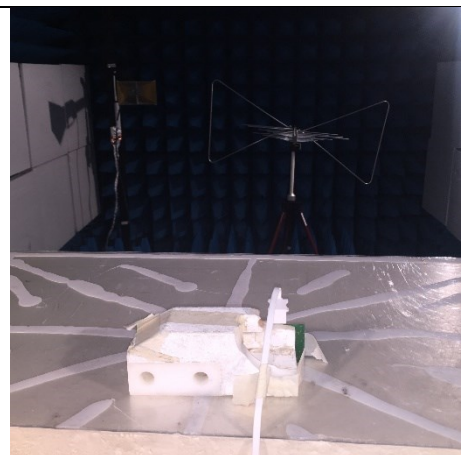
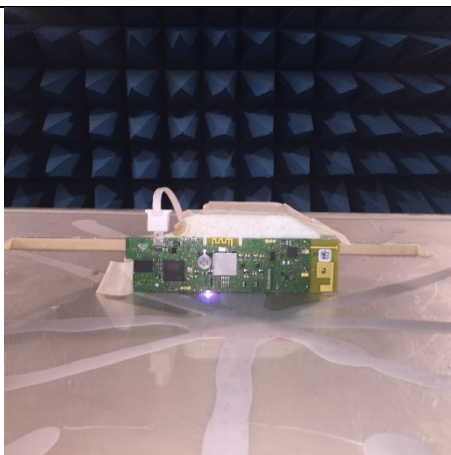
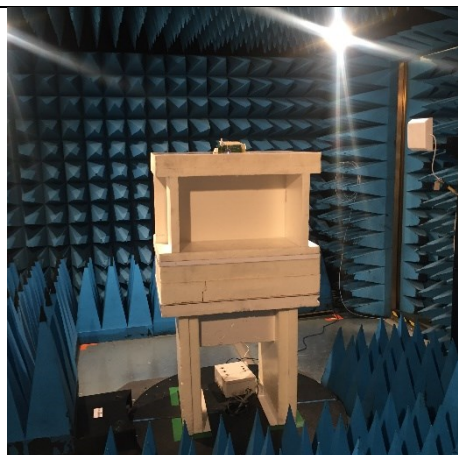


Axis Z on FAR (30MHz-1GHz)

Photograph for Unwanted Emission in restricted frequency bands

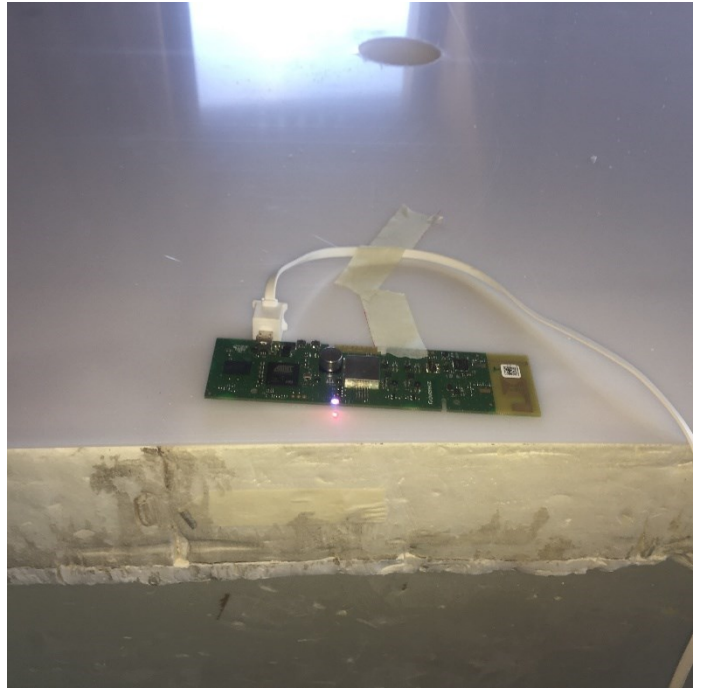


Axis XY on FAR (above 1GHz)

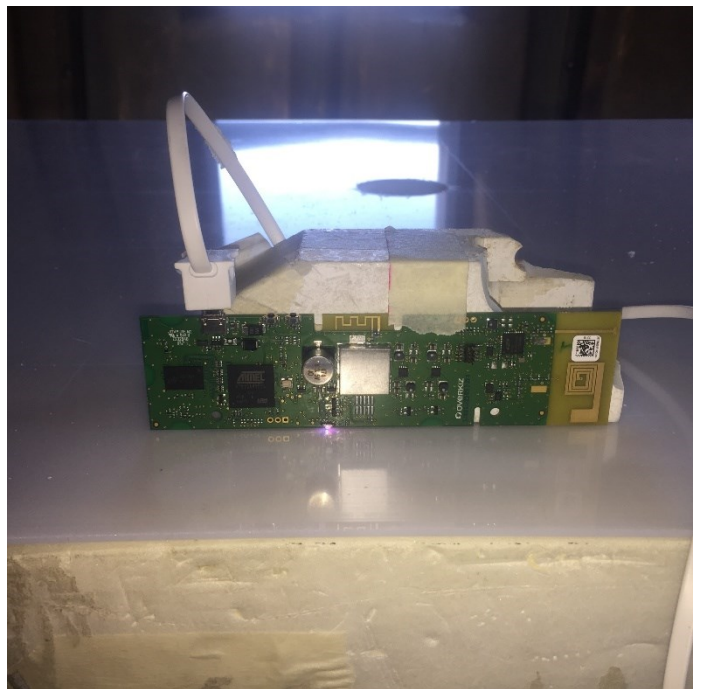


Axis Z on FAR (above 1GHz)

Photograph for Unwanted Emission in restricted frequency bands



Axis XY on OATS



Axis Z on OATS

Photograph for Unwanted Emission in restricted frequency bands



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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 on FAR					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Amplifier 9kHz - 40GHz	LCIE SUD EST	_	A7102082	10/18	03/20
Antenna Bi-Log	CHASE	UPA6192	C2040221	01/18	01/20
Antenna horn 18GHz	EMCO	3115	C2042029	09/17	09/20
BAT EMC	NEXIO	v3.19.1.18	L1000115		
Comb EMR HF	YORK	CGE01	A3169114		
Emission Cable (SMA 1m)	TELEDYNE	26GHz	A5329874	01/19	01/20
Emission Cable (SMA 3.3m)	TELEDYNE	26GHz	A5329875	01/19	01/20
Emission Cable (SMA 30cm)	TELEDYNE	26GHz	A5329873	01/19	01/20
Emission Cable <1GHz (Ampl <-> Cage)	-	18GHz	A5329562	08/19	08/20
Emission Cable <1GHz (Ampl <-> Cage)	-	18GHz	A5329907	08/19	08/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
Rehausse Table C3	LCIE	_	F2000507		
Rehausse Table C3	LCIE	_	F2000511		
Semi-Anechoic chamber #3 (BF)	SIEPEL	_	D3044017_BF	03/17	03/20
Semi-Anechoic chamber #3 (VSWR)	SIEPEL	_	D3044017_VSWR	03/17	03/20
Spectrum analyzer	ROHDE & SCHWARZ	FSU 26	A4060058	09/19	09/21
Table C3	LCIE	_	F2000461		
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		

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



TEST EQUIPMENT USED on OATS					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Antenna Bi-log	CHASE	CBL6111A	C2040051	06/19	06/20
Antenna mast (OATS)	ETS Lingren	2071-2	F2000392		
Cable (OATS)	–	1GHz	A5329623	03/19	03/20
Emission Cable	SUCOFLEX	6GHz	A5329061	02/19	02/20
OATS	–	–	F2000409	02/19	02/20
Radiated emission comb generator	BARDET	–	A3169050		
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	12/17	02/20
Table C1/OATS	LCIE	–	F2000445		
Turntable (OATS)	ETS Lingren	Model 2187	F2000403		
Turntable / Mast controller (OATS)	ETS Lingren	Model 2066	F2000372		

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

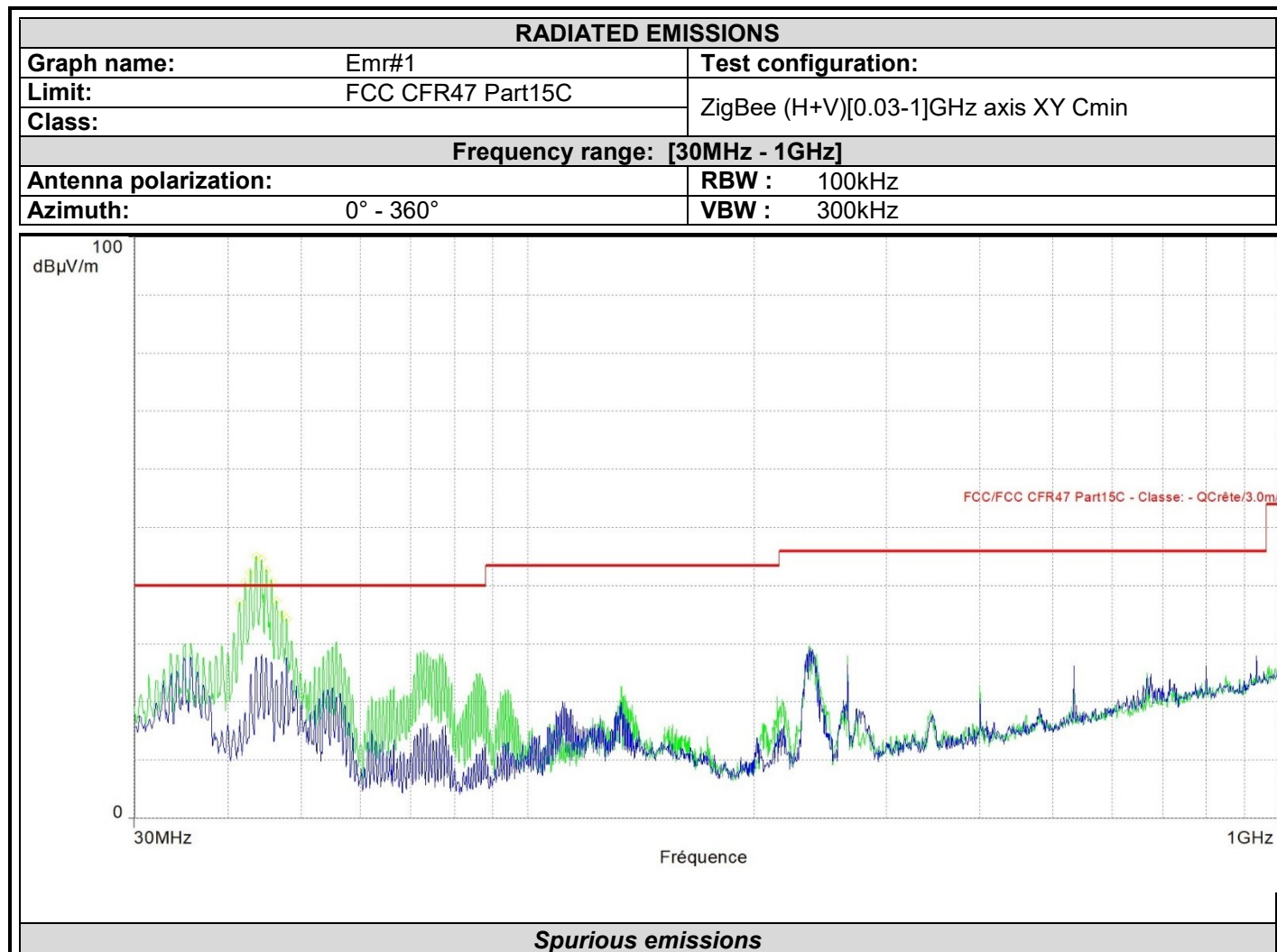
None Divergence:

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).

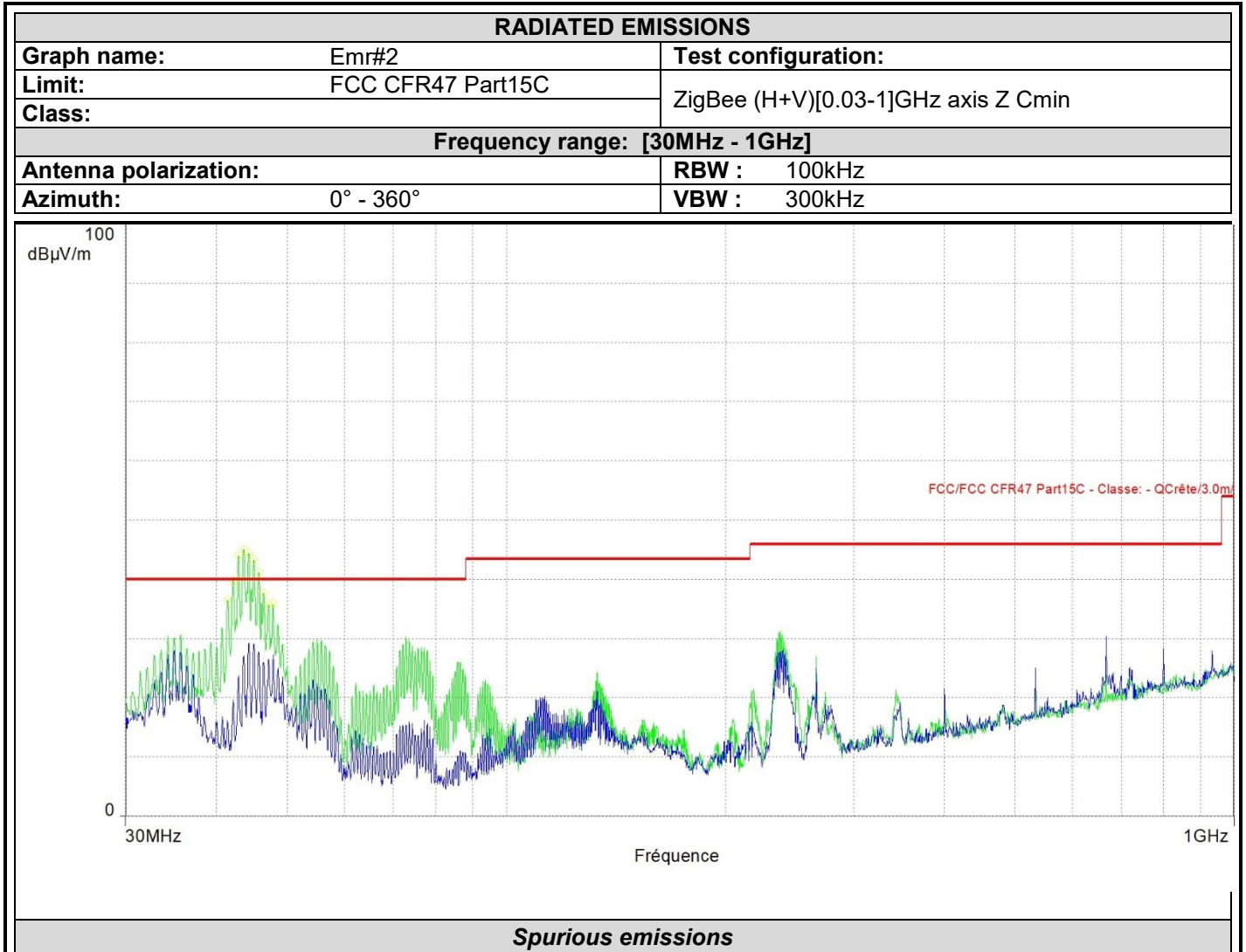
Results in the frequency band [30-1000] MHz: Worst case presented see test results in §8.5(Cmin, Cmid or Cmax):



Frequency (MHz)	Peak Level (dBµV/m)	Polarization	Correction (dB)
41.349	37.1	Vertical	-18.8
42.125	40.6	Vertical	-19.0
42.707	42.2	Vertical	-19.1
43.580	45.0	Vertical	-19.3
44.259	44.5	Vertical	-19.4
45.035	42.7	Vertical	-19.6
45.714	40.7	Vertical	-19.9
46.393	37.4	Vertical	-20.1
47.169	35.1	Vertical	-20.4
47.848	34.3	Vertical	-20.7



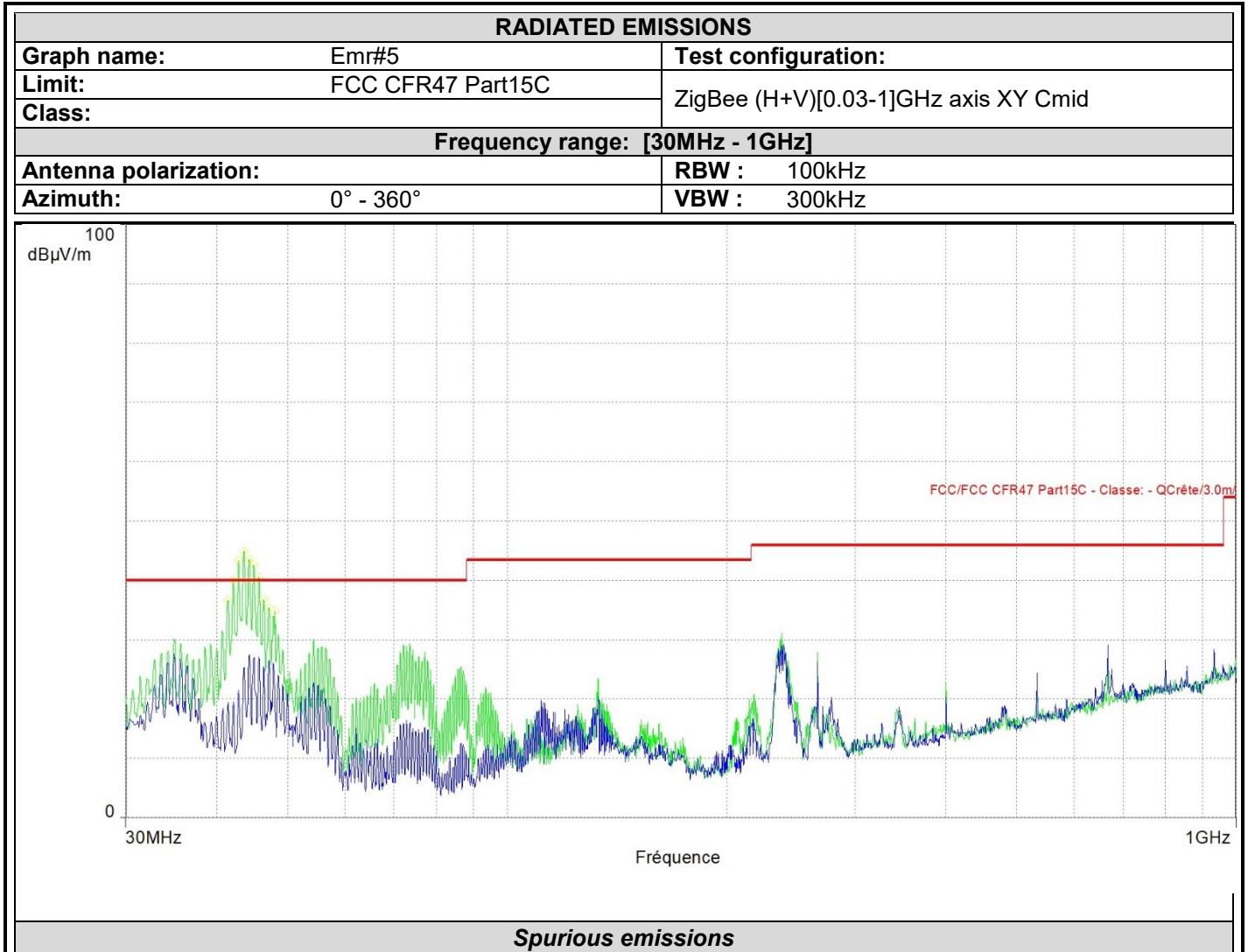
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Frequency (MHz)	Peak Level (dBµV/m)	Polarization	Correction (dB)
41.407	36.5	Vertical	-18.8
42.087	39.7	Vertical	-19.0
42.852	44.0	Vertical	-19.1
43.566	45.1	Vertical	-19.3
44.297	44.5	Vertical	-19.4
45.011	43.3	Vertical	-19.6
45.708	41.2	Vertical	-19.9
46.405	37.7	Vertical	-20.1
47.153	35.7	Vertical	-20.4
47.799	36.0	Vertical	-20.6



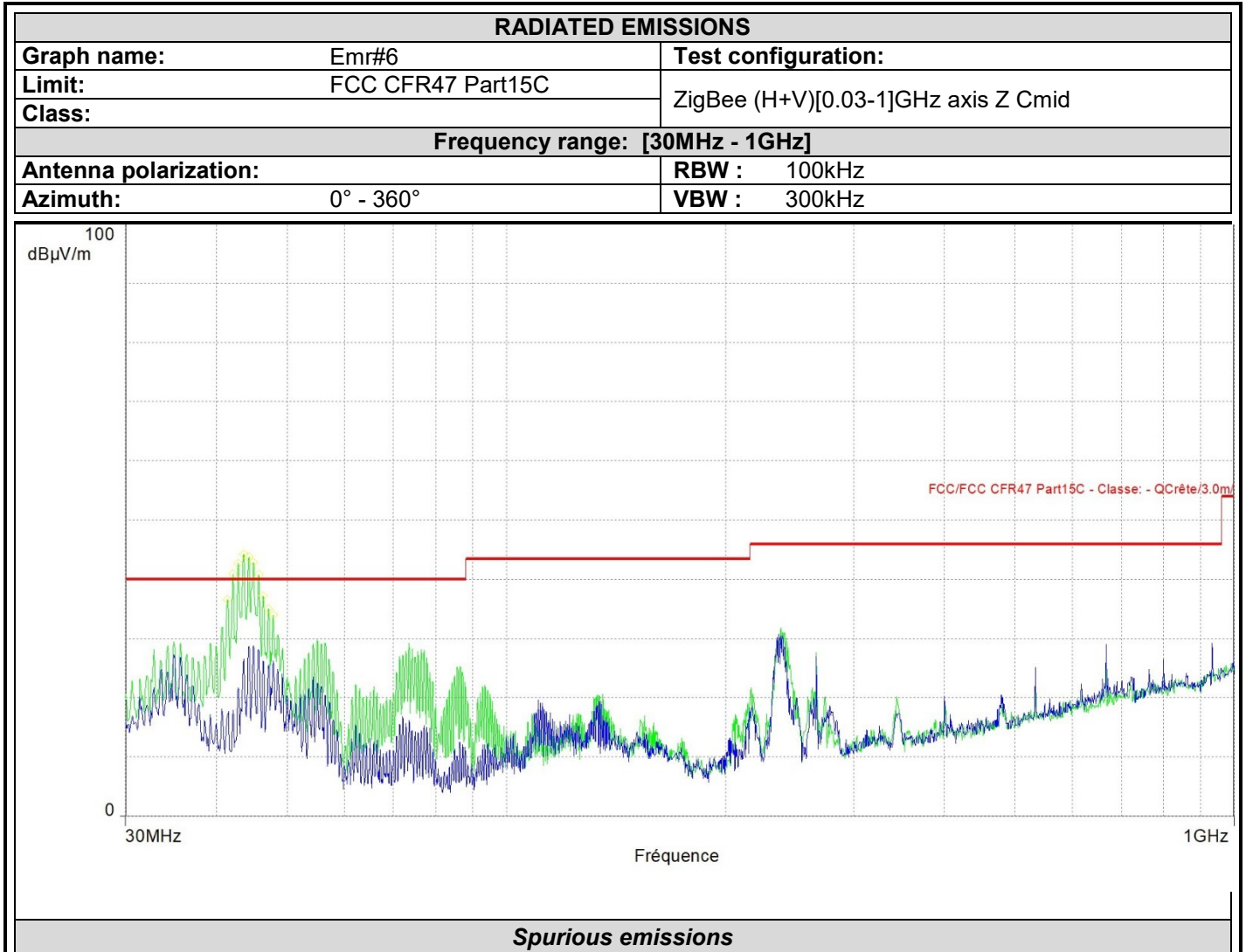
L C I E



Frequency (MHz)	Peak Level (dBµV/m)	Polarization	Correction (dB)
41.349	36.7	Vertical	-18.8
42.125	40.1	Vertical	-19.0
42.804	43.4	Vertical	-19.1
43.580	44.9	Vertical	-19.3
44.259	43.6	Vertical	-19.4
44.938	42.7	Vertical	-19.6
45.714	40.5	Vertical	-19.9
46.393	36.8	Vertical	-20.1
47.169	35.3	Vertical	-20.4
48.042	34.8	Vertical	-20.7



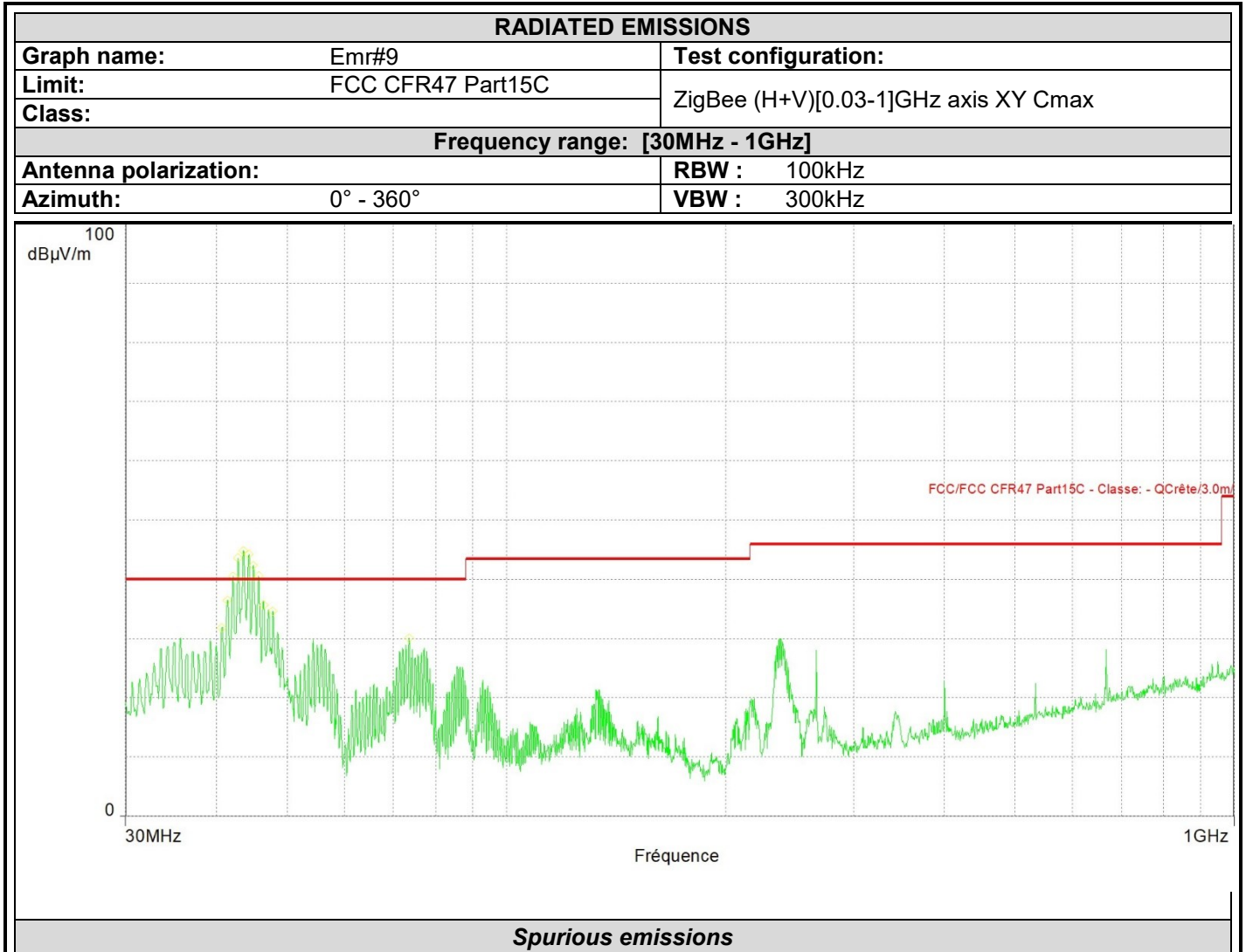
L C I E



Frequency (MHz)	Peak Level (dBµV/m)	Polarization	Correction (dB)
41.349	36.6	Vertical	-18.8
42.125	40.9	Vertical	-19.0
42.804	42.6	Vertical	-19.1
43.580	44.2	Vertical	-19.3
44.259	43.9	Vertical	-19.4
44.938	42.9	Vertical	-19.6
45.714	40.8	Vertical	-19.9
46.393	37.2	Vertical	-20.1
47.072	35.1	Vertical	-20.4
47.848	34.0	Vertical	-20.7



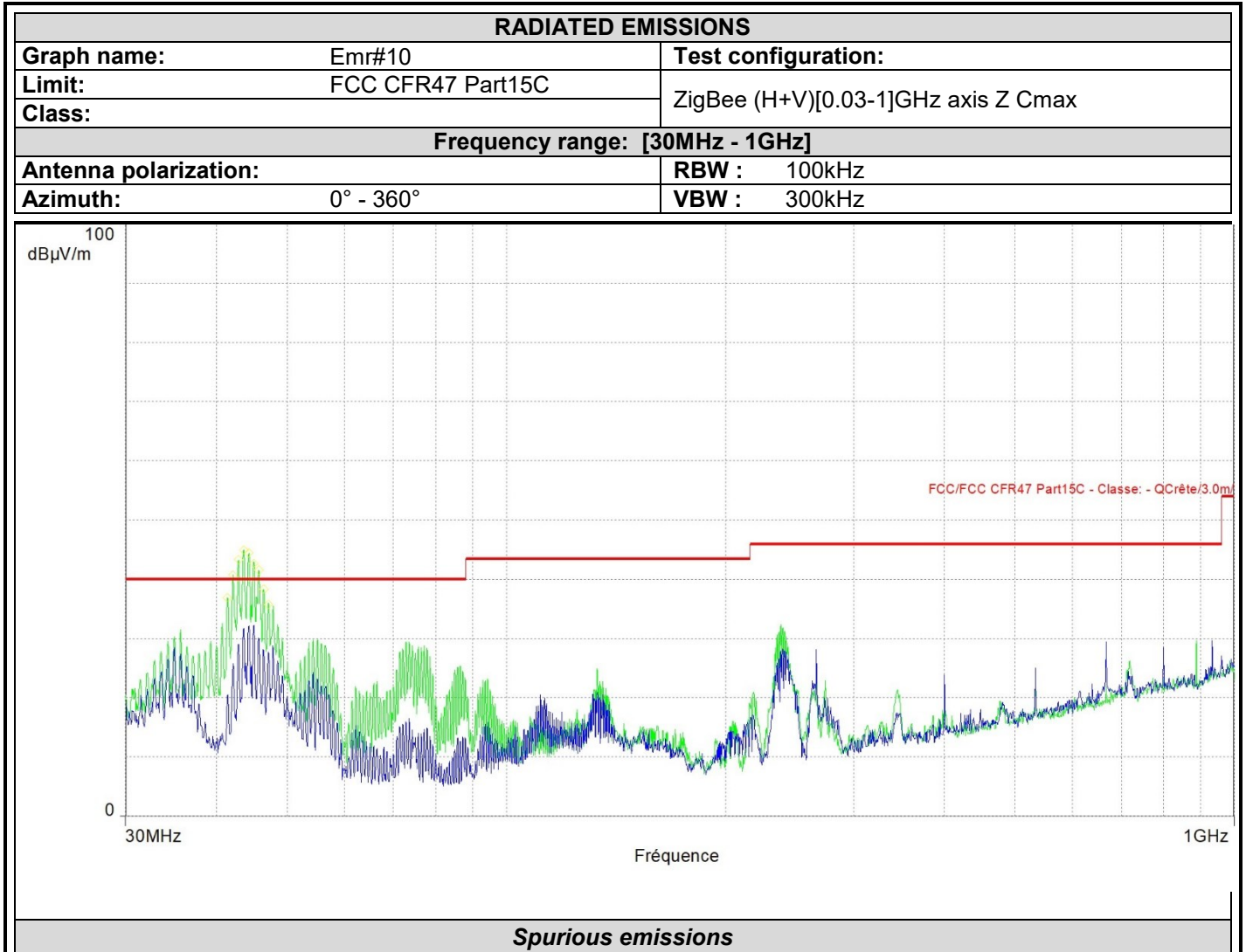
L C I E



Frequency (MHz)	Peak Level (dBµV/m)	Polarization	Correction (dB)
40.670	31.8	Vertical	-18.6
41.349	36.5	Vertical	-18.8
42.125	40.6	Vertical	-19.0
42.804	43.6	Vertical	-19.1
43.483	44.9	Vertical	-19.3
44.259	44.3	Vertical	-19.4
44.938	42.4	Vertical	-19.6
45.714	40.6	Vertical	-19.9
46.490	35.6	Vertical	-20.1
47.751	34.7	Vertical	-20.6
73.553	30.1	Vertical	-26.3



L C I E



Frequency (MHz)	Peak Level (dBµV/m)	Polarization	Correction (dB)
41.407	36.9	Vertical	-18.8
42.155	40.7	Vertical	-19.0
42.852	43.3	Vertical	-19.1
43.583	44.9	Vertical	-19.3
44.280	44.4	Vertical	-19.4
45.028	42.7	Vertical	-19.6
45.708	41.5	Vertical	-19.9
46.422	38.4	Vertical	-20.1
47.153	35.7	Vertical	-20.4



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.

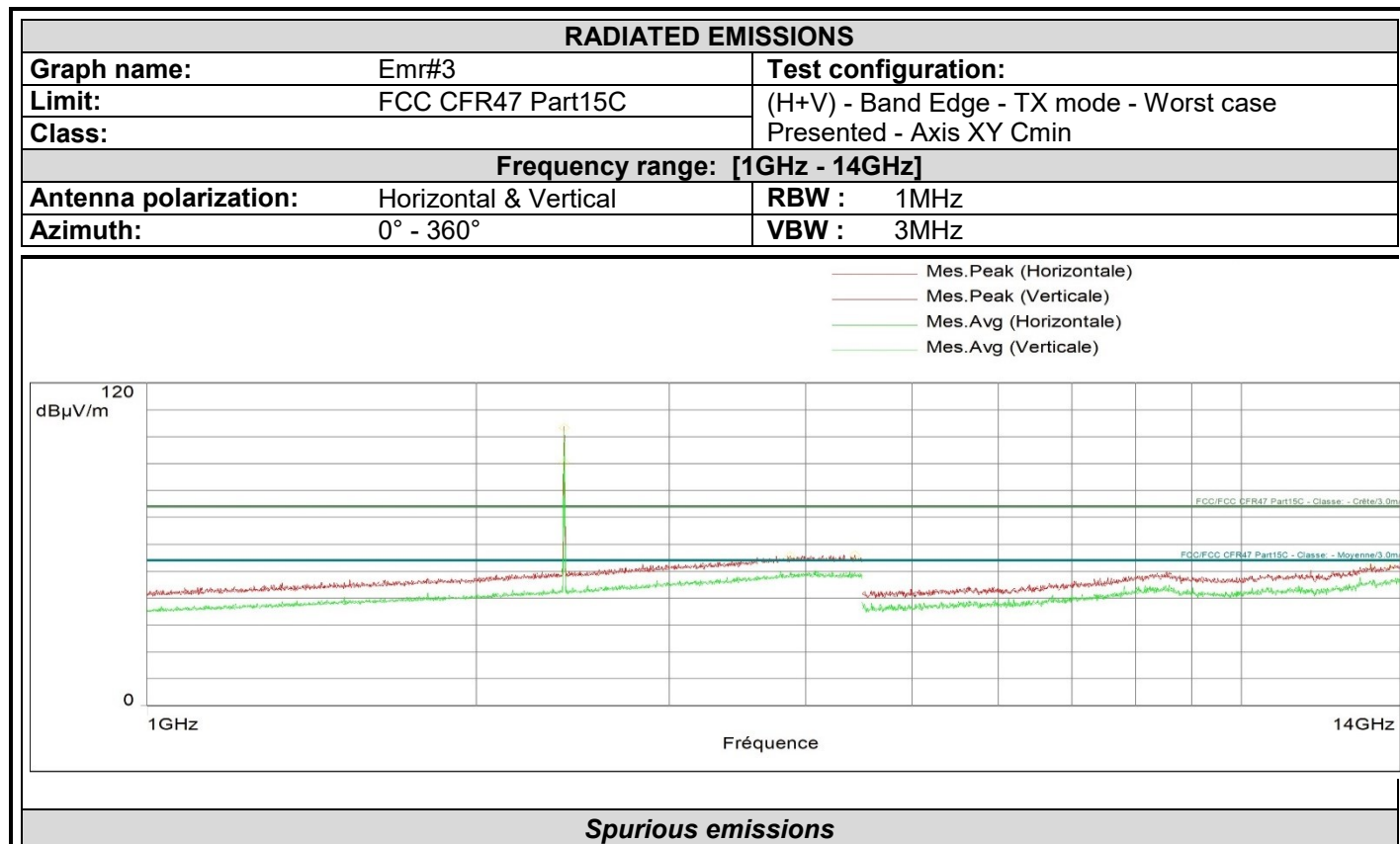
Test Frequency (MHz)	Meter Reading dB(μV)	Detector (Pk/QP/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
40.670	16.6	QP	V	0	120	14.0	30.6	40.0	-9.4	Worst case
41.407	17.4	QP	V	0	120	13.6	31.0	40.0	-9.0	Worst case
42.155	17.8	QP	V	0	120	13.2	31.0	40.0	-9.0	Worst case
42.852	18.6	QP	V	0	120	12.8	31.4	40.0	-8.6	Worst case
43.583	20.0	QP	V	0	120	12.4	32.4	40.0	-7.6	Worst case
44.280	19.5	QP	V	0	120	12.1	31.6	40.0	-8.4	Worst case
45.028	23.5	QP	V	0	120	11.7	35.2	40.0	-4.8	Worst case
45.708	19.5	QP	V	0	120	11.4	30.9	40.0	-9.1	Worst case
46.422	19.5	QP	V	0	120	11.0	30.5	40.0	-9.5	Worst case
47.153	19.5	QP	V	0	120	10.7	30.2	40.0	-9.8	Worst case
48.000	19.5	QP	V	0	120	10.3	29.8	40.0	-10.2	Worst case
73.550	19.5	QP	V	0	120	7.9	27.4	40.0	-12.6	Worst case

*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



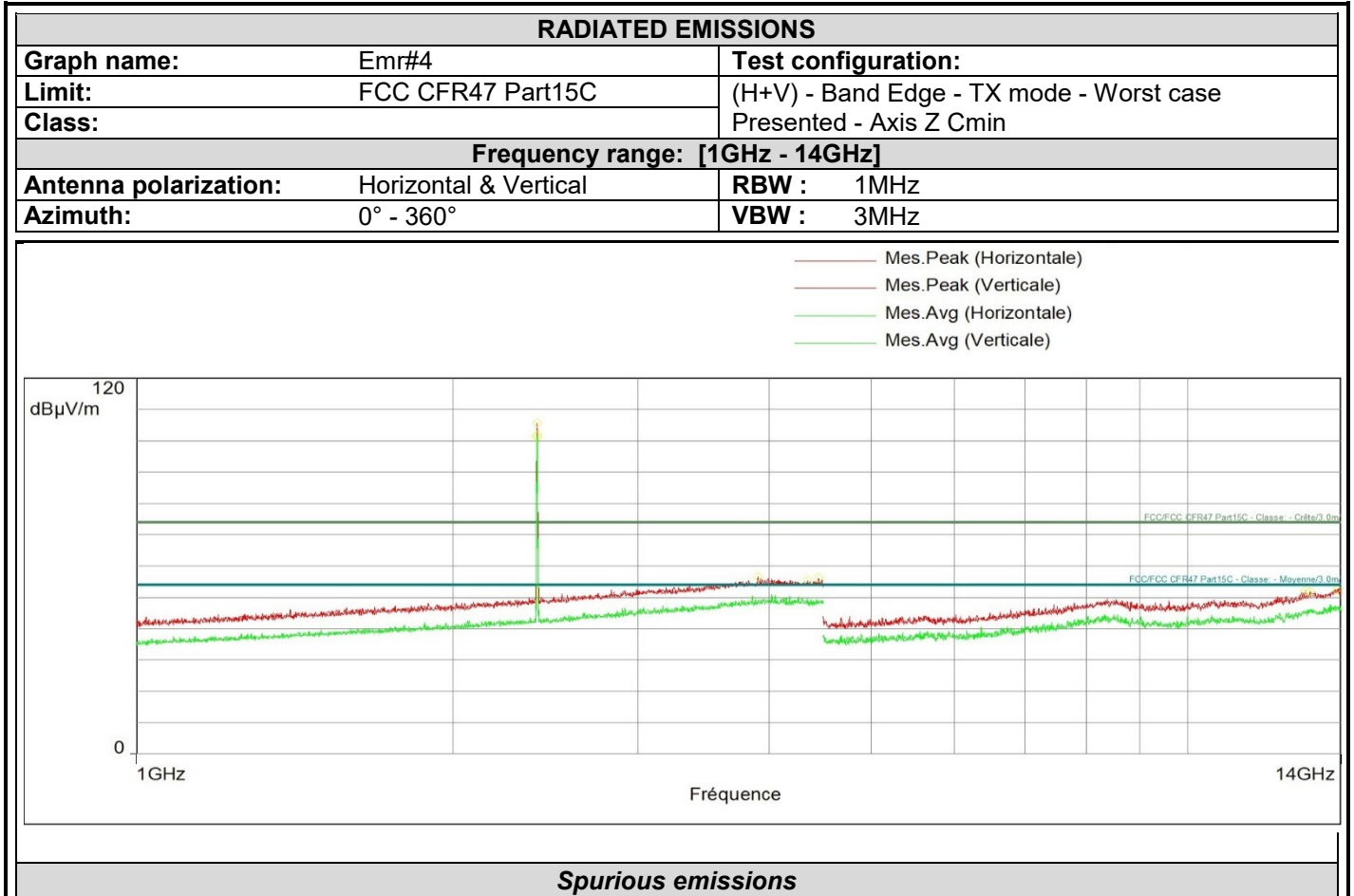
Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Limit Peak (dBµV)	Polarization	Correction (dB)
2405	103.4	74	Horizontal	33.4
13121.844	52.8	74	Horizontal	-15.3
13676.406	52.4	74	Horizontal	-14.2
2405	90.5	74	Vertical	33.4
3867.550	55.7	74	Vertical	38.0
4431.400	56.1	74	Vertical	38.2

Frequency (MHz)	Average Level (dBµV/m)	Limit Average (dBµV)	Polarization	Correction (dB)
2405.600	102.075	54	Horizontal	33.4
13121.844	46.694	54	Horizontal	-15.3
13676.406	46.573	54	Horizontal	-14.2
2404.550	87.449	54	Vertical	33.4
3867.550	49.614	54	Vertical	38.0
4431.400	49.473	54	Vertical	38.2



L C I E



Frequency (MHz)	Peak Level (dBµV/m)	Limit Peak (dBµV)	Polarization	Correction (dB)
2405	101.7	74	Horizontal	33.4
4347.050	55.2	74	Horizontal	38.2
13921.031	53.1	74	Horizontal	-13.7
13071.969	51.8	74	Vertical	-15.4
13875.906	52.7	74	Vertical	-13.8
2405	105.6	74	Vertical	33.4
3902.900	56.4	74	Vertical	38.1
4456.250	56.3	74	Vertical	38.2

Frequency (MHz)	Average Level (dBµV/m)	Limit Average (dBµV)	Polarization	Correction (dB)
2405	99.846	54	Horizontal	33.4
4347.050	49.908	54	Horizontal	38.2
13921.031	46.960	54	Horizontal	-13.7
13071.969	46.205	54	Vertical	-15.4
13875.906	46.824	54	Vertical	-13.8
2405	103.328	54	Vertical	33.4
3902.900	49.073	54	Vertical	38.1
4456.250	49.147	54	Vertical	38.2



QUALIFICATION (1GHz- 26GHz): 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(μ V)	Detector (Pk/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Remark
No significant frequency observed										

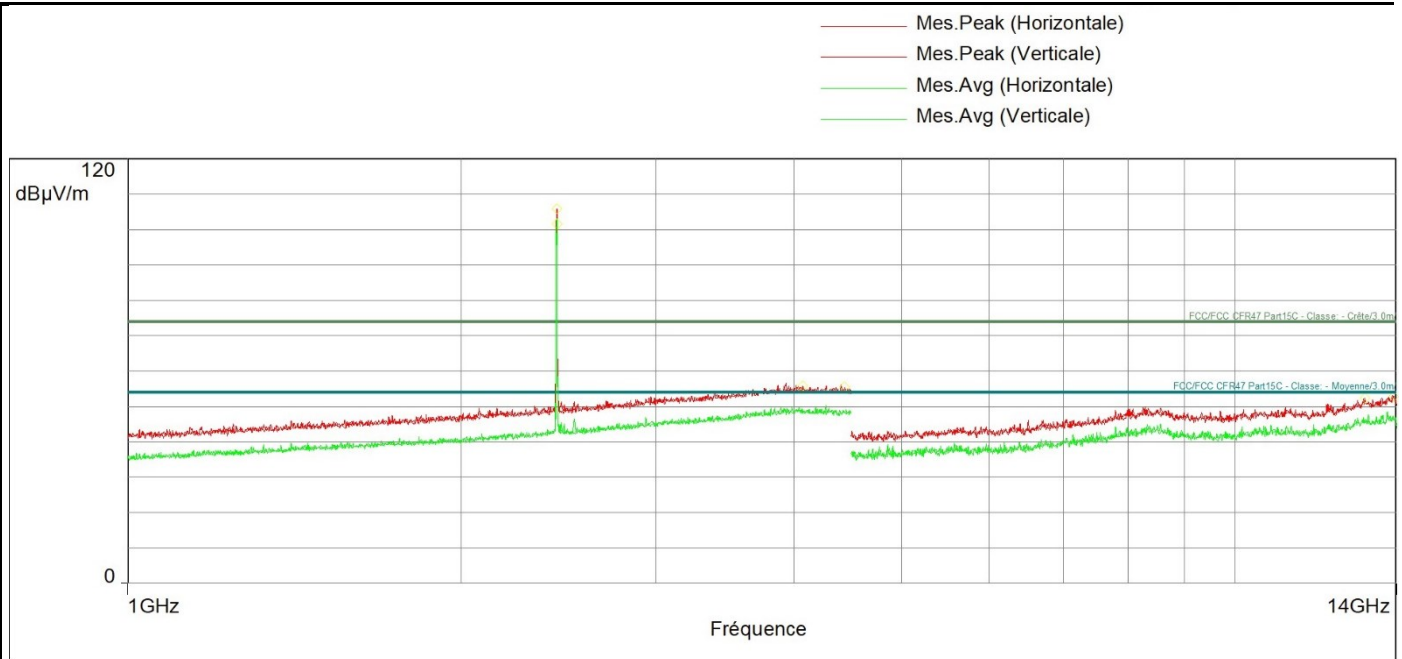


L C I E

CMID

RADIATED EMISSIONS

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



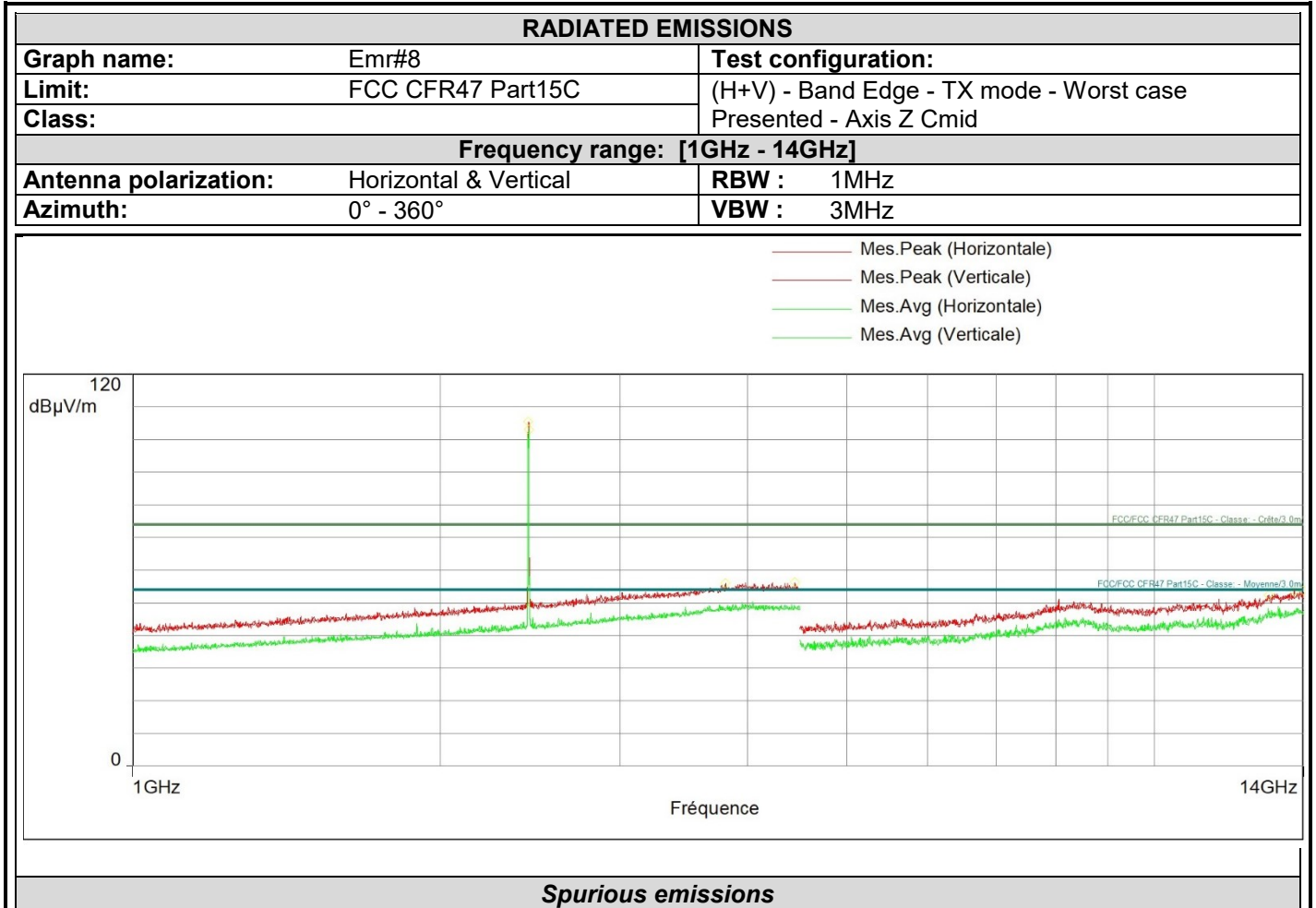
Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Limit Peak (dBµV)	Polarization	Correction (dB)
2440	101.6	74	Horizontal	33.6
4444.000	55.5	74	Horizontal	38.2
2440.600	105.8	74	Vertical	33.6
4072.650	55.9	74	Vertical	38.3
13108.781	52.4	74	Horizontal	-15.3
13906.781	52.9	74	Vertical	-13.7

Frequency (MHz)	Average Level (dBµV/m)	Limit Average (dBµV)	Polarization	Correction (dB)
2440	98.892	54	Horizontal	33.6
4444.000	49.138	54	Horizontal	38.2
2440.600	103.242	54	Vertical	33.6
4072.650	49.281	54	Vertical	38.3
13108.781	47.716	54	Horizontal	-15.3
13906.781	46.845	54	Vertical	-13.7



L C I E



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Limit Peak (dBµV)	Polarization	Correction (dB)
2440	105.4	74	Horizontal	33.5
3804.550	56.0	74	Horizontal	37.8
4448.900	56.2	74	Horizontal	38.2
12940.750	52.4	74	Horizontal	-15.7
13707.875	53.6	74	Horizontal	-14.1
13994.062	53.8	74	Horizontal	-13.5
2440.	103.0		Vertical	33.6

Frequency (MHz)	Average Level (dBµV/m)	Limit Average (dBµV)	Polarization	Correction (dB)
2440	103.748	54	Horizontal	33.5
3804.550	48.737	54	Horizontal	37.8
4448.900	49.530	54	Horizontal	38.2
12940.750	47.131	54	Horizontal	-15.7
13707.875	48.311	54	Horizontal	-14.1
13994.062	47.753	54	Horizontal	-13.5
2440	104.32	54	Vertical	33.6



QUALIFICATION (1GHz- 26GHz): 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(μ V)	Detector (Pk/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Remark
No significant frequency observed										

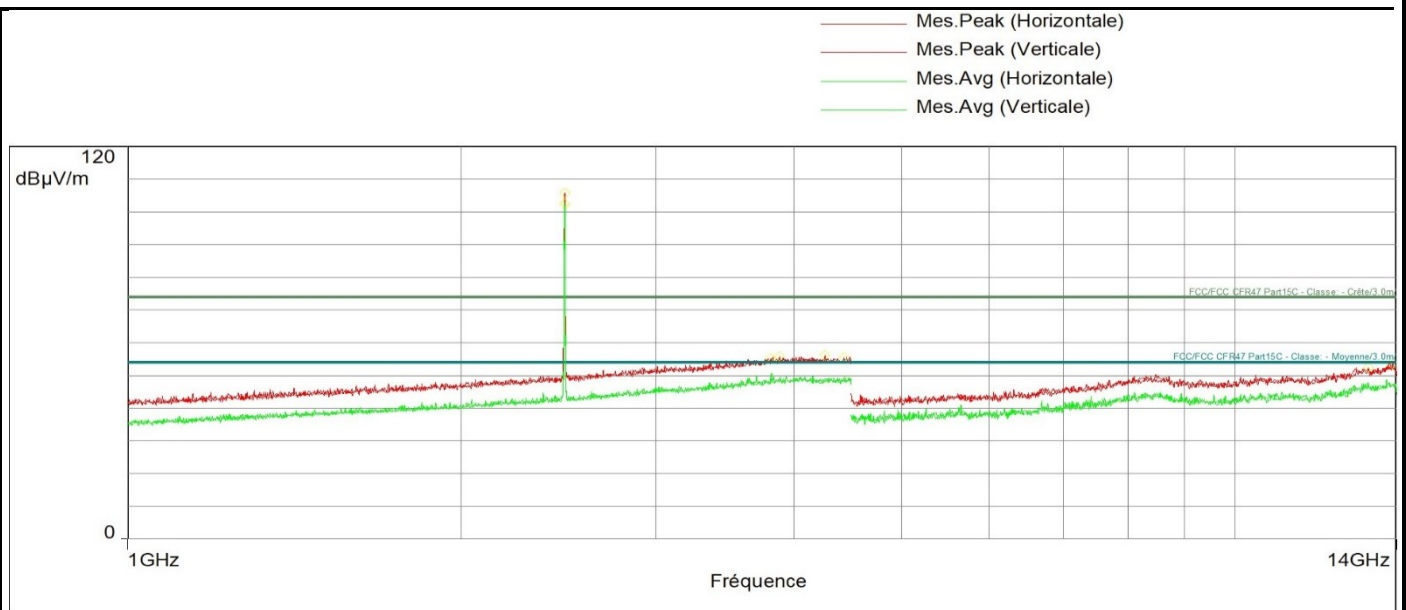


L C I E

CMAX

RADIATED EMISSIONS

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



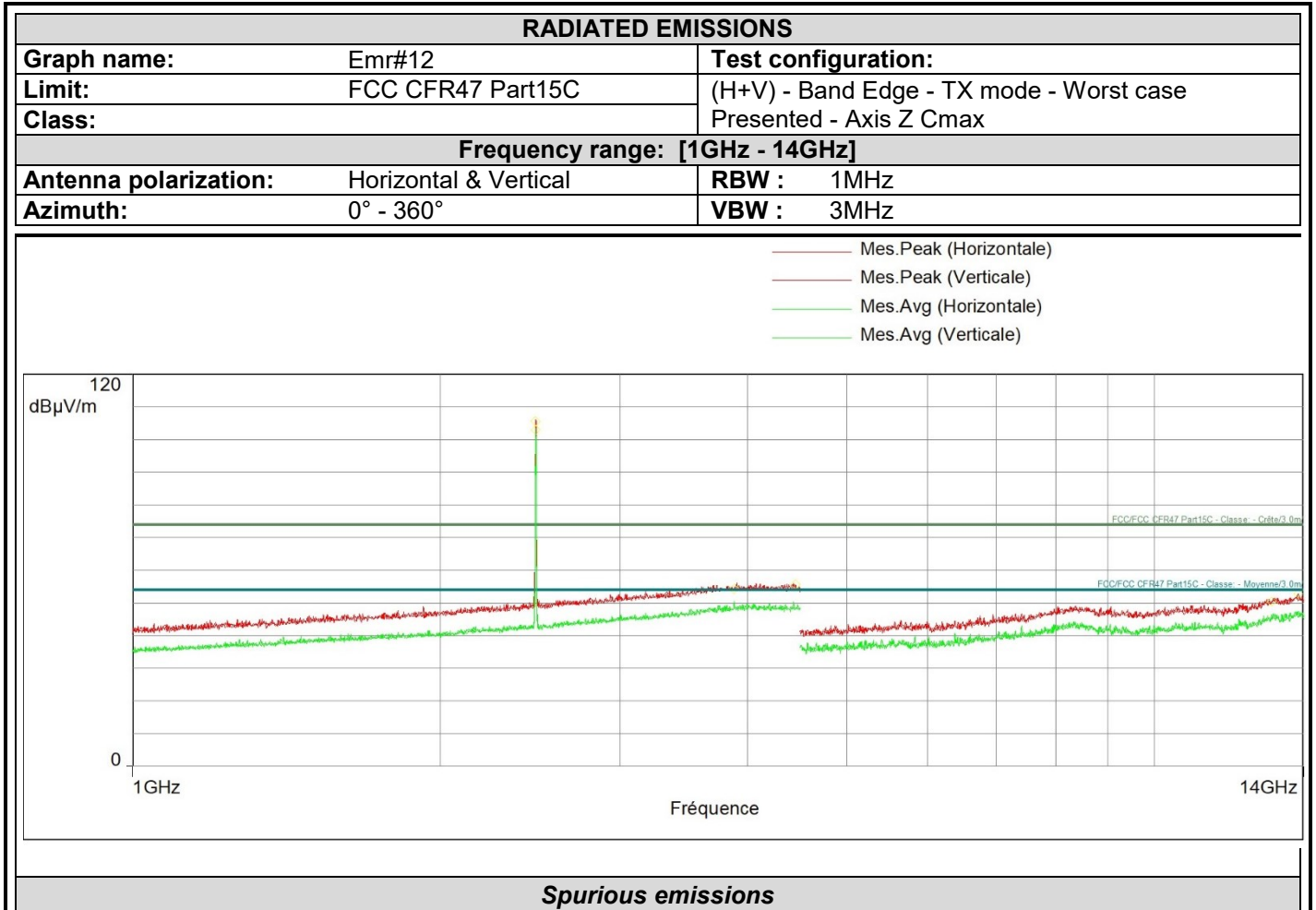
Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Limit Peak (dBµV)	Polarization	Correction (dB)
2480	102.6	74	Horizontal	33.7
3810.150	55.2	74	Horizontal	37.9
4433.150	55.5	74	Horizontal	38.2
2480	105.8	74	Vertical	33.7
3878.400	55.9	74	Vertical	38.0
4267.250	56.3	74	Vertical	38.2
13874.719	53.3	74	Vertical	-13.8

Frequency (MHz)	Average Level (dBµV/m)	Limit Average (dBµV)	Polarization	Correction (dB)
2480	100.540	54	Horizontal	33.7
3810.150	49.604	54	Horizontal	37.9
4433.150	49.492	54	Horizontal	38.2
2480	102.530	54	Vertical	33.7
3878.400	49.601	54	Vertical	38.0
4267.250	49.031	54	Vertical	38.2
13874.719	47.430	54	Vertical	-13.8



L C I E



Spurious emissions

Frequency (MHz)	Peak Level (dBµV/m)	Limit Peak (dBµV)	Polarization	Correction (dB)
2480	105.7	74	Horizontal	33.7
3880.850	54.2	74	Horizontal	38.0
4456.250	55.6	74	Horizontal	38.2
13019.125	50.3	74	Horizontal	-15.5
13824.844	52.8	74	Horizontal	-13.9
2480	103.1	74	Vertical	33.7

Frequency (MHz)	Average Level (dBµV/m)	Limit Average (dBµV)	Polarization	Correction (dB)
2480	103.442	54	Horizontal	33.7
3880.850	50.650	54	Horizontal	38.0
4456.250	49.930	54	Horizontal	38.2
13019.125	46.535	54	Horizontal	-15.5
13824.844	45.543	54	Horizontal	-13.9
2480	101.081	54	Vertical	33.7



QUALIFICATION (1GHz- 26GHz): 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(μ V)	Detector (Pk/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dB μ V/m)	Limit (dB μ V/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 **OVERKIZ / SOMFY Smartkiz PCBA / TaHoma Beecon PCBA**, SN: **O17196101F22180055**, 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

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