Test report

N°: 128206-657248E

Subject	**Radio spectrum Matters (ERM) tests according to standards: 47 CFR Part 15.247 & RSS-210, Issue 8 & RSS-Gen, Issue 3**
Issued to	WITHINGS 20 rue Rouget de Lisle 92130 Issy-Les-Moulineaux, France
Apparatus under test	
Product	Withings Aura Bedside Device
Trade mark	Withings AuraTM
Manufacturer	Withings
Model	WSD01
Serial number	0024E4182A06
FCC ID	XNAWSD01
IC ID	11411A-WSD01
Test date	2014/06/10 to 2014/06/30
Test location	Fontenay Aux Roses
Test performed by	Arnaud FAYETTE & Stéphane PHOUDIAH & Gilles DE BUYSER
Composition of document	64 pages
Modification of the last version	None
Document issued on	2014/07/09

Written by :
Stéphane PHOUDIAH & Arnaud FAYETTE
Tests operator

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Approved by :
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Technical manager

SUMMARY

1. TEST PROGRAM

- **References**

Standards: -47 CFR Part 15C
-RSS-210
-RSS-Gen
-ANSI C63.10

- **Radio requirement:**

Standard Section	Test Description	TEST RESULT - Comments
CFR 47 § 15.247(a)(1) RSS-210 A8.4(2)	Number of Hopping Frequencies	☒**PASS** ☐**FAIL** ☐**NA** ☐**NP (Limited Program)**
CFR 47 § 15.247(a)(1) RSS-210 A8.1(b)	Carrier Frequency Separation	☒**PASS** ☐**FAIL** ☐**NA** ☐**NP (Limited Program**
CFR 47 § 15.247(a)(1) RSS-210 A8.1(a)	Time of Occupancy	☒**PASS** ☐**FAIL** ☐**NA** ☐**NP (Limited Program**
RSS-Gen § 4.6.1	Occupied Bandwidth	☒**PASS** ☐**FAIL** ☐**NA** ☐**NP (Limited Program**
CFR 47 § 15.247 (a) (1) RSS-210 § A8.1(a)	20dB Bandwidth	☒**PASS** ☐**FAIL** ☐**NA** ☐**NP (Limited Program**
CFR 47 § 15.247 (b)(1) RSS-210 § A8.1(b)	Peak Output Power	☒**PASS** ☐**FAIL** ☐**NA** ☐**NP (Limited Program**
CFR 47 § 15.247 (d) RSS-210 § A8.5	Unwanted Emissions into Non-Restricted Frequency Bands	☒**PASS** ☐**FAIL** ☐**NA** ☐**NP (Limited Program**
CFR 47 § 15.207 RSS-Gen § 7.2.4	AC Power Line Conducted Emissions	☒**PASS** ☐**FAIL** ☐**NA** ☐**NP (Limited Program**
CFR 47 § 15.209 (a) CFR 47 § 15.205 (a) CFR 47 § 15.247 (d) RSS-210 § A8.5	Unwanted Emissions into Restricted Frequency Bands	☒**PASS** ☐**FAIL** ☐**NA** ☐**NP (Limited Program**
RSS-Gen § 4.10	Receiver Radiated emissions	☒**PASS (Include in Unwanted Emission into Restricted Bands)** ☐**FAIL** ☐**NA** ☐**NP (Limited Program)**
This table is a summary of test report, see conclusion of each clause of this test report for detail.		

The product Withings AuraTM **WSD01, SN: 0024E4182A06 is Compliant according to FCC 15.247, RSS-210, RSS-Gen standards.**

PASS: EUT complies with standard's requirement
FAIL: EUT does not comply with standard's requirement
NA: Not Applicable
NP: Not Performed

2. EQUIPMENT DESCRIPTION

2.1. GENERAL DESCRIPTION

The Withings Aura™ Bedside Device is a connected and active product designed to both monitor and improve sleep quality.
It 'connects' to the outside world through Wi-Fi, USB, Bluetooth and Bluetooth Low Energy.
It is 'active' as it includes multi-color LED lighting and audio diffusion capabilities.

Withings Aura discreetly records environment data (light, sound, temperature) and gathers sleep quality data from external sensors connected to it through the USB ports (NB: the USB-connected sensors are outside of the WSD01/Withings Aura Bedside Device perimeter). This recorded data allows to get a complete understanding of sleep patterns.
The Withings Aura™ Bedside Device then uses light and sound programs to positively impact wake-up and fall-asleep experiences, which are both instrumental in improving sleep quality and overall well-being.

It also offers additional options to create personal ambiances for relaxation and powernaps through light and sound programs.

2.2. HARDWARE & SOFTWARE IDENTIFICATION

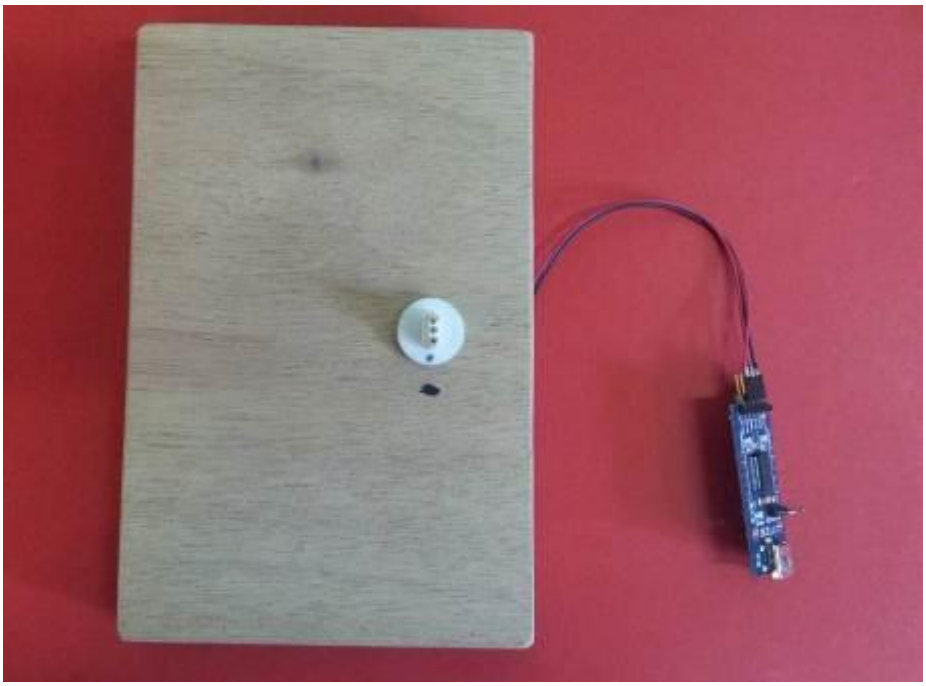
- **Equipment under test (EUT):**

Photograph of EUT

Photograph of EUT

- **<u>Auxiliary equipment (AE) used for testing:</u>**

- Personal Computer
- USB port to Uart port



Photograph of AE

- **Input/output:**

- Input Power
- 3 Usb

- **Software identification:**

-Software version: firmware_wsd01_20140522-113550_emc_radio

- **Equipment information:**

- Bluetooth Version: ☒ 1.2 ☒ 2.0 ☒ 2.1+EDR ☐ 3.0+HS
- Modulation technology: FHSS modulation
- EIRP: See 3.3. Result
- Transmit operating mode: ☐ Multiples antenna without beam forming
  ☐ Multiples antenna with beam forming
  ☒ Single antenna
- Number of transmit chains: ☒ 1
- Number of receiver chains: ☒ 1
- Antenna type: ☒ Integral ☐ External
- Antenna Gain: 3.3dBi
- Beamforming gain: ☐ Yes ☒ No
- Type of the equipment: ☒ Stand-alone equipment ☐ Plug-in radio device ☐ Combined equipment
- Test source voltage: Vnom: ☒ 120V/60Hz ☐ Vdc
- Type of power source: ☐ Battery (Alkaline/Lithium-Ion/Lead acid/Other) ☐ Internal power supply
  ☒ External power supply ☐ Car Charger
- Test sequence/test software used: See 2.2. Running Mode
- Ad-hoc mode: ☐ Yes ☒ No
- Minimum number of hopping frequency: 20
- Maximum number of hopping frequency: 79
- Duty Cycle: ☒ Continuous duty ☐ Intermittent duty ☐ Continuous operation
- Equipement type: ☐ Representative production model ☒ Pre-production model

- Operating frequency range

Frequency Band (MHz)	
2400MHz to 2483,5MHz	☒
5150MHz to 5350MHz	☐
5470MHz to 5725MHz	☐
MHz to MHz	☐

-Channel plan:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	27	2429	54	2456
1	2403	28	2430	55	2457
2	2404	29	2431	56	2458
3	2405	30	2432	57	2459
4	2406	31	2433	58	2460
5	2407	32	2434	59	2461
6	2408	33	2435	60	2462
7	2409	34	2436	61	2463
8	2410	35	2437	62	2464
9	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

-Data Rate:

Data Rate (Mbps)	Modulation Type
1	GFSK
2	π/4 DQPSK
3	8DPSK

-Packet:

Packet Type	Available
DM1	☐
DH1	☒
DM3	☐
DH3	☒
DM5	☐
DH5	☒
AUX1	☐
2DH1	☒
3DH1	☒
2DH3	☒
3DH3	☒
2DH5	☒
3DH5	☒

2.3. EQUIPMENT OF THE SAME FAMILY

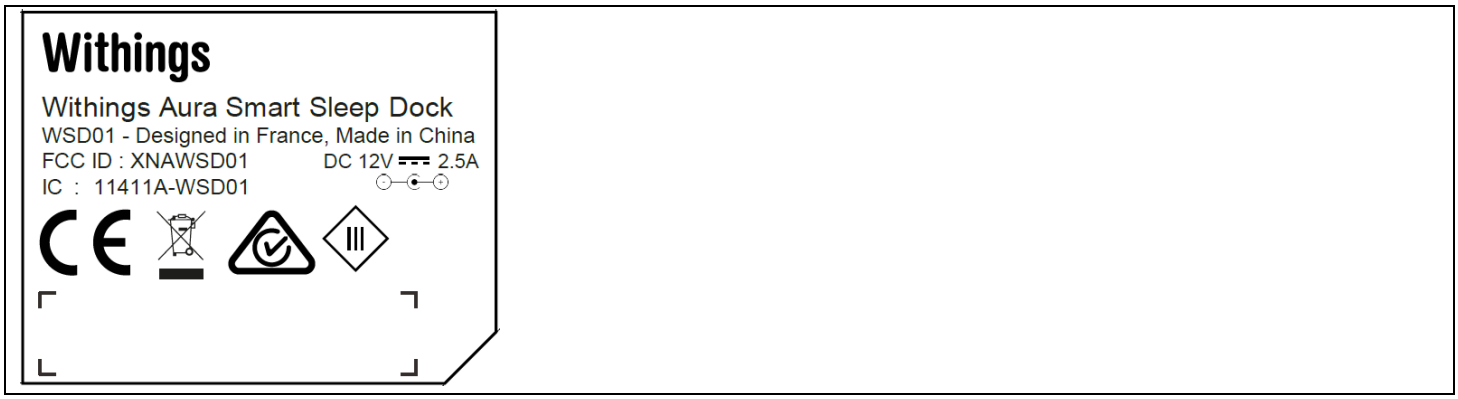
-None

2.4. RUNNING MODE

The EUT is set in the following modes during tests:
- Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
- Permanent emission with modulation with hopping mode in the data rate that produced the highest power
- Permanent reception

Following commands with the terterm test software are used to set the product:
See « WS01_EMI_test_v5.txt » file.

2.5. EQUIPMENT LABELLING



2.6. EQUIPMENT MODIFICATIONS

☒ No equipment modification has been necessary during testing.
☐ Modification applied for following tests:

3. NUMBER OF HOPPING FREQUENCIES

3.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE
Date of test : 2014/06/27
Ambient temperature : 26°C
Relative humidity : 46%

3.2. TEST SETUP

- The Equipment under Test is installed:
☐ In the climatic chamber
☒ On a table

-Measurement is performed with a spectrum analyzer
☒ On the EUT conducted access

The product has been tested according to the FCC DA 00-705 reference method.
The EUT is set in permanent emission with modulation & hopping.

Photograph for Number of Hopping Frequencies

3.3. LIMIT

Number of Hopping Frequencies shall be at least 15 channels

3.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05
Attenuator	MINI CIRCUITS	BW-S3W2+	A7122237	2013/07	2014/07
RF cable	Télédyne	920-0202-024	A5329674	2014/04	2015/04
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2012/11	2014/11

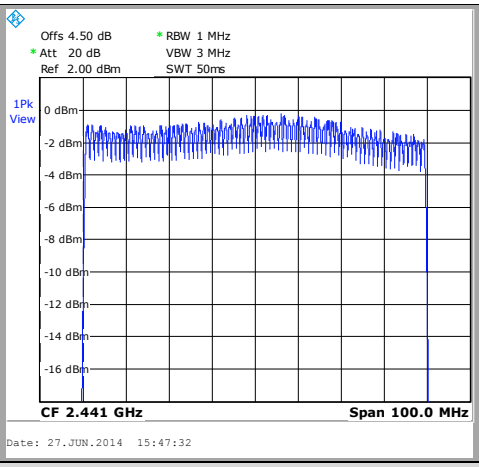
3.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒None ☐Divergence:

3.6. GRAPHICS & RESULTS

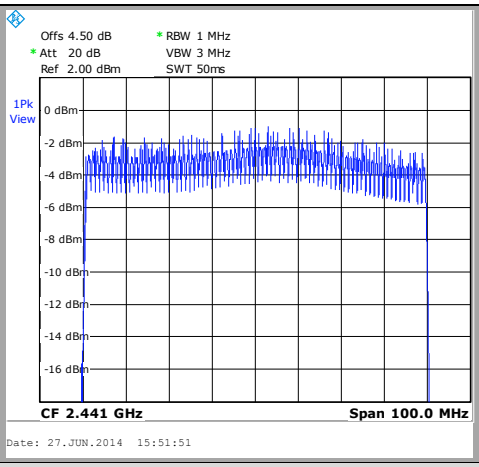
GFSK

Call



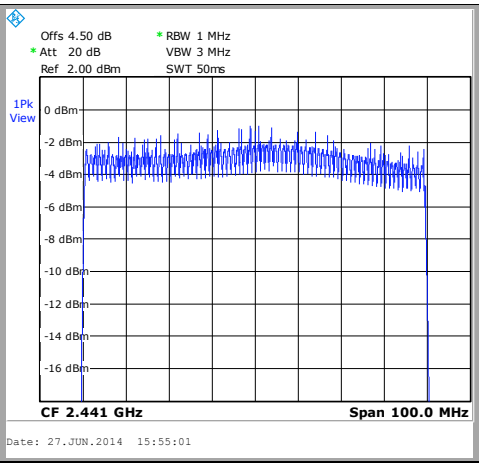
π/4 DQPSK

Call



8DPSK

Call



GFSK:

Temperature	Tnom
Voltage	**Vnom**
Channel	Call
Number of Hopping Frequencies	79

π/4 DQPSK:

Temperature	Tnom
Voltage	**Vnom**
Channel	Call
Number of Hopping Frequencies	79

8DPSK 3DH5:

Temperature	Tnom
Voltage	**Vnom**
Channel	Call
Number of Hopping Frequencies	79

3.7. CONCLUSION

Number of Hopping Frequencies measurement performed on the sample of the product Withings AuraTM WSD01, SN:0024E4182A06, in configuration and description presented in this test report, show levels Below the FCC 15.247, RSS-210, RSS-Gen limits.

4. CARRIER FREQUENCY SEPARATION

4.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE
Date of test : 2014/06/27
Ambient temperature : 26°C
Relative humidity : 46%

4.2. TEST SETUP

- The Equipment under Test is installed:
☐ In the climatic chamber
☒ On a table

-Measurement is performed with a spectrum analyzer
☒ On the EUT conducted access

The product has been tested according to the FCC DA 00-705 reference method.
The EUT is set in permanent emission with modulation & hopping.

Photograph for Carrier Frequency Separation

4.3. LIMIT

Carrier Frequency Separation shall be at least two-thirds of the 20dB Bandwidth

4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05
Attenuator	MINI CIRCUITS	BW-S3W2+	A7122237	2013/07	2014/07
RF cable	Télédyne	920-0202-024	A5329674	2014/04	2015/04
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2012/11	2014/11

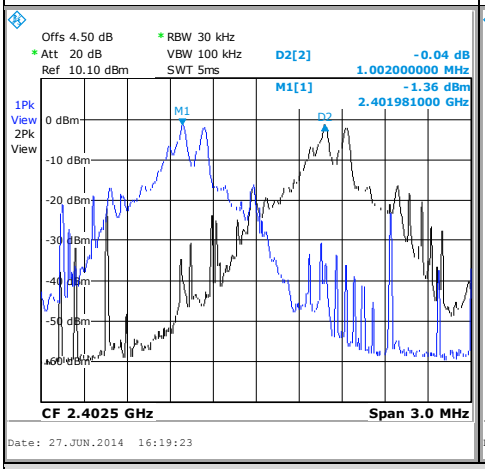
4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒None ☐Divergence:

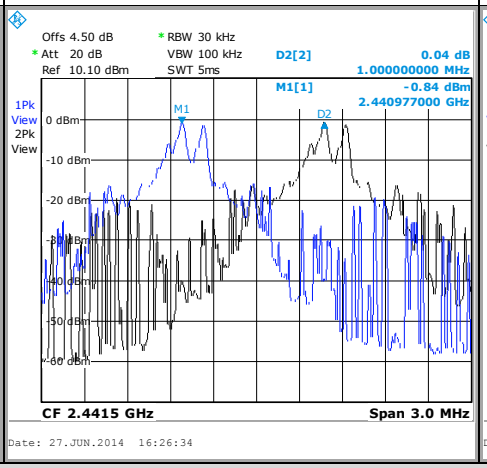
4.6. GRAPHICS & RESULTS

GFSK

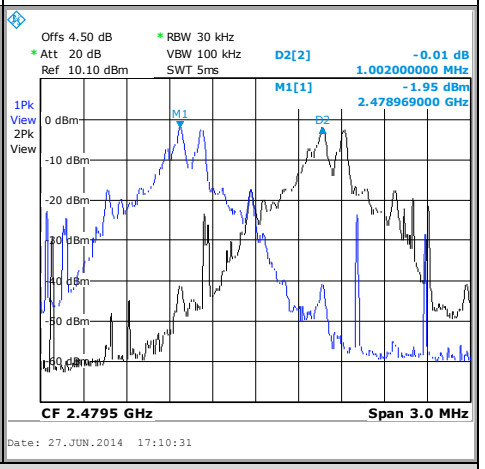
Cmin



Cnom

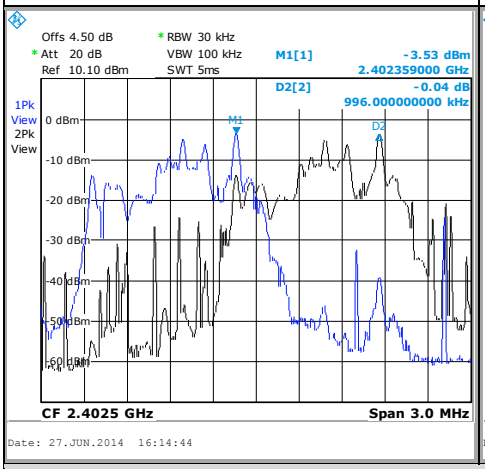


Cmax

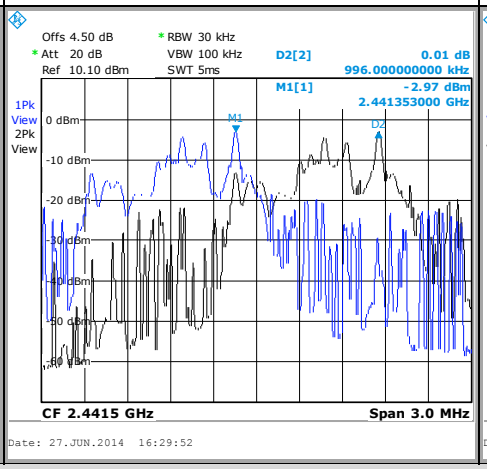


π/4 DQPSK

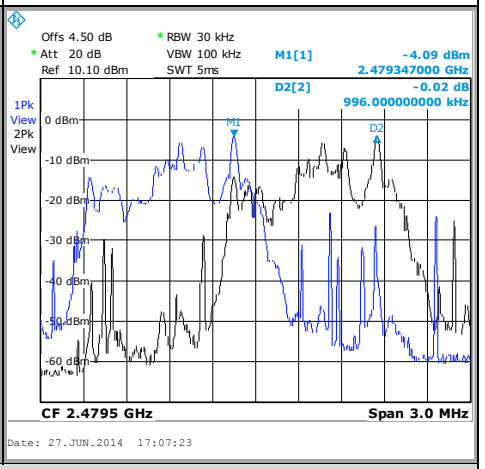
Cmin



Cnom

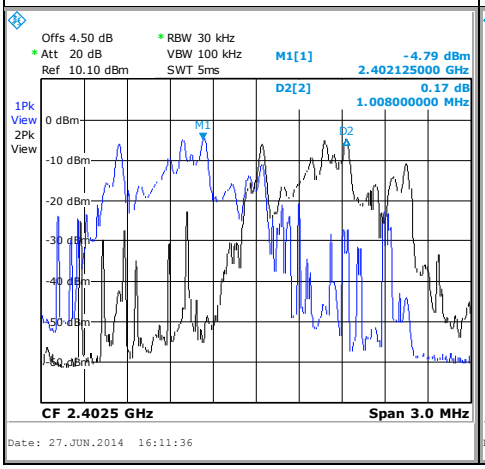


Cmax

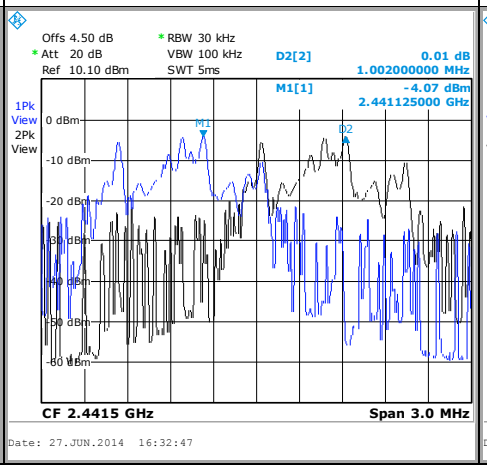


8DPSK

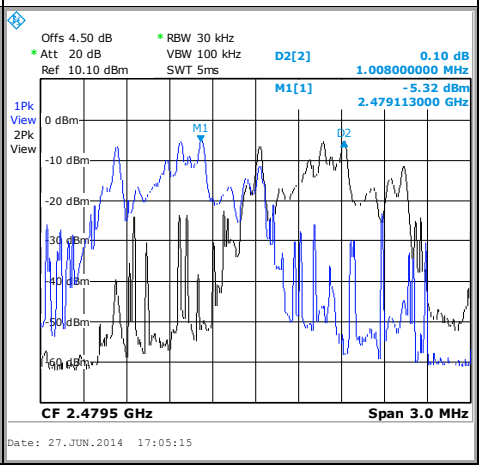
Cmin



Cnom



Cmax



GFSK:

Temperature	Tnom		
Voltage	**Vnom**		
Channel	Cmin	Cnom	Cmax
Carrier Frequency Separation (MHz)	1.002	1	1.002

π/4 DQPSK:

Temperature	Tnom		
Voltage	**Vnom**		
Channel	Cmin	Cnom	Cmax
Carrier Frequency Separation (MHz)	0.996	0.996	0.996

8DPSK 3DH5:

Temperature	Tnom		
Voltage	**Vnom**		
Channel	Cmin	Cnom	Cmax
Carrier Frequency Separation (MHz)	1.008	1.002	1.008

4.7. CONCLUSION

Carrier Frequency Separation measurement performed on the sample of the product Withings AuraTM WSD01, SN:0024E4182A06, in configuration and description presented in this test report, show levels Below the FCC 15.247, RSS-210, RSS-Gen limits.

5. TIME OF OCCUPANCY

5.1. TEST CONDITIONS

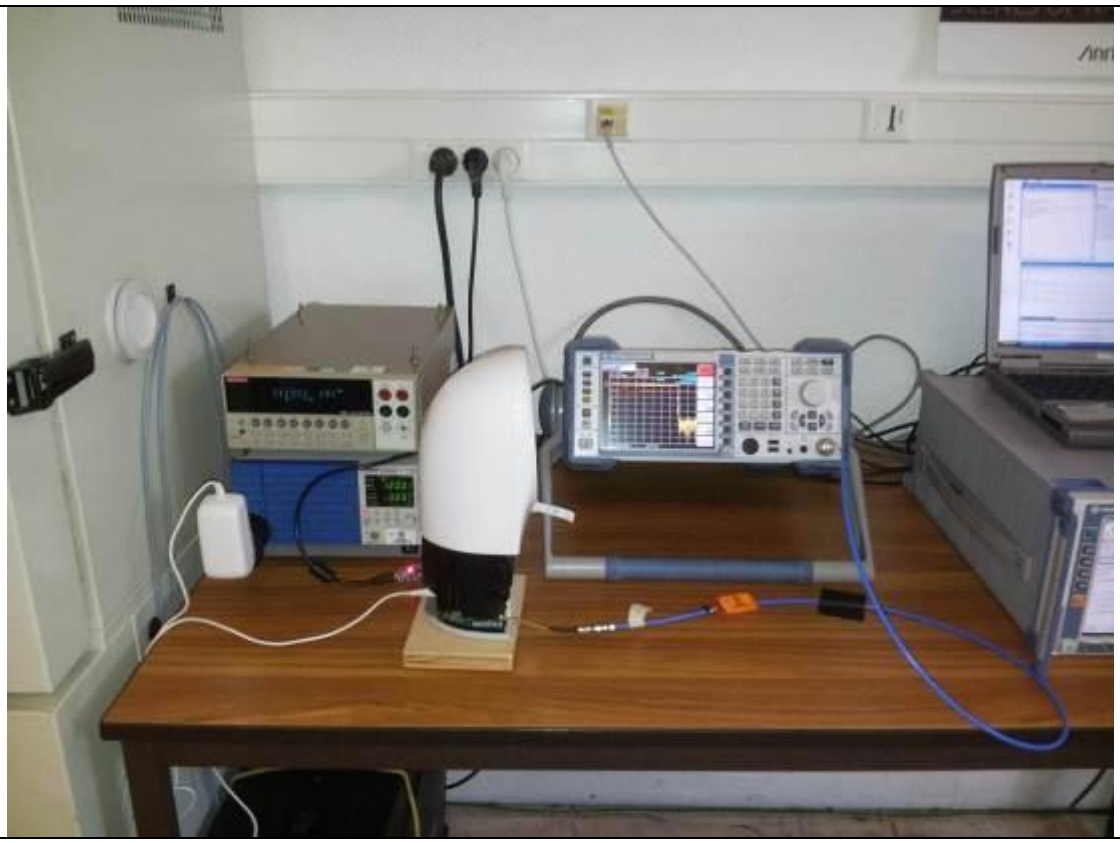
Test performed by : Stéphane PHOUDIAH
Date of test : 2014/06/30
Ambient temperature : 20°C
Relative humidity : 50%

5.2. TEST SETUP

- The Equipment under Test is installed:
☐ In the climatic chamber
☒ On a table

-Measurement is performed with a spectrum analyzer
☒ On the EUT conducted access

The product has been tested according to the FCC DA 00-705
The EUT is set in permanent emission with modulation & hopping.



Photograph for Time of Occupancy

5.3. LIMIT

The Time of Occupancy shall not exceed 0.4s within any period of 0.4s multiplied by the number of hopping channels employed

5.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2012/11	2014/11
RF cable	Télédyne	920-0202-048	A5329675	2014/05	2015/05
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05
Attenuator	MINI CIRCUITS	BW-S3W2+	A7122208	2014/07	2014/07

5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

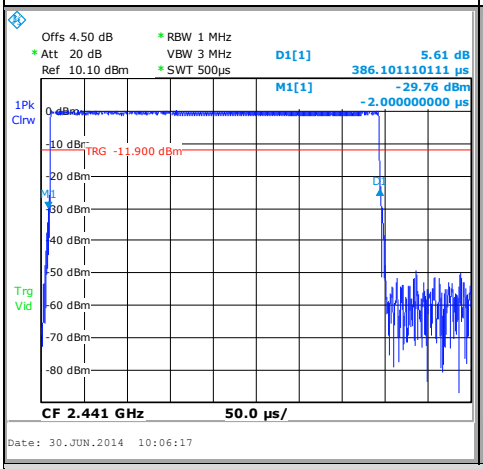
☒None ☐Divergence:

5.6. GRAPHICS & RESULTS

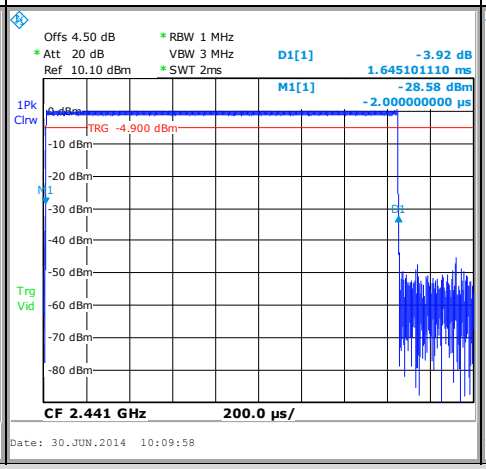
Burst Length

GFSK

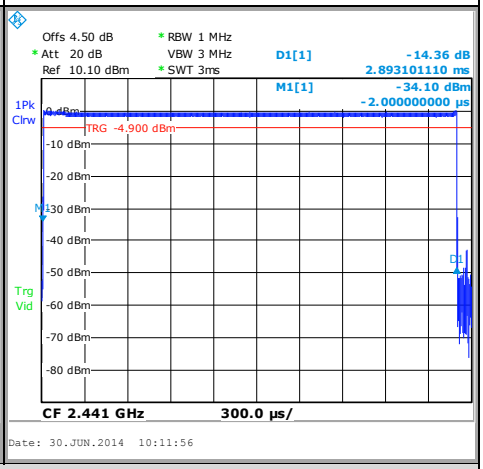
DH1



DH3

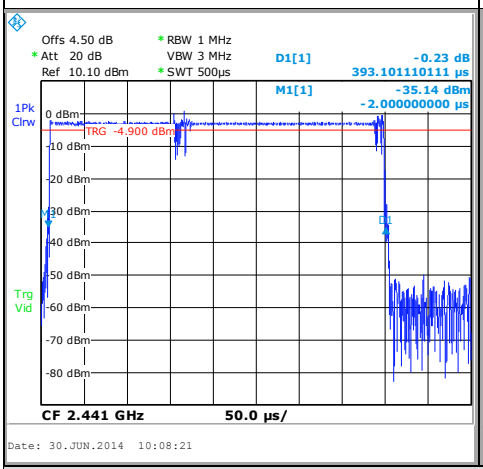


DH5

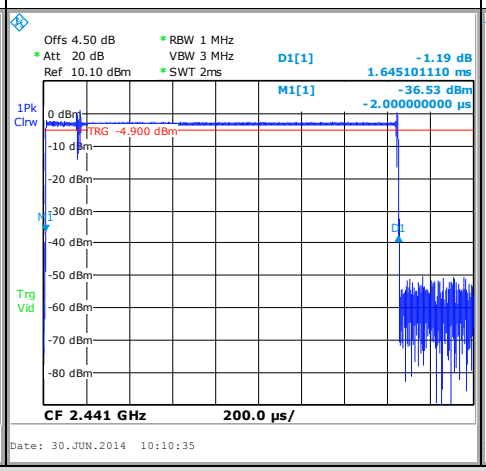


π/4 DQPSK

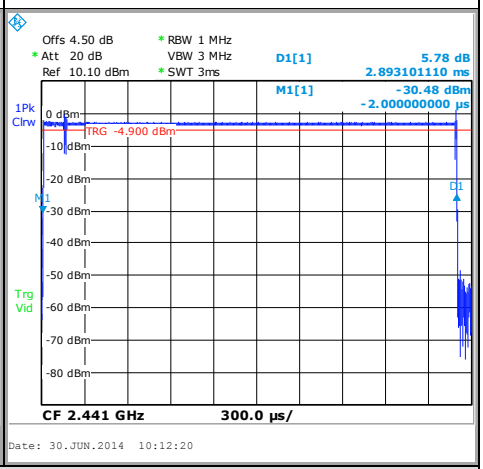
2DH1



2DH3

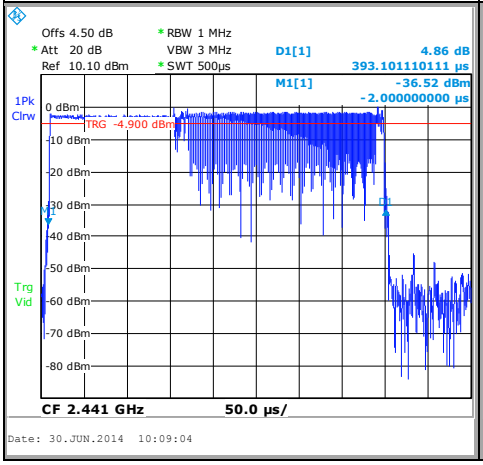


2DH5

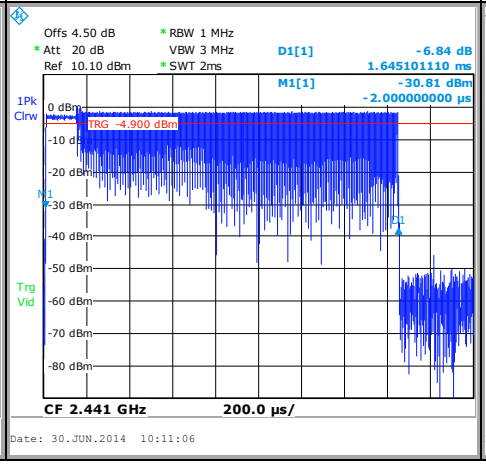


8DPSK

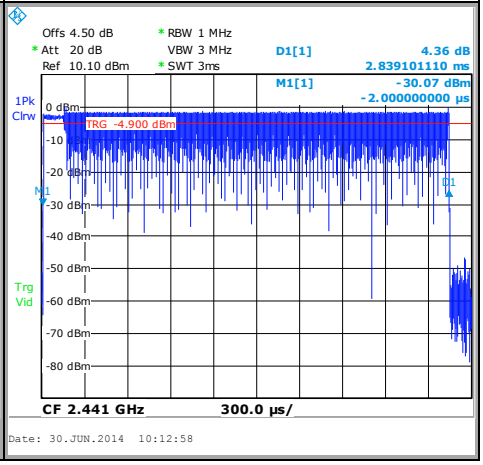
3DH1



3DH3



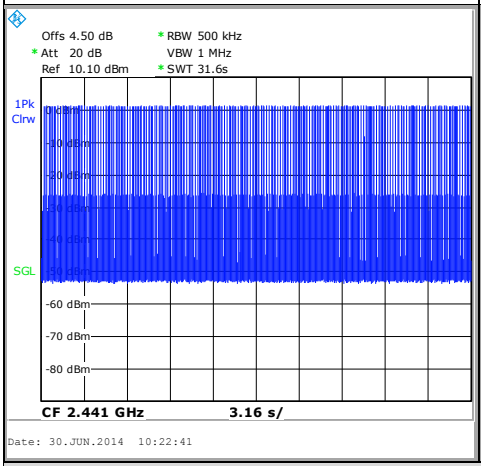
3DH5



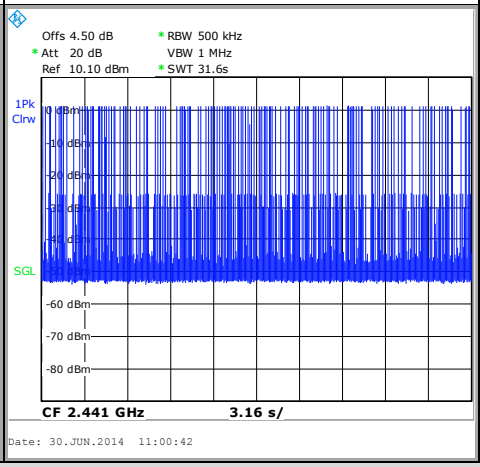
Time of Occupancy

GFSK

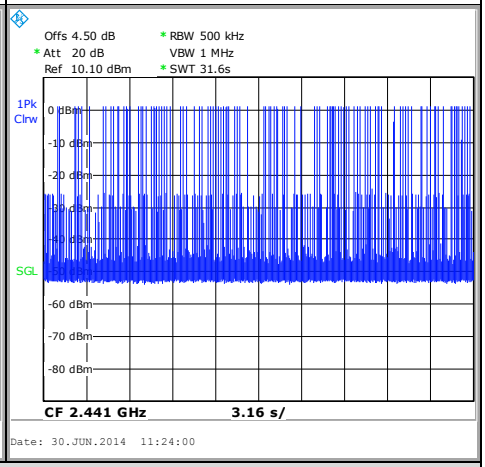
DH1



DH3

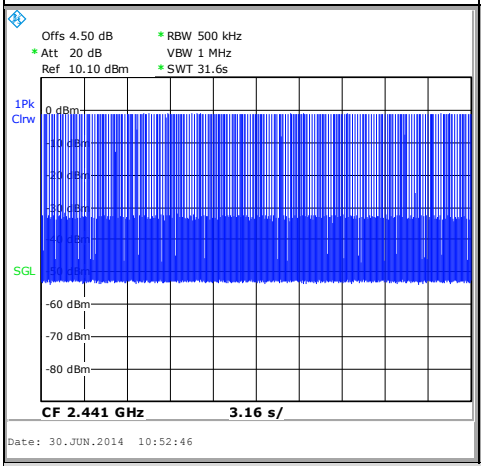


DH5

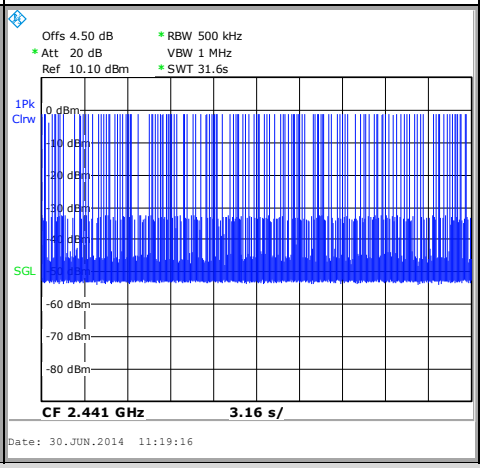


π/4 DQPSK

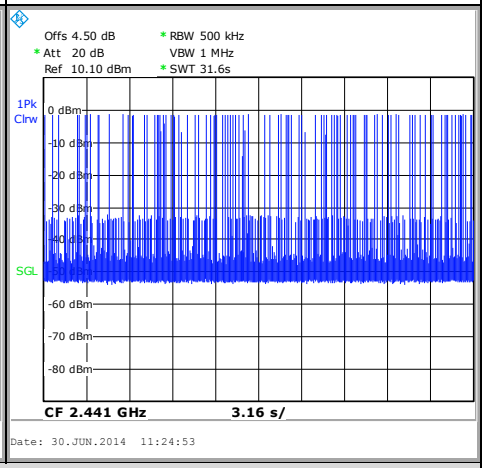
2DH1



2DH3

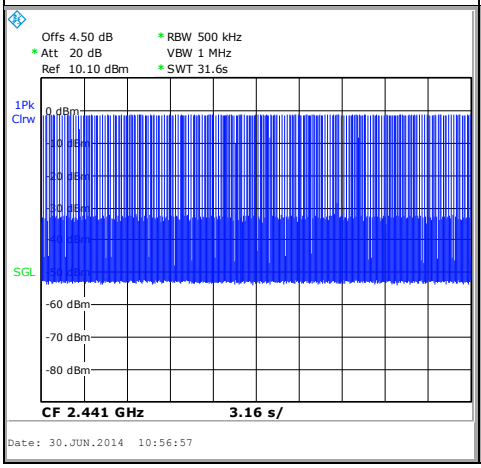


2DH5

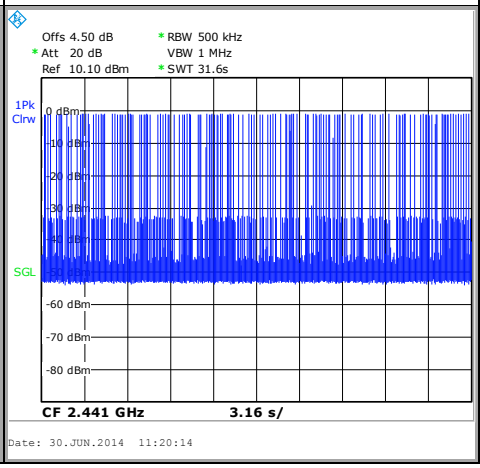


8DPSK

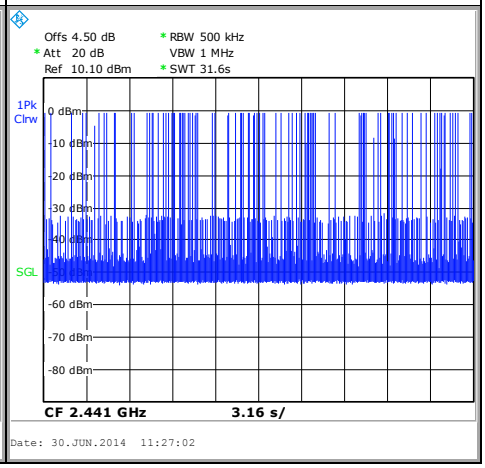
3DH1



3DH3



3DH5



GFSK:

Temperature	**Tnom**		
Voltage	**Vnom**		
Packet Type	DH1	DH3	DH5
Burst Length (ms)	0.386	1.645	2.893
Number of Burst in 31.6s period	321	146	99
Time of Occupancy (ms)	123.906	240.17	286.407

π/4 DQPSK:

Temperature	**Tnom**		
Voltage	**Vnom**		
Packet Type	2DH1	2DH3	2DH5
Burst Length (ms)	0.393	1.645	2.893
Number of Burst in 31.6s period	330	150	96
Time of Occupancy (ms)	129.69	246.75	277.728

8DPSK 3DH5:

Temperature	**Tnom**		
Voltage	**Vnom**		
Packet Type	3DH1	3DH3	3DH5
Burst Length (ms)	0.393	1.645	2.839
Number of Burst in 31.6s period	315	143	92
Time of Occupancy (ms)	123.795	235.235	261.188

5.7. CONCLUSION

Time of Occupancy measurement performed on the sample of the product Withings AuraTM WSD01, SN:0024E4182A06, in configuration and description presented in this test report, show levels Below the FCC 15.247, RSS-210, RSS-Gen limits.

6. OCCUPIED BANDWIDTH

6.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE
Date of test : 2014/06/27
Ambient temperature : 26°C
Relative humidity : 46%

6.2. TEST SETUP

- The Equipment under Test is installed:
☐ In the climatic chamber
☒ On a table

-Measurement is performed with a spectrum analyzer
☒ On the EUT conducted access

The product has been tested according to the RSS-GEN § 4.6.1 reference method.
The EUT is set in permanent emission with modulation & no hopping.

Photograph for Occupied Bandwidth

6.3. LIMIT

No Limit

6.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05
Attenuator	MINI CIRCUITS	BW-S3W2+	A7122237	2013/07	2014/07
RF cable	Télédyne	920-0202-024	A5329674	2014/04	2015/04
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2012/11	2014/11

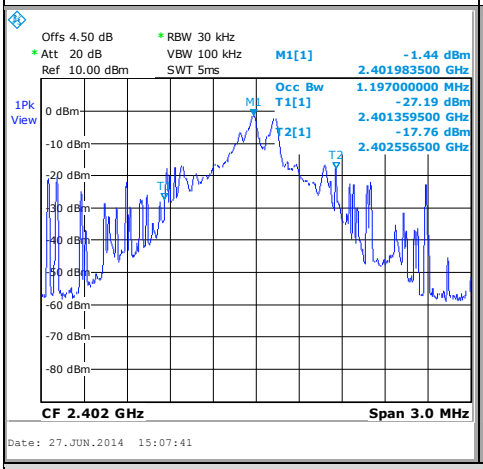
6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒None ☐Divergence:

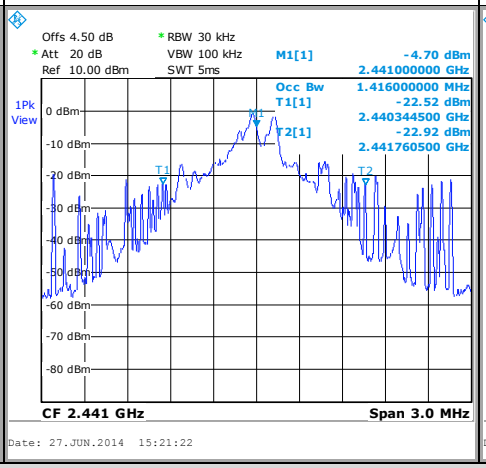
6.6. GRAPHICS & RESULTS

GFSK

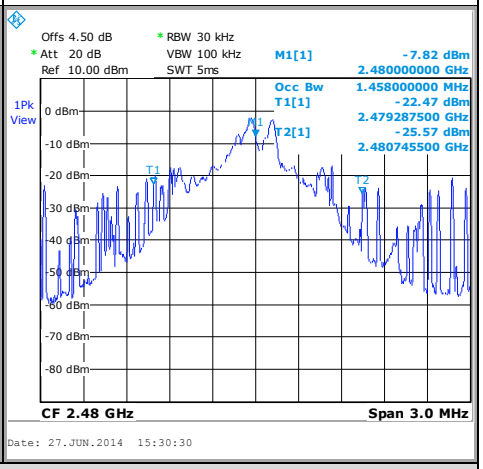
Cmin



Cnom

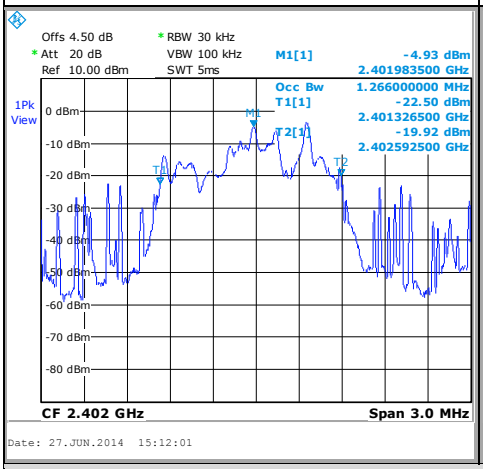


Cmax

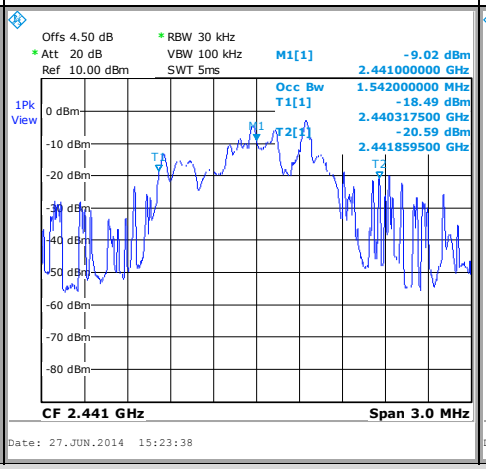


π/4 DQPSK

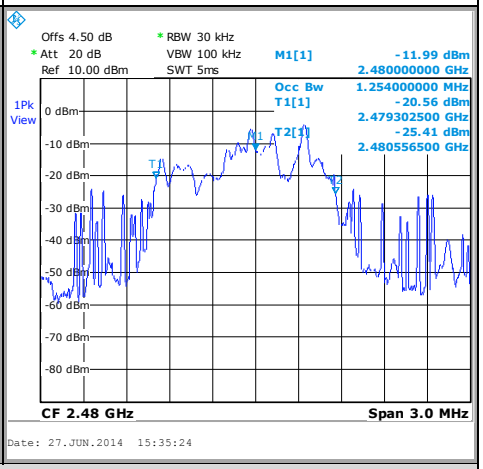
Cmin



Cnom

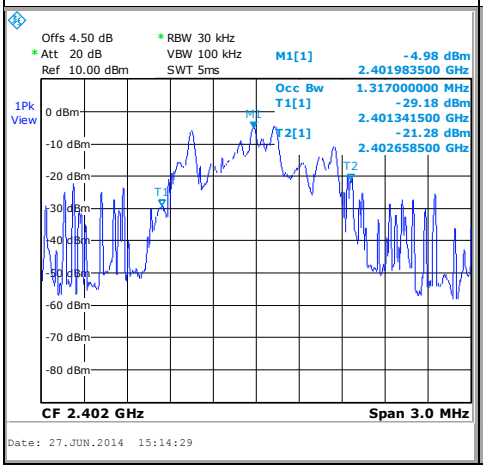


Cmax

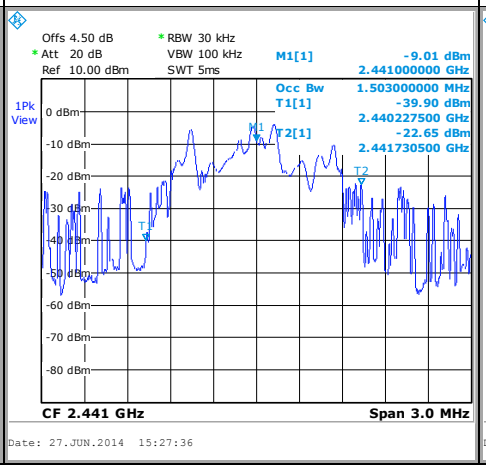


8DPSK

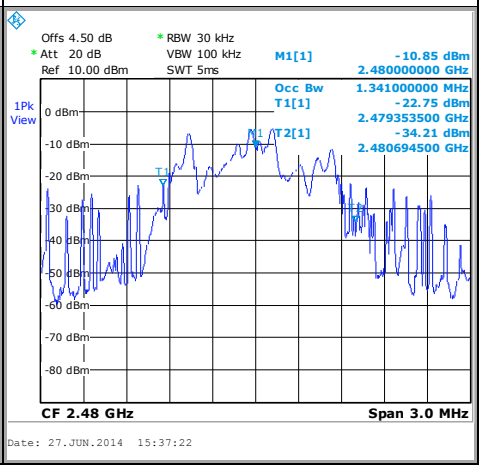
Cmin



Cnom



Cmax



GFSK:

Temperature	Tnom		
Voltage	**Vnom**		
Channel	Cmin	Cnom	Cmax
Occupied Bandwidth (MHz)	1.197	1.416	1.458

π/4 DQPSK:

Temperature	Tnom		
Voltage	**Vnom**		
Channel	Cmin	Cnom	Cmax
Occupied Bandwidth (MHz)	1.266	1.542	1.254

8DPSK 3DH5:

Temperature	Tnom		
Voltage	**Vnom**		
Channel	Cmin	Cnom	Cmax
Occupied Bandwidth (MHz)	1.317	1.503	1.341

6.7. CONCLUSION

Occupied Bandwidth measurement performed on the sample of the product Withings AuraTM WSD01, SN:0024E4182A06, in configuration and description presented in this test report, show levels Below the RSS-210, RSS-Gen limits.

7. 20dB BANDWIDTH

7.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE
Date of test : 2014/06/27
Ambient temperature : 26°C
Relative humidity : 46%

7.2. TEST SETUP

- The Equipment under Test is installed:
☐ In the climatic chamber
☒ On a table

-Measurement is performed with a spectrum analyzer
☒ On the EUT conducted access

The product has been tested according to the FCC DA 00-705 reference method.
The EUT is set in permanent emission with modulation & no hopping.

Photograph for 20dB Bandwidth

7.3. LIMIT

No Limit

7.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05
Attenuator	MINI CIRCUITS	BW-S3W2+	A7122237	2013/07	2014/07
RF cable	Télédyne	920-0202-024	A5329674	2014/04	2015/04
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2012/11	2014/11

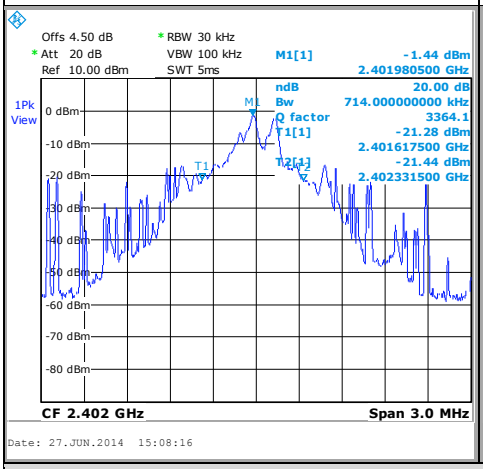
7.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒None ☐Divergence:

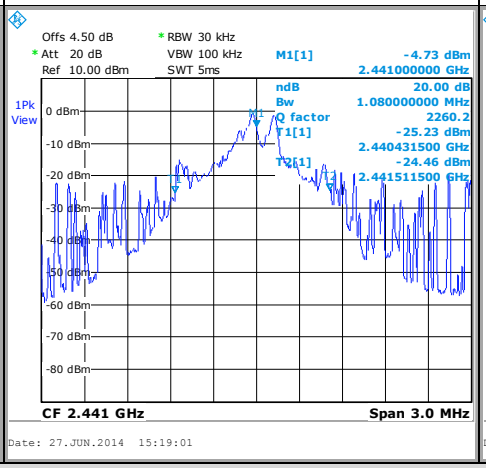
7.6. GRAPHICS & RESULTS

GFSK

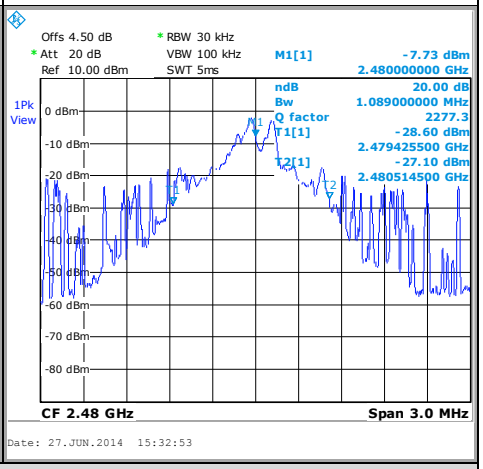
Cmin



Cnom

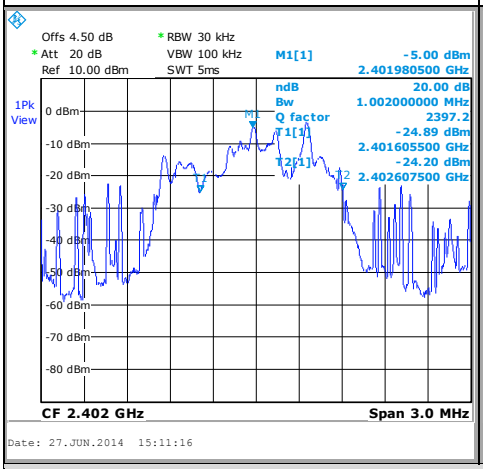


Cmax

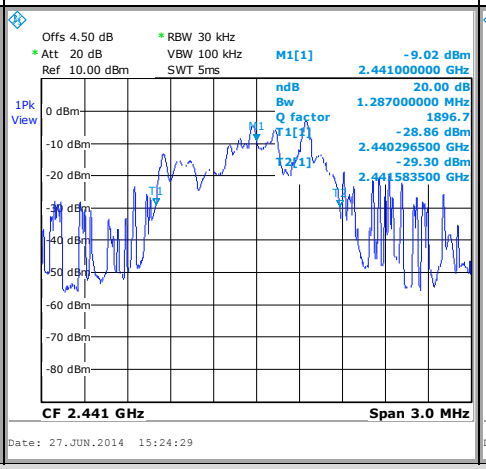


π/4 DQPSK

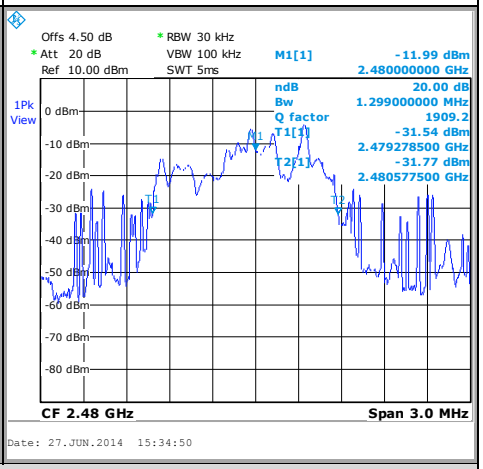
Cmin



Cnom

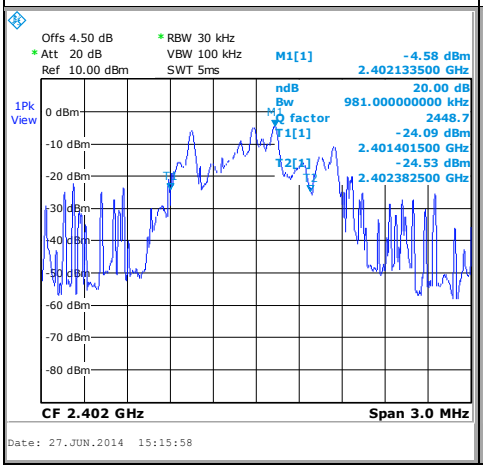


Cmax

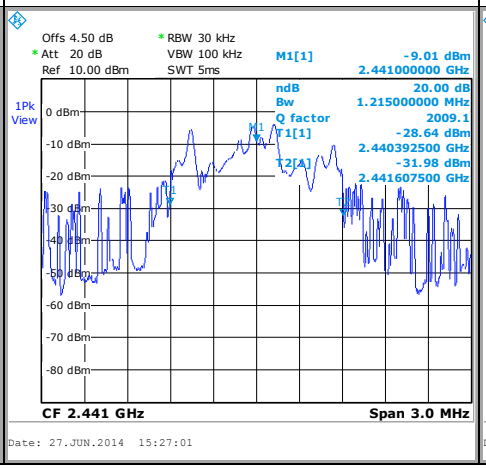


8DPSK

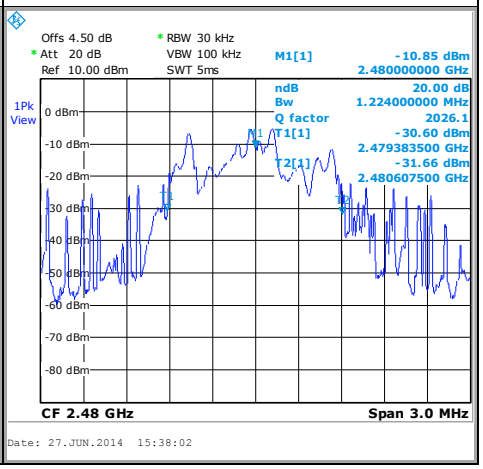
Cmin



Cnom



Cmax



GFSK:

Temperature	Tnom		
Voltage	**Vnom**		
Channel	Cmin	Cnom	Cmax
20dB Bandwidth (MHz)	0.741	1.08	1.089

π/4 DQPSK:

Temperature	Tnom		
Voltage	**Vnom**		
Channel	Cmin	Cnom	Cmax
20dB Bandwidth (MHz)	1.002	1.287	1.299

8DPSK 3DH5:

Temperature	Tnom		
Voltage	**Vnom**		
Channel	Cmin	Cnom	Cmax
20dB Bandwidth (MHz)	0.981	1.215	1.224

7.7. CONCLUSION

20dB Bandwidth measurement performed on the sample of the product Withings AuraTM WSD01, SN:0024E4182A06, in configuration and description presented in this test report, show levels Below the FCC 15.247, RSS-210, RSS-Gen limits.

8. PEAK OUTPUT POWER

8.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE
Date of test : 2014/06/27
Ambient temperature : 26°C
Relative humidity : 46%

8.2. TEST SETUP

- The Equipment under Test is installed:
☐ In the climatic chamber
☒ On a table

-Measurement is performed with a spectrum analyzer
☒ On the EUT conducted access

The product has been tested according to the FCC DA 00-705 reference method.
The EUT is set in permanent emission with modulation & no hopping.

Photograph for Peak Output Power

8.3. LIMIT

The Peak Output Power shall not exceed 21dBm

8.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05
Attenuator	MINI CIRCUITS	BW-S3W2+	A7122237	2013/07	2014/07
RF cable	Télédyne	920-0202-024	A5329674	2014/04	2015/04
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2012/11	2014/11

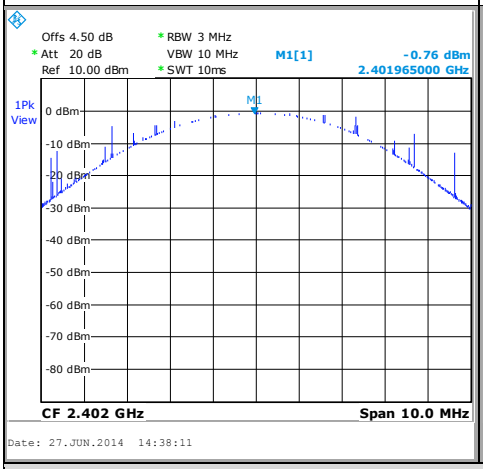
8.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒None ☐Divergence:

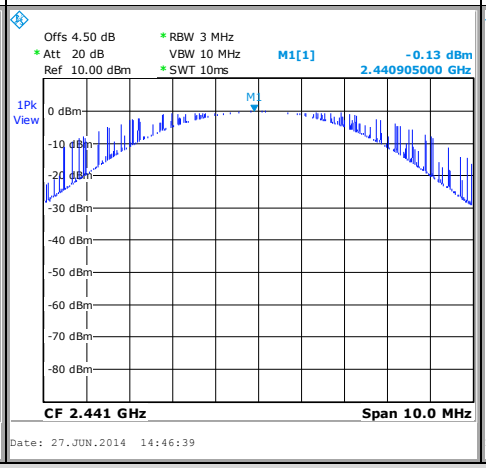
8.6. GRAPHICS & RESULTS

GFSK

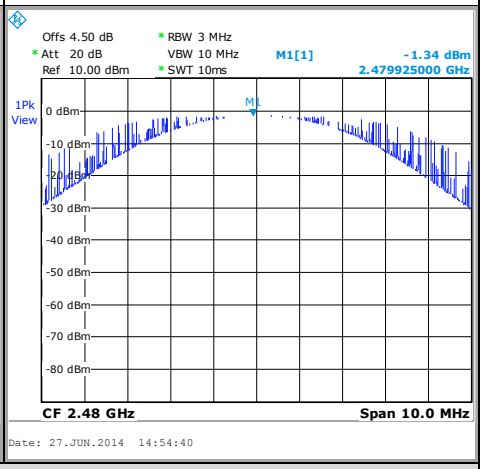
Cmin



Cnom

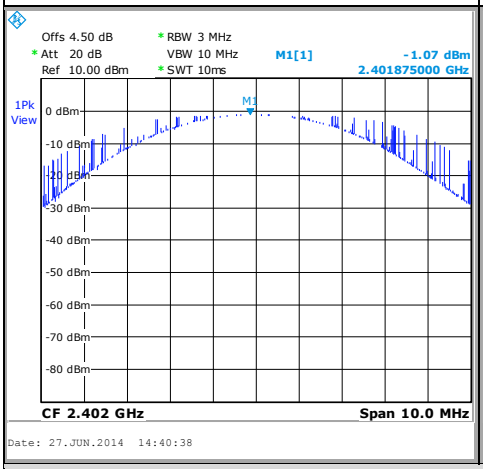


Cmax

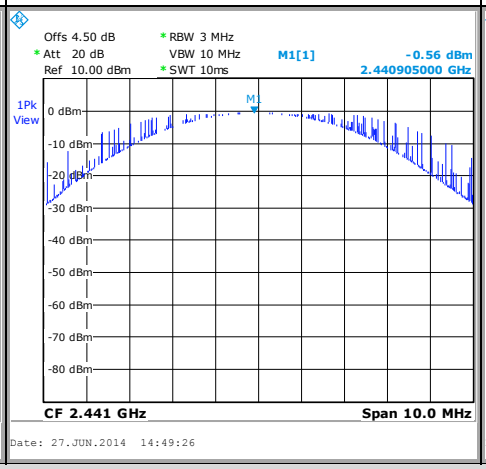


π/4 DQPSK

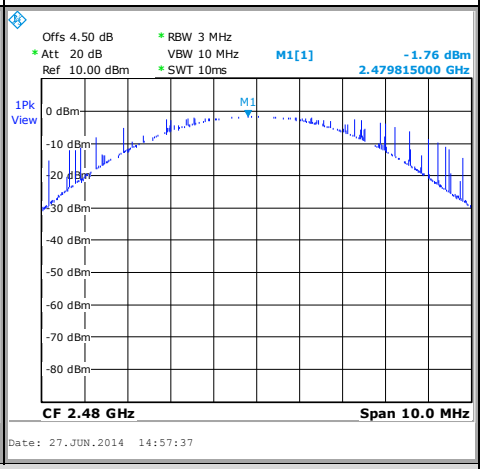
Cmin



Cnom

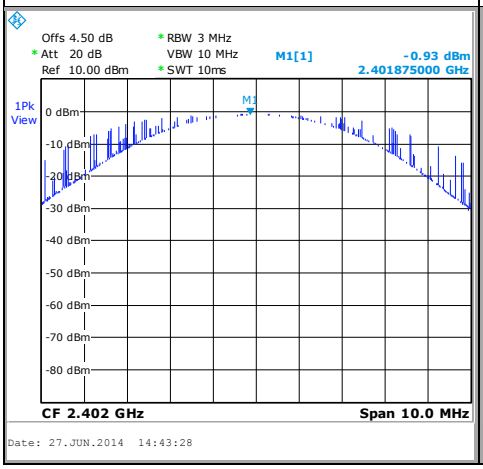


Cmax

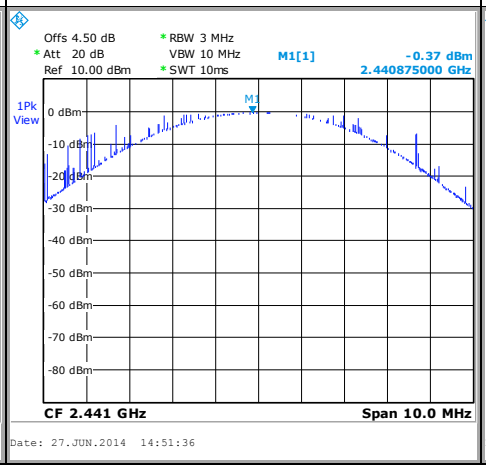


8DPSK

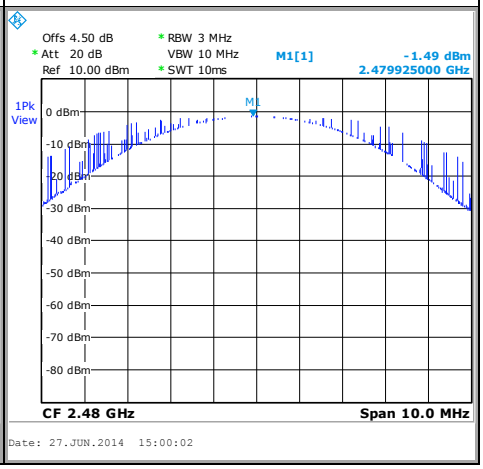
Cmin



Cnom



Cmax



Cable Loss + Attenuator: 4.5dB (Include in the spectrum analyser offset)

GFSK:

Temperature	**Tnom**		
Voltage	**Vnom**		
Channel	Cmin	Cnom	Cmax
Peak Output Power (dBm)	-0.76	-0.13	-1.34

π/4 DQPSK:

Temperature	**Tnom**		
Voltage	**Vnom**		
Channel	Cmin	Cnom	Cmax
Peak Output Power (dBm)	-1.07	-0.56	-1.76

8DPSK 3DH5:

Temperature	**Tnom**		
Voltage	**Vnom**		
Channel	Cmin	Cnom	Cmax
Peak Output Power (dBm)	-0.93	-0.37	-1.49

8.7. CONCLUSION

Peak Output Power measurement performed on the sample of the product Withings AuraTM WSD01, SN:0024E4182A06, in configuration and description presented in this test report, show levels Below the FCC 15.247, RSS-210, RSS-Gen limits.

9. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS

9.1. TEST CONDITIONS

Test performed by : Stéphane PHOUDIAH
Date of test : 2014/06/30 & 2014/07/07
Ambient temperature : 23°C
Relative humidity : 46%

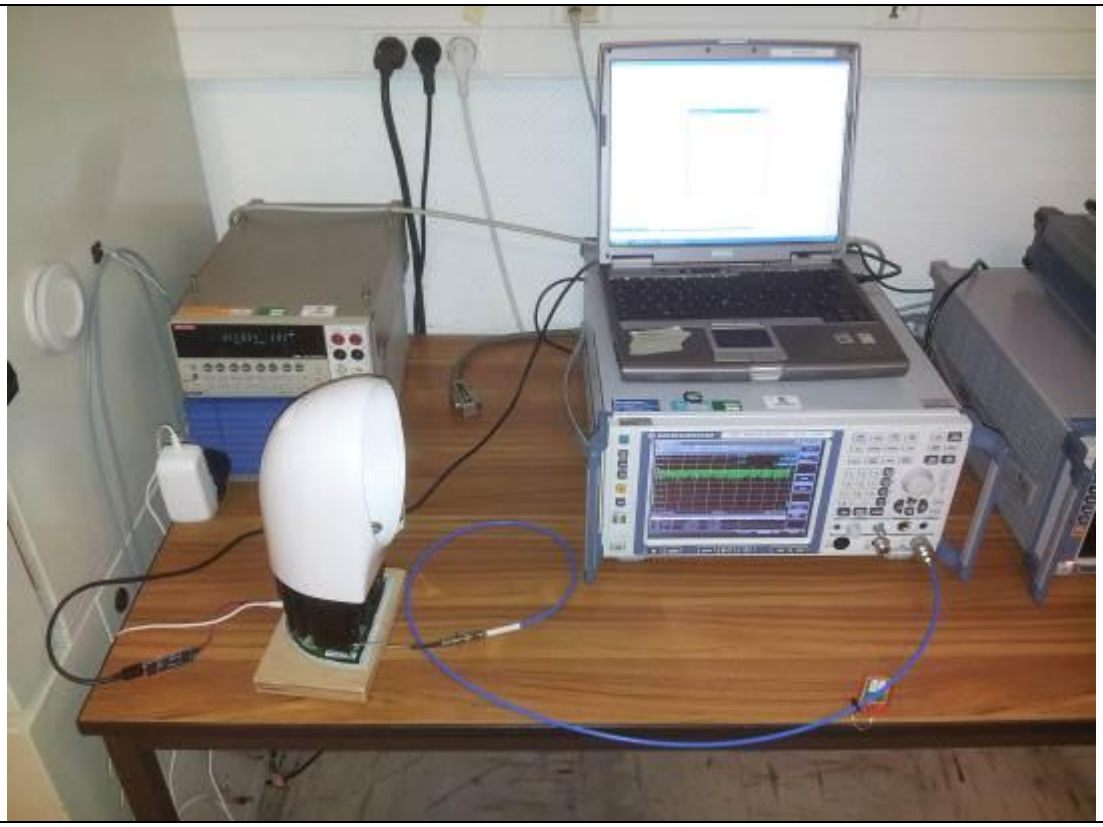
9.2. TEST SETUP

- The Equipment under Test is installed:
☐ In the climatic chamber
☒ On a table

-Measurement is performed with a spectrum analyzer
☒ On the EUT conducted access

The product has been tested according to the FCC DA 00-705 reference method.
The EUT is set in permanent emission with modulation & no hopping.

Photograph for Unwanted Emissions into Non-Restricted Frequency Bands



Photograph for Unwanted Emissions into Non-Restricted Frequency Bands

9.3. LIMIT

Unwanted Emissions into Non-Restricted Frequency Bands shall be at least 20dB below highest level of the radiated power in any 100kHz bandwidth outside the intentional radiation frequency band

9.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI Test Receiver	ROHDE & SCHWARZ	ESR7	A2642023	2013/10	2014/10
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
Measurement RF cable	-	-	A5329592	2014/05	2015/05
Measurement RF cable	-	-	A5329621	2014/04	2015/04
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2013/04	2014/04
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	2014/05	2015/05
Attenuator 3dB	WEINSCHEL	WA54-3-12	A7122223	2013/12	2014/12
Attenuator 3dB	MINI-CIRCUITS	BW-S3W2	A7122208	2013/07	2014/07

Note: In our Quality System, the calibration due of our equipments is more or less 2 months.

9.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

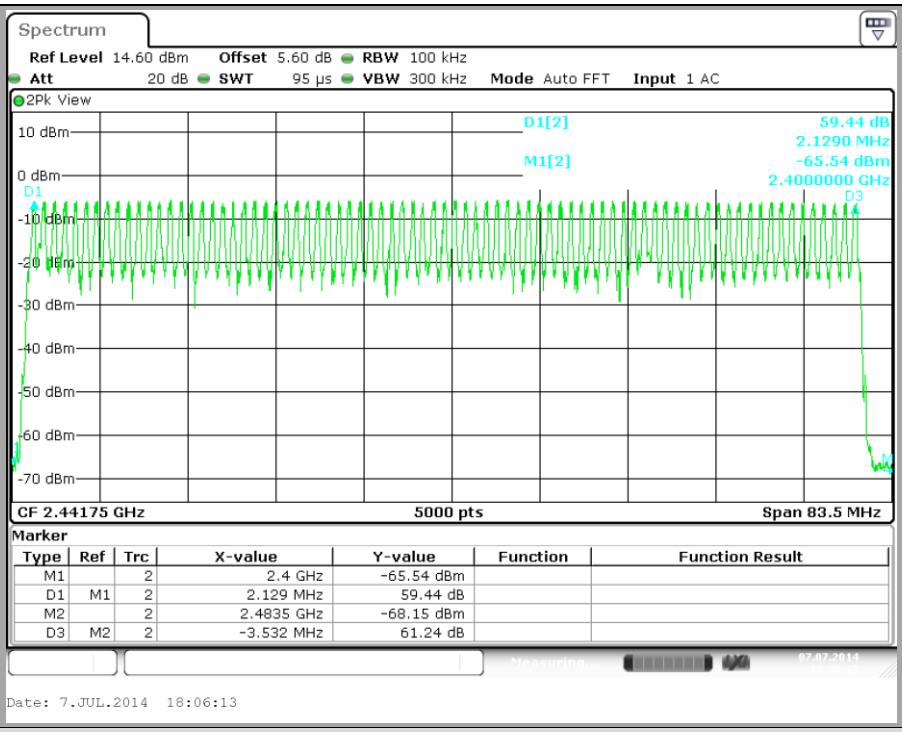
☒None ☐Divergence:

9.6. GRAPHICS & RESULTS

GFSK

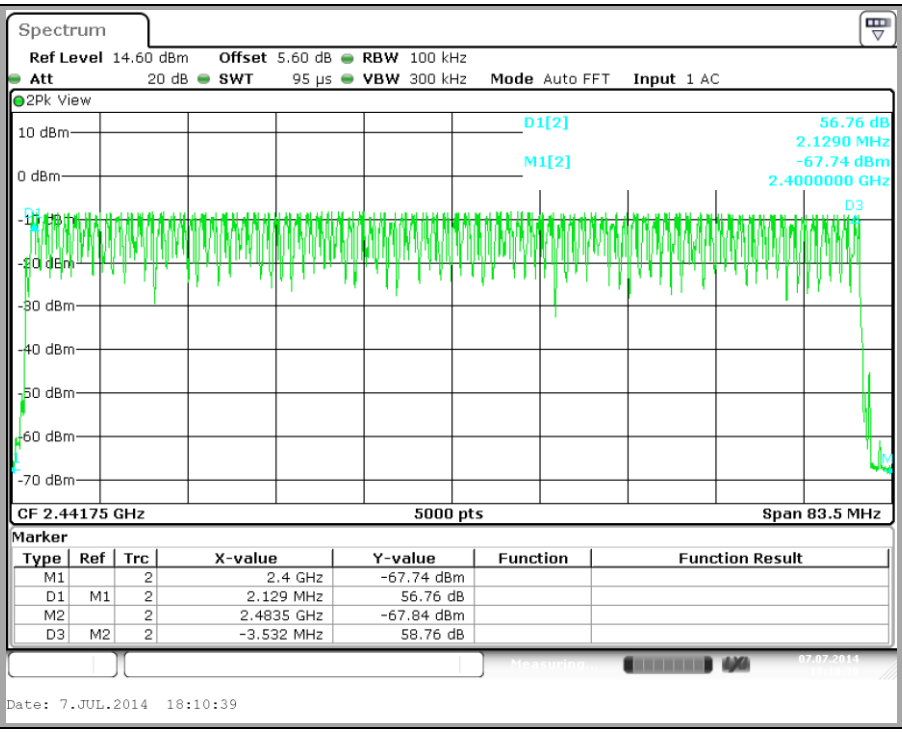
Unwanted Emissions into Non-Restricted Bands at the Band-Edge

Call

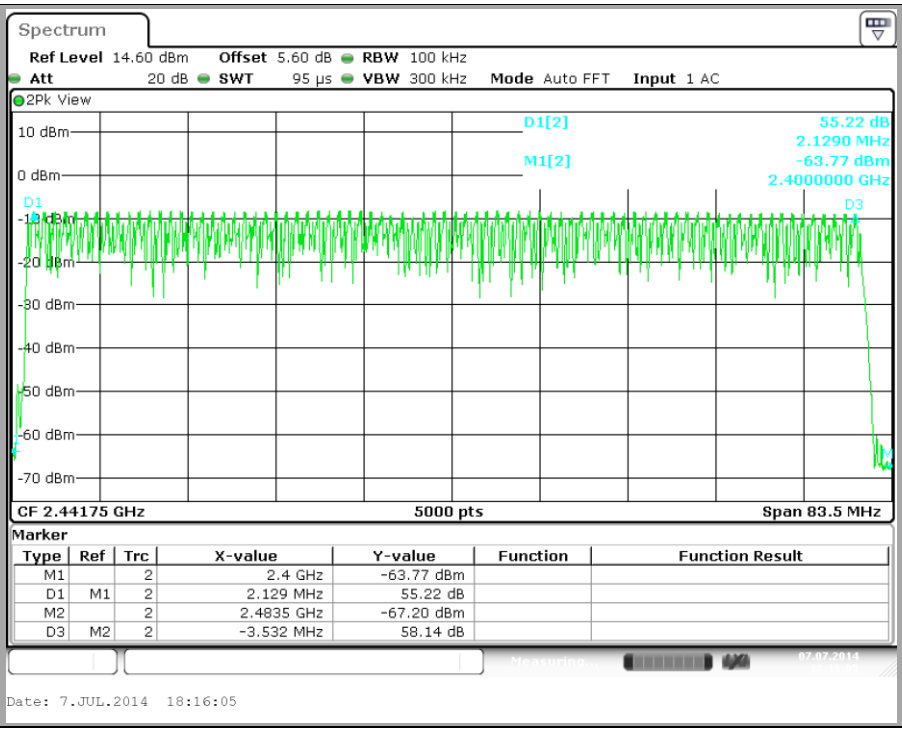


π/4 DQPSK

Call



8DPSK
Unwanted Emissions into Non-Restricted Bands at the Band-Edge
Call



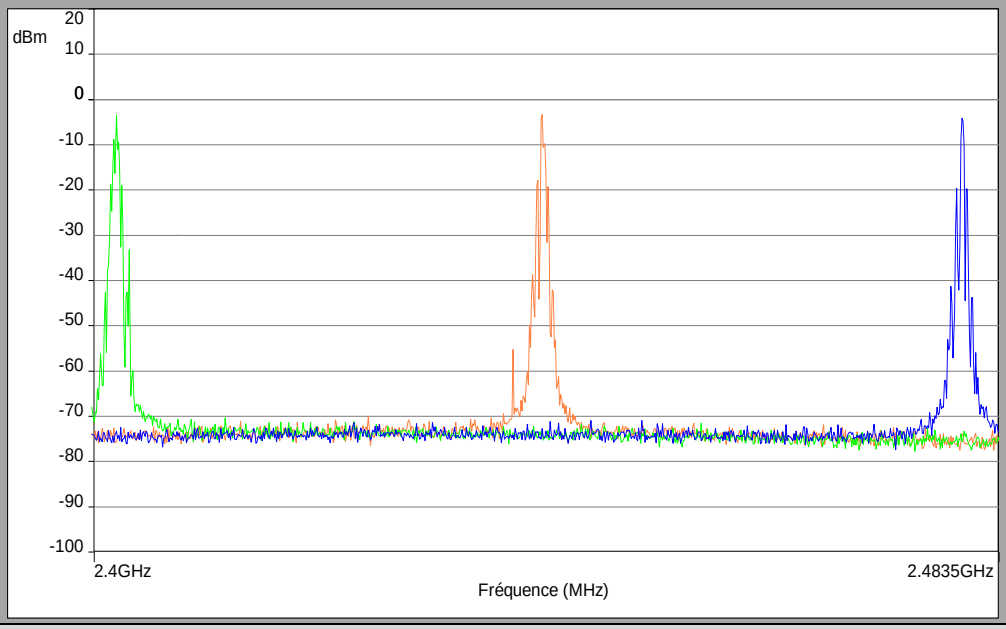
GFSK

Unwanted Emissions into Non-Restricted Bands at the Band-Edge

Cmin & Cnom & Cmax

Description Sous-bande 1
Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)
Réglages: RBW: 100 kHz, VBW: 300 kHz, Temps de mesure : 1 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur : On

Mes.Peak GFSK Channel 78
Mes.Peak GFSK Channel 0
Mes.Peak GFSK Channel 39

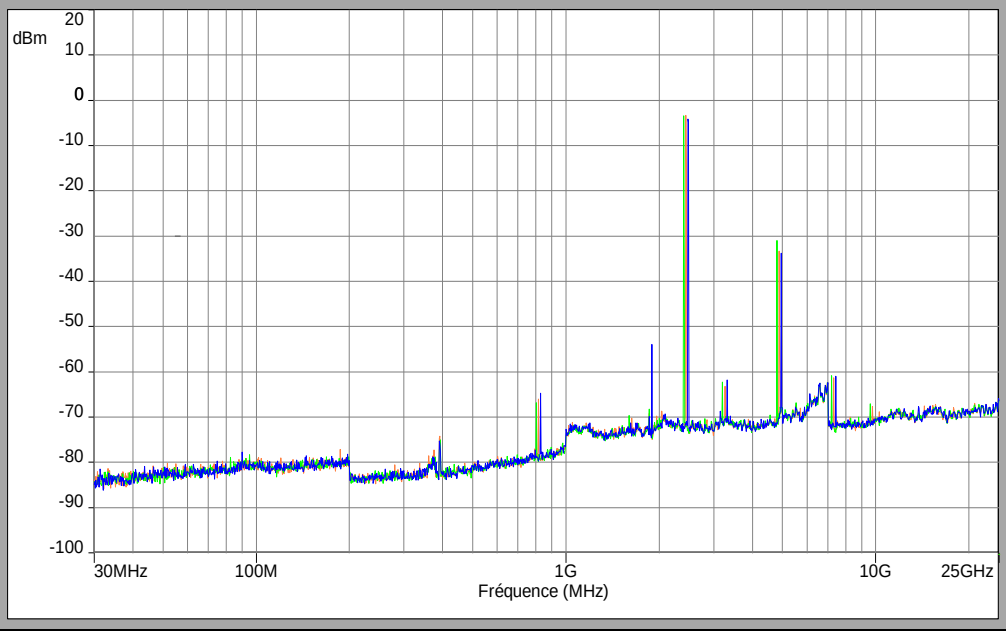


Unwanted Emissions into Non-Restricted Bands

Cmin & Cnom & Cmax

Description Sous-bande 1
Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)
Réglages: RBW: 100 kHz, VBW: 300 kHz, Temps de mesure : 1 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur : On

Mes.Peak GFSK Channel 78
Mes.Peak GFSK Channel 0
Mes.Peak GFSK Channel 39



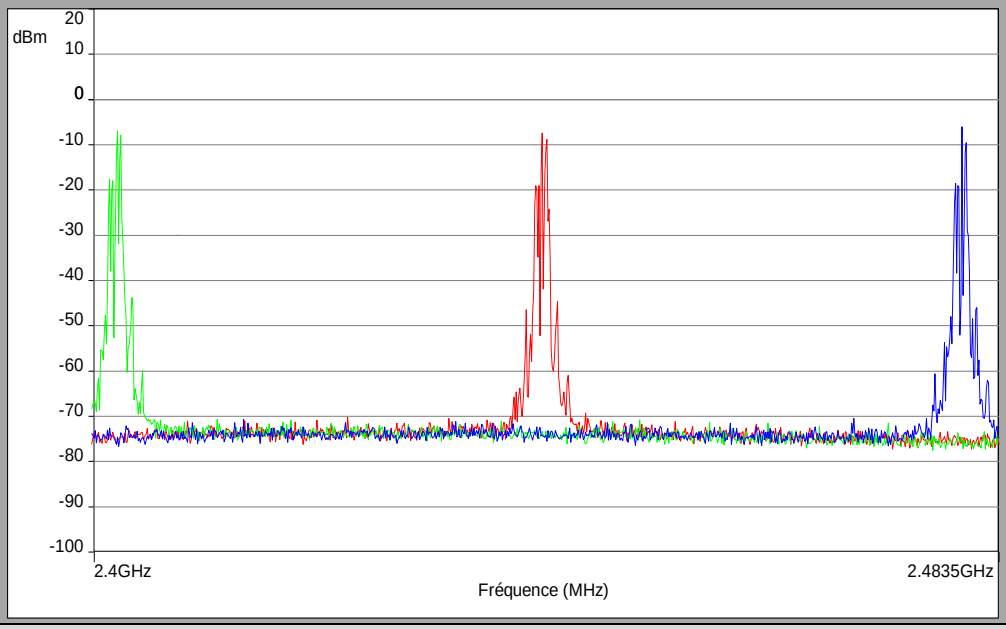
π/4 DQPSK

Unwanted Emissions into Non-Restricted Bands at the Band-Edge

Cmin & Cnom & Cmax

Description Sous-bande 1
Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)
Réglages: RBW: 100 kHz, VBW: 300 kHz, Temps de mesure : 1 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: Off

Mes.Peak PI/4 DQPSK Channel 78
Mes.Peak PI/4 DQPSK Channel 0
Mes.Peak PI/4 DQPSK Channel 39

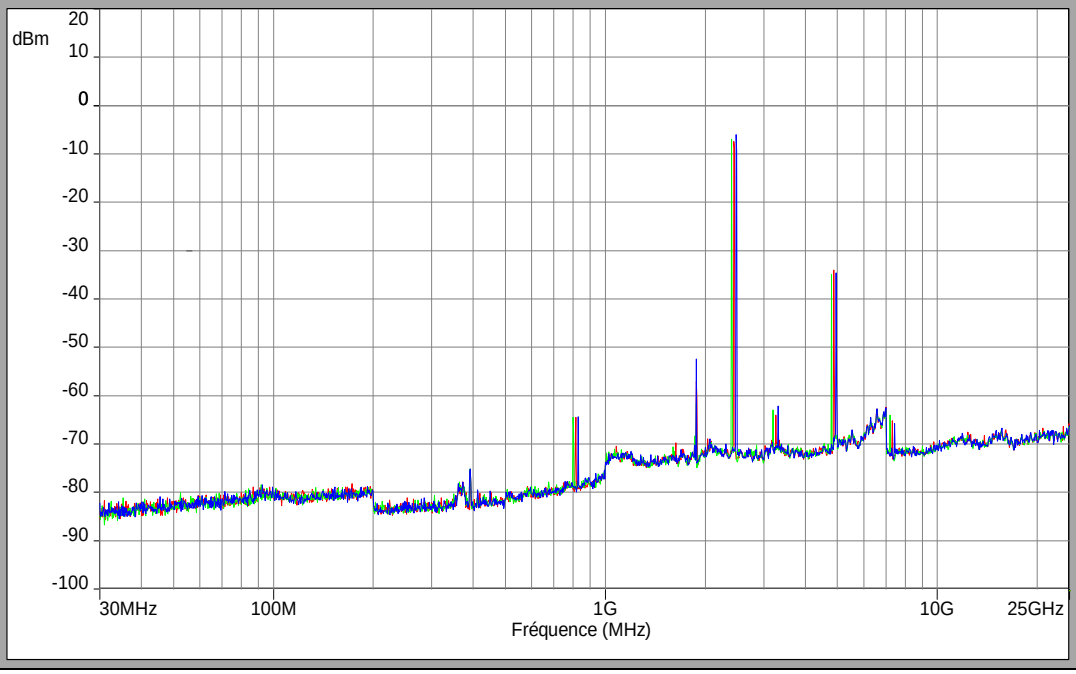


Unwanted Emissions into Non-Restricted Bands

Cmin & Cnom & Cmax

Description Sous-bande 1
Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)
Réglages: RBW: 100 kHz, VBW: 300 kHz, Temps de mesure : 1 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: Off

Mes.Peak PI/4 DQPSK Channel 78
Mes.Peak PI/4 DQPSK Channel 0
Mes.Peak PI/4 DQPSK Channel 39



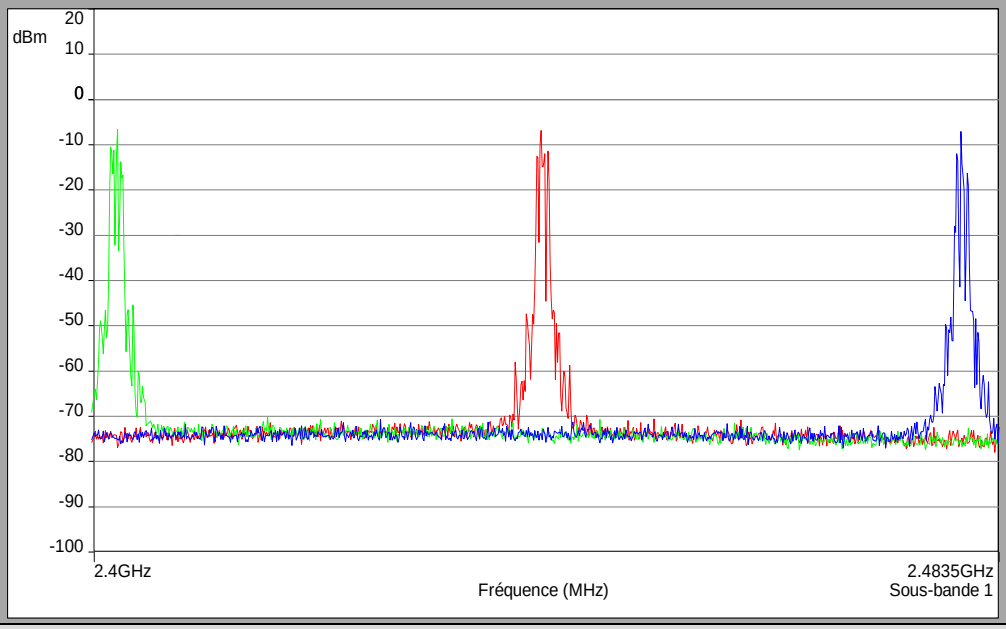
8DPSK

Unwanted Emissions into Non-Restricted Bands at the Band-Edge

Cmin & Cnom & Cmax

Description Sous-bande 1
Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)
Réglages: RBW: 100 kHz, VBW: 300 kHz, Temps de mesure : 1 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur : On

Mes.Peak 8DPSK Channel 78
Mes.Peak 8DPSK Channel 0
Mes.Peak 8DPSK Channel 39

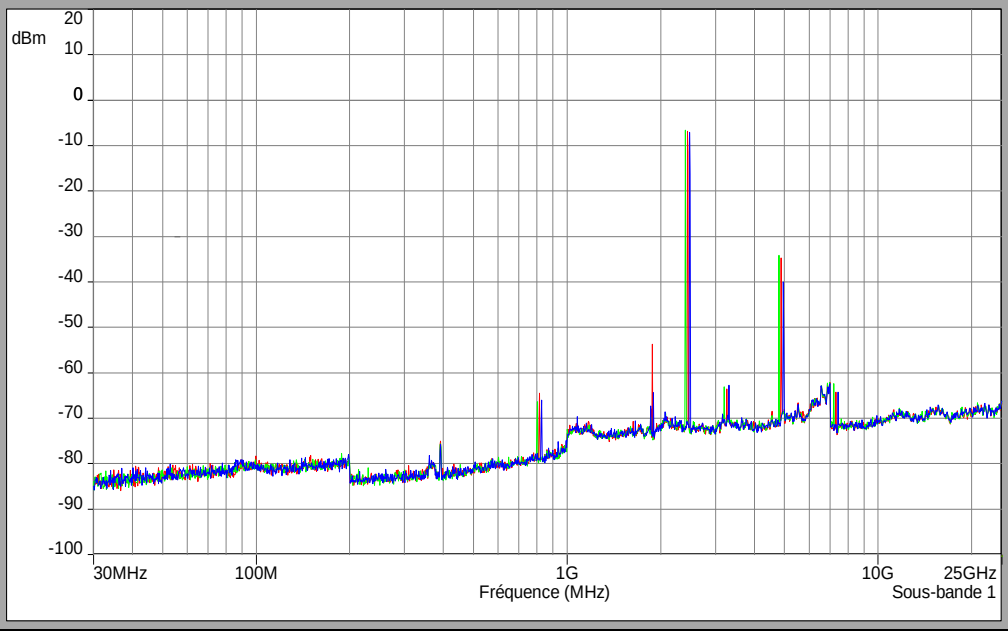


Unwanted Emissions into Non-Restricted Bands

Cmin & Cnom & Cmax

Description Sous-bande 1
Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)
Réglages: RBW: 100 kHz, VBW: 300 kHz, Temps de mesure : 1 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur : On

Mes.Peak 8DPSK Channel 78
Mes.Peak 8DPSK Channel 0
Mes.Peak 8DPSK Channel 39



GFSK:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin=-3.38dBm	Cnom=-4.39dBm	Cmax=-4.11dBm
Frequencies (MHz)	Level (dB)	Level (dB)	Level (dB)
2400	67,89	70,18	70,08
2483.5	71,9	71,15	68,76
800,7	63,39	-	-
4804	27,6	-	-
7205,5	57,46	-	-
813,7	-	61,65	-
4882	-	28,88	-
7322,9	-	56,95	-
1892.2	-	-	49,88
4960.2	-	-	29,64
7439.9	-	-	56,82

π/4 DQPSK:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin=-6.99dBm	Cnom=-7.38dBm	Cmax=-5.98dBm
Frequencies (MHz)	Level (dB)	Level (dB)	Level (dB)
2400	-73,48	-80,79	-80,78
2483.5	-81,9	-83,72	-80,51
800.3	-71,51	-	-
4804.7	-41,96	-	-
7206.1	-71,01	-	-
813.3	-	-71,9	-
4882.7	-	-41,4	-
7323.4	-	-72,62	-
1882.1	-	-	-58,34
4960.7	-	-	-40,64
7441	-	-	-72,28

8DPSK:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin=-6.58dBm	Cnom=-6.85dBm	Cmax=-7.1dBm
Frequencies (MHz)	Level (dB)	Level (dB)	Level (dB)
2400	-71,49	-80,52	-81,6
2483.5	-81,49	-81,51	-79,4
801.1	-72,99		
4804	-40,77		
7439.1	-68,98		
1882.2		-60,57	
4882		-41,53	
7322.1		-71,1	
826.5			-73,13
4959.6			-47,05
7439.1			-71,33

9.7. CONCLUSION

Unwanted Emission into Non-Restricted Bands measurement performed on the sample of the product Withings AuraTM WSD01, SN:0024E4182A06, in configuration and description presented in this test report, show levels Below the FCC 15.247, RSS-210, RSS-Gen limits.

10. AC POWER LINE CONDUCTED EMISSIONS

10.1. TEST CONDITIONS

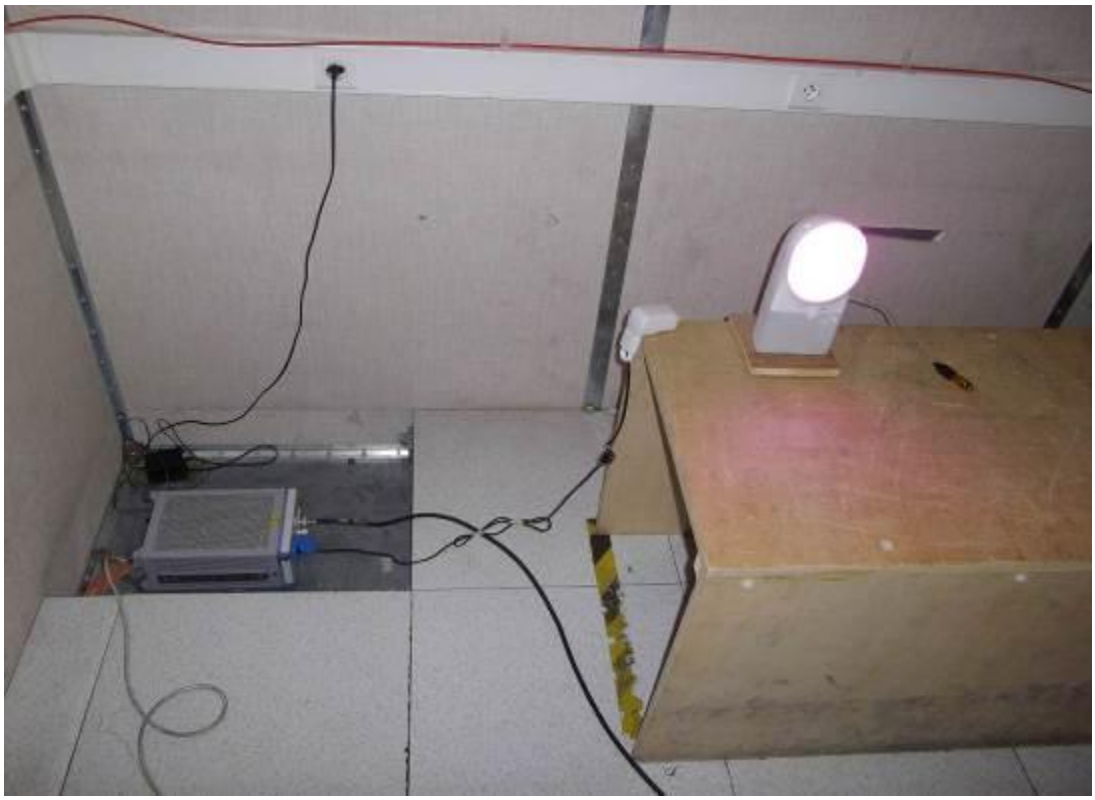
Test performed by : Gilles DE BUYSER
Date of test : 2014/06/13
Ambient temperature : 19°C
Relative humidity : 54%

10.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2009) 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)

Photograph for AC Power Line Conducted Emissions (Rear View)



Photograph for AC Power Line Conducted Emissions (Global View)

10.3. LIMIT

AC Power Line Conducted Emissions shall not exceed value below:

Quasi-Peak
0,15kHz to 0,5MHz: 66dBµV to 56dBµV*
0,5MHz to 5MHz: 56dBµV
5MHz to 30MHz: 60dBµV

Average
0,15kHz to 0,5MHz: 56dBµV to 46dBµV*
0,5MHz to 5MHz: 46dBµV
5MHz to 30MHz: 50dBµV

*Decreases with the logarithm of the frequency

10.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable	CABLES & CONNECTIQUES		A5329411	2014/05	2015/05
V LISN	ROHDE & SCHWARZ	ENV216	C2320162	2014/03	2015/03
Semi anechoic chamber	SIEPEL	-	D3044008	2011/04	2014/04
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2013/04	2014/04

Note: In our Quality System, the calibration due of our equipments is more or less 2 months.

10.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒None ☐Divergence:

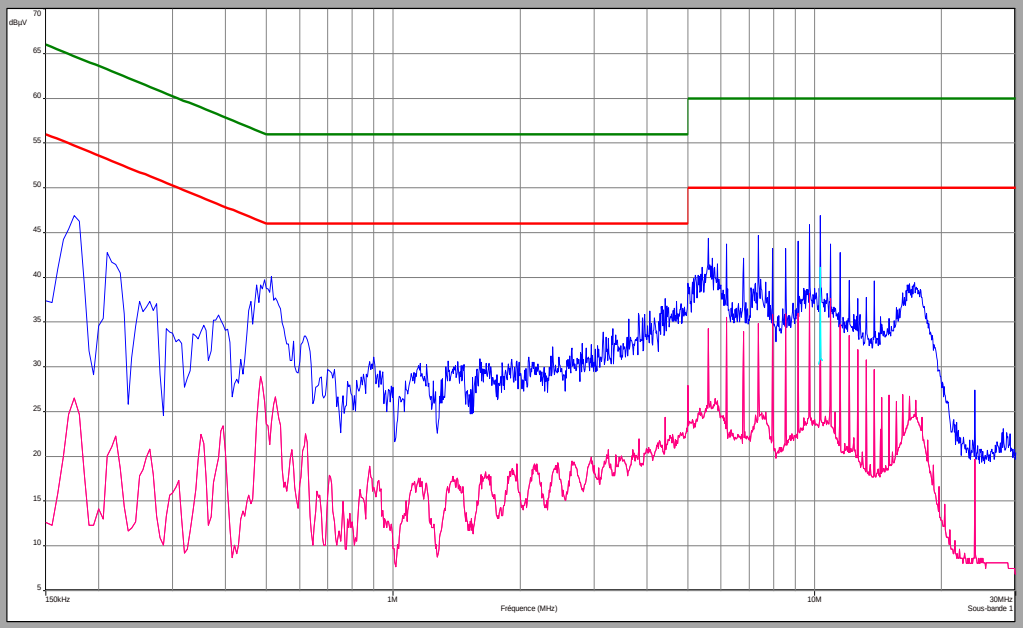
10.6. GRAPHICS & RESULTS

AC Power Line Conducted Emissions

Phase Line

Description Sous-bande 1
Fréquences: 150 kHz - 30 MHz (Mode: Lin, Pas: 5 kHz)
Réglages: RBW: 9 kHz, VBW: Auto, Temps de mesure : 50 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: On
Ligne: Phase 1

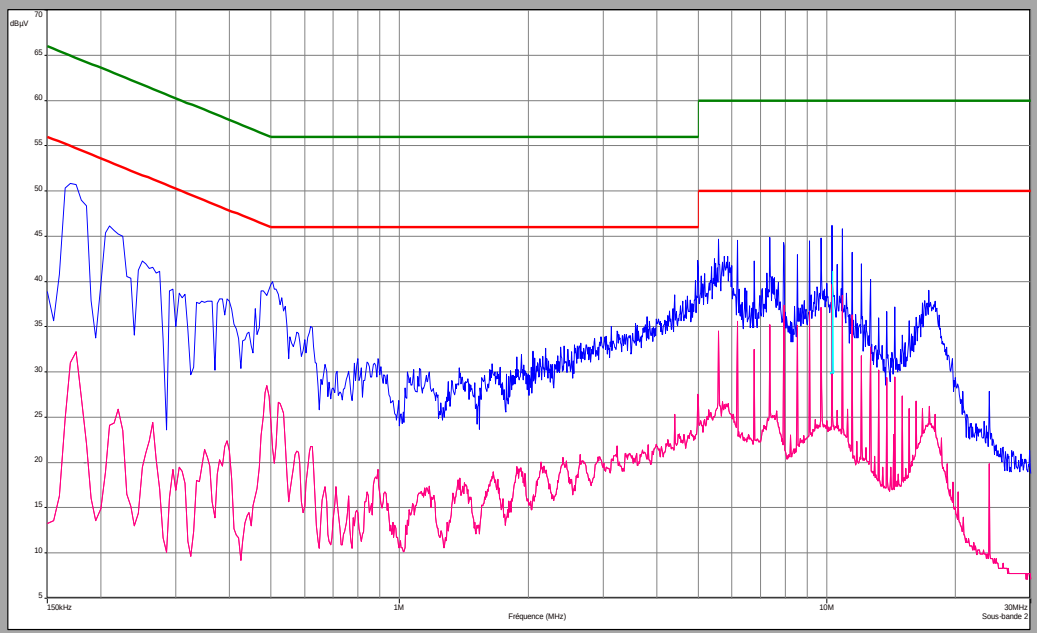
FCC/FCC 15.107 - Classe:B - Moyenne/
FCC/FCC 15.107 - Classe:B - QCrête/
Mes.Peak (Phase 1)
Mes.QPeak (Phase 1)
Mes.Avg (Phase 1)



Neutral Line

Description Sous-bande 2
Fréquences: 150 kHz - 30 MHz (Mode: Lin, Pas: 5 kHz)
Réglages: RBW: 9 kHz, VBW: Auto, Temps de mesure : 50 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: On
Ligne: Neutre

FCC/FCC 15.107 - Classe:B - Moyenne/
FCC/FCC 15.107 - Classe:B - QCrête/
Mes.Peak (Neutre)
Mes.QPeak (Neutre)
Mes.Avg (Neutre)



Phase Line					
Frequencies (MHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Average Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Limit (dBµV)
0.175	46.9	26.5	54.7	-	64.7
0.5	40.1	28.9	46.0	-	56.0
5.59	44.4	34.2	50	-	60
9.72	45.9	38.2	50	-	60
10.31	46.9	39.2	50	41.1	60
10.9	43.7	37.6	50	-	60

Neutral Line					
Frequencies (MHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Average Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Limit (dBµV)
0.175	50.7	32.2	54.7	-	64.7
0.5	40.0	28.5	46.0	-	56.0
6.17	44.5	35.6	50	-	60
7.94	43.8	37.4	50	-	60
10.29	46.2	39.6	50	41.1	60
10.88	45.8	38.5	50	-	60

10.7. CONCLUSION

AC Power Line Conducted Emissions measurement performed on the sample of the product Withings AuraTM WSD01, SN:0024E4182A06, in configuration and description presented in this test report, show levels below the FCC 15.247, RSS-210, RSS-Gen limits.

11. UNWANTED EMISSIONS INTO RESTRICTED FREQUENCY BANDS

11.1. TEST CONDITIONS

Test performed by : Gilles DE BUYSER & Stéphane CAMBOUET
Date of test : 2014/06/10
Ambient temperature : 18°C
Relative humidity : 48%

11.2. TEST SETUP

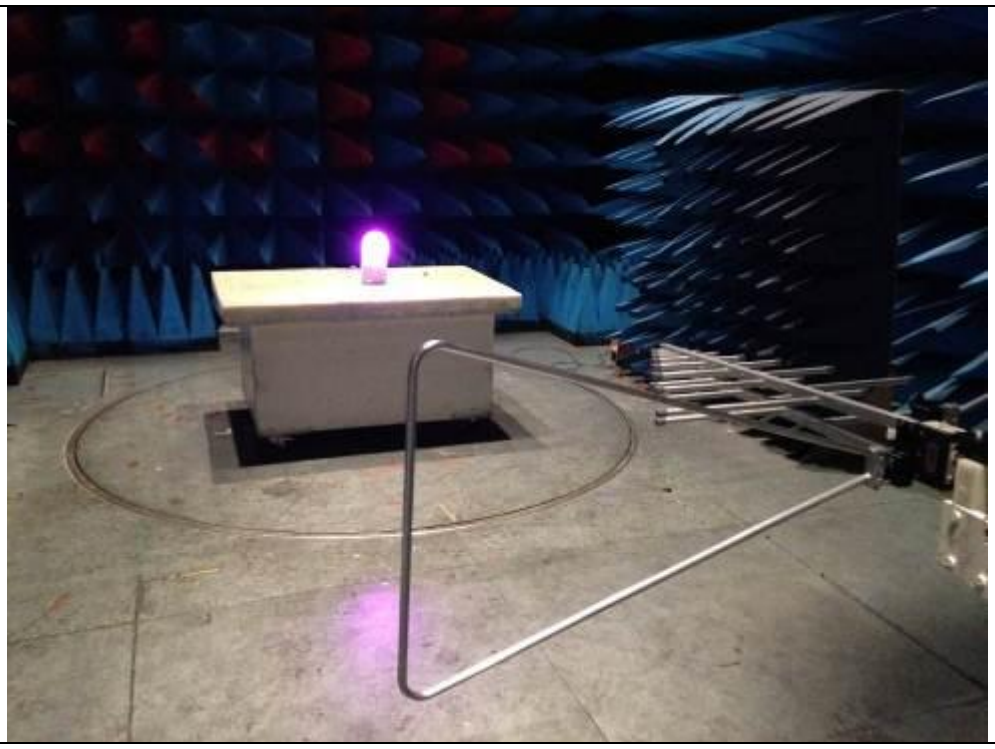
- The Equipment under Test is installed:
☒SAR ☐OATS

- Distance between EUT and the measuring antenna is:
☒3m ☐10m

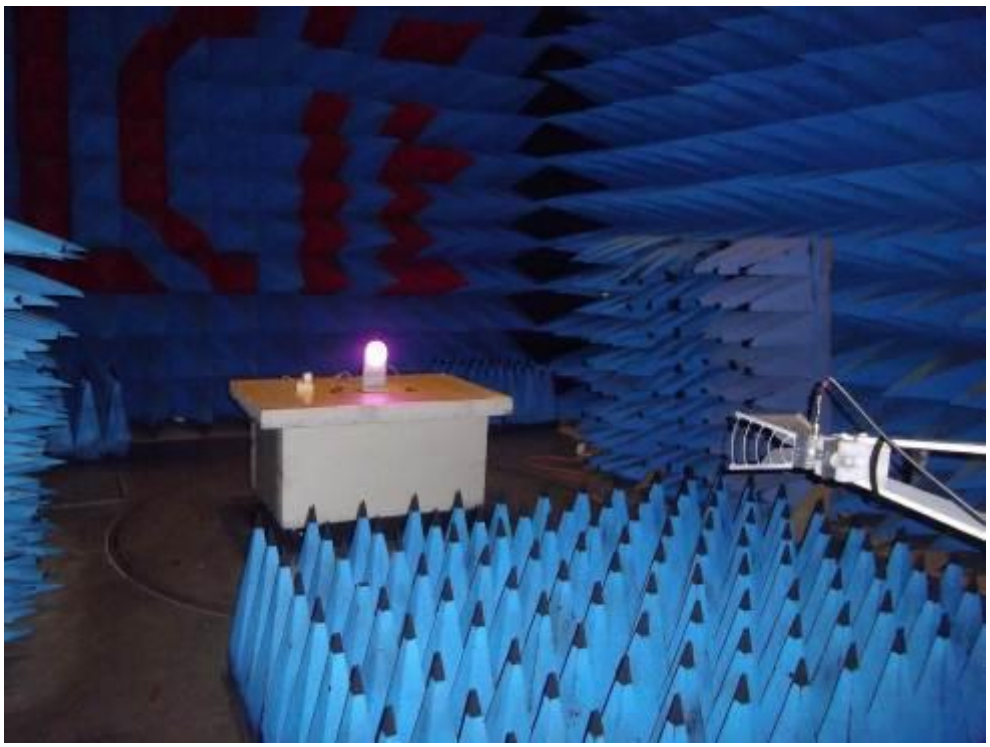
- Choice of measuring antenna below 1GHz:
☒Bilog ☐Log periodic ☐Biconic ☐Dipole antenna

- Choice of measuring antenna above 1GHz:
☒Horn

The product has been tested according to ANSI C63.10 (2009). Test is performed in horizontal (H) and vertical (V) polarization. Measurement bandwidth was 120kHz below 1GHz and 1MHz above 1GHz. The level has been maximised by the turntable rotation of 360 degrees range on the 3 axis of EUT. Antenna height search was performed from 1 to 4m.



Photograph for Unwanted Emissions into Restricted Frequency Bands



Photograph for Unwanted Emissions into Restricted Frequency Bands

11.3. LIMIT

Unwanted Emissions into Restricted Frequency Bands shall not exceed value below:

30MHz to 88MHz: 40dBµV/m QPeak
88MHz to 216MHz: 43,5dBµV/m QPeak
216MHz to 960MHz: 46dBµV/m QPeak
960MHz to 1000MHz: 54dBµV/m QPeak
Above 1000MHz: 74dBµV/m Peak
54dBµV/m Average

11.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable	-	-	A5329261	2014/05	2015/05
Cable	CABLES & CONNECTIQUES	-	A5329374	2014/05	2015/05
Cable	CABLES & CONNECTIQUES	-	A5329459	2014/04	2015/04
Preamplifier	LCIE	LCIE-ALB-001	A7080073	2013/11	2014/11
Bilog antenna	SCHWARZBECK	VULB 9160	C2040150	2014/06	2015/06
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2013/04	2014/04
Horn antenna 18-26,5GHz	AH SYSTEMS	SAS572	C2042026	2014/01	2016/01
Horn antenna	A-INFOMW	LB-10180-NF	C2042051	2014/04	2015/04
Semi anechoic chamber	SIEPEL	-	D3044008	2011/04	2014/04

Note: In our Quality System, the calibration due of our equipments is more or less 2 months.

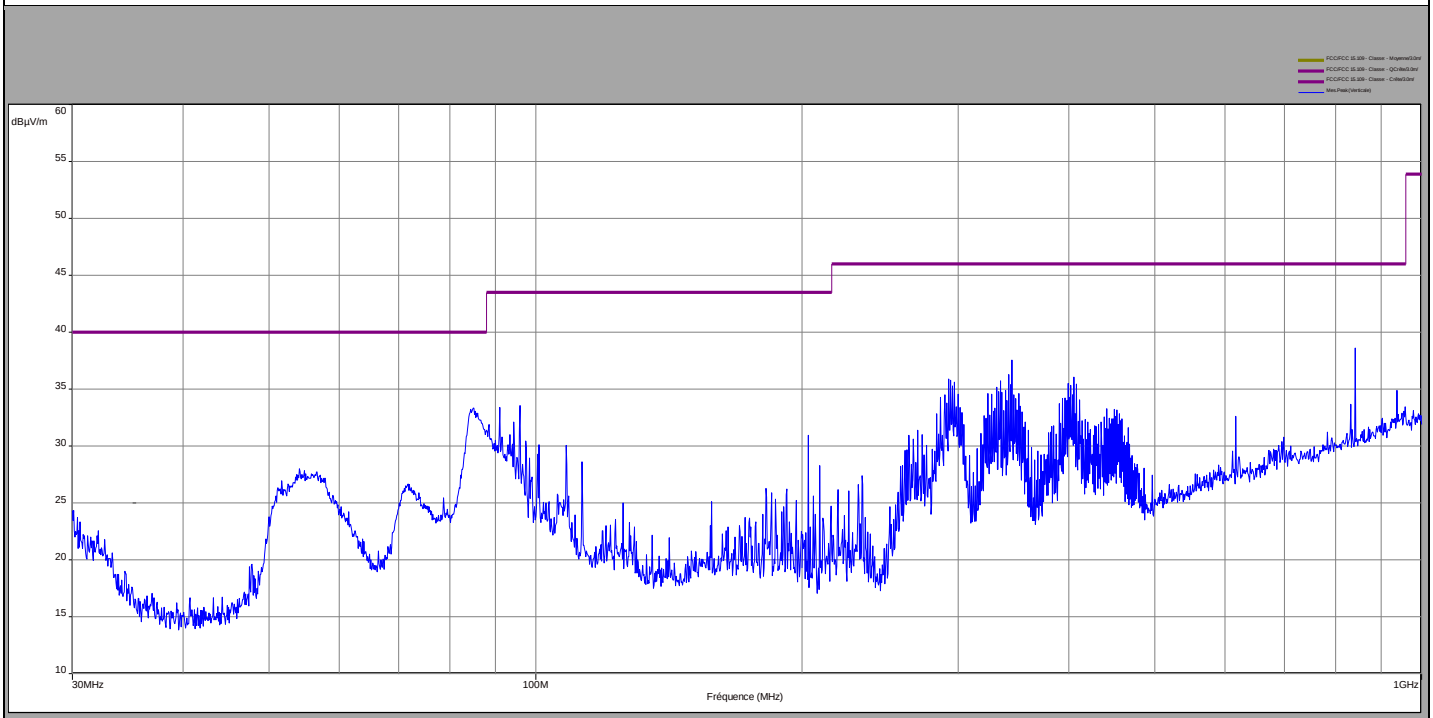
11.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒None ☐Divergence:

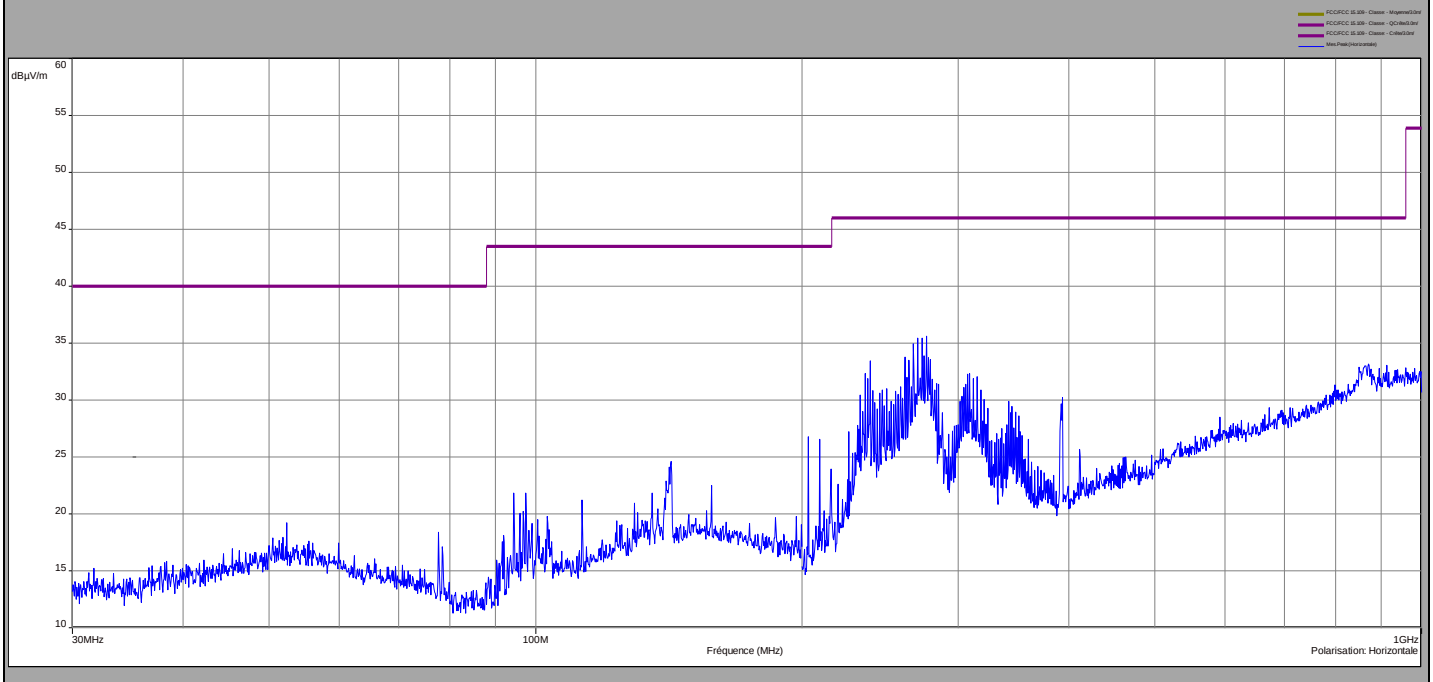
11.6. GRAPHICS & RESULTS

Unwanted Emissions into Restricted Bands below 1GHz

Vertical Polarization



Horizontal Polarization

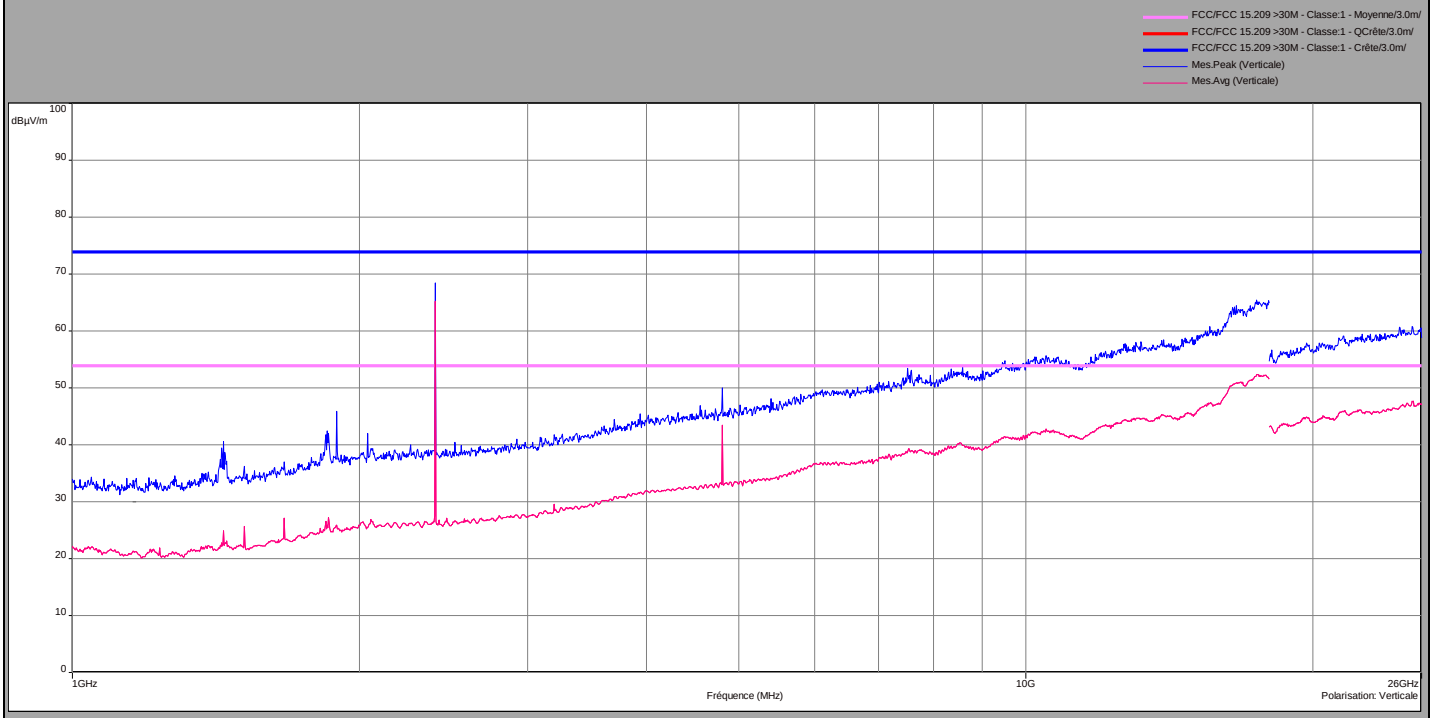


GFSK

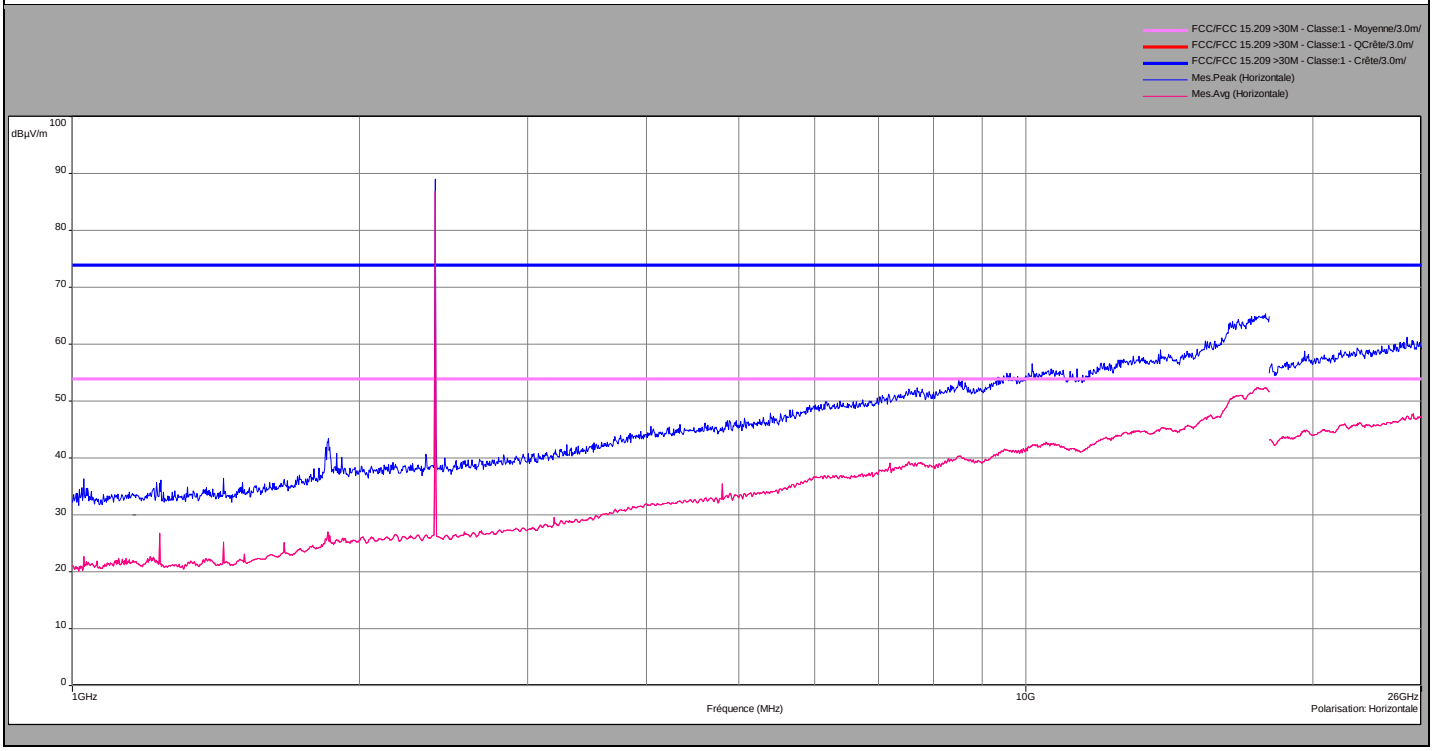
Cmin

Unwanted Emissions into Restricted Bands above 1GHz

Vertical Polarization



Horizontal Polarization

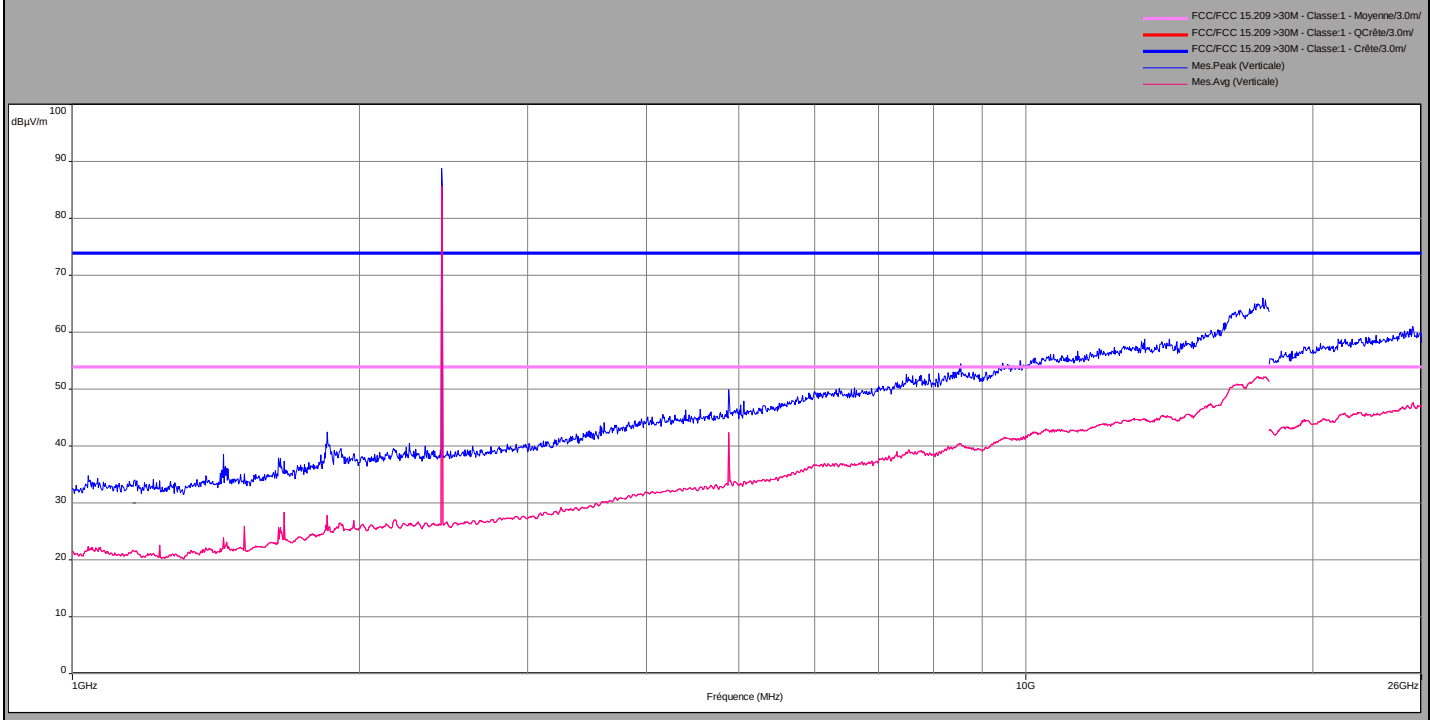


GFSK

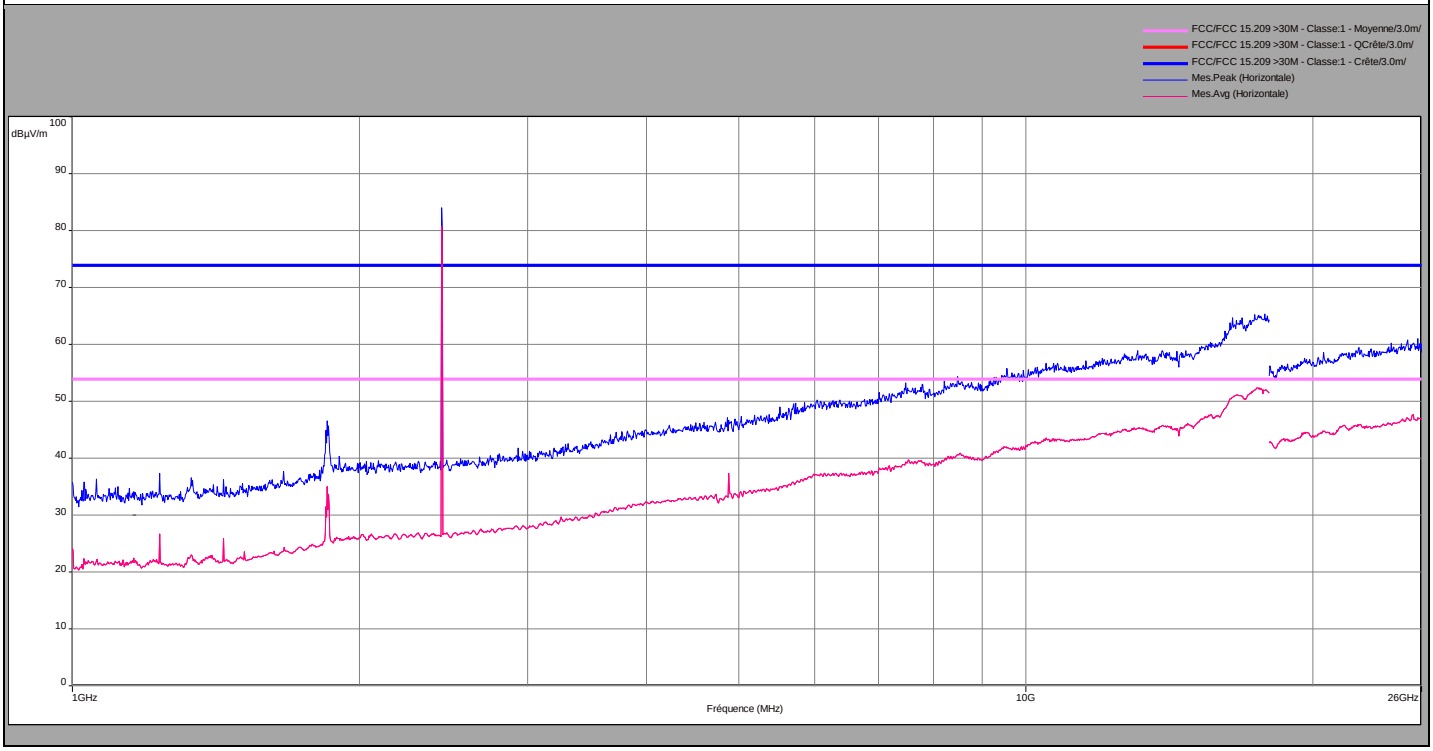
Cnom

Unwanted Emissions into Restricted Bands above 1GHz

Vertical Polarization



Horizontal Polarization

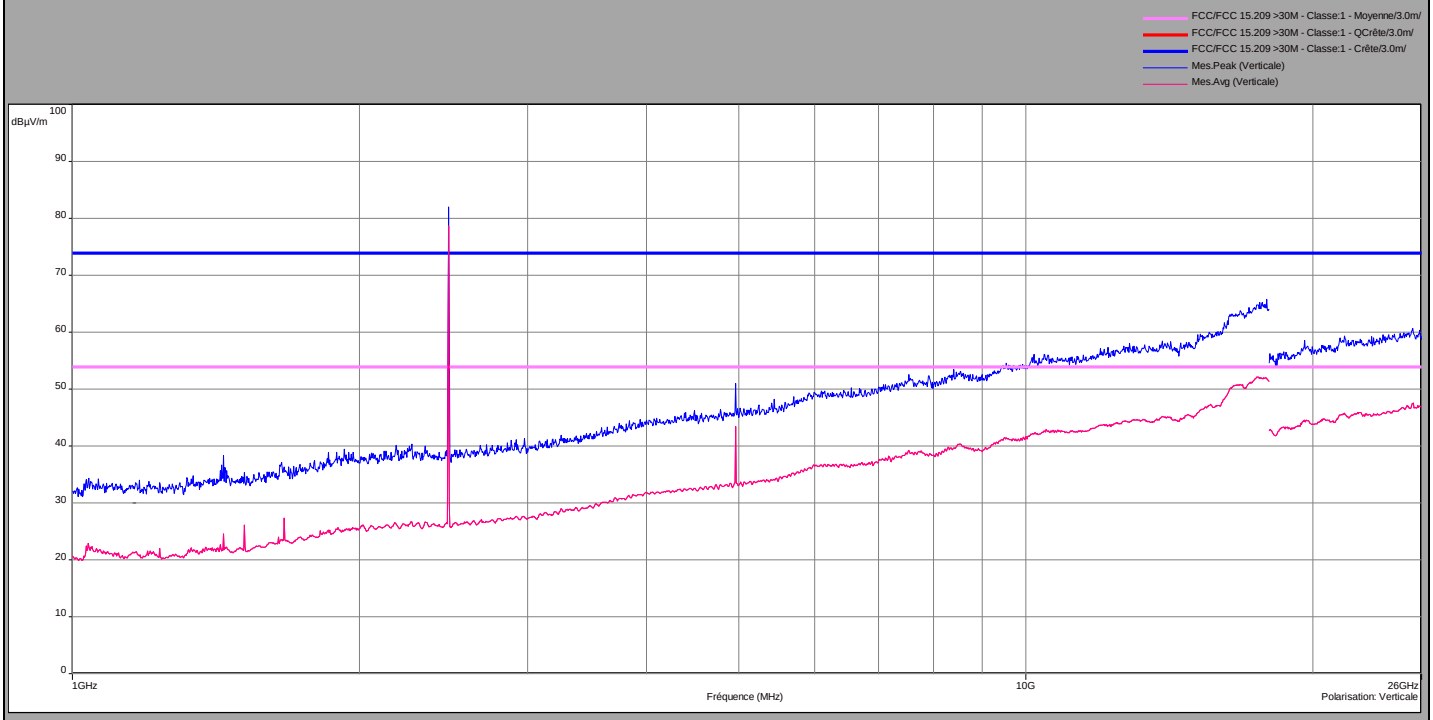


GFSK

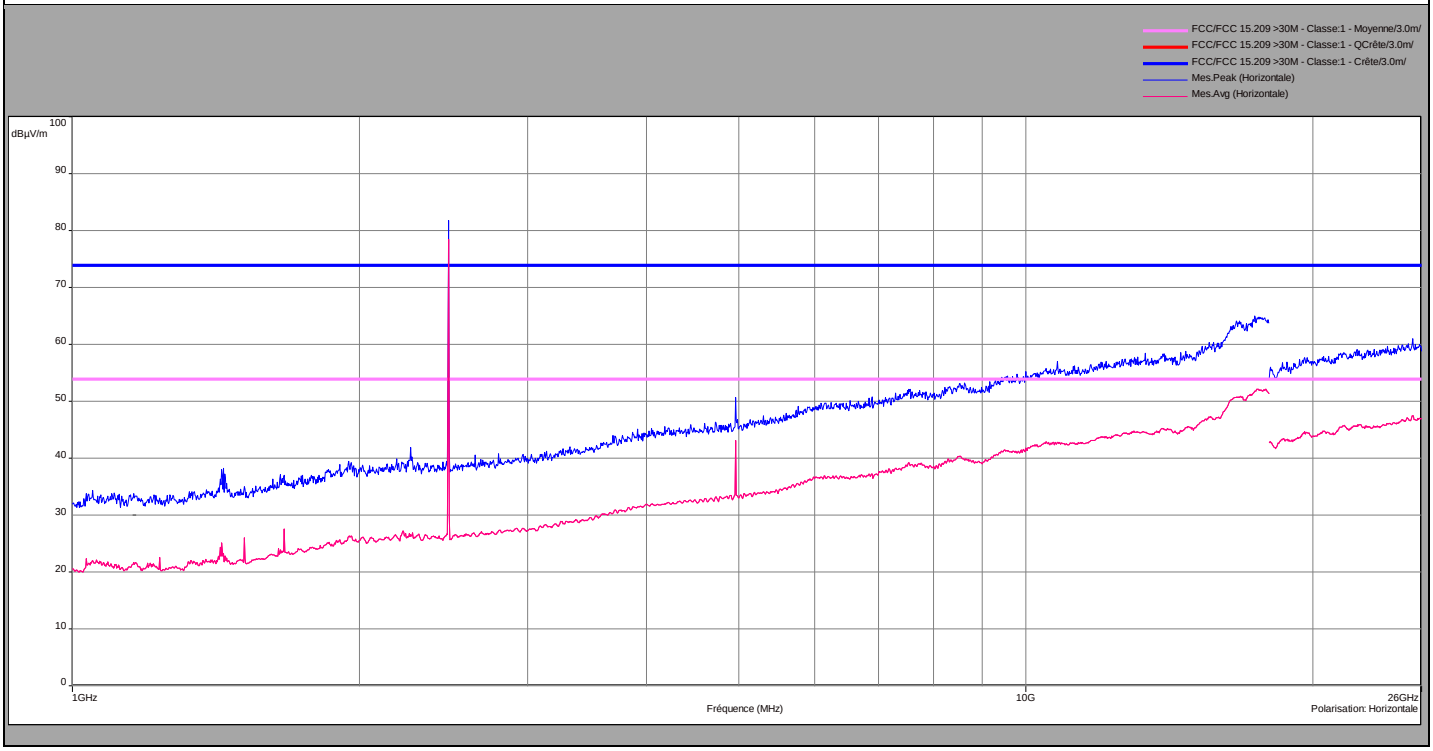
Cmax

Unwanted Emissions into Restricted Bands above 1GHz

Vertical Polarization



Horizontal Polarization

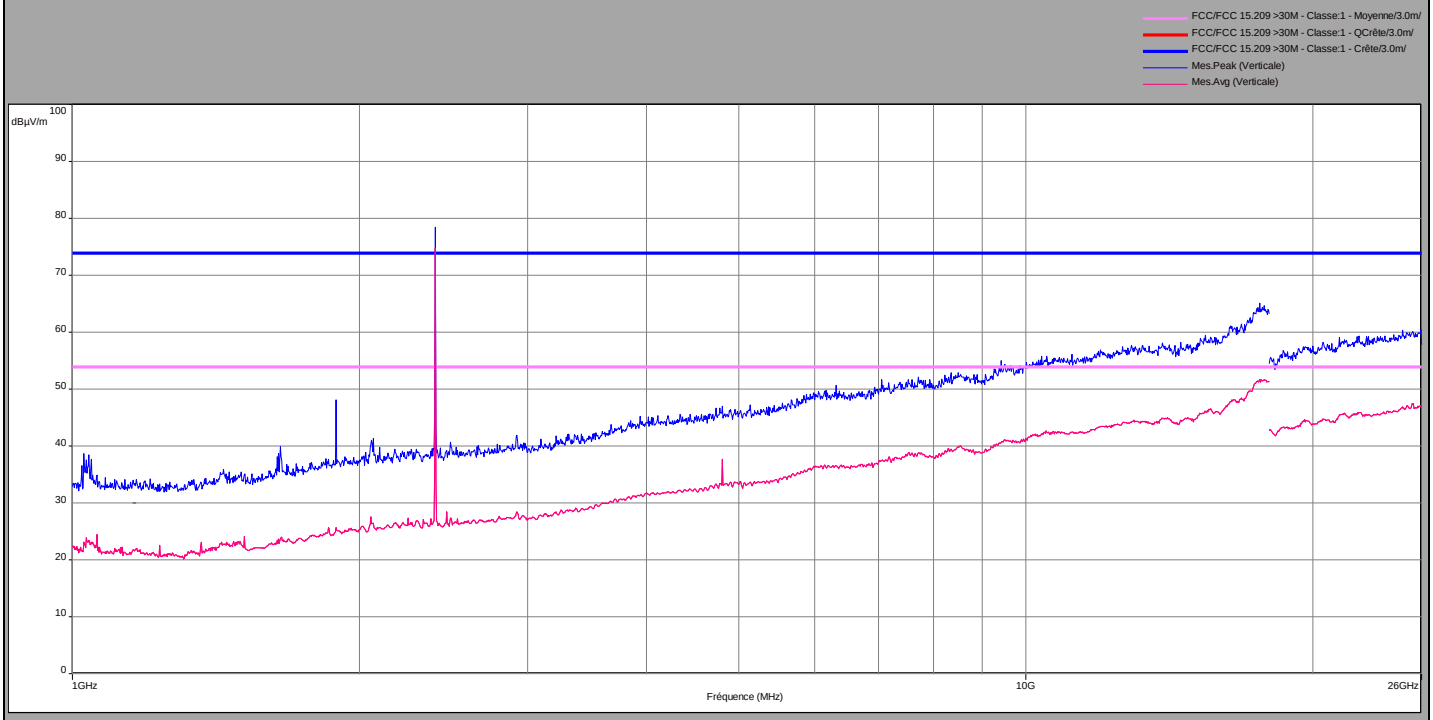


π/4 DQPSK

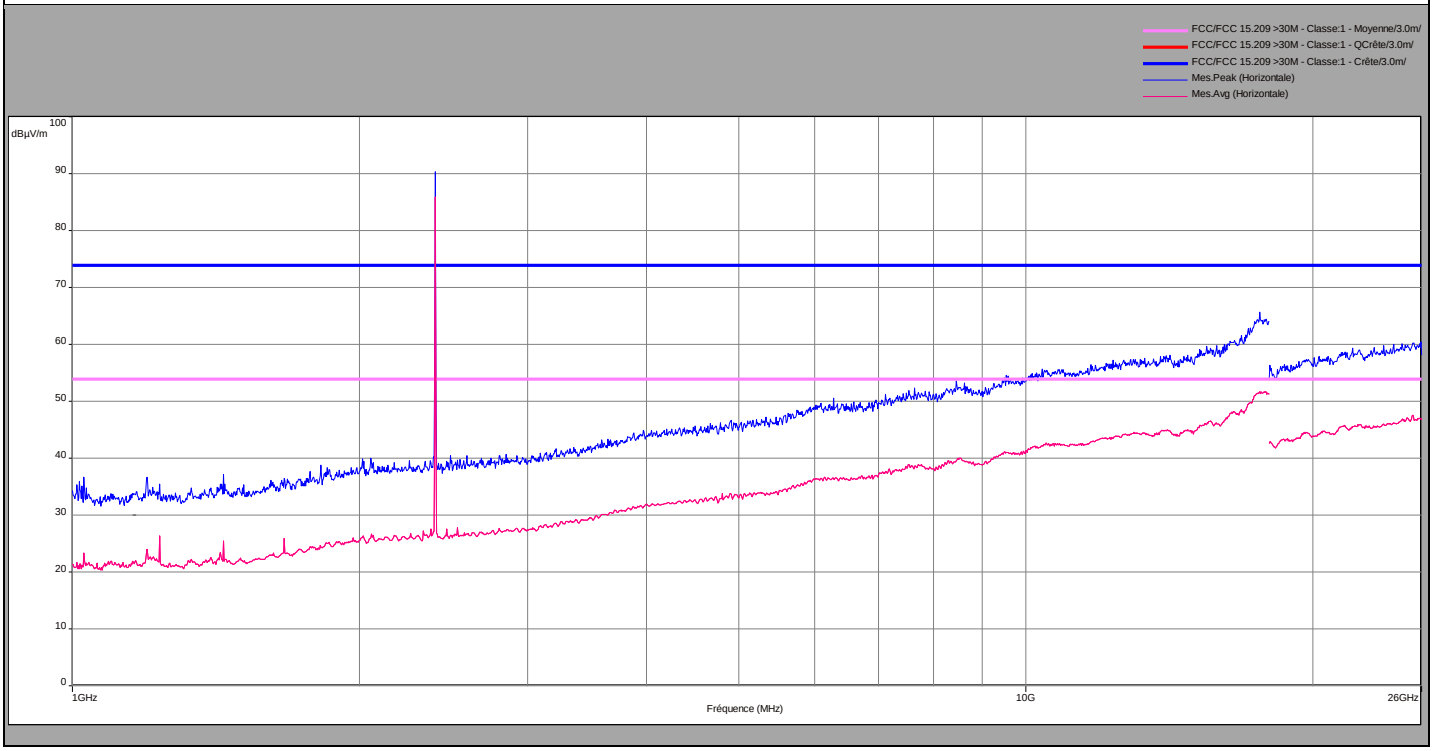
Cmin

Unwanted Emissions into Restricted Bands above 1GHz

Vertical Polarization



Horizontal Polarization

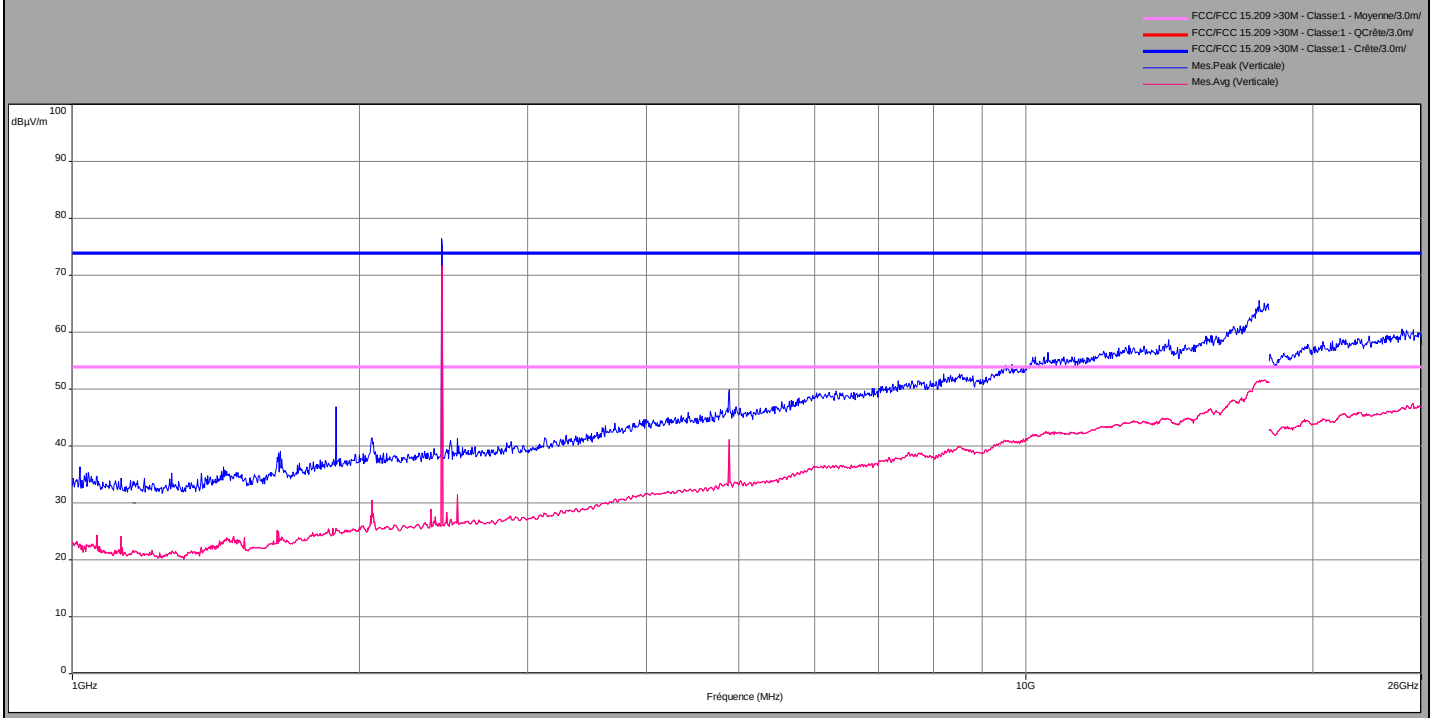


π/4 DQPSK

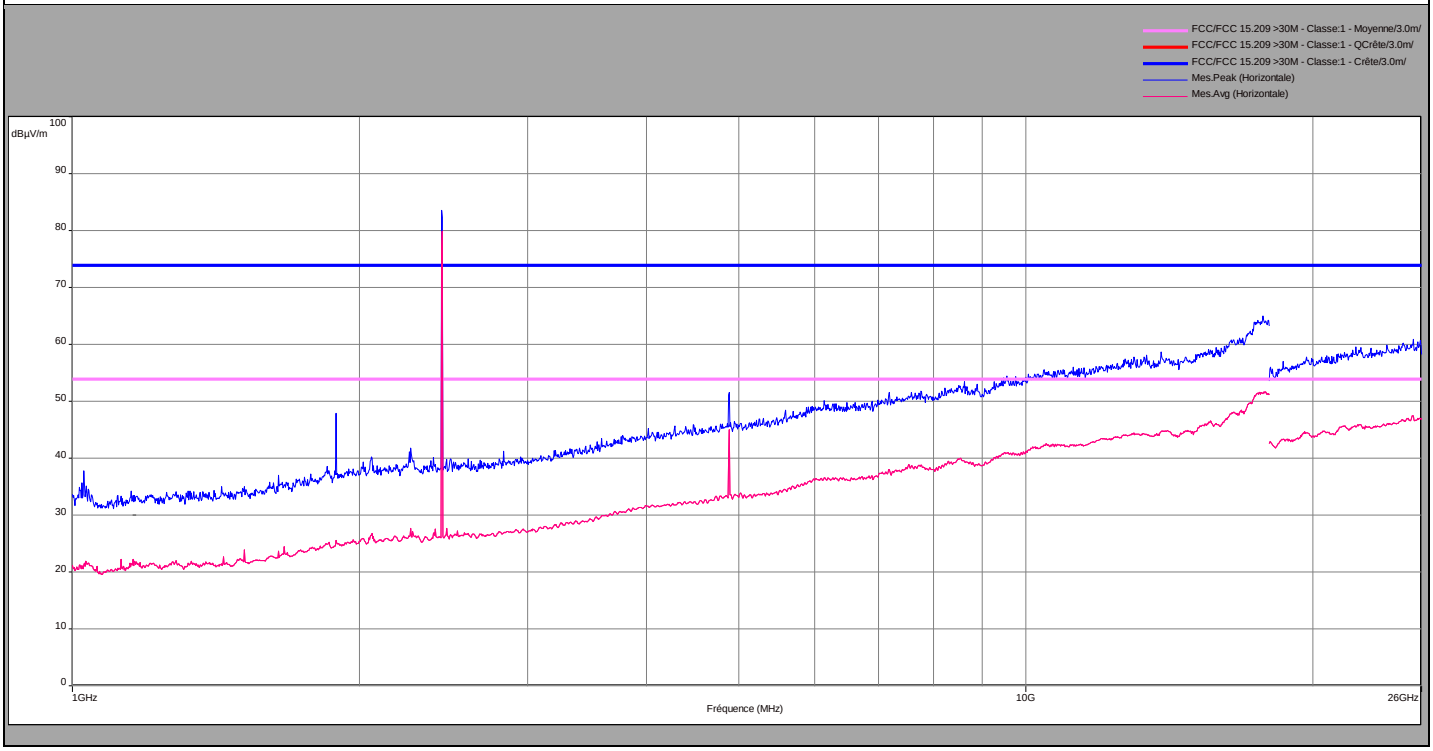
Cnom

Unwanted Emissions into Restricted Bands above 1GHz

Vertical Polarization



Horizontal Polarization

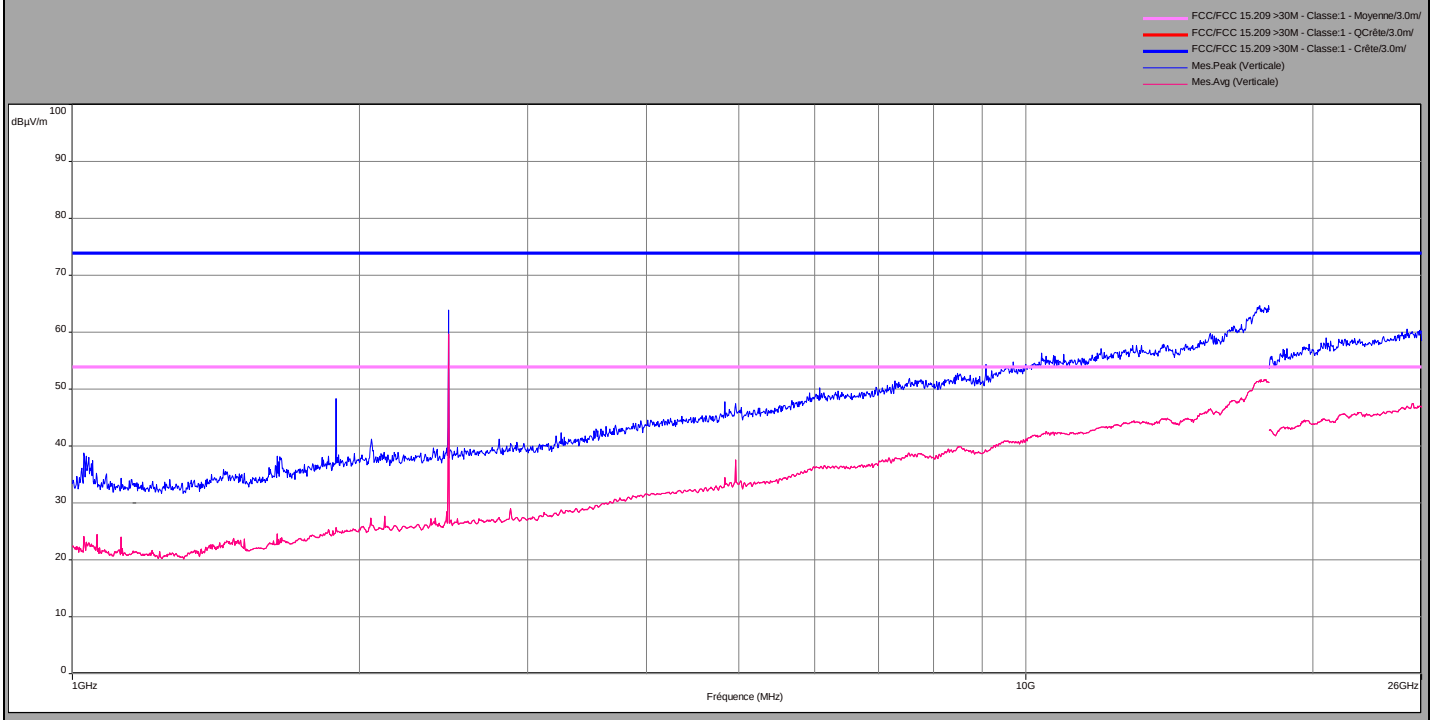


π/4 DQPSK

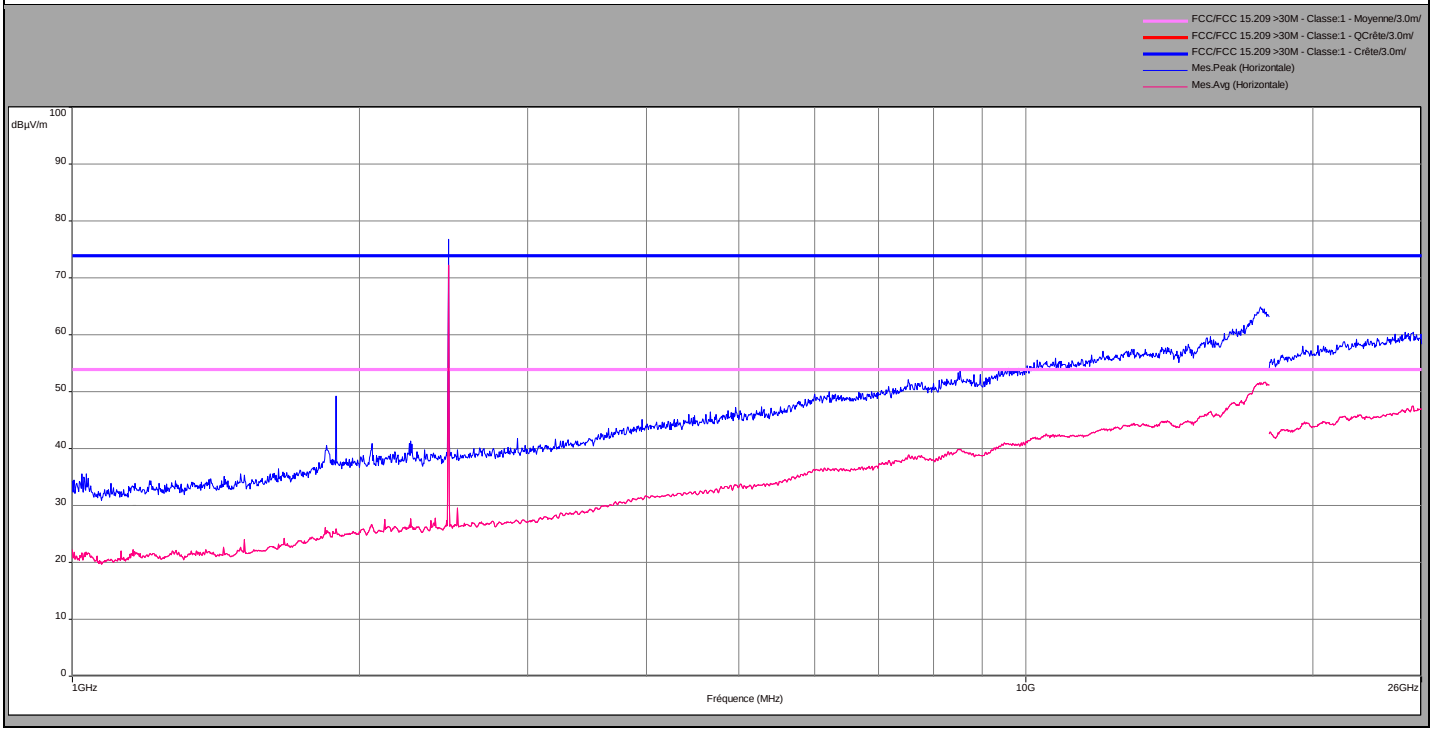
Cmax

Unwanted Emissions into Restricted Bands above 1GHz

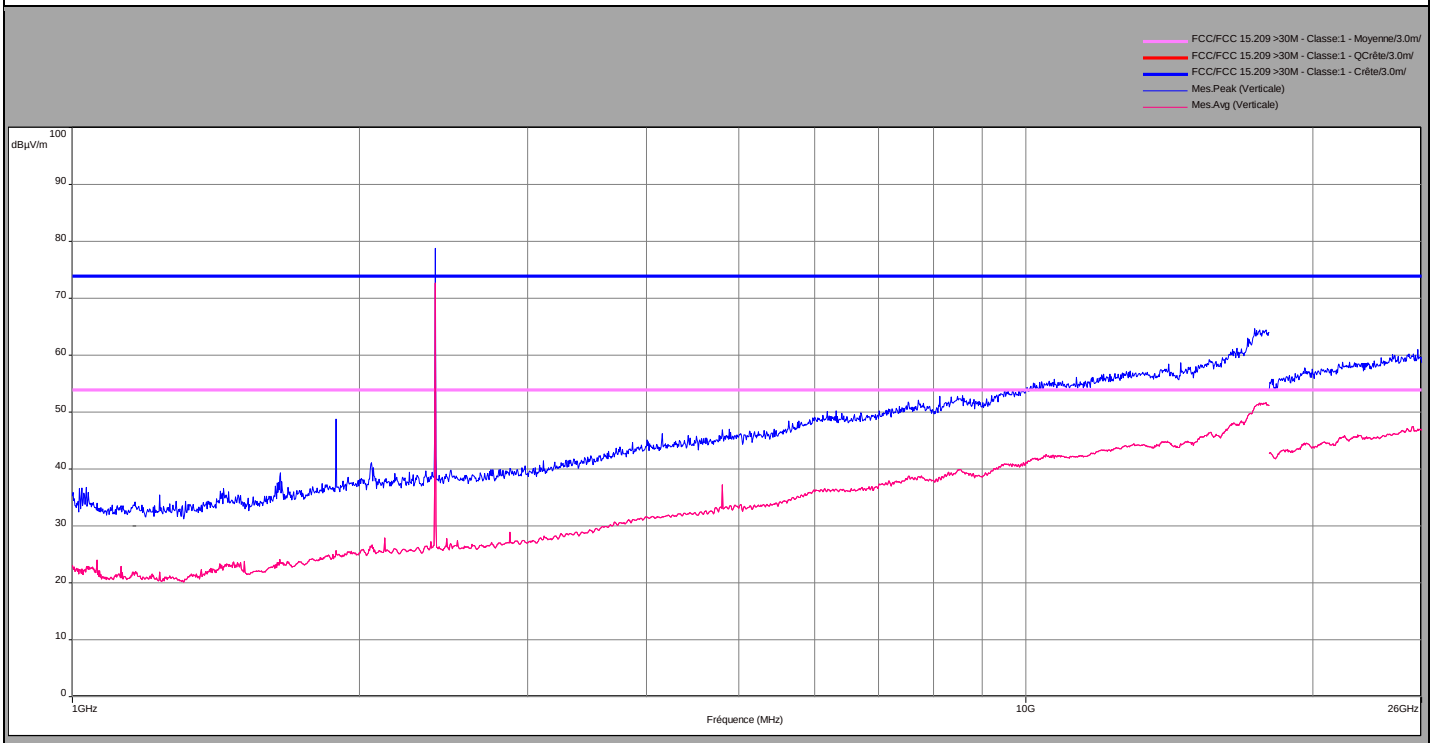
Vertical Polarization



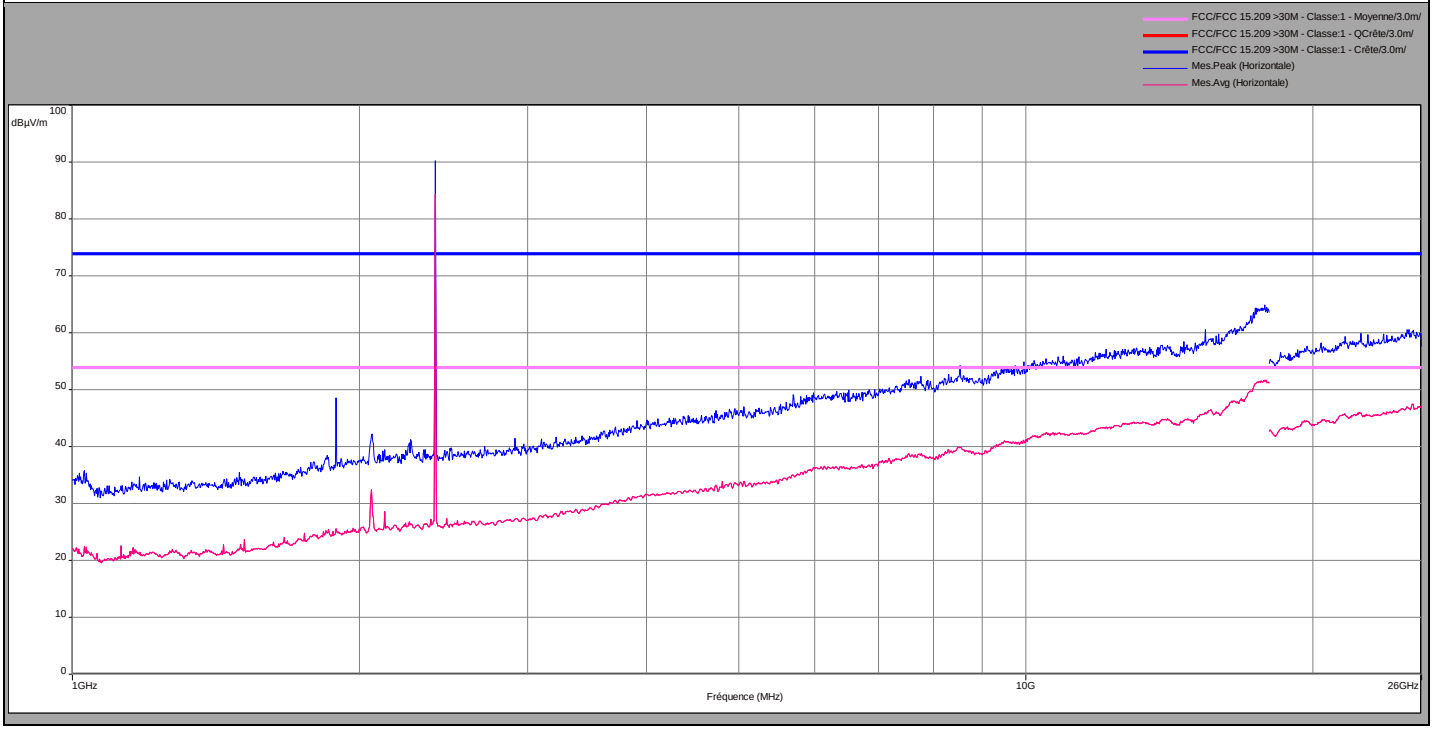
Horizontal Polarization



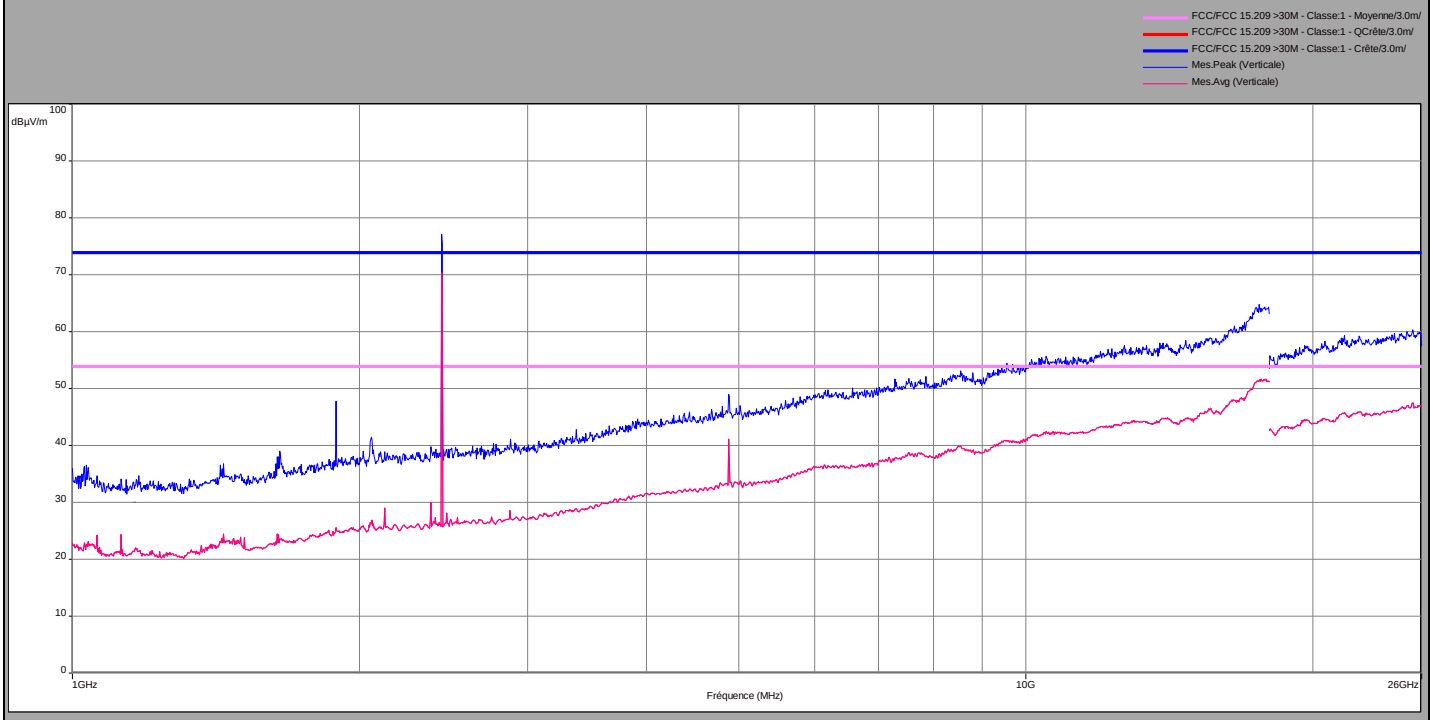
8DPSK
Cmin
Unwanted Emissions into Restricted Bands above 1GHz
Vertical Polarization



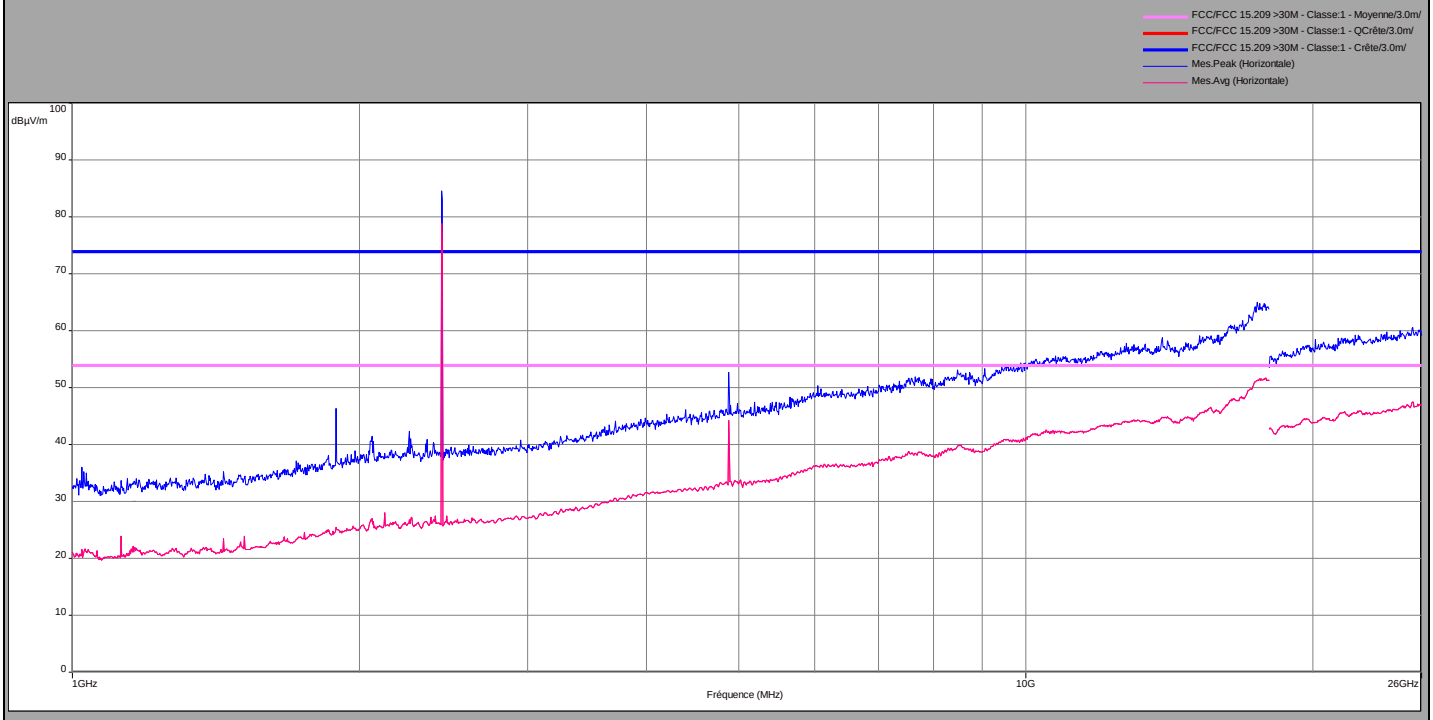
Horizontal Polarization



8DPSK
Cnom
Unwanted Emissions into Restricted Bands above 1GHz
Vertical Polarization



Horizontal Polarization

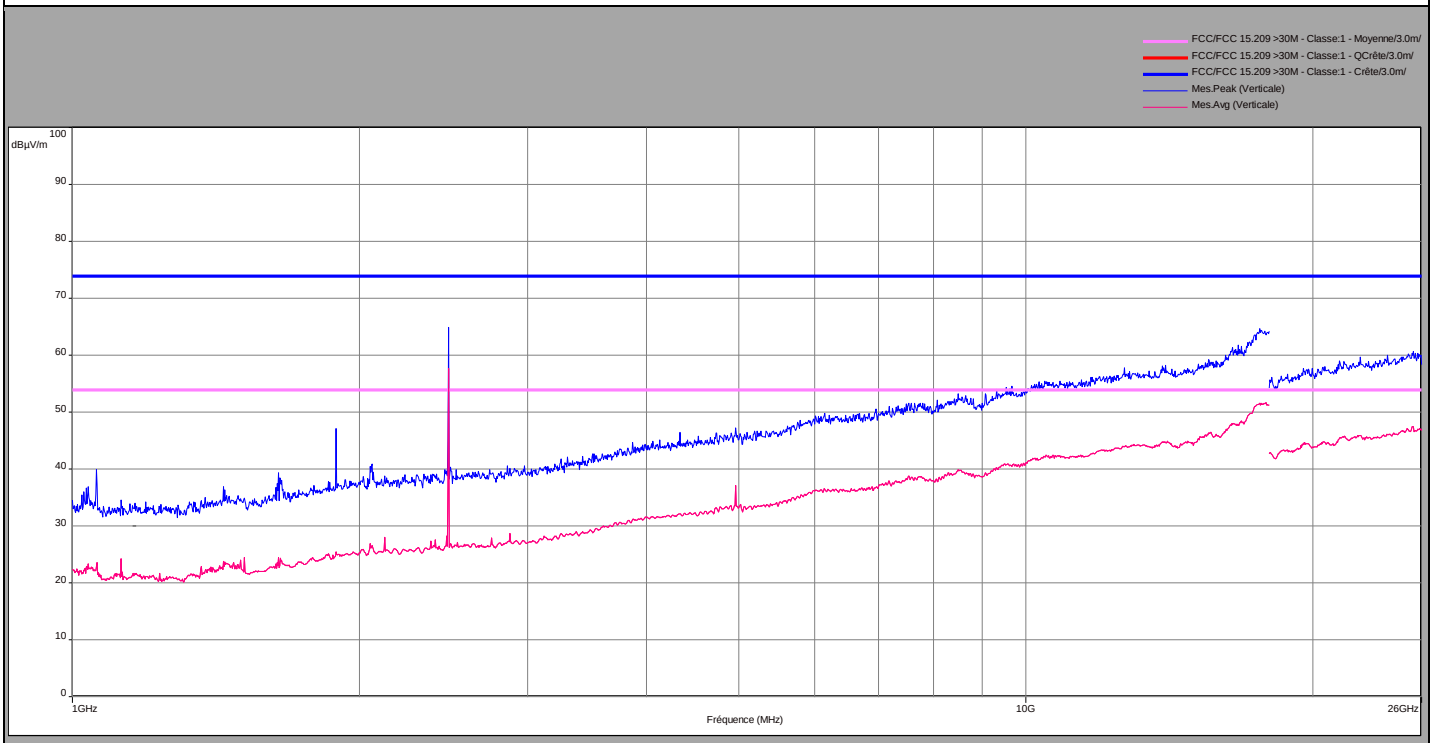


8DPSK

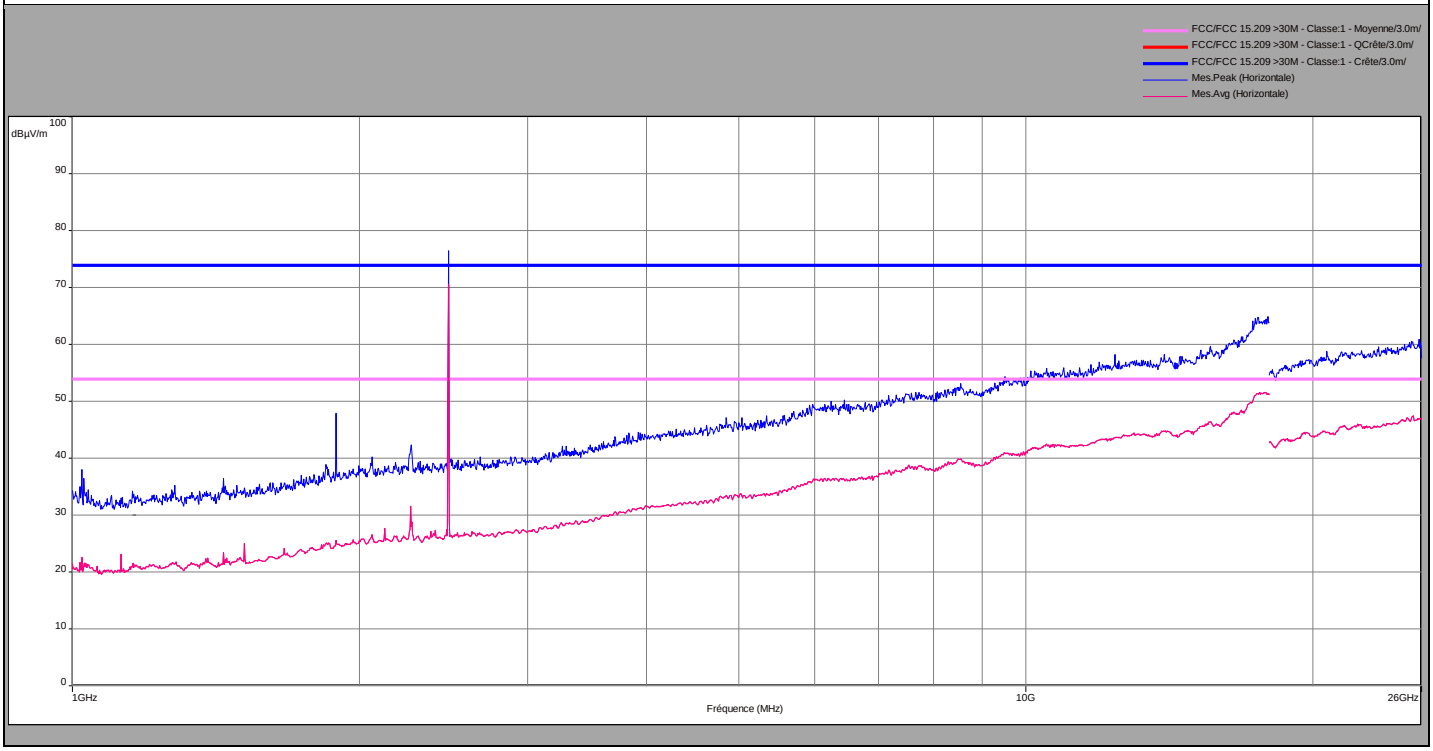
Cmax

Unwanted Emissions into Restricted Bands above 1GHz

Vertical Polarization



Horizontal Polarization



Below 1GHz				
Polarization	Frequencies (MHz)	Peak Level (dBµV/m)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Limit (dBµV/m)
Vertical	85	33.3	-	40
Vertical	96	33.6	-	43.5
Vertical	345	37.6	-	46
Vertical	841.4	38.6	-	46
Vertical	979.3	33.1	-	53.9
Horizontal	276	35.6	-	46

GFSK					
Above 1GHz					
Polarization	Frequencies (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)
Horizontal	2400	64.3	73.9	42.8	53.9
Horizontal	2483.5	38.8	73.9	26.2	53.9
Vertical	4804	50	43.4	74	54
Vertical	4882	49.8	42.3	74	54
Vertical	4960	51.1	43.4	74	54

π/4 DQPSK					
Above 1GHz					
Polarization	Frequencies (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)
Horizontal	2400	57.6	73.9	46.4	53.9
Horizontal	2483.5	38.2	73.9	26.3	53.9
Vertical	4804.5	47.1	37.6	74	54
Vertical	4882.5	51.6	45	74	54
Vertical	4960.5	47.5	37.5	74	54

8DPSK					
Above 1GHz					
Polarization	Frequencies (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)
Horizontal	2400	57.5	73.9	49.3	53.9
Horizontal	2483.5	37.6	73.9	26.2	53.9
Vertical	4804	46.9	37.2	74	54
Vertical	4882	52.6	44.2	74	54
Vertical	4960	47.1	37.16	74	54

11.7. CONCLUSION

Unwanted Emission into Restricted Bands measurement performed on the sample of the product Withings AuraTM WSD01, SN:0024E4182A06, in configuration and description presented in this test report, show levels Below the FCC 15.247, RSS-210, RSS-Gen limits.

12. UNCERTAINTIES CHART

Kind of test	Measurement uncertainties (k=2) ±x(dB) / (Hz)	Limit for uncertainties ±y(dB)
REQUIREMENTS		
RF output power, conducted	±0.6 dB	±1,5 dB
Power Spectral Density, conducted	±0.6 dB	±1,5 dB
Unwanted Emissions, conducted	±0.6 dB	±1,5 dB
Radiated emissions • Frequency < 1000 MHz • Frequency > 1000 MHz	 ±3.9 dB ±3.1 dB	±6 dB
Temperature	±0.5°C	±1°C
Humidity	±2.5 %	±5 %