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TEST REPORT

N°: 172911-765736-B **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	**SAGEMCOM 250 Route de l'Empereur 92848 – RUEIL MALMAISON FRANCE**
Apparatus under test	
↳ Product	**TV Set Top Box**
↳ Trade mark	**COGECO**
↳ Manufacturer	**SAGEMCOM**
↳ Model under test	**DIW3930 COGECO**
↳ Serial number	**6211130035003**
↳ FCC ID	**VW3DIW3930**
↳ IC	**9140A-DIW3930**
Conclusion	See Test Program chapter
Test date	June 17, 2021 to June 25, 2021
Test location	Moirans
Test Site	6500A-1 & 6500A-3
Registration Number	197516
Designation Number	FR0008
Sample receipt date	June 7, 2021
Composition of document	89 pages
Document issued on	September 30, 2021

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Approved by :
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PUBLICATION HISTORY

Version	Date	Author	Modification
01	August 3, 2021	Armand MAHOUNGOU	Creation of the document
02	September 30, 2021	Armand MAHOUNGOU	Customer request withdraw the pictures of equipment

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.

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1. TEST PROGRAM

References

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

Radio requirement:

Clause (47CFR Part 15.247 & RSS-247 Issue 2 & RSS-Gen Issue 5) Test Description	Test result - Comments			
Occupied Bandwidth	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
20dB Bandwidth	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Number of Hopping Frequency	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Carrier Frequency Separation	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Time of Occupancy	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Duty Cycle	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Maximum Conducted Output Power	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Conducted Spurious Emission at the Band Edge	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Unwanted Emissions into Non-Restricted Frequency Bands	☑ **PASS**	☐ **FAIL**	☐ **NA()**	☐ **NP(1)**
AC Power Line Conducted Emission	☑ **PASS**	☐ **FAIL**	☐ **NA(2)**	☐ **NP(1)**
Unwanted Emissions into Restricted Frequency Bands	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Receiver Radiated emissions	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
This table is a summary of test report, see conclusion of each clause of this test report for detail.				

(1): Limited program
(2): EUT not directly or indirectly connected to the AC Power Public Network

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

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

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):
COGECO DIW3930 COGECO **Serial Number: 6211130035003**

Power supply:

Name	Type	Rating	Reference / Sn	Comments
Supply1	☑ AC ☐ DC ☐ Battery	100-127Vac; 50/60Hz; 0.3A	NBC12B120100VU / 191636225-xx	-

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Main power supply cable	-	☑	☐	☐	-
2	HDMI cable	-	☑	☐	☐	-
3	USB cable	-	☑	☐	☐	-
4	Ethernet cable	-	☑	☐	☐	-

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop	-	-	Use to set the EUT
Bluetooth tester	ROHDE & SCHWARZ CBT	-	Use to set the EUT

Equipment information:

Bluetooth Classic Type:	☐ **v1.2**	☐ **v2.0**	☐ **v2.1+EDR**	☐ **v3.0+HS**
	☐ **v4.0**	☐ **v4.1**	☑ **v4.2**	
Chipset Ref :	BCM72180			
Frequency band:	[2400 – 2483.5] MHz			
Spectrum Modulation:	☑ FHSS			
Number of Channel:	Maximum:	79	Minimum:	20
Spacing channel:	1MHz			
Channel bandwidth:	1MHz			
Antenna Type:	☑ Integral	☐ External	☐ Dedicated	
Antenna connector:	☑ Yes	☐ No	☐ Temporary for test	
Transmit chains:	1			
	Single antenna			
Beam forming gain:	No			
Antenna Requirements §15.203	The transmitter uses an integral antenna with a u.fl connector which is classified as a unique connector			
Receiver chains	1			
Type of equipment:	☑ Stand-alone	☐ Plug-in	☐ Combined	
Equipment arrangement:	☑ Tabletop	☐ Floor-standing	☐ Multiple orientations	
Ad-Hoc mode:	☐ Yes	☑ No		
Duty cycle:	☑ Continuous duty	☐ Intermittent duty	☐ 100% duty	
Equipment type:	☑ Production model	☐ Pre-production model		
Operating temperature range:	Tnom:	20°C		
Type of power source:	☑ AC power supply	☐ DC power supply	☐ Battery	
Operating voltage range:	Vnom:	☑ 120V/60Hz	☐ X VDC	
		☐ 240V/50Hz	☐ X VDC	

Antenna Characteristic			
Antenna assembly	**Gain (dBi)**	**Frequency Band (MHz)**	**Impedance(Ω)**
1	3.62	2400 – 2483.5	50

Hardware information		
Software (if applicable):	**V. :**	STB_BCM4375B1_100.007_4375B1_UART_37_4MHz_fcbga_ipa_ref_stbda_class2.HCD FW

CHANNEL PLAN					
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
Cmin: 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	**Cmax: 78**	**2480**
25	2427	52	2454		
26	2428	53	2455		

DATA RATE				
Available for EUT	**Modulation type**	**Max. Data Rate (Mbps)**	**Packet type**	**Worst Case Modulation**
☑	GFSK	1	1-DM1	☐
	GFSK	1	1-DH1	☐
	GFSK	1	1-DM3	☐
	GFSK	1	1-DH3	☐
	GFSK	1	1-DM5	☐
	GFSK	1	1-DH5	☑
☐	GFSK	1	AUX1	☐
☑	π/4 DQPSK	2	2-DH1	☐
	π/4 DQPSK	2	2-DH3	☐
	π/4 DQPSK	2	2-DH5	☑
	8DPSK	3	3-DH1	☐
	8DPSK	3	3-DH3	☐
	8DPSK	3	3-DH5	☑

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 emission with modulation & hopping in the data rate that produced the highest power

Test	Running mode	
Occupied Bandwidth	☑ Test mode 1 (1)	☐ Alternative test mode()
20dB Bandwidth	☑ Test mode 1 (1)	☐ Alternative test mode()
Number of Hopping Frequency	☑ Test mode 2 (1)	☐ Alternative test mode()
Carrier Frequency Separation	☑ Test mode 1 (1)	☐ Alternative test mode()
Time of Occupancy	☑ Test mode 2 (1)	☐ Alternative test mode()
Duty Cycle	☑ Test mode 1 (1)	☐ Alternative test mode()
Maximum Conducted Output Power	☑ Test mode 1 (1)	☐ Alternative test mode()
Conducted Spurious Emission at the Band Edge	☑ Test mode 1 (1)	☐ Alternative test mode()
Unwanted Emissions into Non-Restricted Frequency Bands	☑ Test mode 1 (1)	☐ Alternative test mode()
AC Power Line Conducted Emission	☑ Test mode 2 (1)	☐ Alternative test mode()
Unwanted Emissions into Restricted Frequency Bands	☑ Test mode 1 (1)	☐ Alternative test mode()

(1) Following commands with the specific test software “Teraterm Pro V4.52” are used to set the product:

a. – See document “FCC BLE compliance test commands for M393 COGEFO, ref: AVS 31 005 955, version: 01”(provided by customer) for the command used during test.

2.3. EQUIPMENT LABELLING

2.4. EQUIPMENT MODIFICATION

☑ None ☐ Modification:

2.5. *FIELD STRENGTH CALCULATION*

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:

FS = RA + AF + CF – AG

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5dBµV is obtained. The antenna factor of 7.4 and a cable factor of 1.1 are added. The amplifier gain of 29dB is subtracted, giving a field strength of 32 dBµV/m.
FS = 52.5 + 7.4 + 1.1 – 29 = 32 dBµV/m
The 32 dBµV/m value can be mathematically converted to its corresponding level in µV/m.
Level in µV/m = Common Antilogarithm [(32dBµV/m)/20] = 39.8 µV/m.

2.6. *CALIBRATION DATE*

The calibration intervals are extended at 12+2 months. This extended interval is based on the fact that there is sufficient calibration data to statistically establish a trend or based on experience of use of the test equipment to assure good measurement results for a longer period.

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

Test performed by	: Julien Palard
Date of test	: June 17, 2021
Ambient temperature	: 26 °C
Relative humidity	: 36 %

3.2. TEST SETUP

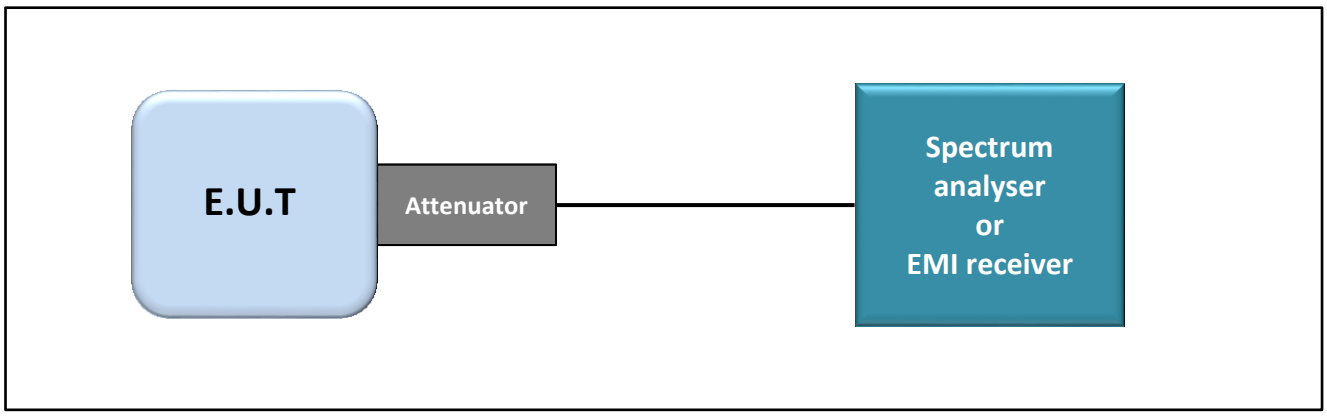
- The Equipment under Test is installed:
☑ On a table
☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

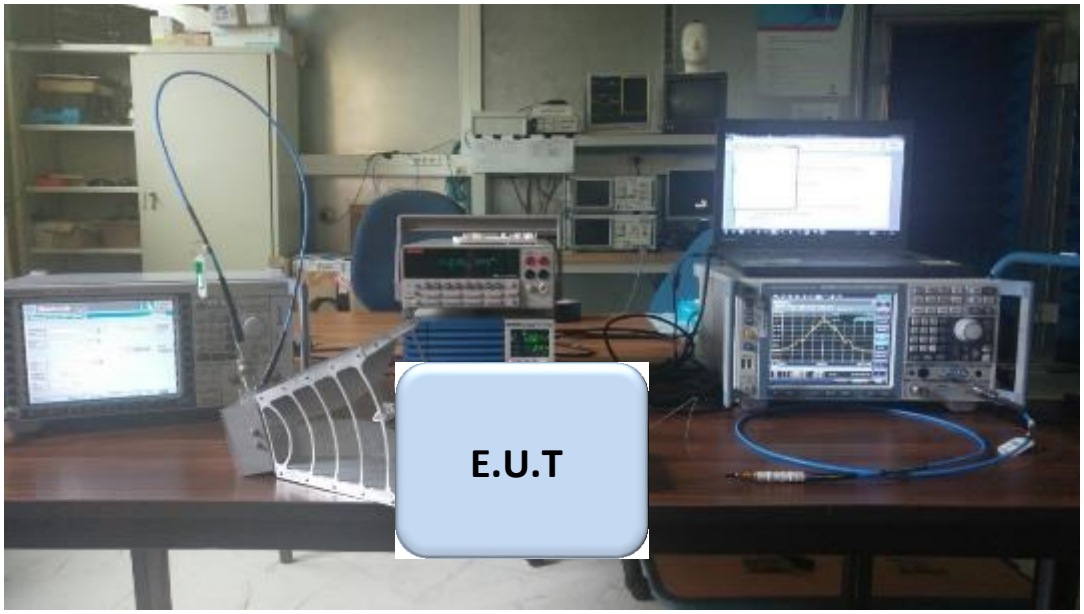
- Test Procedure:
☐ RSS-Gen Issue 5 § 6.7
☑ ANSI C63.10 § 6.9.2

Measurement Procedure:

a) RBW shall be in the range of 1% to 5% of the anticipated occupied bandwidth
b) Set the video bandwidth (VBW) ≥ 3 x 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

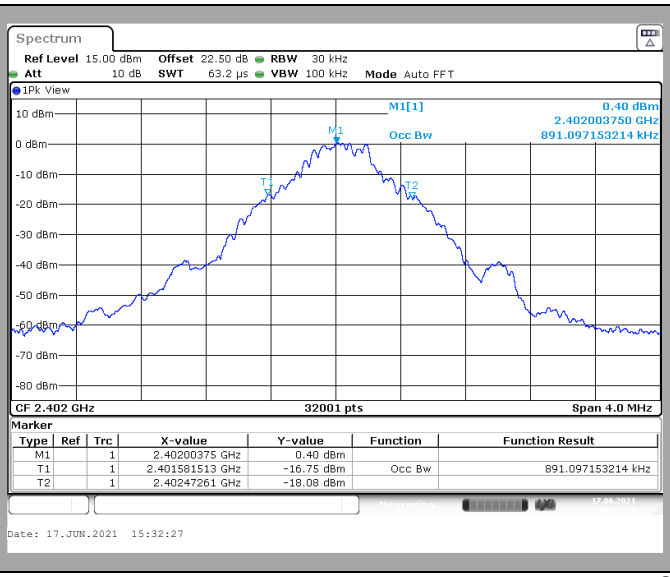
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Power supply	KIKUSUI	PCR500M	A7049006	Calibrate with multimeter	Calibrate with multimeter
Multimeter	KEITHLEY	2000	A1242090	2021/03	2023/03
R&S Commander Software	ROHDE & SCHWARZ	Version 1,6,4	-	-	-
Cable SONDE 026+ Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329971	2020/09	2021/09
EMI signal analyser	ROHDE & SCHWARZ	FSV40	A4060061	2019/05	2021/05

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

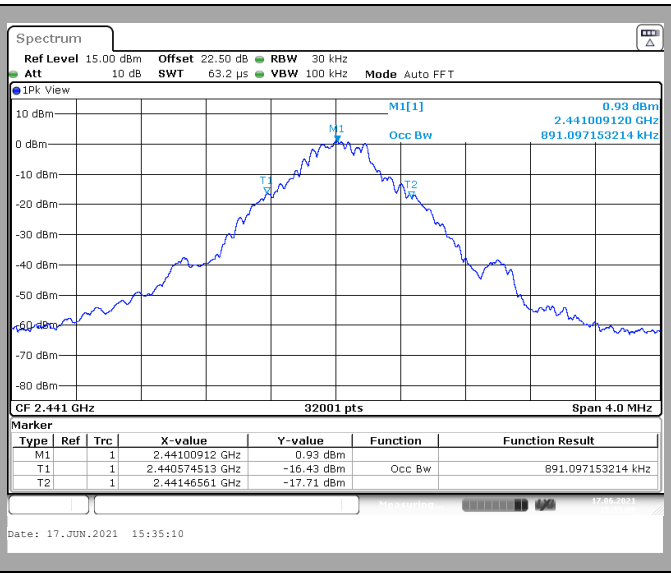
3.5. RESULTS

Occupied Bandwidth (DH5)

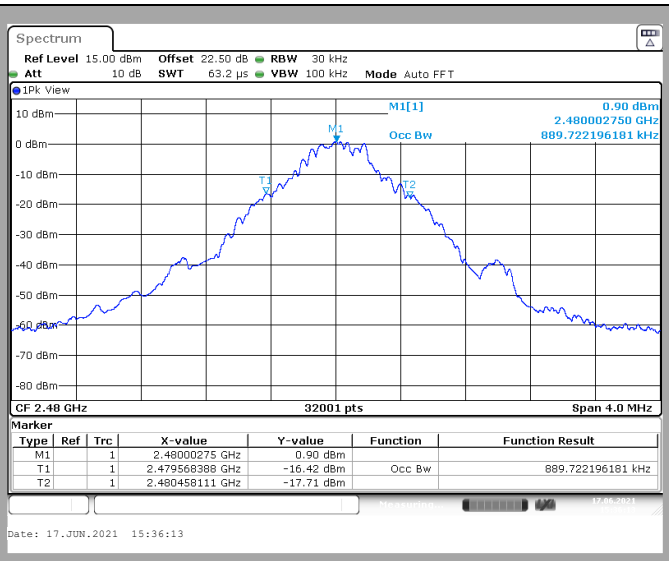
Cmin



Cnom



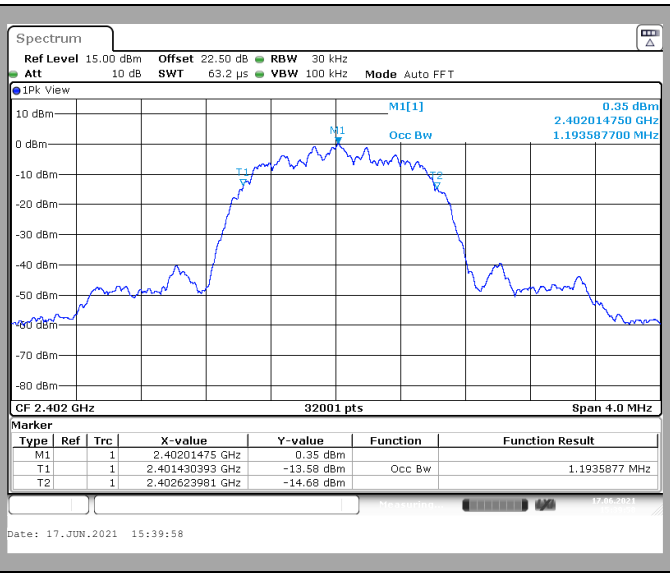
Cmax



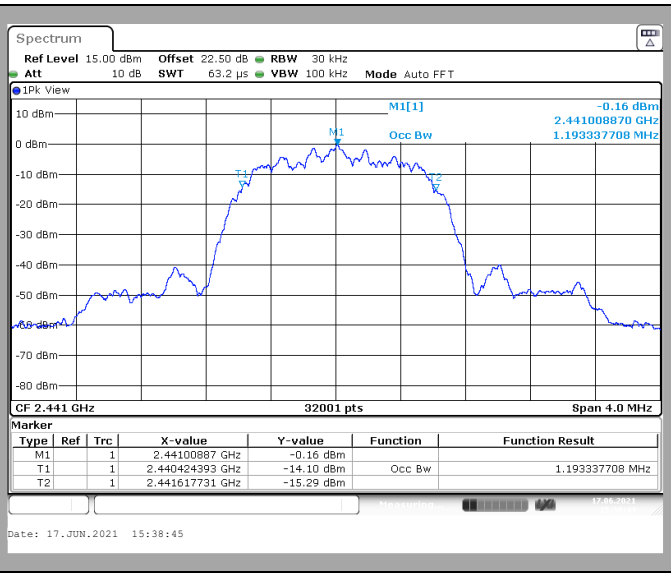
Channel	Occupied Bandwidth (MHz)
Cmin	0.891
Cnom	0.891
Cmax	0.889

Occupied Bandwidth
(2-DH5)

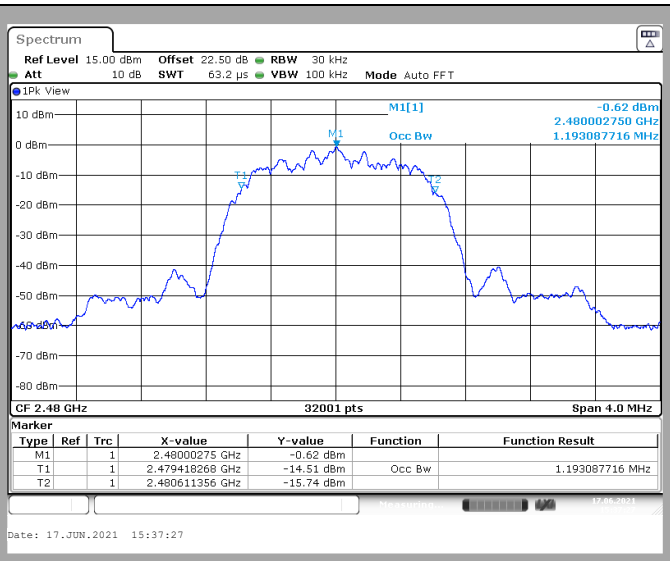
Cmin



Cnom



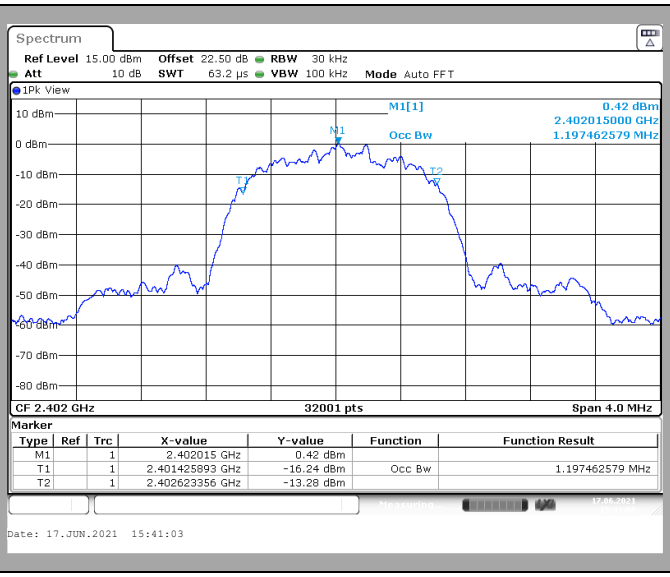
Cmax



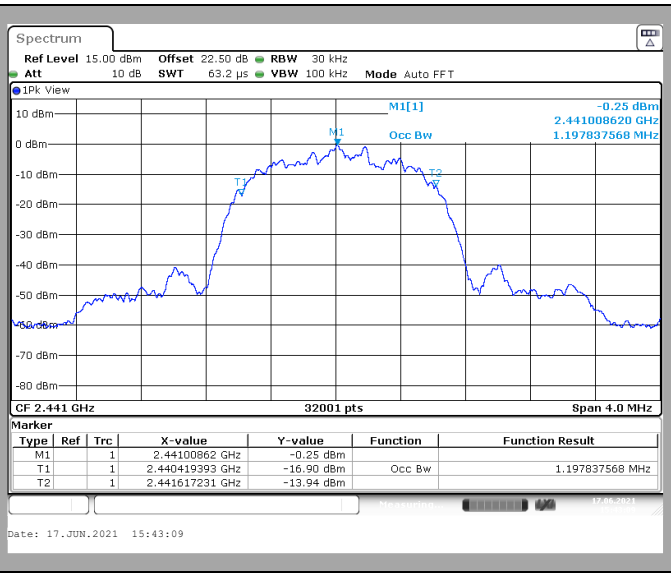
Channel	Occupied Bandwidth (MHz)
Cmin	1.194
Cnom	1.193
Cmax	1.193

Occupied Bandwidth
(3-DH5)

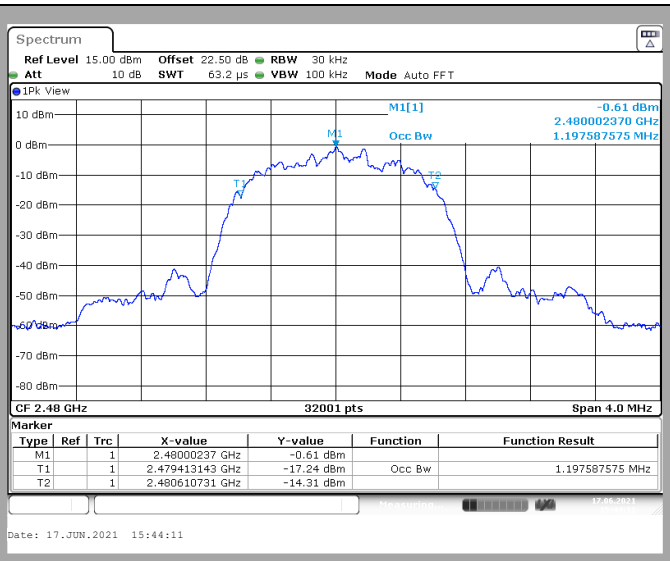
Cmin



Cnom



Cmax



Channel	Occupied Bandwidth (MHz)
Cmin	1.197
Cnom	1.198
Cmax	1.198

3.6. *CONCLUSION*

Occupied Channel Bandwidth measurement performed on the sample of the product **COGECO DIW3930 COGECO**, SN: **6211130035003**, 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. 20dB Emission Bandwidth

4.1. TEST CONDITIONS

Test performed by	: Julien Palard
Date of test	: June 17, 2021
Ambient temperature	: 26 °C
Relative humidity	: 36 %

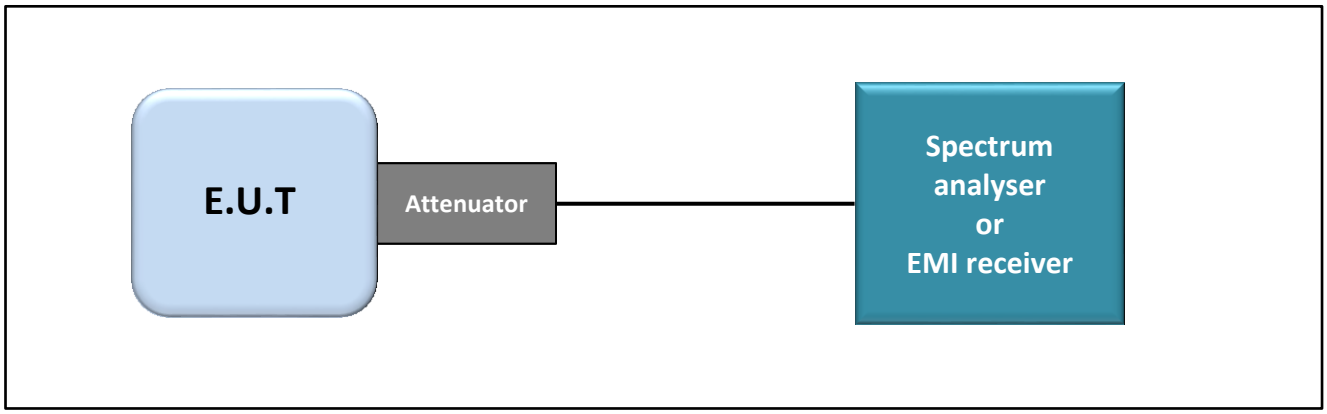
4.2. TEST SETUP

- The Equipment Under Test is installed:
☑ On a table
☐ In an anechoic chamber

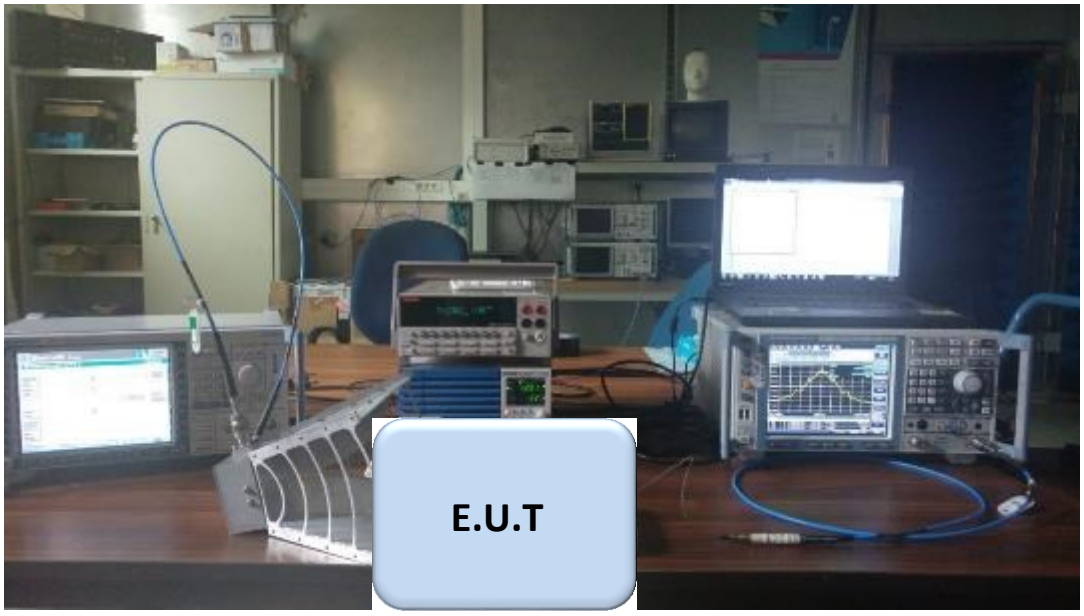
- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- Test Procedure:
☑ ANSI C63.10 § 6.9.2:

The EUT is placed in an anechoic chamber; levels have been corrected to be in compliant with the Peak Output Power measured. The EUT is turn ON and using the MaxHold function, the frequency separation of two frequencies that were attenuated 20dB from the Peak Output Power level. A delta marker is used to measure the frequency difference as the emission bandwidth.



Test set up of 20dB Emission Bandwidth



Photograph for 20dB emission bandwidth

4.3. LIMIT

No Limit

4.4. TEST EQUIPMENT LIST

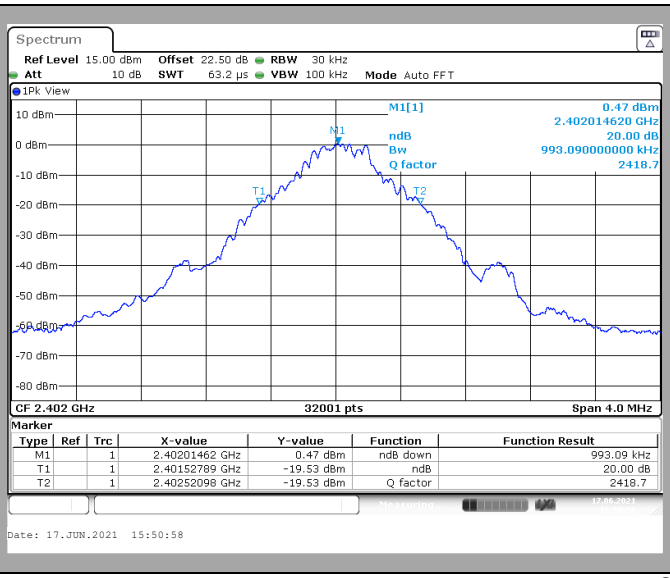
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Power supply	KIKUSUI	PCR500M	A7049006	Calibrate with multimeter	Calibrate with multimeter
Multimeter	KEITHLEY	2000	A1242090	2021/03	2023/03
R&S Commander Software	ROHDE & SCHWARZ	Version 1,6,4	-	-	-
Cable SONDE 026+ Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329971	2020/09	2021/09
EMI signal analyser	ROHDE & SCHWARZ	FSV40	A4060061	2019/05	2021/05

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

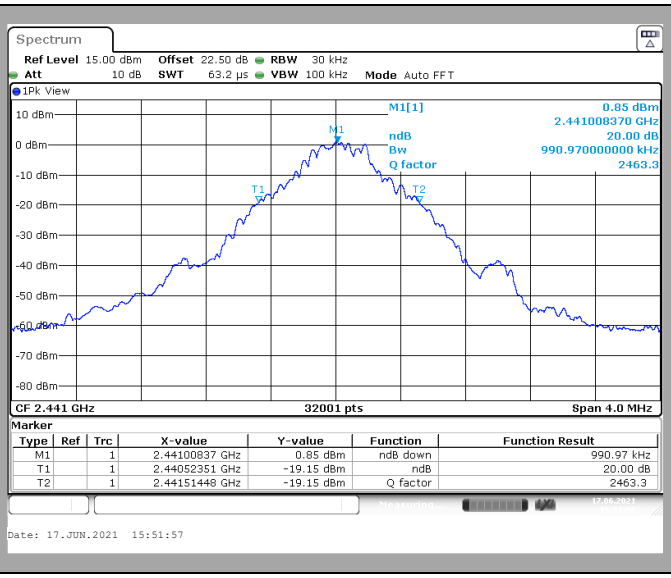
4.5. RESULTS

GFSK (DH5)

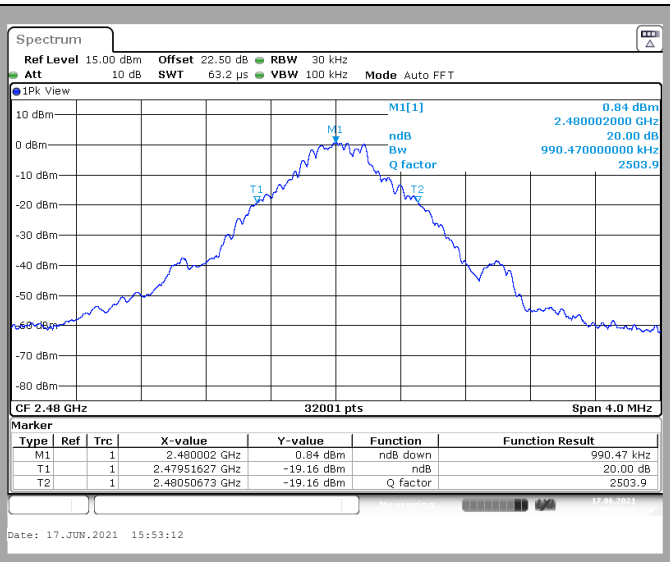
Cmin



Cnom



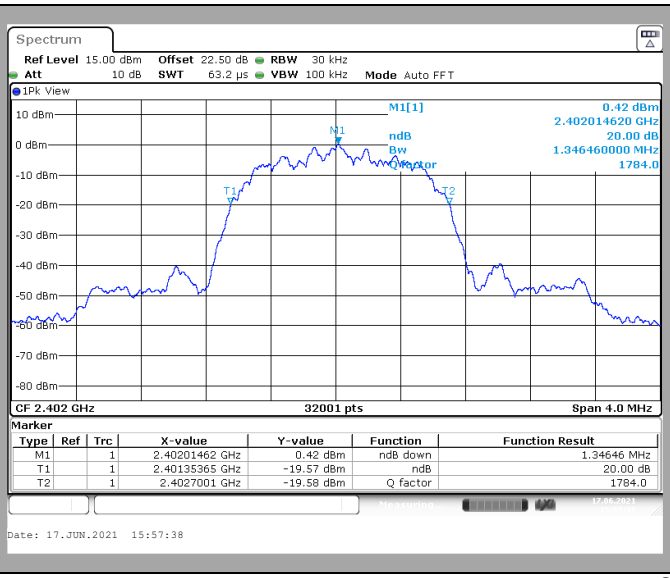
Cmax



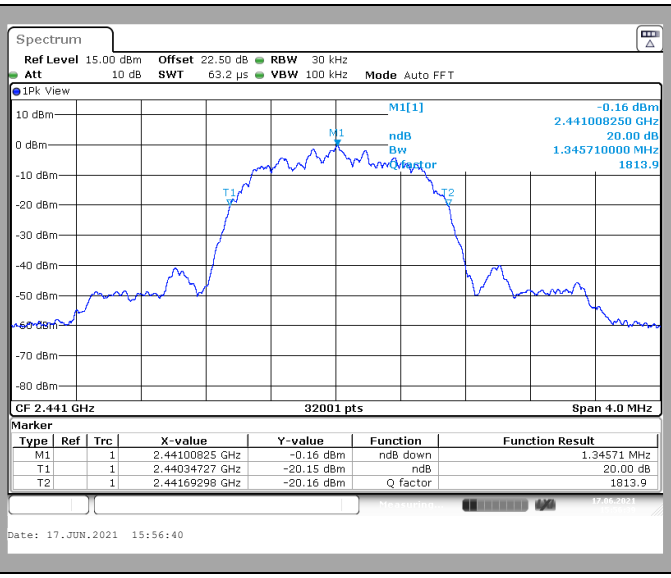
Channel	20dB Bandwidth (MHz)
Cmin	0.993
Cnom	0.991
Cmax	0.990

π/4 DQPSK (2-DH5)

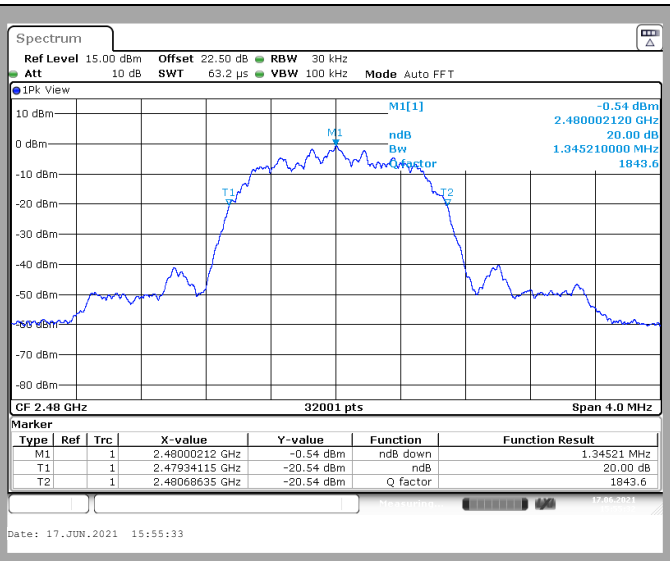
Cmin



Cnom



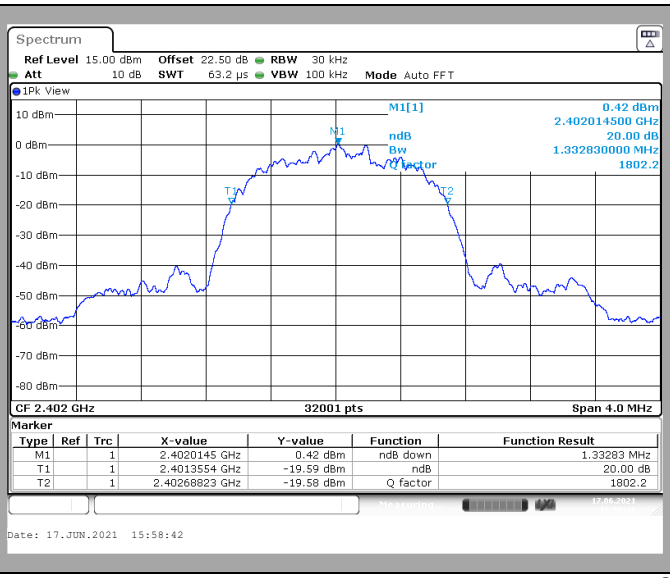
Cmax



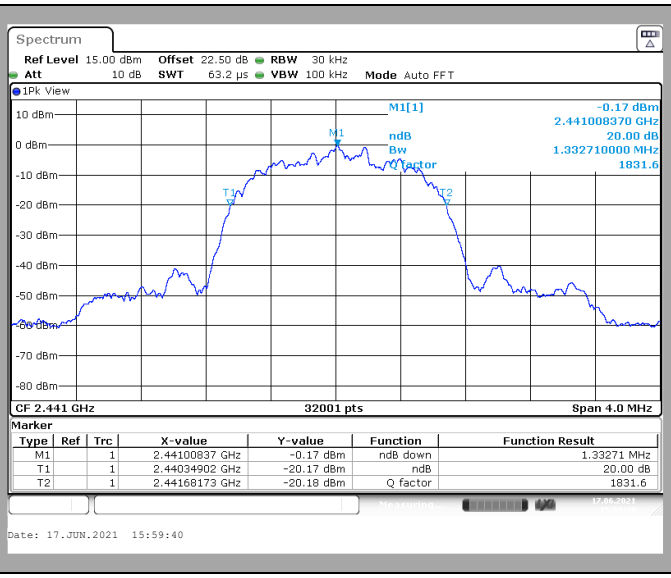
Channel	20dB Bandwidth (MHz)
Cmin	1.346
Cnom	1.346
Cmax	1.345

8DPSK (3-DH5)

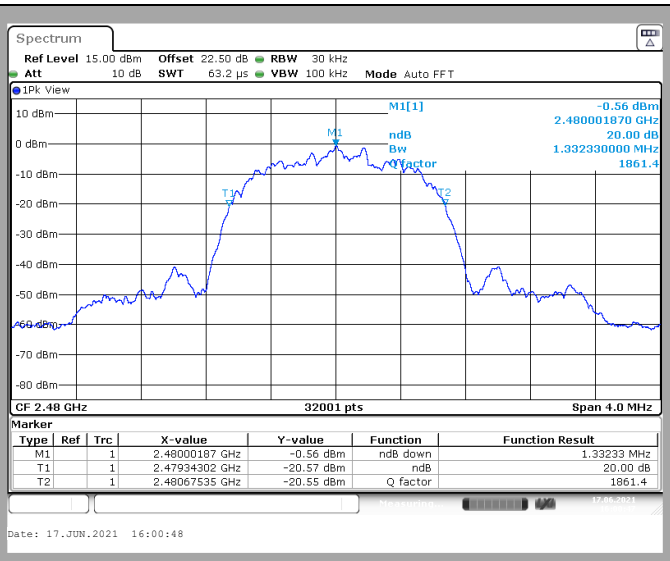
Cmin



Cnom



Cmax



Channel	20dB Bandwidth (MHz)
Cmin	1.333
Cnom	1.333
Cmax	1.332

4.6. CONCLUSION

20dB Emission Bandwidth measurement performed on the sample of the product **COGECO** DIW3930 **COGECO**, SN: **6211130035003**, 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. CARRIER FREQUENCY SEPARATION

5.1. TEST CONDITIONS

Test performed by	: Julien Palard
Date of test	: June 18, 2021
Ambient temperature	: 27 °C
Relative humidity	: 34 %

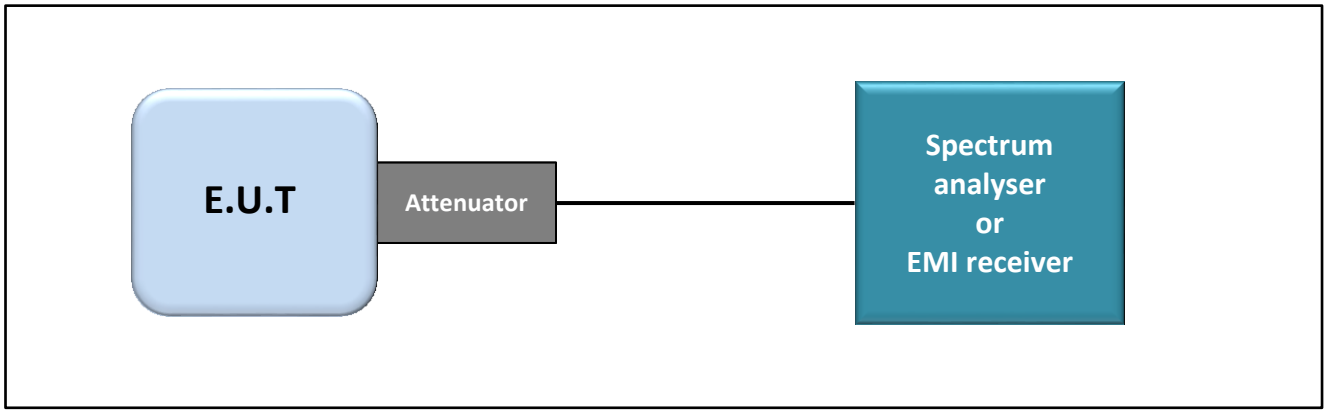
5.2. TEST SETUP

- The Equipment Under Test is installed:
☑ On a table
☐ In an anechoic chamber

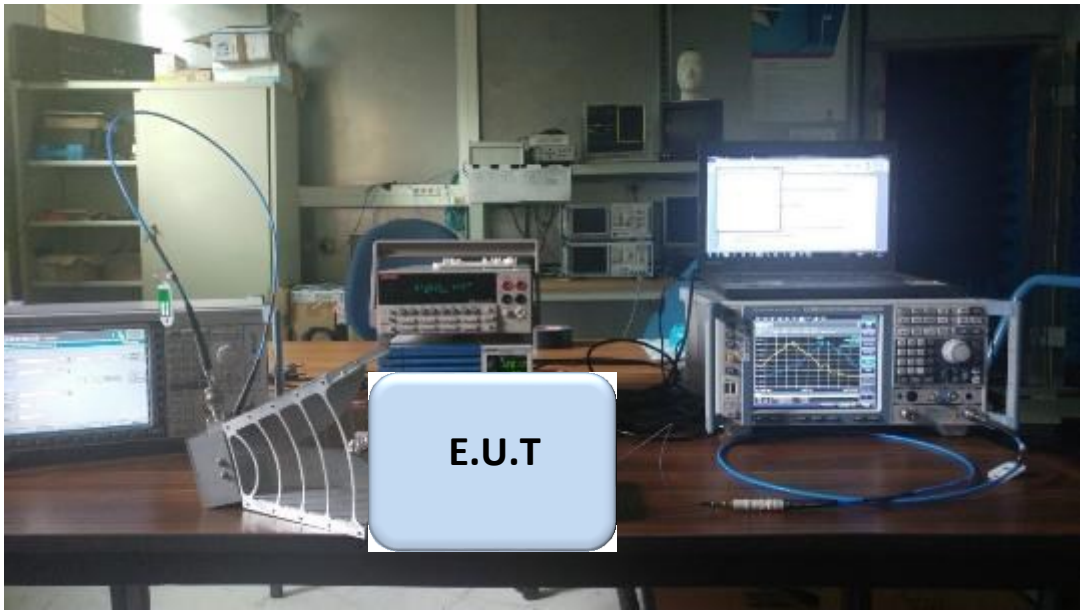
- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- Test Procedure:
☑ ANSI C63.10 § 7.8.2:

The EUT is placed in an anechoic chamber; levels have been corrected to be in compliant with the Peak Output Power measured. The EUT is turn ON and using the MaxHold function, the separation of two adjacent channels is recorded. A delta marker is used to measure the frequency difference.



Test set up of Carrier Frequency Separation



Photograph for Carrier Frequency Separation

5.3. LIMIT

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

5.4. TEST EQUIPMENT LIST

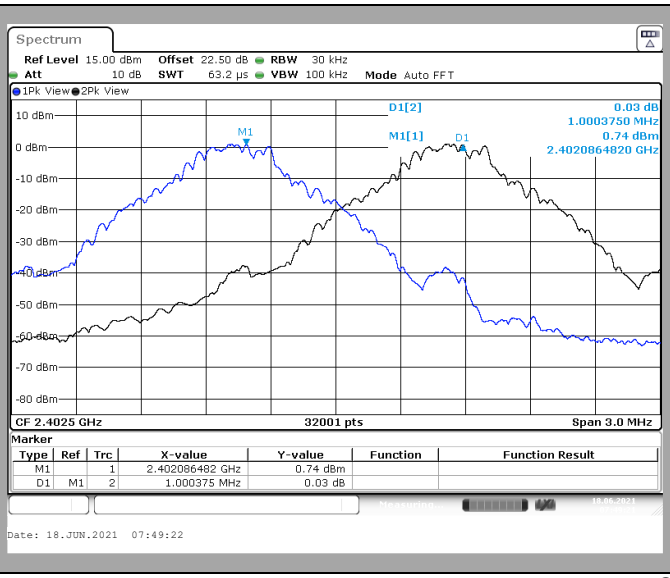
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Power supply	KIKUSUI	PCR500M	A7049006	Calibrate with multimeter	Calibrate with multimeter
Multimeter	KEITHLEY	2000	A1242090	2021/03	2023/03
R&S Commander Software	ROHDE & SCHWARZ	Version 1,6,4	-	-	-
Cable SONDE 026+ Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329971	2020/09	2021/09
EMI signal analyser	ROHDE & SCHWARZ	FSV40	A4060061	2019/05	2021/05

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

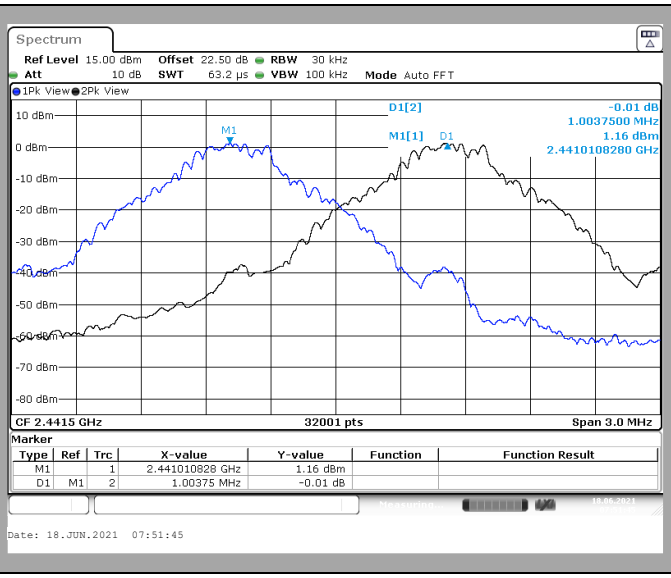
5.5. RESULTS

GFSK (DH5)

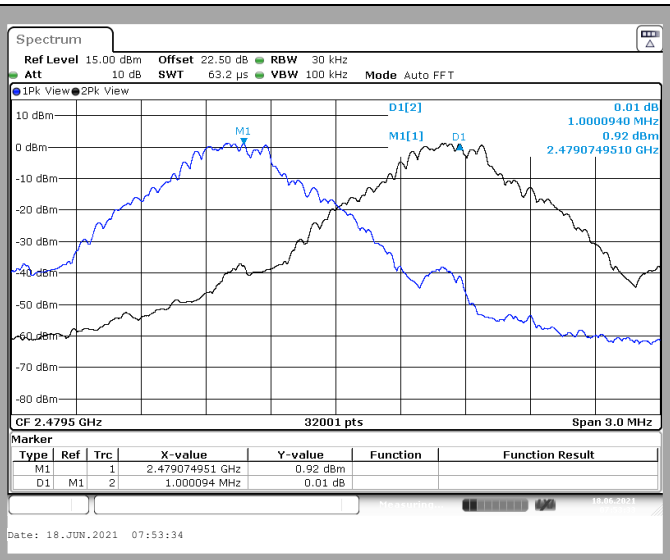
Cmin



Cnom



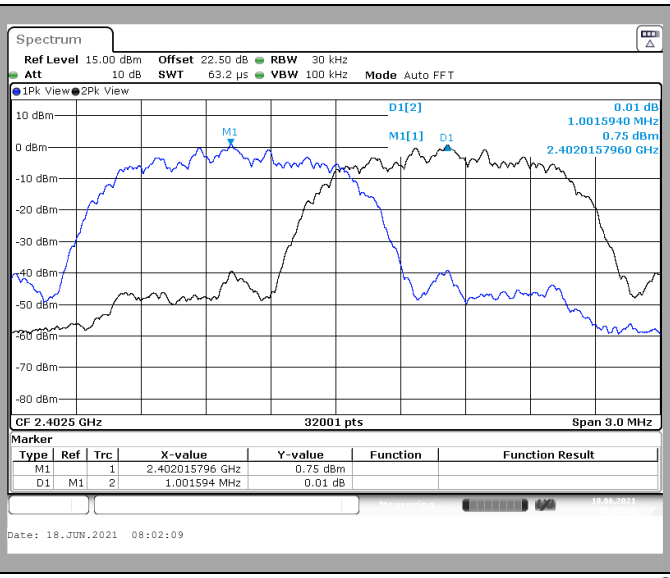
Cmax



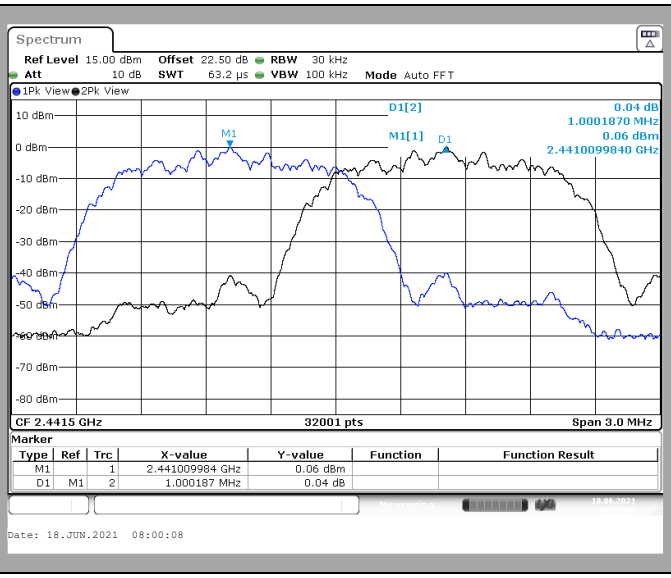
Channel	Carrier Frequency Separation (MHz)	Limit (MHz)
Cmin	1.0003750	Minimum 2/3 of 20dB Emission Bandwidth
Cnom	1.0037500	Minimum 2/3 of 20dB Emission Bandwidth
Cmax	1.0000940	Minimum 2/3 of 20dB Emission Bandwidth

π/4 DQPSK (2-DH5)

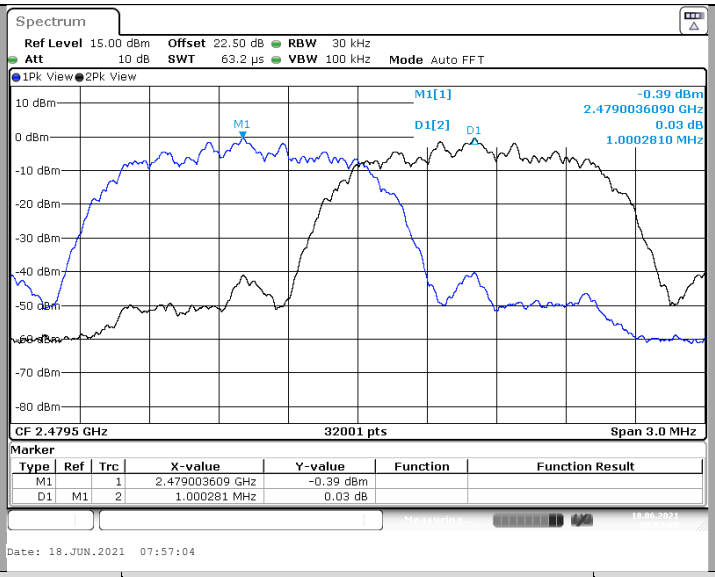
Cmin



Cnom



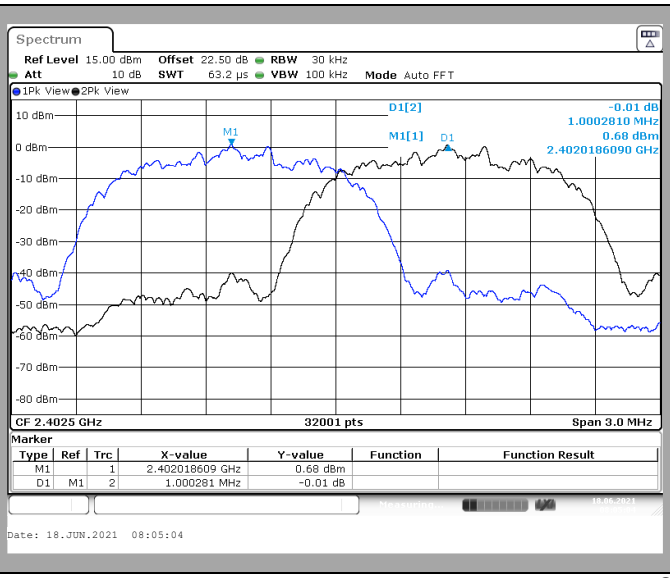
Cmax



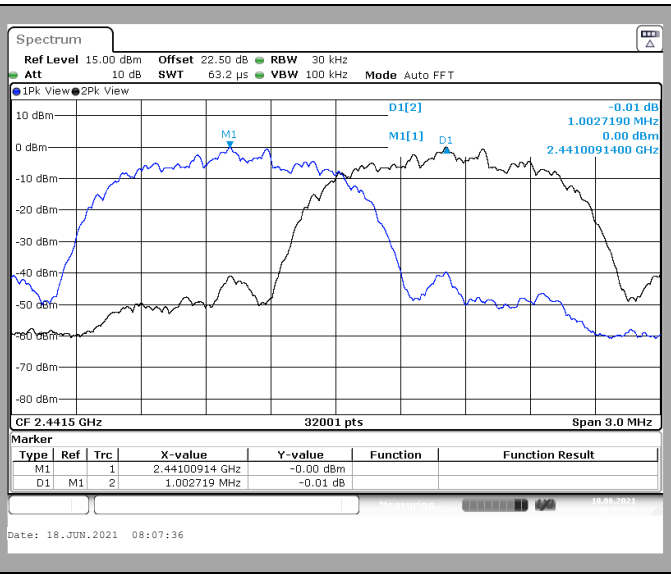
Channel	Carrier Frequency Separation (MHz)	Limit (MHz)
Cmin	1.0015940	Minimum 2/3 of 20dB Emission Bandwidth
Cnom	1.0001870	Minimum 2/3 of 20dB Emission Bandwidth
Cmax	1.0002810	Minimum 2/3 of 20dB Emission Bandwidth

8DPSK (3-DH5)

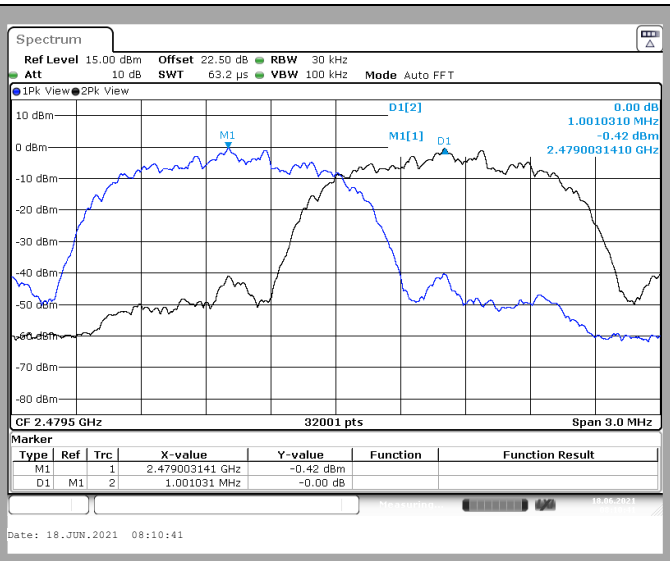
Cmin



Cnom



Cmax



Channel	Carrier Frequency Separation (MHz)	Limit (MHz)
Cmin	1.0002810	Minimum 2/3 of 20dB Emission Bandwidth
Cnom	1.0027190	Minimum 2/3 of 20dB Emission Bandwidth
Cmax	1.0010310	Minimum 2/3 of 20dB Emission Bandwidth

5.6. CONCLUSION

Carrier Frequency Separation measurement performed on the sample of the product **COGECO** DIW3930 **COGECO**, SN: **6211130035003**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS-GEN ISSUE 5** limits.

6. NUMBER OF HOPPING FREQUENCY

6.1. TEST CONDITIONS

Test performed by	: Julien Palard
Date of test	: June 18, 2021
Ambient temperature	: 27 °C
Relative humidity	: 34 %

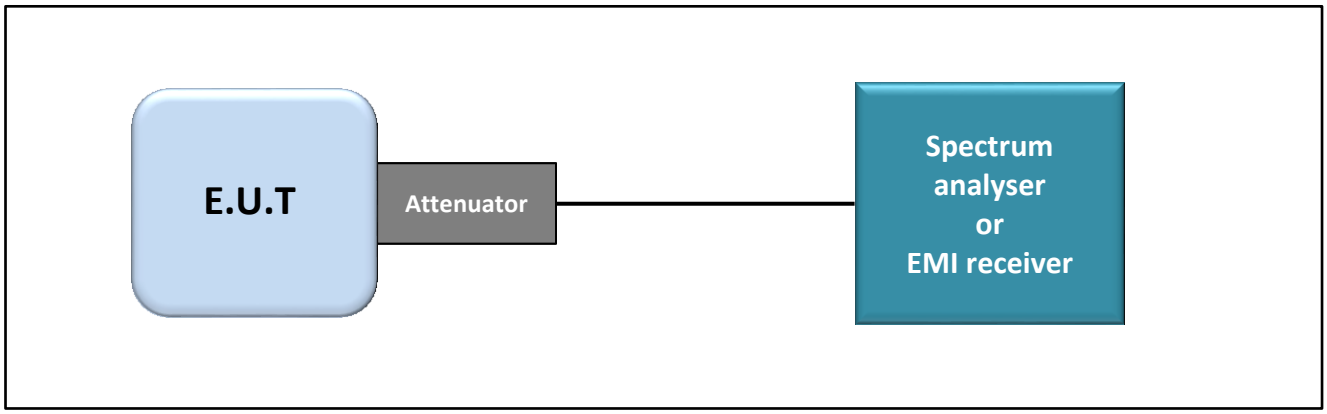
6.2. TEST SETUP

- The Equipment Under Test is installed:
☑ On a table
☐ In an anechoic chamber

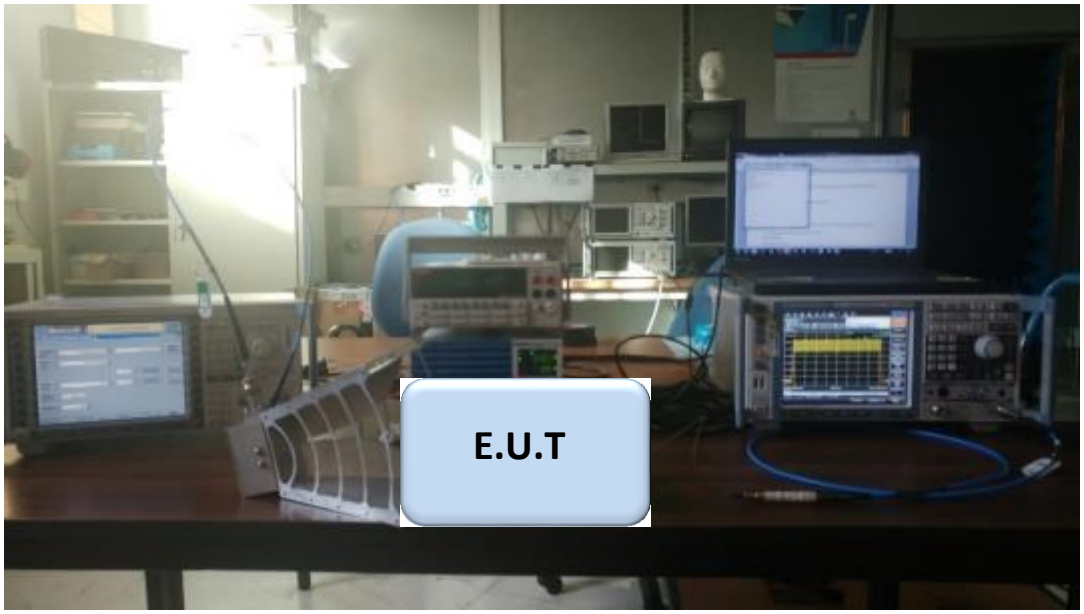
- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- Test Procedure:
☑ ANSI C63.10 § 7.8.3:

The EUT is placed in an anechoic chamber. The EUT is turn ON and using the MaxHold function and a delta marker the number of frequencies used for this FHSS system is recorded, see following graphs.
RBW: 100kHz
VBW: 300kHz



Test set up of Number of Hopping Frequency



Photograph for Number of Frequency Hopping

6.3. LIMIT

Number of Hopping Frequencies shall be at least 15 channels

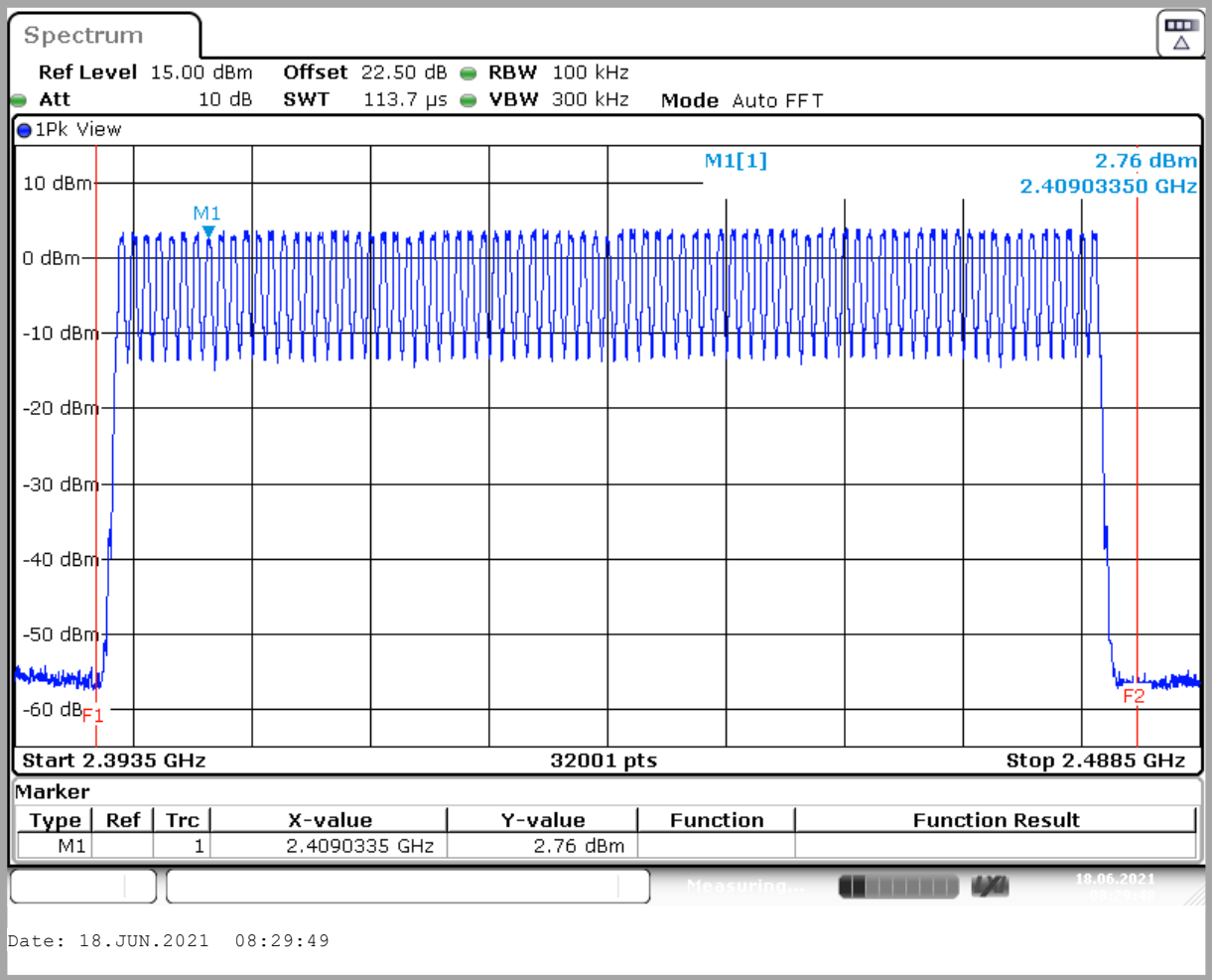
6.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Power supply	KIKUSUI	PCR500M	A7049006	Calibrate with multimeter	Calibrate with multimeter
Multimeter	KEITHLEY	2000	A1242090	2021/03	2023/03
R&S Commander Software	ROHDE & SCHWARZ	Version 1,6,4	-	-	-
Cable SONDE 026+ Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329971	2020/09	2021/09
EMI signal analyser	ROHDE & SCHWARZ	FSV40	A4060061	2019/05	2021/05

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

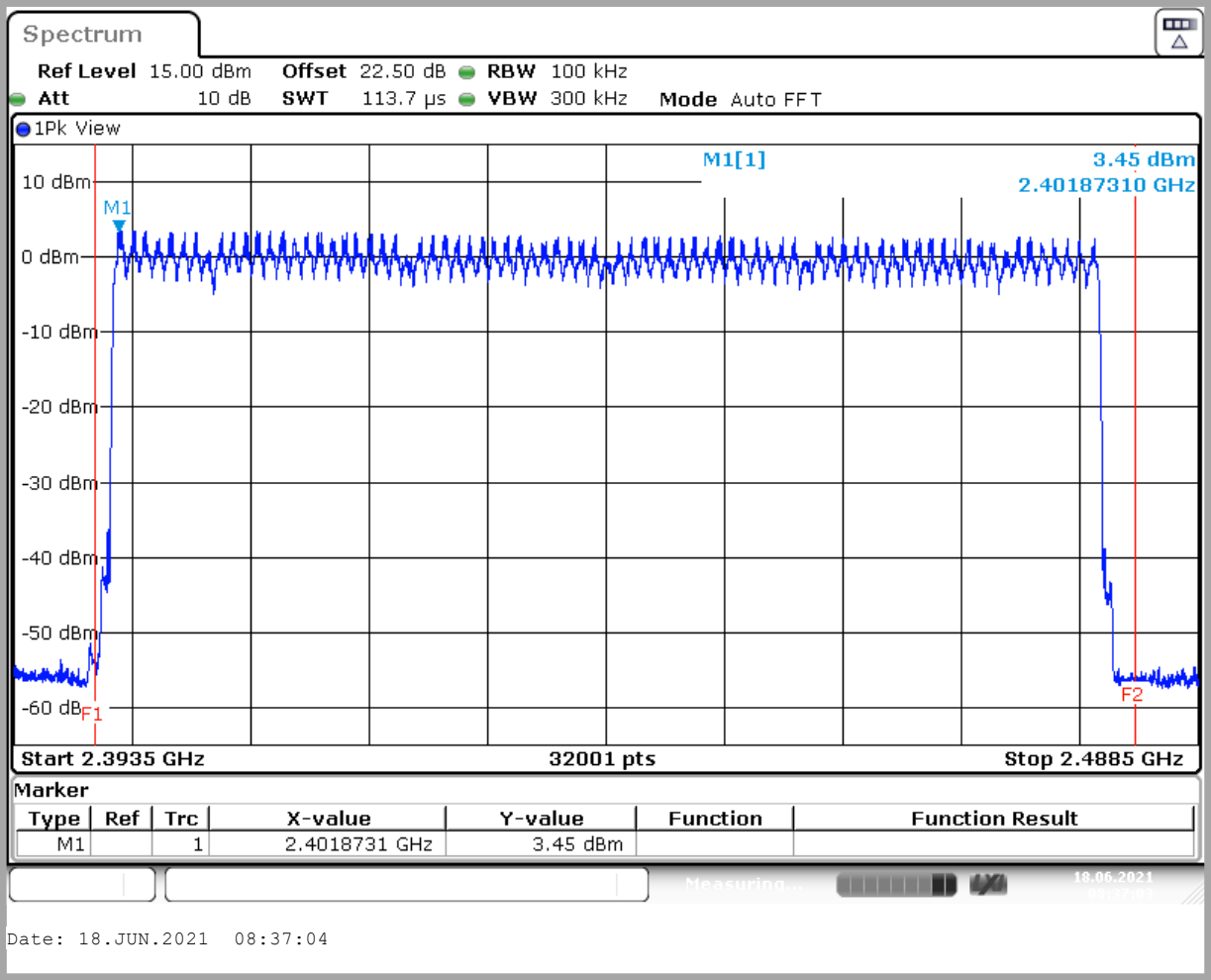
6.5. RESULTS

GFSK (DH5)		
Call		



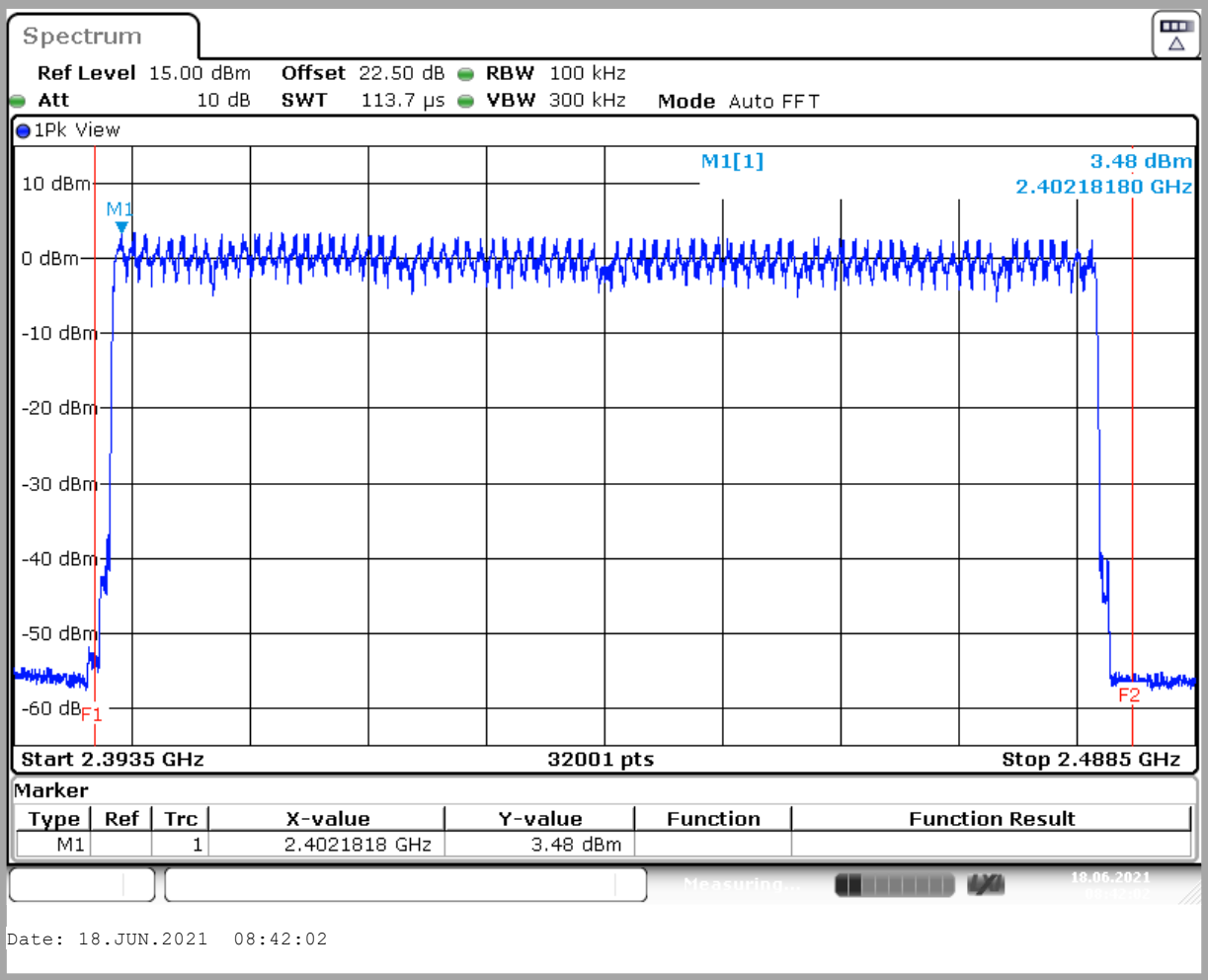
Channel	Number of Hopping Frequencies	Limit
Call	79	Minimum 15

π/4 DQPSK (2-DH5)
Call



Channel	Number of Hopping Frequencies	Limit
Call	74	Minimum 15

8DPSK (3-DH5)
Call



Channel	Number of Hopping Frequencies	Limit
Call	72	Minimum 15

6.6. CONCLUSION

Number of Frequency Hopping measurement performed on the sample of the product **COGECO** DIW3930 **COGECO**, SN: **6211130035003**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS-GEN ISSUE 5** limits.

7. TIME OF OCCUPANCY

7.1. TEST CONDITIONS

Test performed by	: Julien Palard
Date of test	: June 18, 2021
Ambient temperature	: 27 °C
Relative humidity	: 34 %

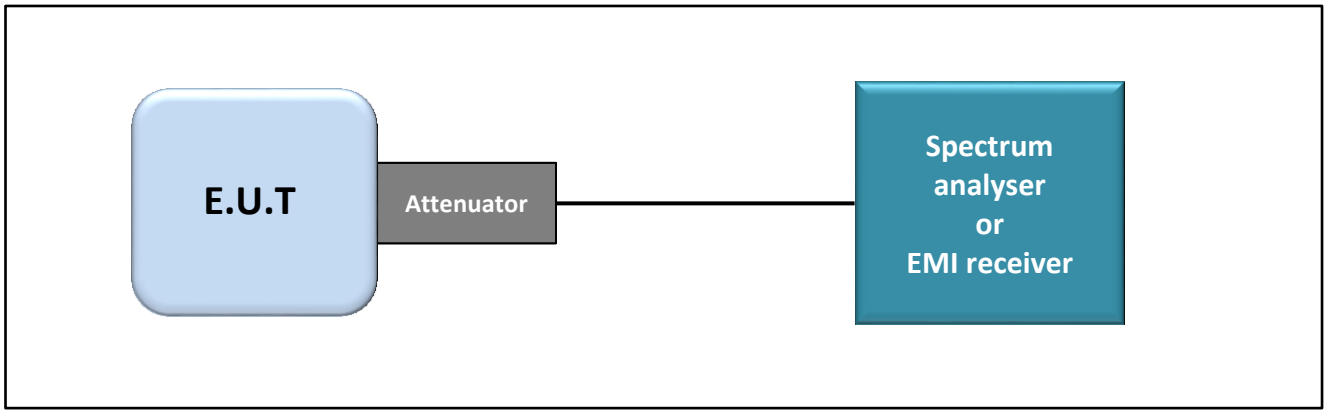
7.2. TEST SETUP

- The Equipment Under Test is installed:
☑ On a table
☐ In an anechoic chamber

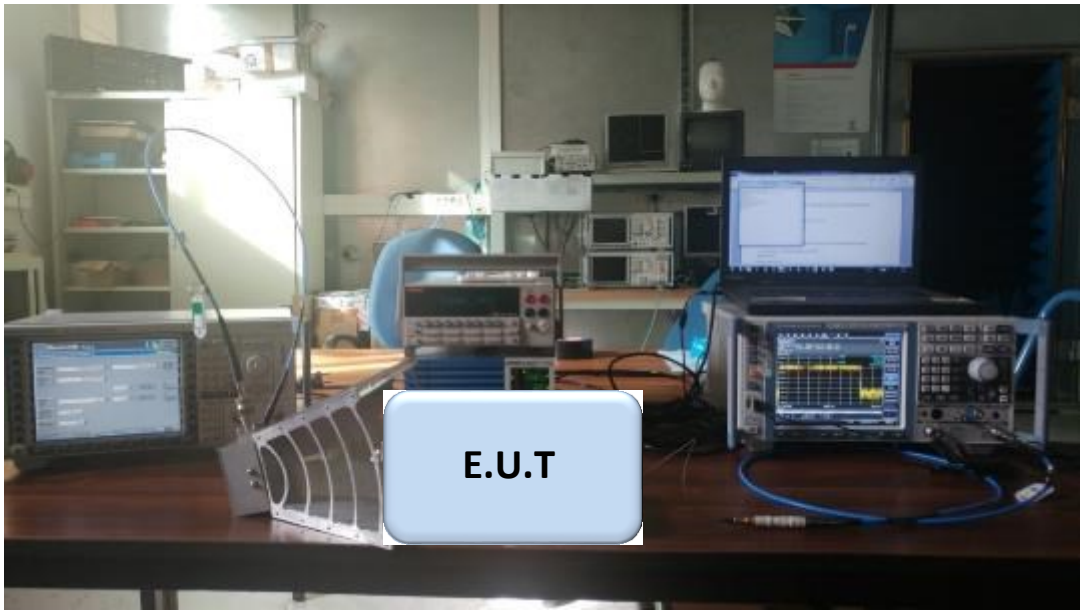
- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- Test Procedure:
☑ ANSI C63.10 § 7.8.4

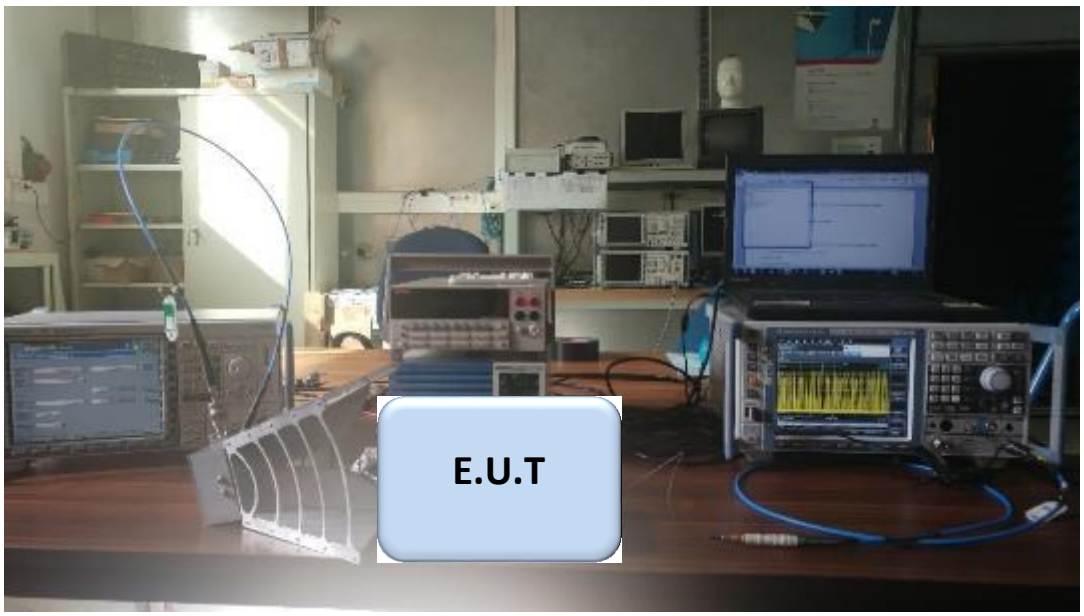
Dwell Time is measured and calculated using the zero SPAN mode on a channel frequency and a SWEEP with an adapter value to measure the number of transmission within a period and the time of transmission
RBW: 100kHz



Test set up of Time of Occupancy



Photograph for Time of Occupancy



Photograph for Time of Occupancy

7.3. LIMIT

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

7.4. TEST EQUIPMENT LIST

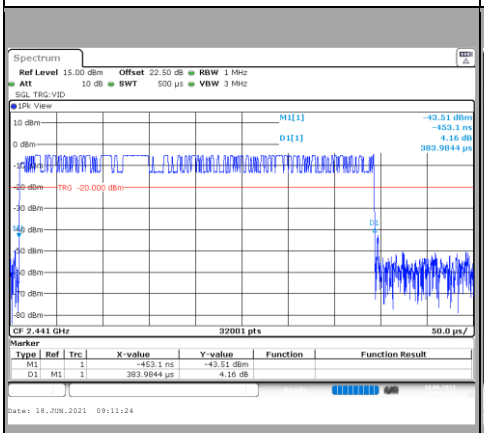
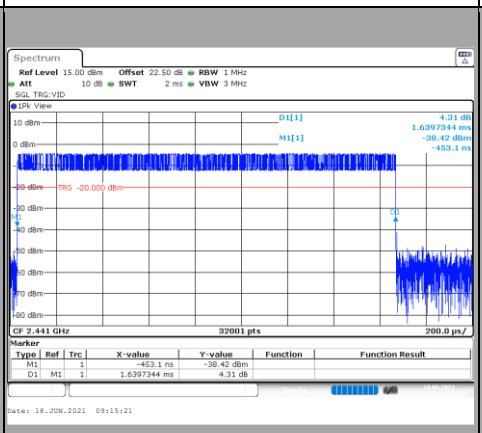
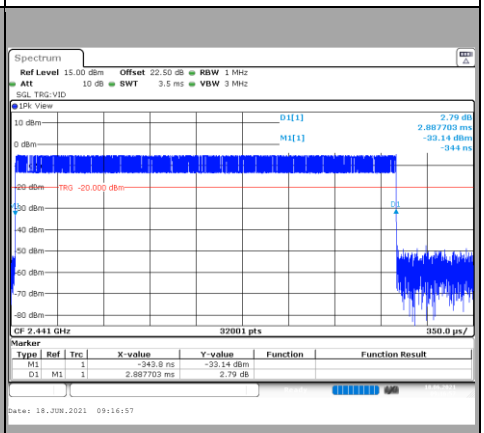
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Power supply	KIKUSUI	PCR500M	A7049006	Calibrate with multimeter	Calibrate with multimeter
Multimeter	KEITHLEY	2000	A1242090	2021/03	2023/03
R&S Commander Software	ROHDE & SCHWARZ	Version 1,6,4	-	-	-
Cable SONDE 026+ Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329971	2020/09	2021/09
EMI signal analyser	ROHDE & SCHWARZ	FSV40	A4060061	2019/05	2021/05

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

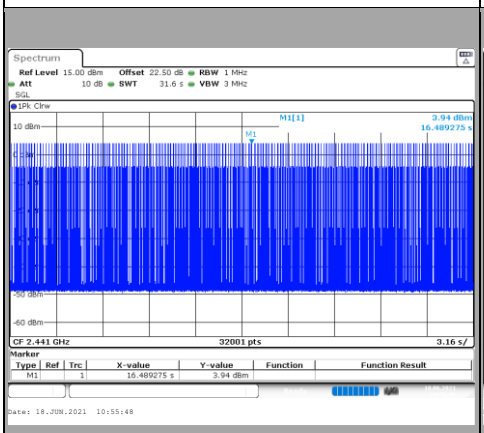
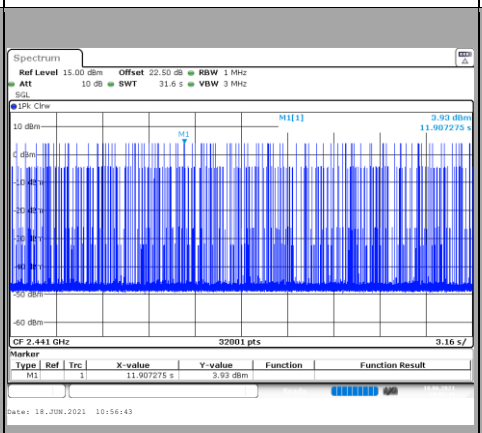
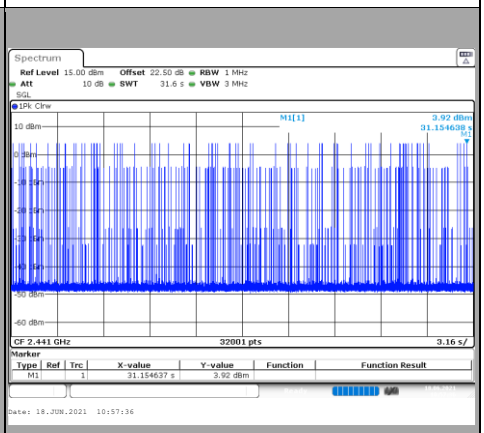
7.5. RESULTS

Burst Length

GFSK

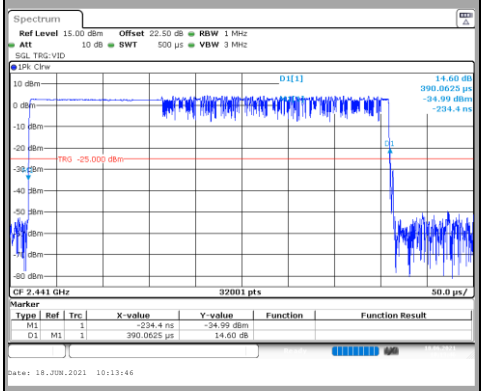
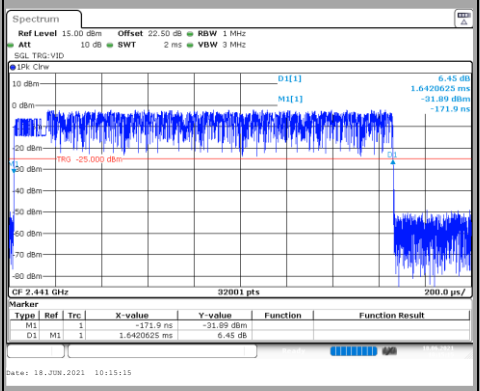
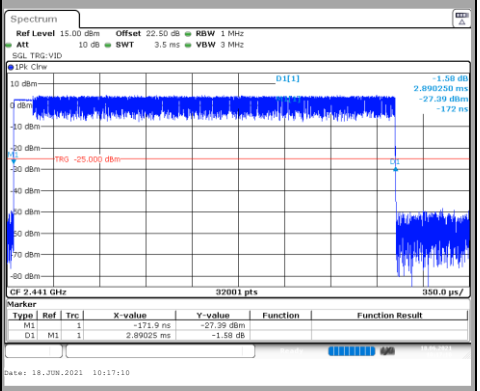
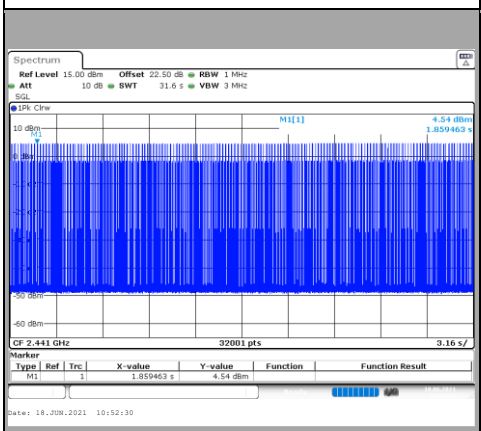
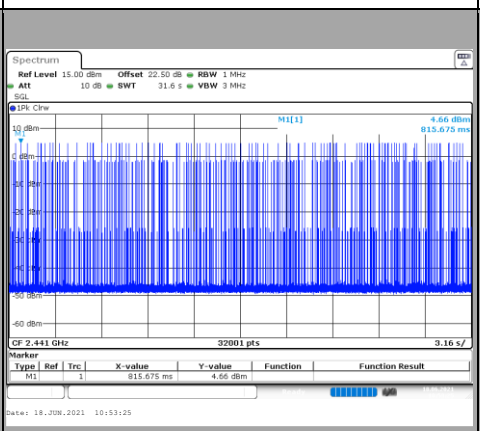
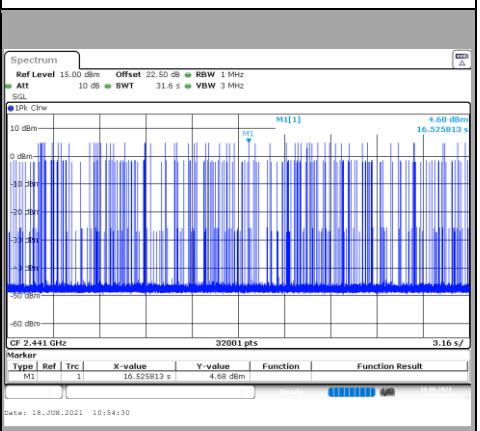
DH1	DH3	DH5
		

Time of Occupancy

DH1	DH3	DH5
		

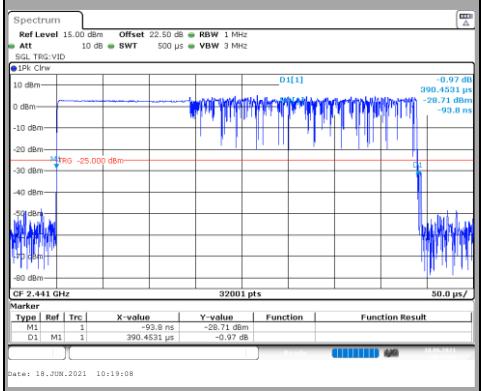
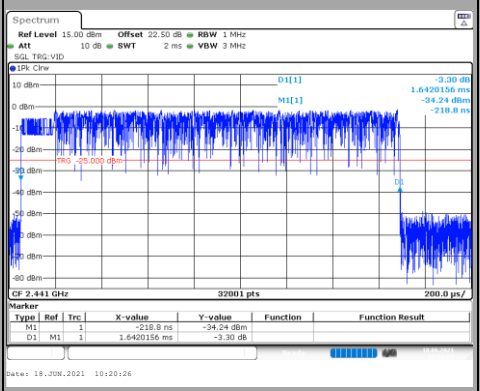
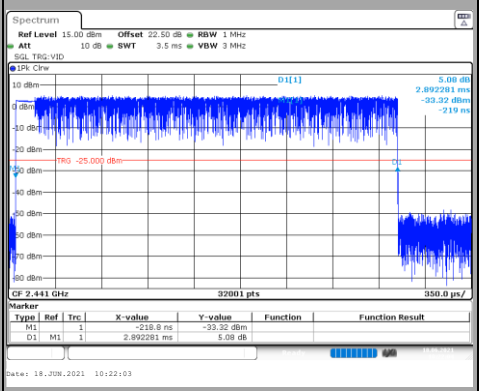
Packet Type	Burst Length (ms)	Number of Hopping during Time of Occupancy	Time of Occupancy (ms)	Limit of Time of Occupancy (ms)
DH1	0.384	321	123.264	400
DH3	1.640	108	177.120	400
DH5	2.888	71	205.048	400

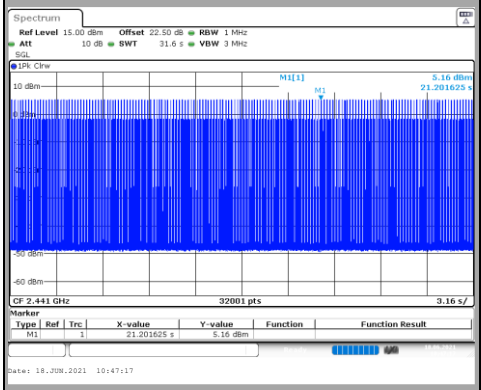
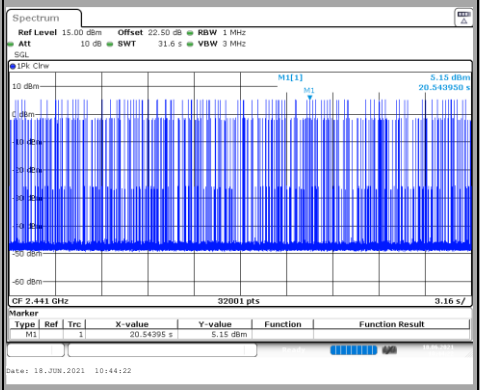
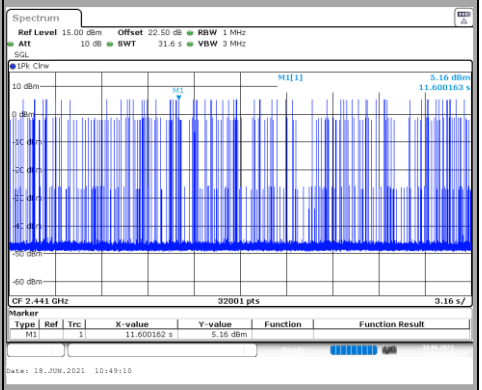
Note: Period of 31.6 seconds (79 channels x 0.4)

Burst Length		
π/4 DQPSK		
2DH1	2DH3	2DH5
		
Time of Occupancy		
2DH1	2DH3	2DH5
		

Packet Type	Burst Length (ms)	Number of Hopping during Time of Occupancy	Time of Occupancy (ms)	Limit of Time of Occupancy (ms)
2DH1	0.390	314	122.460	400
2DH3	1.642	107	175.694	400
2DH5	2.890	52	150.28	400

Note: Period of 31.6 seconds (79 channels x 0.4)

Burst Length		
8DPSK		
3DH1	3DH3	3DH5
		

Time of Occupancy		
3DH1	3DH3	3DH5
		

Packet Type	Burst Length (ms)	Number of Hopping during Time of Occupancy	Time of Occupancy (ms)	Limit of Time of Occupancy (ms)
DH1	0.390	320	124.800	400
DH3	1.642	105	172.410	400
DH5	2.892	66	190.872	400

Note: Period of 31.6 seconds (79 channels x 0.4)

7.6. CONCLUSION

Time of Occupancy measurement performed on the sample of the product **COGECO** DIW3930 **COGECO**, SN: **6211130035003**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS-GEN ISSUE 5** limits.

8. DUTY CYCLE

8.1. TEST CONDITIONS

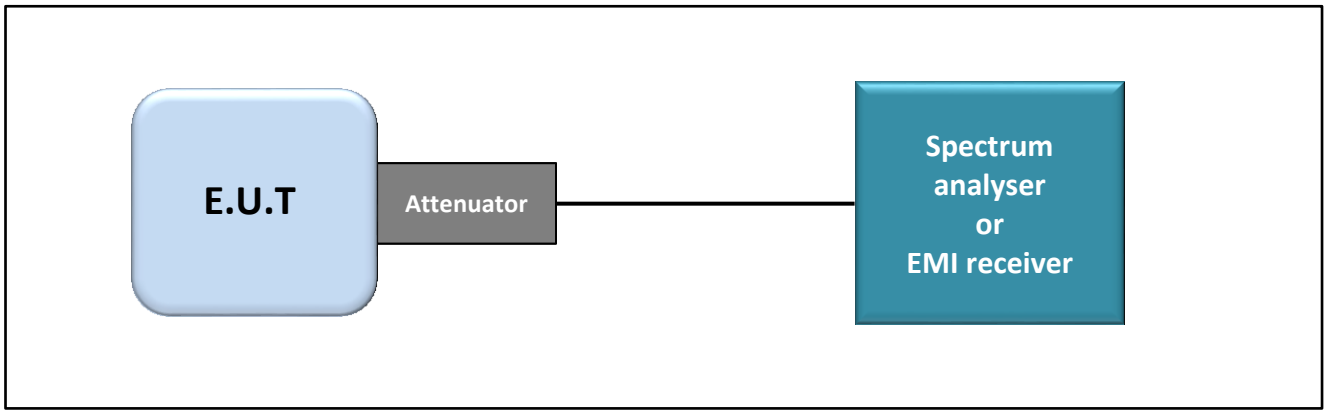
Test performed by	: Armand MAHOUNGOU
Date of test	: June 9, 2021
Ambient temperature	: 24°C
Relative humidity	: 41%

8.2. TEST SETUP

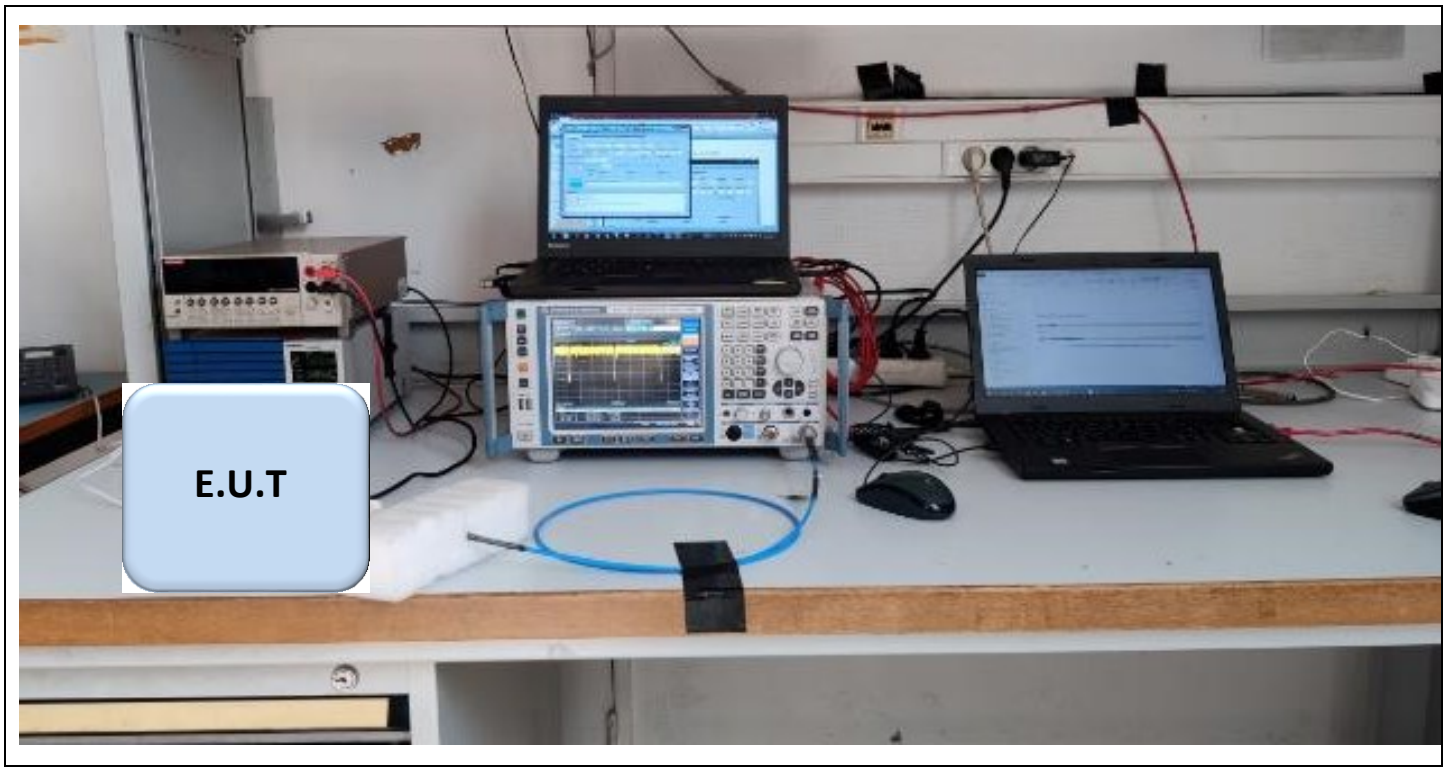
- The Equipment Under Test is installed:
☑ On a table
☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

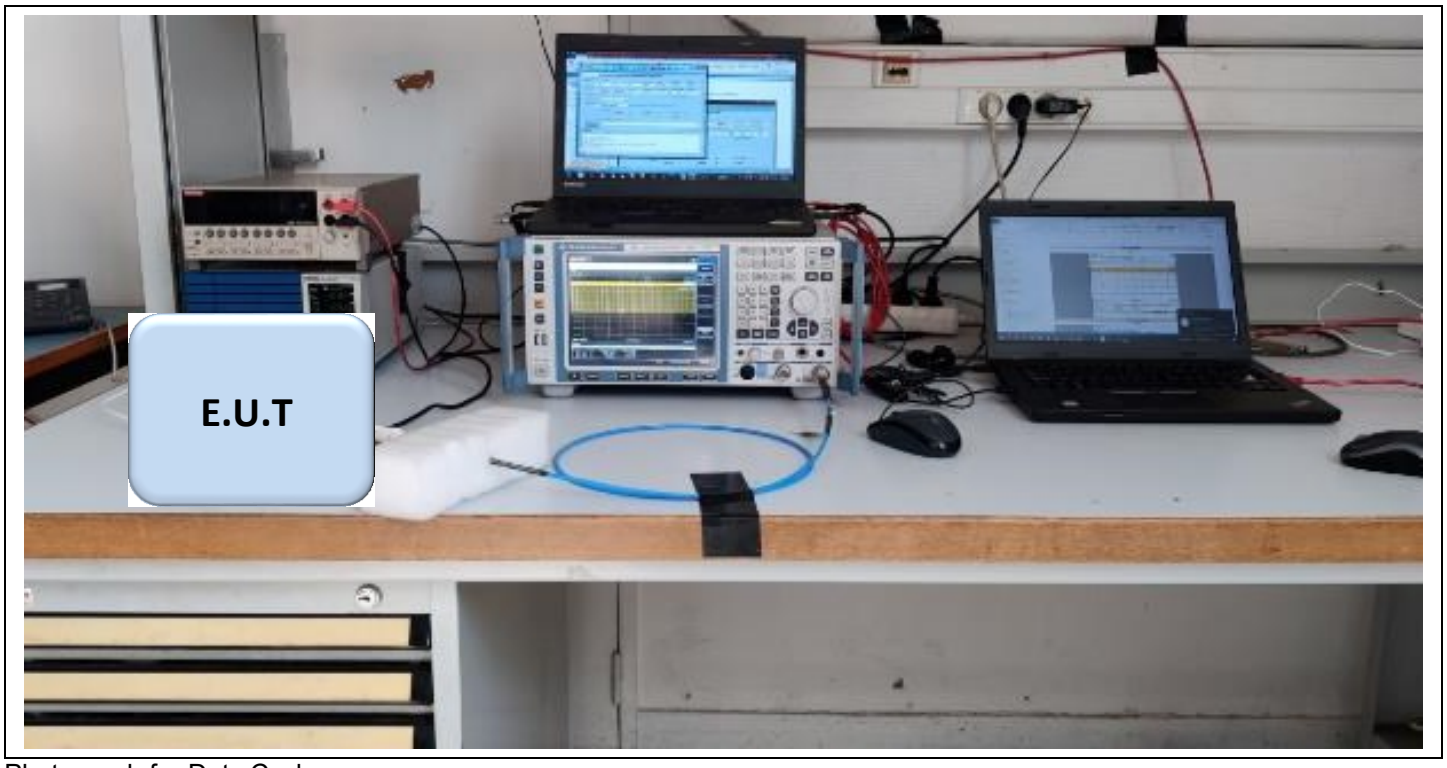
- Test Procedure:
☑ ANSI C63.10 § 11.6



Test set up of Duty Cycle



Photograph for Duty Cycle



Photograph for Duty Cycle

8.3. LIMIT

None

8.4. TEST EQUIPMENT LIST

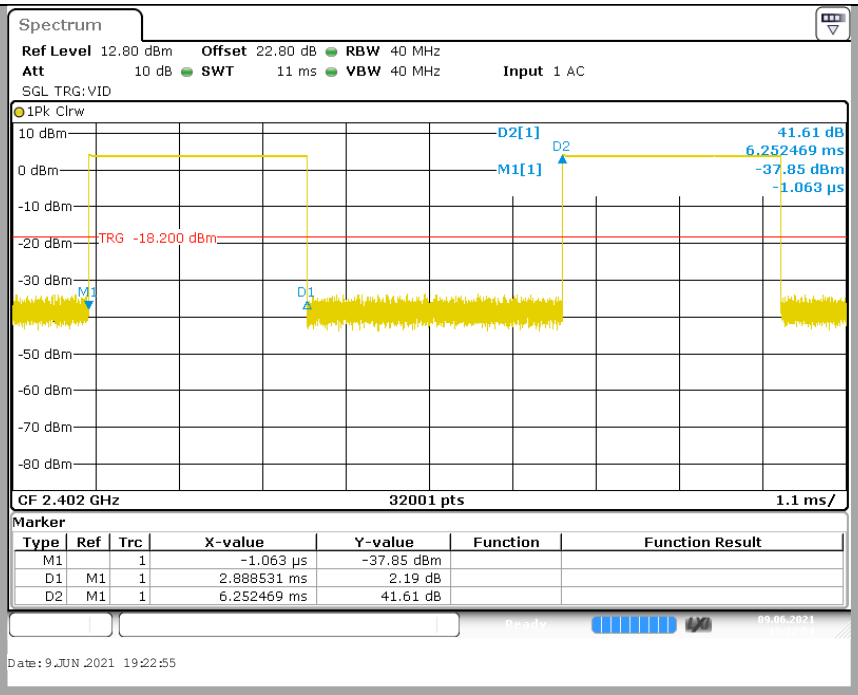
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642026	2019/07	2021/07
Cable + Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329970	2020/09	2021/09
Power supply	KIKUSUI	PCR500M	A7049006	See Multimeter	See Multimeter
Multimeter	KEITHLEY	2000	A1242090	2021/03	2023/03
R&S Commander Software	ROHDE & SCHWARZ	Version 1,6,4	-	-	-
Load 50 ohms	TELEGARTNER	-	A7150103	2021/04	2023/04
Load 50 ohms	TELEGARTNER	-	A7150104	2021/04	2023/04

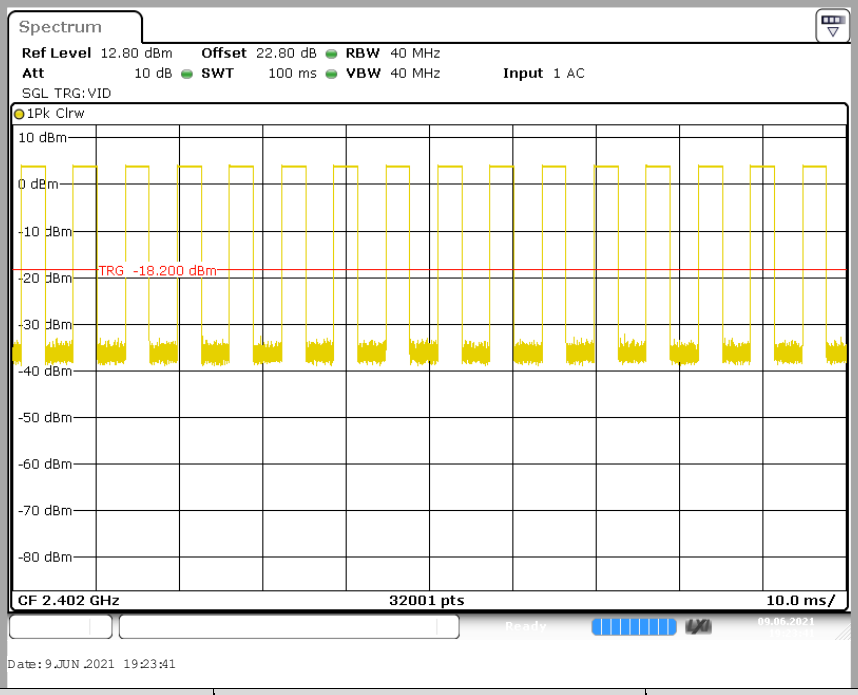
Note: In our quality system, the test equipment calibration due is more & less 2 months

8.5. RESULTS

GFSK

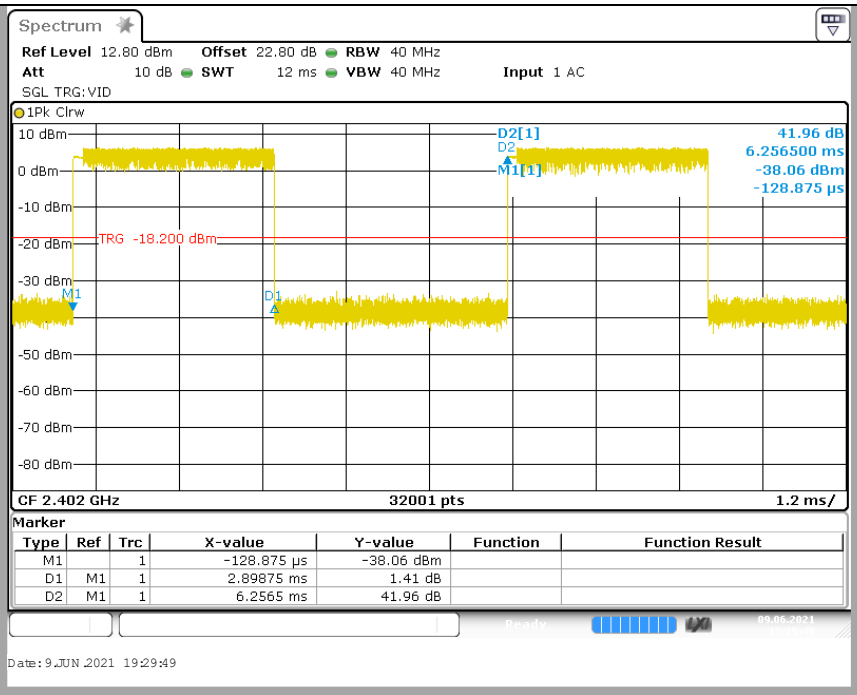
Cmin

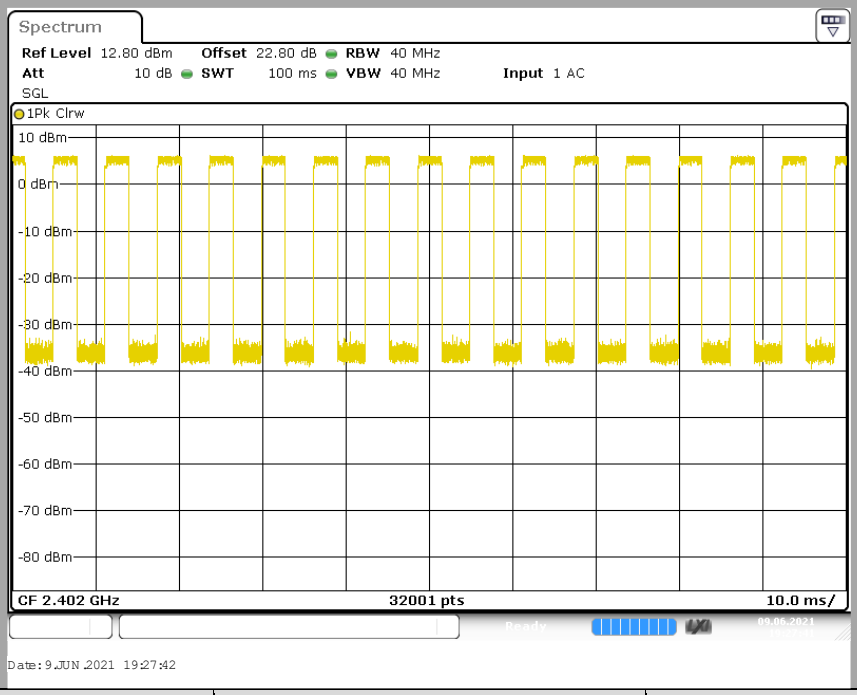




Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Channel	46.198	$20\log(\frac{1}{duty\ cycle})$ = 6.7075

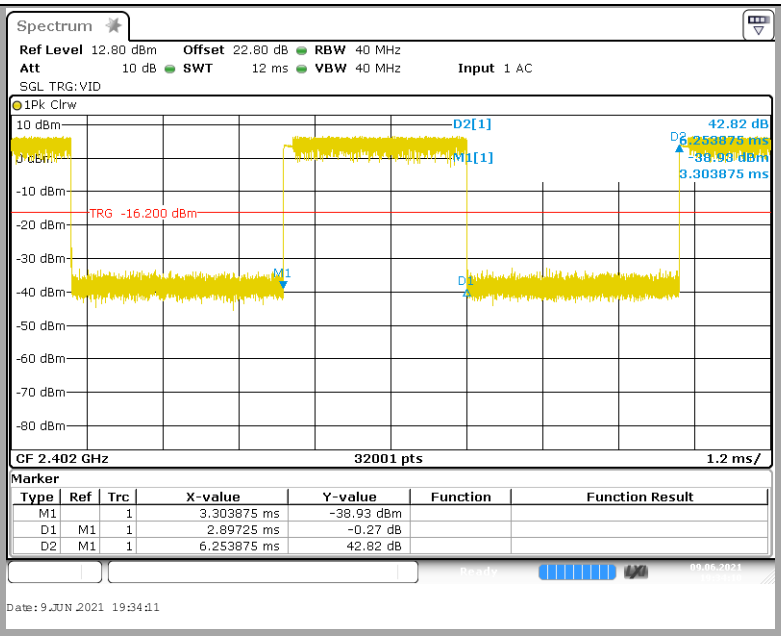
π/4 DQPSK
Cmin

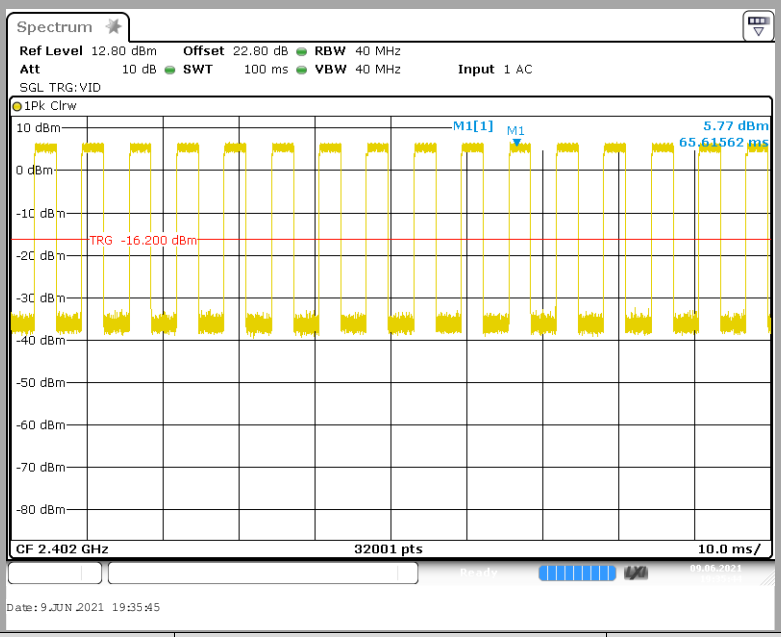




Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Channel	46.331	$20\log(\frac{1}{duty\ cycle}) = 6.6825$

8DPSK
Cmin





Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Channel	46.327	$20\log(\frac{1}{duty\ cycle})$ = 6.6833

8.6. *CONCLUSION*

Duty Cycle measurement performed on the sample of the product **COGECO** DIW3930 **COGECO**, SN: **6211130035003**, 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. MAXIMUM CONDUCTED OUTPUT POWER

9.1. TEST CONDITIONS

Test performed by	: Julien Palard
Date of test	: June 18, 2021
Ambient temperature	: 27 °C
Relative humidity	: 34 %

9.2. TEST SETUP

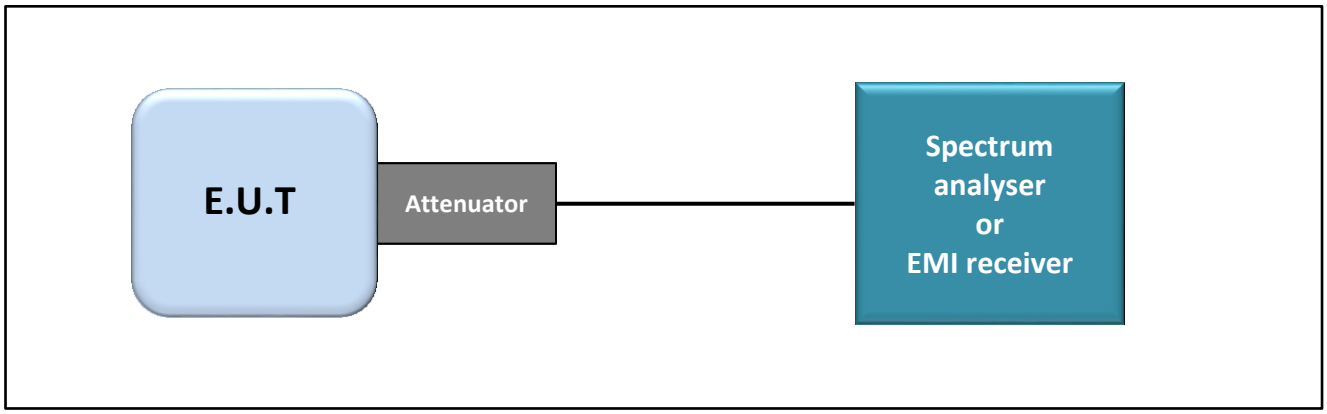
- The Equipment Under Test is installed:
☑ On a table
☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

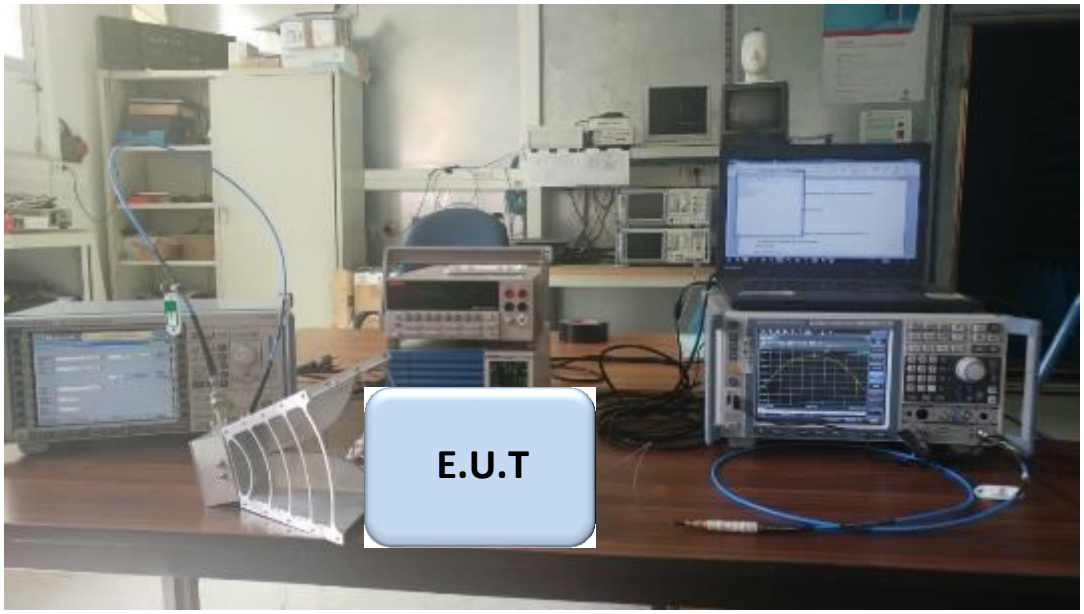
- Test Procedure:
☑ ANSI C63.10 § 7.8.5

Measurement Procedure:

a) 1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
b) 2) RBW > 20 dB bandwidth of the emission being measured.
c) 3) VBW ≥ RBW.
d) 4) Sweep: Auto.
e) 5) Detector function: Peak.
f) 6) Trace: Max hold.



Test set up of Maximum Conducted Output Power



Photograph for Maximum Conducted Output Power

9.3. LIMIT

Frequency range	Maximum Conducted Output Power
2400MHz to 2483.5MHz	≤21dBm*

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

9.4. TEST EQUIPMENT LIST

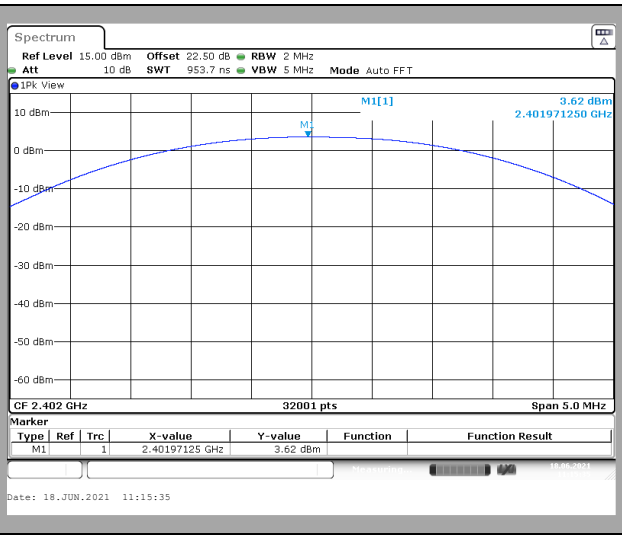
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Power supply	KIKUSUI	PCR500M	A7049006	Calibrate with multimeter	Calibrate with multimeter
Multimeter	KEITHLEY	2000	A1242090	2021/03	2023/03
R&S Commander Software	ROHDE & SCHWARZ	Version 1,6,4	-	-	-
Cable SONDE 026+ Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329971	2020/09	2021/09
EMI signal analyser	ROHDE & SCHWARZ	FSV40	A4060061	2019/05	2021/05

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

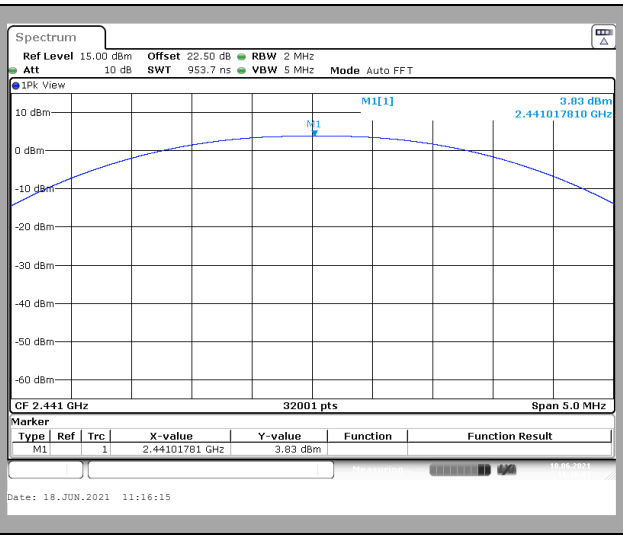
9.5. RESULTS

GFSK (DH5)

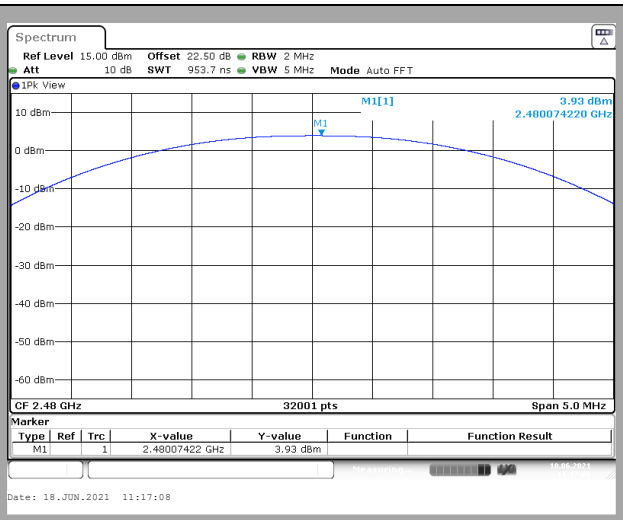
Cmin



Cnom



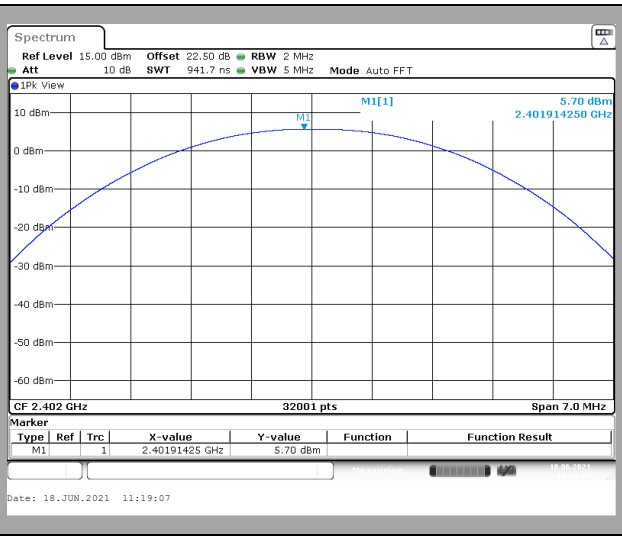
Cmax



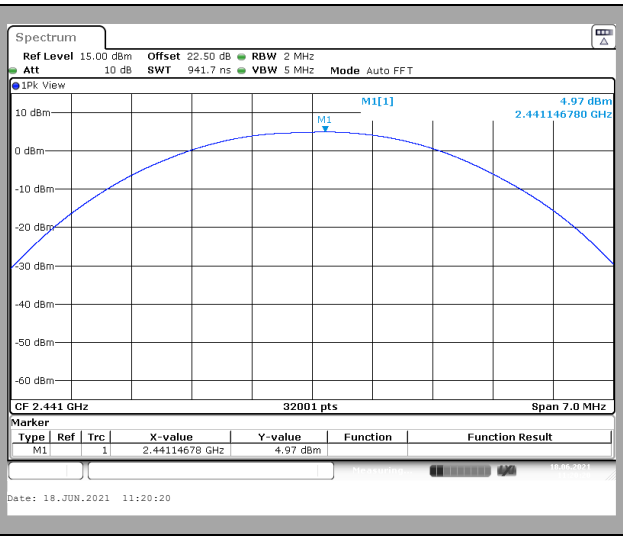
Channel	Offset Cable + Att (dB)	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	22.5	3.62	3.62	21dBm
Cnom	22.5	3.62	3.83	21dBm
Cmax	22.5	3.62	3.93	21dBm

π/4 DQPSK (2-DH5)

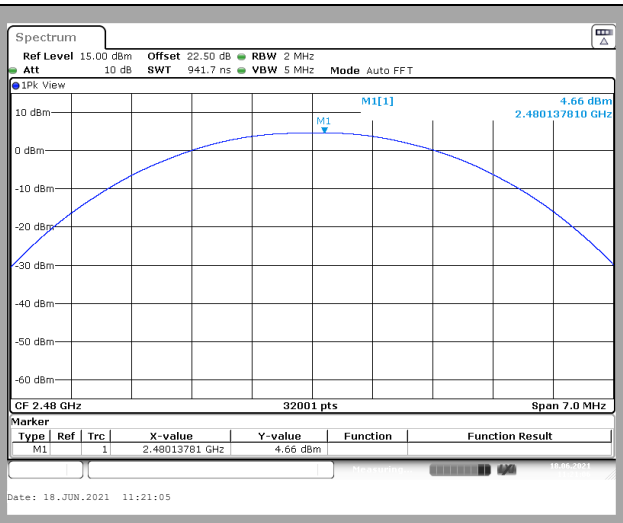
Cmin



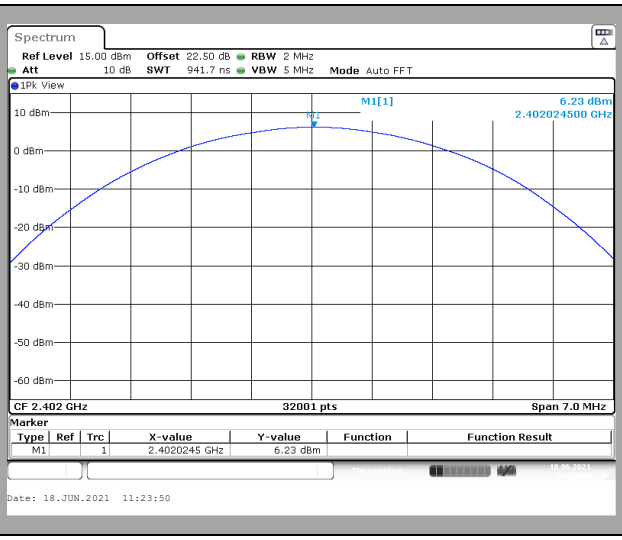
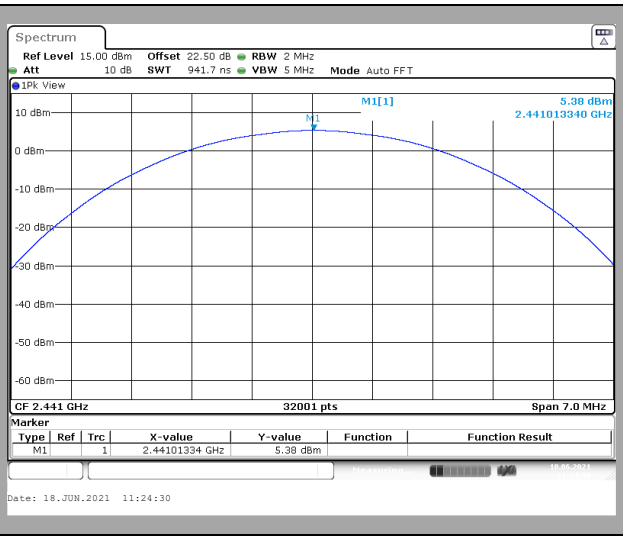
Cnom



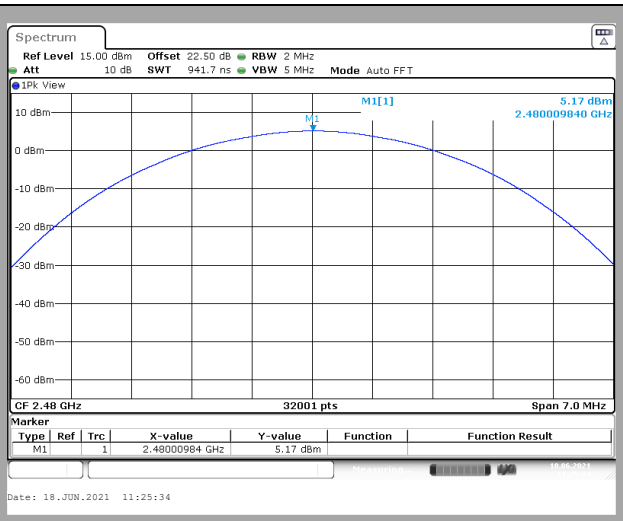
Cmax



Channel	Offset Cable + Att (dB)	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	22.5	3.62	5.70	21dBm
Cnom	22.5	3.62	4.97	21dBm
Cmax	22.5	3.62	4.66	21dBm

π/4 DQPSK (3-DH5)	
Cmin	**Cnom**
	

Cmax



Channel	Offset Cable + Att (dB)	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	22.5	3.62	6.23	21dBm
Cnom	22.5	3.62	5.38	21dBm
Cmax	22.5	3.62	5.17	21dBm

9.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **COGECO DIW3930 COGECO**, SN: **6211130035003**, 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 INTO NON-RESTRICTED FREQUENCY BANDS AT THE BAND EDGE

10.1. TEST CONDITIONS

Test performed by	: Julien Palard
Date of test	: June 18, 2021
Ambient temperature	: 27 °C
Relative humidity	: 34 %

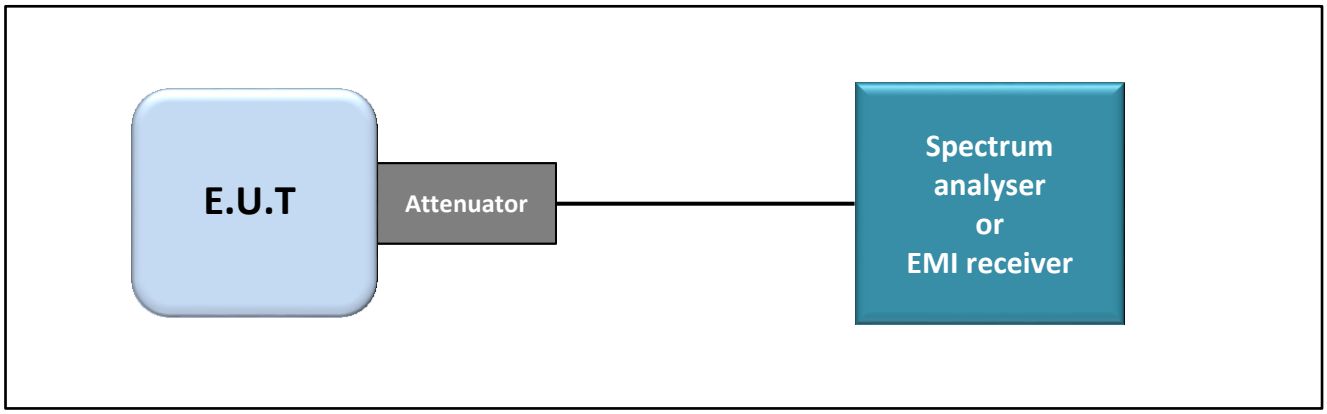
10.2. TEST SETUP

- The Equipment Under Test is installed:
☑ On a table
☐ In an anechoic chamber

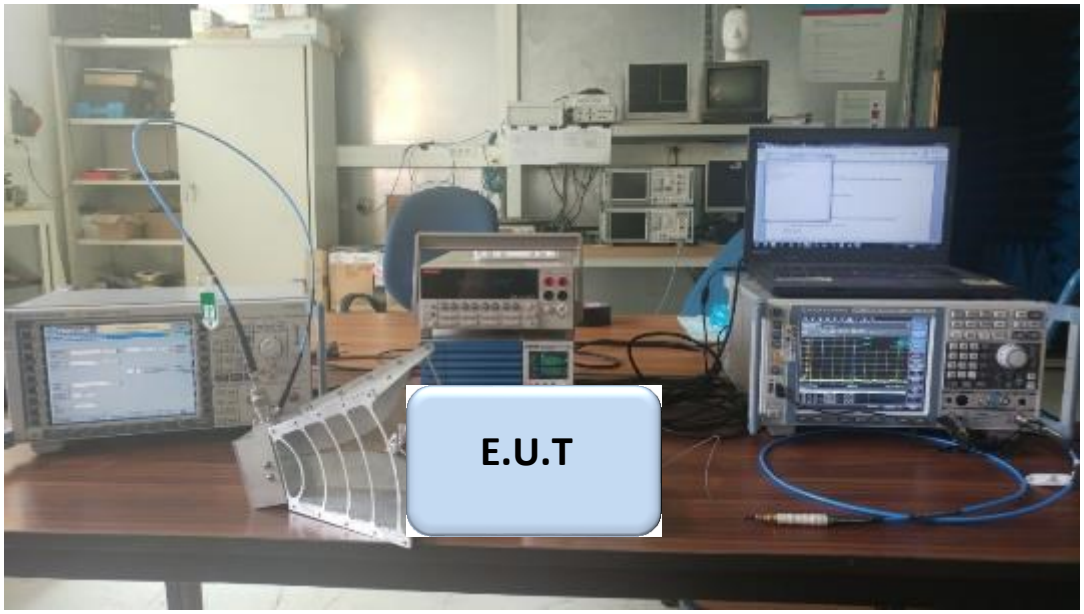
- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

Packet type: 1-DH5 / 2-DH5 / 3-DH5 Worst case presented

- Test Procedure:
☑ ANSI C63.10 § 7.8.6



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

10.3. LIMIT

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

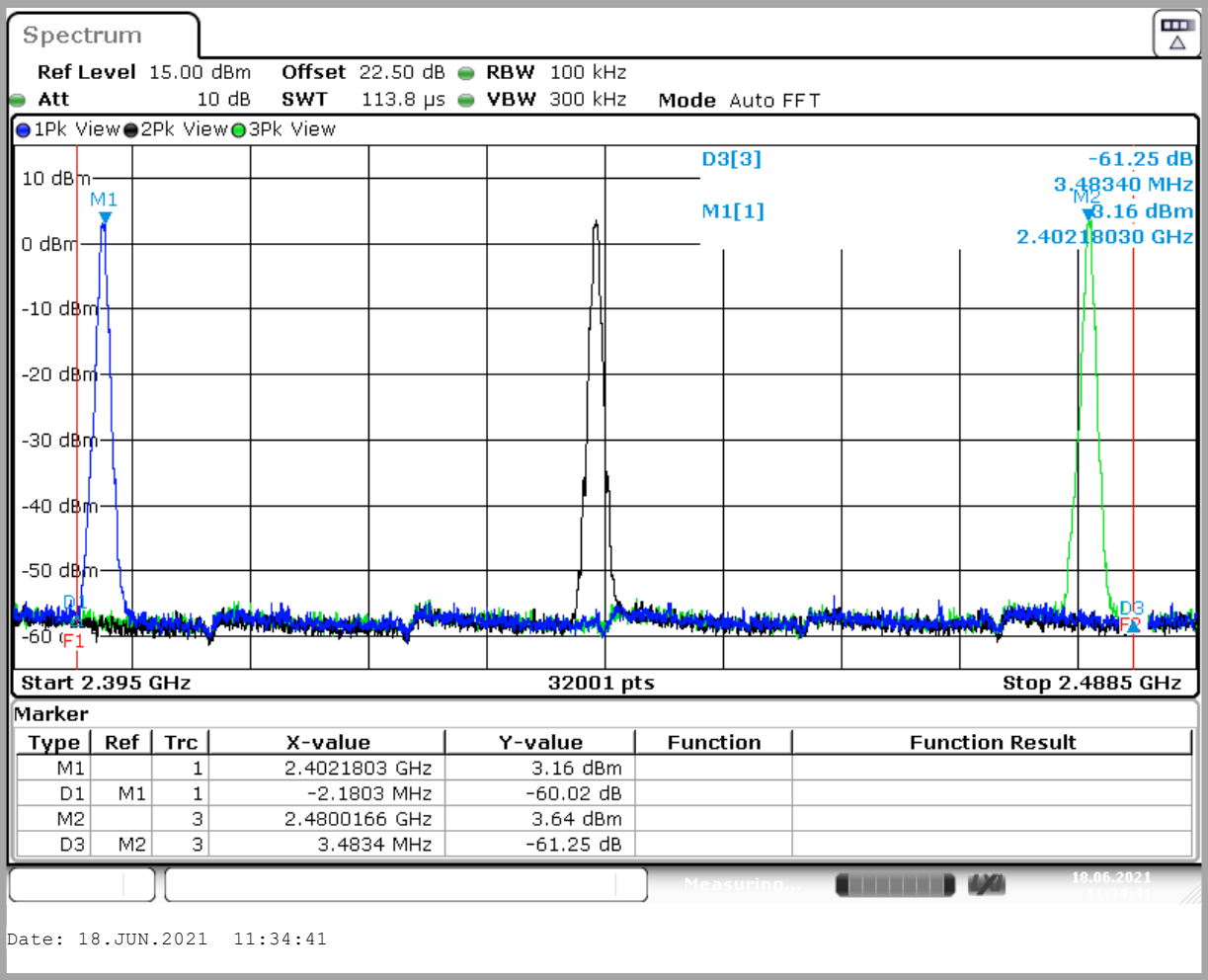
10.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Power supply	KIKUSUI	PCR500M	A7049006	Calibrate with multimeter	Calibrate with multimeter
Multimeter	KEITHLEY	2000	A1242090	2021/03	2023/03
R&S Commander Software	ROHDE & SCHWARZ	Version 1,6,4	-	-	-
Cable SONDE 026+ Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329971	2020/09	2021/09
EMI signal analyser	ROHDE & SCHWARZ	FSV40	A4060061	2019/05	2021/05

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

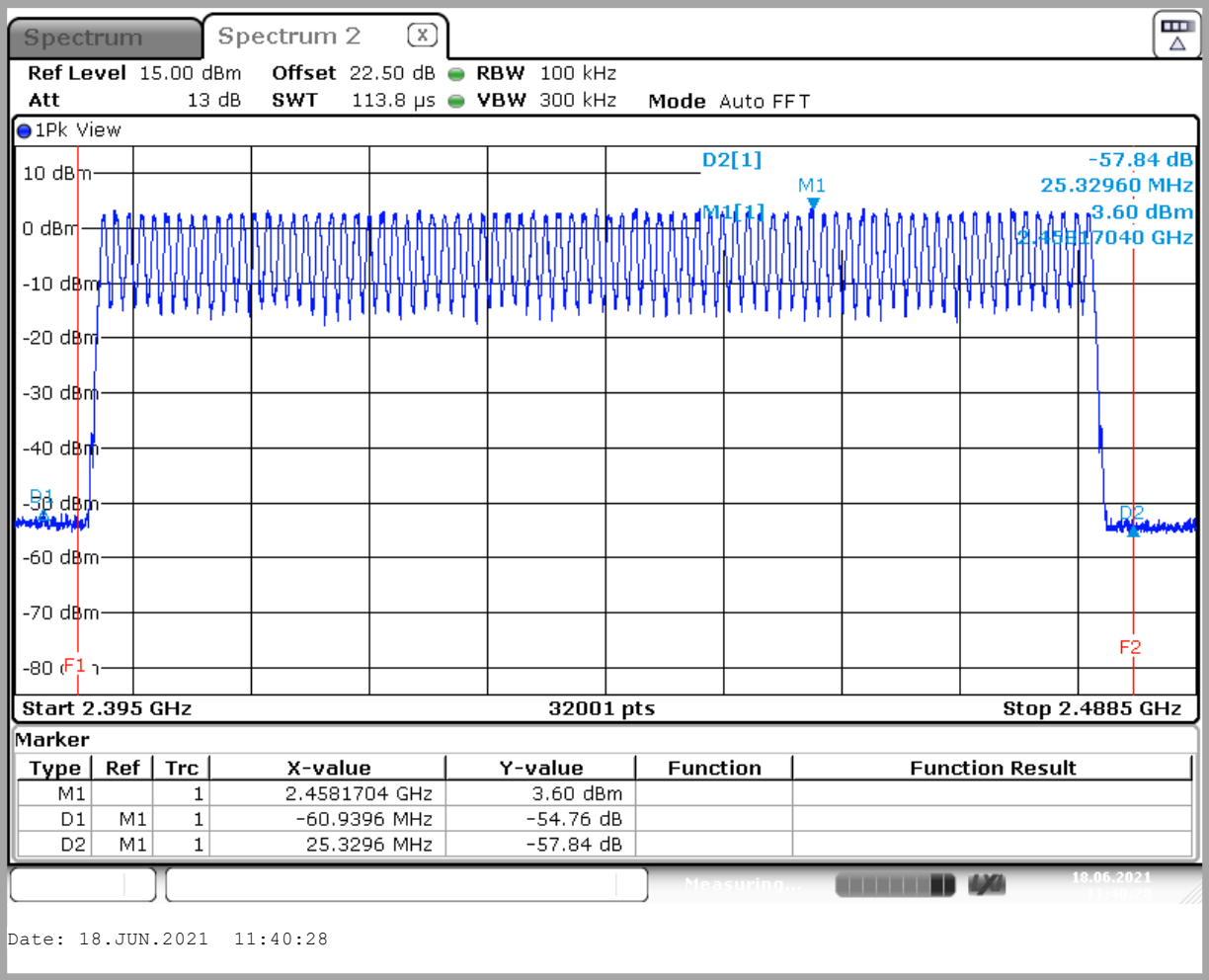
10.5. RESULTS

GFSK
Cmin/Cnom/Cmax



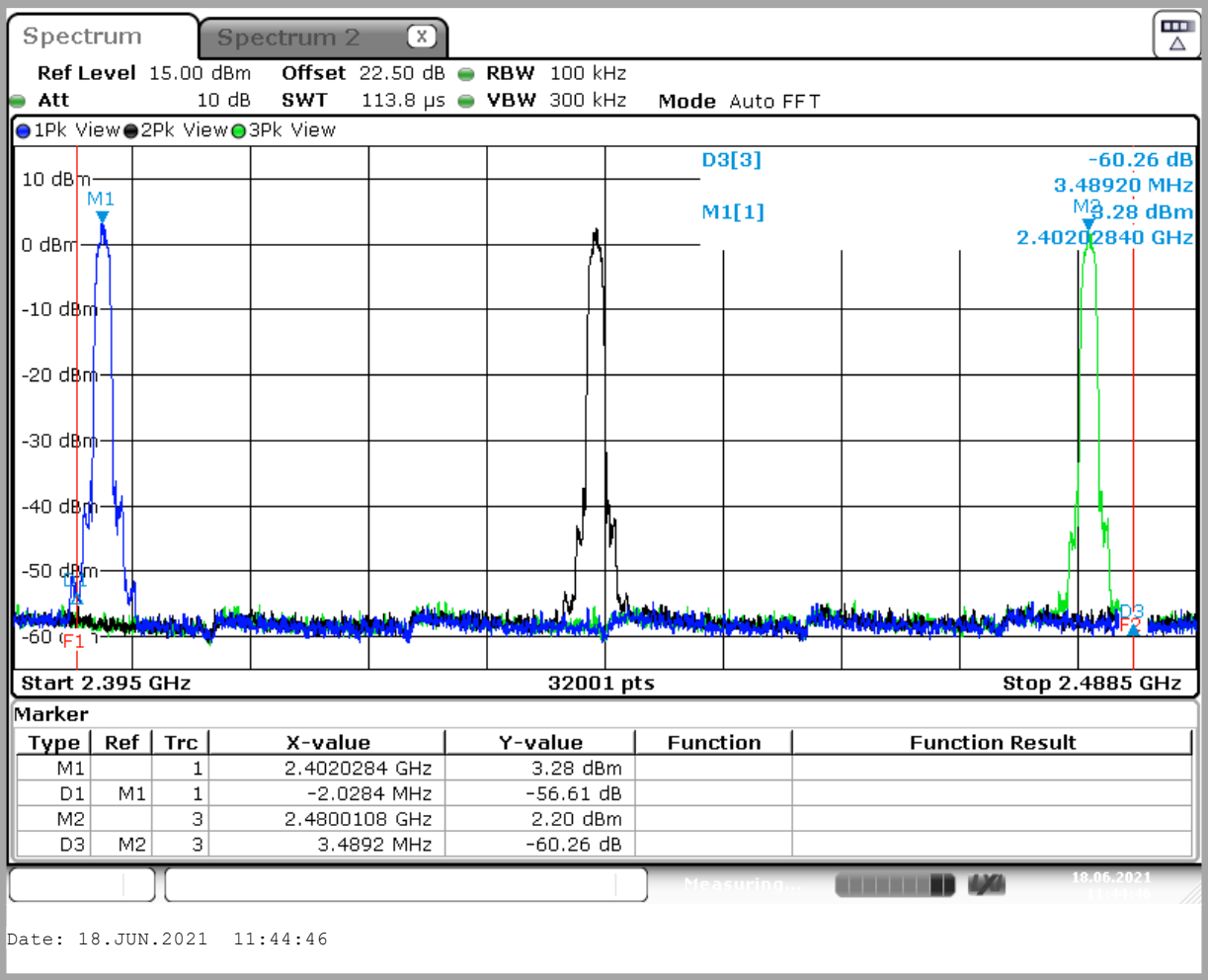
Frequency (MHz)	Level (dBc)	Limit (dBc)
2400	60.02	20
2483.5	61.25	20

GFSK
Call



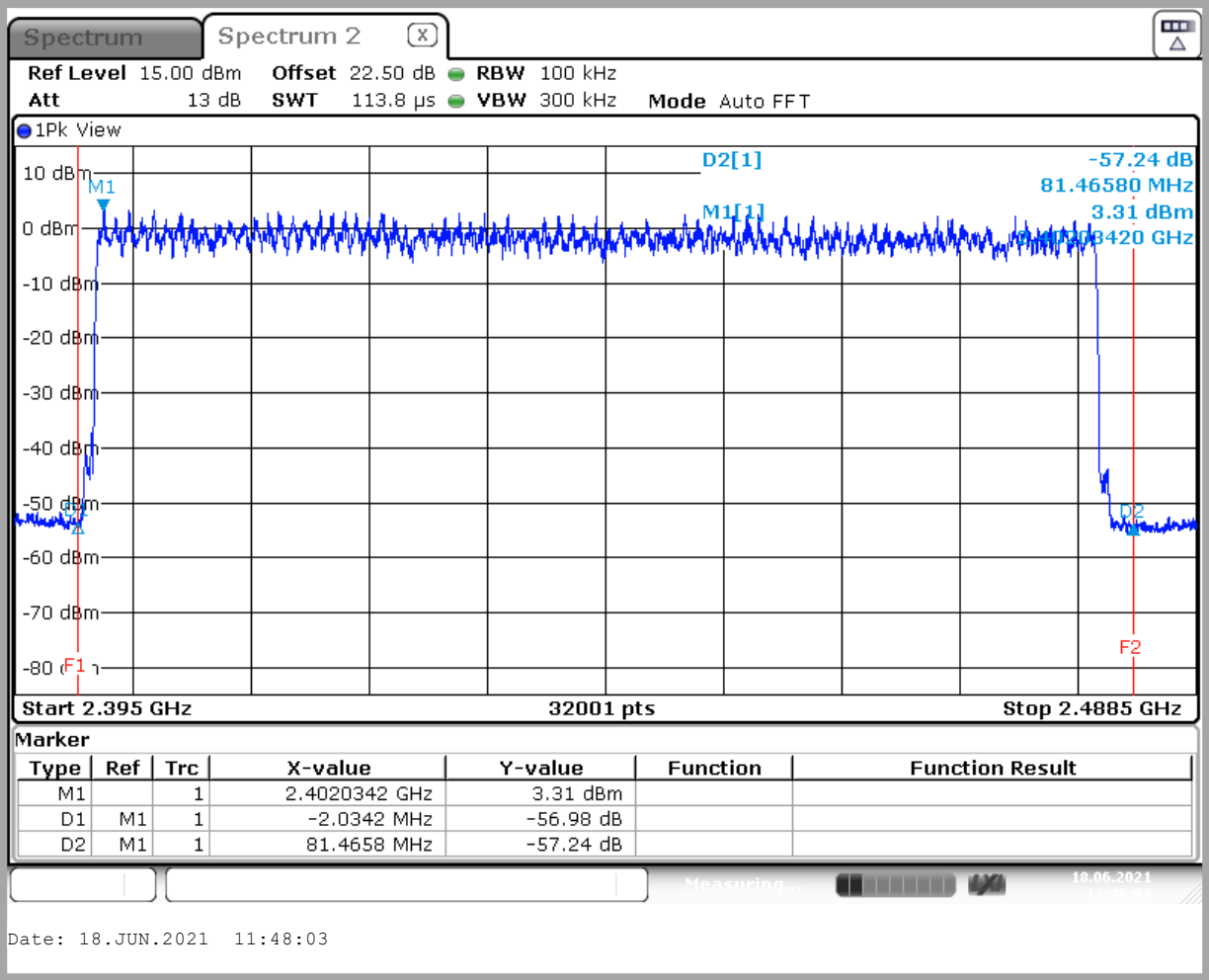
Frequency (MHz)	Level (dBc)	Limit (dBc)
2400	54.76	20
2483.5	57.84	20

π/4 DQPSK
Cmin/Cnom/Cmax



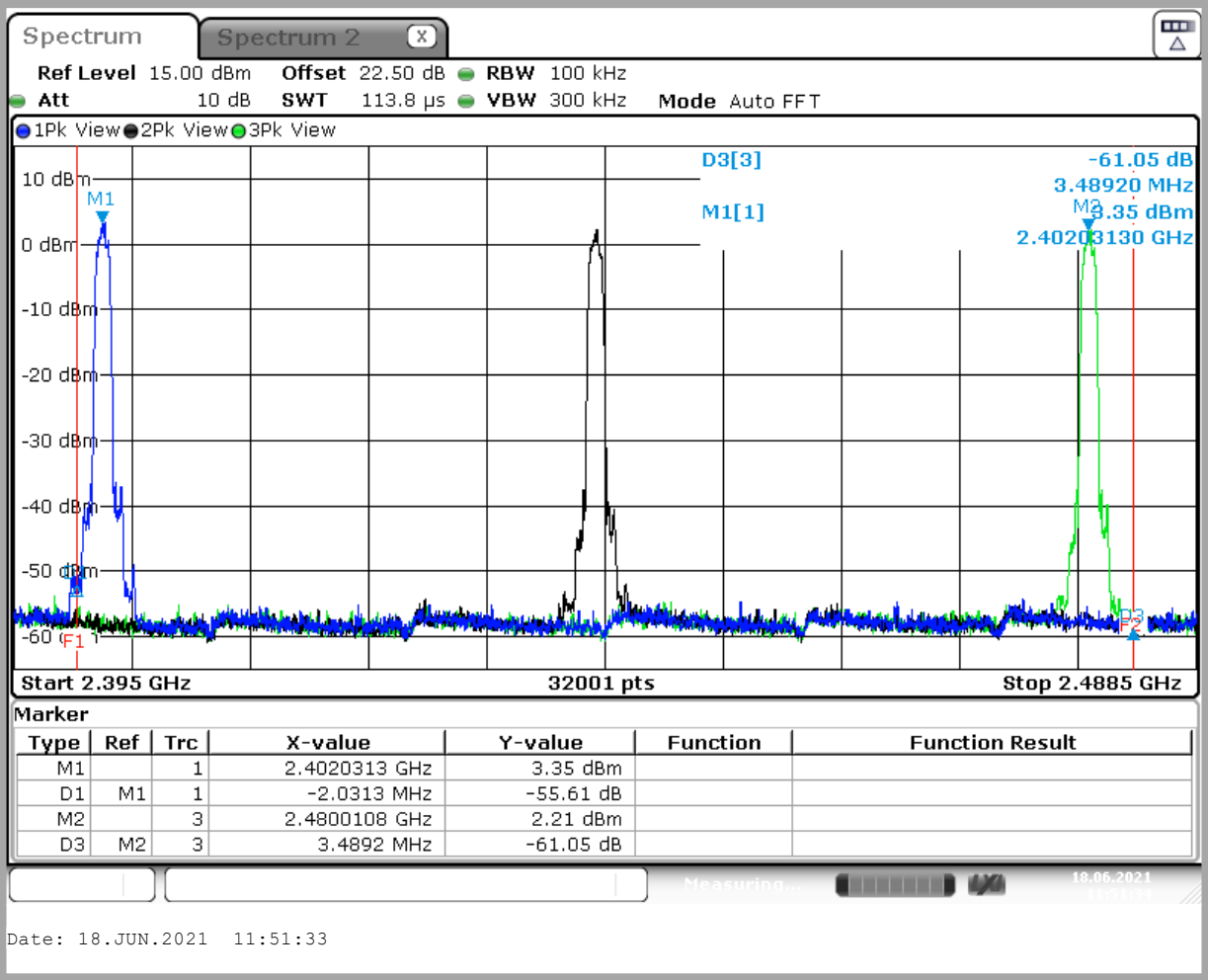
Frequency (MHz)	Level (dBc)	Limit (dBc)
2400	56.61	20
2483.5	60.26	20

π/4 DQPSK
Call



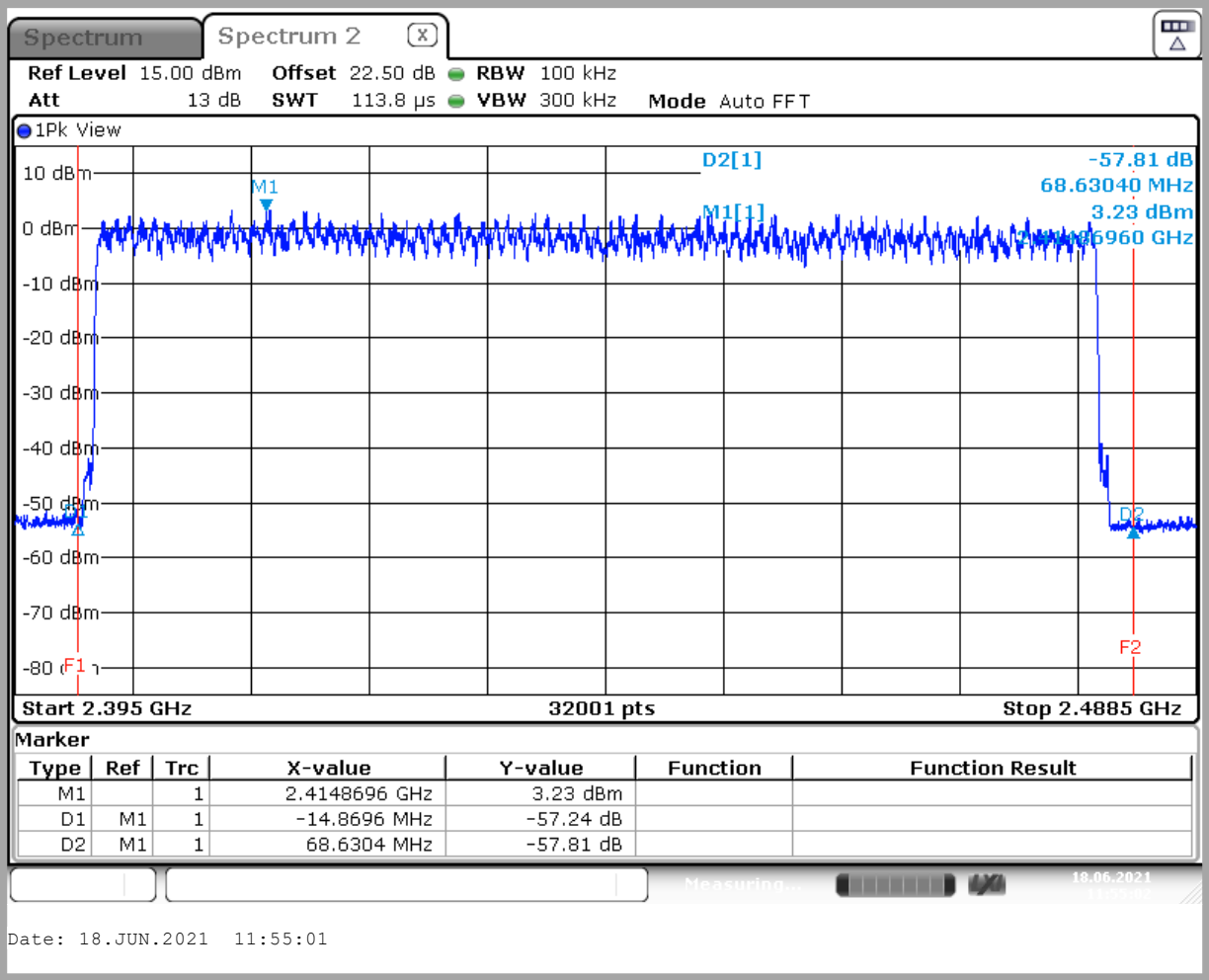
Frequency (MHz)	Level (dBc)	Limit (dBc)
2400	56.98	20
2483.5	57.24	20

8DPSK
Cmin/Cnom/Cmax



Frequency (MHz)	Level (dBc)	Limit (dBc)
2400	55.61	20
2483.5	61.05	20

8DPSK
Call



Frequency (MHz)	Level (dBc)	Limit (dBc)
2400	57.24	20
2483.5	57.81	20

10.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands at the band edge measurement performed on the sample of the product **COGECO DIW3930 COGECO**, SN: **6211130035003**, 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. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS

11.1. TEST CONDITIONS

Test performed by	: Julien Palard
Date of test	: June 18, 2021
Ambient temperature	: 27 °C
Relative humidity	: 34 %

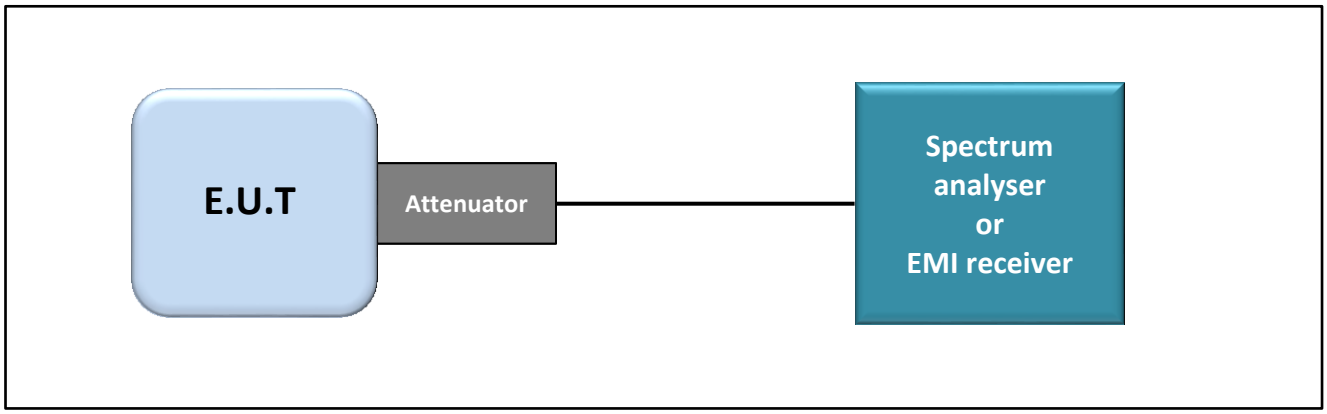
11.2. TEST SETUP

- The Equipment under Test is installed:
☑ On a table
☐ In an anechoic chamber

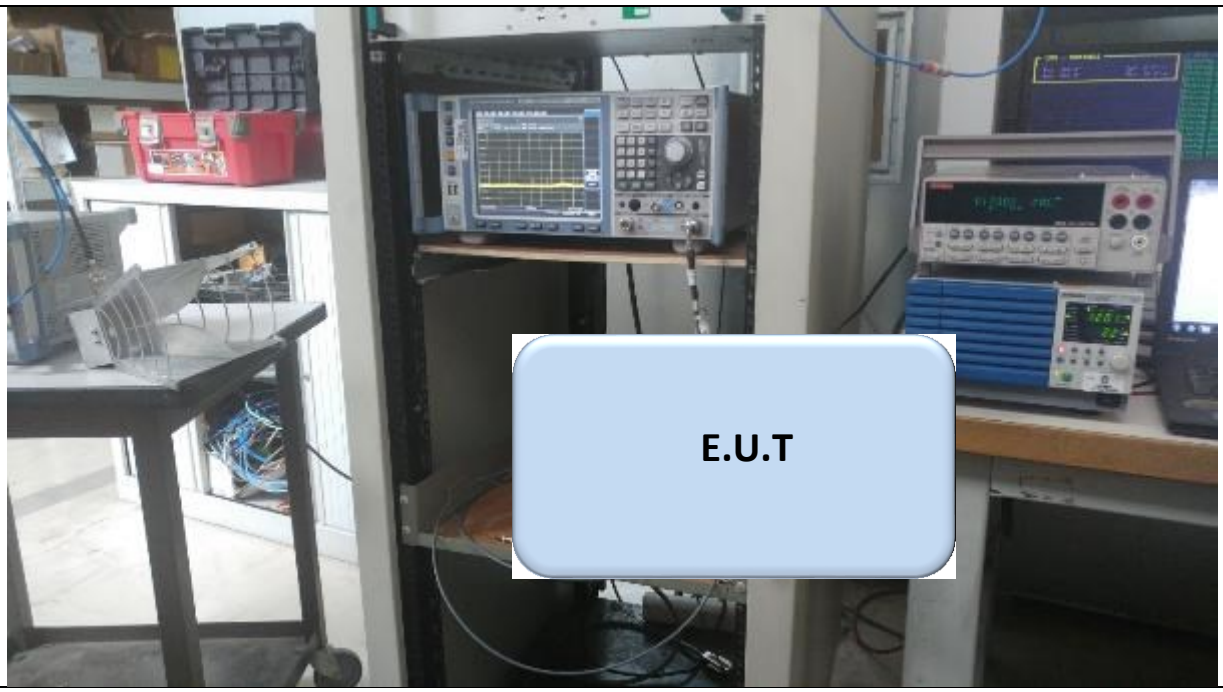
- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

Packet type: 1-DH5 / 2-DH5 / 3-DH5 Worst case presented

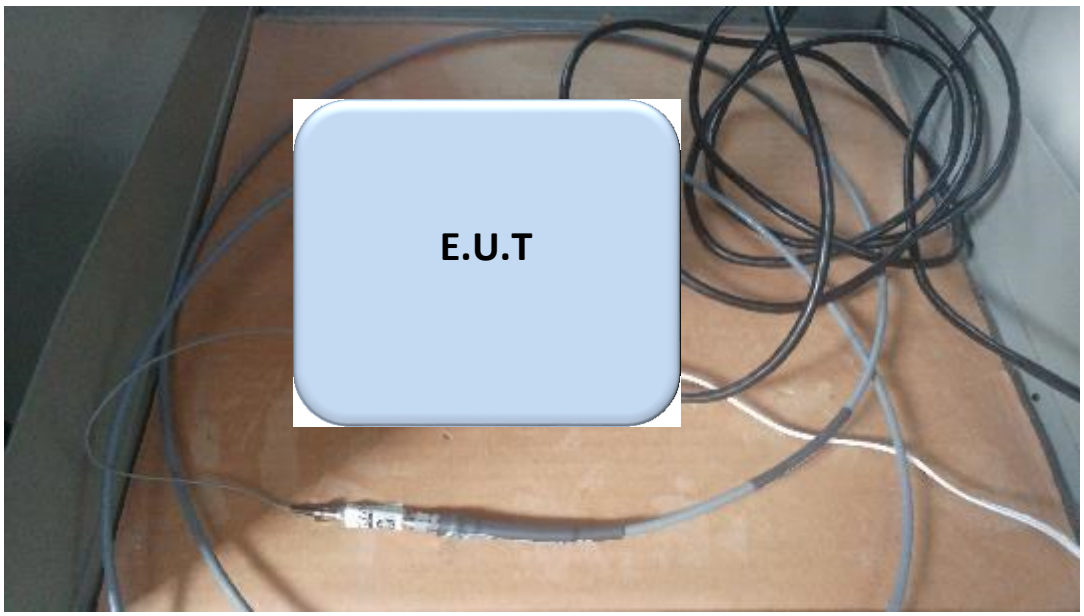
- Test Procedure:
☑ ANSI C63.10 § 7.8.8



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



Photograph for Unwanted Emission into non-restricted frequency bands



Photograph for Unwanted Emission into non-restricted frequency bands

11.3. *LIMIT*

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

11.4. TEST EQUIPMENT LIST

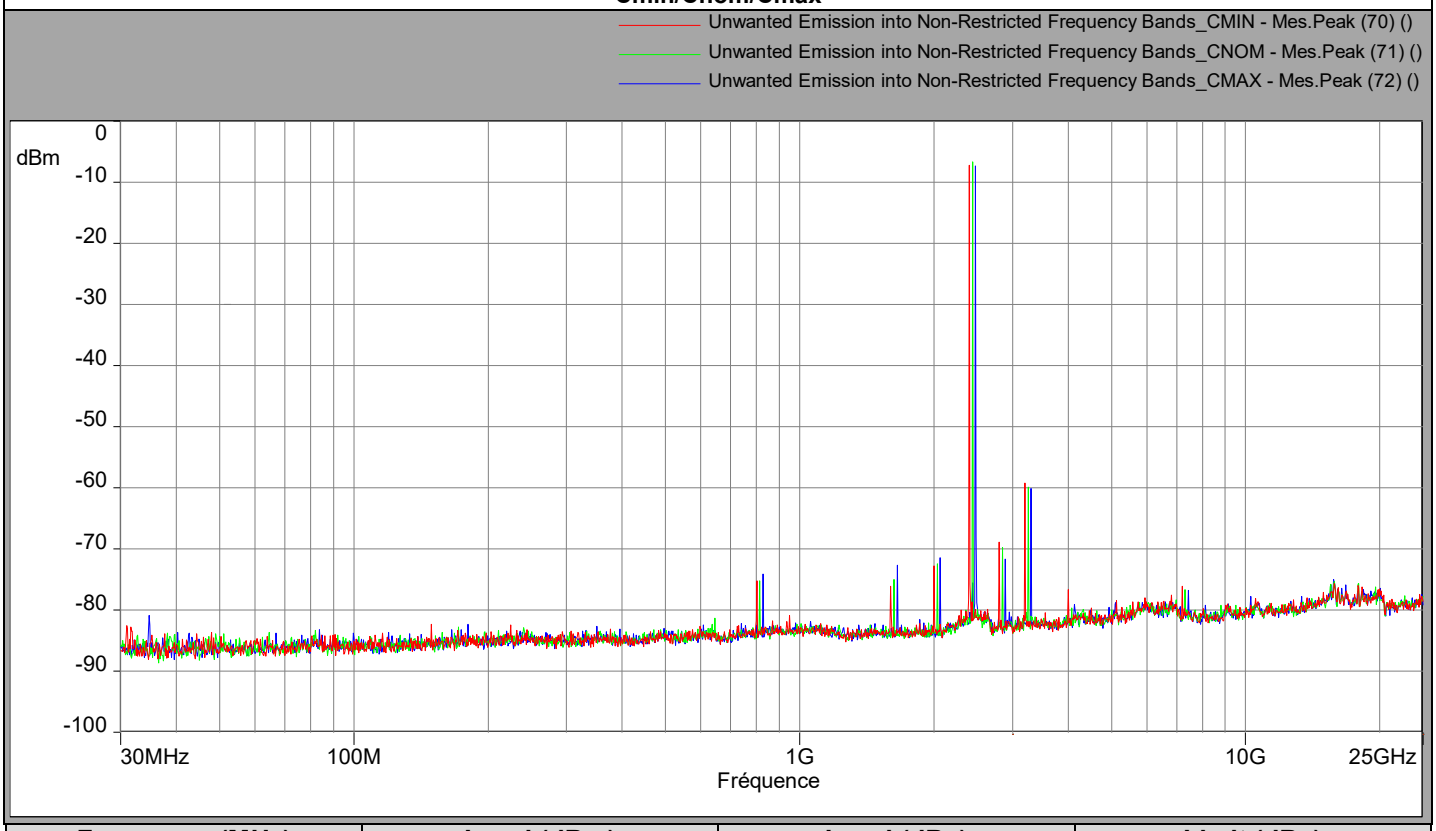
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
BAT EMC Software	NEXIO	Version 3.19.1.18	-	-	-
Cable S36 chamber	PASTERNACK	PE360-1500CM	A5329940	2021/02	2022/02
EMI receiver	ROHDE & SCHWARZ	FSV40GHz	A4060061	2019/05	2021/05
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7040079	See Multimeter	See Multimeter
High Pass Filter 2,4GHz	WAINWRIGHT	WHK12-2494	A7484068	2019/07	2021/07
Attenuator 3dB Cable Spurious Conducted	-	WA54-3-12	A7122223	2021/02	2022/02
Load 50 ohms	TELEGARTNER	-	A7150105	2021/04	2023/04
Load 50 ohms	TELEGARTNER	-	A7150104	2021/04	2023/04

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

11.5. RESULTS

GFSK

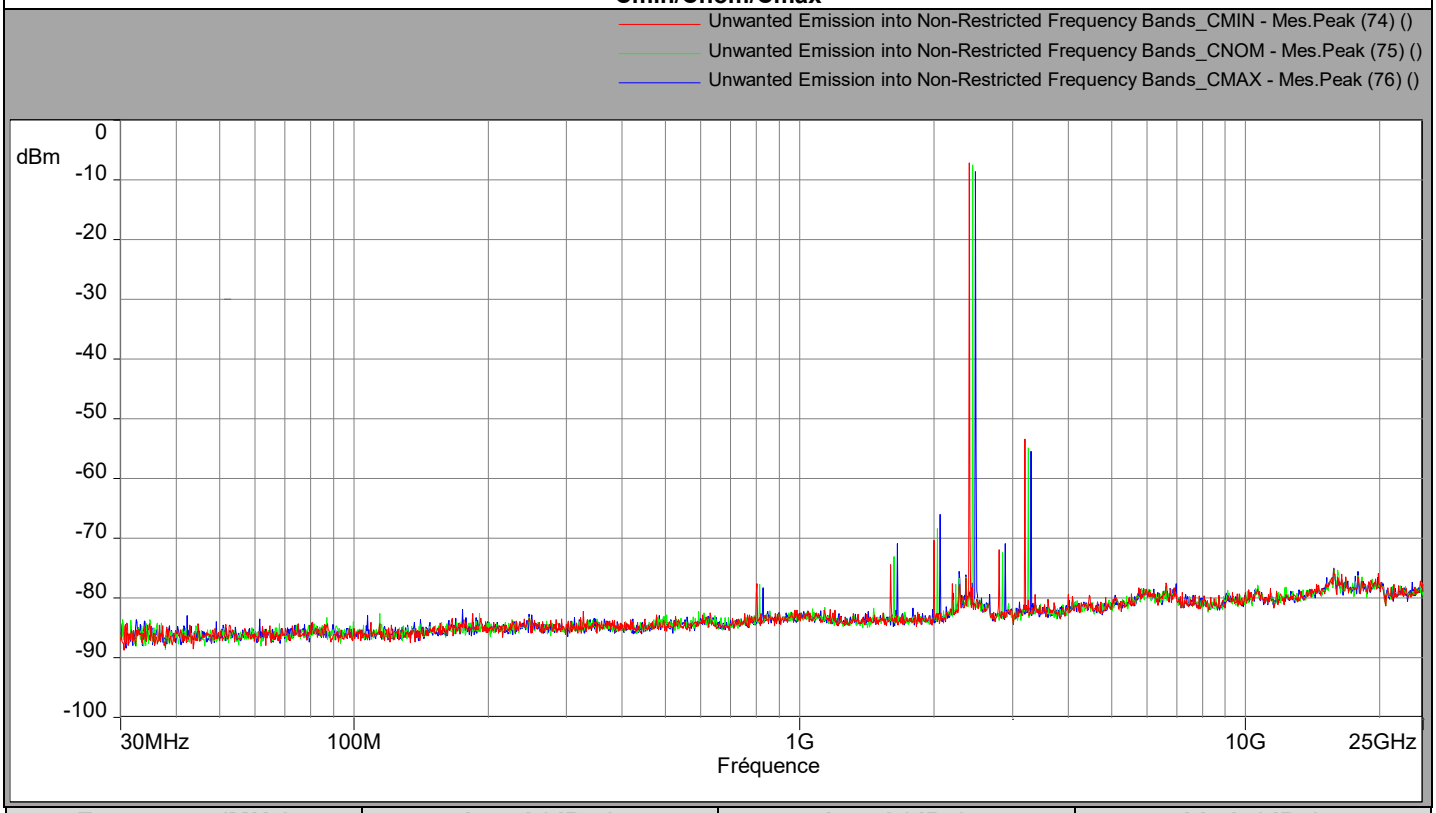
Cmin/Cnom/Cmax



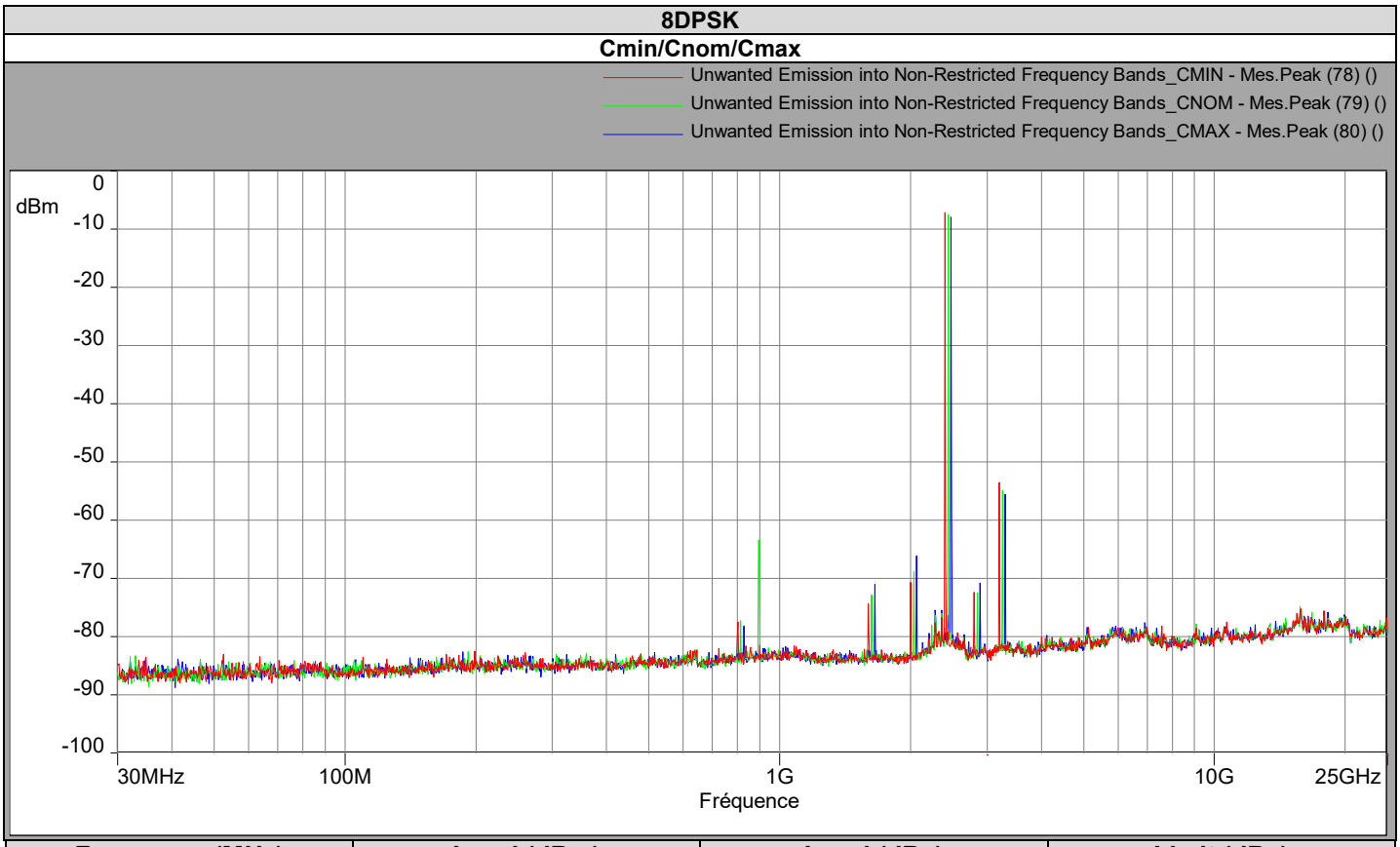
Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2402	-7,18		
2802	-68,88	61,70	20
3202	-59,26	52,08	20
4003	-76,71	69,53	20
7205	-76,09	68,91	20
2441	-6,70		
2848	-69,72	63,02	20
3254	-59,91	53,21	20
7322	-76,23	69,53	20
2480	-7,32		
2893	-71,69	64,37	20
3307	-60,15	52,83	20
7440	-76,76	69,44	20

π/4 DQPSK

Cmin/Cnom/Cmax



Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2402	-7,19		
2802	-71,91	64,72	20
3202	-53,43	46,24	20
2441	-7,50		
2848	-72,38	64,88	20
3254	-54,93	47,43	20
2480	-8,60		
2893	-70,92	62,32	20
3307	-55,44	46,84	20



Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2402	-7,19		
2802	-72,33	65,14	20
3202	-53,51	46,32	20
2441	-7,52		
2848	-72,45	64,93	20
3254	-54,93	47,41	20
2480	-7,91		
2893	-70,83	62,92	20
3307	-55,56	47,65	20

11.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands measurement performed on the sample of the product **COGECO DIW3930 COGECO**, SN: **6211130035003**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

12. AC POWER LINE CONDUCTED EMISSIONS

12.1. TEST CONDITIONS

Test performed by	: Laurent DENEUX
Date of test	: June 24, 2021
Ambient temperature	: 21 °C
Relative humidity	: 46 %

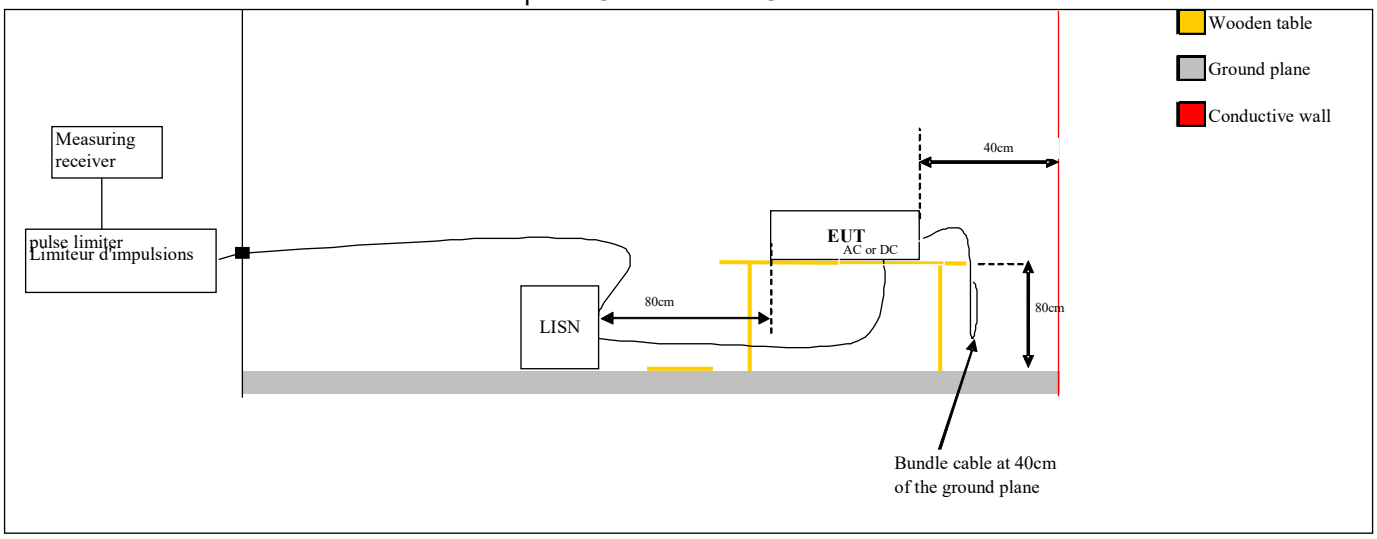
12.2. TEST SETUP

The product has been tested according to ANSI C63.10 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.

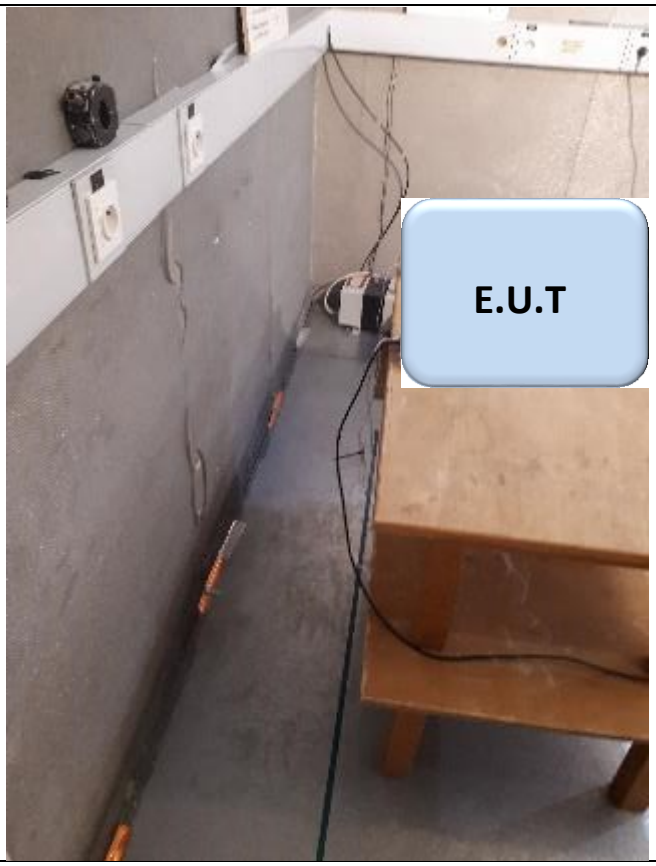
Voltage table used (for Power Line Conducted Emissions):

Type	Measurement performed:	
☑ AC / ☐ DC (Auxiliary used)	☑ 120VAC/60Hz	☑ 240VAC/50Hz
☐ USB (Laptop auxiliary)	☐ 120VAC/60Hz (Laptop auxiliary)	☐ 240VAC/50Hz(Laptop auxiliary)

Test set up of AC Power Line Conducted Emissions



Photograph for AC Power Line Conducted Emissions (Front view)



Photograph for AC Power Line Conducted Emissions (Front view)

12.3. LIMIT

Frequency range	Level	Detector
0,15kHz to 0,5MHz	66dBµV to 56µV*	QPeak
	56dBµV to 46µV*	Average
0,5MHz to 5MHz	56dBµV	QPeak
	46dBµV	Average
5MHz to 30MHz	60BµV	QPeak
	50dBµV	Average

*Decreases with the logarithm of the frequency

12.4. TEST EQUIPMENT LIST

Test equipment used					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Calibration date**	**Calibration due date**
EMI Test Receiver	ROHDE & SCHWARZ	ESU	A2642018	2020-10	2022-10
V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322002	2020-10	2021-10
Pulse limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	2020-05	2021-05
Cable	-	-	A5329417	2020-12	2021-12
Cable	LCIE	-	A5329589	2020-11	2021-11
Reference ground plan 3 x 3m	L.C.I.E.	-	-	-	-

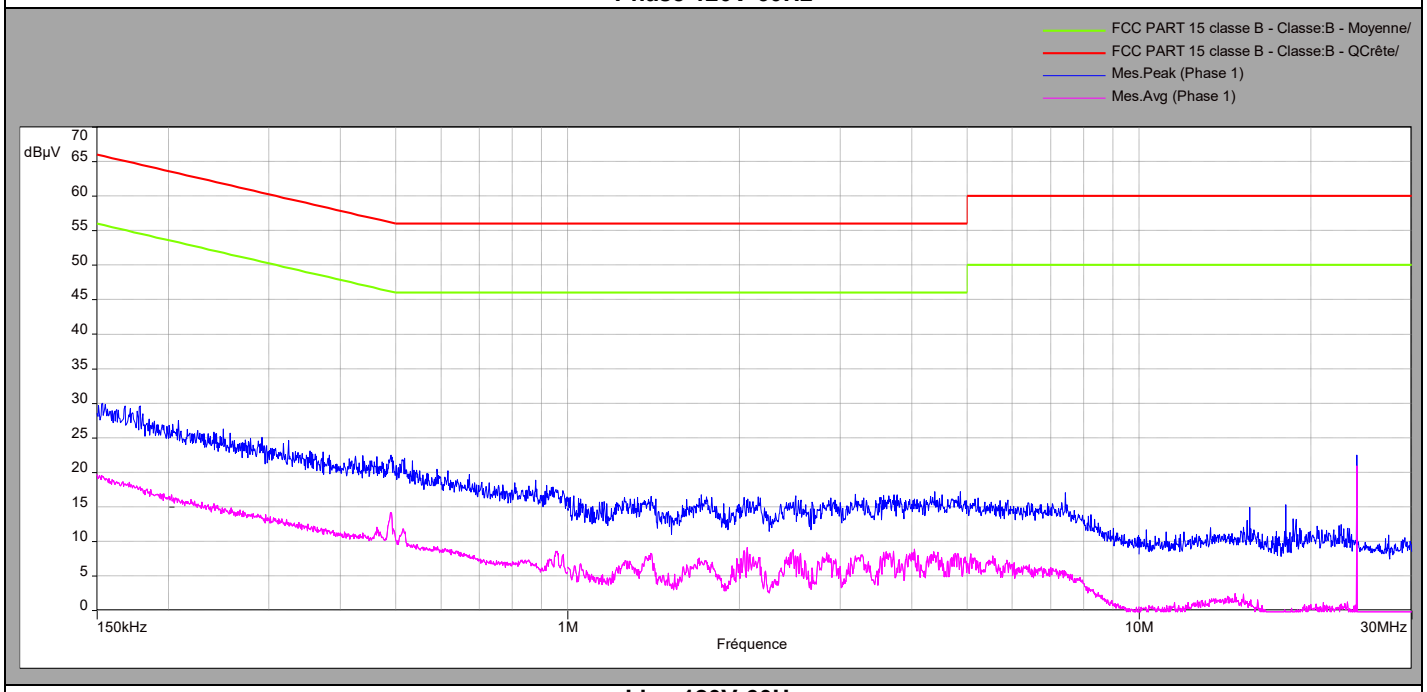
12.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

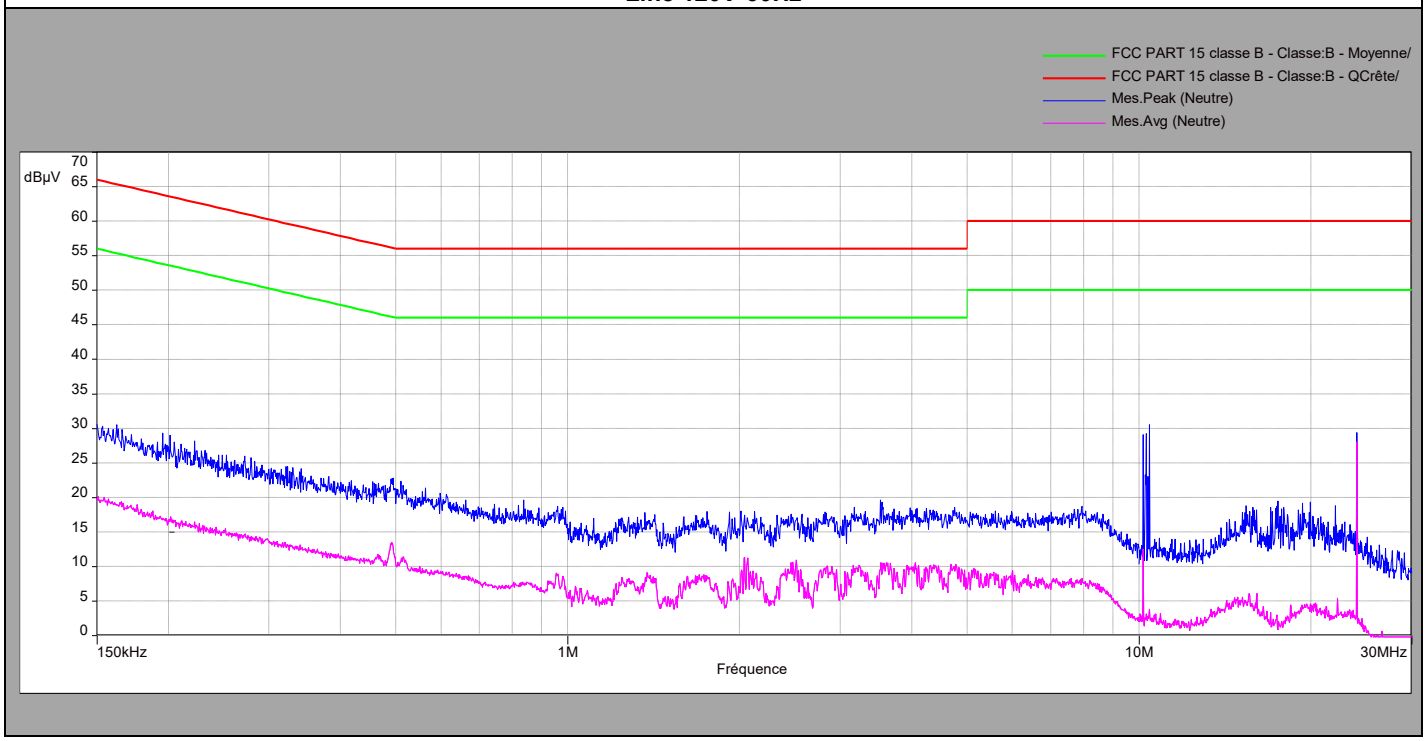
12.6. RESULTS

Cmin

Phase 120V-60Hz



Line 120V-60Hz

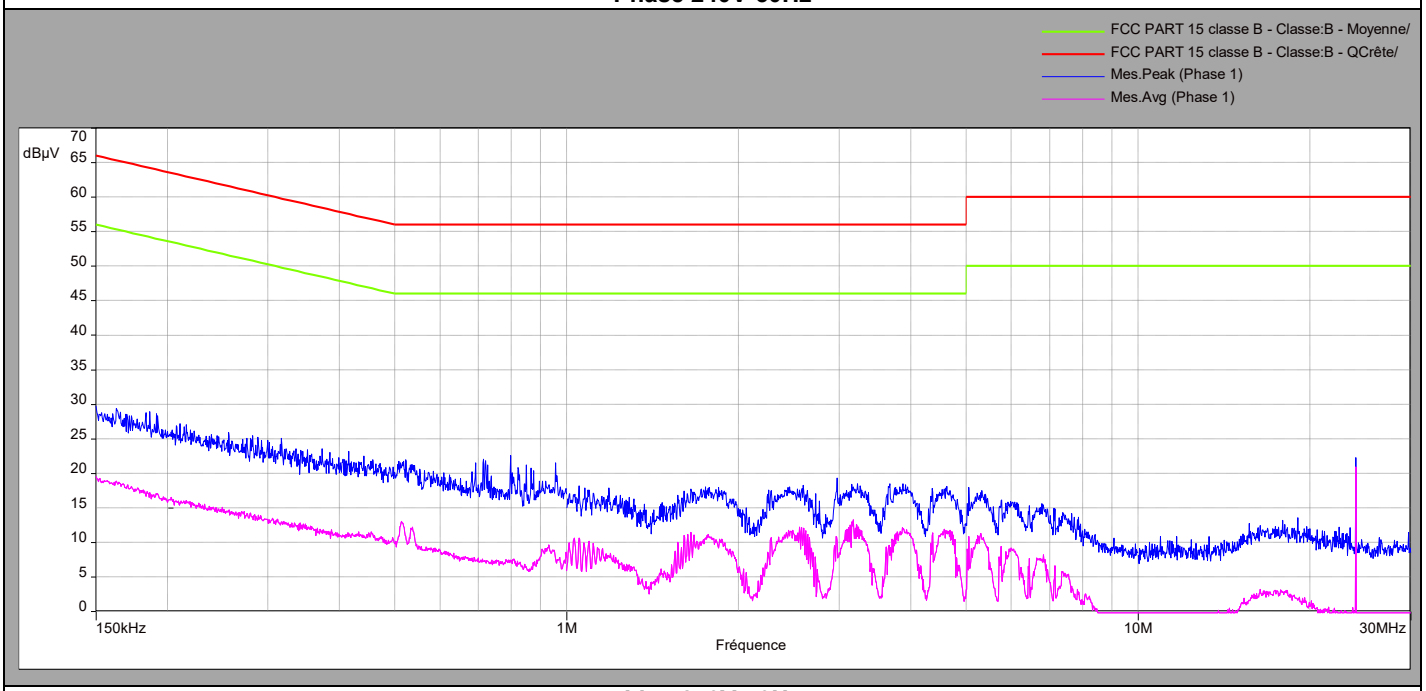


Phase Line 120V-60Hz							
Frequency (MHz)	**Peak Level (dBµV)**	**Quasi-Peak Level (dBµV)**	**Quasi-Peak Limit (dBµV)**	**Margin Quasi-Peak (dBµV)**	**Average Level (dBµV)**	**Average Limit (dBµV)**	**Margin Average (dBµV)**
0,1535	28,21	-	65,81	37,6	17,08	55,81	38,73
0,373	21,08	-	58,43	37,35	9,28	48,43	39,15
0,591	18,39	-	56	37,61	6,64	46	39,36
0,8795	15,08	-	56	40,92	3,89	46	42,11
24,046	22,31	-	60	37,69	20,7	50	29,3

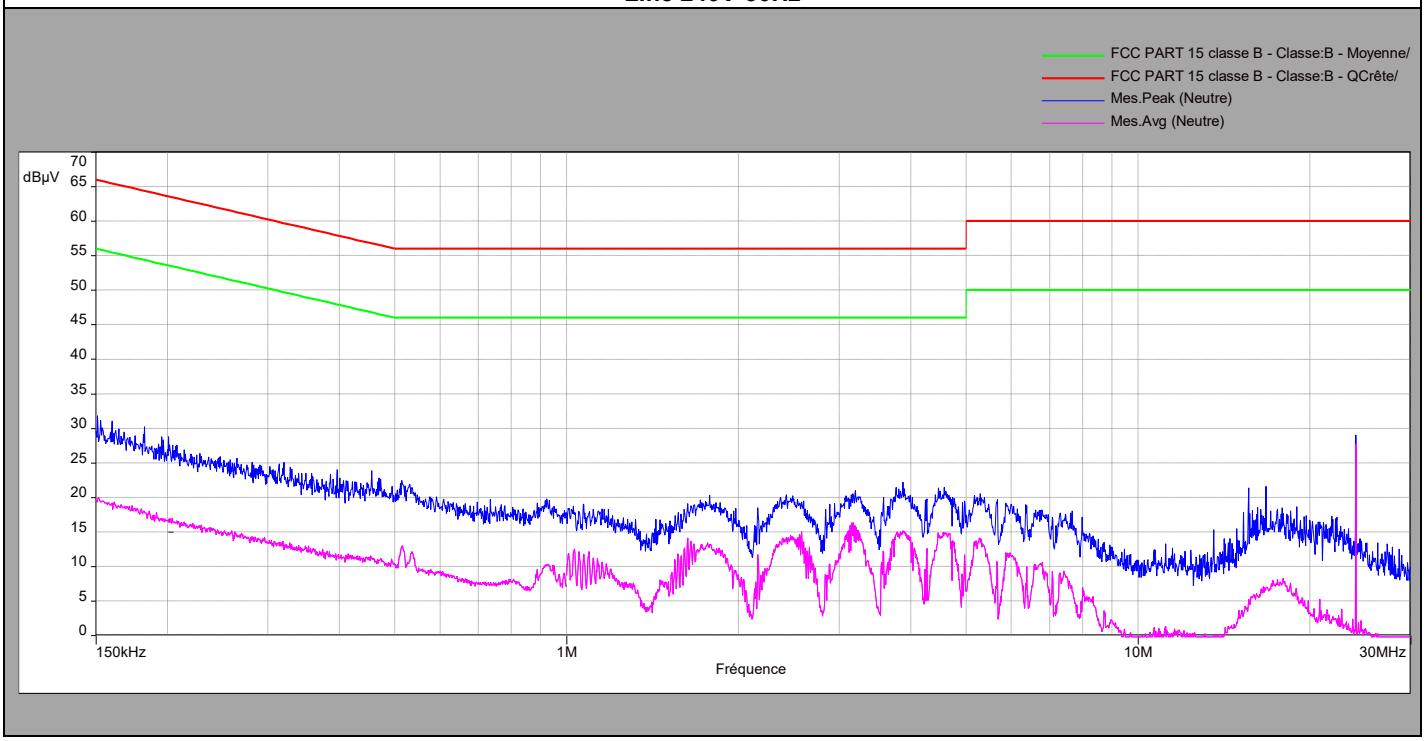
Neutral Line 120V-60Hz							
Frequency (MHz)	**Peak Level (dBµV)**	**Quasi-Peak Level (dBµV)**	**Quasi-Peak Limit (dBµV)**	**Margin Quasi-Peak (dBµV)**	**Average Level (dBµV)**	**Average Limit (dBµV)**	**Margin Average (dBµV)**
0,15	28,85	-	66	37,15	17,68	56	38,32
0,495	20,68	-	56,08	35,4	10,35	46,08	35,73
0,663	17,73	-	56	38,27	5,97	46	40,03
17,51	16,12	-	60	43,88	-1,85	50	51,85
24,046	29,62	-	60	30,38	27,9	50	22,1

Cmin

Phase 240V-50Hz



Line 240V-50Hz



Phase Line 240V-50Hz							
Frequency (MHz)	**Peak Level (dBµV)**	**Quasi-Peak Level (dBµV)**	**Quasi-Peak Limit (dBµV)**	**Margin Quasi-Peak (dBµV)**	**Average Level (dBµV)**	**Average Limit (dBµV)**	**Margin Average (dBµV)**
0,15	28,07	-	66	37,93	17,3	56	38,7
0,373	20,68	-	58,43	37,75	9,31	48,43	39,12
0,7155	17,72	-	56	38,28	4,95	46	41,05
0,7975	15,65	-	56	40,35	4,88	46	41,12
24,046	22,44	-	60	37,56	20,71	50	29,29

Neutral Line 240V-50Hz							
Frequency (MHz)	**Peak Level (dBµV)**	**Quasi-Peak Level (dBµV)**	**Quasi-Peak Limit (dBµV)**	**Margin Quasi-Peak (dBµV)**	**Average Level (dBµV)**	**Average Limit (dBµV)**	**Margin Average (dBµV)**
0,151	29,2	-	65,94	36,74	17,58	55,94	38,36
3,202	20,21	-	56	35,79	7,84	46	38,16
3,876	20,1	-	56	35,9	12,15	46	33,85
16,734	16,41	-	60	43,59	3,19	50	46,81
24,044	28,83	-	60	31,17	26,89	50	23,11

12.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product COGECO DIW3930 COGECO, SN: 6211130035003, in configuration and description presented in this test report, show levels compliant to the 47 CFR PART 15.247 & RSS 247 ISSUE 2 limits.

13. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS

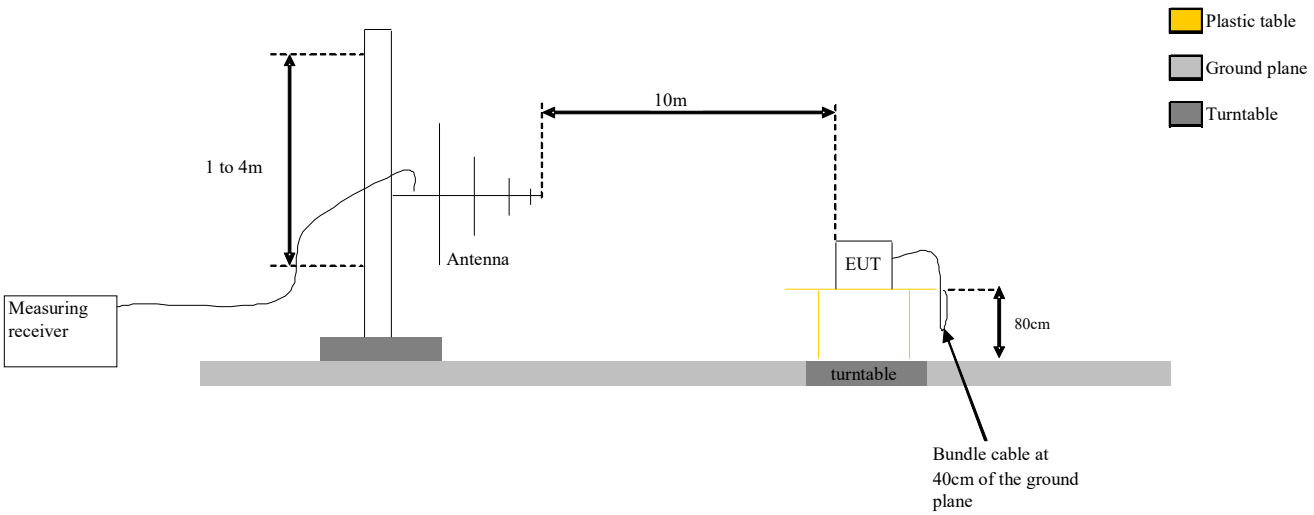
13.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
Date of test : June 24, 2021 to June 25, 2021
Ambient temperature : 20 °C
Relative humidity : 45 %

13.2. TEST SETUP

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

Frequency range :	**Below 30MHz**	**From 30MHz to 1GHz**	**Above 1GHz**
Antenna Polarization :	Parallel, Perpendicular And Ground parallel	Horizontal And Vertical	Horizontal And Vertical
Antenna Height :	1m	Varied from 1m to 4m	Varied from 1m to 4m
Antenna Type :	Loop	Bi-Log	Horn
RBW Filter :	200Hz below 150kHz 9kHz above 150kHz	120kHz	1MHz
Maximization :	Turntable rotation of 360 degrees range		
EUT height :	0.8m		1.5m
Test site :	Open Aera Test Site	Open Aera Test Site	Open Aera Test Site
Distance EUT-Antenna :	3m	10m	3m



Test Set up for radiated measurement in open area test site

Photograph for Unwanted Emission in restricted frequency bands

Photograph for Unwanted Emission in restricted frequency bands

13.3. LIMIT

Measure at 300m		
Frequency range	**Level**	**Detector**
9kHz-490kHz	67.6dBµV/m /F(kHz)	QPeak
Measure at 30m		
Frequency range	**Level**	**Detector**
490kHz-1.705MHz	87.6dBµV/m /F(kHz)	QPeak
1.705MHz-30MHz	29.5dBµV/m	QPeak
Measure at 10m		
Frequency range	**Level**	**Detector**
30MHz to 88MHz	29.5dBµV/m	QPeak
88MHz to 216MHz	33dBµV/m	QPeak
216MHz to 960MHz	35.5BµV/m	QPeak
960MHz to 1000MHz	43.5dBµV/m	QPeak
Above 1000MHz	63.5dBµV/m	Peak
	43.5dBµV/m	Average
Measure at 3m		
Frequency range	**Level**	**Detector**
30MHz to 88MHz	40dBµV/m	QPeak
88MHz to 216MHz	43.5dBµV/m	QPeak
216MHz to 960MHz	46BµV/m	QPeak
960MHz to 1000MHz	54dBµV/m	QPeak
Above 1000MHz	74dBµV/m	Peak
	54dBµV/m	Average

13.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
BAT EMC Software	NEXIO	Version 3,19,1,18	-	-	-
Preamplifier	LCIE	LCIE-ALB-001	A7080073	2021/02	2023/02
Horn antenna	AH SYSTEMS	SAS 571	C2042041	2019/11	2021/11
Horn antenna (18-26,5GHz)	PASTERNACK	PE9852/2F-20	C2042048	2020/06	2022/06
EMI receiver	ROHDE & SCHWARZ	FSV40GHz	A4060061	2019/05	2021/05
Cable	PASTERNACK	PE360-3000CM	A5329872	2021/02	2022/02
Cable	PASTERNACK	PE360-1000CM	A5329939	2021/02	2022/02
Cable	PASTERNACK	PE360-1500CM	A5329940	2021/02	2022/02
High Pass Filter 2,4GHz	WAINWRIGHT	WHK12-2494	A7484068	2019/07	2021/07
Open test site	LCIE	-	F2000400	2021-02	2022-02
EMI Test Receiver	ROHDE & SCHWARZ	ESU	A2642018	2020-10	2022-10
Preamplifier	HELWETT PACKARD	8449B	A4069002	2020-09	2022-09
Cable	-	-	A5329442	2020-12	2021-12
Cable	-	-	A5329542	2020-11	2021-11
Loop antenna	R&S	HFH2-Z2	C2040269	2020-09	2022-09
Cable	-	-	A53291007	2021-02	2022-02
Horn antenna	ETS	3115	C2042016	2021-04	2023-04
Cable			A5329361	2020-12	2021-12
Antenne bilog	CHASE	CBL 6112A	C2040040	2021-04	2022-04
Cable	-	-	A5329876	2020-12	2021-12
Cable	-	-	A5329449	2020-12	2021-12

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

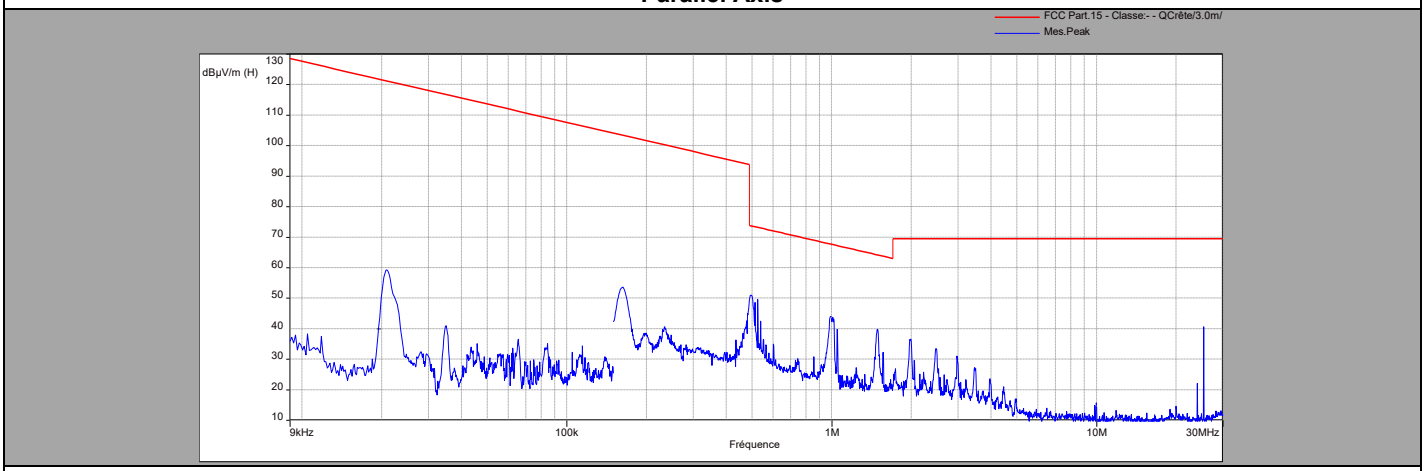
13.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

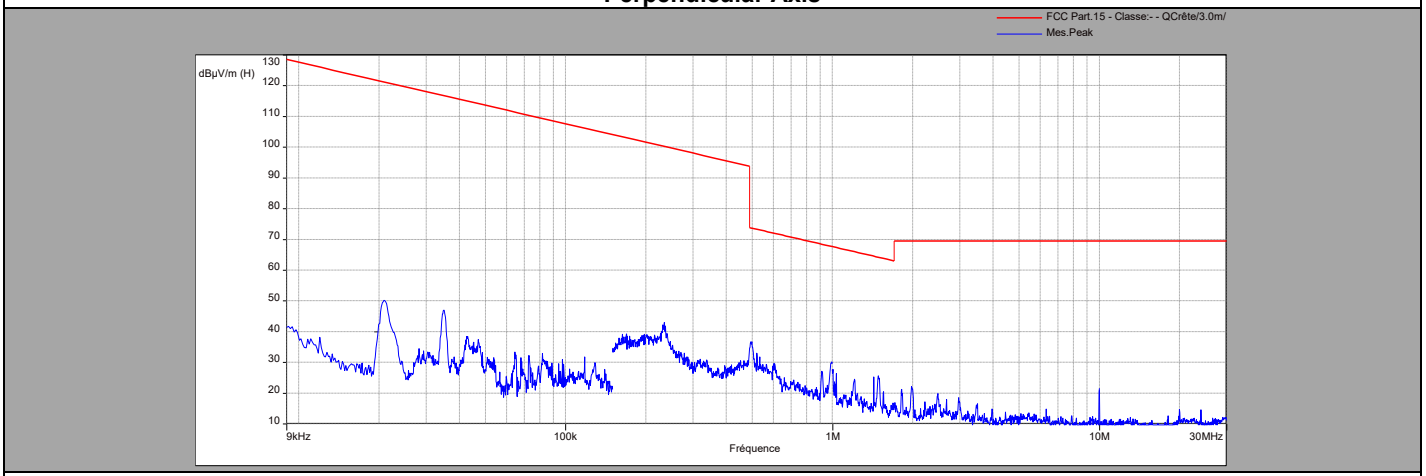
13.6. RESULTS

9kHz to 30MHz

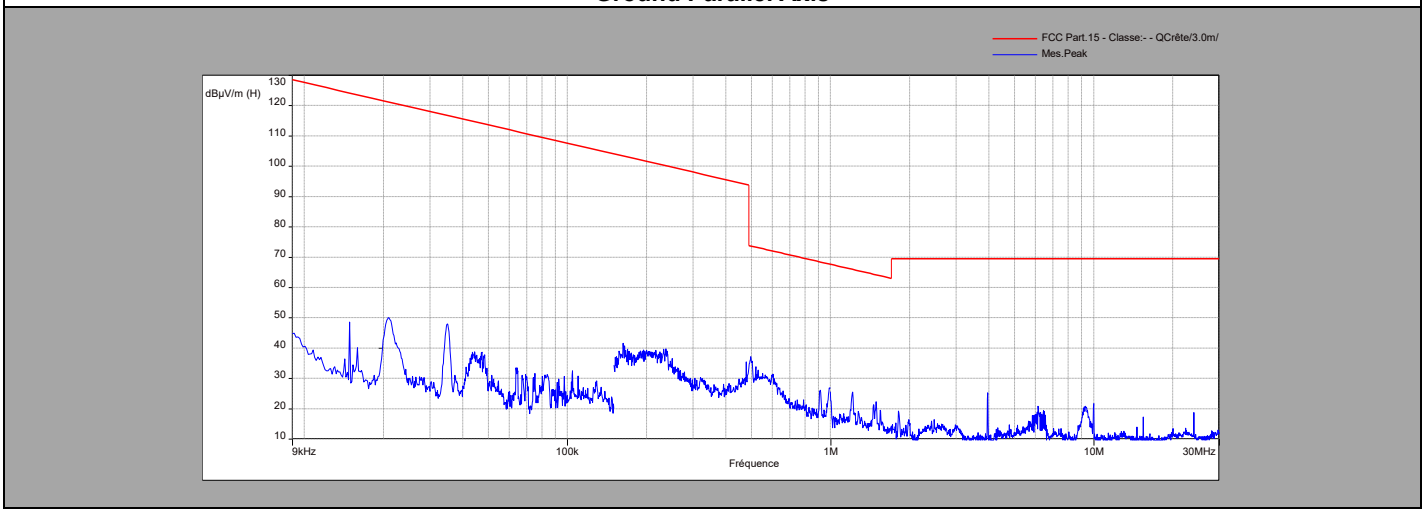
Parallel Axis



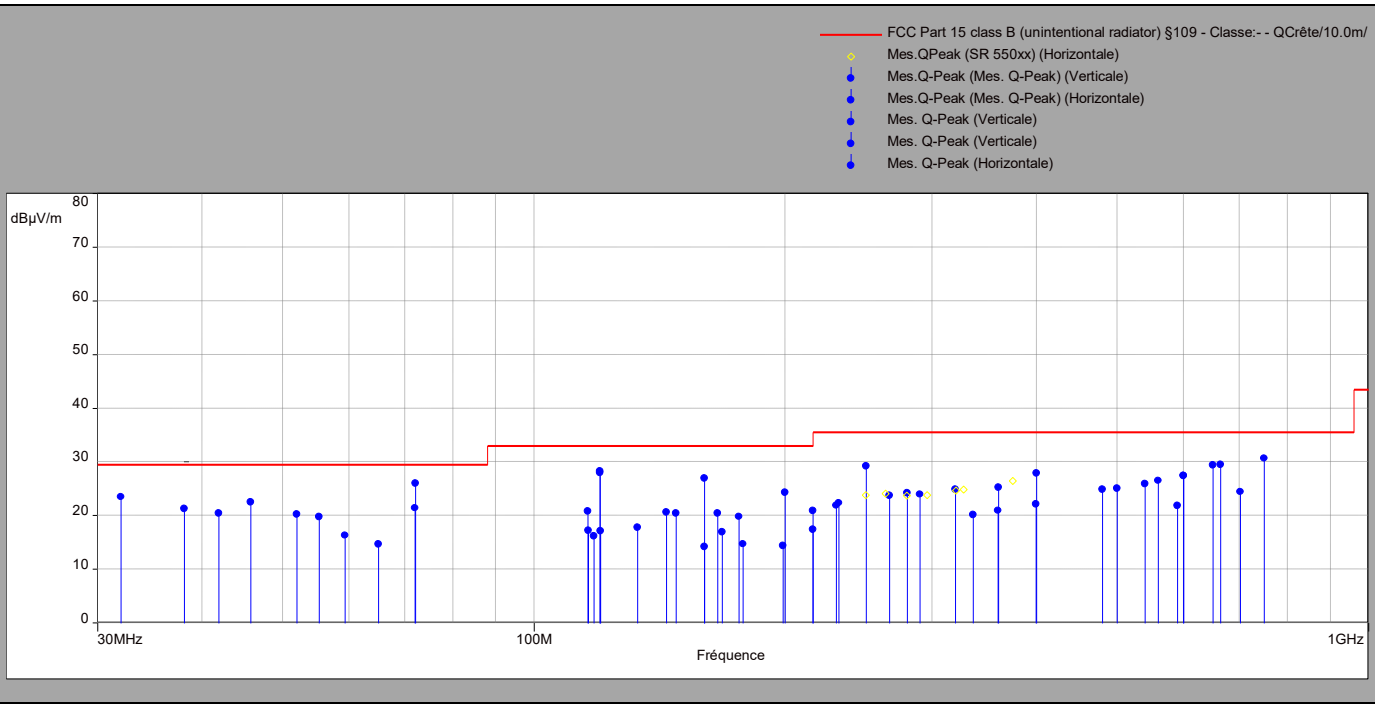
Perpendicular Axis



Ground Parallel Axis



GFSK
Below 1GHz
Cmin/Cnom/Cmax
Vertical & horizontal Polarization



GFSK

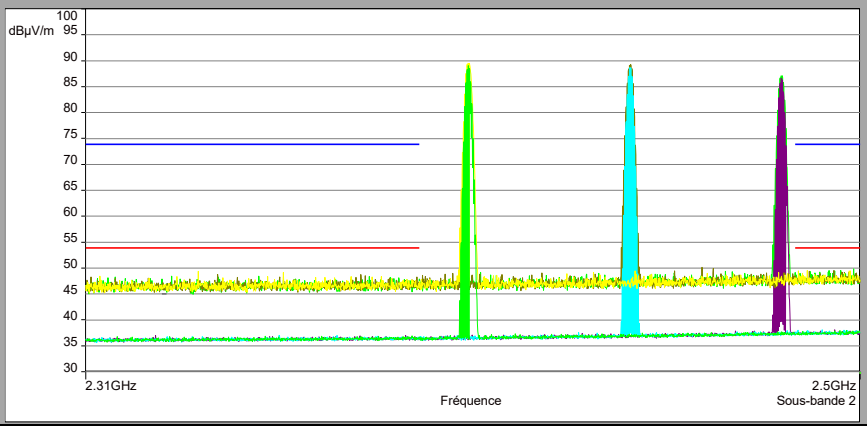
Above 1GHz Zoom 2310MHz-2500MHz

Cmin/Cnom/Cmax

Vertical Polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Avg_C0 - Verticale (Verticale)
Mes.Peak_C0 - Verticale (Verticale)
Mes.Avg_C66 - Verticale (Verticale)
Mes.Peak_C66 - Verticale (Verticale)
Mes.Avg_C78 - Verticale (Verticale)
Mes.Peak_C78 - Verticale (Verticale)

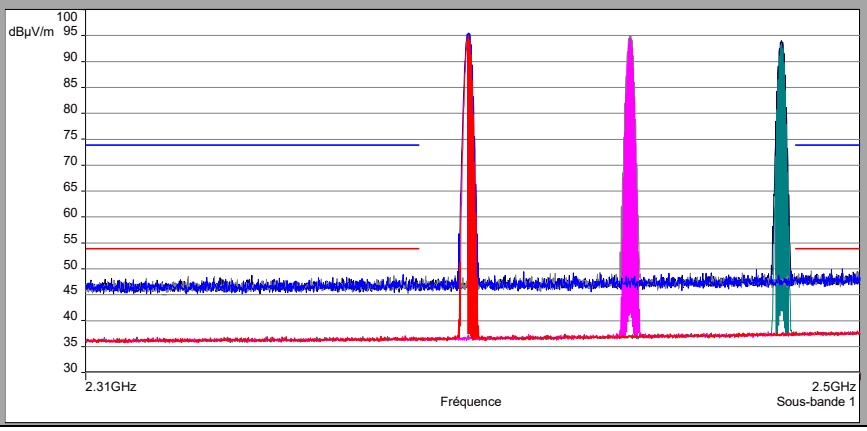
Description Sous-bande 2
Fréquences:2.31 GHz - 2.5 GHz (Mode analyseur) 32001 Points
Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 20 ms/MHz, Atténuation : 0 dB, Nombre de Balayages : 1, Pream
Polarisation:Verticale
Distance: 3 m



Horizontal polarization

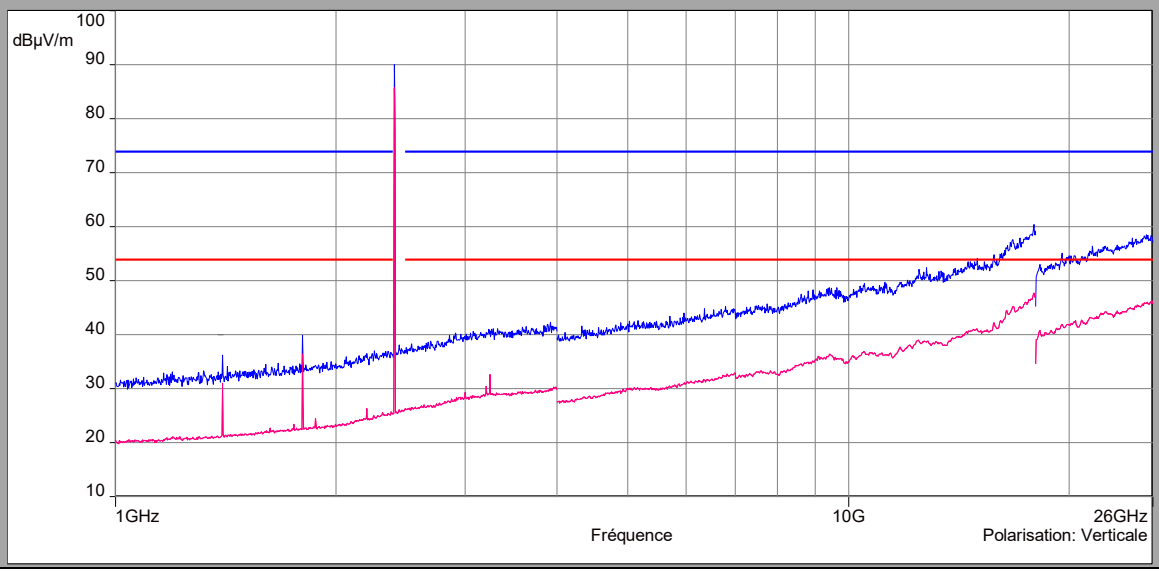
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Avg_C0 - Horizontale (Horizontale)
Mes.Peak_C0 - Horizontale (Horizontale)
Mes.Avg_C66 - Horizontale (Horizontale)
Mes.Peak_C66 - Horizontale (Horizontale)
Mes.Avg_C78 - Horizontale (Horizontale)
Mes.Peak_C78 - Horizontale (Horizontale)

Description Sous-bande 1
Fréquences:2.31 GHz - 2.5 GHz (Mode analyseur) 32001 Points
Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 20 ms/MHz, Atténuation : 0 dB, Nombre de Balayages : 1, Pream
Polarisation:Horizontale
Distance: 3 m



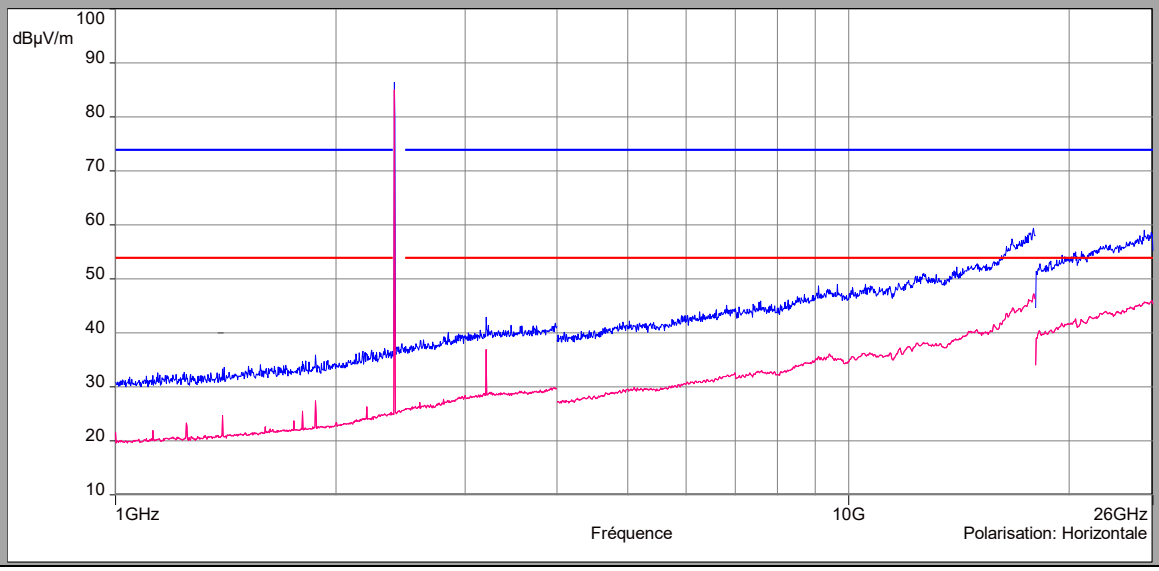
GFSK
Above 1GHz
Cmin
Vertical Polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - QCrête/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Peak (Verticale)
Mes.Avg (Verticale)



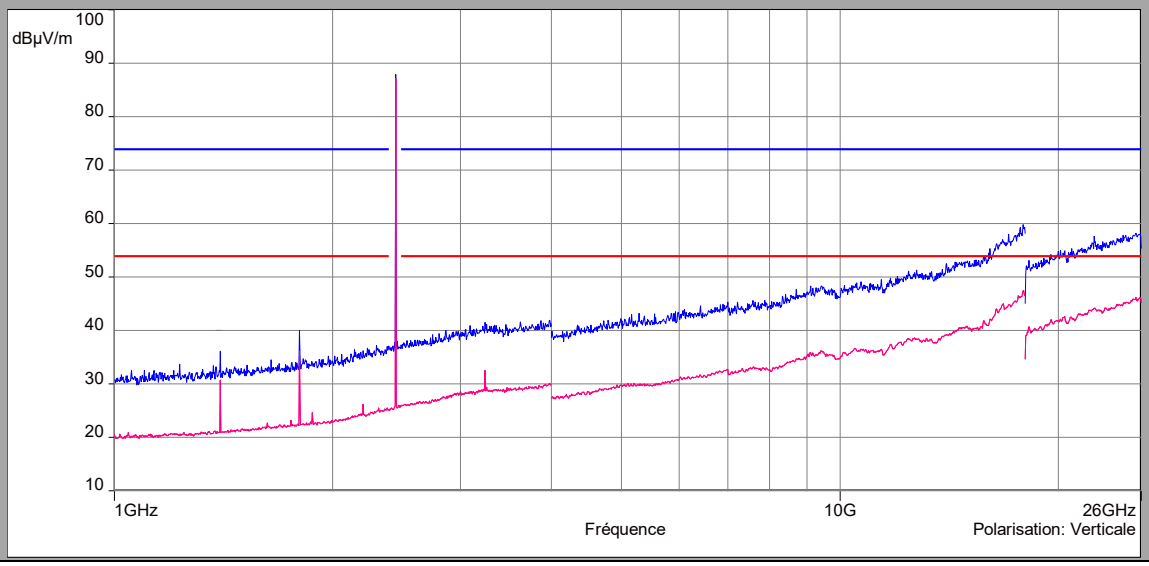
Horizontal polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - QCrête/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Peak (Horizontale)
Mes.Avg (Horizontale)



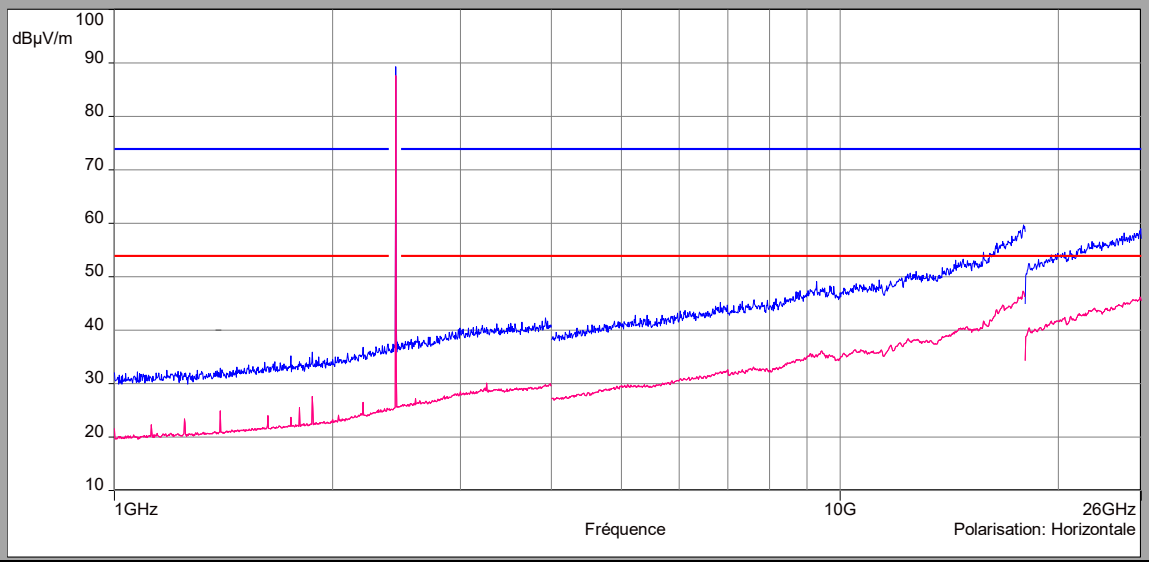
GFSK
Above 1GHz
Cnom
Vertical Polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - QCrête/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Peak (Verticale)
Mes.Avg (Verticale)

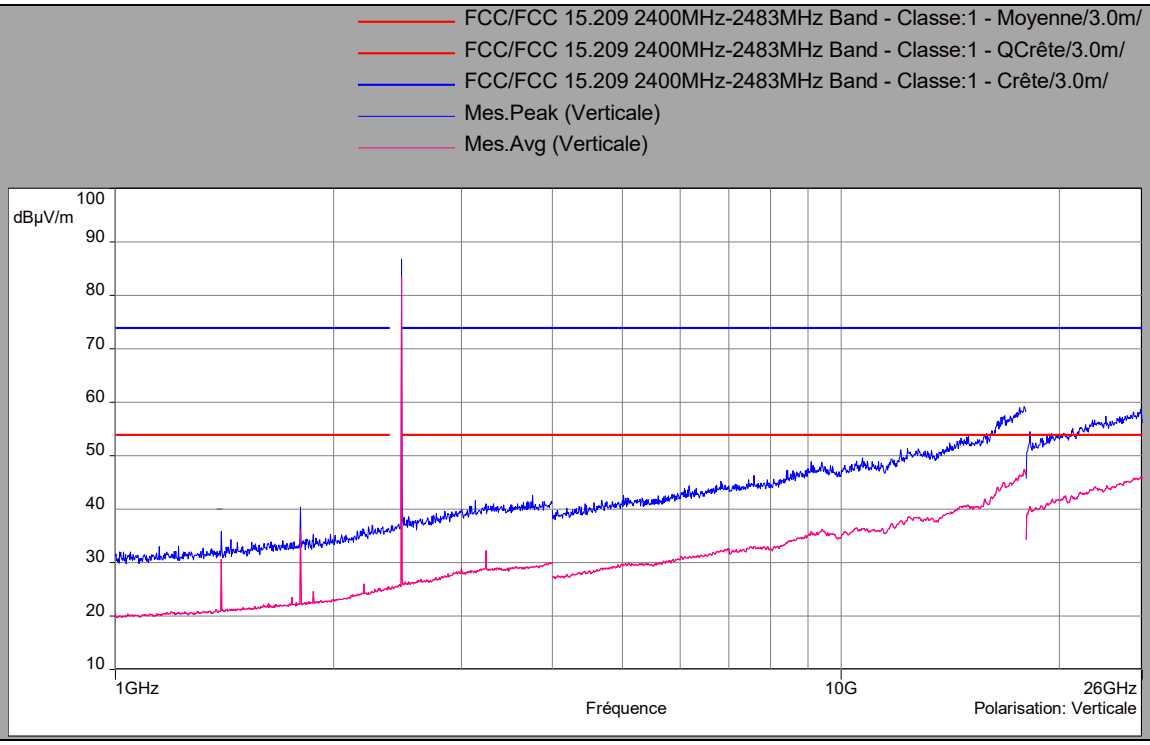


Horizontal polarization

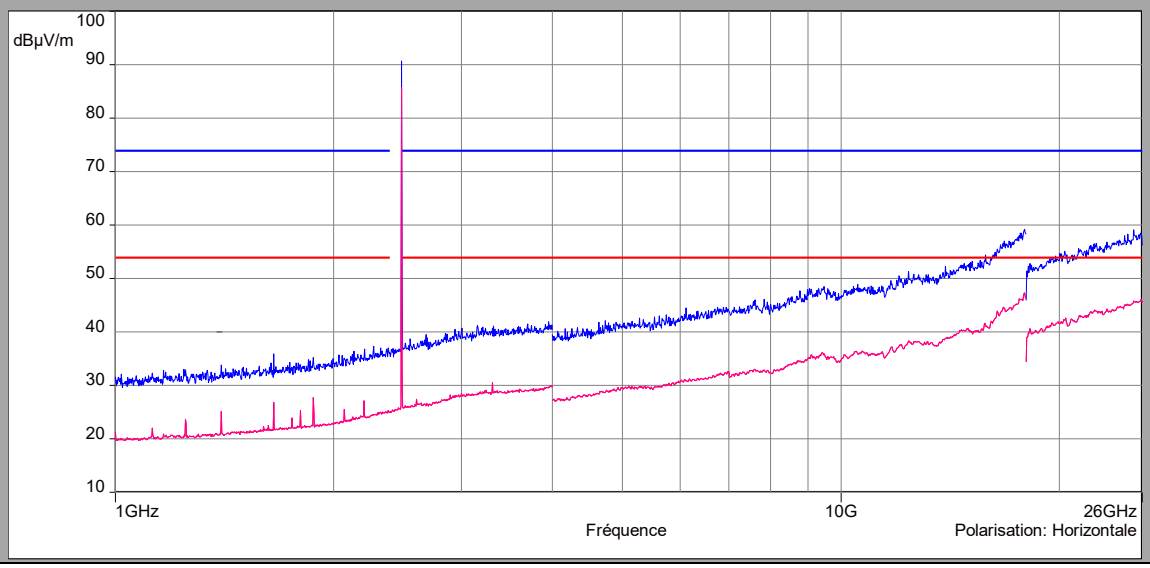
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - QCrête/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Peak (Horizontale)
Mes.Avg (Horizontale)



GFSK
Above 1GHz
Cmax
Vertical Polarization



Horizontal polarization



π/4 DQPSK

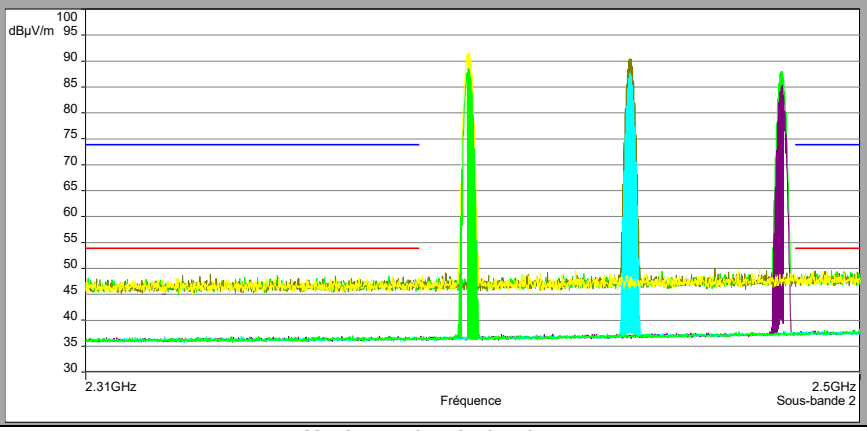
Above 1GHz Zoom 2310MHz-2500MHz

Cmin/Cnom/Cmax

Vertical Polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Avg_C0 - Verticale (Verticale)
Mes.Peak_C0 - Verticale (Verticale)
Mes.Avg_C66 - Verticale (Verticale)
Mes.Peak_C66 - Verticale (Verticale)
Mes.Avg_C78 - Verticale (Verticale)
Mes.Peak_C78 - Verticale (Verticale)

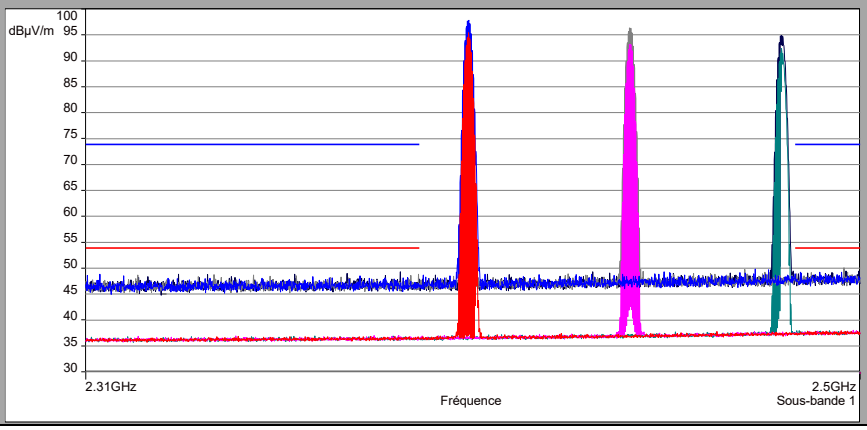
Description Sous-bande 2
Fréquences:2.31 GHz - 2.5 GHz (Mode analyseur) 32001 Points
Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 20 ms/MHz, Atténuation : 0 dB, Nombre de Balayages : 1, Pream
Polarisation:Verticale
Distance: 3 m



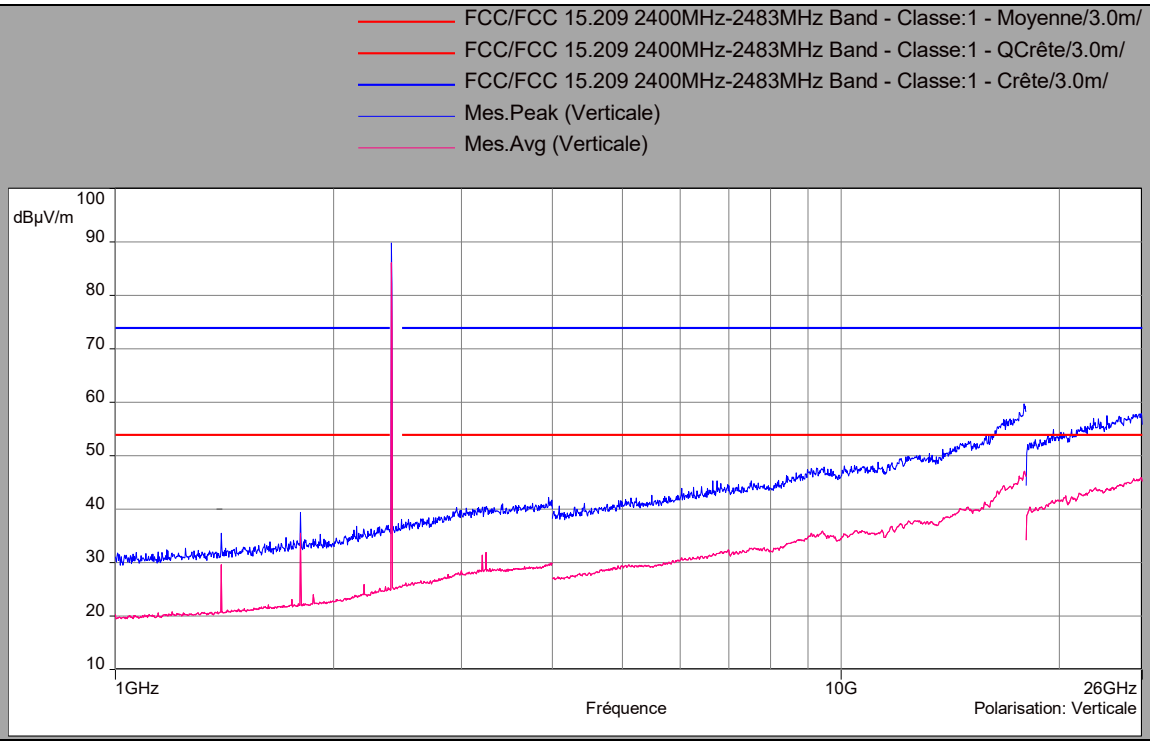
Horizontal polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Avg_C0 - Horizontale (Horizontale)
Mes.Peak_C0 - Horizontale (Horizontale)
Mes.Avg_C66 - Horizontale (Horizontale)
Mes.Peak_C66 - Horizontale (Horizontale)
Mes.Avg_C78 - Horizontale (Horizontale)
Mes.Peak_C78 - Horizontale (Horizontale)

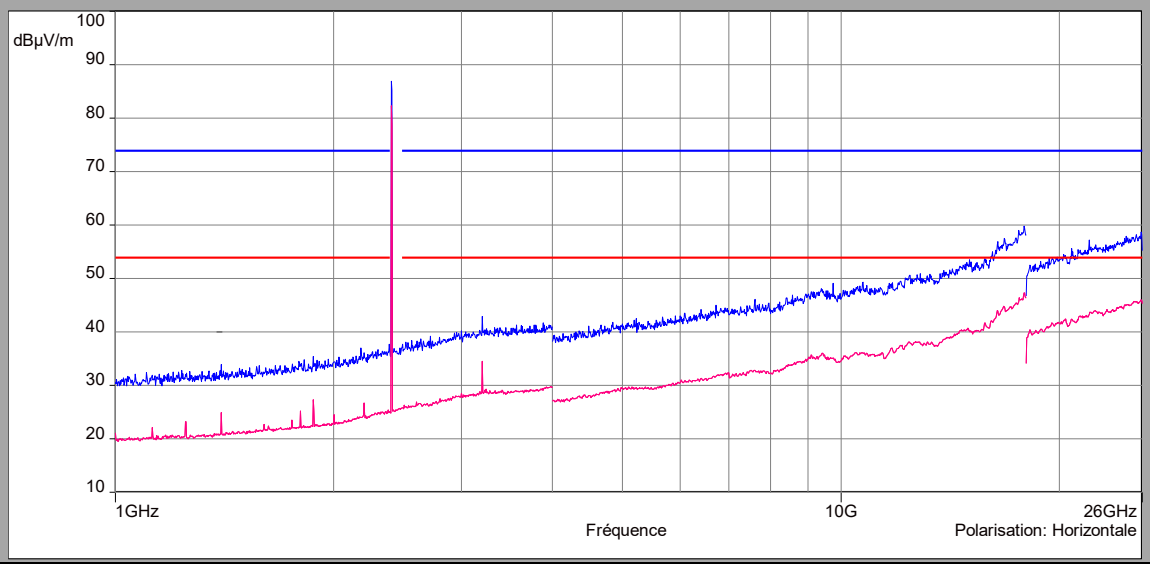
Description Sous-bande 1
Fréquences:2.31 GHz - 2.5 GHz (Mode analyseur) 32001 Points
Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 20 ms/MHz, Atténuation : 0 dB, Nombre de Balayages : 1, Pream
Polarisation:Horizontale
Distance: 3 m



π/4 DQPSK
Above 1GHz
Cmin
Vertical Polarization

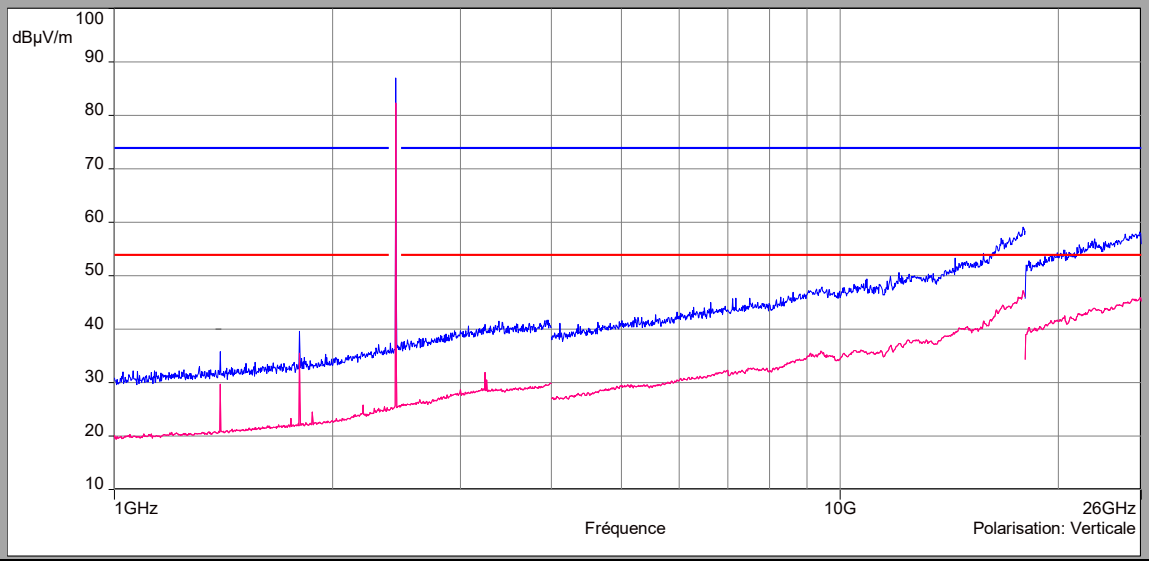


Horizontal polarization



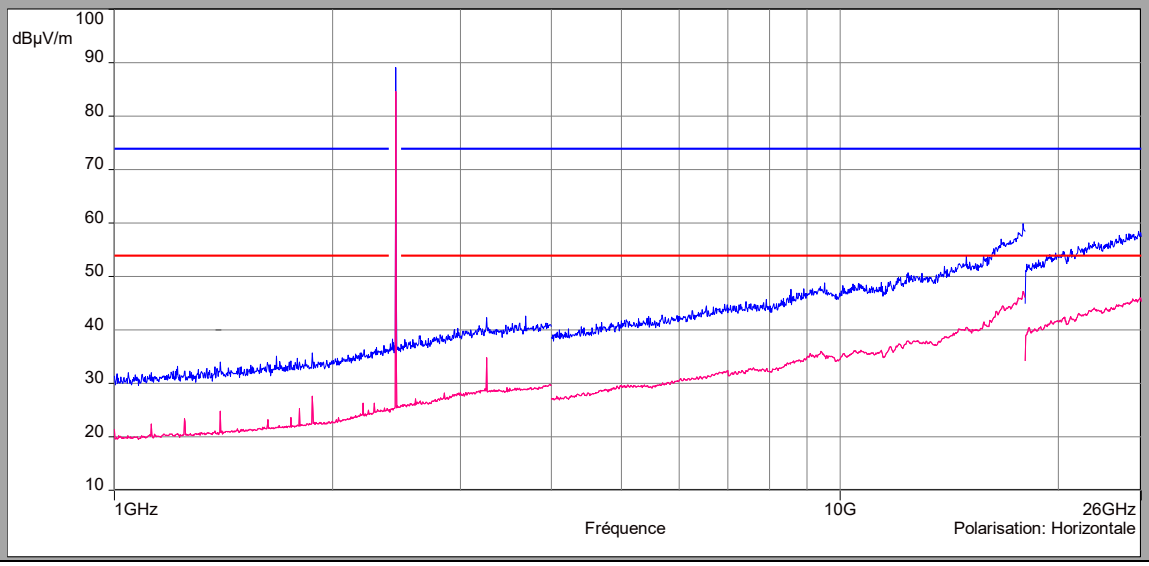
π/4 DQPSK
Above 1GHz
Cnom
Vertical Polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - QCrête/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Peak (Verticale)
Mes.Avg (Verticale)

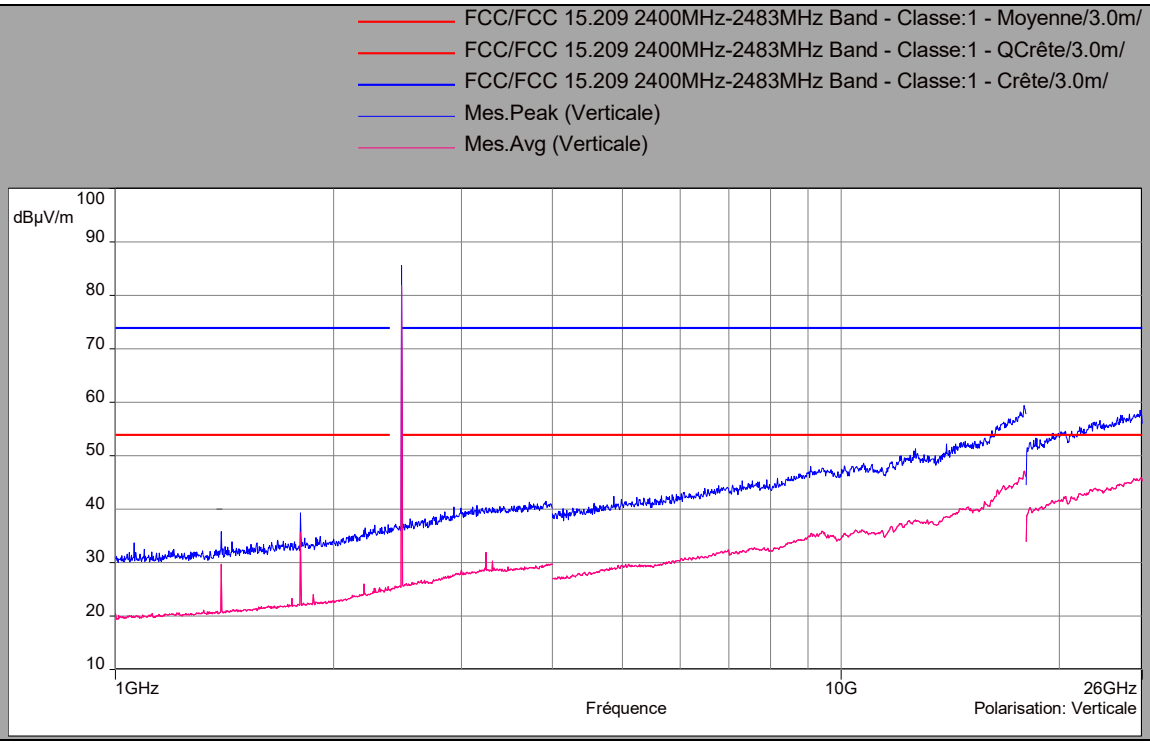


Horizontal polarization

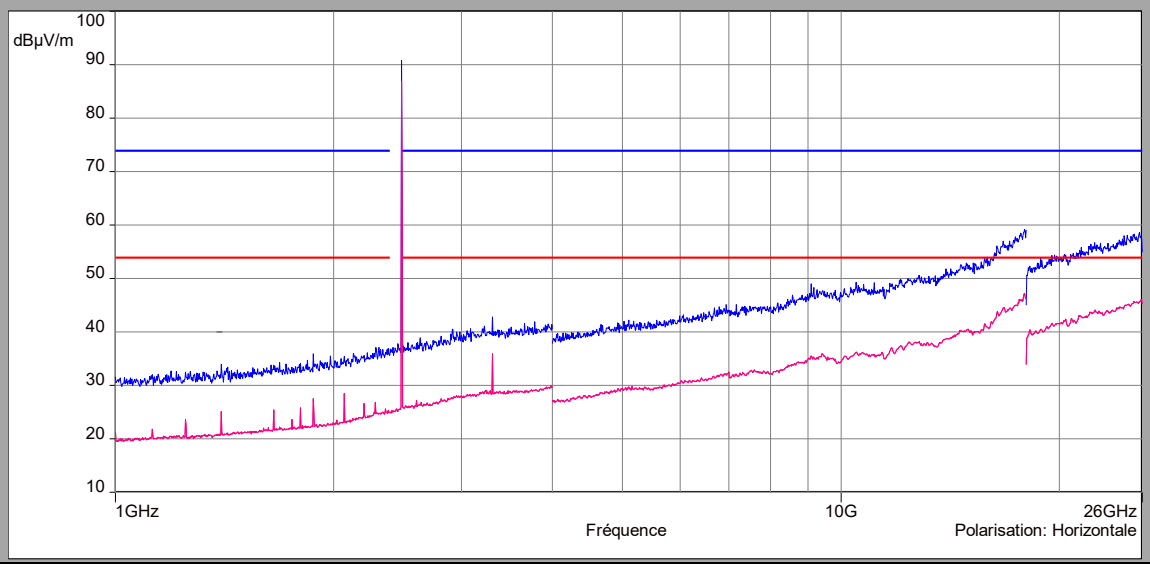
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - QCrête/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Peak (Horizontale)
Mes.Avg (Horizontale)



π/4 DQPSK
Above 1GHz
Cmax
Vertical Polarization



Horizontal polarization



8DPSK

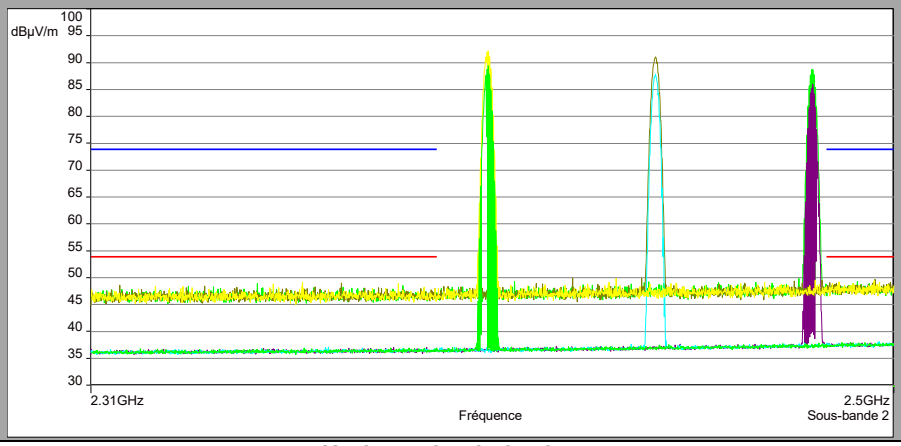
Above 1GHz Zoom 2310MHz-2500MHz

Cmin/Cnom/Cmax

Vertical Polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Avg_C0 - Verticale (Verticale)
Mes.Peak_C0 - Verticale (Verticale)
Mes.Avg_C66 - Verticale (Verticale)
Mes.Peak_C66 - Verticale (Verticale)
Mes.Avg_C78 - Verticale (Verticale)
Mes.Peak_C78 - Verticale (Verticale)

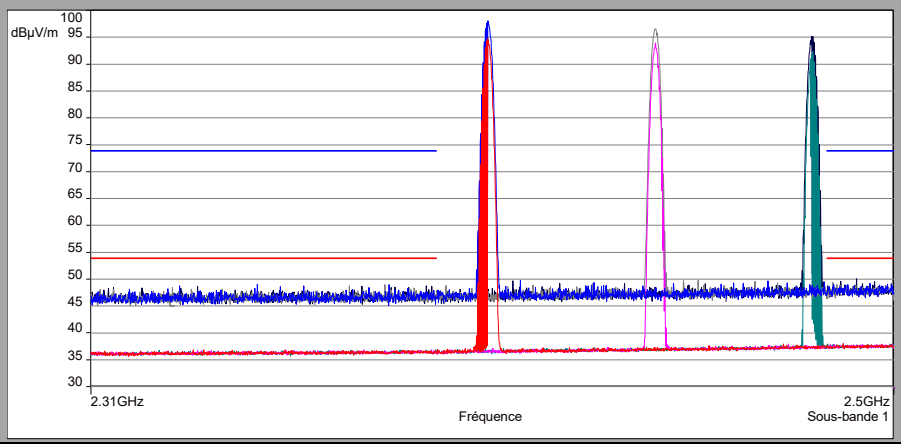
Description Sous-bande 2
Fréquences:2.31 GHz - 2.5 GHz (Mode analyseur) 32001 Points
Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 20 ms/MHz, Atténuation : 0 dB, Nombre de Balayages : 1, Preamp : On: 10 dB, LN
Polarisation:Verticale
Distance: 3 m



Horizontal polarization

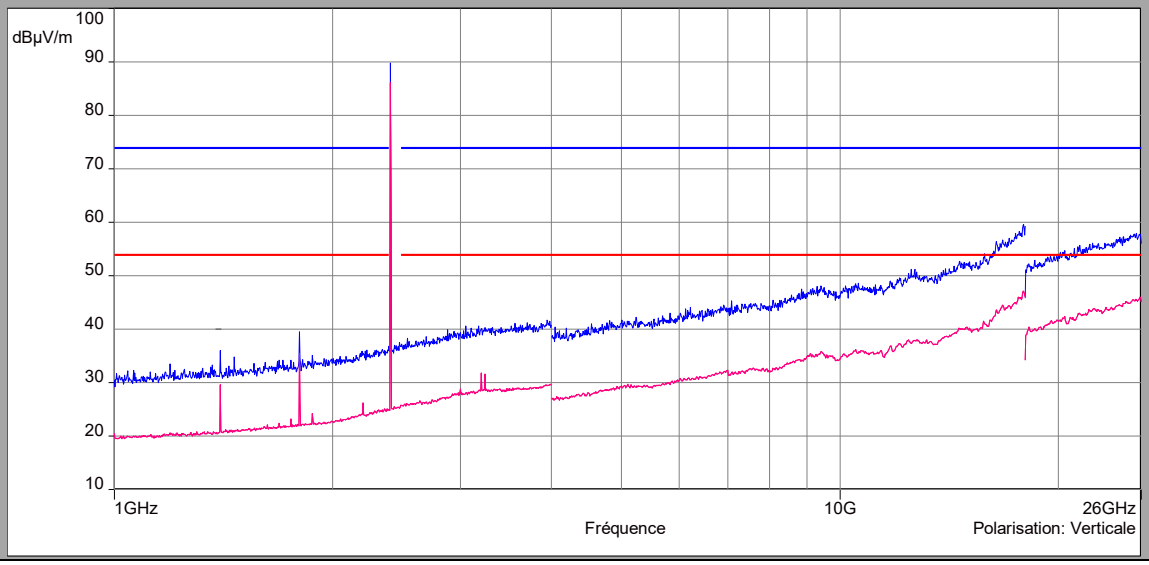
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Avg_C0 - Horizontale (Horizontale)
Mes.Peak_C0 - Horizontale (Horizontale)
Mes.Avg_C66 - Horizontale (Horizontale)
Mes.Peak_C66 - Horizontale (Horizontale)
Mes.Avg_C78 - Horizontale (Horizontale)
Mes.Peak_C78 - Horizontale (Horizontale)

Description Sous-bande 1
Fréquences:2.31 GHz - 2.5 GHz (Mode analyseur) 32001 Points
Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 20 ms/MHz, Atténuation : 0 dB, Nombre de Balayages : 1, Preamp : On: 10 dB, LN
Polarisation:Horizontale
Distance: 3 m



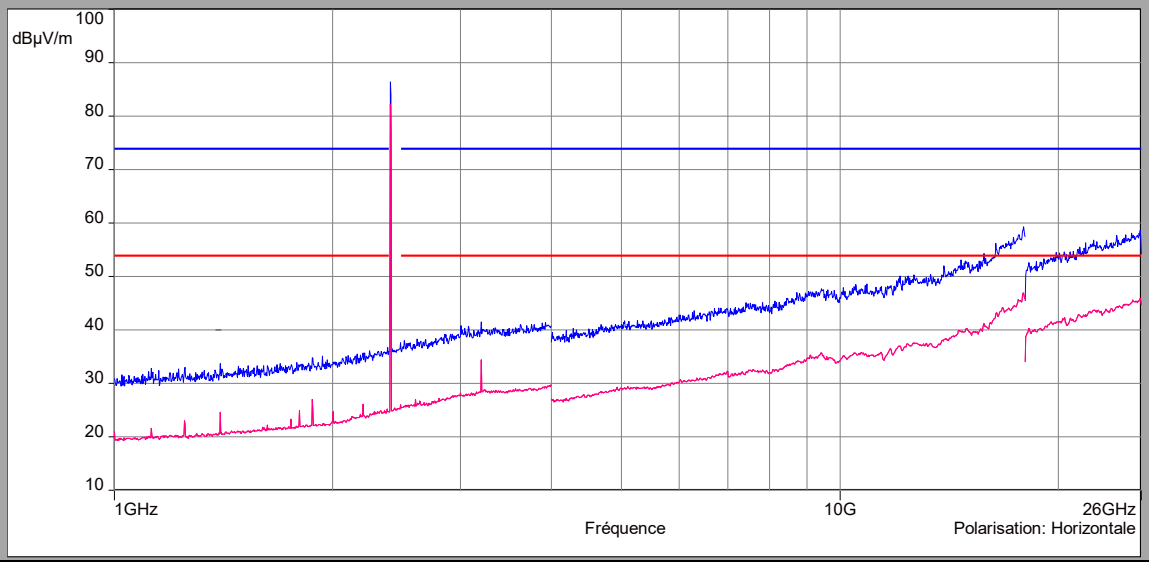
8DPSK
Above 1GHz
Cmin
Vertical Polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - QCrête/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Peak (Verticale)
Mes.Avg (Verticale)



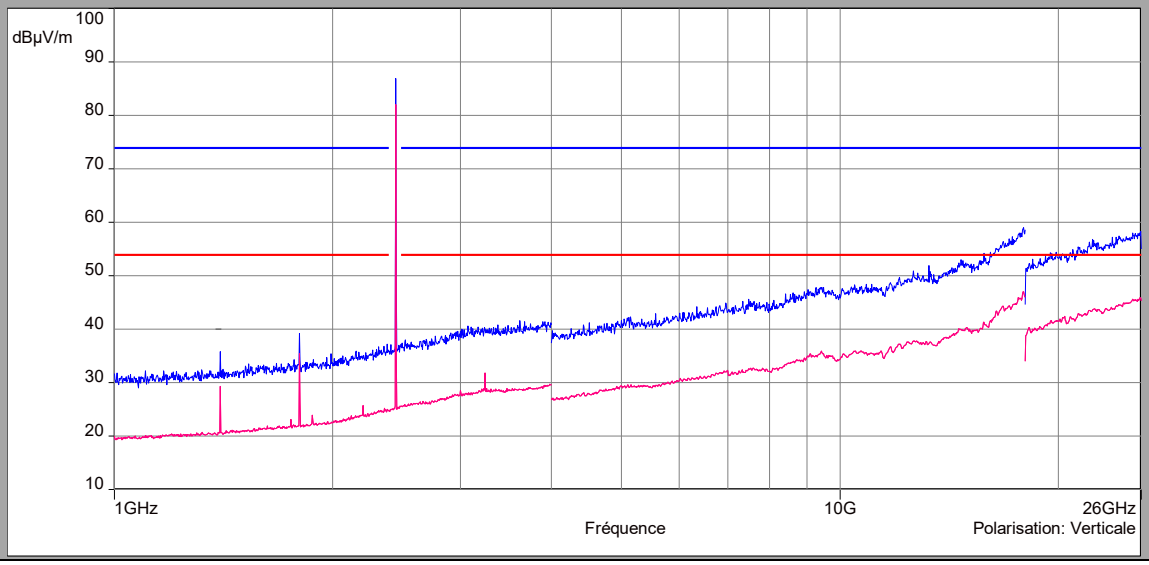
Horizontal polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - QCrête/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Peak (Horizontale)
Mes.Avg (Horizontale)



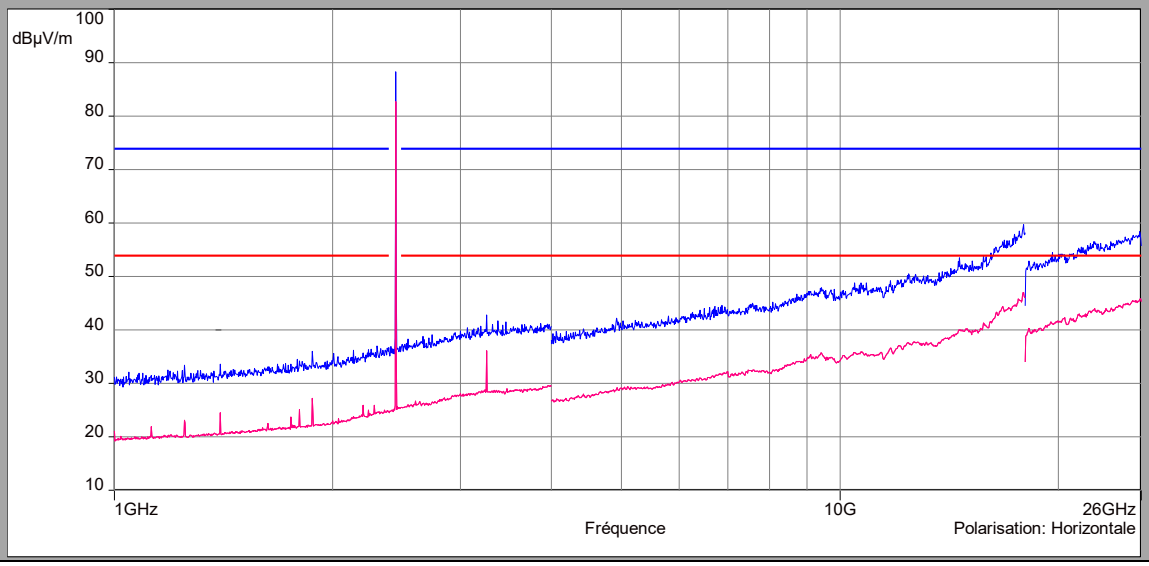
8DPSK
Above 1GHz
Cnom
Vertical Polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - QCrête/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Peak (Verticale)
Mes.Avg (Verticale)



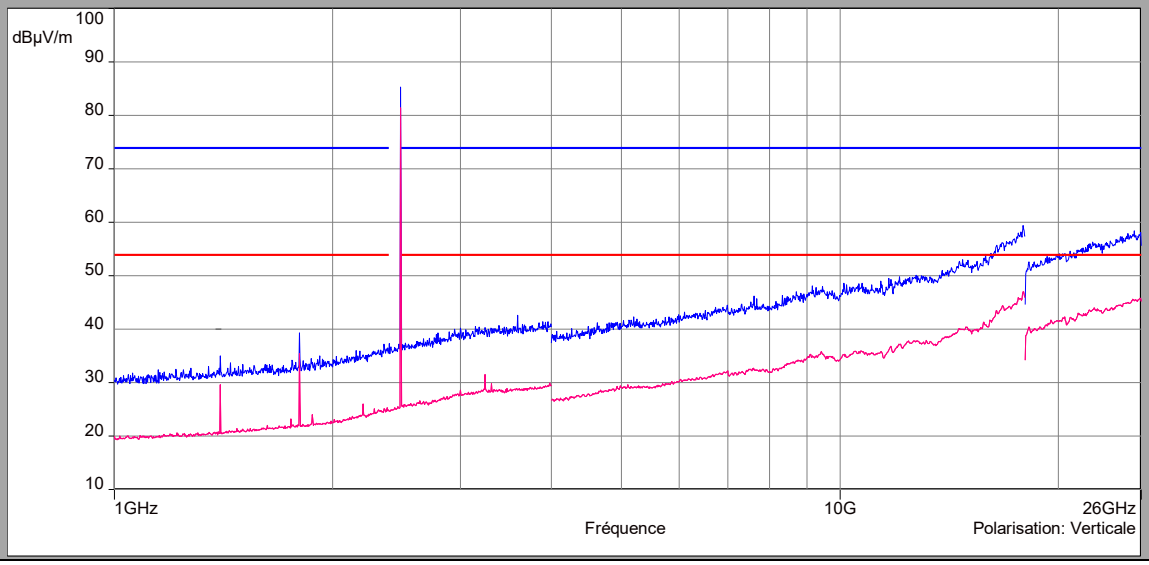
Horizontal polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - QCrête/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Peak (Horizontale)
Mes.Avg (Horizontale)



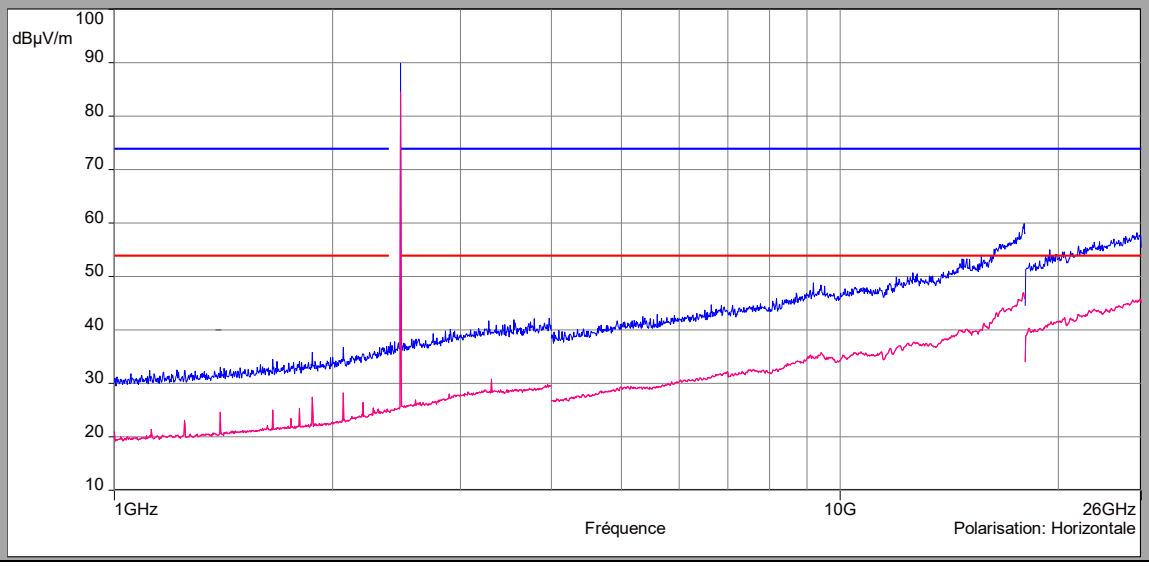
8DPSK
Above 1GHz
Cmax
Vertical Polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - QCrête/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Peak (Verticale)
Mes.Avg (Verticale)



Horizontal polarization

FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - QCrête/3.0m/
FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
Mes.Peak (Horizontale)
Mes.Avg (Horizontale)



9kHz to 30MHz				
Polarization	Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit (dBµV/m)
all emissions were greater than 20 dB below the limit				

Below 1GHz				
Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)
63.5	-	20.97	29.5	8.53
120	-	28.21	33	4.79
160	-	27.37	33	5.63
250	-	29.75	35.5	5.75
600	-	27.58	35.5	7.92
63.5	-	20.97	29.5	8.53

GFSK								
Above 1GHz								
Cmin/Cnom/Cmax								
Polarization	Frequency (MHz)	Average Level (dBµV/m)	Average Level + Duty Cycle Factor (dBµV/m)	Average Limit (dBµV/m)	Average Margin Level (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin Level (dBµV/m)
Verticale	1400	30,99	37,6975	54	16,3025	36,17	74	37,83
Verticale	1799	36,42	43,1275	54	10,8725	39,86	74	34,14
Verticale	1875	27,63	34,3375	54	19,6625	35,94	74	38,06
Horizontale	3203	36,93	43,6375	54	10,3625	42,92	74	31,08
Horizontale	2390	37,09	43,7975	54	10,2025	48,47	74	25,53
Verticale	2390	36,95	43,6575	54	10,3425	49,34	74	24,66
Horizontale	2483.5	37,79	44,4975	54	9,5025	49,08	74	24,92
Verticale	2483.5	38,06	44,7675	54	9,2325	49,83	74	24,17

π/4 DQPSK								
Above 1GHz								
Cmin/Cnom/Cmax								
Polarization	**Frequency (MHz)**	**Average Level (dBµV/m)**	**Average Level + Duty Cycle Factor (dBµV/m)**	**Average Limit (dBµV/m)**	**Average Margin Level (dBµV/m)**	**Peak Level (dBµV/m)**	**Peak Limit (dBµV/m)**	**Peak Margin Level (dBµV/m)**
Verticale	1399	30,85	37,5325	54	16,4675	36,74	74	37,26
Verticale	1800	36,33	43,0125	54	10,9875	40,12	74	33,88
Verticale	1877	28,12	34,8025	54	19,1975	36,55	74	37,45
Horizontale	3203	36,55	43,2325	54	10,7675	42,98	74	31,02
Horizontale	2390	37,18	43,8625	54	10,1375	48,58	74	25,42
Verticale	2390	36,87	43,5525	54	10,4475	47,47	74	26,53
Horizontale	2483.5	37,82	44,5025	54	9,4975	49,23	74	24,77
Verticale	2483.5	38,24	44,9225	54	9,0775	49,44	74	24,56

8DPSK								
Above 1GHz								
Cmin/Cnom/Cmax								
Polarization	**Frequency (MHz)**	**Average Level (dBµV/m)**	**Average Level + Duty Cycle Factor (dBµV/m)**	**Average Limit (dBµV/m)**	**Average Margin Level (dBµV/m)**	**Peak Level (dBµV/m)**	**Peak Limit (dBµV/m)**	**Peak Margin Level (dBµV/m)**
Verticale	1399	38,89	45,5733	54	8,4267	36,77	74	37,23
Verticale	1799	37,21	43,8933	54	10,1067	40,26	74	33,74
Verticale	1877	29,57	36,2533	54	17,7467	36,32	74	37,68
Horizontale	3202	36,85	43,5333	54	10,4667	41,87	74	32,13
Horizontale	2390	37,53	44,2133	54	9,7867	48,51	74	25,49
Verticale	2390	36,81	43,4933	54	10,5067	47,74	74	26,26
Horizontale	2483.5	36,99	43,6733	54	10,3267	49,26	74	24,74
Verticale	2483.5	37,94	44,6233	54	9,3767	49,49	74	24,51

13.7. CONCLUSION

Unwanted Emission in restricted frequency bands measurement performed on the sample of the product **COGECO DIW3930 COGECO**, SN: **6211130035003**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.247 & RSS 247 ISSUE 2 limits.

14. UNCERTAINTIES CHART

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

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