



LCIE

WIFI 2,4GHz Template: Release July 3rd, 2019

TEST REPORT

N°: 161998-738364

Version : 01

Subject

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

Issued to

NETATMO
93 Rue Nationale
92100-BOULOGNE-BILLANCOURT
FRANCE

Apparatus under test

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

Doorbell
Netatmo
Netatmo
NDB01
g549be2
N3A-NDB01
10860A-NDB01

Conclusion

See Test Program chapter

Test date

: September 13, 2019 to September 18, 2019

Test location

Fontenay Aux Roses & Ecuelles

Test Site

6230B-1

Composition of document

77 pages

Document issued on

October 2, 2019

Written by :
Armand MAHOUNGOU
Tests operator



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PUBLICATION HISTORY

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.

Version	Date	Author	Modification
01	02/10/2019	A. MAHOUNGOU	Creation of the document

Date of receipt of test item 18/06/2019



SUMMARY

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1. TEST PROGRAM

References

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

Radio requirement:

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

NDB01

Serial Number: g549be2



Equipment Under Test



Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Power supply	-	☐	☐	☐	-

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop Computer	-	-	-
SMA Cable antenna	-	-	For conducted test
USB cable	-	-	For sending command to the EUT

Equipment information:

Type:	WIFI			
Frequency band:	2400MHz-2483.5MHz			
Standard:	☒ 802.11b	☒ 802.11g	☒ 802.11n HT20	☐ 802.11n HT40
Spectrum Modulation:	☒ DSSS		☒ OFDM	
Number of Channel:	11			
Spacing channel:	5MHz			
Channel bandwidth:	☒ 20MHz		☐ 40MHz	
Antenna Type:	☒ Integral	☐ External	☐ Dedicated	
Antenna connector:	☐ Yes	☐ No	☒ Temporary for test	
Transmit chains:	☒ 1	☐ 2	☐ 3	☐ 4
Beam forming gain:	☐ Yes: XdB		☒ No	
Receiver chains:	☒ 1	☐ 2	☐ 3	☐ 4
Type of equipment:	☒ Stand-alone		☐ Plug-in	☐ Combined
Duty cycle:	☒ Continuous duty		☐ Intermittent duty	☐ 100% duty
Operating temperature range:	Tmin:	☐ -20°C	☐ 0°C	☒ -10°C
	Tnom:	20°C		
	Tmax:	☐ 35°C	☐ 55°C	☒ 40°C
Type of power source:	☒ AC power supply		☒ DC power supply	☒ Battery
Operating voltage range:	Vnom:	☒ 120V/60Hz		☒ 5 Vdc
		☒ 8V to 24V/60Hz		

Antenna Characteristic			
Antenna assembly	Gain (dBi)	Frequency Band (MHz)	Impedance(Ω)
1	1.4	2400-2483.5	50

CHANNEL PLAN	
802.11b / 802.11g / 802.11n HT20	
Channel	Frequency (MHz)
Cmin: 1	2412
2	2417
3	2422
4	2427
5	2432
Cmid: 6	2437
7	2442
8	2447
9	2452
10	2457
Cmax: 11	2462

CHANNEL PLAN	
802.11n HT40	
Channel	Frequency (MHz)
Cmin: 3	2422
4	2427
5	2432
Cmid: 6	2437
7	2442
8	2447
Cmax: 9	2452

DATA RATE		
802.11b		
Data Rate (Mbps)	Modulation Type	Modulation Worst Case
1	DBPSK	☒
2	DQPSK	☐
5.5	DQPSK	☐
11	CCK	☐

DATA RATE		
802.11g		
Data Rate (Mbps)	Modulation Type	Modulation Worst Case
6	BPSK	☒
9	BPSK	☐
12	QPSK	☐
18	QPSK	☐
24	16-QAM	☐
36	16-QAM	☐
48	64-QAM	☐
54	64-QAM	☐



L C I E

DATA RATE									
802.11n HT20									
Available for EUT	MCS Index	Spatial streams	Modulation				Data Rate (Mbps)		Worst Case Modulation
							(GI = 800ns)	(GI = 400ns)	
☑	0	1	BPSK				6.5	7.2	☑
	1	1	QPSK				13	14.4	☐
	2	1	QPSK				19.5	21.7	☐
	3	1	16-QAM				26	28.9	☐
	4	1	16-QAM				39	43.3	☐
	5	1	64-QAM				52	57.8	☐
	6	1	64-QAM				58.5	65	☐
	7	1	64-QAM				65	72.2	☐
☐	32	1	BPSK	-	-	-	-	-	☐
	8	2	BPSK				13	14.4	☐
	9	2	QPSK				26	28.9	☐
	10	2	QPSK				39	43.3	☐
	11	2	16-QAM				52	57.8	☐
	12	2	16-QAM				78	86.7	☐
	13	2	64-QAM				104	115.6	☐
	14	2	64-QAM				117	130.3	☐
	15	2	64-QAM				130	144.4	☐
	33	2	16-QAM	QPSK	-	-	39	43.3	☐
	34	2	64-QAM	QPSK	-	-	52	57.8	☐
	35	2	64-QAM	16-QAM	-	-	65	72.2	☐
	36	2	16-QAM	QPSK	-	-	58.5	65	☐
	37	2	64-QAM	QPSK	-	-	78	86.7	☐
	38	2	64-QAM	16-QAM	-	-	97.5	108.3	☐
☐	16	3	BPSK				19.5	21.7	☐
	17	3	QPSK				39	43.3	☐
	18	3	QPSK				58.5	65	☐
	19	3	16-QAM				78	86.7	☐
	20	3	16-QAM				117	130	☐
	21	3	64-QAM				156	173.3	☐
	22	3	64-QAM				175.5	195	☐
	23	3	64-QAM				195	216.7	☐
	39	3	16-QAM	QPSK	QPSK	-	52	57.8	☐
	40	3	16-QAM	16-QAM	QPSK	-	65	72.2	☐
	41	3	64-QAM	QPSK	QPSK	-	65	72.2	☐
	42	3	64-QAM	16-QAM	QPSK	-	78	86.7	☐
	43	3	64-QAM	16-QAM	16-QAM	-	91	101.1	☐
	44	3	64-QAM	64-QAM	QPSK	-	91	101.1	☐
	45	3	64-QAM	64-QAM	16-QAM	-	104	115.6	☐
	46	3	16-QAM	QPSK	QPSK	-	78	86.7	☐
	47	3	16-QAM	16-QAM	QPSK	-	97.5	108.3	☐
	48	3	64-QAM	QPSK	QPSK	-	97.5	108.3	☐
	49	3	64-QAM	16-QAM	QPSK	-	117	130	☐
	50	3	64-QAM	16-QAM	16-QAM	-	136.5	151.7	☐
	51	3	64-QAM	64-QAM	QPSK	-	136.5	151.7	☐
☐	52	3	64-QAM	64-QAM	16-QAM	-	156	173.3	☐
	24	4	BPSK				26	28.9	☐
	25	4	QPSK				52	57.8	☐
	26	4	QPSK				78	86.7	☐
	27	4	16-QAM				104	115.6	☐
	28	4	16-QAM				156	173.3	☐
	29	4	64-QAM				208	231.1	☐
	30	4	64-QAM				234	260	☐
	31	4	64-QAM				260	288.9	☐
	53	4	16-QAM	QPSK	QPSK	QPSK	65	72.2	☐
	54	4	16-QAM	16-QAM	QPSK	QPSK	78	86.7	☐
	55	4	16-QAM	16-QAM	16-QAM	QPSK	91	101.1	☐
	56	4	64-QAM	QPSK	QPSK	QPSK	78	86.7	☐
	57	4	64-QAM	16-QAM	QPSK	QPSK	91	101.1	☐
	58	4	64-QAM	16-QAM	16-QAM	QPSK	104	115.6	☐
	59	4	64-QAM	16-QAM	16-QAM	16-QAM	117	130	☐
	60	4	64-QAM	QPSK	QPSK	QPSK	104	115.6	☐
	61	4	64-QAM	16-QAM	16-QAM	QPSK	117	130	☐
	62	4	64-QAM	16-QAM	16-QAM	16-QAM	130	144.4	☐
	63	4	64-QAM	64-QAM	64-QAM	QPSK	130	144.4	☐
	64	4	64-QAM	64-QAM	64-QAM	16-QAM	143	158.9	☐
	65	4	16-QAM	QPSK	QPSK	QPSK	97.5	108.3	☐
	66	4	16-QAM	16-QAM	QPSK	QPSK	117	130	☐
	67	4	16-QAM	16-QAM	16-QAM	QPSK	136.5	151.7	☐
	68	4	64-QAM	QPSK	QPSK	QPSK	117	130	☐
	69	4	64-QAM	16-QAM	QPSK	QPSK	136.5	151.7	☐
	70	4	64-QAM	16-QAM	16-QAM	QPSK	156	173.3	☐
	71	4	64-QAM	16-QAM	16-QAM	16-QAM	175.5	195	☐
	72	4	64-QAM	64-QAM	QPSK	QPSK	156	173.3	☐
	73	4	64-QAM	64-QAM	16-QAM	QPSK	175.5	195	☐
	74	4	64-QAM	64-QAM	16-QAM	16-QAM	195	216.7	☐
	75	4	64-QAM	64-QAM	64-QAM	QPSK	195	216.7	☐
	76	4	64-QAM	64-QAM	64-QAM	16-QAM	214.5	238.3	☐

2.2. RUNNING MODE

Test mode	Description of test mode
Test mode 1	Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
Test mode 2	Permanent reception

Test	Running mode	
Occupied Bandwidth	☒ Test mode 1 (1)	☐ Alternative test mode()
6dB Bandwidth	☒ Test mode 1 (1)	☐ Alternative test mode()
Duty Cycle	☒ Test mode 1 (1)	☐ Alternative test mode()
Maximum Conducted Output Power	☒ Test mode 1 (1)	☐ Alternative test mode()
Power Spectral Density	☒ Test mode 1 (1)	☐ Alternative test mode()
Conducted Spurious Emission at the Band Edge	☒ Test mode 1 (1)	☐ Alternative test mode()
Unwanted Emissions into Non-Restricted Frequency Bands	☒ Test mode 1 (1)	☐ Alternative test mode()
AC Power Line Conducted Emission	☒ Test mode 1 (1)	☐ Alternative test mode()
Unwanted Emissions into Restricted Frequency Bands	☒ Test mode 1 (1)	☐ Alternative test mode()
Receiver Radiated emissions	☒ Test mode 2	☐ Alternative test mode()

(1) Target used are :

- Mode B = 18
- Mode G and nHT20 = 17

2.3. EQUIPMENT LABELLING

No label

2.4. EQUIPMENT MODIFICATION

☒ None ☐ Modification:

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : September 13, 2019 & September 18, 2019
Ambient temperature : 27°C & 26°C
Relative humidity : 47% & 44%

3.2. TEST SETUP

- The Equipment Under Test is installed:

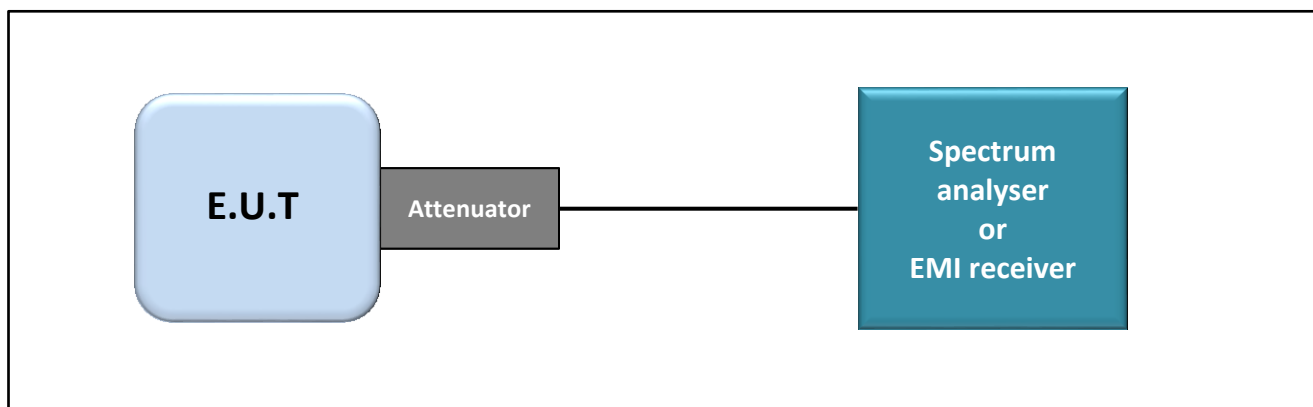
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

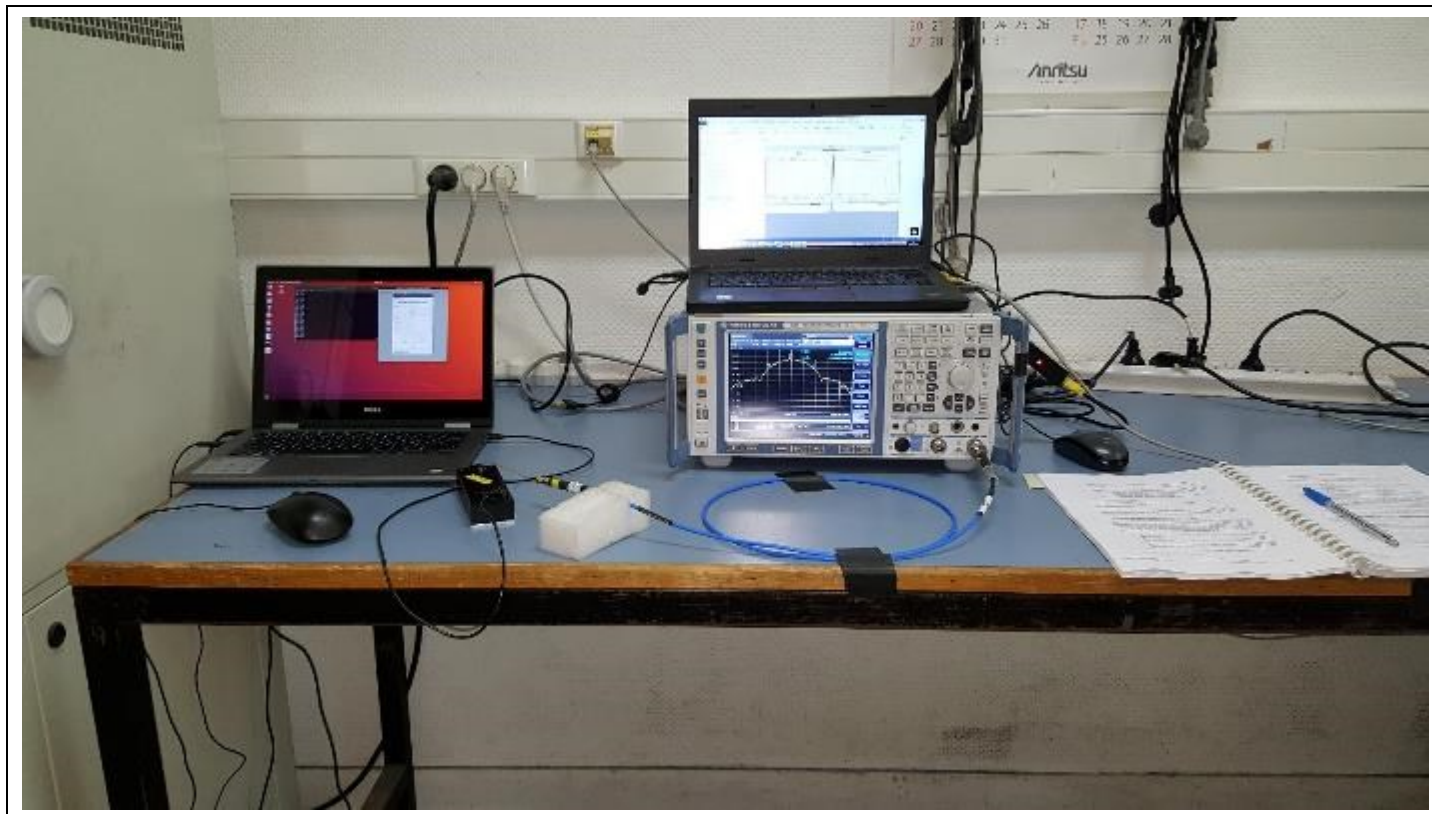
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

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



Test set up of Occupied Bandwidth



Photograph for Occupied bandwidth

3.3. LIMIT

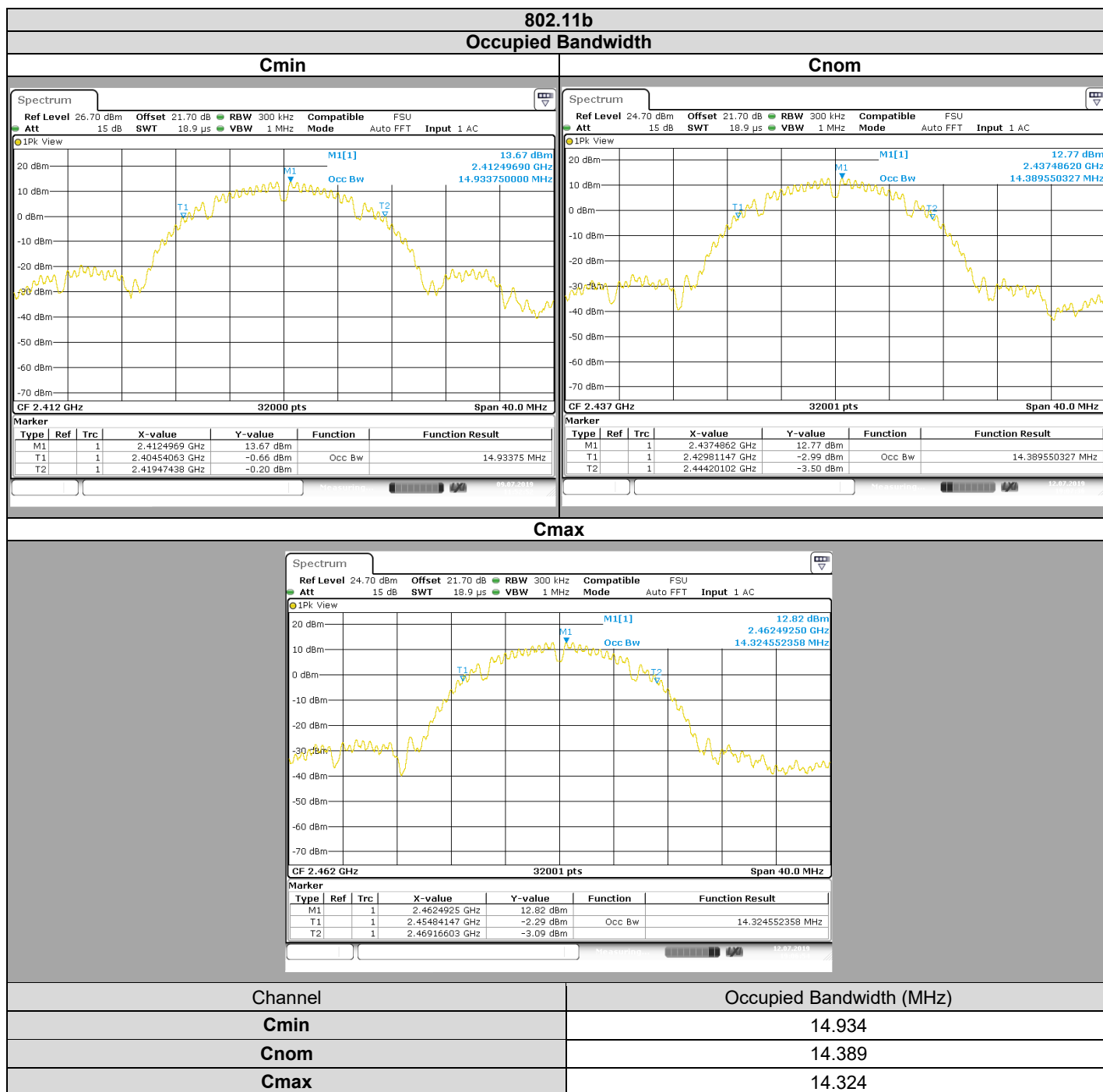
None

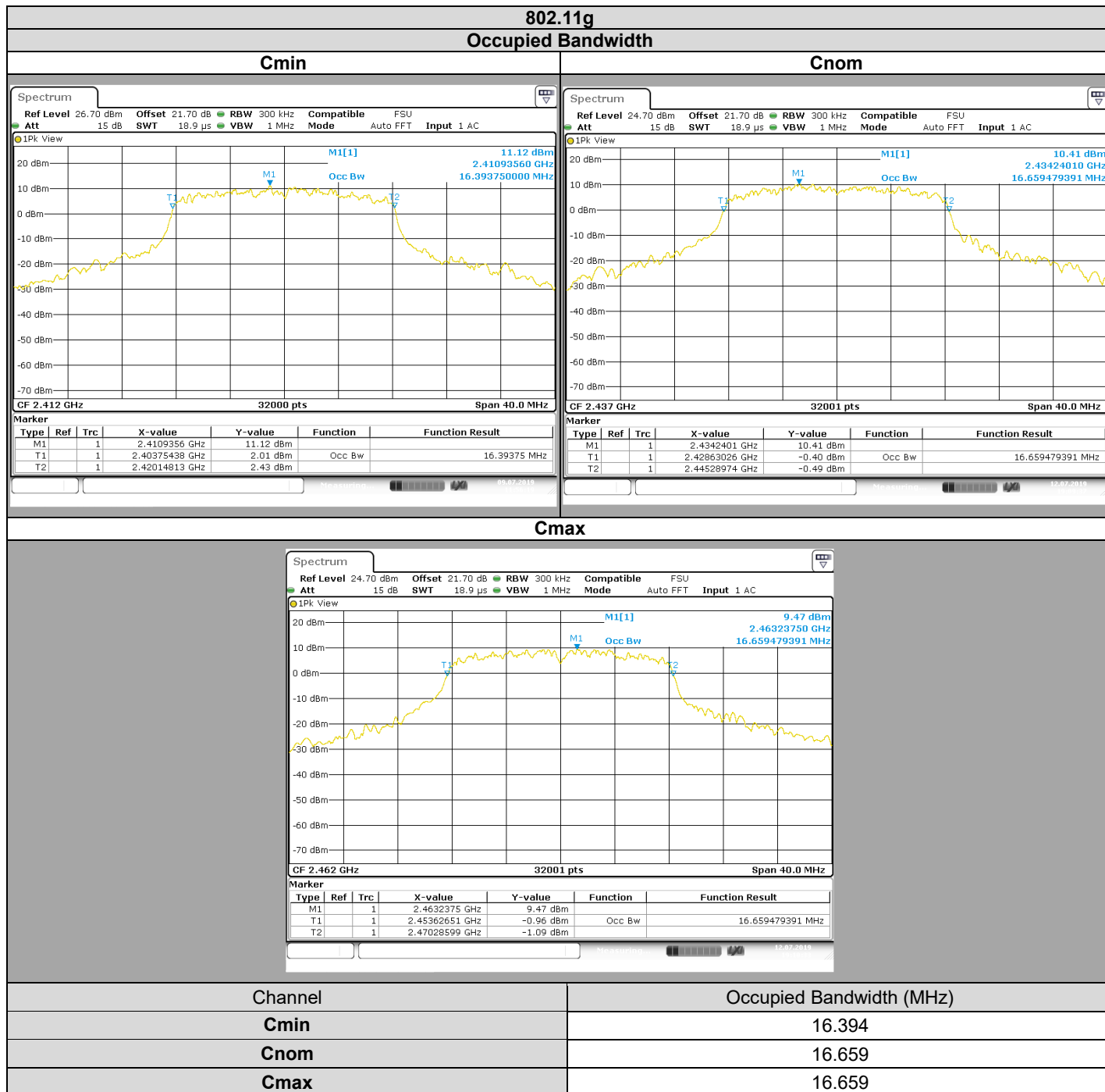
3.4. TEST EQUIPMENT LIST

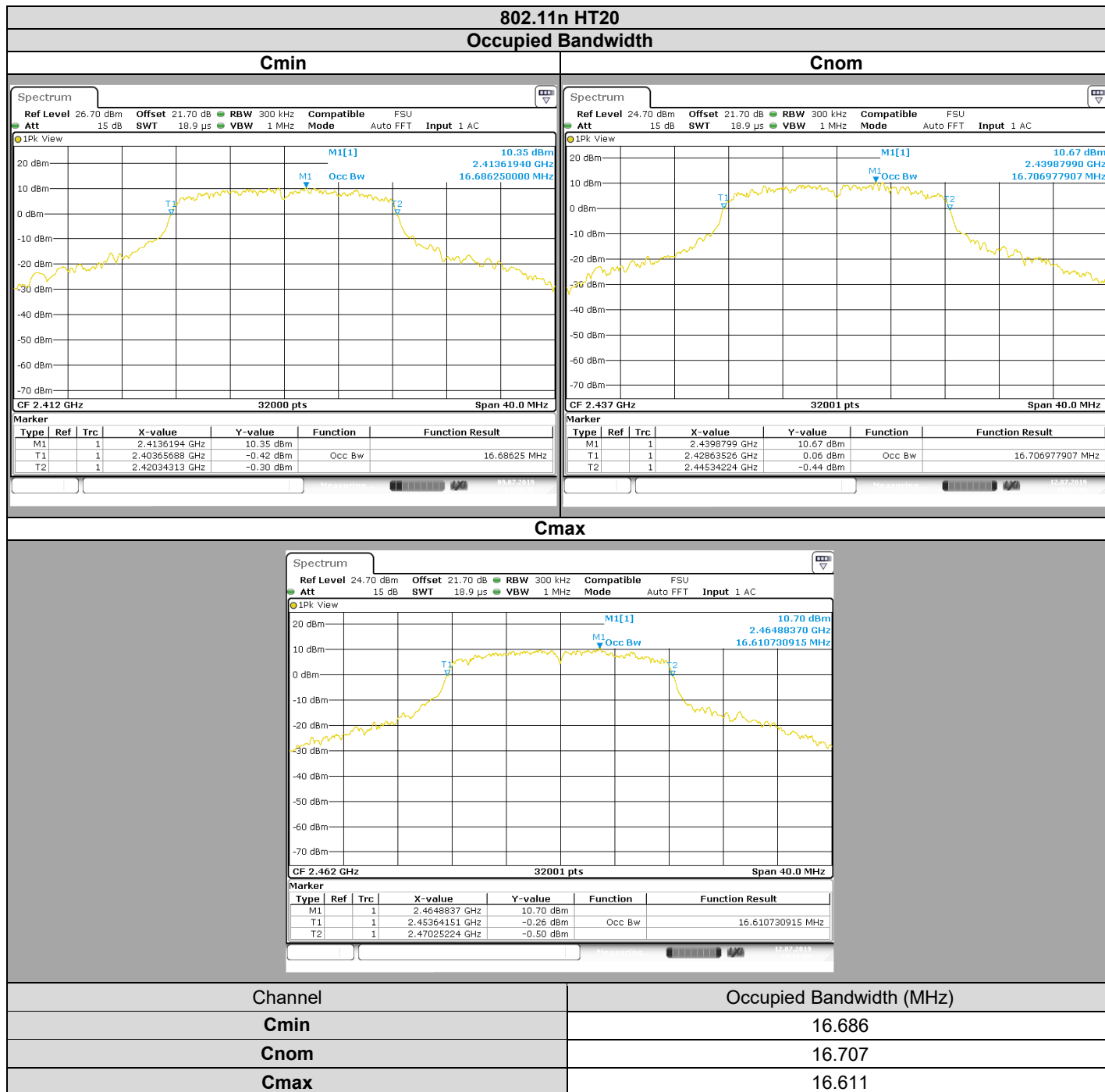
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2019/01	2021/01
Cable + Attenuateur 20dB	PASTERNAK	PE350-150CM	A5329867	2018/12	2019/12

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

3.5. RESULTS







3.6. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product Netatmo NDB01, SN: **g549be2**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS-GEN ISSUE 5** limits.

4. 6dB EMISSION BANDWIDTH

4.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : September 13, 2019 & September 18, 2019
Ambient temperature : 27°C & 26°C
Relative humidity : 47% & 44%

4.2. TEST SETUP

- The Equipment Under Test is installed:

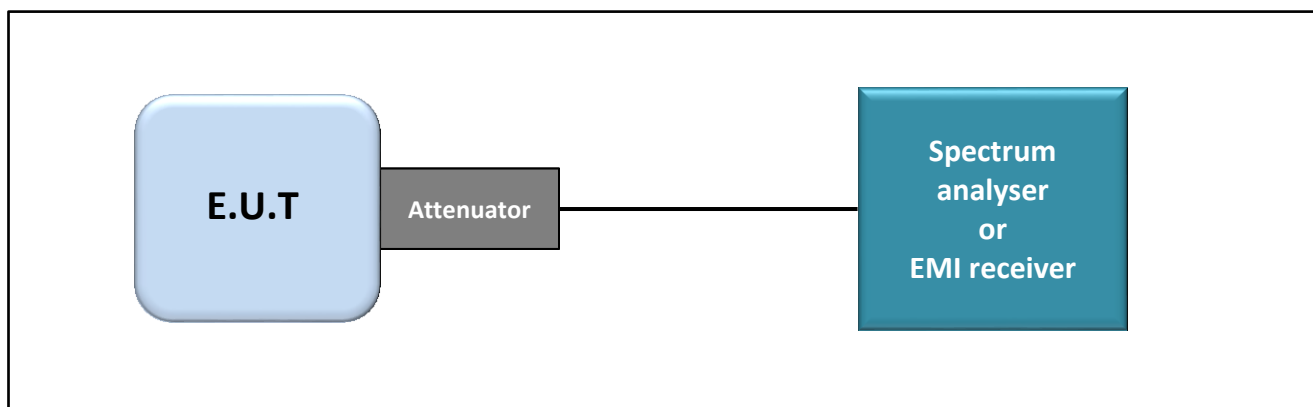
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

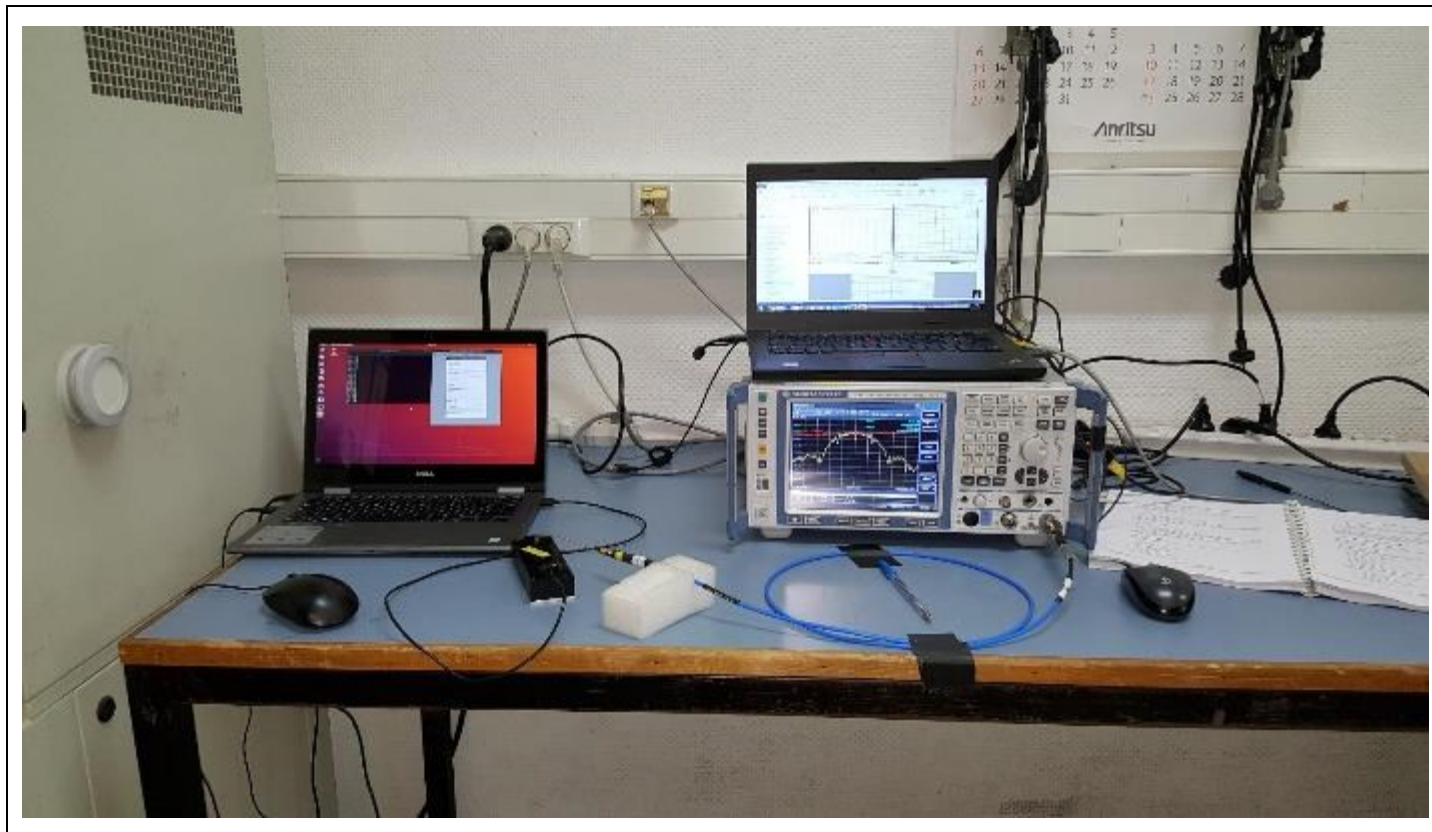
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ ANSI C63.10 § 11.8.1
- ☐ ANSI C63.10 § 11.8.2



Test set up of 6dB Emission Bandwidth



Photograph for 6dB emission bandwidth

4.3. LIMIT

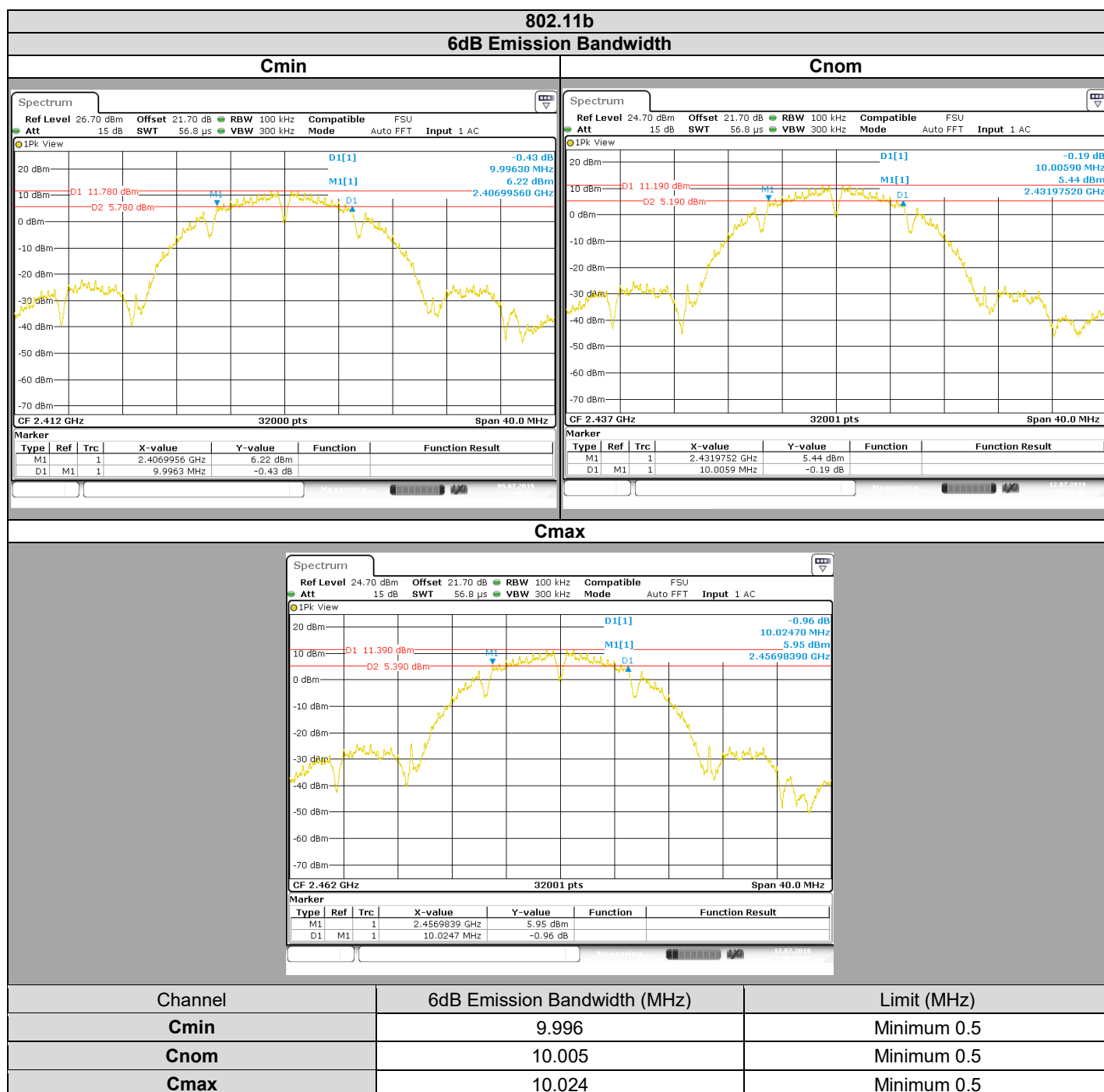
The 6dB bandwidth shall be at least 500kHz

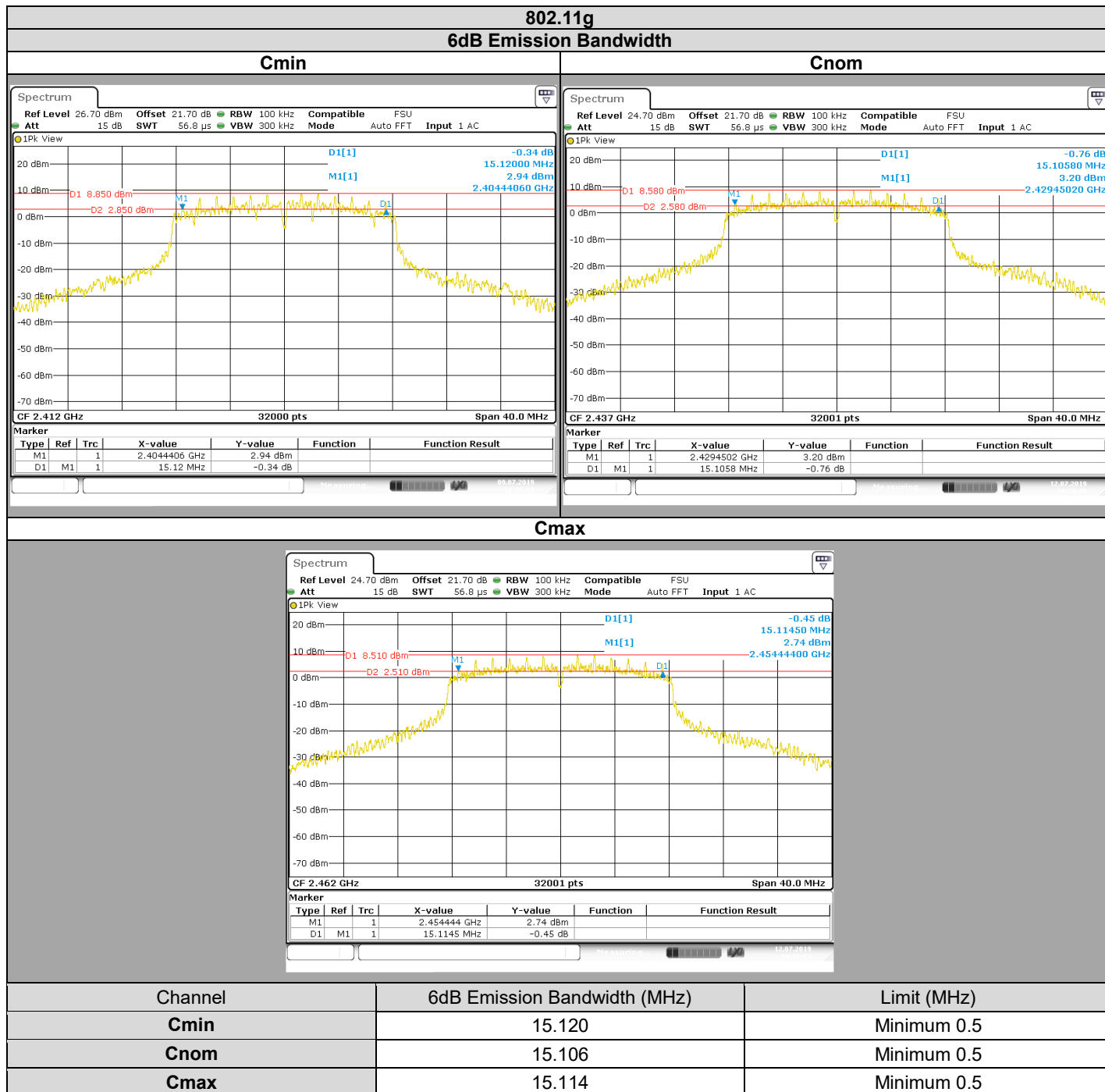
4.4. TEST EQUIPMENT LIST

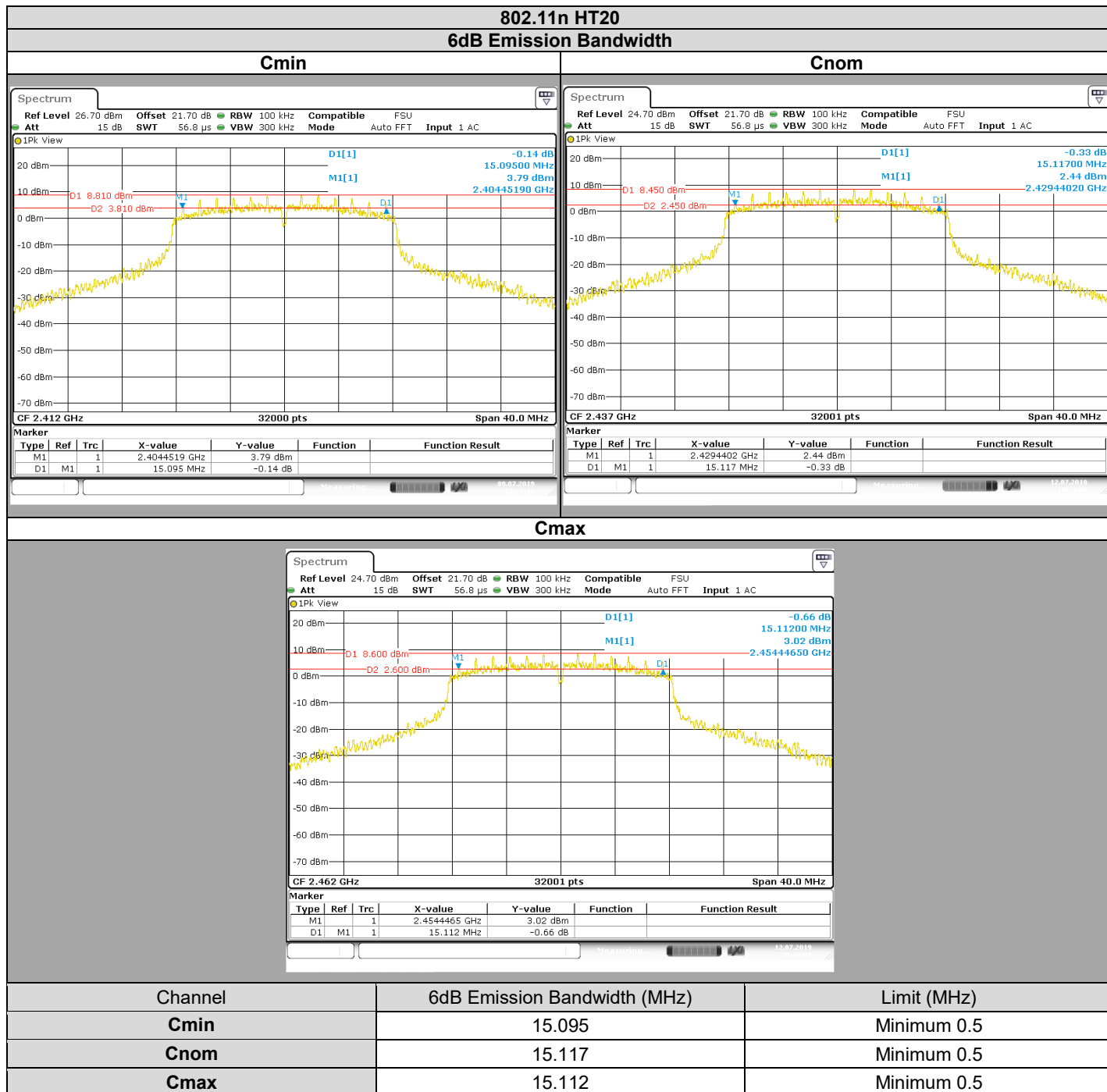
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2019/01	2021/01
Cable + Attenuateur 20dB	PASTERNAK	PE350-150CM	A5329867	2018/12	2019/12

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

4.5. RESULTS







4.6. CONCLUSION

6dB Emission Bandwidth measurement performed on the sample of the product Netatmo NDB01, SN: **g549be2**, 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. DUTY CYCLE

5.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : September 13, 2019 & September 18, 2019
Ambient temperature : 27°C & 26°C
Relative humidity : 47% & 44%

5.2. TEST SETUP

- The Equipment Under Test is installed:

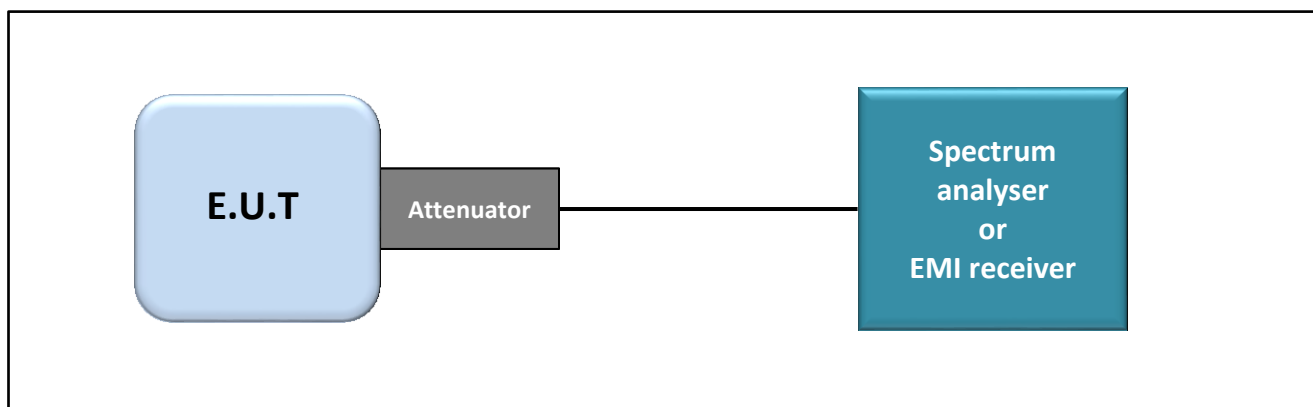
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

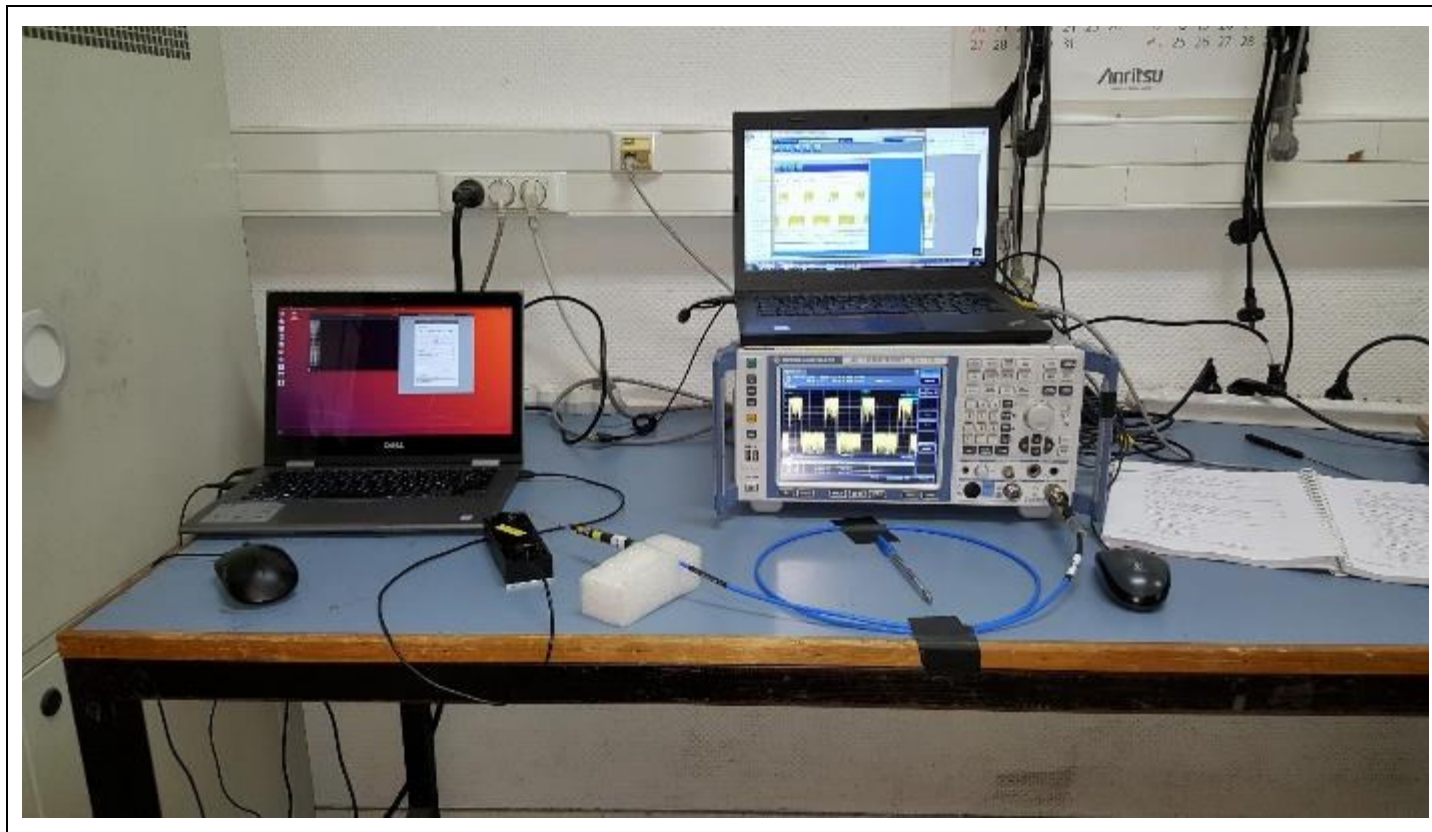
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ ANSI C63.10 § 11.6



Test set up of Duty Cycle



Photograph for Duty Cycle

5.3. LIMIT

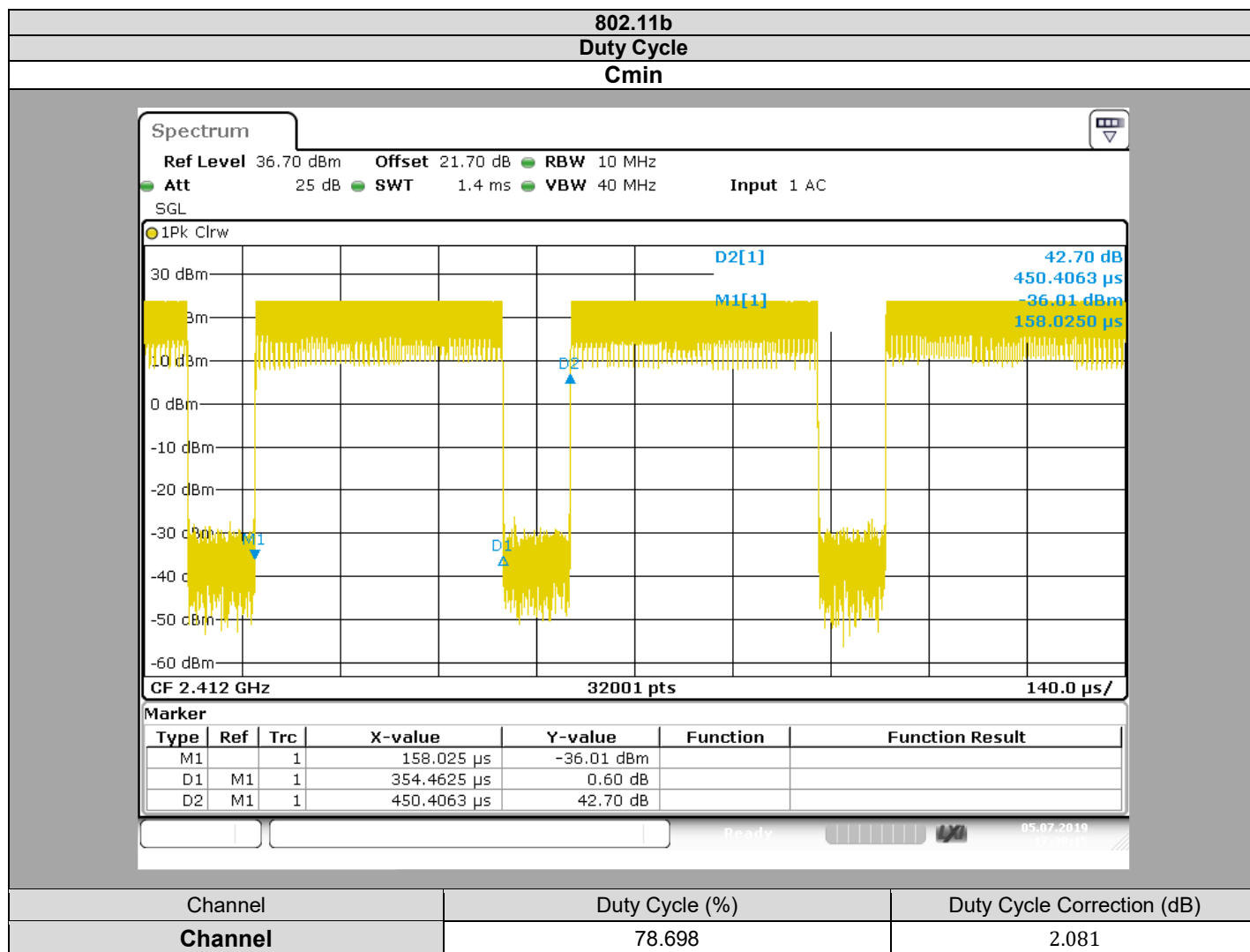
None

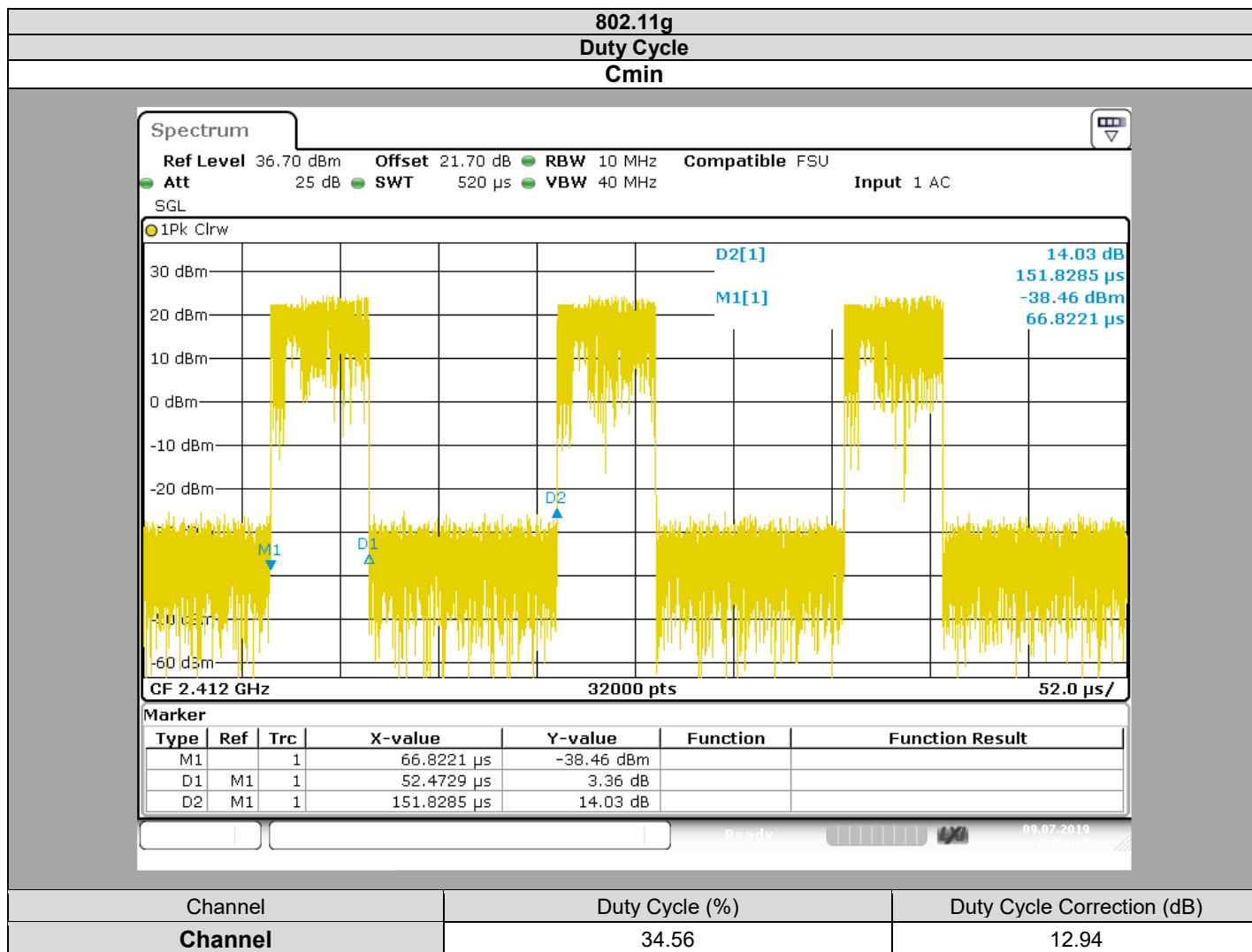
5.4. TEST EQUIPMENT LIST

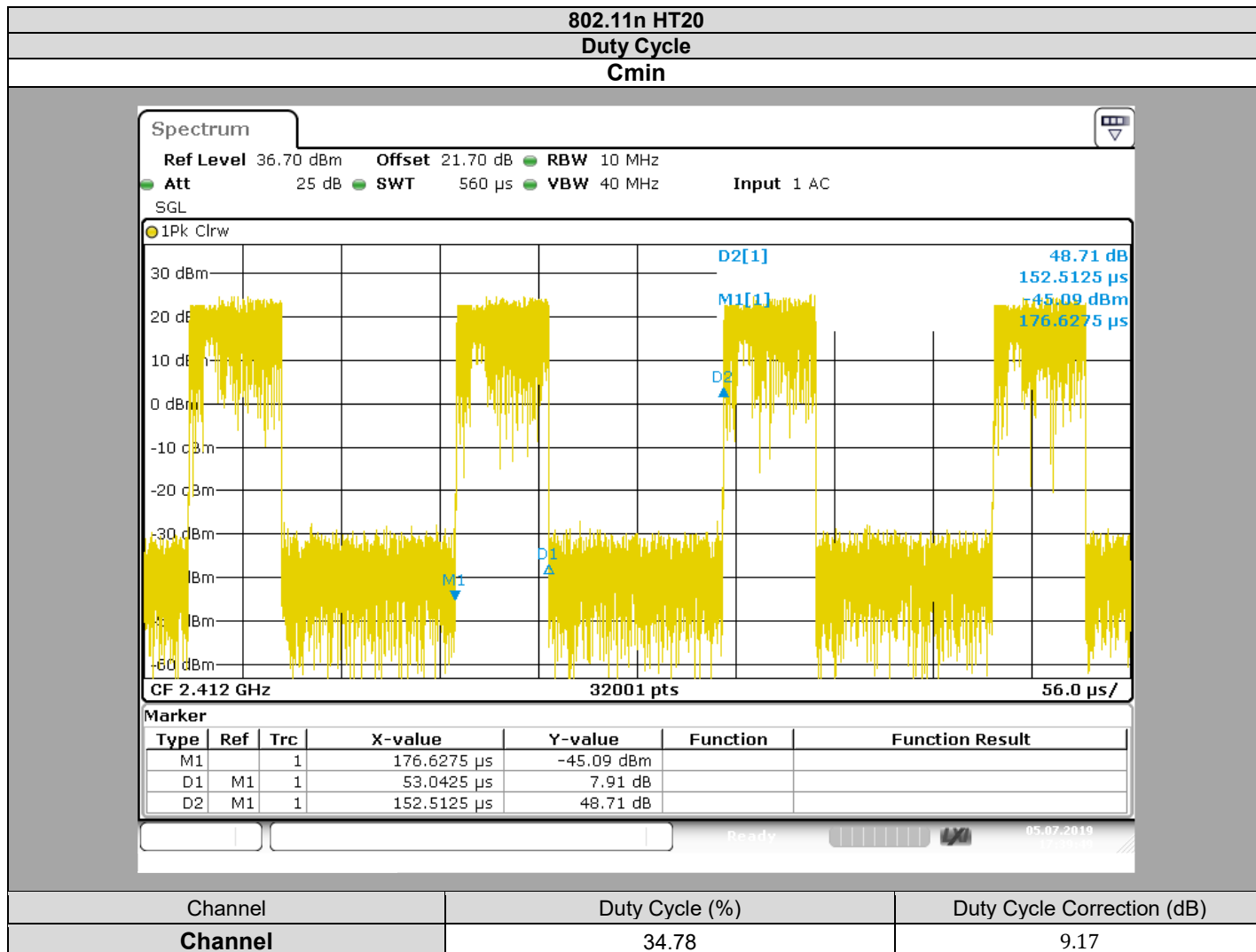
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2019/01	2021/01
Cable + Attenuateur 20dB	PASTERNAK	PE350-150CM	A5329867	2018/12	2019/12

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

5.5. RESULTS







5.6. CONCLUSION

Duty Cycle measurement performed on the sample of the product Netatmo NDB01, SN: **g549be2**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

6. MAXIMUM CONDUCTED OUTPUT POWER

6.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : September 13, 2019 & September 18, 2019
Ambient temperature : 27°C & 26°C
Relative humidity : 47% & 44%

6.2. TEST SETUP

- The Equipment Under Test is installed:

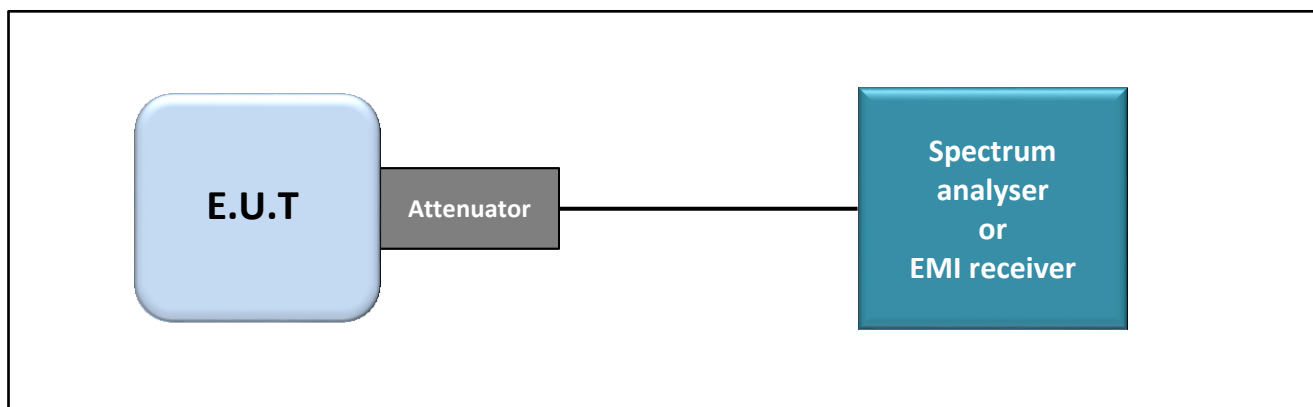
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

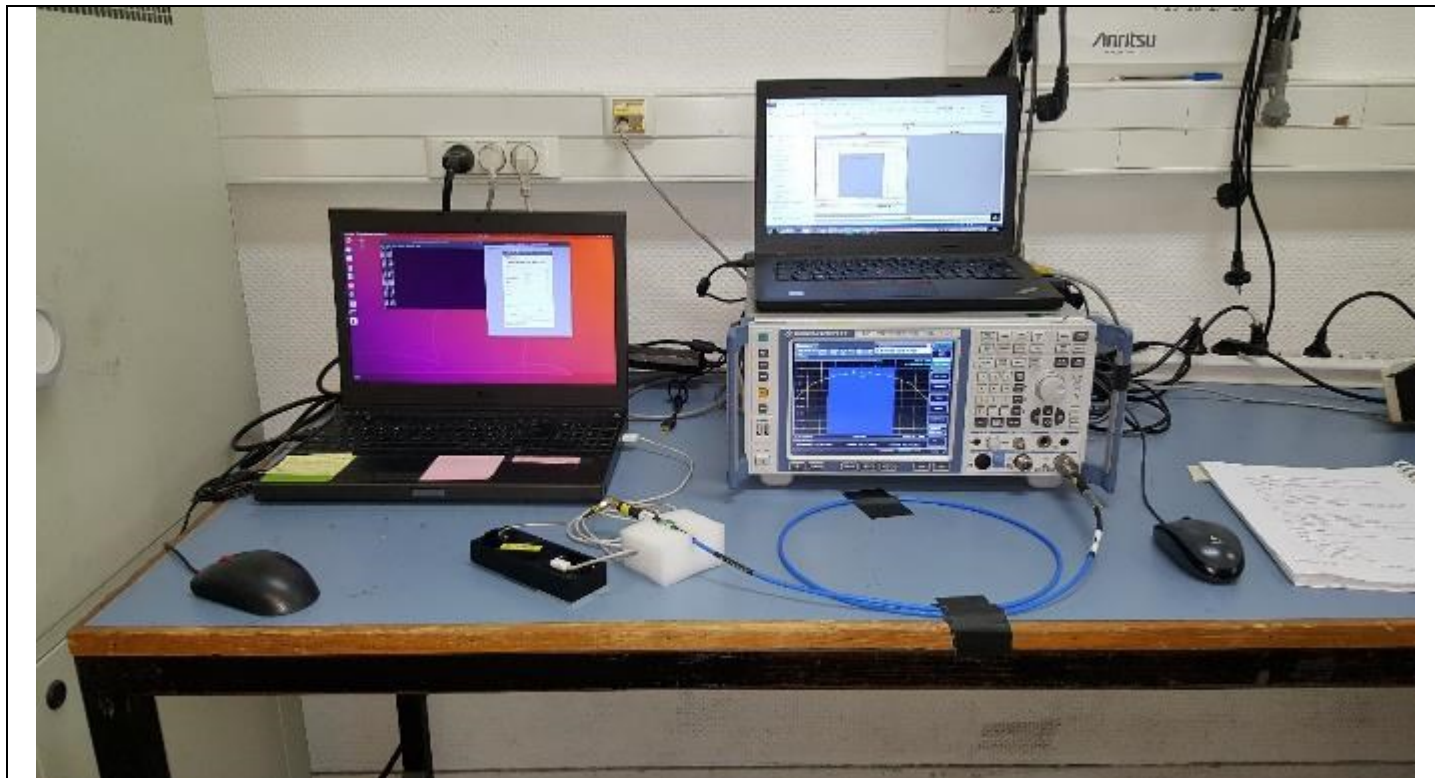
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☐ ANSI C63.10 § 11.9.1.1
- ☒ ANSI C63.10 § 11.9.1.2
- ☐ ANSI C63.10 § 11.9.2.2.2 (Method AVGSA-1)
- ☐ ANSI C63.10 § 11.9.2.2.4 (Method AVGSA-2)
- ☐ KDB 662911 D01 Multiple Transmitter Output v02r01



Test set up of Maximum Conducted Output Power



Photograph for Maximum Conducted Output Power

6.3. LIMIT

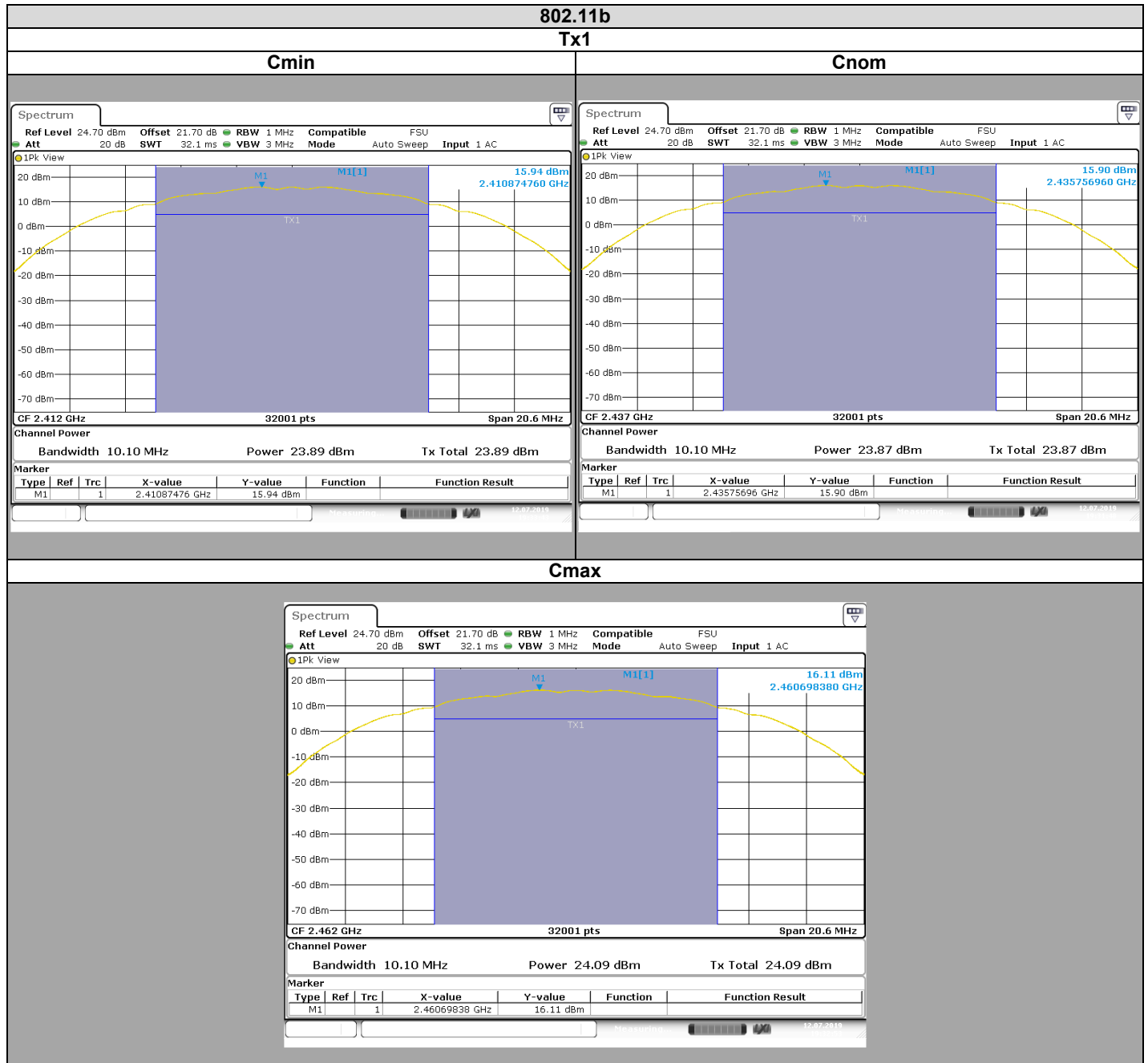
Maximum Conducted Output power:
 2400MHz-2483.5MHz: Shall not exceed 30dBm
 Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

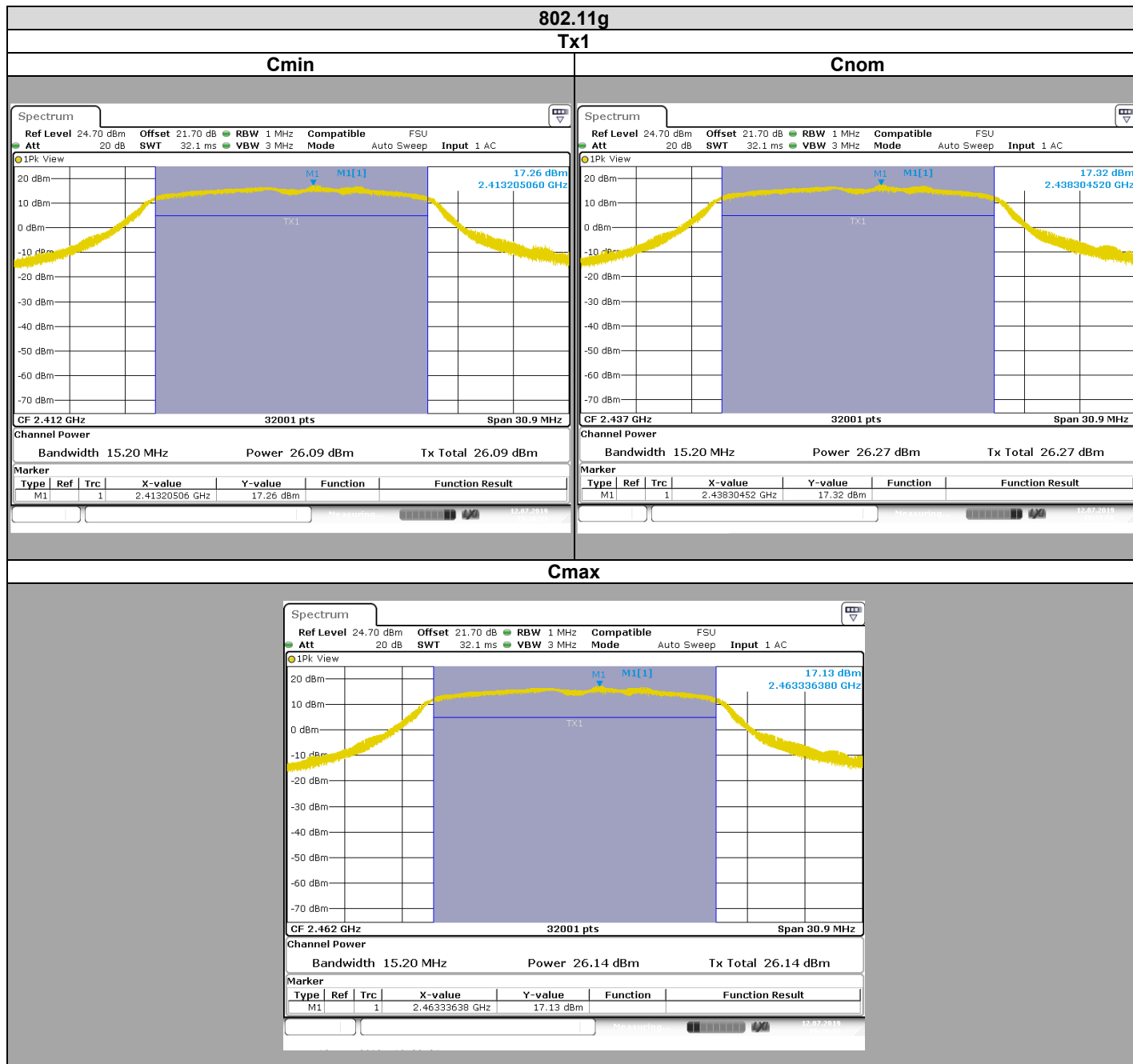
6.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2019/01	2021/01
Cable + Attenuateur 20dB	PASTERNAK	PE350-150CM	A5329867	2018/12	2019/12

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

6.5. RESULTS



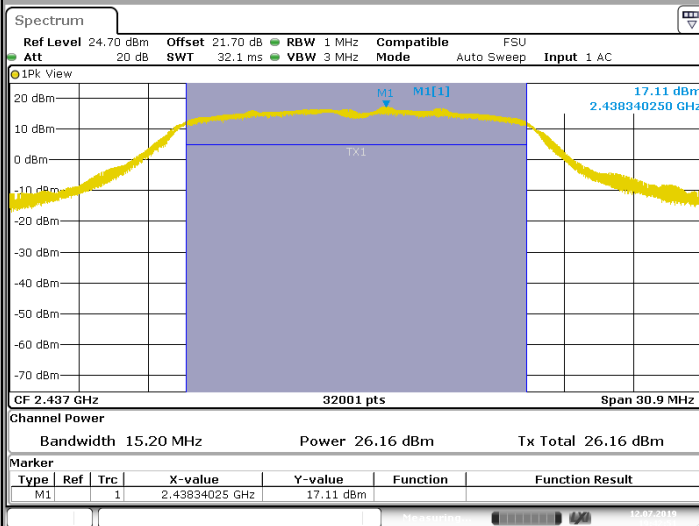
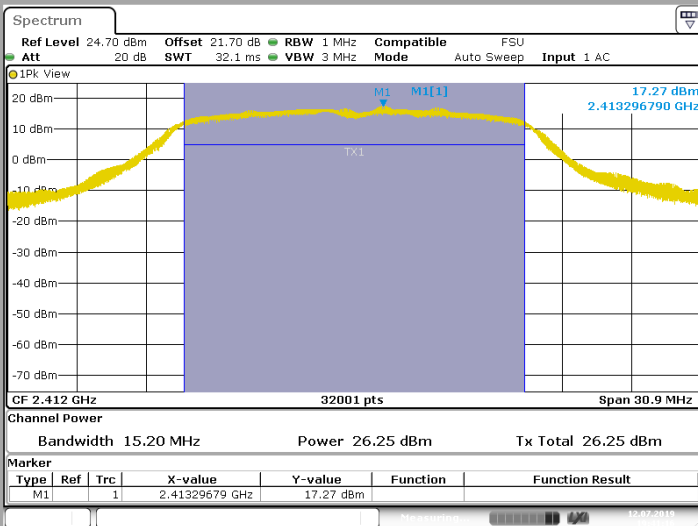


802.11n HT20

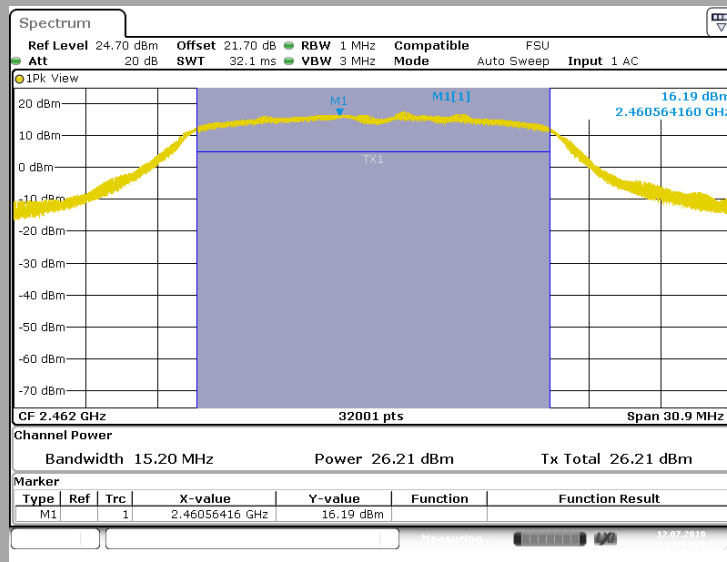
Tx1

Cmin

Cnom



Cmax





Spectrum Analyzer Offset:
Cable Loss= 1.7dB + Attenuator= 20dB

802.11b							
Channel	Tx1 (dBm)	Tx2 (dBm)	Tx3 (dBm)	Tx4 (dBm)	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	23.89	-	-	-	1.4	23.89	30
Cnom	23.87	-	-	-	1.4	23.87	30
Cmax	24.09	-	-	-	1.4	24.09	30

802.11g							
Channel	Tx1 (dBm)	Tx2 (dBm)	Tx3 (dBm)	Tx4 (dBm)	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	26.09	-	-	-	1.4	26.09	30
Cnom	26.27	-	-	-	1.4	26.27	30
Cmax	26.14	-	-	-	1.4	26.14	30

802.11n HT20							
Channel	Tx1 (dBm)	Tx2 (dBm)	Tx3 (dBm)	Tx4 (dBm)	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	26.25	-	-	-	1.4	26.25	30
Cnom	26.16	-	-	-	1.4	26.16	30
Cmax	26.21	-	-	-	1.4	26.21	30

6.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product Netatmo NDB01, SN: **g549be2**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

7. POWER SPECTRAL DENSITY

7.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : September 13, 2019 & September 18, 2019
Ambient temperature : 27°C & 26°C
Relative humidity : 47% & 44%

7.2. TEST SETUP

- The Equipment Under Test is installed:

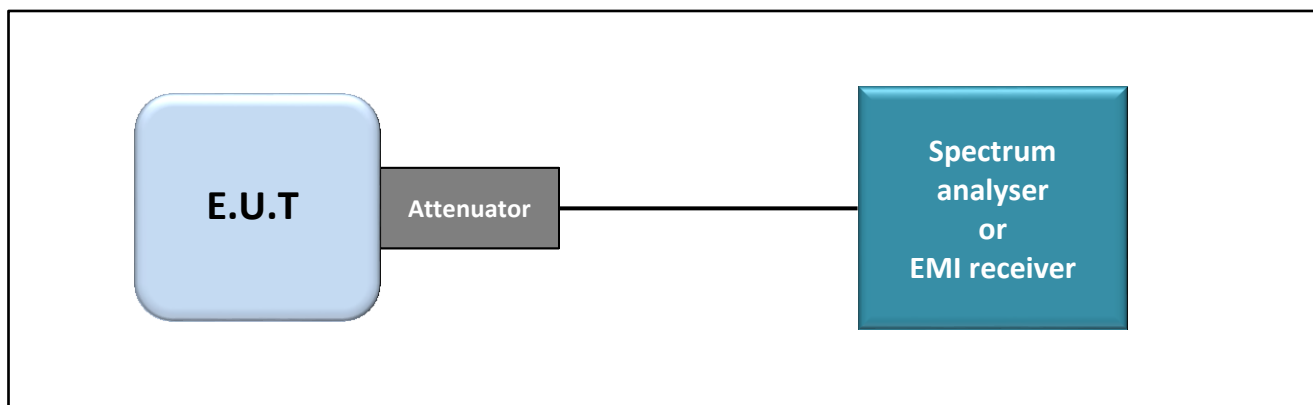
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

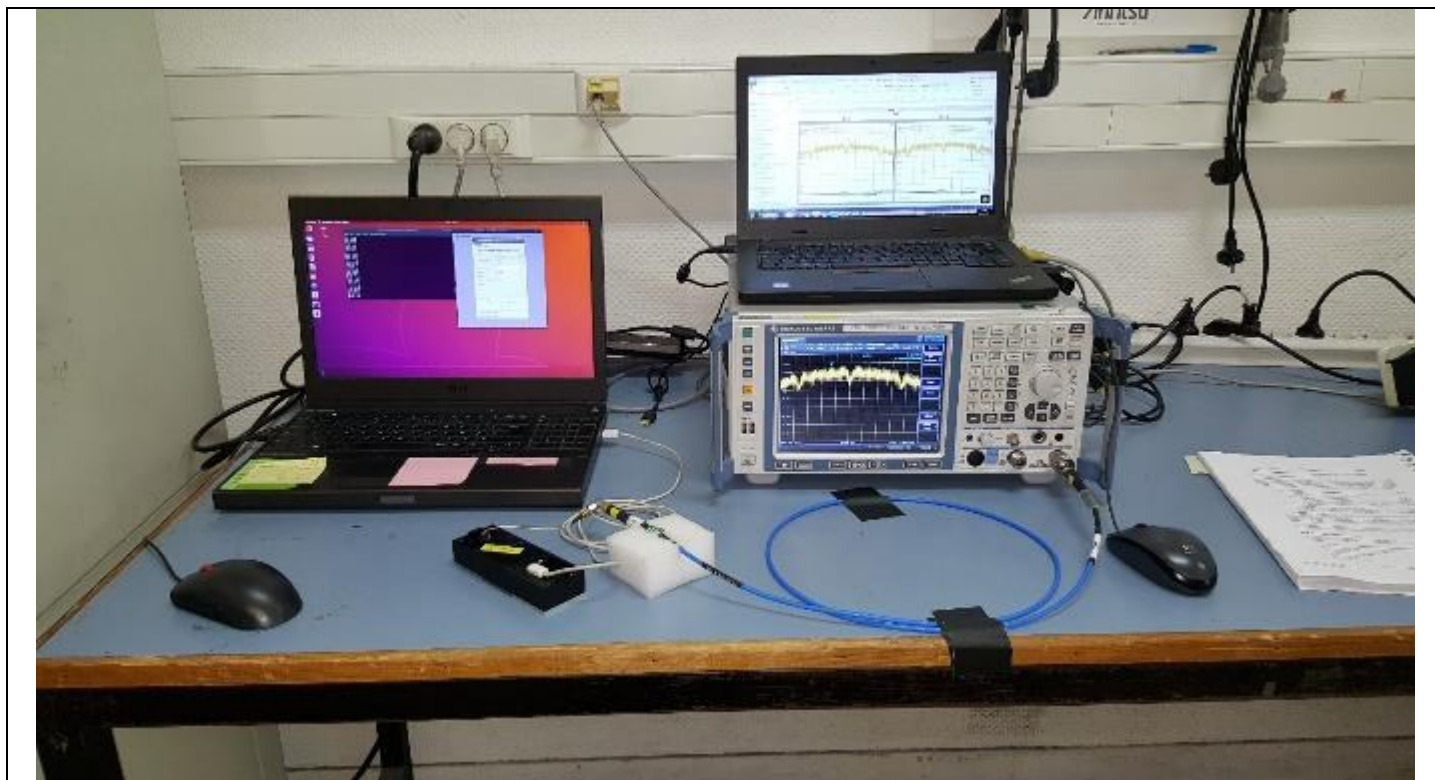
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ ANSI C63.10 § 11.10.2 (Method PKPSD)
- ☐ ANSI C63.10 § 11.10.3 (Method AVGPSD-1)
- ☐ KDB 662911 D01 Multiple Transmitter Output v02r01



Test set up of Power Spectral Density



Photograph for Power Spectral Density

7.3. LIMIT

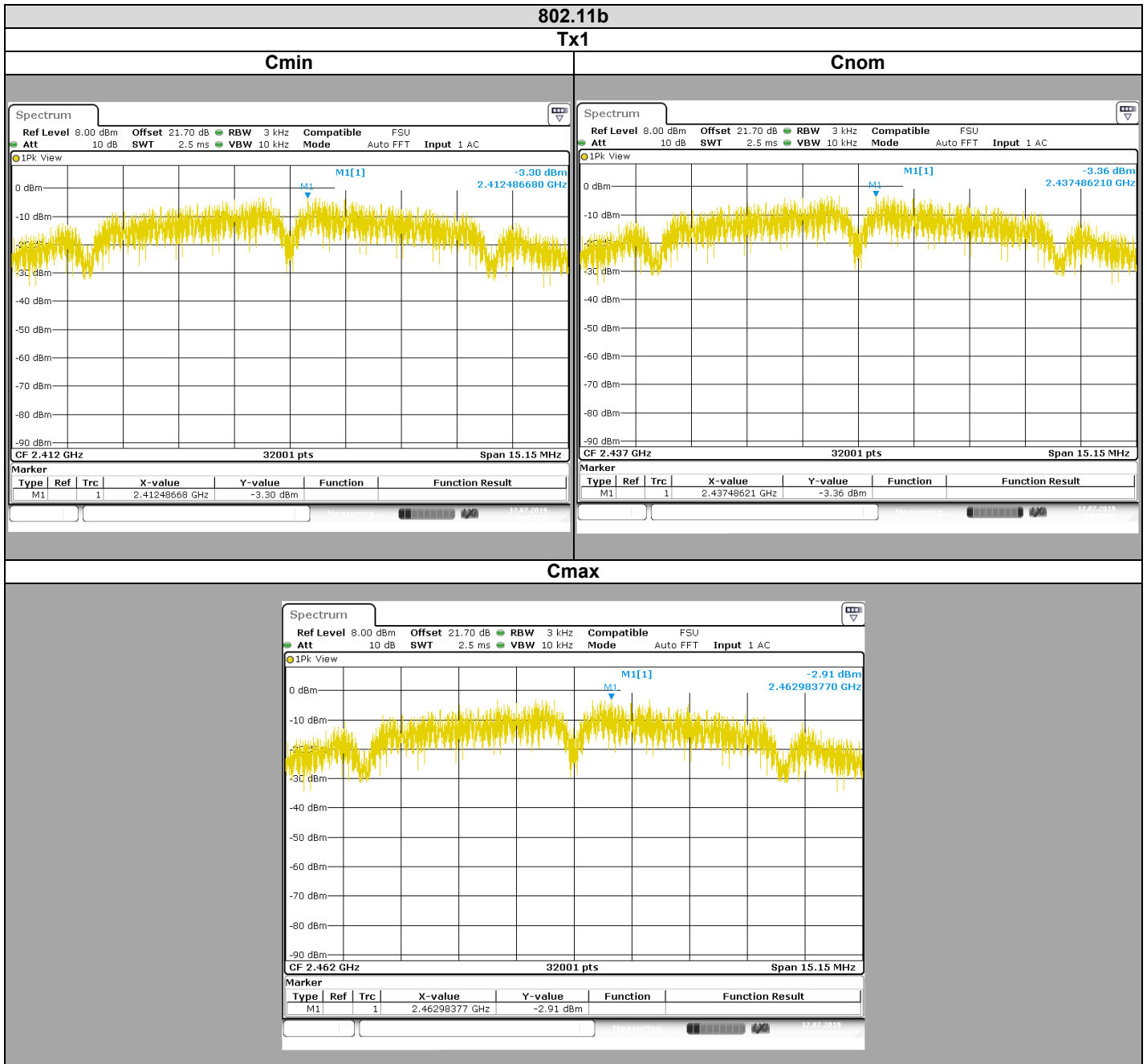
Power Spectral Density:
 2400MHz-2483.5MHz: Shall not exceed 8dBm/3kHz
 Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

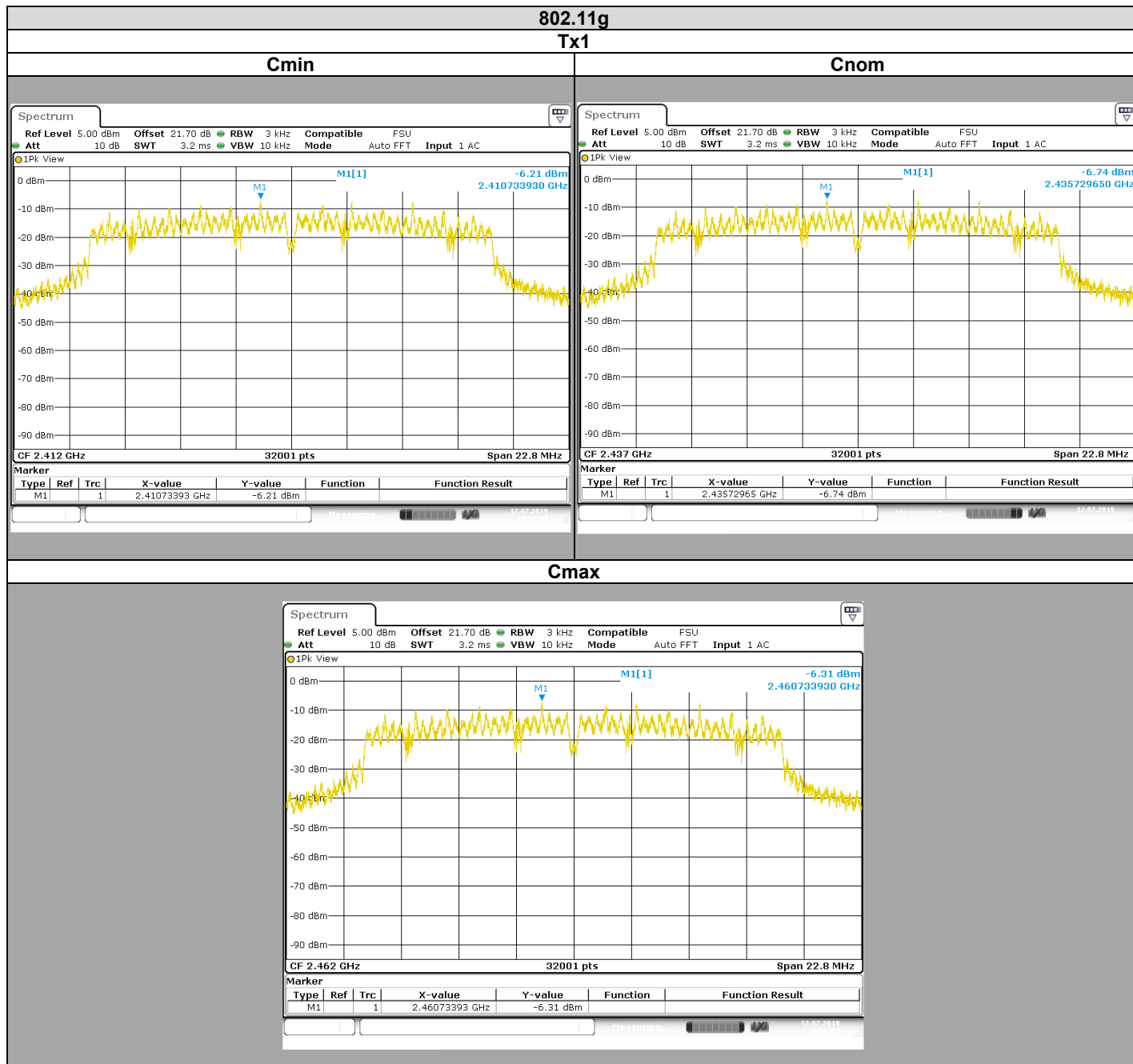
7.4. TEST EQUIPMENT LIST

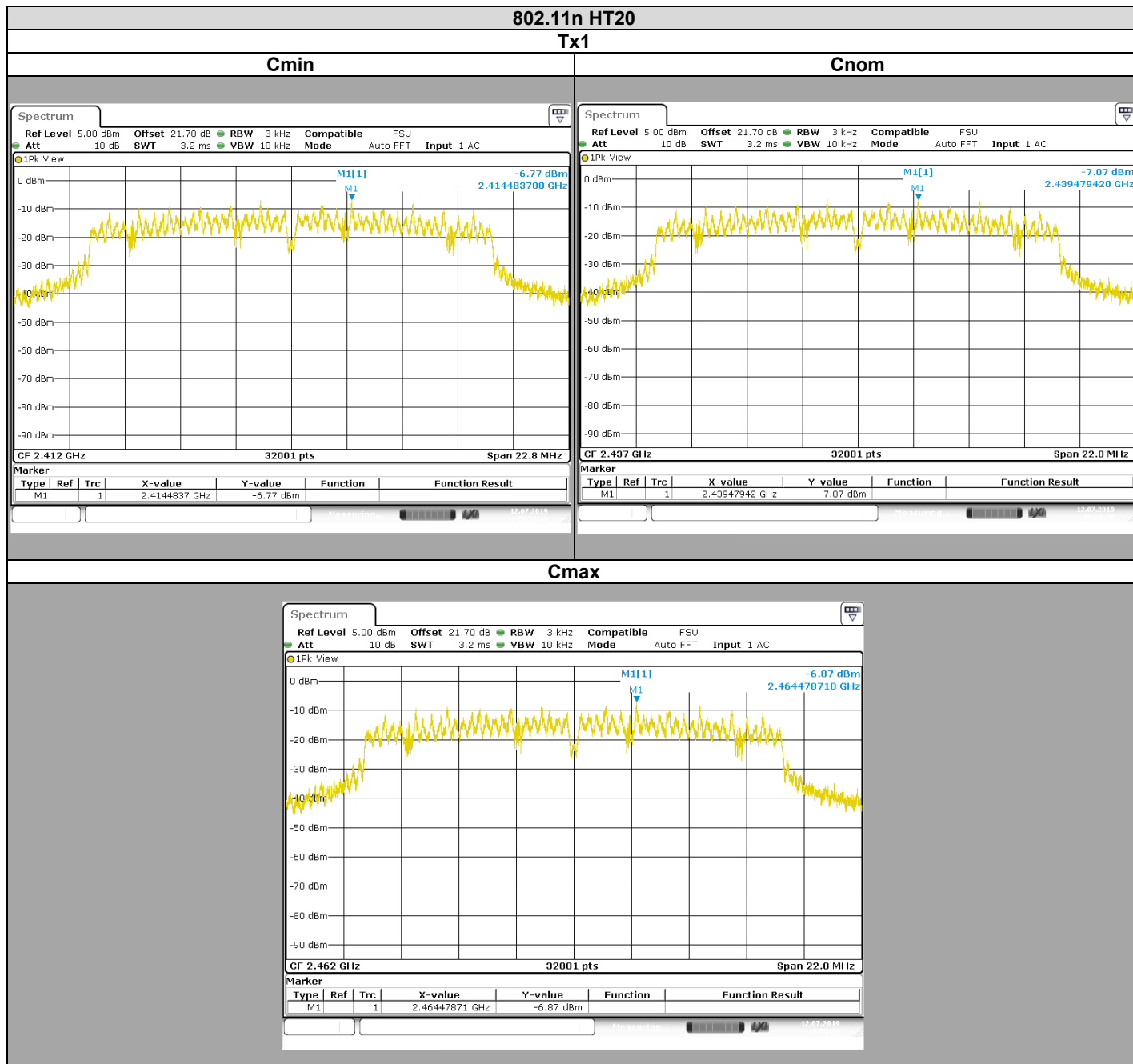
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2019/01	2021/01
Cable + Attenuateur 20dB	PASTERNAK	PE350-150CM	A5329867	2018/12	2019/12

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

7.5. RESULTS









Spectrum Analyzer Offset:
Cable Loss=1.7dB + Attenuator= 20dB

802.11b							
Channel	Tx1 (dBm/3kHz)	Tx1 (dBm/3kHz)	Tx1 (dBm/3kHz)	Tx1 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-3.30	-	-	-	1.4	-3.30	8
Cnom	-3.36	-	-	-	1.4	-3.36	8
Cmax	-2.91	-	-	-	1.4	-2.91	8

802.11g							
Channel	Tx1 (dBm/3kHz)	Tx1 (dBm/3kHz)	Tx1 (dBm/3kHz)	Tx1 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-6.21	-	-	-	1.4	-6.21	8
Cnom	-6.74	-	-	-	1.4	-6.74	8
Cmax	-6.31	-	-	-	1.4	-6.31	8

802.11n HT20							
Channel	Tx1 (dBm/3kHz)	Tx1 (dBm/3kHz)	Tx1 (dBm/3kHz)	Tx1 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-6.77	-	-	-	1.4	-6.77	8
Cnom	-7.07	-	-	-	1.4	-7.07	8
Cmax	-6.87	-	-	-	1.4	-6.87	8

7.6. CONCLUSION

Power Spectral Density measurement performed on the sample of the product Netatmo NDB01, SN: **g549be2**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

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

8.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : September 13, 2019 & September 18, 2019
Ambient temperature : 27°C & 26°C
Relative humidity : 47% & 44%

8.2. TEST SETUP

- The Equipment Under Test is installed:

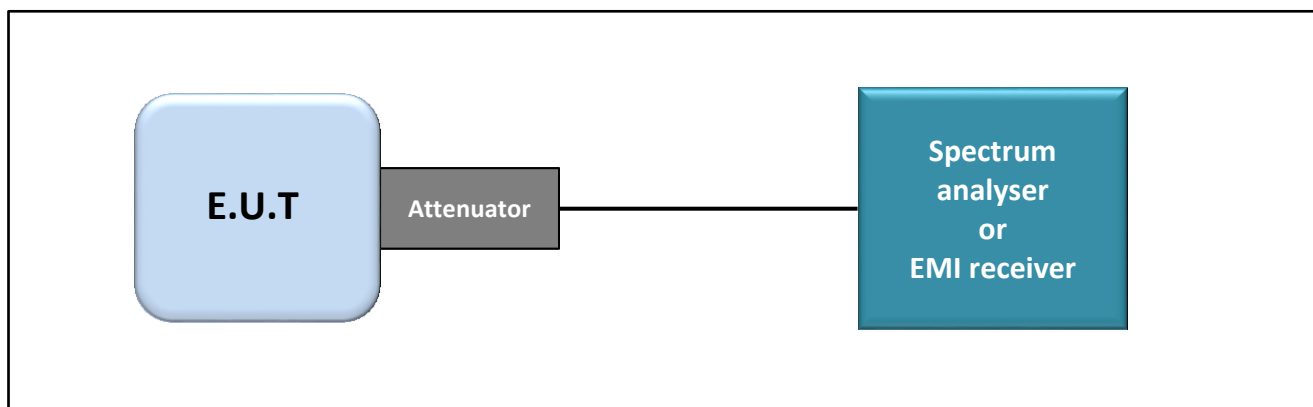
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

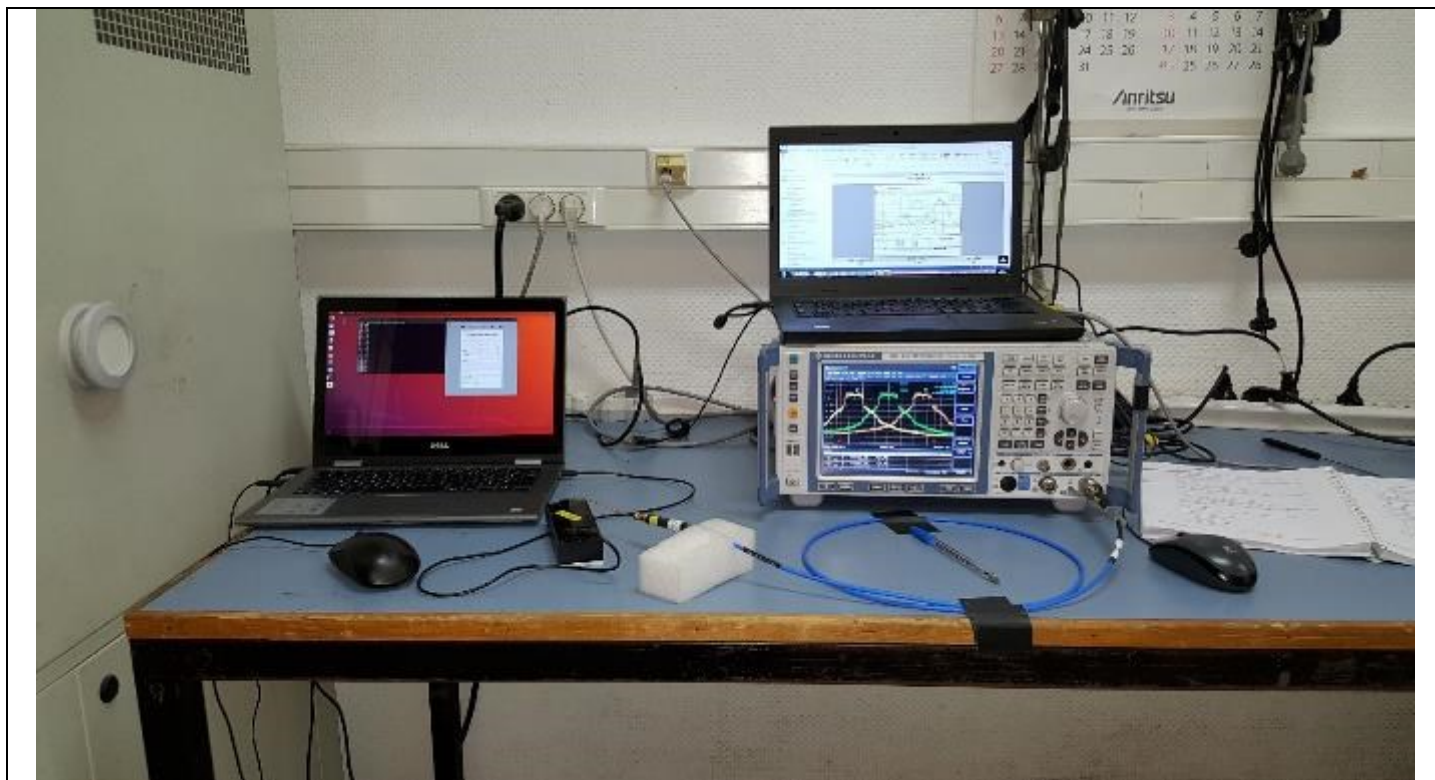
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ ANSI C63.10 § 11.11
- ☐ KDB 662911 D01 Multiple Transmitter Output v02r01



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

8.3. LIMIT

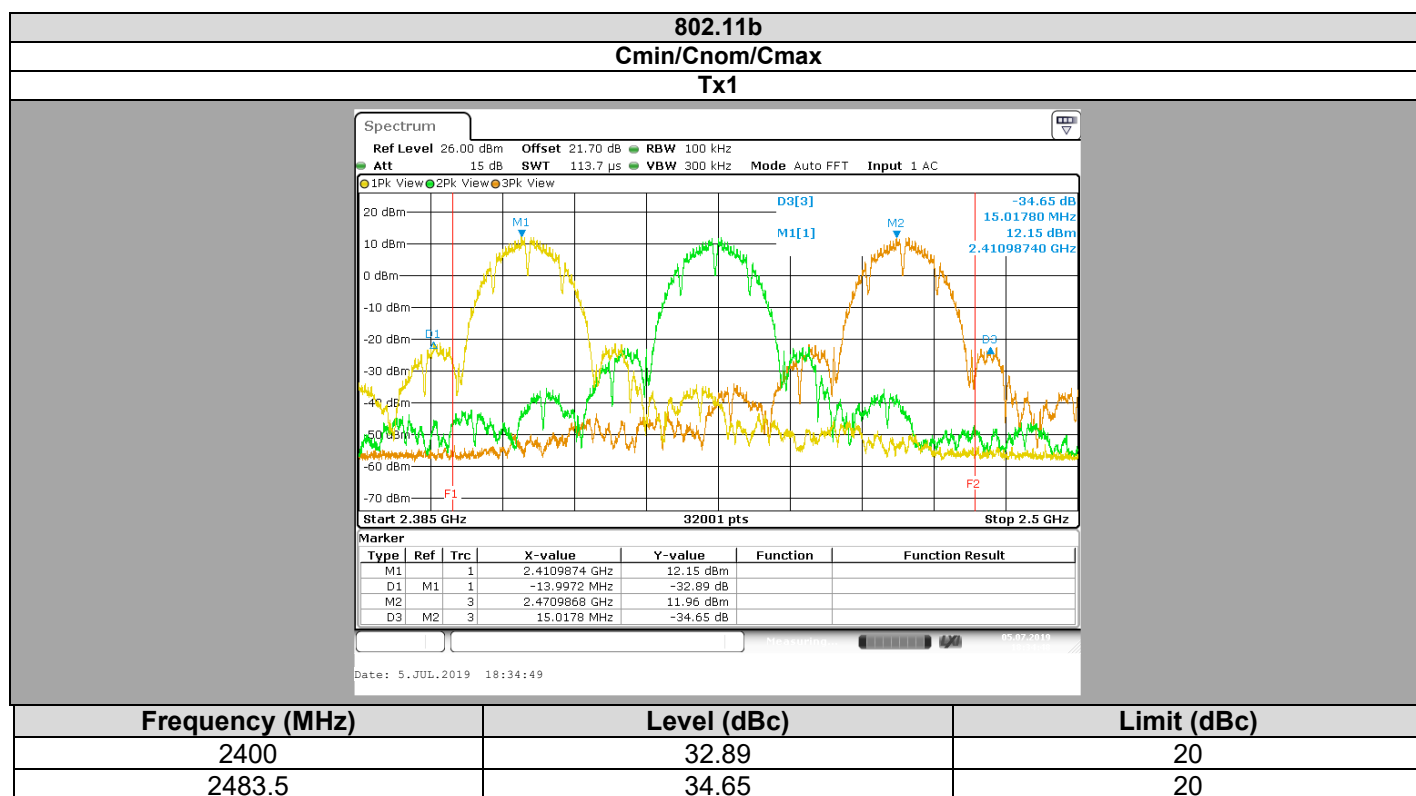
All Spurious Emissions must be at least 20dB (Maximum Conducted Power) below the Fundamental Radiator Level at the Band Edge Edge "2400MHz & 2483,5MHz"

8.4. TEST EQUIPMENT LIST

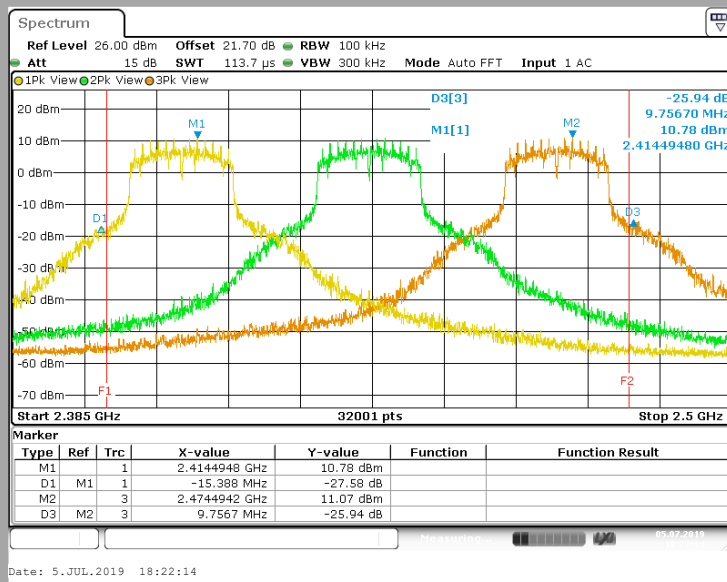
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2019/01	2021/01
Cable + Attenuateur 20dB	PASTERNAK	PE350-150CM	A5329867	2018/12	2019/12

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

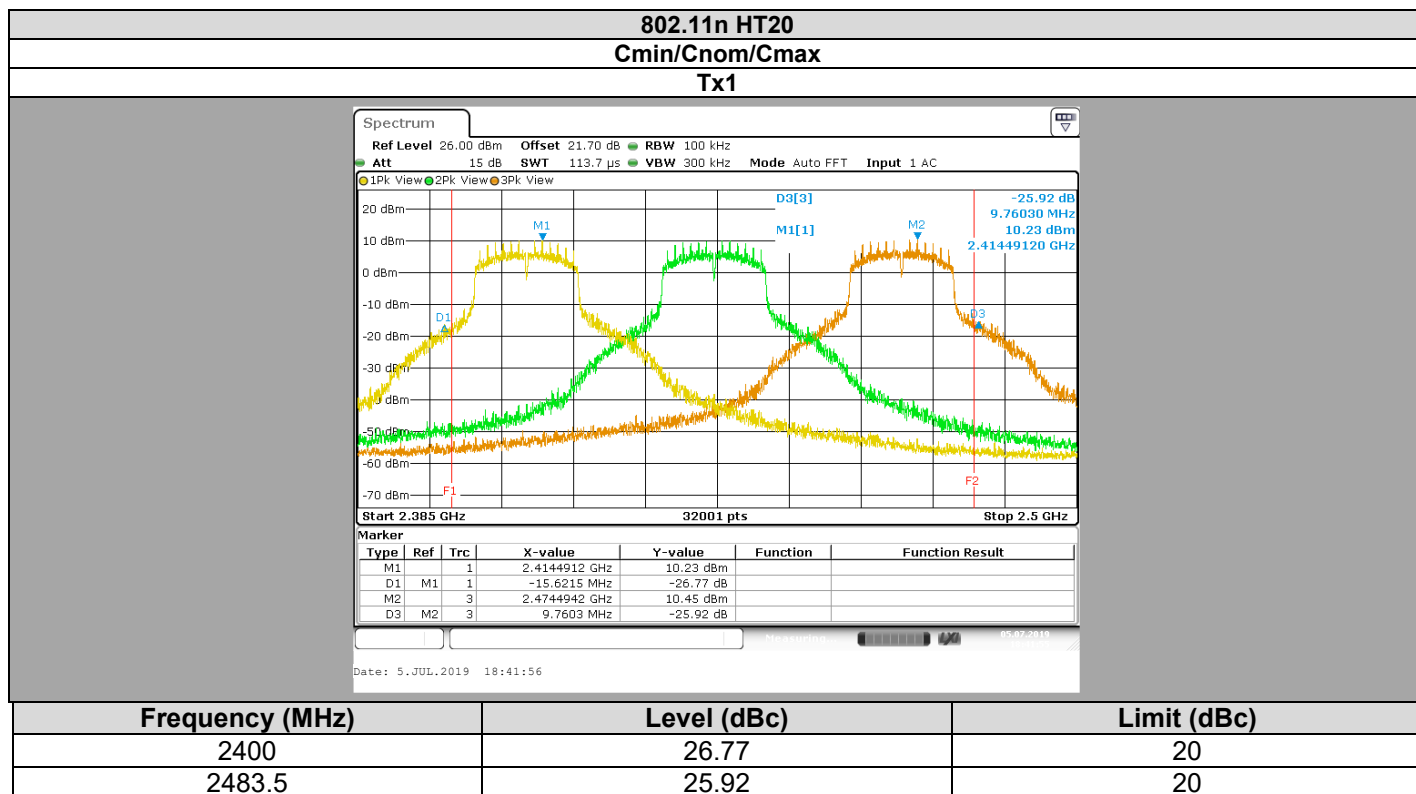
8.5. RESULTS



802.11g
Cmin/Cnom/Cmax
Tx1



Frequency (MHz)	Level (dBc)	Limit (dBc)
2400	27.58	20
2483.5	25.94	20



8.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands at the band edge measurement performed on the sample of the product Netatmo NDB01, SN: **g549be2**, 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. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS

9.1. TEST CONDITIONS

Test performed by : Armand MAHOUGOU
Date of test : September 13, 2019
Ambient temperature : 27°C
Relative humidity : 47%

9.2. TEST SETUP

- The Equipment Under Test is installed:

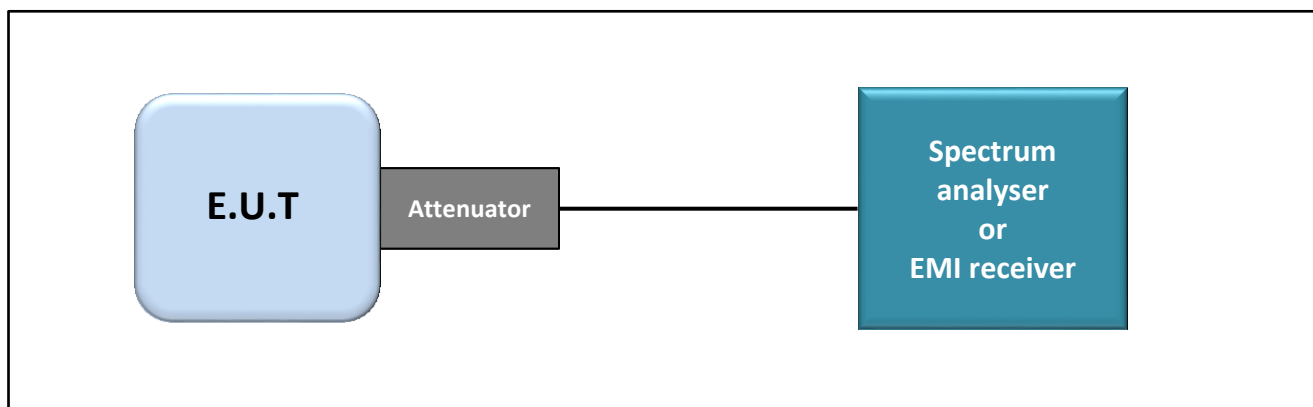
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

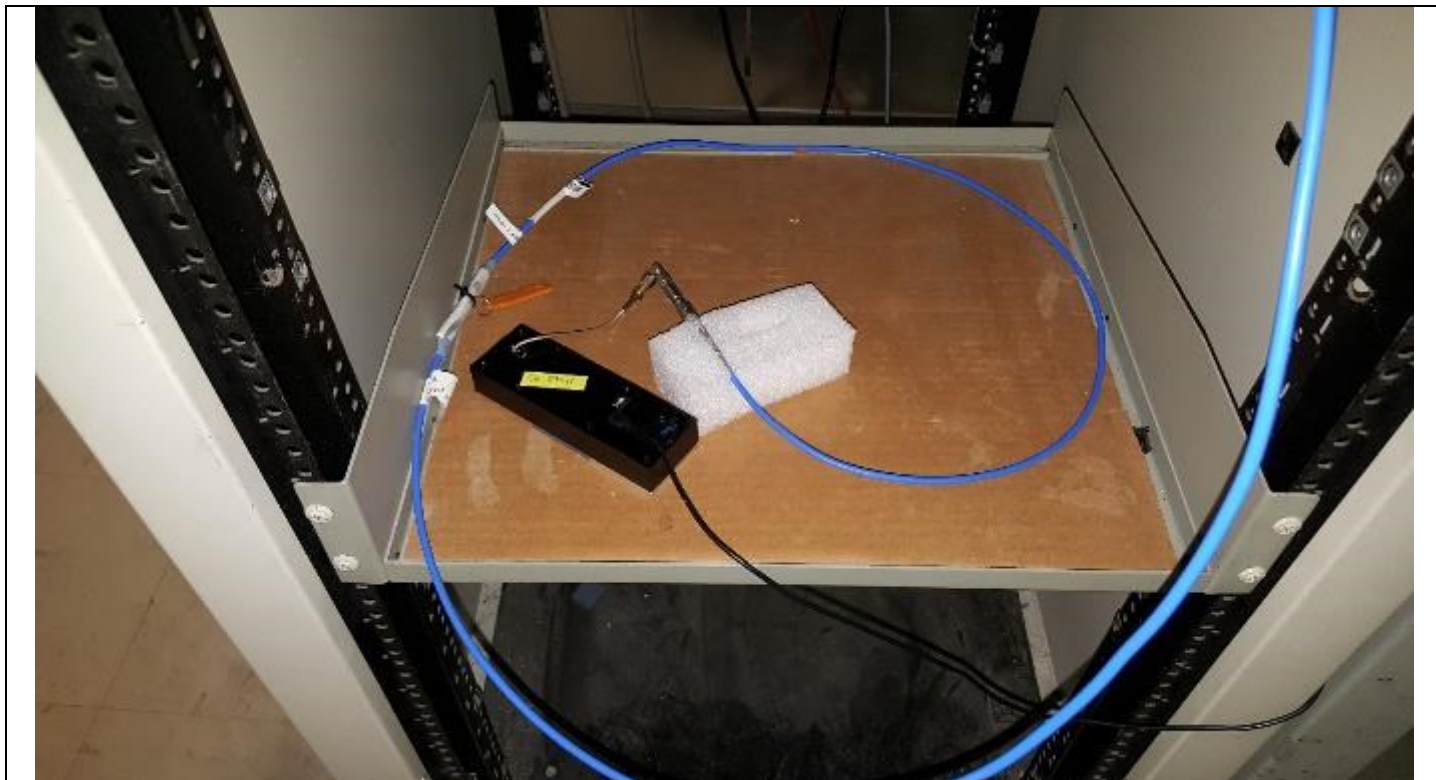
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

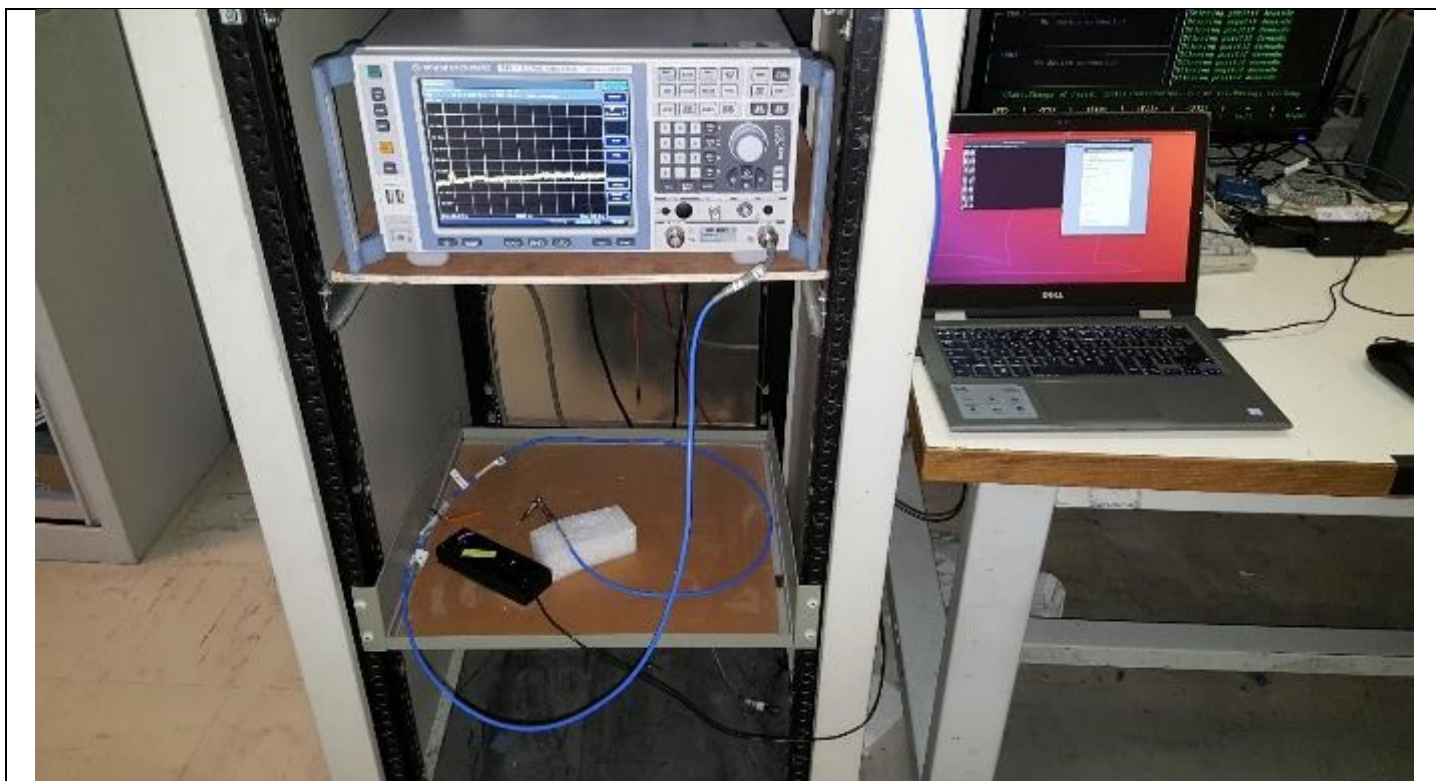
- ☒ ANSI C63.10 § 11.11
- ☐ KDB 662911 D01 Multiple Transmitter Output v02r01



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



9.3. LIMIT

All Spurious Emissions must be at least 20dB (Maximum Conducted Power) below the Fundamental Radiator Level

9.4. TEST EQUIPMENT LIST

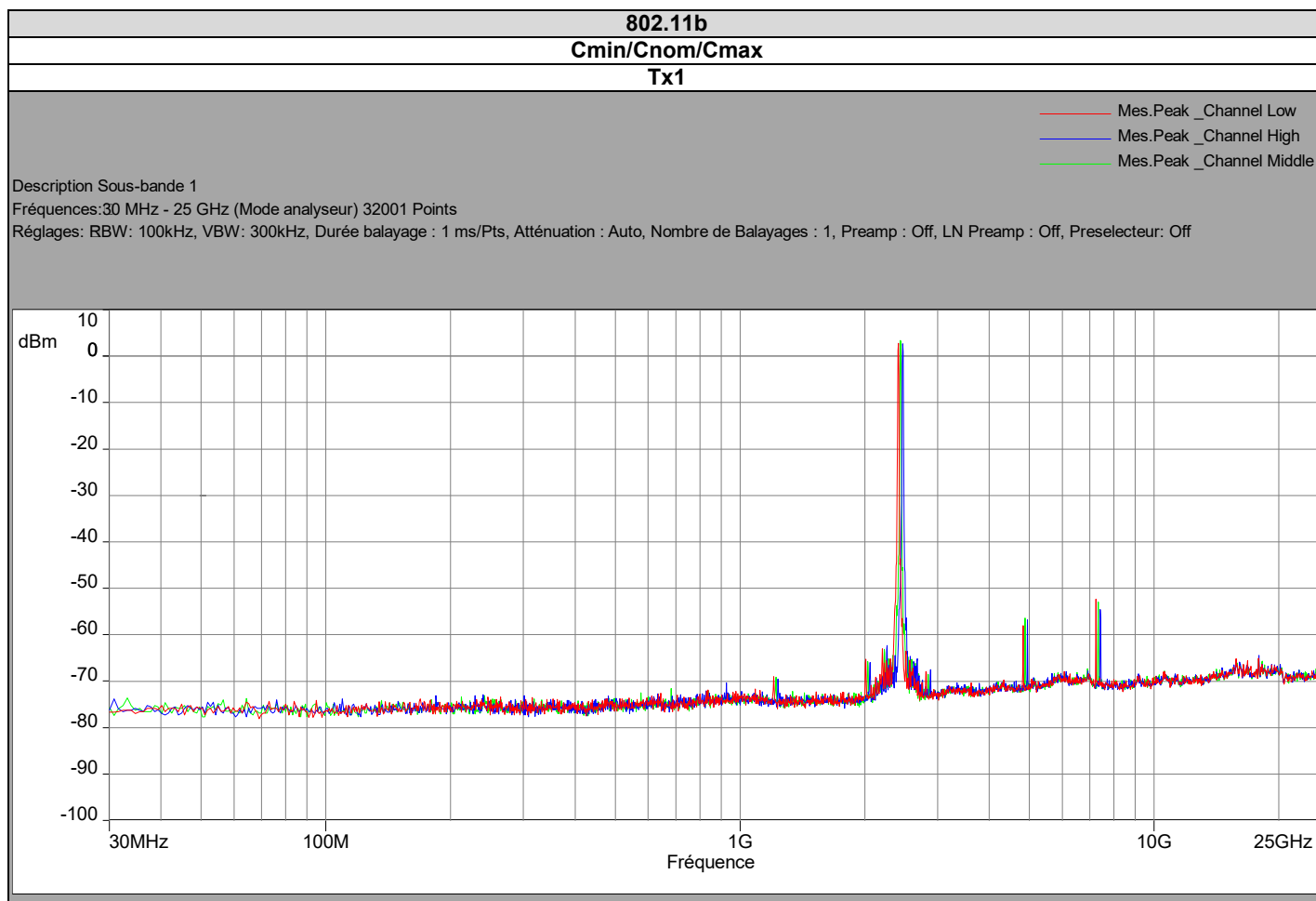
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	FSV40GHz	A4060061	2019/05	2021/05
Cable Conducted S36 chamber	TELEDYNE	084-0555-2MTR	A5329758	2019/02	2020/02
Attenuator 3dB Cable Spurious Conducted	-	WA54-3-12	A7122223	2019/02	2020/02

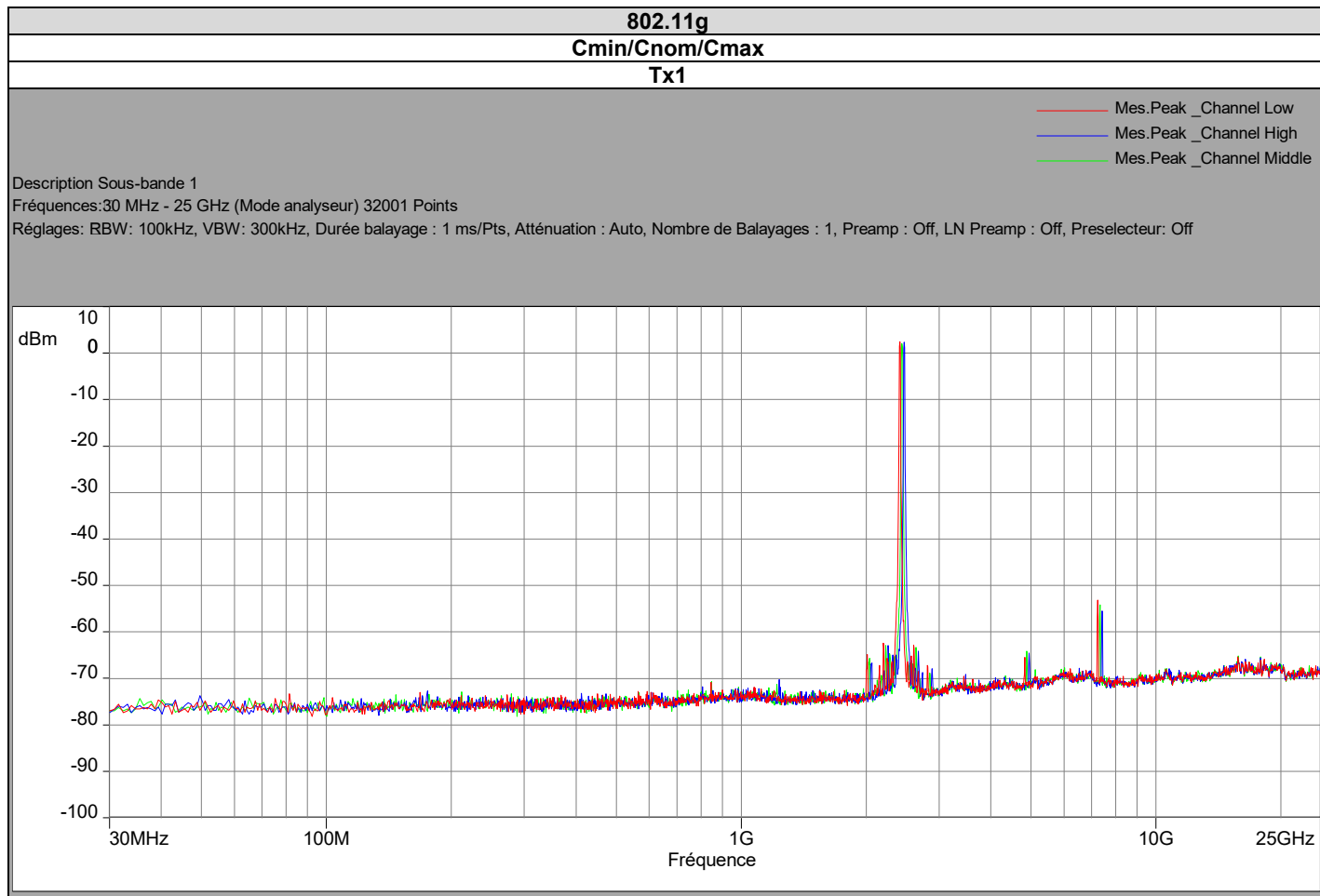
Note: In our quality system, the test equipment calibration due is more & less 2 months

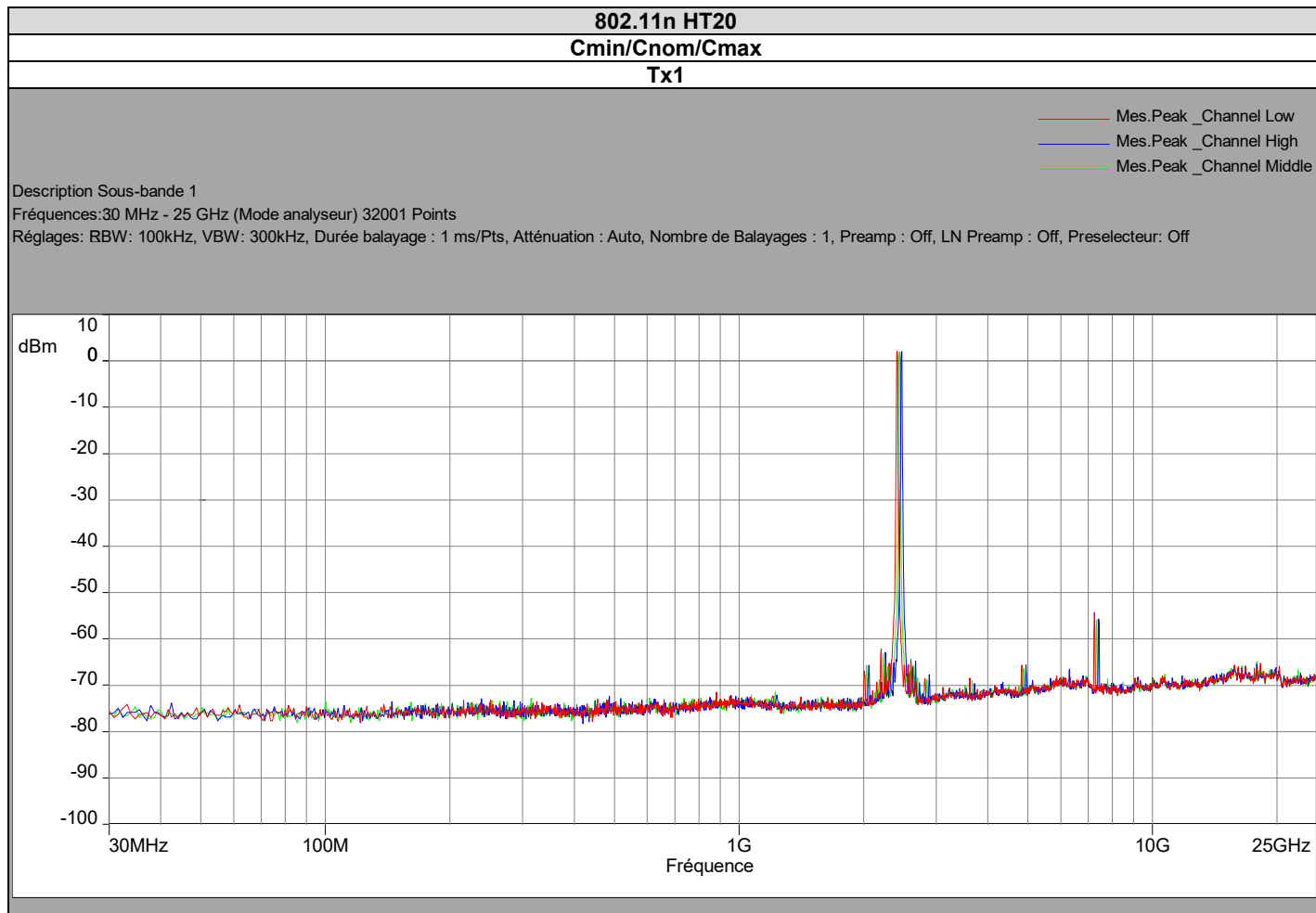
9.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None ☐ Divergence:

9.6. RESULTS







802.11b			
Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2412	2.74		
4825	-57.98	55.24	20
7236.22	-52.33	49.59	20
2437	3.40		
4874.57	-56.41	53.01	20
7311.19	-52.92	49.52	20
2462	2.67		
4924.66	-56.78	54.11	20
7386.45	-54.55	51.88	20

802.11g			
Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2412	2.50		
4825.02	-65.49	62.99	20
7236.18	-53.13	50.63	20
2437	2.10		
4874.54	-63.10	61.00	20
7311.14	-54.14	52.04	20
2462	2.36		
4924.63	-64.50	62.14	20
7386.44	-55.46	53.10	20

802.11n HT20			
Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2412	2.15		
4825.02	-65.63	63.48	20
7236.18	-54.28	52.13	20
2437	1.96		
4874.54	-66.33	64.37	20
7311.14	-55.92	53.96	20
2462	2.03		
4924.63	-65.52	63.49	20
7386.44	-55.69	53.66	20

9.7. CONCLUSION

Unwanted Emission into non-restricted frequency bands measurement performed on the sample of the product Netatmo NDB01, SN: **g549be2**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

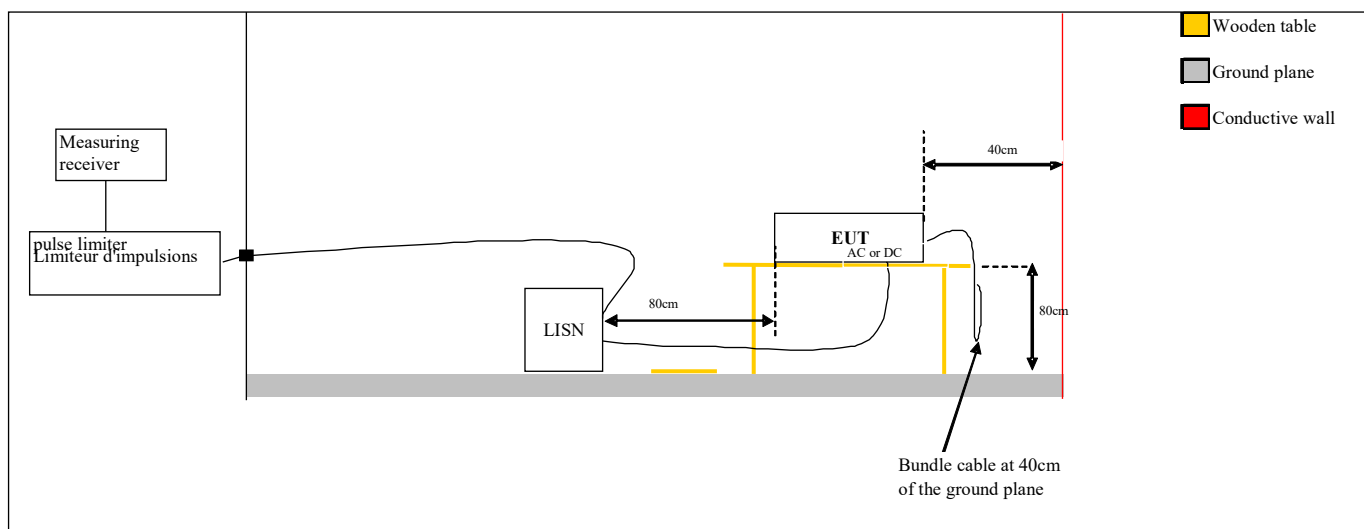
10. AC POWER LINE CONDUCTED EMISSIONS

10.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
 Date of test : September 17, 2019
 Ambient temperature : 19 °C
 Relative humidity : 47 %

10.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013) method. The EUT is placed on the ground reference plane, at 80cm from the LISN. The distance between the EUT and the vertical ground plane is 40cm. Auxiliaries are powered by another LISN. The cable has been shorted to 1meter length. The EUT is powered through the LISN. Measurement is made with a receiver in peak mode. This was followed by a Quasi-Peak, i.e. CISPR measurement for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary. The LISN (measure) is 50Ω / 50μH. Interconnecting cables and equipment's were moved to position that maximized emission.





Photograph for AC Power Line Conducted Emissions (Front view)



Photograph for AC Power Line Conducted Emissions (Rear view)

10.3. LIMIT

Quasi-Peak

0,15kHz to 0,5MHz: 66dB μ V to 56dB μ V*

0,5MHz to 5MHz: 56dB μ V

5MHz to 30MHz: 60dB μ V

Average

0,15kHz to 0,5MHz: 56dB μ V to 46dB μ V*

0,5MHz to 5MHz: 46dB μ V

5MHz to 30MHz: 50dB μ V

*Decreases with the logarithm of the frequency

10.4. TEST EQUIPMENT LIST

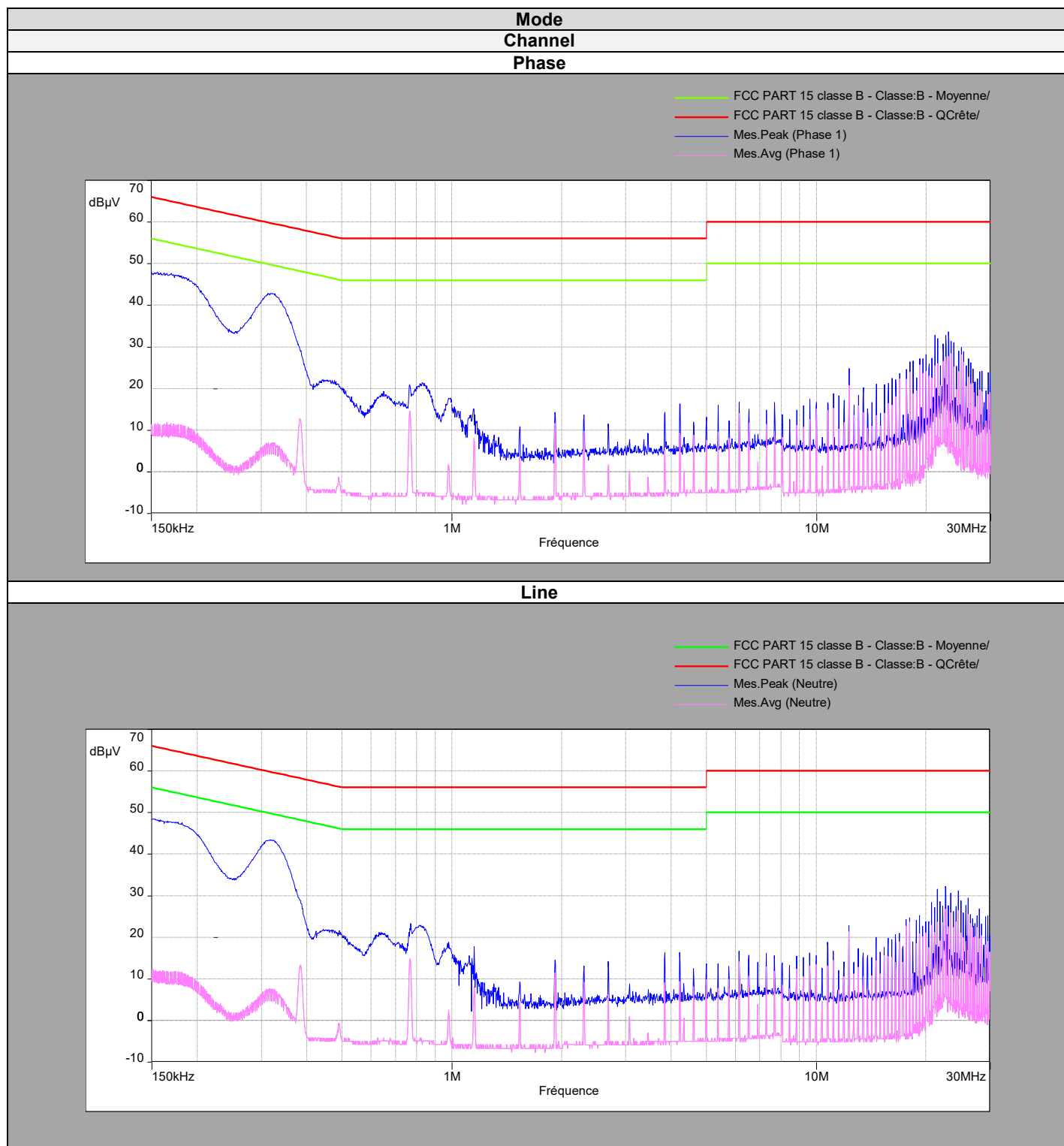
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	10/2018	10/2020
V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322001	08/2018	08/2019
Limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	03/2019	03/2020
Cable	-	-	A5329417	09/2018	09/2019
Cable	-	-	A5329589	09/2018	09/2019
Ground plane	LCIE	-	-	-	-

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

10.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None ☐ Divergence:

10.6. RESULTS



Phase

Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.15	47.5	-	66	18.5	11.3	56	44.7
0.767	21	-	56	35	14.3	46	31.7
4.22	16.3	-	56	39.7	9.3	46	36.7
12.28	24.8	-	56	31.2	20.7	46	25.3
23	33.6	-	60	26.4	27.7	50	22.3

Neutral

Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin peak/Quasi Peak (dB)	Average Level (dBμV)	Average Limit (dBμV)	Margin Avg/Avg (dB)
0.15	48.3	-	66	17.7	12	56	44
0.77	23.3	-	56	32.7	14.7	46	31.3
1.92	14.4	-	56	41.6	11.4	46	34.6
12.28	22.8	-	60	37.2	21.3	50	28.7
22.65	32.2	-	60	27.8	26.7	50	23.3

10.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product Netatmo NDB01, SN: **g549be2**, 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 IN RESTRICTED FREQUENCY BANDS

11.1. TEST CONDITIONS

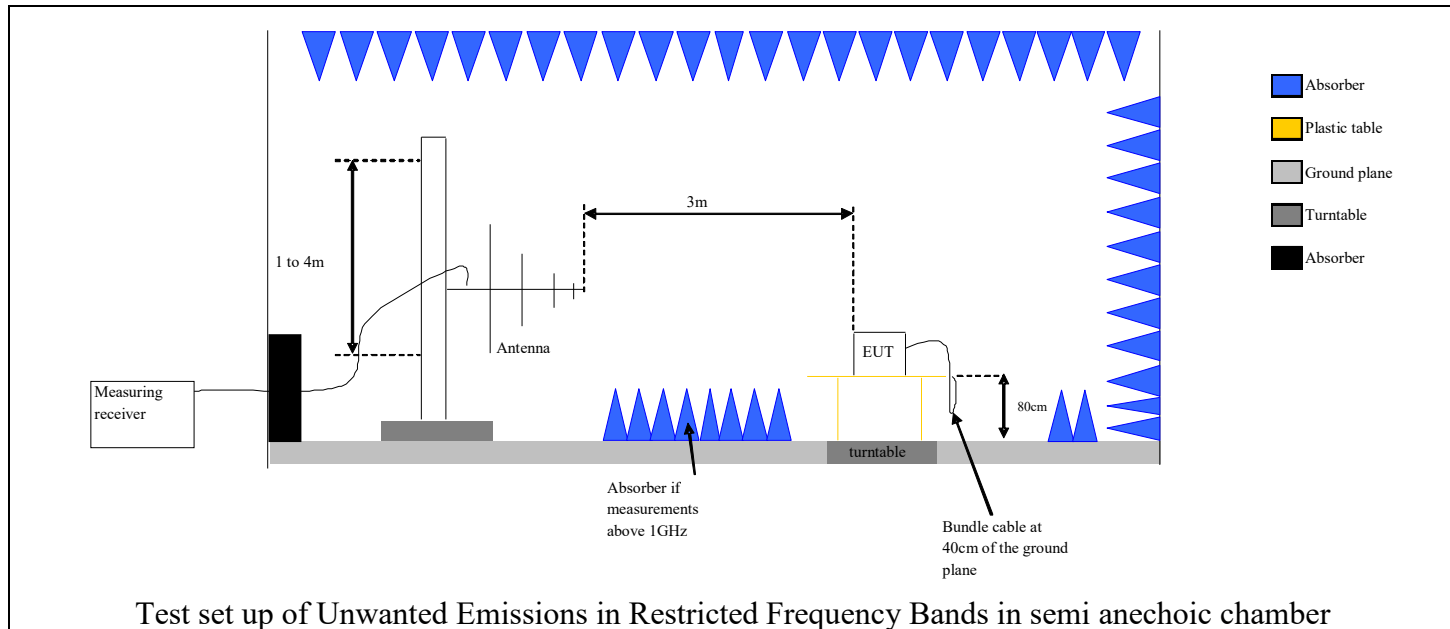
Test performed by : Armand MAHOUNGOU & Laurent DENEUX
 Date of test : September 13, 2019 to September 18, 2019
 Ambient temperature : 27°C & 29°C
 Relative humidity : 47% & 51%

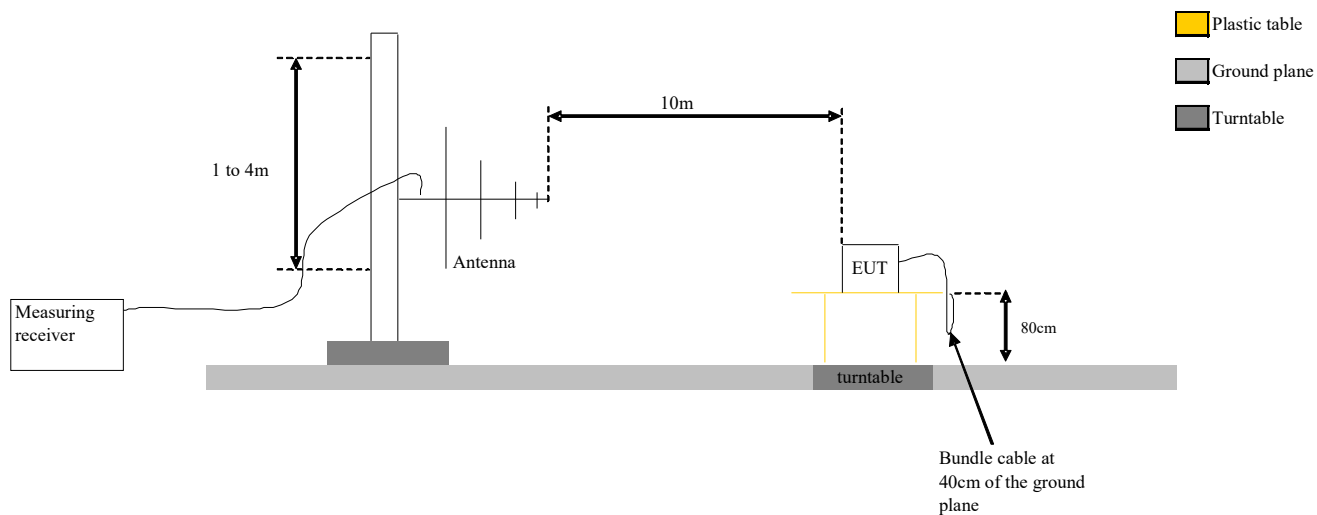
11.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013).

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

Test is performed in horizontal (H) and vertical (V) polarization with **bilog** between 30MHz & 1GHz and with a horn antenna above 1GHz. Measurement bandwidth was 120kHz below 1GHz and 1MHz above 1GHz. The level has been maximised by the turntable rotation of 360 degrees range on the 3 axis of EUT. Antenna height search was performed from 1 to 4m. The EUT is place at 1.5m high above 1GHz and at 0.8m high under 1GHz. The EUT is placed **in a full anechoic chamber** above 1GHz and **on an open area test site** from 30MHz to 1GHz. Distance between measuring antenna and the EUT is **10m**.

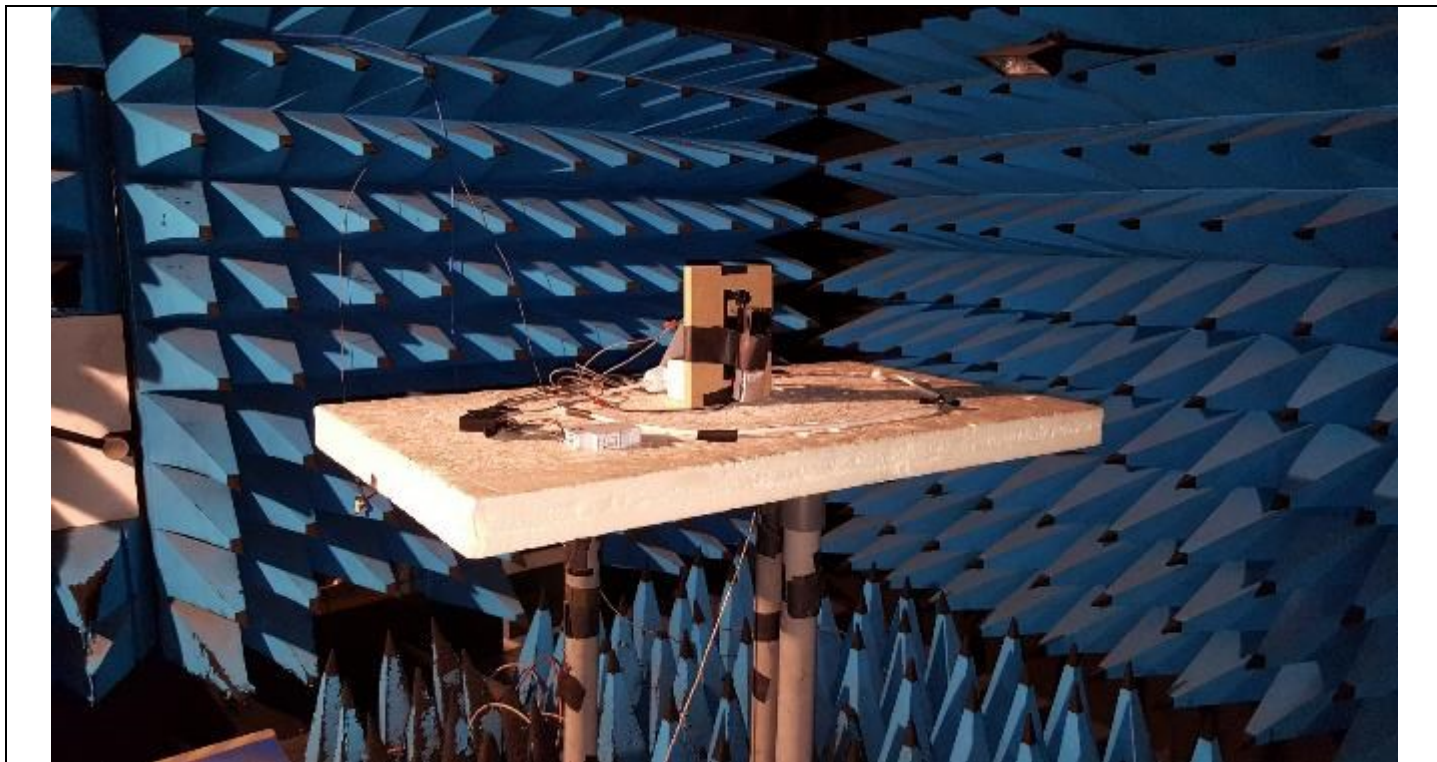




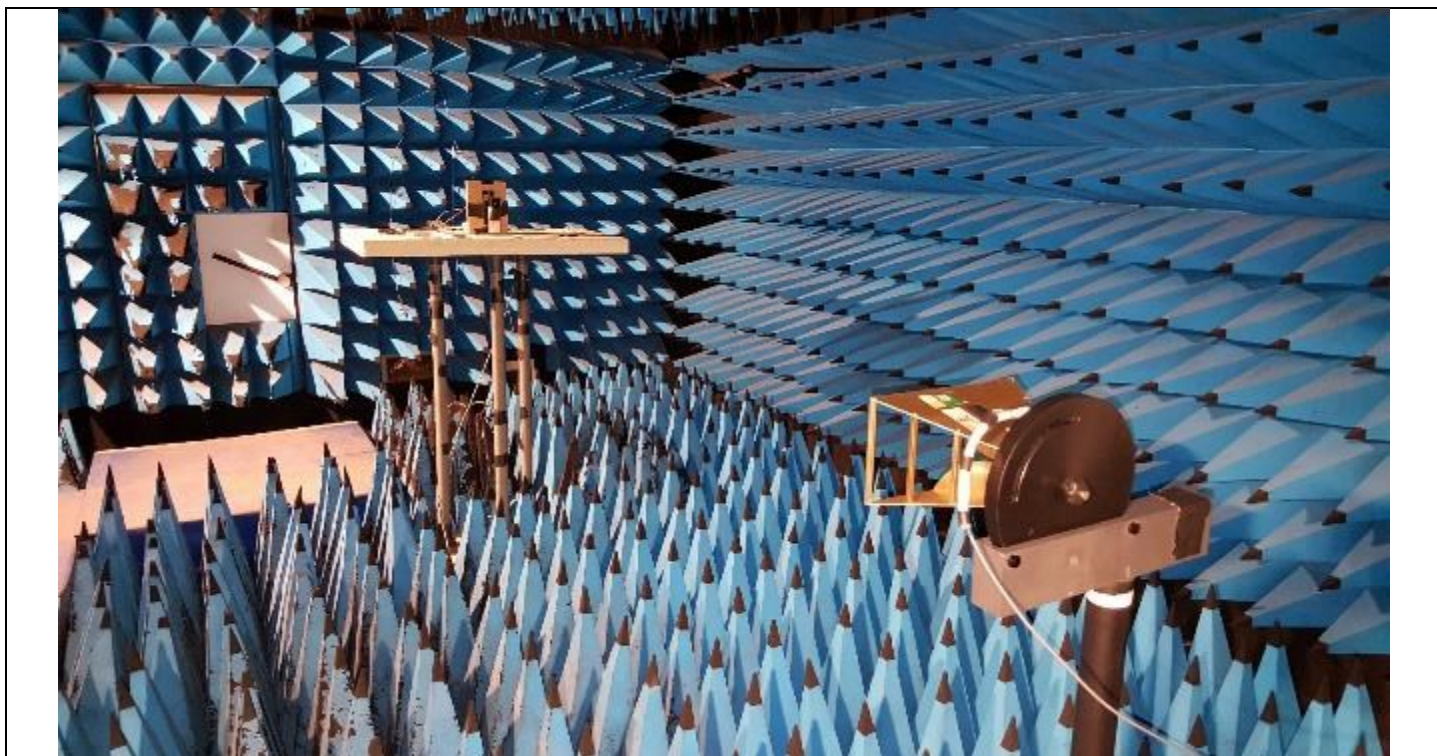
Test Set up for radiated measurement in open area test site



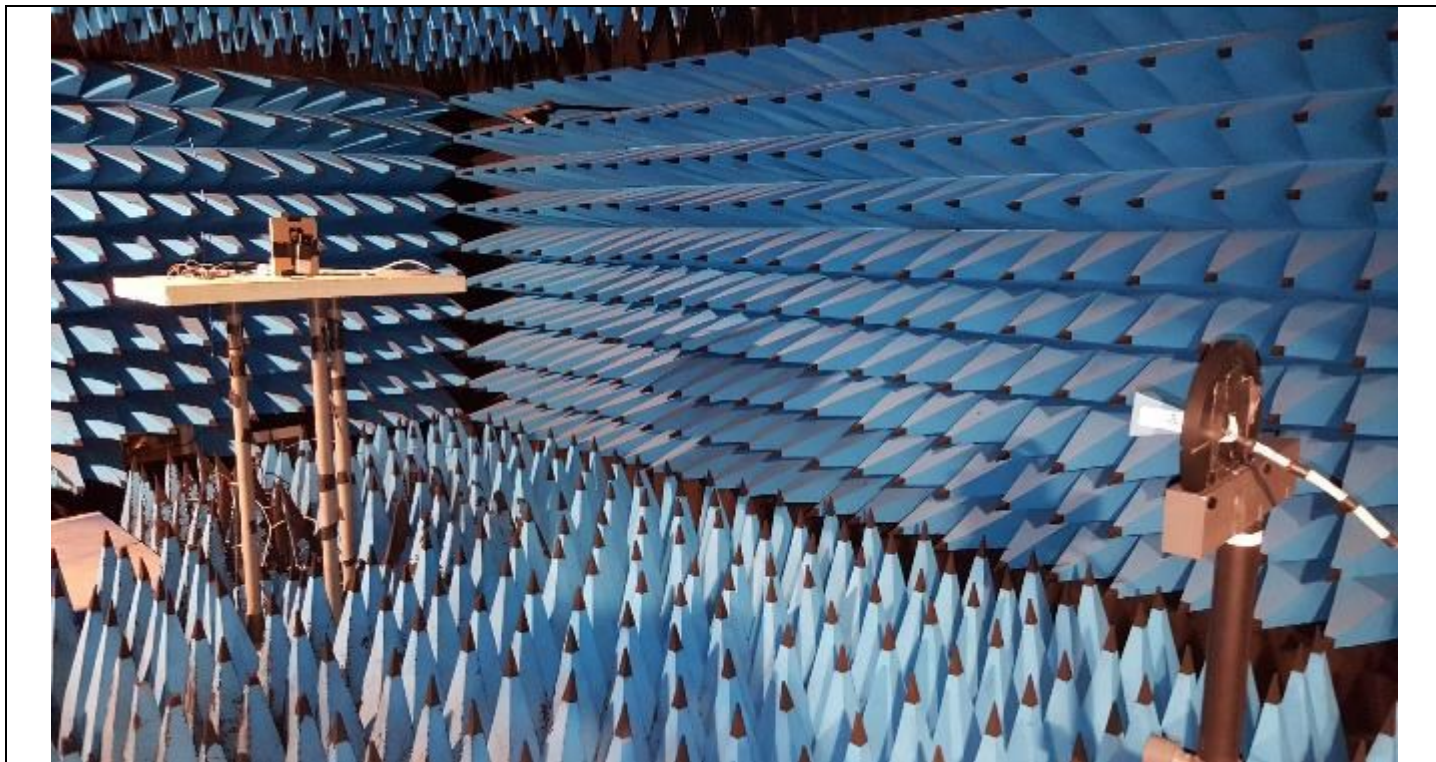
Photograph for Unwanted Emissions



Photograph for Unwanted Emissions



Photograph for Unwanted Emissions



Photograph for Unwanted Emissions

11.3. LIMIT

Limit at 3m:

9kHz to 0,490MHz:	$2400/F(\text{kHz})\mu\text{V/m}$ (300m) or $20\log(2400/F(\text{kHz}))\text{dB}\mu\text{V/m}$ (3m) QPeak
0,490MHz to 1.705MHz:	$240000/F(\text{kHz})\mu\text{V/m}$ (30m) or $20\log(240000/F(\text{kHz}))\text{dB}\mu\text{V/m}$ (3m) QPeak
1.705MHz to 30MHz:	$30\mu\text{V/m}$ (30m) or $\text{dB}\mu\text{V/m}$ (3m) QPeak
30MHz to 88MHz:	$40\text{dB}\mu\text{V/m}$ QPeak
88MHz to 216MHz:	$43,5\text{dB}\mu\text{V/m}$ QPeak
216MHz to 960MHz:	$46\text{dB}\mu\text{V/m}$ QPeak
960MHz to 1000MHz:	$54\text{dB}\mu\text{V/m}$ QPeak
Above 1000MHz:	$74\text{dB}\mu\text{V/m}$ Peak $54\text{dB}\mu\text{V/m}$ Average

Limit at 10m:

30MHz to 88MHz:	$29,5\text{dB}\mu\text{V/m}$ QPeak
88MHz to 216MHz:	$33\text{dB}\mu\text{V/m}$ QPeak
216MHz to 960MHz:	$35,5\text{dB}\mu\text{V/m}$ QPeak
960MHz to 1000MHz:	$43,5\text{dB}\mu\text{V/m}$ QPeak
Above 1000MHz:	$63,5\text{dB}\mu\text{V/m}$ Peak $43,5\text{dB}\mu\text{V/m}$ Average

11.4. TEST EQUIPMENT LIST

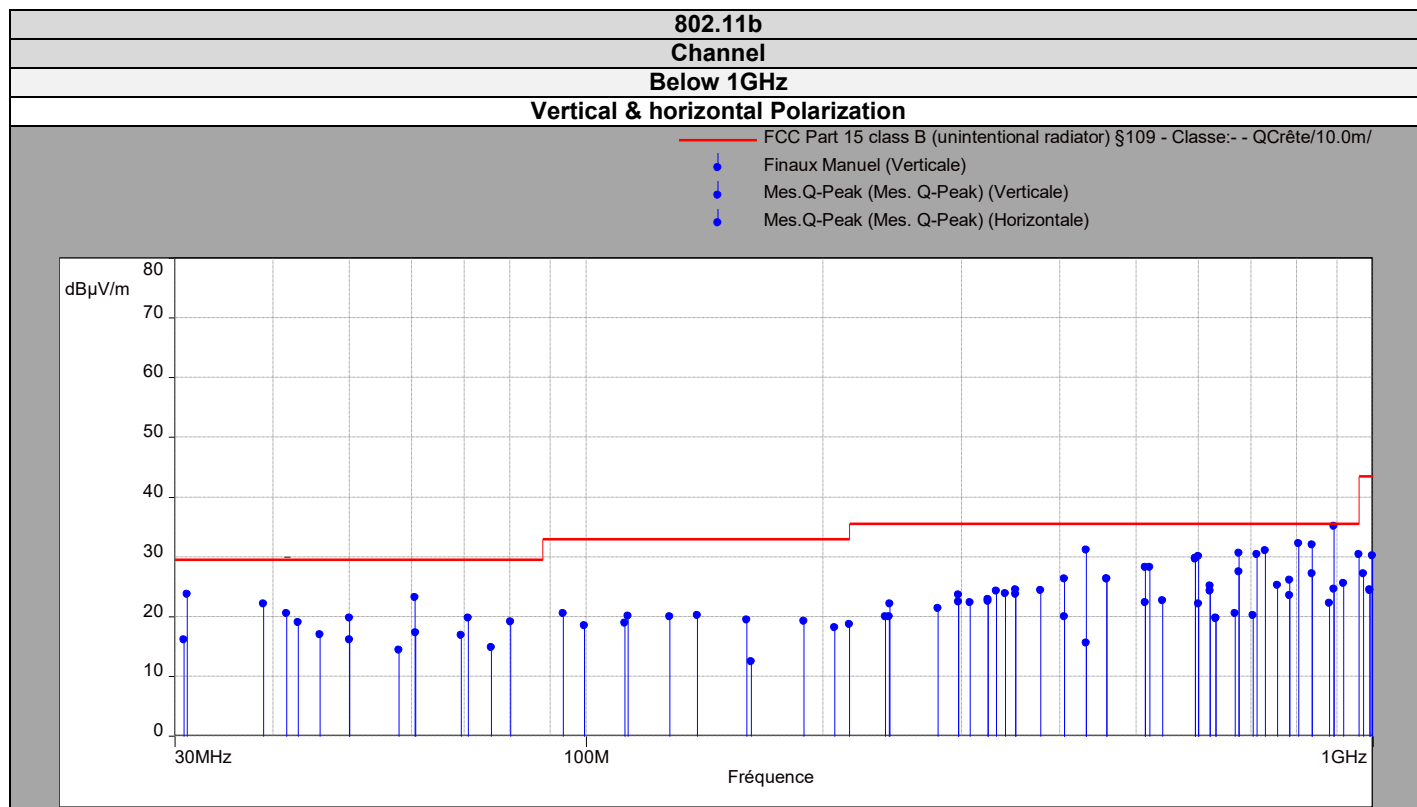
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Open test site	LCIE	-	F2000400	06/2019	06/2020
Receiver	RHODE & SCHWARZ	ESIB26	A2642021	10/2018	10/2020
Bilog antenna	CHASE	CBL 6112A	C2040040	04/2018	04/2019
Cable	-	-	A5329876	11/2018	11/2019
Cable	-	-	A5329444	09/2018	09/2019
Cable	-	-	A5329368	11/2018	11/2019
loop antenna	RHODE & SCHWARZ	HFH2-Z2	C2040007	2018-11	2020-11
Cable	-	-	A5329442	2018-09	2019-09
Cable	-	-	A5329416	2018-12	2019-12
Full anechoic chamber	SIEPEL	-	D3044019	2018/10	2022/10
Horn antenna	AH SYSTEMS	SAS 571	C2042041	2018/09	2019/09
EMI receiver	ROHDE & SCHWARZ	FSV40GHz	A4060061	2019/05	2021/05
Cable S36 chamber	PASTERNAK	PE360-1500CM	A5329870	2019/01	2020/01
Cable S36 chamber	PASTERNAK	PE360-1000CM	A5329871	2019/01	2020/01
Cable S36 chamber	PASTERNAK	PE360-3000CM	A5329872	2019/01	2020/01
Horn antenna (18-26,5GHz)	PASTERNAK	PE9852/2F-20	C2042048	2017/12	2019/12

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

11.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None ☐ Divergence:

11.6. RESULTS

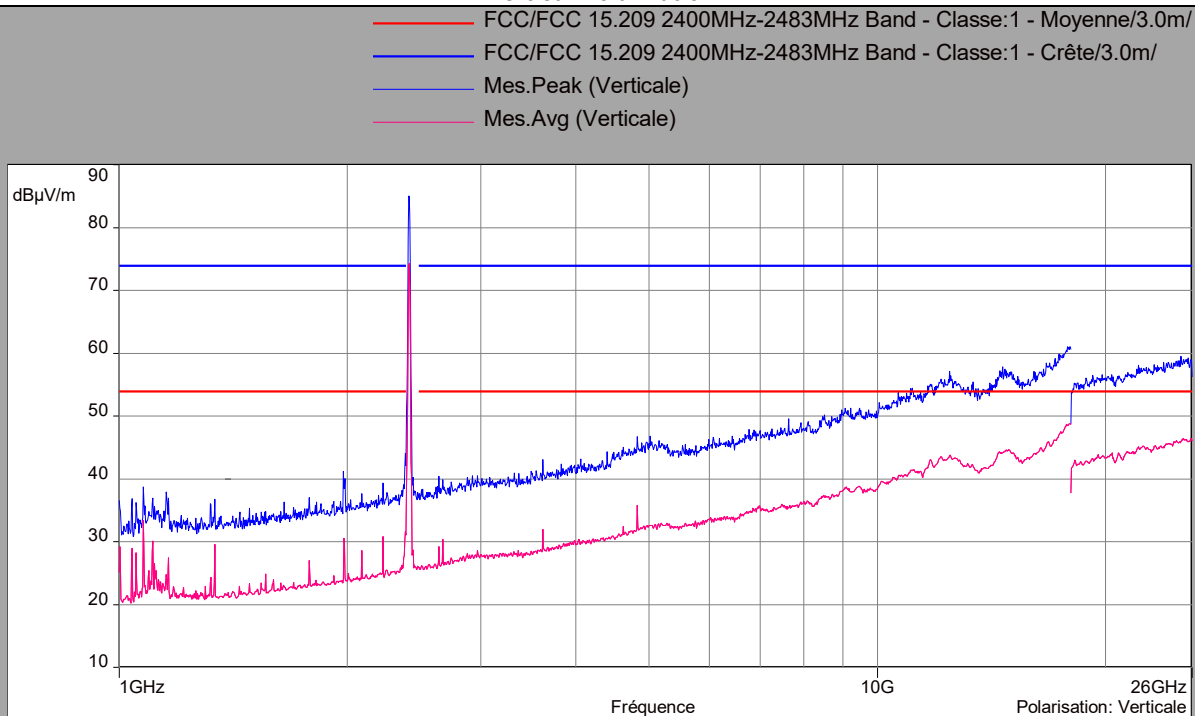


802.11b

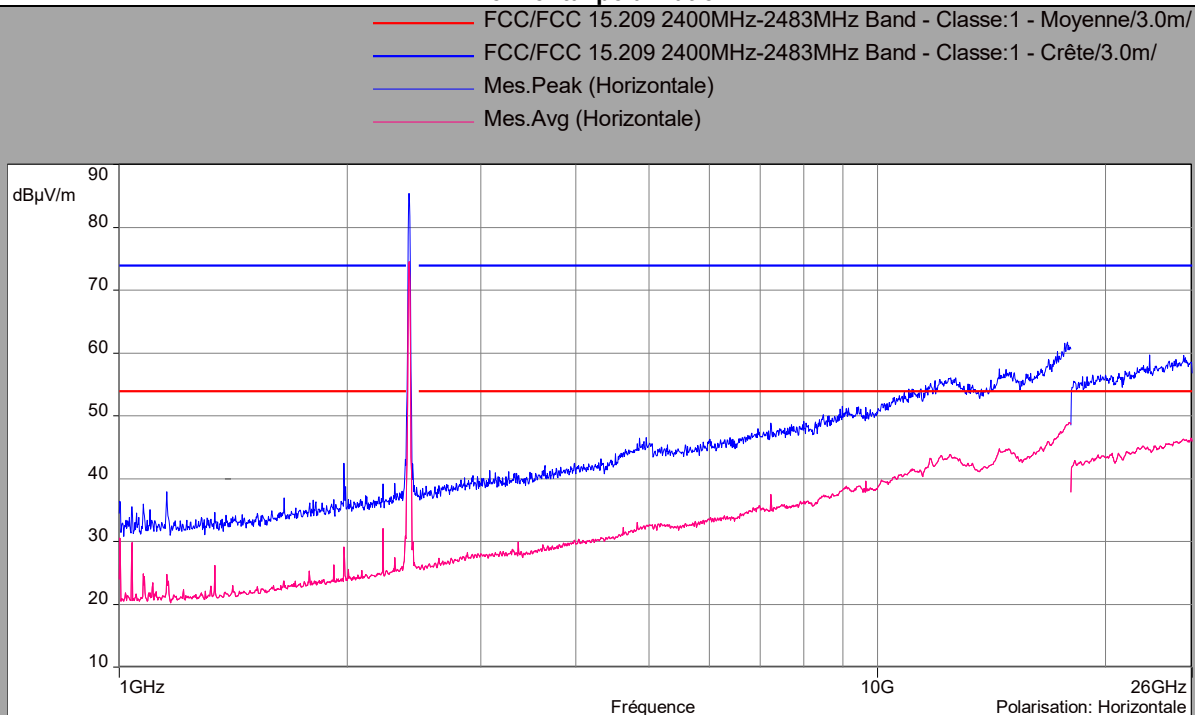
Cmin

Above 1GHz

Vertical Polarization



Horizontal polarization



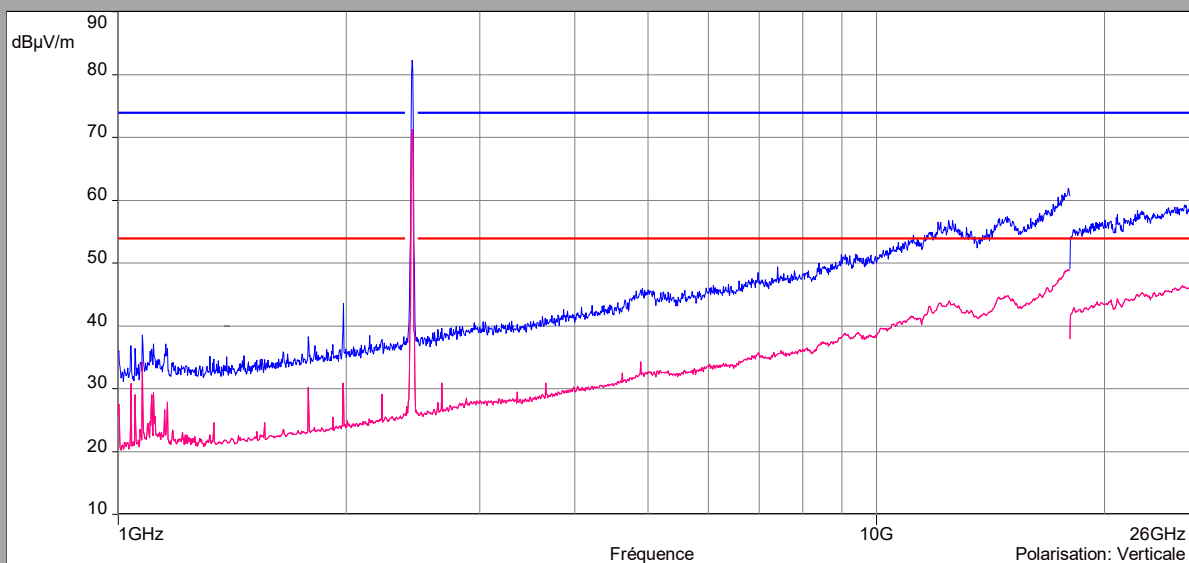
802.11b

Cnom

Above 1GHz

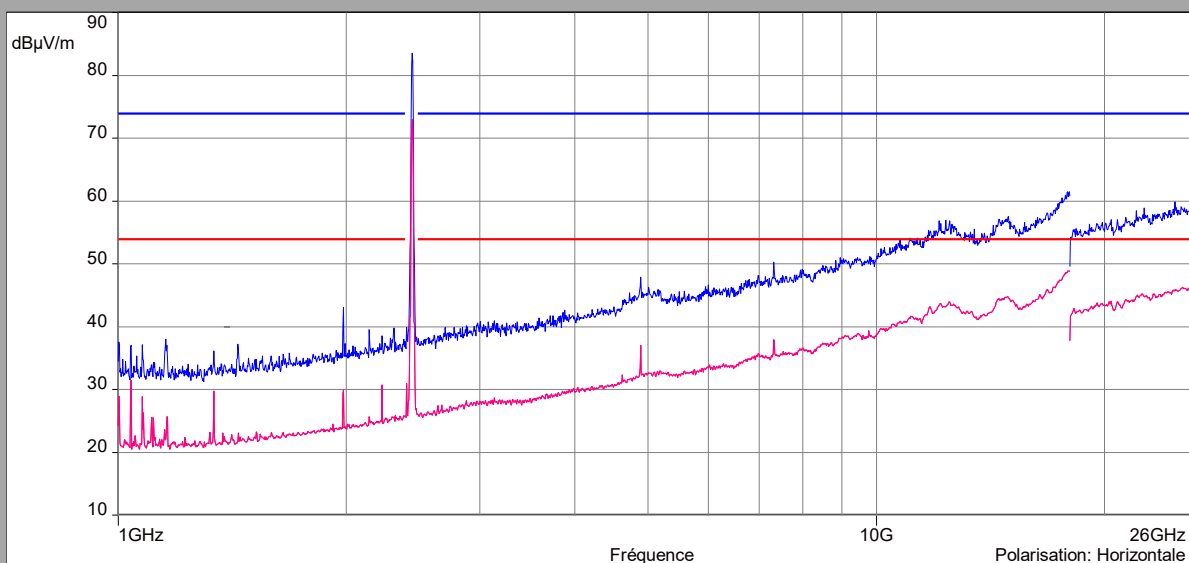
Vertical Polarization

- 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.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 - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Avg (Horizontale)



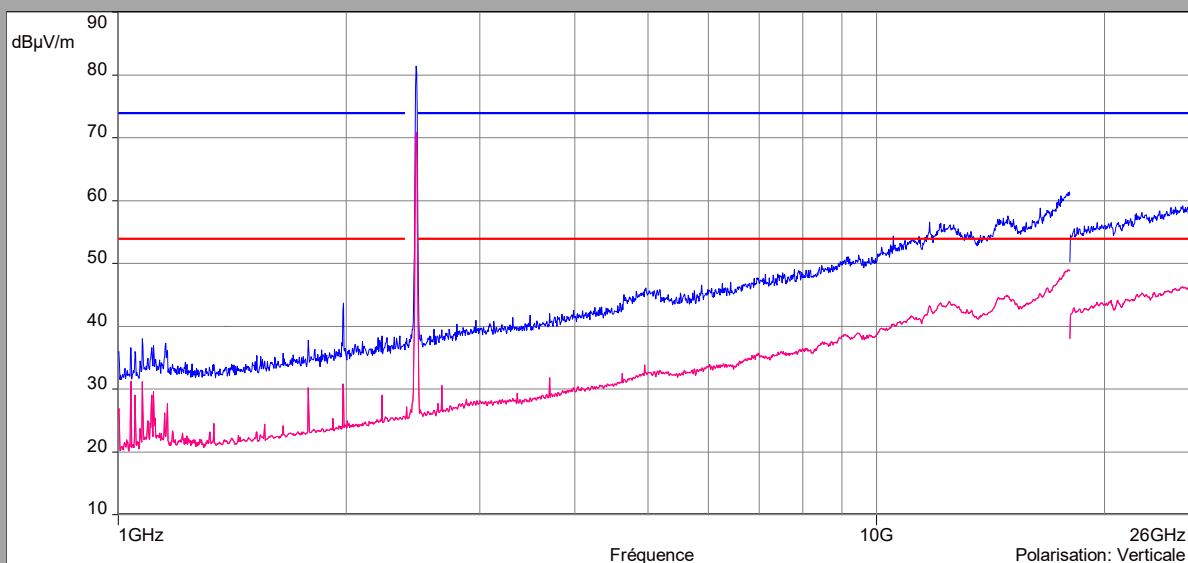
802.11b

Cmax

Above 1GHz

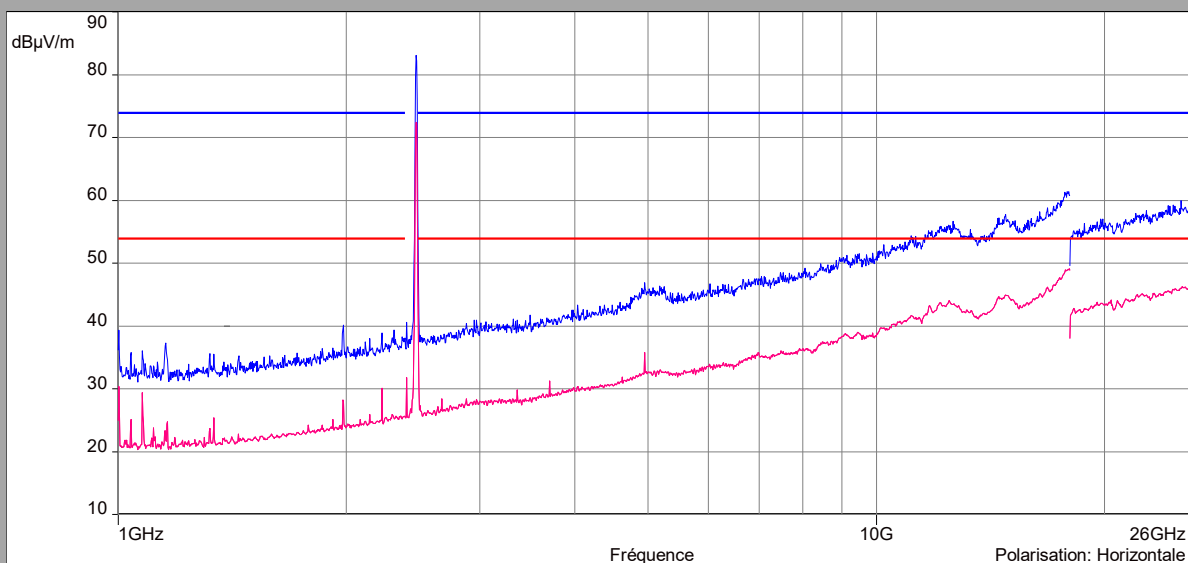
Vertical Polarization

- 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.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 - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Avg (Horizontale)



802.11b

Cmin/Cnom/Cmax

Zoom 2310MHz-2500MHz

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.Peak _Channel High - Verticale (Verticale)
- Mes.Avg _Channel Middle - Verticale (Verticale)
- Mes.Peak _Channel Middle - Verticale (Verticale)
- Mes.Avg _Channel Low - Verticale (Verticale)
- Mes.Avg _Channel High - Verticale (Verticale)
- Mes.Peak _Channel Low - Verticale (Verticale)

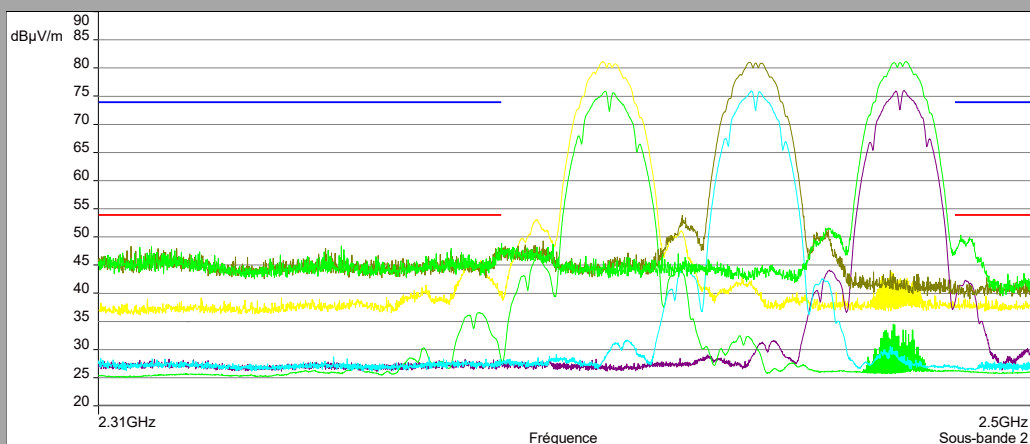
Description Sous-bande 2

Fréquences: 2.31 GHz - 2.5 GHz (Mode analyseur) 32001 Points

Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 2 ms/Pts, Atténuation : Auto, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: Off

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 _Channel Low - Horizontale (Horizontale)
- Mes.Avg _Channel High - Horizontale (Horizontale)
- Mes.Peak _Channel Low - Horizontale (Horizontale)
- Mes.Peak _Channel High - Horizontale (Horizontale)
- Mes.Avg _Channel Middle - Horizontale (Horizontale)
- Mes.Peak _Channel Middle - Horizontale (Horizontale)

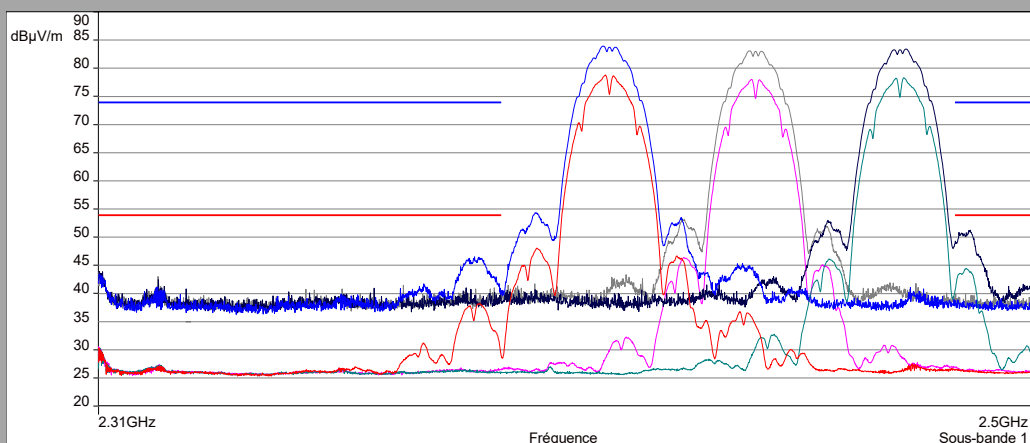
Description Sous-bande 1

Fréquences: 2.31 GHz - 2.5 GHz (Mode analyseur) 32001 Points

Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 2 ms/Pts, Atténuation : Auto, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: Off

Polarisation: Horizontale

Distance: 3 m



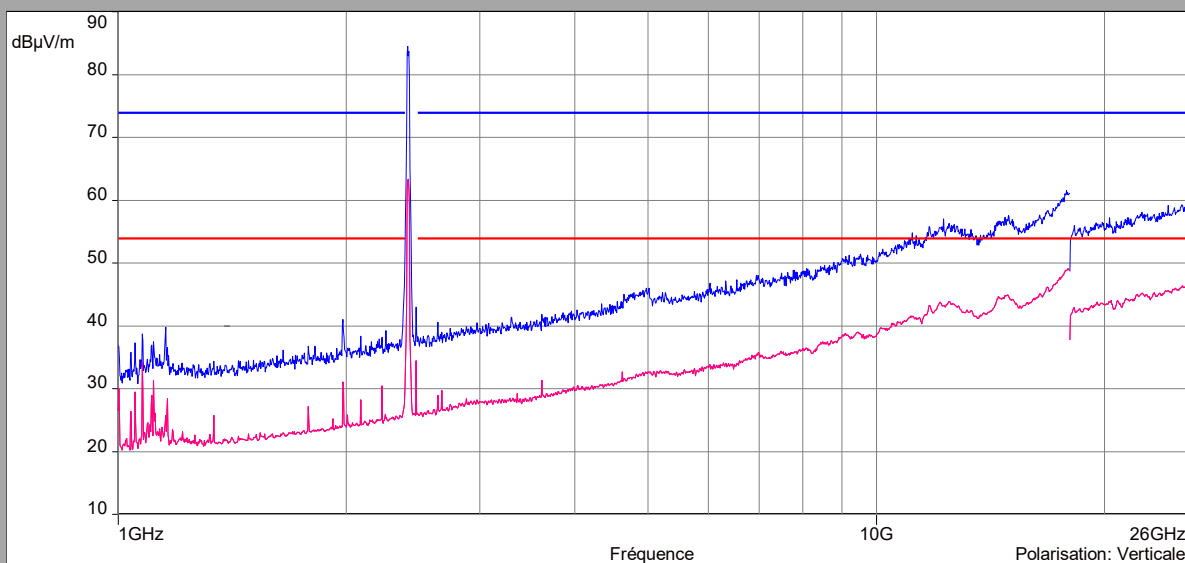
802.11g

Cmin

Above 1GHz

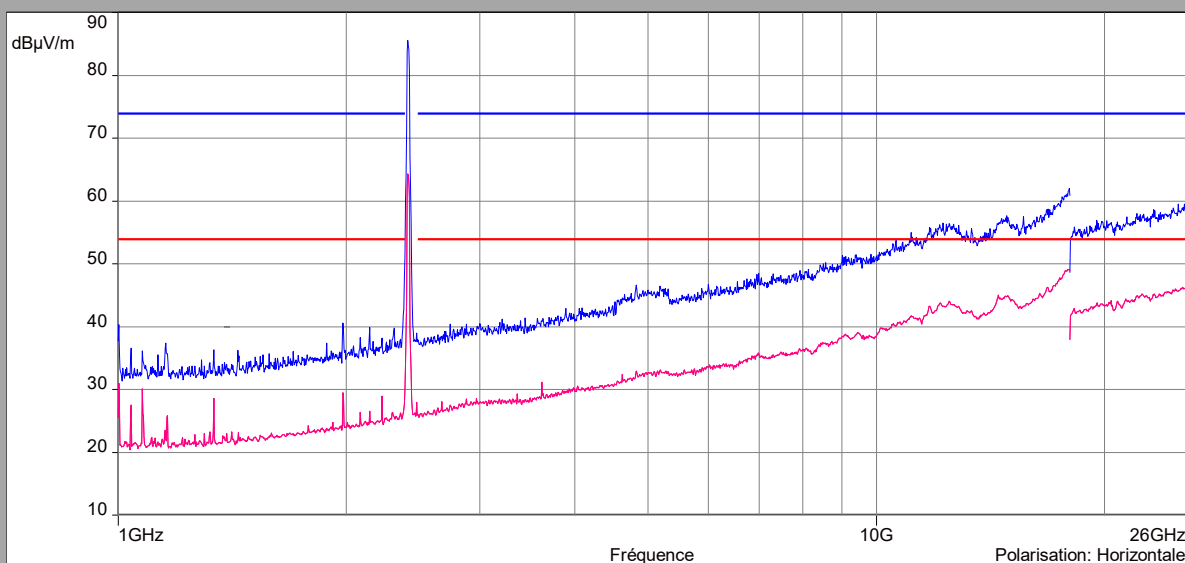
Vertical Polarization

- 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.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 - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Avg (Horizontale)

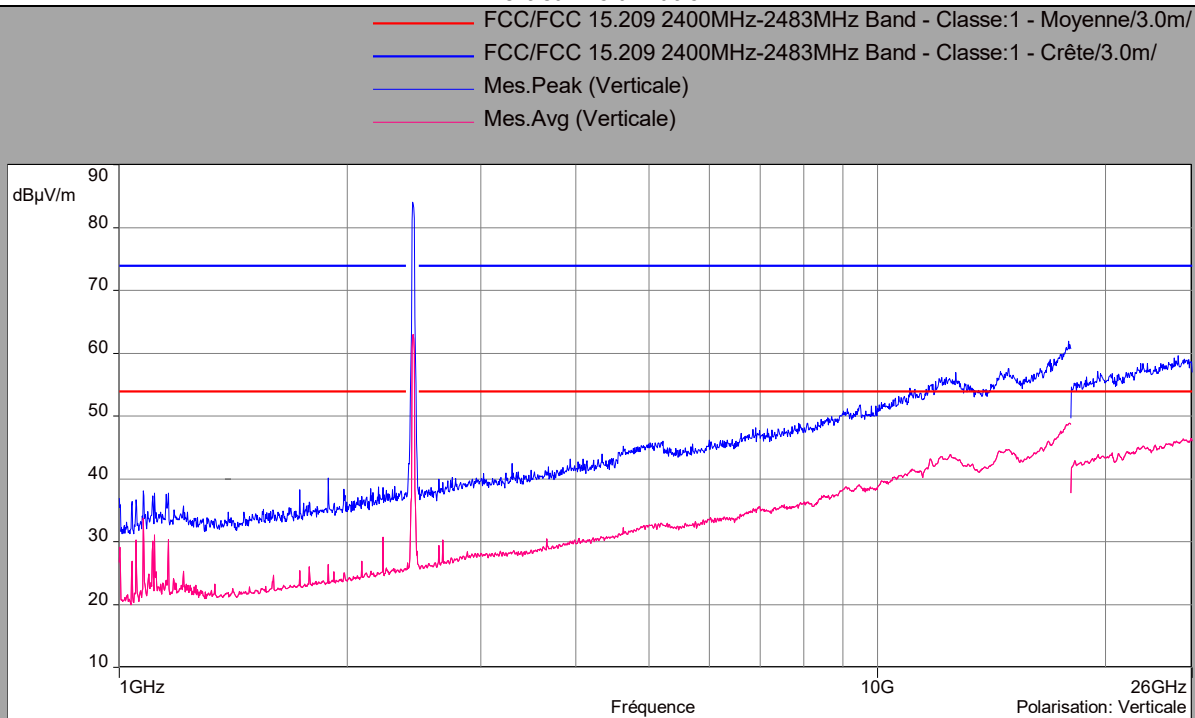


802.11g

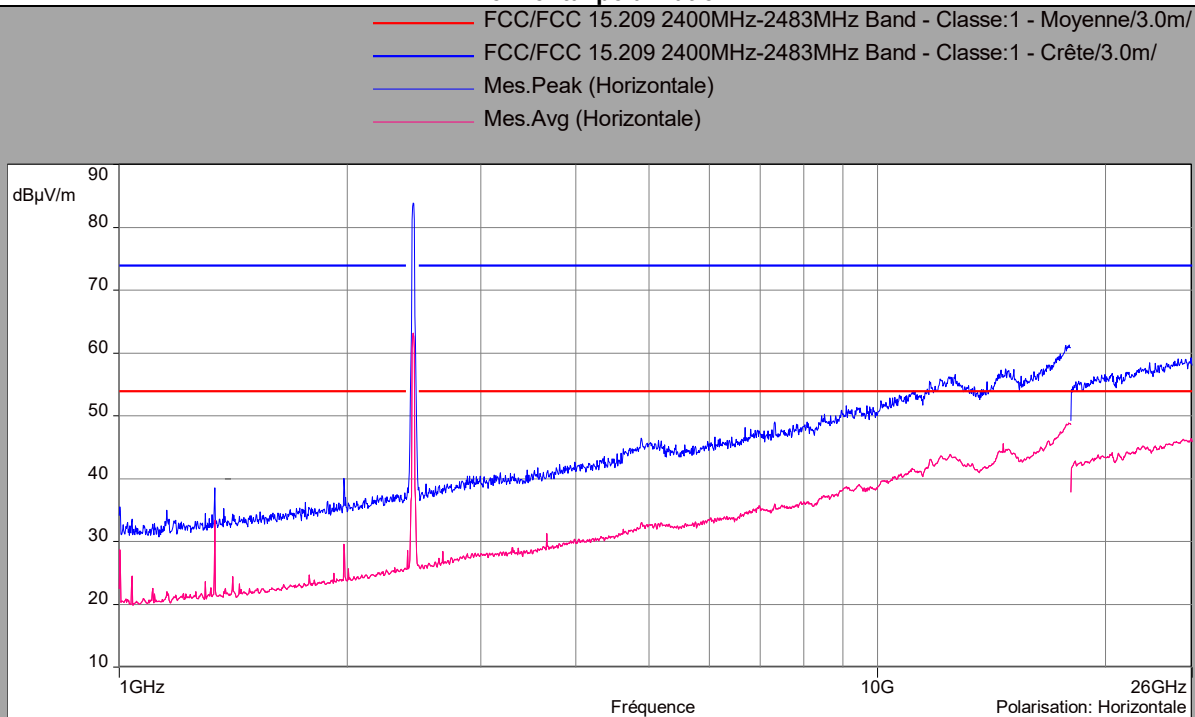
Cnom

Above 1GHz

Vertical Polarization



Horizontal polarization



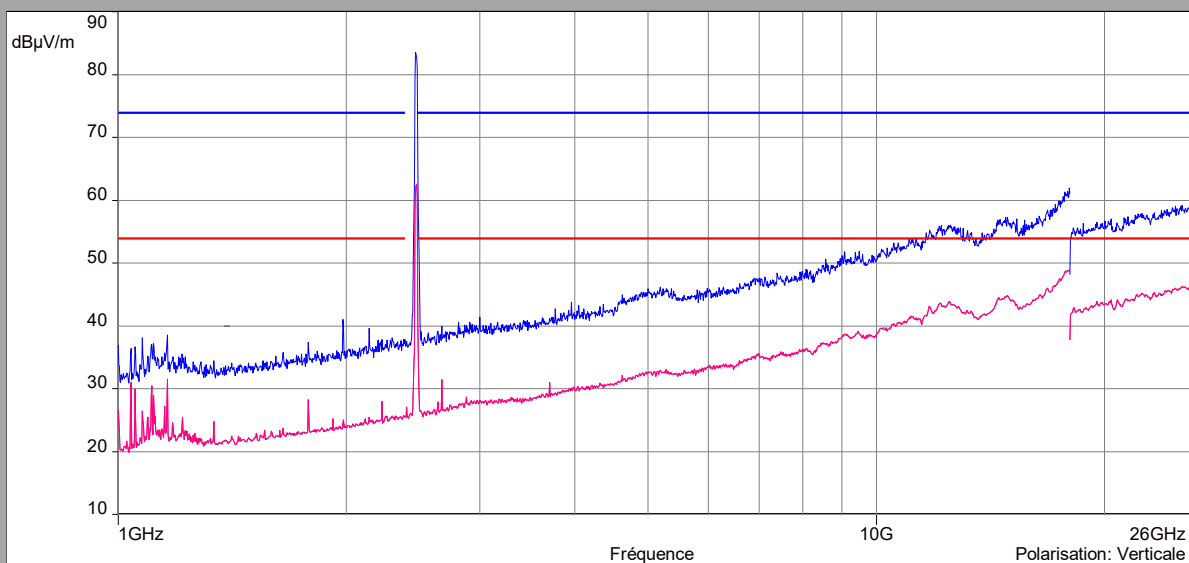
802.11g

Cmax

Above 1GHz

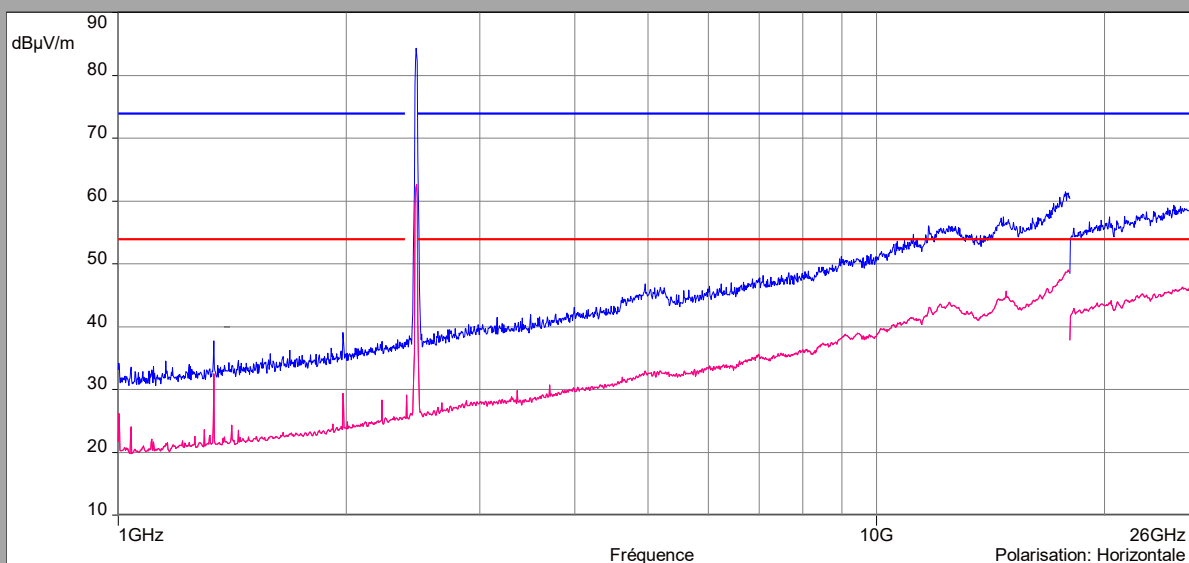
Vertical Polarization

- 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.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 - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Avg (Horizontale)



802.11g

Cmin/Cnom/Cmax

Zoom 2310MHz-2500MHz

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.Peak _Channel High - Verticale (Verticale)
- Mes.Avg _Channel Middle - Verticale (Verticale)
- Mes.Peak _Channel Middle - Verticale (Verticale)
- Mes.Avg _Channel Low - Verticale (Verticale)
- Mes.Avg _Channel High - Verticale (Verticale)
- Mes.Peak _Channel Low - Verticale (Verticale)

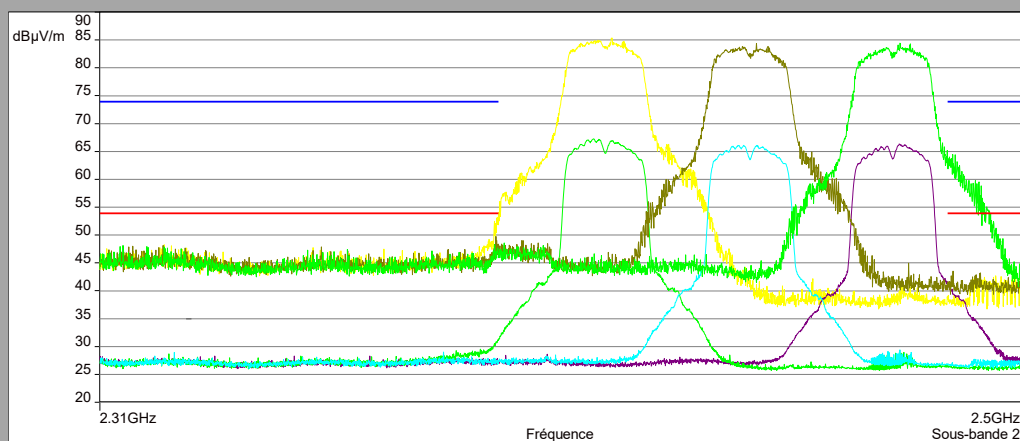
Description Sous-bande 2

Fréquences:2.31 GHz - 2.5 GHz (Mode analyseur) 32001 Points

Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 2 ms/Pts, Atténuation : Auto, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: Off

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 _Channel Low - Horizontale (Horizontale)
- Mes.Avg _Channel High - Horizontale (Horizontale)
- Mes.Peak _Channel Low - Horizontale (Horizontale)
- Mes.Peak _Channel High - Horizontale (Horizontale)
- Mes.Avg _Channel Middle - Horizontale (Horizontale)
- Mes.Peak _Channel Middle - Horizontale (Horizontale)

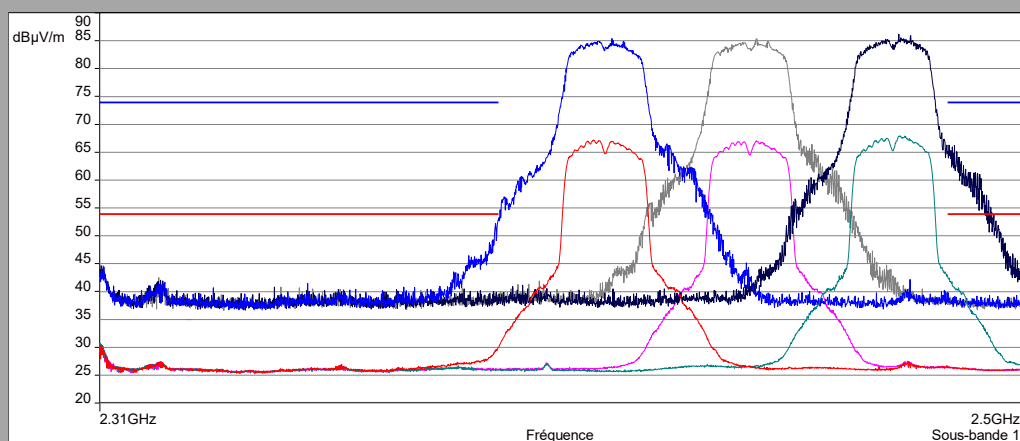
Description Sous-bande 1

Fréquences:2.31 GHz - 2.5 GHz (Mode analyseur) 32001 Points

Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 2 ms/Pts, Atténuation : Auto, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: Off

Polarisation:Horizontale

Distance: 3 m



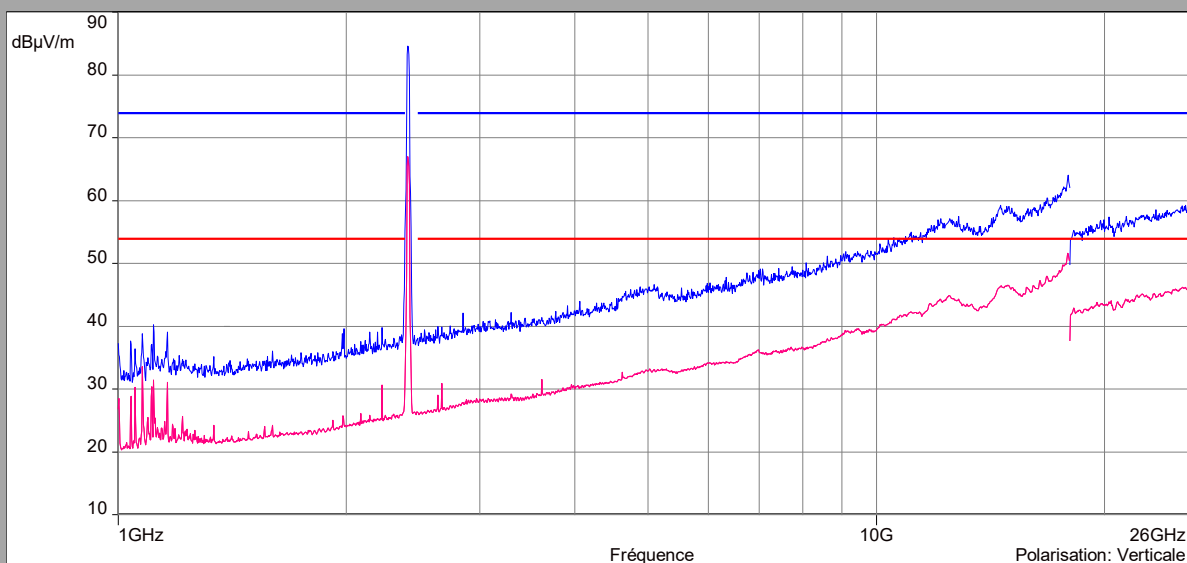
802.11n HT20

Cmin

Above 1GHz

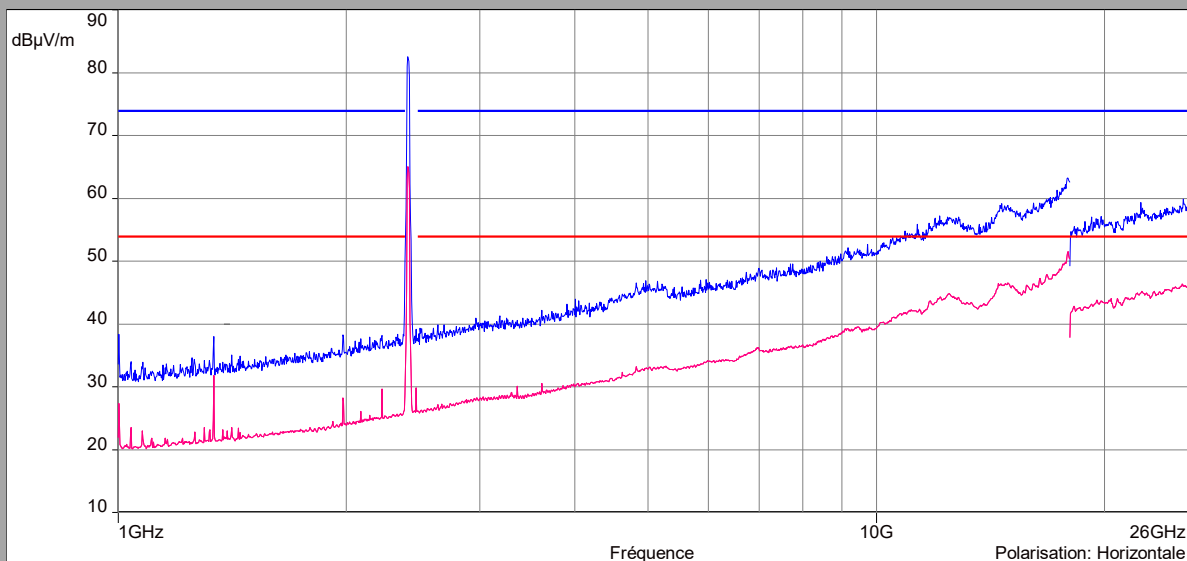
Vertical Polarization

- 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.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 - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Avg (Horizontale)



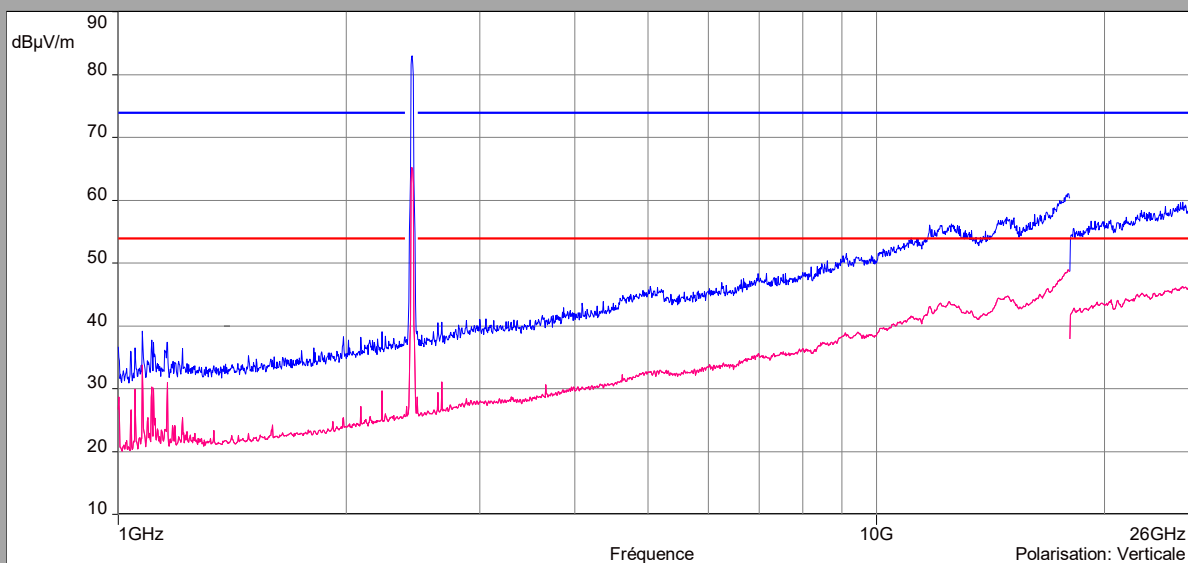
802.11n HT20

Cnom

Above 1GHz

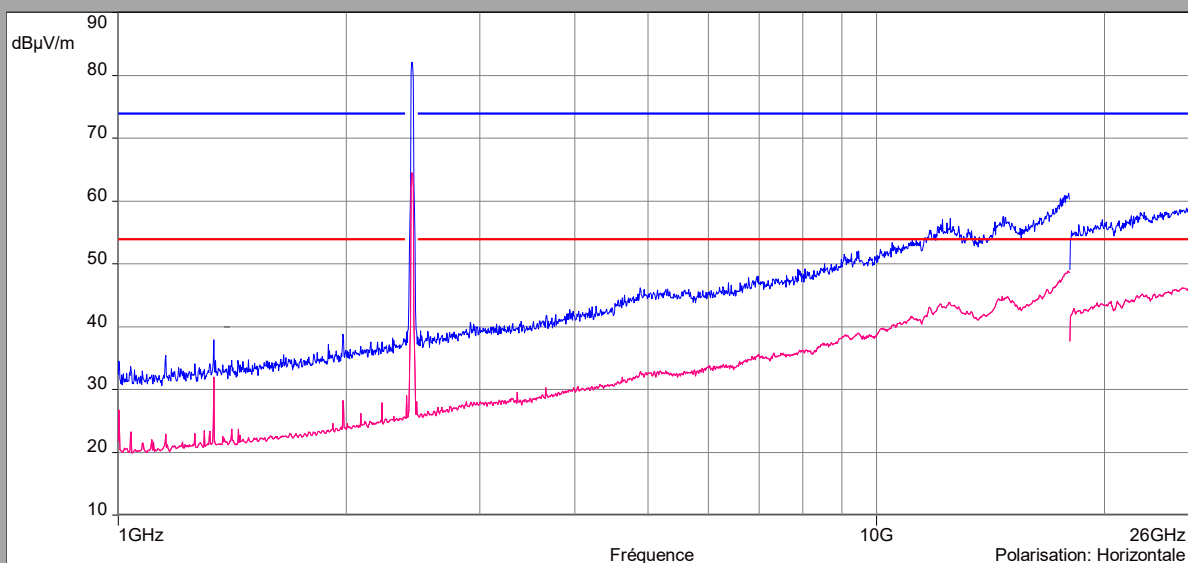
Vertical Polarization

- 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.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 - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Avg (Horizontale)



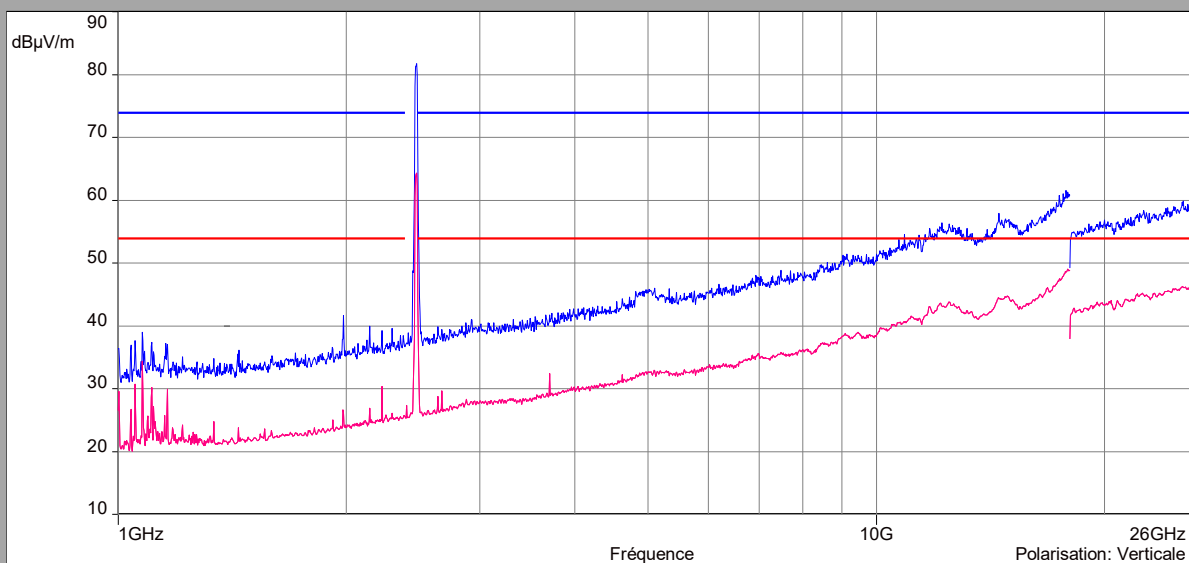
802.11n HT20

Cmax

Above 1GHz

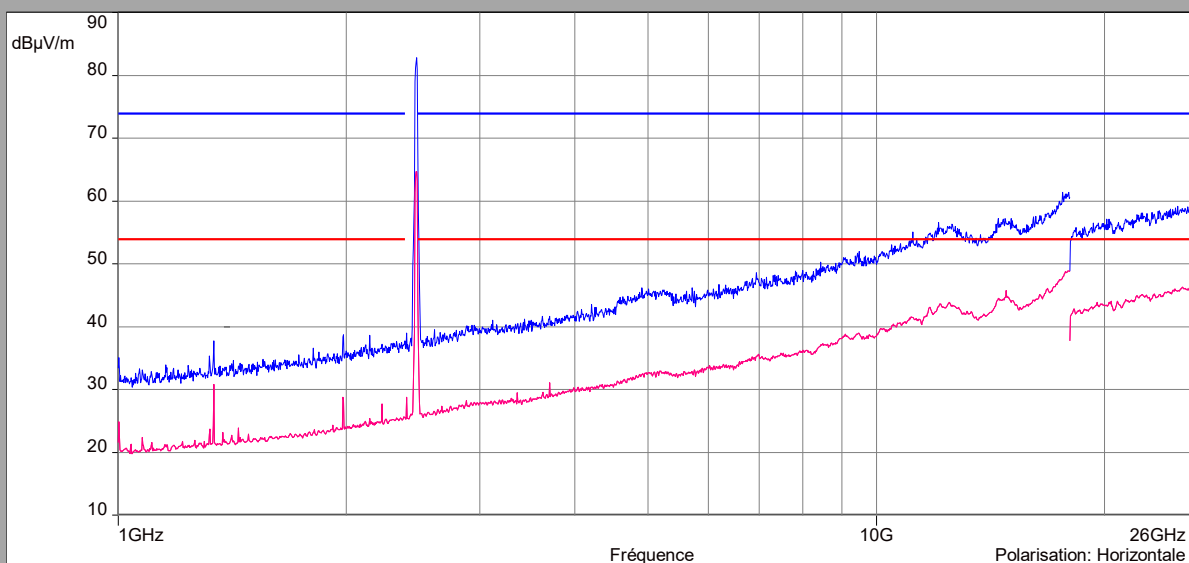
Vertical Polarization

- 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.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 - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Avg (Horizontale)



802.11n HT20

Cmin/Cnom/Cmax

Zoom 2310MHz-2500MHz

Vertical Polarization

Description Sous-bande 2

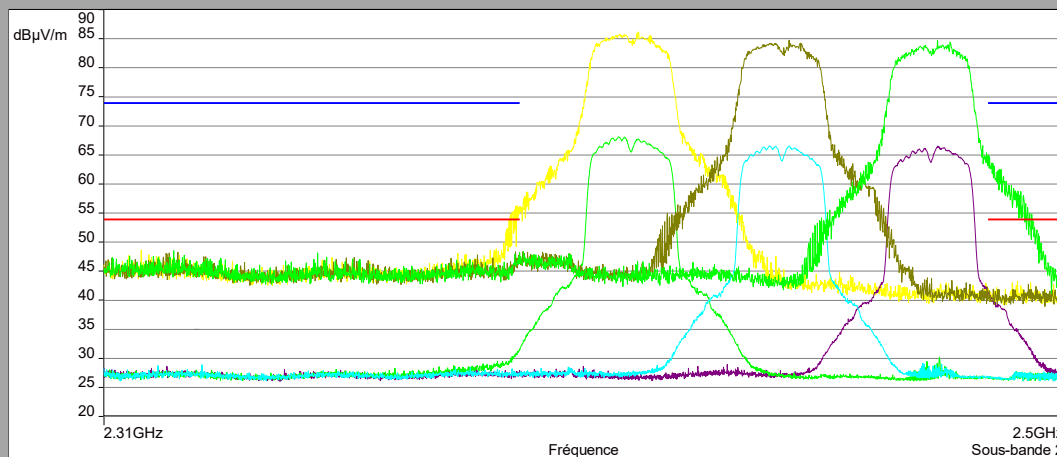
Fréquences: 2.31 GHz - 2.5 GHz (Mode analyseur) 32001 Points

Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 2 ms/Pts, Atténuation : Auto, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: Off

Polarisation: Verticale

Distance: 3 m

- 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.Peak_Channel High - Verticale (Verticale)
- Mes.Avg_Channel Middle - Verticale (Verticale)
- Mes.Peak_Channel Middle - Verticale (Verticale)
- Mes.Avg_Channel Low - Verticale (Verticale)
- Mes.Avg_Channel High - Verticale (Verticale)
- Mes.Peak_Channel Low - Verticale (Verticale)



Horizontal polarization

Description Sous-bande 1

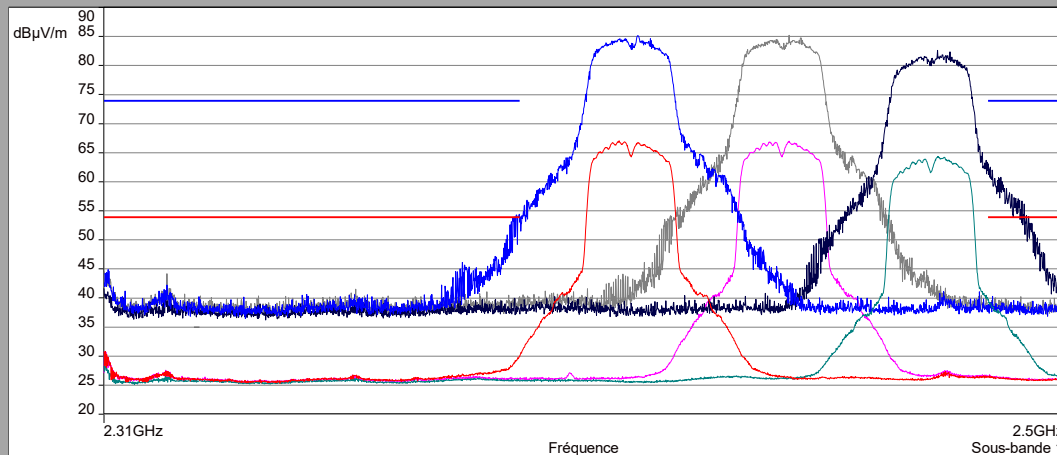
Fréquences: 2.31 GHz - 2.5 GHz (Mode analyseur) 32001 Points

Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 2 ms/Pts, Atténuation : Auto, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: Off

Polarisation: Horizontale

Distance: 3 m

- 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_Channel Low - Horizontale (Horizontale)
- Mes.Avg_Channel High - Horizontale (Horizontale)
- Mes.Peak_Channel Low - Horizontale (Horizontale)
- Mes.Peak_Channel High - Horizontale (Horizontale)
- Mes.Avg_Channel Middle - Horizontale (Horizontale)
- Mes.Peak_Channel Middle - Horizontale (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					
Polarization	Frequency (MHz)	Peak Level (dBμV/m)	QPeak Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)
Vertical	31.1	-	23.72	29.5	5.78
Horizontal	432	-	31.11	35.5	4.39
Horizontal	712	-	30.36	35.5	5.14
Horizontal	729	-	31.06	35.5	4.44
Vertical	837	-	32.05	35.5	3.45
Vertical	891	-	35.1	35.5	0.4

802.11b								
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	1076	33,39	35.47	54	18.53	38,69	74	35,31
Verticale	1336	29,58	31.66	54	22.34	36,99	74	37,01
Verticale	1979	30,51	32.59	54	21.41	41,32	74	32,68
Horizontale	2390	28,88	30.96	54	23.04	38,76	74	35,24
Verticale	2390	28,14	30.22	54	23.78	38,17	74	35,83
Horizontale	2483.5	39,76	41.84	54	12.16	48,42	74	25,58
Verticale	2483.5	37,58	39.66	54	14.34	46,14	74	27,86



802.11g								
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)
Horizontale	1007	31,01	43,95	54	10,05	40,32	74	33,68
Verticale	1076	34,2	47,14	54	6,86	38,85	74	35,15
Horizontale	1336	28,55	41,49	54	12,51	36,29	74	37,71
Horizontale	1979	29,44	42,38	54	11,62	40,65	74	33,35
Horizontale	2390	29,29	42,23	54	11,77	50,06	74	23,94
Verticale	2390	30,8	43,74	54	10,26	53,47	74	20,53
Horizontale	2483.5	40,07	53,01	54	1,01	62,83	74	11,17
Verticale	2483.5	40,75	53,69	54	0,31	61,98	74	12,02

802.11n HT20								
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	1002	28,58	37,75	54	16,25	37,77	74	36,23
Verticale	1052	30,26	39,43	54	14,57	37,65	74	36,35
Verticale	1076	33,53	42,7	54	11,3	39,22	74	34,78
Verticale	1113	30,8	39,97	54	14,03	40,28	74	33,72
Verticale	1160	31,11	40,28	54	13,72	38,95	74	35,05
Horizontale	2390	29,85	39,02	54	14,98	49,83	74	24,17
Verticale	2390	30,5	39,67	54	14,33	49,98	74	24,02
Horizontale	2483.5	39,31	48,48	54	5,52	59,99	74	14,01
Verticale	2483.5	40,94	50,11	54	3,89	61,86	74	12,14

11.7. CONCLUSION

Unwanted emissions measurement performed on the sample of the product Netatmo NDB01, SN: **g549be2**, 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. UNCERTAINTIES CHART

47 CFR Part 15.209 & 15.207 Kind of test	Wide uncertainty laboratory (k=2) $\pm x(\text{dB}) / (\text{Hz}) / \text{ms}$	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