



Accreditation
N°1-1633
Scope available on
www.cofrac.fr

Template : March 5th, 2024

TEST REPORT

N°: 21742978-799210-A(FILE#8108341)

Version: 01

Subject Radio spectrum tests according to the standards:
FCC CFR 47 Part 15.247 & ANSI C63.10
RSS-247 & RSS-Gen

Issued to Jay Electronique
Zac la bâtie, rue Champrond
38334-Saint-Ismier
France

Apparatus under test

↪ Product	Wireless safety logic signal transmission system
↪ Trade mark	CONDUCTIX wampfler
↪ Manufacturer	Jay Electronique
↪ Model under test	RSEFBox
↪ Serial number	231227401
↪ FCCID	OQMRSEFBOX
↪ IC	3393A-RSEFBOX

Conclusion See Test Program chapter

Test date	March 05, 2024 to March 21, 2024
Test location	LCIE Grenoble
FCC Test site	FR0008 - 918017 (MOI)
ISED Test site	6500A (MOI)
Sample receipt date	March 05, 2024
Composition of document	80 pages
Document issued on	April 24, 2024

Written by :
Majid MOURZAGH
Tests operator

Approved by :
Anthony MERLIN
Technical manager



Reproduction of this document is only authorized in its complete form. Any partial reproduction or any insertion of results in an accompanying text with a view to their distribution must receive prior and formal agreement from LCIE. This document results from tests carried out on a specimen, sample or test piece. It does not prejudice the conformity of all the products manufactured to the object tested. Unless otherwise indicated or rule specified by the test method, the decision of conformity does not take into account measurement uncertainty. It in no way prejudices a certification decision.



PUBLICATION HISTORY

Version	Date	Author	Modification
01	April 24, 2024	Majid MOURZAGH	Creation of the document

Each new edition of this test report replaces and cancels the previous edition. The control of the old editions of report is under responsibility of client.



SUMMARY

1.	TEST PROGRAM	4
2.	EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER).....	5
3.	OCCUPIED BANDWIDTH.....	14
4.	6DB BANDWIDTH	19
5.	MAXIMUM CONDUCTED OUTPUT POWER	23
6.	POWER SPECTRAL DENSITY	28
7.	UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS	33
8.	UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS	39
9.	UNCERTAINTIES CHART	80



1. TEST PROGRAM

References

- 47 CFR Part 15.247 (2023)
- RSS 247 Issue 3
- RSS Gen Issue 5
- KDB 558074 D01 DTS Meas Guidance v05r02 [P](#)
- KDB 662911 D01 Multiple Transmitter Output v02r01 [P](#)
- ANSI C63.10 (2013)

Radio requirement:

Clause - Test Description		Test result - Comments
Occupied Bandwidth	<i>ISED</i>	PASS
6dB Bandwidth	<i>FCC & ISED</i>	PASS
Maximum Conducted Output Power	<i>FCC & ISED</i>	PASS
Power Spectral Density	<i>FCC & ISED</i>	PASS
Unwanted Emissions in Non-Restricted Frequency Bands	<i>FCC & ISED</i>	PASS
Unwanted Emissions in Restricted Frequency Bands	<i>FCC & ISED</i>	PASS
Receiver Radiated Emissions	<i>ISED</i>	PASS(2)

This table is a summary of test report, see conclusion of each clause of this test report for detail.

(1) Limited program

(2) Testing covered the receive mode, and receiver spurious emissions are considered to be the same as transmitter.

PASS: EUT complies with standard's requirement

FAIL: EUT does not comply with standard's requirement

NA: Not Applicable

NP: Test Not Performed

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

2.1. INFORMATIONS

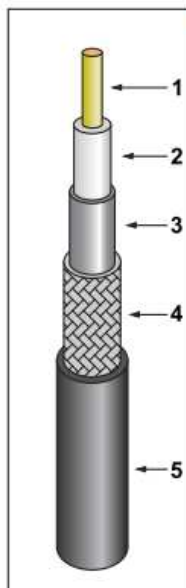
An internal switch of the antennas allows for sequential transmission on one and then the other, never both simultaneously.

The antennas are connected to the RSEFBox using cables of at least 30 meters, with a minimum attenuation of 4.35 dB. All tests were conducted with this minimal attenuation..



Ph: +44 (0) 1727 845 750 Email: info@gemcable.co.uk www.gemcable.co.uk

GBC600 Low Loss Coax Cable LMR600[®] Direct Equivalent Cable 201-603



- Jumper Assemblies in Wireless Communications Systems
- Short Antenna Feeder Runs
- Any application (e.g. WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Mobile Antennas) requiring an easily routed low loss RF cable

Construction Specifications		
1 Inner Conductor	Bare Copper Clad Aluminium	4.47mm
2 Dielectric	Physical Foam Polyethylene	11.56mm
3 Outer Conductor	Bonded Aluminium Foil	11.71mm
4 Overall Braid	Tinned Copper	12.45mm
5 Jacket	Black Polyethylene	14.99mm

Electrical Specifications	
1 Impedance	50 Ω
2 Capacitance	76.6pF/M (23.4pF/ft)
3 Velocity of Propagation	87%
4 Voltage Withstand	4000 VDC
5 Max Operating Frequency	10.3 GHz

Environmental Specifications	
1 Bending Radius Static	38.1mm (1.50")
2 Bending Radius Repeated	152.4mm (6.0")
3 Weight	200 Kg/Km



LSZH
Version
Also
Available

Frequency (MHz)	150	220	450	900	1500	1800	2000	2500	3000	5800
Attenuation dB/100m	3.2	3.9	5.6	8.2	10.9	12.1	12.8	14.5	16.1	23.8
Avg. Power kW	2.41	1.97	1.35	0.93	0.70	0.63	0.59	0.52	0.47	0.32



**We Manufacture Your
Cable Assemblies
To Your Spec**







Although GEM Cable Solutions makes every reasonable effort to ensure their accuracy at the time of this publication, information and specifications described herein are subject to error or omission and to change without notice, and the listing of such information and specifications does not ensure product availability.

Unit C, 156 St. Albans Road, Sandridge, St. Albans, Herts. AL4 9LP

2.2. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):

Model under test:	RSEFBox		
Serial Number:	231227401		
			
	Antenna reference: Solwise MNT-2409N	Antenna reference: Pasternack PE510M1026	Antenna reference :: Amphenol CXL2400-3LW/m
Dimensions:	400cm x 230cm x 540cm (Length x Width x Height)		
Type:	Table-Top		



Power supply:

Name	Type	Rating	Reference / Sn	Comments
Supply1	DC	24VDC	/	/

NC: Not communicated by provider

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Comments
Supply1	2 Wires Industrial connector	3	No	No	/
Access1	Industrial connector16C:Power supply - 4 dry Contacts - 4Inputs-2 outputs- RS232-Earth	1.8	No	No	/
Access2	2 RF outputs - N connector	/	No	Yes	/

NC: Not communicated by provider

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop LENOVO	L460	/	/
Boitier Jaune	/	/	Emergency stop- RS232 access -2 inputs - 2 Light Indicators

NC: Not communicated by provider

Equipment information (declaration of provider):

Chipset / RF Module	SX1280 Semtech
Frequency band:	[2400 – 2483.5] MHz
Spectrum Modulation:	DSSS (Tested like it – international agreements)
Number of Channel:	64
Spacing channel:	1.25MHz
Channel bandwidth:	1MHz
Antenna Type:	External with connector
Antenna connector:	Permanent external
Transmit chains:	2*
Receiver chains	0 - transmitter only

* :An internal switch of the antennas allows for sequential transmission on one and then the other, never both simultaneously.



L C I E

Chan.	Freq. (MHz)
01	2402.00
02	2403.25
03	2404.50
04	2405.75
05	2407.00
06	2408.25
07	2409.50
08	2410.75
09	2412.00
10	2413.25
11	2414.50
12	2415.75
13	2417.00
14	2418.25
15	2419.50
16	2420.75
17	2422.00
18	2423.25
19	2424.50
20	2425.75
21	2427.00
22	2428.25
23	2429.50
24	2430.75
25	2432.00
26	2433.25
27	2434.50
28	2435.75
29	2437.00
30	2438.25
31	2439.50
32	2440.75

Chan.	Freq. (MHz)
33	2442.00
34	2443.25
35	2444.50
36	2445.75
37	2447.00
38	2448.25
39	2449.50
40	2450.75
41	2452.00
42	2453.25
43	2454.50
44	2455.75
45	2457.00
46	2458.25
47	2459.50
48	2460.75
49	2462.00
50	2463.25
51	2464.50
52	2465.75
53	2467.00
54	2468.25
55	2469.50
56	2470.75
57	2472.00
58	2473.25
59	2474.50
60	2475.75
61	2477.00
62	2478.25
63	2479.50
64	2480.75

Cmin = Canal 01
 Cmid = Canal 32
 Cmax = canal 64

DATA RATE			
Available	Data Rate (Mbps)	Modulation Type	Worst Case Modulation
<input checked="" type="checkbox"/>	8 Kb/s	Proprietary spread spectrum modulation that is similar to an derivative of chirp spread spectrum (CSS) modulation.(LoRa)	<input checked="" type="checkbox"/>

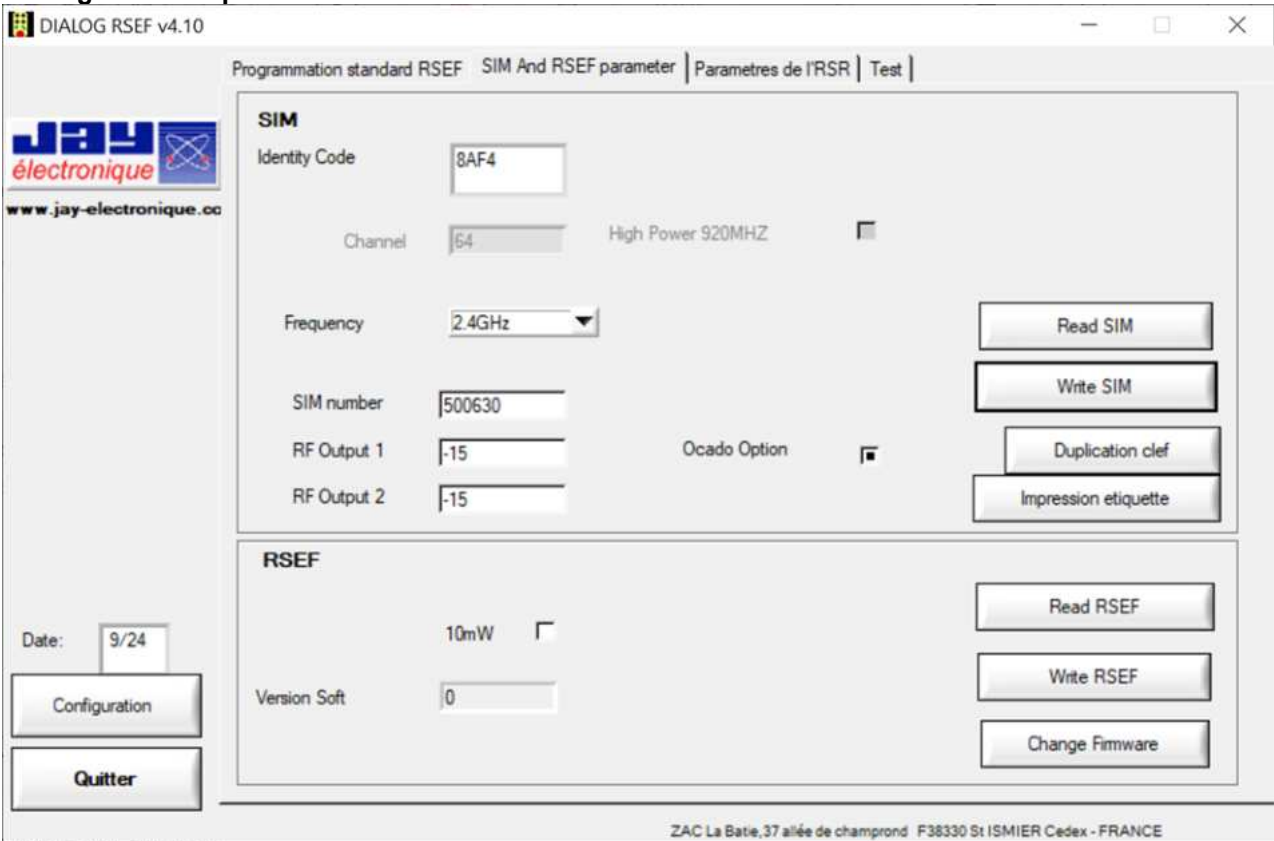


Antenna Characteristic			
Antenna reference	Gain (dBi)	Frequency Band (Impedance(Ω)
Solwise MNT-2409N	9	2.4 – 2.5GHz ISM Band	50
Pasternack PE51OM1026	8	2.4 – 2.5GHz	50
Amphenol CXL 2400-3LW/m	5.2	2.4 – 2.6GHz	50

Hardware information			
Highest internal frequency (PLL, Quartz, Clock, Microprocessor...):	F_{Highest}:	52	MHz
Firmware (if applicable):	V:	15	
Software (if applicable):	V:	/	
Equipment intended:	Fixed		
Type of equipment:	Stand-alone		
Equipment sample:	Production model		
Duty cycle:	Continuous duty		
Operating temperature range:	T_{min}:	-20 °C	
	T_{nom}:	20°C	
	T_{max}:	+45 °C	
Operating voltage:	V_{nom}:	24VDC	

NC: Not communicated by provider

2.3. RUNNING MODE

Test mode	Description of test mode
<p>Test mode 1</p>	<p>Permanent emission with modulation on a fixed channel in the data rate that produced the highest power. Setting of RF Output 1 & 2 Channel 1 to 63 at -12 dBm. Setting of RF Output 1 & 2 Channel 64 at -18 dBm.</p> 
<p>Test mode 2</p>	<p>Permanent reception</p>



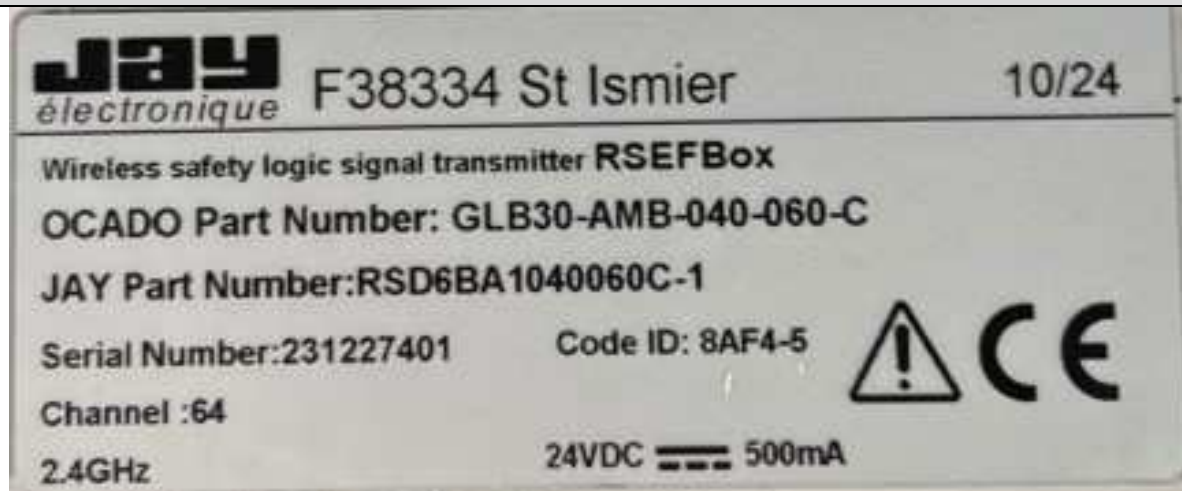
Test	Running mode
Occupied Bandwidth	Test mode 1
6dB Bandwidth	Test mode 1
Maximum Conducted Output Power	Test mode 1
Power Spectral Density	Test mode 1
Conducted Spurious Emission at the Band Edge	Test mode 1
Unwanted Emissions in Non-Restricted Frequency Bands	Test mode 1
Unwanted Emissions in Restricted Frequency Bands	Test mode 1
Receiver Radiated Emissions	Test mode 2 (1)

(1) Testing covered the receive mode, and receiver spurious emissions are considered to be the same as transmitter.

Configuration mode 1	RSEFBox with 2 antennas Solwise MNT-2409N
Configuration mode 2	RSEFBox with 1 antenna Pasternack PE51OM1026 and 1e antenna Amphenol CXL 2400-3LW
Configuration mode 3	For conducted test wit RSEFbox and Load 50 Ohm LCIE n° A7125009

2.4. EQUIPMENT LABELLING

Label



2.5. EQUIPMENT MODIFICATIONS DURING THE TESTS

None



2.6. 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

Example:

Assume a receiver reading of 52.5dB μ V 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 dB μ V/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dB}\mu\text{V/m}$$

The 32 dB μ V/m value can be mathematically converted to its corresponding level in μ V/m.

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32\text{dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m.}$$

2.7. TEST DISTANCE EXTRAPOLATION – FCC/ISED

The field strength is extrapolated to the new measurement distance using formula from FCC Part15.31 (f) and §6.5-6.6 RSS-GEN:

Below 30MHz,

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left(\frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

Above 30MHz,

$$FS_{\text{limit}} = FS_{\text{max}} - 20 \log \left(\frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

Where:

FS_{limit} is the calculation of field strength at the limit distance, expressed in dB μ V/m

FS_{max} is the measured field strength, expressed in dB μ V/m

d_{measure} is the distance of the measurement point from the EUT

d_{limit} is the reference limit distance

2.8. 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.

2.9. METHOD TO DETERMINATE THE SPURIOUS RADIATED EMISSION

The Normalized Site Attenuation (NSA) is added to the maximum values observed during the azimuth search in order to obtain the spurious radiated emission. For spurious above -6dB from the limit found with the NSA, the Substitution Method is applied.

The substitution antenna replaces the equipment under test (EUT) for Effective Radiated Power (ERP) or Effective Isotropically Radiated Power (EIRP) measurement following the standard. Power is measured for a high level and calculated for the same level of radiated field strength obtained on the measuring antenna and EUT.

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

Date of test : March 20, 2024
 Test performed by : Majid MOURZAGH
 Relative humidity (%) : 37
 Ambient temperature (°C) : 23

3.2. TEST SETUP

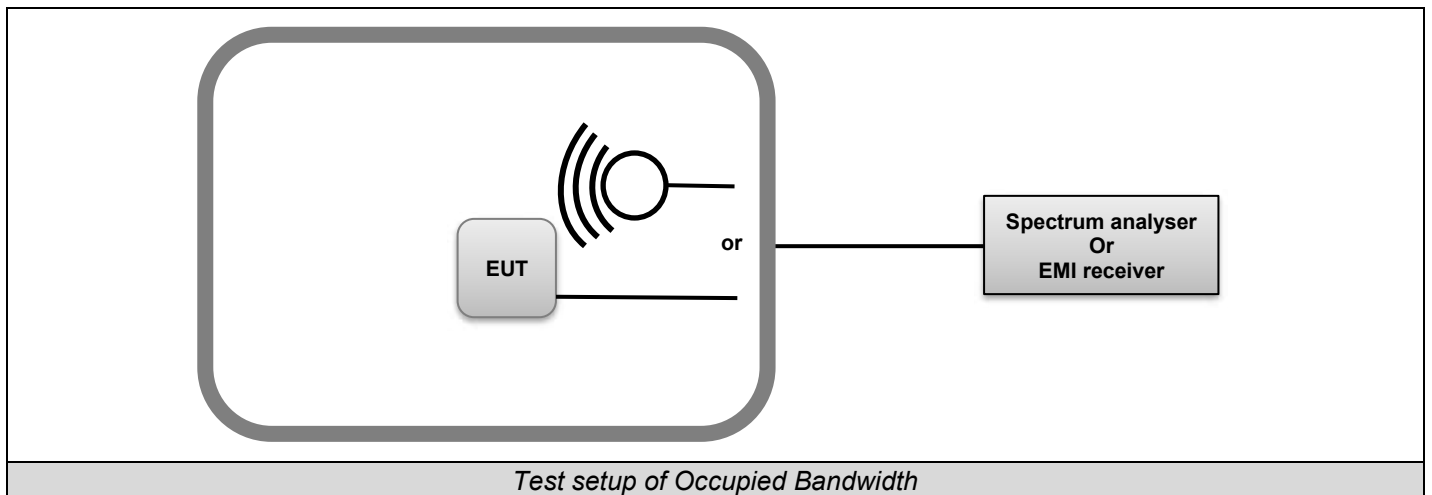
The Equipment Under Test is installed on a table.
 Measurement is performed with a spectrum analyzer in conducted method.

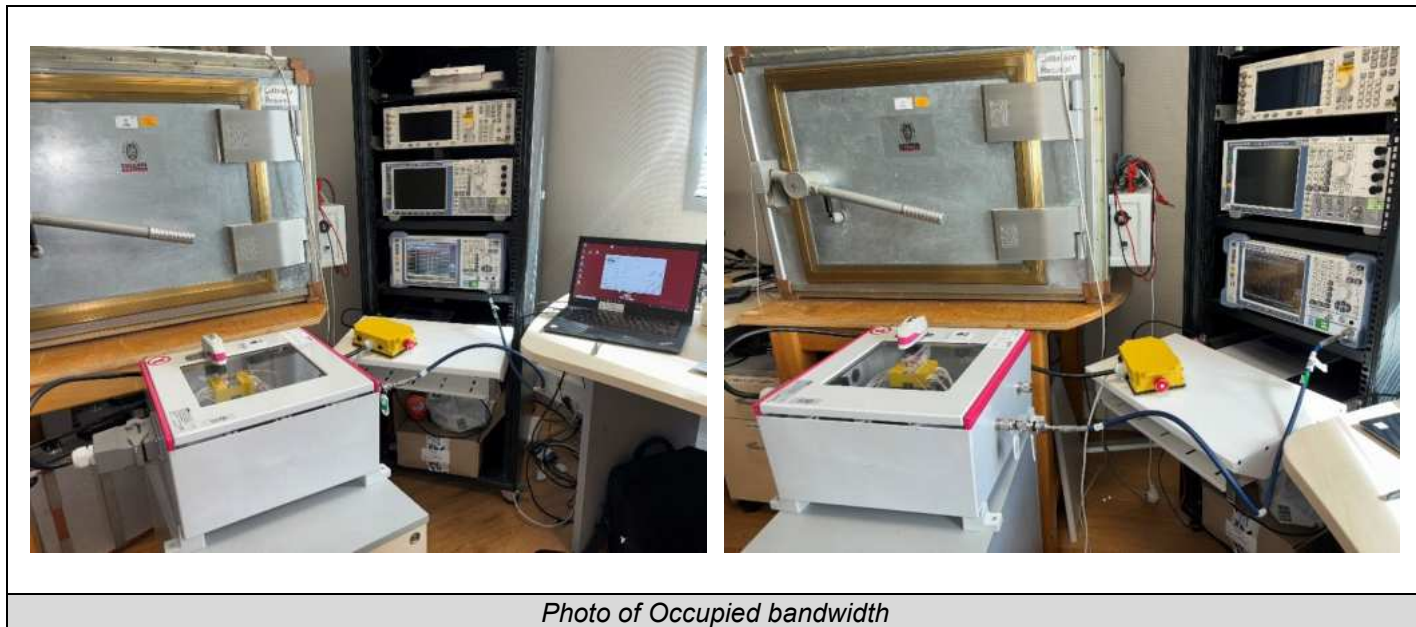
The EUT is turned ON, the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

Test Procedure:

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

- RBW used in the range of 1% to 5% of the anticipated emission bandwidth
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = Max Hold.
- Sweep = Auto couple.
- Allow the trace to stabilize.
- OBW 99% function of spectrum analyzer used





3.3. **LIMIT**

None



3.4. TEST EQUIPMENT LIST

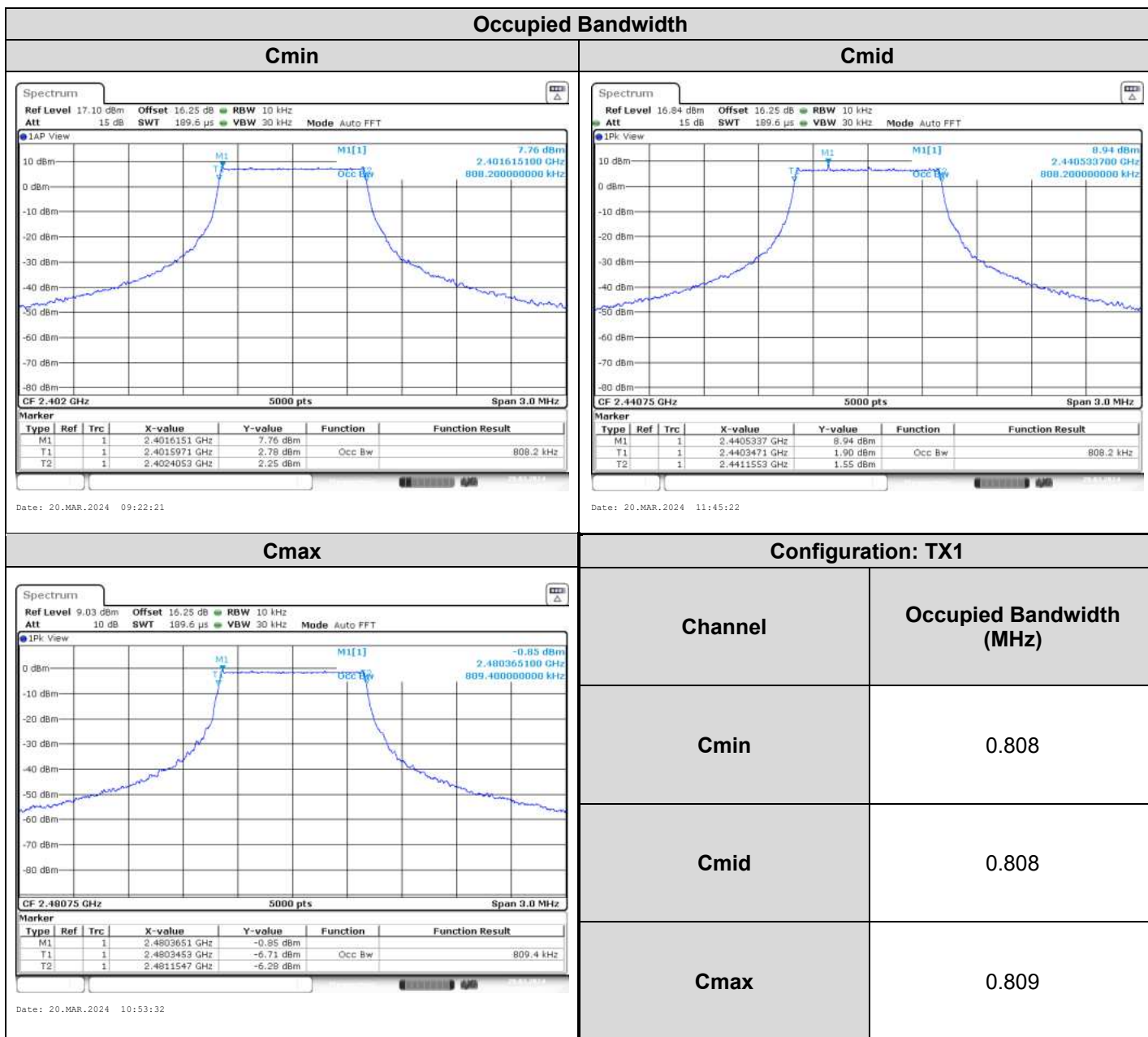
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	–	A7122267	10/23	10/25
Emission Cable (SMA 1m)	TELEDYNE	26GHz	A5329874	08/22	08/25
Full Anechoic Room	SIEPEL	–	D3044024		
Power supply DC	METRIX	AX503	A7042307		
Multimeter - CEM	FLUKE	87	A1240251	10/23	10/25
SMA 1.5m	SUCOFLEX	18GHz	A5329864	10/23	10/24
SMK 0.8m	TELEDYNE	A84-0505-0.8MTR	A5330054	04/23	04/24
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	11/21	04/24
Thermo-hygrometer	TESTO	608-H1	B4204120	03/23	03/25
Attenuator 10dB	AEROFLEX	–	A7122268	07/23	07/25

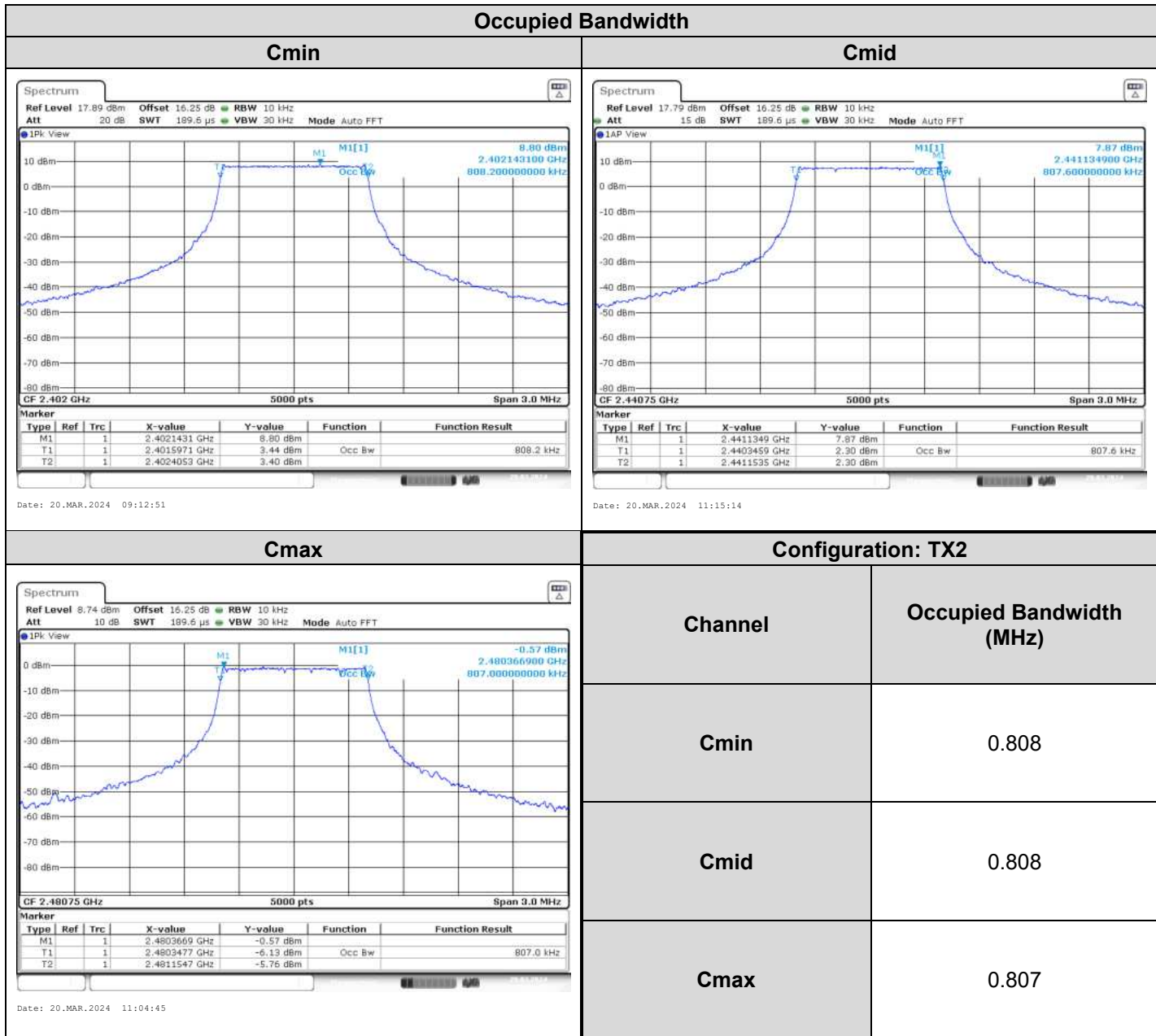
3.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

3.6. RESULTS

Configuration mode 3





3.7. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **RSEFBox**, Sn: **231227401**, in configuration and description presented in this test report, show levels **compliant** to the **RSS-GEN** limits.

4. 6dB BANDWIDTH

4.1. TEST CONDITIONS

Date of test : March 20, 2024
 Test performed by : Majid MOURZAGH
 Relative humidity (%) : 37
 Ambient temperature (°C) : 23

4.2. TEST SETUP

The Equipment Under Test is installed on a table.
 Measurement is performed with a spectrum analyzer in conducted method.

The EUT is turned ON, the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

Test Procedure:

KDB 558074 D01 DTS Meas Guidance v05r02 § 8.2

- Set resolution bandwidth (RBW) = 100kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer.

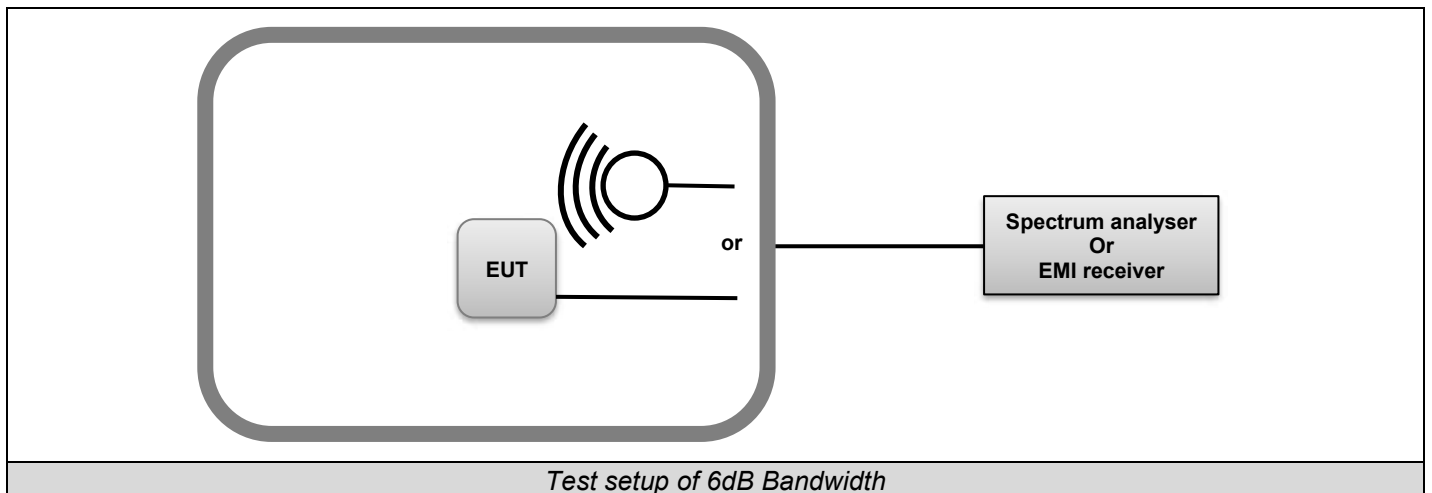




Photo of 6dB bandwidth

4.3. LIMIT

Frequency range	6dB bandwidth
2400MHz to 2483.5MHz	≥500kHz

4.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	_	A7122267	10/23	10/25
Emission Cable (SMA 1m)	TELEDYNE	26GHz	A5329874	08/22	08/25
Full Anechoic Room	SIEPEL	_	D3044024		
Power supply DC	METRIX	AX503	A7042307		
Multimeter - CEM	FLUKE	87	A1240251	10/23	10/25
SMA 1.5m	SUCOFLEX	18GHz	A5329864	10/23	10/24
SMK 0.8m	TELEDYNE	A84-0505-0.8MTR	A5330054	04/23	04/24
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	11/21	04/24
Thermo-hygrometer	TESTO	608-H1	B4204120	03/23	03/25
Attenuator 10dB	AEROFLEX	_	A7122268	07/23	07/25

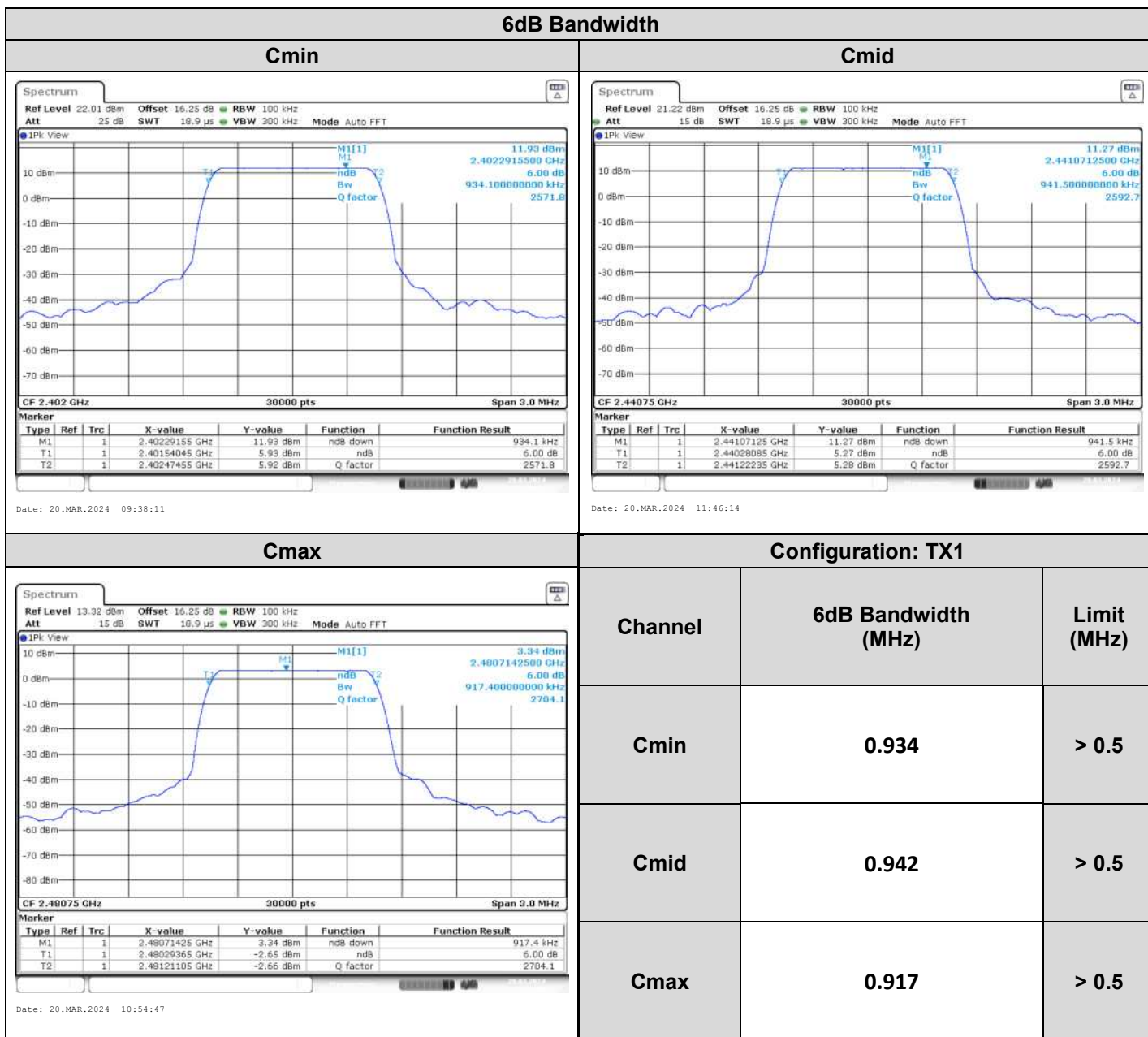
4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None



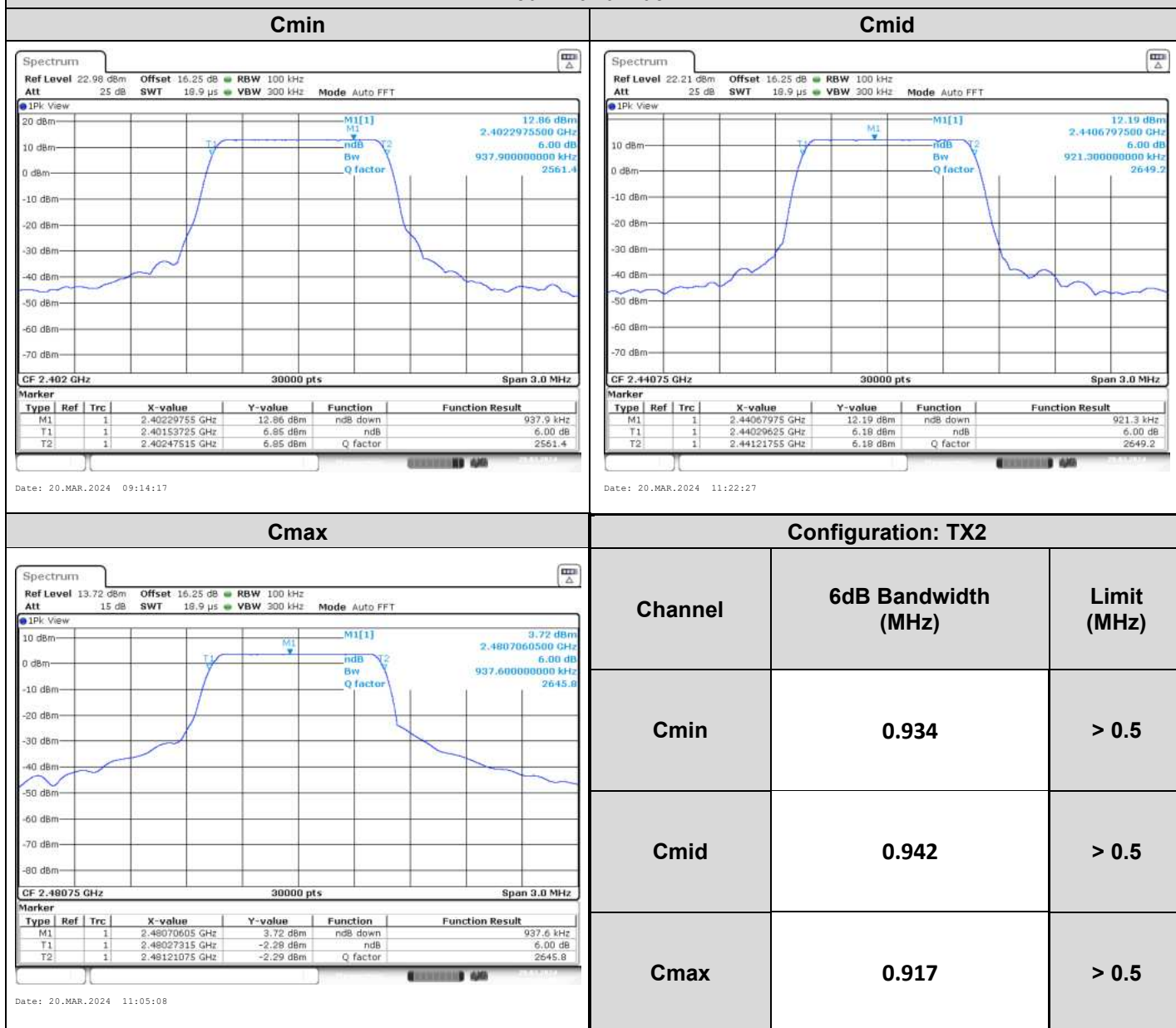
4.6. RESULTS

Configuration mode 3





6dB Bandwidth



4.7. CONCLUSION

6dB Bandwidth measurement performed on the sample of the product **RSEFBox**, Sn: **231227401**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247** limits.



5. MAXIMUM CONDUCTED OUTPUT POWER

5.1. TEST CONDITIONS

Date of test : March 20, 2024
Test performed by : Majid MOURZAGH
Relative humidity (%) : 37
Ambient temperature (°C) : 23

5.2. TEST SETUP

The Equipment Under Test is installed on a table.
Measurement is performed with a spectrum analyzer in conducted method.

The EUT is turned ON, the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

Test Procedure used: KDB 558074 D01 DTS Meas Guidance v05r02 § 8.3.1.1

KDB 558074 D01 DTS Meas Guidance v05r02 § 8.3.1.1

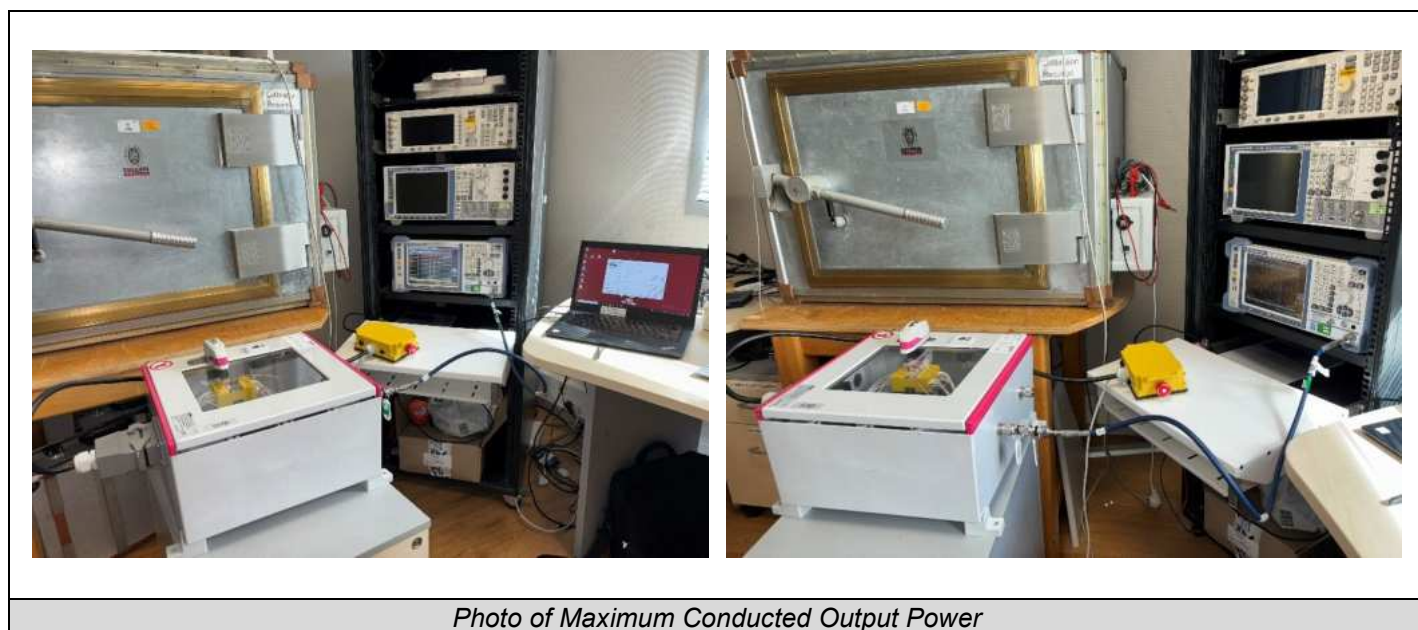
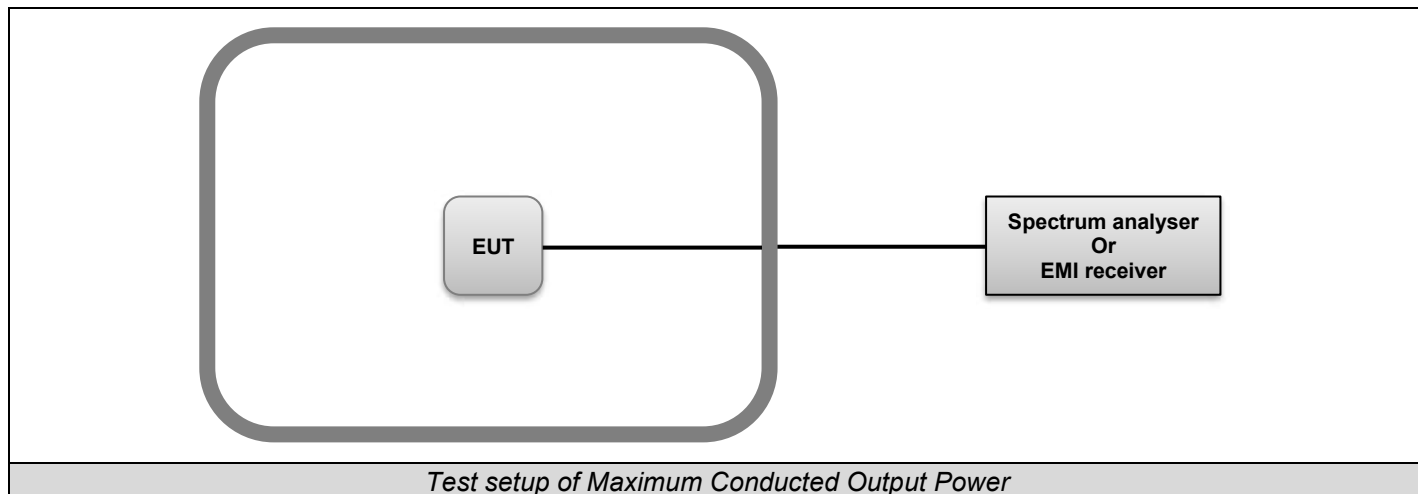
This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

- Set the RBW \geq DTS bandwidth.
- Set VBW $\geq 3 \times$ RBW.
- Set span $\geq 3 \times$ RBW
- Sweep time = auto couple.
- Detector = peak.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level.

KDB 558074 D01 DTS Meas Guidance v05r02 § 8.3.1.2

This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.

- Set the RBW = 1 MHz.
- Set the VBW $\geq 3 \times$ RBW
- Set the span $\geq 1.5 \times$ DTS bandwidth.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges





5.3. LIMIT

Frequency range	Maximum Conducted Output Power
2400MHz to 2483.5MHz	≤30dBm*

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

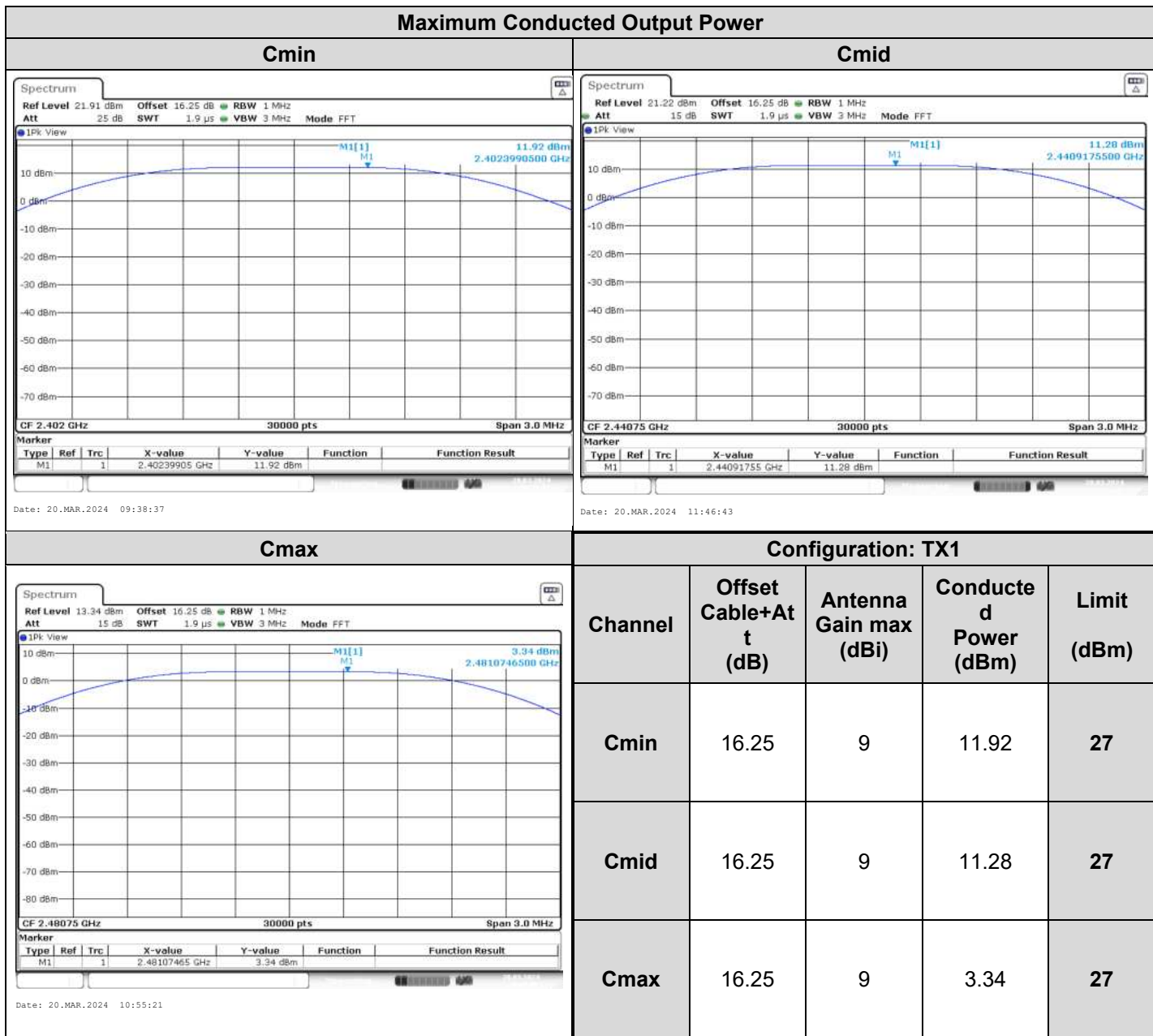
5.4. TEST EQUIPMENT LIST

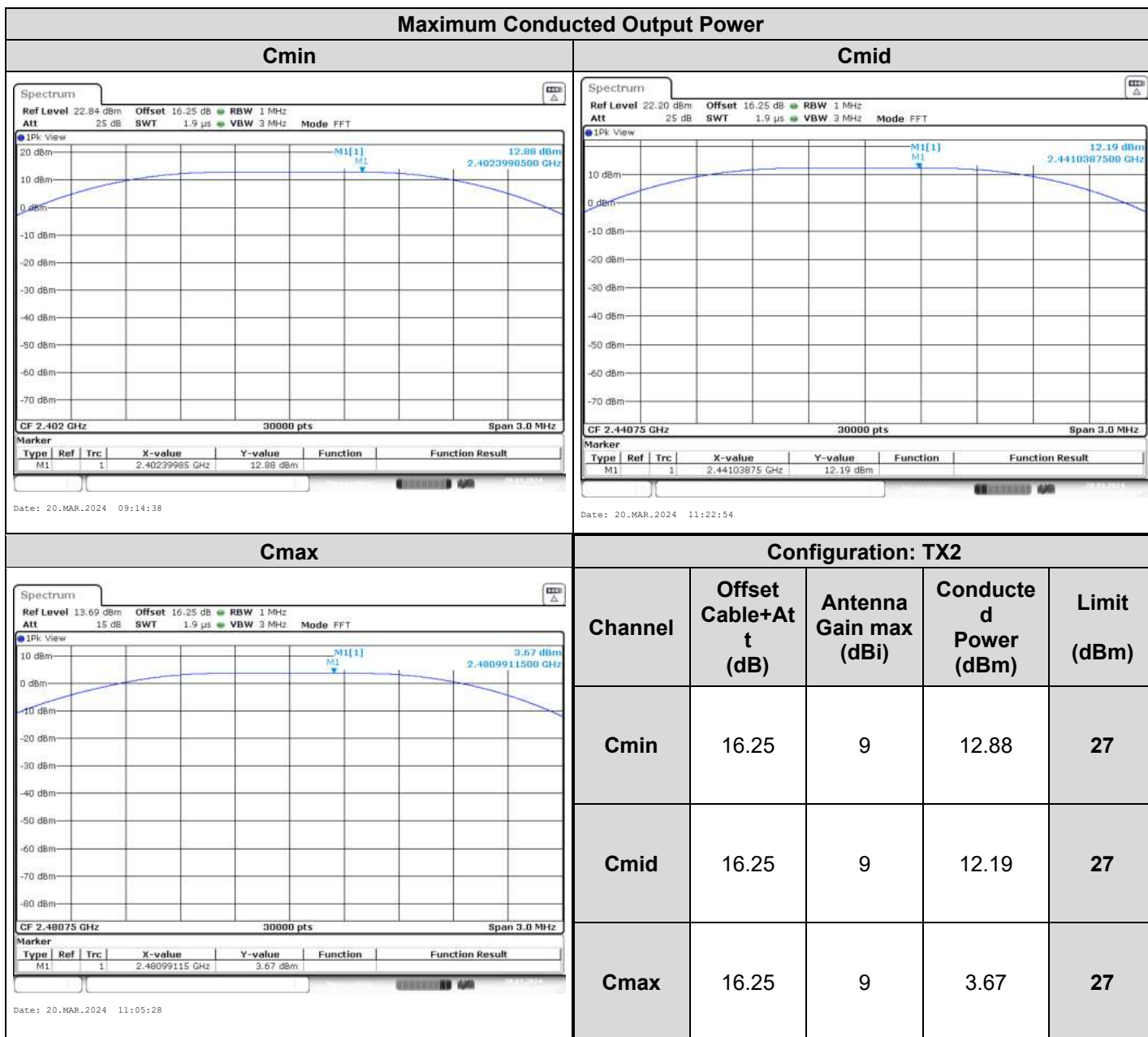
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	_	A7122267	10/23	10/25
Emission Cable (SMA 1m)	TELEDYNE	26GHz	A5329874	08/22	08/25
Full Anechoic Room	SIEPEL	_	D3044024		
Power supply DC	METRIX	AX503	A7042307		
Multimeter - CEM	FLUKE	87	A1240251	10/23	10/25
SMA 1.5m	SUCOFLEX	18GHz	A5329864	10/23	10/24
SMK 0.8m	TELEDYNE	A84-0505-0.8MTR	A5330054	04/23	04/24
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	11/21	04/24
Thermo-hygrometer	TESTO	608-H1	B4204120	03/23	03/25
Attenuator 10dB	AEROFLEX	_	A7122268	07/23	07/25

5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

5.6. RESULTS





5.7. CONCLUSION

Maximum Output Conducted Power measurement performed on the sample of the product **RSEFBox**, Sn: **231227401**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247** limits.



6. POWER SPECTRAL DENSITY

6.1. TEST CONDITIONS

Date of test : March 20, 2024
Test performed by : Majid MOURZAGH
Relative humidity (%) : 37
Ambient temperature (°C) : 23

6.2. TEST SETUP

The Equipment Under Test is installed on a table.
Measurement is performed with a spectrum analyzer in conducted method.

The EUT is turned ON, the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

Test Procedure used: KDB 558074 D01 DTS Meas Guidance v05r02 § 8.4 (Method PKPSD)

KDB 558074 D01 DTS Meas Guidance v05r02 § 8.4 (Method PKPSD)

Subclause 11.10 of ANSI C63.10 is applicable

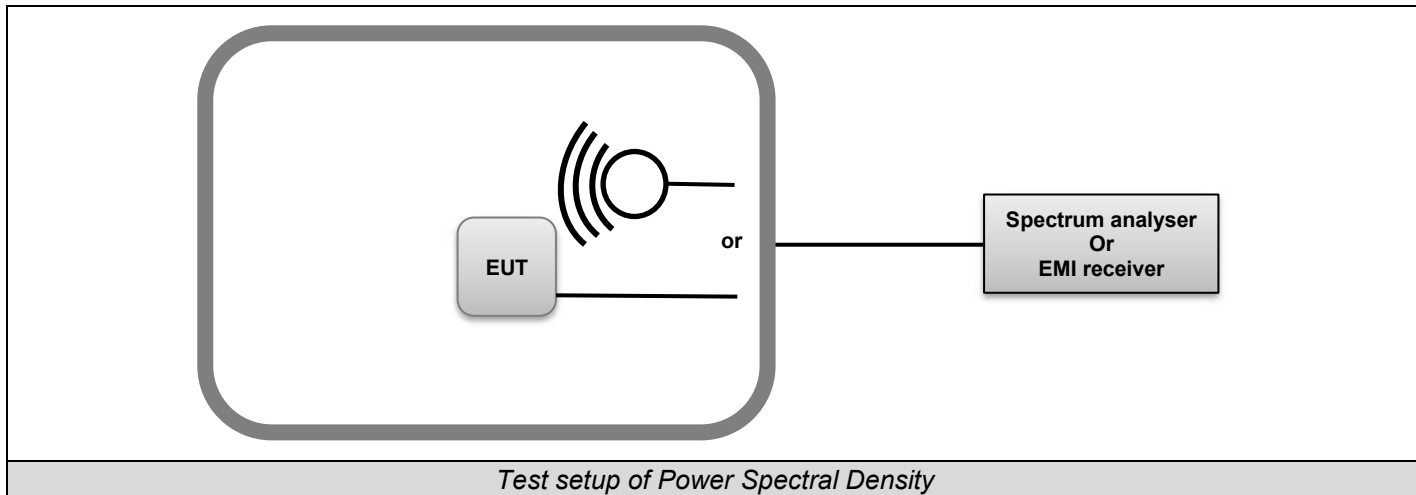
- o Set analyzer center frequency to DTS channel center frequency.
- o Set the span to 1.5 times the DTS bandwidth.
- o Set the RBW to: 3 kHz.
- o Set the VBW $\geq 3 \times$ RBW.
- o Detector = peak.
- o Sweep time = auto couple.
- o Trace mode = max hold.
- o Allow trace to fully stabilize.
- o Use the peak marker function to determine the maximum amplitude level within the RBW.
- o If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

KDB 558074 D01 DTS Meas Guidance v05r02 § 8.4 (Method AVGPS-1)

Subclause 11.10 of ANSI C63.10 is applicable

Method AVGPS-1 uses trace averaging with EUT transmitting at full power throughout each sweep. The following procedure may be used when the maximum (average) conducted output power was used to determine compliance to the fundamental output power limit. This is the baseline method for determining the maximum (average) conducted PSD level. If the instrument has a power averaging (rms) detector, then it must be used; otherwise, use the sample detector. The EUT must be configured to transmit continuously ($D \geq 98\%$), or else sweep triggering/signal gating must be implemented to ensure that measurements are made only when the EUT is transmitting at its maximum power control level (no transmitter OFF time to be considered):

- o a) Set instrument center frequency to DTS channel center frequency.
- o b) Set span to at least 1.5 times the OBW.
- o c) Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- o d) Set $\text{VBW} \geq [3 \times \text{RBW}]$.
- o e) Detector = power averaging (rms) or sample detector (when rms not available).
- o f) Ensure that the number of measurement points in the sweep $\geq [2 \times \text{span} / \text{RBW}]$.
- o g) Sweep time = auto couple.
- o h) Employ trace averaging (rms) mode over a minimum of 100 traces.
- o i) Use the peak marker function to determine the maximum amplitude level.
- o j) If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).



Test setup of Power Spectral Density

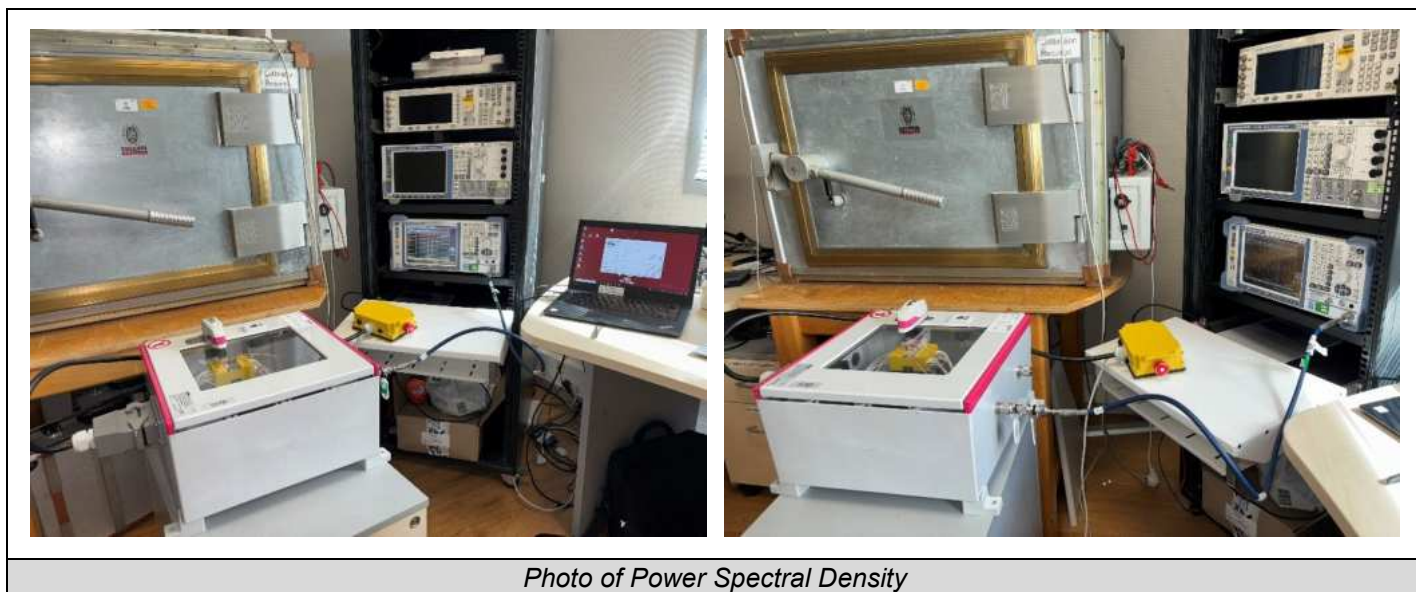


Photo of Power Spectral Density



6.3. LIMIT

Frequency range	Power Spectral Density
902-928MHz 2400MHz to 2483.5MHz 5725-5850 MHz	≤8dBm / 3kHz *

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

6.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	-	A7122267	10/23	10/25
Emission Cable (SMA 1m)	TELEDYNE	26GHz	A5329874	08/22	08/25
Full Anechoic Room	SIEPEL	-	D3044024		
Power supply DC	METRIX	AX503	A7042307		
Multimeter - CEM	FLUKE	87	A1240251	10/23	10/25
SMA 1.5m	SUCOFLEX	18GHz	A5329864	10/23	10/24
SMK 0.8m	TELEDYNE	A84-0505-0.8MTR	A5330054	04/23	04/24
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	11/21	04/24
Thermo-hygrometer	TESTO	608-H1	B4204120	03/23	03/25
Attenuator 10dB	AEROFLEX	-	A7122268	07/23	07/25

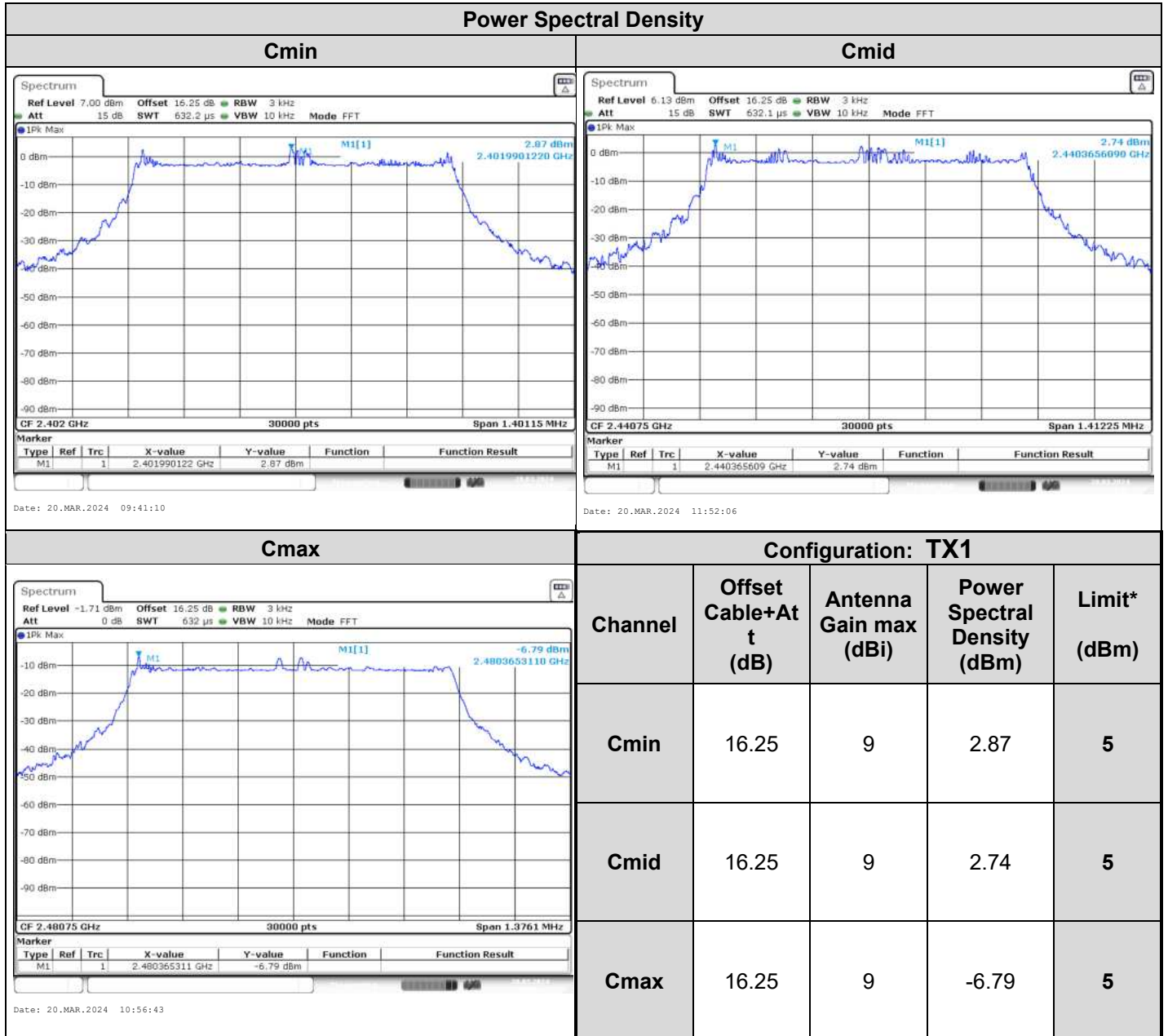
6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

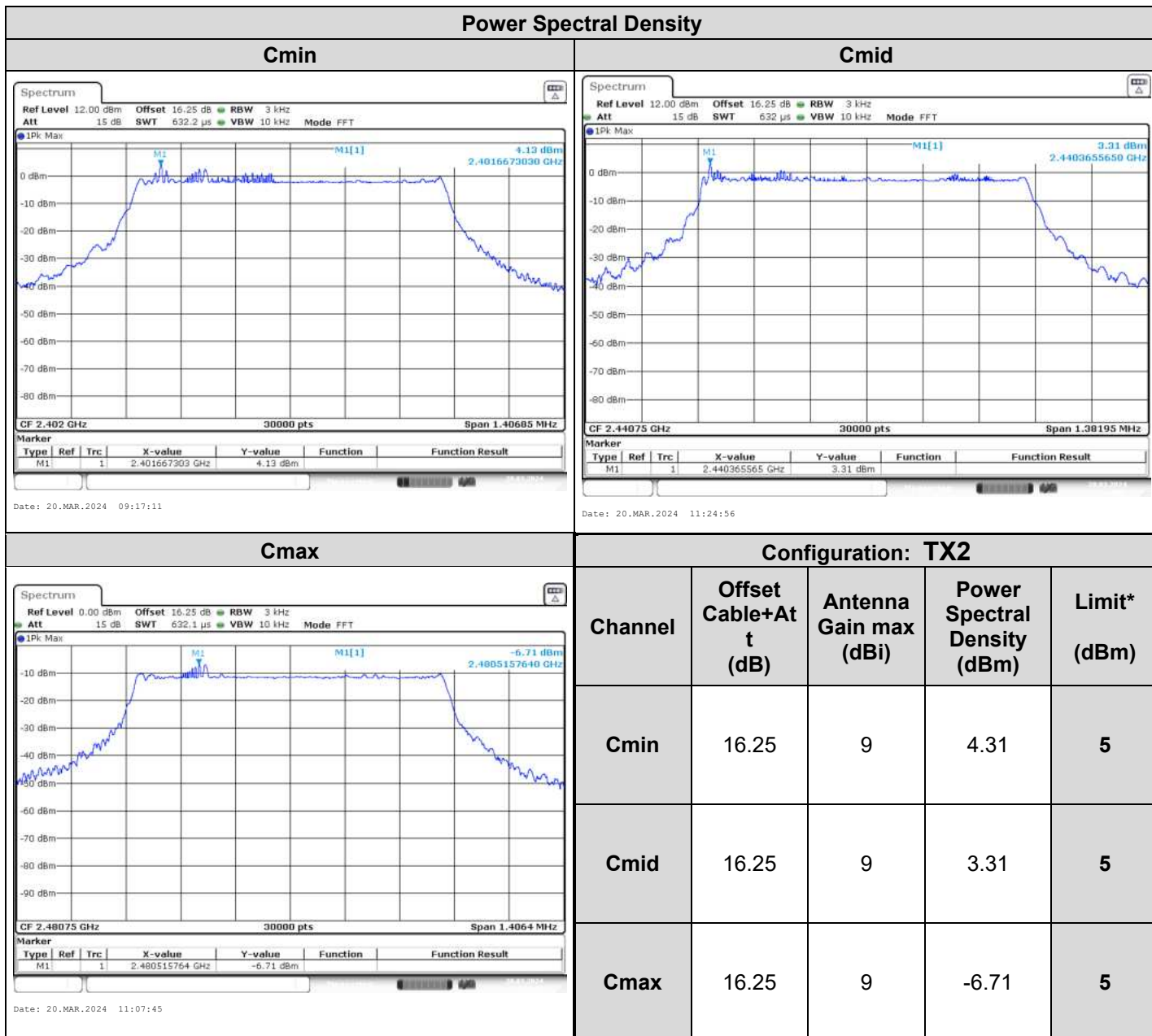


6.6. RESULTS

Configuration mode 3



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



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

6.7. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **RSEFBox**, Sn: **231227401**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247** limits.

7. UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

7.1. TEST CONDITIONS

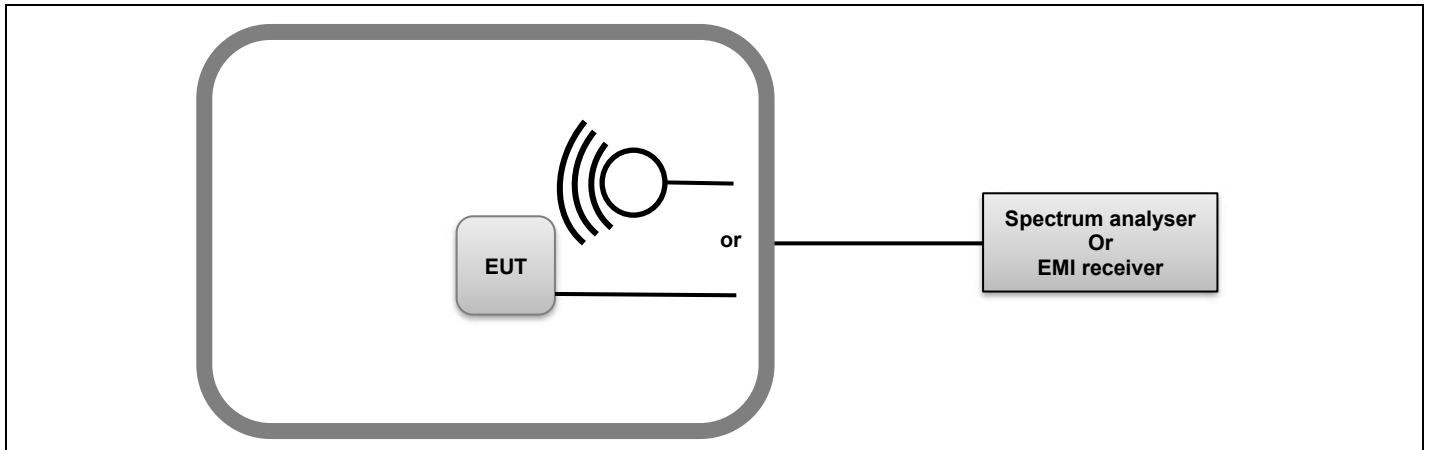
Date of test : March 20, 2024
Test performed by : Majid MOURZAGH
Relative humidity (%) : 37
Ambient temperature (°C) : 23

7.2. TEST SETUP

The Equipment Under Test is installed on a table.
Measurement is performed with a spectrum analyzer in conducted method.

The EUT is turned ON, the captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

Test Procedure:
KDB 558074 D01 DTS Meas Guidance v05r02 § 8.5



Test setup of Unwanted emissions in non-restricted frequency bands



Photo of Unwanted emissions in non-restricted frequency bands

7.3. LIMIT

All Spurious Emissions must be at least 20dB below the Fundamental Radiator Level at the Band Edge of operating frequency band and in non-restricted bands.

7.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	–	A7122267	10/23	10/25
Emission Cable (SMA 1m)	TELEDYNE	26GHz	A5329874	08/22	08/25
Full Anechoic Room	SIEPEL	–	D3044024		
Power supply DC	METRIX	AX503	A7042307		
Multimeter - CEM	FLUKE	87	A1240251	10/23	10/25
SMA 1.5m	SUCOFLEX	18GHz	A5329864	10/23	10/24
SMK 0.8m	TELEDYNE	A84-0505-0.8MTR	A5330054	04/23	04/24
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	11/21	04/24
Thermo-hygrometer	TESTO	608-H1	B4204120	03/23	03/25
Attenuator 10dB	AEROFLEX	–	A7122268	07/23	07/25

7.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

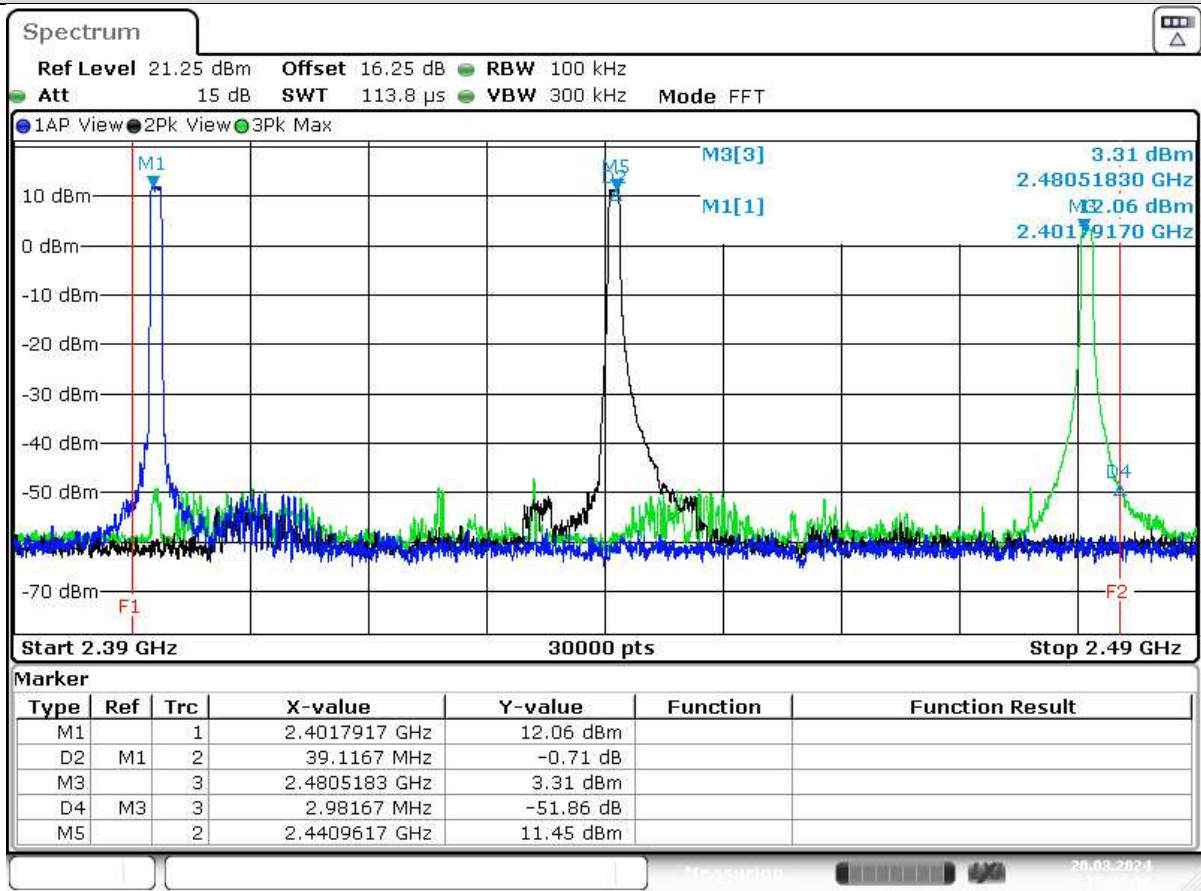


7.6. RESULTS

Configuration mode 3

7.6.1. At the band edge

Unwanted emissions in non-restricted bands at the band edge
Cmin / Cmid / Cmax
Lower band edge / Higher band edge
Delta limit (dBc) determination
Tx1



Date: 20.MAR.2024 10:37:17

Frequency (MHz)	Level (dBc)	Limit (dBc)
C_{min}	< - 52.73	-20
C_{max}	-51.86	-20

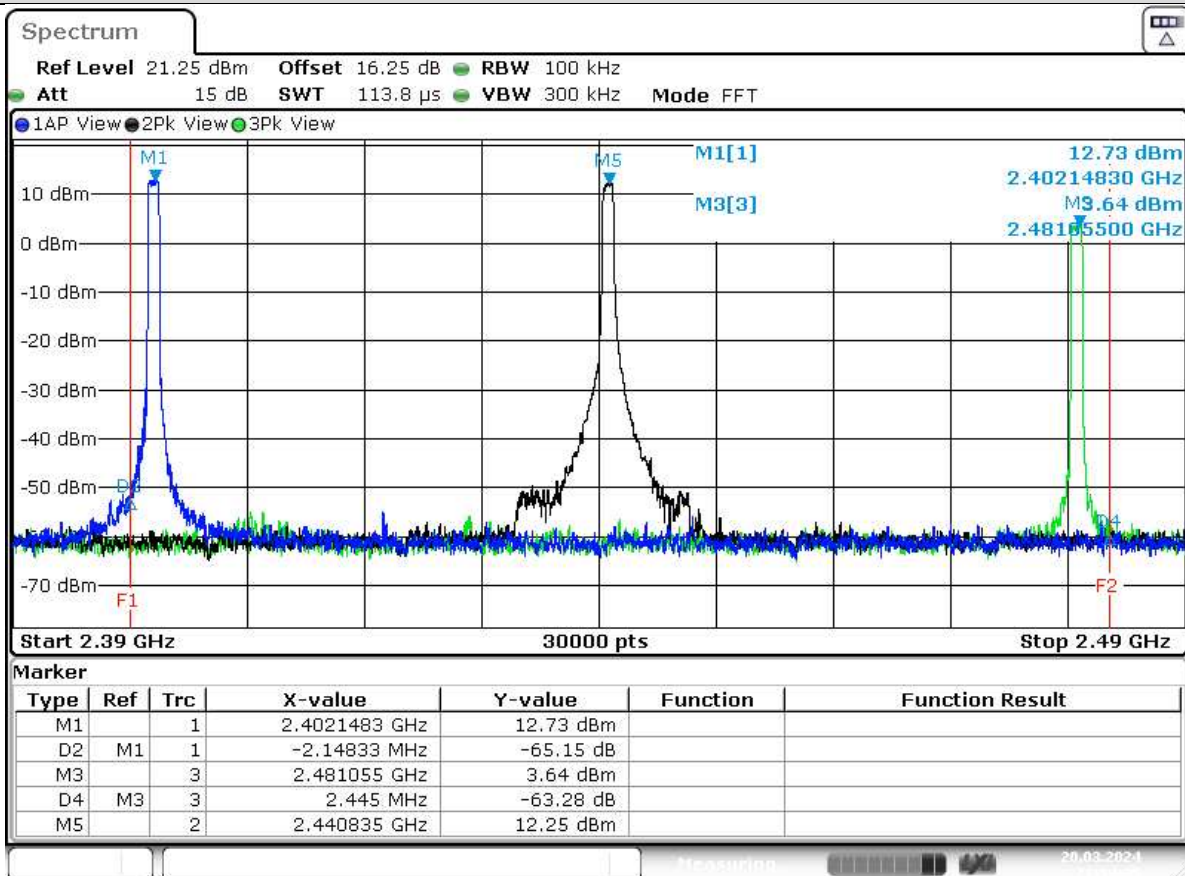


Unwanted emissions in non-restricted bands at the band edge

Cmin / Cmid / Cmax

Delta limit (dBc) determination

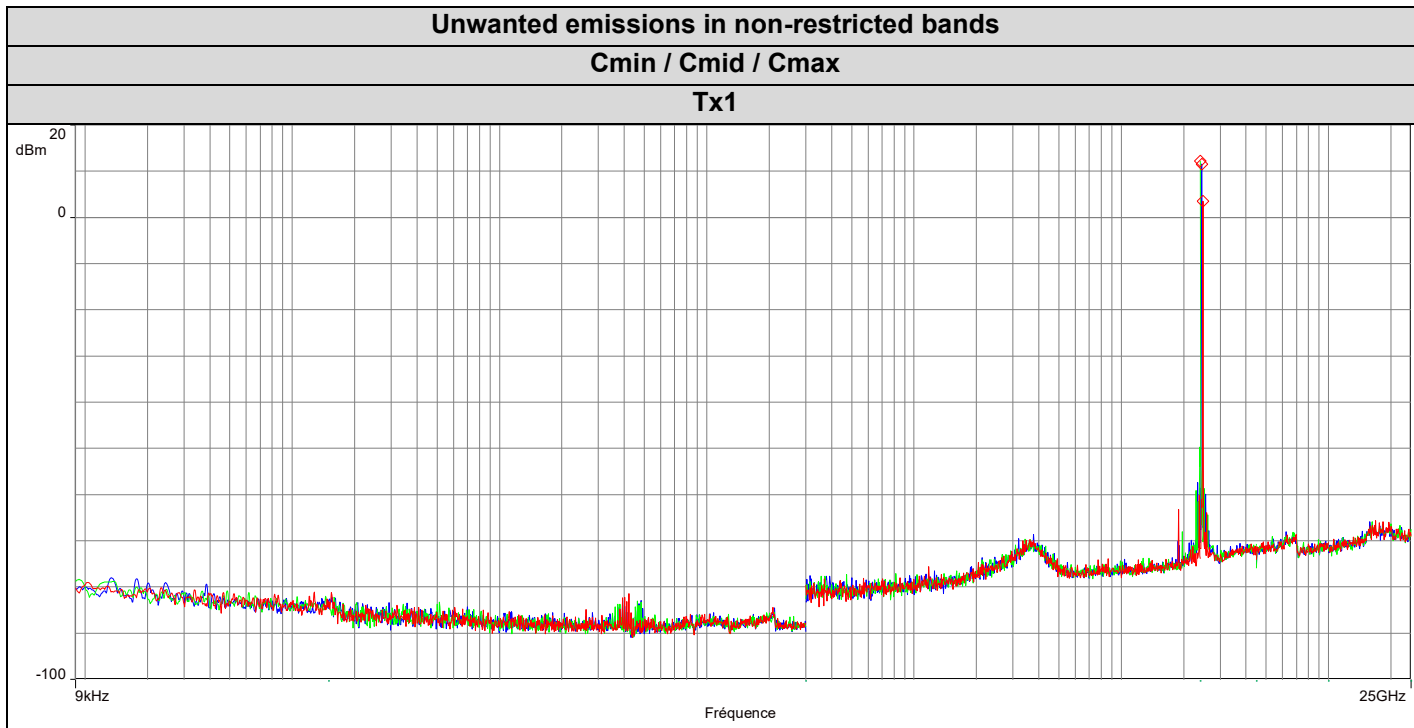
Tx2



Date: 20.MAR.2024 11:14:49

Frequency (MHz)	Level (dBc)	Limit (dBc)
C _{min}	-65.15	-30
C _{max}	-63.28	-30

7.6.2. Non restricted frequency bands



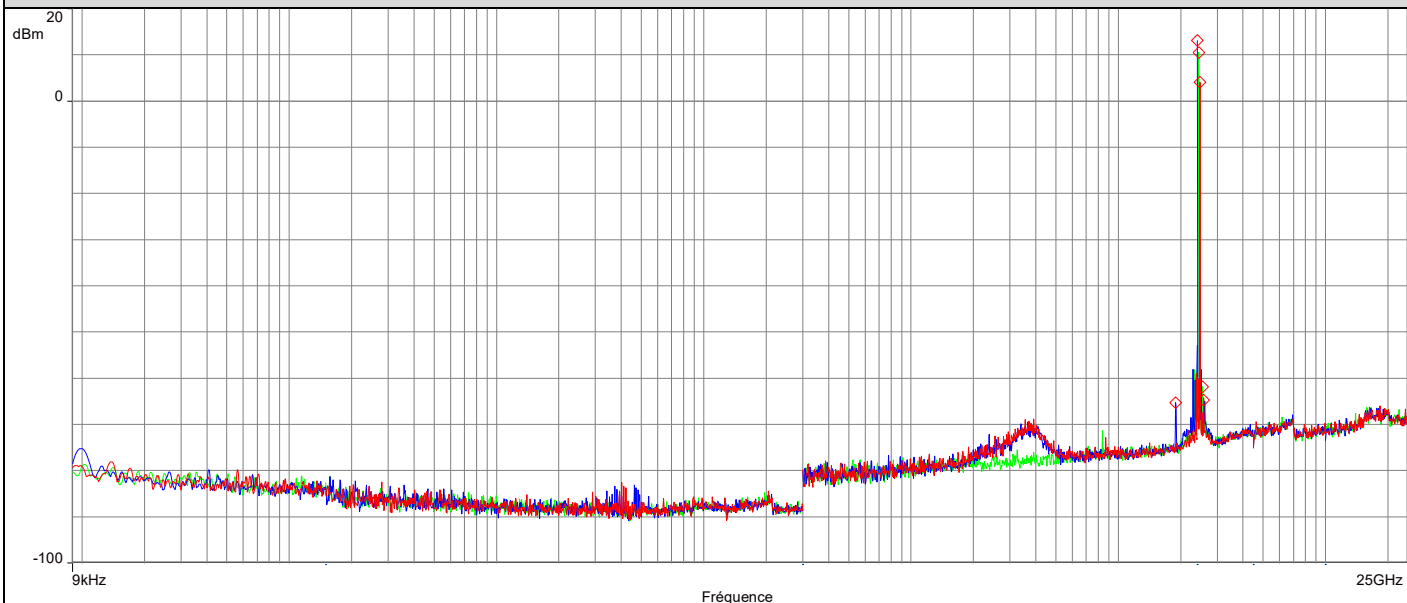
Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2402	12.23		
1964.10	-68.08	-80.31	-30
2440.75	11.59		
1883.58	-70.15	-81.71	-30
2480.75	3.53		
1893.61	-63.275	-66.80	-30



Unwanted emissions in non-restricted bands

Cmin / Cmid / Cmax

Tx2



Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2402	13.12		
837.38	-71.40	-84.5	-30
2440.75	10.54		
367.014M	-69.576	-80.11	-30
1.895427	-65.290	-75.83	
2480.75	4.04		
390.872M	-68.90	-72.94	-30

7.7. CONCLUSION

Unwanted emissions in non-restricted bands and at the band edge measurement performed on the sample of the product **RSEFBox**, Sn: **231227401**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247** limits.



8. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS

8.1. TEST CONDITIONS

Date of test : March 05, 2024
 Test performed by : Majid MOURZAGH
 Relative humidity (%) : 38
 Ambient temperature (°C) : 23

8.2. TEST SETUP

Test procedure:
 ANSI C63.10 & FCC Part 15 subpart C

Following frequency ranges, test setup parameters are different and specified in this table:

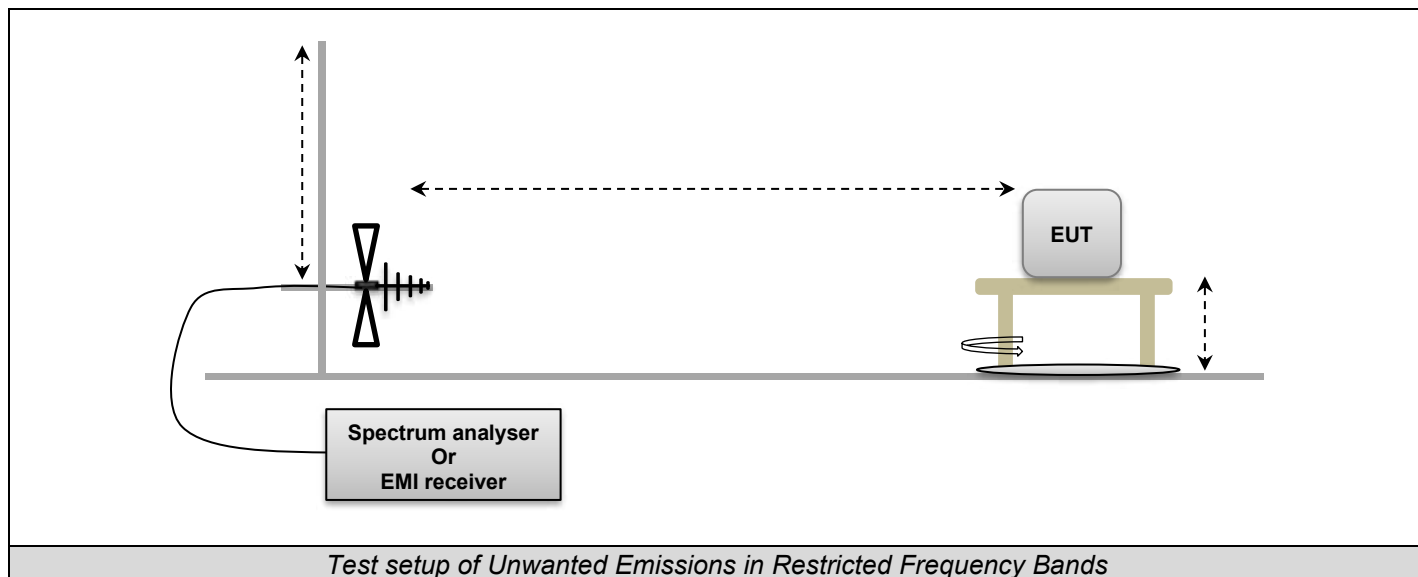
Frequency range:	9kHz to 30MHz	
Test:	Pre-Characterization	Qualification
Antenna Polarization:	Parallel, Perpendicular and Ground parallel	
Antenna Height:	Centered on EUT (§6.6.5 ANSI C63-10)	1m
Antenna Type:	Loop	
RBW Filter:	200Hz below 150kHz / 9kHz above 150kHz	
Maximization:	Turntable rotation of 360 degrees range and all axis of EUT used in normal configuration	
EUT height:	1.5m	1.5m
Test site:	Full Anechoic Chamber	Open Aera Test Site
Distance EUT - Antenna:	3m	3m
Detector:	Peak	QPeak

Frequency range:	30MHz to 1GHz	
Test:	Pre-Characterization	Qualification
Antenna Polarization:	Horizontal and Vertical	
Antenna Height:	Centered on EUT (§6.6.5 ANSI C63-10)	Varied from 1m to 4m
Antenna Type:	Biconical & Bi-Log	
RBW Filter:	120kHz	
Maximization:	Turntable rotation of 360 degrees range and all axis of EUT used in normal configuration	
EUT height:	1.5m	0.8m
Test site:	Full Anechoic Chamber	Open Aera Test Site
Distance EUT - Antenna:	3m	3m
Detector:	Peak	QPeak



Frequency range:	1GHz to 14GHz	
Test:	Pre-Characterization	Qualification
Antenna Polarization:	Horizontal and Vertical	
Antenna Height:	Centered on EUT (§6.6.5 ANSI C63-10)	Centered on EUT (§6.6.5 ANSI C63-10)
Antenna Type:	Horn	
RBW Filter:	1MHz	
Maximization:	Turntable rotation of 360 degrees range and all axis of EUT used in normal configuration	
EUT height:	1.5m	1.5m
Test site:	Full Anechoic Chamber	Full Anechoic Chamber
Distance EUT - Antenna:	3m	3m
Detector:	Peak & Average	Peak & Average

Frequency range:	14GHz to 25GHz	
Test:	Pre-Characterization	Qualification
Antenna Polarization:	Horizontal and Vertical	
Antenna Height:	Centered on EUT (§6.6.5 ANSI C63-10)	Centered on EUT (§6.6.5 ANSI C63-10)
Antenna Type:	Horn	
RBW Filter:	1MHz	
Maximization:	Turntable rotation of 360 degrees range and all axis of EUT used in normal configuration	
EUT height:	1.5m	1.5m
Test site:	Full Anechoic Chamber	Full Anechoic Chamber
Distance EUT - Antenna:	1m	1m
Detector:	Peak & Average	Peak & Average



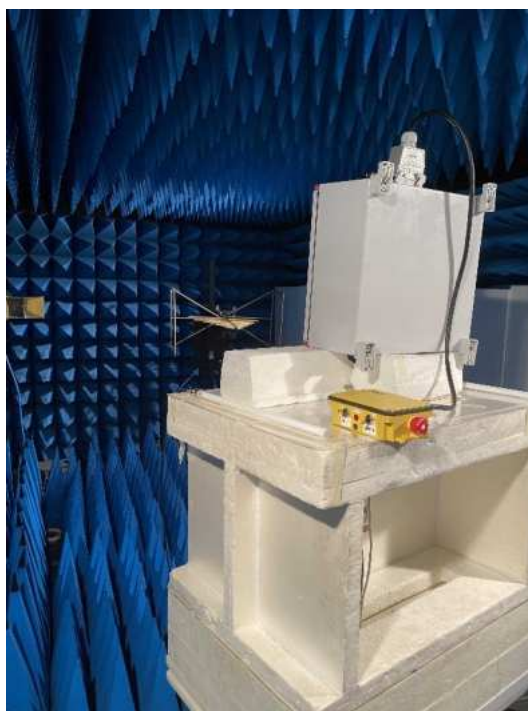
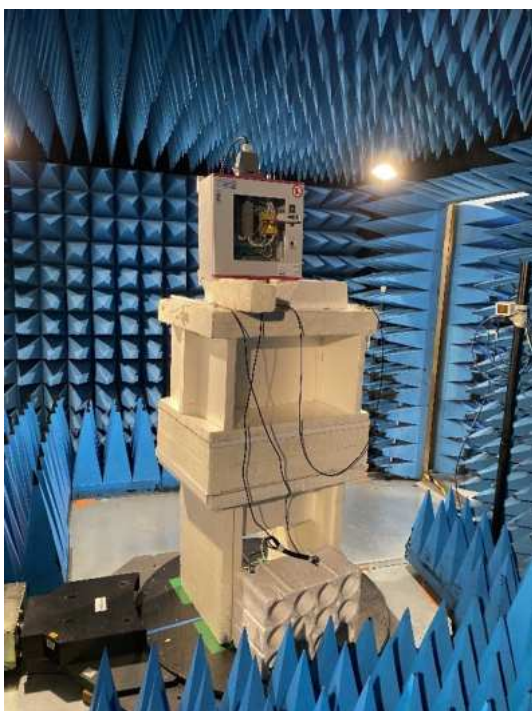
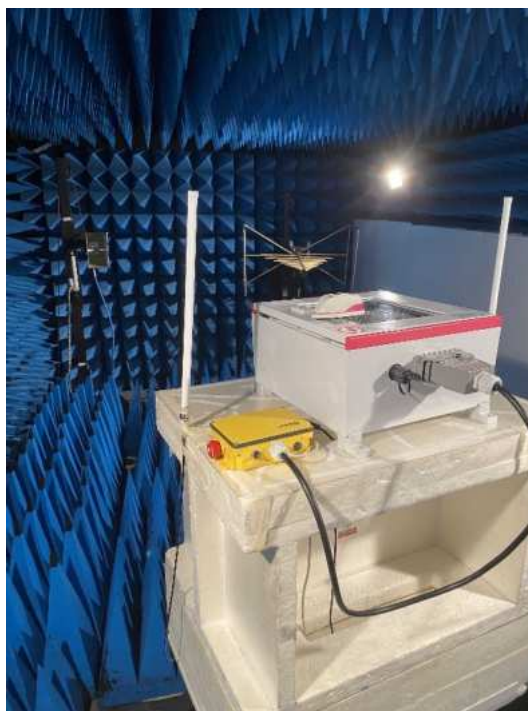
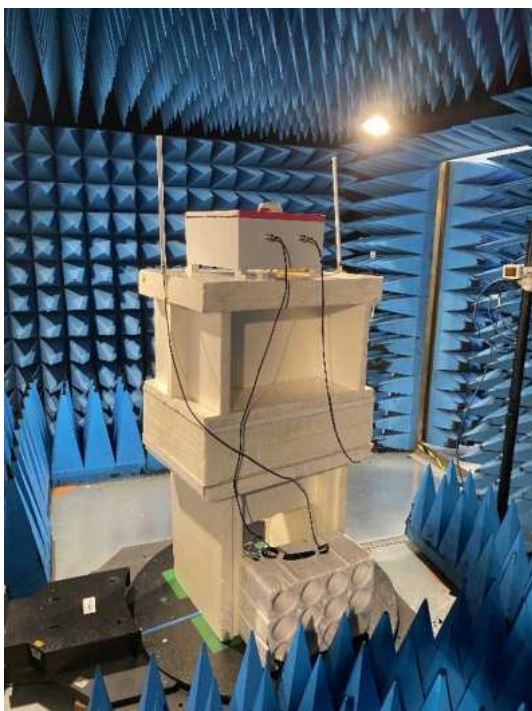


Photo of Unwanted Emissions in Restricted Frequency Bands on FAR



Photo of Unwanted Emissions in Restricted Frequency Bands on OATS



8.3. LIMIT

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



8.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Amplifier 10MHz - 18GHz	LCIE SUD EST	_	A7102082	05/22	05/24
Antenna Bi-log	AH System	SAS-521-7	C2040180	05/23	05/25
Antenna horn 18GHz	EMCO	3115	C2042029	03/22	03/25
BAT EMC	NEXIO	v3.21.0.32	L1000115		
Cable 0.75m	-	18GHz	A5329900	08/22	08/24
Comb EMR HF	YORK	CGE01	A3169114		
CONTROLLER	INNCO	CO3000	D3044034		
Filter Matrice	LCIE SUD EST	Combined filters	A7484078	03/23	03/25
Multimeter - CEM	FLUKE	87	A1240251	10/23	10/25
Rehausse Table C3	LCIE	_	F2000511		
Rehausse Table C3	LCIE	_	F2000507		
Semi-Anechoic chamber #3 (BF)	SIEPEL	_	D3044017_BF	04/22	04/25
Semi-Anechoic chamber #3 (VSWR)	SIEPEL	_	D3044017_VSWR	04/22	04/25
SMA Cable 18GHz 0.5m	TELEDYNE	18GHz	A5330059	02/23	02/24
SMA Cable 18GHz 0.5m	TELEDYNE	18GHz	A5330060	02/23	02/24
SMA Cable 18GHz 0.6m	TELEDYNE	18GHz	A5330055	02/23	02/24
SMA Cable 18GHz 3.5m	TELEDYNE	18GHz	A5330058	02/23	02/24
SMA Cable 18GHz 6m	TELEDYNE	18GHz	A5330057	02/23	02/24
Table C3	LCIE	_	F2000461		
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	05/23	05/25
TILT	INNCO	TILT	D3044033		
Turntable chamber (Cage#3)	ETS Lingren	Model 2165	F2000371		
Turntable controller (Cage#3)	ETS Lingren	Model 2090	F2000444		

8.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None



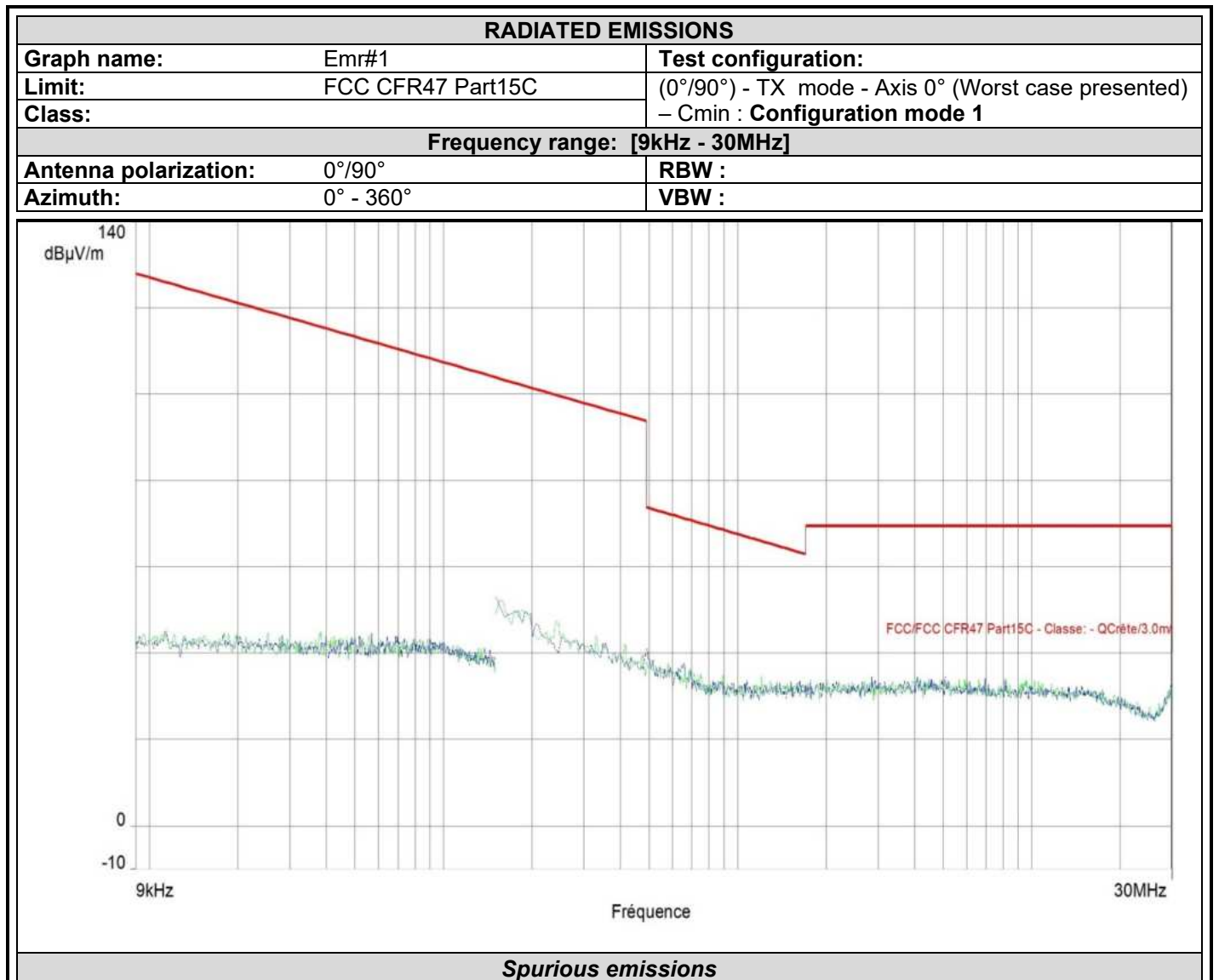
8.6. RESULTS

For all following measurements, worst case is presented with different configurations and modulations of EUT.

8.6.1. 9kHz to 30MHz

Graphs – Pre characterization:

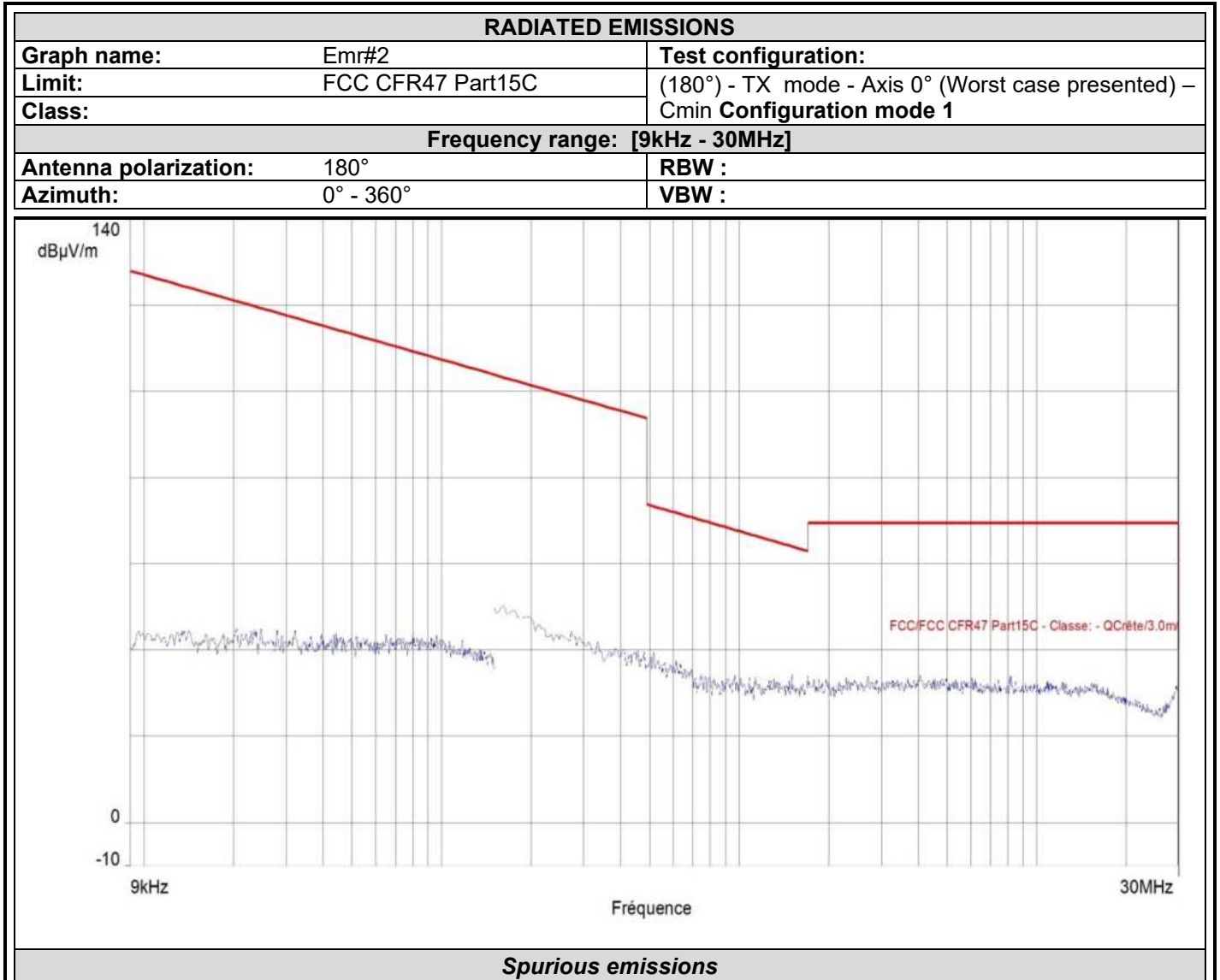
Graph identifier	Polarization	Mode	Channel	EUT position	Comments
Emr# 1	0°/90°	TX	Cmin	Axis XY/Z	Configuration mode 1
Emr# 2	180°	TX	Cmin	Axis XY/Z	Configuration mode 1
Emr# 3	0°/90°	TX	Cmin	Axis XY/Z	Configuration mode 2
Emr# 4	0°/90°/180°	TX	Cmin	Axis XY/Z	Configuration mode 2



No significant frequency observed



L C I E

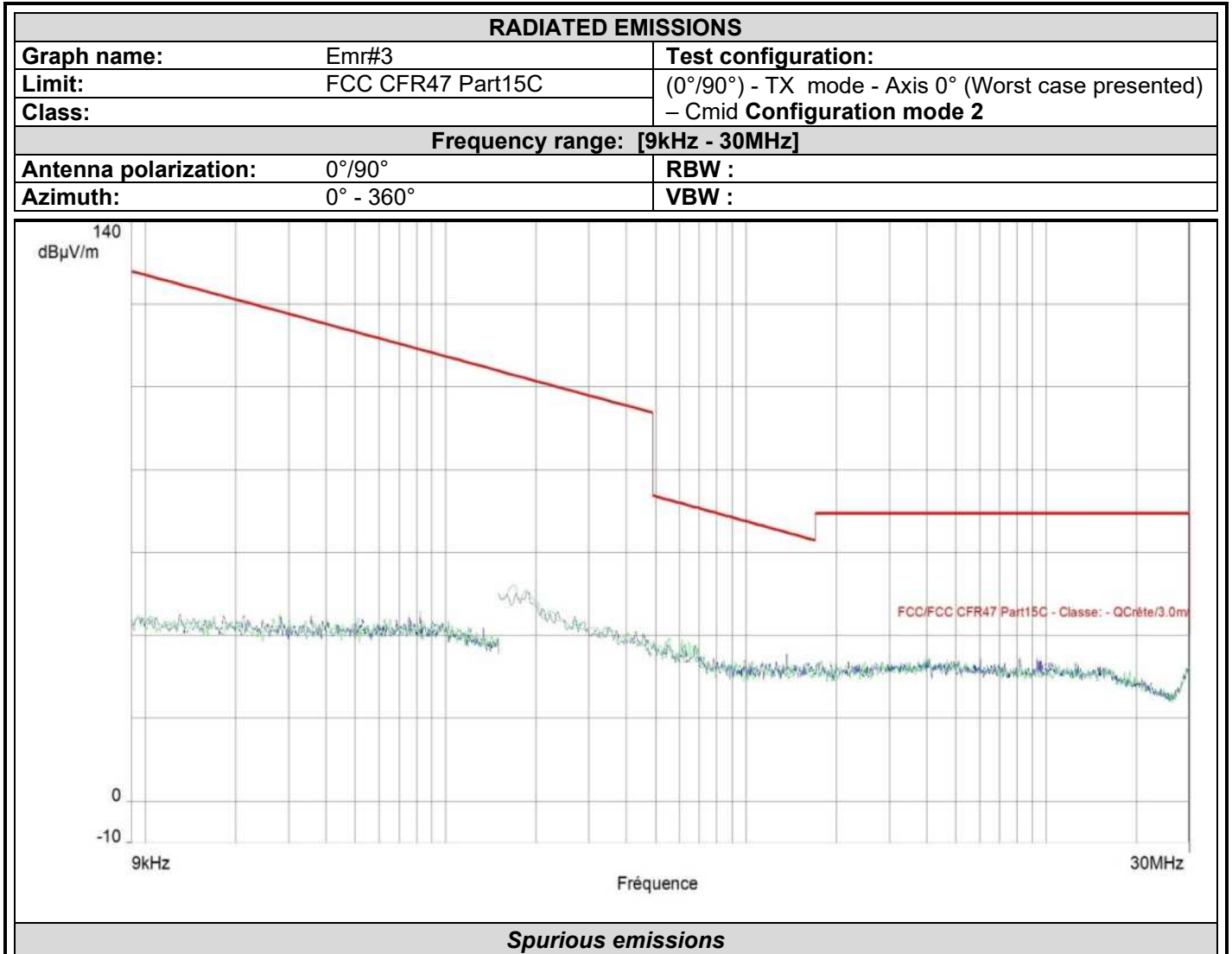


Spurious emissions

No significant frequency observed

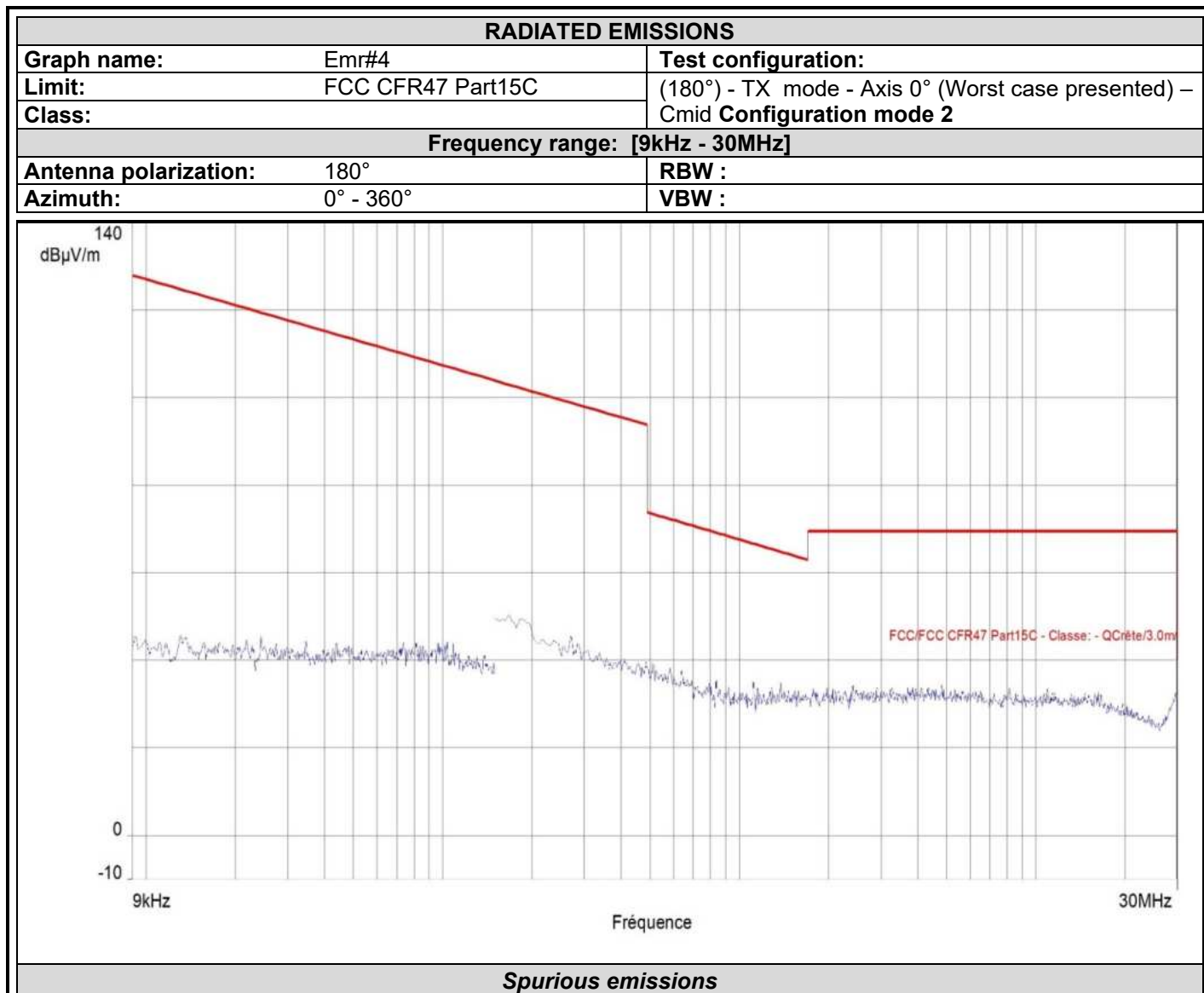


L C I E



Spurious emissions

No significative frequency observed



No significant frequency observed

Final measurement:

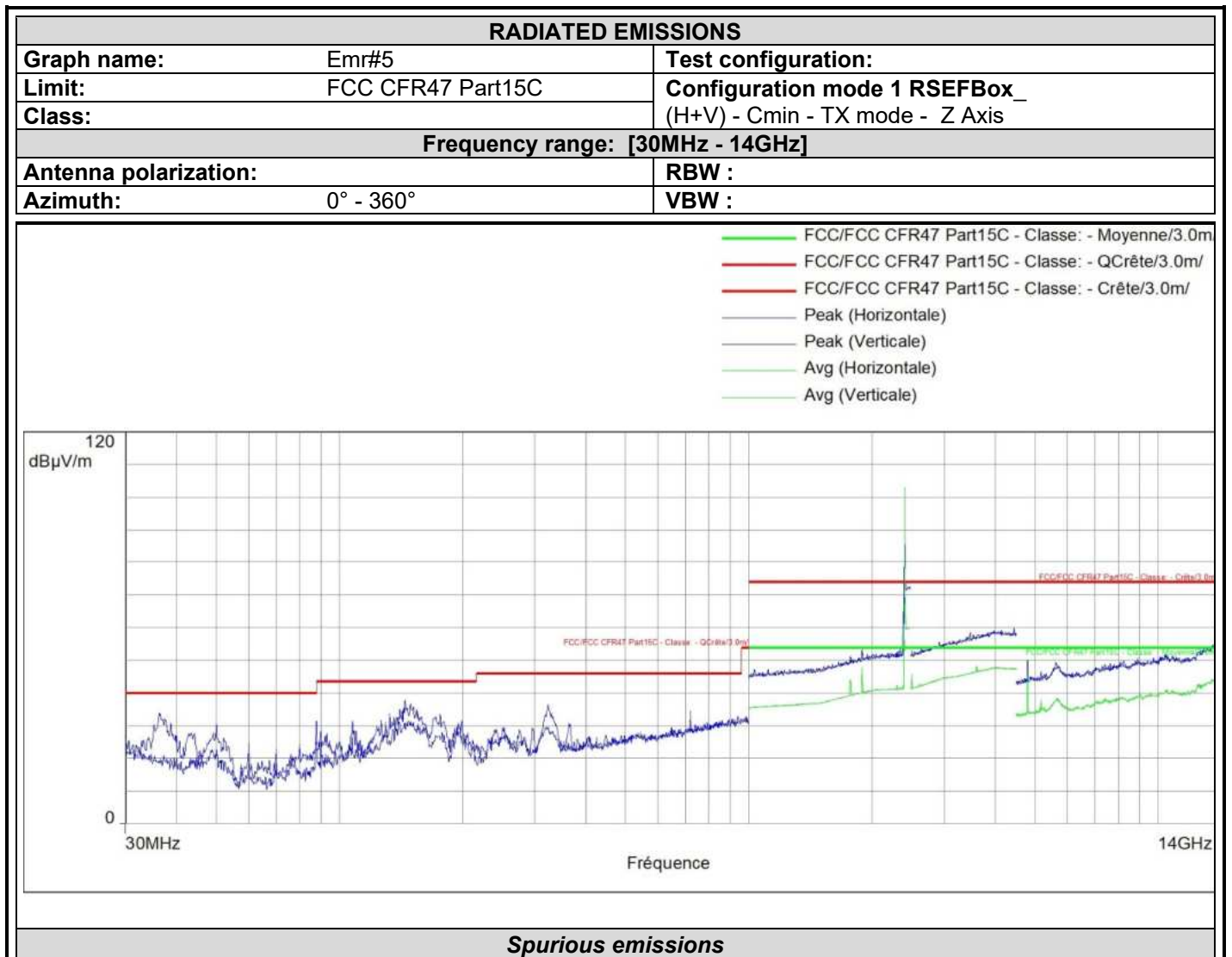
No significant frequency observed



8.6.2. 30MHz to 14GHz

Graphs – Pre characterization:

Graph identifier	Polarization	Mode	Channel	EUT position	Comments
Emr# 5	H/V	TX	Cmin	Axis XY/Z	Configuration mode 1
Emr# 6	H/V	TX	Cmid	Axis XY/Z	Configuration mode 1
Emr# 7	H/V	TX	Cmax	Axis XY/Z	Configuration mode 1
Emr# 8	H/V	TX	Cmin	Axis XY/Z	Configuration mode 2
Emr# 9	H/V	TX	Cmid	Axis XY/Z	Configuration mode 2
Emr# 10	H/V	TX	Cmax	Axis XY/Z	Configuration mode 2





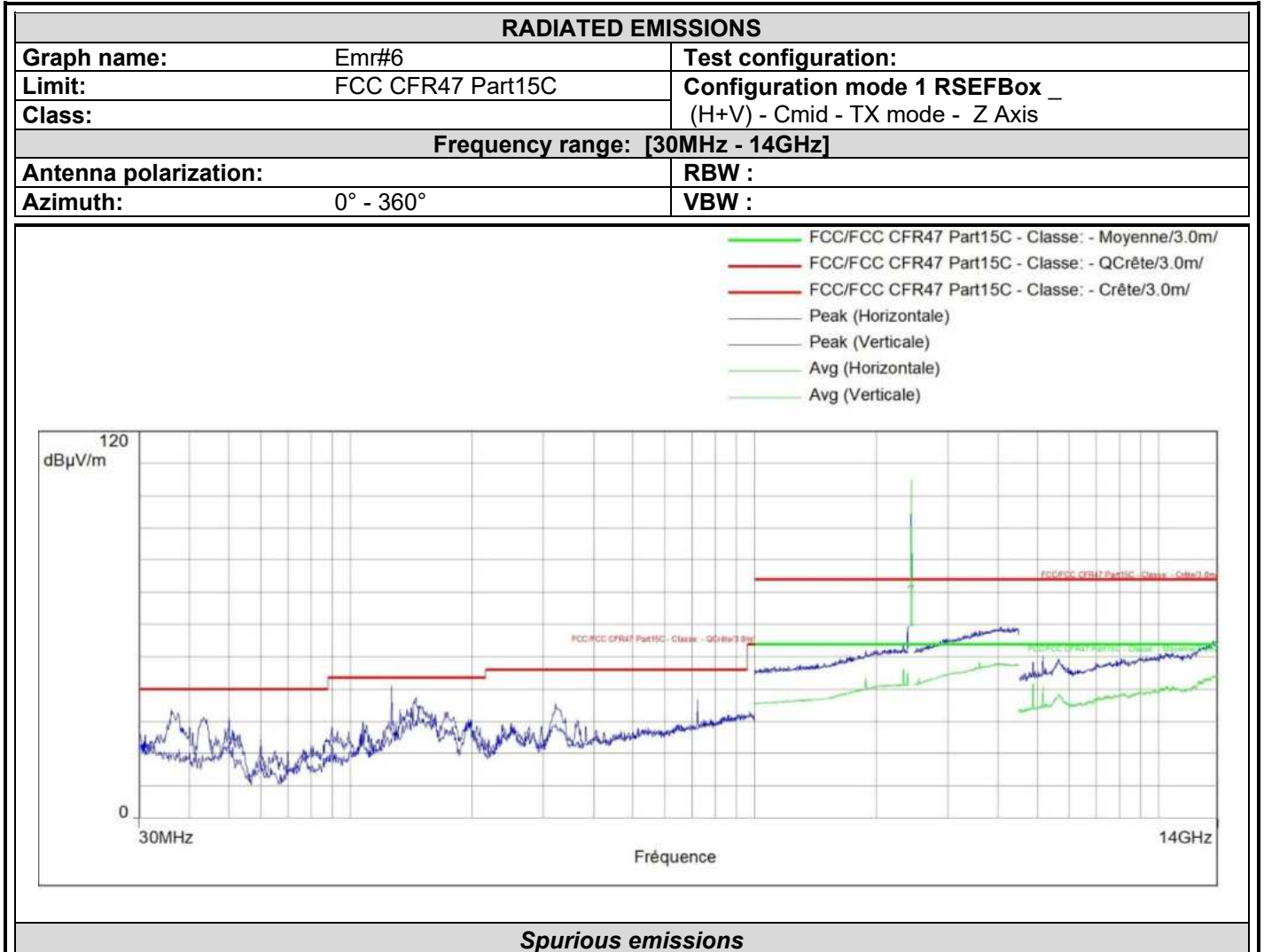
Frequency (MHz)	Peak (dB μ V/m)	Lim.Q-Peak (dB μ V/m)	Peak-Lim.Q-Peak (dB)	Polarization	Polarization
144.654	37.8	43.5	-5.6	0.2	Horizontal
36.208	33.9	40.0	-6.1	0.2	Vertical

Frequency (MHz)	Average (dB μ V/m)	Lim.Average (dB μ V/m)	Average-Lim.Average (dB)	Polarization	Polarization
4803.050	45.0	54.0	-9.0	0.2	Vertical
5620.050	37.2	54.0	-16.8	0.2	Vertical
13584.850	43.4	54.0	-10.6	0.2	Vertical
4447.168	47.2	54.0	-6.8	0.2	Vertical
1892.150	47.9	54.0	-6.1	0.2	Vertical

Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak-Lim.Peak (dB)	Polarization	Polarization
13584.850	54.8	74.0	-19.2	0.2	Vertical
4447.168	60.0	74.0	-14.0	0.2	Vertical



L C I E



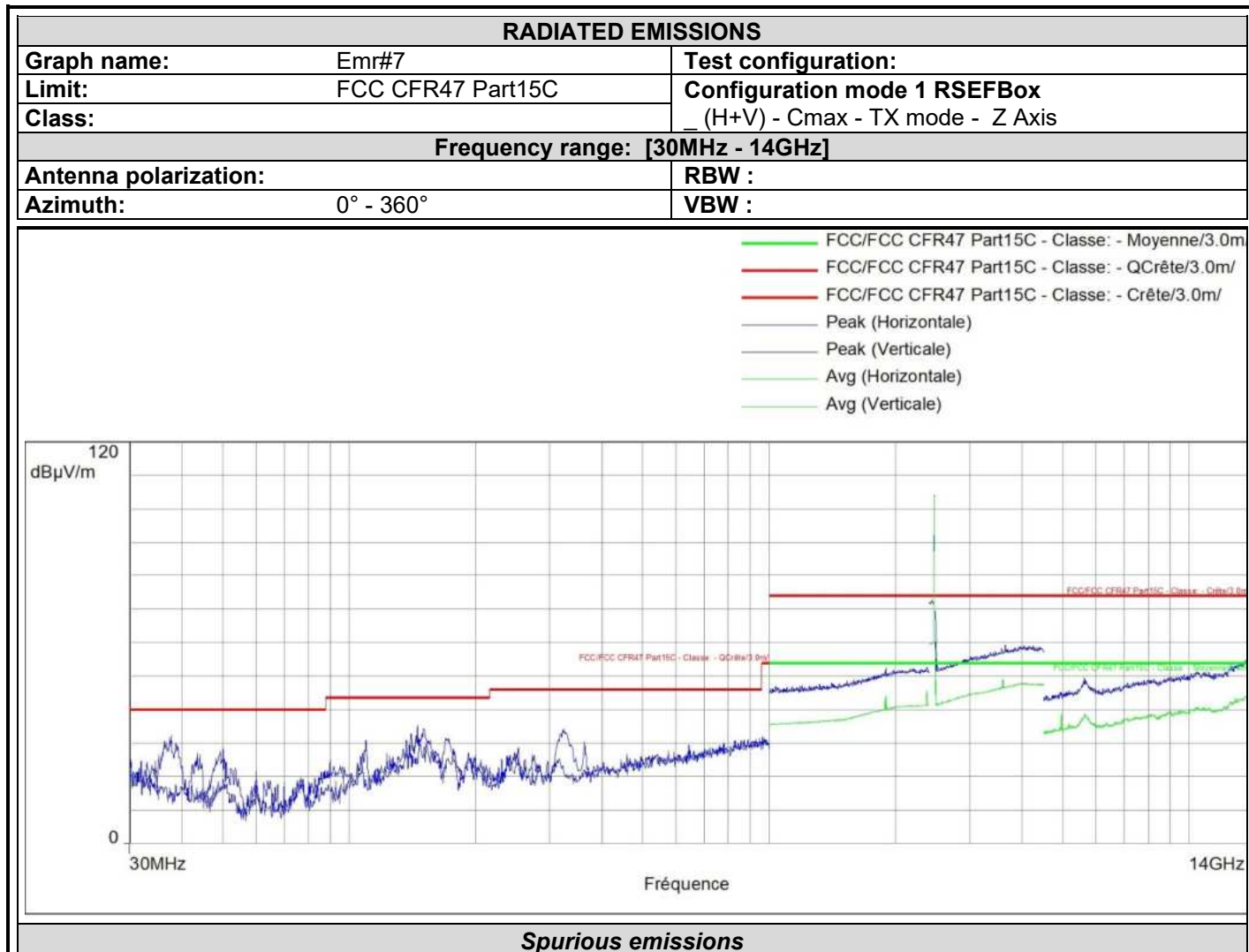
Spurious emissions



Frequency (MHz)	Peak (dB μ V/m)	Lim.Q-Peak (dB μ V/m)	Peak-Lim.Q-Peak (dB)	Polarization	Polarization
126.418	41.0	43.5	-2.5	0.2	Horizontal
145.284	37.4	43.5	-6.2	0.2	Horizontal
35.966	33.7	40.0	-6.3	0.2	Vertical
43.3375	31.30	40.00	-8.70	0.20	Vertical
49.982	31.23	40.00	-8.77	0.20	Vertical

Frequency (MHz)	Average (dB μ V/m)	Lim.Average (dB μ V/m)	Average-Lim.Average (dB)	Polarization	Polarization
5172.600	34.6	54.0	-19.4	0.2	Vertical
5663.750	37.5	54.0	-16.5	0.2	Vertical
13680.800	43.3	54.0	-10.7	0.2	Vertical
4055.967	47.6	54.0	-6.4	0.2	Vertical

Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak-Lim.Peak (dB)	Polarization	Polarization
5172.600	50.3	74.0	-23.7	0.2	Vertical
5663.750	49.5	74.0	-24.5	0.2	Vertical
13680.800	55.1	74.0	-18.9	0.2	Vertical
4055.967	59.2	74.0	-14.8	0.2	Vertical

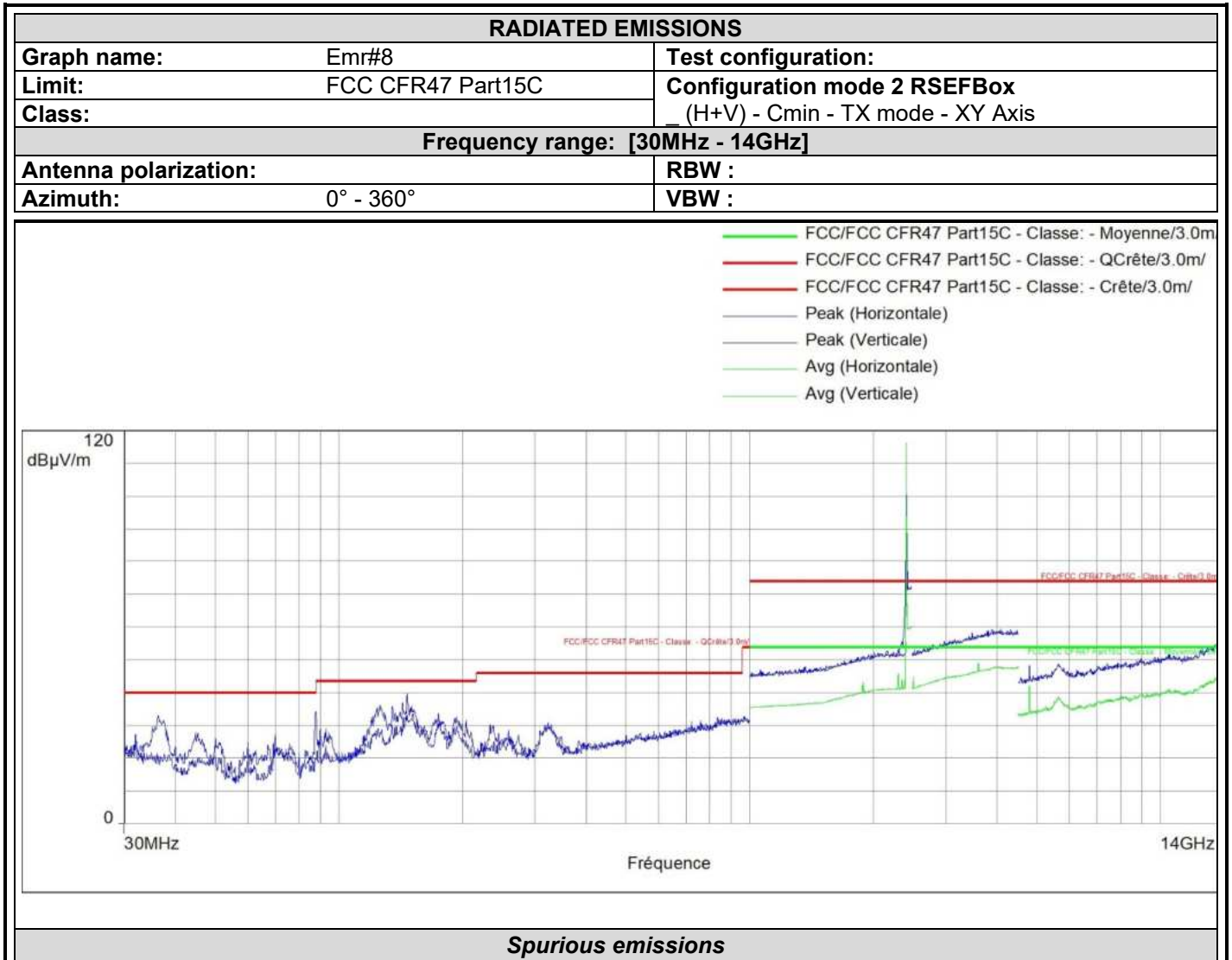


Frequency (MHz)	Average (dBµV/m)	Lim.Average (dBµV/m)	Average-Lim.Average (dB)	Polarization	Polarization
1895.300	44.0	54.0	-10.0	0.2	Horizontal
4260.843	47.2	54.0	-6.8	0.2	Horizontal
5639.050	38.0	54.0	-16.0	0.2	Vertical
13983.850	43.8	54.0	-10.2	0.2	Vertical
3649.440	46.4	54.0	-7.6	0.2	Vertical

Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Peak-Lim.Peak (dB)	Polarization	Polarization
1895.300	52.7	74.0	-21.3	0.2	Horizontal
4260.843	59.1	74.0	-14.9	0.2	Horizontal
5639.050	49.6	74.0	-24.4	0.2	Vertical
13983.850	55.4	74.0	-18.6	0.2	Vertical
3649.440	59.4	74.0	-14.6	0.2	Vertical



L C I E





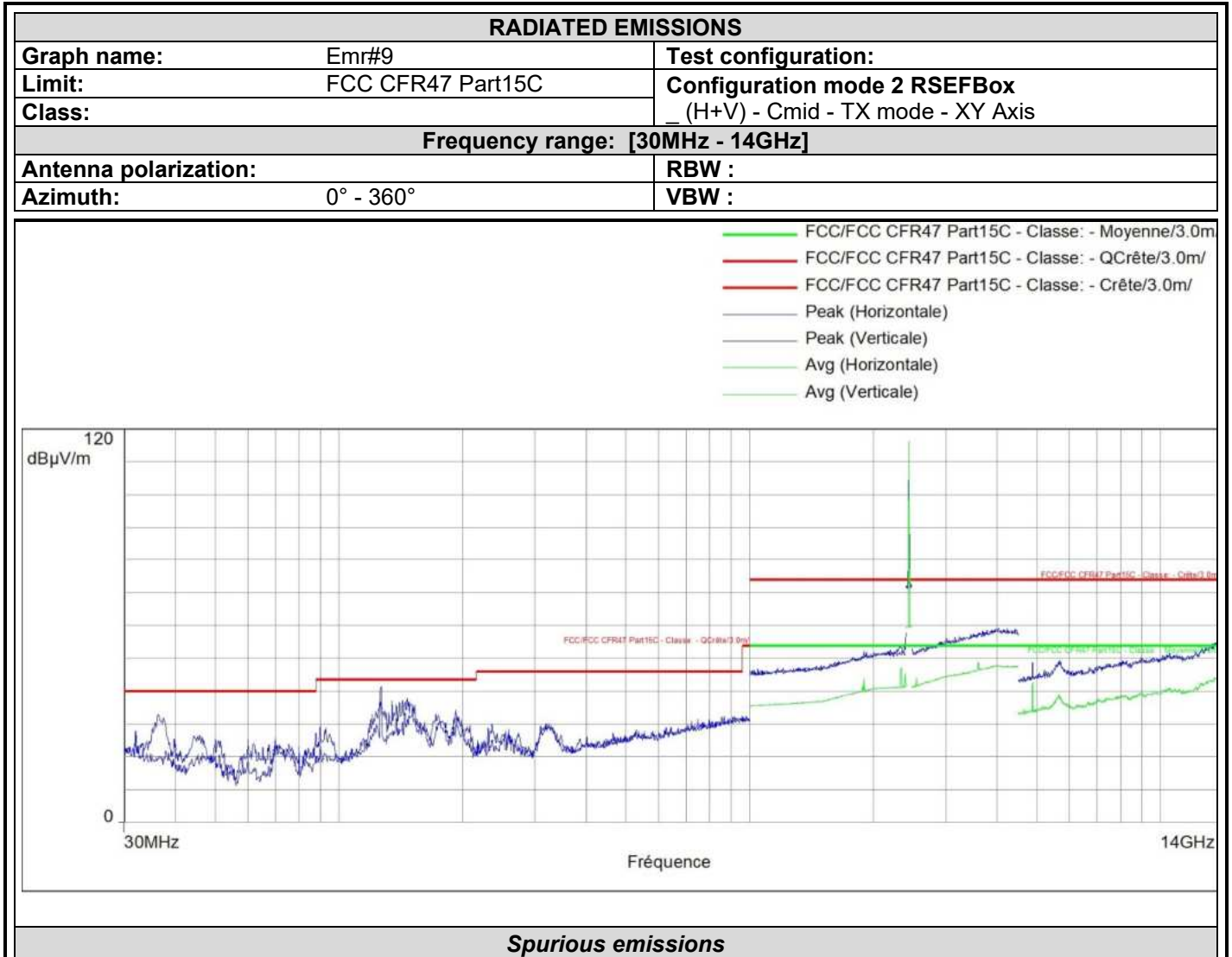
Frequency (MHz)	Peak (dB μ V/m)	Lim.Q-Peak (dB μ V/m)	Peak-Lim.Q-Peak (dB)	Polarization	Polarization
125.545	36.2	43.5	-7.3	0.4	Horizontal
146.594	39.8	43.5	-3.7	0.4	Horizontal
36.354	32.9	40.0	-7.1	0.4	Vertical
70.012	27.5	40.0	-12.5	0.4	Vertical
87.860	34.3	40.0	-5.7	0.4	Vertical

Frequency (MHz)	Average (dB μ V/m)	Lim.Average (dB μ V/m)	Average-Lim.Average (dB)	Polarization	Polarization
5655.200	37.6	54.0	-16.4	0.4	Horizontal
13945.850	43.2	54.0	-10.8	0.4	Horizontal
4803.050	41.2	54.0	-12.8	0.4	Vertical
5650.450	37.8	54.0	-16.2	0.4	Vertical
4085.811	47.4	54.0	-6.6	0.4	Vertical
2402.380	114.6	54.0	60.6	0.4	Vertical

Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak-Lim.Peak (dB)	Polarization	Polarization
5655.200	48.8	74.0	-25.2	0.4	Horizontal
13945.850	54.9	74.0	-19.1	0.4	Horizontal
4803.050	48.3	74.0	-25.7	0.4	Vertical
5650.450	48.3	74.0	-25.7	0.4	Vertical
4085.811	59.4	74.0	-14.6	0.4	Vertical
2402.380	116.3	74.0	42.3	0.4	Vertical



L C I E





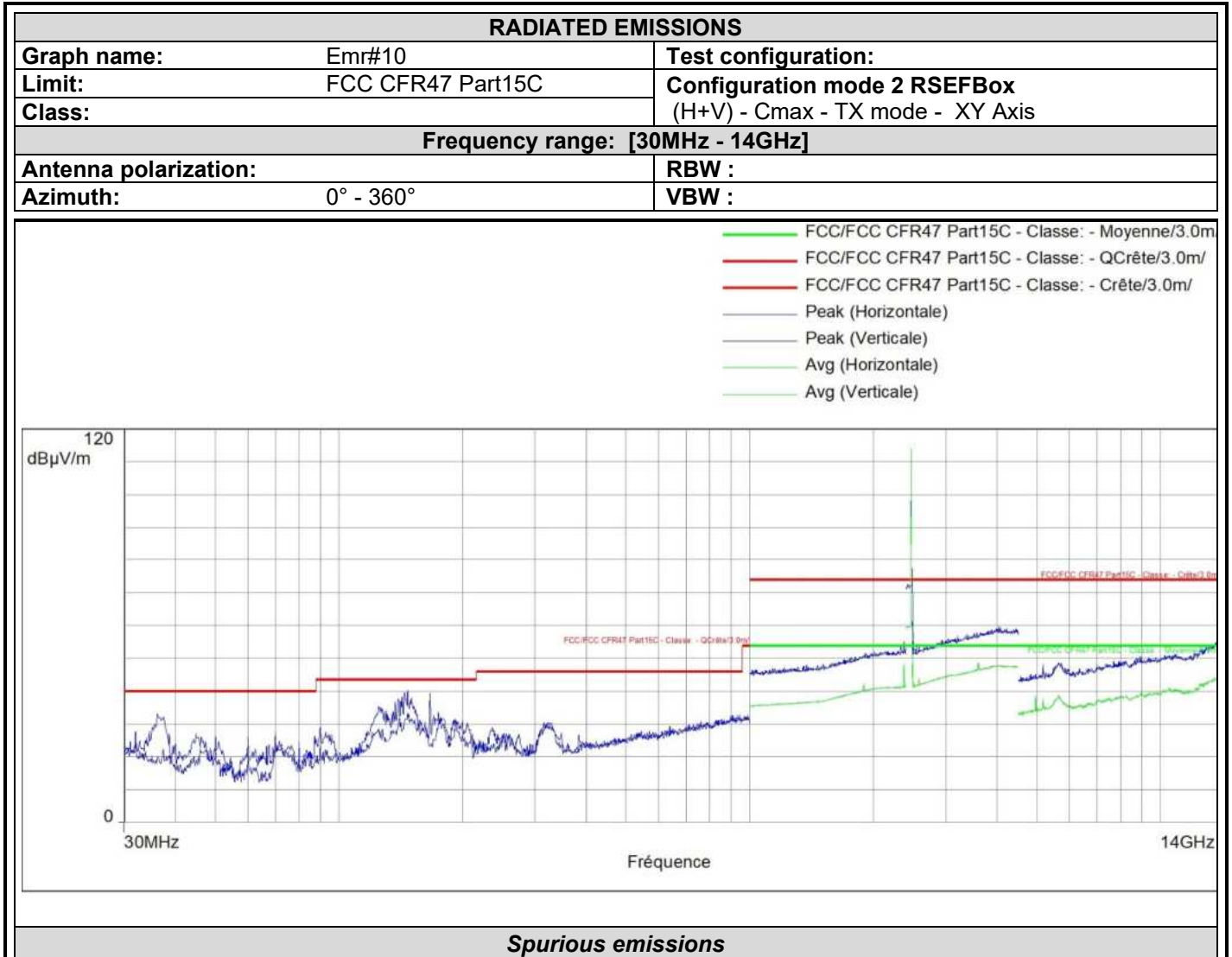
Frequency (MHz)	Peak (dB μ V/m)	Lim.Q-Peak (dB μ V/m)	Peak-Lim.Q-Peak (dB)	Polarization	Polarization
146.594	37.8	43.5	-5.7	0.4	Horizontal
36.305	32.9	40.0	-7.1	0.4	Vertical
126.321	41.3	43.5	-2.2	0.4	Vertical

Frequency (MHz)	Average (dB μ V/m)	Lim.Average (dB μ V/m)	Average-Lim.Average (dB)	Polarization	Polarization
1897.400	43.9	54.0	-10.1	0.4	Horizontal
4036.608	47.4	54.0	-6.6	0.4	Horizontal
4880.950	42.8	54.0	-11.2	0.4	Horizontal
5676.100	37.7	54.0	-16.3	0.4	Horizontal
13641.850	43.2	54.0	-10.8	0.4	Vertical
2440.915	115.9	54.0	61.9	0.4	Vertical

Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak-Lim.Peak (dB)	Polarization	Polarization
1897.400	52.4	74.0	-21.6	0.4	Horizontal
4036.608	59.1	74.0	-14.9	0.4	Horizontal
4880.950	48.9	74.0	-25.1	0.4	Horizontal
5676.100	49.6	74.0	-24.4	0.4	Horizontal
13641.850	54.9	74.0	-19.1	0.4	Vertical
2440.915	116.1	74.0	42.1	0.4	Vertical



L C I E





Frequency (MHz)	Peak (dB μ V/m)	Lim.Q-Peak (dB μ V/m)	Peak-Lim.Q-Peak (dB)	Polarization	Polarization
124.575	35.4	43.5	-8.1	0.4	Horizontal
147.176	40.3	43.5	-3.2	0.4	Horizontal
36.160	33.1	40.0	-6.9	0.4	Vertical
166.576	39.4	43.5	-4.1	0.4	Vertical

Frequency (MHz)	Average (dB μ V/m)	Lim.Average (dB μ V/m)	Average-Lim.Average (dB)	Polarization	Polarization
5650.450	37.5	54.0	-16.5	0.4	Horizontal
5175.450	37.1	54.0	-16.9	0.4	Vertical
13691.250	43.4	54.0	-10.6	0.4	Vertical
4038.222	47.4	54.0	-6.6	0.4	Vertical
2480.494	113.6	54.0	59.6	0.4	Vertical
2481.287	111.1	54.0	57.1	0.4	Vertical

Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak-Lim.Peak (dB)	Polarization	Polarization
5650.450	48.7	74.0	-25.3	0.4	Horizontal
5175.450	48.2	74.0	-25.8	0.4	Vertical
13691.250	55.1	74.0	-18.9	0.4	Vertical
4038.222	59.7	74.0	-14.3	0.4	Vertical
2480.494	113.8	74.0	39.8	0.4	Vertical
2481.287	112.8	74.0	38.8	0.4	Vertical



Final measurement:

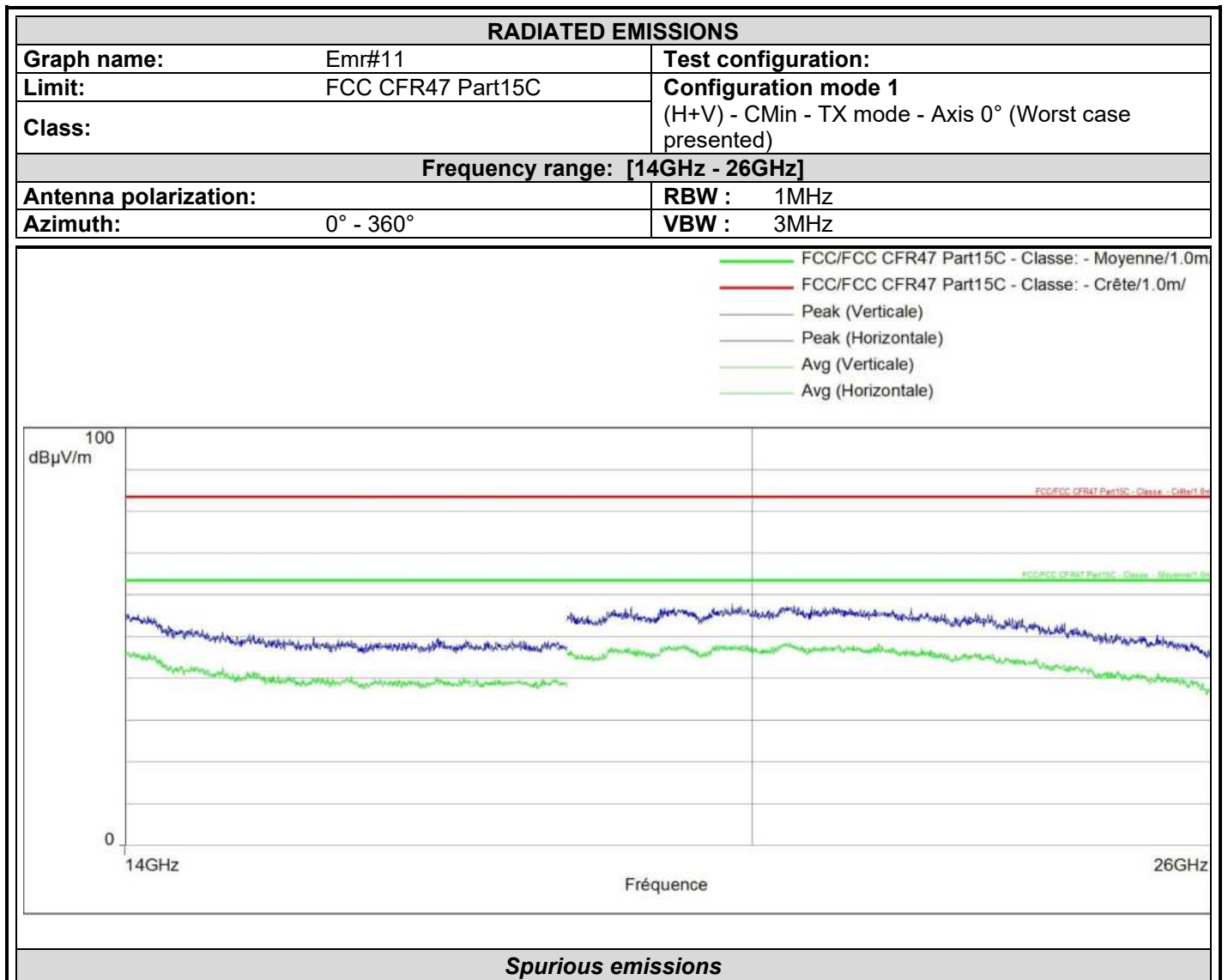
Test Frequency (MHz)	Meter Reading dB(μ V)	Detector (Pk/QP/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Remark
35.9660	18.6	QP	V	0	100	14.2	32.8	40.0	-7.2	Worst case
36.3050	18.4	QP	V	0	110	14.1	32.5	40.0	-7.5	Worst case
36.3540	13.5	QP	V	90	110	14.1	27.6	40.0	-12.4	Worst case
43.3375	16.0	QP	V	0	100	13.5	29.5	40.0	-10.5	Worst case
49.9820	16.2	QP	V	350	110	12.1	28.3	40.0	-11.7	Worst case
70.0120	20.4	QP	V	125	120	7.3	27.7	40.0	-12.3	Worst case
86.5000	17.7	QP	V	350	120	11.3	29.0	40.0	-11.0	Worst case
124.5750	23.7	QP	V	0	100	13.6	37.3	43.5	-6.2	Worst case
126.3210	22.2	QP	V	0	120	14.0	36.2	43.5	-7.3	Worst case
146.2840	17.6	QP	V	45	120	18.4	36.0	43.5	-7.5	Worst case
166.5760	16.8	QP	V	0	120	19.3	36.1	43.5	-7.4	Worst case



8.6.3. 14GHz to 25GHz

Graphs – Pre characterization:

Graph identifier	Polarization	Mode	Channel	EUT position	Comments
Emr# 11	H/V	TX	Cmin	Axis XY/Z	Configuration mode 1
Emr# 12	H/V	TX	Cmid	Axis XY/Z	Configuration mode 1
Emr# 13	H/V	TX	Cmax	Axis XY/Z	Configuration mode 1
Emr# 14	H/V	TX	Cmin	Axis XY/Z	Configuration mode 2
Emr# 15	H/V	TX	Cmid	Axis XY/Z	Configuration mode 2
Emr# 16	H/V	TX	Cmax	Axis XY/Z	Configuration mode 2



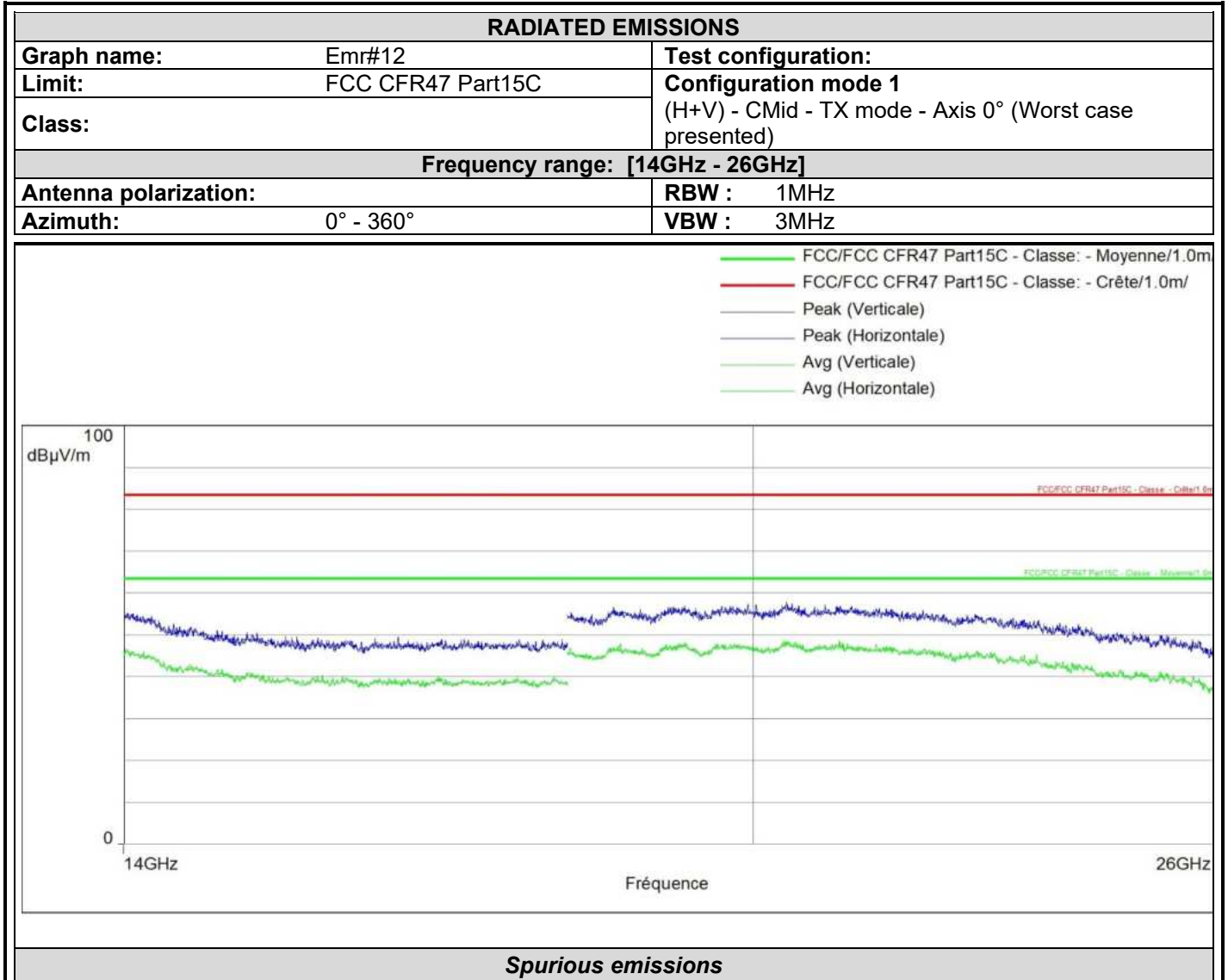


Frequency (MHz)	Average (dB μ V/m)	Lim.Average (dB μ V/m)	Average-Lim.Average (dB)	Polarization	Polarization
14184.500	43.7	63.5	-19.8	0.4	Vertical
18490.000	46.7	63.5	-16.8	0.4	Vertical
19128.000	46.0	63.5	-17.5	0.4	Vertical
20482.000	47.1	63.5	-16.4	0.4	Vertical
23881.000	41.8	63.5	-21.7	0.4	Vertical

Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak-Lim.Peak (dB)	Polarization	Polarization
14184.500	54.9	83.5	-28.6	0.4	Vertical
18490.000	56.6	83.5	-26.9	0.4	Vertical
19128.000	56.8	83.5	-26.7	0.4	Vertical
20482.000	57.4	83.5	-26.1	0.4	Vertical
23881.000	53.4	83.5	-30.1	0.4	Vertical



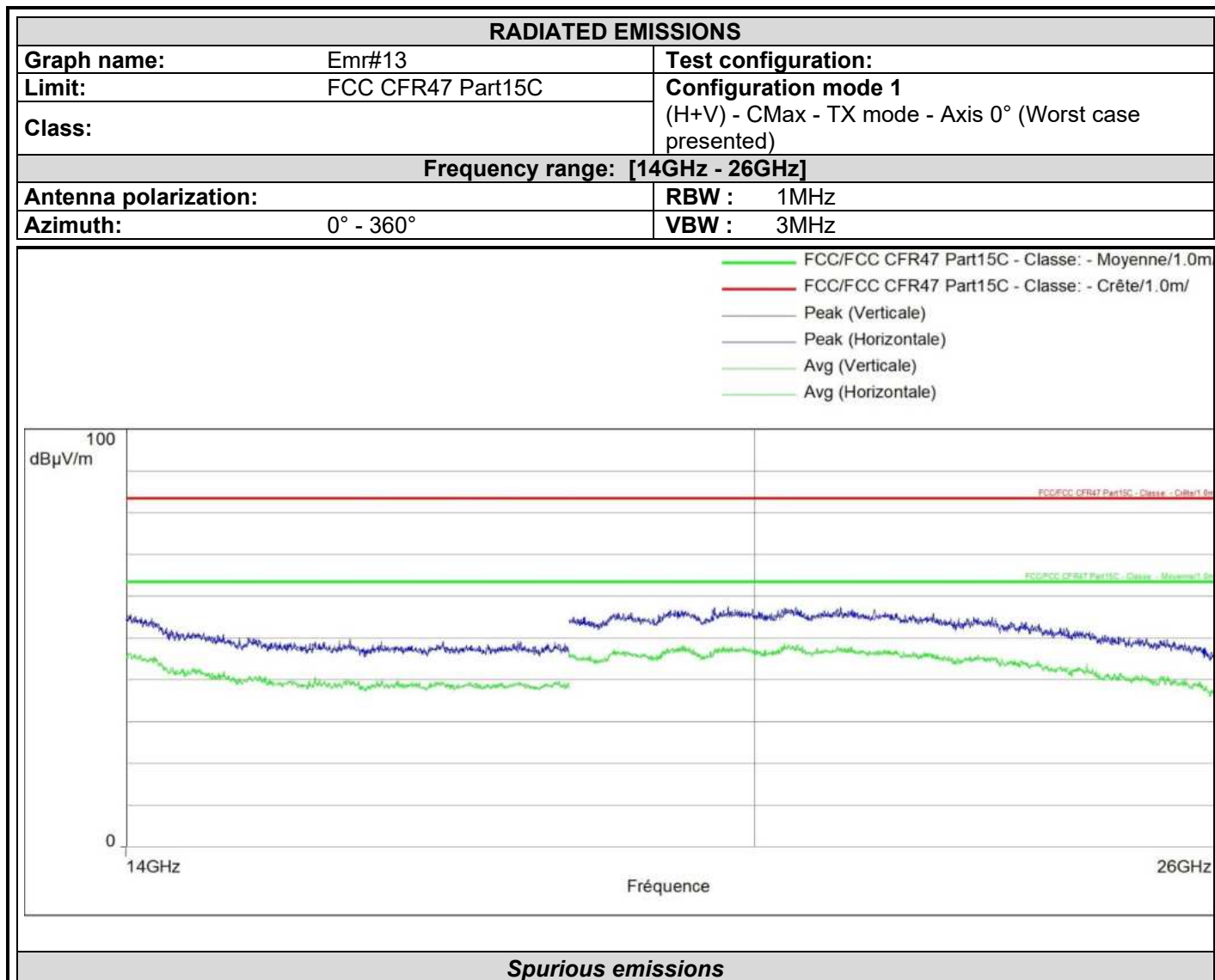
L C I E





Frequency (MHz)	Average (dB μ V/m)	Lim.Average (dB μ V/m)	Average-Lim.Average (dB)	Polarization	Polarization
14074.000	44.8	63.5	-18.8	0.4	Vertical
18477.000	45.4	63.5	-18.1	0.4	Vertical
19232.000	46.8	63.5	-16.7	0.4	Vertical
20382.000	47.9	63.5	-15.6	0.4	Vertical
23790.000	42.2	63.5	-21.3	0.4	Vertical

Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak-Lim.Peak (dB)	Polarization	Polarization
14074.000	55.1	83.5	-28.4	0.4	Vertical
18477.000	56.8	83.5	-26.7	0.4	Vertical
19232.000	57.1	83.5	-26.4	0.4	Vertical
20382.000	57.9	83.5	-25.6	0.4	Vertical
23790.000	52.9	83.5	-30.6	0.4	Vertical



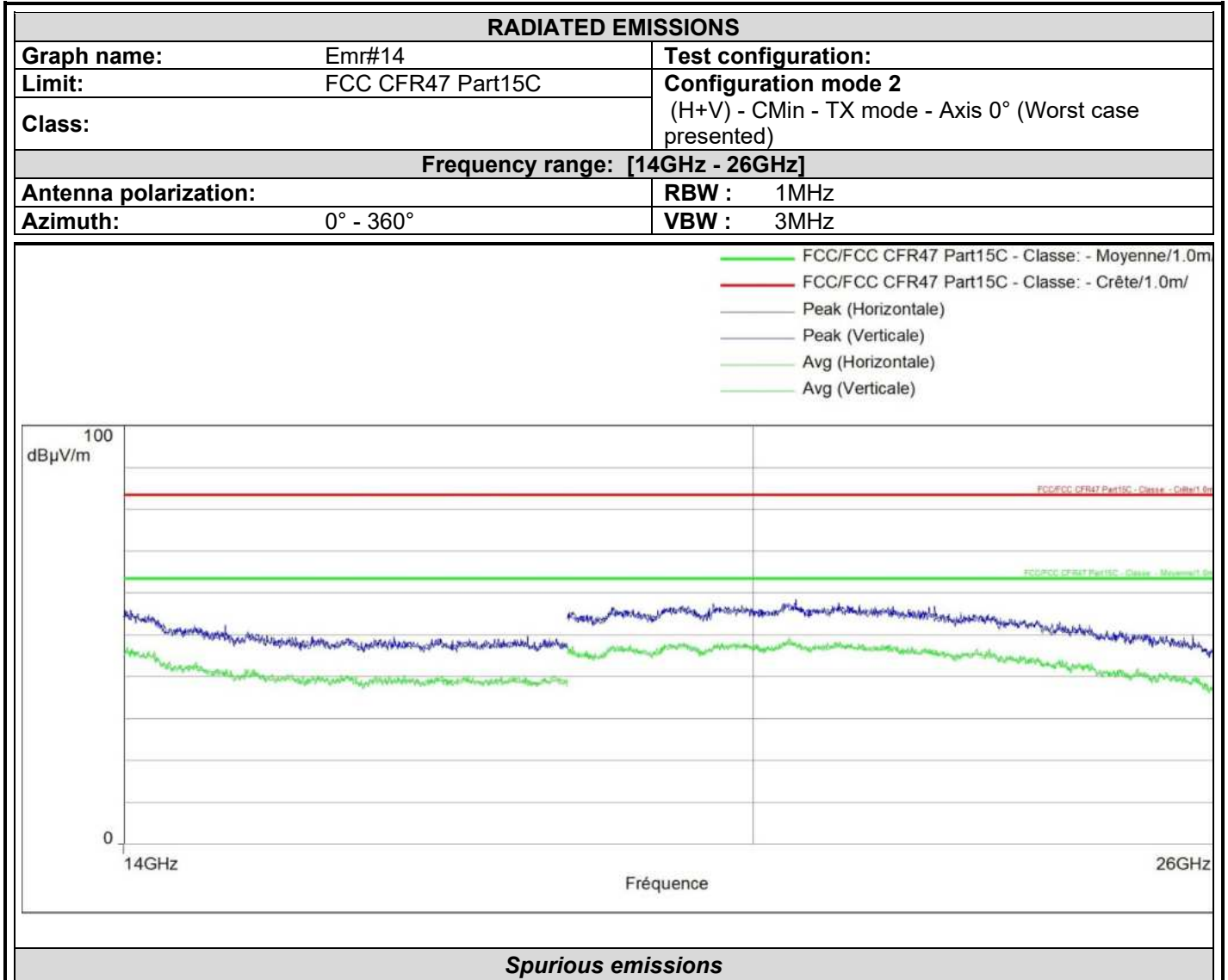


Frequency (MHz)	Average (dB μ V/m)	Lim.Average (dB μ V/m)	Average-Lim.Average (dB)	Polarization	Polarization
14204.000	44.2	63.5	-19.3	0.4	Vertical
19704.000	46.9	63.5	-16.6	0.4	Vertical
22883.000	44.8	63.5	-18.7	0.4	Vertical
18455.000	46.1	63.5	-17.4	0.4	Horizontal
19190.000	46.4	63.5	-17.1	0.4	Horizontal

Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak-Lim.Peak (dB)	Polarization	Polarization
14204.000	54.8	83.5	-28.7	0.4	Vertical
19704.000	57.6	83.5	-25.9	0.4	Vertical
22883.000	55.2	83.5	-28.3	0.4	Vertical
18455.000	55.7	83.5	-27.8	0.4	Horizontal
19190.000	56.7	83.5	-26.8	0.4	Horizontal



L C I E





Frequency (MHz)	Average (dB μ V/m)	Lim.Average (dB μ V/m)	Average-Lim.Average (dB)	Polarization	Polarization
14054.500	46.2	63.5	-17.3	0.4	Horizontal
14830.000	40.7	63.5	-22.8	0.4	Horizontal
18465.000	46.1	63.5	-17.4	0.4	Horizontal
19213.000	47.0	63.5	-16.5	0.4	Horizontal
20485.000	47.7	63.5	-15.8	0.4	Vertical

Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak-Lim.Peak (dB)	Polarization	Polarization
14054.500	56.0	83.5	-27.5	0.4	Horizontal
14830.000	52.5	83.5	-31.0	0.4	Horizontal
18465.000	56.7	83.5	-26.8	0.4	Horizontal
19213.000	57.0	83.5	-26.5	0.4	Horizontal
20485.000	58.6	83.5	-24.9	0.4	Vertical



RADIATED EMISSIONS

Graph name: Emr#15	Test configuration:
Limit: FCC CFR47 Part15C	Configuration mode 2
Class:	(H+V) - CMid - TX mode - Axis 0° (Worst case presented)
Frequency range: [14GHz - 26GHz]	
Antenna polarization:	RBW : 1MHz
Azimuth: 0° - 360°	VBW : 3MHz

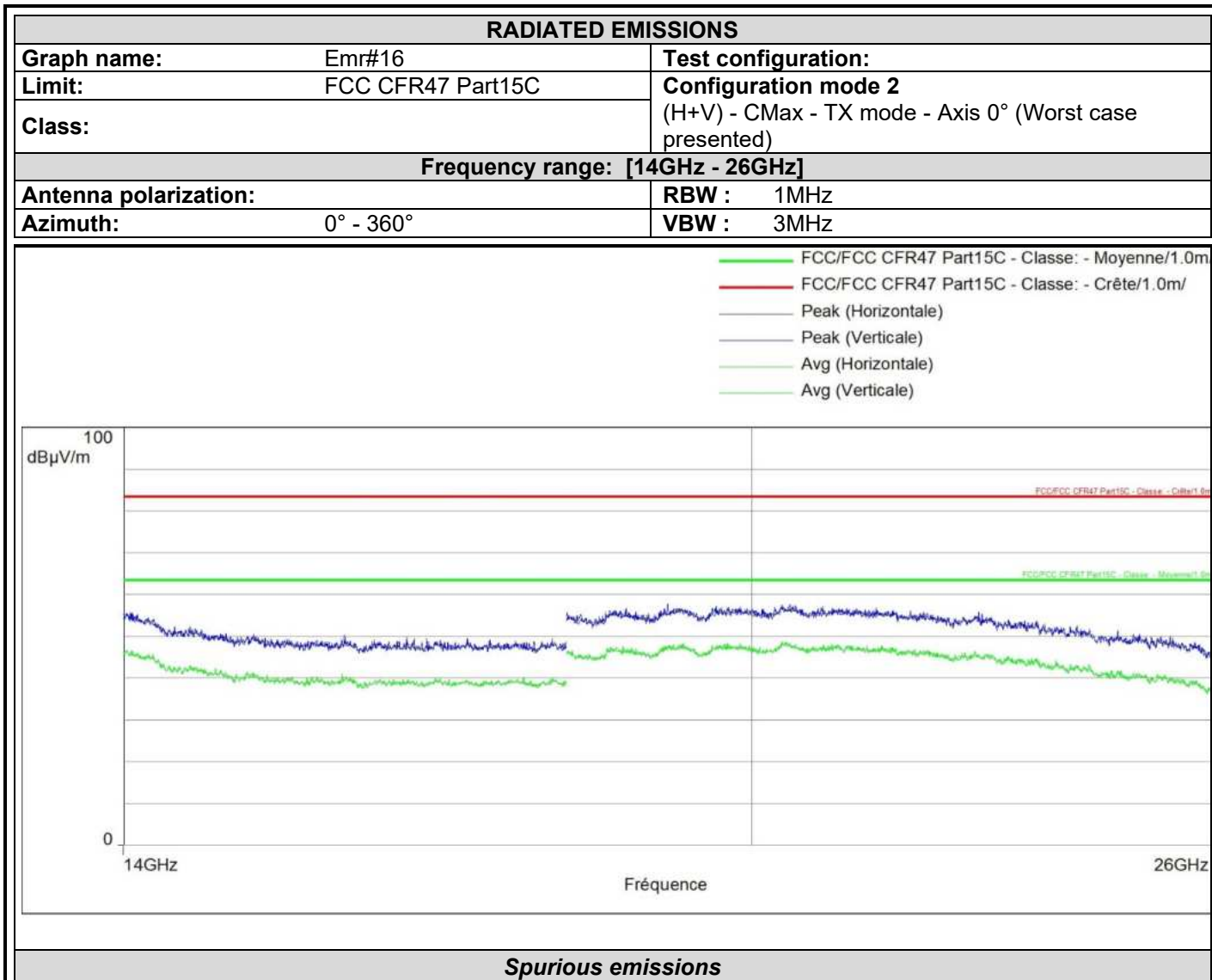


Spurious emissions



Frequency (MHz)	Average (dB μ V/m)	Lim.Average (dB μ V/m)	Average-Lim.Average (dB)	Polarization	Polarization
14193.000	44.8	63.5	-18.7	0.4	Horizontal
18546.000	46.3	63.5	-17.2	0.4	Horizontal
19599.000	47.2	63.5	-16.3	0.4	Horizontal
21273.000	47.8	63.5	-15.7	0.4	Horizontal

Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak-Lim.Peak (dB)	Polarization	Polarization
14193.000	54.3	83.5	-29.2	0.4	Horizontal
18546.000	56.8	83.5	-26.7	0.4	Horizontal
19599.000	57.9	83.5	-25.6	0.4	Horizontal
21273.000	58.3	83.5	-25.2	0.4	Horizontal





Frequency (MHz)	Average (dB μ V/m)	Lim.Average (dB μ V/m)	Average-Lim.Average (dB)	Polarization	Polarization
15874.000	38.8	63.5	-24.7	0.4	Horizontal
14065.000	45.3	63.5	-18.2	0.4	Vertical
19063.000	46.4	63.5	-17.1	0.4	Vertical
20436.000	47.6	63.5	-15.9	0.4	Vertical
22788.000	44.2	63.5	-19.3	0.4	Vertical

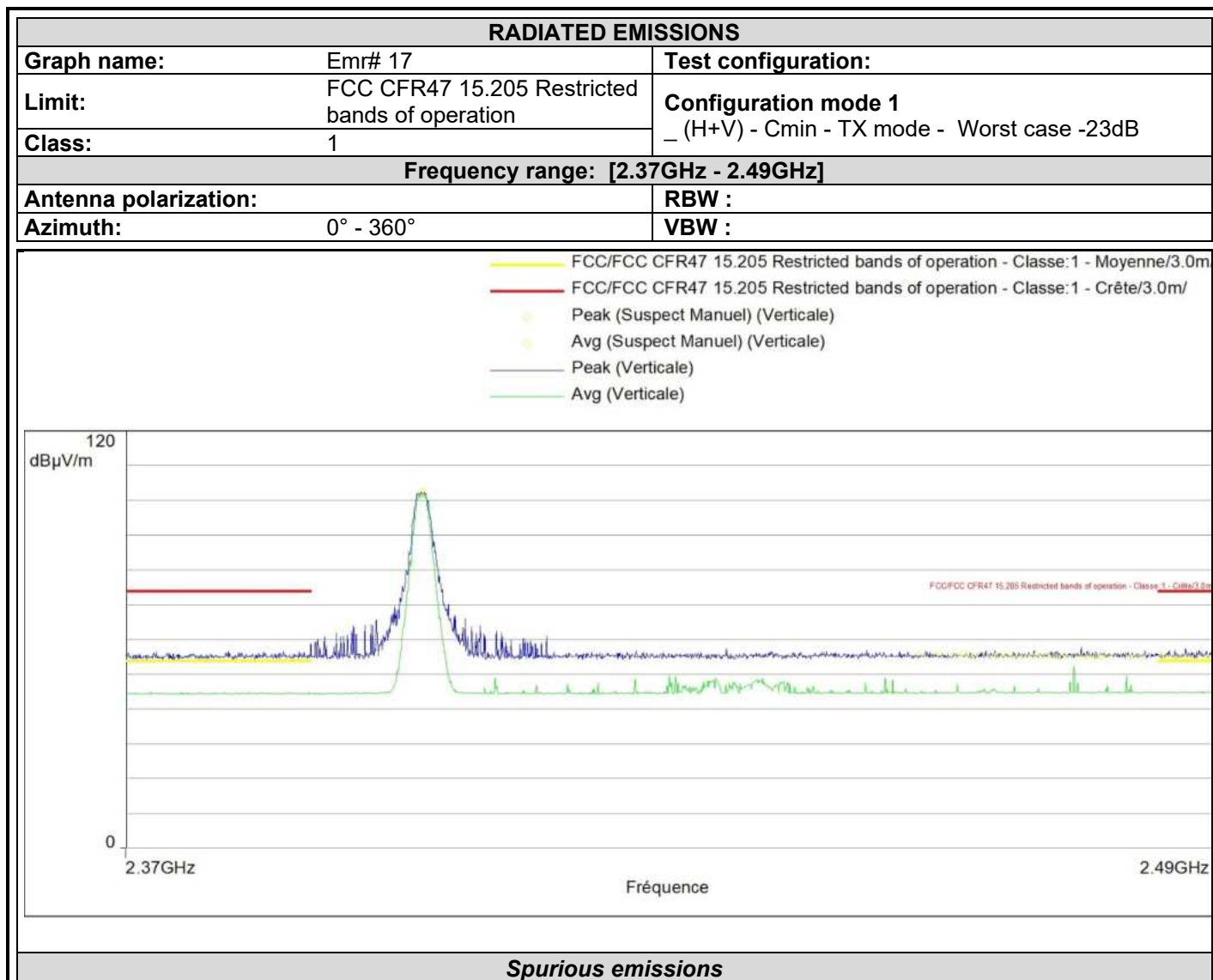
Frequency (MHz)	Peak (dB μ V/m)	Lim.Peak (dB μ V/m)	Peak-Lim.Peak (dB)	Polarization	Polarization
15874.000	50.4	83.5	-33.1	0.4	Horizontal
14065.000	55.7	83.5	-27.8	0.4	Vertical
19063.000	57.8	83.5	-25.7	0.4	Vertical
20436.000	57.7	83.5	-25.8	0.4	Vertical
22788.000	55.4	83.5	-28.0	0.4	Vertical

Final measurement:

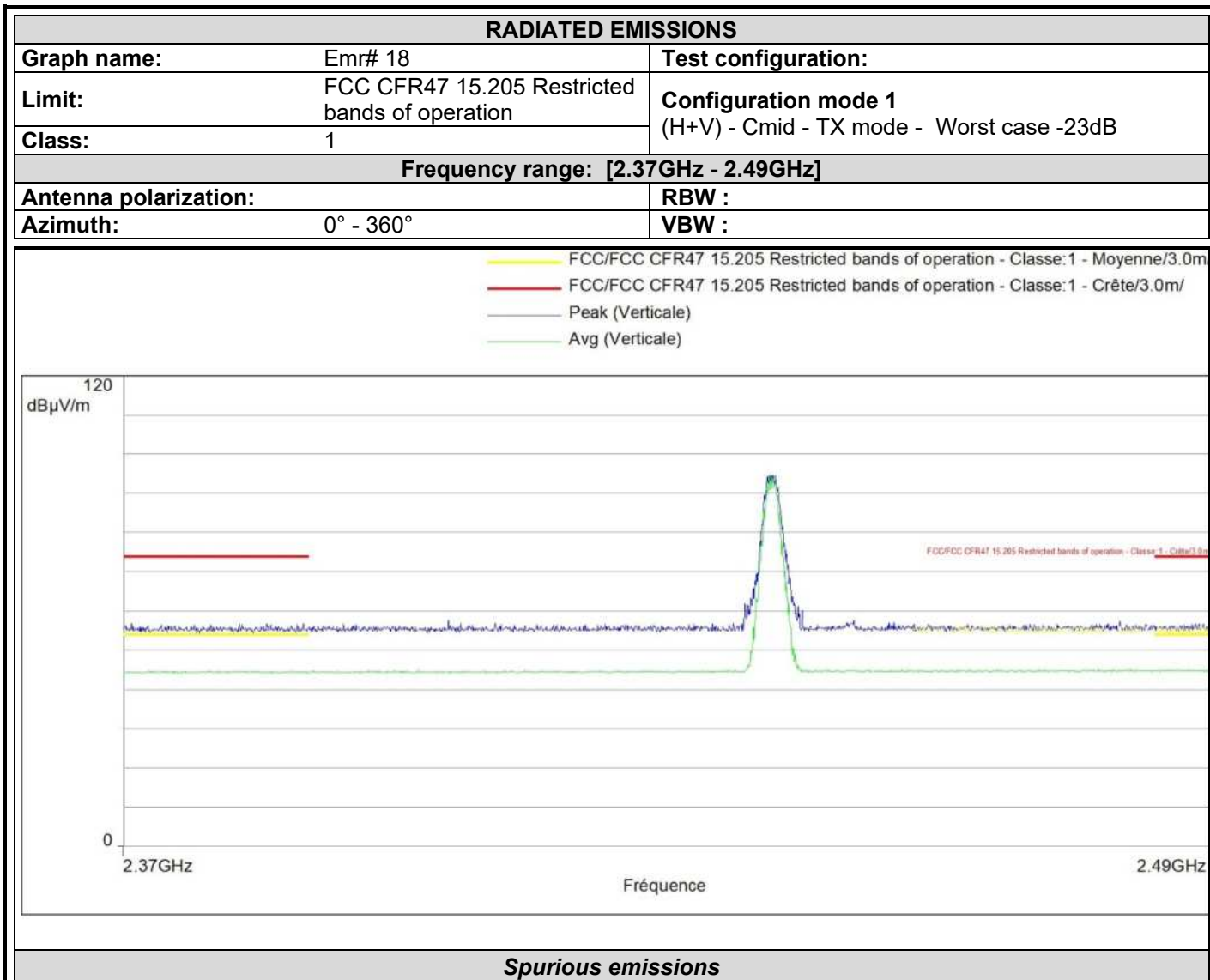
No significative frequency observed



8.6.4. Emissions in restricted frequency bands



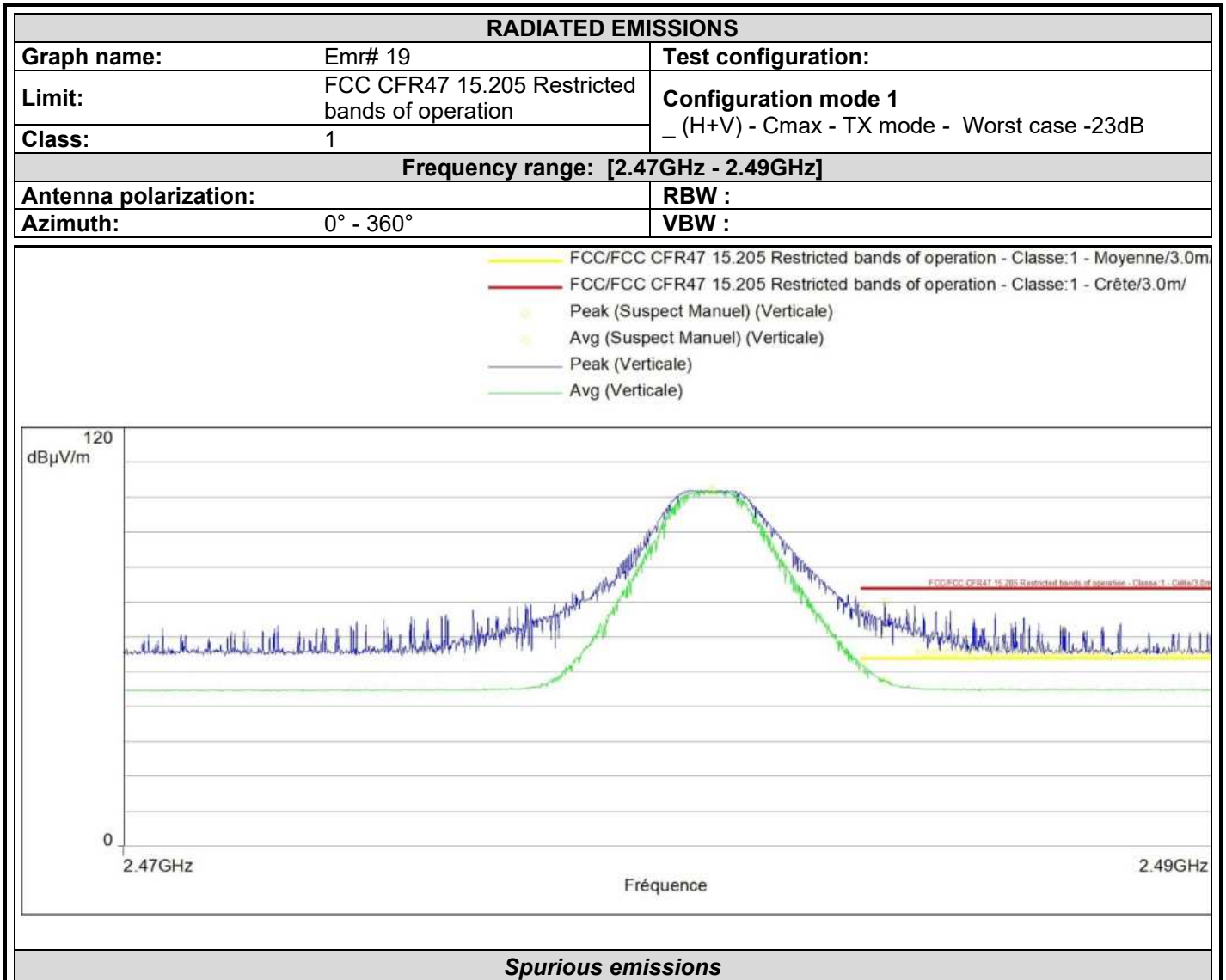
Suspect No significative frequency observed



No significative frequency observed



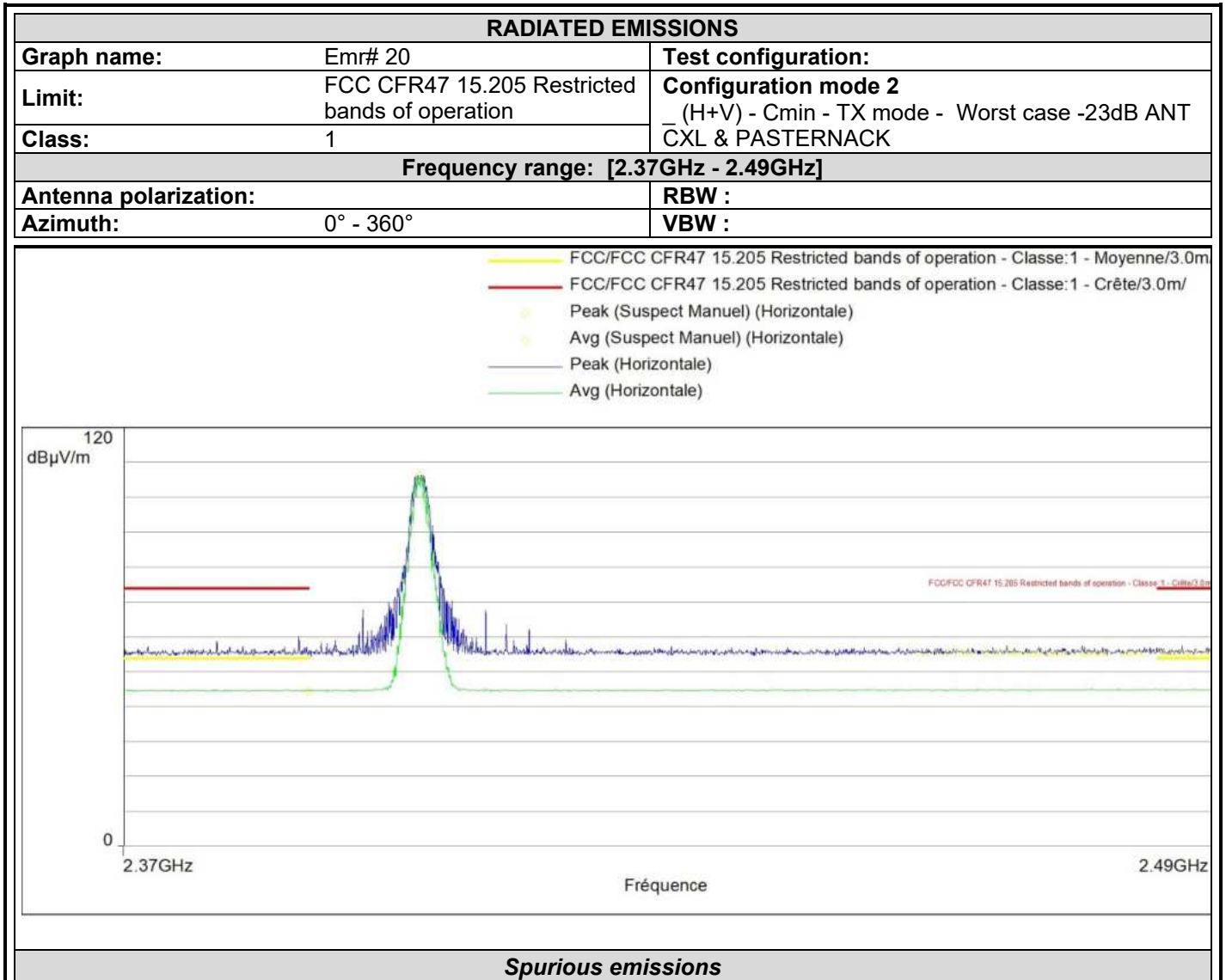
L C I E



Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Peak-Lim.Peak (dB)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Average-Lim.Average (dB)	Polarisation	Correction (dB)
2480.75	102.03	/	/	101.87	/	/	Verticale	35.08
2483.5	67.82	74	-6.18	52.33	54	-1.67	Verticale	35.09
2483.94	69.76	74	-4.24	47.26	53.90	-6.74	Verticale	35.09



L C I E

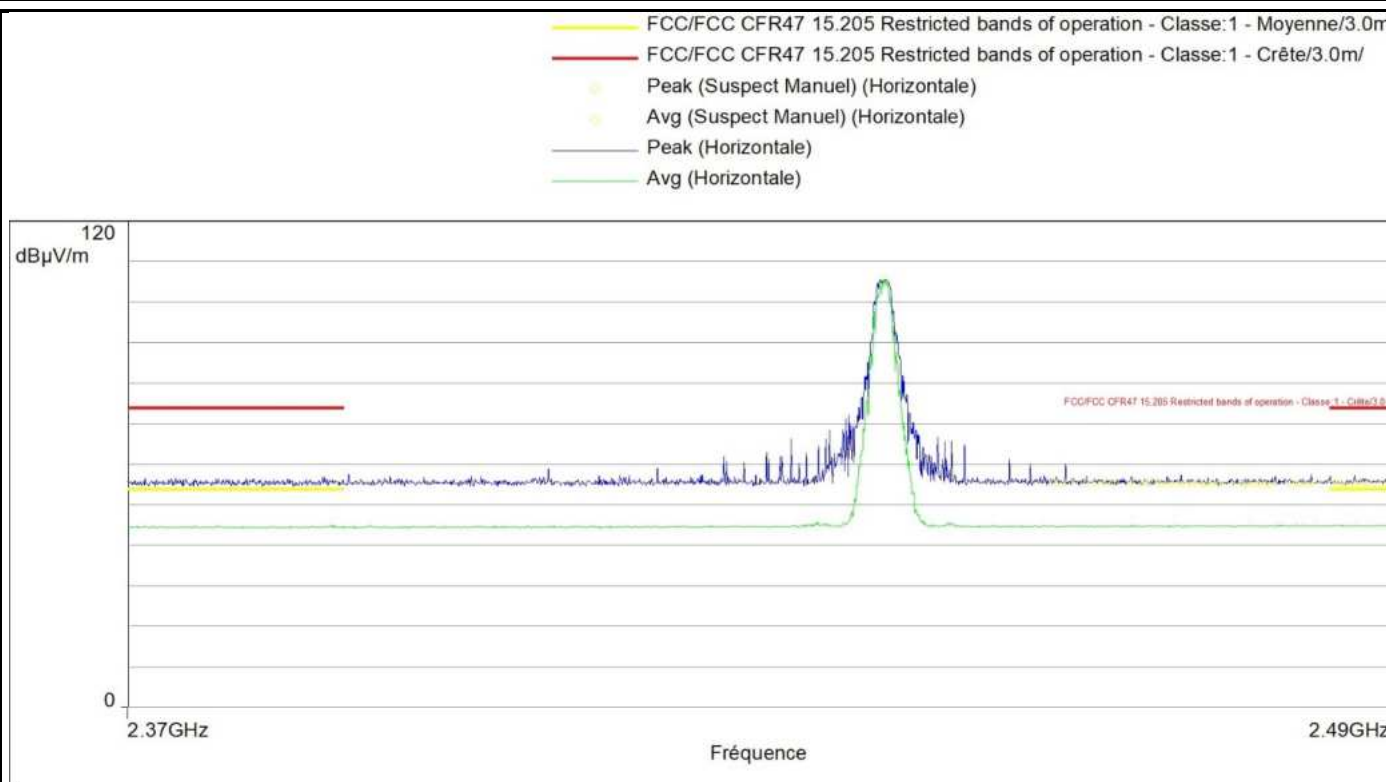


Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Peak-Lim.Peak (dB)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Average-Lim.Average (dB)	Polarization	Correction (dB)
2389.860	54.8	74	-19.2	44.6	54	-9.4	Horizontal	35.0
2401.980	106.3	/		106.0	/		Horizontal	35.0



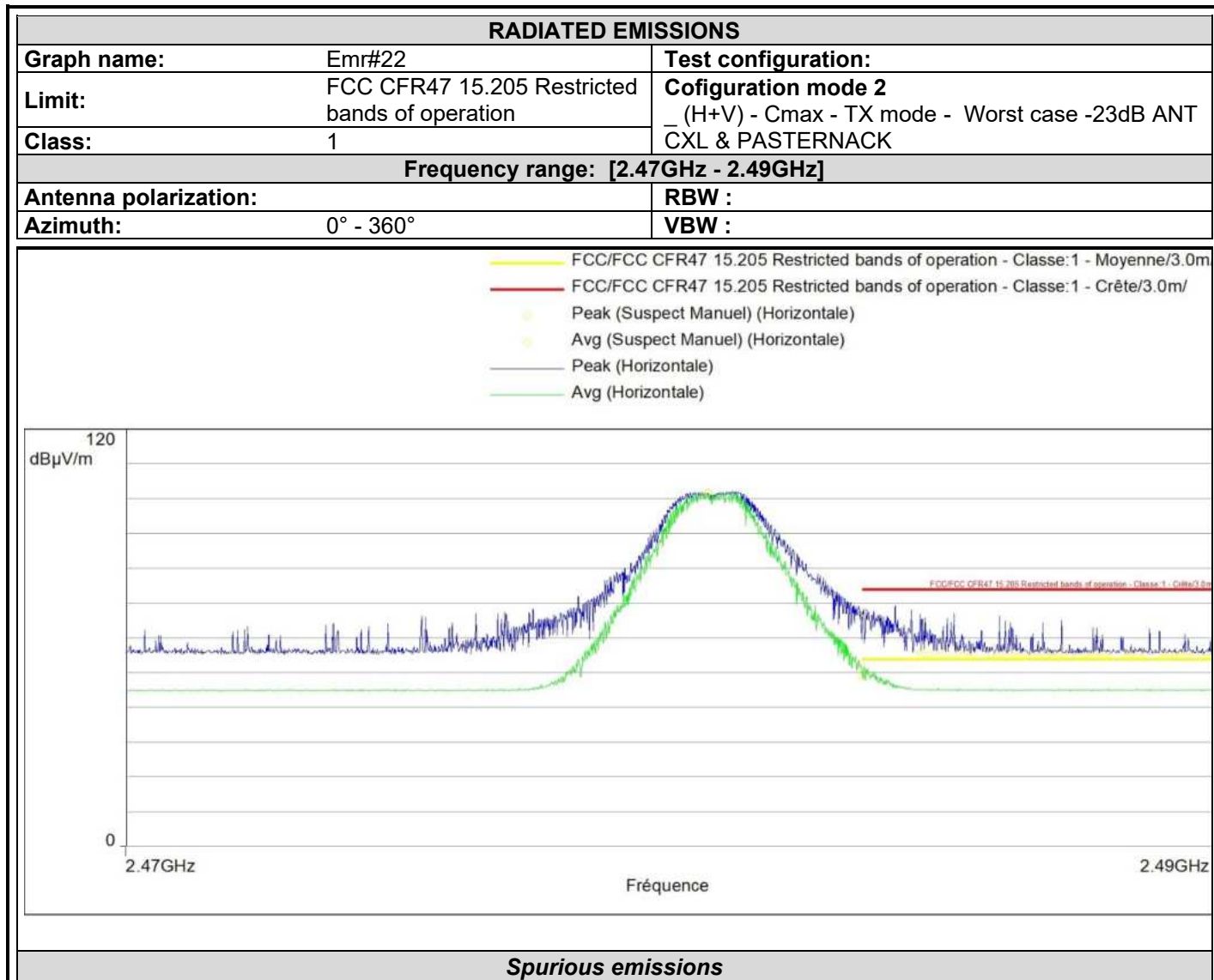
RADIATED EMISSIONS

Graph name:	Emr#21	Test configuration:
Limit:	FCC CFR47 15.205 Restricted bands of operation	Configuration mode 2 (H+V) - Cmid - TX mode - Worst case -23dB ANT CXL & PASTERNAK
Class:	1	
Frequency range: [2.37GHz - 2.49GHz]		
Antenna polarization:		RBW :
Azimuth:	0° - 360°	VBW :



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Peak-Lim.Peak (dB)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Average-Lim.Average (dB)	Polarization	Correction (dB)
2440.740	105.5	/	/	105.4	/	/	Horizontal	35.1



8.7. CONCLUSION

Unwanted emissions in non-restricted bands measurement performed on the sample of the product **RSEFBox**, Sn: **231227401**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247** limits.



9. UNCERTAINTIES CHART

<i>Kind of measurement</i>	<i>Wide uncertainty laboratory</i>
Occupied Channel Bandwidth	±2.8 %
Humidity	±3.2 %
Power Spectral Density, Conducted	±1.7 dB
Radio frequency	±0.3 ppm
RF power, conducted	±1.2 dB
RF power, radiated (Full anechoic chamber above 1GHz)	±3.7 dB
RF power, radiated (Semi anechoic chamber & open test site)	±5.6 dB
Spurious emission, conducted	±2.3 dB
Spurious emission, radiated (Full anechoic chamber above 1GHz)	±3.8 dB
Spurious emission, radiated (Semi anechoic chamber & open test site)	±5.7 dB
Temperature	±0.75 °C
Time	±2.3 %
Voltage	±1.7 %

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