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TEST REPORT

N°: 26401645-811702-B(FILE# 11061858)

Version: 03

Subject

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

Issued to

MICHELIN NORTH AMERICA (US) INC

One Parkway South
29615 – GREENVILLE
UNITED STATES

Apparatus under test

Product

SATELLITE

Trade mark

Michelin

Manufacturer

MANUFACTURE FRANCAISE DES PNEUMATIQUES
MICHELIN

Model under test

SAT AB-01

Serial number

BC:03:A7:01:F1:97

FCCID

FI5SATAB01

IC

5056A-SATAB01

Conclusion

See Test Program chapter

Test date

September 17, 2025 to September 29, 2025

Test location

LCIE Grenoble

FCC Test site

FR0008 - 918017 (MOI)

ISED Test site

6500A (MOI)

Sample receipt date

September 11, 2025

Composition of document

57 pages

Document issued on

January 22, 2026

Written by :

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Tests operator

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Anthony MERLIN

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PUBLICATION HISTORY

Version	Date	Author	Modification
01	November 25, 2025	Majid MOURZAGH	Creation of the document
02	December 11, 2025	Majid MOURZAGH	Add FCC ID and IC on page 1
03	January 22, 2026	Majid MOURZAGH	Correction issue address on page 1

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



SUMMARY

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1. TEST PROGRAM

References

- 47 CFR Part 15.247 (September 25, 2025)[Pb](#)
- RSS 247 Issue 4
- RSS Gen Issue 5
- KDB 558074 D01 DTS Meas Guidance v05r02[Pb](#)
- KDB 662911 D01 Multiple Transmitter Output v02r01[Pb](#)
- 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)
AC Power Line Conducted Emission	<i>FCC & ISED</i>	PASS
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

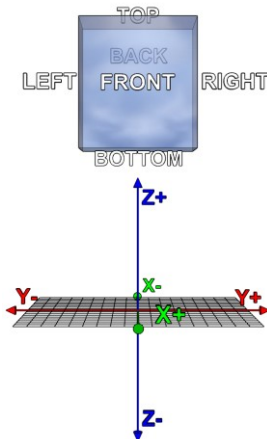
NA: Not Applicable

NP: Test Not Performed

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

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):

Model under test:	SAT AB-01
Serial Number:	BC:03:A7:01:F1:97
 	
Dimensions:	12cm x 13cm x 7cm (Length x Width x Height)
Type:	Table-Top

Supply:

Name	Type	Rating	Reference / Sn	Comments
Supply1	DC	6 to 12Vdc	/	/

NC: Not communicated by provider

**Inputs/outputs - Cable:**

Access	Type	Length used (m)	Declared <3m	Shielded	Comments
Supply1	2 wires	5	No	No	/

NC: Not communicated by provider

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Automated programmer	CYCLONE FX	/	To set configuration mode
Solar Panel + battery	/	/	12Vdc

NC: Not communicated by provider



Equipment information (declaration of provider):

802.15.4:	THREAD
Chipset / RF Module	X.X
Frequency band:	[2400 – 2483.5] MHz
Spectrum Modulation:	DSSS
Number of Channel:	16
Spacing channel:	5MHz
Channel bandwidth:	2MHz
Antenna Type:	Internal
Antenna connector:	None
Antenna requirements §15.203	Conducted Method (welded connection, according to manufacturer's requirements)
Transmit chains:	1
Receiver chains	1

CHANNEL PLAN	
Channel	Frequency (MHz)
Cmin: 11	2405
12	2410
13	2415
14	2420
15	2425
16	2430
17	2435
Cmid: 18	2440
19	2445
20	2450
21	2455
22	2460
23	2465
24	2470
25	2475
Cmax: 26	2480

DATA RATE		
Data Rate (Mbps)	Modulation Type	Worst Case Modulation
0.25	O-QPSK	☒



Antenna Characteristic			
Antenna reference	Gain (dBi)	Frequency Band (MHz)	Impedance(Ω)
ETHERTRONICS : PN 1001013	2.6	2400 – 2485 MHz	50

Hardware information				
Highest internal frequency (PLL, Quartz, Clock, Microprocessor...):		F _{Highest} :	78	MHz
Firmware (if applicable):		V:	N/A	
Software (if applicable):		V:	N/A	
Equipment intended:	Fixed			
Type of equipment:	Stand-alone			
Equipment sample:	Production model			
Duty cycle:	Continuous duty			
Operating temperature range:	T _{min} :	-40 °C		
	T _{nom} :	20°C		
	T _{max} :	+85 °C		
Operating voltage:	V _{nom} :	+6 to +12VDC		

NC: Not communicated by provider

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. Radio Power set at +7 dBm - THREAD_7DBM_2405 - THREAD_7DBM_2440 - THREAD_7DBM_2480
Test mode 2	Permanent reception

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
AC Power Line Conducted Emission	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.

2.3. EQUIPMENT LABELLING

Label


2.4. EQUIPMENT MODIFICATIONS DURING THE TESTS

None

3. LABORATORY EQUIPMENT AND METHODOLOGY

3.1. TEST DISTANCE EXTRAPOLATION – FCC

The field strength is extrapolated to the new measurement distance using formula from §6.4.4 de l'ANSI C63.10 and FCC Part15.31 (p), the choice of equation is made according to the distances of the limit and the measurement,

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left(\frac{d_{\text{near field}}}{d_{\text{measure}}} \right) - 20 \log \left(\frac{d_{\text{limit}}}{d_{\text{near field}}} \right) \quad (2)$$

$$FS_{\text{limit}} = FS_{\text{max}} - 20 \log \left(\frac{d_{\text{limit}}}{d_{\text{measure}}} \right) \quad (3)$$

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left(\frac{d_{\text{limit}}}{d_{\text{measure}}} \right) \quad (4)$$

where

FS_{limit}	is the calculation of field strength at the limit distance, expressed in dBμV/m
FS_{max}	is the measured field strength, expressed in dBμV/m
$d_{\text{near field}}$	is the $\lambda/2\pi$ distance
d_{measure}	is the distance of the measurement point from the EUT
d_{limit}	is the reference limit distance

3.2. TEST DISTANCE EXTRAPOLATION – ISSED

The field strength is extrapolated to the new measurement distance using formula from §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 dBμV/m

FS_{max} is the measured field strength, expressed in dBμV/m

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

d_{limit} is the reference limit distance



3.3. 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.

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

3.4. CALIBRATION DATE

The calibration intervals are extended at +4 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. The symbol -/- replaces the date for equipment checking before test or that have none impact on the test or that have no calibration required by the standard.

4. OCCUPIED BANDWIDTH

4.1. TEST CONDITIONS

Date of test : September 24, 2025
Test performed by : Majid MOURZAGH
Relative humidity (%) : 40
Ambient temperature (°C) : 23

4.2. TEST SETUP

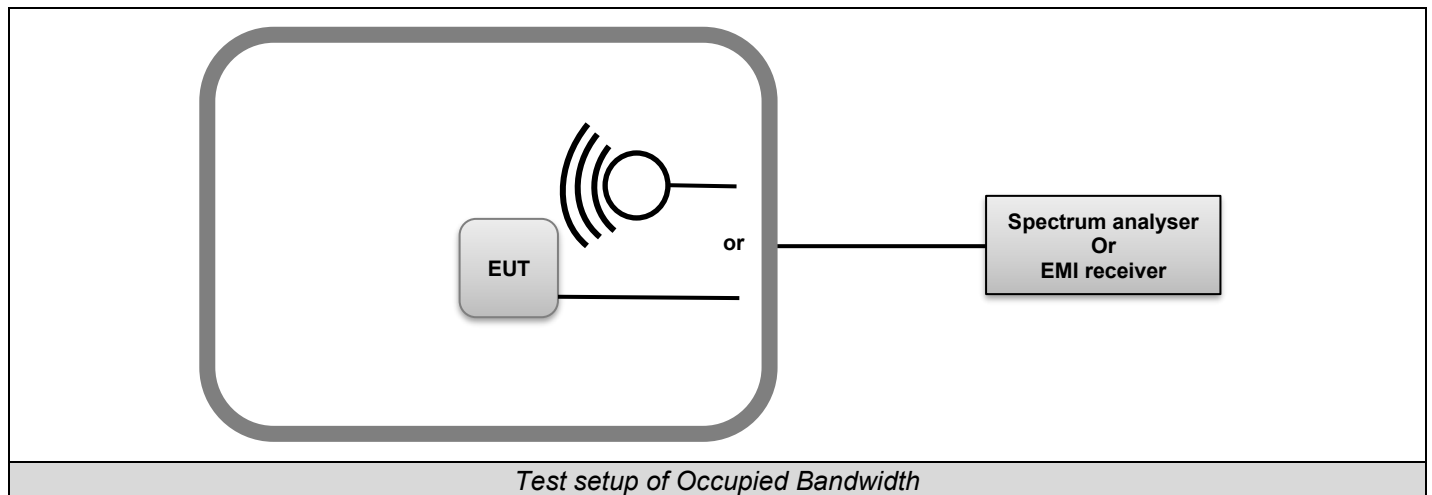
The Equipment Under Test is installed in an anechoic chamber.
Measurement is performed with a spectrum analyzer in conducted method.

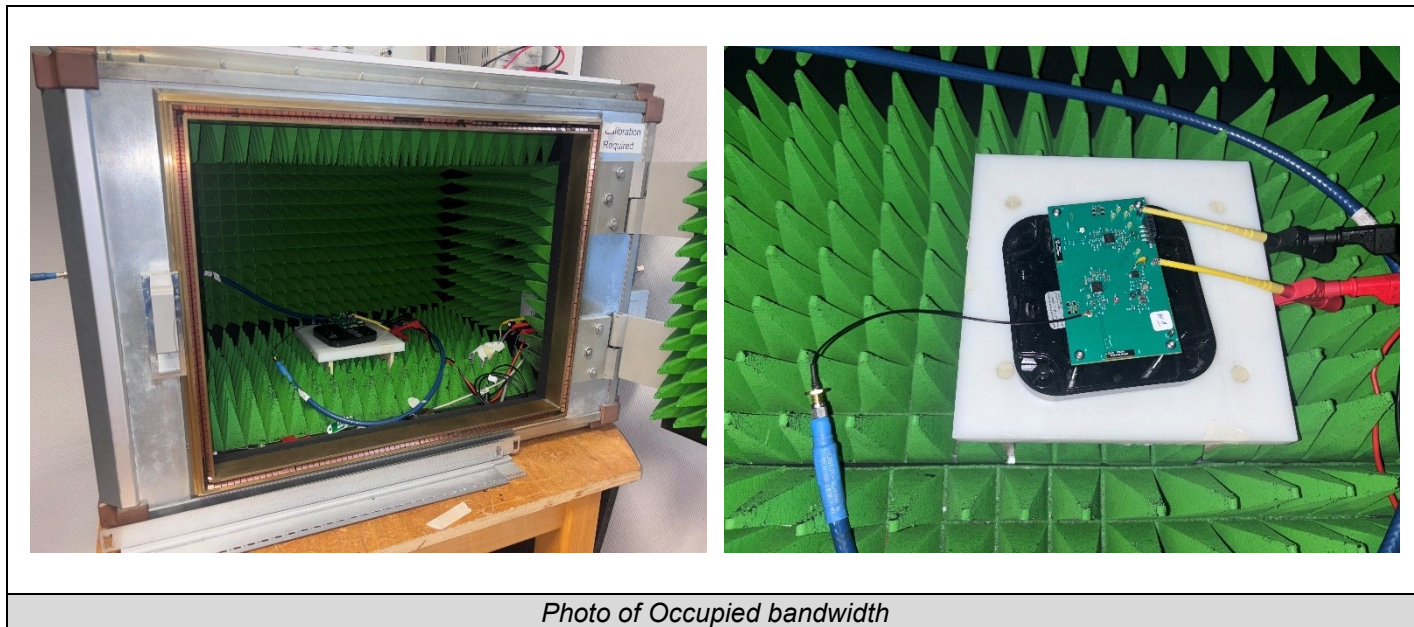
The EUT is turned ON, the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

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





4.3. LIMIT

None

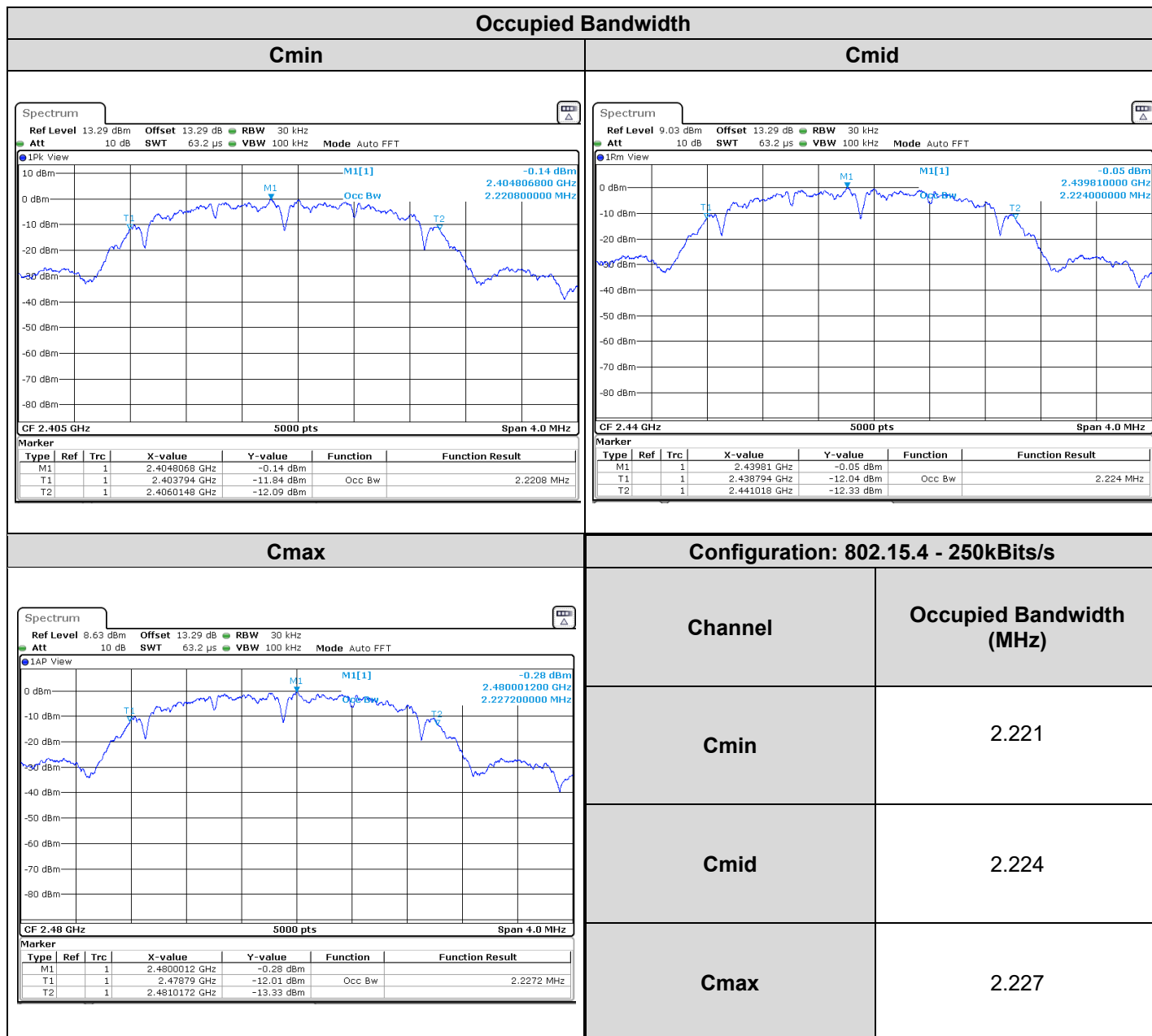
4.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Mesure_DTS_FCC-ISED	LCIE SUD EST	Mesure_DTS_FCC-ISED v1.3	L2000060	-/-	-/-
Attenuator 10dB	AEROFLEX	—	A7122268	08/25	08/27
Full Anechoic Room	SIEPEL	—	D3044024	-/-	-/-
SMA 1.5m	SUCOFLEX	18GHz	A5329864	01/25	01/26
SMA 1.5m	SUCOFLEX	18GHz	A5329863	08/25	08/26
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	04/24	04/26
Thermo-hygrometer	TESTO	608-H1	B4204120	05/25	05/27
Multimeter - CEM	FLUKE	87	A1240251	10/23	10/25

4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

4.6. RESULTS



4.7. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **SAT AB-01**, Sn: **BC:03:A7:01:F1:97**, in configuration and description presented in this test report, show levels **compliant** to the **RSS-GEN** limits.

5. 6dB BANDWIDTH

5.1. TEST CONDITIONS

Date of test : September 24, 2025
Test performed by : Majid MOURZAGH
Relative humidity (%) : 40
Ambient temperature (°C) : 23

5.2. TEST SETUP

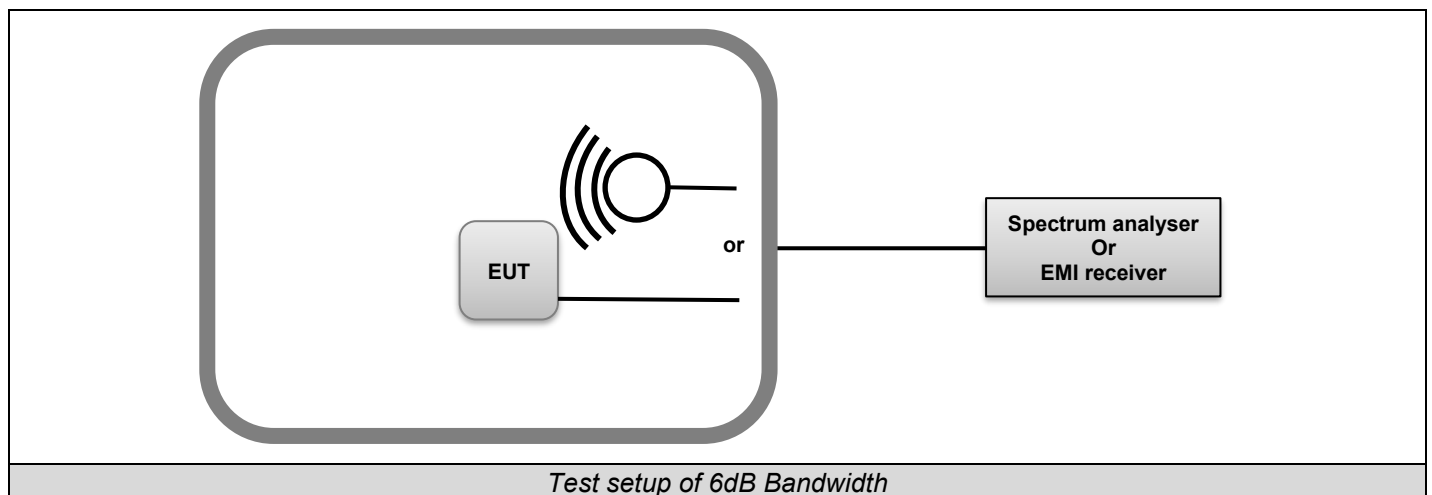
The Equipment Under Test is installed in an anechoic chamber.
Measurement is performed with a spectrum analyzer in conducted method.

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.



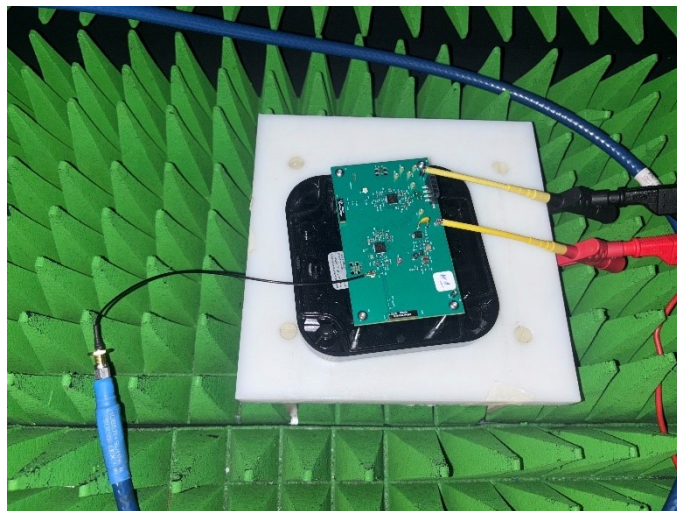
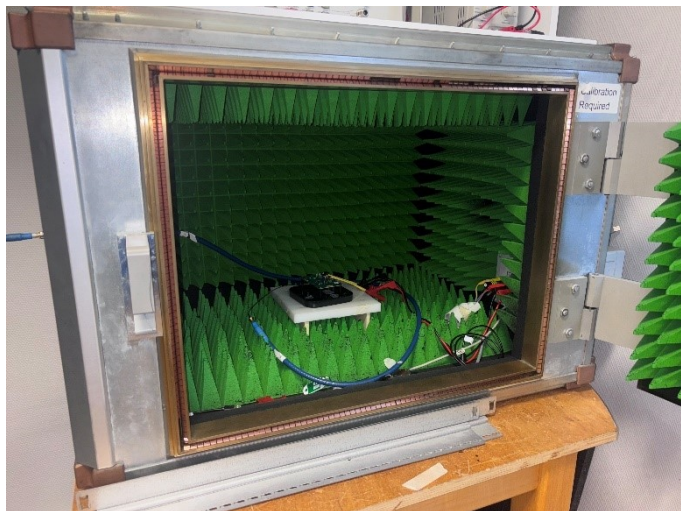


Photo of 6dB bandwidth

5.3. LIMIT

Frequency range	6dB bandwidth
902-928MHz 2400MHz to 2483.5MHz 5725-5850 MHz	≥500kHz

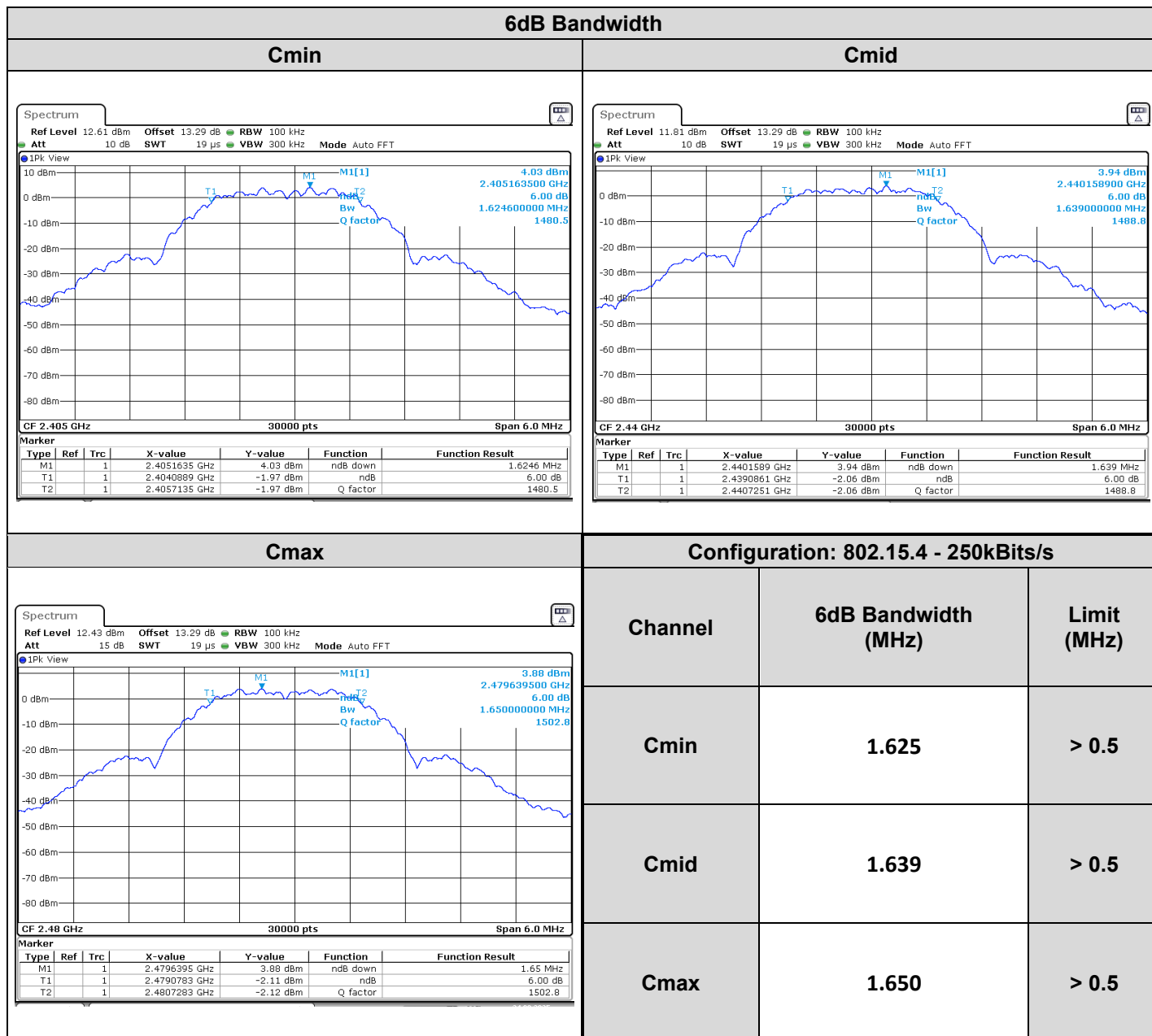
5.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Mesure_DTS_FCC-ISED	LCIE SUD EST	Mesure_DTS_FCC-ISED v1.3	L2000060	-/-	-/-
Attenuator 10dB	AEROFLEX	—	A7122268	08/25	08/27
Full Anechoic Room	SIEPEL	—	D3044024	-/-	-/-
SMA 1.5m	SUCOFLEX	18GHz	A5329864	01/25	01/26
SMA 1.5m	SUCOFLEX	18GHz	A5329863	08/25	08/26
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	04/24	04/26
Thermo-hygrometer	TESTO	608-H1	B4204120	05/25	05/27
Multimeter - CEM	FLUKE	87	A1240251	10/23	10/25

5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

5.6. RESULTS



5.7. CONCLUSION

6dB Bandwidth measurement performed on the sample of the product **SAT AB-01**, Sn: **BC:03:A7:01:F1:97**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247** limits.

6. MAXIMUM CONDUCTED OUTPUT POWER

6.1. TEST CONDITIONS

Date of test : September 24, 2025
Test performed by : Majid MOURZAGH
Relative humidity (%) : 40
Ambient temperature (°C) : 23

6.2. TEST SETUP

The Equipment Under Test is installed in an anechoic chamber.
Measurement is performed with a spectrum analyzer in conducted method.

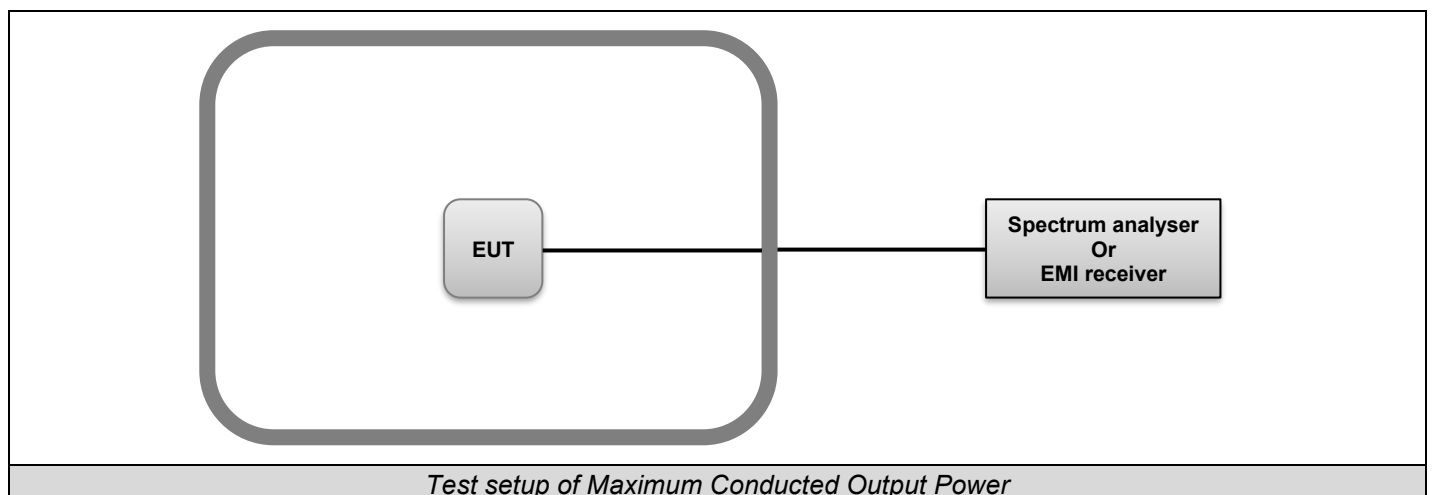
The EUT is turned ON, the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

Test Procedure used: KDB 558074 D01 DTS Meas Guidance v05r02 § 8.3.1.2

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



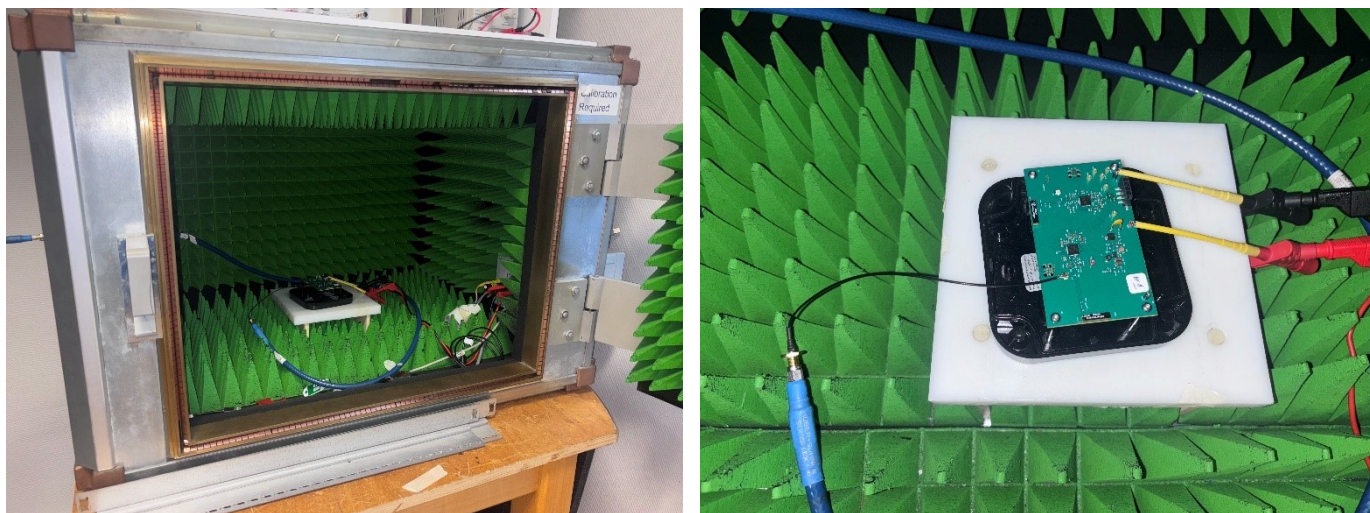


Photo of Maximum Conducted Output Power

6.3. LIMIT

Frequency range	Maximum Conducted Output Power
902-928MHz 2400MHz to 2483.5MHz 5725-5850 MHz	≤30dBm*

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

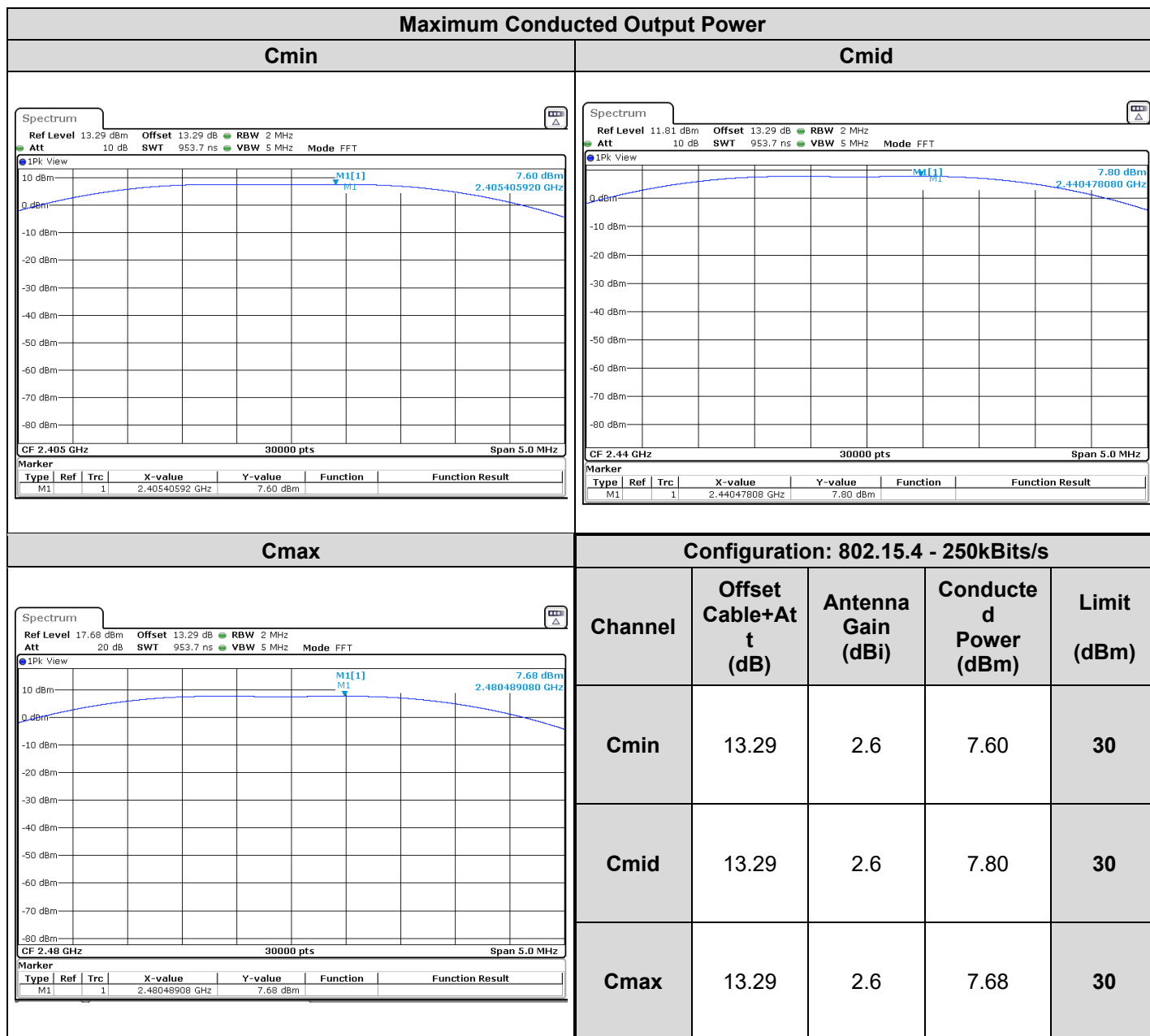
6.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Mesure_DTS_FCC-ISED	LCIE SUD EST	Mesure_DTS_FCC-ISED v1.3	L2000060	-/-	-/-
Attenuator 10dB	AEROFLEX	—	A7122268	08/25	08/27
Full Anechoic Room	SIEPEL	—	D3044024	-/-	-/-
SMA 1.5m	SUCOFLEX	18GHz	A5329864	01/25	01/26
SMA 1.5m	SUCOFLEX	18GHz	A5329863	08/25	08/26
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	04/24	04/26
Thermo-hygrometer	TESTO	608-H1	B4204120	05/25	05/27
Multimeter - CEM	FLUKE	87	A1240251	10/23	10/25

6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

6.6. RESULTS



6.7. CONCLUSION

Maximum Output Conducted Power measurement performed on the sample of the product **SAT AB-01**, Sn: **BC:03:A7:01:F1:97**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247** limits.

7. POWER SPECTRAL DENSITY

7.1. TEST CONDITIONS

Date of test : September 24, 2025
Test performed by : Majid MOURZAGH
Relative humidity (%) : 40
Ambient temperature (°C) : 23

7.2. TEST SETUP

The Equipment Under Test is installed in an anechoic chamber.
Measurement is performed with a spectrum analyzer in conducted method.

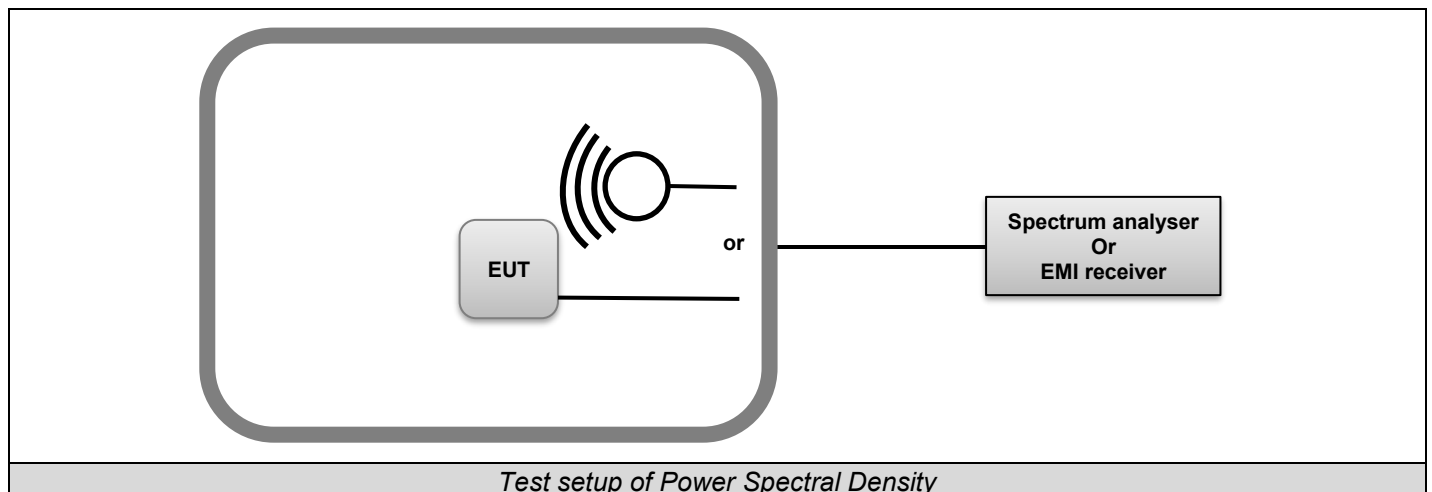
The EUT is turned ON, the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

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

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



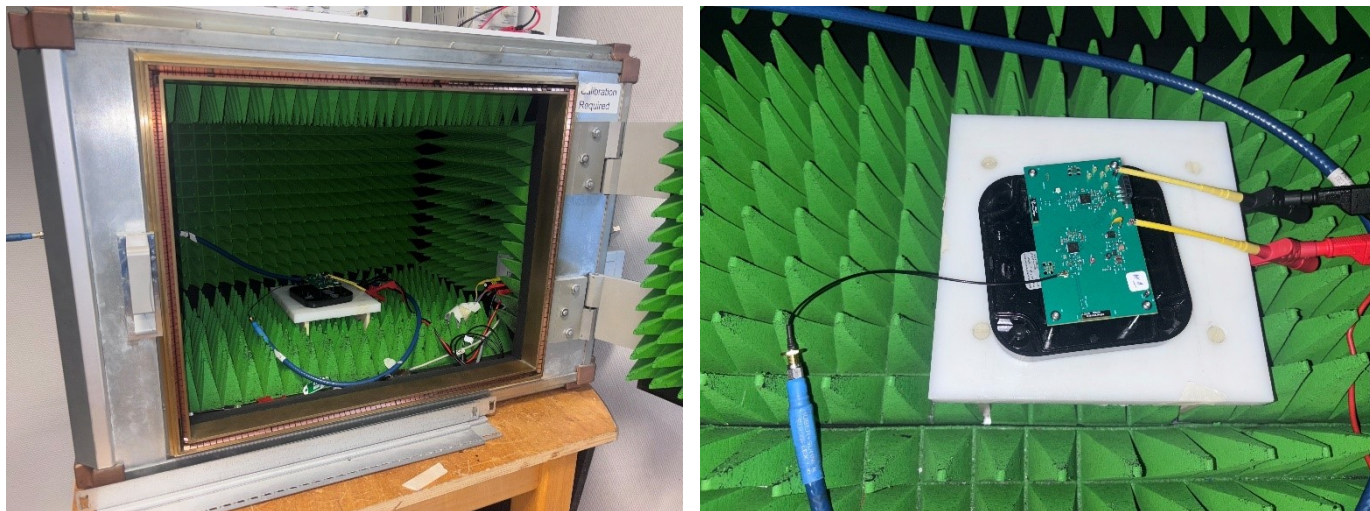


Photo of Power Spectral Density

7.3. LIMIT

Frequency range	Power Spectral Density
902-928MHz 2400MHz to 2483.5MHz 5725-5850 MHz	$\leq 8\text{dBm} / 3\text{kHz}^*$

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

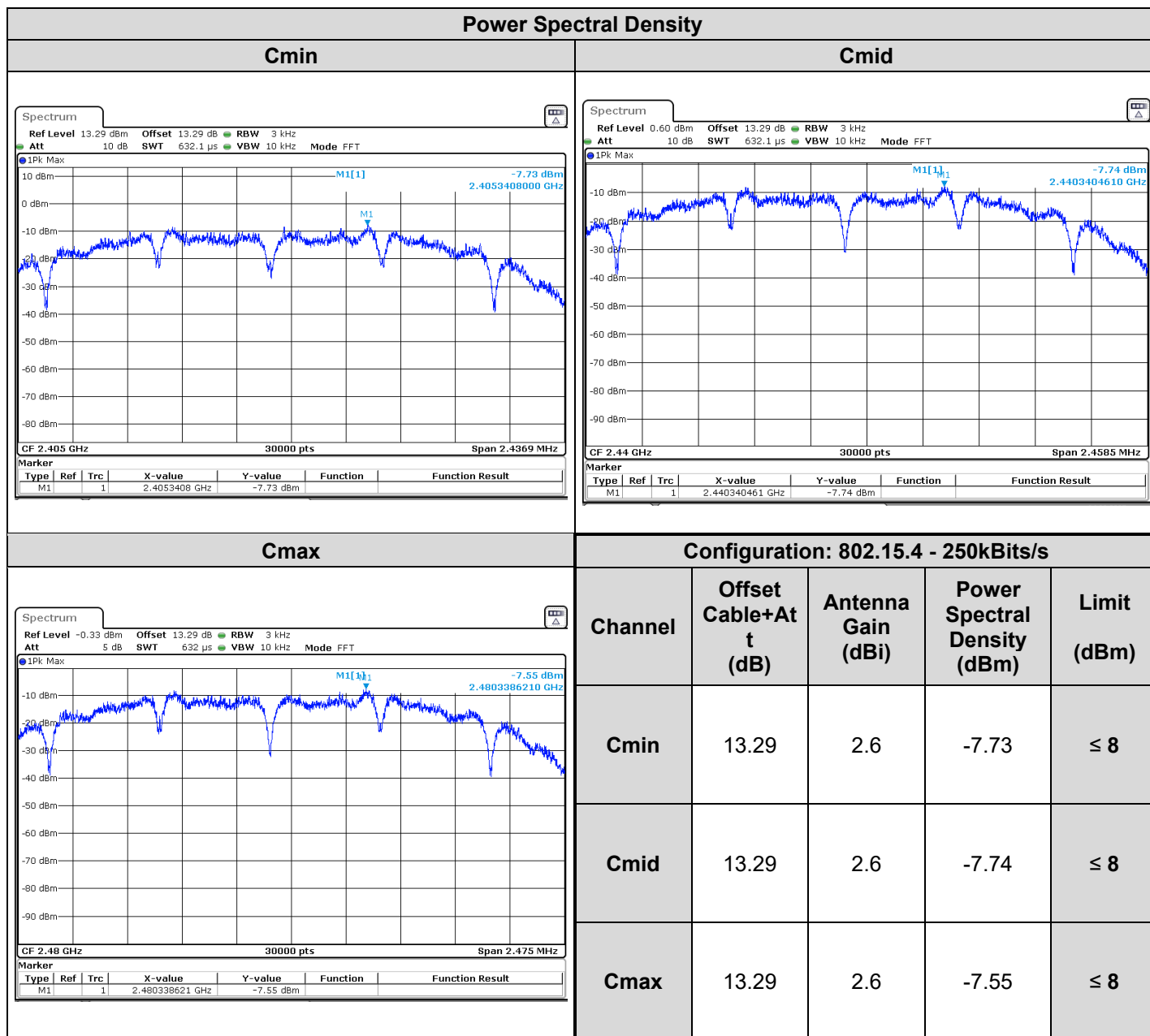
7.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Mesure_DTS_FCC-ISED	LCIE SUD EST	Mesure_DTS_FCC-ISED v1.3	L2000060	-/-	-/-
Attenuator 10dB	AEROFLEX	—	A7122268	08/25	08/27
Full Anechoic Room	SIEPEL	—	D3044024	-/-	-/-
SMA 1.5m	SUCOFLEX	18GHz	A5329864	01/25	01/26
SMA 1.5m	SUCOFLEX	18GHz	A5329863	08/25	08/26
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	04/24	04/26
Thermo-hygrometer	TESTO	608-H1	B4204120	05/25	05/27
Multimeter - CEM	FLUKE	87	A1240251	10/23	10/25

7.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

7.6. RESULTS



7.7. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **SAT AB-01**, Sn: **BC:03:A7:01:F1:97**, 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 NON-RESTRICTED FREQUENCY BANDS

8.1. TEST CONDITIONS

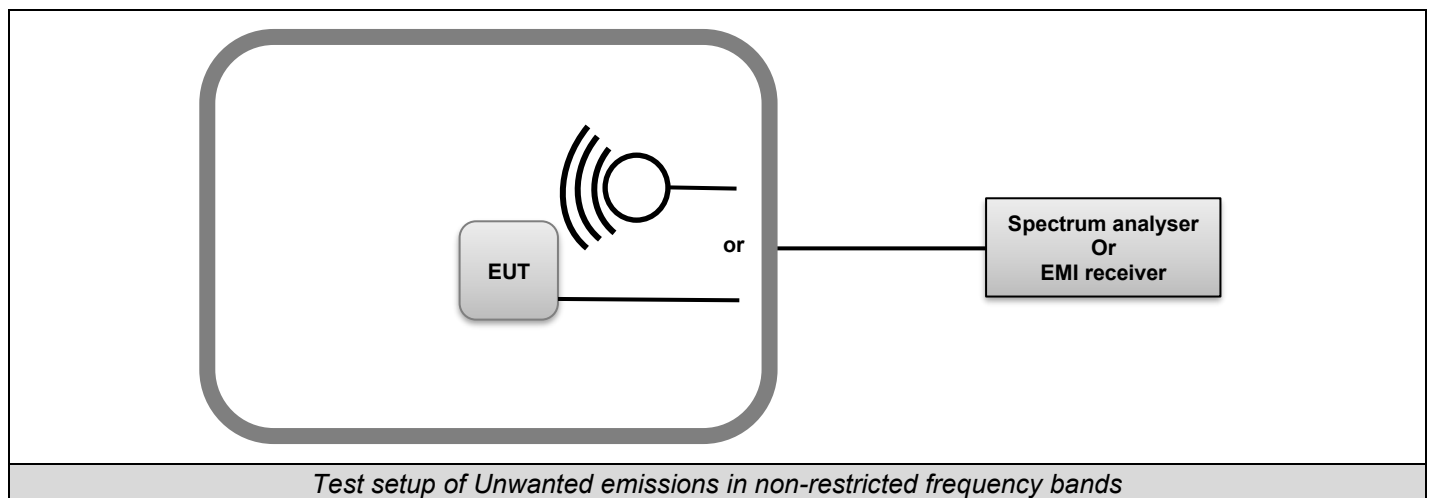
Date of test : September 24, 2025
Test performed by : Majid MOURZAGH
Relative humidity (%) : 40
Ambient temperature (°C) : 23

8.2. TEST SETUP

The Equipment Under Test is installed in an anechoic chamber.
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



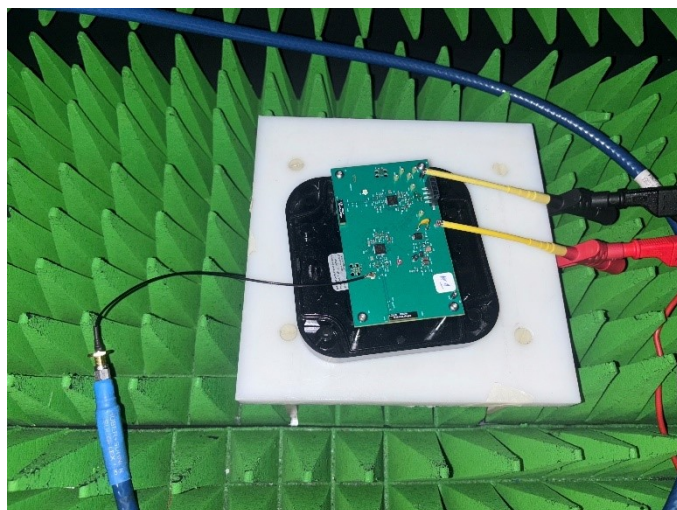
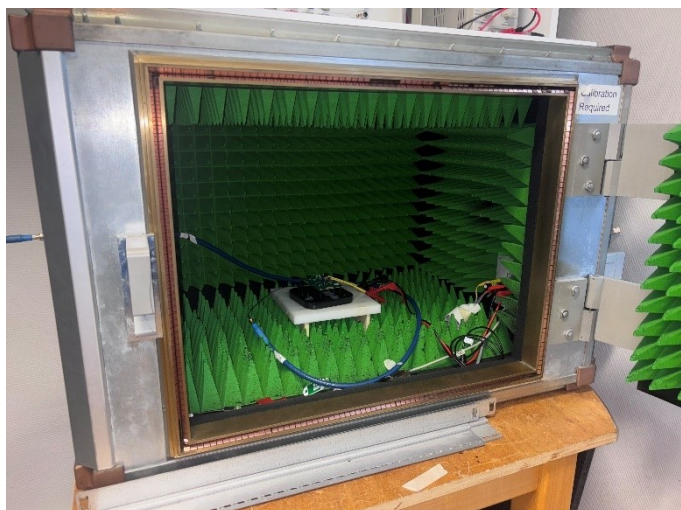


Photo of Unwanted emissions in non-restricted frequency bands

8.3. 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.

8.4. TEST EQUIPMENT LIST

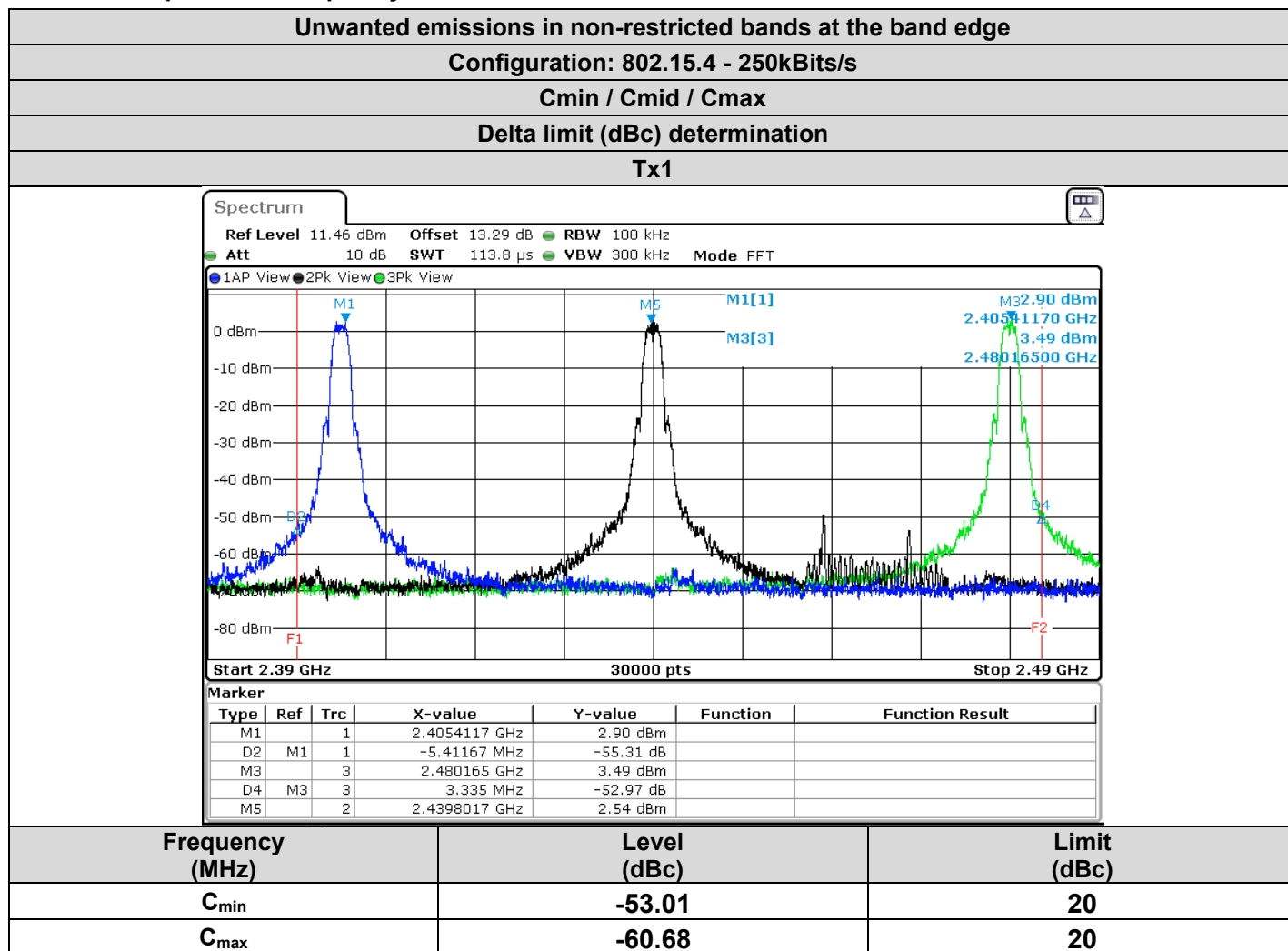
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Mesure_DTS_FCC-ISED	LCIE SUD EST	Mesure_DTS_FCC-ISED v1.3	L2000060	-/-	-/-
Attenuator 10dB	AEROFLEX	—	A7122268	08/25	08/27
Full Anechoic Room	SIEPEL	—	D3044024	-/-	-/-
SMA 1.5m	SUCOFLEX	18GHz	A5329864	01/25	01/26
SMA 1.5m	SUCOFLEX	18GHz	A5329863	08/25	08/26
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	04/24	04/26
Thermo-hygrometer	TESTO	608-H1	B4204120	05/25	05/27
Multimeter - CEM	FLUKE	87	A1240251	10/23	10/25

8.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

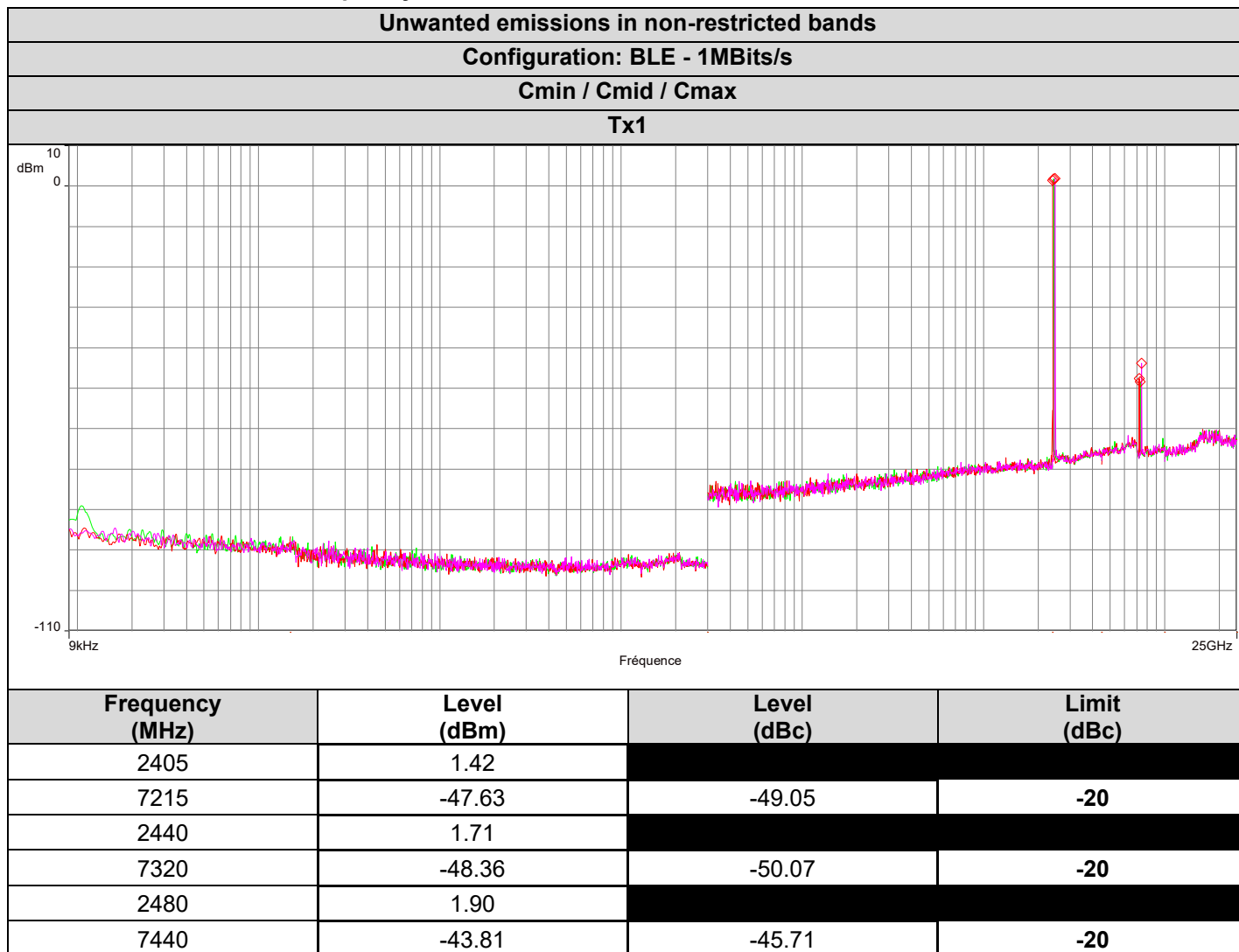
None

8.6. RESULTS

8.6.1. Operational frequency band



8.6.2. Non restricted frequency bands



8.7. CONCLUSION

Unwanted emissions in non-restricted bands and at the band edge measurement performed on the sample of the product **SAT AB-01**, Sn: **BC:03:A7:01:F1:97**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247** limits.



9. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS

9.1. TEST CONDITIONS

Date of test : September 30, 2025
 Test performed by : Majid MOURZAGH
 Relative humidity (%) : 37
 Ambient temperature (°C) : 24

9.2. 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	10m
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:	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	1.5m
Test site:	Full Anechoic Chamber	Open Aera Test Site
Distance EUT - Antenna:	3m	10m
Detector:	Peak	QPeak

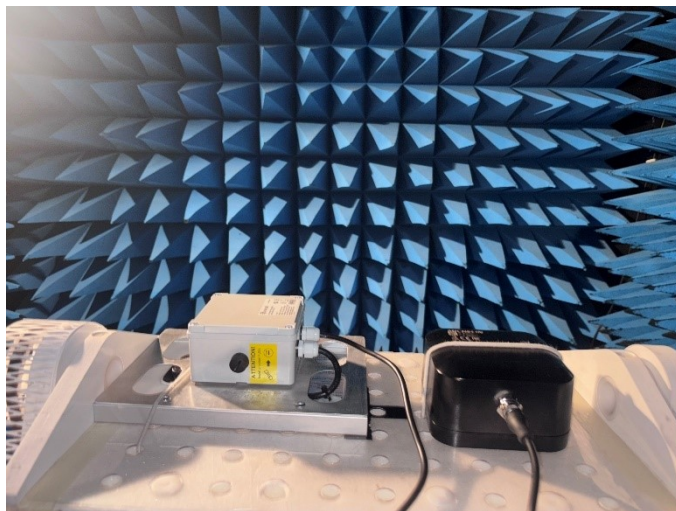


Frequency range:	1GHz to 14GHz	
Test:	Pre-Characterization	Qualification
Antenna Polarization:	Horizontal and Vertical	
Antenna Height:	Centered on EUT (§6.6.5 ANSI C63-10)	Centered on EUT (§6.6.5 ANSI C63-10)
Antenna Type:	Horn	
RBW Filter:	1MHz	
Maximization:	Turntable rotation of 360 degrees range 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	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	Peak & Average



Axis XY on FAR



Axis Z on FAR

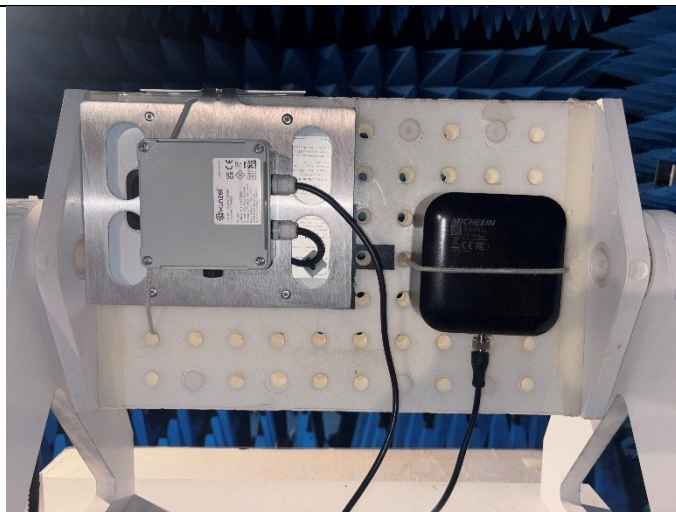


Photo of Unwanted Emissions in Restricted Frequency Bands



Axis XY on OATS



Axis Z on OATS

Photo of Unwanted Emissions in Restricted Frequency Bands

9.3. 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

9.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Multimeter - CEM	FLUKE	87	A1240251	10/23	10/25
Antenna Bi-log	AH System	SAS-521-7	C2040180	05/23	05/25
Antenna horn 18GHz	AINFO	LB	C2042055	11/24	11/27
BAT EMC	NEXIO	v3.21.0.32	L1000115	-/-	-/-
Cable 0.75m	-	18GHz	A5329900	08/24	08/25
CONTROLLER	INNCO	CO3000	D3044034	-/-	-/-
Filter Matrice	LCIE SUD EST	Combined filters	A7484078	08/25	08/27
HF Radiated emission comb generator	LCIE SUD EST	—	A3169088	-/-	-/-
Rehausse Table C3	LCIE	—	F2000507	-/-	-/-
Rehausse Table C3	LCIE	—	F2000511	-/-	-/-
Semi-Anechoic chamber #3 (BF)	SIEPEL	—	D3044017_BF	04/22	04/25
Semi-Anechoic chamber #3 (VSWR)	SIEPEL	—	D3044017_VSWR	08/25	08/28
SMA Cable 18GHz 0.5m	TELEDYNE	18GHz	A5330059	01/25	01/26
SMA Cable 18GHz 0.5m	TELEDYNE	18GHz	A5330060	01/25	01/26
SMA Cable 18GHz 0.6m	TELEDYNE	18GHz	A5330055	08/25	08/26
SMA Cable 18GHz 3.5m	TELEDYNE	18GHz	A5330058	08/25	08/26
SMA Cable 18GHz 6m	TELEDYNE	18GHz	A5330057	01/25	01/26
Spectrum analyzer	ROHDE & SCHWARZ	FSU 26	A4060058	09/23	09/25
Table C3	LCIE	—	F2000461	-/-	-/-
Thermo-hygrometer	TESTO	608-H1	B4204120	05/25	05/27
TILT	INNCO	TILT	D3044033	-/-	-/-
Turntable chamber (Cage#3)	ETS Lingren	Model 2165	F2000371	-/-	-/-
Turntable controller (Cage#3)	ETS Lingren	Model 2090	F2000444	-/-	-/-

9.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

9.6. RESULTS

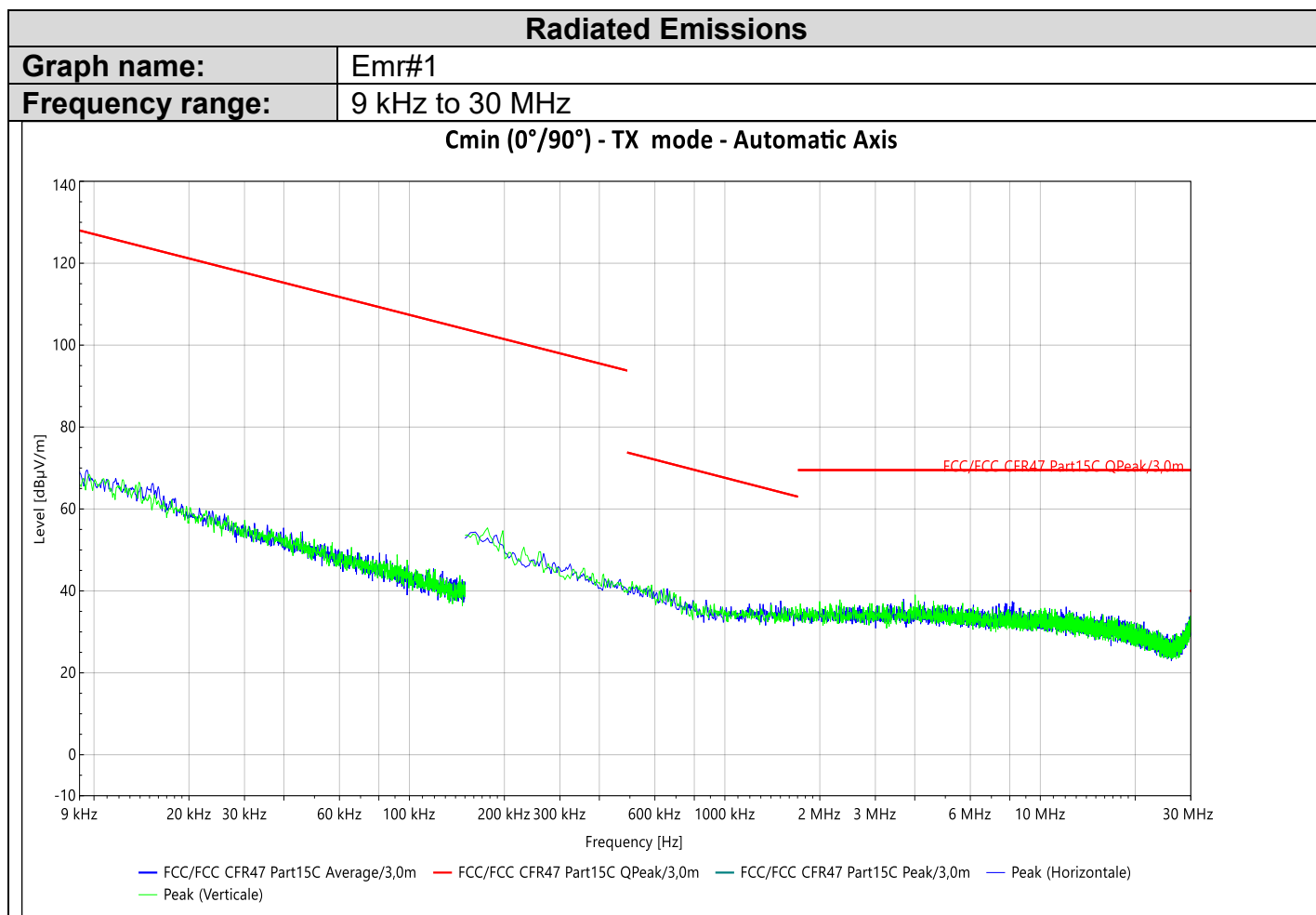
For all following measurements, worst case is presented with different configurations and modulations of EUT.

9.6.1. 9kHz to 30MHz

Graphs – Pre characterization:

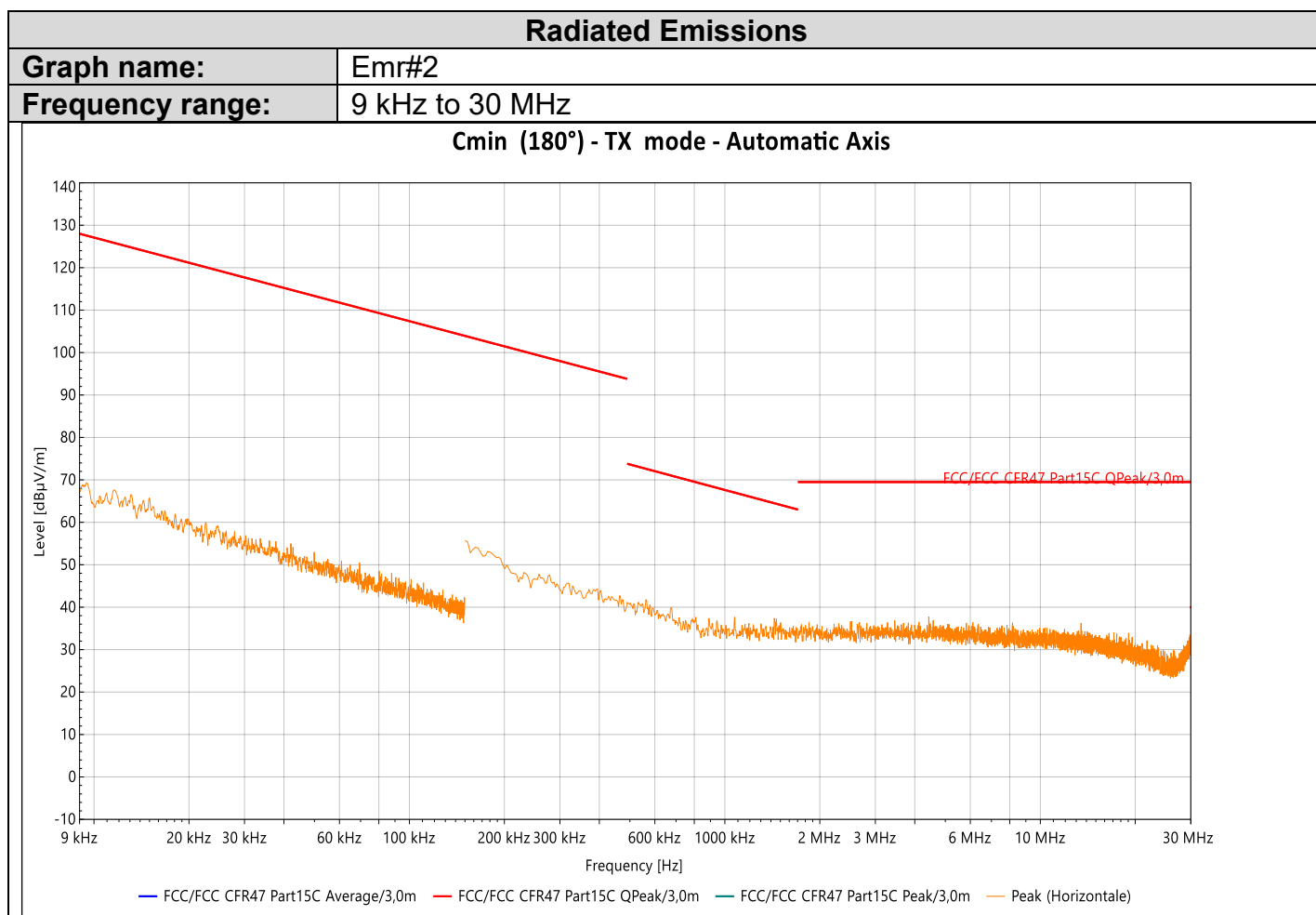
Graph identifier	Polarization	Mode	Channel	EUT position	Comments
Emr# 1	H/V	TX	Cmin	Axis XY/Z	See the following results
Emr# 2	H/V	TX	Cmin	Axis XY/Z	See the following results

(worst case presented)



Pre-Characterization:

No significant frequency observed



Pre-Characterization:

No significant frequency observed

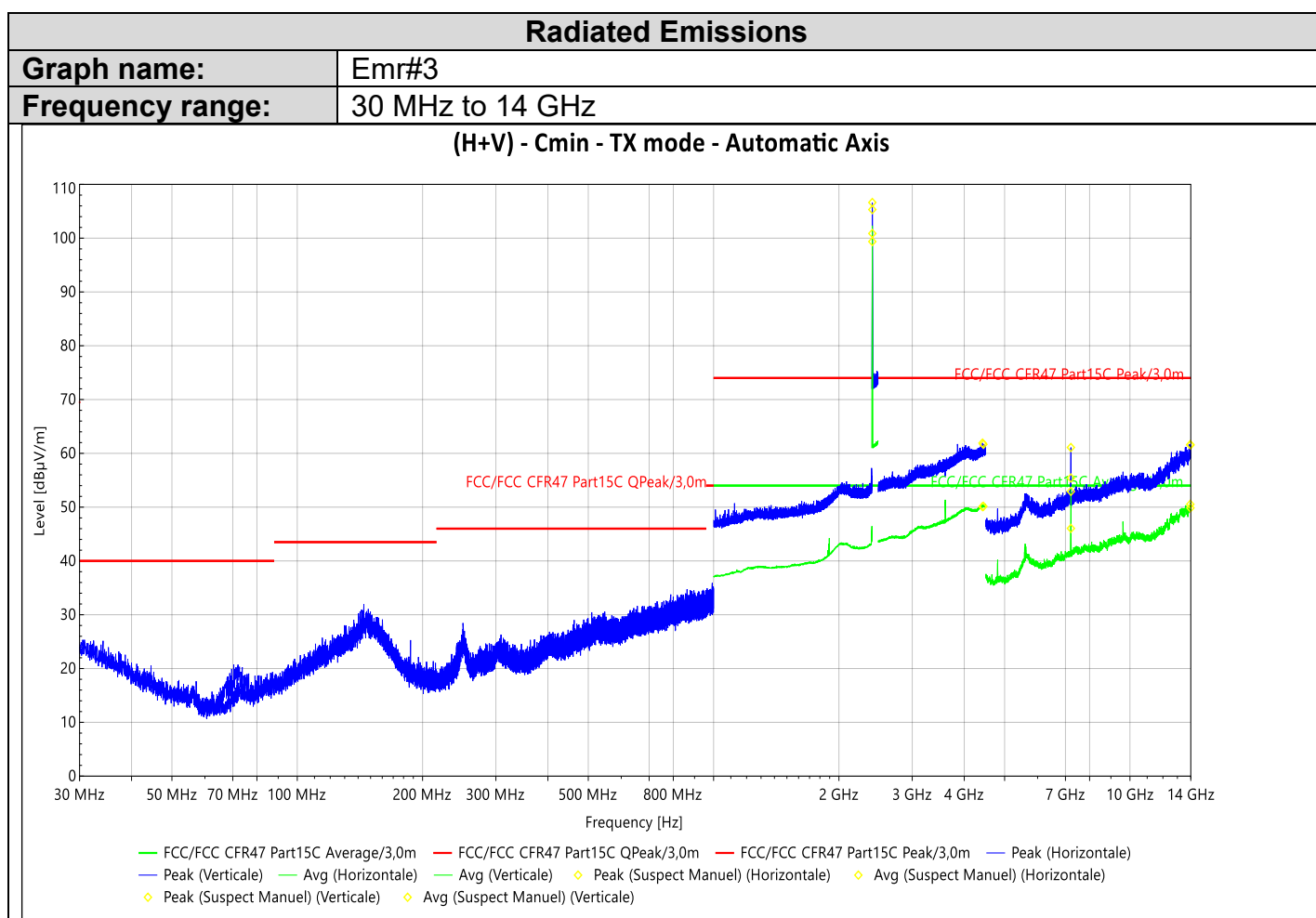
Final measurement:

No significant frequency observed

9.6.2. 30MHz to 14GHz

Graphs – Pre characterization:

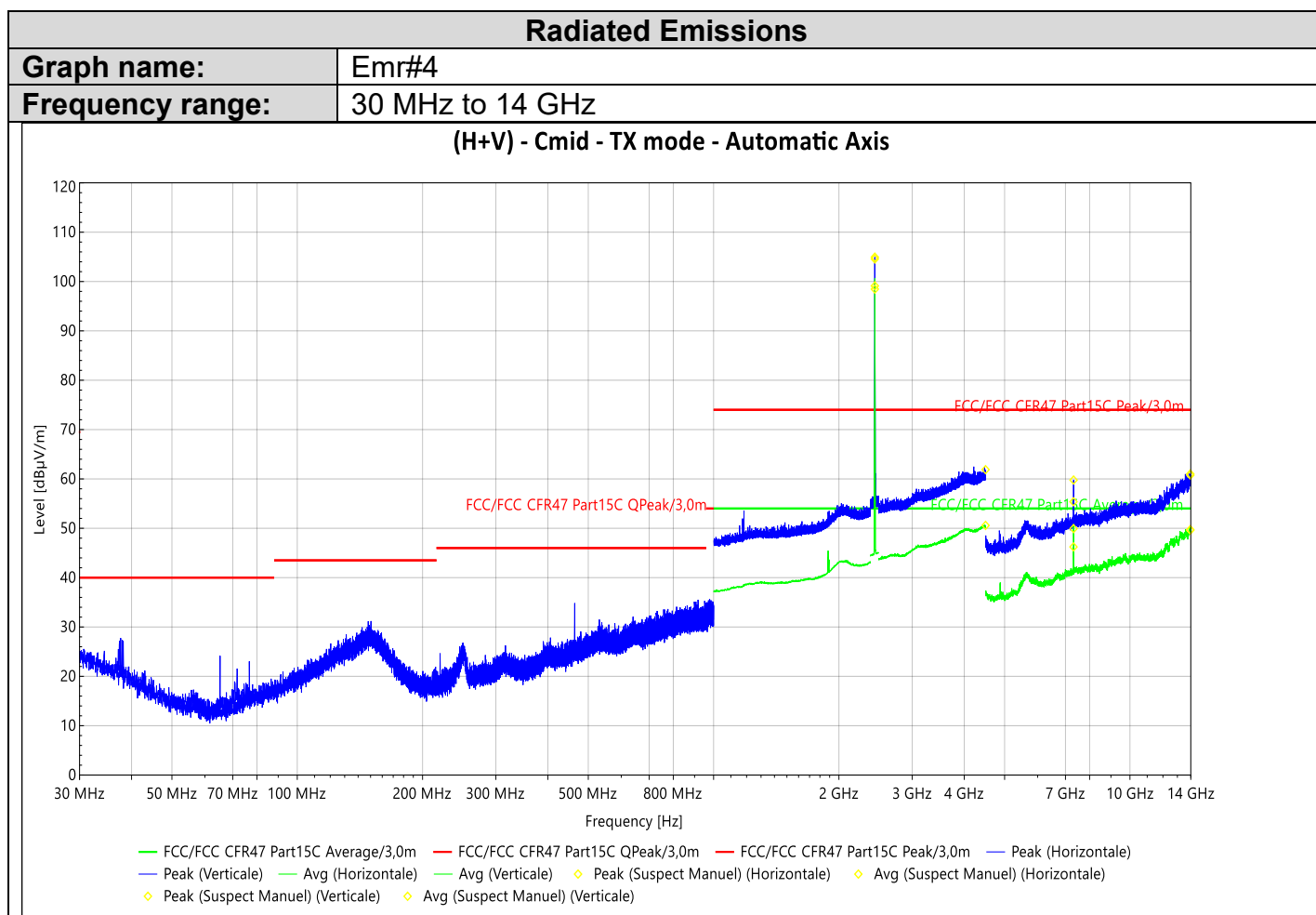
Graph identifier	Polarization	Mode	Channel	EUT position	Comments
Emr# 3	H/V	TX	Cmin	Axis XY/Z	See the following results
Emr# 4	H/V	TX	Cmid	Axis XY/Z	See the following results
Emr# 5	H/V	TX	Cmax	Axis XY/Z	See the following results



Pre-Characterization:

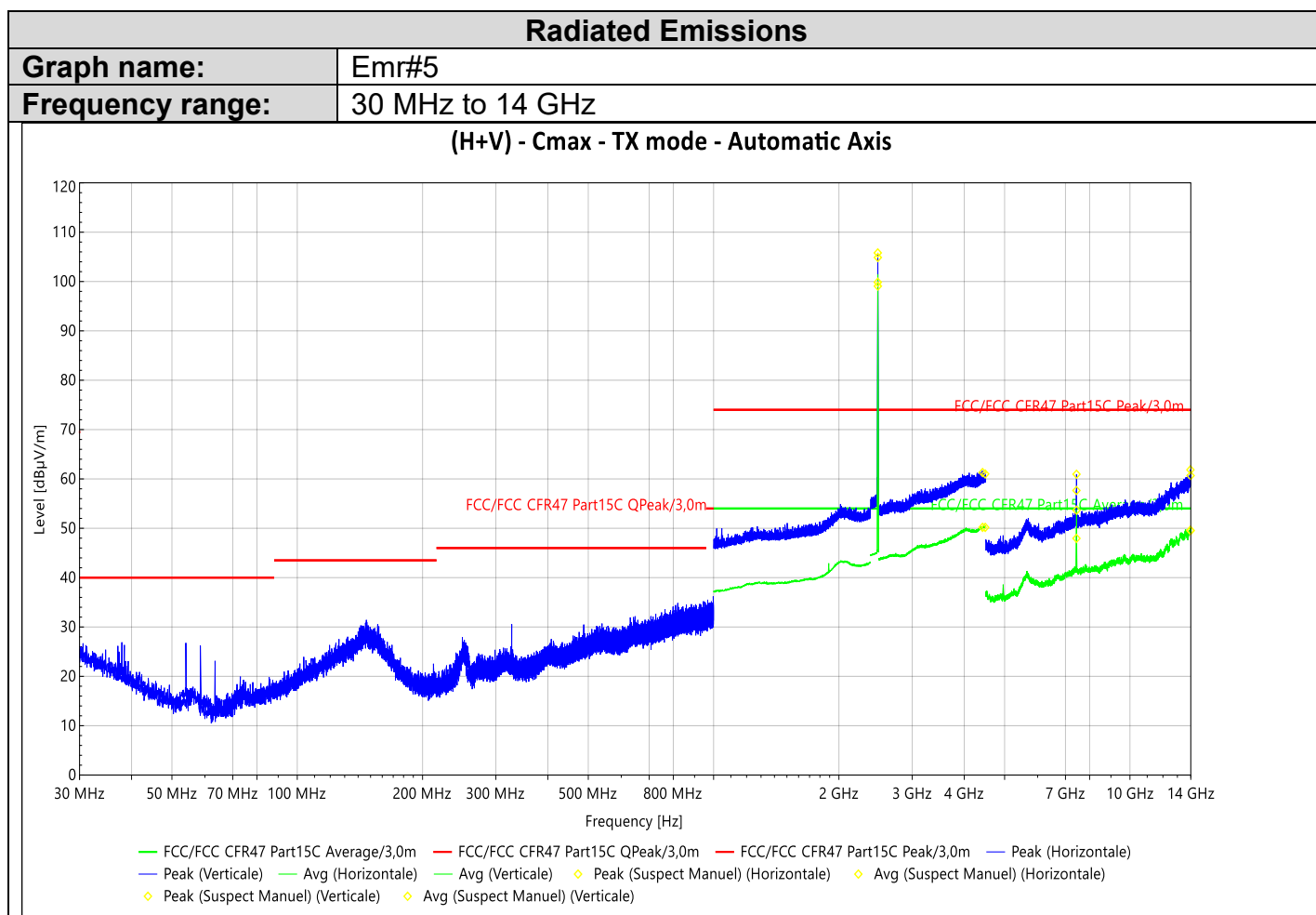
Frequency	PK Level (dBµV/m)	Lim.PK (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Angle (°)	Polar.	Correct. (dB)
2.405 GHz	106.62	/	100.87	/	99	H	37.12
4.446 GHz	61.67	74.00	50.15	54.00	19	H	43.41
7.213 GHz*	55.41	74.00	46.05	54.00	22	H	-7.31
13.962 GHz	61.64	74.00	50.53	54.00	198	H	4.01
7.213 GHz*	61.09	74.00	52.92	54.00	327	V	-7.31
13.972 GHz	61.54	74.00	49.85	54.00	0	V	4.07
4.425 GHz	61.91	74.00	50.09	54.00	283	V	43.37
2.405 GHz	/	74.00	99.36	/	87	V	37.12

* : See final result



Pre-Characterization:

Frequency	PK Level (dBµV/m)	Lim.PK (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Angle (°)	Polar.	Correct. (dB)
2.439 GHz	104.57	/	98.46	/	88	H	37.25
4.500 GHz	61.88	74.00	50.58	54.00	53	H	43.43
7.318 GHz	55.37	74.00	46.23	54.00	332	H	-7.04
13.963 GHz	60.76	74.00	49.62	54.00	41	H	4.02
7.321 GHz	59.77	74.00	49.93	54.00	332	V	-7.04
13.959 GHz	61.01	74.00	49.72	54.00	0	V	4.00
2.439 GHz	104.94	/	99.11	/	28	V	37.25



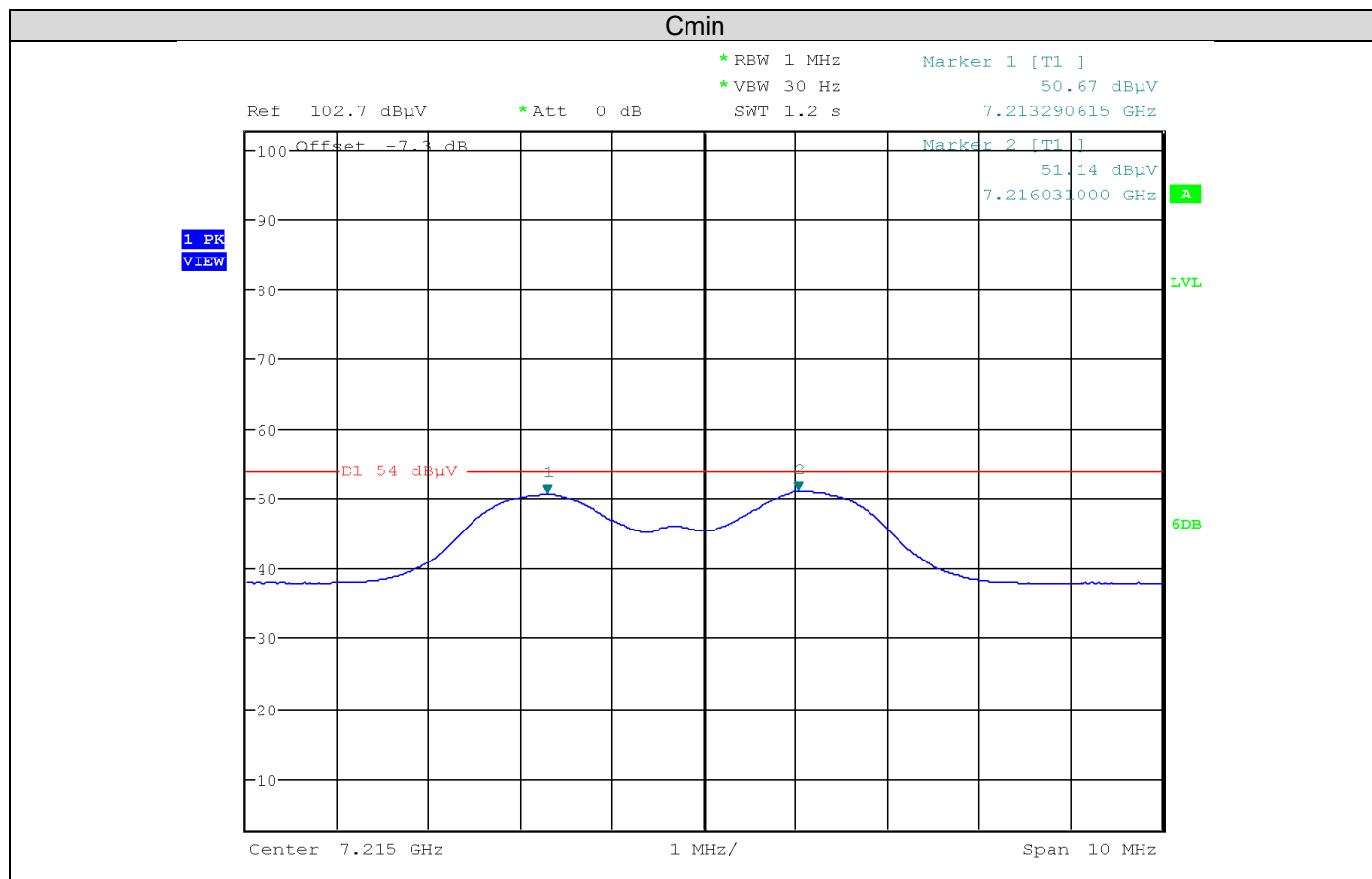
Pre-Characterization:

Frequency	PK Level (dBμV/m)	Lim.PK (dBμV/m)	Avg (dBμV/m)	Lim.Avg (dBμV/m)	Angle (°)	Polar.	Correct. (dB)
2.479 GHz	105.80	/	99.84	/	87	H	37.45
4.426 GHz	61.29	74.00	50.19	54.00	91	H	43.37
7.438 GHz*	57.66	74.00	47.95	54.00	19	H	-7.01
13.984 GHz	60.67	74.00	49.50	54.00	181	H	4.14
7.441 GHz*	60.95	74.00	53.66	54.00	340	V	-7.02
13.973 GHz	61.85	74.00	49.61	54.00	313	V	4.08
4.491 GHz	61.00	74.00	50.18	54.00	0	V	43.43
2.480 GHz	104.87	/	99.07	/	128	V	37.46

*: See final mesurement

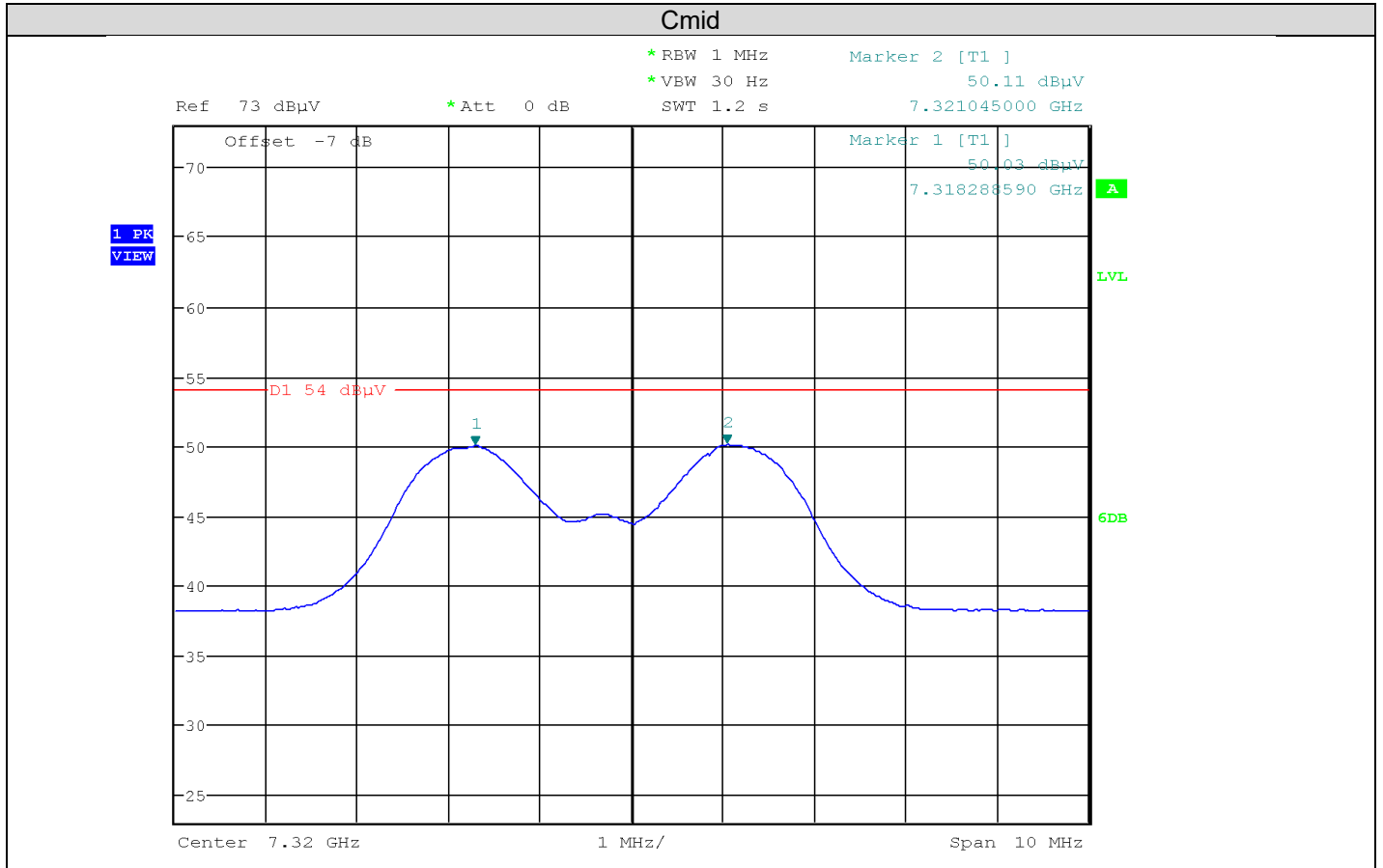
Final measurement: C63.10 ,§ 4.1.4.2.3

Worst case presented Horizontal , Vertical, and Tilt table 0° to 150° by step 30°



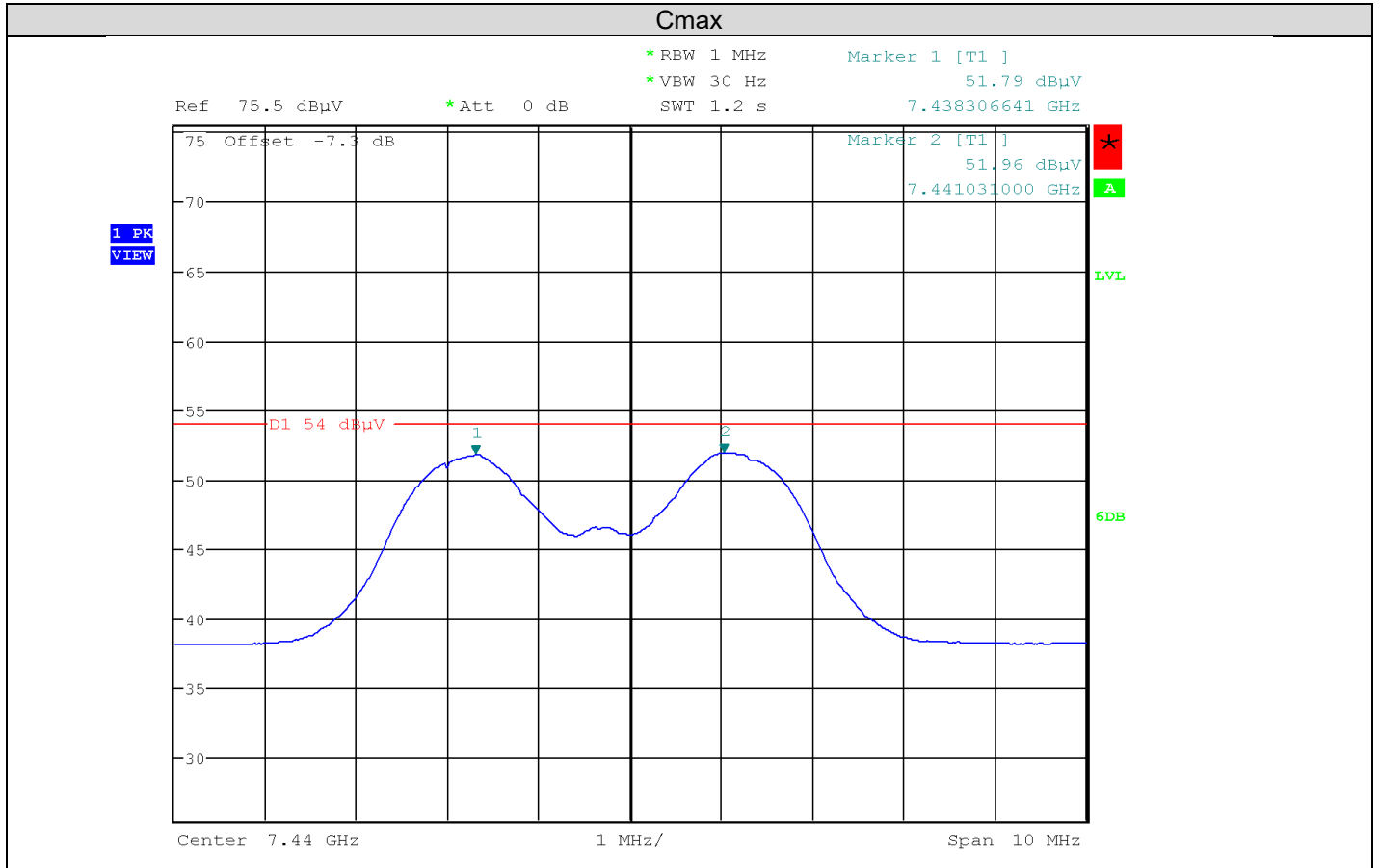


L C I E





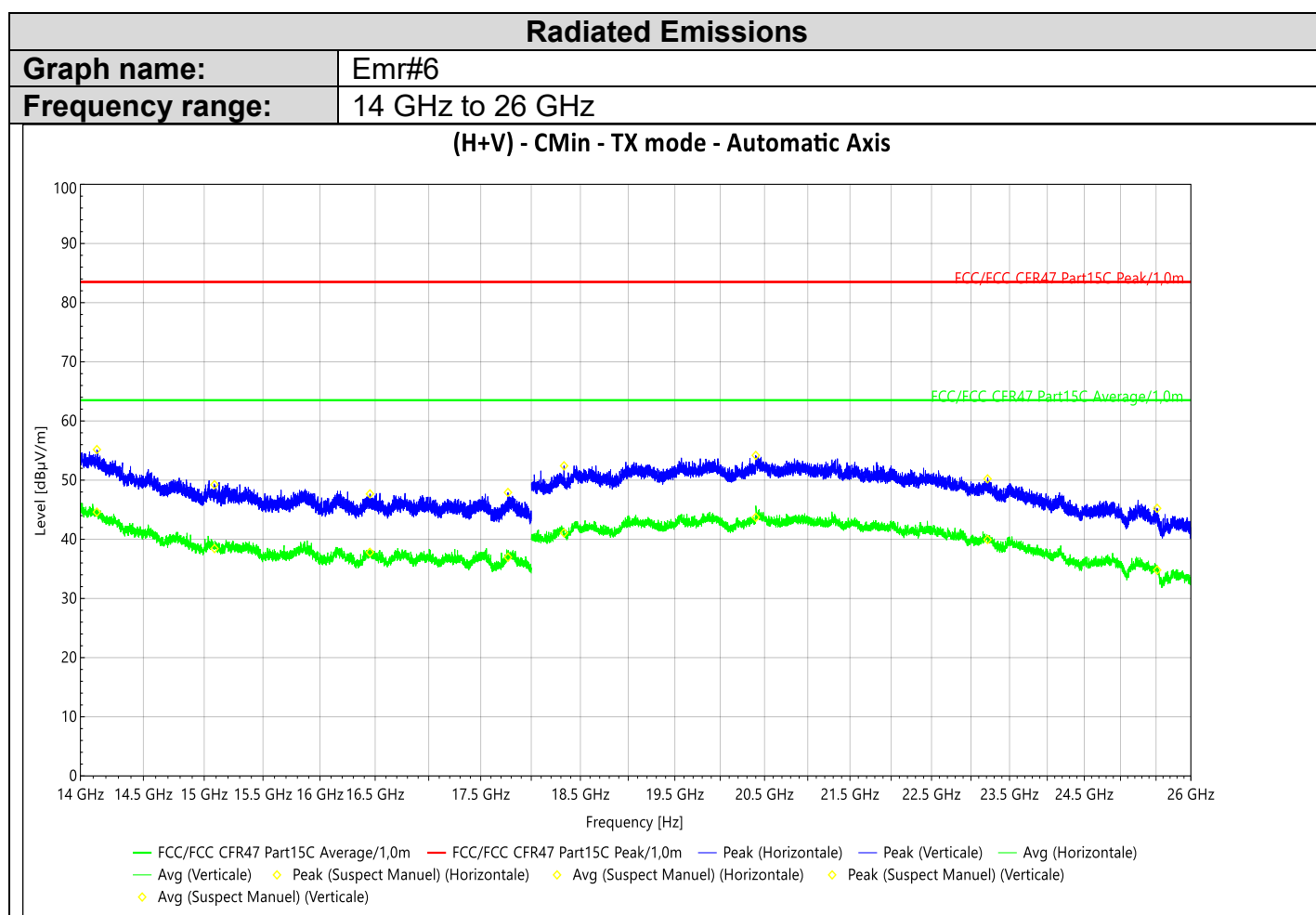
L C I E



9.6.3. 14GHz to 26GHz

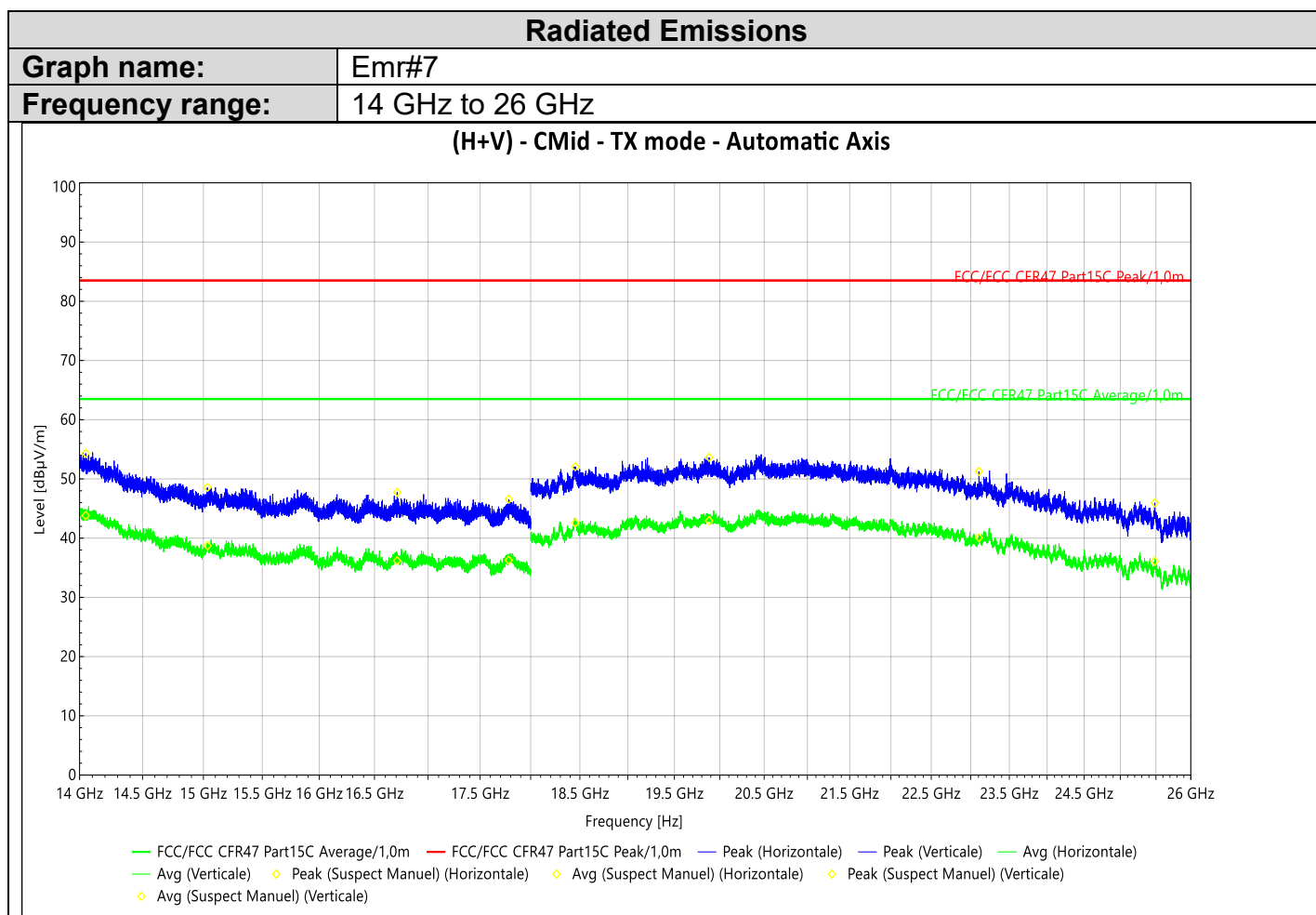
Graphs – Pre characterization:

Graph identifier	Polarization	Mode	Channel	EUT position	Comments
Emr# 6	H/V	TX	Cmin	Axis XY/Z	See the following results
Emr# 7	H/V	TX	Cmid	Axis XY/Z	See the following results
Emr# 8	H/V	TX	Cmax	Axis XY/Z	See the following results



Pre-Characterization:

Frequency	PK Level (dBµV/m)	Lim.PK (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Angle (°)	Polar.	Correct. (dB)
14.129 GHz	55.17	83.50	44.60	63.50	128	H	2.63
17.768 GHz	47.92	83.50	36.97	63.50	109	H	-4.56
18.332 GHz	52.42	83.50	41.08	63.50	302	H	-0.08
25.516 GHz	45.24	83.50	34.80	63.50	285	H	2.77
15.086 GHz	49.23	83.50	38.43	63.50	60	V	-2.36
16.452 GHz	47.68	83.50	37.80	63.50	234	V	-4.81
20.400 GHz	54.18	83.50	43.71	63.50	275	V	1.37
23.214 GHz	50.22	83.50	39.94	63.50	313	V	0.41



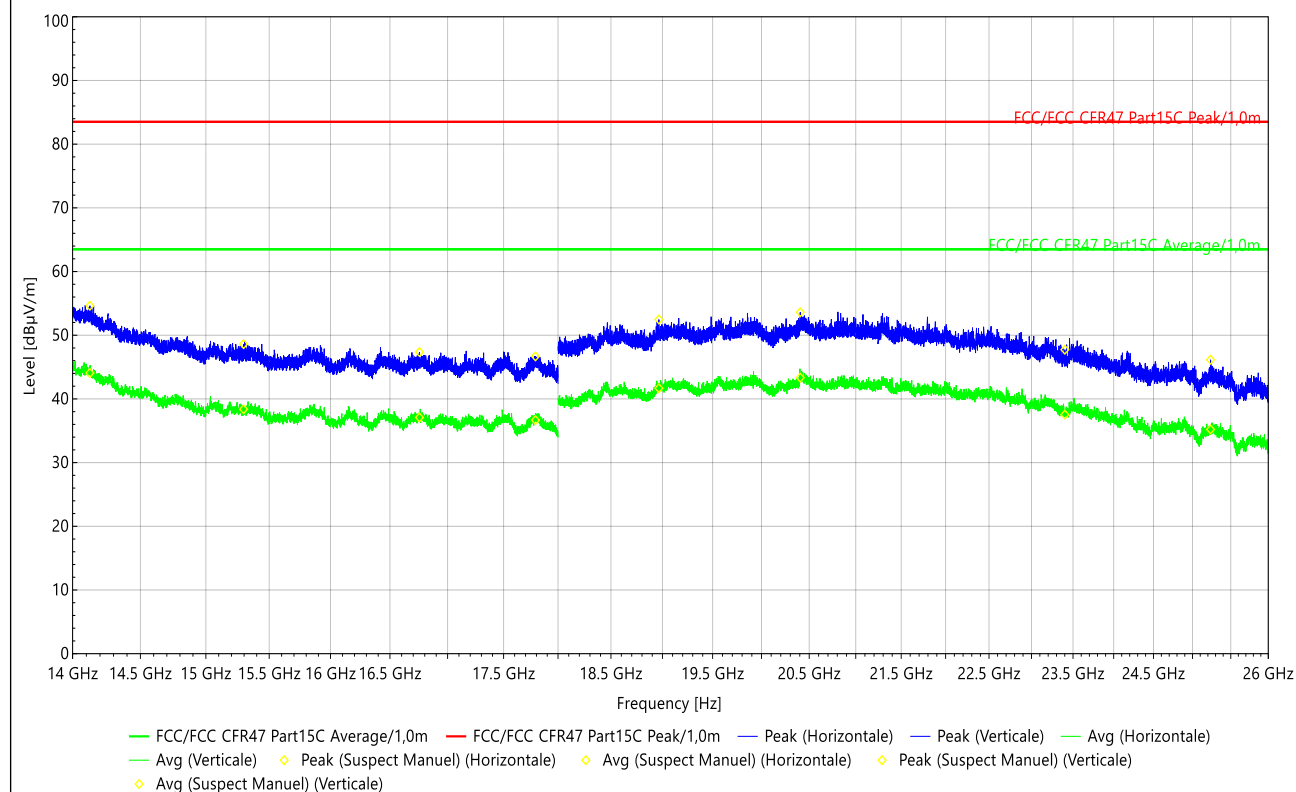
Pre-Characterization:

Frequency	PK Level (dBµV/m)	Lim.PK (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Angle (°)	Polar.	Correct. (dB)
14.048 GHz	54.32	83.50	43.82	63.50	271	H	3.34
17.781 GHz	46.57	83.50	36.28	63.50	133	H	-4.45
18.453 GHz	52.08	83.50	42.59	63.50	3	H	1.24
25.483 GHz	45.96	83.50	36.10	63.50	87	H	2.76
15.034 GHz	48.56	83.50	38.72	63.50	343	V	-2.35
16.710 GHz	47.74	83.50	36.20	63.50	30	V	-4.31
19.881 GHz	53.64	83.50	42.94	63.50	345	V	1.33
23.105 GHz	51.27	83.50	40.09	63.50	14	V	0.11

Radiated Emissions

Graph name: Emr#8
Frequency range: 14 GHz to 26 GHz

(H+V) - CMax - TX mode - Automatic Axis



Pre-Characterization:

Frequency	PK Level (dBμV/m)	Lim.PK (dBμV/m)	Avg (dBμV/m)	Lim.Avg (dBμV/m)	Angle (°)	Polar.	Correct. (dB)
14.126 GHz	54.63	83.50	44.07	63.50	5	H	2.66
17.791 GHz	46.67	83.50	36.67	63.50	258	H	-4.37
18.965 GHz	52.47	83.50	41.68	63.50	11	H	1.24
25.234 GHz	46.15	83.50	35.20	63.50	196	H	2.30
15.296 GHz	48.60	83.50	38.38	63.50	266	V	-3.81
16.754 GHz	47.36	83.50	37.09	63.50	112	V	-4.35
20.405 GHz	53.60	83.50	43.34	63.50	262	V	1.36
23.401 GHz	47.73	83.50	37.53	63.50	59	V	0.57

Final measurement:

No significant frequency observed

9.6.4. At the band edge

Unwanted emissions at the band edge

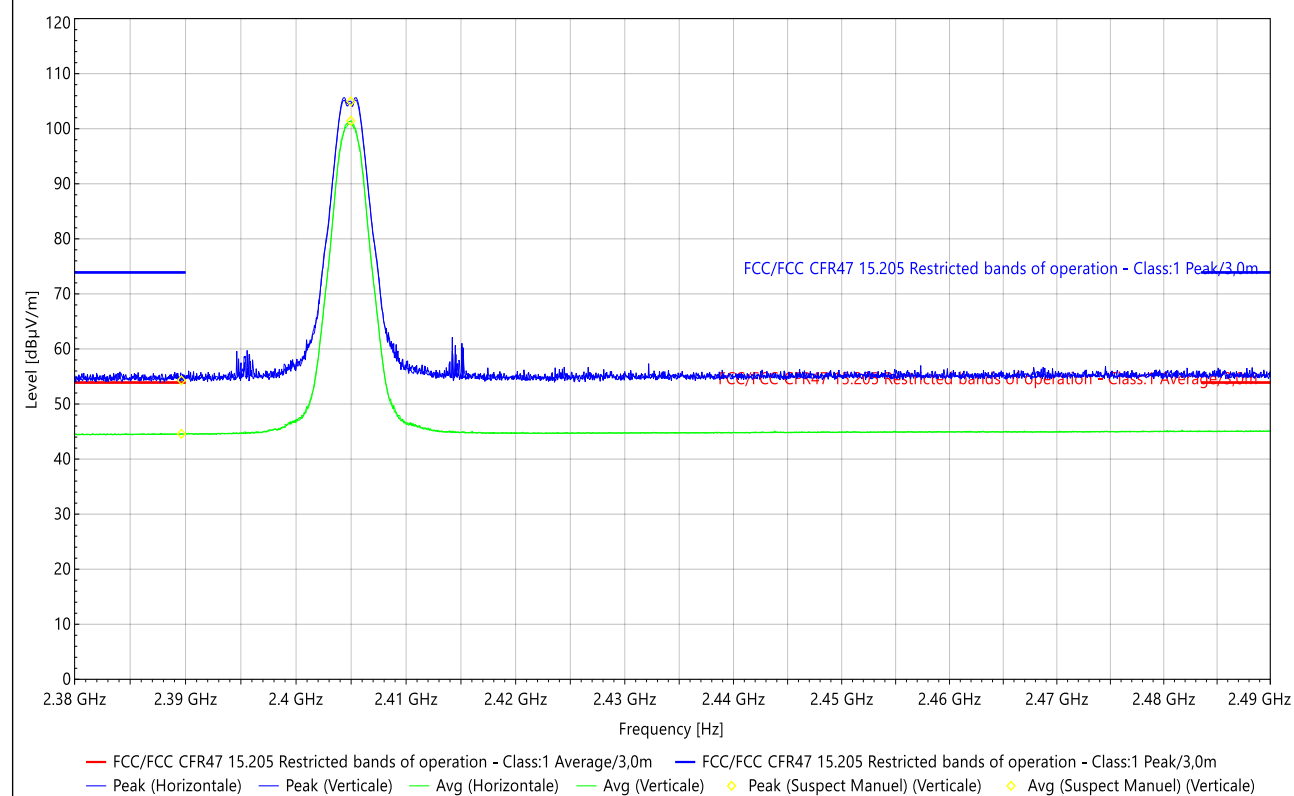
Configuration: BLE - 1Mbits/s

Radiated Emissions

Graph name: Emr#1

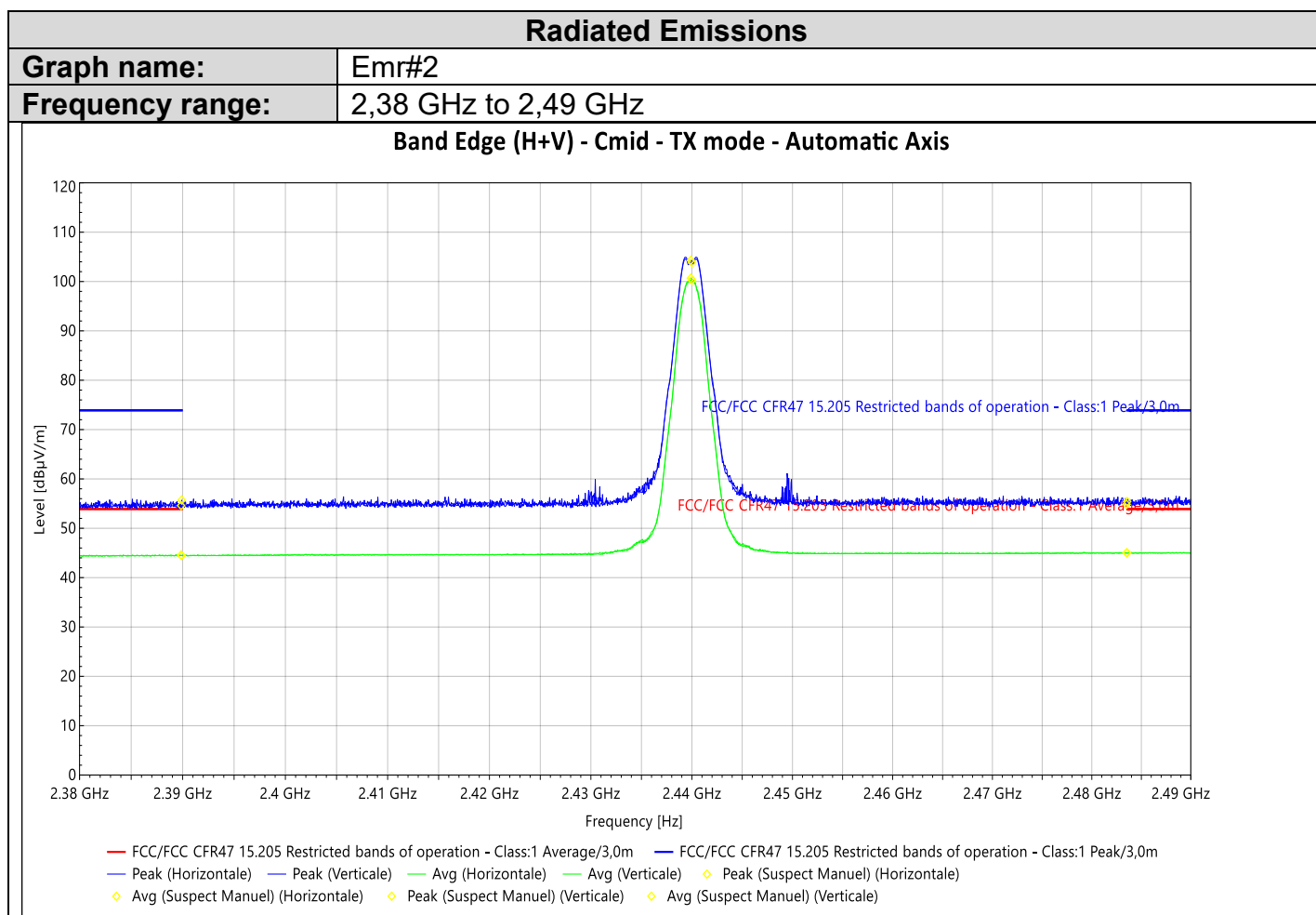
Frequency range: 2,38 GHz to 2,49 GHz

Band Edge (H+V) - Cmin - TX mode - Automatic Axis



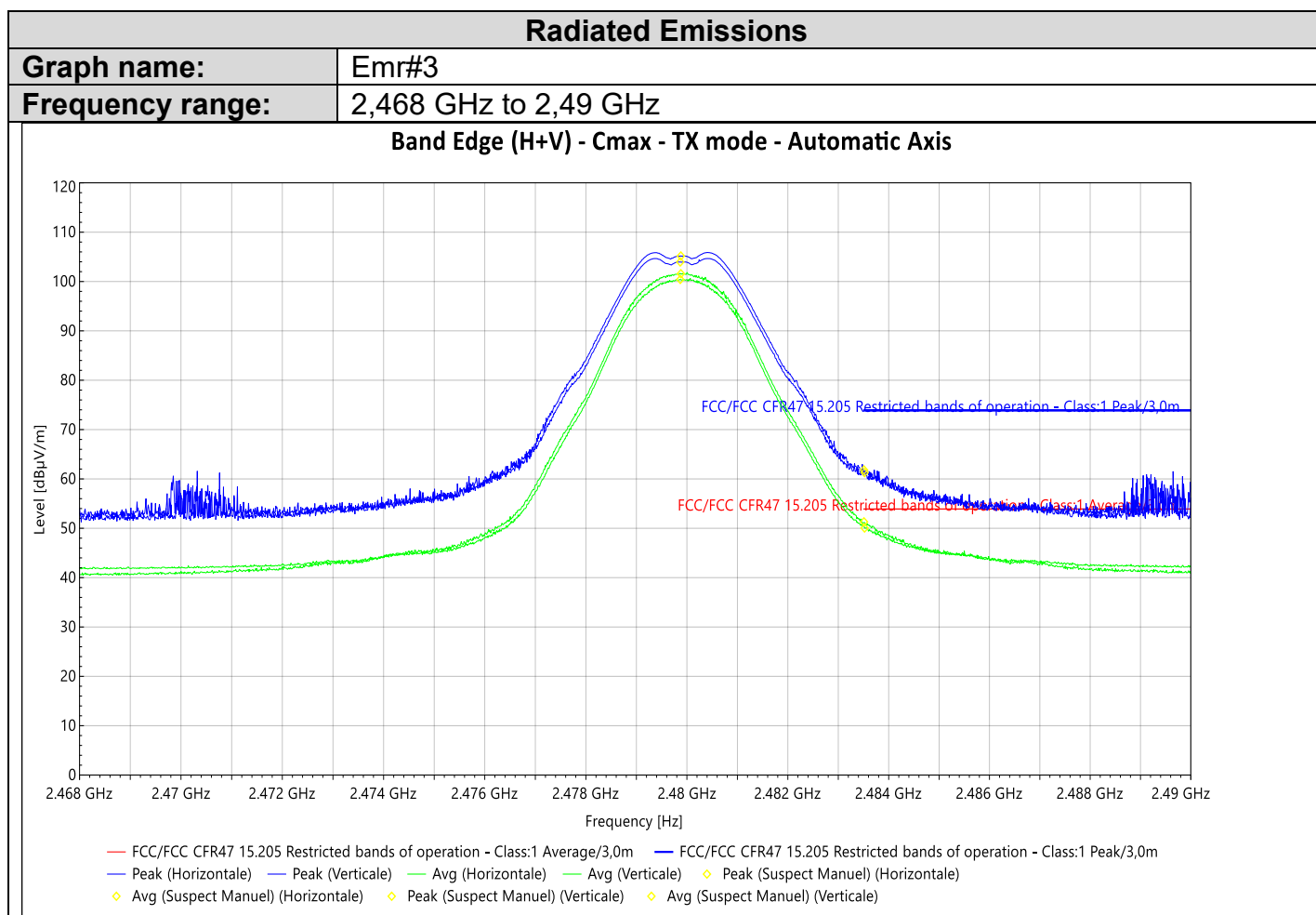
Pre-Characterization:

Frequency	PK Level (dBμV/m)	Lim.PK (dBμV/m)	Avg (dBμV/m)	Lim.Avg (dBμV/m)	Angle (°)	Polar.	Correct. (dB)
2,389625 GHz	54.31	73.90	44.60	53.90	358	V	37.01
2. 40497 GHz	104.95	/	101.43	/	25	V	37.12



Pre-Characterization:

Frequency	PK Level (dBµV/m)	Lim.PK (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Angle (°)	Polar.	Correct. (dB)
2.3899 GHz	55.72	73.90	44.47	53.90	21	H	37.01
2.440005 GHz	103.85	/	100.26	/	88	H	37.26
2.48351 GHz	54.87	73.90	45.04	53.90	143	H	37.48
2.389845 GHz	54.60	73.90	44.57	53.90	109	V	37.01
2.439895 GHz	104.28	/	100.67	/	28	V	37.26
2.483565 GHz	55.42	73.90	45.02	53.90	74	V	37.48



Pre-Characterization:

Frequency	PK Level (dBµV/m)	Lim.PK (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Angle (°)	Polar.	Correct. (dB)
2.47988 GHz	105.18	/	101.58	/	87	H	37.46
2.48351 GHz	61.82	73.90	51.31	53.90	87	H	37.48
2.479869 GHz	103.95	/	100.42	/	127	V	37.46
2.483521 GHz	61.28	73.90	50.05	53.90	25	V	37.48

9.7. CONCLUSION

Unwanted emissions in non-restricted bands measurement performed on the sample of the product **SAT AB-01**, Sn: **BC:03:A7:01:F1:97**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247** limits.

10. AC POWER LINE CONDUCTED EMISSION

10.1. TEST CONDITIONS

Date of test : October 20, 2025
 Test performed by : Majid MOURZAGH
 Relative humidity (%) : 40
 Ambient temperature (°C) : 23

10.2. TEST SETUP

Test procedure:
 ANSI C63.10 / C63.4 & FCC Part 15 subpart C

The EUT and auxiliaries are set 80cm above the ground on the non-conducting table (Table-top equipment) at 80cm from the LISN, the cable has been shorted to 1meter length. The distance between the EUT and the vertical ground plane is 40cm. 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. Interconnecting cables and equipment were moved to position that maximized emission. The EUT is powered like specified in following table, through a LISN (measure); auxiliaries are powered by another LISN.

Frequency range:	150kHz to 30MHz	
Test:	Pre-Characterization	Qualification
RBW Filter:	10kHz	9kHz
Detector:	Peak & Average	QPeak & Cispr Average
Mode:	Linear Scan	

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

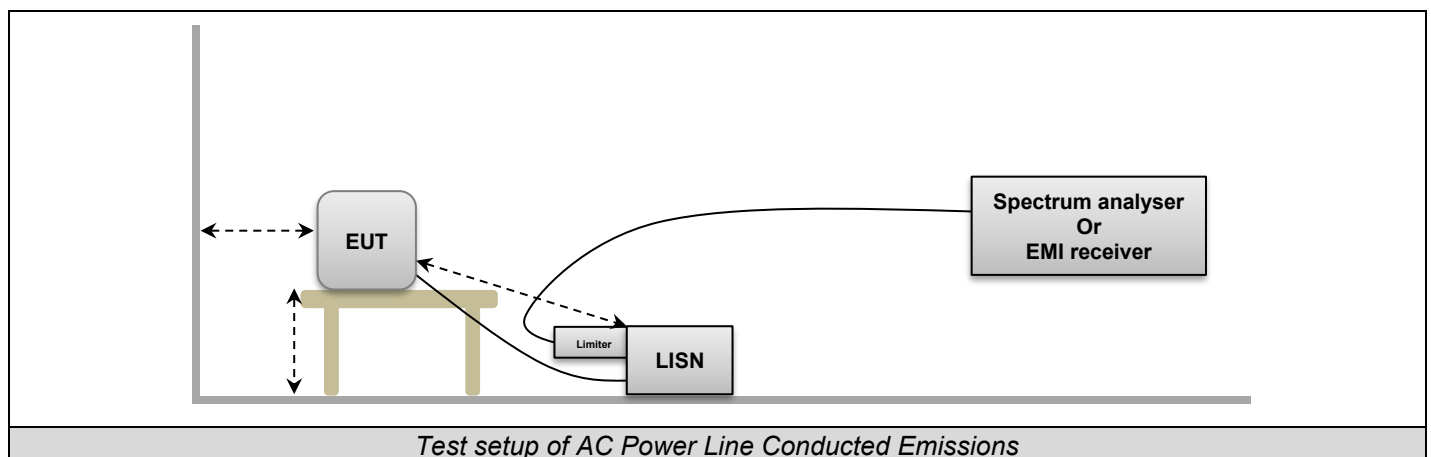




Photo of AC Power Line Conducted Emissions (Auxiliary used)

10.3. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
BAT EMC	NEXIO	v3.21.0.32	L1000115		
Cable + self	—	—	A5329578	05/24	05/26
EMC comb generator	LCIE SUD EST	—	A3169098		
LISN	ROHDE & SCHWARZ	ENV216	C2320291	08/25	08/26
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESU26	A2642035	10/25	10/27
Thermo-hygrometer	TESTO	608-H1	B4204120	05/25	05/27
Transient limiter	ROHDE & SCHWARZ	ESH3-Z2	A7122204	07/24	07/26

10.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

10.5. TEST RESULTS – RUNNING MODE N°1

Mains terminals:

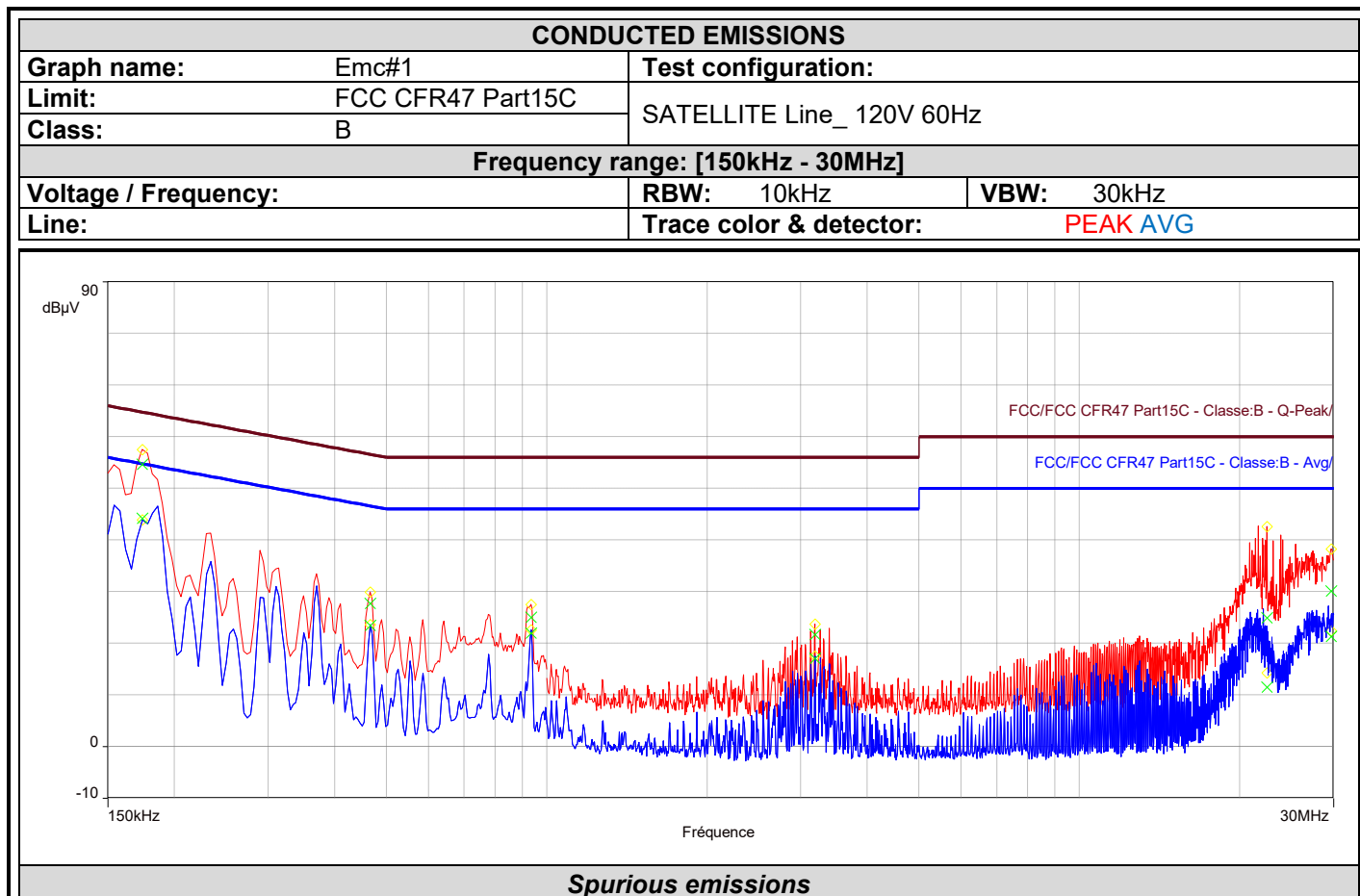
SUPPLY1

Measurements are performed on the phase (L1) and neutral (N) of the power line.

Graph identifier	Line	Comments	
Emc# 1	Phase	120VAC/60Hz	See below
Emc# 2	Neutral	120VAC/60Hz	See below
Emc# 3	Phase	240VAC/50Hz	See below
Emc# 4	Neutral	240VAC/50Hz	See below



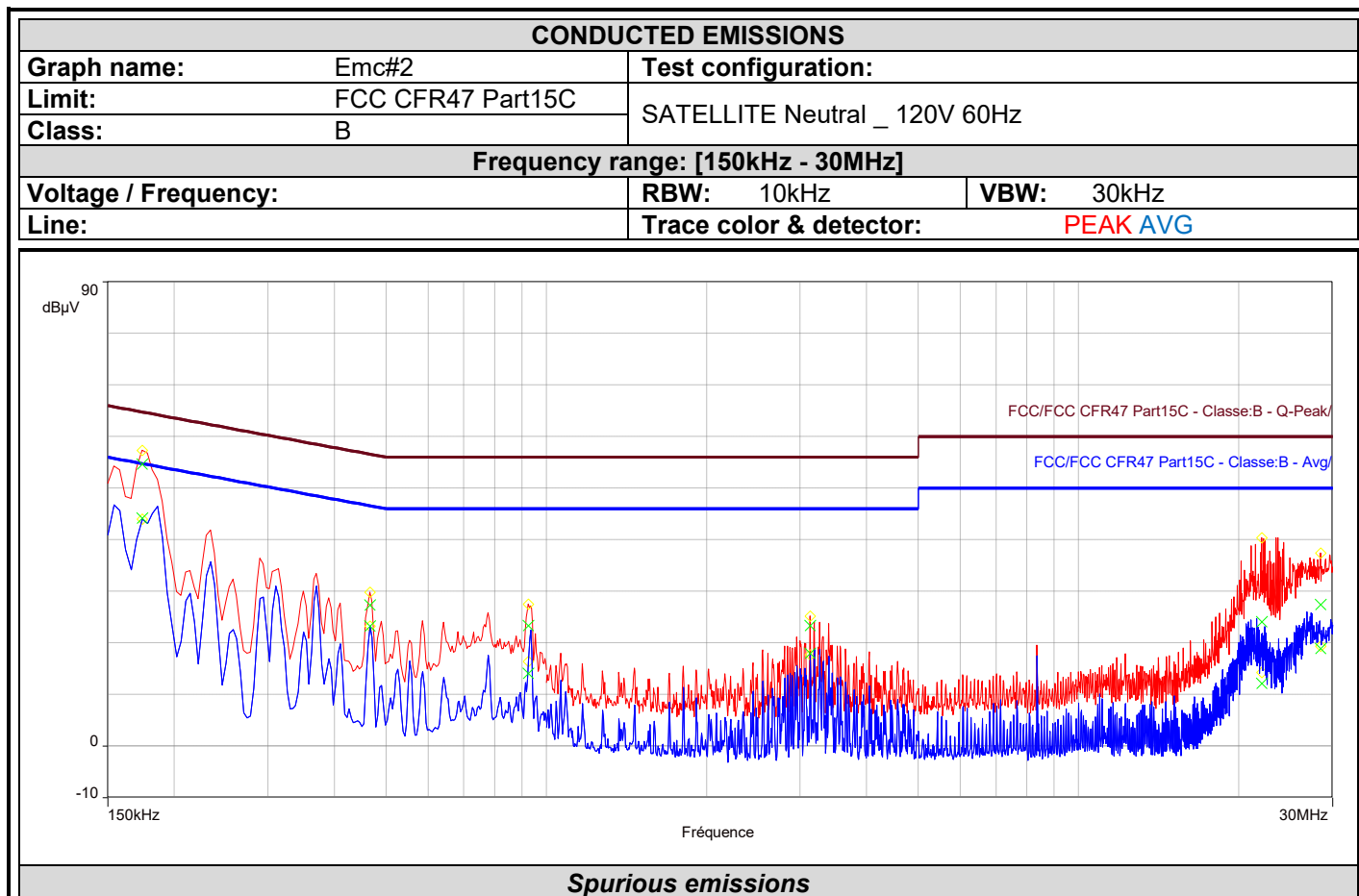
LCIE



Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.174	54.68	64.77	-10.08	44.22	54.77	-10.55
0.466	27.71	56.58	-28.88	23.43	46.58	-23.16
0.934	25.03	56.00	-30.97	21.97	46.00	-24.03
3.188	21.64	56.00	-34.36	17.07	46.00	-28.93
22.488	24.93	60.00	-35.07	11.52	50.00	-38.48
29.676	30.06	60.00	-29.94	21.29	50.00	-28.71



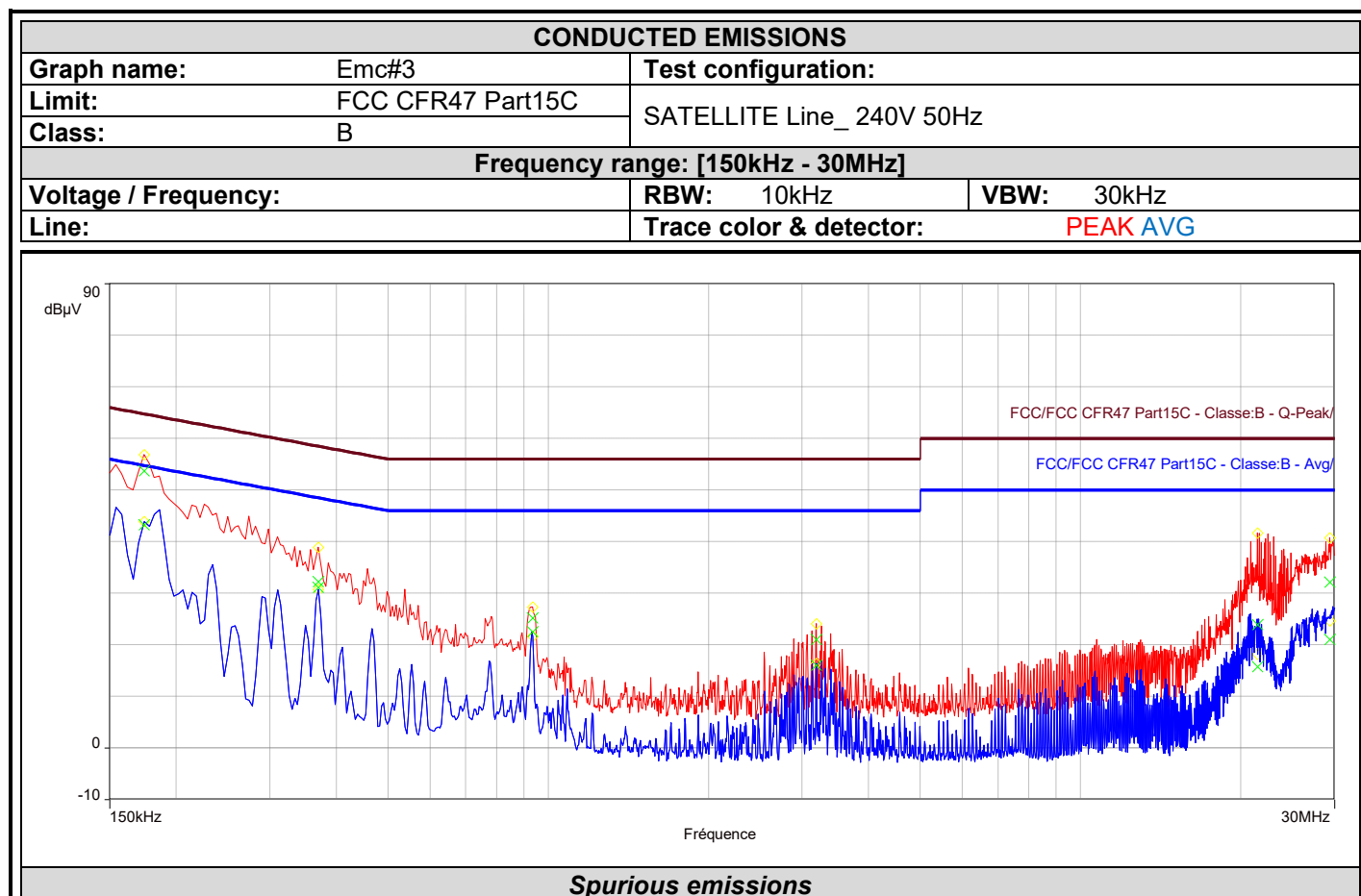
L C I E



Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.174	54.67	64.77	-10.09	44.14	54.77	-10.63
0.466	27.34	56.58	-29.24	23.22	46.58	-23.36
0.926	23.30	56.00	-32.70	14.07	46.00	-31.93
3.132	23.32	56.00	-32.68	17.97	46.00	-28.03
22.084	24.05	60.00	-35.95	12.10	50.00	-37.90
28.492	27.46	60.00	-32.54	18.88	50.00	-31.12



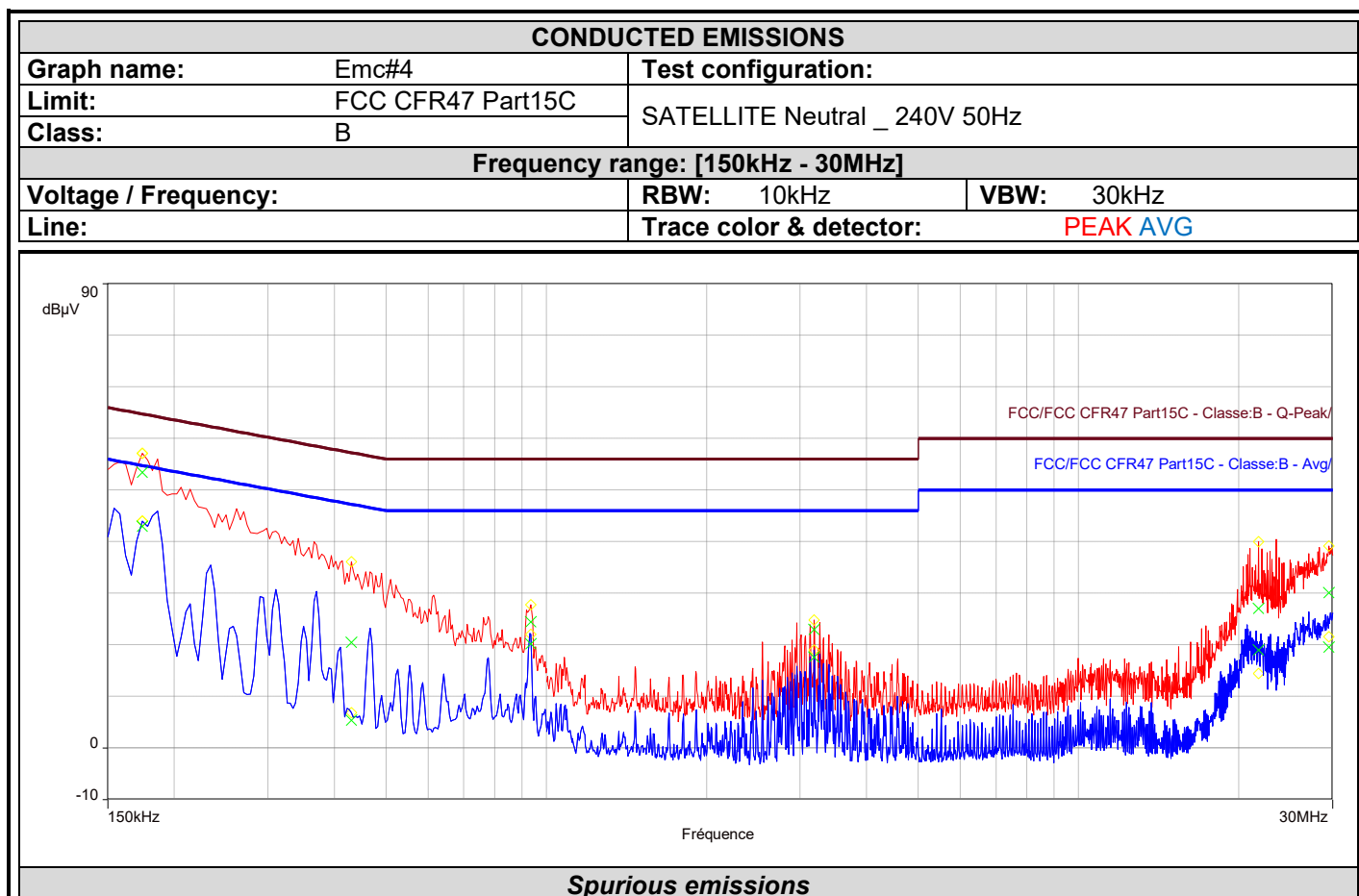
L C I E



Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.174	53.72	64.77	-11.04	43.26	54.77	-11.51
0.370	32.21	58.50	-26.29	31.10	48.50	-17.40
0.934	25.22	56.00	-30.78	22.49	46.00	-23.51
3.188	21.06	56.00	-34.94	16.04	46.00	-29.96
21.496	23.88	60.00	-36.12	15.79	50.00	-34.21
29.392	32.16	60.00	-27.84	21.06	50.00	-28.94



L C I E



Frequency (MHz)	QPeak (dBμV)	Lim.QPeak (dBμV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBμV)	Lim.CISPR.AVG (dBμV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.174	53.45	64.77	-11.32	42.97	54.77	-11.80
0.430	20.48	57.25	-36.78	5.38	47.25	-41.87
0.934	24.46	56.00	-31.54	20.17	46.00	-25.83
3.184	22.95	56.00	-33.05	17.61	46.00	-28.39
21.780	27.03	60.00	-32.97	18.97	50.00	-31.03
29.520	30.09	60.00	-29.91	19.50	50.00	-30.50

10.6. CONCLUSION

The sample of the equipment **SAT AB-01**, Sn : **BC:03:A7:01:F1:97**, tested in the configuration presented in this test report **satisfies** to requirements of the product family standard applied (See §Test Program) for conducted emissions.



11. UNCERTAINTIES CHART

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

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.



----- **END OF REPORT** -----