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TEST REPORT

N°: 172319-764277-A

Version : 02

Subject

Radio spectrum matters
tests according to standards:
47 CFR Part 15.247

Issued to

Technicolor Connected Home USA, LLC
5030 Sugarloaf Parkway, Building 6
Lawrenceville – GA 30044
USA

Apparatus under test

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

IP Set-Top Box
Technicolor
Technicolor
UIW4059MIL
LAB3-V0 nr.030
G95UIW4059

Conclusion

See Test Program chapter

Test date

April 8, 2021 to April 19, 2021

Test location

Moirans

Test Site

6500A-1 & 6500A-3

Registration Number

197516

Designation Number

FR0008

Sample receipt date

April 6, 2021

Composition of document

54 pages

Document issued on

June 8, 2021

Written by :
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Tests operator



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PUBLICATION HISTORY

Version	Date	Author	Modification
01	June 8, 2021	Armand MAHOUNGOU	Creation of the document
02	June 8, 2021	Armand MAHOUNGOU	Device internal picture removing

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
- KDB 558074 D01 DTS Meas Guidance v05r02
- ANSI C63.10-2013

Radio requirement:

Clause (47CFR Part 15.247) Test Description	Test result - Comments
Occupied Bandwidth	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
6dB Bandwidth	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
Duty Cycle	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
Maximum Conducted Output Power	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
Power Spectral Density	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
Conducted Spurious Emission at the Band Edge	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
Unwanted Emissions into Non-Restricted Frequency Bands	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
AC Power Line Conducted Emission	☒ PASS ☐ FAIL ☐ NA(2) ☐ NP(1)
Unwanted Emissions into Restricted Frequency Bands	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
Receiver Radiated emissions	☒ PASS ☐ FAIL ☐ NA ☐ NP(1)
This table is a summary of test report, see conclusion of each clause of this test report for detail.	

(1): Limited program

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

PASS: EUT complies with standard's requirement

FAIL: EUT does not comply with standard's requirement

NA: Not Applicable

NP: Test Not Performed

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

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):
Technicolor UIW4059MIL

Serial Number: LAB3-V0 nr.030



Equipment Under Test



Equipment Under Test

Power supply:

Name	Type	Rating	Reference / Sn	Comments
Supply1	☒ AC ☐ DC ☐ Battery	120-240V;50-60Hz	-	-

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Mains power supply cable	1.2	☒	☐	☐	-
2	HDMI cable	1.5	☒	☒	☐	-
3	Ethernet cable	1.5	☒	☒	☐	-

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop computer	-	-	Use to set the EUT

Equipment information:

Bluetooth LE Type:	☒ BLE	☐ v4.0	☐ v4.1	☒ v4.2
Frequency band:	[2400 – 2483.5] MHz			
Number of Channel:	40			
Spacing channel:	2MHz			
Channel bandwidth:	1MHz			
Antenna Type:	☒ Integral	☐ External	☐ Dedicated	
Antenna connector:	☒ Yes	☐ No	☐ Temporary for test	
Transmit chains:	1			
	Single antenna			
Receiver chains	1			
Type of equipment:	☒ Stand-alone	☐ Plug-in	☐ Combined	
Equipment arrangement:	☒ Tabletop	☐ Floor-standing	☐ Multiple orientations	
Ad-Hoc mode:	☒ Yes		☐ No	
Duty cycle:	☒ Continuous duty	☐ Intermittent duty	☐ 100% duty	
Equipment type:	☒ Production model		☐ Pre-production model	
Operating temperature range:	Tmin:	☐ -20°C	☐ 0°C	☒ 5°C
	Tnom:	20°C		
	Tmax:	☐ 35°C	☐ 55°C	☒ 45°C
Type of power source:	☒ AC power supply	☒ DC power supply	☐ Battery	
Operating voltage range:	Vnom:	☒ 120V/60Hz	☒ 12 VDC +/-5%	
		☒ 240V/50Hz	☐ X VDC	

Antenna Characteristic			
Antenna assembly	Gain (dBi)	Frequency Band (MHz)	Impedance(Ω)
1	2.9	2400 – 2483.5	50

Hardware information		
Software (if applicable):	V. :	UIW4059MIL_HSW 0.7



CHANNEL PLAN			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
Cmin: 0	2402	Cmid: 20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	Cmax: 39	2480

DATA RATE		
Data Rate (Mbps)	Modulation Type	Worst Case Modulation
1	GFSK	☒

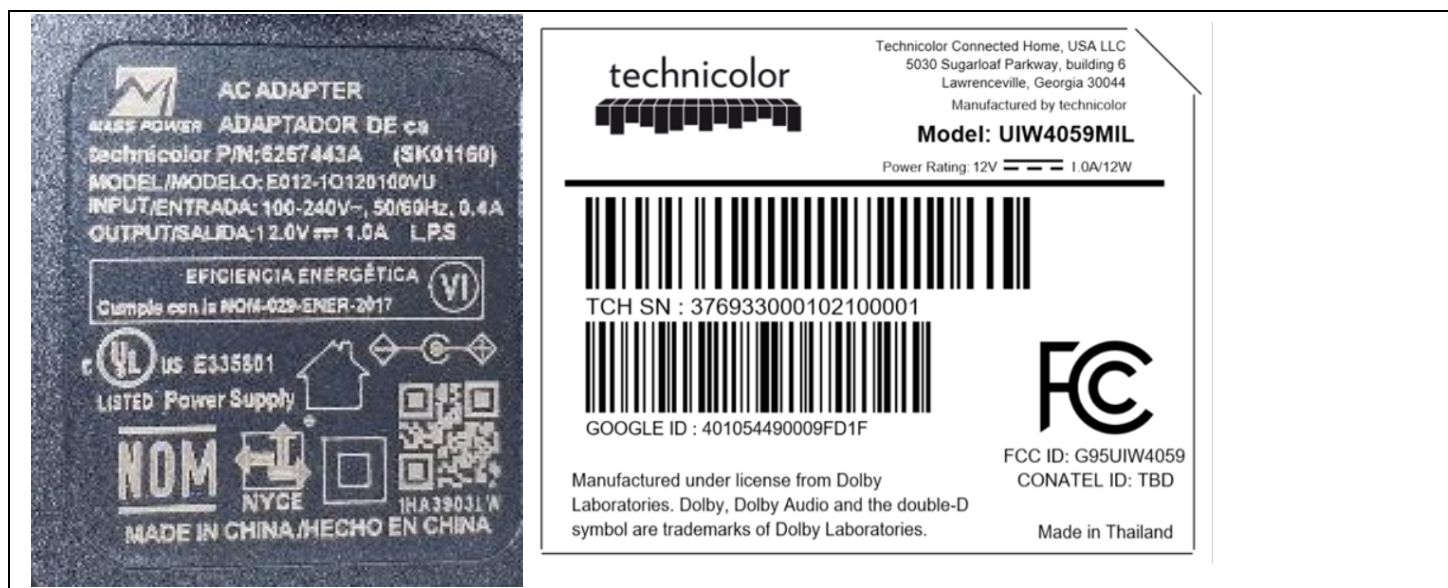
2.2. RUNNING MODE

Test mode	Description of test mode
Test mode 1	Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
Test	Running mode
Occupied Bandwidth	☒ Test mode 1 (1) ☐ Alternative test mode()
6dB Bandwidth	☒ Test mode 1 (1) ☐ Alternative test mode()
Duty Cycle	☒ Test mode 1 (1) ☐ Alternative test mode()
Maximum Conducted Output Power	☒ Test mode 1 (1) ☐ Alternative test mode()
Power Spectral Density	☒ Test mode 1 (1) ☐ Alternative test mode()
Conducted Spurious Emission at the Band Edge	☒ Test mode 1 (1) ☐ Alternative test mode()
Unwanted Emissions into Non-Restricted Frequency Bands	☒ Test mode 1 (1) ☐ Alternative test mode()
AC Power Line Conducted Emission	☒ Test mode 1 (1) ☐ Alternative test mode()
Unwanted Emissions into Restricted Frequency Bands	☒ Test mode 1 (1) ☐ Alternative test mode()

(1) Following commands with the specific test software "Teraterm" are used to set the product:

- a. – See document "UIW4059MIL_BT control_V1.docx"(provided by customer) for the command used during test.

2.3. EQUIPMENT LABELLING



2.4. EQUIPMENT MODIFICATION

☒ None ☐ Modification:



2.5. FIELD STRENGTH CALCULATION

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

$$FS = RA + AF + CF - AG$$

Where

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

Assume a receiver reading of 52.5dB 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.

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

2.6. CALIBRATION DATE

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

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : April 8, 2021
Ambient temperature : 26°C
Relative humidity : 45%

3.2. TEST SETUP

- The Equipment under Test is installed:

- ☒ On a table
☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

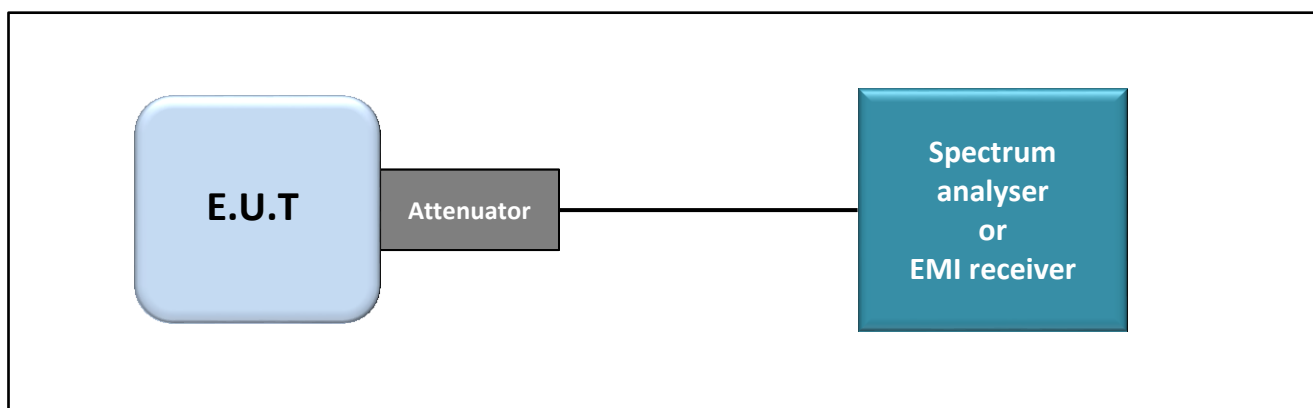
- ☒ Conducted Method
☐ Radiated Method

- Test Procedure:

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

Measurement Procedure:

- RBW shall be in the range of 1% to 5% of the anticipated occupied bandwidth
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW
- SPAN = Capture all products of the modulation process
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- OBW 99% function of spectrum analyzer used



Test set up of Occupied Bandwidth



Photograph for Occupied bandwidth

3.3. **LIMIT**

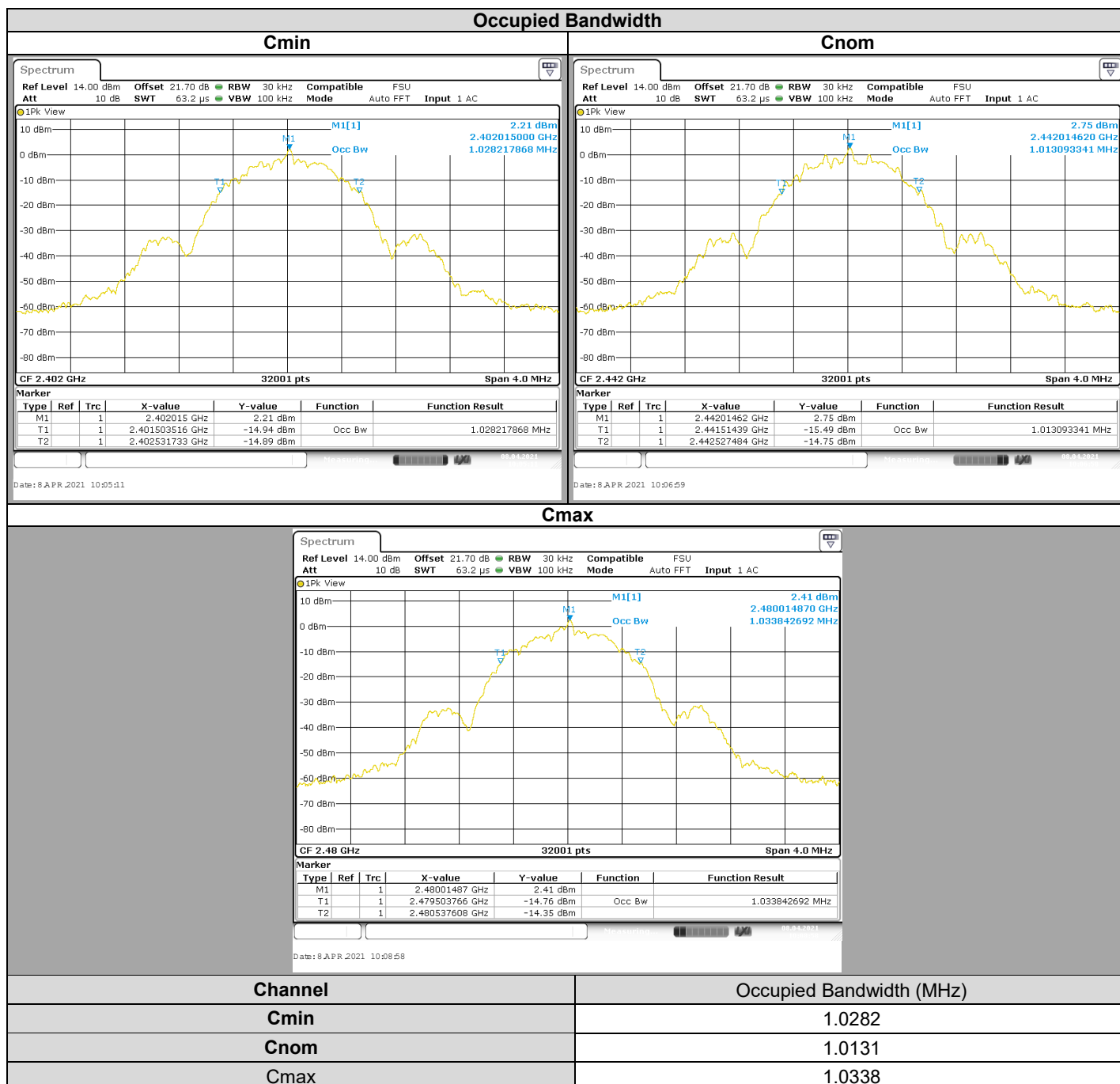
None

3.4. **TEST EQUIPMENT LIST**

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642026	2019/07	2021/07
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7040079	See Multimeter	See Multimeter
Cable + Attenuateur 20dB	PASTERNAK	PE350-150CM	A5329973	2020/08	2021/08
Load 50 ohms	TELEGARTNER	-	A7150105	2019/04	2021/04
Load 50 ohms	TELEGARTNER	-	A7150104	2019/04	2021/04

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

3.5. RESULTS



3.6. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **Technicolor UIW4059MIL**, SN: **LAB3-V0 nr.030**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

4. 6dB EMISSION BANDWIDTH

4.1. TEST CONDITIONS

Test performed by : Armand MAHOUGOU
Date of test : April 8, 2021
Ambient temperature : 26°C
Relative humidity : 45%

4.2. TEST SETUP

- The Equipment under Test is installed:

- ☒ On a table
☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

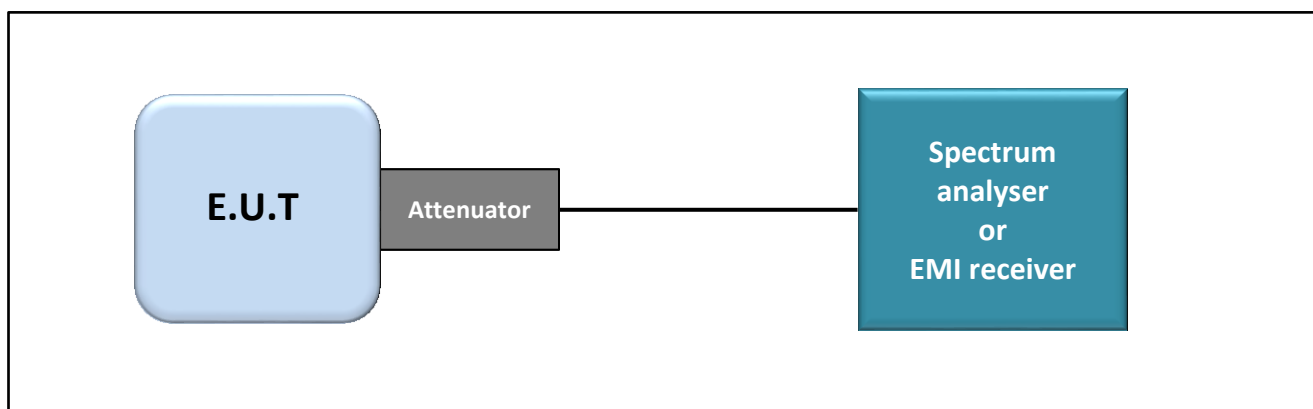
- ☒ Conducted Method
☐ Radiated Method

- Test Procedure:

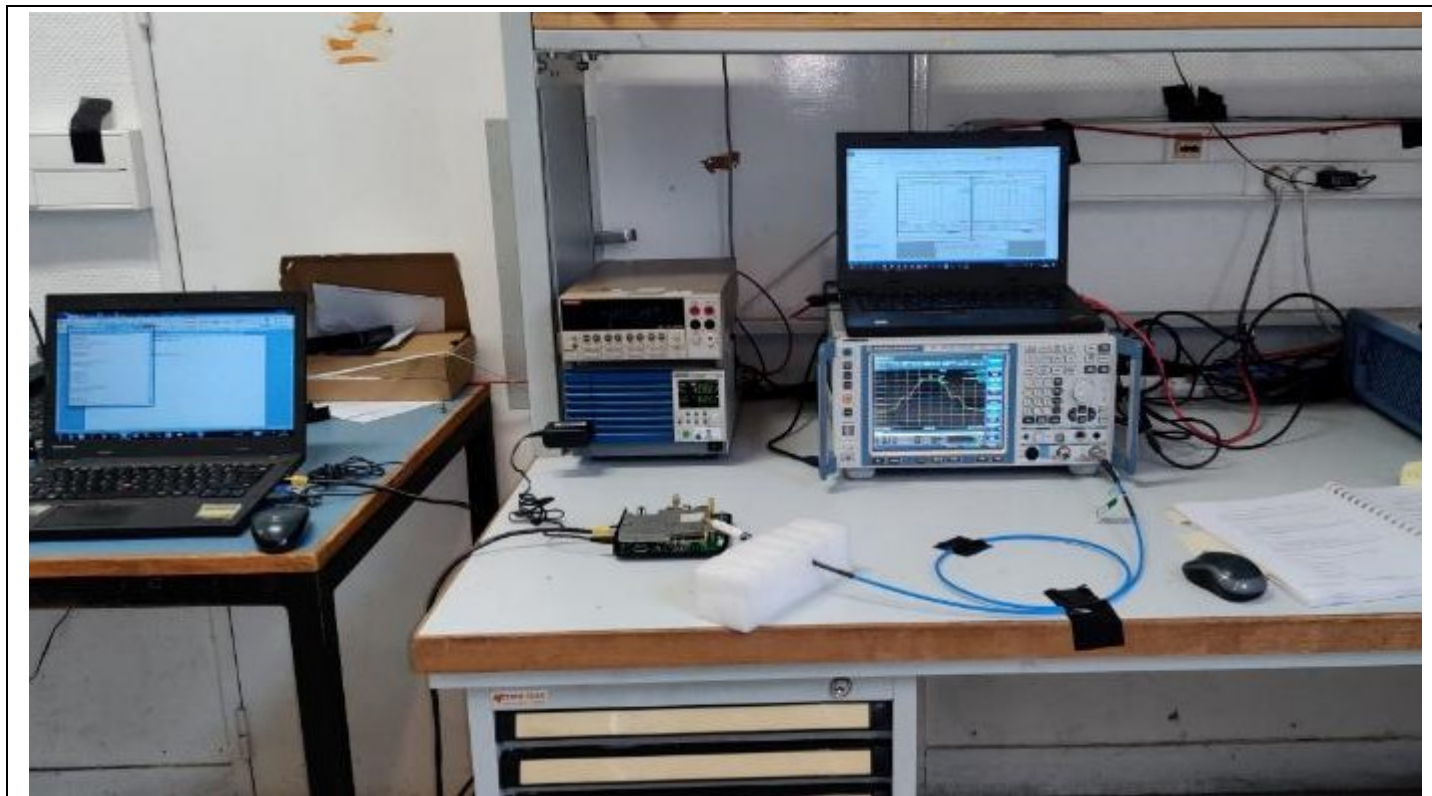
- ☒ ANSI C63.10 § 11.8.1
☐ ANSI C63.10 § 11.8.2

Measurement Procedure:

1. Set resolution bandwidth (RBW) = 100kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. 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.



Test set up of 6dB Emission Bandwidth



Photograph for 6dB emission bandwidth

4.3. LIMIT

Frequency range	The 6dB bandwidth Limit
2400MHz to 2483.5MHz	≤500kHz

4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642026	2019/07	2021/07
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7040079	See Multimeter	See Multimeter
Cable + Attenuateur 20dB	PASTERNAK	PE350-150CM	A5329973	2020/08	2021/08
Load 50 ohms	TELEGARTNER	-	A7150105	2019/04	2021/04
Load 50 ohms	TELEGARTNER	-	A7150104	2019/04	2021/04

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

4.5. RESULTS



4.6. CONCLUSION

6dB Emission Bandwidth measurement performed on the sample of the product **Technicolor UIW4059MIL**, SN: **LAB3-V0 nr.030**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

5. DUTY CYCLE

5.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : April 8, 2021
Ambient temperature : 26°C
Relative humidity : 45%

5.2. TEST SETUP

- The Equipment under Test is installed:

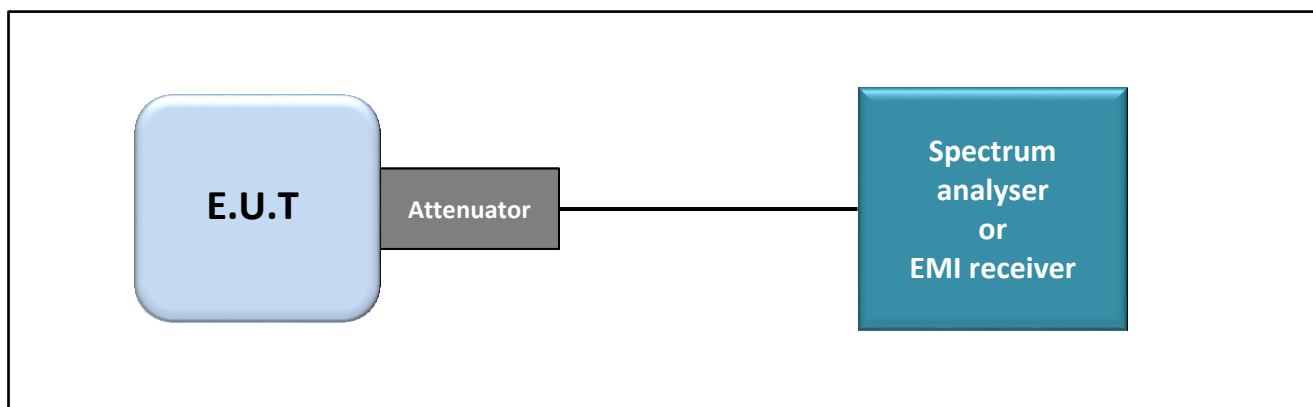
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ ANSI C63.10 § 11.6



Test set up of Duty Cycle



Photograph for Duty Cycle

5.3. LIMIT

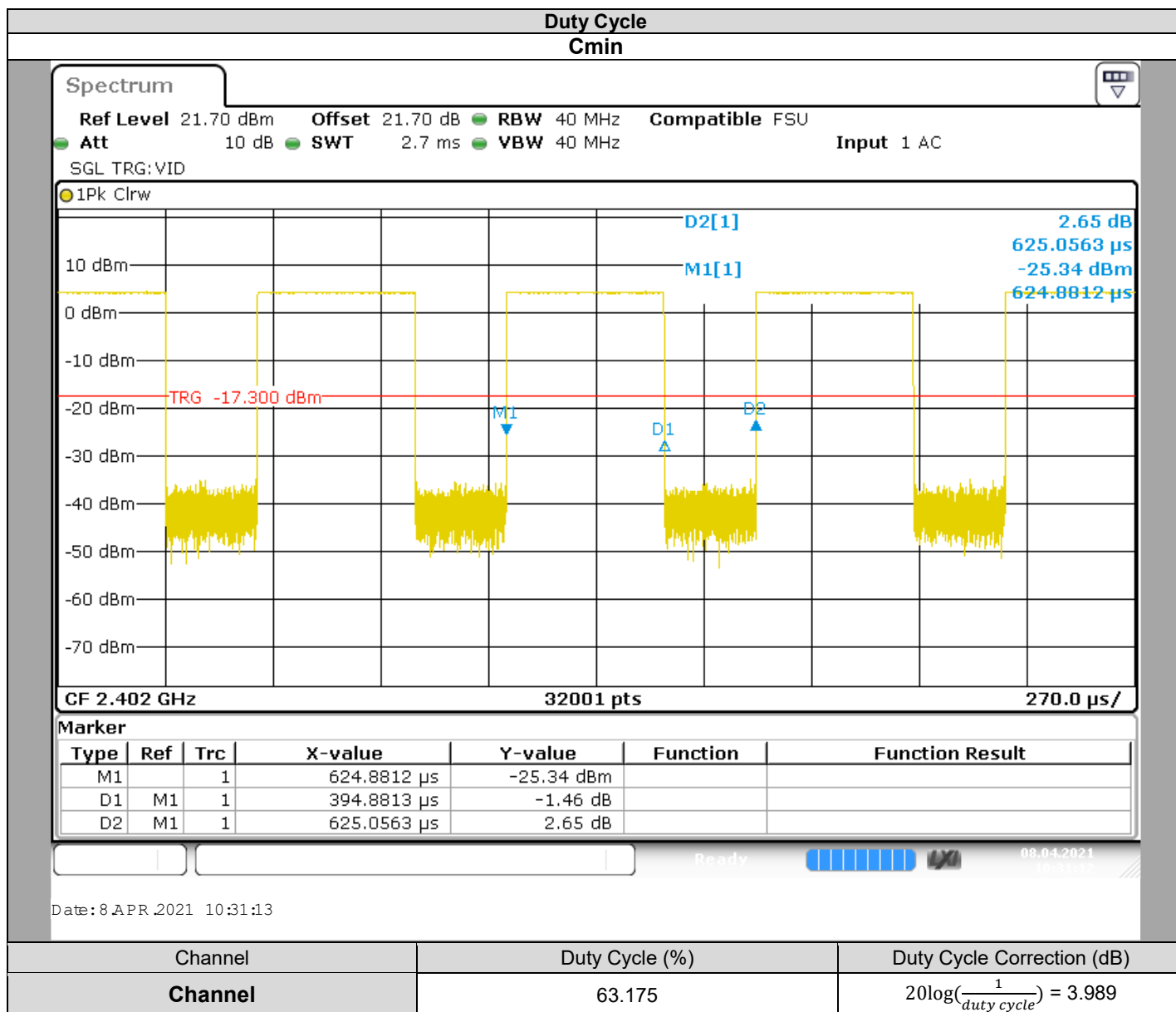
None

5.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642026	2019/07	2021/07
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7040079	See Multimeter	See Multimeter
Cable + Attenuateur 20dB	PASTERNAK	PE350-150CM	A5329973	2020/08	2021/08
Load 50 ohms	TELEGARTNER	-	A7150105	2019/04	2021/04
Load 50 ohms	TELEGARTNER	-	A7150104	2019/04	2021/04

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

5.5. RESULTS



5.6. CONCLUSION

Duty Cycle measurement performed on the sample of the product **Technicolor UIW4059MIL**, SN: **LAB3-V0 nr.030**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

6. MAXIMUM CONDUCTED OUTPUT POWER

6.1. TEST CONDITIONS

Test performed by : Armand MAHOUGOU
Date of test : April 8, 2021
Ambient temperature : 26°C
Relative humidity : 45%

6.2. TEST SETUP

- The Equipment under Test is installed:

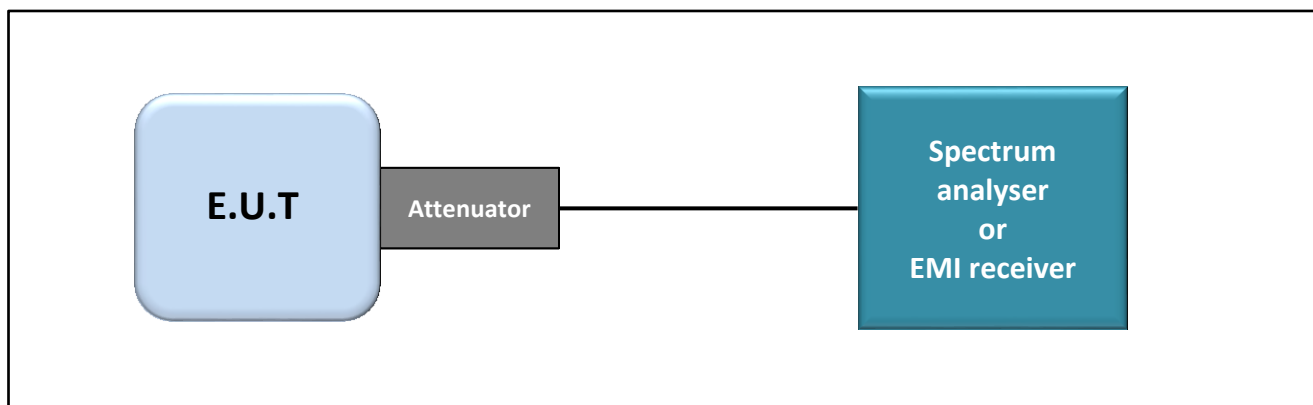
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

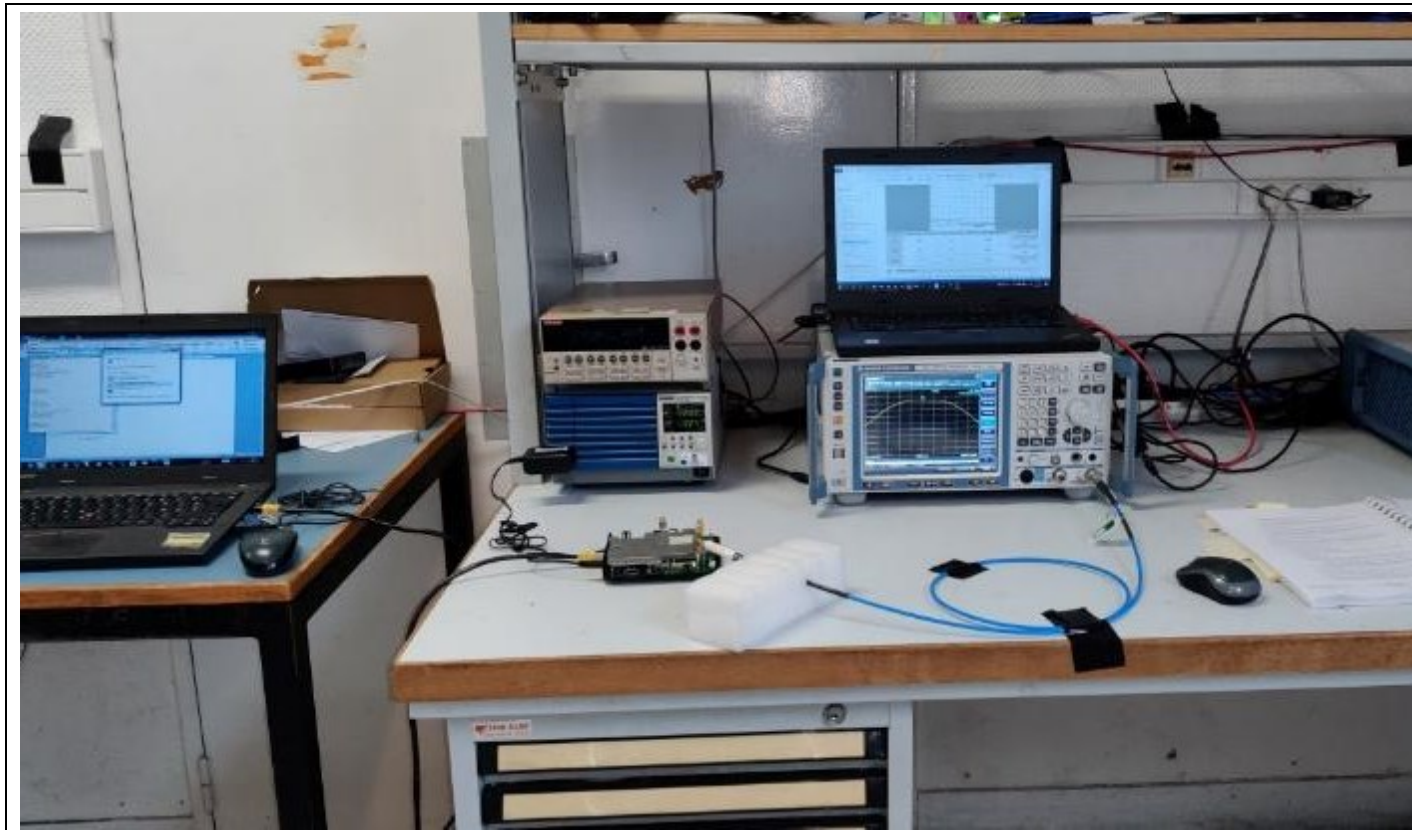
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ ANSI C63.10 § 11.9.1.1
- ☐ ANSI C63.10 § 11.9.1.2
- ☐ ANSI C63.10 § 11.9.2.2.2 (Method AVGSA-1)
- ☐ ANSI C63.10 § 11.9.2.2.4 (Method AVGSA-2)



Test set up of Maximum Conducted Output Power



Photograph for Maximum Conducted Output Power

6.3. LIMIT

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

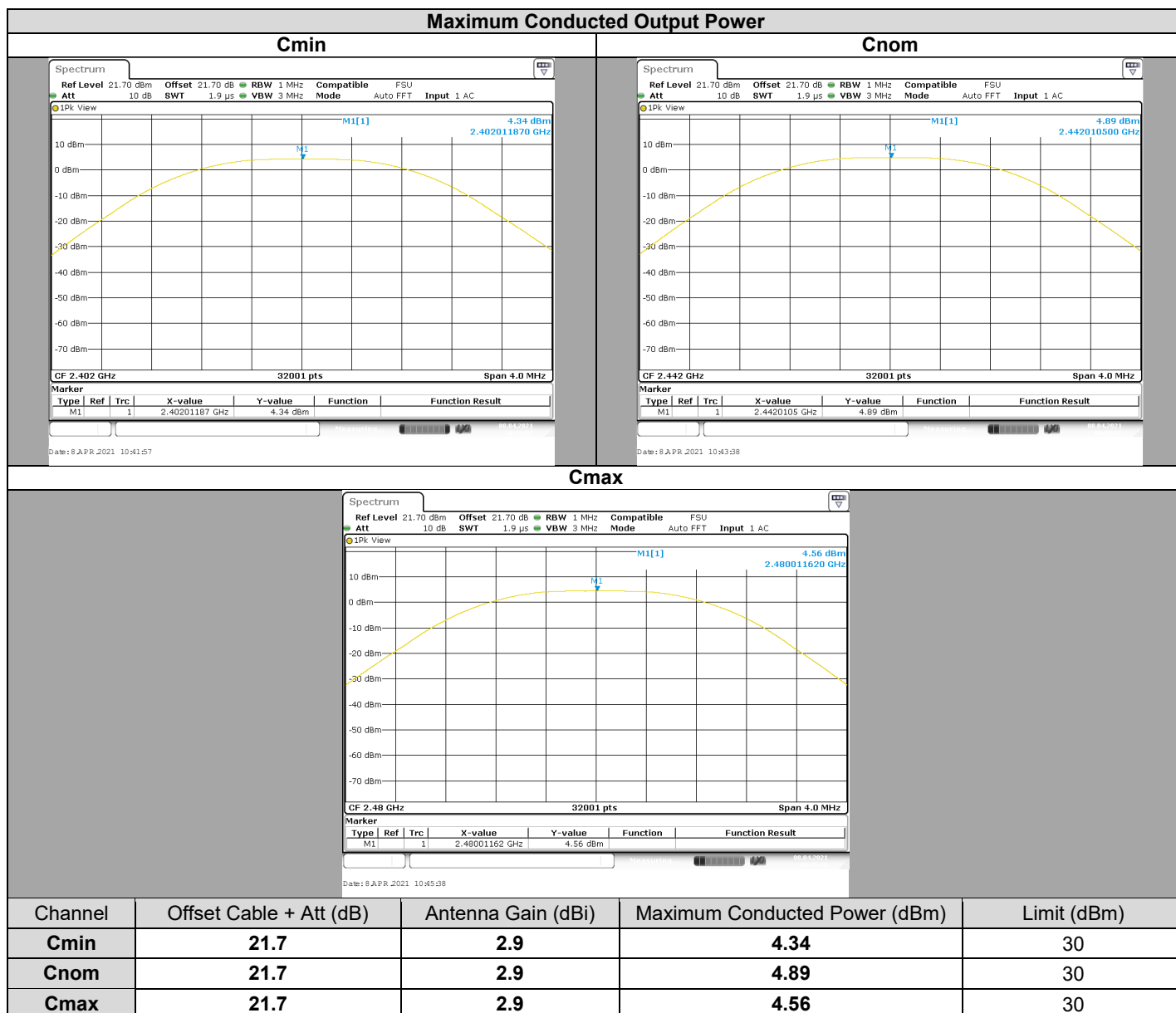
*Remark: Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

6.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642026	2019/07	2021/07
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7040079	See Multimeter	See Multimeter
Cable + Attenuateur 20dB	PASTERNAK	PE350-150CM	A5329973	2020/08	2021/08
Load 50 ohms	TELEGARTNER	-	A7150105	2019/04	2021/04
Load 50 ohms	TELEGARTNER	-	A7150104	2019/04	2021/04

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

6.5. RESULTS



6.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **Technicolor UIW4059MIL**, SN: **LAB3-V0 nr.030**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

7. POWER SPECTRAL DENSITY

7.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : April 8, 2021
Ambient temperature : 26°C
Relative humidity : 45%

7.2. TEST SETUP

- The Equipment Under Test is installed:

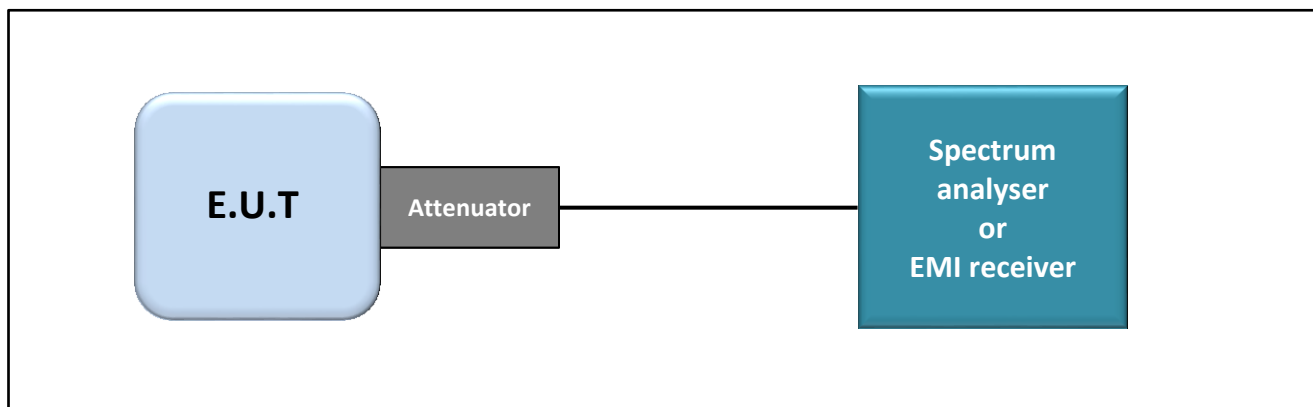
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ ANSI C63.10 § 11.10.2 (Method PKPSD)
- ☐ ANSI C63.10 § 11.10.3 (Method AVGPS-1)



Test set up of Power Spectral Density



Photograph for Power Spectral Density

7.3. LIMIT

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

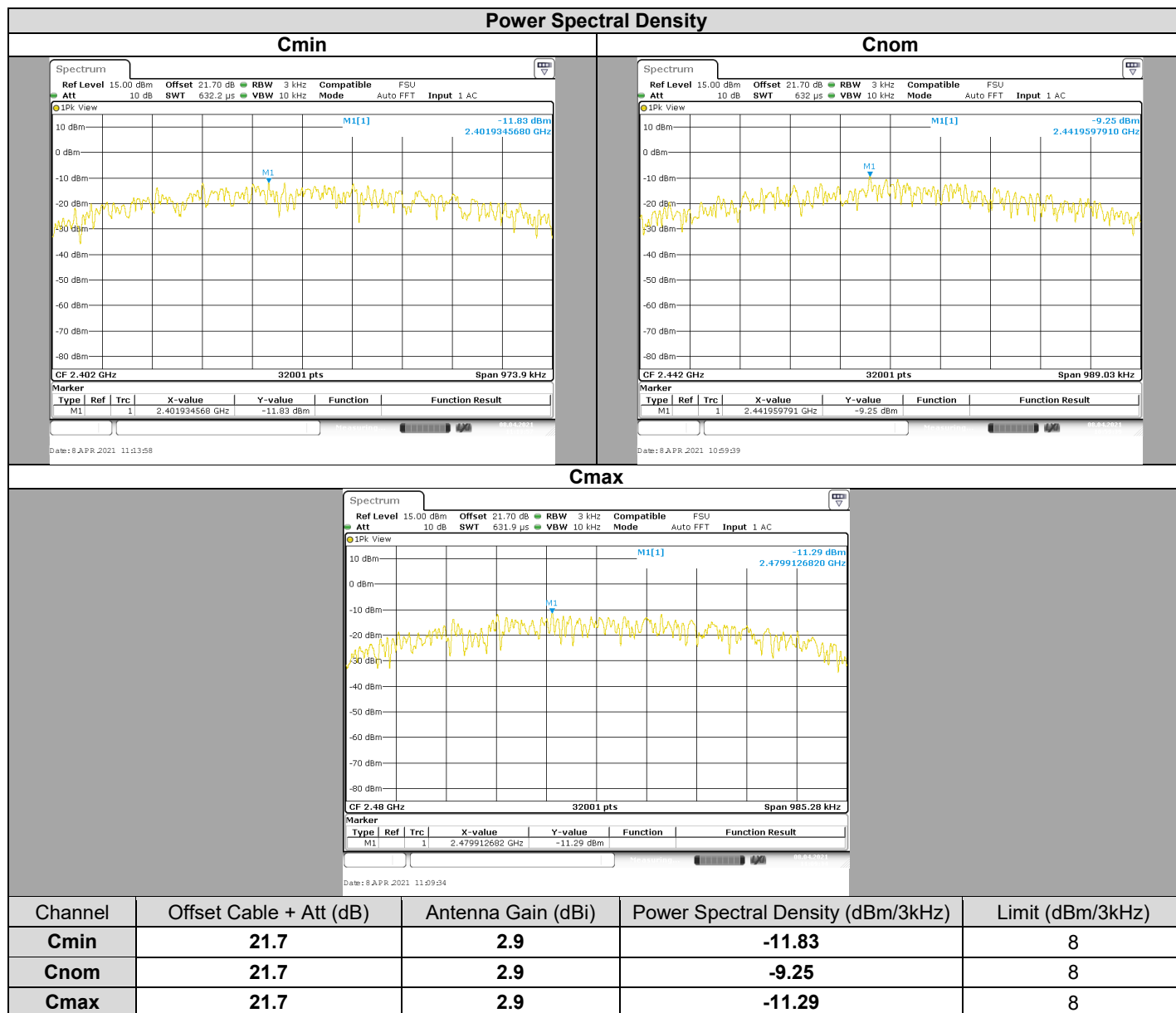
*Remark: Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

7.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642026	2019/07	2021/07
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7040079	See Multimeter	See Multimeter
Cable + Attenuateur 20dB	PASTERNAK	PE350-150CM	A5329973	2020/08	2021/08
Load 50 ohms	TELEGARTNER	-	A7150105	2019/04	2021/04
Load 50 ohms	TELEGARTNER	-	A7150104	2019/04	2021/04

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

7.5. RESULTS



7.6. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **Technicolor UIW4059MIL**, SN: **LAB3-V0 nr.030**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

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

8.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : April 8, 2021
Ambient temperature : 26°C
Relative humidity : 45%

8.2. TEST SETUP

- The Equipment Under Test is installed:

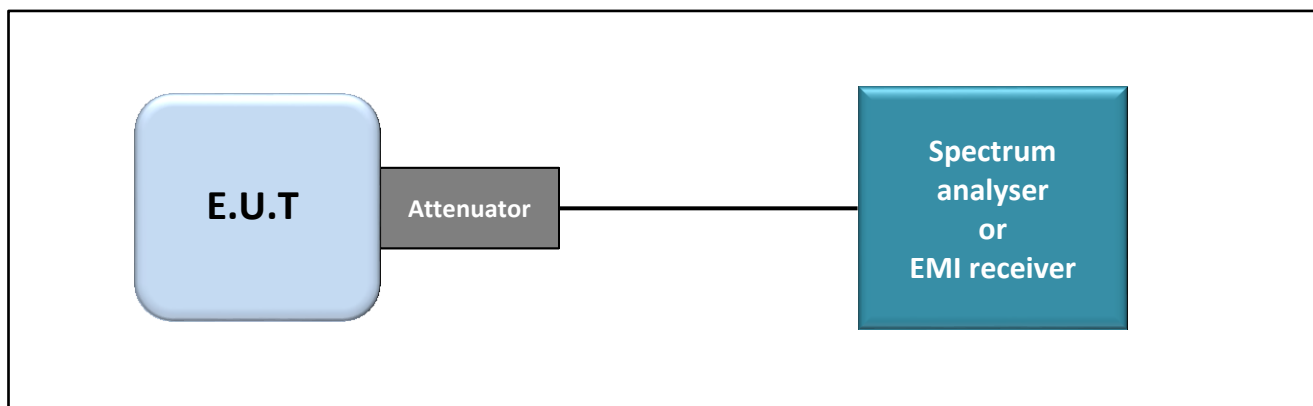
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

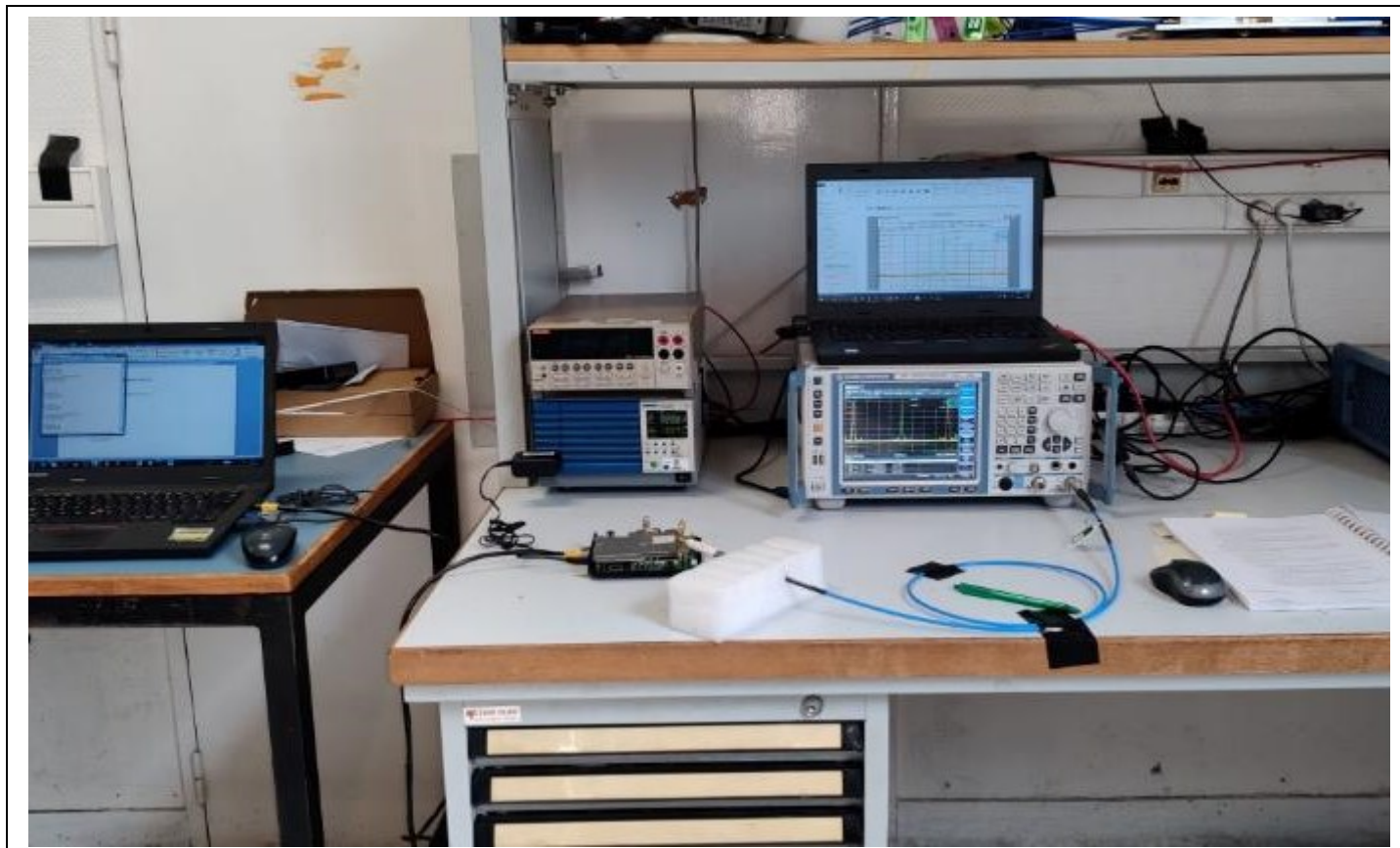
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ ANSI C63.10 § 11.11



Test set up of Unwanted Emissions into Non-Restricted Frequency Bands at the Band Edge



Photograph for Unwanted Emission into non-restricted frequency bands at the band edge

8.3. LIMIT

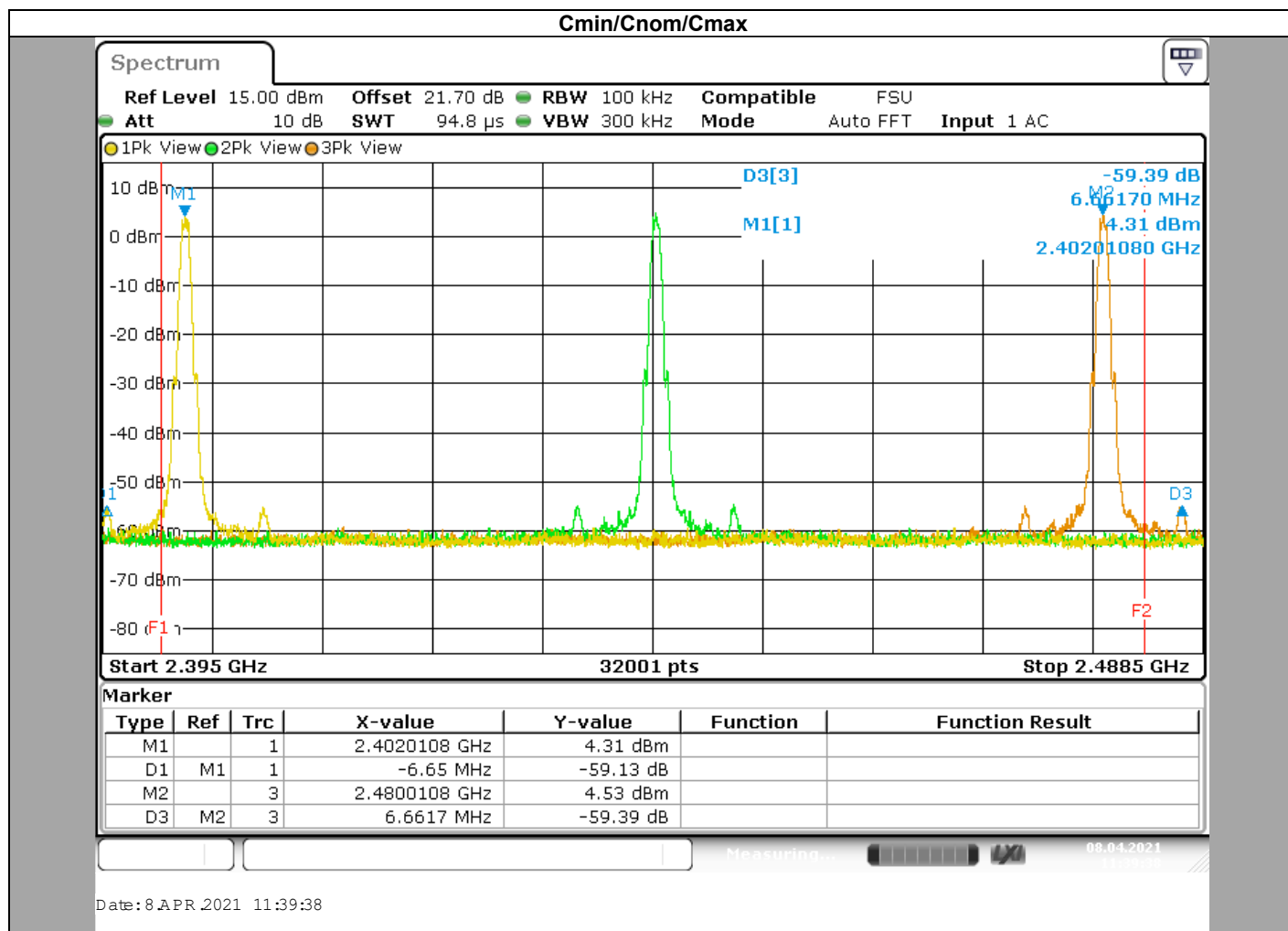
All Spurious Emissions must be at least 20dB (Maximum Conducted Power) below the Fundamental Radiator Level at the Band Edge “2400MHz & 2483,5MHz”

8.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642026	2019/07	2021/07
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7040079	See Multimeter	See Multimeter
Cable + Attenuateur 20dB	PASTERNAK	PE350-150CM	A5329973	2020/08	2021/08
Load 50 ohms	TELEGARTNER	-	A7150105	2019/04	2021/04
Load 50 ohms	TELEGARTNER	-	A7150104	2019/04	2021/04

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

8.5. RESULTS



Frequency (MHz)	Level (dBc)	Limit (dBc)
2400	59.13	20
2483.5	59.39	20

8.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands at the band edge measurement performed on the sample of the product **Technicolor UIW4059MIL**, SN: **LAB3-V0 nr.030**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

9. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS

9.1. TEST CONDITIONS

Test performed by : Julien Palard
Date of test : April 16, 2021
Ambient temperature : 25 °C
Relative humidity : 32 %

9.2. TEST SETUP

- The Equipment under Test is installed:

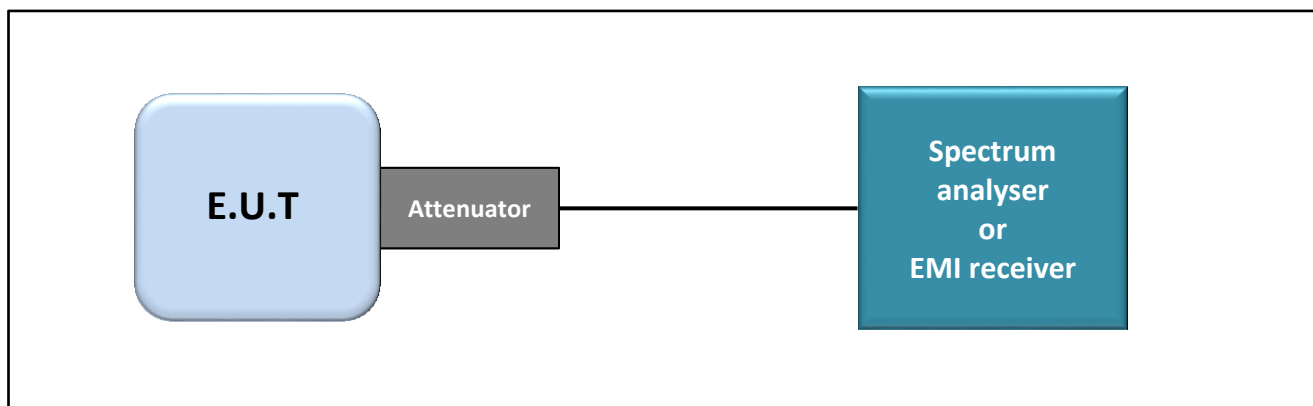
- ☒ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ ANSI C63.10 § 11.11



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



Photograph for Unwanted Emission into non-restricted frequency bands



Photograph for Unwanted Emission into non-restricted frequency bands



9.3. LIMIT

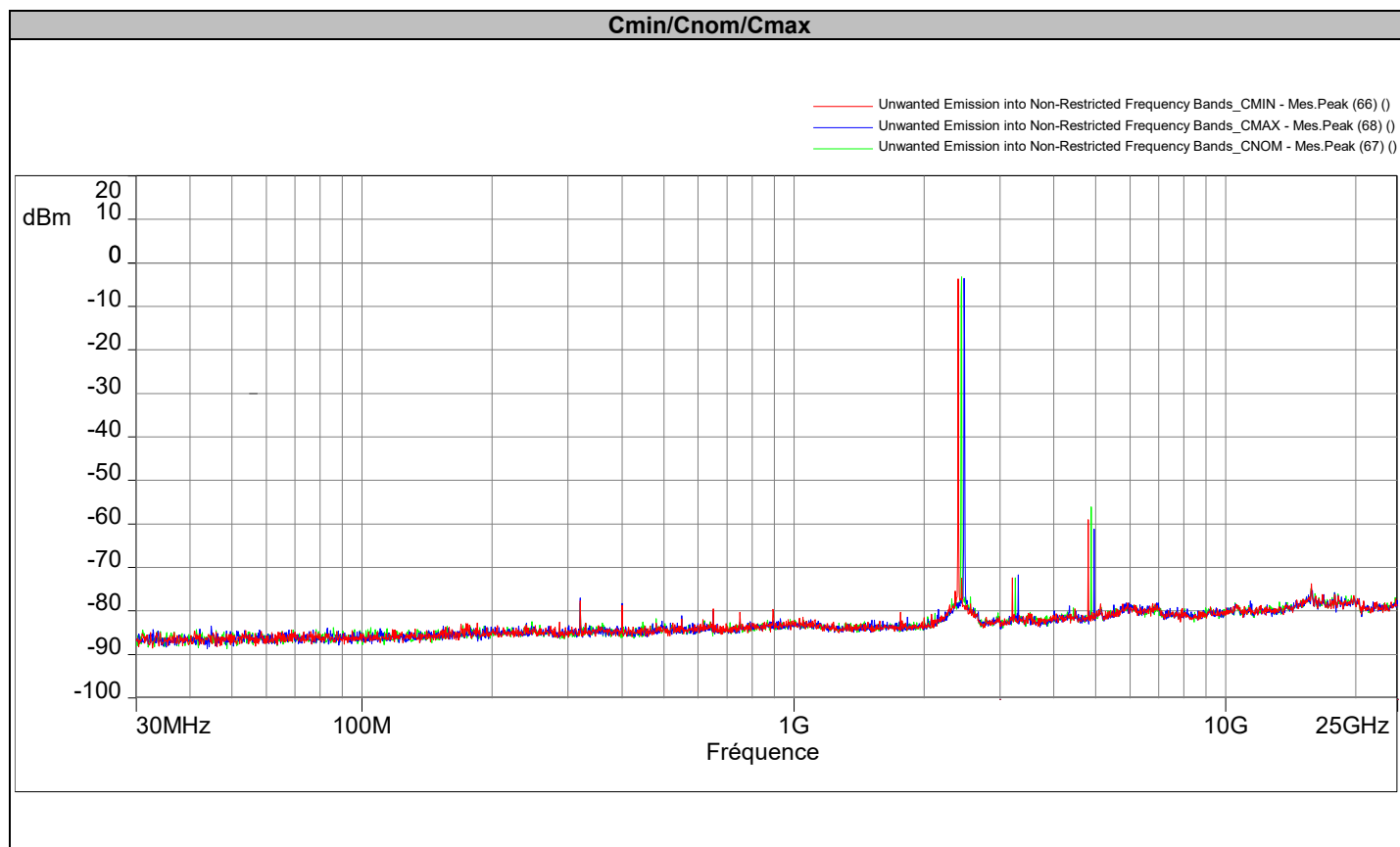
All Spurious Emissions must be at least 20dB (Maximum Conducted Power) below the Fundamental Radiator Level

9.4. TEST EQUIPMENT LIST

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

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

9.5. RESULTS



Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2402	-3,7		
320	-77,7	74,0	20
400	-78,7	75,0	20
650	-79,5	75,8	20
894	-79,6	75,9	20
1766	-80,3	76,6	20
3202	-72,3	68,6	20
4804	-59,0	55,3	20
2442	-3,2		
320	-78,3	75,1	20
400	-78,3	75,1	20
650	-79,7	76,5	20
894	-85,2	82,0	20
2122	-80,5	77,3	20
3256	-72,4	69,2	20
4884	-56,1	52,9	20
2480	-3,5		
320	-77,0	73,5	20
400	-78,3	74,8	20
550	-81,1	77,6	20
650	-80,0	76,5	20
2160	-79,6	76,1	20
3307	-71,7	68,2	20
4960	-61,1	57,6	20

9.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands measurement performed on the sample of the product **Technicolor UIW4059MIL**, SN: **LAB3-V0 nr.030**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

10. AC POWER LINE CONDUCTED EMISSIONS

10.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
 Date of test : April 20, 2021
 Ambient temperature : 21 °C
 Relative humidity : 47 %

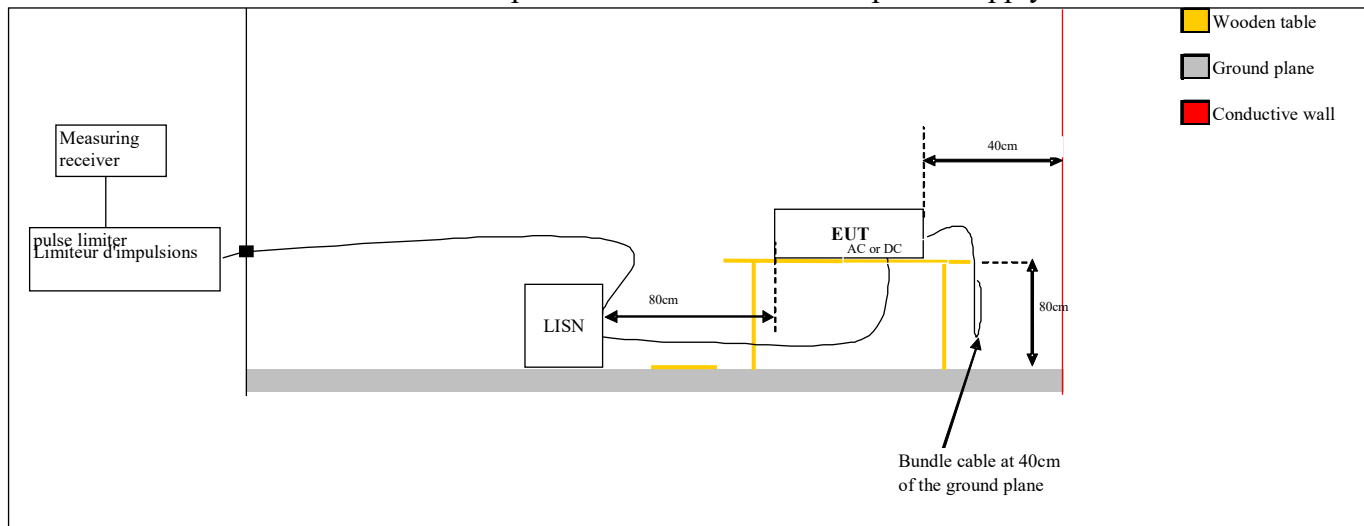
10.2. TEST SETUP

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

Voltage table used (for Power Line Conducted Emissions):

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

Test set up of conducted emission on power supply





Photograph for AC Power Line Conducted Emissions (Front view)



Photograph for AC Power Line Conducted Emissions (Rear view)

10.3. LIMIT

Frequency range	Level	Detector
0,15kHz to 0,5MHz	66dB μ V to 56 μ V*	QPeak
	56dB μ V to 46 μ V*	Average
0,5MHz to 5MHz	56dB μ V	QPeak
	46dB μ V	Average
5MHz to 30MHz	60B μ V	QPeak
	50dB μ V	Average

*Decreases with the logarithm of the frequency

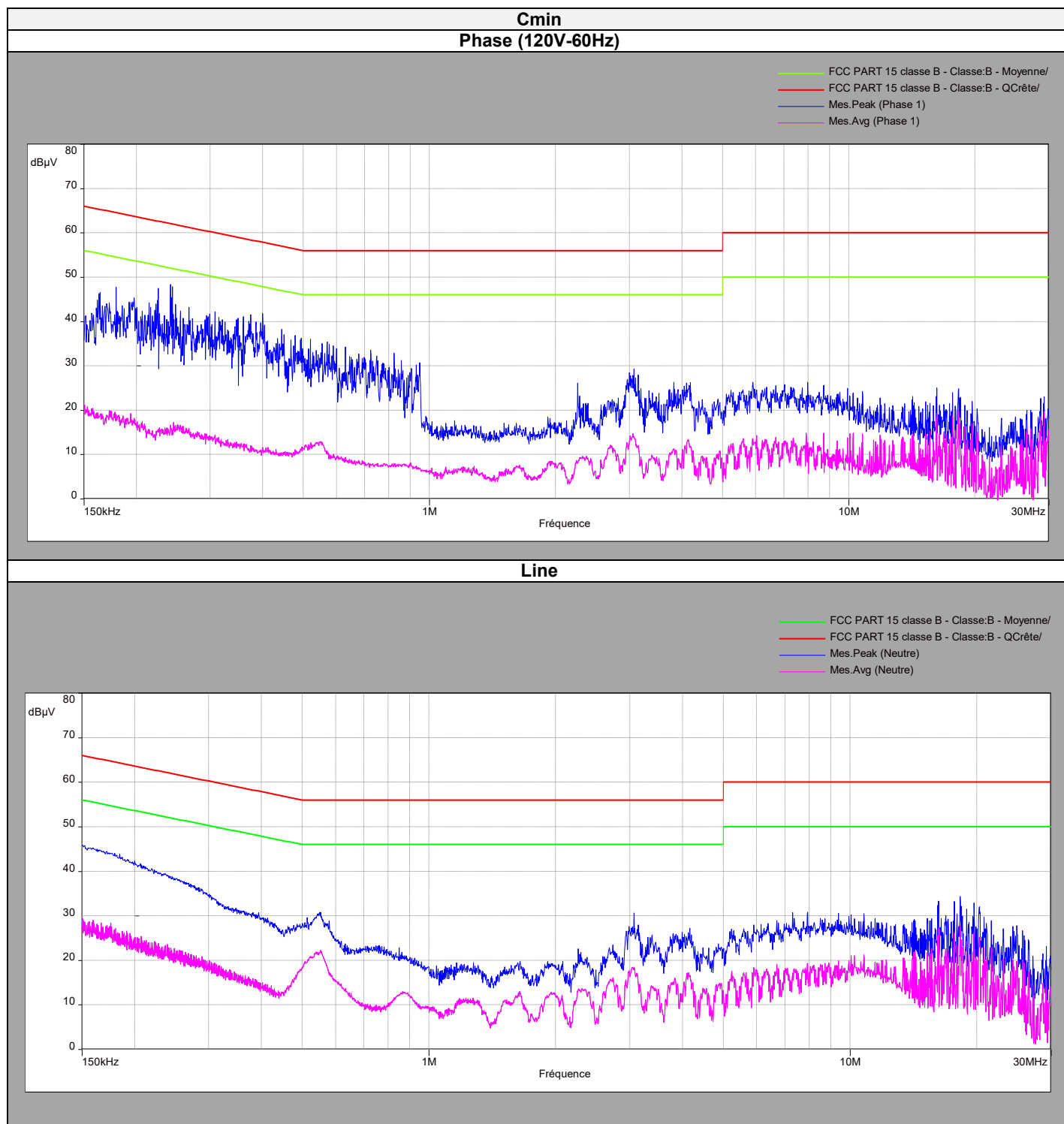
10.4. TEST EQUIPMENT LIST

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Recepteur	R&S	ESU	A2642018	01/2020	01/2022
V ISLN	R&S	ESH2-Z5	C2322002	10/2020	10/2021
Pulse limiter	R&S	ESH3-Z2	A2649008	05/2020	05/2021
Cable	LCIE	-	A5329589	11/2020	11/2021
Cable	-	-	A5329417	12/2020	12/2021
Reference ground plan 2.5 x 3m	L.C.I.E.	-	-	-	-

10.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None ☐ Divergence:

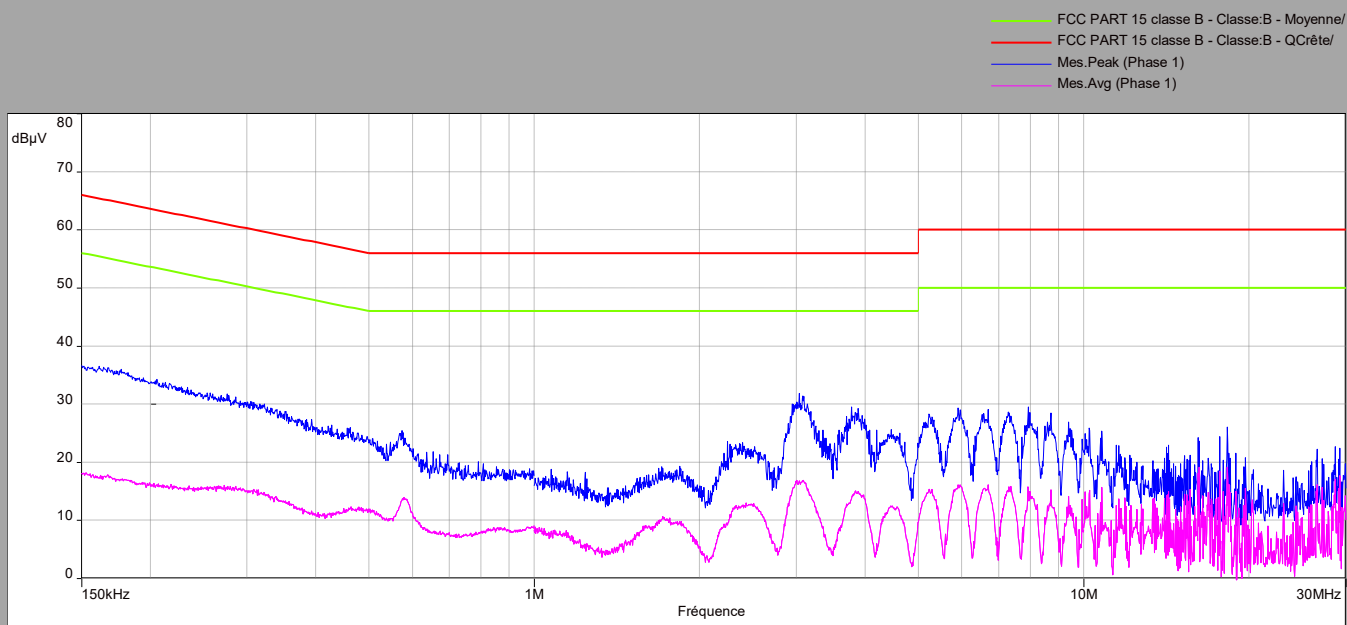
10.6. RESULTS



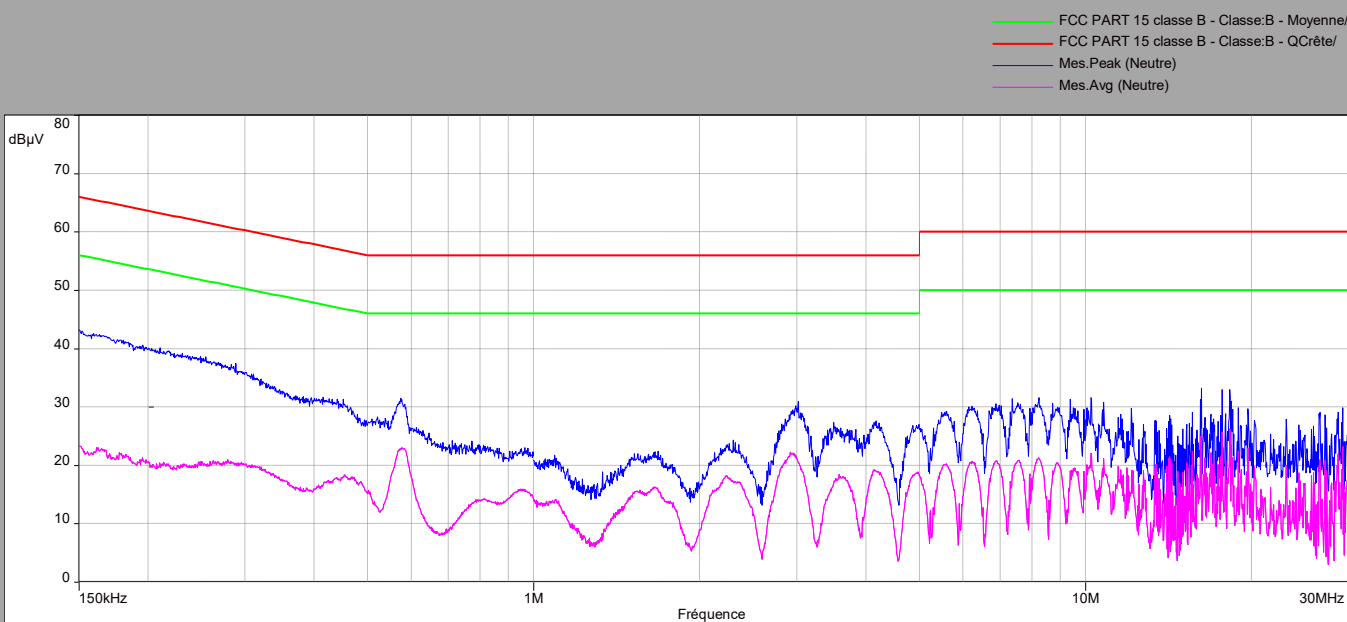
Phase Line							
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin Quasi-Peak (dBμV)	Average Level (dBμV)	Average Limit (dBμV)	Margin Average (dBμV)
0,15	39,5	-	64	24,5	20,7	39	18,3
0,554	35	-	56	21	12,6	46	33,4
3,08	39,4	-	56	16,6	29,2	46	16,8
16,22	25	-	60	35	18,8	50	31,2
29,23	23	-	60	37	19,6	50	30,4

Neutral Line							
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin Quasi-Peak (dBμV)	Average Level (dBμV)	Average Limit (dBμV)	Margin Average (dBμV)
0,15	45,9	-	64	18,1	29,4	39	9,6
0,548	29,9	-	56	26,1	21,2	46	24,8
3,07	30,6	-	56	25,4	18	46	28
16,22	32,8	-	60	27,2	26	50	24
19,71	33	-	60	27	26,2	50	23,8

Cmin
Phase (240V-50Hz)



Line



Phase Line							
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin Quasi-Peak (dBμV)	Average Level (dBμV)	Average Limit (dBμV)	Margin Average (dBμV)
0,15	35,6	-	64	28,4	18	39	21
0,554	24	-	56	32	13,5	46	32,5
3,08	31,8	-	56	16,4	39,2	46	6,8
6,66	28	-	60	32	15,4	50	34,6
17,69	24,4	-	60	35,6	18	50	32

Neutral Line							
Frequency (MHz)	Peak Level (dBμV)	Quasi-Peak Level (dBμV)	Quasi-Peak Limit (dBμV)	Margin Quasi-Peak (dBμV)	Average Level (dBμV)	Average Limit (dBμV)	Margin Average (dBμV)
0,15	43,2	-	64	20,8	23,4	39	15,6
0,548	30,8	-	56	25,2	22,6	46	23,4
2,98	30,2	-	56	25,8	21,6	46	24,4
16,23	31,8	-	60	28,2	25	50	25
18,24	33	-	60	27	26,3	50	23,7

10.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product **Technicolor UIW4059MIL**, SN: **LAB3-V0 nr.030**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.247 limits.

11. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS

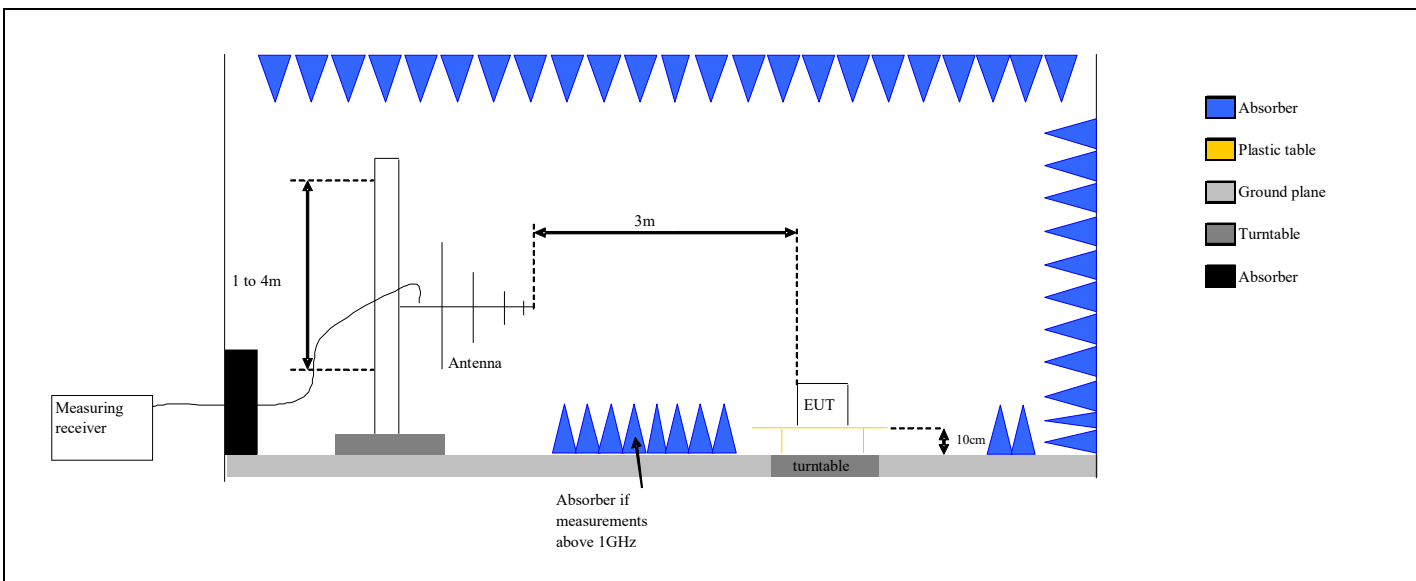
11.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
 Date of test : April 20, 2021 to April 21, 2021
 Ambient temperature : 20 °C
 Relative humidity : 45 %

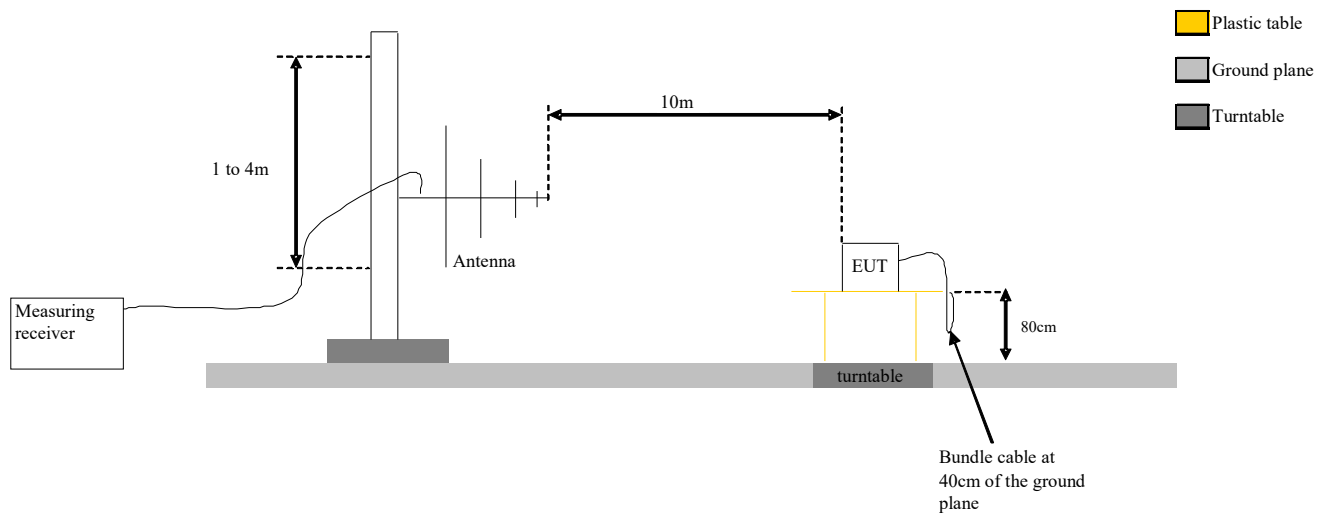
11.2. TEST SETUP

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

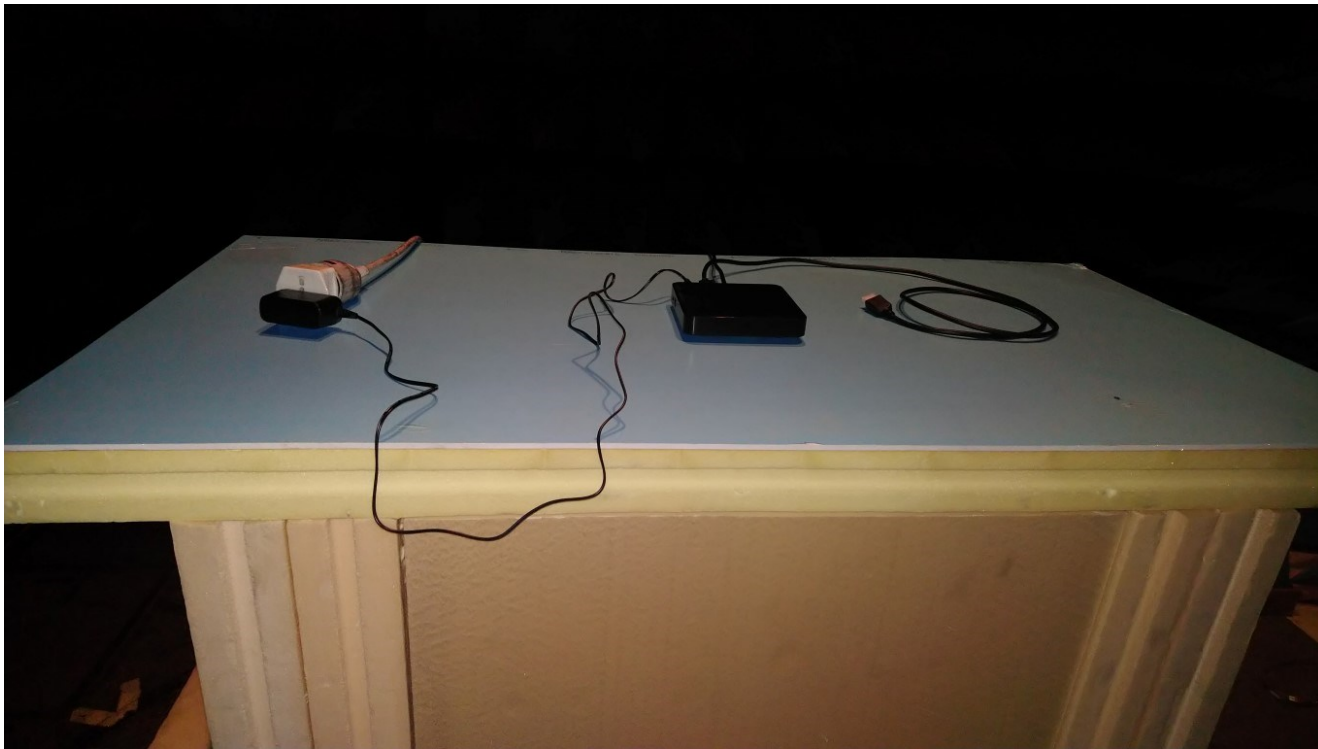
Frequency range :	Below 30MHz	From 30MHz to 1GHz	Above 1GHz
Antenna Polarization :	Parallel, Perpendicular And Ground parallel	Horizontal And Vertical	Horizontal And Vertical
Antenna Height :	1m	Varied from 1m to 4m	Varied from 1m to 4m
Antenna Type :	Loop	Bi-Log	Horn
RBW Filter :	200Hz below 150kHz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



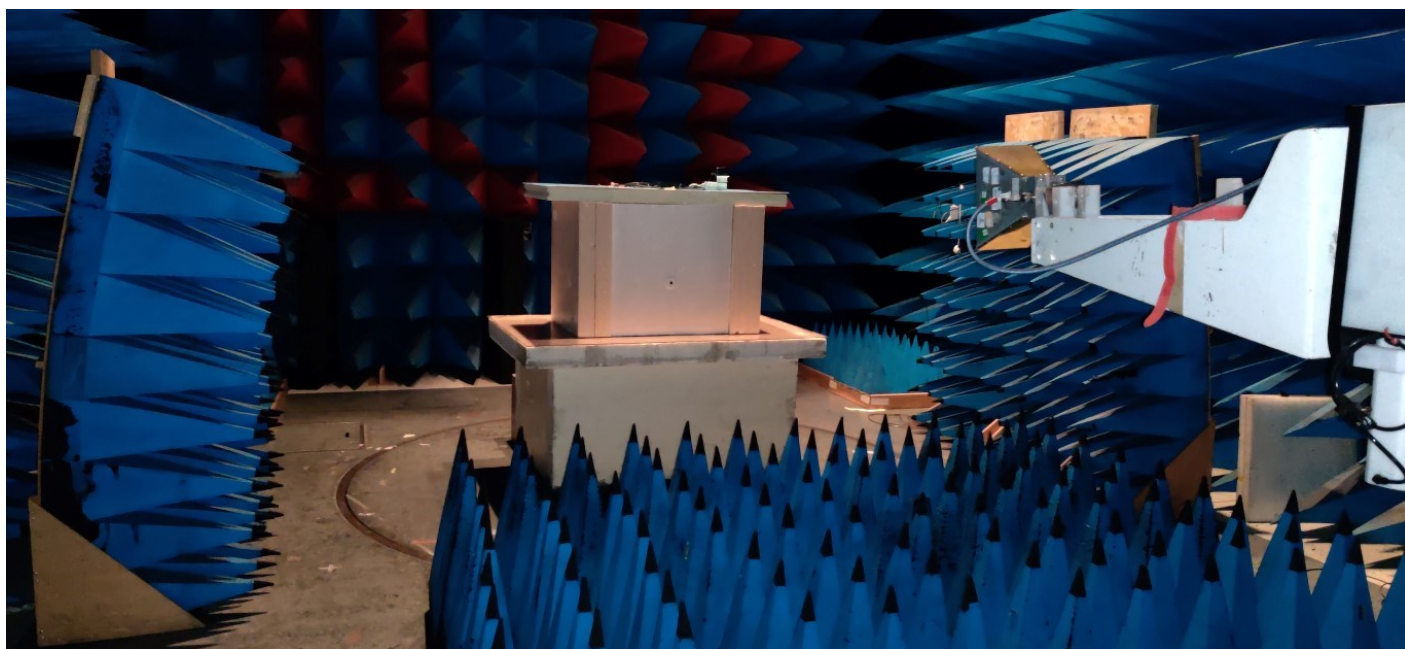
Test set up of Unwanted Emissions in Restricted Frequency Bands in semi anechoic chamber



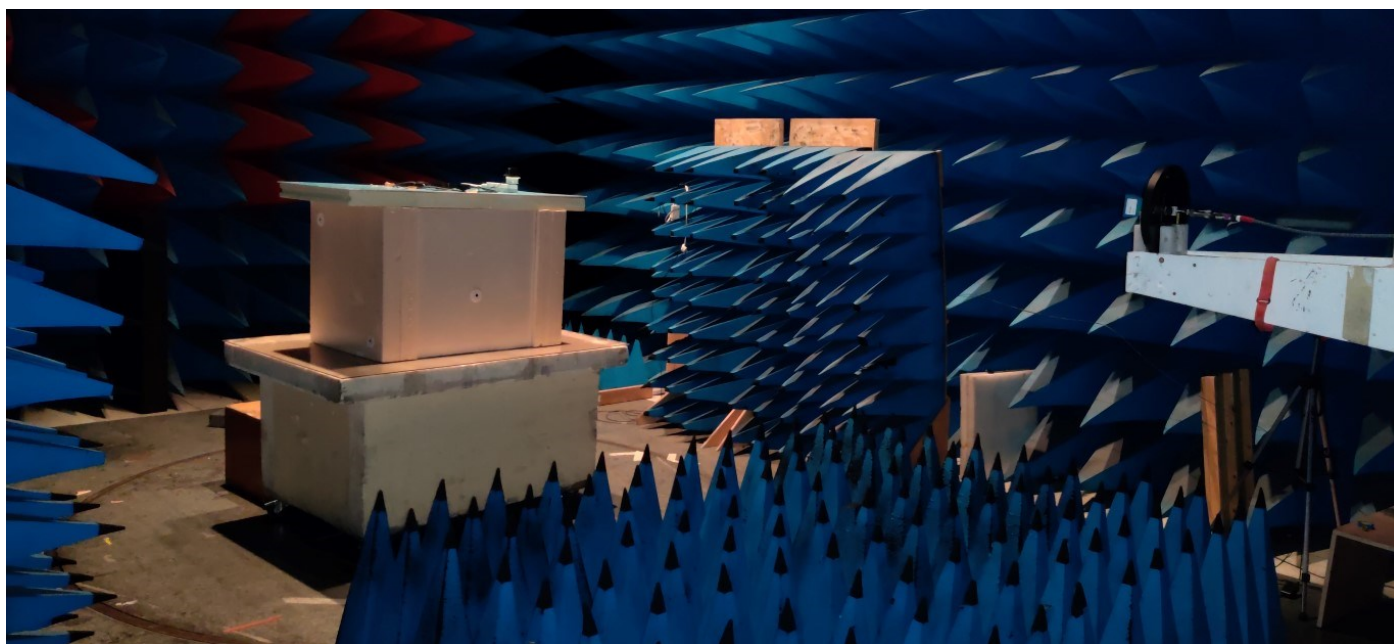
Photograph for Unwanted Emission in restricted frequency bands



Photograph for Unwanted Emission in restricted frequency bands



Photograph for Unwanted Emission in restricted frequency bands



Photograph for Unwanted Emission in restricted frequency bands

11.3. 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	35.5dB 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

11.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
BAT EMC Software	NEXIO	Version 3,19,1,18	-	-	-
SEMI ANECHOIC CHAMBER	SIEPEL	ZONE HOMOGENE	D3044008	2020/05	2021/05
Preamplifier	LCIE	LCIE-ALB-001	A7080073	2021/02	2023/02
Horn antenna	AH SYSTEMS	SAS 571	C2042041	2019/11	2021/11
Horn antenna (18-26,5GHz)	PASTERNAK	PE9852/2F-20	C2042048	2020/06	2022/06
EMI receiver	ROHDE & SCHWARZ	FSV40GHz	A4060061	2019/05	2021/05
Cable S36 chamber	PASTERNAK	PE360-3000CM	A5329872	2021/02	2022/02
Cable S36 chamber	PASTERNAK	PE360-1000CM	A5329939	2021/02	2022/02
Cable S36 chamber	PASTERNAK	PE360-1500CM	A5329940	2021/02	2022/02
High Pass Filter 2,4GHz	WAINWRIGHT	WHK12-2494	A7484068	2019/07	2021/07
Recepteur	R&S	ESU	A2642018	01/2020	01/2022
Antenna bilog	CHASE	CBL 6112A	C2042040	05/2020	05/2021
Preamplifier	HP	8449B	A4069002	09/2020	09/2022
Antenna cornet	EMCO	3115	C2042016	05/2020	05/2021
OATS	L.C.I.E.	-	F2000400	09/2020	09/2021
Cable	-	-	A5329442	12/2020	12/2021
loop antenna	ROHDE & SCHWARZ	HFH2-Z2	C2040269	09/2020	09/2022
Cable	-	-	A5329416	02/2021	02/2022
Cable	-	-	A5329542	11/2020	11/2021
Cable	-	-	A5329876	12/2019	12/2021
Cable	-	-	A5329449	12/2020	12/2021

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

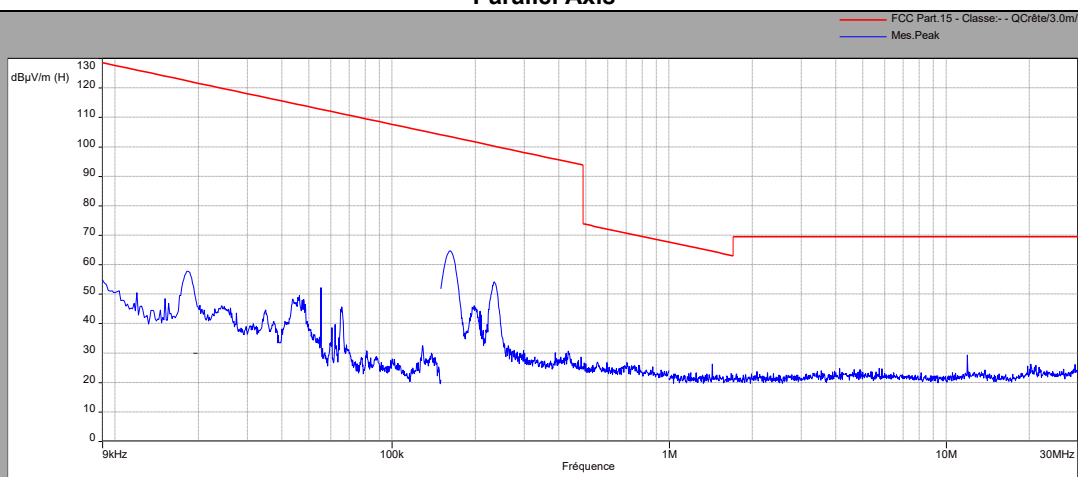
11.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None ☐ Divergence:

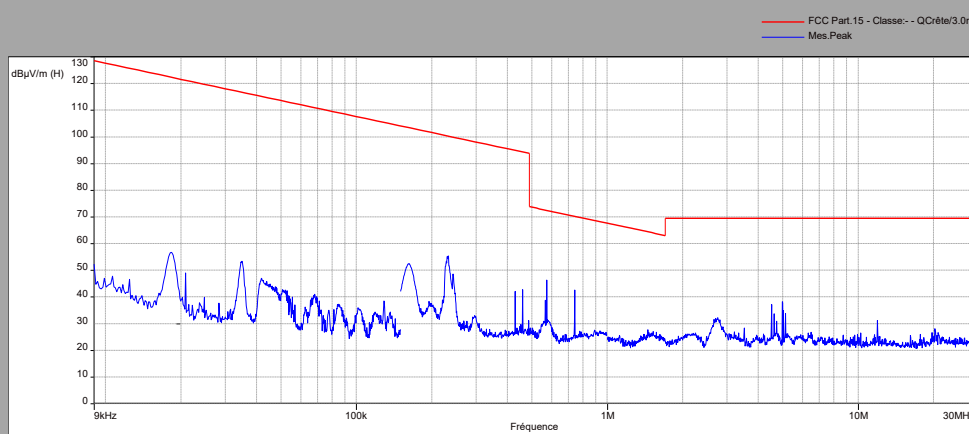
11.6. RESULTS

9kHz to 30MHz

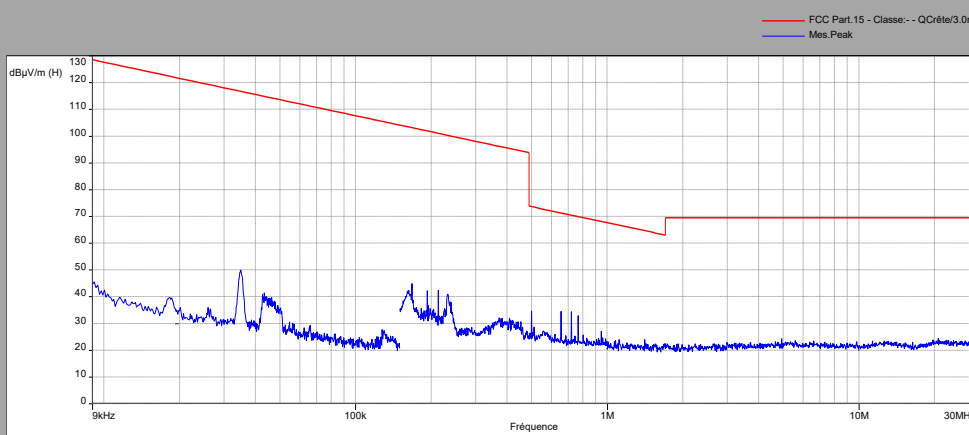
Parallel Axis

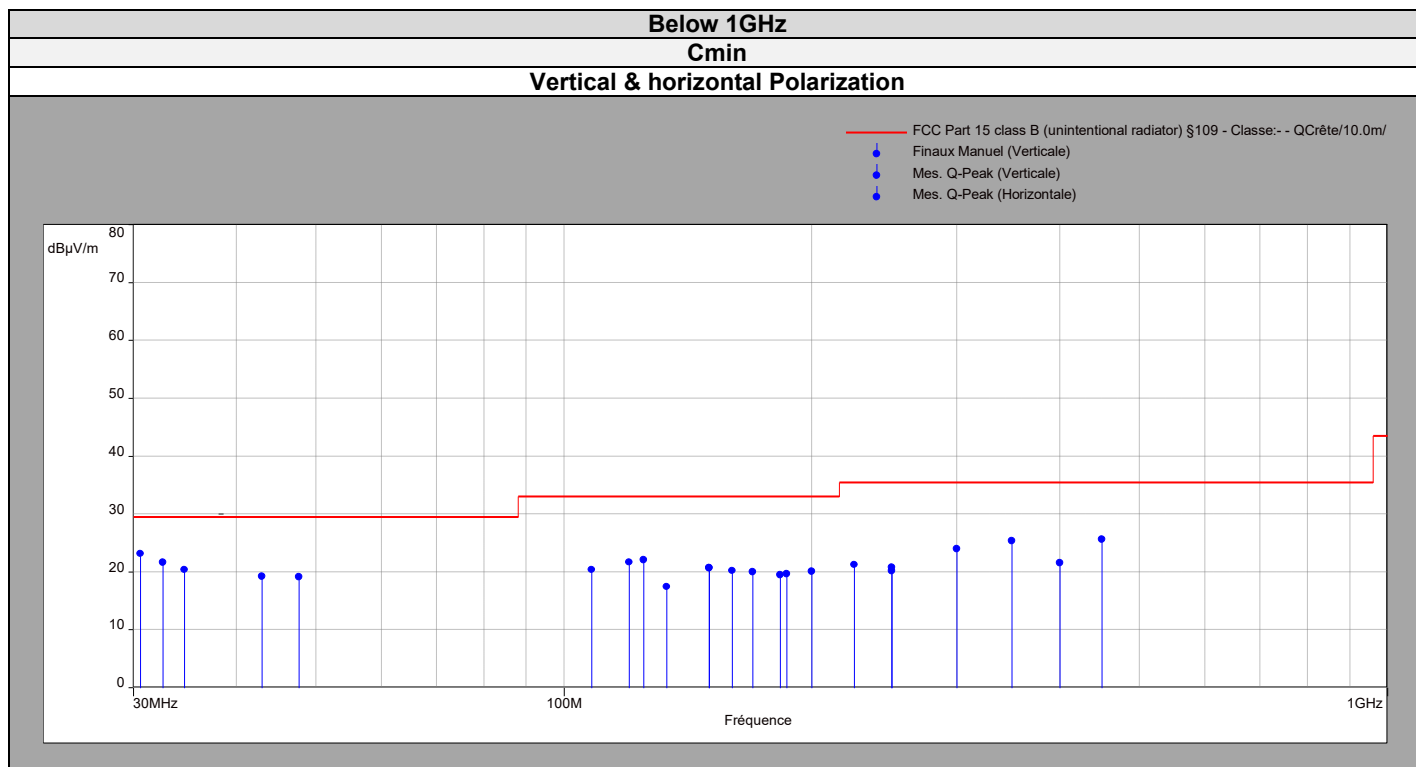


Perpendicular Axis



Ground Parallel Axis





Above 1GHz Zoom 2310MHz-2500MHz

Cmin/Cnom/Cmax

Vertical Polarization

- FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
- FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
- Mes.Peak_Channel C0 - Verticale (Verticale)
- Mes.Avg_Channel C0 - Verticale (Verticale)
- Mes.Peak_Channel C20 - Verticale (Verticale)
- Mes.Avg_Channel C20 - Verticale (Verticale)
- Mes.Peak_Channel C39 - Verticale (Verticale)
- Mes.Avg_Channel C39 - Verticale (Verticale)

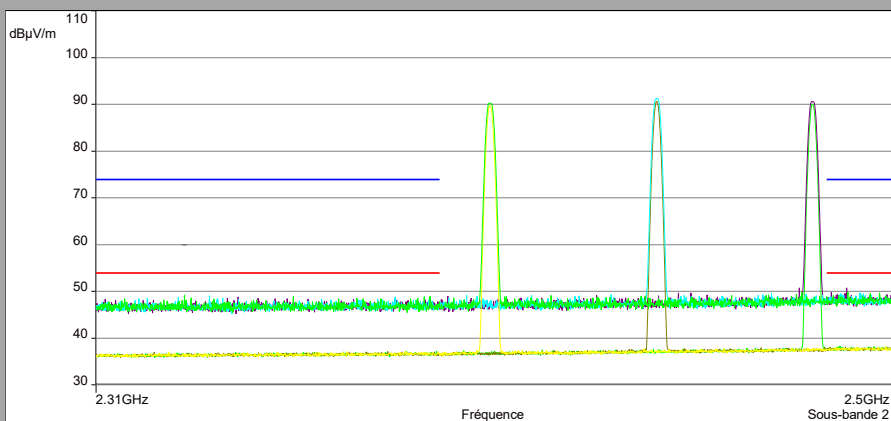
Description Sous-bande 2

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

Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 20 ms/MHz, Atténuation : 0 dB, Nombre de Balayages : 1, Preamp

Polarisation: Verticale

Distance: 3 m



Horizontal polarization

- FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Moyenne/3.0m/
- FCC/FCC 15.209 2400MHz-2483MHz Band - Classe:1 - Crête/3.0m/
- Mes.Peak_Channel C0 - Horizontale (Horizontale)
- Mes.Avg_Channel C0 - Horizontale (Horizontale)
- Mes.Peak_Channel C20 - Horizontale (Horizontale)
- Mes.Avg_Channel C20 - Horizontale (Horizontale)
- Mes.Peak_Channel C39 - Horizontale (Horizontale)
- Mes.Avg_Channel C39 - Horizontale (Horizontale)

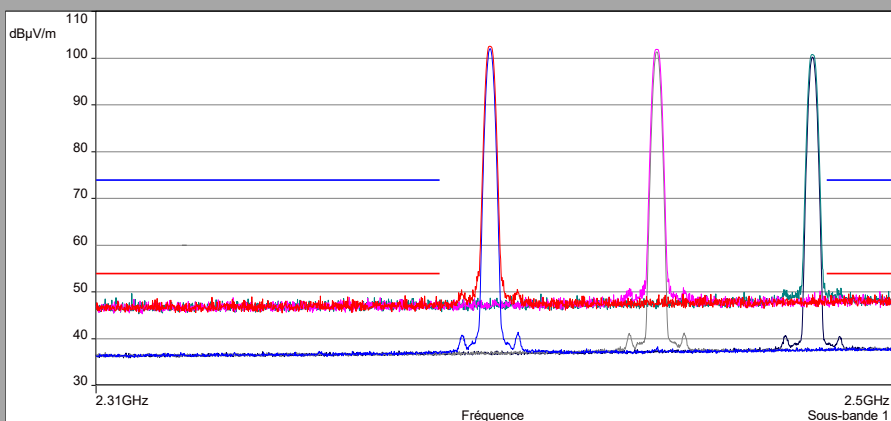
Description Sous-bande 1

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

Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 20 ms/MHz, Atténuation : 0 dB, Nombre de Balayages : 1, Preamp

Polarisation: Horizontale

Distance: 3 m

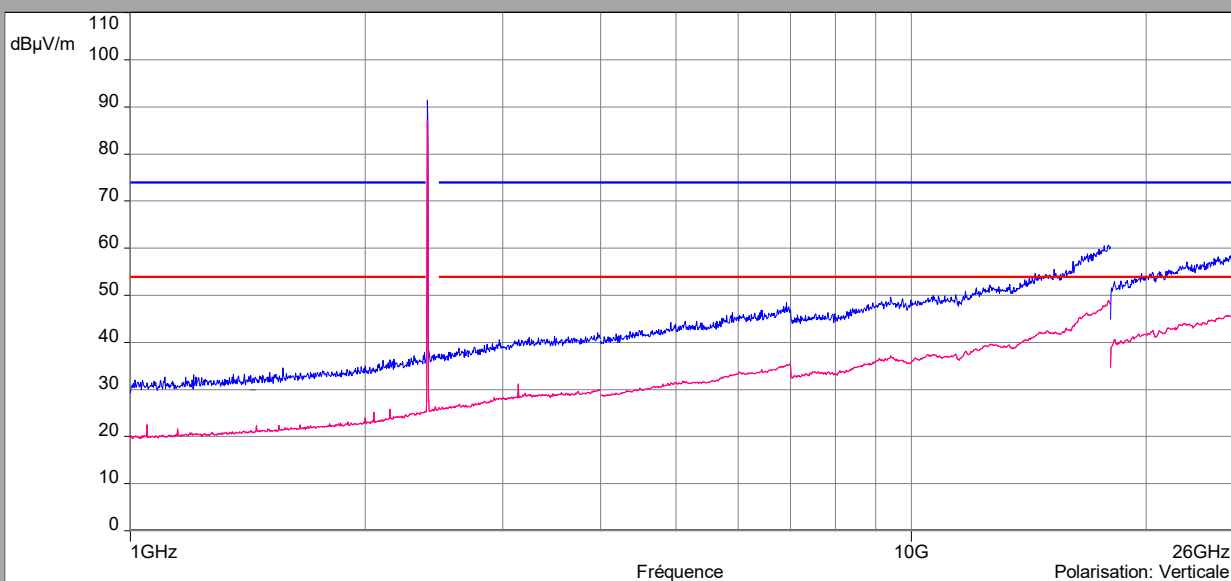


Above 1GHz

Cmin

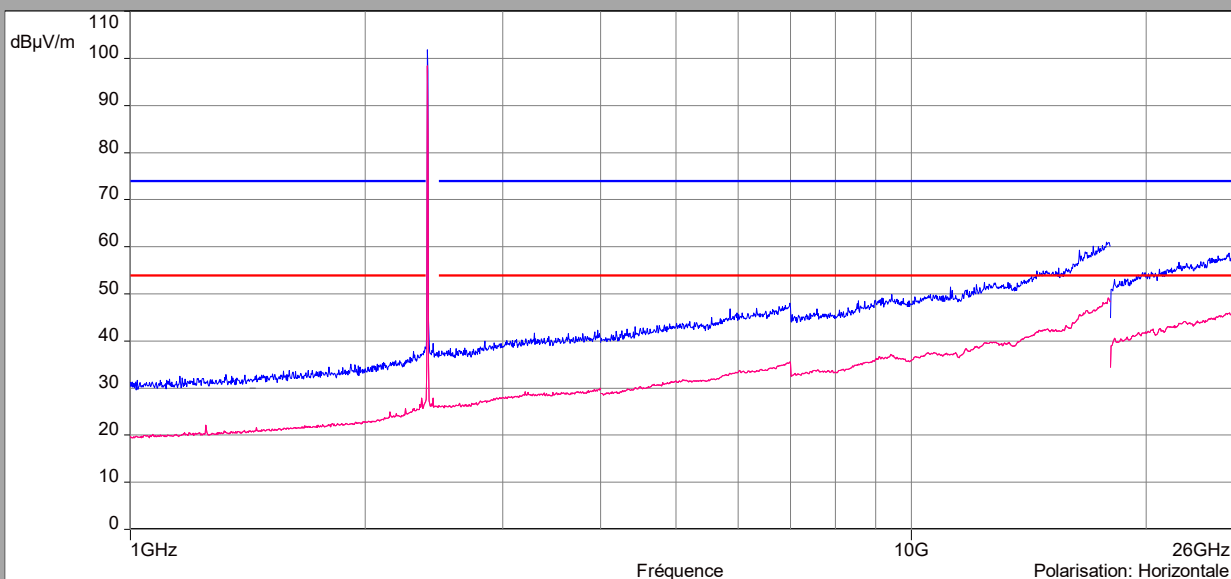
Vertical Polarization

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



Horizontal polarization

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

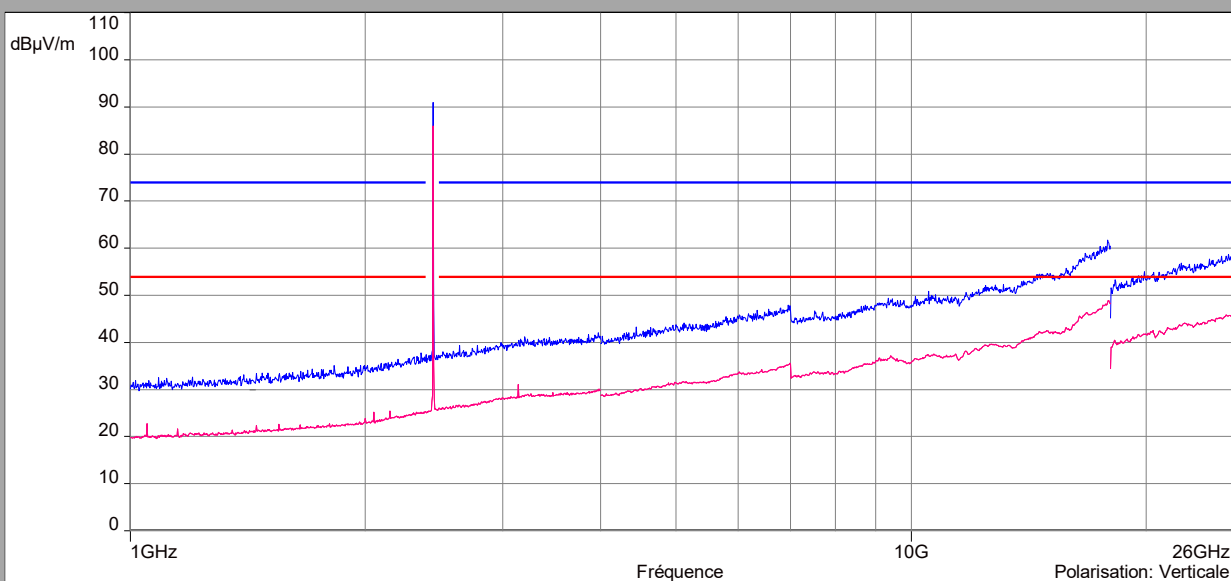


Above 1GHz

Cnom

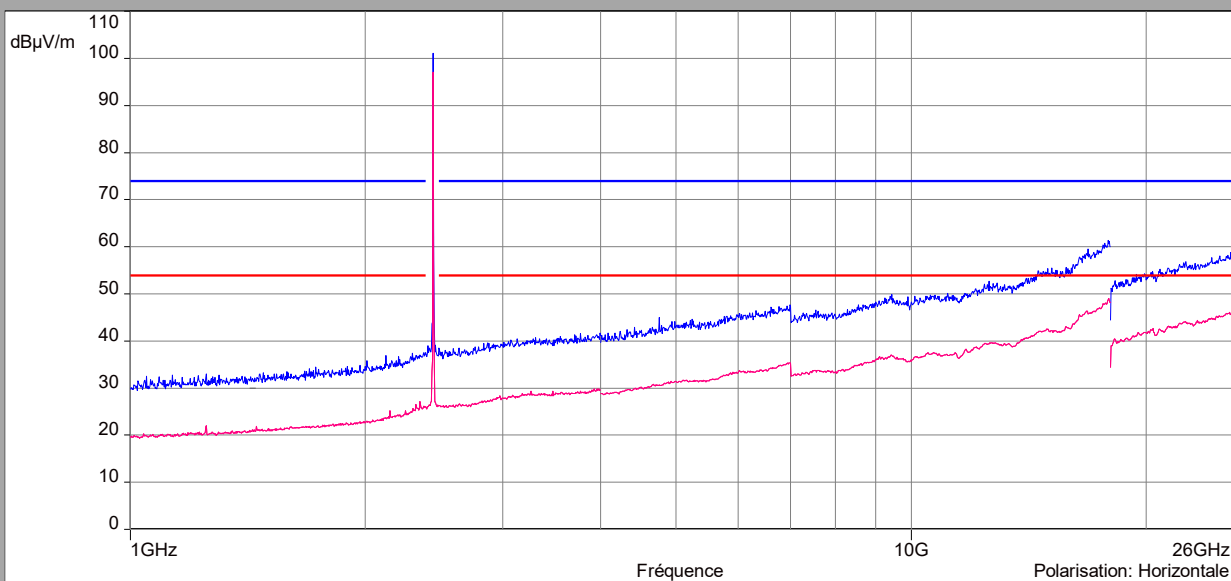
Vertical Polarization

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



Horizontal polarization

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

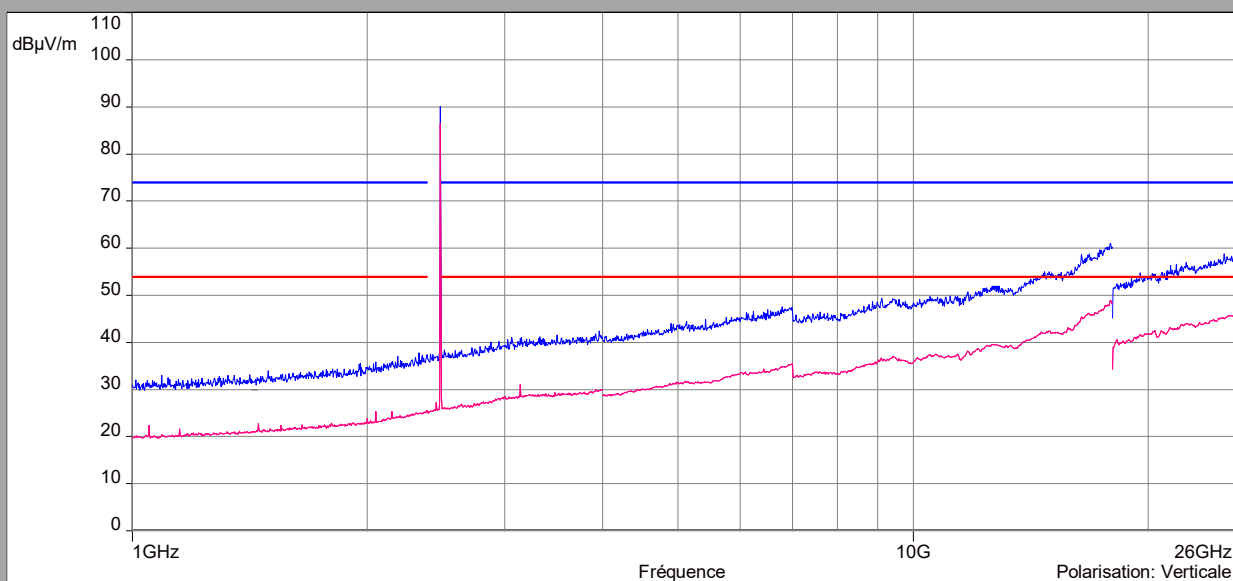


Above 1GHz

Cmax

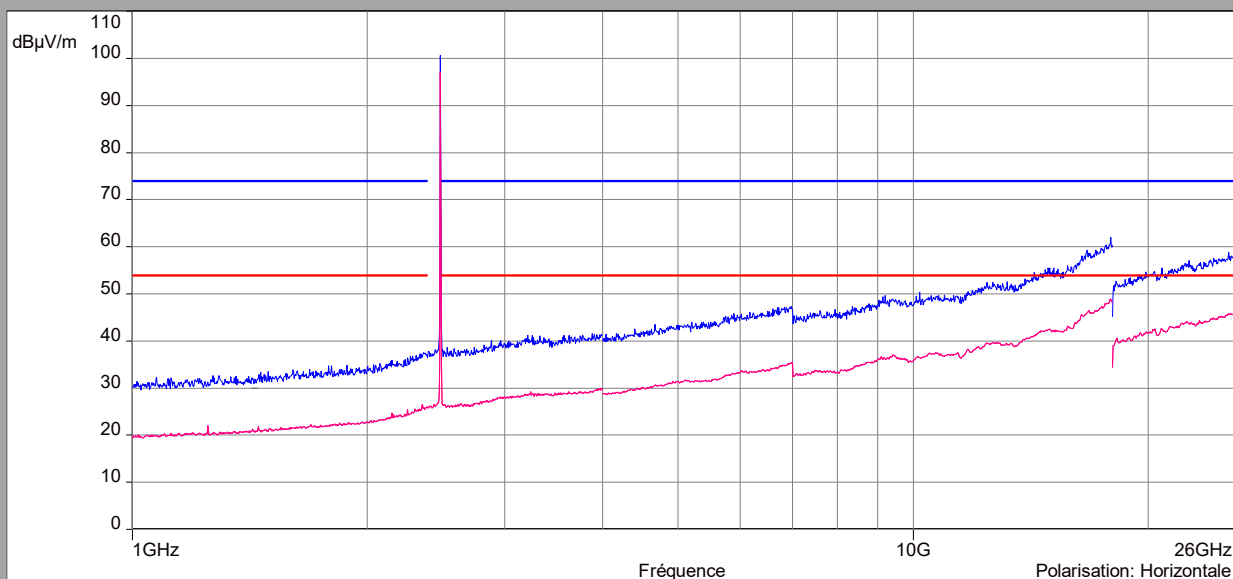
Vertical Polarization

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



Horizontal polarization

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



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

Below 1GHz					
Polarization	Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)
Vertical	30.6	-	23.18	29.5	6.32
Vertical	32.6	-	21.64	29.5	7.86
Vertical	34.6	-	20.44	29.5	9.06
Vertical	43	-	19.19	29.5	10.31
Vertical	120	-	21.75	33	11.25
Vertical	125	-	22.07	33	10.93
Vertical	150	-	20.68	33	12.32
Vertical	350	-	25.33	35.5	10.17
Horizontal	300	-	23.97	35.5	11.53
Horizontal	400	-	21.54	35.5	13.96
Horizontal	450	-	25.64	35.5	9.86

Above 1GHz								
Cmin/Cnom/Cmax								
Polarization	Frequency (MHz)	Average Level (dBµV/m)	Average Level + Duty Cycle Factor (dBµV/m)	Average Limit (dBµV/m)	Average Margin Level (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin Level (dBµV/m)
Horizontale	2390	37.25	41.239	54	12.761	49.03	74	24.97
Verticale	2390	37.01	40.999	54	13.001	47.76	74	26.24
Horizontale	2483.5	39.09	43.079	54	10.921	50.38	74	23.62
Verticale	2483.5	37.95	41.939	54	12.061	48.65	74	25.35
Verticale	3136	31.14	35.129	54	18.871	40.63	74	33.37

11.7. CONCLUSION

Unwanted Emission in restricted frequency bands measurement performed on the sample of the product **Technicolor UIW4059MIL**, SN: **LAB3-V0 nr.030**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.247 limits.

12. UNCERTAINTIES CHART

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

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