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TEST REPORT

N°: 15015967-778552-A(FILE#3282601)

Version : 02

Subject

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

Issued to

ENLAPS
26 avenue jean Kuntzmann,
38330 - montbonnot-saint-martin
FRANCE

Apparatus under test

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

Timelapse digital cameras
ENLAPS
ENLAPS
Tikee
T-EUR-3L-801129
2ASLI-TIKEE002
24785-TIKEE002

Conclusion

See Test Program chapter

Test date

June 29, 2022 to July 7, 2022

Test location

Moirans

FCC Test site

FR0008 - 197516

ISED Test site

FR0008 - 6500A

Sample receipt date

June 29, 2022

Composition of document

76 pages

Document issued on

September 20, 2022

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PUBLICATION HISTORY

Version	Date	Author	Modification
01	September 8,2022	Majid MOURZAGH	Creation of the document
02	September 20, 2022	Majid MOURZAGH	Correction tab result on page 31

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
- RSS 247 Issue 2
- 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 (47CFR Part 15.247 & RSS-247 Issue 2 & RSS-Gen Issue 5) 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):

ENLAPS Tikee

Serial Number: T-EUR-3L-801129



Equipment Under Test

Power supply:

During all the tests, EUT is supplied by V_{nom} : VAC

For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference / Sn	Comments
Supply1	☐ AC ☐ DC ☒ Battery ☐ USB	3.6V	APF18650LION08AI	
Supply2	☐ AC ☒ DC ☐ Battery ☐ USB	5Vusb		

Voltage table used (for Power Line Conducted Emissions):

Type	Measurement performed:	
☒ AC	☒ 120VAC/60Hz	☒ 240VAC/50Hz
☐ DC	☐ +....VDC	☐ -....VDC
☒ USB (Laptop auxiliary)	☒ 120VAC/60Hz (Laptop auxiliary)	☒ 240VAC/50Hz(Laptop auxiliary)

**Inputs/outputs - Cable:**

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
μUSB cable	Cordon USB 2.0 type A et micro B	1	☐	☒	☒	

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop LENOVO	L470	/	Use to set the EUT
ACDC adapter LENOVO	ADLX90NLC3A	/	Used for Power Line Conducted Emissions
PSU Ravower Prime	RP-PC028	/	Used for Power Line Conducted Emissions

Equipment information:

Type:	WIFI			
Frequency band:	2400MHz-2483.5MHz			
Standard:	☒ 802.11b	☒ 802.11g	☒ 802.11n HT20	☐ 802.11n HT40
Spectrum Modulation:	☒ DSSS		☒ OFDM	
Number of Channel:	11			
Spacing channel:	5MHz			
Channel bandwidth:	☒ 20MHz		☐ 40MHz	
Antenna Type:	☒ Integral	☐ External	☐ Dedicated	
Antenna connector:	☐ Yes		☒ No	☐ Temporary for test
Transmit chains:	☒ 1	☐ 2	☐ 3	☐ 4
Beam forming gain:	☐ Yes: XdB		☒ No	
Receiver chains	☒ 1	☐ 2	☐ 3	☐ 4
Antenna requirements §15.203	The transmitter uses an integral antenna and it permanently connected			
	Conducted Method (welded connection, according to manufacturer's requirements)			
Type of equipment:	☒ Stand-alone	☐ Plug-in	☐ Combined	
Ad-Hoc mode:	☐ Yes		☒ No	
Duty cycle:	☒ Continuous duty	☐ Intermittent duty	☐ 100% duty	
Operating temperature range:	Tnom	20°C		
Type of power source:	☒ DC power supply		☒ Battery	
Operating voltage range:	Vnom:	☒ 5Vdc	☒ 3.6	

Antenna Characteristic			
Antenna assembly	Gain (dBi)	Frequency Band (MHz)	Impedance(Ω)
1	2.5	2400MHz to 2500MHz	50

Accumulated gain calculation		
Formula used for calculation	KDB	Correlated
		☐ Yes / ☒ No

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

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



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

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



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



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DATA RATE									
802.11n HT40									
Available for EUT	MCS Index	Spatial streams	Modulation				Data Rate (Mbps)		Worst Case Modulation
							(GI = 800ns)	(GI = 400ns)	
□	0	1	BPSK				13	15	□
	1	1	QPSK				27	30	□
	2	1	QPSK				40.5	45	□
	3	1	16-QAM				54	60	□
	4	1	16-QAM				81	90	□
	5	1	64-QAM				108	120	□
	6	1	64-QAM				121.5	135	□
	7	1	64-QAM				135	150	□
	32	1	BPSK	-	-	-	6.0	6.7	□
□	8	2	BPSK				27	30	□
	9	2	QPSK				54	60	□
	10	2	QPSK				81	90	□
	11	2	16-QAM				108	120	□
	12	2	16-QAM				162	180	□
	13	2	64-QAM				216	240	□
	14	2	64-QAM				243	270	□
	15	2	64-QAM				270	300	□
	33	2	16-QAM	QPSK	-	-	81	90.0	□
	34	2	64-QAM	QPSK	-	-	108	120	□
	35	2	64-QAM	16-QAM	-	-	135	150	□
	36	2	16-QAM	QPSK	-	-	121.5	135	□
	37	2	64-QAM	QPSK	-	-	162	180	□
	38	2	64-QAM	16-QAM	-	-	202.5	225	□
	□	16	3	BPSK				40.5	45
17		3	QPSK				81	90	□
18		3	QPSK				121.5	135	□
19		3	16-QAM				162	180	□
20		3	16-QAM				243	270	□
21		3	64-QAM				324	360	□
22		3	64-QAM				364.5	405	□
23		3	64-QAM				405	450	□
39		3	16-QAM	QPSK	QPSK	-	108	120	□
40		3	16-QAM	16-QAM	QPSK	-	135	150	□
41		3	64-QAM	QPSK	QPSK	-	135	150	□
42		3	64-QAM	16-QAM	QPSK	-	162	180	□
43		3	64-QAM	16-QAM	16-QAM	-	189	210	□
44		3	64-QAM	64-QAM	QPSK	-	189	210	□
45		3	64-QAM	64-QAM	16-QAM	-	216	240	□
46		3	16-QAM	QPSK	QPSK	-	162	180	□
47		3	16-QAM	16-QAM	QPSK	-	202.5	225	□
48		3	64-QAM	QPSK	QPSK	-	202.5	225	□
49		3	64-QAM	16-QAM	QPSK	-	243	270	□
50		3	64-QAM	16-QAM	16-QAM	-	283.5	315	□
51		3	64-QAM	64-QAM	QPSK	-	283.5	315	□
52		3	64-QAM	64-QAM	16-QAM	-	324	360	□
□	24	4	BPSK				54	60	□
	25	4	QPSK				108	120	□
	26	4	QPSK				162	180	□
	27	4	16-QAM				216	240	□
	28	4	16-QAM				324	360	□
	29	4	64-QAM				432	480	□
	30	4	64-QAM				486	540	□
	31	4	64-QAM				540	600	□
	53	4	16-QAM	QPSK	QPSK	QPSK	135	150	□
	54	4	16-QAM	16-QAM	QPSK	QPSK	162	180	□
	55	4	16-QAM	16-QAM	16-QAM	QPSK	189	210	□
	56	4	64-QAM	QPSK	QPSK	QPSK	162	180	□
	57	4	64-QAM	16-QAM	QPSK	QPSK	189	210	□
	58	4	64-QAM	16-QAM	16-QAM	QPSK	216	240	□
	59	4	64-QAM	16-QAM	16-QAM	16-QAM	243	270	□
	60	4	64-QAM	QPSK	QPSK	QPSK	216	240	□
	61	4	64-QAM	16-QAM	16-QAM	QPSK	243	270	□
	62	4	64-QAM	16-QAM	16-QAM	16-QAM	270	300	□
	63	4	64-QAM	64-QAM	64-QAM	QPSK	270	300	□
	64	4	64-QAM	64-QAM	64-QAM	16-QAM	297	330	□
	65	4	16-QAM	QPSK	QPSK	QPSK	202.5	225	□
	66	4	16-QAM	16-QAM	QPSK	QPSK	243	270	□
	67	4	16-QAM	16-QAM	16-QAM	QPSK	283.5	315	□
	68	4	64-QAM	QPSK	QPSK	QPSK	243	270	□
	69	4	64-QAM	16-QAM	QPSK	QPSK	283.5	315	□
	70	4	64-QAM	16-QAM	16-QAM	QPSK	324	360	□
	71	4	64-QAM	16-QAM	16-QAM	16-QAM	364.5	405	□
	72	4	64-QAM	64-QAM	QPSK	QPSK	324	360	□
	73	4	64-QAM	64-QAM	16-QAM	QPSK	364.5	405	□
	74	4	64-QAM	64-QAM	16-QAM	16-QAM	405	450	□
	75	4	64-QAM	64-QAM	64-QAM	QPSK	405	450	□
	76	4	64-QAM	64-QAM	64-QAM	16-QAM	445.5	495	□



2.2. RUNNING MODE

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

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

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



Hardware information		
Software (if applicable):	V. :	5.0.5 - MP1.10
<pre>echo wifipower -power on > /dev/ttyRSH1 echo wifisetup -mode sta -ssid TELIUM3 -pass 12345678 -sec wpa2_psk > /dev/ttyRSH1 ping 192.168.1.2 -s 65000 #WIFI 2,4GHz Channel 1 802.11b Mode AP wl -i eth2 down wl -i eth1 down wl -i eth1 country US wl -i eth1 chanspec 1/20 wl -i eth1 rateset 1b wl -i eth1 rateset -m 00 wl -i eth1 rateset -v 00 wl -i eth1 txpwr1 1 -d wl -i eth1 up #WIFI 2,4GHz Channel 6 802.11b Mode AP wl -i eth2 down wl -i eth1 down wl -i eth1 country US wl -i eth1 chanspec 6/20 wl -i eth1 rateset 1b wl -i eth1 rateset -m 00 wl -i eth1 rateset -v 00 wl -i eth1 txpwr1 1 -d wl -i eth1 up #WIFI 2,4GHz Channel 11 802.11b Mode AP wl -i eth2 down wl -i eth1 down wl -i eth1 country US wl -i eth1 chanspec 11/20 wl -i eth1 rateset 1b wl -i eth1 rateset -m 00 wl -i eth1 rateset -v 00 wl -i eth1 txpwr1 1 -d wl -i eth1 up #WIFI 2,4GHz Channel 1 802.11g Mode AP wl -i eth2 down wl -i eth1 down wl -i eth1 country US wl -i eth1 chanspec 1/20 wl -i eth1 rateset 6b wl -i eth1 rateset -m 00 wl -i eth1 rateset -v 00 wl -i eth1 txpwr1 1 -d wl -i eth1 up</pre>		



#WIFI 2,4GHz Channel 6 802.11g Mode AP

wl -i eth2 down
wl -i eth1 down
wl -i eth1 country US
wl -i eth1 chanspec 6/20
wl -i eth1 rateset 6b
wl -i eth1 rateset -m 00
wl -i eth1 rateset -v 00
wl -i eth1 txpwr1 1 -d
wl -i eth1 up

#WIFI 2,4GHz Channel 11 802.11g Mode AP

wl -i eth2 down
wl -i eth1 down
wl -i eth1 country US
wl -i eth1 chanspec 11/20
wl -i eth1 rateset 6b
wl -i eth1 rateset -m 00
wl -i eth1 rateset -v 00
wl -i eth1 txpwr1 1 -d
wl -i eth1 up

#WIFI 2,4GHz Channel 1 802.11n HT20 Mode AP

wl -i eth2 down
wl -i eth1 down
wl -i eth1 country US
wl -i eth1 chanspec 1/20
wl -i eth1 rateset 1b
wl -i eth1 rateset -m 01
wl -i eth1 rateset -v 00
wl -i eth1 txpwr1 1 -d
wl -i eth1 up

#WIFI 2,4GHz Channel 6 802.11n HT20 Mode AP

wl -i eth2 down
wl -i eth1 down
wl -i eth1 country US
wl -i eth1 chanspec 6/20
wl -i eth1 rateset 1b
wl -i eth1 rateset -m 01
wl -i eth1 rateset -v 00
wl -i eth1 txpwr1 1 -d
wl -i eth1 up

#WIFI 2,4GHz Channel 11 802.11n HT20 Mode AP

wl -i eth2 down
wl -i eth1 down
wl -i eth1 country US
wl -i eth1 chanspec 11/20
wl -i eth1 rateset 1b
wl -i eth1 rateset -m 01
wl -i eth1 rateset -v 00
wl -i eth1 txpwr1 1 -d
wl -i eth1 up



2.3. EQUIPMENT LABELLING

None

2.4. EQUIPMENT MODIFICATION

☒ None ☐ Modification:

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : July 6, 2022
Ambient temperature : 23 °C
Relative humidity : 39 %

3.2. TEST SETUP

- The Equipment Under Test is installed:

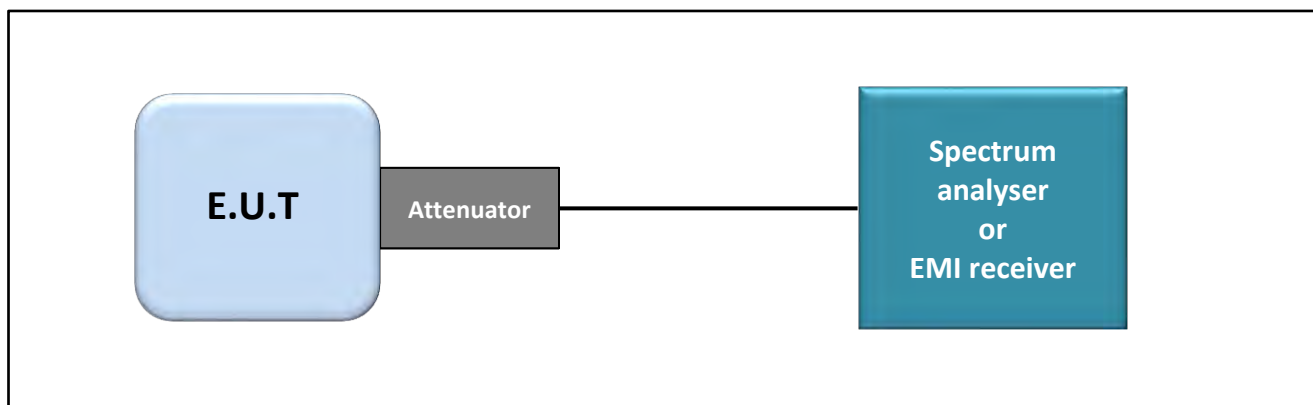
- ☐ On a table
☒ On FAR

- Measurement is performed with a spectrum analyzer in:

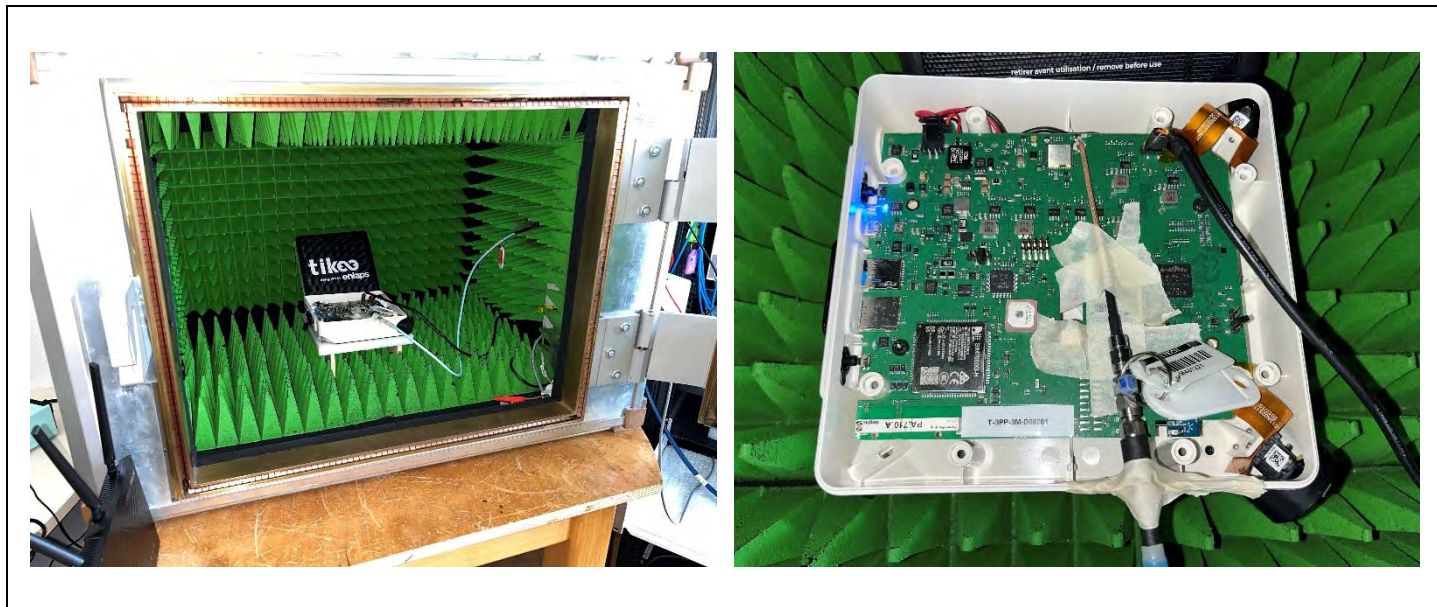
- ☒ Conducted Method
☐ Radiated Method

- Test Procedure:

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



Test set up of Occupied Bandwidth



Photograph for Occupied bandwidth

3.3. LIMIT

None

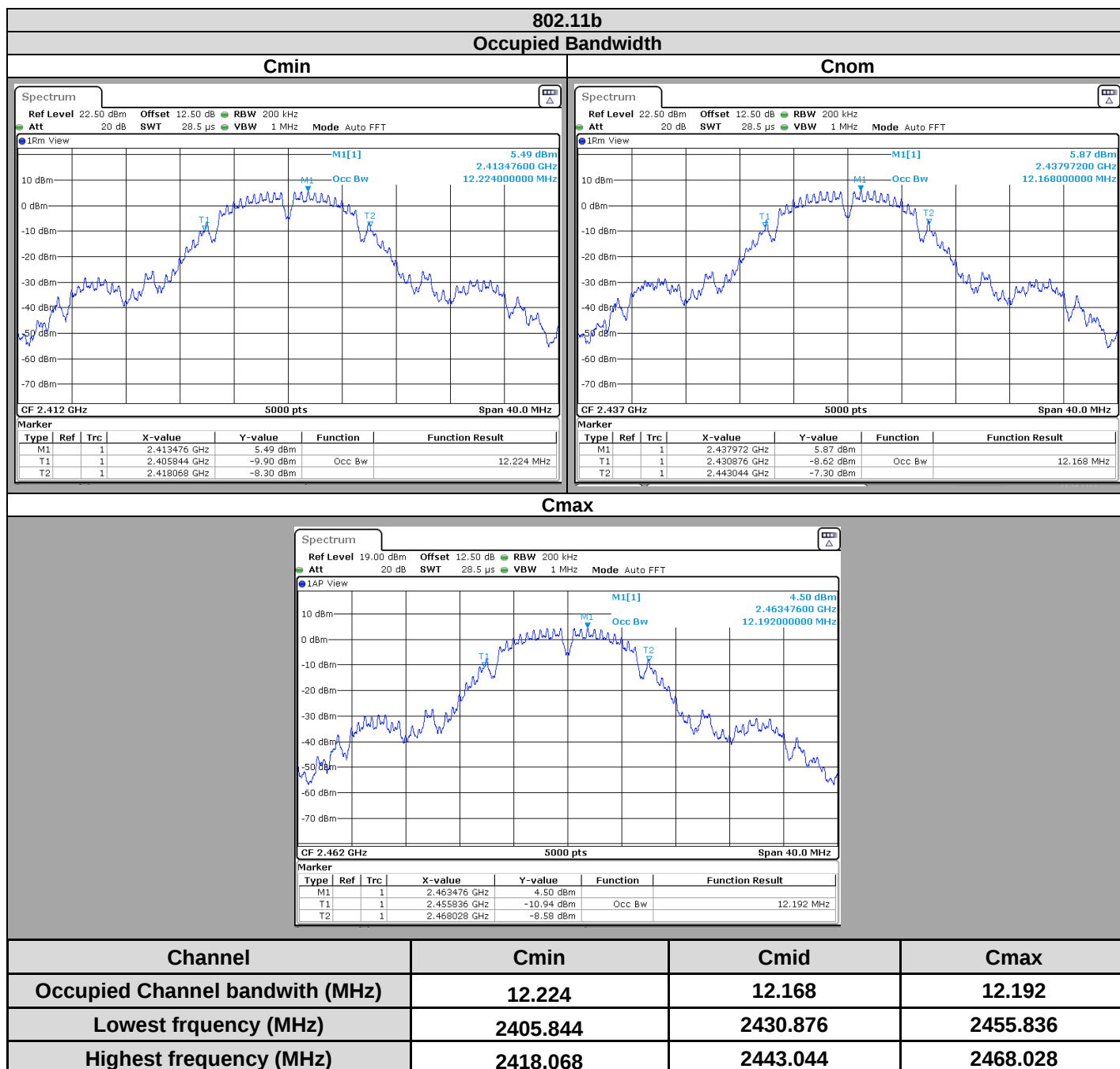
3.4. TEST EQUIPMENT LIST

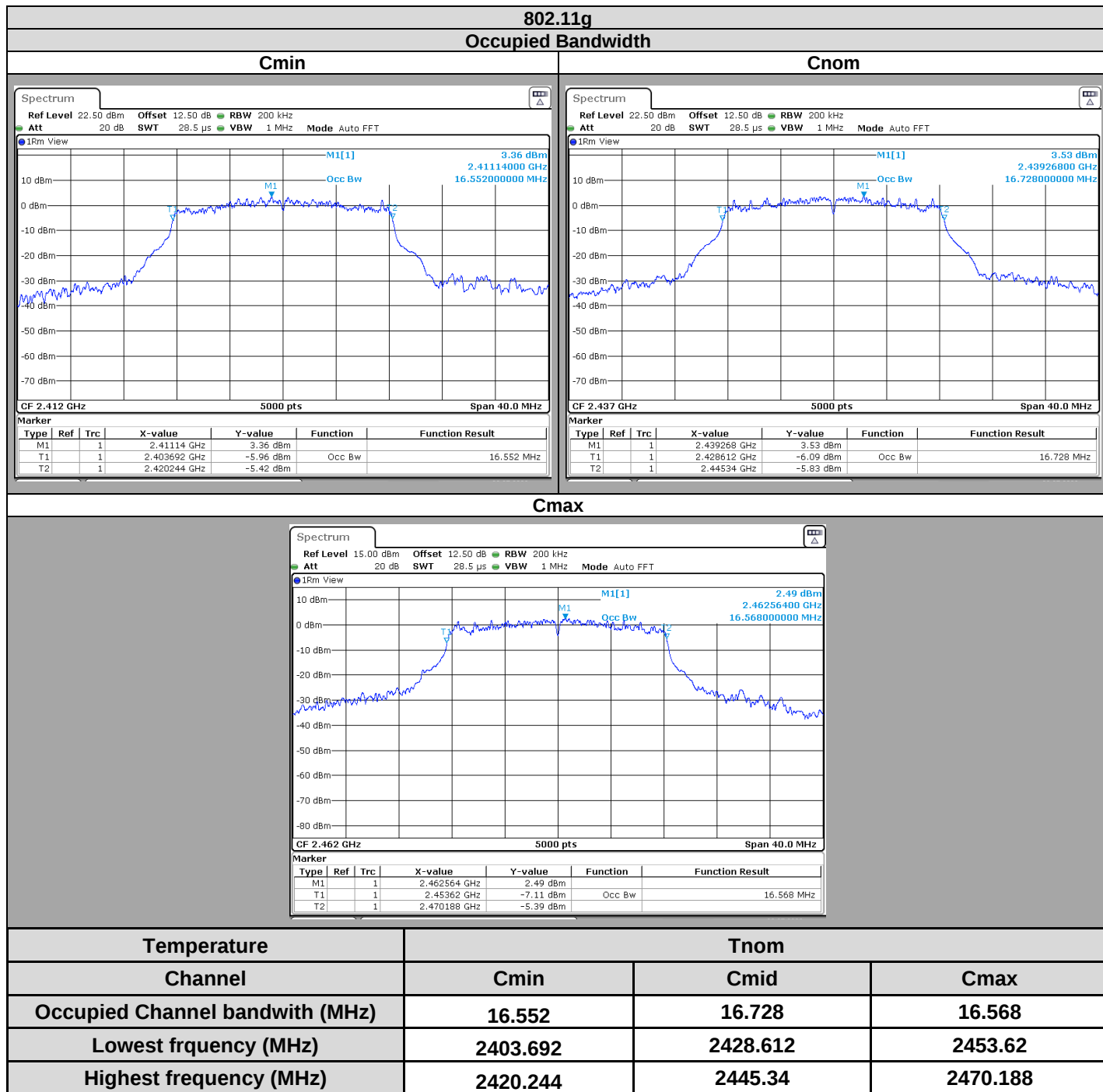
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	—	A7122269	09/20	09/22
Cable Measure	—	36G	A5329604	04/21	08/22
Full Anechoic Room	SIEPEL	—	D3044024	□*	□*
Multimeter - CEM	FLUKE	87	A1240251	03/21	03/23
SMA 1.5m	SUCOFLEX	18GHz	A5329863	05/22	05/23
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	11/21	11/23
Thermo-hygrometer	TESTO	608-H1	B4204120	12/20	12/22
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	01/21	01/23

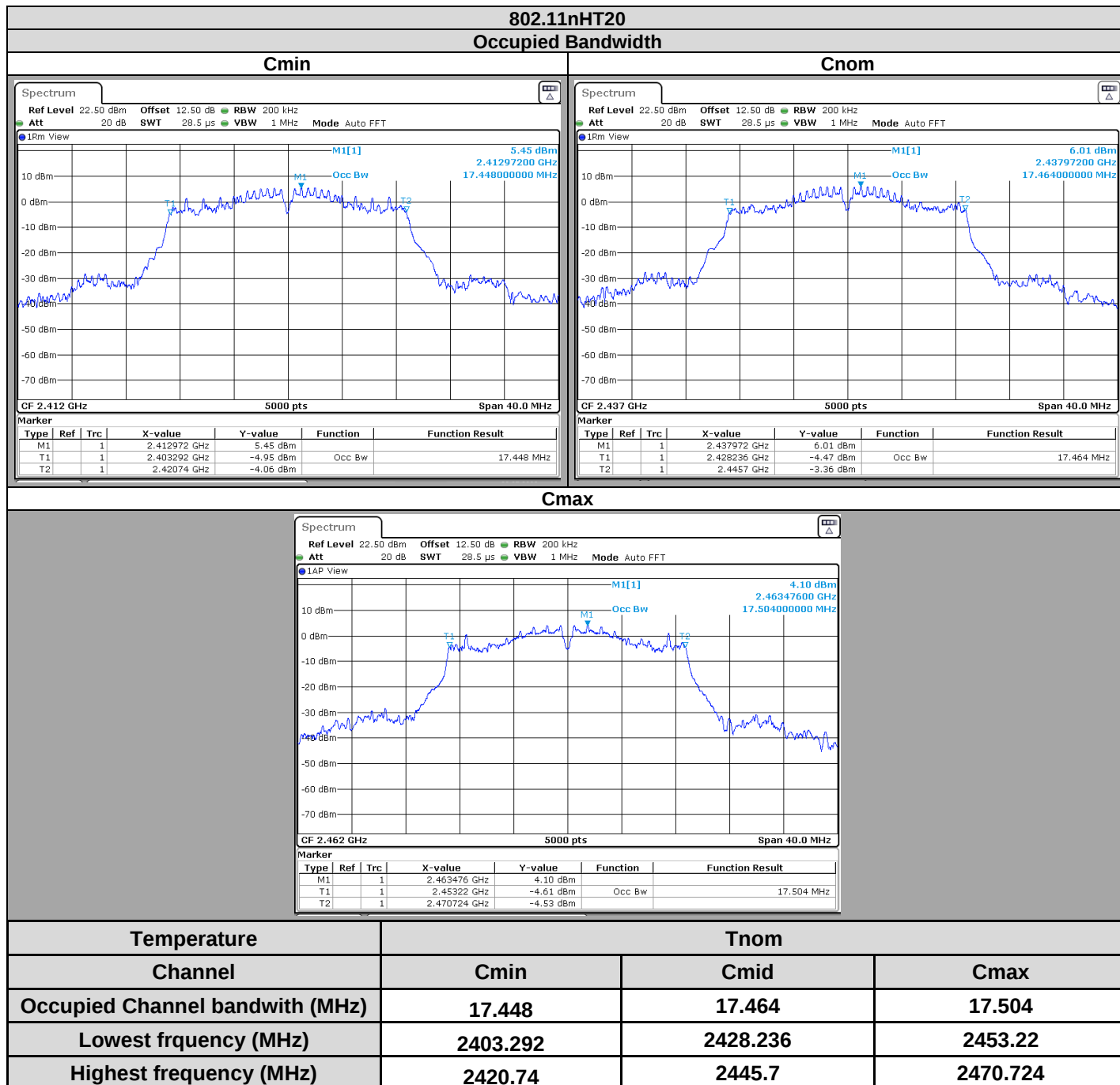
* : no degradation observed before test

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 **ENLAPS Tikee**, SN: **T-EUR-3L-801129**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS-GEN ISSUE 5** limits.

4. 6dB EMISSION BANDWIDTH

4.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : July 6, 2022
Ambient temperature : 23 °C
Relative humidity : 39 %

4.2. TEST SETUP

- The Equipment Under Test is installed:

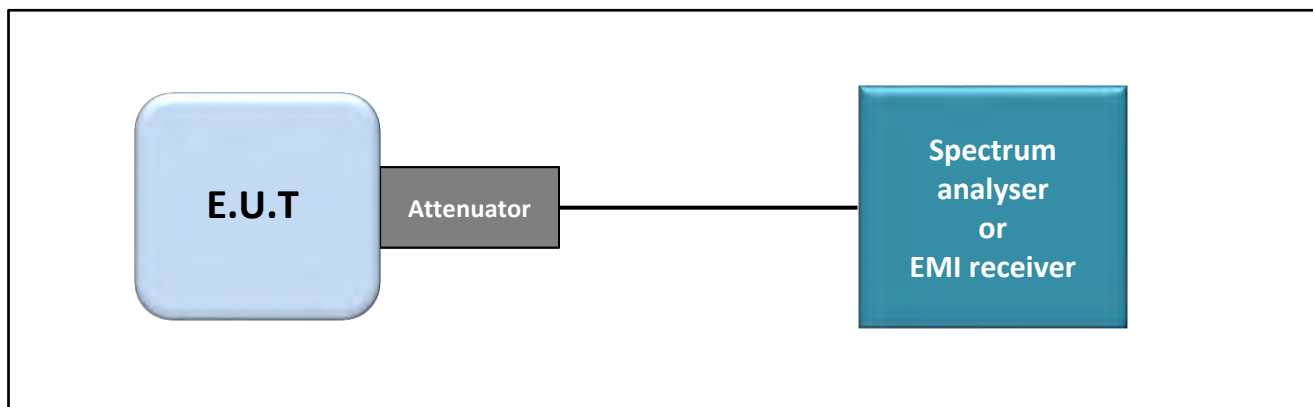
- ☐ On a table
- ☒ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

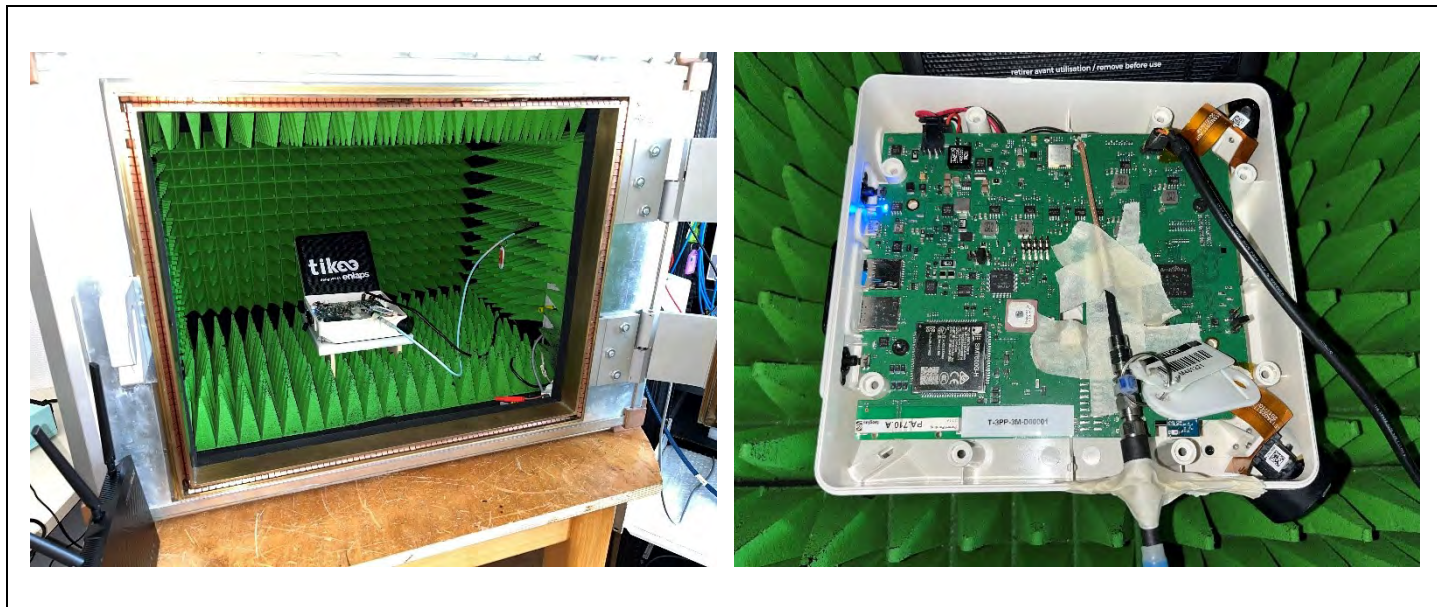
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.2



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

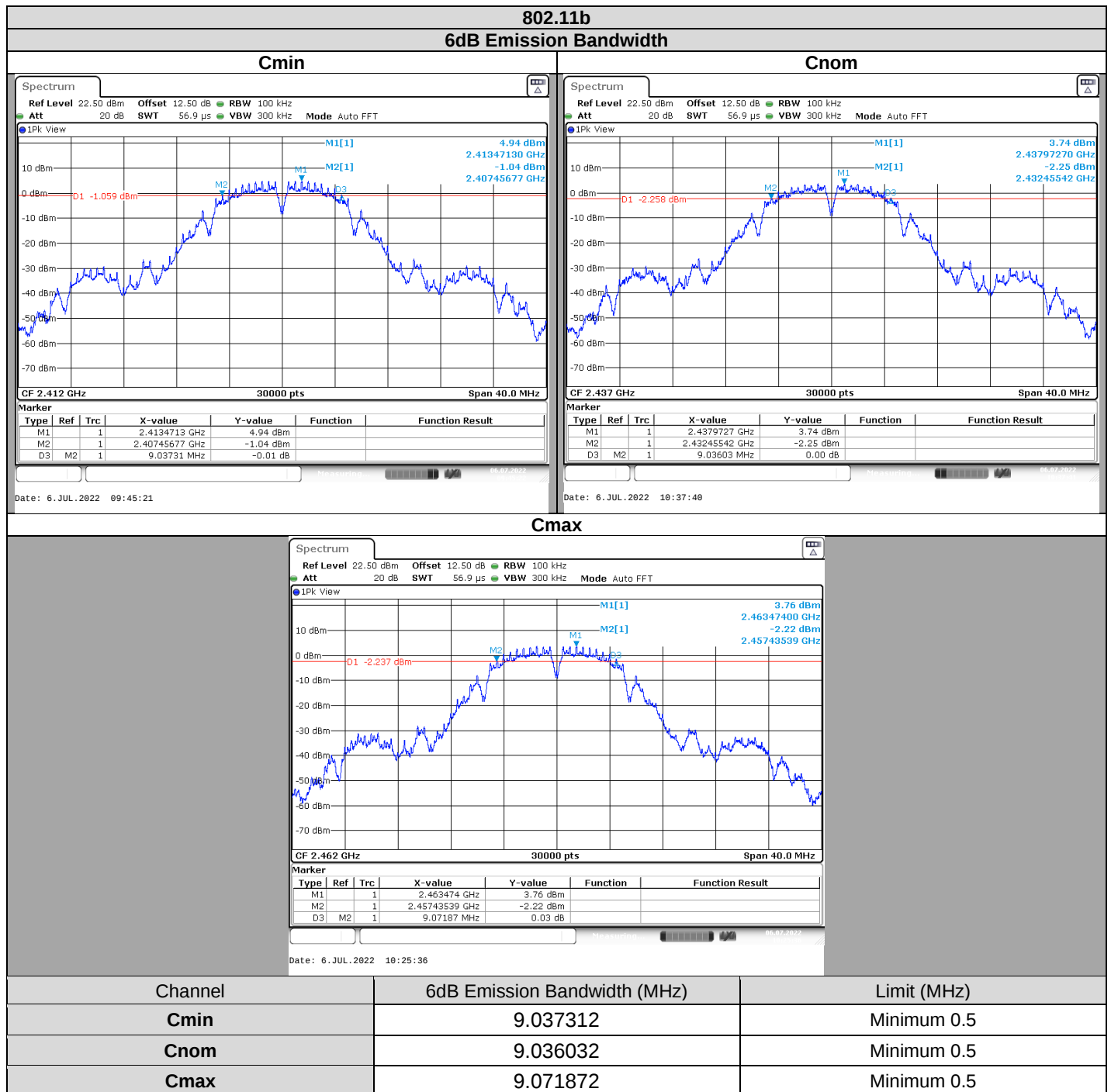
4.4. TEST EQUIPMENT LIST

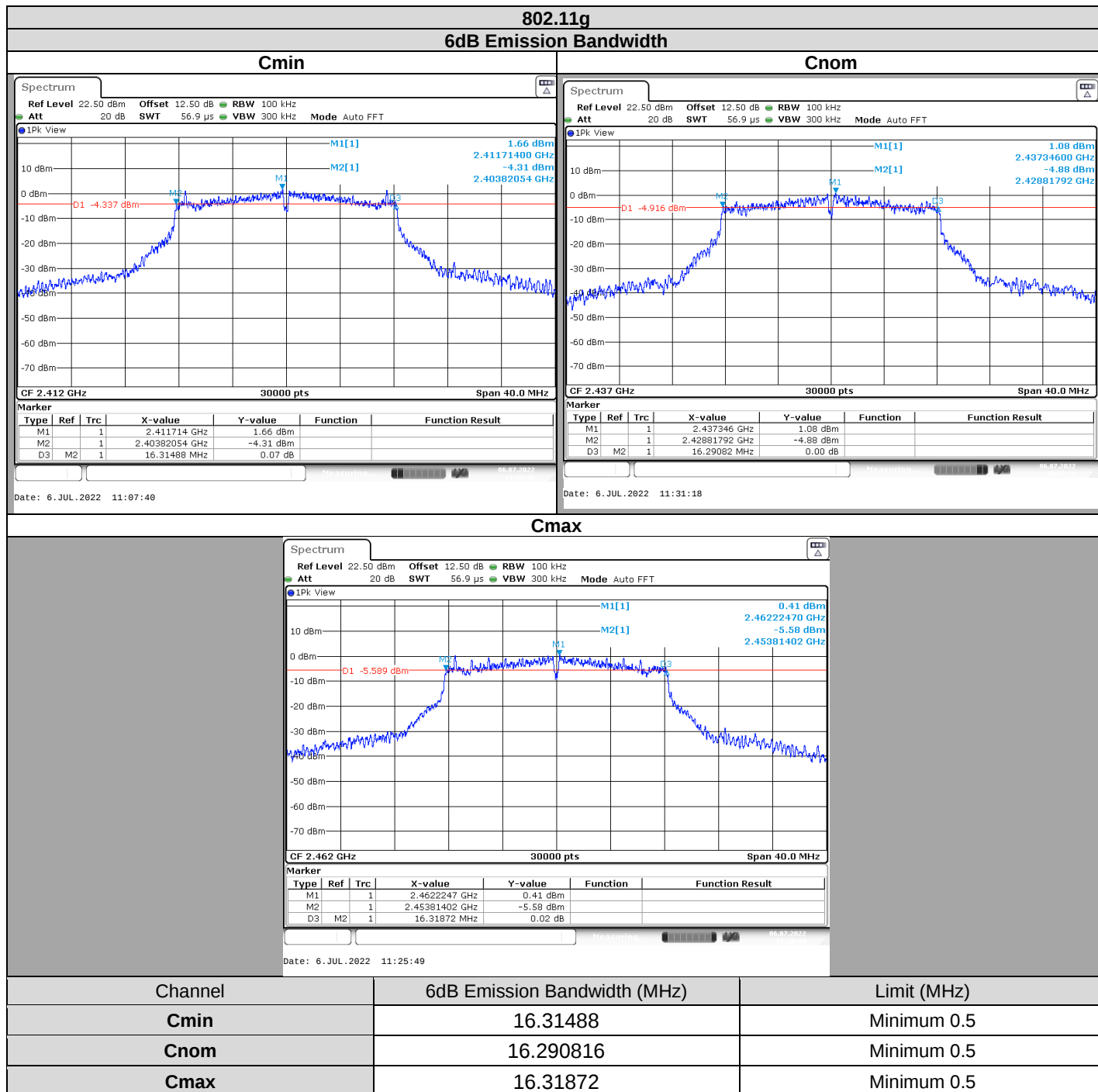
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	—	A7122269	09/20	09/22
Cable Measure	—	36G	A5329604	04/21	08/22
Full Anechoic Room	SIEPEL	—	D3044024	α*	α*
Multimeter - CEM	FLUKE	87	A1240251	03/21	03/23
SMA 1.5m	SUCOFLEX	18GHz	A5329863	05/22	05/23
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	11/21	11/23
Thermo-hygrometer	TESTO	608-H1	B4204120	12/20	12/22
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	01/21	01/23

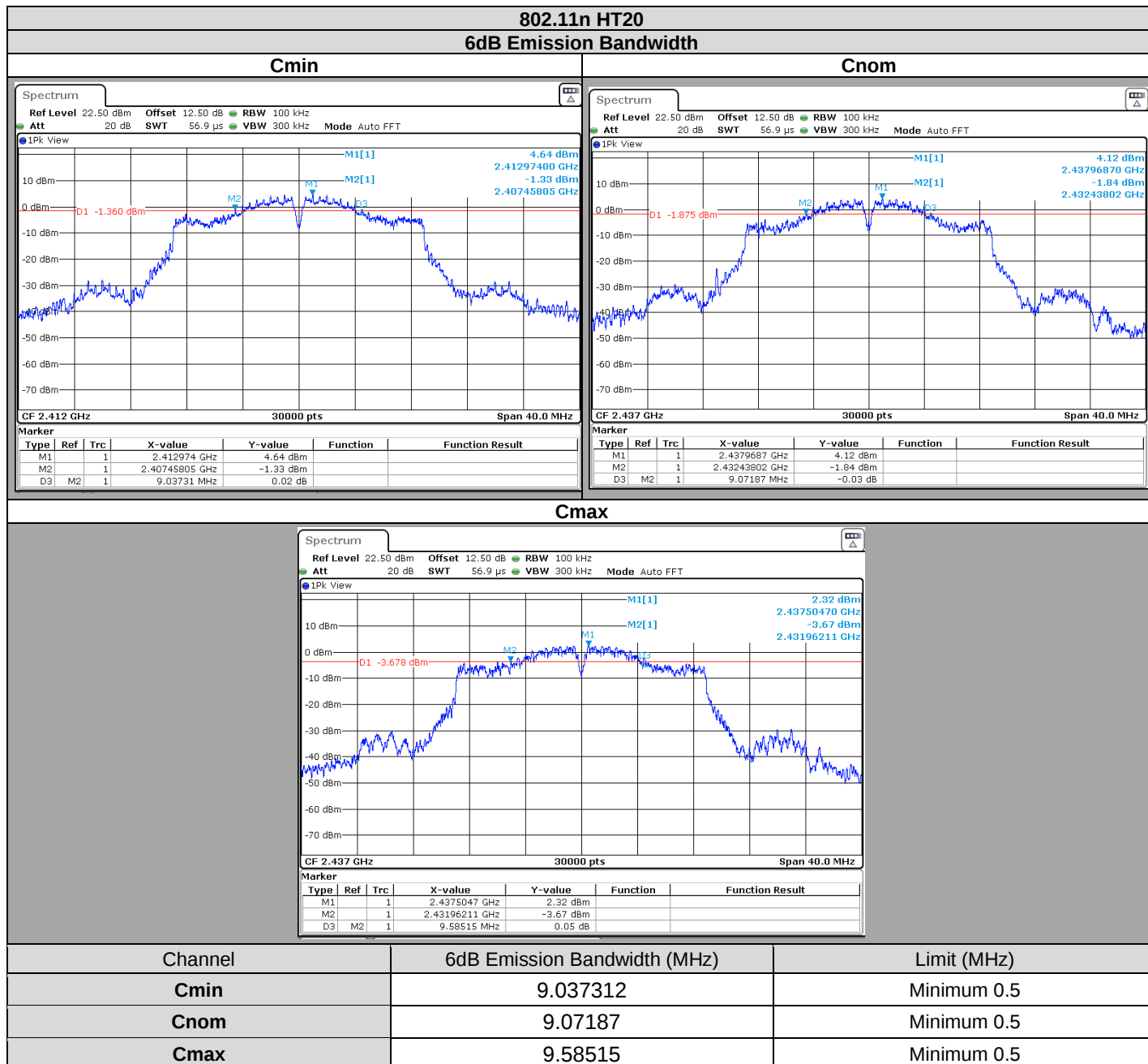
* : no degradation observed before test

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 **ENLAPS** Tikee, SN: **T-EUR-3L-801129**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

5. MAXIMUM CONDUCTED OUTPUT POWER

5.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : July 6, 2022
Ambient temperature : 23 °C
Relative humidity : 39 %

5.2. TEST SETUP

- The Equipment under Test is installed:

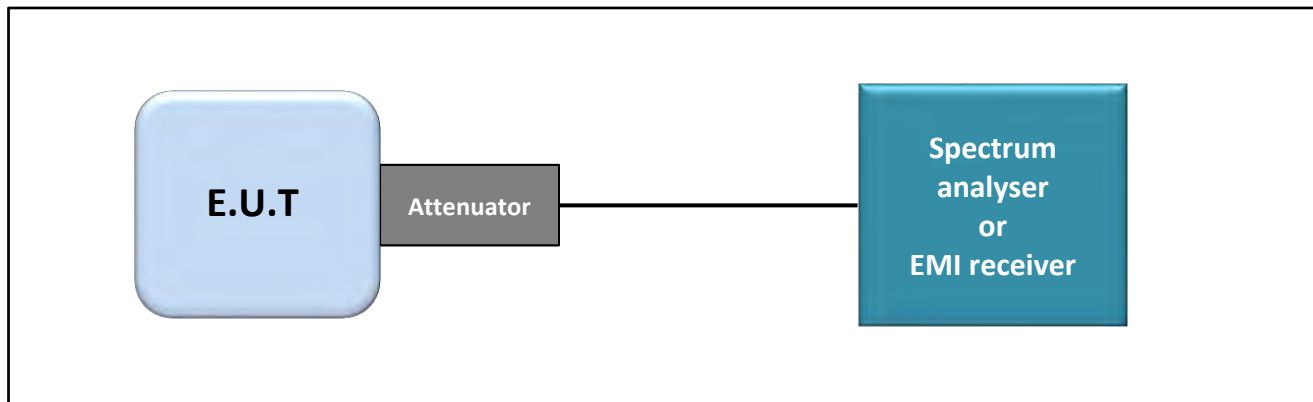
- ☐ On a table
- ☒ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

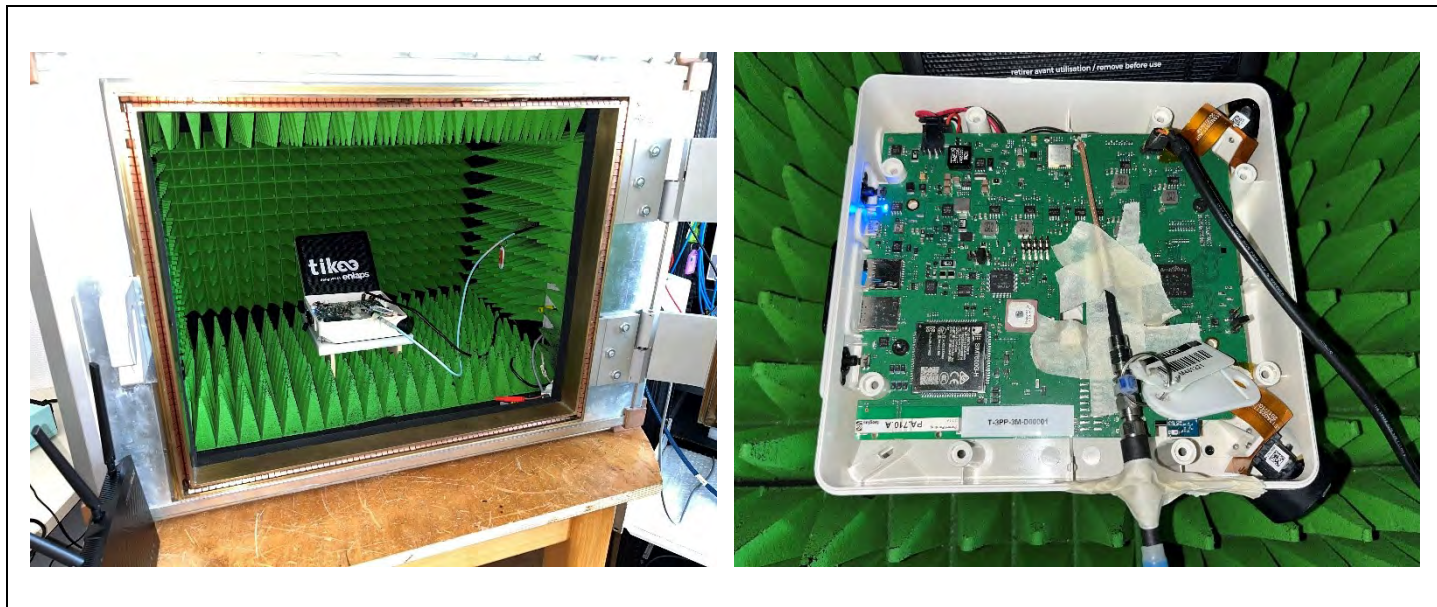
- ☐ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☐ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.3.1.2
- ☒ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.3.2.2(Method AVGSA-1)
- ☐ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.3.2.2(Method AVGSA-2)
- ☐ KDB 662911 D01 Multiple Transmitter Output v02r01



Test set up of Maximum Conducted Output Power



Photograph for Maximum Conducted Output Power

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

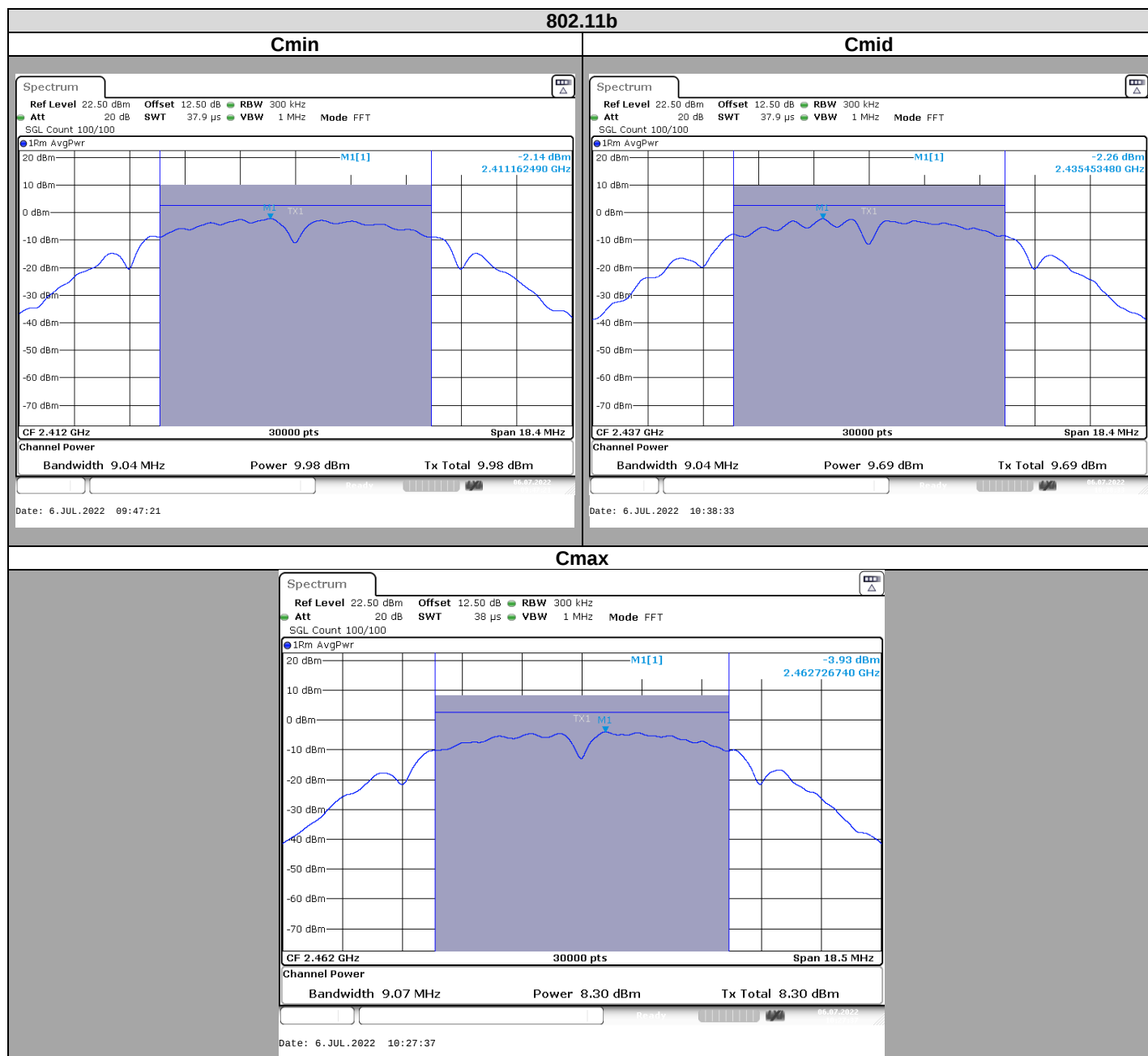
5.4. TEST EQUIPMENT LIST

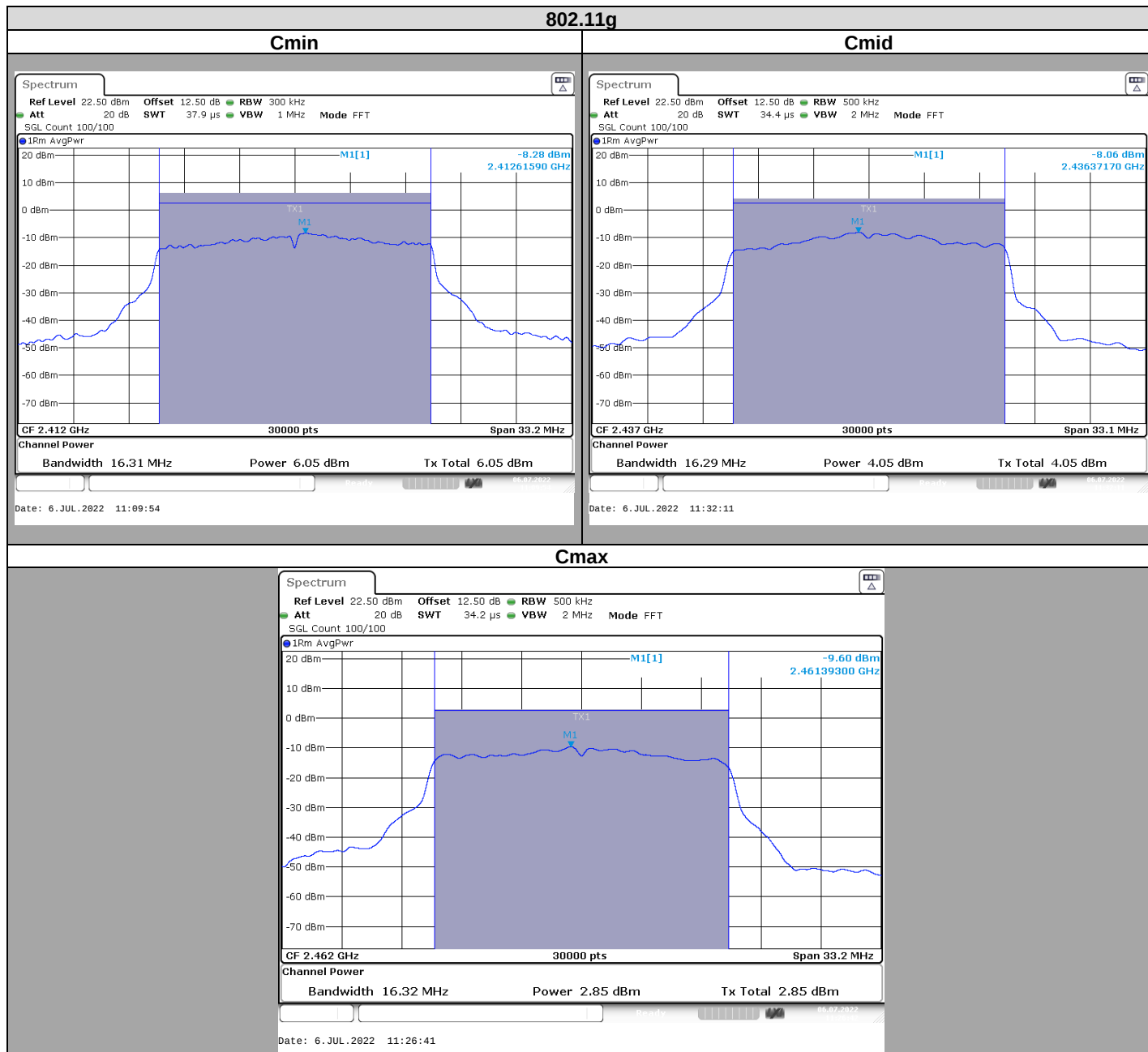
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	—	A7122269	09/20	09/22
Cable Measure	—	36G	A5329604	04/21	08/22
Full Anechoic Room	SIEPEL	—	D3044024	□*	□*
Multimeter - CEM	FLUKE	87	A1240251	03/21	03/23
SMA 1.5m	SUCOFLEX	18GHz	A5329863	05/22	05/23
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	11/21	11/23
Thermo-hygrometer	TESTO	608-H1	B4204120	12/20	12/22
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	01/21	01/23

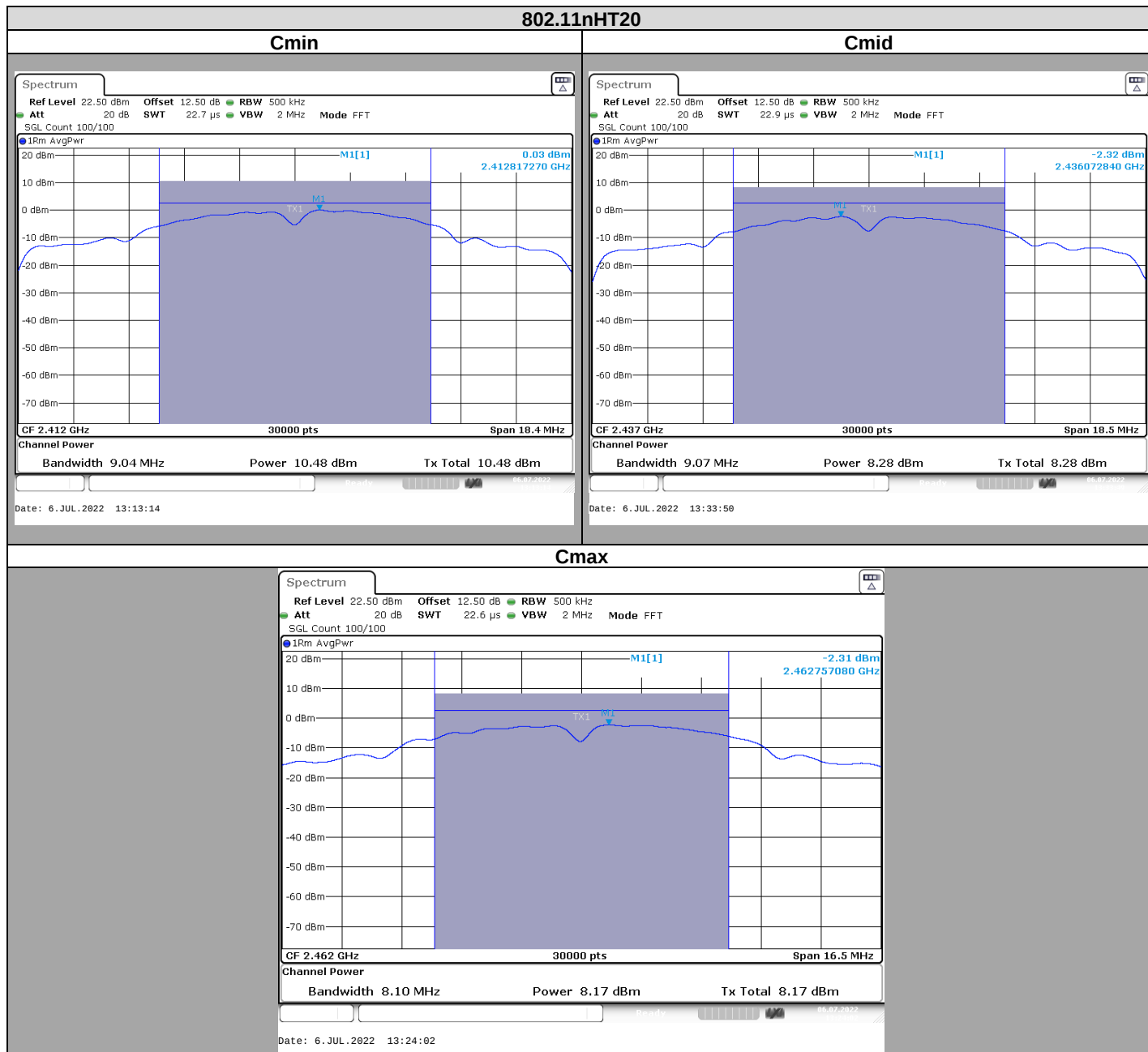
* : no degradation observed before test

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

5.5. RESULTS









Spectrum Analyzer Offset:
Cable Loss=2.5dB + Attenuator= 10dB

802.11b				
Channel	Tx1 (dBm)	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	9.94	2.5	9.94	30
Cnom	9.69	2.5	9.69	30
Cmax	8.30	2.5	8.30	30

802.11g				
Channel	Tx1 (dBm)	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	6.05	2.5	6.05	30
Cnom	4.05	2.5	4.05	30
Cmax	2.84	2.5	2.84	30

802.11n HT20				
Channel	Tx1 (dBm)	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	10.48	2.5	10.48	30
Cnom	8.26	2.5	8.26	30
Cmax	8.17	2.5	8.17	30

5.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **ENLAPS** Tikee, SN: **T-EUR-3L-801129**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

6. POWER SPECTRAL DENSITY

6.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : July 6, 2022
Ambient temperature : 23 °C
Relative humidity : 39 %

6.2. TEST SETUP

- The Equipment Under Test is installed:

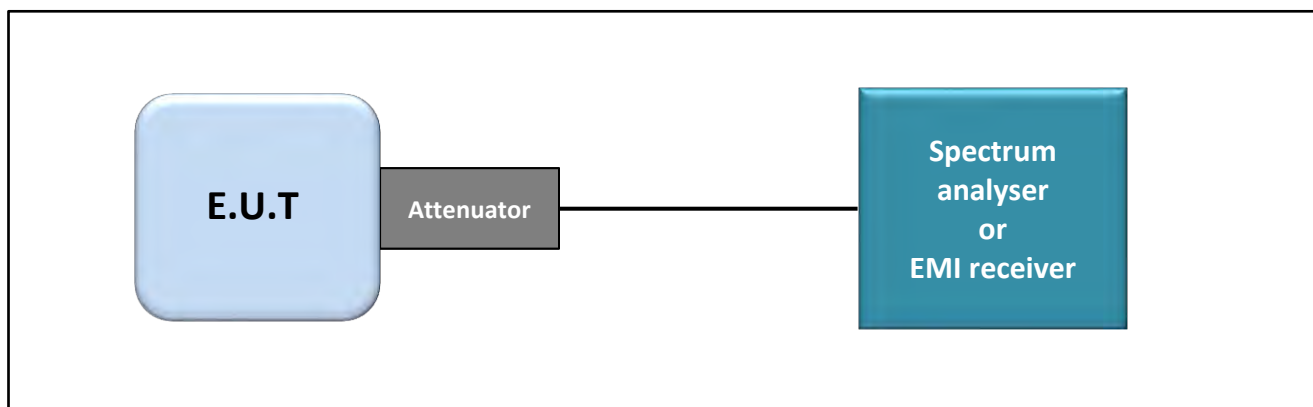
- ☐ On a table
- ☒ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

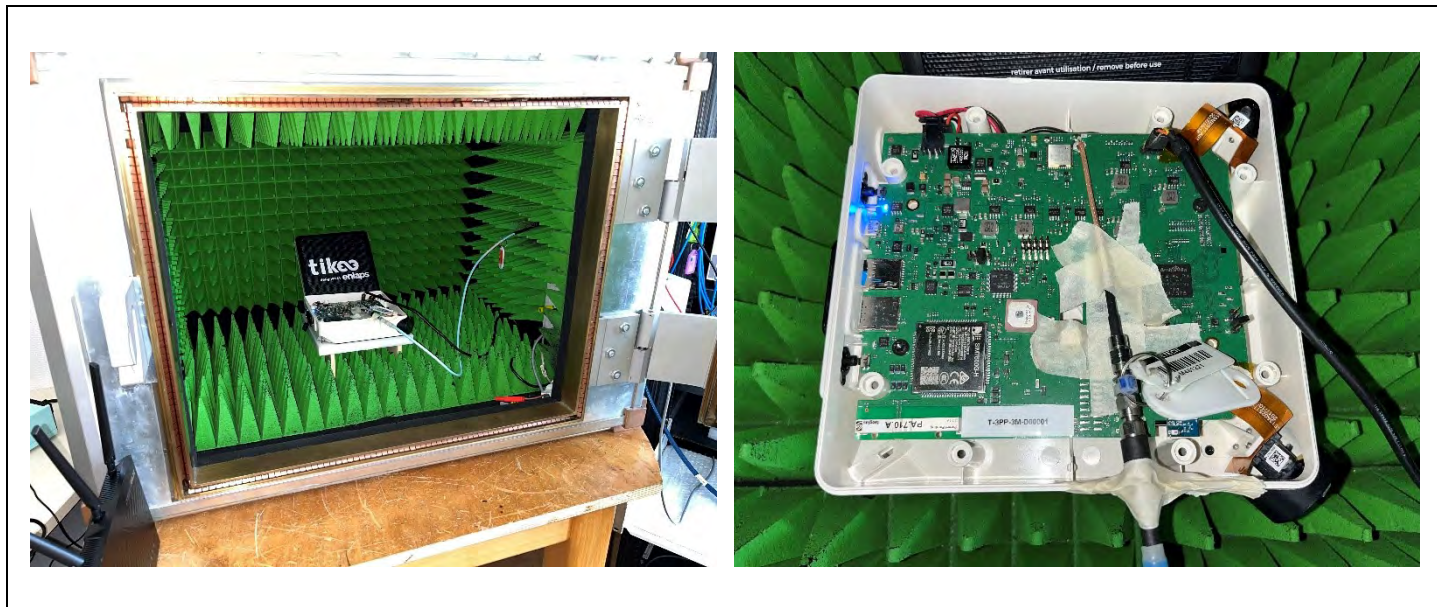
- ☐ Conducted Method
- ☒ Radiated Method

- Test Procedure:

- ☒ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.4 (Method PKPSD)
- ☐ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.4 (Method AVGPSD-1)
- ☐ KDB 662911 D01 Multiple Transmitter Output v02r01



Test set up of Power Spectral Density



Photograph for Power Spectral Density

6.3. 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

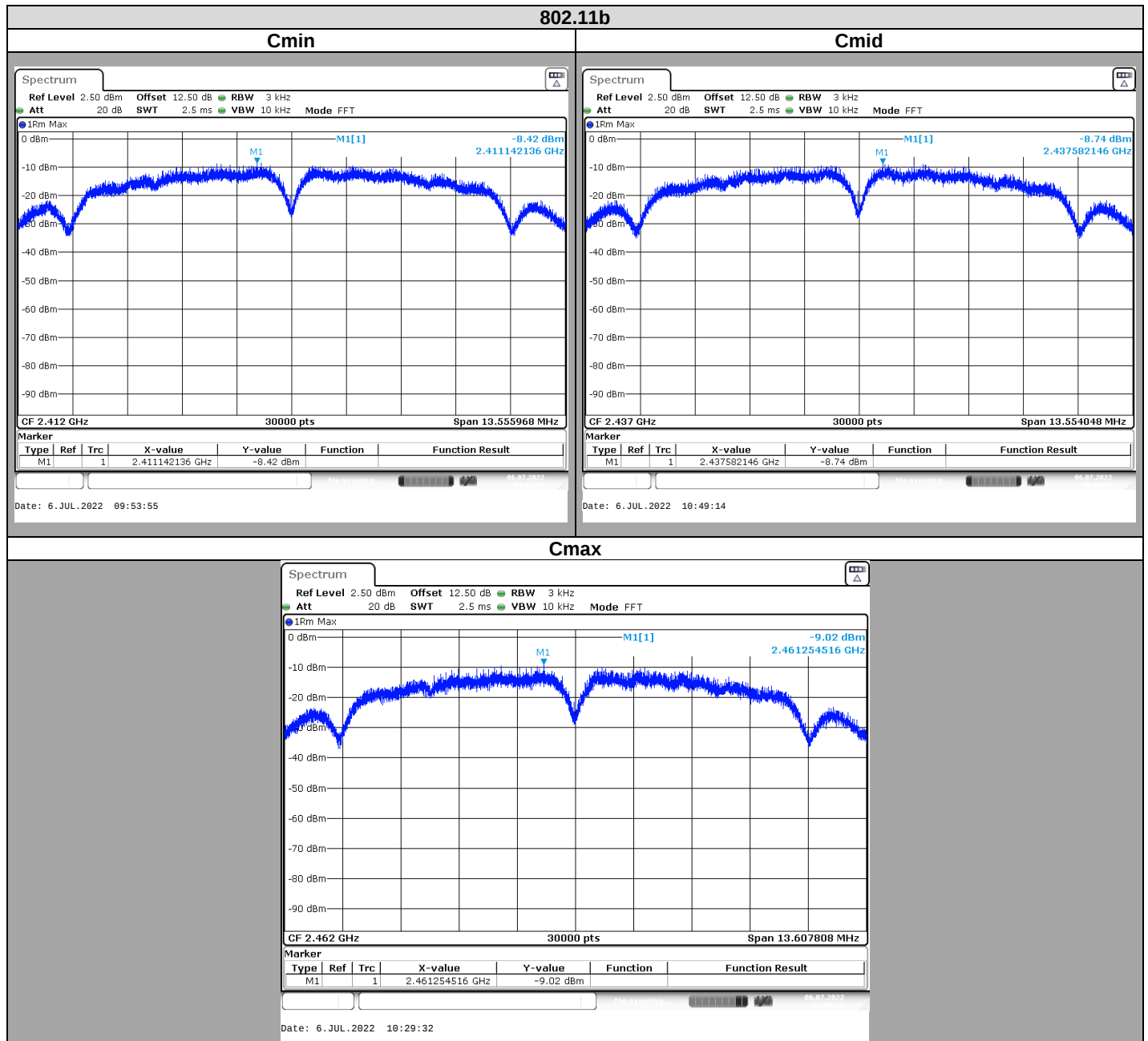
6.4. TEST EQUIPMENT LIST

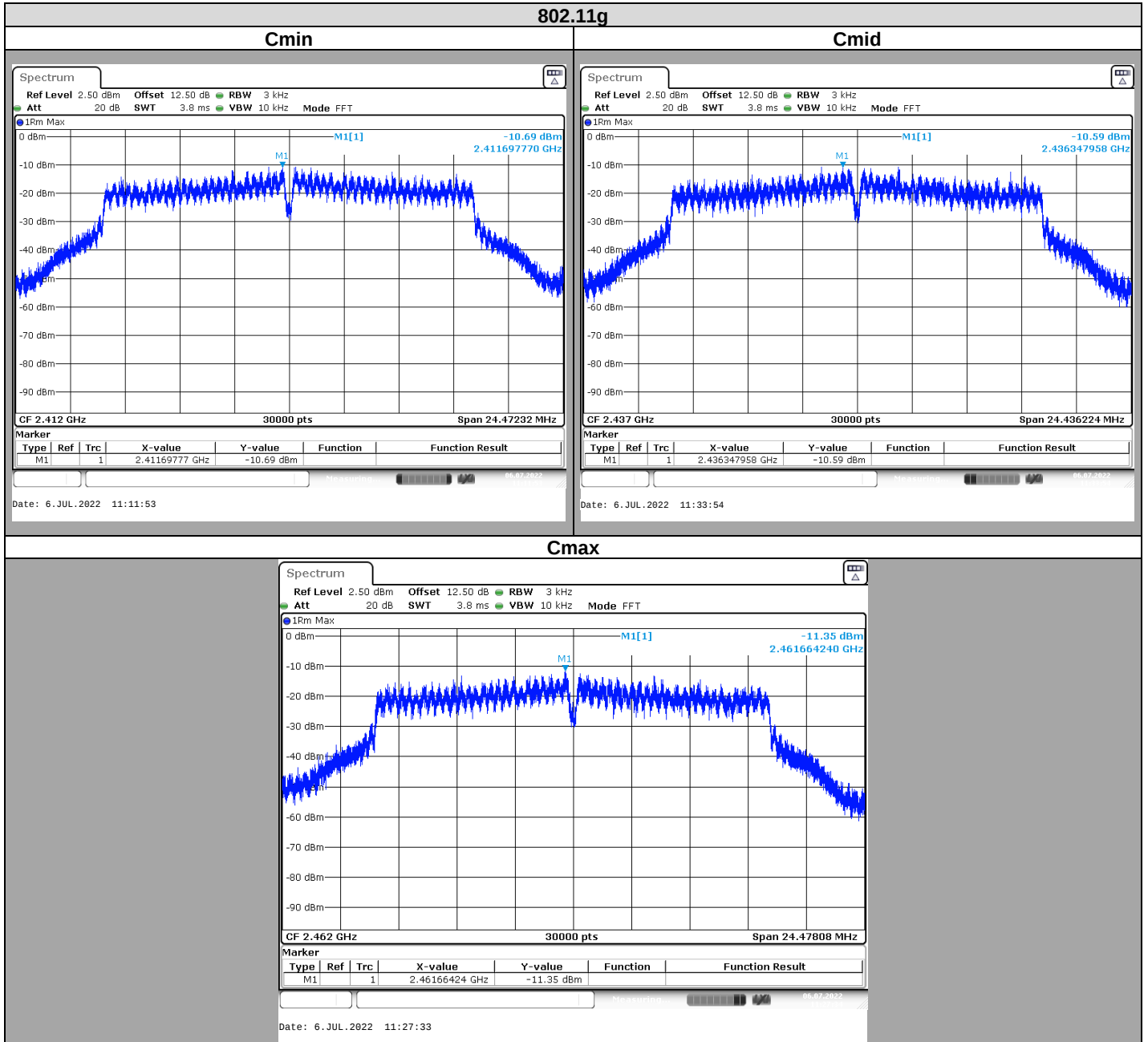
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	—	A7122269	09/20	09/22
Cable Measure	—	36G	A5329604	04/21	08/22
Full Anechoic Room	SIEPEL	—	D3044024	□*	□*
Multimeter - CEM	FLUKE	87	A1240251	03/21	03/23
SMA 1.5m	SUCOFLEX	18GHz	A5329863	05/22	05/23
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	11/21	11/23
Thermo-hygrometer	TESTO	608-H1	B4204120	12/20	12/22
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	01/21	01/23

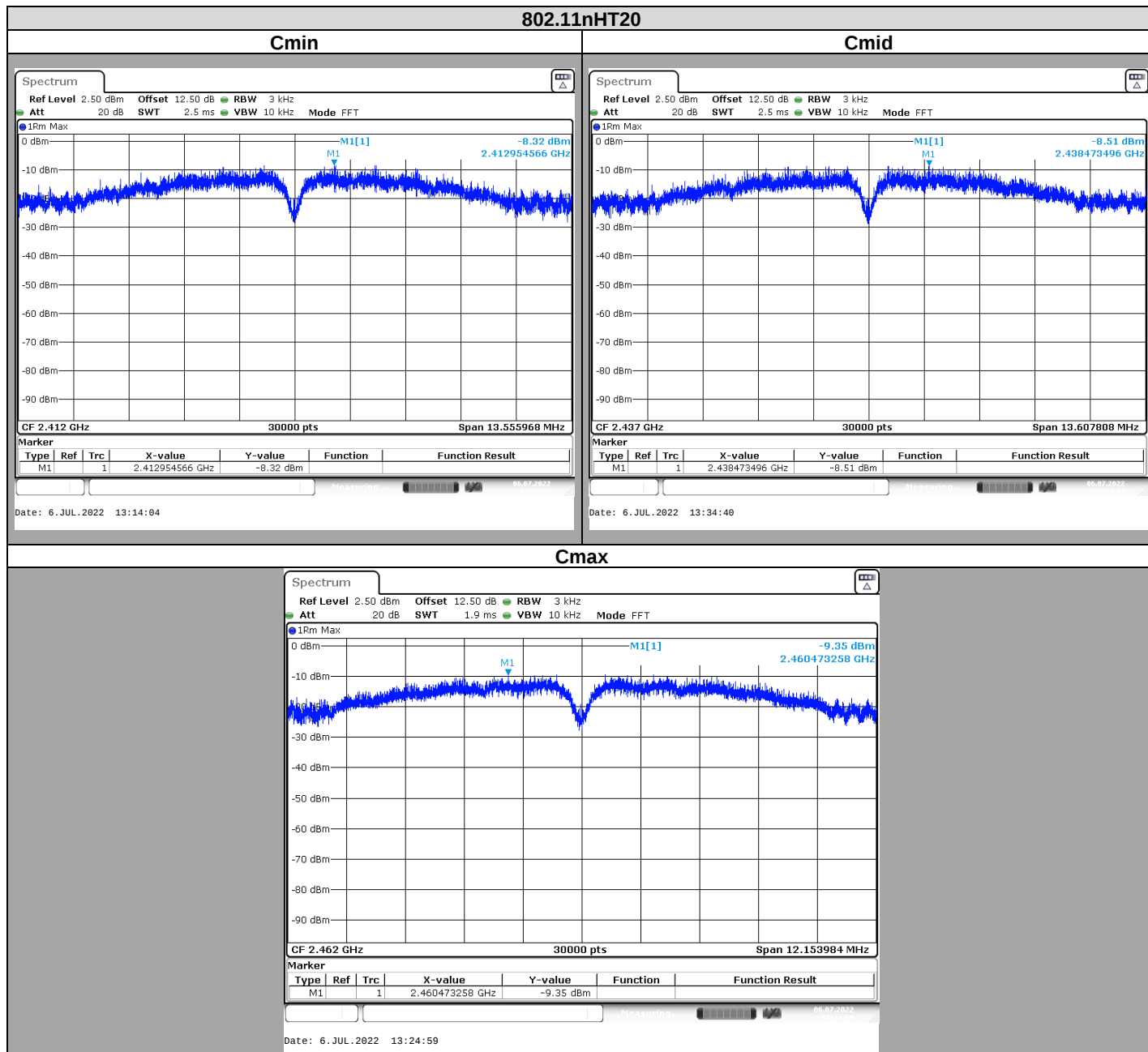
* : no degradation observed before test

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

6.5. RESULTS









Spectrum Analyzer Offset:
Cable Loss=2.5dB + Attenuator= 10dB

802.11b				
Channel	Tx1 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-8.42	2.5	-8.42	8
Cnom	-8.74	2.5	-8.74	8
Cmax	-9.02	2.5	-9.02	8

802.11g				
Channel	Tx1 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-10.69	2.5	-10.69	8
Cnom	-10.59	2.5	-10.59	8
Cmax	-11.35	2.5	-11.35	8

802.11n HT20				
Channel	Tx1 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-8.32	2.5	-8.32	8
Cnom	-8.51	2.5	-8.51	8
Cmax	-9.35	2.5	-9.35	8

6.6. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **ENLAPS** Tikee, SN: **T-EUR-3L-801129**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

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

7.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : July 6, 2022
Ambient temperature : 23 °C
Relative humidity : 39 %

7.2. TEST SETUP

- The Equipment Under Test is installed:

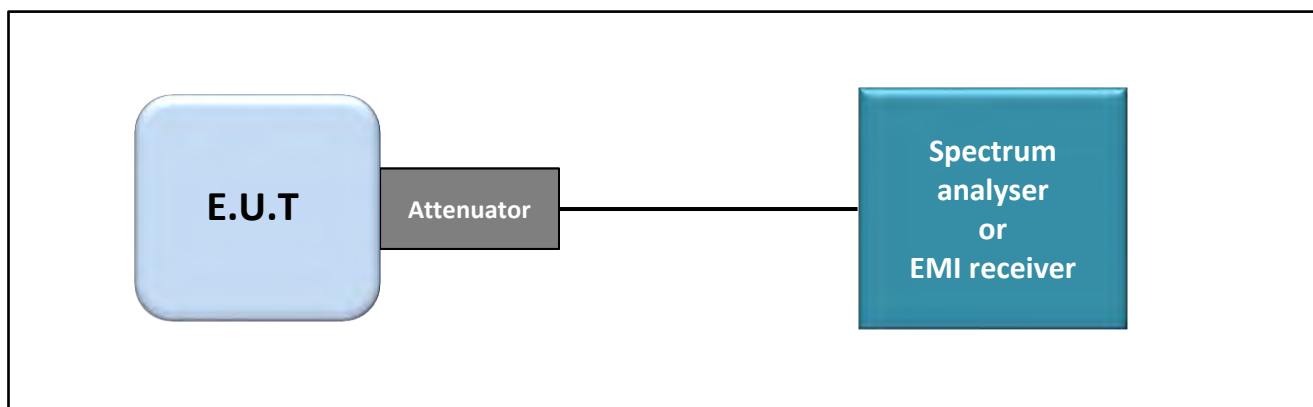
- ☐ On a table
- ☒ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

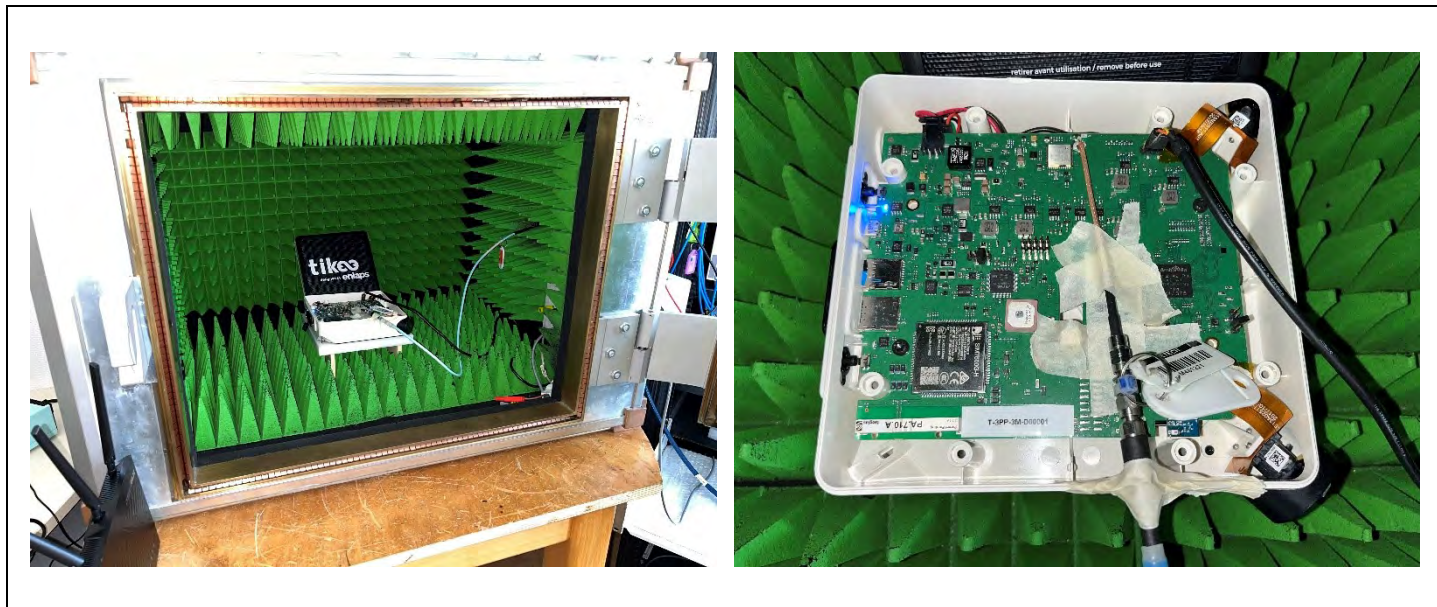
- ☒ Conducted Method
- ☐ Radiated Method

- Test Procedure:

- ☒ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.5
- ☐ KDB 662911 D01 Multiple Transmitter Output v02r01



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



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

7.3. LIMIT

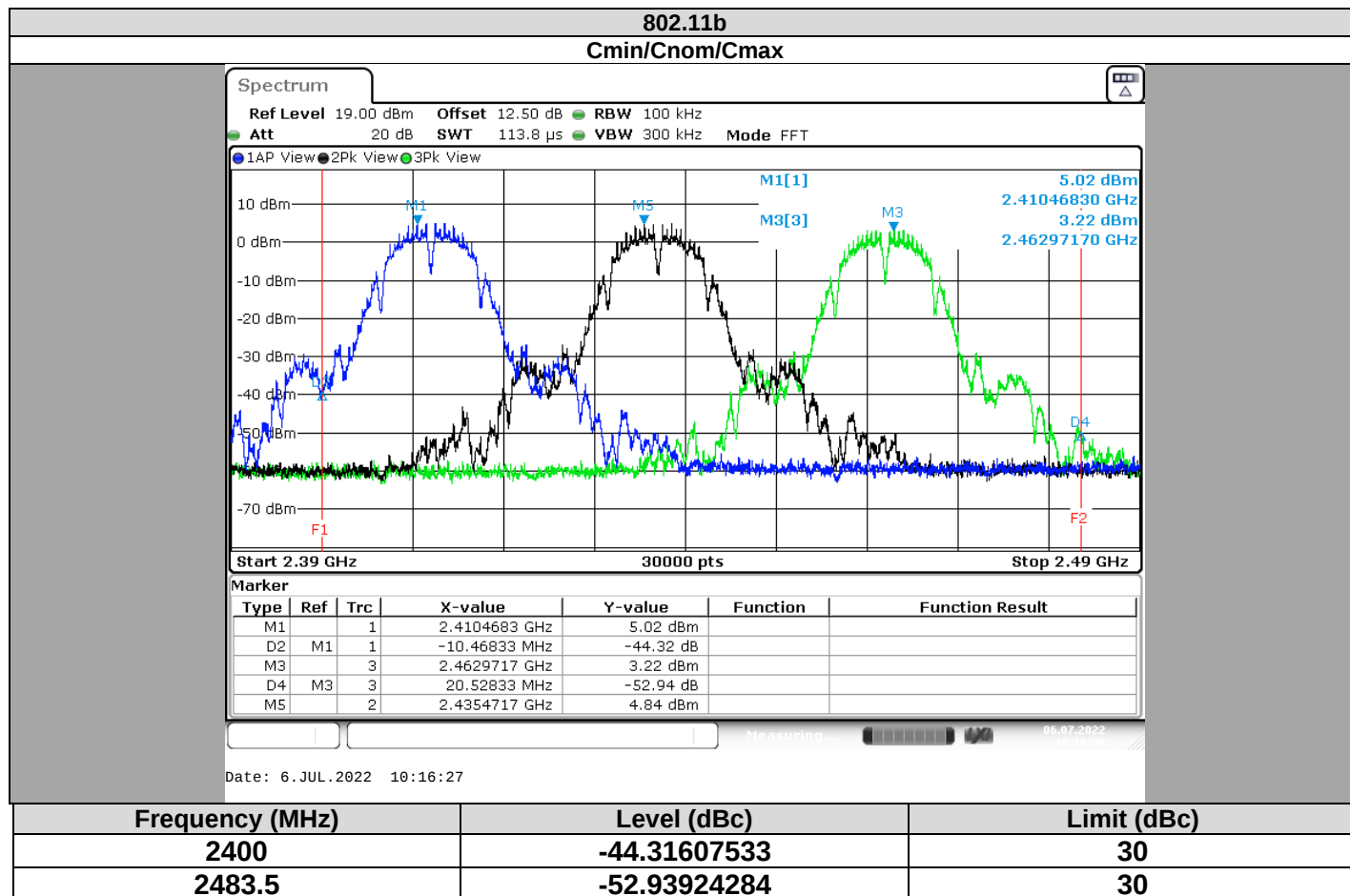
All Spurious Emissions must be at least Choose limit below the Fundamental Radiator Level at the Band Edge Edge
 “2400MHz & 2483,5MHz”

7.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	—	A7122269	09/20	09/22
Cable Measure	—	36G	A5329604	04/21	08/22
Full Anechoic Room	SIEPEL	—	D3044024	□*	□*
Multimeter - CEM	FLUKE	87	A1240251	03/21	03/23
SMA 1.5m	SUCOFLEX	18GHz	A5329863	05/22	05/23
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	11/21	11/23
Thermo-hygrometer	TESTO	608-H1	B4204120	12/20	12/22
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	01/21	01/23
* : no degradation observed before test					

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

7.5. RESULTS

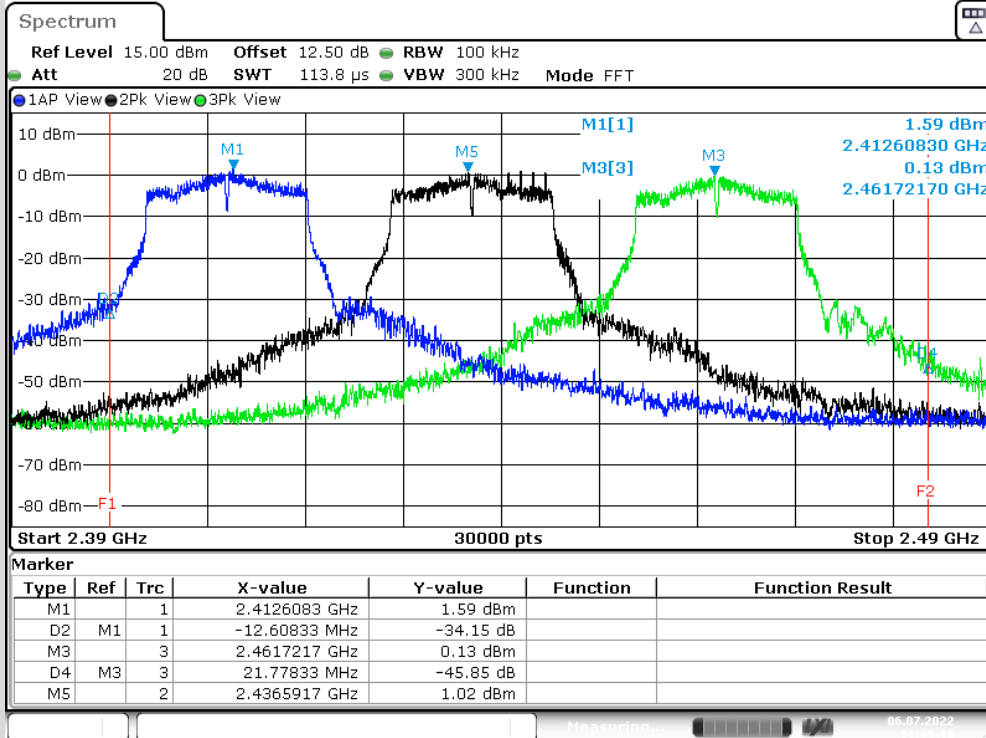




L C I E

802.11b

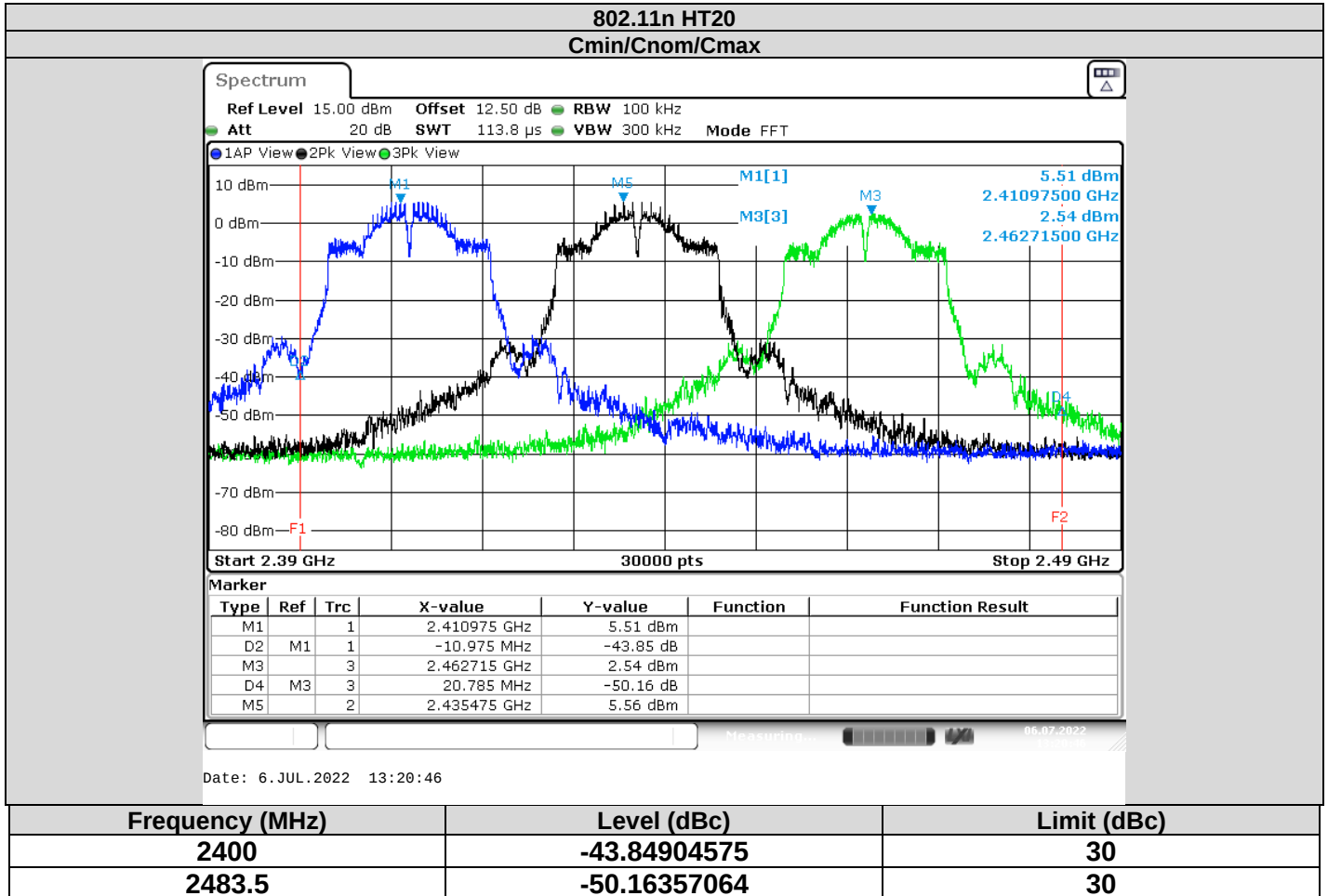
Cmin/Cnom/Cmax



Frequency (MHz)	Level (dBc)	Limit (dBc)
2400	-34.15222239	30
2483.5	-45.85164297	30



L C I E



7.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands at the band edge measurement performed on the sample of the product **ENLAPS Tikee**, SN: **T-EUR-3L-801129**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

8. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS

8.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
Date of test : July 6, 2022
Ambient temperature : 23 °C
Relative humidity : 39 %

8.2. TEST SETUP

- The Equipment Under Test is installed:

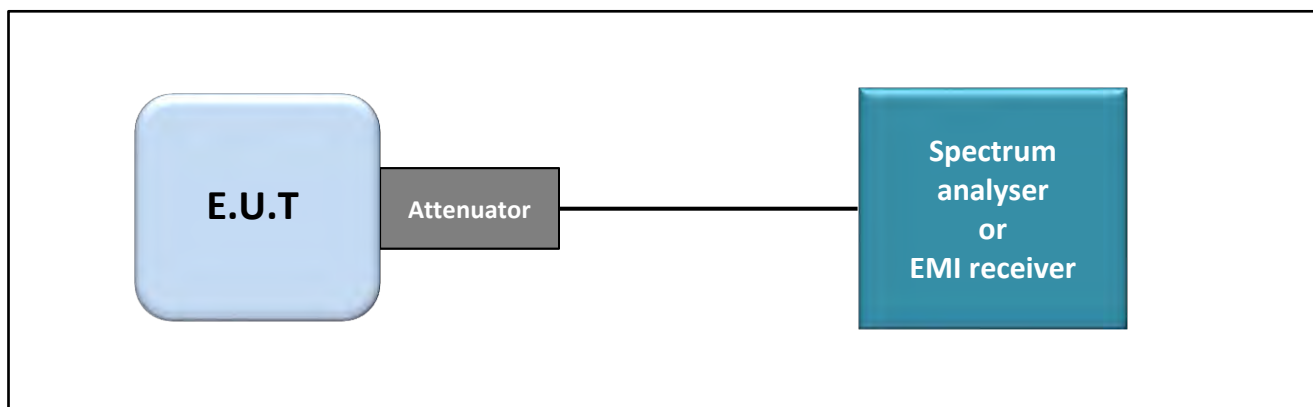
- ☐ On a table
- ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

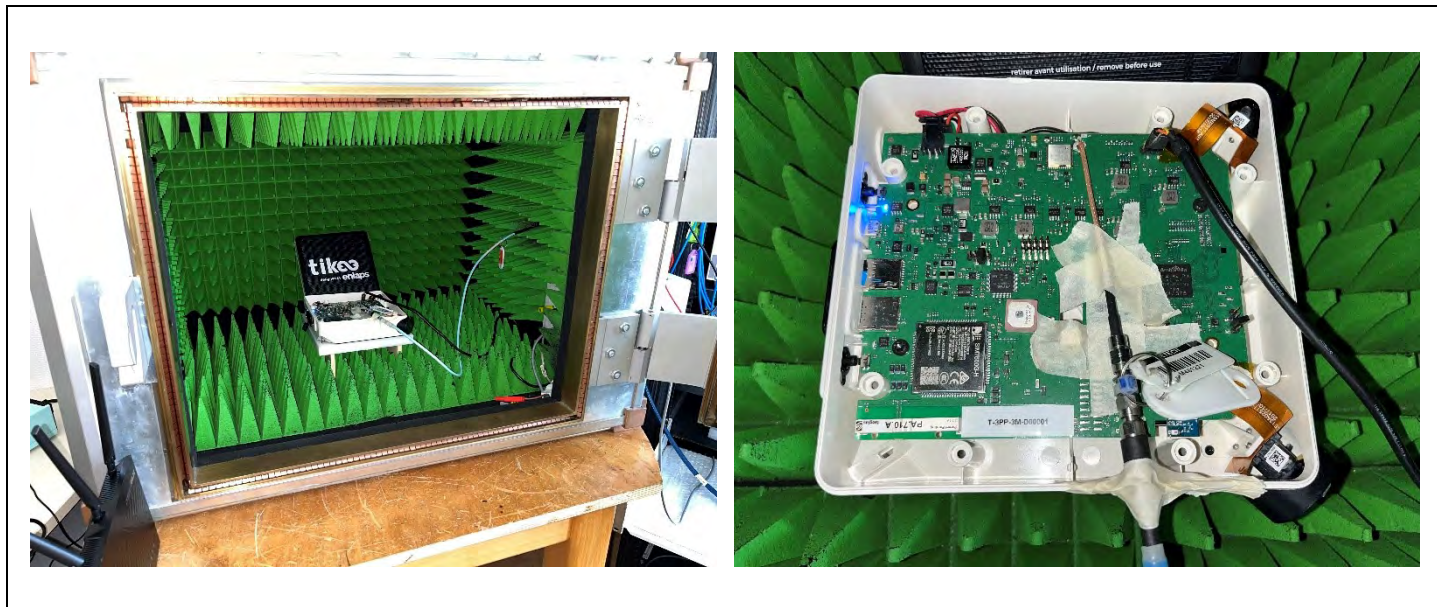
- ☐ Conducted Method
- ☒ Radiated Method

- Test Procedure:

- ☒ KDB 558074 D01 DTS Meas Guidance v05r02 § 8.5
- ☐ KDB 662911 D01 Multiple Transmitter Output v02r01



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



Photograph for Unwanted Emission into non-restricted frequency bands

8.3. LIMIT

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

8.4. TEST EQUIPMENT LIST

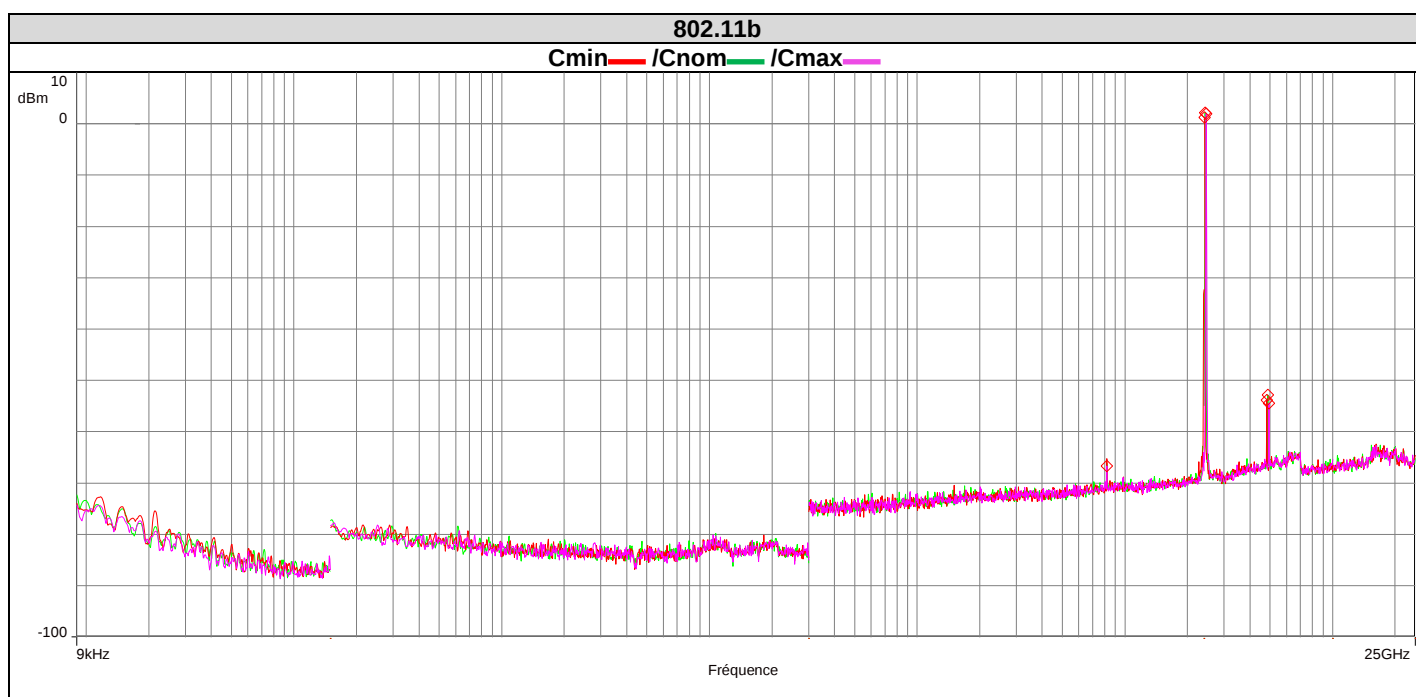
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	—	A7122269	09/20	09/22
Cable Measure	—	36G	A5329604	04/21	08/22
Full Anechoic Room	SIEPEL	—	D3044024	□*	□*
Multimeter - CEM	FLUKE	87	A1240251	03/21	03/23
SMA 1.5m	SUCOFLEX	18GHz	A5329863	05/22	05/23
Spectrum analyzer	ROHDE & SCHWARZ	FSV 40	A4060059	11/21	11/23
Thermo-hygrometer	TESTO	608-H1	B4204120	12/20	12/22
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	01/21	01/23

* : no degradation observed before test

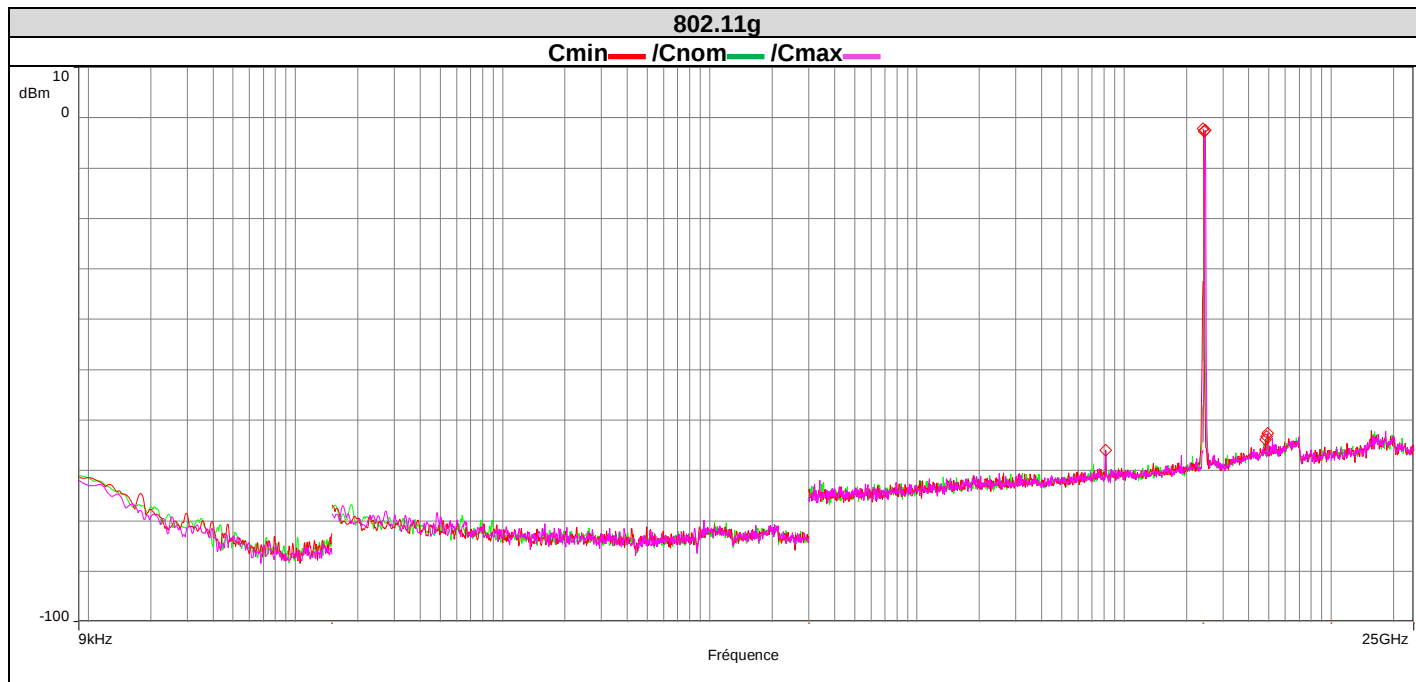
Note: In our quality system, the test equipment calibration due is more & less 2 months

8.5. RESULTS

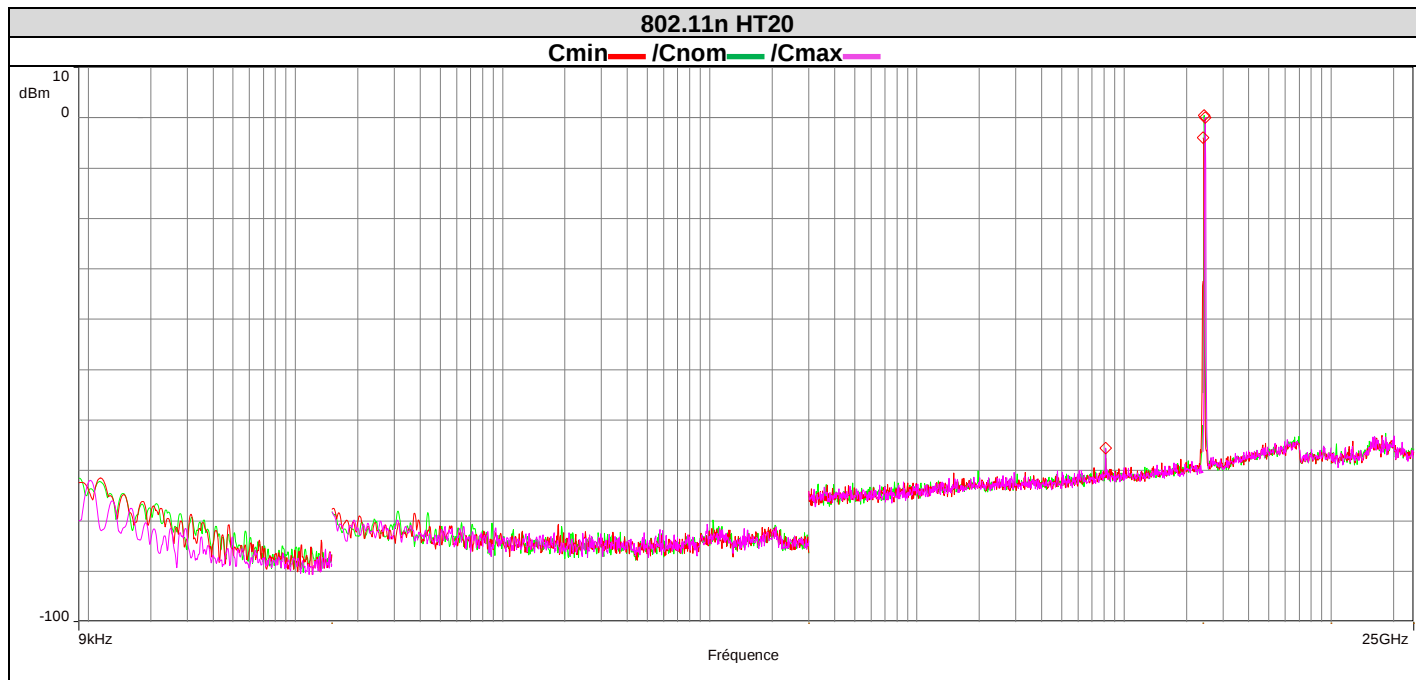
Worst case presented (see §8.5 in Unwanted Emissions...Band Edge):



802.11b			
Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2412	1.26		
4824	-43.86	-45.22	30
2437	2.16		
4874	-52.78	-54.94	30
2462	1.93		
4924	-54.48	-56.41	30



802.11g			
Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2412	-2.21		
4824	-63.86	-61.65	30
2437	-2.74		
4874	-63.25	-60.51	30
2462	-2.43		
4924	-62.59	-60.16	30



802.11n HT20			
Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2412	-3.94		
2437	0.48		
2462	-0.01		

8.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands measurement performed on the sample of the product **ENLAPS** Tikee, SN: **T-EUR-3L-801129**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

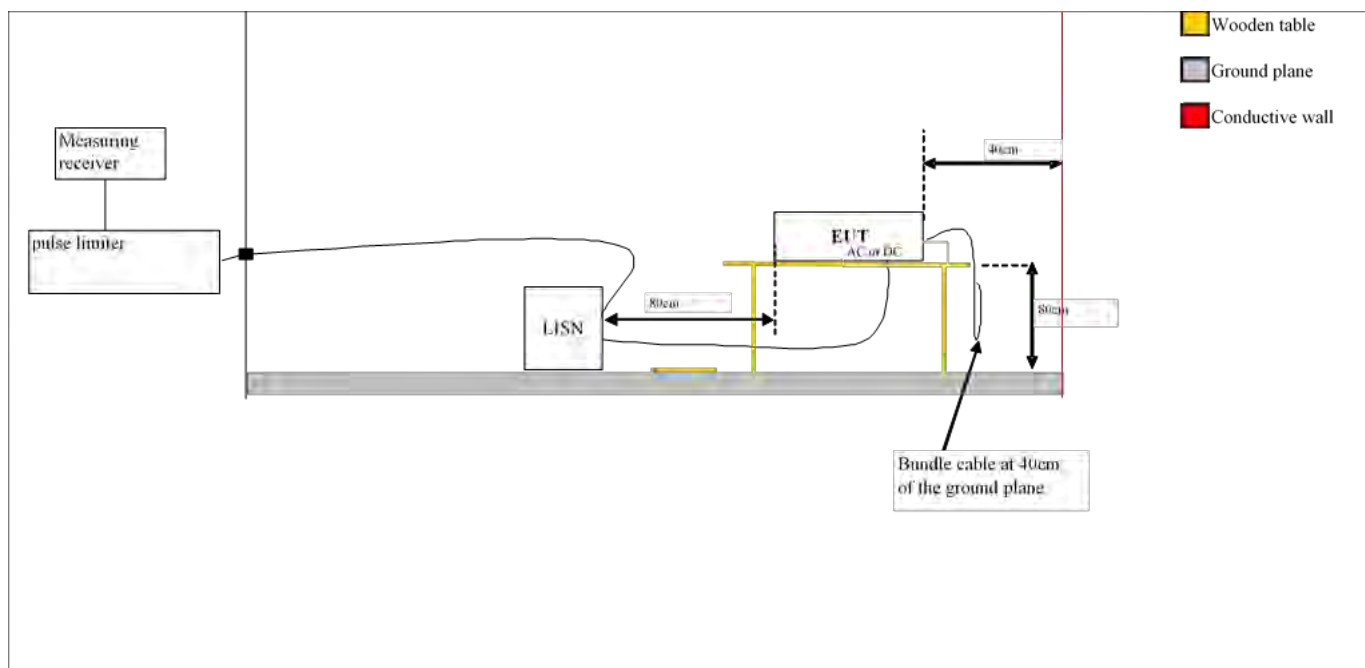
9. AC POWER LINE CONDUCTED EMISSIONS

9.1. TEST CONDITIONS

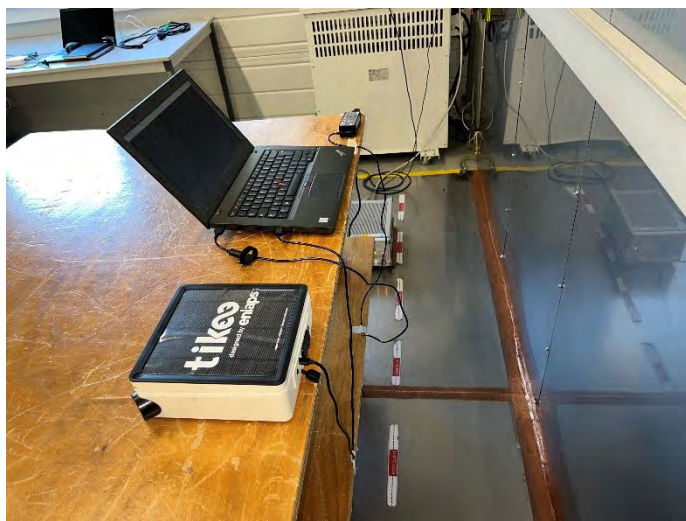
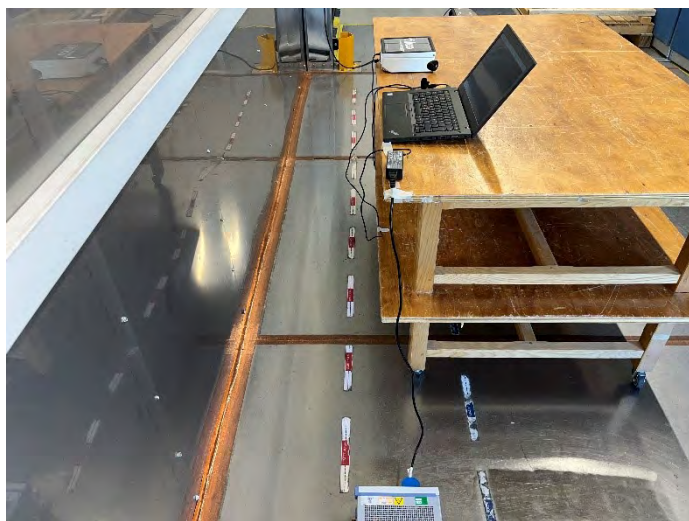
Test performed by : Majid MOURZAGH
 Date of test : July 6, 2022
 Ambient temperature : 23 °C
 Relative humidity : 39 %

9.2. TEST SETUP

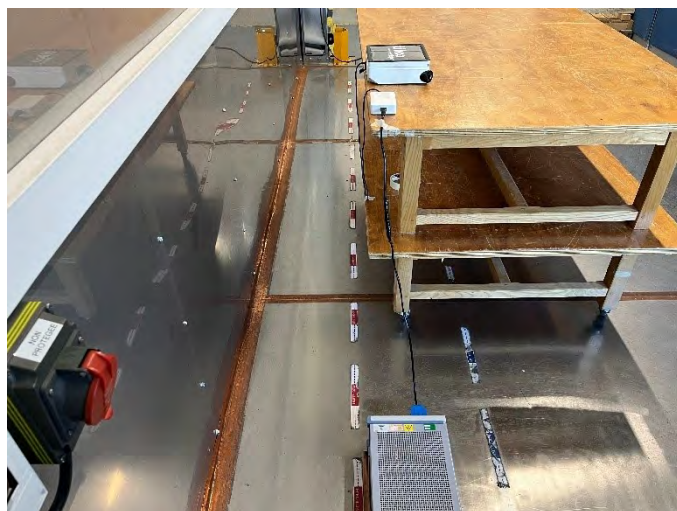
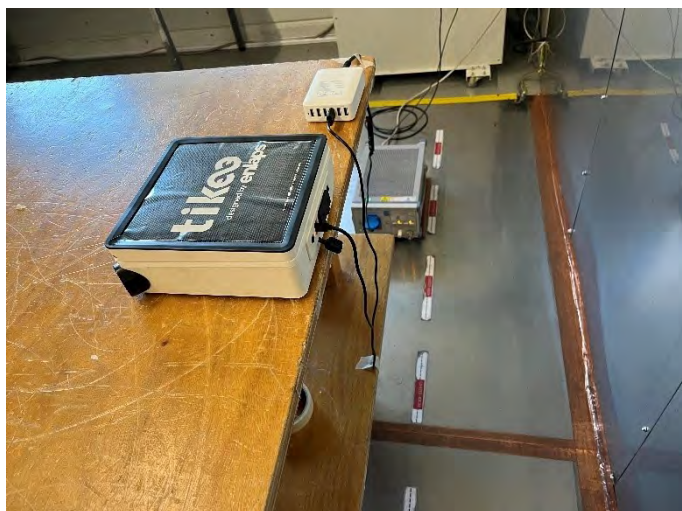
The product has been tested according to ANSI C63.10 (2013) method. The EUT is placed on the ground reference plane, at 80cm from the LISN. The distance between the EUT and the vertical ground plane is 40cm. Auxiliaries are powered by another LISN. The cable has been shorted to 1meter length. The EUT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



Test set up of AC Power Line Conducted Emissions



Photograph for AC Power Line Conducted Emissions (with Laptop)



Photograph for AC Power Line Conducted Emissions (with AC/DC Adapter



9.3. 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

9.4. TEST EQUIPMENT LIST

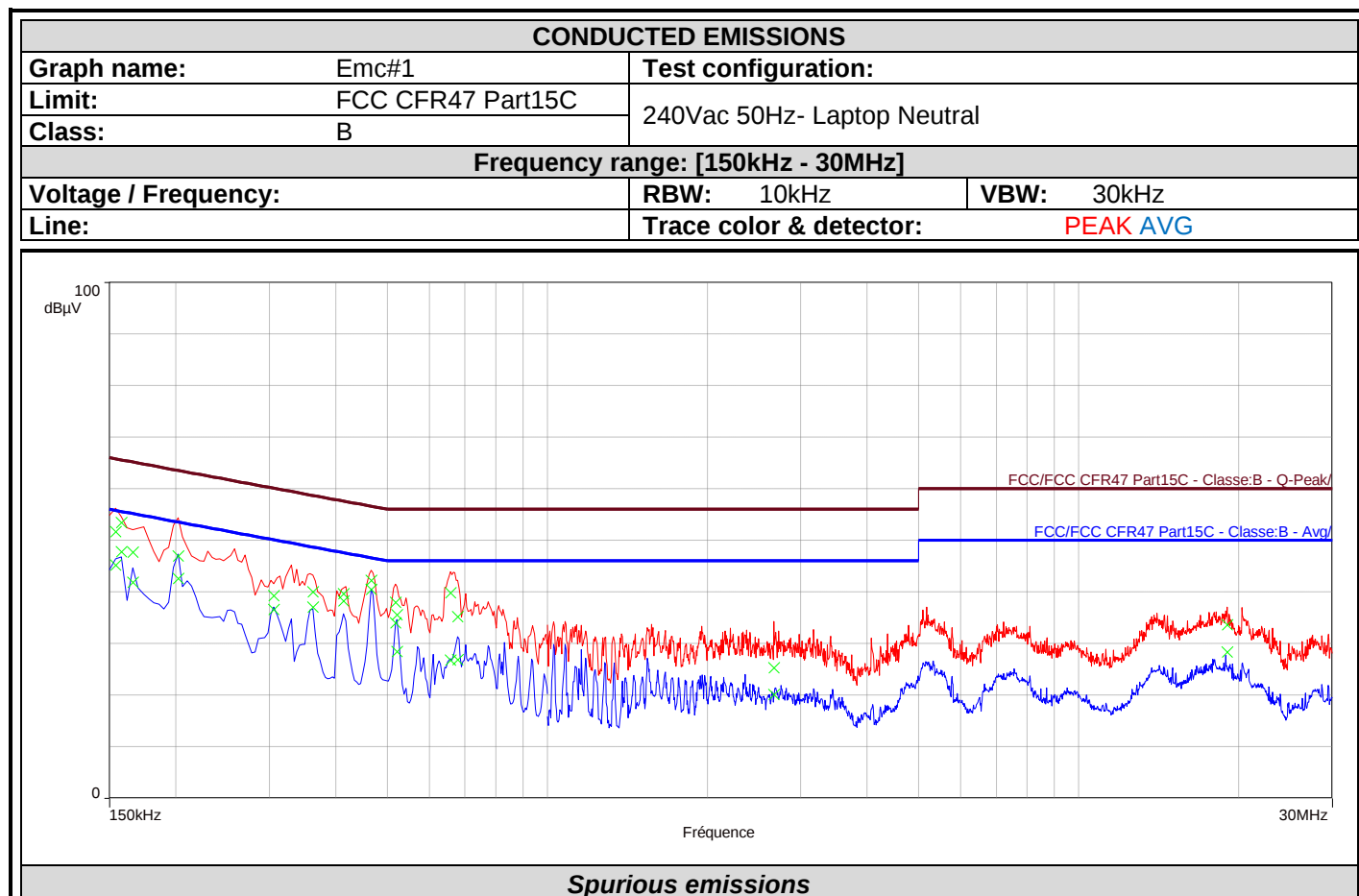
TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
BAT EMC	NEXIO	v3.21.0.32	L1000115	□	□
Cable + self	—	—	A5329578	05/22	05/23
EMC comb generator	LCIE SUD EST	—	A3169098	□	□
LISN	ROHDE & SCHWARZ	ENV216	C2320291	08/21	08/22
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	01/21	01/23
Transient limiter	ROHDE & SCHWARZ	ESH3-Z2	A7122204	08/20	08/22
AC source	EMTEST	NetWave 20/400	A7043058	06/22	10/25

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

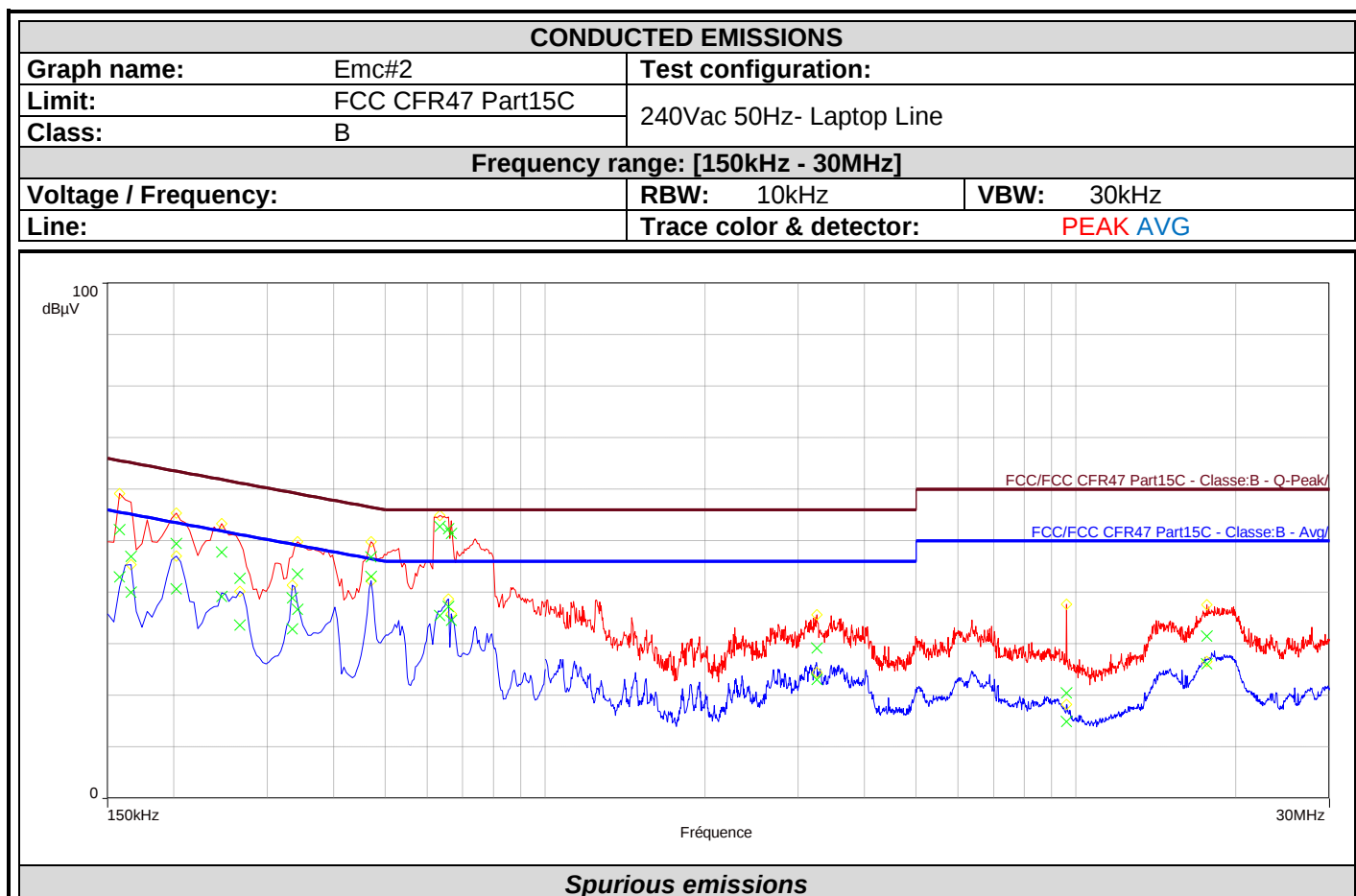
9.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None ☐ Divergence:

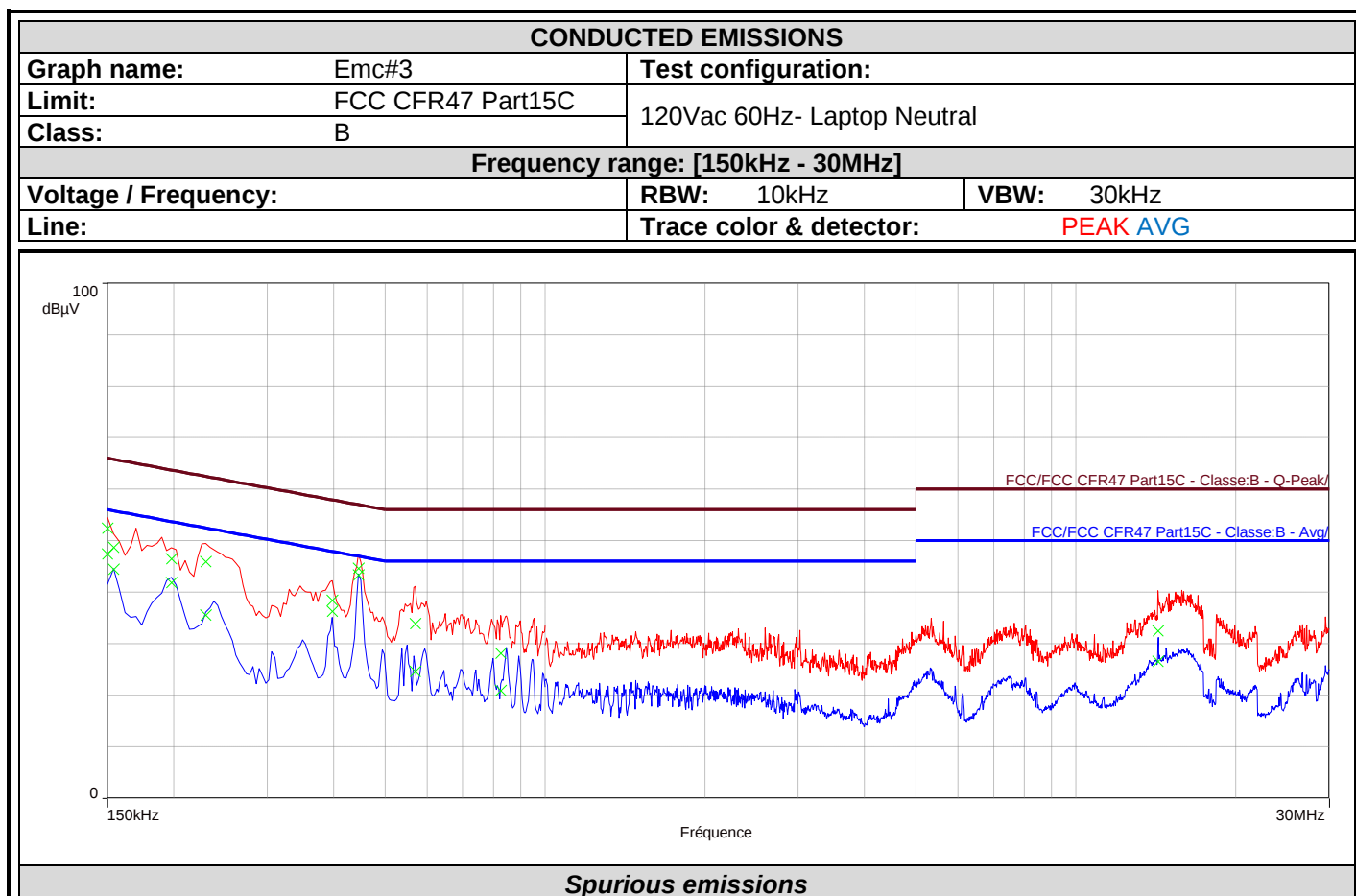
9.6. RESULTS



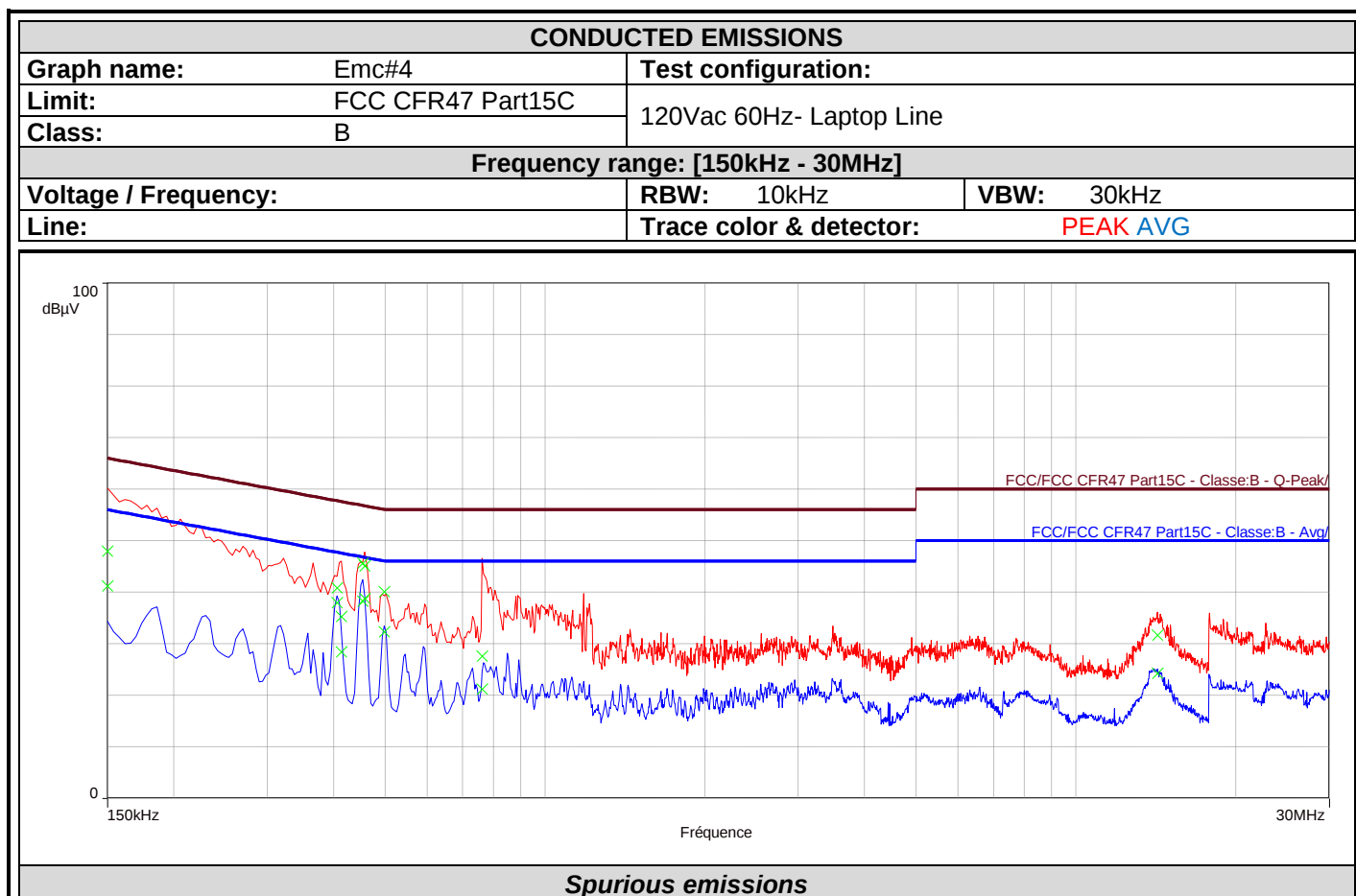
Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.154	51.7	65.8	-14.1	45.2	55.8	-10.6
0.158	53.4	65.6	-12.2	47.8	55.6	-7.8
0.166	47.7	65.2	-17.4	41.8	55.2	-13.3
0.202	46.9	63.5	-16.6	42.6	53.5	-11.0
0.306	39.3	60.1	-20.8	36.6	50.1	-13.5
0.362	40.0	58.7	-18.7	37.0	48.7	-11.6
0.414	39.6	57.6	-18.0	38.2	47.6	-9.3
0.466	42.3	56.6	-14.3	40.5	46.6	-6.1
0.518	38.0	56.0	-18.0	34.0	46.0	-12.0
0.522	35.6	56.0	-20.4	28.4	46.0	-17.6
0.658	39.8	56.0	-16.2	26.7	46.0	-19.3
0.678	35.2	56.0	-20.8	26.9	46.0	-19.1
2.668	25.3	56.0	-30.7	20.1	46.0	-25.9
19.048	33.6	60.0	-26.4	28.4	50.0	-21.6



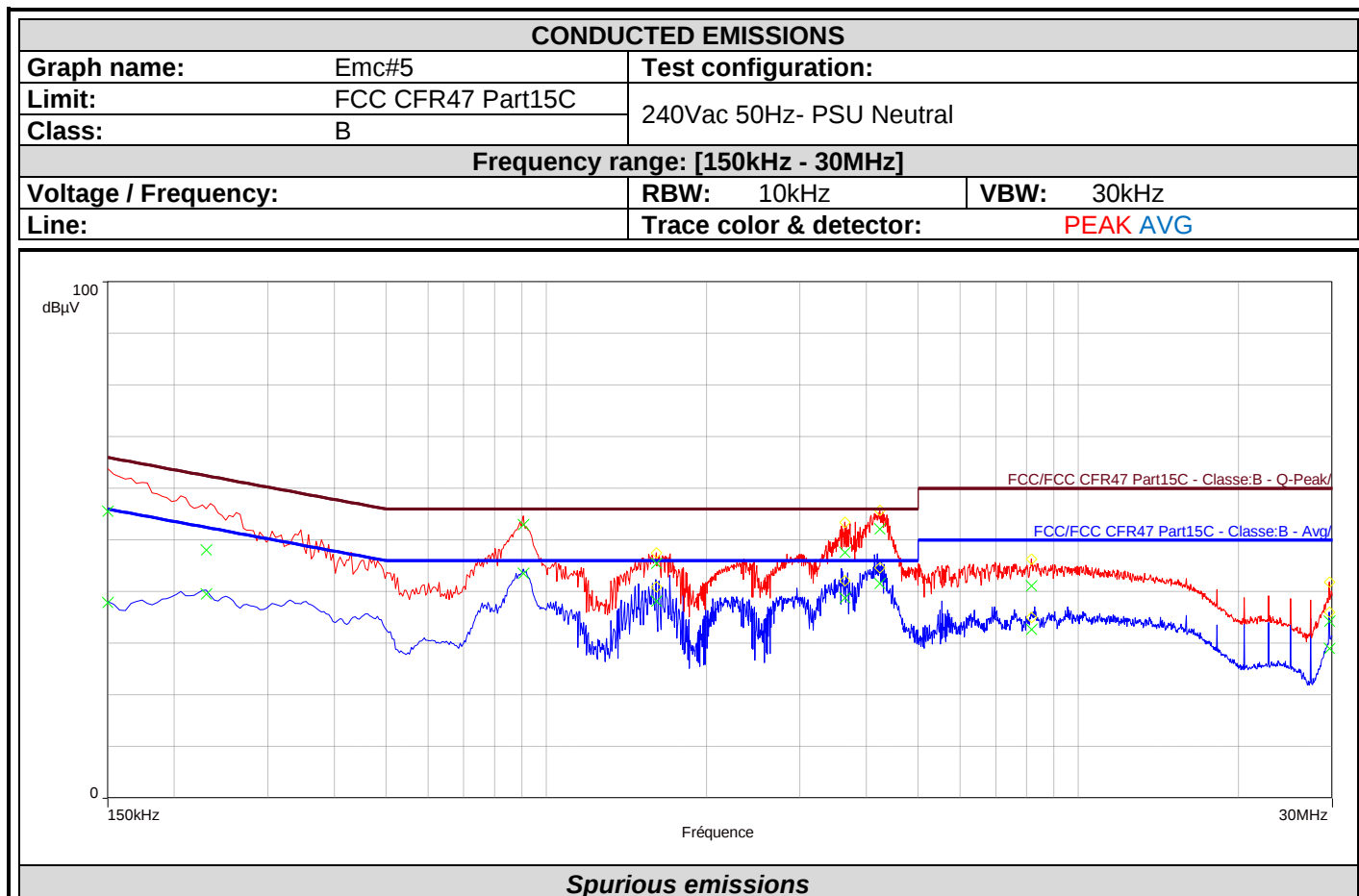
Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.158	52.1	65.6	-13.4	42.9	55.6	-12.6
0.166	47.0	65.2	-18.2	40.0	55.2	-15.2
0.202	49.5	63.5	-14.1	40.7	53.5	-12.9
0.246	47.8	61.9	-14.1	39.2	51.9	-12.7
0.266	42.7	61.2	-18.6	33.6	51.2	-17.6
0.334	38.9	59.4	-20.4	32.9	49.4	-16.4
0.342	43.5	59.2	-15.6	36.7	49.2	-12.5
0.470	46.9	56.5	-9.6	43.1	46.5	-3.4
0.634	52.8	56.0	-3.2	35.4	46.0	-10.6
0.658	52.4	56.0	-3.6	37.2	46.0	-8.8
0.666	51.4	56.0	-4.6	34.6	46.0	-11.4
3.248	29.2	56.0	-26.8	23.1	46.0	-22.9
9.588	20.5	60.0	-39.5	15.0	50.0	-35.0
17.620	31.5	60.0	-28.5	26.1	50.0	-23.9



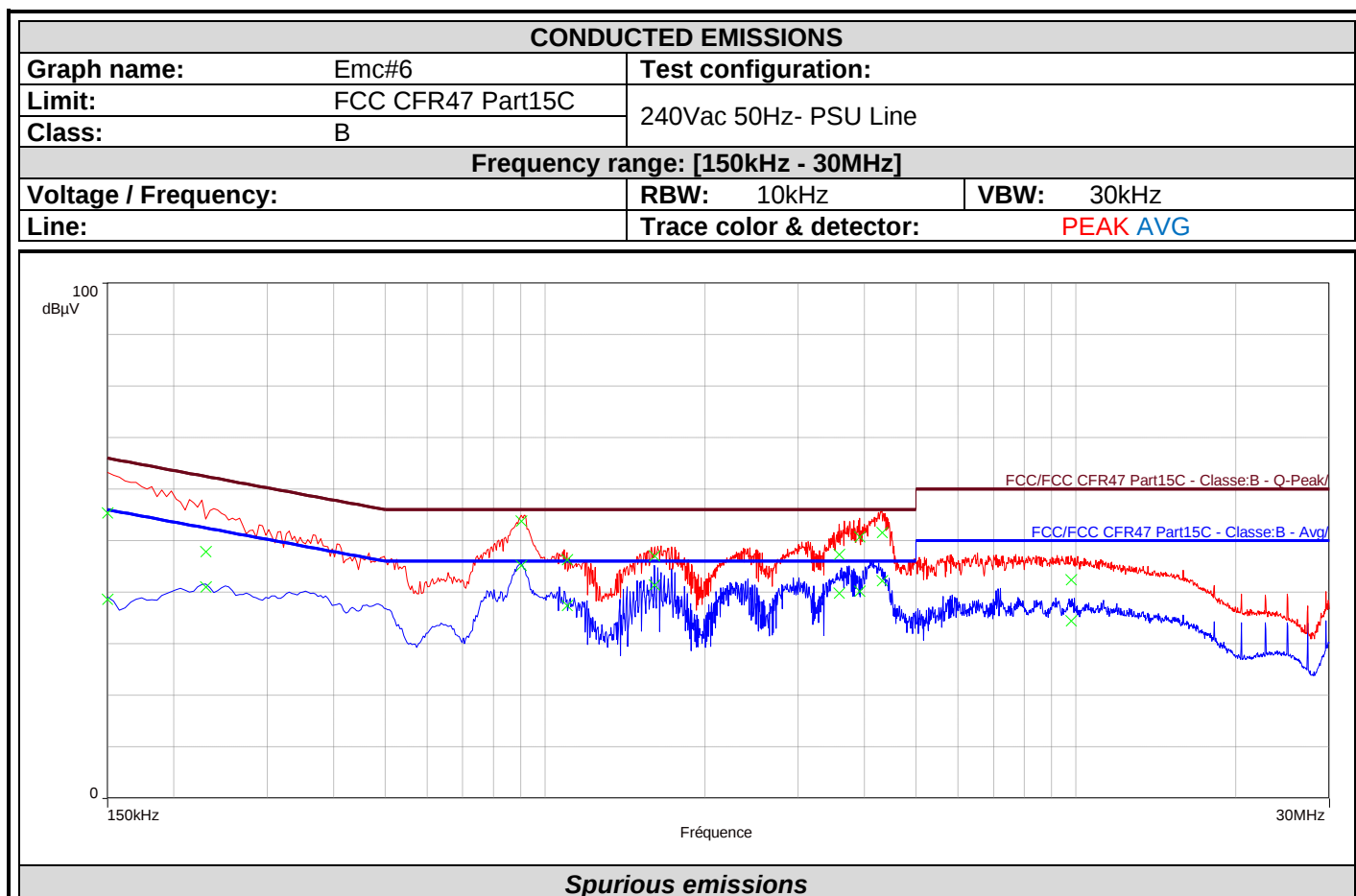
Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.150	52.4	66.0	-13.6	47.4	56.0	-8.6
0.154	48.7	65.8	-17.1	44.5	55.8	-11.3
0.198	46.5	63.7	-17.2	41.8	53.7	-11.8
0.230	45.9	62.4	-16.5	35.6	52.4	-16.9
0.398	38.5	57.9	-19.4	36.3	47.9	-11.6
0.446	44.7	57.0	-12.3	43.4	47.0	-3.6
0.570	33.9	56.0	-22.1	24.7	46.0	-21.3
0.826	28.2	56.0	-27.8	21.0	46.0	-25.0
14.284	32.6	60.0	-27.4	26.5	50.0	-23.5



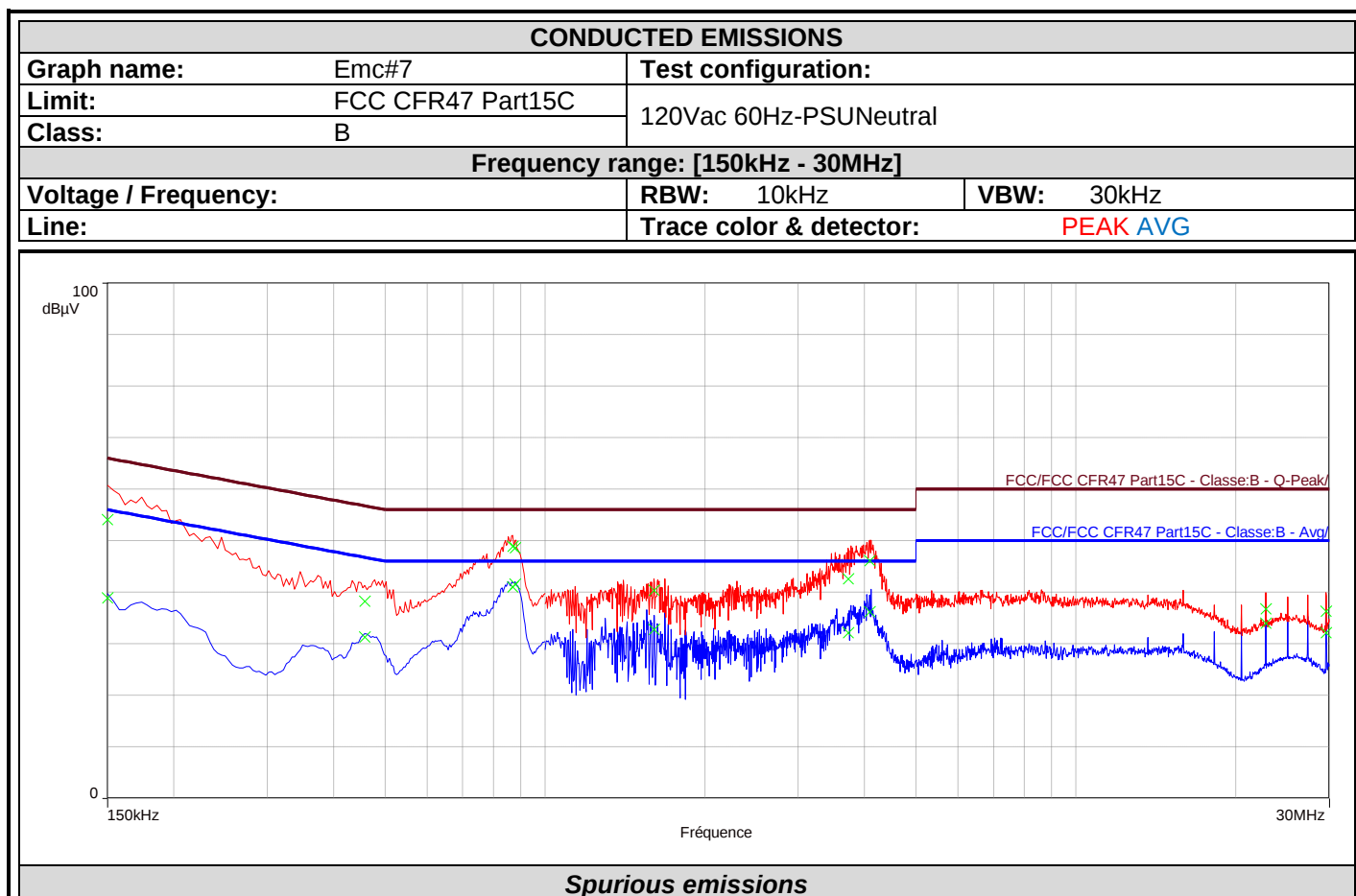
Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.150	47.9	66.0	-18.1	41.2	56.0	-14.8
0.406	40.9	57.7	-16.8	38.0	47.7	-9.8
0.414	35.3	57.6	-22.3	28.5	47.6	-19.1
0.454	45.6	56.8	-11.2	38.2	46.8	-8.6
0.458	45.1	56.7	-11.7	38.8	46.7	-8.0
0.498	40.1	56.0	-16.0	32.3	46.0	-13.7
0.762	27.6	56.0	-28.4	21.2	46.0	-24.8
14.228	31.7	60.0	-28.3	24.3	50.0	-25.7



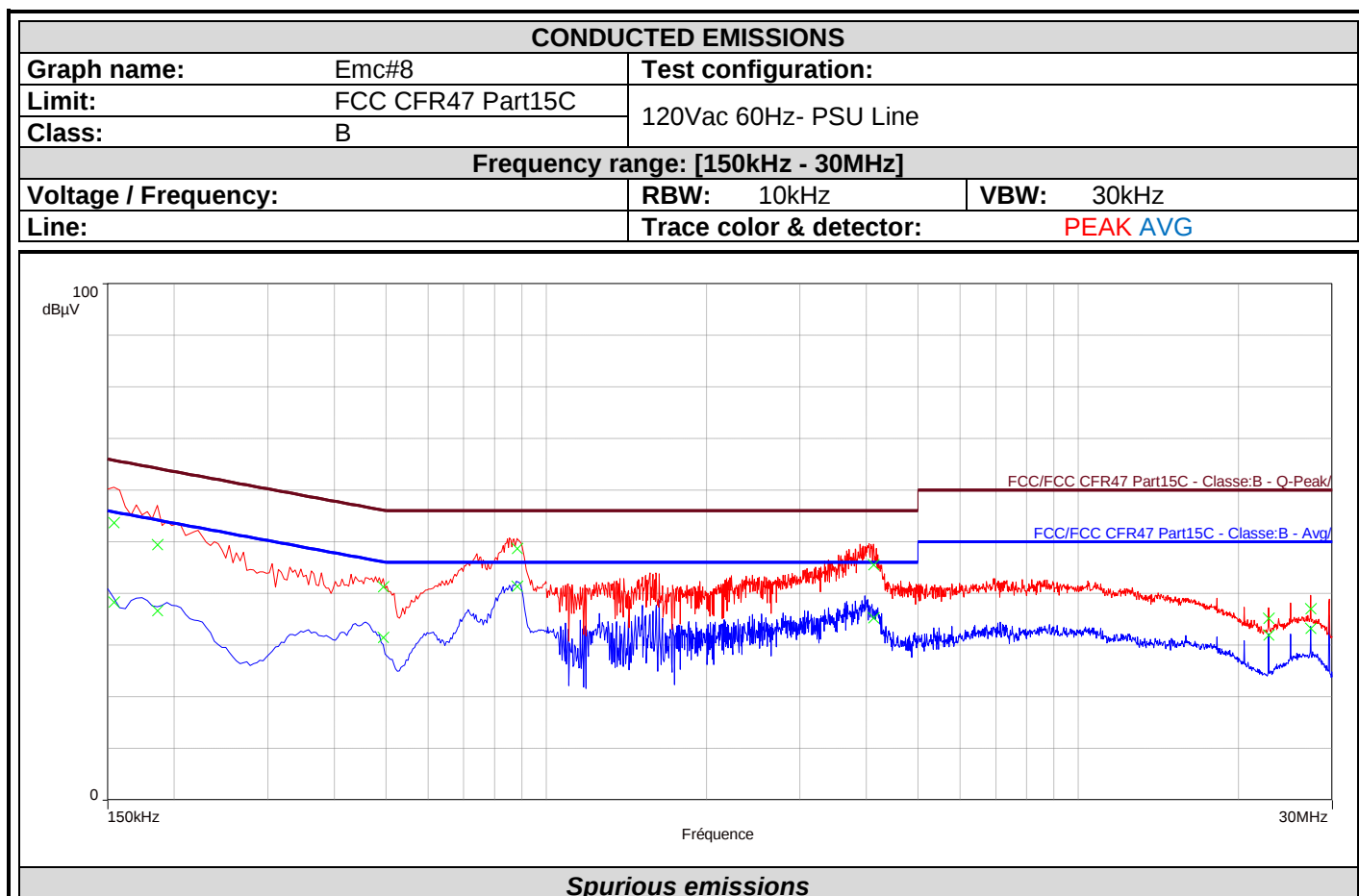
Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.150	55.6	66.0	-10.4	37.9	56.0	-18.1
0.230	48.0	62.4	-14.4	39.6	52.4	-12.9
0.906	53.0	56.0	-3.0	43.5	46.0	-2.5
1.612	45.4	56.0	-10.6	38.2	46.0	-7.8
3.644	47.6	56.0	-8.4	38.8	46.0	-7.2
4.236	52.2	56.0	-3.8	41.6	46.0	-4.4
8.168	41.2	60.0	-18.8	32.7	50.0	-17.3
29.608	34.3	60.0	-25.7	29.0	50.0	-21.0



Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.150	55.3	66.0	-10.7	38.6	56.0	-17.4
0.230	47.9	62.4	-14.5	41.0	52.4	-11.4
0.902	53.8	56.0	-2.2	45.2	46.0	-0.8
1.100	46.3	56.0	-9.7	37.4	46.0	-8.6
1.608	47.1	56.0	-8.9	41.4	46.0	-4.6
3.584	47.4	56.0	-8.6	39.8	46.0	-6.2
3.912	50.7	56.0	-5.3	40.2	46.0	-5.8
4.312	51.6	56.0	-4.4	42.2	46.0	-3.8
9.788	42.4	60.0	-17.6	34.5	50.0	-15.5



Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.150	54.1	66.0	-11.9	38.9	56.0	-17.1
0.458	38.2	56.7	-18.5	31.3	46.7	-15.4
0.870	48.9	56.0	-7.1	41.0	46.0	-5.0
0.878	48.7	56.0	-7.3	41.6	46.0	-4.4
1.604	40.4	56.0	-15.6	32.8	46.0	-13.2
3.724	42.6	56.0	-13.4	32.1	46.0	-13.9
4.092	46.1	56.0	-9.9	36.2	46.0	-9.8
22.772	36.8	60.0	-23.2	34.0	50.0	-16.0
29.600	36.3	60.0	-23.7	32.2	50.0	-17.8



Frequency (MHz)	QPeak (dBµV)	Lim.QPeak (dBµV)	QPeak-Lim.QPeak (dB)	CISPR.AVG (dBµV)	Lim.CISPR.AVG (dBµV)	CISPR.AVG-Lim.CISPR.AVG (dB)
0.154	53.7	65.8	-12.1	38.3	55.8	-17.4
0.186	49.4	64.2	-14.8	36.7	54.2	-17.5
0.494	41.3	56.1	-14.8	31.5	46.1	-14.6
0.882	48.8	56.0	-7.2	41.4	46.0	-4.6
4.124	45.6	56.0	-10.4	35.3	46.0	-10.7
22.772	35.2	60.0	-24.8	31.9	50.0	-18.1
27.328	37.0	60.0	-23.0	33.2	50.0	-16.8

9.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product **ENLAPS** Tikee, SN: **T-EUR-3L-801129**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.247 & RSS 247 ISSUE 2 limits.

10. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS

10.1. TEST CONDITIONS

Test performed by : Majid MOURZAGH
 Date of test : June 29, 2022
 Ambient temperature : 22 °C
 Relative humidity : 41 %

10.2. TEST SETUP

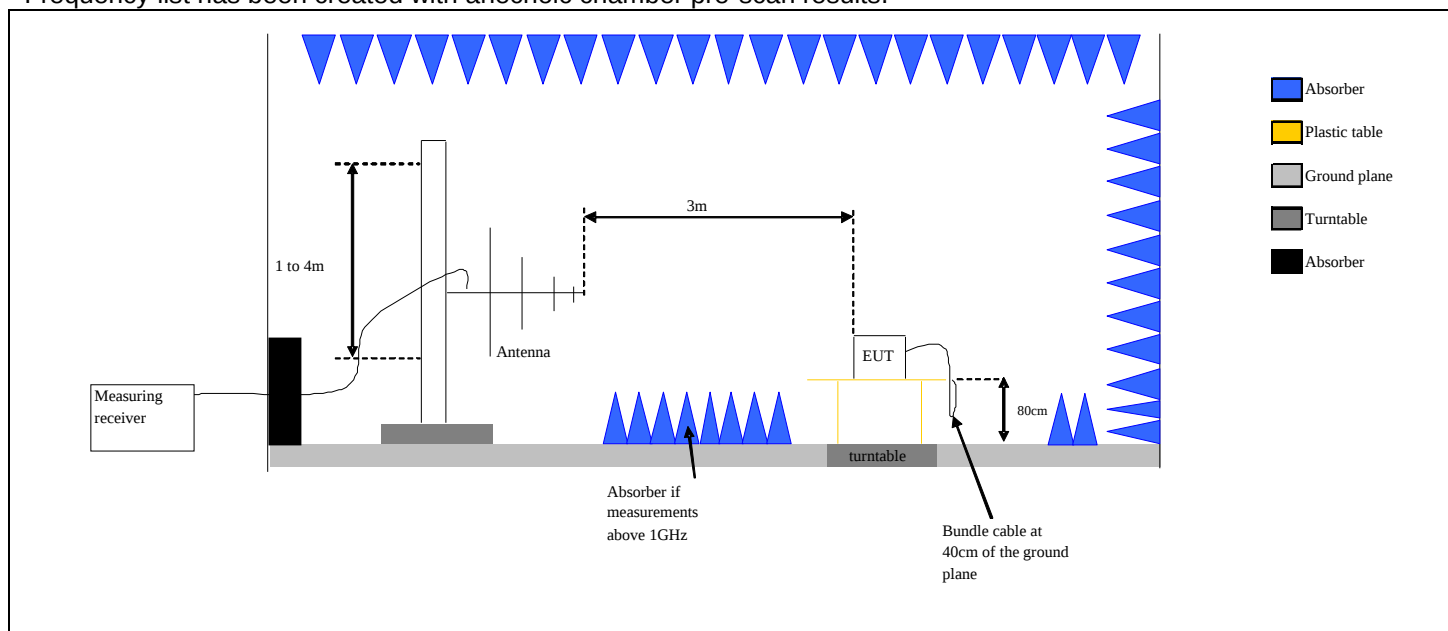
The product has been tested according to ANSI C63.10 (2013) and FCC part15 subpart C.
 Test is performed in parallel, perpendicular and ground parallel axis with a loop antenna below 30MHz. Measurement bandwidth was 200Hz below 150kHz and 9kHz between 150kHz & 30MHz. The level has been maximised by the turntable rotation of 360 degrees range on all axis of EUT used in normal configuration. Antenna height was 1m. The EUT is placed **Select Test Site**. Distance between measuring antenna and the EUT is **Distance**.

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

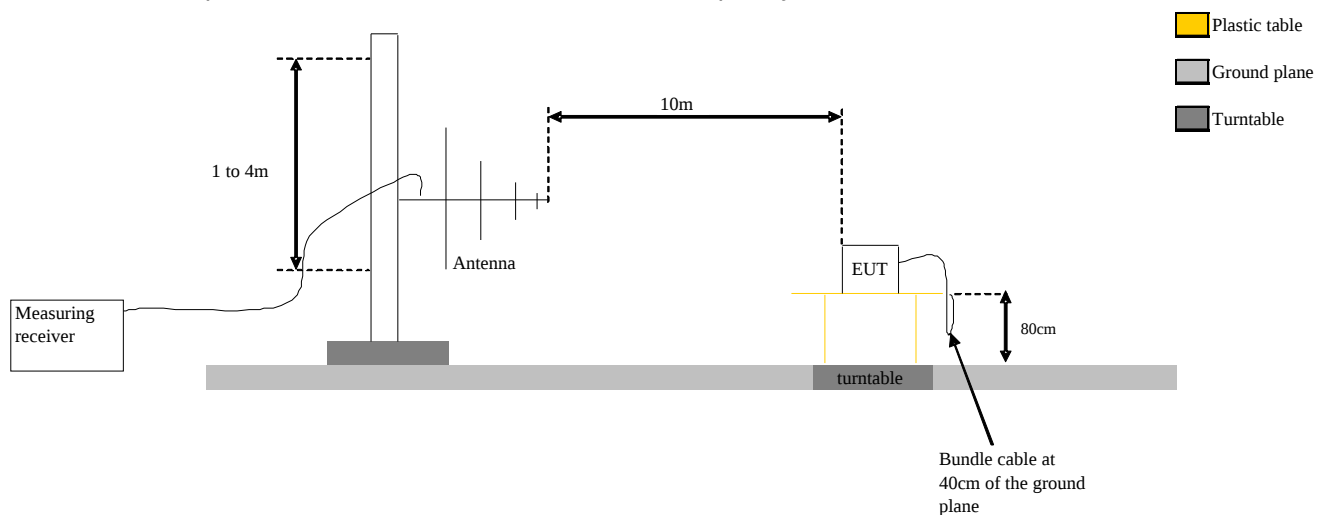
☐ On mast, varied from 1m to 4m

☐ Fixed and centered on the EUT (EUT smaller than the beamwidth of the measurement antenna, ANSI C63.10 §6.6.5)

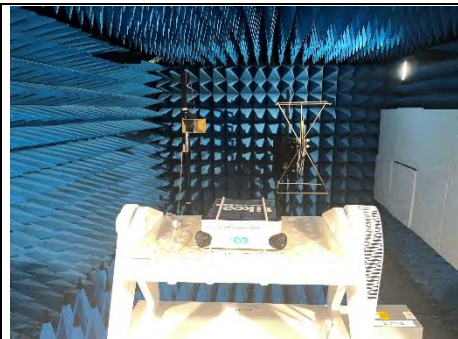
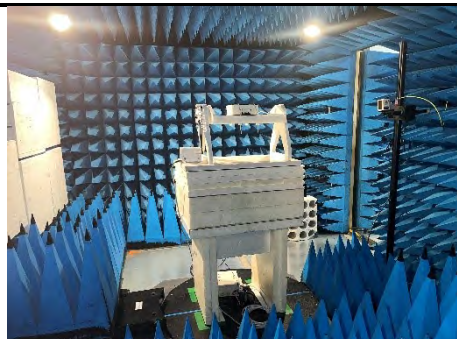
Frequency list has been created with anechoic chamber pre-scan results.



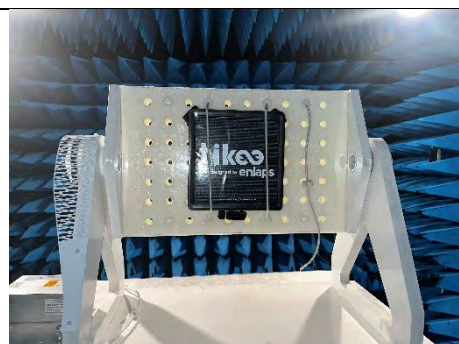
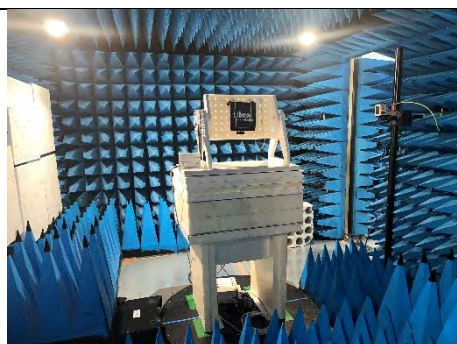
Test set up of Unwanted Emissions in Restricted Frequency Bands in semi anechoic chamber



Test Set up for radiated measurement in open area test site

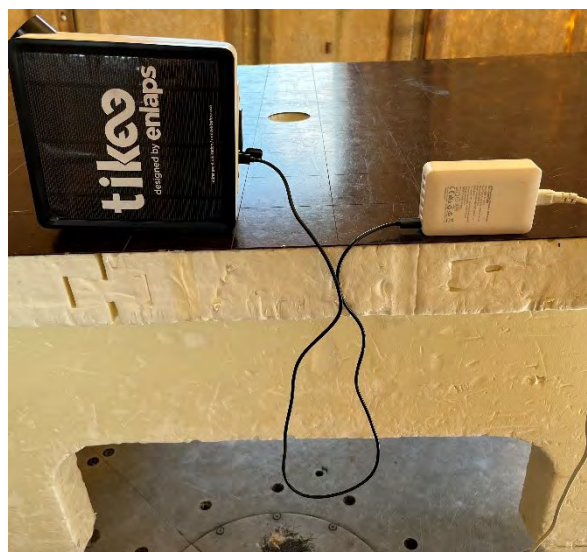


Axis XY



Axis Z

Photograph for Unwanted Emissions



Photograph for Unwanted Emissions

10.3. 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

10.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Amplifier 9kHz - 40GHz	LCIE SUD EST	—	A7102082	05/22	05/24
Antenna Loop	ELECTRO-METRICS	EM-6879	C2040052	06/19	06/22
Biconic Antenna	EATON	94455-1	C2040234	03/21	03/23
Antenna Bi-log	AH System	SAS-521-7	C2040180	02/21	02/23
Antenna horn 18GHz	EMCO	3115	C2042029	03/22	03/25
BAT EMC	NEXIO	v3.21.0.32	L1000115	□	□
Cable SMA 40GHz 40cm	WITHWAVE	W101-SM1-0.4M	A5329979	04/21	08/22
Comb EMR HF	YORK	CGE01	A3169114	□	□
CONTROLLER	INNCO	CO3000	D3044034	□	□
Emission Cable (SMA 1m)	TELEDYNE	26GHz	A5329874	08/21	08/22
Emission Cable (SMA 3.3m)	TELEDYNE	26GHz	A5329875	08/21	08/22
Emission Cable <1GHz (Ampl <-> Cage)	INTELLICONNECT	C-KPKP-1503-500MM	A5329988	04/21	08/22
Filter Matrice	LCIE SUD EST	Combined filters	A7484078	09/20	09/22
Multimeter - CEM	FLUKE	189	A1240171	09/21	09/23
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
Spare C3 Cable Measure	TELEDYNE	26GHz	A5329681	09/20	09/22
Spectrum analyzer	ROHDE & SCHWARZ	FSU 26	A4060058	09/21	09/23
Table C3	LCIE	—	F2000461	□	□
Thermo-hygrometer (C3)	OREGON	BAR206	B4204078	02/21	02/23
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	01/21	01/23
TILT	INNCO	TILT	D3044033	□	□
Turntable chamber (Cage#3)	ETS Lingren	Model 2165	F2000371	□	□
Turntable controller (Cage#3)	ETS Lingren	Model 2090	F2000444	□	□
Emission Cable	MICRO-COAX	1GHz	A5329656	08/21	08/22
OATS	—	—	F2000409	04/21	08/22
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	10/20	10/22
Table C1/OATS	LCIE	—	F2000445	□	□
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	01/21	01/23
Turntable (OATS)	ETS Lingren	Model 2187	F2000403	□	□
Turntable / Mast controller (OATS)	ETS Lingren	Model 2066	F2000372	□	□

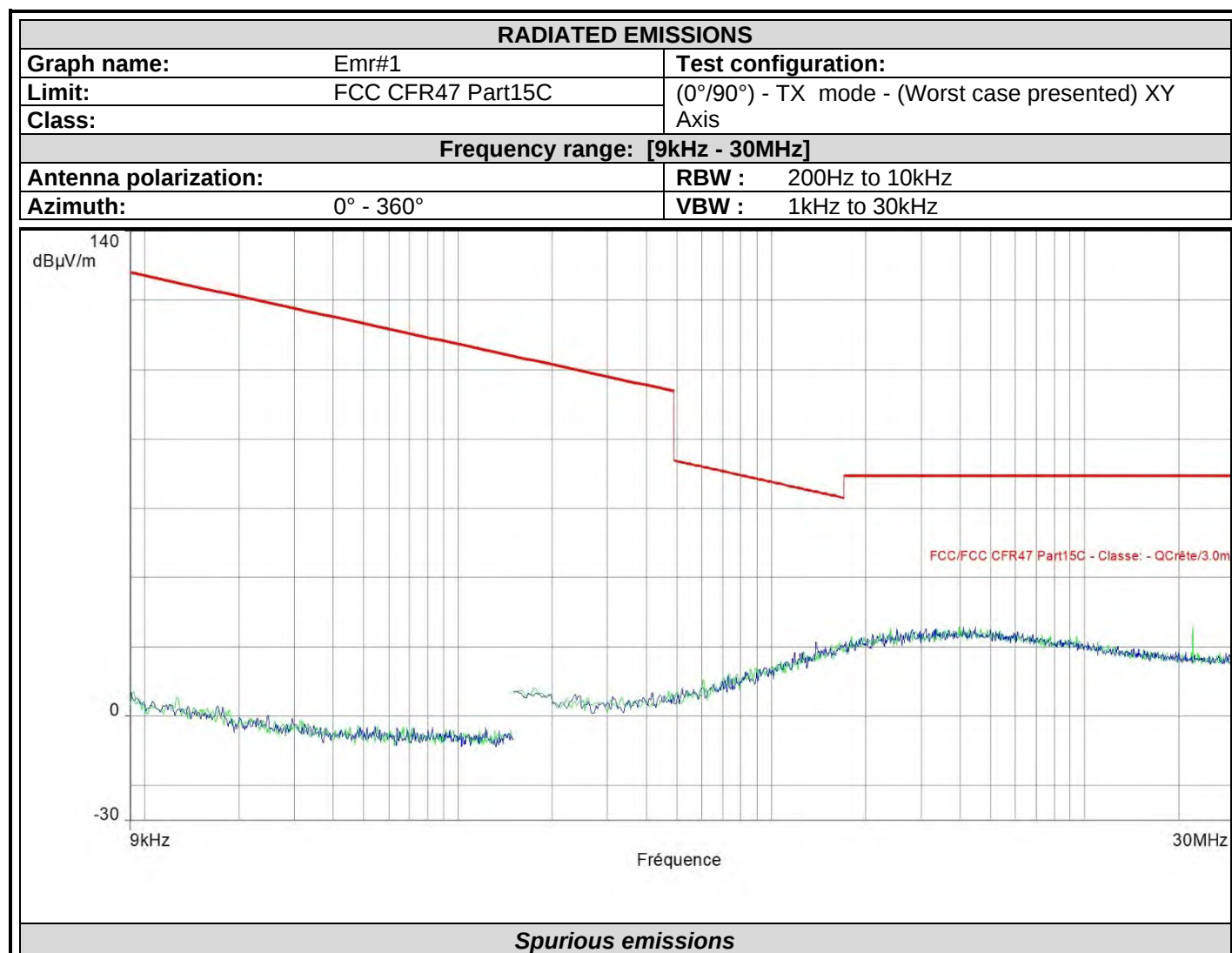
Note: In our quality system, the test equipment calibration due is more & less 2 months

10.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

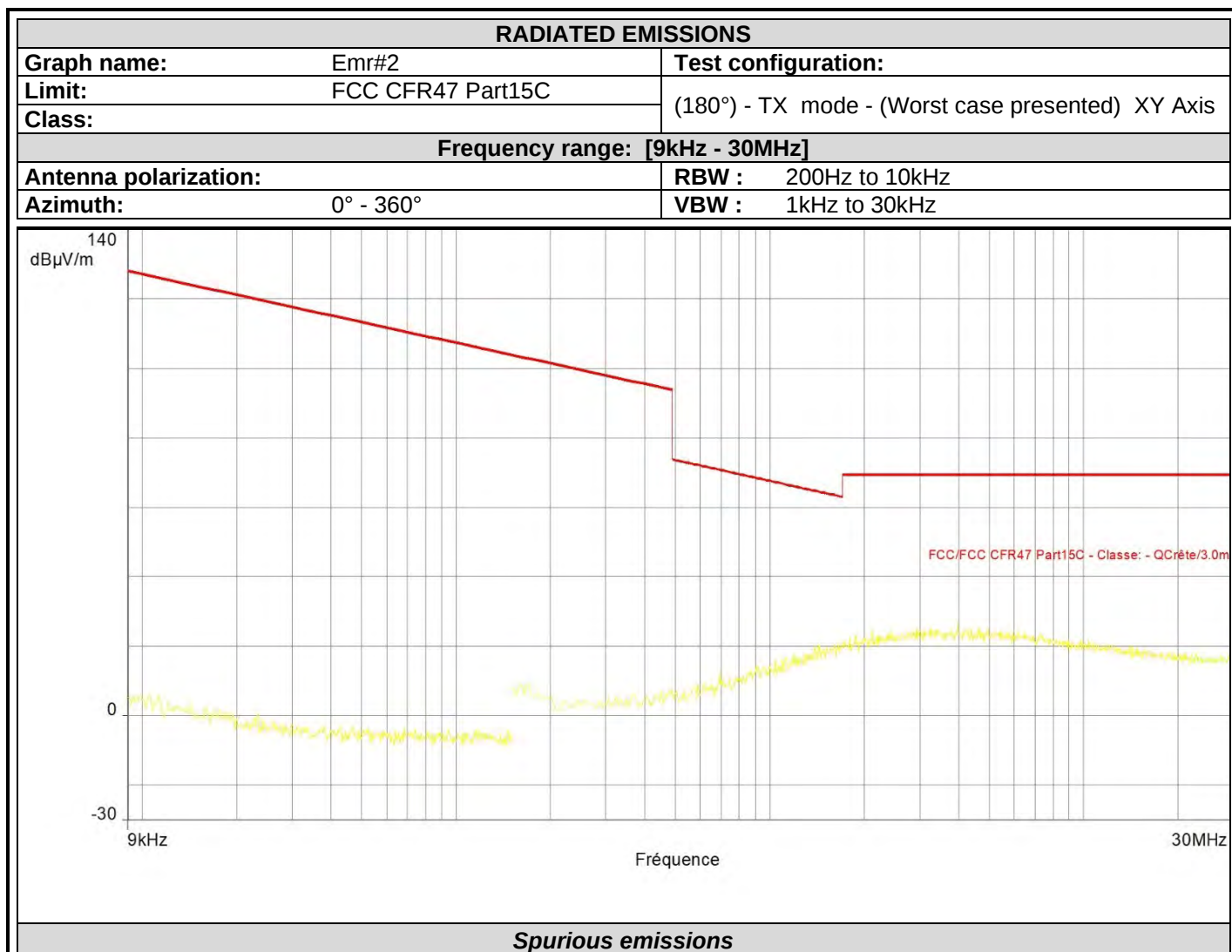
☒ None ☐ Divergence:

10.6. RESULTS

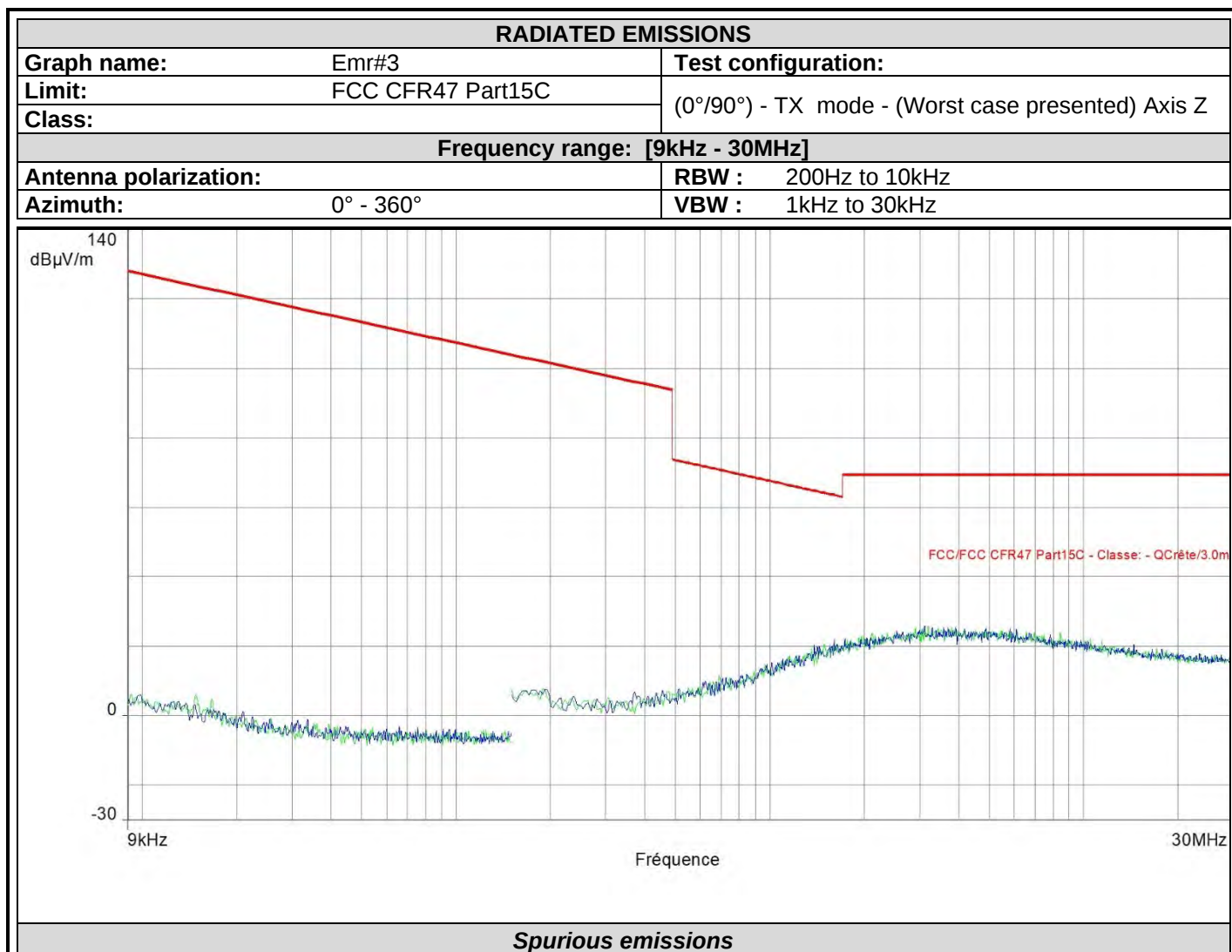
Results in the frequency band [0.009-30] MHz: Worst case presented



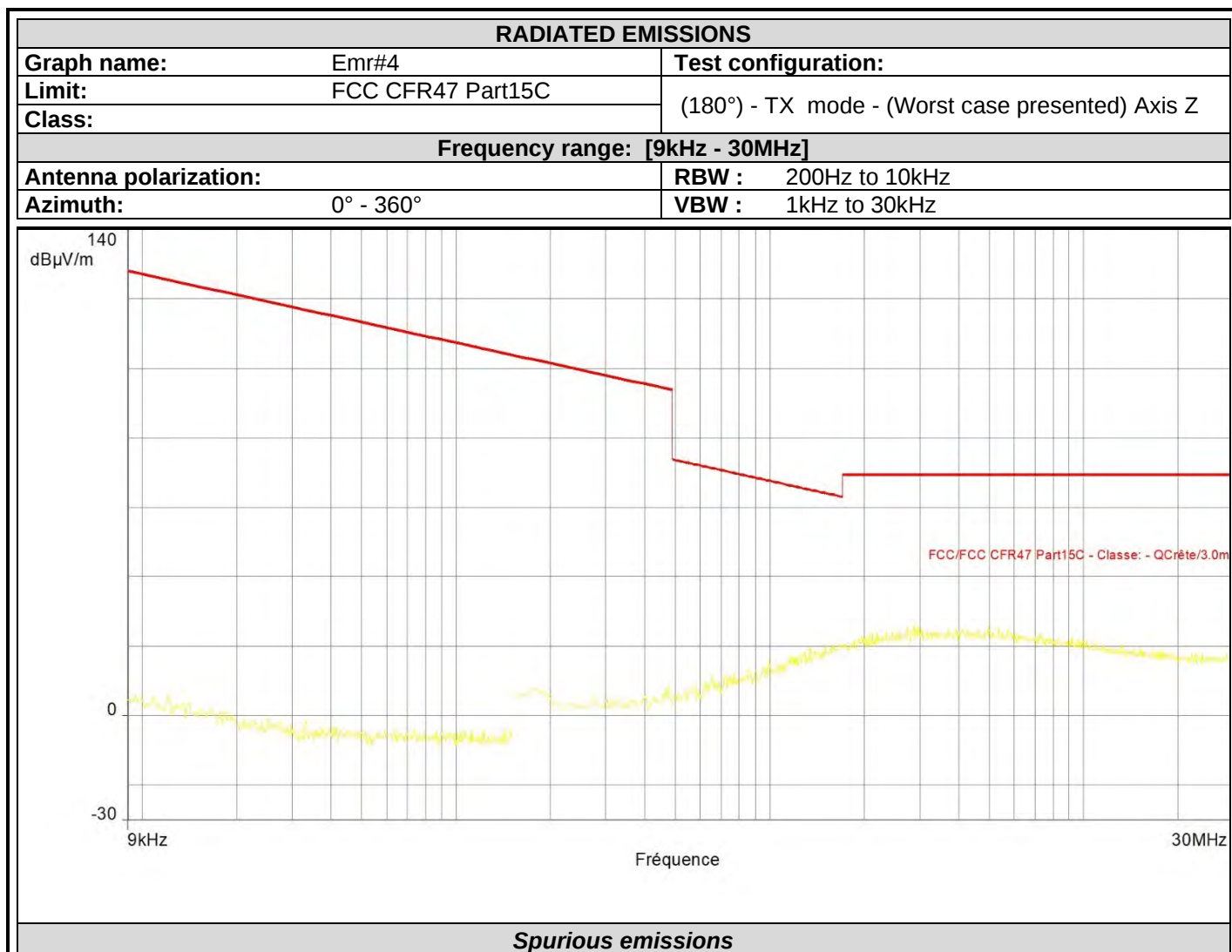
No significative frequency observed



No significative frequency observed

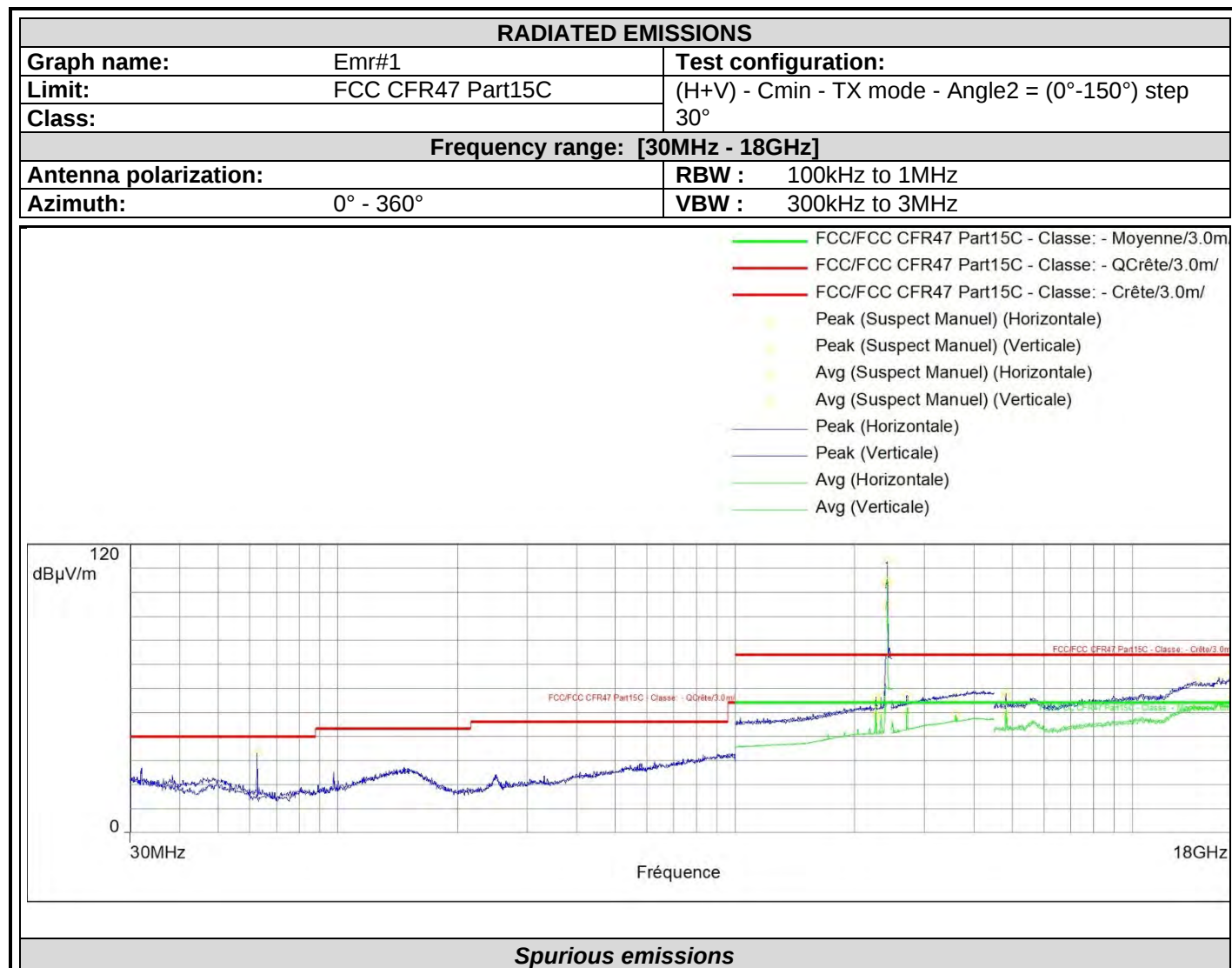


No significative frequency observed



No significative frequency observed

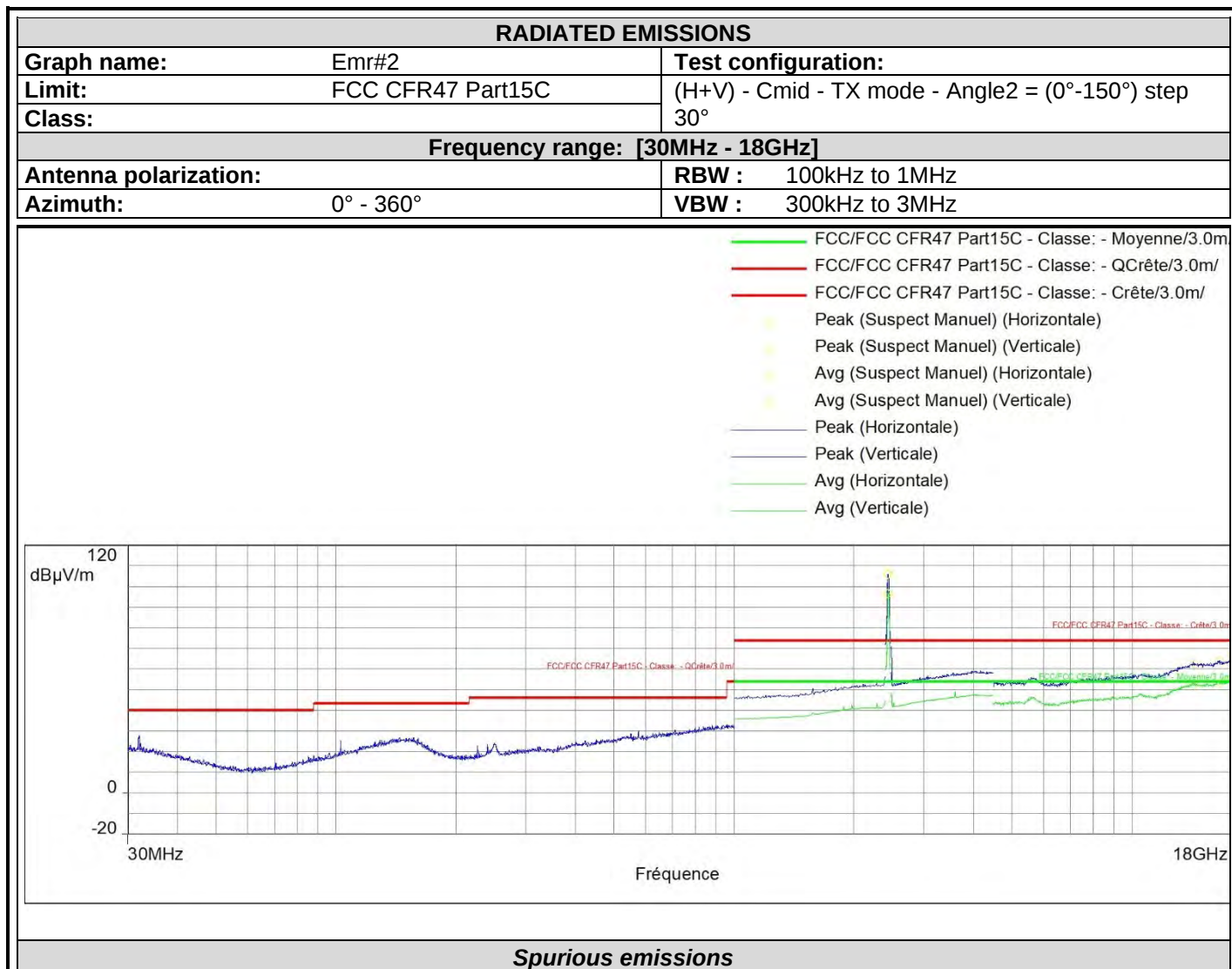
Results in the frequency band [30-18000] MHz: Worst case presented



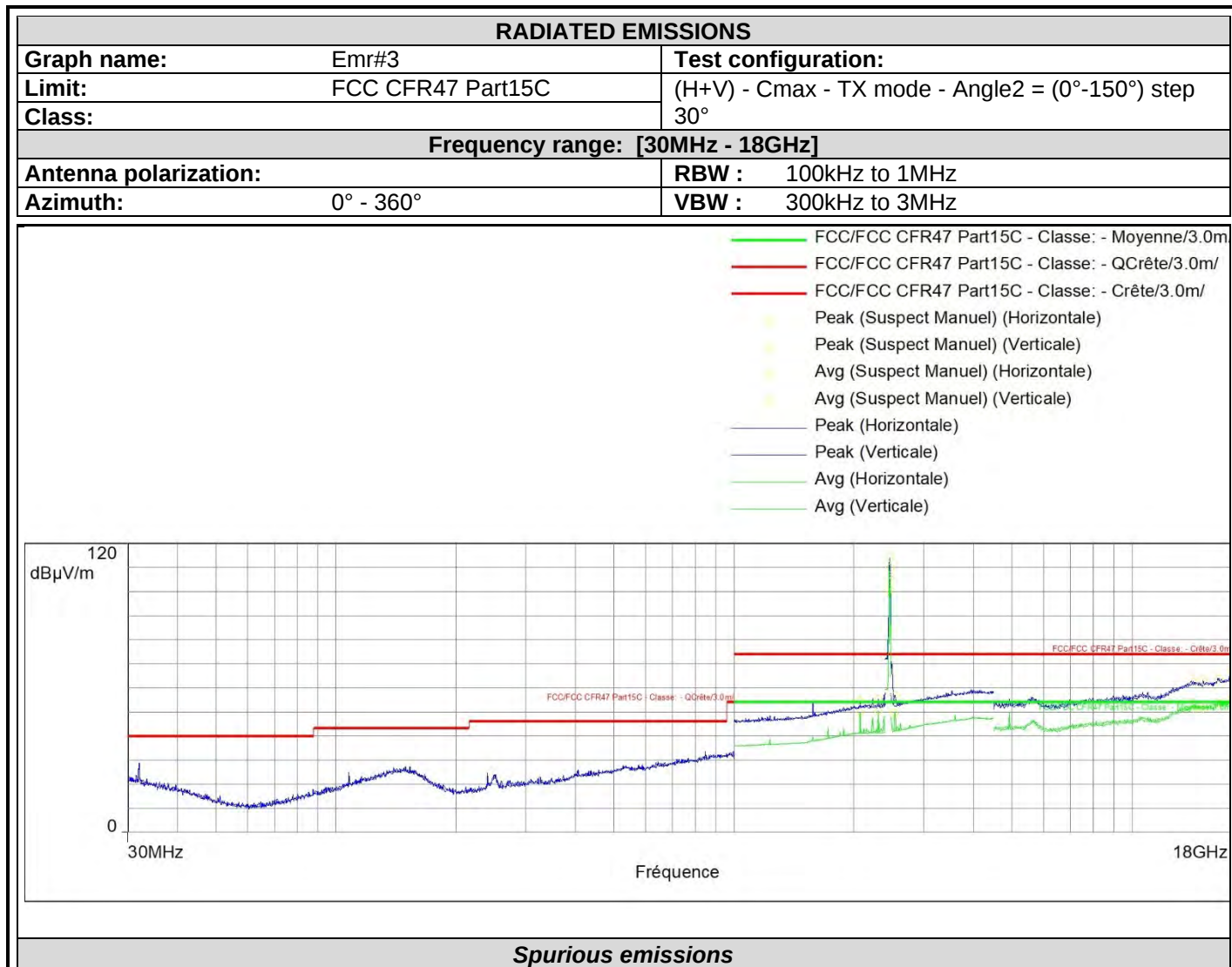
Frequency (MHz)	Peak (dBμV/m)	Lim.Q-Peak (dBμV/m)	Polarization	Correction (dB)
62.689	32.9	40.0	Vertical	9.9



Frequency (MHz)	Peak (dBμV/m)	Lim.Peak (dBμV/m)	Avg (dBμV/m)	Lim.Avg (dBμV/m)	Polarization	Correction (dB)
2413.151	104.7	74.0	95.0	54.0	Horizontal	34.8
2414.529	113.1	74.0	103.9	54.0	Vertical	34.8
2261.400	53.7	74.0	48.7	54.0	Horizontal	34.7
4824.000	56.4	74.0	48.3	54.0	Horizontal	-14.0
4823.156	58.0	74.0	51.8	54.0	Vertical	-14.0
14452.031	63.0	74.0	52.2	54.0	Vertical	-1.0
16552.969	63.5	74.0	53.1	54.0	Vertical	10.5
17994.094	66.7	74.0	56.3	54.0	Vertical	21.8
2712.978	57.1	74.0	49.7	54.0	Vertical	36.1
3599.834	56.5	74.0	49.1	54.0	Vertical	39.1
2261.050	56.2	74.0	50.9	54.0	Vertical	34.7
2332.800	56.4	74.0	49.5	54.0	Vertical	34.7



Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Lim.Q-Peak (dBµV/m)	Polarization	Correction (dB)
2437.539	105.8	74.0	96.3	54.0		Horizontal	34.8
14352.469	62.6	74.0	52.2	54.0		Horizontal	-1.2
16618.781	64.1	74.0	53.2	54.0		Horizontal	10.5
17950.219	66.4	74.0	55.8	54.0		Horizontal	21.4
2437.330	106.0	74.0	96.6	54.0		Vertical	34.8



Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Avg (dBµV/m)	Lim.Avg (dBµV/m)	Lim.Q-Peak (dBµV/m)	Polarization	Correction (dB)
2461.122	105.3	74.0	100.7	54.0		Horizontal	34.8
2538.752	56.9	74.0	49.6	54.0		Vertical	35.0
2460.997	114.1	74.0	109.8	54.0		Vertical	34.8
2077.300	54.5	74.0	49.7	54.0		Vertical	34.6
2308.300	55.4	74.0	50.5	54.0		Vertical	34.7
15100.875	63.1	74.0	51.5	54.0		Horizontal	2.6
16530.188	64.0	74.0	53.1	54.0		Horizontal	10.5
17863.312	67.5	74.0	55.6	54.0		Horizontal	20.5
14364.281	62.3	74.0	51.1	54.0		Vertical	-1.1



QUALIFICATION (30MHz-1GHz): 10 meters measurement on the Open Area Test Site.
Frequency list has been created with semi-anechoic chamber pre-scan results.
Measurements are performed using a QUASI-PEAK detection.

Test Frequency (MHz)	Meter Reading dB(μV)	Detector (Pk/QP/Av)	Polarit y (V/H)	Azimuth (Degrees)	Antenn a Height (cm)	Transduce r Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margi n (dB)	Remar k
62.7	16.6	QP	V	55	150	8.8	25.4	40.0	-14.6	

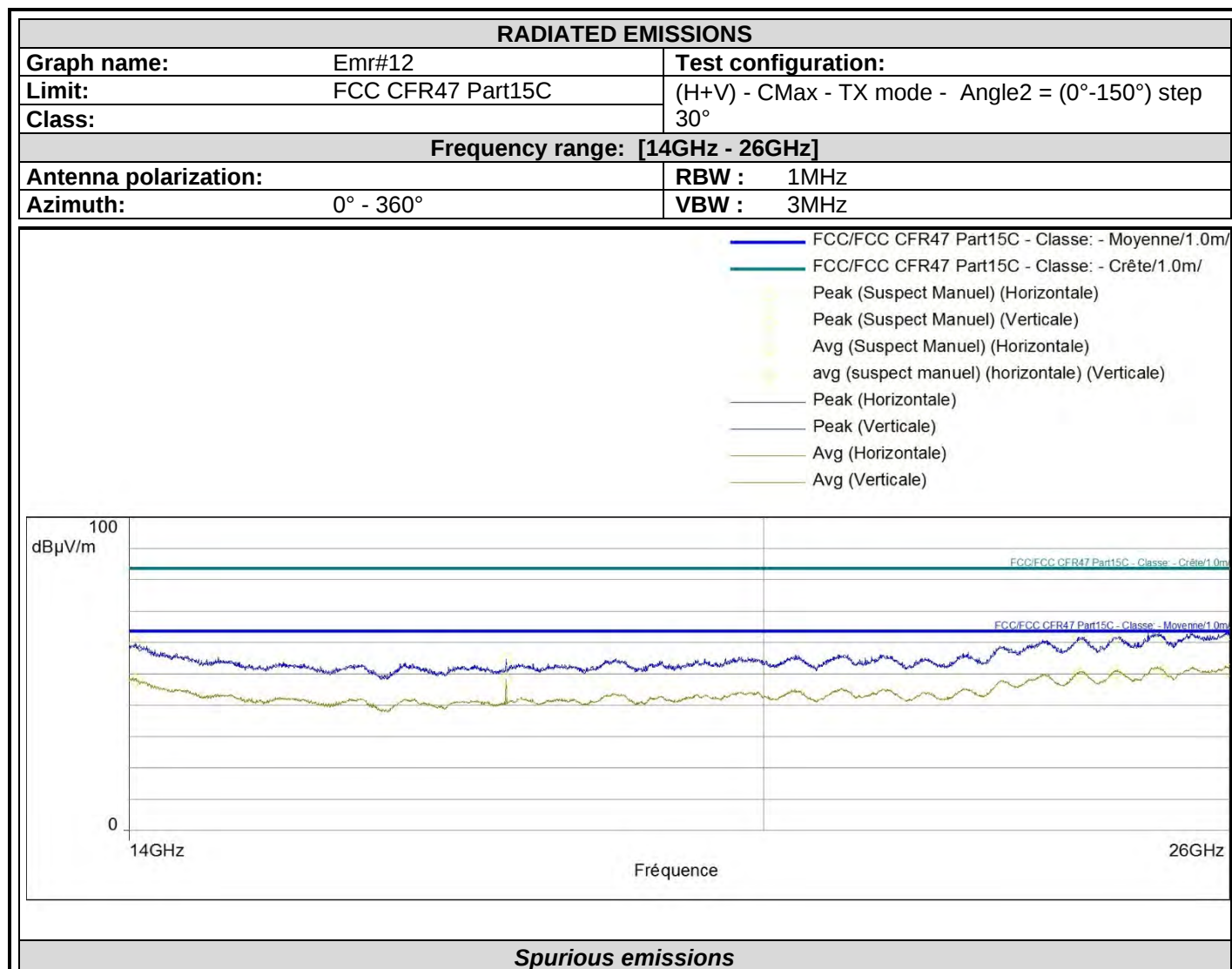
*Note: Measure have been done at 10m distance and corrected according to requirements of 15.209.e)
(M@3m = M@10m+10.5dB)*

Results in the frequency band [1-18] GHz: Worst case presented

QUALIFICATION (1GHz- 18GHz): The frequency list is created from the results obtained during the pre-characterization in anechoic chamber.
Measurements are performed using a PEAK and AVERAGE detection.

Test Frequency (MHz)	Meter Reading dB(μV)	Detector (Pk/QP/Av)	Polarit y (V/H)	Azimuth Tilt (°)	Antenn a Height (cm)	Transduce r Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margi n (dB)	Remark
2077.300	17.77	Pk	V	120	150	34.6	52.4	74.0	-21.6	Worst case
2077.300	5.73	Av	V	120	150	34.6	40.3	54.0	-13.7	Worst case
2308.300	17.99	Pk	H	0	150	34.7	52.7	74.0	-21.3	Worst case
2308.300	5.6	Av	H	0	150	34.7	40.3	54.0	-13.7	Worst case
2538.752	18.39	Pk	V	90	150	35	53.4	74.0	-20.6	Worst case
2538.752	6.09	Av	V	90	150	35	41.1	54.0	-12.9	Worst case
14364.281	64.63	Pk	H	0	150	-1.1	63.5	74.0	-10.5	Worst case
14364.281	50.8	Av	H	0	150	-1.1	49.7	54.0	-4.3	Worst case
15100.875	60.42	Pk	V	90	150	2.6	63.0	74.0	-11.0	Worst case
15100.875	46.48	Av	V	90	150	2.6	49.1	54.0	-4.9	Worst case
16530.188	53.28	Pk	V	90	150	10.5	63.8	74.0	-10.2	Worst case
16530.188	40.23	Av	V	90	150	10.5	50.7	54.0	-3.3	Worst case
17863.312	32.43	Av	V	90	150	20.5	52.9	54.0	-1.1	Worst case

Results in the frequency band [18-26] GHz: Worst case presented



QUALIFICATION (18GHz- 25GHz): The frequency list is created from the results obtained during the pre-characterization in anechoic chamber.

Measurements are performed using a PEAK and AVERAGE detection.

No significant frequency observed

10.7. CONCLUSION

Unwanted emissions measurement performed on the sample of the product **ENLAPS** Tikee, SN: **T-EUR-3L-801129**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.247 & RSS 247 ISSUE 2 limits.

11. UNCERTAINTIES CHART

Type de mesure / Kind of measurement	Incertitude élargie laboratoire / Wide uncertainty laboratory (k=2) $\pm x$	Incertitude limite du CISPR / CISPR uncertainty limit $\pm y$
Measurement of conducted disturbances in voltage on the power port	3.29dB	3.4 dB
Measurement of conducted disturbances in voltage on the telecommunication port.	3.26 dB	5dB
Measurement of discontinuous conducted disturbances in voltage	3.33 dB	3.4 dB
Measurement of conducted disturbances in current	2.67 dB	2.9dB
Spurious emission, radiated (Semi anechoic chamber & open test site)	5.60 dB	6 dB
Spurious emission, radiated (Full anechoic chamber above 1GHz)	± 3.8 dB	± 6 dB
Occupied Channel Bandwidth	± 2.8 %	± 5 %
RF power, conducted	± 1.2 dB	± 1.5 dB
Power Spectral Density, Conducted	± 1.7 dB	± 3 dB
Spurious emission, conducted	± 2.3 dB	± 3 dB
Temperature	± 0.75 °C	± 3 °C
Supply Voltages	± 1.7 %	± 3 %

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