TEST REPORT

N°: 166336-748857-A **Version : 01**

Subject	**Radio spectrum matters tests according to standards: 47 CFR Part 15.247 & RSS-247 Issue 2 & RSS-Gen Issue 5**
Issued to	**FEETME 157 Boulevard MacDonald 75019 - PARIS FRANCE**
Apparatus under test	
Product	**Connected insoles**
Trade mark	**FEETME**
Manufacturer	**FEETME**
Model under test	**FTM-DK**
Serial number	**DK9701000088R & DK9701000078L**
FCC ID	**2AXOA-DKIN01**
Conclusion	See Test Program chapter
Test date	March 9, 2020 to July 9, 2021
Test location	Moirans
Test Site	6500A-1 & 6500A-3
Sample receipt date	March 9, 2020
Registration Number	197516
Designation Number	FR0008
Composition of document	67 pages
Document issued on	July 13, 2021

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Approved by :
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PUBLICATION HISTORY

Version	Date	Author	Modification
01	July 13, 2021	Armand MAHOUNGOU	Creation of the document

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

SUMMARY

1. TEST PROGRAM 4
2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER) 5
3. OCCUPIED BANDWIDTH 10
4. 6DB EMISSION BANDWIDTH 16
5. DUTY CYCLE 22
6. MAXIMUM CONDUCTED OUTPUT POWER 28
7. POWER SPECTRAL DENSITY 34
8. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS AT THE BAND EDGE 40
9. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS 46
10. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS 53
11. UNCERTAINTIES CHART 67

1. TEST PROGRAM

References

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

Radio requirement:

Clause (47CFR Part 15.247 & RSS-247 Issue 2 & RSS-Gen Issue 5) Test Description	Test result - Comments			
Occupied Bandwidth	☑ 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.				

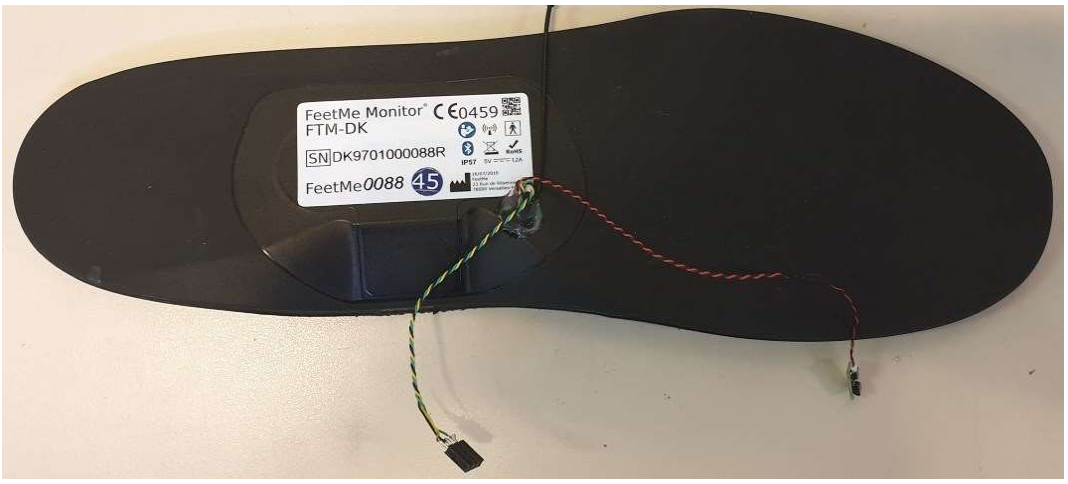
(1): Limited program
(2): EUT not directly or indirectly connected to the AC Power Public Network

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):
FEETME FTM-DK **Serial Number: DK9701000088R & DK9701000078L**



Equipment Under Test

Equipment Under Test

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Battery cable	-	☐	☐	☐	To supply the product during conducted test
2	Communication cable	-	☐	☐	☐	To set the product in test mode

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop	-	-	To set the product

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	
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	☐ X°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	☑ 3.7 Vdc	
		☐ 240V/50Hz	☐ X Vdc	

Antenna Characteristic			
Antenna assembly	**Gain (dBi)**	**Frequency Band (MHz)**	**Impedance(Ω)**
1	4.74	2400-2483.5	50

Hardware information		
Software (if applicable):	**V. :**	**-**

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	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 are used to set the product:

a. – See document “LCIE_ Setup FeetMe.docx” (provided by customer) for the command used during test.

2.3. EQUIPMENT MODIFICATION

☑ None ☐ Modification:

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

Test performed by	: Armand MAHOUNGOU
Date of test	: March 13, 2020 & July 9, 2021
Ambient temperature	: 26°C
Relative humidity	: 46%

3.2. TEST SETUP

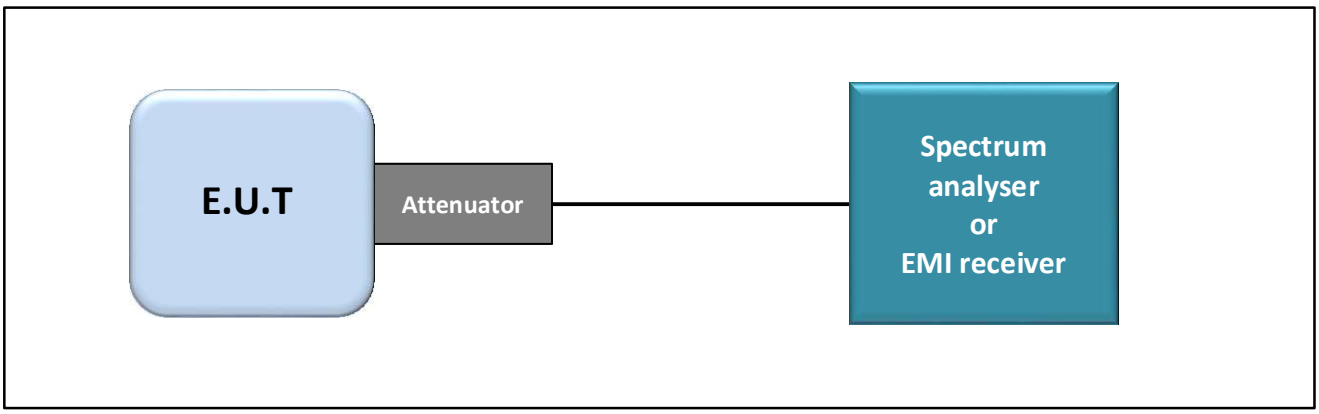
- The Equipment under Test is installed:
☑ On a table
☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

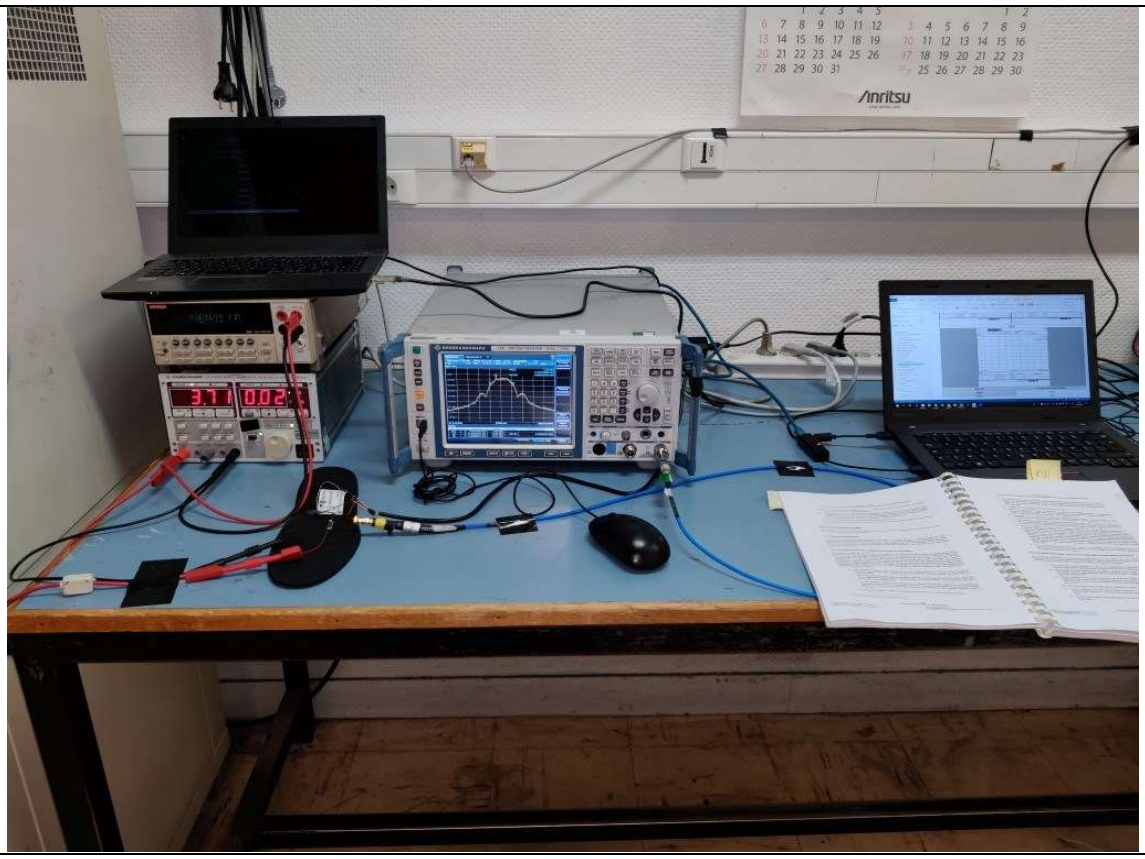
- Test Procedure:
☐ RSS-Gen Issue 5 § 6.7
☑ ANSI C63.10 § 6.9.2

Measurement Procedure:

a) RBW shall be in the range of 1% to 5% of the anticipated occupied bandwidth
b) Set the video bandwidth (VBW) ≥ 3 x RBW
c) SPAN = Capture all products of the modulation process
d) Detector = Peak.
e) Trace mode = max hold.
f) Sweep = auto couple.
g) Allow the trace to stabilize.
h) 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

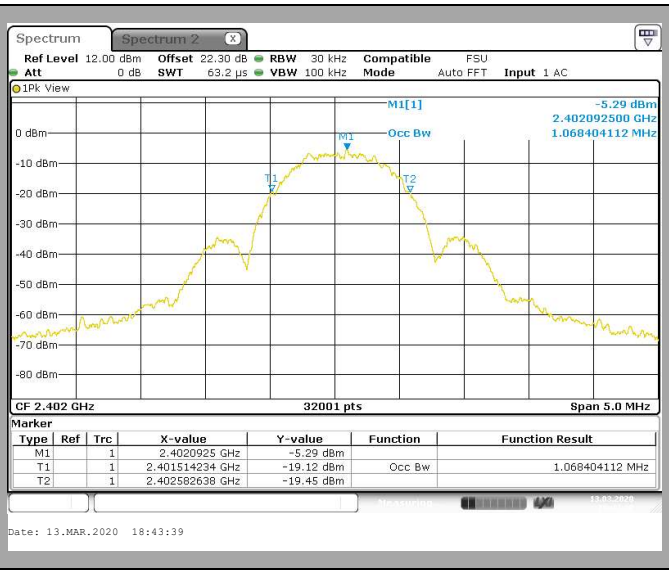
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642026	2019/07	2021/07
Cable + Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329865	2019/09	2021/09
Multimeter	KEITHLEY	2000	A1242090	2020/03	2022/03
Programmable DC power supply	ROHDE & SCHWARZ	NGSM32/10	A7040074	See multimeter	See multimeter

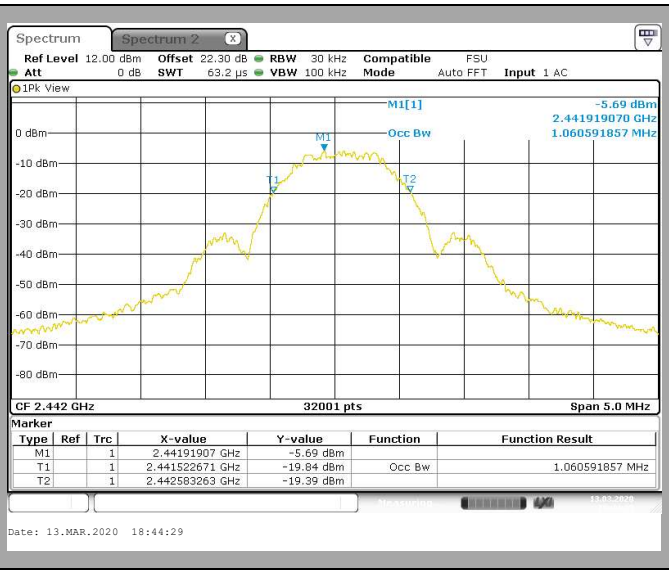
Note: In our quality system, the test equipment calibration due is more & less 2 months

3.5. RESULTS

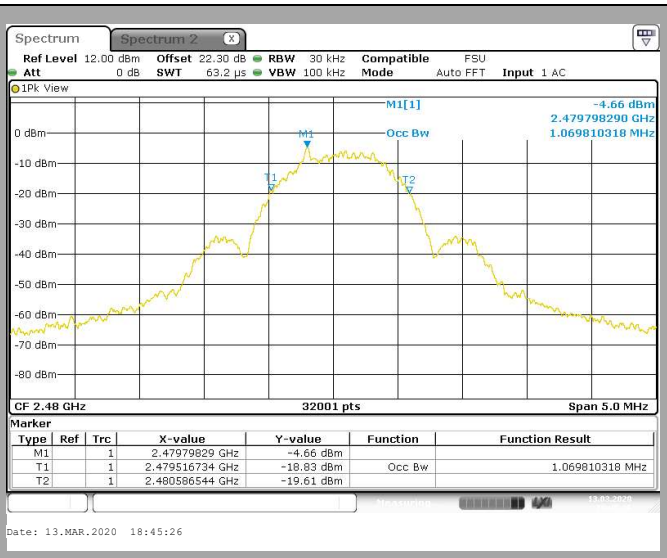
Right insole

Occupied Bandwidth	
BLE V4.2	
Cmin	Cnom





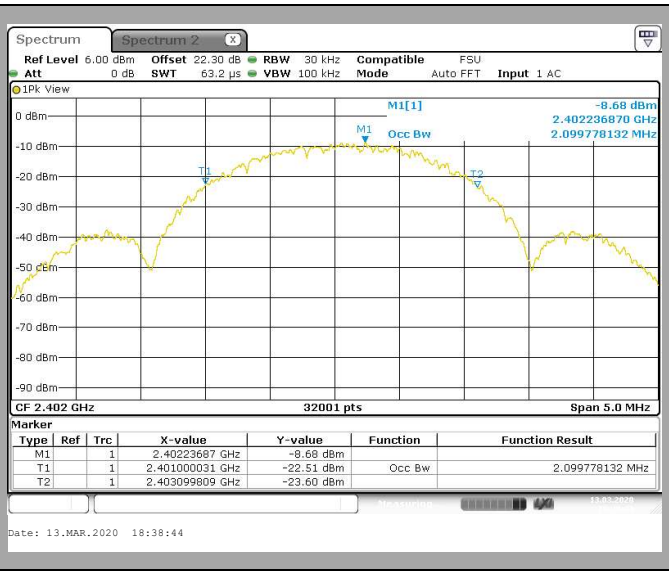
Cmax

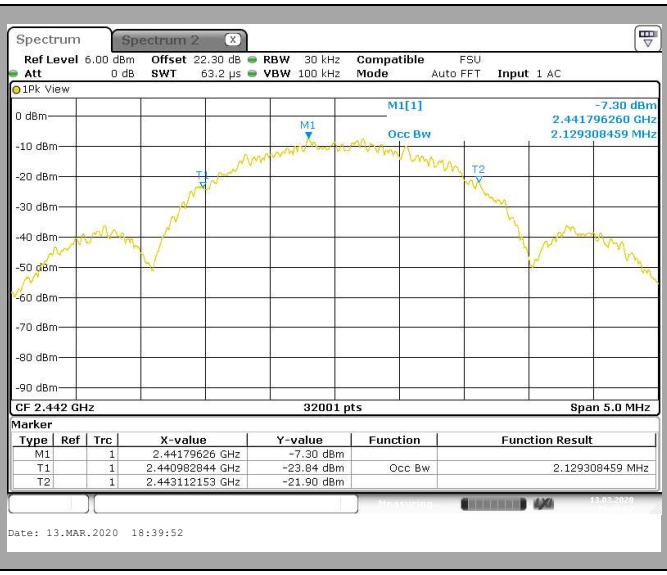


Channel	Occupied Bandwidth (MHz)
Cmin	1.068
Cnom	1.060
Cmax	1.070

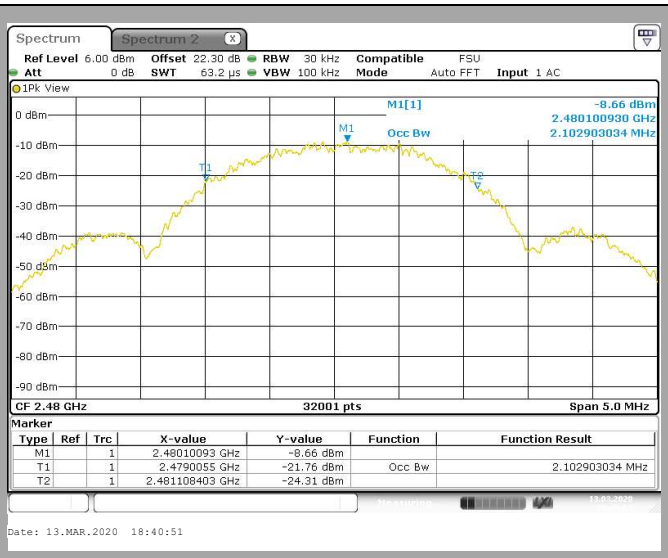
Right insole

Occupied Bandwidth	
BLE V5.0	
Cmin	Cnom





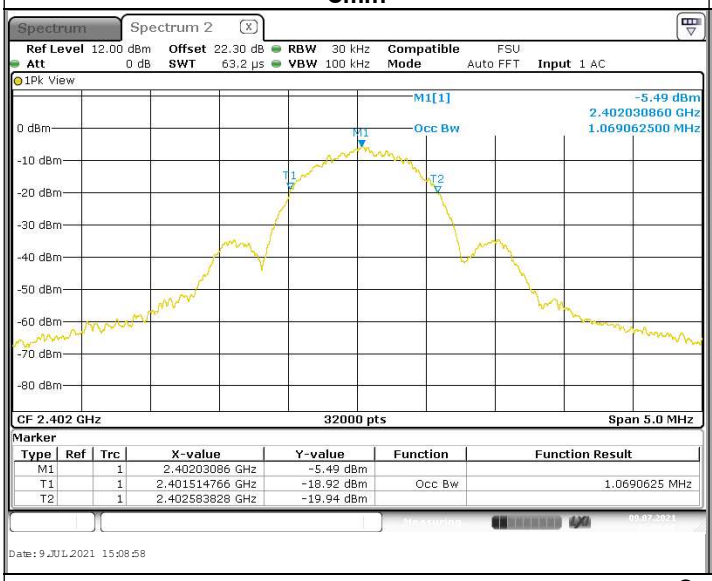
Cmax

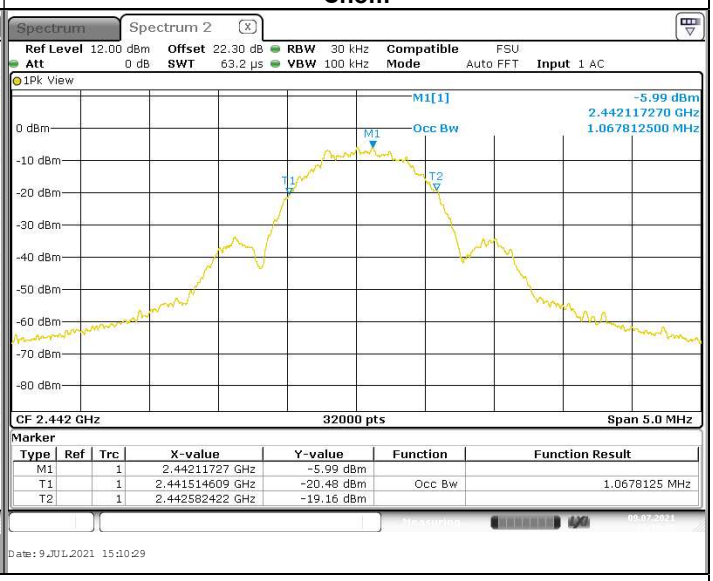


Channel	Occupied Bandwidth (MHz)
Cmin	2.099
Cnom	2.129
Cmax	2.103

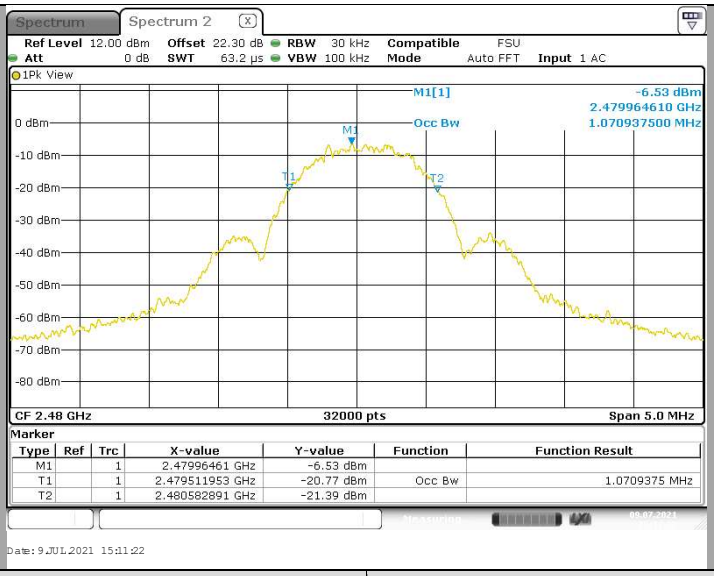
Left insole

Occupied Bandwidth	
BLE V4.2	
Cmin	Cnom





Cmax



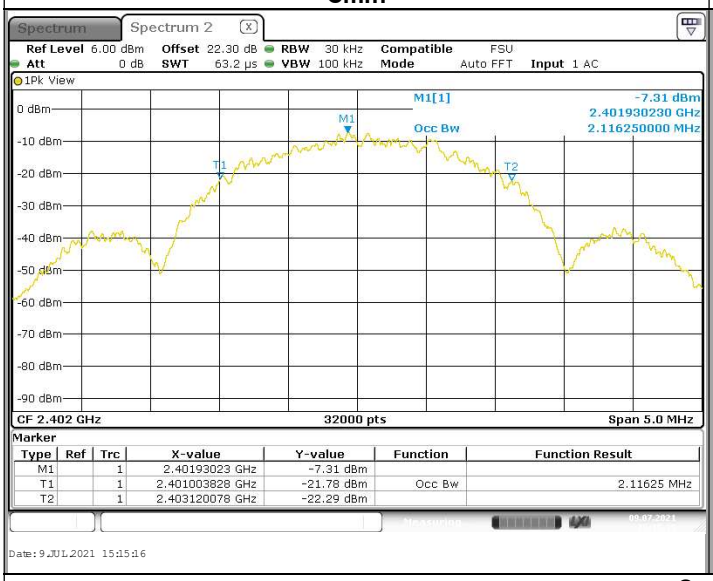
Channel	Occupied Bandwidth (MHz)
Cmin	1,069
Cnom	1,068
Cmax	1,071

Left insole

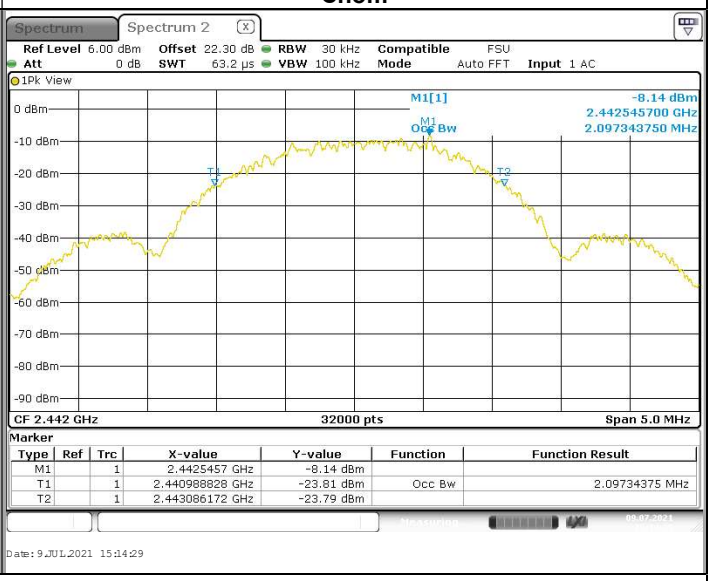
Occupied Bandwidth

BLE V5.0

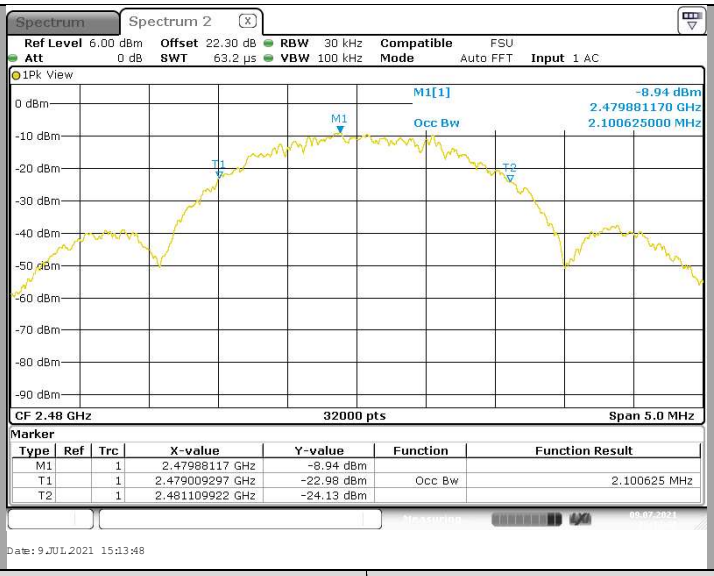
Cmin



Cnom



Cmax



Channel	Occupied Bandwidth (MHz)
Cmin	2,116
Cnom	2,097
Cmax	2,101

3.6. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **FEETME FTM-DK**, SN: **DK9701000088R & DK9701000078L**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS-GEN ISSUE 5** limits.

4. 6DB EMISSION BANDWIDTH

4.1. TEST CONDITIONS

Test performed by	: Armand MAHOUNGOU
Date of test	: March 13, 2020 & July 9, 2021
Ambient temperature	: 26°C
Relative humidity	: 46%

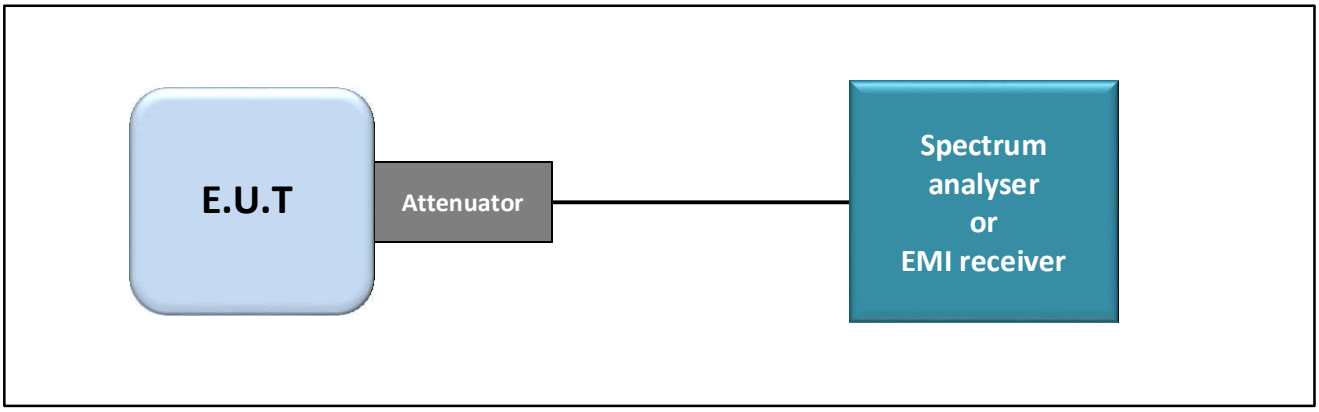
4.2. TEST SETUP

- The Equipment under Test is installed:
☑ On a table
☐ In an anechoic chamber

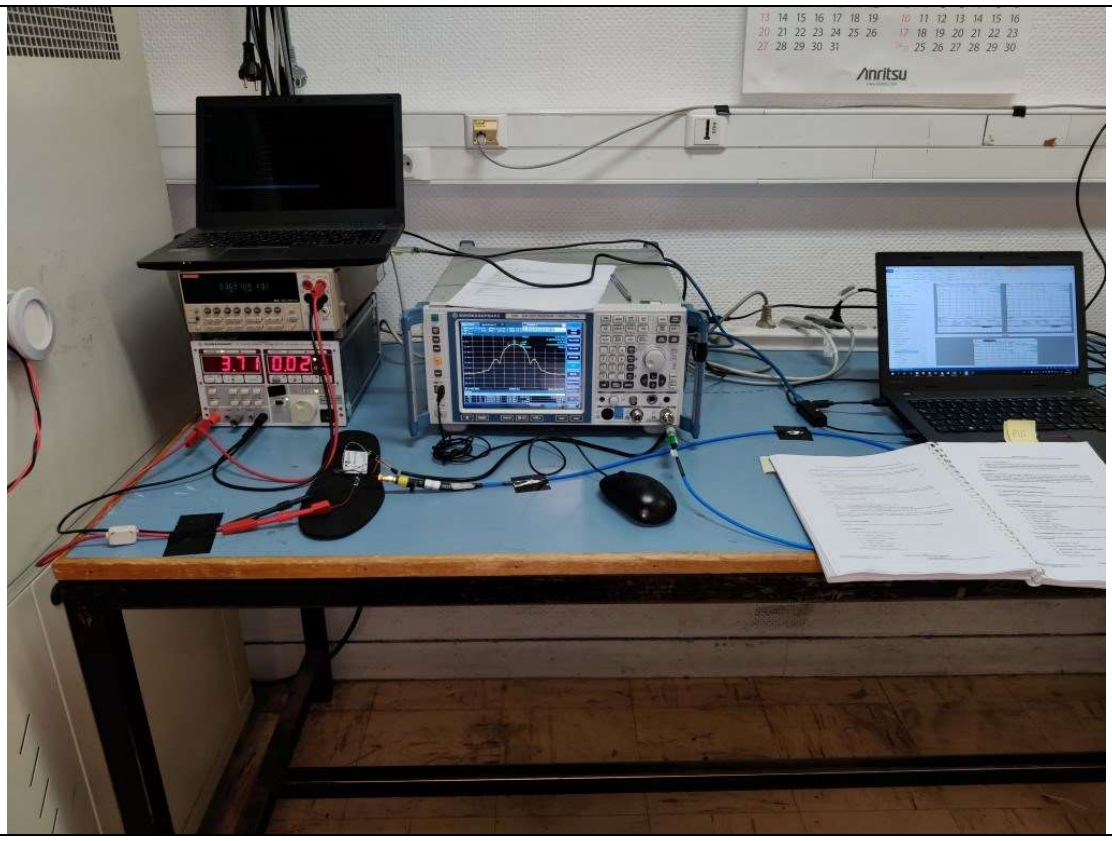
- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- 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) ≥ 3 x 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	ESR 7	A2642026	2019/07	2021/07
Cable + Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329865	2019/09	2021/09
Multimeter	KEITHLEY	2000	A1242090	2020/03	2022/03
Programmable DC power supply	ROHDE & SCHWARZ	NGSM32/10	A7040074	See multimeter	See multimeter

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

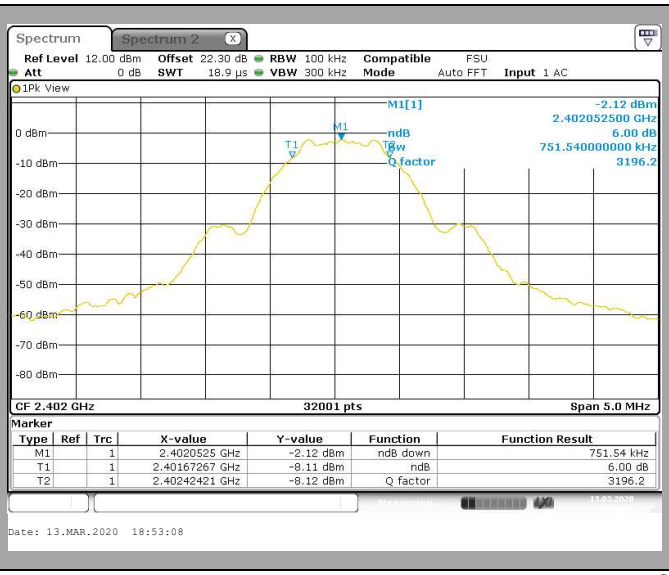
4.5. RESULTS

Right insole

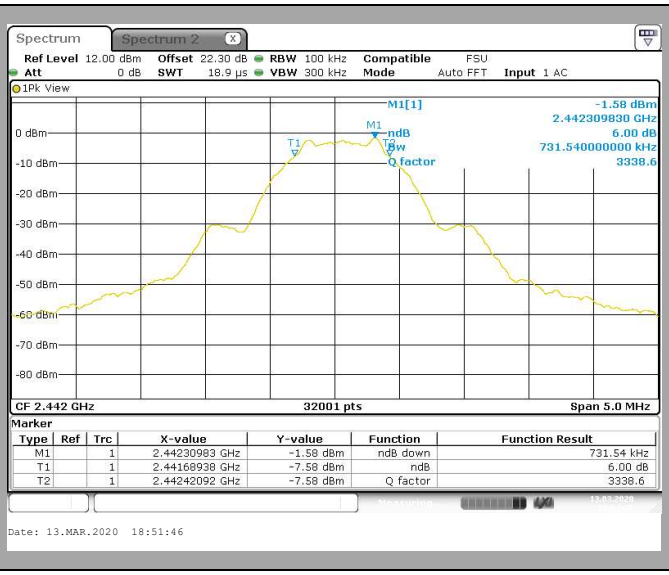
6dB Emission Bandwidth

BLE V4.2

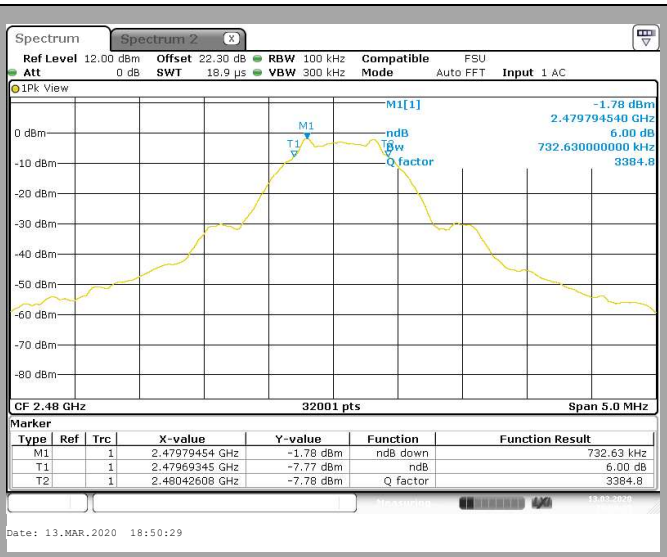
Cmin



Cnom



Cmax



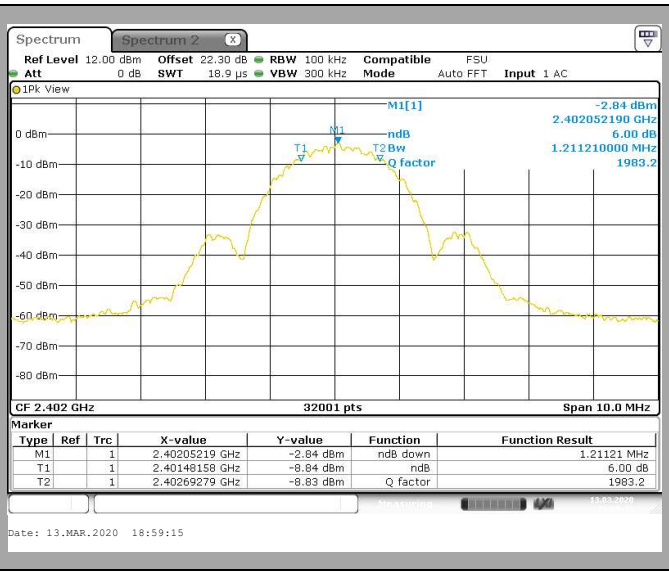
Channel	6dB Emission Bandwidth (MHz)	Limit (MHz)
Cmin	0.751	Minimum 0.5
Cnom	0.731	Minimum 0.5
Cmax	0.732	Minimum 0.5

Right insole

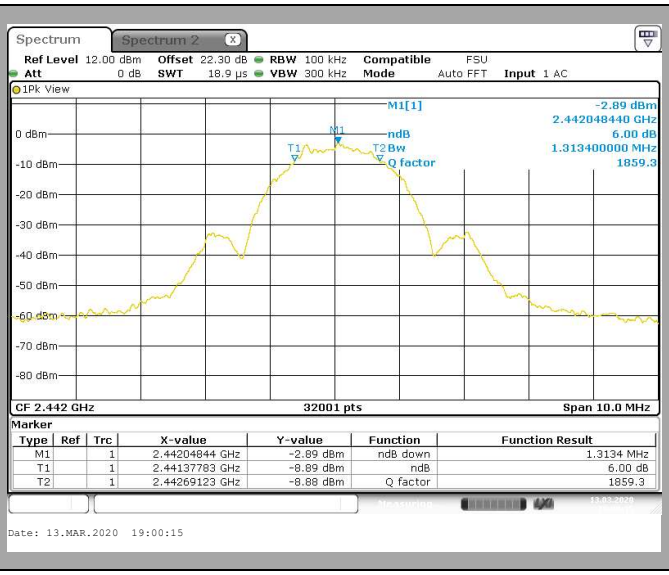
6dB Emission Bandwidth

BLE V5.0

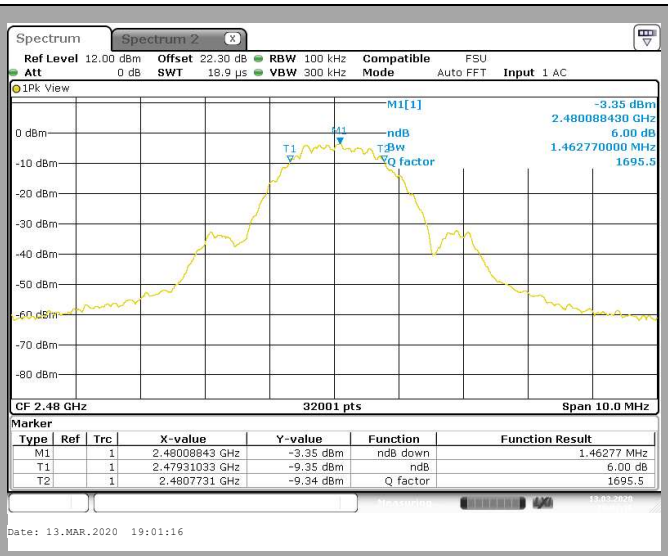
Cmin



Cnom



Cmax



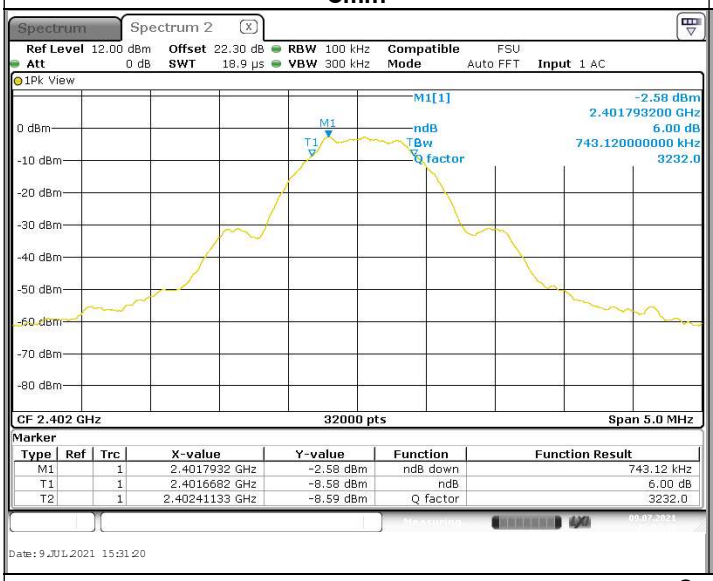
Channel	6dB Emission Bandwidth (MHz)	Limit (MHz)
Cmin	1.211	Minimum 0.5
Cnom	1.313	Minimum 0.5
Cmax	1.463	Minimum 0.5

Left insole

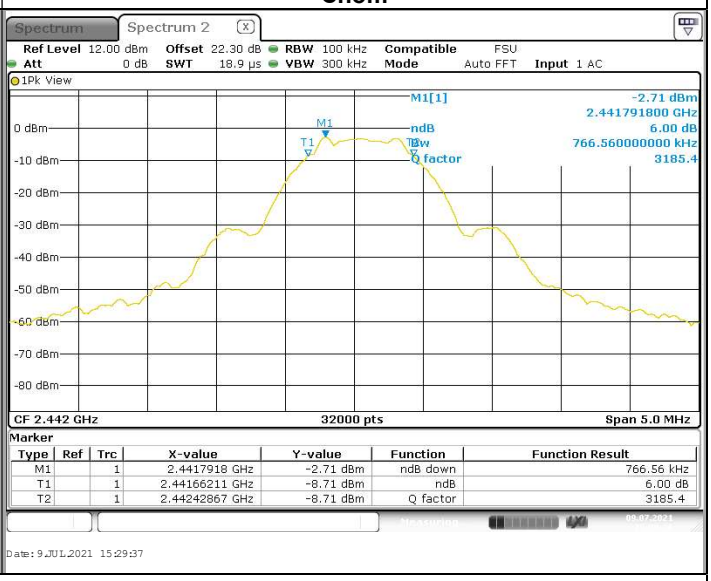
6dB Emission Bandwidth

BLE V4.2

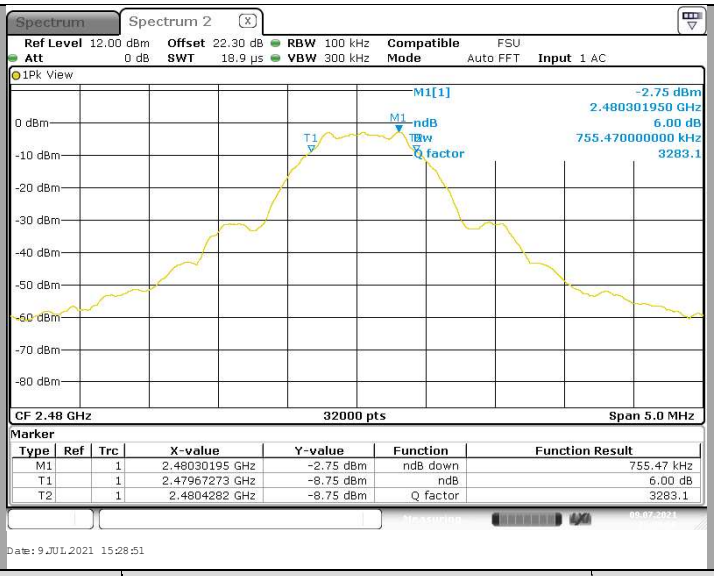
Cmin



Cnom



Cmax



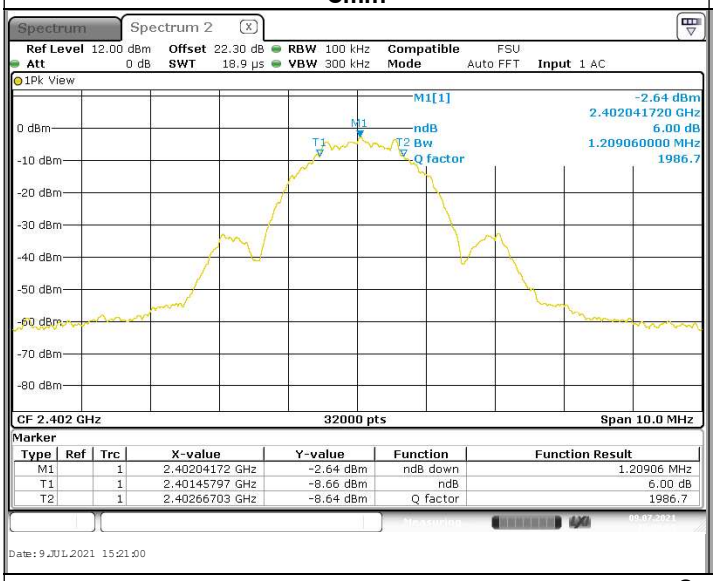
Channel	6dB Emission Bandwidth (MHz)	Limit (MHz)
Cmin	0,743	Minimum 0.5
Cnom	0,766	Minimum 0.5
Cmax	0,755	Minimum 0.5

Left insole

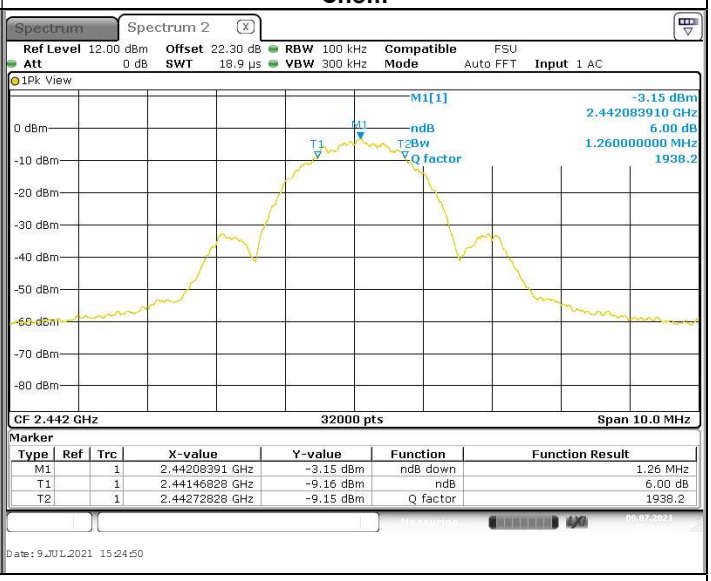
6dB Emission Bandwidth

BLE V5.0

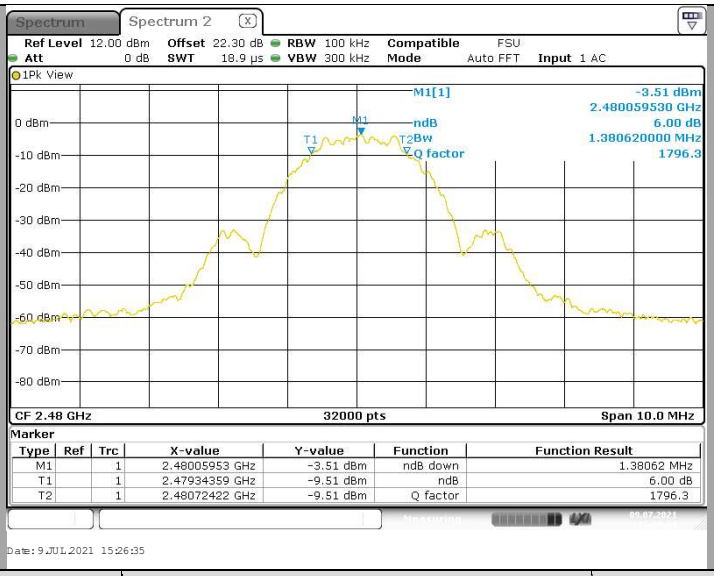
Cmin



Cnom



Cmax



Channel	6dB Emission Bandwidth (MHz)	Limit (MHz)
Cmin	1,209	Minimum 0.5
Cnom	1,260	Minimum 0.5
Cmax	1,381	Minimum 0.5

4.6. CONCLUSION

6dB Emission Bandwidth measurement performed on the sample of the product **FEETME FTM-DK**, SN: **DK9701000088R & DK9701000078L**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

5. DUTY CYCLE

5.1. TEST CONDITIONS

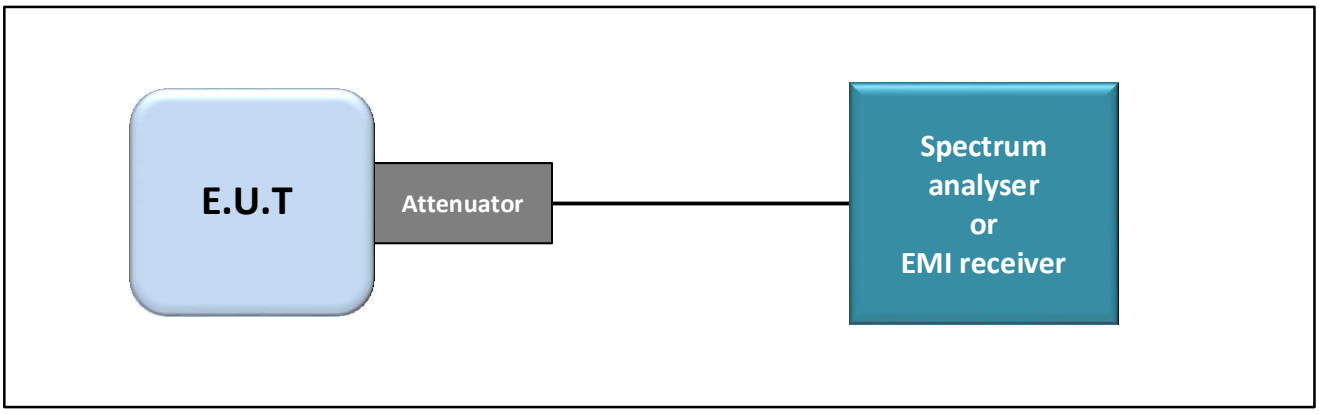
Test performed by	: Armand MAHOUNGOU
Date of test	: March 13, 2020 & July 9, 2021
Ambient temperature	: 26°C
Relative humidity	: 46%

5.2. TEST SETUP

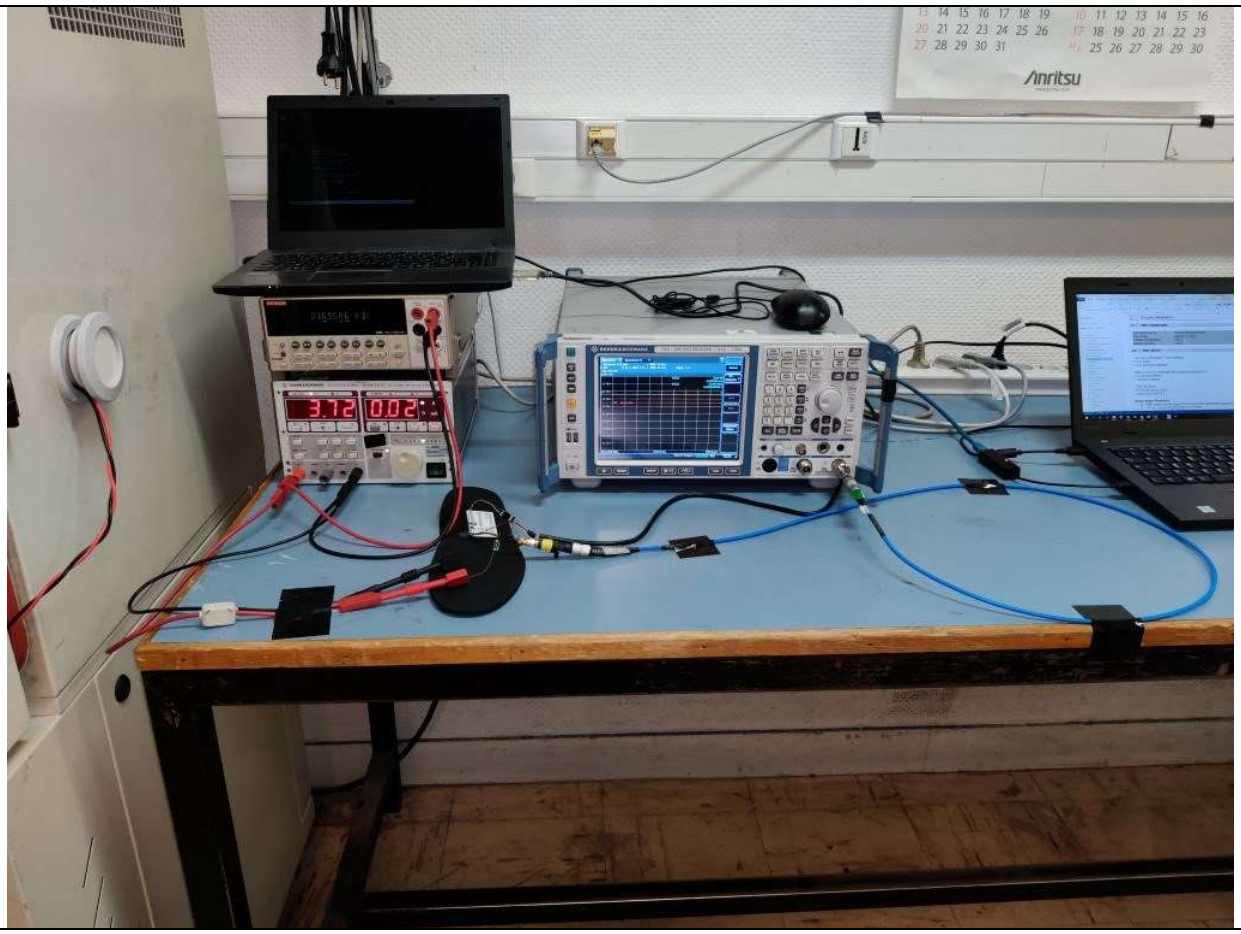
- The Equipment under Test is installed:
☑ On a table
☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- Test Procedure:
☑ ANSI C63.10 § 11.6



Test set up of Duty Cycle



Photograph for Duty Cycle

5.3. LIMIT

None

5.4. TEST EQUIPMENT LIST

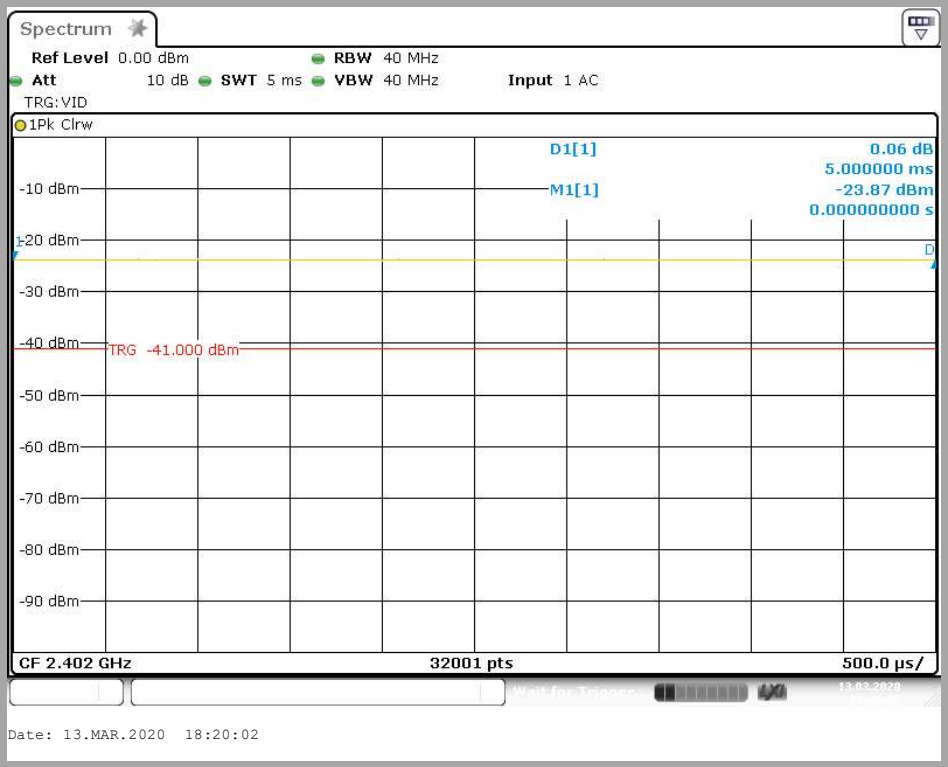
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642026	2019/07	2021/07
Cable + Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329865	2019/09	2021/09
Multimeter	KEITHLEY	2000	A1242090	2020/03	2022/03
Programmable DC power supply	ROHDE & SCHWARZ	NGSM32/10	A7040074	See multimeter	See multimeter

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

5.5. RESULTS

Right insole

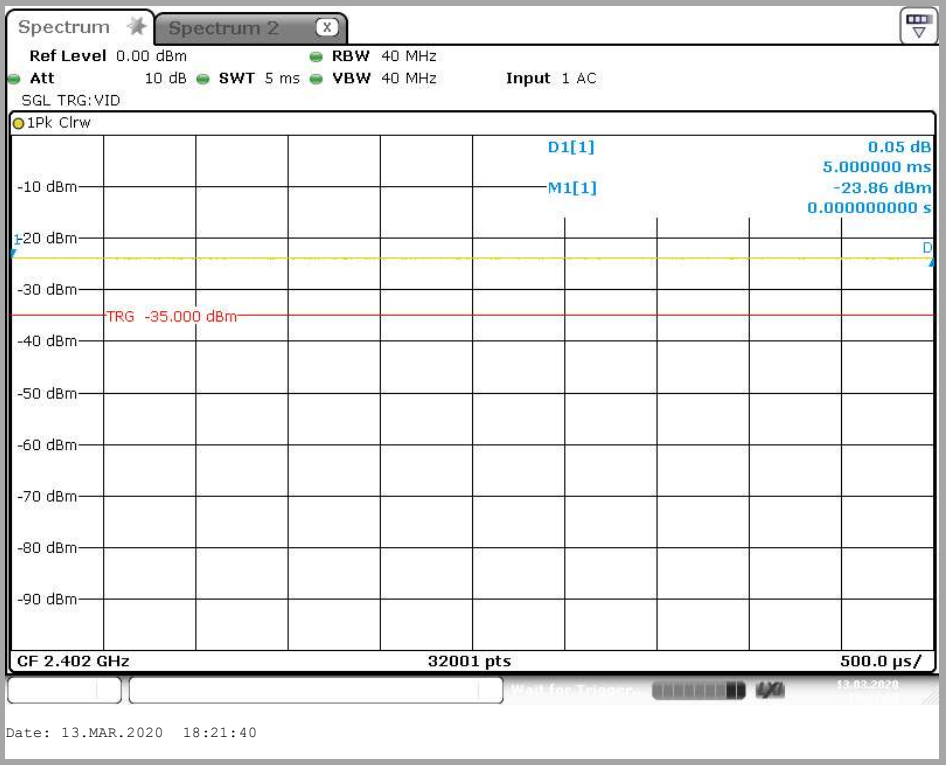
Duty Cycle
Cmin
BLE V4.2



Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Channel	100	$20\log(\frac{1}{duty\ cycle}) = 0$

Right insole

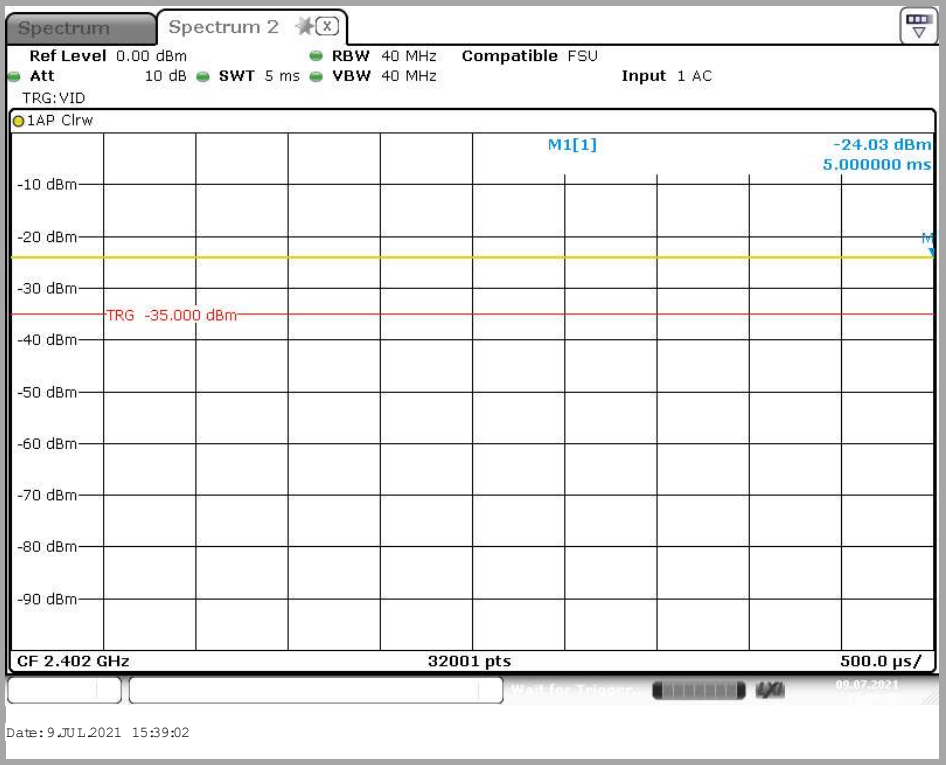
Duty Cycle
Cmin
BLE V5.0



Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Channel	100	$20\log(\frac{1}{duty\ cycle}) = 0$

Left insole

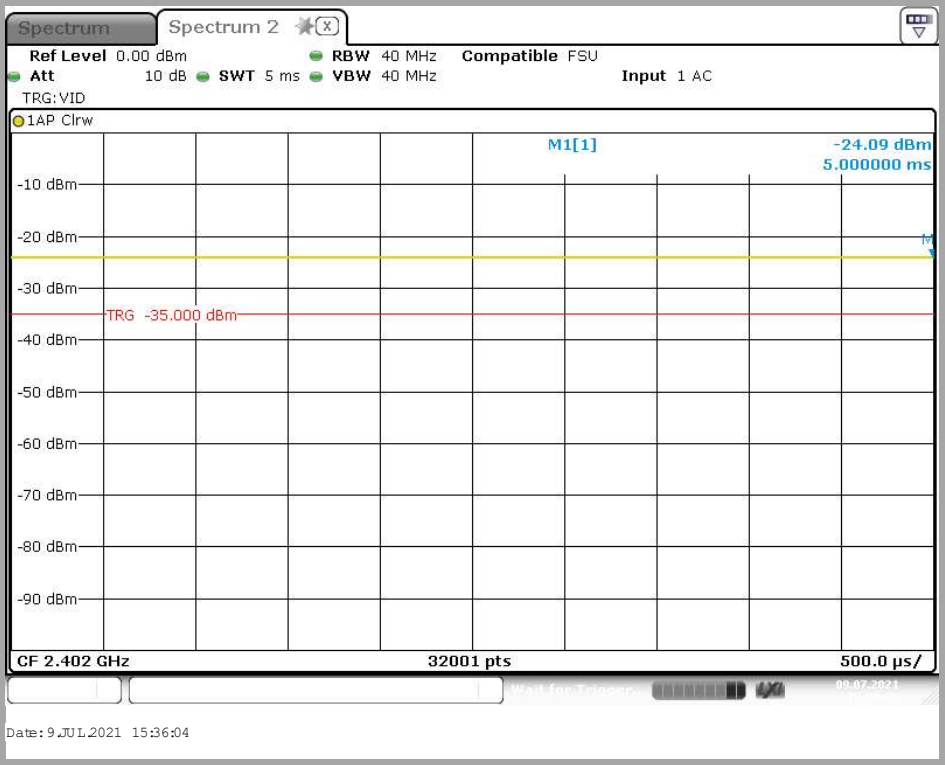
Duty Cycle
Cmin
BLE V4.2



Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Channel	100	$20\log(\frac{1}{duty\ cycle}) = 0$

Left insole

Duty Cycle
Cmin
BLE V5.0



Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Channel	100	$20\log(\frac{1}{duty\ cycle}) = 0$

5.6. CONCLUSION

Duty Cycle measurement performed on the sample of the product **FEETME FTM-DK**, SN: **DK9701000088R & DK9701000078L**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

6. MAXIMUM CONDUCTED OUTPUT POWER

6.1. TEST CONDITIONS

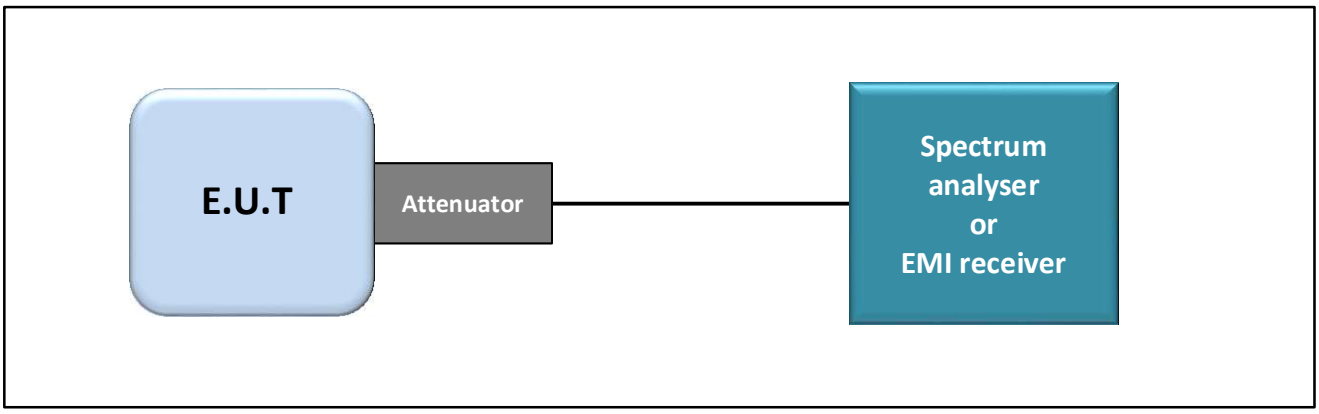
Test performed by	: Armand MAHOUNGOU
Date of test	: March 13, 2020 & July 9, 2021
Ambient temperature	: 26°C
Relative humidity	: 46%

6.2. TEST SETUP

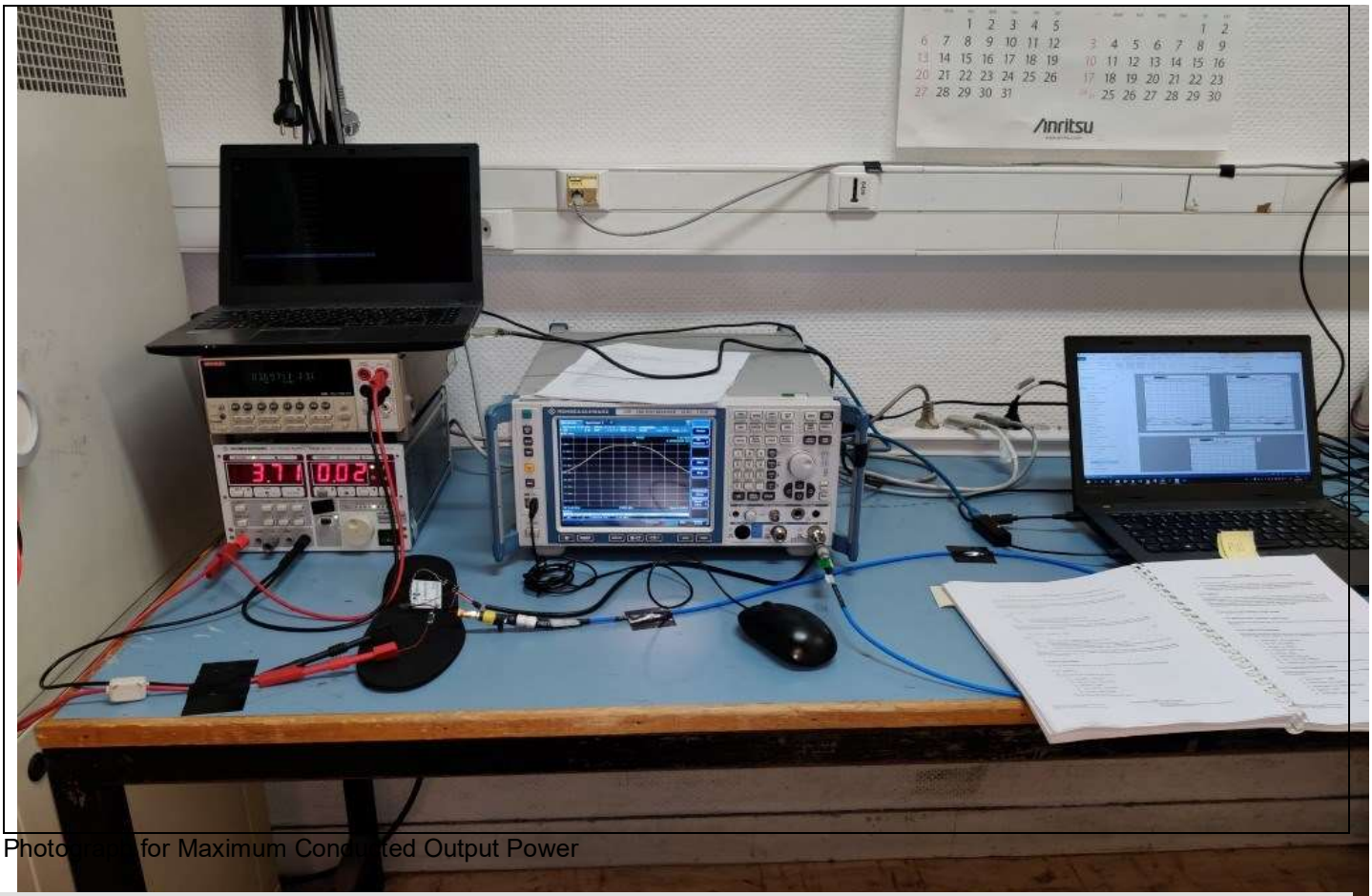
- The Equipment under Test is installed:
☑ On a table
☐ In an anechoic chamber

- 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-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	ESR 7	A2642026	2019/07	2021/07
Cable + Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329865	2019/09	2021/09
Multimeter	KEITHLEY	2000	A1242090	2020/03	2022/03
Programmable DC power supply	ROHDE & SCHWARZ	NGSM32/10	A7040074	See multimeter	See multimeter

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

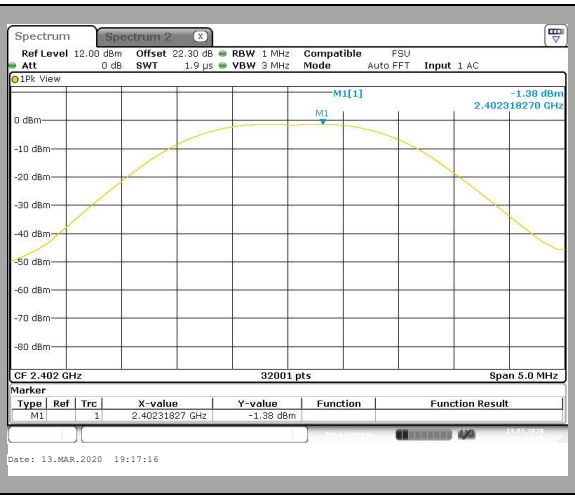
6.5. RESULTS

Right insole

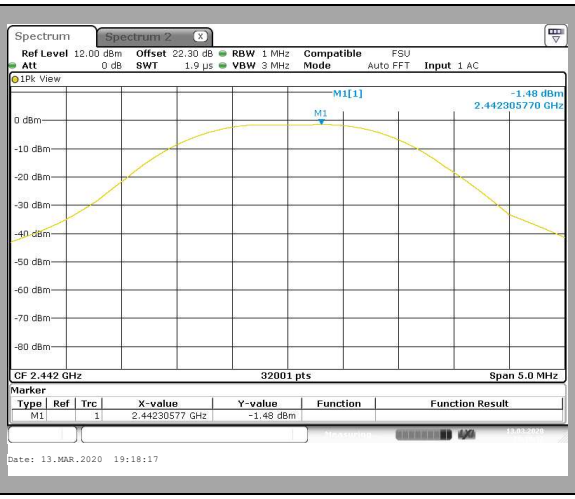
Maximum Conducted Output Power

BLE V4.2

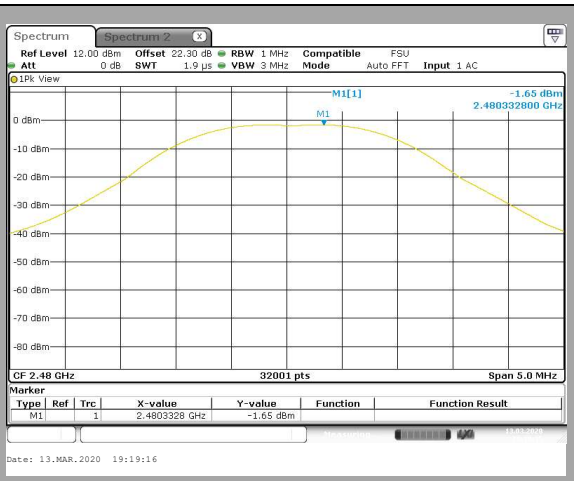
Cmin



Cnom

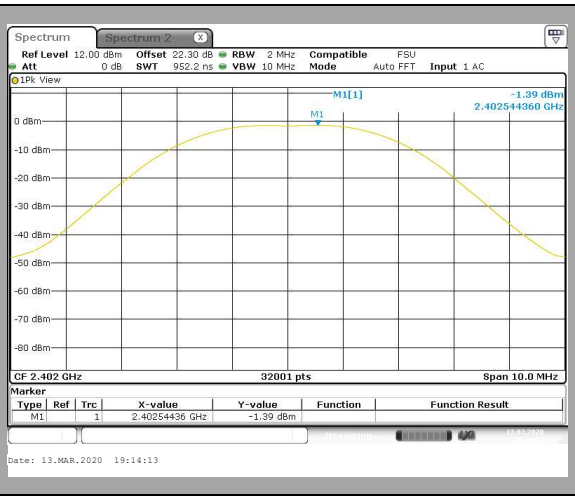
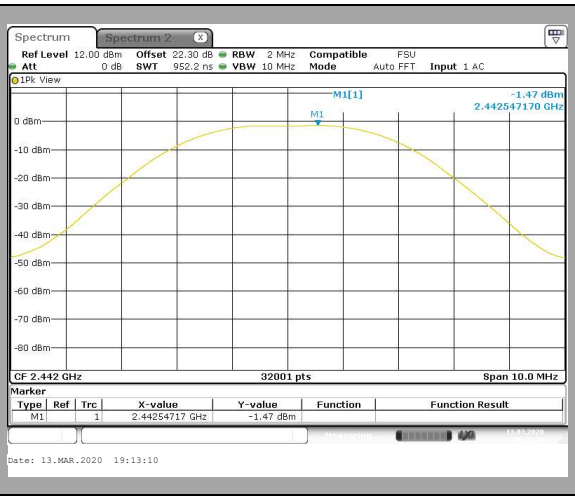
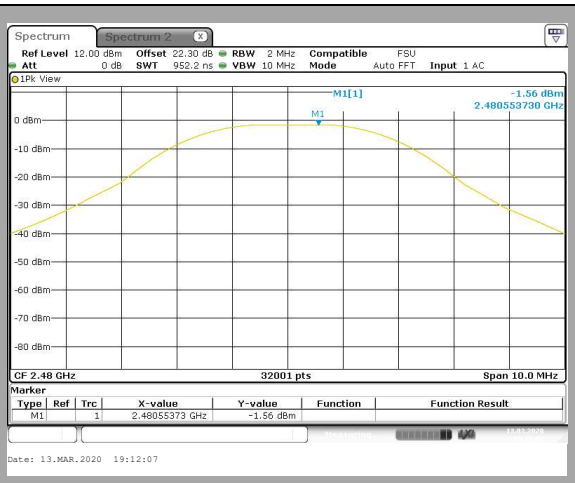


Cmax



Channel	Offset Cable + Att (dB)	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	**22.3**	**4.74**	**-1.38**	30
Cnom	**22.3**	**4.74**	**-1.48**	30
Cmax	**22.3**	**4.74**	**-1.65**	30

Right insole

Maximum Conducted Output Power	
BLE V5.0	
Cmin	Cnom
	
Cmax	
	

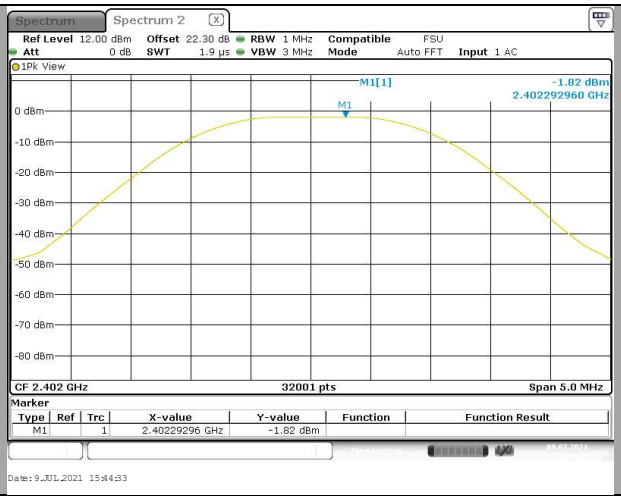
Channel	Offset Cable + Att (dB)	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	**22.3**	**4.74**	**-1.39**	30
Cnom	**22.3**	**4.74**	**-1.47**	30
Cmax	**22.3**	**4.74**	**-1.56**	30

Left insole

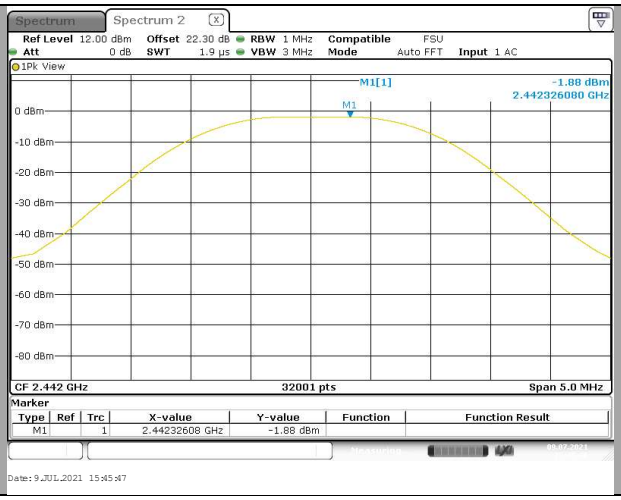
Maximum Conducted Output Power

BLE V4.2

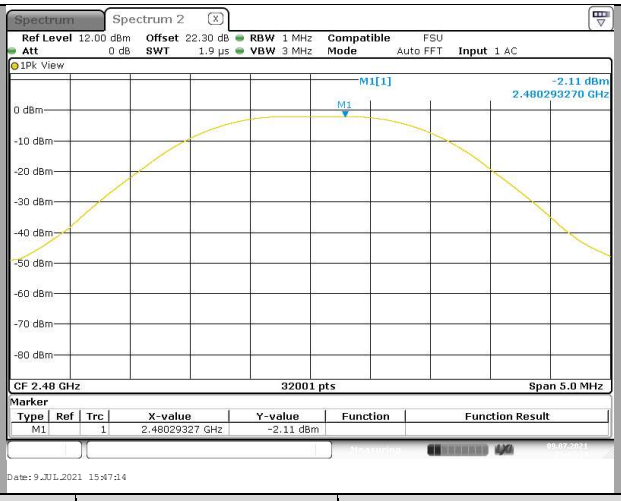
Cmin



Cnom



Cmax



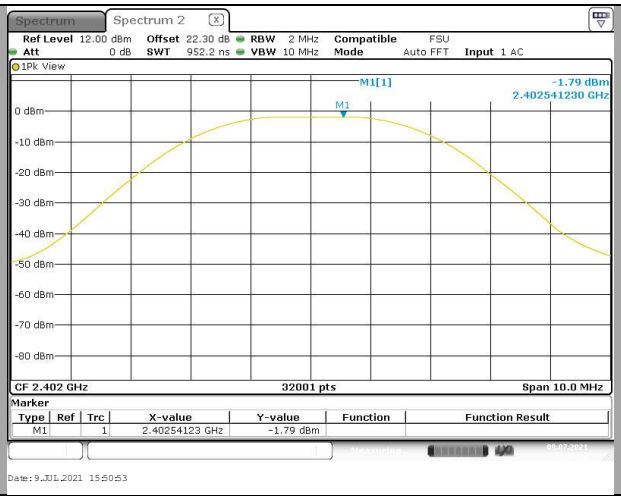
Channel	Offset Cable + Att (dB)	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	**22.3**	**4.74**	**-1,82**	30
Cnom	**22.3**	**4.74**	**-1,88**	30
Cmax	**22.3**	**4.74**	**-2,11**	30

Left insole

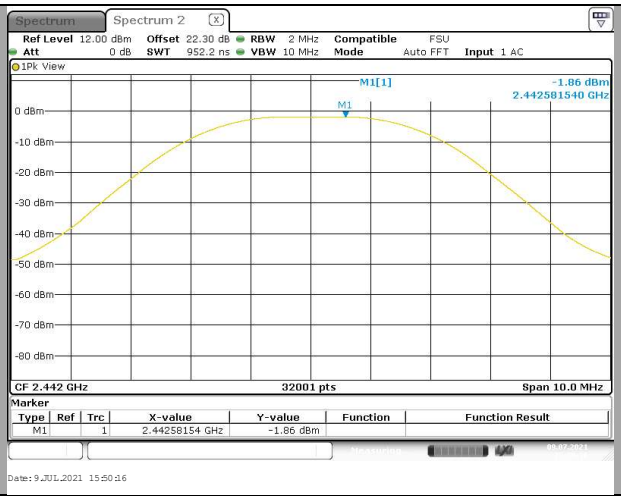
Maximum Conducted Output Power

BLE V5.0

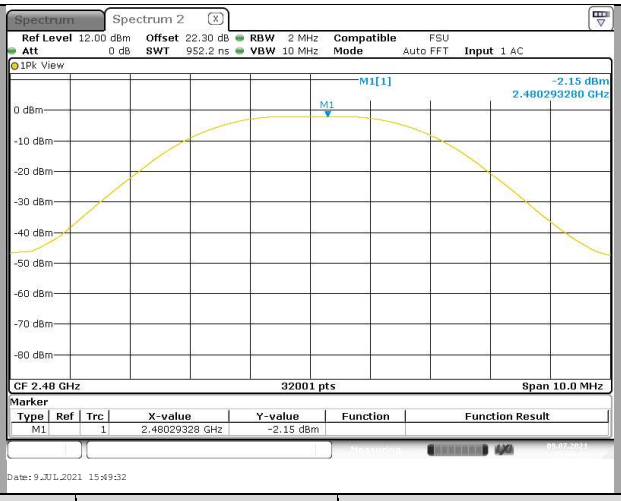
Cmin



Cnom



Cmax



Channel	Offset Cable + Att (dB)	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	**22.3**	**4.74**	**-1,79**	30
Cnom	**22.3**	**4.74**	**-1,86**	30
Cmax	**22.3**	**4.74**	**-2,15**	30

6.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **FEETME FTM-DK**, SN: **DK9701000088R & DK9701000078L**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.

7. POWER SPECTRAL DENSITY

7.1. TEST CONDITIONS

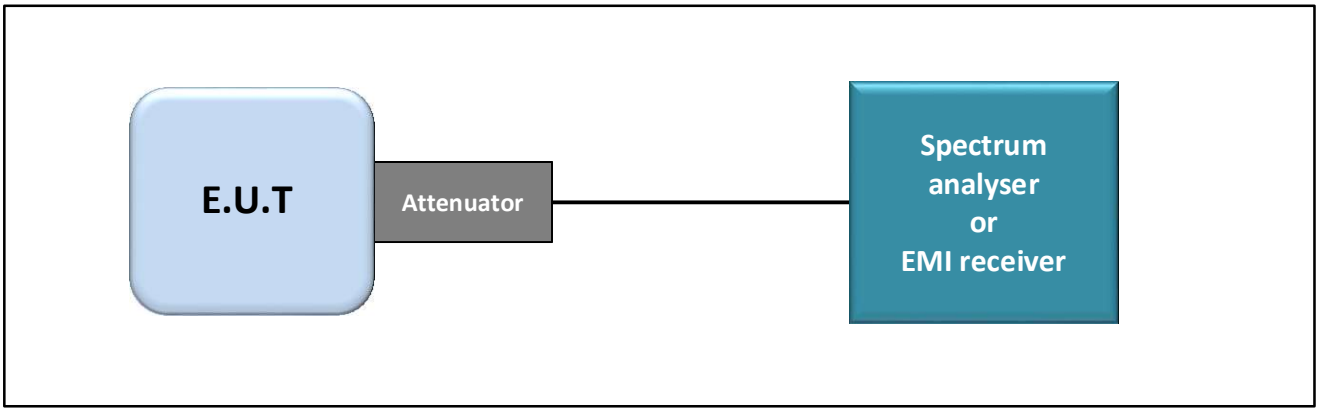
Test performed by	: Armand MAHOUNGOU
Date of test	: March 13, 2020 & July 9, 2021
Ambient temperature	: 26°C
Relative humidity	: 46%

7.2. TEST SETUP

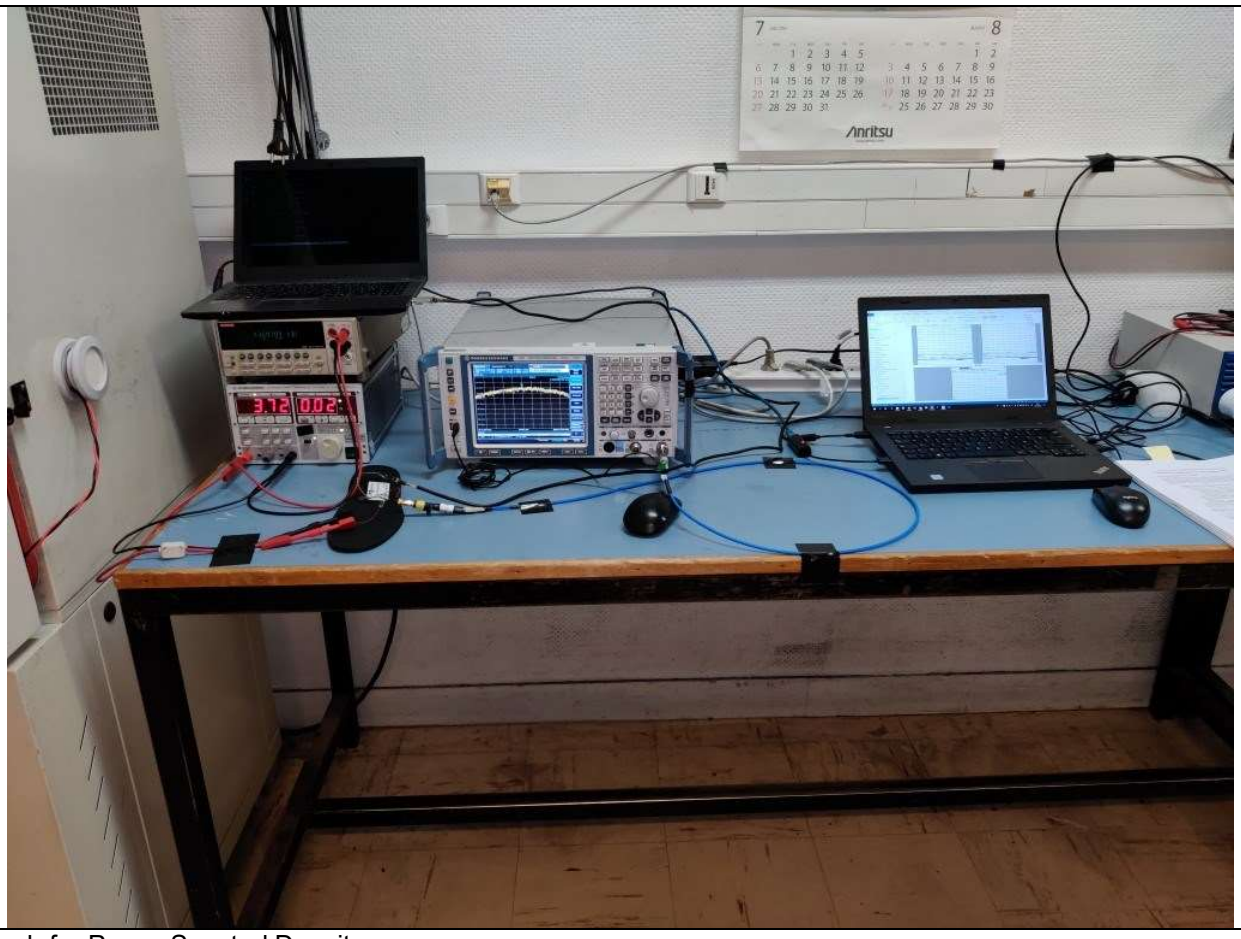
- The Equipment Under Test is installed:
☑ On a table
☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- Test Procedure:
☑ ANSI C63.10 § 11.10.2 (Method PKPSD)
☐ ANSI C63.10 § 11.10.3 (Method AVGPSD-1)



Test set up of Power Spectral Density



Photograph for Power Spectral Density

7.3. LIMIT

Frequency range	Power Spectral Density
2400MHz to 2483.5MHz	≤8dBm/3kHz*

*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	ESR 7	A2642026	2019/07	2021/07
Cable + Attenuateur 20dB	PASTERNACK	PE350-150CM	A5329865	2019/09	2021/09
Multimeter	KEITHLEY	2000	A1242090	2020/03	2022/03
Programmable DC power supply	ROHDE & SCHWARZ	NGSM32/10	A7040074	See multimeter	See multimeter

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

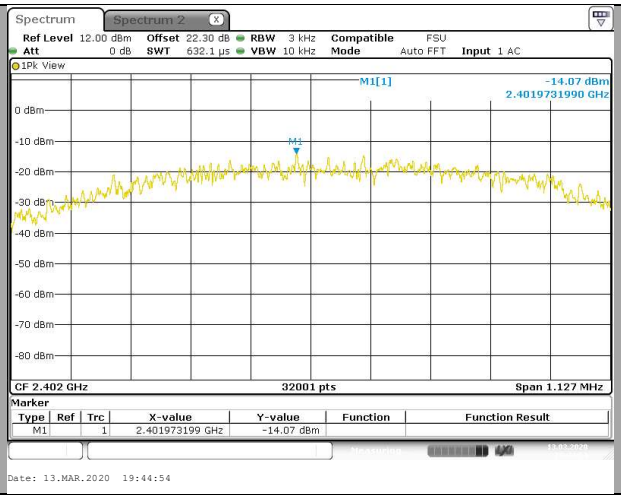
7.5. RESULTS

Right insole

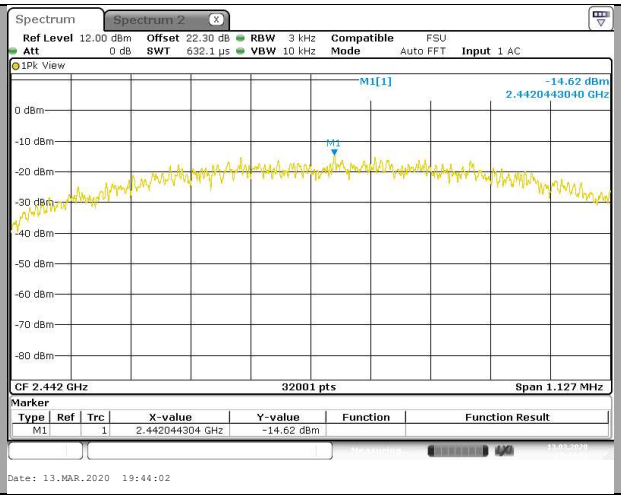
Power Spectral Density

BLE V4.2

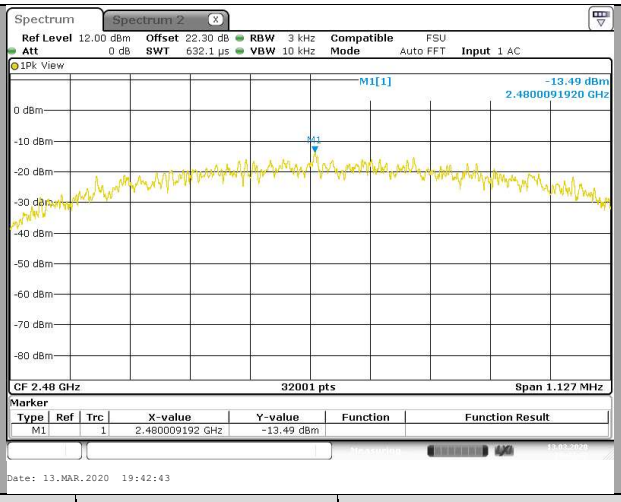
Cmin



Cnom



Cmax



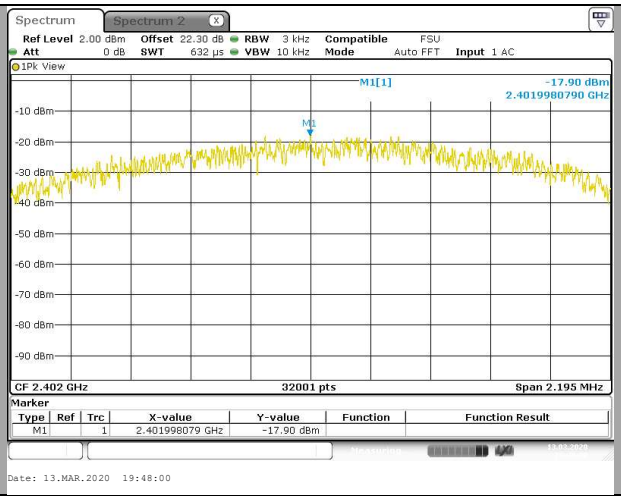
Channel	Offset Cable + Att (dB)	Antenna Gain (dBi)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
Cmin	**22.3**	**4.74**	**-14.07**	8
Cnom	**22.3**	**4.74**	**-14.62**	8
Cmax	**22.3**	**4.74**	**-13.49**	8

Right insole

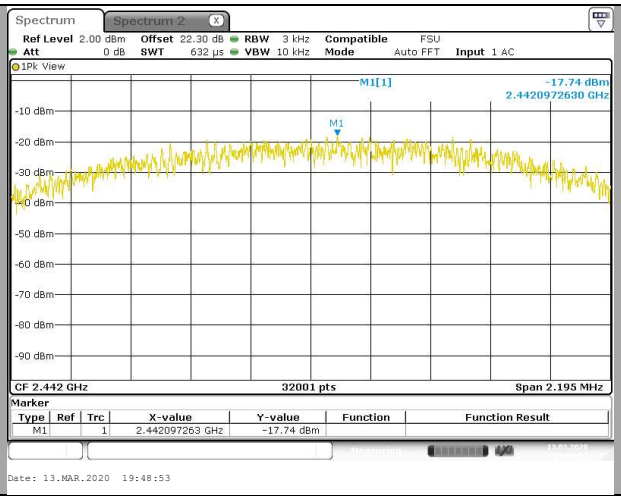
Power Spectral Density

BLE V5.0

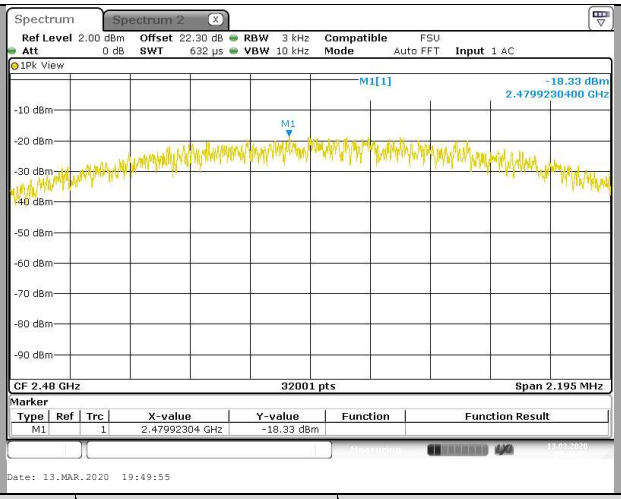
Cmin



Cnom



Cmax



Channel	Offset Cable + Att (dB)	Antenna Gain (dBi)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
Cmin	**22.3**	**4.74**	**-17.90**	8
Cnom	**22.3**	**4.74**	**-17.74**	8
Cmax	**22.3**	**4.74**	**-18.33**	8