



LCIE

Bluetooth Low Energy Template: Release October 11th, 2019

TEST REPORT

N°: 163298-742025-A

Version : 01

Subject

Radio spectrum matters
tests according to standards:
47 CFR Part 15.247 [¶](#)

Issued to

SKF
204 Bd Charles De Gaulle
37540 – Saint Cyr sur Loire
France

Apparatus under test

↳ Product	SKF Enlight Collect IMx-1
↳ Trade mark	SKF
↳ Manufacturer	SKF
↳ Model under test	CMWA-6100
↳ Serial number	281R 0007 & 3E7
↳ FCC ID	2AJ99-CMWA-6100

Conclusion

See Test Program chapter

Test date

October 21, 2019 to October 23, 2019

Test location

Fontenay Aux Roses & Ecouelles

Test Site

6230B-1

Sample receipt date

October 14, 2019

Composition of document

40 pages

Document issued on

November 25, 2019

Written by :
Armand MAHOUNGOU
Tests operator



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PUBLICATION HISTORY

Version	Date	Author	Modification
01	November 25, 2019	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

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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	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
6dB Bandwidth	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA()	<input type="checkbox"/> NP(1)
Duty Cycle	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Maximum Conducted Output Power	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Power Spectral Density	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Conducted Spurious Emission at the Band Edge	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA()	<input type="checkbox"/> NP(1)
Unwanted Emissions into Non-Restricted Frequency Bands	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA()	<input type="checkbox"/> NP(1)
AC Power Line Conducted Emission	<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input checked="" type="checkbox"/> NA(2)	<input type="checkbox"/> NP(1)
Unwanted Emissions into Restricted Frequency Bands	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Receiver Radiated emissions	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> 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



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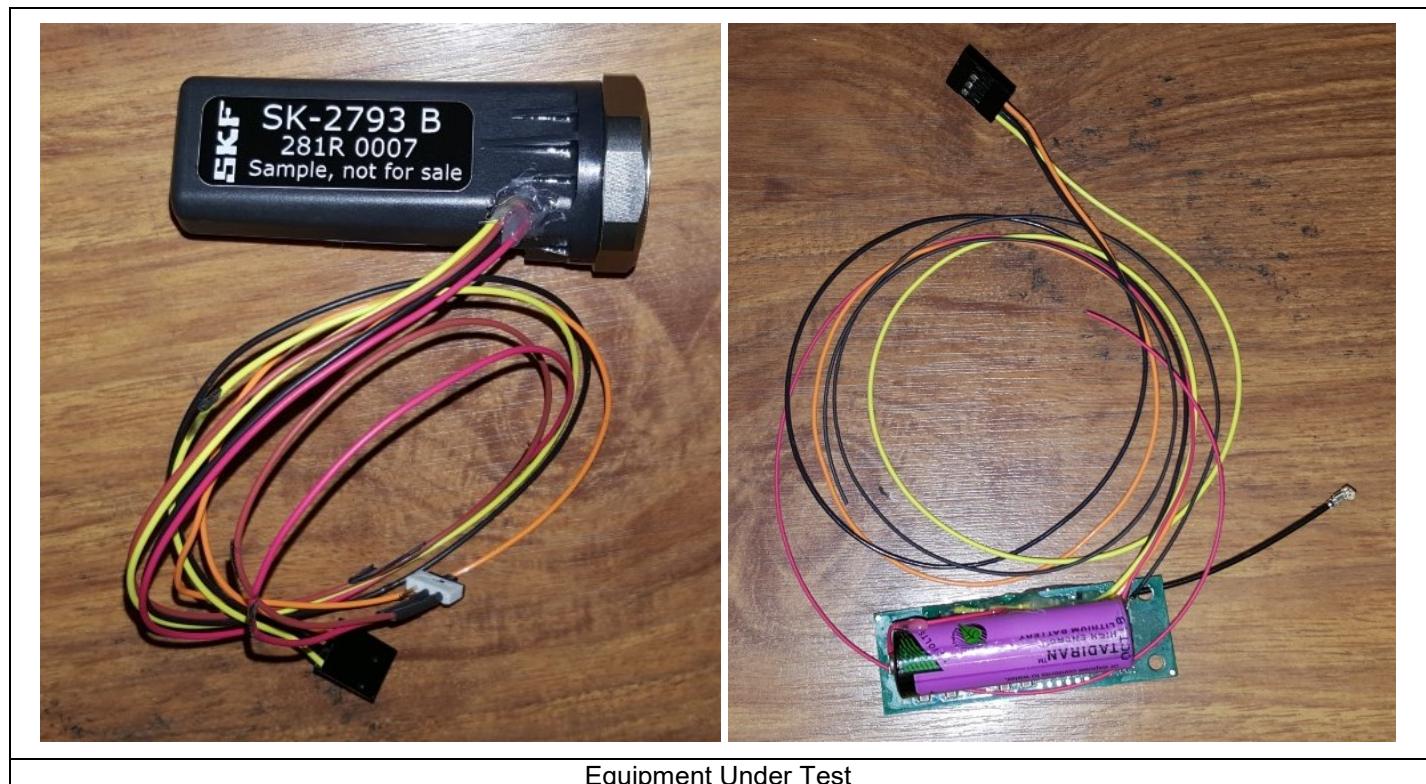
2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):

SKF CMWA-6100

Serial Number: 281R 0007 & 3E7



Equipment Under Test

Power supply:

During all the tests, EUT is supplied by V_{nom} : 3.6VDC

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

Name	Type	Rating	Reference / Sn	Comments
Supply1	<input type="checkbox"/> AC <input type="checkbox"/> DC <input checked="" type="checkbox"/> Battery	3.6VDC		

Voltage table used (for Power Line Conducted Emissions):

Type	Measurement performed:	
<input type="checkbox"/> AC	<input type="checkbox"/> 120VAC/60Hz	<input type="checkbox"/> 240VAC/50Hz
<input type="checkbox"/> DC	<input type="checkbox"/> +12VDC	<input type="checkbox"/> -....VDC
<input checked="" type="checkbox"/> Battery	<input checked="" type="checkbox"/> +3.6VDC	<input type="checkbox"/> -....VDC
<input type="checkbox"/> USB (Laptop auxiliary)	<input type="checkbox"/> 120VAC/60Hz (Laptop auxiliary)	<input type="checkbox"/> 240VAC/50Hz(Laptop auxiliary)



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Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Power supply	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop computer	-	-	-

Equipment information:

Bluetooth LE Type:	<input checked="" type="checkbox"/> BLE	<input type="checkbox"/> v4.0	<input type="checkbox"/> v4.1	<input checked="" type="checkbox"/> v4.2
Frequency band:		[2400 – 2483.5] MHz		
Number of Channel:		40		
Spacing channel:		2MHz		
Channel bandwidth:		1MHz		
Antenna Type:	<input checked="" type="checkbox"/> Integral	<input type="checkbox"/> External	<input type="checkbox"/> Dedicated	
Antenna connector:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Temporary for test	
Transmit chains:		1		
Receiver chains		Single antenna		
Type of equipment:	<input type="checkbox"/> Stand-alone	<input type="checkbox"/> Plug-in	<input checked="" type="checkbox"/> Combined	
Duty cycle:	<input checked="" type="checkbox"/> Continuous duty	<input type="checkbox"/> Intermittent duty	<input type="checkbox"/> 100% duty	
Equipment type:	<input type="checkbox"/> Production model	<input type="checkbox"/> Pre-production model		
Operating temperature range:	Tmin:	<input type="checkbox"/> -20°C	<input type="checkbox"/> 0°C	<input checked="" type="checkbox"/> -40°C
	Tnom:		20°C	
	Tmax:	<input type="checkbox"/> 35°C	<input type="checkbox"/> 55°C	<input checked="" type="checkbox"/> 85°C
Type of power source:	<input type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input checked="" type="checkbox"/> Battery	
Operating voltage range:	Vnom:	<input type="checkbox"/> 120V/60Hz	<input checked="" type="checkbox"/> 3.6 Vdc	<input type="checkbox"/> X Vdc
		<input type="checkbox"/> 240V/50Hz		

Antenna Characteristic

Antenna assembly	Gain (dBi)	Frequency Band (MHz)	Impedance(Ω)
1	0.35	[2402 – 2480]	50

Hardware information

Software (if applicable):	V. :	LX_WEM200_02_WM ; SVN Version : 3881
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CHANNEL PLAN	
Channel	Frequency (MHz)
Cmin: 0	2402
Cmid: 20	2442
Cmax: 39	2480

DATA RATE		
Data Rate (Mbps)	Modulation Type	Worst Case Modulation
1	GFSK	<input checked="" type="checkbox"/>

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	<input checked="" type="checkbox"/> Test mode 1	<input type="checkbox"/> Alternative test mode()
6dB Bandwidth	<input checked="" type="checkbox"/> Test mode 1	<input type="checkbox"/> Alternative test mode()
Duty Cycle	<input checked="" type="checkbox"/> Test mode 1	<input type="checkbox"/> Alternative test mode()
Maximum Conducted Output Power	<input checked="" type="checkbox"/> Test mode 1	<input type="checkbox"/> Alternative test mode()
Power Spectral Density	<input checked="" type="checkbox"/> Test mode 1	<input type="checkbox"/> Alternative test mode()
Conducted Spurious Emission at the Band Edge	<input checked="" type="checkbox"/> Test mode 1	<input type="checkbox"/> Alternative test mode()
Unwanted Emissions into Non-Restricted Frequency Bands	<input checked="" type="checkbox"/> Test mode 1	<input type="checkbox"/> Alternative test mode()
Unwanted Emissions into Restricted Frequency Bands	<input checked="" type="checkbox"/> Test mode 1	<input type="checkbox"/> Alternative test mode()



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2.3. EQUIPMENT LABELLING



2.4. EQUIPMENT MODIFICATION

None

Modification:



3. 6dB EMISSION BANDWIDTH

3.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : October 22, 2019
Ambient temperature : 27°C
Relative humidity : 44%

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:

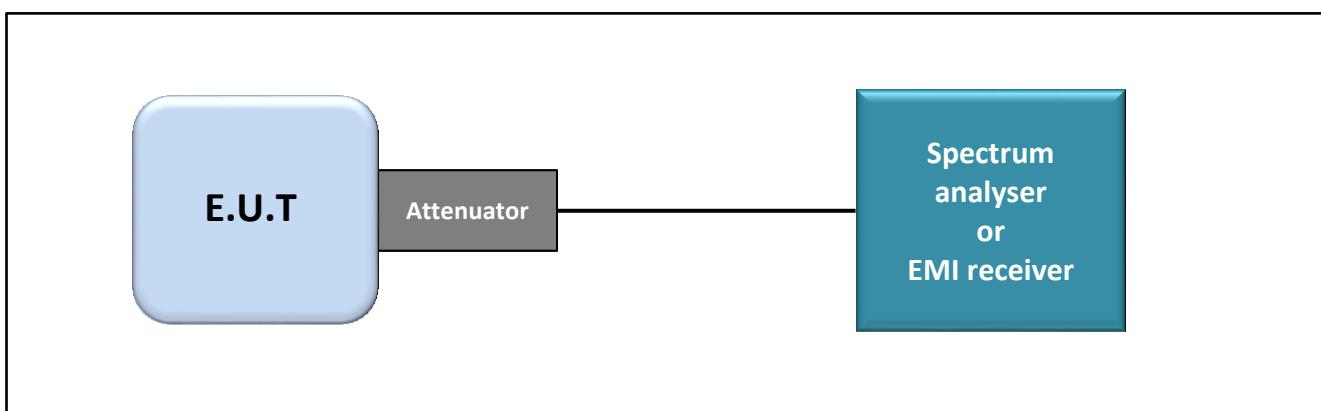
- Conducted Method
- Radiated Method

- Test Procedure:

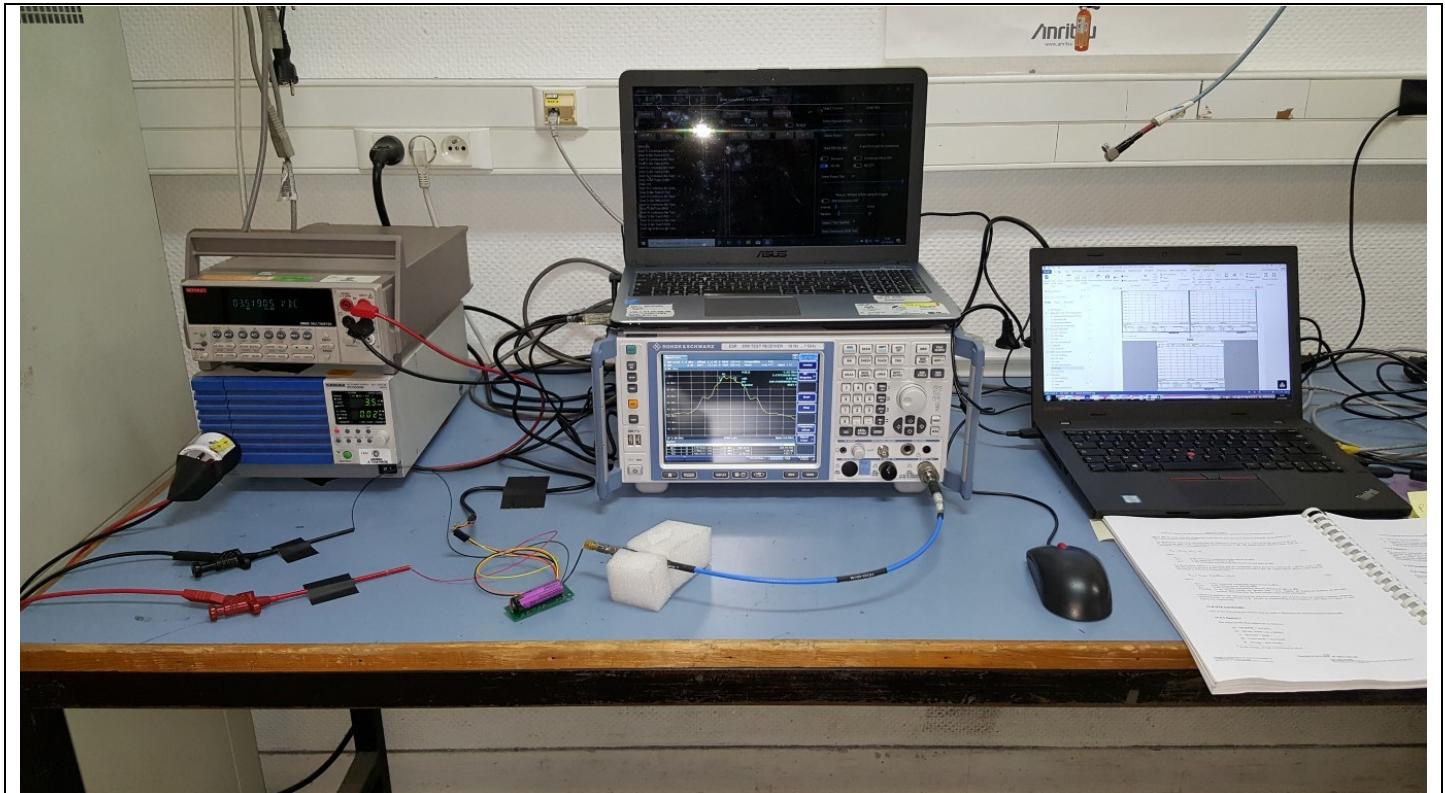
- ANSI C63.10 § 11.8.1
- ANSI C63.10 § 11.8.2

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

3.3. LIMIT

Frequency range	The 6dB bandwidth Limit
2400MHz to 2483.5MHz	$\geq 500\text{kHz}$

3.4. TEST EQUIPMENT LIST

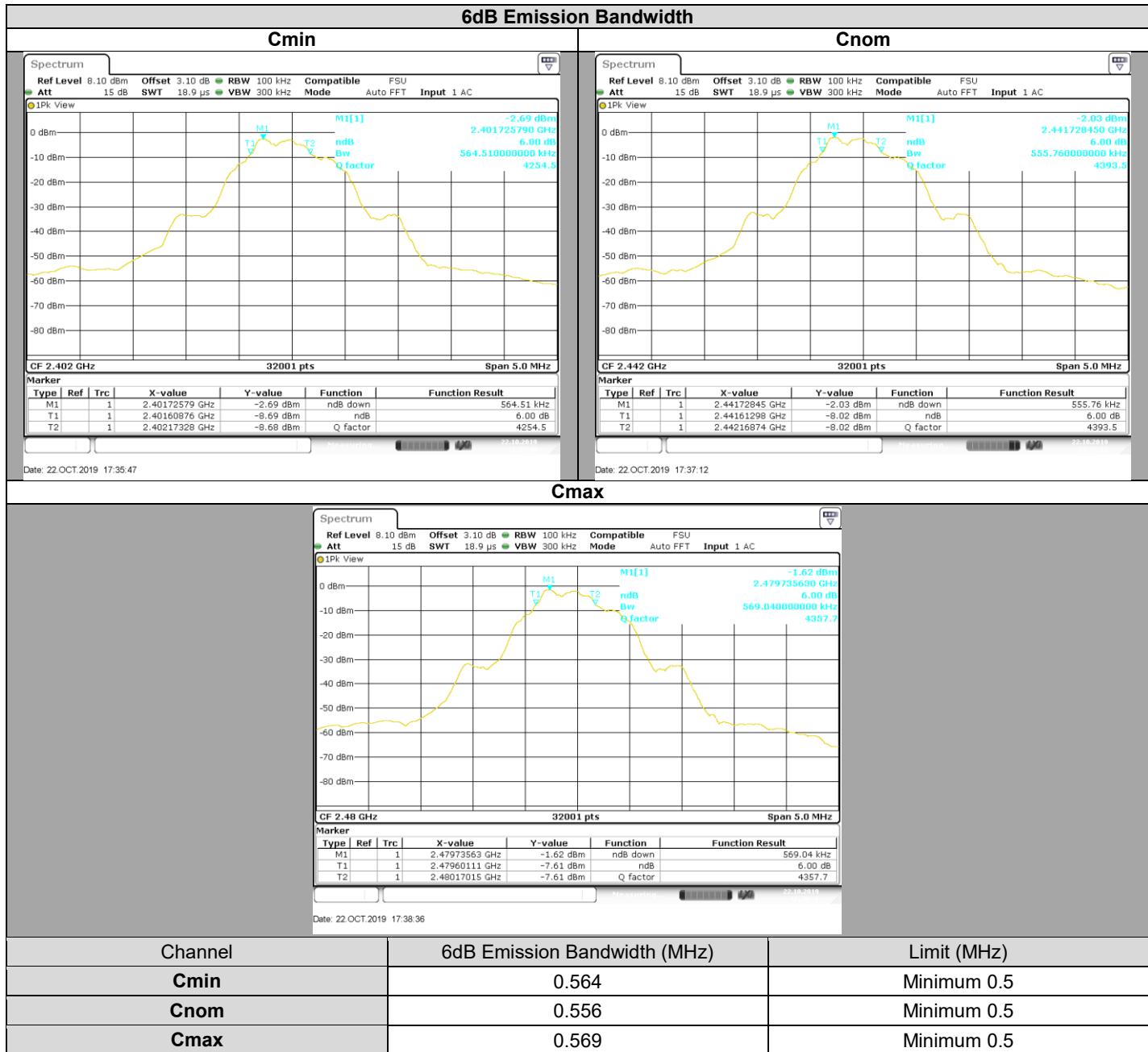
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642026	2019/07	2021/07
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7049006	See Multimeter	See Multimeter
Cable	PASTERNACK	PE350-50CM	A5329765	2019/08	2020/08
Attenuator 3dB	-	WA54-3-12	A7122230	2019/02	2020/02

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



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3.5. RESULTS



3.6. CONCLUSION

6dB Emission Bandwidth measurement performed on the sample of the product **SKF CMWA-6100**, SN: **281R 0007 & 3E7**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.



4. DUTY CYCLE

4.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : October 22, 2019
Ambient temperature : 27°C
Relative humidity : 44%

4.2. TEST SETUP

- The Equipment under Test is installed:

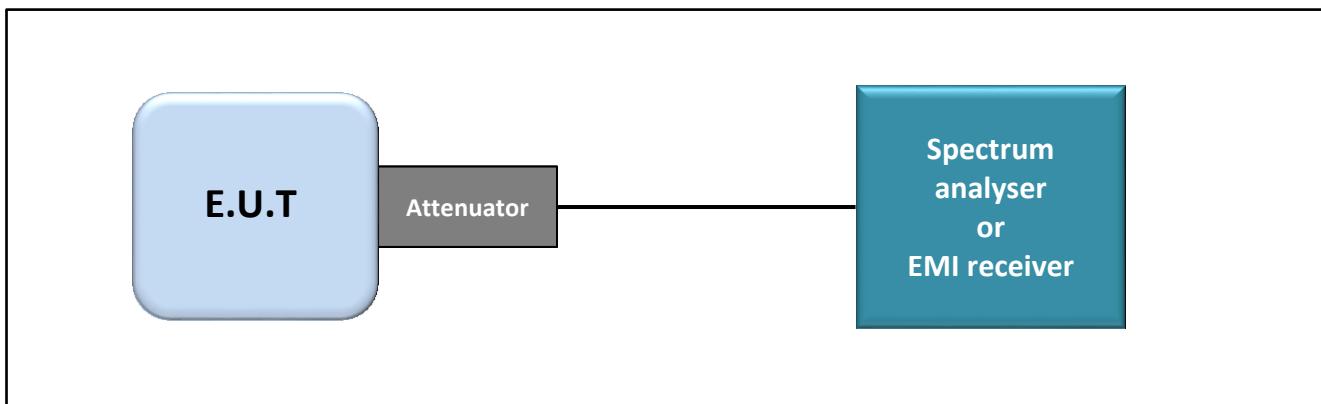
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

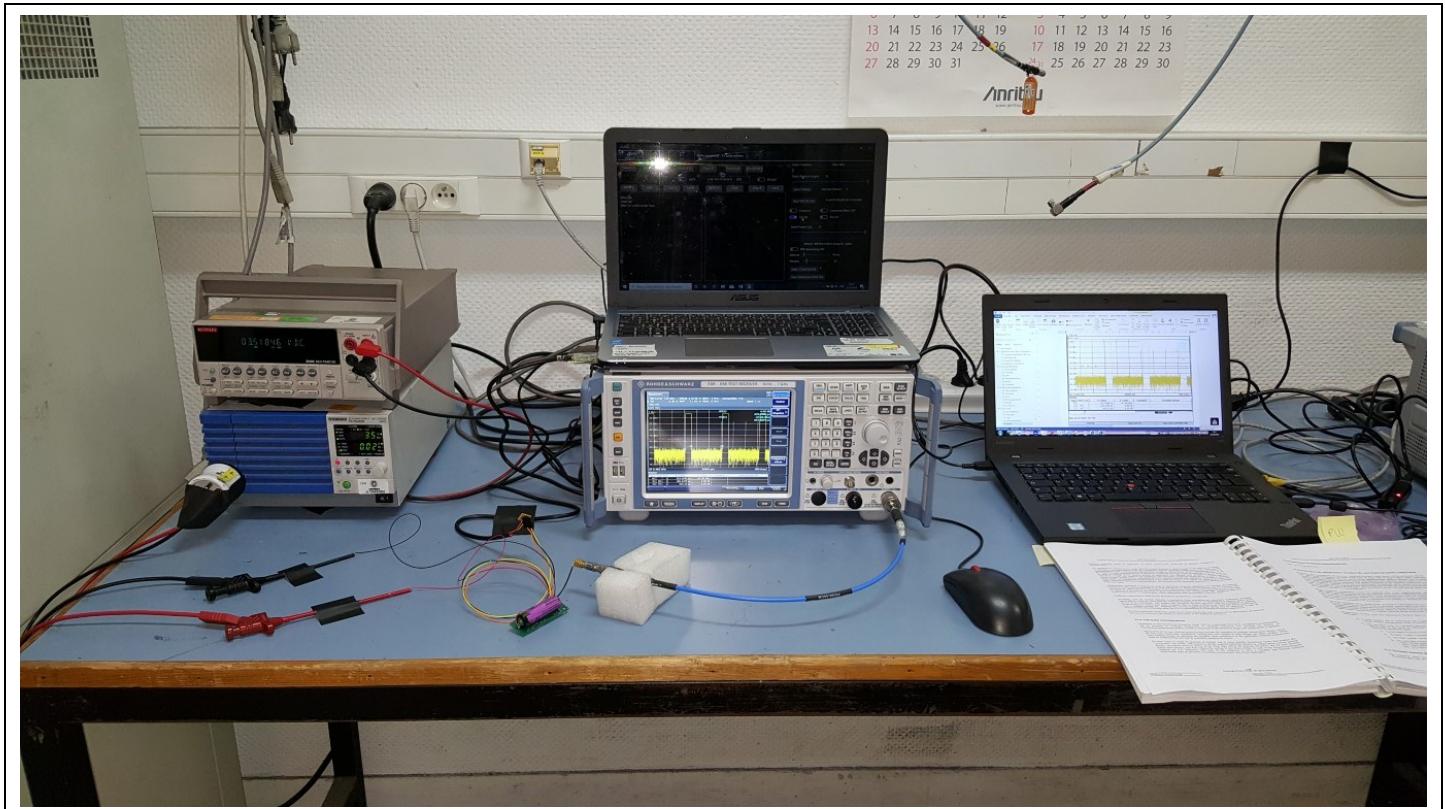
- ANSI C63.10 § 11.6



Test set up of Duty Cycle



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Photograph for Duty Cycle

4.3. LIMIT

None

4.4. TEST EQUIPMENT LIST

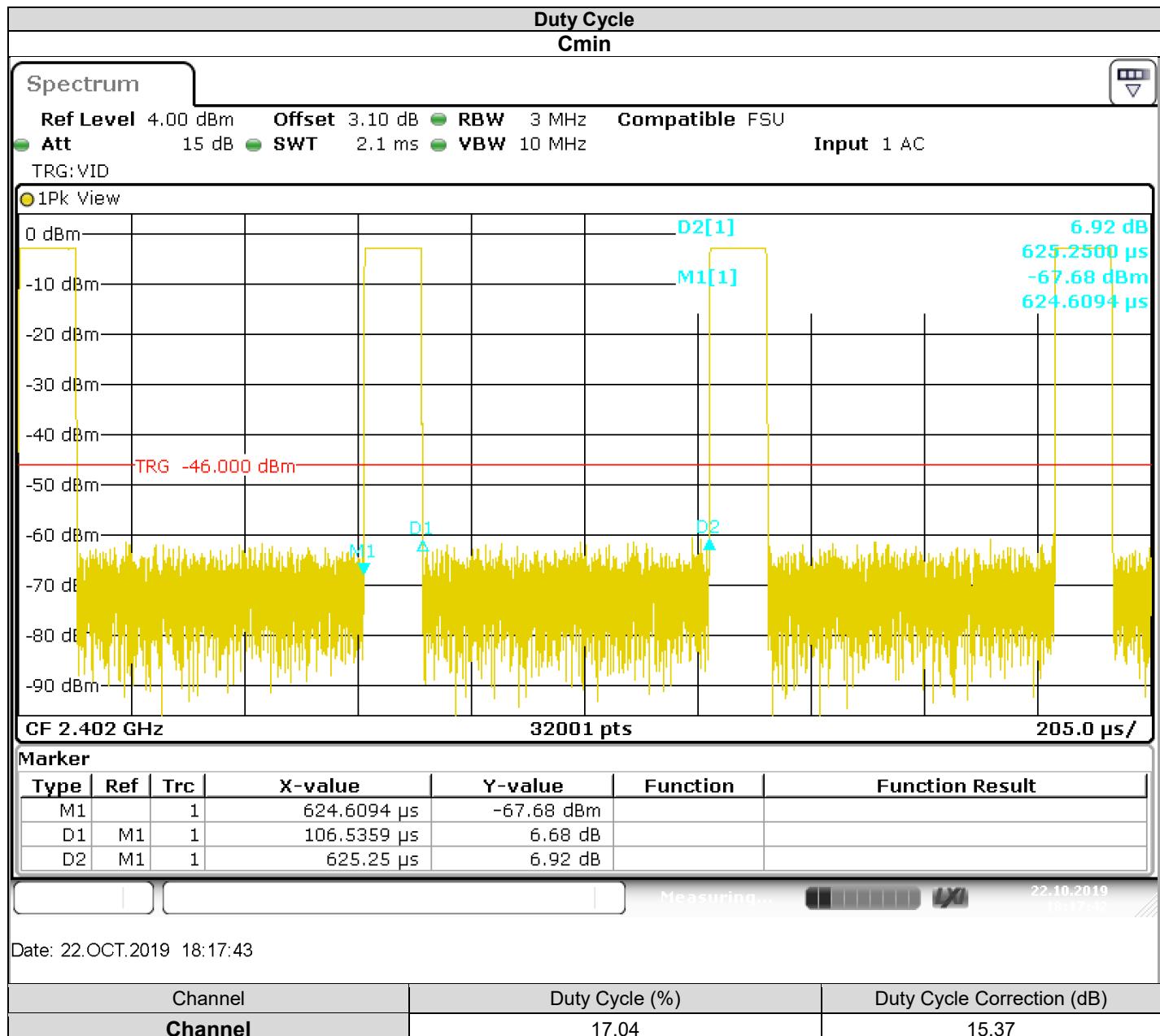
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642026	2019/07	2021/07
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7049006	See Multimeter	See Multimeter
Cable	PASTERNACK	PE350-50CM	A5329765	2019/08	2020/08
Attenuator 3dB	-	WA54-3-12	A7122230	2019/02	2020/02

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



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4.5. RESULTS



4.6. CONCLUSION

Duty Cycle measurement performed on the sample of the product **SKF CMWA-6100**, SN: **281R 0007 & 3E7**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.



5. MAXIMUM CONDUCTED OUTPUT POWER

5.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : October 22, 2019
Ambient temperature : 27°C
Relative humidity : 44%

5.2. TEST SETUP

- The Equipment under Test is installed:

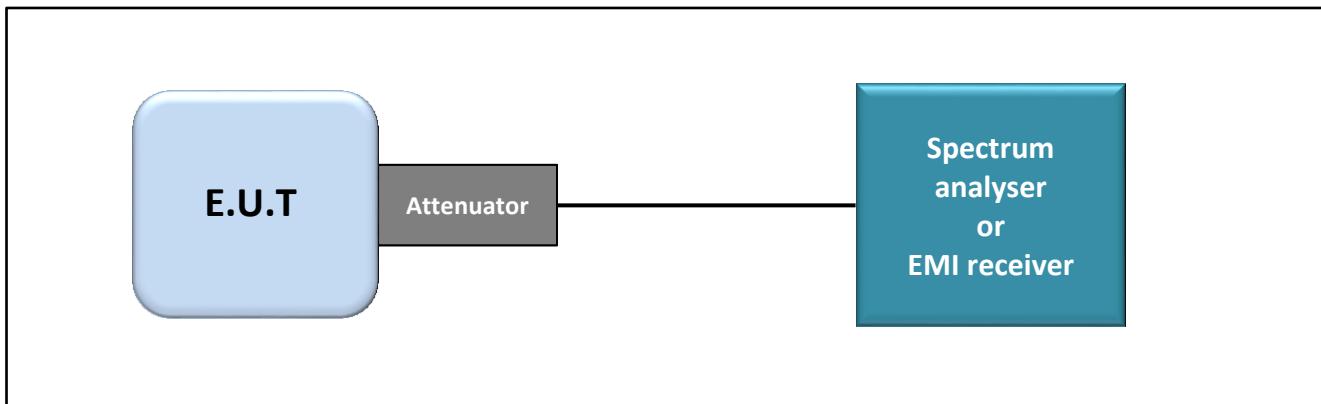
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

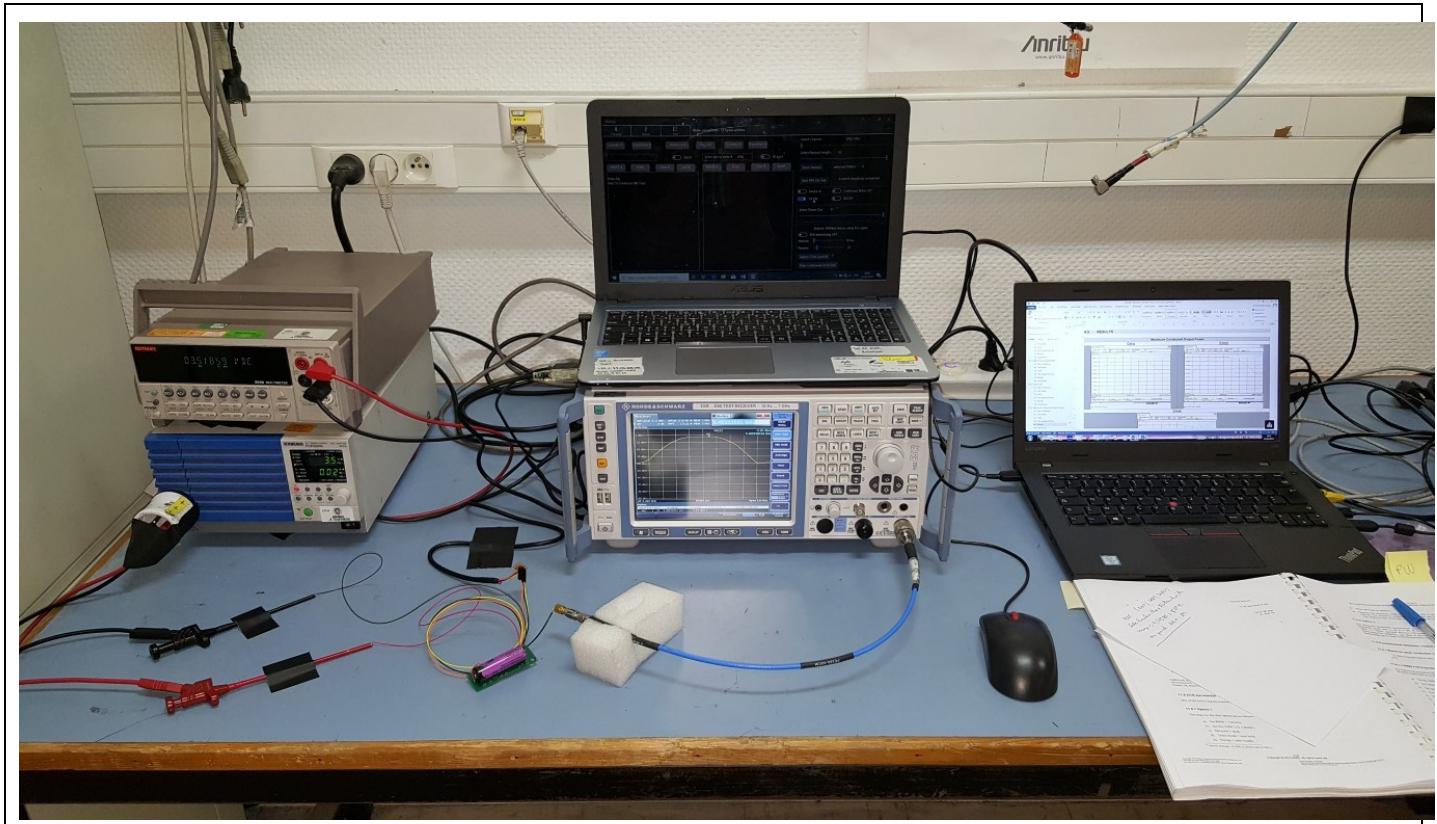
- ANSI C63.10 § 11.9.1.1
- ANSI C63.10 § 11.9.1.2
- ANSI C63.10 § 11.9.2.2.2 (Method AVGSA-1)
- ANSI C63.10 § 11.9.2.2.4 (Method AVGSA-2)



Test set up of Maximum Conducted Output Power



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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

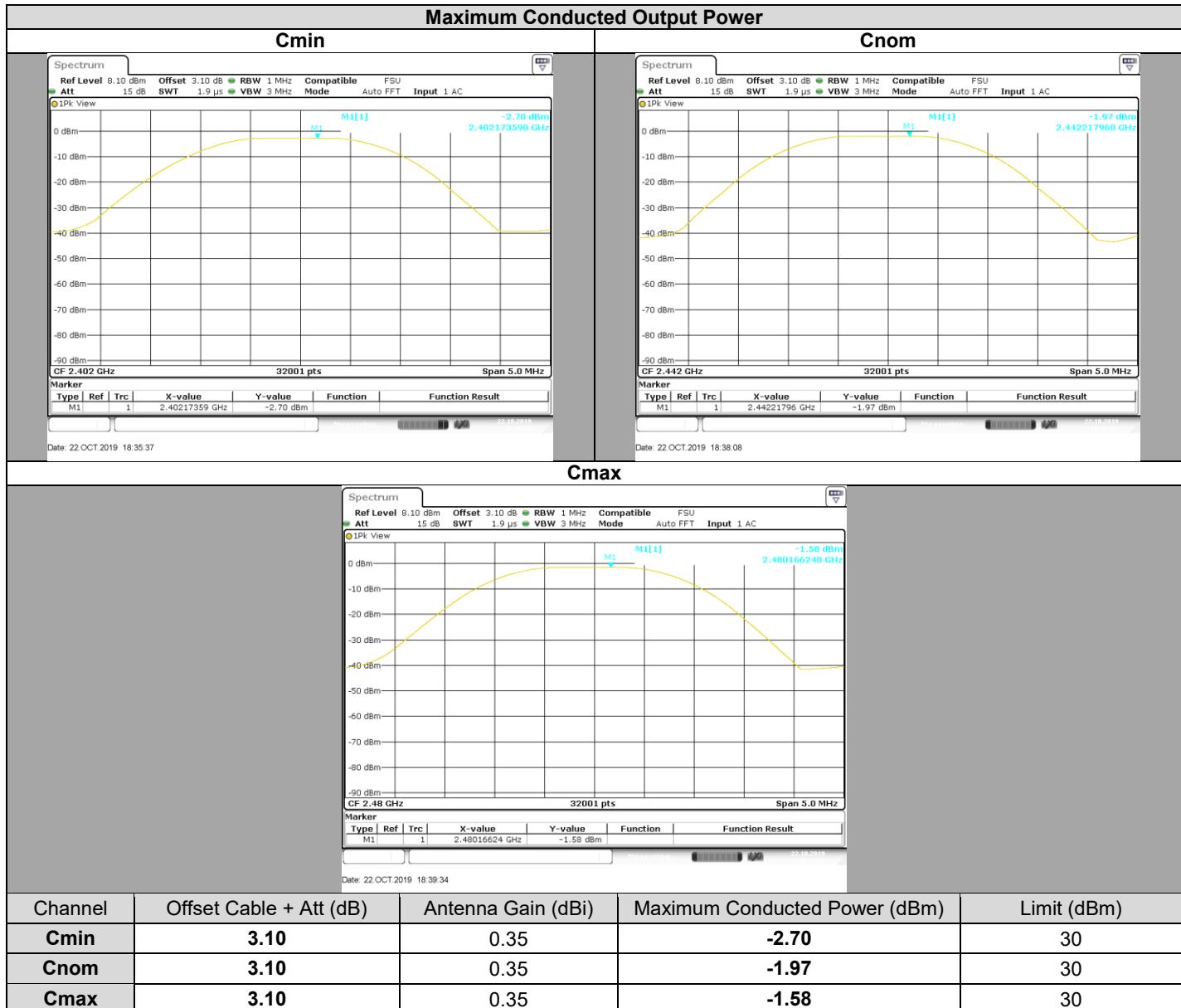
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642026	2019/07	2021/07
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7049006	See Multimeter	See Multimeter
Cable	PASTERNACK	PE350-50CM	A5329765	2019/08	2020/08
Attenuator 3dB	-	WA54-3-12	A7122230	2019/02	2020/02

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



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5.5. RESULTS



5.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **SKF CMWA-6100**, SN: 281R 0007 & 3E7, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.



6. POWER SPECTRAL DENSITY

6.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : October 22, 2019
Ambient temperature : 27°C
Relative humidity : 44%

6.2. TEST SETUP

- The Equipment Under Test is installed:

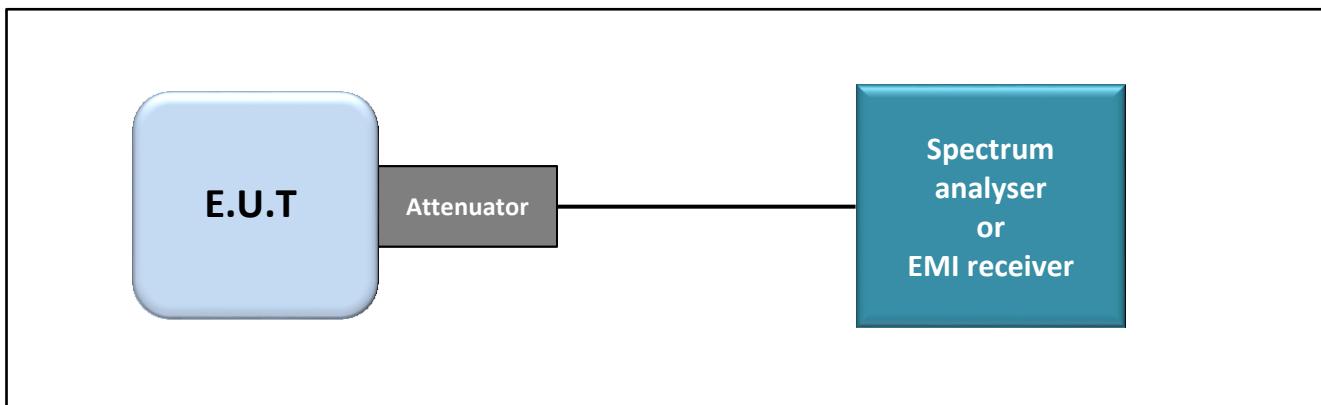
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

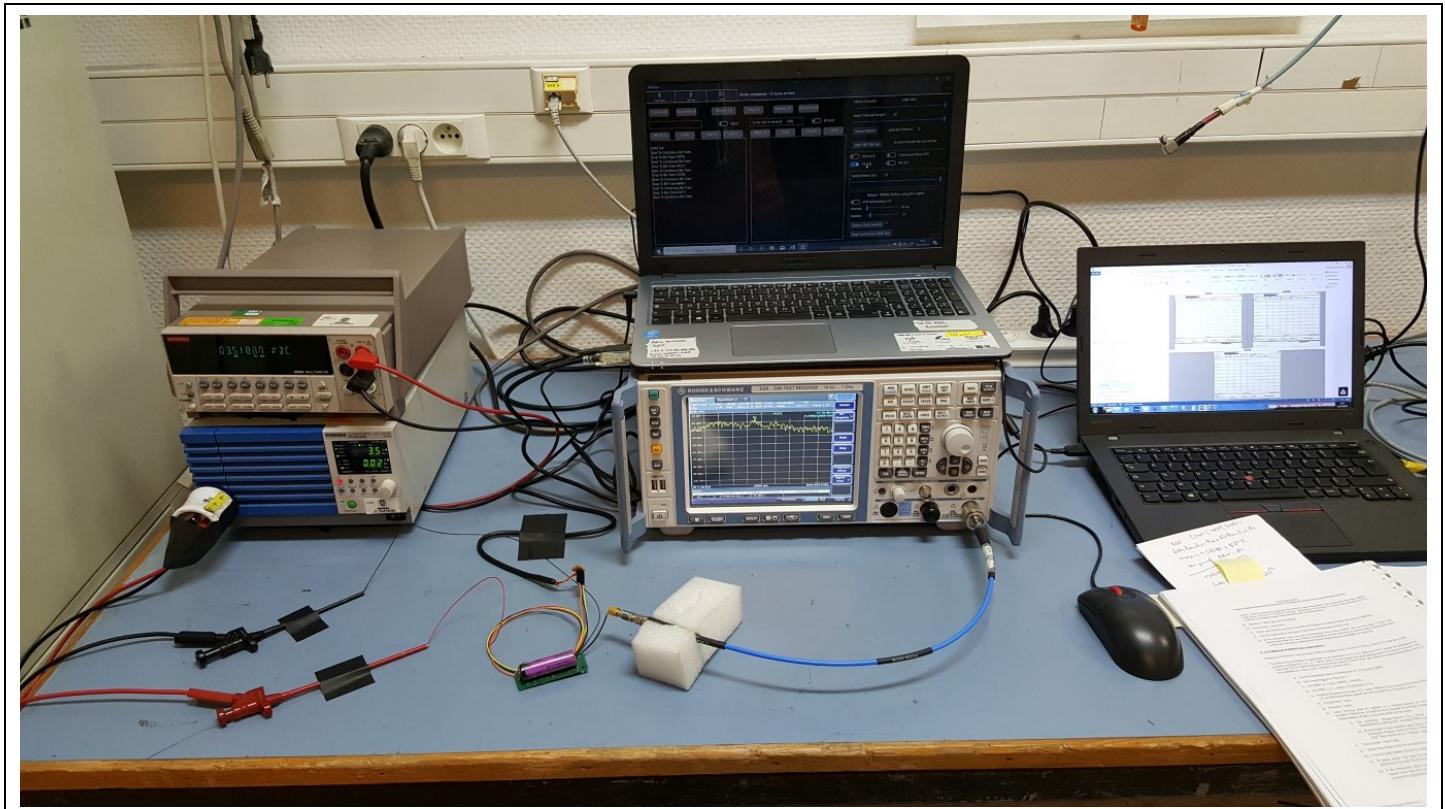
- Conducted Method
- Radiated Method

- Test Procedure:

- ANSI C63.10 § 11.10.2 (Method PKPSD)
- ANSI C63.10 § 11.10.3 (Method AVGPSD-1)



Test set up of Power Spectral Density



Photograph for Power Spectral Density

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

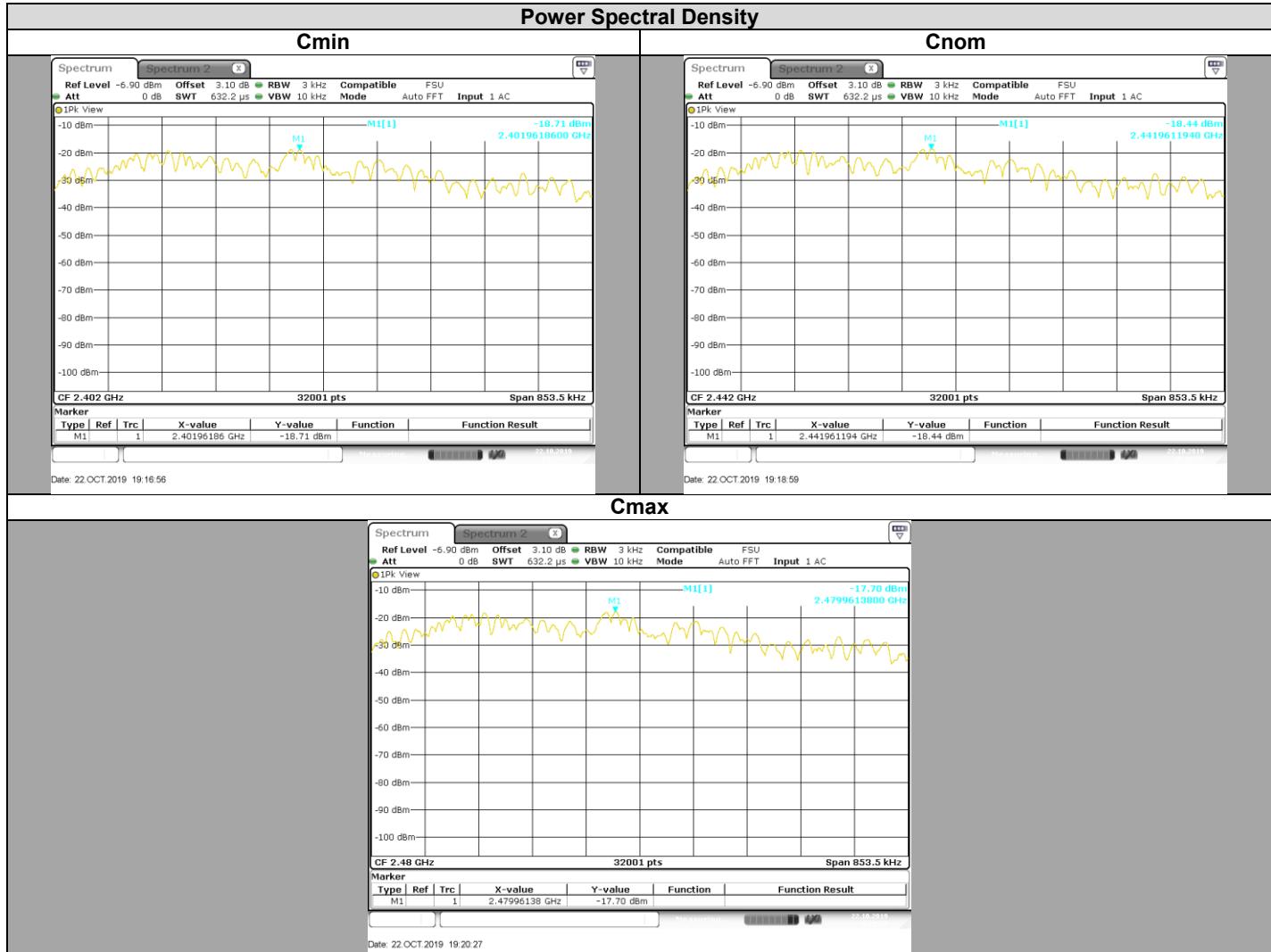
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642026	2019/07	2021/07
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7049006	See Multimeter	See Multimeter
Cable	PASTERNACK	PE350-50CM	A5329765	2019/08	2020/08
Attenuator 3dB	-	WA54-3-12	A7122230	2019/02	2020/02

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



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6.5. RESULTS



Channel	Offset Cable + Att (dB)	Antenna Gain (dBi)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
Cmin	3.10	0.35	-18.71	8
Cnom	3.10	0.35	-18.44	8
Cmax	3.10	0.35	-17.70	8

6.6. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **SKF CMWA-6100**, SN: **281R 0007 & 3E7**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.



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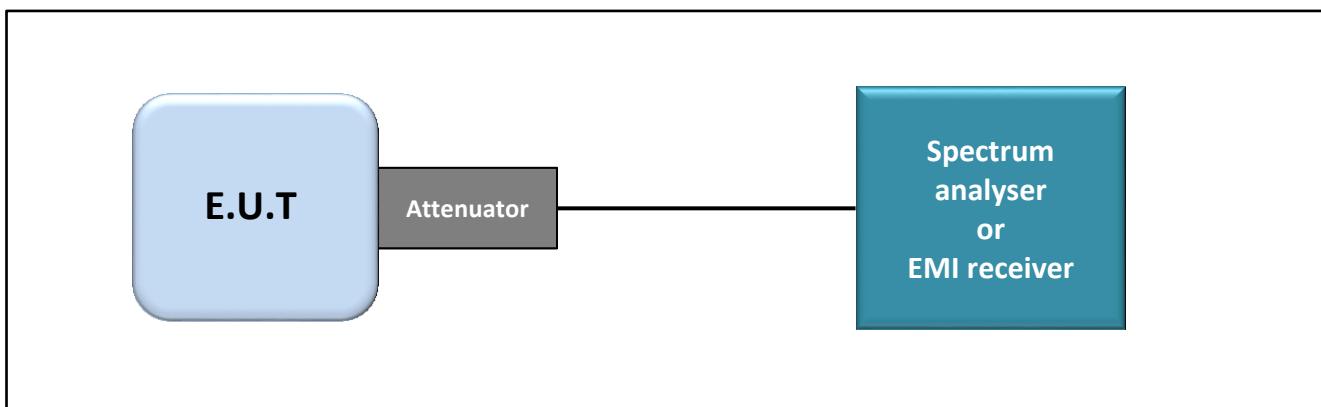
7. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS AT THE BAND EDGE

7.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : October 22, 2019
Ambient temperature : 27°C
Relative humidity : 44%

7.2. TEST SETUP

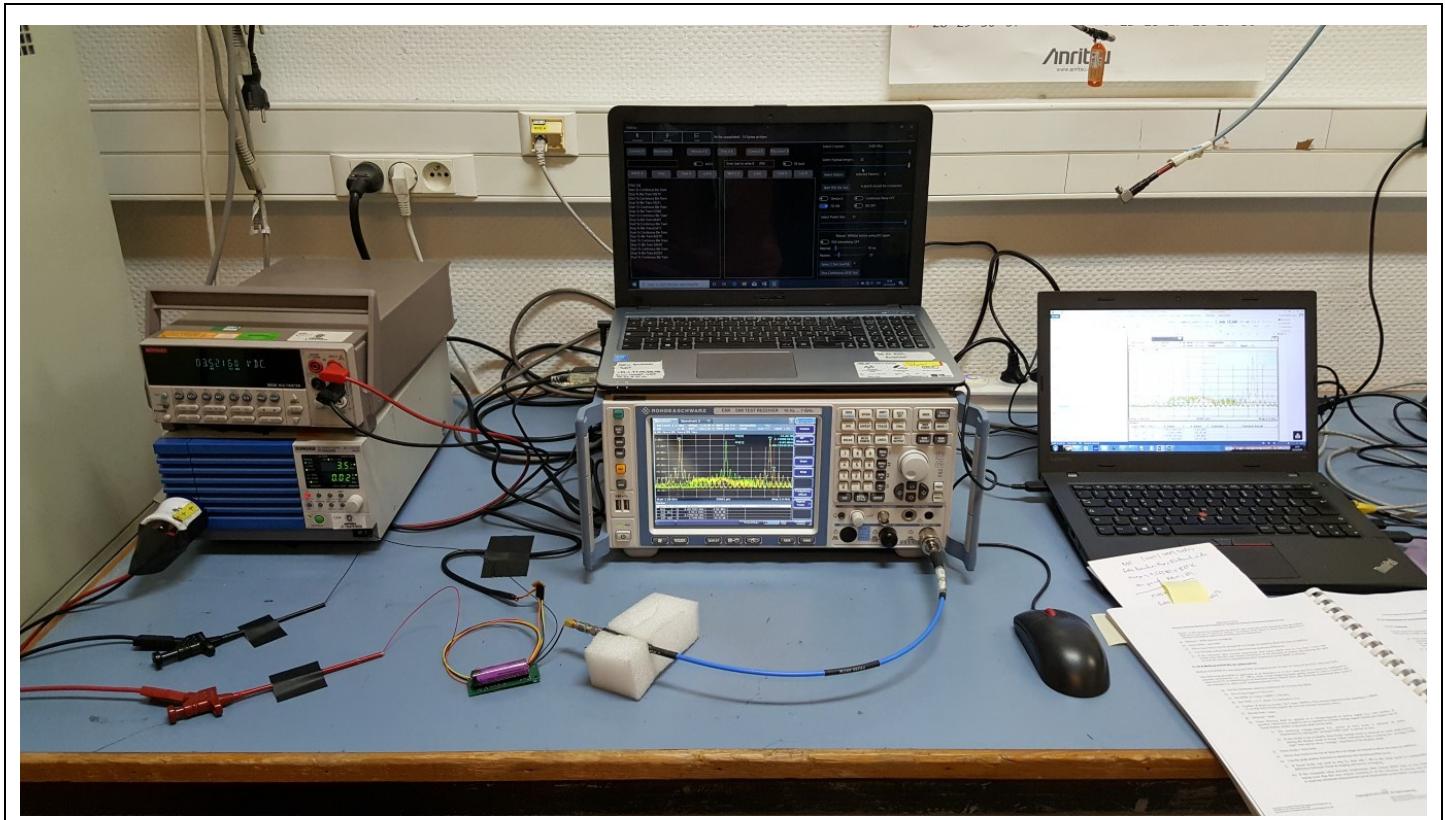
- The Equipment Under Test is installed:
 On a table
 In an anechoic chamber
- Measurement is performed with a spectrum analyzer in:
 Conducted Method
 Radiated Method
- Test Procedure:
 ANSI C63.10 § 11.11



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



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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
“2400MHz & 2483,5MHz”

7.4. TEST EQUIPMENT LIST

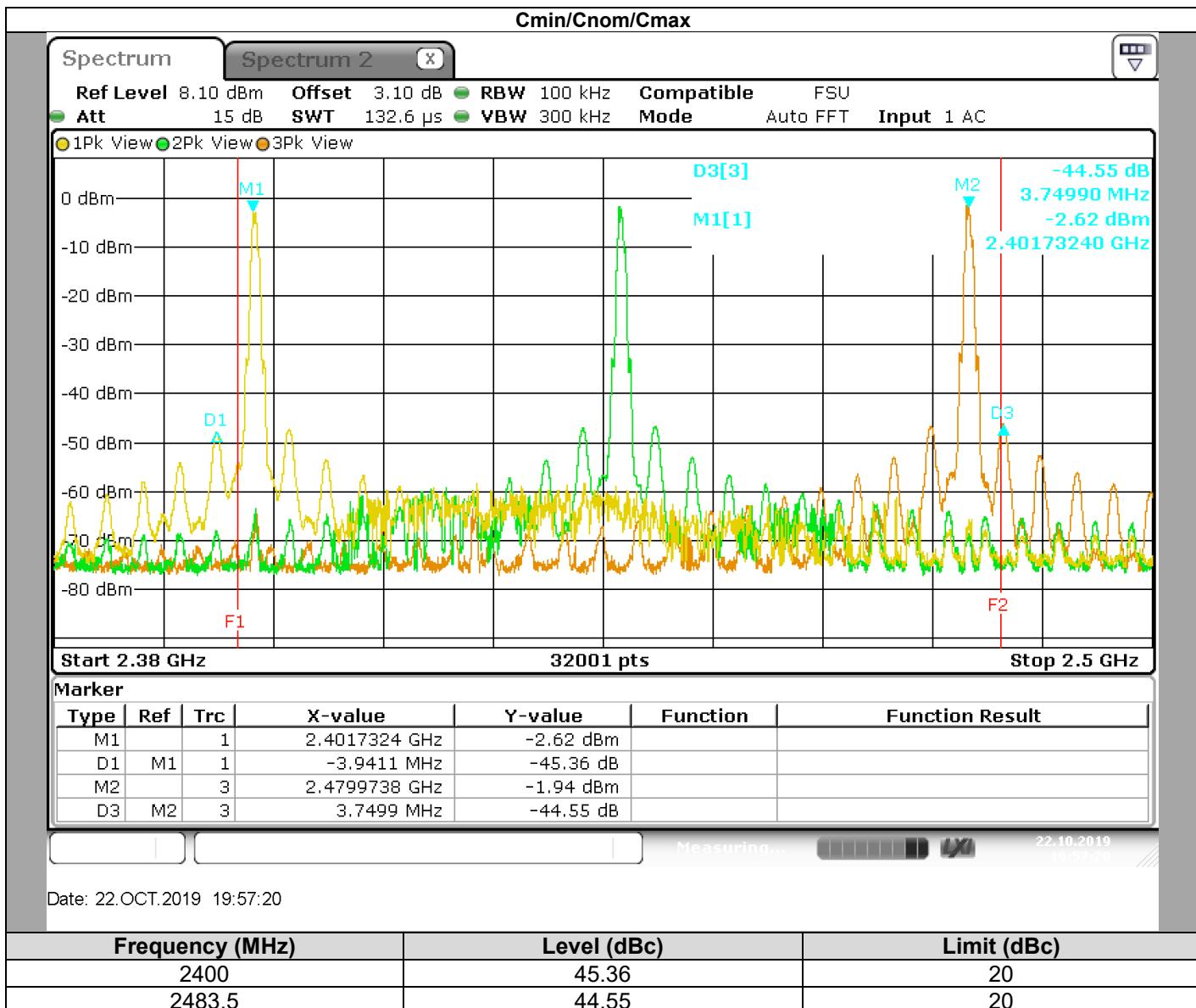
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR7	A2642026	2019/07	2021/07
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7049006	See Multimeter	See Multimeter
Cable	PASTERNACK	PE350-50CM	A5329765	2019/08	2020/08
Attenuator 3dB	-	WA54-3-12	A7122230	2019/02	2020/02

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



L C I E

7.5. RESULTS



7.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands at the band edge measurement performed on the sample of the product **SKF CMWA-6100**, SN: **281R 0007 & 3E7**, 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

8.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : October 21, 2019 to October 22, 2019
Ambient temperature : 25°C & 27°C
Relative humidity : 44% & 42%

8.2. TEST SETUP

- The Equipment under Test is installed:

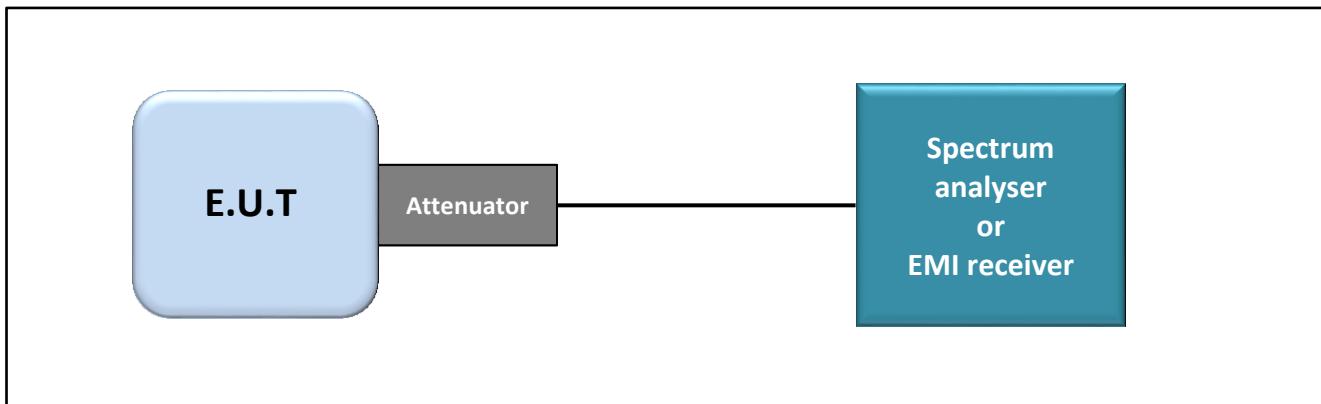
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

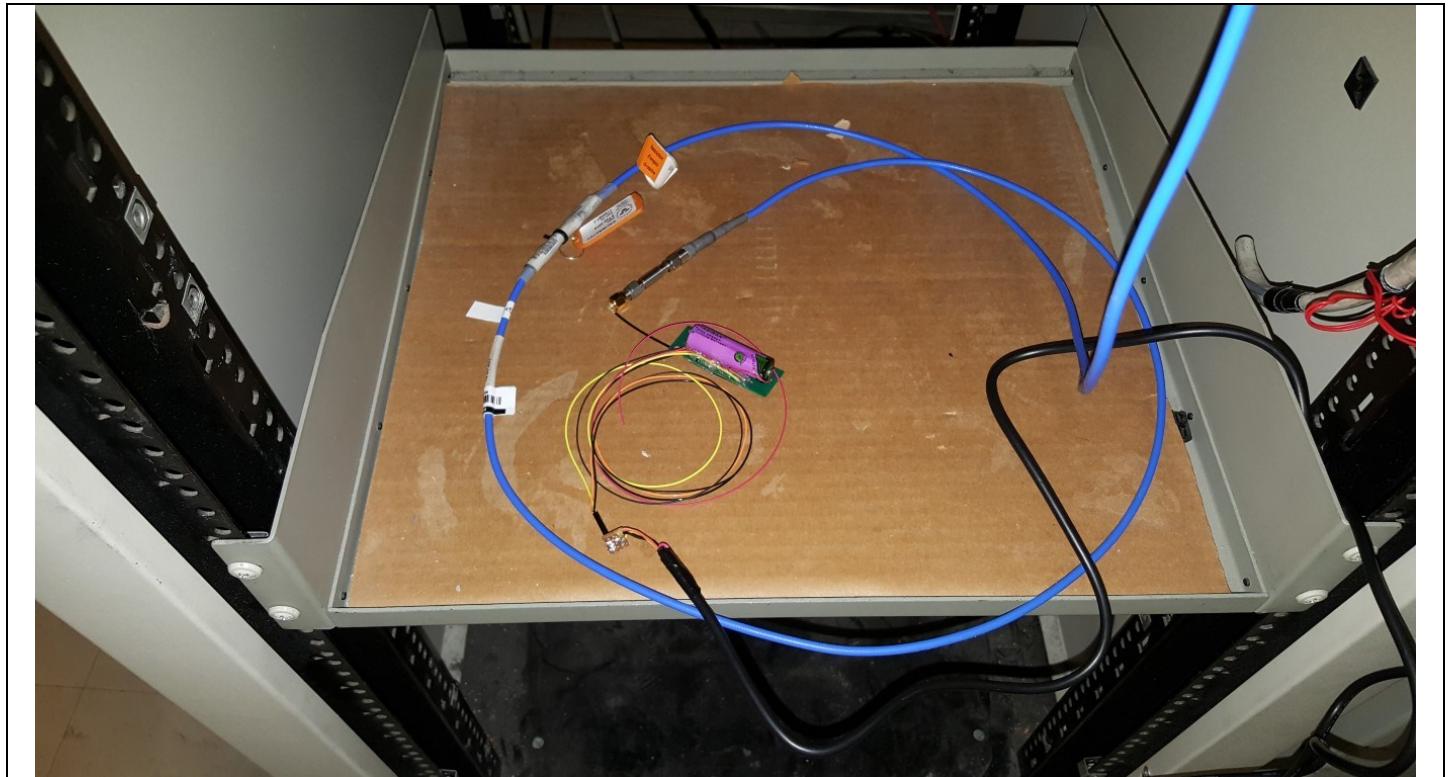
- ANSI C63.10 § 11.11



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



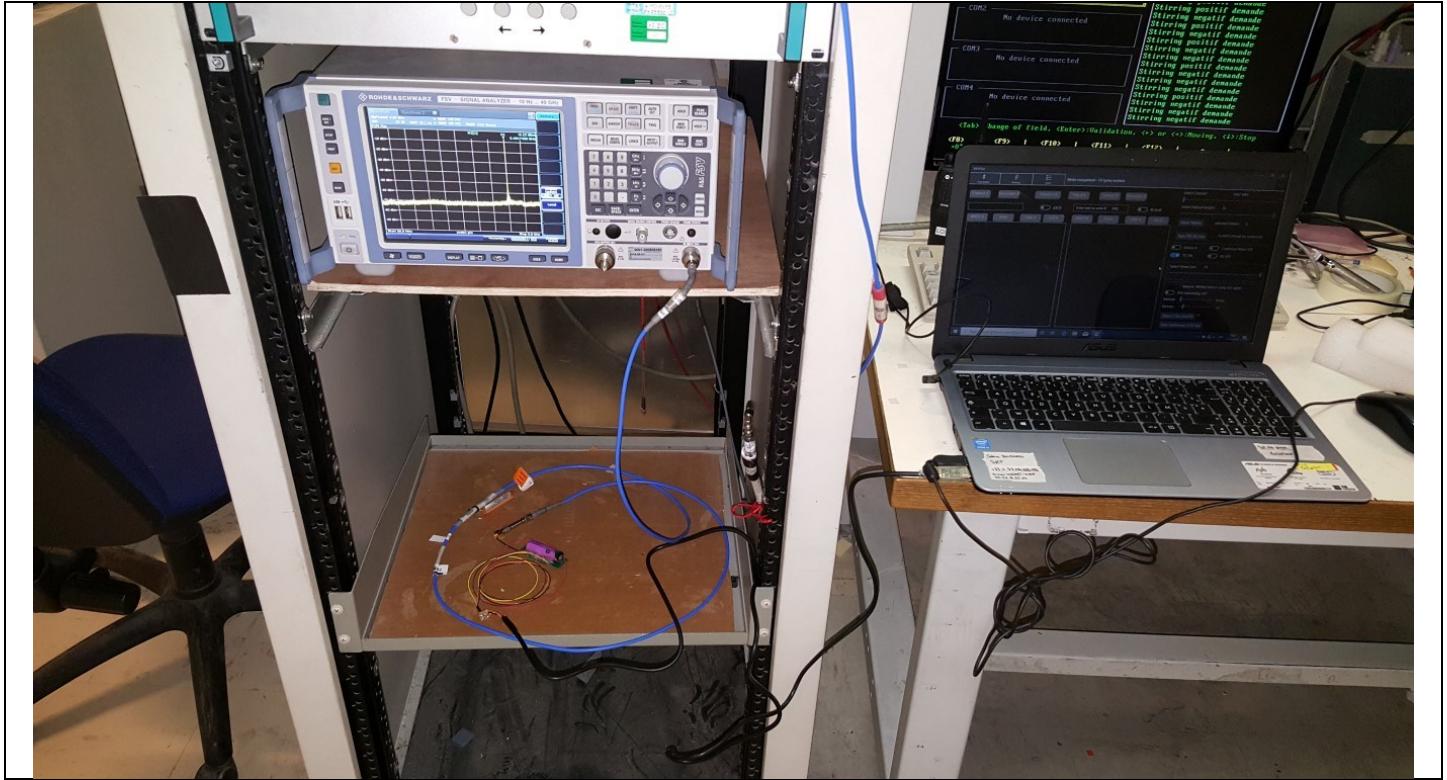
L C I E



Photograph for Unwanted Emission into non-restricted frequency bands



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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

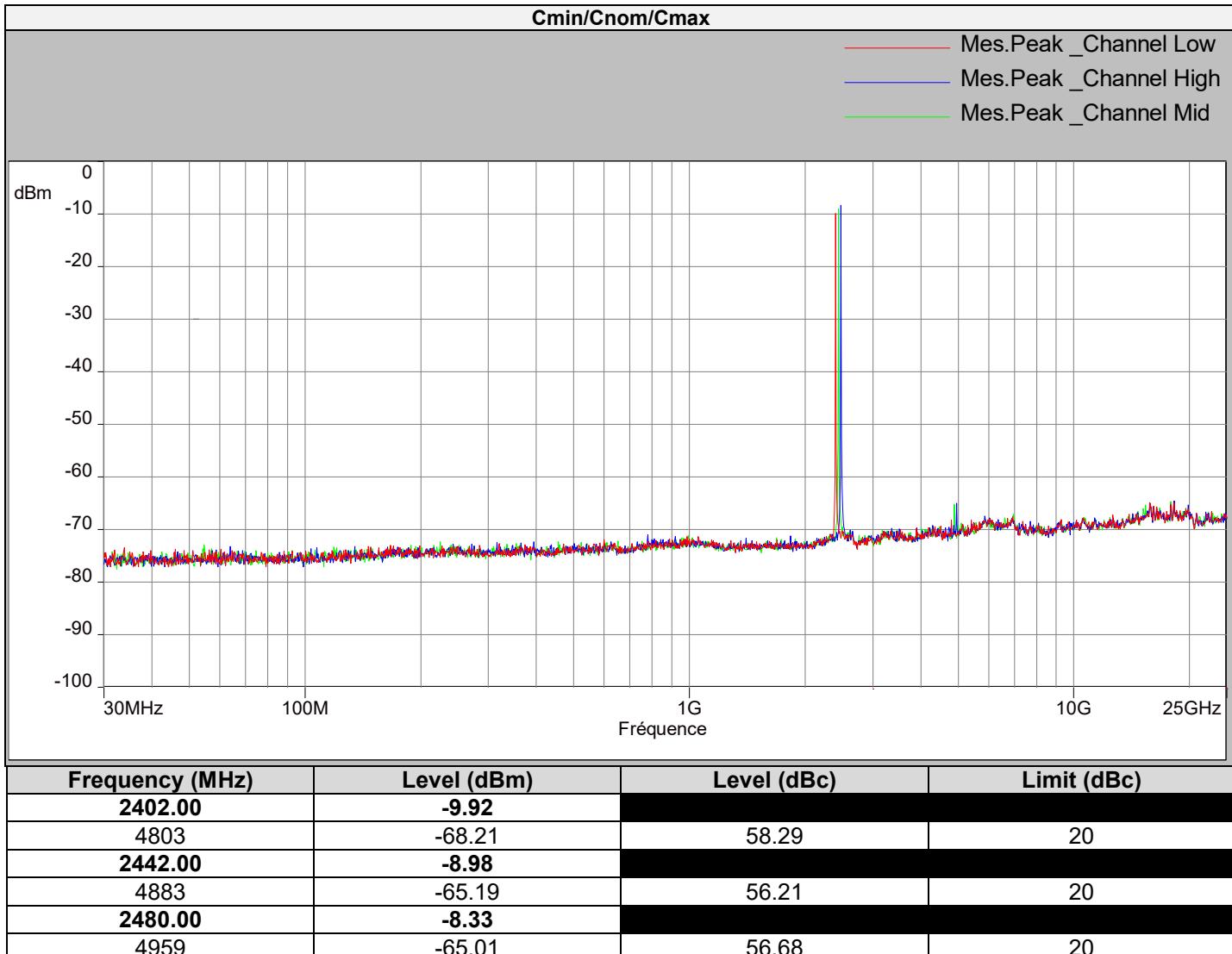
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable Conducted S36 chamber	TELEDYNE	084-0555-2MTR	A5329758	2019/02	2020/02
EMI receiver	ROHDE & SCHWARZ	FSV40GHz	A4060061	2019/05	2021/05
Attenuator 3dB Cable Spurious Conducted	-	WA54-3-12	A7122223	2019/02	2020/02
High Pass Filter 2,4GHz	WAINWRIGHT	WHK12-2494	A7484068	2019/07	2021/07

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



L C I E

8.5. RESULTS



8.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands measurement performed on the sample of the product **SKF CMWA-6100**, SN: **281R 0007 & 3E7**, in configuration and description presented in this test report, show levels compliant to the **47 CFR PART 15.247** limits.

9. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS

9.1. TEST CONDITIONS

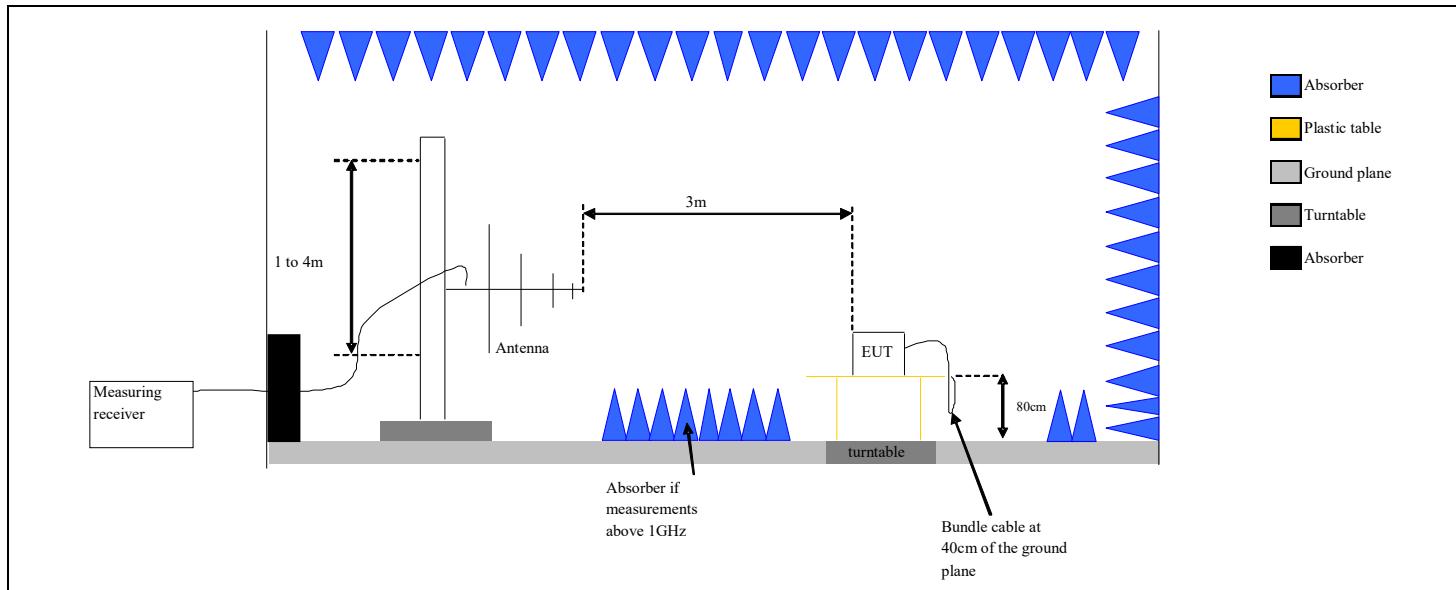
Test performed by : Armand MAHOUNGOU
 Date of test : October 21, 2019 to October 22, 2019
 Ambient temperature : 25°C & 27°C
 Relative humidity : 44% & 42%

9.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013) and FCC part15 subpart C.

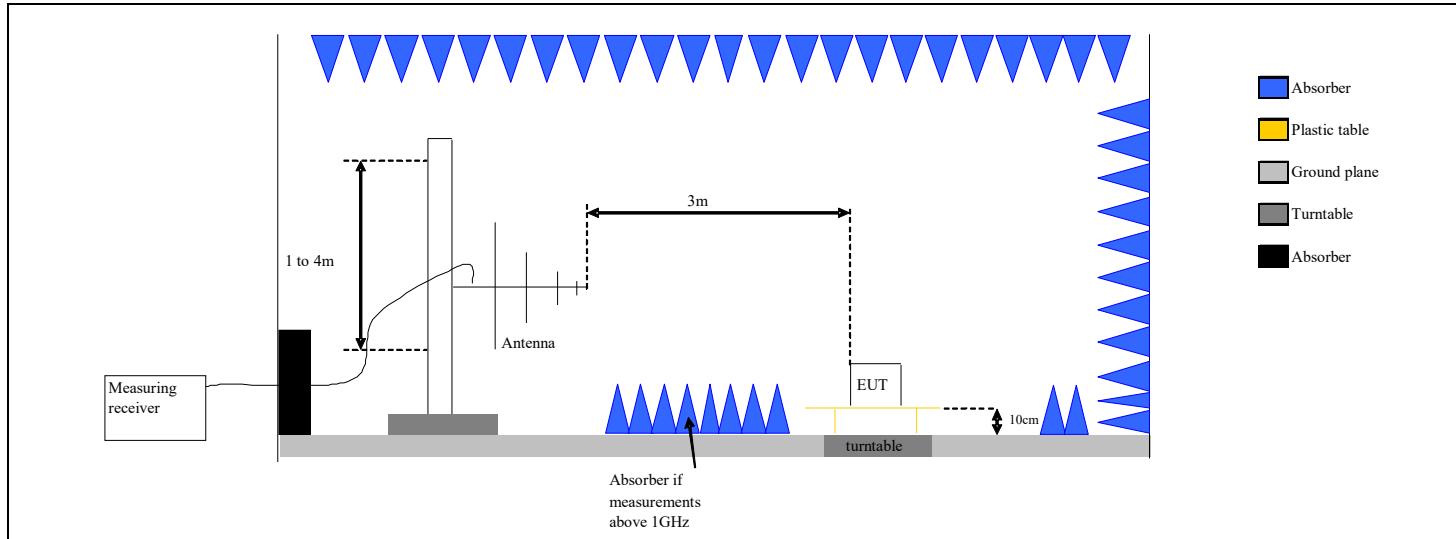
Test is performed in parallel, perpendicular and ground parallel axis with a loop antenna below 30MHz. Measurement bandwidth was 200Hz below 150kHz and 9kHz between 150kHz & 30MHz. The level has been maximised by the turntable rotation of 360 degrees range on the 3 axis of EUT. Antenna height was 1m. The EUT is placed **on an open area test site**. Distance between measuring antenna and the EUT is **3m**.

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 the 3 axis of EUT. Antenna height search was performed from 1 to 4m. The EUT is place 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**.

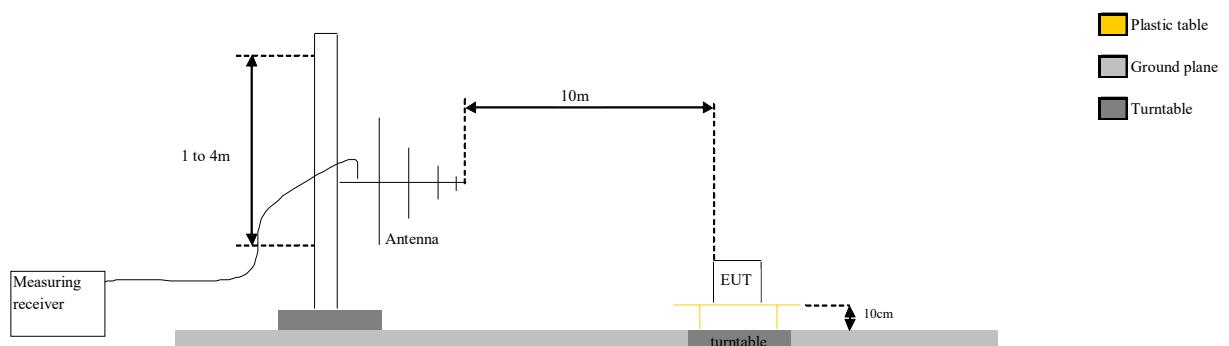
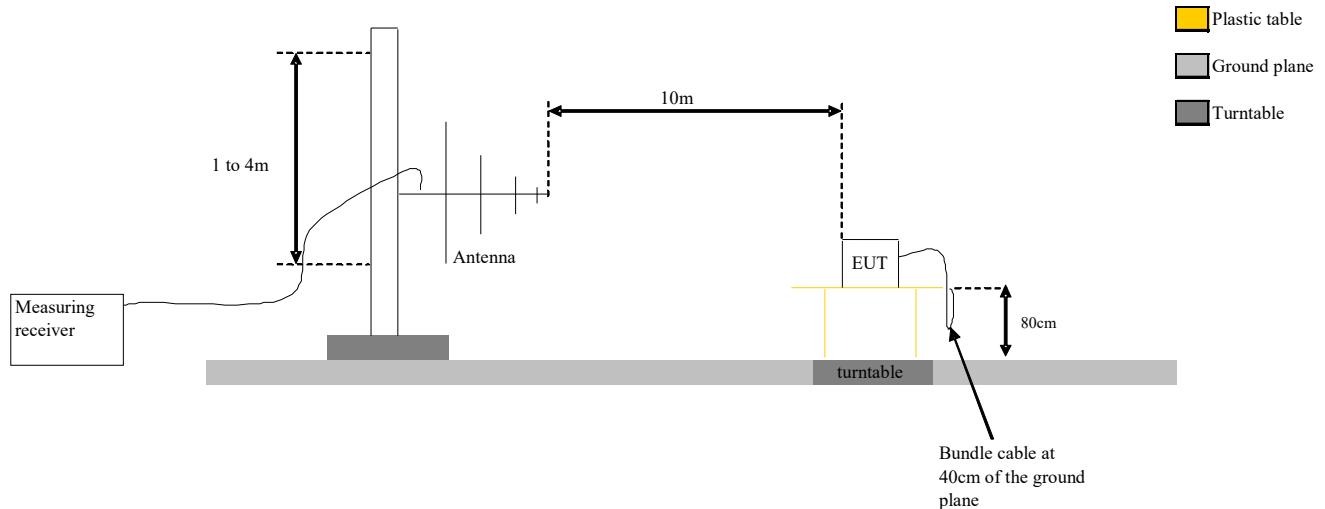




L C I E



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



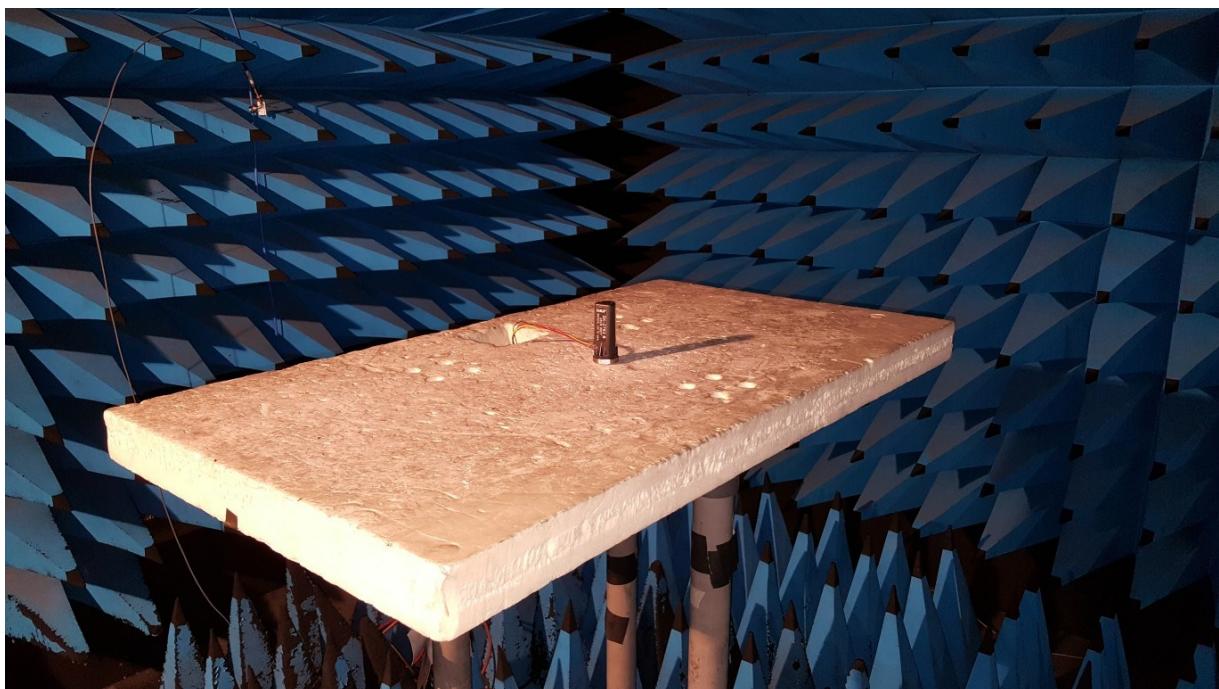
Test Set up for radiated measurement in open area test site



L C I E



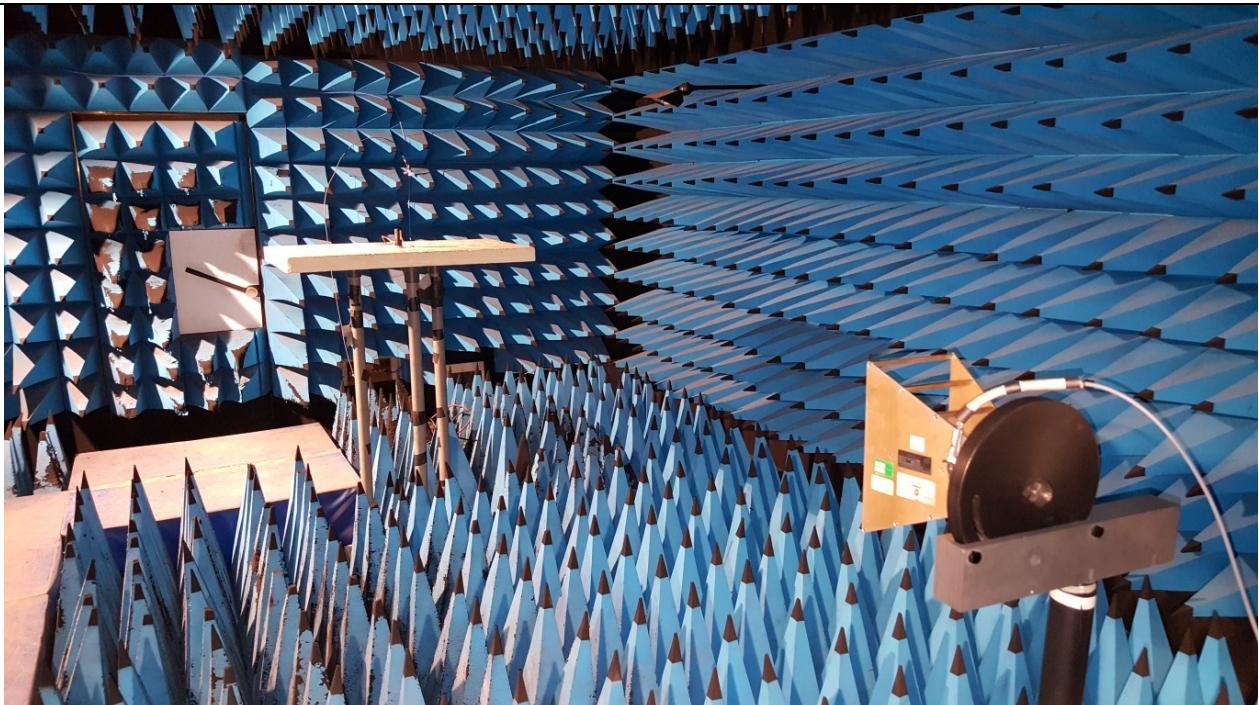
Photograph for Unwanted Emission in restricted frequency bands



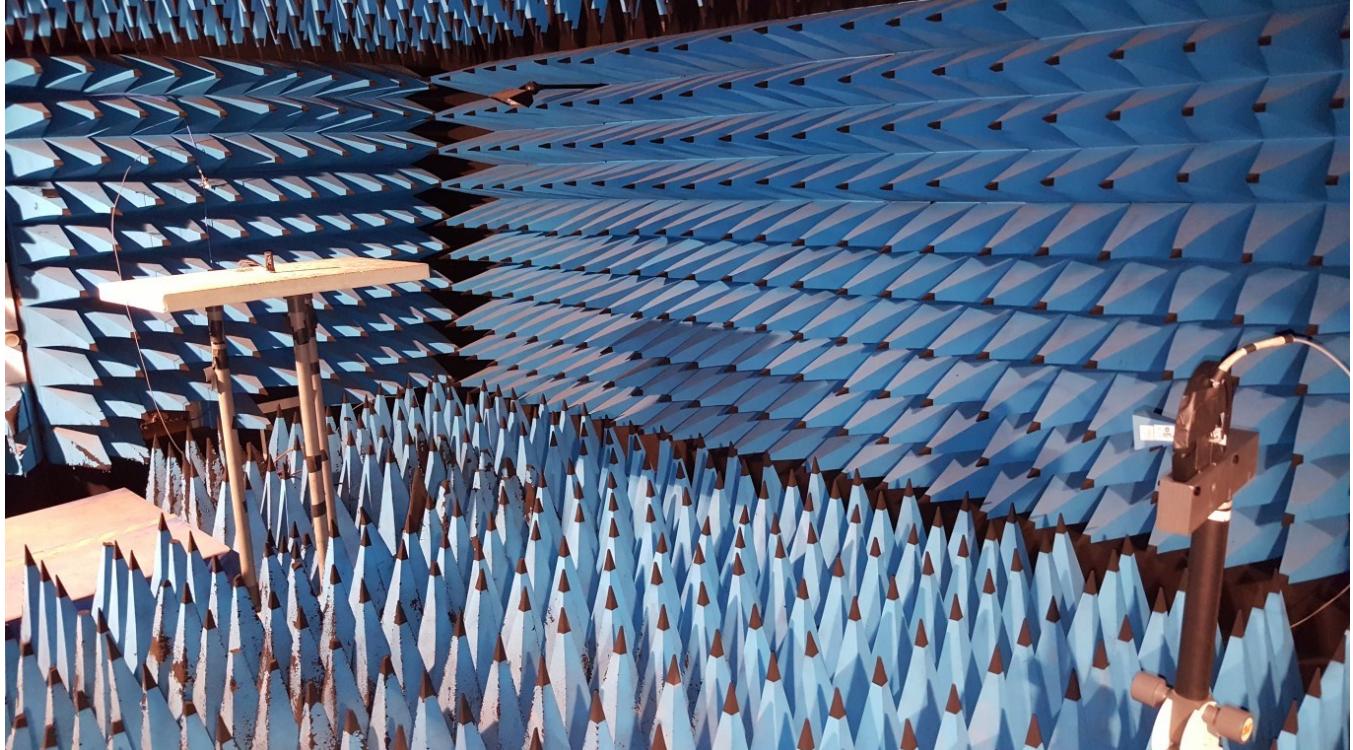
Photograph for Unwanted Emission in restricted frequency bands



L C I E



Photograph for Unwanted Emission in restricted frequency bands



Photograph for Unwanted Emission in restricted frequency bands



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9.3. LIMIT

Measure at 300m

Frequency range	Level	Detector
9kHz-490kHz	67.6dB μ V/m /F(kHz)	QPeak

Measure at 30m

Frequency range	Level	Detector
490kHz-1.705MHz	87.6dB μ V/m /F(kHz)	QPeak
1.705MHz-30MHz	29.5dB μ V/m	QPeak

Measure at 10m

Frequency range	Level	Detector
30MHz to 88MHz	29.5dB μ V/m	QPeak
88MHz to 216MHz	33dB μ V/m	QPeak
216MHz to 960MHz	35.5B μ V/m	QPeak
960MHz to 1000MHz	43.5dB μ V/m	QPeak
Above 1000MHz	63.5dB μ V/m	Peak
	43.5dB μ V/m	Average

Measure at 3m

Frequency range	Level	Detector
30MHz to 88MHz	40dB μ V/m	QPeak
88MHz to 216MHz	43.5dB μ V/m	QPeak
216MHz to 960MHz	46B μ V/m	QPeak
960MHz to 1000MHz	54dB μ V/m	QPeak
Above 1000MHz	74dB μ V/m	Peak
	54dB μ V/m	Average



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9.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Full anechoic chamber	SIEPEL	-	D3044019	2018/10	2022/10
Preamplifier	Bonn Elektronik	BLNA 3018-8F305	A7080053	2018/12	2020/12
Horn antenna	AH SYSTEMS	SAS 571	C2042041	2017/09	2019/09
Horn antenna (18-26,5GHz)	PASTERNACK	PE9852/2F-20	C2042048	2017/12	2019/12
EMI receiver	ROHDE & SCHWARZ	FSV40GHz	A4060061	2019/05	2021/05
Cable S36 chamber	PASTERNACK	PE360-1500CM	A5329870	2019/01	2020/01
Cable S36 chamber	PASTERNACK	PE360-1000CM	A5329871	2019/01	2020/01
Cable S36 chamber	PASTERNACK	PE360-3000CM	A5329872	2019/01	2020/01
High Pass Filter 2,4GHz	WAINWRIGHT	WHK12-2494	A7484068	2019/07	2021/07
Open test site	LCIE	-	F2000400	2019-06	2020-06
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2018-10	2020-10
Bilog antenna	CHASE	CBL 6112A	C2040040	2019-04	2020-04
Cable	-	-	A5329442	2018-09	2019-09
Cable	-	-	A5329444	2018-09	2019-09
Cable	-	-	A5329876	2018-11	2019-11
loop antenna	RHODE & SCHWARZ	HFH2-Z2	C2040007	2018-11	2020-11
Cable	-	-	A5329416	2018-12	2019-12

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

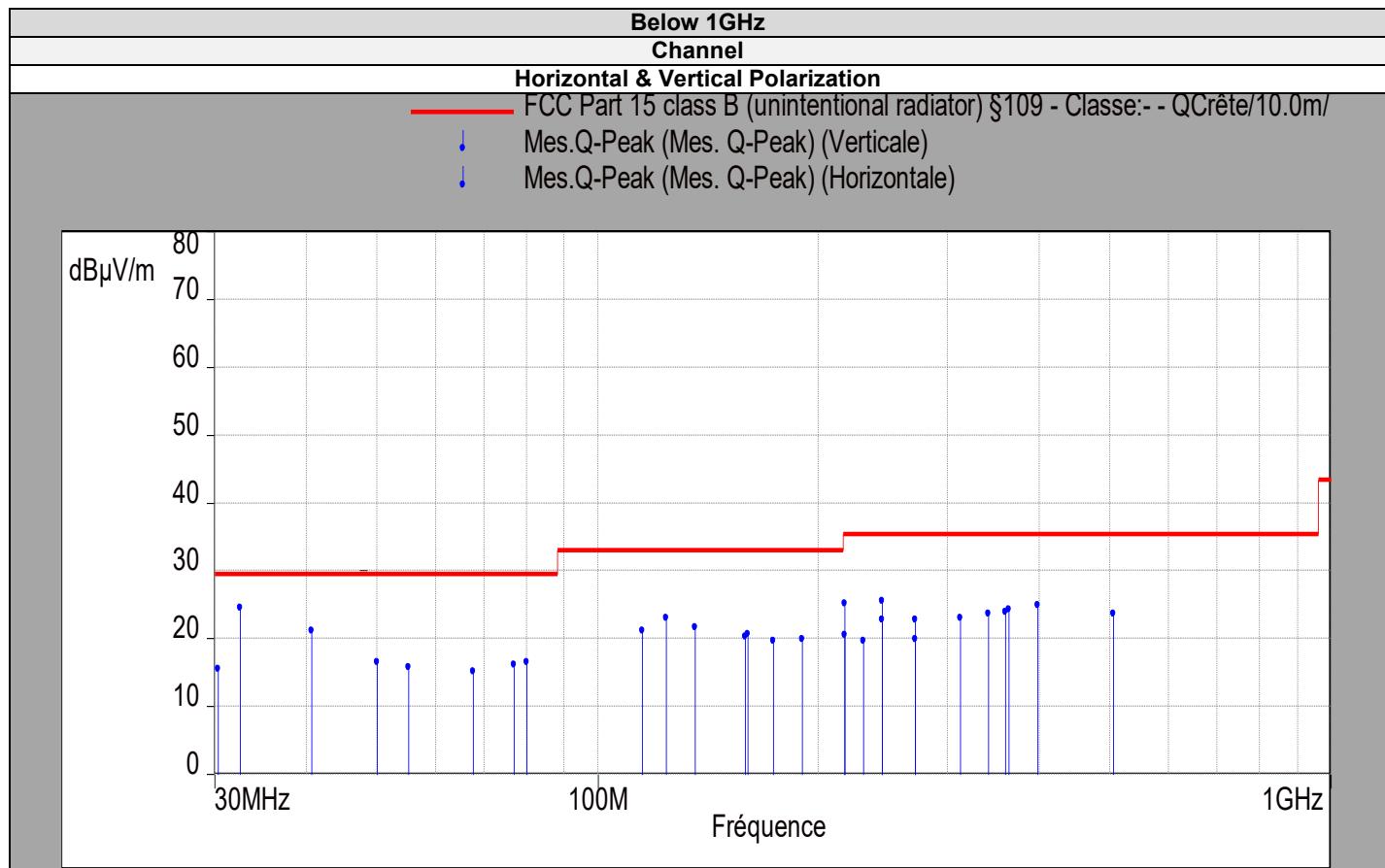
None

Divergence:



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9.6. RESULTS





L C I E

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 High - Verticale (Verticale)
- Mes.Avg _Channel Mid - Verticale (Verticale)
- Mes.Peak _Channel Mid - Verticale (Verticale)
- Mes.Avg _Channel Low - Verticale (Verticale)
- Mes.Avg _Channel High - Verticale (Verticale)
- Mes.Peak _Channel Low - Verticale (Verticale)

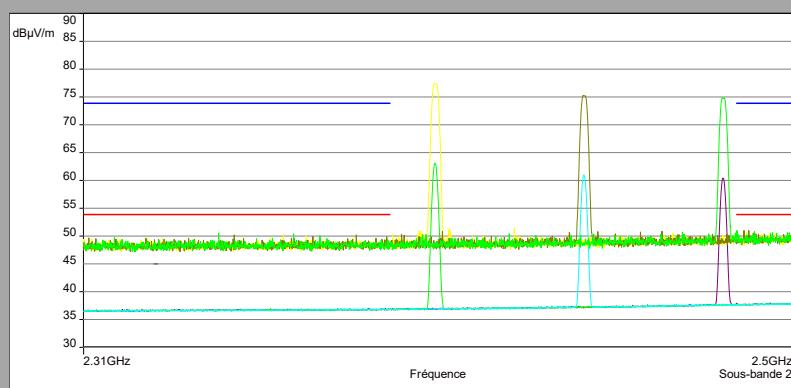
Description Sous-bande 2

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

Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 2 ms/Pts, 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.Avg _Channel Low - Horizontale (Horizontale)
- Mes.Avg _Channel High - Horizontale (Horizontale)
- Mes.Peak _Channel Low - Horizontale (Horizontale)
- Mes.Peak _Channel High - Horizontale (Horizontale)
- Mes.Avg _Channel Mid - Horizontale (Horizontale)
- Mes.Peak _Channel Mid - Horizontale (Horizontale)

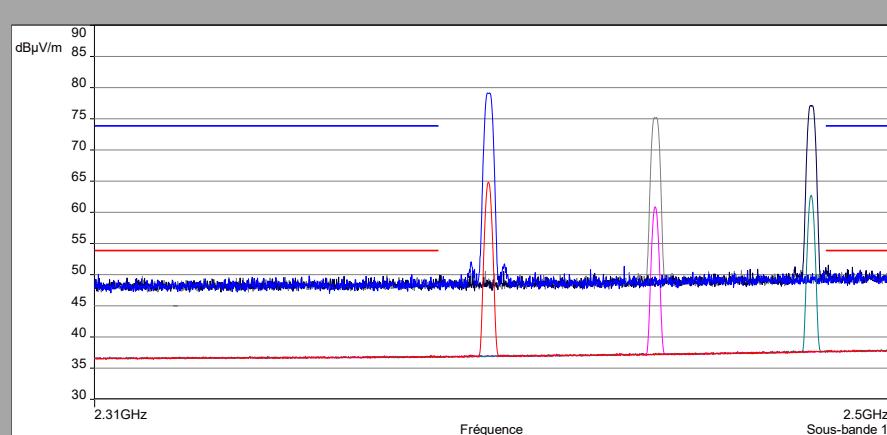
Description Sous-bande 1

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

Réglages: RBW: 1MHz, VBW: 3MHz, Durée balayage : 2 ms/Pts, Atténuation : 0 dB, Nombre de Balayages : 1, Preamp :

Polarisation: Horizontale

Distance: 3 m



TEST REPORT

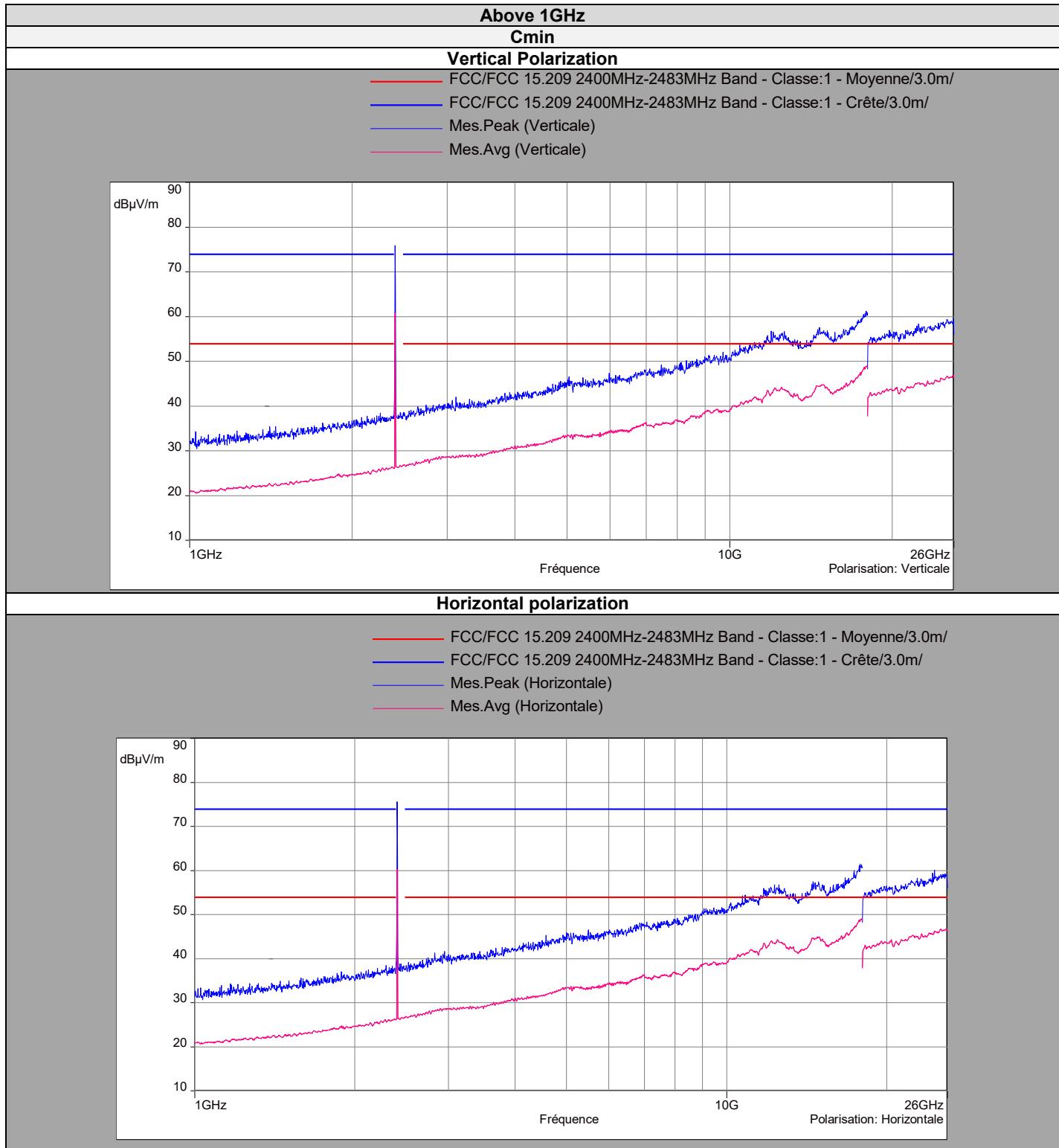
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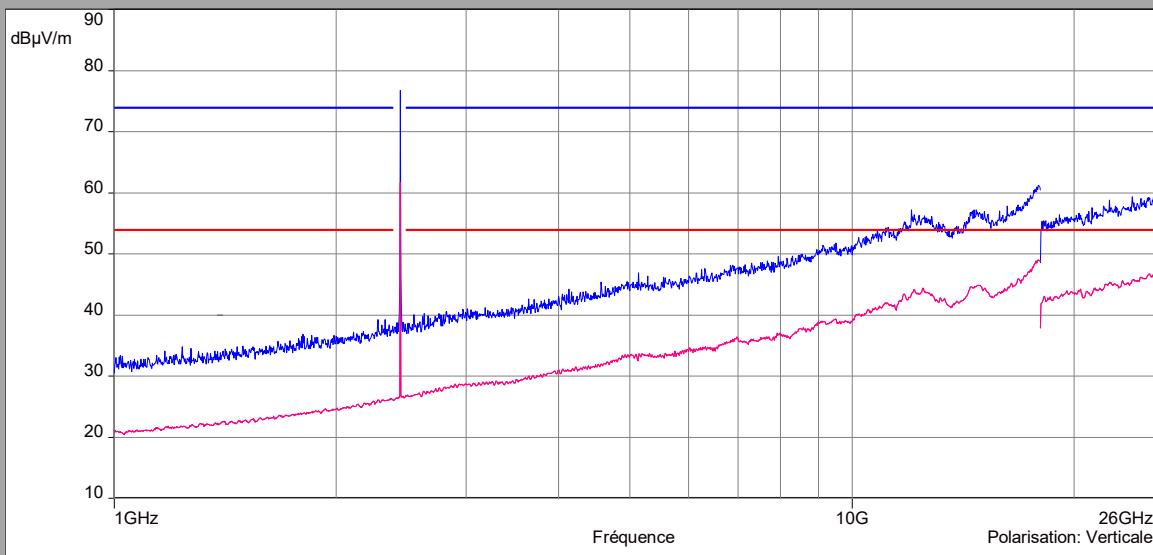
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Above 1GHz

Cnom

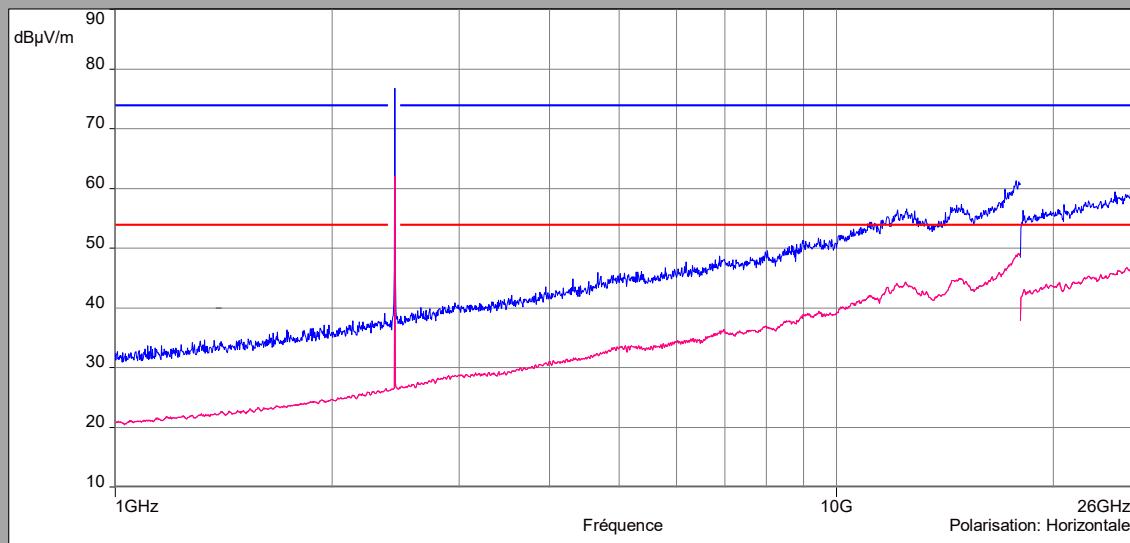
Vertical Polarization

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



Horizontal polarization

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



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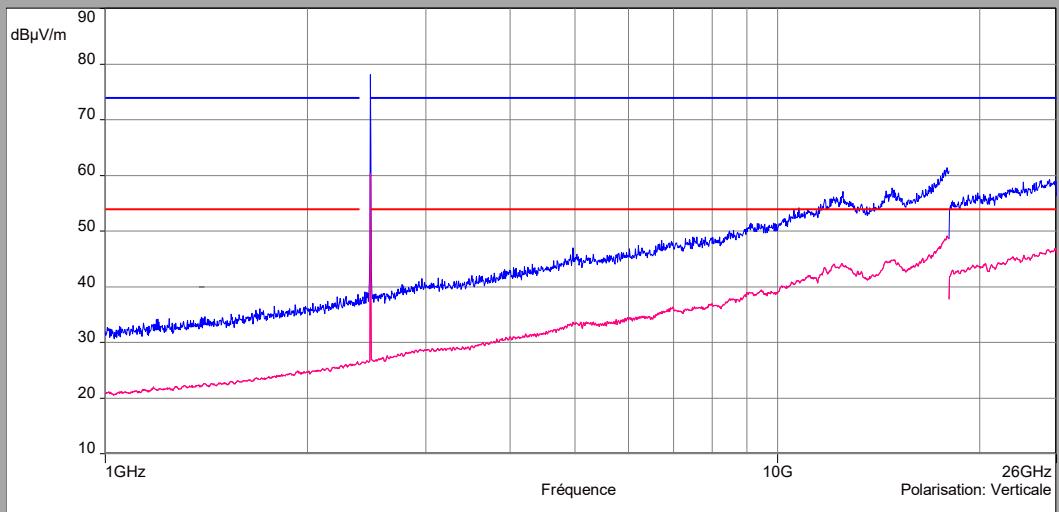
L C I E

Above 1GHz

Cmax

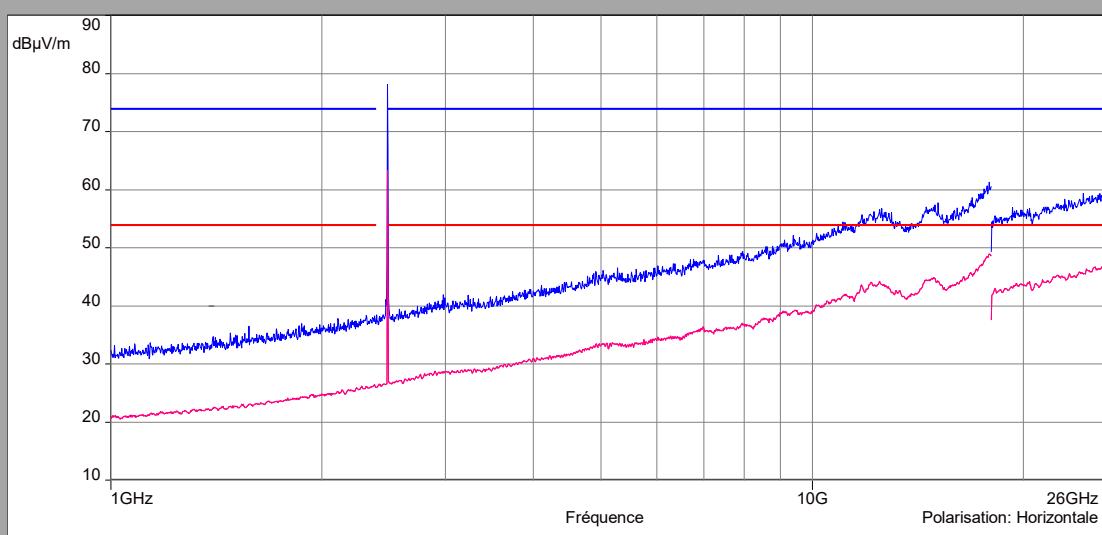
Vertical Polarization

- 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)



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

30MHz to 1GHz					
Polarization	Frequency (MHz)	Peak Level (dB μ V/m)	QPeak Level (dB μ V/m)	Limit (dB μ V/m)	Margin QPeak (dB μ V/m)
Vertical	32.5	-	24.56	29.5	4.94
Vertical	40.7	-	21.2	29.5	8.3
Vertical	217	-	25.19	35.5	10.31
Vertical	244.1	-	22.85	35.5	12.65
Vertical	271.2	-	22.76	35.5	12.74
Vertical	363.8	-	24.25	35.5	11.25
Horizontal	244.1	-	25.57	35.5	9.93
all emissions were greater than 20 dB below the limit					

Above 1GHz								
Cmin/Cnom/Cmax								
Polarization	Frequency (MHz)	Average Level (dB μ V/m)	Average Level + Duty Cycle Factor (dB μ V/m)	Average Limit (dB μ V/m)	Average Margin Level (dB μ V/m)	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Peak Margin Level (dB μ V/m)
Horizontale	2390	36,61	51,98	54	2,02	48,27	74	25,73
Verticale	2390	36,73	52,10	54	1,90	48,68	74	25,32
Horizontale	2483.5	37,53	52,90	54	1,10	51,16	74	22,84
Verticale	2483.5	37,44	52,81	54	1,19	48,11	74	25,89

9.7. CONCLUSION

Unwanted Emission in restricted frequency bands measurement performed on the sample of the product **SKF CMWA-6100**, SN: **281R 0007 & 3E7**, in configuration and description presented in this test report, show levels compliant to the 47 CFR PART 15.247 limits.



L C I E

10. 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 (Euelles)	4,88	6.3
Measurement of radiated electric field from 1 to 18GHz on the Euelles site	5,16	/
Measurement of radiated electric field from 30 to 1000MHz in vertical position on the OATS (Euelles)	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 (Euelles)	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