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C.I.F. A29 507 456

ISED CABid: ES1909

Test report No:
NIE: 66554RRF.005

Partial Test report
USA FCC Part 15.31, 15.247, 15.209
CANADA RSS-247, RSS-Gen

(*) Identification of item tested	WOE46R
(*) Trademark	GN Hearing A/S, GN Audio A/S, ReSound, Beltone, Interton, Audigy, Jabra
(*) Model and /or type reference	WOE46R
Other identification of the product	HW version: PCBA,WOLVERINE,RIGHT,V1.B,C6.0 SW version: Dooku2 (M.1.5.6) FCC ID: X26WOE46R IC: 6941C-WOE46R
(*) Features	Audio amplification, Bluetooth 5.0 and 10.667 MHz wireless magnetic induction functionality
Applicant	GN Hearing Lautrupbjerg 7, 2750 Ballerup Denmark
Test method requested, standard	USA FCC Part 15.31 (10-1-19) Edition: Measurements standards. USA FCC Part 15.247 (10-1-19) Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-19) Edition: Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 (March 2019). -Transmitter out of band radiated emissions with simultaneous transmissions. Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Approved by (name / position & signature)	Rafael López EMC Consumer & RF Lab. Manager 2021.07.19 13:04:52 +02'00'
Date of issue	2021-07-19
Report template No	FDT08_23 (*) "Data provided by the client"

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Competences and guarantees

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DEKRA Testing and Certification S.A.U. is an FCC-recognized accredited testing laboratory with the appropriate scope of accreditation that covers the performed test in this report.

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DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").

2. The sample of the model WOE46R is a rechargeable wireless hearing aid.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of result.

Usage of samples

Samples undergoing test have been selected by: The client.

- Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
66554C/038	Hearing aid (Right)	WOE46R03	2100803140	2021/05/25

Sample S/01 has undergone the test(s): All Radiated tests indicated in Appendixes A.

Test sample description

Ports…… :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient(3)		
	--		☐	☐	☐		
Supplementary information to the ports…… :	--						
Rated power supply .....:	Voltage and Frequency	Reference poles					
		L1	L2	L3	N	PE	
	☒ DC: 3.8V						
Rated Power .....:	3.8 V						
Clock frequencies .....:	2.48 GHz and 10.667 MHZ						
Other parameters.....:	--						
Software version .....:	Dooku2 (M.1.5.6)						
Hardware version.....:	PCBA,WOLVERINE,RIGHT,V1.B,C6.0						
Dimensions in cm (W x H x D)....:	--						
	☒ Other: Placed behind the ear						
Modules/parts .....:	Module/parts of test item	Type	Manufacturer				
	--						
Accessories (not part of the test item) .....:	Description	Type	Manufacturer				
	Computer	Certified according to IEC 60950-1, IEC 62368-1 or equivalent standard					
Documents as provided by the	Description	File name	Issue date				

applicant.....:	Radio test plan	0422570rA_WOE46R_Radio_Test_Plan.docx	2021.03.25

(3) Only for Medical Equipment

Identification of the client

GN HEARING A/S

Lautrupbjerg 7, 2750 Ballerup, Denmark

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2021-06-02
Date (finish)	2021-06-03

Document history

Report number	Date	Description
66554RRF.005	2021-07-19	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

Remarks and comments

The tests have been performed by the technical personnel: Verónica Garcia and Nicolás Salguero.

Used instrumentation:

Radiated Measurements:

		Last Calibration	Due Calibration
1.	Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N.A.	N.A.
2.	Shielded Room ETS LINDGREN S101	N.A.	N.A.
3.	EMI Test Receiver 9kHz-7GHz ROHDE AND SCHWARZ ESR7	2020/12	2022/12
4.	Active Loop Antenna HEWLETT PACKARD 11966A	2020/07	2022/07
5.	Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2020/04	2023/04
6.	RF Pre-amplifier, 40 dB ,10MHz-6 GHz BONN ELEKTRONIK BLMA 0160-01N	2021/03	2022/03
7.	Signal and Spectrum Analyzer 2Hz-50GHz ROHDE AND SCHWARZ FSW50	2020/07	2022/07
8.	Broadband Horn antenna 1 - 18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120D	2019/11	2022/11
9.	Pre-amplifier, G>40 dB, 1-18 GHz BONN ELEKTRONIK BLMA 0118-1M	2021/06	2022/06
10.	Broadband Horn antenna 18 - 40 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170	2020/05	2023/05
11.	Pre-amplifier, G>30 dB, 18-40 GHz BONN ELEKTRONIK BLMA 1840-3G	2019/11	2021/11

Testing verdicts

Not applicable:	N/A
Pass:	P
Fail:	F
Not measured:	N/M

Summary

FCC PART 15 PARAGRAPH / RSS-247 / RSS-Gen		
Requirement – Test case	**Verdict**	**Remark**
FCC 15.31 (h), 15.209 (a), 15.247 (d) / RSS-Gen 8.9, RSS-247 5.5: Emission limitations radiated (Transmitter)	P	(1)
Supplementary information and remarks: (1) Only co-location radiated spurious emission test was requested.		

Appendix A: Test results. Bluetooth Low Energy 5.0 (2M, 1M) + SRD 10.667 MHz

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TEST CONDITIONS

POWER SUPPLY (V):

Vnominal: 3.8 Vdc

Type of Power Supply: Battery.

ANTENNA:

Type of Antenna: Integral

Maximum Declared Antenna Gain for BLE : -5.75 dBi

Maximum Declared Antenna Gain for Inductive coil: N/A

RADIOS AND CHANNELS TESTED:

	Bluetooth Low Energy 5.0 (2M, 1M)	
Mode:	1M (GFSK - 1DH5)	
Channel Spacing:	2 MHz	
Frequency Range:	2402 MHz to 2480 MHz	
Transmit Channel:	Channel	Channel Frequency (MHz)
	20	2440

	SRD 10.667 MHz / D-BPSK	
Mode:	Single Channel	
Channel Spacing:	Not Applicable	
Frequency Range:	5 – 30 MHz	
Transmit Channel:	Channel	Channel Frequency (MHz)
	1	10.667

The EUT was tested in the following operating mode:

- Continuous transmission with a modulated carrier at maximum power in all required channels selecting the supported data rates/modulations types.

During transmitter test the EUT was being controlled by the SW tool to operate in a continuous transmit mode on the test channel as required and in each of the different modulation modes.

Transmission modes selected with each Radio:

The following configurations were selected based on preliminary testing that identified those corresponding to the worst cases:

* Bluetooth Low Energy: Transmitter radiated spurious emissions tests were performed with the EUT transmitting in 1Mbps.

* SRD 10.667 MHz: Transmitter radiated spurious emissions tests were performed with the EUT transmitting in the single channel configuration supported by this radio.

Simultaneous transmission modes selected:

* Co-location Bluetooth, SRD 10.667 MHz, with the EUT configured to simultaneously transmit two signals at maximum output power: Bluetooth Low Energy in 1Mbps mode, SRD 10.667 MHz.

RADIATED MEASUREMENTS

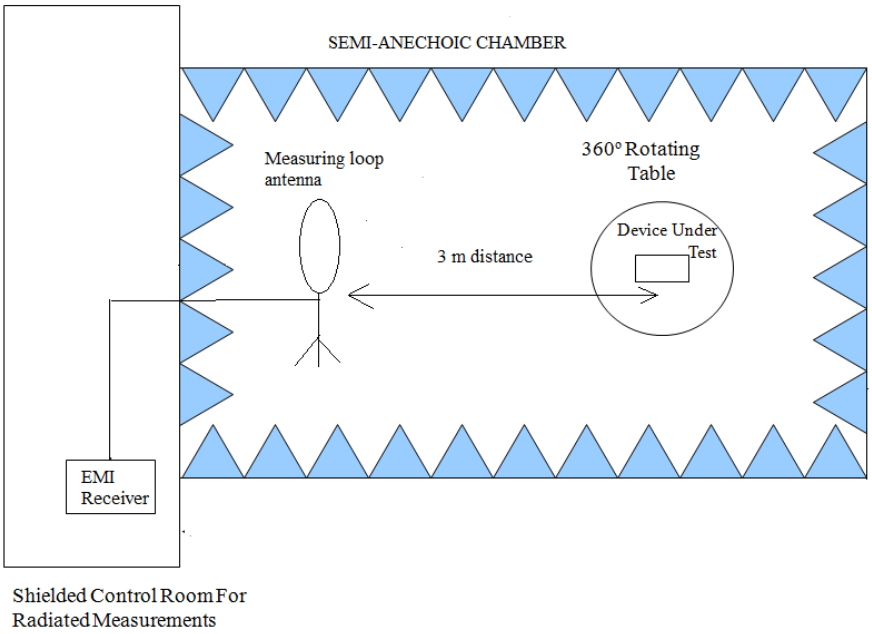
All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Loop antenna for the range between 9 kHz to 30 MHz, Bilog antenna for the range between 30 MHz to 1000 MHz and 1 GHz-17 GHz Double ridge horn antenna) is situated at a distance of 3 m and at a distance of 1m for the frequency range 17 GHz-26 GHz (antenna and 18 GHz-40 GHz horn antenna).

For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

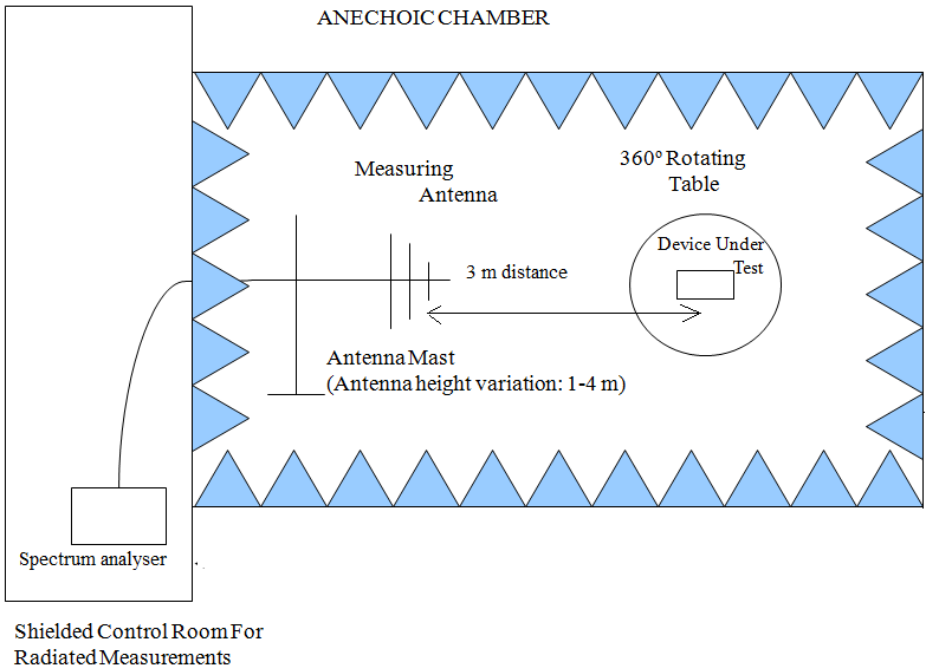
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

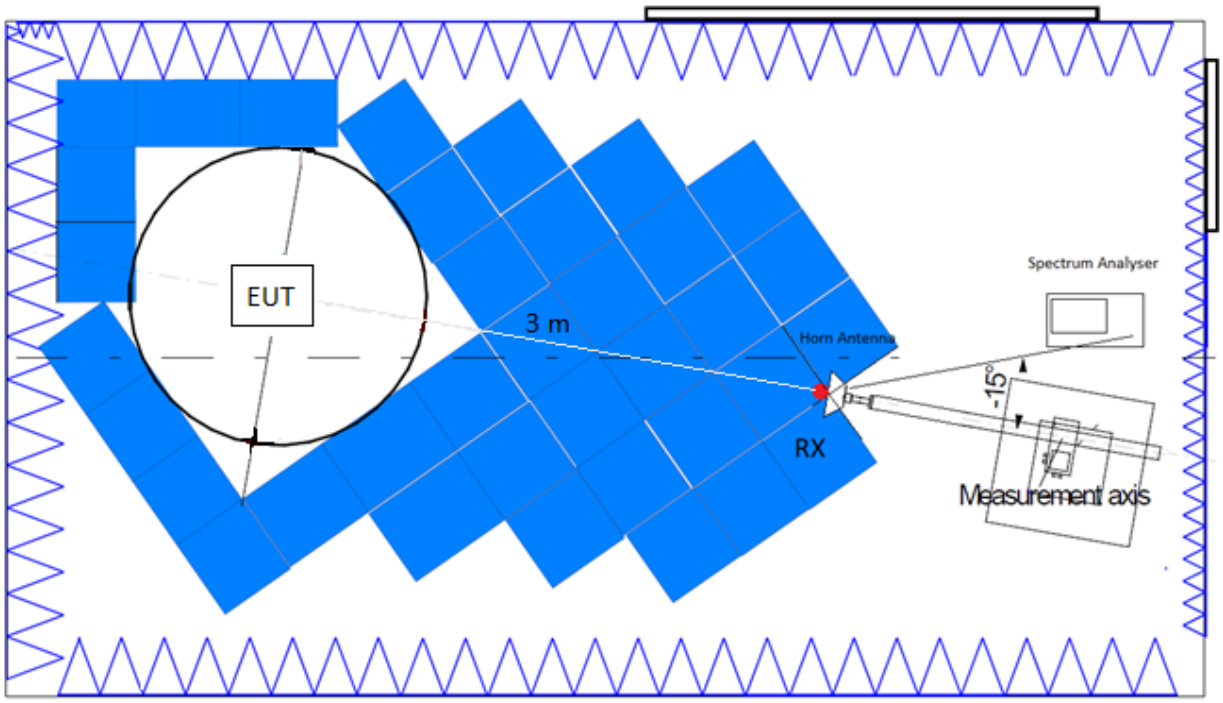
Radiated measurements setup f < 30 MHz:



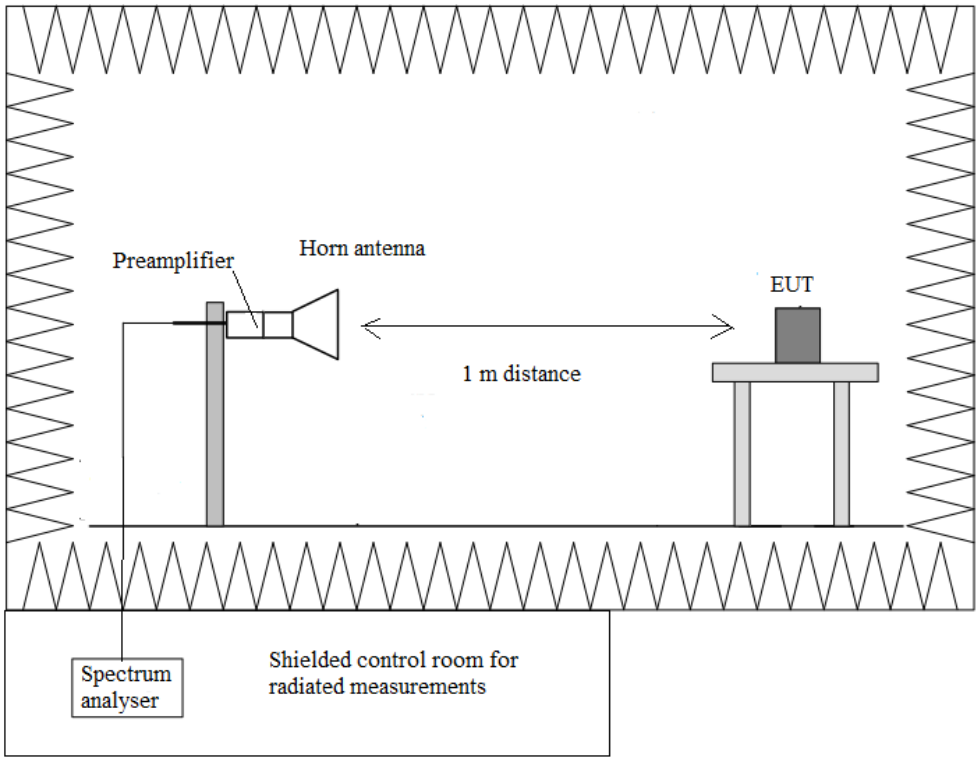
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1GHz to 17 GHz:



Radiated measurements setup f > 17 GHz:



Radiated emissions

SPECIFICATION:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)/RSS-Gen):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 10000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247: Attenuation below the general field strength limits specified in RSS-Gen is not required.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 9 KHz-17 GHz and at distance of 1m for the frequency range 17 GHz-26 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

Frequency range 9 kHz - 30 MHz

The spurious emissions do not depend on either the operating channel or the modulation mode.

No spurious frequencies detected at less than 20 dB below the limit.

Measurement uncertainty (dB): < ± 3.04

Frequency range 30 MHz - 1 GHz:

The spurious frequencies detected do not depend neither on the operating channel nor the modulation mode.

No spurious frequencies detected at less than 20 dB below the limit:

Measurement Uncertainty (dB): <± 5.07

Frequency range 1 - 26 GHz:

The results in the next tables show the maximum measured levels in the 1-26 GHz range.

Spurious frequencies with peak levels above the average limit (54 dBµV/m at 3 m) are measured with average detector for checking compliance with the average limit.

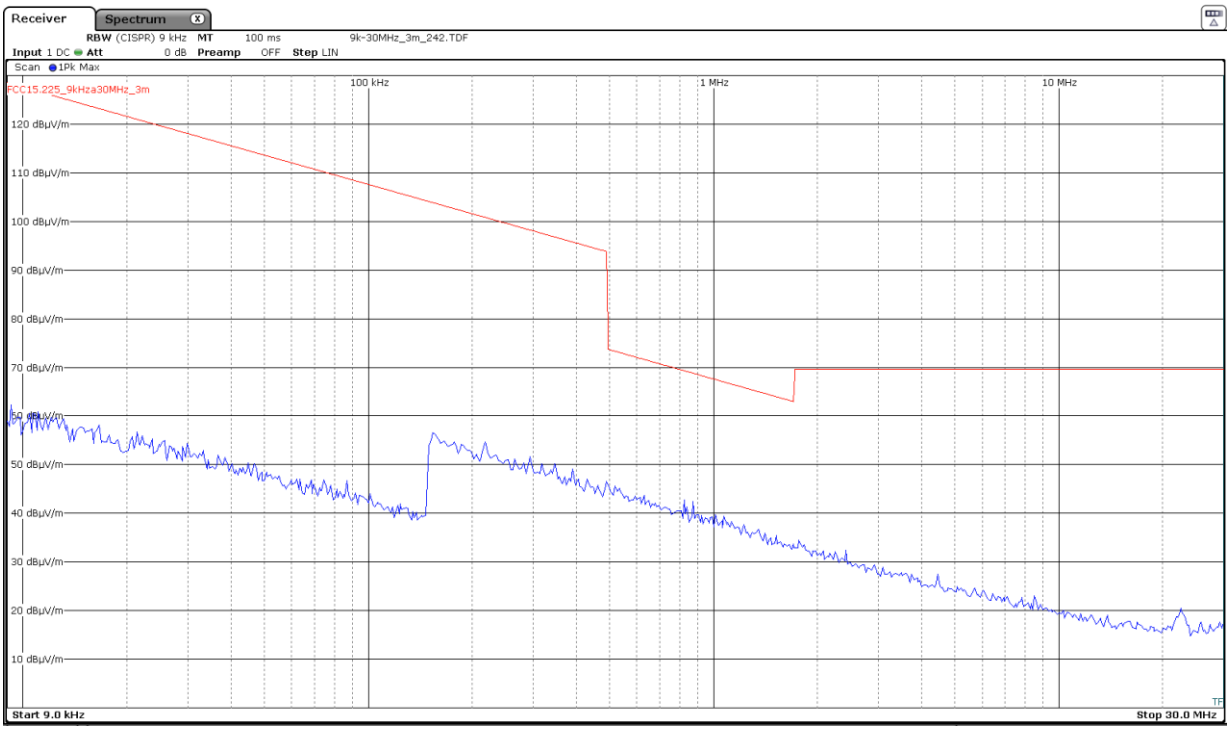
Spurious frequencies detected closest to the limit:

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.8853	56.71	V	Peak	<± 4.00
	45.92		Average	<± 4.00
4.8795	53.28	V	Peak	<± 4.99
7.3201	44.32	V	Peak	<± 4.99
9.7594	51.37	H	Peak	<± 4.99

Measurement uncertainty (dB)
<± 4.00 for f < 1 GHz up to 3 GHz
<± 4.99 for f ≥ 3 GHz up to 17 GHz
<± 5.08 for f ≥ 17 GHz up to 26 GHz

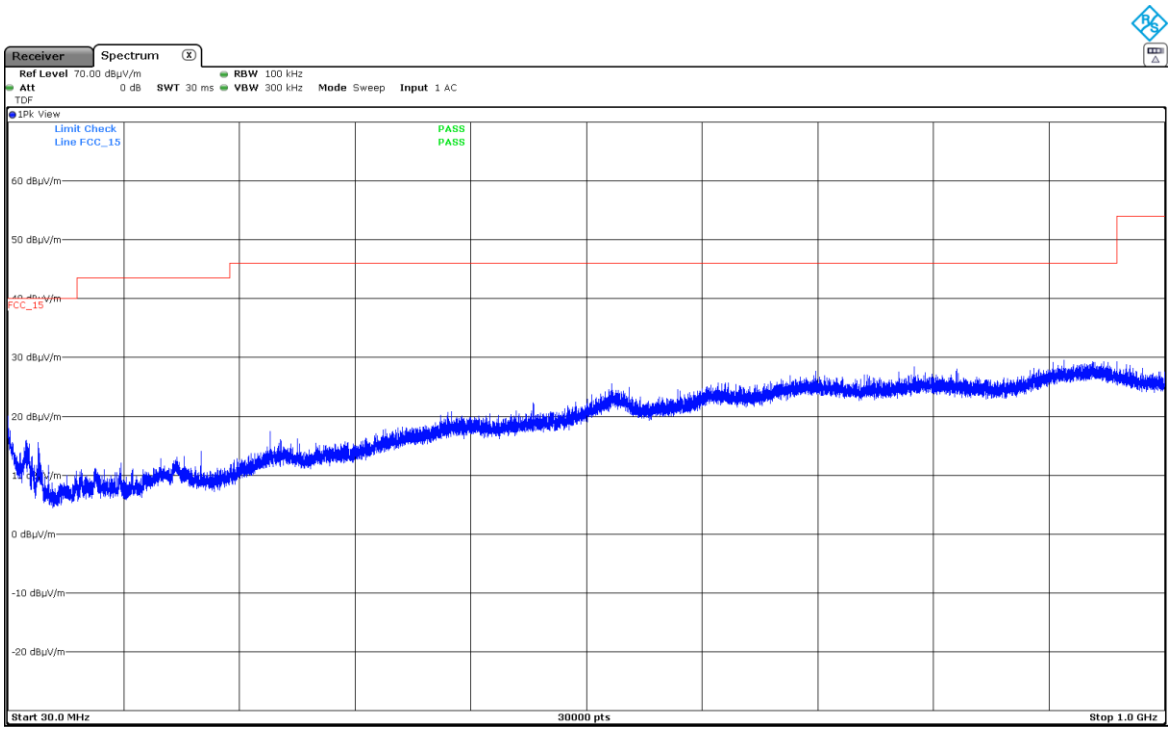
Verdict: PASS

FREQUENCY RANGE 9KHz to 30 MHz:

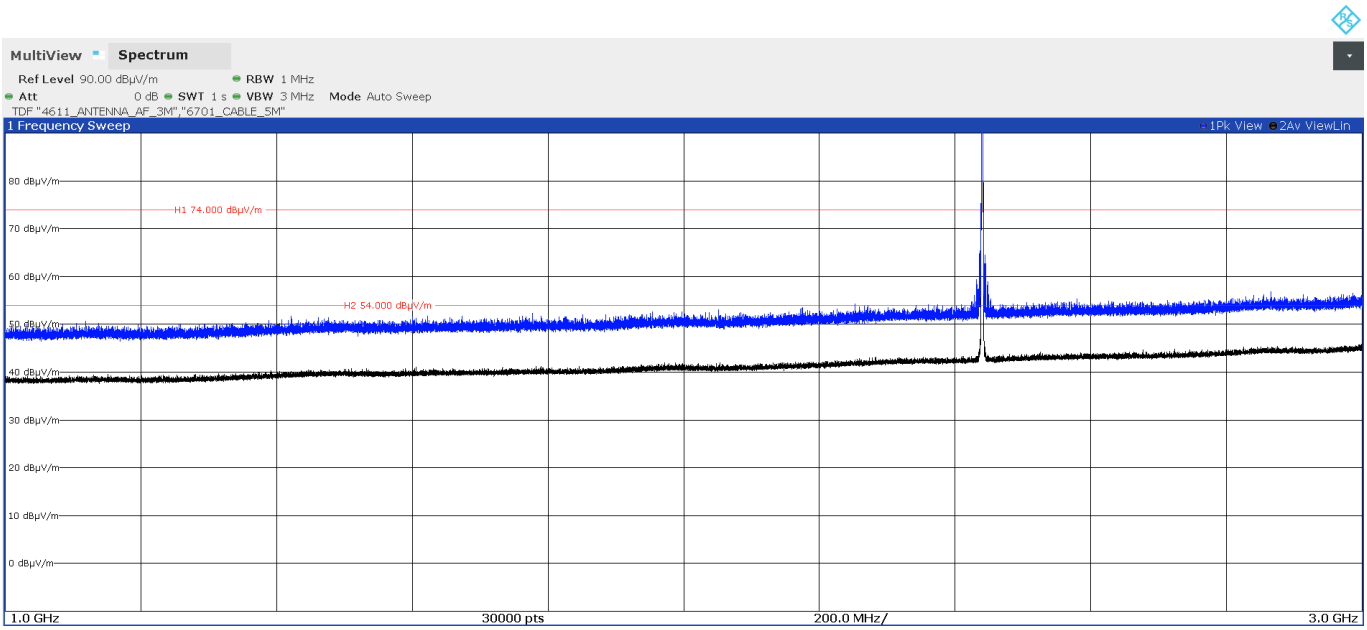


FREQUENCY RANGE 30 MHz - 1 GHz:

The spurious frequencies detected do not depend neither on the operating channel nor the modulation mode.

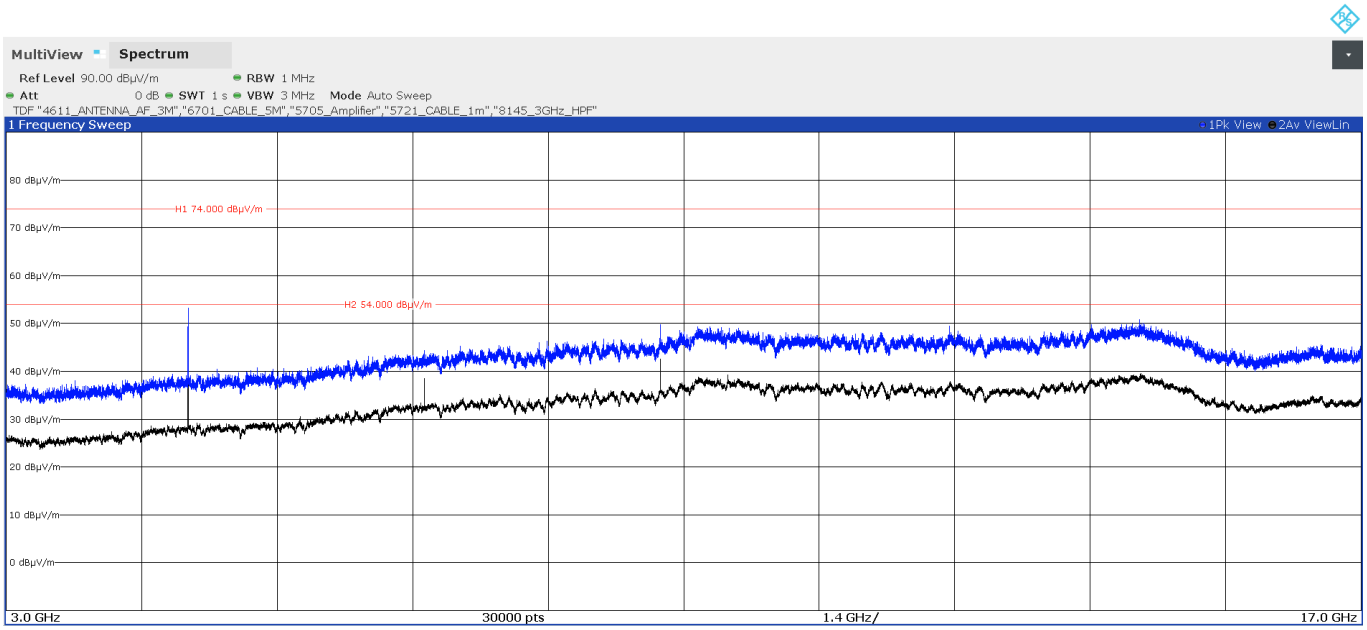
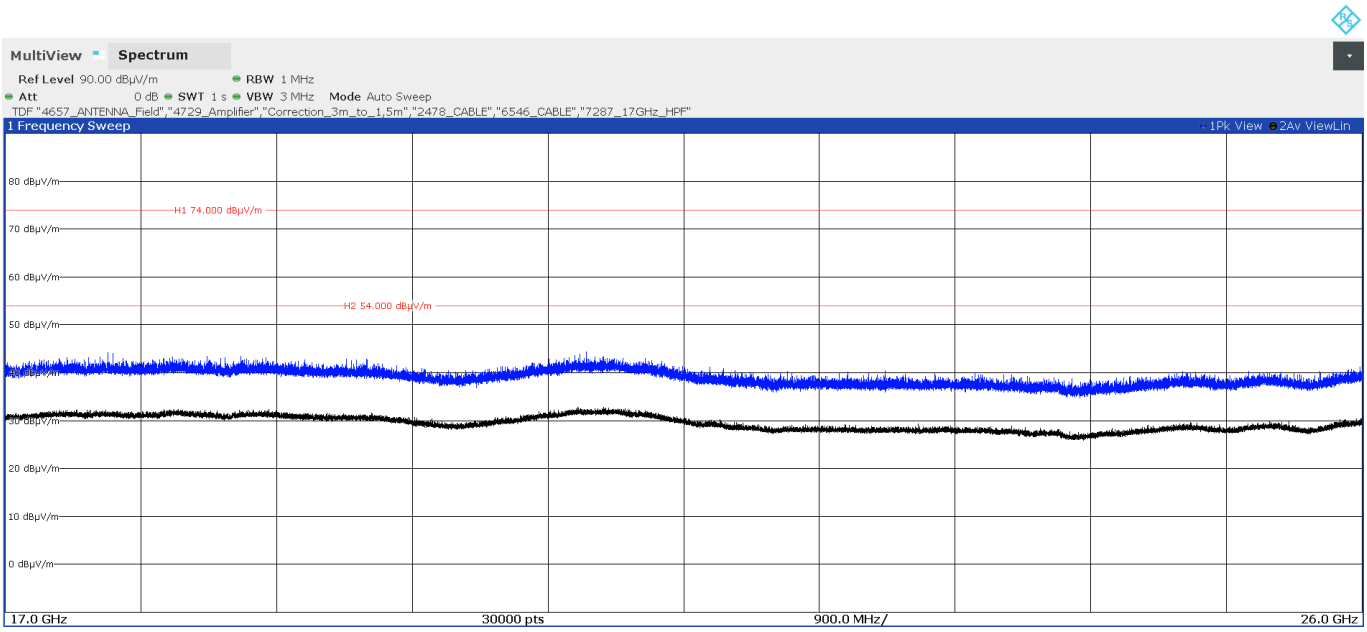


FREQUENCY RANGE 1 - 3 GHz:



The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 - 17 GHz:



FREQUENCY RANGE 17 - 26 GHz: