



Test report No:
 NIE: 65304RRF.002

Partial Test Report

Reference Standard:
 USA FCC Part 24
 CANADA RSS-133

(*) Identification of item tested	External wireless connectivity module for ventilators
(*) Trademark	ResMed
(*) Model and /or type reference	27206 ResMed Connectivity Module
Other identification of the product	HW version: BOM 27206 SW version: SX560 FCC ID: 2ACHL-RCM4G IC: 9103A-RCM4G
(*) Features	4G, 3G
Applicant	ResMed Ltd 1 Elizabeth Macarthur Drive, Bella Vista, NSW 2153, Australia
Test method requested, standard	USA FCC Part 24 (10-1-19 Edition) CANADA RSS-133 Issue 6, Jan. 2018 ANSI C63.26-2015. KDB 971168 D01 Power Meas License Digital Systems v03r01, April. 2018
Approved by (name / position & signature)	Rafael López Martín EMC Consumer & RF Lab. Manager
Date of issue	2020-11-26
Report template No	FDT08_22 (*) "Data provided by the client"

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Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

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In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

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.

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General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

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 27206 ResMed Connectivity Module (RCM) is an external wireless connectivity module used to transmit ventilator data from patient to cloud for online patient monitoring.

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 results.

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
65304C/016	External wireless connectivity module	27206 ResMed Connectivity Module	22201368154	2020/09/23
65304C/029	Bracket	--	--	2020/09/23
65304C/030	AC/DC Adaptor	--	YMRC520423000425900	2020/09/23

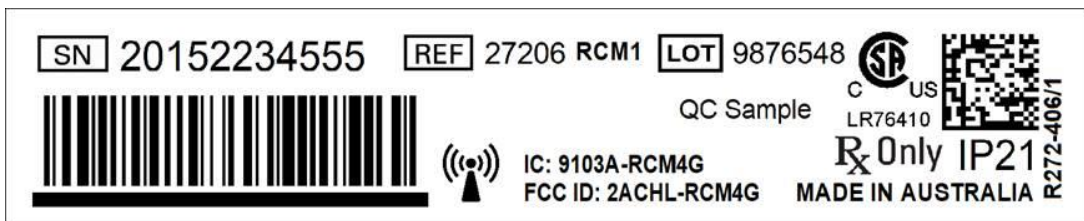
Sample S/01 has undergone the test(s): All tests indicated in the Appendix A.

Test sample description

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾		
	Micro-USB	1.8m	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Supplementary information to the ports..... :							
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<input checked="" type="checkbox"/>	AC: 100-240V, 0.350.70A, 50-60Hz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	DC:					
	DC:						
Rated Power	<3W						
Clock frequencies.....	N/A						
Other parameters	N/A						
Software version	SX560						
Hardware version	BOM 27206						
Dimensions in cm (W x H x D)	1.73" x 5.28" x 5.91"						
Mounting position	<input checked="" type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Wall/Ceiling mounted equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input type="checkbox"/>	Hand-held equipment					

	<input type="checkbox"/>	Other:		
Modules/parts.....:	Module/parts of test item		Type	Manufacturer
	Wireless Module		ELS61-US	Thales
Accessories (not part of the test item)	Description		Type	Manufacturer
	Power Supply Unit		N/A	ResMed
Documents as provided by the applicant.....:	Description		File name	Issue date

Copy of marking plate:



Identification of the client

ResMed Pty Ltd.
 1 Elizabeth Macarthur Drive, Bella Vista, NSW 2153, Australia

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2020-09-25
Date (finish)	2020-09-29

Document history

Report number	Date	Description
65304RRF.002	2020-11-26	First release.

Environmental conditions

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

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

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

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

Remarks and comments

The tests have been performed by the technical personnel: Nicolás Salguero and Cristina Calle.

Used instrumentation:

Radiated Measurements

	Last Calibration	Due Calibration
1. Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N.A.	N.A.
2. Wideband Radio Communication Tester ROHDE AND SCHWARZ CMW500	2020/07	2021/07
3. EMI Test Receiver ROHDE AND SCHWARZ ESR7	2019/10	2021/10
4. Biconical/Log Antenna 30MHz-6GHz ETS LINDGREN 3142E	2020/04	2023/04
5. Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSW50	2020/07	2022/07
6. RF pre-amplifier 1-18 GHz Bonn Elektronik BLMA 0118-1M	2020/05	2021/05
7. Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2019/11	2022/11
8. RF Pre-amplifier, G>30dB, 18-40GHz BONN ELEKTRONIK BLMA 1840-1M	2019/02	2021/02
9. Broadband Horn antenna 18 - 40 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170	2018/07	2021/07

Testing verdicts

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

Summary

FCC PART 24 / RSS-133 PARAGRAPH		
Requirement – Test case	Verdict	Remark
FCC 24.232 / RSS-133 6.4: RF output power	N/M	(1)
FCC 2.1047 / RSS-133 6.2: Modulation characteristics	N/M	(1)
FCC 24.235 / RSS-133 6.3: Frequency stability	N/M	(1)
FCC 2.1049: Occupied Bandwidth	N/M	(1)
FCC 24.238 / RSS-133 6.5: Spurious emissions at antenna terminals	N/M	(1)
FCC 24.238 / RSS-133 6.5: Radiated emissions	P	
<u>Supplementary information and remarks:</u>		
(1) Test not requested. Radiated emissions test only requested.		

Appendix A: Test results for FCC 24 / RSS-133

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TEST CONDITIONS

POWER SUPPLY (V):

Vn: 110 Vac

Type of Power Supply: AC/DC Adaptor.

ANTENNA:

MIDDLE Bands		ANTENNA TYPE
3G WCDMA Band II	+3.03 dBi	LTE Ceramic SMT Antenna
LTE Band 2	+3.03 dBi	LTE Ceramic SMT Antenna

TEST FREQUENCIES:

3G Band II:

WCDMA and HSUPA MODULATIONS:

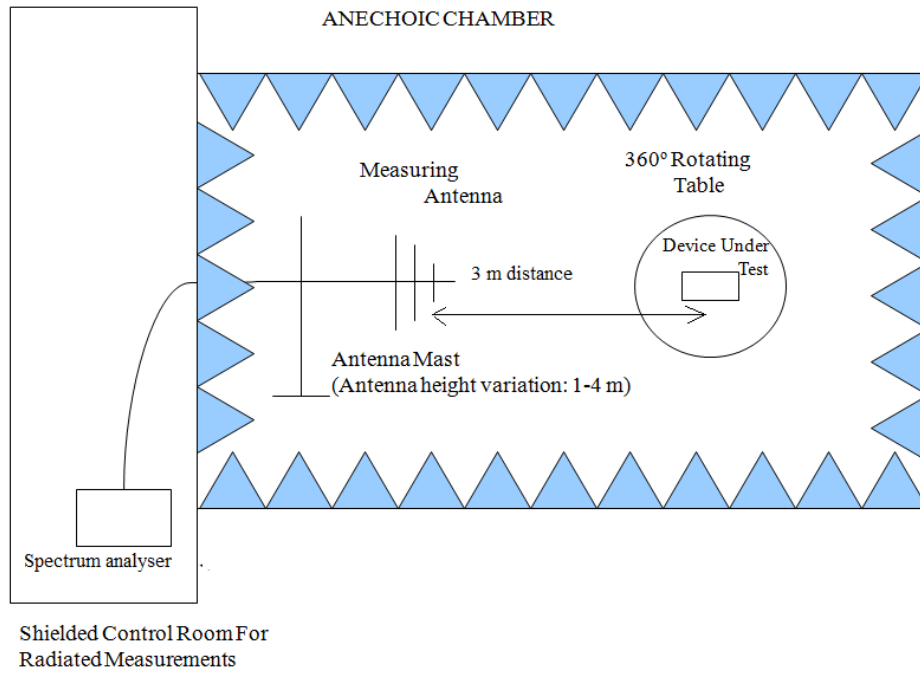
Low Channel (9262): 1852.4 MHz
 Middle Channel (9400): 1880.0 MHz
 High Channel (9538): 1907.6 MHz

LTE Band 2. QPSK AND 16QAM MODULATIONS:

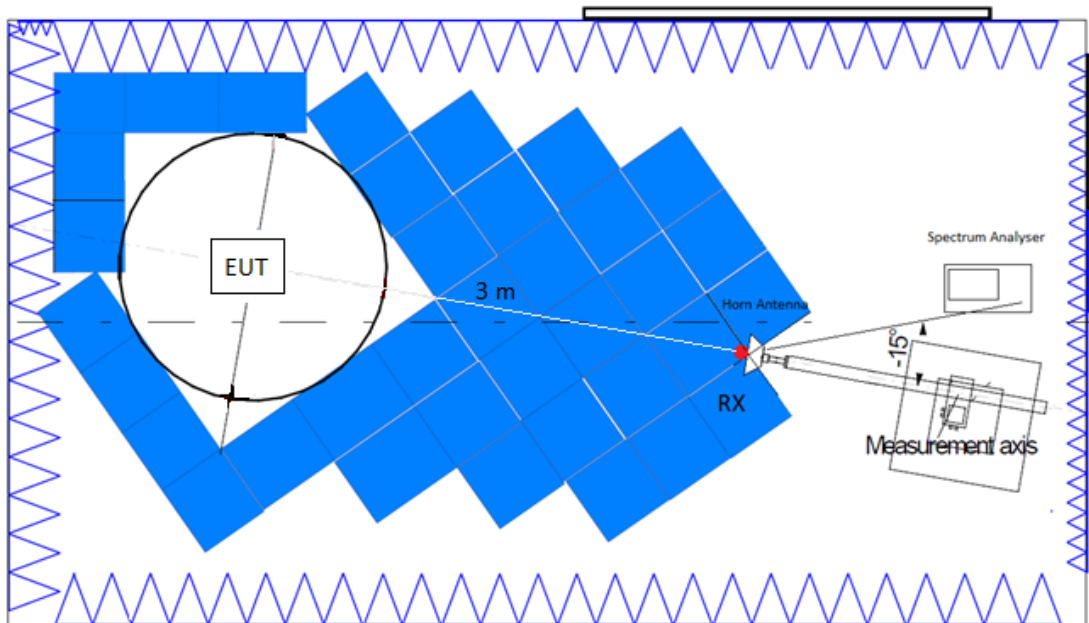
	Channel (Frequency)					
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Low	18607 (1850.7 MHz)	18615 (1851.5 MHz)	18625 (1852.5 MHz)	18650 (1855 MHz)	18675 (1857.5 MHz)	18700 (1860 MHz)
Middle	18900 (1880 MHz)	18900 (1880 MHz)	18900 (1880 MHz)	18900 (1880 MHz)	18900 (1880 MHz)	18900 (1880 MHz)
Highest	19193 (1909.3 MHz)	19185 (1908.5 MHz)	19175 (1907.5 MHz)	19150 (1905 MHz)	19125 (1902.5 MHz)	19100 (1900 MHz)

TEST SETUP:

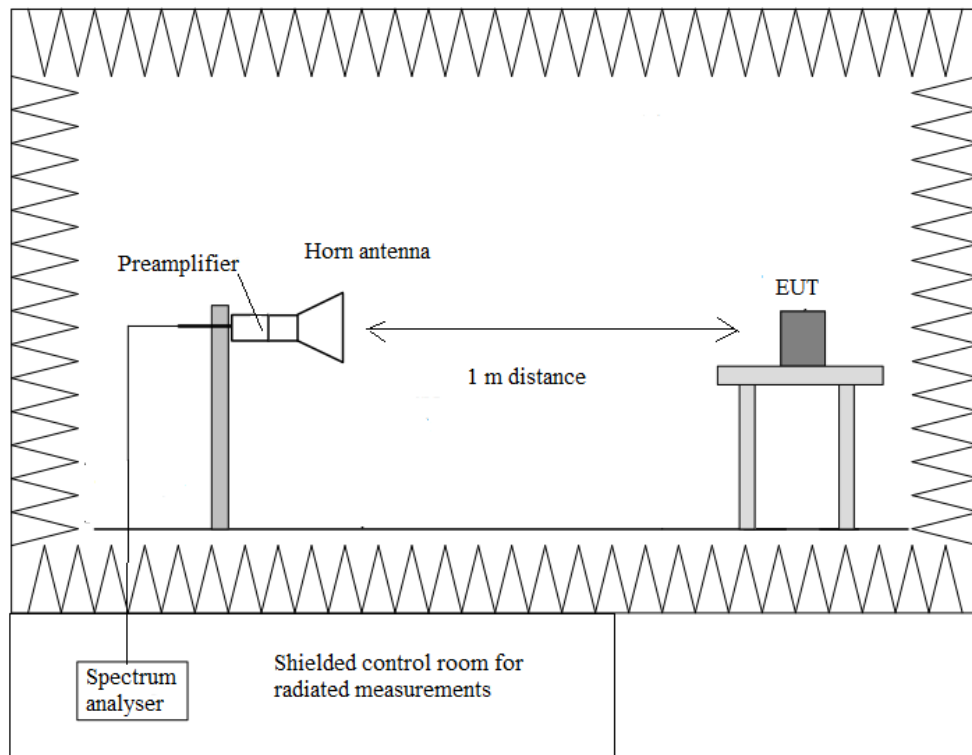
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 18 GHz:



Radiated measurements setup $f > 18$ GHz:



Radiated emissions

SPECIFICATION:

FCC § 24.238. RSS-133 Clause 6.5.

The power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. P in watts.

METHOD:

The measurement was performed with the EUT inside an anechoic chamber.

The spectrum was scanned from 30 MHz to at least the 10th harmonic of the highest frequency generated within the equipment.

The EUT was placed on a non-conductive stand at a 3 meter distance from the measuring antenna for measurements below 1 GHz and at 1 m distance for measurements above 18 GHz.

Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum meter reading was recorded.

Measurement Limit:

According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. P in watts.

At P_o transmitting power, the specified minimum attenuation becomes $43+10\log (P_o)$, and the level in dBm relative P_o becomes:

$$P_o \text{ (dBm)} - [43 + 10 \log (P_o \text{ in mwatts}) - 30] = - 13 \text{ dBm}$$

RESULTS:

3G Band II:

WCDMA AND HSUPA MODULATION:

A preliminary scan determined the WCDMA modulation as the worst case.
The following tables and plots show the results for the worst case.

- Low Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 18 GHz

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

Frequency range 18 - 20 GHz

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

- Middle Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 18 GHz

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

Frequency range 18 - 20 GHz

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

- High Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 18 GHz

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

Frequency range 18 - 20 GHz

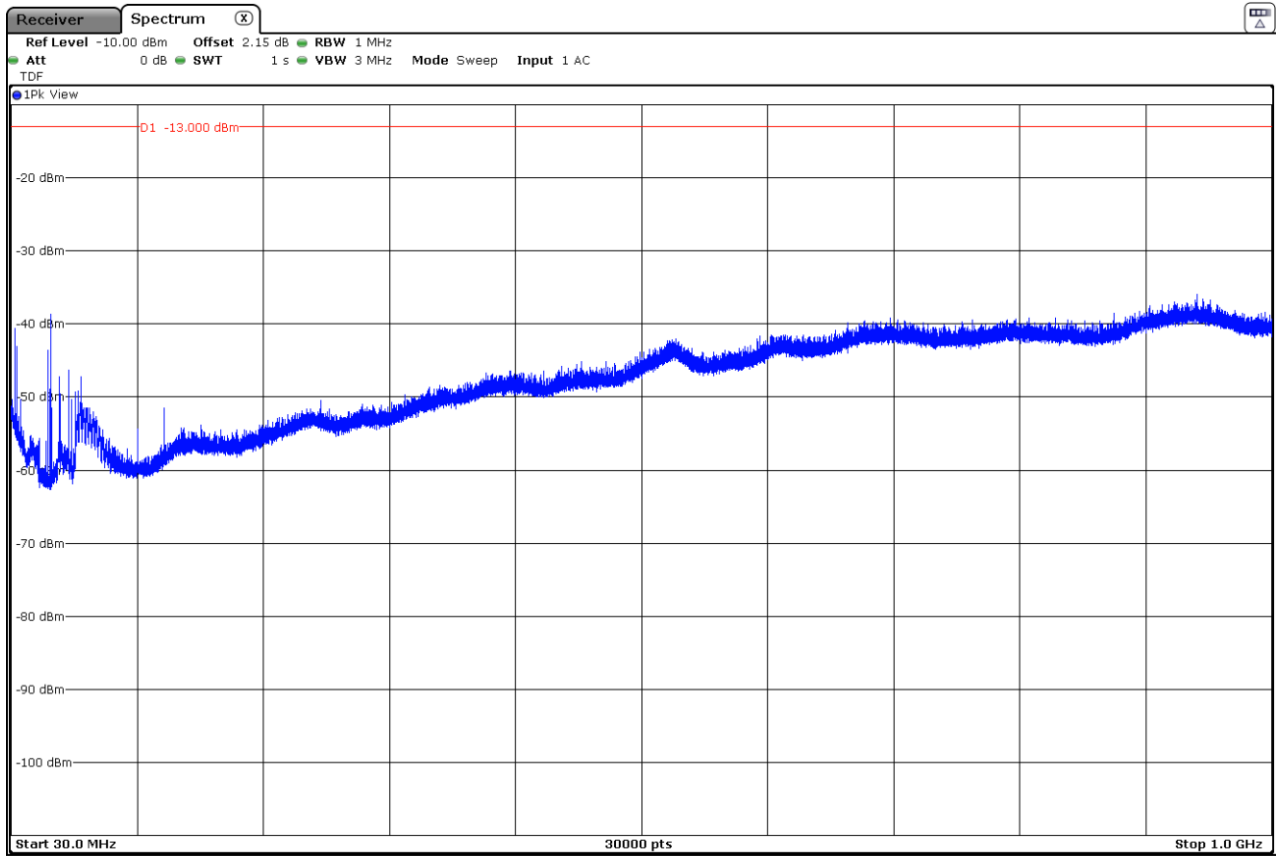
No spurious frequencies detected at less than 20 dB below the limit.

Measurement uncertainty (dB)	<± 4.99 for f < 1 GHz <± 3.98 for f ≥ 1 GHz up to 3 GHz <± 4.98 for f ≥ 3 GHz up to 17 GHz <± 5.08 for f ≥ 17 GHz up to 20 GHz
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Verdict: PASS

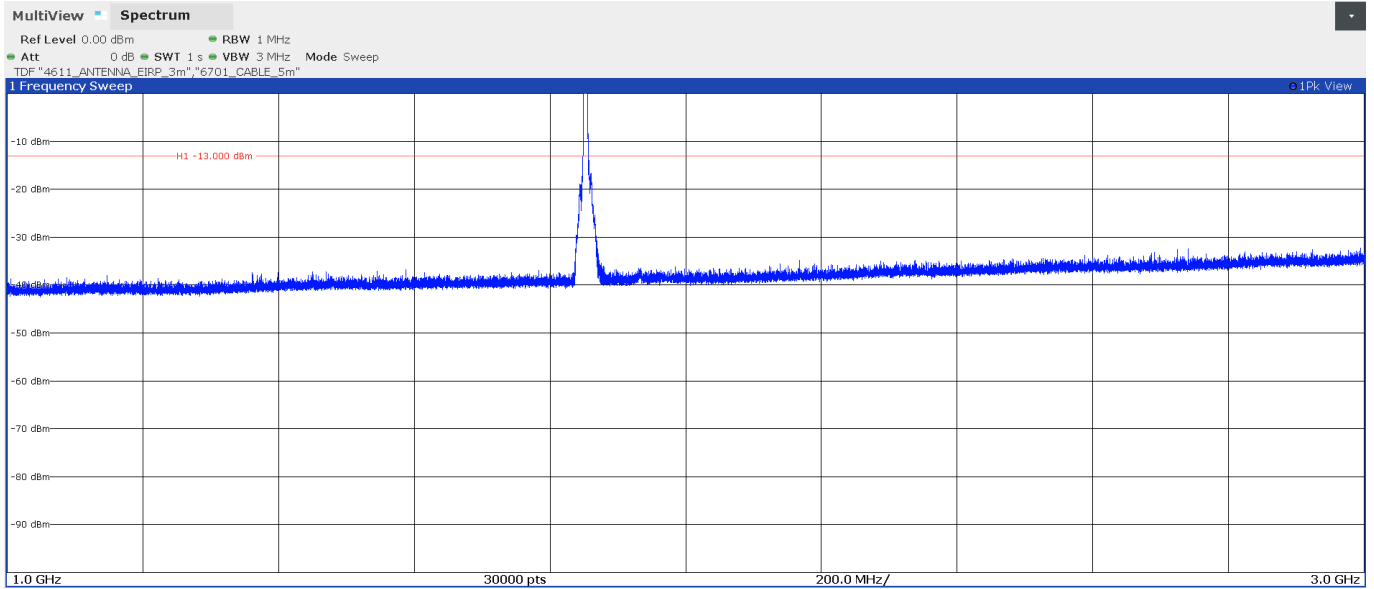
FREQUENCY RANGE 30 MHz - 1 GHz (worst case):

This plot is valid for the Low, Middle and High Channels:



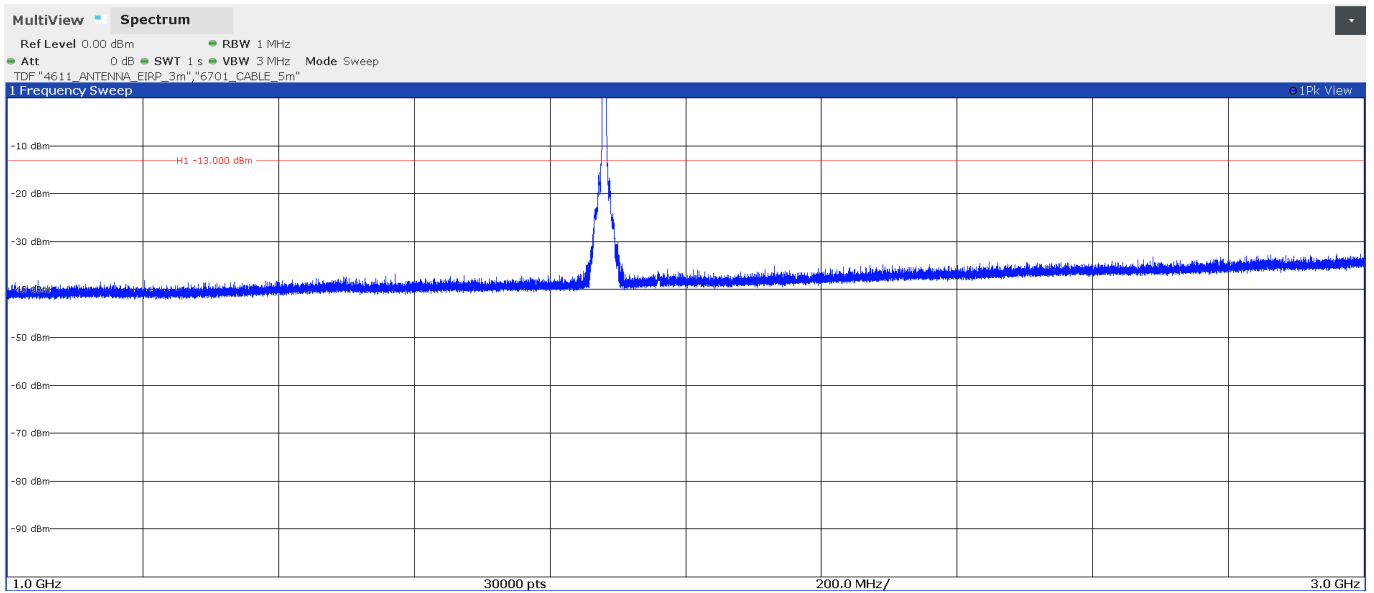
FREQUENCY RANGE 1 - 3 GHz (worst case):

- Low Channel:



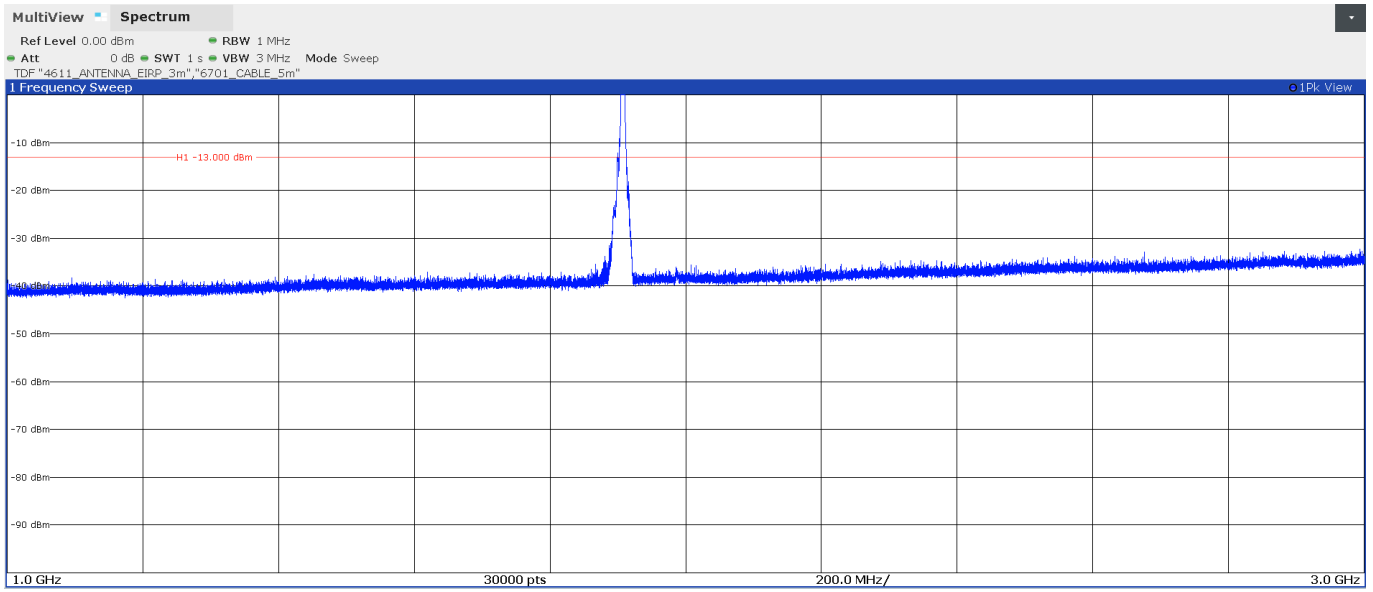
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

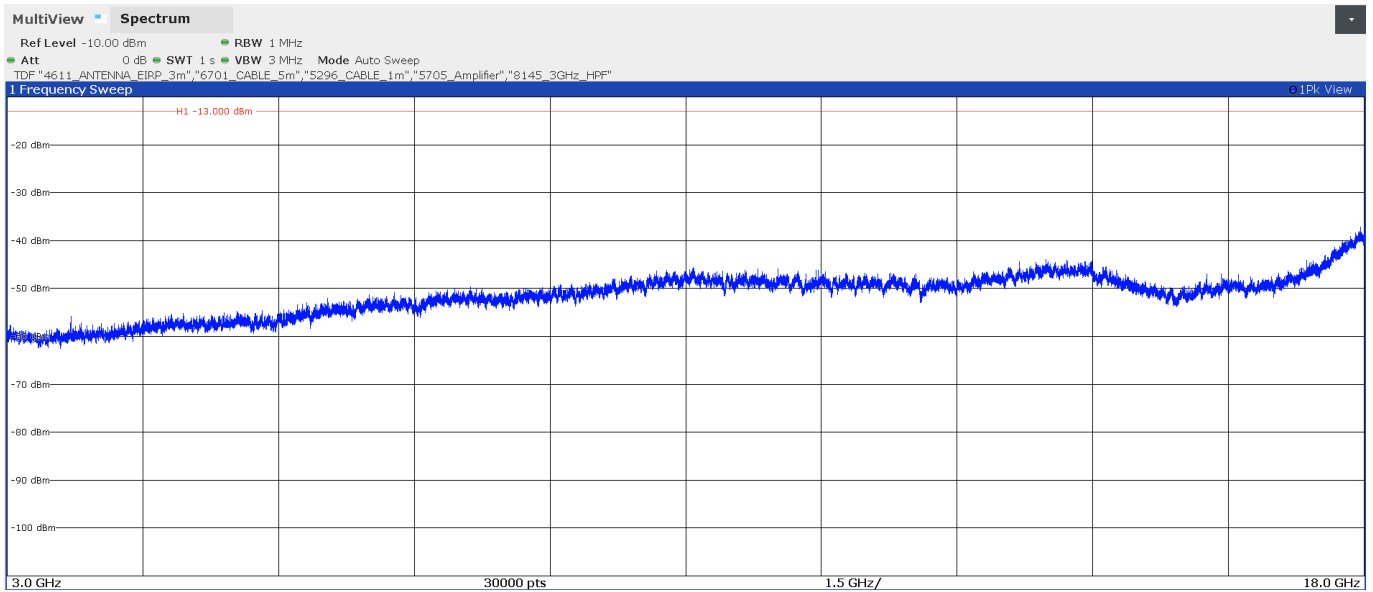
- High Channel:



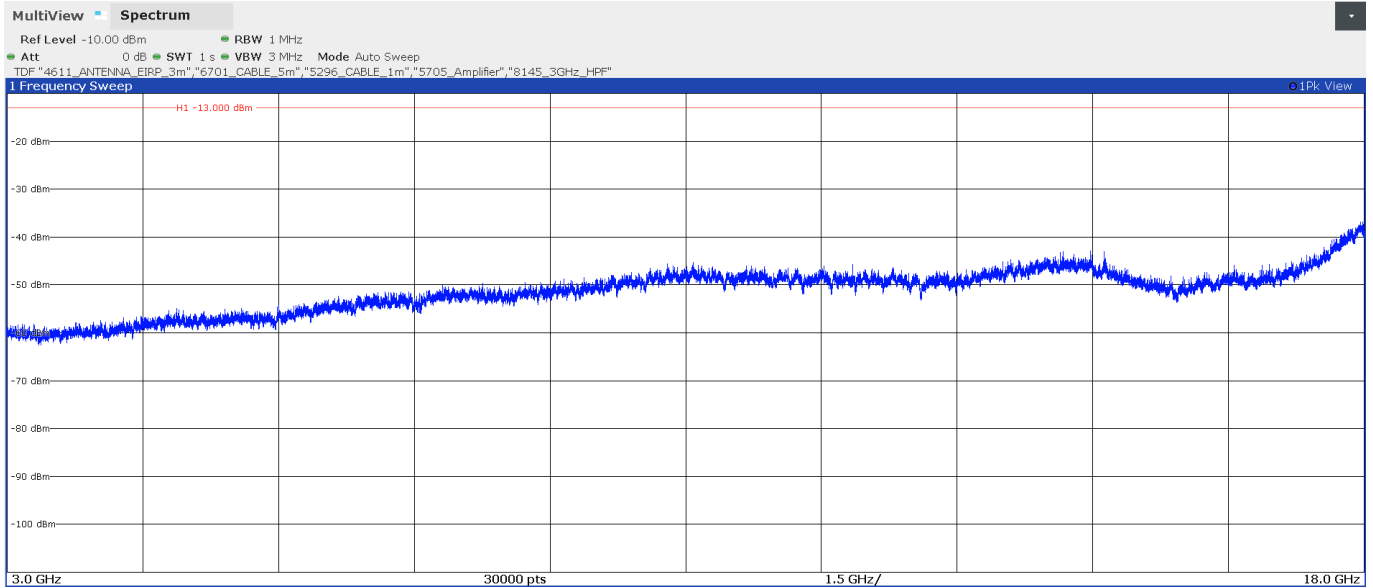
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 - 18 GHz (worst case):

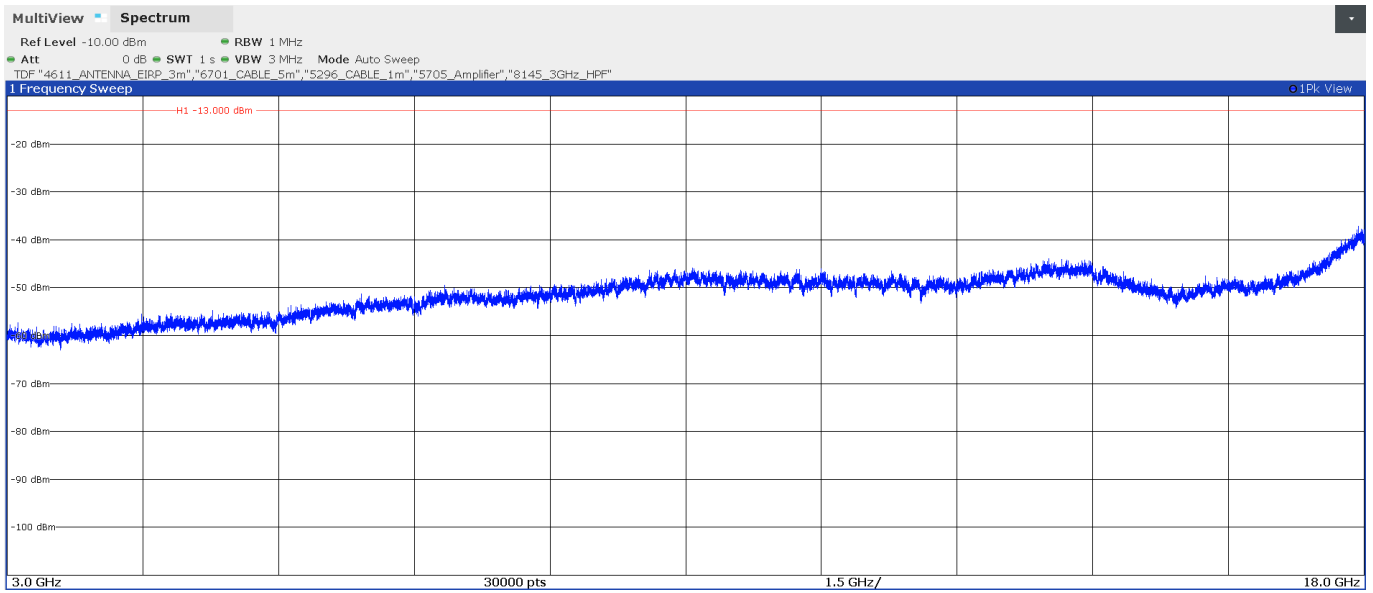
- Low Channel:



- Middle Channel:

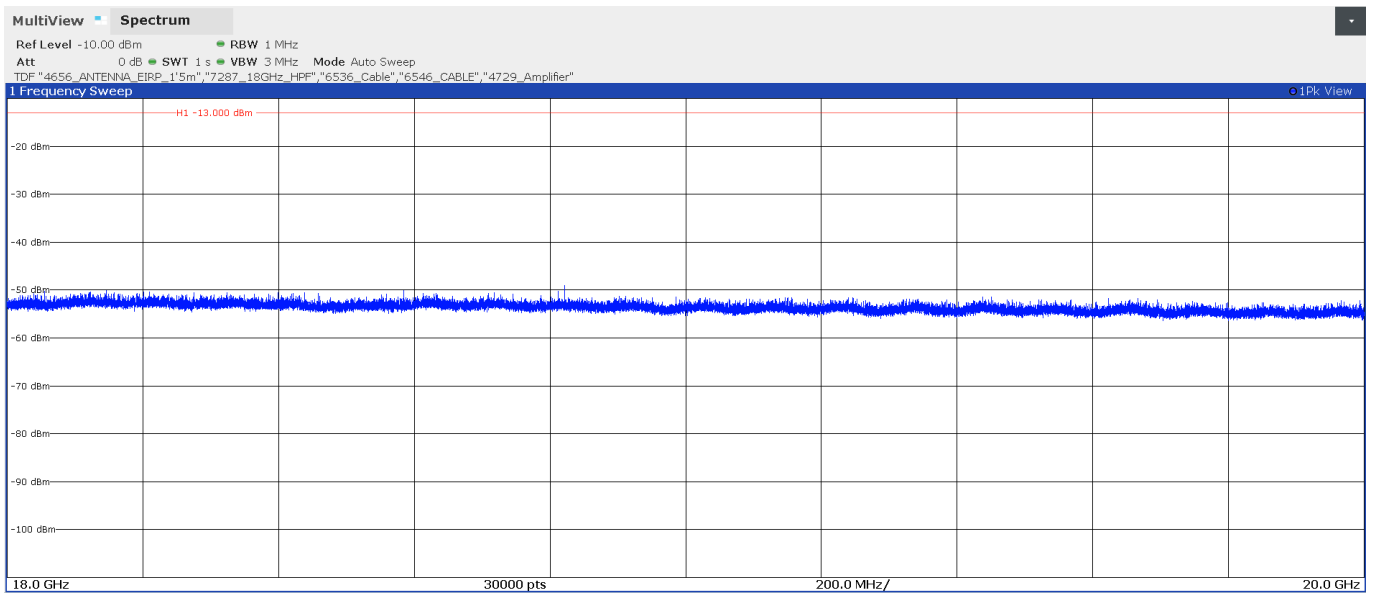


- High Channel:



FREQUENCY RANGE 18 - 20 GHz (worst case):

This plot is valid for the Low, Middle and High Channels:



LTE Band 2:

QPSK and 16QAM Modulations:

A preliminary scan determined the QPSK modulation, BW=20 MHz, RB=1, Offset=0 as the worst case. The following tables and plots show the results for the worst case.

- Low Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 18 GHz

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

Frequency range 18 - 20 GHz

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

- Middle Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 GHz-18 GHz

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

Frequency range 18 - 20 GHz

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

- High Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 GHz-18 GHz.

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

Frequency range 18 - 20 GHz

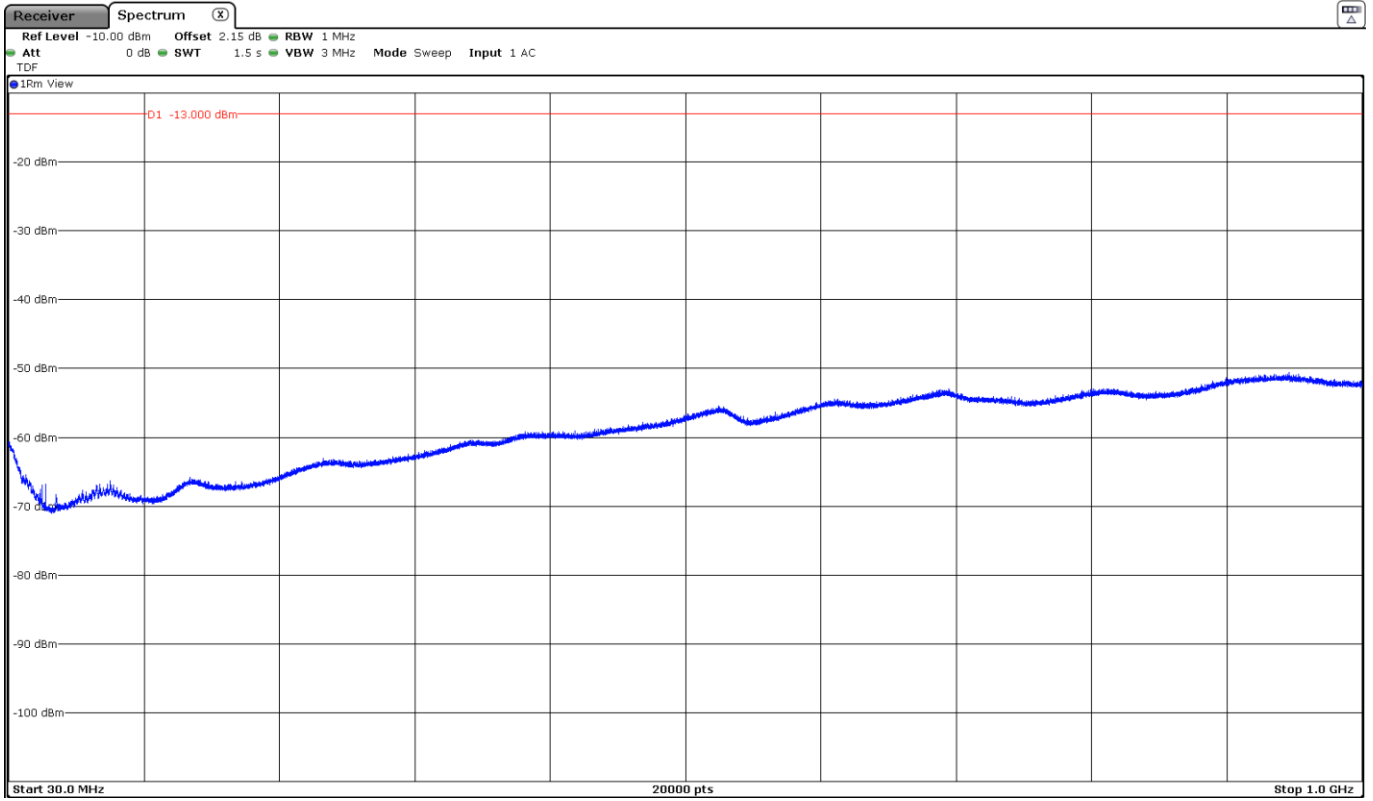
No spurious frequencies detected at less than 20 dB below the limit.

Measurement uncertainty (dB)	<± 4.99 for f < 1 GHz <± 3.98 for f ≥ 1 GHz up to 3 GHz <± 4.98 for f ≥ 3 GHz up to 17 GHz <± 5.08 for f ≥ 17 GHz up to 20 GHz
------------------------------	---

Verdict: PASS

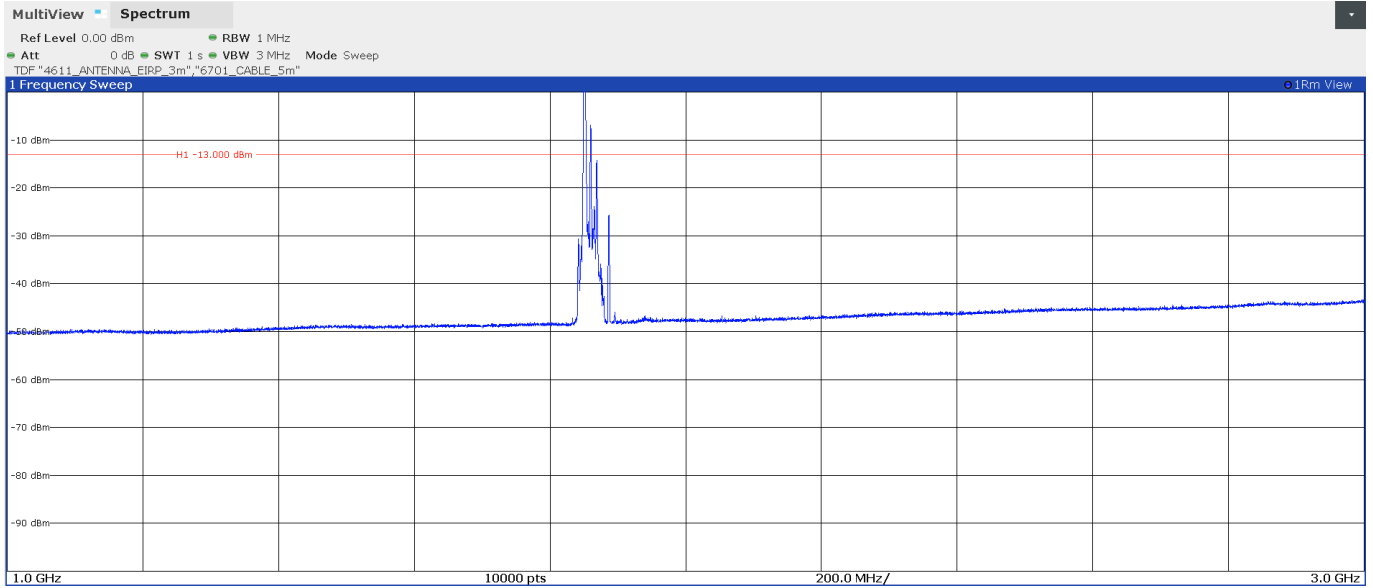
FREQUENCY RANGE 30 MHz - 1 GHz (worst case):

This plot is valid for the Low, Middle and High Channels:



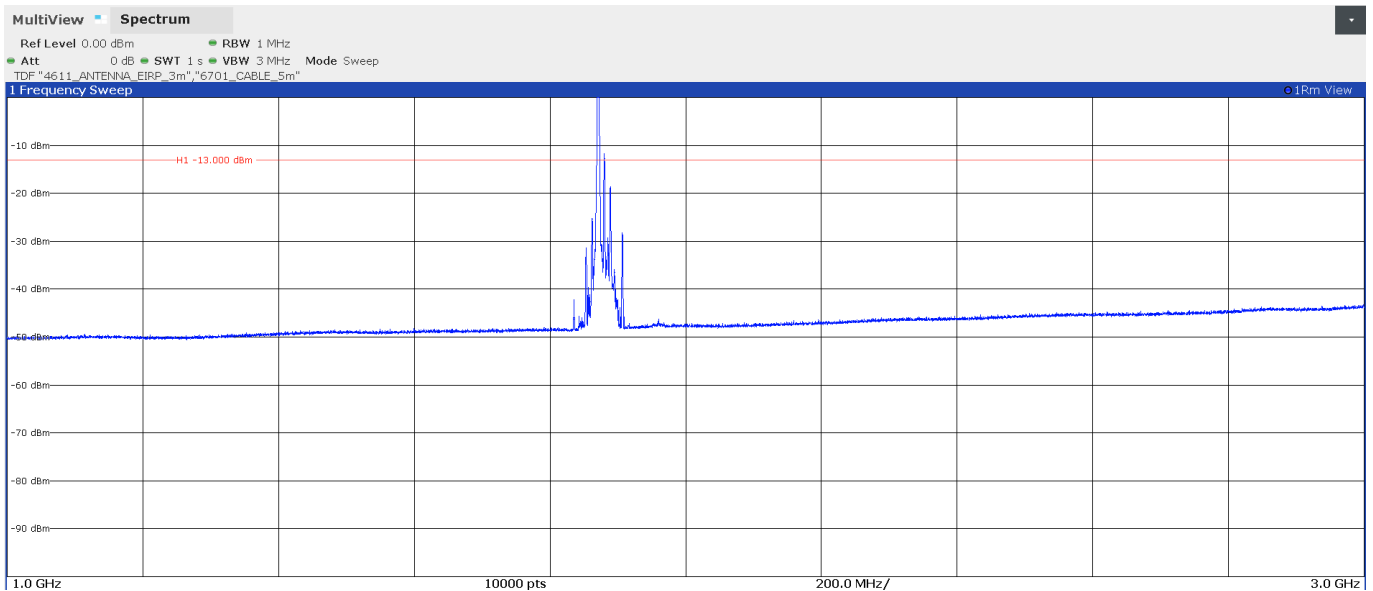
FREQUENCY RANGE 1 - 3 GHz (worst case):

- Low Channel:



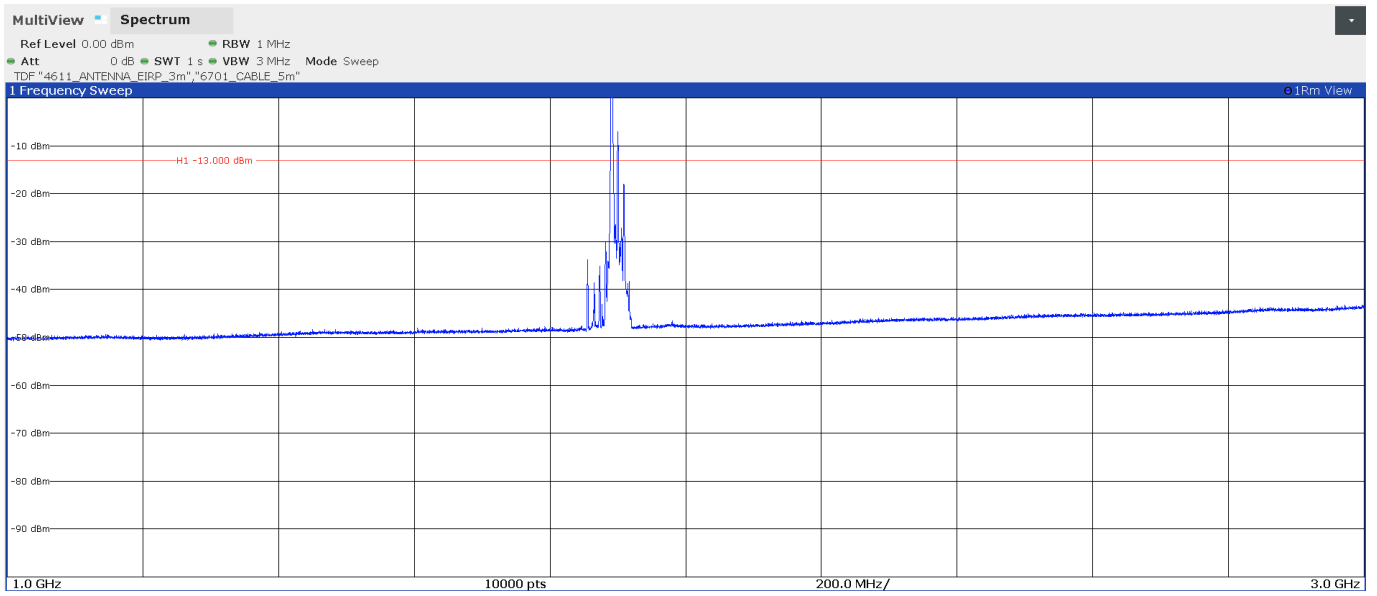
The peak above the limit is the carrier frequency. The peak at 1930 MHz corresponds to the downlink signal.

- Middle Channel:



The peak above the limit is the carrier frequency. The peak at 1960 MHz corresponds to the downlink signal.

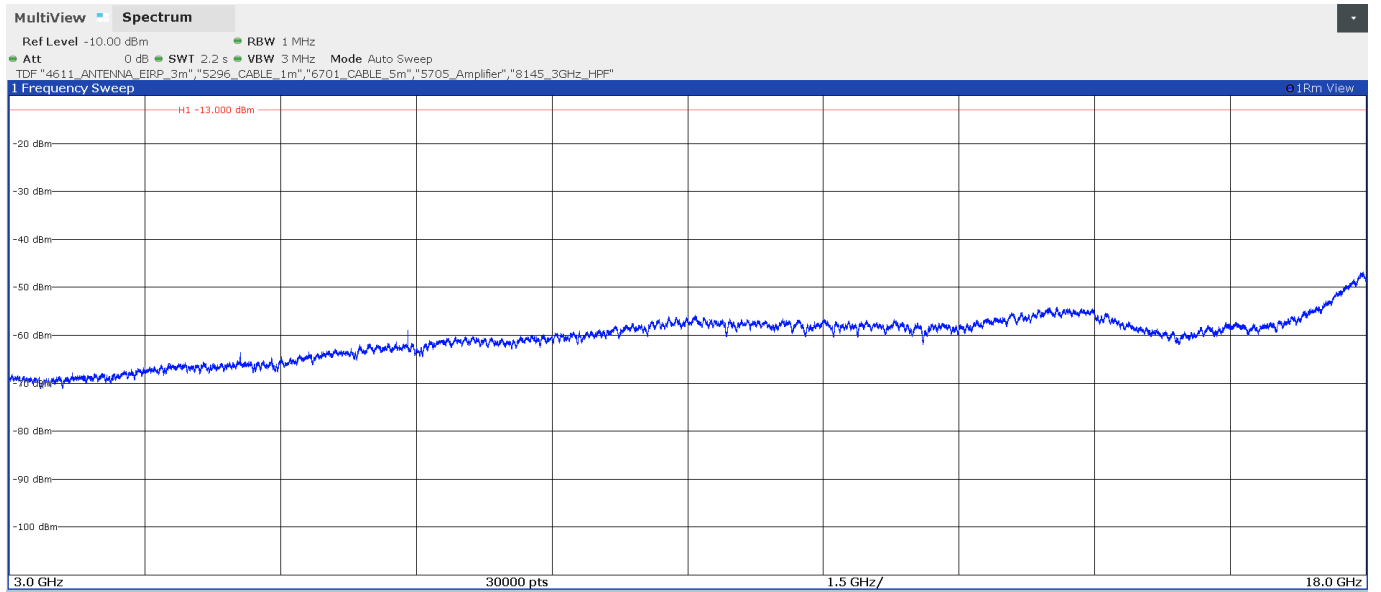
- High Channel:



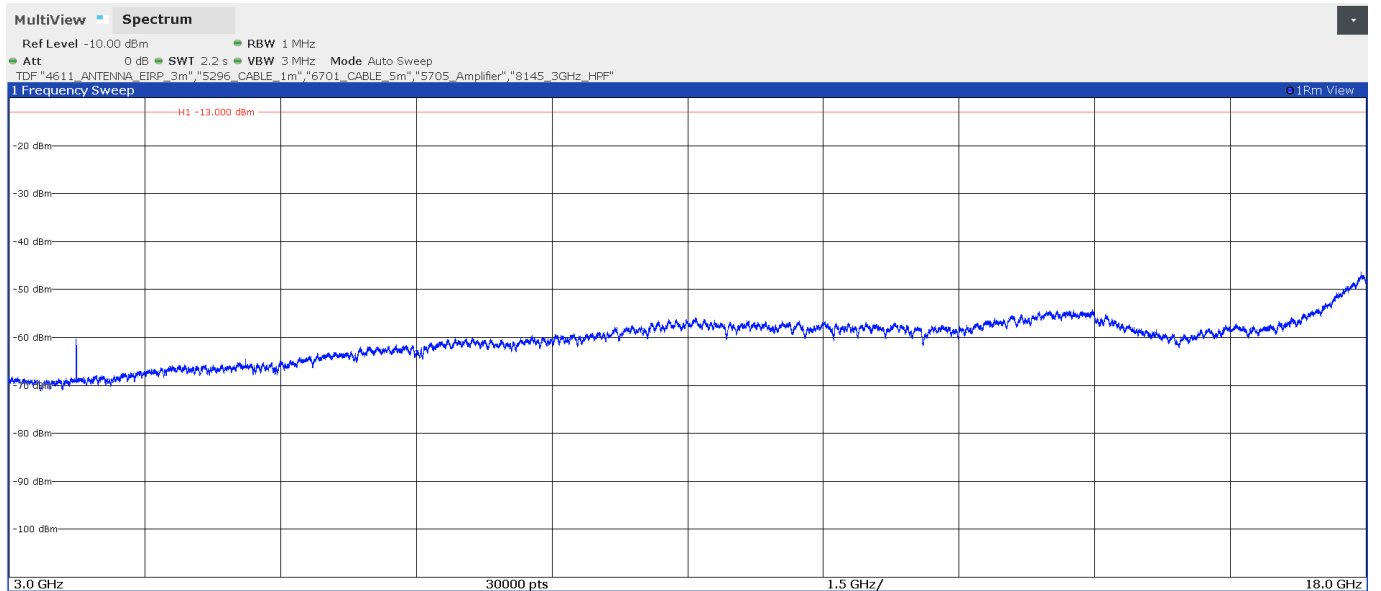
The peak above the limit is the carrier frequency. The peak at 1990 MHz corresponds to the downlink signal.

FREQUENCY RANGE 3 - 18 GHz (worst case):

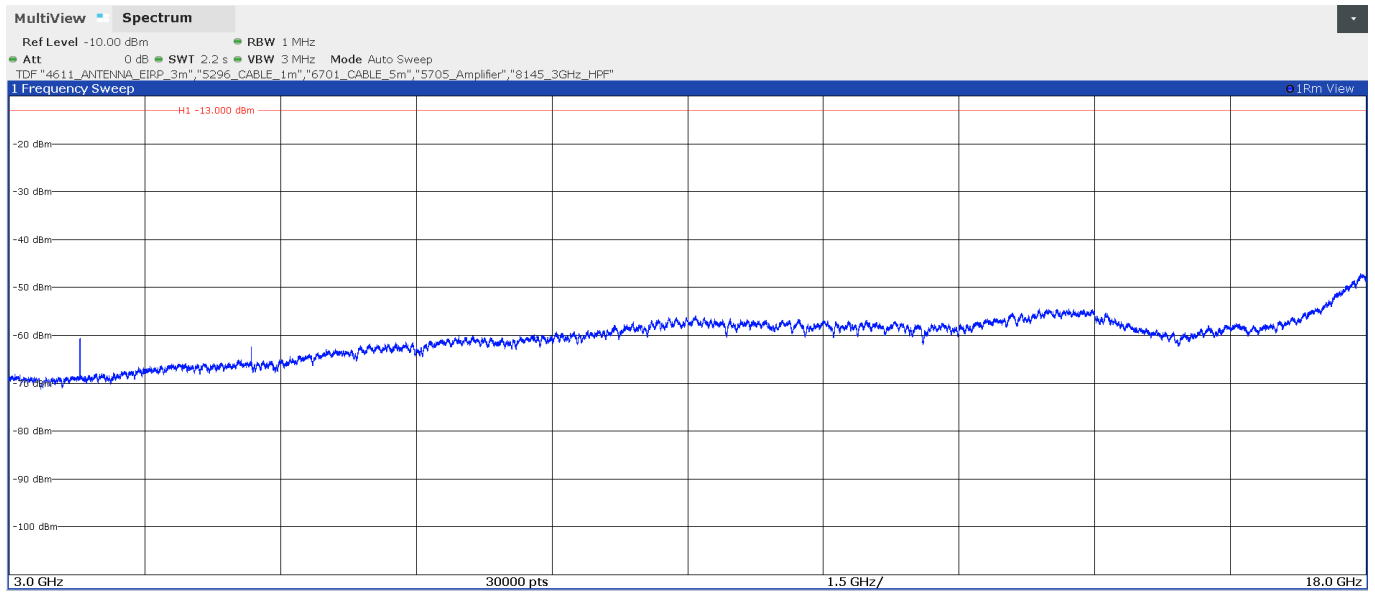
- Low Channel:



- Middle Channel:



- High Channel:



FREQUENCY RANGE 18 - 20 GHz (worst case):

This plot is valid for the Low, Middle and High Channels:

