

Test report No:
NIE: 63467RRF.003

Partial Test report

REFERENCE STANDARD:

USA FCC Part 22, Part 24 & Part 27

CANADA RSS-130, RSS-132, RSS-133 & RSS-139

(*) Identification of item tested	Continuous Positive Airway Pressure (CPAP) Device
(*) Trademark	ResMed
(*) Model and /or type reference	39000 AirSense 11
(*) Derived model not tested	39420 AirSense 11 AutoSet, 39421 AirSense 11 CPAP, 39422 AirSense 11 Elite, 39423 AirSense 11 AutoSet, 39424 AirSense 11 CPAP, 39425 AirSense 11 Elite.
Other identification of the product	HW Version: 1.0 SW Version: SW04600 FCC ID: 2ACHL-AIR114G IC: 9103A-AIR114G
(*) Features	4G LTE Cat 1, 3G, BLE
Applicant	RESMED Pty Ltd 1 Elizabeth Macarthur Drive, BELLA VISTA, NSW, 2153, AUSTRALIA
Test method requested, standard	USA FCC Part 22 (10-1-19 Edition). Public Mobile Services. USA FCC Part 24 (10-1-19 Edition). Personal Communications Services. USA FCC Part 27 (10-1-19 Edition). Miscellaneous Wireless Communications Services. CANADA RSS-130 Issue 2, Feb. 2019. CANADA RSS-132 Issue 3, Jan. 2013. CANADA RSS-133 Issue 6 Amendment 1, Jan. 2018. CANADA RSS-139 Issue 3, Jul. 2015. 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	2021-02-03
Report template No	FDT08_23 (*) "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.

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

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.

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

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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 AirSense 11 is a CPAP device with integrated cellular and Bluetooth connectivity.
3. Derived model not tested. These models have been declared by the supplier of the sample as being the same as the model under test.



Date: 20 December 2020

DECLARATION OF EQUIVALENCE

This document declares that the following designated products (model/name) are equivalent to the unit under test 39000.

For the USA:

39420 AirSense 11 AutoSet
39421 AirSense 11 CPAP
39422 AirSense 11 Elite

For Canada:

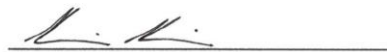
39423 AirSense 11 AutoSet
39424 AirSense 11 CPAP
39425 AirSense 11 Elite

All the above stated products have the same hardware and the same cellular firmware and Bluetooth firmware.

Applicant

Company name: ResMed Pty Ltd. ACN 003 765 142
Address: 1 Elizabeth Macarthur Drive
Bella Vista
NSW 2153
Australia
Telephone No: +61 2 8884 1000

By:



Christopher Jenkins

Title:

Associate Manager – Systems Engineering

Email:

christopher.jenkins@resmed.com.au

ResMed Pty Ltd 1 Elizabeth Macarthur Drive, Bella Vista NSW 2153, Australia
T +61 2 8884 1000 E Christopher.jenkins@ResMed.com.au

ResMed.com

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 N°	Description	Model	Serial N°	Date of reception
63467/002	Continuous Positive Airway Pressure (CPAP) Device	39000 AirSense 11	22201142040	2020/10/01
63467/013	AC/DC adapter	--	0000C100	2020/10/01
63467/015	ClimateLine	AIR11	--	2020/10/14

Sample S/01 has undergone the following test(s): All radiated tests indicated in Appendixes A, B and C.

Test sample description

Ports..... :	Port name and description	Cable				
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	
	Power		☒	☐	☐	
Supplementary information to the ports..... :	--					
Rated power supply	Voltage and Frequency		Reference poles			
			L1	L2	L3	N PE
	☒ AC: 100-240V~, 50-60Hz		☐	☐	☐	☐
	☐ DC:					
Rated Power	24Vdc, 2.71A					
Clock frequencies..... :	--					
Other parameters	--					
Software version	SW04600					
Hardware version	1.0					
Dimensions in cm (W x H x D) :	--					
Mounting position	☒	Table top equipment				
Modules/parts..... :	Module/parts of test item		Type		Manufacturer	
	ELS61-US		Cellular		Thales	
	EFR32BG1		Bluetooth LE		SiLabs	
Accessories (not part of the test item)	Description		Type		Manufacturer	
	--					
Documents as provided by the applicant..... :	Description		File name		Issue date	
	--					

⁽³⁾ Only for Medical Equipment

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)	2020-10-13
Date (finish)	2020-10-14

Document history

Report number	Date	Description
63467RRF.003	2021-02-03	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, Cristina Calle and Miguel Manuel López.

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.	Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2020/04	2023/04
4.	EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2019/10	2021/10
5.	RF Pre-amplifier, 40 dB ,10MHz-6 GHz BONN ELEKTRONIK BLMA 0160-01N	2020/02	2021/02
6.	Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2019/11	2022/11
7.	RF Pre-amplifier 1-18 GHz BONN ELEKTRONIK BLMA 0118-1M	2020/05	2021/05
8.	Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSW 50	2020/07	2022/07
9.	Broadband Horn antenna 1-18 Horn antenna SCHWARZBECK BBHA 9170	2020/05	2023/05
10.	RF Pre-amplifier 18-40 GHz BONN ELEKTRONIK BLMA 1840-1M	2019/02	2021/02

Testing verdicts

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

Summary

1. 3G Band V, LTE Band FDD 5

FCC PART 22 / RSS-132 PARAGRAPH		
Requirement – Test case	Verdict	Remark
Clause 22.913 / RSS-132 Clause 5.4: RF output power	N/M	(1)
Clause 2.1047 / RSS-132 Clause 5.2: Modulation characteristics	N/M	(1)
Clause 22.355 / RSS-132 Clause 5.3: Frequency stability	N/M	(1)
Clause 2.1049: Occupied Bandwidth	N/M	(1)
Clause 22.917 / RSS-132 Clause 5.5: Spurious emissions at antenna terminals	N/M	(1)
Clause 22.917 / RSS-132 Clause 5.5: Radiated emissions	P	
<u>Supplementary information and remarks:</u>		
1. Radiated Spurious Emissions test only requested.		

2. 3G Band II, LTE Cat M1 Band FDD 2

FCC PART 24 / RSS-133 PARAGRAPH		
Requirement – Test case	Verdict	Remark
Clause 24.232 / RSS-133 Clause 6.4: RF output power	N/M	(1)
Clause 2.1047 / RSS-133 Clause 6.2: Modulation characteristics	N/M	(1)
Clause 24.235 / RSS-133 Clause 6.3: Frequency stability	N/M	(1)
Clause 2.1049: Occupied Bandwidth	N/M	(1)
Clause 24.238 / RSS-133 Clause 6.5: Spurious emissions at antenna terminals	N/M	(1)
Clause 24.238 / RSS-133 Clause 6.5: Radiated emissions	P	
<u>Supplementary information and remarks:</u>		
1. Radiated Spurious Emissions test only requested.		

3. 3G Band IV, LTE Band FDD 4, Band FDD 12

FCC PART 27 / IC RSS-130 / RSS-139 PARAGRAPH		
Requirement – Test case	Verdict	Remark
Clause 27.50 / RSS-139 Clause 6.5. / RSS-130 Clause 4.6: RF output power	N/M	(1)
Clause 2.1047 / RSS-139 Clause 6.2. / RSS-130 Clause 4.2: Modulation characteristics	N/M	(1)
Clause 27.54 / RSS-139 Clause 6.4. / RSS-130 Clause 4.5: Frequency stability	N/M	(1)
Clause 2.1049: Occupied Bandwidth	N/M	(1)
Clause 27.53 / RSS-139 Clause 6.6. / RSS-130 Clause 4.7: Spurious emissions at antenna terminals	N/M	(1)
Clause 27.53 / RSS-139 Clause 6.6. / RSS-130 Clause 4.7: Radiated emissions	P	
<u>Supplementary information and remarks:</u> 1. Radiated Spurious Emissions test only requested.		

Appendix A: Test results FCC Part 22 / RSS-132

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TEST CONDITIONS

POWER SUPPLY (V):

Vnominal: 230 Vac
Type of Power Supply: AC voltage.

ANTENNA:

Type of Antennas: Internal.
Maximum Declared Gain for 3G Band V: +2.2 dBi
Maximum Declared Gain for LTE Band 5: +2.2 dBi

TEST FREQUENCIES:

3G Band V:

WCDMA and HSUPA MODULATIONS:

Low Channel (4132): 826.4 MHz
Middle Channel (4182): 836.4 MHz
High Channel (4233): 846.6 MHz

LTE Band 5. QPSK AND 16QAM MODULATIONS:

	Channel (Frequency)			
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz
Low	20407 (824.7 MHz)	20415 (825.5 MHz)	20425 (826.5 MHz)	20450 (829 MHz)
Middle	20525 (836.5 MHz)	20525 (836.5 MHz)	20525 (836.5 MHz)	20525 (836.5 MHz)
High	20643 (848.3 MHz)	20635 (847.5 MHz)	20625 (846.5 MHz)	20600 (844 MHz)

Radiated emissions

SPECIFICATION:

FCC §22.917:

RSS-132. Clause 5.5:

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.

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.

The maximum field strength (dB μ V/m) of each detected emission at less than 20 dB respect to the limit is converted to an equivalent EIRP level (dBm) according to ANSI C63.26 with the formula:

$$\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8$$

Where D is the measurement distance (in the far field region) in m. $D = 3 \text{ m}$

Measurement Limit:

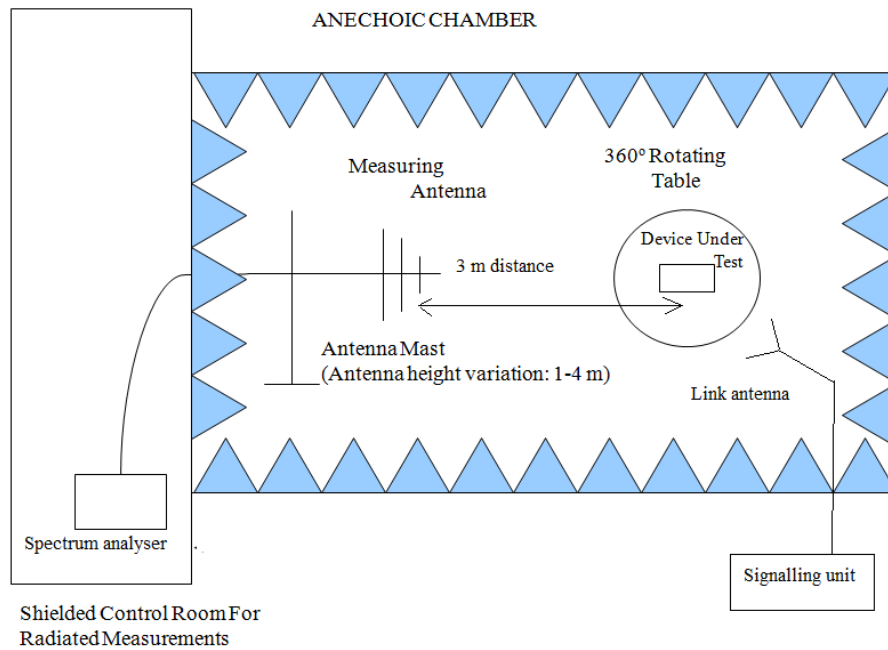
According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. P in watts.

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

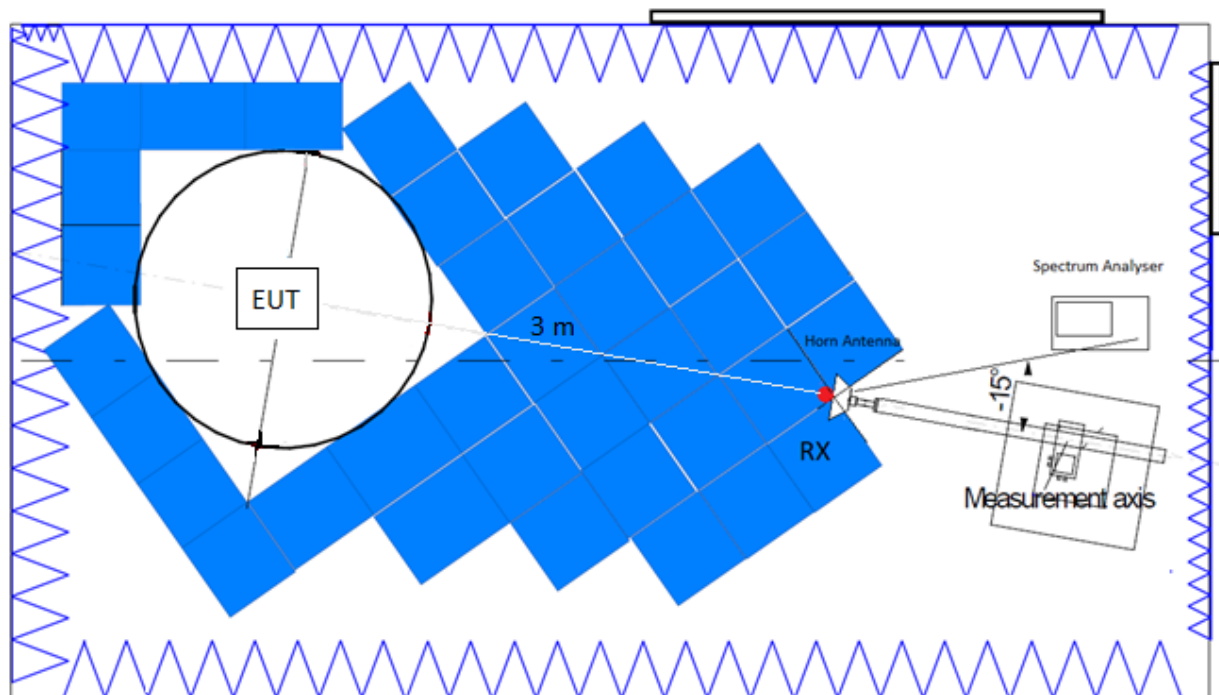
$$P_o \text{ (dBm)} - [43 + 10 \log (P_o \text{ in mwatts}) - 30] = - 13 \text{ dBm}$$

TEST SETUP:

Radiated measurements below 1 GHz:



Radiated measurements above 1 GHz:



RESULTS:

3G Band V:

WCDMA and HSUPA Modulations:

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

- Low Channel:

Frequency range 30 MHz - 1 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	E.I.R.P (dBm)	Polarization	Detector
34.737	-26.38	V	Peak
39.846	-32.29	V	Peak
821.139	-29.31	H	Peak
822.950	-24.60	H	Peak

Frequency range 1 - 10 GHz

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

- Middle Channel:

Frequency range 30 MHz - 1 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	E.I.R.P (dBm)	Polarization	Detector
39.619	-27.53	V	Peak

Frequency range 1 - 10 GHz

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

- High Channel:

Frequency range 30 MHz - 1 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	E.I.R.P (dBm)	Polarization	Detector
850.050	-27.31	H	Peak
851.182	-29.62	H	Peak

Frequency range 1 - 10 GHz

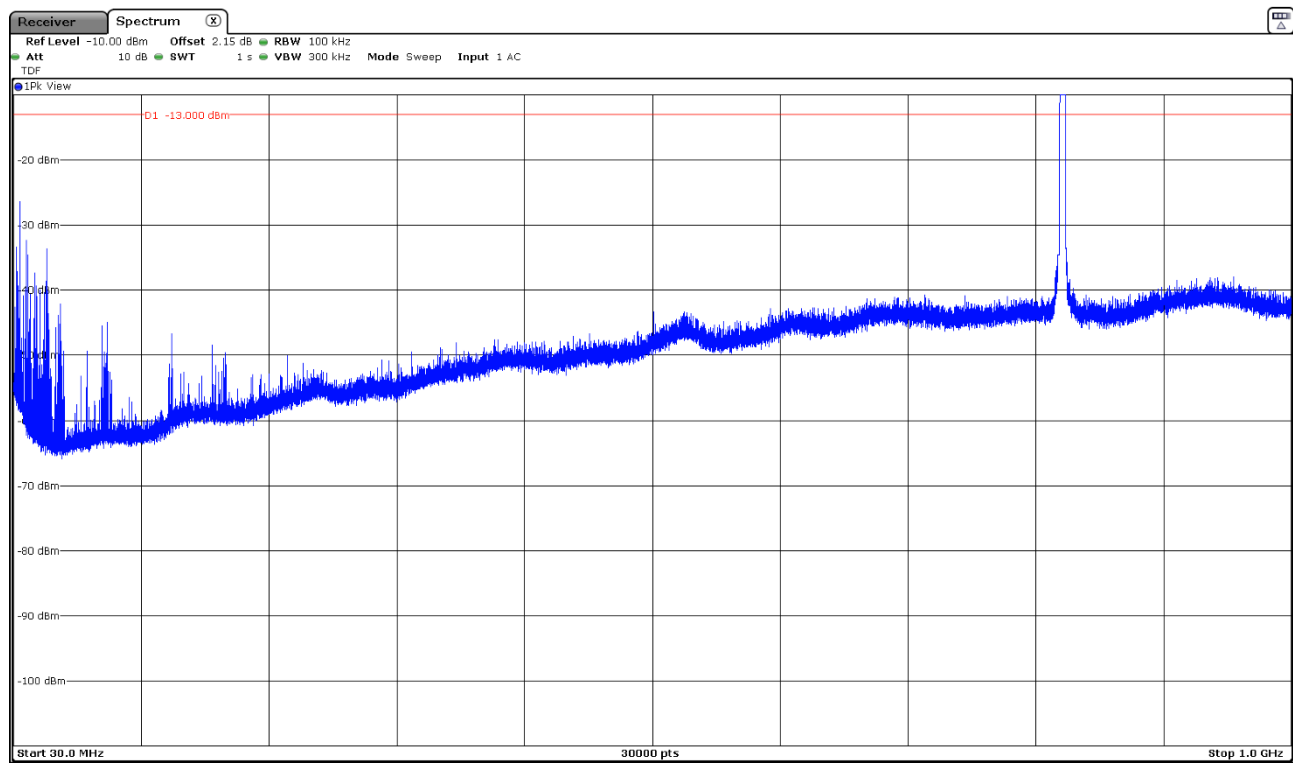
No spurious frequencies detected at less than 20 dB below the limit.

Measurement uncertainty (dB) $< \pm 4.68$ for $f < 1$ GHz
 $< \pm 4.99$ for $f \geq 1$ GHz up to 10 GHz

Verdict: PASS

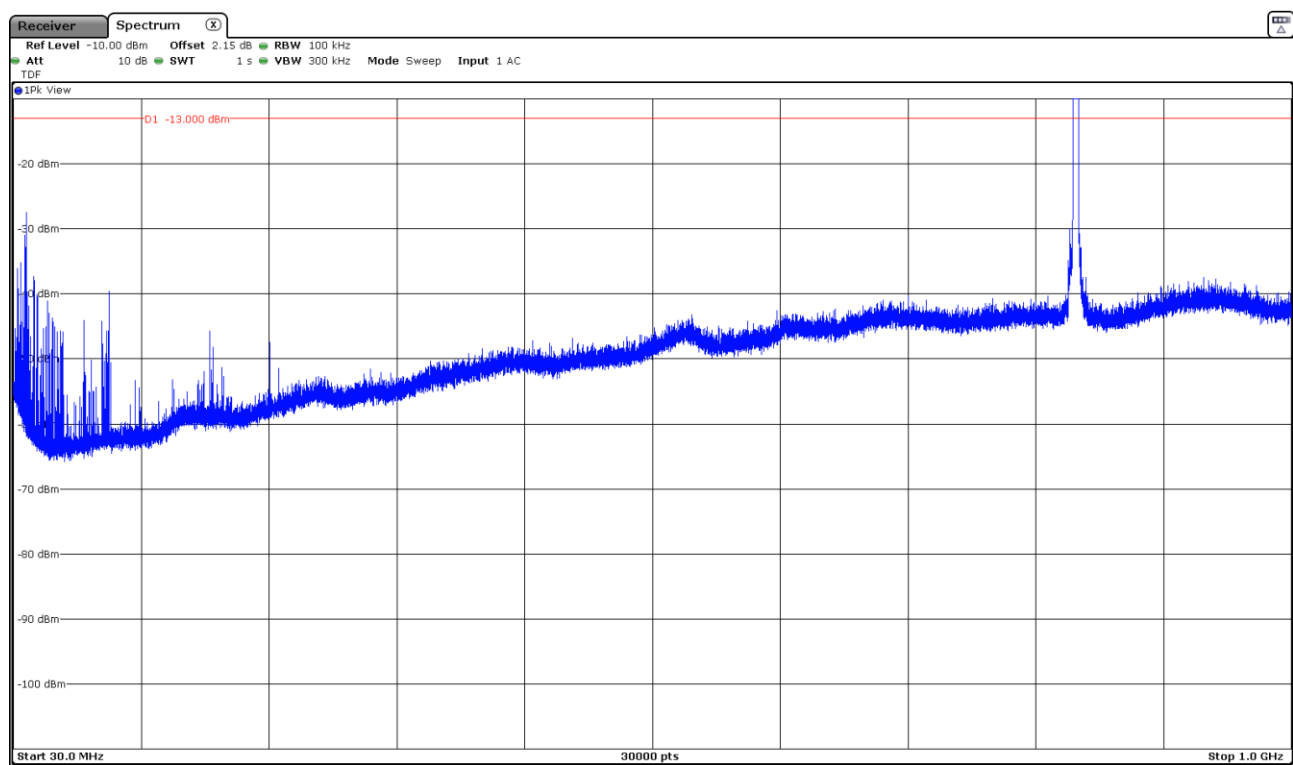
FREQUENCY RANGE 30 MHz - 1 GHz

- Low Channel:



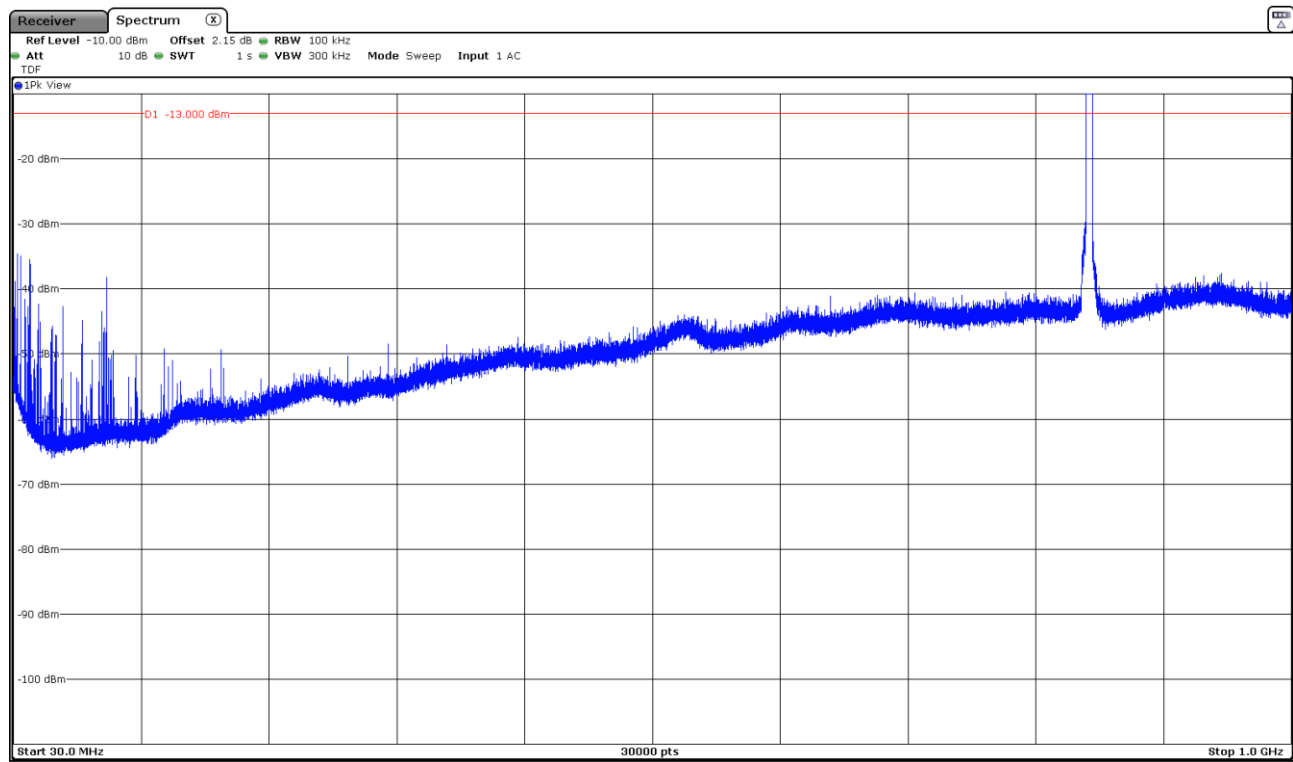
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

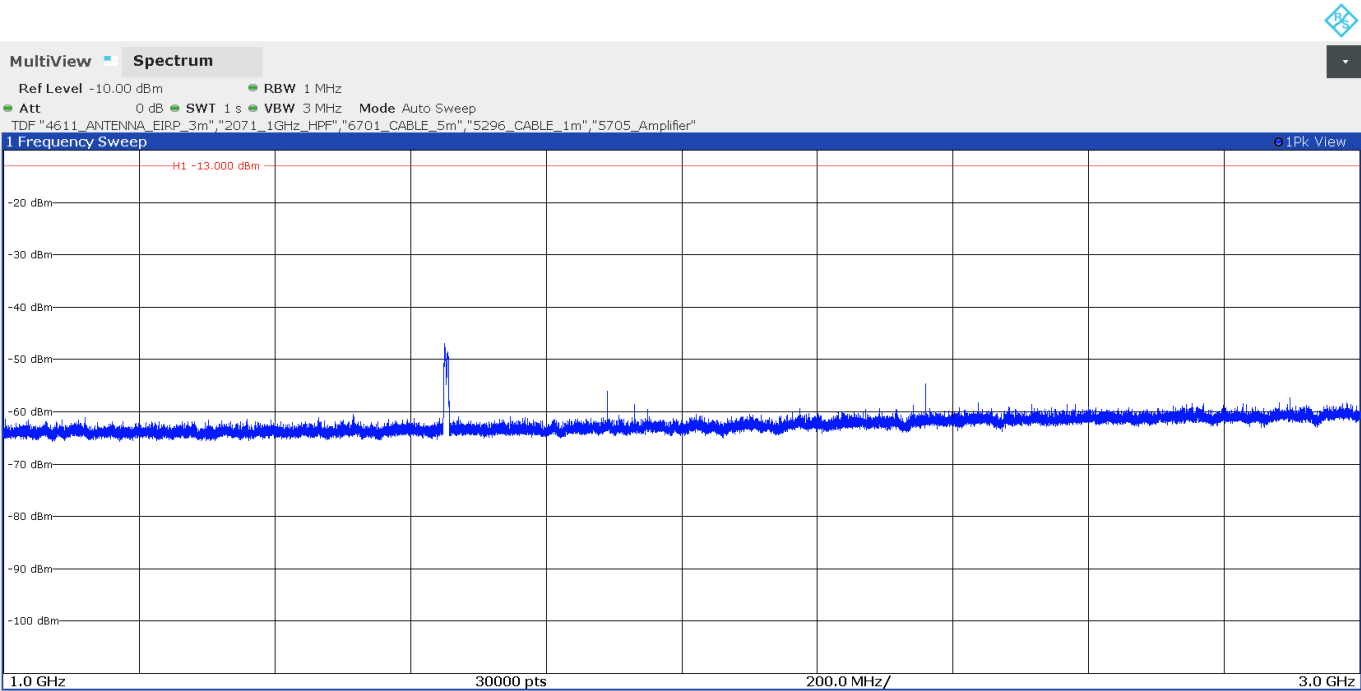
- High Channel:



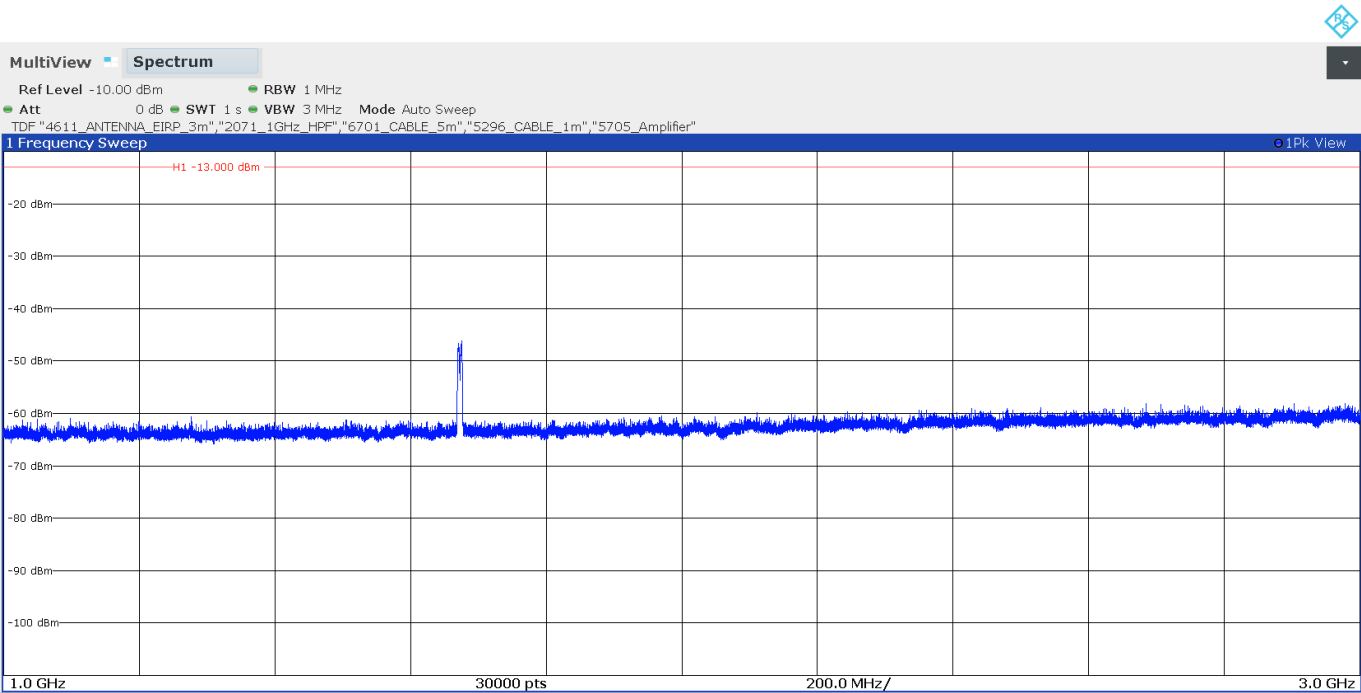
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 1 - 3 GHz

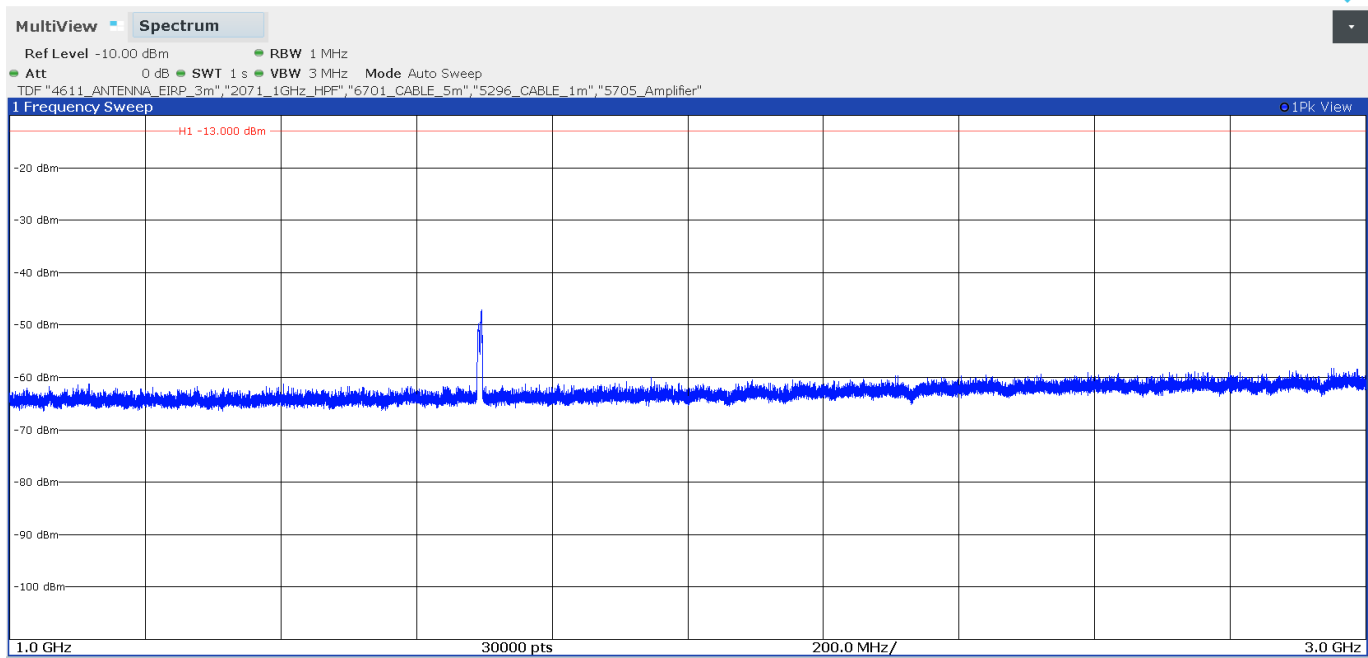
- Low Channel:



- Middle Channel:

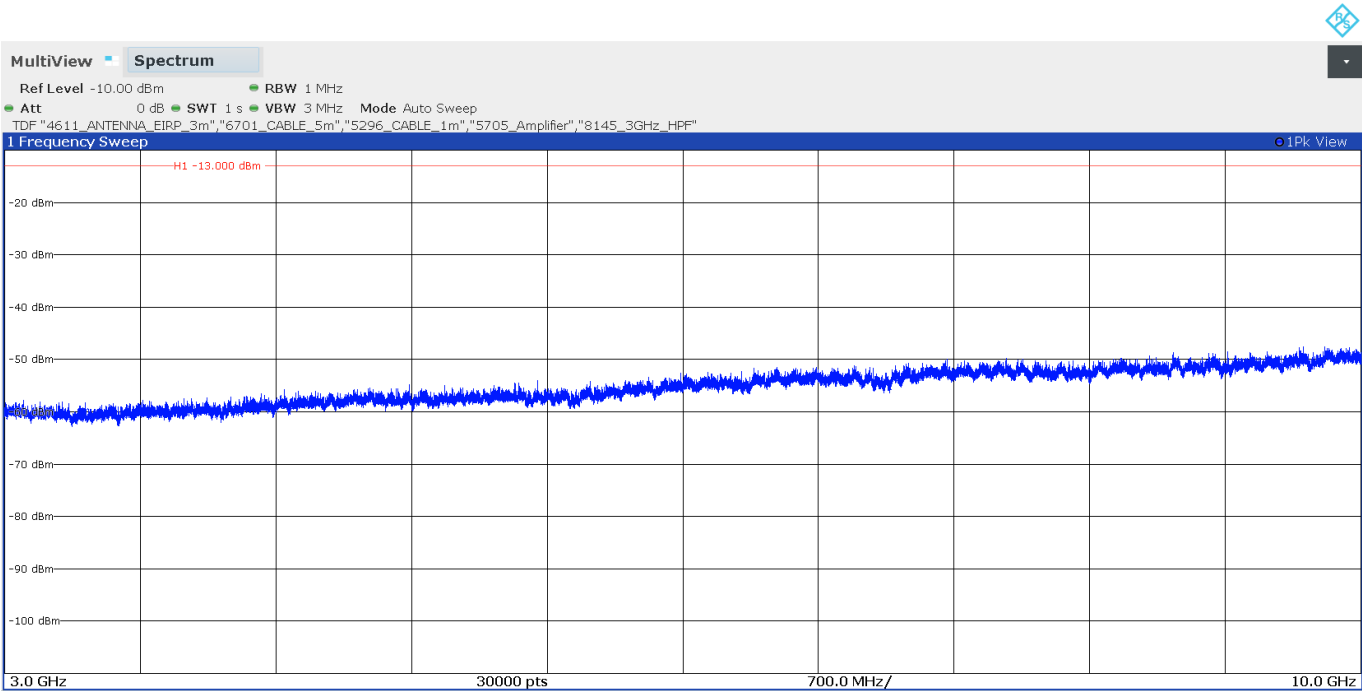


- High Channel:

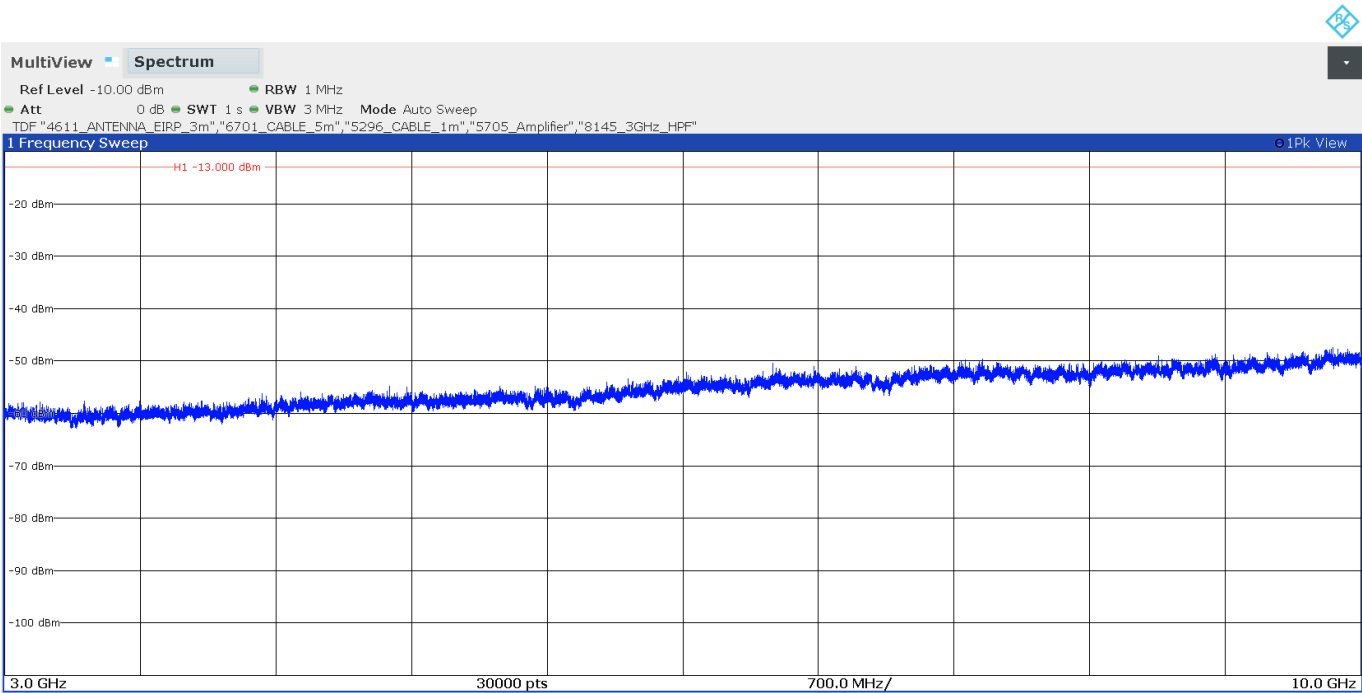


FREQUENCY RANGE 3 - 10 GHz

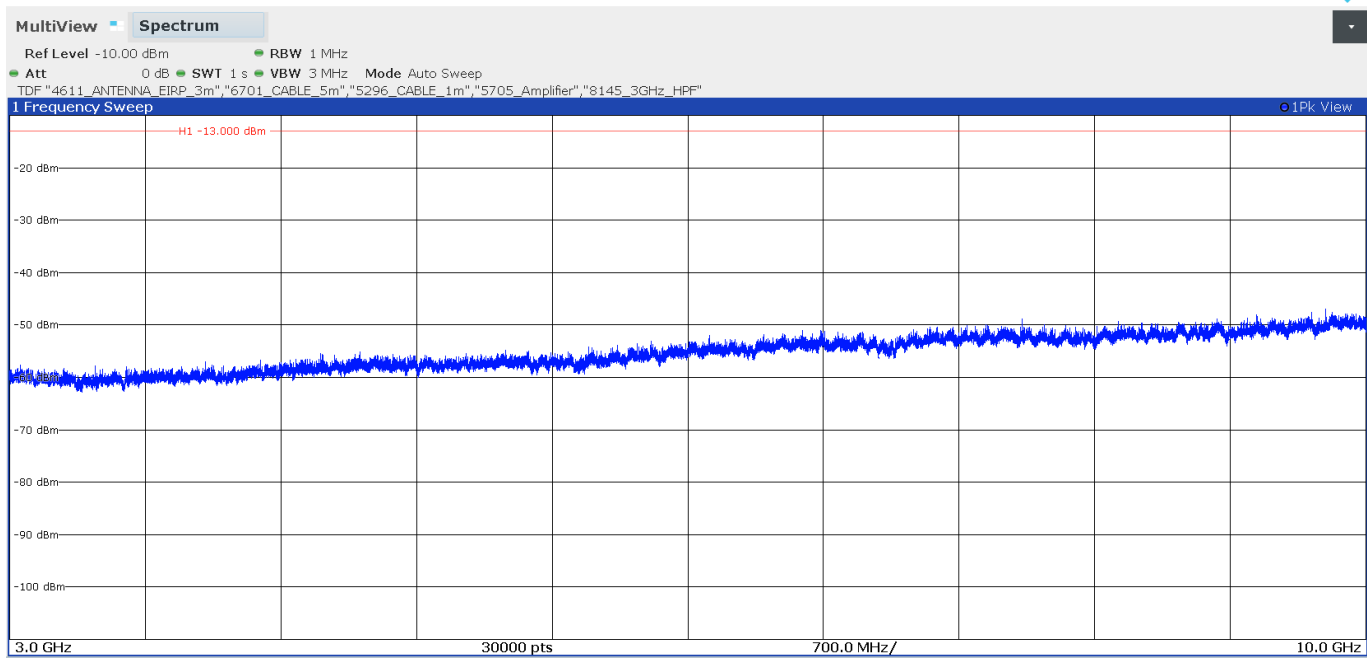
- Low Channel:



- Middle Channel:



- High Channel:



LTE Band 5:

QPSK and 16QAM Modulations:

A preliminary scan determined the QPSK modulation, BW=1.4 MHz, RB=1, Offset=0 as the worst case. The following tables and plots show the results for the worst case modulation.

- Low Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 10 GHz

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

- Middle Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 10 GHz

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

- High Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 10 GHz

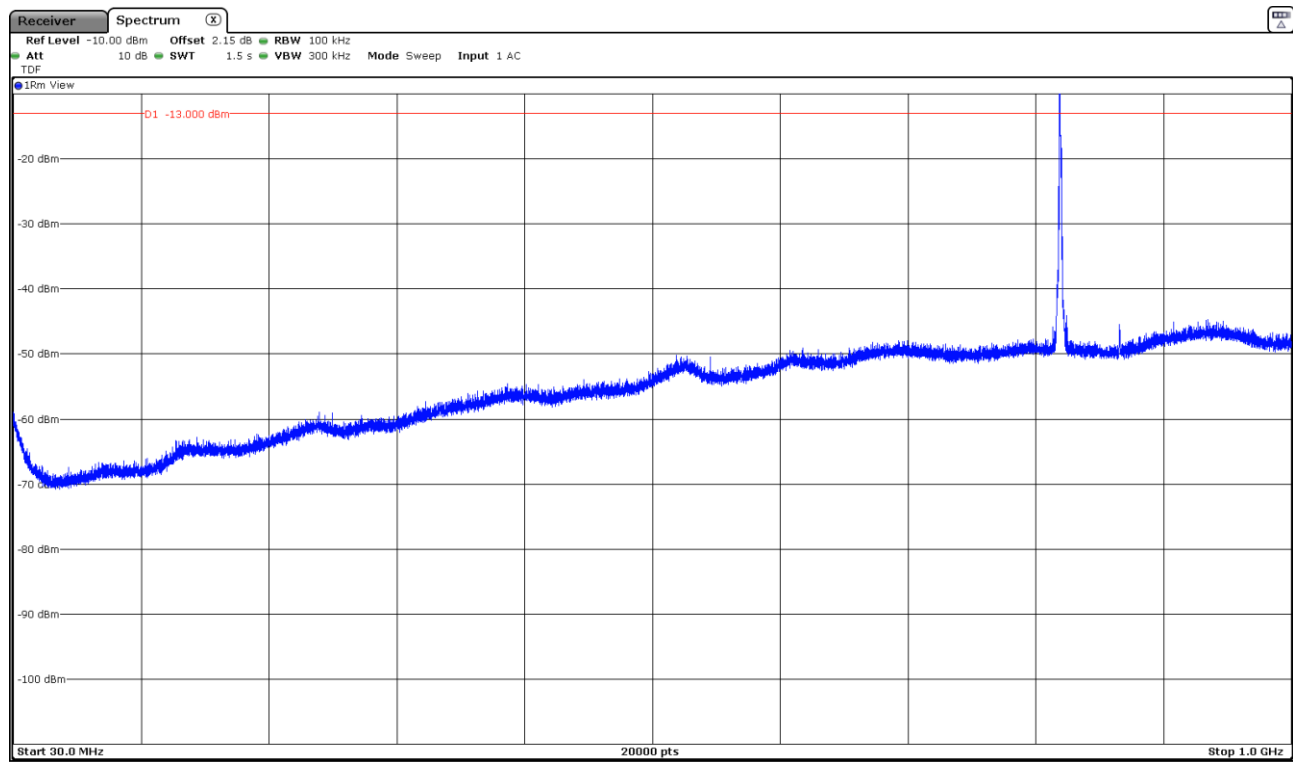
No spurious frequencies at less than 20 dB below the limit.

Measurement uncertainty (dB) $< \pm 4.68$ for $f < 1$ GHz
 $< \pm 4.99$ for $f \geq 1$ GHz up to 10 GHz

Verdict: PASS

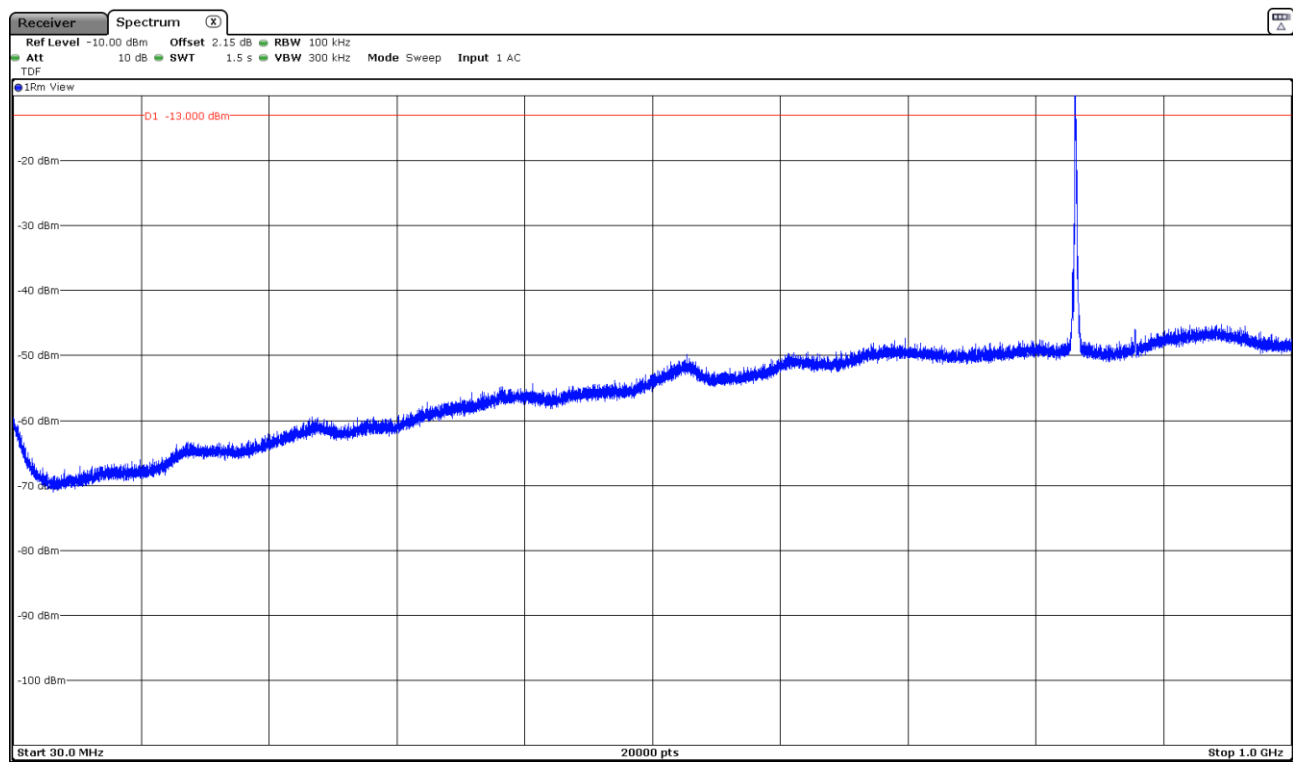
FREQUENCY RANGE 30 MHz - 1 GHz

- Low Channel:



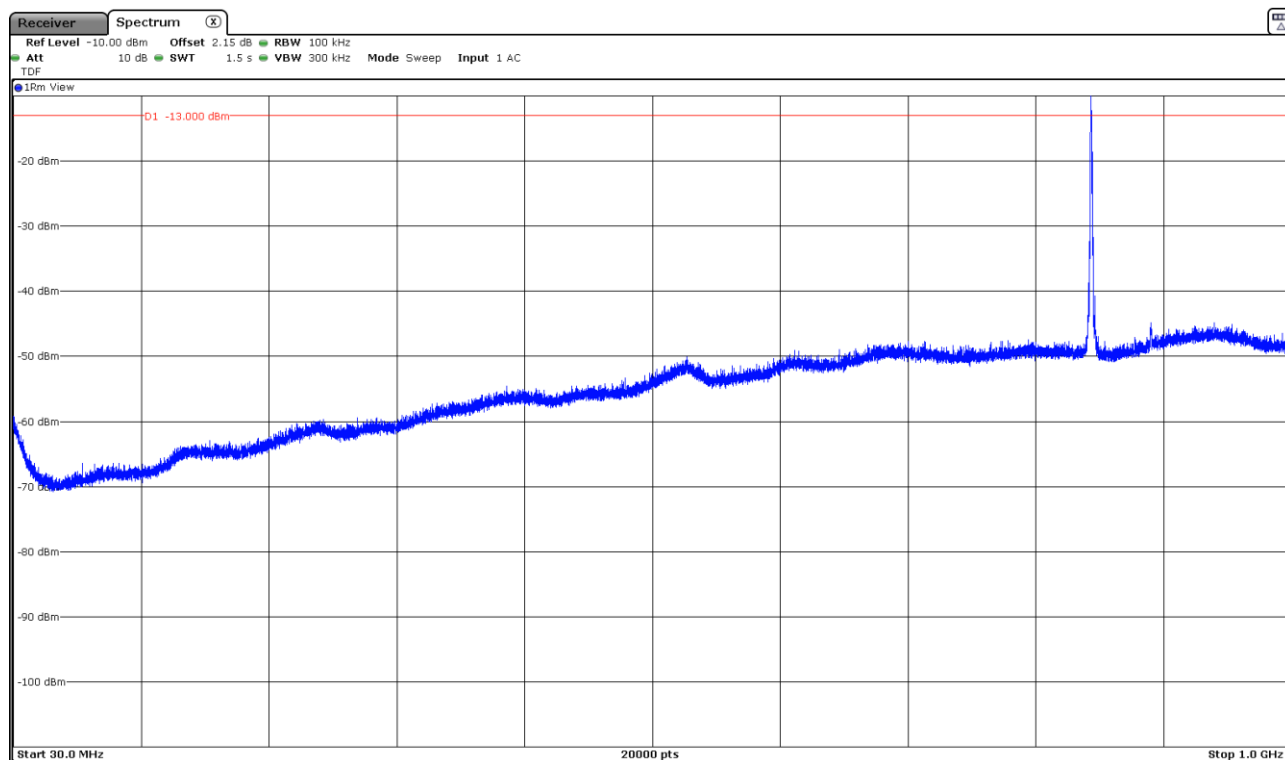
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

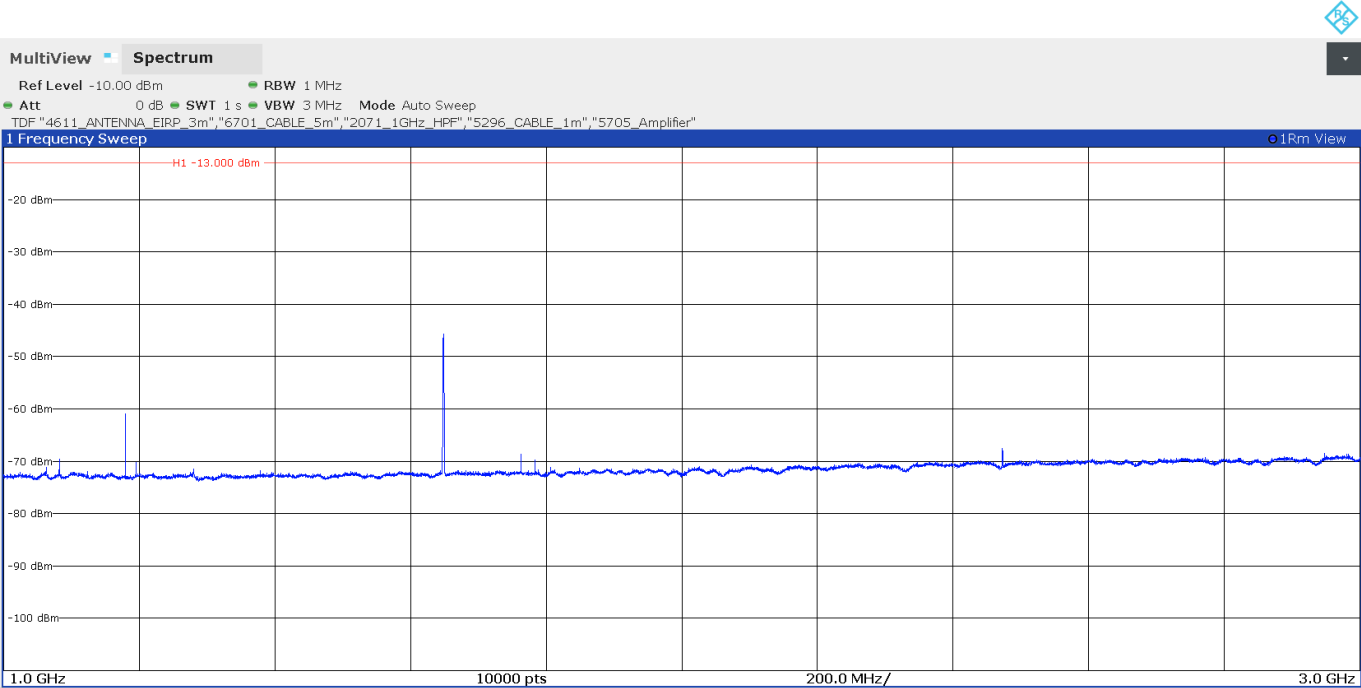
- High Channel:



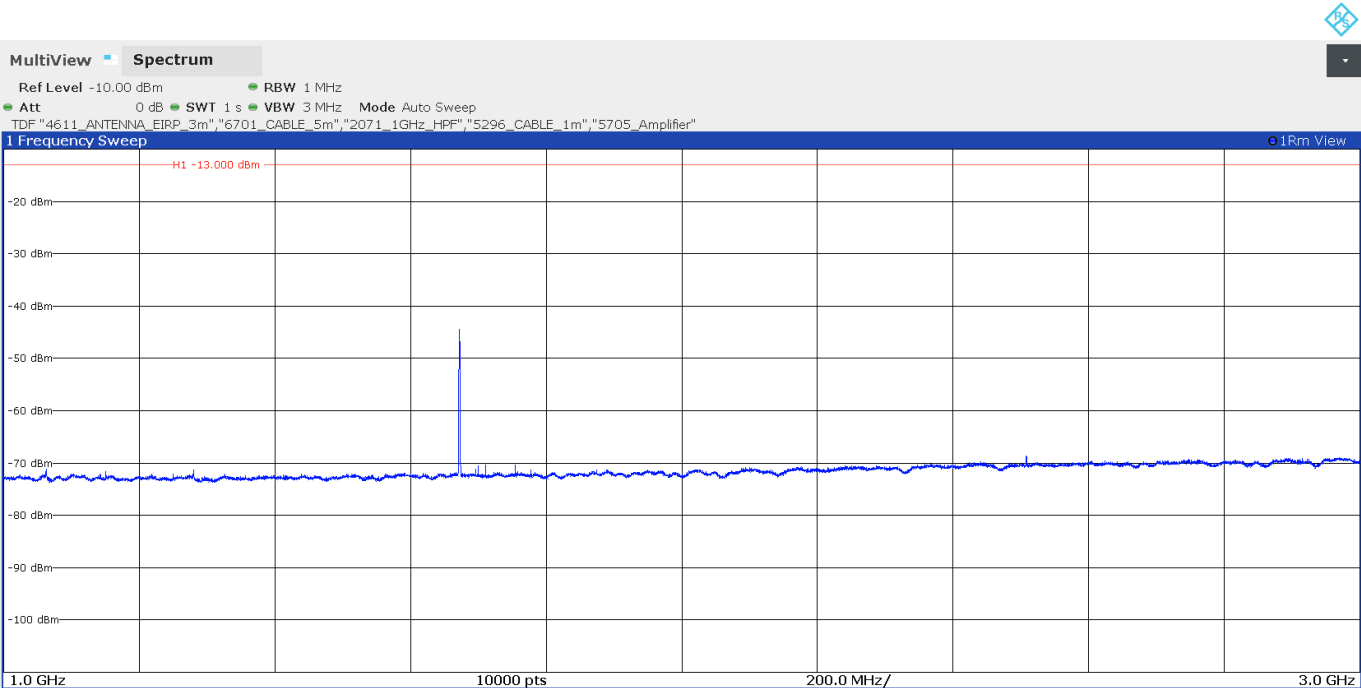
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 1 - 3 GHz

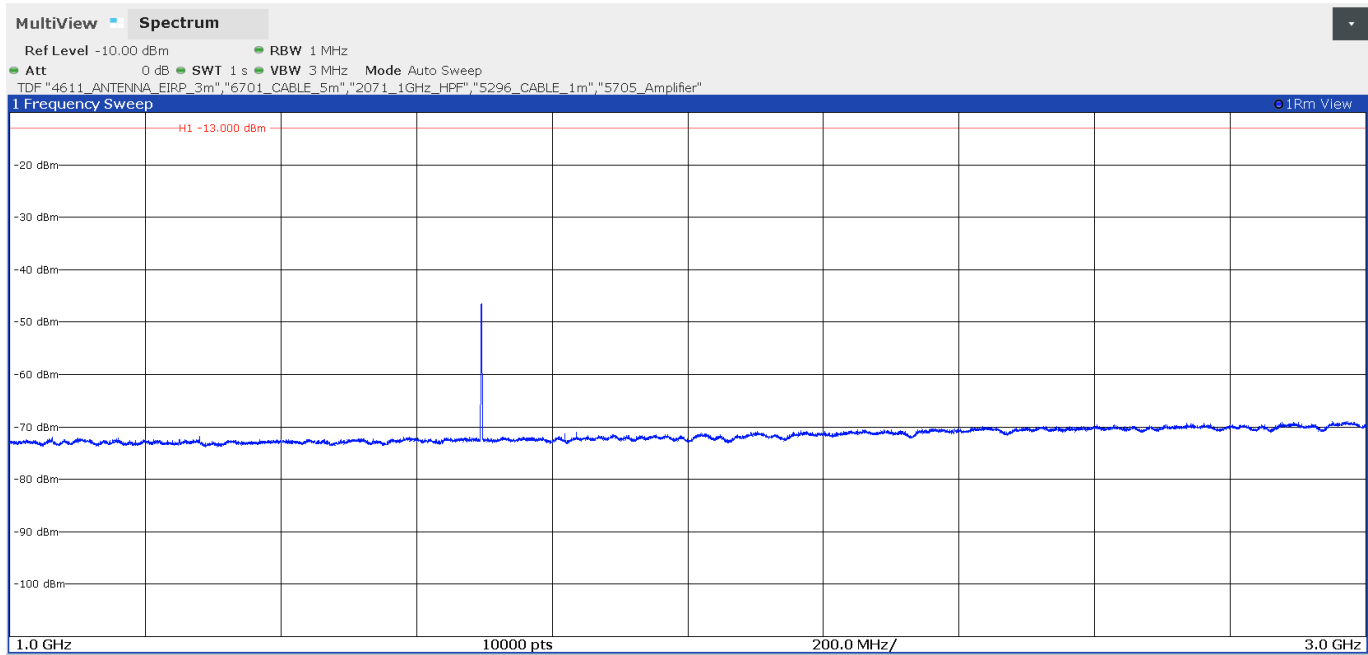
- Low Channel:



- Middle Channel:

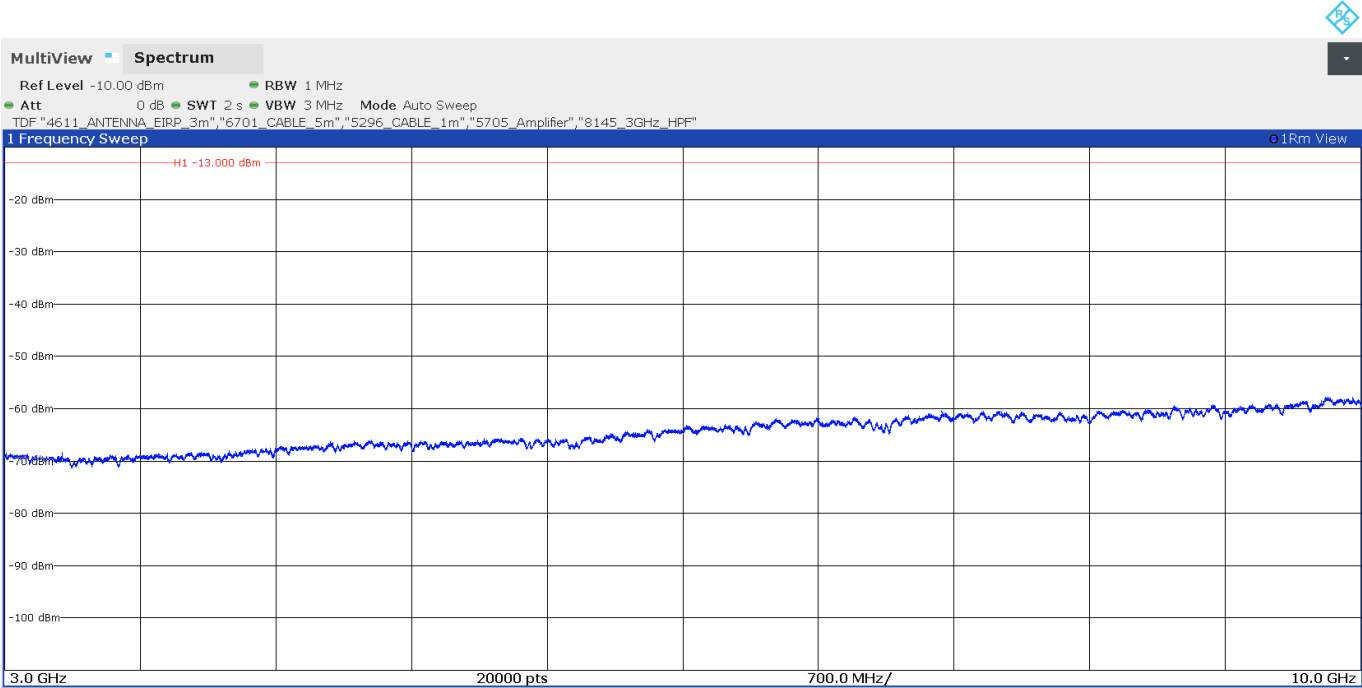


- High Channel:

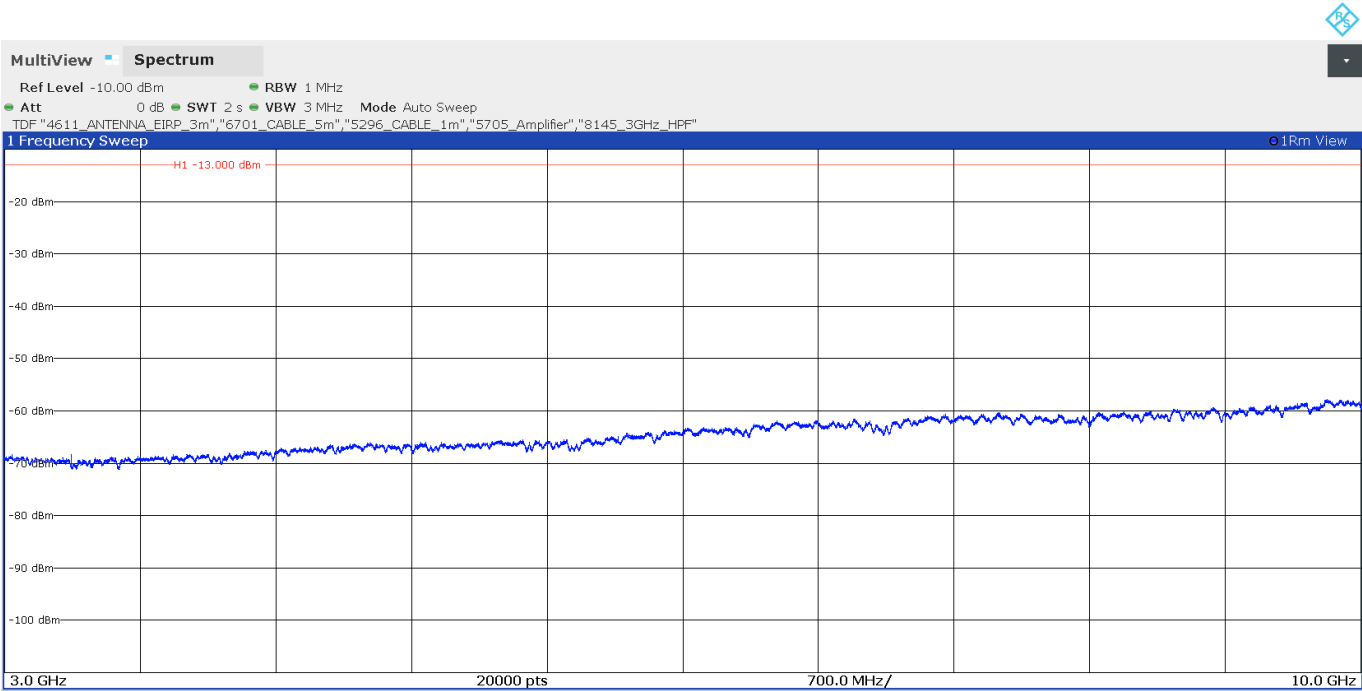


FREQUENCY RANGE 3 - 10 GHz

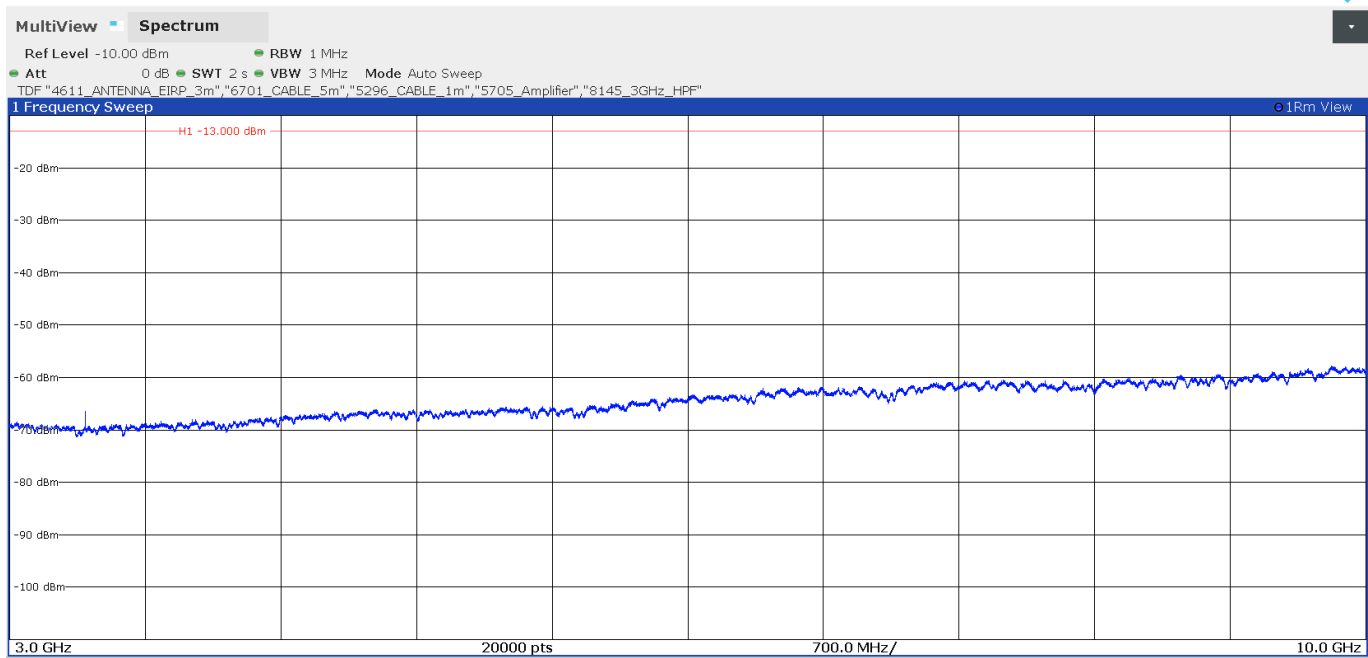
- Low Channel:



- Middle Channel:



- High Channel:



Appendix B: Test results FCC Part 24 / RSS-133

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TEST CONDITIONS

POWER SUPPLY (V):

Vnominal: 230 Vac
Type of Power Supply: AC voltage

ANTENNA:

Type of Antennas: Internal.
Maximum Declared Gain for 3G Band II: +2.5 dBi
Maximum Declared Gain for LTE Band 2: +2.5 dBi

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

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 High 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 18 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.

The maximum field strength (dB μ V/m) of each detected emission at less than 20 dB respect to the limit is converted to an equivalent EIRP level (dBm) according to ANSI C63.26 with the formula:

$$\text{EIRP (dBm)} = E(\text{dB}\mu\text{V/m}) + 20 \log (D) - 104.8$$

Where D is the measurement distance (in the far field region) in m. $D = 3$ m.

Measurement Limit:

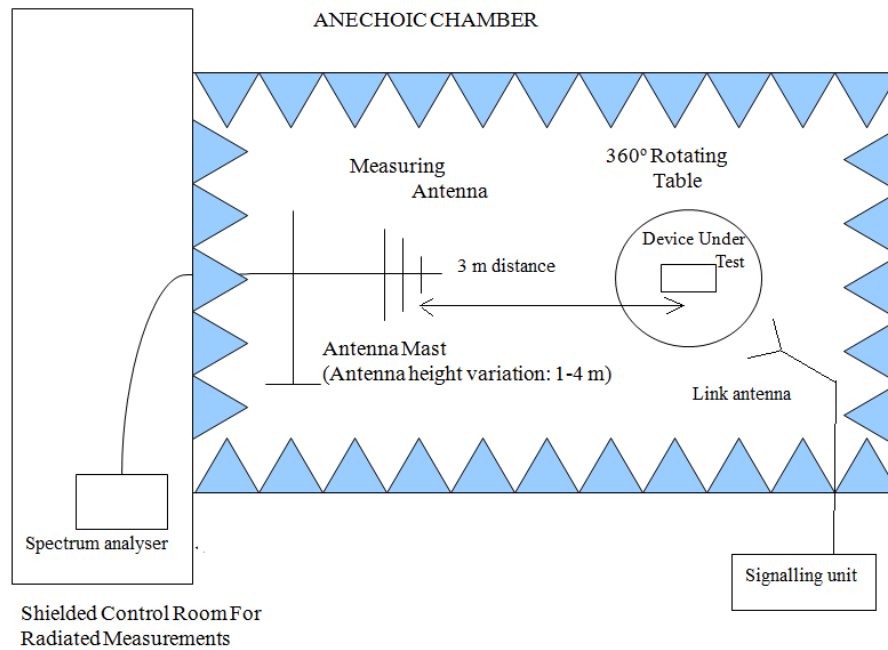
According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. P in watts.

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

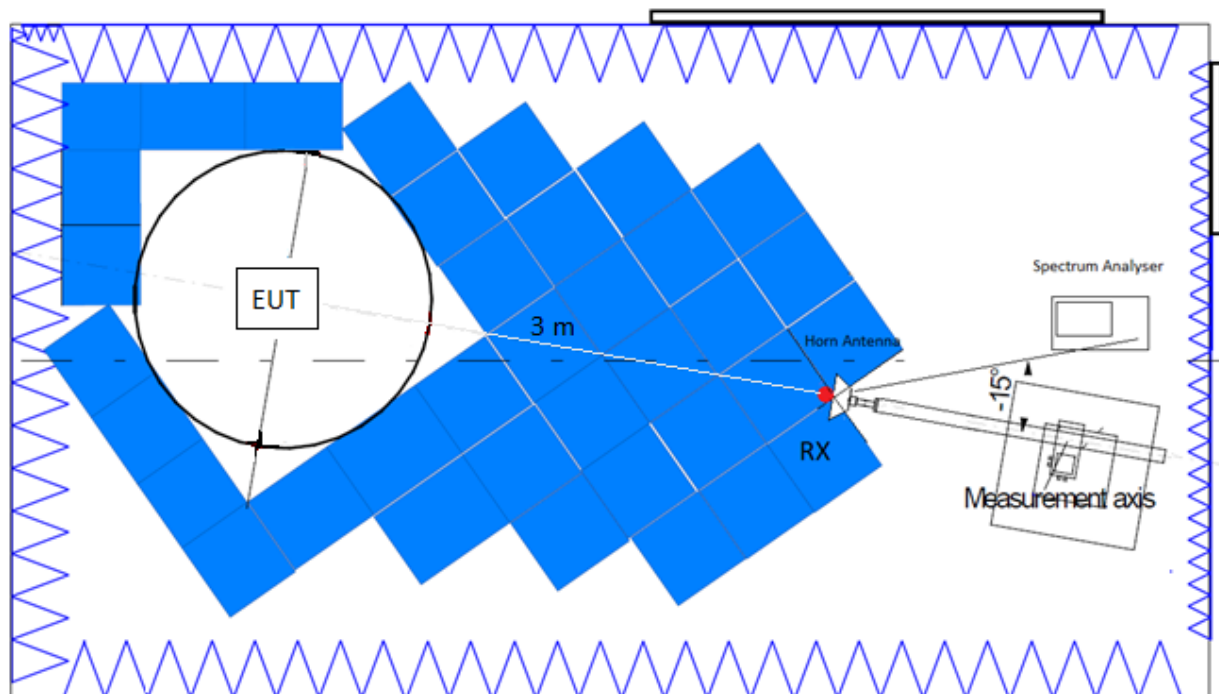
$$P_o (\text{dBm}) - [43 + 10 \log (P_o \text{ in mwatts}) - 30] = -13 \text{ dBm}$$

TEST SETUP:

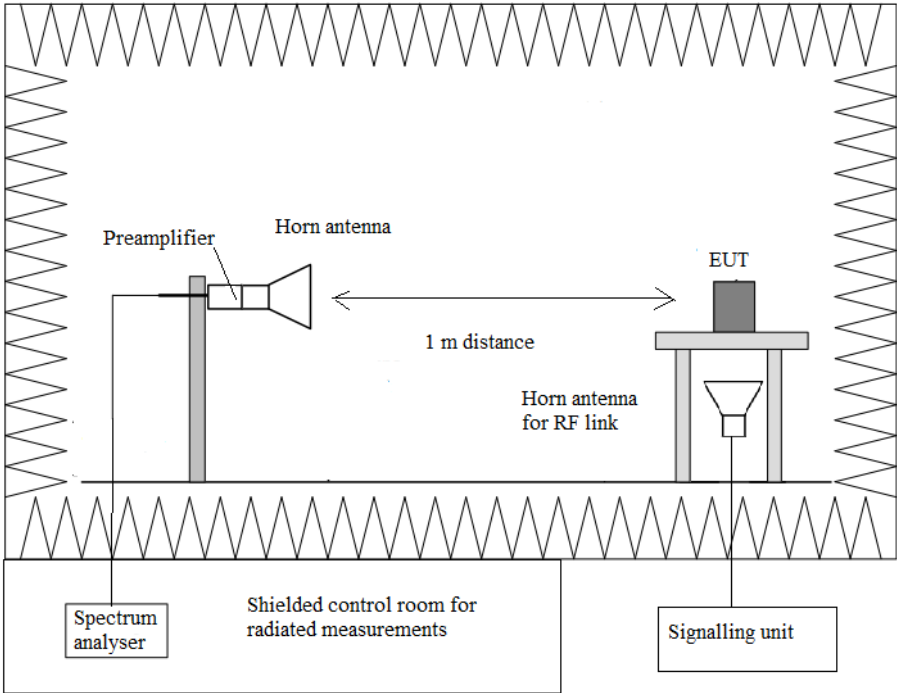
Radiated measurements below 1 GHz:



Radiated measurements setup from 1GHz to 18 GHz:



Radiated measurements above 18 GHz:



RESULTS:

3G Band II:

WCDMA and HSUPA Modulations:

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

- Low Channel:

Frequency range 30 MHz - 1 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	E.I.R.P (dBm)	Polarization	Detector
39.555	-26.39	V	Peak
46.862	-25.42	V	Peak
62.770	-26.79	V	Peak
96.073	-28.95	V	Peak

Frequency range 1 - 20 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector
1.8447	-17.30	H	Peak
1.8485	-14.34	H	Peak

- Middle Channel:

Frequency range 30 MHz - 1 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	E.I.R.P (dBm)	Polarization	Detector
34.026	-26.34	V	Peak
43.047	-28.28	V	Peak
48.317	-26.89	V	Peak
57.532	-30.94	V	Peak
76.835	-32.62	V	Peak

Frequency range 1 - 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 - 20 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector
1.9115	-14.15	H	Peak
1.9134	-19.26	H	Peak
1.9166	-23.95	H	Peak

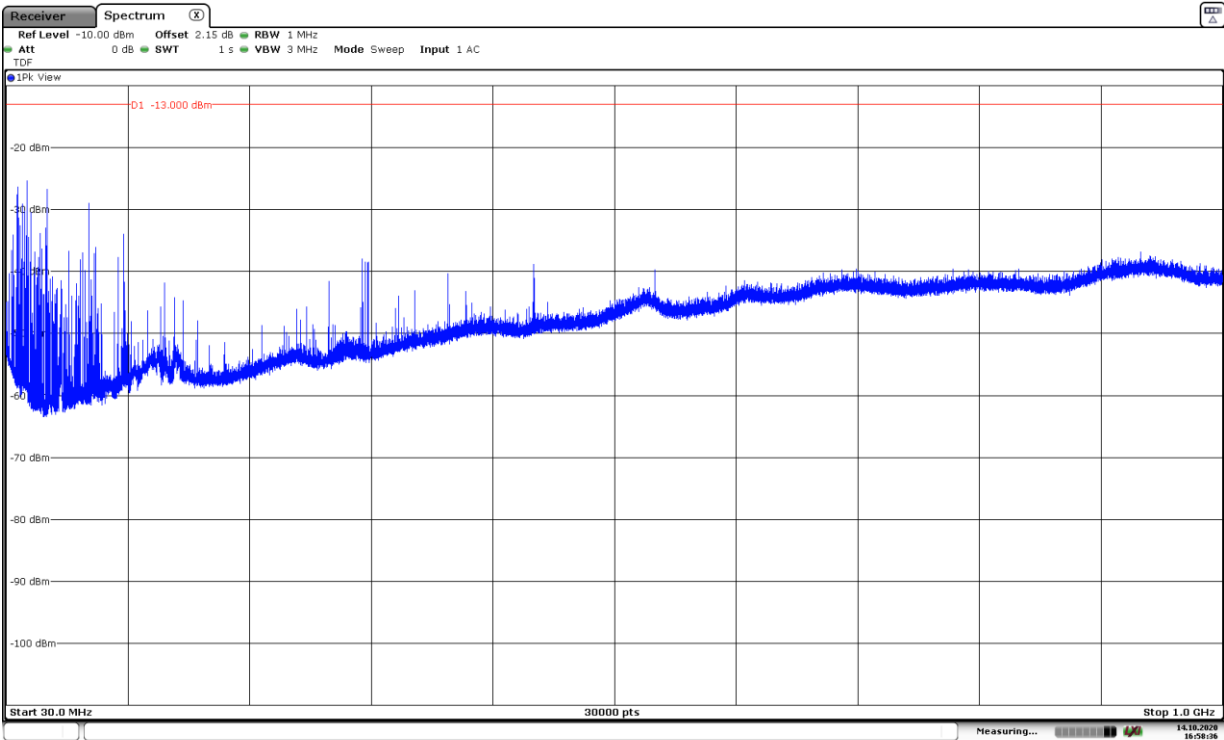
Measurement uncertainty (dB)

< ±4.68 for f < 1 GHz
< ±4.00 for f ≥ 1 GHz up to 3 GHz
< ±4.99 for f ≥ 3 GHz up to 18 GHz
< ±5.08 for f ≥ 18 GHz

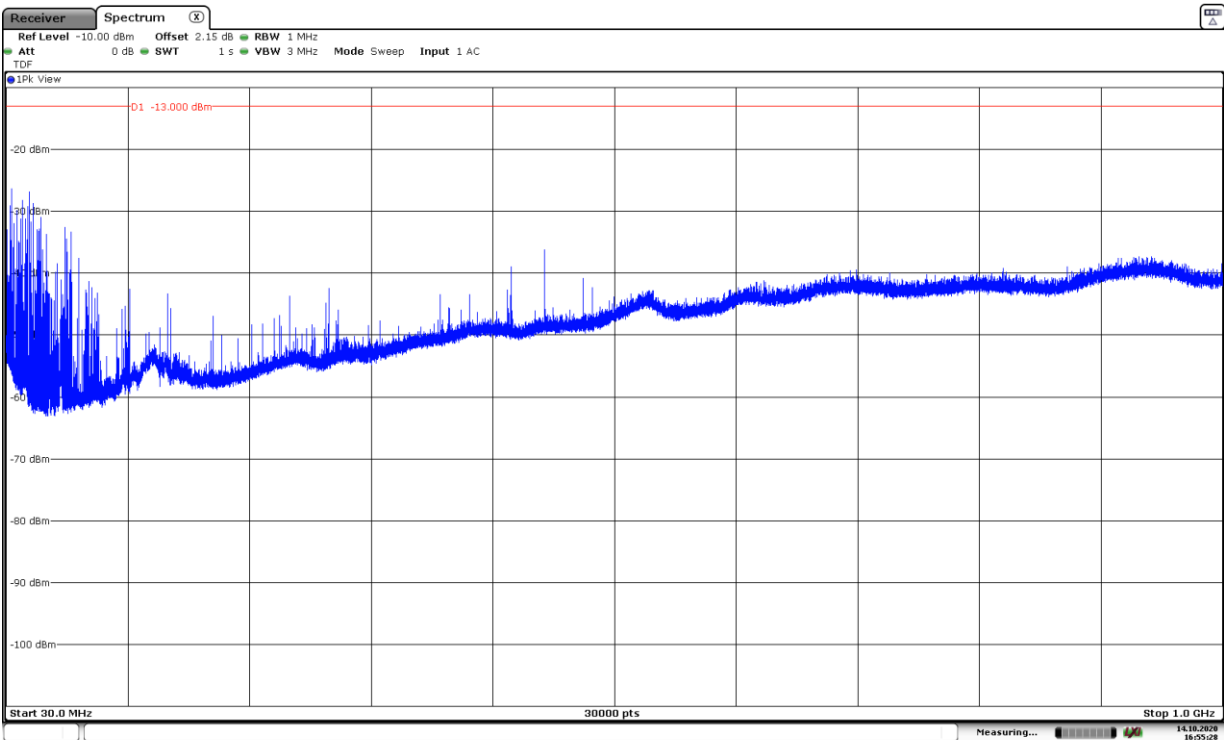
Verdict: PASS

FREQUENCY RANGE 30 MHz - 1 GHz

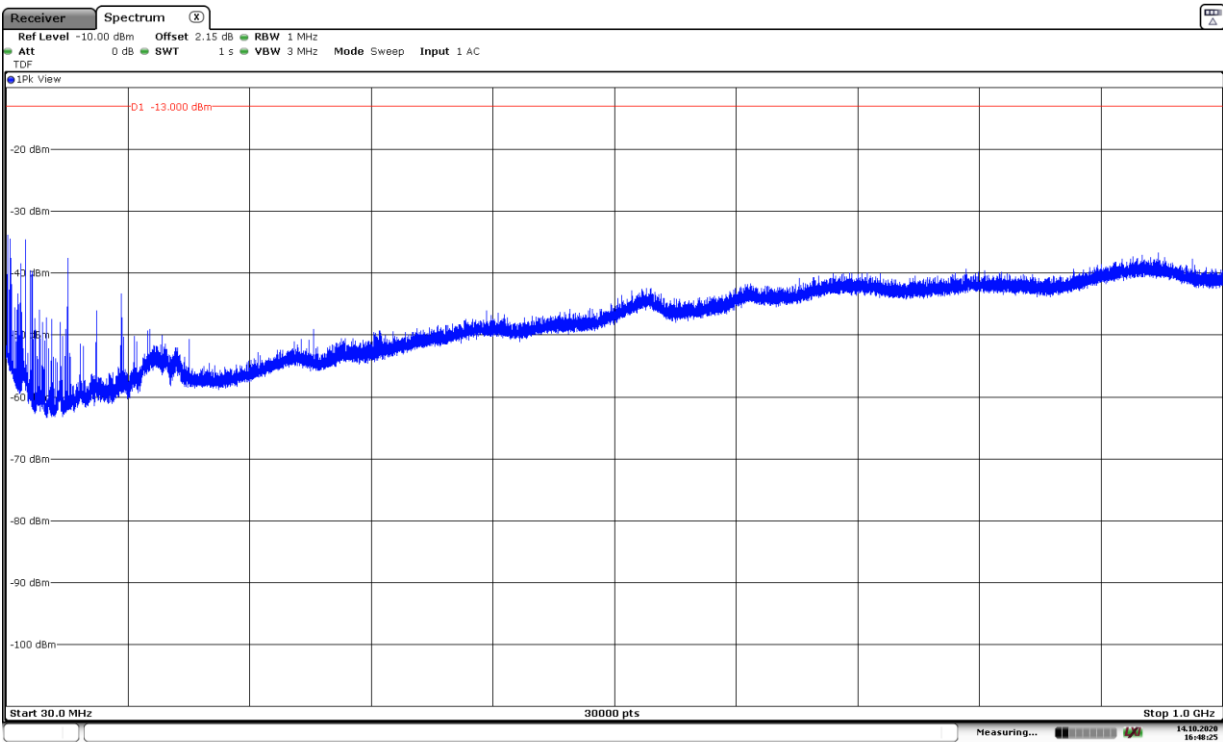
- Low Channel:



- Middle Channel:

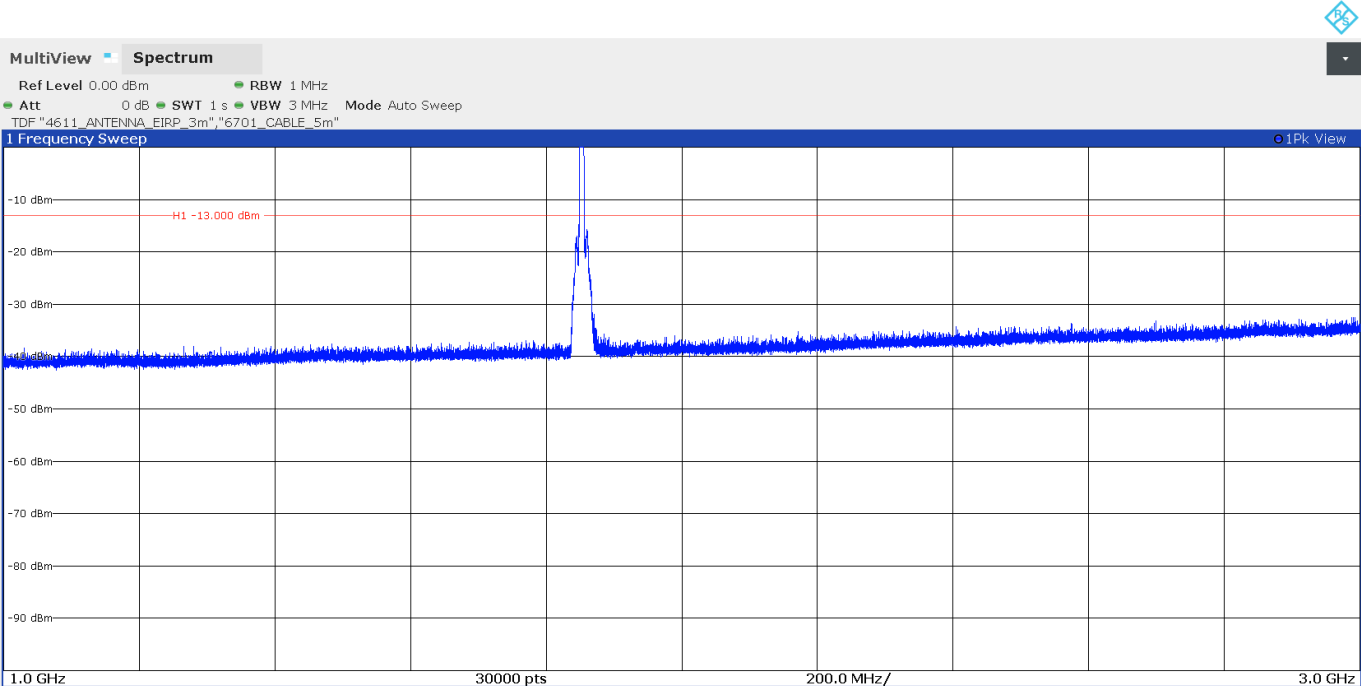


- High Channel:



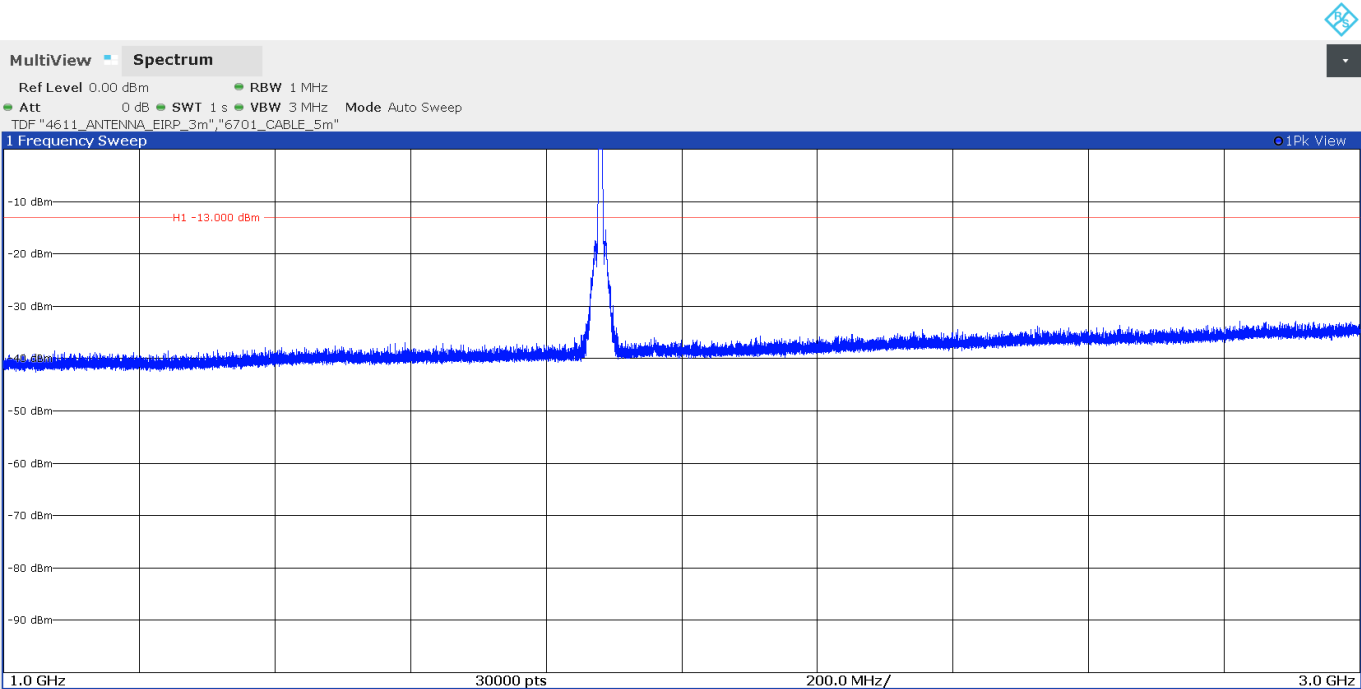
FREQUENCY RANGE 1 - 3 GHz

- Low Channel:



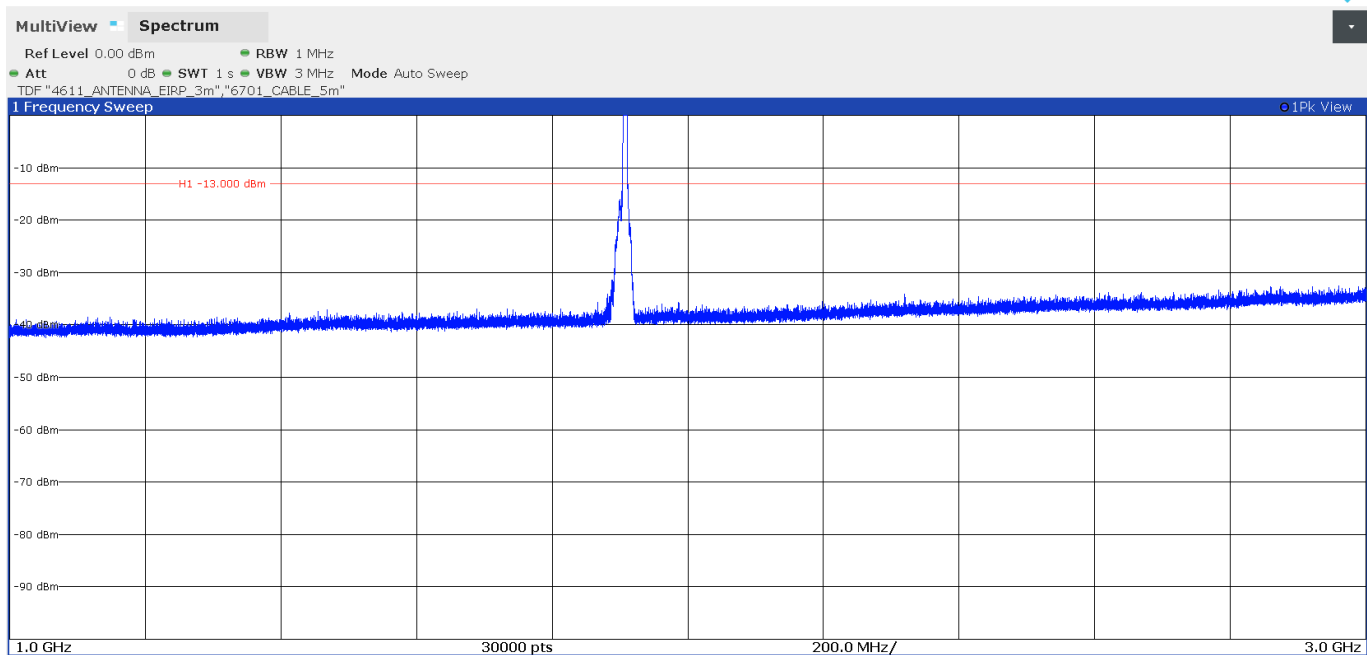
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

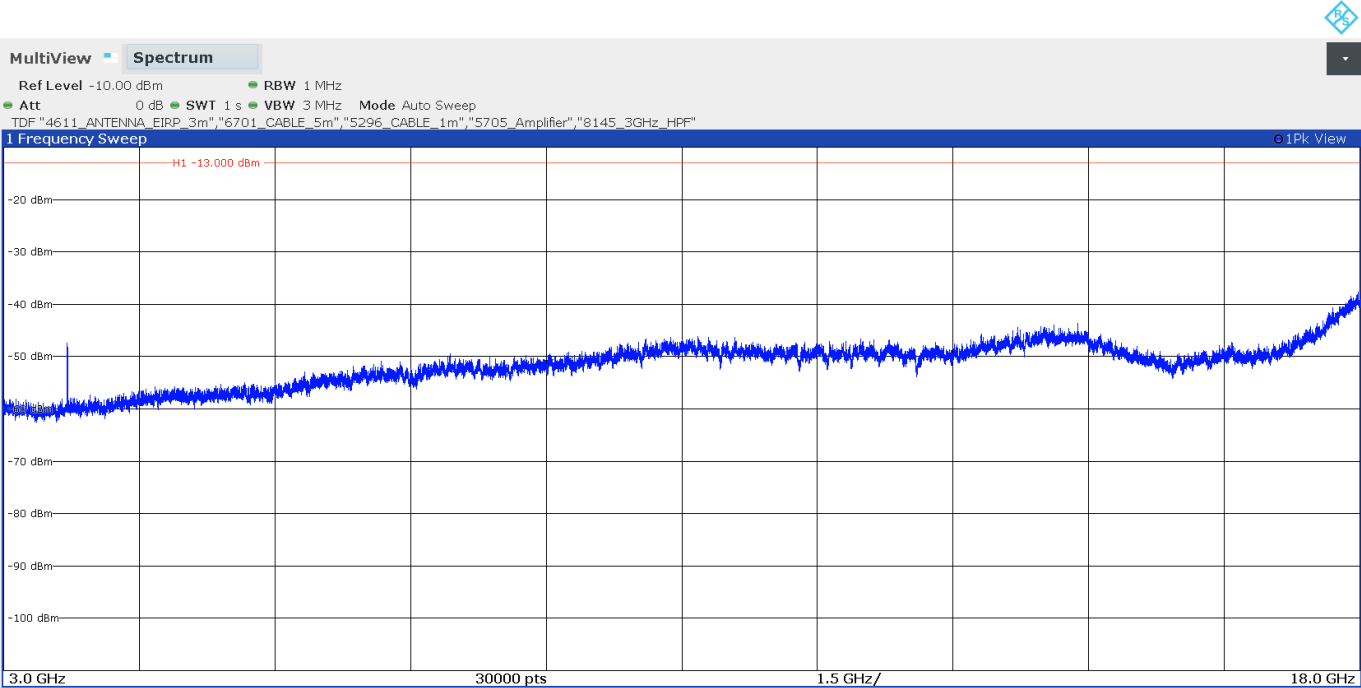
- High Channel:



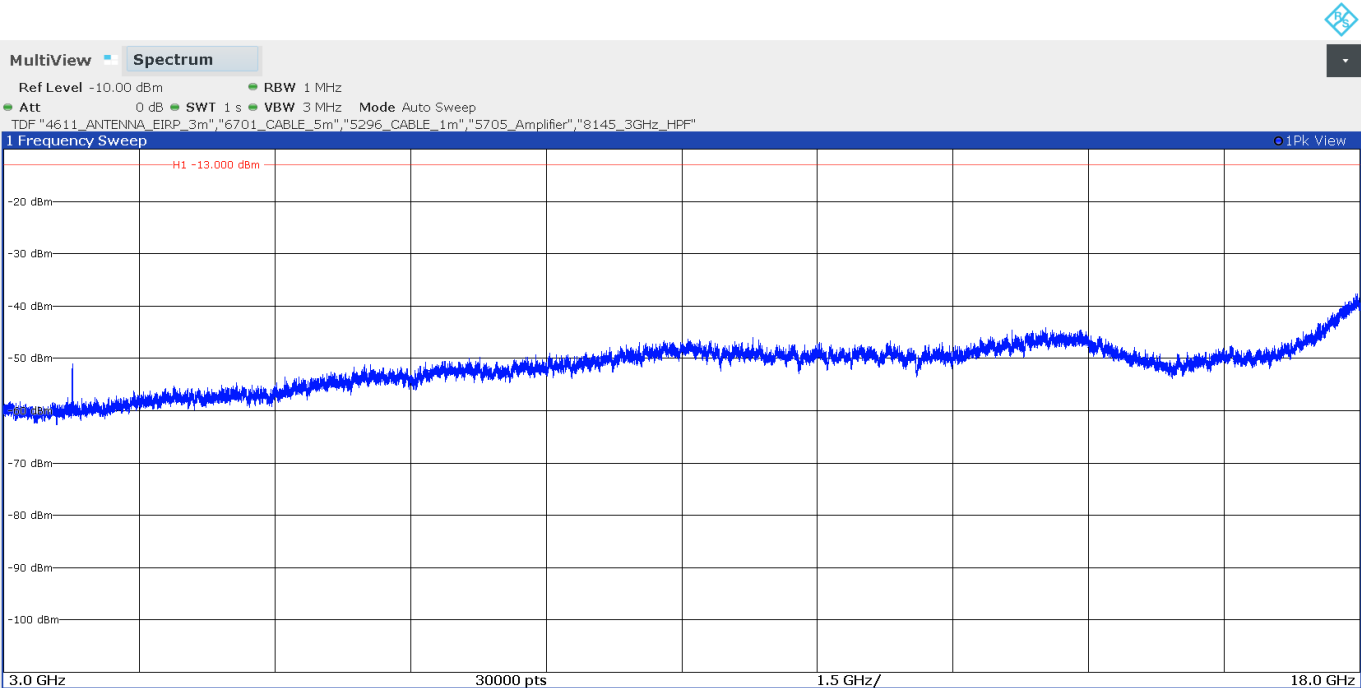
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 - 18 GHz

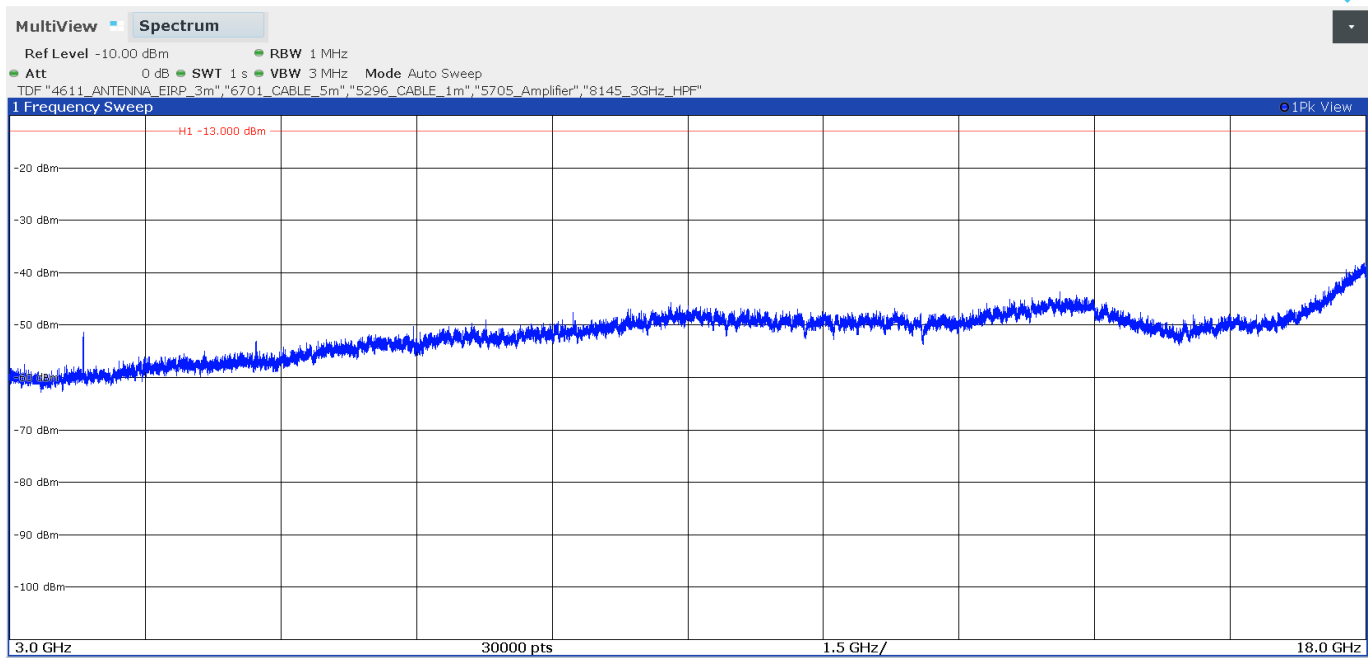
- Low Channel:



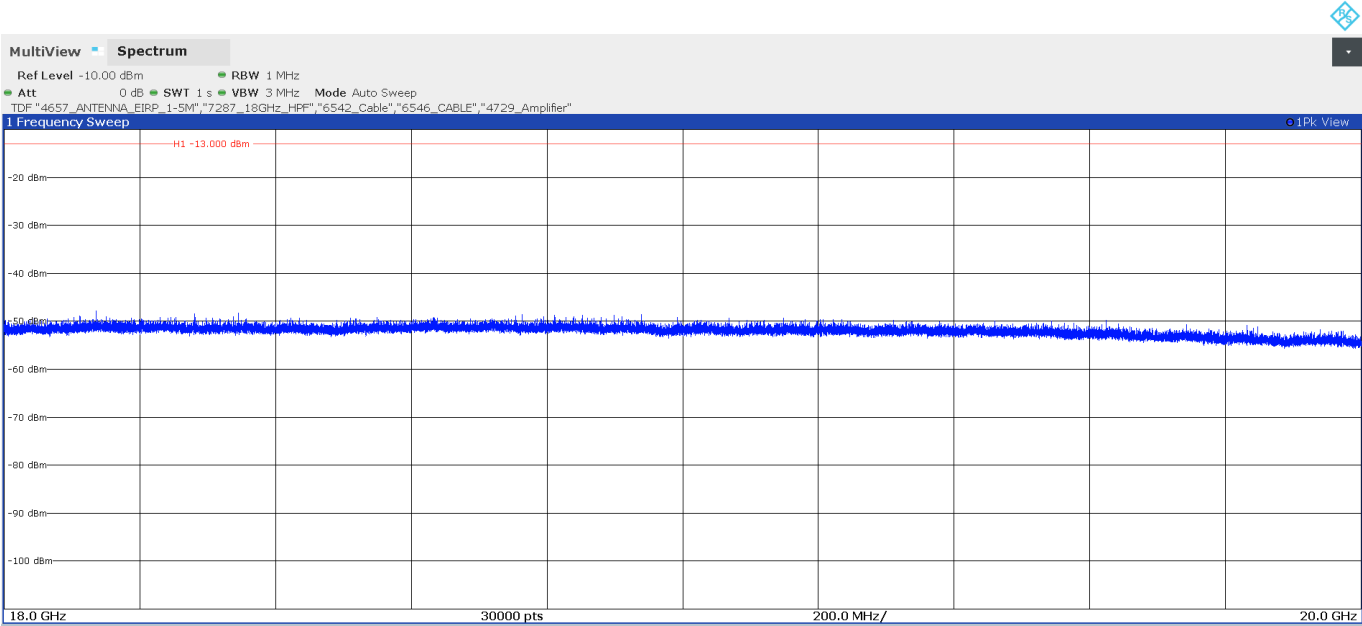
- Middle Channel:



- High Channel:



FREQUENCY RANGE 18 - 20 GHz



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 this combination.

- Low Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 20 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector
1.8487	-24.68	V	RMS

- Middle Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 GHz - 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 - 20 GHz.

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

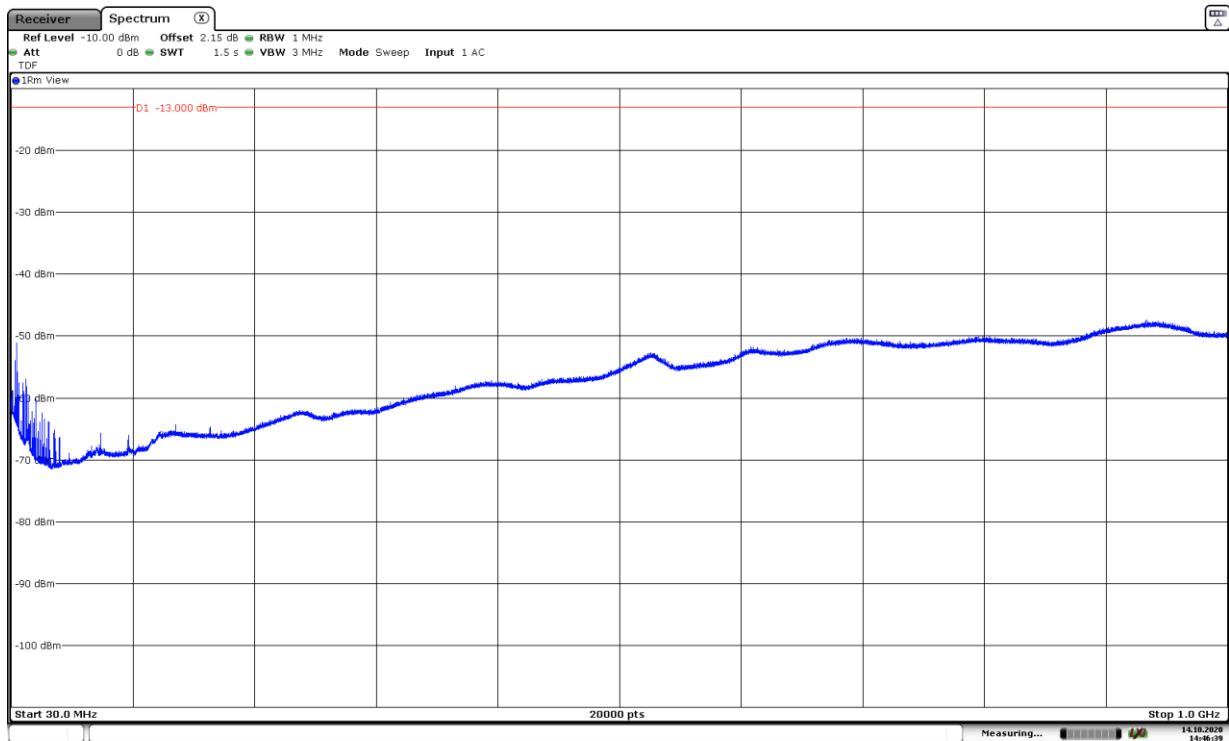
Measurement uncertainty (dB)

< ±4.68 for f < 1 GHz
< ±4.00 for f ≥ 1 GHz up to 3 GHz
< ±4.99 for f ≥ 3 GHz up to 18 GHz
< ±5.08 for f ≥ 18 GHz

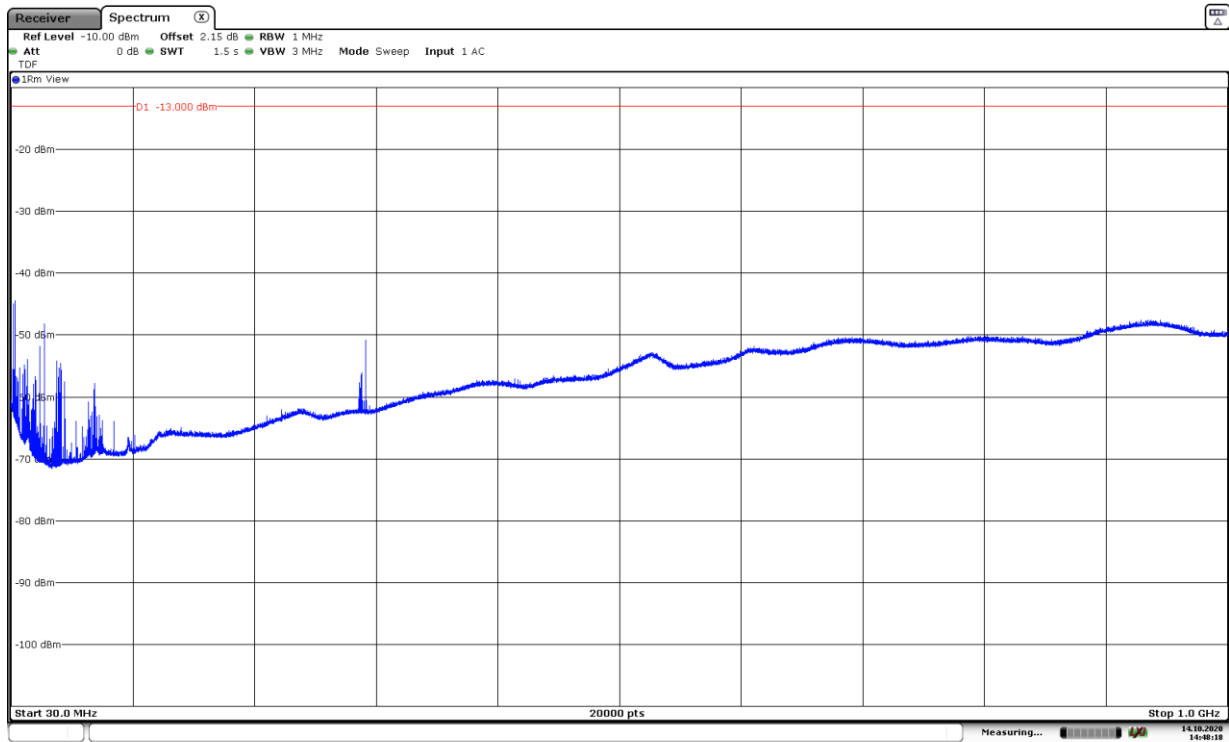
Verdict: PASS

FREQUENCY RANGE 30 MHz - 1 GHz

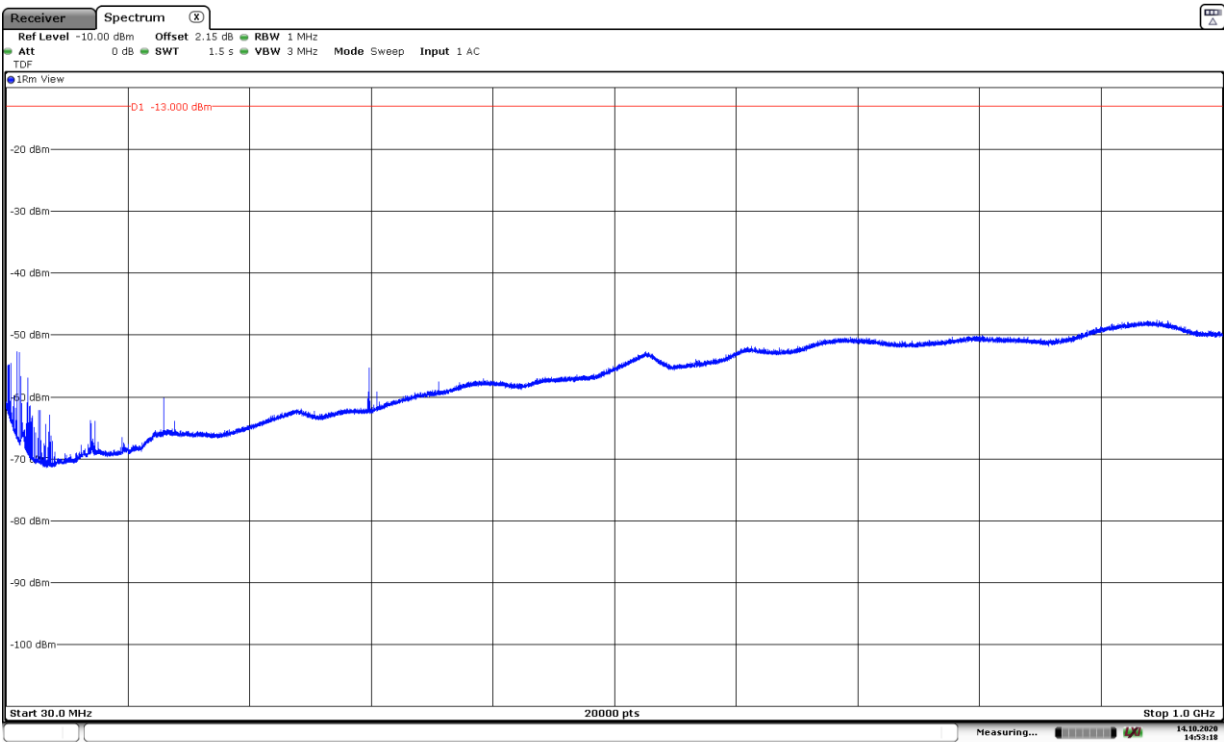
- Low Channel:



- Middle Channel:

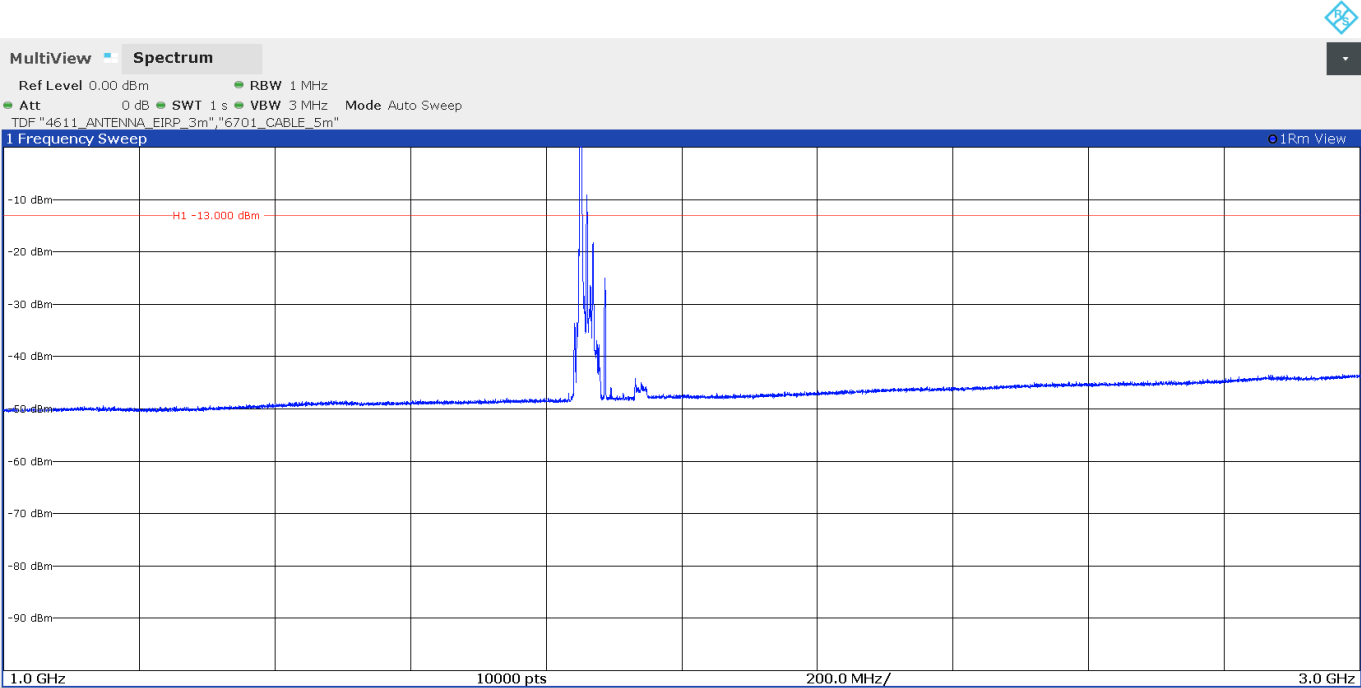


- High Channel:



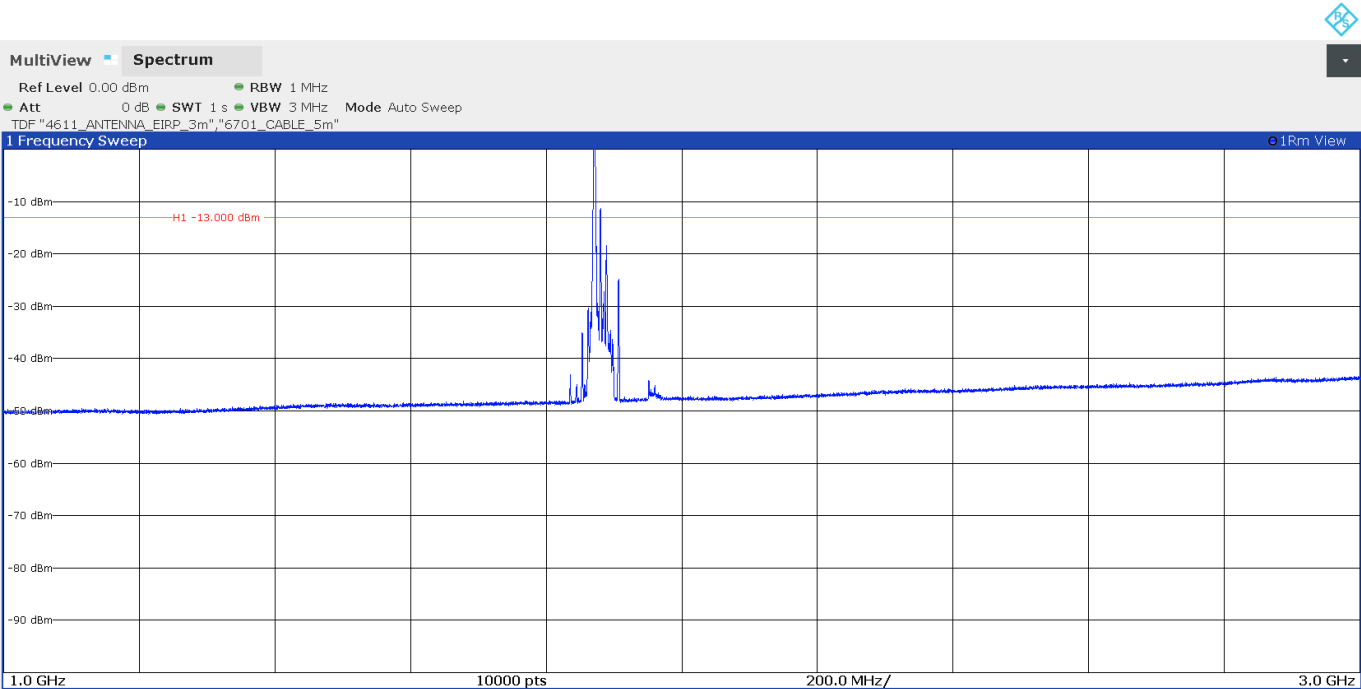
FREQUENCY RANGE 1 - 3 GHz

- Low Channel:



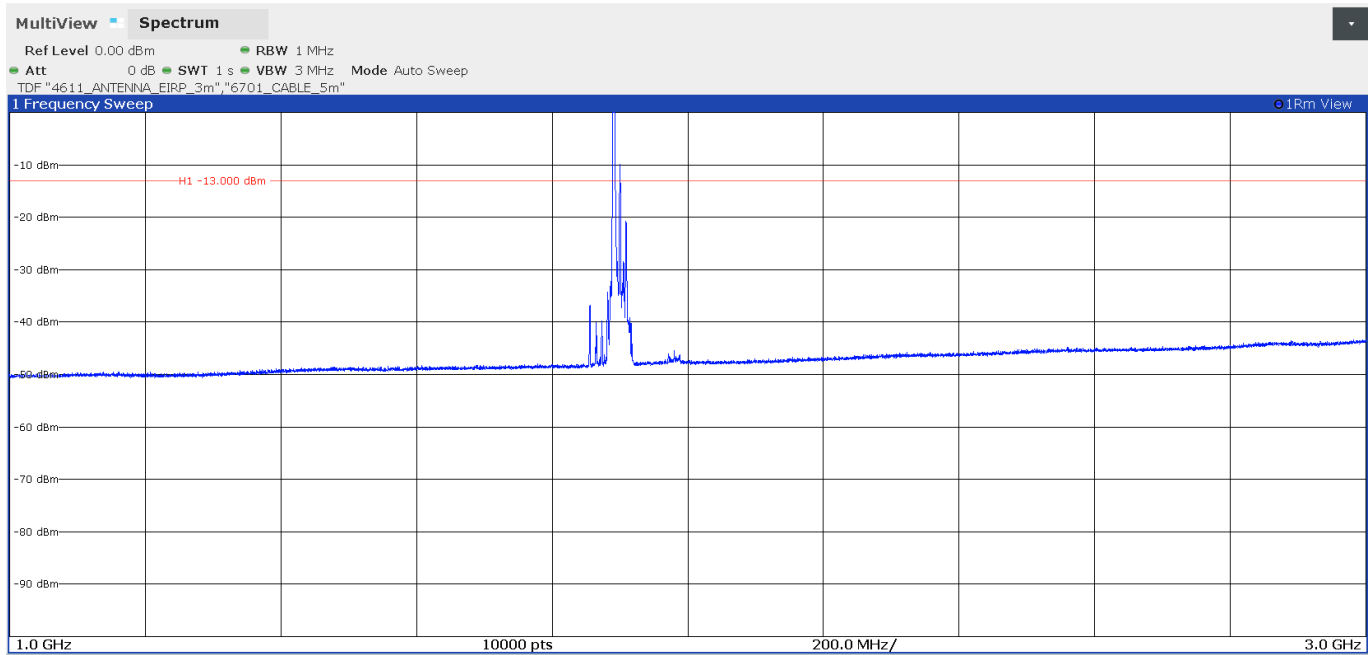
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

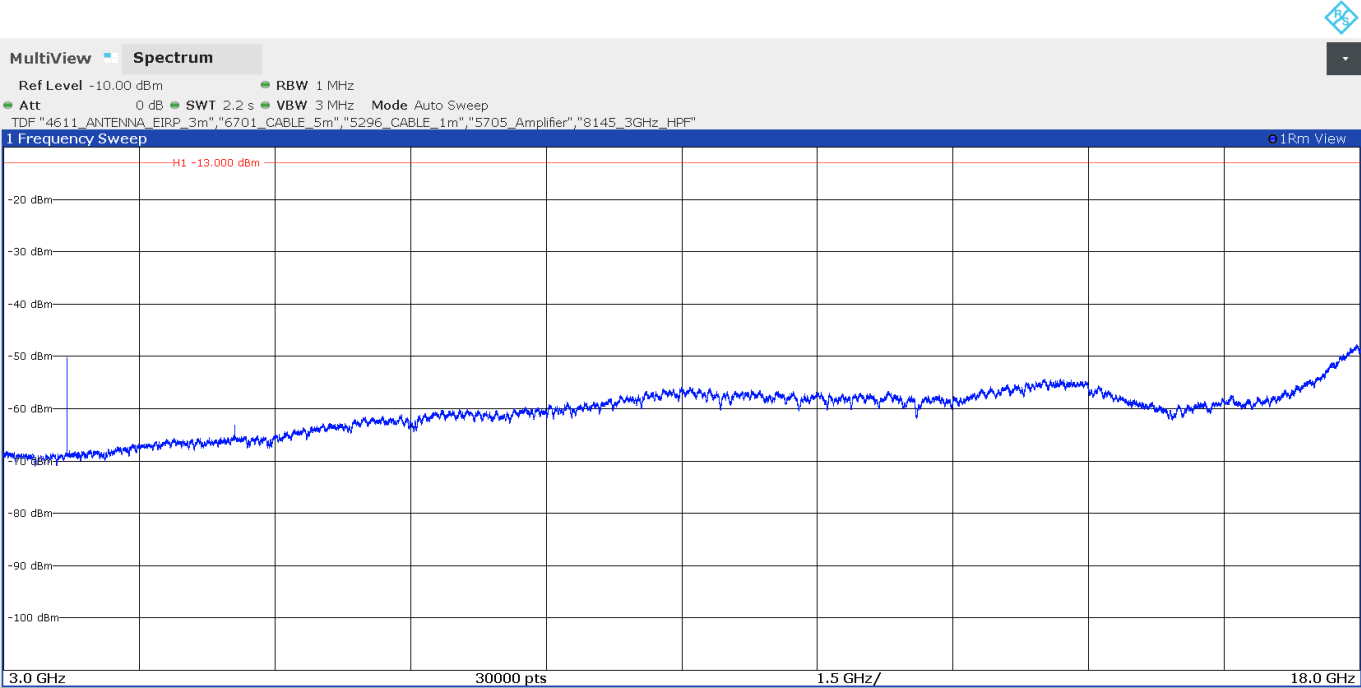
- High Channel:



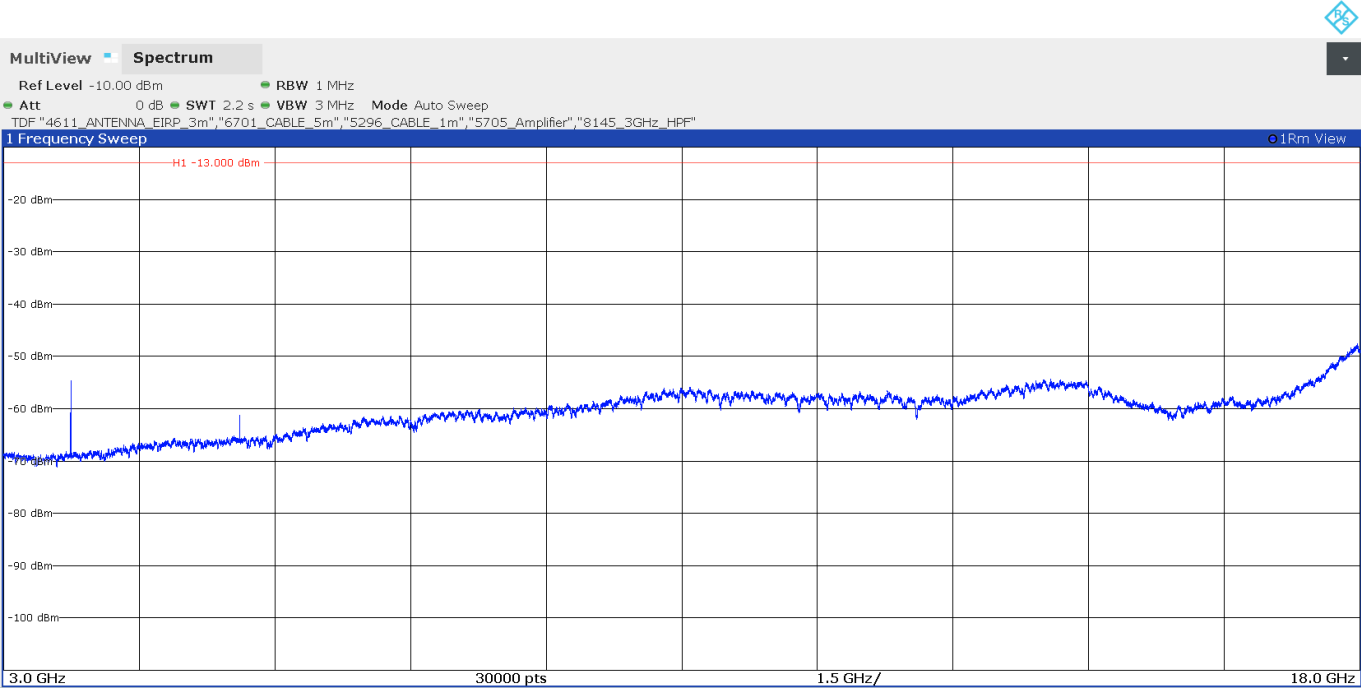
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 - 18 GHz

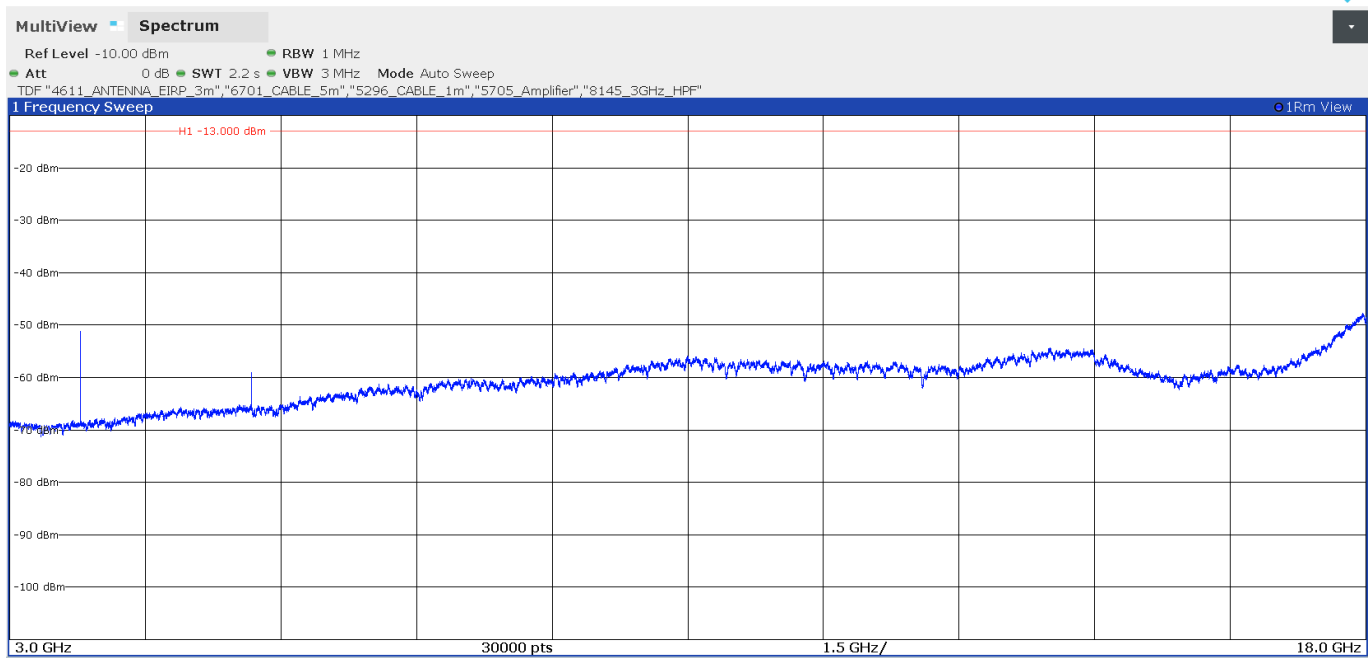
- Low Channel:



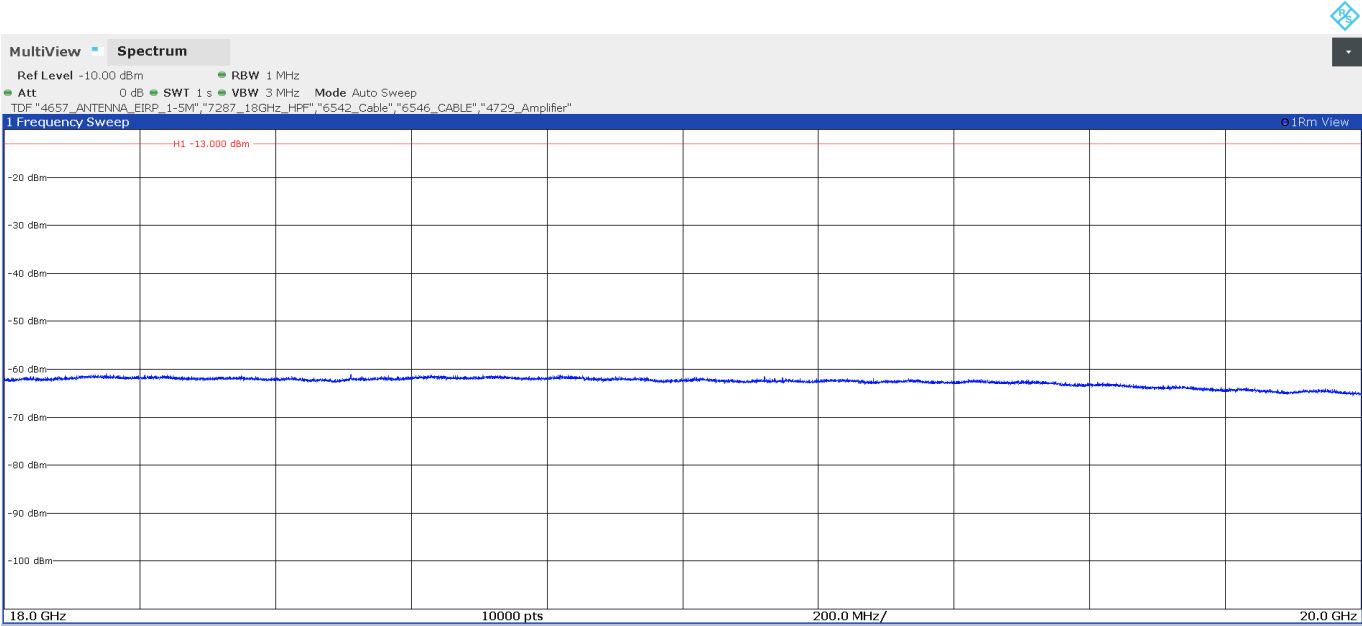
- Middle Channel:



- High Channel:



FREQUENCY RANGE 18 - 20 GHz



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

Appendix C: Test results FCC Part 27 / RSS-130, RSS-139

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TEST CONDITIONS

POWER SUPPLY (V):

Vnominal: 230 Vac
Type of Power Supply: AC voltage

ANTENNA:

Type of Antennas: Internal.
Maximum Declared Gain for 3G Band IV: +4.5 dBi
Maximum Declared Gain for LTE Band 4: +4.5 dBi
Maximum Declared Gain for LTE Band 12: +2.0 dBi

TEST FREQUENCIES:

3G Band IV:

WCDMA and HSUPA MODULATIONS:

Low Channel (1312): 1712.4 MHz
Middle Channel (1762): 1732.5 MHz
High Channel (1513): 1752.6 MHz

LTE Band 4. QPSK AND 16QAM MODULATION:

	Channel (Frequency in MHz)					
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Low	19957 (1710.7)	19965 (1711.5)	19975 (1712.5)	20000 (1715.0)	20025 (1717.5)	20050 (1720.0)
Middle	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)
High	20393 (1754.3)	20385 (1753.5)	20375 (1752.5)	20350 (1750.0)	20325 (1747.5)	20300 (1745.0)

LTE Band 12. QPSK AND 16QAM MODULATION:

	Channel (Frequency in MHz)			
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz
Low	23017 (699.7)	23025 (700.5)	23035 (701.5)	23060 (704.0)
Middle	23095 (707.5)	23095 (707.5)	23095 (707.5)	23095 (707.5)
High	23173 (715.3)	23165 (714.5)	23155 (713.5)	23130 (711.0)

Radiated emissions

SPECIFICATION:

1. 3G Band IV and LTE Band 4. FCC §2.1053 & §27.53 (h) / RSS-139 Issue 3 Clause 6.6.

FCC §27.53 (h):

(h) Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 MHz, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

RSS-139 Clause 6.6:

i. In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} p$ (watts) dB.

ii. After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} P$ (watts) dB.

3G Band IV and LTE Band 4 MEASUREMENT LIMIT:

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

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

2. LTE Band 12. FCC §2.1053 & §27.53 (g) / RSS-130 Issue 2 Clause 4.7.1.

FCC §27.53 (g):

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

RSS-130 Issue 2 Clause 4.7.1:

4.7.1. The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts), dB. However, in the 100 kHz band immediately outside the equipment's operating frequency range, a resolution bandwidth of 30 kHz may be employed.

LTE Band 12 MEASUREMENT LIMIT:

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

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

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 High frequency generated within the equipment.

The EUT was placed on a non-conductive stand at a 3 meter distance from the measuring antenna.

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.

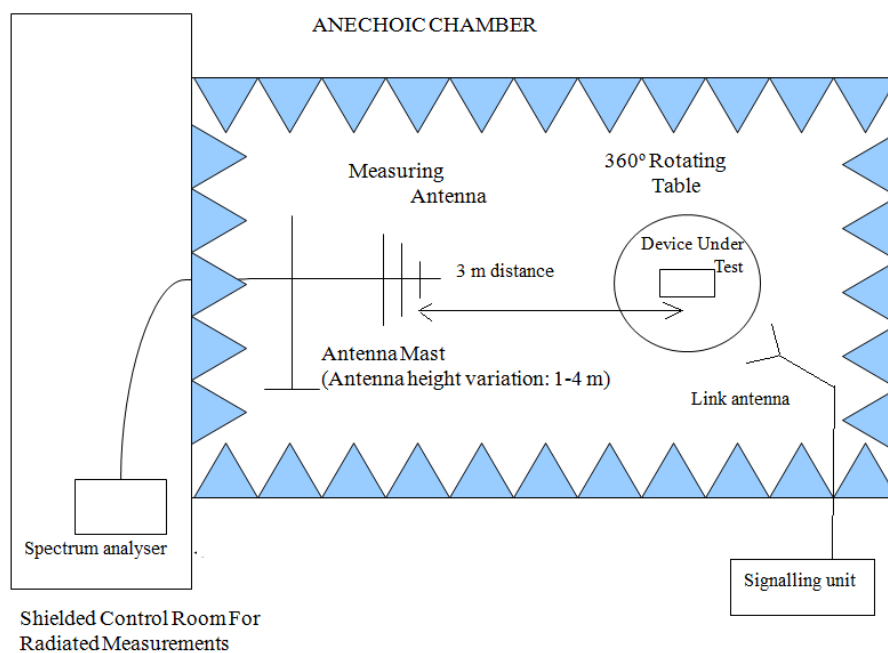
The maximum field strength (dBμV/m) of each detected emission at less than 20 dB respect to the limit is converted to an equivalent EIRP level (dBm) according to ANSI C63.26 with the formula:

$$\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8$$

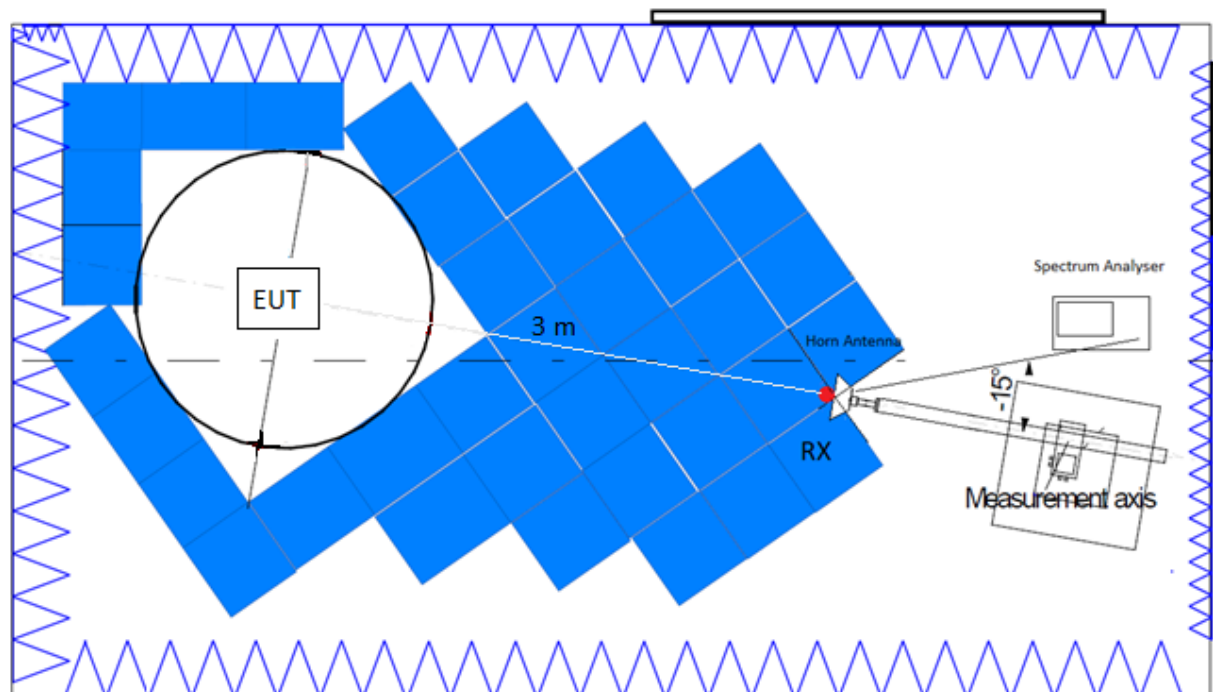
Where D is the measurement distance (in the far field region) in m. D = 3 m

TEST SETUP:

Radiated measurements below 1 GHz:



Radiated measurements above 1 GHz:



RESULTS:

3G Band IV:

WCDMA and HSUPA Modulations:

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

- Low Channel:

Frequency range 30 MHz - 1 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	E.I.R.P (dBm)	Polarization	Detector
32.441	-25.99	V	Peak
40.686	-31.22	V	Peak
45.924	-24.89	V	Peak
56.885	-29.75	V	Peak
156.892	-32.84	V	Peak
556.694	-27.85	V	Peak

Frequency range 1 - 18 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector
1.6984	-29.65	H	Peak
1.7028	-22.42	H	Peak
1.7042	-18.57	H	Peak
1.7085	-13.50	H	Peak

- Middle Channel:

Frequency range 30 MHz - 1 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	E.I.R.P (dBm)	Polarization	Detector
34.963	-32.00	V	Peak
38.931	-28.20	H	Peak
40.137	-26.47	V	Peak
47.735	-30.31	V	Peak
58.049	-32.09	V	Peak
401.785	-32.42	V	Peak

Frequency range 1 - 18 GHz

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

- High Channel:

Frequency range 30 MHz - 1 GHz

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	E.I.R.P (dBm)	Polarization	Detector
33.451	-28.27	V	Peak
46.539	-29.74	V	Peak
80.877	-32.36	V	Peak

Frequency range 1 - 18 GHz

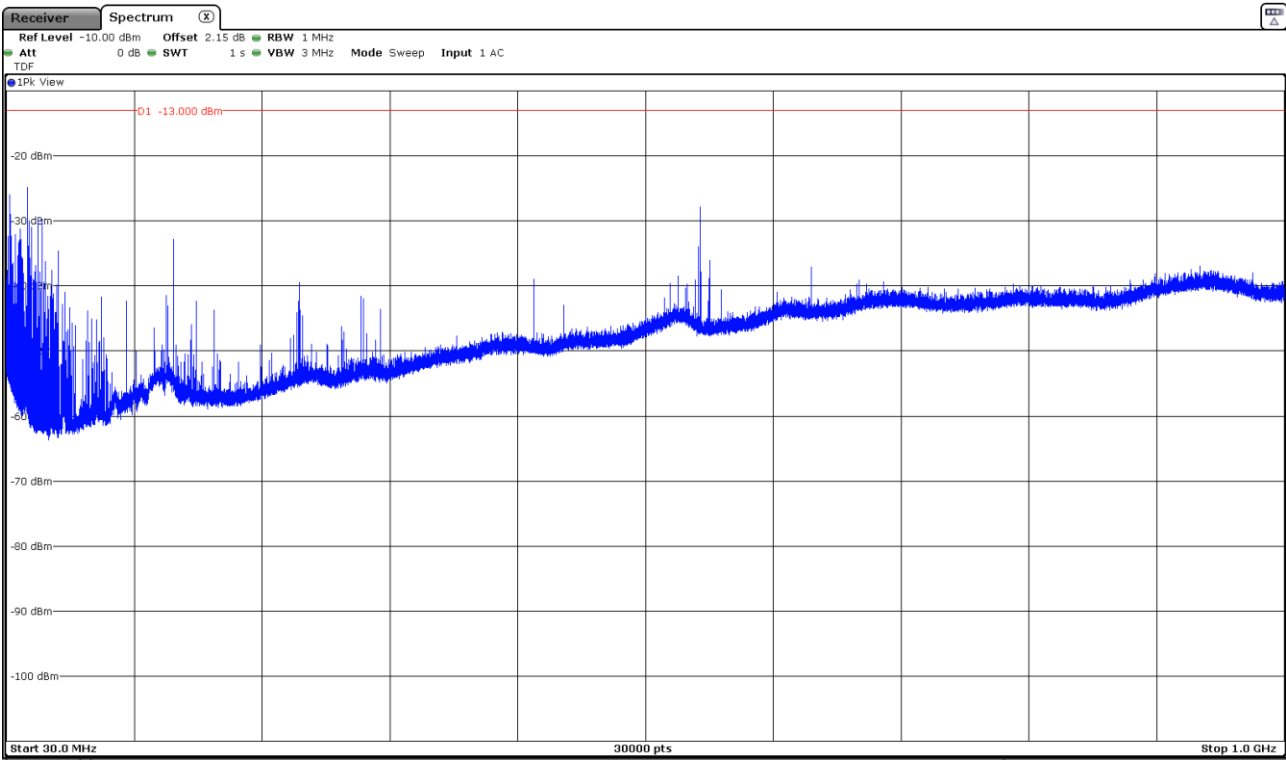
Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector
1.7565	-13.30	H	Peak
1.7572	-16.36	H	Peak
1.7602	-18.40	H	Peak
1.7618	-22.18	H	Peak

Measurement uncertainty (dB) $< \pm 5.07$ for $f < 1$ GHz
 $< \pm 4.00$ for $f \geq 1$ GHz up to 3 GHz
 $< \pm 4.99$ for $f \geq 3$ GHz

Verdict: PASS

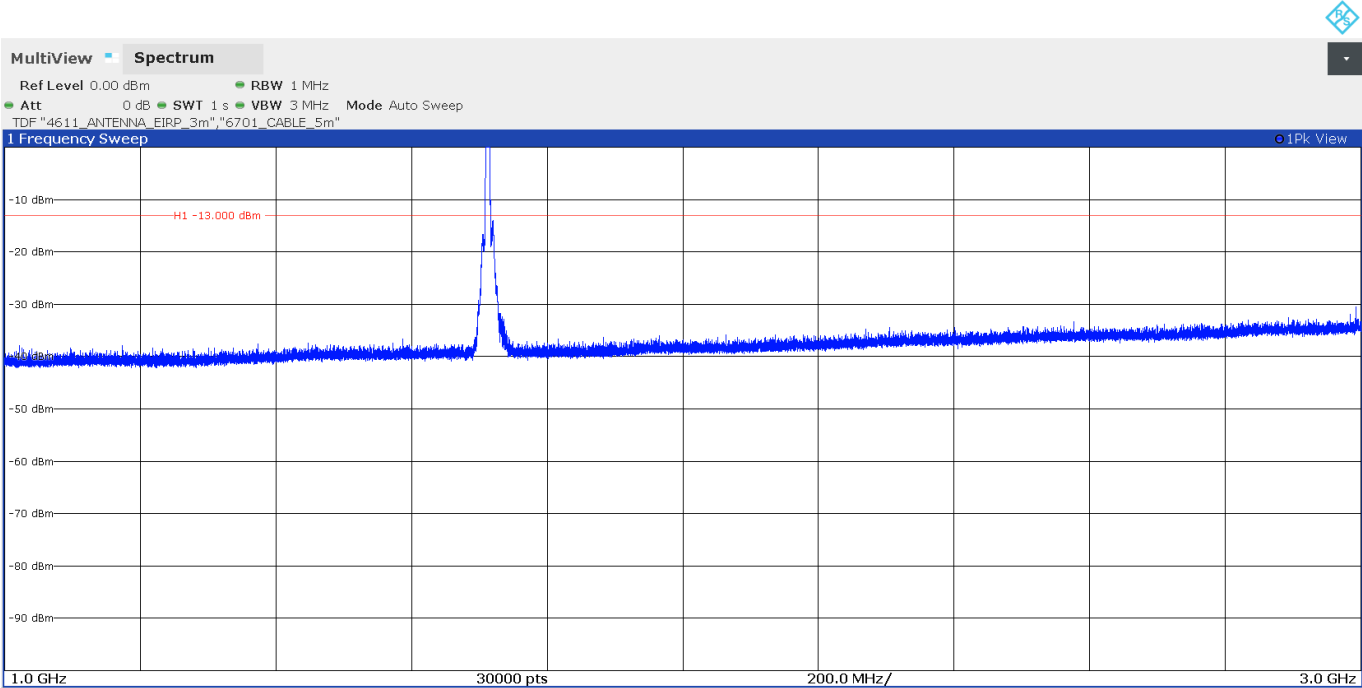
FREQUENCY RANGE 30 MHz - 1 GHz



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

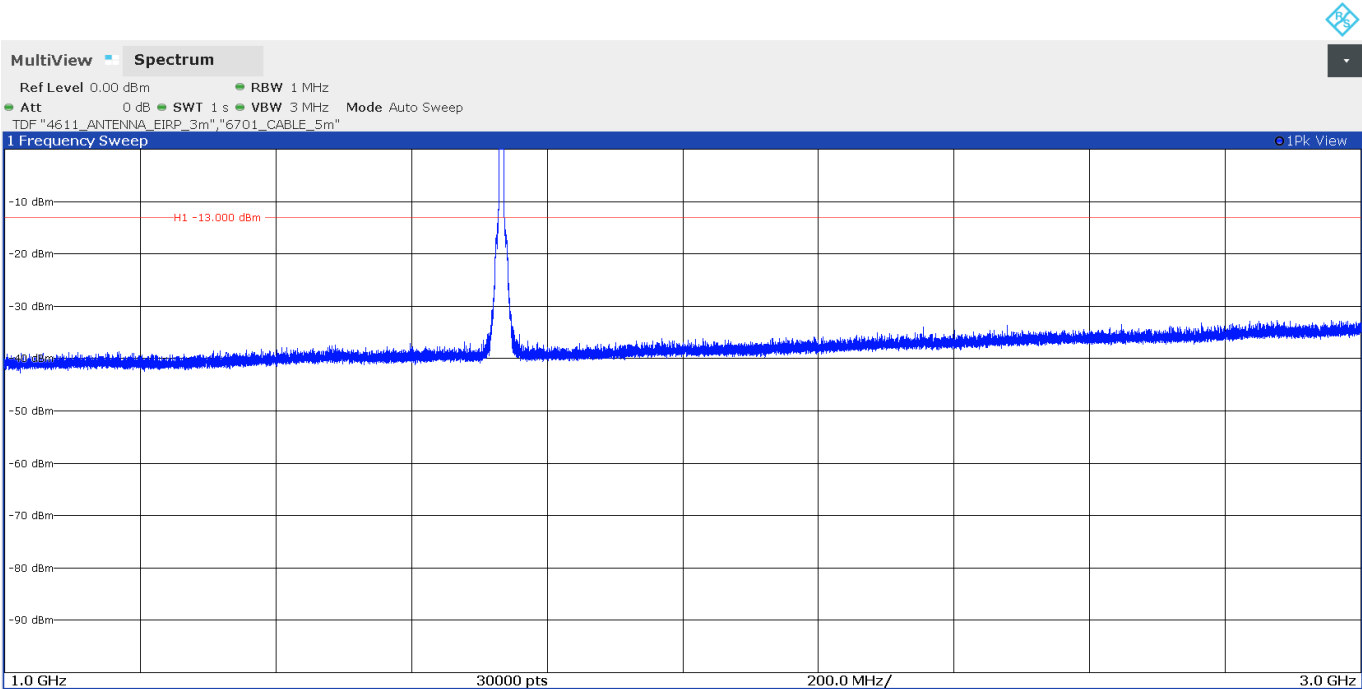
FREQUENCY RANGE 1 - 3 GHz

- Low Channel:



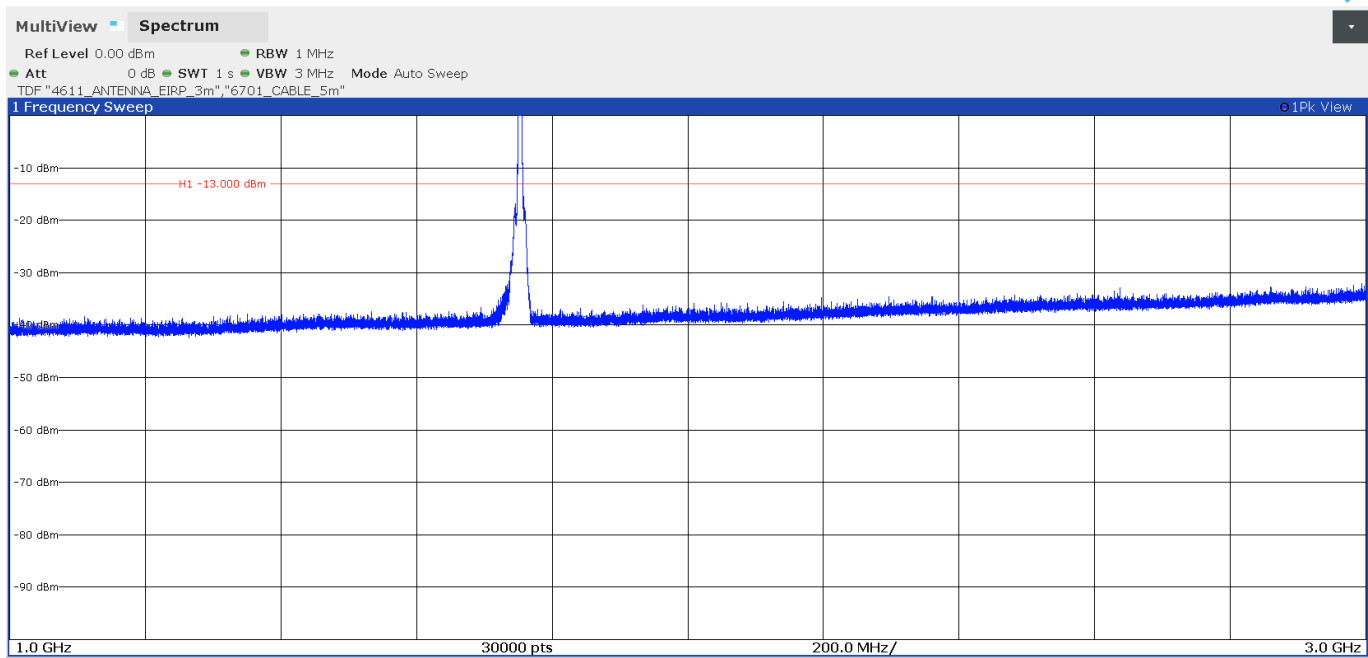
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

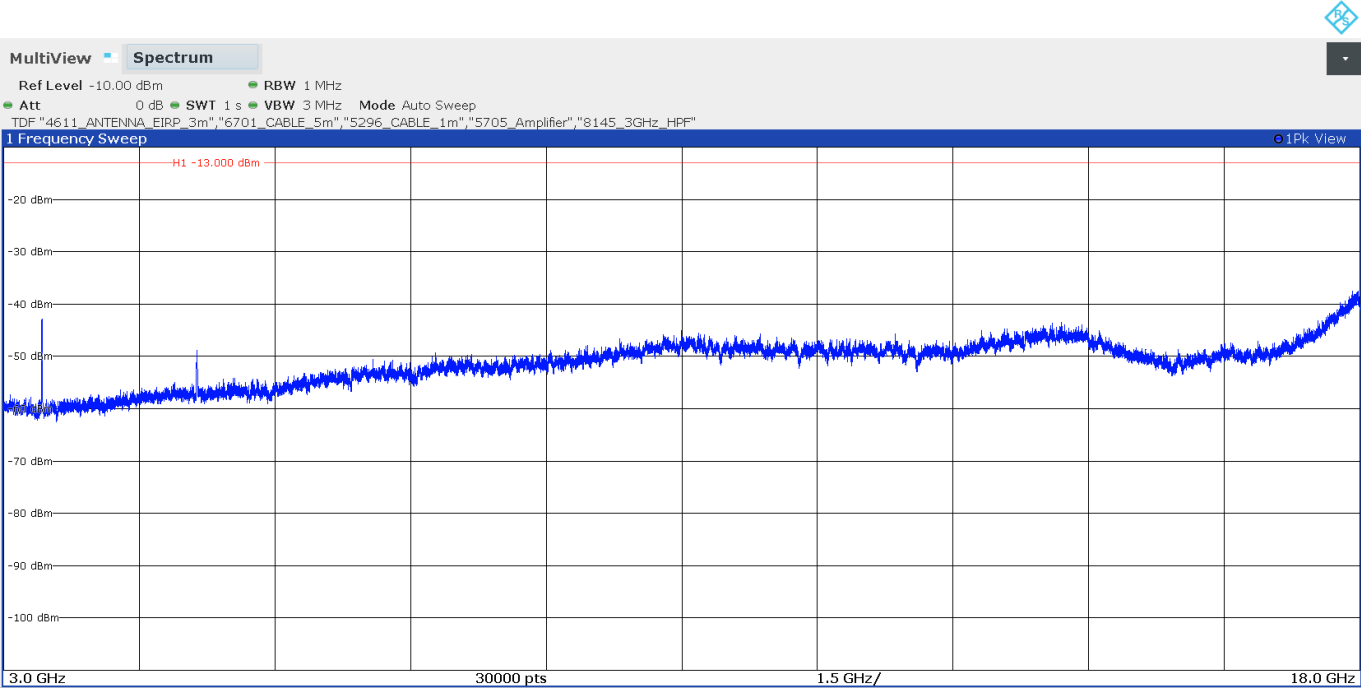
- High Channel:



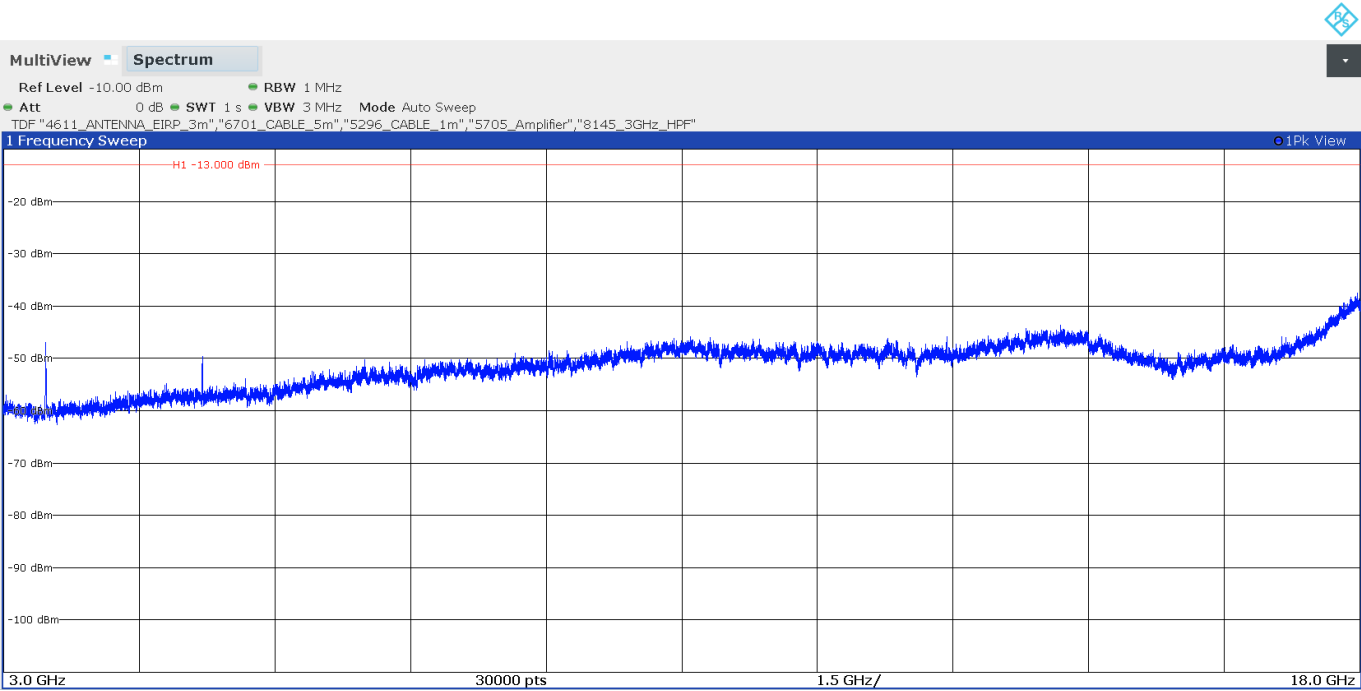
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 - 18 GHz

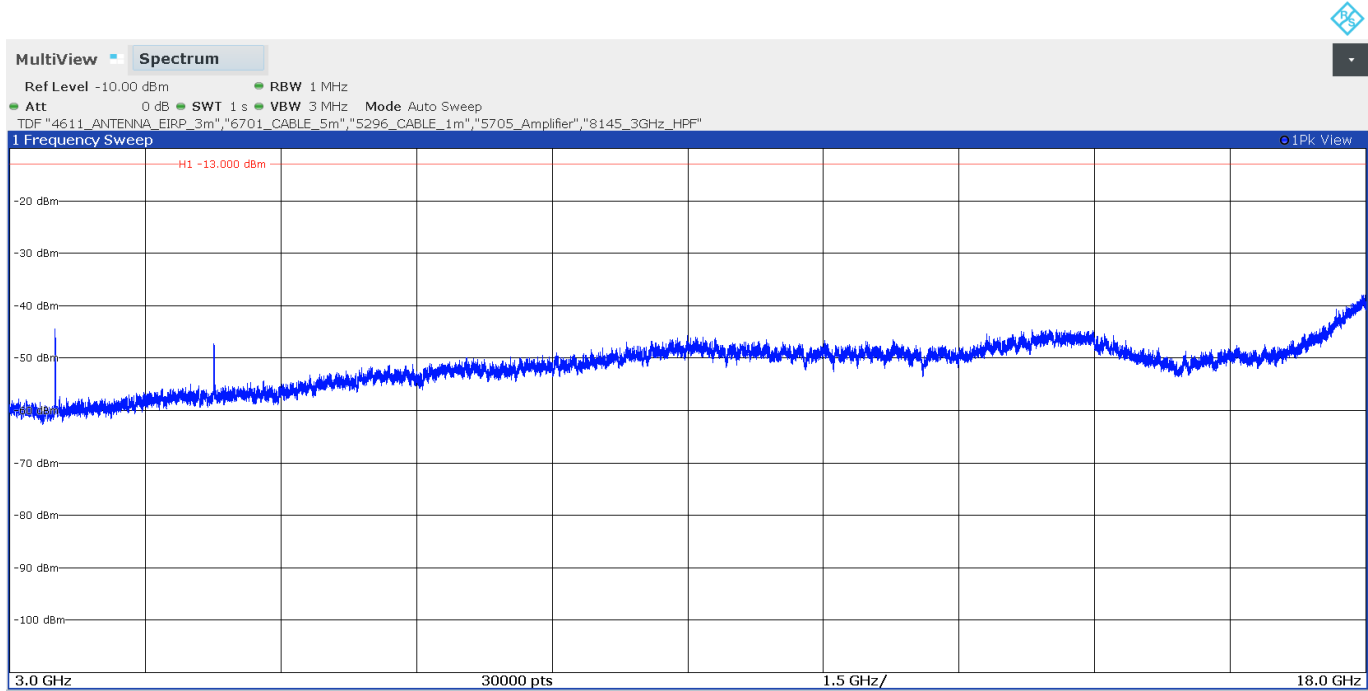
- Low Channel:



- Middle Channel:



- High Channel:



LTE Band 4:

QPSK and 16QAM Modulations:

A preliminary scan determined the QPSK modulation, BW=15 MHz, RB=1, Offset=0 as the worst case. The following tables and plots show the results for this combination.

- 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

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector
1.7085	-13.56	H	RMS

- 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.

- 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

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector
1.7673	-31.53	H	RMS

Measurement uncertainty (dB) $< \pm 4.68$ for $f < 1\text{GHz}$
 $< \pm 4.00$ for $f \geq 1\text{GHz}$ up to 3GHz
 $< \pm 4.99$ for $f \geq 3\text{GHz}$

Verdict: PASS

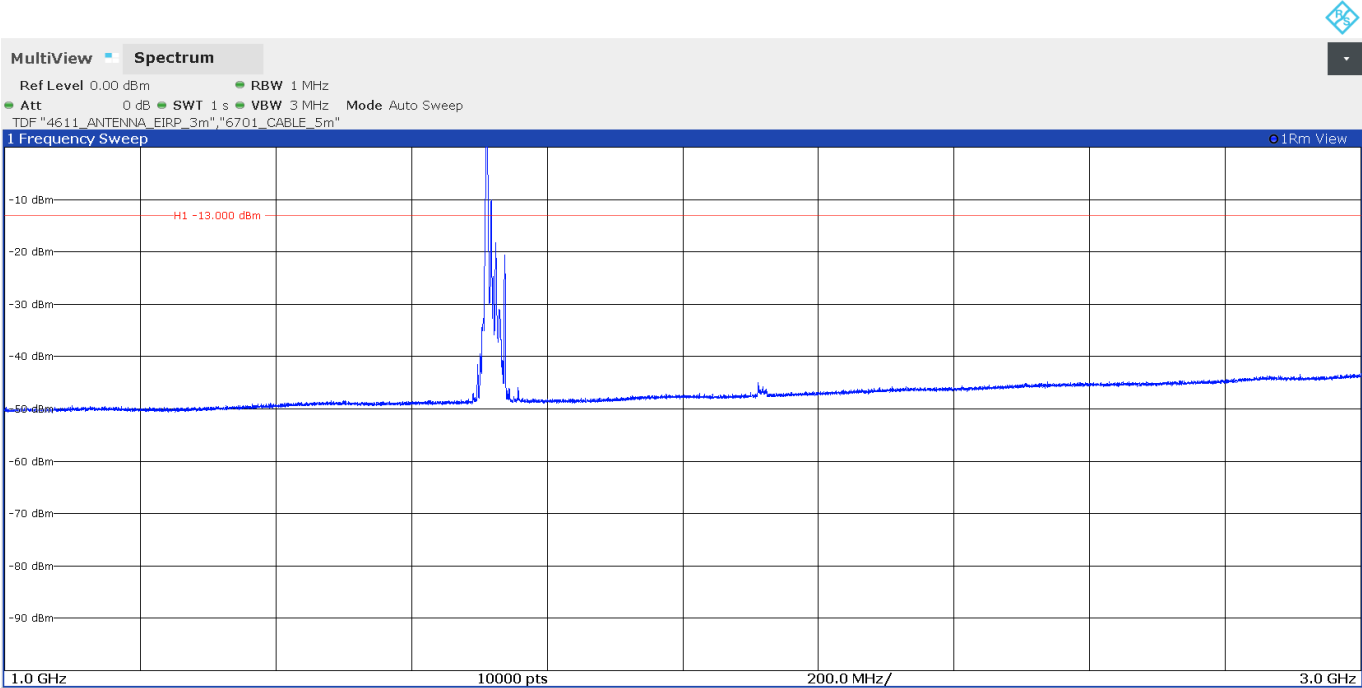
FREQUENCY RANGE 30 MHz - 1 GHz



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

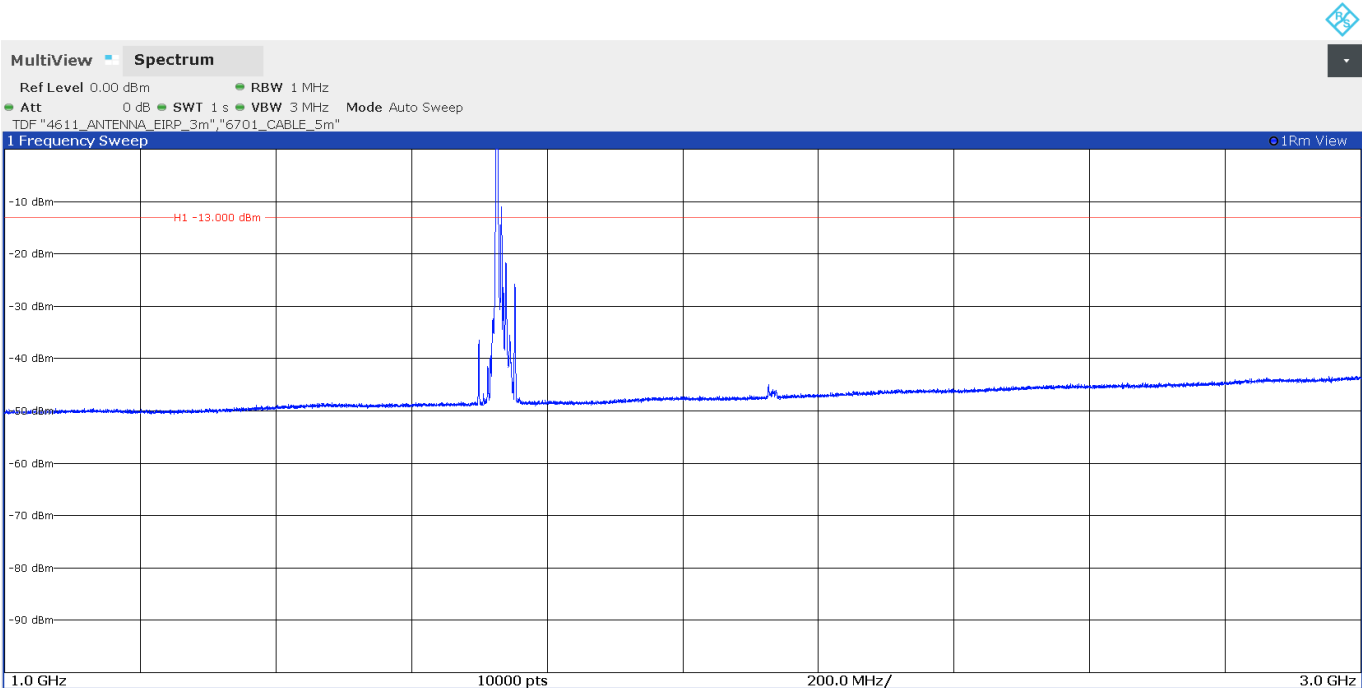
FREQUENCY RANGE 1 - 3 GHz

- Low Channel:



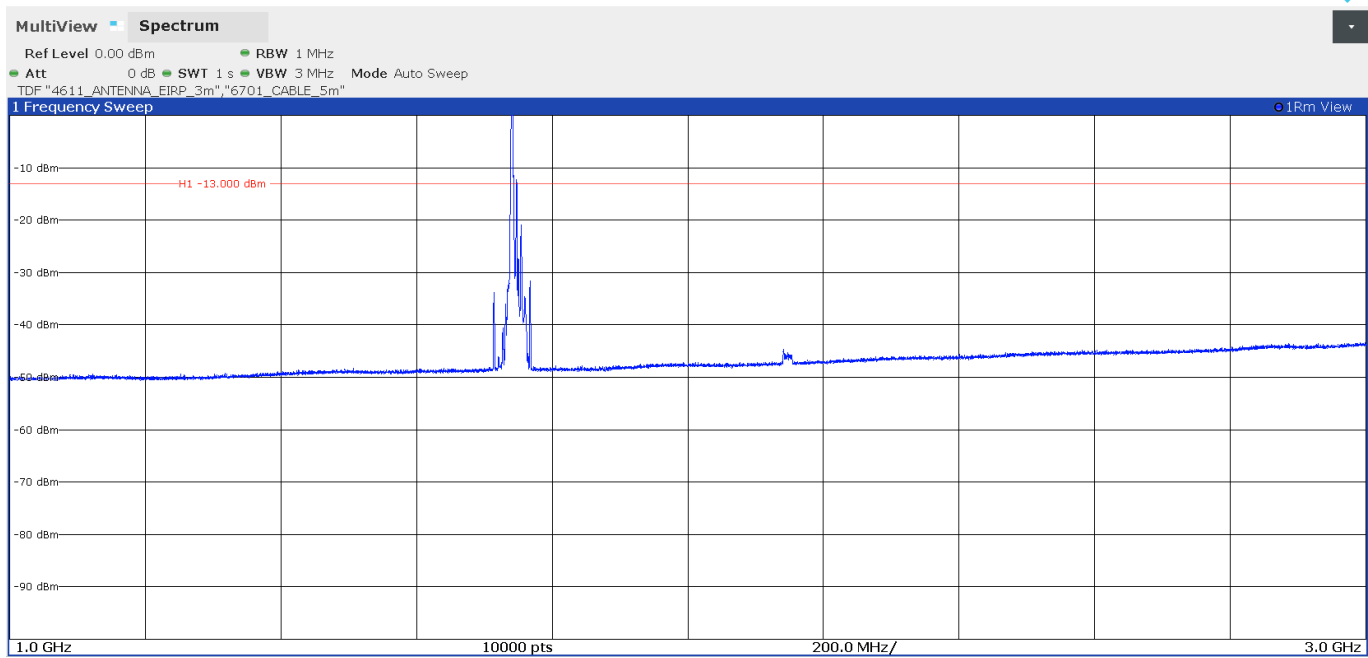
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

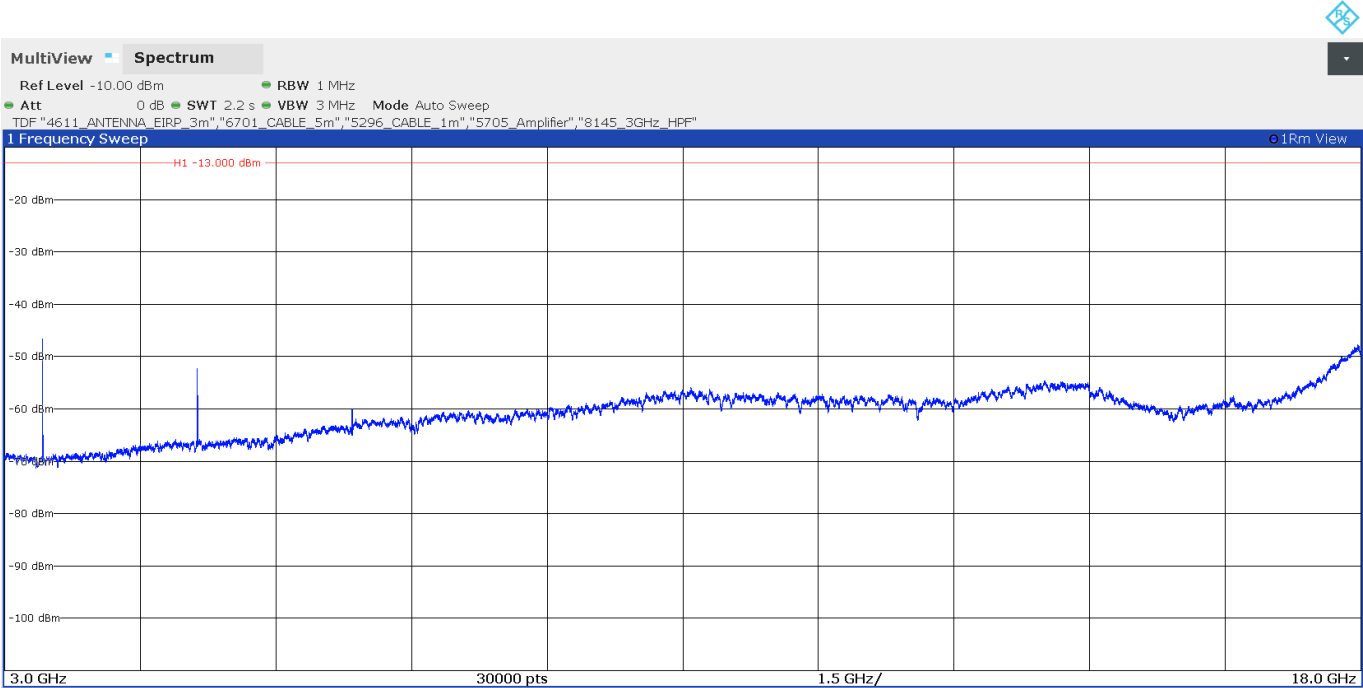
- High Channel:



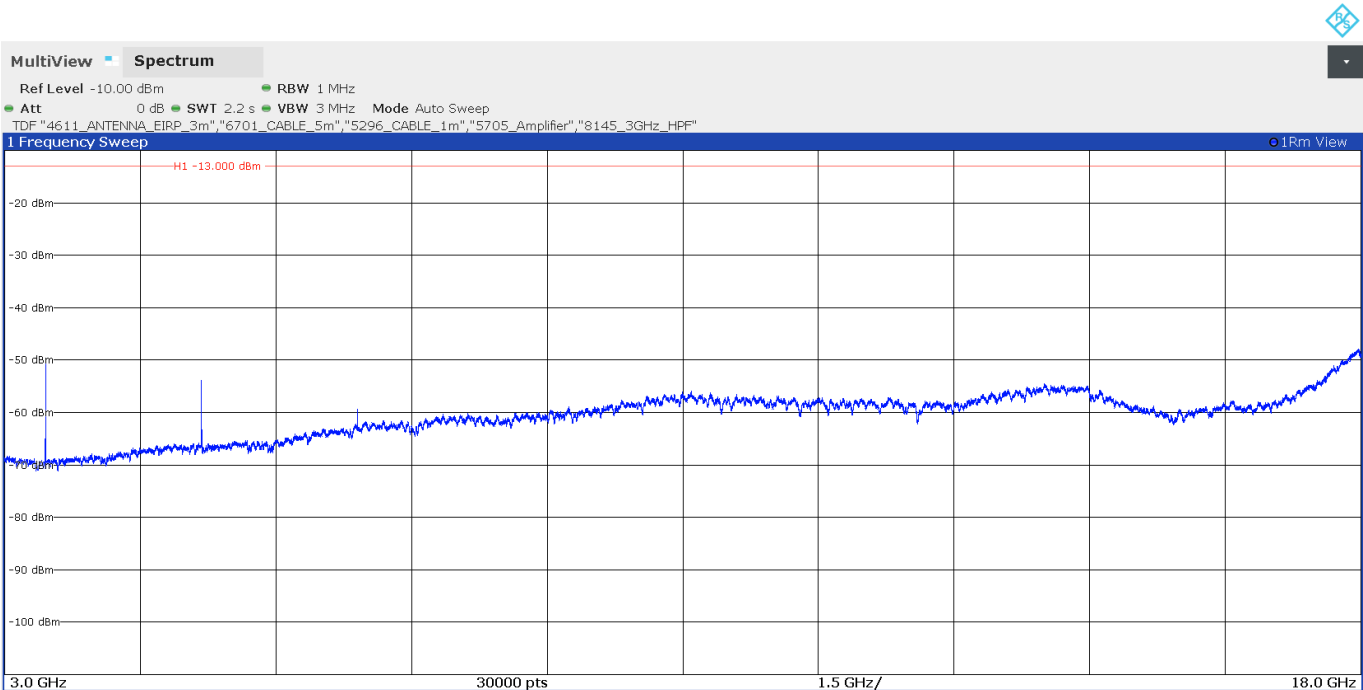
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 – 18 GHz

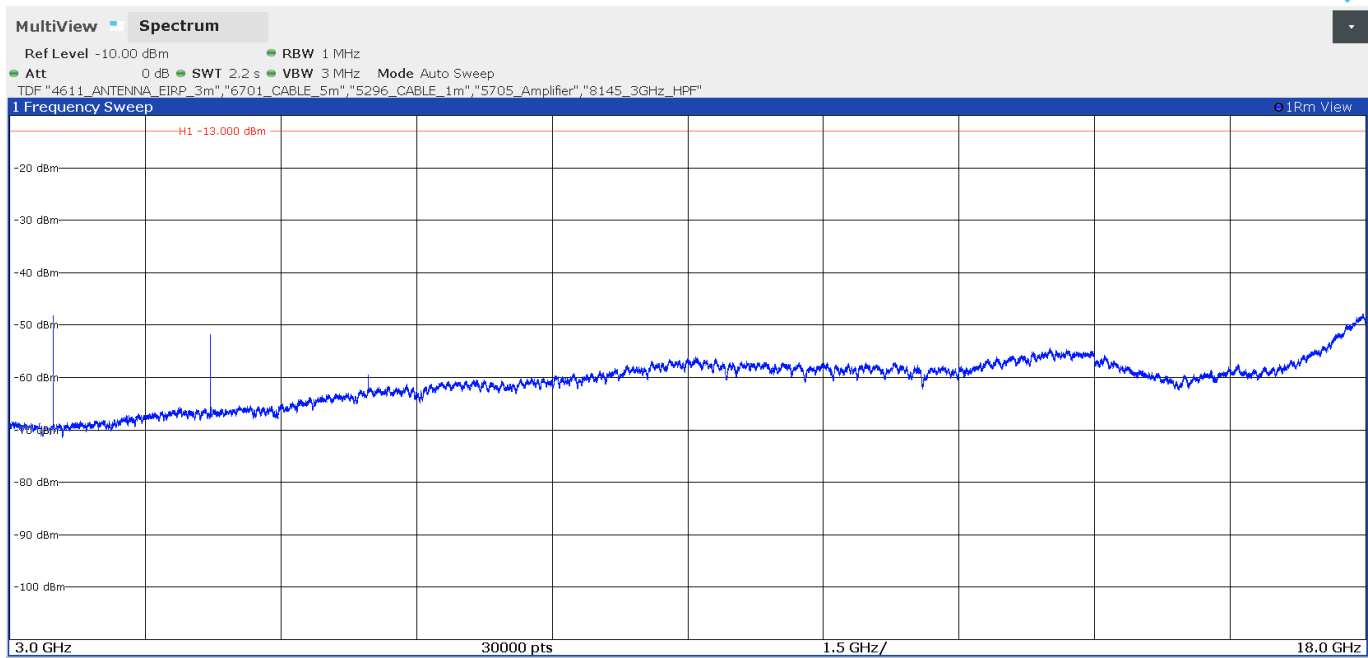
- Low Channel:



- Middle Channel:



- High Channel:



LTE Band 12:

QPSK and 16QAM Modulations:

A preliminary scan determined the QPSK modulation, BW=1.4 MHz, RB=1, Offset=0 as the worst case. The following tables and plots show the results for this combination.

- Low Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 8 GHz

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

- Middle Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 8 GHz

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

- High Channel:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 8 GHz

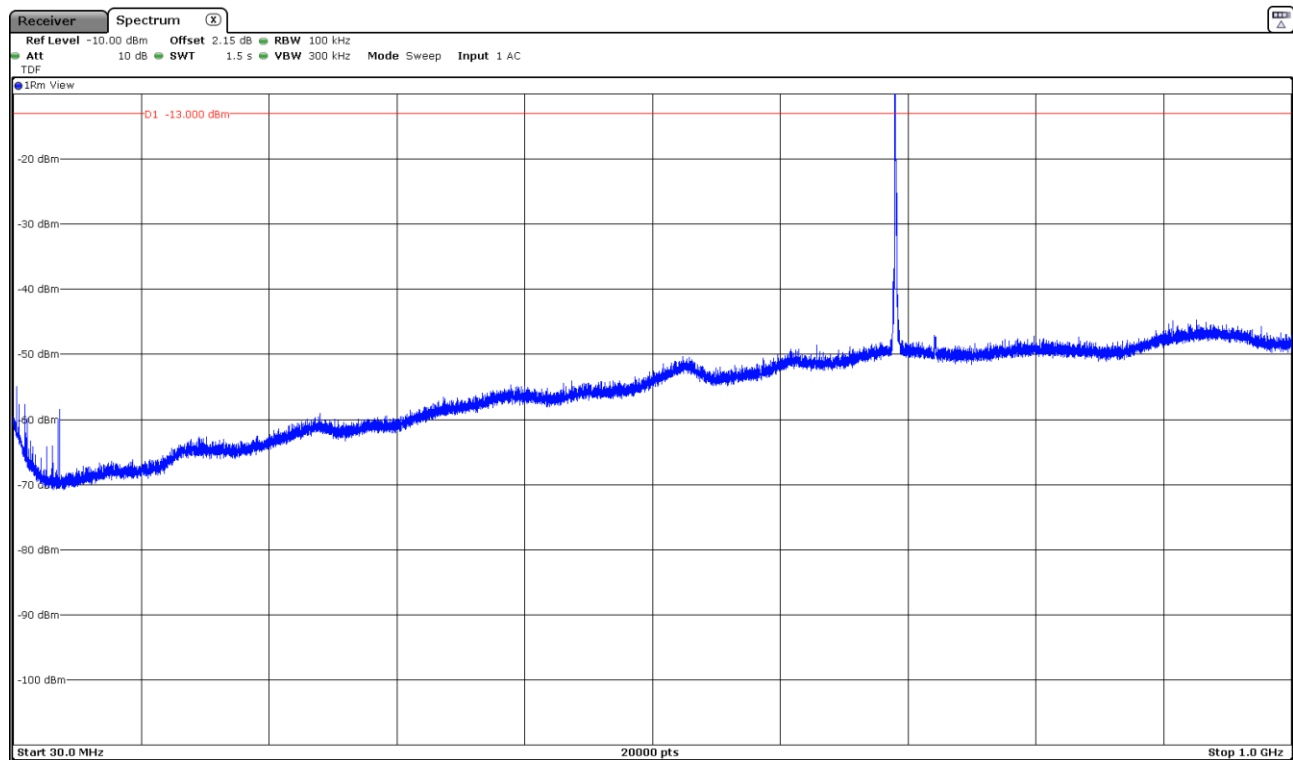
No spurious frequencies at less than 20 dB below the limit.

Measurement uncertainty (dB) $\leq \pm 4.68$ for $f < 1\text{GHz}$
 $\leq \pm 4.99$ for $f \geq 1\text{GHz}$ up to 8 GHz

Verdict: PASS

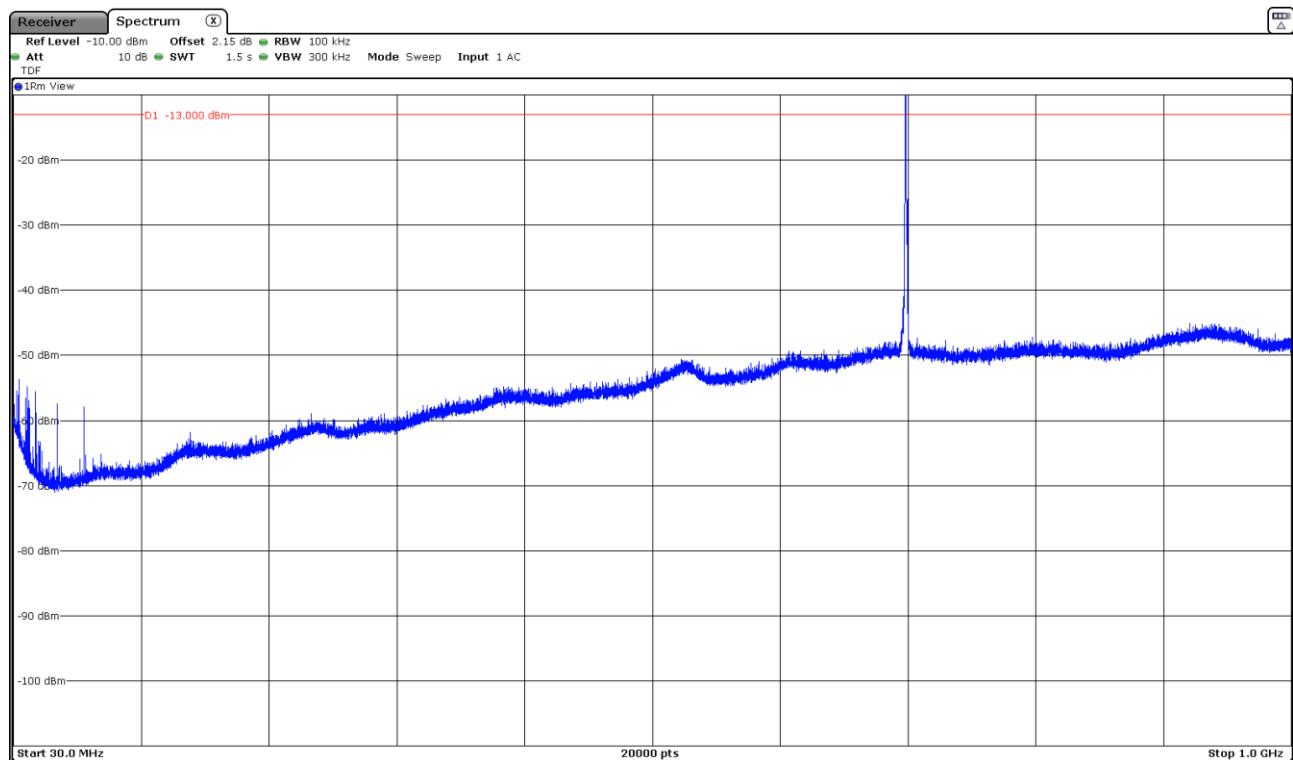
FREQUENCY RANGE 30 MHz - 1 GHz

- Low Channel:



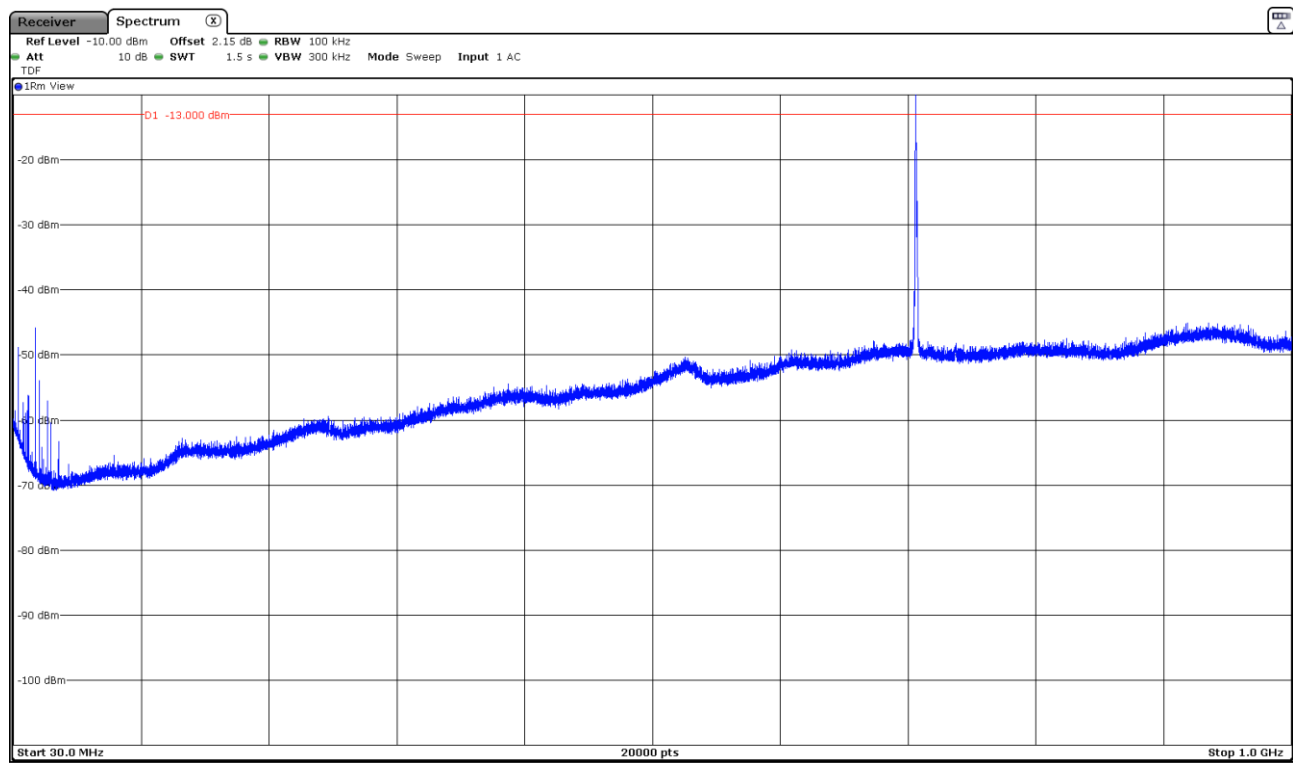
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

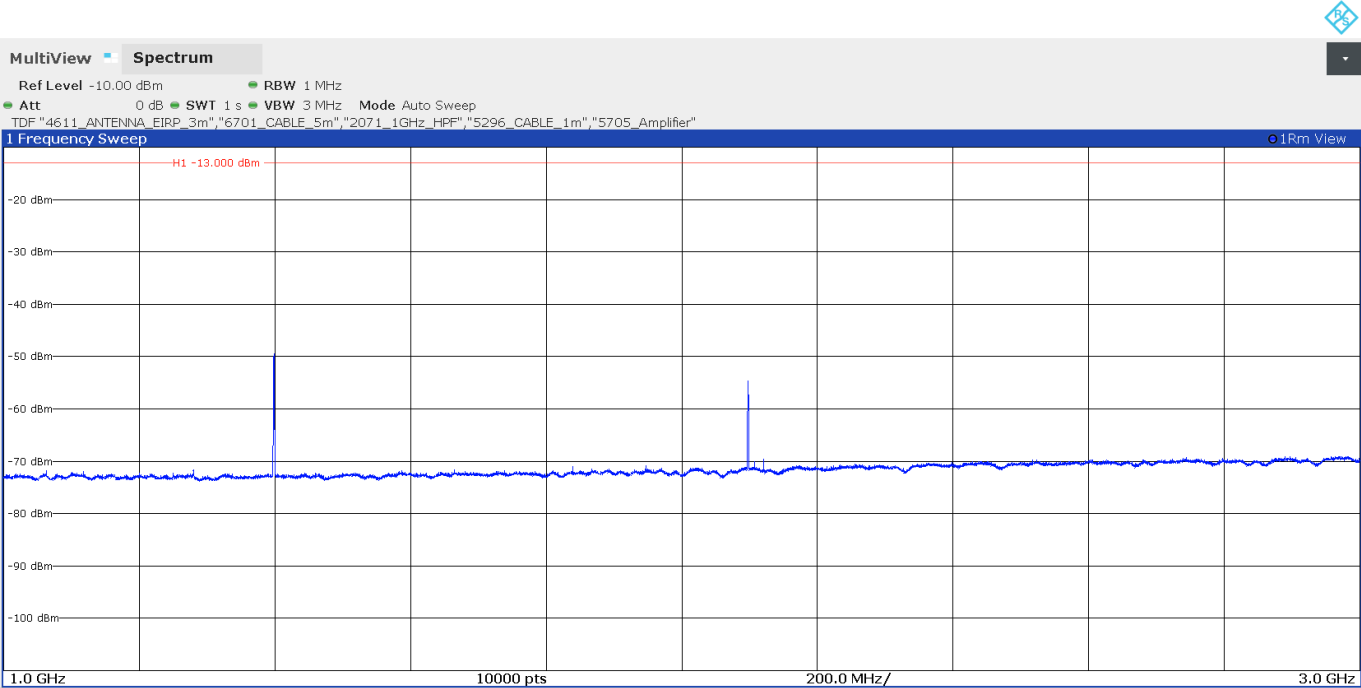
- High Channel:



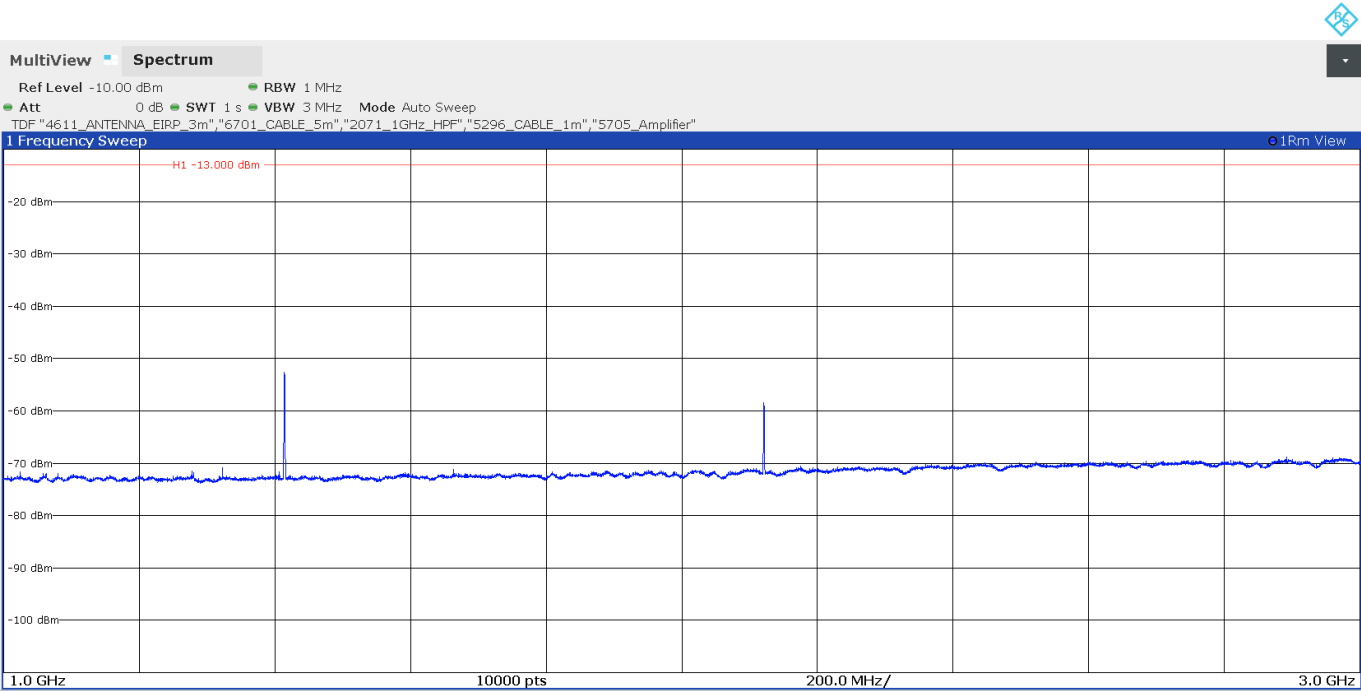
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 1 - 3 GHz

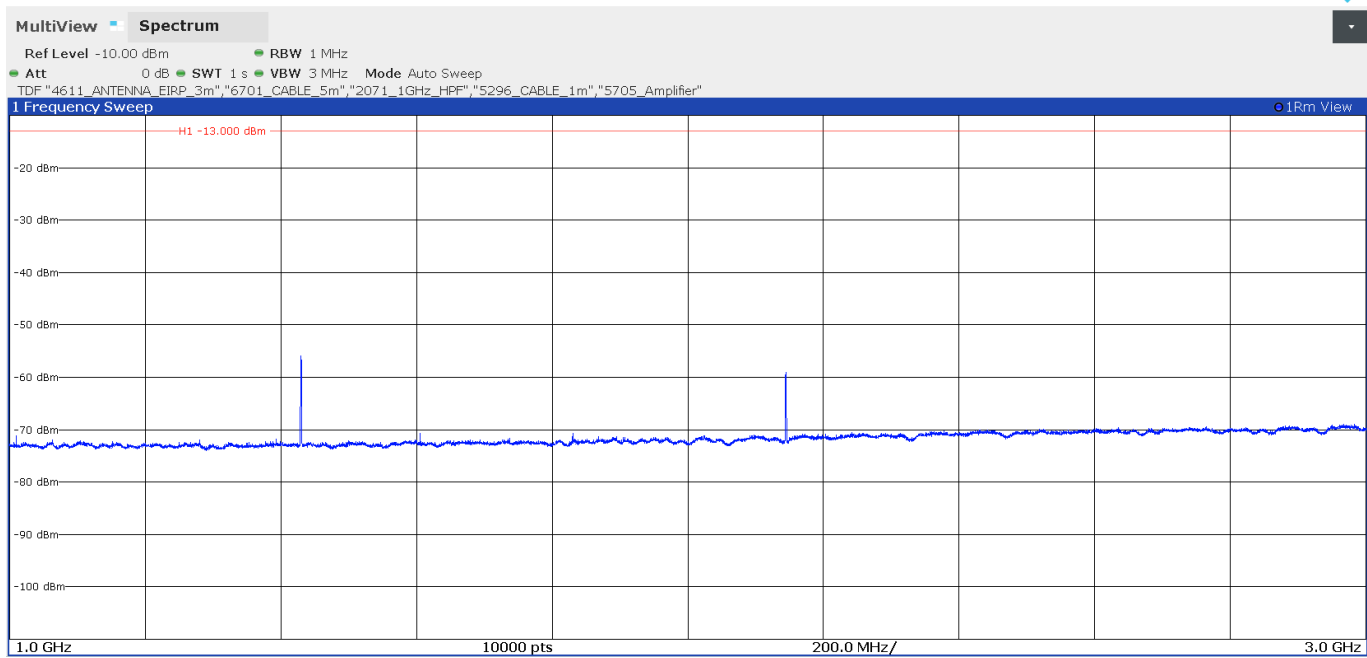
- Low Channel:



- Middle Channel:

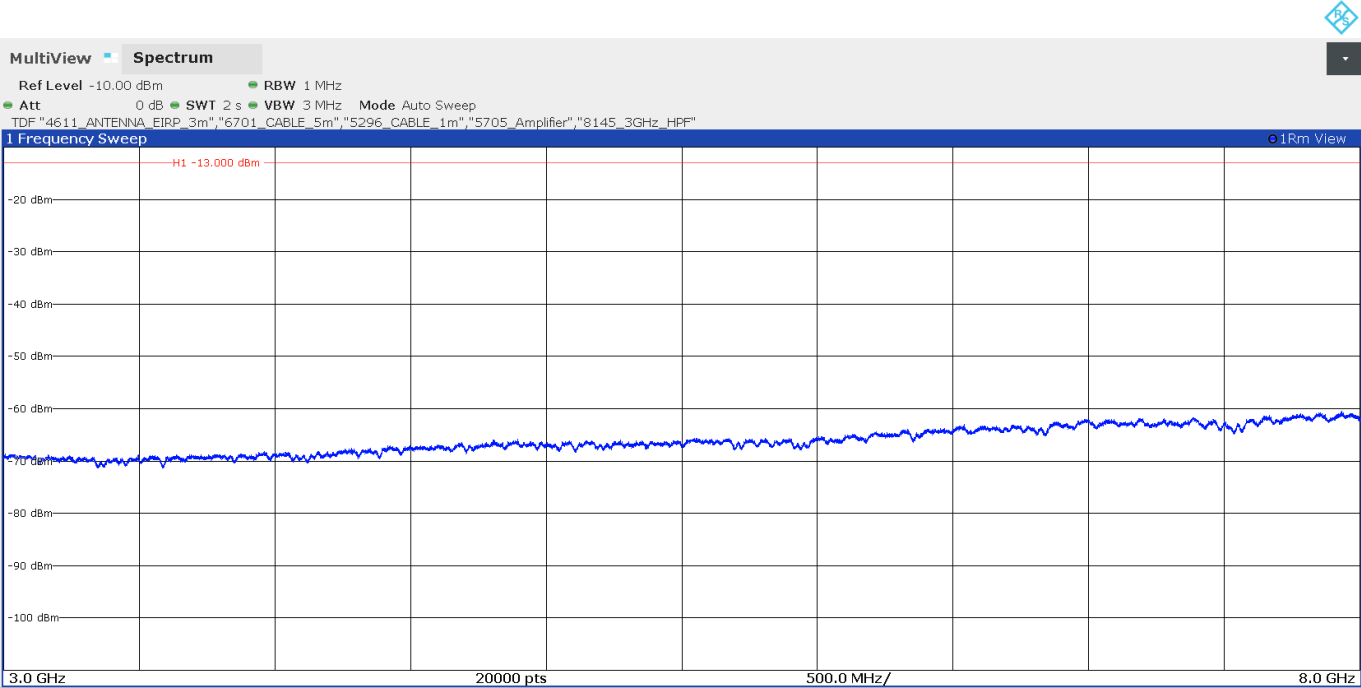


- High Channel:

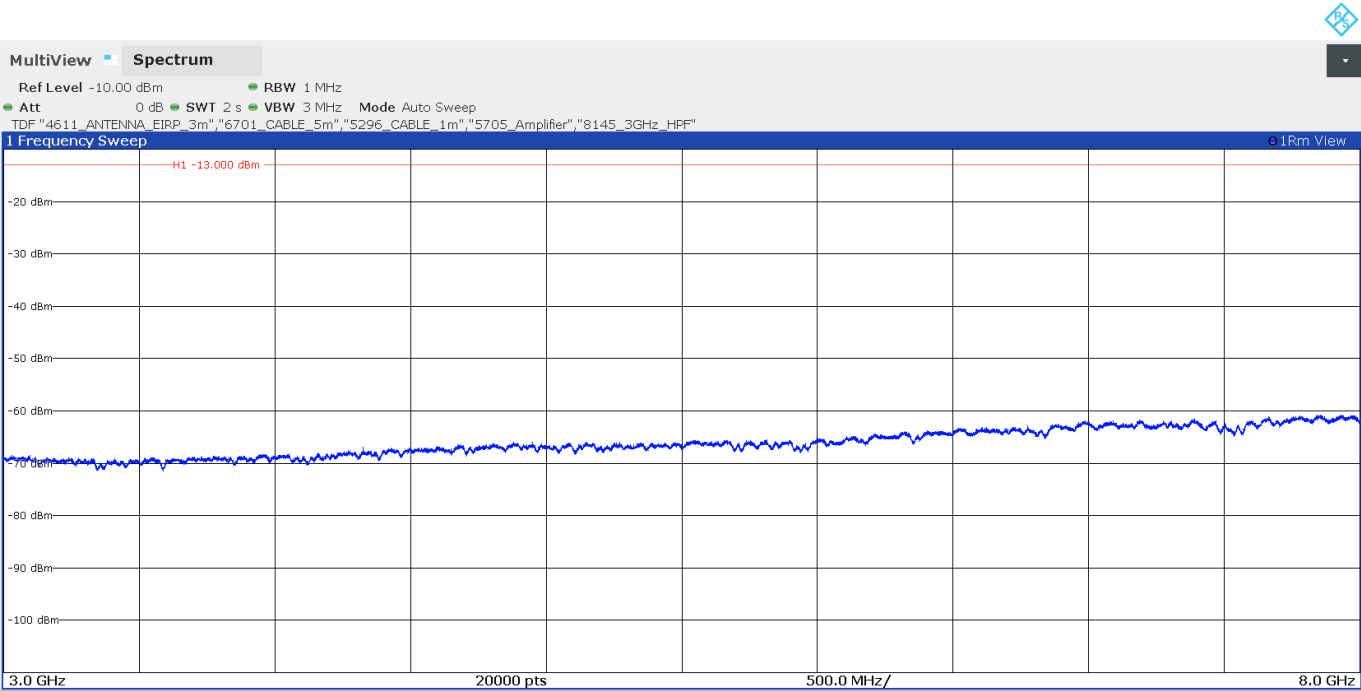


FREQUENCY RANGE 3 - 8 GHz

- Low Channel:



- Middle Channel:



- High Channel:

