

ISED CABid: ES1909  
 Lab. Company Number: 4621A

Test Report No:  
 NIE: 72943RRF.003A1

## Partial Test Report

### USA FCC Part 27

### CANADA RSS-130, RSS-139

(*) Identification of item tested	Continuous Positive Airway Pressure (CPAP) Device
(*) Trademark	ResMed
(*) Model and /or type reference	39485
(*) Derived model not tested	39517, 39518, 39519, 39520, 39521, 39522
Other identification of the product	FCC ID: 2ACHL-AIR11M1G22 IC: 9103A-AIR11M1G22
(*) Features	LTE Cat-M1, BLE HW version: R390-7654 SW version: SW04600
Applicant	ResMed Pty Ltd 1 Elizabeth Macarthur Drive, Bella Vista, NSW, 2153 Australia
Test method requested, standard	USA FCC Part 27 (10-1-21 Edition). CANADA RSS-130 Issue 2, Feb. 2019. CANADA RSS-139 Issue 3, Jul. 2015. ANSI C63.26-2015. KDB 971168 D01 Power Meas License Digital Systems v03r01, April. 2018. <ul style="list-style-type: none"> <li>FCC 27.50 / RSS-130 4.6, RSS-139 6.5 RF Output Power.</li> <li>FCC 27.53 / RSS-130 4.7, RSS-139 6.6 Radiated Emissions.</li> </ul>
Approved by (name / position & signature)	Rafael López EMC Consumer & RF Lab. Manager
Date of issue	2022-12-23
Report template No.	FDT08_24 (*) "Data provided by the client"

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## Competences and guarantees

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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 an 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, CABid: ES1909, Company Number: 4621A, with the appropriate scope of accreditation that covers the performed tests in this 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.

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## General conditions

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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

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

## Data provided by the client

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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 39485 is a CPAP device with integrated cellular and Bluetooth connectivity.
3. Derived models not tested. These models have been declared by the supplier of the sample as being the same as the model under test.



Date: 25-Oct-2022

### DECLARATION OF EQUIVALENCE

This document declares that the following designated products are equivalent to the unit under test **39485**.

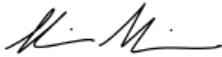
Model Name / Product Code	Marketing Name
39517	AirSense 11 AutoSet USA
39518	AirSense 11 CPAP USA
39519	AirSense 11 Elite USA
39520	AirSense 11 AutoSet CAN
39521	AirSense 11 CPAP CAN
39522	AirSense 11 Elite CAN

All the above stated products and the unit under test - 39485 have the same cellular hardware and firmware.

**Applicant:**

Company Name: ResMed Pty Ltd  
Address: 1 Elizabeth Macarthur Drive,  
Bella Vista NSW 2153  
Australia

By,



**Christopher Jenkins**  
Title: Manager – Systems Engineering  
Company: ResMed Pty Ltd  
Telephone: +61 2 8884 1517  
e-mail: Christopher.jenkins@resmed.com.au

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

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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
72943/046	Continuous Positive Airway Pressure (CPAP) Device	39485	22221830061	2022/09/19
72943/010	Water Tank	HumidAir11	--	2022/08/02
72943/018	AC/DC Adapter	390000	0001RP02	2022/08/02
72943/025	Power Cord	-	--	2022/08/02
66427/006	Climate Line	AIR11	--	2020/12/29

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

- Sample S/02 is composed of the following elements:

Control No.	Description	Model	Serial No.	Date of reception
72943/045	Continuous Positive Airway Pressure (CPAP) Device	39485	22221830059	2022/09/19
72943/020	AC/DC Adapter	390000	0001RG02	2022/08/02

Sample S/02 has undergone the following test(s): The Conducted tests indicated in Appendix A.

## Test sample description

Ports.....:	Port name and description		Cable				
			Specified max length [m]	Attached during test	Shielded	Coupled to patient <sup>(3)</sup>	
	Power		<input checked="" 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~50-60 Hz 2.0A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	AC: 115V~400Hz 1.5A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	DC: 12V (DC-DC for Vehicle Use)					
<input type="checkbox"/>	DC: 24V (DC-DC for Vehicle Use)						
Rated Power.....:	--						
Clock frequencies.....:	N/A						
Other parameters .....	390000 (PSU Model Number)						
Software version.....:	SW04600 (DUT)						
Hardware version .....	R390-7654 (DUT)						
Dimensions in cm (W x H x D) ...:	138.5 mm x 259.4 mm x 94.5 mm						
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		EXS62-W	Thales			
	Bluetooth LE		EFR32BG22	SiLabs			
Accessories (not part of the test item) .....	Description		Type	Manufacturer			
	--						
	--						
Documents as provided by the applicant.....:	Description		File name	Issue date			
	--						
	--						

<sup>(3)</sup> Only for Medical Equipment

## Identification of the client

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

## Testing period and place

<b>Test Location</b>	DEKRA Testing and Certification S.A.U.
<b>Date (start)</b>	2022-08-31
<b>Date (finish)</b>	2022-10-05

## Document history

Report number	Date	Description
72943RRF.003	2022-11-25	First release.
72943RRF.003A1	2022-12-23	Second release. This report is modified due to minor typos. This modification test report cancels and replaces the test report 72943RRF003

## Environmental conditions

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

<b>Temperature</b>	Min. = 15 °C Max. = 35 °C
<b>Relative humidity</b>	Min. = 20 % Max. = 75 %

In the semi-anechoic chamber, the following limits were not exceeded during the test.

<b>Temperature</b>	Min. = 15 °C Max. = 35 °C
<b>Relative humidity</b>	Min. = 20 % Max. = 75 %

In the chamber for conducted measurements, the following limits were not exceeded during the test:

<b>Temperature</b>	Min. = 15 °C Max. = 35 °C
<b>Relative humidity</b>	Min. = 20 % Max. = 75 %

## Remarks and comments

The tests have been performed by the technical personnel: Miguel Manuel López, Pablo Redondo, José Manuel Jiménez.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
6791	SEMIANECHOIC ABSORBER LINED CHAMBER IV	FACT 3 200 STP	ETS LINDGREN	2024-06-07
6792	SHIELDED ROOM	S101	ETS LINDGREN	--
7817	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2024-01-24
3783	PRE-AMPLIFIER G>30dB 1GHz-18GHz	BLMA 0118-3A	BONN ELEKTRONIK	2022-12-01
7862	PRE-AMPLIFIER G>30dB 17-40GHz	BLMA 1840-3G	BONN ELEKTRONIK	2023-02-15
6143	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2023-10-29
6496	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK	2023-08-24
4657	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2023-05-05
4609	AC POWER SUPPLY	6490	CHROMA	2022-12-11
6794	SHIELDED ROOM	S101	ETS LINDGREN	--
6667	WIDEBAND RADIO COMMUNICATION TESTER	CMW500	ROHDE AND SCHWARZ	2023-05-31
3342	SIGNAL ANALIZER 20Hz-8GHz	FSQ8	ROHDE AND SCHWARZ	2022-10-06



## Testing verdicts

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

## Summary

FCC PART 27 / RSS-130, RSS-139		
Requirement – Test case	Verdict	Remark
FCC 27.50 / RSS-130 4.6, RSS-139 6.5: RF Output Power	P	
FCC 2.1047 / RSS-130 4.2, RSS-139 6.2: Modulation Characteristics	N/M	(1)
FCC 27.54 / RSS-130 4.5, RSS-139 6.4: Frequency Stability	N/M	(1)
FCC 2.1049 / RSS-130 4.5, RSS-139 6.4: Occupied Bandwidth	N/M	(1)
FCC 27.53 / RSS-130 4.7, RSS-139 6.6: Spurious Emissions at Antenna Terminals	N/M	(1)
FCC 27.53 / RSS-130 4.7, RSS-139 6.6: Spurious Emissions at Antenna Terminals at Block Edges	N/M	(1)
FCC 27.53 / RSS-130 4.7, RSS-139 6.6: Radiated Emissions	P	
<u>Supplementary information and remarks:</u>		
(1) Test not requested.		

## Appendix A: Test results for FCC 27 / RSS-130, RSS-139

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Radiated Emissions.....	52

## TEST CONDITIONS

(\*): Declared by the Applicant.

### POWER SUPPLY (\*):

Vnormal: Preliminary scan determined 115Vac / 60Hz as worst case of power supply.

Type of Power Supply: Mains Supply.

### ANTENNA (\*):

Low Bands	Gain (dBi)	Type
LTE 12	+2.0	Ceramic
LTE 13	+2.0	Ceramic

High Bands	Gain (dBi)	Type
4	+4.5	Ceramic
66	+4.5	Ceramic

### TEST FREQUENCIES:

LTE Band 4. QPSK and 16QAM modulations:

	Channel per Nominal Bandwidth (Frequency, 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)

NOTE: Band 4 is completely included in band 66, so the channels of band 66 were tested to give conformity to the assigned block.

LTE Band 12. QPSK and 16QAM modulations:

	Channel (Frequency, 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)



LTE Band 13. QPSK and 16QAM modulations:

	Channel (Frequency, MHz)	
	BW = 5 MHz	BW = 10 MHz
Low	23205 (779.5)	N/A
Middle	23230 (782.0)	23230 (782.0)
High	23255 (784.5)	N/A

LTE Band 66. QPSK and 16QAM modulations:

	Channel per Nominal Bandwidth (Frequency, MHz)					
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Low	131979 (1710.7)	131987 (1711.5)	131997 (1712.5)	132022 (1715.0)	132047 (1717.5)	132072 (1720.0)
Middle	132322 (1745)	132322 (1745)	132322 (1745)	132322 (1745)	132322 (1745)	132322 (1745)
High	132665 (1779.3)	132657 (1778.5)	132647 (1777.5)	132622 (1775)	132597 (1772.5)	132572 (1770)

## RF Output Power

### Limits

#### FCC §27.50 (b) (10):

Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

#### FCC §27.50 (c) (10):

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

#### FCC §27.50 (d):

(4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

(5) In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

#### RSS-130 Clause 4.6:

##### 4.6.1 General

The transmitter output power shall be measured in terms of average power. In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the High PAPR during periods of continuous transmission.

##### 4.6.3 Frequency bands 698-756 MHz and 777-787 MHz

The e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment.

#### RSS-139 Clause 6.5:

The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed one watt.

In addition, the peak to average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1% of the time, using a signal that corresponds to the High PAPR during periods of continuous transmission.

### Method

The conducted RF output power measurements were made at the RF output terminals of the EUT using the power meter of the Universal Radio Communication tester CMW500, selecting maximum transmission power of the EUT and different modes of modulation.

The peak-to-average power ratio (PAPR) is measured using an attenuator, power splitter and spectrum analyser with a Complementary Cumulative Distribution Function implemented.

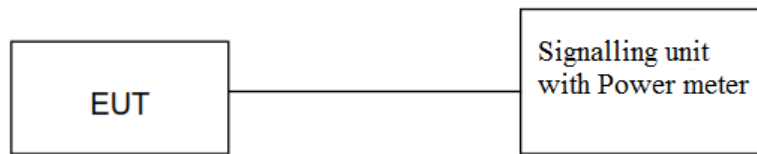
The maximum equivalent isotropically radiated power (e.i.r.p.) is calculated by adding the declared maximum antenna gain (dBi).

The maximum effective radiated power e.r.p. is calculated from the maximum equivalent isotropically radiated power (e.i.r.p.) by subtracting 2.15 dB:

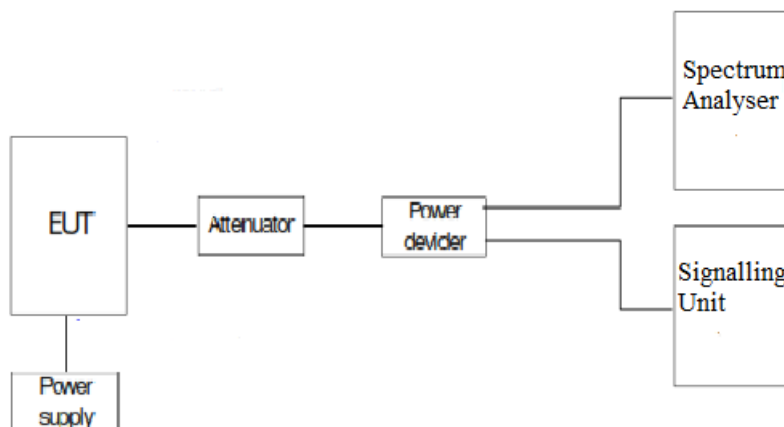
$$E.R.P. = E.I.R.P. - 2.15 \text{ dB}$$

### Test setup

#### 1. CONDUCTED AVERAGE POWER:



#### 2. PEAK-TO-AVERAGE POWER RATIO (PAPR) and Conducted Average power:





## Results

### 1. CONDUCTED AVERAGE POWER

LTE Band 12:

LTE Band 12. QPSK modulation. BW=1.4 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	2		
Measured maximum average power (dBm) at antenna port	19.76	19.65	19.68
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	21.76	21.65	21.68
Maximum effective radiated power E.R.P. (dBm)	19.61	19.50	19.53
PAPR (dB)	(*)	4.73	(*)
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation QPSK. RB Size: 1. RB Offset: 0.

PAPR Worst Case: Modulation QPSK. RB Size: 6. RB Offset: 0.

(\*): Preliminary measurements determined the Middle Channel as the worst case.

LTE Band 12. 16QAM modulation. BW=1.4 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	2		
Measured maximum average power (dBm) at antenna port	18.39	18.21	18.17
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	20.39	20.21	20.17
Maximum effective radiated power E.R.P. (dBm)	18.24	18.06	18.02
PAPR (dB)	5.48	5.34	5.18
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

PAPR Worst Case: Modulation 16QAM. RB Size: 5. RB Offset: 0.

LTE Band 12. QPSK modulation. BW=3 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	2		
Measured maximum average power (dBm) at antenna port	19.83	19.76	19.75
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	21.83	21.76	21.75
Maximum effective radiated power E.R.P. (dBm)	19.68	19.61	19.60
PAPR (dB)	(*)	4.65	(*)
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation QPSK. RB Size: 1. RB Offset: 0.

PAPR Worst Case: Modulation QPSK. RB Size: 6. RB Offset: 0.

(\*): Preliminary measurements determined the Middle Channel as the worst case.

LTE Band 12. 16QAM modulation. BW=3 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	2		
Measured maximum average power (dBm) at antenna port	18.58	18.45	18.57
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	20.58	20.45	20.57
Maximum effective radiated power E.R.P. (dBm)	18.43	18.30	18.42
PAPR (dB)	5.34	5.30	5.19
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

PAPR Worst Case: Modulation 16QAM. RB Size: 5. RB Offset: 0.

LTE Band 12. QPSK modulation. BW=5 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	2		
Measured maximum average power (dBm) at antenna port	19.84	19.80	19.79
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	21.84	21.80	21.79
Maximum effective radiated power E.R.P. (dBm)	19.69	19.65	19.64
PAPR (dB)	(*)	5.74	(*)
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation QPSK. RB Size: 1. RB Offset: 0.

PAPR Worst Case: Modulation QPSK. RB Size: 6. RB Offset: 0.

(\*): Preliminary measurements determined the Middle Channel as the worst case.

LTE Band 12. 16QAM modulation. BW=5 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	2		
Measured maximum average power (dBm) at antenna port	19.47	19.45	19.36
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	21.47	21.45	21.36
Maximum effective radiated power E.R.P. (dBm)	19.32	19.30	19.21
PAPR (dB)	6.01	6.15	5.95
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

PAPR Worst Case: Modulation 16QAM. RB Size: 5. RB Offset: 0.

LTE Band 12. QPSK modulation. BW=10 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	2		
Measured maximum average power (dBm) at antenna port	19.70	19.74	19.69
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	21.70	21.74	21.69
Maximum effective radiated power E.R.P. (dBm)	19.55	19.59	19.54
PAPR (dB)	(*)	5.42	(*)
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation QPSK. RB Size: 1. RB Offset: 0.

PAPR Worst Case: Modulation QPSK. RB Size: 6. RB Offset: 0.

(\*): Preliminary measurements determined the Middle Channel as the worst case.

LTE Band 12. 16QAM modulation. BW=10 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	2		
Measured maximum average power (dBm) at antenna port	19.47	19.35	19.47
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	21.47	21.35	21.47
Maximum effective radiated power E.R.P. (dBm)	19.32	19.20	19.32
PAPR (dB)	6.11	6.35	6.09
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

PAPR Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

LTE Band 13:

LTE Band 13. QPSK modulation. BW=5 MHz.

Measurements required on one frequency near top channel and one frequency near bottom channel, according to FCC § 15.31 (m).

Channel	Low	High
Maximum declared antenna gain (dBi)	2	
Measured maximum average power (dBm) at antenna port	19.66	19.76
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	21.66	21.76
Maximum effective radiated power E.R.P. (dBm)	19.51	19.61
PAPR (dB)	4.84	(*)
Measurement uncertainty (dB)	<±0.94	

Average Power Worst Case: Modulation QPSK. RB Size: 1. RB Offset: 0.

PAPR Worst Case: Modulation QPSK. RB Size: 6. RB Offset: 0.

(\*): Preliminary measurements determined the Low Channel as the worst case.

LTE Band 13. 16QAM modulation. BW=5 MHz.

Measurements required on one frequency near top channel and one frequency near bottom channel, according to FCC § 15.31 (m).

Channel	Low	High
Maximum declared antenna gain (dBi)	2	
Measured maximum average power (dBm) at antenna port	19.48	19.44
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	21.48	21.44
Maximum effective radiated power E.R.P. (dBm)	19.33	19.29
PAPR (dB)	5.53	5.29
Measurement uncertainty (dB)	<±0.94	

Average Power Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

PAPR Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

LTE Band 13. QPSK modulation. BW=10 MHz.

Only one channel available in the operating range.

Channel	Middle
Maximum declared antenna gain (dBi)	2
Measured maximum average power (dBm) at antenna port	19.65
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	21.65
Maximum effective radiated power E.R.P. (dBm)	19.50
PAPR (dB)	4.78
Measurement uncertainty (dB)	<±0.94

Average Power Worst Case: Modulation QPSK. RB Size: 1. RB Offset: 0.

PAPR Worst Case: Modulation QPSK. RB Size: 6. RB Offset: 0.

LTE Band 13. 16QAM modulation. BW=10 MHz.

Only one channel available in the operating range.

Channel	Middle
Maximum declared antenna gain (dBi)	2
Measured maximum average power (dBm) at antenna port	19.49
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	21.49
Maximum effective radiated power E.R.P. (dBm)	19.34
PAPR (dB)	5.45
Measurement uncertainty (dB)	<±0.94

Average Power Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

PAPR Worst Case: Modulation 16QAM. RB Size: 5. RB Offset: 0.

LTE Band 66:

LTE Band 66. QPSK modulation. BW=1.4 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	4.5		
Measured maximum average power (dBm) at antenna port	19.21	19.29	19.03
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	23.71	23.79	23.53
Maximum effective radiated power E.R.P. (dBm)	21.56	21.64	21.38
PAPR (dB)	(*)	5.51	(*)
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation QPSK. RB Size: 1. RB Offset: 0.

PAPR Worst Case Modulation QPSK. RB Size: 6. RB Offset: 0.

(\*): Preliminary measurements determined the Middle Channel as the worst case.

LTE Band 66. 16QAM modulation. BW=1.4 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	4.5		
Measured maximum average power (dBm) at antenna port	18.85	18.02	18.22
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	23.35	22.52	22.72
Maximum effective radiated power E.R.P. (dBm)	21.20	20.37	20.57
PAPR (dB)	6.38	6.07	6.68
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

PAPR Worst Case Modulation 16QAM. RB Size: 5. RB Offset: 0.

LTE Band 66. QPSK modulation. BW=3 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	4.5		
Measured maximum average power (dBm) at antenna port	19.35	19.23	19.25
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	23.85	23.73	23.75
Maximum effective radiated power E.R.P. (dBm)	21.70	21.58	21.60
PAPR (dB)	(*)	5.74	(*)
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation QPSK. RB Size: 1. RB Offset: 0.

PAPR Worst Case Modulation QPSK. RB Size: 6. RB Offset: 0.

(\*): Preliminary measurements determined the Middle Channel as the worst case.

LTE Band 66. 16QAM modulation. BW=3 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	4.5		
Measured maximum average power (dBm) at antenna port	18.04	18.19	18.10
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	22.54	22.69	22.60
Maximum effective radiated power E.R.P. (dBm)	20.39	20.54	20.45
PAPR (dB)	5.51	5.90	5.63
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

PAPR Worst Case Modulation 16QAM. RB Size: 5. RB Offset: 0.



LTE Band 66. QPSK modulation. BW=5 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	4.5		
Measured maximum average power (dBm) at antenna port	19.34	19.27	19.28
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	23.84	23.77	23.78
Maximum effective radiated power E.R.P. (dBm)	21.69	21.62	21.63
PAPR (dB)	(*)	5.38	(*)
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation QPSK. RB Size: 1. RB Offset: 0.

PAPR Worst Case Modulation QPSK. RB Size: 6. RB Offset: 0.

(\*): Preliminary measurements determined the Middle Channel as the worst case.

LTE Band 66. 16QAM modulation. BW=5 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	4.5		
Measured maximum average power (dBm) at antenna port	19.38	18.92	19.10
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	23.88	23.42	23.60
Maximum effective radiated power E.R.P. (dBm)	21.73	21.27	21.45
PAPR (dB)	4.54	6.03	6.54
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

PAPR Worst Case Modulation 16QAM. RB Size: 5. RB Offset: 0.

LTE Band 66. QPSK modulation. BW=10 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	4.5		
Measured maximum average power (dBm) at antenna port	19.32	19.21	18.98
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	23.82	23.71	23.48
Maximum effective radiated power E.R.P. (dBm)	21.67	21.56	21.33
PAPR (dB)	(*)	5.46	(*)
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation QPSK. RB Size: 1. RB Offset: 0.

PAPR Worst Case Modulation QPSK. RB Size: 6. RB Offset: 0.

(\*): Preliminary measurements determined the Middle Channel as the worst case.

LTE Band 66. 16QAM modulation. BW=10 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	4.5		
Measured maximum average power (dBm) at antenna port	19.43	19.31	18.94
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	23.93	23.81	23.44
Maximum effective radiated power E.R.P. (dBm)	21.78	21.66	21.29
PAPR (dB)	5.46	5.50	6.31
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

PAPR Worst Case Modulation 16QAM. RB Size: 5. RB Offset: 0.

LTE Band 66. QPSK modulation. BW=15 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	4.5		
Measured maximum average power (dBm) at antenna port	19.25	19.41	19.09
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	23.75	23.91	23.59
Maximum effective radiated power E.R.P. (dBm)	21.60	21.76	21.44
PAPR (dB)	(*)	4.50	(*)
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation QPSK. RB Size: 1. RB Offset: 0.

PAPR Worst Case Modulation QPSK. RB Size: 6. RB Offset: 0.

(\*): Preliminary measurements determined the Middle Channel as the worst case.

LTE Band 66. 16QAM modulation. BW=15 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	4.5		
Measured maximum average power (dBm) at antenna port	19.19	19.33	18.67
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	23.69	23.83	23.17
Maximum effective radiated power E.R.P. (dBm)	21.54	21.68	21.02
PAPR (dB)	4.60	4.97	5.05
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

PAPR Worst Case Modulation 16QAM. RB Size: 5. RB Offset: 0.

LTE Band 66. QPSK modulation. BW=20 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	4.5		
Measured maximum average power (dBm) at antenna port	19.20	19.23	19.06
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	23.70	23.73	23.56
Maximum effective radiated power E.R.P. (dBm)	21.55	21.58	21.41
PAPR (dB)	(*)	4.58	(*)
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation QPSK. RB Size: 1. RB Offset: 0.

PAPR Worst Case Modulation QPSK. RB Size: 6. RB Offset: 0.

(\*): Preliminary measurements determined the Middle Channel as the worst case.

LTE Band 66. 16QAM modulation. BW=20 MHz.

Channel	Low	Middle	High
Maximum declared antenna gain (dBi)	4.5		
Measured maximum average power (dBm) at antenna port	19.15	19.32	18.77
Maximum equivalent isotropically radiated power (E.I.R.P.) (dBm)	23.65	23.82	23.27
Maximum effective radiated power E.R.P. (dBm)	21.50	21.67	21.12
PAPR (dB)	4.71	5.08	5.10
Measurement uncertainty (dB)	<±0.94		

Average Power Worst Case: Modulation 16QAM. RB Size: 1. RB Offset: 0.

PAPR Worst Case Modulation 16QAM. RB Size: 5. RB Offset: 0.

**Verdict**

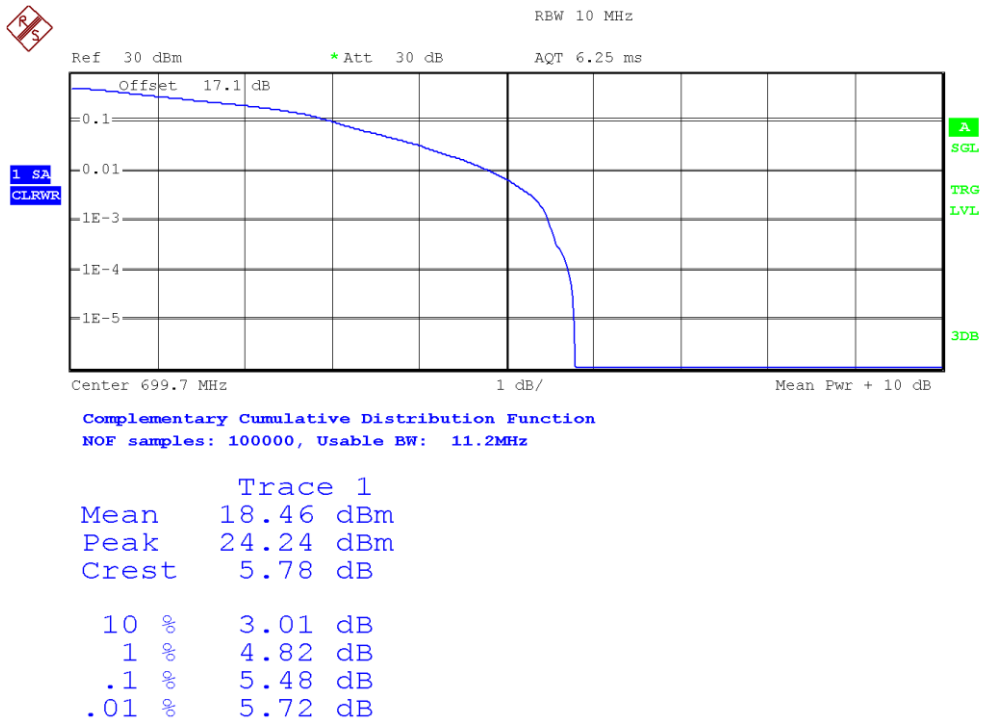
Pass

## 2. PEAK-TO-AVERAGE POWER RATIO (PAPR)

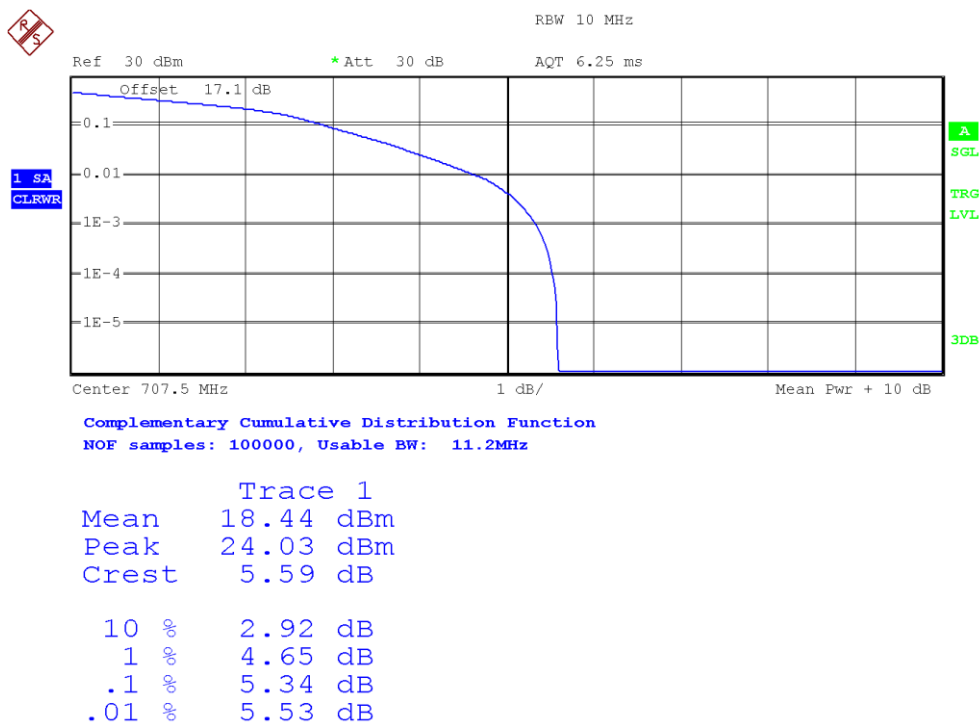
Worst-case modulation in terms of PAPR is reported below: 16QAM.

LTE Band 12. Bandwidth = 1.4 MHz. Modulation 16 QAM. RB Size: 5. RB Offset: 0.

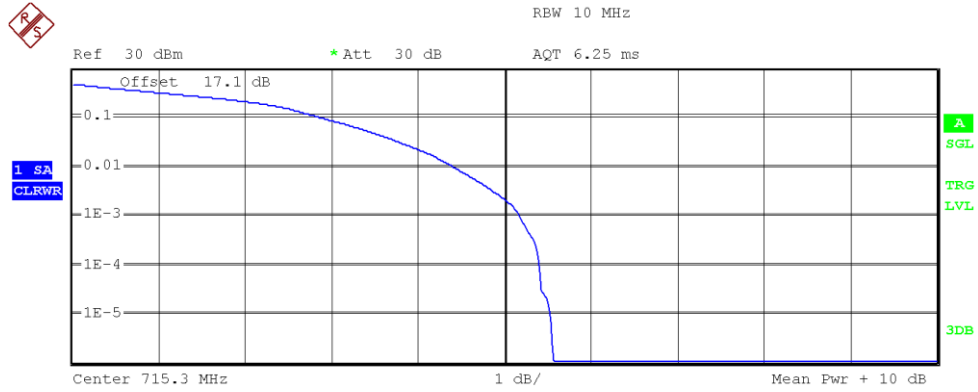
Low Channel:



Middle Channel:



High Channel:

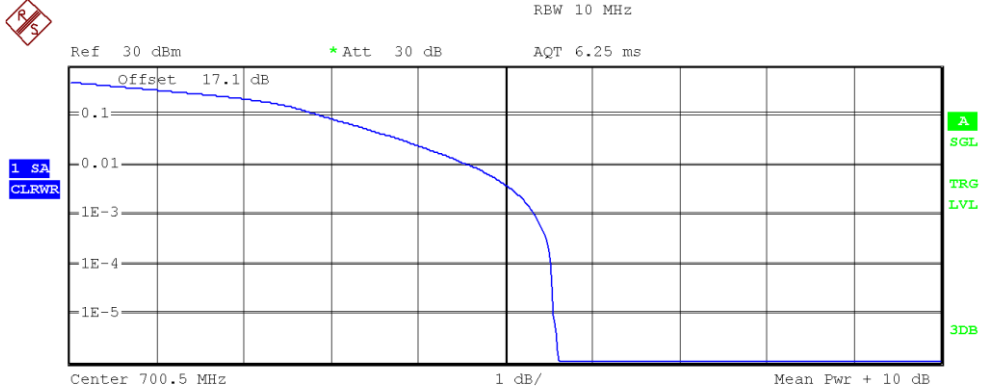


Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	18.32 dBm
Peak	23.88 dBm
Crest	5.56 dB
10 %	2.87 dB
1 %	4.41 dB
.1 %	5.18 dB
.01 %	5.40 dB

LTE Band 12. Bandwidth = 3 MHz. Modulation 16 QAM. RB Size: 5. RB Offset: 0.

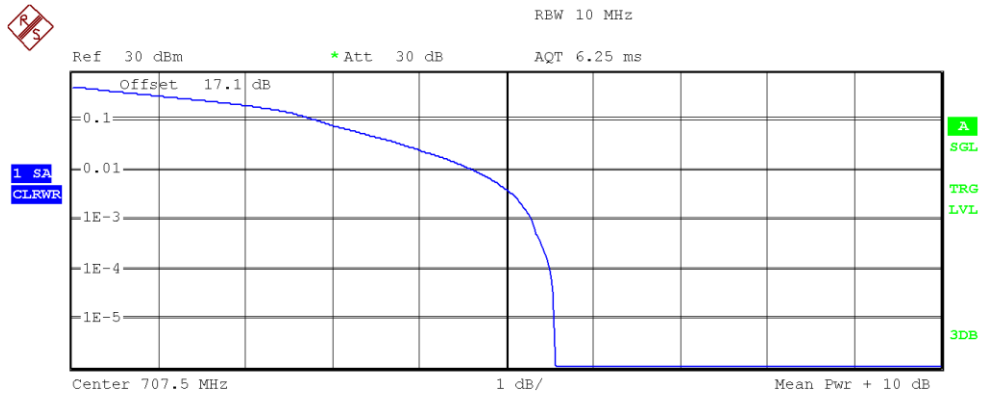
Low Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	18.56 dBm
Peak	24.17 dBm
Crest	5.61 dB
10 %	2.88 dB
1 %	4.58 dB
.1 %	5.34 dB
.01 %	5.53 dB

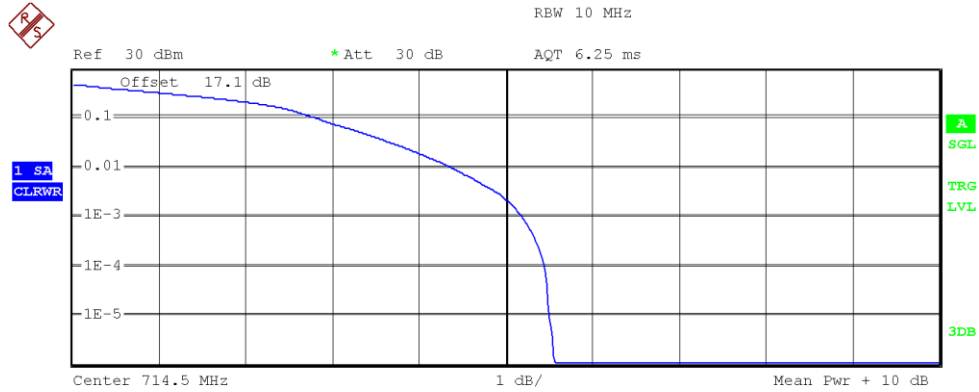
Middle Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	18.47 dBm
Peak	24.03 dBm
Crest	5.56 dB
10 %	2.84 dB
1 %	4.62 dB
.1 %	5.30 dB
.01 %	5.51 dB

High Channel:



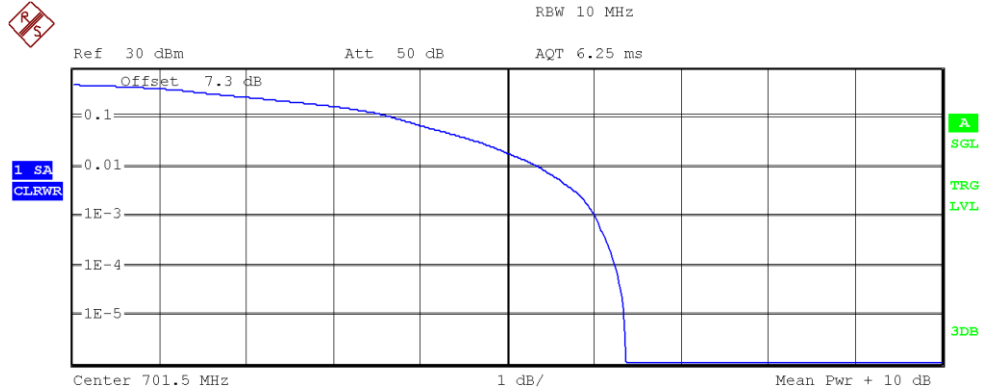
Center 714.5 MHz 1 dB/ Mean Pwr + 10 dB  
 Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	18.18 dBm
Peak	23.74 dBm
Crest	5.56 dB
10 %	2.82 dB
1 %	4.36 dB
.1 %	5.19 dB
.01 %	5.45 dB



LTE Band 12. Bandwidth = 5 MHz. Modulation 16 QAM. RB Size: 5. RB Offset: 0.

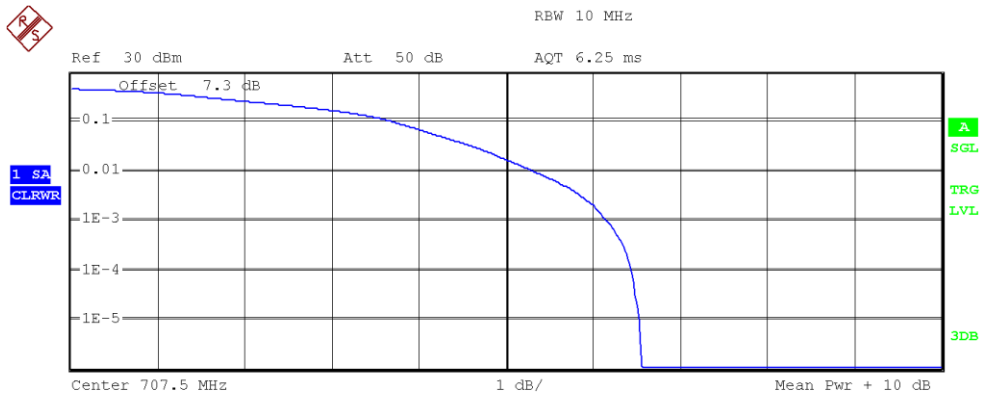
Low Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	18.12 dBm
Peak	24.48 dBm
Crest	6.36 dB
10 %	3.69 dB
1 %	5.35 dB
.1 %	6.01 dB
.01 %	6.25 dB

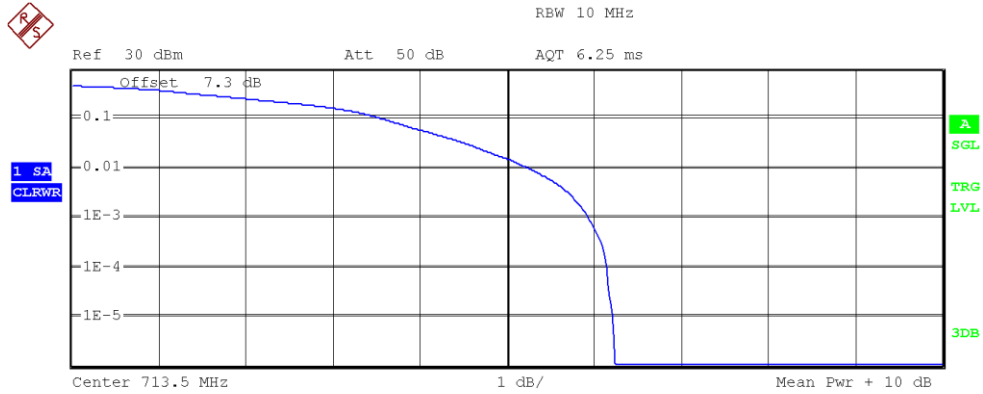
Middle Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	17.78 dBm
Peak	24.33 dBm
Crest	6.55 dB
10 %	3.70 dB
1 %	5.32 dB
.1 %	6.15 dB
.01 %	6.44 dB

High Channel:

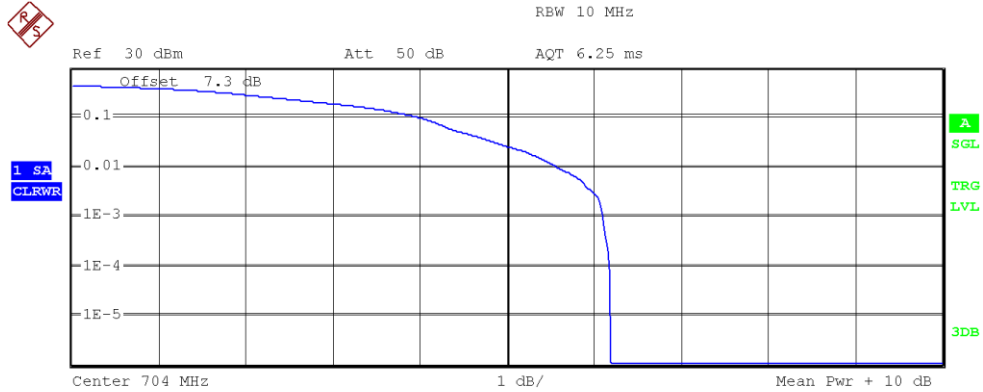


Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	17.95 dBm
Peak	24.19 dBm
Crest	6.23 dB
10 %	3.56 dB
1 %	5.24 dB
.1 %	5.95 dB
.01 %	6.15 dB

LTE Band 12. Bandwidth = 10 MHz. Modulation 16 QAM. RB Size: 1. RB Offset: 0.

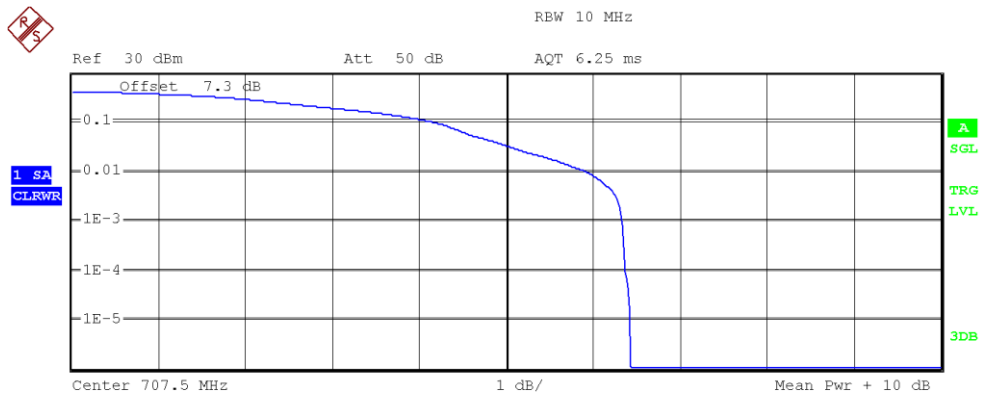
Low Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	18.07 dBm
Peak	24.26 dBm
Crest	6.19 dB
10 %	4.01 dB
1 %	5.58 dB
.1 %	6.11 dB
.01 %	6.19 dB

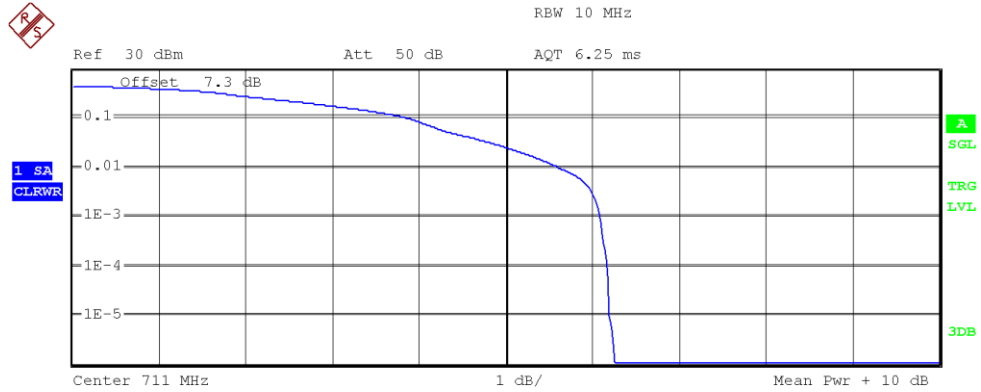
Middle Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	17.90 dBm
Peak	24.33 dBm
Crest	6.43 dB
10 %	4.18 dB
1 %	5.91 dB
.1 %	6.35 dB
.01 %	6.38 dB

High Channel:

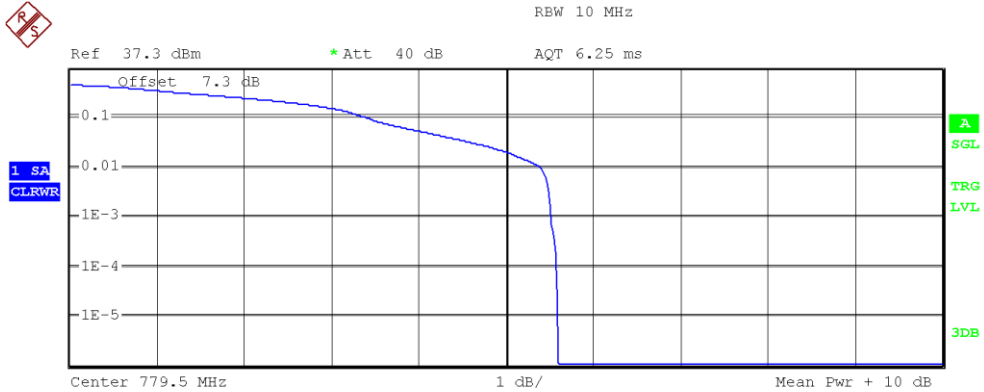


Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	18.07 dBm
Peak	24.33 dBm
Crest	6.26 dB
10 %	3.88 dB
1 %	5.61 dB
.1 %	6.09 dB
.01 %	6.17 dB

LTE Band 13. Bandwidth = 5 MHz. Modulation 16 QAM. RB Size: 1. RB Offset: 0.

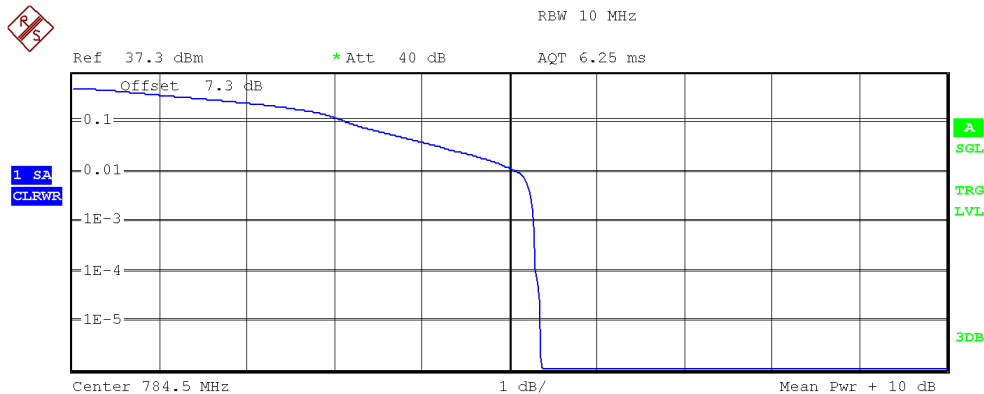
Low Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	18.86 dBm
Peak	24.44 dBm
Crest	5.59 dB
10 %	3.41 dB
1 %	5.38 dB
.1 %	5.53 dB
.01 %	5.59 dB

High Channel:

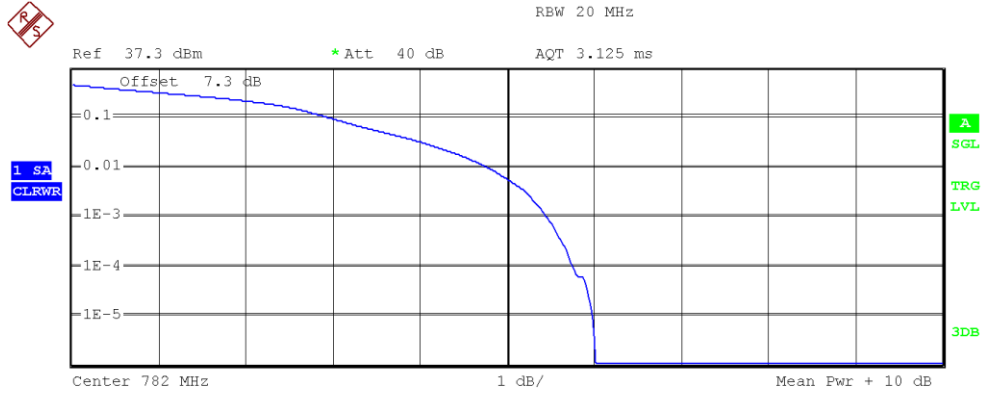


Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	18.80 dBm
Peak	24.16 dBm
Crest	5.36 dB
10 %	3.14 dB
1 %	5.08 dB
.1 %	5.29 dB
.01 %	5.30 dB

LTE Band 13. Bandwidth = 10 MHz. Modulation 16 QAM. RB Size: 5. RB Offset: 0.

Middle Channel:

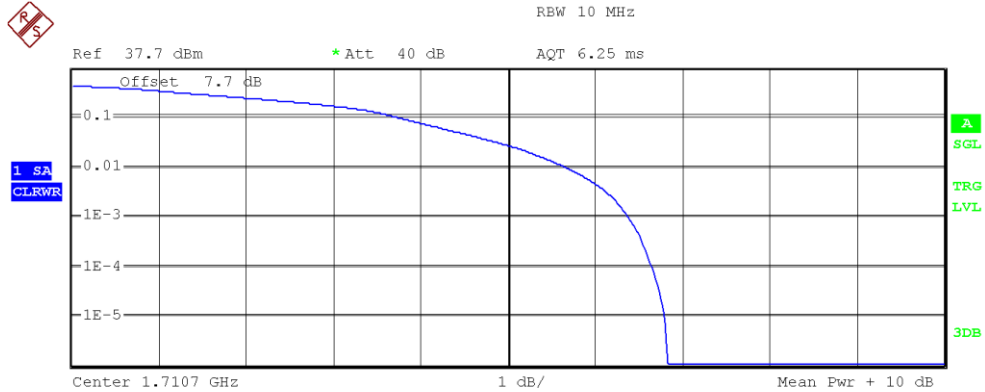


Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 23.7MHz

Trace 1	
Mean	18.66 dBm
Peak	24.68 dBm
Crest	6.01 dB
10 %	2.96 dB
1 %	4.76 dB
.1 %	5.45 dB
.01 %	5.75 dB

LTE Band 66. Bandwidth = 1.4 MHz. Modulation 16 QAM. RB Size: 5. RB Offset: 0.

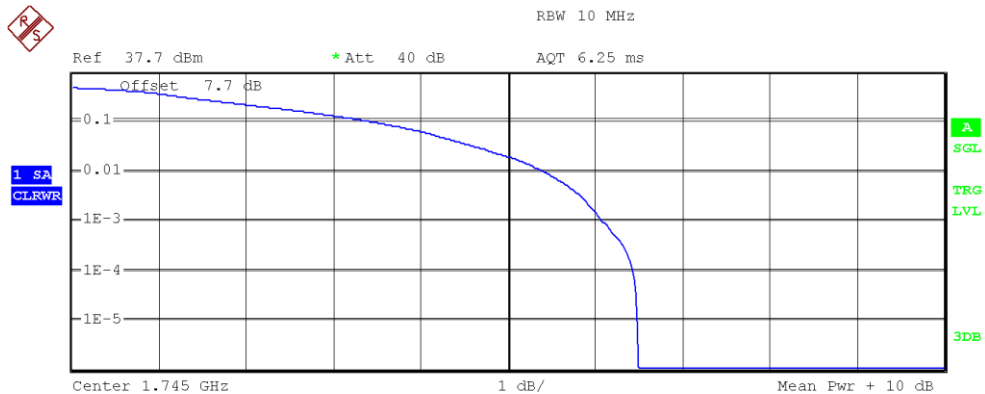
Low Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	16.20 dBm
Peak	23.03 dBm
Crest	6.83 dB
10 %	3.77 dB
1 %	5.67 dB
.1 %	6.38 dB
.01 %	6.65 dB

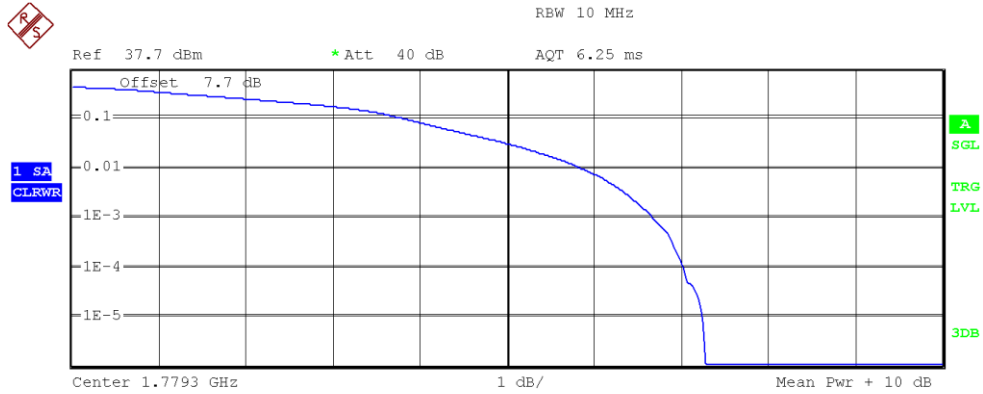
Middle Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	15.60 dBm
Peak	22.09 dBm
Crest	6.49 dB
10 %	3.45 dB
1 %	5.40 dB
.1 %	6.07 dB
.01 %	6.44 dB

High Channel:



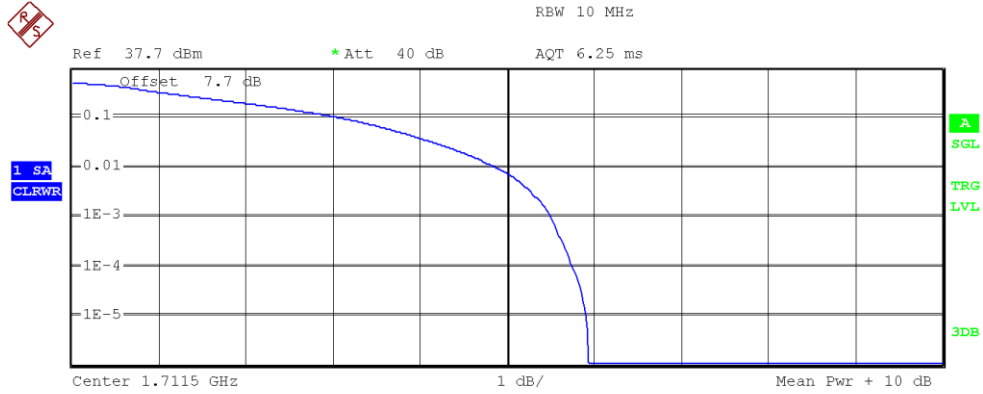
Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	16.01 dBm
Peak	23.29 dBm
Crest	7.28 dB
10 %	3.81 dB
1 %	5.85 dB
.1 %	6.68 dB
.01 %	7.04 dB



LTE Band 66. Bandwidth = 3 MHz. Modulation 16 QAM. RB Size: 5. RB Offset: 0.

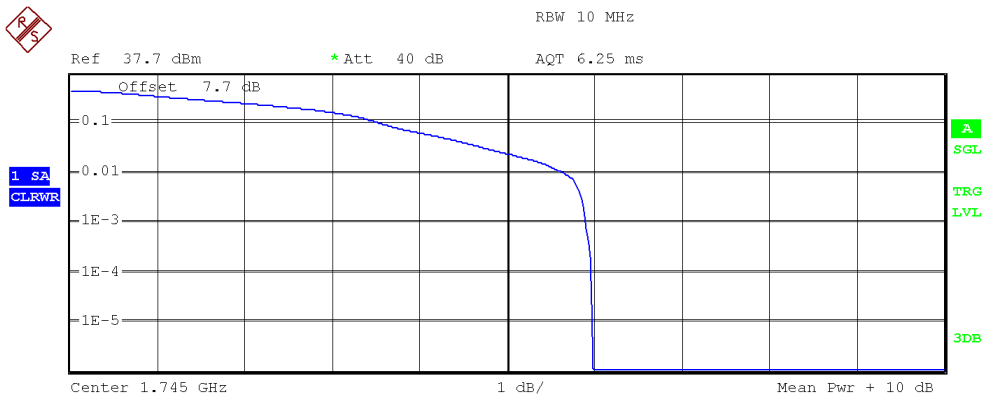
Low Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	16.45 dBm
Peak	22.39 dBm
Crest	5.94 dB
10 %	3.08 dB
1 %	4.86 dB
.1 %	5.51 dB
.01 %	5.75 dB

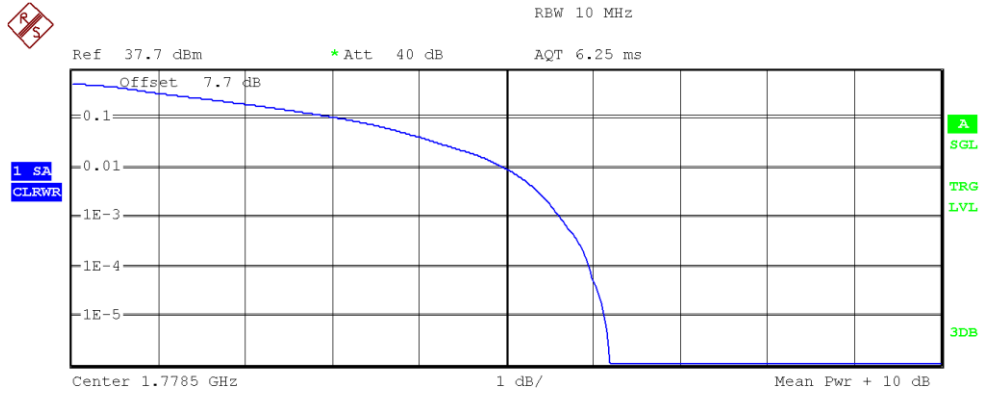
Middle Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	16.96 dBm
Peak	22.93 dBm
Crest	5.97 dB
10 %	3.54 dB
1 %	5.64 dB
.1 %	5.90 dB
.01 %	5.98 dB

High Channel:

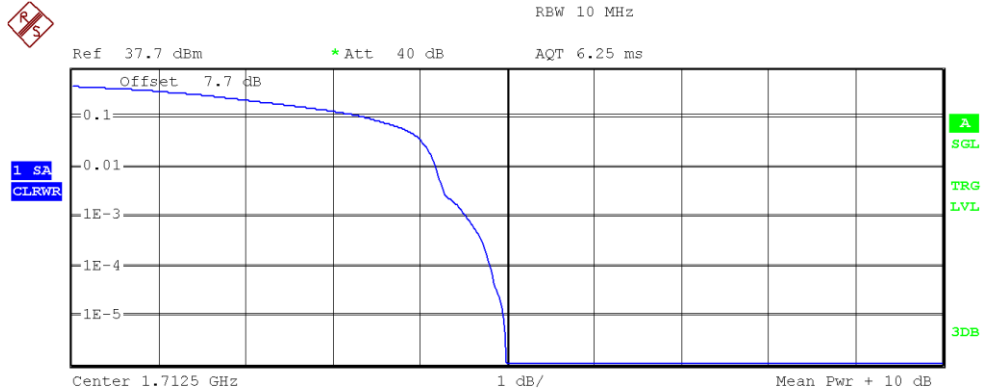


Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	16.32 dBm
Peak	22.51 dBm
Crest	6.19 dB
10 %	3.11 dB
1 %	4.98 dB
.1 %	5.63 dB
.01 %	5.96 dB

LTE Band 66. Bandwidth = 5 MHz. Modulation 16 QAM. RB Size: 5. RB Offset: 0.

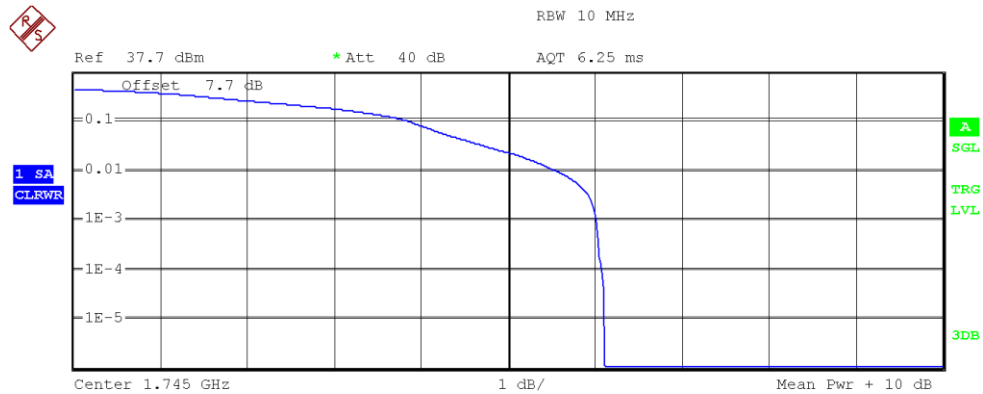
Low Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	17.82 dBm
Peak	22.81 dBm
Crest	4.99 dB
10 %	3.38 dB
1 %	4.18 dB
.1 %	4.54 dB
.01 %	4.81 dB

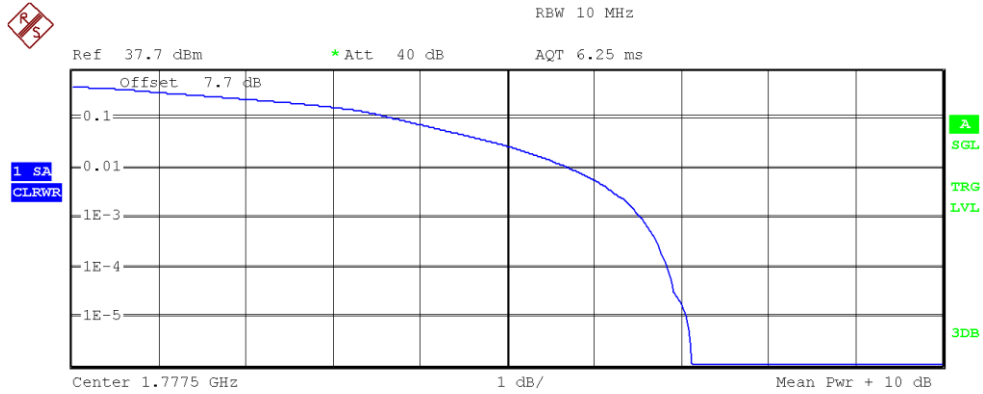
Middle Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	17.31 dBm
Peak	23.43 dBm
Crest	6.11 dB
10 %	3.86 dB
1 %	5.54 dB
.1 %	6.03 dB
.01 %	6.09 dB

High Channel:

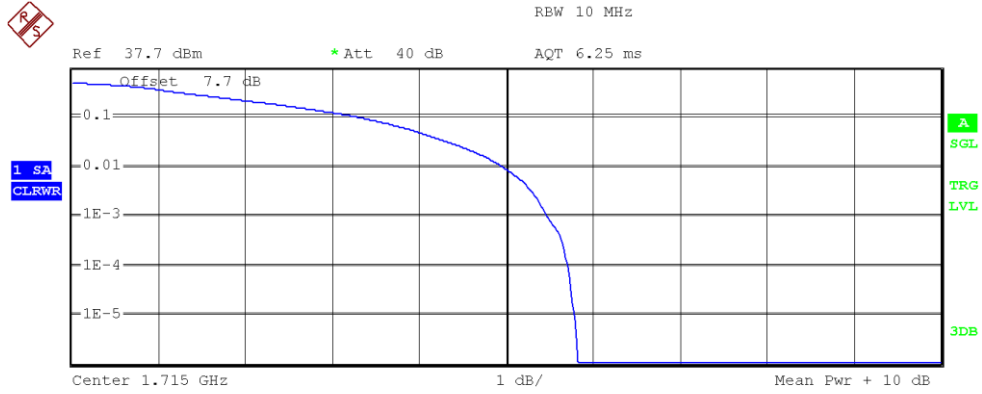


Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	16.02 dBm
Peak	23.14 dBm
Crest	7.12 dB
10 %	3.72 dB
1 %	5.72 dB
.1 %	6.54 dB
.01 %	6.84 dB

LTE Band 66. Bandwidth = 10 MHz. Modulation 16 QAM. RB Size: 5. RB Offset: 0.

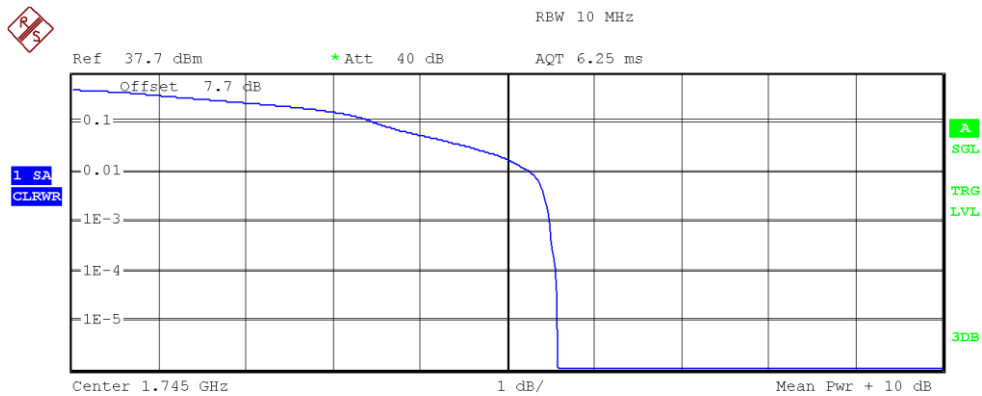
Low Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	16.98 dBm
Peak	22.80 dBm
Crest	5.82 dB
10 %	3.32 dB
1 %	4.95 dB
.1 %	5.46 dB
.01 %	5.72 dB

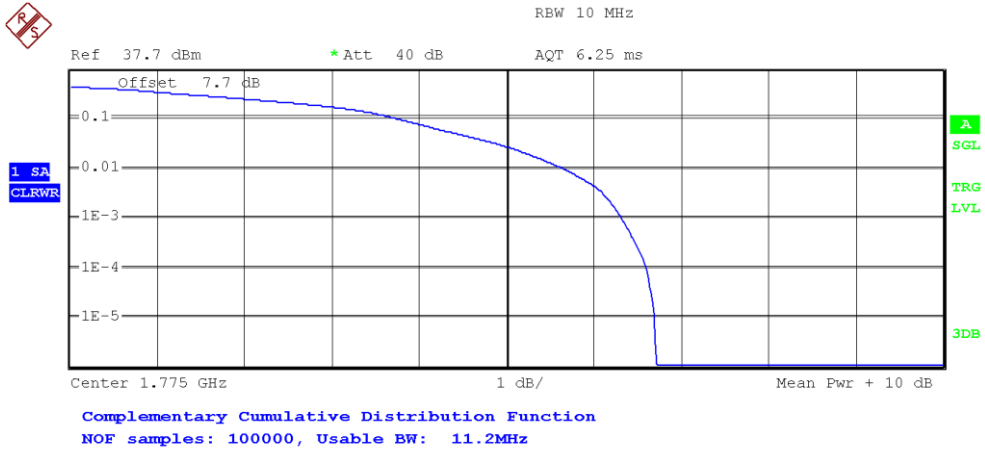
Middle Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	17.78 dBm
Peak	23.36 dBm
Crest	5.58 dB
10 %	3.48 dB
1 %	5.27 dB
.1 %	5.50 dB
.01 %	5.56 dB

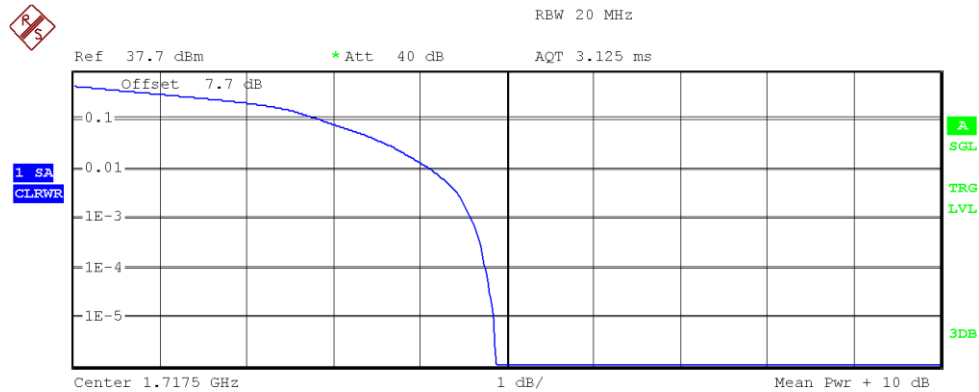
High Channel:



Trace 1	
Mean	16.56 dBm
Peak	23.27 dBm
Crest	6.71 dB
10 %	3.75 dB
1 %	5.66 dB
.1 %	6.31 dB
.01 %	6.60 dB

LTE Band 66. Bandwidth = 15 MHz. Modulation 16 QAM. RB Size: 5. RB Offset: 0.

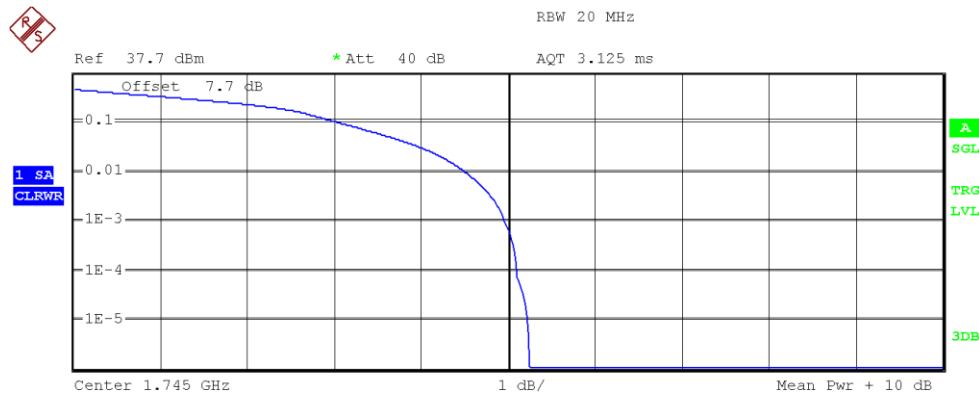
Low Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 23.7MHz

Trace 1	
Mean	19.07 dBm
Peak	23.94 dBm
Crest	4.87 dB
10 %	2.85 dB
1 %	4.12 dB
.1 %	4.60 dB
.01 %	4.76 dB

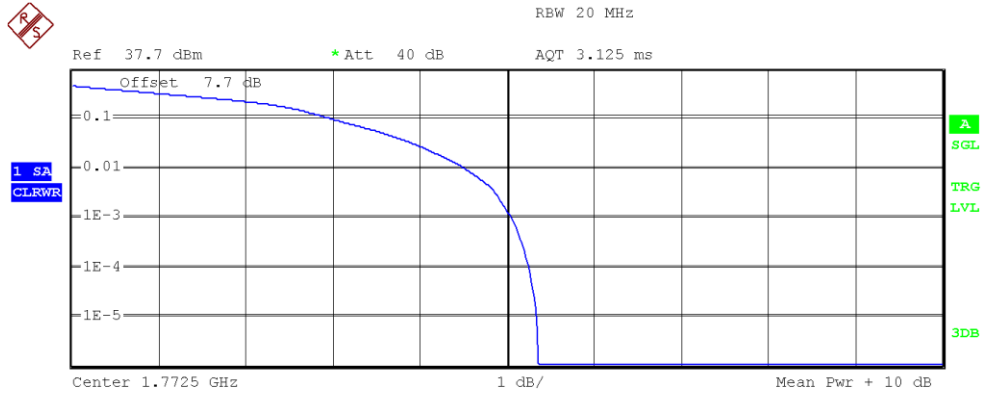
Middle Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 23.7MHz

Trace 1	
Mean	18.76 dBm
Peak	24.00 dBm
Crest	5.25 dB
10 %	3.04 dB
1 %	4.50 dB
.1 %	4.97 dB
.01 %	5.11 dB

High Channel:



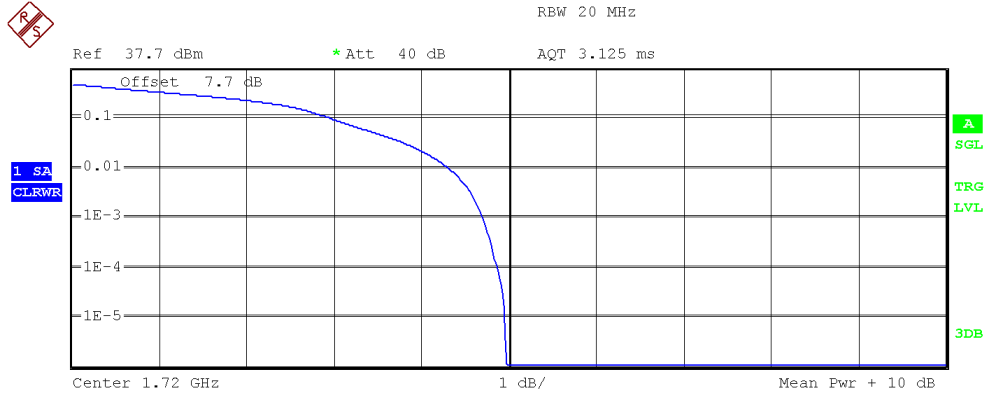
Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 23.7MHz

Trace 1	
Mean	18.49 dBm
Peak	23.84 dBm
Crest	5.36 dB
10 %	2.98 dB
1 %	4.50 dB
.1 %	5.05 dB
.01 %	5.26 dB



LTE Band 66. Bandwidth = 20 MHz. Modulation 16 QAM. RB Size: 5. RB Offset: 0.

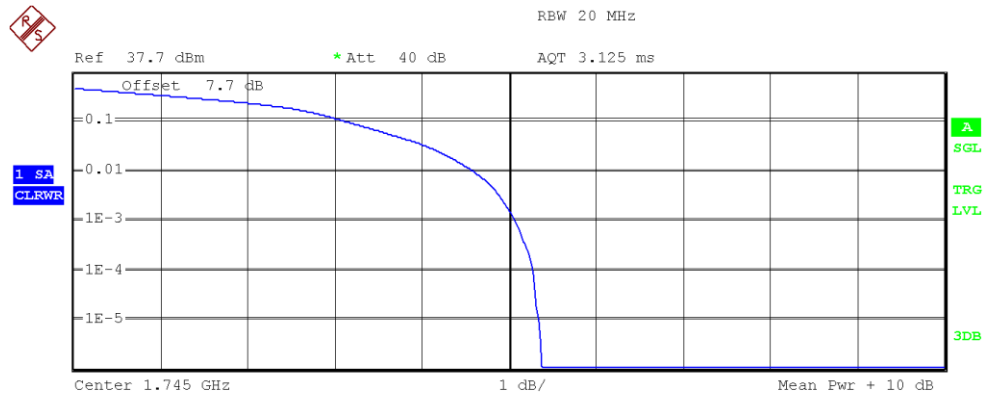
Low Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 23.7MHz

Trace 1	
Mean	18.82 dBm
Peak	23.79 dBm
Crest	4.96 dB
10 %	2.96 dB
1 %	4.31 dB
.1 %	4.71 dB
.01 %	4.87 dB

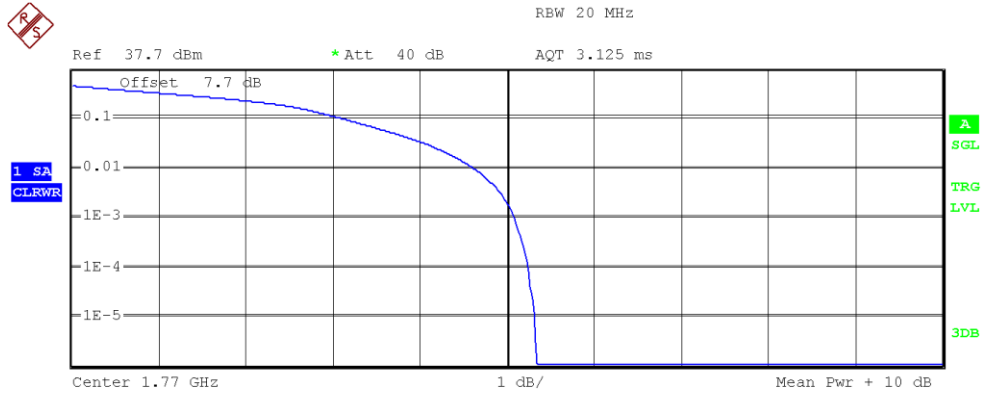
Middle Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 23.7MHz

Trace 1	
Mean	18.63 dBm
Peak	24.00 dBm
Crest	5.37 dB
10 %	3.14 dB
1 %	4.58 dB
.1 %	5.08 dB
.01 %	5.27 dB

High Channel:



Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 23.7MHz

Trace 1	
Mean	18.57 dBm
Peak	23.90 dBm
Crest	5.33 dB
10 %	3.11 dB
1 %	4.62 dB
.1 %	5.10 dB
.01 %	5.26 dB

LTE Band 12:

Channel	Measured maximum average power at antenna port (dBm)	Maximum declared antenna gain (dBi)	Maximum equivalent isotropically radiated power E.I.R.P (dBm)	Maximum effective radiated power E.R.P (dBm)	PAPR (dB)
Low	19.84	2	21.84	19.69	6.11
Middle	19.80		21.80	19.65	6.35
High	19.79		21.79	19.64	6.09
Measurement uncertainty (dB)	<±0.94				

LTE Band 13:

Channel	Measured maximum average power at antenna port (dBm)	Maximum declared antenna gain (dBi)	Maximum equivalent isotropically radiated power E.I.R.P (dBm)	Maximum effective radiated power E.R.P (dBm)	PAPR (dB)
Low	19.66	2	21.66	19.51	5.53
Middle	19.65		21.65	19.50	5.45
High	19.76		21.76	19.61	5.29
Measurement uncertainty (dB)	<±0.94				

LTE Band 66:

Channel	Measured maximum average power at antenna port (dBm)	Maximum declared antenna gain (dBi)	Maximum equivalent isotropically radiated power E.I.R.P (dBm)	Maximum effective radiated power E.R.P (dBm)	PAPR (dB)
Low	19.43	4.5	23.93	21.78	6.38
Middle	19.41		23.91	21.76	6.07
High	19.28		23.78	21.63	6.68
Measurement uncertainty (dB)	<±0.94				

## Radiated Emissions

### Limits

#### 1. LTE Band 12.

FCC §27.53 (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.

RSS-130 Clause 4.7.1:

The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least  $43 + 10 \log_{10} p$  (watts), dB.

#### 2. LTE Band 13.

FCC §27.53 (c):

On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB. Compliance is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.

On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log(P)$  dB in a 6.25 kHz band segment, for mobile and portable stations. Compliance is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

FCC §27.53 (f):

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to  $-70$  dBW ( $-40$  dBm)/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and  $-80$  dBW ( $-50$  dBm) EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

RSS-130 Clause 4.7.1:

The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least  $43 + 10 \log_{10} p$  (watts), dB.

RSS-130 Clause 4.7.2:

The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least  $65 + 10 \log_{10} p$  (watts), dB, for mobile and portable equipment.

The e.i.r.p. in the band 1559-1610 MHz shall not exceed  $-70$  dBW/MHz for wideband signal and  $-80$  dBW for discrete emission with bandwidth less than 700 Hz.

### 3. LTE Band 66.

FCC §27.53 (h). RSS-139, Clause 6.6:

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 bands, 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. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater.

#### **Method**

The measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to at least the 10<sup>th</sup> harmonic of the highest frequency generated within the equipment.

The EUT was placed on a non-conductive stand at 3-meter distance from the measuring antenna for the frequency range 30 MHz to 18 GHz.

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

Measurement Limits:

At  $P_o$  transmitting power, the specified minimum attenuation  $43 + 10 \log_{10} p$  (watts) becomes:

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

At  $P_o$  transmitting power, the specified minimum attenuation  $65 + 10 \log_{10} p$  (watts) becomes:

$$P_o \text{ (dBm)} - [65 + 10 \log (P_o \text{ in mwatts}) - 30] = -35 \text{ dBm}$$

For operation in band 13, the e.i.r.p. in the band 1559-1610 MHz shall not exceed  $-70$  dBW ( $-40$  dBm) per MHz for wideband signals, and  $-80$  dBW ( $-50$  dBm) per MHz for discrete emissions of less than 700 Hz bandwidth.

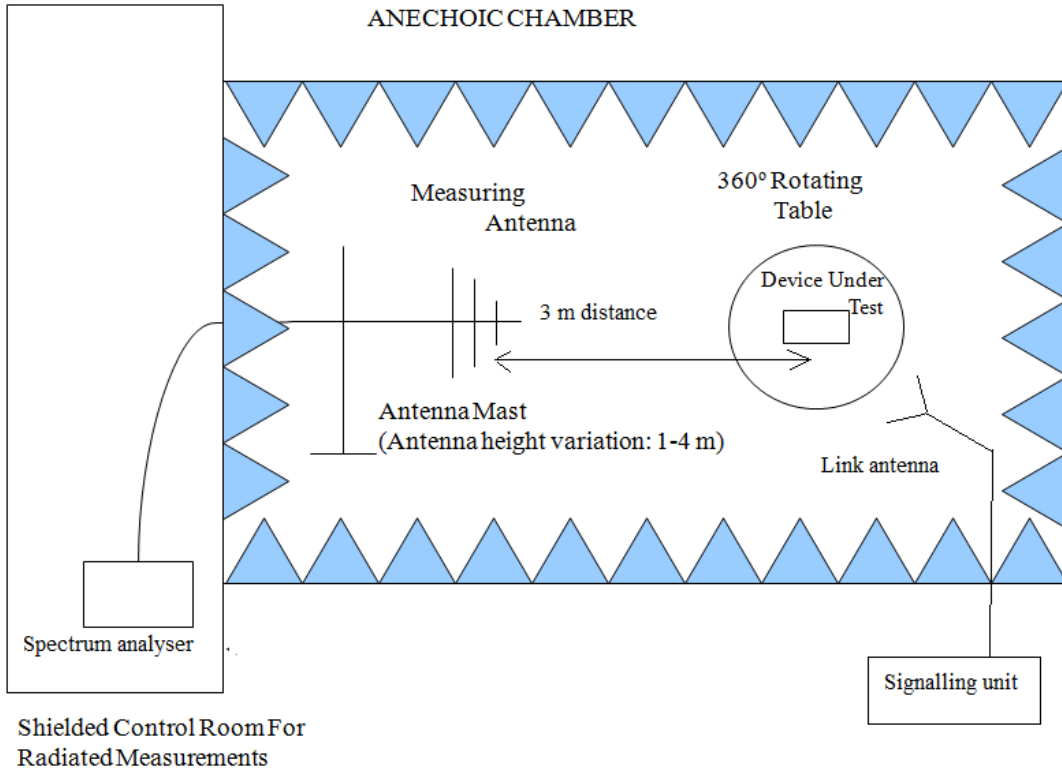
The maximum field strength (dB $\mu$ V/m) of each detected emission at less than 20 dB respect to the limit is converted to an equivalent EIRP level (dBm) according to ANSI C63.26 with the formula:

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

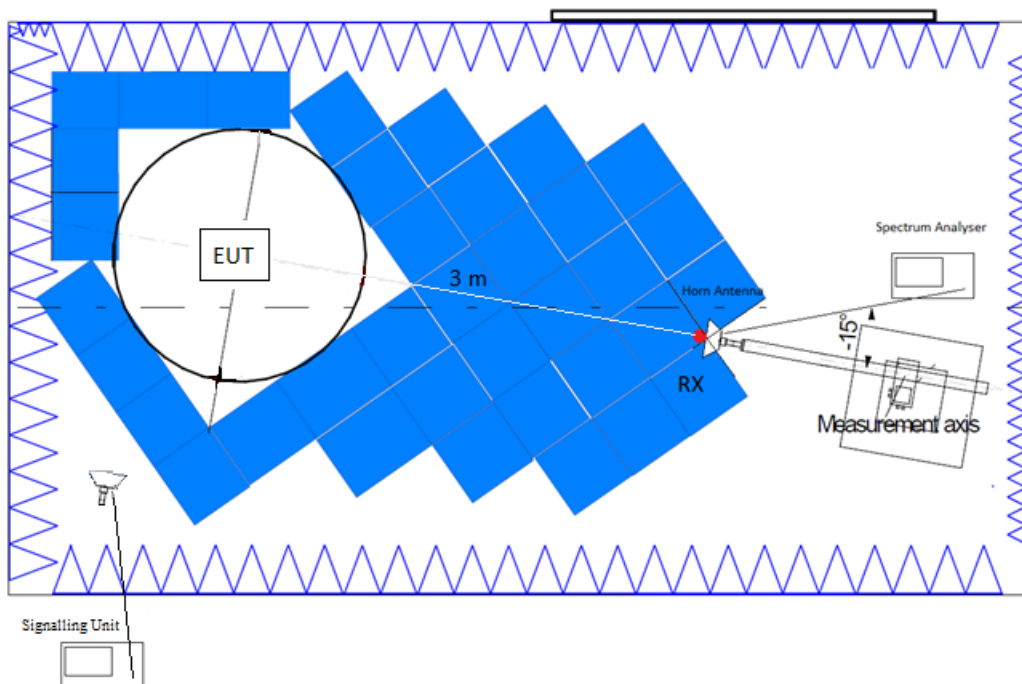
where D is the measurement distance (in the far field region) in m.  $D = 3\text{m}$ .

**Test setup**

Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 18 GHz:



## Results

### LTE Band 12:

A preliminary scan determined the QPSK modulation, BW=5 MHz, RB=1, Offset=0, Narrow Band=0 as the worst case. The next results are for this worst-case configuration.

#### - 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)  $< \pm 5.35$  for  $f < 1$  GHz  
 $< \pm 4.32$  for  $f \geq 1$  GHz up to 8 GHz

## Verdict

Pass

### **LTE Band 13:**

A preliminary scan determined the QPSK modulation, BW=5 MHz, RB=1, Offset=0, Narrow Band=0 as the worst case. The next results are for this worst-case configuration.

Measurements required on one frequency near top channel and one frequency near bottom channel, according to FCC § 15.31 (m).

#### **- 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.

##### **Frequency range 763 - 775 MHz:**

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (MHz)	E.I.R.P (dBm)	Polarization	Detector	Limit (dBm)
774.959400	-45.88	V	Peak	-35

##### **Frequency range 793 - 806 MHz:**

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

##### **Frequency range 1559 - 1610 MHz:**

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.

##### **Frequency range 763 - 775 MHz:**

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



**Frequency range 793 - 806 MHz:**

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

**Frequency range 1559 - 1610 MHz:**

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector	Limit (dBm)
1.564473	-51.71	H	Peak	-40

Measurement uncertainty (dB)  $< \pm 5.35$  for  $f < 1$  GHz  
 $< \pm 4.32$  for  $f \geq 1$  GHz up to 8 GHz

**Verdict**

Pass

## **LTE Band 66:**

A preliminary scan determined the 16QAM modulation, BW=20 MHz, RB=1, RB Offset=0, Narrow Band=0 as the worst-case. The next results are for this worst-case configuration.

### **- Low Channel:**

#### **Frequency range 30 MHz - 1 GHz:**

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

#### **Frequency range 1 - 18 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 - 18 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 - 18 GHz:**

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

Measurement Uncertainty (dB)  $< \pm 5.35$  for  $f < 1$  GHz  
 $< \pm 4.32$  for  $f \geq 1$  GHz up to 18 GHz

## **Verdict**

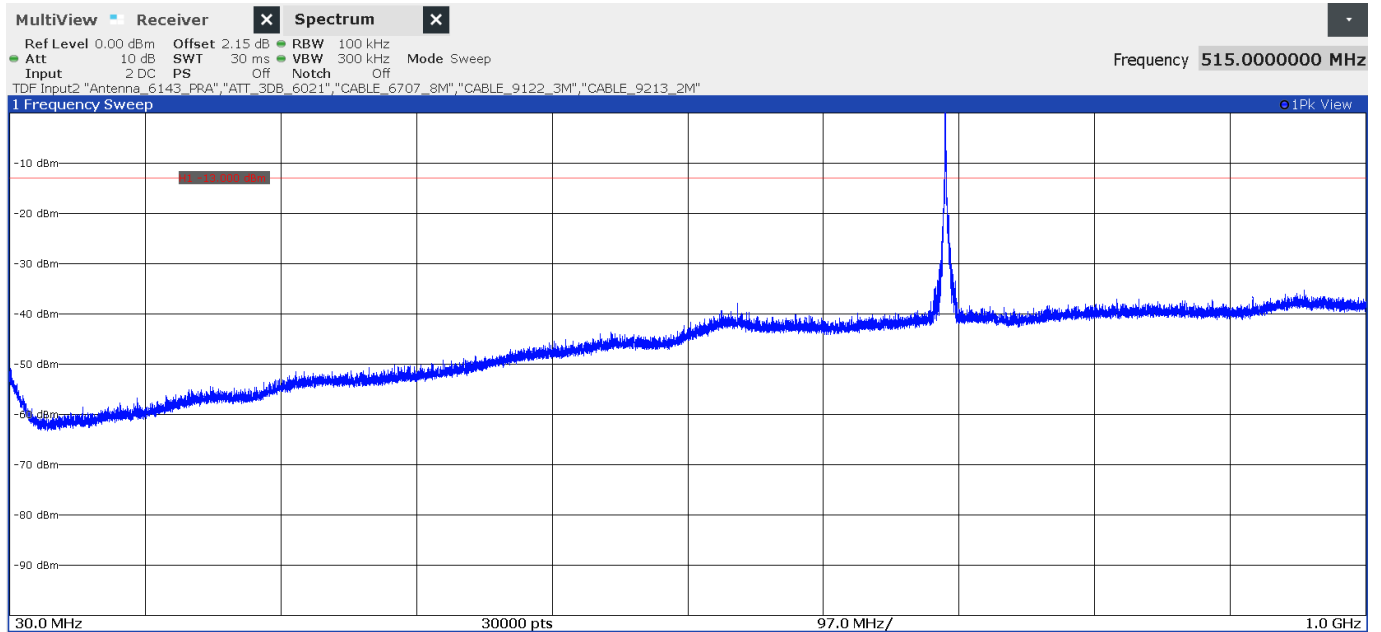
Pass

### Attachments

### LTE Band 12:

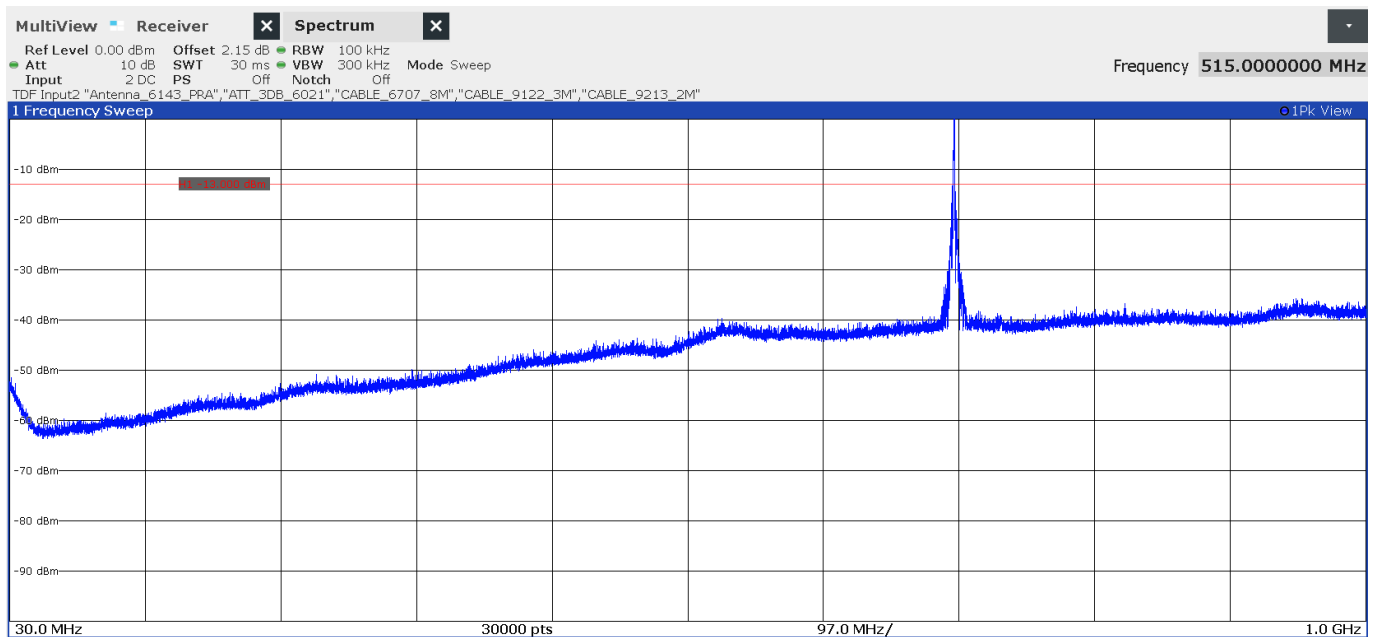
### FREQUENCY RANGE 30 MHz - 1 GHz

#### - Low Channel:



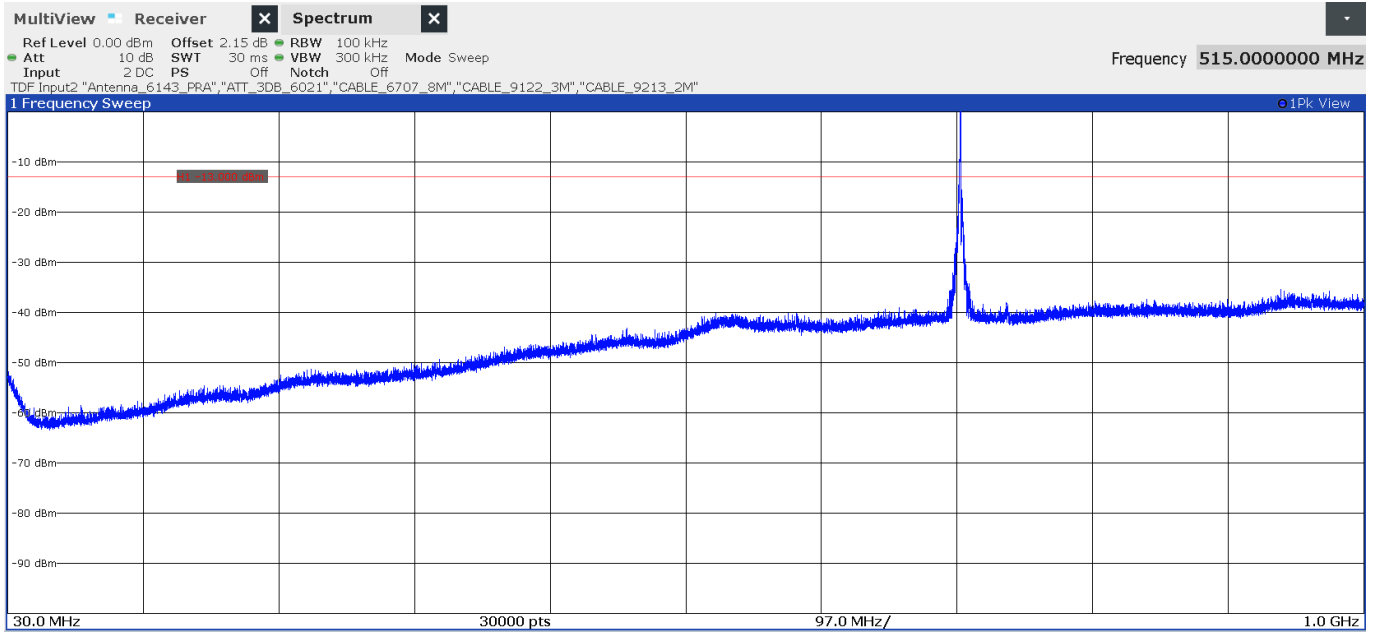
The peak above the limit is the carrier frequency.

#### - Middle Channel:



The peak above the limit is the carrier frequency.

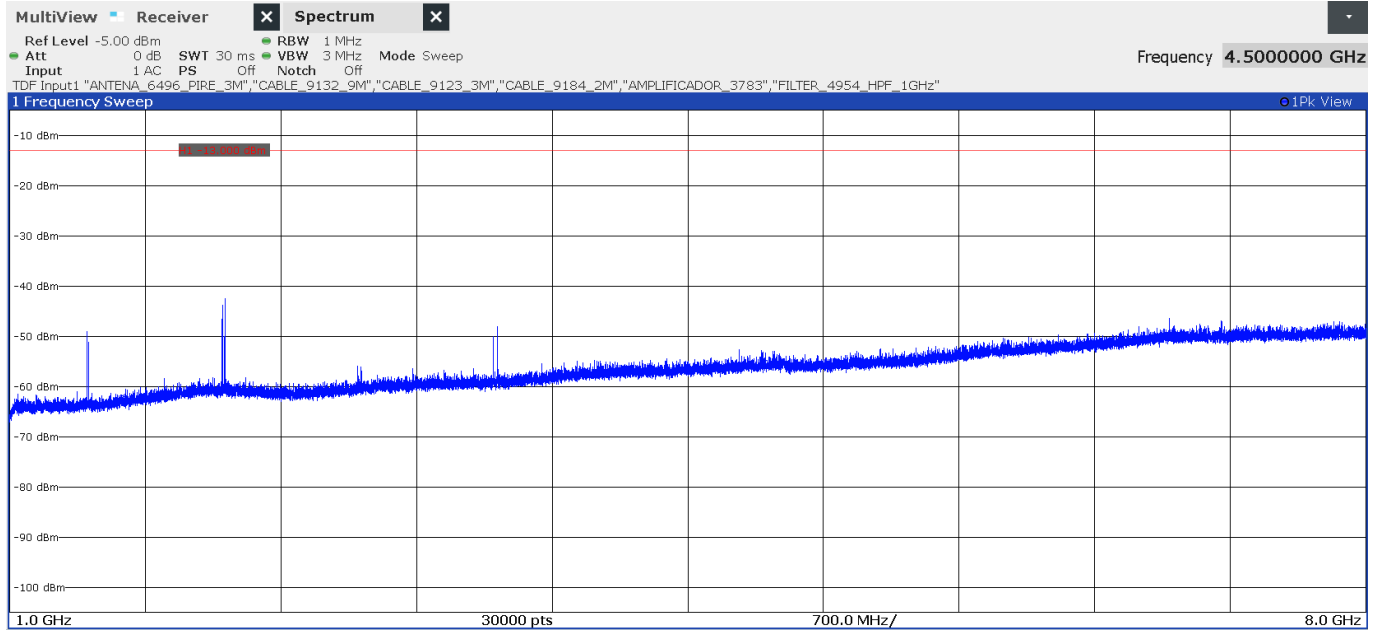
- High Channel:



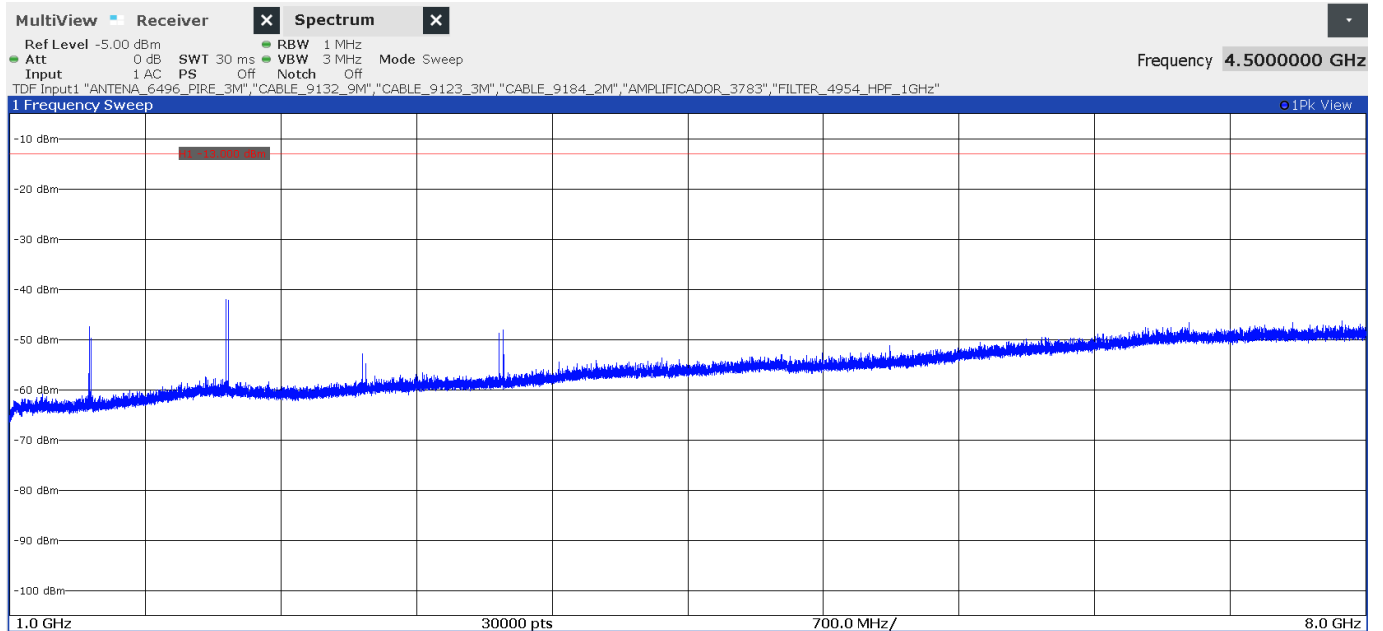
The peak above the limit is the carrier frequency.

### FREQUENCY RANGE 1 - 8 GHz

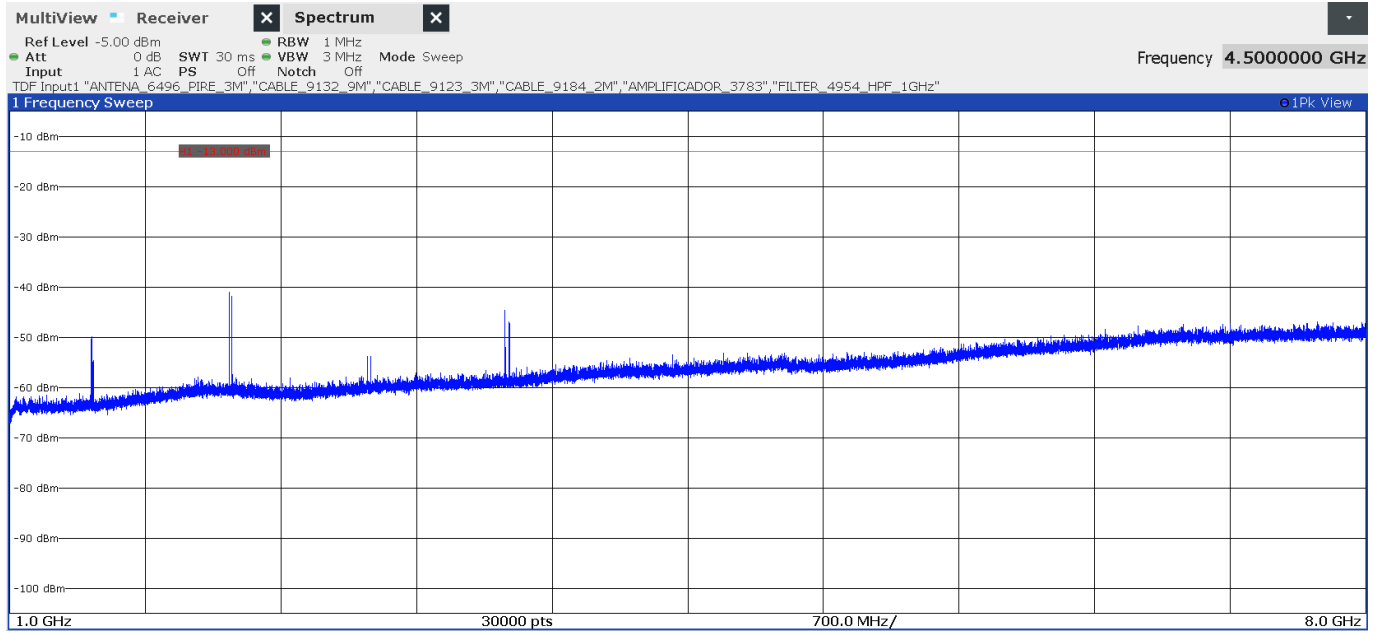
- Low Channel:



- Middle Channel:



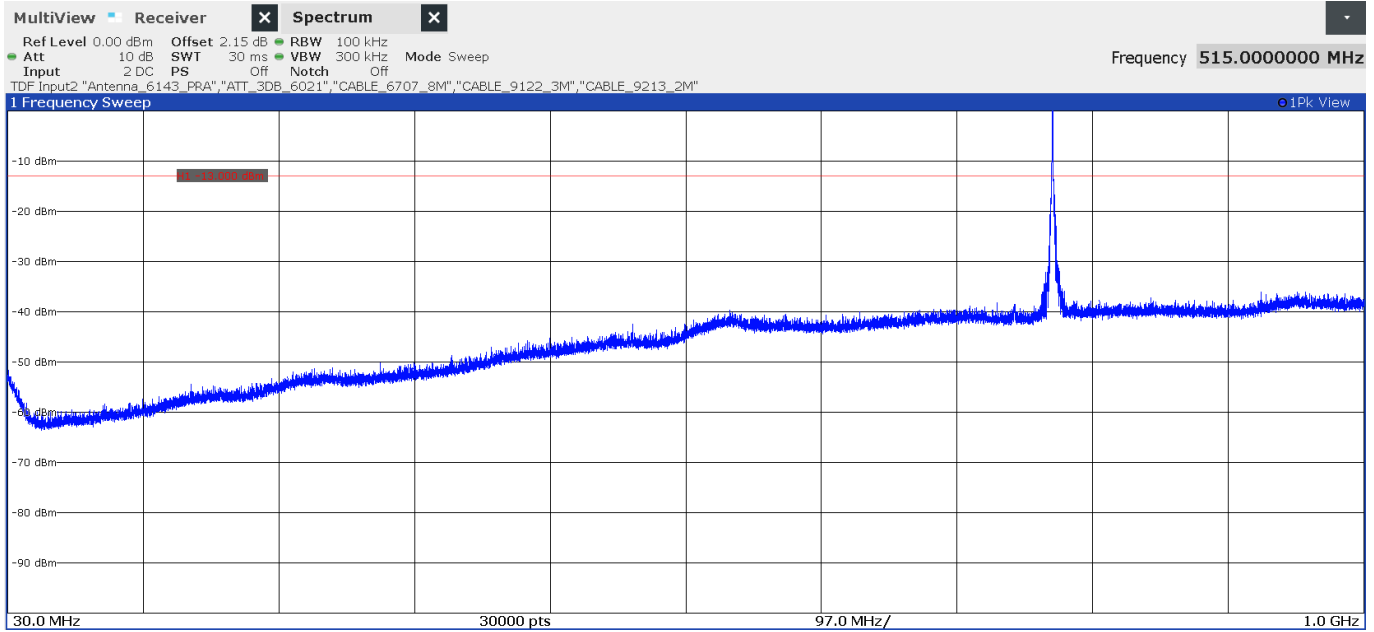
- High Channel:



**LTE Band 13:**

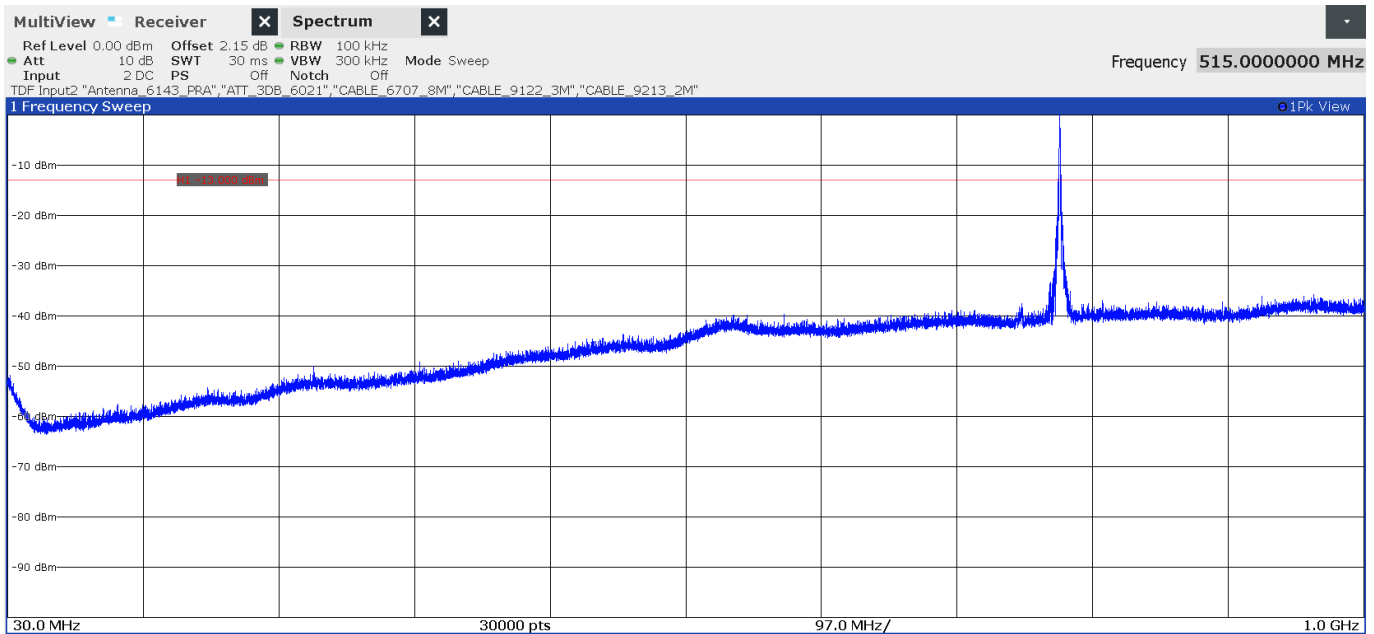
**FREQUENCY RANGE 30 MHz - 1 GHz**

- Low Channel:



The peak above the limit is the carrier frequency.

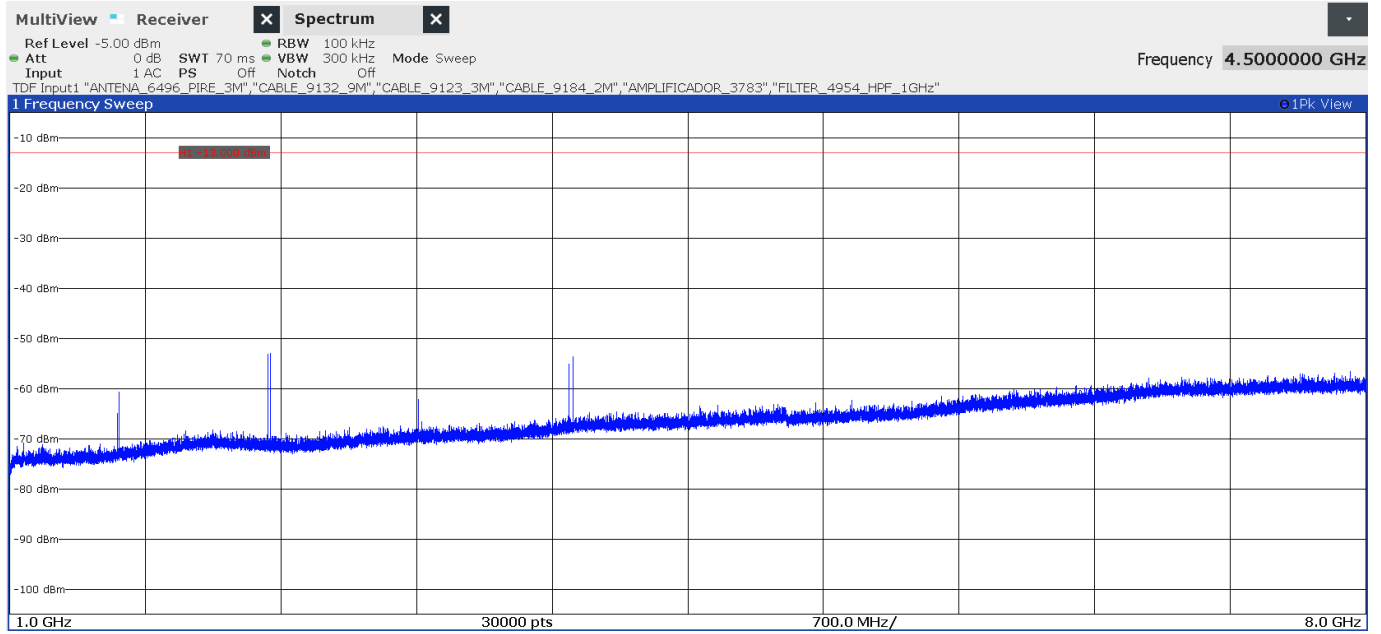
- High Channel:



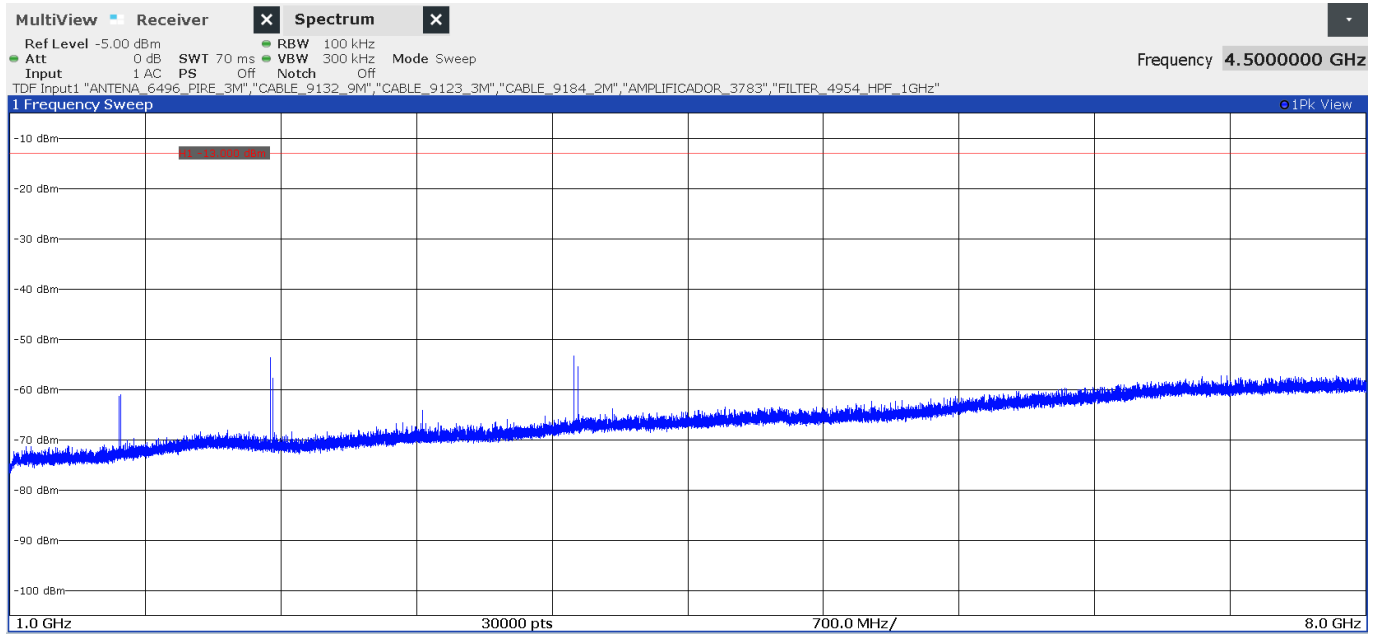
The peak above the limit is the carrier frequency.

### FREQUENCY RANGE 1 - 8 GHz

- Low Channel:



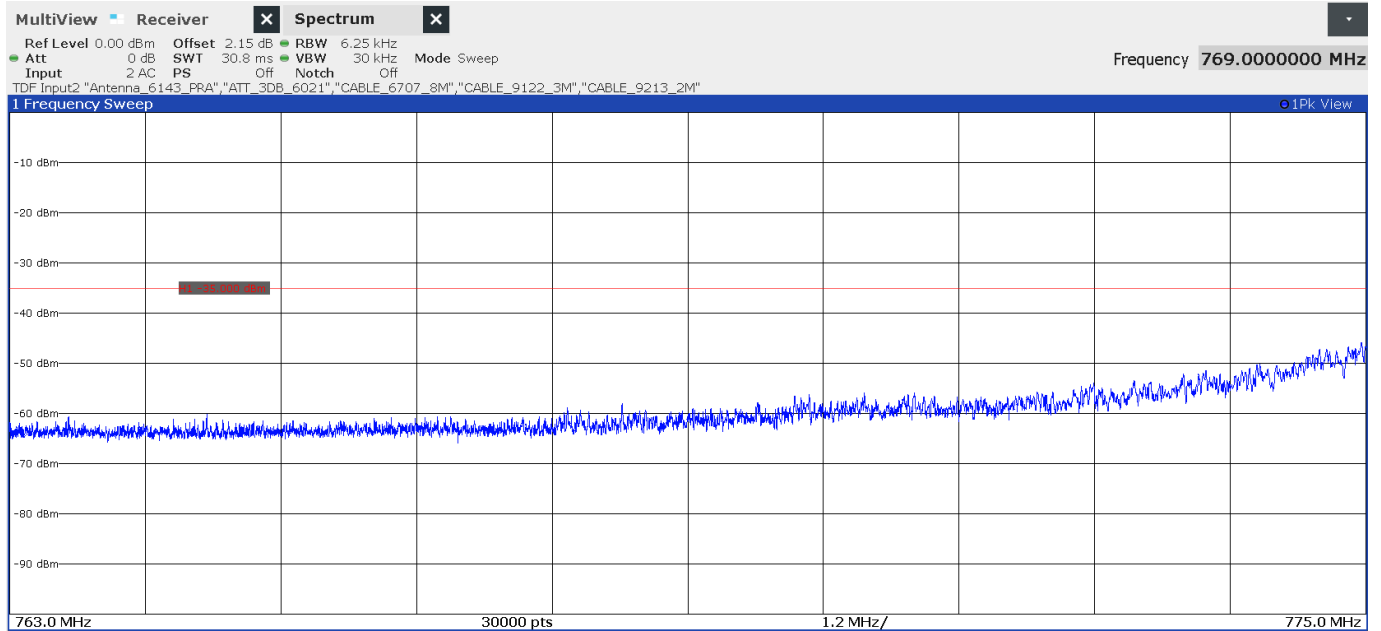
- High Channel:



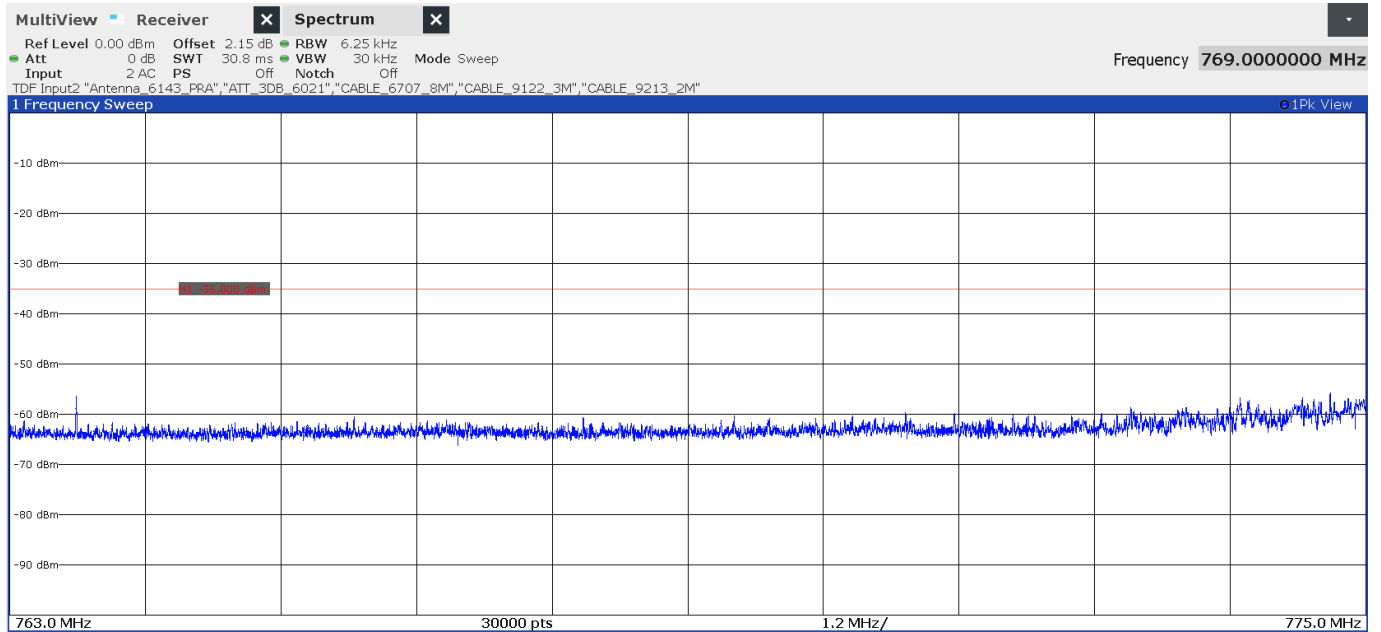


### FREQUENCY RANGE 763 - 775 MHz

- Low Channel:

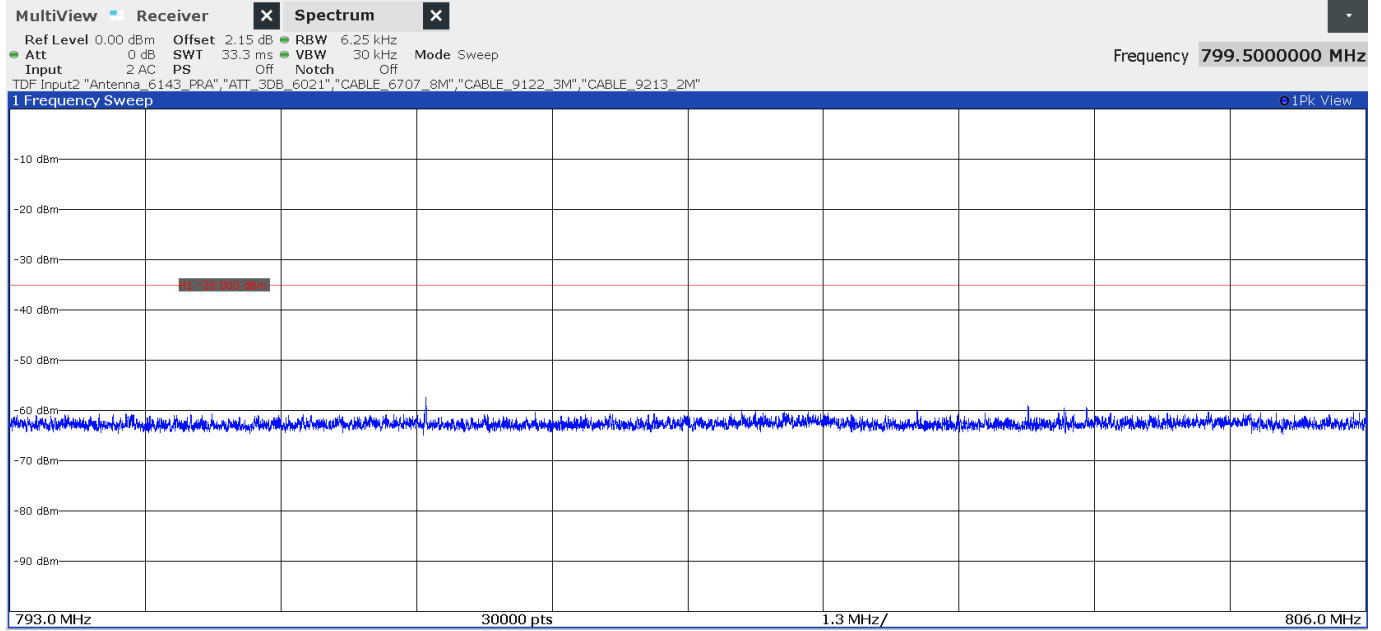


- High Channel:

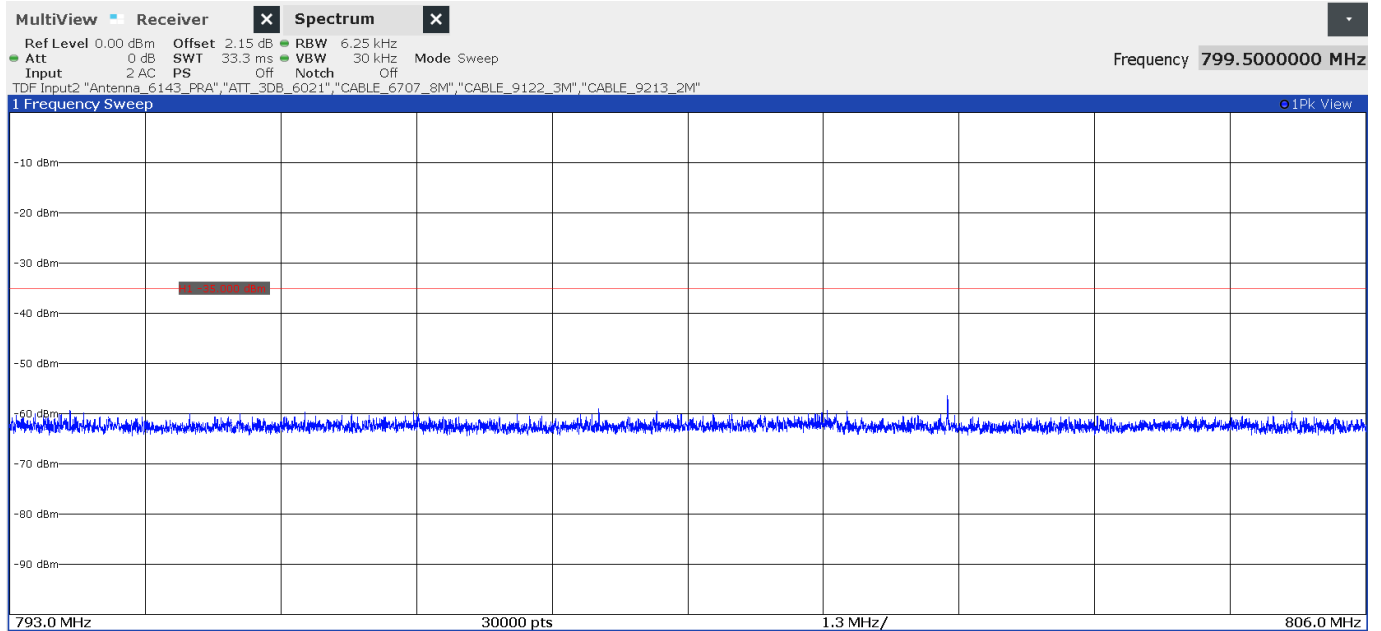


### FREQUENCY RANGE 793 - 806 MHz

- Low Channel:

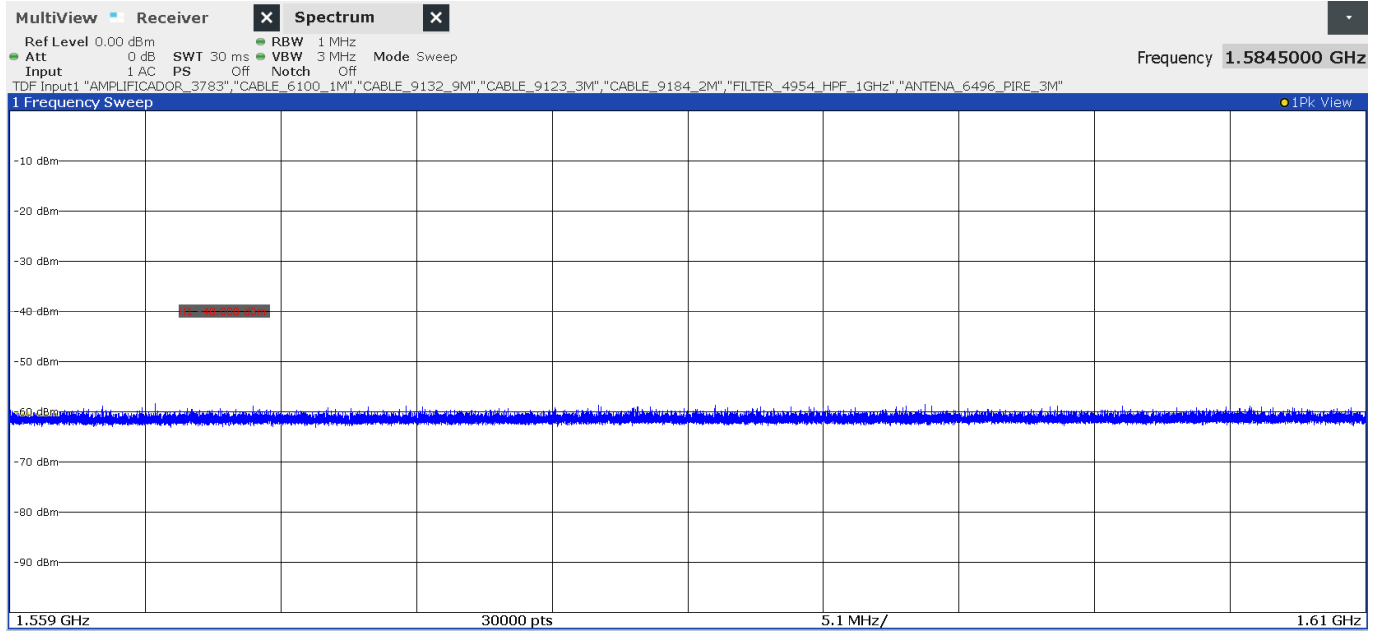


- High Channel:

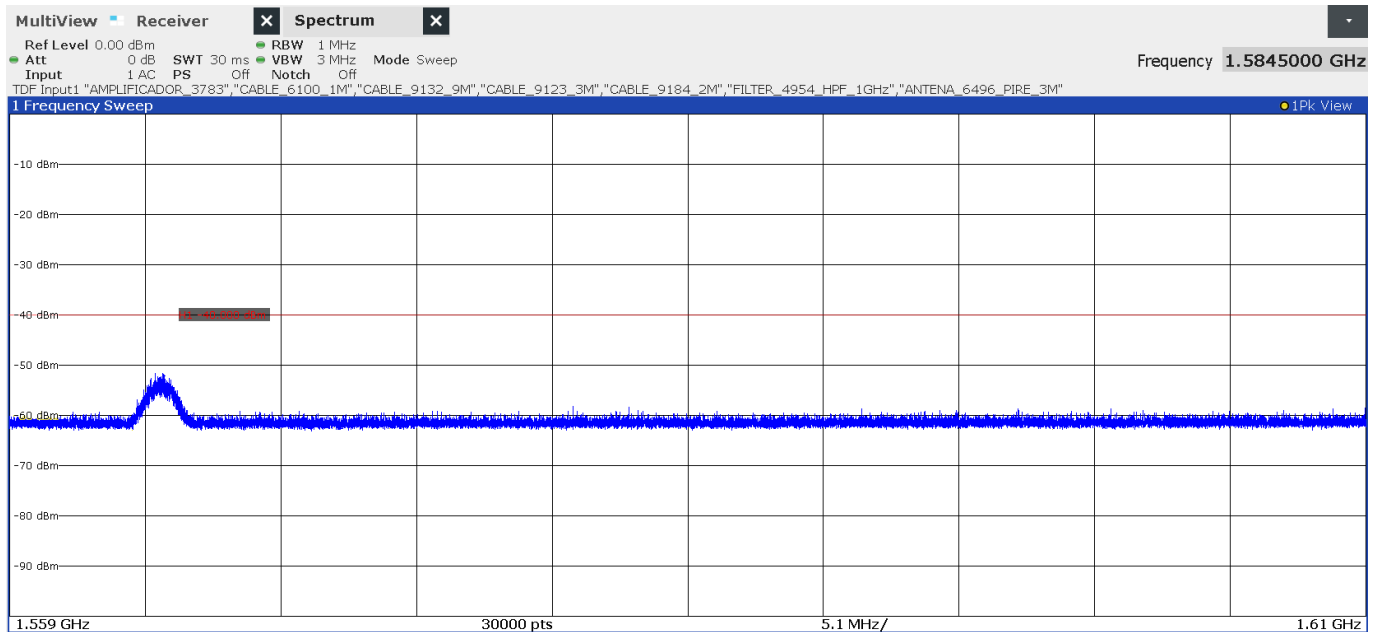


### FREQUENCY RANGE 1559 - 1610 MHz

- Low Channel:



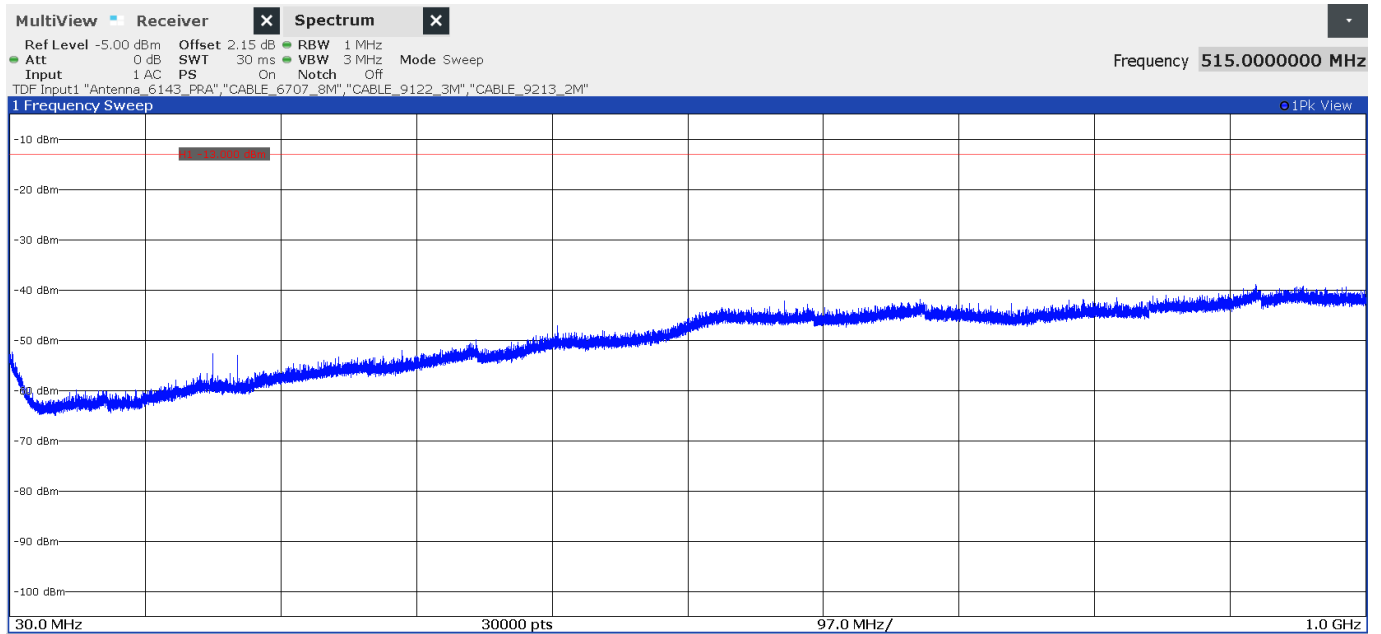
- High Channel:



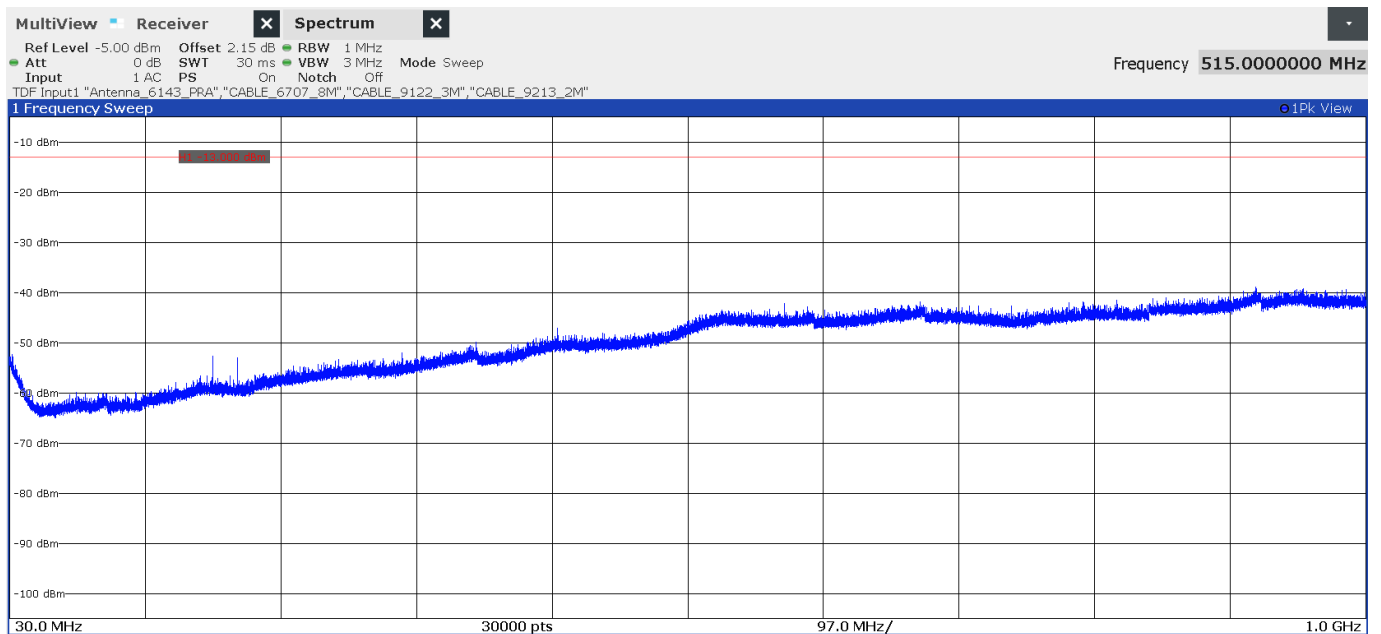
**LTE Band 66:**

**FREQUENCY RANGE 30 MHz - 1 GHz**

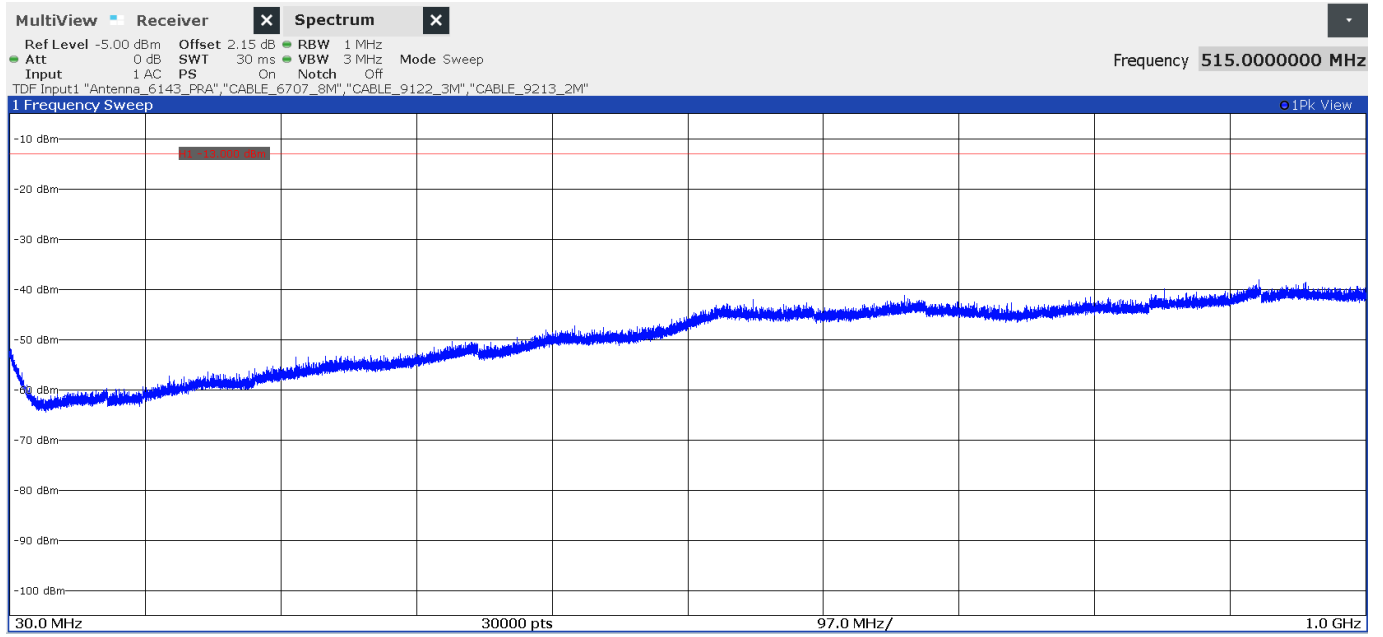
- Low Channel:



- Middle Channel:

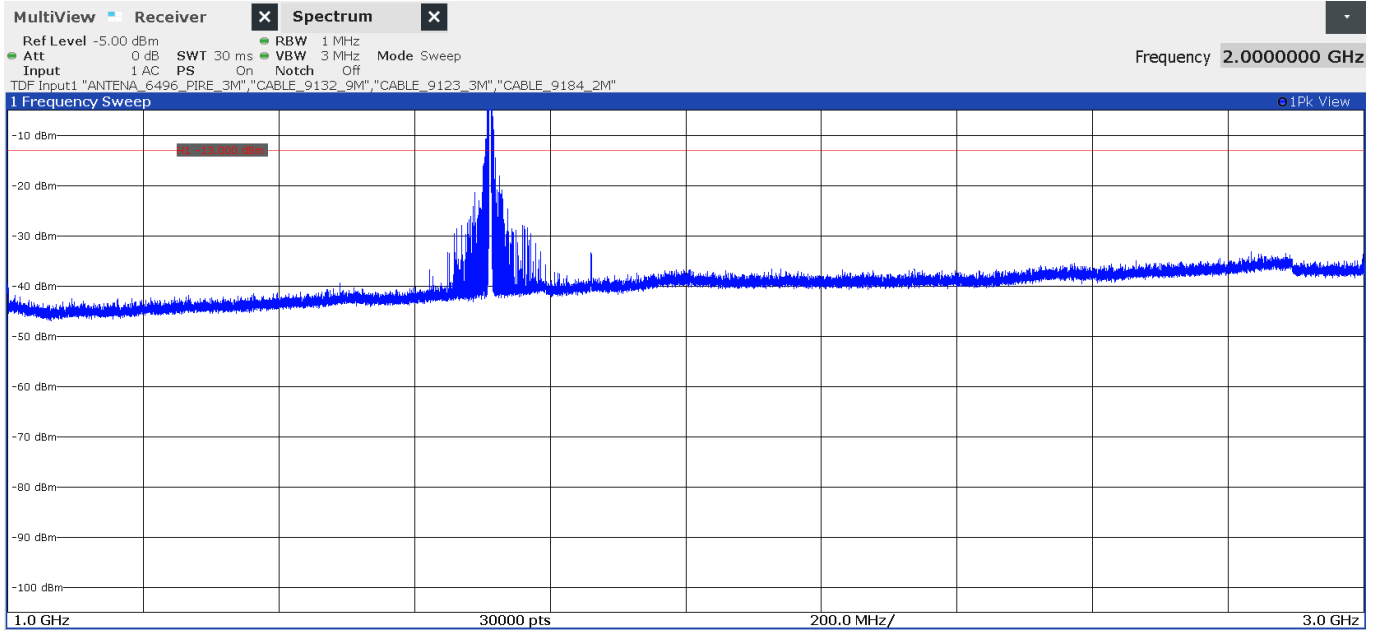


- High Channel:



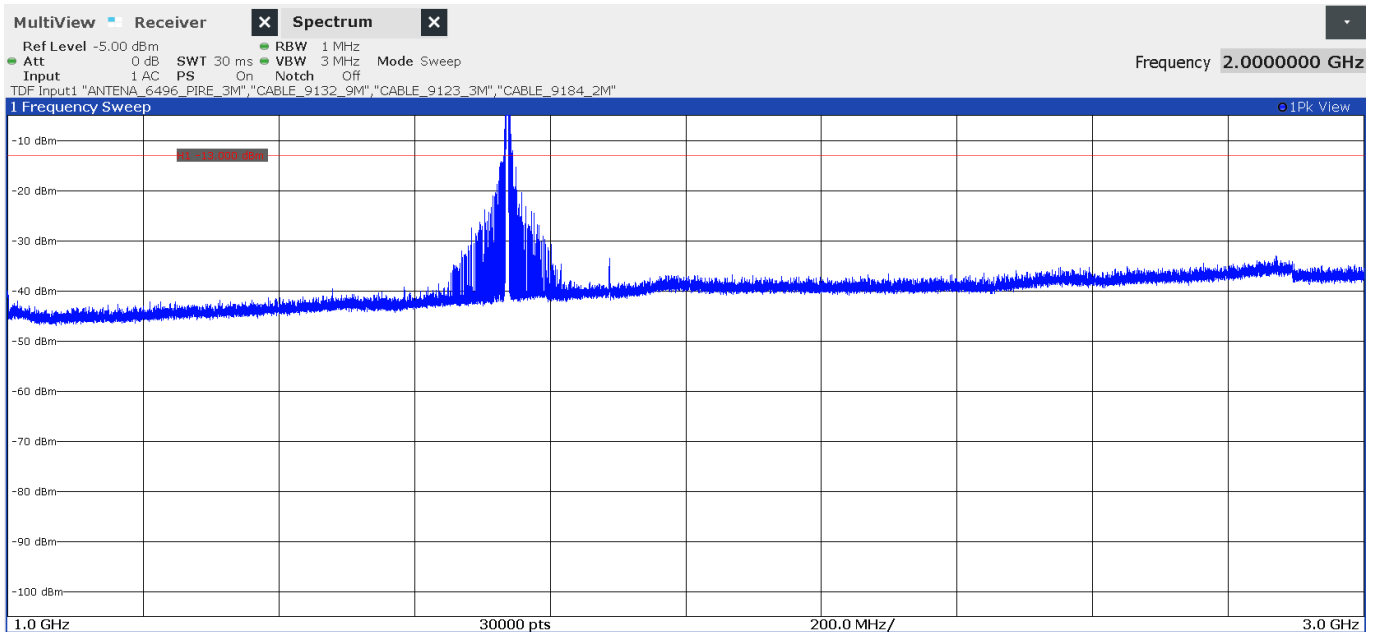
## FREQUENCY RANGE 1 - 3 GHz

- Low Channel:



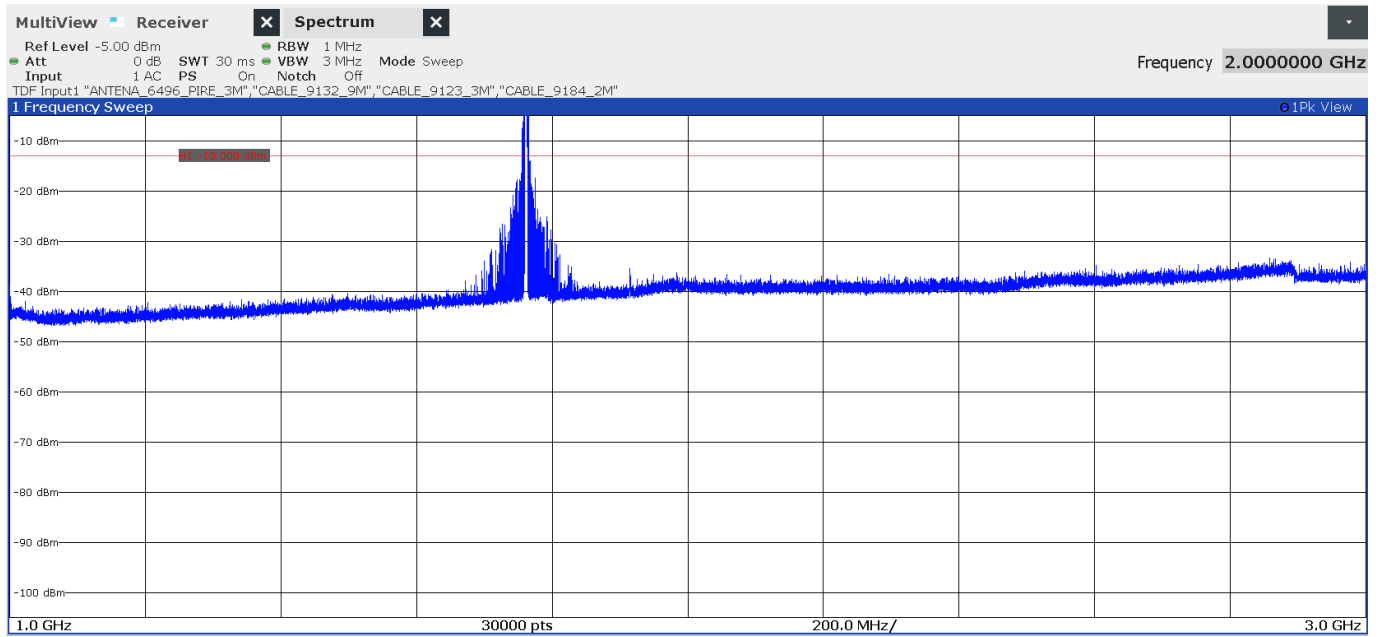
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

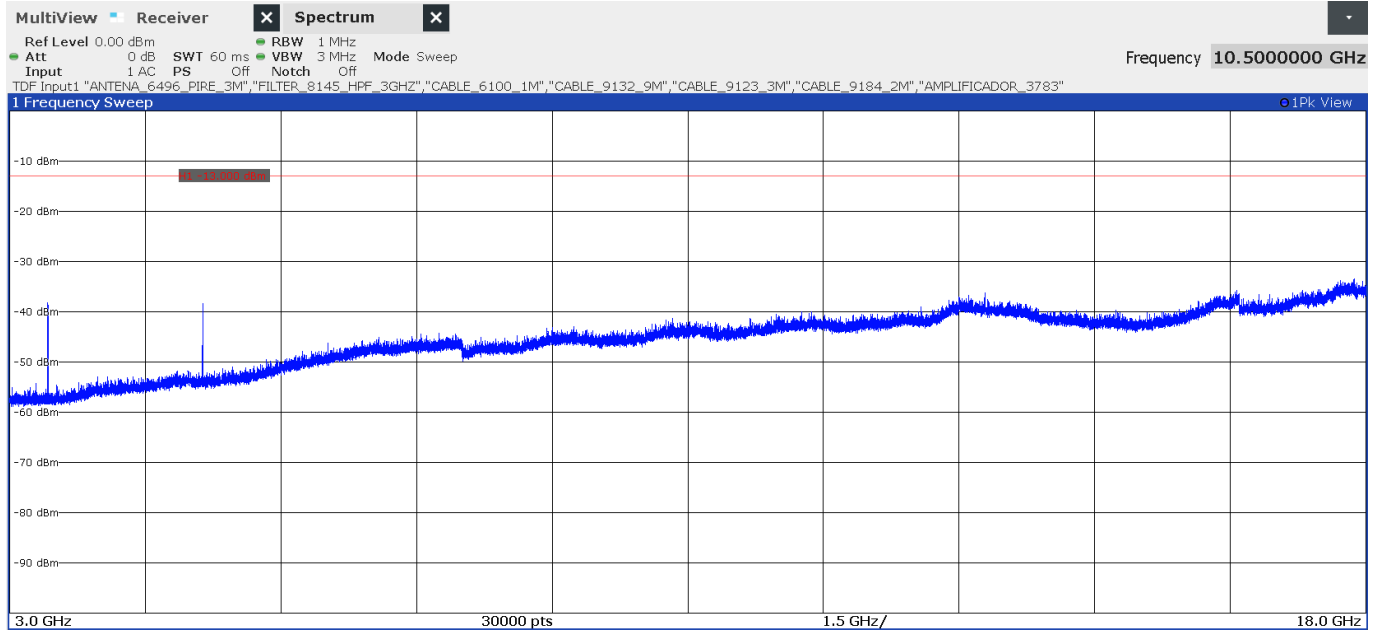
- High Channel:



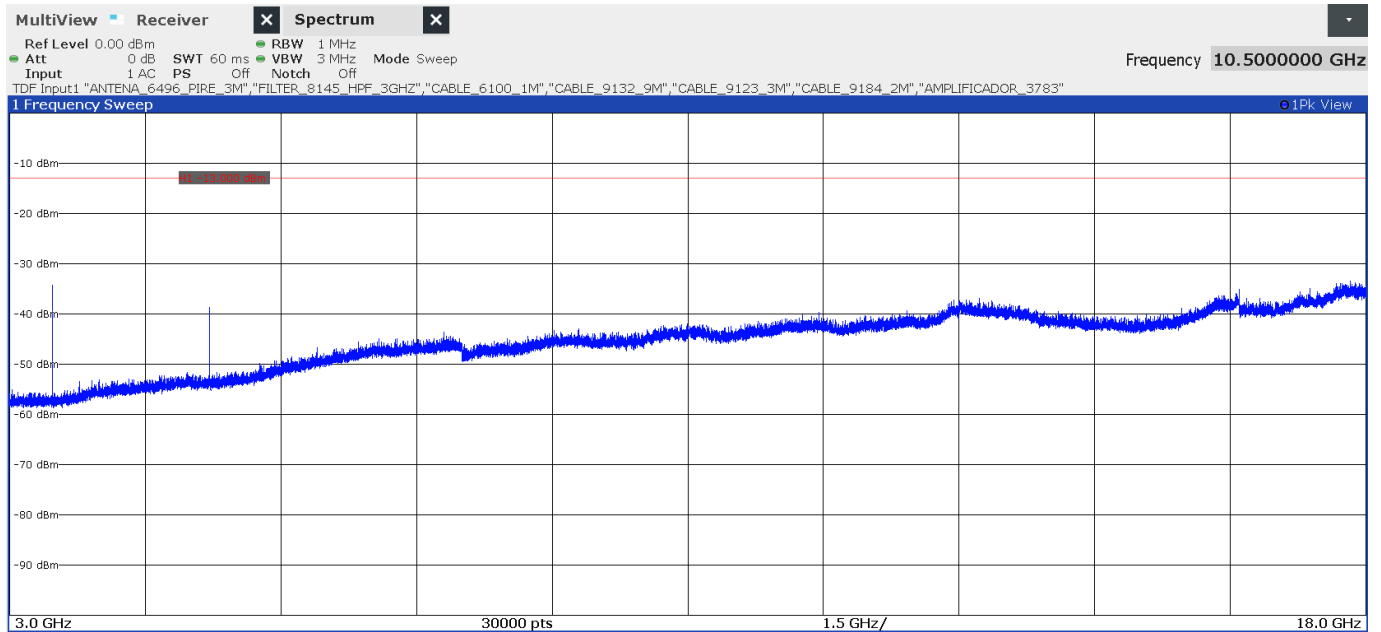
The peak above the limit is the carrier frequency.

### FREQUENCY RANGE 3 - 18 GHz

- Low Channel:



- Middle Channel:





- High Channel:

