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Report On

Application for Grant of Equipment Authorization of the
Inseego Corp.
MIFI8000 Wireless Hotspot Modem

FCC CFR 47 Part 2 and 27: 2018
RSS-195 Issue 2: 2014
RSS-199 Issue 3: 2016

Report No. 72152860A **October 2019**

REPORT ON	Radio Testing of the Inseego Corp. MIFI8000 Wireless Hotspot Modem
TEST REPORT NUMBER	72152860A
PREPARED FOR	Inseego Corp. 9605 Scranton Road, Suite 300 San Diego, CA 92121 USA
CONTACT PERSON	Roman Olmos Senior Regulatory Engineer (858) 812-0606 roman.olmos@inseego.com
PREPARED BY	Alex Chang **Name** Authorized Signatory Title: Senior EMC/RF Wireless Test Engineer
APPROVED BY	Ferdinand S. Custodio **Name** Authorized Signatory Title: Senior EMC Test Engineer/Wireless Team Lead
DATED	October 29, 2019

TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364

Revision History

72152860A Inseego Corp. MIFI8000 Wireless Hotspot Modem					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
10/29/2019	—	Initial Release			Ferdinand Custodio

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Section **Page No**

TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364

SECTION 1

REPORT SUMMARY

Radio Testing of the
Inseego Corp.
MIFI8000 Wireless Hotspot Modem

TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Inseego Corp. MIFI8000 Wireless Hotspot Modem to the requirements of the following:

- FCC CFR 47 Part 2 and 27: 2018
- RSS-195 Issue 2: 2014
- RSS-199 Issue 3: 2016

Objective	To perform Radio testing to determine the Equipment Under Test's (EUT's) compliance with the test specification, for the series of tests carried out.
Manufacturer	Inseego Corp.
Product Marketing Name	MiFi 8000
Model Number(s)	MIFI8000
FCC ID Number	PKRISGMIFI8000
IC Number	3229A-MIFI8000
Serial Number(s)	FJ220819C00056
Number of Samples Tested	1
Test Specification/Issue/Date	• FCC CRF 47 Part 2 and 27 (October 1, 2018) • RSS-195 Issue 2: April 2014 – Wireless Communication Service (WCS) Equipment Operating in the Bands 2305-2320 MHz and 2345-2360 MHz • RSS-199 Issue 3: December 2016 – Broadband Radio Service (BRS) Equipment Operating in the Band 2500-2690 MHz • RSS-Gen Issue 5 Amendment1: March 2019 - General Requirements for Compliance of Radio Apparatus • ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
Start of Test	September 11, 2019
Finish of Test	October 28, 2019
Name of Engineer(s)	Alex Chang
Related Document(s)	• Supporting documents for EUT certification are separate exhibits.

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 2 and 27: 2018 with cross-reference to the corresponding ISED RSS standard is shown below.

Section	FCC Part Sections(s)	RSS Section(s)	Test Description	Result
2.1	2.1046	-	Transmitter Conducted Output Power	Compliant
2.2	2.1046 27.50(a)(3) 27.50(h)(2)	RSS-195 (5.5) RSS-199 (4.4)	Equivalent Isotropic Radiated Power	Compliant
2.3	2.1049 27.53(a)(5) 27.53(m)(6)	RSS-Gen (6.7) RSS-195 (5.6) RSS-199 (4.5)	Occupied Bandwidth	Compliant
2.4	-	RSS-199 (4.4)	Peak-Average Ratio	Compliant
2.5	2.1051 27.53(a)(4)(5) 27.53(m)(4)(6)	RSS-195 (5.6) RSS-199 (4.5)	Band Edge	Compliant
2.6	2.1051 27.53(a)(4)(5) 27.53(m)(4)(6)	RSS-195 (5.6) RSS-199 (4.5)	Conducted Spurious Emissions	Compliant
2.7	2.1053 27.53(a)(4) 27.53(m)(4)	RSS-195 (5.6) RSS-199 (4.5)	Field Strength of Spurious Radiation	Compliant
2.8	2.1055 27.54	RSS-195 (5.4) RSS-199 (4.3)	Frequency Stability	Compliant
-	-	RSS-Gen 7.4	Receiver Spurious Emissions	N/A*
-	-	RSS-GEN 8.8	Power Line Conducted Emissions	*)

N/A* Not Applicable. No stand-alone receiver.
*) Test was previously evaluated by TÜV SÜD America, report number 72142923B issued on May 16, 2019. The additional LTE Bands added on this test report does not affecting significant differences. No further evaluation considered necessary.

1.3 PRODUCT INFORMATION

1.3.1 EUT General Description

The Equipment Under Test (EUT) was an Inseego Corp. MIFI8000 Wireless Hotspot Modem. The EUT is a Wireless Hotspot Modem supporting 2G/3G/4G Technologies. The EUT comes with a USB Port.

1.3.2 Technical Description

EUT Description	Wireless Hotspot Modem
Product Marketing Name	MiFi 8000
Model Number(s)	MIFI8000
Rated Voltage	3.7V, 4400mAh (Rechargeable Li-Ion battery pack) Input 100-240VAC, Output 5V (External AC-DC Power Adapter)
Mode Verified	LTE Band 30: 2305-2315 MHz LTE Band 38: 2570-2620 MHz LTE Band 40: 2305-2315 and 2350-2360 MHz
Capability	WCDMA Band 2, 4, 5, LTE Band 2, 4, 5, 7, 12, 13, 14, 17, 25, 26, 30, 38, 40, 41, 42, 48, 66 and 802.11 a/b/g/n/ac
Primary Unit (EUT)	☒ Production ☐ Pre-Production ☐ Engineering
Manufacturer Declared Voltage Range	3.3 V – 4.3 VDC

(Client declaration, max. antenna gain covered under this test report)

Bands	Frequency(ies)	Antenna Gains
LTE Band 30	2305-2315 MHz	0.0 dBi
LTE Band 38	2570-2620 MHz	1.5 dBi
LTE Band 40	2305-2315 MHz 2350-2360 MHz	0.0 dBi

1.3.3 Transmit Frequency Table

Technology / Band	Modulation	Bandwidth (MHz)	Tx Frequency (MHz)	Emission Designator	EIRP	
					Max. Power (dBm)	Max. Power (mW)
LTE Band 30	QPSK	5	2305-2315	4M51G7D	23.92	247
		10	2305-2315	8M94G7D	23.95	248
	16QAM	5	2305-2315	4M53W7D	23.47	222
		10	2305-2315	8M94W7D	23.32	215
LTE Band 38	QPSK	5	2570-2620	4M51G7D	19.59	91.0
		10	2570-2620	8M98G7D	19.49	88.9
		15	2570-2620	13M4G7D	19.78	95.1
		20	2570-2620	18M0G7D	19.90	97.7
	16QAM	5	2570-2620	4M51W7D	20.37	109
		10	2570-2620	8M94W7D	19.27	84.5
		15	2570-2620	13M4W7D	19.50	89.1
		20	2570-2620	18M0W7D	19.61	91.4
LTE Band 40	QPSK	5	2305-2315	4M49G7D	19.70	93.3
		10	2305-2315	8M94G7D	19.64	92.0
	16QAM	5	2305-2315	4M52W7D	18.85	76.7
		10	2305-2315	8M94W7D	18.78	75.5
LTE Band 40	QPSK	5	2350-2360	4M51G7D	19.54	89.9
		10	2350-2360	8M94G7D	19.60	91.2
	16QAM	5	2350-2360	4M51W7D	18.99	79.3
		10	2350-2360	8M94W7D	18.74	74.8

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
A	Conducted antenna port measurement. EUT Transmits at max power and is powered by the internal battery and/or USB via AC Adapter.
B	Radiated test setup / case spurious emissions. The EUT is connected to the call box in connect to the call box with antenna port terminated by the call box.

1.4.2 EUT Exercise Software

EUT is controlled by a CMW 500 Wideband Radio Communication Tester. There is no other test software used during verification.

1.4.3 Support Equipment and I/O cables

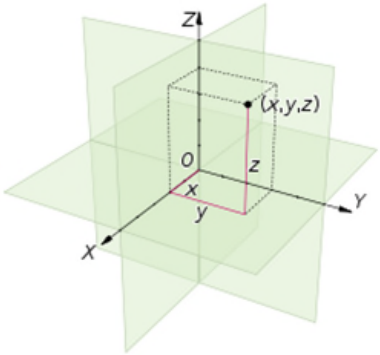
Manufacturer	Equipment/Cable	Description
Inseego Corp.	USB Cable	Standard USB Type A to USB Type C
Inseego Corp.	External AC-DC Power Adapter	Model: SSW-2783, PN: 40123126.01 Input: 100-240VAC, 50/60Hz, 0.5A Output: 5VDC, max. 2A

1.4.4 Worst Case Configuration

Worst-case configuration used in this test report as per output power measurements:

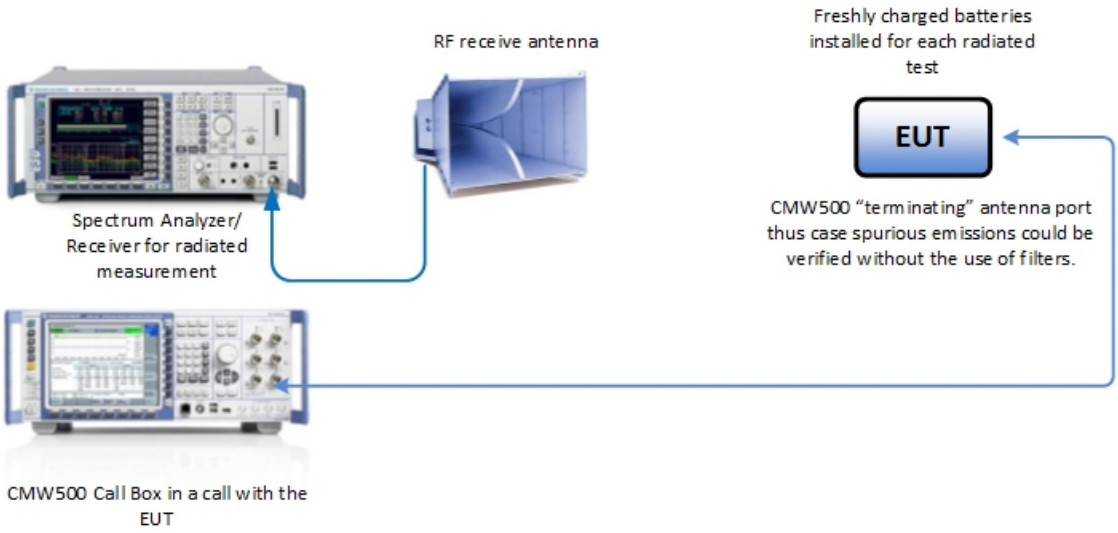
Band	Channel BW	Modulation	RB Size/Offset
LTE Band 30	5 MHz	QPSK	1/13
LTE Band 38	20 MHz	QPSK	1/0
LTE Band 40 (2305-2315MHz Band)	5 MHz	QPSK	1/13
LTE Band 40 (2350-2360MHz Band)	5 MHz	QPSK	1/13

For radiated measurements X, Y, and Z orientations were verified. The verification was determined “Y” as worst-case configuration.

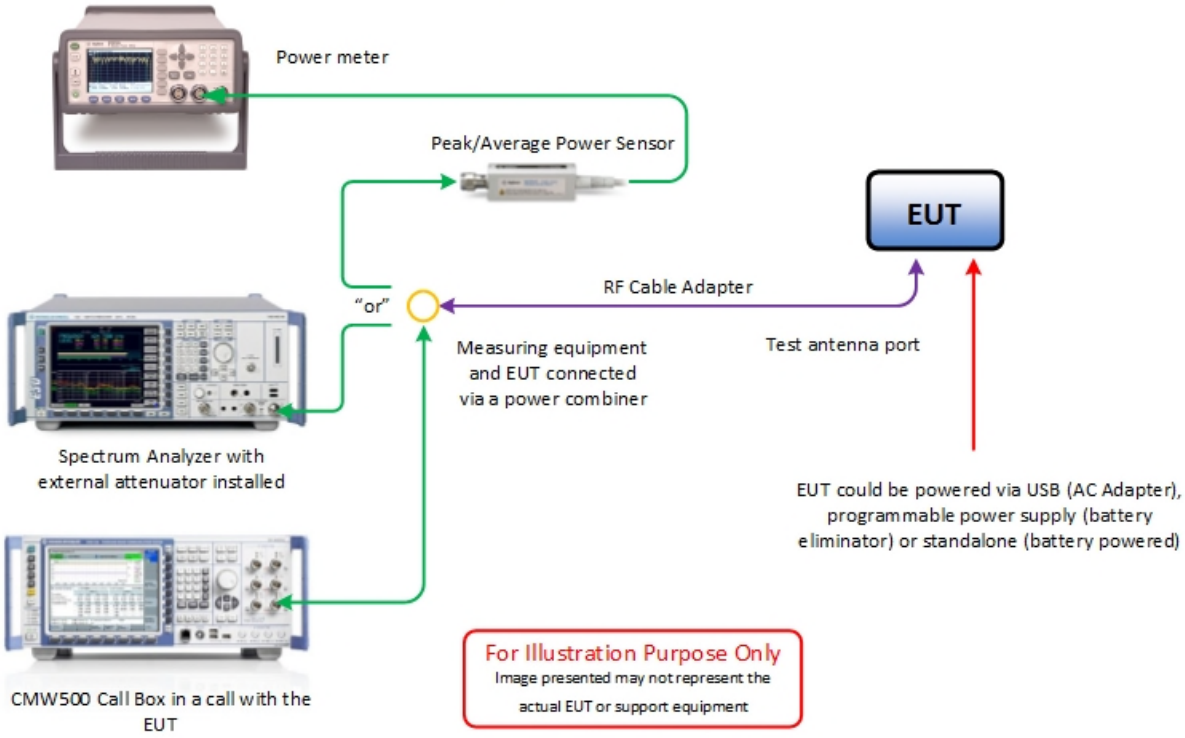


1.4.5 Simplified Test Configuration Diagram

Radiated Test Configuration



Conducted (Antenna Port) Test Configuration



1.5 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.6 MODIFICATION RECORD

Description of Modification	Modification Fitted By	Date Modification Fitted
Serial Number: FJ220819C00056		
None	—	—

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

1.7 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.26-2015, American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

For conducted and radiated emissions, the equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

1.8 TEST FACILITY LOCATION

1.8.1 TÜV SÜD America Inc. (Mira Mesa)

10040 Mesa Rim Road, San Diego, CA 92121-2912 (32.901268,-117.177681). Phone: (858) 678 1400 Fax: (858) 546 0364

1.8.2 TÜV SÜD America Inc. (Rancho Bernardo)

16936 Via Del Campo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: (858) 678 1400 Fax: (858) 546 0364.

1.9 TEST FACILITY REGISTRATION

1.9.1 FCC – Designation No.: US1146

TÜV SÜD America Inc. (San Diego), is an accredited test facility with the site description report on file and has met all the requirements specified in §2.948 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Designation is US1146.

1.9.2 Innovation, Science and Economic Development Canada (ISED) Registration No.: 3067A-1 & 22806-1

The 10m Semi-anechoic chamber of TÜV SÜD America Inc. (San Diego Rancho Bernardo) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 3067A-1.

The 3m Semi-anechoic chamber of TÜV SÜD America Inc. (San Diego Mira Mesa) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 22806-1.

1.9.3 BSMI – Laboratory Code: SL2-IN-E-028R (US0102)

TÜV Product Service Inc. (San Diego) is a recognized EMC testing laboratory by the BSMI under the MRA (Mutual Recognition Arrangement) with the United States. Accreditation includes CNS 13438 up to 6GHz.

1.9.4 NCC (National Communications Commission - US0102)

TÜV SÜD America Inc. (San Diego) is listed as a Foreign Recognized Telecommunication Equipment Testing Laboratory and is accredited to ISO/IEC 17025 (A2LA Certificate No.2955.13) which under APEC TEL MRA Phase 1 was designated as a Conformity Assessment Body competent to perform testing of equipment subject to the Technical Regulations covered under its scope of accreditation including RTTE01, PLMN01 and PLMN08 for TTE type of testing and LP002 for Low-Power RF Device type of testing.

1.9.5 VCCI – Registration No. A-0280 and A-0281

TÜV SÜD America Inc. (San Diego) is a VCCI registered measurement facility which includes radiated field strength measurement, radiated field strength measurement above 1GHz, mains port interference measurement and telecommunication port interference measurement.

1.9.6 RRA – Identification No. US0102

TÜV SÜD America Inc. (San Diego) is National Radio Research Agency (RRA) recognized laboratory under Phase I of the APEC Tel MRA.

1.9.7 OFCA – U.S. Identification No. US0102

TÜV SÜD America Inc. (San Diego) is recognized by Office of the Communications Authority (OFCA) under Appendix B, Phase I of the APEC Tel MRA.

1.10 SAMPLE CALCULATIONS

1.10.1 LTE Emission Designator (QPSK)

Emission Designator = 4M51G7D
G = Phase Modulation
7= Quantized/Digital Info
D = Data Transmission, telemetry, telecommand

1.10.2 LTE Emission Designator (16QAM)

Emission Designator = 4M50W7D
W = Frequency Modulation
7= Quantized/Digital Info
D = Data Transmission, telemetry, telecommand

1.10.3 Spurious Radiated Emission (below 1GHz)

Measuring equipment raw measurement (dbµV) @ 30 MHz			24.4
Correction Factor (dB)	Asset# 1066 (cable)	0.3	-12.6
	Asset# 1172 (cable)	0.3	
	Asset# 1016 (preamplifier)	-30.7	
	Asset# 1175(cable)	0.3	
	Asset# 1002 (antenna)	17.2	
Reported QuasiPeak Final Measurement (dbµV/m) @ 30MHz			**11.8**

1.10.4 Spurious Radiated Emission – Substitution Method

Example = 84dBµV/m @ 1413 MHz (numerical sample only)

The field strength reading of 84dBµV/m @ 1413 MHz (2nd Harmonic of 706.5 MHz) is the maximized measurement when the EUT is on the turntable measured at 3 meters. The gain of the substituted antenna is 7.8dBi while the transmit cable loss is 1.0 dB (cable between signal generator and the substituted antenna). The signal generator level is adjusted until the 84dBµV/m level at the receiving end is replicated (identical test setup, i.e. same antenna, cable/s and preamp). If the adjusted signal generator level is -18dBm, then we have the following for both EIRP and ERP as required:

P_{EIRP} = -18 dBm + 7.8 dBi – 1dB
= 11.2 dBm

SECTION 2

TEST DETAILS

Radio Testing of the
Inseego Corp.
MIFI8000 Wireless Hotspot Modem

2.1 TRANSMITTER CONDUCTED POWER MEASUREMENTS

2.1.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1046

2.1.2 Standard Applicable

The conducted power mesurements were made in accordance to FCC Part 2 Clasue 2.1046.

FCC 47 CFR Part 2.1046:
(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in §2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.
(c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

2.1.3 Equipment Under Test and Modification State

Serial No: FJ220819C00056 / Test Configuration A

2.1.4 Date of Test/Initial of test personnel who performed the test

September 13 and 16, 2019 / AC

2.1.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	25.7 °C
Relative Humidity	41.7 %
ATM Pressure	98.9 kPa

2.1.7 Additional Observations

- This is a conducted test using Power Meter.
- The path loss was measured and entered as a level offset.
- Low, Middle and High channels for all bandwidths with different RB size and RB offset and modulations were verified and reported.

2.1.8 Test Results

LTE Band 30 (Ant 2)							
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**No. RB**	**RB Offset**	**Average Power (dBm)**	**Peak Power (dBm)**
5	27685	2307.5	QPSK	1	13	**23.92**	**26.76**
	27710	2310				**23.84**	**26.74**
	27735	2312.5				**23.70**	**26.62**
10	27710	2310		1	0	23.95	26.57
5	27685	2307.5	16QAM	1	13	23.47	26.94
	27710	2310				23.07	27.19
	27735	2312.5				23.21	27.02
10	27710	2310		1	25	23.32	27.23

LTE Band 38 (Ant 2)							
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**No. RB**	**RB Offset**	**Average Power (dBm)**	**Peak Power (dBm)**
5	37775	2572.5	QPSK	1	13	19.59	27.21
	38000	2595				19.08	26.65
	38225	2617.5				19.16	26.71
	37775	2572.5	16QAM	1	13	20.37	29.21
	38000	2595				19.84	28.60
	38225	2617.5				18.98	27.70

LTE Band 38 (Ant 2)							
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**No. RB**	**RB Offset**	**Average Power (dBm)**	**Peak Power (dBm)**
10	37800	2575	QPSK	1	25	19.49	26.85
	38000	2595				19.09	26.36
	38200	2615				19.34	26.50
	37800	2575	16QAM	1	0	19.27	28.18
	38000	2595				18.74	27.61
	38200	2615				18.90	27.69

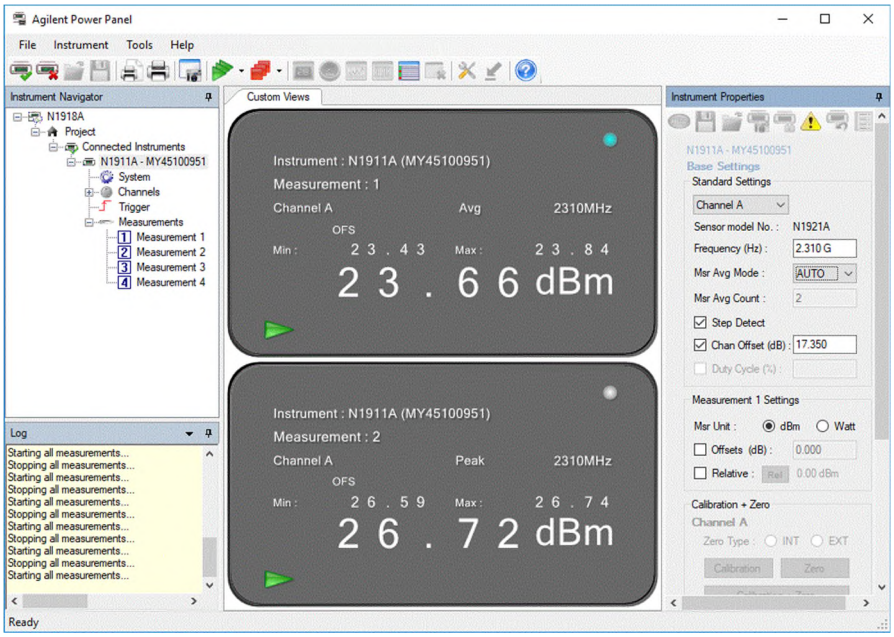
LTE Band 38 (Ant 2)							
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**No. RB**	**RB Offset**	**Average Power (dBm)**	**Peak Power (dBm)**
15	37825	2577.5	QPSK	1	0	19.78	27.07
	38000	2595				19.35	26.67
	38175	2612.5				19.29	26.40
	37825	2577.5	16QAM	1	0	19.50	28.31
	38000	2595				18.95	27.69
	38175	2612.5				18.96	27.68

LTE Band 38 (Ant 2)							
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**No. RB**	**RB Offset**	**Average Power (dBm)**	**Peak Power (dBm)**
20	37850	2580	QPSK	1	0	**19.90**	**27.18**
	38000	2595				**19.53**	**26.78**
	38150	2610				**19.33**	**26.51**
	37850	2580	16QAM	1	0	19.61	28.30
	38000	2595				18.98	27.83
	38150	2610				18.79	27.61

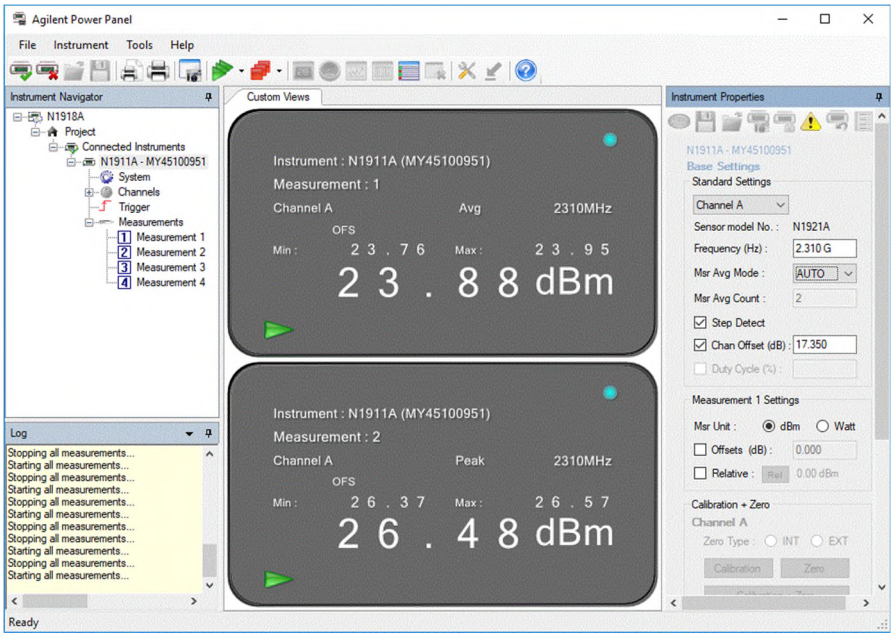
LTE Band 40 (2305-2315MHz Band) (Ant 2)							
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**No. RB**	**RB Offset**	**Average Power (dBm)**	**Peak Power (dBm)**
5	38725	2307.5	QPSK	1	13	**19.70**	**27.31**
	38750	2310				**19.68**	**28.05**
	38775	2312.5				**19.62**	**27.21**
	38725	2307.5	16QAM	1	13	18.82	28.24
	38750	2310				18.85	28.21
	38775	2312.5				18.72	28.59
10	38750	2310	QPSK	1	25	19.64	27.55
	38750	2310	16QAM	1	25	18.78	27.96

LTE Band 40 (2350-2360MHz Band) (Ant 2)							
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**No. RB**	**RB Offset**	**Average Power (dBm)**	**Peak Power (dBm)**
5	39175	2352.5	QPSK	1	13	**19.54**	**27.52**
	39200	2355				**19.78**	**27.65**
	39225	2357.5				**19.66**	**27.58**
	39175	2352.5	16QAM	1	13	18.99	28.32
	39200	2355				18.97	28.62
	39225	2357.5				18.89	28.52
10	39200	2355	QPSK	1	25	19.60	27.60
	39200	2355	16QAM	1	25	18.74	28.37

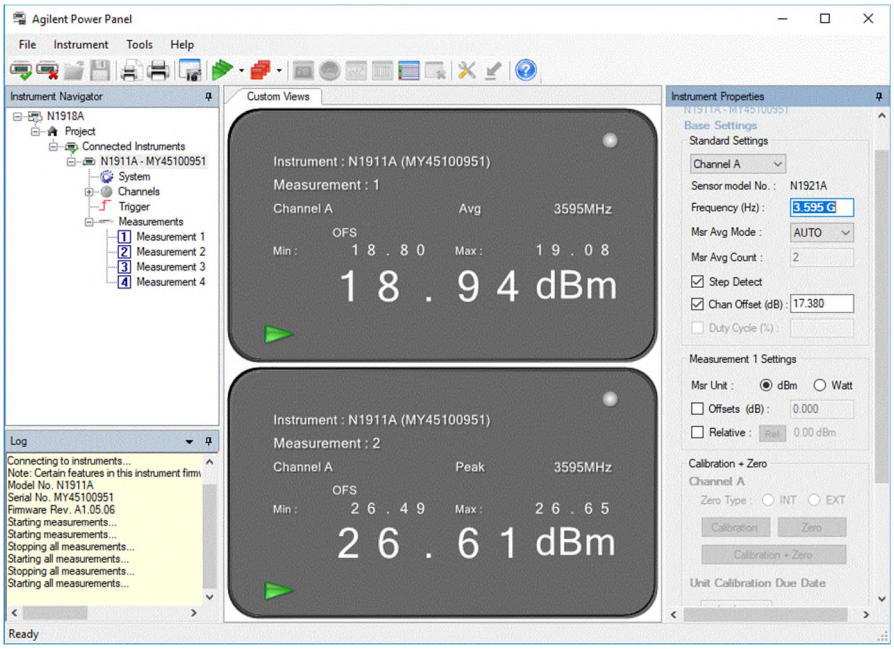
2.1.9 Sample Test Measurement Screen



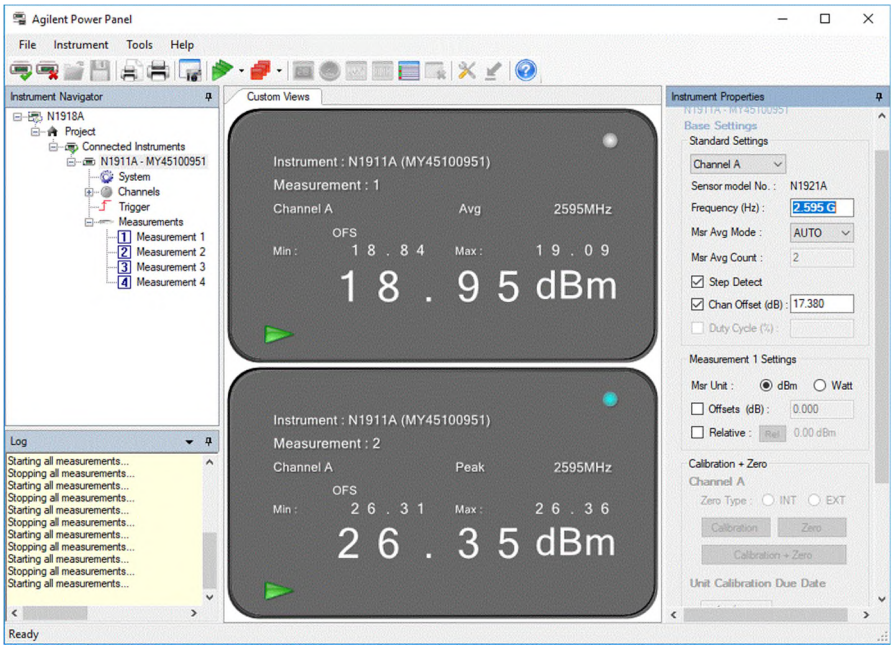
LTE Band 30_5 MHz Bandwidth Mid Chanel at 2310 MHz QPSK 1 RB 13 Offset



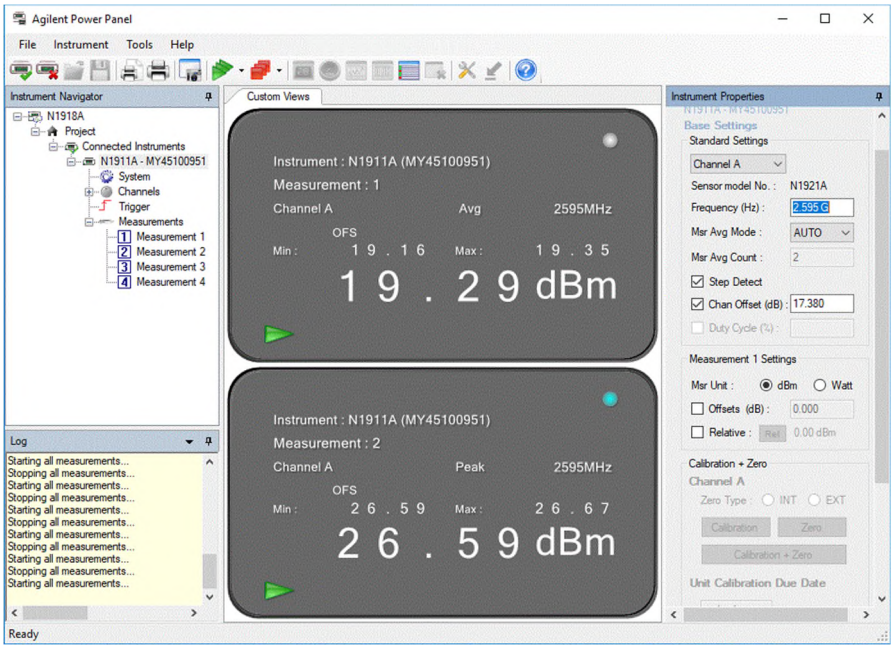
LTE Band 30_10 MHz Bandwidth Mid Chanel at 2310 MHz QPSK 1 RB 0 Offset



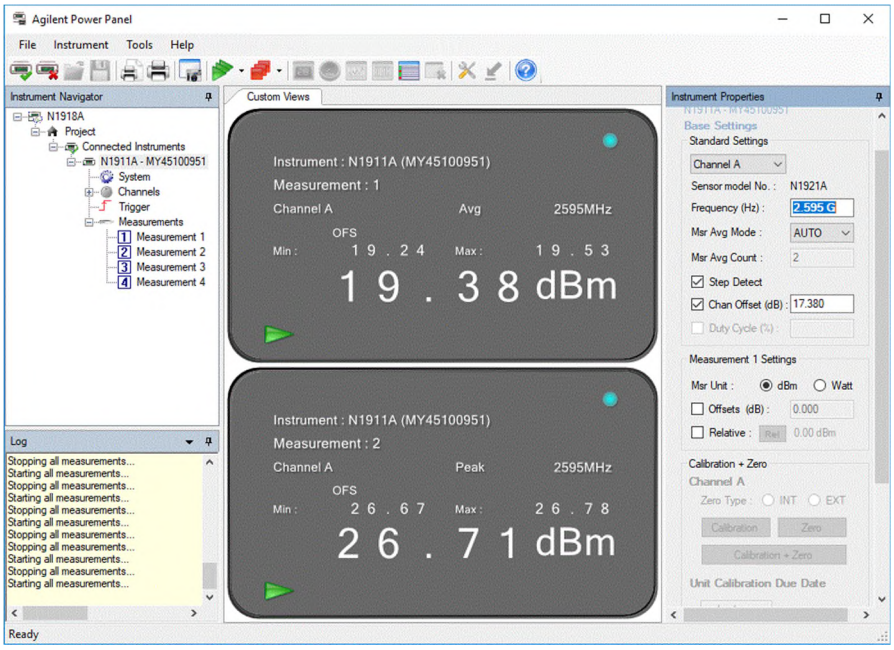
LTE Band 38_5 MHz Bandwidth Mid Chanel at 2595 MHz QPSK 1 RB 13 Offset



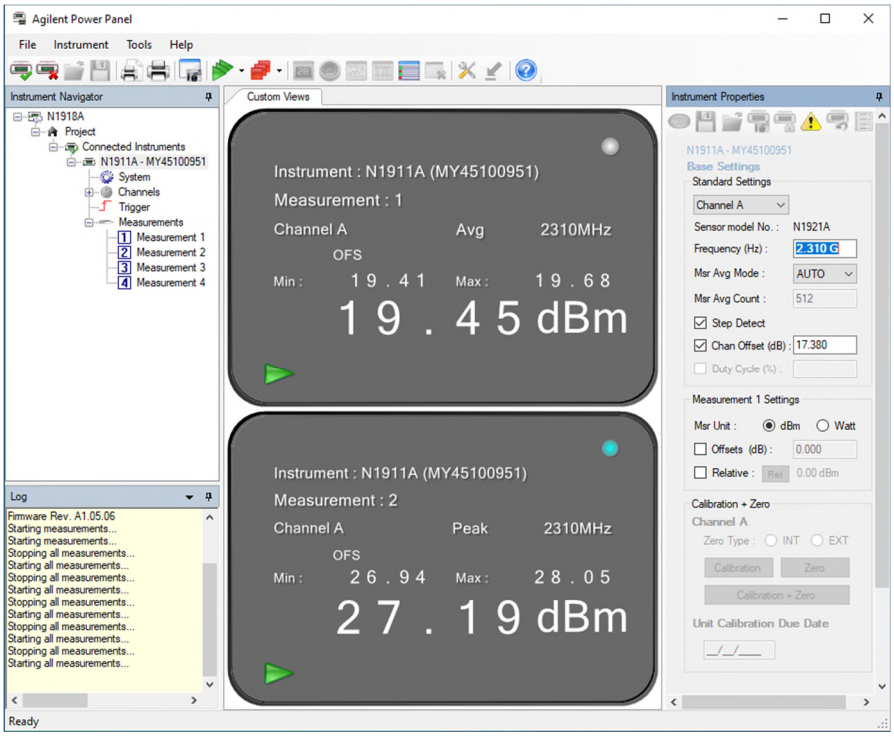
LTE Band 38_10 MHz Bandwidth Mid Chanel at 2595 MHz QPSK 1 RB 25 Offset



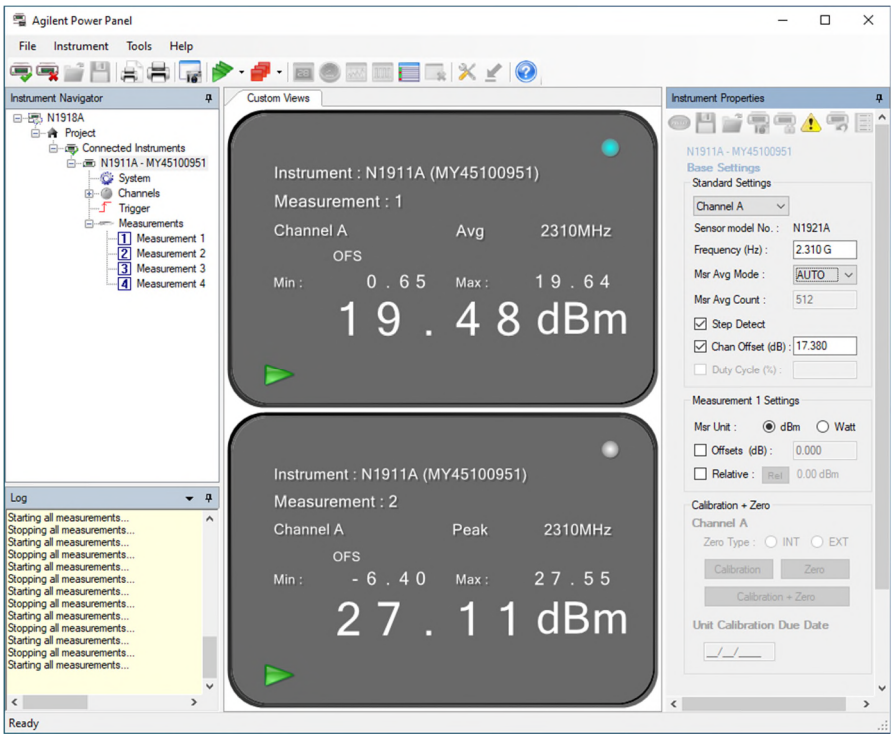
LTE Band 38_15 MHz Bandwidth Mid Chanel at 2595 MHz QPSK 1 RB 0 Offset



LTE Band 38_20 MHz Bandwidth Mid Chanel at 2595 MHz QPSK 1 RB 0 Offset



LTE Band 40_5 MHz Bandwidth Mid Chanel at 2310 MHz QPSK 1 RB 13 Offset on 2305-2315MHz Band



LTE Band 40_10 MHz Bandwidth Mid Chanel at 2310 MHz QPSK 1 RB 25 Offset on 2305-2315MHz Band

2.2 EQUIVALENT ISOTROPIC RADIATED POWER

2.2.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1046
FCC 47 CFR Part 27, Clause 27.50 (a)(3)
FCC 47 CFR Part 27, Clause 27.50 (h)(2)
RSS-195, Clause 5.5
RSS-199, Clause 4.4

2.2.2 Standard Applicable

FCC 47 CFR Part 27.50(a)(3):
Mobile and portable stations. (i) For mobile and portable stations transmitting in the 2305–2315 MHz band or the 2350–2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, except that for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth. For mobile and portable stations using time division duplexing (TDD) technology, the duty cycle must not exceed 38 percent in the 2305–2315 MHz and 2350–2360 MHz bands. Mobile and portable stations using FDD technology are restricted to transmitting in the 2305–2315 MHz band. Power averaging shall not include intervals in which the transmitter is off.

FCC 47 CFR Part 27.50(h)
(2) Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts trasmitter output power.

RSS-195, Clause 5.5:
The e.i.r.p. of mobile or portable equipment transmitting in the band 2305-2315 MHz or the band 2350-2360 MHz, employing 3GPP LTE (Third Generation Partnership Project Long Term Evolution) standards, shall not exceed 250 mW within any 5 MHz bandwidth. For other technologies, the e.i.r.p. shall not exceed 50 mW within any 1 MHz bandwidth.

RSS-199, Clase 4.4:
For mobile subscriber equiment, the e.i.r.p. shall not exceed 2 W.

2.2.3 Equipment Under Test

Serial No: FJ220819C00056 Test Configuration (N/A, calculation only)

2.2.4 Date of Verification/Initial of test personnel who performed the calculation

October 22, 2019 / AC

2.2.5 Additional Observations

- EIRP was calculated as per Section 1.2 and 1.3 of KDB412172 D01 (Determining ERP and EIRP v01r01).
- Calculation formula in logarithmic terms:

$$EIRP = P_T + G_T - L_C$$

Where:

P_T = transmitter conducted output power dBm (Section 2.1 of this test report)
G_T = gain of the transmitting antenna, in dBi (EIRP)
L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB (Power measurement performed directly at the primary antenna port. The loss between the LTE module and the primary antenna port is considered negligible).

- For LTE Bands, only the worst-case RB size and RB offset presented.

2.2.6 Test Results

LTE Band 30 (Ant 2)									
Modulation	**Bandwidth (MHz)**	**RB Size/Offset**	**Channels**	**Frequency (MHz)**	**Tx Average Power (dBm)**	**Antenna Gain (dBi)**	**EIRP (dBm)**	**Limit (dBm/5Mz)**	**Margin (dBm)**
QPSK	5	1 / 13	27685	2307.5	23.92	0.0	23.92	23.97	0.05
		1 / 13	27710	2310	23.84	0.0	23.84	23.97	0.13
		1 / 13	27735	2312.5	23.70	0.0	23.70	23.97	0.27
	10	1 / 0	27710	2310	23.95	0.0	23.95	23.97	0.02
16QAM	5	1 / 13	27685	2307.5	23.47	0.0	23.47	23.97	0.5
		1 / 13	27710	2310	23.07	0.0	23.07	23.97	0.9
		1 / 13	27735	2312.5	23.21	0.0	23.21	23.97	0.76
	10	1 / 0	27710	2310	23.32	0.0	23.32	23.97	0.65

LTE Band 38 (Ant 2)									
Bandwidth (MHz)	**Modulation**	**RB Size/Offset**	**Channels**	**Frequency (MHz)**	**Tx Average Power (dBm)**	**Antenna Gain (dBi)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin (dBm)**
5	QPSK	1 / 13	37775	2572.5	19.59	1.5	21.09	33	11.91
		1 / 13	38000	2595	19.08	1.5	20.58	33	12.42
		1 / 13	38225	2617.5	19.16	1.5	20.66	33	12.34
	16QAM	1 / 13	37775	2572.5	20.37	1.5	21.87	33	11.13
		1 / 13	38000	2595	19.84	1.5	21.34	33	11.66
		1 / 13	38225	2617.5	18.98	1.5	20.48	33	12.52
10	QPSK	1 / 25	37800	2575	19.49	1.5	20.99	33	12.01
		1 / 25	38000	2595	19.09	1.5	20.59	33	12.41
		1 / 25	38200	2615	19.34	1.5	20.84	33	12.16
	16QAM	1 / 0	37800	2575	19.27	1.5	20.77	33	12.23
		1 / 0	38000	2595	18.74	1.5	20.24	33	12.76
		1 / 0	38200	2615	18.90	1.5	20.4	33	12.6
15	QPSK	1 / 0	37825	2577.5	19.78	1.5	21.28	33	11.72
		1 / 0	38000	2595	19.35	1.5	20.85	33	12.15
		1 / 0	38175	2612.5	19.29	1.5	20.79	33	12.21
	16QAM	1 / 0	37825	2577.5	19.50	1.5	21	33	12
		1 / 0	38000	2595	18.95	1.5	20.45	33	12.55
		1 / 0	38175	2612.5	18.96	1.5	20.46	33	12.54
20	QPSK	1 / 0	37850	2580	19.90	1.5	21.4	33	11.6
		1 / 0	38000	2595	19.53	1.5	21.03	33	11.97
		1 / 0	38150	2610	19.33	1.5	20.83	33	12.17
	16QAM	1 / 0	37850	2580	19.61	1.5	21.11	33	11.89
		1 / 0	38000	2595	18.98	1.5	20.48	33	12.52
		1 / 0	38150	2610	18.79	1.5	20.29	33	12.71

LTE Band 40 (2305-2315MHz Band) (Ant 2)									
Bandwidth (MHz)	**Modulation**	**RB Size/Offset**	**Channels**	**Frequency (MHz)**	**Tx Average Power (dBm)**	**Antenna Gain (dBi)**	**EIRP (dBm)**	**Limit (dBm/5Mz)**	**Margin (dBm)**
5	QPSK	1 / 13	38725	2307.5	19.70	0.0	19.70	23.97	4.27
		1 / 13	38750	2310	19.68	0.0	19.68	23.97	4.29
		1 / 13	38775	2312.5	19.62	0.0	19.62	23.97	4.35
	16QAM	1 / 13	38725	2307.5	18.82	0.0	18.82	23.97	5.15
		1 / 13	38750	2310	18.85	0.0	18.85	23.97	5.12
		1 / 13	38775	2312.5	18.72	0.0	18.72	23.97	5.25
10	QPSK	1 / 25	38750	2310	19.64	0.0	19.64	23.97	4.33
	16QAM	1 / 25	38750	2310	18.78	0.0	18.78	23.97	5.19

LTE Band 40 (2350-2360MHz Band) (Ant 2)									
Bandwidth (MHz)	**Modulation**	**RB Size/Offset**	**Channels**	**Frequency (MHz)**	**Tx Average Power (dBm)**	**Antenna Gain (dBi)**	**EIRP (dBm)**	**Limit (dBm/5Mz)**	**Margin (dBm)**
5	QPSK	1 / 13	39175	2352.5	19.54	0.0	19.54	23.97	4.43
		1 / 13	39200	2355	19.78	0.0	19.78	23.97	4.19
		1 / 13	39225	2357.5	19.66	0.0	19.66	23.97	4.31
	16QAM	1 / 13	39175	2352.5	18.99	0.0	18.99	23.97	4.98
		1 / 13	39200	2355	18.97	0.0	18.97	23.97	5.0
		1 / 13	39225	2357.5	18.89	0.0	18.89	23.97	5.08
10	QPSK	1 / 25	39200	2355	19.60	0.0	19.60	23.97	4.37
	16QAM	1 / 25	39200	2355	18.74	0.0	18.74	23.97	5.23

2.3 OCCUPIED BANDWIDTH

2.3.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1049
FCC 47 CFR Part 27, Clause 27.53 (a)(5)
FCC 47 CFR Part 27, Clause 27.53 (m)(6)
RSS-GEN, Clause 6.7

2.3.2 Standard Applicable

The transmitted signal bandwidth shall be reported as the 99% emission bandwidth, that is the frequency bandwidth suuch that, below its lower and above its upper frequency limits, the mean powers radiated are eqch equal to 0.5 percent of the total mean power radiated by a give emission.

26dB Bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated by at least 26 dB below the transmitter power.

2.3.3 Equipment Under Test and Modification State

Serial No: FJ220819C00056 / Test Configuration A

2.3.4 Date of Test/Initial of test personnel who performed the test

September 18, 2019 / AC

2.3.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	21.2 °C
Relative Humidity	35.0 %
ATM Pressure	99.0 kPa

2.3.7 Additional Observations

- This is a conducted test. Both 26dB bandwidth and 99% bandwidth presented.
- Using the occupied bandwidth meansurement function in the spectrum analyzer, the 99% occupied bandwith was measured.
- The 26dB bandwidth was measured in accorance with ANSI C63.26 clause 5.4.3 using the ndB measurement function in the spectrum analyzer.
- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be at least 3x RBW.
- Low, Middle and High channels for all bandwidths and modulations were verified. Test results of Middle channel were presented as representative.

2.3.8 Test Results

LTE Band 30 (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**99% OBW (MHz)**	**26dB BW (MHz)**
5	27685	2307.5	QPSK	4.51	5.01
	27710	2310		4.51	5.03
	27735	2312.5		4.51	4.99
10	27710	2310		8.94	9.70
5	27685	2307.5	16QAM	4.51	4.99
	27710	2310		4.53	4.97
	27735	2312.5		4.51	4.99
10	27710	2310		8.94	9.66

LTE Band 38 (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**99% OBW (MHz)**	**26dB BW (MHz)**
5	37775	2572.5	QPSK	4.51	4.97
	38000	2595		4.51	4.93
	38225	2617.5		4.51	4.93
	37775	2572.5	16QAM	4.51	4.95
	38000	2595		4.51	4.93
	38225	2617.5		4.49	4.97

LTE Band 38 (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**99% OBW (MHz)**	**26dB BW (MHz)**
10	37800	2575	QPSK	8.94	9.66
	38000	2595		8.94	9.62
	38200	2615		8.98	9.58
	37800	2575	16QAM	8.94	9.50
	38000	2595		8.94	9.62
	38200	2615		8.94	9.54

LTE Band 38 (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**99% OBW (MHz)**	**26dB BW (MHz)**
15	37825	2577.5	QPSK	13.41	14.57
	38000	2595		13.41	14.57
	38175	2612.5		13.37	14.61
	37825	2577.5	16QAM	13.41	14.37
	38000	2595		13.41	14.65
	38175	2612.5		13.41	14.41

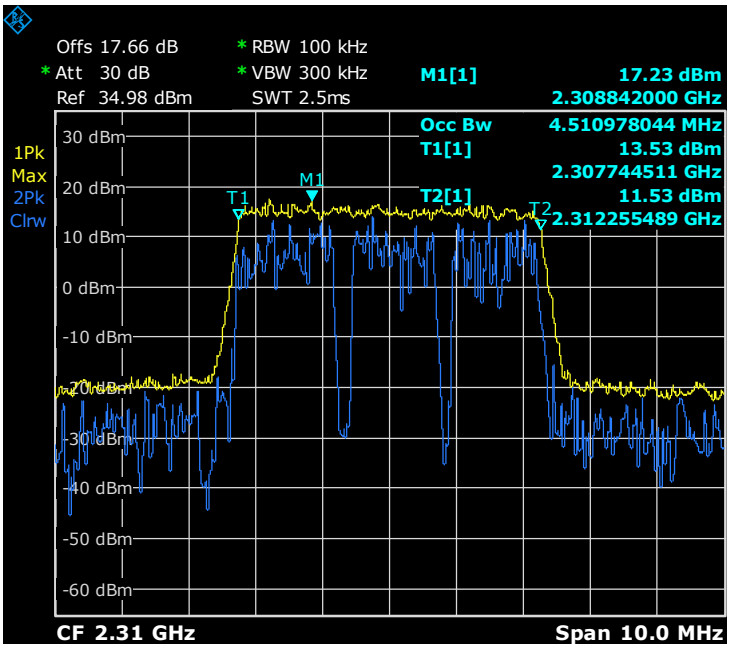
LTE Band 38 (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**99% OBW (MHz)**	**26dB BW (MHz)**
20	37850	2580	QPSK	17.96	19.36
	38000	2595		17.86	19.16
	38150	2610		17.96	19.26
	37850	2580	16QAM	17.96	19.16
	38000	2595		17.96	19.26
	38150	2610		17.96	19.16

LTE Band 40 (2305-2315MHz Band) (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**99% OBW (MHz)**	**26dB BW (MHz)**
5	38725	2307.5	QPSK	4.49	4.97
	38750	2310		4.49	4.95
	38775	2312.5		4.49	4.99
10	38750	2310		8.94	9.62
5	38725	2307.5	16QAM	4.52	4.95
	38750	2310		4.49	4.93
	38775	2312.5		4.49	4.97
10	38750	2310		8.94	9.58

LTE Band 40 (2350-2360MHz Band) (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**99% OBW (MHz)**	**26dB BW (MHz)**
5	39175	2352.5	QPSK	4.51	4.91
	39200	2355		4.49	4.87
	39225	2357.5		4.51	4.91
10	39200	2355		8.94	9.66
5	39175	2352.5	16QAM	4.49	4.95
	39200	2355		4.51	4.91
	39225	2357.5		4.51	4.95
10	39200	2355		8.94	9.54

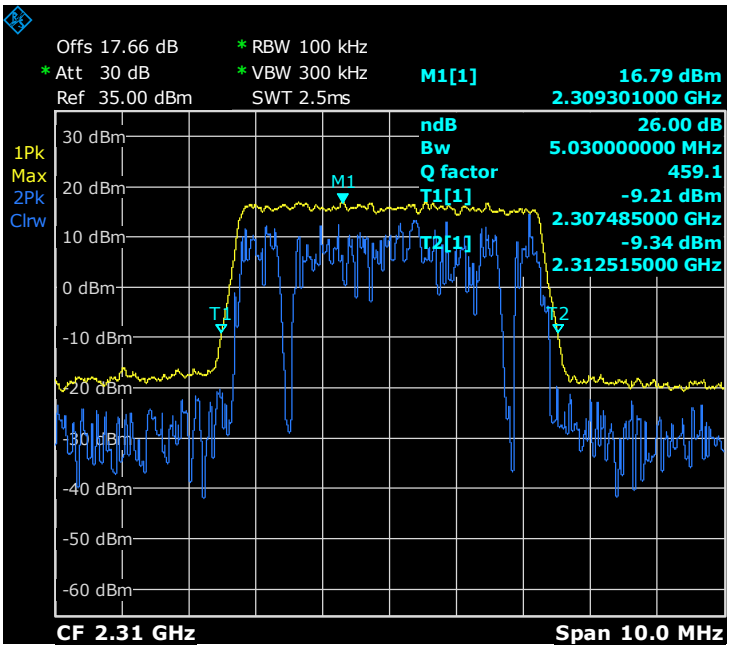
2.3.9 Example Test Plots

LTE Band 30 (5 MHz BW) / Middle Channel 2310 MHz / QPSK / 99%OBW



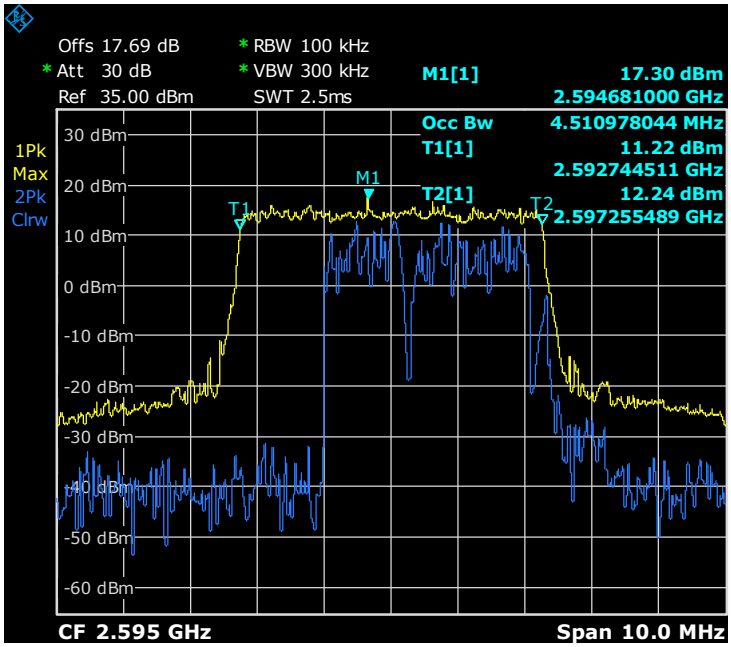
Date: 18.SEP.2019 14:46:59

LTE Band 30 (5 MHz BW) / Middle Channel 2310 MHz / QPSK / 26dB OBW



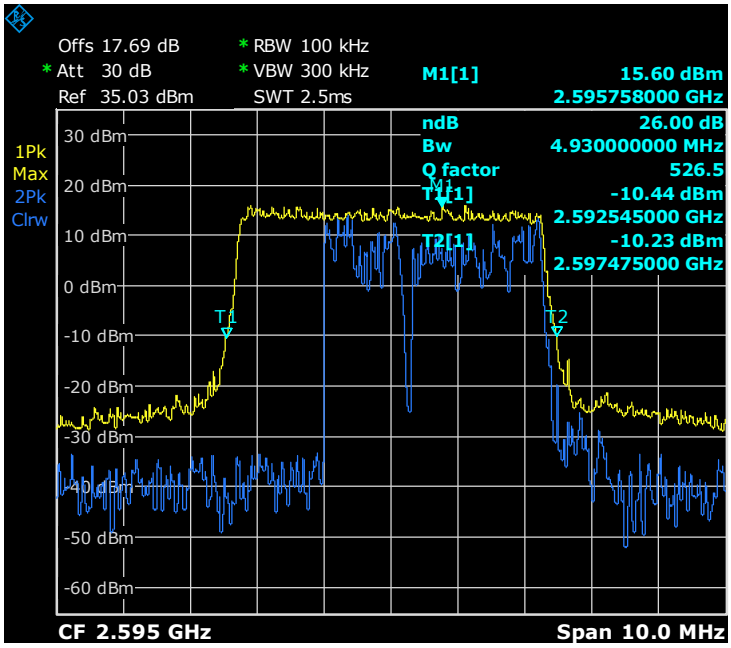
Date: 18.SEP.2019 16:34:13

LTE Band 38 (5 MHz BW) / Middle Channel 2595 MHz / QPSK / 99%OBW



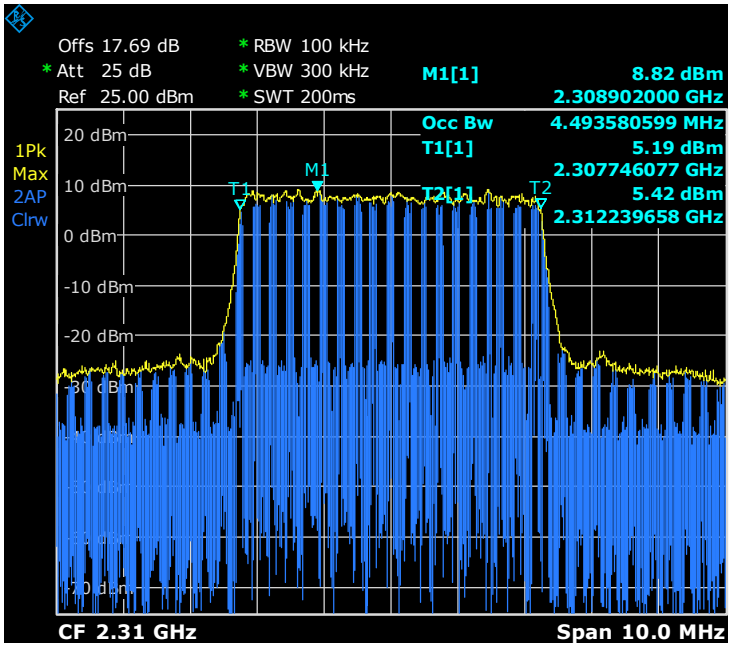
Date: 19.SEP.2019 13:27:36

LTE Band 38 (5 MHz BW) / Middle Channel 2595 MHz / QPSK / 26dB OBW



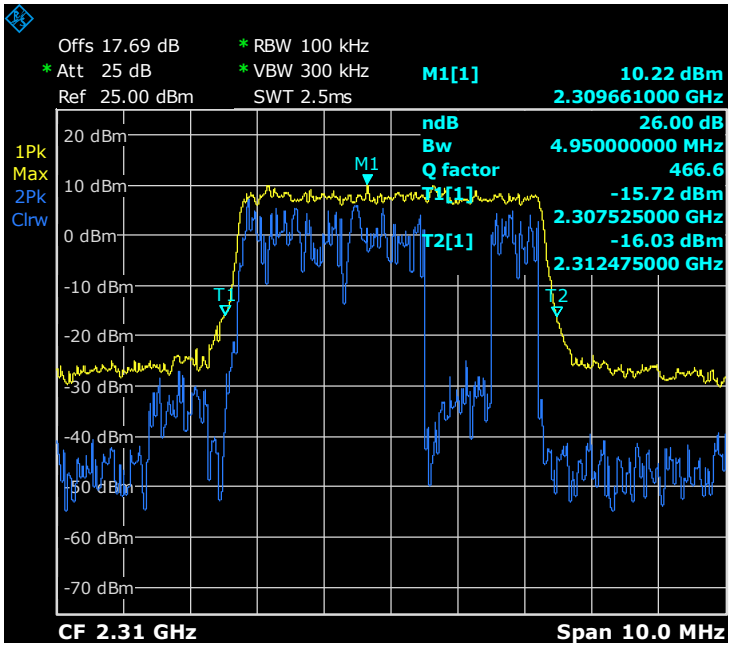
Date: 18.SEP.2019 16:44:37

LTE Band 40 (2310-2315MHz Band) (5 MHz BW) / Middle Channel 2310 MHz / QPSK / 99%OBW



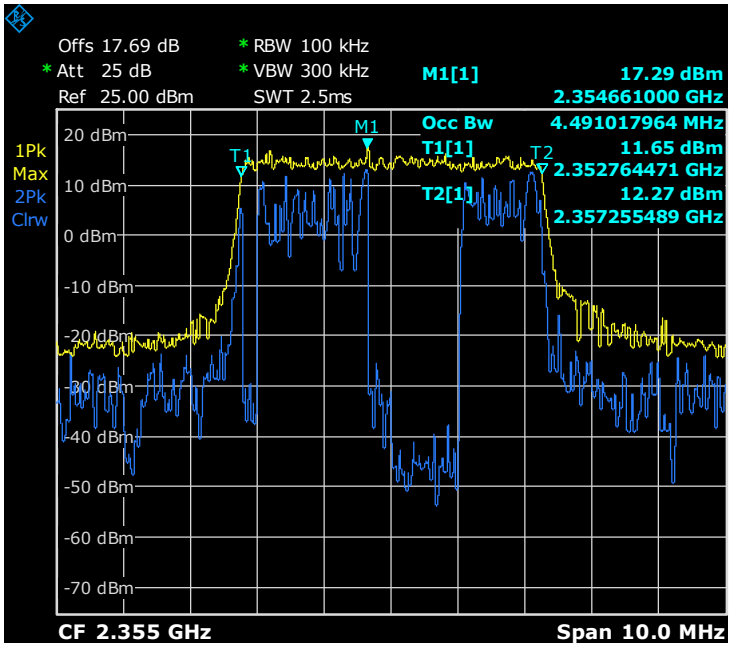
Date: 8.OCT.2019 19:09:45

LTE Band 40 (2310-2315MHz Band) (5 MHz BW) / Middle Channel 2310 MHz / QPSK / 26dB OBW



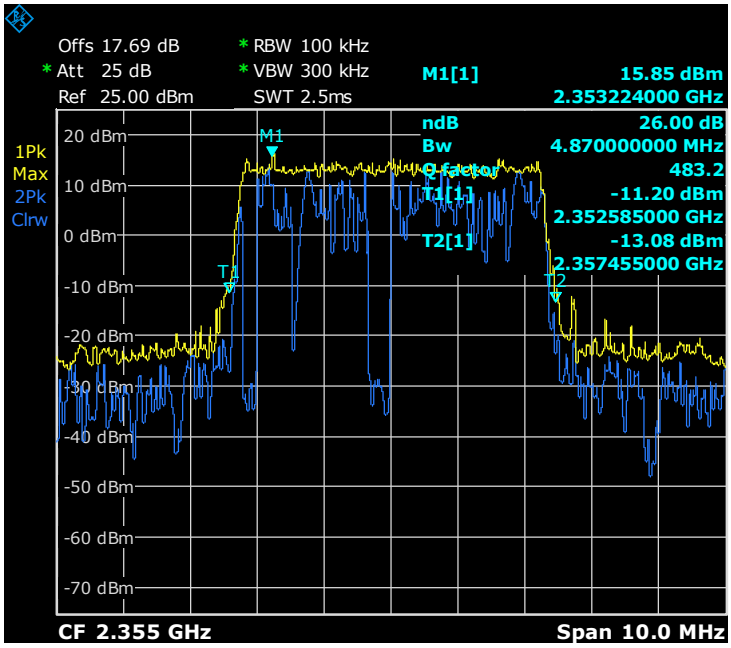
Date: 9.OCT.2019 10:14:31

LTE Band 40 (2350-2360MHz Band) (5 MHz BW) / Middle Channel 2355 MHz / QPSK / 99%OBW



Date: 9.OCT.2019 09:59:04

LTE Band 40 (2350-2360MHz Band) (5 MHz BW) / Middle Channel 2355 MHz / QPSK / 26dB OBW



Date: 9.OCT.2019 10:19:50

2.4 PEAK-AVERAGE POWER RATIO

2.4.1 Specification Reference

FCC 47 CFR Part 27, Clause 27.50 (d)(5)
RSS-199, Clause 4.4

2.4.2 Standard Applicable

FCC 47 CFR Part 27.50(d):
(5) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

RSS-199:
The transmitter's peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

2.4.3 Equipment Under Test and Modification State

Serial No: FJ220819C00056 / Test Configuration A

2.4.4 Date of Test/Initial of test personnel who performed the test

September 23 and October 09, 2019 / AC

2.4.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	21.2 - 26.2°C
Relative Humidity	35.0 - 54.2%
ATM Pressure	98.5 - 99.6kPa

2.4.7 Additional Observations

- This is a conducted test.
- As per FCC KDB 971168 D01 v03r01 clause 5.7, the PAPR was measured in accorance with ANSI C63.26 clause 5.2.3.4.
- Measurement was done using the Spectrum Analyzer's Complementary Cumulative Distribution Function (CCDF) measurement profile. The built-in function is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth (crest factor or peak-to-average ratio) A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth.
- Low, Middle and High channels for all bandwidths and modulations were verified.
- The path loss for was measured and entered as a level offset.
- There are no measured PAR levels greater than 13dB. EUT complies.

2.4.8 Test Results

LTE Band 30 (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**PAR (dB)**	**Limit for PAR (dB)**
5	27685	2307.5	QPSK	4.35	13
	27710	2310		4.62	13
	27735	2312.5		4.51	13
10	27710	2310		4.64	13
5	27685	2307.5	16QAM	5.40	13
	27710	2310		5.49	13
	27735	2312.5		5.76	13
10	27710	2310		5.68	13

LTE Band 38 (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**PAR (dB)**	**Limit for PAR (dB)**
5	37775	2572.5	QPSK	7.53	13
	38000	2595		7.53	13
	38225	2617.5		6.97	13
	37775	2572.5	16QAM	8.54	13
	38000	2595		8.24	13
	38225	2617.5		8.27	13

LTE Band 38 (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**PAR (dB)**	**Limit for PAR (dB)**
10	37800	2575	QPSK	7.32	13
	38000	2595		7.54	13
	38200	2615		7.30	13
	37800	2575	16QAM	8.75	13
	38000	2595		8.64	13
	38200	2615		8.89	13

LTE Band 38 (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**PAR (dB)**	**Limit for PAR (dB)**
15	37825	2577.5	QPSK	7.57	13
	38000	2595		7.20	13
	38175	2612.5		7.25	13
	37825	2577.5	16QAM	8.71	13
	38000	2595		8.90	13
	38175	2612.5		8.61	13

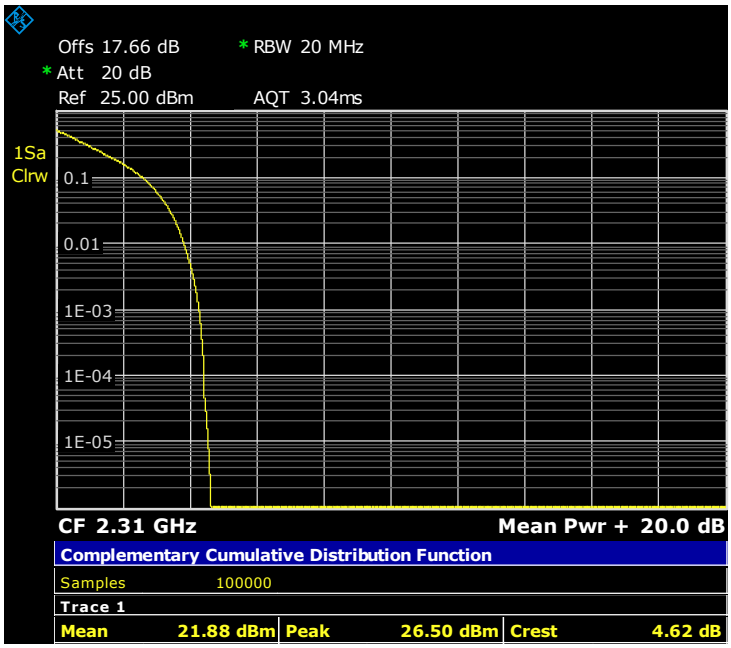
LTE Band 38 (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**PAR (dB)**	**Limit for PAR (dB)**
20	37850	2580	QPSK	7.51	13
	38000	2595		7.31	13
	38150	2610		7.38	13
	37850	2580	16QAM	8.89	13
	38000	2595		8.69	13
	38150	2610		8.72	13

LTE Band 40 (2310-2315MHz Band) (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**PAR (dB)**	**Limit for PAR (dB)**
5	38725	2307.5	QPSK	7.90	13
	38750	2310		7.86	13
	38775	2312.5		7.93	13
10	38750	2310		8.07	13
5	38725	2307.5	16QAM	9.15	13
	38750	2310		8.93	13
	38775	2312.5		9.35	13
10	38750	2310		9.20	13

LTE Band 40 (2350-2360MHz Band) (Ant 2)					
Bandwidth (MHz)	**Channel**	**Frequency (MHz)**	**Modulation**	**PAR (dB)**	**Limit for PAR (dB)**
5	39175	2352.5	QPSK	8.18	13
	39200	2355		8.31	13
	39225	2357.5		8.05	13
10	39200	2355		9.09	13
5	39175	2352.5	16QAM	9.90	13
	39200	2355		9.10	13
	39225	2357.5		9.41	13
10	39200	2355		9.54	13

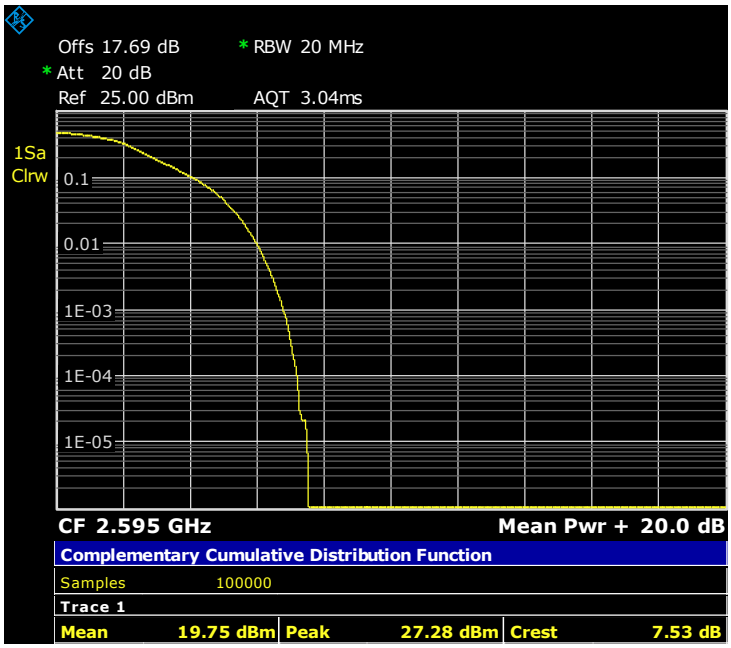
2.4.9 Example Test Plots

LTE Band 30 (5 MHz BW) / Middle Channel 2310 MHz / QPSK



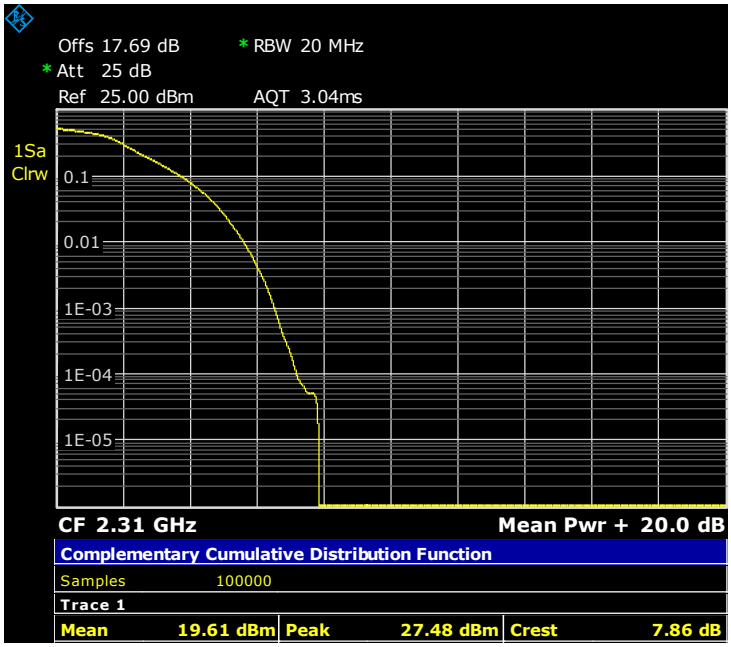
Date: 20.SEP.2019 16:22:01

LTE Band 38 (5 MHz BW) / Middle Channel 2595 MHz / QPSK



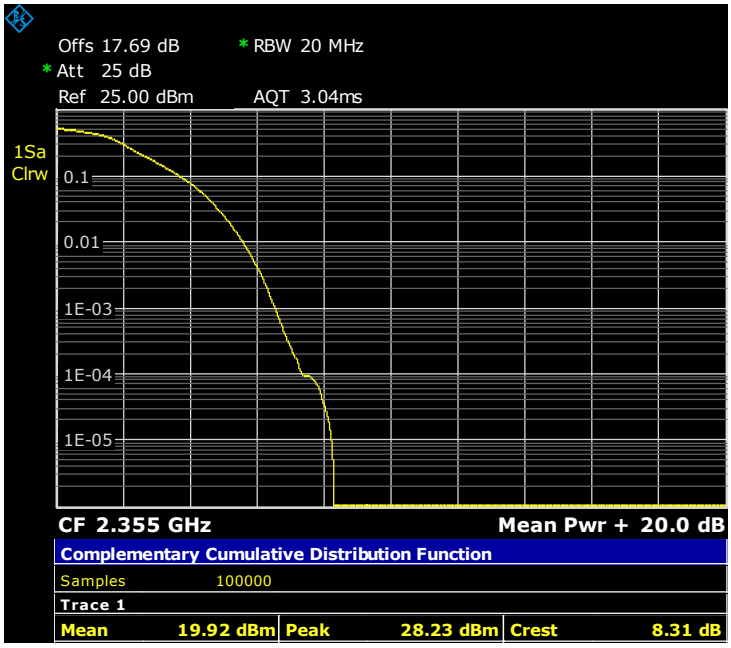
Date: 20.SEP.2019 17:26:54

LTE Band 40 (2305-2315MHz Band) (5 MHz BW) / Middle Channel 2310 MHz / QPSK



Date: 9.OCT.2019 10:33:44

LTE Band 40 (2350-2360MHz Band) (5 MHz BW) / Middle Channel 2355 MHz / QPSK



Date: 9.OCT.2019 10:38:50

2.5 SPURIOUS EMISSION AT BAND EDGE

2.5.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 27, Clause 27.53(a)(4)(5)
FCC 47 CFR Part 27, Clause 27.53(m)(4)(6)
RSS-195, Clause 5.6
RSS-199, Clause 4.5

2.5.2 Standard Applicable

FCC 47 CFR Part 27.53(a):
For mobile and portable stations operating in the 2305–2315 MHz and 2350–2360 MHz bands:
(i) By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;
(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;
(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.

FCC 47 CFR Part 27.53(m):
For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

RSS-195, Clause 5.6:
The power of any emission outside the frequency range(s) in which the equipment operates shall be attenuated below the transmitter power, P(dBW), by the amount indicated in Table 2, where p is the transmitter output power measured in watts.

Table 2 — Unwanted Emissions for Mobile, Portable and Low-Power Fixed Subscriber Equipment

Frequency (MHz)	Attenuation (dB)
<2200	$43 + 10 \log_{10}(p)$
2200 - 2288	$70 + 10 \log_{10}(p)$
2288 - 2292	$67 + 10 \log_{10}(p)$
2292 - 2296	$61 + 10 \log_{10}(p)$
2296 - 2300	$55 + 10 \log_{10}(p)$
2300 - 2305	$43 + 10 \log_{10}(p)$
2305 - 2320	$43 + 10 \log_{10}(p)$ Note
2320 - 2324	$55 + 10 \log_{10}(p)$
2324 - 2328	$61 + 10 \log_{10}(p)$
2328 - 2337	$67 + 10 \log_{10}(p)$
2337 - 2341	$61 + 10 \log_{10}(p)$
2341 - 2345	$55 + 10 \log_{10}(p)$
2345 - 2360	$43 + 10 \log_{10}(p)$ Note
2360 - 2365	$43 + 10 \log_{10}(p)$
2365 - 2395	$70 + 10 \log_{10}(p)$
>2395	$43 + 10 \log_{10}(p)$

Note: Measured at the edges of the highest and lowest frequency range(s) in which the equipment is designed to operate. See Section 5.2 for the permitted frequency ranges for various equipment types.

RSS-199, Clause 4.5:
In the 1 MHz band immediatel outside and adjacent to the channel edge, the unwanted emission power shall be measured with a resolution bandwidth of at 1% of the occupied bandwidth for base station and fixed subscriber equipment, and 2% for mobile subscriber equipment. Beyond the 1 MHz band, a resolution bandwidth of 1 MHz shall be used.

(b) for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:
(i) $40 + 10 \log_{10} p$ from the channel edges to 5 MHz away.
(ii) $43 + 10 \log_{10} p$ between 5 MHz and X MHz from the channel edges, and
(iii) $55 + 10 \log_{10} p$ at X MHz and beyond from the channel edges
Note: X is 6 MHz or the equipment occupied bandwidth, whichever is greater

2.5.3 Equipment Under Test and Modification State

Serial No: FJ220819C00056 / Test Configuration A

2.5.4 Date of Test/Initial of test personnel who performed the test

October 11, 12 and 29, 2019 / AC

2.5.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

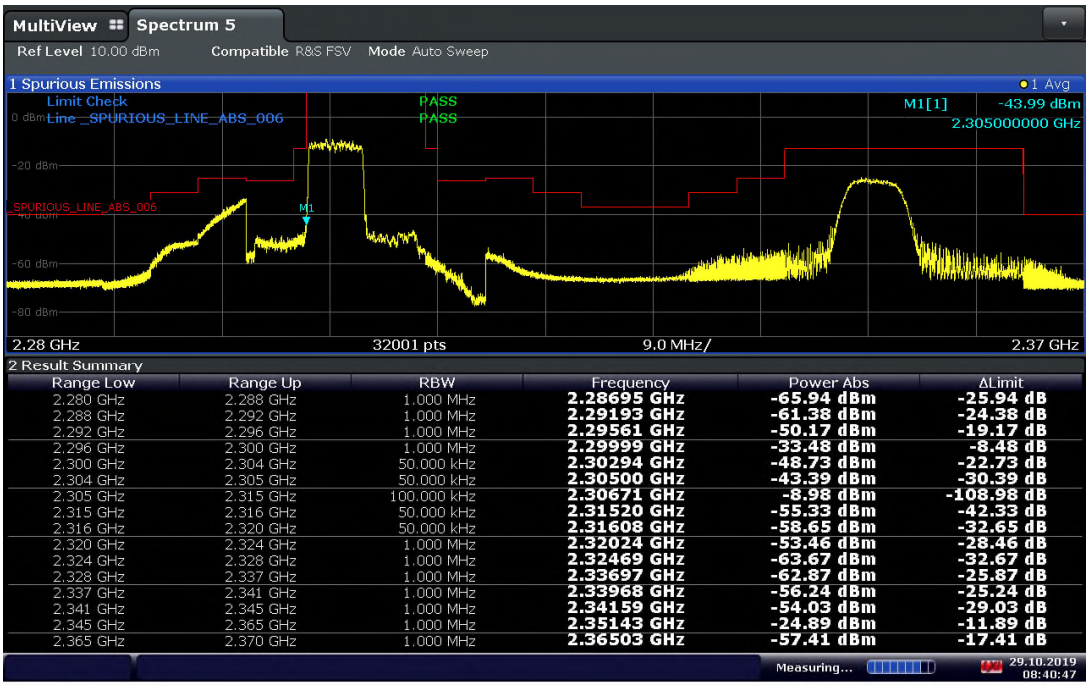
Ambient Temperature	21.2 - 26.4°C
Relative Humidity	35.0 - 56.4%
ATM Pressure	98.9 - 99.6kPa

2.5.7 Additional Observations

- This is a conducted test.
- The path loss were measured and entered as a level offset.
- Only worst case configuration for all technologies presented in this test report.

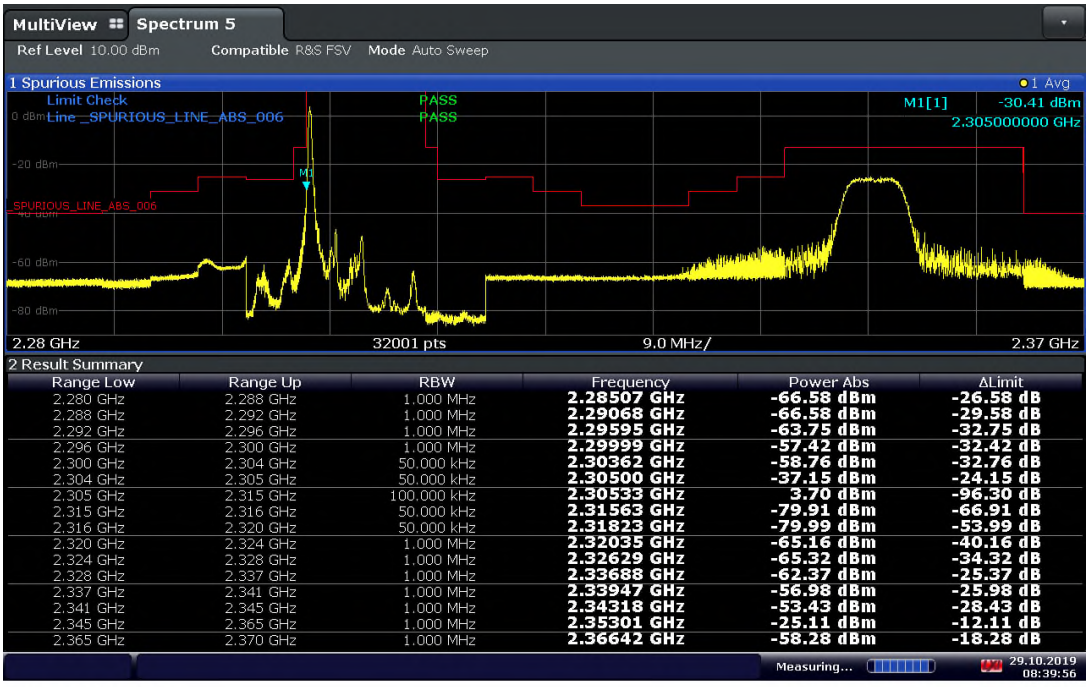
2.5.8 Test Results

LTE Band 30 / 5MHz BW / QPSK / Low Channel 2307.5 MHz Mask (Full RB)



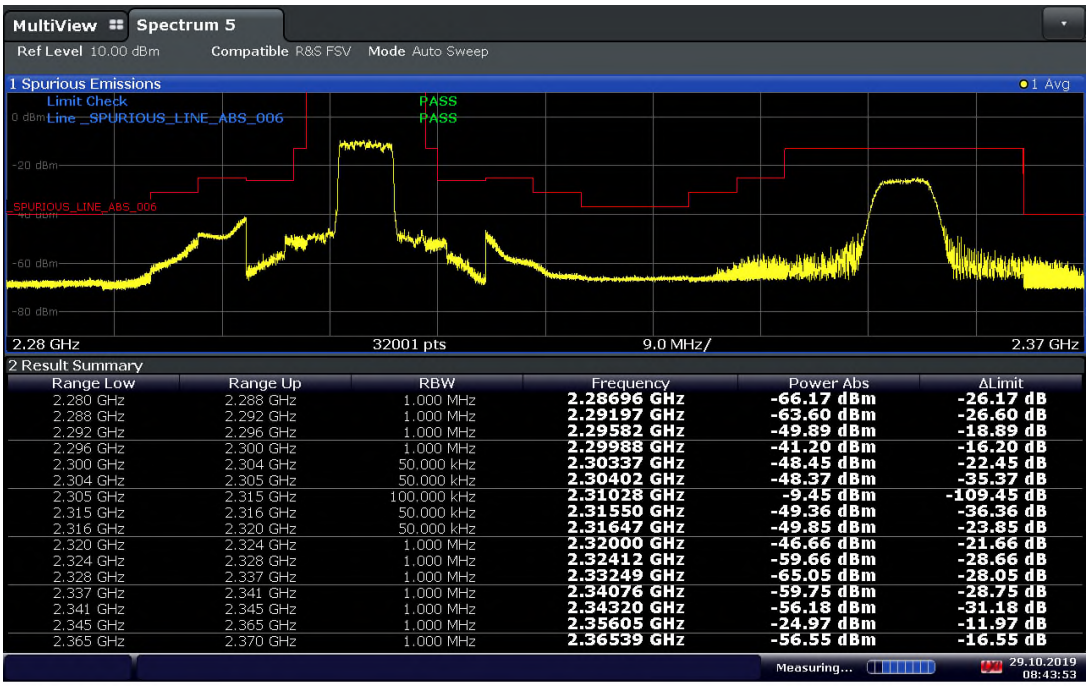
08:40:48 29.10.2019

LTE Band 30 / 5MHz BW / QPSK / Low Channel 2307.5 MHz Mask (1 RB, 0 Offset)



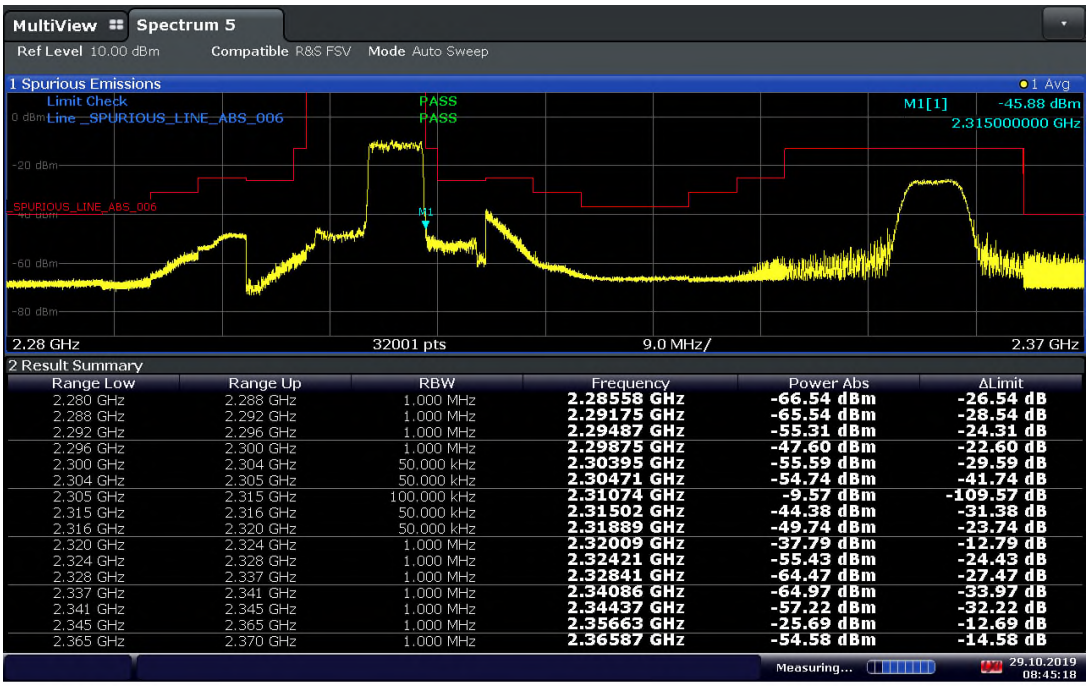
08:39:56 29.10.2019

LTE Band 30 / 5MHz BW / QPSK / Mid Channel 2310 MHz Mask (Full RB)



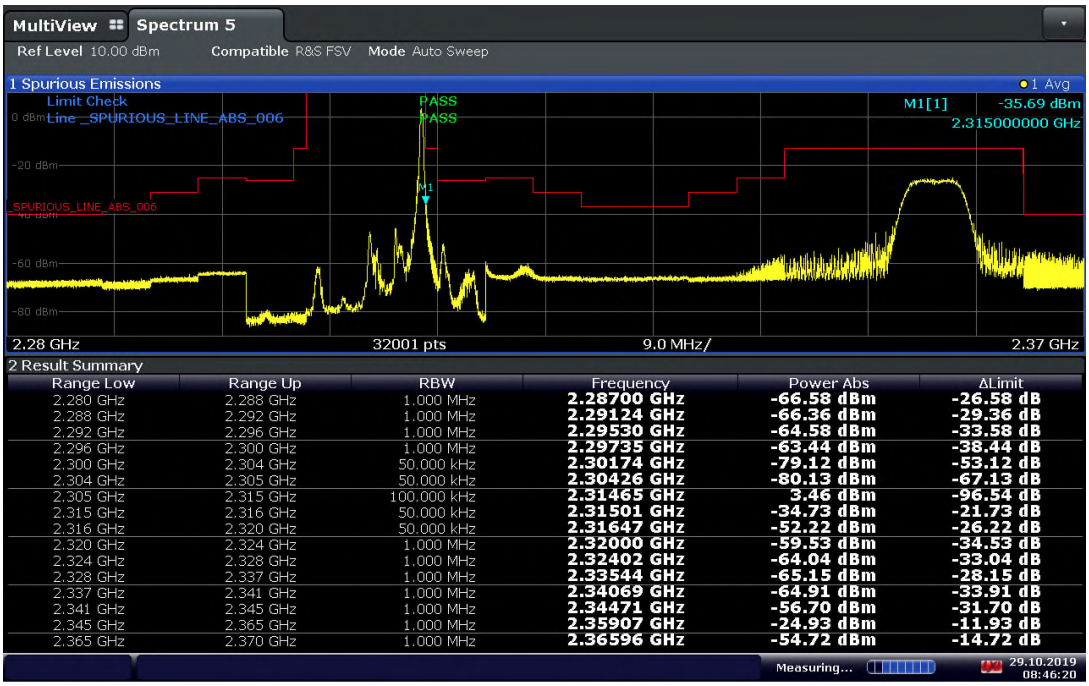
08:43:54 29.10.2019

LTE Band 30 / 5MHz BW / QPSK / High Channel 2312.5 MHz Mask (Full RB)



08:45:18 29.10.2019

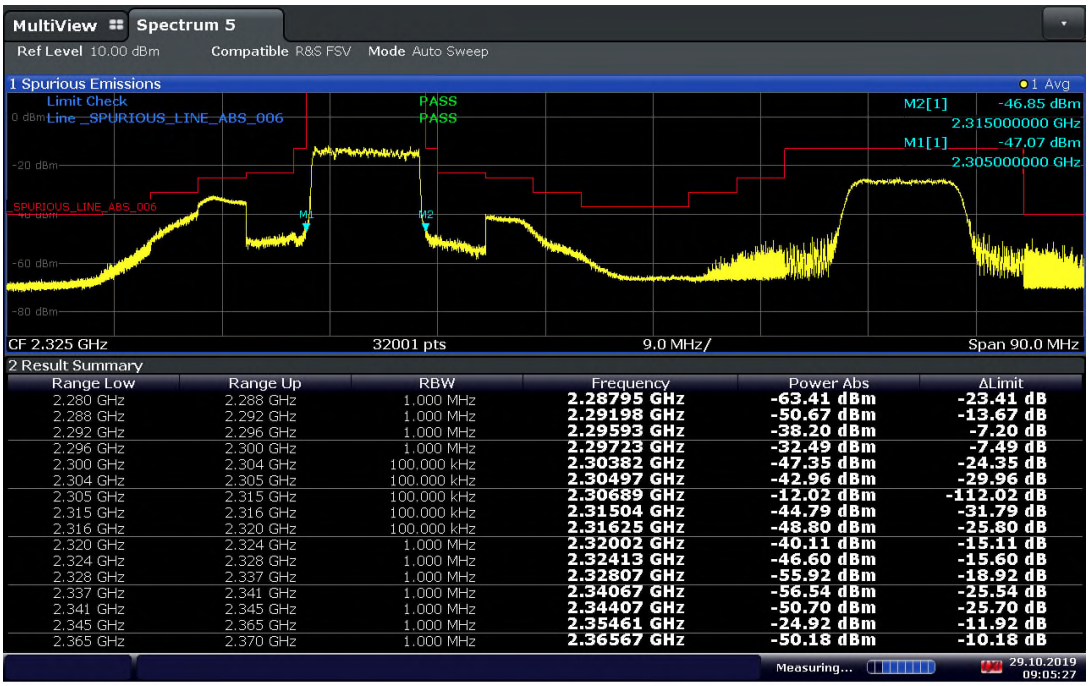
LTE Band 30 / 5MHz BW / QPSK / High Channel 2312.5 MHz Mask (1 RB, 24 Offset)



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.280 GHz	2.288 GHz	1.000 MHz	2.28700 GHz	-66.58 dBm	-26.58 dB
2.288 GHz	2.292 GHz	1.000 MHz	2.29124 GHz	-66.36 dBm	-29.36 dB
2.292 GHz	2.296 GHz	1.000 MHz	2.29530 GHz	-64.58 dBm	-33.58 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29735 GHz	-63.44 dBm	-38.44 dB
2.300 GHz	2.304 GHz	50.000 kHz	2.30174 GHz	-79.12 dBm	-53.12 dB
2.304 GHz	2.305 GHz	50.000 kHz	2.30426 GHz	-80.13 dBm	-67.13 dB
2.305 GHz	2.315 GHz	100.000 kHz	2.31465 GHz	3.46 dBm	-96.54 dB
2.315 GHz	2.316 GHz	50.000 kHz	2.31501 GHz	-34.73 dBm	-21.73 dB
2.316 GHz	2.320 GHz	50.000 kHz	2.31647 GHz	-52.22 dBm	-26.22 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32000 GHz	-59.53 dBm	-34.53 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32402 GHz	-64.04 dBm	-33.04 dB
2.328 GHz	2.337 GHz	1.000 MHz	2.33544 GHz	-65.15 dBm	-28.15 dB
2.337 GHz	2.341 GHz	1.000 MHz	2.34069 GHz	-64.91 dBm	-33.91 dB
2.341 GHz	2.345 GHz	1.000 MHz	2.34471 GHz	-56.70 dBm	-31.70 dB
2.345 GHz	2.365 GHz	1.000 MHz	2.35907 GHz	-24.93 dBm	-11.93 dB
2.365 GHz	2.370 GHz	1.000 MHz	2.36596 GHz	-54.72 dBm	-14.72 dB

08:46:20 29.10.2019

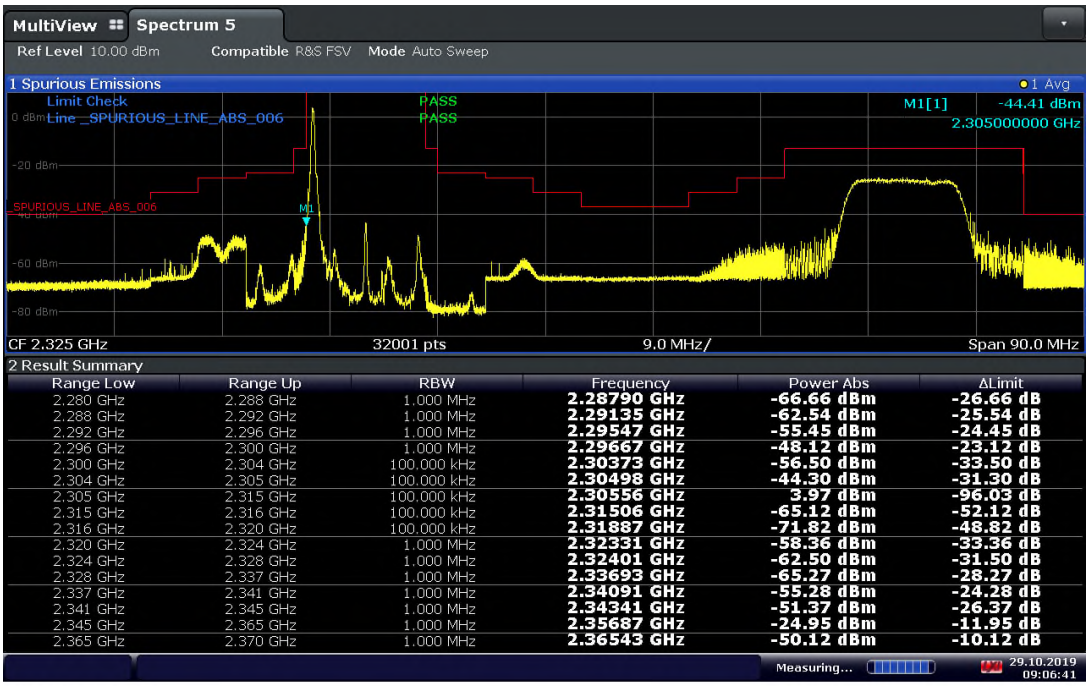
LTE Band 30 /10 MHz BW / QPSK / Mid Channel 2310 MHz Mask (Full RB)



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.280 GHz	2.288 GHz	1.000 MHz	2.28795 GHz	-63.41 dBm	-23.41 dB
2.288 GHz	2.292 GHz	1.000 MHz	2.29198 GHz	-50.67 dBm	-13.67 dB
2.292 GHz	2.296 GHz	1.000 MHz	2.29593 GHz	-38.20 dBm	-7.20 dB
2.296 GHz	2.300 GHz	1.000 MHz	2.29723 GHz	-32.49 dBm	-7.49 dB
2.300 GHz	2.304 GHz	100.000 kHz	2.30382 GHz	-47.35 dBm	-24.35 dB
2.304 GHz	2.305 GHz	100.000 kHz	2.30497 GHz	-42.96 dBm	-29.96 dB
2.305 GHz	2.315 GHz	100.000 kHz	2.30689 GHz	-12.02 dBm	-112.02 dB
2.315 GHz	2.316 GHz	100.000 kHz	2.31504 GHz	-44.79 dBm	-31.79 dB
2.316 GHz	2.320 GHz	100.000 kHz	2.31625 GHz	-48.80 dBm	-25.80 dB
2.320 GHz	2.324 GHz	1.000 MHz	2.32002 GHz	-40.11 dBm	-15.11 dB
2.324 GHz	2.328 GHz	1.000 MHz	2.32413 GHz	-46.60 dBm	-15.60 dB
2.328 GHz	2.337 GHz	1.000 MHz	2.32807 GHz	-55.92 dBm	-18.92 dB
2.337 GHz	2.341 GHz	1.000 MHz	2.34067 GHz	-56.54 dBm	-25.54 dB
2.341 GHz	2.345 GHz	1.000 MHz	2.34407 GHz	-50.70 dBm	-25.70 dB
2.345 GHz	2.365 GHz	1.000 MHz	2.35461 GHz	-24.92 dBm	-11.92 dB
2.365 GHz	2.370 GHz	1.000 MHz	2.36567 GHz	-50.18 dBm	-10.18 dB

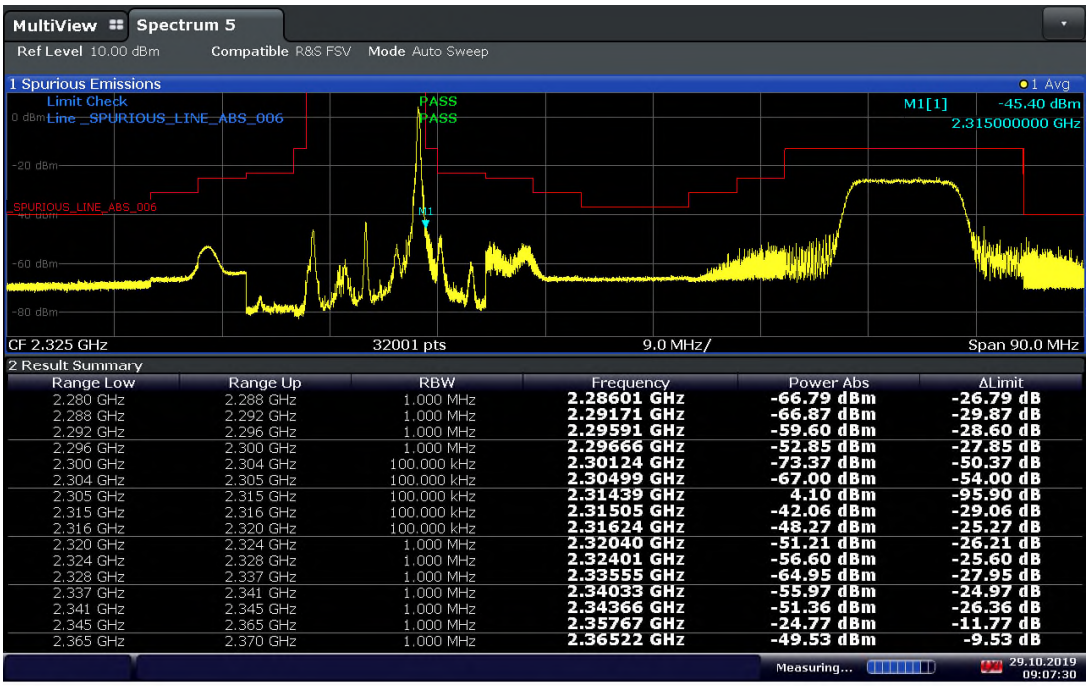
09:05:28 29.10.2019

LTE Band 30 /10 MHz BW / QPSK / Mid Channel 2310 MHz Mask (1 RB, 0 Offset)



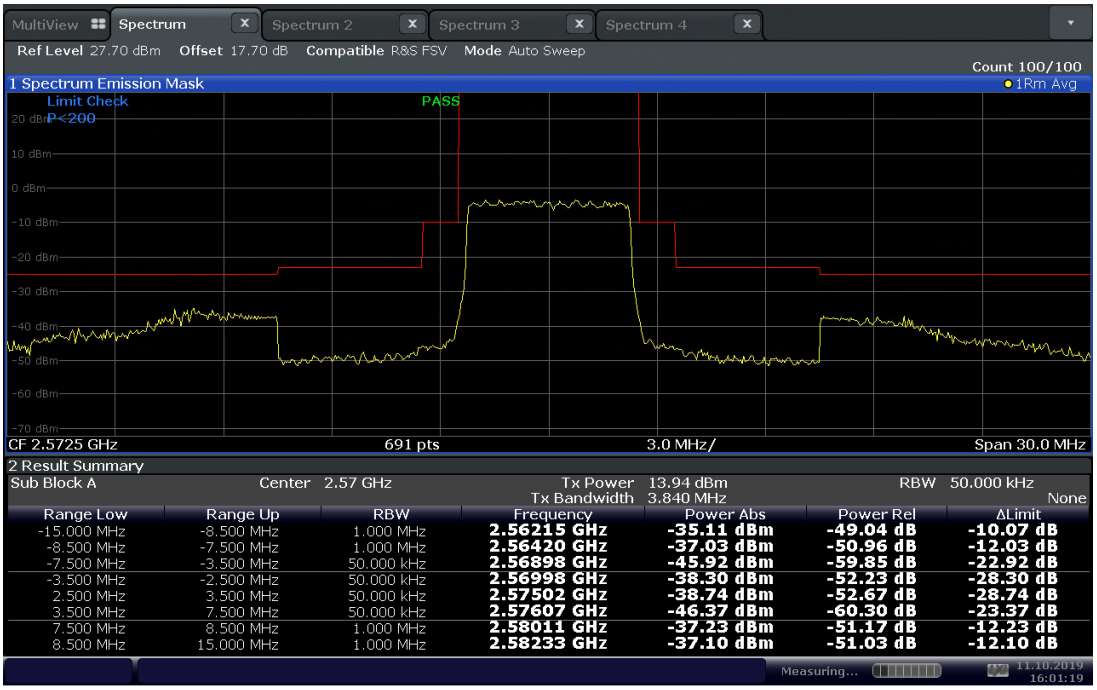
09:06:42 29.10.2019

LTE Band 30 /10 MHz BW / QPSK / Mid Channel 2310 MHz Mask (1 RB, 49 Offset)



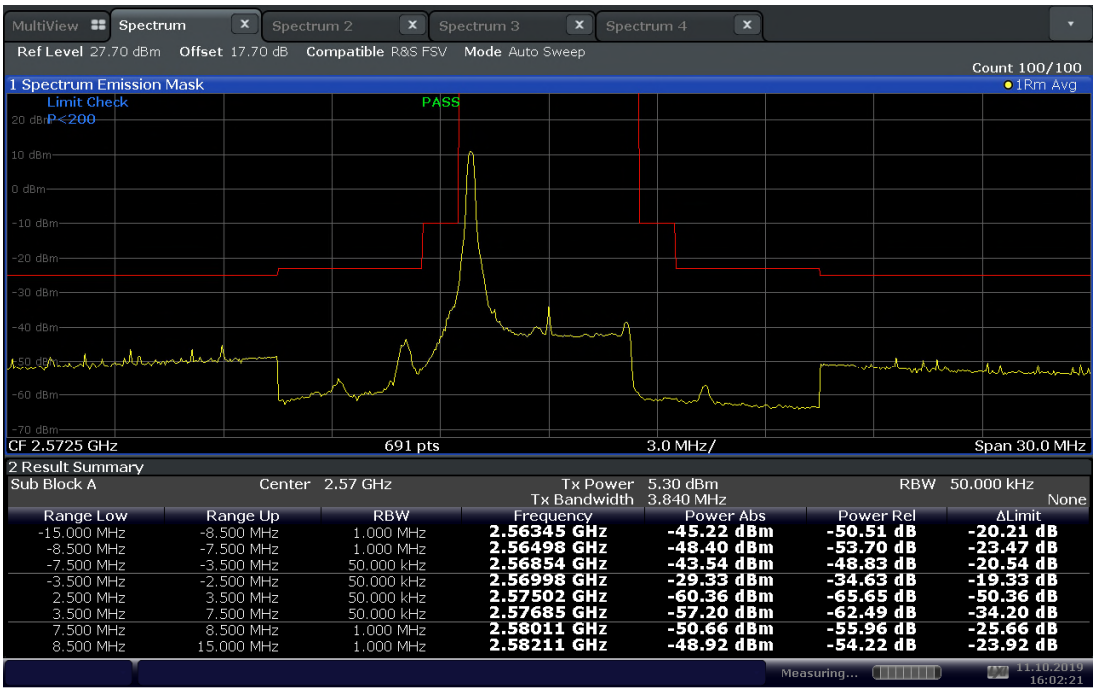
09:07:30 29.10.2019

LTE Band 38 / 5MHz BW / QPSK / Low Channel 2572.5 MHz / Mask Band Edge @ 2570 and 2620 MHz in Full RB



16:01:20 11.10.2019

LTE Band 38 / 5MHz BW / QPSK / Low Channel 2572.5 MHz / Mask Band Edge @ 2570 MHz in 1 RB 0 Offset



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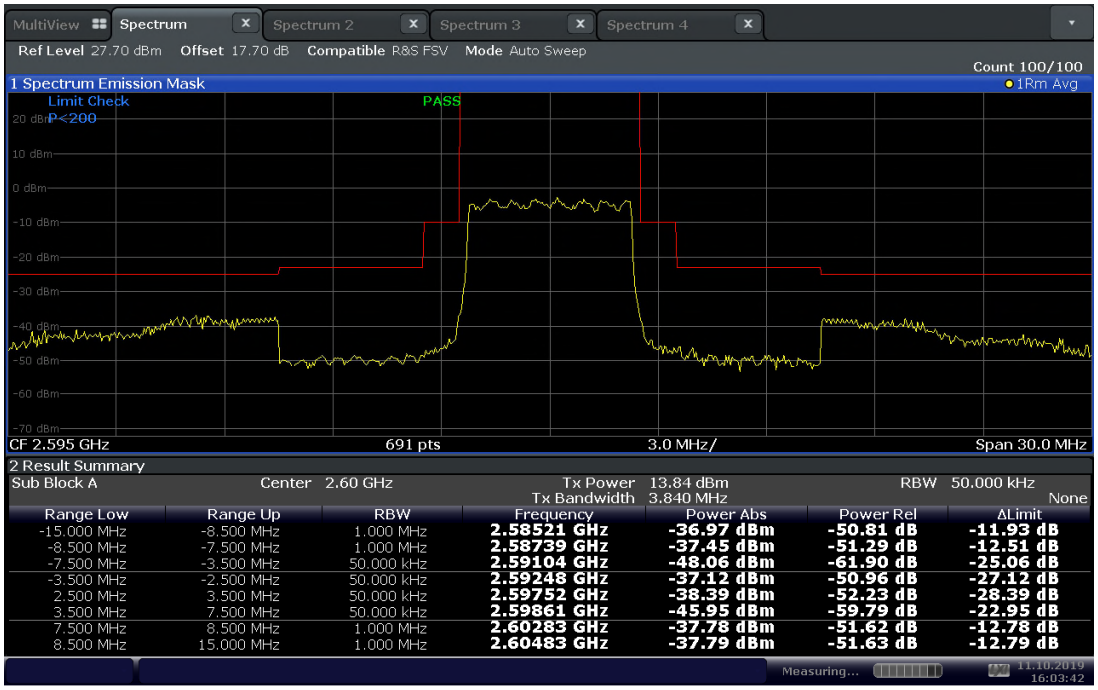
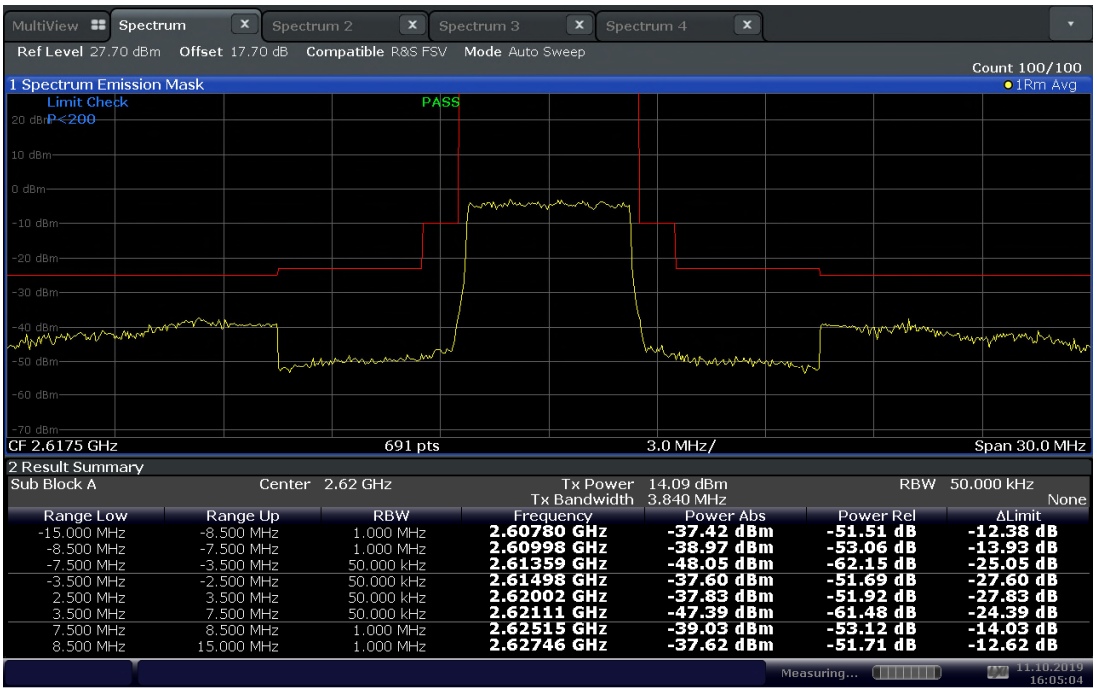
LTE Band 38 / 5MHz BW / QPSK / Mid Channel 2595 MHz / Mask Band Edge @ 2570 and 2620 MHz in Full RB



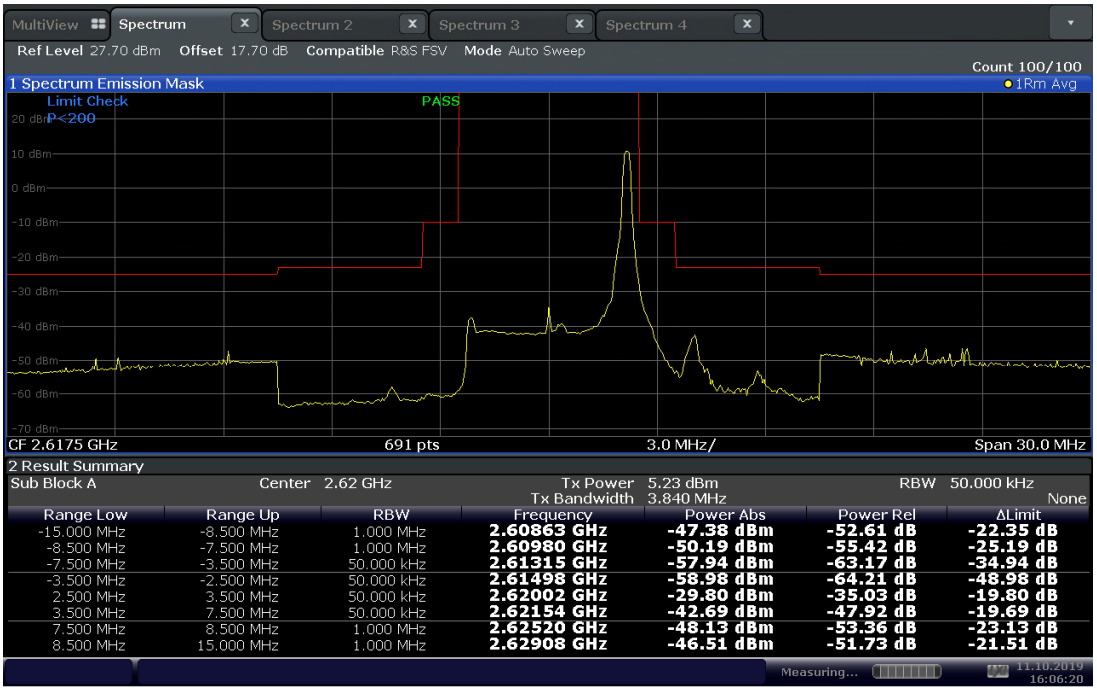
16:03:42 11.10.2019

LTE Band 38 / 5MHz BW / QPSK / High Channel 2617.5 MHz / Mask Band Edge @ 2570 and 2620 MHz in Full RB



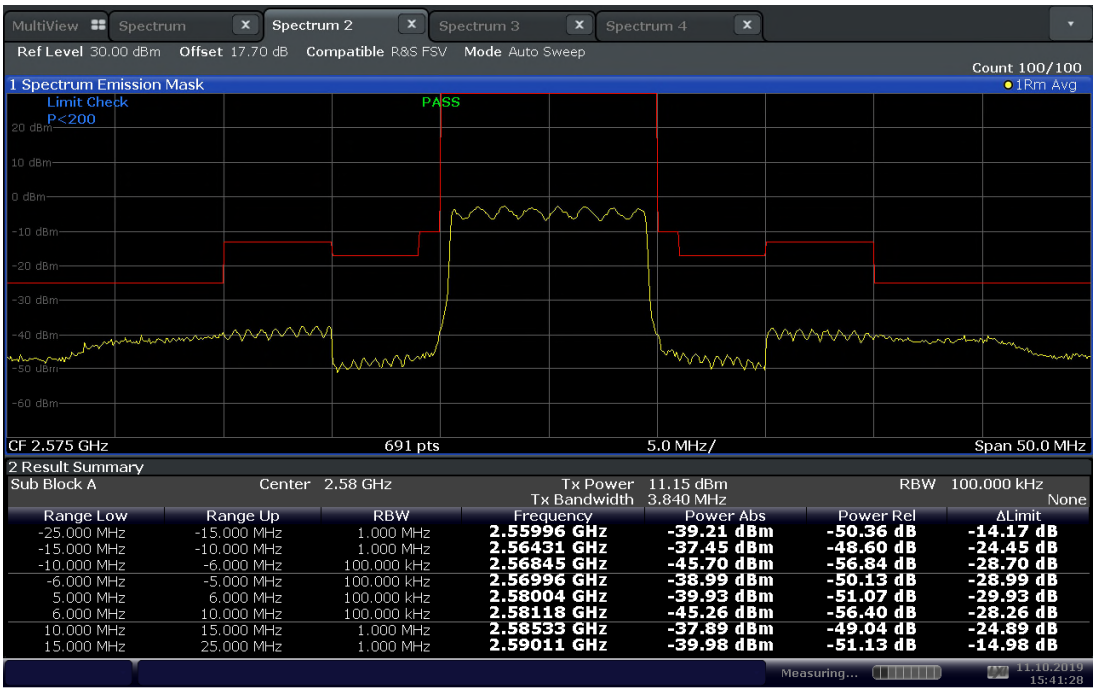
16:05:04 11.10.2019

LTE Band 38 / 5MHz BW / QPSK / High Channel 2617.5 MHz / Mask Band Edge @ 2620 MHz in 1 RB 24 Offset



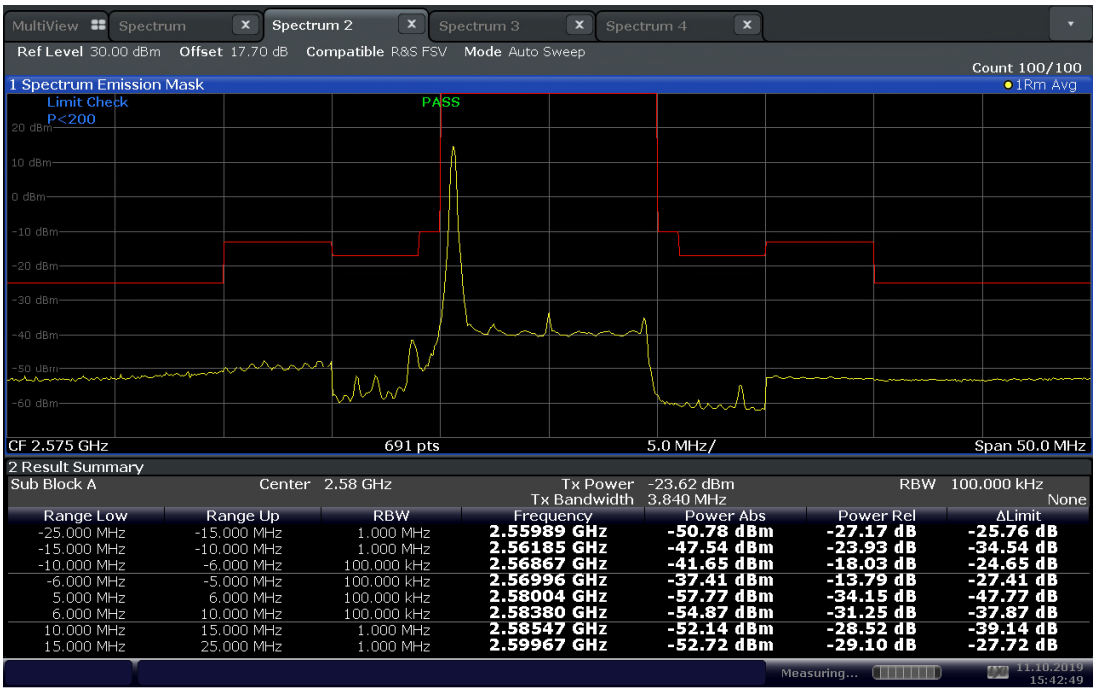
16:06:20 11.10.2019

LTE Band 38 / 10MHz BW / QPSK / Low Channel 2575 MHz / Mask Band Edge @ 2570 and 2620 MHz in Full RB



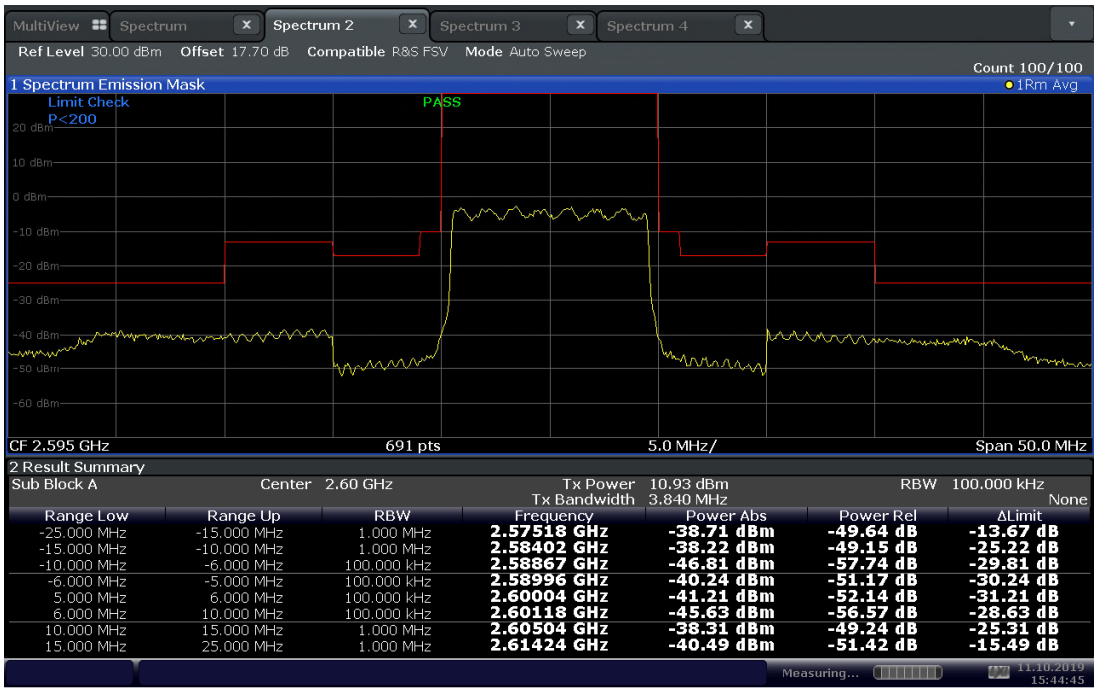
15:41:29 11.10.2019

LTE Band 38 / 10MHz BW / QPSK / Low Channel 2575 MHz / Mask Band Edge @ 2570 MHz in 1 RB 0 Offset



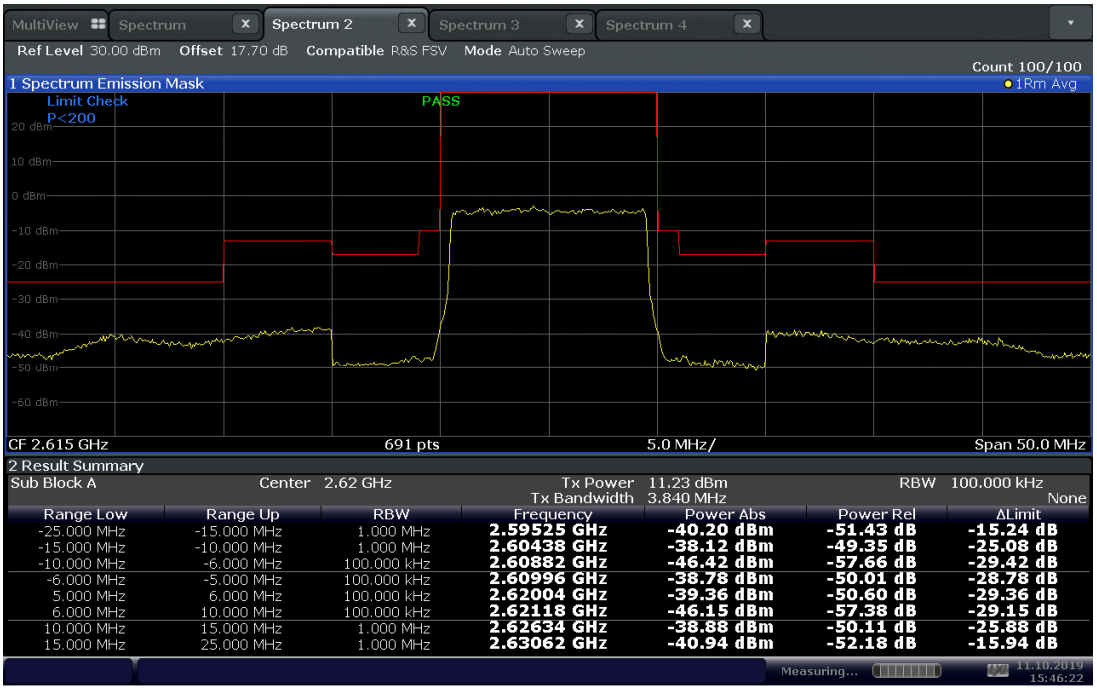
15:42:50 11.10.2019

LTE Band 38 / 10MHz BW / QPSK / Mid Channel 2595 MHz / Mask Band Edge @ 2570 and 2620 MHz in Full RB



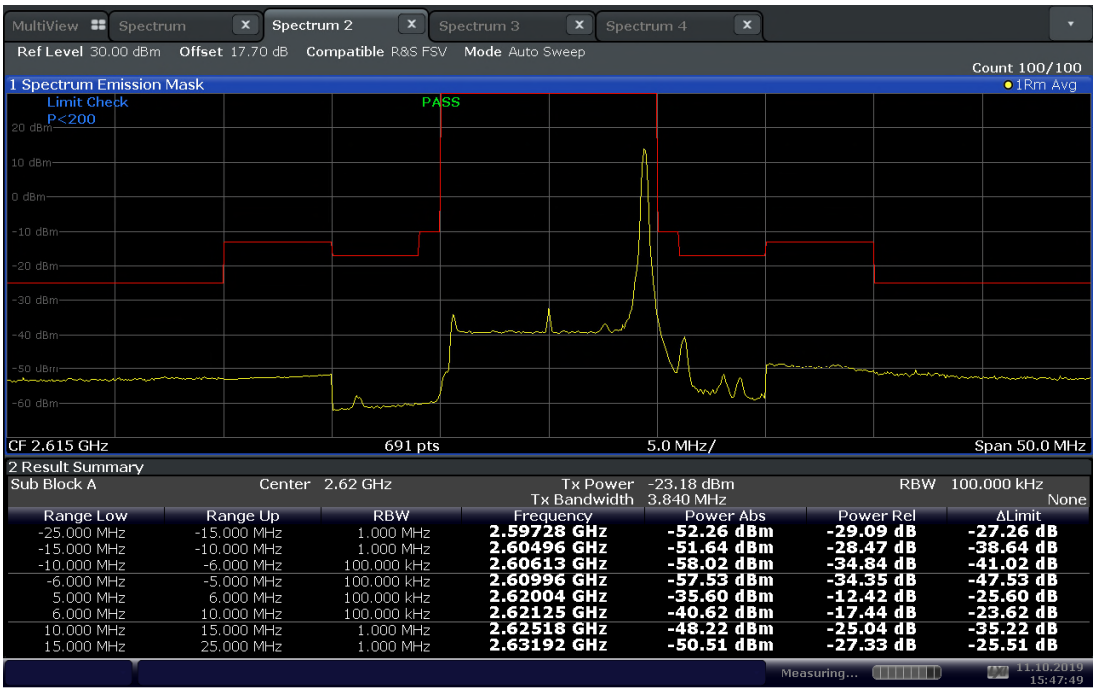
15:44:45 11.10.2019

LTE Band 38 / 10MHz BW / QPSK / High Channel 3615 MHz / Mask Band Edge @ 2570 and 2620 MHz in Full RB



15:46:23 11.10.2019

LTE Band 38 / 10MHz BW / QPSK / High Channel 3615 MHz / Mask Band Edge @ 2620 MHz in 1 RB 49 Offset



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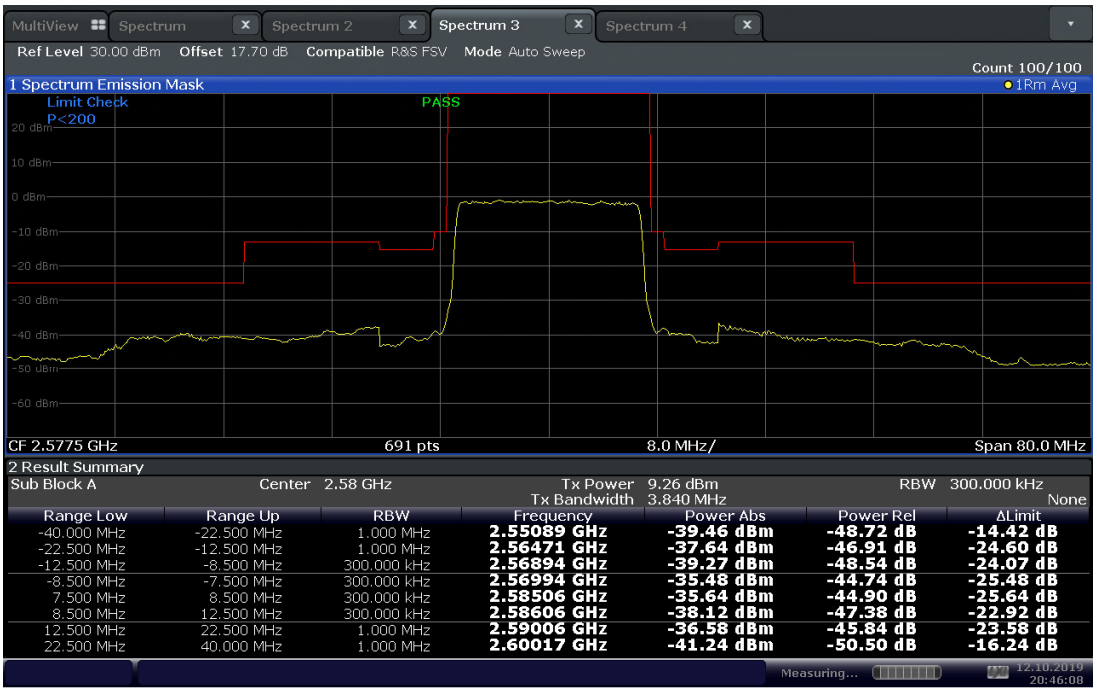
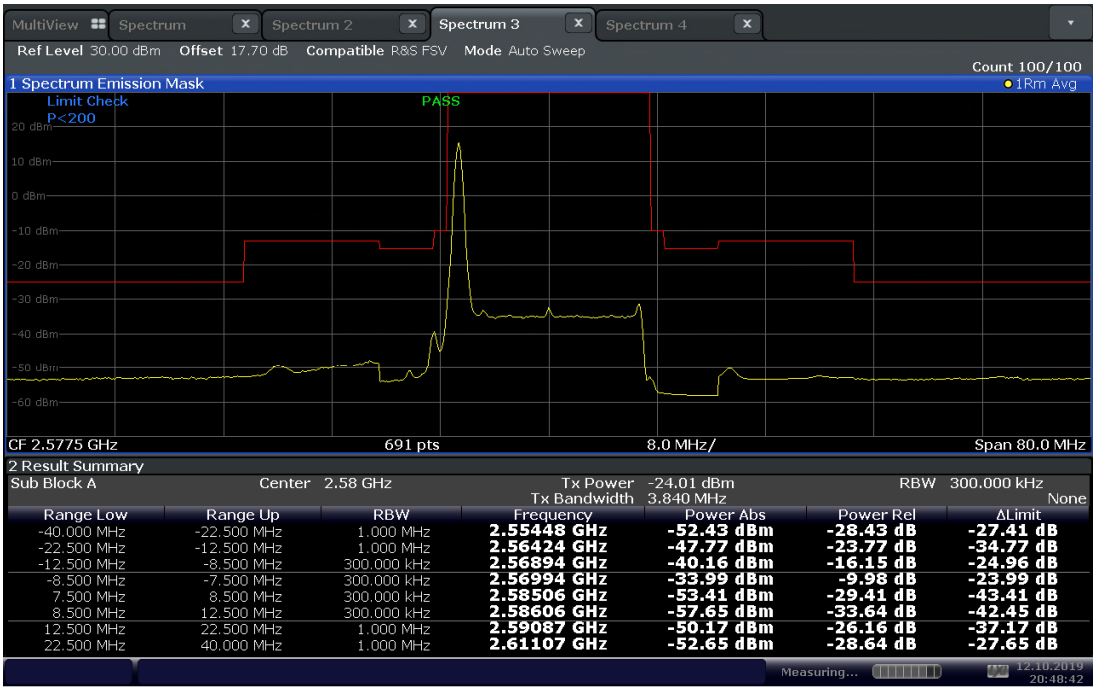
LTE Band 38 / 15MHz BW / QPSK / Low Channel 2577.5 MHz / Mask Band Edge @ 2570 and 2620 MHz in Full RB



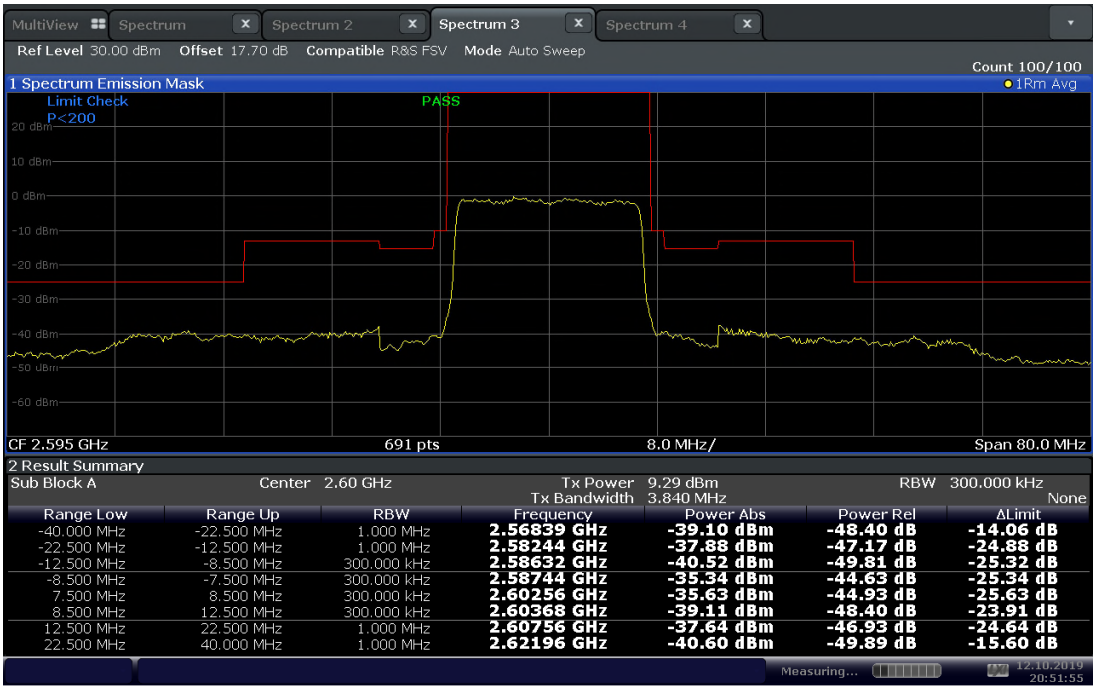
20:46:08 12.10.2019

LTE Band 38 / 15MHz BW / QPSK / Low Channel 2577.5 MHz / Mask Band Edge @ 2570 MHz in 1 RB 0 Offset



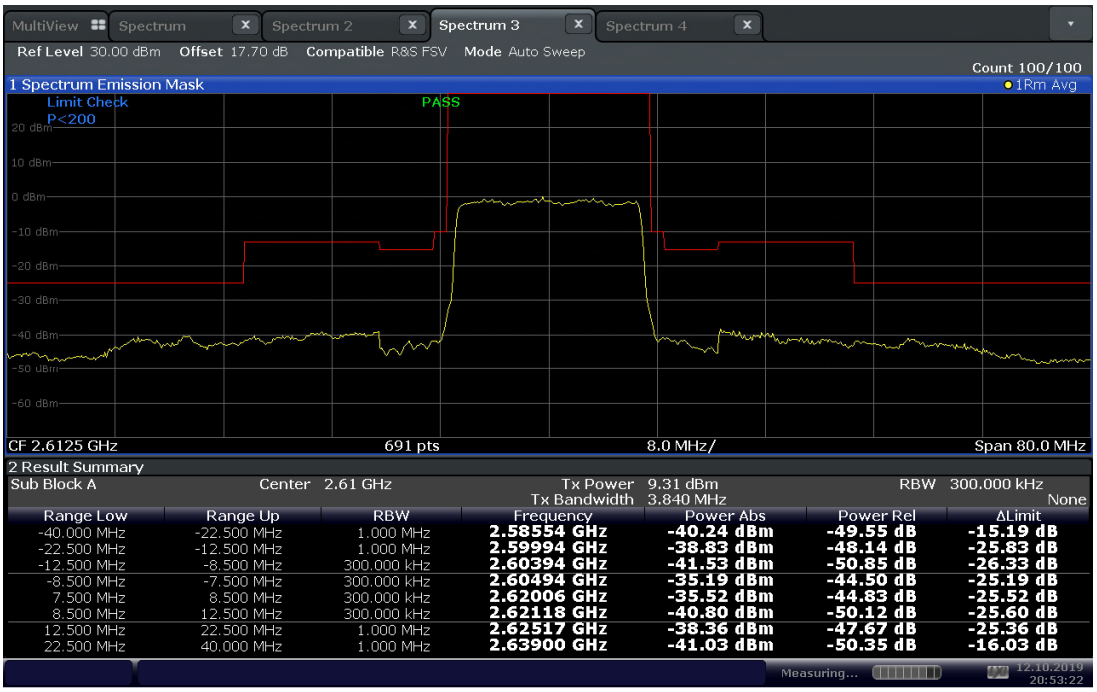
20:48:42 12.10.2019

LTE Band 38 / 15MHz BW / QPSK / Mid Channel 2595 MHz / Mask Band Edge @ 2570 and 2620 MHz in Full RB



20:51:55 12.10.2019

LTE Band 38 / 15MHz BW / QPSK / High Channel 2612.5 MHz / Mask Band Edge @ 2570 and 2620 MHz in Full RB



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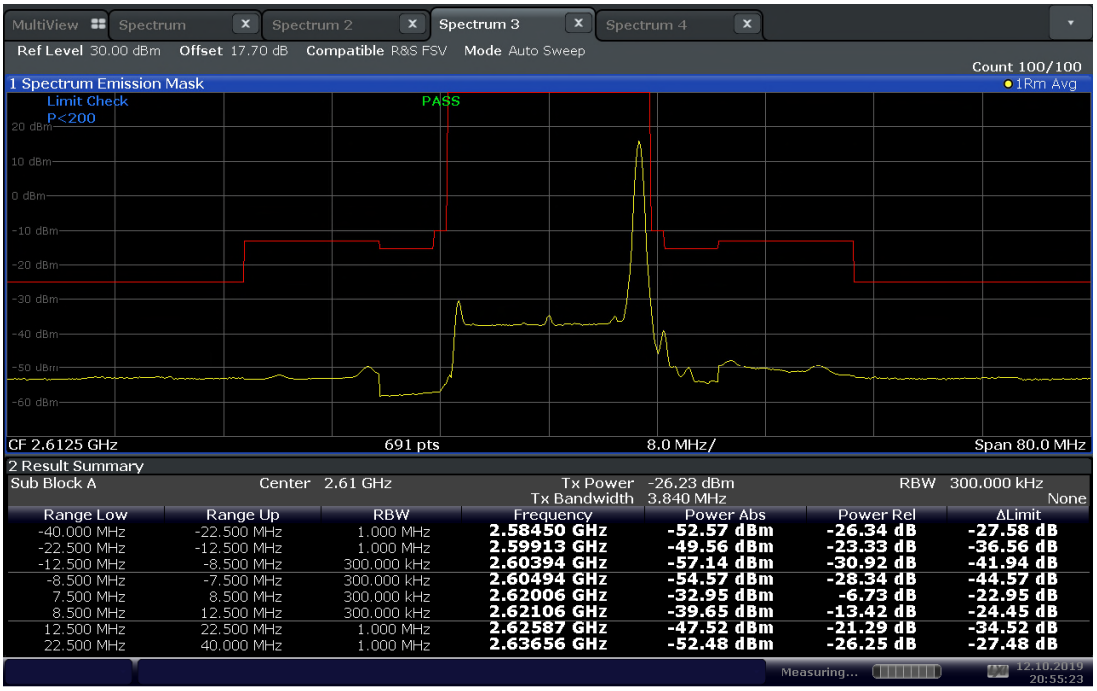
LTE Band 38 / 15MHz BW / QPSK / High Channel 2612.5 MHz / Mask Band Edge @ 2620 MHz in 1 RB 74 Offset



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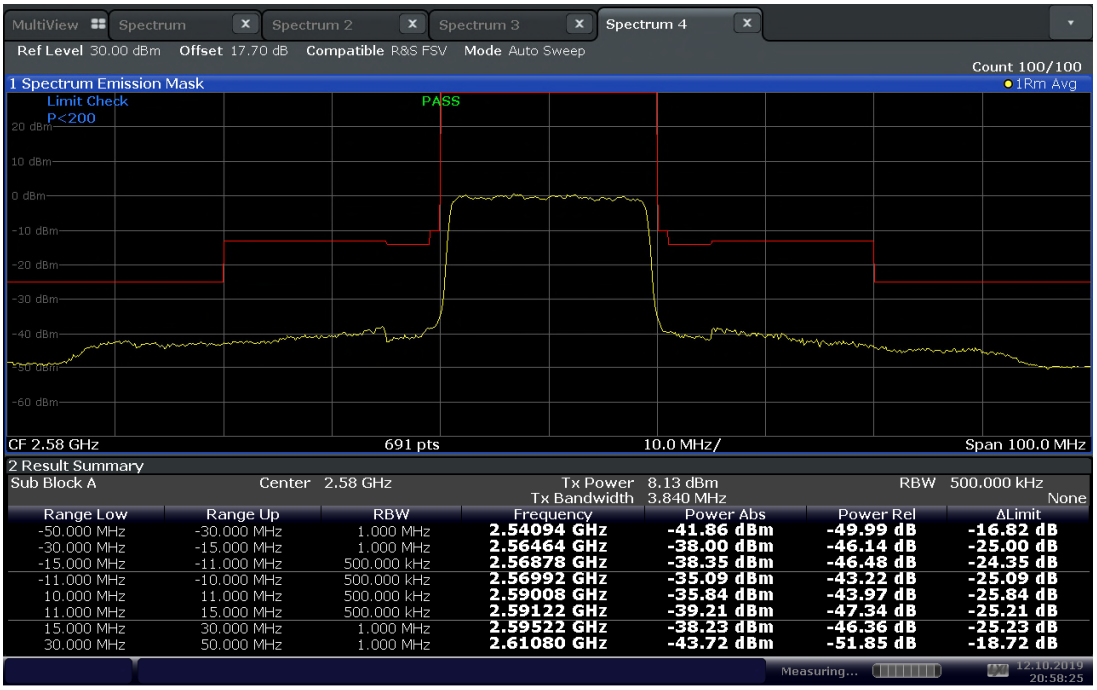
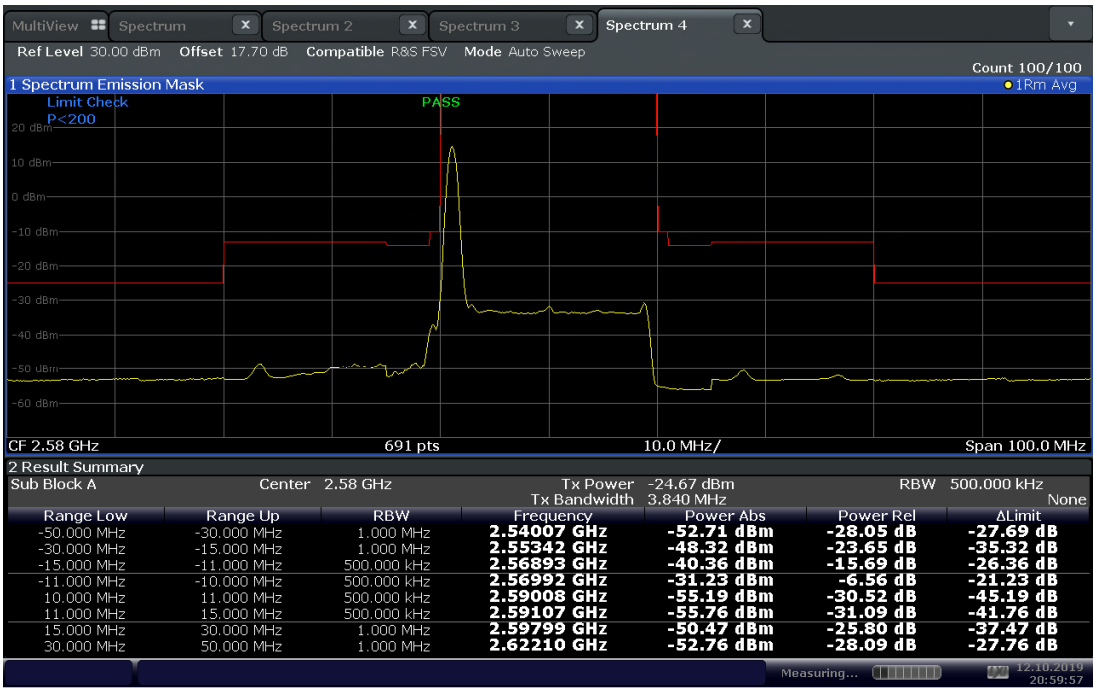
LTE Band 38 / 20MHz BW / QPSK / Low Channel 2580 MHz / Mask Band Edge @ 2570 and 2620 MHz in Full RB



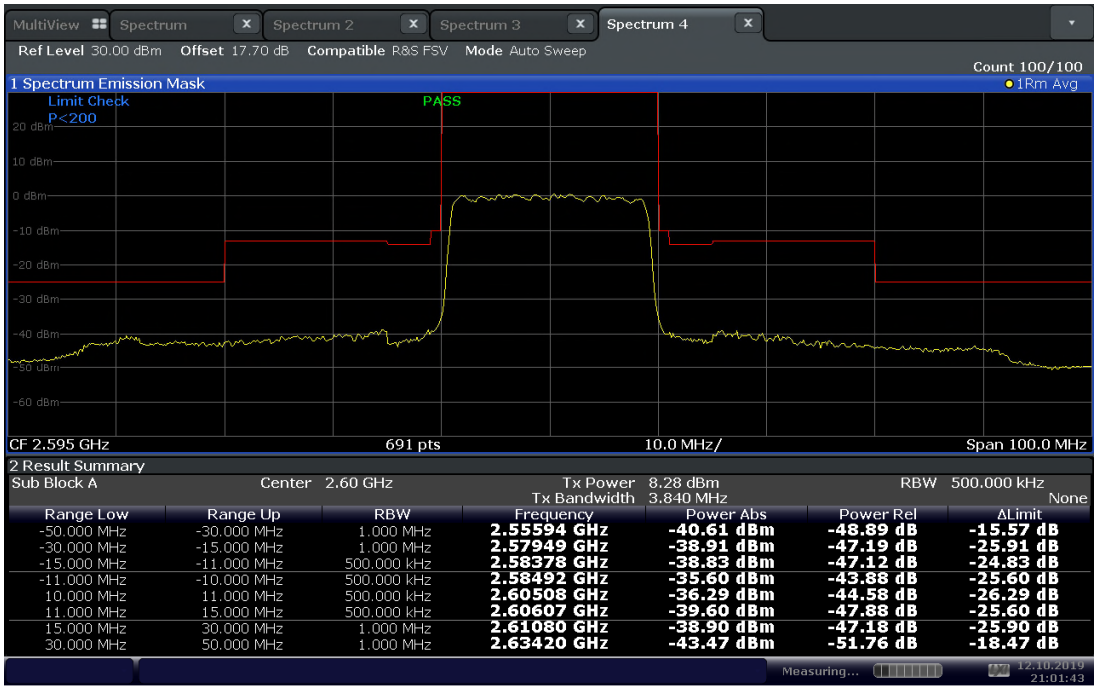
20:58:25 12.10.2019

LTE Band 38 / 20MHz BW / QPSK / Low Channel 2580 MHz / Mask Band Edge @ 2570 MHz in 1 RB 0 Offset



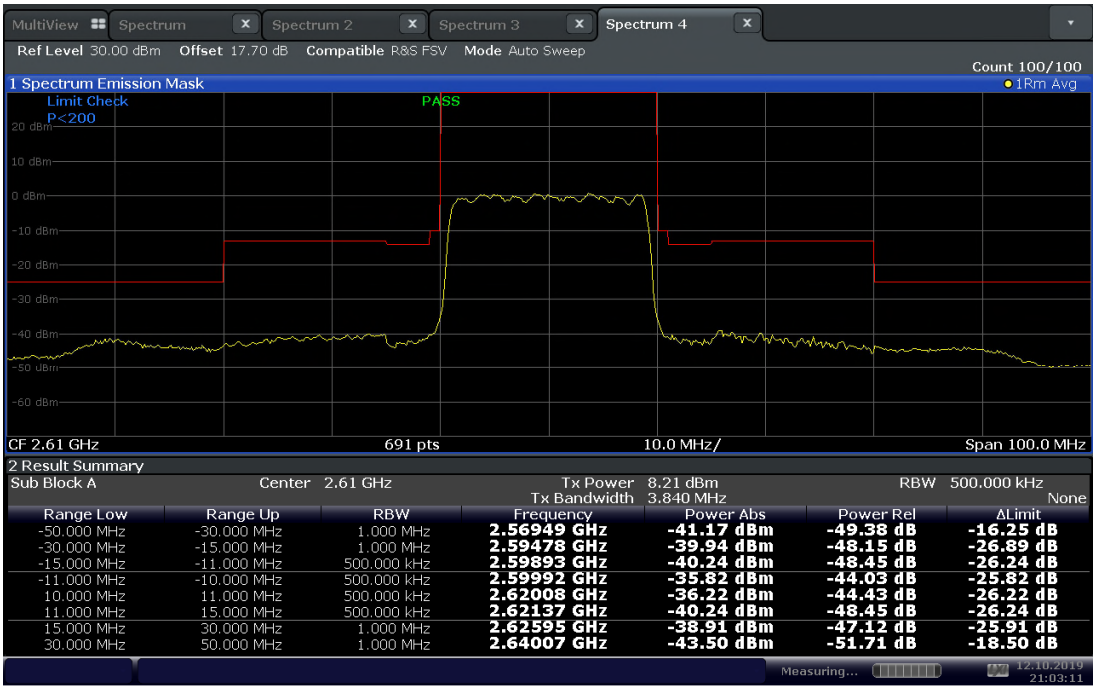
20:59:58 12.10.2019

LTE Band 38 / 20MHz BW / QPSK / Mid Channel 2595 MHz / Mask Band Edge @ 2570 and 2620 MHz in Full RB



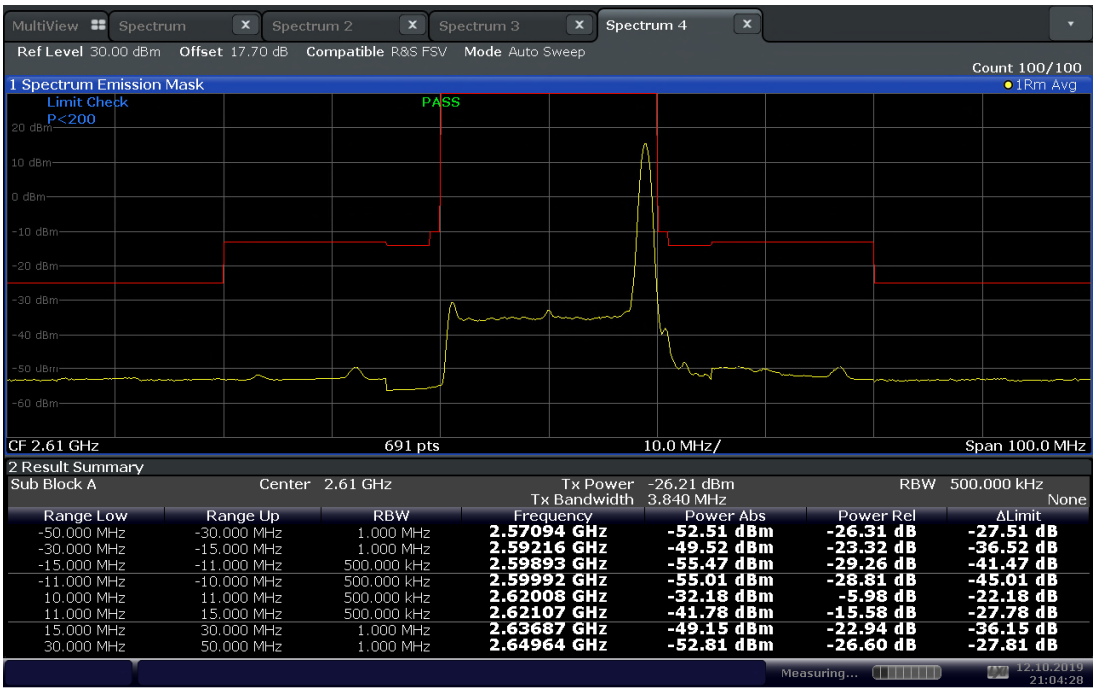
21:01:44 12.10.2019

LTE Band 38 / 20MHz BW / QPSK / High Channel 2610 MHz / Mask Band Edge @ 2570 and 2620 MHz in Full RB



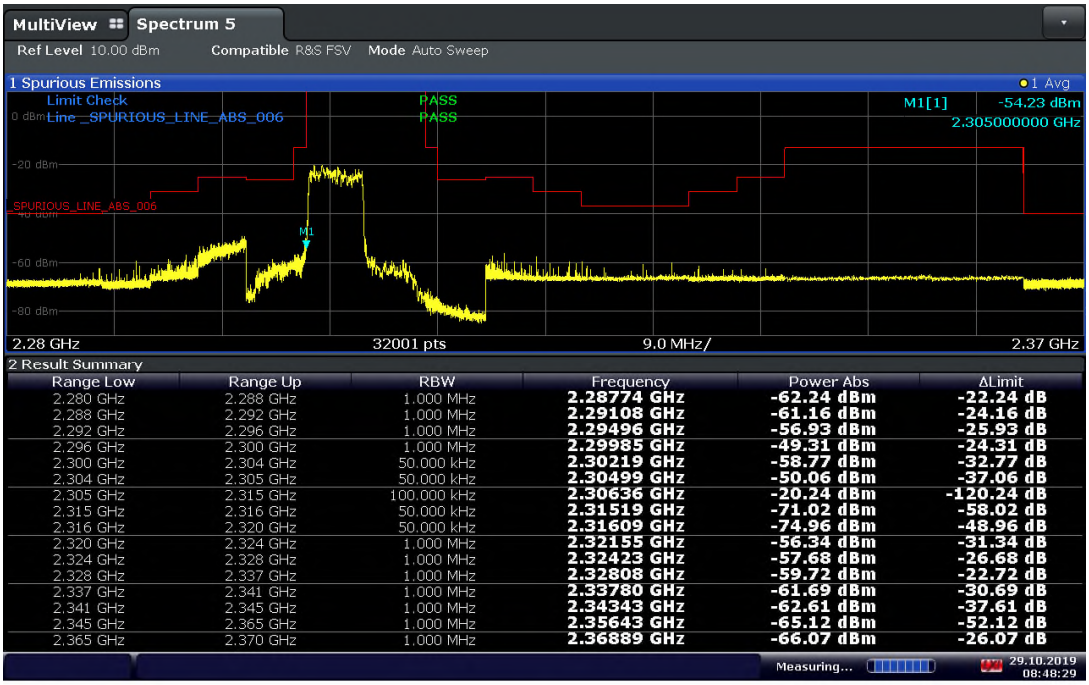
21:03:11 12.10.2019

LTE Band 38 / 20MHz BW / QPSK / High Channel 2610 MHz / Mask Band Edge @ 2620 MHz in 1 RB 99 Offset



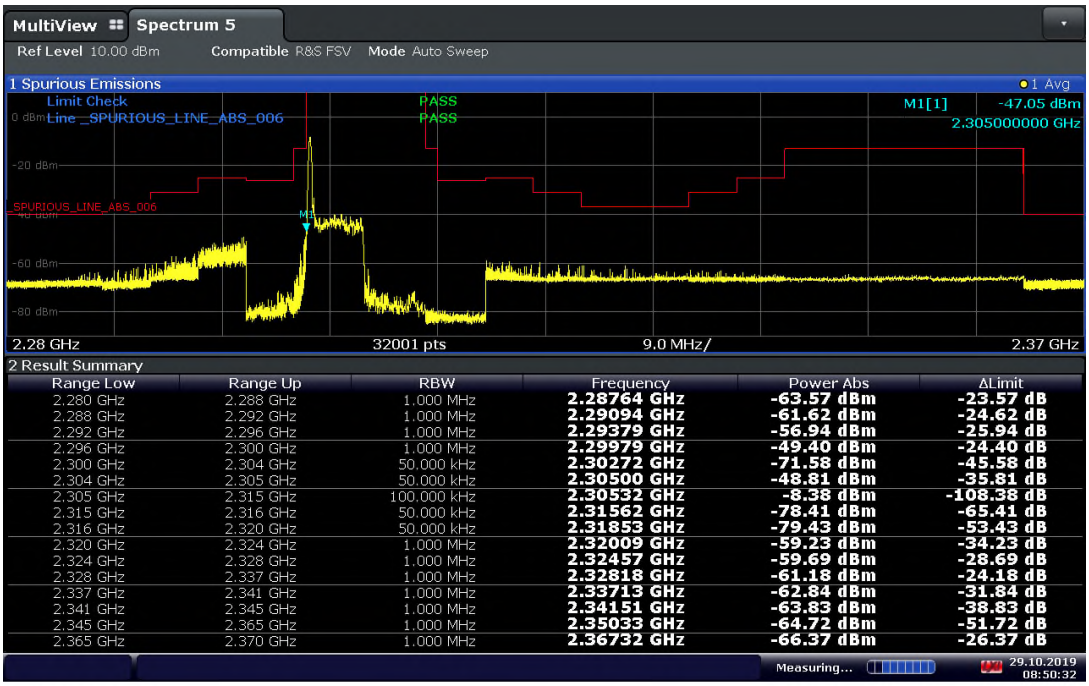
21:04:29 12.10.2019

LTE Band 40 / 5MHz BW / QPSK / Low Channel 2307.5 MHz Mask (Full RB)



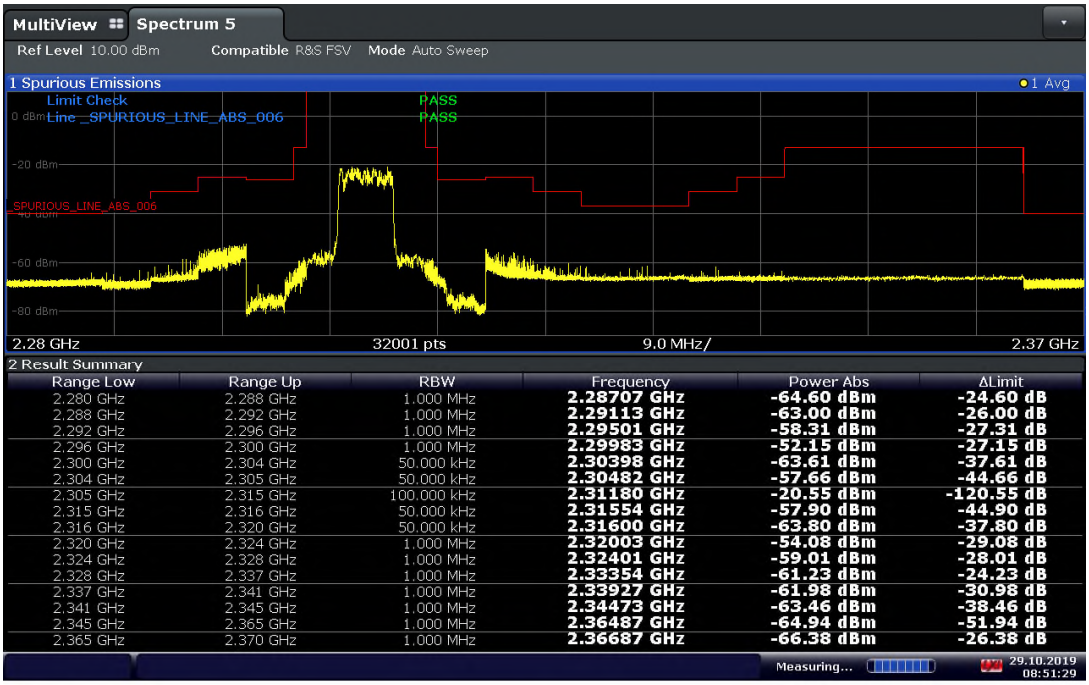
08:48:30 29.10.2019

LTE Band 40 / 5MHz BW / QPSK / Low Channel 2307.5 MHz Mask (1 RB, 0 Offset)

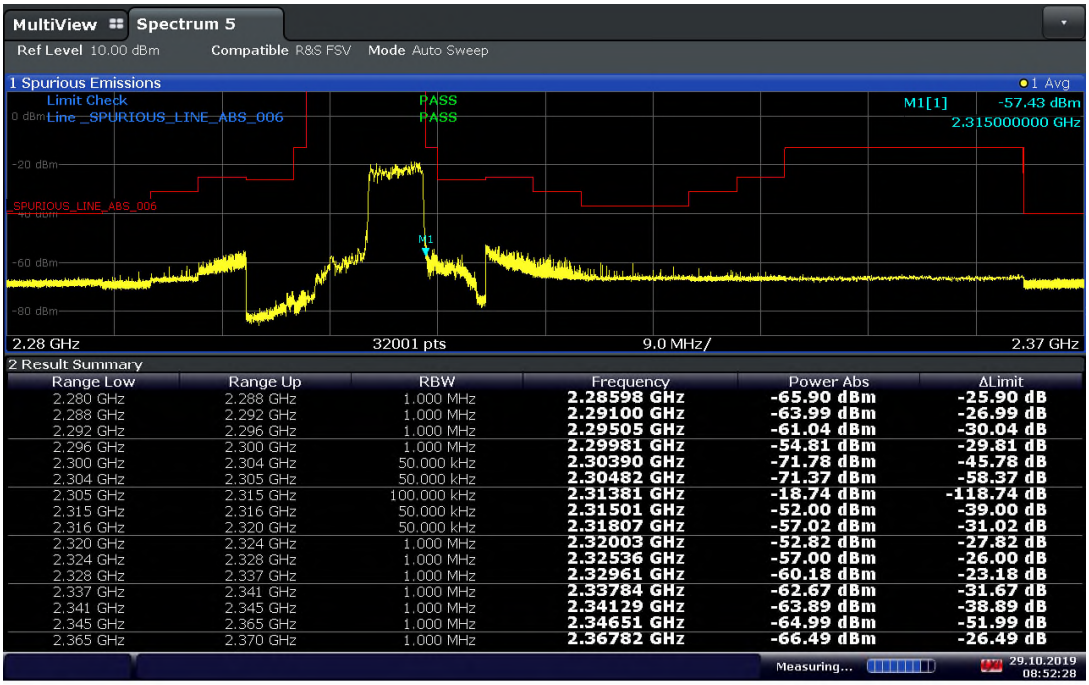


08:50:33 29.10.2019

LTE Band 40 / 5MHz BW / QPSK / Mid Channel 2310 MHz Mask (Full RB)

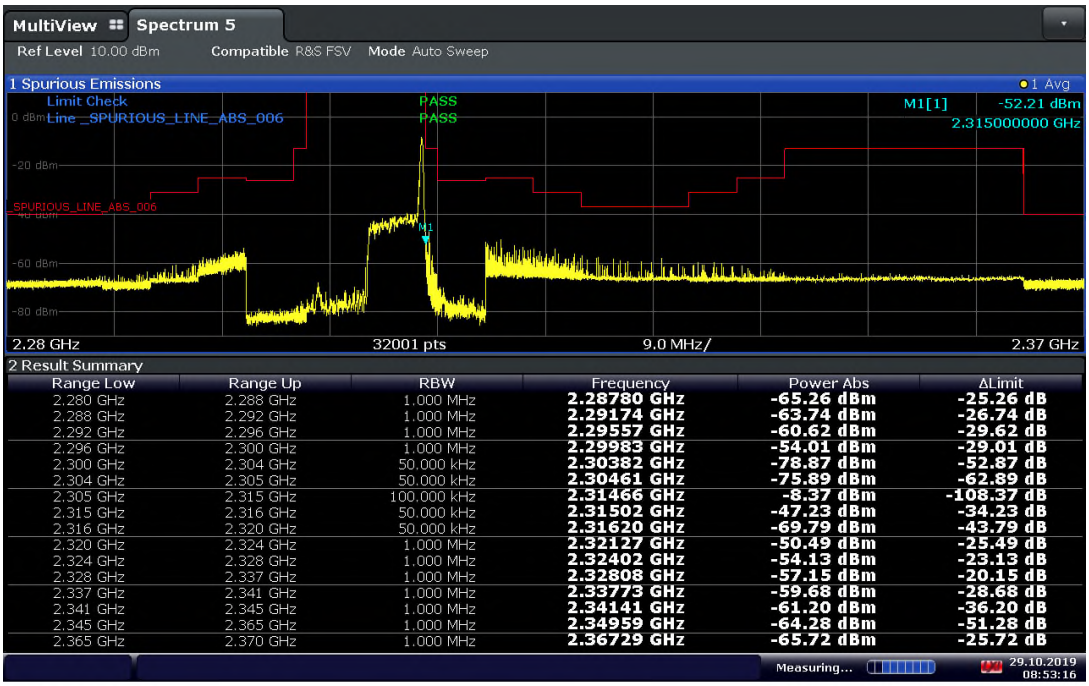


LTE Band 40 / 5MHz BW / QPSK / High Channel 2312.5 MHz Mask (Full RB)



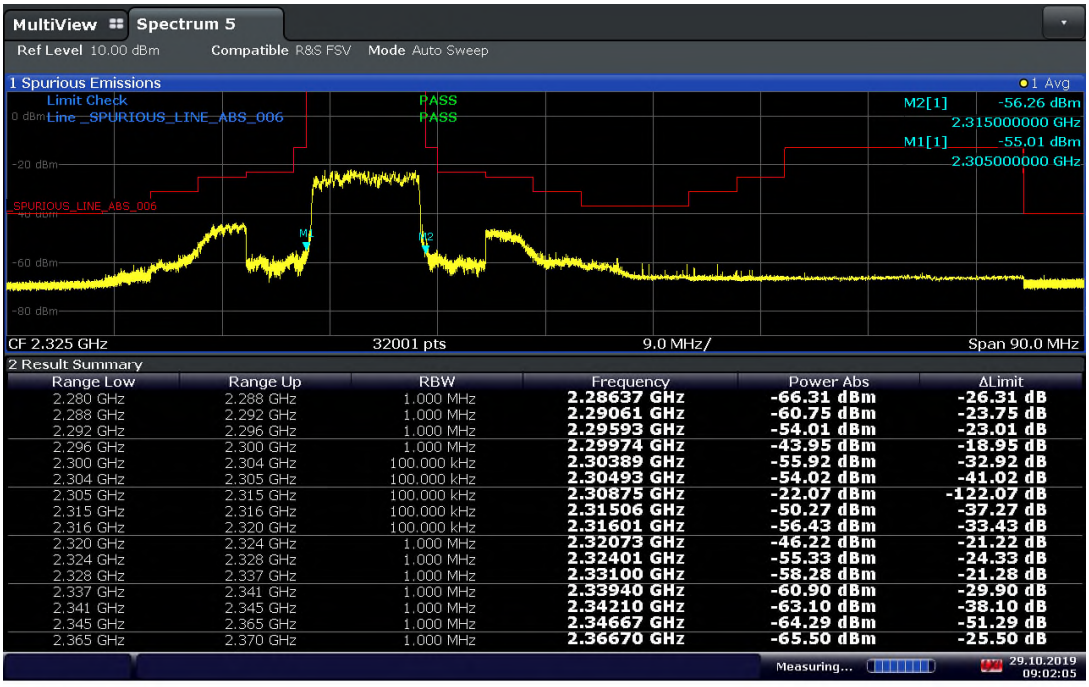
08:52:29 29.10.2019

LTE Band 40 / 5MHz BW / QPSK / High Channel 2312.5 MHz Mask (1 RB, 24 Offset)

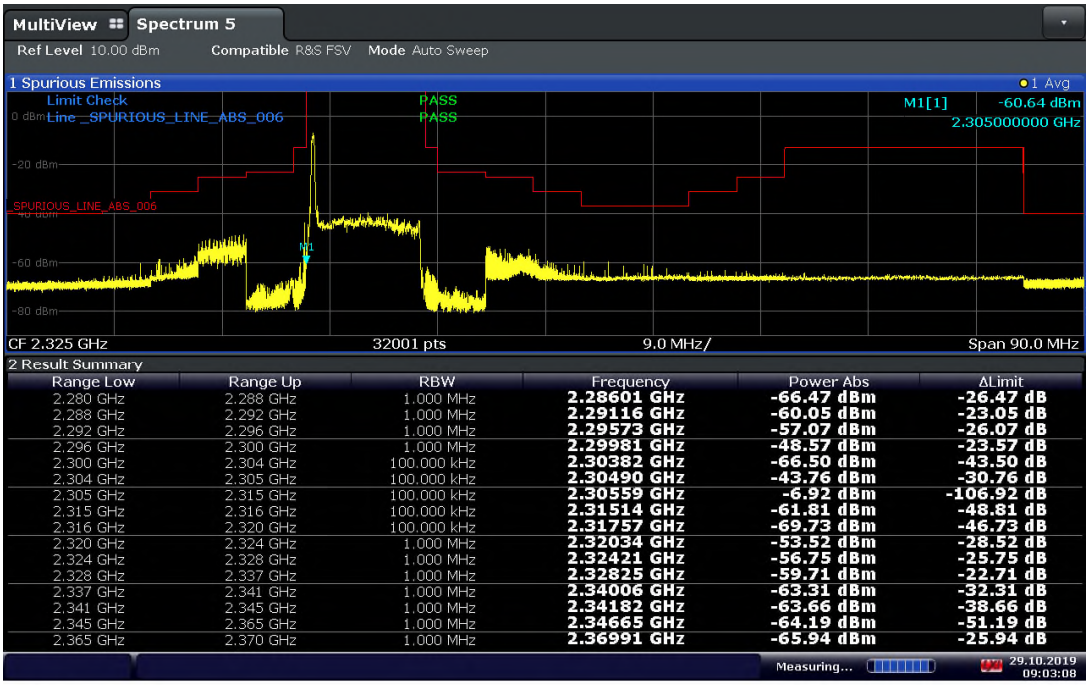


08:53:16 29.10.2019

LTE Band 40 / 10MHz BW / QPSK / Mid Channel 2310 MHz Mask (Full RB)

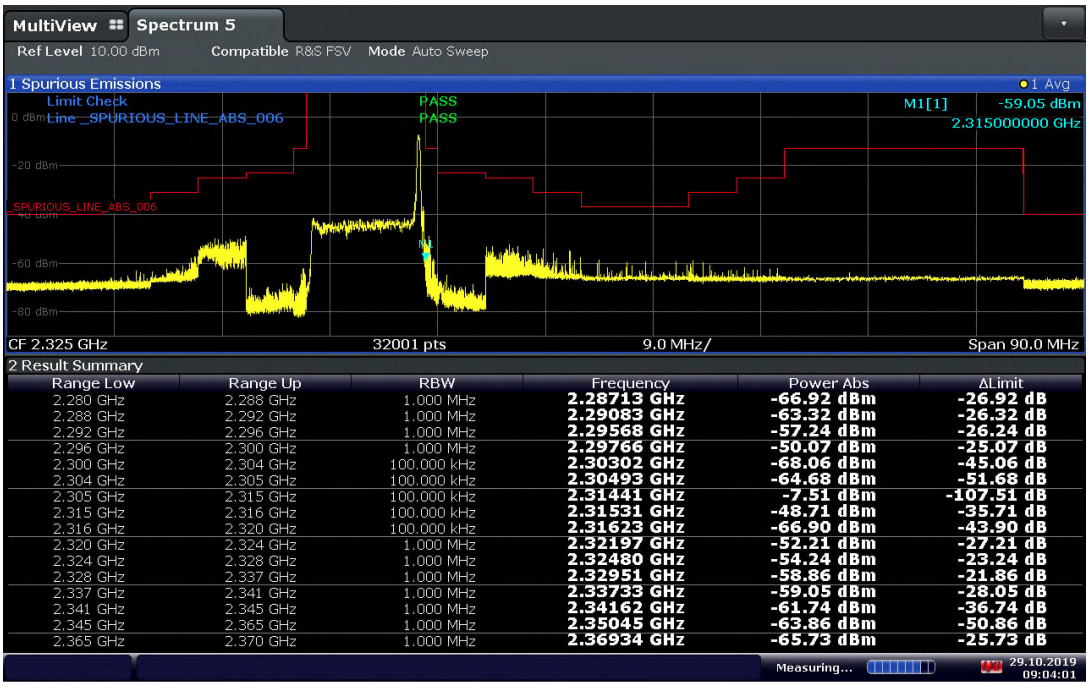


LTE Band 40 / 10MHz BW / QPSK / Mid Channel 2310 MHz Mask (1 RB, 0 Offset)



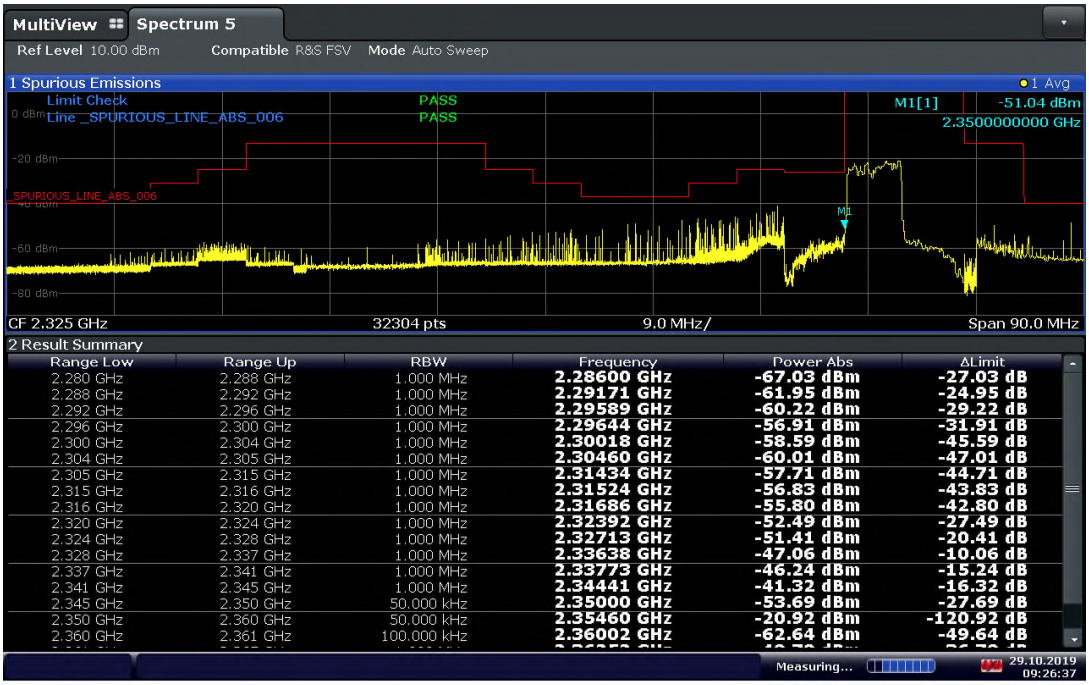
09:03:09 29.10.2019

LTE Band 40 / 10MHz BW / QPSK / Mid Channel 2310 MHz Mask (1 RB, 49 Offset)



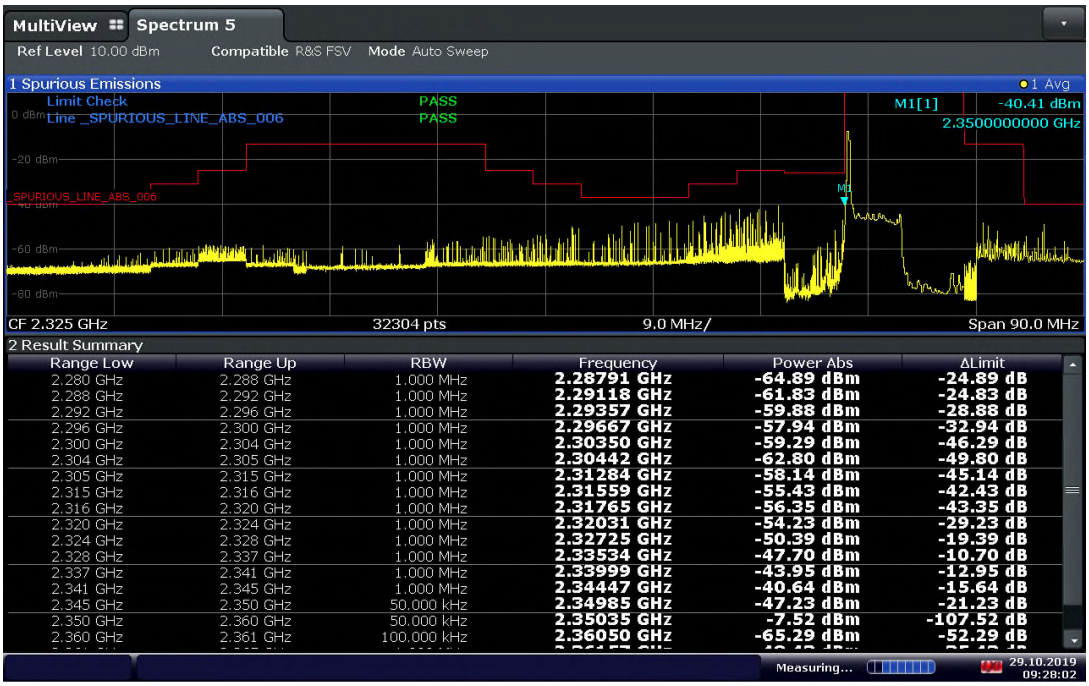
09:04:02 29.10.2019

LTE Band 40 / 5 MHz BW / QPSK / Low Channel 2352.5 MHz Mask (Full RB)



09:26:38 29.10.2019

LTE Band 40 / 5 MHz BW / QPSK / Low Channel 2352.5 MHz Mask (1 RB, 0 Offset)



09:28:03 29.10.2019