

FCC RF Test Report

APPLICANT : OnePlus Technology (Shenzhen) Co., Ltd.
EQUIPMENT : Smart Phone
BRAND NAME : ONEPLUS
MODEL NAME : KB2007
FCC ID : 2ABZ2-EF009
STANDARD : 47 CFR Part 2, 96
CLASSIFICATION : Citizens Band End User Devices (CBE)
EQUIPMENT TYPE : End User Equipment

The product was received on Jun. 15, 2020 and completely tested on Aug. 17, 2020. We, Sporton International (ShenZhen) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (ShenZhen) Inc., the test report shall not be reproduced except in full.



Reviewed by: Derreck Chen / Supervisor



Approved by: Eric Shih / Manager



Sporton International (ShenZhen) Inc.

**1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055
People's Republic of China**



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description	5
1.1 Applicant.....	5
1.2 Manufacturer	5
1.3 Feature of Equipment Under Test.....	5
1.4 Maximum ERP Power, Frequency Tolerance, and Emission Designator	6
1.5 Testing Site.....	8
1.6 Test Software	8
1.7 Applied Standards	9
2 Test Configuration of Equipment Under Test	10
2.1 Test Mode.....	10
2.2 Connection Diagram of Test System	11
2.3 Support Unit used in test configuration	12
2.4 Measurement Results Explanation Example	12
2.5 Frequency List of Low/Middle/High Channels.....	12
3 Conducted Test Items.....	14
3.1 Measuring Instruments.....	14
3.2 Conducted Output Power	15
3.3 EIRP	16
3.4 Occupied Bandwidth	17
3.5 Conducted Band Edge	18
3.6 Conducted Spurious Emission	19
3.7 Frequency Stability.....	20
4 Radiated Test Items	21
4.1 Measuring Instruments.....	21
4.2 Test Setup	21
4.3 Test Result of Radiated Test.....	21
4.4 Radiated Spurious Emission	22
5 List of Measuring Equipment.....	23
6 Uncertainty of Evaluation.....	24
Appendix A. Test Results of Conducted Test	
Appendix B. Test Results of EIRP and Radiated Test	
Appendix C. Test Setup Photographs	



History of this test report

Report No.	Version	Description	Issued Date
FG061509E	01	Initial issue of report	Aug. 24, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
-	§96.41	Peak-to-Average Ratio	Not Required	Not applicable for End User Devices
3.3	§96.41	Maximum E.I.R.P	Pass	-
		Maximum Power Spectral Density	Not Required	Not applicable for End User Devices
3.4	§2.1049 §96.41	Occupied Bandwidth	Reporting only	-
3.5	§2.1051 §96.41	Conducted Band Edge Measurement Adjacent Channel Leakage Ratio	Pass	-
3.6	§2.1051 §96.41	Conducted Spurious Emission	Pass	
3.7	§2.1055	Frequency Stability for Temperature & Voltage	Pass	-
4.4	§2.1051 §96.41	Radiated Spurious Emission	Pass	Under limit 10.46 dB at 7139.800 MHz

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

OnePlus Technology (Shenzhen) Co., Ltd.

18C02, 18C03, 18C04,18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen,Guangdong,China

1.2 Manufacturer

OnePlus Technology (Shenzhen) Co., Ltd.

18C02, 18C03, 18C04,18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen,Guangdong,China

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Smart Phone
Brand Name	ONEPLUS
Model Name	KB2007
FCC ID	2ABZ2-EF009
Tx Frequency	LTE Band 48: 3552.5 MHz ~ 3697.5 MHz
Rx Frequency	LTE Band 48: 3552.5 MHz ~ 3697.5 MHz
Bandwidth	5MHz / 10MHz / 15MHz / 20MHz
Uplink CA Band(s)	48C
Antenna Gain	-3.0 dBi
Type of Modulation	QPSK / 16QAM / 64QAM / 256QAM
IMEI Code	Conducted: 990016770027769 Radiation: 001004552813462
HW Version	13
SW Version	11.1.0.1.KB09
EUT Stage	Production Unit

Remark:

The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Maximum ERP Power, Frequency Tolerance, and Emission Designator

LTE Band 48		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP (W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP (W)
5	3552.5~3697.5	4M50G7D	-	0.0988	4M50W7D	-	0.0787
10	3555~3695	9M09G7D	0.0008	0.0984	9M05W7D	-	0.0785
15	3557.5~3692.5	13M5G7D	-	0.0984	13M5W7D	-	0.0781
20	3560~3690	17M9G7D	-	0.0991	17M9W7D	-	0.0787
LTE Band 48		64QAM					
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)		Maximum EIRP (W)		
5	3552.5~3697.5	4M52W7D	-		0.0631		
10	3555~3695	9M07W7D	-		0.0629		
15	3557.5~3692.5	13M5W7D	-		0.0629		
20	3560~3690	17M9W7D	-		0.0631		



LTE Band 48C	QPSK			16QAM		
BW (MHz) Frequency (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
5MHz+20MHz (3553.3 ~ 3690 MHz)	23M5G7D	-	0.0387	23M3W7D	-	0.0337
10MHz+20MHz (3555.5 ~ 3690 MHz)	28M1G7D	-	0.0381	27M9W7D	-	0.0333
15MHz+20MHz (3557.8 ~ 3690 MHz)	32M8G7D	-	0.0386	32M9W7D	-	0.0334
20MHz+5MHz (3560 ~ 3696.7 MHz)	23M3G7D	-	0.0382	23M3W7D	-	0.0338
20MHz+10MHz (3560 ~ 3694.5 MHz)	28M0G7D	-	0.0383	28M1W7D	-	0.0335
20MHz+15MHz (3560 ~ 3692.2 MHz)	33M0G7D	-	0.0389	32M8W7D	-	0.0333
20MHz+20MHz (3560 ~ 3690 MHz)	37M7G7D	-	0.0397	37M8W7D	-	0.0395
LTE Band 48C	64QAM					
BW (MHz) Frequency (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)		Maximum EIRP(W)		
5MHz+20MHz (3553.3 ~ 3690 MHz)	23M3W7D	-		0.0324		
10MHz+20MHz (3555.5 ~ 3690 MHz)	28M2W7D	-		0.0334		
15MHz+20MHz (3557.8 ~ 3690 MHz)	32M9W7D	-		0.0333		
20MHz+5MHz (3560 ~ 3696.7 MHz)	23M3W7D	-		0.0336		
20MHz+10MHz (3560 ~ 3694.5 MHz)	28M3W7D	-		0.0327		
20MHz+15MHz (3560 ~ 3692.2 MHz)	32M8W7D	-		0.0329		
20MHz+20MHz (3560 ~ 3690 MHz)	37M7W7D	-		0.0394		

1.5 Testing Site

Sporton International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	TH01-SZ	CN1256	421272

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan Shenzhen, 518055 People's Republic of China TEL: +86-755-33202398		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH02-SZ	CN1256	421272

1.6 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH02-SZ	AUDIX	E3	6.2009-8-24a

1.7 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ 47 CFR Part 2, 96
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 940660 D01 Part 96 CBRS v02
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

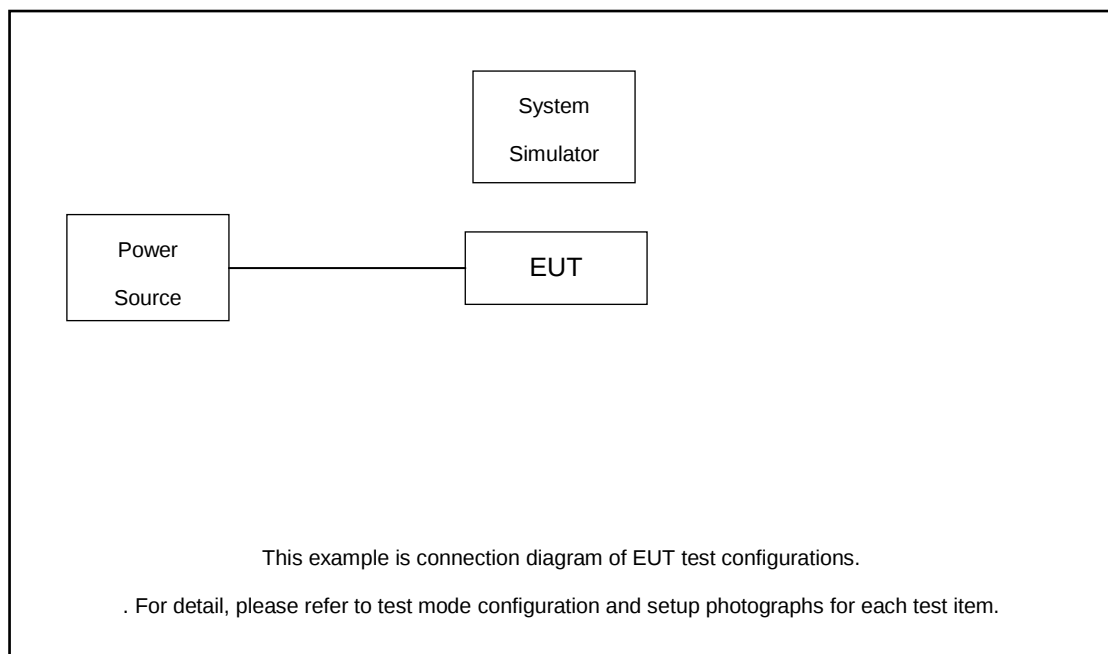
Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases were recorded in this report.

Test Items	Band	Bandwidth (MHz)						Modulation				RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Max. Output Power	48	-	-	v	v	v	v	v	v	v		v	v	v	v	v	v
26dB and 99% Bandwidth	48	-	-	v	v	v	v	v	v	v				v	v	v	v
Conducted Band Edge	48	-	-	v	v	v	v	v	v	v		v		v	v		v
Conducted Spurious Emission	48	-	-	v	v	v	v	v	v	v		v		v	v	v	v
E.R.P / E.I.R.P	48	-	-	v	v	v	v	v	v	v		v			v	v	v
Frequency Stability	48	-	-		v			v				v				v	
Radiated Spurious Emission	48	Worst Case													v	v	v
Remark	1. The mark “v ” means that this configuration is chosen for testing 2. The mark “-” means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. All the radiated test cases were performed with Adapter. 5. For QAM modulation mode, the whole testing has assessed 16QAM&64QAM mode by referring to their higher conducted power.																

Test Items	Band	Bandwidth (MHz)							Modulation				RB #			Test Channel		
		20+20	20+15	15+20	20+10	10+20	20+5	5+20	QPSK	16QAM	64QAM	256 QAM	1	Half	Full	L	M	H
Max. Output Power	48C	v	v	v	v	v	v	v	v	v	v		v		v	v	v	v
26dB and 99% Bandwidth	48C	v	v	v	v	v	v	v	v	v	v				v	v	v	v
Conducted Band Edge	48C	v	v	v	v	v	v	v	v	v	v		v		v	v		v
Conducted Spurious Emission	48C	v	v	v	v	v	v	v	v	v	v		v		v	v	v	v
E.R.P / E.I.R.P	48C	v	v	v	v	v	v	v	v	v	v		v			v	v	v
Radiated Spurious Emission	48C	Worst Case														v	v	v
Note	1. The mark “v ” means that this configuration is chosen for testing 2. The mark “-“ means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. All the radiated test cases were performed with Adapter. 5. Frequency stability only shows the worst case of LTE band 48/48C.																	

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5.5 dB and 10dB attenuator.

Example :

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 5.5 + 10 = 15.5 \text{ (dB)} \end{aligned}$$

2.5 Frequency List of Low/Middle/High Channels

LTE Band 48 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	55340	55990	56640
	Frequency	3560.0	3625.0	3690.0
15	Channel	55315	55990	56665
	Frequency	3557.5	3625.0	3692.5
10	Channel	55290	55990	56690
	Frequency	3555.0	3625.0	3695.0
5	Channel	55265	55990	56715
	Frequency	3552.5	3625.0	3697.5

LTE Band 48C_CA Channel and Frequency List					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
5 + 20	PCC	Channel	55273	55898	56523
		Frequency	3553.3	3615.8	3678.3
	SCC	Channel	55390	56015	56640
		Frequency	3565	3627.5	3690
20 + 5	PCC	Channel	55340	55965	56590
		Frequency	3560	3622.5	3685
	SCC	Channel	55457	56082	56707
		Frequency	3571.7	3634.2	3696.7
10 + 20	PCC	Channel	55295	55896	56496
		Frequency	3555.5	3615.6	3675.6
	SCC	Channel	55439	56040	56640
		Frequency	3569.9	3630	3690
20 + 10	PCC	Channel	55340	55941	56541
		Frequency	3560	3620.1	3680.1
	SCC	Channel	55484	56085	56685
		Frequency	3574.4	3634.5	3694.5
15 + 20	PCC	Channel	55318	55893	56469
		Frequency	3557.8	3615.3	3672.9
	SCC	Channel	55489	56064	56640
		Frequency	3574.9	3632.4	3690
20 + 15	PCC	Channel	55340	55916	56491
		Frequency	3560	3617.6	3675.1
	SCC	Channel	55511	56087	56662
		Frequency	3577.1	3634.7	3692.2
20 + 20	PCC	Channel	55340	55891	56442
		Frequency	3560	3615.1	3670.2
	SCC	Channel	55538	56089	56640
		Frequency	3579.8	3634.9	3690

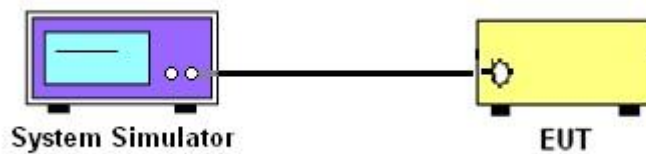
3 Conducted Test Items

3.1 Measuring Instruments

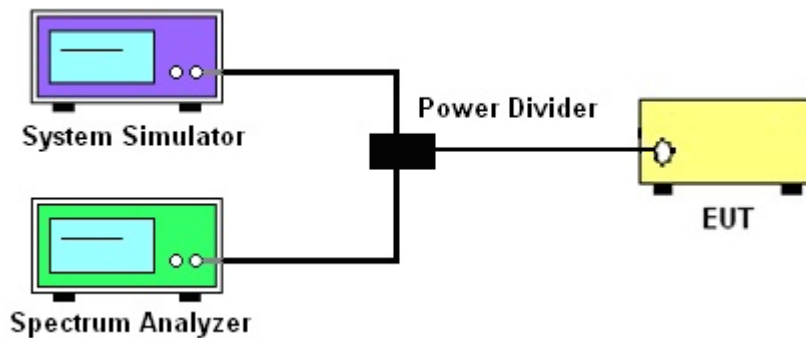
See list of measuring instruments of this test report.

3.1.1 Test Setup

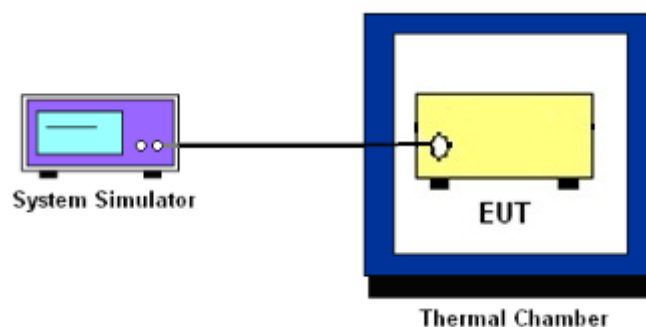
3.1.2 Conducted Output Power



3.1.3 EIRP, Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge and Conducted Spurious Emission



3.1.4 Frequency Stability



3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power

3.2.1 Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

3.2.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.3 EIRP

3.3.1 Description of the EIRP Measurement

EIRP and PSD limits for CBRS equipment as below table:

Device		Maximum EIRP (dBm/10 MHz)	Maximum PSD (dBm/MHz)
☒	End User Device	23	n/a
☐	Category A CBSD	30	20
☐	Category B CBSD	47	37

Remark: Maximum PSD values are radiated. Measurements can be done conducted and add antenna gain back in.

1. Set instrument center frequency to OBW center frequency.
2. Set span to at least 2 times the OBW.
3. Set the RBW to the specified reference bandwidth (often 1 MHz).
4. Set VBW $\geq 3 \times$ RBW.
5. Detector = RMS (power averaging).
6. Ensure that the number of measurement points in the sweep $\geq 2 \times$ span/RBW.
7. Sweep time = auto couple.
8. Employ trace averaging (RMS) mode over a minimum of 100 traces.
9. Use the peak marker function to determine the maximum amplitude level within the reference bandwidth (PSD).
10. Determine the EIRP by adding the effective antenna gain to the adjusted power level.
11. Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission.

The testing follows ANSI C63.26-2015 Section 5.2.5.5

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4 Occupied Bandwidth

3.4.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.4.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.4.3 (26dB) and Section 5.4.4 (99OB)

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
3. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
4. Set the detection mode to peak, and the trace mode to max hold.
5. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.
(this is the reference value)
6. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
7. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.5 Conducted Band Edge

3.5.1 Description of Conducted Band Edge Measurement

Part 96.41 (e) (1) (i)

For CBSD the emission limits outside the fundamental are as follows:

Within 0 MHz to 10 MHz above and below the assigned channel ≤ -13 dBm/MHz

Greater than 10 MHz above and below the assigned channel ≤ -25 dBm/MHz

Part 96.41 (e) (1) (ii)

For End User Devices the emission limits outside the fundamental are as follows:

Within 0 MHz to B MHz above and below the assigned channel ≤ -13 dBm/MHz

Greater than B MHz above and below the assigned channel ≤ -25 dBm/MHz

where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device.

Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

Part 96.41 (e) (2)

For CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz

3.5.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. Set RBW $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used
5. Offset has included the duty factor for LTE Band 48. Duty factor $=10 \log (1/x)$, where x is the measured duty cycle.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.6 Conducted Spurious Emission

3.6.1 Description of Conducted Spurious Emission Measurement

96.41 (e)(2)

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
6. Set spectrum analyzer with RMS detector.
7. Taking the record of maximum spurious emission.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. The limit line is -40dBm/MHz.

3.7 Frequency Stability

3.7.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency

3.7.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.7.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

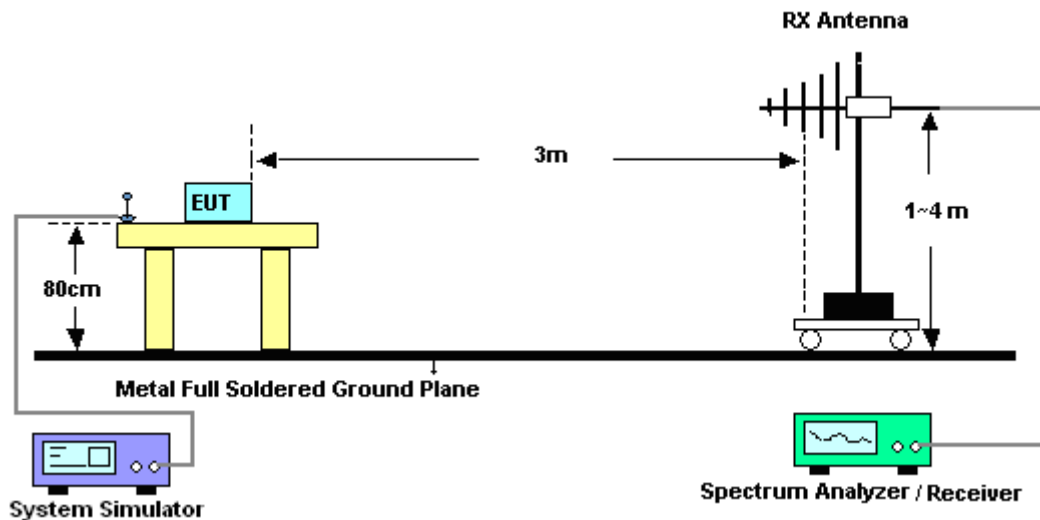
4 Radiated Test Items

4.1 Measuring Instruments

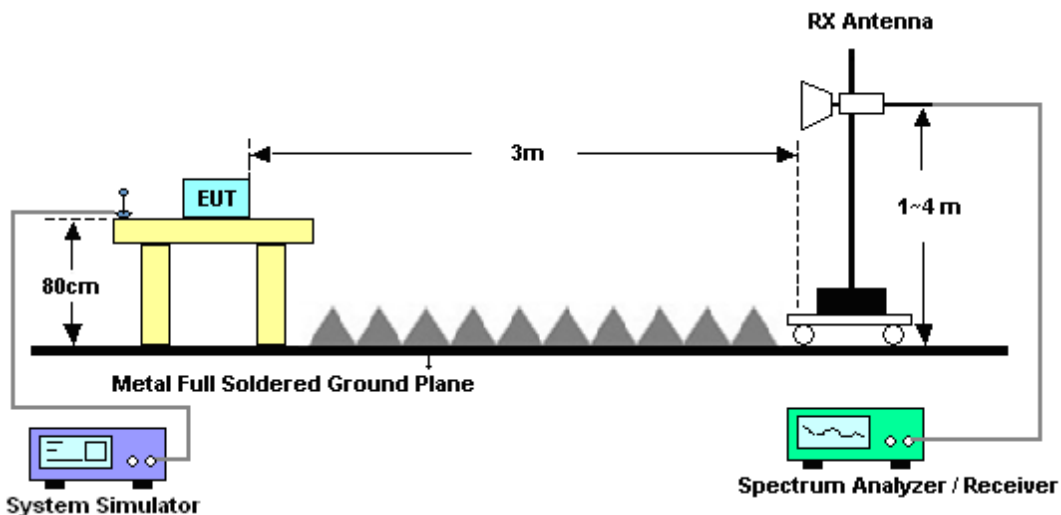
See list of measuring instruments of this test report.

4.2 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least -40dBm / MHz. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
5. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
$$\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$$
$$\text{ERP (dBm)} = \text{EIRP} - 2.15$$
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
The limit line is -40dBm/MHz



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 17, 2020	Jul. 16, 2020~ Aug. 17, 2020	Apr. 16, 2021	Conducted (TH01-SZ)
DC Power Supply	GWINSTEK	AnritsuGPS-3030D	EM882636	Max 30V	Apr. 17, 2020	Jul. 16, 2020~ Aug. 17, 2020	Apr. 16, 2021	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Dec. 22, 2020	Jul. 16, 2020~ Aug. 17, 2020	Dec. 21, 2021	Conducted (TH01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Apr. 17, 2020	Jul. 29, 2020	Apr. 16, 2021	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz~2GHz	Jul. 15, 2020	Jul. 29, 2020	Jul. 14, 2021	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 25, 2020	Jul. 29, 2020	Jul. 24, 2021	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 21, 2020	Jul. 29, 2020	Jul. 20, 2021	Radiation (03CH02-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz~40GHz	Apr. 17, 2020	Jul. 29, 2020	Apr. 16, 2021	Radiation (03CH02-SZ)
LF Amplifier	Burgeon	BPA-530	102211	0.01~3000Mhz	Oct. 18, 2019	Jul. 29, 2020	Oct. 17, 2020	Radiation (03CH02-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5GHz	Oct. 18, 2019	Jul. 29, 2020	Oct. 17, 2020	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010002470	N/A	NCR	Jul. 29, 2020	NCR	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Jul. 29, 2020	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Jul. 29, 2020	NCR	Radiation (03CH02-SZ)

NCR: No Calibration Required

6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.47dB
--	--------

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.31dB
--	--------

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.72dB
--	--------



Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 48

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	for EMC Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				55340	55990	56640
Frequency (MHz)				3560	3625	3690
20	QPSK	1	0	22.56	22.87	22.96
20	QPSK	1	49	22.53	22.74	22.85
20	QPSK	1	99	22.53	22.77	22.93
20	QPSK	50	0	21.57	21.92	22.00
20	QPSK	50	24	21.58	21.92	22.06
20	QPSK	50	50	21.57	21.83	22.04
20	QPSK	100	0	21.63	21.82	22.03
20	16QAM	1	0	21.62	21.88	21.92
20	16QAM	1	49	21.58	21.74	21.85
20	16QAM	1	99	21.54	21.83	21.96
20	16QAM	50	0	20.65	20.93	21.03
20	16QAM	50	24	20.63	20.97	21.06
20	16QAM	50	50	20.60	20.84	21.07
20	16QAM	100	0	20.64	20.89	21.08
20	64QAM	1	0	20.64	20.93	21.00
20	64QAM	1	49	20.57	20.79	20.92
20	64QAM	1	99	20.59	20.81	20.97
20	64QAM	50	0	19.67	19.98	20.07
20	64QAM	50	24	19.68	19.99	20.00
20	64QAM	50	50	19.65	19.87	20.08
20	64QAM	100	0	19.62	19.88	20.05
20	256QAM	1	0	17.53	17.72	17.63
20	256QAM	1	49	17.40	17.55	17.56
20	256QAM	1	99	17.37	17.52	17.58



20	256QAM	50	0	17.82	17.94	17.94
20	256QAM	50	24	17.78	17.87	17.96
20	256QAM	50	50	17.67	17.85	17.86
20	256QAM	100	0	17.74	17.78	17.90

Channel				55315	55990	56665
Frequency (MHz)				3557.5	3625	3692.5
15	QPSK	1	0	22.53	22.80	22.93
15	QPSK	1	37	22.54	22.70	22.86
15	QPSK	1	74	22.53	22.73	22.90
15	QPSK	36	0	21.61	21.90	21.92
15	QPSK	36	20	21.57	21.87	21.99
15	QPSK	36	39	21.51	21.76	21.98
15	QPSK	75	0	21.62	21.78	22.02
15	16QAM	1	0	21.59	21.85	21.92
15	16QAM	1	37	21.55	21.68	21.78
15	16QAM	1	74	21.50	21.75	21.93
15	16QAM	36	0	20.65	20.93	20.97
15	16QAM	36	20	20.59	20.92	21.01
15	16QAM	36	39	20.60	20.86	21.01
15	16QAM	75	0	20.61	20.86	21.10
15	64QAM	1	0	20.57	20.89	20.94
15	64QAM	1	37	20.53	20.81	20.91
15	64QAM	1	74	20.53	20.78	20.99
15	64QAM	36	0	19.62	19.90	20.07
15	64QAM	36	20	19.68	19.97	20.02
15	64QAM	36	39	19.61	19.88	20.08
15	64QAM	75	0	19.54	19.90	19.97
15	256QAM	1	0	17.61	17.75	17.60
15	256QAM	1	37	17.50	17.49	17.47
15	256QAM	1	74	17.42	17.54	17.54
15	256QAM	36	0	17.84	17.99	17.89
15	256QAM	36	20	17.86	17.90	17.87
15	256QAM	36	39	17.57	17.89	17.92
15	256QAM	75	0	17.83	17.68	17.94



Channel				55290	55990	56690
Frequency (MHz)				3555	3625	3695
10	QPSK	1	0	22.57	22.88	22.89
10	QPSK	1	25	22.52	22.69	22.87
10	QPSK	1	49	22.47	22.73	22.93
10	QPSK	25	0	21.62	21.89	21.95
10	QPSK	25	12	21.56	21.85	22.05
10	QPSK	25	25	21.58	21.75	21.99
10	QPSK	50	0	21.61	21.77	21.97
10	16QAM	1	0	21.55	21.84	21.94
10	16QAM	1	25	21.59	21.75	21.81
10	16QAM	1	49	21.54	21.75	21.95
10	16QAM	25	0	20.60	20.85	21.00
10	16QAM	25	12	20.58	20.89	21.00
10	16QAM	25	25	20.56	20.77	21.06
10	16QAM	50	0	20.59	20.82	21.05
10	64QAM	1	0	20.65	20.90	20.92
10	64QAM	1	25	20.57	20.79	20.86
10	64QAM	1	49	20.59	20.79	20.99
10	64QAM	25	0	19.59	19.96	19.99
10	64QAM	25	12	19.67	19.95	20.01
10	64QAM	25	25	19.66	19.85	20.09
10	64QAM	50	0	19.58	19.81	20.07
10	256QAM	1	0	17.46	17.82	17.59
10	256QAM	1	25	17.36	17.49	17.65
10	256QAM	1	49	17.33	17.52	17.61
10	256QAM	25	0	17.73	17.90	17.90
10	256QAM	25	12	17.84	17.77	18.01
10	256QAM	25	25	17.77	17.82	17.96
10	256QAM	50	0	17.69	17.86	17.90



Channel				55265	55990	56715
Frequency (MHz)				3552.5	3625	3697.5
5	QPSK	1	0	22.54	22.87	22.89
5	QPSK	1	12	22.45	22.75	22.80
5	QPSK	1	24	22.54	22.76	22.95
5	QPSK	12	0	21.62	21.90	21.98
5	QPSK	12	7	21.50	21.89	21.99
5	QPSK	12	13	21.55	21.82	22.00
5	QPSK	25	0	21.61	21.79	21.98
5	16QAM	1	0	21.63	21.90	21.92
5	16QAM	1	12	21.60	21.67	21.80
5	16QAM	1	24	21.53	21.84	21.96
5	16QAM	12	0	20.67	20.89	20.99
5	16QAM	12	7	20.65	20.98	21.06
5	16QAM	12	13	20.57	20.84	20.99
5	16QAM	25	0	20.65	20.90	21.00
5	64QAM	1	0	20.61	20.92	21.00
5	64QAM	1	12	20.51	20.78	20.89
5	64QAM	1	24	20.61	20.77	20.91
5	64QAM	12	0	19.68	19.99	20.04
5	64QAM	12	7	19.66	19.99	19.92
5	64QAM	12	13	19.64	19.82	20.01
5	64QAM	25	0	19.63	19.88	20.07
5	256QAM	1	0	17.57	17.63	17.54
5	256QAM	1	12	17.45	17.54	17.61
5	256QAM	1	24	17.36	17.62	17.55
5	256QAM	12	0	17.74	18.03	18.01
5	256QAM	12	7	17.87	17.97	17.88
5	256QAM	12	13	17.65	17.82	17.83
5	256QAM	25	0	17.65	17.88	17.92



CA_48C									
Combination 20MHz+20MHz (100RB+100RB)									
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	-	Measured Power (dBm)
			RB Size	RB offset	RB Size	RB offset			
55340	55538	QPSK	100	0	100	0	200		18.79
			1	0	1	99	2		5.81
			1	99	1	0	2		5.60
		16QAM	100	0	100	0	200		18.80
			1	0	1	99	2		5.99
			1	99	1	0	2		5.74
		64QAM	100	0	100	0	200		18.77
			1	0	1	99	2		5.77
			1	99	1	0	2		5.59
55891	56089	QPSK	100	0	100	0	200	-	18.99
			1	0	1	99	2		5.96
			1	99	1	0	2		5.81
		16QAM	100	0	100	0	200		18.93
			1	0	1	99	2		6.12
			1	99	1	0	2		5.91
		64QAM	100	0	100	0	200		18.95
			1	0	1	99	2		5.88
			1	99	1	0	2		5.77
56442	56640	QPSK	100	0	100	0	200		18.90
			1	0	1	99	2		5.98
			1	99	1	0	2		5.78
		16QAM	100	0	100	0	200		18.97
			1	0	1	99	2		6.10
			1	99	1	0	2		5.90
		64QAM	100	0	100	0	200		18.96
			1	0	1	99	2		6.13
			1	99	1	0	2		5.89



CA_48C									
Combination 20MHz+15MHz (100RB+75RB)									
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	-	Measured Power (dBm)
			RB Size	RB offset	RB Size	RB offset			
55340	55511	QPSK	100	0	75	0	175		17.99
			1	0	1	74	2		5.81
			1	99	1	0	2		6.65
		16QAM	100	0	75	0	175		18.05
			1	0	1	74	2		5.96
			1	99	1	0	2		5.77
		64QAM	100	0	75	0	175		18.03
			1	0	1	74	2		5.84
			1	99	1	0	2		5.64
55916	56087	QPSK	100	0	75	0	175		18.17
			1	0	1	74	2		5.98
			1	99	1	0	2		5.85
		16QAM	100	0	75	0	175		18.23
			1	0	1	74	2		6.13
			1	99	1	0	2		6.06
		64QAM	100	0	75	0	175		18.17
			1	0	1	74	2		5.92
			1	99	1	0	2		5.84
56491	56662	QPSK	100	0	75	0	175		18.80
			1	0	1	74	2		5.95
			1	99	1	0	2		5.83
		16QAM	100	0	75	0	175		18.21
			1	0	1	74	2		6.14
			1	99	1	0	2		5.82
		64QAM	100	0	75	0	175		18.17
			1	0	1	74	2		5.95
			1	99	1	0	2		5.82



Combination 15MHz+20MHz (75RB+100RB)									
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	-	Measured
			RB Size	RB offset	RB Size	RB offset			Power (dBm)
55318	55489	QPSK	75	0	100	0	175		18.03
			1	0	1	99	2		5.90
			1	74	1	0	2		6.59
		16QAM	75	0	100	0	175		18.08
			1	0	1	99	2		6.01
			1	74	1	0	2		5.73
		64QAM	75	0	100	0	175		18.03
			1	0	1	99	2		5.87
			1	74	1	0	2		5.57
55893	56064	QPSK	75	0	100	0	175		18.09
			1	0	1	99	2		5.95
			1	74	1	0	2		5.82
		16QAM	75	0	100	0	175		18.24
			1	0	1	99	2		6.04
			1	74	1	0	2		6.10
		64QAM	75	0	100	0	175		18.12
			1	0	1	99	2		5.95
			1	74	1	0	2		5.89
56469	56640	QPSK	75	0	100	0	175		18.87
			1	0	1	99	2		5.88
			1	74	1	0	2		5.81
		16QAM	75	0	100	0	175		18.17
			1	0	1	99	2		6.22
			1	74	1	0	2		5.76
		64QAM	75	0	100	0	175		18.22
			1	0	1	99	2		6.03
			1	74	1	0	2		5.75



Combination 20MHz+10MHz (100RB+50RB)									
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	-	Measured
			RB Size	RB offset	RB Size	RB offset			Power (dBm)
55340	55484	QPSK	100	0	50	0	150		17.98
			1	0	1	49	2		5.71
			1	99	1	0	2		6.58
		16QAM	100	0	50	0	150		17.99
			1	0	1	49	2		5.97
			1	99	1	0	2		5.85
		64QAM	100	0	50	0	150		18.10
			1	0	1	49	2		5.91
			1	99	1	0	2		5.66
55941	56085	QPSK	100	0	50	0	150		18.15
			1	0	1	49	2		5.92
			1	99	1	0	2		5.82
		16QAM	100	0	50	0	150		18.25
			1	0	1	49	2		6.05
			1	99	1	0	2		5.99
		64QAM	100	0	50	0	150		18.09
			1	0	1	49	2		5.83
			1	99	1	0	2		5.93
56541	56685	QPSK	100	0	50	0	150		18.83
			1	0	1	49	2		5.92
			1	99	1	0	2		5.88
		16QAM	100	0	50	0	150		18.23
			1	0	1	49	2		6.19
			1	99	1	0	2		5.82
		64QAM	100	0	50	0	150		18.15
			1	0	1	49	2		5.86
			1	99	1	0	2		5.87



Combination 10MHz+20MHz (50RB+100RB)									
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	-	Measured
			RB Size	RB offset	RB Size	RB offset			Power (dBm)
55295	55439	QPSK	50	0	100	0	150	-	18.00
			1	0	1	99	2		5.87
			1	49	1	0	2		6.65
		16QAM	50	0	100	0	150		17.95
			1	0	1	99	2		5.91
			1	49	1	0	2		5.81
		64QAM	50	0	100	0	150		17.99
			1	0	1	99	2		5.87
			1	49	1	0	2		5.71
55896	56040	QPSK	50	0	100	0	150	-	18.23
			1	0	1	99	2		6.05
			1	49	1	0	2		5.87
		16QAM	50	0	100	0	150		18.20
			1	0	1	99	2		6.11
			1	49	1	0	2		6.01
		64QAM	50	0	100	0	150		18.24
			1	0	1	99	2		5.93
			1	49	1	0	2		5.79
56496	56640	QPSK	50	0	100	0	150	-	18.81
			1	0	1	99	2		5.92
			1	49	1	0	2		5.87
		16QAM	50	0	100	0	150		18.23
			1	0	1	99	2		6.20
			1	49	1	0	2		5.89
		64QAM	50	0	100	0	150		18.19
			1	0	1	99	2		5.96
			1	49	1	0	2		5.85



Combination 20MHz+5MHz (100RB+25RB)									
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	-	Measured
			RB Size	RB offset	RB Size	RB offset			Power (dBm)
55340	55457	QPSK	100	0	25	0	125		17.97
			1	0	1	24	2		5.73
			1	99	1	0	2		6.62
		16QAM	100	0	25	0	125		18.01
			1	0	1	24	2		5.92
			1	99	1	0	2		5.82
		64QAM	100	0	25	0	125		18.11
			1	0	1	24	2		5.94
			1	99	1	0	2		5.67
55965	56082	QPSK	100	0	25	0	125		18.20
			1	0	1	24	2		5.88
			1	99	1	0	2		5.91
		16QAM	100	0	25	0	125		18.24
			1	0	1	24	2		6.07
			1	99	1	0	2		6.11
		64QAM	100	0	25	0	125		18.26
			1	0	1	24	2		5.91
			1	99	1	0	2		5.75
56590	56707	QPSK	100	0	25	0	125		18.82
			1	0	1	24	2		5.85
			1	99	1	0	2		5.79
		16QAM	100	0	25	0	125		18.29
			1	0	1	24	2		6.04
			1	99	1	0	2		5.81
		64QAM	100	0	25	0	125		18.13
			1	0	1	24	2		5.94
			1	99	1	0	2		5.80



Combination 5MHz+20MHz (25RB+100RB)									
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	-	Measured Power (dBm)
			RB Size	RB offset	RB Size	RB offset			
55273	55390	QPSK	25	0	100	0	125		17.98
			1	0	1	99	2		5.80
			1	24	1	0	2		6.68
		16QAM	25	0	100	0	125		17.97
			1	0	1	99	2		5.98
			1	24	1	0	2		5.81
		64QAM	25	0	100	0	125		17.94
			1	0	1	99	2		5.81
			1	24	1	0	2		5.55
55898	56015	QPSK	25	0	100	0	125		18.23
			1	0	1	99	2		6.04
			1	24	1	0	2		5.81
		16QAM	25	0	100	0	125		18.28
			1	0	1	99	2		6.22
			1	24	1	0	2		6.10
		64QAM	25	0	100	0	125		18.08
			1	0	1	99	2		5.99
			1	24	1	0	2		5.84
56523	56640	QPSK	25	0	100	0	125		18.88
			1	0	1	99	2		5.91
			1	24	1	0	2		5.80
		16QAM	25	0	100	0	125		18.18
			1	0	1	99	2		6.22
			1	24	1	0	2		5.78
		64QAM	25	0	100	0	125		18.11
			1	0	1	99	2		5.93
			1	24	1	0	2		5.90

EIRP

LTE Band 48 (GT - LC = -3.00 dB) QPSK									
Bandwidth	5M			10M			15M		
Channel	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Conducted Power (dBm)	22.54	22.76	22.95	22.47	22.73	22.93	22.53	22.80	22.93
Conducted Power (Watts)	0.1794	0.1888	0.1972	0.1766	0.1875	0.1963	0.1790	0.1905	0.1963
EIRP(dBm)	19.54	19.76	19.95	19.47	19.73	19.93	19.53	19.80	19.93
EIRP(Watts)	0.0899	0.0946	0.0988	0.0885	0.0940	0.0984	0.0897	0.0955	0.0984

LTE Band 48 (GT - LC = -3.00 dB) QPSK			
Bandwidth	20M		
Channel	(Low)	(Mid)	(High)
Conducted Power (dBm)	22.56	22.87	22.96
Conducted Power (Watts)	0.1803	0.1936	0.1977
EIRP(dBm)	19.56	19.87	19.96
EIRP(Watts)	0.0904	0.0971	0.0991



LTE Band 48 (GT - LC = -3.00 dB) 16QAM									
Bandwidth	5M			10M			15M		
Channel	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Conducted Power (dBm)	21.53	21.84	21.96	21.54	21.75	21.95	21.50	21.75	21.93
Conducted Power (Watts)	0.1422	0.1527	0.1570	0.1425	0.1496	0.1566	0.1412	0.1496	0.1559
EIRP(dBm)	18.53	18.84	18.96	18.54	18.75	18.95	18.50	18.75	18.93
EIRP(Watts)	0.0713	0.0765	0.0787	0.0714	0.0750	0.0785	0.0708	0.0750	0.0781

LTE Band 48 (GT - LC = -3.00 dB) 16QAM			
Bandwidth	20M		
Channel	(Low)	(Mid)	(High)
Conducted Power (dBm)	21.54	21.83	21.96
Conducted Power (Watts)	0.1426	0.1524	0.1570
EIRP(dBm)	18.54	18.83	18.96
EIRP(Watts)	0.0714	0.0764	0.0787



LTE Band 48 (GT - LC = -3.00 dB) 64QAM									
Bandwidth	5M			10M			15M		
Channel	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Conducted Power (dBm)	20.61	20.92	21.00	20.59	20.79	20.99	20.53	20.78	20.99
Conducted Power (Watts)	0.1151	0.1236	0.1259	0.1145	0.1199	0.1256	0.1130	0.1196	0.1256
EIRP(dBm)	17.61	17.92	18.00	17.59	17.79	17.99	17.53	17.78	17.99
EIRP(Watts)	0.0577	0.0619	0.0631	0.0574	0.0601	0.0629	0.0566	0.0600	0.0629

LTE Band 48 (GT - LC = -3.00 dB) 64QAM			
Bandwidth	20M		
Channel	(Low)	(Mid)	(High)
Conducted Power (dBm)	20.64	20.93	21.00
Conducted Power (Watts)	0.1159	0.1239	0.1259
EIRP(dBm)	17.64	17.93	18.00
EIRP(Watts)	0.0581	0.0621	0.0631

LTE Band 48 CA (GT - LC = -3.00 dB) QPSK						
Bandwidth	5M + 20M			20M + 5M		
Channel PCC	55273	55898	55273	55898	55273	55898
	(Low)	(Mid)	(Low)	(Mid)	(Low)	(Mid)
Channel SCC	55390	56015	55390	56015	55390	56015
	(Low)	(Mid)	(Low)	(Mid)	(Low)	(Mid)
Conducted Power (dBm)	17.98	18.23	18.88	17.97	18.20	18.82
Conducted Power (Watts)	0.0628	0.0665	0.0773	0.0627	0.0661	0.0762
EIRP(dBm)	14.98	15.23	15.88	14.97	15.20	15.82
EIRP(Watts)	0.0315	0.0333	0.0387	0.0314	0.0331	0.0382

LTE Band 48 CA (GT - LC = -3.00 dB) QPSK									
Bandwidth	10M + 20M			20M + 10M			15M + 20M		
Channel PCC	55295	55896	56496	55340	55941	56541	55318	55893	56469
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Channel SCC	55439	56040	56640	55484	56085	56685	55489	56064	56640
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Conducted Power (dBm)	18.00	18.23	18.81	17.98	18.15	18.83	18.03	18.09	18.87
Conducted Power (Watts)	0.0631	0.0665	0.0760	0.0628	0.0653	0.0764	0.0635	0.0644	0.0771
EIRP(dBm)	15.00	15.23	15.81	14.98	15.15	15.83	15.03	15.09	15.87
EIRP(Watts)	0.0316	0.0333	0.0381	0.0315	0.0327	0.0383	0.0318	0.0323	0.0386

LTE Band 48 CA (GT - LC = -3.00 dB) QPSK						
Bandwidth	20M+15M			20M+20M		
Channel PCC	55340	55916	56491	55340	55891	56442
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Channel SCC	55511	56087	56662	55538	56089	56640
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Conducted Power (dBm)	17.99	18.17	18.90	18.79	18.99	18.90
Conducted Power (Watts)	0.0630	0.0656	0.0776	0.0757	0.0793	0.0776
EIRP(dBm)	14.99	15.17	15.90	15.79	15.99	15.90
EIRP(Watts)	0.0316	0.0329	0.0389	0.0379	0.0397	0.0389

LTE Band 48 CA (GT - LC = -3.00 dB) 16QAM						
Bandwidth	5M + 20M			20M + 5M		
Channel PCC	55273	55898	55273	55898	55273	55898
	(Low)	(Mid)	(Low)	(Mid)	(Low)	(Mid)
Channel SCC	55390	56015	55390	56015	55390	56015
	(Low)	(Mid)	(Low)	(Mid)	(Low)	(Mid)
Conducted Power (dBm)	17.97	18.28	18.18	18.01	18.24	18.29
Conducted Power (Watts)	0.0627	0.0673	0.0658	0.0632	0.0667	0.0675
EIRP(dBm)	14.97	15.28	15.18	15.01	15.24	15.29
EIRP(Watts)	0.0314	0.0337	0.0330	0.0317	0.0334	0.0338

LTE Band 48 CA (GT - LC = -3.00 dB) 16QAM									
Bandwidth	10M + 20M			20M + 10M			15M + 20M		
Channel PCC	55295	55896	56496	55340	55941	56541	55318	55893	56469
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Channel SCC	55439	56040	56640	55484	56085	56685	55489	56064	56640
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Conducted Power (dBm)	17.95	18.20	18.23	17.99	18.25	18.23	18.08	18.24	18.17
Conducted Power (Watts)	0.0624	0.0661	0.0665	0.0630	0.0668	0.0665	0.0643	0.0667	0.0656
EIRP(dBm)	14.95	15.20	15.23	14.99	15.25	15.23	15.08	15.24	15.17
EIRP(Watts)	0.0313	0.0331	0.0333	0.0316	0.0335	0.0333	0.0322	0.0334	0.0329

LTE Band 48 CA (GT - LC = -3.00 dB) 16QAM						
Bandwidth	20M+15M			20M+20M		
Channel PCC	55340	55916	56491	55340	55891	56442
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Channel SCC	55511	56087	56662	55538	56089	56640
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Conducted Power (dBm)	18.05	18.23	18.21	18.80	18.93	18.97
Conducted Power (Watts)	0.0638	0.0665	0.0662	0.0759	0.0782	0.0789
EIRP(dBm)	15.05	15.23	15.21	15.80	15.93	15.97
EIRP(Watts)	0.0320	0.0333	0.0332	0.0380	0.0392	0.0395

LTE Band 48 CA (GT - LC = -3.00 dB) 64QAM						
Bandwidth	5M + 20M			20M + 5M		
Channel PCC	55273	55898	55273	55898	55273	55898
	(Low)	(Mid)	(Low)	(Mid)	(Low)	(Mid)
Channel SCC	55390	56015	55390	56015	55390	56015
	(Low)	(Mid)	(Low)	(Mid)	(Low)	(Mid)
Conducted Power (dBm)	17.94	18.08	18.11	18.11	18.26	18.13
Conducted Power (Watts)	0.0622	0.0643	0.0647	0.0647	0.0670	0.0650
EIRP(dBm)	14.94	15.08	15.11	15.11	15.26	15.13
EIRP(Watts)	0.0312	0.0322	0.0324	0.0324	0.0336	0.0326

LTE Band 48 CA (GT - LC = -3.00 dB) 64QAM									
Bandwidth	10M + 20M			20M + 10M			15M + 20M		
Channel PCC	55295	55896	56496	55340	55941	56541	55318	55893	56469
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Channel SCC	55439	56040	56640	55484	56085	56685	55489	56064	56640
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Conducted Power (dBm)	17.99	18.24	18.19	18.10	18.09	18.15	18.03	18.12	18.22
Conducted Power (Watts)	0.0630	0.0667	0.0659	0.0646	0.0644	0.0653	0.0635	0.0649	0.0664
EIRP(dBm)	14.99	15.24	15.19	15.10	15.09	15.15	15.03	15.12	15.22
EIRP(Watts)	0.0316	0.0334	0.0330	0.0324	0.0323	0.0327	0.0318	0.0325	0.0333

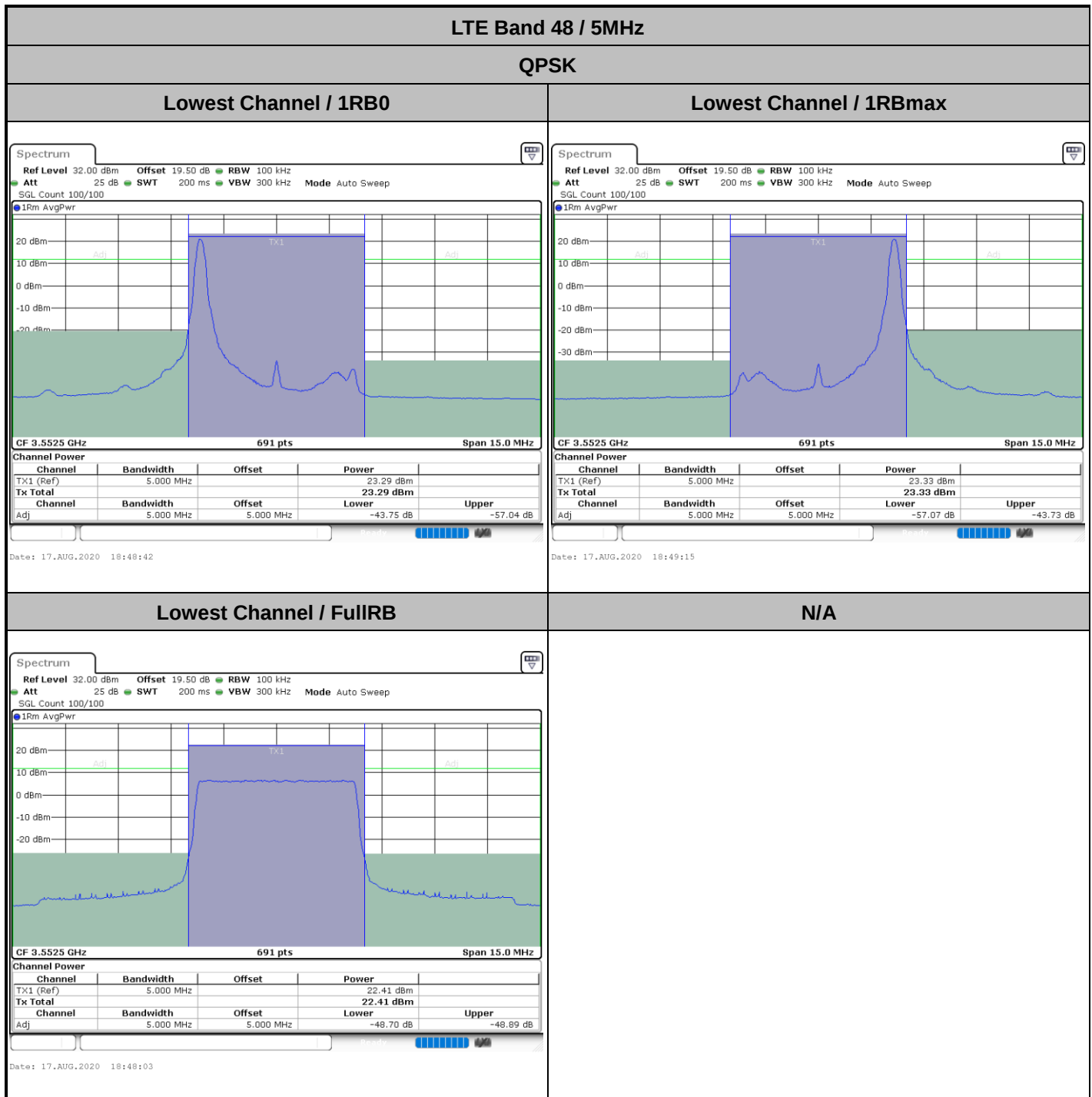
LTE Band 48 CA (GT - LC = -3.00 dB) 64QAM						
Bandwidth	20M+15M			20M+20M		
Channel PCC	55340	55916	56491	55340	55891	56442
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Channel SCC	55511	56087	56662	55538	56089	56640
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Conducted Power (dBm)	18.03	18.17	18.17	18.77	18.95	18.96
Conducted Power (Watts)	0.0635	0.0656	0.0656	0.0753	0.0785	0.0787
EIRP(dBm)	15.03	15.17	15.17	15.77	15.95	15.96
EIRP(Watts)	0.0318	0.0329	0.0329	0.0378	0.0394	0.0394



LTE Band 48

ACLR

The Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB

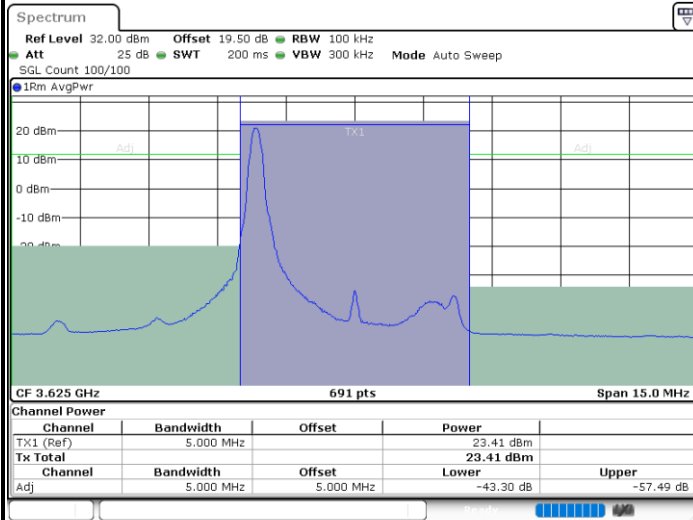




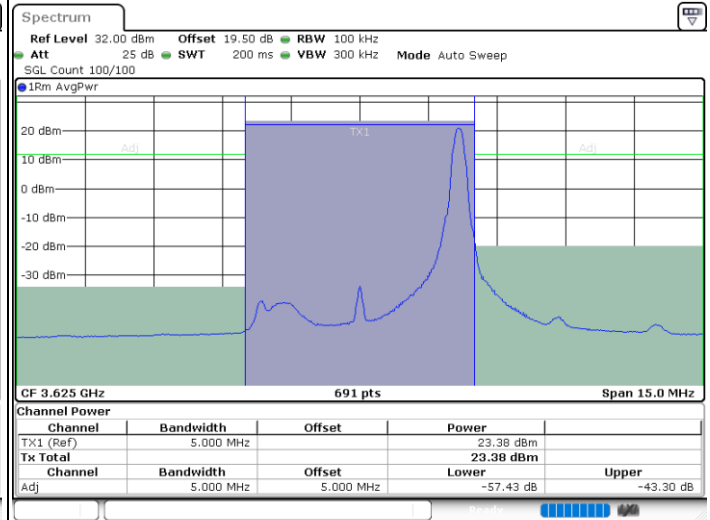
LTE Band 48 / 5MHz

QPSK

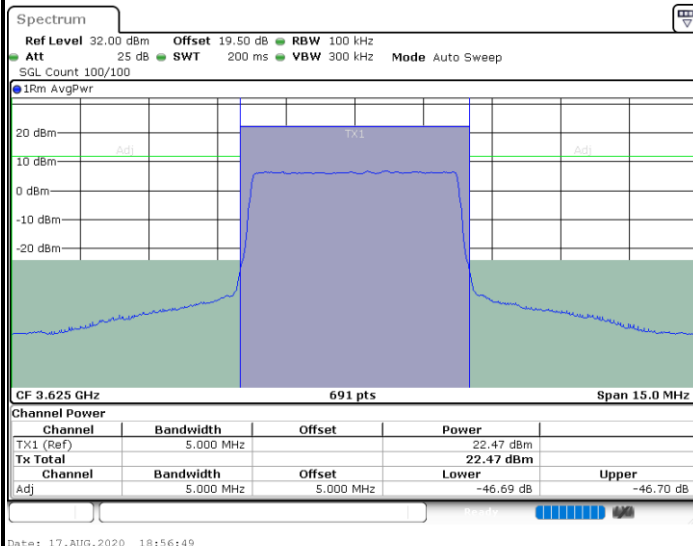
Middle Channel / 1RB0



Middle Channel / 1RBmax



Middle Channel / FullRB



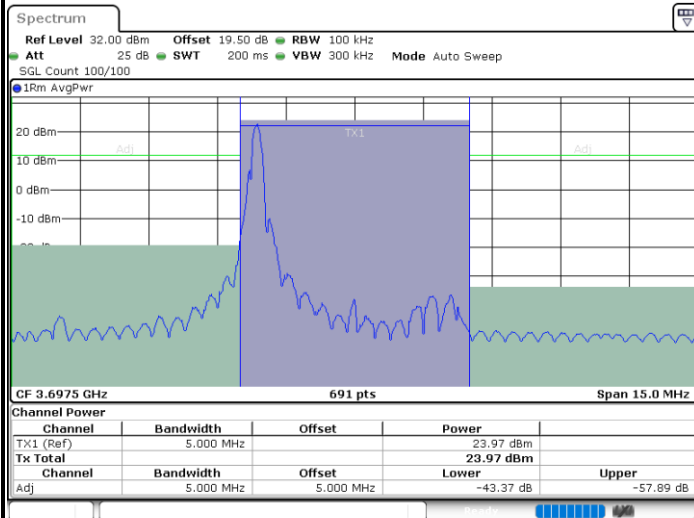
N/A



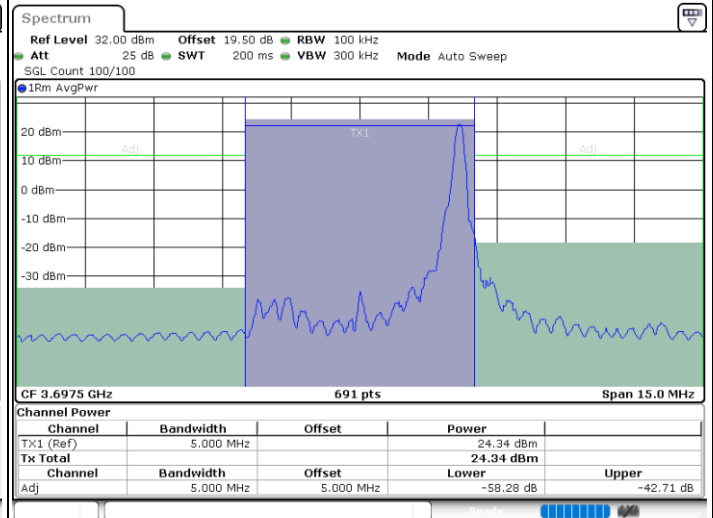
LTE Band 48 / 5MHz

QPSK

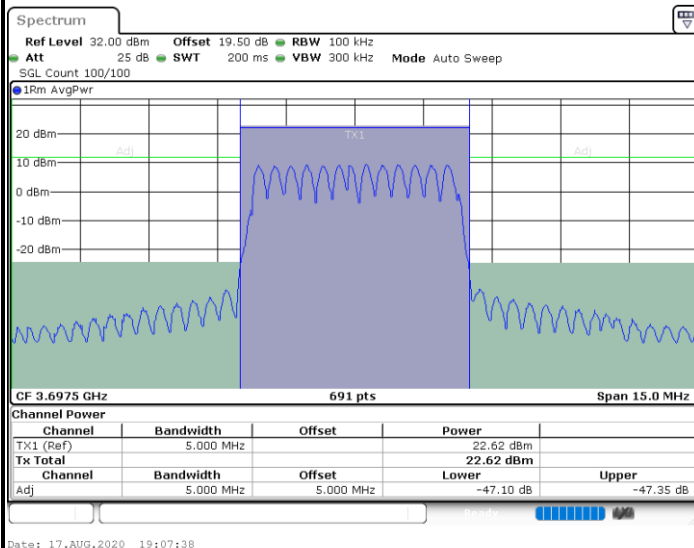
Highest Channel / 1RB0



Highest Channel / 1RBmax



Highest Channel / FullIRB



N/A

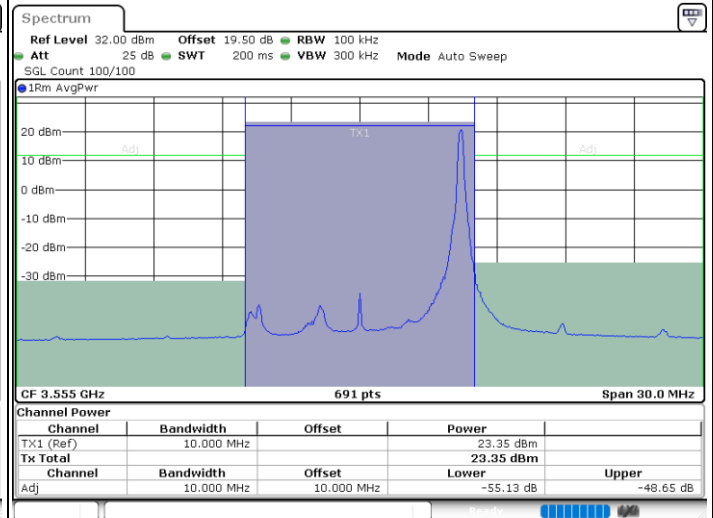
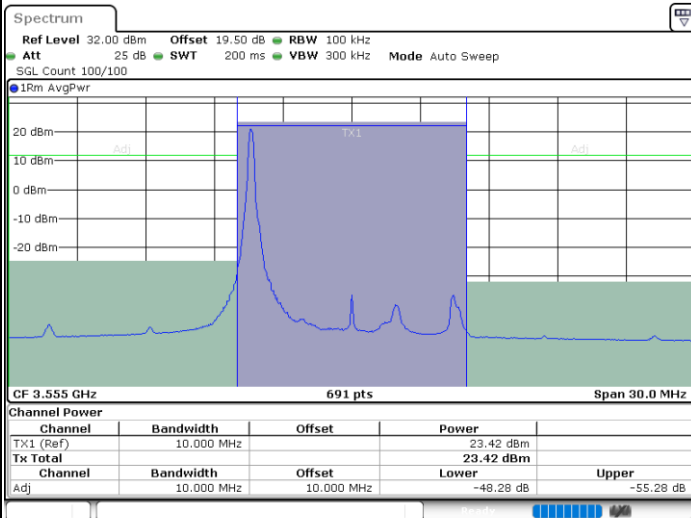


LTE Band 48 / 10MHz

QPSK

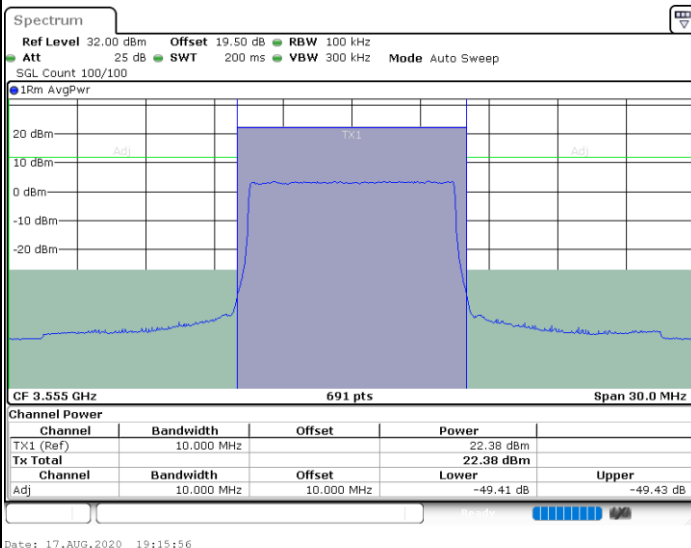
Lowest Channel / 1RB0

Lowest Channel / 1RBmax



Lowest Channel / FullIRB

N/A

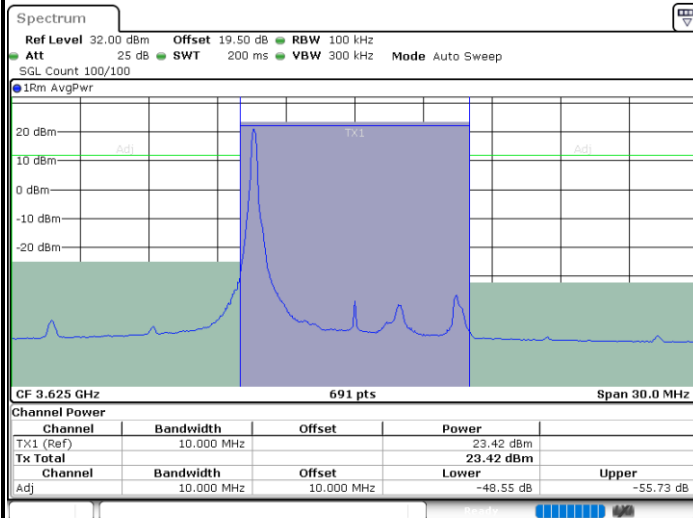




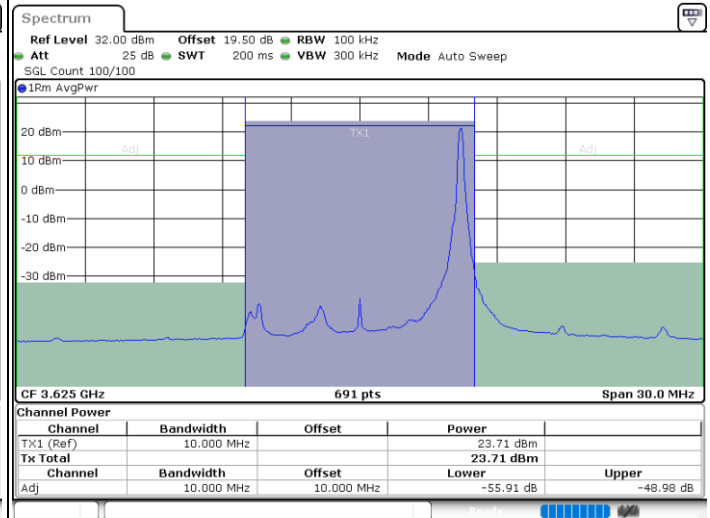
LTE Band 48 / 10MHz

QPSK

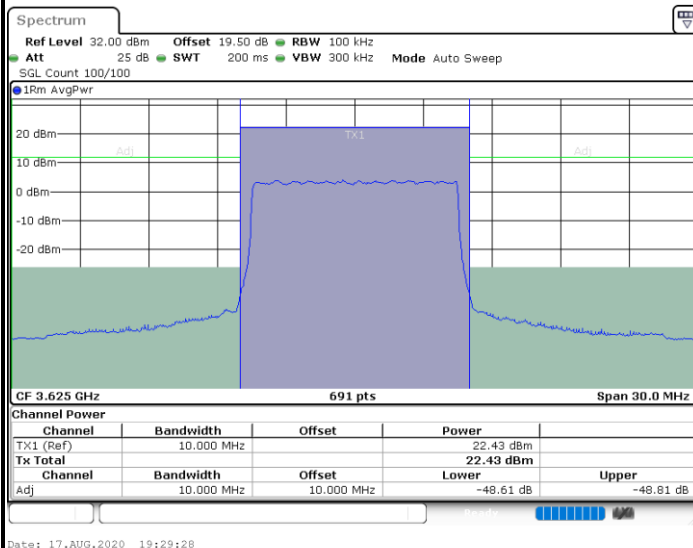
Middle Channel / 1RB0



Middle Channel / 1RBmax



Middle Channel / FullRB



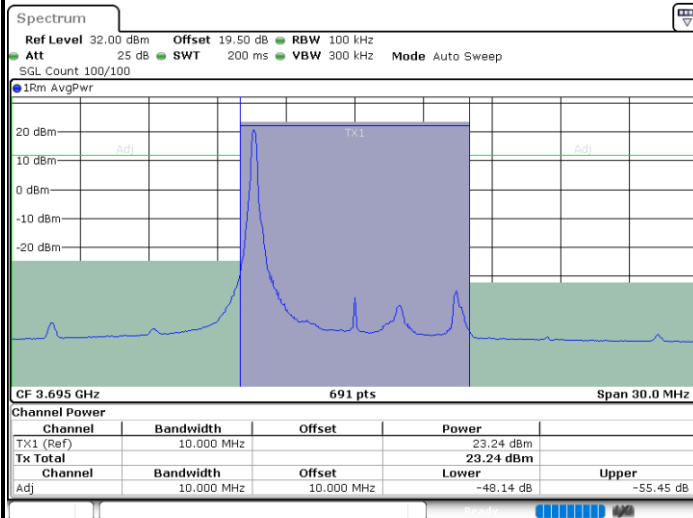
N/A



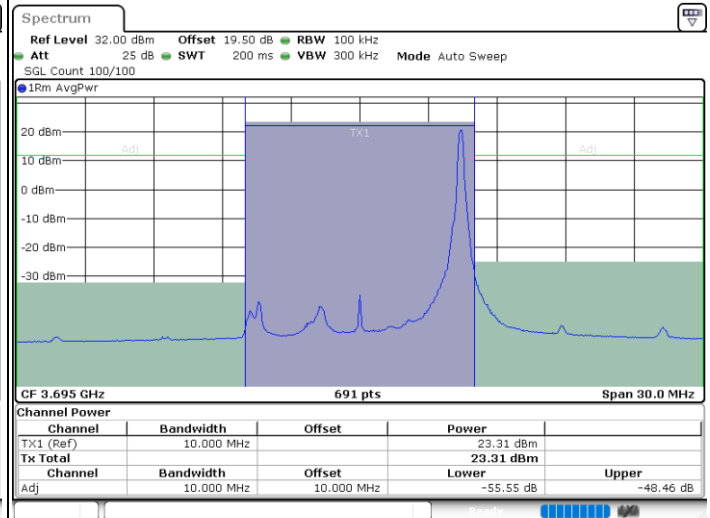
LTE Band 48 / 10MHz

QPSK

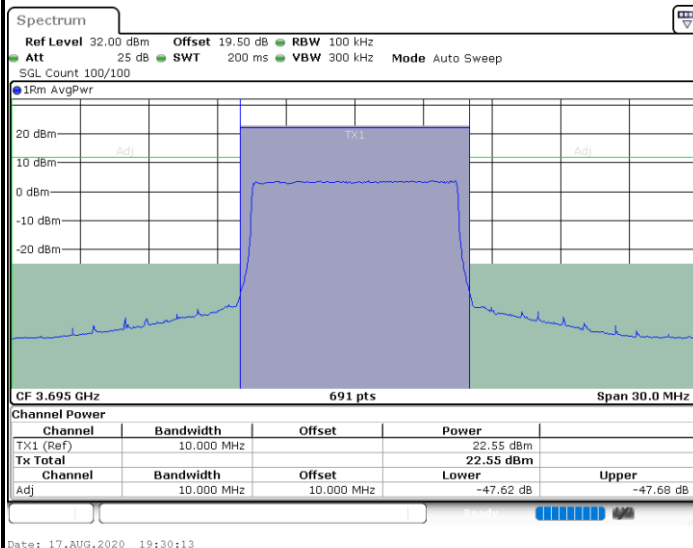
Highest Channel / 1RB0



Highest Channel / 1RBmax



Highest Channel / FullIRB



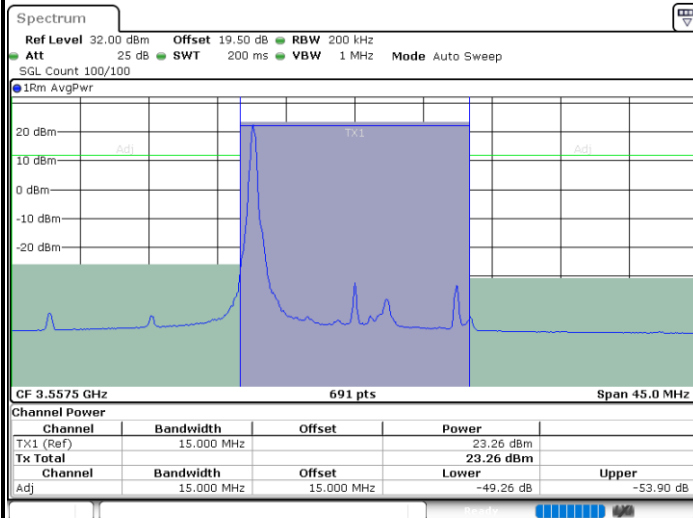
N/A



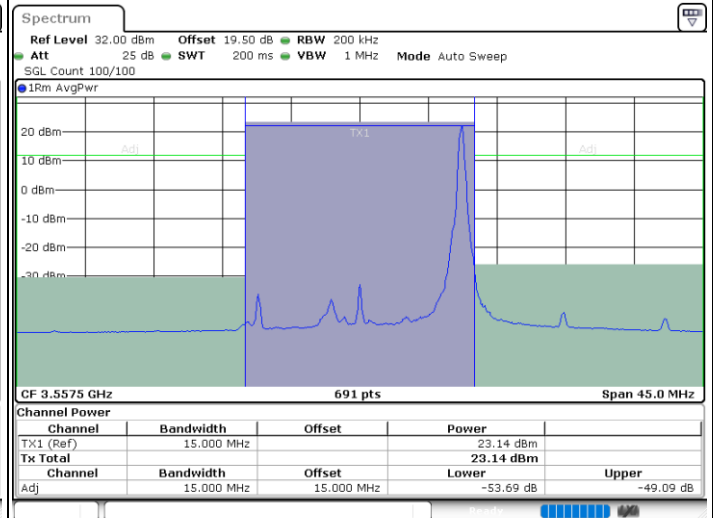
LTE Band 48 / 15MHz

QPSK

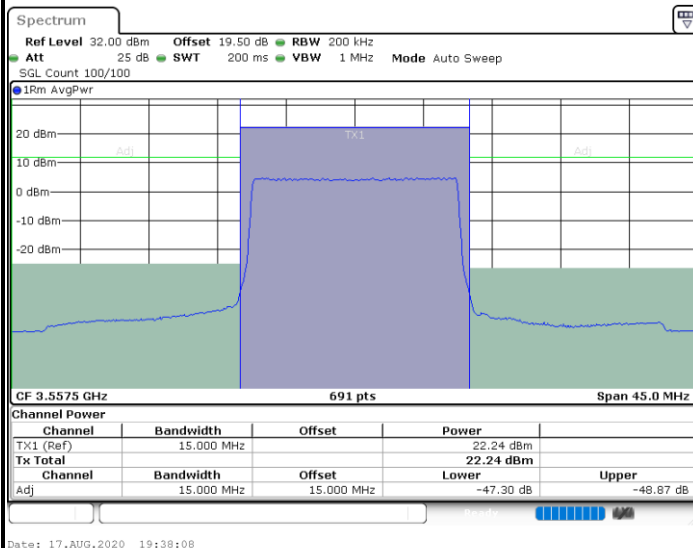
Lowest Channel / 1RB0



Lowest Channel / 1RBmax



Lowest Channel / FullIRB



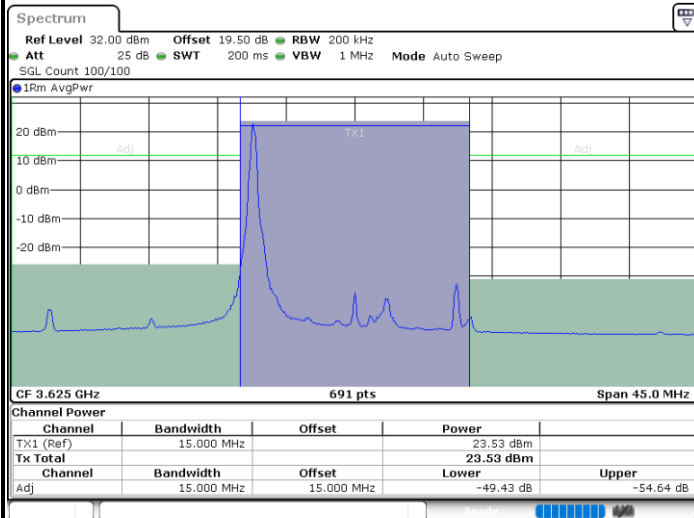
N/A



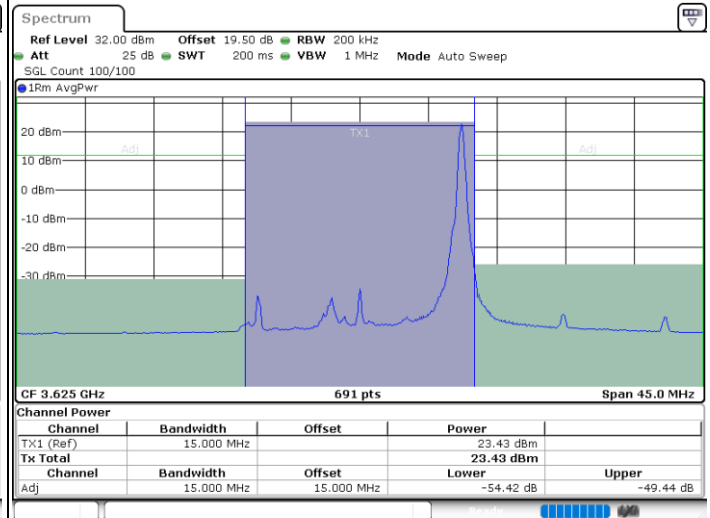
LTE Band 48 / 15MHz

QPSK

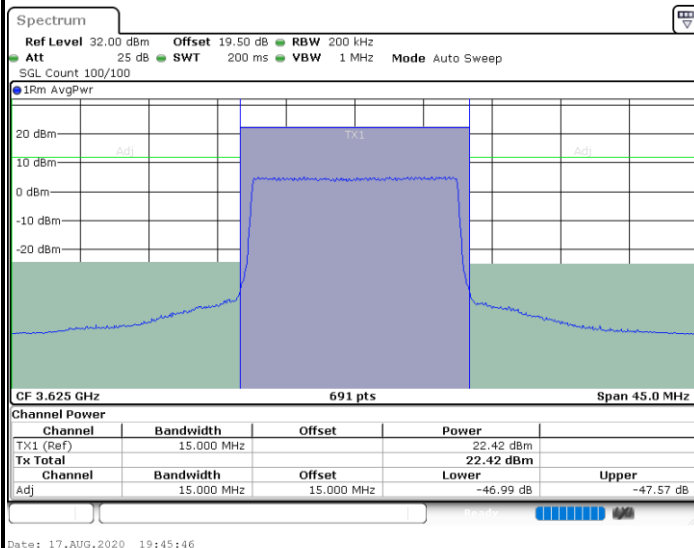
Middle Channel / 1RB0



Middle Channel / 1RBmax



Middle Channel / FullRB



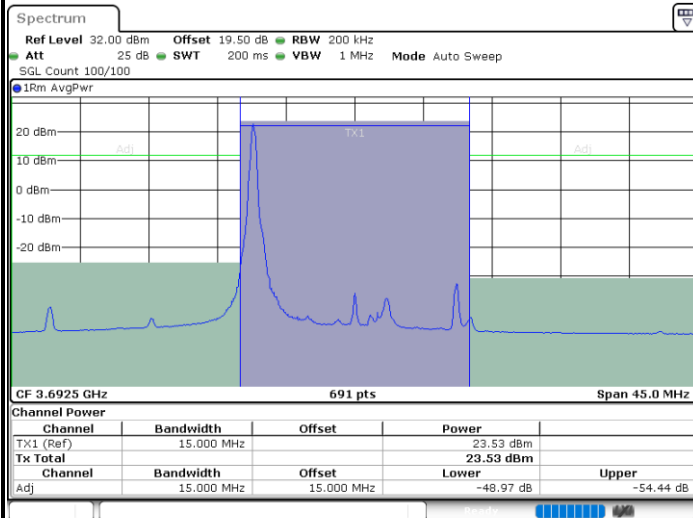
N/A



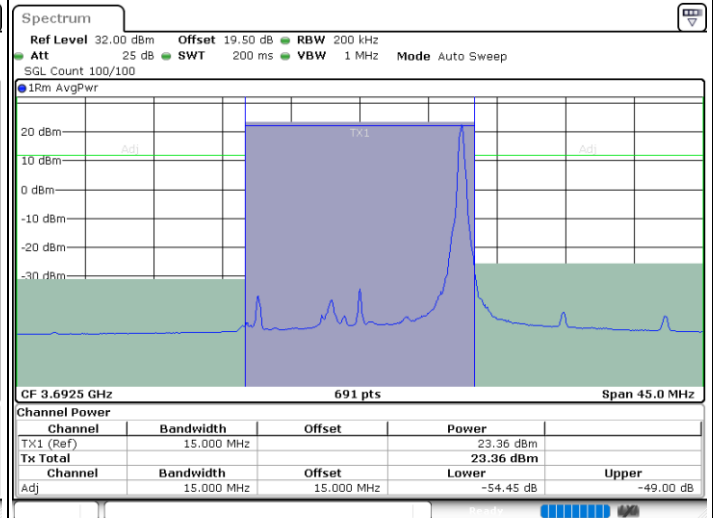
LTE Band 48 / 15MHz

QPSK

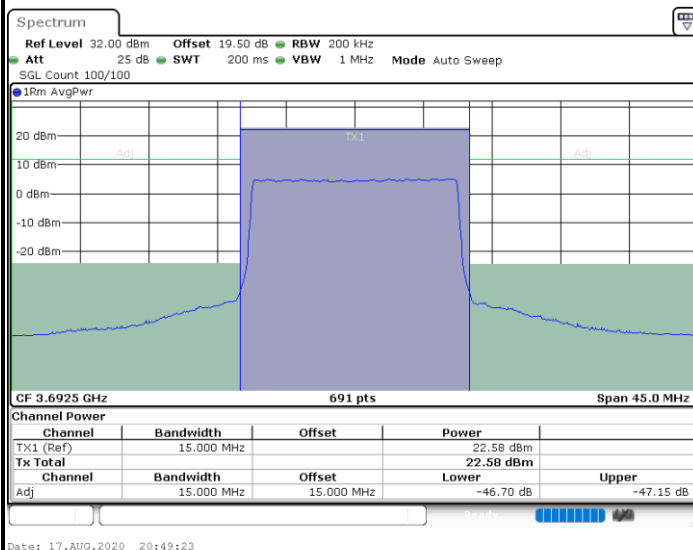
Highest Channel / 1RB0



Highest Channel / 1RBmax



Highest Channel / FullIRB



N/A

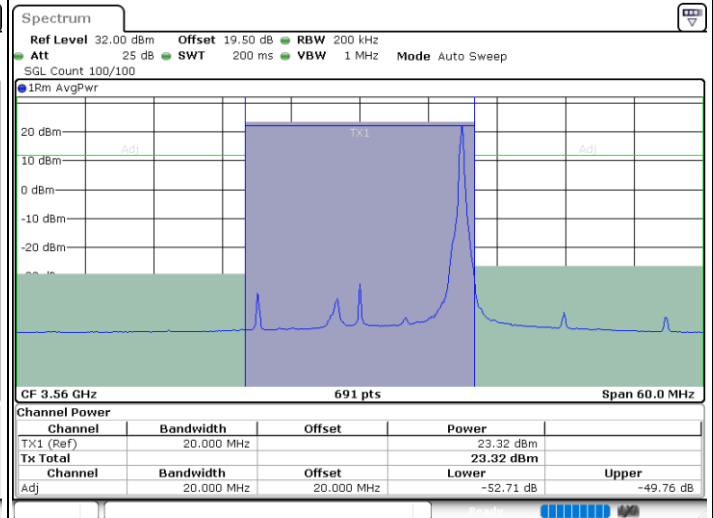
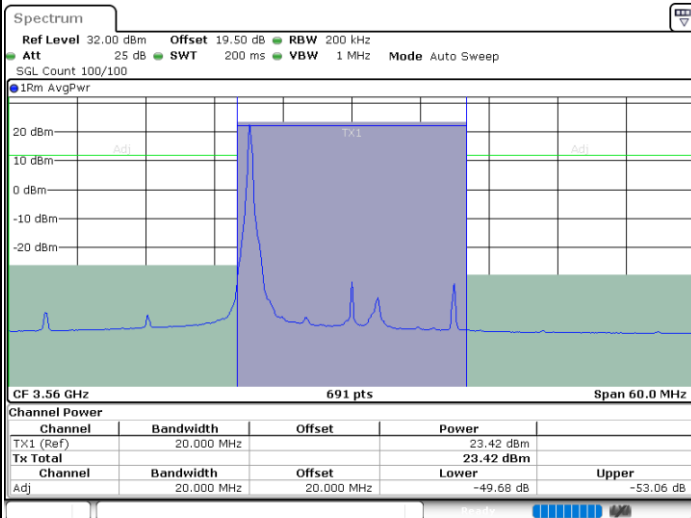


LTE Band 48 / 20MHz

QPSK

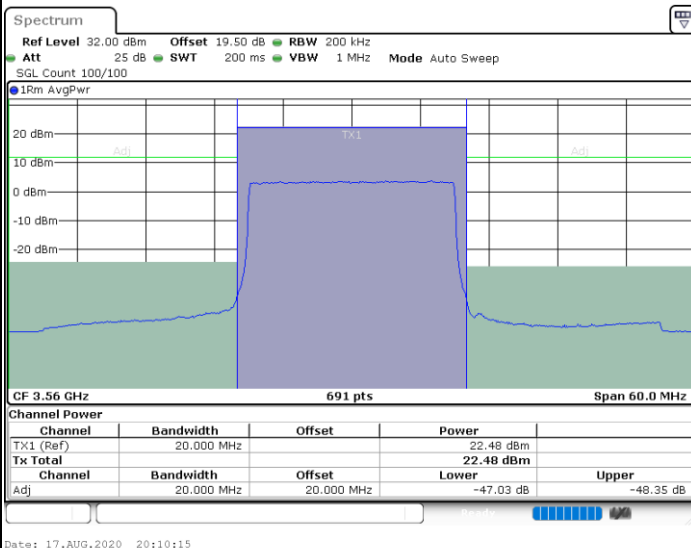
Lowest Channel / 1RB0

Lowest Channel / 1RBmax



Lowest Channel / FullIRB

N/A

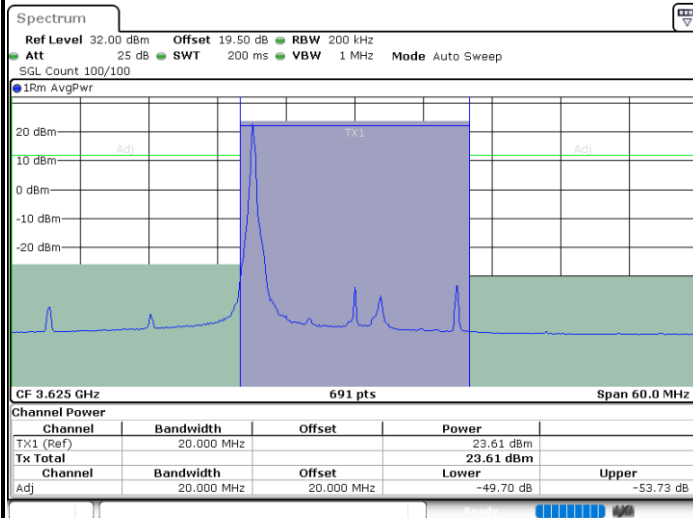




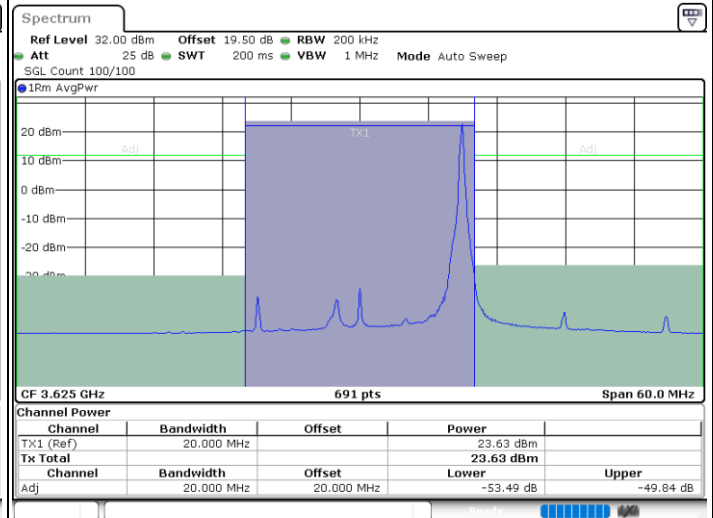
LTE Band 48 / 20MHz

QPSK

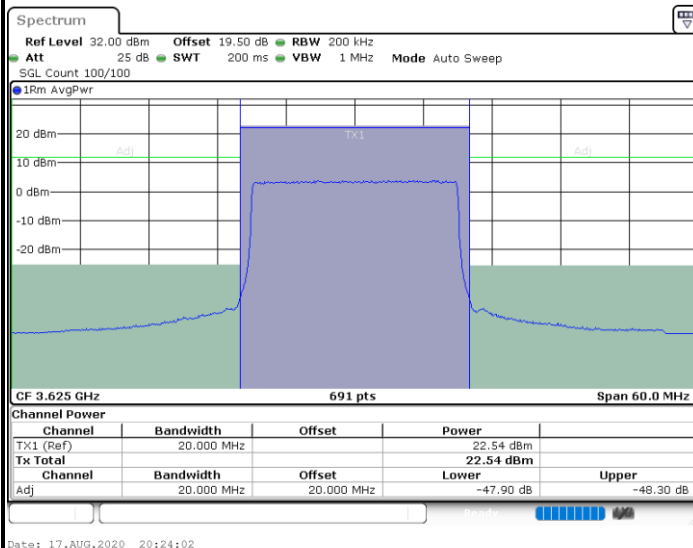
Middle Channel / 1RB0



Middle Channel / 1RBmax



Middle Channel / FullRB



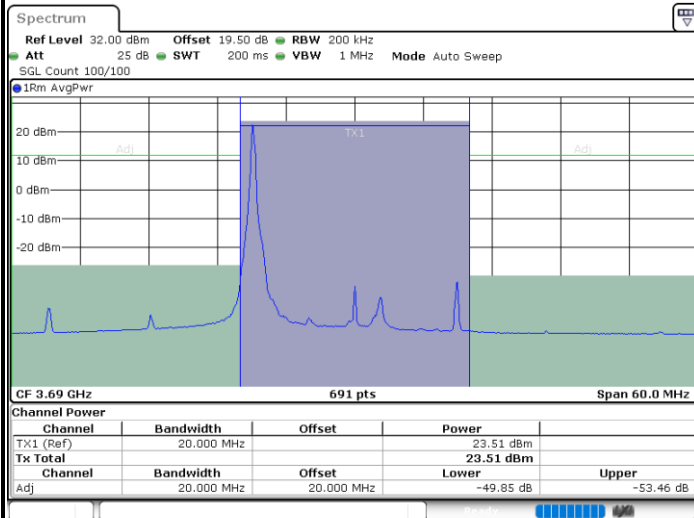
N/A



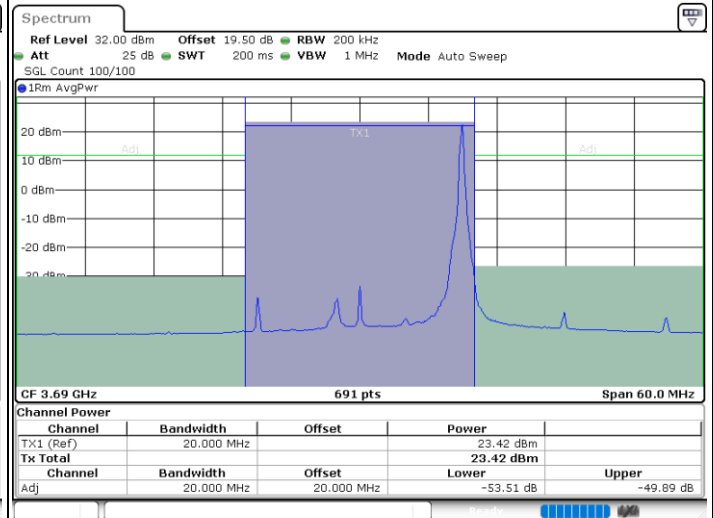
LTE Band 48 / 20MHz

QPSK

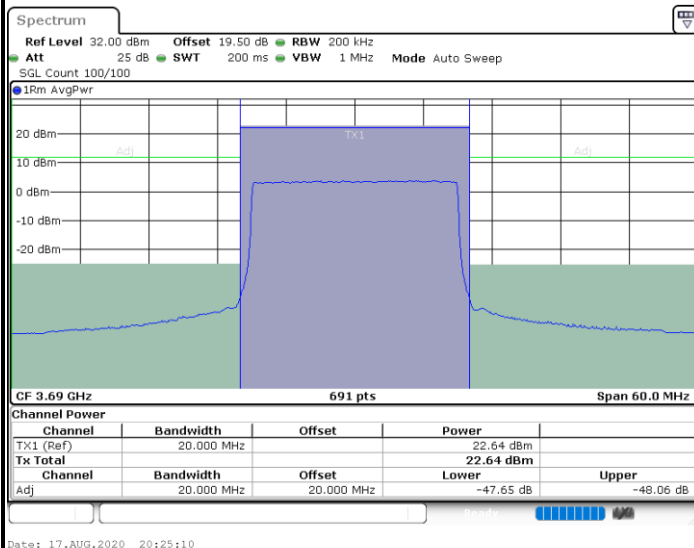
Highest Channel / 1RB0



Highest Channel / 1RBmax



Highest Channel / FullIRB



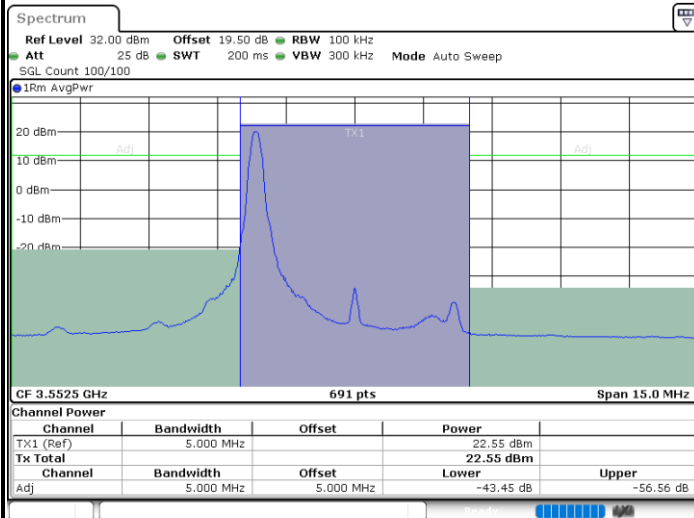
N/A



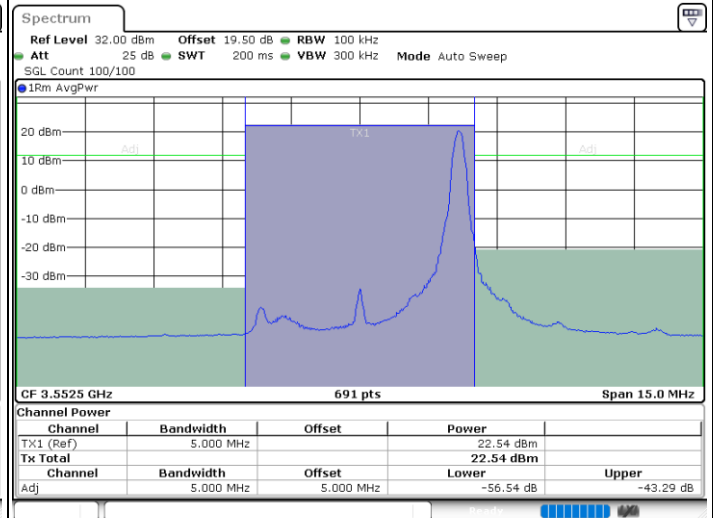
LTE Band 48 / 5MHz

16QAM

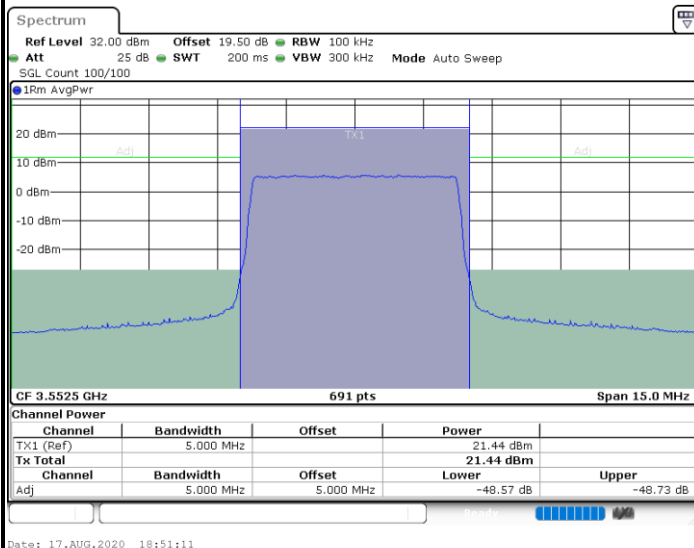
Lowest Channel / 1RB0



Lowest Channel / 1RBmax



Lowest Channel / FullRB



N/A

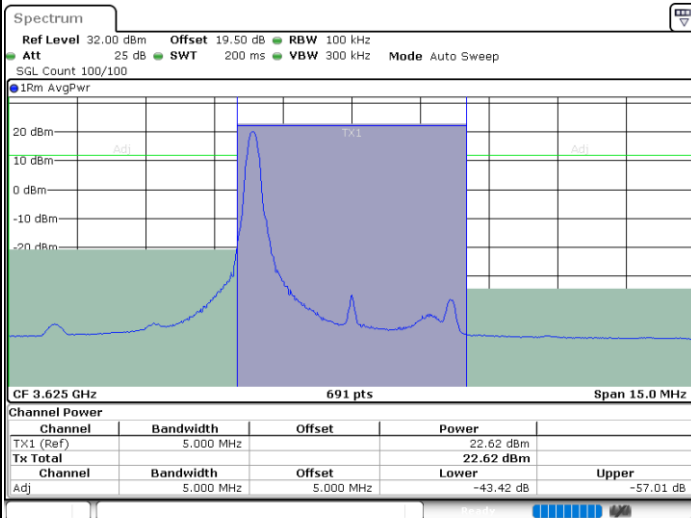


LTE Band 48 / 5MHz

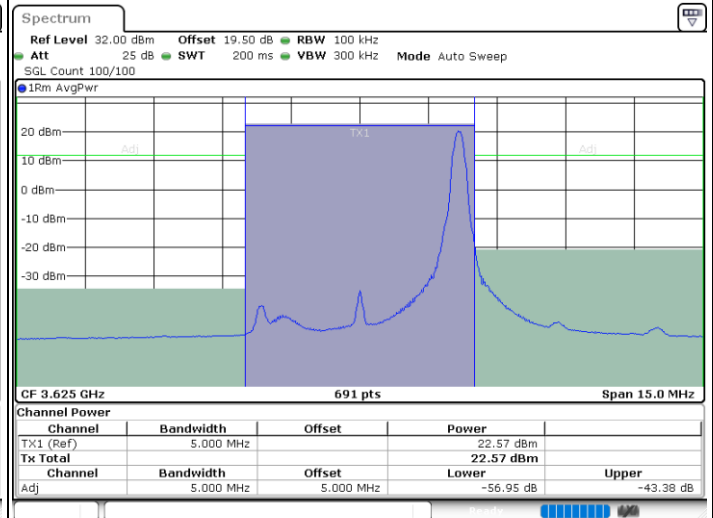
16QAM

Middle Channel / 1RB0

Middle Channel / 1RBmax



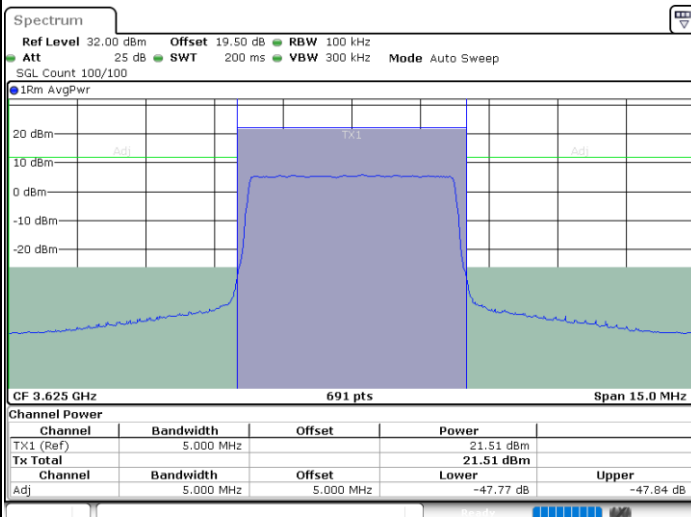
Date: 17.AUG.2020 19:01:23



Date: 17.AUG.2020 19:04:22

Middle Channel / FullRB

N/A



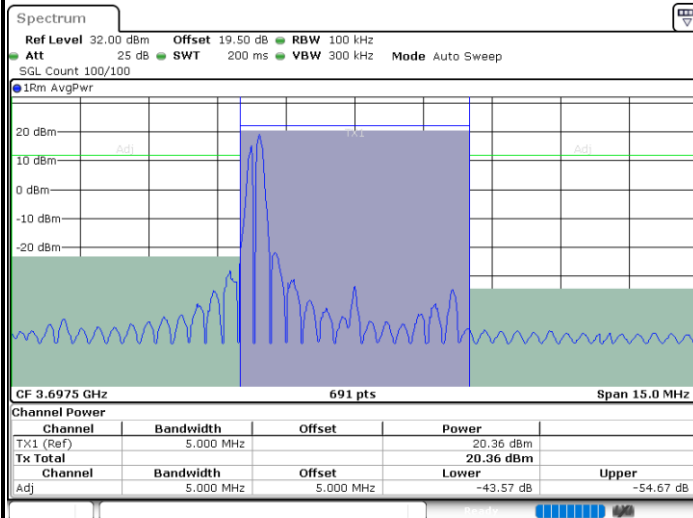
Date: 17.AUG.2020 18:57:44



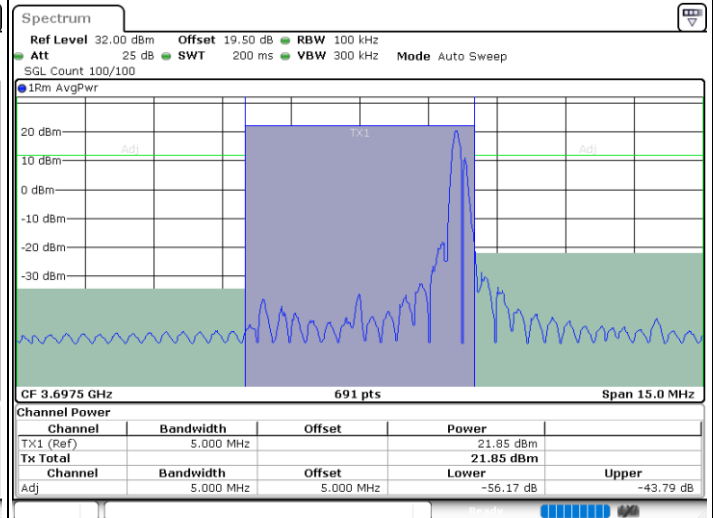
LTE Band 48 / 5MHz

16QAM

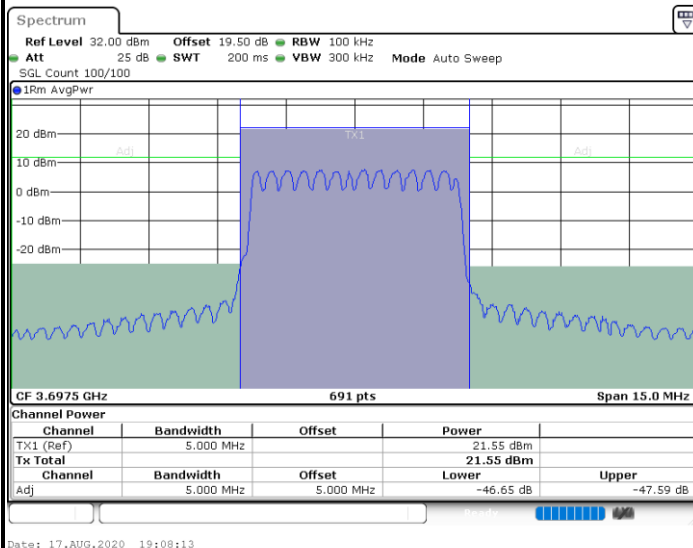
Highest Channel / 1RB0



Highest Channel / 1RBmax



Highest Channel / FullIRB



N/A

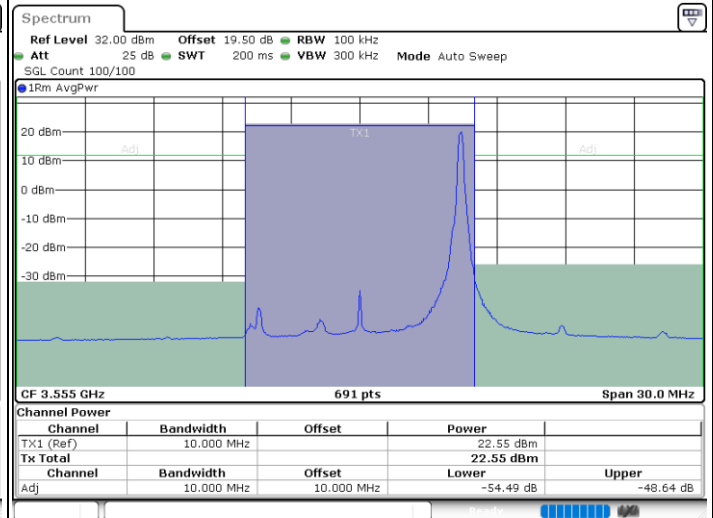
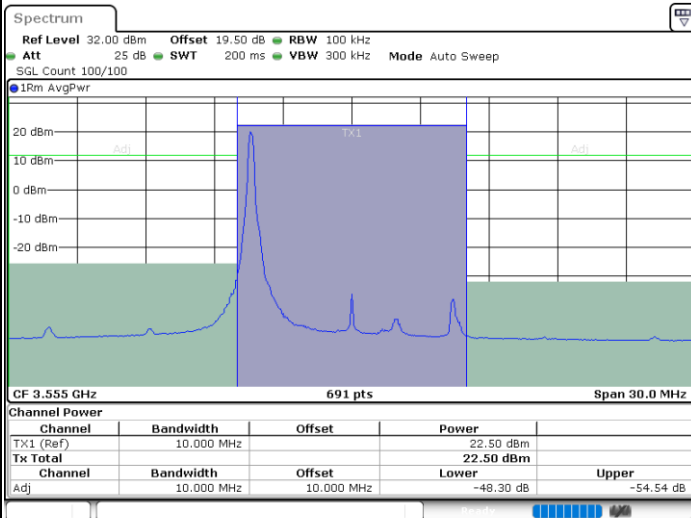


LTE Band 48 / 10MHz

16QAM

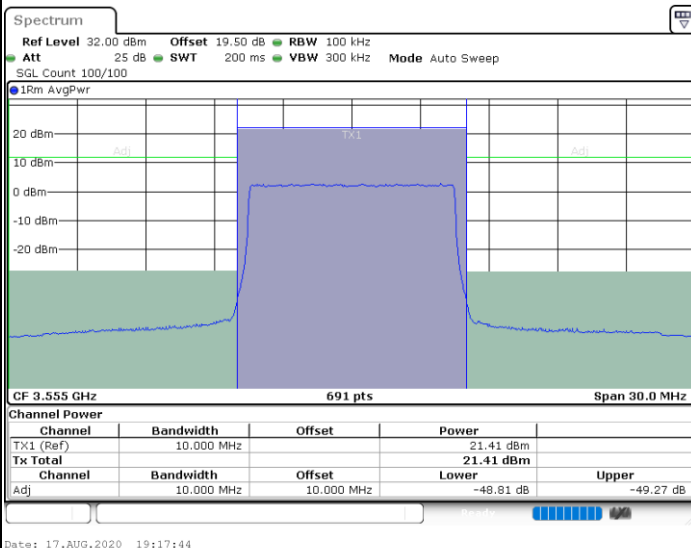
Lowest Channel / 1RB0

Lowest Channel / 1RBmax



Lowest Channel / FullIRB

N/A



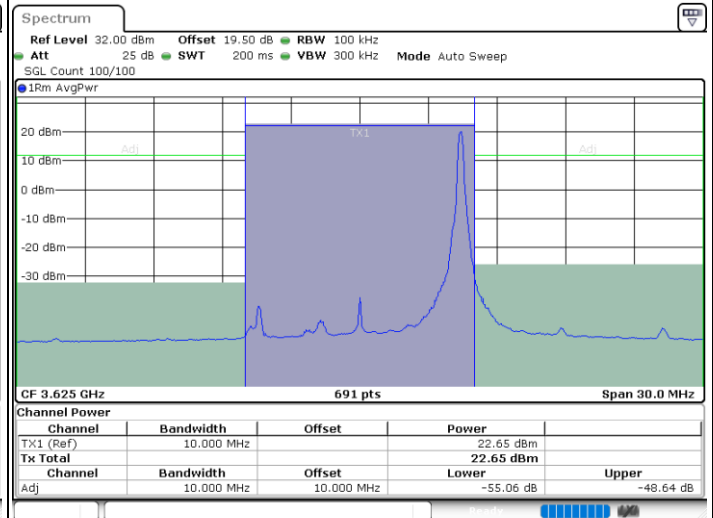
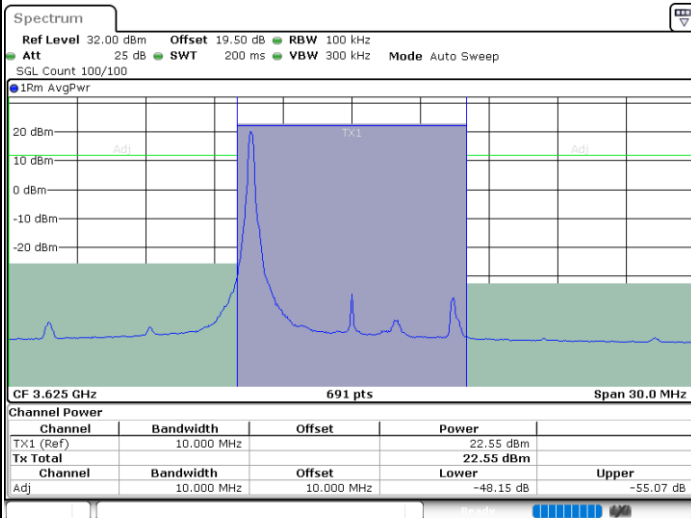


LTE Band 48 / 10MHz

16QAM

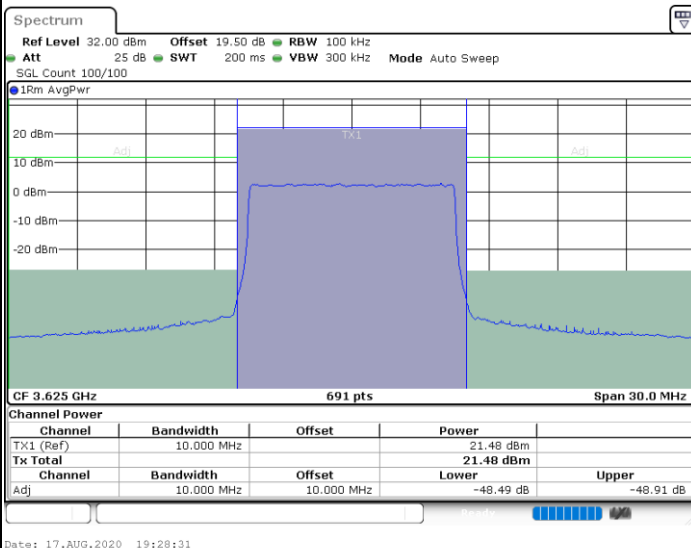
MiddleChannel / 1RB0

Middle Channel / 1RBmax



Middle Channel / FullRB

N/A

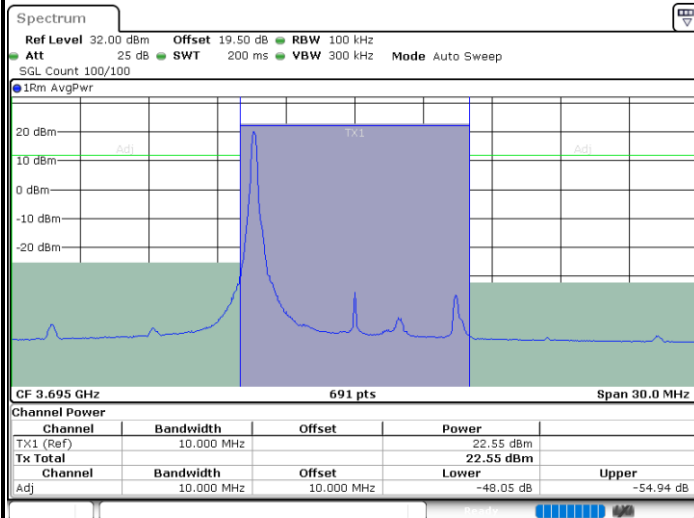




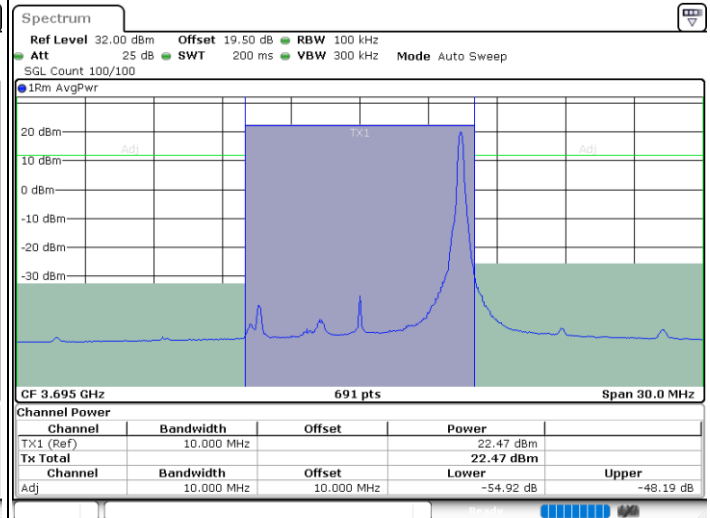
LTE Band 48 / 10MHz

16QAM

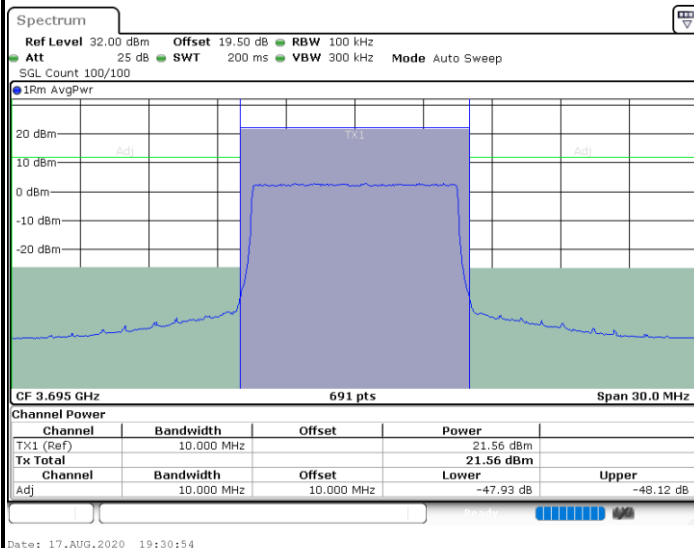
Highest Channel / 1RB0



Highest Channel / 1RBmax



Highest Channel / FullIRB



N/A

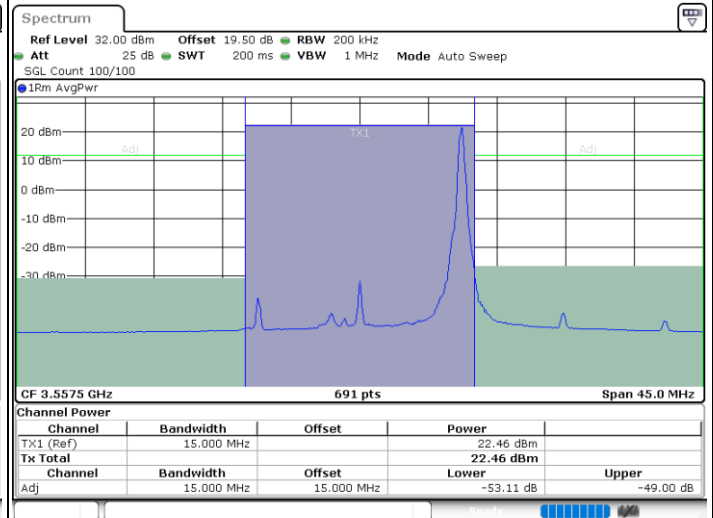
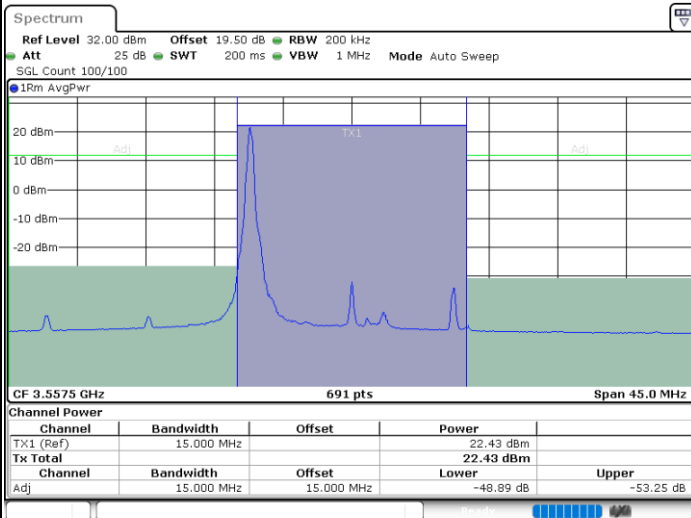


LTE Band 48 / 15MHz

16QAM

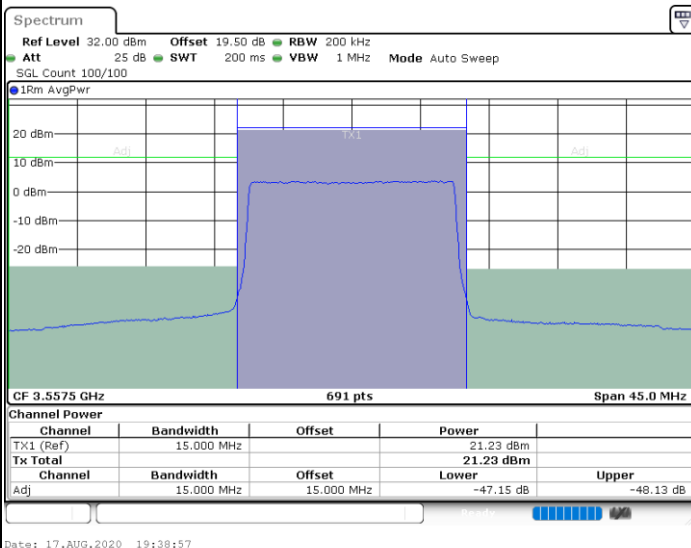
Lowest Channel / 1RB0

Lowest Channel / 1RBmax



Lowest Channel / FullRB

N/A



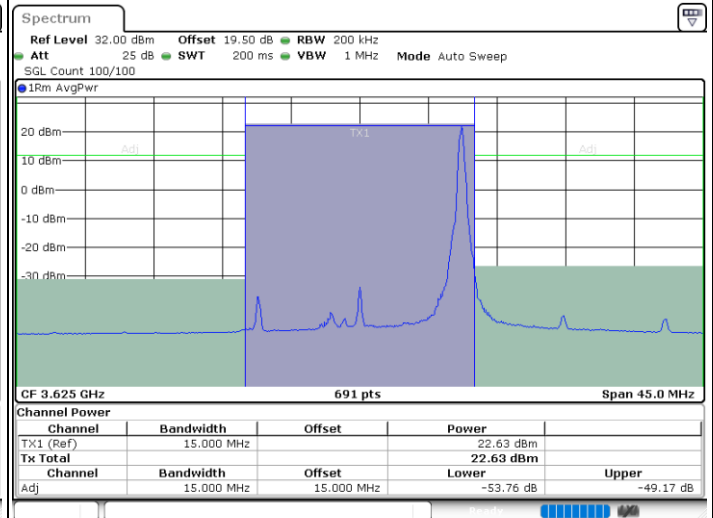
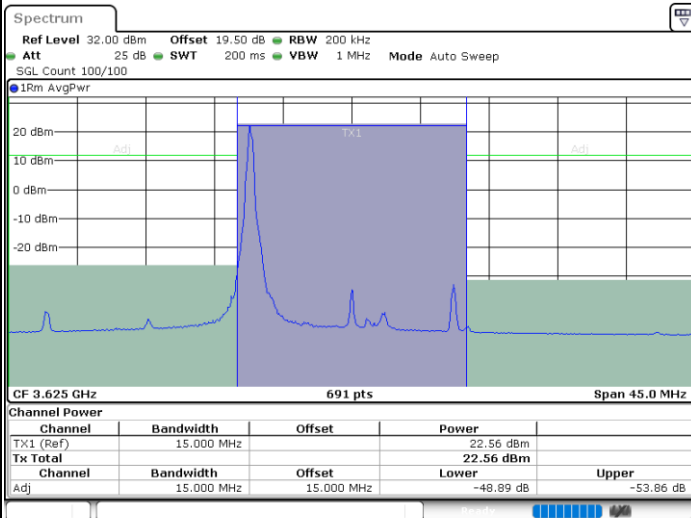


LTE Band 48 / 15MHz

16QAM

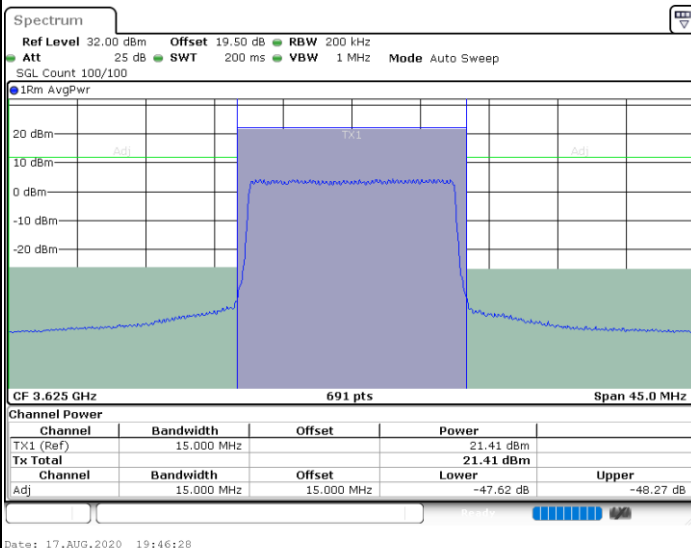
Middle Channel / 1RB0

Middle Channel / 1RBmax



Middle Channel / FullRB

N/A

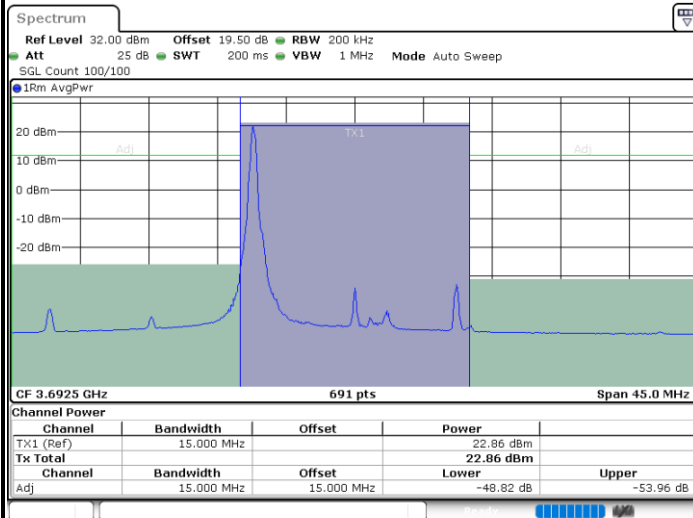




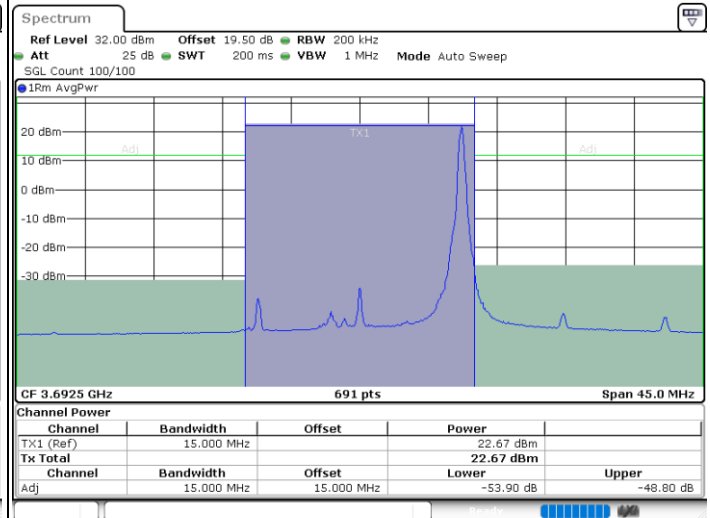
LTE Band 48 / 15MHz

16QAM

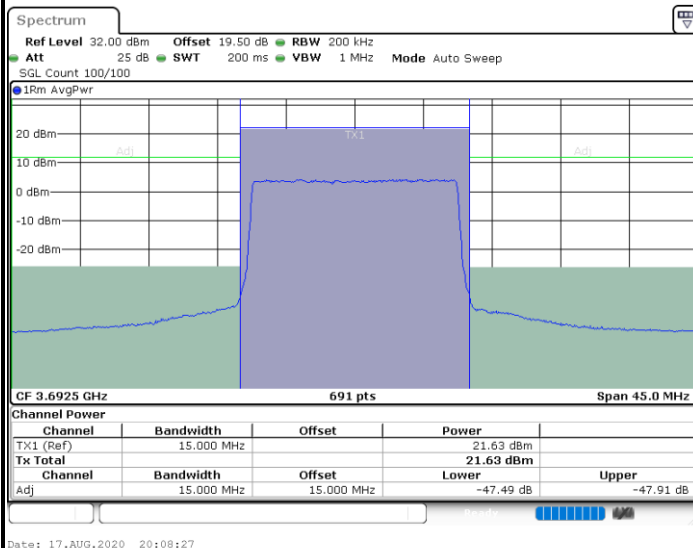
Highest Channel / 1RB0



Highest Channel / 1RBmax



Highest Channel / FullIRB



N/A

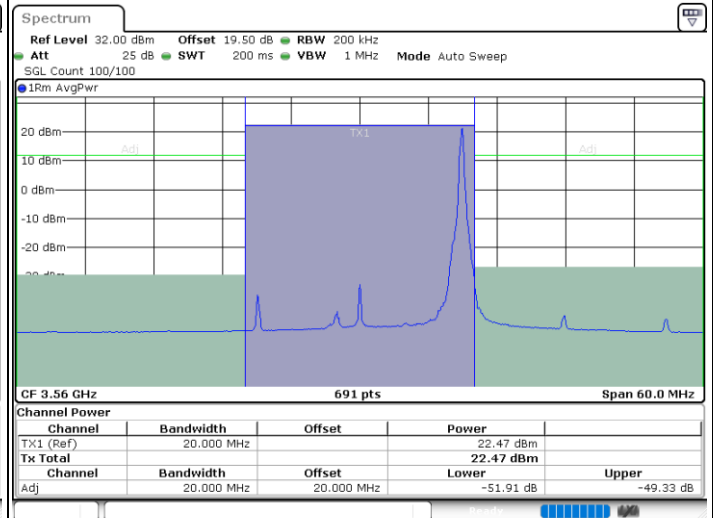
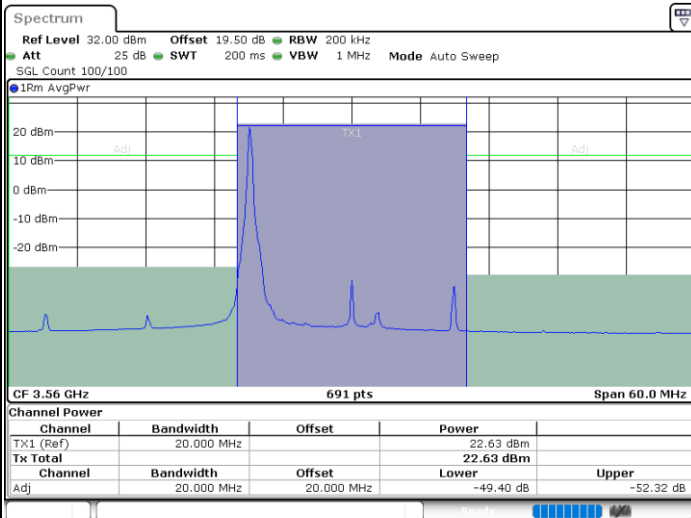


LTE Band 48 / 20MHz

16QAM

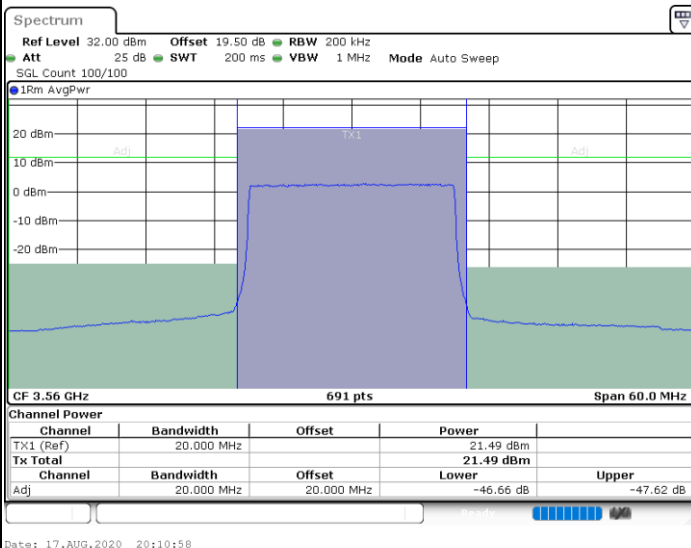
Lowest Channel / 1RB0

Lowest Channel / 1RBmax



Lowest Channel / FullIRB

N/A

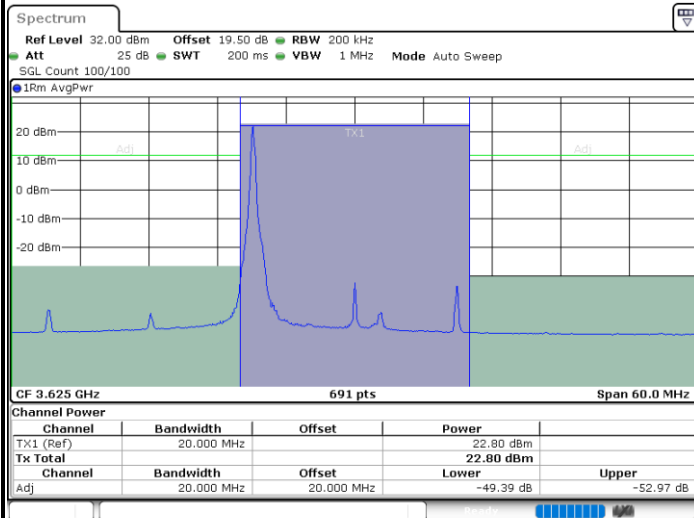




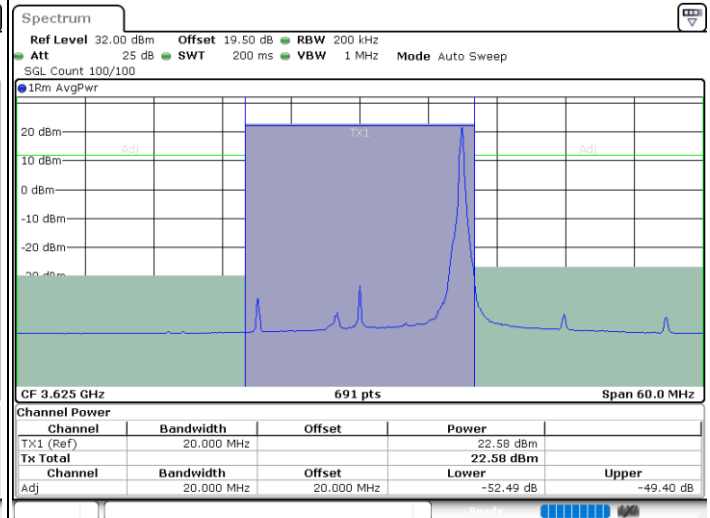
LTE Band 48 / 20MHz

16QAM

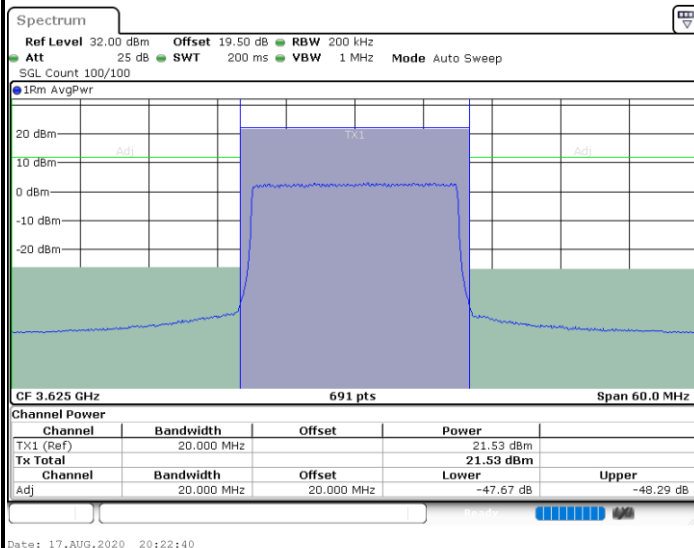
Middle Channel / 1RB0



Middle Channel / 1RBmax



Middle Channel / FullRB



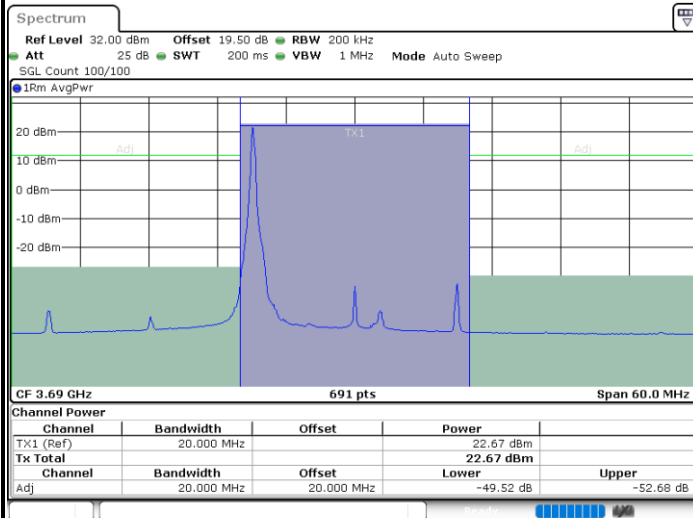
N/A



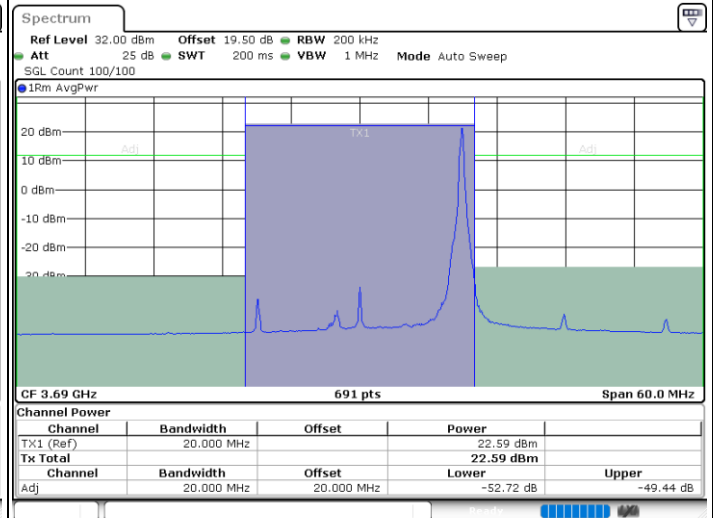
LTE Band 48 / 20MHz

16QAM

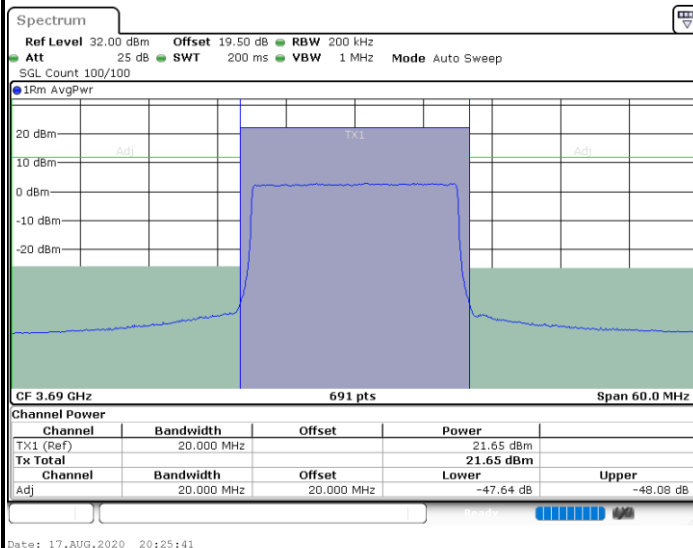
Highest Channel / 1RB0



Highest Channel / 1RBmax



Highest Channel / FullIRB



N/A

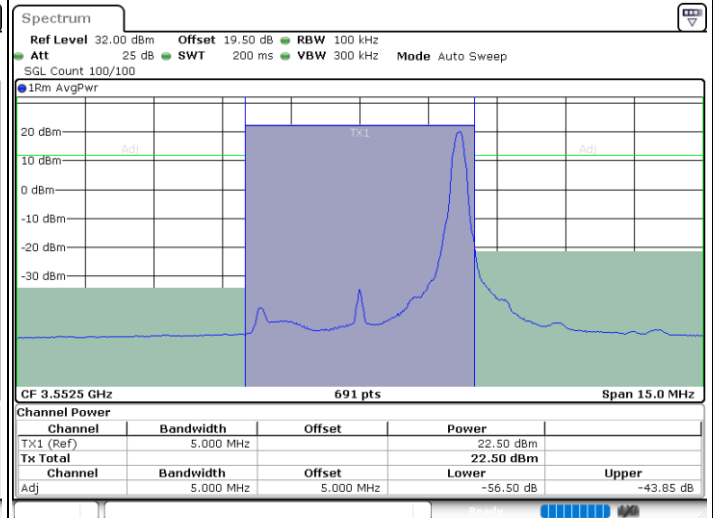
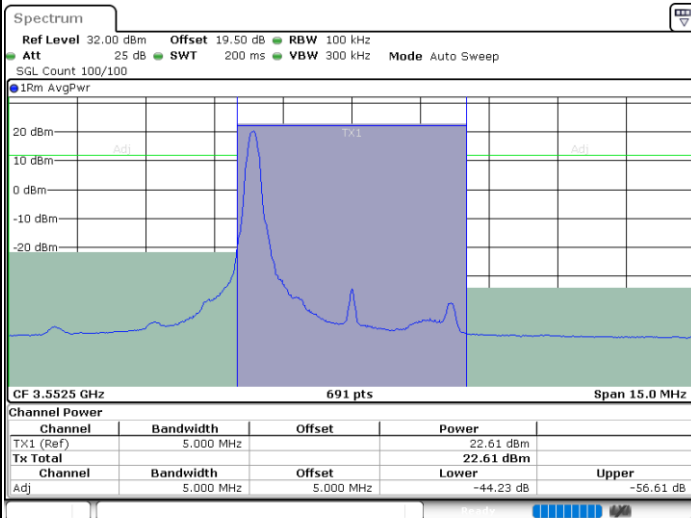


LTE Band 48 / 5MHz

64QAM

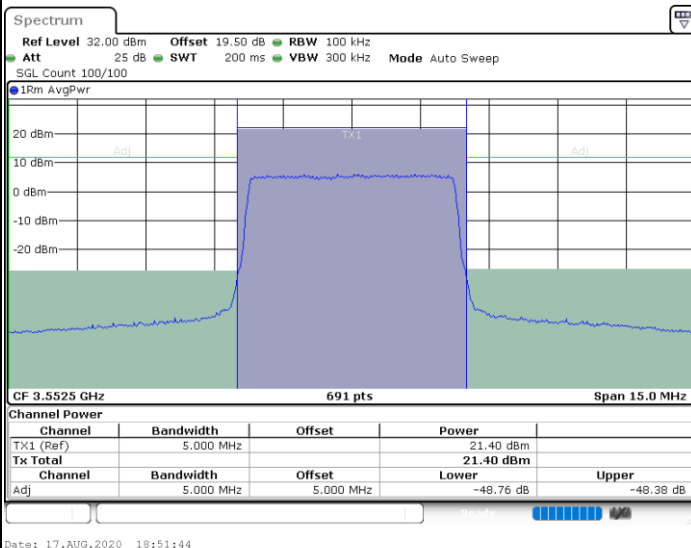
Lowest Channel / 1RB0

Lowest Channel / 1RBmax



Lowest Channel / FullIRB

N/A

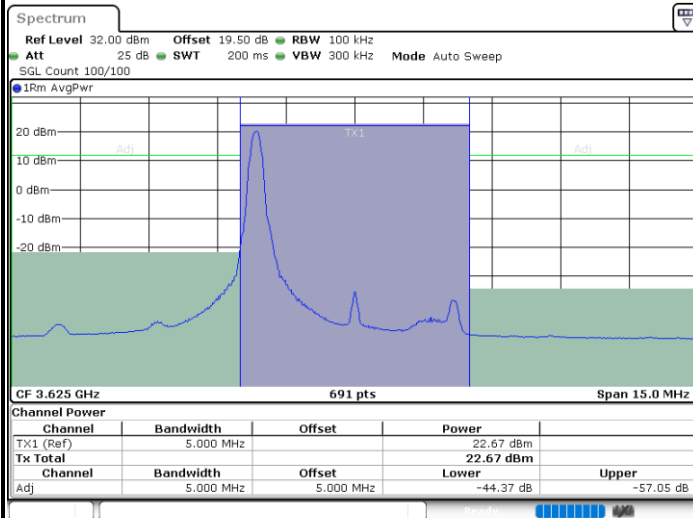




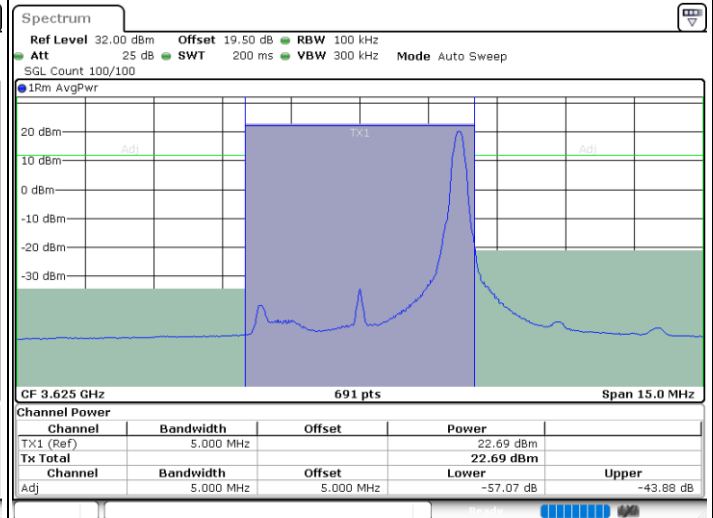
LTE Band 48 / 5MHz

64QAM

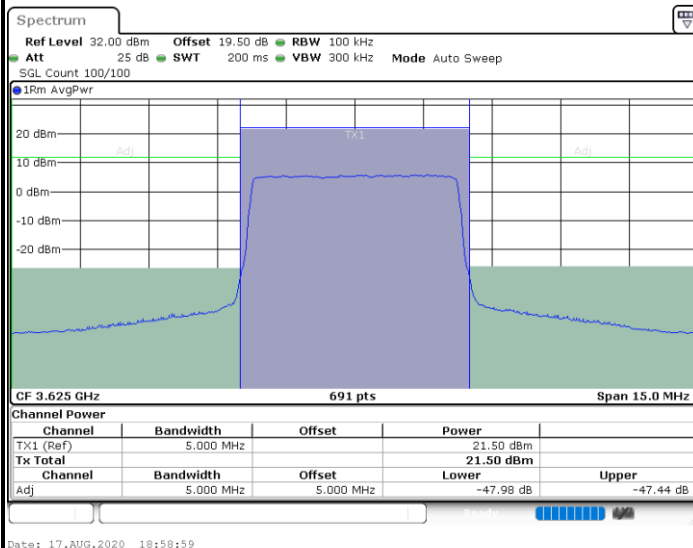
Middle Channel / 1RB0



Middle Channel / 1RBmax



Middle Channel / FullRB



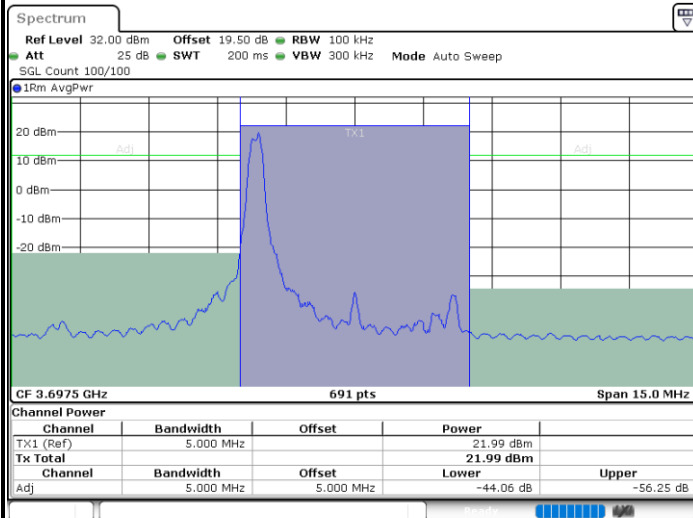
N/A



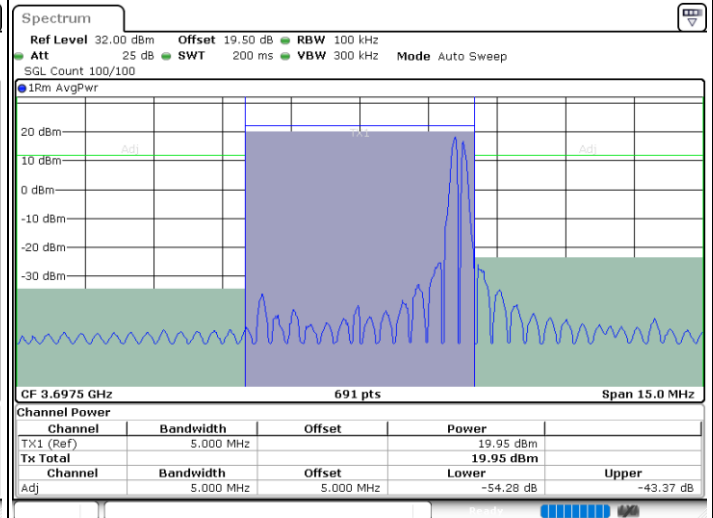
LTE Band 48 / 5MHz

64QAM

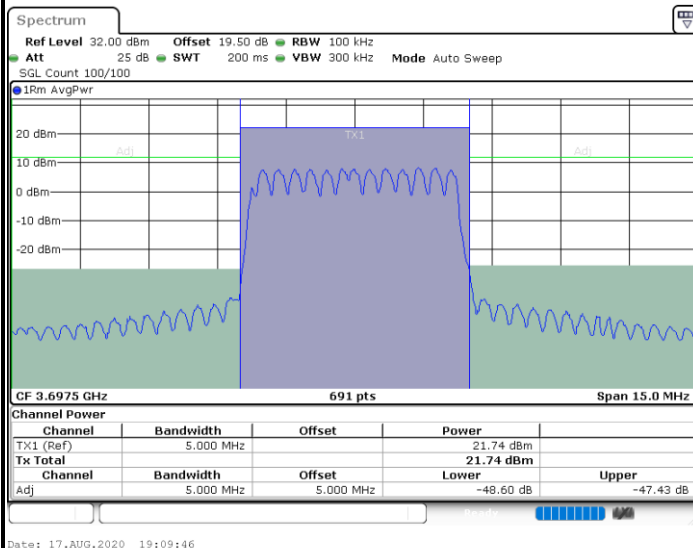
Highest Channel / 1RB0



Highest Channel / 1RBmax



Highest Channel / FullIRB



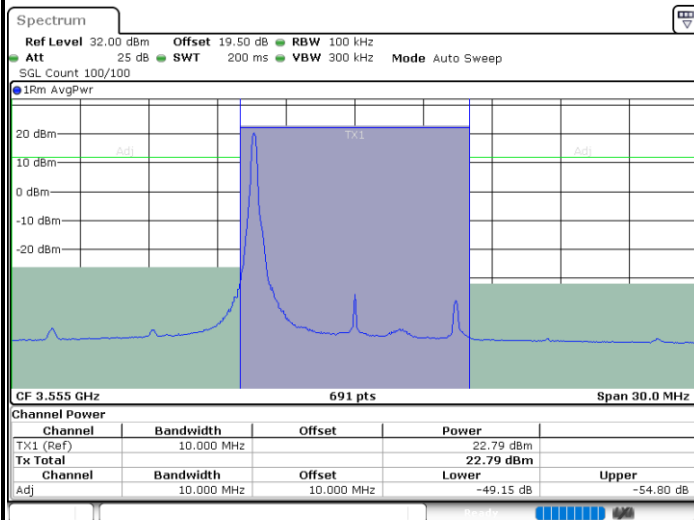
N/A



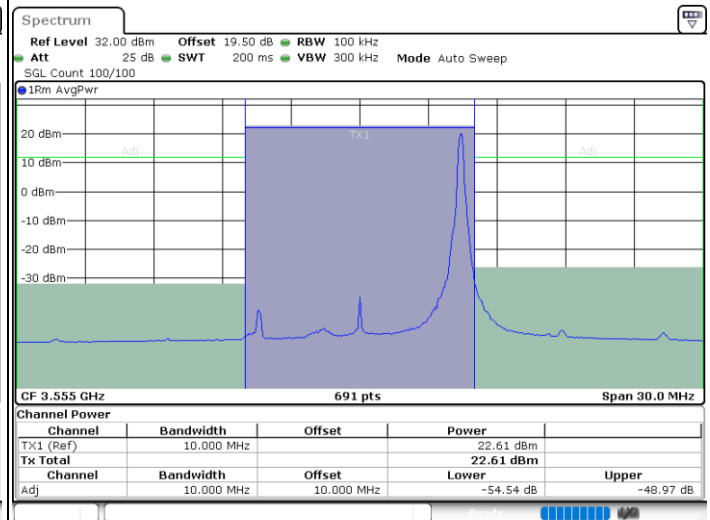
LTE Band 48 / 10MHz

64QAM

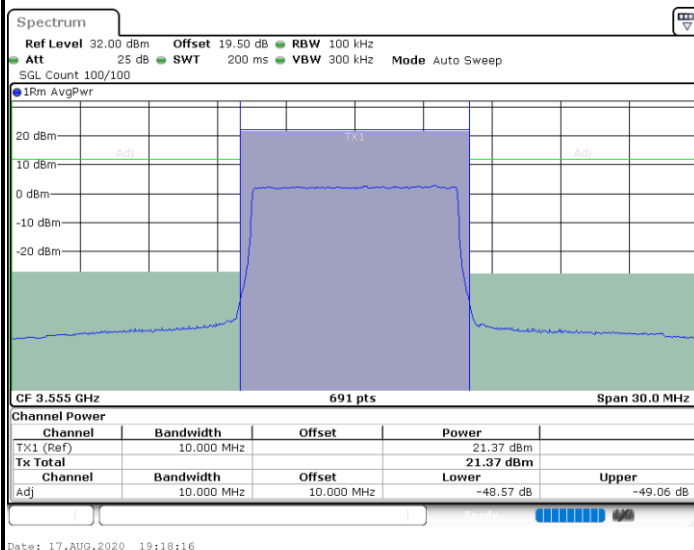
Lowest Channel / 1RB0



Lowest Channel / 1RBmax



Lowest Channel / FullIRB



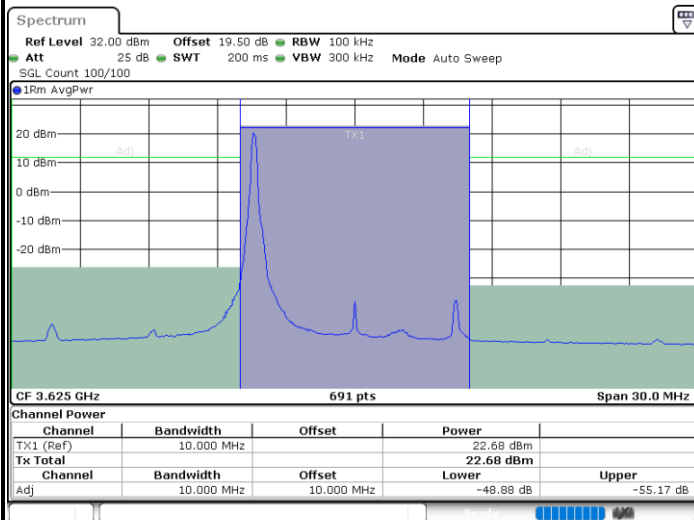
N/A



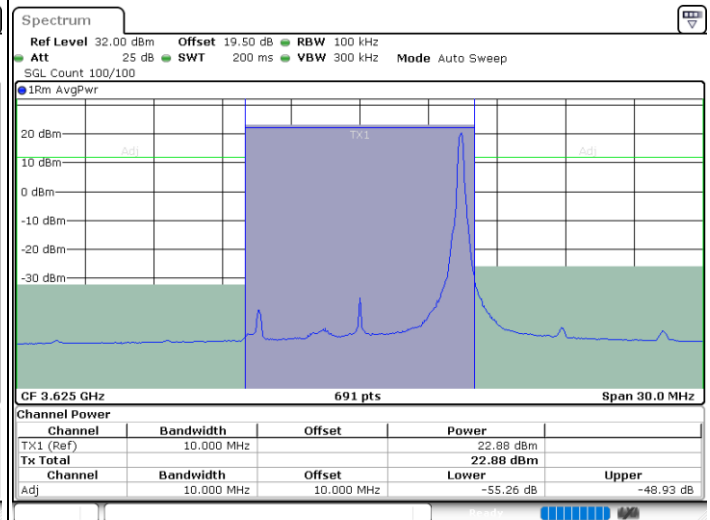
LTE Band 48 / 10MHz

64QAM

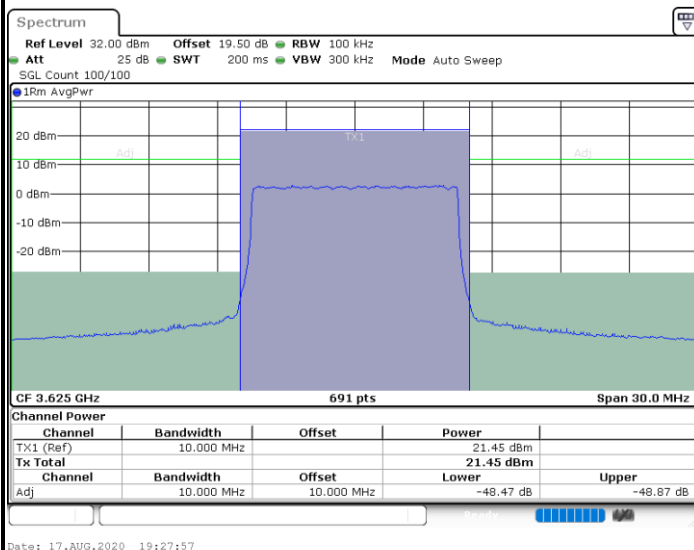
MiddleChannel / 1RB0



Middle Channel / 1RBmax



Middle Channel / FullRB



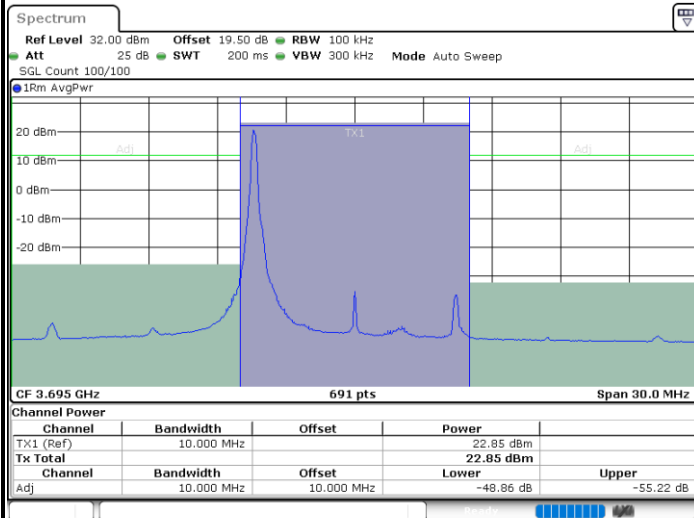
N/A



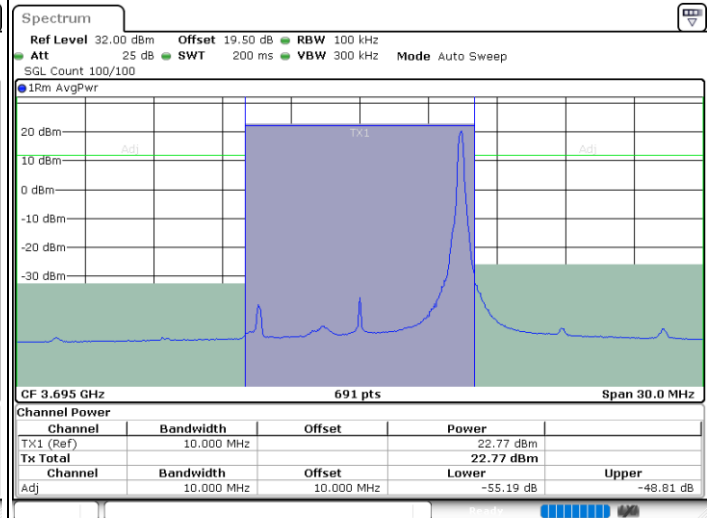
LTE Band 48 / 10MHz

64QAM

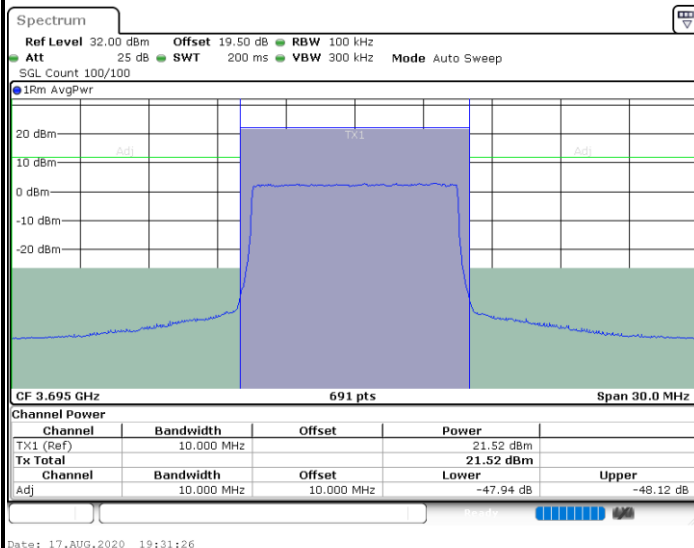
Highest Channel / 1RB0



Highest Channel / 1RBmax



Highest Channel / FullIRB



N/A

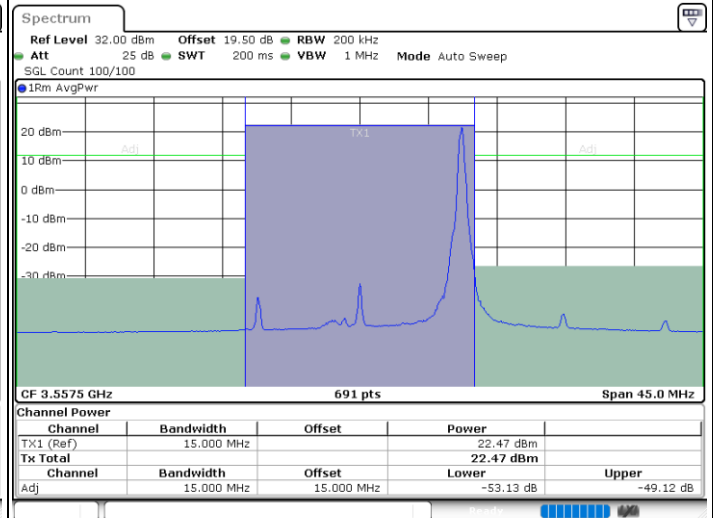
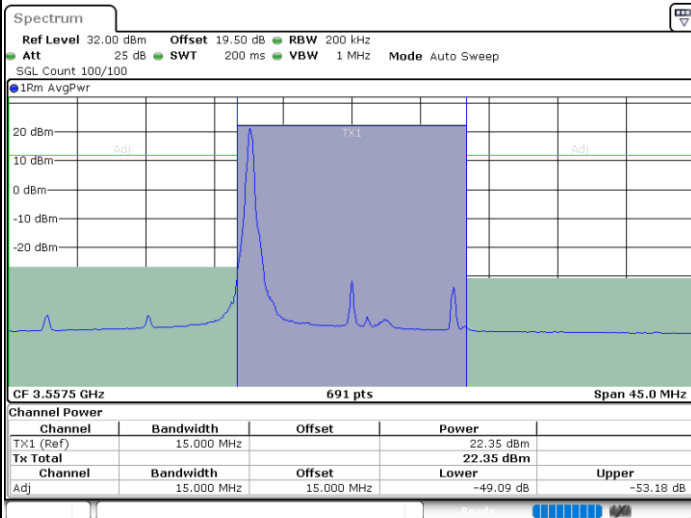


LTE Band 48 / 15MHz

64QAM

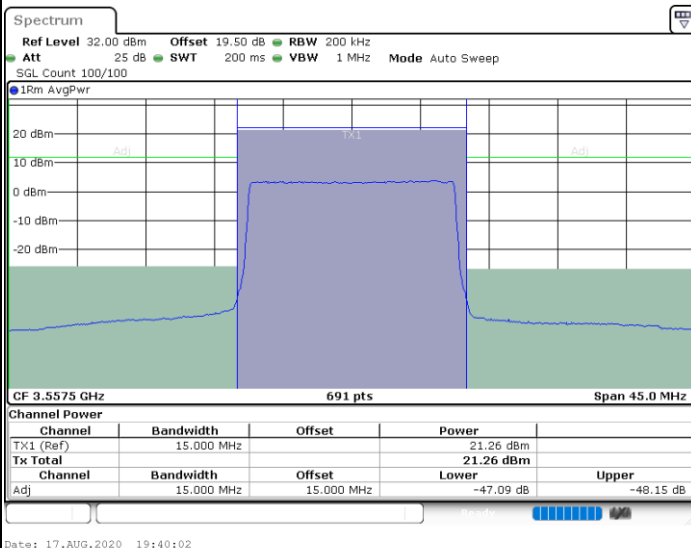
Lowest Channel / 1RB0

Lowest Channel / 1RBmax



Lowest Channel / FullRB

N/A



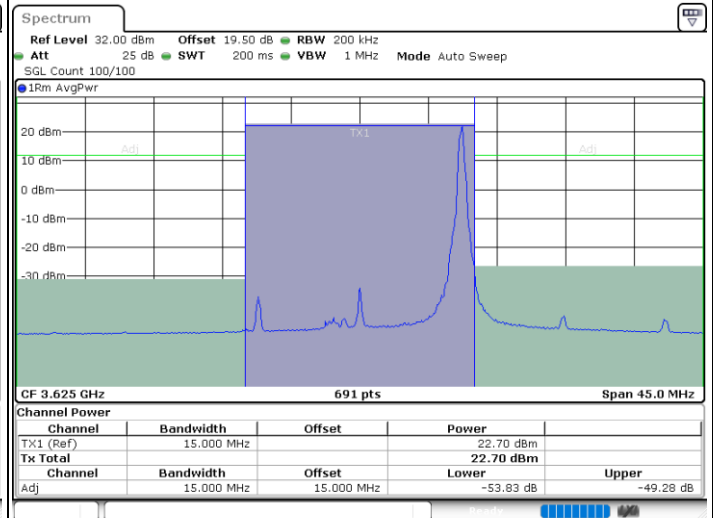
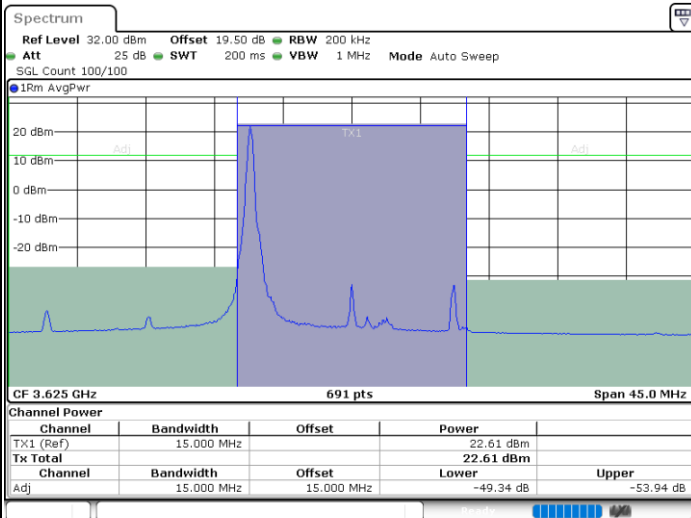


LTE Band 48 / 15MHz

64QAM

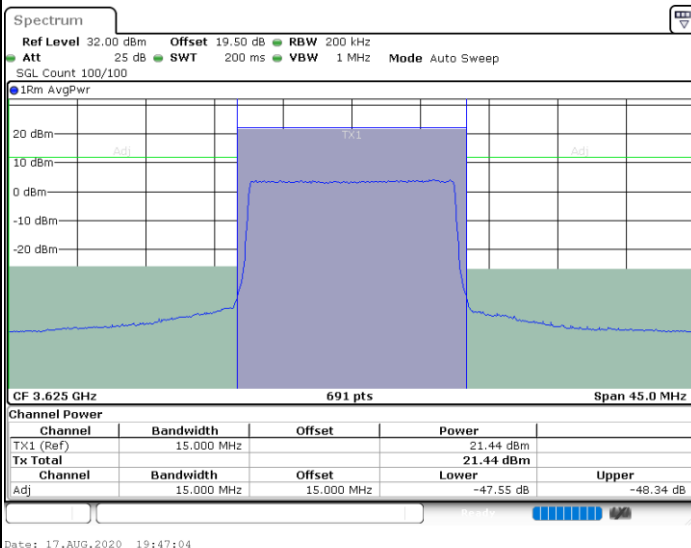
Middle Channel / 1RB0

Middle Channel / 1RBmax



Middle Channel / FullRB

N/A

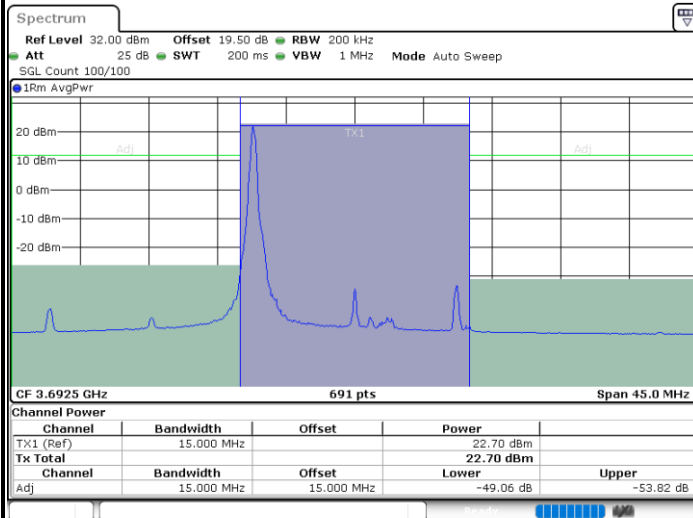




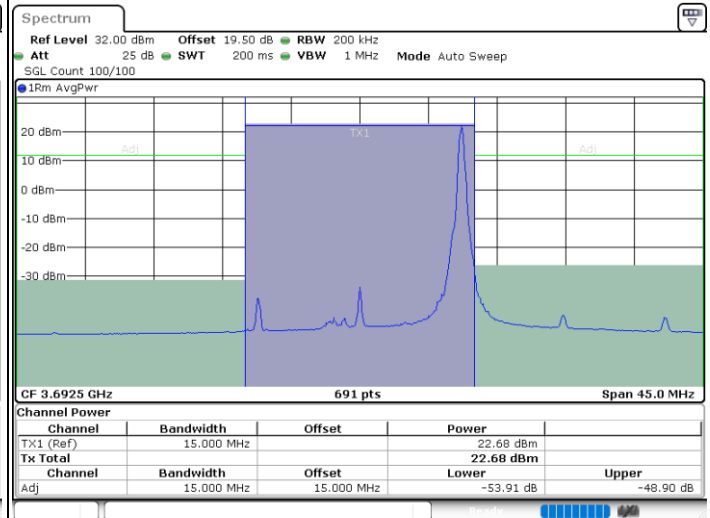
LTE Band 48 / 15MHz

64QAM

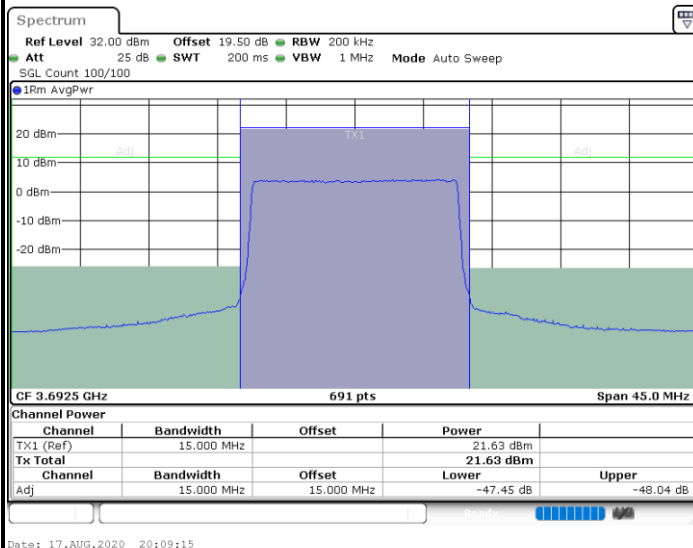
Highest Channel / 1RB0



Highest Channel / 1RBmax



Highest Channel / FullIRB



N/A

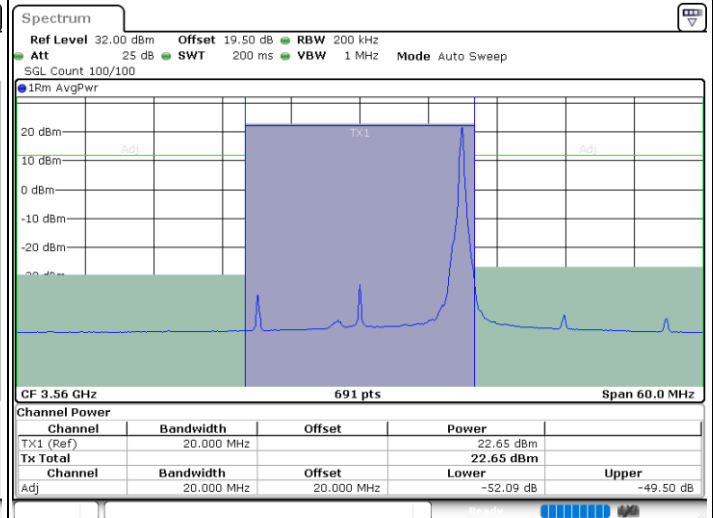
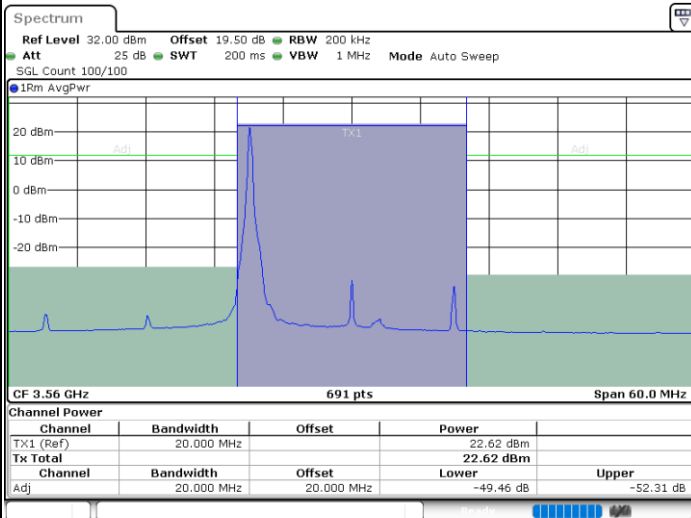


LTE Band 48 / 20MHz

64QAM

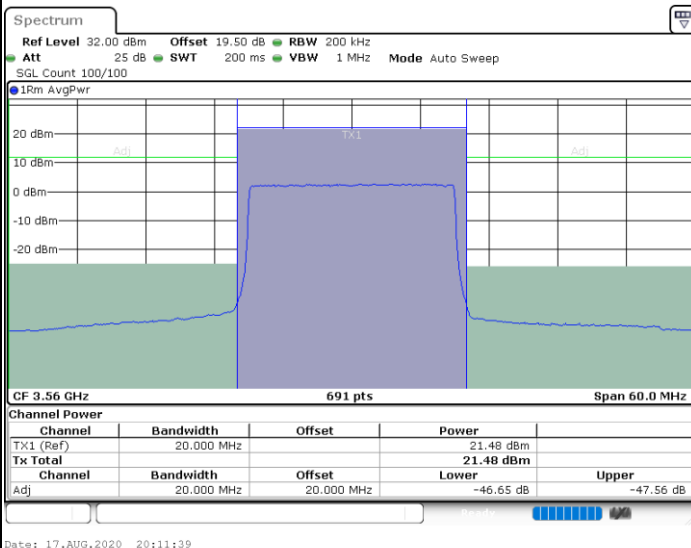
Lowest Channel / 1RB0

Lowest Channel / 1RBmax



Lowest Channel / FullIRB

N/A

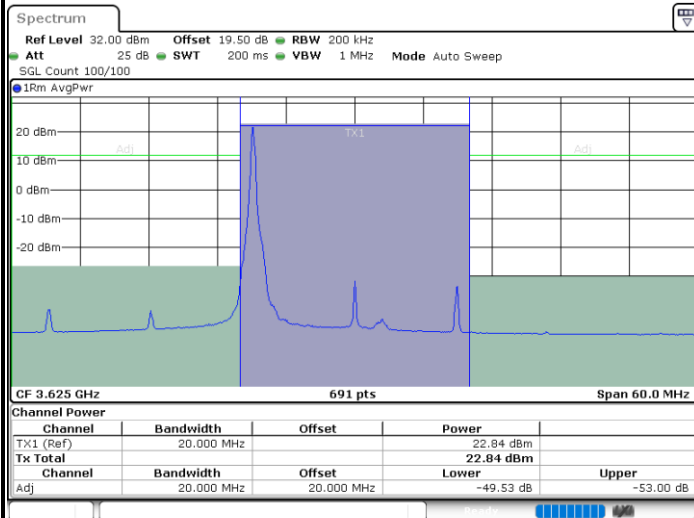




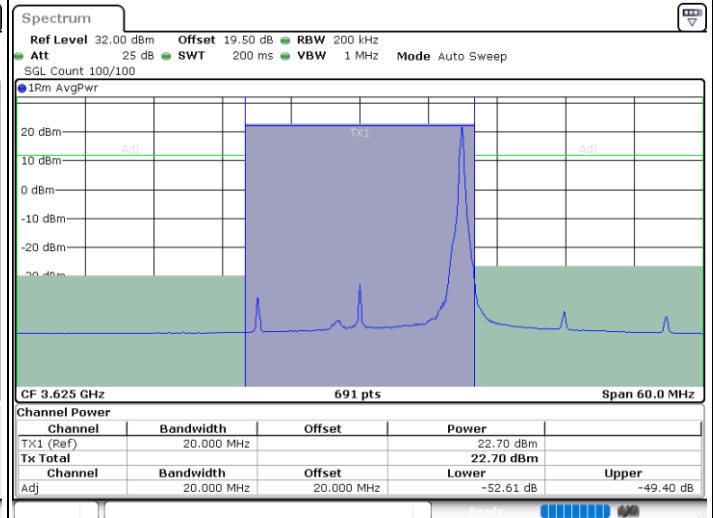
LTE Band 48 / 20MHz

64QAM

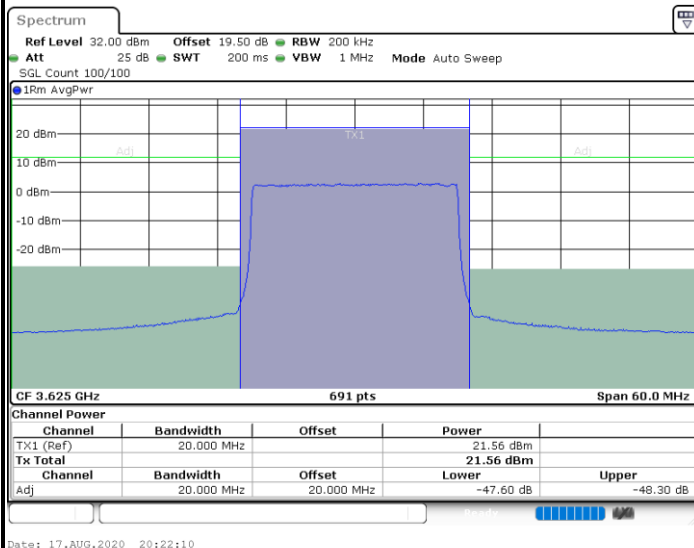
Middle Channel / 1RB0



Middle Channel / 1RBmax



Middle Channel / FullRB



N/A