FCC RF Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	XT2311-3, XT2311-4, XT2311DL
FCC ID	:	IHDT56AH4
STANDARD	:	47 CFR Part 2, 96
CLASSIFICATION	:	Citizens Band End User Devices (CBE)
EQUIPMENT TYPE	:	End User Equipment
TEST DATE(S)	:	Sep. 29, 2022 ~ Oct. 24, 2022

We, Sporton International Inc. (Kunshan), 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 Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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History of this test report

Report No.	Version	Description	Issued Date
FG292212G	01	Initial issue of report	Nov. 10, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
3.3	§96.41	Peak-to-Average Ratio	Not Required	Not applicable for End User Devices
3.4	§96.41	Maximum E.I.R.P	Pass	-
		Maximum Power Spectral Density	Not Required	Not applicable for End User Devices
3.5	§2.1049 §96.41	Occupied Bandwidth	Reporting only	-
3.6	§2.1051 §96.41	Conducted Band Edge Measurement Adjacent Channel Leakage Ratio	Pass	-
3.7	§2.1051 §96.41	Conducted Spurious Emission	Pass	
3.8	§2.1055	Frequency Stability for Temperature & Voltage	Pass	-
4.4	§2.1051 §96.41	Radiated Spurious Emission	Pass	Under limit 12.61 dB at 7104.000 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

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2311-3, XT2311-4, XT2311DL
FCC ID	IHDT56AH4
Tx Frequency	LTE Band 48: 3550 MHz ~ 3700 MHz
Rx Frequency	LTE Band 48: 3550 MHz ~ 3700 MHz
Bandwidth	5MHz / 10MHz / 15MHz / 20MHz
Antenna Gain	-2.4 dBi
Type of Modulation	QPSK / 16QAM / 64QAM
IMEI Code	Conducted: 358373300033767 Radiation: 358373300025821
HW Version	DVT2
SW Version	TTO33.44
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The three model names are only for market differentiation, all the others are the same.

1.4 Specification of Accessory

Specification of Accessory				
AC Adapter 1	**Brand Name**	Motorola(AOHAI)	**Model Name**	MC-101
AC Adapter 2	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-101
AC Adapter 3	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-101
Battery 1	**Brand Name**	Motorola (Sunwoda)	**Model Name**	PD50
Battery 2	**Brand Name**	Motorola (SCUD)	**Model Name**	PD50
USB Cable 1	**Brand Name**	HX	**Model Name**	S928D43190
USB Cable 2	**Brand Name**	NAEE	**Model Name**	S928D43191

1.5 Maximum EIRP Power and Emission Designator

LTE Band 48		QPSK		16QAM/64QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
5	3552.5~3697.5	0.1026	4M49G7D	0.0753	4M50W7D
10	3555~3695	0.1023	9M11G7D	0.0785	8M99W7D
15	3557.5~3692.5	0.1023	13M4G7D	0.0771	13M4W7D
20	3560~3690	0.1064	18M3G7D	0.0789	18M5W7D

LTE Band 48 CA	QPSK		16QAM/64QAM	
BW (MHz) Frequency (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
5MHz+20MHz (3553.5 ~ 3690 MHz)	0.0908	23M2G7D	0.0729	23M2W7D
10MHz+20MHz (3555.5 ~ 3690 MHz)	0.0948	28M0G7D	0.0746	28M1W7D
15MHz+20MHz (3557.8 ~ 3690 MHz)	0.0953	32M8G7D	0.0729	32M9W7D
20MHz+20MHz (3560 ~ 3690 MHz)	0.0979	37M7G7D	0.0757	37M6W7D

LTE Band 48B_CA	QPSK		16QAM/64QAM	
BW (MHz) Frequency (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
10MHz+10MHz (3555 ~ 3695 MHz)	0.1112	18M7G7D	0.0889	18M8W7D

1.6 Testing Site

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-KS TH01-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24al

1.8 Applied Standards

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

- ANSI C63.26-2015
- 47 CFR Part 2, 96
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 940660 D01 Part 96 CBRS v03
- 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 (Z plane) were recorded in this report.

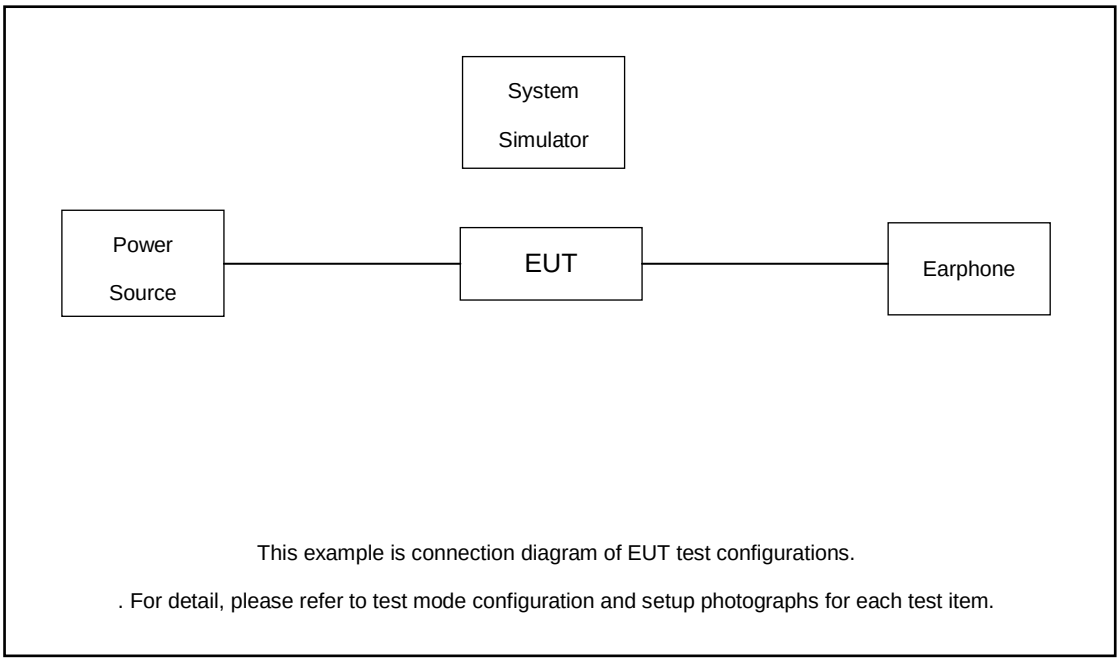
Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	48	-	-	v	v	v	v	v	v	v	v		v	v	v	v
26dB and 99% Bandwidth	48	-	-	v	v	v	v	v	v	v			v		v	
Conducted Band Edge	48	-	-	v	v	v	v	v	v	v	v		v	v	v	v
Conducted Spurious Emission	48	-	-	v	v	v	v	v	v	v	v		v	v	v	v
E.I.R.P	48	-	-	v	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, Earphone and USB Cable.															

Test Items	Band	Bandwidth (MHz)								Modulation			RB #			Test Channel		
		20+20	20+15	15+20	20+10	10+20	10+10	20+5	5+20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	48C	v	v	v	v	v	-	v	v	v	v	v	v			v	v	v
	48B	-	-	-	-	-	v	-	-	v	v	v	v			v	v	v
26dB and 99% Bandwidth	48C	v		v		v	-		v	v	v				v		v	
	48B	-	-	-	-	-	v	-	-	v	v				v		v	
Conducted Band Edge	48C	v		v		v	-		v	v	v	v	v		v	v	v	v
	48B	-	-	-	-	-	v	-	-	v	v	v	v		v	v	v	v
Conducted Spurious Emission	48C	v		v		v	-		v	v			v			v	v	v
	48B	-	-	-	-	-	v	-	-	v			v			v	v	v
Adjacent Channel Leakage Ratio	48C	v		v		v	-		v	v	v	v	v		v	v	v	v
	48B	-	-	-	-	-	v	-	-	v	v	v	v		v	v	v	v
E.I.R.P	48C	v	v	v	v	v	-	v	v	v	v	v	v			v	v	v
	48B	-	-	-	-	-	v	-	-	v	v	v	v			v	v	v
Frequency Stability	48C	v					-			v			v				v	
	48B	-	-	-	-	-	v	-	-	v			v				v	
Radiated Spurious Emission	48C	Worst Case														v	v	v
	48B	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 test items are based on engineering evaluation.
5. All the radiated test cases were performed with Adapter, Earphone and USB Cable.

2.2 Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

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.

Following shows an offset computation example with cable loss 6.5dB.

Example :

Offset(dB) = RF cable loss(dB).

= 6.5 (dB)

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 48B_CA Channel and Frequency List					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
10 + 10	PCC	Channel	55290	56165	56591
		Frequency	3555	3642.5	3685.1
	SCC	Channel	55389	56264	56690
		Frequency	3564.9	3652.4	3695

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

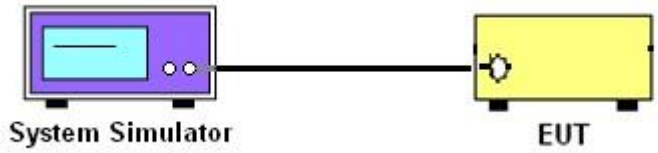
3 Conducted Test Items

3.1 Measuring Instruments

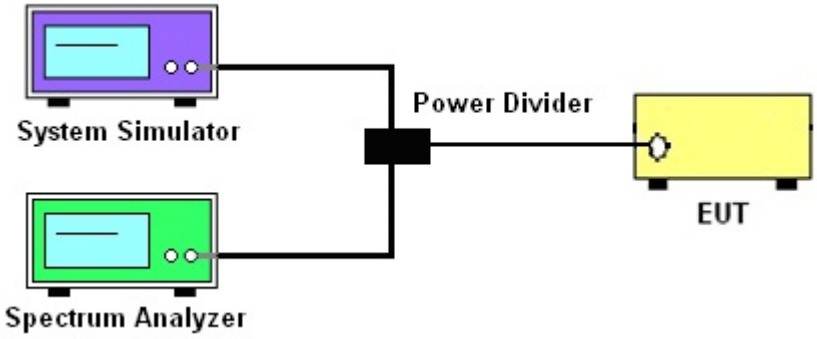
See list of measuring instruments of this test report.

3.1.1 Test Setup

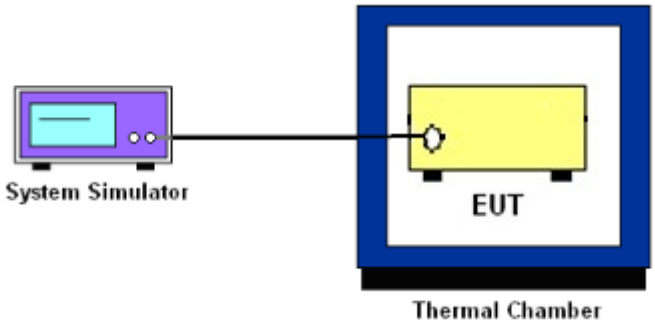
3.1.2 Conducted Output Power



3.1.3 PSD, 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 Peak-to-Average Ratio

3.3.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. 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. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.3.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.2.6

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio

3.4 EIRP and PSD

3.4.1 Description of the EIRP and PSD Measurement

EIRP and PSD limits for CBRS equipment as below table:

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

Remark: The worst case EIRP shown in this section is found with LTE operating only using 1RB. As such, the EIRP/10MHz and full channel EIRP values will be identical since 1RB is fully contained within all available channel bandwidths for LTE Band 48 (i.e. 5, 10, 15, 20MHz)

3.4.2 Test Procedures for EIRP

1. Establishing a communications link with the call box (Base station) to measure the Maximum conducted power, the parameters were set to force the EUT transmitting at maximum output power level. Use the average power measurement function to measure total channel power of each channel bandwidth (per ANSI C63.26-2015 Section 5.2.1)

2. Determining ERP and/or EIRP from conducted RF output power measurements (Per ANSI C63.26-2015 Section 5.2.5.5)

   $EIRP = P_T + G_T – L_C$, $ERP = EIRP - 2.15$, 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

3.5 Occupied Bandwidth

3.5.1 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.

3.5.2 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.

3.6 Conducted Band Edge

3.6.1 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 −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 band edges of low and high channels for the highest RF powers were measured.
3. Set RBW >= 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.

3.7 Conducted Spurious Emission

3.7.1 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.

3.7.2 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.

3.8 Frequency Stability

3.8.1 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 ±0.00025% (±2.5ppm) of the center frequency

3.8.2 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.

3.8.3 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±5° 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.

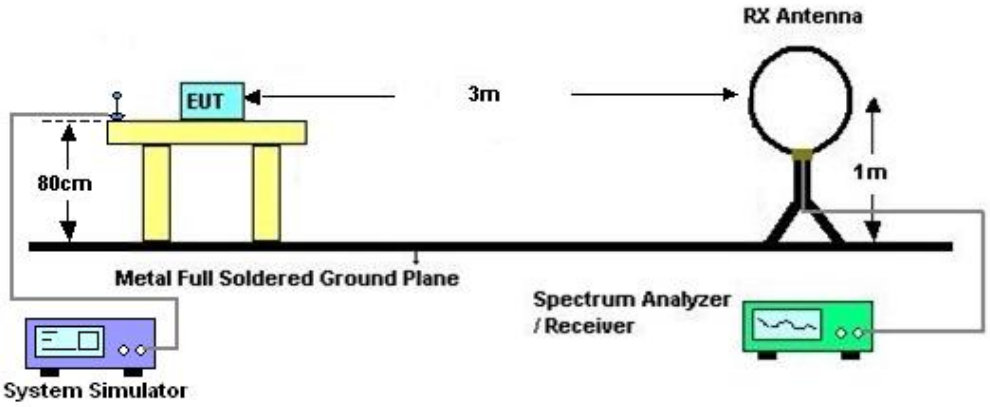
4 Radiated Test Items

4.1 Measuring Instruments

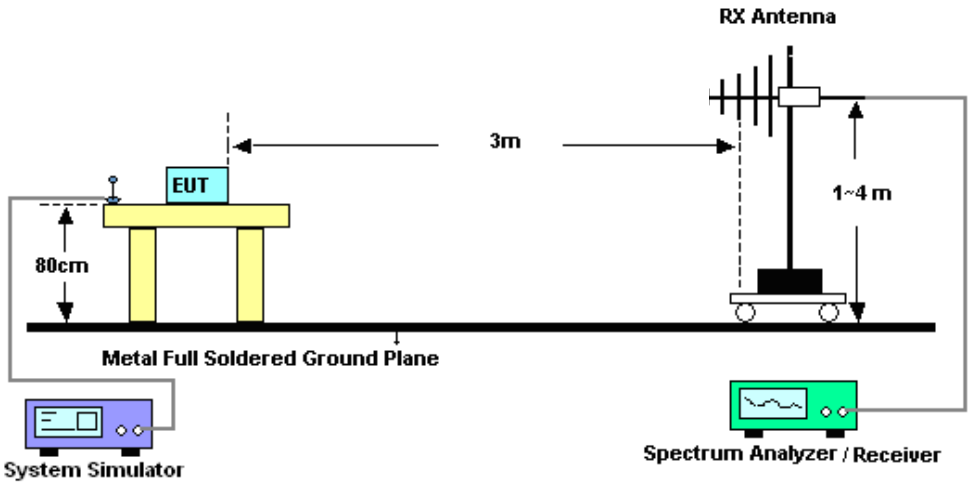
See list of measuring instruments of this test report.

4.2 Test Setup

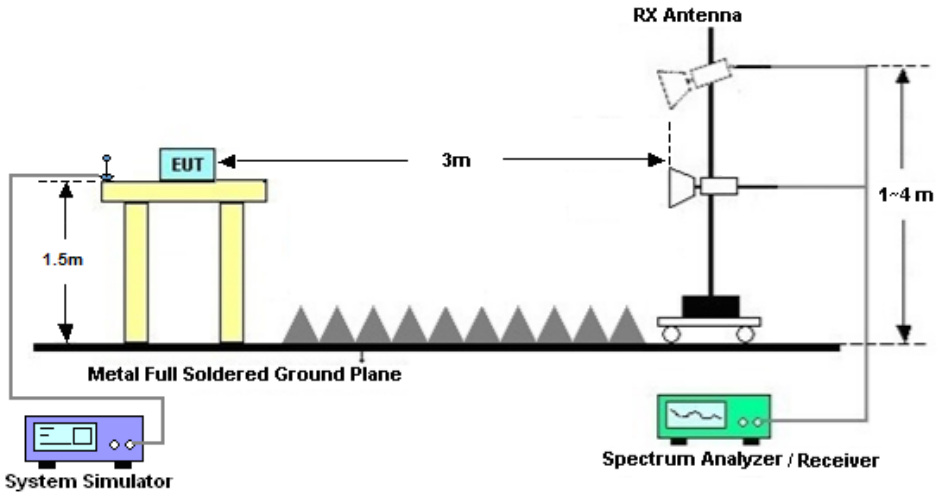
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

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 C63.26-2015.

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.
   EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
   ERP (dBm) = 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	101040	10Hz~40GHz	Oct. 13, 2021	Sep. 29, 2022~ Oct. 09, 2022	Oct. 12, 2022	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	Aug. 25, 2022	Sep. 29, 2022~ Oct. 09, 2022	Aug. 24, 2023	Conducted (TH01-KS)
Temperature &humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 15, 2022	Sep. 29, 2022~ Oct. 09, 2022	Jul. 14, 2023	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	Oct. 24, 2022	Oct. 11, 2023	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Oct. 24, 2022	Oct. 29, 2022	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 24, 2022	Oct. 24, 2022	May 23, 2023	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Jan. 05, 2022	Oct. 24, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	Oct. 24, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Jan. 05, 2022	Oct. 24, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2022	Oct. 24, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 12, 2022	Oct. 24, 2022	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	Oct. 24, 2022	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Oct. 24, 2022	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Oct. 24, 2022	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Oct. 24, 2022	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Power	±0.46 dB
Conducted Emissions	±0.48 dB
Occupied Channel Bandwidth	±0.001 %

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.3 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8 dB

---------- THE END ----------

Appendix A. Test Results of Conducted Test

Test Engineer :	Simle Wang	Temperature :	22~23℃
		Relative Humidity :	40~42%

Conducted Output Power(Average power) and EIRP

LTE Band 48

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				55340	55990	56640			
Frequency (MHz)				3560	3625	3690	L	M	H
20	QPSK	1	0	22.49	22.67	22.31	0.1021	0.1064	0.0979
20	QPSK	1	99	22.26	22.20	22.25	0.0968	0.0955	0.0966
20	QPSK	100	0	21.03	21.21	21.17	0.0729	0.0760	0.0753
20	16QAM	1	0	21.13	21.37	21.20	0.0746	0.0789	0.0759
20	64QAM	1	0	20.22	20.24	20.14	0.0605	0.0608	0.0594
Channel				55315	55990	56665	EIRP(W)		
Frequency (MHz)				3557.5	3625	3692.5	L	M	H
15	QPSK	1	0	22.33	22.50	22.21	0.0984	0.1023	0.0957
15	16QAM	1	0	21.12	21.27	21.18	0.0745	0.0771	0.0755
Channel				55290	55990	56690	EIRP(W)		
Frequency (MHz)				3555	3625	3695	L	M	H
10	QPSK	1	0	22.29	22.50	22.21	0.0975	0.1023	0.0957
10	16QAM	1	0	21.08	21.35	21.05	0.0738	0.0785	0.0733
Channel				55265	55990	56715	EIRP(W)		
Frequency (MHz)				3552.5	3625	3697.5	L	M	H
5	QPSK	1	0	22.37	22.51	22.13	0.0993	0.1026	0.0940
5	16QAM	1	0	21.03	21.17	21.12	0.0729	0.0753	0.0745

CA_48B

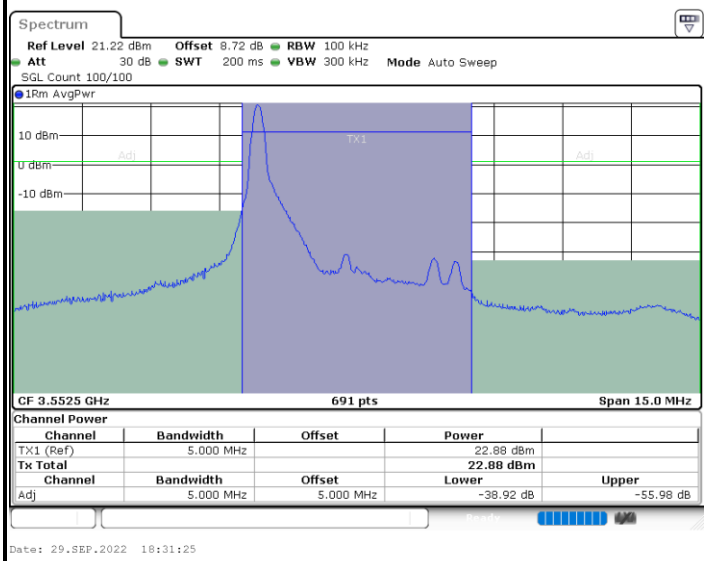
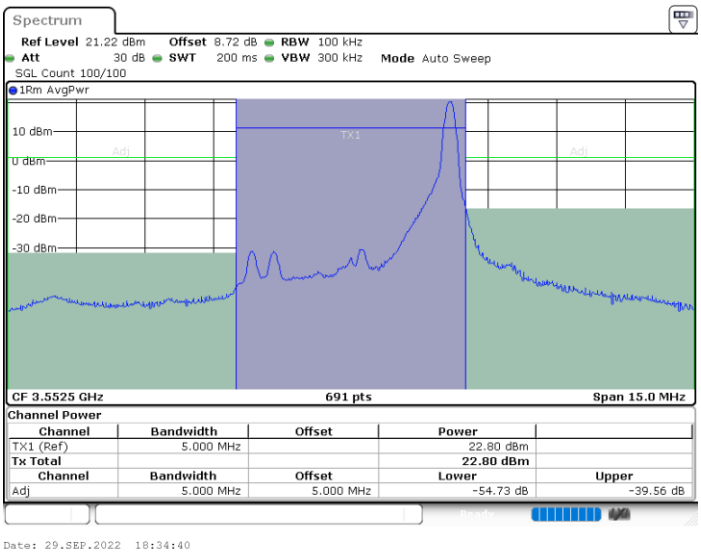
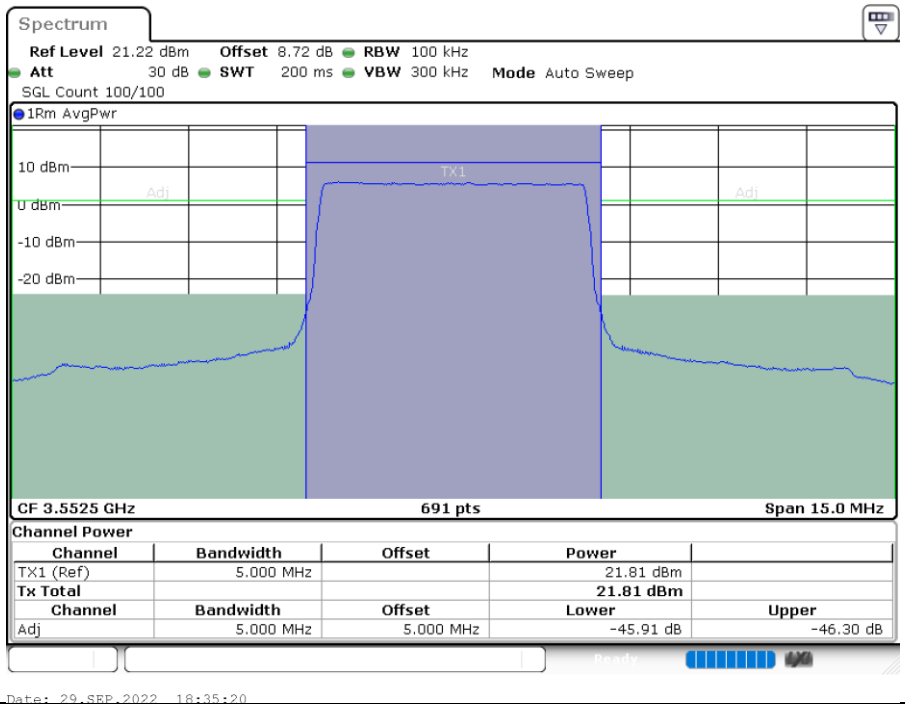
Combination 10MHz+10MHz (50RB+50RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	22.86	0.1112
M	QPSK	1	Max	1	0	22.75	0.1084
H	QPSK	1	Max	1	0	22.69	0.1069
L	16QAM	1	Max	1	0	21.89	0.0889
M	16QAM	1	Max	1	0	21.88	0.0887
H	16QAM	1	Max	1	0	21.82	0.0875
L	64QAM	1	Max	1	0	20.11	0.0590
M	64QAM	1	Max	1	0	19.89	0.0561
H	64QAM	1	Max	1	0	19.99	0.0574

CA_48C

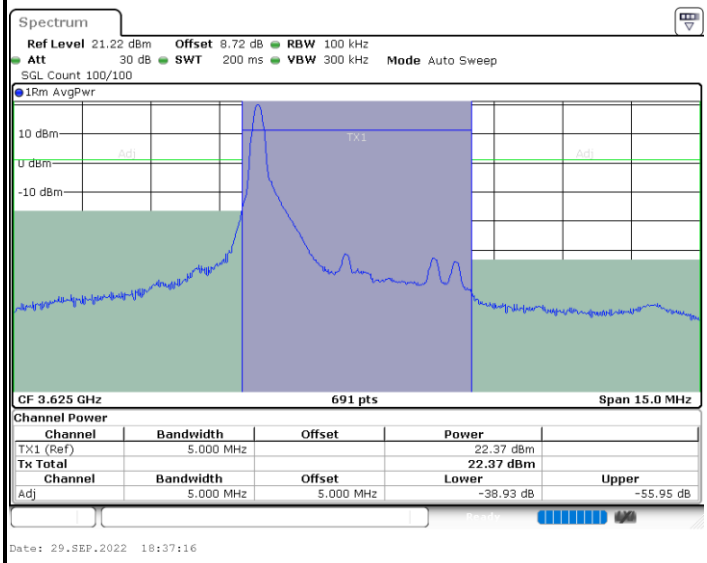
Combination 20MHz+20MHz (100RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	22.26	0.0968
M	QPSK	1	Max	1	0	22.31	0.0979
H	QPSK	1	Max	1	0	22.20	0.0955
L	16QAM	1	Max	1	0	21.13	0.0746
M	16QAM	1	Max	1	0	21.19	0.0757
H	16QAM	1	Max	1	0	21.11	0.0743
L	64QAM	1	Max	1	0	20.22	0.0605
M	64QAM	1	Max	1	0	20.27	0.0612
H	64QAM	1	Max	1	0	20.18	0.0600
Combination 15MHz+20MHz (75RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.19	0.0953
M	16QAM	1	Max	1	0	21.03	0.0729
Combination 20MHz+15MHz (100RB+75RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.11	0.0935
M	16QAM	1	Max	1	0	21.09	0.0740
Combination 10MHz+20MHz (50RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.17	0.0948
M	16QAM	1	Max	1	0	21.13	0.0746
Combination 20MHz+10MHz (100RB+50RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	22.09	0.0931
M	16QAM	1	Max	1	0	21.03	0.0729
Combination 5MHz+20MHz (25RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	21.98	0.0908
M	16QAM	1	Max	1	0	21.03	0.0729
Combination 20MHz+5MHz (100RB+25RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	21.96	0.0904
M	16QAM	1	Max	1	0	20.08	0.0586

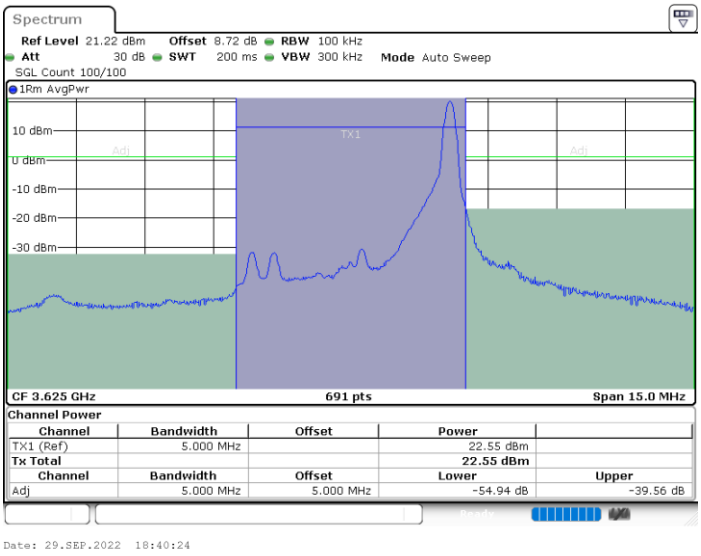
LTE Band 48

ACLR

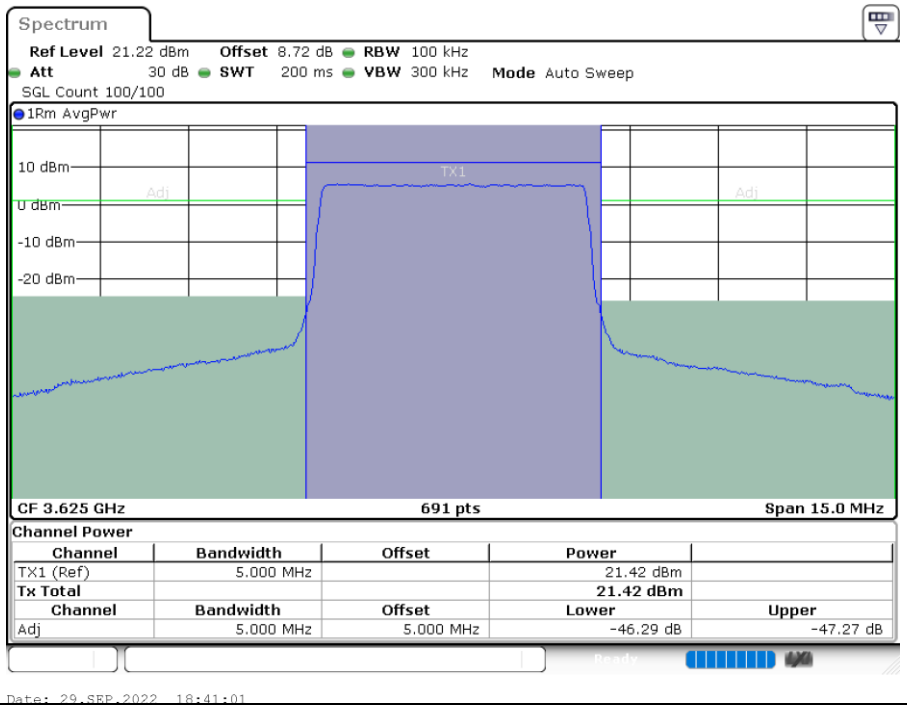
LTE Band 48 / 5MHz / QPSK	
Lowest Channel / 1RB0	**Lowest Channel / 1RBmax**
	
Lowest Channel / Full RB	
	

LTE Band 48 / 5MHz	
QPSK	
Middle Channel / 1RB0	Middle Channel / 1RBmax

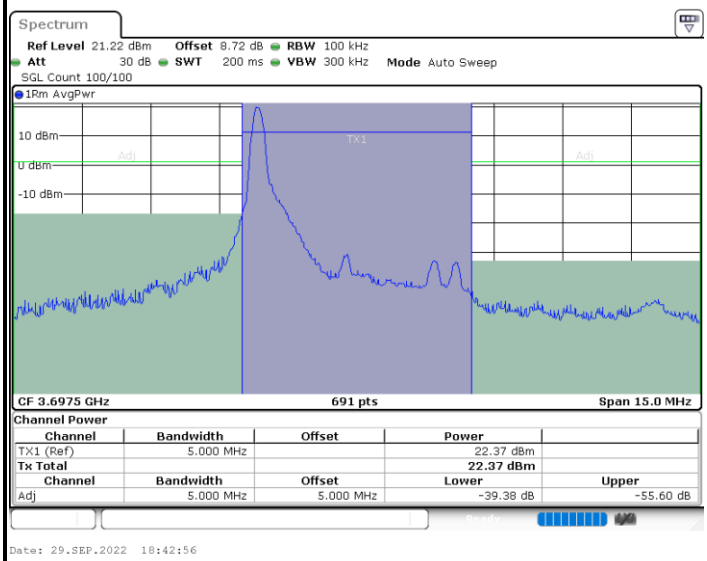


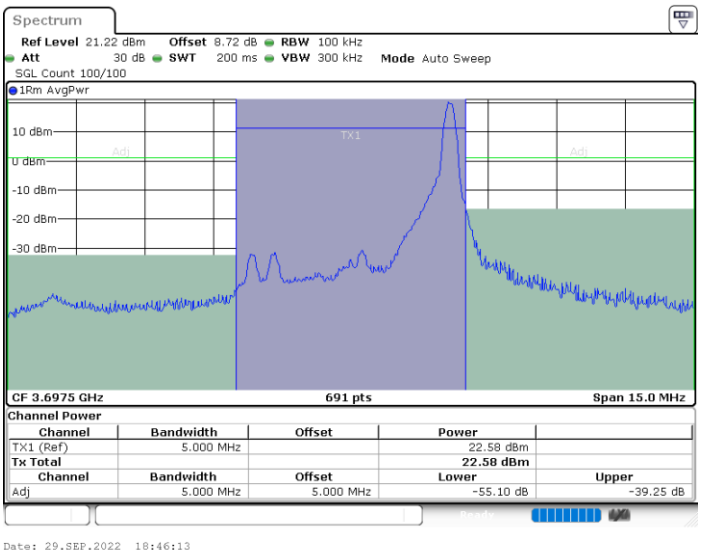


Middle Channel / Full RB

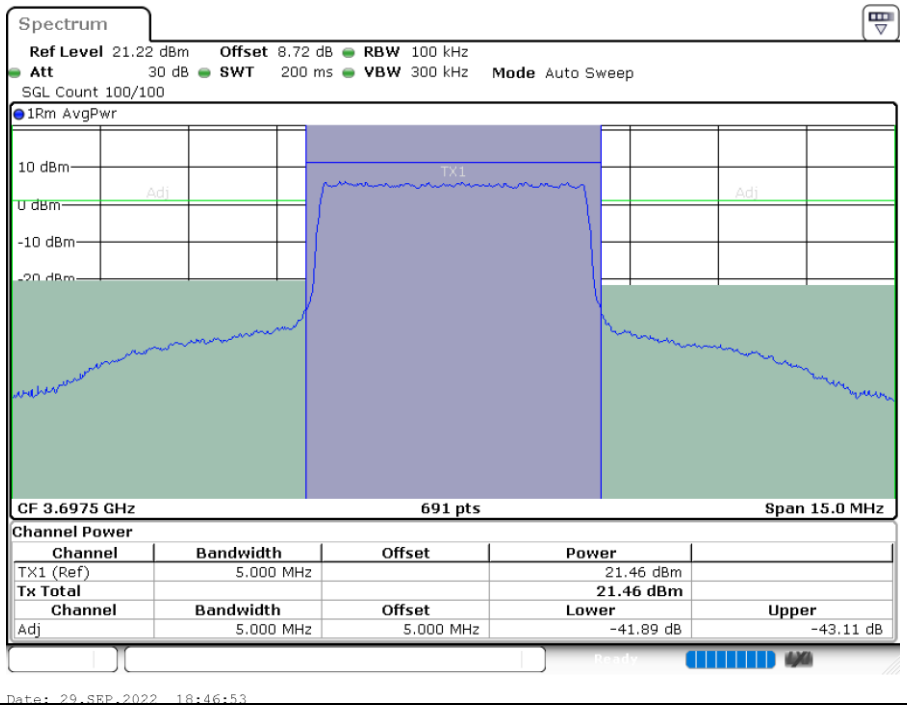


LTE Band 48 / 5MHz	
QPSK	
Highest Channel / 1RB0	Highest Channel / 1RBmax

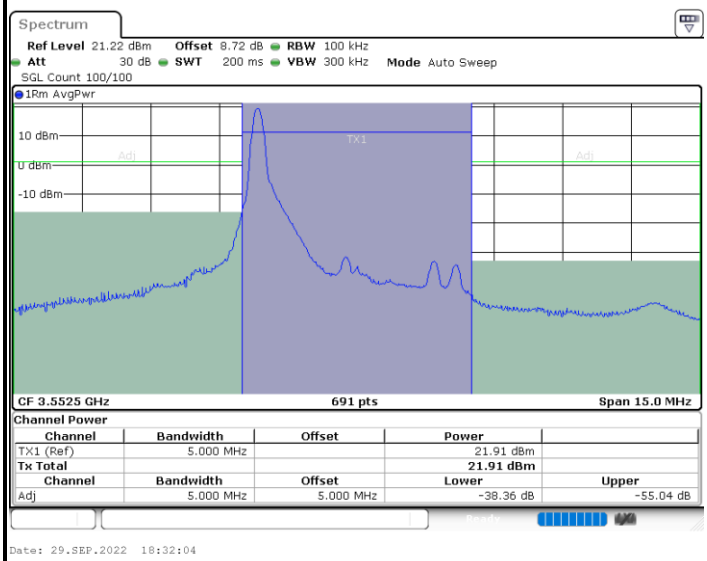


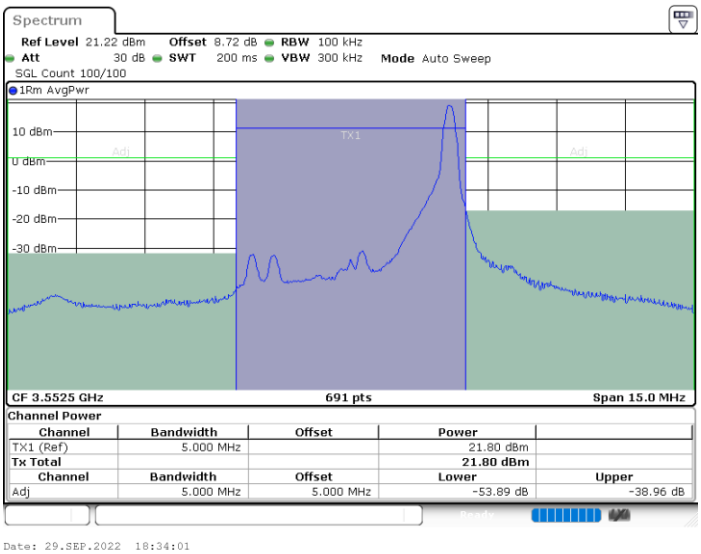


Highest Channel / Full RB

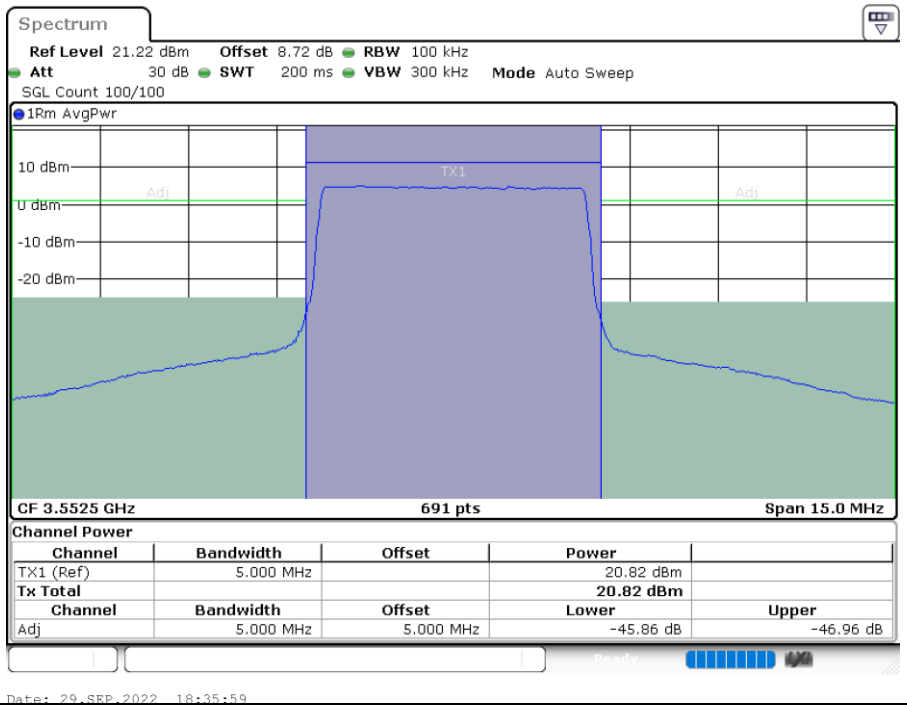


LTE Band 48 / 5MHz	
16QAM	
Lowest Channel / 1RB0	Lowest Channel / 1RBmax

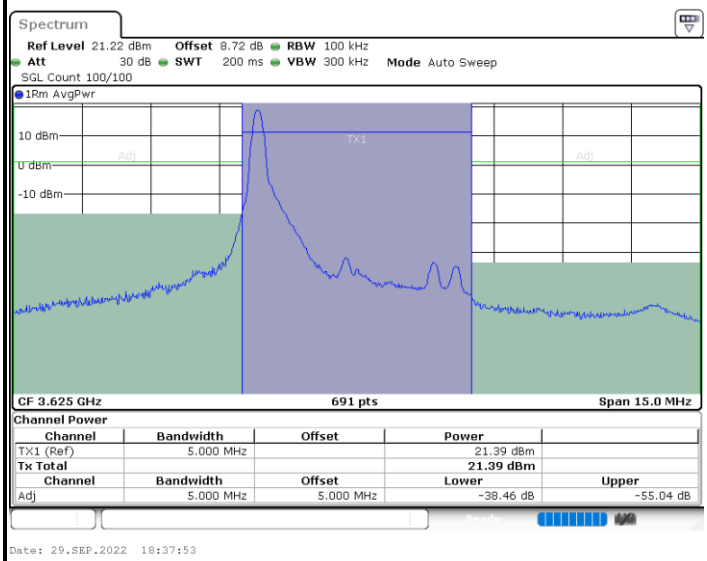


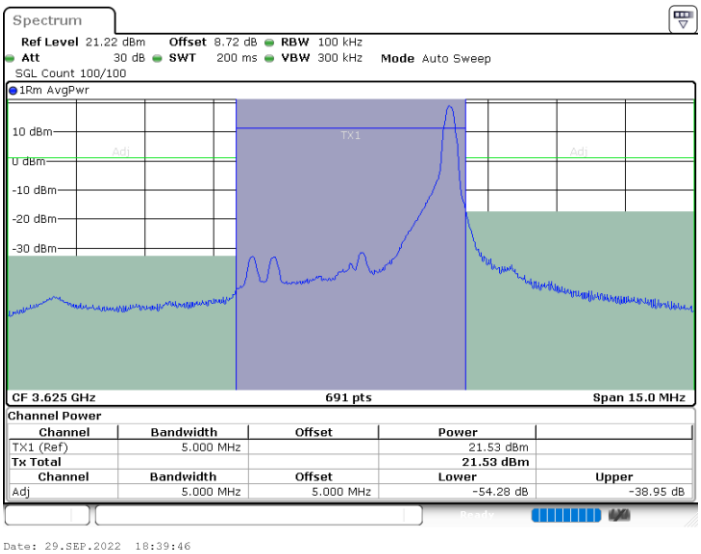


Lowest Channel / Full RB

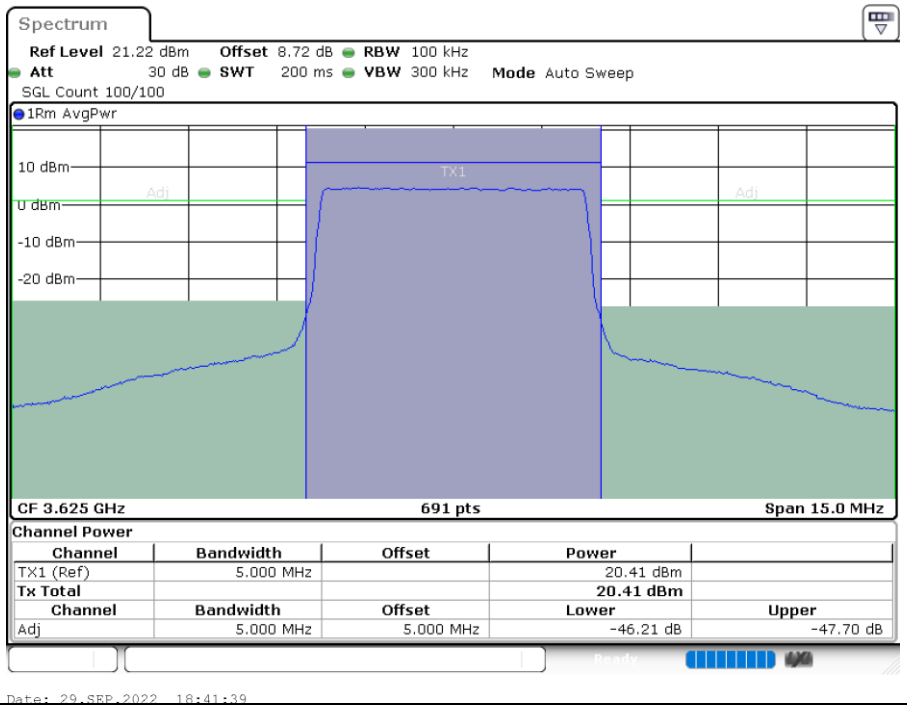


LTE Band 48 / 5MHz	
16QAM	
Middle Channel / 1RB0	Middle Channel / 1RBmax

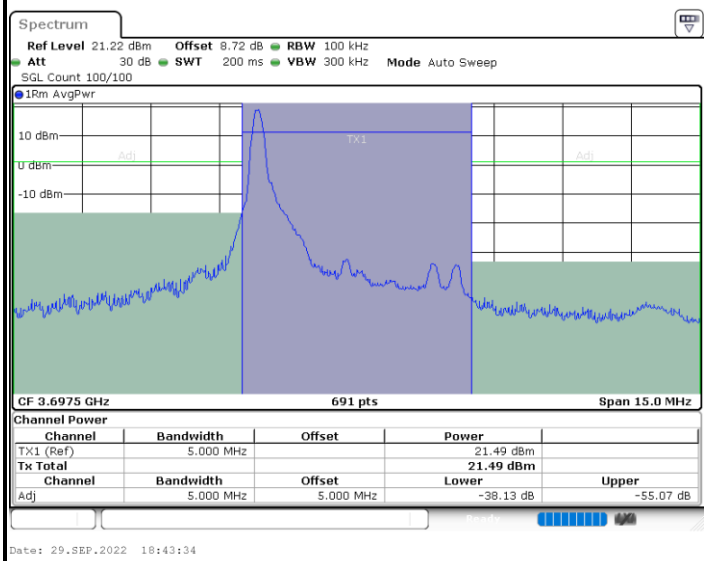


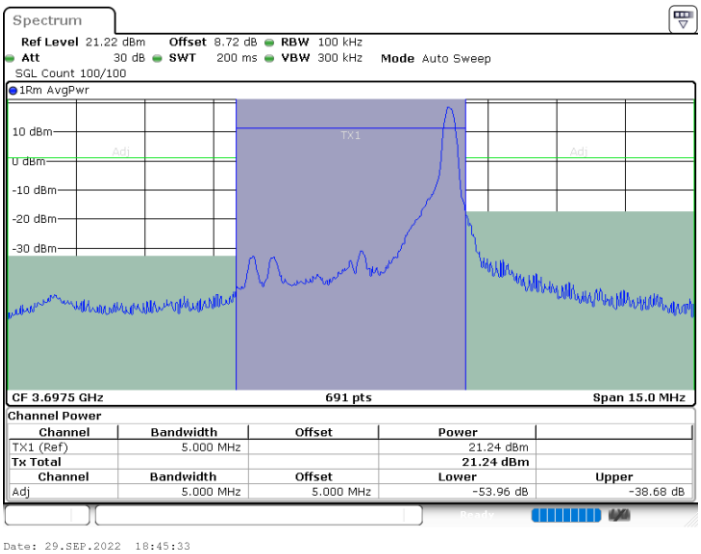


Middle Channel / Full RB

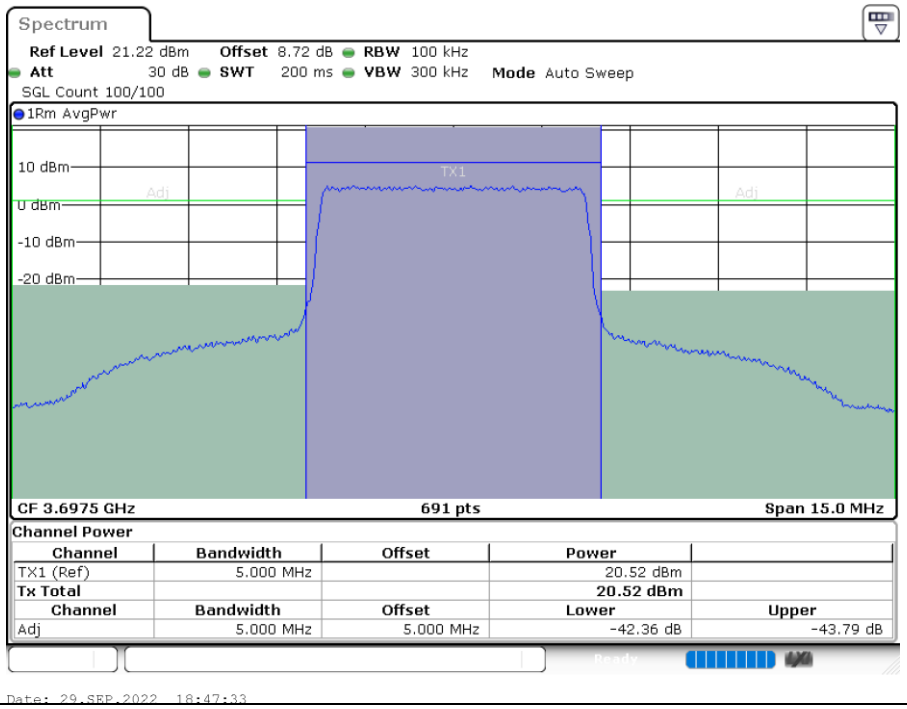


LTE Band 48 / 5MHz	
16QAM	
Highest Channel / 1RB0	Highest Channel / 1RBmax

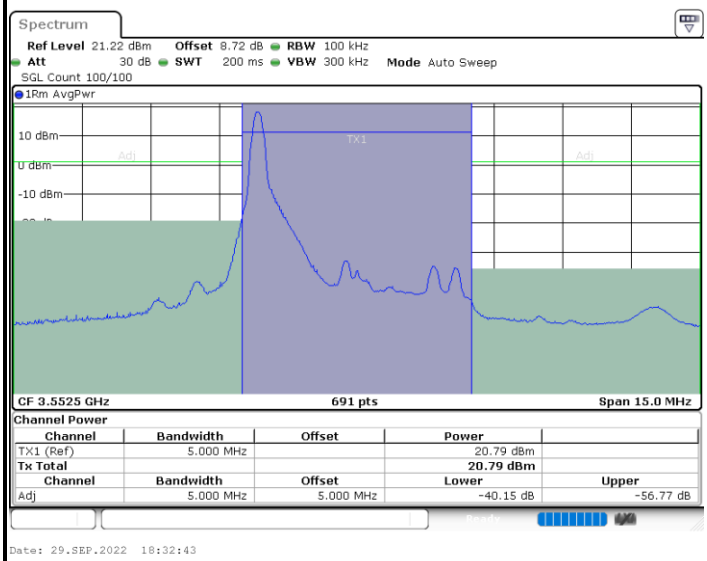


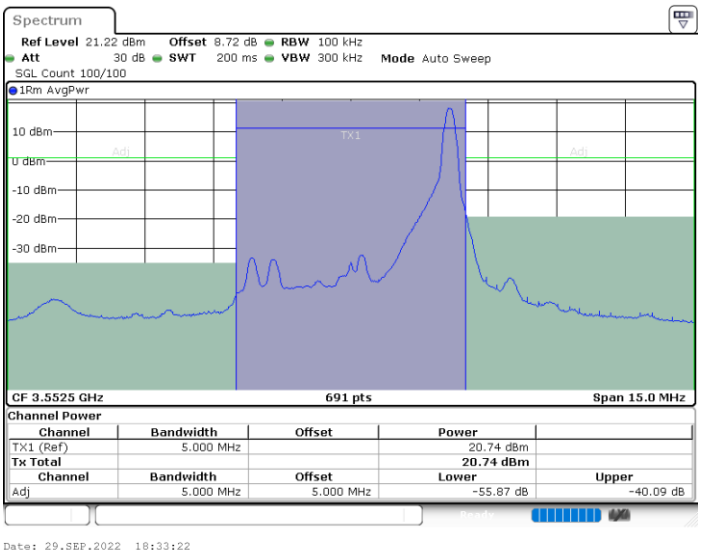


Highest Channel / Full RB

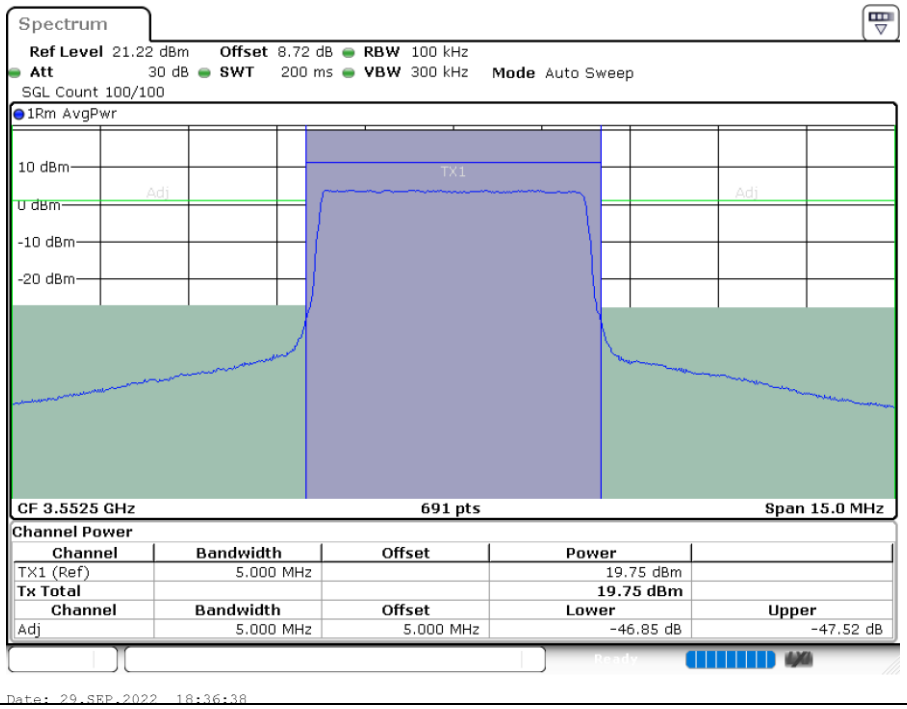


LTE Band 48 / 5MHz	
64QAM	
Lowest Channel / 1RB0	Lowest Channel / 1RBmax

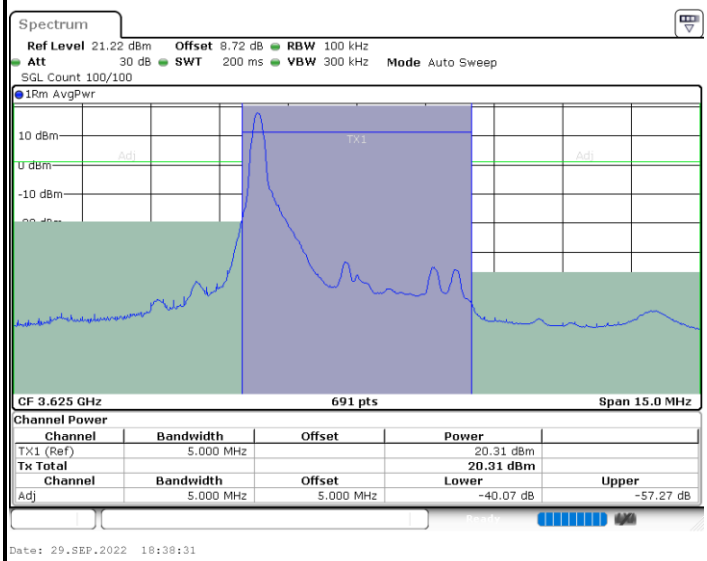


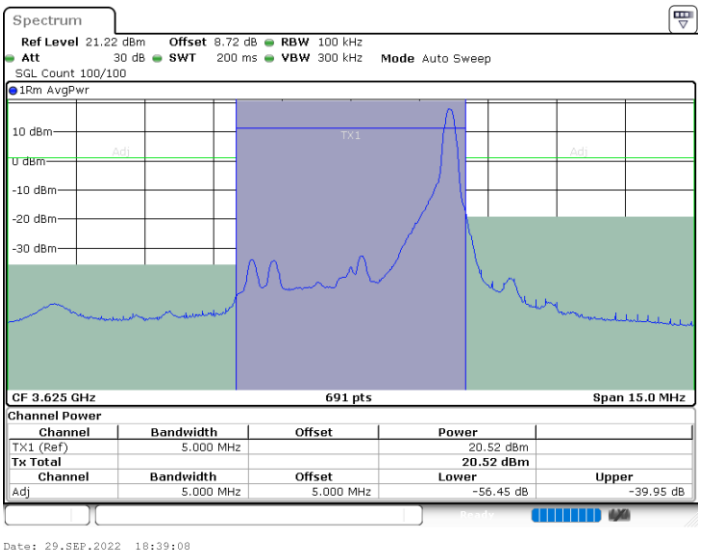


Lowest Channel / Full RB

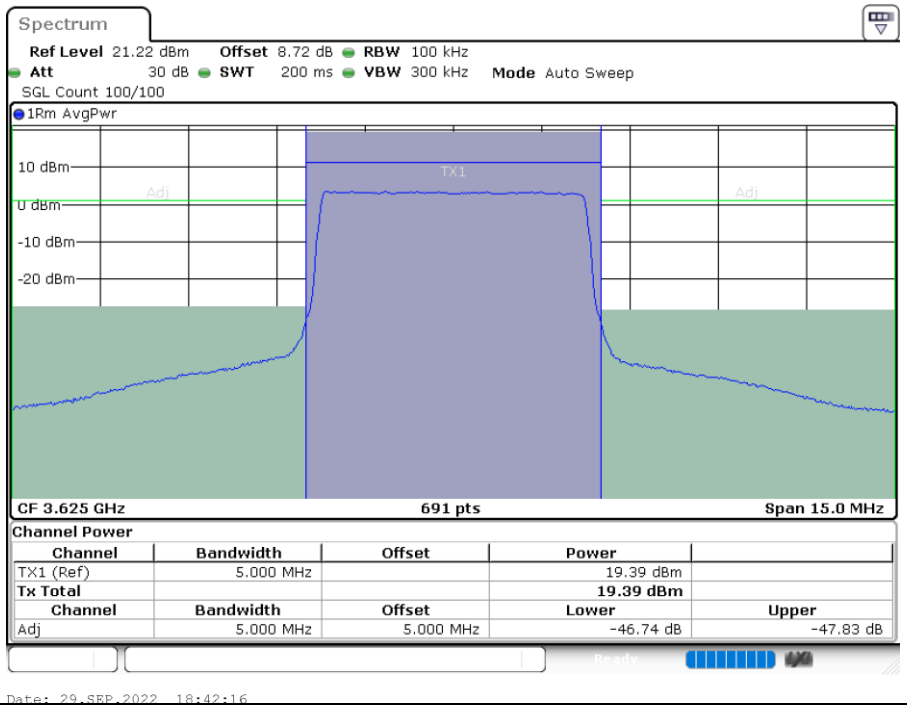


LTE Band 48 / 5MHz	
64QAM	
Middle Channel / 1RB0	Middle Channel / 1RBmax

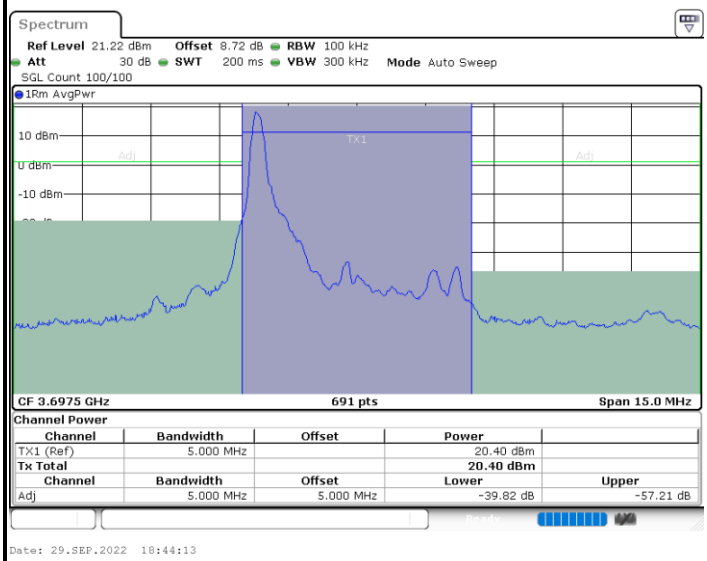


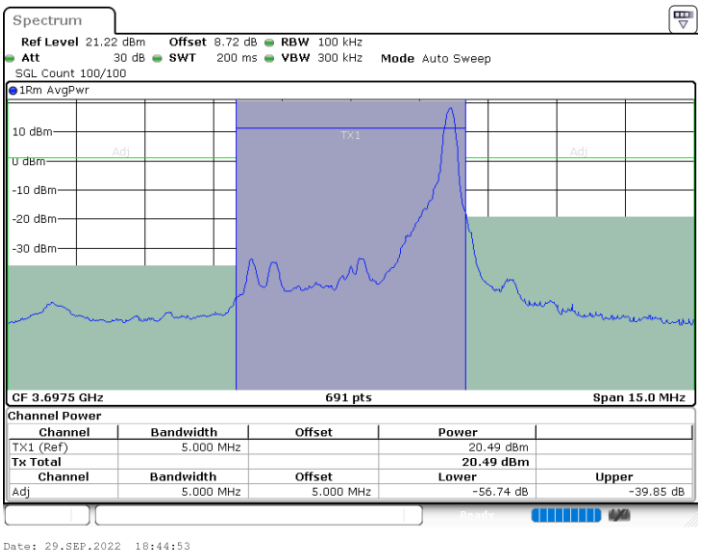


Middle Channel / Full RB

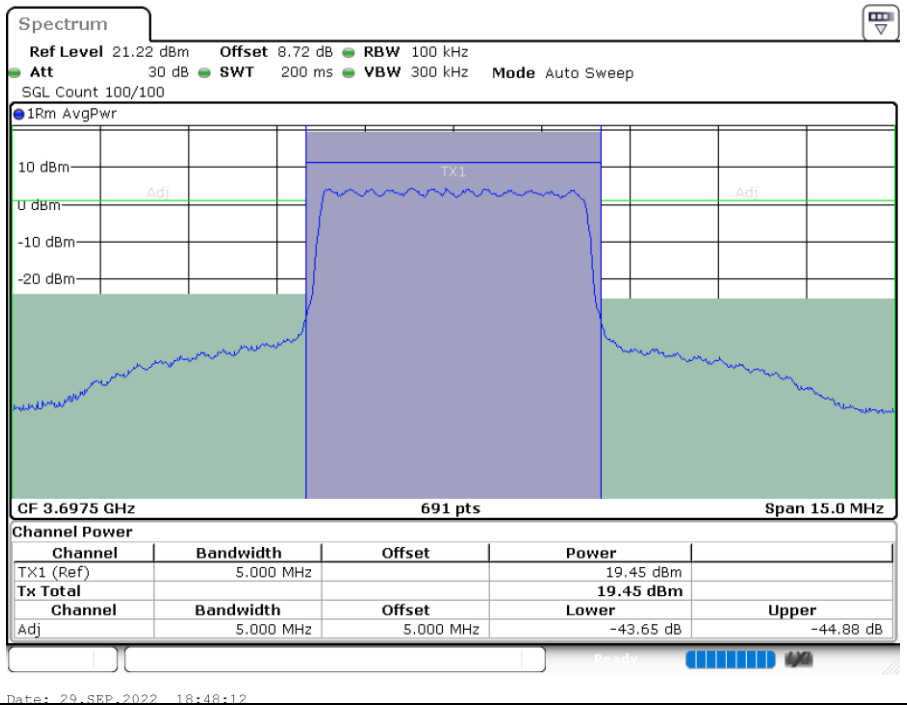


LTE Band 48 / 5MHz	
64QAM	
Highest Channel / 1RB0	Highest Channel / 1RBmax

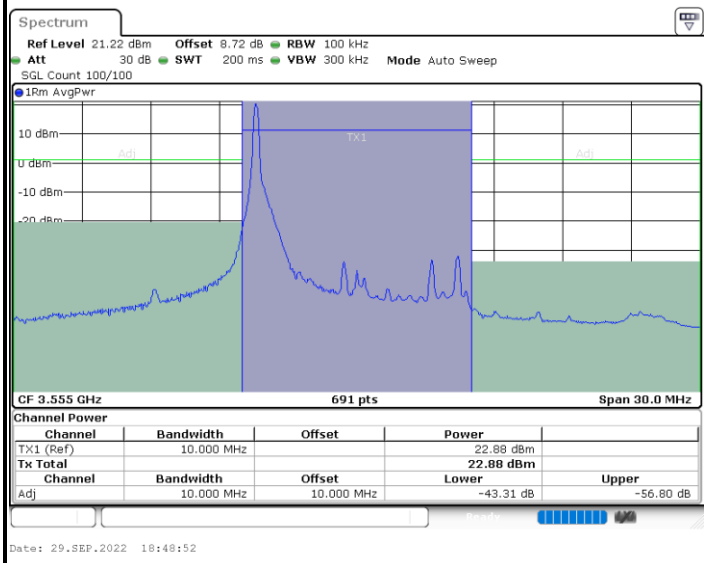


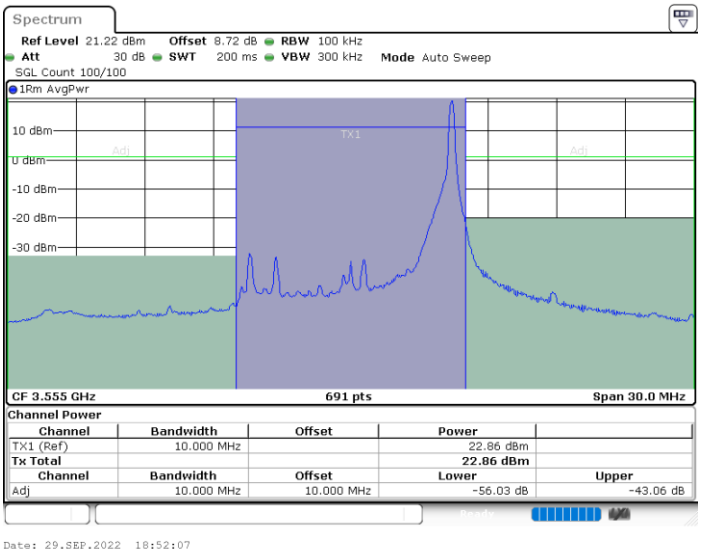


Highest Channel / Full RB

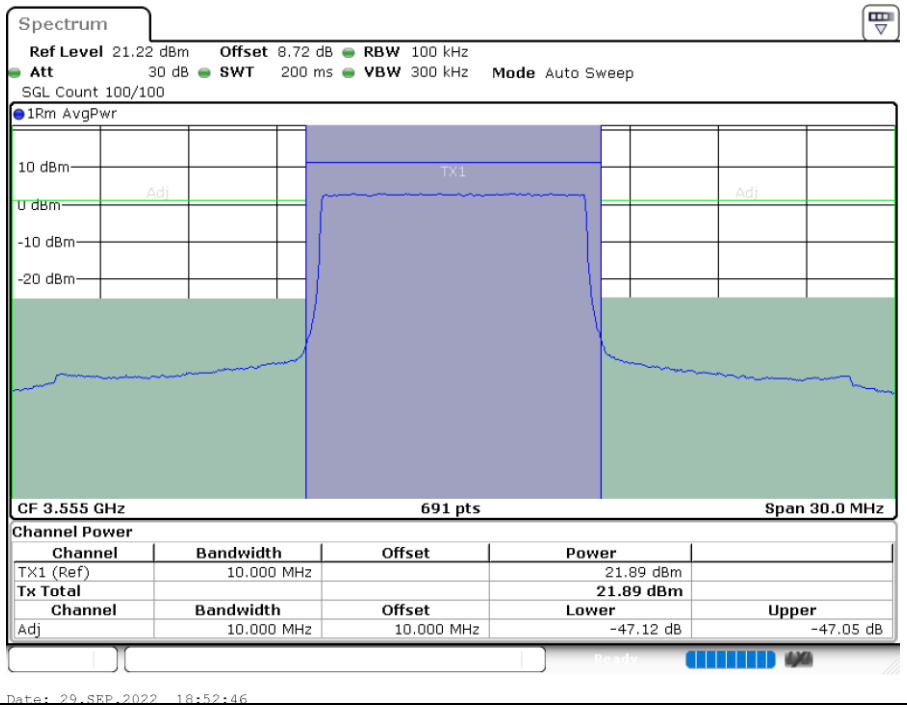


LTE Band 48 / 10MHz	
QPSK	
Lowest Channel / 1RB0	Lowest Channel / 1RBmax

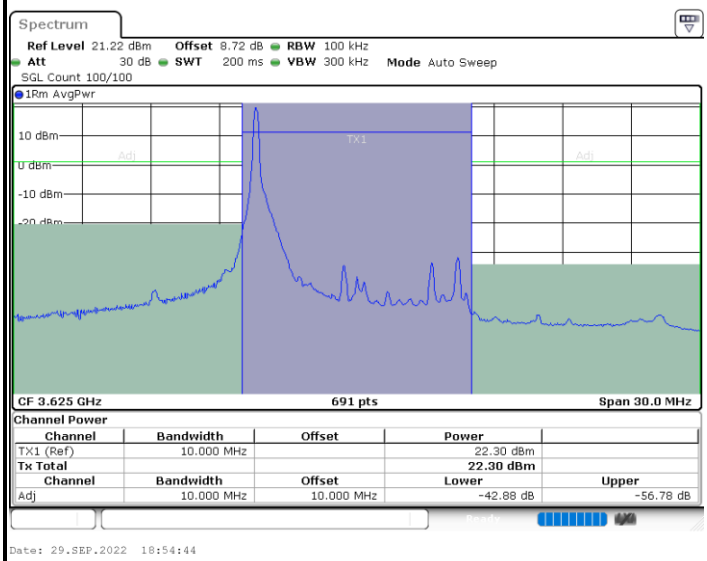


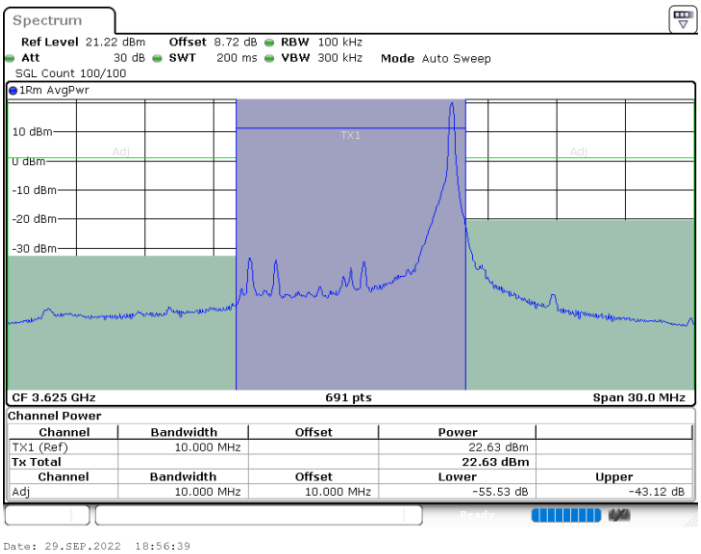


Lowest Channel / Full RB

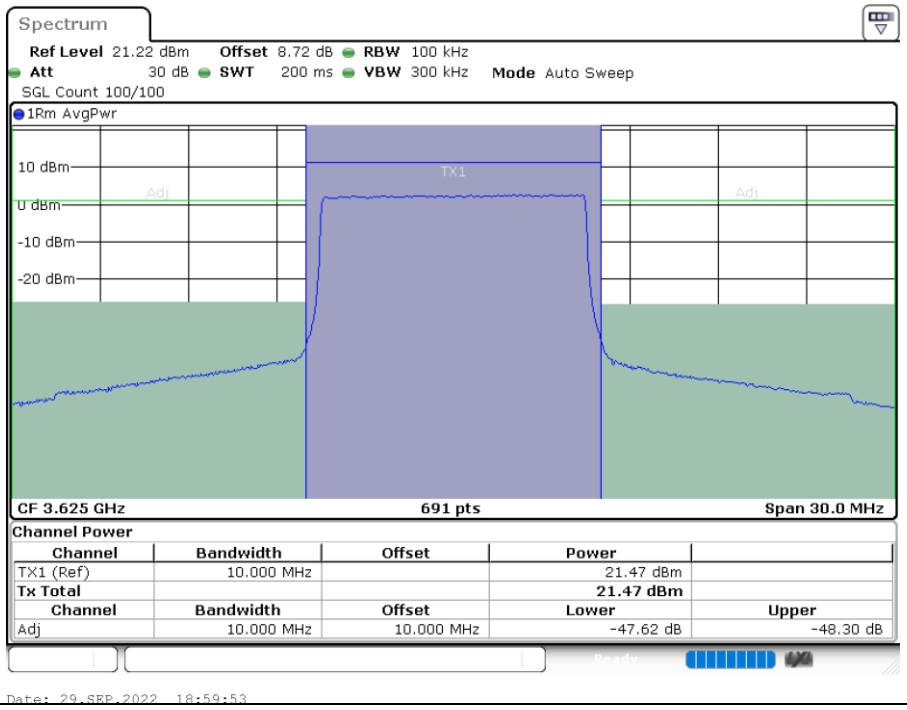


LTE Band 48 / 10MHz	
QPSK	
Middle Channel / 1RB0	Middle Channel / 1RBmax

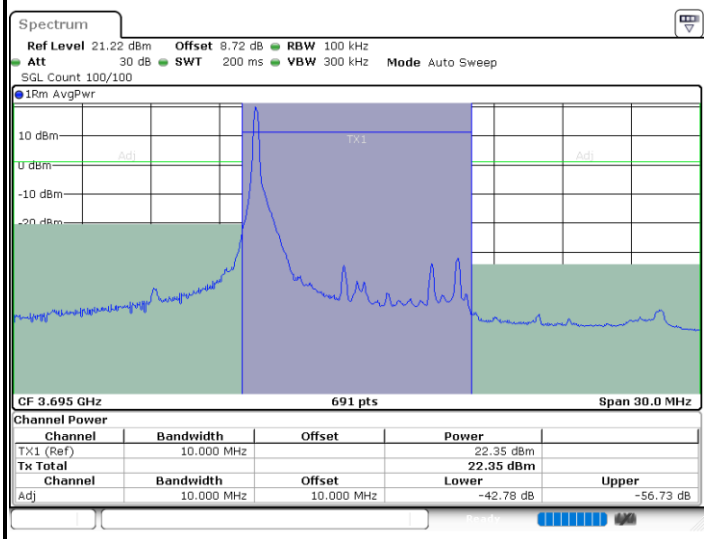


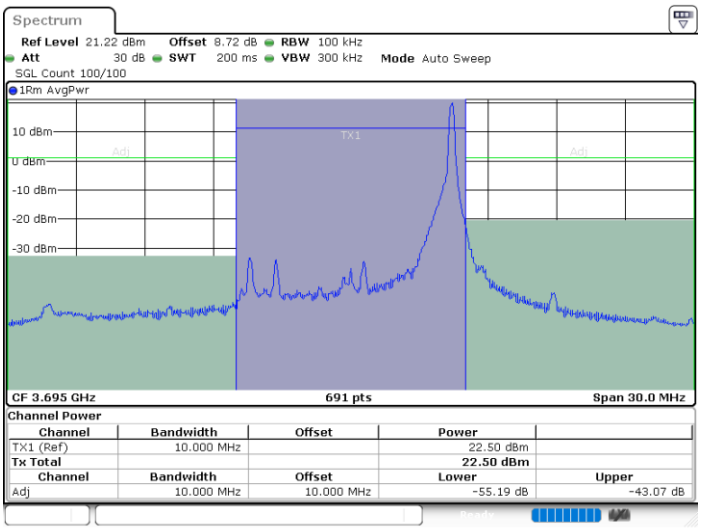


Middle Channel / Full RB

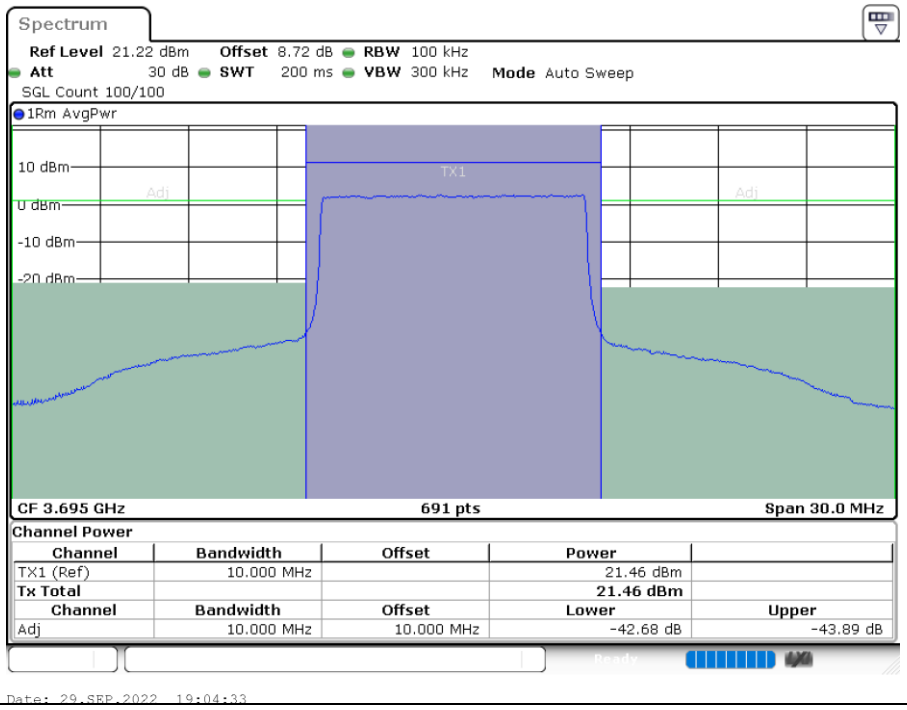


LTE Band 48 / 10MHz	
QPSK	
Highest Channel / 1RB0	Highest Channel / 1RBmax

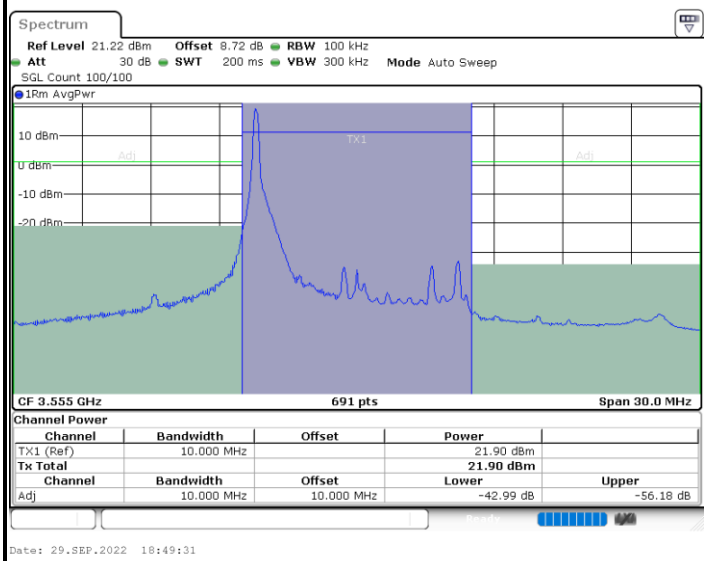


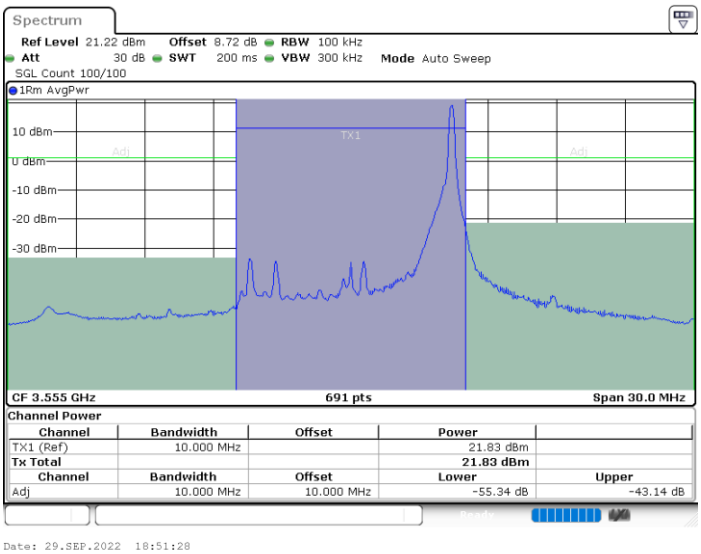


Highest Channel / Full RB

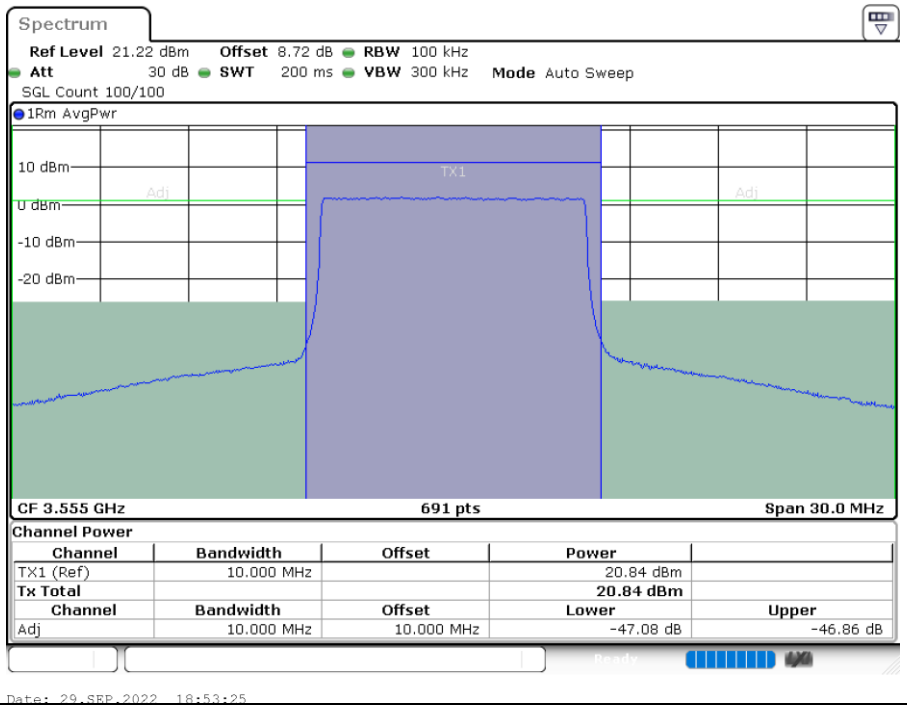


LTE Band 48 / 10MHz	
16QAM	
Lowest Channel / 1RB0	Lowest Channel / 1RBmax

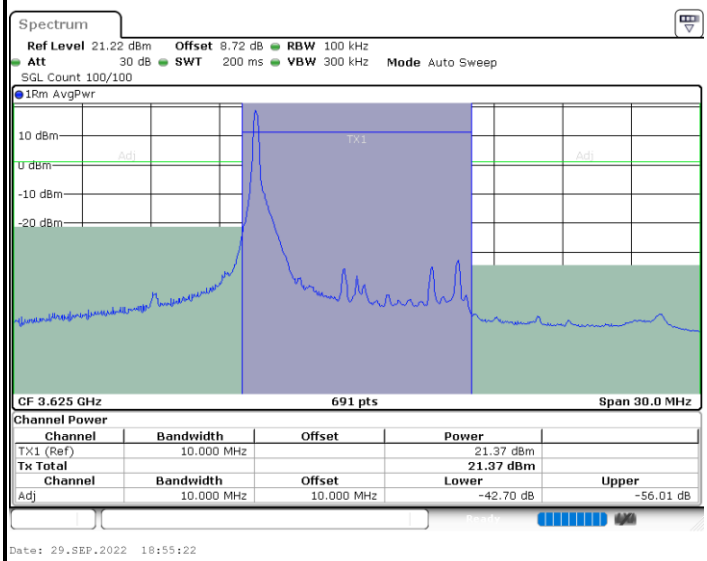


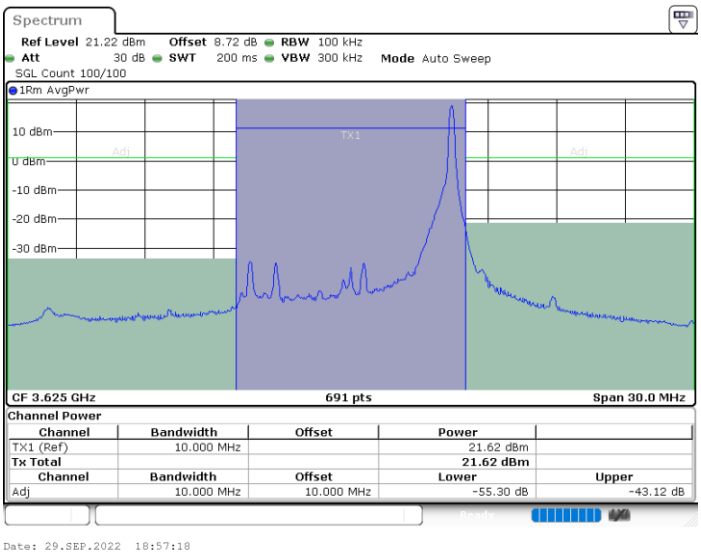


Lowest Channel / Full RB

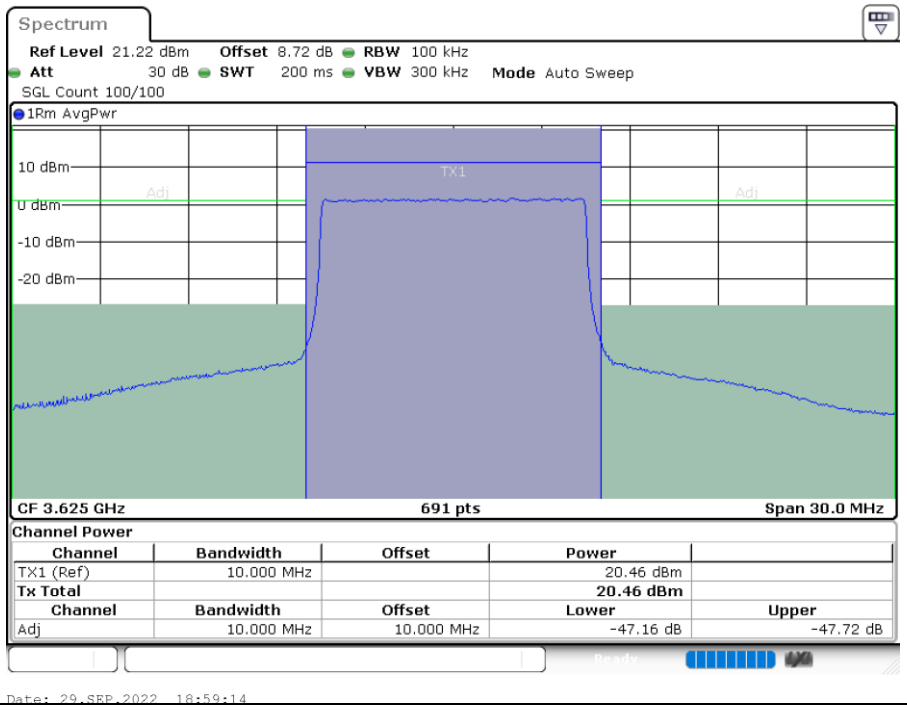


LTE Band 48 / 10MHz	
16QAM	
Middle Channel / 1RB0	Middle Channel / 1RBmax

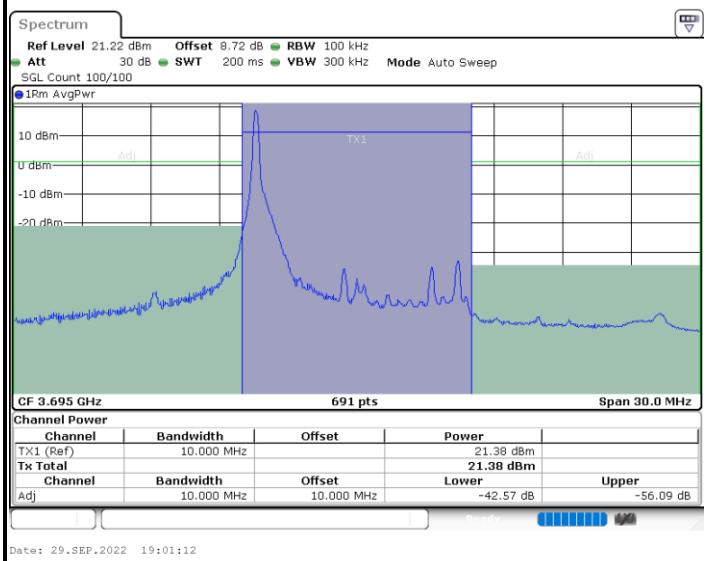


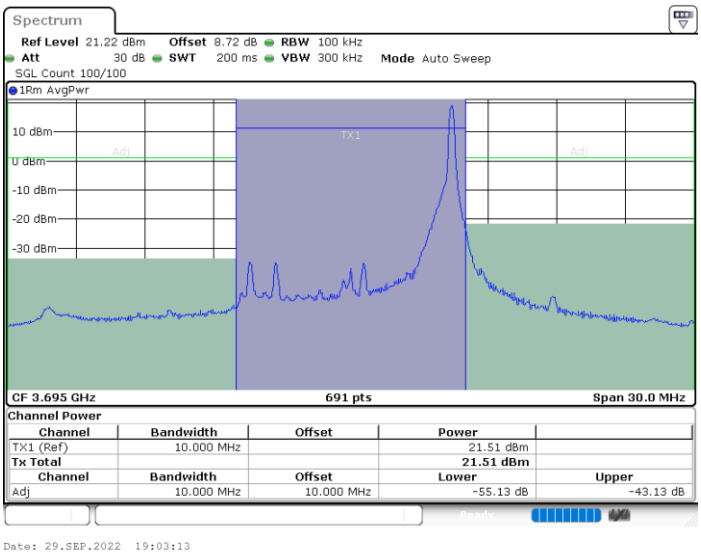


Middle Channel / Full RB

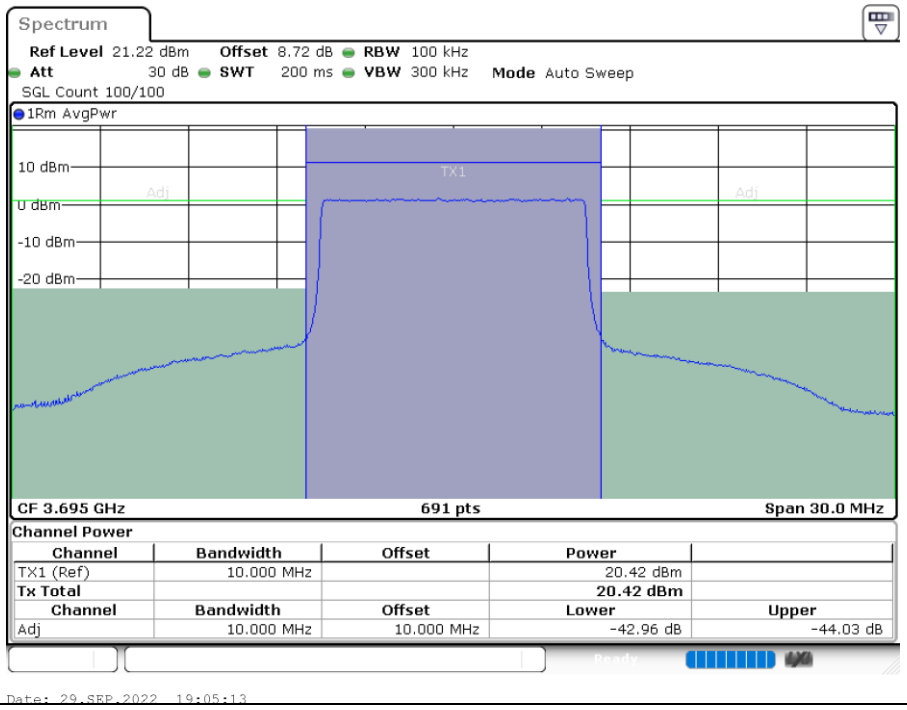


LTE Band 48 / 10MHz	
16QAM	
Highest Channel / 1RB0	Highest Channel / 1RBmax

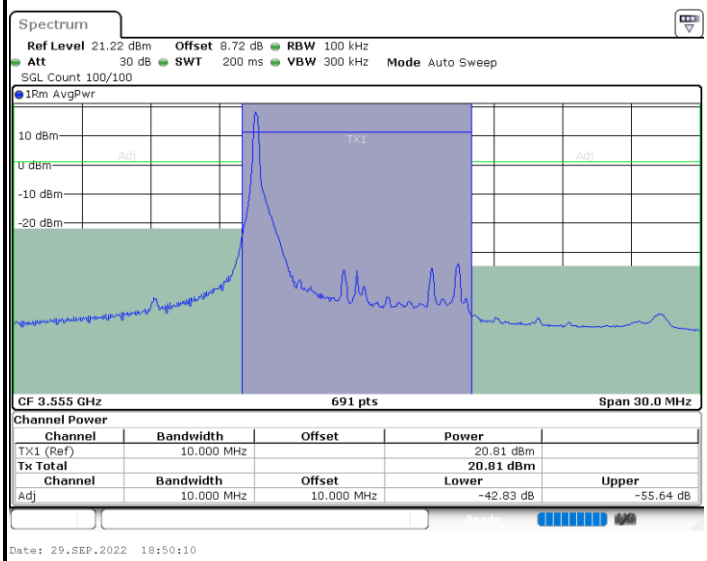


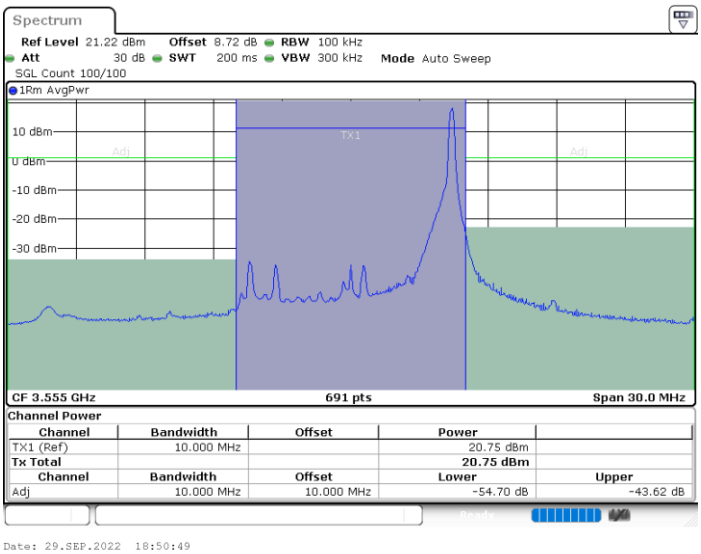


Highest Channel / Full RB

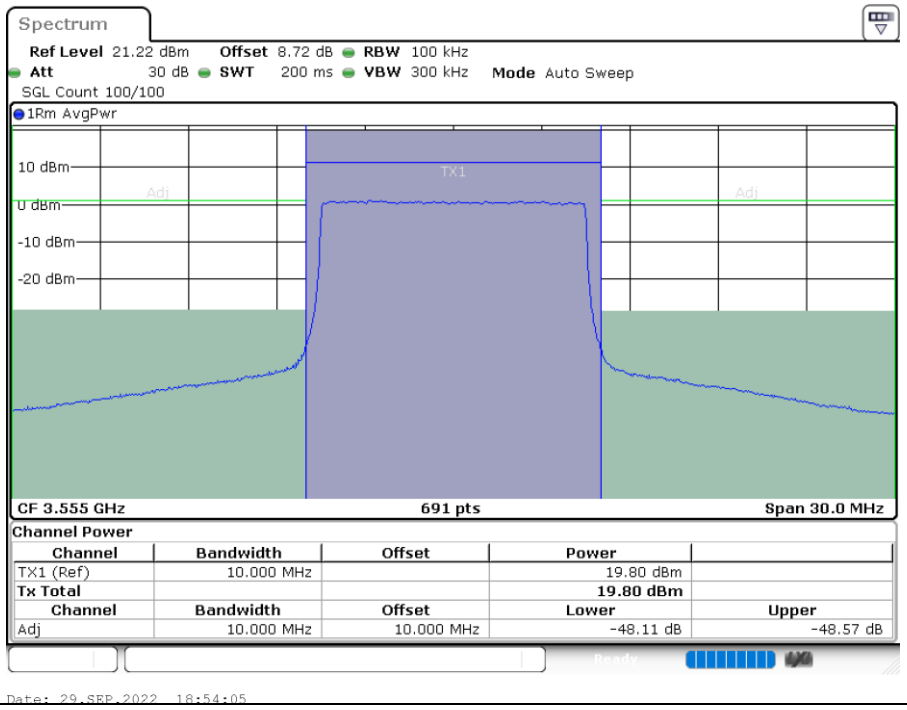


LTE Band 48 / 10MHz	
64QAM	
Lowest Channel / 1RB0	Lowest Channel / 1RBmax

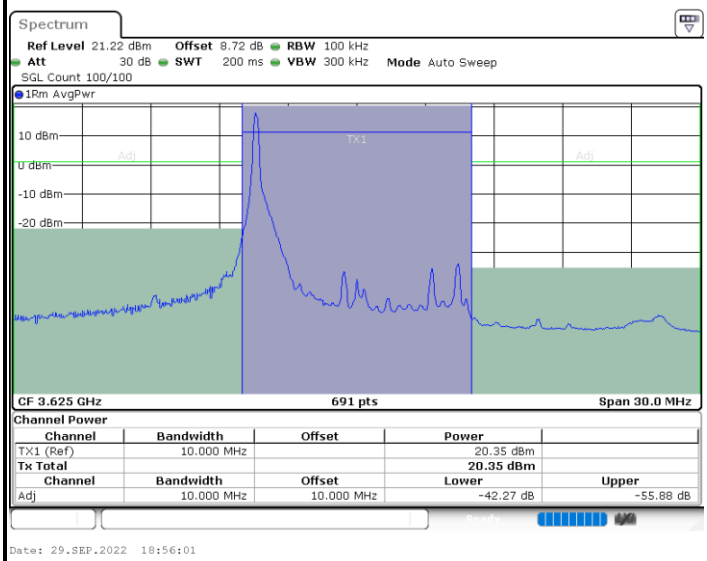


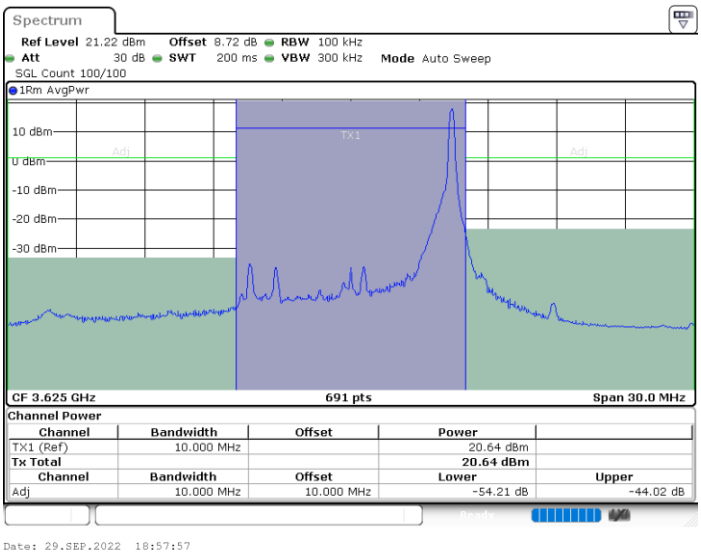


Lowest Channel / Full RB

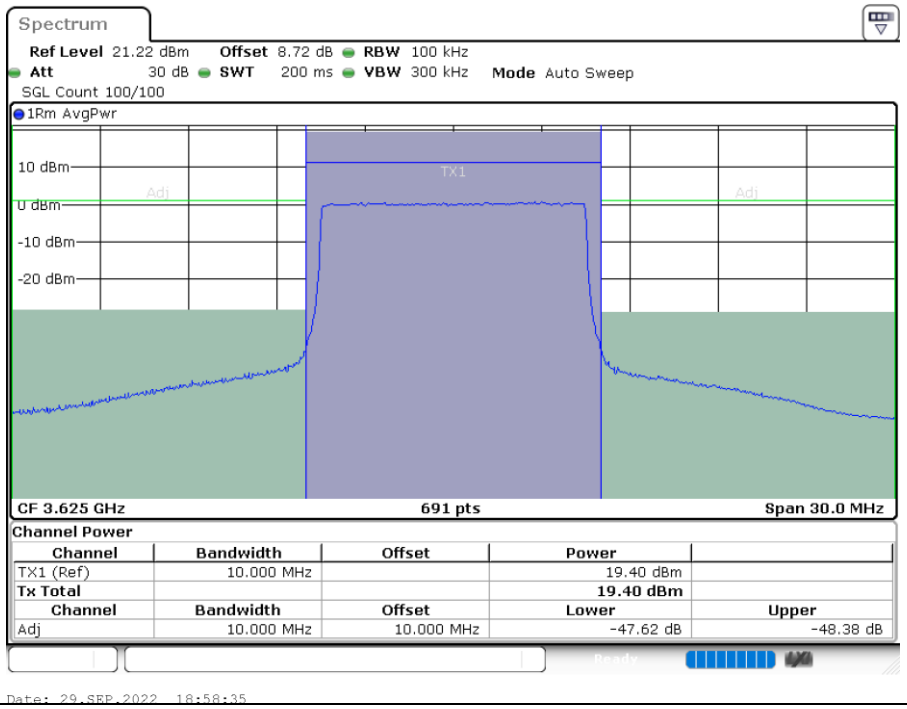


LTE Band 48 / 10MHz	
64QAM	
Middle Channel / 1RB0	Middle Channel / 1RBmax

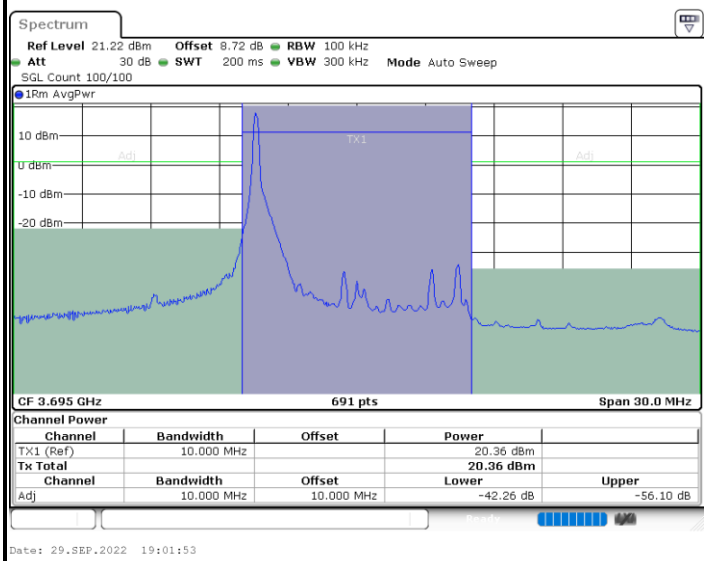


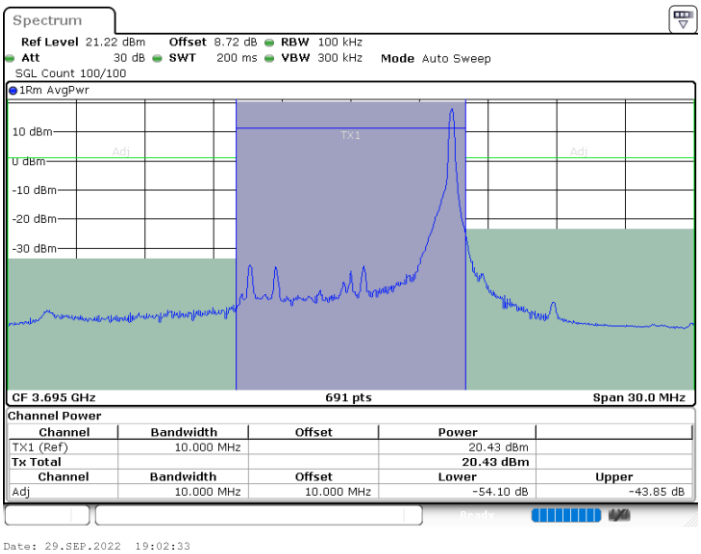


Middle Channel / Full RB

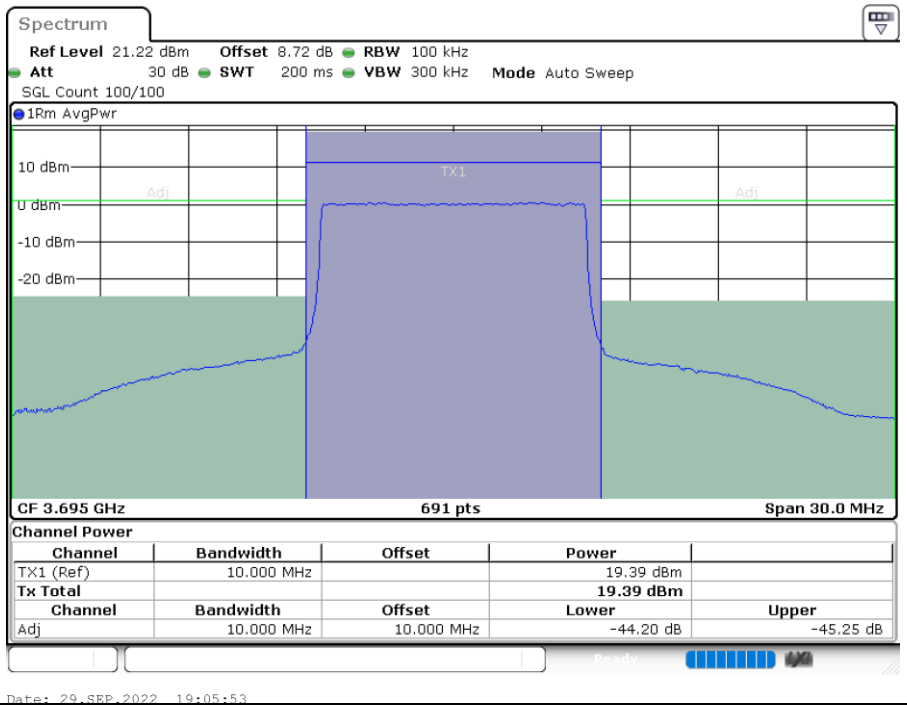


LTE Band 48 / 10MHz	
64QAM	
Highest Channel / 1RB0	Highest Channel / 1RBmax

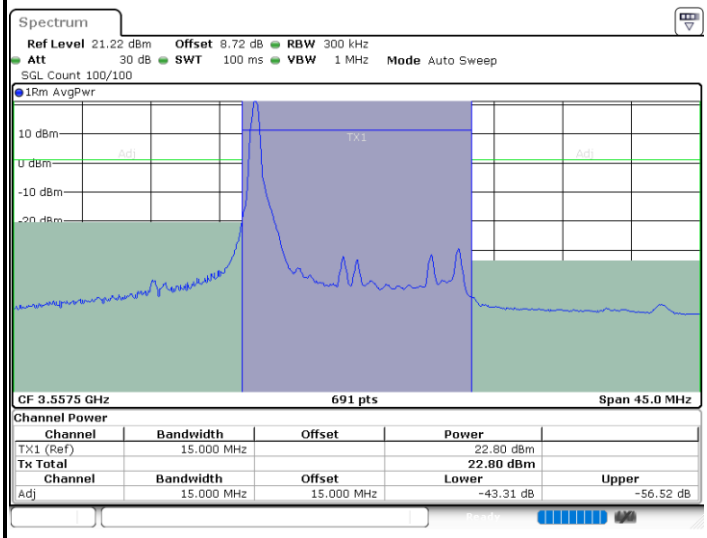


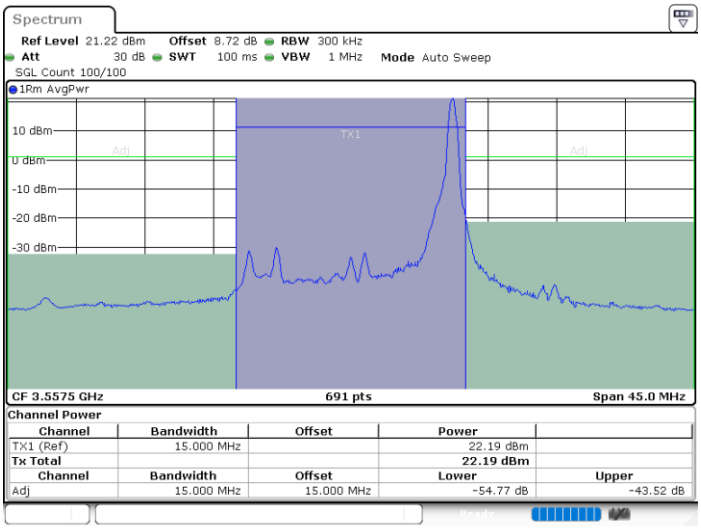


Highest Channel / Full RB

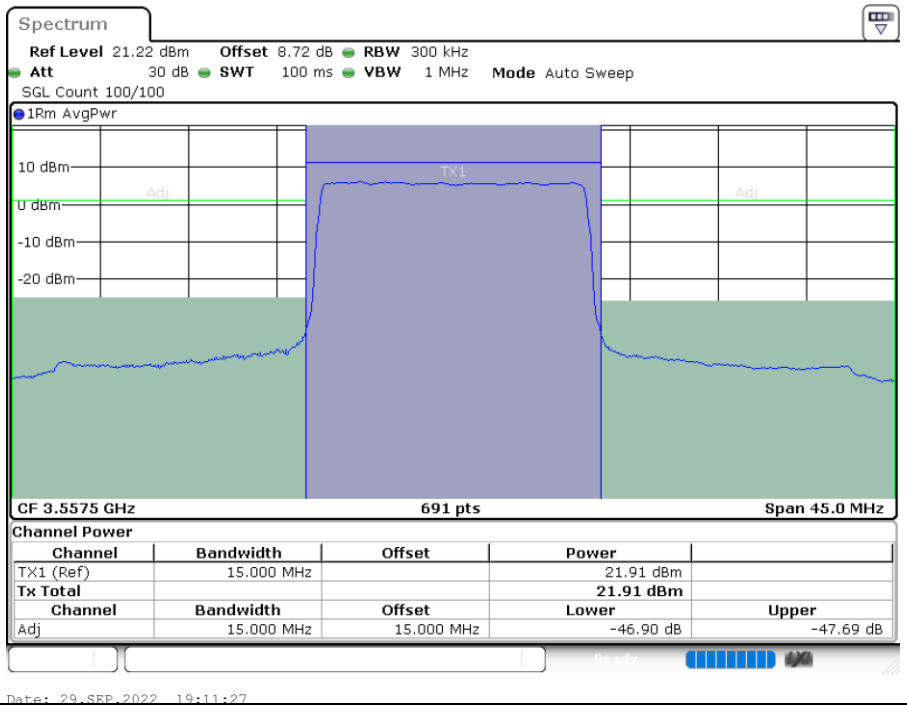


LTE Band 48 / 15MHz	
QPSK	
Lowest Channel / 1RB0	Lowest Channel / 1RBmax

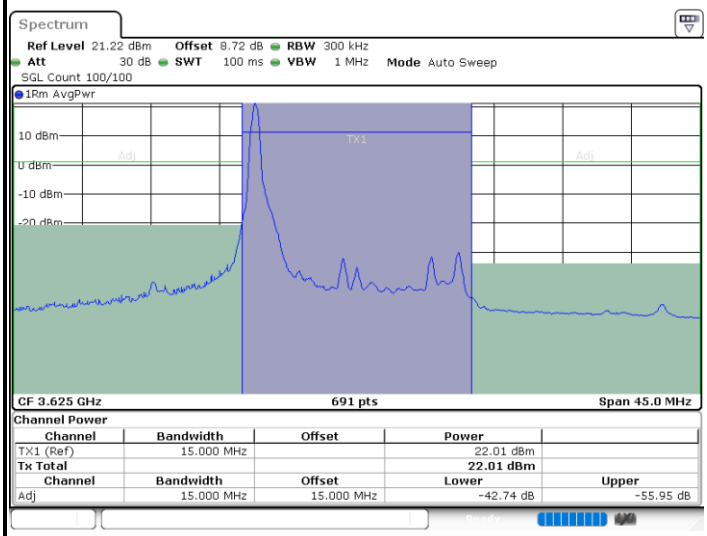


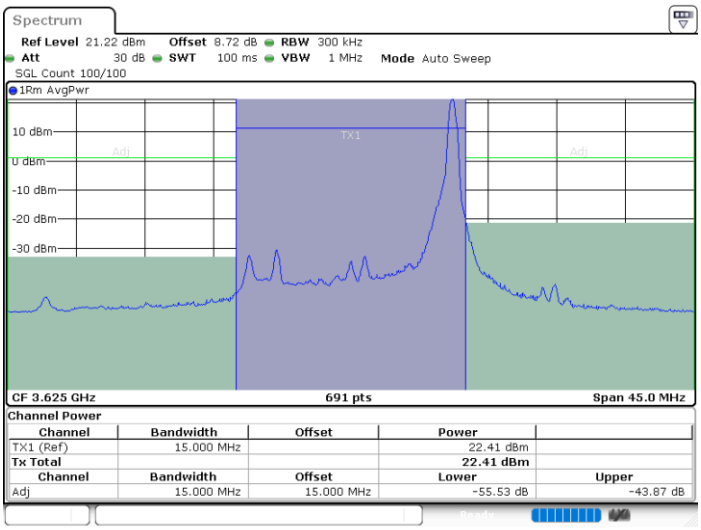


Lowest Channel / Full RB

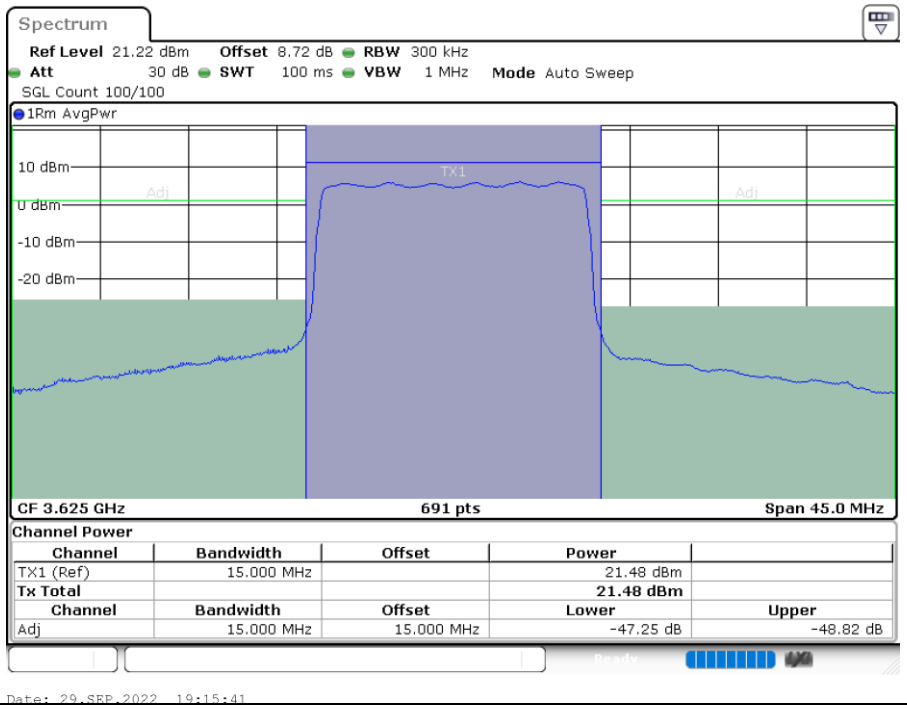


LTE Band 48 / 15MHz	
QPSK	
Middle Channel / 1RB0	Middle Channel / 1RBmax

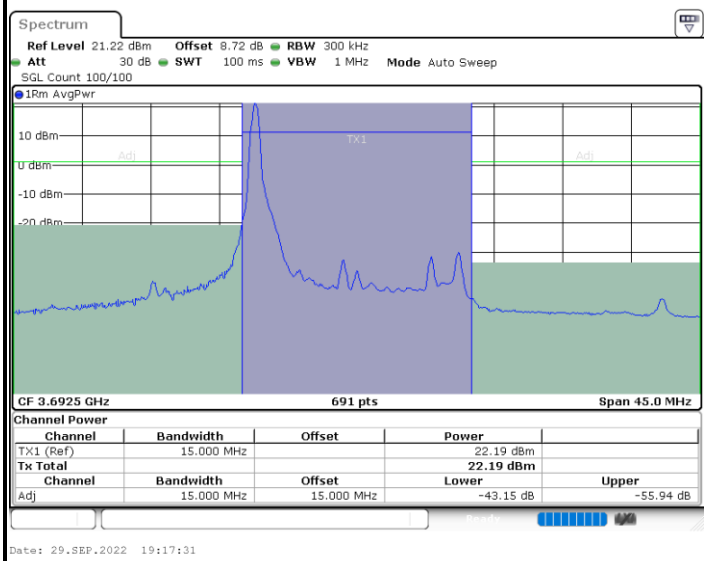


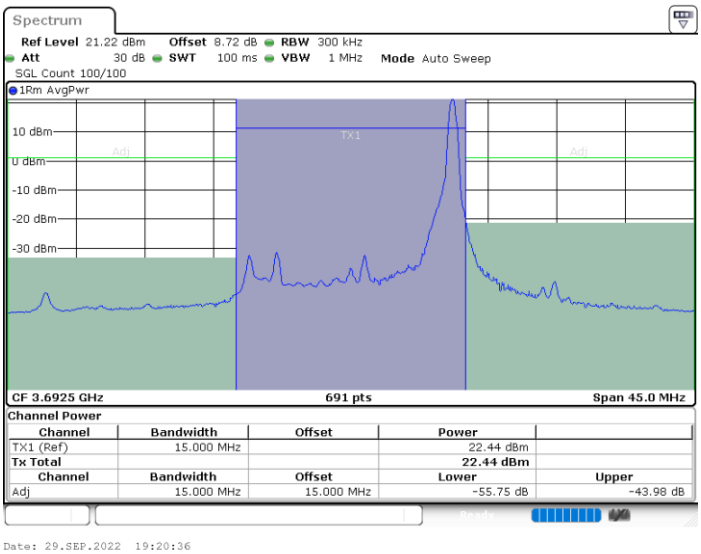


Middle Channel / Full RB

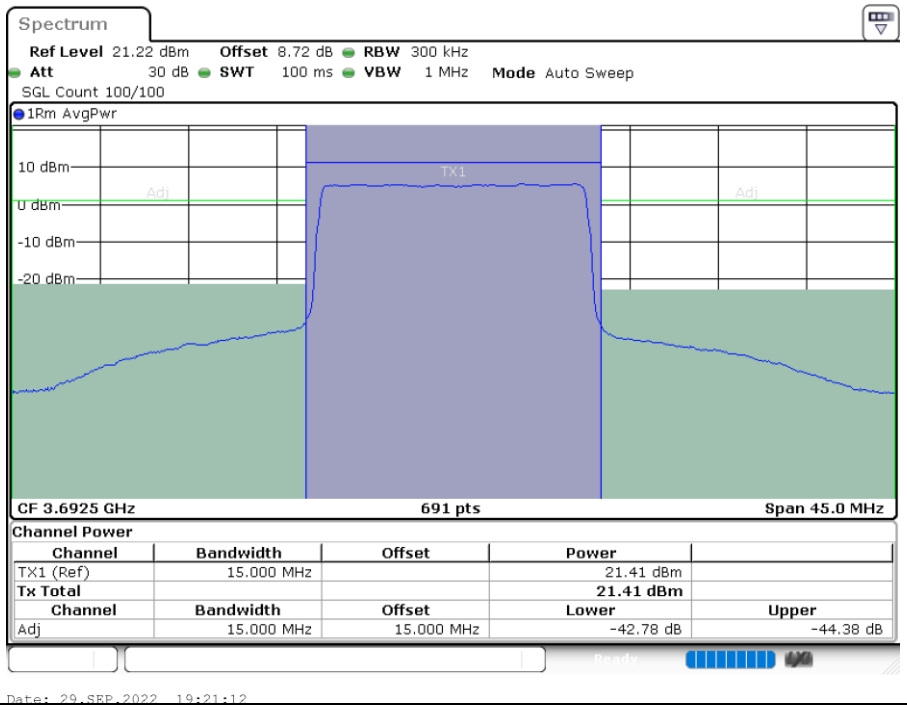


LTE Band 48 / 15MHz	
QPSK	
Highest Channel / 1RB0	Highest Channel / 1RBmax

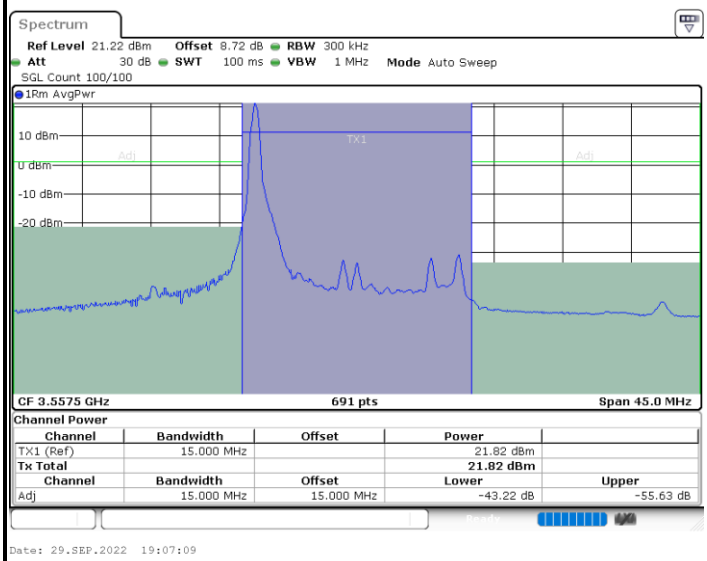


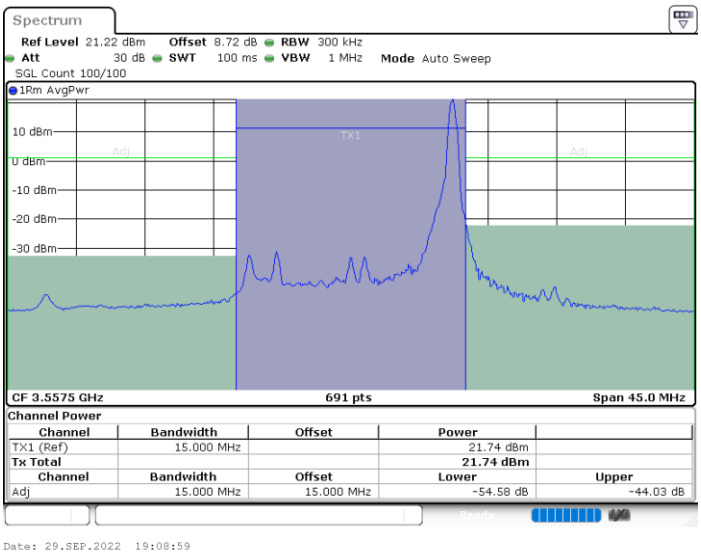


Highest Channel / Full RB

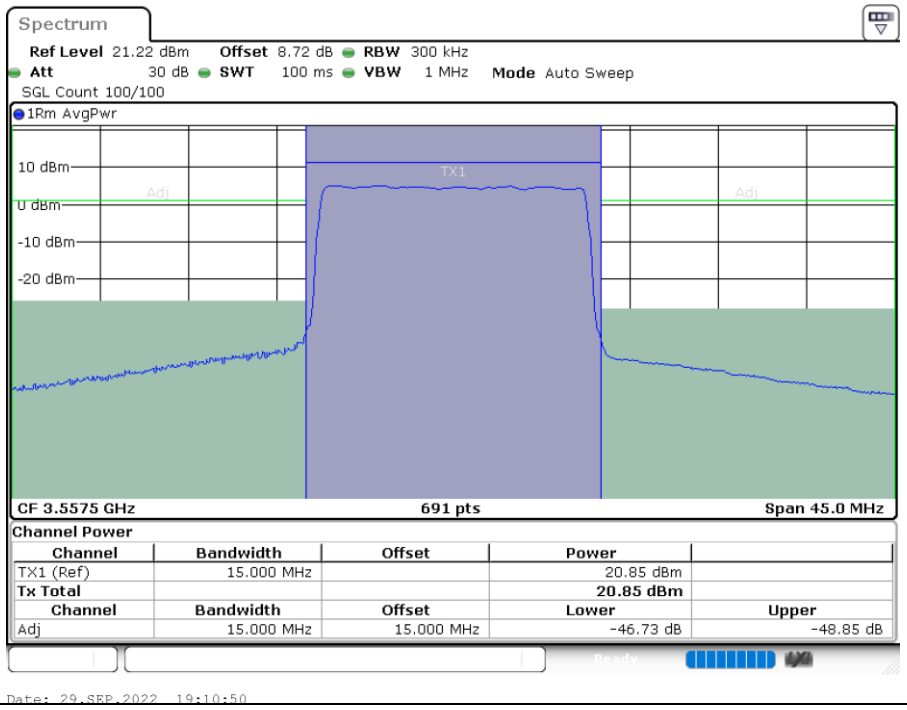


LTE Band 48 / 15MHz	
16QAM	
Lowest Channel / 1RB0	Lowest Channel / 1RBmax

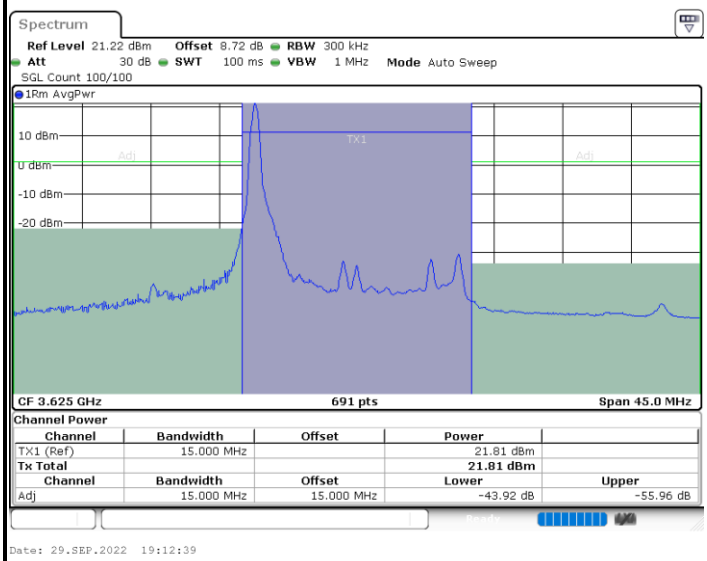


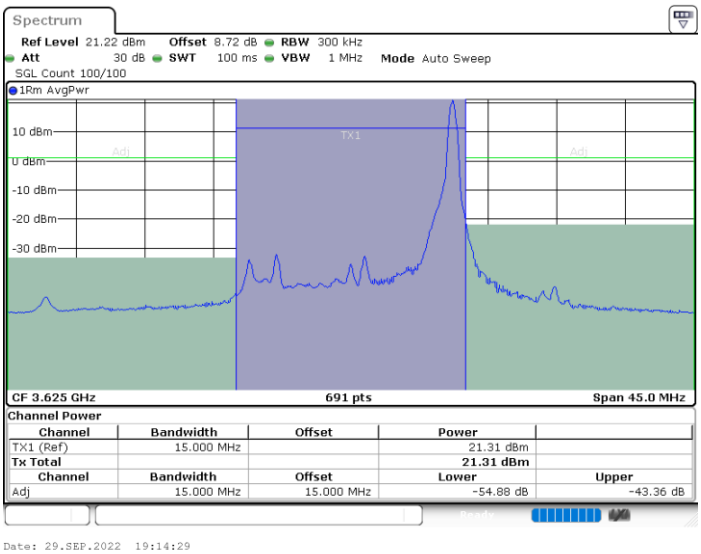


Lowest Channel / Full RB

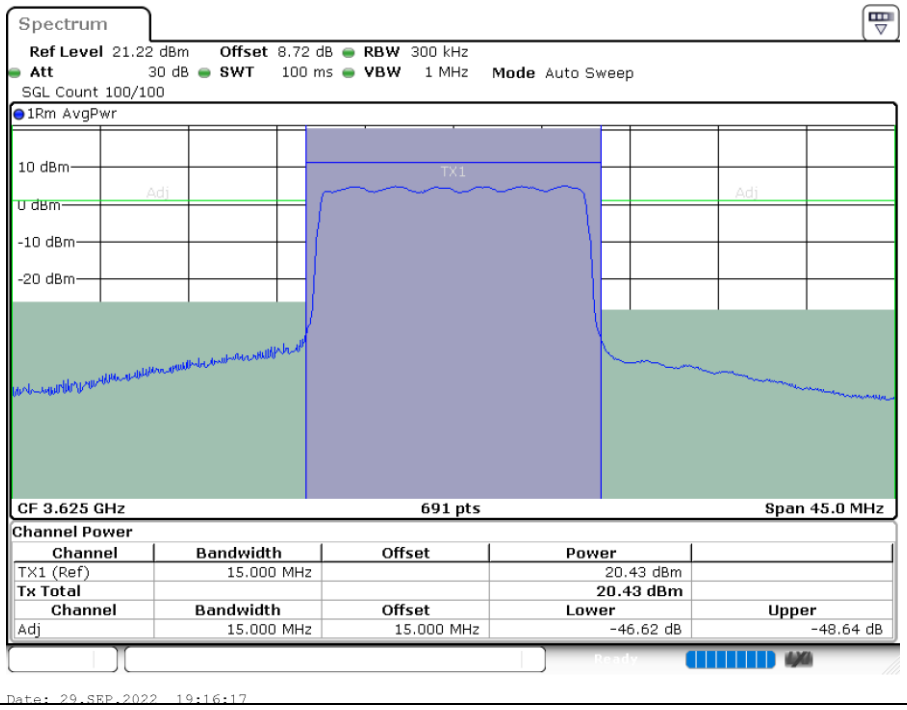


LTE Band 48 / 15MHz	
16QAM	
Middle Channel / 1RB0	Middle Channel / 1RBmax

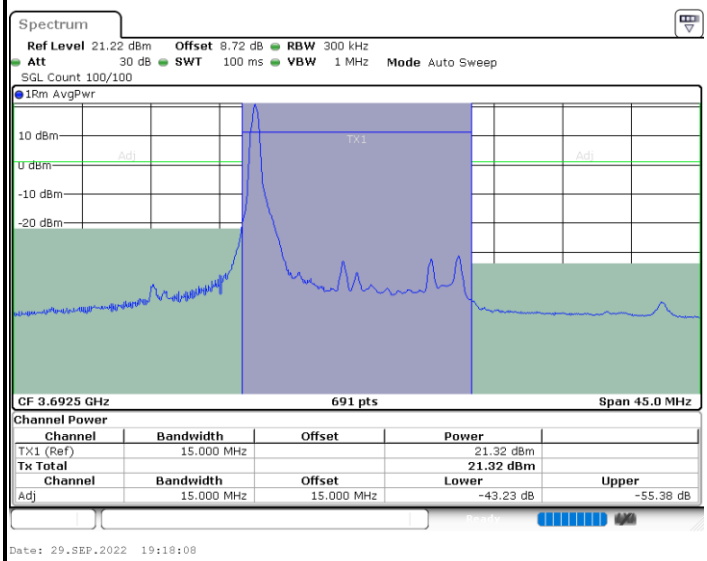


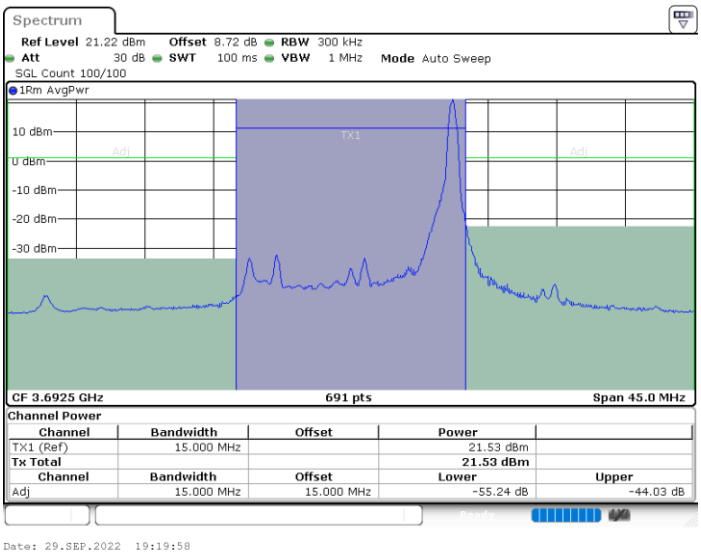


Middle Channel / Full RB

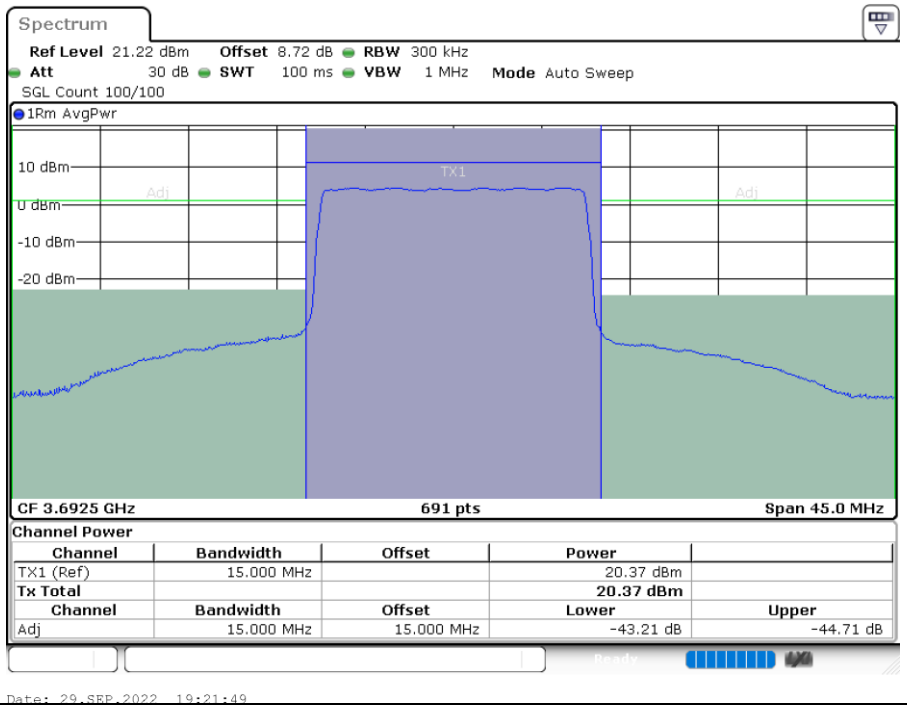


LTE Band 48 / 15MHz	
16QAM	
Highest Channel / 1RB0	Highest Channel / 1RBmax

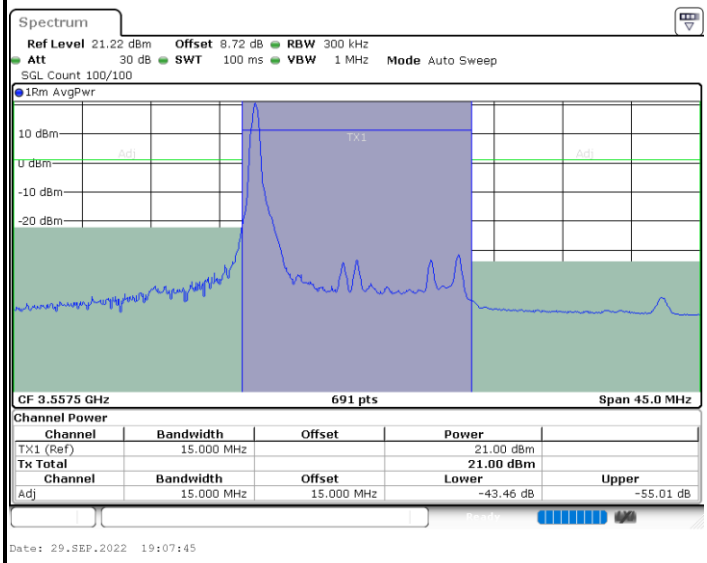


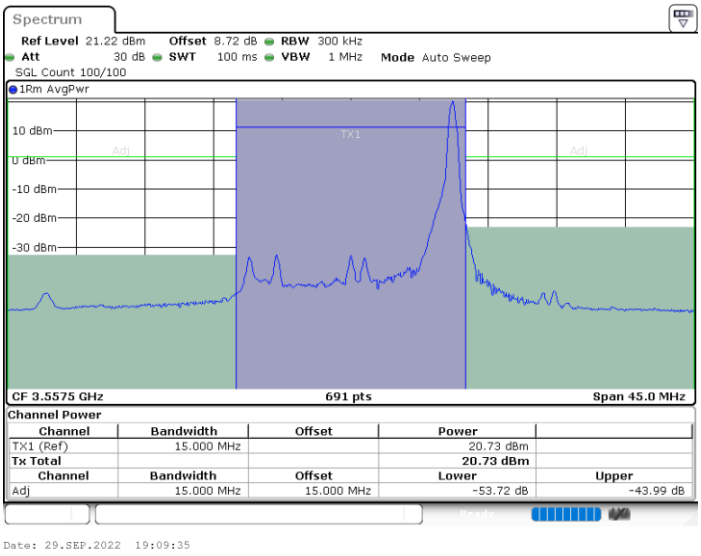


Highest Channel / Full RB

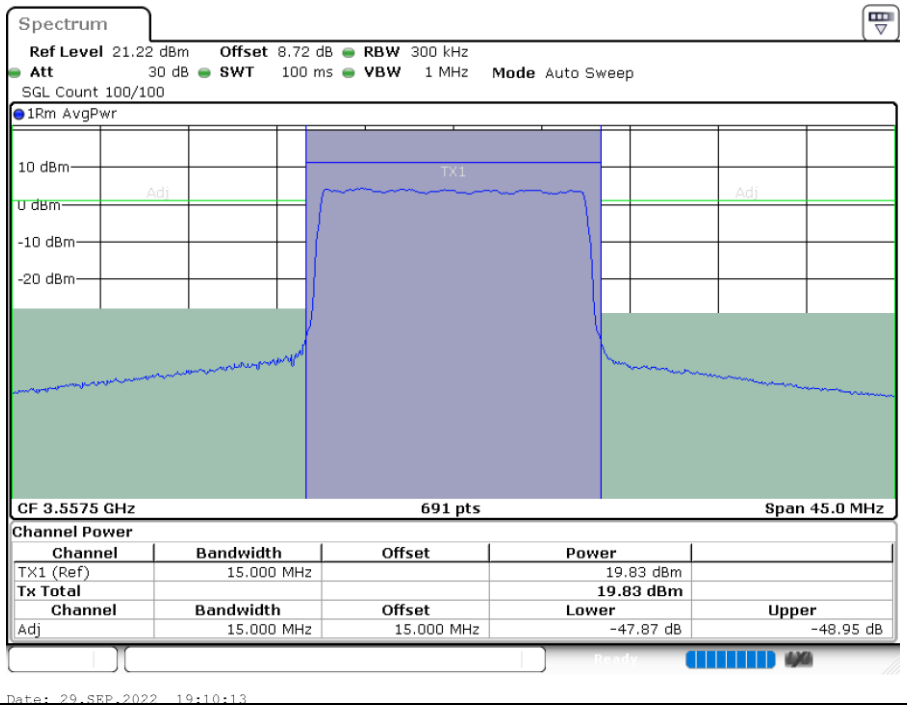


LTE Band 48 / 15MHz	
64QAM	
Lowest Channel / 1RB0	Lowest Channel / 1RBmax

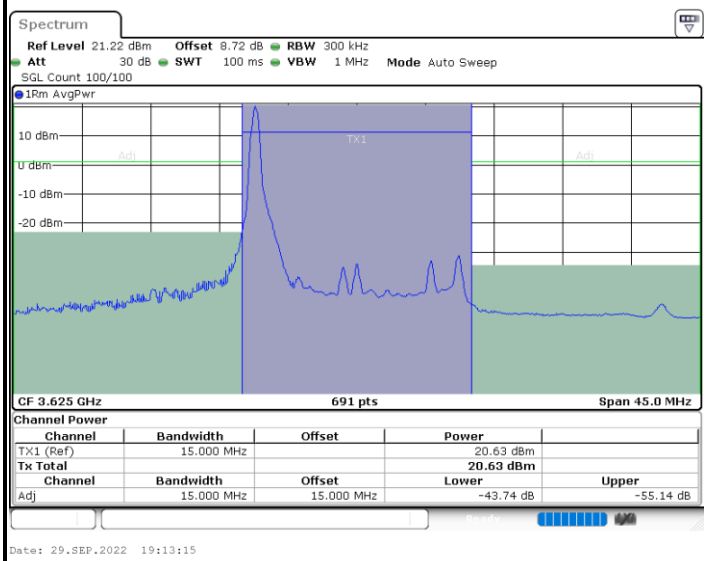


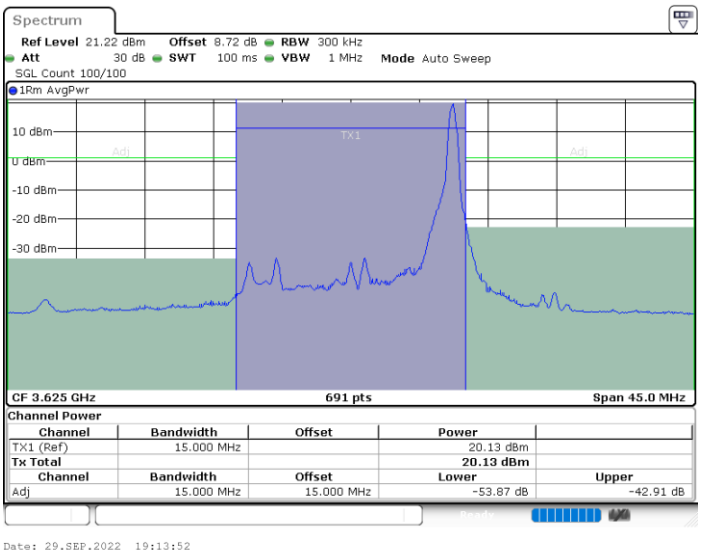


Lowest Channel / Full RB

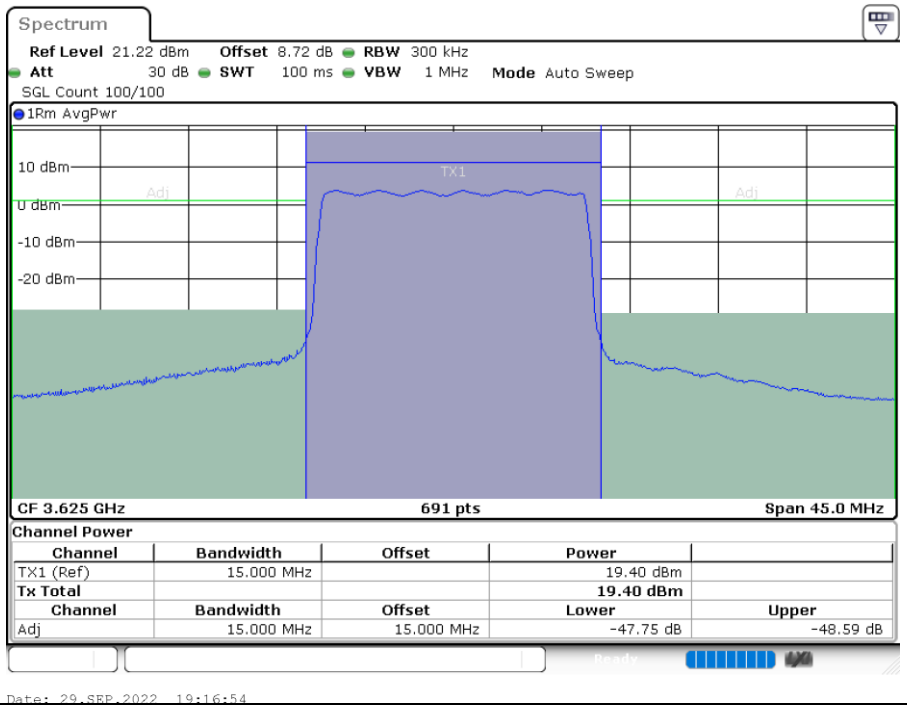


LTE Band 48 / 15MHz	
64QAM	
Middle Channel / 1RB0	Middle Channel / 1RBmax

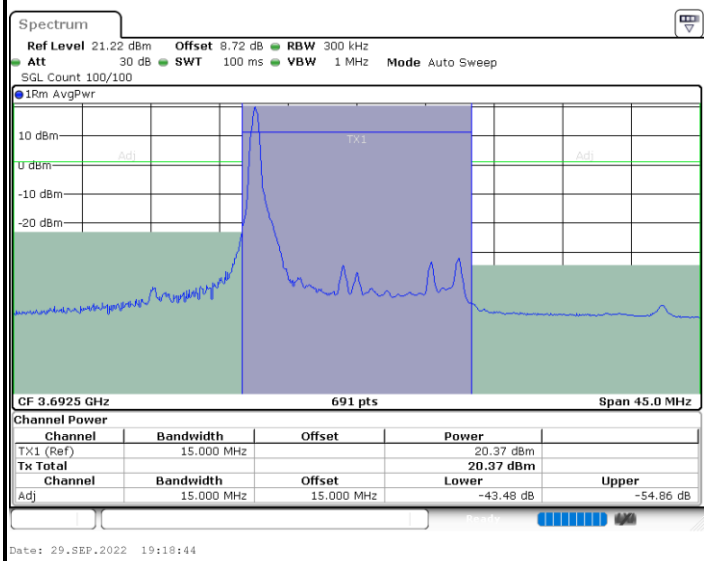




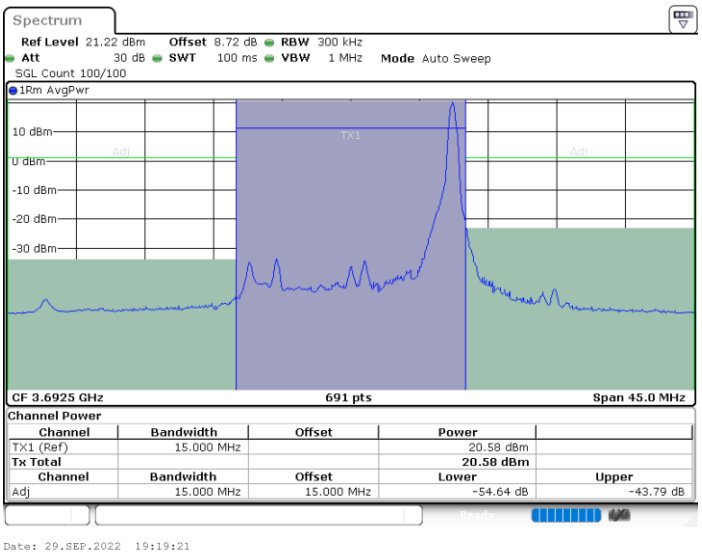
Middle Channel / Full RB



LTE Band 48 / 15MHz	
64QAM	
Highest Channel / 1RB0	Highest Channel / 1RBmax



Date: 29.SEP.2022 19:18:44



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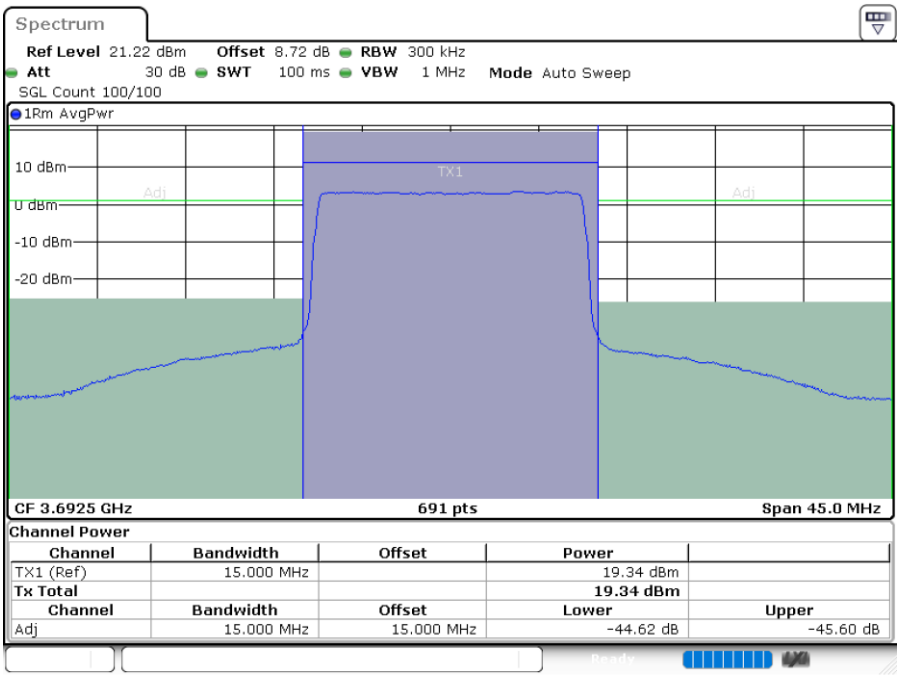
Highest Channel / Full RB



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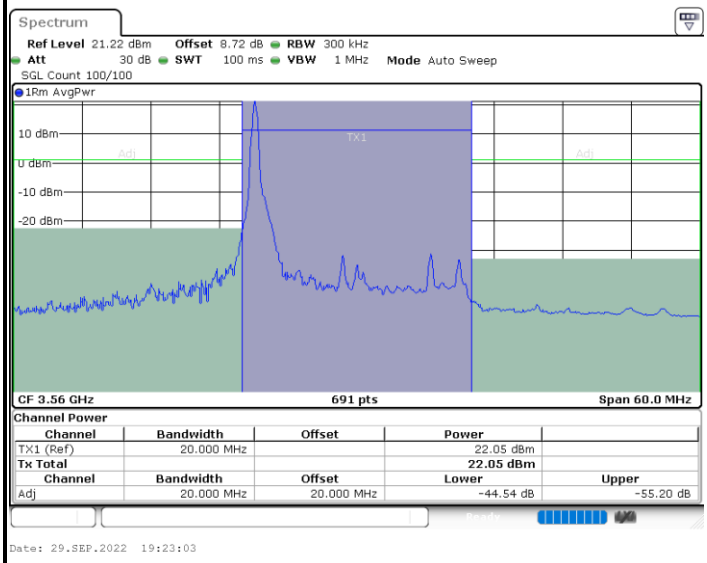
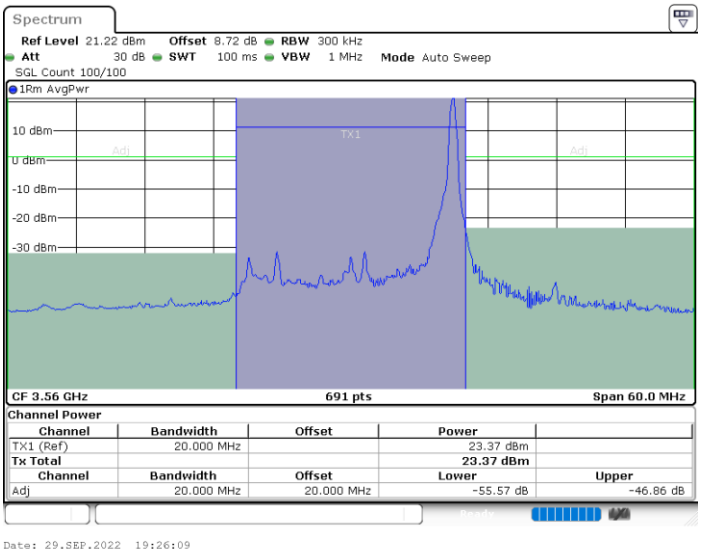
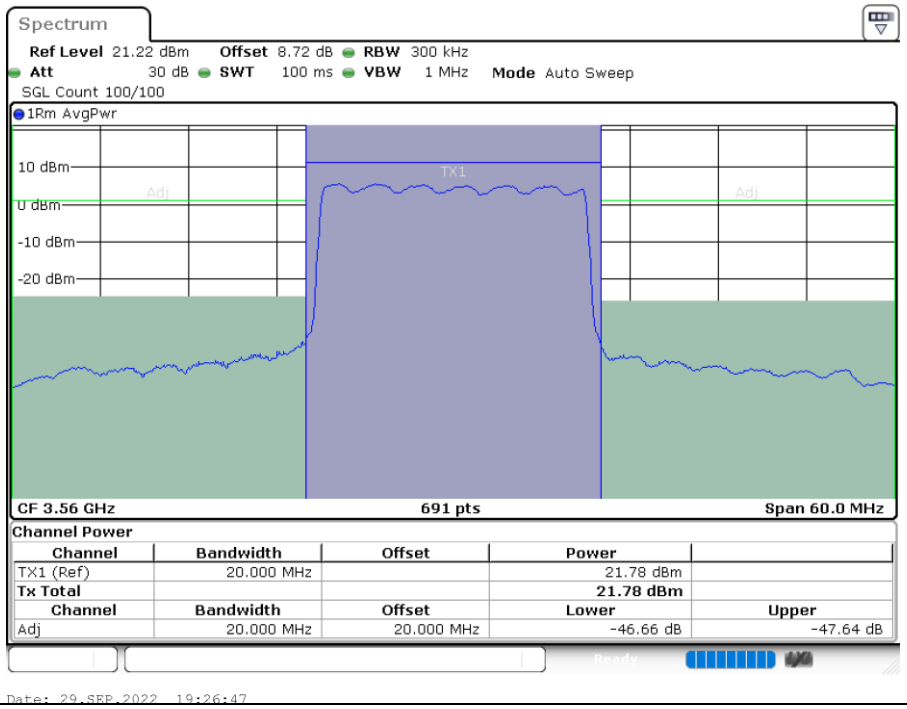
LTE Band 48 / 20MHz	
QPSK	
Lowest Channel / 1RB0	Lowest Channel / 1RBmax

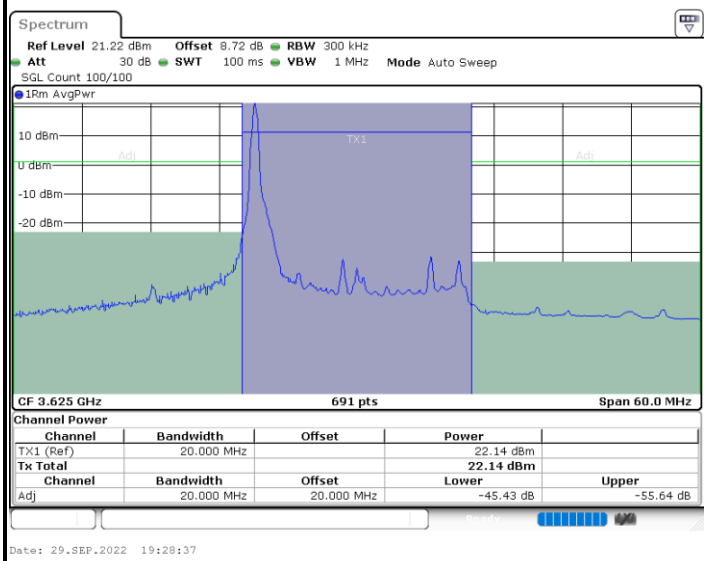


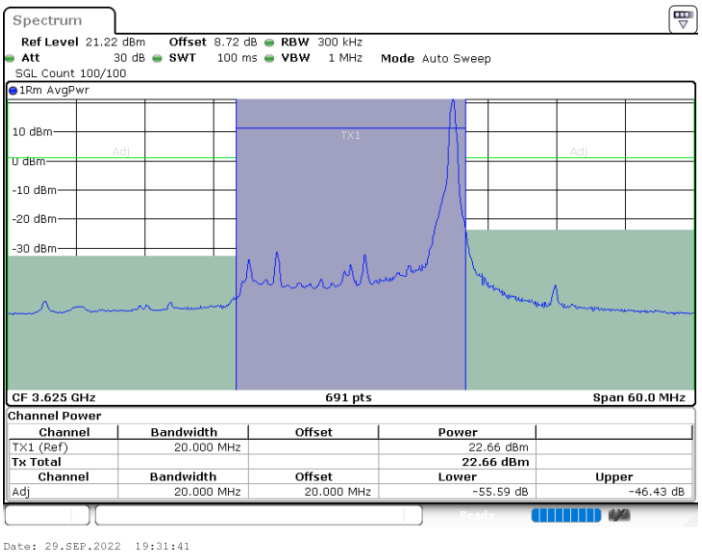


Lowest Channel / Full RB

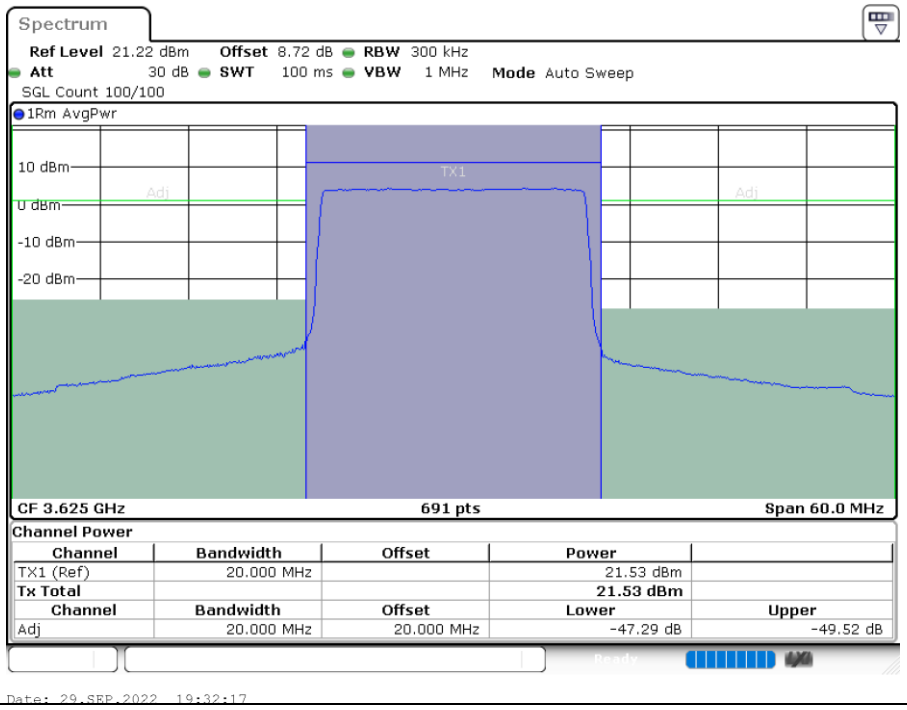


LTE Band 48 / 20MHz	
QPSK	
Middle Channel / 1RB0	Middle Channel / 1RBmax

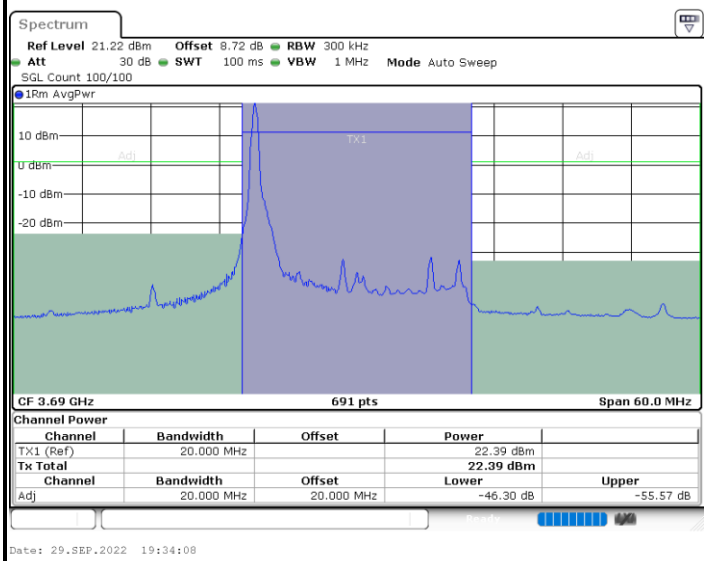


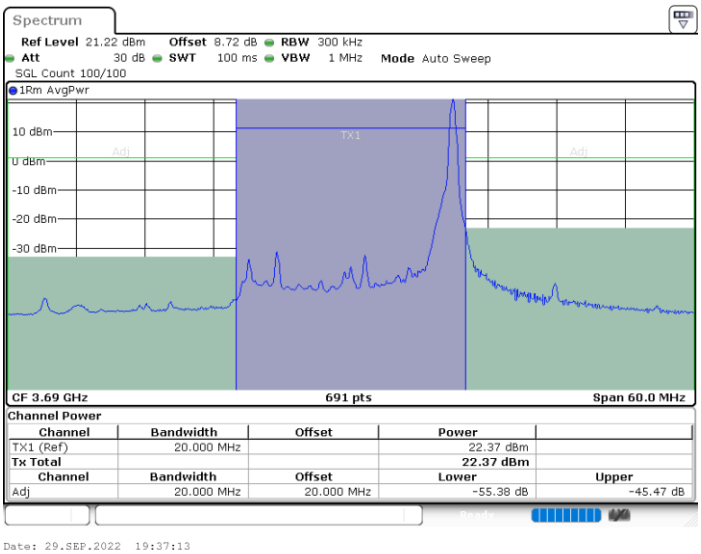


Middle Channel / Full RB



LTE Band 48 / 20MHz	
QPSK	
Highest Channel / 1RB0	Highest Channel / 1RBmax





Highest Channel / Full RB