FCC RF Test Report

APPLICANT	: Nokia Shanghai Bell Co., Ltd.
EQUIPMENT	: FastMile 4G Receiver
BRAND NAME	: Nokia
MODEL NAME	: 4G01-D
FCC ID	: 2ADZR4G01D
STANDARD	: 47 CFR Part 2, 96
CLASSIFICATION	: Citizens Band End User Devices (CBE)
EQUIPMENT TYPE	: End User Equipment
TEST DATE(S)	: Sep. 23, 2021 ~ Oct. 23, 2021

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

Jason Jia

Reviewed by: Jason Jia / Supervisor

Alex wang

Approved by: Alex Wang / Manager

ACCREDITED
Cert #5145.02

Sporton International (Kunshan) Inc.

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

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Appendix B. Test Results of Radiated Test

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History of this test report

Report No.	Version	Description	Issued Date
FG982810-03A	01	Initial issue of report	Dec. 03, 2021

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	Maximum E.I.R.P	Pass	-
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 7.33 dB at 7248.00 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

Nokia Shanghai Bell Co., Ltd.
388#, Ningqiao Road, China (Shanghai) Pilot Free Trade Zone, Shanghai 201206, China

1.2 Manufacturer

Nokia Solutions and Networks Oy
Karakaari 7, 02610 Espoo, Finland

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	FastMile 4G Receiver
Brand Name	Nokia
Model Name	4G01-D
FCC ID	2ADZR4G01D
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
Maximum Output Power to Antenna	LTE Band 48: 3.68 dBm LTE Band 48_CA: 3.97 dBm
Type of Modulation	QPSK / 16QAM / 64QAM
Antenna Type / Gain	Patch Antenna with gain 19 dBi
HW Version	3TG01454AB
SW Version	FASTMILE2_D020111B84T0101M01E0109S
EUT Stage	Identical Prototype

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

ANT No.	Function	Description	MPN	2nd MPN
ANT0	LTE and Bluetooth Antenna	MA-FM4G ODU HG Antenna Board ASM; B48	LC25BA250-1H	KG319-01

1.4 Maximum EIRP 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)
20	**3560~3690**	0.1854	17M9G7D	0.1854	17M9W7D

LTE Band 48 CA		QPSK		16QAM/64QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20+20	**3560~3690**	0.1982	37M9G7D	0.1977	37M9W7D

Note: The maximum power located in maximum bandwidth, thus only the maximum power & maximum bandwidth is shown here.

1.5 Testing Site

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

Test Firm	Sporton International (Kunshan) Inc.		
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

1.6 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH04-KS	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: All test items were verified and recorded according to the standards and without any deviation during the test.

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.

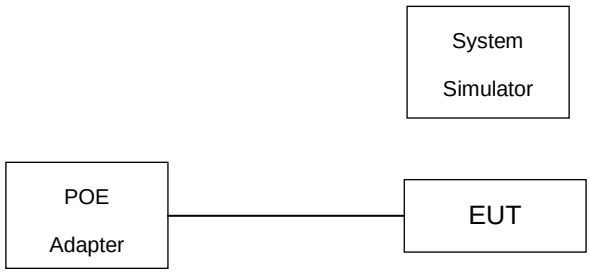
For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

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	v
26dB and 99% Bandwidth	48	-	-				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.R.P / E.I.R.P	48	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
Frequency Stability	48	-	-		v			v					v		v	
RSE	48	Worst Case													v	

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	1	Half	Full	L	M	H
Max. Output Power	48C	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
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
E.R.P / E.I.R.P	48C	v	v	v	v	v	v	v	v	v	v			v	v	v	v
Frequency Stability	48C	v							v					v		v	
RSE	48C	Worst Case														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. LTE CA_48C only support full RB by manufacturer declared.																

	6. The OBW test item assess the worst case of maximum BW, RSE with good margin>6dB thus only test Middle CH.

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.	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 :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 5.5 + 10 = 15.5 (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 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

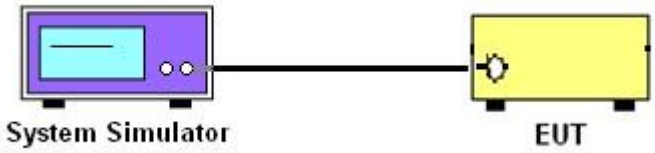
3 Conducted Test Items

3.1 Measuring Instruments

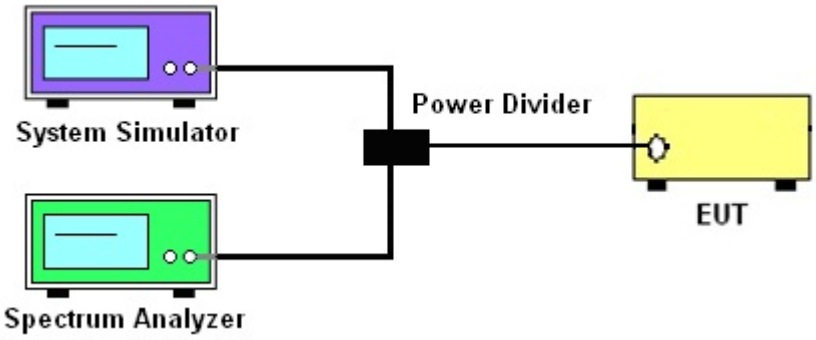
See list of measuring instruments of this test report.

3.1.1 Test Setup

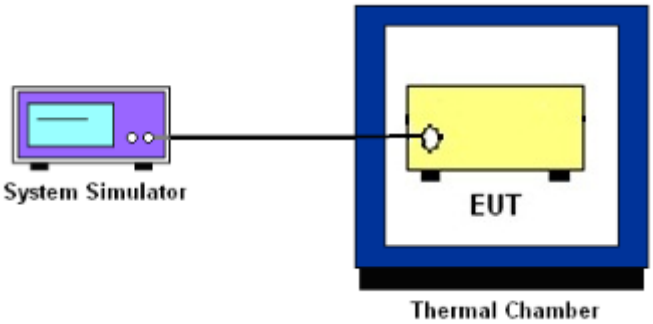
3.1.2 Conducted Output Power



3.1.3 EIRP, 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)
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)

3.3.2 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 EIRP from conducted RF output power measurements (Per ANSI C63.26-2015 Section 5.2.5.5)

   EIRP = $P_T + G_T – L_C$, where

   P_T = transmitter output power in dBm

   G_T = gain of the transmitting antenna in dBi

   LC = 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) (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)

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

3.5.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

9. The EUT was connected to spectrum analyzer and system simulator via a power divider.
10. The band edges of low and high channels for the highest RF powers were measured.
11. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
12. Beyond the 1 MHz band from the band edge, RBW=1MHz was used
13. Offset has included the duty factor for LTE Band 48. Duty factor =10 log (1/x), where x is the measured duty cycle.
14. Set spectrum analyzer with RMS detector.
15. 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.

16. The EUT was connected to spectrum analyzer and system simulator via a power divider.
17. 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.
18. The middle channel for the highest RF power within the transmitting frequency was measured.
19. The conducted spurious emission for the whole frequency range was taken.
20. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
21. Set spectrum analyzer with RMS detector.
22. Taking the record of maximum spurious emission.
23. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
24. 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 ±0.00025% (±2.5ppm) 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±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.

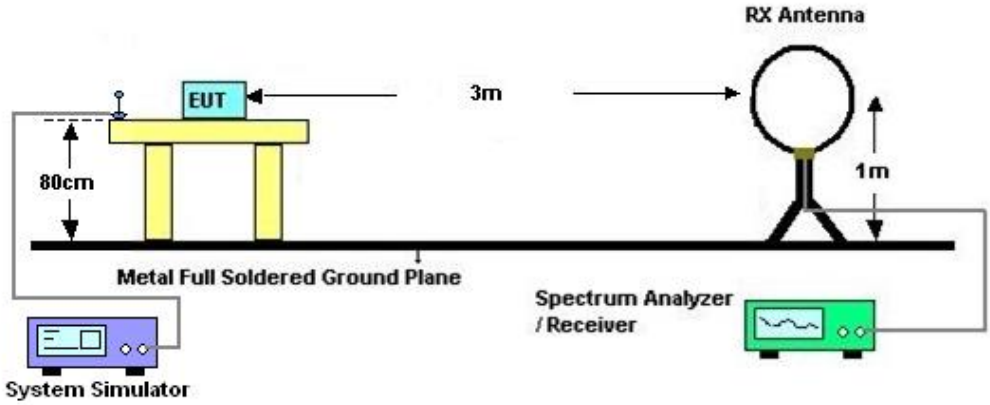
4 Radiated Test Items

4.1 Measuring Instruments

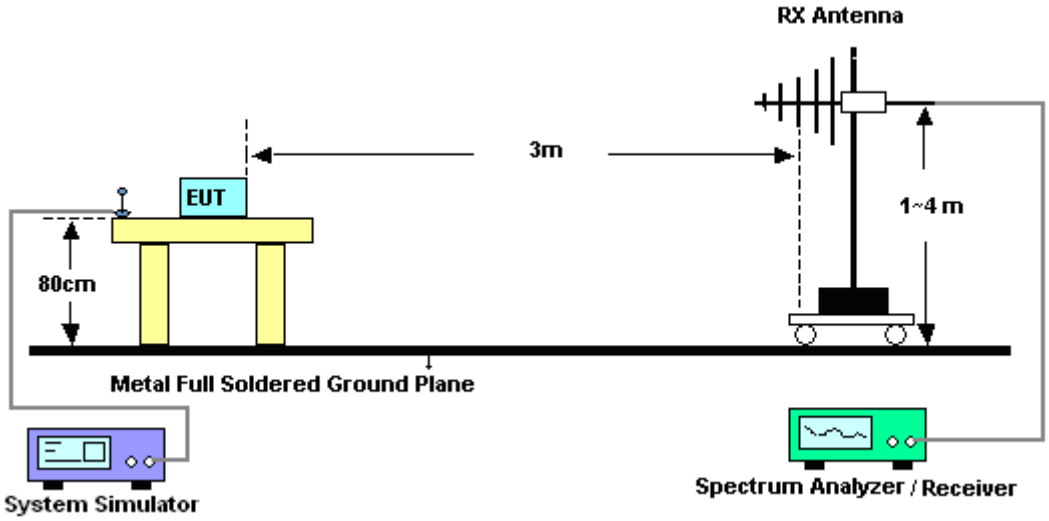
See list of measuring instruments of this test report.

4.2 Test Setup

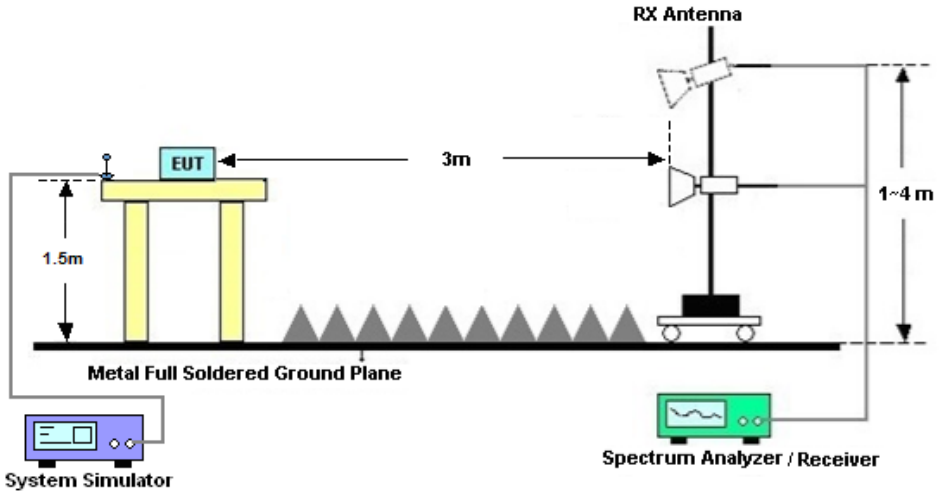
For radiated test below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions 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 / 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.

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	Nov. 01, 2020	Sep. 23, 2021~ Oct. 23, 2021	Oct. 31, 2021	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	Aug. 26, 2021	Sep. 23, 2021~ Oct. 23, 2021	Aug. 25, 2022	Conducted (TH01-KS)
Temperature &humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 12, 2021	Sep. 23, 2021~ Oct. 23, 2021	Jul. 11, 2022	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr. 13, 2021	Sep. 24, 2021	Apr. 12, 2022	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 01, 2020	Sep. 24, 2021	Oct. 31, 2021	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 30, 2021	Sep. 24, 2021	May 29, 2022	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1356	1GHz~18GHz	Apr. 18, 2021	Sep. 24, 2021	Apr. 17, 2022	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Jan. 06, 2021	Sep. 24, 2021	Jan. 05, 2022	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Jan. 06, 2021	Sep. 24, 2021	Jan. 05, 2022	Radiation (03CH04-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Jan. 06, 2021	Sep. 24, 2021	Jan. 05, 2022	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5GHz	Oct. 14, 2020	Sep. 24, 2021	Oct. 13, 2021	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 07, 2021	Sep. 24, 2021	Jan. 06, 2022	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Sep. 24, 2021	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Sep. 24, 2021	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Sep. 24, 2021	NCR	Radiation (03CH04-KS)

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))	**3.3dB**

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

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

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

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

Appendix A. Test Results of Conducted Test

Average Conducted Output Power and EIRP

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

LTE Band 48:

BW [MHz]	Modulation	RB Size	RB Offset	Power(dBm) Low	Power(dBm) Middle	Power(dBm) High	EIRP (mW)	EIRP (mW)	EIRP (mW)
Channel				55340	55990	56640	L	M	H
Frequency (MHz)				3560	3625	3690			
20	QPSK	1	0	3.33	2.93	3.68	0.1710	0.1560	0.1854
20	QPSK	1	99	3.28	3.36	3.59	0.1690	0.1722	0.1816
20	QPSK	100	0	1.73	1.2	1.06	0.1183	0.1047	0.1014
20	16QAM	1	0	3.32	3.11	3.63	0.1706	0.1626	0.1832
20	16QAM	1	99	3.57	3.53	3.66	0.1807	0.1791	0.1845
20	16QAM	100	0	1.6	1.14	1.01	0.1148	0.1033	0.1002
20	64QAM	1	0	3.25	3.07	3.56	0.1679	0.1611	0.1803
20	64QAM	1	99	3.68	3.49	3.66	0.1854	0.1774	0.1845
20	64QAM	100	0	1.48	1.14	1.18	0.1117	0.1033	0.1042
Channel				55315	55990	56665	L	M	H
Frequency (MHz)				3557.5	3625	3692.5			
15	QPSK	1	0	2.92	2.19	3.43	0.1556	0.1315	0.1750
15	QPSK	1	74	2.88	2.69	3.08	0.1542	0.1476	0.1614
15	QPSK	75	0	1.08	0.68	1.53	0.1019	0.0929	0.1130
15	16QAM	1	0	3.01	2.31	3.49	0.1589	0.1352	0.1774
15	16QAM	1	74	2.84	2.67	3.16	0.1528	0.1469	0.1644
15	16QAM	75	0	1.1	0.47	1.73	0.1023	0.0885	0.1183
15	64QAM	1	0	2.82	2.8	3.53	0.1521	0.1514	0.1791
15	64QAM	1	74	2.84	2.89	3.36	0.1528	0.1545	0.1722
15	64QAM	75	0	1.01	0.74	1.56	0.1002	0.0942	0.1138
Channel				55290	55990	56690	L	M	H
Frequency (MHz)				3555	3625	3695			
10	QPSK	1	0	1.99	1.46	2.74	0.1256	0.1112	0.1493
10	QPSK	1	49	2.05	1.85	2.32	0.1274	0.1216	0.1355
10	QPSK	50	0	1.21	0.71	1.75	0.1050	0.0935	0.1189
10	16QAM	1	0	2.04	1.79	2.7	0.1271	0.1199	0.1479
10	16QAM	1	49	2.12	2	2.82	0.1294	0.1259	0.1521
10	16QAM	50	0	1.01	0.78	1.56	0.1002	0.0951	0.1138
10	64QAM	1	0	2.21	1.74	2.63	0.1321	0.1186	0.1455
10	64QAM	1	49	2.49	2.25	2.29	0.1409	0.1334	0.1346
10	64QAM	50	0	1.16	0.6	1.66	0.1038	0.0912	0.1164

Channel				55265	55990	56715	L	M	H
Frequency (MHz)				3552.5	3625	3697.5			
5	QPSK	1	0	1.14	0.81	2.03	0.1033	0.0957	0.1268
5	QPSK	1	24	1.58	0.98	1.55	0.1143	0.0995	0.1135
5	QPSK	25	0	1.17	0.65	1.44	0.1040	0.0923	0.1107
5	16QAM	1	0	1.28	1.07	2.14	0.1067	0.1016	0.1300
5	16QAM	1	24	1.58	1.13	2.03	0.1143	0.1030	0.1268
5	16QAM	25	0	1.11	0.67	1.67	0.1026	0.0927	0.1167
5	64QAM	1	0	1.55	1.37	2.04	0.1135	0.1089	0.1271
5	64QAM	1	24	1.61	1.4	1.88	0.1151	0.1096	0.1225
5	64QAM	25	0	1.2	0.78	1.48	0.1047	0.0951	0.1117

LTE Band 48C:

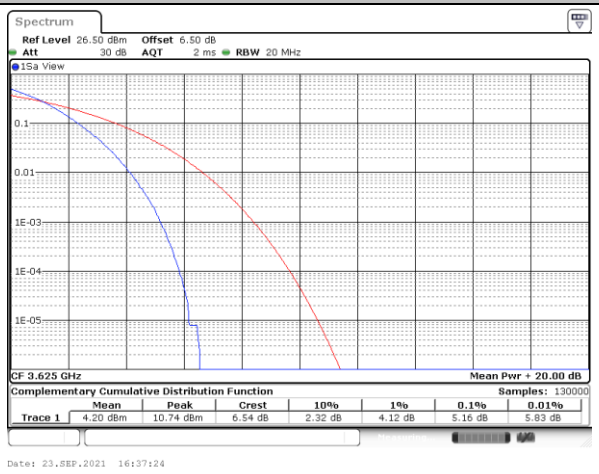
BW [MHz]	Modulation	RB Size	RB Offset	Power(dBm) Low	Power(dBm) Middle	Power(dBm) High	EIRP (mW)	EIRP (mW)	EIRP (mW)
Channel				L	M	H	L	H	H
20+20	QPSK	Full		3.39	3.5	3.22	0.1982	0.1778	0.1667
20+20	16QAM	Full		3.69	3.62	3.14	0.1977	0.1828	0.1637
20+20	64QAM	Full		3.87	3.33	3.29	0.1936	0.1710	0.1694
20+15	QPSK	Full		3.59	3.42	3.18	0.1816	0.1746	0.1652
20+15	16QAM	Full		3.85	3.44	3.1	0.1928	0.1754	0.1622
20+15	64QAM	Full		3.87	3.48	3.1	0.1936	0.1770	0.1622
20+10	QPSK	Full		3.93	3.56	3.42	0.1963	0.1803	0.1746
20+10	16QAM	Full		3.94	3.56	3.39	0.1968	0.1803	0.1734
20+10	64QAM	Full		3.96	3.69	3.4	0.1977	0.1858	0.1738
20+5	QPSK	Full		3.59	3.02	2.75	0.1816	0.1592	0.1496
20+5	16QAM	Full		3.48	3.02	2.94	0.1770	0.1592	0.1563
20+5	64QAM	Full		3.51	3.06	2.96	0.1782	0.1607	0.1570
15+20	QPSK	Full		3.97	3.53	3.31	0.1734	0.1791	0.1702
15+20	16QAM	Full		3.93	3.49	3.4	0.1963	0.1774	0.1738
15+20	64QAM	Full		3.8	3.5	3.52	0.1905	0.1778	0.1786
10+20	QPSK	Full		3.92	3.66	3.54	0.1959	0.1845	0.1795
10+20	16QAM	Full		3.9	3.69	3.62	0.1950	0.1858	0.1828
10+20	64QAM	Full		3.97	3.88	3.6	0.1828	0.1941	0.1820
5+20	QPSK	Full		3.67	3.49	2.92	0.1849	0.1774	0.1556
5+20	16QAM	Full		3.71	3.03	3.1	0.1866	0.1596	0.1622
5+20	64QAM	Full		3.78	3.28	3.07	0.1897	0.1690	0.1611

Peak-to-Average Ratio

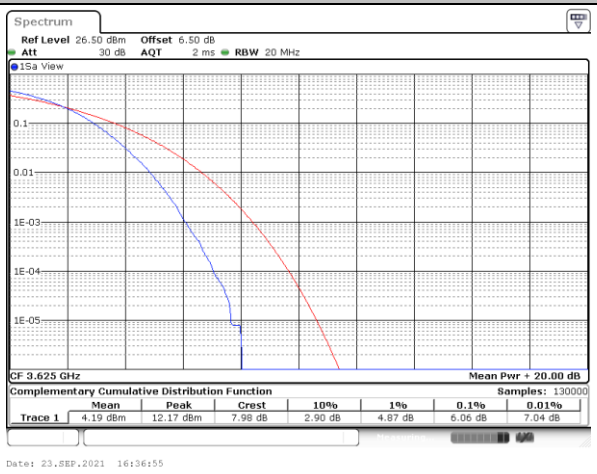
Mode	LTE Band 48 / 20MHz				
Mod.	QPSK	16QAM	64QAM		Limit: 13dB
RB Size	Full RB				Result
Middle CH	5.16	6.06	6.58		PASS

LTE Band 48 / 20MHz / Full RB / Middle Channel

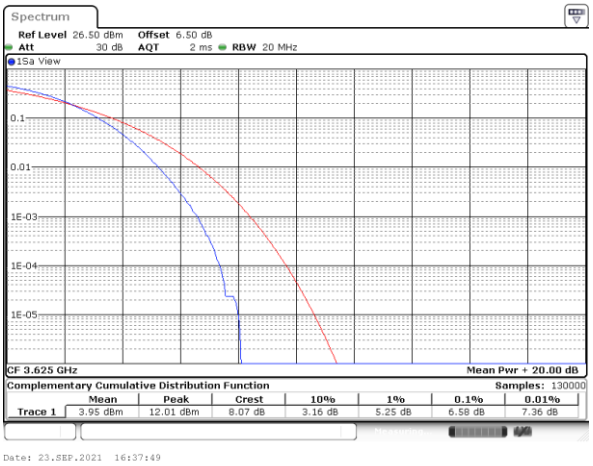
QPSK



16QAM



64QAM

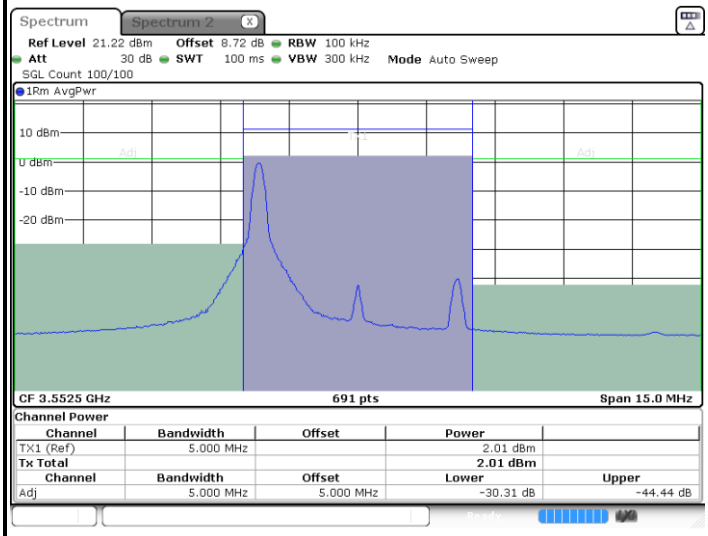


ACLR

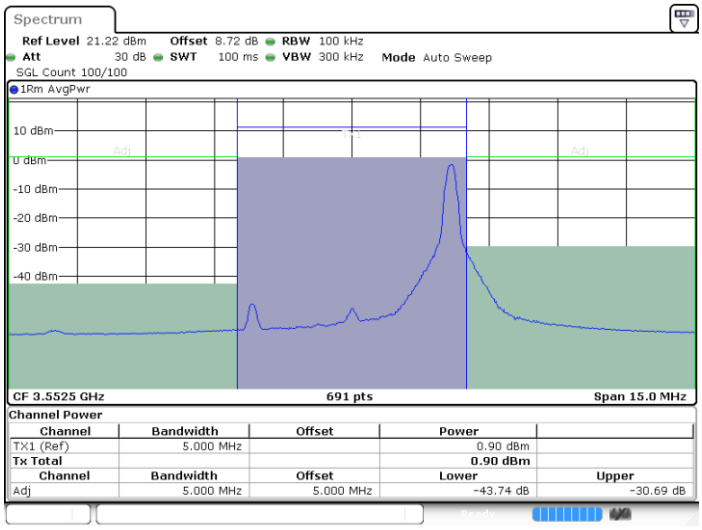
LTE Band 48 / 5MHz

QPSK

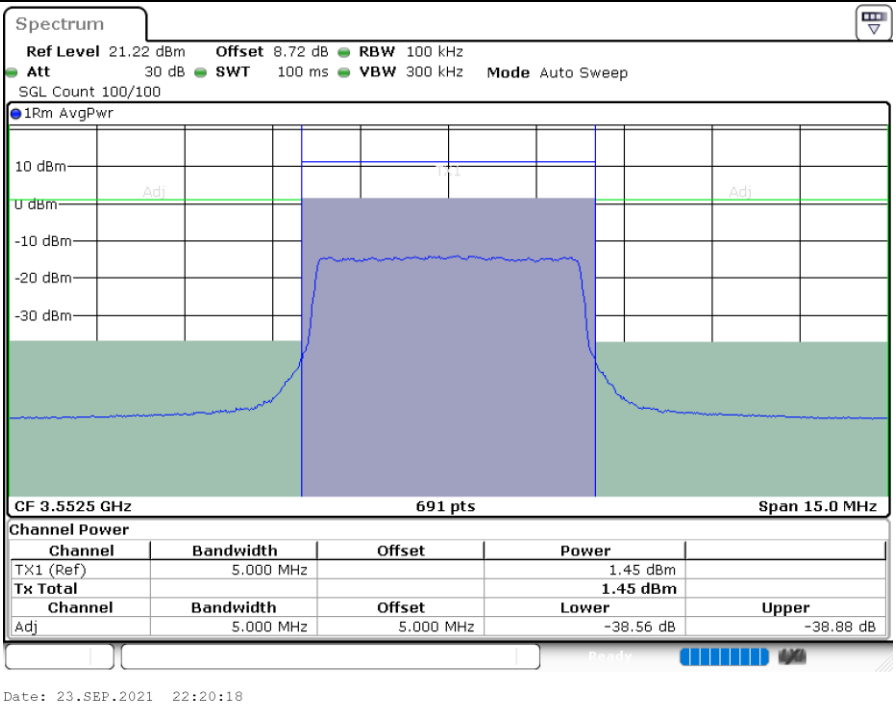
Lowest Channel / 1RB0



Lowest Channel / 1RBmax



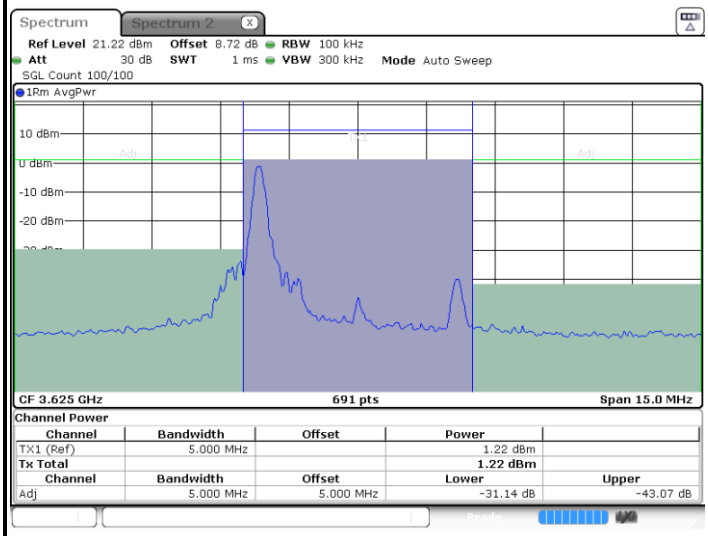
Lowest Channel / Full RB



LTE Band 48 / 5MHz

QPSK

Middle Channel / 1RB0



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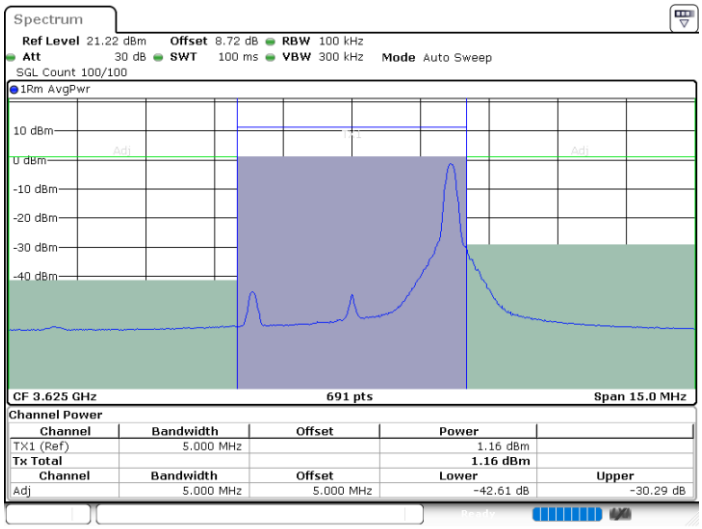
Middle Channel / 1RBmax



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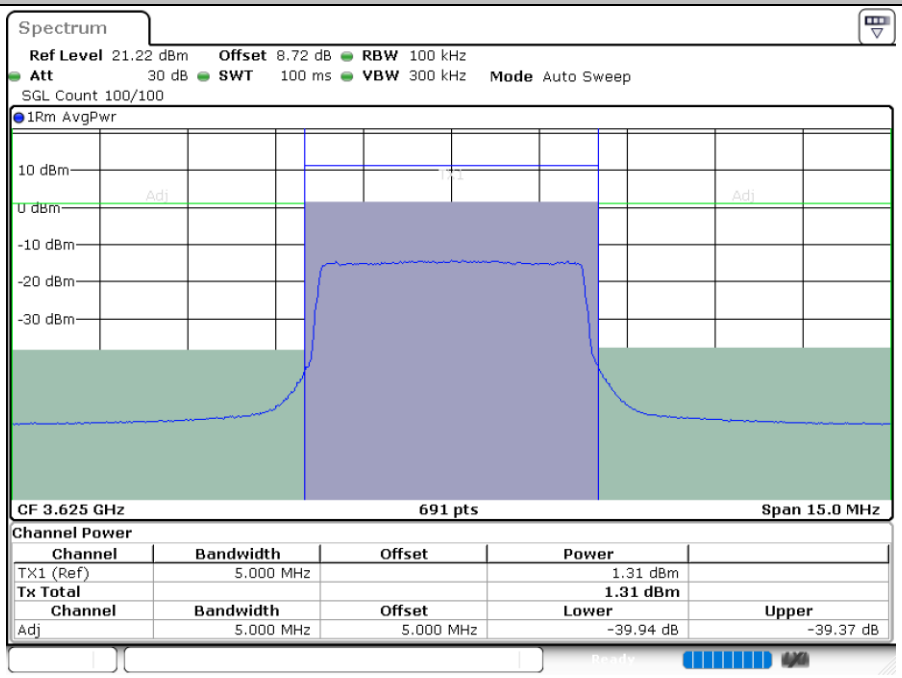
Middle Channel / Full RB



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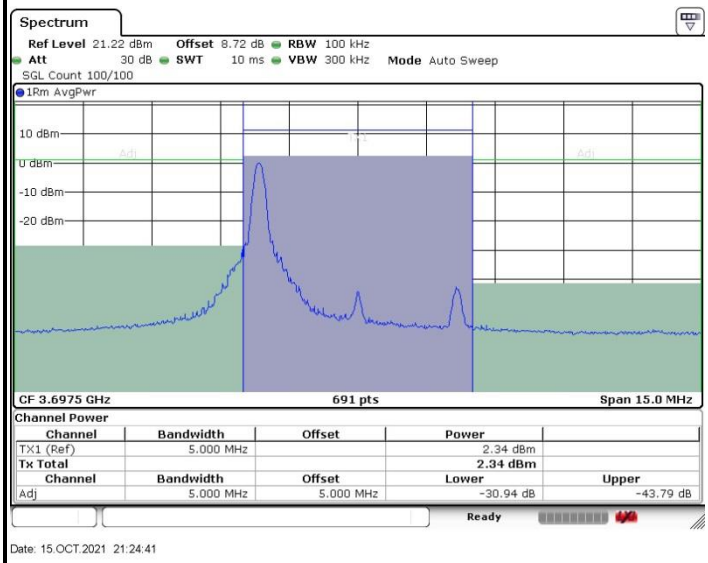
LTE Band 48 / 5MHz

QPSK

Highest Channel / 1RB0



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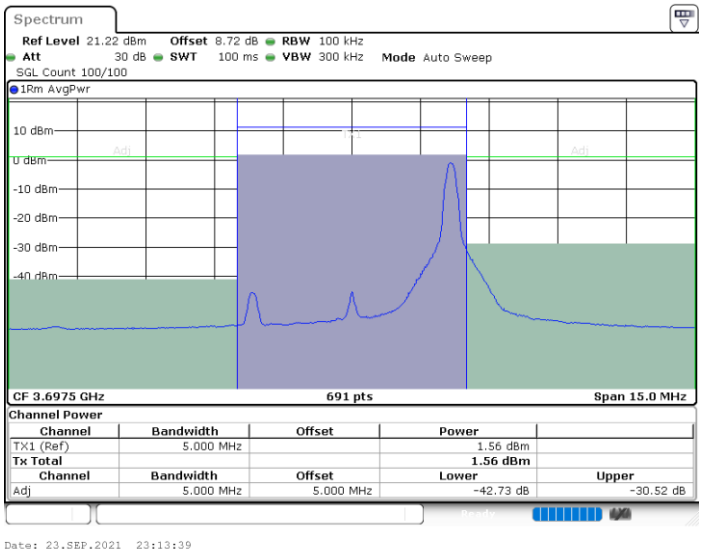
Highest Channel / 1RBmax



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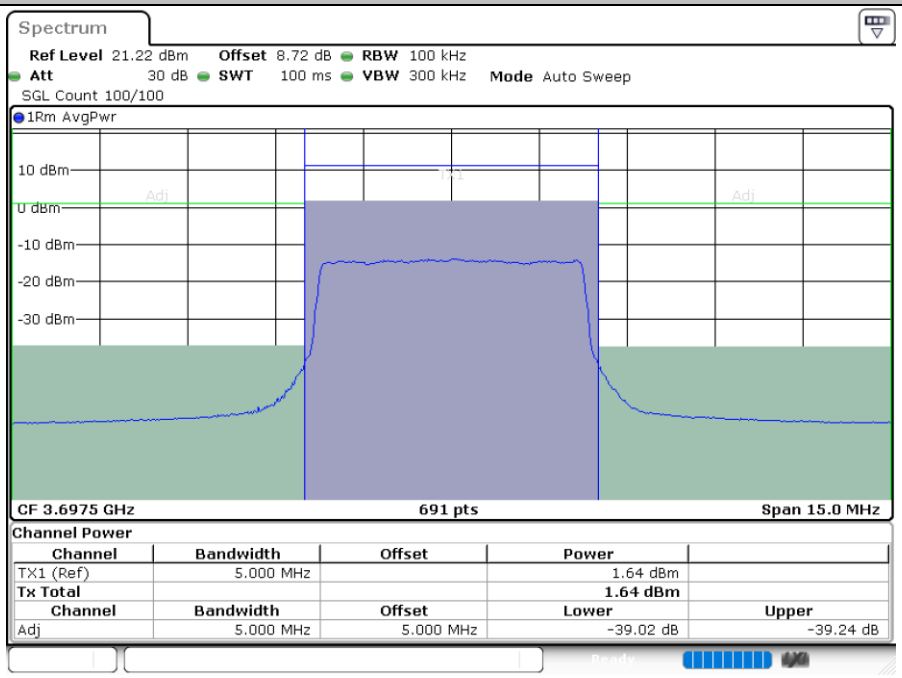
Highest Channel / Full RB



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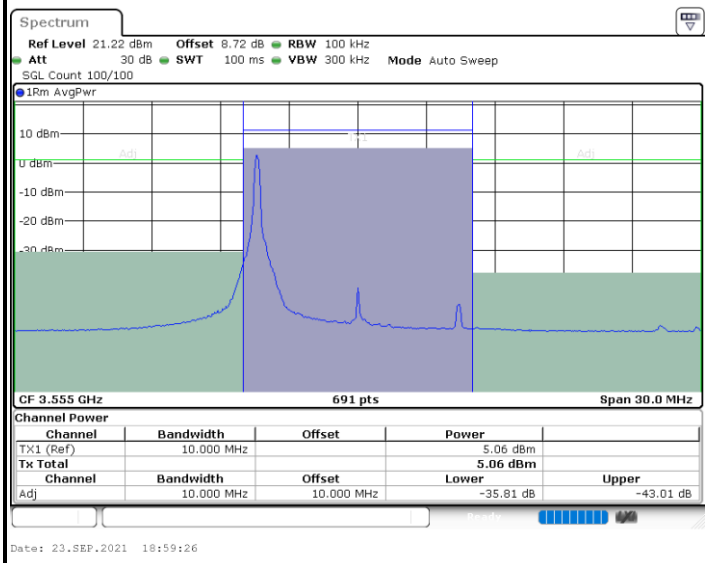
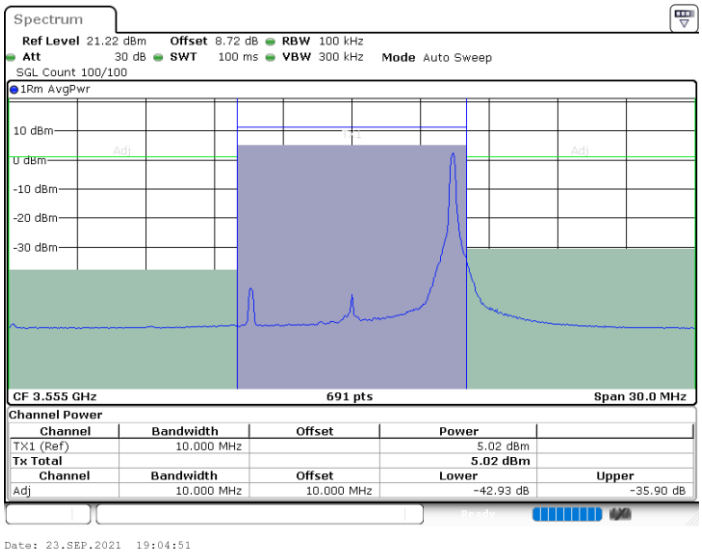
LTE Band 48 / 10MHz

QPSK

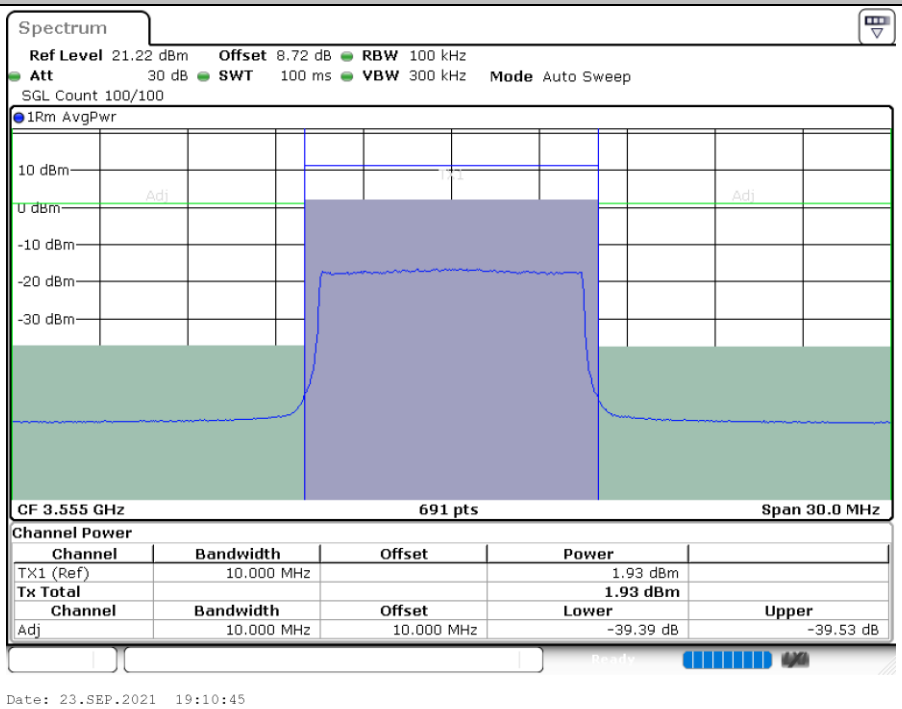
Lowest Channel / 1RB0



Lowest Channel / 1RBmax



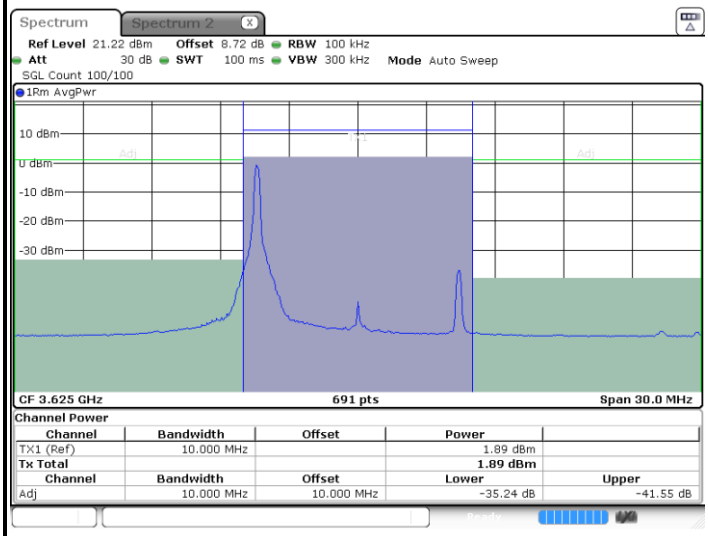
Lowest Channel / Full RB



LTE Band 48 / 10MHz

QPSK

Middle Channel / 1RB0



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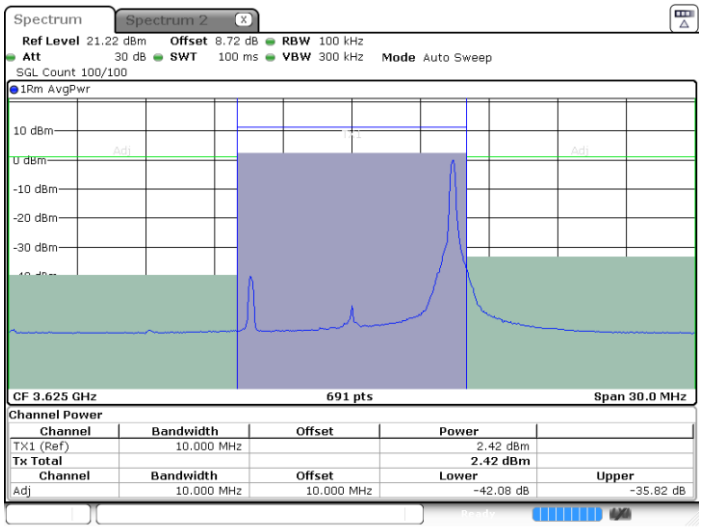
Middle Channel / 1RBmax



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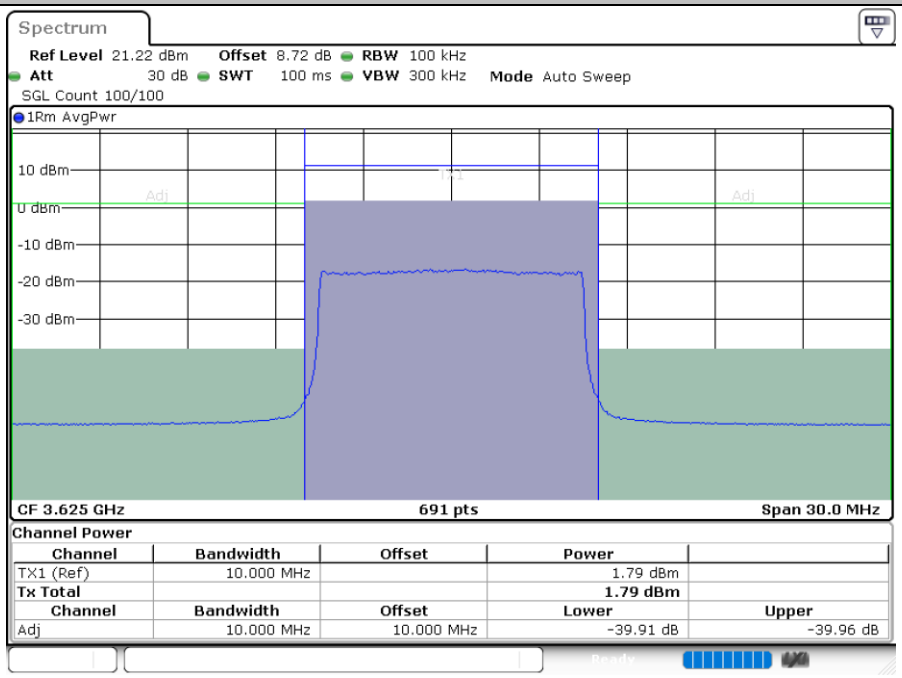
Middle Channel / Full RB



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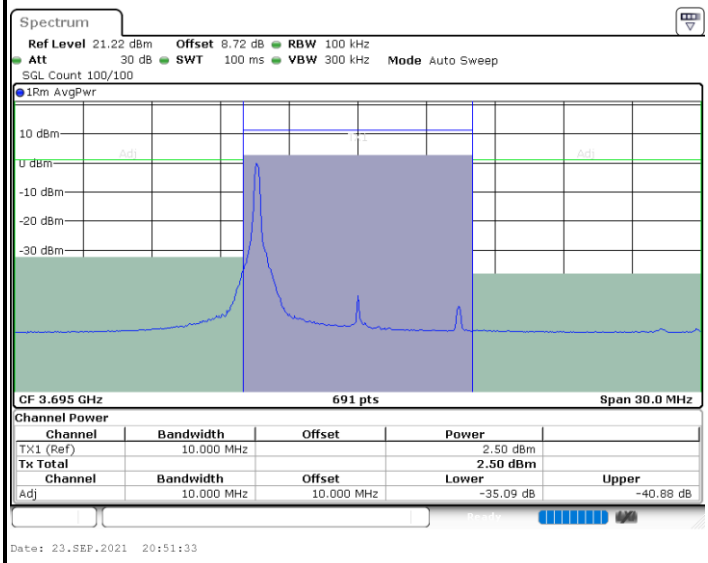
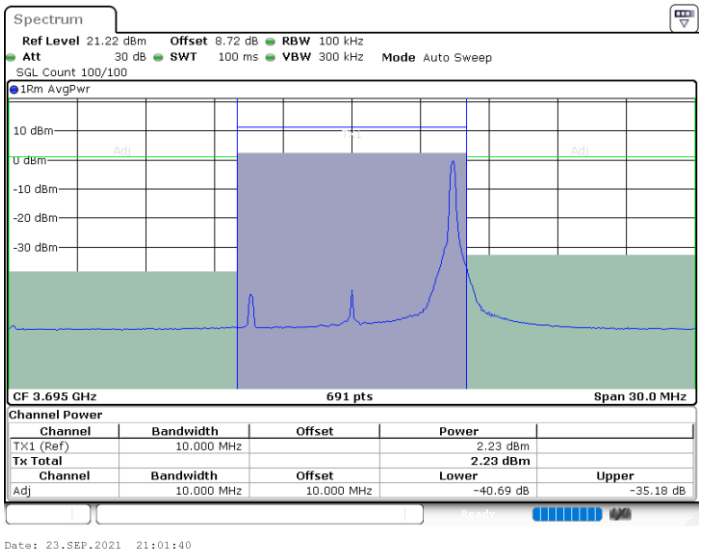
LTE Band 48 / 10MHz

QPSK

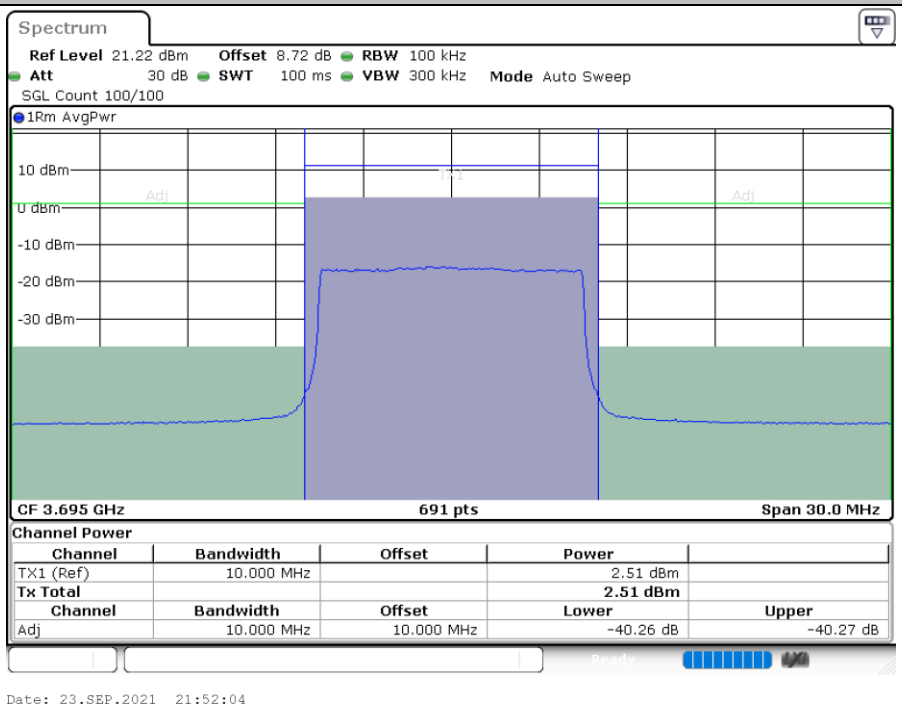
Highest Channel / 1RB0



Highest Channel / 1RBmax



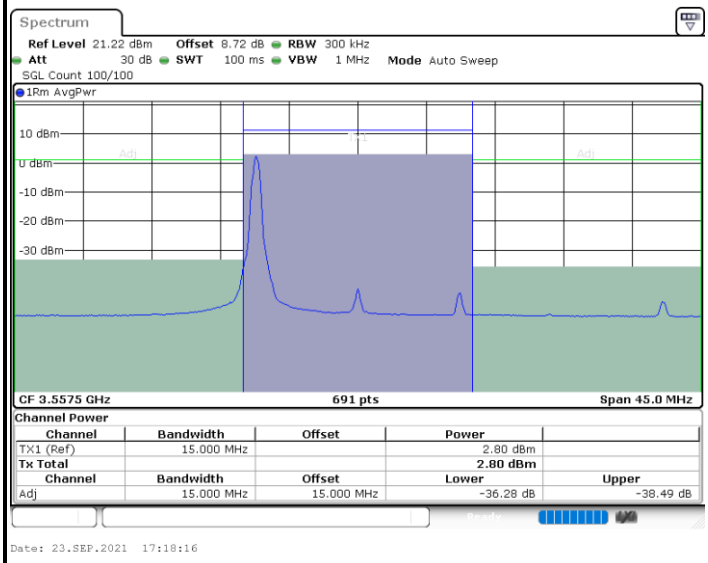
Highest Channel / Full RB



LTE Band 48 / 15MHz

QPSK

Lowest Channel / 1RB0



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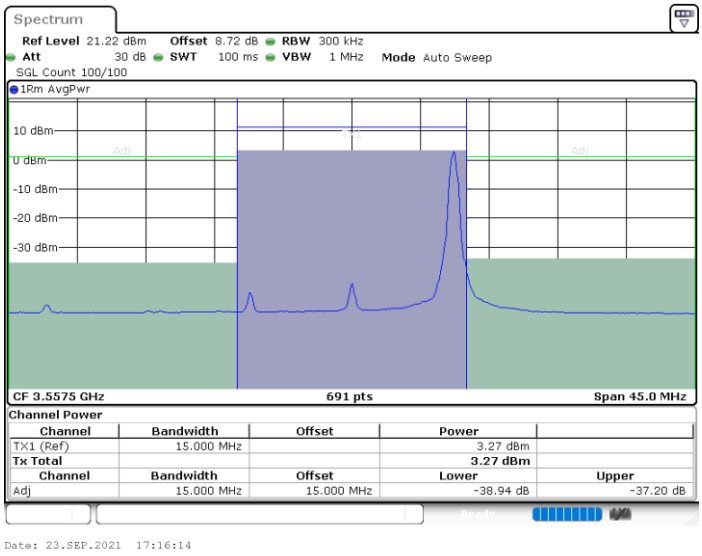
Lowest Channel / 1RBmax



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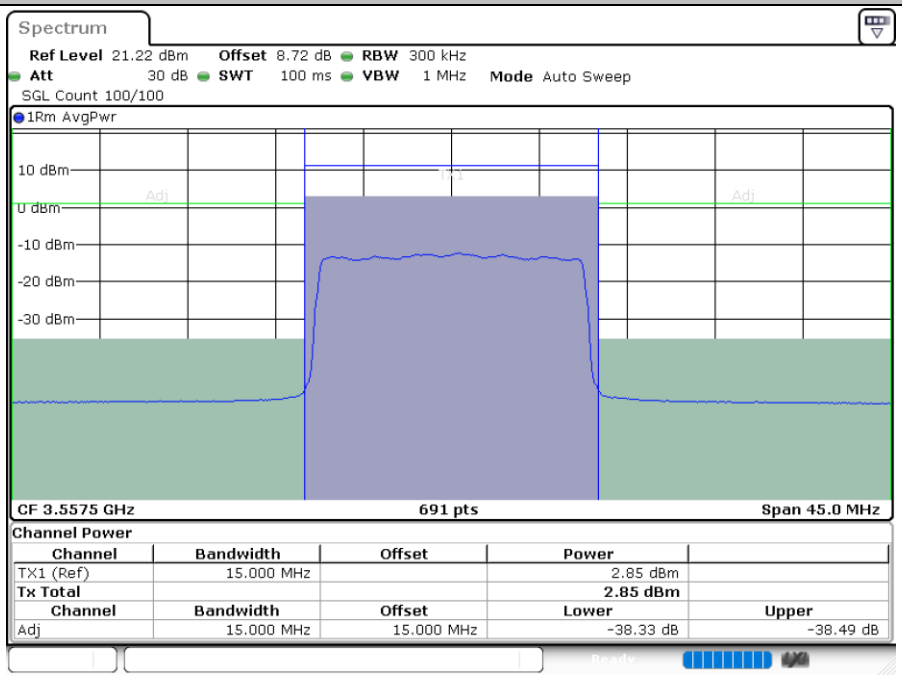
Lowest Channel / Full RB



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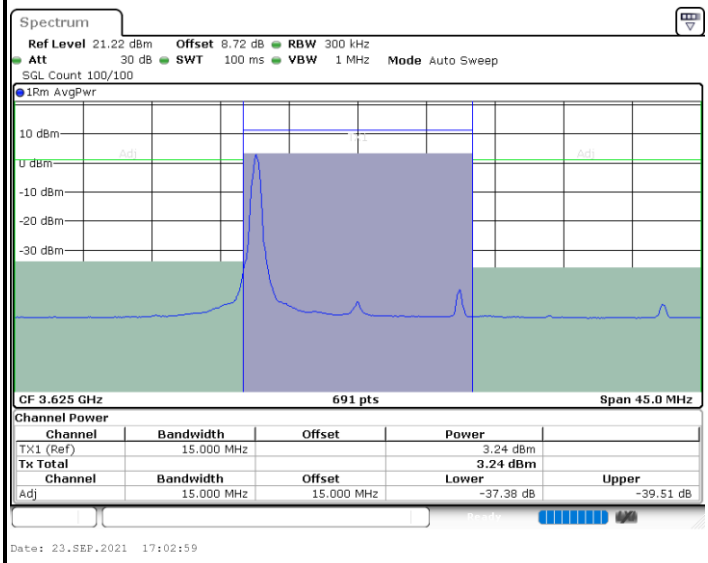
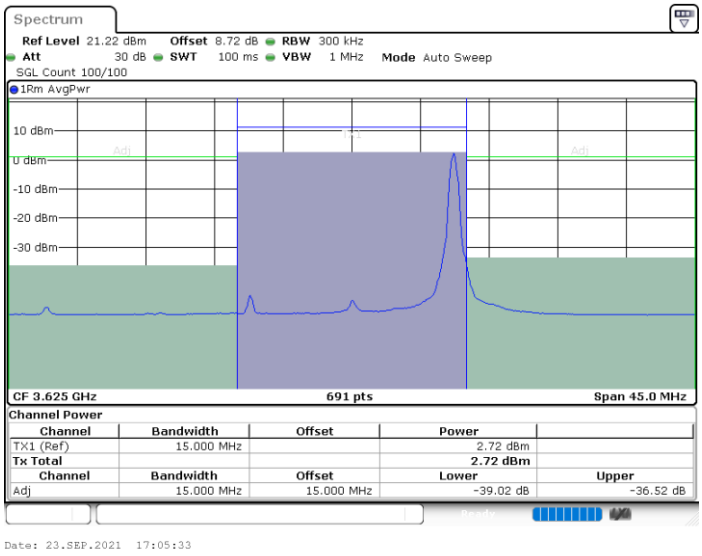
LTE Band 48 / 15MHz

QPSK

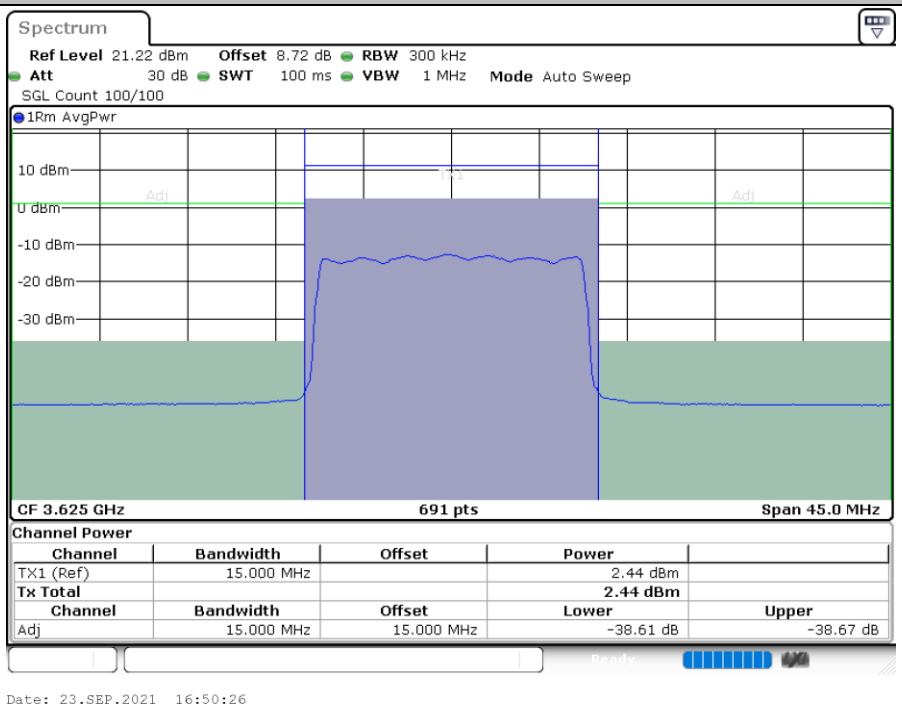
Middle Channel / 1RB0



Middle Channel / 1RBmax



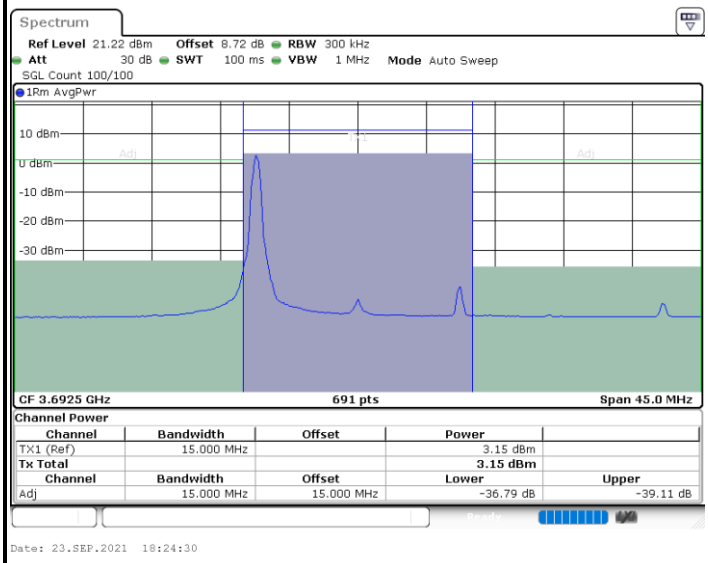
Middle Channel / Full RB



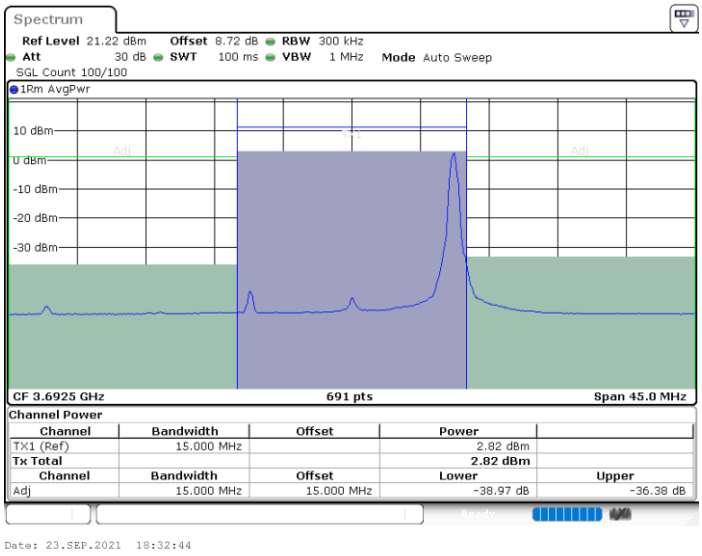
LTE Band 48 / 15MHz

QPSK

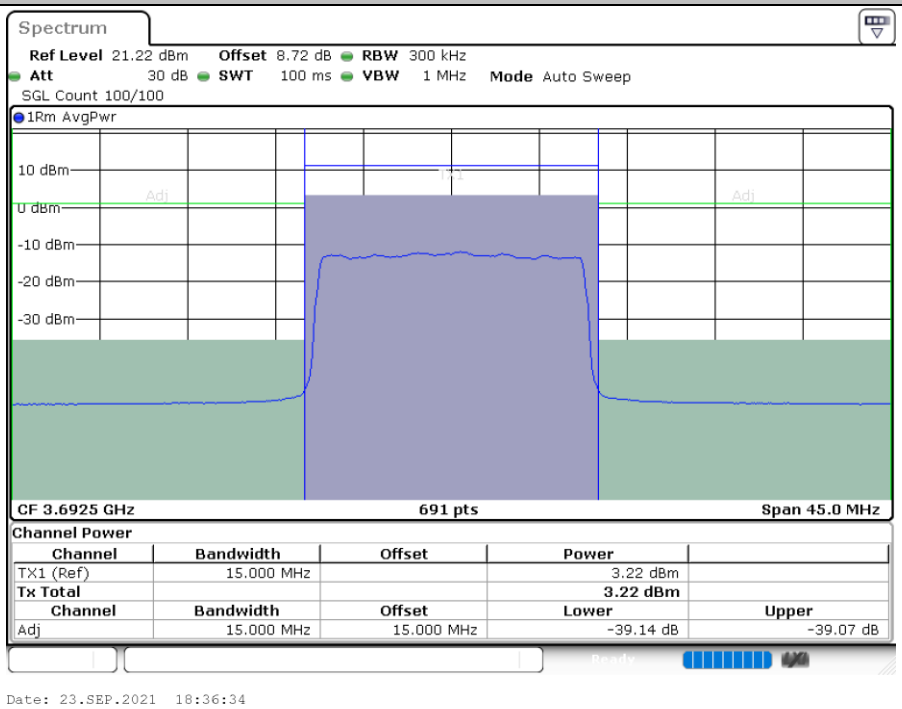
Highest Channel / 1RB0



Highest Channel / 1RBmax



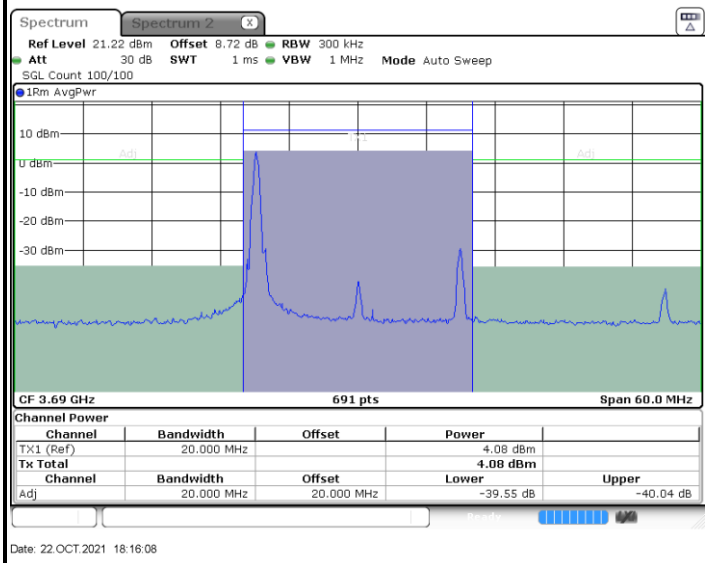
Highest Channel / Full RB



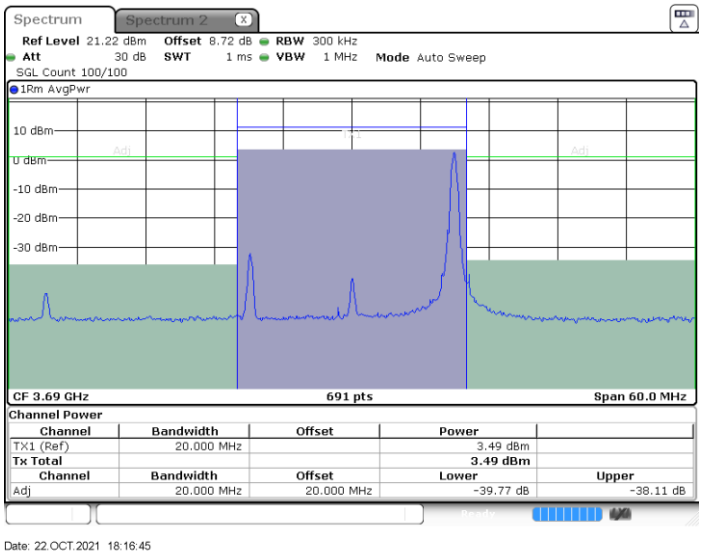
LTE Band 48 / 20MHz

QPSK

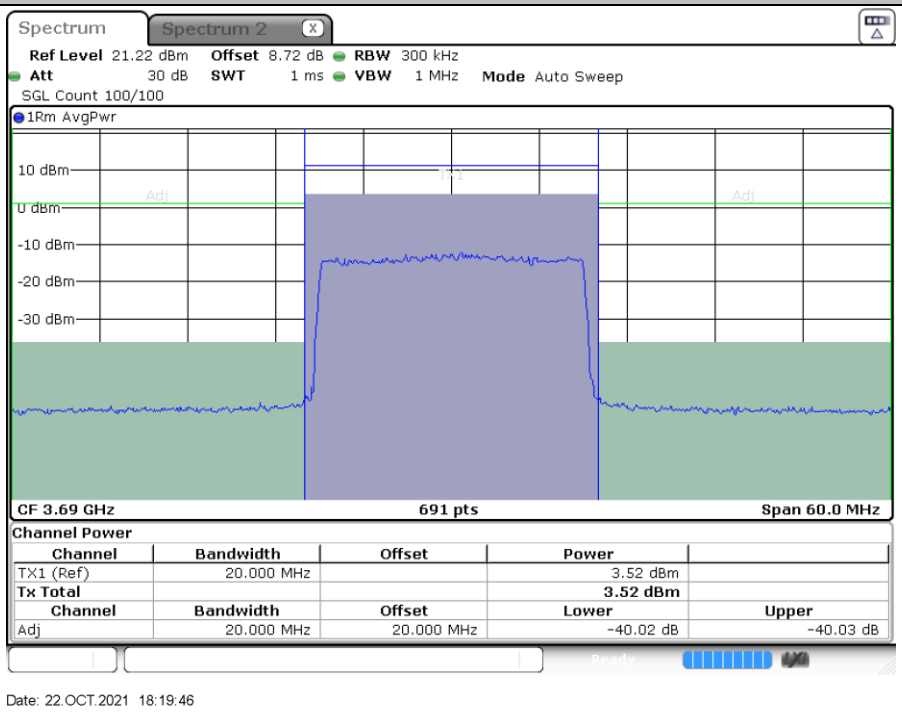
Lowest Channel / 1RB0



Lowest Channel / 1RBmax



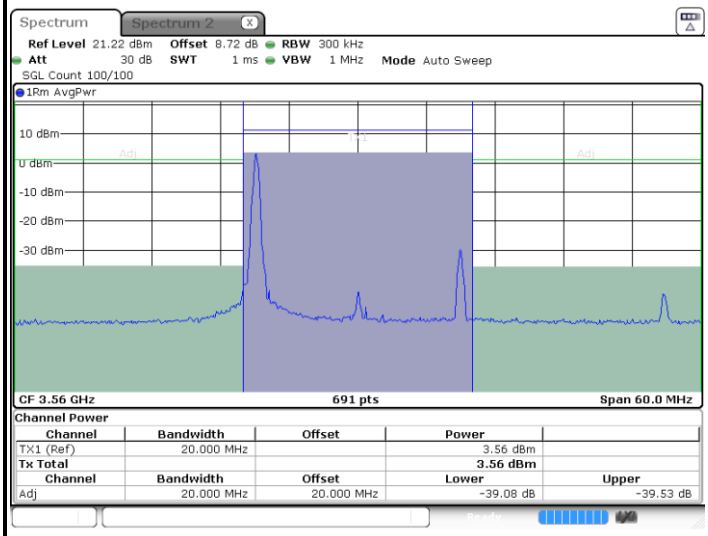
Lowest Channel / Full RB



LTE Band 48 / 20MHz

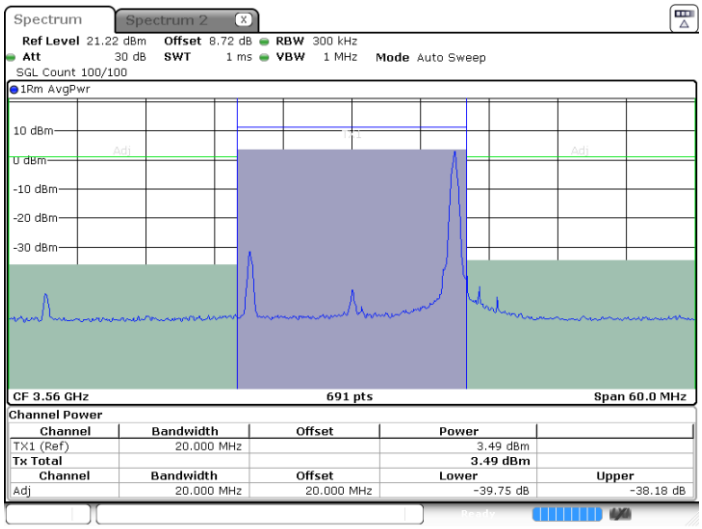
QPSK

Middle Channel / 1RB0



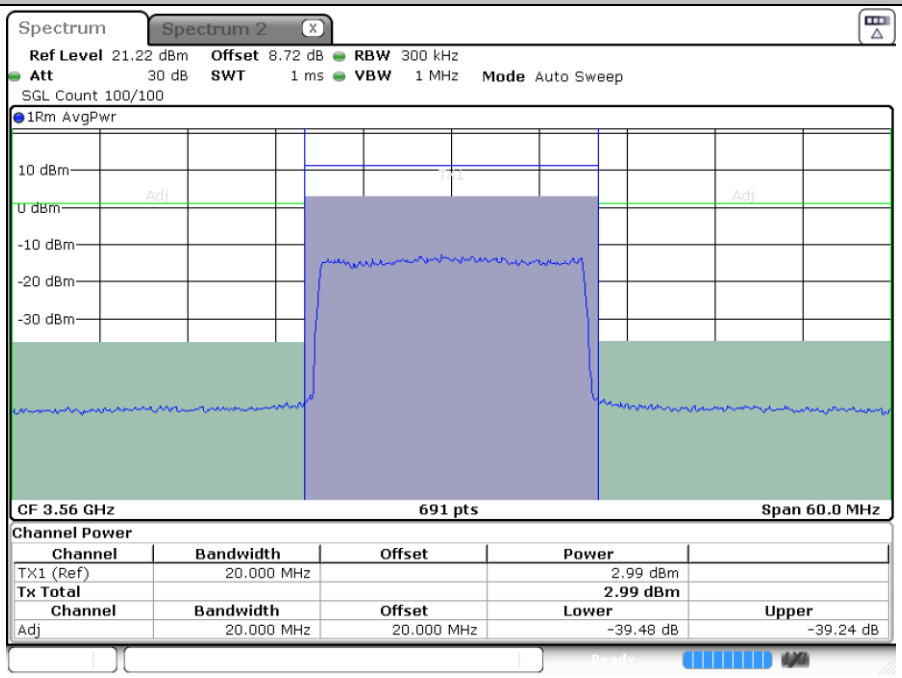
Date: 22.OCT.2021 18:12:47

Middle Channel / 1RBmax



Date: 22.OCT.2021 18:10:33

Middle Channel / Full RB

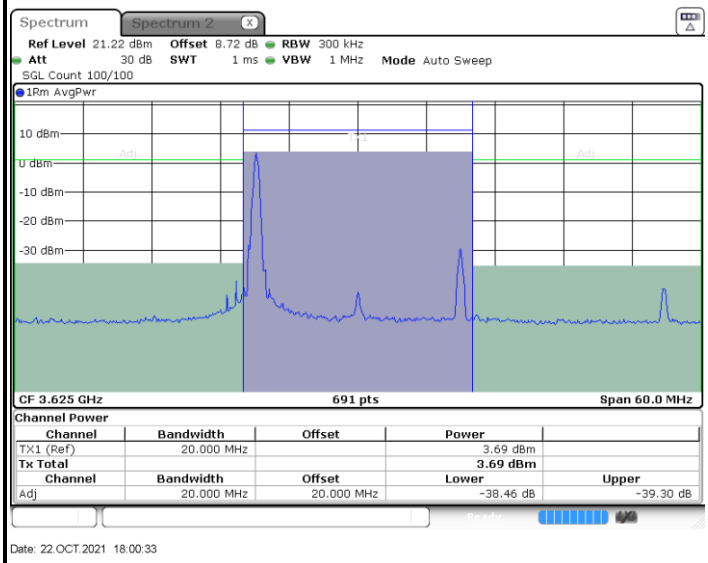


Date: 22.OCT.2021 18:06:42

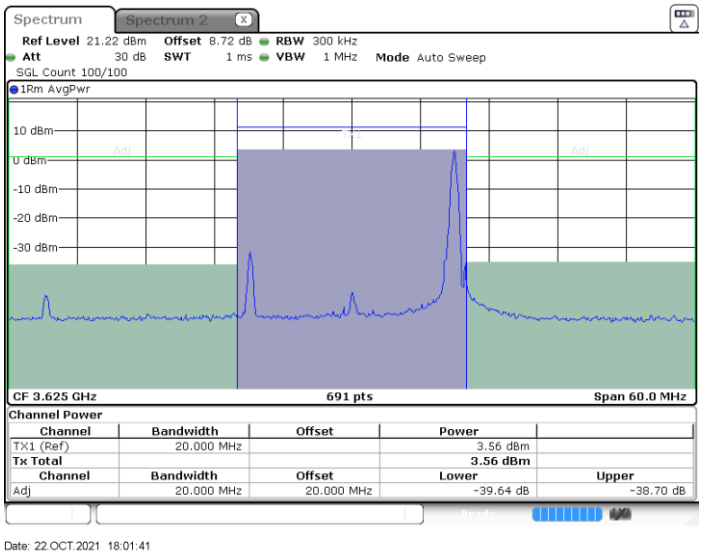
LTE Band 48 / 20MHz

QPSK

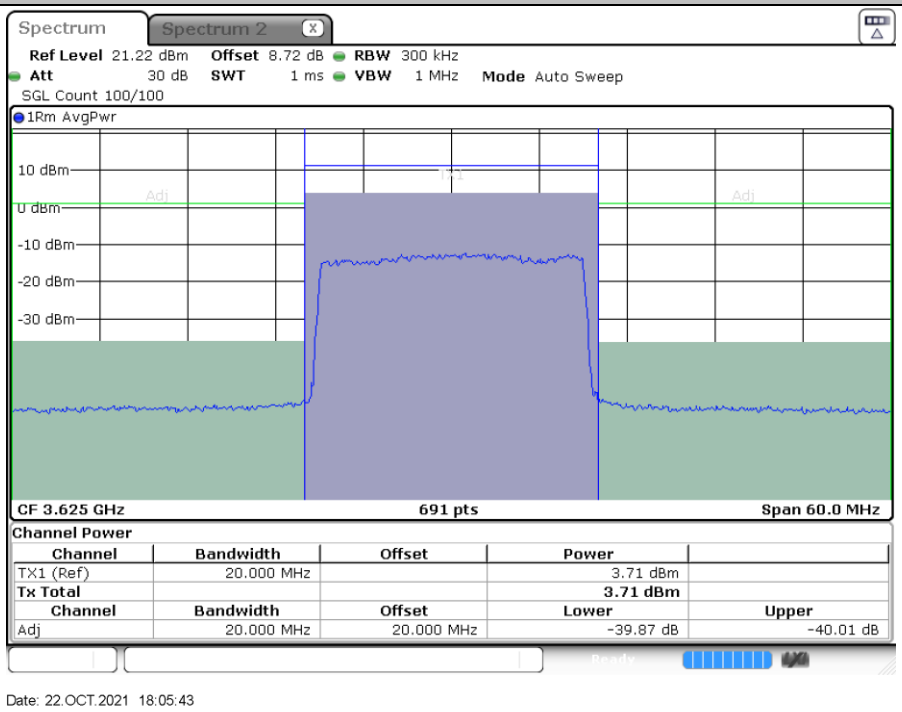
Highest Channel / 1RB0



Highest Channel / 1RBmax



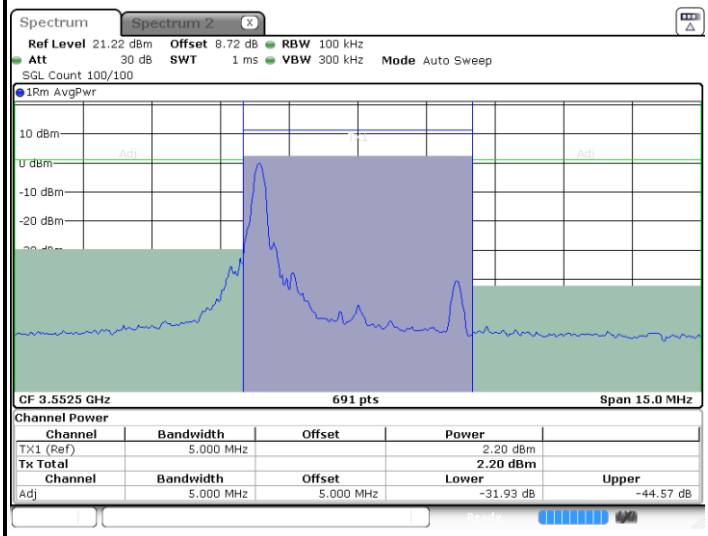
Highest Channel / Full RB



LTE Band 48 / 5MHz

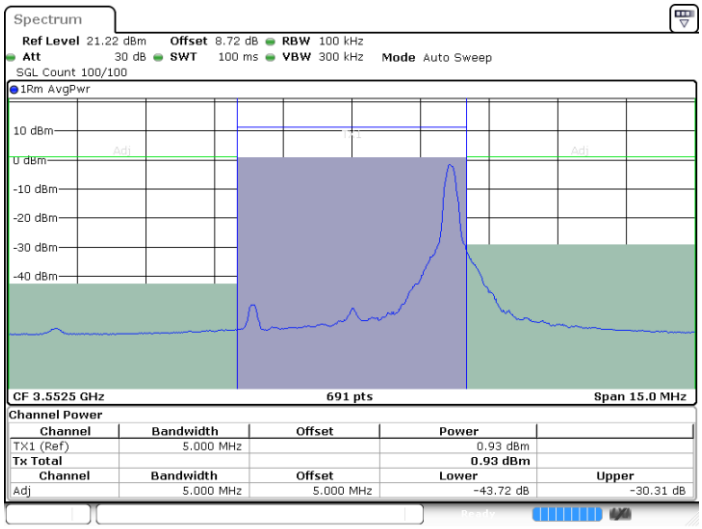
16QAM

Lowest Channel / 1RB0



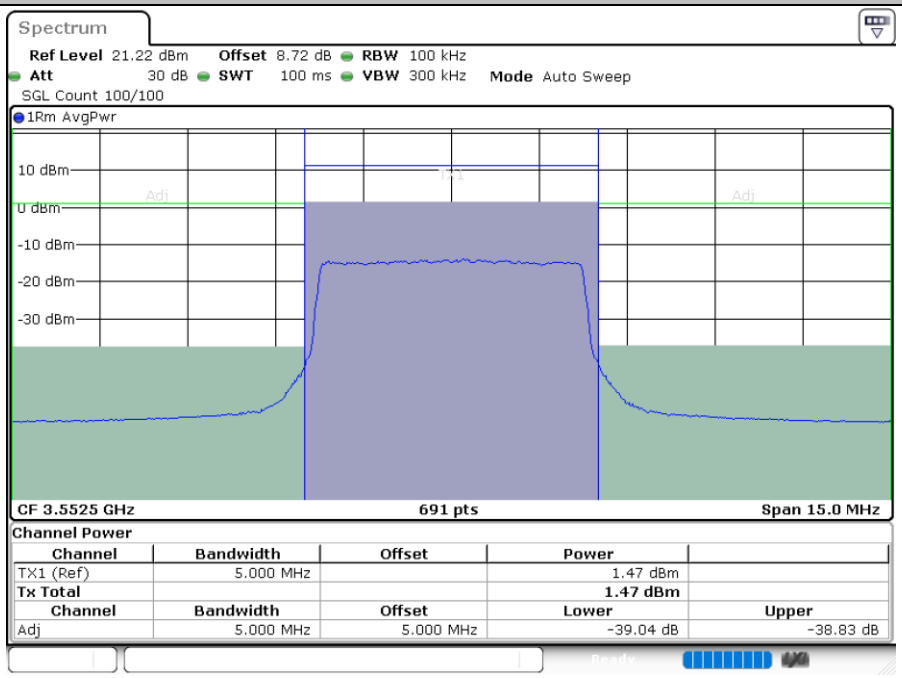
Date: 22.OCT.2021 18:42:42

Lowest Channel / 1RBmax



Date: 24.SEP.2021 19:25:41

Lowest Channel / Full RB

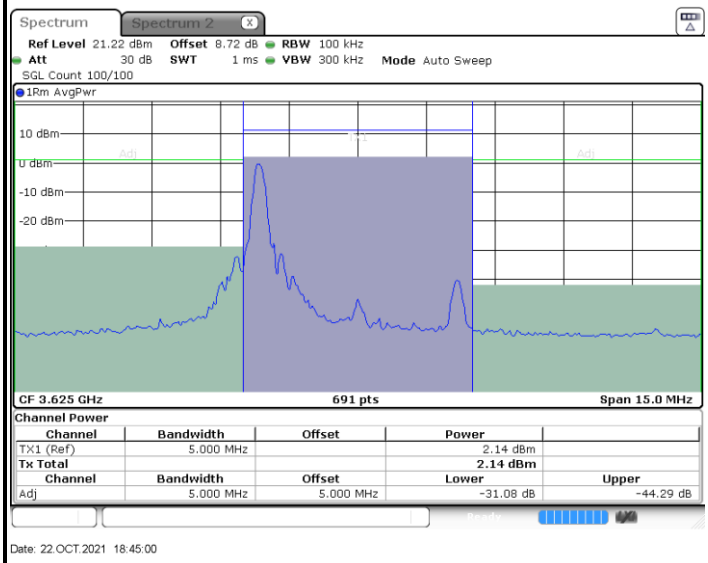


Date: 23.SEP.2021 22:21:40

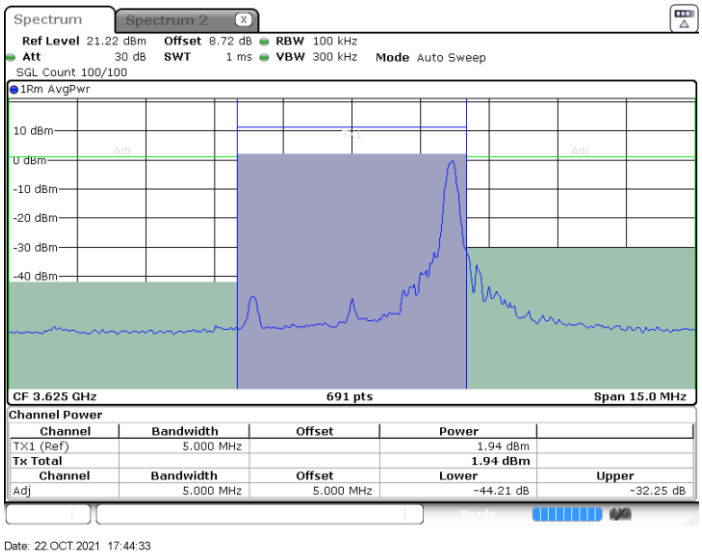
LTE Band 48 / 5MHz

16QAM

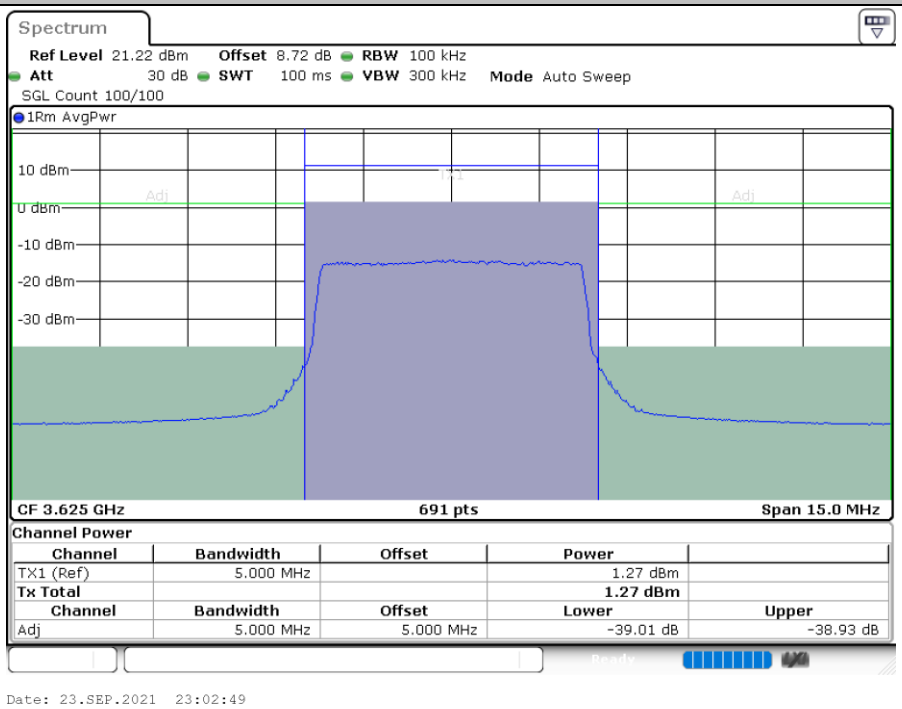
Middle Channel / 1RB0



Middle Channel / 1RBmax



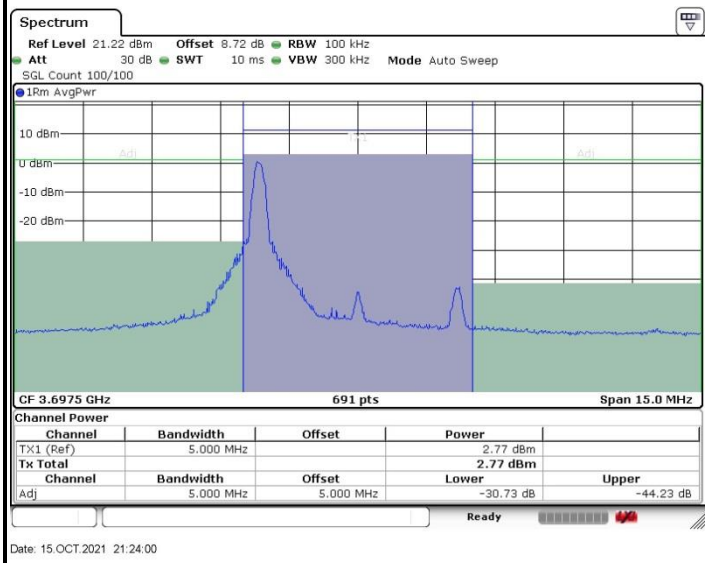
Middle Channel / Full RB



LTE Band 48 / 5MHz

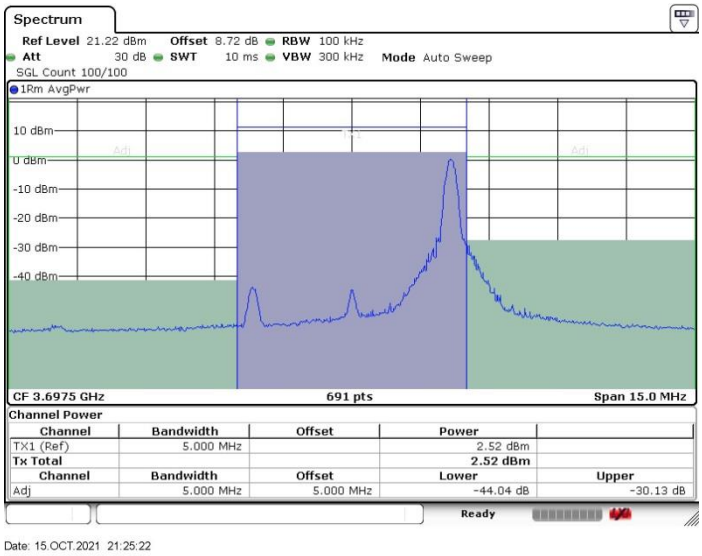
16QAM

Highest Channel / 1RB0



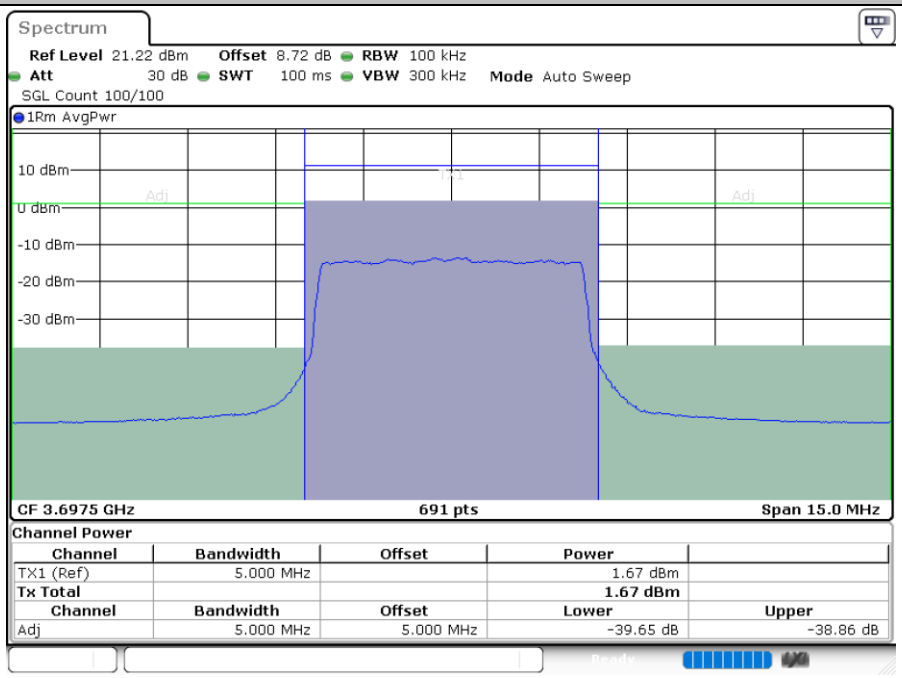
Date: 15.OCT.2021 21:24:00

Highest Channel / 1RBmax



Date: 15.OCT.2021 21:25:22

Highest Channel / Full RB

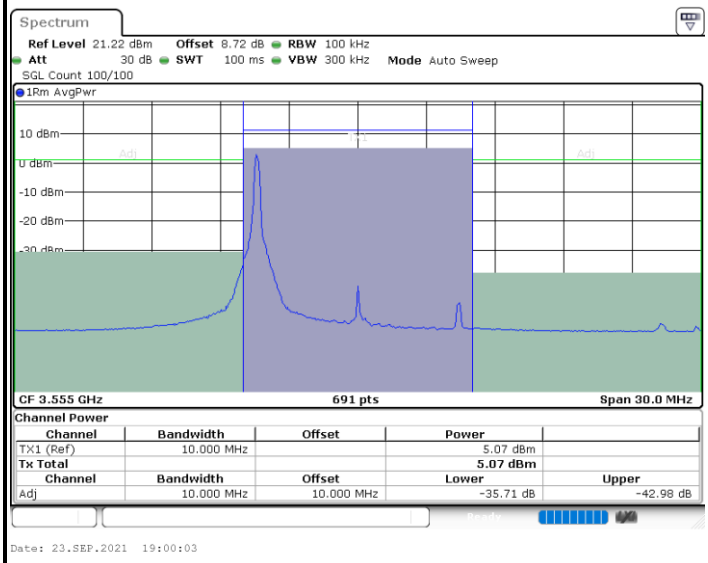


Date: 23.SEP.2021 23:44:30

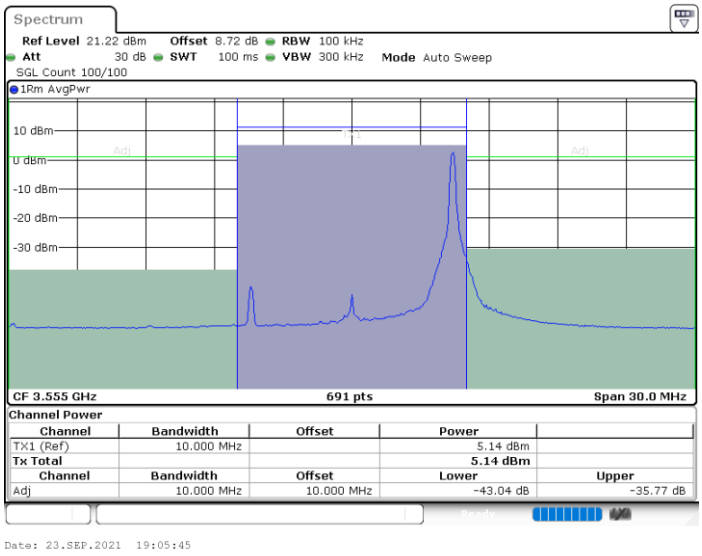
LTE Band 48 / 10MHz

16QAM

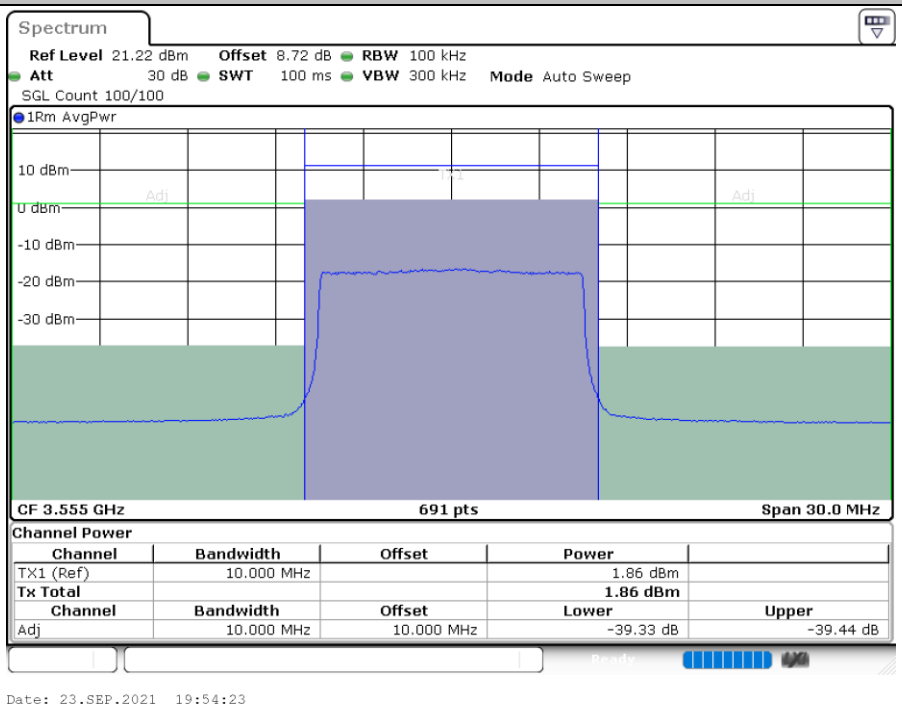
Lowest Channel / 1RB0



Lowest Channel / 1RBmax



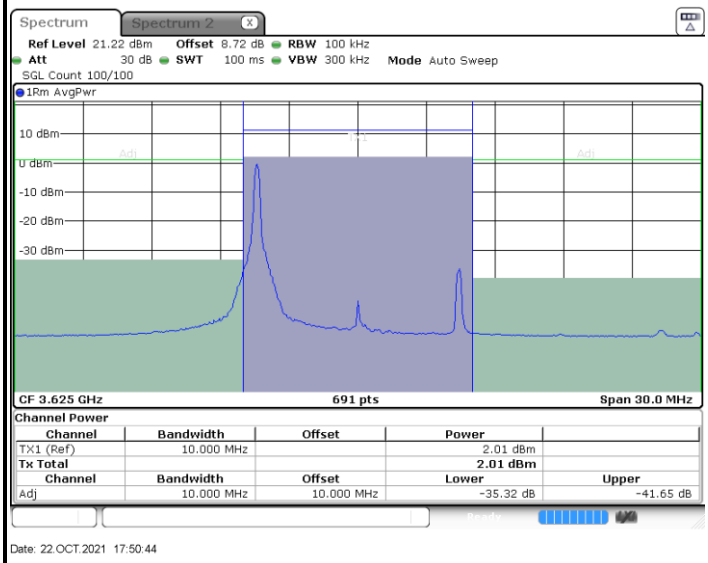
Lowest Channel / Full RB



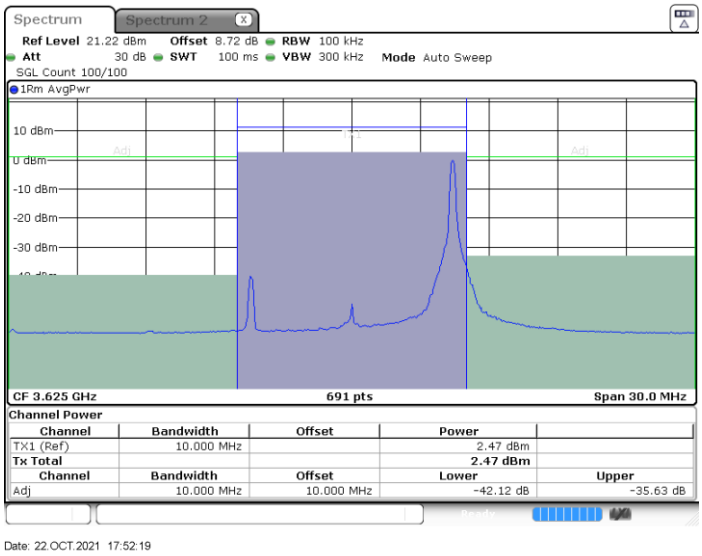
LTE Band 48 / 10MHz

16QAM

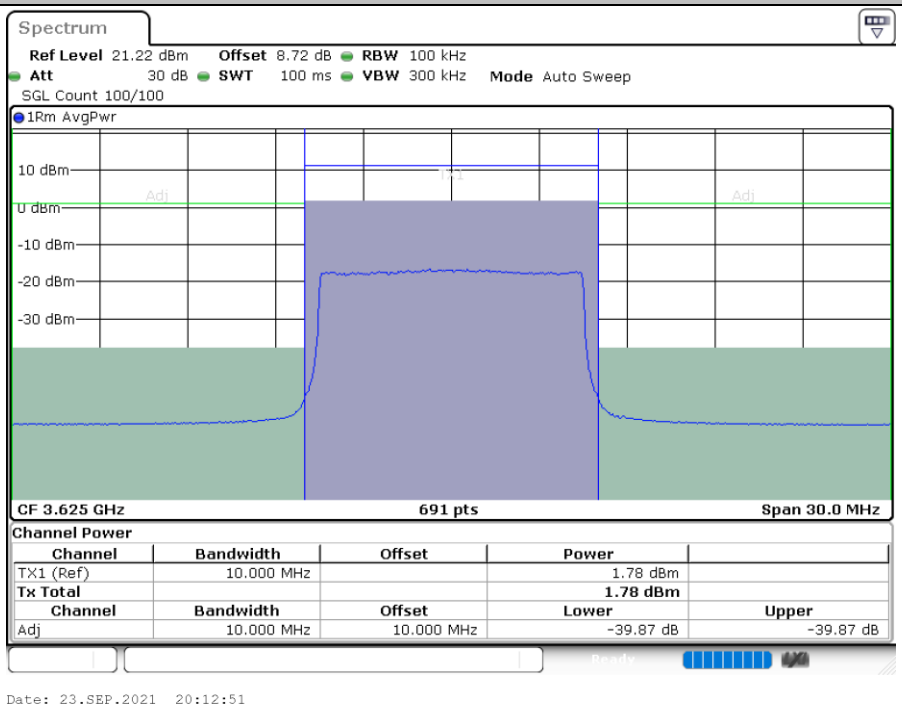
Middle Channel / 1RB0



Middle Channel / 1RBmax



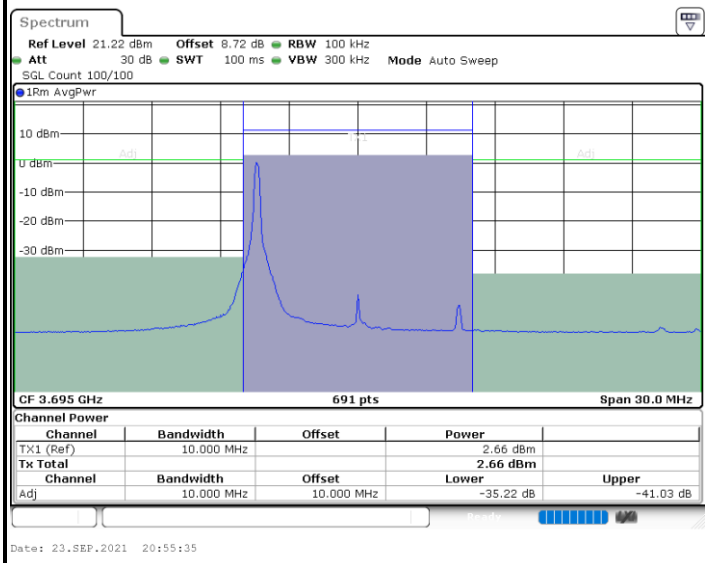
Middle Channel / Full RB



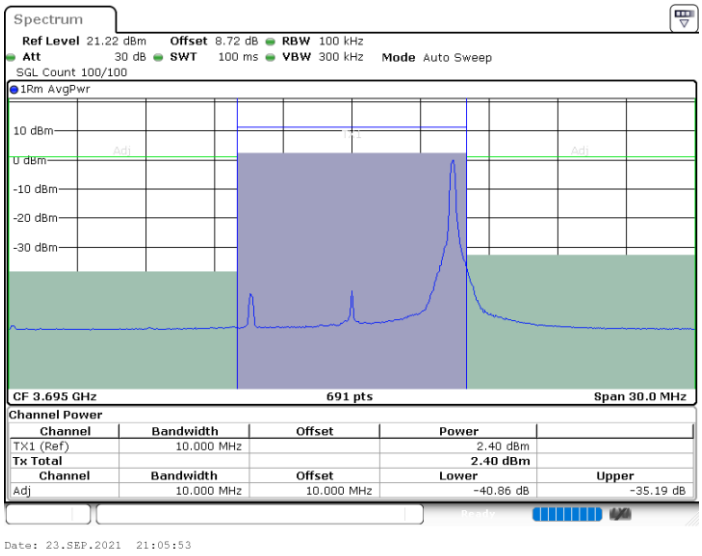
LTE Band 48 / 10MHz

16QAM

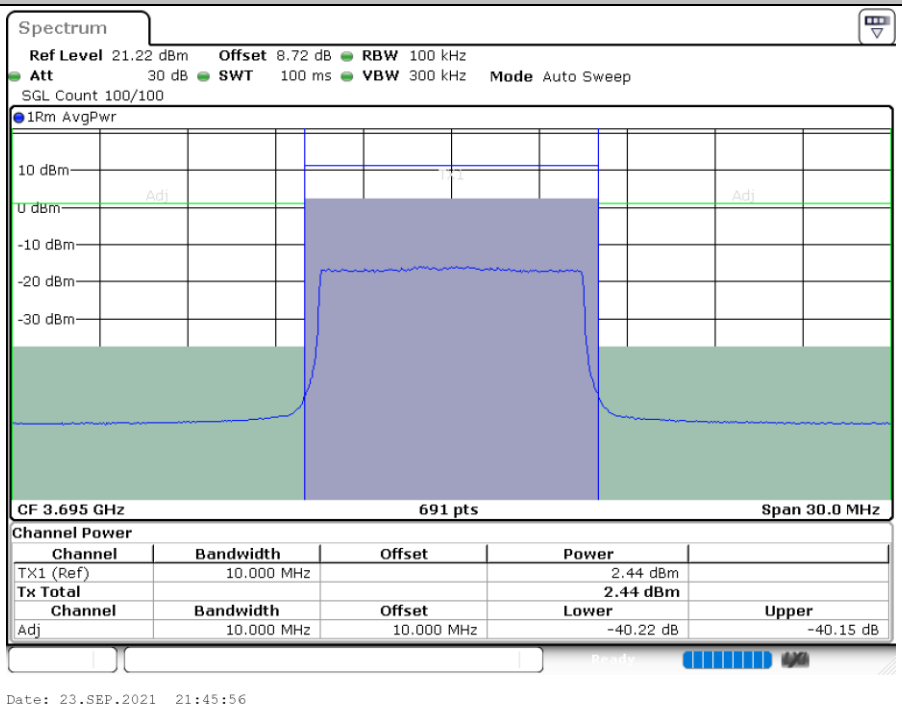
Highest Channel / 1RB0



Highest Channel / 1RBmax



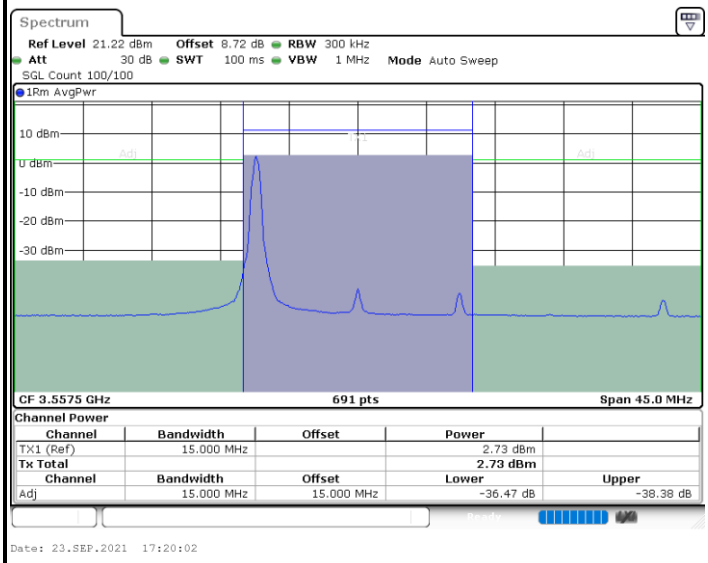
Highest Channel / Full RB



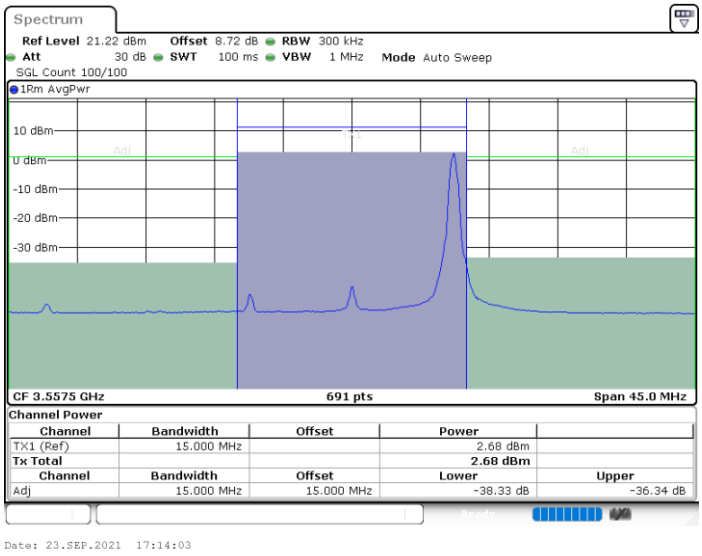
LTE Band 48 / 15MHz

16QAM

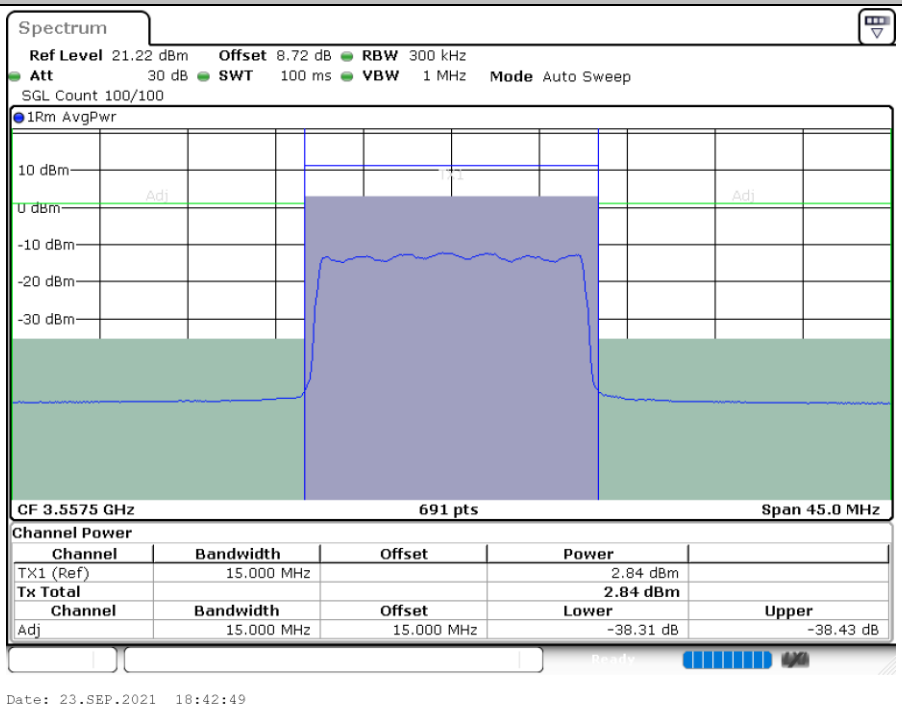
Lowest Channel / 1RB0



Lowest Channel / 1RBmax



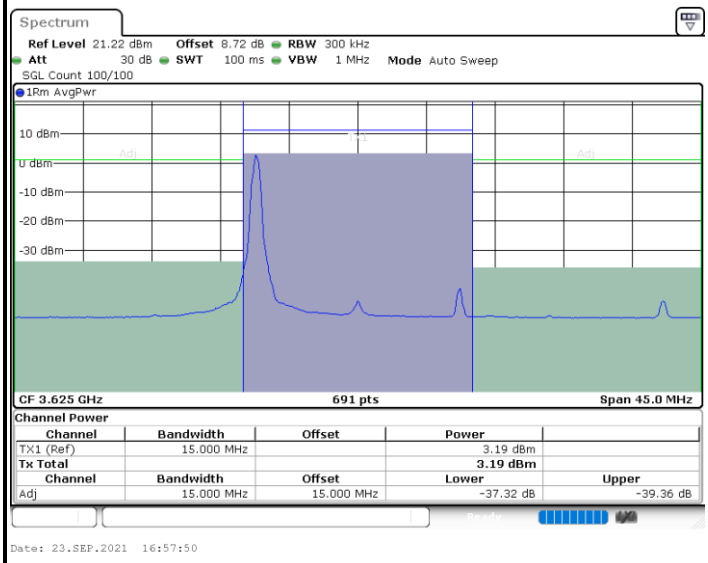
Lowest Channel / Full RB



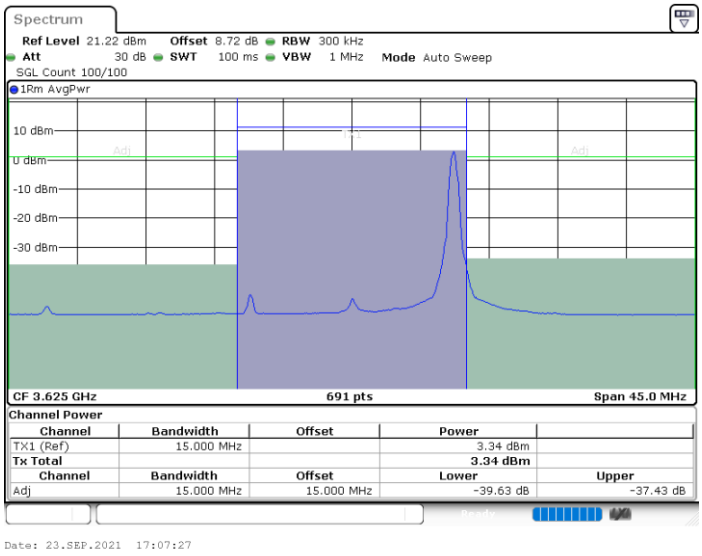
LTE Band 48 / 15MHz

16QAM

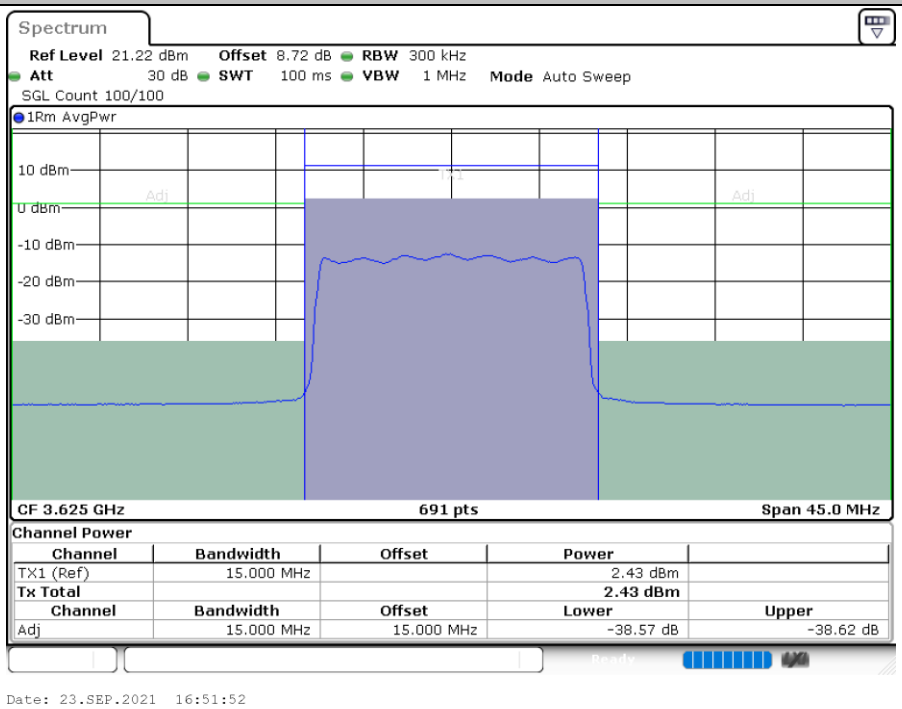
Middle Channel / 1RB0



Middle Channel / 1RBmax



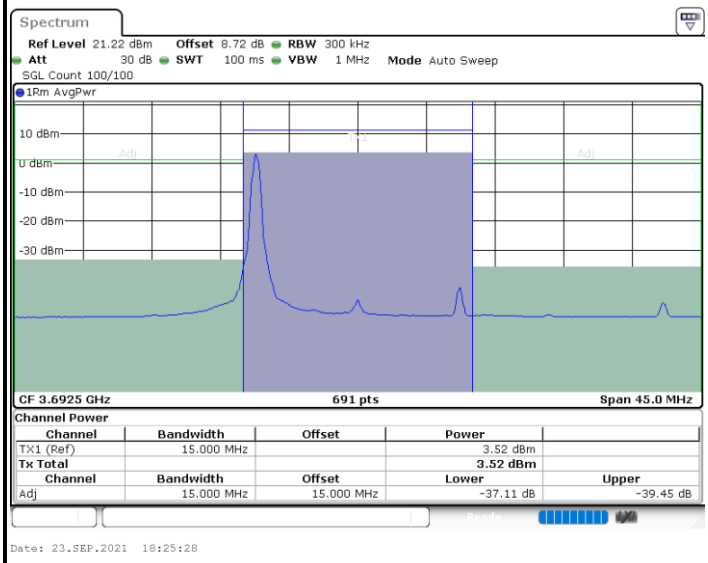
Middle Channel / Full RB



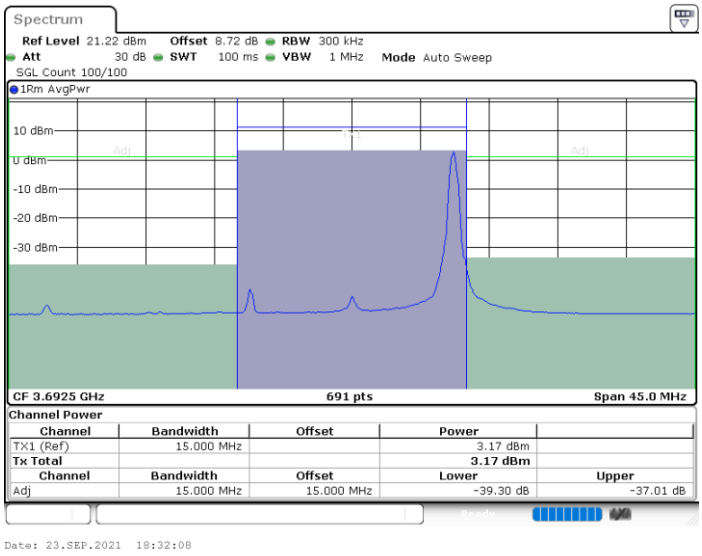
LTE Band 48 / 15MHz

16QAM

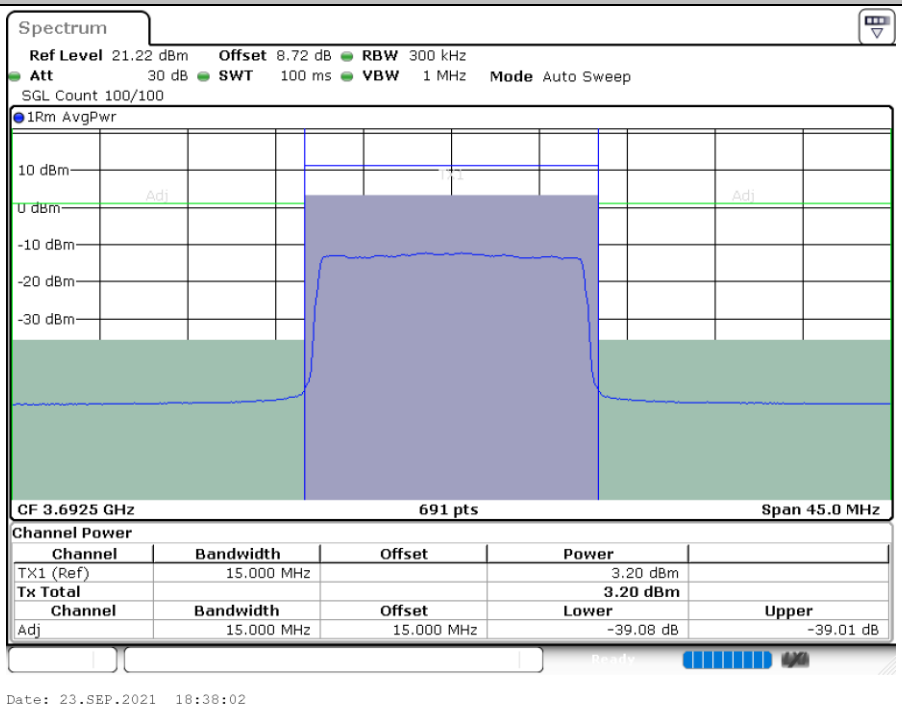
Highest Channel / 1RB0



Highest Channel / 1RBmax



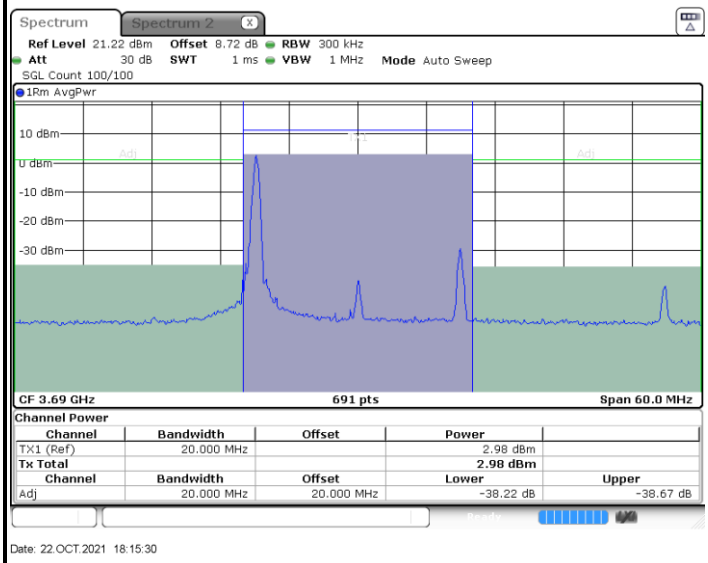
Highest Channel / Full RB



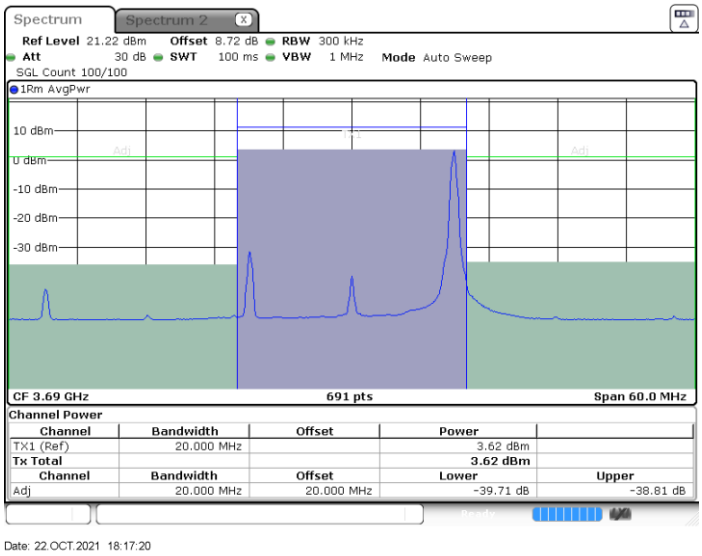
LTE Band 48 / 20MHz

16QAM

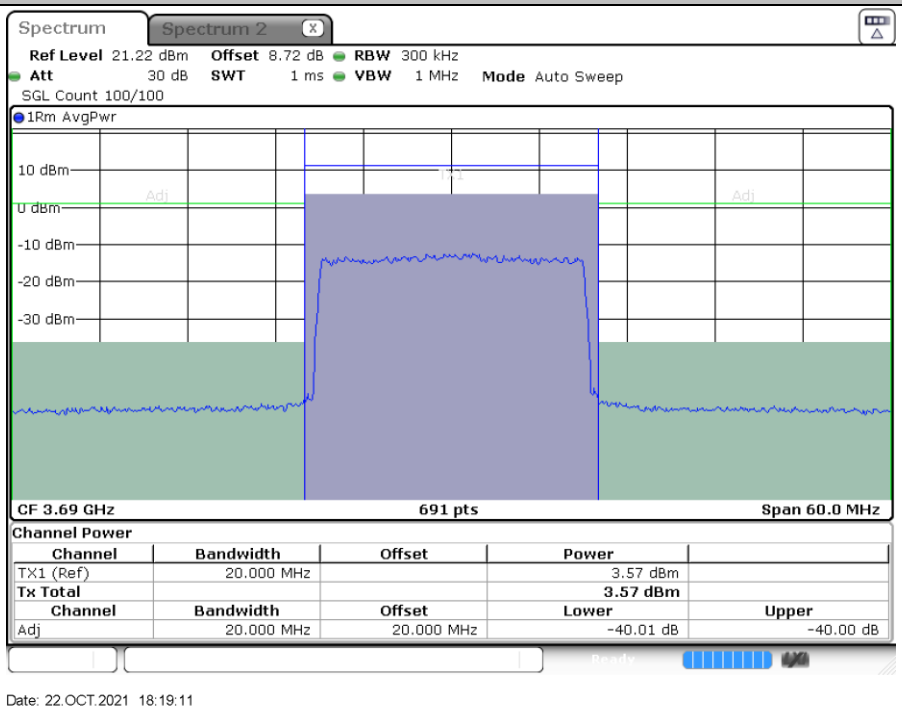
Lowest Channel / 1RB0



Lowest Channel / 1RBmax



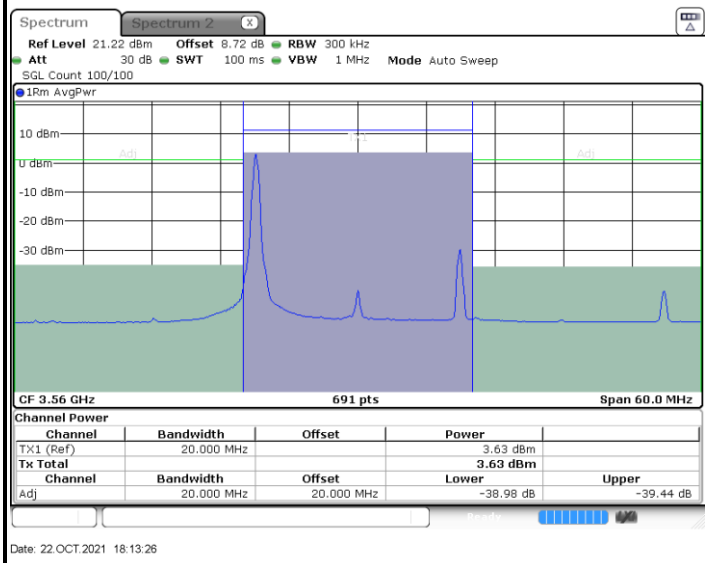
Lowest Channel / Full RB



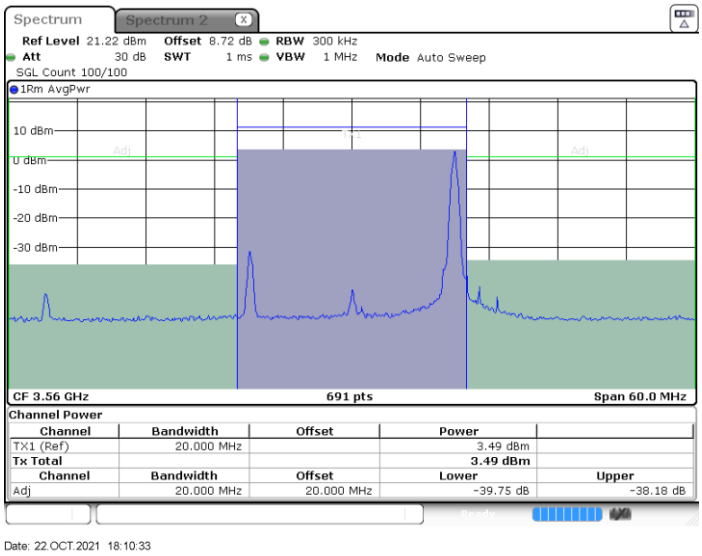
LTE Band 48 / 20MHz

16QAM

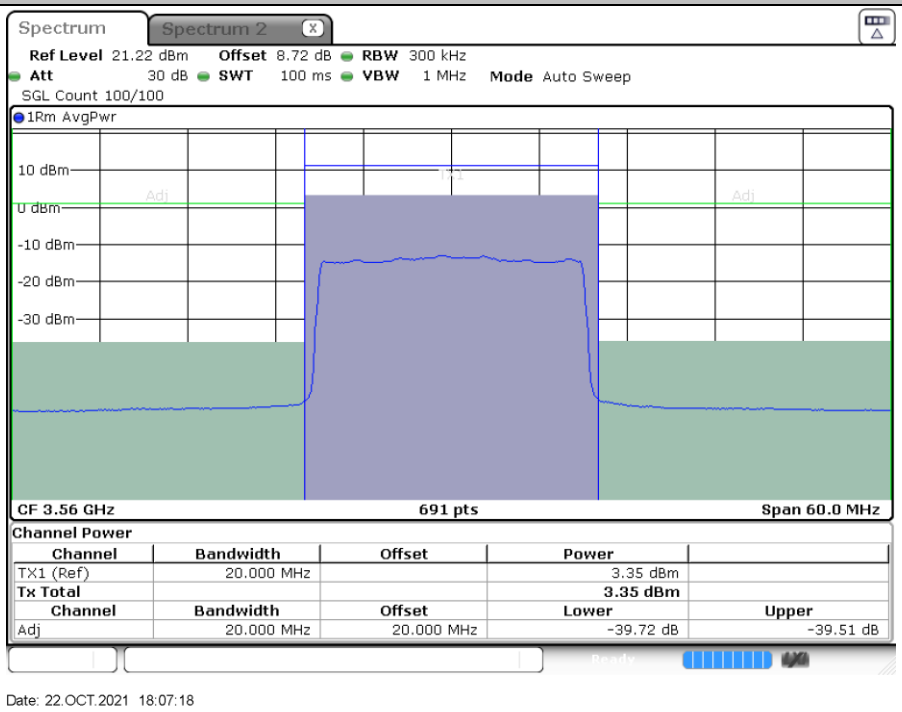
Middle Channel / 1RB0



Middle Channel / 1RBmax



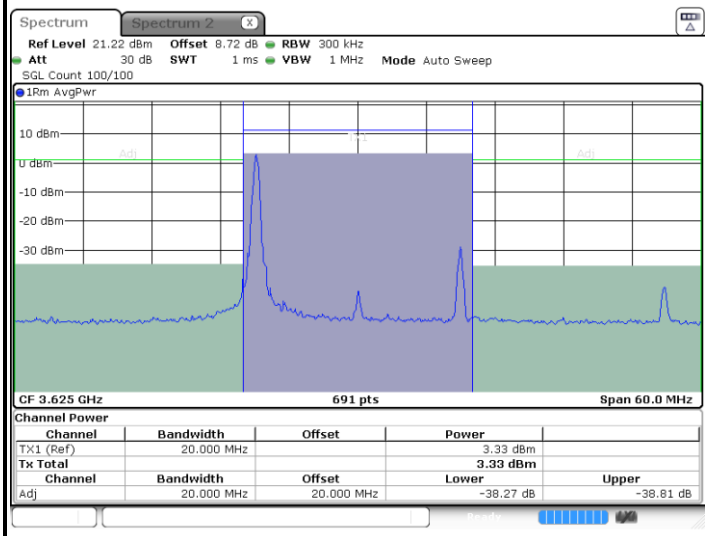
Middle Channel / Full RB



LTE Band 48 / 20MHz

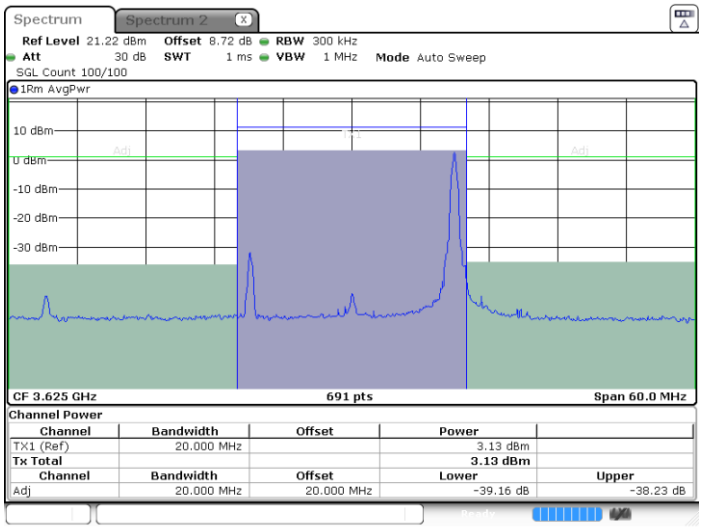
16QAM

Highest Channel / 1RB0



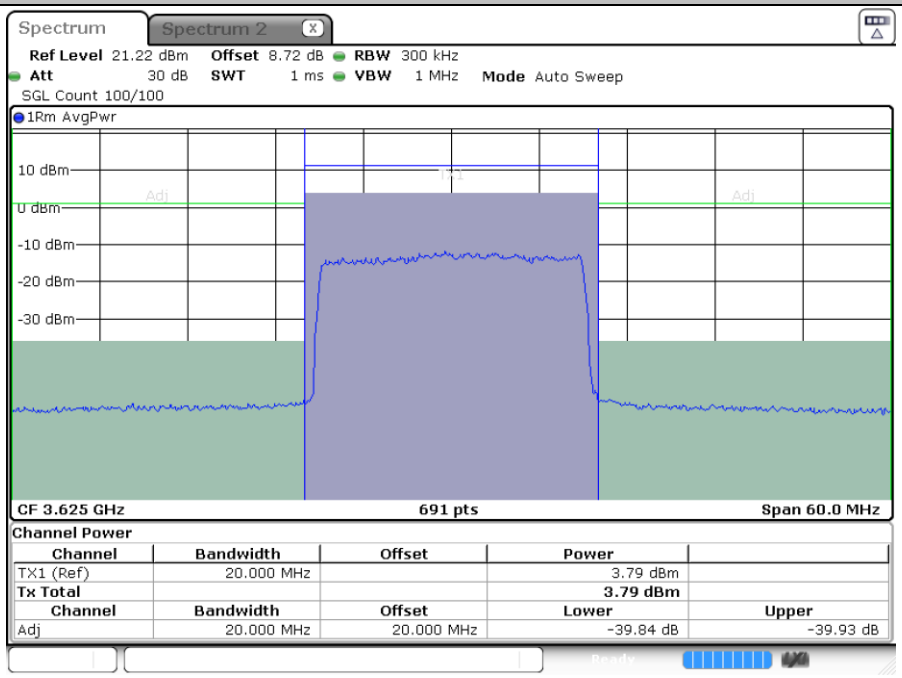
Date: 22.OCT.2021 18:00:02

Highest Channel / 1RBmax



Date: 22.OCT.2021 18:03:07

Highest Channel / Full RB

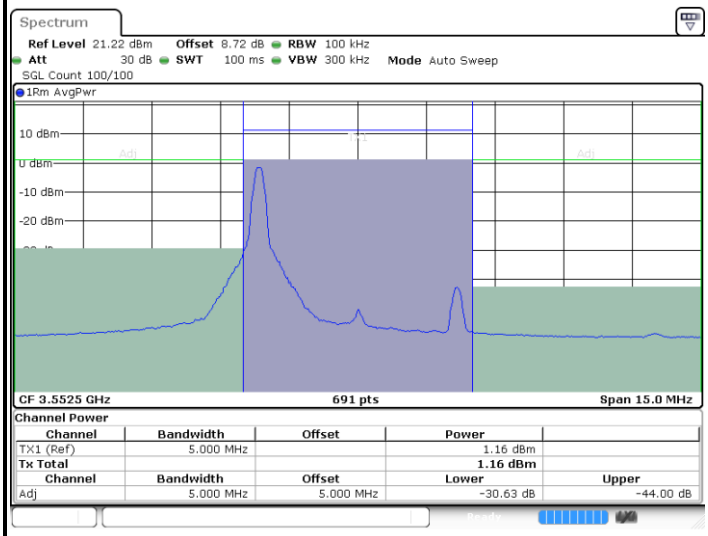


Date: 22.OCT.2021 18:05:06

LTE Band 48 / 5MHz

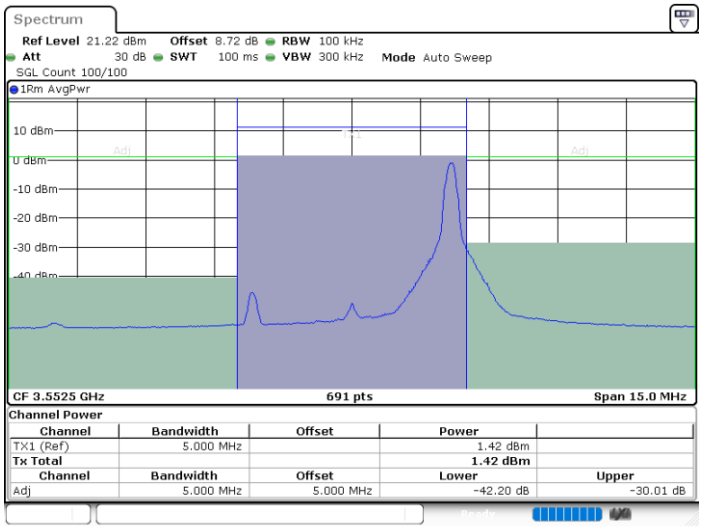
64QAM

Lowest Channel / 1RB0



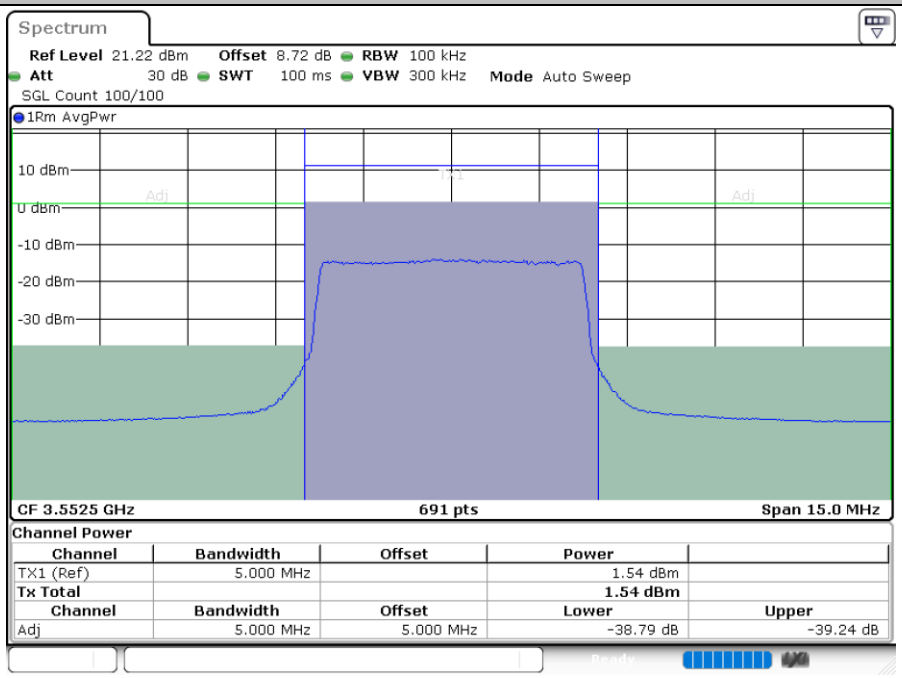
Date: 24.SEP.2021 19:23:30

Lowest Channel / 1RBmax



Date: 23.SEP.2021 22:06:19

Lowest Channel / Full RB

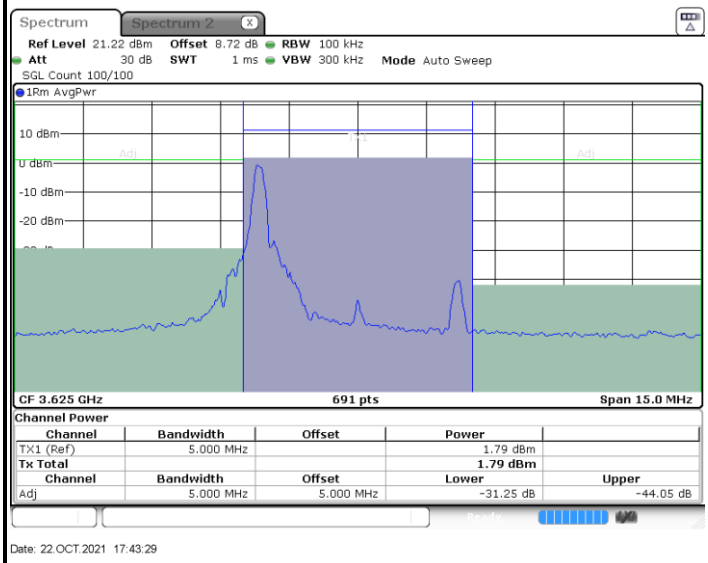


Date: 23.SEP.2021 22:25:42

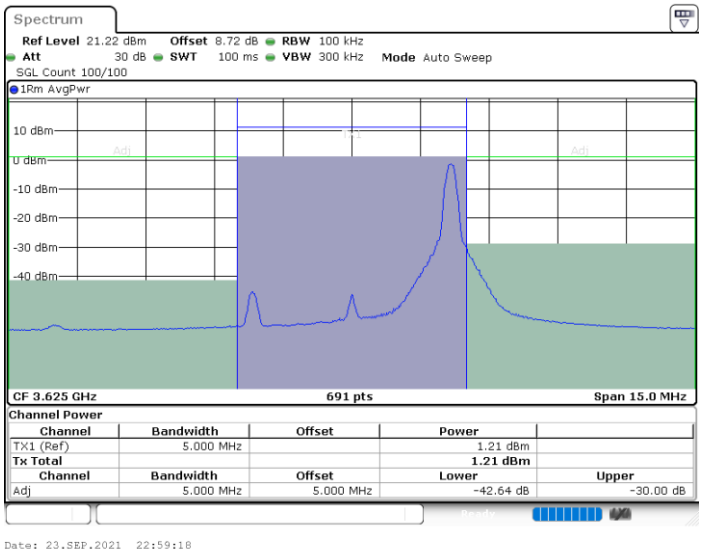
LTE Band 48 / 5MHz

64QAM

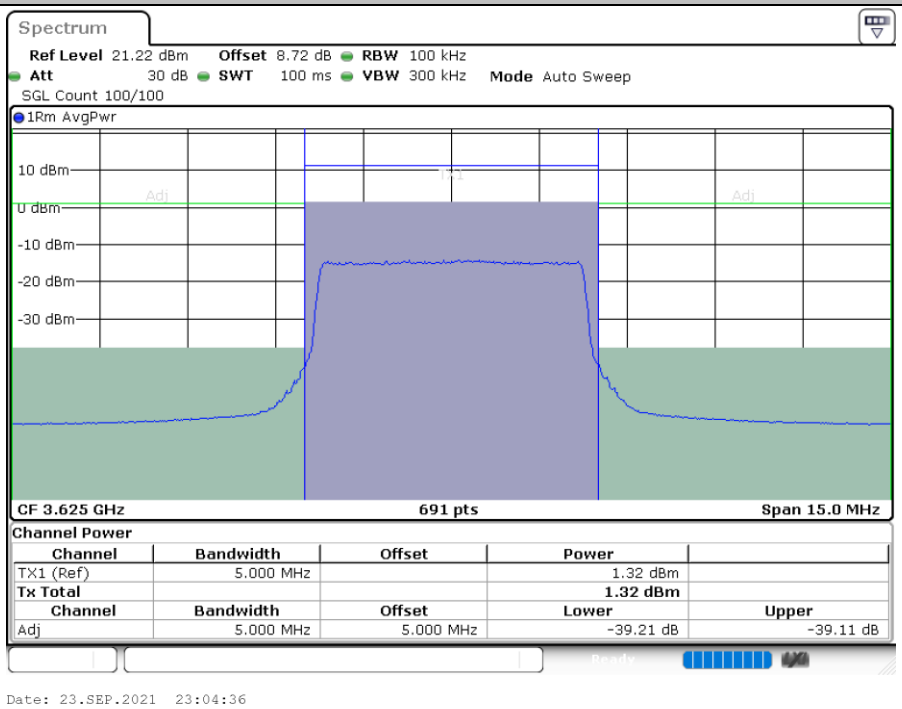
Middle Channel / 1RB0



Middle Channel / 1RBmax



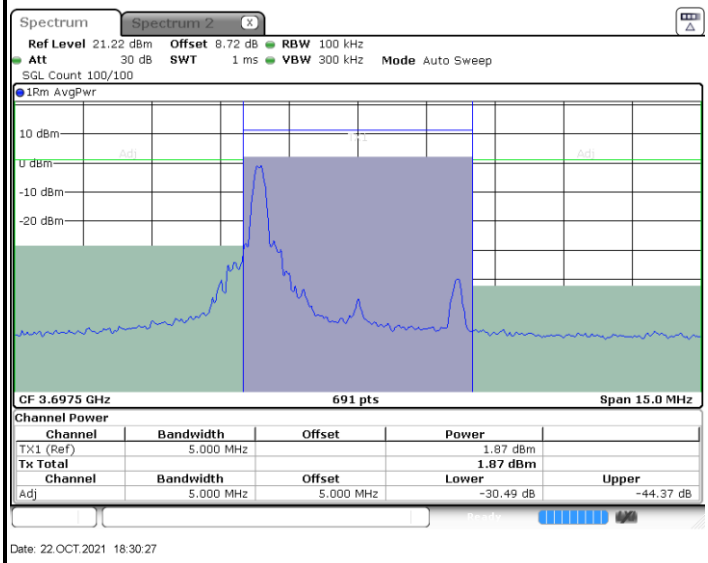
Middle Channel / Full RB



LTE Band 48 / 5MHz

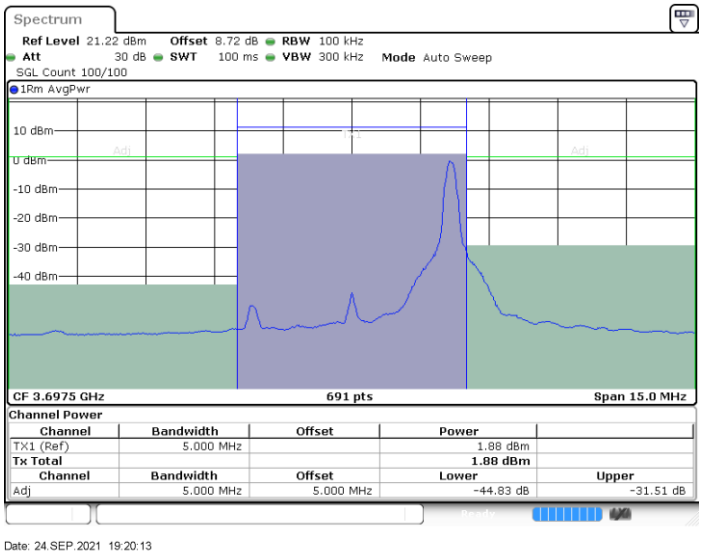
64QAM

Highest Channel / 1RB0



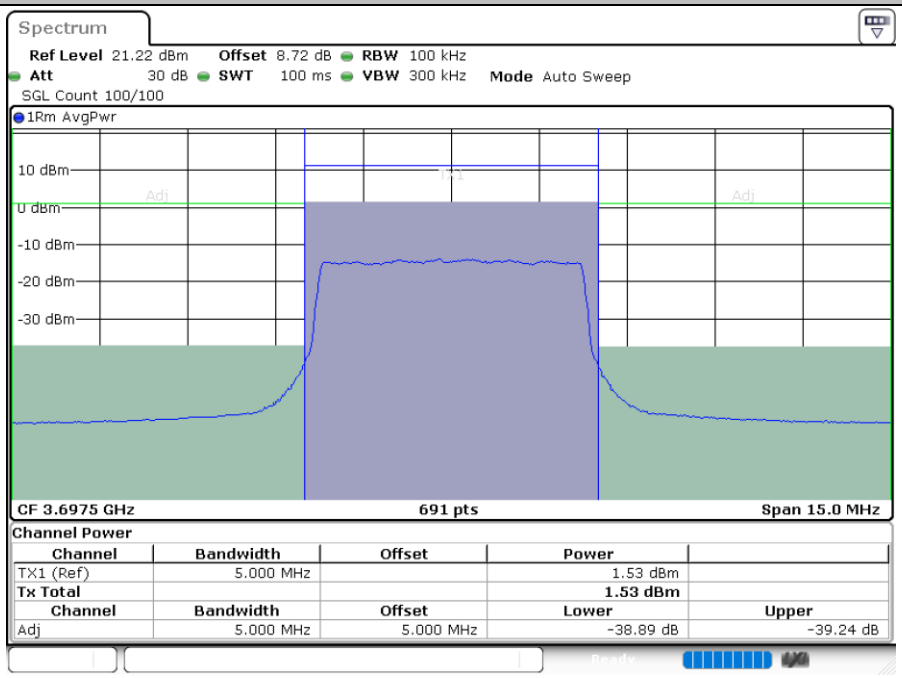
Date: 22.OCT.2021 18:30:27

Highest Channel / 1RBmax



Date: 24.SEP.2021 19:20:13

Highest Channel / Full RB

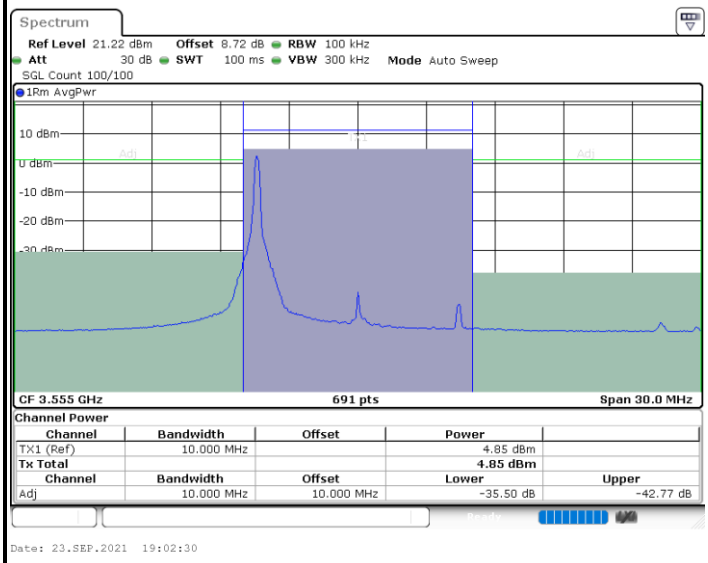


Date: 23.SEP.2021 23:42:39

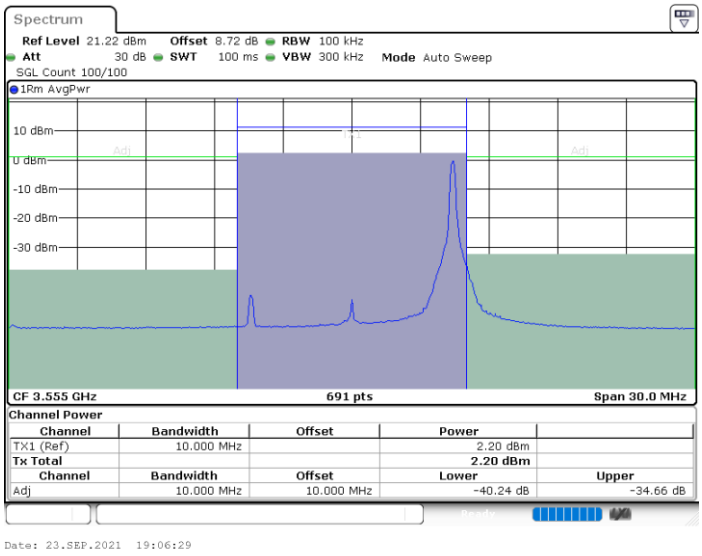
LTE Band 48 / 10MHz

64QAM

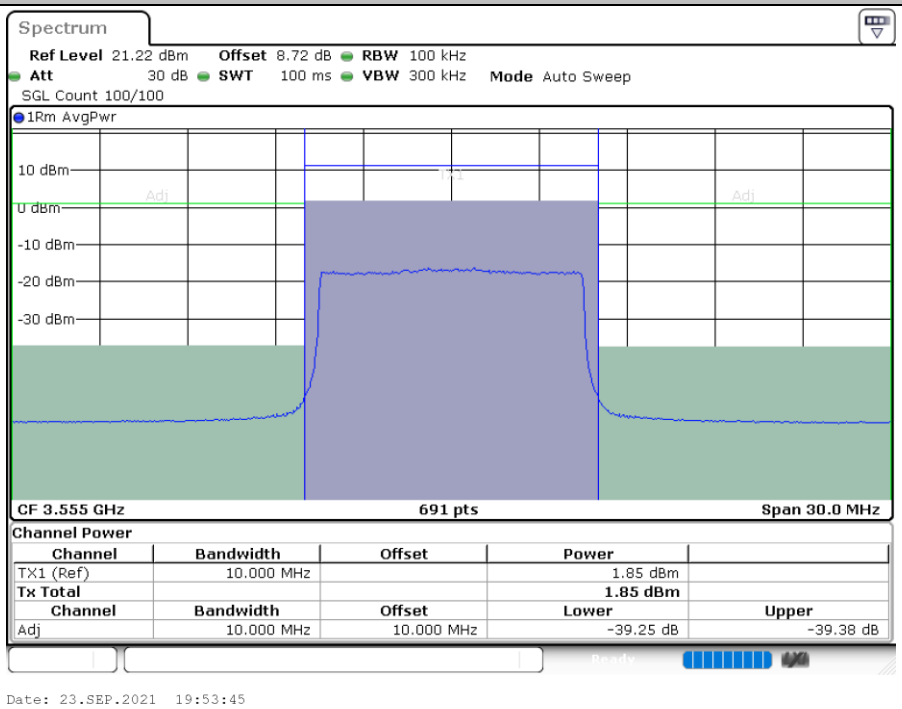
Lowest Channel / 1RB0



Lowest Channel / 1RBmax



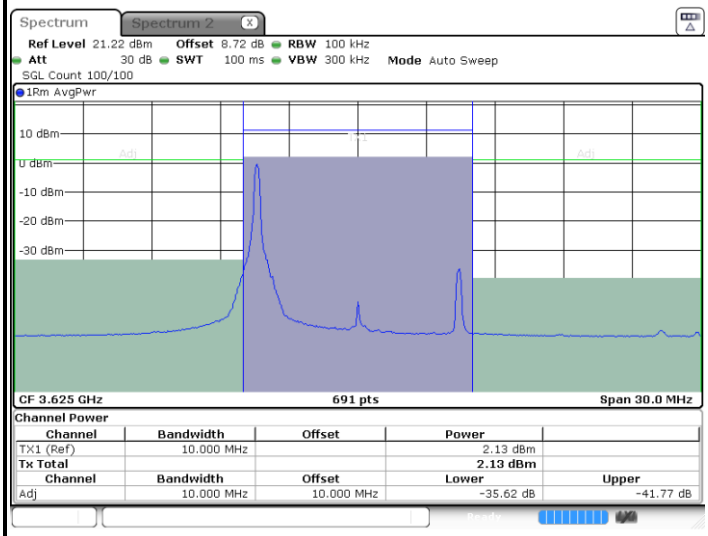
Lowest Channel / Full RB



LTE Band 48 / 10MHz

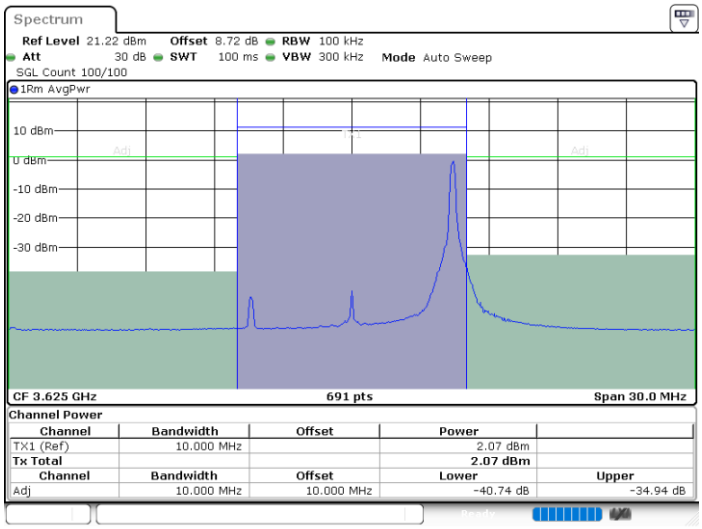
64QAM

Middle Channel / 1RB0



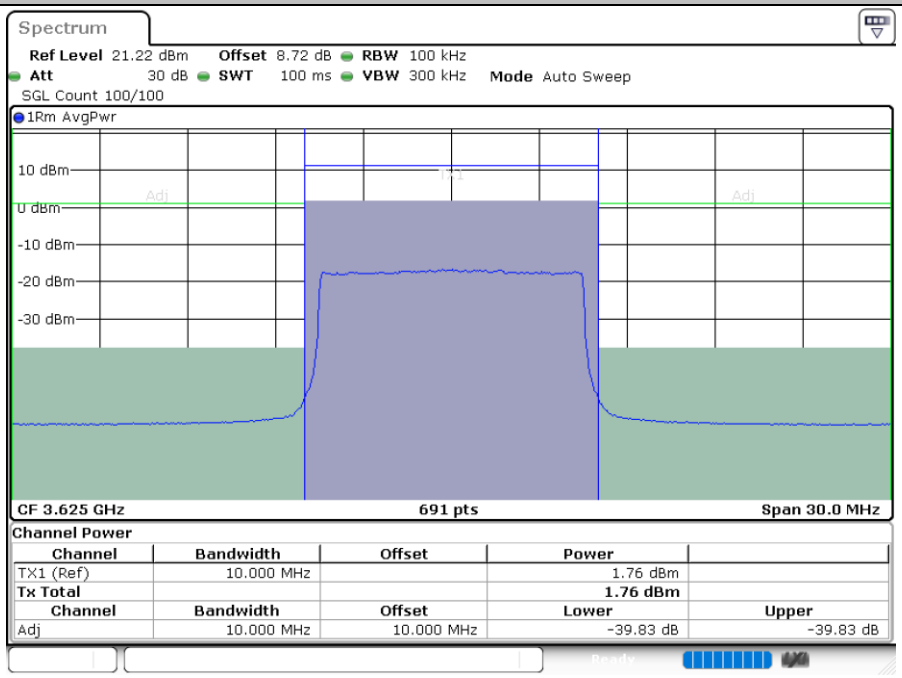
Date: 22.OCT.2021 17:50:09

Middle Channel / 1RBmax



Date: 23.SEP.2021 20:05:34

Middle Channel / Full RB

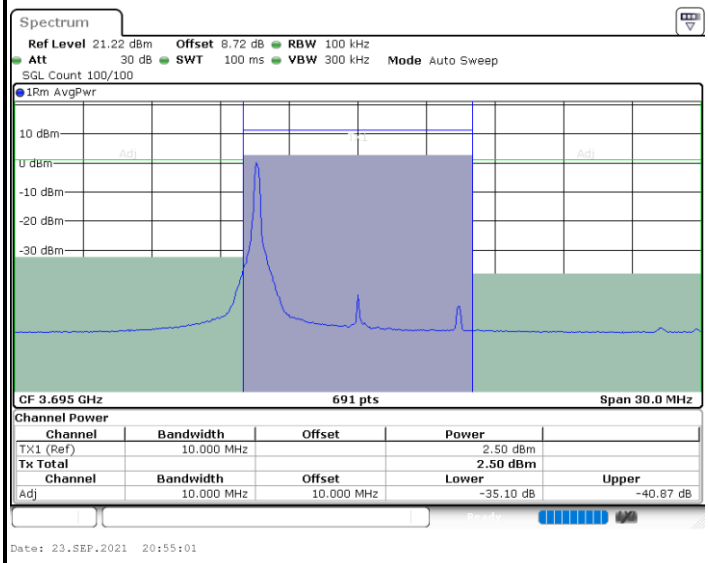


Date: 23.SEP.2021 20:14:16

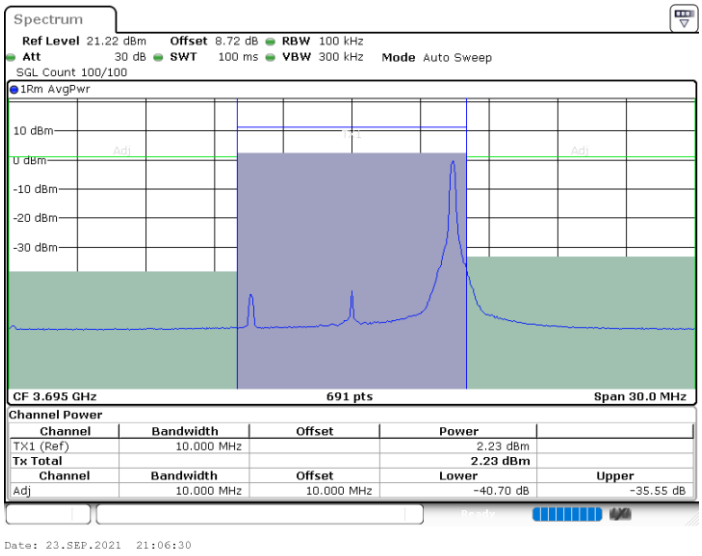
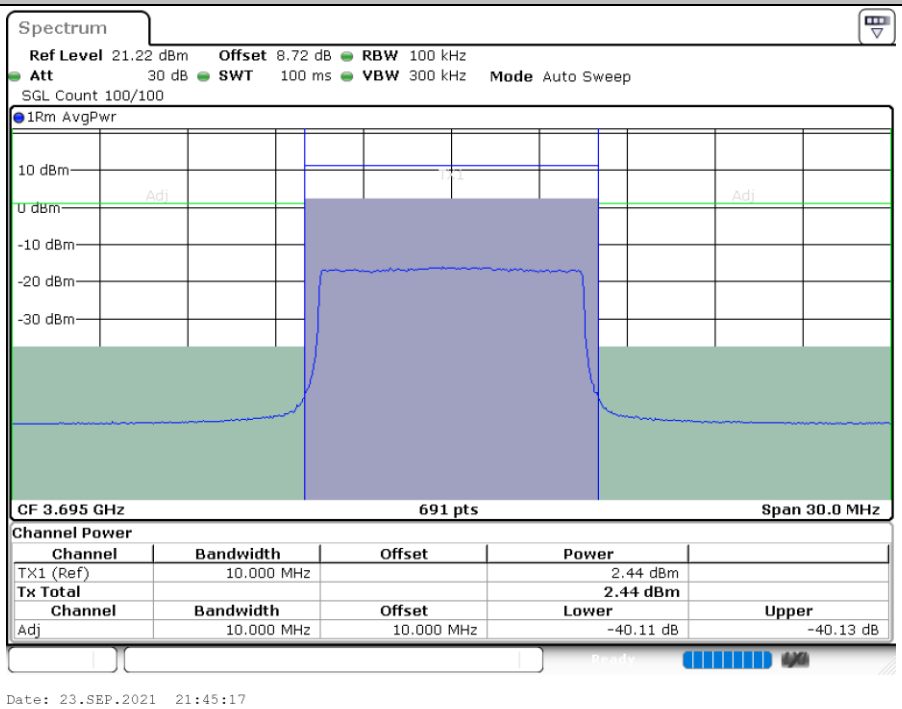
LTE Band 48 / 10MHz

64QAM

Highest Channel / 1RB0



Highest Channel / 1RBmax



Highest Channel / Full RB