FCC RF Test Report

APPLICANT	:	Quectel Wireless Solutions Co., Ltd.
EQUIPMENT	:	5G Sub-6 GHz LGA Module
BRAND NAME	:	Quectel
MODEL NAME	:	RG500L-NA
FCC ID	:	XMR2023RG500LNA
STANDARD	:	47 CFR Part 2, 96
CLASSIFICATION	:	Citizens Band End User Devices (CBE)
EQUIPMENT TYPE	:	End User Equipment
TEST DATE(S)	:	Feb. 05, 2023 ~ May 18, 2023

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
FG2D0201K	01	Initial issue of report	Jun. 02, 2023

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
-	§96.41	Peak-to-Average Ratio	Not Applicable	Not applicable for End User Devices
3.3	§96.41	Maximum E.I.R.P	Pass	-
		Maximum Power Spectral Density	Not Applicable	Not applicable for End User Devices
3.4	§2.1049 §96.41	Occupied Bandwidth	Reporting only	-
3.5	§2.1051 §96.41	Conducted Band Edge Measurement Adjacent Channel Leakage Ratio	Pass	-
3.6	§2.1051 §96.41	Conducted Spurious Emission	Pass	
3.7	§2.1055	Frequency Stability for Temperature & Voltage	Pass	-
4.4	§2.1051 §96.41	Radiated Spurious Emission	Pass	Under limit 17.66 dB at 14220.00 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

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

1.2 Manufacturer

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	5G Sub-6 GHz LGA Module
Brand Name	Quectel
Model Name	RG500L-NA
FCC ID	XMR2023RG500LNA
Tx/Rx Frequency	5G NR n48/n77/n78: 3550 MHz ~ 3700 MHz
SCS	30kHz
Bandwidth	n48/n77: 10 / 15 / 20 / 40 / 50 / 60 / 80 / 90 / 100MHz n78: 10 / 15 / 20 / 25 / 30 / 40 / 50 / 60 / 80 / 90 / 100MHz
Antenna Gain	<Ant.0 / Ant.6> for n48/n77/n78: -4.29 dBi
Type of Modulation	DFT-s-OFDM (PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM) CP-OFDM (QPSK / 16QAM / 64QAM / 256QAM)
IMEI Code	Conducted : 860815050004316 / Radiation : 860815050004233
HW Version	R1.0
SW Version	RG500LNAAAR04A02E32_OCPU
EUT Stage	Identical Prototype

Remark:

1. 5G NR n48/n77/n78 support UL MIMO mode for Antenna port (0+6).
2. 5G NR n48/n77/n78 SISO mode only support Antenna port 0, not support Antenna port 6.
3. 5G NR n48/n77/n78 UL_MIMO mode only supports CP-OFDM Modulation, the MIMO mode is completely uncorrelated, so the directional gain is selected the maximum gain among all antennas.
4. For MIMO mode, the conducted Bandedge/Spurious are tested at single antenna port and add 10*log(N_{ANT}) according to KDB 662911 D01, only the worst MIMO_Ant.0 is shown in the report.
5. 5G NR n48/n77/n78 support SA and NSA mode. The whole testing has assessed SA mode by referring to the higher conducted power for conducted test items.
6. The device supports HPUE mode for 5G NR n77/n78 SISO mode.
7. 5G NR n78 cover n77 due to the n78 power > n77 power.
8. All the supported EN-DC combinations are verified conducted power, only the EN-DC combination with highest power are shown in the report.
9. The EN-DC mode combination could be referred to the product spec.

1.4 Maximum Conducted Power and Emission Designator

5G NR n48		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
10	3555.00~3694.98	0.1954	8M59G7D	0.1419	8M63W7D
15	3557.52~3692.49	0.1959	13M7G7D	0.1426	13M6W7D
20	3560.01~3690.00	0.1936	18M2G7D	0.1396	18M3W7D
40	3570.00~3679.98	0.1795	37M7G7D	0.1294	38M0W7D
50	3575.01~3675.00	0.1919	47M9G7D	0.1396	47M5W7D
60	3580.02~3669.99	0.1828	57M9G7D	0.1330	57M9W7D
80	3590.01~3660.00	0.1766	77M0G7D	0.1285	77M5W7D
90	3595.02~3654.99	0.1730	87M4G7D	0.1259	87M6W7D
100	3600.00~3649.98	0.1986	97M5G7D	0.1324	97M3W7D

5G NR n48 UL MIMO		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
10	3555.00~3694.98	0.1866	8M73G7D	0.1618	8M61W7D
15	3557.52~3692.49	0.1871	13M6G7D	0.1600	13M7W7D
20	3560.01~3690.00	0.1837	18M1G7D	0.1567	18M2W7D
40	3570.00~3679.98	0.1726	38M0G7D	0.1466	38M2W7D
50	3575.01~3675.00	0.1820	47M8G7D	0.1549	47M9W7D
60	3580.02~3669.99	0.1746	57M9G7D	0.1517	57M8W7D
80	3590.01~3660.00	0.1726	77M2G7D	0.1452	77M4W7D
90	3595.02~3654.99	0.1706	87M6G7D	0.1432	87M8W7D
100	3600.00~3649.98	0.1884	97M1G7D	0.1637	97M5W7D

5G NR n77		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
10	3555.00~3694.98	0.4295	8M69G7D	0.3214	8M73W7D
15	3557.52~3692.49	0.4385	13M6G7D	0.3296	13M6W7D
20	3560.01~3690.00	0.4305	18M1G7D	0.3236	18M3W7D
40	3570.00~3679.98	0.3882	38M0G7D	0.2917	38M0W7D
50	3575.01~3675.00	0.4102	47M4G7D	0.3083	47M7W7D
60	3580.02~3669.99	0.3908	57M9G7D	0.2911	58M3W7D
80	3590.01~3660.00	0.3963	76M9G7D	0.2965	77M5W7D
90	3595.02~3654.99	0.3864	87M4G7D	0.2904	87M6W7D
100	3600.00~3649.98	0.4487	97M3G7D	0.3062	98M1W7D

5G NR n77 UL MIMO		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
10	3555.00~3694.98	0.1770	8M61G7D	0.1633	8M67W7D
15	3557.52~3692.49	0.1758	13M5G7D	0.1607	13M6W7D
20	3560.01~3690.00	0.1750	18M2G7D	0.1614	18M3W7D
40	3570.00~3679.98	0.1750	38M4G7D	0.1545	38M0W7D
50	3575.01~3675.00	0.1710	47M7G7D	0.1578	47M8W7D
60	3580.02~3669.99	0.1652	58M0G7D	0.1496	57M9W7D
80	3590.01~3660.00	0.1614	77M4G7D	0.1449	77M7W7D
90	3595.02~3654.99	0.1552	86M3G7D	0.1406	87M6W7D
100	3600.00~3649.98	0.1570	97M9G7D	0.1390	98M1W7D

5G NR n78		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
10	3555.00~3694.98	0.4375	8M69G7D	0.3342	8M73W7D
15	3557.52~3692.49	0.4436	13M6G7D	0.3388	13M6W7D
20	3560.01~3690.00	0.4335	18M1G7D	0.3311	18M3W7D
25	3562.5~3687.48	0.4256	23M2G7D	0.3251	23M2W7D
30	3565.02~3684.99	0.4227	27M8G7D	0.3228	27M8W7D
40	3570.00~3679.98	0.3926	38M0G7D	0.2999	38M0W7D
50	3575.01~3675.00	0.4140	47M4G7D	0.3162	47M7W7D
60	3580.02~3669.99	0.3945	57M9G7D	0.2992	58M3W7D
80	3590.01~3660.00	0.4027	76M9G7D	0.3055	77M5W7D
90	3595.02~3654.99	0.3899	87M4G7D	0.2979	87M6W7D
100	3600.00~3649.98	0.4519	97M3G7D	0.3090	98M1W7D

5G NR n78 UL MIMO		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)
10	3555.00~3694.98	0.1782	8M61G7D	0.1629	8M67W7D
15	3557.52~3692.49	0.1770	13M5G7D	0.1614	13M6W7D
20	3560.01~3690.00	0.1795	18M2G7D	0.1626	18M3W7D
25	3562.5~3687.48	0.1803	23M1G7D	0.1633	23M3W7D
30	3565.02~3684.99	0.1742	27M9G7D	0.1542	27M9W7D
40	3570.00~3679.98	0.1758	38M4G7D	0.1556	38M0W7D
50	3575.01~3675.00	0.1722	47M7G7D	0.1589	47M8W7D
60	3580.02~3669.99	0.1679	58M0G7D	0.1503	57M9W7D
80	3590.01~3660.00	0.1626	77M4G7D	0.1452	77M7W7D
90	3595.02~3654.99	0.1567	86M3G7D	0.1413	87M6W7D
100	3600.00~3649.98	0.1578	97M9G7D	0.1400	98M1W7D

Note:

1. According to the maximum power between 5G NR n77 and 5G NR n78, 5G NR n78 covers 5G NR n77 mode for conducted test items.
2. All modulations have been tested, and only the worst test results of PSK & QAM are shown in the report.

1.5 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

1.6 Test Software

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

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
- 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

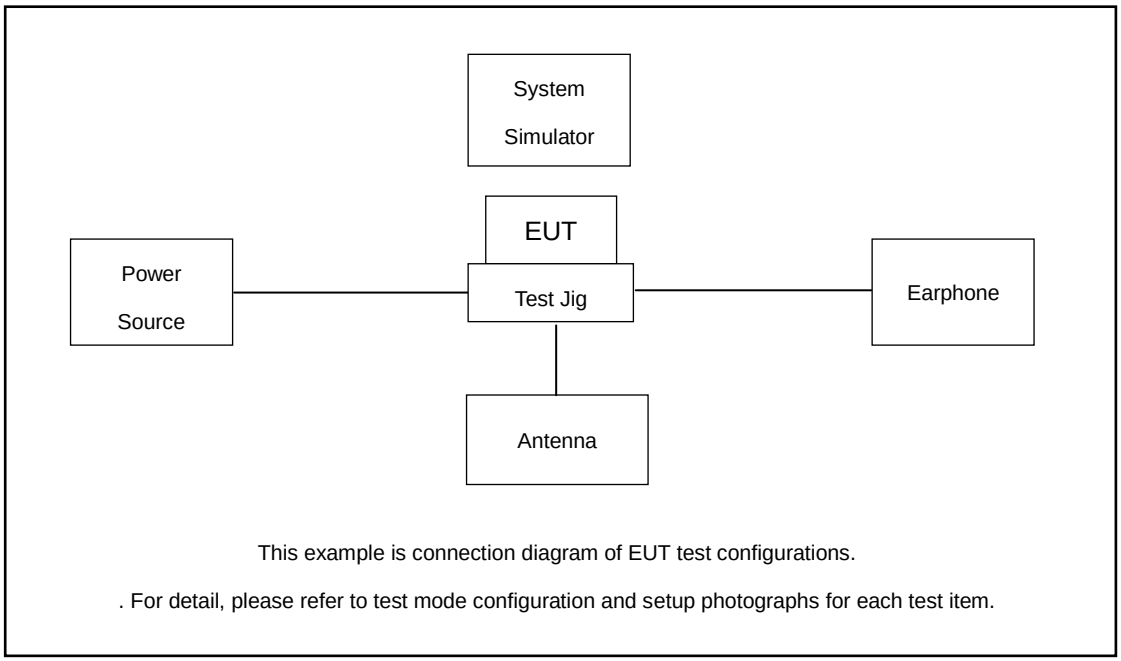
2.1 Test Mode

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 (X plane) were recorded in this report.

Test Items	5G NR	Bandwidth (MHz)												Modulation					RB #		Test Channel		
		10	15	20	25	30	40	50	60	70	80	90	100	PI/2 BPSK	QPSK	16 QAM	64 QAM	256 QAM	1	Full	L	M	H
Max. Output Power	n48	v	v	v	-	-	v	v	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v
	n77	v	v	v	-	-	v	v	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v
	n78	v	v	v		v	v	v	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v
Adjacent Channel Leakage Ratio	n48	v			-	-		v		-			v	v	v	v	v	v	v	v	v	v	v
	n78	v						v		-			v	v	v	v	v	v	v	v	v	v	v
26dB and 99% Bandwidth	n48	v	v	v	-	-	v	v	v	-	v	v	v		v	v	v	v		v		v	
	n78	v	v	v	v	v	v	v	v	-	v	v	v		v	v	v	v		v		v	
Conducted Band Edge	n48	v			-	-		v		-			v	v	v				v	v	v		v
	n78	v						v		-			v	v	v				v	v	v		v
Conducted Spurious Emission	n48	v			-	-		v		-			v	v	v				v		v	v	v
	n78	v						v		-			v	v	v				v		v	v	v
Frequency Stability	n48	v			-	-				-					v					v		v	
	n78	v								-					v					v		v	
E.I.R.P	n48	v	v	v	-	-	v	v	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v
	n77	v	v	v	-	-	v	v	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v
	n78	v	v	v		v	v	v	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	n48	Worst Case																			v	v	v
	n78	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. Based on engineering evaluation, only the worst modulations test results are shown in the report. 5. Frequency Stability : Normal Voltage = 3.8V ; Low Voltage =3.3V.; High Voltage =4.3V.																						

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.	Base Station	Anritsu	MT8820/8821	N/A	N/A	Unshielded, 1.8 m
3.	Test jig	N/A	N/A	N/A	N/A	N/A
4.	Antenna	N/A	N/A	N/A	N/A	N/A
5.	Adapter	N/A	N/A	N/A	N/A	N/A
6.	Earphone	N/A	N/A	N/A	N/A	N/A

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 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.

Offset = RF cable loss.

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

Example :

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

= 6.5 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G n48/n77 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
100	Channel	640000	641666	643332
	Frequency	3600	3624.99	3649.98
90	Channel	639668	641666	643666
	Frequency	3595.02	3624.99	3654.99
80	Channel	639334	641666	644000
	Frequency	3590.01	3624.99	3660
60	Channel	638668	641666	644666
	Frequency	3580.02	3624.99	3669.99
50	Channel	638334	641666	645000
	Frequency	3575.01	3624.99	3675
40	Channel	638000	641666	645332
	Frequency	3570	3624.99	3679.98
20	Channel	637334	641666	646000
	Frequency	3560.01	3624.99	3690
15	Channel	637168	641666	646166
	Frequency	3557.52	3624.99	3692.49
10	Channel	637000	641666	646332
	Frequency	3555	3624.99	3694.98

5G n78 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
100	Channel	640000	641666	643332
	Frequency	3600	3624.99	3649.98
90	Channel	639668	641666	643666
	Frequency	3595.02	3624.99	3654.99
80	Channel	639334	641666	644000
	Frequency	3590.01	3624.99	3660
60	Channel	638668	641666	644666
	Frequency	3580.02	3624.99	3669.99
50	Channel	638334	641666	645000
	Frequency	3575.01	3624.99	3675
40	Channel	638000	641666	645332
	Frequency	3570	3624.99	3679.98
30	Channel	637668	641666	645666
	Frequency	3565.02	3624.99	3684.99
25	Channel	637500	641666	645832
	Frequency	3562.5	3624.99	3687.48
20	Channel	637334	641666	646000
	Frequency	3560.01	3624.99	3690
15	Channel	637168	641666	646166
	Frequency	3557.52	3624.99	3692.49
10	Channel	637000	641666	646332
	Frequency	3555	3624.99	3694.98

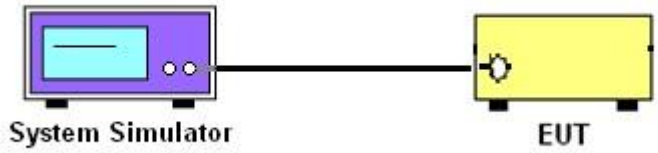
3 Conducted Test Items

3.1 Measuring Instruments

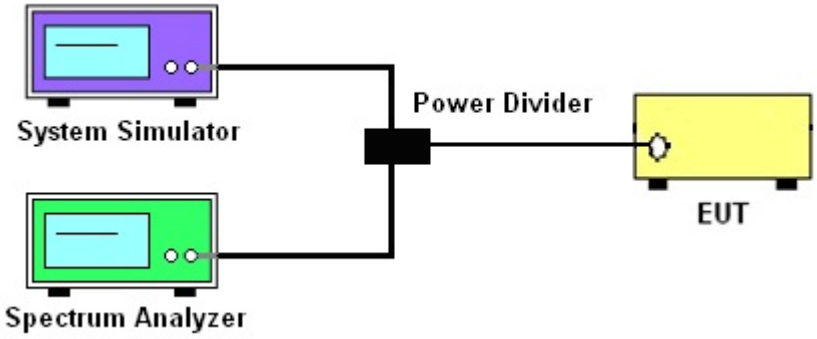
See list of measuring instruments of this test report.

3.1.1 Test Setup

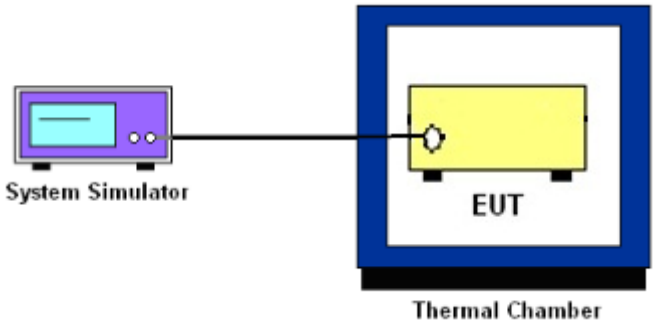
3.1.2 Conducted Output Power



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 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 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

3.4 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)

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

3.5.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. Set RBW >= 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.
8. When using the integration method, the starting frequency of the integration shall be centered at one-half of the RBW away from the band edge.

3.6 Conducted Spurious Emission

3.6.1 Description of Conducted Spurious Emission Measurement

96.41 (e)(2)

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

3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

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

3.7 Frequency Stability

3.7.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±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 -10°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.

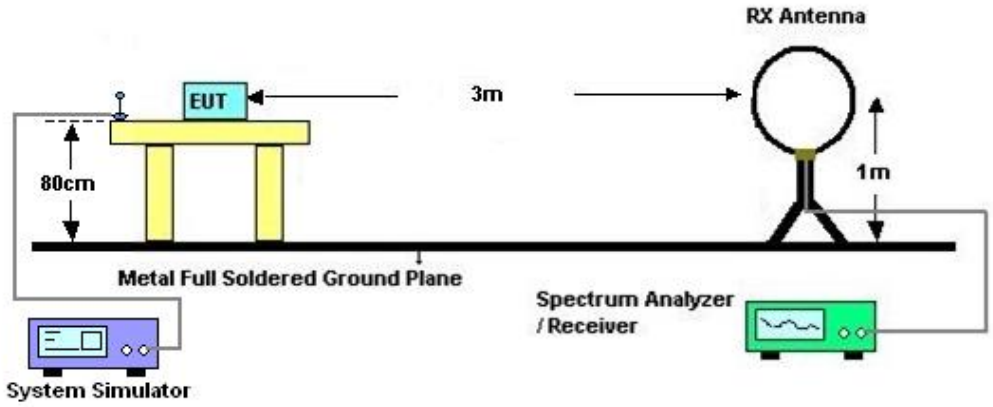
4 Radiated Test Items

4.1 Measuring Instruments

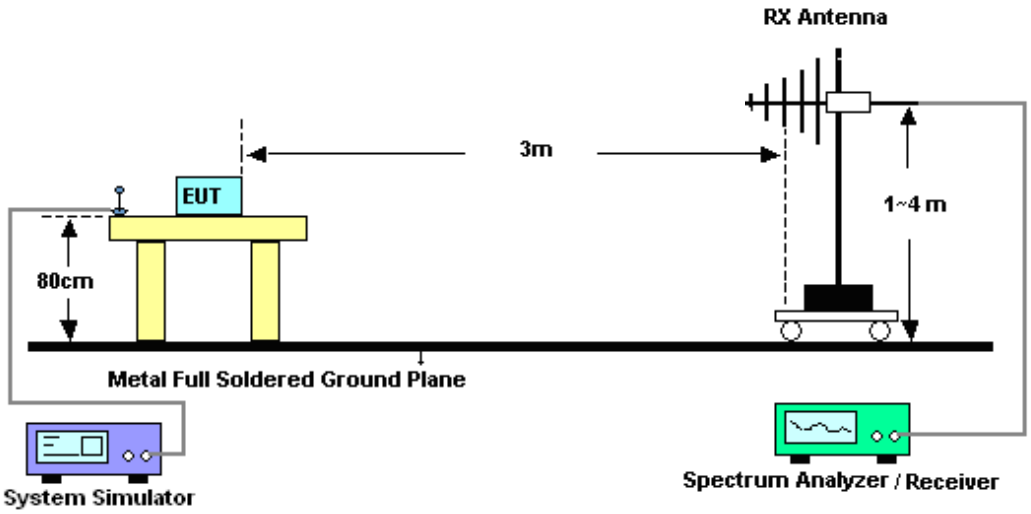
See list of measuring instruments of this test report.

4.2 Test Setup

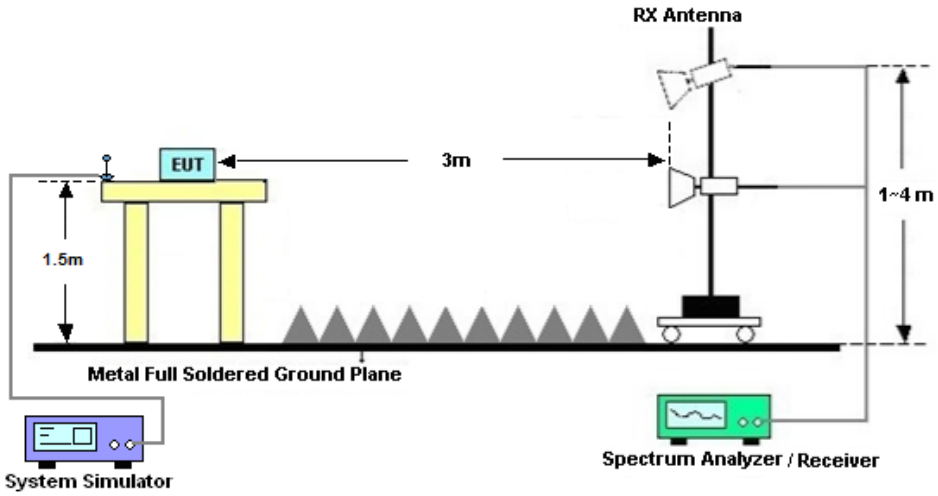
4.2.1 For radiated test below 30MHz



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. 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. 12, 2022	Feb. 05, 2023~ May 18, 2023	Oct. 11, 2023	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Feb. 05, 2023~ May 18, 2023	NCR	Conducted (TH01-KS)
Temperature &humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 15, 2022	Feb. 05, 2023~ May 18, 2023	Jul. 14, 2023	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	Mar. 20, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	Mar. 20, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 24, 2022	Mar. 20, 2023	May 23, 2023	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Oct. 16, 2022	Mar. 20, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 08, 2023	Mar. 20, 2023	Jan. 07, 2024	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	May 24, 2022	Mar. 20, 2023	May 23, 2023	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2023	Mar. 20, 2023	Jan. 04, 2024	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 12, 2022	Mar. 20, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	Mar. 20, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 20, 2023	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 20, 2023	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 20, 2023	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	±0.1 %

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

---------- 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

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BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP （W）		
Channel				640000	641666	643332		L	M	H
Frequency (MHz)				3600	3624.99	3649.98				
100	PI/2 BPSK	1	1	22.89	22.85	22.82	-4.29	0.0724	0.0718	0.0713
100	QPSK	1	1	22.94	22.92	22.88	-4.29	0.0733	0.0729	0.0723
100	QPSK	1	137	22.98	22.91	22.90	-4.29	0.0740	0.0728	0.0726
100	QPSK	1	271	22.05	21.95	21.94	-4.29	0.0597	0.0583	0.0582
100	QPSK	135	0	21.82	21.78	21.68	-4.29	0.0566	0.0561	0.0548
100	QPSK	135	69	22.97	22.87	22.92	-4.29	0.0738	0.0721	0.0729
100	QPSK	135	138	21.64	21.57	21.61	-4.29	0.0543	0.0535	0.0540
100	QPSK	270	0	21.76	21.69	21.70	-4.29	0.0558	0.0550	0.0551
100	16QAM	1	1	21.07	21.22	21.16	-4.29	0.0476	0.0493	0.0486
100	64QAM	1	1	19.98	20.06	19.78	-4.29	0.0371	0.0378	0.0354
100	256QAM	1	1	17.82	17.85	17.74	-4.29	0.0225	0.0227	0.0221
Channel				639668	641666	643666	Gain	EIRP （W）		
Frequency (MHz)				3595.02	3624.99	3654.99				
90	PI/2 BPSK	1	1	22.21	22.32	22.23	-4.29	0.0619	0.0635	0.0622
90	QPSK	1	1	22.25	22.38	22.29	-4.29	0.0625	0.0644	0.0631
90	16QAM	1	1	20.83	21.00	20.80	-4.29	0.0451	0.0469	0.0448
Channel				639334	641666	644000	Gain	EIRP （W）		
Frequency (MHz)				3590.01	3624.99	3660				
80	PI/2 BPSK	1	1	22.39	22.45	22.38	-4.29	0.0646	0.0655	0.0644
80	QPSK	1	1	22.43	22.47	22.44	-4.29	0.0652	0.0658	0.0653
80	16QAM	1	1	21.01	21.09	20.95	-4.29	0.0470	0.0479	0.0463
Channel				638668	641666	644666	Gain	EIRP （W）		
Frequency (MHz)				3580.02	3624.99	3669.99				
60	PI/2 BPSK	1	1	22.57	22.59	22.36	-4.29	0.0673	0.0676	0.0641
60	QPSK	1	1	22.60	22.62	22.41	-4.29	0.0678	0.0681	0.0649
60	16QAM	1	1	21.18	21.24	20.92	-4.29	0.0489	0.0495	0.0460
Channel				638334	641666	645000	Gain	EIRP （W）		
Frequency (MHz)				3575.01	3624.99	3675				
50	PI/2 BPSK	1	1	22.74	22.77	22.62	-4.29	0.0700	0.0705	0.0681
50	QPSK	1	1	22.79	22.83	22.68	-4.29	0.0708	0.0714	0.0690
50	16QAM	1	1	21.37	21.45	21.19	-4.29	0.0511	0.0520	0.0490

Channel				638000	641666	645332	Gain	EIRP （W）		
Frequency (MHz)				3570	3624.99	3679.98				
40	PI/2 BPSK	1	1	22.48	22.44	22.35	-4.29	0.0659	0.0653	0.0640
40	QPSK	1	1	22.54	22.47	22.42	-4.29	0.0668	0.0658	0.0650
40	16QAM	1	1	21.12	21.09	20.93	-4.29	0.0482	0.0479	0.0461
Channel				637334	641666	646000	Gain	EIRP （W）		
Frequency (MHz)				3560.01	3624.99	3690				
20	PI/2 BPSK	1	1	22.81	22.79	22.83	-4.29	0.0711	0.0708	0.0714
20	QPSK	1	1	22.86	22.83	22.87	-4.29	0.0719	0.0714	0.0721
20	16QAM	1	1	21.44	21.45	21.38	-4.29	0.0519	0.0520	0.0512
Channel				637168	641666	646166	Gain	EIRP （W）		
Frequency (MHz)				3557.52	3624.99	3692.49				
15	PI/2 BPSK	1	1	22.81	22.85	22.82	-4.29	0.0711	0.0718	0.0713
15	QPSK	1	1	22.90	22.92	22.88	-4.29	0.0726	0.0729	0.0723
15	16QAM	1	1	21.48	21.54	21.39	-4.29	0.0524	0.0531	0.0513
Channel				637000	641666	646332	Gain	EIRP （W）		
Frequency (MHz)				3555	3624.99	3694.98				
10	PI/2 BPSK	1	1	22.88	22.83	22.87	-4.29	0.0723	0.0714	0.0721
10	QPSK	1	1	22.85	22.90	22.91	-4.29	0.0718	0.0726	0.0728
10	16QAM	1	1	21.43	21.52	21.42	-4.29	0.0518	0.0528	0.0516

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BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP (W)		
Channel				640000	641666	643332		L	M	H
Frequency (MHz)				3600	3624.99	3649.98				
100	QPSK	1	1	22.74	22.67	22.65	-4.29	0.0700	0.0689	0.0685
100	QPSK	1	137	22.75	22.72	22.64	-4.29	0.0701	0.0697	0.0684
100	QPSK	1	271	21.88	21.97	21.90	-4.29	0.0574	0.0586	0.0577
100	QPSK	135	0	21.04	21.10	20.92	-4.29	0.0473	0.0480	0.0460
100	QPSK	135	69	22.61	22.54	22.59	-4.29	0.0679	0.0668	0.0676
100	QPSK	135	138	20.78	20.84	20.86	-4.29	0.0446	0.0452	0.0454
100	QPSK	270	0	20.91	20.86	20.92	-4.29	0.0459	0.0454	0.0460
100	16QAM	1	1	22.14	22.09	21.90	-4.29	0.0610	0.0603	0.0577
100	64QAM	1	1	19.69	19.84	19.87	-4.29	0.0347	0.0359	0.0361
100	256QAM	1	1	17.23	17.11	16.93	-4.29	0.0197	0.0191	0.0184
Channel				639668	641666	643666	Gain	EIRP (W)		
Frequency (MHz)				3595.02	3624.99	3654.99				
90	QPSK	1	1	22.26	22.32	22.23	-4.29	0.0627	0.0635	0.0622
90	16QAM	1	1	21.51	21.56	21.47	-4.29	0.0527	0.0533	0.0522
Channel				639334	641666	644000	Gain	EIRP (W)		
Frequency (MHz)				3590.01	3624.99	3660				

80	QPSK	1	1	22.35	22.37	22.31	-4.29	0.0640	0.0643	0.0634
80	16QAM	1	1	21.42	21.46	21.62	-4.29	0.0516	0.0521	0.0541
Channel				638668	641666	644666	Gain	EIRP (W)		
Frequency (MHz)				3580.02	3624.99	3669.99				
60	QPSK	1	1	22.42	22.40	22.39	-4.29	0.0650	0.0647	0.0646
60	16QAM	1	1	21.81	21.69	21.58	-4.29	0.0565	0.0550	0.0536
Channel				638334	641666	645000	Gain	EIRP (W)		
Frequency (MHz)				3575.01	3624.99	3675				
50	QPSK	1	1	22.59	22.60	22.47	-4.29	0.0676	0.0678	0.0658
50	16QAM	1	1	21.90	21.86	21.75	-4.29	0.0577	0.0571	0.0557
Channel				638000	641666	645332	Gain	EIRP (W)		
Frequency (MHz)				3570	3624.99	3679.98				
40	QPSK	1	1	22.37	22.28	22.24	-4.29	0.0643	0.0630	0.0624
40	16QAM	1	1	21.66	21.61	21.52	-4.29	0.0546	0.0540	0.0528
Channel				637334	641666	646000	Gain	EIRP (W)		
Frequency (MHz)				3560.01	3624.99	3690				
20	QPSK	1	1	22.64	22.52	22.57	-4.29	0.0684	0.0665	0.0673
20	16QAM	1	1	21.95	21.88	21.87	-4.29	0.0583	0.0574	0.0573
Channel				637168	641666	646166	Gain	EIRP (W)		
Frequency (MHz)				3557.52	3624.99	3692.49				
15	QPSK	1	1	22.72	22.65	22.62	-4.29	0.0697	0.0685	0.0681
15	16QAM	1	1	22.04	21.94	21.91	-4.29	0.0596	0.0582	0.0578
Channel				637000	641666	646332	Gain	EIRP (W)		
Frequency (MHz)				3555	3624.99	3694.98				
10	QPSK	1	1	22.71	22.67	22.65	-4.29	0.0695	0.0689	0.0685
10	16QAM	1	1	22.05	22.09	21.90	-4.29	0.0597	0.0603	0.0577

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BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP （W）		
Channel				640000	641666	643332		L	M	H
Frequency (MHz)				3600	3624.99	3649.98				
100	PI/2 BPSK	1	1	26.18	26.14	26.41	-4.29	0.1545	0.1531	0.1629
100	QPSK	1	1	26.24	26.20	26.47	-4.29	0.1567	0.1552	0.1652
100	QPSK	1	137	26.52	26.30	26.33	-4.29	0.1671	0.1589	0.1600
100	QPSK	1	271	25.48	25.56	25.67	-4.29	0.1315	0.1340	0.1374
100	QPSK	135	0	25.30	25.28	25.21	-4.29	0.1262	0.1256	0.1236
100	QPSK	135	69	26.47	26.30	26.38	-4.29	0.1652	0.1589	0.1618
100	QPSK	135	138	25.18	25.10	25.23	-4.29	0.1227	0.1205	0.1242
100	QPSK	270	0	25.25	25.18	25.25	-4.29	0.1247	0.1227	0.1247
100	16QAM	1	1	24.38	24.86	24.63	-4.29	0.1021	0.1140	0.1081
100	64QAM	1	1	22.80	23.23	23.16	-4.29	0.0710	0.0783	0.0771
100	256QAM	1	1	20.85	20.95	21.32	-4.29	0.0453	0.0463	0.0505
Channel				639668	641666	643666	Gain	EIRP (W)		
Frequency (MHz)				3595.02	3624.99	3654.99				
90	PI/2 BPSK	1	1	25.71	25.80	25.82	-4.29	0.1387	0.1416	0.1422
90	QPSK	1	1	25.65	25.87	25.78	-4.29	0.1368	0.1439	0.1409
90	16QAM	1	1	24.41	24.63	24.54	-4.29	0.1028	0.1081	0.1059
Channel				639334	641666	644000	Gain	EIRP (W)		
Frequency (MHz)				3590.01	3624.99	3660				
80	PI/2 BPSK	1	1	25.84	25.98	25.89	-4.29	0.1429	0.1476	0.1445
80	QPSK	1	1	25.92	25.96	25.84	-4.29	0.1455	0.1469	0.1429
80	16QAM	1	1	24.68	24.72	24.60	-4.29	0.1094	0.1104	0.1074
Channel				638668	641666	644666	Gain	EIRP (W)		
Frequency (MHz)				3580.02	3624.99	3669.99				
60	PI/2 BPSK	1	1	25.81	25.92	25.73	-4.29	0.1419	0.1455	0.1393
60	QPSK	1	1	25.75	25.88	25.69	-4.29	0.1400	0.1442	0.1380
60	16QAM	1	1	24.51	24.64	24.45	-4.29	0.1052	0.1084	0.1038
Channel				638334	641666	645000	Gain	EIRP (W)		
Frequency (MHz)				3575.01	3624.99	3675				
50	PI/2 BPSK	1	1	25.95	26.08	25.91	-4.29	0.1466	0.1510	0.1452
50	QPSK	1	1	25.91	26.13	25.97	-4.29	0.1452	0.1528	0.1472
50	16QAM	1	1	24.67	24.89	24.73	-4.29	0.1091	0.1148	0.1107
Channel				638000	641666	645332	Gain	EIRP (W)		
Frequency (MHz)				3570	3624.99	3679.98				
40	PI/2 BPSK	1	1	25.68	25.84	25.67	-4.29	0.1377	0.1429	0.1374
40	QPSK	1	1	25.71	25.89	25.70	-4.29	0.1387	0.1445	0.1384
40	16QAM	1	1	24.47	24.65	24.46	-4.29	0.1042	0.1086	0.1040
Channel				637334	641666	646000	Gain	EIRP (W)		
Frequency (MHz)				3560.01	3624.99	3690				
20	PI/2 BPSK	1	1	26.14	26.16	26.27	-4.29	0.1531	0.1538	0.1578

20	QPSK	1	1	26.19	26.18	26.34	-4.29	0.1549	0.1545	0.1603
20	16QAM	1	1	24.95	24.94	25.10	-4.29	0.1164	0.1161	0.1205
Channel				637168	641666	646168	Gain	EIRP (W)		
Frequency (MHz)				3557.52	3624.99	3692.52				
15	PI/2 BPSK	1	1	26.20	26.24	26.39	-4.29	0.1552	0.1567	0.1622
15	QPSK	1	1	26.26	26.27	26.42	-4.29	0.1574	0.1578	0.1633
15	16QAM	1	1	25.02	25.03	25.18	-4.29	0.1183	0.1186	0.1227
Channel				637000	641666	646334	Gain	EIRP (W)		
Frequency (MHz)				3555	3624.99	3695.01				
10	PI/2 BPSK	1	1	26.05	26.10	26.33	-4.29	0.1500	0.1517	0.1600
20	QPSK	1	1	26.11	26.12	26.31	-4.29	0.1521	0.1524	0.1592
20	16QAM	1	1	24.87	24.88	25.07	-4.29	0.1143	0.1146	0.1197

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BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP (W)		
Channel				640000	641666	643332		L	M	H
Frequency (MHz)				3600	3624.99	3649.98				
ANT				ANT0+ANT6				ANT0+ANT6		
100	QPSK	1	1	21.77	21.96	21.78	-4.29	0.0560	0.0585	0.0561
100	QPSK	1	272	20.48	20.03	20.20	-4.29	0.0416	0.0375	0.0390
100	QPSK	273	0	20.61	20.55	20.53	-4.29	0.0429	0.0423	0.0421
100	16QAM	1	1	21.43	21.41	21.43	-4.29	0.0518	0.0515	0.0518
100	16QAM	1	272	20.03	20.06	20.31	-4.29	0.0375	0.0378	0.0400
100	16QAM	273	0	20.61	20.53	20.61	-4.29	0.0429	0.0421	0.0429
Channel				639668	641666	643666	Gain	EIRP (W)		
Frequency (MHz)				3595.02	3624.99	3654.99				
90	QPSK	1	1	21.91	21.83	21.91	-4.29	0.0578	0.0568	0.0578
90	16QAM	1	1	21.43	21.48	21.43	-4.29	0.0518	0.0524	0.0518
Channel				639334	641666	644000	Gain	EIRP (W)		
Frequency (MHz)				3590.01	3624.99	3660				
80	QPSK	1	1	22.08	21.96	21.93	-4.29	0.0601	0.0585	0.0581
80	16QAM	1	1	21.61	21.53	21.51	-4.29	0.0540	0.0530	0.0527
Channel				638668	641666	644666	Gain	EIRP (W)		
Frequency (MHz)				3580.02	3624.99	3669.99				
60	QPSK	1	1	22.16	22.18	22.03	-4.29	0.0612	0.0615	0.0594
60	16QAM	1	1	21.75	21.73	21.59	-4.29	0.0557	0.0555	0.0537
Channel				638334	641666	645000	Gain	EIRP (W)		
Frequency (MHz)				3575.01	3624.99	3675				
50	QPSK	1	1	22.31	22.33	22.18	-4.29	0.0634	0.0637	0.0615
50	16QAM	1	1	21.98	21.88	21.83	-4.29	0.0587	0.0574	0.0568

Channel				638000	641666	645332	Gain	EIRP (W)		
Frequency (MHz)				3570	3624.99	3679.98				
40	QPSK	1	1	22.43	22.38	22.34	-4.29	0.0652	0.0644	0.0638
40	16QAM	1	1	21.89	21.68	21.65	-4.29	0.0575	0.0548	0.0545
Channel				637334	641666	646000	Gain	EIRP (W)		
Frequency (MHz)				3560.01	3624.99	3690				
20	QPSK	1	1	22.53	22.43	22.42	-4.29	0.0667	0.0652	0.0650
20	16QAM	1	1	22.08	22.01	22.05	-4.29	0.0601	0.0592	0.0597
Channel				637168	641666	646166	Gain	EIRP (W)		
Frequency (MHz)				3557.52	3624.99	3692.49				
15	QPSK	1	1	22.43	22.41	22.45	-4.29	0.0652	0.0649	0.0655
15	16QAM	1	1	22.03	22.02	22.06	-4.29	0.0594	0.0593	0.0598
Channel				637000	641666	646332	Gain	EIRP (W)		
Frequency (MHz)				3555	3624.99	3694.98				
10	QPSK	1	1	22.44	22.42	22.48	-4.29	0.0653	0.0650	0.0659
10	16QAM	1	1	22.03	22.05	22.13	-4.29	0.0594	0.0597	0.0608

5G NR n78

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP （W）		
Channel				640000	641666	643332		L	M	H
Frequency (MHz)				3600	3624.99	3649.98				
100	PI/2 BPSK	1	1	26.23	26.16	26.46	-4.29	0.1563	0.1538	0.1648
100	QPSK	1	1	26.29	26.25	26.52	-4.29	0.1585	0.1570	0.1671
100	QPSK	1	137	26.55	26.39	26.48	-4.29	0.1683	0.1622	0.1656
100	QPSK	1	271	25.56	25.69	25.69	-4.29	0.1340	0.1380	0.1380
100	QPSK	135	0	25.37	25.32	25.28	-4.29	0.1282	0.1268	0.1256
100	QPSK	135	69	26.53	26.45	26.46	-4.29	0.1675	0.1644	0.1648
100	QPSK	135	138	25.24	25.19	25.32	-4.29	0.1245	0.1230	0.1268
100	QPSK	270	0	25.34	25.27	25.31	-4.29	0.1274	0.1253	0.1265
100	16QAM	1	1	24.63	24.90	24.82	-4.29	0.1081	0.1151	0.1130
100	64QAM	1	1	22.91	23.31	23.27	-4.29	0.0728	0.0798	0.0791
100	256QAM	1	1	20.92	21.04	21.38	-4.29	0.0460	0.0473	0.0512
Channel				639668	641666	643666	Gain	EIRP (W)		
Frequency (MHz)				3595.02	3624.99	3654.99				
90	PI/2 BPSK	1	1	25.88	25.84	25.85	-4.29	0.1442	0.1429	0.1432
90	QPSK	1	1	25.79	25.91	25.83	-4.29	0.1413	0.1452	0.1426
90	16QAM	1	1	24.62	24.74	24.66	-4.29	0.1079	0.1109	0.1089
Channel				639334	641666	644000	Gain	EIRP (W)		
Frequency (MHz)				3590.01	3624.99	3660				
80	PI/2 BPSK	1	1	25.91	26.05	25.94	-4.29	0.1452	0.1500	0.1462
80	QPSK	1	1	25.97	26.02	25.89	-4.29	0.1472	0.1489	0.1445

80	16QAM	1	1	24.80	24.85	24.72	-4.29	0.1125	0.1138	0.1104
Channel				638668	641666	644666	Gain	EIRP (W)		
Frequency (MHz)				3580.02	3624.99	3669.99				
60	PI/2 BPSK	1	1	25.84	25.96	25.75	-4.29	0.1429	0.1469	0.1400
60	QPSK	1	1	25.82	25.93	25.71	-4.29	0.1422	0.1459	0.1387
60	16QAM	1	1	24.65	24.76	24.54	-4.29	0.1086	0.1114	0.1059
Channel				638334	641666	645000	Gain	EIRP (W)		
Frequency (MHz)				3575.01	3624.99	3675				
50	PI/2 BPSK	1	1	26.06	26.15	25.96	-4.29	0.1503	0.1535	0.1469
50	QPSK	1	1	25.98	26.17	26.04	-4.29	0.1476	0.1542	0.1496
50	16QAM	1	1	24.81	25.00	24.87	-4.29	0.1127	0.1178	0.1143
Channel				638000	641666	645332	Gain	EIRP (W)		
Frequency (MHz)				3570	3624.99	3679.98				
40	PI/2 BPSK	1	1	25.76	25.91	25.77	-4.29	0.1403	0.1452	0.1406
40	QPSK	1	1	25.80	25.94	25.80	-4.29	0.1416	0.1462	0.1416
40	16QAM	1	1	24.63	24.77	24.63	-4.29	0.1081	0.1117	0.1081
Channel				637668	641666	645666	Gain	EIRP (W)		
Frequency (MHz)				3565.02	3624.99	3684.99				
30	PI/2 BPSK	1	1	26.20	26.18	26.21	-4.29	0.1552	0.1545	0.1556
30	QPSK	1	1	26.24	26.26	26.24	-4.29	0.1567	0.1574	0.1567
30	16QAM	1	1	25.07	25.09	25.07	-4.29	0.1197	0.1202	0.1197
Channel				637500	641666	645832	Gain	EIRP (W)		
Frequency (MHz)				3562.5	3624.99	3687.48				
25	PI/2 BPSK	1	1	26.17	26.13	26.25	-4.29	0.1542	0.1528	0.1570
25	QPSK	1	1	26.22	26.20	26.29	-4.29	0.1560	0.1552	0.1585
25	16QAM	1	1	25.05	25.03	25.12	-4.29	0.1191	0.1186	0.1211
Channel				637334	641666	646000	Gain	EIRP (W)		
Frequency (MHz)				3560.01	3624.99	3690				
20	PI/2 BPSK	1	1	26.18	26.20	26.31	-4.29	0.1545	0.1552	0.1592
20	QPSK	1	1	26.21	26.22	26.37	-4.29	0.1556	0.1560	0.1614
20	16QAM	1	1	25.04	25.05	25.20	-4.29	0.1189	0.1191	0.1233
Channel				637168	641666	646166	Gain	EIRP (W)		
Frequency (MHz)				3557.52	3624.99	3692.49				
15	PI/2 BPSK	1	1	26.24	26.27	26.44	-4.29	0.1567	0.1578	0.1641
15	QPSK	1	1	26.30	26.32	26.47	-4.29	0.1589	0.1596	0.1652
15	16QAM	1	1	25.13	25.15	25.30	-4.29	0.1213	0.1219	0.1262
Channel				637000	641666	646332	Gain	EIRP (W)		
Frequency (MHz)				3555	3624.99	3694.98				
10	PI/2 BPSK	1	1	26.11	26.02	26.21	-4.29	0.1521	0.1489	0.1556
10	QPSK	1	1	26.18	26.05	26.41	-4.29	0.1545	0.1500	0.1629
10	16QAM	1	1	25.01	24.88	25.24	-4.29	0.1180	0.1146	0.1245

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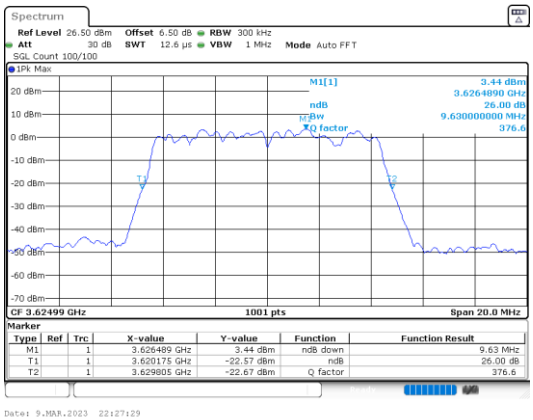
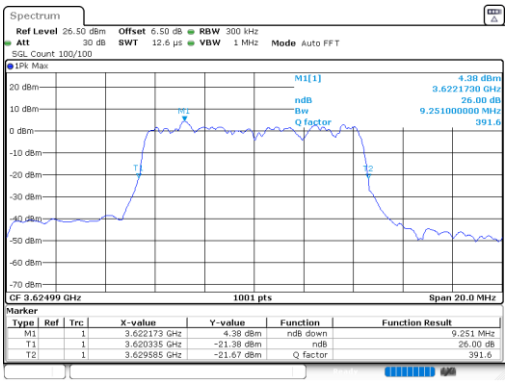
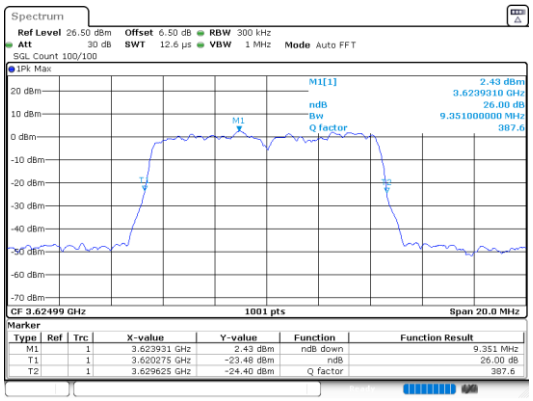
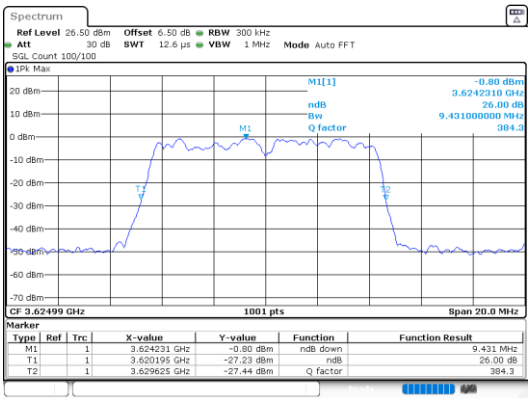
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Gain	EIRP (W)		
Channel				640000	641666	643332		L	M	H
Frequency (MHz)				3600	3624.99	3649.98				
ANT				ANT0+ANT6				ANT0+ANT6		
100	QPSK	1	1	21.81	21.98	21.81	-4.29	0.0565	0.0587	0.0565
100	QPSK	1	272	20.50	20.05	20.22	-4.29	0.0418	0.0377	0.0392
100	QPSK	273	0	20.64	20.60	20.65	-4.29	0.0432	0.0428	0.0433
100	16QAM	1	1	21.46	21.43	21.45	-4.29	0.0521	0.0518	0.0520
100	16QAM	1	272	20.06	20.10	20.35	-4.29	0.0378	0.0381	0.0404
100	16QAM	273	0	20.62	20.56	20.63	-4.29	0.0430	0.0424	0.0431
Channel				639668	641666	643666	Gain	EIRP (W)		
Frequency (MHz)				3595.02	3624.99	3654.99				
90	QPSK	1	1	21.94	21.95	21.93	-4.29	0.0582	0.0583	0.0581
90	16QAM	1	1	21.46	21.50	21.49	-4.29	0.0521	0.0526	0.0525
Channel				639334	641666	644000	Gain	EIRP (W)		
Frequency (MHz)				3590.01	3624.99	3660				
80	QPSK	1	1	22.11	22.02	21.96	-4.29	0.0605	0.0593	0.0585
80	16QAM	1	1	21.62	21.54	21.53	-4.29	0.0541	0.0531	0.0530
Channel				638668	641666	644666	Gain	EIRP (W)		
Frequency (MHz)				3580.02	3624.99	3669.99				
60	QPSK	1	1	22.18	22.25	22.04	-4.29	0.0615	0.0625	0.0596
60	16QAM	1	1	21.77	21.76	21.62	-4.29	0.0560	0.0558	0.0541
Channel				638334	641666	645000	Gain	EIRP (W)		
Frequency (MHz)				3575.01	3624.99	3675				
50	QPSK	1	1	22.32	22.36	22.21	-4.29	0.0635	0.0641	0.0619
50	16QAM	1	1	22.01	21.91	21.84	-4.29	0.0592	0.0578	0.0569
Channel				638000	641666	645332	Gain	EIRP (W)		
Frequency (MHz)				3570	3624.99	3679.98				
40	QPSK	1	1	22.45	22.41	22.36	-4.29	0.0655	0.0649	0.0641
40	16QAM	1	1	21.92	21.69	21.69	-4.29	0.0579	0.0550	0.0550
Channel				637668	641666	645666	Gain	EIRP (W)		
Frequency (MHz)				3565.02	3624.99	3684.99				
30	QPSK	1	1	22.41	22.37	22.32	-4.29	0.0649	0.0643	0.0635
30	16QAM	1	1	21.88	21.65	21.65	-4.29	0.0574	0.0545	0.0545
Channel				637500	641666	645832	Gain	EIRP (W)		
Frequency (MHz)				3562.5	3624.99	3687.48				
25	QPSK	1	1	22.56	22.47	22.46	-4.29	0.0671	0.0658	0.0656
25	16QAM	1	1	22.13	22.05	22.08	-4.29	0.0608	0.0597	0.0601
Channel				637334	641666	646000	Gain	EIRP (W)		
Frequency (MHz)				3560.01	3624.99	3690				
20	QPSK	1	1	22.54	22.45	22.44	-4.29	0.0668	0.0655	0.0653
20	16QAM	1	1	22.11	22.03	22.06	-4.29	0.0605	0.0594	0.0598
Channel				637168	641666	646166	Gain	EIRP (W)		

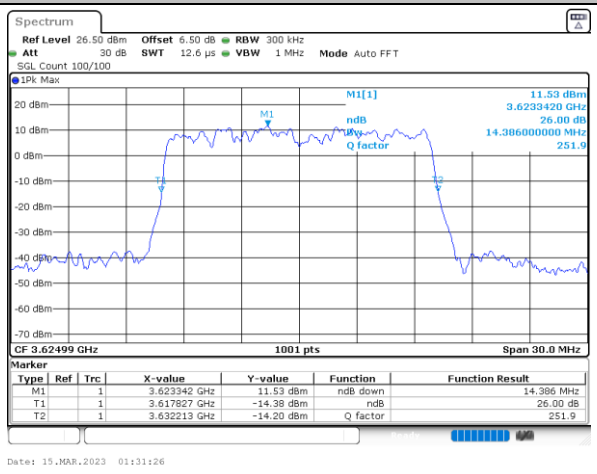
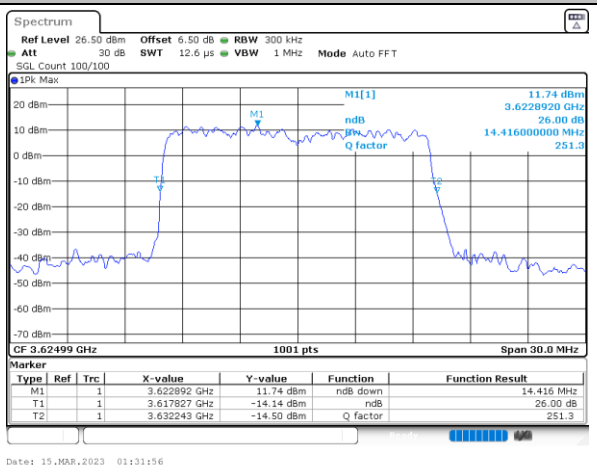
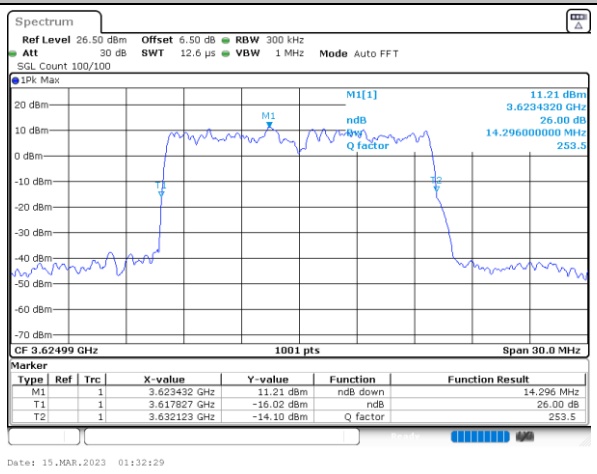
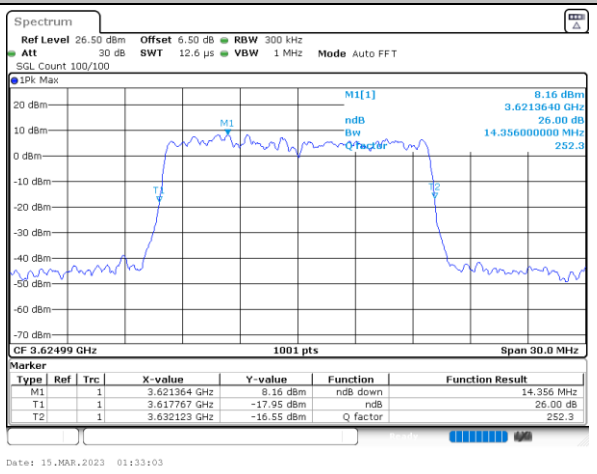
Frequency (MHz)				3557.52	3624.99	3692.49				
15	QPSK	1	1	22.47	22.43	22.48	-4.29	0.0658	0.0652	0.0659
15	16QAM	1	1	22.05	22.05	22.08	-4.29	0.0597	0.0597	0.0601
Channel				637000	641666	646332	Gain	EIRP (W)		
Frequency (MHz)				3555	3624.99	3694.98				
10	QPSK	1	1	22.45	22.51	22.51	-4.29	0.0655	0.0664	0.0664
10	16QAM	1	1	22.05	22.09	22.12	-4.29	0.0597	0.0603	0.0607

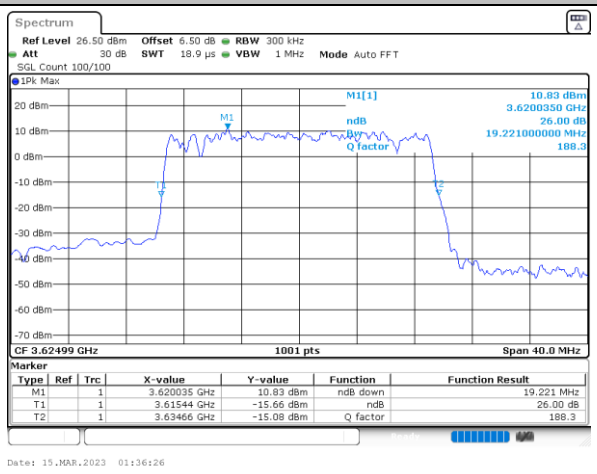
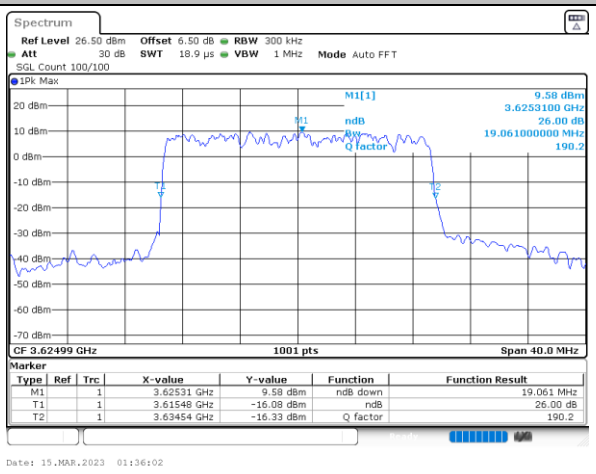
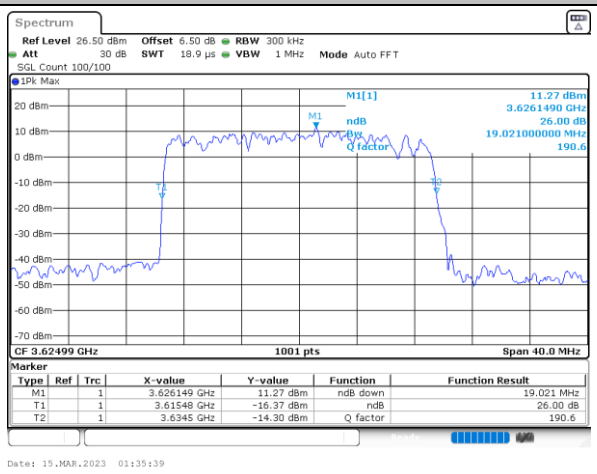
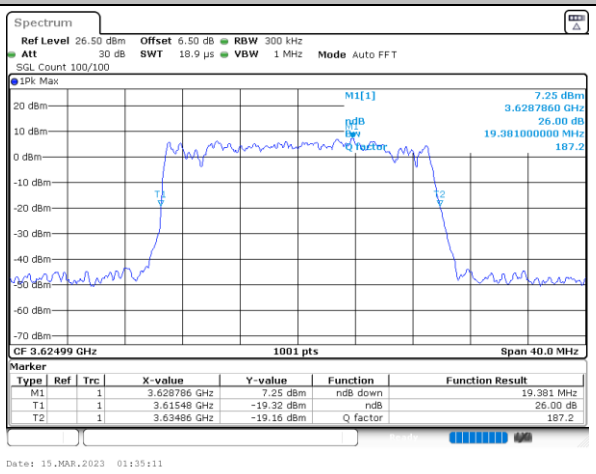
FR1 n48

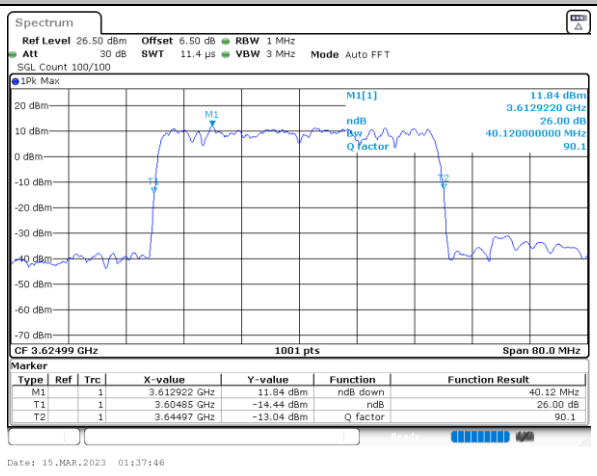
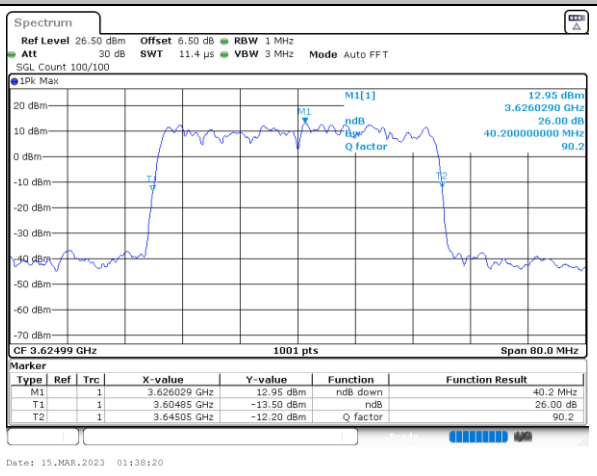
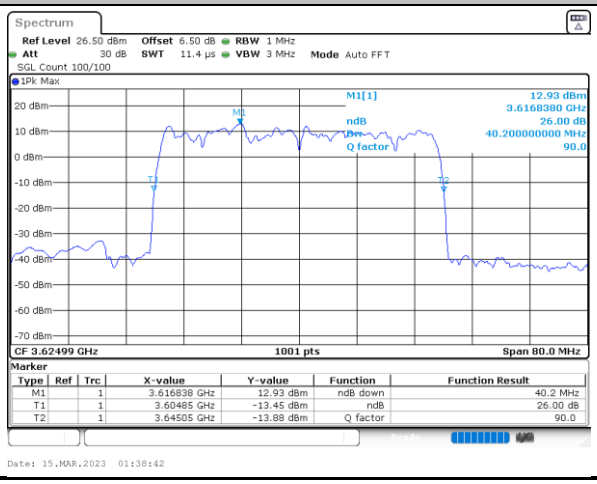
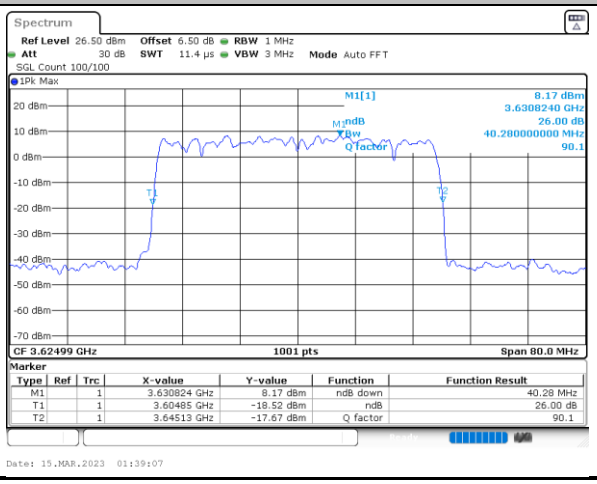
26dB Bandwidth

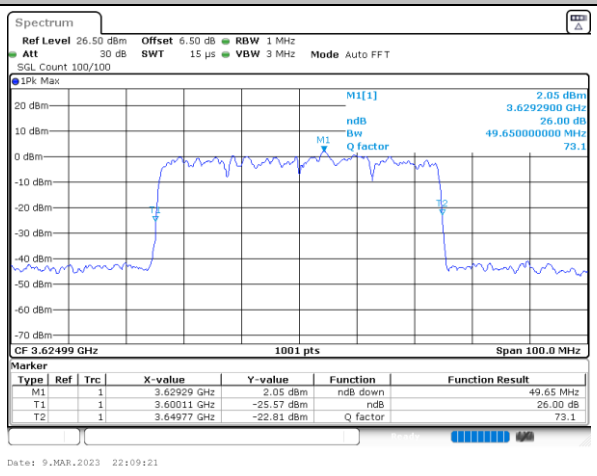
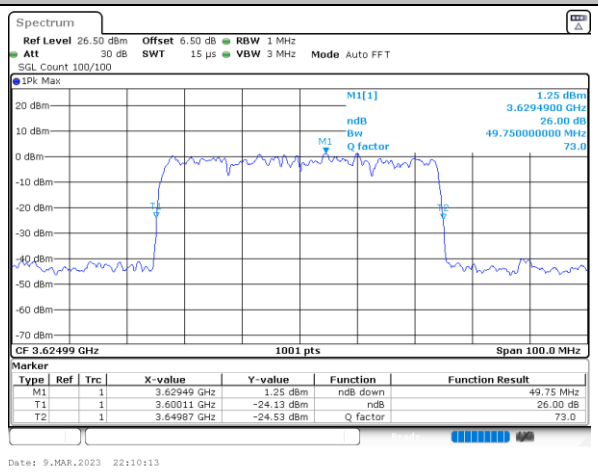
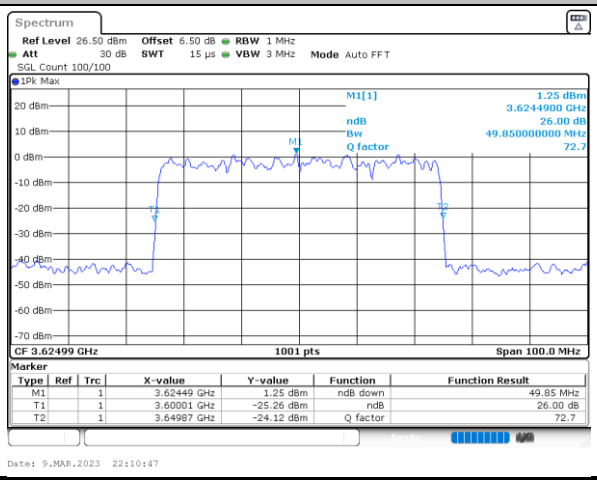
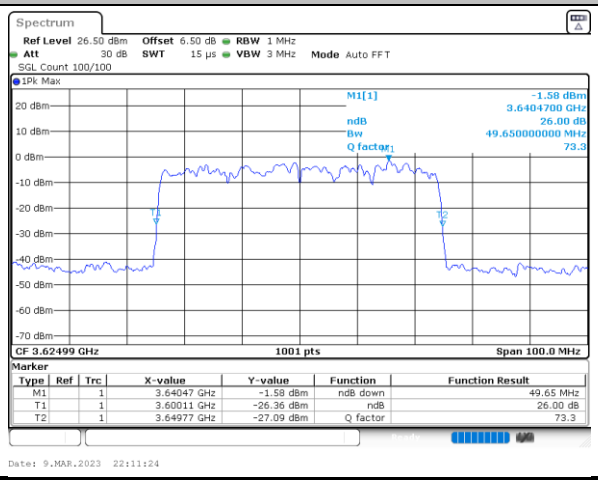
Mode	FR1 n48 : 26dB BW(10 MHz) / CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	9.63	9.25	9.35	9.43
Mode	FR1 n48 : 26dB BW(15 MHz) / CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	14.39	14.42	14.30	14.36
Mode	FR1 n48 : 26dB BW(20 MHz) / CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	19.22	19.06	19.02	19.38
Mode	FR1 n48 : 26dB BW(40 MHz) / CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	40.12	40.20	40.20	40.28
Mode	FR1 n48 : 26dB BW(50 MHz) / CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	49.65	49.75	49.85	49.65
Mode	FR1 n48 : 26dB BW(60 MHz) / CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	60.30	60.42	60.30	60.30
Mode	FR1 n48 : 26dB BW(80 MHz) / CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	79.92	79.92	80.08	79.92
Mode	FR1 n48 : 26dB BW(90 MHz) / CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	92.25	92.25	92.07	92.07
Mode	FR1 n48 : 26dB BW(100 MHz) / CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	102.3	102.3	102.3	102.3

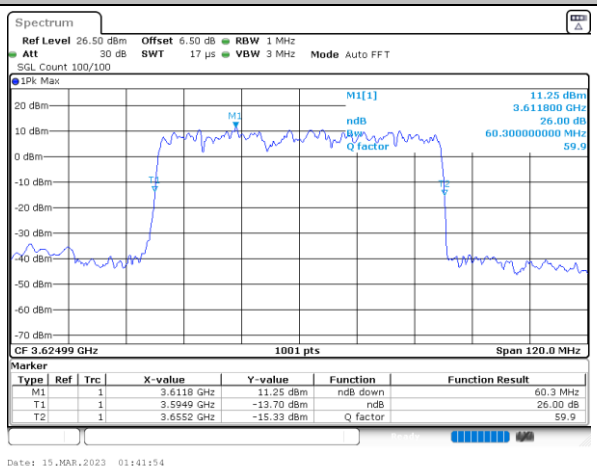
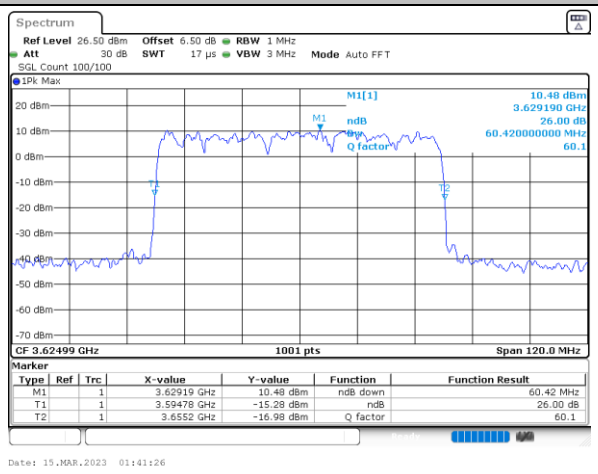
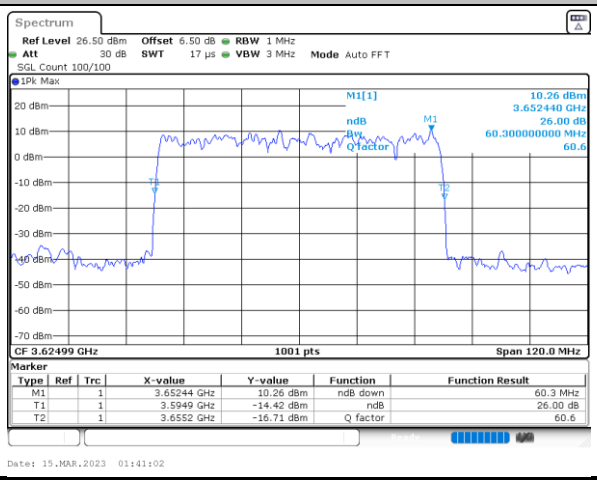
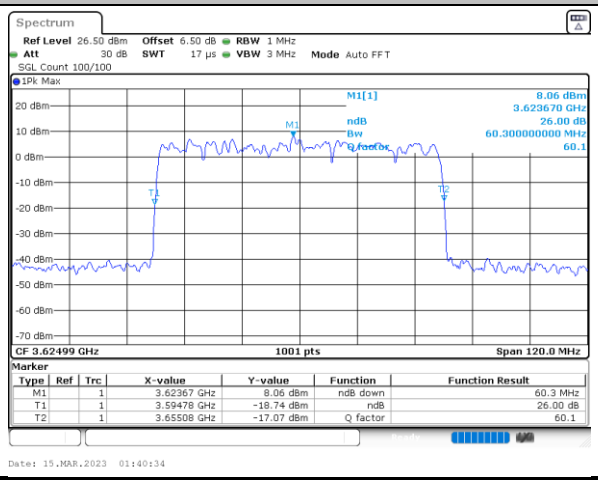
FR1 n48 / 10MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

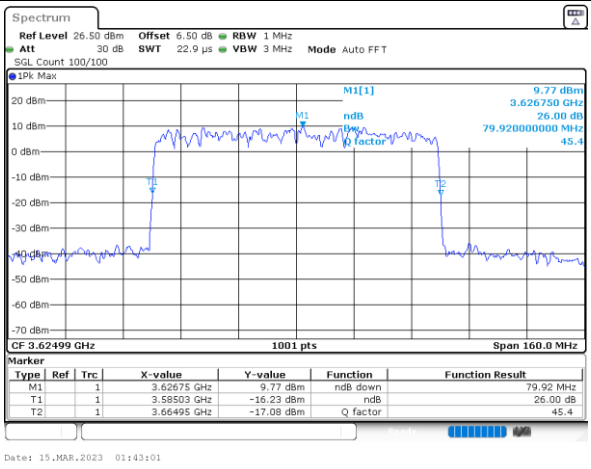
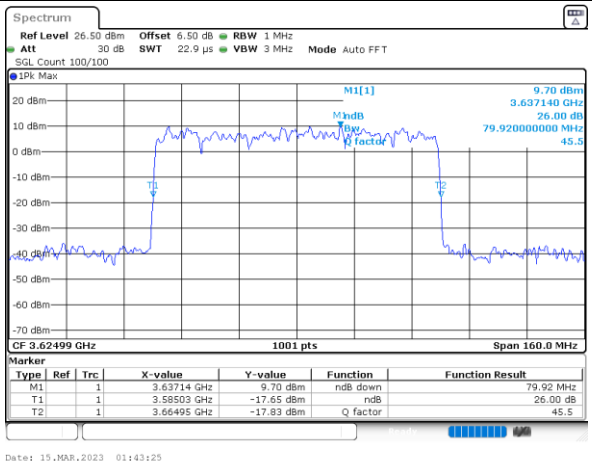
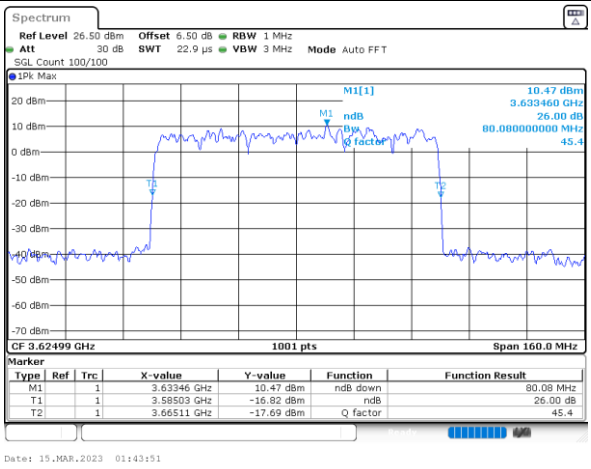
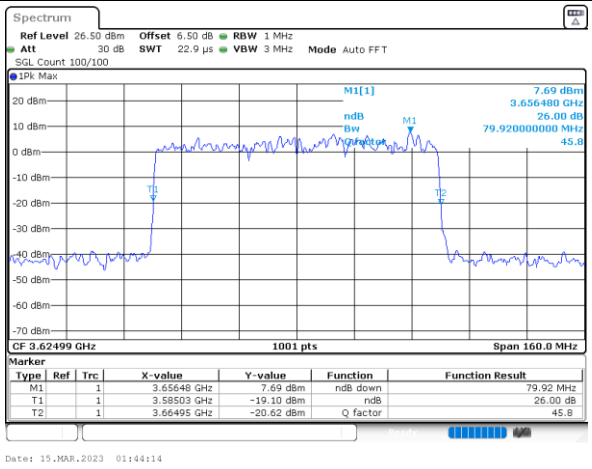
FR1 n48 / 15MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

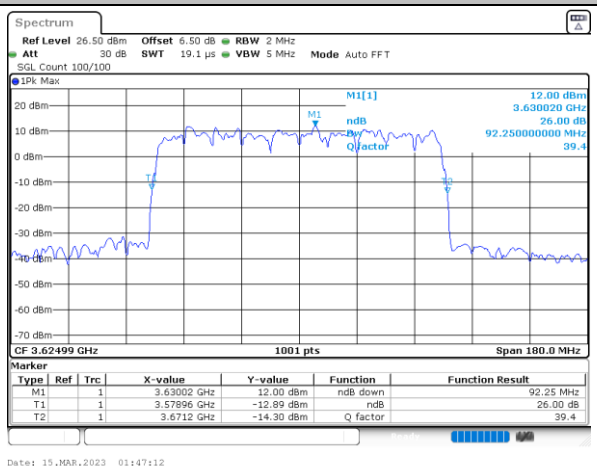
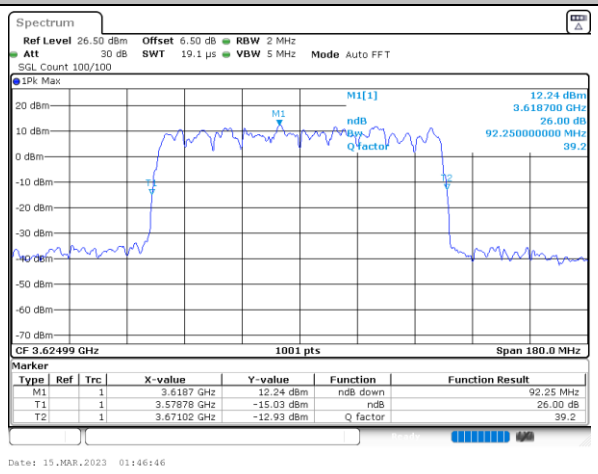
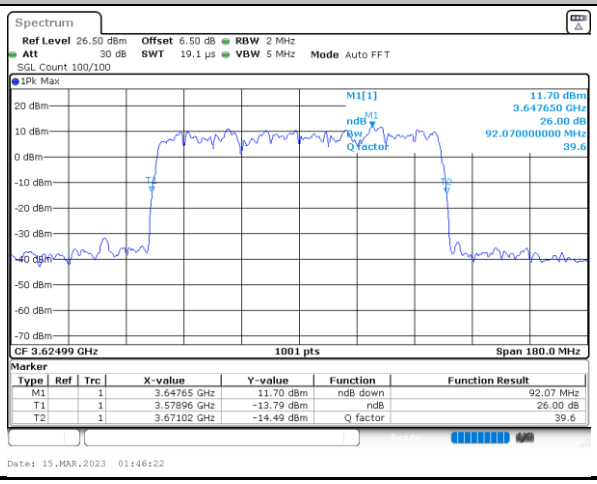
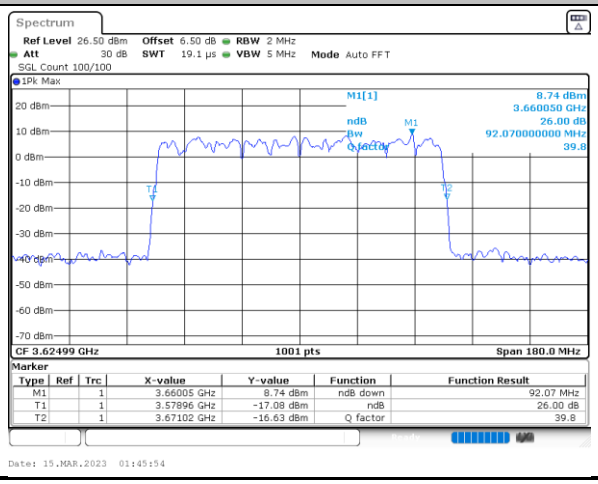
FR1 n48 / 20MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

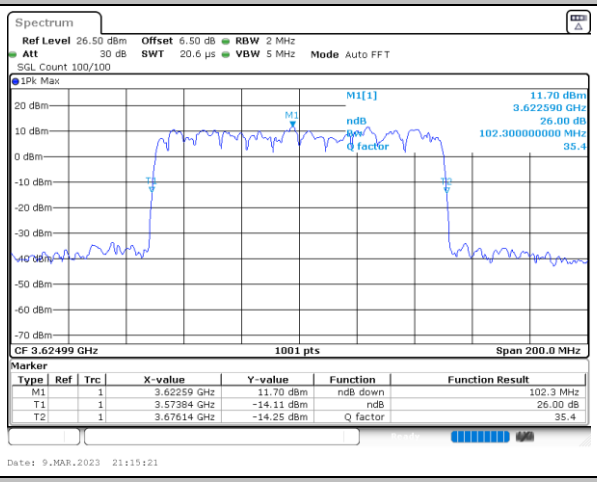
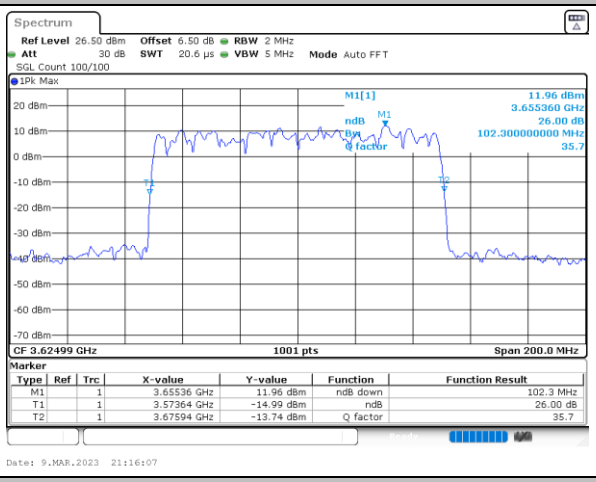
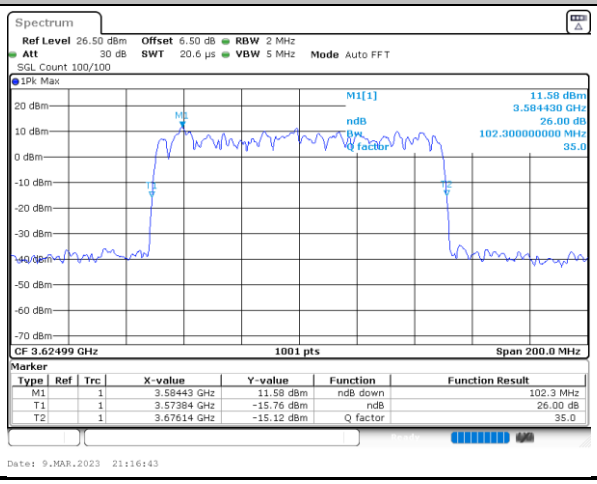
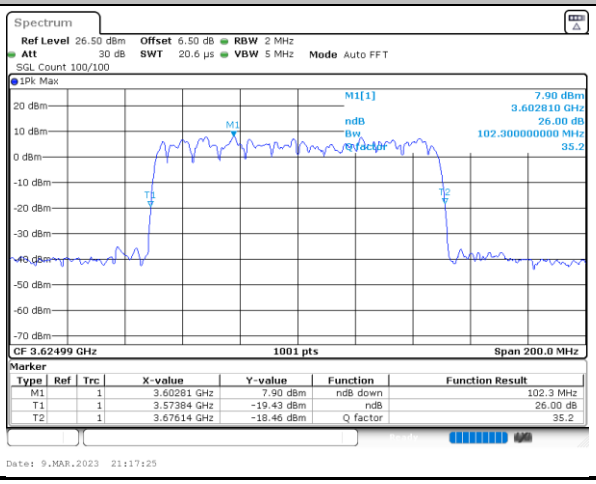
FR1 n48 / 40MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

FR1 n48 / 50MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

FR1 n48 / 60MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

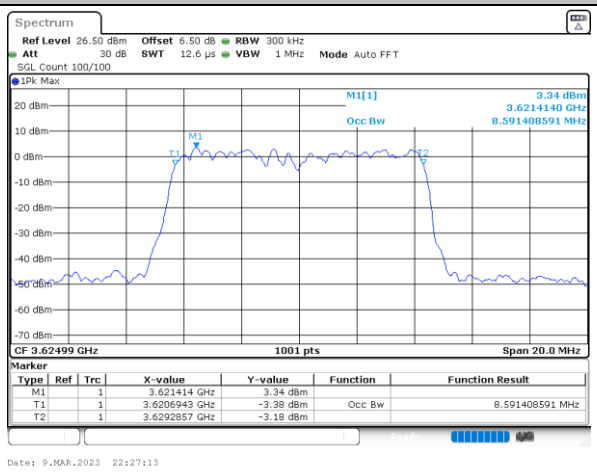
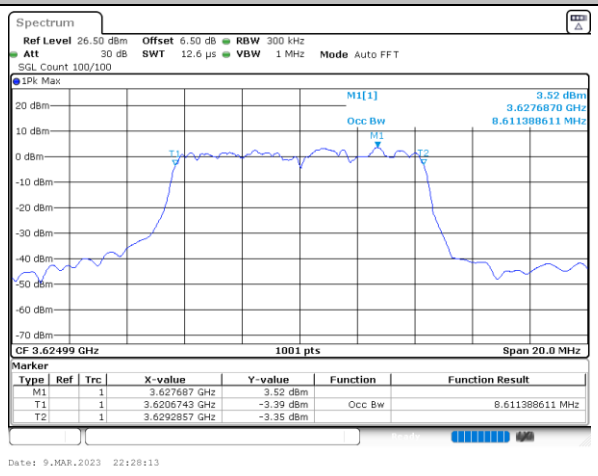
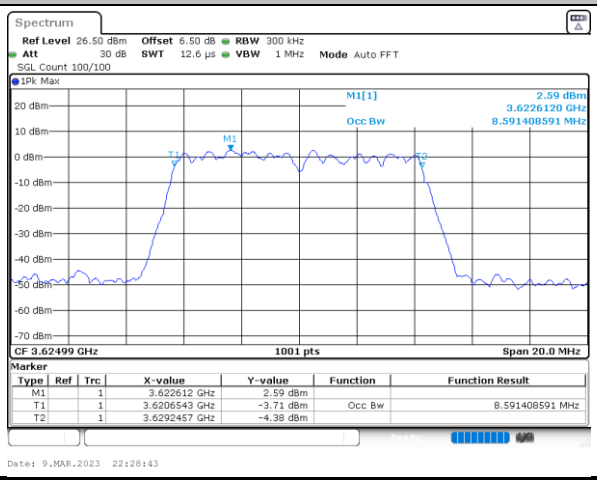
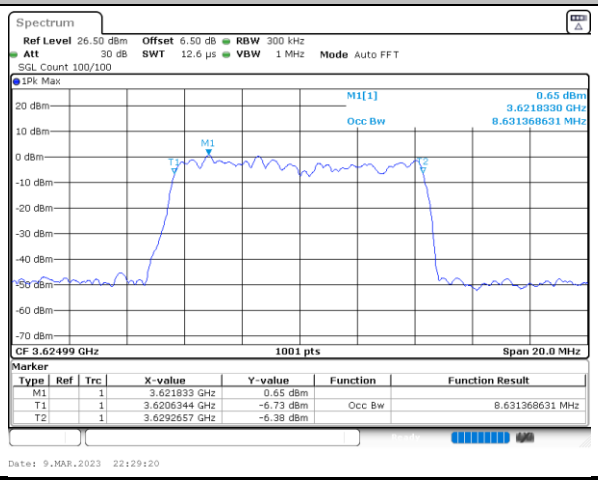
FR1 n48 / 80MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

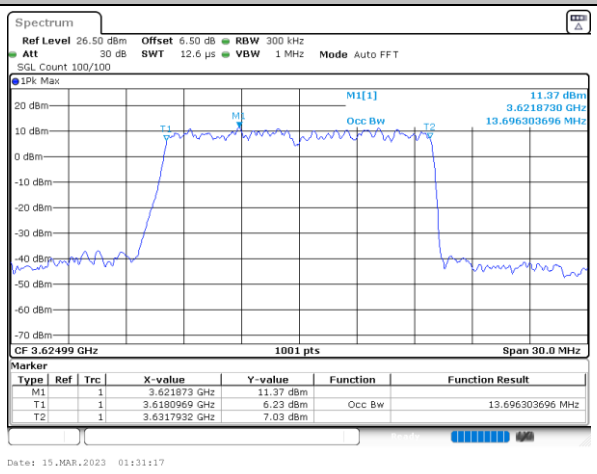
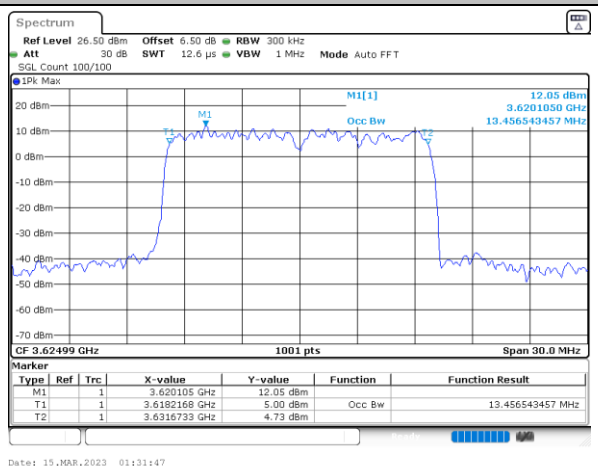
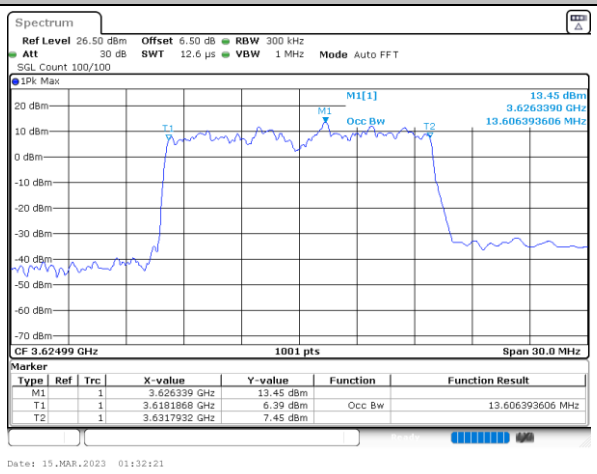
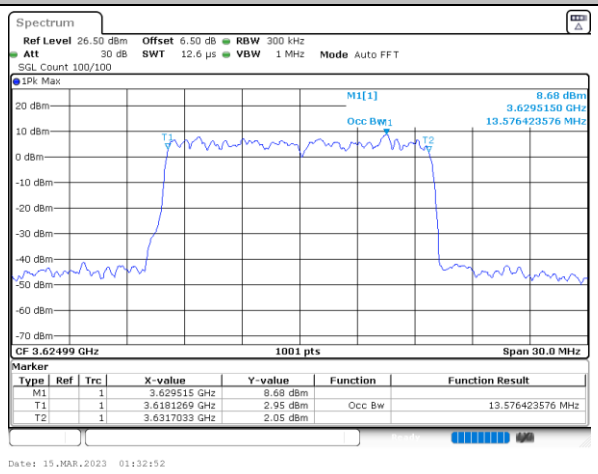
FR1 n48 / 90MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

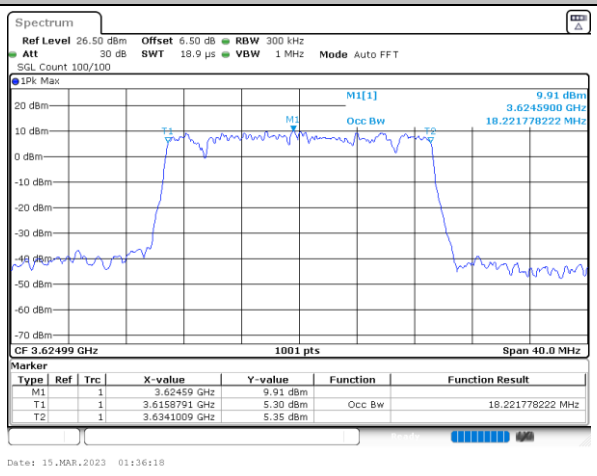
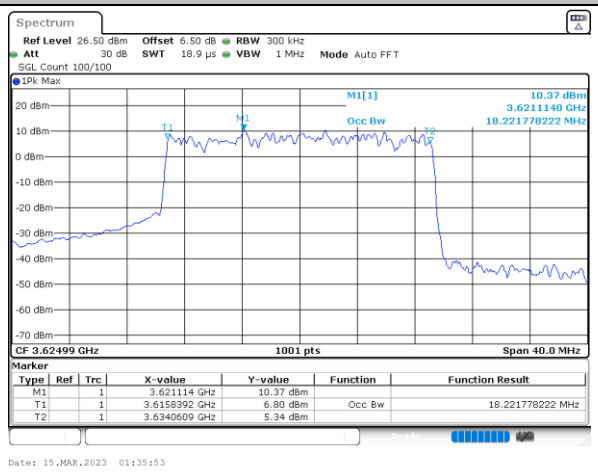
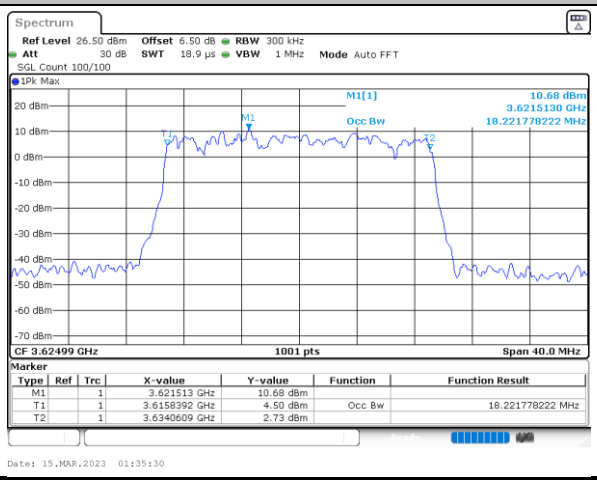
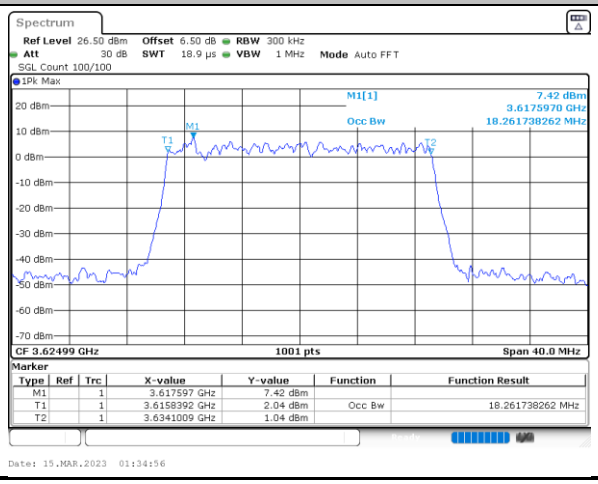
FR1 n48 / 100MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

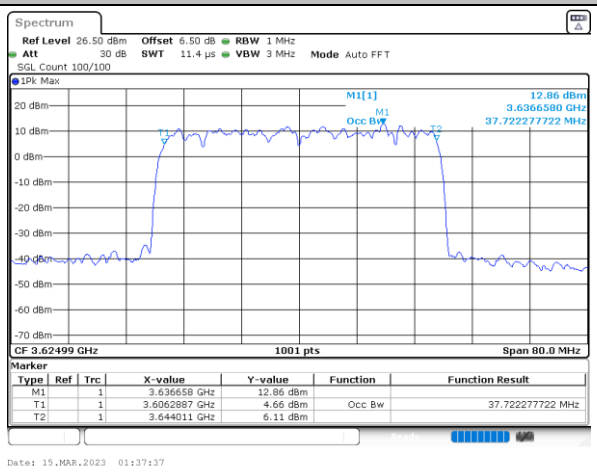
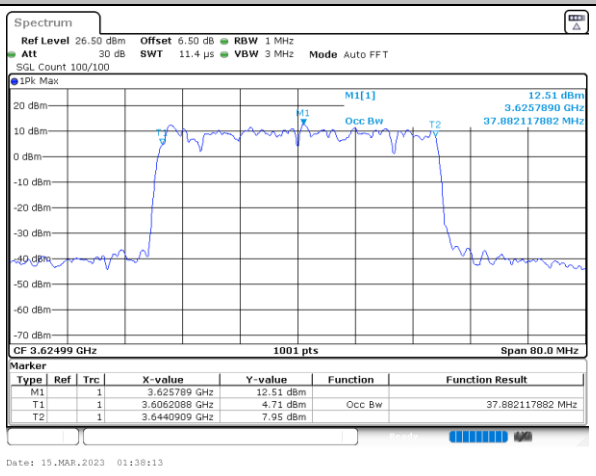
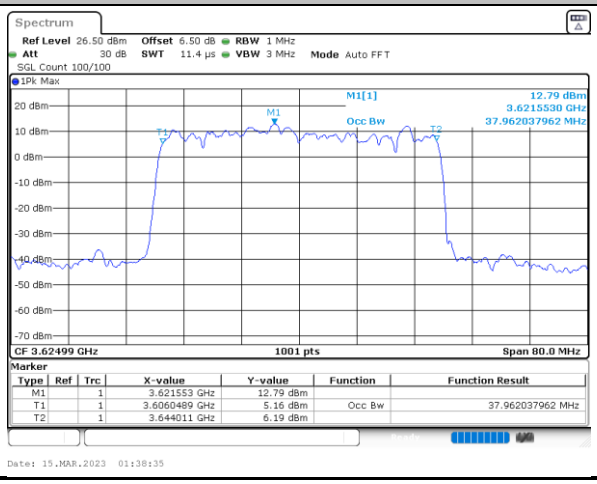
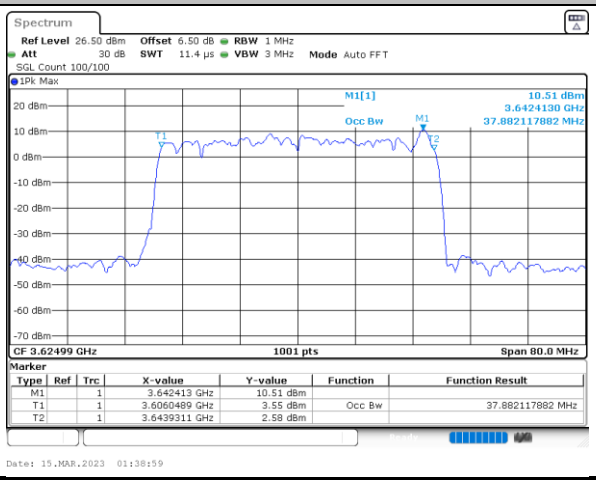
Occupied Bandwidth

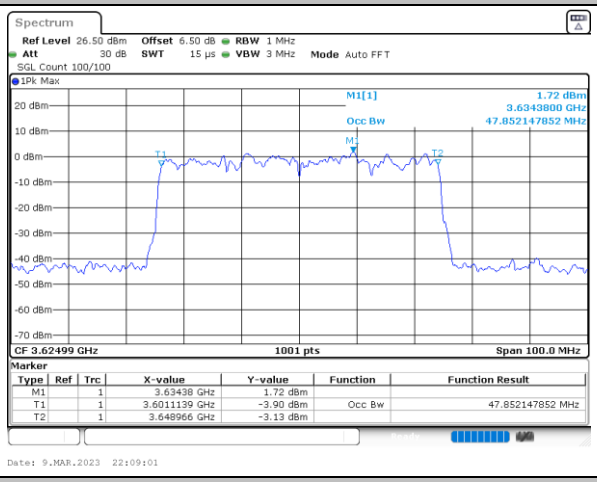
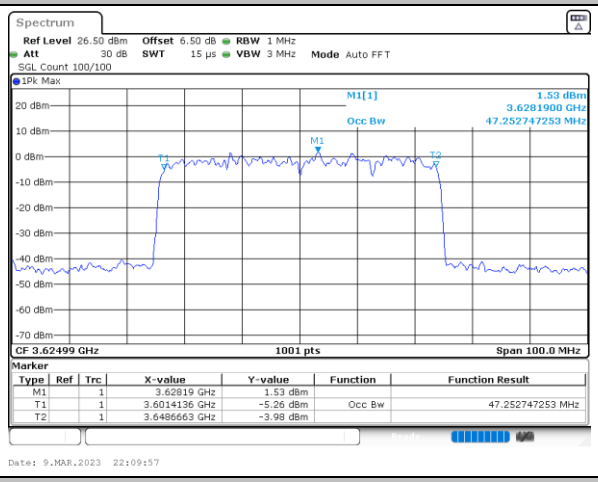
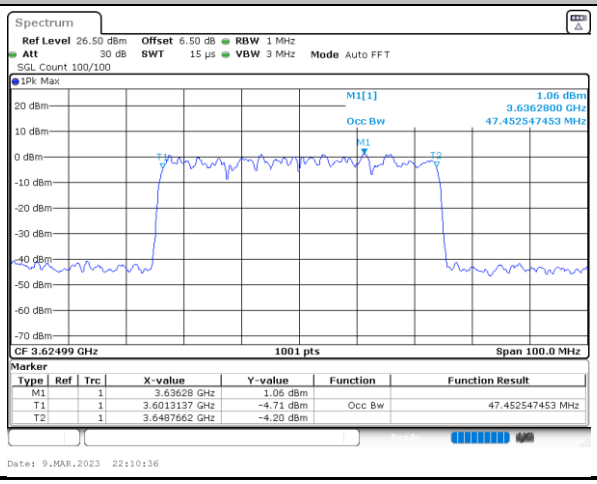
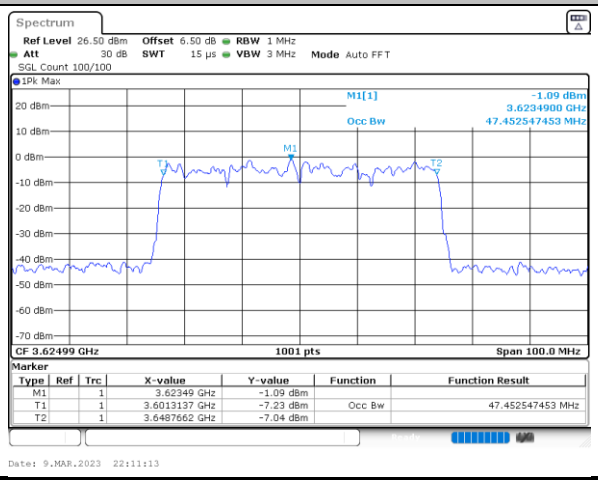
Mode	FR1 n48 : OB BW(10 MHz) /CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	8.59	8.61	8.59	8.63
Mode	FR1 n48 : OB BW(15 MHz) /CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	13.70	13.46	13.61	13.58
Mode	FR1 n48 : OB BW(20 MHz) /CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	18.22	18.22	18.22	18.26
Mode	FR1 n48 : OB BW(40 MHz) /CP OFDM			
BW	CP			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	37.72	37.88	37.96	37.88
Mode	FR1 n48 : OB BW(50 MHz) /CP OFDM			
BW	DFT			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	47.85	47.25	47.45	47.45
Mode	FR1 n48 : OB BW(60 MHz) /CP OFDM			
BW	DFT			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	57.90	57.42	57.66	57.90
Mode	FR1 n48 : OB BW(80 MHz) /CP OFDM			
BW	DFT			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	77.04	77.52	77.04	77.20
Mode	FR1 n48 : OB BW(90 MHz) /CP OFDM			
BW	DFT			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	87.39	86.85	87.57	86.67
Mode	FR1 n48 : OB BW(100 MHz) /CP OFDM			
BW	DFT			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	97.50	97.30	97.10	97.10

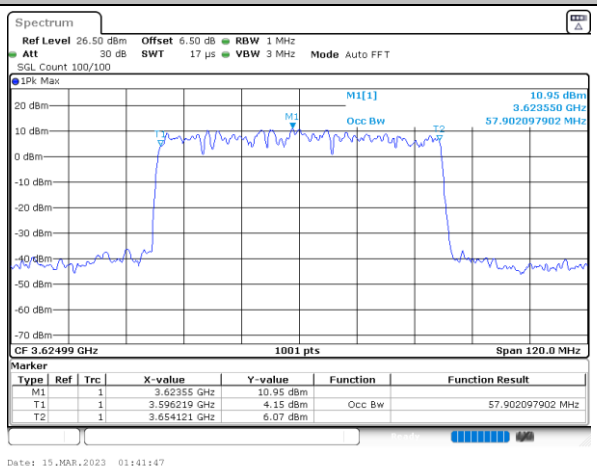
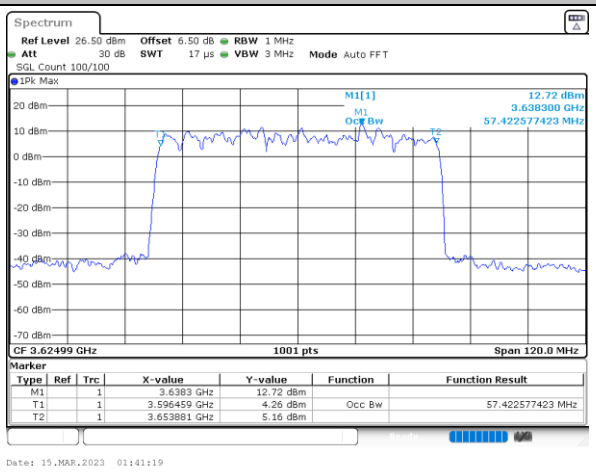
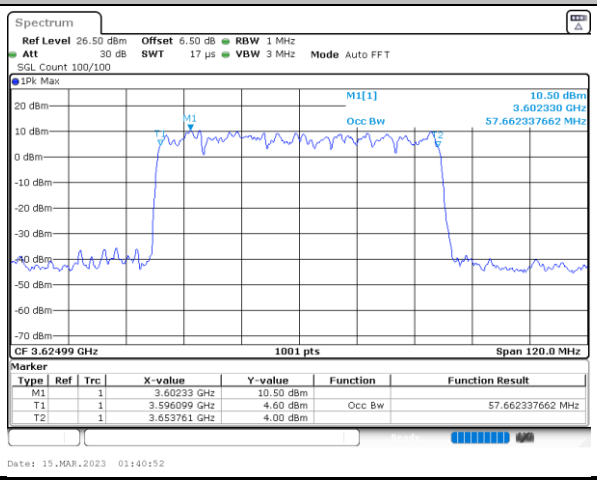
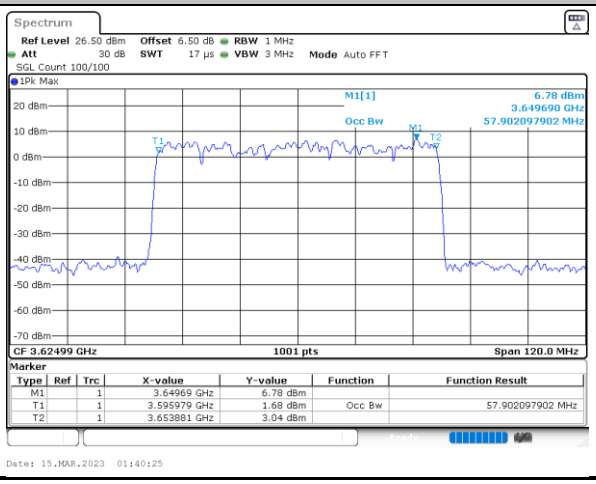
FR1 n48 / 10MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

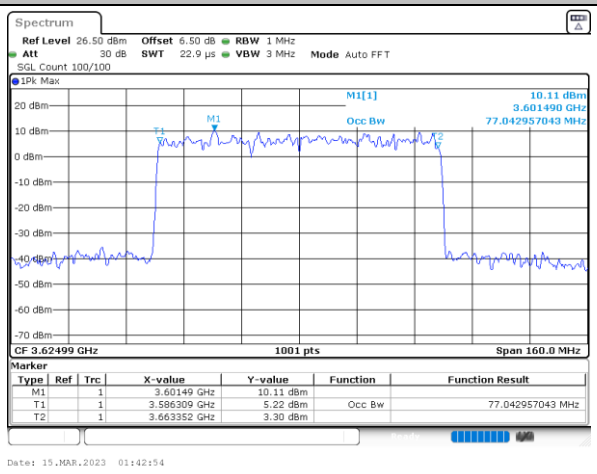
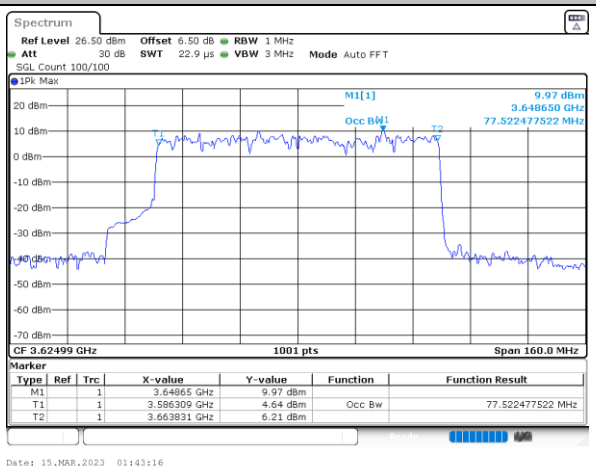
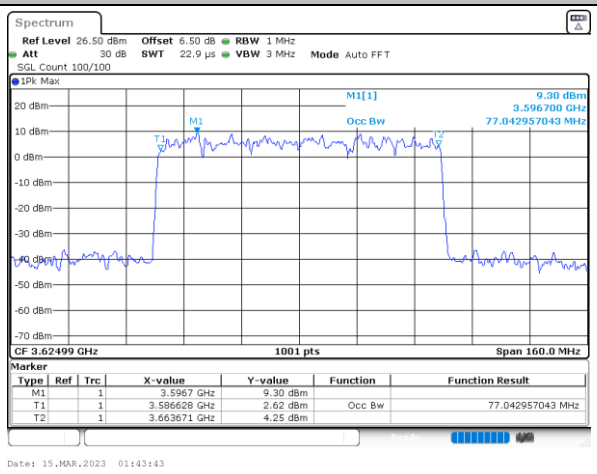
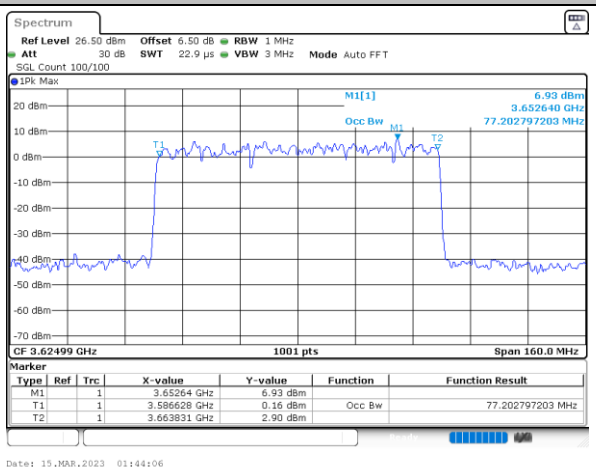
FR1 n48 / 15MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

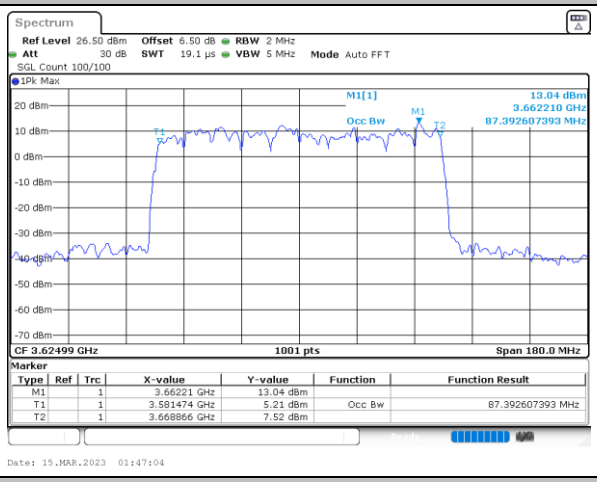
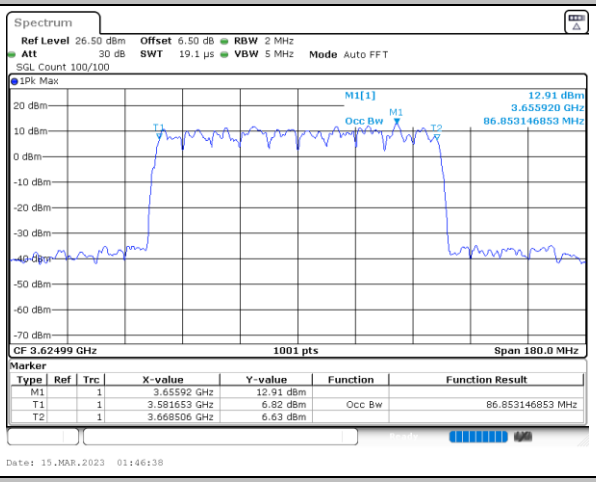
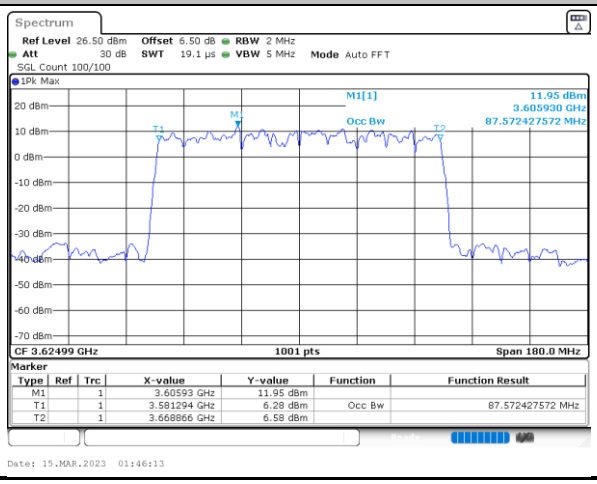
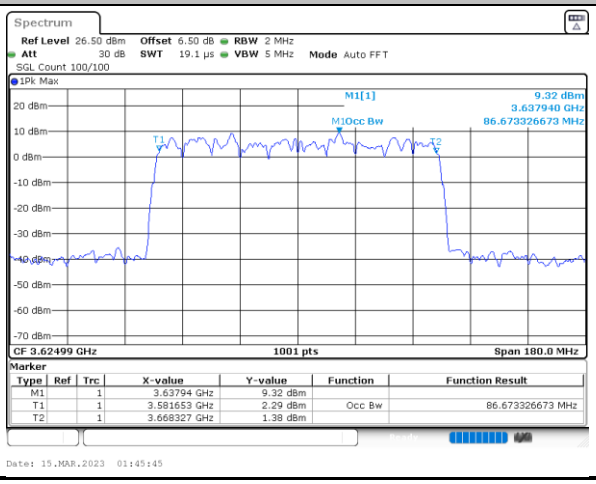
FR1 n48 / 20MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

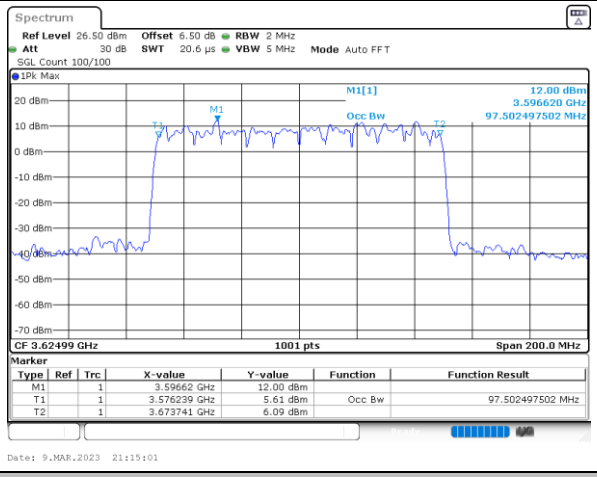
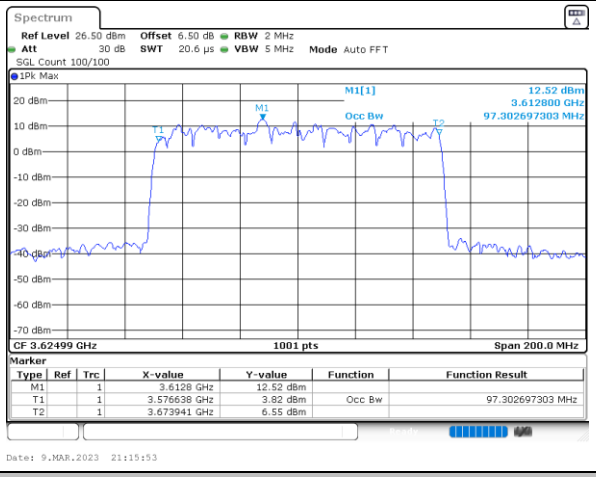
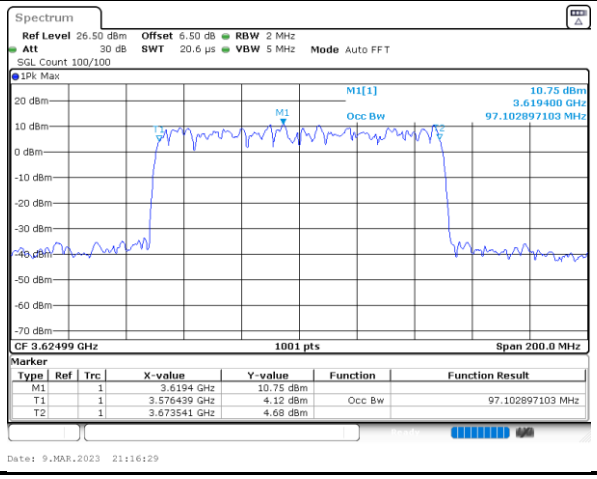
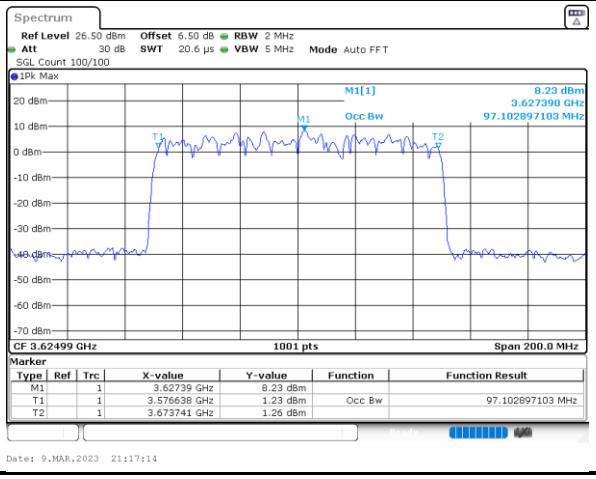
FR1 n48 / 40MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

FR1 n48 / 50MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

FR1 n48 / 60MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

FR1 n48 / 80MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

FR1 n48 / 90MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

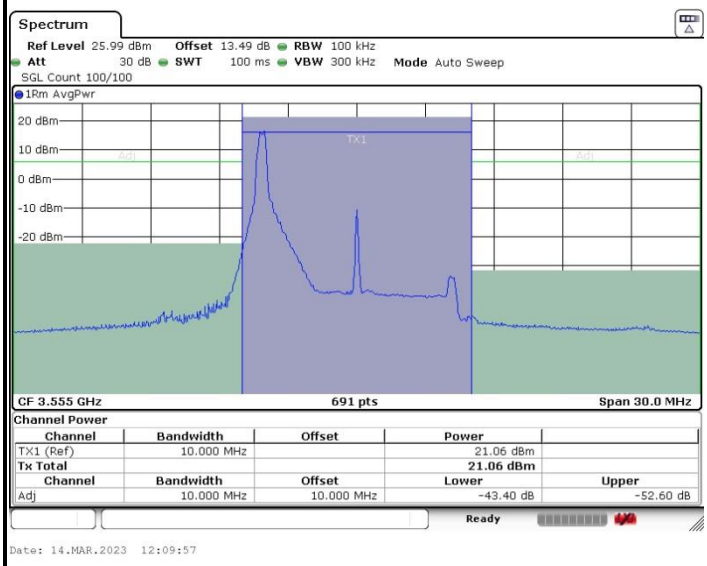
FR1 n48 / 100MHz / CP-OFDM	
QPSK	**16QAM**
Middle Channel	**Middle Channel**
	
64QAM	**256QAM**
Middle Channel	**Middle Channel**
	

ACLR

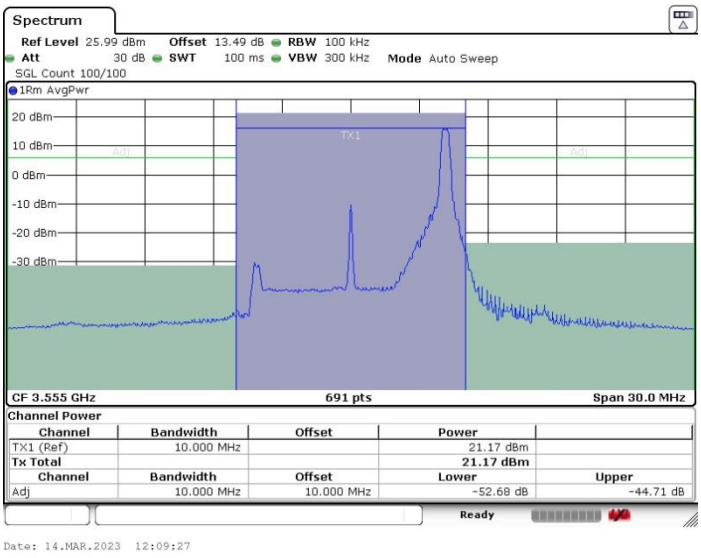
FR1 n48 / 10MHz

BPSK

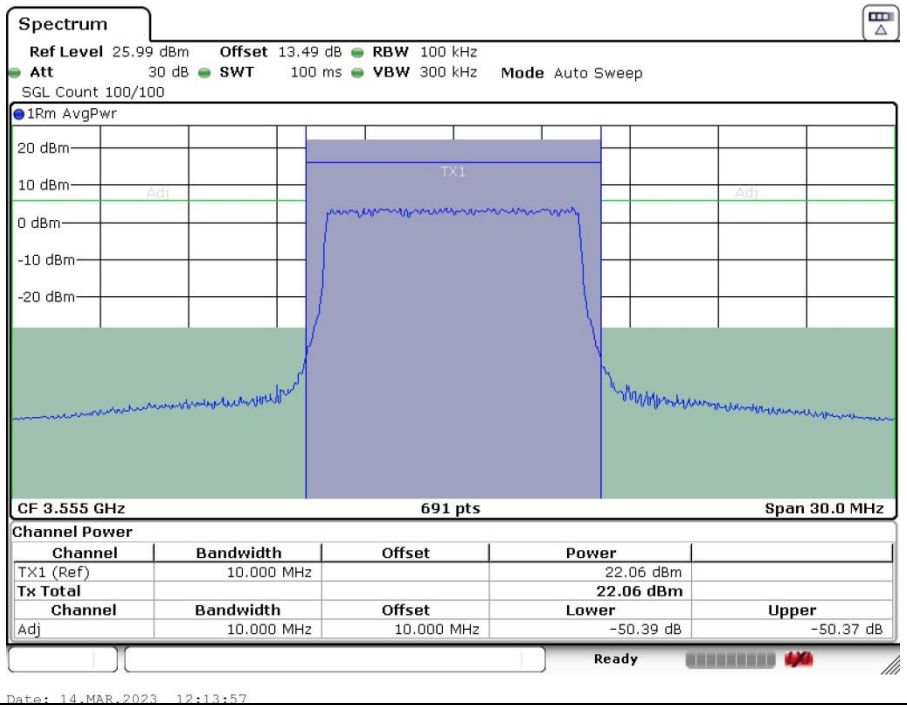
Lowest Channel / 1RB0



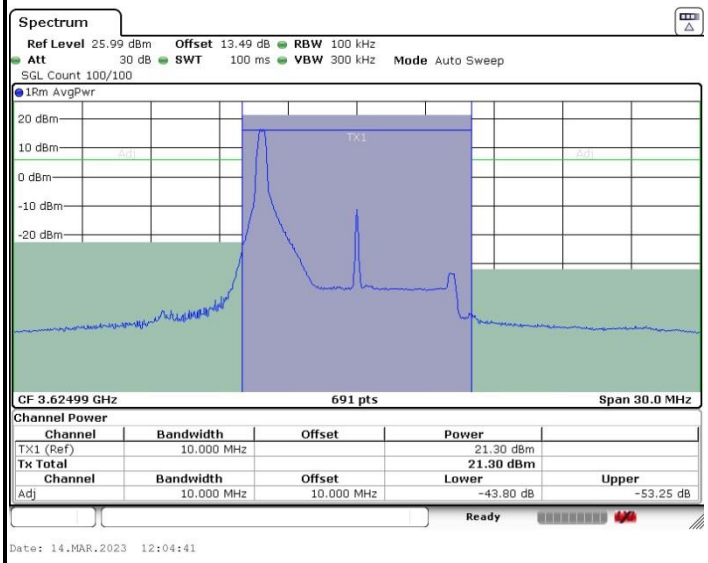
Lowest Channel / 1RBmax

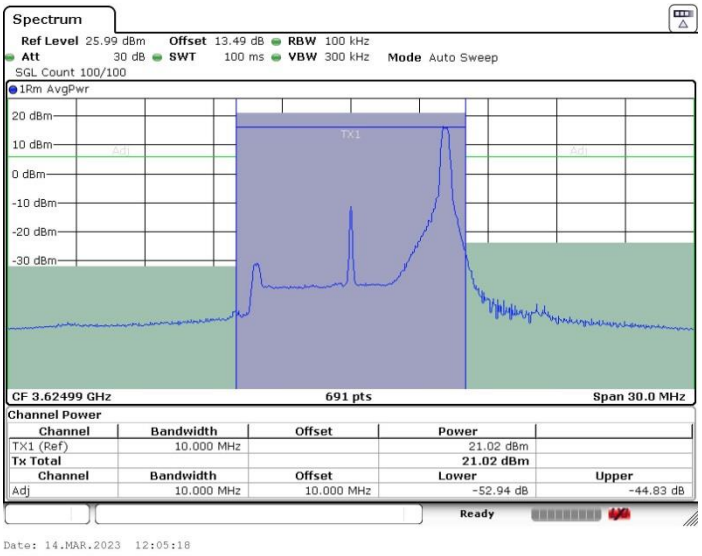


Lowest Channel / FullRB

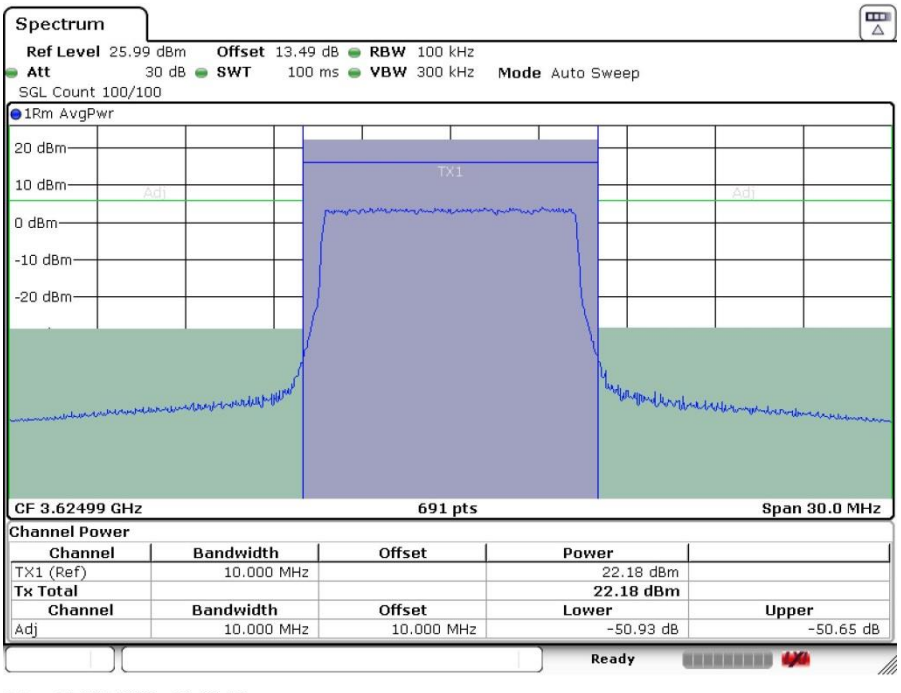


FR1 n48 / 10MHz	
BPSK	
Middle Channel / 1RB0	Middle Channel / 1RBmax

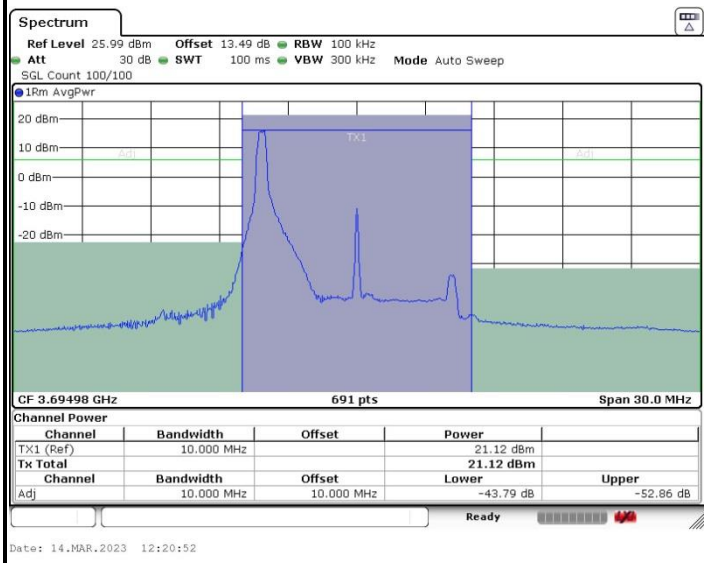


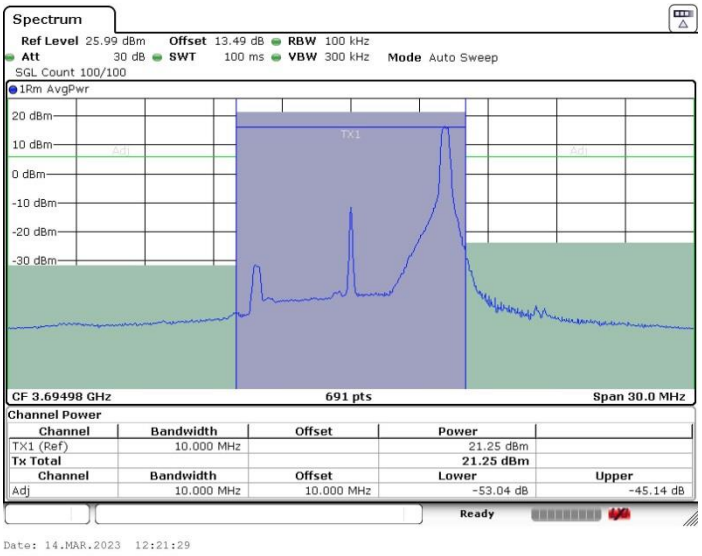


Middle Channel / FullRB

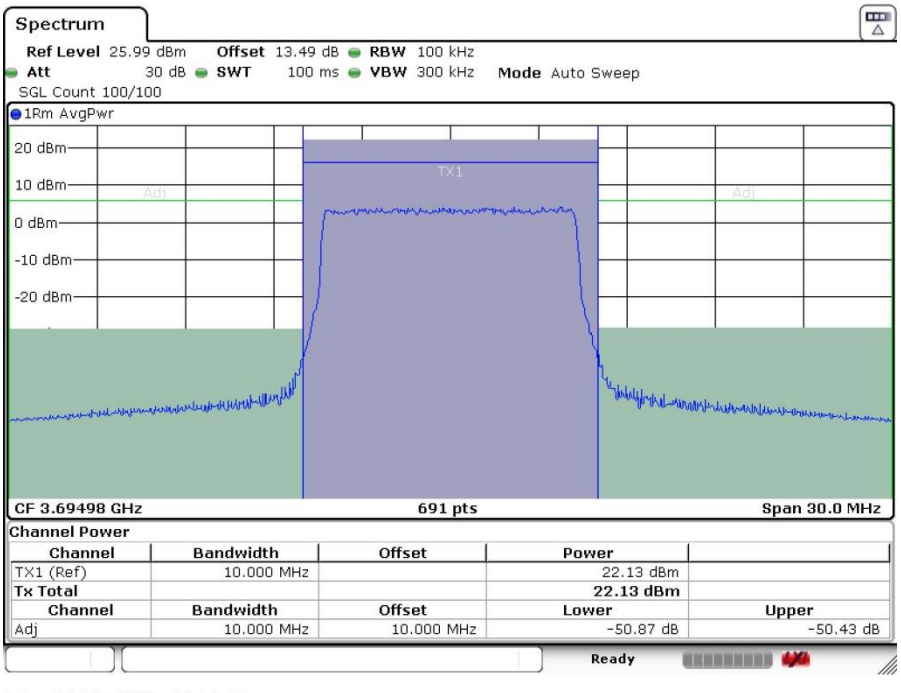


FR1 n48 / 10MHz	
BPSK	
Highest Channel / 1RB0	Highest Channel / 1RBmax

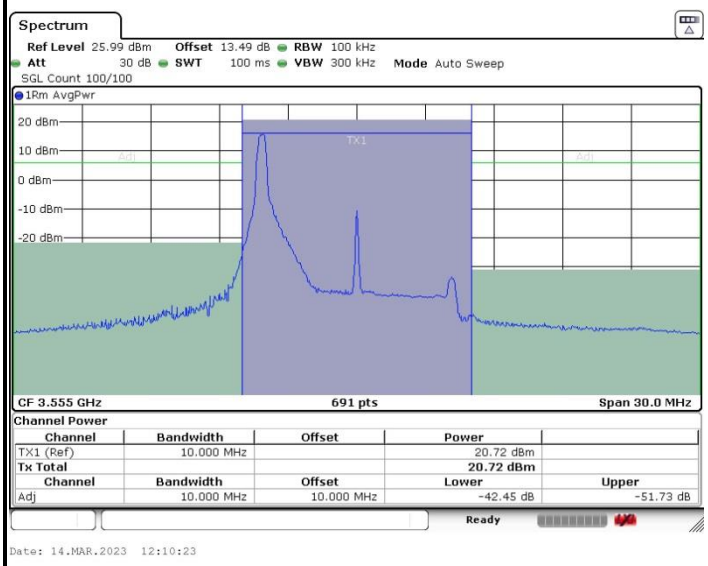


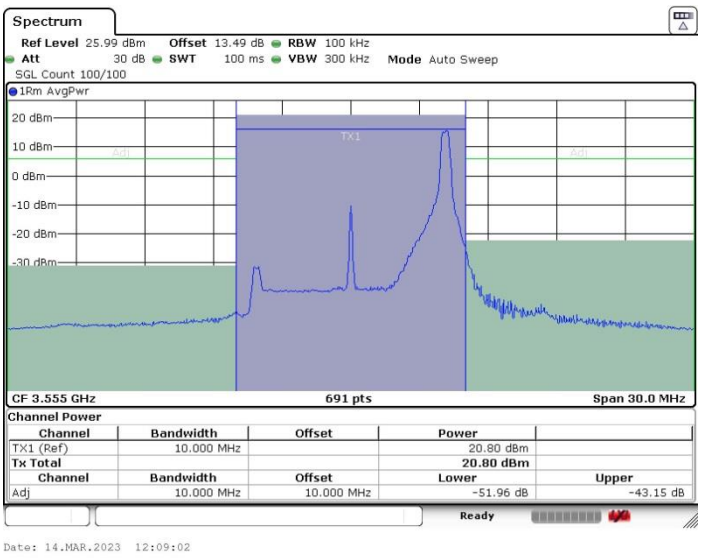


Highest Channel / FullRB

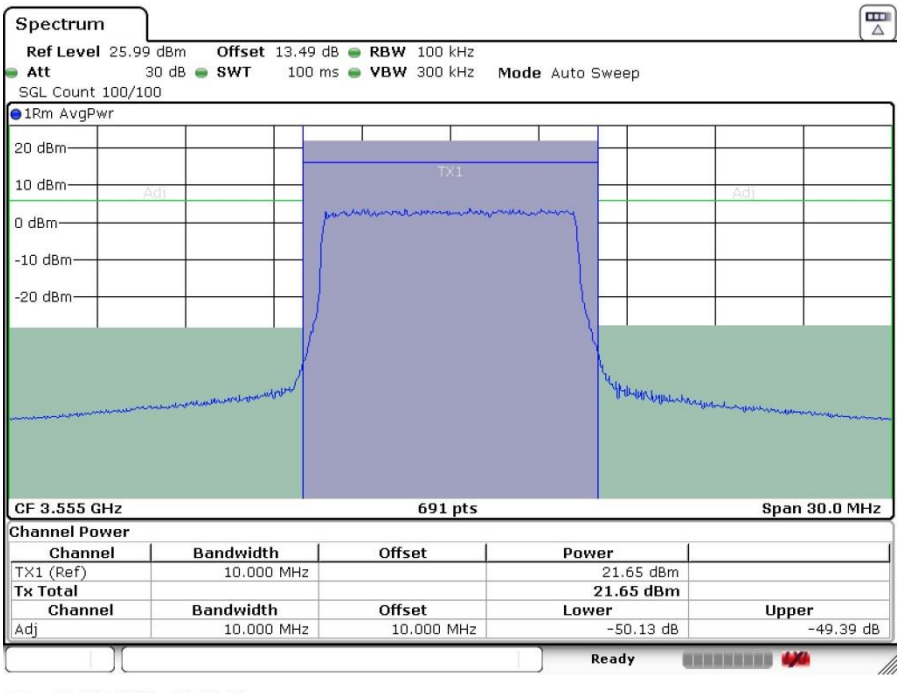


FR1 n48 / 10MHz	
QPSK	
Lowest Channel / 1RB0	Lowest Channel / 1RBmax

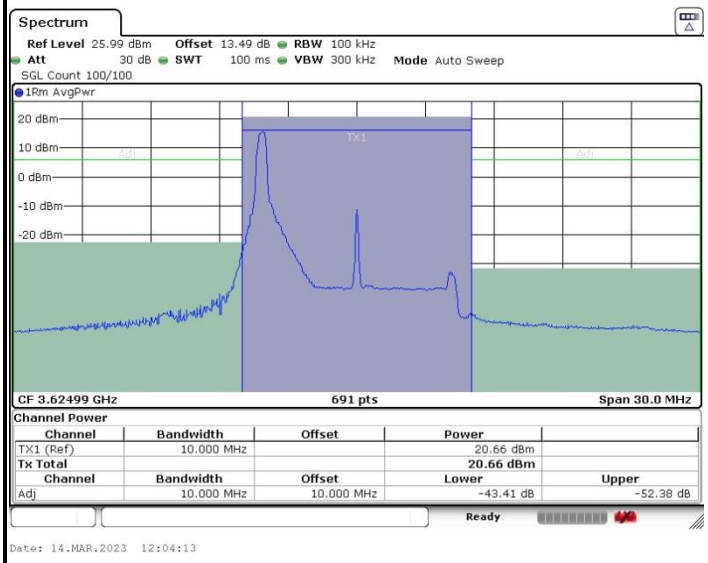


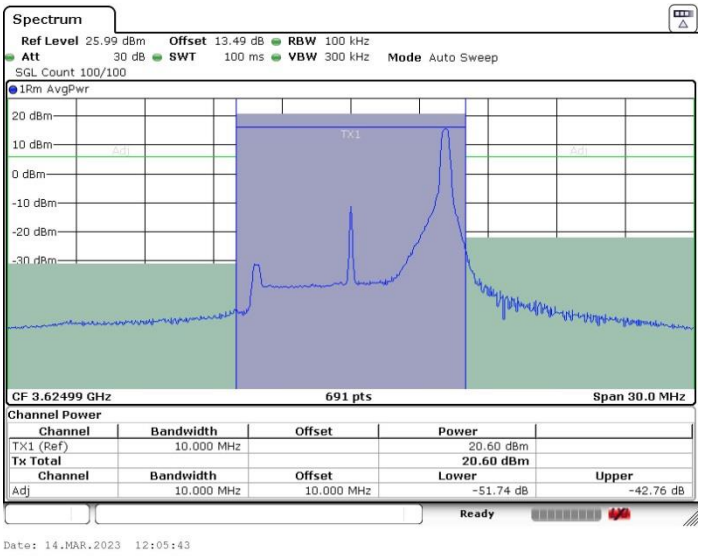


Lowest Channel / FullRB

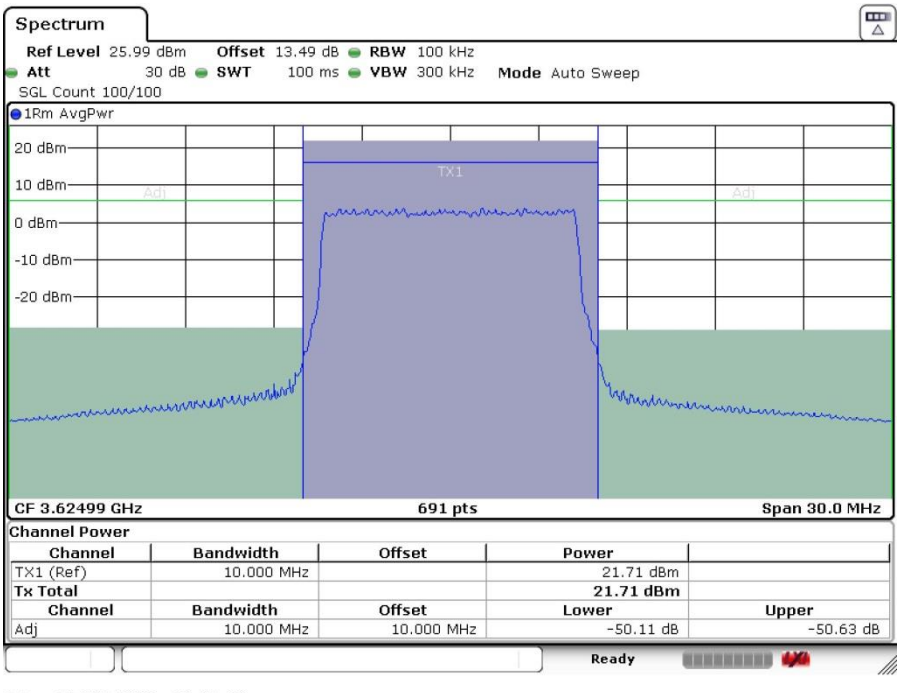


FR1 n48 / 10MHz	
QPSK	
Middle Channel / 1RB0	Middle Channel / 1RBmax

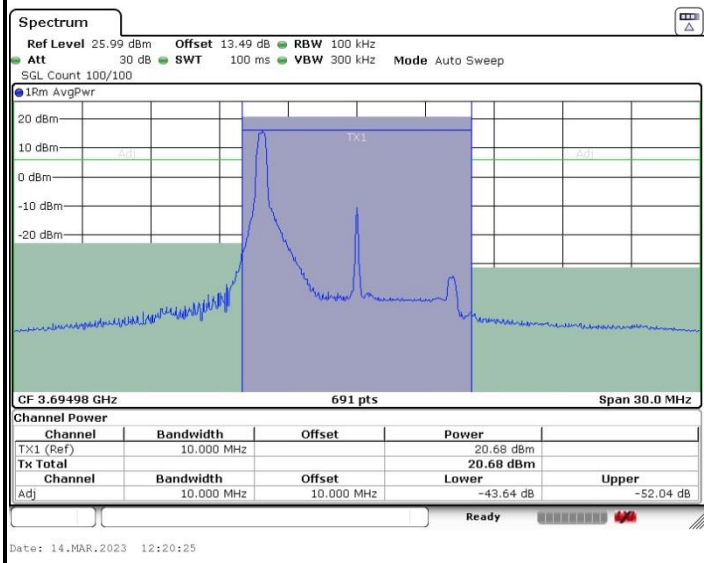


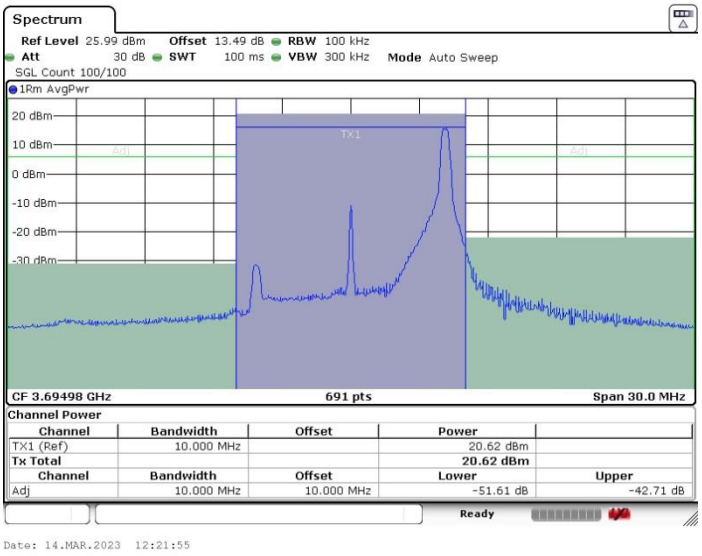


Middle Channel / FullRB

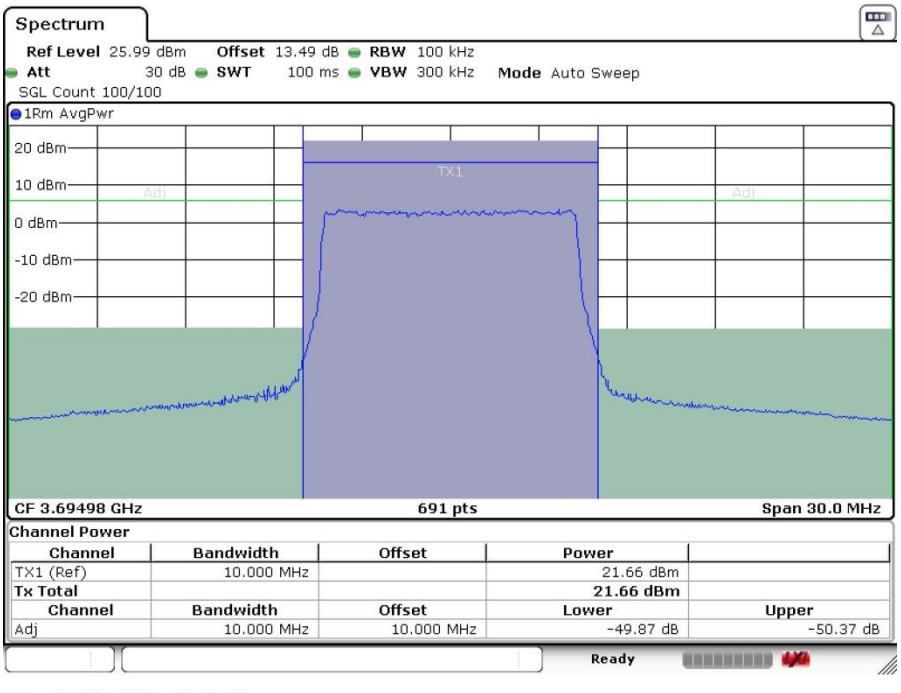


FR1 n48 / 10MHz	
QPSK	
Highest Channel / 1RB0	Highest Channel / 1RBmax

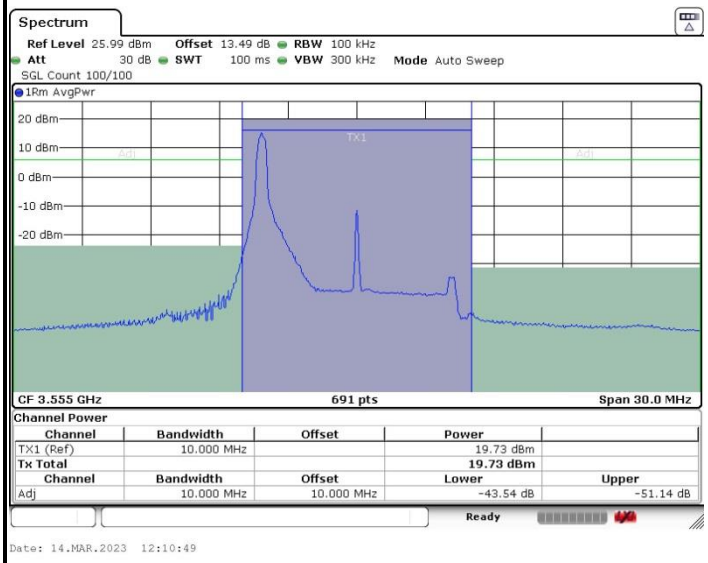


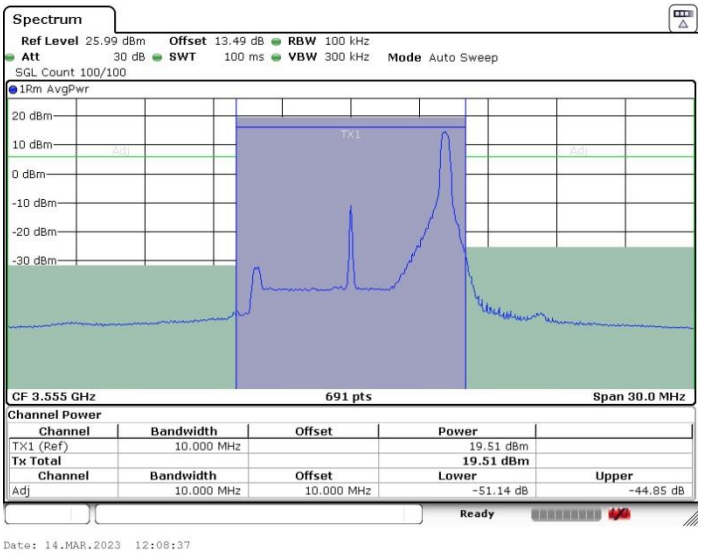


Highest Channel / FullRB



FR1 n48 / 10MHz	
16QAM	
Lowest Channel / 1RB0	Lowest Channel / 1RBmax





Lowest Channel / FullRB