TEST REPORT

No.I22Z61533-WMD06

for

Wingtech Group (Hong Kong) Limited

5G Mobile Phone

Model Name: Celero5G+

FCC ID: 2APXW-CELERO5GPLUS

with

Hardware Version: V1.0

Software Version: Celero5GPlus_0.01.03

Issued Date: 2023-05-11

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I22Z61533-WMD06	Rev.0	1st edition	2023-04-24
I22Z61533-WMD06	Rev.1	Removed A.8	2023-05-11

Note: the latest revision of the test report supersedes all previous version.

CONTENTS

1. TEST LABORATORY 4
1.1. INTRODUCTION & ACCREDITATION 4
1.2. TESTING LOCATION 4
1.3. TESTING ENVIRONMENT 5
1.4. PROJECT DATA 5
1.5. SIGNATURE 5
2. CLIENT INFORMATION 6
2.1. APPLICANT INFORMATION 6
2.2. MANUFACTURER INFORMATION 6
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) 7
3.1. ABOUT EUT 7
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST 7
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST 7
4. REFERENCE DOCUMENTS 8
4.1. DOCUMENTS SUPPLIED BY APPLICANT 8
4.2. REFERENCE DOCUMENTS FOR TESTING 8
5. SUMMARY OF TEST RESULT 9
6. TEST EQUIPMENT UTILIZED 11
ANNEX A: MEASUREMENT RESULTS 12
A.1 OUTPUT POWER 12
A.2 FREQUENCY STABILITY 24
A.3 OCCUPIED BANDWIDTH 26
A.4 EMISSION BANDWIDTH 30
A.5 BAND EDGE COMPLIANCE 34
A.6 CONDUCTED SPURIOUS EMISSION 47
A.7 PEAK-TO-AVERAGE POWER RATIO 49
ANNEX B: ACCREDITATION CERTIFICATE 50

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0 and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Location 1: CTTL (huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

1.3. Testing Environment

Normal Temperature: 15-35℃

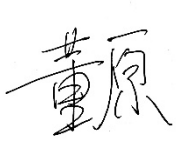
Relative Humidity: 20-75%

1.4. Project Data

Testing Start Date: 2023-04-10

Testing End Date: 2023-04-20

1.5. Signature



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2. Client Information

2.1. Applicant Information

Company Name:	Wingtech Group (Hong Kong) Limited
Address /Post:	Flat/RM 1802 18/F, Podium Plaza, 5 Hanoi Road, Tsim Sha Tsui, KL, HK
Contact:	sharui
Email:	sharui@wingtech.com
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2.2. Manufacturer Information

Company Name:	Wingtech Group (Hong Kong) Limited
Address /Post:	Flat/RM 1802 18/F, Podium Plaza, 5 Hanoi Road, Tsim Sha Tsui, KL, HK
Contact:	sharui
Email:	sharui@wingtech.com
Telephone:	+86-21-53529900

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	5G Mobile Phone
Model Name	Celero5G+
FCC ID	2APXW-CELERO5GPLUS
Antenna	Embedded
Output power	22.69dBm/10MHz maximum EIRP measured for n48
Extreme vol. Limits	3.6VDC to 4.2VDC (nominal: 3.85VDC)
Extreme temp. Tolerance	-10°C to +55°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL.

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version	Date of receipt
UT112a	869183060009887	V1.0	Celero5GPlus_0.01.03	2022-09-13

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery

AE1

Model	TM001
Manufacturer	Dongguan Veken Battery Co., Ltd.
Capacitance	5000mAh

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters are supplied by the customer, which are the bases of testing. CAICT is not responsible for the accuracy of customer supplied technical information that may affect the test results (for example, antenna gain and loss of customer supplied cable).

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 96	CITIZENS BROADBAND RADIO SERVICE	10-1-21 Edition
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
ANSI C63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
KDB 971168 D01	MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS	v03r01
KDB 940660 D01	CERTIFICATION AND TEST PROCEDURES FOR CITIZENS BROADBAND RADIO SERVICE DEVICES AUTHORIZED UNDER PART 96	v03

5. Summary Of Test Result

n48

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	96.41	P
2	Frequency Stability	2.1055	P
3	Occupied Bandwidth	2.1049	P
4	Emission Bandwidth	96.41	P
5	Band Edge Compliance	96.41	P
6	Conducted Spurious Emission	96.41	P
7	Peak-to-Average Power Ratio	96.41	P

Terms used in Verdict column

P	Pass. The EUT complies with the essential requirements in the standard.
NP	Not Performed. The test was not performed by CTTL.
NA	Not Applicable.The test was not applicable.
BR	Re-use test data from basic model report.
F	Fail. The EUT does not comply with the essential requirements in the standard.

All the test results are based on normal power.

n26_part90: 814MHz-824MHz

n26_part22: 814MHz-824MHz

n77L：3450MHz-3550MHz

n77H：3700MHz-3980MHz

n41, n77L and n77H are tested by power class 2.

n48 is tested by power class 3.

NR n25, n26 overlaps the entire frequency range of NR n2, n5. Therefore, test data provided in this report covers n2, n5 as well as n25, n26.

The Band n48 only has conducted emission limit according to Part 96.41. In this circumstances, the radiated emission tests are not applicable for this band.

Explanation of worst-case configuration
NR modulation: DFT-s-OFDM pi/2 BPSK; QPSK; 16QAM; 64QAM; 256QAM
CP-OFDM QPSK; 16QAM; 64QAM; 256QAM
NR BW: 5/10MHz for n26_Part90 and n30, 5/10/15MHz for n70, 20/30/40/50/60/80/90/100MHz for n41, 10/20/40MHz for n48, 20/30/40/60/80MHz for n77L, 20/30/40/60/80/100MHz for n77H and 5/10/15/20MHz for other NR bands.
The EUT supports n2, n5, n25, n26, n30, n41, n48, n66, n70, n71, n77L, n77H, B4/5/12/66-n2, B2/66-n5, B12/66-n25, B2/5/12/14/66-n30, B2/4/5/25/26/66-n41, B2/5/12-n66, B2/66-n71, B2/5/12/25/66-n77.
The test results provided in this report represent the worst case configuration.
For all the NSA cases, LTE Bands are set under the 10MHz bandwidth, middle channel, 50RB and QPSK modulation.
For all the NSA combinations and SA mode of the same NR band, output powers are pretested under the maximum bandwidth and mid channel so that the modes with the maximum output power values are chosen out ,which are n25, n26_Part90, n26_Part22, n30, n41, n48, n66, n70, n71, n77L and n77H. Only the results of the modes chosen by the max values are presented in the report. Then all the conducted test cases under the modes chosen out are performed.

The Equipment Under Test (EUT) is a Class 2 Permissive Change to Celero5G+(FCC ID: 2APXW-CELERO5GPLUS). n48 is performed on this device.
For detail differences between two models please refer the Declaration of Changes document.

6. Test Equipment Utilized

Description	Type	Series Number	Manufacture	Cal Due Date	Calibration Interval
Radio Communication Test Station	MT8000A	6262093285	Anritsu	2024-01-11	1 year
Radio Communication Analyzer	MT8821C	6201763159	Anritsu	2023-08-02	1 year
Signal&Spectrum Analyzer	FSW	104038	R&S	2023-06-20	1 year
PXA Signal Analyzer	N9030A	MY54490239	Keysight	2023-08-31	1 year
Climate chamber	SH-242	93008556	ESPEC	2023-12-23	3 years

Annex A: Measurement Results

A.1 Output Power

A.1.1 Summary

During the process of testing, the EUT was controlled via communication tester to ensure max power transmission and proper modulation.

In all cases, output power is within the specified limits.

A.1.2 Conducted

A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies (bottom, middle and top of operational frequency range) for each bandwidth.

The results below include a correction factor for cable loss that is provided by the customer.

A.1.2.2 Measurement Result

n48

BAND	BW(MHz)	SCS(kHz)	FREQ(MHz)	OFDM	MODULATION	RB LOCATION	POWER(dBm)
n48	10	30	3555	DFT	pi/2 BPSK	Inner_Full	22.32
n48	10	30	3555	DFT	pi/2 BPSK	Edge_1RB_Left	22.32
n48	10	30	3555	DFT	pi/2 BPSK	Edge_1RB_Right	22.10
n48	10	30	3555	DFT	pi/2 BPSK	Outer_Full	22.22
n48	10	30	3555	DFT	QPSK	Inner_Full	22.36
n48	10	30	3555	DFT	QPSK	Edge_1RB_Left	22.20
n48	10	30	3555	DFT	QPSK	Edge_1RB_Right	22.27
n48	10	30	3555	DFT	QPSK	Outer_Full	22.32
n48	10	30	3555	DFT	16QAM	Inner_Full	22.25
n48	10	30	3555	DFT	16QAM	Edge_1RB_Left	22.13
n48	10	30	3555	DFT	16QAM	Edge_1RB_Right	21.98
n48	10	30	3555	DFT	16QAM	Outer_Full	21.98
n48	10	30	3555	DFT	64QAM	Inner_Full	21.53
n48	10	30	3555	DFT	64QAM	Edge_1RB_Left	20.82
n48	10	30	3555	DFT	64QAM	Edge_1RB_Right	20.89
n48	10	30	3555	DFT	64QAM	Outer_Full	21.44
n48	10	30	3555	DFT	256QAM	Inner_Full	19.61
n48	10	30	3555	DFT	256QAM	Edge_1RB_Left	19.35
n48	10	30	3555	DFT	256QAM	Edge_1RB_Right	19.25
n48	10	30	3555	DFT	256QAM	Outer_Full	19.53
n48	10	30	3555	CP	QPSK	Inner_Full	22.20
n48	10	30	3555	CP	QPSK	Edge_1RB_Left	21.07
n48	10	30	3555	CP	QPSK	Edge_1RB_Right	20.87

n48	10	30	3555	CP	QPSK	Outer_Full	20.95
n48	10	30	3555	CP	16QAM	Inner_Full	22.11
n48	10	30	3555	CP	16QAM	Edge_1RB_Left	21.11
n48	10	30	3555	CP	16QAM	Edge_1RB_Right	20.74
n48	10	30	3555	CP	16QAM	Outer_Full	21.05
n48	10	30	3555	CP	64QAM	Inner_Full	20.54
n48	10	30	3555	CP	64QAM	Edge_1RB_Left	20.18
n48	10	30	3555	CP	64QAM	Edge_1RB_Right	19.76
n48	10	30	3555	CP	64QAM	Outer_Full	20.47
n48	10	30	3555	CP	256QAM	Inner_Full	17.42
n48	10	30	3555	CP	256QAM	Edge_1RB_Left	17.56
n48	10	30	3555	CP	256QAM	Edge_1RB_Right	17.34
n48	10	30	3555	CP	256QAM	Outer_Full	17.40
n48	10	30	3624.99	DFT	pi/2 BPSK	Inner_Full	22.82
n48	10	30	3624.99	DFT	pi/2 BPSK	Edge_1RB_Left	22.68
n48	10	30	3624.99	DFT	pi/2 BPSK	Edge_1RB_Right	22.95
n48	10	30	3624.99	DFT	pi/2 BPSK	Outer_Full	22.82
n48	10	30	3624.99	DFT	QPSK	Inner_Full	22.81
n48	10	30	3624.99	DFT	QPSK	Edge_1RB_Left	22.74
n48	10	30	3624.99	DFT	QPSK	Edge_1RB_Right	22.68
n48	10	30	3624.99	DFT	QPSK	Outer_Full	22.76
n48	10	30	3624.99	DFT	16QAM	Inner_Full	22.76
n48	10	30	3624.99	DFT	16QAM	Edge_1RB_Left	22.61
n48	10	30	3624.99	DFT	16QAM	Edge_1RB_Right	22.67
n48	10	30	3624.99	DFT	16QAM	Outer_Full	22.52
n48	10	30	3624.99	DFT	64QAM	Inner_Full	22.16
n48	10	30	3624.99	DFT	64QAM	Edge_1RB_Left	21.50
n48	10	30	3624.99	DFT	64QAM	Edge_1RB_Right	21.45
n48	10	30	3624.99	DFT	64QAM	Outer_Full	22.20
n48	10	30	3624.99	DFT	256QAM	Inner_Full	19.98
n48	10	30	3624.99	DFT	256QAM	Edge_1RB_Left	19.99
n48	10	30	3624.99	DFT	256QAM	Edge_1RB_Right	20.14
n48	10	30	3624.99	DFT	256QAM	Outer_Full	20.00
n48	10	30	3624.99	CP	QPSK	Inner_Full	22.85
n48	10	30	3624.99	CP	QPSK	Edge_1RB_Left	21.55
n48	10	30	3624.99	CP	QPSK	Edge_1RB_Right	21.53
n48	10	30	3624.99	CP	QPSK	Outer_Full	21.73
n48	10	30	3624.99	CP	16QAM	Inner_Full	22.68
n48	10	30	3624.99	CP	16QAM	Edge_1RB_Left	21.76
n48	10	30	3624.99	CP	16QAM	Edge_1RB_Right	21.73
n48	10	30	3624.99	CP	16QAM	Outer_Full	21.46

n48	10	30	3624.99	CP	64QAM	Inner_Full	21.20
n48	10	30	3624.99	CP	64QAM	Edge_1RB_Left	20.52
n48	10	30	3624.99	CP	64QAM	Edge_1RB_Right	20.67
n48	10	30	3624.99	CP	64QAM	Outer_Full	21.21
n48	10	30	3624.99	CP	256QAM	Inner_Full	18.21
n48	10	30	3624.99	CP	256QAM	Edge_1RB_Left	17.99
n48	10	30	3624.99	CP	256QAM	Edge_1RB_Right	17.94
n48	10	30	3624.99	CP	256QAM	Outer_Full	17.98
n48	10	30	3694.98	DFT	pi/2 BPSK	Inner_Full	22.29
n48	10	30	3694.98	DFT	pi/2 BPSK	Edge_1RB_Left	22.04
n48	10	30	3694.98	DFT	pi/2 BPSK	Edge_1RB_Right	22.26
n48	10	30	3694.98	DFT	pi/2 BPSK	Outer_Full	22.31
n48	10	30	3694.98	DFT	QPSK	Inner_Full	22.31
n48	10	30	3694.98	DFT	QPSK	Edge_1RB_Left	22.24
n48	10	30	3694.98	DFT	QPSK	Edge_1RB_Right	22.18
n48	10	30	3694.98	DFT	QPSK	Outer_Full	22.17
n48	10	30	3694.98	DFT	16QAM	Inner_Full	22.18
n48	10	30	3694.98	DFT	16QAM	Edge_1RB_Left	22.11
n48	10	30	3694.98	DFT	16QAM	Edge_1RB_Right	22.06
n48	10	30	3694.98	DFT	16QAM	Outer_Full	21.97
n48	10	30	3694.98	DFT	64QAM	Inner_Full	21.50
n48	10	30	3694.98	DFT	64QAM	Edge_1RB_Left	20.96
n48	10	30	3694.98	DFT	64QAM	Edge_1RB_Right	21.02
n48	10	30	3694.98	DFT	64QAM	Outer_Full	21.72
n48	10	30	3694.98	DFT	256QAM	Inner_Full	19.55
n48	10	30	3694.98	DFT	256QAM	Edge_1RB_Left	19.32
n48	10	30	3694.98	DFT	256QAM	Edge_1RB_Right	19.43
n48	10	30	3694.98	DFT	256QAM	Outer_Full	19.63
n48	10	30	3694.98	CP	QPSK	Inner_Full	22.17
n48	10	30	3694.98	CP	QPSK	Edge_1RB_Left	20.83
n48	10	30	3694.98	CP	QPSK	Edge_1RB_Right	21.03
n48	10	30	3694.98	CP	QPSK	Outer_Full	21.09
n48	10	30	3694.98	CP	16QAM	Inner_Full	21.98
n48	10	30	3694.98	CP	16QAM	Edge_1RB_Left	21.13
n48	10	30	3694.98	CP	16QAM	Edge_1RB_Right	21.06
n48	10	30	3694.98	CP	16QAM	Outer_Full	21.00
n48	10	30	3694.98	CP	64QAM	Inner_Full	20.69
n48	10	30	3694.98	CP	64QAM	Edge_1RB_Left	20.13
n48	10	30	3694.98	CP	64QAM	Edge_1RB_Right	20.16
n48	10	30	3694.98	CP	64QAM	Outer_Full	20.48
n48	10	30	3694.98	CP	256QAM	Inner_Full	17.68

n48	10	30	3694.98	CP	256QAM	Edge_1RB_Left	17.58
n48	10	30	3694.98	CP	256QAM	Edge_1RB_Right	17.36
n48	10	30	3694.98	CP	256QAM	Outer_Full	17.46
n48	20	30	3560.01	DFT	pi/2 BPSK	Inner_Full	22.33
n48	20	30	3560.01	DFT	pi/2 BPSK	Edge_1RB_Left	22.34
n48	20	30	3560.01	DFT	pi/2 BPSK	Edge_1RB_Right	22.28
n48	20	30	3560.01	DFT	pi/2 BPSK	Outer_Full	22.14
n48	20	30	3560.01	DFT	QPSK	Inner_Full	22.08
n48	20	30	3560.01	DFT	QPSK	Edge_1RB_Left	22.08
n48	20	30	3560.01	DFT	QPSK	Edge_1RB_Right	22.13
n48	20	30	3560.01	DFT	QPSK	Outer_Full	22.19
n48	20	30	3560.01	DFT	16QAM	Inner_Full	22.14
n48	20	30	3560.01	DFT	16QAM	Edge_1RB_Left	22.02
n48	20	30	3560.01	DFT	16QAM	Edge_1RB_Right	21.98
n48	20	30	3560.01	DFT	16QAM	Outer_Full	22.08
n48	20	30	3560.01	DFT	64QAM	Inner_Full	21.67
n48	20	30	3560.01	DFT	64QAM	Edge_1RB_Left	20.97
n48	20	30	3560.01	DFT	64QAM	Edge_1RB_Right	20.88
n48	20	30	3560.01	DFT	64QAM	Outer_Full	21.46
n48	20	30	3560.01	DFT	256QAM	Inner_Full	19.57
n48	20	30	3560.01	DFT	256QAM	Edge_1RB_Left	19.39
n48	20	30	3560.01	DFT	256QAM	Edge_1RB_Right	19.35
n48	20	30	3560.01	DFT	256QAM	Outer_Full	19.41
n48	20	30	3560.01	CP	QPSK	Inner_Full	22.12
n48	20	30	3560.01	CP	QPSK	Edge_1RB_Left	20.92
n48	20	30	3560.01	CP	QPSK	Edge_1RB_Right	21.15
n48	20	30	3560.01	CP	QPSK	Outer_Full	21.11
n48	20	30	3560.01	CP	16QAM	Inner_Full	21.94
n48	20	30	3560.01	CP	16QAM	Edge_1RB_Left	20.86
n48	20	30	3560.01	CP	16QAM	Edge_1RB_Right	20.92
n48	20	30	3560.01	CP	16QAM	Outer_Full	20.97
n48	20	30	3560.01	CP	64QAM	Inner_Full	20.66
n48	20	30	3560.01	CP	64QAM	Edge_1RB_Left	20.11
n48	20	30	3560.01	CP	64QAM	Edge_1RB_Right	20.11
n48	20	30	3560.01	CP	64QAM	Outer_Full	20.53
n48	20	30	3560.01	CP	256QAM	Inner_Full	17.71
n48	20	30	3560.01	CP	256QAM	Edge_1RB_Left	17.64
n48	20	30	3560.01	CP	256QAM	Edge_1RB_Right	17.48
n48	20	30	3560.01	CP	256QAM	Outer_Full	17.54
n48	20	30	3624.99	DFT	pi/2 BPSK	Inner_Full	22.81
n48	20	30	3624.99	DFT	pi/2 BPSK	Edge_1RB_Left	22.52

n48	20	30	3624.99	DFT	pi/2 BPSK	Edge_1RB_Right	22.59
n48	20	30	3624.99	DFT	pi/2 BPSK	Outer_Full	22.62
n48	20	30	3624.99	DFT	QPSK	Inner_Full	22.74
n48	20	30	3624.99	DFT	QPSK	Edge_1RB_Left	22.70
n48	20	30	3624.99	DFT	QPSK	Edge_1RB_Right	22.68
n48	20	30	3624.99	DFT	QPSK	Outer_Full	22.77
n48	20	30	3624.99	DFT	16QAM	Inner_Full	22.93
n48	20	30	3624.99	DFT	16QAM	Edge_1RB_Left	22.32
n48	20	30	3624.99	DFT	16QAM	Edge_1RB_Right	22.46
n48	20	30	3624.99	DFT	16QAM	Outer_Full	22.64
n48	20	30	3624.99	DFT	64QAM	Inner_Full	22.19
n48	20	30	3624.99	DFT	64QAM	Edge_1RB_Left	21.34
n48	20	30	3624.99	DFT	64QAM	Edge_1RB_Right	21.33
n48	20	30	3624.99	DFT	64QAM	Outer_Full	21.97
n48	20	30	3624.99	DFT	256QAM	Inner_Full	20.12
n48	20	30	3624.99	DFT	256QAM	Edge_1RB_Left	19.63
n48	20	30	3624.99	DFT	256QAM	Edge_1RB_Right	19.73
n48	20	30	3624.99	DFT	256QAM	Outer_Full	19.90
n48	20	30	3624.99	CP	QPSK	Inner_Full	22.63
n48	20	30	3624.99	CP	QPSK	Edge_1RB_Left	21.43
n48	20	30	3624.99	CP	QPSK	Edge_1RB_Right	21.47
n48	20	30	3624.99	CP	QPSK	Outer_Full	21.63
n48	20	30	3624.99	CP	16QAM	Inner_Full	22.62
n48	20	30	3624.99	CP	16QAM	Edge_1RB_Left	21.53
n48	20	30	3624.99	CP	16QAM	Edge_1RB_Right	21.44
n48	20	30	3624.99	CP	16QAM	Outer_Full	21.61
n48	20	30	3624.99	CP	64QAM	Inner_Full	21.15
n48	20	30	3624.99	CP	64QAM	Edge_1RB_Left	20.30
n48	20	30	3624.99	CP	64QAM	Edge_1RB_Right	20.73
n48	20	30	3624.99	CP	64QAM	Outer_Full	20.97
n48	20	30	3624.99	CP	256QAM	Inner_Full	18.10
n48	20	30	3624.99	CP	256QAM	Edge_1RB_Left	17.96
n48	20	30	3624.99	CP	256QAM	Edge_1RB_Right	18.01
n48	20	30	3624.99	CP	256QAM	Outer_Full	18.28
n48	20	30	3690	DFT	pi/2 BPSK	Inner_Full	21.98
n48	20	30	3690	DFT	pi/2 BPSK	Edge_1RB_Left	22.27
n48	20	30	3690	DFT	pi/2 BPSK	Edge_1RB_Right	21.87
n48	20	30	3690	DFT	pi/2 BPSK	Outer_Full	22.18
n48	20	30	3690	DFT	QPSK	Inner_Full	21.97
n48	20	30	3690	DFT	QPSK	Edge_1RB_Left	22.19
n48	20	30	3690	DFT	QPSK	Edge_1RB_Right	21.93

n48	20	30	3690	DFT	QPSK	Outer_Full	22.10
n48	20	30	3690	DFT	16QAM	Inner_Full	21.97
n48	20	30	3690	DFT	16QAM	Edge_1RB_Left	21.94
n48	20	30	3690	DFT	16QAM	Edge_1RB_Right	21.88
n48	20	30	3690	DFT	16QAM	Outer_Full	21.68
n48	20	30	3690	DFT	64QAM	Inner_Full	21.19
n48	20	30	3690	DFT	64QAM	Edge_1RB_Left	20.94
n48	20	30	3690	DFT	64QAM	Edge_1RB_Right	20.79
n48	20	30	3690	DFT	64QAM	Outer_Full	21.48
n48	20	30	3690	DFT	256QAM	Inner_Full	19.30
n48	20	30	3690	DFT	256QAM	Edge_1RB_Left	19.43
n48	20	30	3690	DFT	256QAM	Edge_1RB_Right	19.09
n48	20	30	3690	DFT	256QAM	Outer_Full	19.49
n48	20	30	3690	CP	QPSK	Inner_Full	22.01
n48	20	30	3690	CP	QPSK	Edge_1RB_Left	20.81
n48	20	30	3690	CP	QPSK	Edge_1RB_Right	20.77
n48	20	30	3690	CP	QPSK	Outer_Full	20.89
n48	20	30	3690	CP	16QAM	Inner_Full	21.96
n48	20	30	3690	CP	16QAM	Edge_1RB_Left	20.96
n48	20	30	3690	CP	16QAM	Edge_1RB_Right	20.60
n48	20	30	3690	CP	16QAM	Outer_Full	20.75
n48	20	30	3690	CP	64QAM	Inner_Full	20.30
n48	20	30	3690	CP	64QAM	Edge_1RB_Left	20.06
n48	20	30	3690	CP	64QAM	Edge_1RB_Right	19.74
n48	20	30	3690	CP	64QAM	Outer_Full	20.28
n48	20	30	3690	CP	256QAM	Inner_Full	17.49
n48	20	30	3690	CP	256QAM	Edge_1RB_Left	17.21
n48	20	30	3690	CP	256QAM	Edge_1RB_Right	17.19
n48	20	30	3690	CP	256QAM	Outer_Full	17.48
n48	40	30	3570	DFT	pi/2 BPSK	Inner_Full	22.48
n48	40	30	3570	DFT	pi/2 BPSK	Edge_1RB_Left	22.20
n48	40	30	3570	DFT	pi/2 BPSK	Edge_1RB_Right	22.38
n48	40	30	3570	DFT	pi/2 BPSK	Outer_Full	22.32
n48	40	30	3570	DFT	QPSK	Inner_Full	22.26
n48	40	30	3570	DFT	QPSK	Edge_1RB_Left	22.36
n48	40	30	3570	DFT	QPSK	Edge_1RB_Right	22.47
n48	40	30	3570	DFT	QPSK	Outer_Full	22.29
n48	40	30	3570	DFT	16QAM	Inner_Full	22.29
n48	40	30	3570	DFT	16QAM	Edge_1RB_Left	22.12
n48	40	30	3570	DFT	16QAM	Edge_1RB_Right	22.34
n48	40	30	3570	DFT	16QAM	Outer_Full	22.27

n48	40	30	3570	DFT	64QAM	Inner_Full	21.60
n48	40	30	3570	DFT	64QAM	Edge_1RB_Left	21.10
n48	40	30	3570	DFT	64QAM	Edge_1RB_Right	21.38
n48	40	30	3570	DFT	64QAM	Outer_Full	21.57
n48	40	30	3570	DFT	256QAM	Inner_Full	19.52
n48	40	30	3570	DFT	256QAM	Edge_1RB_Left	19.45
n48	40	30	3570	DFT	256QAM	Edge_1RB_Right	19.82
n48	40	30	3570	DFT	256QAM	Outer_Full	19.58
n48	40	30	3570	CP	QPSK	Inner_Full	22.46
n48	40	30	3570	CP	QPSK	Edge_1RB_Left	20.99
n48	40	30	3570	CP	QPSK	Edge_1RB_Right	21.36
n48	40	30	3570	CP	QPSK	Outer_Full	21.42
n48	40	30	3570	CP	16QAM	Inner_Full	22.16
n48	40	30	3570	CP	16QAM	Edge_1RB_Left	21.46
n48	40	30	3570	CP	16QAM	Edge_1RB_Right	21.19
n48	40	30	3570	CP	16QAM	Outer_Full	21.32
n48	40	30	3570	CP	64QAM	Inner_Full	20.81
n48	40	30	3570	CP	64QAM	Edge_1RB_Left	20.05
n48	40	30	3570	CP	64QAM	Edge_1RB_Right	20.10
n48	40	30	3570	CP	64QAM	Outer_Full	20.62
n48	40	30	3570	CP	256QAM	Inner_Full	17.58
n48	40	30	3570	CP	256QAM	Edge_1RB_Left	17.56
n48	40	30	3570	CP	256QAM	Edge_1RB_Right	17.60
n48	40	30	3570	CP	256QAM	Outer_Full	17.89
n48	40	30	3624.99	DFT	pi/2 BPSK	Inner_Full	22.68
n48	40	30	3624.99	DFT	pi/2 BPSK	Edge_1RB_Left	22.37
n48	40	30	3624.99	DFT	pi/2 BPSK	Edge_1RB_Right	22.34
n48	40	30	3624.99	DFT	pi/2 BPSK	Outer_Full	22.67
n48	40	30	3624.99	DFT	QPSK	Inner_Full	22.68
n48	40	30	3624.99	DFT	QPSK	Edge_1RB_Left	22.57
n48	40	30	3624.99	DFT	QPSK	Edge_1RB_Right	22.26
n48	40	30	3624.99	DFT	QPSK	Outer_Full	22.65
n48	40	30	3624.99	DFT	16QAM	Inner_Full	22.83
n48	40	30	3624.99	DFT	16QAM	Edge_1RB_Left	22.29
n48	40	30	3624.99	DFT	16QAM	Edge_1RB_Right	22.46
n48	40	30	3624.99	DFT	16QAM	Outer_Full	22.62
n48	40	30	3624.99	DFT	64QAM	Inner_Full	22.26
n48	40	30	3624.99	DFT	64QAM	Edge_1RB_Left	21.26
n48	40	30	3624.99	DFT	64QAM	Edge_1RB_Right	21.10
n48	40	30	3624.99	DFT	64QAM	Outer_Full	22.17
n48	40	30	3624.99	DFT	256QAM	Inner_Full	20.21

n48	40	30	3624.99	DFT	256QAM	Edge_1RB_Left	19.72
n48	40	30	3624.99	DFT	256QAM	Edge_1RB_Right	19.54
n48	40	30	3624.99	DFT	256QAM	Outer_Full	20.09
n48	40	30	3624.99	CP	QPSK	Inner_Full	22.86
n48	40	30	3624.99	CP	QPSK	Edge_1RB_Left	21.31
n48	40	30	3624.99	CP	QPSK	Edge_1RB_Right	21.22
n48	40	30	3624.99	CP	QPSK	Outer_Full	21.37
n48	40	30	3624.99	CP	16QAM	Inner_Full	22.52
n48	40	30	3624.99	CP	16QAM	Edge_1RB_Left	21.15
n48	40	30	3624.99	CP	16QAM	Edge_1RB_Right	21.34
n48	40	30	3624.99	CP	16QAM	Outer_Full	21.41
n48	40	30	3624.99	CP	64QAM	Inner_Full	21.07
n48	40	30	3624.99	CP	64QAM	Edge_1RB_Left	20.19
n48	40	30	3624.99	CP	64QAM	Edge_1RB_Right	20.24
n48	40	30	3624.99	CP	64QAM	Outer_Full	20.90
n48	40	30	3624.99	CP	256QAM	Inner_Full	18.28
n48	40	30	3624.99	CP	256QAM	Edge_1RB_Left	17.91
n48	40	30	3624.99	CP	256QAM	Edge_1RB_Right	17.93
n48	40	30	3624.99	CP	256QAM	Outer_Full	18.04
n48	40	30	3679.98	DFT	pi/2 BPSK	Inner_Full	22.12
n48	40	30	3679.98	DFT	pi/2 BPSK	Edge_1RB_Left	21.89
n48	40	30	3679.98	DFT	pi/2 BPSK	Edge_1RB_Right	22.44
n48	40	30	3679.98	DFT	pi/2 BPSK	Outer_Full	22.03
n48	40	30	3679.98	DFT	QPSK	Inner_Full	22.09
n48	40	30	3679.98	DFT	QPSK	Edge_1RB_Left	21.85
n48	40	30	3679.98	DFT	QPSK	Edge_1RB_Right	21.99
n48	40	30	3679.98	DFT	QPSK	Outer_Full	22.03
n48	40	30	3679.98	DFT	16QAM	Inner_Full	22.11
n48	40	30	3679.98	DFT	16QAM	Edge_1RB_Left	21.80
n48	40	30	3679.98	DFT	16QAM	Edge_1RB_Right	22.19
n48	40	30	3679.98	DFT	16QAM	Outer_Full	21.82
n48	40	30	3679.98	DFT	64QAM	Inner_Full	21.43
n48	40	30	3679.98	DFT	64QAM	Edge_1RB_Left	20.82
n48	40	30	3679.98	DFT	64QAM	Edge_1RB_Right	20.92
n48	40	30	3679.98	DFT	64QAM	Outer_Full	21.34
n48	40	30	3679.98	DFT	256QAM	Inner_Full	19.65
n48	40	30	3679.98	DFT	256QAM	Edge_1RB_Left	18.99
n48	40	30	3679.98	DFT	256QAM	Edge_1RB_Right	19.45
n48	40	30	3679.98	DFT	256QAM	Outer_Full	19.34
n48	40	30	3679.98	CP	QPSK	Inner_Full	22.35
n48	40	30	3679.98	CP	QPSK	Edge_1RB_Left	20.58

n48	40	30	3679.98	CP	QPSK	Edge_1RB_Right	20.89
n48	40	30	3679.98	CP	QPSK	Outer_Full	20.85
n48	40	30	3679.98	CP	16QAM	Inner_Full	21.97
n48	40	30	3679.98	CP	16QAM	Edge_1RB_Left	20.63
n48	40	30	3679.98	CP	16QAM	Edge_1RB_Right	21.00
n48	40	30	3679.98	CP	16QAM	Outer_Full	20.92
n48	40	30	3679.98	CP	64QAM	Inner_Full	20.45
n48	40	30	3679.98	CP	64QAM	Edge_1RB_Left	19.79
n48	40	30	3679.98	CP	64QAM	Edge_1RB_Right	19.97
n48	40	30	3679.98	CP	64QAM	Outer_Full	20.66
n48	40	30	3679.98	CP	256QAM	Inner_Full	17.51
n48	40	30	3679.98	CP	256QAM	Edge_1RB_Left	17.45
n48	40	30	3679.98	CP	256QAM	Edge_1RB_Right	17.49
n48	40	30	3679.98	CP	256QAM	Outer_Full	17.50

A.1.3 Radiated

A.1.3.1 Description

This is the test for the maximum radiated power from the EUT.

Part 96.41(b) states that the maximum effective isotropic radiated power (EIRP) and maximum Power Spectral Density (PSD) of any CBSD and End User Device must comply with the limit of 23 dBm/10 megahertz.

A.1.3.2 Method of Measurement

According to KDB 412172 D01 and ANSI C63.26 the relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

$$\mathbf{ERP\ or\ EIRP} = P_T + G_T - L_C$$

where;

- $\mathbf{ERP\ or\ EIRP}$ = effective radiated power or equivalent isotropically radiated power(expressed in the same units as P_T.
- $\mathbf{P_T}$ = transmitter output power, in this report the unit express as dBm;
- $\mathbf{G_T}$ = gain of the transmitting antenna, in dBd(ERP) or dBi(EIRP);
- $\mathbf{L_C}$ = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

Alternatively, the EIRP can be determined from Equation above and then converted to ERP based on the maximum antenna gain relationship by applying the following equation:

$$ERP = EIRP - 2.15dB$$

Note: The antenna gain information was provided by the client. The laboratory is not responsible for identifying its authenticity during the test.

A.1.3.3 Limits and Measurement Results

BAND	BW (MHz)	SCS (kHz)	FREQ (MHz)	OFDM	MODULATION	RB LOCATION	Conducted Power (dBm/10MHz)	EIRP (dBm/10MHz) (Gt-Lc=-0.3)	LIMIT (dBm/ 10MHz)	Margin
n48	10	30	3555	DFT	pi/2 BPSK	Inner_Full	22.21	21.91	23	1.09
n48	10	30	3624.99	DFT	pi/2 BPSK	Inner_Full	22.53	22.23	23	0.77
n48	10	30	3694.98	DFT	pi/2 BPSK	Inner_Full	22.32	22.02	23	0.98
n48	10	30	3555	DFT	QPSK	Inner_Full	22.27	21.97	23	1.03
n48	10	30	3624.99	DFT	QPSK	Inner_Full	22.99	22.69	23	0.31
n48	10	30	3694.98	DFT	QPSK	Inner_Full	22.30	22.00	23	1.00
n48	10	30	3555	DFT	16QAM	Inner_Full	22.14	21.84	23	1.16
n48	10	30	3624.99	DFT	16QAM	Inner_Full	22.89	22.59	23	0.41
n48	10	30	3694.98	DFT	16QAM	Inner_Full	22.26	21.96	23	1.04
n48	10	30	3555	DFT	64QAM	Inner_Full	21.41	21.11	23	1.89
n48	10	30	3624.99	DFT	64QAM	Inner_Full	22.22	21.92	23	1.08
n48	10	30	3694.98	DFT	64QAM	Inner_Full	21.53	21.23	23	1.77
n48	10	30	3555	DFT	256QAM	Inner_Full	19.31	19.01	23	3.99
n48	10	30	3624.99	DFT	256QAM	Inner_Full	20.16	19.86	23	3.14
n48	10	30	3694.98	DFT	256QAM	Inner_Full	19.49	19.19	23	3.81
n48	20	30	3560.01	DFT	pi/2 BPSK	Inner_Full	21.55	21.25	23	1.75
n48	20	30	3624.99	DFT	pi/2 BPSK	Inner_Full	22.32	22.02	23	0.98
n48	20	30	3690	DFT	pi/2 BPSK	Inner_Full	21.37	21.07	23	1.93
n48	20	30	3560.01	DFT	QPSK	Inner_Full	21.57	21.27	23	1.73
n48	20	30	3624.99	DFT	QPSK	Inner_Full	22.11	21.81	23	1.19
n48	20	30	3690	DFT	QPSK	Inner_Full	21.46	21.16	23	1.84
n48	20	30	3560.01	DFT	16QAM	Inner_Full	21.58	21.28	23	1.72
n48	20	30	3624.99	DFT	16QAM	Inner_Full	22.23	21.93	23	1.07
n48	20	30	3690	DFT	16QAM	Inner_Full	21.38	21.08	23	1.92
n48	20	30	3560.01	DFT	64QAM	Inner_Full	20.93	20.63	23	2.37
n48	20	30	3624.99	DFT	64QAM	Inner_Full	21.48	21.18	23	1.82
n48	20	30	3690	DFT	64QAM	Inner_Full	20.75	20.45	23	2.55
n48	20	30	3560.01	DFT	256QAM	Inner_Full	18.82	18.52	23	4.48
n48	20	30	3624.99	DFT	256QAM	Inner_Full	19.48	19.18	23	3.82
n48	20	30	3690	DFT	256QAM	Inner_Full	18.67	18.37	23	4.63
n48	40	30	3570	DFT	pi/2 BPSK	Inner_Full	19.81	19.51	23	3.49
n48	40	30	3624.99	DFT	pi/2 BPSK	Inner_Full	20.57	20.27	23	2.73
n48	40	30	3679.98	DFT	pi/2 BPSK	Inner_Full	19.41	19.11	23	3.89
n48	40	30	3570	DFT	QPSK	Inner_Full	19.71	19.41	23	3.59
n48	40	30	3624.99	DFT	QPSK	Inner_Full	20.52	20.22	23	2.78
n48	40	30	3679.98	DFT	QPSK	Inner_Full	19.41	19.11	23	3.89
n48	40	30	3570	DFT	16QAM	Inner_Full	19.83	19.53	23	3.47
n48	40	30	3624.99	DFT	16QAM	Inner_Full	20.53	20.23	23	2.77

n48	40	30	3679.98	DFT	16QAM	Inner_Full	19.25	18.95	23	4.05
n48	40	30	3570	DFT	64QAM	Inner_Full	19.11	18.81	23	4.19
n48	40	30	3624.99	DFT	64QAM	Inner_Full	19.84	19.54	23	3.46
n48	40	30	3679.98	DFT	64QAM	Inner_Full	18.71	18.41	23	4.59
n48	40	30	3570	DFT	256QAM	Inner_Full	17.29	16.99	23	6.01
n48	40	30	3624.99	DFT	256QAM	Inner_Full	17.93	17.63	23	5.37
n48	40	30	3679.98	DFT	256QAM	Inner_Full	16.63	16.33	23	6.67

Note: The maximum value of expanded measurement uncertainty for this test item is U = 0.764 dB, k = 2.

A.2 Frequency Stability

A.2.1 Method of Measurement

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage. Two reference points are established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and highest channel of operation shall be identified as F_L and F_H respectively.

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of MT8000A.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30℃.
3. With the EUT, powered via nominal voltage, connected to the MT8000A, and in a simulated call on middle channel for each NR band, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the MT8000A and in a simulated call on the center channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 ℃ decrements from +50℃ to -30℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of the lower, higher and nominal voltage. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

A.2.2 Measurement results

n48

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.85	3550.800	3697.040	5.10	0.0014
50				-4.50	0.0012
40				-12.30	0.0034
30				-4.10	0.0011
10				6.10	0.0017
0				-5.10	0.0014
-10				2.50	0.0007
-20				0.80	0.0002
-30					

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	3550.800	3697.040	8.70	0.0024
4.2				14.40	0.0040

Note: The maximum value of expanded measurement uncertainty for this test item is U = 0.047k Hz, k = 2.

A.3 Occupied Bandwidth

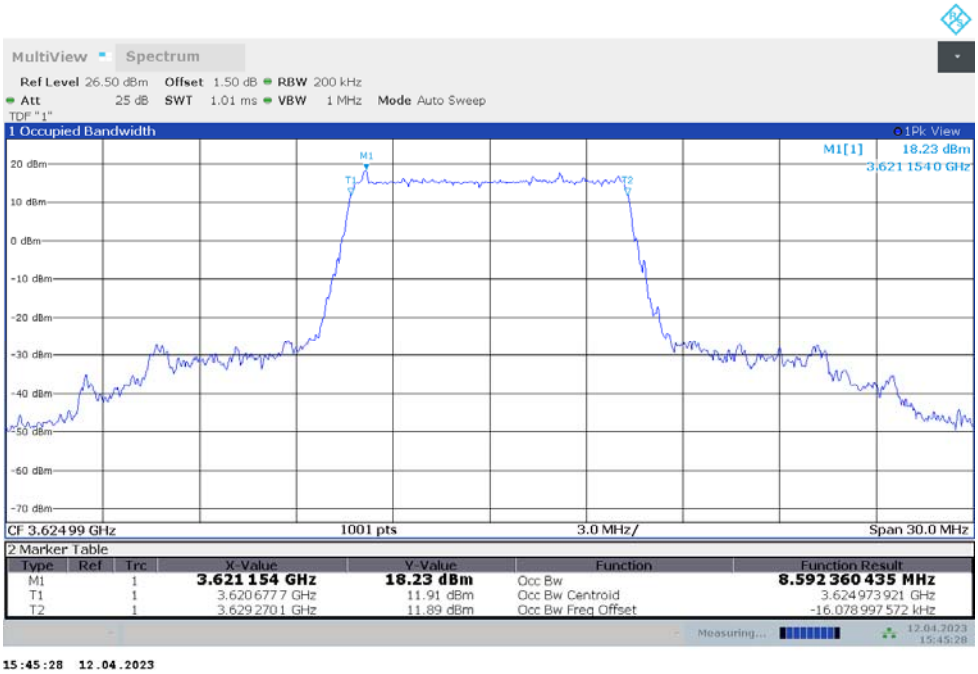
Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the mid frequencies frequency. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.
The measurement method is from ANSI C63.26:
a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts.
b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
d) Set the detection mode to peak, and the trace mode to max-hold.

n48

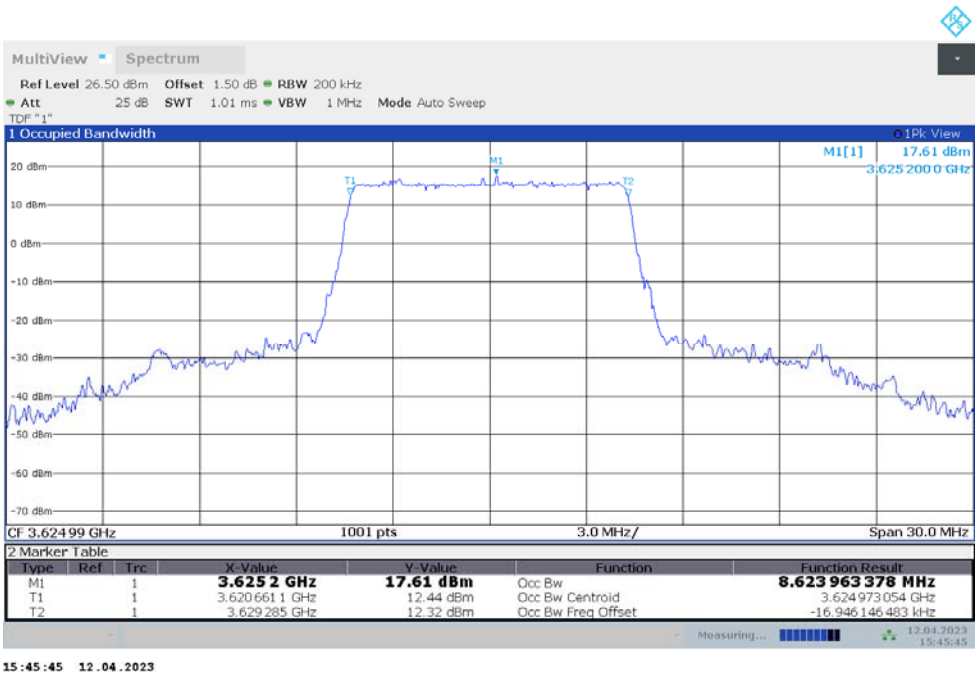
n48,10MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3624.99	8.592	8.624

n48,10MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)



n48,10MHz Bandwidth,DFT-s-QPSK (99% BW)

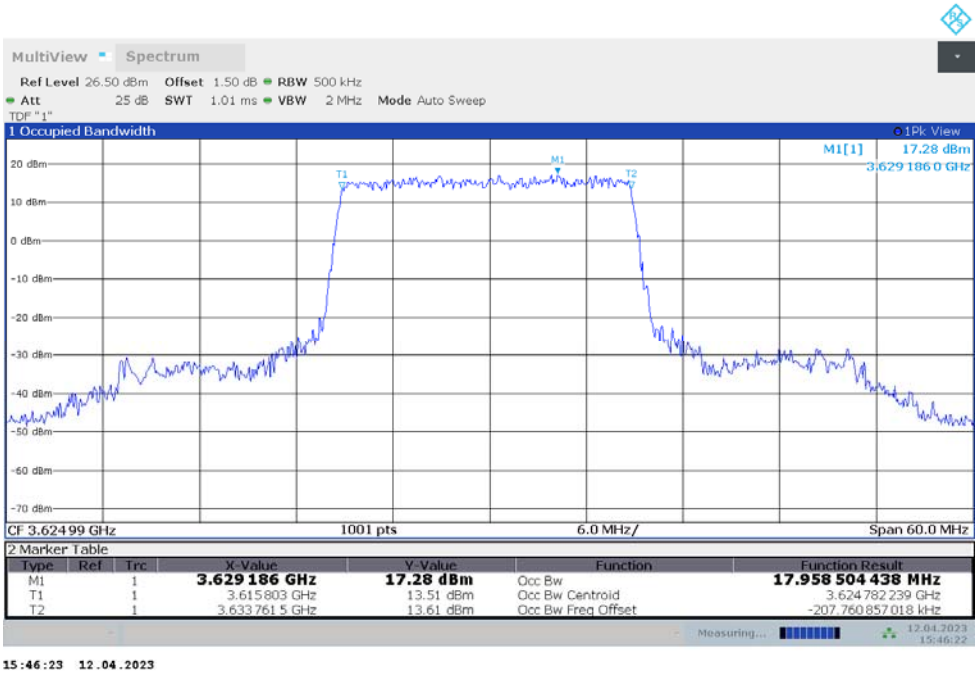


n48

n48,20MHz(99%)

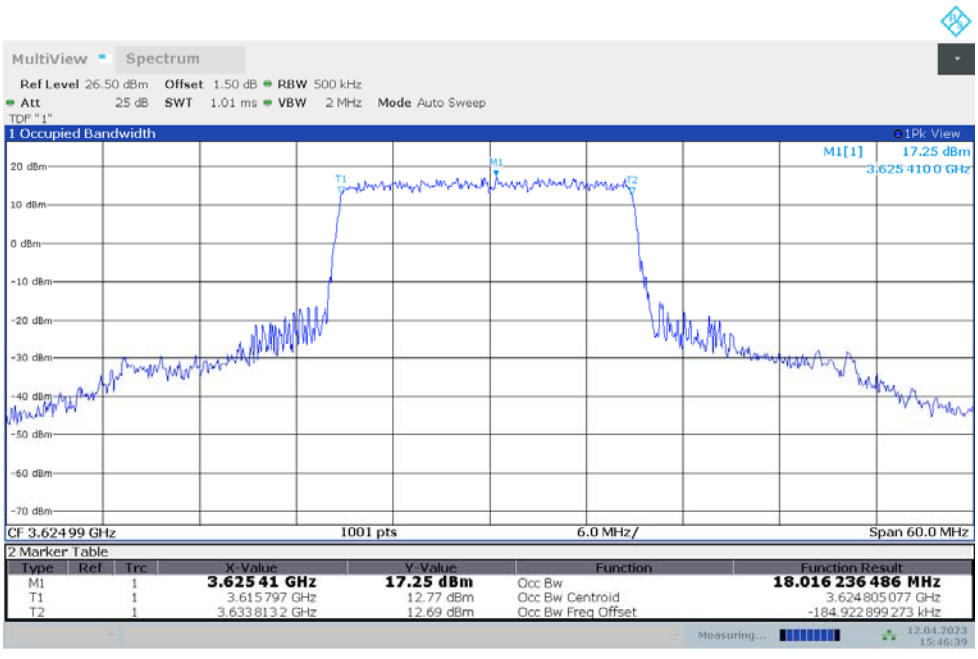
Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3624.99	17.959	18.016

n48,20MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)



15:46:23 12.04.2023

n48,20MHz Bandwidth,DFT-s-QPSK (99% BW)



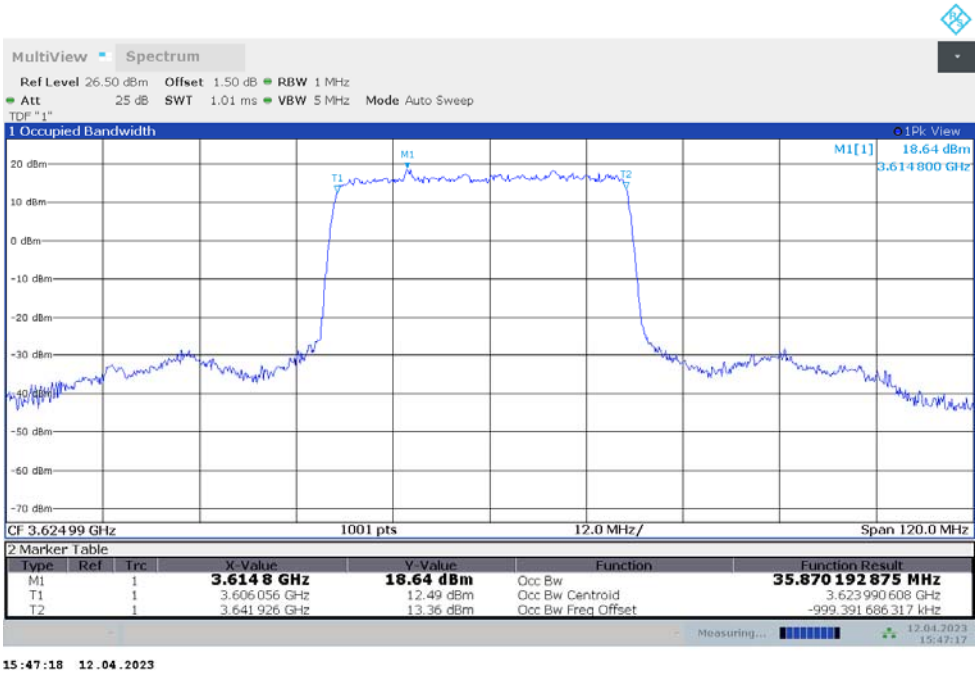
15:46:40 12.04.2023

n48

n48,40MHz(99%)

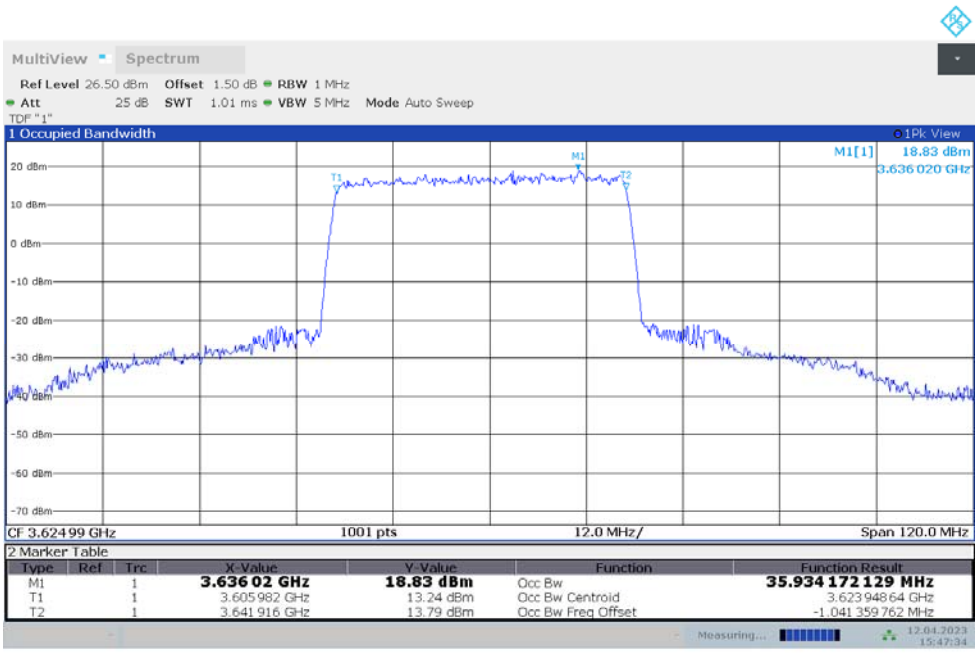
Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3624.99	35.870	35.934

n48,40MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)



15:47:18 12.04.2023

n48,40MHz Bandwidth,DFT-s-QPSK (99% BW)



15:47:34 12.04.2023

Note: The maximum value of expanded measurement uncertainty for this test item is U = 0.626 kHz, k = 2.

A.4 Emission Bandwidth

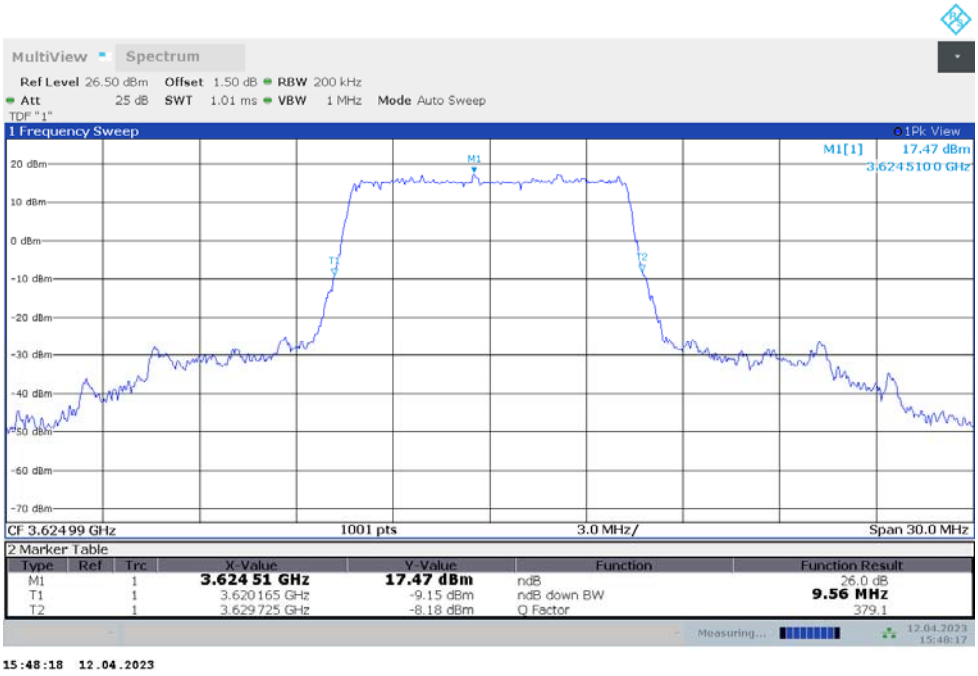
The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.
The measurement method is from ANSI C63.26:
a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “−X dB” requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.

n48

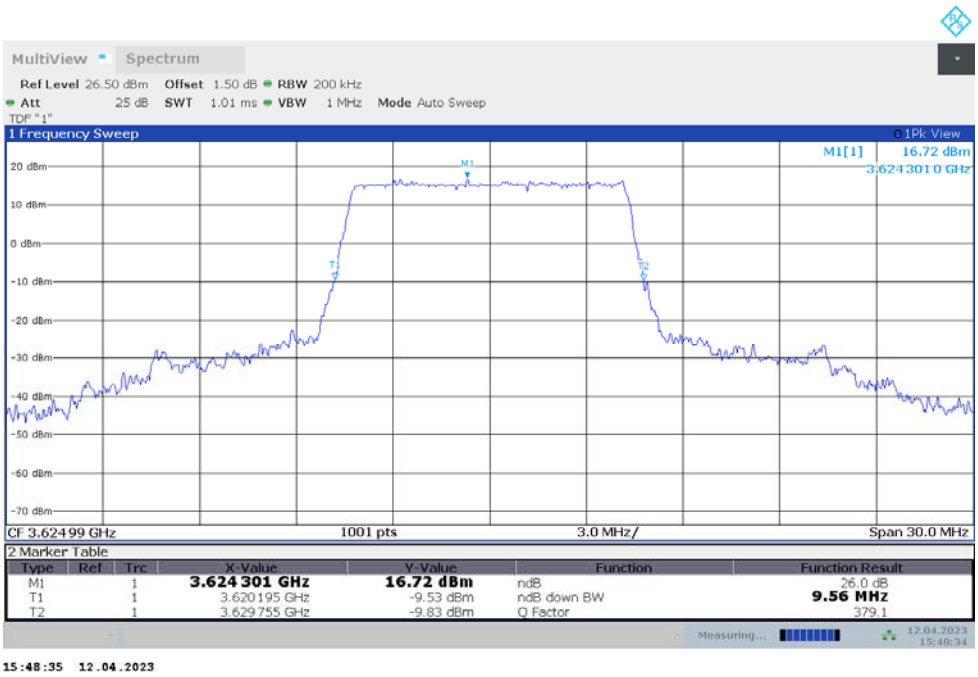
n48,10MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3624.99	9.560	9.560

n48,10MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n48,10MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

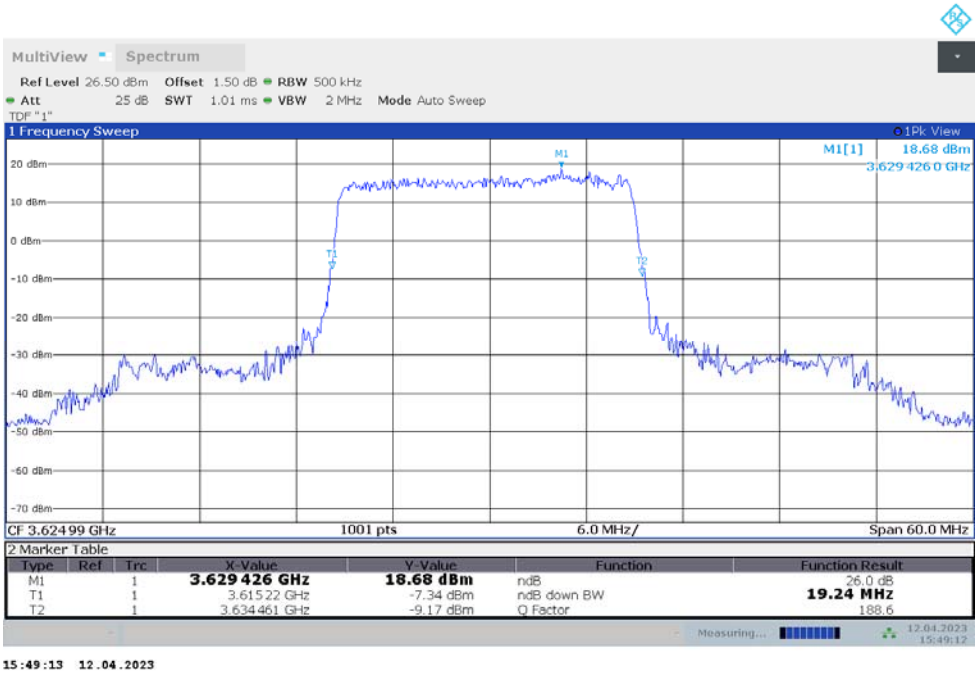


n48

n48,20MHz(-26dBc)

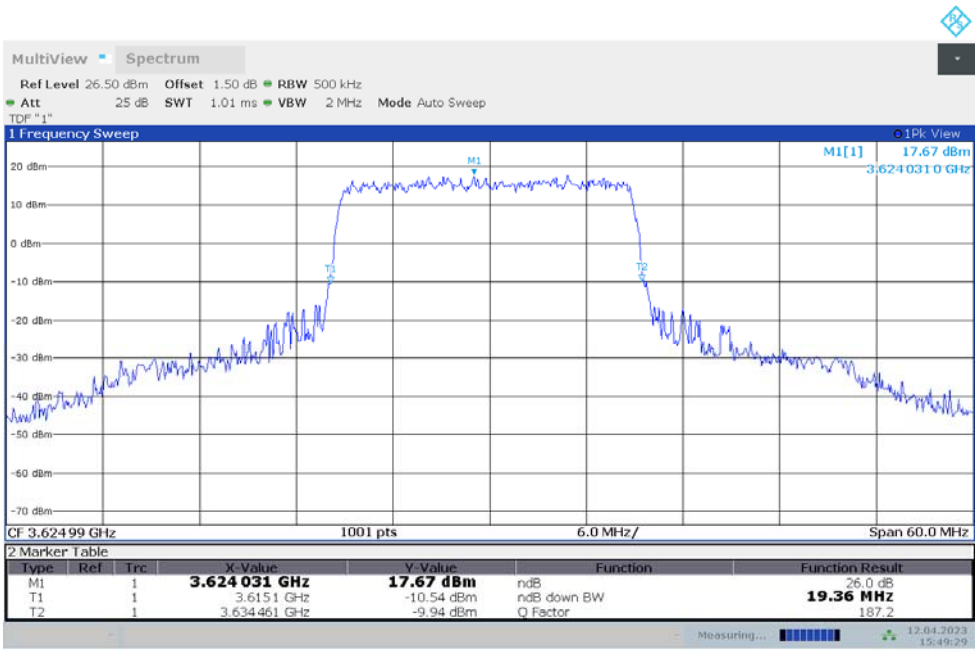
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3624.99	19.241	19.361

n48,20MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



15:49:13 12.04.2023

n48,20MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



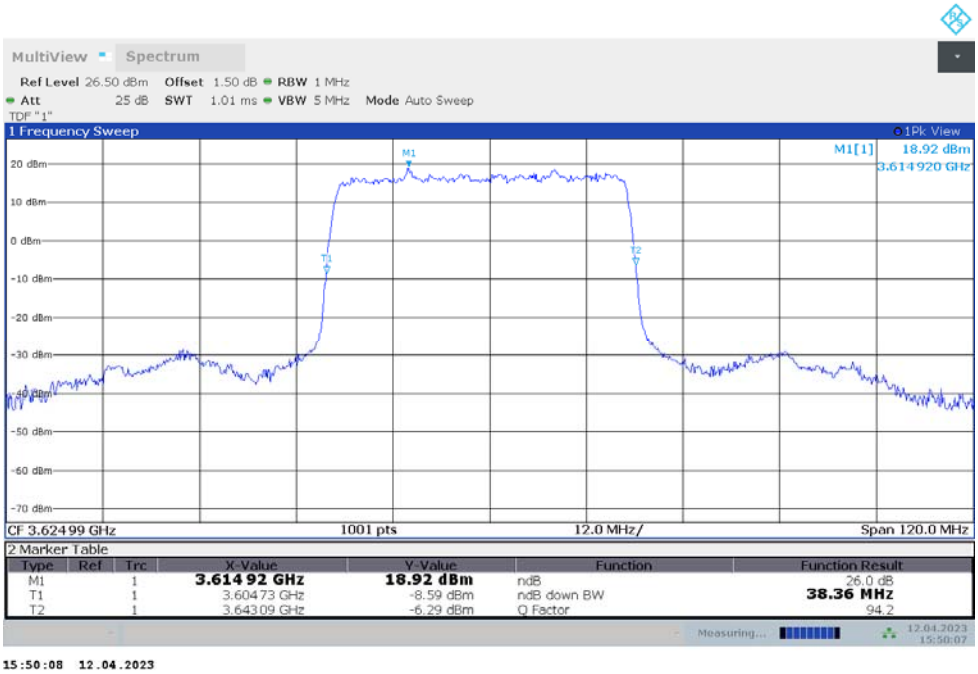
15:49:29 12.04.2023

n48

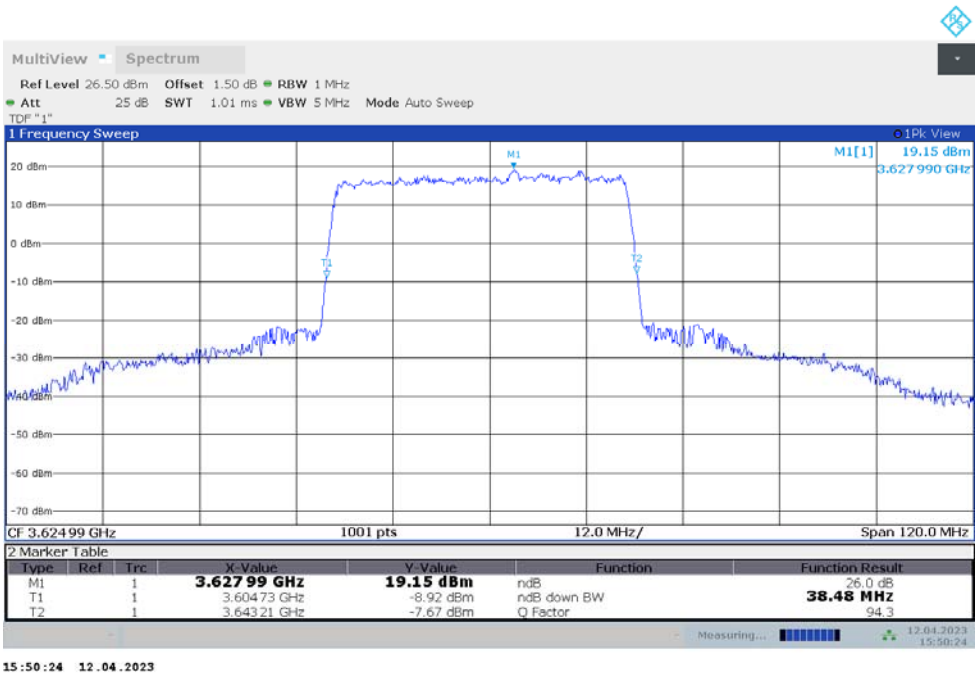
n48,40MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
3624.99	38.360	38.480

n48,40MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



n48,40MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



Note: The maximum value of expanded measurement uncertainty for this test item is U = 0.626 kHz, k = 2.

A.5 Band Edge Compliance

A.5.1 Measurement limit

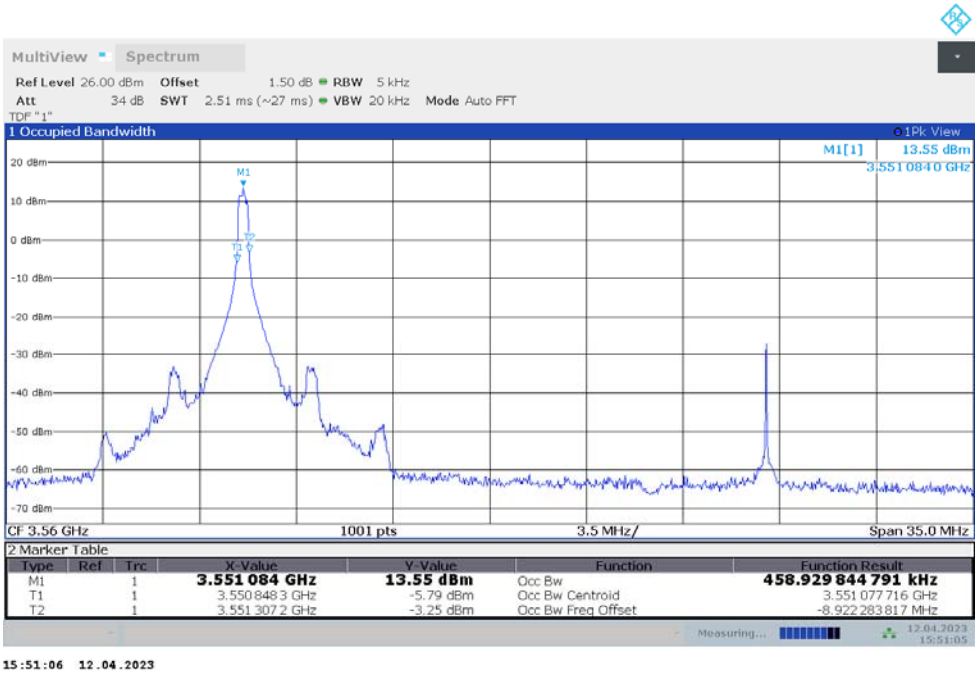
Part 96.41(e) states for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed −13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed −25 dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

The spectrum analyzer readings are corrected by [10 log (1/duty cycle)] for the non-continuous transmitting scenario.

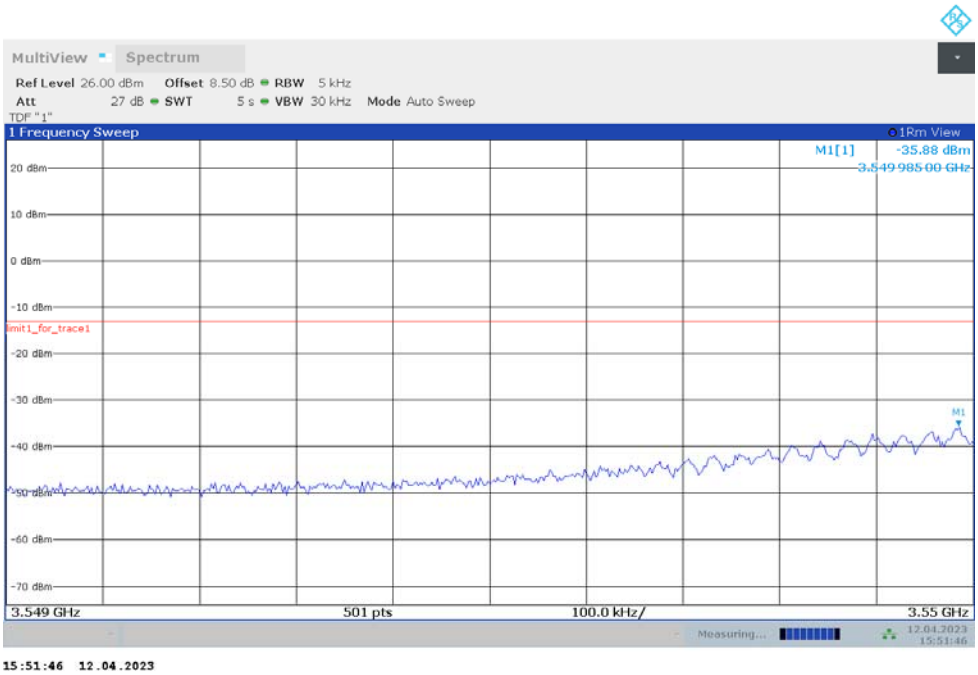
A.5.2 Measurement result

NR n48

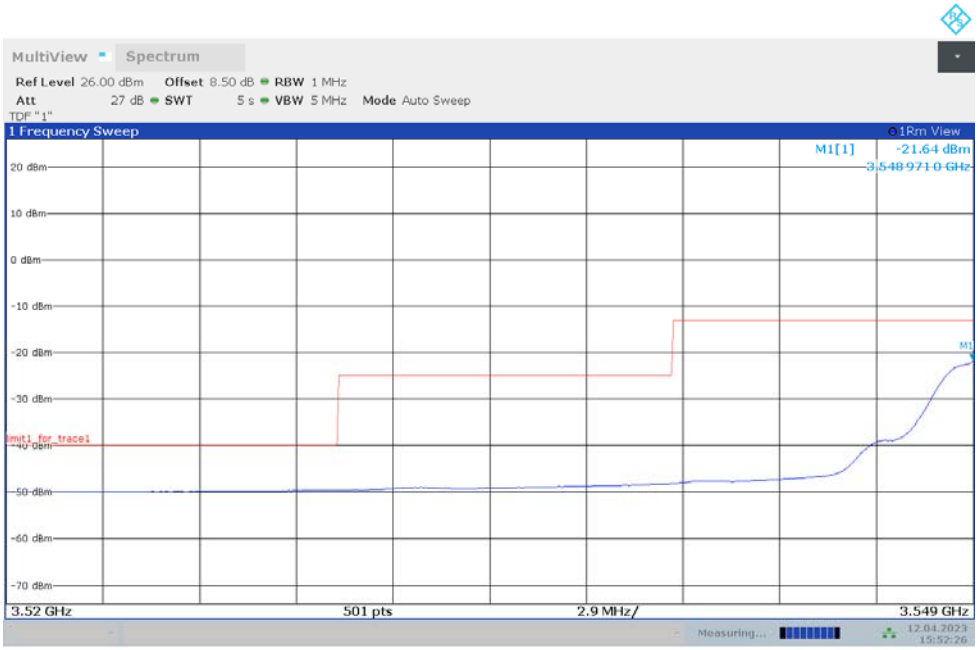
OBW: 1RB-LOW_offset



LOW BAND EDGE BLOCK-1RB-LOW_offset



LOW BAND EDGE BLOCK-1RB-LOW_offset



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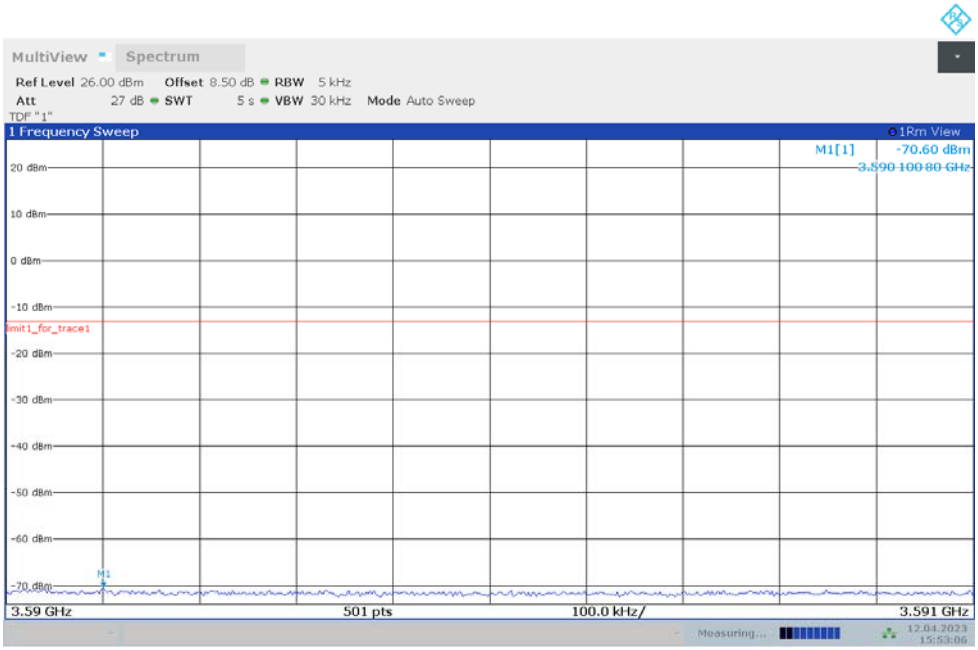
LOW BAND EDGE BLOCK-1RB-LOW_offset



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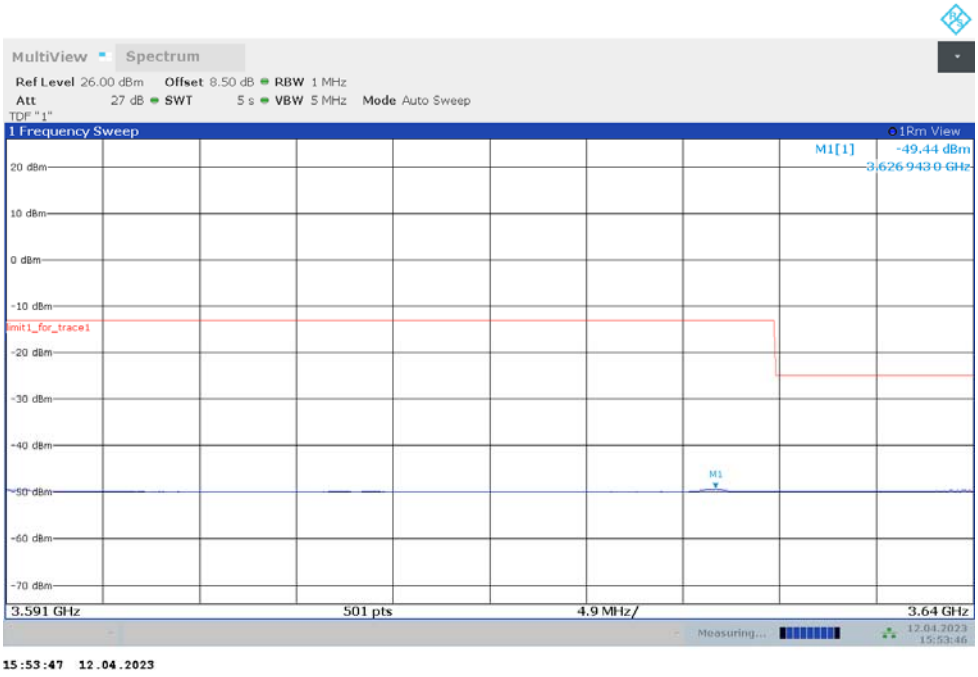
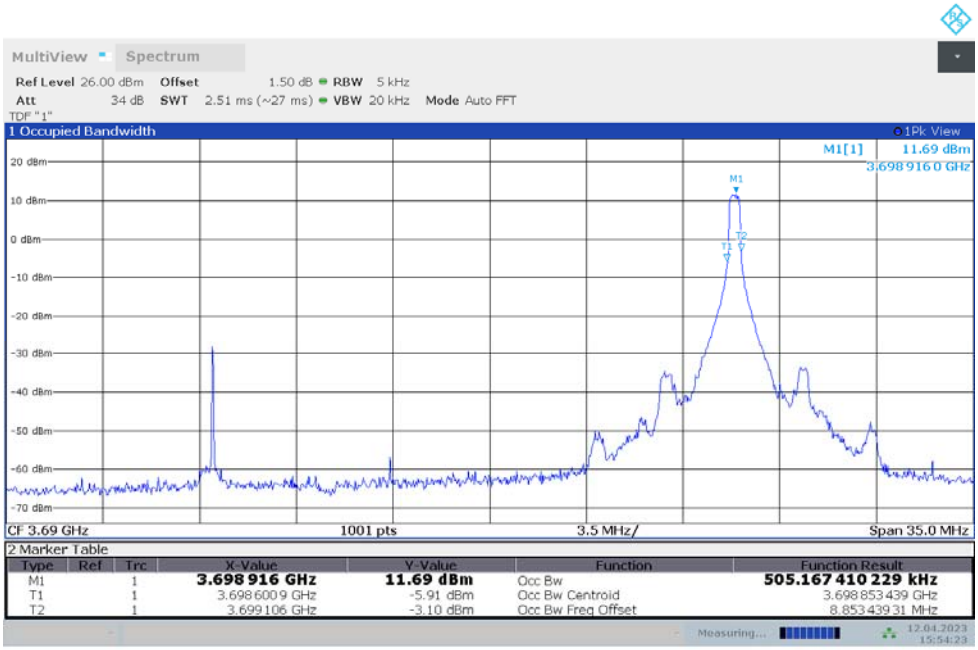
LOW BAND EDGE BLOCK-1RB-LOW_offset

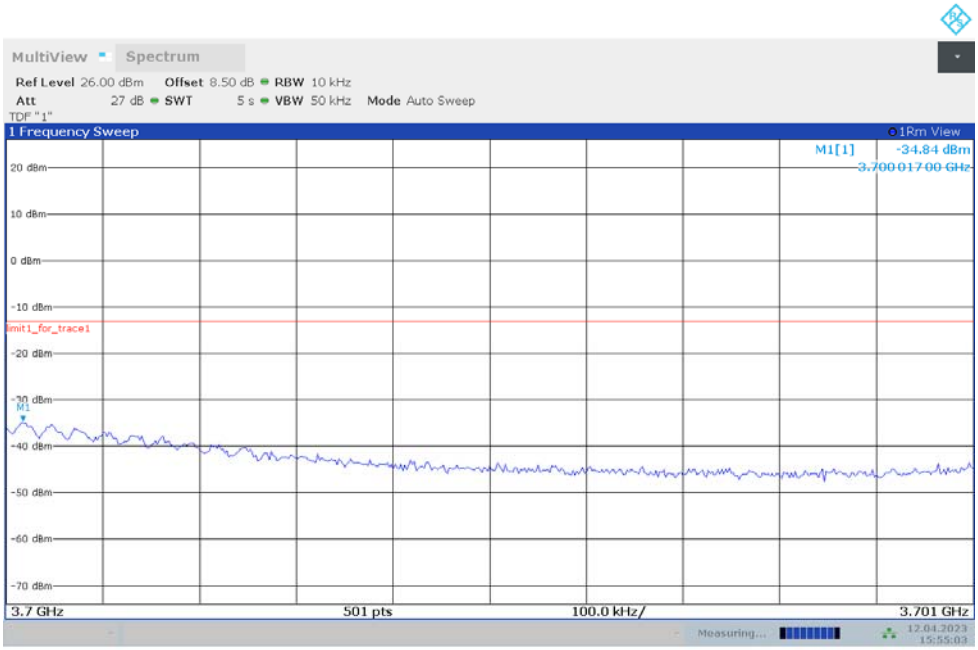


OBW: 1RB-HIGH_offset



15:54:23 12.04.2023

HIGH BAND EDGE BLOCK-1RB-HIGH_offset



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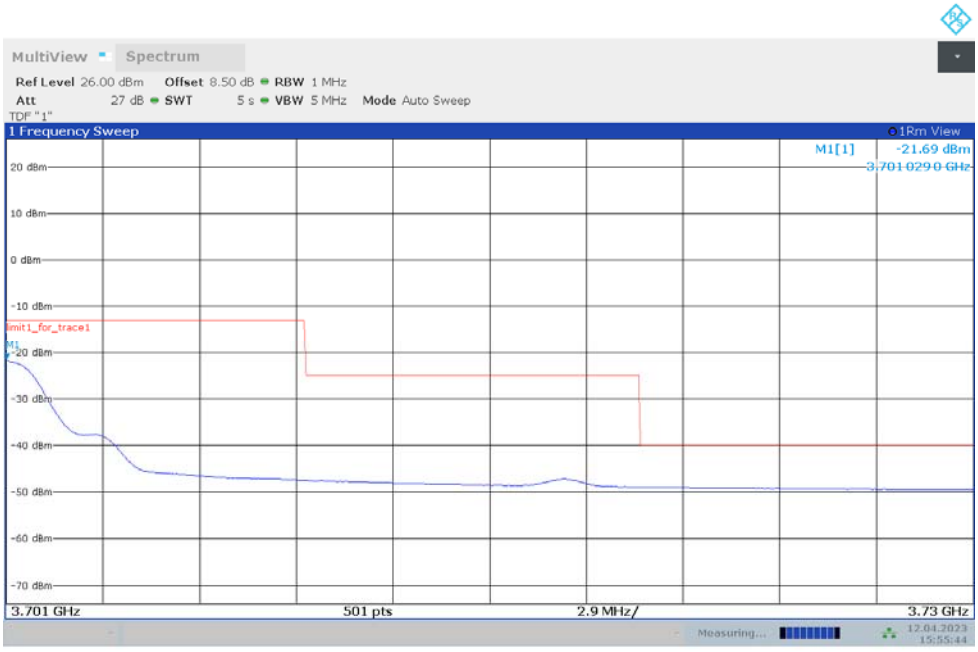
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



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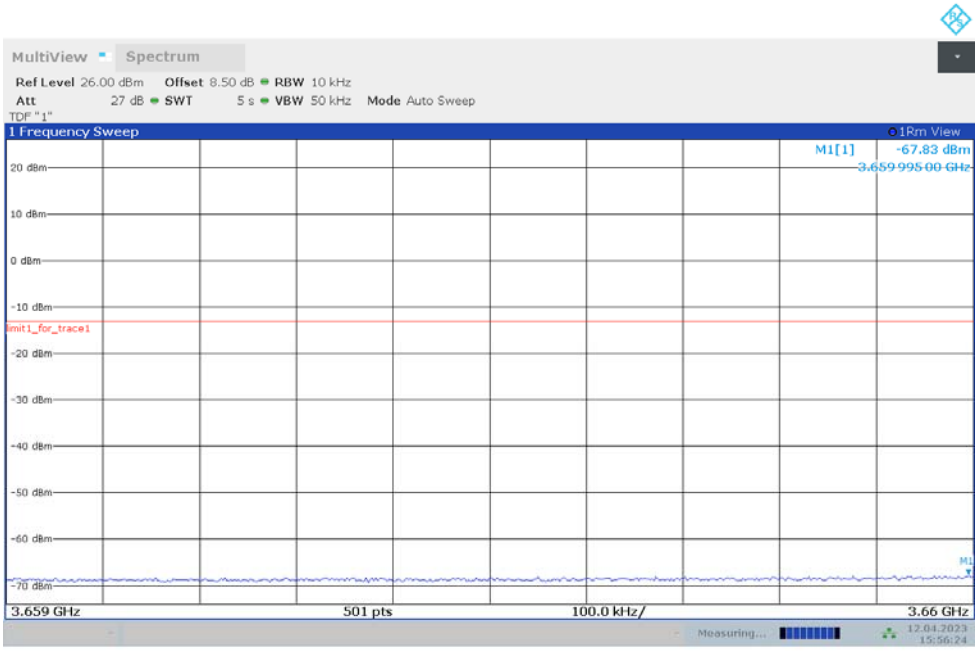

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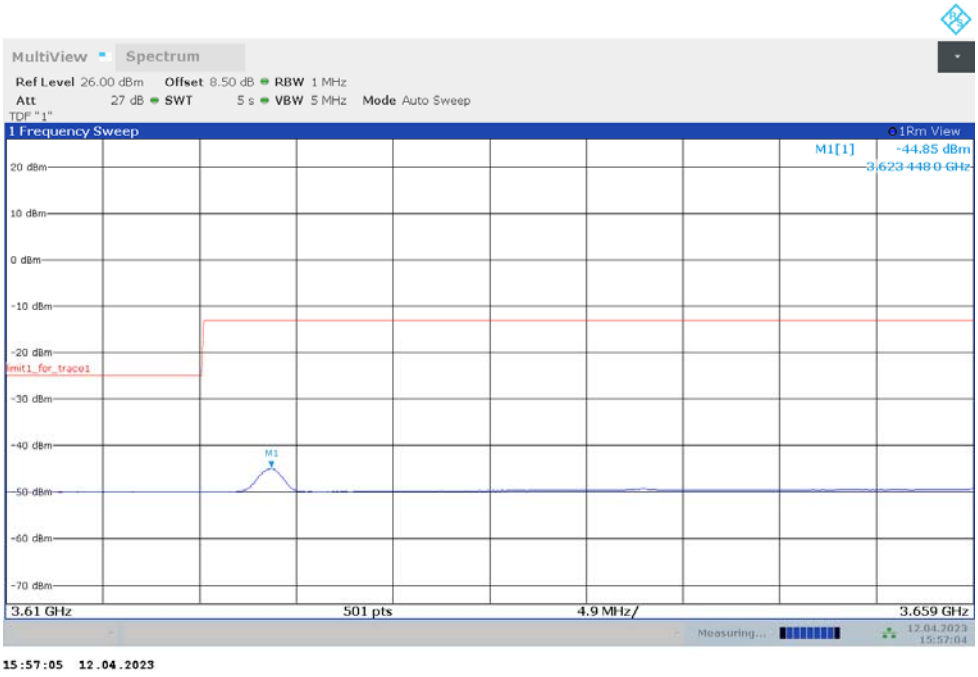
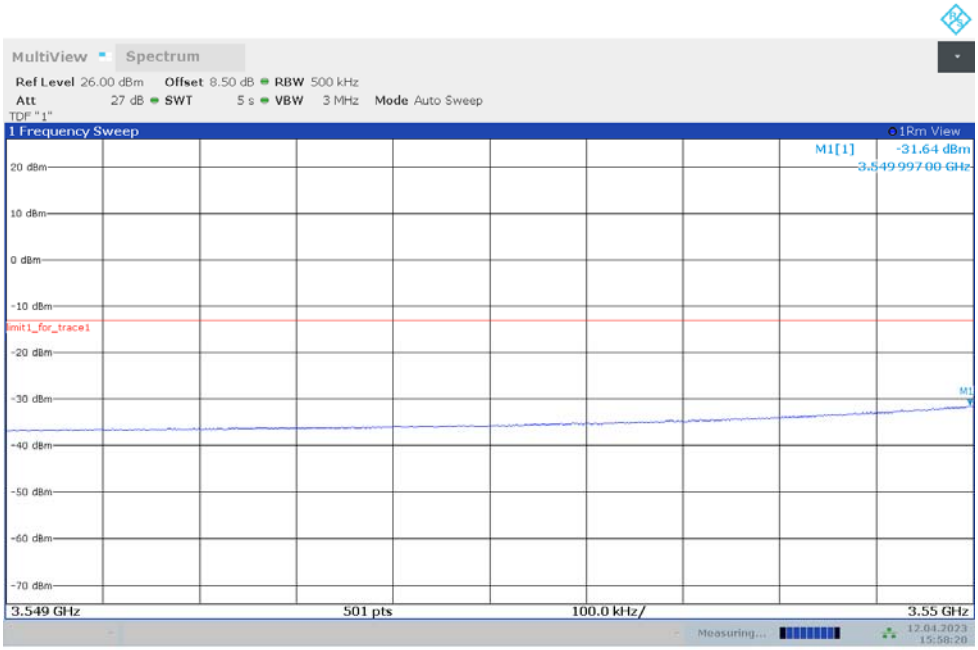
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



LOW BAND EDGE BLOCK-40M-100%RB



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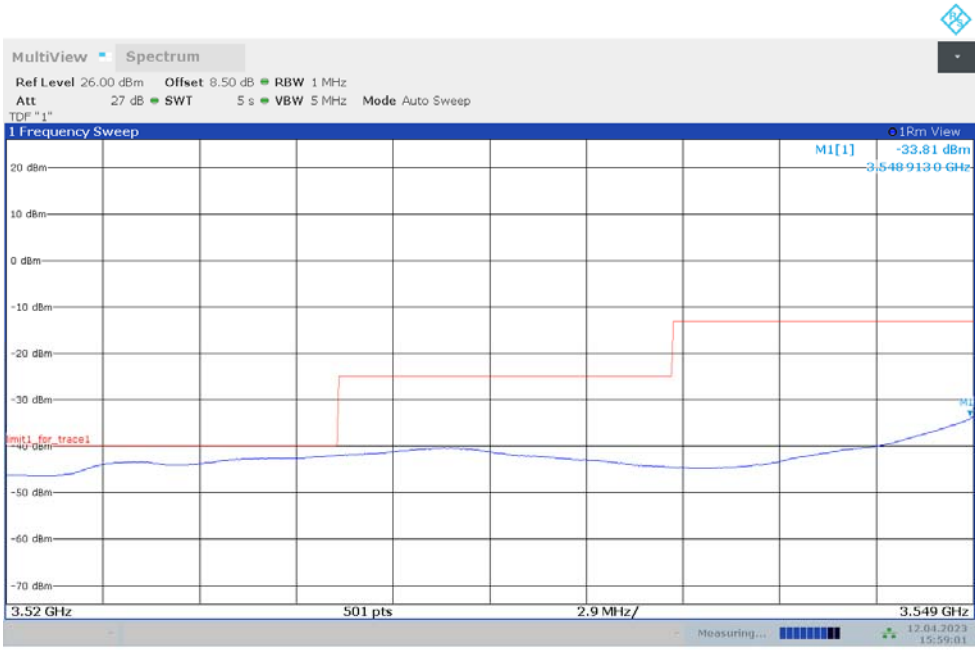
LOW BAND EDGE BLOCK-40M-100%RB



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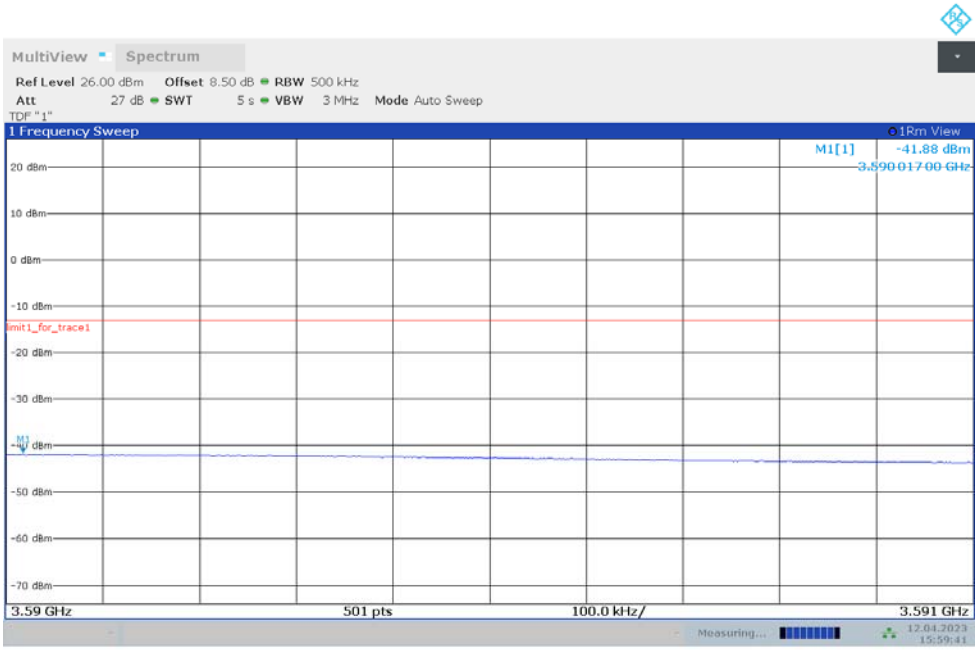
LOW BAND EDGE BLOCK-40M-100%RB



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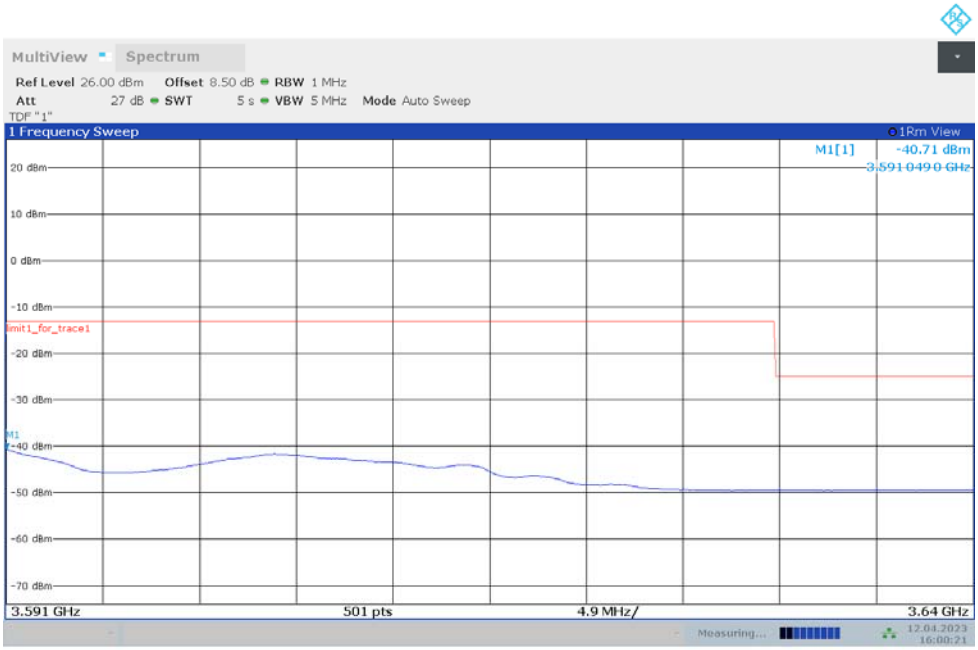
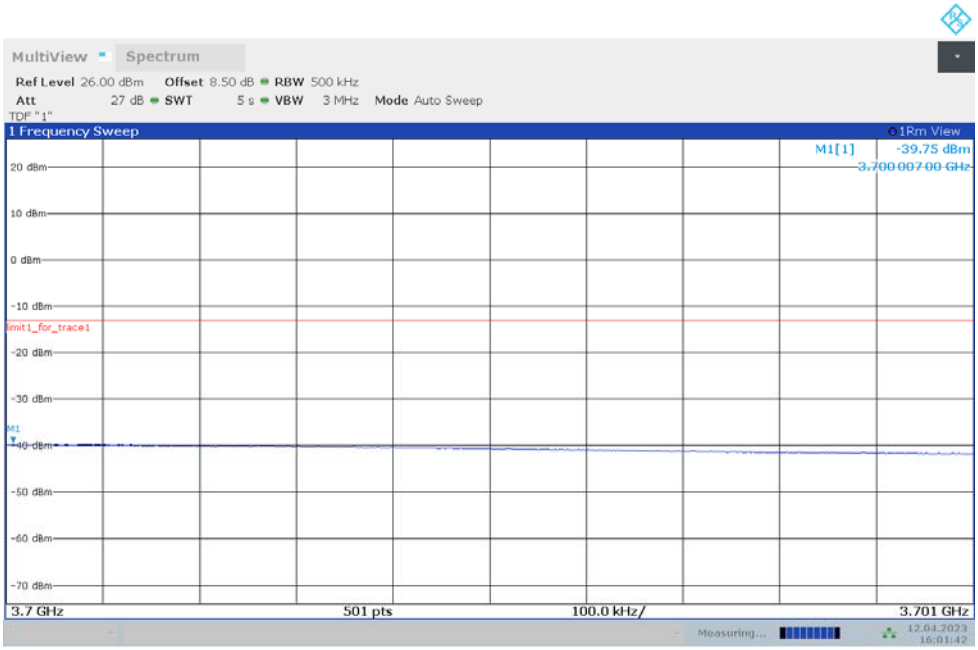
LOW BAND EDGE BLOCK-40M-100%RB



16:00:21 12.04.2023

ACLR

HIGH BAND EDGE BLOCK-40M-100%RB



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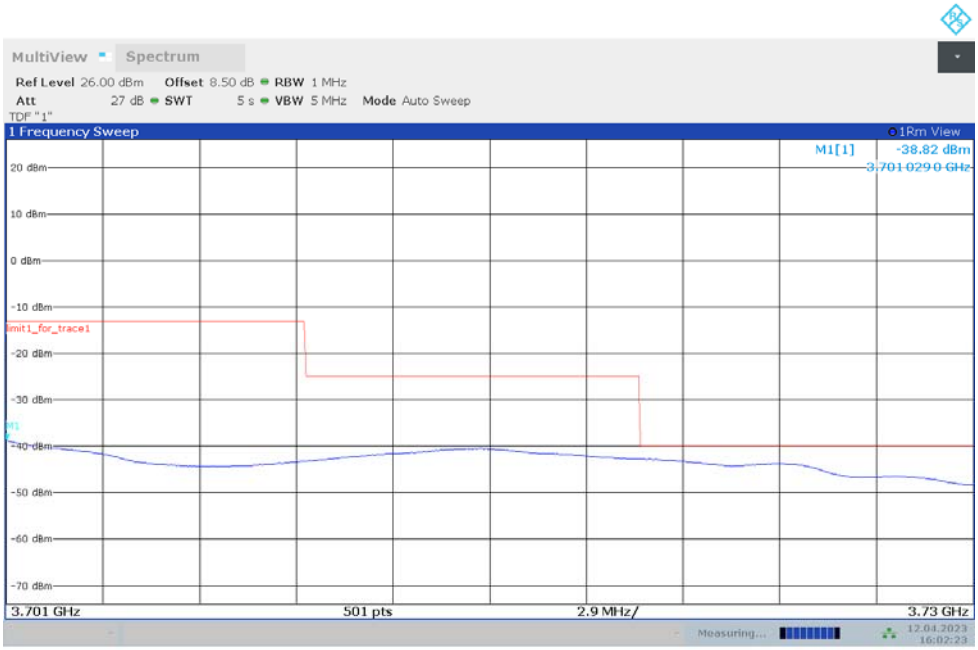
HIGH BAND EDGE BLOCK-40M-100%RB



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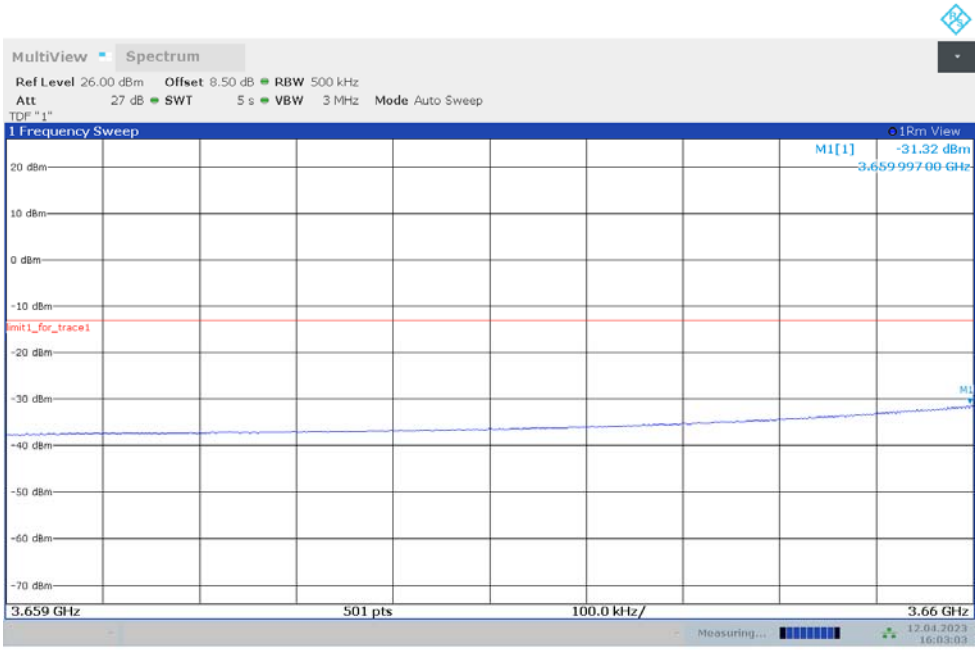
HIGH BAND EDGE BLOCK-40M-100%RB



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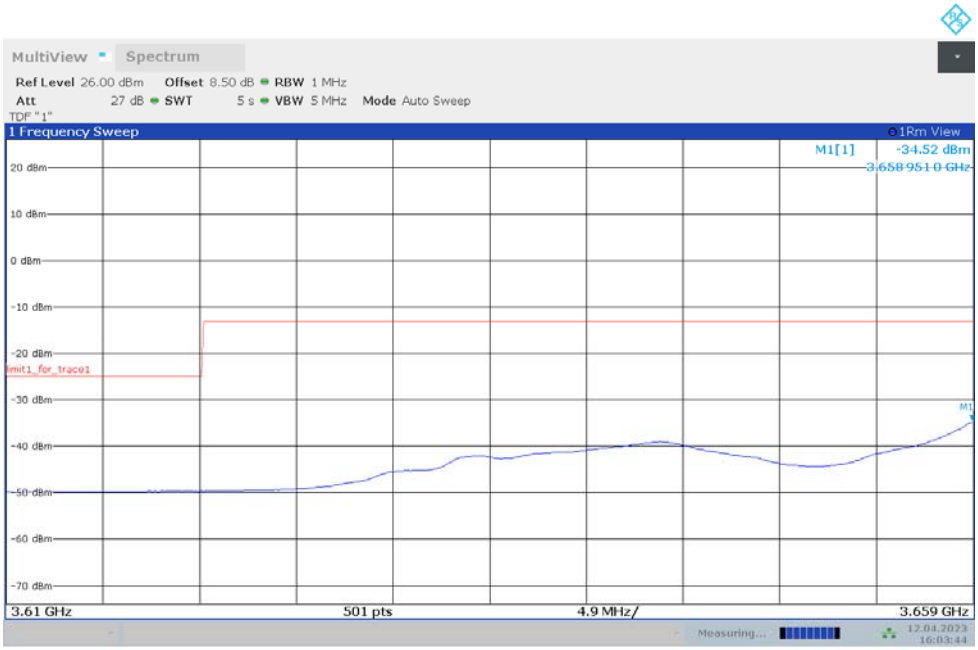
HIGH BAND EDGE BLOCK-40M-100%RB



16:03:44 12.04.2023

ACLR

Note: The maximum value of expanded measurement uncertainty for this test item is U = 0.626 kHz, k = 2.

A.6 Conducted Spurious Emission

A.6.1 Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency given below:
   (a) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
   (b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3. The number of sweep points of spectrum analyzer is greater than 2×span/RBW.

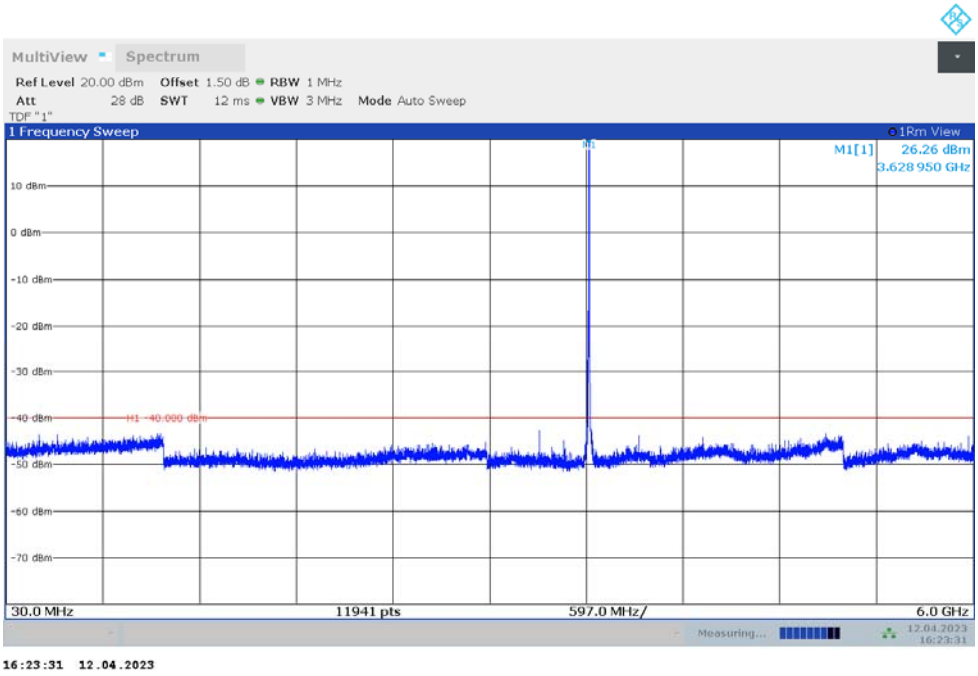
A.6.2 Measurement Limit

Part 96.41(e) states for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed −13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed −25 dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

A.6.3 Measurement result

n48

NOTE: peak above the limit line is the carrier frequency.



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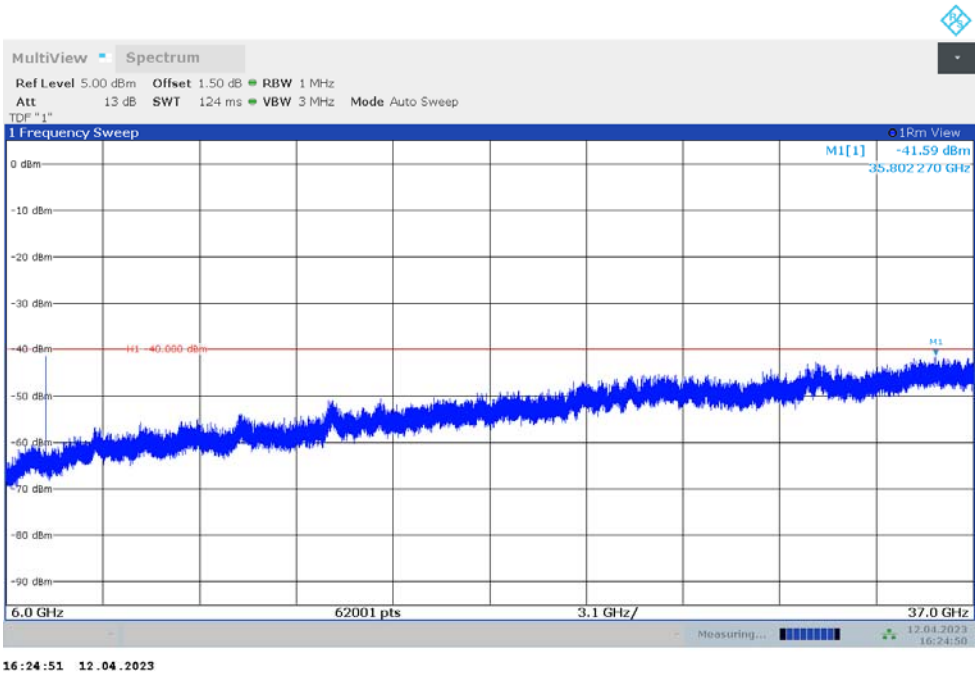


16:24:51 12.04.2023

Note: The maximum value of expanded measurement uncertainty for this test item is U = 0.372 dB, k = 2.

A.7 Peak-to-Average Power Ratio

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB

a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

c) Set the number of counts to a value that stabilizes the measured CCDF curve;

d) Record the maximum PAPR level associated with a probability of 0.1%.

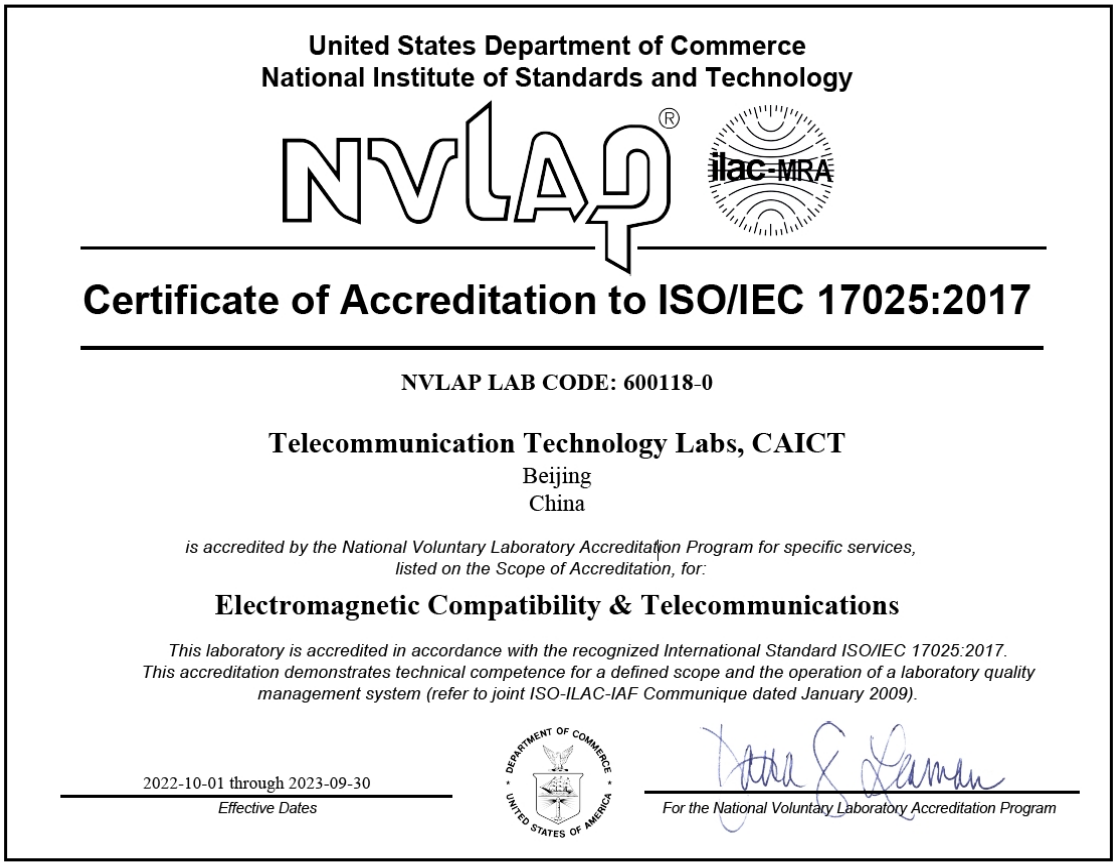
Measurement results

n48, 40MHz

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
3624.99	4.05	5.41	6.46	6.68	6.70	7.55	7.71	7.50	8.51

Note: The maximum value of expanded measurement uncertainty for this test item is U = 0.356 dB, k = 2.

Annex B: Accreditation Certificate



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NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT
Beijing
China

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2022-10-01 through 2023-09-30
Effective Dates

DEPARTMENT OF COMMERCE · UNITED STATES OF AMERICA

For the National Voluntary Laboratory Accreditation Program

*****END OF REPORT*****