TEST REPORT

No.I22N02450-RF UMTS

for

Realme Chongqing Mobile Telecommunications Corp., Ltd.

Mobile Phone

Model Name: RMX3710

FCC ID: 2AUYFRMX3710

with

Hardware Version: 11

Software Version: ColorOS 13.0

Issued Date: 2022-12-17

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 SAICT.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I22N02450-RF UMTS	Rev.0	1st edition	2022-12-17

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1. SUMMARY OF TEST REPORT

1.1. Test Items

Description	Mobile Phone
Model Name	RMX3710
Brand Name	realme
Applicant's name	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Manufacturer's Name	Realme Chongqing Mobile Telecommunications Corp., Ltd.

1.2. Test Standards

FCC Part 2/22/24/27	10-1-20 Edition
ANSI C63.26	2015
KDB971168 D01	v03r01

1.3. Test Result

All test items are pass. Please refer to "6 Summary of Test Results" for detail.

1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518000

1.5. Project Data

Testing Start Date: 2022-11-22 Testing End Date: 2022-12-12

1.6. Signature

Wang Ping
(Prepared this test report)

Huang Qiuqin
(Reviewed this test report)

Zhang Hao
(Approved this test report)

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2. CLIENT INFORMATION

2.1. Applicant Information

Company Name:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Address /Post:	No.178 Yulong Avenue,Yufengshan,Yubei District,Chongqing,China
Contact Person:	Yang LiangPing
Contact Email	(86)13798864426
Telephone:	ylp@realme.net
Fax:	/

2.2. Manufacturer Information

Company Name:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Address /Post:	No.178 Yulong Avenue,Yufengshan,Yubei District,Chongqing,China
Contact Person:	Yang LiangPing
Contact Email	(86)13798864426
Telephone:	ylp@realme.net
Fax:	/

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3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)

3.1. About EUT

Description	Mobile Phone
Model Name	RMX3710
FCC ID	2AUYFRMX3710
Frequency Bands	WCDMA Band 2,4,5
Antenna	Integrated
Extreme vol. Limits	3.41V to 4.45V (nominal: 3.87V)
Condition of EUT as received	No abnormality in appearance

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

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT03aa	863851060019819	11	ColorOS 13.0	2022-11-22
UT01aa	863851060019934 863851060019926	11	ColorOS 13.0	2022-11-22

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

UT03aa is used for conduction test, UT01aa is used for radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery
AE2	Charger
AE3	USB Cable
AE4	Headset

AE1

Model	BLP875
Manufacturer	Sunwoda Electronic Co.Ltd.
Capacity	4880mAh
Nominal Voltage	3.87 V

AE2

Model	VCB3HDUH
Manufacturer	Shenzhen Huntkey Chiyuan Electric Co., LTD
Specification	American Standard Charger

AE3

Model	DL150
Manufacturer	/

AE4

Model	MH156
Manufacturer	/

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

AE: ancillary equipment

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3.4. General Description

The Equipment Under Test (EUT) is a model Mobile Phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfil the test. Samples undergoing test were selected by the Client.

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4. REFERENCE DOCUMENTS

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

Reference	Title	Version
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-20 Edition
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	10-1-20 Edition
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-20 Edition
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-20 Edition
ANSI C63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
KDB971168 D01	Power Meas License Digital Systems	v03r01

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5. LABORATORY ENVIRONMENT

Shielded room did not exceed following limits along the RF testing:

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz>60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	>2 MΩ
Ground system resistance	< 4 Ω

Fully-anechoic chamber did not exceed following limits along the EMC testing

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Voltage Standing Wave Ratio （VSWR）	≤ 6 dB, from 1 to 18 GHz， 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

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6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	F	Fail
	NA	Not applicable
	NM	Not measured

WCDMA Band II

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/24.232	A.1	P
2	Field Strength of Spurious Radiation	2.1053/24.238	A.2	P
3	Frequency Stability	2.1055/24.235	A.3	P
4	Occupied Bandwidth	2.1049/24.238	A.4	P
5	Emission Bandwidth	2.1049/24.238	A.5	P
6	Band Edge Compliance	2.1051/24.238	A.6	P
7	Conducted Spurious Emission	2.1051/24.238	A.7	P
8	Peak-to-Average Power Ratio	24.232/KDB971168 D01	A.8	P

WCDMA Band V

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/22.913	A.1	P
2	Field Strength of Spurious Radiation	2.1053/22.917	A.2	P
3	Frequency Stability	2.1055/22.355	A.3	P
4	Occupied Bandwidth	2.1049/22.917	A.4	P
5	Emission Bandwidth	2.1049/22.917	A.5	P
6	Band Edge Compliance	2.1051/22.917	A.6	P
7	Conducted Spurious Emission	2.1051/22.917	A.7	P
8	Peak-to-Average Power Ratio	KDB971168 D01	A.8	P

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WCDMA Band IV

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/27.50(d)	A.1	P
2	Field Strength of Spurious Radiation	2.1053/27.53(h)	A.2	P
3	Frequency Stability	2.1055/27.54	A.3	P
4	Occupied Bandwidth	2.1049/27.53(g)	A.4	P
5	Emission Bandwidth	2.1049/27.53(g)	A.5	P
6	Band Edge Compliance	2.1051/27.53(h)	A.6	P
7	Conducted Spurious Emission	2.1051/27.53(h)	A.7	P
8	Peak-to-Average Power Ratio	27.50(d) /KDB971168 D01	A.8	P

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7. STATEMENT

Since the information of samples in this report is provided by the client, the laboratory is not responsible for the authenticity of sample information.

This report takes measured values as criterion of test conclusion. The test conclusion meets the limit requirements.

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8. TEST EQUIPMENTS UTILIZED

NO.	Description	TYPE	Manufacture	series number	CAL DUE DATE
1	Test Receiver	ESR7	R&S	101676	2023-11-23
2	BiLog Antenna	3142E	ETS-Lindgren	0224831	2024-05-27
3	Horn Antenna	3117	ETS-Lindgren	00066585	2025-03-15
4	Horn Antenna	QSH-SL-18 -26-S-20	Q-par	17013	2023-01-06
5	Antenna	BBHA 9120D	Schwarzbeck	1593	2025-10-24
6	Antenna	VUBA 9117	Schwarzbeck	207	2023-07-15
7	Antenna	QWH-SL-18 -40-K-SG	Q-par	15979	2023-01-06
8	preamplifier	83017A	Agilent	MY39501110	/
9	Signal Generator	SMB100A	R&S	179725	2023-11-23
10	Fully Anechoic Chamber	FACT3-2.0	ETS-Lindgren	1285	2023-05-29
11	Spectrum Analyzer	FSV40	R&S	101192	2023-01-12
12	Universal Radio Communication Tester	CMU200	R&S	114545	2023-01-12
13	Spectrum Analyzer	FSW26	R&S	102197	2023-11-24
14	Universal Radio Communication Tester	CMW500	R&S	129146	2023-04-24
15	DC Power Supply	DC Power Supply	Agilent Technologies	MY50450012	2023-11-13
16	Temperature Chamber	SH-241	ESPEC	92007516	2023-10-15

Test software

Item	Name	Vesion
Radiated	EMC32	V10.50.40

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ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

Reference

FCC: CFR Part 2.1046, 22.913, 24.232, 27.50(d)

A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation.

This result contains max output power and EIRP measurements for the EUT. 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, 1852.4 MHz, 1880.0MHz and 1907.6MHz for WCDMA Band II;826.4MHz, 836.6MHz and 846.6MHz for WCDMA Band V and 1712.4MHz, 1732.4MHz and 1752.6MHz for WCDMA Band IV (bottom, middle and top of operational frequency range).

Limit

According to FCC Part 2.1046

WCDMA Band II

A.1.2.2 Measurement result

QPSK

	CH	Frequency(MHz)	output power(dBm)
WCDMA (Band II)	9262	1852.4	22.5
	9400	1880.0	22.3
	9538	1907.6	22.5

16QAM

	CH	Frequency(MHz)	output power(dBm)
WCDMA (Band II)	9262	1852.4	21.8
	9400	1880.0	21.6
	9538	1907.6	21.8

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WCDMA Band V

Measurement result

QPSK

	CH	Frequency(MHz)	output power(dBm)
WCDMA (Band V)	4132	826.4	23.5
	4183	836.6	23.3
	4233	846.6	23.1

16QAM

	CH	Frequency(MHz)	output power(dBm)
WCDMA (Band V)	4132	826.4	22.8
	4183	836.6	22.6
	4233	846.6	22.4

WCDMA Band IV

Measurement result

QPSK

	CH	Frequency(MHz)	output power(dBm)
WCDMA (Band IV)	1312	1712.4	22.9
	1412	1732.4	23.0
	1513	1752.6	23.0

16QAM

	CH	Frequency(MHz)	output power(dBm)
WCDMA (Band IV)	1312	1712.4	22.2
	1412	1732.4	22.3
	1513	1752.6	22.2

Note: Expanded measurement uncertainty is U = 0.49dB, k = 1.96

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A.1.3 Radiated

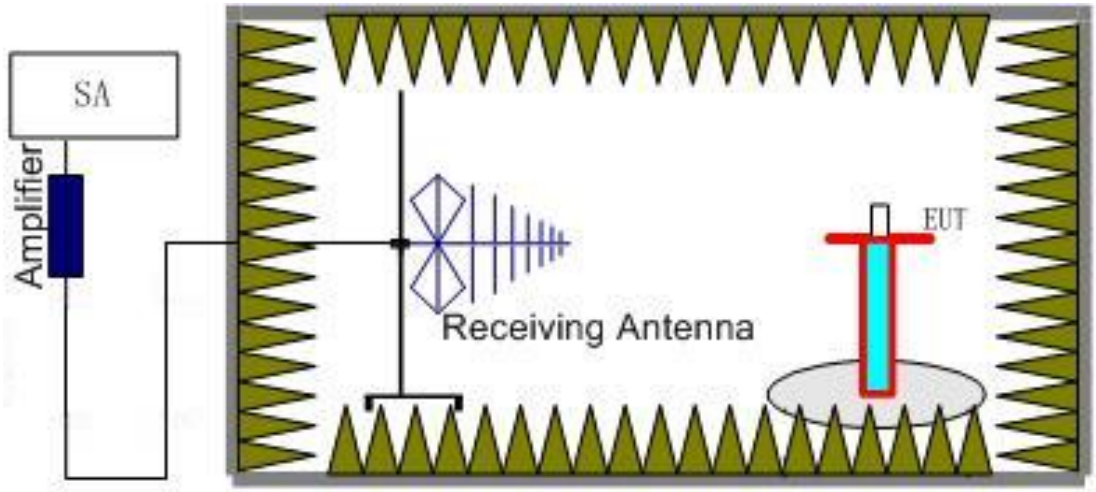
A.1.3.1 Description

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

Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."Rule Part 22.913(a) specifies ” The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.”

A.1.3.2 Method of Measurement

1. For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, EUT was placed on a 80 cm high non-conductive stand at a 3 meter test distance from the receive antenna. For radiated measurements performed at frequencies above 1 GHz, EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. Receiving antenna was placed on the antenna mast 3 meters from the EUT. For emission measurements. The receiving antenna shall be varied from 1 m to 4 m in height above the reference ground in a search for the relative positioning that produces the maximum radiated signal level. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.

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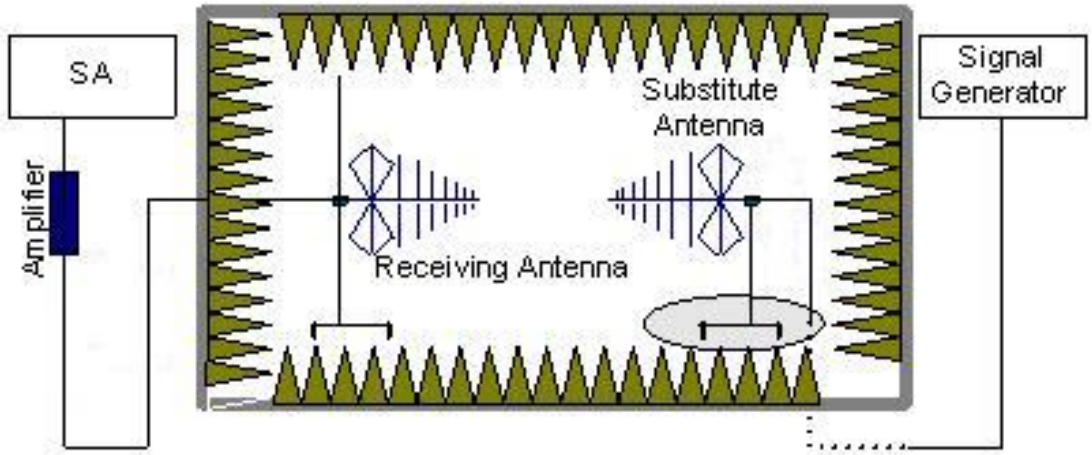

In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna.
   The cable loss (P_{cl}) ,the Substitution Antenna Gain(dBi) (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea} - P_{Ag} - P_{cl} + G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dB.

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WCDMA Band II-EIRP

Limits

	Burst Peak EIRP (dBm)
WCDMA Band II	≤33dBm (2W)

Measurement result

Upper antenna

WCDMA Band II QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Polarization
1852.40	-17.33	-29.30	8.10	20.07	33.00	H
1880.00	-17.17	-29.40	8.10	20.33	33.00	H
1907.60	**-16.86**	**-29.30**	**8.10**	**20.54**	**33.00**	**H**

WCDMA Band II 16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Polarization
1852.40	-18.38	-29.30	8.10	19.02	33.00	H
1880.00	-18.23	-29.40	8.10	19.27	33.00	H
1907.60	-17.96	-29.30	8.10	19.44	33.00	H

Frequency: 1907.60MHz

Peak EIRP(dBm)= PMea(-16.68dBm)-(Pcl+PAg)(-29.30dB)+Ga (8.10dB) =20.54dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

Lower antenna

WCDMA Band II QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Polarization
1852.40	-17.29	-29.30	8.10	20.11	33.00	H
1880.00	-16.66	-29.40	8.10	20.84	33.00	H
1907.60	**-16.52**	**-29.30**	**8.10**	**20.88**	**33.00**	**H**

WCDMA Band II 16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Polarization
1852.40	-18.36	-29.30	8.10	19.04	33.00	H
1880.00	-17.77	-29.40	8.10	19.73	33.00	H
1907.60	-17.58	-29.30	8.10	19.82	33.00	H

Frequency: 1907.60MHz

Peak EIRP(dBm)= PMea(-16.52dBm)-(Pcl+PAg)(-29.30dB)+Ga (8.10dB) =20.88dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

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WCDMA Band V-ERP

Limits

	Burst Peak ERP (dBm)
WCDMA Band V	≤38.45dBm

Measurement result

Upper antenna

WCDMA Band V QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Polarization
826.40	-11.98	-33.60	-0.84	2.15	18.63	38.45	V
836.60	-11.31	-33.50	-0.74	2.15	19.31	38.45	V
846.60	**-11.29**	**-33.50**	**-0.73**	**2.15**	**19.33**	**38.45**	**V**

WCDMA Band V 16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Polarization
826.40	-12.19	-33.60	-0.84	2.15	18.42	38.45	V
836.60	-12.41	-33.50	-0.74	2.15	18.20	38.45	V
846.60	-12.47	-33.50	-0.73	2.15	18.15	38.45	V

Frequency: 826.40MHz

Peak ERP(dBm)= PMea(-11.29dBm)-(Pcl+PAg)(-33.50dB)+Ga (-0.73dB)-2.15dB=19.33dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

Lower antenna

WCDMA Band V QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Polarization
826.40	-11.84	-33.60	-0.84	2.15	18.77	38.45	V
836.60	-12.00	-33.50	-0.74	2.15	18.61	38.45	V
846.60	**-11.19**	**-33.50**	**-0.73**	**2.15**	**19.43**	**38.45**	**V**

WCDMA Band V 16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Polarization
826.40	-11.98	-33.60	-0.84	2.15	18.63	38.45	V
836.60	-12.10	-33.50	-0.74	2.15	18.51	38.45	V
846.60	-12.32	-33.50	-0.73	2.15	18.30	38.45	V

Frequency: 826.40MHz

Peak ERP(dBm)= PMea(-11.19dBm)-(Pcl+PAg)(-33.50dB)+Ga (-0.73dB)-2.15dB=19.43dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

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WCDMA Band IV-EIRP

Limits

	Burst Peak EIRP (dBm)
WCDMA Band IV	≤30.00dBm

Measurement result

Upper antenna

WCDMA Band IV QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Polarization
1712.40	-17.26	-29.60	8.10	20.44	30.00	H
1732.60	**-17.14**	**-29.50**	**8.10**	**20.46**	**30.00**	**H**
1752.60	-17.25	-29.50	8.10	20.35	30.00	H

WCDMA Band IV 16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Polarization
1712.40	-18.37	-29.60	8.10	19.33	30.00	H
1732.60	-18.20	-29.50	8.10	19.40	30.00	H
1752.60	-18.37	-29.50	8.10	19.23	30.00	H

Frequency: 1732.60 MHz

Peak EIRP(dBm)= PMea(-14.14dBm)-(Pcl+PAg)(-29.50dB)+Ga (8.10dB)=20.46dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

Lower antenna

WCDMA Band IV QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Polarization
1712.40	-17.18	-29.60	8.10	20.52	30.00	H
1732.60	-16.92	-29.50	8.10	20.68	30.00	H
1752.60	**-16.61**	**-29.50**	**8.10**	**20.99**	**30.00**	**H**

WCDMA Band IV 16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl}(dB)+ P_{Ag}(dB)	Ga Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Polarization
1712.40	-18.25	-29.60	8.10	19.45	30.00	H
1732.60	-17.78	-29.50	8.10	19.82	30.00	H
1752.60	-17.70	-29.50	8.10	19.90	30.00	H

Frequency: 1752.60 MHz

Peak EIRP(dBm)= PMea(-16.61dBm)-(Pcl+PAg)(-29.50dB)+Ga (8.10dB)=20.99dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

Note: The maximum value of expanded measurement uncertainty for this test item is U = 2.87dB(30MHz-3GHz)/3.35dB(3GHz-18GHz)/2.68dB(18GHz-40GHz), k = 2

Note: Both of Vertical and Horizontal polarizations are evaluated, but only the worst case is recorded in this report.

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A.2 FIELD STRENGTH OF SPURIOUS RADIATION

Reference

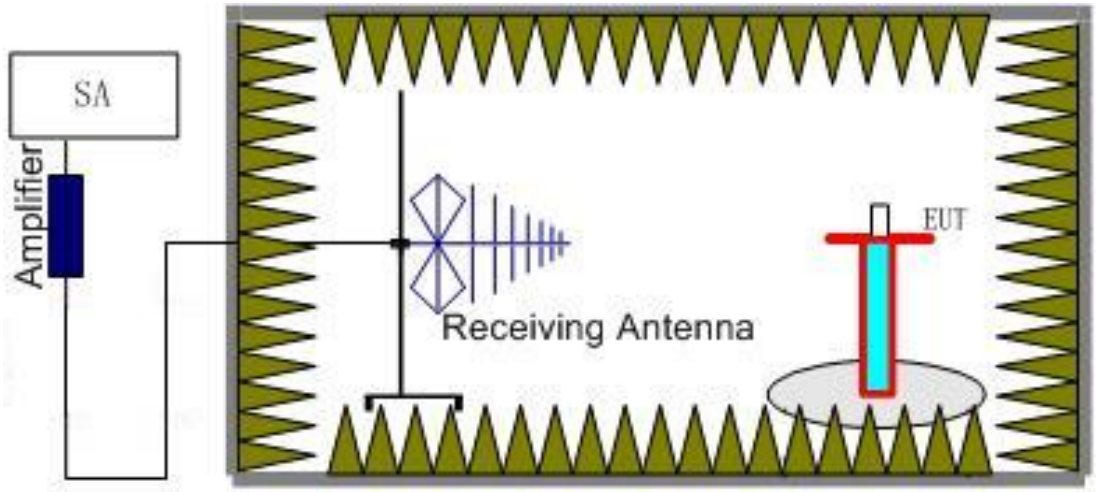
FCC: CFR 2.1053, 22.917, 24.238, 27.53(h).

A.2.1 Measurement Method

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set 1MHz as outlined in Part 24.238, Part 22.917 and Part 27.53.The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of WCDMA Band II, WCDMA Band V and WCDMA Band IV.

The procedure of radiated spurious emissions is as follows:

1. For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, EUT was placed on a 80 cm high non-conductive stand at a 3 meter test distance from the receive antenna. For radiated measurements performed at frequencies above 1 GHz, EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. Receiving antenna was placed on the antenna mast 3 meters from the EUT. For emission measurements. The receiving antenna shall be varied from 1 m to 4 m in height above the reference ground in a search for the relative positioning that produces the maximum radiated signal level. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.

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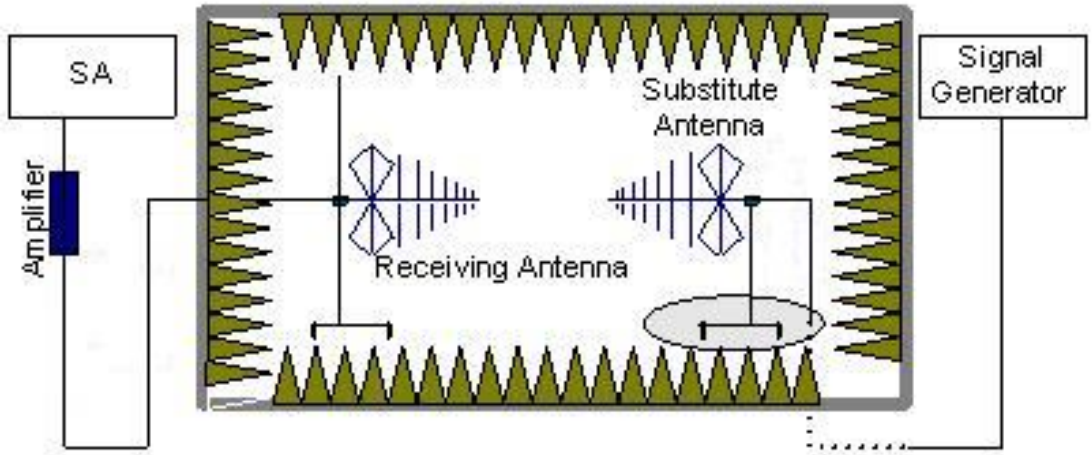

In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain(dBi) (G_a) should be recorded after test.
   A amplifier should be connected in for the test.
   The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea} - P_{pl} + G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dB.

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A.2.2 Measurement Limit

Part 24.238 , Part 22.917 and Part 27.50 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of WCDMA Band II (1852.4 MHz, 1880.0MHz and 1907.6MHz), WCDMA Band V(826.4MHz, 836.6MHz and 846.6MHz) and WCDMA Band IV (1712.4MHz, 1732.4MHz and 1752.6MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the WCDMA Band II,WCDMA Band V and WCDMA Band IV into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

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A.2.4 Measurement Results Table

Frequency	Channel	Frequency Range	Result
WCDMA Band V	Low	30MHz-10GHz	Pass
	Middle	30MHz-10GHz	Pass
	High	30MHz-10GHz	Pass
WCDMA Band II	Low	30MHz-20GHz	Pass
	Middle	30MHz-20GHz	Pass
	High	30MHz-20GHz	Pass
WCDMA Band IV	Low	30MHz-20GHz	Pass
	Middle	30MHz-20GHz	Pass
	High	30MHz-20GHz	Pass

A.2.5 Sweep Table

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
WCDMA Band V	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3
WCDMA Band II	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2
WCDMA Band IV	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	3

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Upper antenna

WCDMA BAND II Mode Channel 9662/1932.4MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16969.38	-45.54	2.90	16.50	-31.94	-13.00	H
17198.75	-44.43	2.90	14.50	-32.83	-13.00	H
17295.00	-43.61	3.20	14.50	-32.31	-13.00	H
17520.62	-39.81	2.90	12.80	-29.91	-13.00	H
17586.88	-40.05	3.30	12.80	-30.55	-13.00	H
17690.00	-40.89	3.30	12.80	-31.39	-13.00	H

WCDMA BAND II Mode Channel 9800/1960MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16987.50	-45.01	2.90	16.50	-31.41	-13.00	H
17200.00	-43.46	2.90	14.50	-31.86	-13.00	H
17238.12	-43.30	3.20	14.50	-32.00	-13.00	H
17520.62	-40.28	2.90	12.80	-30.38	-13.00	H
17561.88	-39.32	3.30	12.80	-29.82	-13.00	H
17837.50	-40.70	3.60	12.80	-31.50	-13.00	H

WCDMA BAND II Mode Channel 9938/1987.6MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16976.25	-45.60	2.90	16.50	-32.00	-13.00	H
17193.12	-44.47	2.90	14.50	-32.87	-13.00	H
17345.00	-43.52	3.20	14.50	-32.22	-13.00	H
17407.50	-42.18	2.90	14.50	-30.58	-13.00	H
17559.38	-40.82	2.90	12.80	-30.92	-13.00	H
17834.38	-40.71	3.60	12.80	-31.51	-13.00	H

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WCDMA BAND II Mode Channel 9662/1932.4MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16991.88	-44.97	2.90	16.50	-31.37	-13.00	H
17126.88	-43.99	2.90	14.50	-32.39	-13.00	H
17293.75	-43.32	3.20	14.50	-32.02	-13.00	H
17410.00	-41.81	2.90	14.50	-30.21	-13.00	H
17641.88	-39.50	3.30	12.80	-30.00	-13.00	H
17735.62	-40.87	3.30	12.80	-31.37	-13.00	H

WCDMA BAND II Mode Channel 9800/1960MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16980.00	-44.24	2.90	16.50	-30.64	-13.00	H
17165.00	-44.13	2.90	14.50	-32.53	-13.00	H
17293.12	-43.82	3.20	14.50	-32.52	-13.00	H
17416.88	-42.33	2.90	14.50	-30.73	-13.00	H
17636.88	-40.32	3.30	12.80	-30.82	-13.00	H
17774.38	-40.11	3.60	12.80	-30.91	-13.00	H

WCDMA BAND II Mode Channel 9938/1987.6MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
17006.25	-43.49	2.90	14.50	-31.89	-13.00	H
17193.75	-43.42	2.90	14.50	-31.82	-13.00	H
17252.50	-43.68	3.20	14.50	-32.38	-13.00	H
17472.50	-42.68	2.90	14.50	-31.08	-13.00	H
17611.88	-40.05	3.30	12.80	-30.55	-13.00	H
17809.38	-40.57	3.60	12.80	-31.37	-13.00	H

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WCDMA BAND IV Mode Channel 1537/1712.4MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16935.62	-45.24	2.90	16.50	-31.64	-13.00	H
17124.38	-44.39	2.90	14.50	-32.79	-13.00	H
17233.75	-43.22	3.20	14.50	-31.92	-13.00	H
17501.88	-40.82	2.90	12.80	-30.92	-13.00	H
17581.88	-40.58	3.30	12.80	-31.08	-13.00	H
17835.62	-40.51	3.60	12.80	-31.31	-13.00	H

WCDMA BAND IV Mode Channel 1638/1732.6MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16940.00	-45.35	2.90	16.50	-31.75	-13.00	H
17185.62	-44.01	2.90	14.50	-32.41	-13.00	H
17263.75	-41.66	3.20	14.50	-30.36	-13.00	H
17516.25	-40.58	2.90	12.80	-30.68	-13.00	H
17628.75	-40.04	3.30	12.80	-30.54	-13.00	H
17804.38	-40.53	3.60	12.80	-31.33	-13.00	H

WCDMA BAND IV Mode Channel 1738/1752.6MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16938.75	-45.78	2.90	16.50	-32.18	-13.00	H
17145.62	-44.30	2.90	14.50	-32.70	-13.00	H
17281.88	-43.40	3.20	14.50	-32.10	-13.00	H
17505.00	-39.80	2.90	12.80	-29.90	-13.00	H
17580.00	-39.18	3.30	12.80	-29.68	-13.00	H
17820.62	-40.53	3.60	12.80	-31.33	-13.00	H

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WCDMA BAND IV Mode Channel 1537/1712.4MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16986.88	-45.71	2.90	16.50	-32.11	-13.00	H
17197.50	-43.37	2.90	14.50	-31.77	-13.00	H
17280.00	-43.45	3.20	14.50	-32.15	-13.00	H
17463.12	-42.48	2.90	14.50	-30.88	-13.00	H
17615.00	-40.01	3.30	12.80	-30.51	-13.00	H
17836.88	-40.18	3.60	12.80	-30.98	-13.00	H

WCDMA BAND IV Mode Channel 1638/1732.6MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16958.12	-45.33	2.90	16.50	-31.73	-13.00	H
17155.00	-43.82	2.90	14.50	-32.22	-13.00	H
17353.75	-43.27	3.20	14.50	-31.97	-13.00	H
17517.50	-40.20	2.90	12.80	-30.30	-13.00	H
17570.62	-40.47	3.30	12.80	-30.97	-13.00	H
17838.75	-40.66	3.60	12.80	-31.46	-13.00	H

WCDMA BAND IV Mode Channel 1738/1752.6MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16909.38	-46.20	2.90	16.50	-32.60	-13.00	H
16987.50	-45.22	2.90	16.50	-31.62	-13.00	H
17231.88	-43.22	3.20	14.50	-31.92	-13.00	H
17445.62	-41.93	2.90	14.50	-30.33	-13.00	H
17633.75	-39.35	3.30	12.80	-29.85	-13.00	H
17823.75	-39.90	3.60	12.80	-30.70	-13.00	H

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WCDMA BAND V Mode Channel 4357/871.4MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
8520.75	-52.50	2.10	12.00	-44.75	-13.00	H
9100.88	-50.79	2.20	11.60	-43.54	-13.00	H
9296.88	-50.43	2.00	11.60	-42.98	-13.00	H
9478.12	-50.68	2.10	11.60	-43.33	-13.00	V
9742.50	-50.81	2.20	11.20	-43.96	-13.00	H
9792.50	-50.79	2.30	11.20	-44.04	-13.00	H

WCDMA BAND V Mode Channel 4408/881.6MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
7095.75	-52.71	1.80	12.00	-44.66	-13.00	H
9102.62	-51.99	2.20	11.60	-44.74	-13.00	H
9300.12	-50.11	2.00	11.60	-42.66	-13.00	H
9474.38	-50.94	2.10	11.60	-43.59	-13.00	V
9744.12	-51.11	2.20	11.20	-44.26	-13.00	H
9805.75	-51.42	2.30	11.20	-44.67	-13.00	H

WCDMA BAND V Mode Channel 4458/891.6MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
8527.12	-52.84	2.10	12.00	-45.09	-13.00	H
9101.25	-52.08	2.20	11.60	-44.83	-13.00	H
9226.25	-50.08	2.10	11.60	-42.73	-13.00	H
9471.88	-51.11	2.10	11.60	-43.76	-13.00	V
9749.25	-51.29	2.20	11.20	-44.44	-13.00	H
9782.38	-51.14	2.30	11.20	-44.39	-13.00	H

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WCDMA BAND V Mode Channel 4357/871.4MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
7222.12	-53.15	1.80	12.00	-45.10	-13.00	H
8425.50	-52.43	1.80	11.30	-45.08	-13.00	H
9095.38	-51.52	2.20	11.60	-44.27	-13.00	H
9306.25	-50.52	2.00	11.60	-43.07	-13.00	H
9423.75	-50.87	2.10	11.60	-43.52	-13.00	H
9749.50	-51.15	2.20	11.20	-44.30	-13.00	H

WCDMA BAND V Mode Channel 4408/881.6MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
8415.75	-51.96	1.80	11.30	-44.61	-13.00	H
8638.12	-53.35	2.00	12.00	-45.50	-13.00	H
9097.38	-52.56	2.20	11.60	-45.31	-13.00	H
9223.38	-50.32	2.10	11.60	-42.97	-13.00	H
9475.88	-51.13	2.10	11.60	-43.78	-13.00	V
9748.12	-50.61	2.20	11.20	-43.76	-13.00	H

WCDMA BAND V Mode Channel 4458/891.6MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
8429.25	-52.61	1.80	11.30	-45.26	-13.00	H
9099.25	-51.77	2.20	11.60	-44.52	-13.00	H
9295.50	-50.73	2.00	11.60	-43.28	-13.00	H
9475.00	-49.62	2.10	11.60	-42.27	-13.00	V
9761.88	-51.53	2.20	11.20	-44.68	-13.00	H
9795.88	-51.65	2.30	11.20	-44.90	-13.00	H

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Lower antenna

WCDMA BAND II Mode Channel 9662/1932.4MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
17001.88	-43.15	2.90	14.50	-31.55	-13.00	H
17190.00	-43.96	2.90	14.50	-32.36	-13.00	H
17341.88	-43.86	3.20	14.50	-32.56	-13.00	H
17446.25	-41.94	2.90	14.50	-30.34	-13.00	H
17623.75	-39.86	3.30	12.80	-30.36	-13.00	H
17818.12	-40.28	3.60	12.80	-31.08	-13.00	H

WCDMA BAND II Mode Channel 9800/1960MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16481.88	-47.01	2.70	17.40	-32.31	-13.00	H
16965.00	-45.82	2.90	16.50	-32.22	-13.00	H
17240.62	-42.71	3.20	14.50	-31.41	-13.00	H
17405.62	-42.31	2.90	14.50	-30.71	-13.00	H
17622.50	-40.14	3.30	12.80	-30.64	-13.00	H
17827.50	-40.72	3.60	12.80	-31.52	-13.00	H

WCDMA BAND II Mode Channel 9938/1987.6MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16933.12	-45.38	2.90	16.50	-31.78	-13.00	H
17175.62	-43.78	2.90	14.50	-32.18	-13.00	H
17325.62	-43.12	3.20	14.50	-31.82	-13.00	H
17524.38	-40.46	2.90	12.80	-30.56	-13.00	H
17588.75	-40.66	3.30	12.80	-31.16	-13.00	H
17689.38	-40.86	3.30	12.80	-31.36	-13.00	H

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WCDMA BAND II Mode Channel 9662/1932.4MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16988.75	-44.92	2.90	16.50	-31.32	-13.00	H
17182.50	-44.67	2.90	14.50	-33.07	-13.00	H
17364.38	-42.94	3.20	14.50	-31.64	-13.00	H
17518.75	-40.35	2.90	12.80	-30.45	-13.00	H
17591.88	-40.43	3.30	12.80	-30.93	-13.00	H
17823.12	-40.26	3.60	12.80	-31.06	-13.00	H

WCDMA BAND II Mode Channel 9800/1960MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16996.25	-45.50	2.90	16.50	-31.90	-13.00	H
17162.50	-44.39	2.90	14.50	-32.79	-13.00	H
17317.50	-43.01	3.20	14.50	-31.71	-13.00	H
17502.50	-40.61	2.90	12.80	-30.71	-13.00	H
17593.12	-39.53	3.30	12.80	-30.03	-13.00	H
17791.88	-40.23	3.60	12.80	-31.03	-13.00	H

WCDMA BAND II Mode Channel 9938/1987.6MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16983.12	-45.05	2.90	16.50	-31.45	-13.00	H
17128.75	-43.68	2.90	14.50	-32.08	-13.00	H
17221.88	-42.13	3.20	14.50	-30.83	-13.00	H
17488.75	-42.68	2.90	14.50	-31.08	-13.00	H
17575.62	-40.17	3.30	12.80	-30.67	-13.00	H
17835.62	-40.44	3.60	12.80	-31.24	-13.00	H

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WCDMA BAND IV Mode Channel 1537/1712.4MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16922.50	-45.91	2.90	16.50	-32.31	-13.00	H
17212.50	-43.79	2.90	14.50	-32.19	-13.00	H
17290.62	-43.89	3.20	14.50	-32.59	-13.00	H
17459.38	-41.52	2.90	14.50	-29.92	-13.00	H
17596.25	-40.06	3.30	12.80	-30.56	-13.00	H
17835.62	-40.60	3.60	12.80	-31.40	-13.00	H

WCDMA BAND IV Mode Channel 1638/1732.6MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16986.25	-45.76	2.90	16.50	-32.16	-13.00	H
17101.88	-43.37	2.90	14.50	-31.77	-13.00	H
17326.88	-42.74	3.20	14.50	-31.44	-13.00	H
17418.75	-42.48	2.90	14.50	-30.88	-13.00	H
17603.75	-40.19	3.30	12.80	-30.69	-13.00	H
17810.00	-39.53	3.60	12.80	-30.33	-13.00	H

WCDMA BAND IV Mode Channel 1738/1752.6MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16997.50	-45.65	2.90	16.50	-32.05	-13.00	H
17128.12	-43.67	2.90	14.50	-32.07	-13.00	H
17236.88	-43.21	3.20	14.50	-31.91	-13.00	H
17466.25	-41.93	2.90	14.50	-30.33	-13.00	H
17600.00	-39.72	3.30	12.80	-30.22	-13.00	H
17833.75	-40.49	3.60	12.80	-31.29	-13.00	H

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WCDMA BAND IV Mode Channel 1537/1712.4MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16984.38	-44.73	2.90	16.50	-31.13	-13.00	H
17183.12	-44.53	2.90	14.50	-32.93	-13.00	H
17365.62	-43.87	3.20	14.50	-32.57	-13.00	H
17458.12	-41.65	2.90	14.50	-30.05	-13.00	H
17629.38	-39.72	3.30	12.80	-30.22	-13.00	H
17810.62	-40.49	3.60	12.80	-31.29	-13.00	H

WCDMA BAND IV Mode Channel 1638/1732.6MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16985.00	-45.11	2.90	16.50	-31.51	-13.00	H
17109.38	-44.34	2.90	14.50	-32.74	-13.00	H
17340.62	-42.57	3.20	14.50	-31.27	-13.00	H
17511.88	-39.59	2.90	12.80	-29.69	-13.00	H
17595.00	-40.22	3.30	12.80	-30.72	-13.00	H
17837.50	-40.72	3.60	12.80	-31.52	-13.00	H

WCDMA BAND IV Mode Channel 1738/1752.6MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
16906.88	-45.96	2.90	16.50	-32.36	-13.00	H
16986.25	-45.41	2.90	16.50	-31.81	-13.00	H
17183.12	-43.65	2.90	14.50	-32.05	-13.00	H
17455.00	-41.44	2.90	14.50	-29.84	-13.00	H
17568.75	-39.72	3.30	12.80	-30.22	-13.00	H
17795.00	-40.04	3.60	12.80	-30.84	-13.00	H

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WCDMA BAND V Mode Channel 4357/871.4MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
8426.25	-51.96	1.80	11.30	-44.61	-13.00	H
9104.88	-51.65	2.20	11.60	-44.40	-13.00	H
9293.12	-49.58	2.00	11.60	-42.13	-13.00	H
9469.38	-50.84	2.10	11.60	-43.49	-13.00	V
9734.00	-50.64	2.20	11.20	-43.79	-13.00	H
9796.88	-51.03	2.30	11.20	-44.28	-13.00	H

WCDMA BAND V Mode Channel 4408/881.6MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
7194.38	-52.95	1.80	12.00	-44.90	-13.00	V
9102.88	-51.75	2.20	11.60	-44.50	-13.00	H
9300.50	-49.79	2.00	11.60	-42.34	-13.00	H
9473.75	-50.96	2.10	11.60	-43.61	-13.00	V
9744.00	-51.04	2.20	11.20	-44.19	-13.00	H
9797.12	-50.85	2.30	11.20	-44.10	-13.00	H

WCDMA BAND V Mode Channel 4458/891.6MHz(QPSK)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
7173.38	-53.38	1.80	12.00	-45.33	-13.00	V
9102.88	-51.54	2.20	11.60	-44.29	-13.00	H
9293.12	-50.67	2.00	11.60	-43.22	-13.00	H
9476.00	-51.30	2.10	11.60	-43.95	-13.00	V
9753.25	-51.30	2.20	11.20	-44.45	-13.00	H
9787.38	-50.60	2.30	11.20	-43.85	-13.00	H

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WCDMA BAND V Mode Channel 4357/871.4MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
8472.75	-51.60	1.80	11.30	-44.25	-13.00	H
9107.12	-52.07	2.10	11.60	-44.72	-13.00	H
9299.88	-50.81	2.00	11.60	-43.36	-13.00	H
9473.38	-50.27	2.10	11.60	-42.92	-13.00	V
9753.12	-51.50	2.20	11.20	-44.65	-13.00	H
9785.75	-51.51	2.30	11.20	-44.76	-13.00	H

WCDMA BAND V Mode Channel 4408/881.6MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
7445.62	-53.02	1.90	12.00	-45.07	-13.00	H
8477.25	-52.25	1.80	11.30	-44.90	-13.00	H
9102.25	-51.85	2.20	11.60	-44.60	-13.00	H
9300.50	-50.79	2.00	11.60	-43.34	-13.00	H
9475.25	-51.31	2.10	11.60	-43.96	-13.00	V
9738.38	-50.69	2.20	11.20	-43.84	-13.00	H

WCDMA BAND V Mode Channel 4458/891.6MHz(16QAM)

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit (dBm)	Polarization
7193.62	-53.18	1.80	12.00	-45.13	-13.00	V
8407.50	-52.19	1.80	11.30	-44.84	-13.00	H
9092.88	-51.73	2.20	11.60	-44.48	-13.00	H
9299.62	-51.27	2.00	11.60	-43.82	-13.00	H
9472.50	-50.72	2.10	11.60	-43.37	-13.00	V
9738.25	-51.03	2.20	11.20	-44.18	-13.00	H

Note: The maximum value of expanded measurement uncertainty for this test item is U = 2.87dB(30MHz-3GHz)/3.35dB(3GHz-18GHz)/2.68dB(18GHz-40GHz), k = 2

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A.3 FREQUENCY STABILITY

Reference

FCC: CFR Part 2.1055, 22.355, 24.235, 27.54

A.3.1 Method of Measurement

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 R&S CMW500

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 CMW500 and in a simulated call on mid channel of each 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. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring 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 CMW500 and in a simulated call on the centre 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℃ increments 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.

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A.3.2 Measurement results

WCDMA Band II

Frequency Error vs Voltage

Temperature(℃)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	1850.060	1909.920		
50				-3.92	0.0042
40				-2.68	0.0029
30				-5.79	0.0062
10				-4.84	0.0052
0				-4.99	0.0053
-10				-5.65	0.0060
-20				-3.83	0.0041
-30				-1.75	0.0019

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.41	20	1850.060	1909.920	-7.01	0.0075
4.45				-6.60	0.0070

WCDMA Band IV

Frequency Error vs Voltage-QPSK

Temperature(℃)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	1710.060	1754.940		
50				-0.89	0.0010
40				-5.87	0.0068
30				2.61	0.0030
10				-1.22	0.0014
0				-4.48	0.0052
-10				-5.57	0.0064
-20				-0.49	0.0006
-30				0.78	0.0009

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.41	20	1710.060	1754.940	-1.05	0.0012
4.45				1.20	0.0014

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WCDMA Band V

Frequency Error vs Voltage-QPSK

Temperature(℃)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	824.070	848.930		
50				-0.36	0.0009
40				-10.24	0.0245
30				-4.46	0.0107
10				-6.92	0.0165
0				-7.92	0.0189
-10				-5.87	0.0140
-20				-6.97	0.0167
-30				-3.07	0.0073

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.41	20	824.070	848.930	-3.58	0.0085
4.45				-8.15	0.0195

Expanded measurement uncertainty is 10Hz, k = 2

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A.4 OCCUPIED BANDWIDTH

Reference

FCC: CFR Part 2.1049, 22.917, 24.238, 27.53(g).

A.4.1 Occupied Bandwidth Results

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

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 (i.e., two to five times the OBW).

b) The nominal IF filter bandwidth (3 dB 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.

c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.

e) Set the detection mode to peak, and the trace mode to max hold.

d) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

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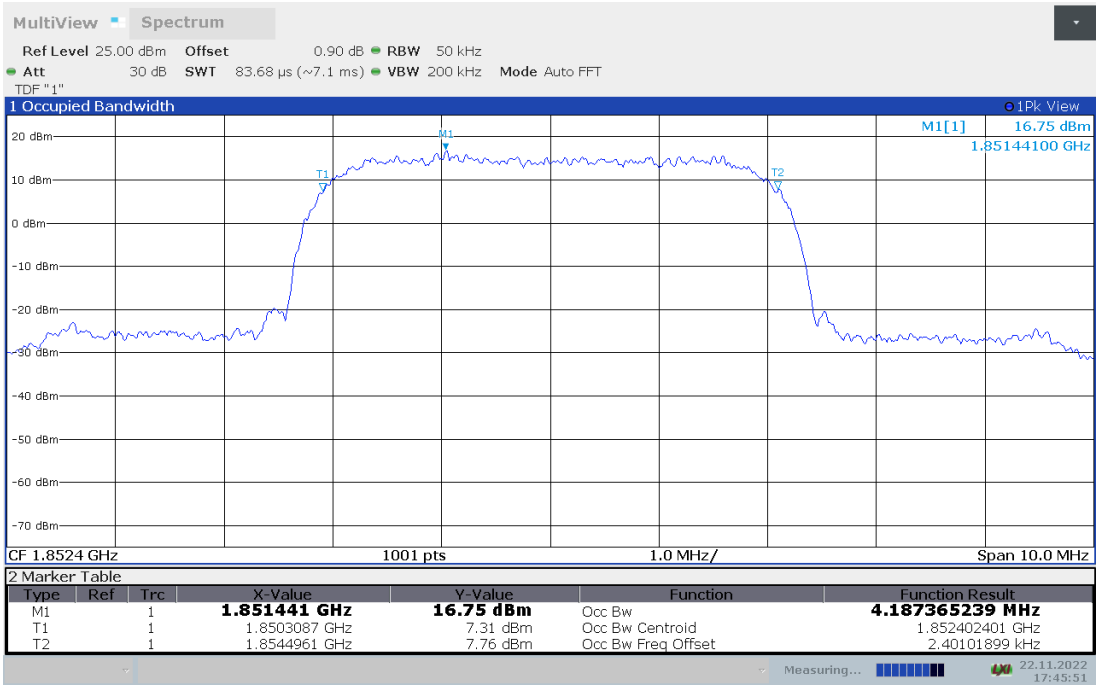
WCDMA Band 2 (99%)-QPSK

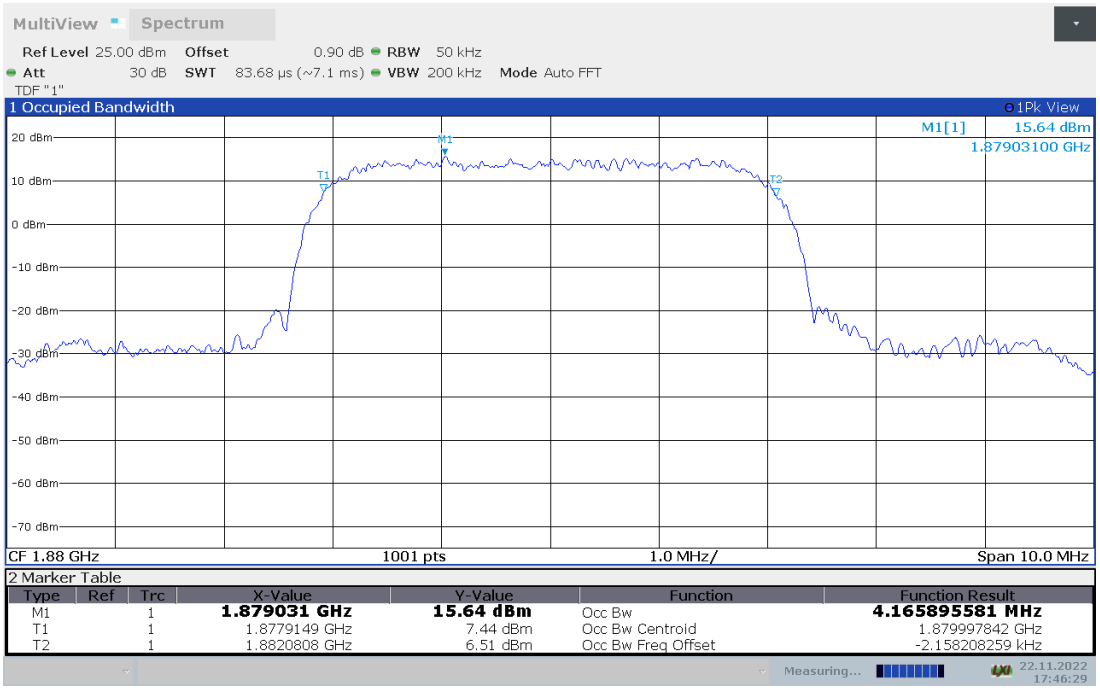
Frequency (MHz)	Occupied Bandwidth (99%) (MHz)
1852.4	4.187
1880	4.166
1907.6	4.165

WCDMA Band 2 (99%)

Channel 9262-Occupied Bandwidth (99% BW)



Channel 9400-Occupied Bandwidth (99% BW)



Channel 9538-Occupied Bandwidth (99% BW)

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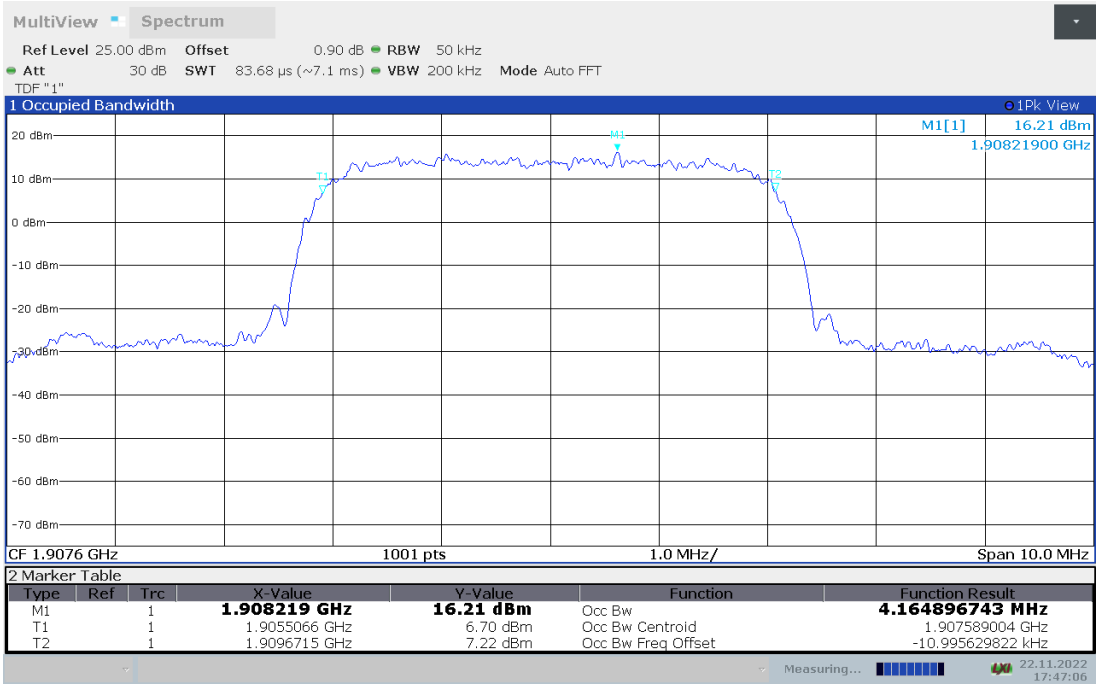

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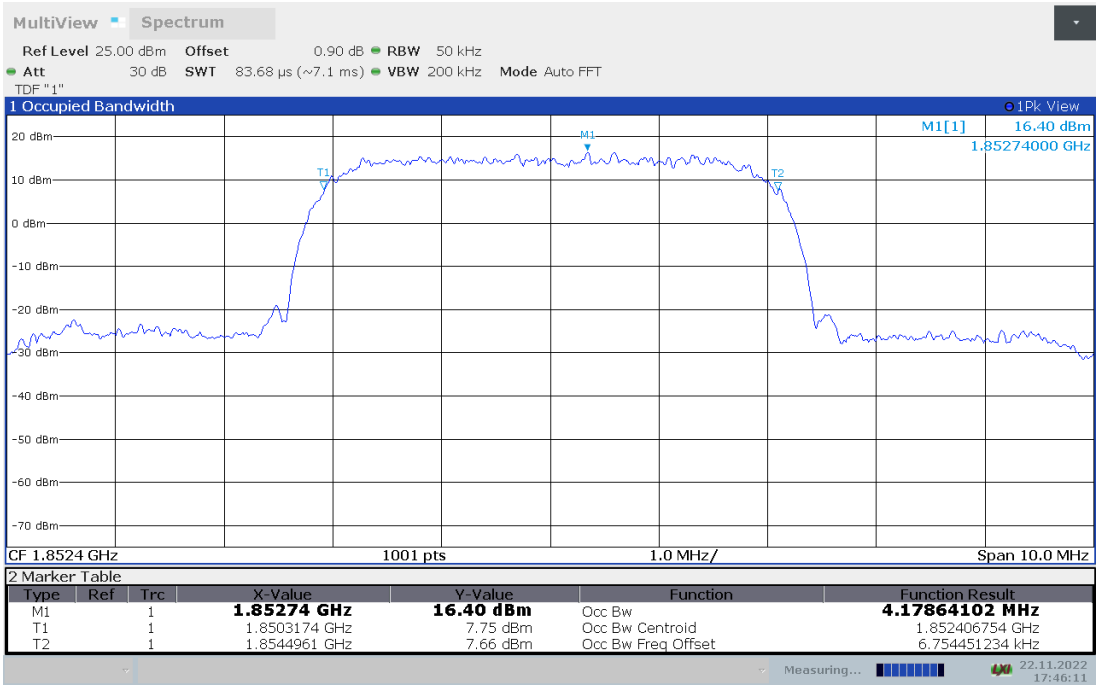
WCDMA Band 2 (99%)-16QAM

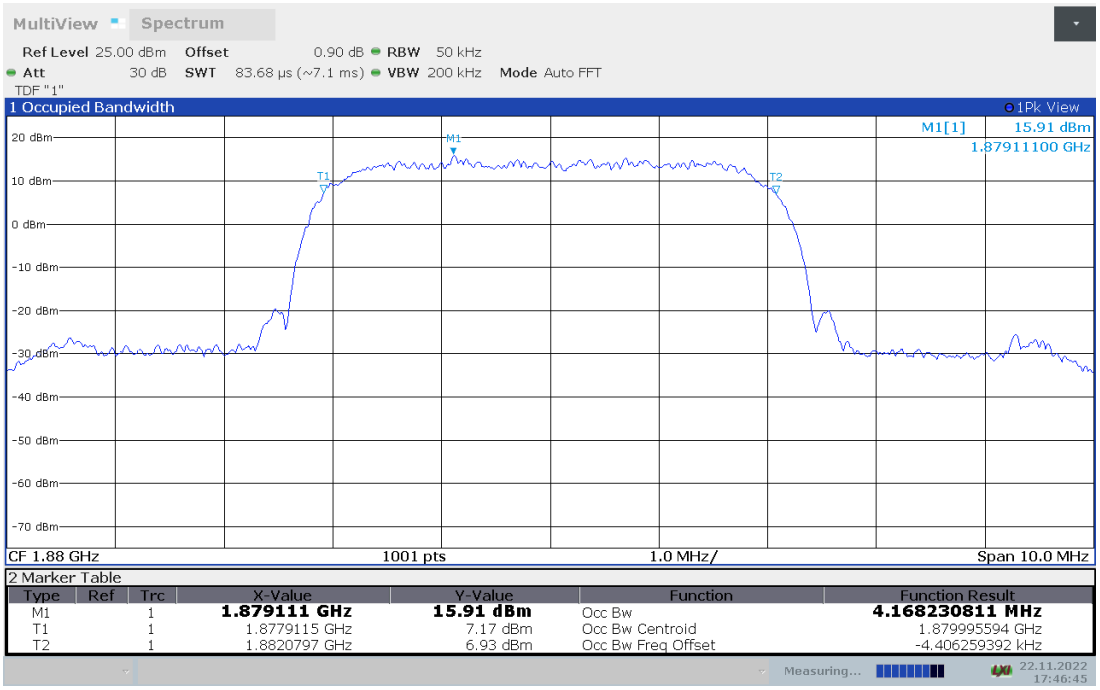
Frequency (MHz)	Occupied Bandwidth (99%) (MHz)
1852.4	4.179
1880	4.168
1907.6	4.169

WCDMA Band 2 (99%)

Channel 9262-Occupied Bandwidth (99% BW)



Channel 9400-Occupied Bandwidth (99% BW)



Channel 9538-Occupied Bandwidth (99% BW)

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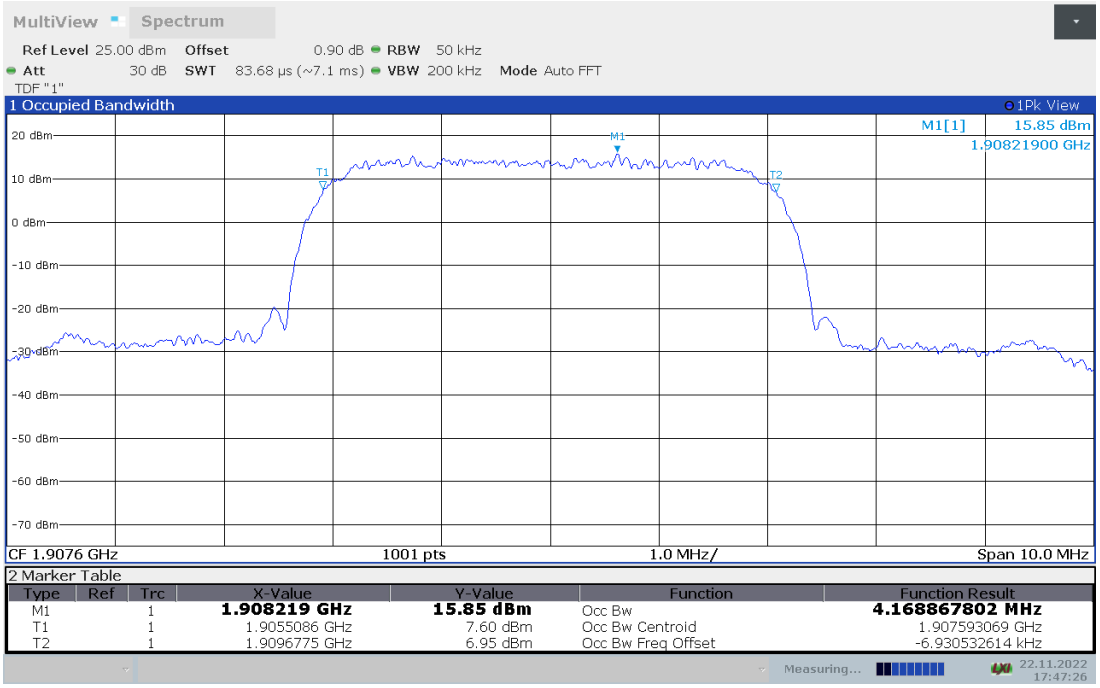

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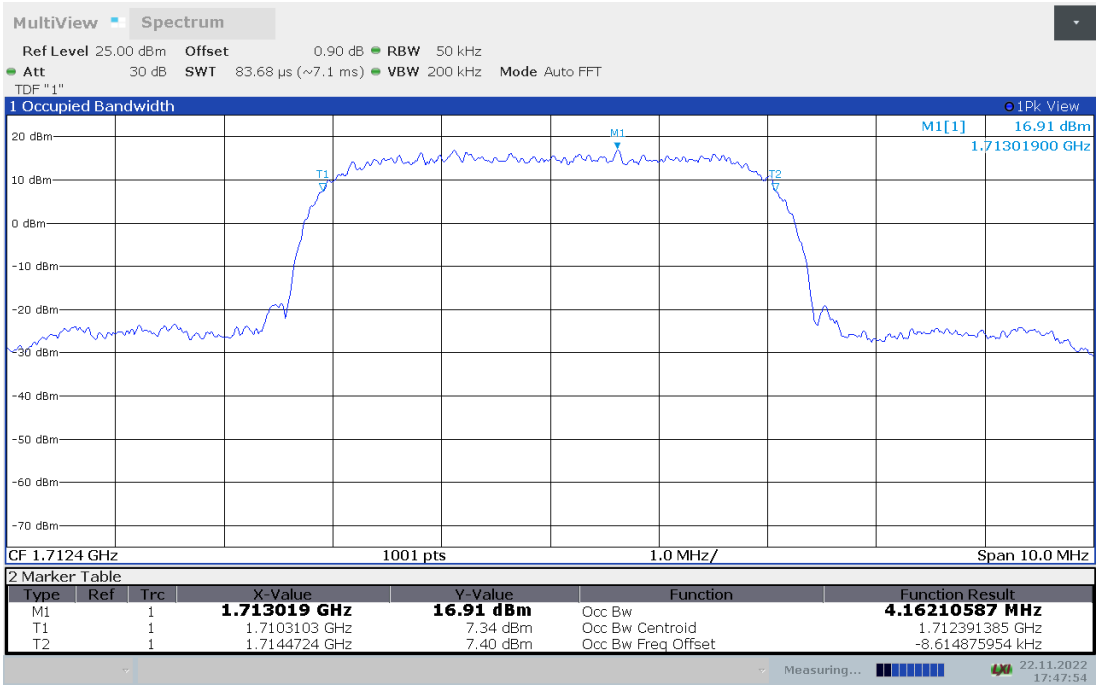
WCDMA Band 4 (99%)-QPSK

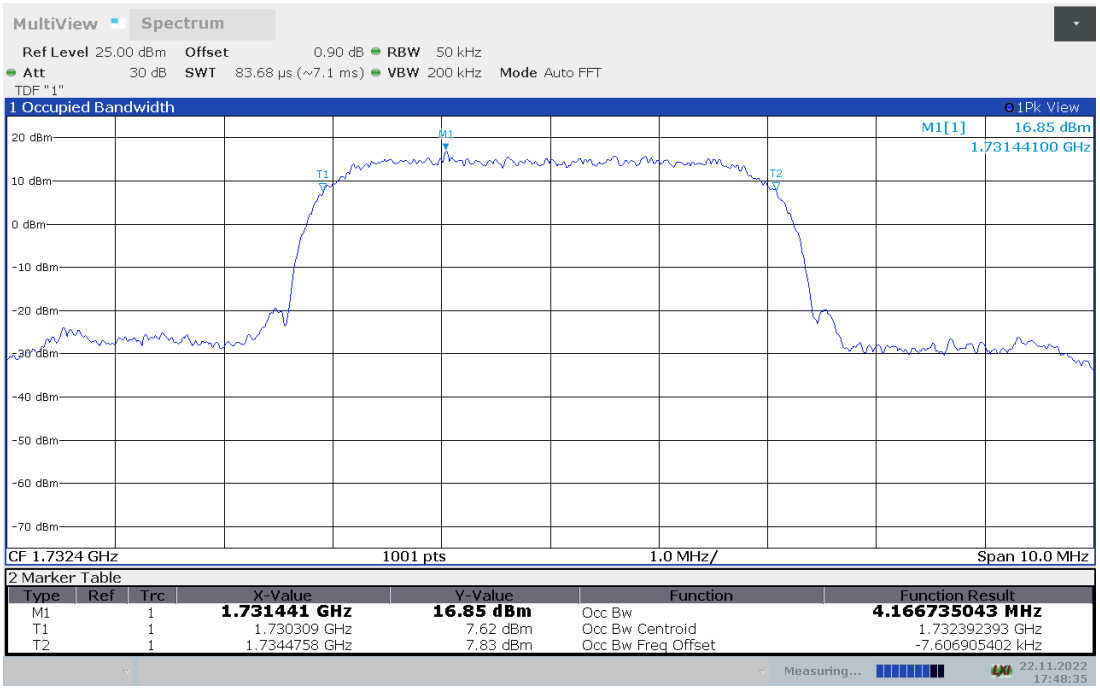
Frequency (MHz)	Occupied Bandwidth (99%) (MHz)
1712.4	4.162
1732.4	4.167
1752.6	4.185

WCDMA Band 4 (99%)

Channel 1312-Occupied Bandwidth (99% BW)



Channel 1412-Occupied Bandwidth (99% BW)



Channel 1513-Occupied Bandwidth (99% BW)

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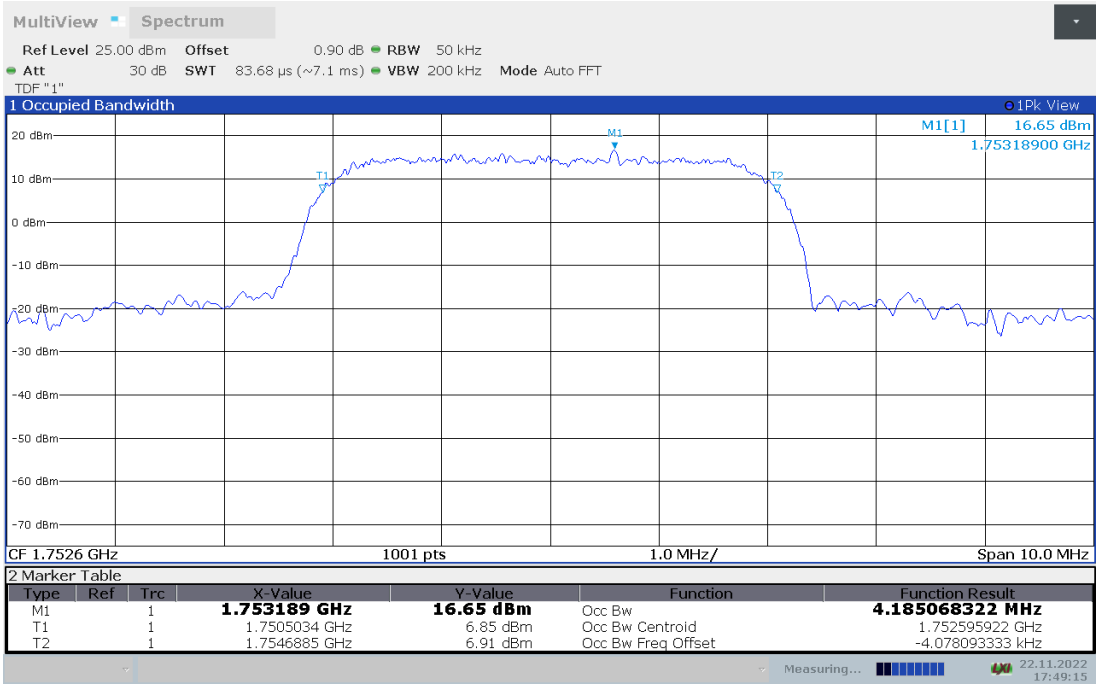

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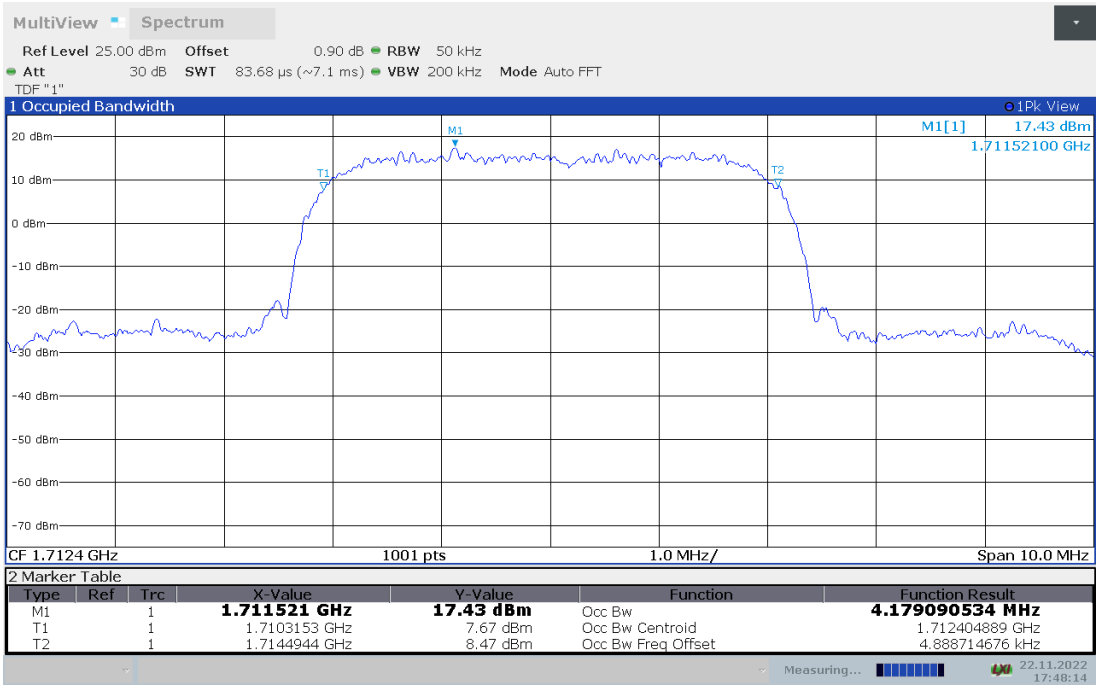
WCDMA Band 4 (99%)-16QAM

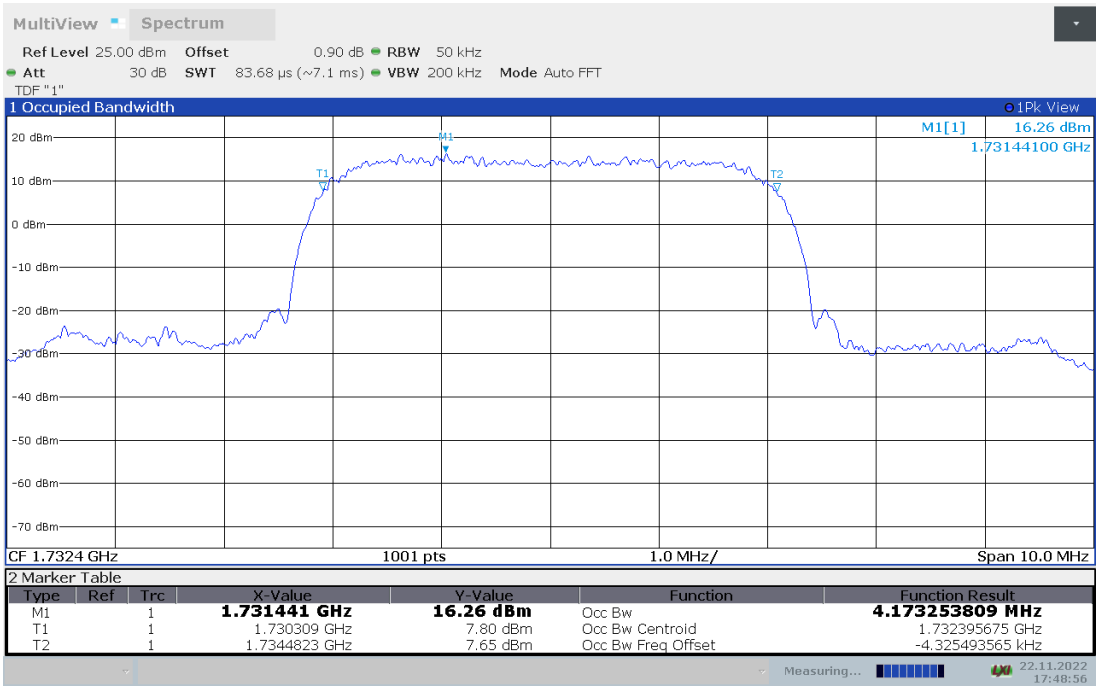
Frequency (MHz)	Occupied Bandwidth (99%) (MHz)
1712.4	4.179
1732.4	4.173
1752.6	4.167

WCDMA Band 4 (99%)

Channel 1312-Occupied Bandwidth (99% BW)



Channel 1412-Occupied Bandwidth (99% BW)



Channel 1513-Occupied Bandwidth (99% BW)

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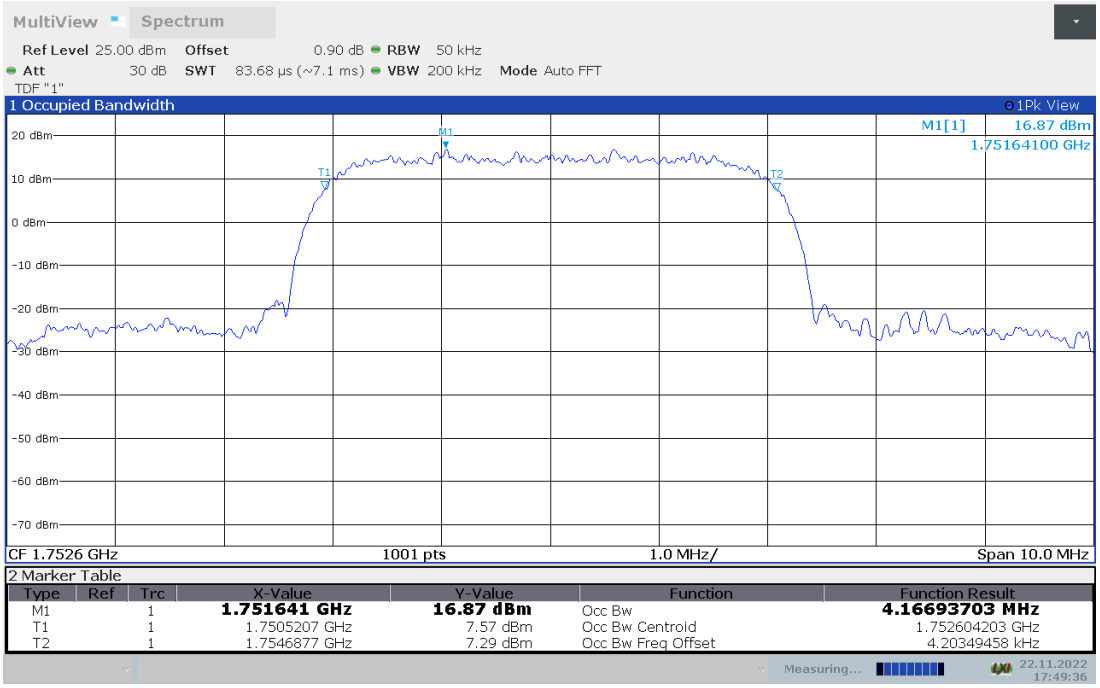

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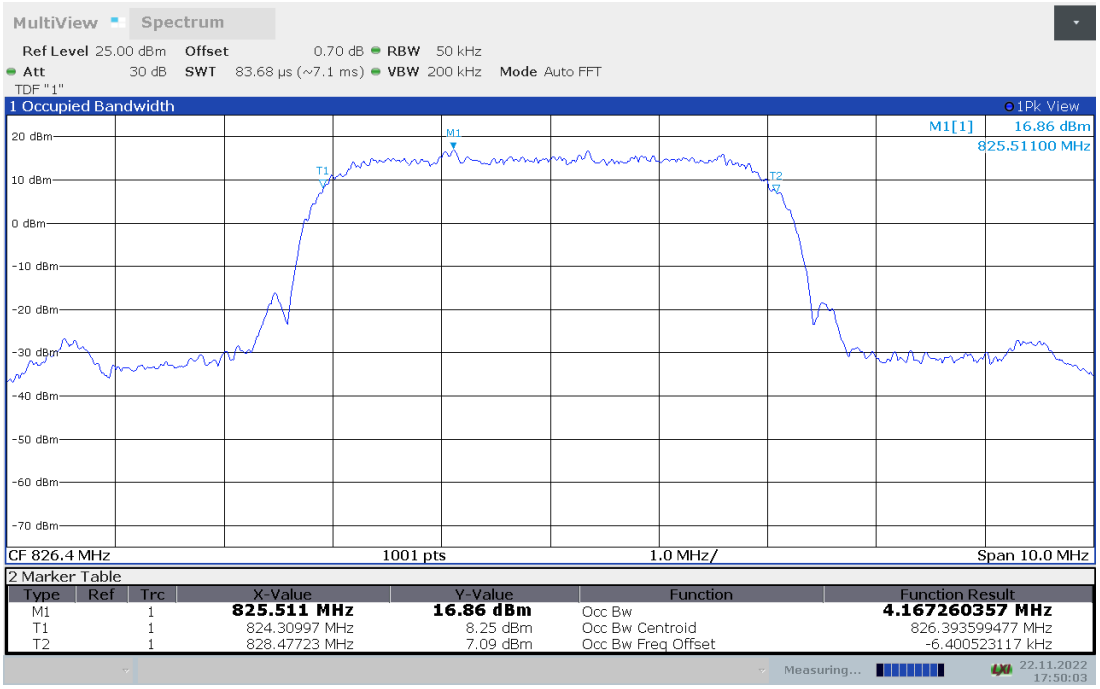
WCDMA Band 5 (99%)-QPSK

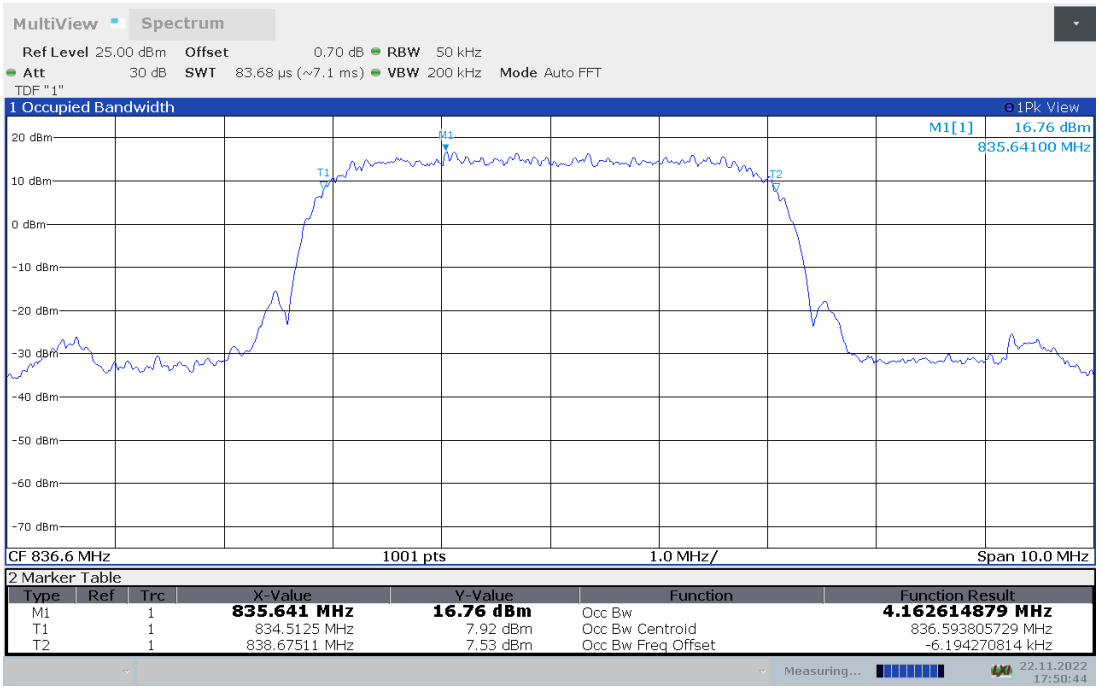
Frequency (MHz)	Occupied Bandwidth (99%) (MHz)
826.4	4.167
836.6	4.163
846.6	4.165

WCDMA Band 5 (99%)

Channel 4132-Occupied Bandwidth (99% BW)



Channel 4183-Occupied Bandwidth (99% BW)



Channel 4233-Occupied Bandwidth (99% BW)

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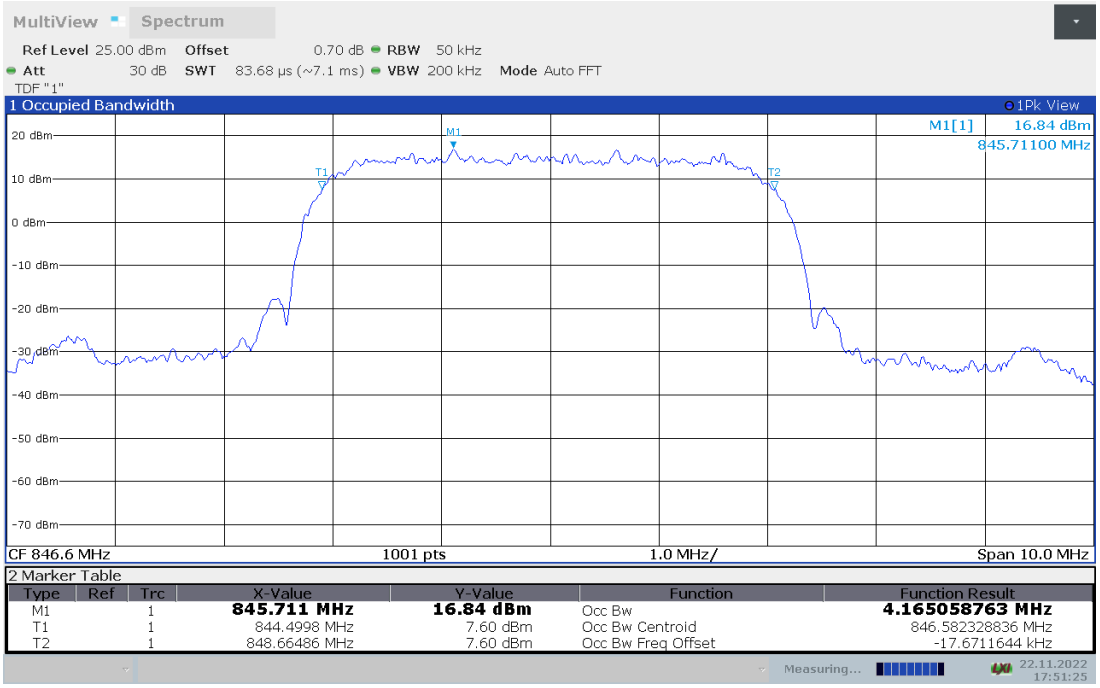

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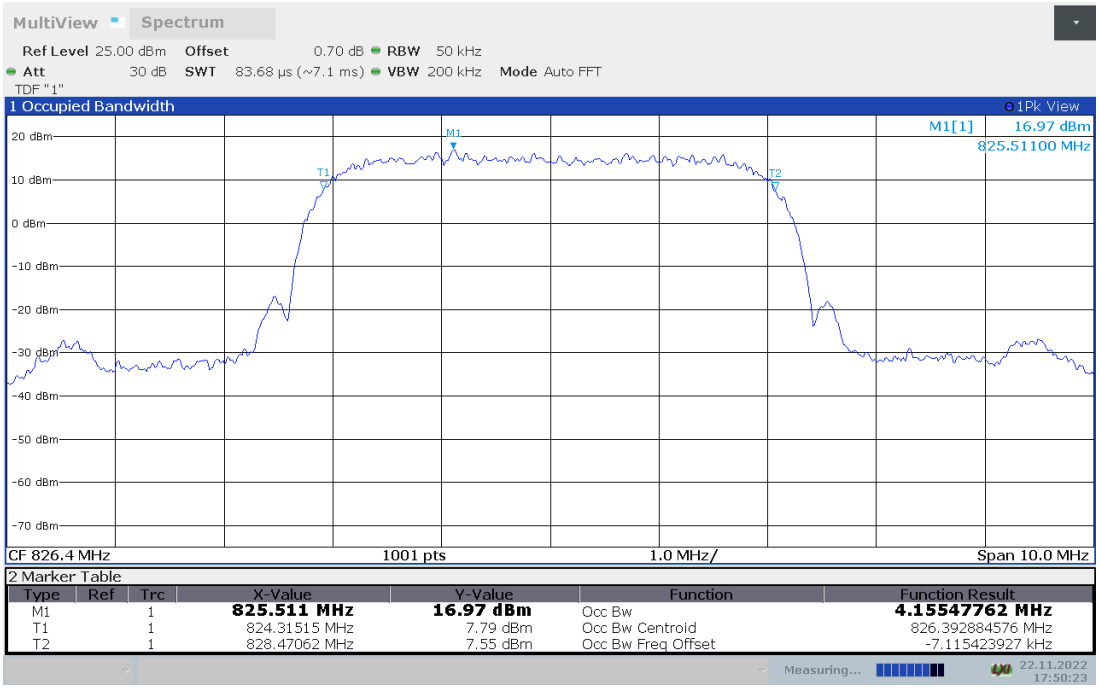
WCDMA Band 5 (99%)-16QAM

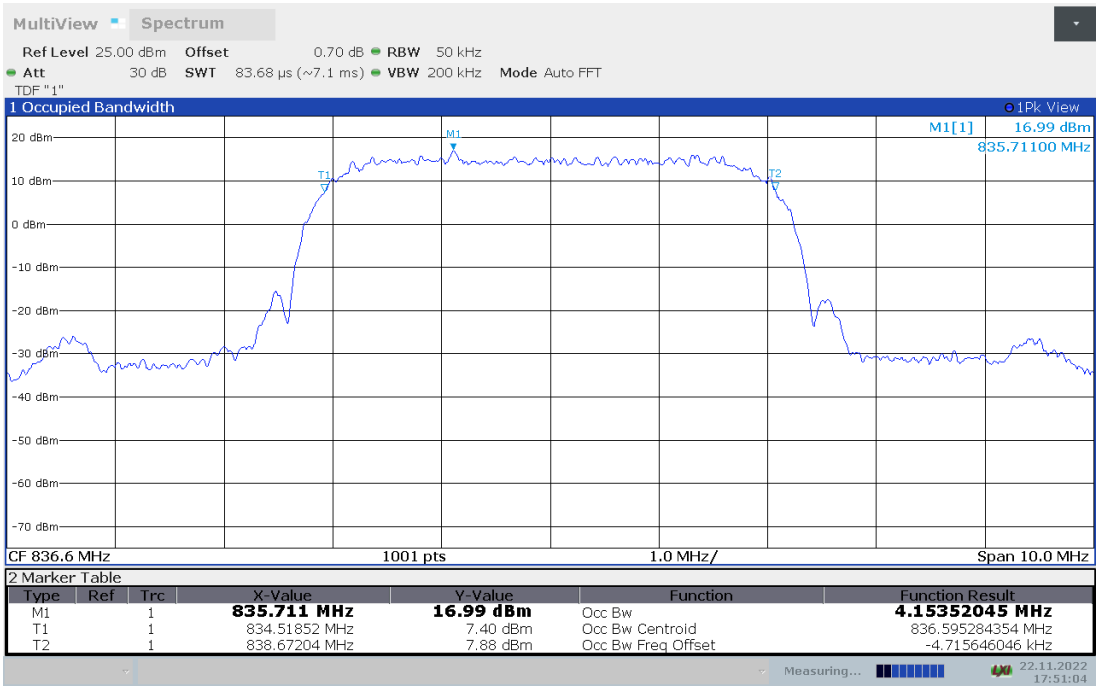
Frequency (MHz)	Occupied Bandwidth (99%) (MHz)
826.4	4.155
836.6	4.154
846.6	4.166

WCDMA Band 5 (99%)

Channel 4132-Occupied Bandwidth (99% BW)



Channel 4183-Occupied Bandwidth (99% BW)



Channel 4233-Occupied Bandwidth (99% BW)

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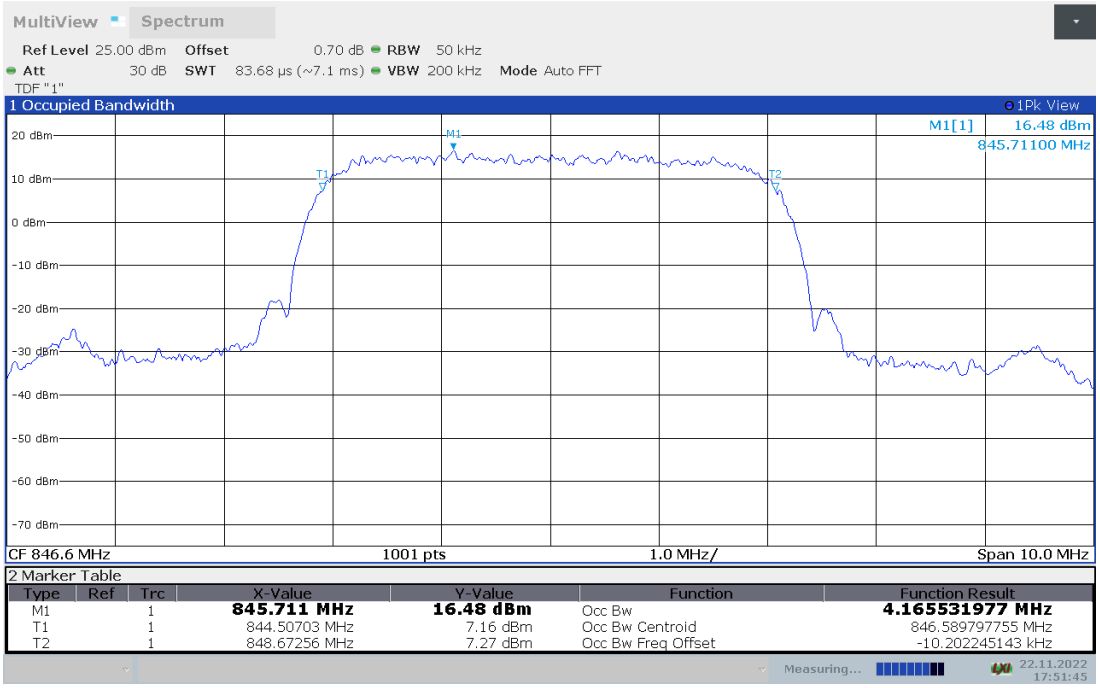

Note: Expanded measurement uncertainty is U = 3428Hz, k = 2

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A.5 EMISSION BANDWIDTH

Reference

FCC: CFR Part 2.1049, 22.917, 24.238, 27.53(g).

A.5.1Emission Bandwidth Results

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 26dB below the transmitter power.

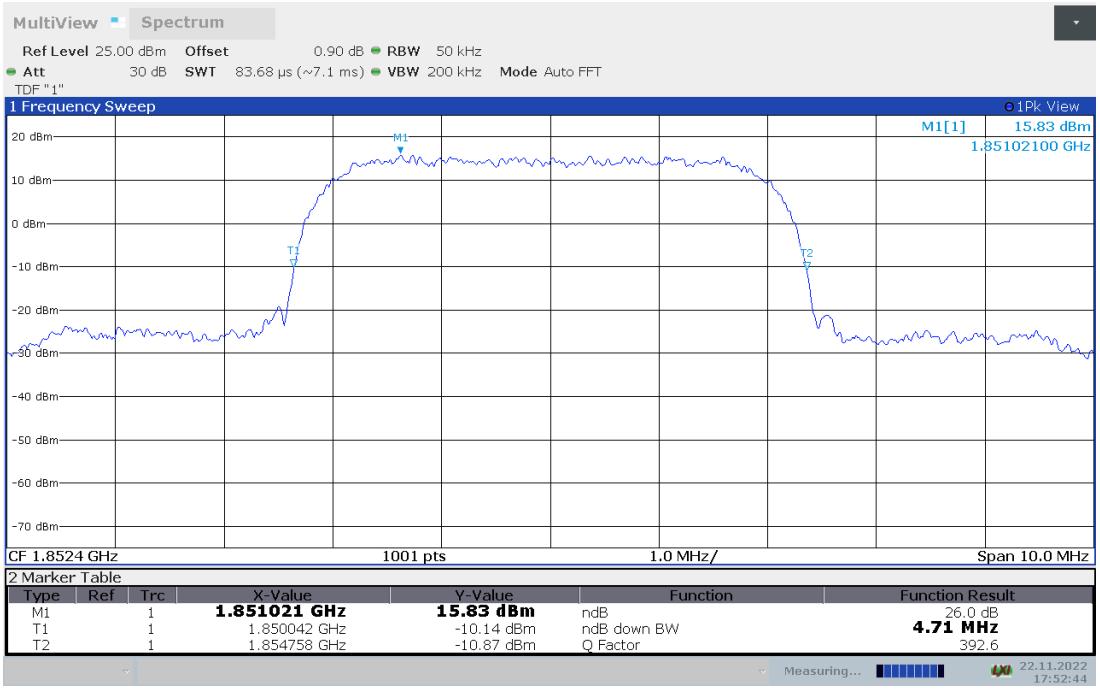
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

WCDMA Band 2 (-26dBc)-QPSK

Frequency (MHz)	Emission Bandwidth (-26dBc)(MHz)
1852.4	4.715
1880	4.695
1907.6	4.705

WCDMA Band 2 (-26dBc)

Channel 9262-Emission Bandwidth (-26dBc BW)



Channel 9400-Emission Bandwidth (-26dBc BW)

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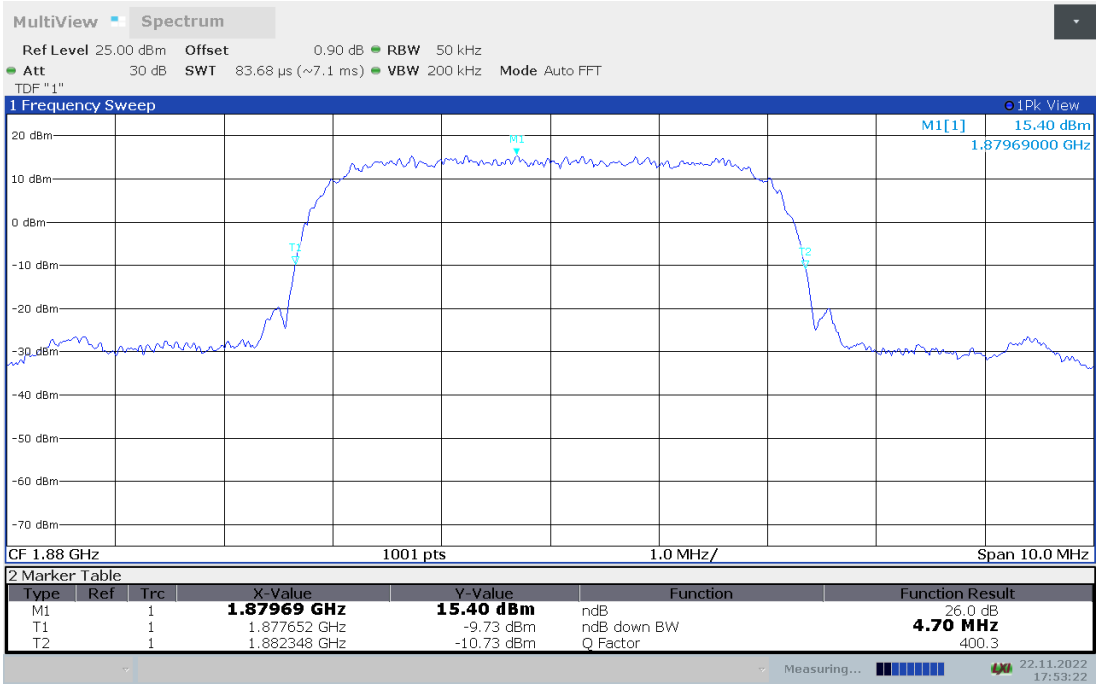
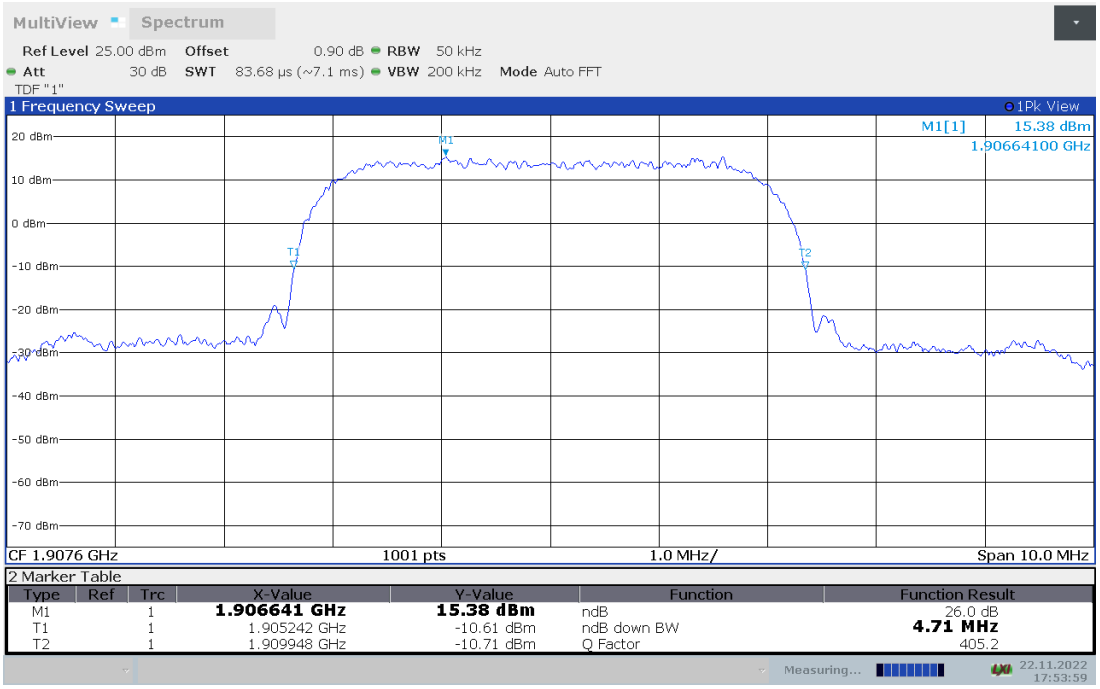


Channel 9538-Emission Bandwidth (-26dBc BW)



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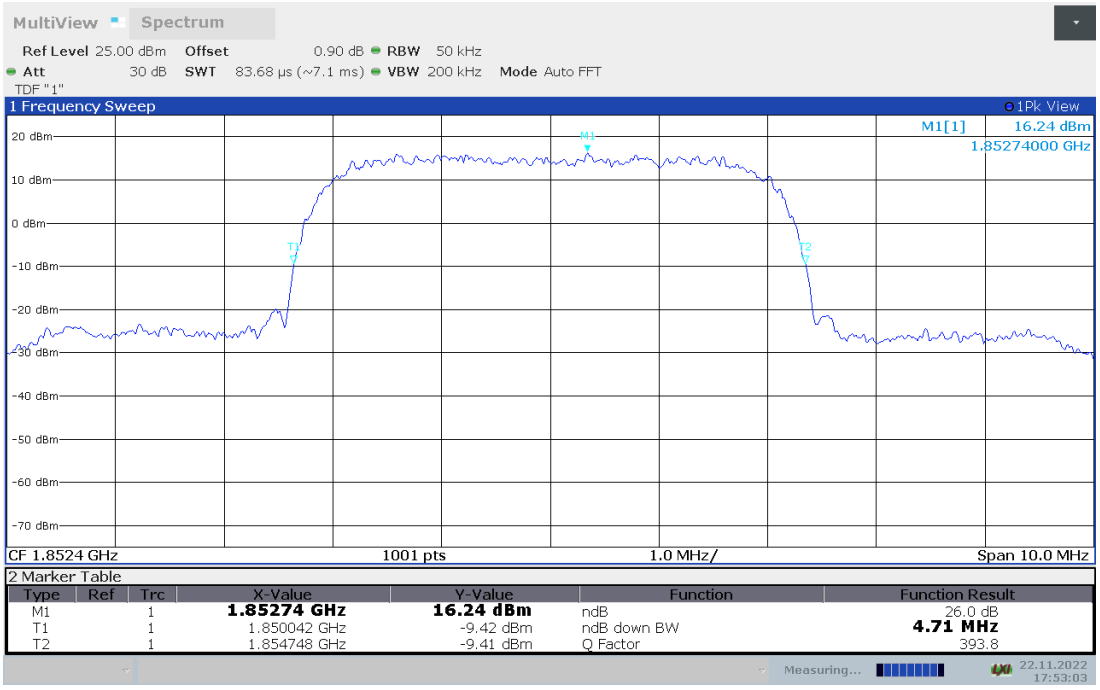
WCDMA Band 2 (-26dBc)-16QAM

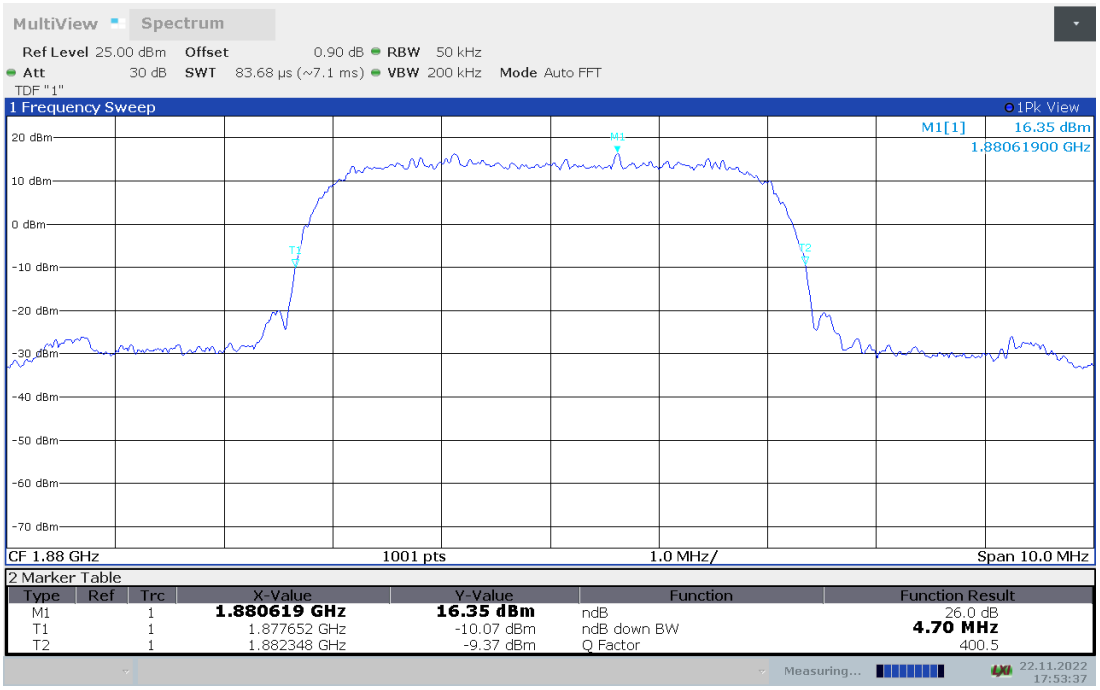
Frequency (MHz)	Emission Bandwidth (-26dBc)(MHz)
1852.4	4.705
1880	4.695
1907.6	4.705

WCDMA Band 2 (-26dBc)

Channel 9262-Emission Bandwidth (-26dBc BW)



Channel 9400-Emission Bandwidth (-26dBc BW)



Channel 9538-Emission Bandwidth (-26dBc BW)

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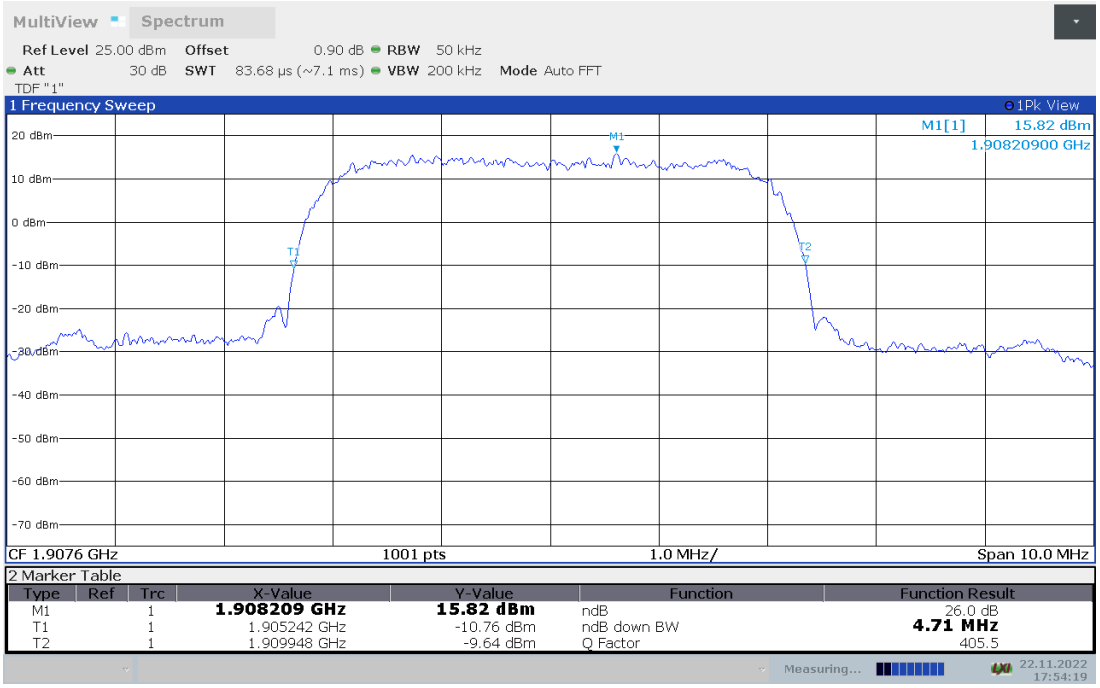

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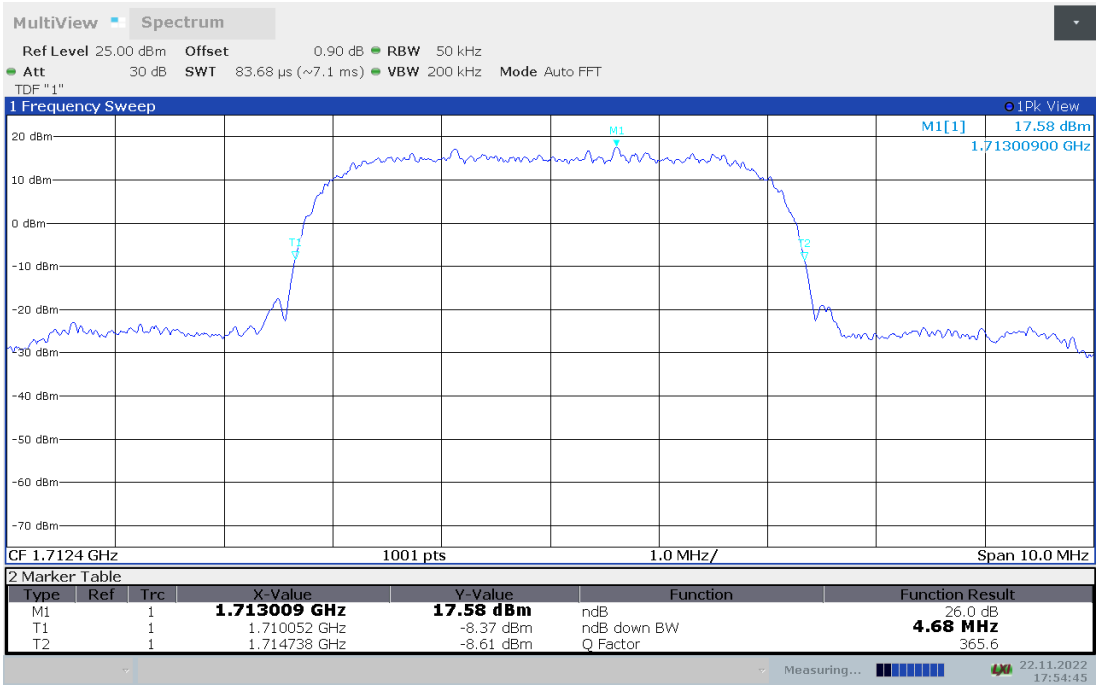
WCDMA Band 4 (-26dBc)-QPSK

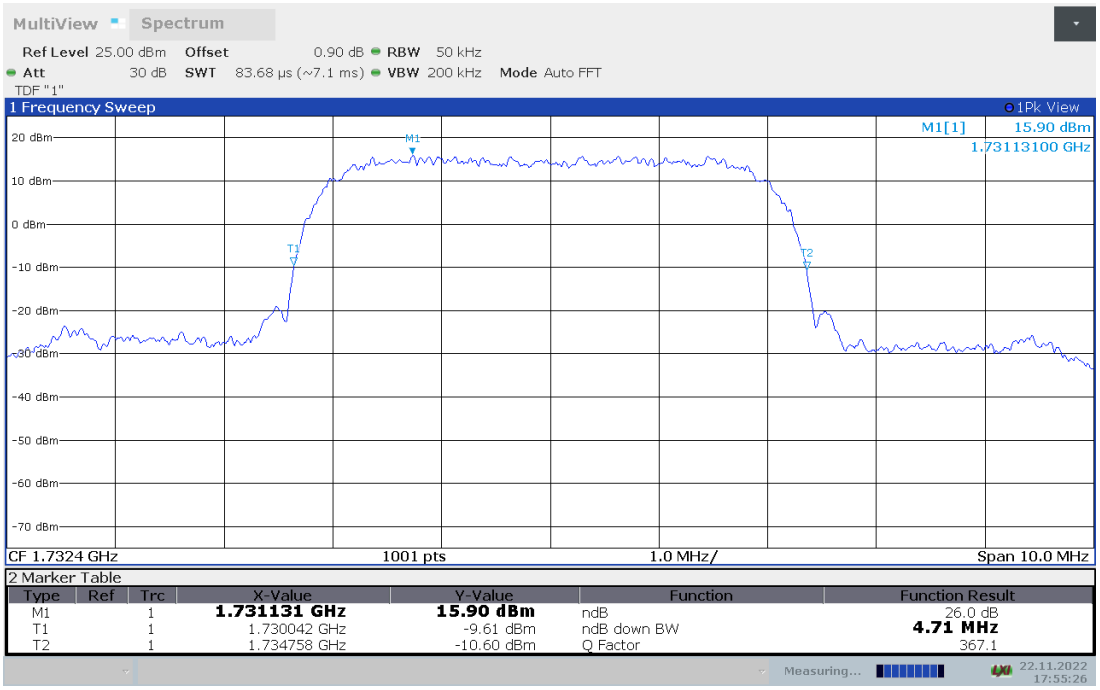
Frequency (MHz)	Emission Bandwidth (-26dBc)(MHz)
1712.4	4.685
1732.4	4.715
1752.6	4.705

WCDMA Band 4 (-26dBc)

Channel 1312-Emission Bandwidth (-26dBc BW)



Channel 1412-Emission Bandwidth (-26dBc BW)



Channel 1513-Emission Bandwidth (-26dBc BW)

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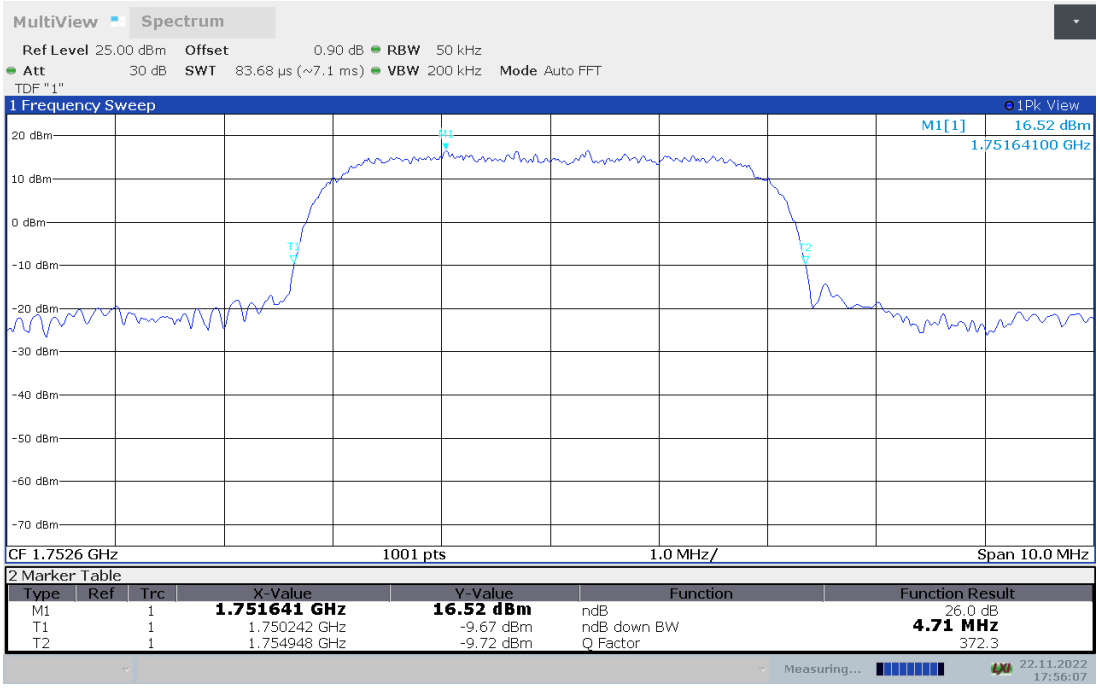

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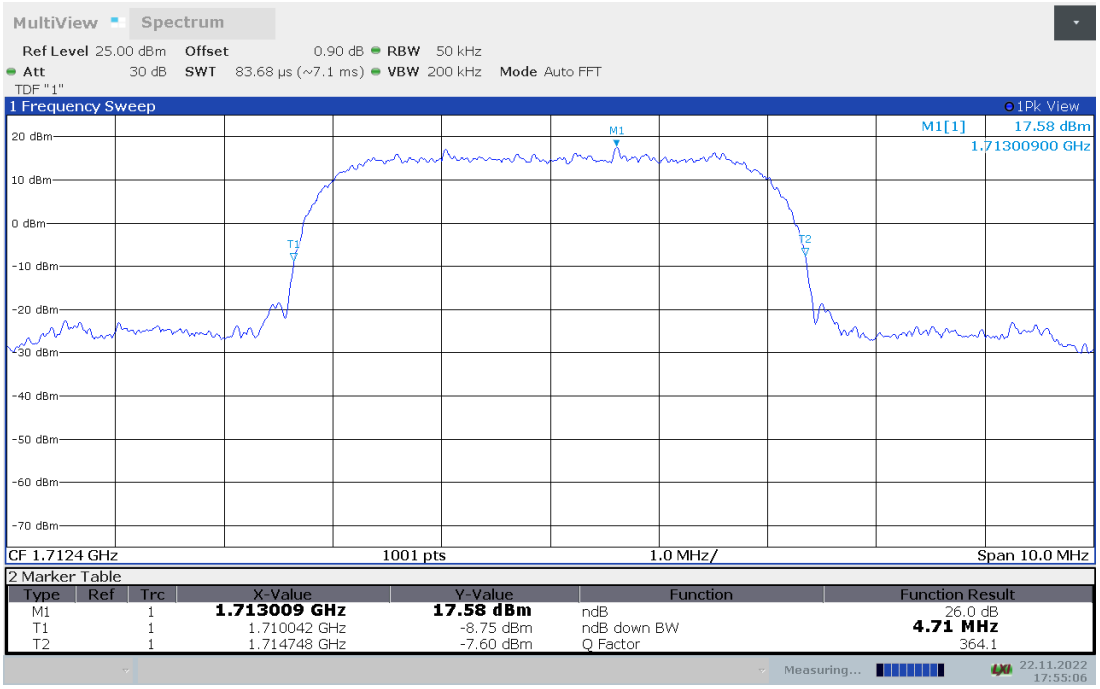
WCDMA Band 4 (-26dBc)-16QAM

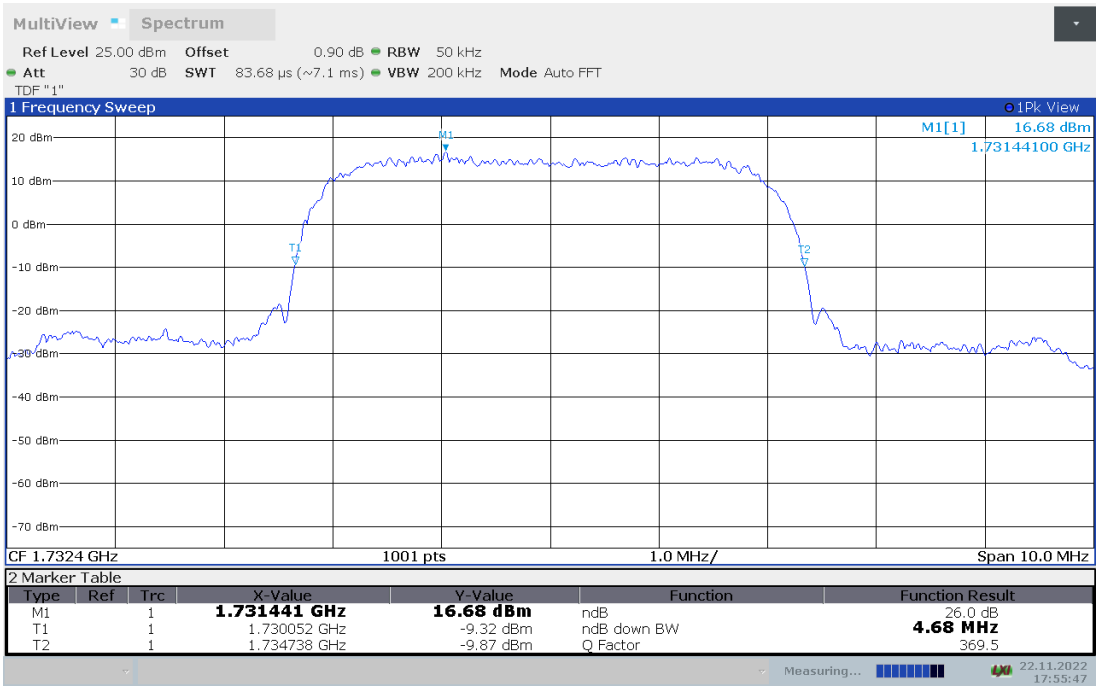
Frequency (MHz)	Emission Bandwidth (-26dBc)(MHz)
1712.4	4.705
1732.4	4.685
1752.6	4.695

WCDMA Band 4 (-26dBc)

Channel 1312-Emission Bandwidth (-26dBc BW)



Channel 1412-Emission Bandwidth (-26dBc BW)



Channel 1513-Emission Bandwidth (-26dBc BW)

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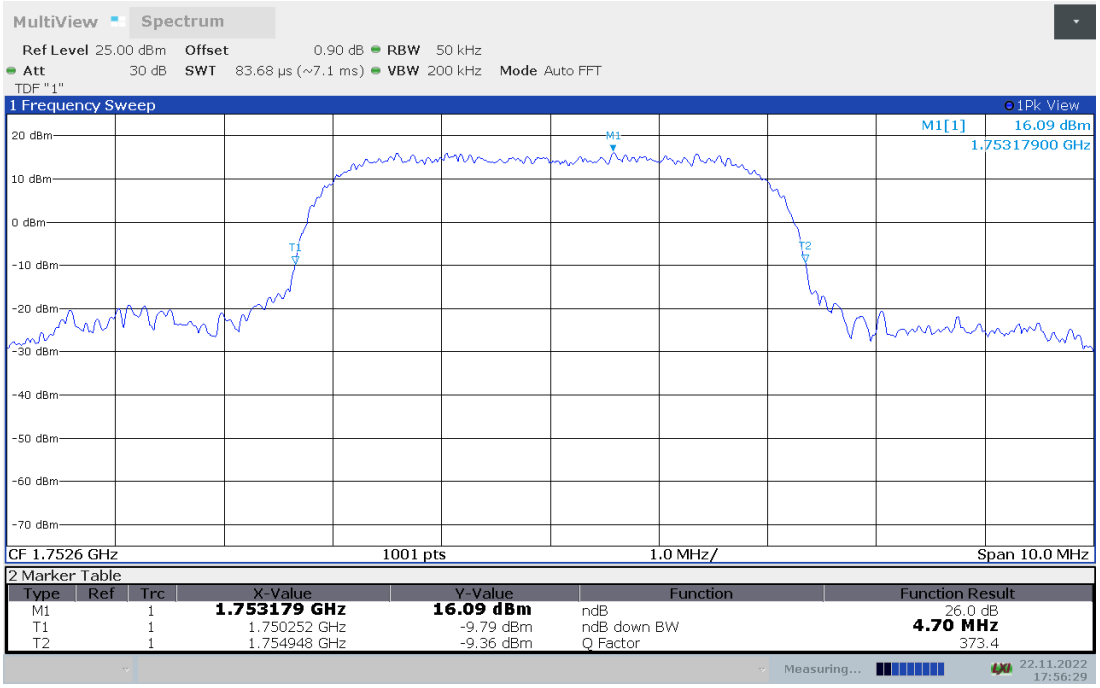

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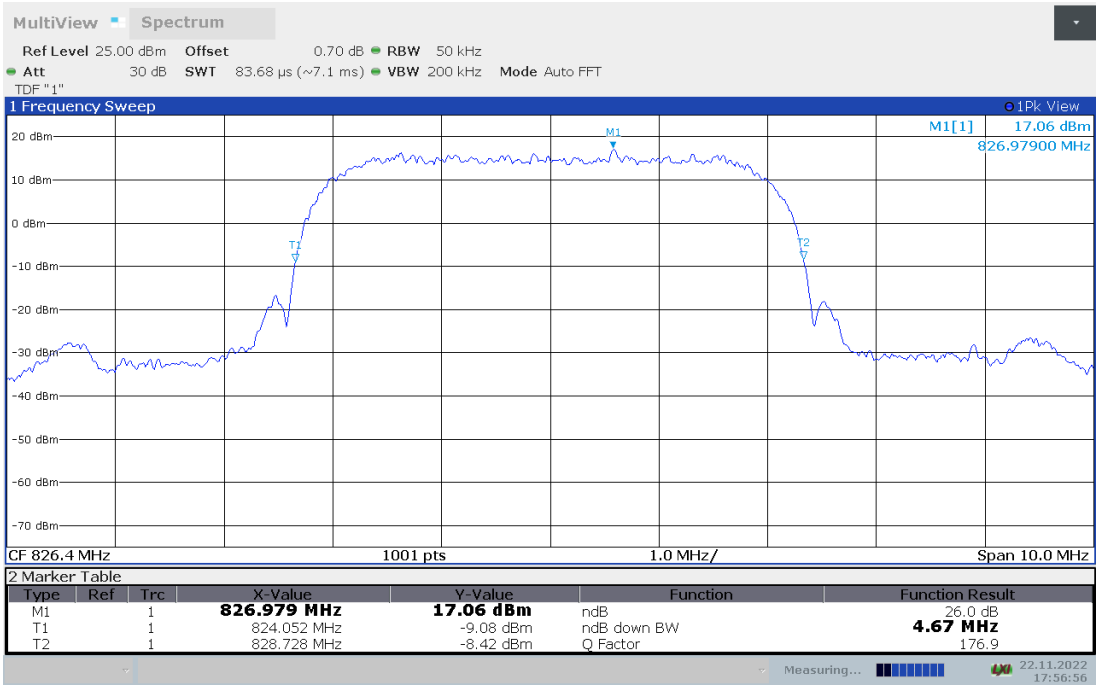
WCDMA Band 5 (-26dBc)-QPSK

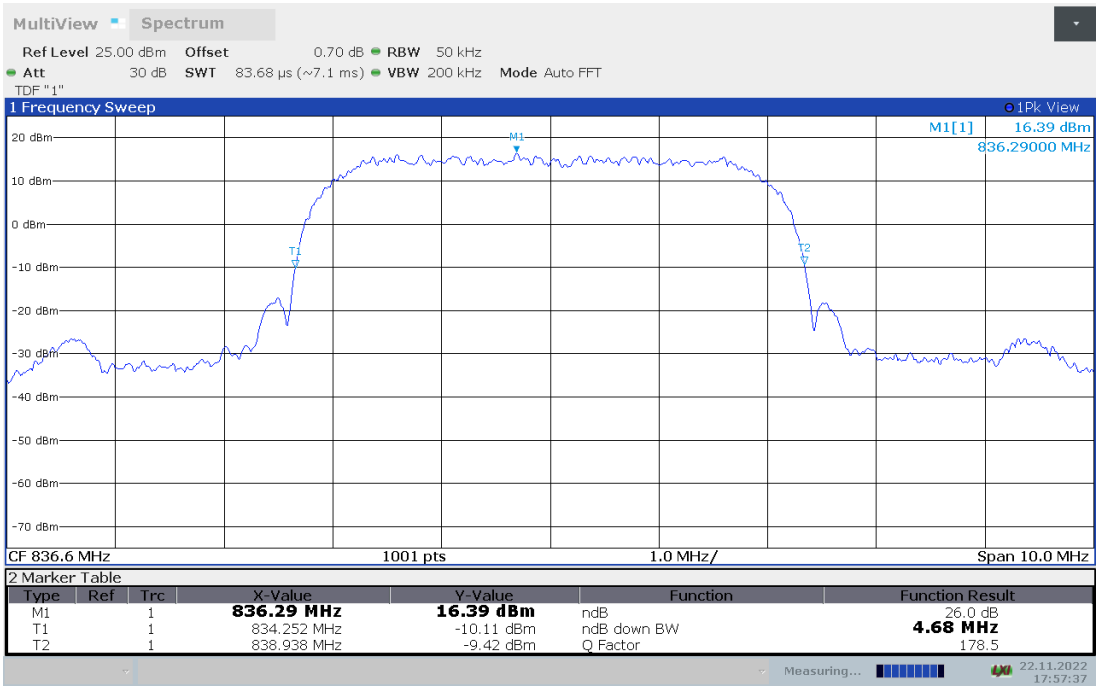
Frequency (MHz)	Emission Bandwidth (-26dBc)(MHz)
826.4	4.675
836.6	4.685
846.6	4.685

WCDMA Band 5 (-26dBc)

Channel 4132-Emission Bandwidth (-26dBc BW)



Channel 4183-Emission Bandwidth (-26dBc BW)



Channel 4233-Emission Bandwidth (-26dBc BW)

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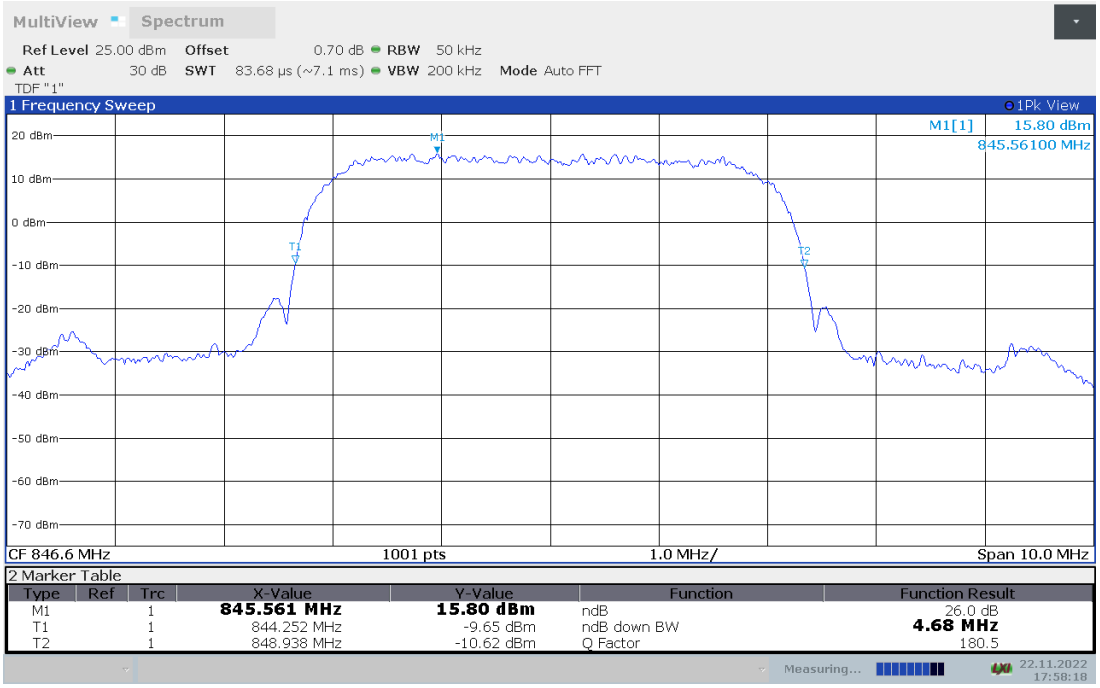

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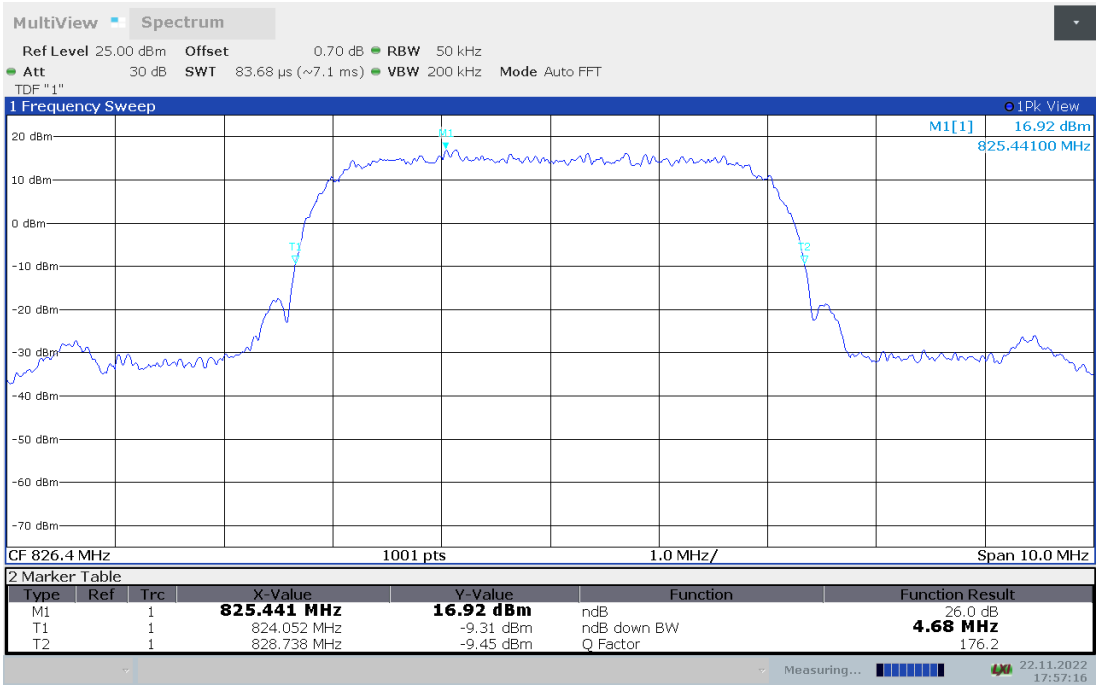
WCDMA Band 5 (-26dBc)-16QAM

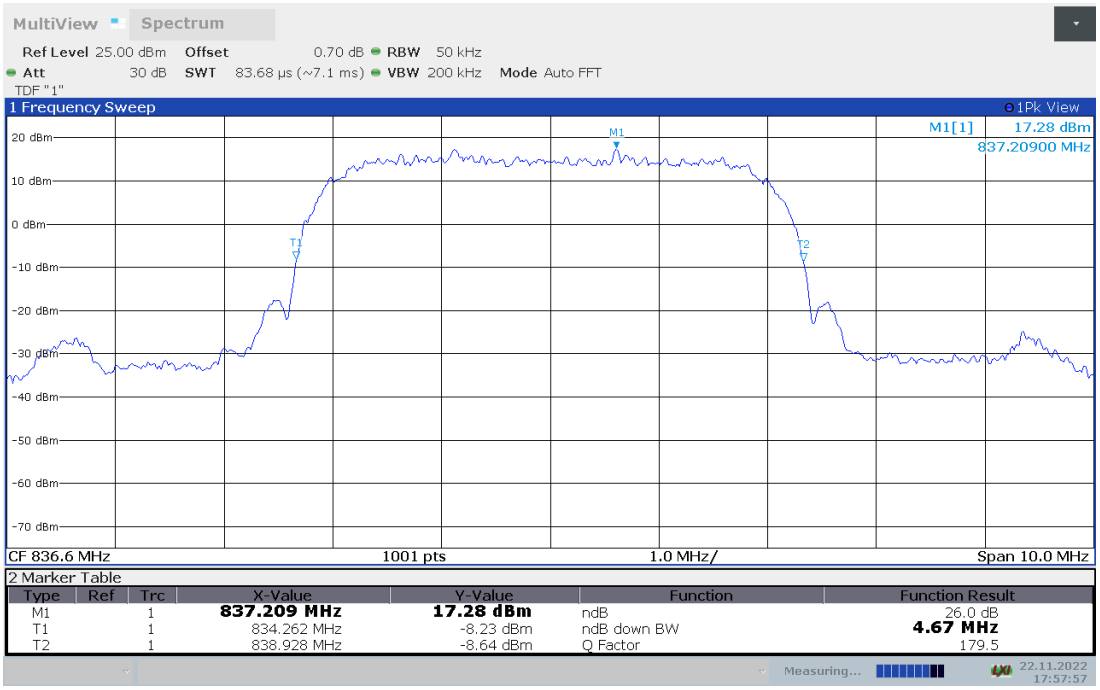
Frequency (MHz)	Emission Bandwidth (-26dBc)(MHz)
826.4	4.685
836.6	4.665
846.6	4.685

WCDMA Band 5 (-26dBc)

Channel 4132-Emission Bandwidth (-26dBc BW)



Channel 4183-Emission Bandwidth (-26dBc BW)



Channel 4233-Emission Bandwidth (-26dBc BW)

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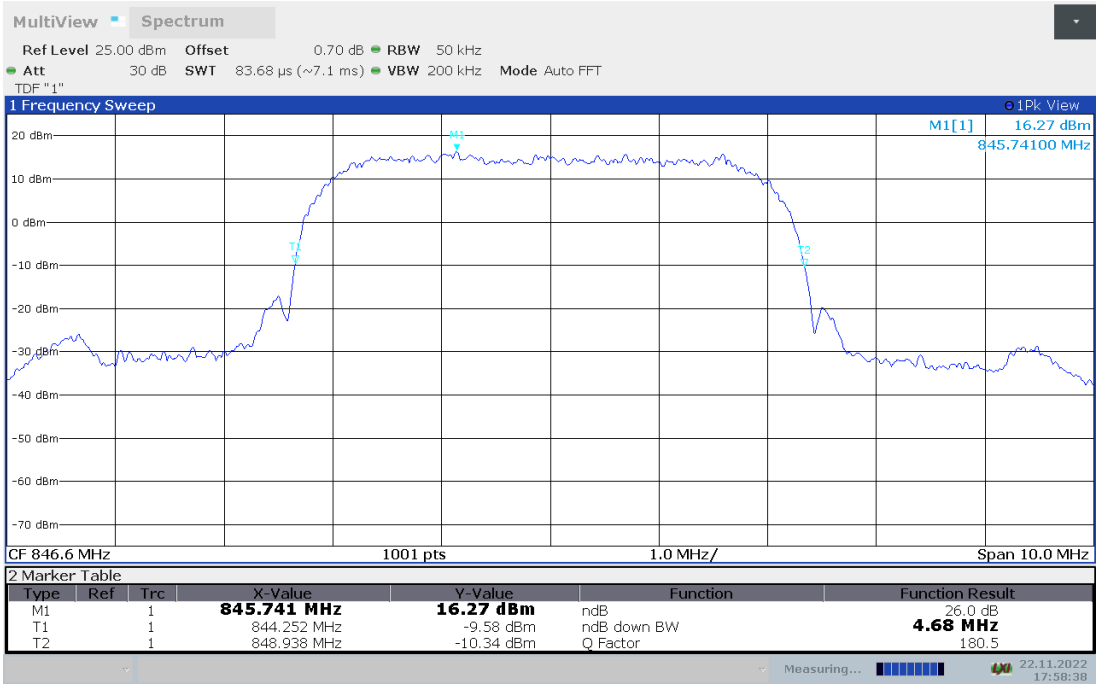

Note: Expanded measurement uncertainty is U = 3428Hz, k = 2

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A.6 BAND EDGE COMPLIANCE

Reference

FCC: CFR Part 2.1051, 22.917, 24.238, 27.53(h).

A.6.1 Measurement limit

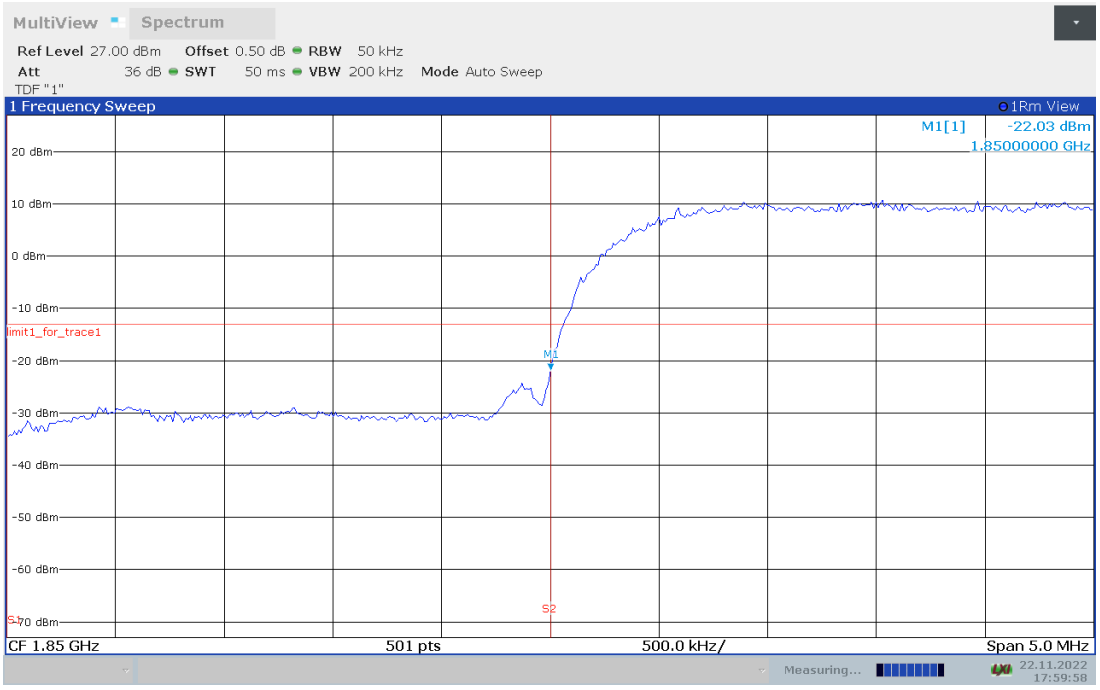
On any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log (P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm. A relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

A.6.2 Measurement result

Only worst case result is given below

WCDMA Band 2-QPSK

Channel 9262



Channel 9538

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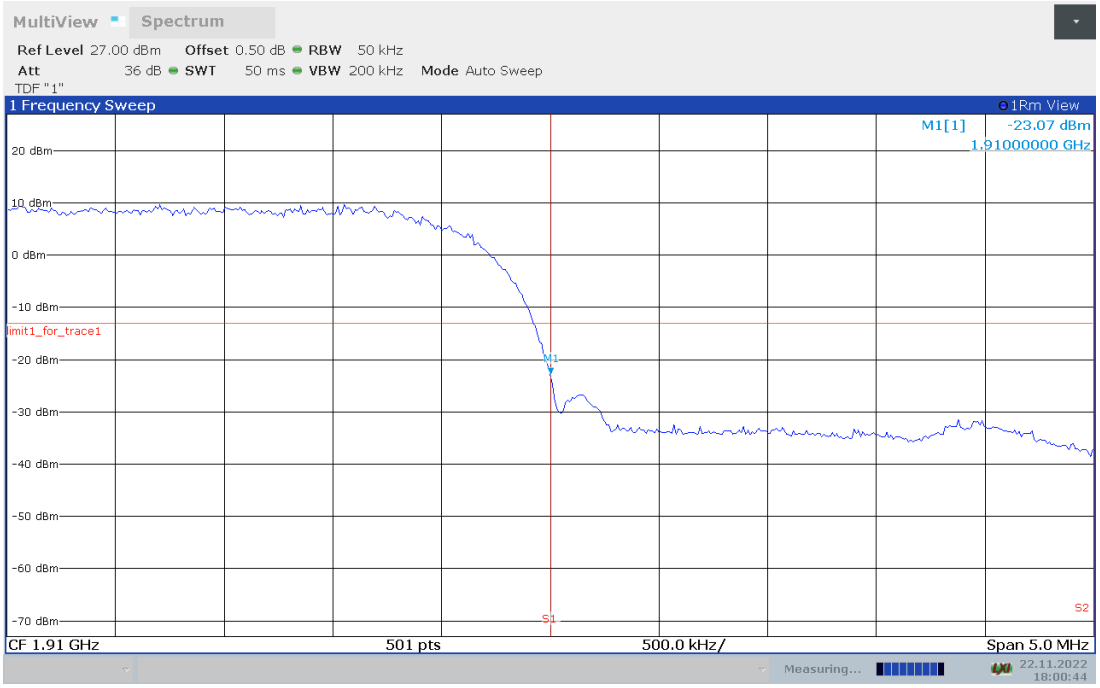

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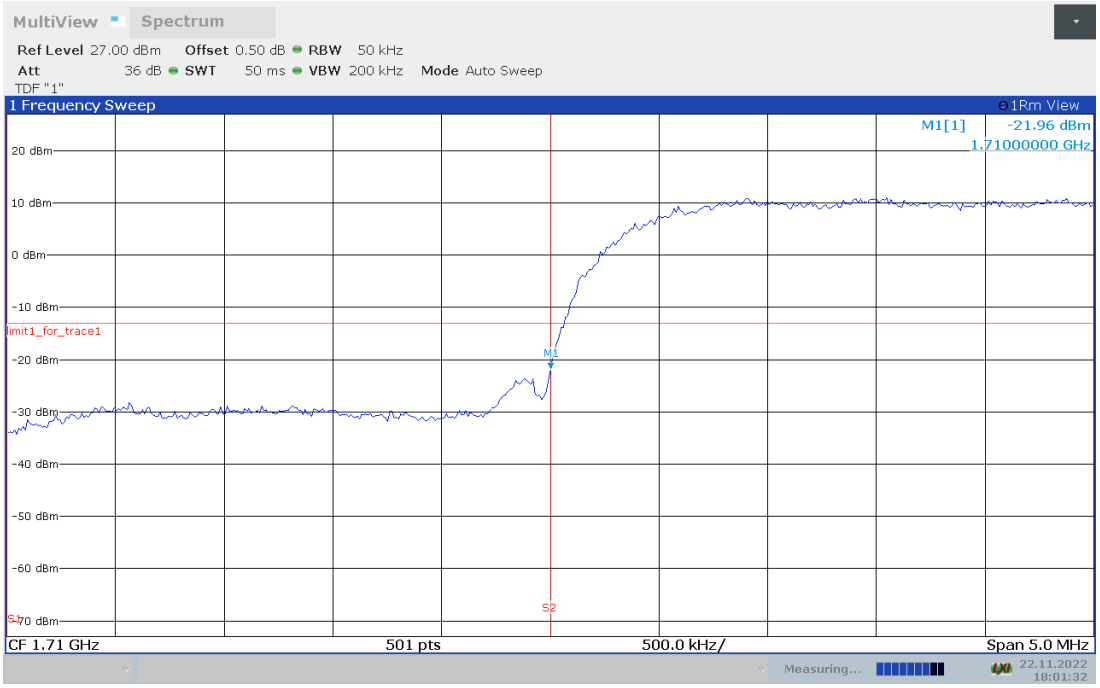
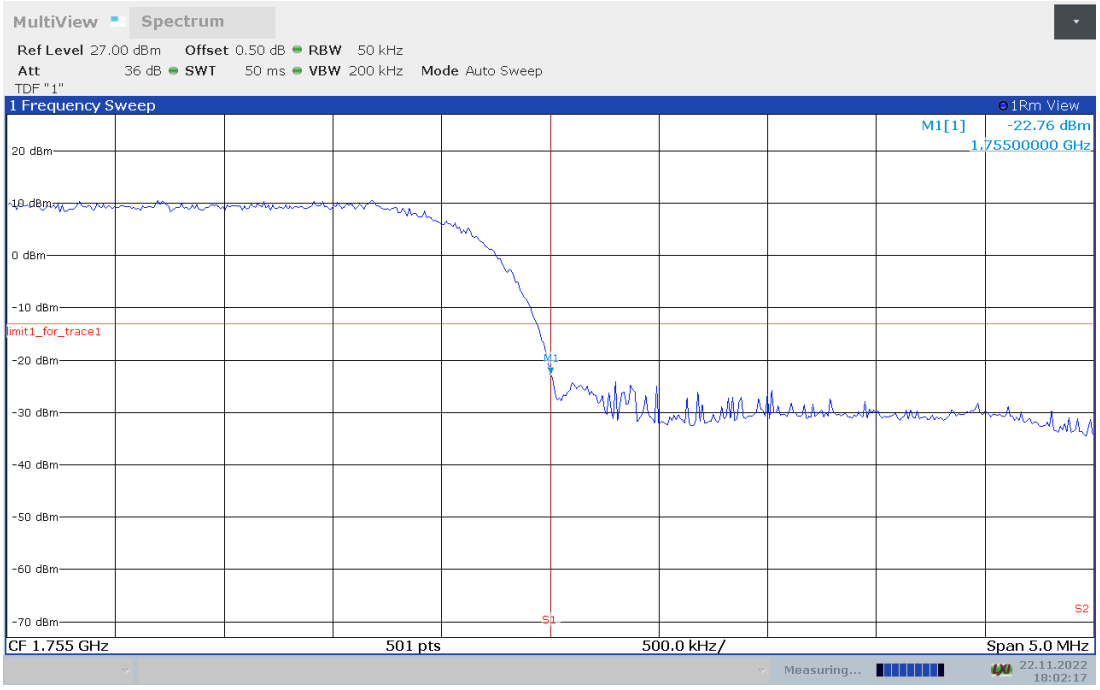
WCDMA Band 4-QPSK

Channel 1312



Channel 1513



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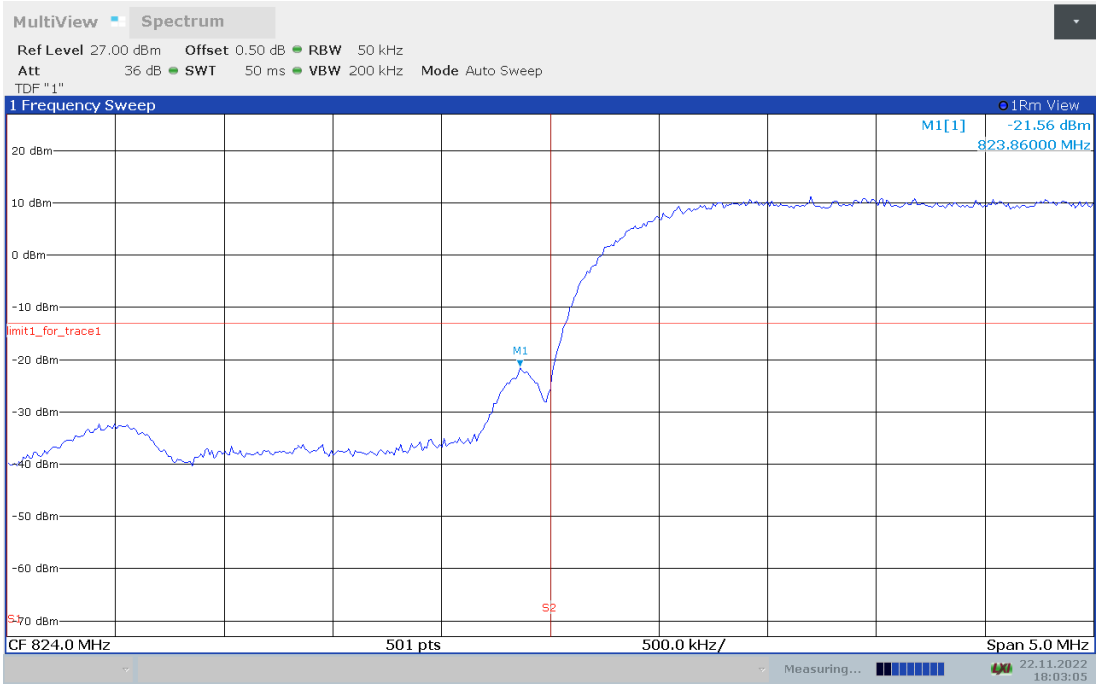
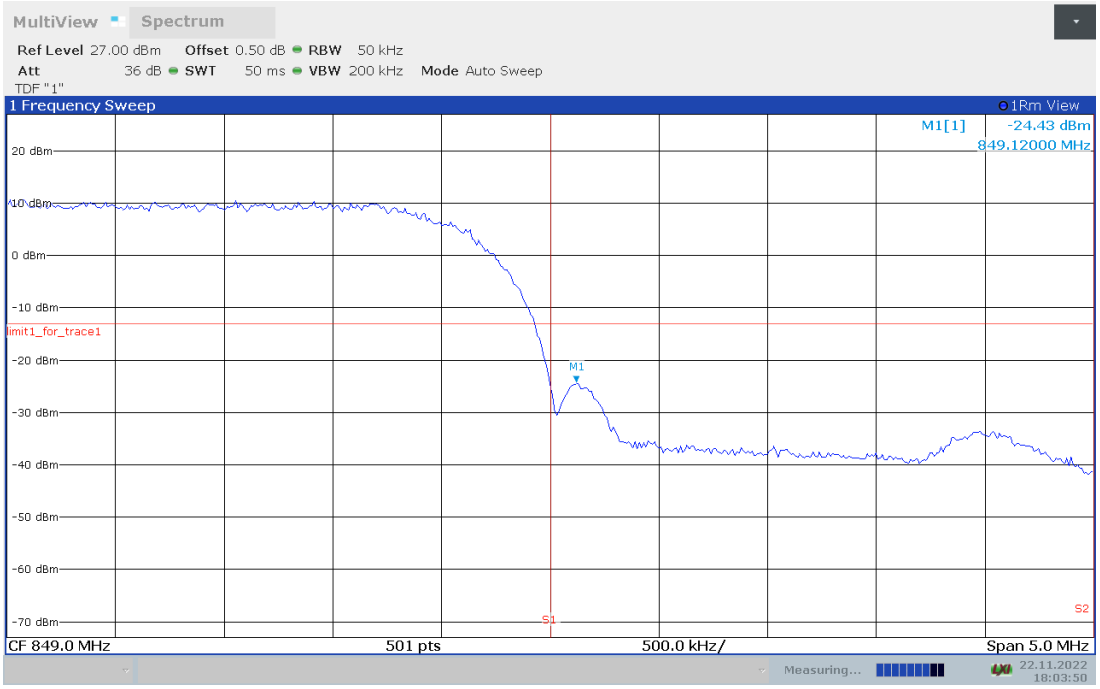
WCDMA Band 5-QPSK

Channel 4132



Channel 4233



Note: Expanded measurement uncertainty is U = 0.49 dB(100KHz-2GHz)/1.21 dB (2GHz-26.5GHz), k = 1.96

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A.7 CONDUCTED SPURIOUS EMISSION

Reference

FCC: CFR Part 2.1051, 22.917, 24.238, 27.53(h).

A.7.1 Measurement Method

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

1. Determine frequency range for measurements: From CFR 2.1051 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 9 GHz, data taken from 10 MHz to 25 GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

WCDMA Band Ⅱ Transmitter

Channel	Frequency (MHz)
9262	1852.4
9400	1880.0
9538	1907.6

WCDMA Band Ⅴ Transmitter

Channel	Frequency (MHz)
4132	826.4
4183	836.6
4233	846.6

WCDMA Band IV Transmitter

Channel	Frequency (MHz)
1312	1712.4
1412	1732.4
1513	1752.6

A.7.2 Measurement Limit

Part 24.238, Part 22.917 and Part 27.53(h) specify that the power of any emission outside of the authorized

operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

A.7.3 Measurement result

Only worst case result is given below

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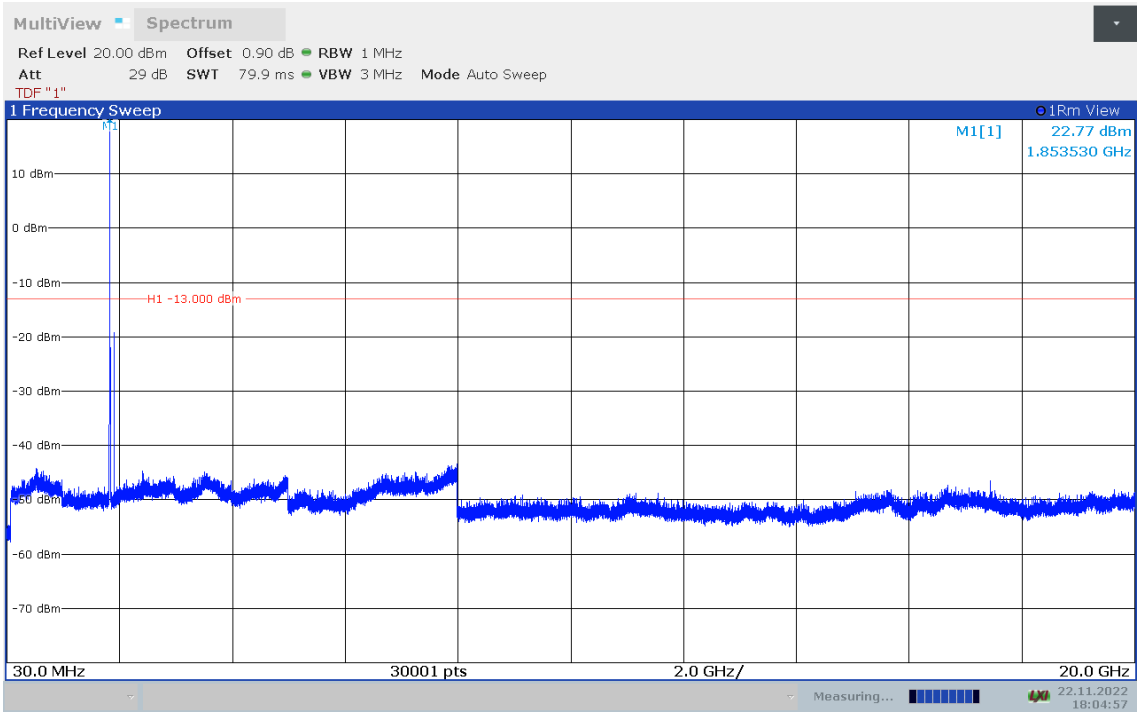
WCDMA Band Ⅱ

Channel 9262: 30MHz –19.1GHz

Spurious emission limit –13dBm.

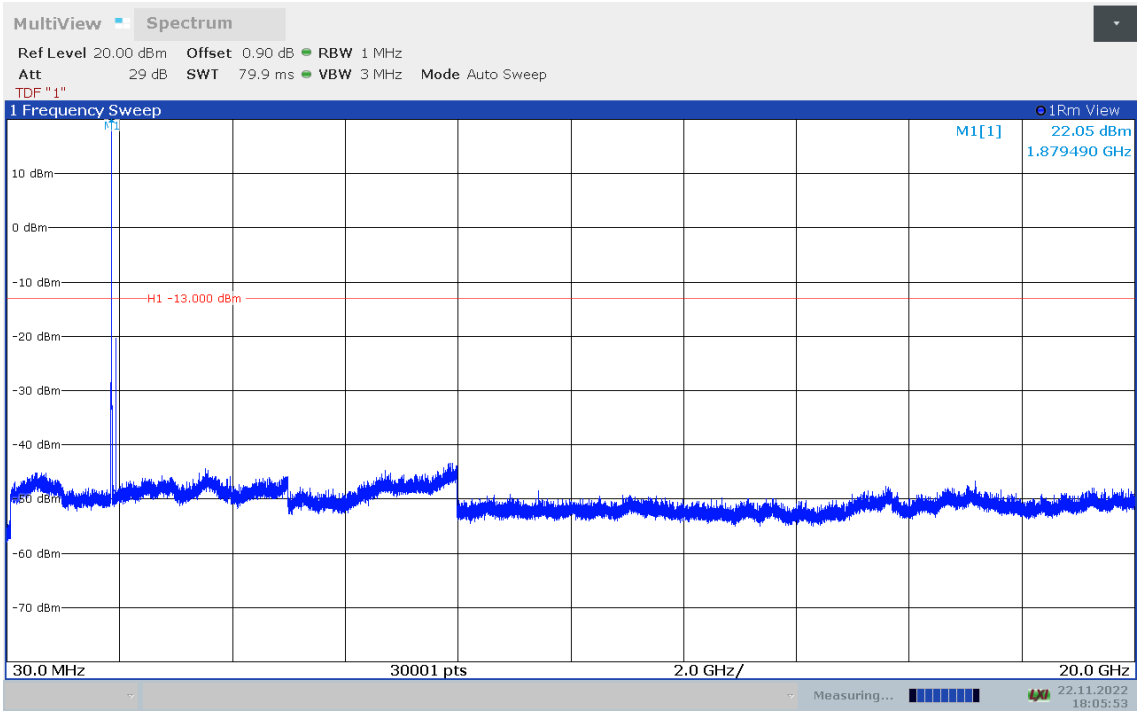
NOTE: peak above the limit line is the carrier frequency.



Channel 9400: 30MHz –19.1GHz

Spurious emission limit –13dBm.

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



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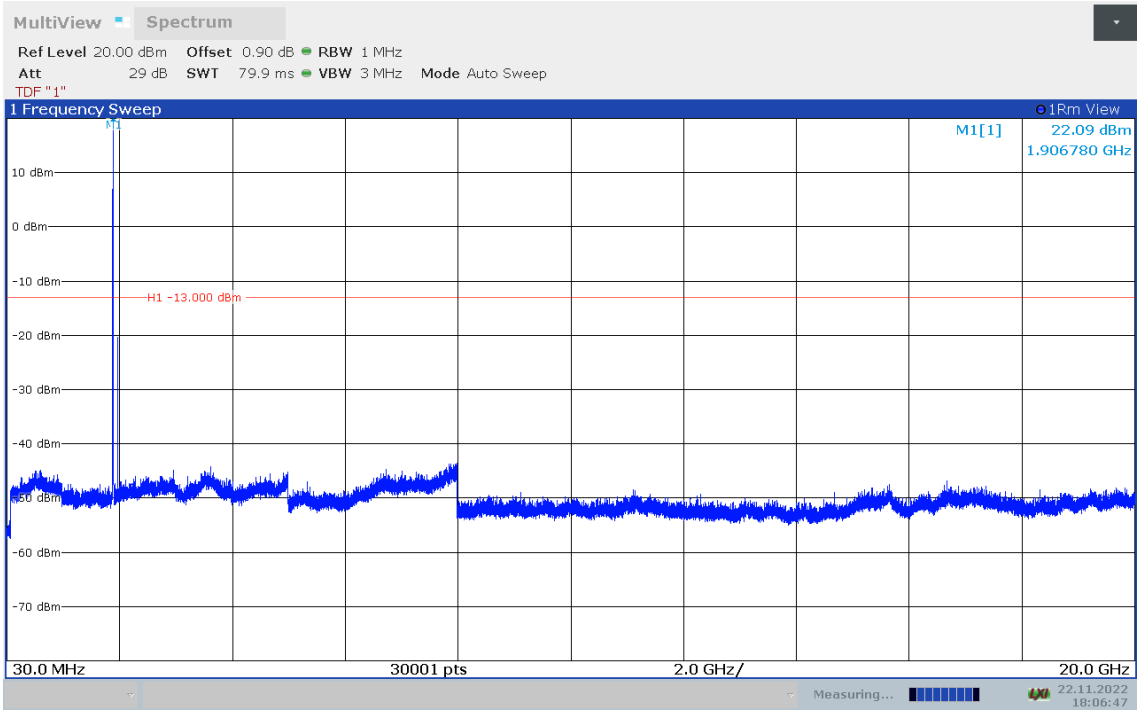
Channel 9538: 30MHz –19.1GHz

Spurious emission limit –13dBm.

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

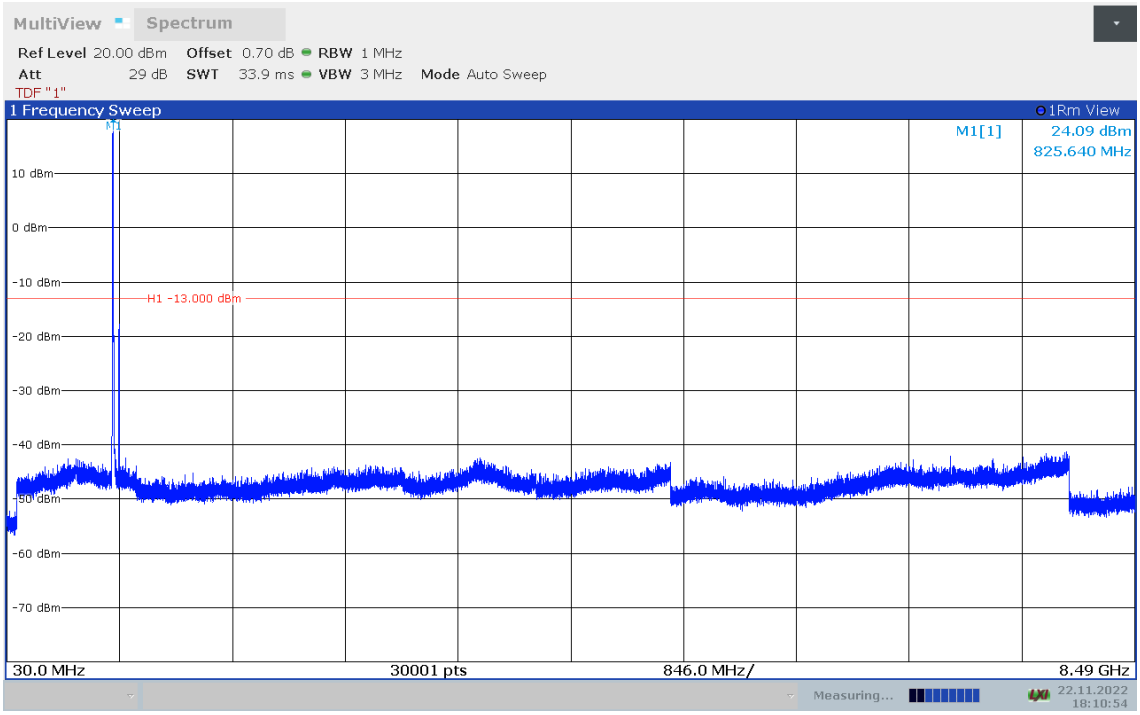


WCDMA Band Ⅴ

Channel 4132: 30MHz –8.49GHz

Spurious emission limit –13dBm.

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



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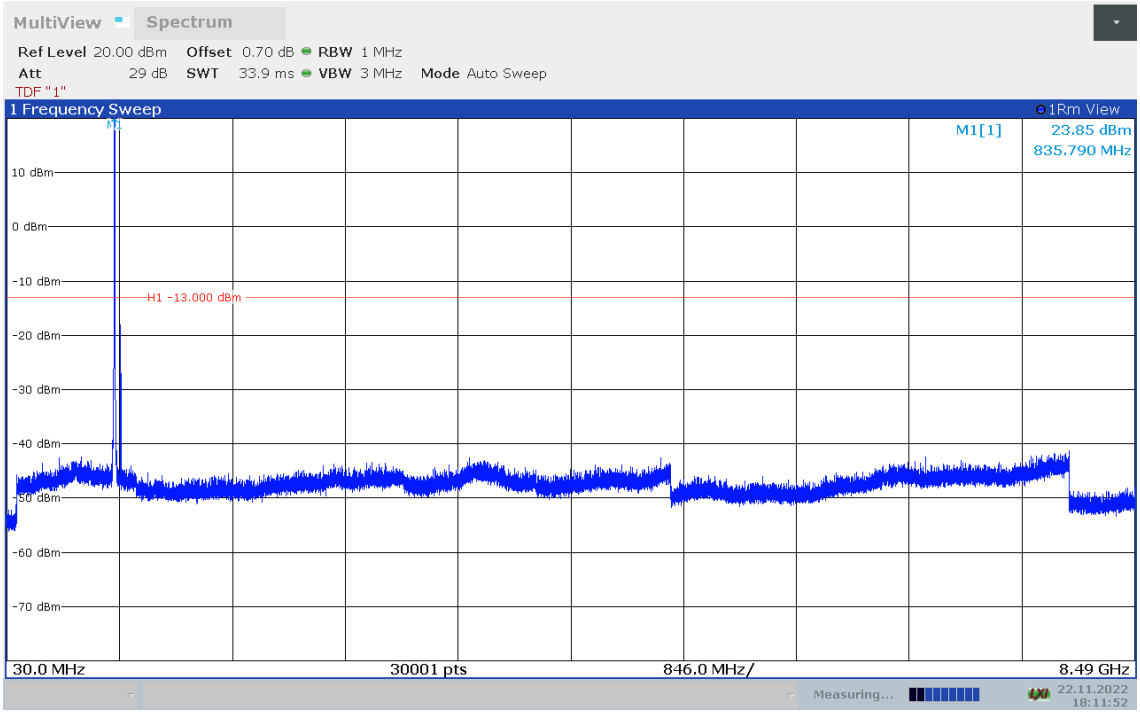
Channel 4183: 30MHz –8.49GHz

Spurious emission limit –13dBm.

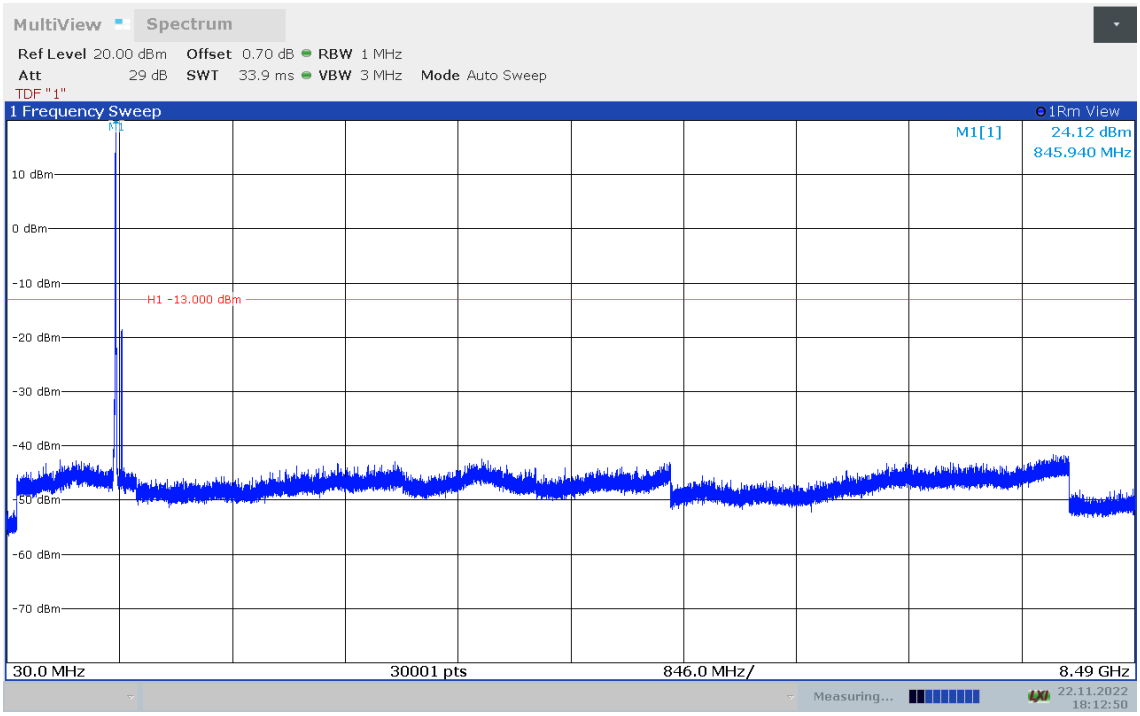
NOTE: peak above the limit line is the carrier frequency.



Channel 4233: 30MHz –8.49GHz

Spurious emission limit –13dBm.

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



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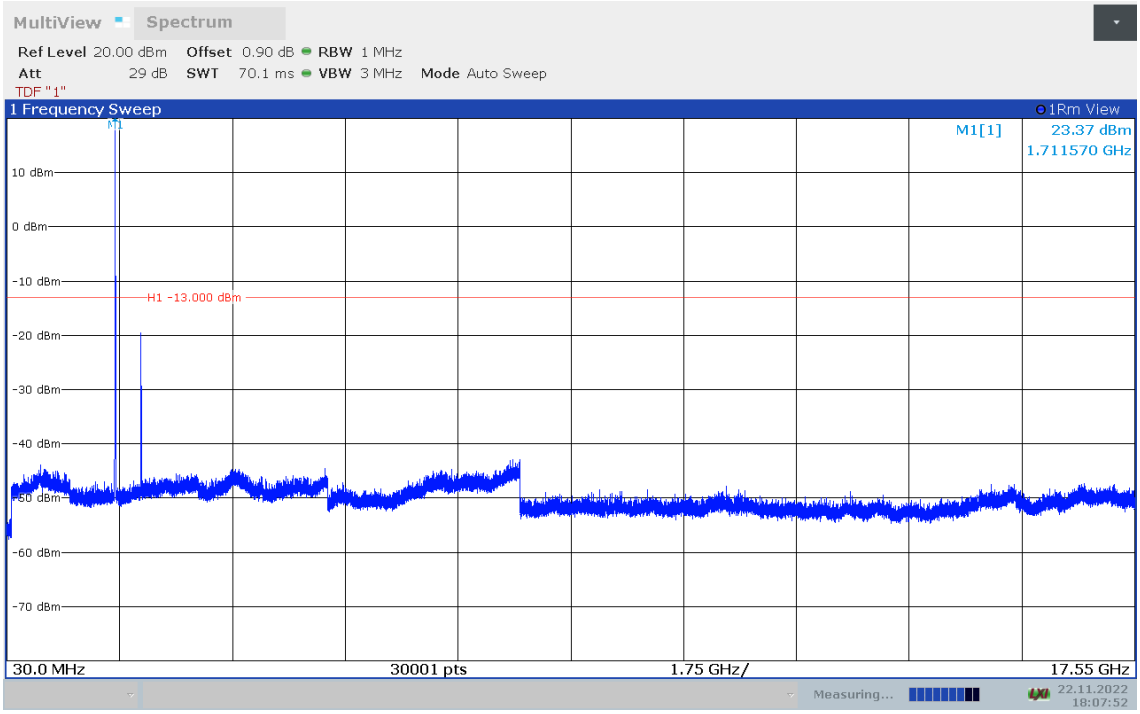
WCDMA Band IV

Channel 1312: 30MHz –17.55GHz

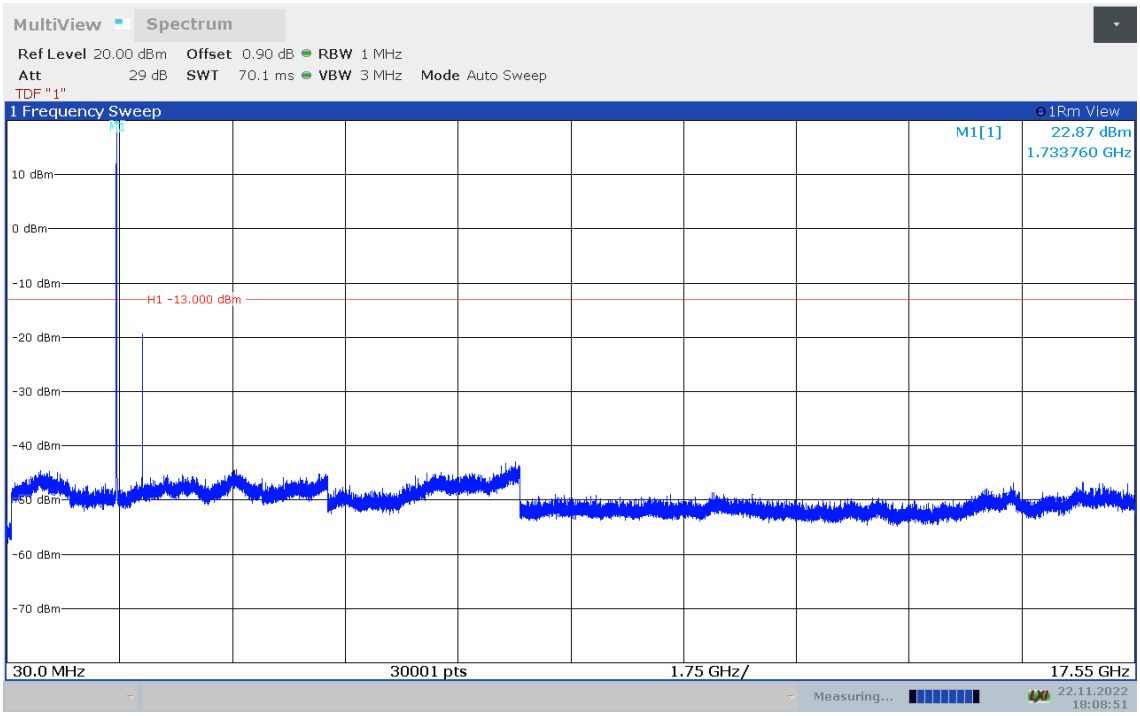
Spurious emission limit –13dBm.



Channel 1412: 30MHz –17.55GHz

Spurious emission limit –13dBm.

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



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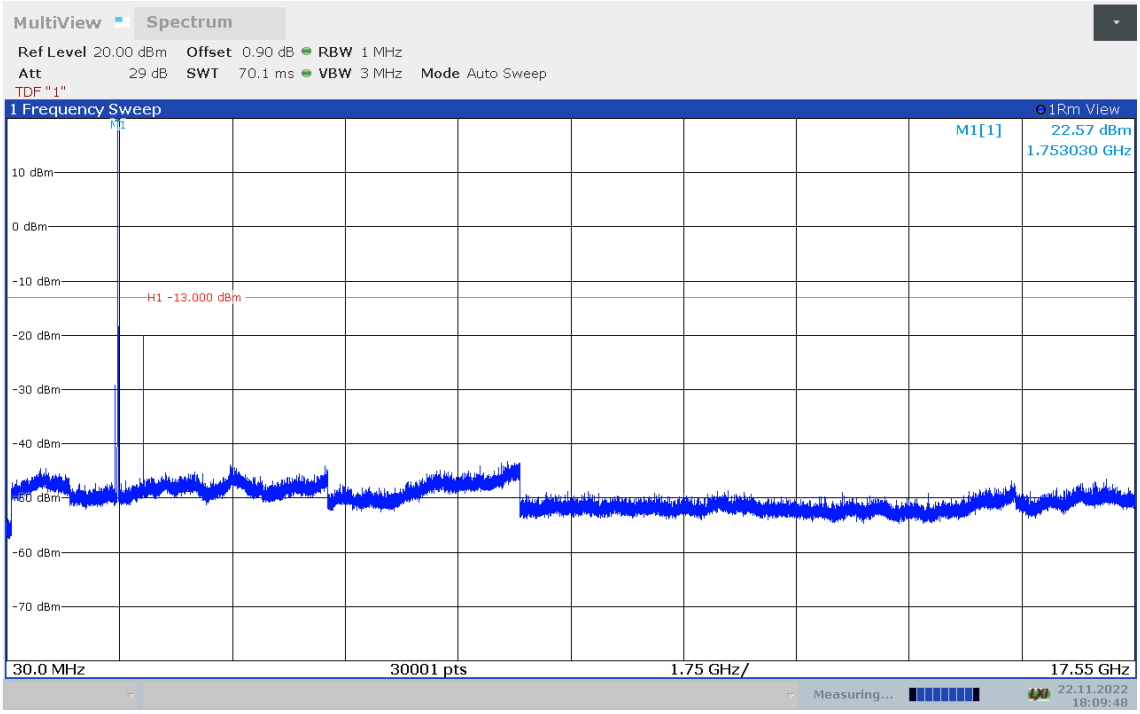
Channel 1513: 30MHz –17.55GHz

Spurious emission limit –13dBm.

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



Note: Expanded measurement uncertainty is *U* = 0.49 dB(100KHz-2GHz)/1.21 dB (2GHz-26.5GHz), *k* = 1.96

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A.8 PEAK-TO-AVERAGE POWER RATIO

Reference

FCC: CFR Part 24.232, 27.50(d), KDB971168 D01.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

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) Set the measurement interval to 1 ms

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

A.8.1 Measurement limit

not exceed 13 dB

A.8.2 Measurement results

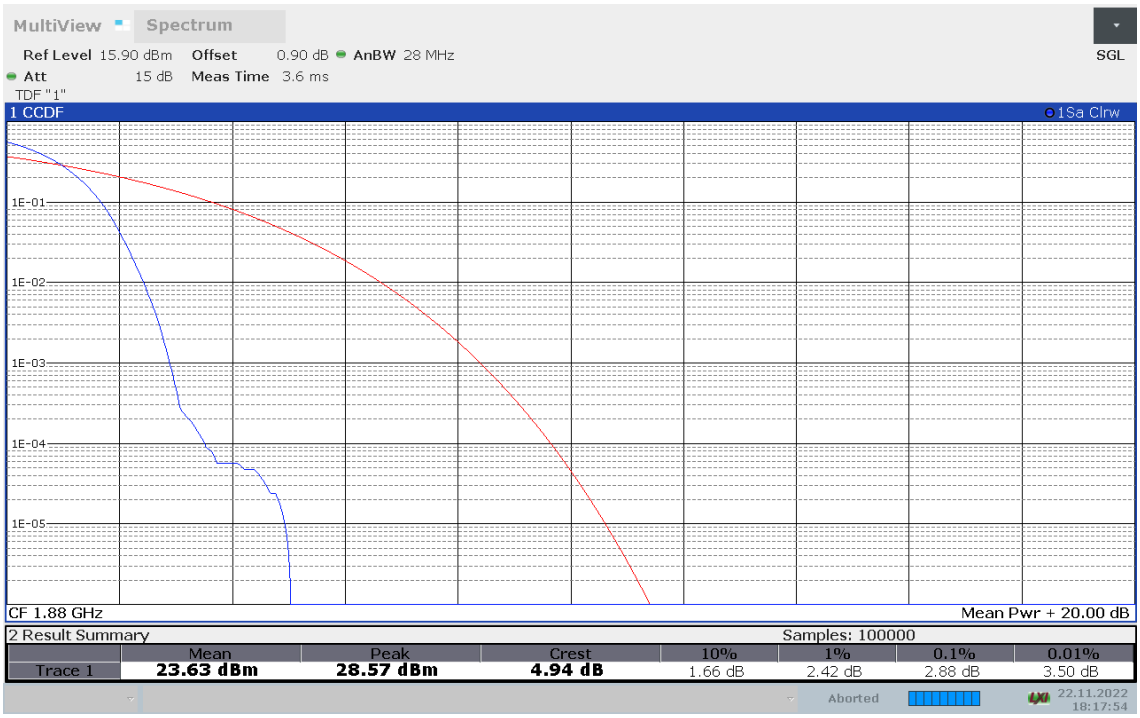
Only worst case result is given below

WCDMA Band II (PAPR)-QPSK

Frequency(MHz)	Peak-To-Average Power Ratio(PAPR)(dB)
1880.0	2.88

WCDMA Band II

Channel 9400- Peak-To-Average Power Ratio(PAPR)-QPSK



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WCDMA Band II (PAPR)-16QAM

Frequency(MHz)	Peak-To-Average Power Ratio(PAPR)(dB)
1880.0	4.60

WCDMA Band II

Channel 9400- Peak-To-Average Power Ratio(PAPR)-16QAM

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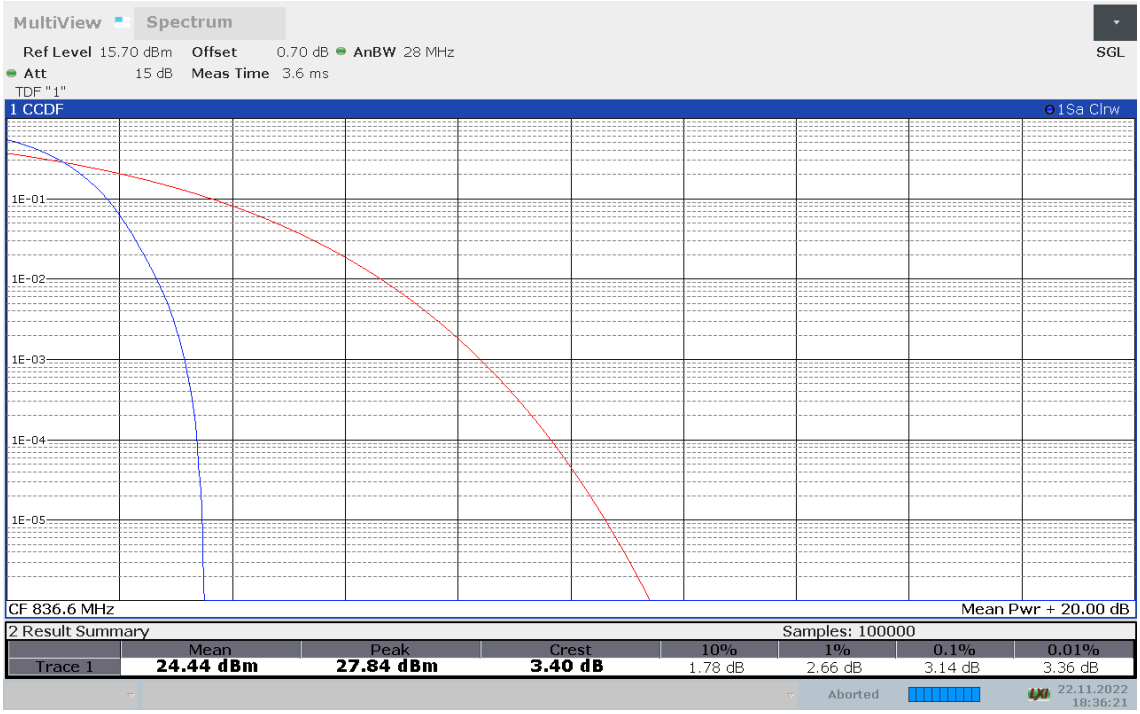
WCDMA Band V (PAPR)-QPSK

Frequency(MHz)	Peak-To-Average Power Ratio(PAPR)(dB)
836.6	3.14

WCDMA Band V

Channel 4183- Peak-To-Average Power Ratio(PAPR)-QPSK



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WCDMA Band V (PAPR)-16QAM

Frequency(MHz)	Peak-To-Average Power Ratio(PAPR)(dB)
836.6	4.68

WCDMA Band V

Channel 4183- Peak-To-Average Power Ratio(PAPR)-16QAM

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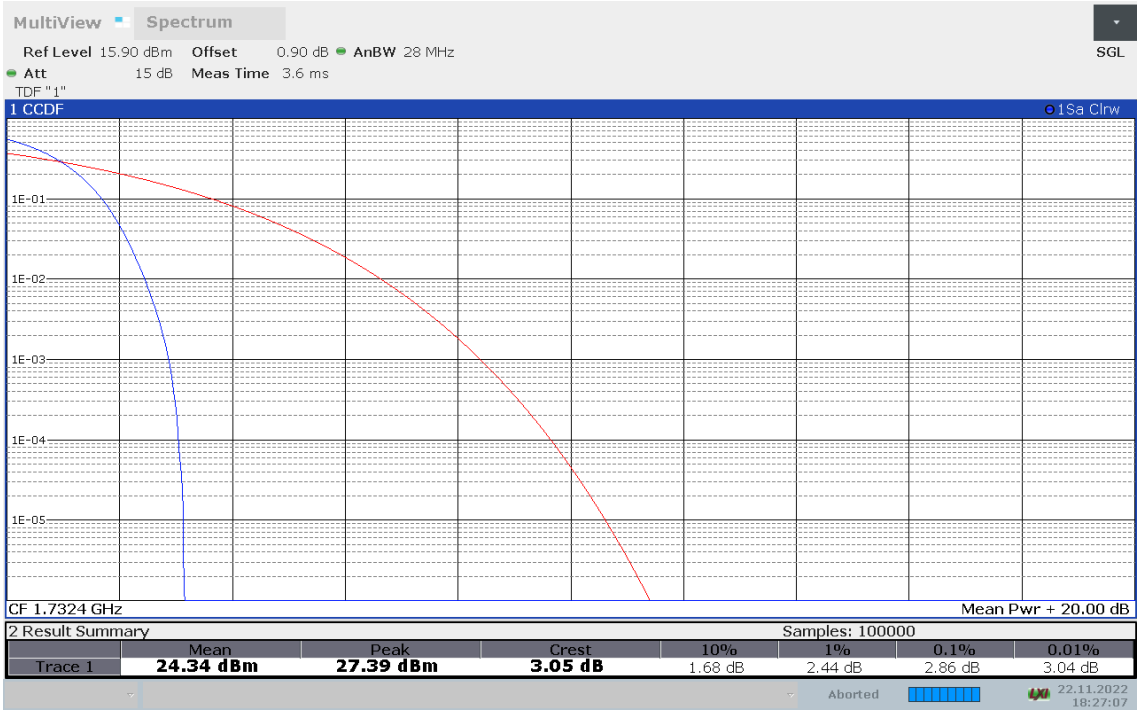
WCDMA Band IV (PAPR)-QPSK

Frequency(MHz)	Peak-To-Average Power Ratio(PAPR)(dB)
1732.4	2.86

WCDMA Band IV

Channel 1412- Peak-To-Average Power Ratio(PAPR)-QPSK



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WCDMA Band IV (PAPR)-16QAM

Frequency(MHz)	Peak-To-Average Power Ratio(PAPR)(dB)
1732.4	4.68

WCDMA Band IV

Channel 1412- Peak-To-Average Power Ratio(PAPR)-16QAM

Note: Expanded measurement uncertainty is U = 0.48 dB, k = 2

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

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