



TEST REPORT

No.I23Z61566-WMD02

for

Wingtech Group (Hong Kong) Limited

4G Mobile Hotspot

Model Name: ATTCKTHS02

FCC ID: 2APXW-ATTCKTHS02

with

Hardware Version: 80177_1_11

Software Version: ATTCKTHS02_0.00.010

Issued Date: 2023-09-26

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.

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No.I23Z61566-WMD02

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I23Z61566-WMD02	Rev.0	1 st edition	2023-09-26

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

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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1: CTTL (huayuan North Road)

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

Location 2: CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology
Development Area, Beijing, P. R. China 100176

1.3. Testing Environment

Normal Temperature: 15-35℃
Relative Humidity: 20-75%

1.4. Project Data

Testing Start Date: 2023-08-24
Testing End Date: 2023-09-22

1.5. Signature



Dong Yuan
(Prepared this test report)



Zhou Yu
(Reviewed this test report)



Zhao Hui Lin
(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: Wingtech Group (Hong Kong) Limited
Address /Post: Flat/RM 1903 19/F, Podium Plaza, 5 Hanoi Road, Tsim Sha Tsui, KL,
HK
Contact: sharui
Email: sharui@wingtech.com
Telephone: +86-21-53529900

2.2. Manufacturer Information

Company Name: Wingtech Group (Hong Kong) Limited
Address /Post: Flat/RM 1903 19/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	4G Mobile Hotspot
Model Name	ATTCKTHS02
FCC ID	2APXW-ATTCKTHS02
Antenna	Embedded
Output power	25.67dBm maximum EIRP measured for LTE Band 2
Extreme Voltage	3.6VDC to 4.4VDC (nominal: 3.8VDC)
Extreme Temperature	-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
UT17a	864747070000105	80177_1_11	ATTCKTHS02_0.00.010	2023-08-24
UT30a	864747070000295	80177_1_11	ATTCKTHS02_0.00.010	2023-08-24

*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	MF02
Manufacturer	Jiade Energy Technology (Zhuhai) Co., Ltd.
Capacitance	3000mAh

*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 24	PERSONAL COMMUNICATIONS SERVICES	10-1-22 Edition
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-22 Edition
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-22 Edition
FCC Part 90	PRIVATE LAND MOBILE RADIO SERVICES	10-1-22 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

5. Summary of Test Result

LTE Band 2

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	24.232	P
2	Emission Limit	2.1051/24.238	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	24.238	P
6	Band Edge Compliance	24.238	P
7	Conducted Spurious Emission	24.238	P
8	Peak-to-Average Power Ratio	24.232	P

LTE Band 5

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	22.913	P
2	Emission Limit	2.1051/22.917	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	22.917	P
6	Band Edge Compliance	22.917	P
7	Conducted Spurious Emission	22.917	P

LTE Band 12

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	2.1051/27.53	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	27.53	P
6	Band Edge Compliance	27.53	P
7	Conducted Spurious Emission	27.53	P
8	Peak-to-Average Power Ratio	27.50	P

LTE Band 14

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	90.542	P
2	Emission Limit	2.1051/90.543	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	2.1049	P
6	Band Edge Compliance	90.543	P
7	Conducted Spurious Emission	90.543	P

LTE Band 30

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	2.1051/27.53	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	27.53	P
6	Band Edge Compliance	27.53	P
7	Conducted Spurious Emission	27.53	P
8	Peak-to-Average Power Ratio	27.50	P

LTE Band 66 (4)

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	2.1051/27.53	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	27.53	P
6	Band Edge Compliance	27.53	P
7	Conducted Spurious Emission	27.53	P
8	Peak-to-Average Power Ratio	27.50	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.

LTE Band 66 overlaps the entire frequency range of LTE Band 4. Therefore, test data provided in this report covers Band 4 as well as Band 66.

Explanation of worst-case configuration

The worst-case scenario for all measurements is based on the conducted output power measurement investigation results. Output power was measured on QPSK, 16QAM modulations. It was found that QPSK was the worst case. All testing was performed using QPSK modulations to represent the worst case unless otherwise stated. The test results shown in the following sections represent the worst case emission.

6. Test Equipment Utilized

Description	Type	Series Number	Manufacture	Cal Due Date	Calibration Interval
Wideband Radio Communication Tester	CMW500	159082	R&S	2024-01-09	1 year
Spectrum Analyzer	FSU	200030	R&S	2024-05-25	1 year
Climate Chamber	SH-242	93008556	ESPEC	2023-12-23	3 years
Spectrum Analyzer	FSV40	101047	R&S	2024-07-25	1 year
Antenna	VULB9163	9163-482	Schwarzbeck	2024-01-03	1 year
Antenna	LB-7180-NF	J203001300005	A-INFO	2024-05-07	1 year
Antenna	LB-180400-25-C-KF	J211060826	A-INFO	2024-03-02	1 year
Universal Radio Communication Tester	CMW500	143008	R&S	2024-02-03	1 year

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

LTE band 2

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	1909.3	23.12	22.16
		1880.0	23.03	22.40
		1850.7	23.40	22.56
	1 RB low	1909.3	23.06	22.20
		1880.0	23.05	22.22
		1850.7	23.35	22.60
	50% RB mid	1909.3	23.21	22.08
		1880.0	23.14	22.06
		1850.7	23.39	22.44
	100% RB	1909.3	22.05	21.11
		1880.0	22.11	21.10
		1850.7	22.36	21.49
3MHz	1 RB high	1908.5	23.02	22.23
		1880.0	23.12	22.21
		1851.5	23.38	22.68
	1 RB low	1908.5	23.08	22.23
		1880.0	23.02	22.31
		1851.5	23.40	22.67
	50% RB mid	1908.5	22.15	21.13
		1880.0	22.06	21.18
		1851.5	22.45	21.51

	100% RB	1908.5	22.13	21.09
		1880.0	22.11	21.06
		1851.5	22.45	21.45
5MHz	1 RB high	1907.5	23.37	22.31
		1880.0	23.26	22.36
		1852.5	23.60	22.79
	1 RB low	1907.5	23.22	22.28
		1880.0	23.25	22.42
		1852.5	23.47	22.82
	50% RB mid	1907.5	22.38	21.14
		1880.0	22.33	21.25
		1852.5	22.59	21.53
	100% RB	1907.5	22.26	21.13
		1880.0	22.30	21.18
		1852.5	22.52	21.59
10MHz	1 RB high	1905.0	23.35	22.35
		1880.0	23.30	22.40
		1855.0	23.44	22.70
	1 RB low	1905.0	23.51	22.62
		1880.0	23.31	22.56
		1855.0	23.49	22.79
	50% RB mid	1905.0	22.34	21.29
		1880.0	22.31	21.24
		1855.0	22.69	21.62
	100% RB	1905.0	22.45	21.27
		1880.0	22.33	21.24
		1855.0	22.44	21.50
15MHz	1 RB high	1902.5	23.45	22.45
		1880.0	23.39	22.54
		1857.5	23.40	22.73
	1 RB low	1902.5	23.51	22.56
		1880.0	23.37	22.54
		1857.5	23.57	22.77
	50% RB mid	1902.5	22.52	21.36
		1880.0	22.43	21.34
		1857.5	22.51	21.57
	100% RB	1902.5	22.52	21.35
		1880.0	22.46	21.33
		1857.5	22.47	21.47

20MHz	1 RB high	1900.0	23.62	22.51
		1880.0	23.48	22.55
		1860.0	23.58	22.79
	1 RB low	1900.0	23.75	22.72
		1880.0	23.77	22.74
		1860.0	23.74	22.83
	50% RB mid	1900.0	22.78	21.51
		1880.0	22.65	21.47
		1860.0	22.72	21.64
	100% RB	1900.0	22.74	21.43
		1880.0	22.60	21.44
		1860.0	22.65	21.60

LTE band 5

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	848.3	22.54	21.86
		836.5	22.43	21.68
		824.7	22.32	21.57
	1 RB low	848.3	22.58	22.02
		836.5	22.45	21.76
		824.7	22.32	21.55
	50% RB mid	848.3	22.69	21.67
		836.5	22.57	21.55
		824.7	22.44	21.38
	100% RB	848.3	21.64	20.80
		836.5	21.48	20.60
		824.7	21.41	20.42
3MHz	1 RB high	847.5	22.49	21.89
		836.5	22.52	21.83
		825.5	22.40	21.69
	1 RB low	847.5	22.55	22.01
		836.5	22.50	21.80
		825.5	22.37	21.59
	50% RB mid	847.5	21.74	20.90
		836.5	21.58	20.66
		825.5	21.52	20.58
	100% RB	847.5	21.76	20.85
		836.5	21.65	20.58
		825.5	21.48	20.45
5MHz	1 RB high	846.5	22.41	21.92
		836.5	22.43	21.73
		826.5	22.40	21.64
	1 RB low	846.5	22.66	22.02
		836.5	22.47	21.78
		826.5	22.39	21.54
	50% RB mid	846.5	21.69	20.76
		836.5	21.63	20.66
		826.5	21.46	20.50
	100% RB	846.5	21.64	20.76
		836.5	21.65	20.60
		826.5	21.46	20.51
10MHz	1 RB high	844.0	22.53	21.85
		836.5	22.38	21.71



		829.0	22.29	21.50
	1 RB low	844.0	22.55	21.78
		836.5	22.44	21.68
		829.0	22.31	21.51
	50% RB mid	844.0	21.69	20.70
		836.5	21.48	20.49
		829.0	21.47	20.44
	100% RB	844.0	21.56	20.53
		836.5	21.46	20.50
		829.0	21.43	20.44

LTE band 12

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	715.3	21.76	21.08
		707.5	21.84	20.97
		699.7	21.48	20.64
	1 RB low	715.3	21.78	20.90
		707.5	21.83	21.05
		699.7	21.43	20.61
	50% RB mid	715.3	21.88	20.79
		707.5	21.86	20.93
		699.7	21.53	20.57
	100% RB	715.3	20.86	19.99
		707.5	20.82	19.94
		699.7	20.46	19.58
3MHz	1 RB high	714.5	21.91	20.99
		707.5	21.91	21.12
		700.5	21.62	20.91
	1 RB low	714.5	21.90	21.07
		707.5	21.90	21.11
		700.5	21.74	21.02
	50% RB mid	714.5	20.93	20.03
		707.5	20.97	20.02
		700.5	20.76	19.72
	100% RB	714.5	20.97	19.94
		707.5	20.96	19.86
		700.5	20.77	19.76
5MHz	1 RB high	713.5	21.90	21.00
		707.5	21.85	21.05
		701.5	21.66	20.88
	1 RB low	713.5	21.89	21.16
		707.5	21.92	21.13
		701.5	21.70	20.88
	50% RB mid	713.5	20.95	20.03
		707.5	21.05	20.04
		701.5	20.76	19.81
	100% RB	713.5	20.91	19.95
		707.5	21.01	20.04
		701.5	20.89	19.89
10MHz	1 RB high	711.0	21.97	21.07
		707.5	21.93	21.18



		704.0	21.88	21.15
	1 RB low	711.0	22.14	21.28
		707.5	21.99	21.26
		704.0	21.96	21.17
	50% RB mid	711.0	21.09	20.12
		707.5	21.17	20.11
		704.0	21.04	20.07
	100% RB	711.0	21.10	20.08
		707.5	21.12	20.15
		704.0	21.03	20.08

LTE band 14

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)	
			QPSK	16QAM
5MHz	1 RB high	795.5	22.33	21.41
		793.0	22.39	21.57
		790.5	22.38	21.53
	1 RB low	795.5	22.39	21.62
		793.0	22.38	21.61
		790.5	22.39	21.58
	50% RB mid	795.5	21.45	20.36
		793.0	21.45	20.40
		790.5	21.49	20.38
	100% RB	795.5	21.47	20.36
		793.0	21.46	20.39
		790.5	21.43	20.37
10MHz	1 RB high	793.0	22.23	21.55
	1 RB low	793.0	22.26	21.46
	50% RB mid	793.0	21.41	20.42
	100% RB	793.0	21.37	20.40

LTE band 30

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)	
			QPSK	16QAM
5MHz	1 RB high	2312.5	22.92	21.80
		2310.0	22.71	21.86
		2307.5	22.61	21.81
	1 RB low	2312.5	22.86	21.83
		2310.0	22.74	21.86
		2307.5	22.72	22.03
	50% RB mid	2312.5	21.81	20.75
		2310.0	21.80	20.76
		2307.5	21.74	20.73
	100% RB	2312.5	21.89	20.76
		2310.0	21.87	20.74
		2307.5	21.72	20.68
10MHz	1 RB high	2310.0	22.56	21.73
	1 RB low	2310.0	22.74	21.93
	50% RB mid	2310.0	21.66	20.64
	100% RB	2310.0	21.69	20.66

LTE band 66

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	1779.3	22.41	21.98
		1745.0	22.43	21.58
		1710.7	23.15	22.61
	1 RB low	1779.3	22.47	21.97
		1745.0	22.38	21.61
		1710.7	23.20	22.60
	50% RB mid	1779.3	22.52	21.71
		1745.0	22.50	21.54
		1710.7	23.27	22.36
	100% RB	1779.3	21.47	20.79
		1745.0	21.41	20.50
		1710.7	22.27	21.33
3MHz	1 RB high	1778.5	22.57	21.98
		1745.0	22.46	21.64
		1711.5	23.38	22.56
	1 RB low	1778.5	22.45	22.01
		1745.0	22.48	21.61
		1711.5	23.34	22.69
	50% RB mid	1778.5	21.57	20.84
		1745.0	21.58	20.55
		1711.5	22.37	21.48
	100% RB	1778.5	21.56	20.77
		1745.0	21.57	20.51
		1711.5	22.36	21.32
5MHz	1 RB high	1777.5	22.89	22.09
		1745.0	22.48	21.87
		1712.5	23.30	22.83
	1 RB low	1777.5	22.91	22.17
		1745.0	22.49	21.68
		1712.5	23.38	22.66
	50% RB mid	1777.5	21.89	20.84
		1745.0	21.60	20.62
		1712.5	22.43	21.49
	100% RB	1777.5	21.70	20.84
		1745.0	21.58	20.56
		1712.5	22.46	21.39
10MHz	1 RB high	1775.0	22.93	22.14
		1745.0	22.51	21.75

	1 RB low	1715.0	23.36	22.63
		1775.0	22.89	22.13
		1745.0	22.54	21.82
	50% RB mid	1715.0	23.42	22.72
		1775.0	21.73	20.77
		1745.0	21.60	20.56
	100% RB	1715.0	22.46	21.36
		1775.0	21.69	20.82
		1745.0	21.61	20.48
15MHz	1 RB high	1715.0	22.44	21.35
		1775.0	21.69	20.82
		1745.0	21.61	20.48
	1 RB low	1772.5	22.82	21.94
		1745.0	22.43	21.78
		1717.5	23.33	22.58
	50% RB mid	1772.5	22.81	22.13
		1745.0	22.48	21.81
		1717.5	23.31	22.73
	100% RB	1772.5	21.86	20.80
		1745.0	21.50	20.48
		1717.5	22.37	21.39
20MHz	1 RB high	1772.5	21.85	20.72
		1745.0	21.47	20.51
		1717.5	22.35	21.40
	1 RB low	1770.0	22.68	21.99
		1745.0	22.41	21.75
		1720.0	23.09	22.65
	50% RB mid	1770.0	22.71	22.13
		1745.0	22.47	21.67
		1720.0	23.15	22.64
	100% RB	1770.0	21.79	20.78
		1745.0	21.53	20.52
		1720.0	22.24	21.32
	1 RB high	1770.0	21.75	20.75
		1745.0	21.49	20.46
		1720.0	22.23	21.28

A.1.3 Radiated

A.1.3.1 Description

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

LTE Band 2: 24.232(c) specifies "Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications."

LTE Band 5: 22.913(a) specifies "The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts"

LTE Band 12: Rule Part 27.50(c)(10) specifies, " The following power and antenna height requirements apply to stations transmitting in the 600 MHz band and the 698-746 MHz band:

(10) Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP."

LTE Band 14: 90.542(a) (7) specifies " Portable stations (hand-held de-vices) transmitting in the 758–768 MHz band and the 788–798 MHz band are limited to 3 watts ERP."

LTE Band 30: 27.50(a)(3)(i) specifies " For mobile and portable stations transmitting in the 2305–2315 MHz band or the 2350–2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth"

LTE Band 66: Rule Part 27.50(d) specifies "Fixed, mobile, and portable (handheld) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP."

A.1.3.2 Method of Measurement

ANSI C63.26 chapter 5.2.5.5: when working in decibels (i.e., logarithmic scale), the ERP and EIRP represent the sum of the transmit antenna gain (in dBd or dBi, respectively) and the conducted RF output power (expressed in dB relative to watts or milliwatts).

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation (1) as follows:

$$\text{ERP or EIRP} = P_{\text{Mea}} + G_T$$

Where

ERP or EIRP	effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Mea} , e.g., dBm or dBW)
P_{Mea}	measured transmitter output power or PSD, in dBm or dBW
G_T	gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

The antenna gain provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

LTE band 2- EIRP
Limits: ≤33dBm (2W)

Max EIRP: 25.67dBm

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power (dBm)			Radiated Power (dBm) GT = 1.9dBi		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
1.4MHz	1 RB high	1909.3	23.12	22.16	/	25.02	24.06	/
		1880	23.03	22.4	/	24.93	24.30	/
		1850.7	23.4	22.56	/	25.30	24.46	/
	1 RB low	1909.3	23.06	22.2	/	24.96	24.10	/
		1880	23.05	22.22	/	24.95	24.12	/
		1850.7	23.35	22.6	/	25.25	24.50	/
	50% RB mid	1909.3	23.21	22.08	/	25.11	23.98	/
		1880	23.14	22.06	/	25.04	23.96	/
		1850.7	23.39	22.44	/	25.29	24.34	/
	100% RB	1909.3	22.05	21.11	/	23.95	23.01	/
		1880	22.11	21.1	/	24.01	23.00	/
		1850.7	22.36	21.49	/	24.26	23.39	/
3MHz	1 RB high	1908.5	23.02	22.23	/	24.92	24.13	/
		1880	23.12	22.21	/	25.02	24.11	/
		1851.5	23.38	22.68	/	25.28	24.58	/
	1 RB low	1908.5	23.08	22.23	/	24.98	24.13	/
		1880	23.02	22.31	/	24.92	24.21	/
		1851.5	23.4	22.67	/	25.30	24.57	/
	50% RB mid	1908.5	22.15	21.13	/	24.05	23.03	/
		1880	22.06	21.18	/	23.96	23.08	/
		1851.5	22.45	21.51	/	24.35	23.41	/
	100% RB	1908.5	22.13	21.09	/	24.03	22.99	/
		1880	22.11	21.06	/	24.01	22.96	/
		1851.5	22.45	21.45	/	24.35	23.35	/
5MHz	1 RB high	1907.5	23.37	22.31	/	25.27	24.21	/
		1880	23.26	22.36	/	25.16	24.26	/
		1852.5	23.6	22.79	/	25.50	24.69	/
	1 RB low	1907.5	23.22	22.28	/	25.12	24.18	/
		1880	23.25	22.42	/	25.15	24.32	/
		1852.5	23.47	22.82	/	25.37	24.72	/
	50% RB mid	1907.5	22.38	21.14	/	24.28	23.04	/
		1880	22.33	21.25	/	24.23	23.15	/
		1852.5	22.59	21.53	/	24.49	23.43	/
	100% RB	1907.5	22.26	21.13	/	24.16	23.03	/
		1880	22.3	21.18	/	24.20	23.08	/
		1852.5	22.52	21.59	/	24.42	23.49	/
10MHz	1 RB high	1905	23.35	22.35	/	25.25	24.25	/

		1880	23.3	22.4	/	25.20	24.30	/
		1855	23.44	22.7	/	25.34	24.60	/
	1 RB low	1905	23.51	22.62	/	25.41	24.52	/
		1880	23.31	22.56	/	25.21	24.46	/
		1855	23.49	22.79	/	25.39	24.69	/
	50% RB mid	1905	22.34	21.29	/	24.24	23.19	/
		1880	22.31	21.24	/	24.21	23.14	/
		1855	22.69	21.62	/	24.59	23.52	/
	100% RB	1905	22.45	21.27	/	24.35	23.17	/
		1880	22.33	21.24	/	24.23	23.14	/
1855		22.44	21.5	/	24.34	23.40	/	
15MHz	1 RB high	1902.5	23.45	22.45	/	25.35	24.35	/
		1880	23.39	22.54	/	25.29	24.44	/
		1857.5	23.4	22.73	/	25.30	24.63	/
	1 RB low	1902.5	23.51	22.56	/	25.41	24.46	/
		1880	23.37	22.54	/	25.27	24.44	/
		1857.5	23.57	22.77	/	25.47	24.67	/
	50% RB mid	1902.5	22.52	21.36	/	24.42	23.26	/
		1880	22.43	21.34	/	24.33	23.24	/
		1857.5	22.51	21.57	/	24.41	23.47	/
	100% RB	1902.5	22.52	21.35	/	24.42	23.25	/
		1880	22.46	21.33	/	24.36	23.23	/
		1857.5	22.47	21.47	/	24.37	23.37	/
20MHz	1 RB high	1900	23.62	22.51	/	25.52	24.41	/
		1880	23.48	22.55	/	25.38	24.45	/
		1860	23.58	22.79	/	25.48	24.69	/
	1 RB low	1900	23.75	22.72	/	25.65	24.62	/
		1880	23.77	22.74	/	25.67	24.64	/
		1860	23.74	22.83	/	25.64	24.73	/
	50% RB mid	1900	22.78	21.51	/	24.68	23.41	/
		1880	22.65	21.47	/	24.55	23.37	/
		1860	22.72	21.64	/	24.62	23.54	/
	100% RB	1900	22.74	21.43	/	24.64	23.33	/
		1880	22.6	21.44	/	24.50	23.34	/
		1860	22.65	21.6	/	24.55	23.50	/

LTE band 5- ERP
Limits: ≤38.45dBm (7W)

Max ERP: 19.14dBm

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power (dBm)			Radiated Power (dBm) GT = -1.4dBi		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
1.4MHz	1 RB high	848.3	22.54	21.86	/	18.99	18.31	/
		836.5	22.43	21.68	/	18.88	18.13	/
		824.7	22.32	21.57	/	18.77	18.02	/
	1 RB low	848.3	22.58	22.02	/	19.03	18.47	/
		836.5	22.45	21.76	/	18.90	18.21	/
		824.7	22.32	21.55	/	18.77	18.00	/
	50% RB mid	848.3	22.69	21.67	/	19.14	18.12	/
		836.5	22.57	21.55	/	19.02	18.00	/
		824.7	22.44	21.38	/	18.89	17.83	/
	100% RB	848.3	21.64	20.8	/	18.09	17.25	/
		836.5	21.48	20.6	/	17.93	17.05	/
		824.7	21.41	20.42	/	17.86	16.87	/
3MHz	1 RB high	847.5	22.49	21.89	/	18.94	18.34	/
		836.5	22.52	21.83	/	18.97	18.28	/
		825.5	22.4	21.69	/	18.85	18.14	/
	1 RB low	847.5	22.55	22.01	/	19.00	18.46	/
		836.5	22.5	21.8	/	18.95	18.25	/
		825.5	22.37	21.59	/	18.82	18.04	/
	50% RB mid	847.5	21.74	20.9	/	18.19	17.35	/
		836.5	21.58	20.66	/	18.03	17.11	/
		825.5	21.52	20.58	/	17.97	17.03	/
	100% RB	847.5	21.76	20.85	/	18.21	17.30	/
		836.5	21.65	20.58	/	18.10	17.03	/
		825.5	21.48	20.45	/	17.93	16.90	/
5MHz	1 RB high	846.5	22.41	21.92	/	18.86	18.37	/
		836.5	22.43	21.73	/	18.88	18.18	/
		826.5	22.4	21.64	/	18.85	18.09	/
	1 RB low	846.5	22.66	22.02	/	19.11	18.47	/
		836.5	22.47	21.78	/	18.92	18.23	/
		826.5	22.39	21.54	/	18.84	17.99	/
	50% RB mid	846.5	21.69	20.76	/	18.14	17.21	/
		836.5	21.63	20.66	/	18.08	17.11	/
		826.5	21.46	20.5	/	17.91	16.95	/
	100% RB	846.5	21.64	20.76	/	18.09	17.21	/
		836.5	21.65	20.6	/	18.10	17.05	/
		826.5	21.46	20.51	/	17.91	16.96	/
10MHz	1 RB high	844	22.53	21.85	/	18.98	18.30	/

		836.5	22.38	21.71	/	18.83	18.16	/
		829	22.29	21.5	/	18.74	17.95	/
	1 RB low	844	22.55	21.78	/	19.00	18.23	/
		836.5	22.44	21.68	/	18.89	18.13	/
	50% RB mid	829	22.31	21.51	/	18.76	17.96	/
		844	21.69	20.7	/	18.14	17.15	/
		836.5	21.48	20.49	/	17.93	16.94	/
	100% RB	829	21.47	20.44	/	17.92	16.89	/
		844	21.56	20.53	/	18.01	16.98	/
		836.5	21.46	20.5	/	17.91	16.95	/
		829	21.43	20.44	/	17.88	16.89	/

LTE band 12- ERP
Limits: ≤34.77dBm (3W)

Max ERP: 18.39dBm

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power (dBm)			Radiated Power (dBm) GT = -1.6dBi		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
1.4MHz	1 RB high	715.3	21.76	21.08	/	18.01	17.33	/
		707.5	21.84	20.97	/	18.09	17.22	/
		699.7	21.48	20.64	/	17.73	16.89	/
	1 RB low	715.3	21.78	20.9	/	18.03	17.15	/
		707.5	21.83	21.05	/	18.08	17.30	/
		699.7	21.43	20.61	/	17.68	16.86	/
	50% RB mid	715.3	21.88	20.79	/	18.13	17.04	/
		707.5	21.86	20.93	/	18.11	17.18	/
		699.7	21.53	20.57	/	17.78	16.82	/
	100% RB	715.3	20.86	19.99	/	17.11	16.24	/
		707.5	20.82	19.94	/	17.07	16.19	/
		699.7	20.46	19.58	/	16.71	15.83	/
3MHz	1 RB high	714.5	21.91	20.99	/	18.16	17.24	/
		707.5	21.91	21.12	/	18.16	17.37	/
		700.5	21.62	20.91	/	17.87	17.16	/
	1 RB low	714.5	21.9	21.07	/	18.15	17.32	/
		707.5	21.9	21.11	/	18.15	17.36	/
		700.5	21.74	21.02	/	17.99	17.27	/
	50% RB mid	714.5	20.93	20.03	/	17.18	16.28	/
		707.5	20.97	20.02	/	17.22	16.27	/
		700.5	20.76	19.72	/	17.01	15.97	/
	100% RB	714.5	20.97	19.94	/	17.22	16.19	/
		707.5	20.96	19.86	/	17.21	16.11	/
		700.5	20.77	19.76	/	17.02	16.01	/
5MHz	1 RB high	713.5	21.9	21	/	18.15	17.25	/
		707.5	21.85	21.05	/	18.10	17.30	/
		701.5	21.66	20.88	/	17.91	17.13	/
	1 RB low	713.5	21.89	21.16	/	18.14	17.41	/
		707.5	21.92	21.13	/	18.17	17.38	/
		701.5	21.7	20.88	/	17.95	17.13	/
	50% RB mid	713.5	20.95	20.03	/	17.20	16.28	/
		707.5	21.05	20.04	/	17.30	16.29	/
		701.5	20.76	19.81	/	17.01	16.06	/
	100% RB	713.5	20.91	19.95	/	17.16	16.20	/
		707.5	21.01	20.04	/	17.26	16.29	/
		701.5	20.89	19.89	/	17.14	16.14	/
10MHz	1 RB high	711	21.97	21.07	/	18.22	17.32	/

		707.5	21.93	21.18	/	18.18	17.43	/
		704	21.88	21.15	/	18.13	17.40	/
	1 RB low	711	22.14	21.28	/	18.39	17.53	/
		707.5	21.99	21.26	/	18.24	17.51	/
		704	21.96	21.17	/	18.21	17.42	/
	50% RB mid	711	21.09	20.12	/	17.34	16.37	/
		707.5	21.17	20.11	/	17.42	16.36	/
		704	21.04	20.07	/	17.29	16.32	/
	100% RB	711	21.1	20.08	/	17.35	16.33	/
		707.5	21.12	20.15	/	17.37	16.40	/
		704	21.03	20.08	/	17.28	16.33	/

LTE band 14- ERP
Limits: ≤34.77dBm (3W)

Max ERP: 20.34dBm

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power (dBm)			Radiated Power (dBm) GT = 0.1dBi		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
5MHz	1 RB high	784.5	22.33	21.41	/	20.28	19.36	/
		782	22.39	21.57	/	20.34	19.52	/
		779.5	22.38	21.53	/	20.33	19.48	/
	1 RB low	784.5	22.39	21.62	/	20.34	19.57	/
		782	22.38	21.61	/	20.33	19.56	/
		779.5	22.39	21.58	/	20.34	19.53	/
	50% RB mid	784.5	21.45	20.36	/	19.40	18.31	/
		782	21.45	20.4	/	19.40	18.35	/
		779.5	21.49	20.38	/	19.44	18.33	/
	100% RB	784.5	21.47	20.36	/	19.42	18.31	/
		782	21.46	20.39	/	19.41	18.34	/
		779.5	21.43	20.37	/	19.38	18.32	/
10MHz	1 RB high	782	22.23	21.55	/	20.18	19.50	/
	1 RB low	782	22.26	21.46	/	20.21	19.41	/
	50% RB mid	782	21.41	20.42	/	19.36	18.37	/
	100% RB	782	21.37	20.4	/	19.32	18.35	/

LTE band 30- ERP

Limits: ≤24dBm/5MHz

Max ERP: 23.92dBm/5MHz

Bandwidth	RB size/offset	Frequency (MHz)	Modulation	Conducted Power (dBm/5MHz)	Antenna Gain	EIRP (dBm/5MHz)
5MHz	1 RB low	2307.5	QPSK	22.10	1.5	23.60
5MHz	1 RB high	2307.5	QPSK	22.18	1.5	23.68
5MHz	100% RB	2307.5	QPSK	20.22	1.5	21.72
5MHz	1 RB low	2307.5	16QAM	21.16	1.5	22.66
5MHz	1 RB high	2307.5	16QAM	21.26	1.5	22.76
5MHz	100% RB	2307.5	16QAM	19.18	1.5	20.68
5MHz	1 RB low	2310	QPSK	22.15	1.5	23.65
5MHz	1 RB high	2310	QPSK	22.24	1.5	23.74
5MHz	100% RB	2310	QPSK	20.30	1.5	21.80
5MHz	1 RB low	2310	16QAM	21.35	1.5	22.85
5MHz	1 RB high	2310	16QAM	21.32	1.5	22.82
5MHz	100% RB	2310	16QAM	19.27	1.5	20.77
5MHz	1 RB low	2312.5	QPSK	22.15	1.5	23.65
5MHz	1 RB high	2312.5	QPSK	22.30	1.5	23.80
5MHz	100% RB	2312.5	QPSK	20.27	1.5	21.77
5MHz	1 RB low	2312.5	16QAM	21.36	1.5	22.86
5MHz	1 RB high	2312.5	16QAM	21.33	1.5	22.83
5MHz	100% RB	2312.5	16QAM	19.28	1.5	20.78
10MHz	1 RB low	2310	QPSK	22.24	1.5	23.74
10MHz	1 RB high	2310	QPSK	22.42	1.5	23.92
10MHz	100% RB	2310	QPSK	18.45	1.5	19.95
10MHz	1 RB low	2310	16QAM	21.23	1.5	22.73
10MHz	1 RB high	2310	16QAM	21.25	1.5	22.75
10MHz	100% RB	2310	16QAM	17.40	1.5	18.90

LTE band 66- EIRP
Limits: ≤30dBm (1W)

Max EIRP: 25.12dBm

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power (dBm)			Radiated Power (dBm) GT = 1.7dBi		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
1.4MHz	1 RB high	1779.3	22.41	21.98	/	24.11	23.68	/
		1745	22.43	21.58	/	24.13	23.28	/
		1710.7	23.15	22.61	/	24.85	24.31	/
	1 RB low	1779.3	22.47	21.97	/	24.17	23.67	/
		1745	22.38	21.61	/	24.08	23.31	/
		1710.7	23.2	22.6	/	24.90	24.30	/
	50% RB mid	1779.3	22.52	21.71	/	24.22	23.41	/
		1745	22.5	21.54	/	24.20	23.24	/
		1710.7	23.27	22.36	/	24.97	24.06	/
	100% RB	1779.3	21.47	20.79	/	23.17	22.49	/
		1745	21.41	20.5	/	23.11	22.20	/
		1710.7	22.27	21.33	/	23.97	23.03	/
3MHz	1 RB high	1778.5	22.57	21.98	/	24.27	23.68	/
		1745	22.46	21.64	/	24.16	23.34	/
		1711.5	23.38	22.56	/	25.08	24.26	/
	1 RB low	1778.5	22.45	22.01	/	24.15	23.71	/
		1745	22.48	21.61	/	24.18	23.31	/
		1711.5	23.34	22.69	/	25.04	24.39	/
	50% RB mid	1778.5	21.57	20.84	/	23.27	22.54	/
		1745	21.58	20.55	/	23.28	22.25	/
		1711.5	22.37	21.48	/	24.07	23.18	/
	100% RB	1778.5	21.56	20.77	/	23.26	22.47	/
		1745	21.57	20.51	/	23.27	22.21	/
		1711.5	22.36	21.32	/	24.06	23.02	/
5MHz	1 RB high	1777.5	22.89	22.09	/	24.59	23.79	/
		1745	22.48	21.87	/	24.18	23.57	/
		1712.5	23.3	22.83	/	25.00	24.53	/
	1 RB low	1777.5	22.91	22.17	/	24.61	23.87	/
		1745	22.49	21.68	/	24.19	23.38	/
		1712.5	23.38	22.66	/	25.08	24.36	/
	50% RB mid	1777.5	21.89	20.84	/	23.59	22.54	/
		1745	21.6	20.62	/	23.30	22.32	/
		1712.5	22.43	21.49	/	24.13	23.19	/
	100% RB	1777.5	21.7	20.84	/	23.40	22.54	/
		1745	21.58	20.56	/	23.28	22.26	/
		1712.5	22.46	21.39	/	24.16	23.09	/
10MHz	1 RB high	1775	22.93	22.14	/	24.63	23.84	/

		1745	22.51	21.75	/	24.21	23.45	/
		1715	23.36	22.63	/	25.06	24.33	/
	1 RB low	1775	22.89	22.13	/	24.59	23.83	/
		1745	22.54	21.82	/	24.24	23.52	/
		1715	23.42	22.72	/	25.12	24.42	/
	50% RB mid	1775	21.73	20.77	/	23.43	22.47	/
		1745	21.6	20.56	/	23.30	22.26	/
		1715	22.46	21.36	/	24.16	23.06	/
	100% RB	1775	21.69	20.82	/	23.39	22.52	/
		1745	21.61	20.48	/	23.31	22.18	/
1715		22.44	21.35	/	24.14	23.05	/	
15MHz	1 RB high	1772.5	22.82	21.94	/	24.52	23.64	/
		1745	22.43	21.78	/	24.13	23.48	/
		1717.5	23.33	22.58	/	25.03	24.28	/
	1 RB low	1772.5	22.81	22.13	/	24.51	23.83	/
		1745	22.48	21.81	/	24.18	23.51	/
		1717.5	23.31	22.73	/	25.01	24.43	/
	50% RB mid	1772.5	21.86	20.8	/	23.56	22.50	/
		1745	21.5	20.48	/	23.20	22.18	/
		1717.5	22.37	21.39	/	24.07	23.09	/
	100% RB	1772.5	21.85	20.72	/	23.55	22.42	/
		1745	21.47	20.51	/	23.17	22.21	/
		1717.5	22.35	21.4	/	24.05	23.10	/
20MHz	1 RB high	1770	22.68	21.99	/	24.38	23.69	/
		1745	22.41	21.75	/	24.11	23.45	/
		1720	23.09	22.65	/	24.79	24.35	/
	1 RB low	1770	22.71	22.13	/	24.41	23.83	/
		1745	22.47	21.67	/	24.17	23.37	/
		1720	23.15	22.64	/	24.85	24.34	/
	50% RB mid	1770	21.79	20.78	/	23.49	22.48	/
		1745	21.53	20.52	/	23.23	22.22	/
		1720	22.24	21.32	/	23.94	23.02	/
	100% RB	1770	21.75	20.75	/	23.45	22.45	/
		1745	21.49	20.46	/	23.19	22.16	/
		1720	22.23	21.28	/	23.93	22.98	/

Note: Expanded measurement uncertainty is $U = 0.578$ dB, $k = 2$.

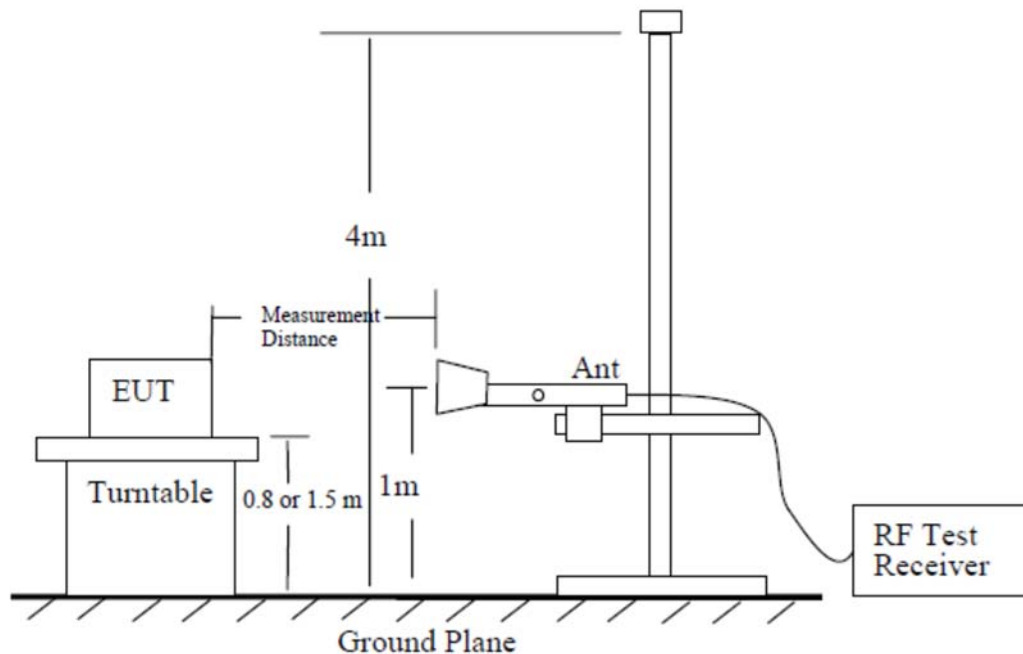
A.2 Emission Limit

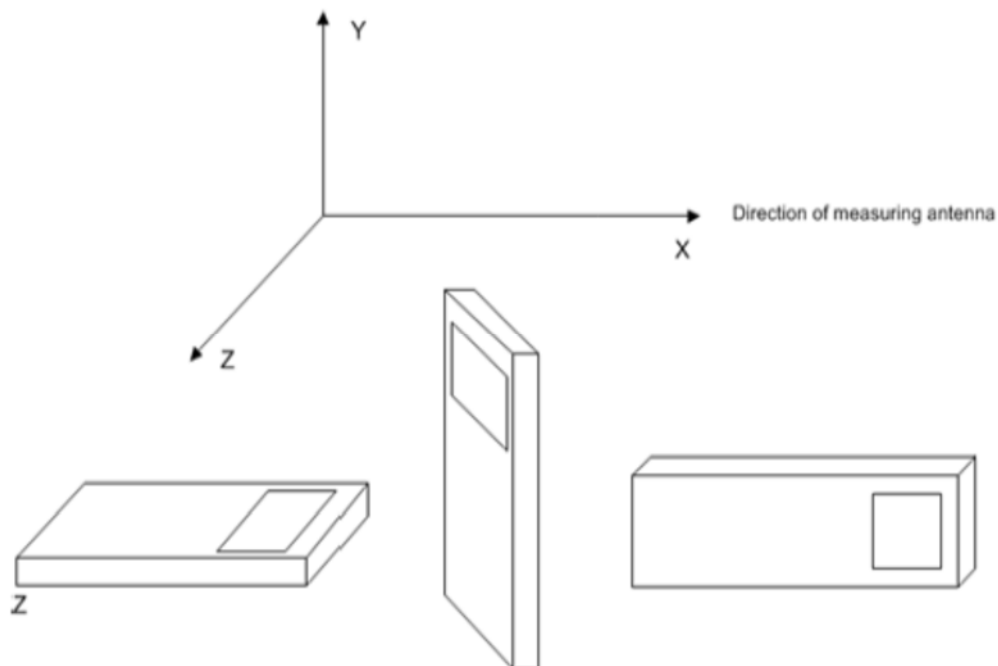
The measurements procedures in C63.26 are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE Bands 2/5/12/14/30/66.

The procedure of radiated spurious emissions is as follows:

Using the test configuration as follow, measure the radiated emissions directly from the EUT and convert the measured field strength or received power to ERP or EIRP, as required, for comparison to the applicable limits.





The emission characteristics of the EUT can be identified from the pre-scan measurement information.

Exploratory radiated measurements (pre-scans) may be performed to determine the general EUT radiated emissions characteristics and, when necessary, the EUT-to-measurement antenna orientation that produces the maximum emission amplitude. Pre-scans shall only be used to determine the emission frequencies (i.e., not amplitude levels). The information garnered from a pre-scan can then be used to perform final compliance measurements using either the substitution or direct field strength method.

For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table or support at a nominal height of 80 cm above the reference ground plane. Radiated measurements shall be made with the measurement antenna positioned in both horizontal and vertical polarization. The measurement 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 (i.e., field strength or received power). When orienting the measurement antenna in vertical polarization, the minimum height of the lowest element of the antenna shall clear the site reference ground plane by at least 25 cm.

The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.

For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table or support at a nominal height of 1.5 m above the ground plane. When maximizing the emissions from the EUT for measurement, the EUT and its transmitting antenna(s) shall be rotated through 360°. For each mode of operation to be tested, the frequency spectrum (based on findings from exploratory measurements) shall be monitored. Final measurements shall be performed for the worst case combination(s) of variable technical parameters that result in the maximum measured emission amplitude, record the frequency and amplitude of the highest fundamental emission (if applicable), and the frequency and amplitude data for the six highest-amplitude spurious emissions.

A.2.2 Measurement Limit

FDD Band 2: 24.238 specifies 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.

FDD Band 5 Part 22.917 specifies " Out of band emissions. 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."

FDD Band 12: 27.53(g) specifies " For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed ".

FDD Band 14: Part 90.543(e) specifies " For operations in the 758–768 MHz and the 788–798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(3) On any frequency between 775–788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log (P)$ dB."

FDD Band 30: 27.53(a)(4) specifies " For mobile and portable stations operating in the 2305-2315 MHz and 2350-2360 MHz bands:

(i) By a factor of not less than: $43 + 10 \log (P)$ dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than $55 + 10 \log (P)$ dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than $61 + 10 \log (P)$ dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than $67 + 10 \log (P)$ dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2300 and 2305 MHz, $55 + 10 \log (P)$ dB on all frequencies between 2296 and 2300 MHz, $61 + 10 \log (P)$ dB on all frequencies between 2292 and 2296 MHz, $67 + 10 \log (P)$ dB on all frequencies between 2288 and 2292 MHz, and $70 + 10 \log (P)$ dB below 2288 MHz;

(iii) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2360 and 2365 MHz, and not less than $70 + 10 \log (P)$ dB above 2365 MHz."

FDD Band 66: 27.53(h) specifies "AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB"



A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE Bands. 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 LTE Bands 2/5/12/14/30/66 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. The range of evaluated frequency is from 30MHz to 26GHz.

Measurement Results:
LTE Band 2, 1.4MHz, QPSK, Channel 18607

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3684.50	-58.94	6.46	8.46	-56.94	-13.00	43.94	V
5526.50	-57.66	7.16	10.59	-54.23	-13.00	41.23	V
7401.50	-52.99	8.12	12.08	-49.03	-13.00	36.03	V
9278.50	-51.99	9.10	13.27	-47.82	-13.00	34.82	H
11132.50	-51.63	9.69	13.17	-48.15	-13.00	35.15	V
12931.50	-51.16	10.49	13.46	-48.19	-13.00	35.19	H

LTE Band 2, 1.4MHz, QPSK, Channel 18900

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3783.50	-61.62	6.19	10.30	-57.51	-13.00	44.51	H
5638.00	-58.37	7.27	11.20	-54.44	-13.00	41.44	H
7522.00	-50.94	8.30	10.30	-48.94	-13.00	35.94	V
9445.00	-51.02	9.26	11.69	-48.59	-13.00	35.59	H
11313.50	-50.39	10.00	12.79	-47.60	-13.00	34.60	H
13194.50	-47.69	10.52	12.61	-45.60	-13.00	32.60	V

LTE Band 2, 1.4MHz, QPSK, Channel 19193

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3780.00	-59.18	6.20	8.59	-56.79	-13.00	43.79	H
5772.50	-57.36	7.23	10.55	-54.04	-13.00	41.04	H
7627.00	-54.33	8.10	12.30	-50.13	-13.00	37.13	V
9550.50	-52.16	9.36	13.35	-48.17	-13.00	35.17	H
11434.50	-48.93	9.98	13.11	-45.80	-13.00	32.80	H
13333.00	-46.51	10.58	13.97	-43.12	-13.00	30.12	V

LTE Band 5, 1.4MHz, QPSK, Channel 20407

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1649.50	-54.54	3.56	5.23	2.15	-55.02	-13.00	42.02	H
2480.50	-48.41	4.60	6.04	2.15	-49.12	-13.00	36.12	H
3297.50	-57.85	5.29	7.71	2.15	-57.58	-13.00	44.58	V
4124.50	-57.09	6.04	9.02	2.15	-56.26	-13.00	43.26	H
4939.50	-55.73	6.71	9.84	2.15	-54.75	-13.00	41.75	H
5772.00	-54.47	7.23	10.55	2.15	-53.30	-13.00	40.30	V

LTE Band 5, 1.4MHz, QPSK, Channel 20525

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.00	-53.80	3.58	5.19	2.15	-54.34	-13.00	41.34	V
2512.00	-48.77	4.64	6.12	2.15	-49.44	-13.00	36.44	V
3344.50	-58.80	5.31	7.83	2.15	-58.43	-13.00	45.43	V
4173.50	-56.15	6.15	9.07	2.15	-55.38	-13.00	42.38	H
5029.00	-55.52	6.57	9.94	2.15	-54.30	-13.00	41.30	V
5869.50	-55.86	7.30	10.53	2.15	-54.78	-13.00	41.78	H

LTE Band 5, 1.4MHz, QPSK, Channel 20643

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1697.00	-49.54	3.60	5.15	2.15	-50.14	-13.00	37.14	V
2531.00	-48.58	4.65	6.16	2.15	-49.22	-13.00	36.22	V
3379.00	-59.11	5.34	7.91	2.15	-58.69	-13.00	45.69	H
4237.50	-56.67	6.25	9.14	2.15	-55.93	-13.00	42.93	H
5079.50	-55.77	6.71	10.01	2.15	-54.62	-13.00	41.62	H
5927.00	-54.77	7.47	10.51	2.15	-53.88	-13.00	40.88	V

LTE Band 12, 1.4MHz, QPSK, Channel 23017

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1340.00	-56.95	3.16	4.67	2.15	-57.59	-13.00	44.59	H
1994.50	-51.52	4.04	4.61	2.15	-53.10	-13.00	40.10	H
2691.50	-48.01	4.78	6.44	2.15	-48.50	-13.00	35.50	V
3343.50	-58.90	5.31	7.82	2.15	-58.54	-13.00	45.54	H
4008.00	-56.86	6.06	8.91	2.15	-56.16	-13.00	43.16	H
4698.00	-56.22	6.50	9.60	2.15	-55.27	-13.00	42.27	V

LTE Band 12, 1.4MHz, QPSK, Channel 23095

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.00	-57.37	3.25	5.06	2.15	-57.71	-13.00	44.71	H
2117.50	-50.15	4.21	4.95	2.15	-51.56	-13.00	38.56	H
2828.00	-46.24	4.95	6.69	2.15	-46.65	-13.00	33.65	V
3534.00	-57.77	5.66	8.25	2.15	-57.33	-13.00	44.33	H
4253.50	-56.26	6.24	9.15	2.15	-55.50	-13.00	42.50	H
4957.50	-56.26	6.68	9.86	2.15	-55.23	-13.00	42.23	V

LTE Band 12, 1.4MHz, QPSK, Channel 23173

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1431.00	-57.23	3.28	5.14	2.15	-57.52	-13.00	44.52	V
2158.50	-49.81	4.26	5.08	2.15	-51.14	-13.00	38.14	V
2875.00	-46.73	4.97	6.78	2.15	-47.07	-13.00	34.07	V
3587.00	-57.10	6.20	8.32	2.15	-57.13	-13.00	44.13	H
4295.00	-56.22	6.20	9.20	2.15	-55.37	-13.00	42.37	V
4998.00	-56.25	6.61	9.90	2.15	-55.11	-13.00	42.11	H

LTE Band 14, 5MHz, QPSK, Channel 23305

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2374.50	-49.41	4.49	5.72	2.15	-50.33	-13.00	37.33	V
3162.50	-59.24	5.35	7.39	2.15	-59.35	-13.00	46.35	V
3952.50	-57.22	6.10	8.83	2.15	-56.64	-13.00	43.64	H
4747.50	-57.29	6.57	9.65	2.15	-56.36	-13.00	43.36	H
5535.00	-56.98	7.17	10.59	2.15	-55.71	-13.00	42.71	H
6320.00	-55.28	7.55	10.82	2.15	-54.16	-13.00	41.16	V

LTE Band 14, 5MHz, QPSK, Channel 23330

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2378.97	-49.28	4.49	5.74	2.15	-50.18	-13.00	37.18	V
3172.50	-57.85	5.34	7.41	2.15	-57.93	-13.00	44.93	V
3970.00	-57.87	6.09	8.86	2.15	-57.25	-13.00	44.25	V
4755.00	-57.10	6.58	9.66	2.15	-56.17	-13.00	43.17	H
5552.50	-56.87	7.18	10.59	2.15	-55.61	-13.00	42.61	V
6340.00	-55.50	7.56	10.84	2.15	-54.37	-13.00	41.37	H

LTE Band 14, 5MHz, QPSK, Channel 23355

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2384.43	-49.77	4.50	5.75	2.15	-50.67	-13.00	37.67	H
3185.00	-58.43	5.32	7.44	2.15	-58.46	-13.00	45.46	H
3977.50	-57.58	6.08	8.87	2.15	-56.94	-13.00	43.94	V
4777.50	-58.03	6.62	9.68	2.15	-57.12	-13.00	44.12	H
5572.50	-56.73	7.21	10.59	2.15	-55.50	-13.00	42.50	H
6365.00	-55.20	7.56	10.87	2.15	-54.04	-13.00	41.04	V

LTE Band 30, 5MHz, QPSK, Channel 27685

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
4615.00	-63.21	6.46	9.52	-60.15	-40.00	20.15	V
6923.00	-61.61	7.72	11.51	-57.82	-40.00	17.82	V
9230.50	-61.73	9.00	13.24	-57.49	-40.00	17.49	V
11557.50	-61.60	9.81	13.09	-58.32	-40.00	18.32	H
13834.50	-60.08	10.67	14.40	-56.35	-40.00	16.35	V
16171.50	-59.03	11.76	13.67	-57.12	-40.00	17.12	H

LTE Band 30, 5MHz, QPSK, Channel 27710

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
4620.50	-67.28	6.45	9.52	-64.21	-40.00	24.21	V
6930.00	-60.53	7.76	11.52	-56.77	-40.00	16.77	V
9240.50	-59.55	9.02	13.24	-55.33	-40.00	15.33	H
11552.50	-61.44	9.81	13.09	-58.16	-40.00	18.16	H
13842.50	-60.36	10.69	14.41	-56.64	-40.00	16.64	H
16167.50	-58.15	11.77	13.67	-56.25	-40.00	16.25	V

LTE Band 30, 5MHz, QPSK, Channel 27735

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
4625.00	-61.35	6.44	9.53	-58.26	-40.00	18.26	H
6938.00	-60.53	7.82	11.53	-56.82	-40.00	16.82	H
9250.50	-59.77	9.04	13.25	-55.56	-40.00	15.56	V
11551.50	-61.24	9.81	13.09	-57.96	-40.00	17.96	H
13861.50	-60.53	10.73	14.42	-56.84	-40.00	16.84	H
16180.50	-57.45	11.75	13.66	-55.54	-40.00	15.54	V

LTE Band 66, 1.4MHz, QPSK, Channel 131979

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3421.50	-69.02	5.38	8.01	-66.39	-13.00	53.39	H
5132.00	-67.83	6.85	10.08	-64.60	-13.00	51.60	H
6843.00	-65.28	7.83	11.41	-61.70	-13.00	48.70	V
8560.00	-64.18	8.56	13.01	-59.73	-13.00	46.73	H
10245.00	-62.39	9.45	13.00	-58.84	-13.00	45.84	H
11923.00	-59.65	10.41	13.02	-57.04	-13.00	44.04	V

LTE Band 66, 1.4MHz, QPSK, Channel 132322

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3513.50	-70.08	5.54	8.22	-67.40	-13.00	54.40	V
5235.00	-67.63	7.00	10.23	-64.40	-13.00	51.40	V
7018.50	-64.54	8.27	11.62	-61.19	-13.00	48.19	V
8774.00	-64.27	8.58	13.05	-59.80	-13.00	46.80	H
10452.50	-60.80	9.72	13.08	-57.44	-13.00	44.44	V
12218.00	-60.33	10.05	13.09	-57.29	-13.00	44.29	H

LTE Band 66, 1.4MHz, QPSK, Channel 132665

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3612.00	-68.85	6.46	8.36	-66.95	-13.00	53.95	V
5338.00	-68.43	6.96	10.37	-65.02	-13.00	52.02	V
7117.50	-64.30	8.16	11.74	-60.72	-13.00	47.72	H
8943.50	-63.97	9.00	13.09	-59.88	-13.00	46.88	H
10703.00	-63.50	9.31	13.14	-59.67	-13.00	46.67	H
12489.50	-60.86	10.20	13.20	-57.86	-13.00	44.86	V

Sample: 3612.00MHz

$$\text{Power (EIRP)} = P_{\text{Mea}} - P_{\text{pl}} + G_a$$

$$\text{Power (-66.95dBm)} = P_{\text{Mea}} (-68.85\text{dBm}) - P_{\text{pl}} (6.46\text{dB}) + G_a (8.36\text{dBi})$$

Note: Expanded measurement uncertainty

Frequency range	Expanded measurement uncertainty
30MHz-1GHz	5.64dB, k=2
1GHz-18GHz	4.23dB, k=2
18GHz-40GHz	3.72dB, k=2

Note: The measurement results showed here are worst cases

A.3 Frequency Stability

A.3.1 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 CMW500.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30°C.
3. With the EUT, powered via nominal voltage, connected to the CMW500, and in a simulated call on middle channel for each LTE 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°C increments from -30°C to +50°C. 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°C.
7. With the EUT, powered via nominal voltage, connected to the CMW500 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 °C decrements from +50°C to -30°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5°C 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.3.2 Measurement results

LTE Band 2, 20MHz bandwidth QPSK (worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	1850.833	1909.199		
50				-0.82	0.0004
40				-2.19	0.0012
30				-1.65	0.0009
10				-0.44	0.0002
0				-0.27	0.0001
-10				-0.21	0.0001
-20				0.84	0.0004
-30				-1.04	0.0006

Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	1850.833	1909.199	0.50	0.0003
4.4				-0.82	0.0004

LTE Band 5, 10MHz bandwidth QPSK (worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	824.417	848.583		
50				1.14	0.0014
40				1.63	0.0019
30				2.23	0.0027
10				1.06	0.0013
0				1.57	0.0019
-10				1.70	0.0020
-20				2.60	0.0031
-30				1.83	0.0022

Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	824.417	848.583	1.60	0.0019
4.4				0.57	0.0007

LTE Band 12, 10MHz bandwidth QPSK (worst case of all bandwidths)
Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	699.481	715.519		
50				-1.24	0.0018
40				-1.09	0.0015
30				-0.43	0.0006
10				-0.33	0.0005
0				-1.04	0.0015
-10				0.72	0.0010
-20				0.41	0.0006
-30				0.97	0.0014

Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	699.481	715.519	-0.57	0.0008
4.4				-1.07	0.0015

LTE Band 14, 10MHz bandwidth QPSK (worst case of all bandwidths)
Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	788.476	797.514		
50				-0.77	0.0010
40				-2.59	0.0033
30				-4.25	0.0054
10				-3.20	0.0040
0				-1.53	0.0019
-10				-3.46	0.0044
-20				-3.43	0.0043
-30				-3.48	0.0044

Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	788.476	797.514	-3.06	0.0039
4.4				-1.33	0.0017

LTE Band 30, 10MHz bandwidth QPSK (worst case of all bandwidths)
Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	2305.417	2314.583		
50				23.20	0.0100
40				23.12	0.0100
30				34.70	0.0150
10				1.09	0.0005
0				2.40	0.0010
-10				21.01	0.0091
-20				2.69	0.0012
-30				-0.29	0.0001

Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	2305.417	2314.583	21.94	0.0095
4.4				21.37	0.0093

LTE Band 66, 20MHz bandwidth QPSK (worst case of all bandwidths)
Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	1710.833	1779.199		
50				5.44	0.0031
40				18.71	0.0107
30				-0.56	0.0003
10				-1.03	0.0006
0				0.40	0.0002
-10				0.16	0.0001
-20				-0.60	0.0003
-30				0.07	0.0000

Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	1710.833	1779.199	0.70	0.0004
4.4				1.70	0.0010

Note: Expanded measurement uncertainty is $U = 0.01 \text{ PPM}$, $k = 2$.

A.4 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.

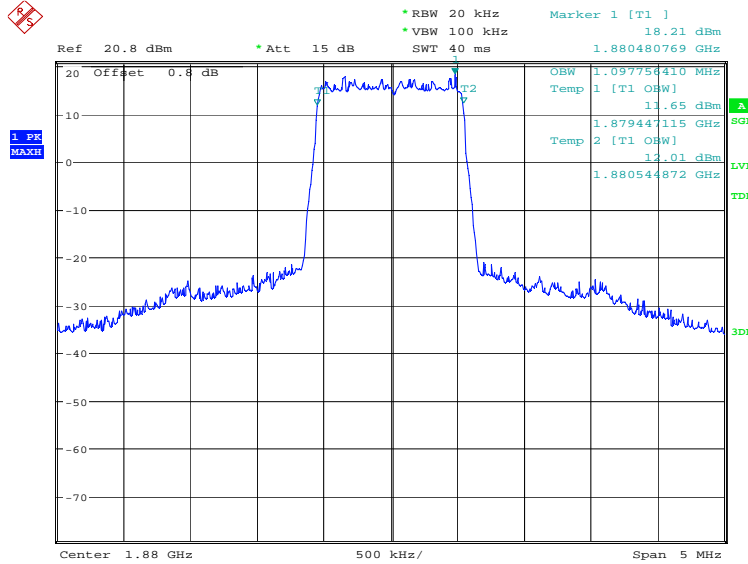
The measurement method is from ANSI C63.26:

- 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 $\geq 3 \times$ 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.

LTE band 2, 1.4MHz (99%)

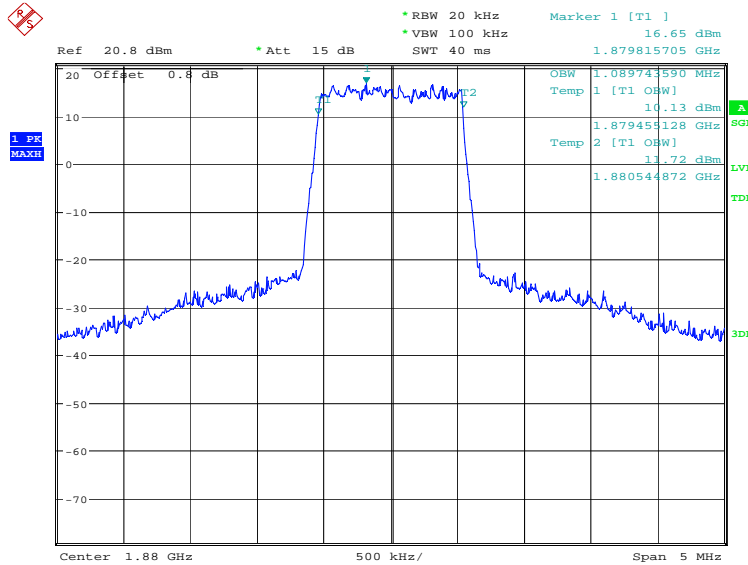
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	1097.76	1089.74

LTE band 2, 1.4MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:41:29

LTE band 2, 1.4MHz Bandwidth, 16QAM (99% BW)

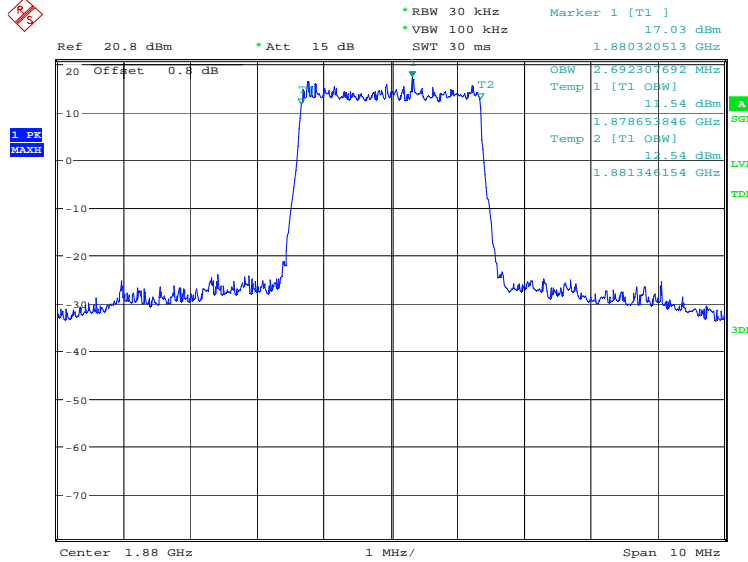


Date: 24.AUG.2023 09:42:09

LTE band 2, 3MHz (99%)

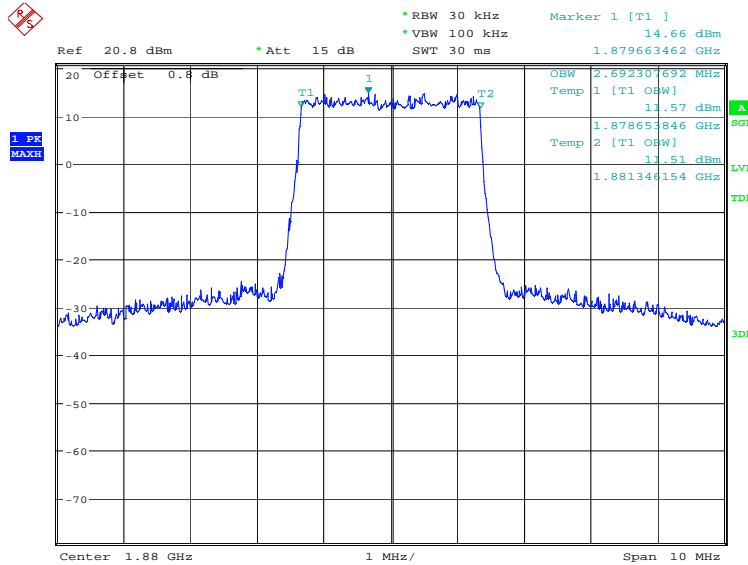
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	2692.31	2692.31

LTE band 2, 3MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:42:51

LTE band 2, 3MHz Bandwidth, 16QAM (99% BW)

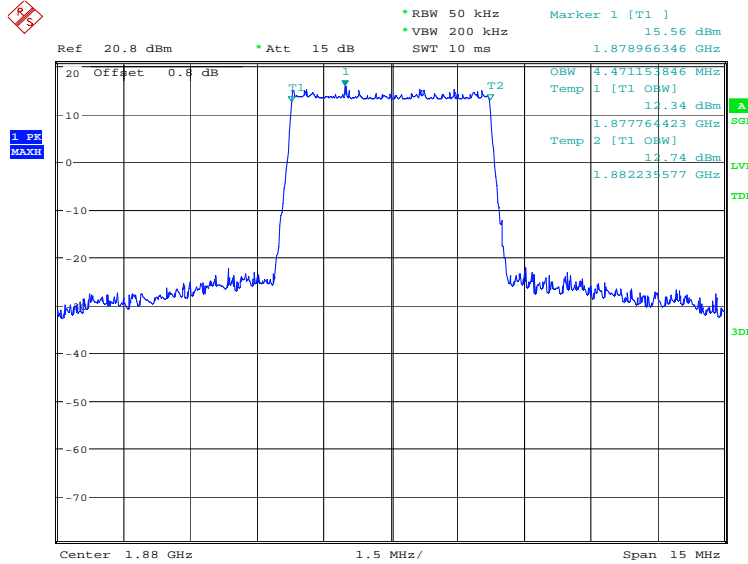


Date: 24.AUG.2023 09:43:31

LTE band 2, 5MHz (99%)

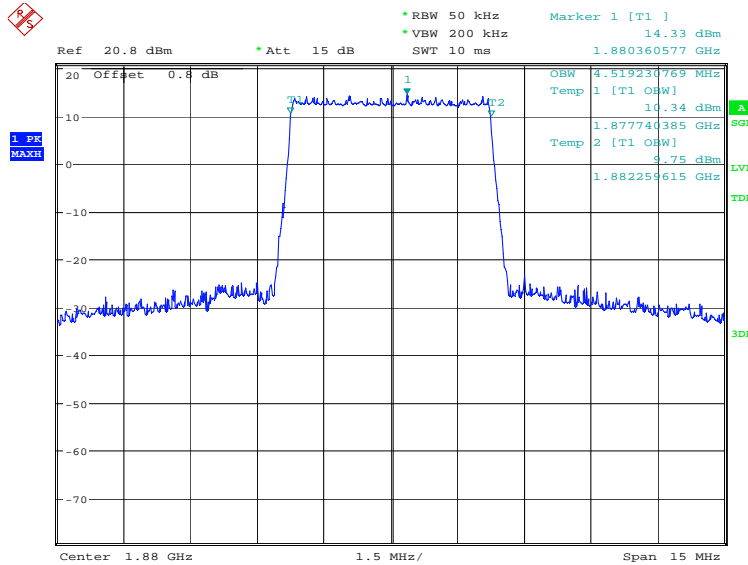
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	4471.15	4519.23

LTE band 2, 5MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:44:13

LTE band 2, 5MHz Bandwidth, 16QAM (99% BW)

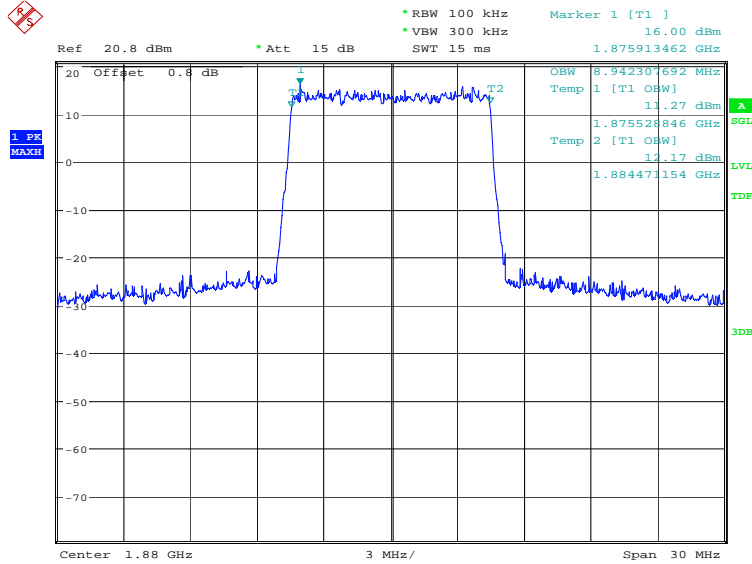


Date: 24.AUG.2023 09:44:53

LTE band 2, 10MHz (99%)

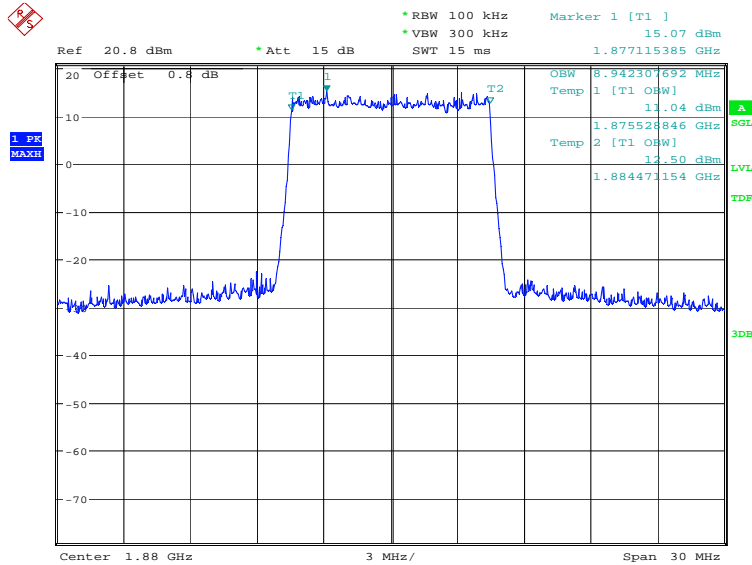
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	8942.31	8942.31

LTE band 2, 10MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:45:35

LTE band 2, 10MHz Bandwidth, 16QAM (99% BW)

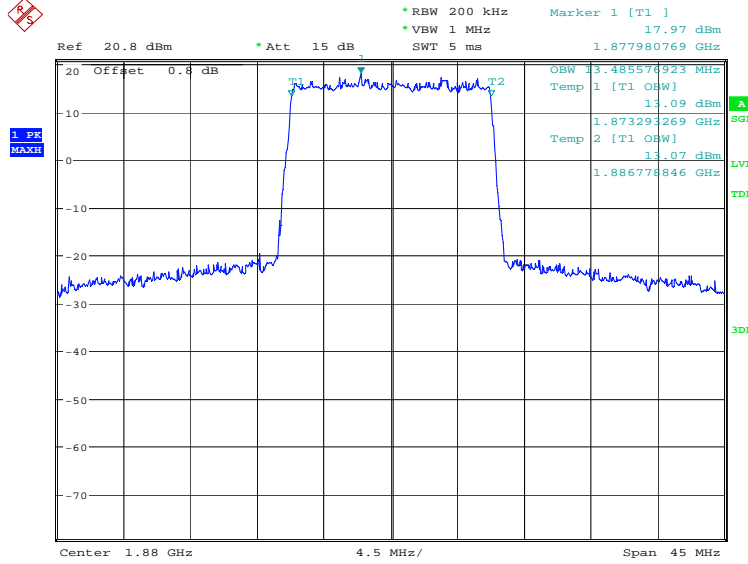


Date: 24.AUG.2023 09:46:15

LTE band 2, 15MHz (99%)

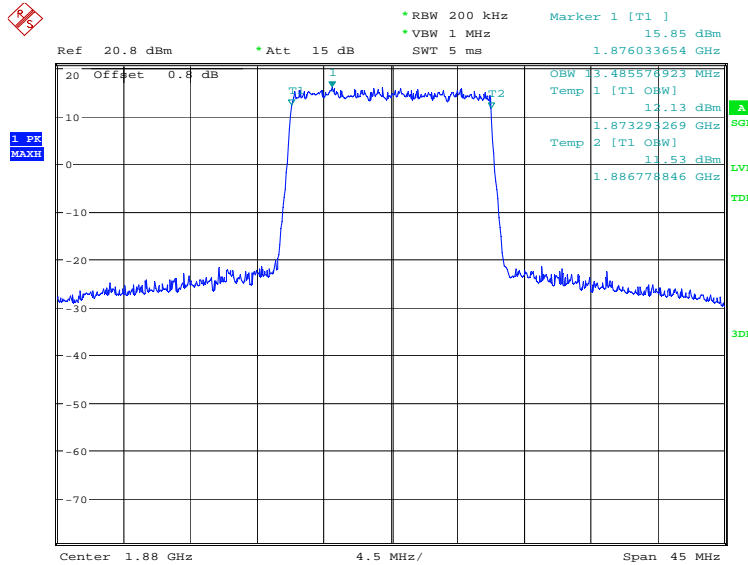
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	13485.58	13485.58

LTE band 2, 15MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:46:57

LTE band 2, 15MHz Bandwidth, 16QAM (99% BW)

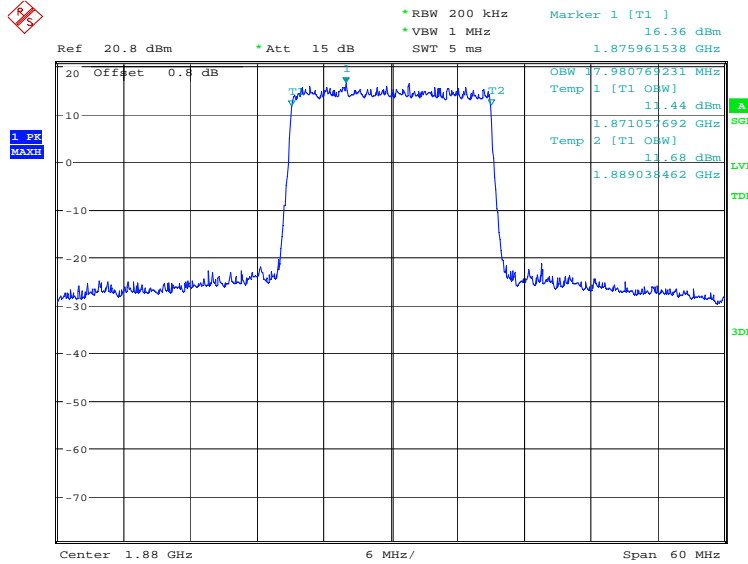


Date: 24.AUG.2023 09:47:37

LTE band 2, 20MHz (99%)

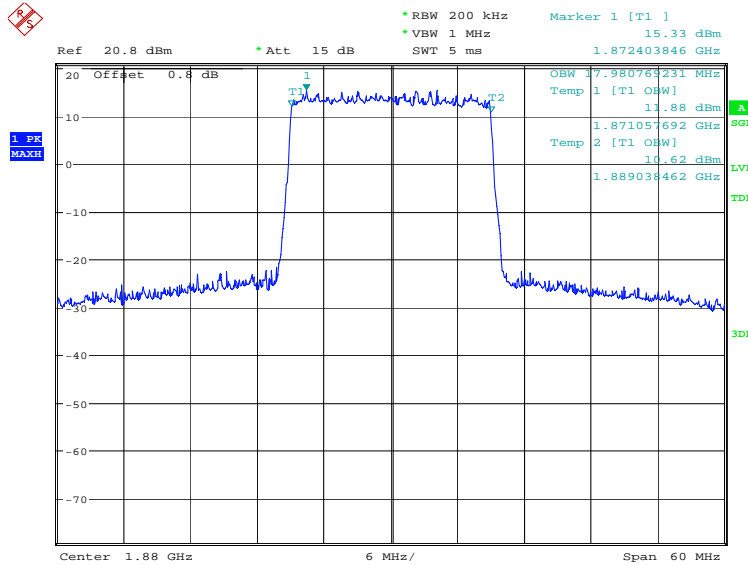
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	17980.77	17980.77

LTE band 2, 20MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:48:19

LTE band 2, 20MHz Bandwidth, 16QAM (99% BW)

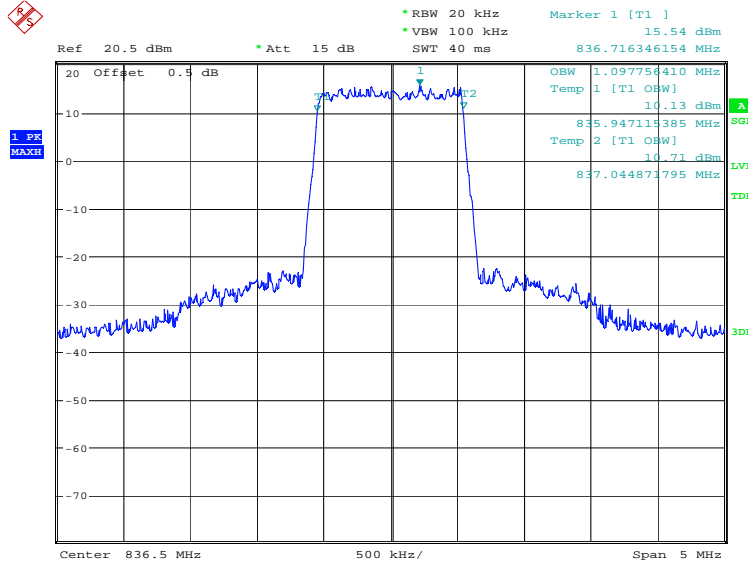


Date: 24.AUG.2023 09:48:59

LTE band 5, 1.4MHz (99%)

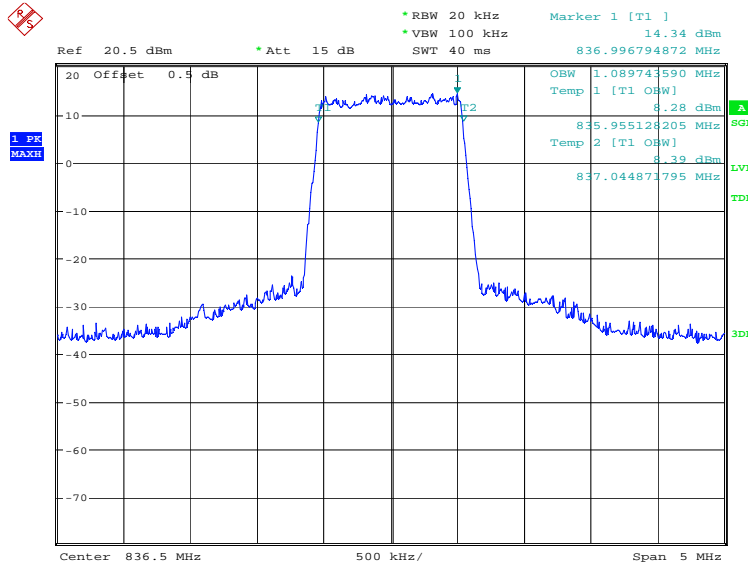
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	1097.76	1089.74

LTE band 5, 1.4MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:50:38

LTE band 5, 1.4MHz Bandwidth, 16QAM (99% BW)

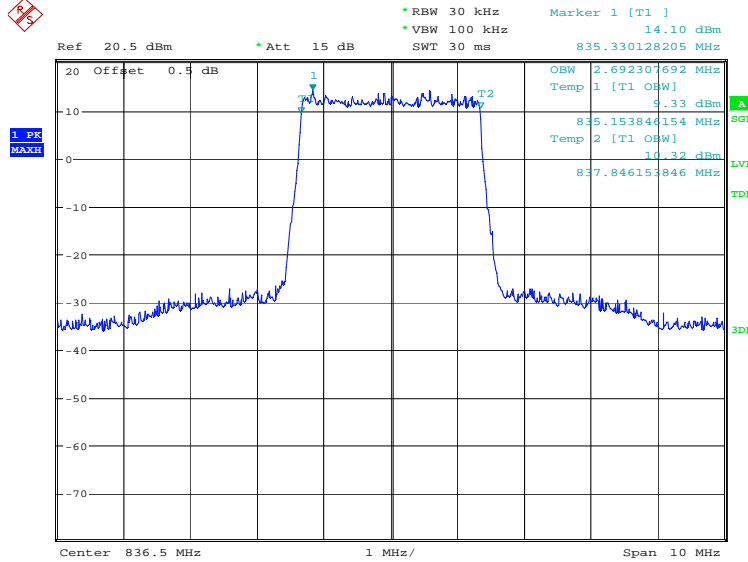


Date: 24.AUG.2023 09:51:18

LTE band 5, 3MHz (99%)

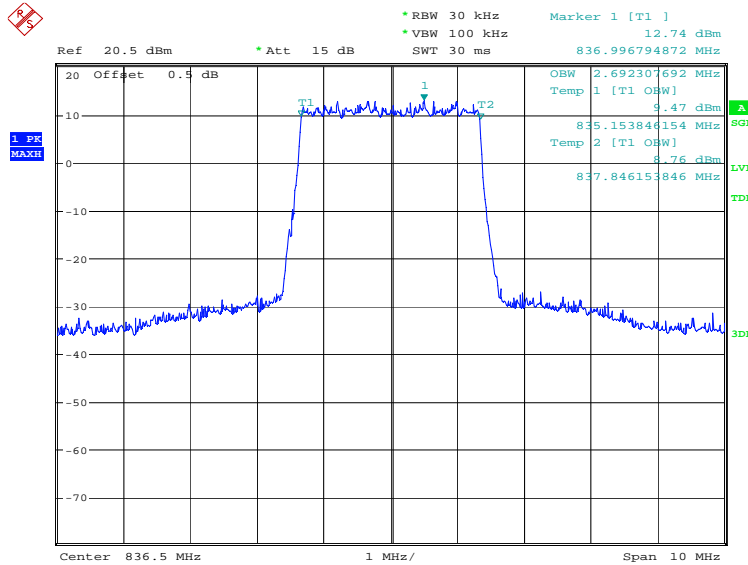
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	2692.31	2692.31

LTE band 5, 3MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:52:00

LTE band 5, 3MHz Bandwidth, 16QAM (99% BW)

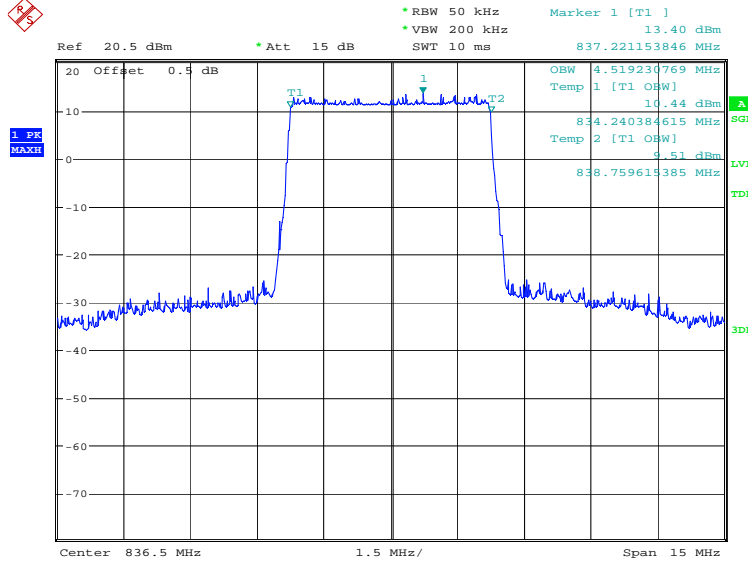


Date: 24.AUG.2023 09:52:40

LTE band 5, 5MHz (99%)

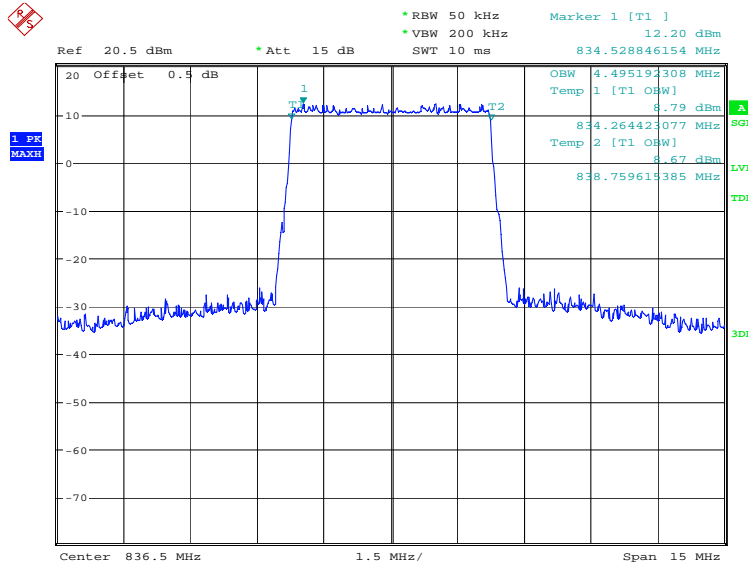
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	4519.23	4495.19

LTE band 5, 5MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:53:22

LTE band 5, 5MHz Bandwidth, 16QAM (99% BW)

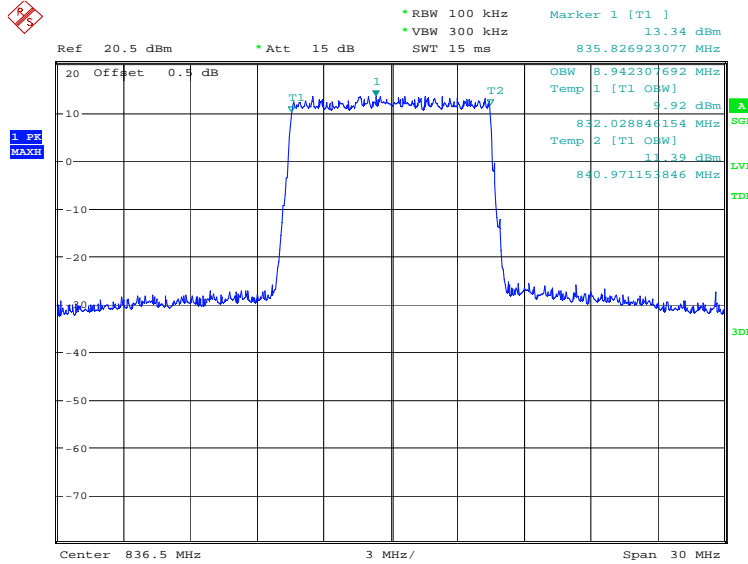


Date: 24.AUG.2023 09:54:02

LTE band 5, 10MHz (99%)

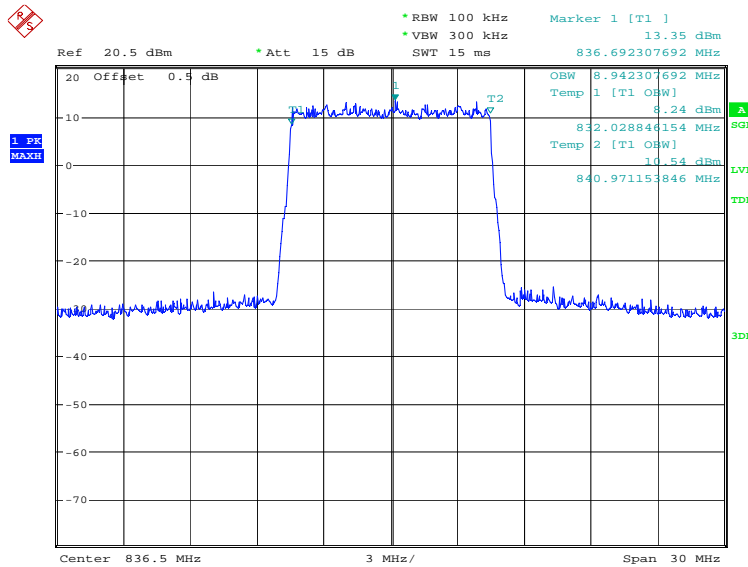
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	8942.31	8942.31

LTE band 5, 10MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:54:44

LTE band 5, 10MHz Bandwidth, 16QAM (99% BW)

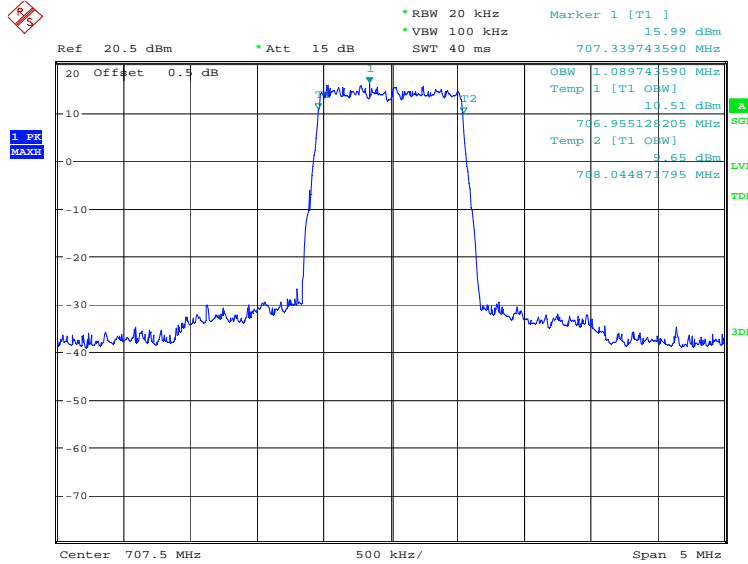


Date: 24.AUG.2023 09:55:25

LTE band 12, 1.4MHz (99%)

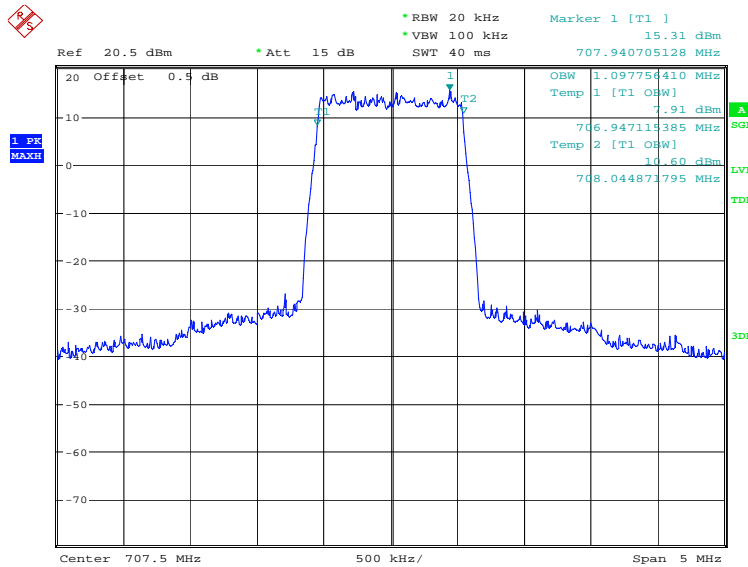
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
707.5	QPSK	16QAM
	1089.74	1097.76

LTE band 12, 1.4MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:56:08

LTE band 12, 1.4MHz Bandwidth, 16QAM (99% BW)

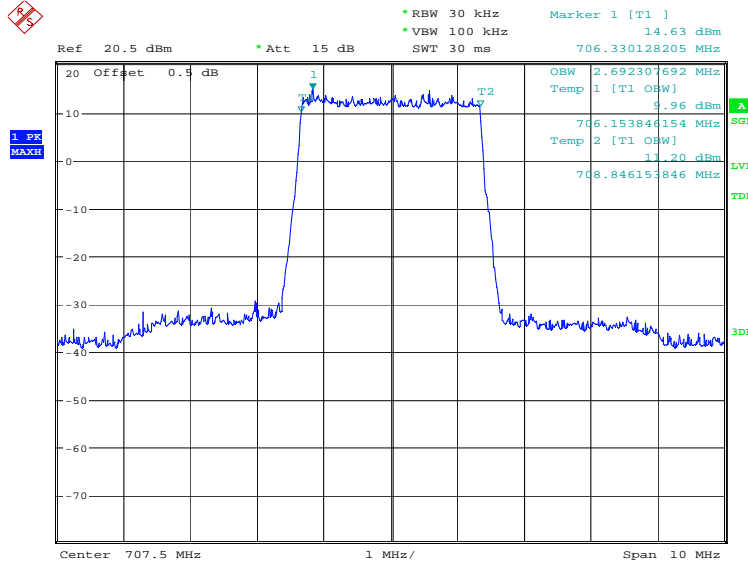


Date: 24.AUG.2023 09:56:49

LTE band 12, 3MHz (99%)

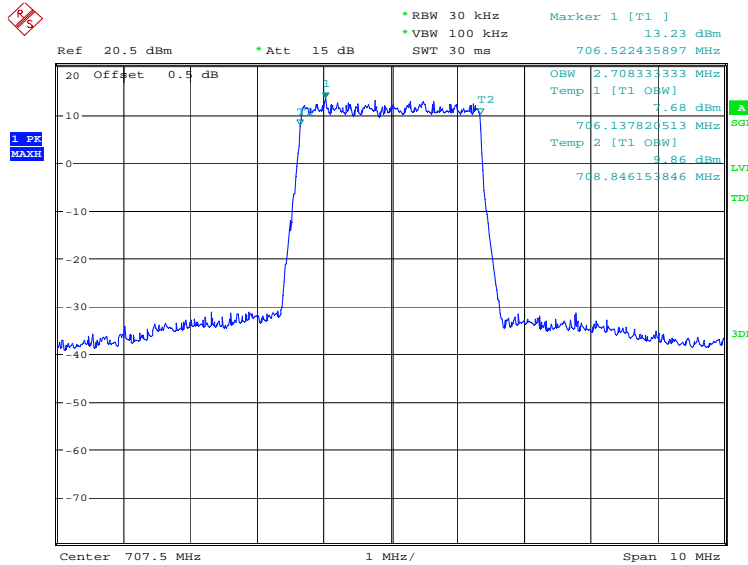
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
707.5	QPSK	16QAM
	2692.31	2708.33

LTE band 12, 3MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:57:31

LTE band 12, 3MHz Bandwidth, 16QAM (99% BW)

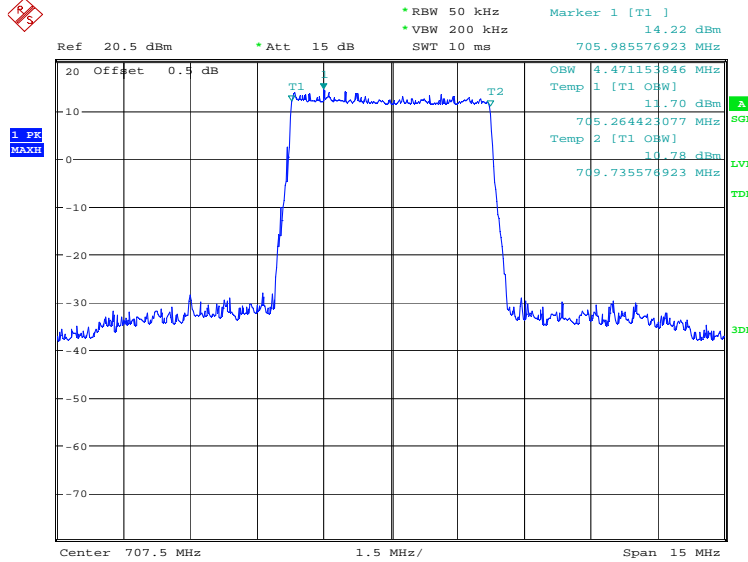


Date: 24.AUG.2023 09:58:11

LTE band 12, 5MHz (99%)

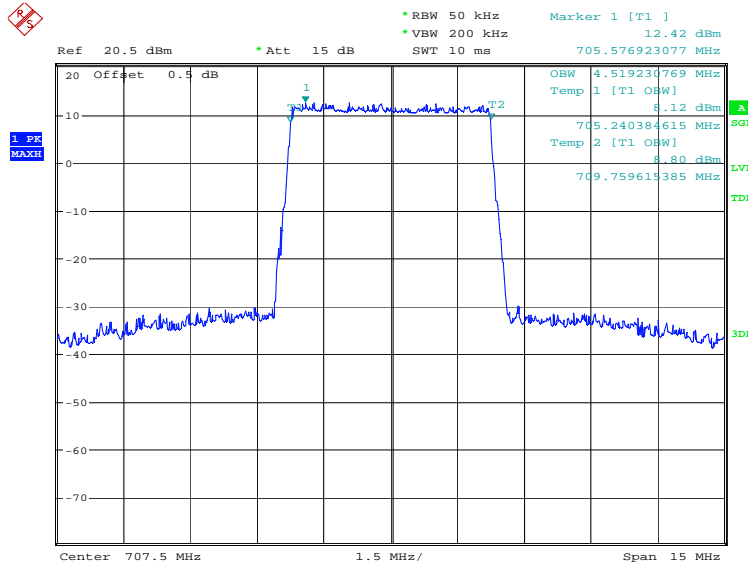
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
707.5	QPSK	16QAM
	4471.15	4519.23

LTE band 12, 5MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 09:58:53

LTE band 12, 5MHz Bandwidth, 16QAM (99% BW)

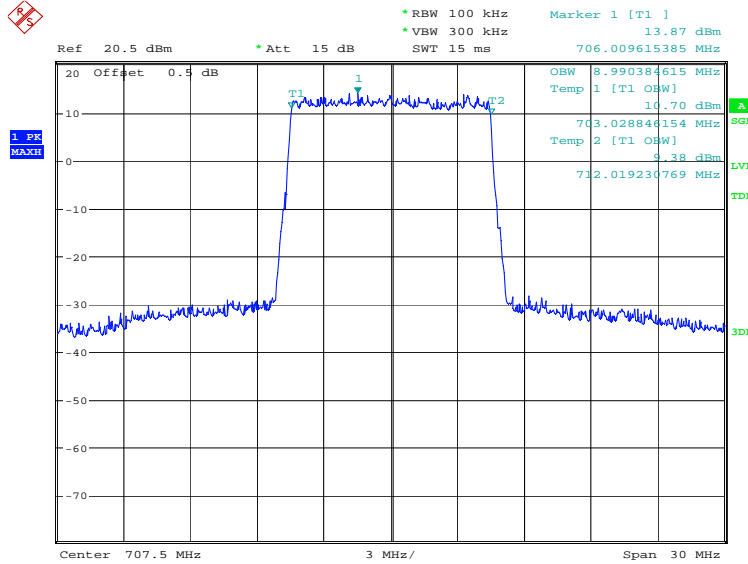


Date: 24.AUG.2023 09:59:33

LTE band 12, 10MHz (99%)

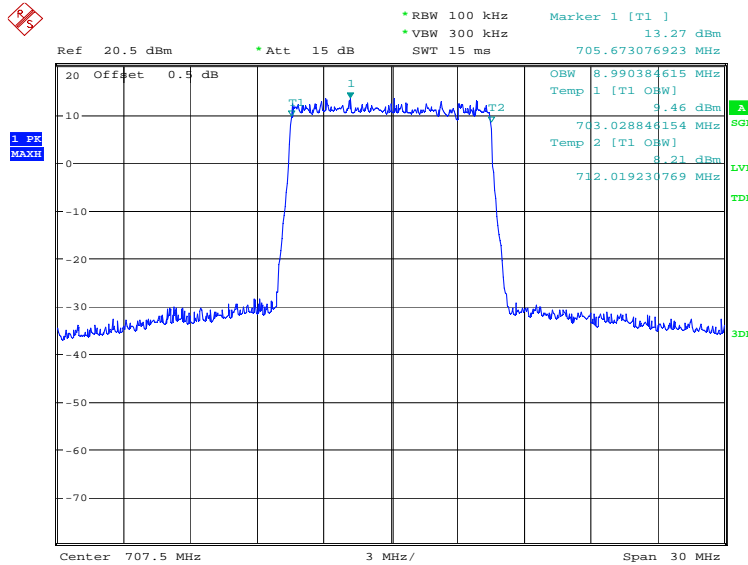
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
707.5	QPSK	16QAM
	8990.38	8990.38

LTE band 12, 10MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 10:00:15

LTE band 12, 10MHz Bandwidth, 16QAM (99% BW)

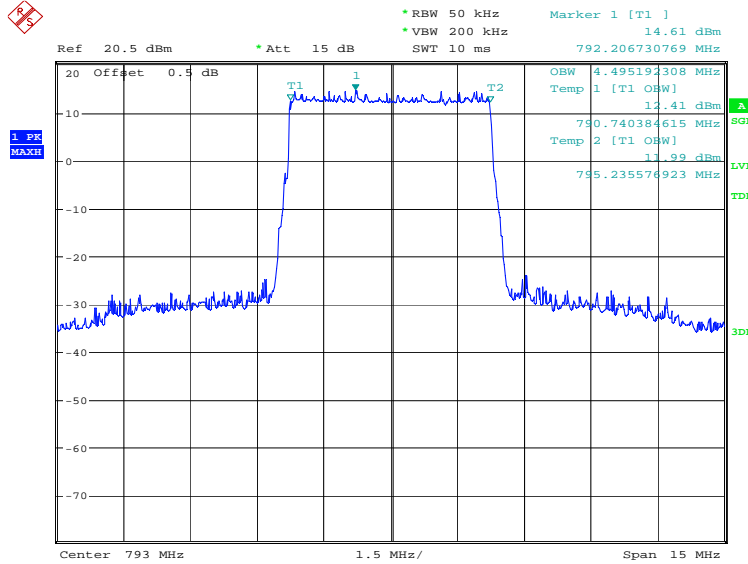


Date: 24.AUG.2023 10:00:55

LTE band 14, 5MHz (99%)

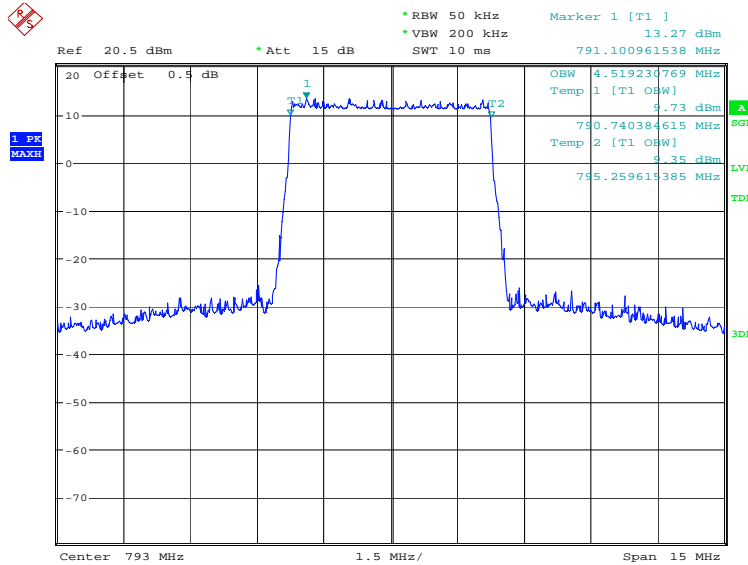
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
793.0	QPSK	16QAM
	4495.19	4519.23

LTE band 14, 5MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 10:01:39

LTE band 14, 5MHz Bandwidth, 16QAM (99% BW)

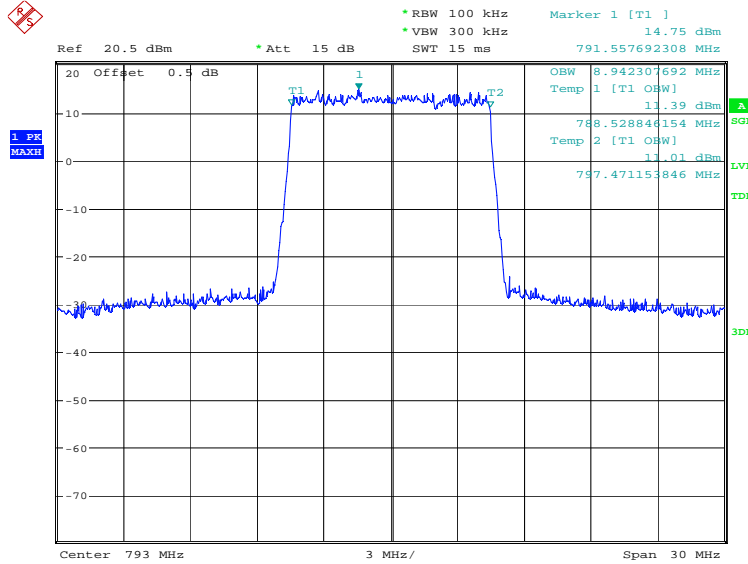


Date: 24.AUG.2023 10:02:19

LTE band 14, 10MHz (99%)

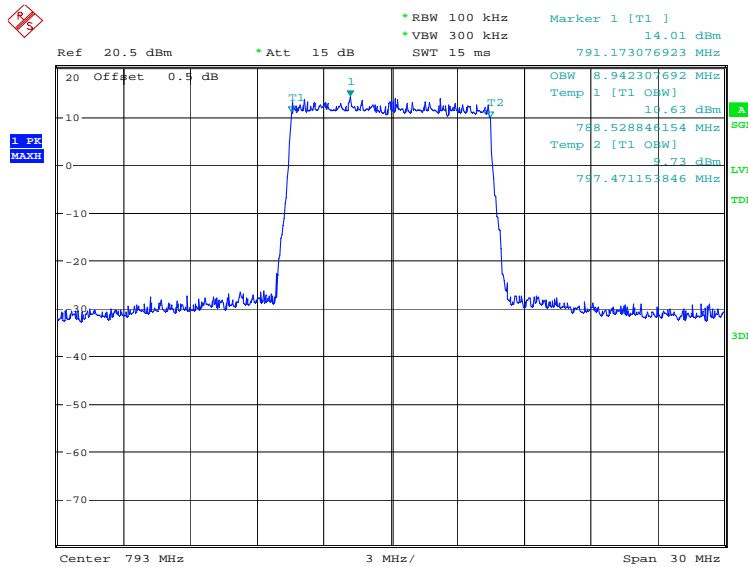
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
793.0	QPSK	16QAM
	8942.31	8942.31

LTE band 14, 10MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 10:03:01

LTE band 14, 10MHz Bandwidth,16QAM (99% BW)

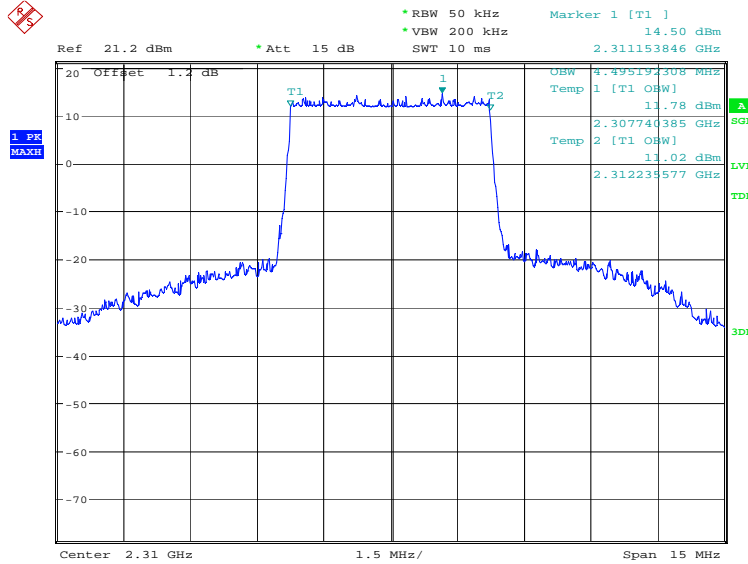


Date: 24.AUG.2023 10:03:41

LTE band 30, 5MHz (99%)

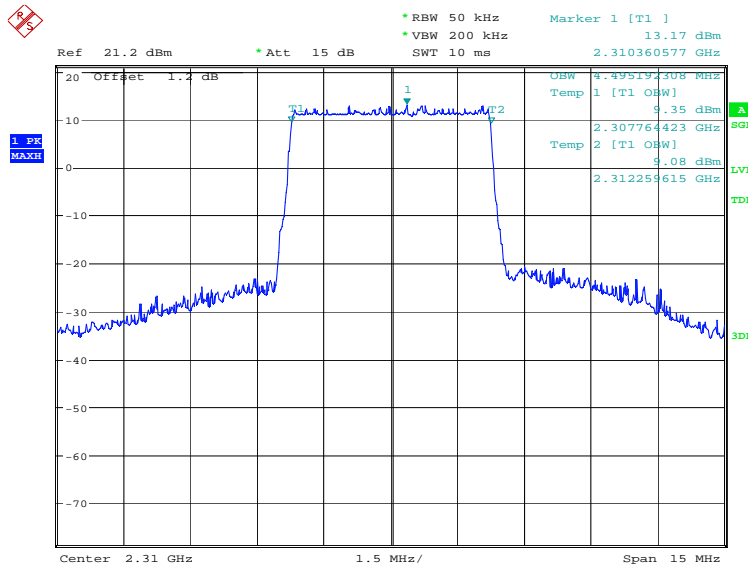
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2310.0	QPSK	16QAM
	4495.19	4495.19

LTE band 30, 5MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 10:04:25

LTE band 30, 5MHz Bandwidth, 16QAM (99% BW)

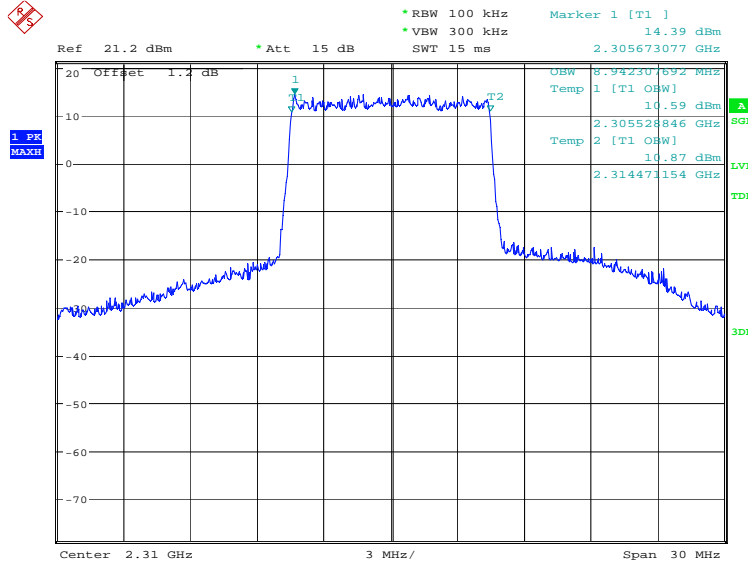


Date: 24.AUG.2023 10:05:05

LTE band 30, 10MHz (99%)

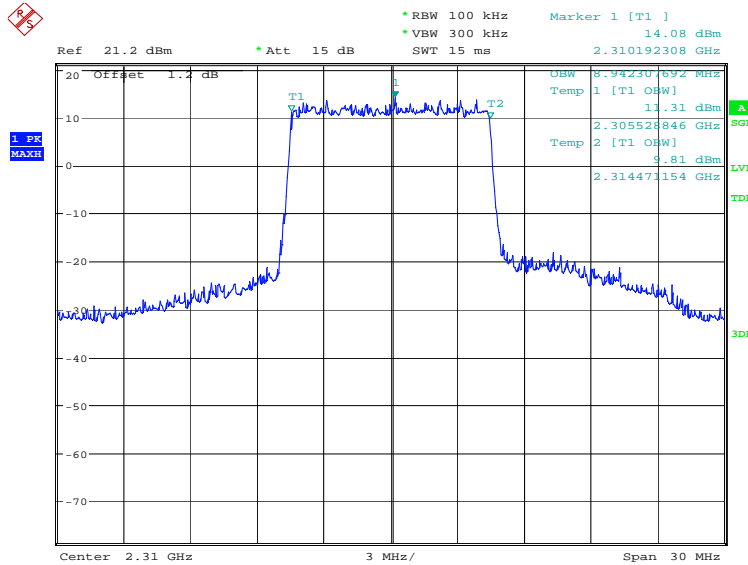
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2310.0	QPSK	16QAM
	8942.31	8942.31

LTE band 30, 10MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 10:05:47

LTE band 30, 10MHz Bandwidth,16QAM (99% BW)

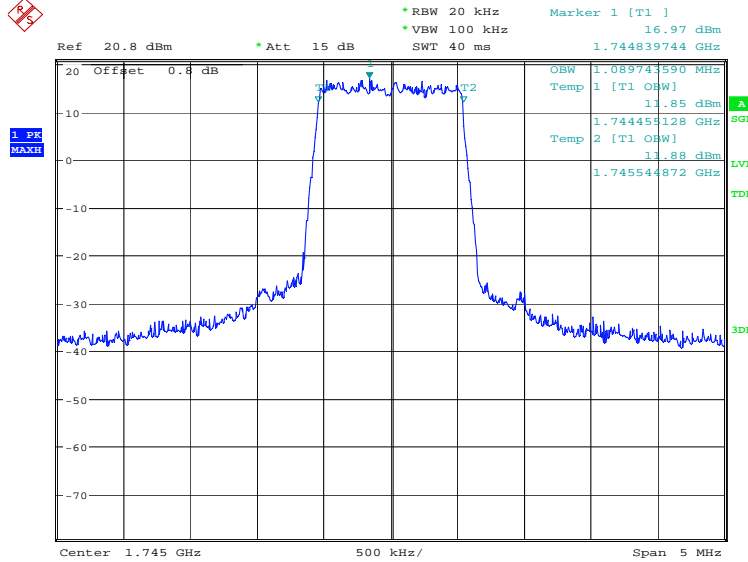


Date: 24.AUG.2023 10:06:27

LTE band 66, 1.4MHz (99%)

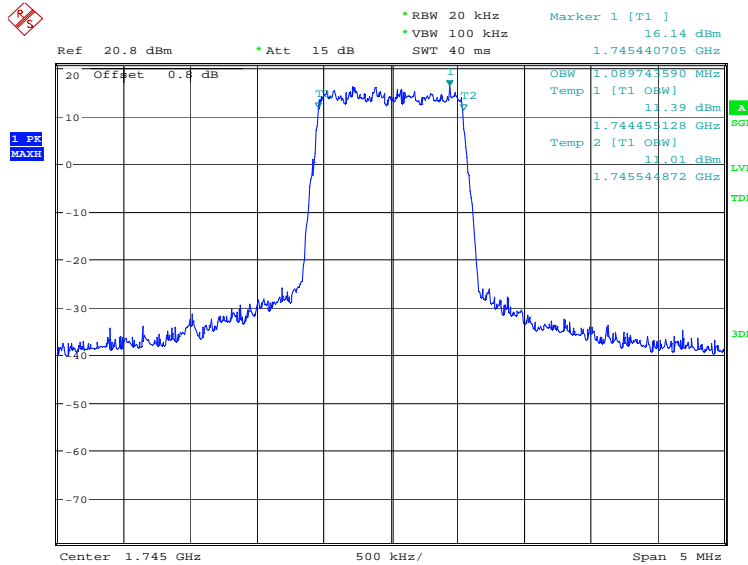
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1745.0	QPSK	16QAM
	1089.74	1089.74

LTE band 66, 1.4MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 10:07:11

LTE band 66, 1.4MHz Bandwidth, 16QAM (99% BW)

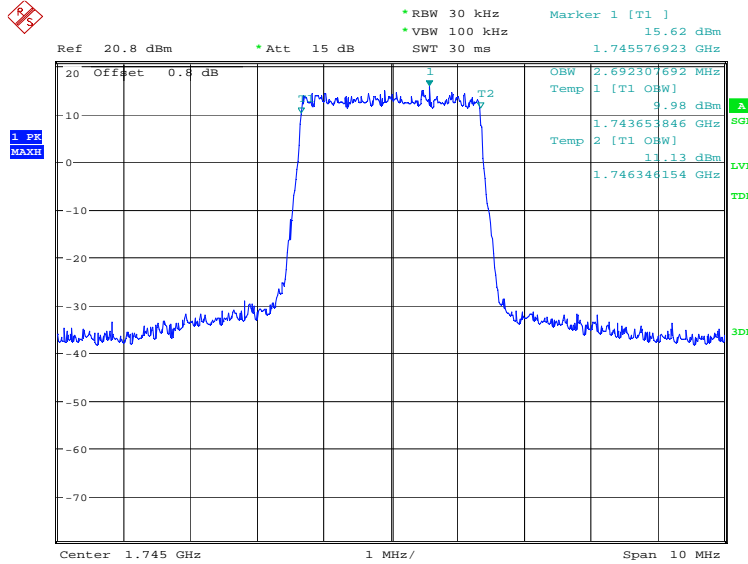


Date: 24.AUG.2023 10:07:52

LTE band 66, 3MHz (99%)

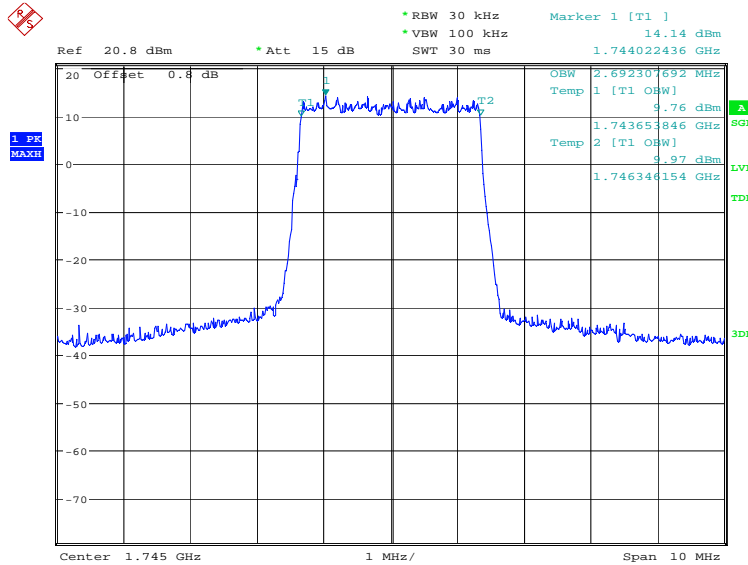
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1745.0	QPSK	16QAM
	2692.31	2692.31

LTE band 66, 3MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 10:08:33

LTE band 66, 3MHz Bandwidth, 16QAM (99% BW)

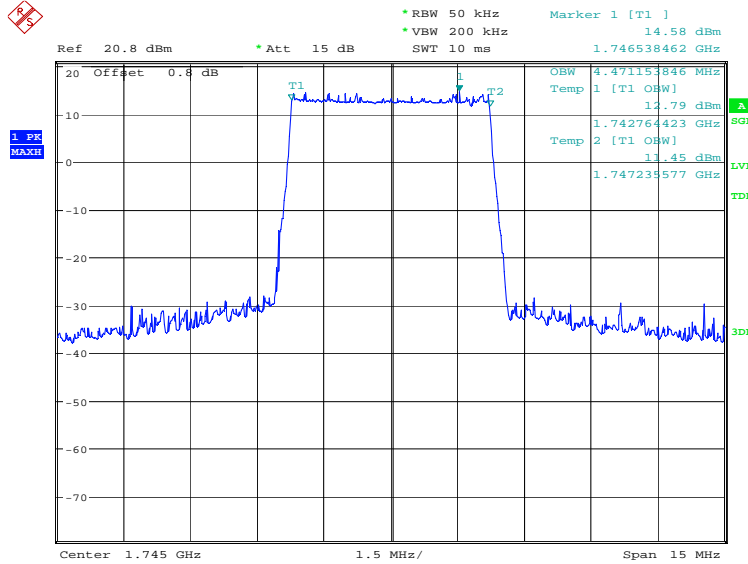


Date: 24.AUG.2023 10:09:14

LTE band 66, 5MHz (99%)

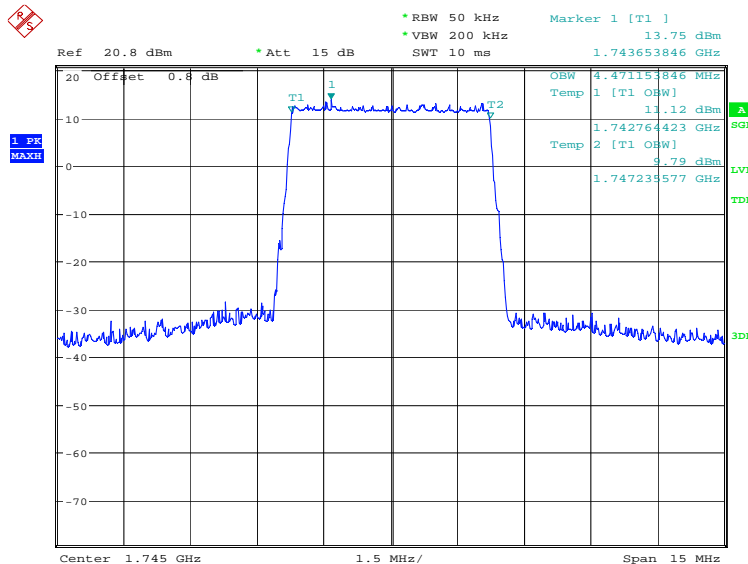
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1745.0	QPSK	16QAM
	4471.15	4471.15

LTE band 66, 5MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 10:09:56

LTE band 66, 5MHz Bandwidth, 16QAM (99% BW)

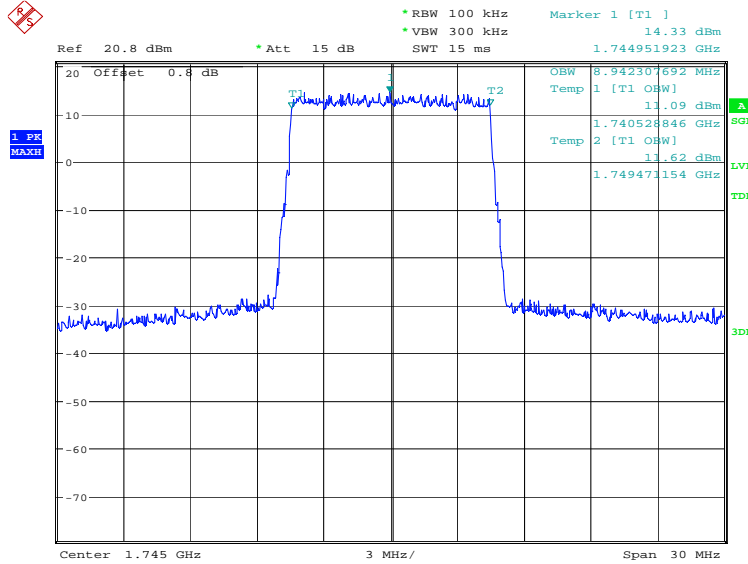


Date: 24.AUG.2023 10:10:36

LTE band 66, 10MHz (99%)

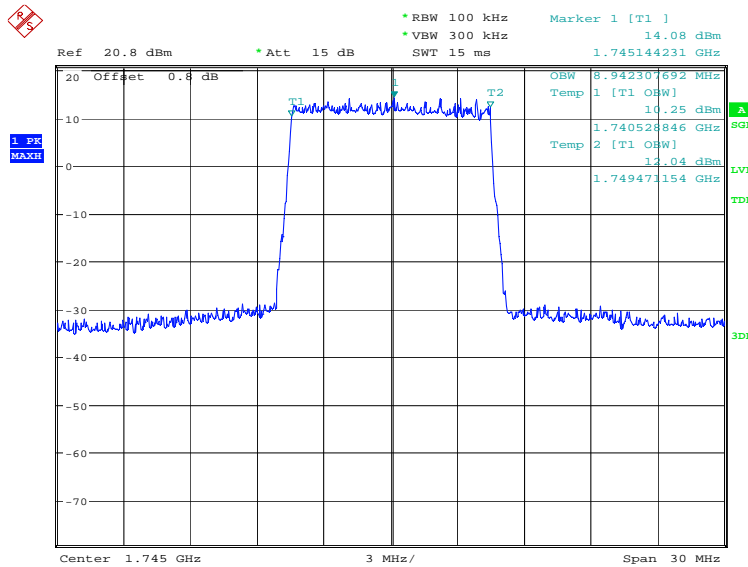
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1745.0	QPSK	16QAM
	8942.31	8942.31

LTE band 66, 10MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 10:11:18

LTE band 66, 10MHz Bandwidth, 16QAM (99% BW)

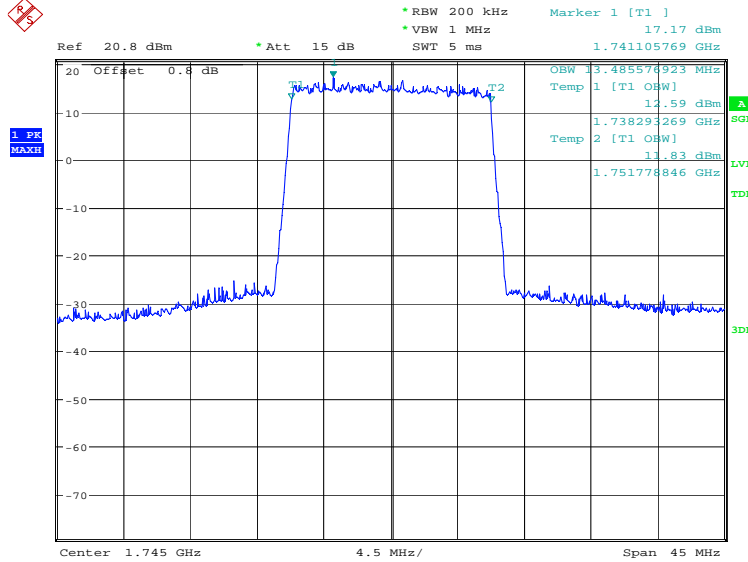


Date: 24.AUG.2023 10:11:58

LTE band 66, 15MHz (99%)

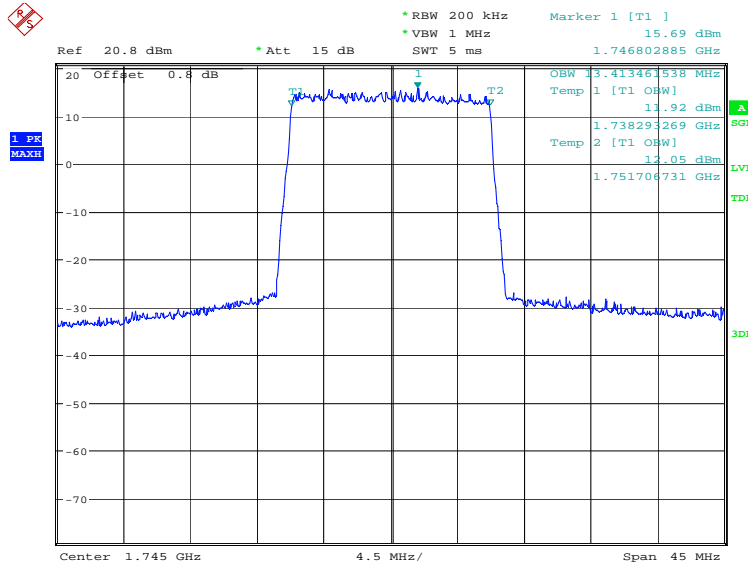
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1745.0	QPSK	16QAM
	13485.58	13413.46

LTE band 66, 15MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 10:12:41

LTE band 66, 15MHz Bandwidth, 16QAM (99% BW)

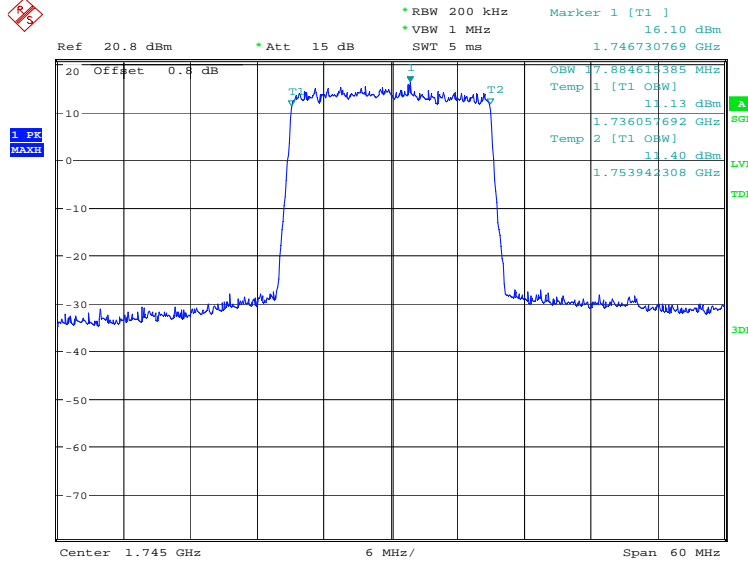


Date: 24.AUG.2023 10:13:21

LTE band 66, 20MHz (99%)

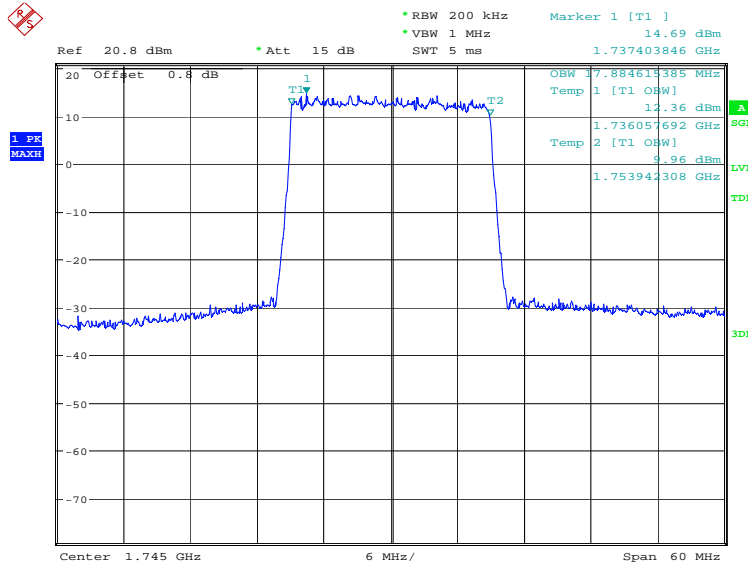
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1745.0	QPSK	16QAM
	17884.62	17884.62

LTE band 66, 20MHz Bandwidth, QPSK (99% BW)



Date: 24.AUG.2023 10:14:03

LTE band 66, 20MHz Bandwidth, 16QAM (99% BW)



Date: 24.AUG.2023 10:14:44

Note: Expanded measurement uncertainty is $U = 3428 \text{ Hz}$, $k = 2$.

A.5 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.

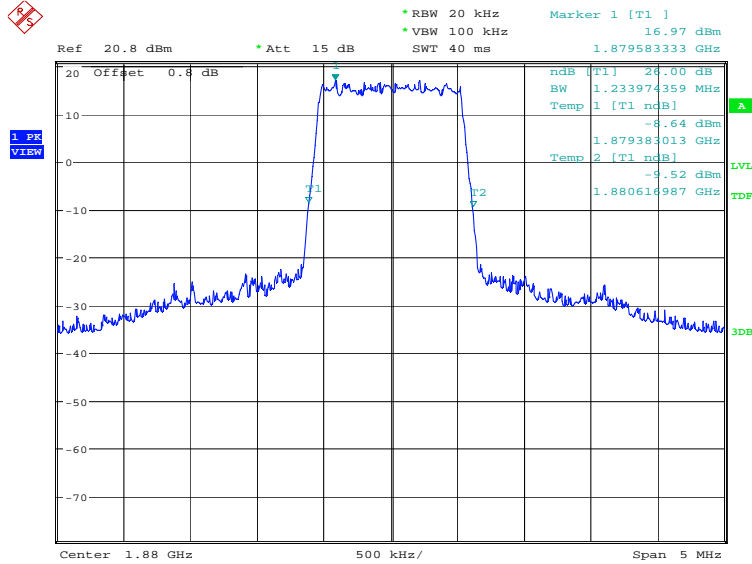
The measurement method is from ANSI C63.26:

- 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 $\geq 3 \times$ 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.

LTE band 2, 1.4MHz (-26dBc)

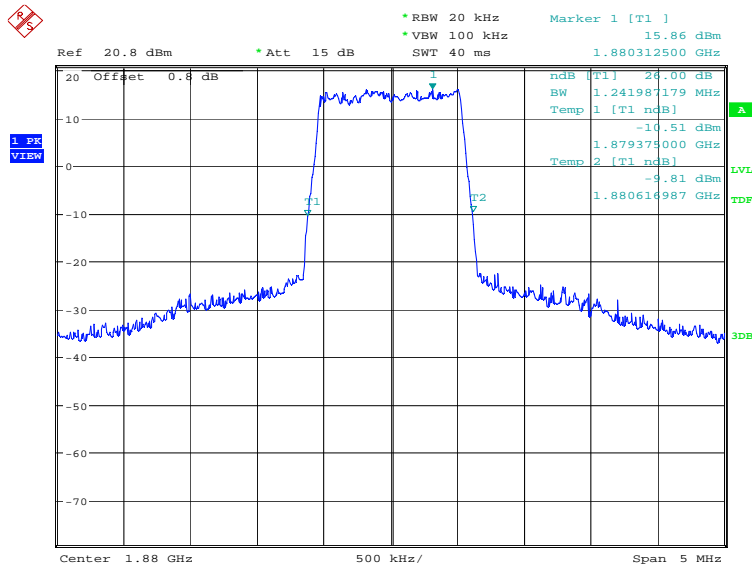
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	1233.97	1241.99

LTE band 2, 1.4MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:16:03

LTE band 2, 1.4MHz Bandwidth, 16QAM (-26dBc BW)

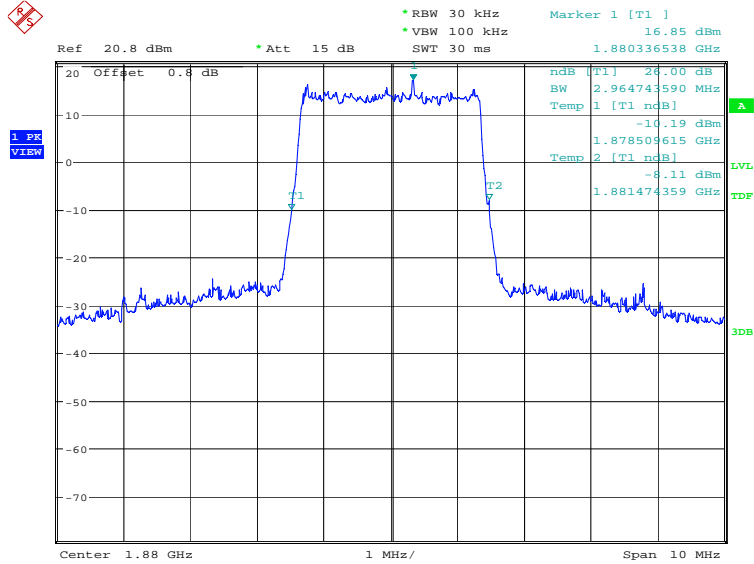


Date: 24.AUG.2023 10:16:43

LTE band 2, 3MHz (-26dBc)

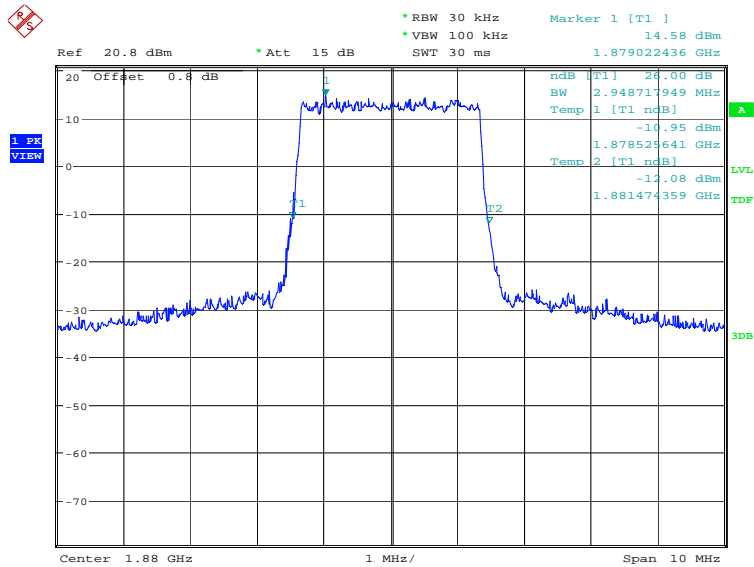
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	2964.74	2948.72

LTE band 2, 3MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:17:25

LTE band 2, 3MHz Bandwidth, 16QAM (-26dBc BW)

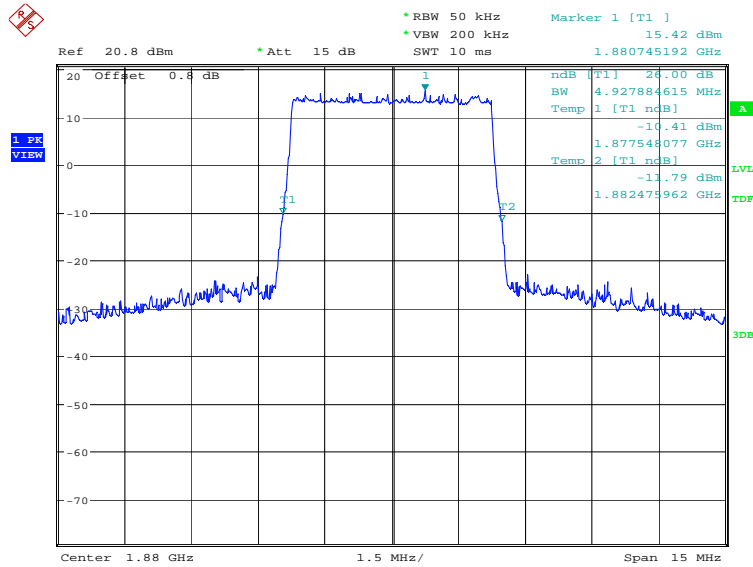


Date: 24.AUG.2023 10:18:06

LTE band 2, 5MHz (-26dBc)

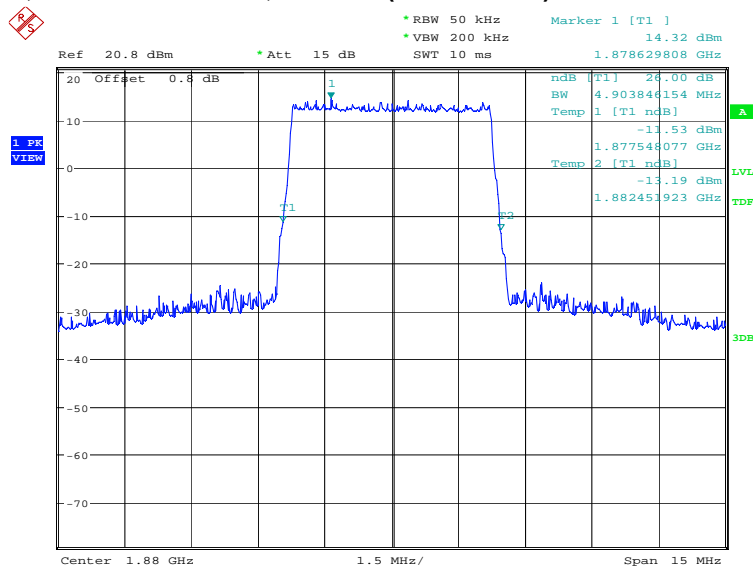
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	4927.88	4903.85

LTE band 2, 5MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:18:48

LTE band 2, 5MHz Bandwidth, 16QAM (-26dBc BW)

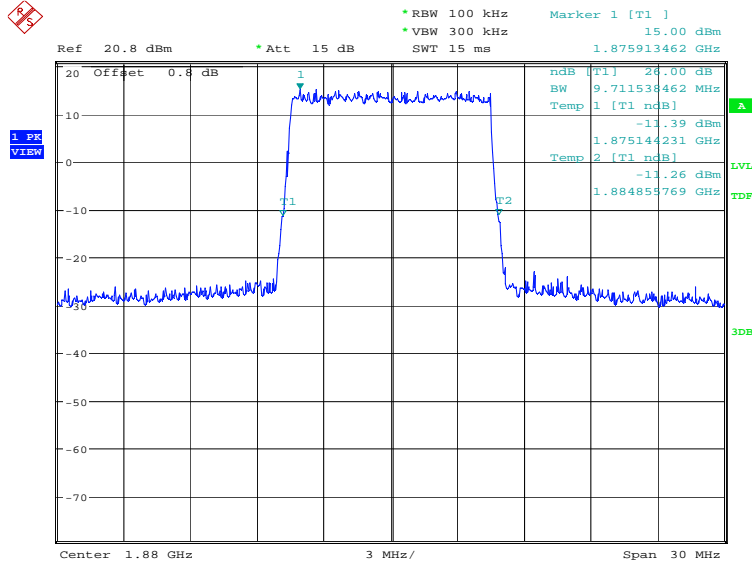


Date: 24.AUG.2023 10:19:29

LTE band 2, 10MHz (-26dBc)

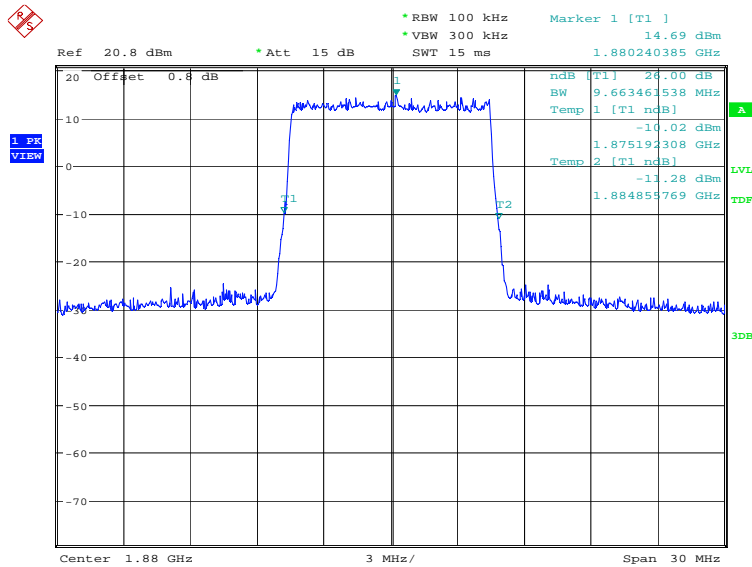
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	9711.54	9663.46

LTE band 2, 10MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:20:11

LTE band 2, 10MHz Bandwidth, 16QAM (-26dBc BW)

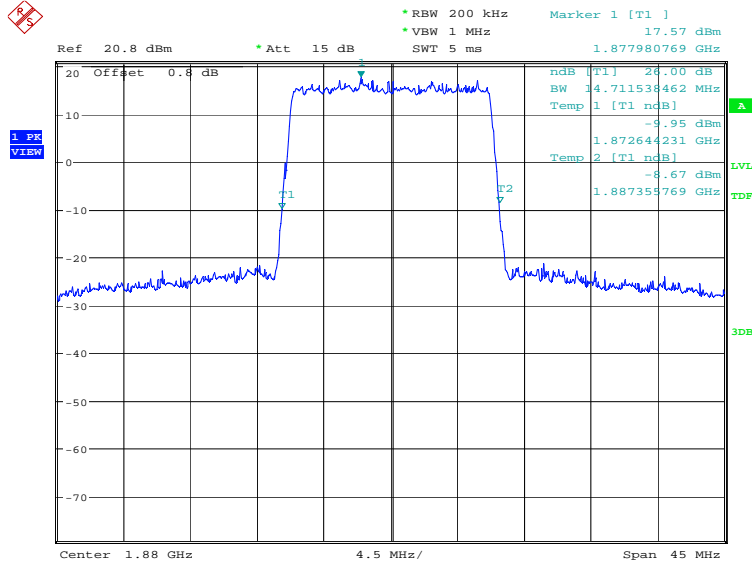


Date: 24.AUG.2023 10:20:52

LTE band 2, 15MHz (-26dBc)

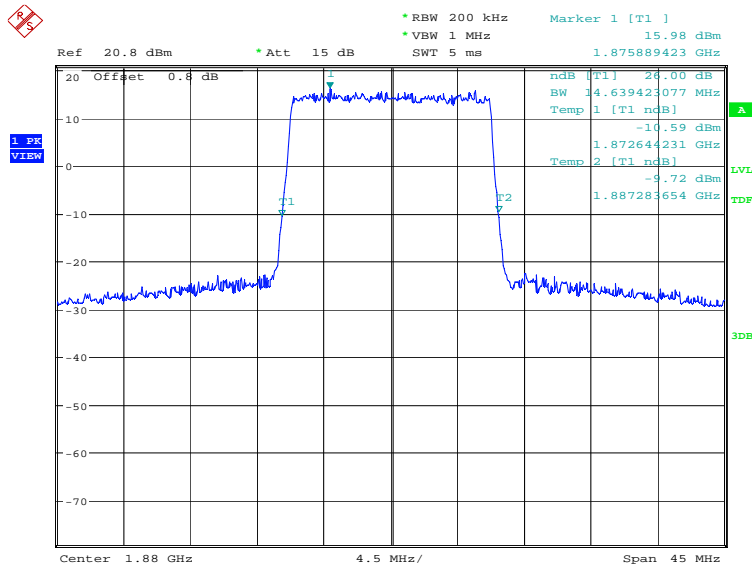
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	14711.54	14639.42

LTE band 2, 15MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:21:34

LTE band 2, 15MHz Bandwidth, 16QAM (-26dBc BW)

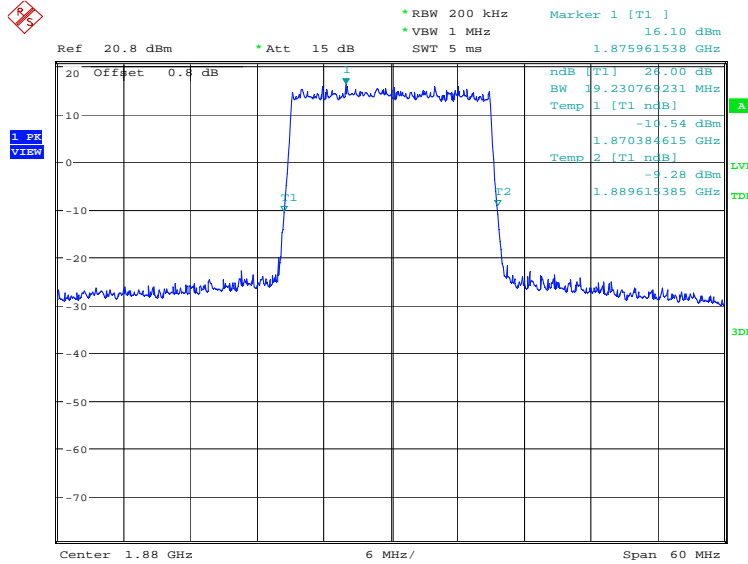


Date: 24.AUG.2023 10:22:15

LTE band 2, 20MHz (-26dBc)

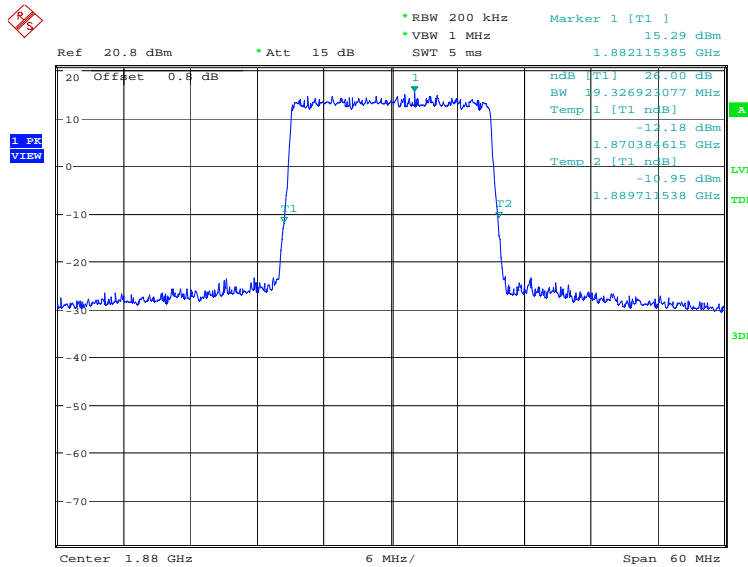
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	19230.77	19326.92

LTE band 2, 20MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:22:57

LTE band 2, 20MHz Bandwidth, 16QAM (-26dBc BW)

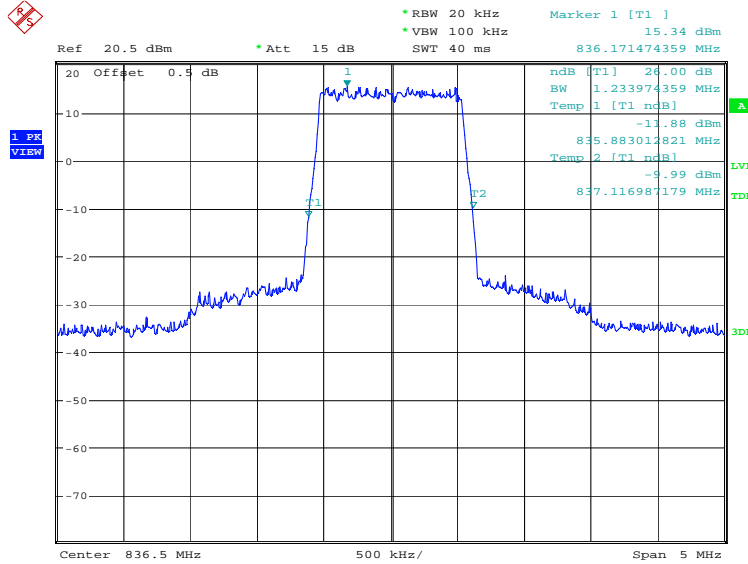


Date: 24.AUG.2023 10:23:38

LTE band 5, 1.4MHz (-26dBc)

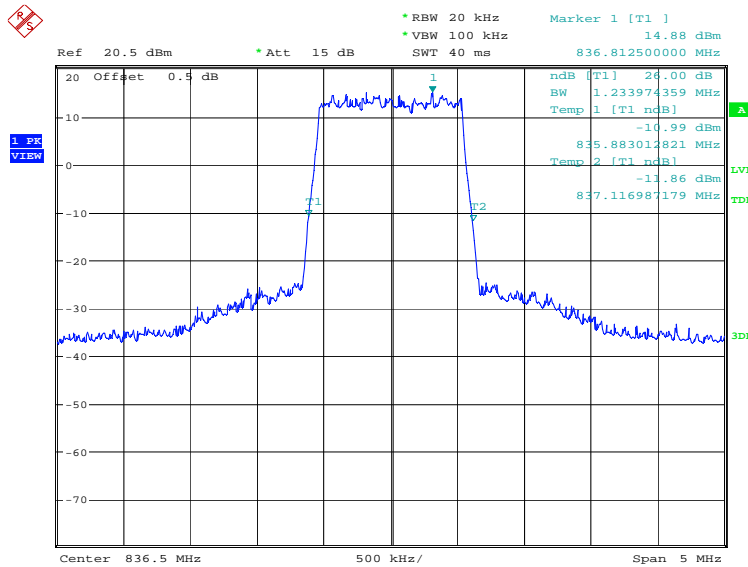
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
836.5	QPSK	16QAM
	1233.97	1233.97

LTE band 5, 1.4MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:25:16

LTE band 5, 1.4MHz Bandwidth, 16QAM (-26dBc BW)

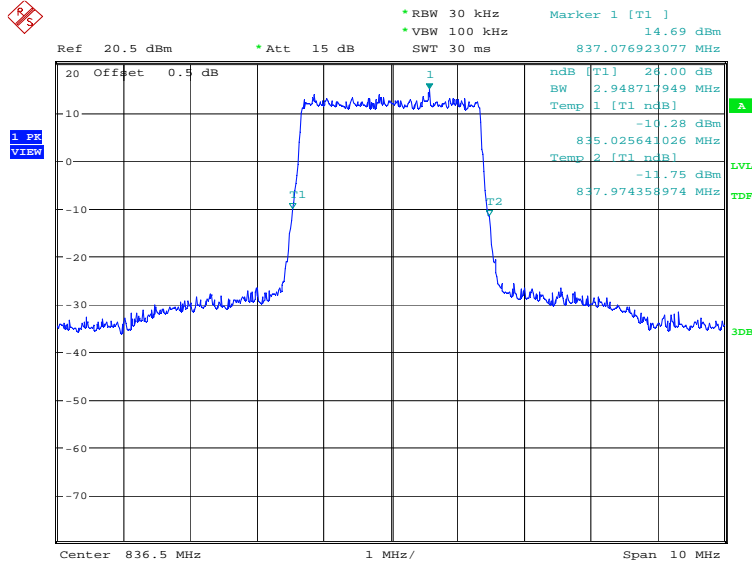


Date: 24.AUG.2023 10:25:57

LTE band 5, 3MHz (-26dBc)

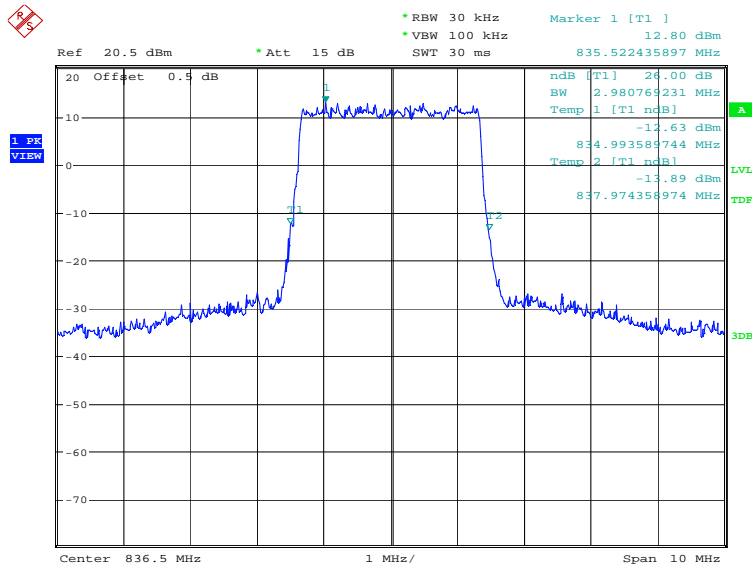
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
836.5	QPSK	16QAM
	2948.72	2980.77

LTE band 5, 3MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:26:39

LTE band 5, 3MHz Bandwidth, 16QAM (-26dBc BW)

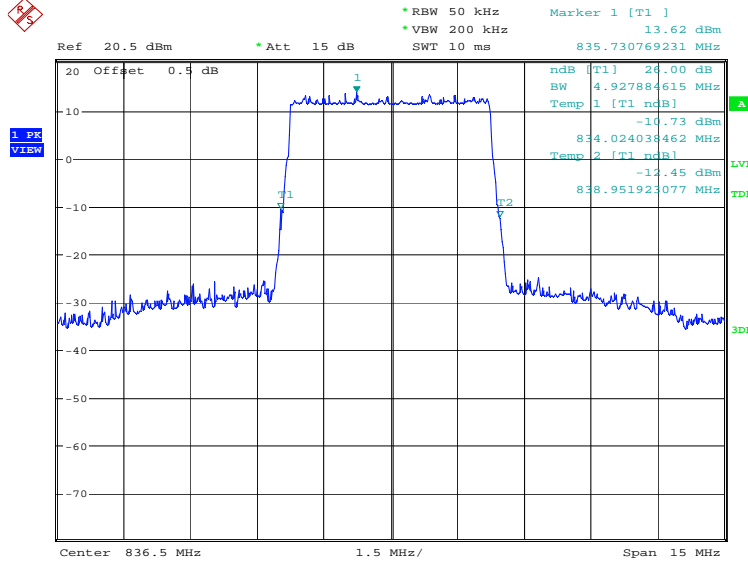


Date: 24.AUG.2023 10:27:20

LTE band 5, 5MHz (-26dBc)

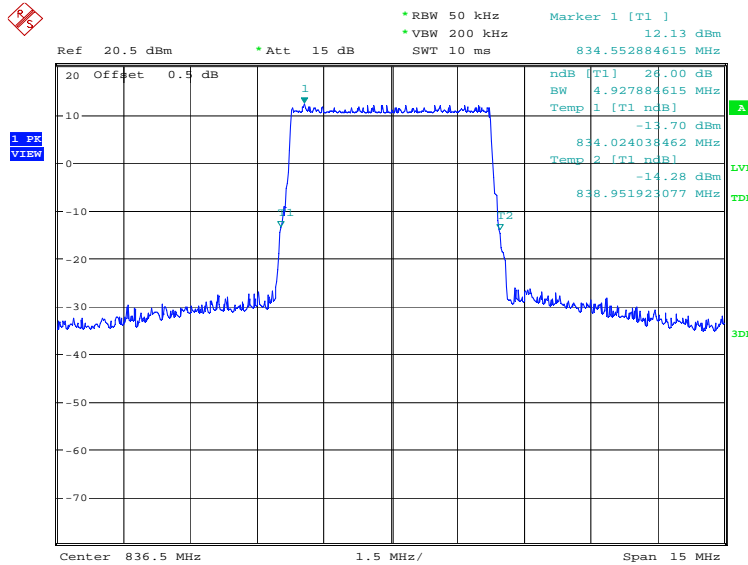
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
836.5	QPSK	16QAM
	4927.88	4927.88

LTE band 5, 5MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:28:02

LTE band 5, 5MHz Bandwidth, 16QAM (-26dBc BW)

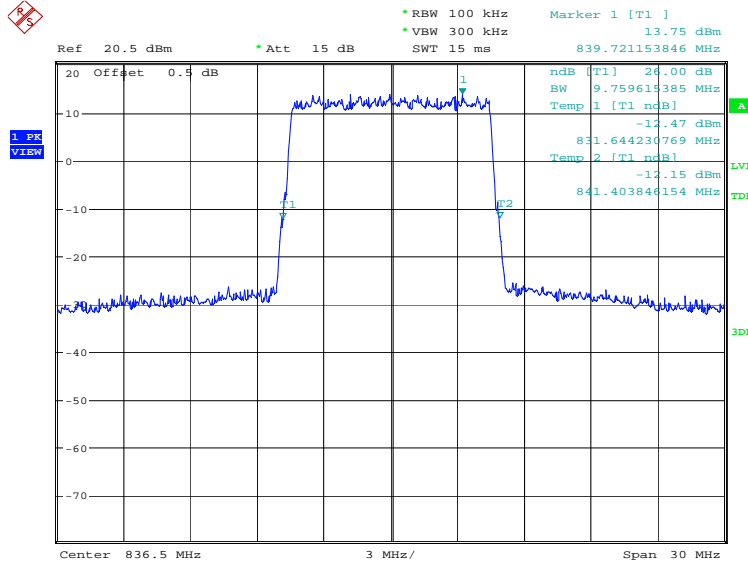


Date: 24.AUG.2023 10:28:43

LTE band 5, 10MHz (-26dBc)

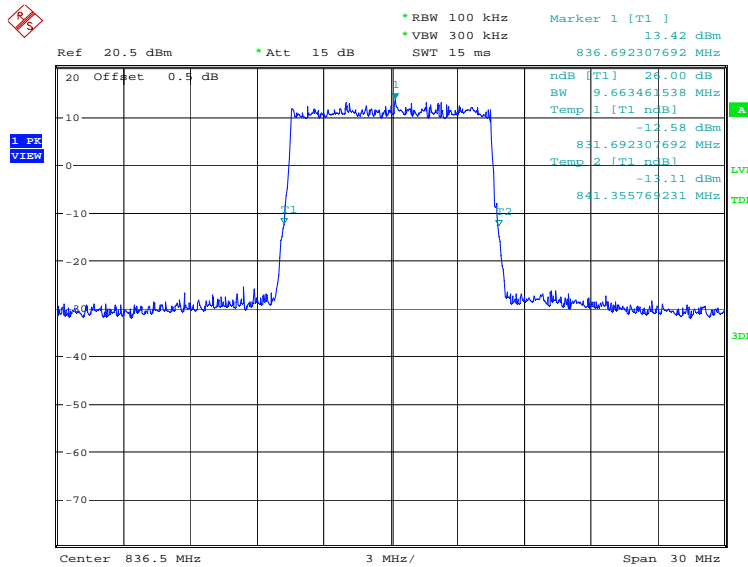
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
836.5	QPSK	16QAM
	9759.62	9663.46

LTE band 5, 10MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:29:25

LTE band 5, 10MHz Bandwidth, 16QAM (-26dBc BW)

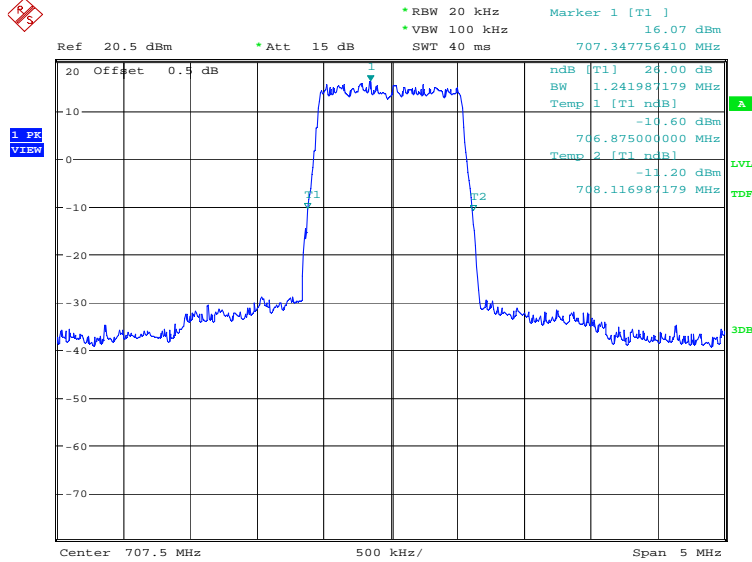


Date: 24.AUG.2023 10:30:06

LTE band 12, 1.4MHz (-26dBc)

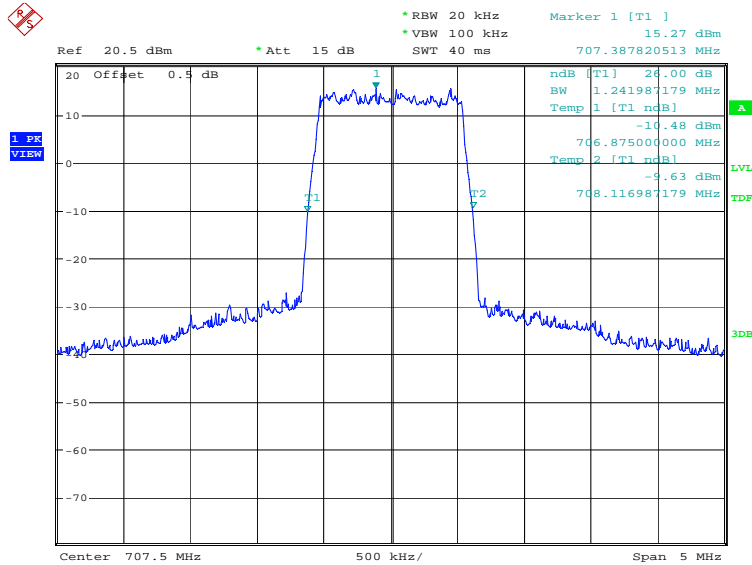
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
707.5	QPSK	16QAM
	1241.99	1241.99

LTE band 12, 1.4MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:30:50

LTE band 12, 1.4MHz Bandwidth, 16QAM (-26dBc BW)

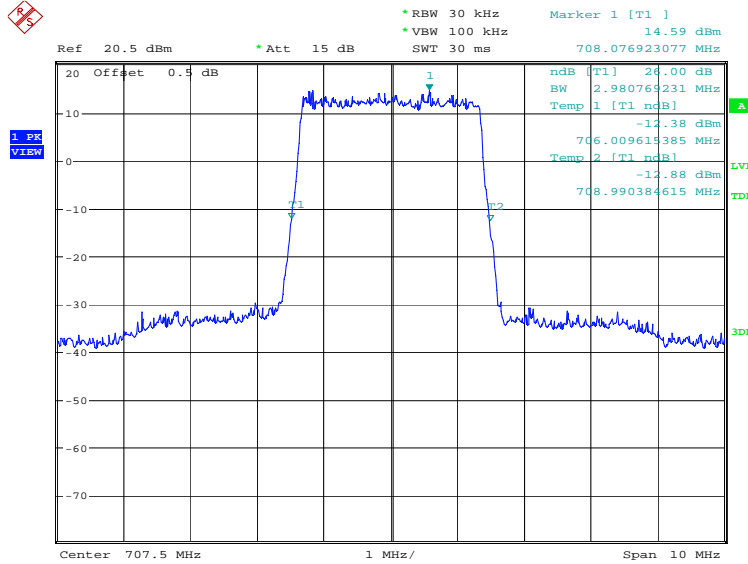


Date: 24.AUG.2023 10:31:30

LTE band 12, 3MHz (-26dBc)

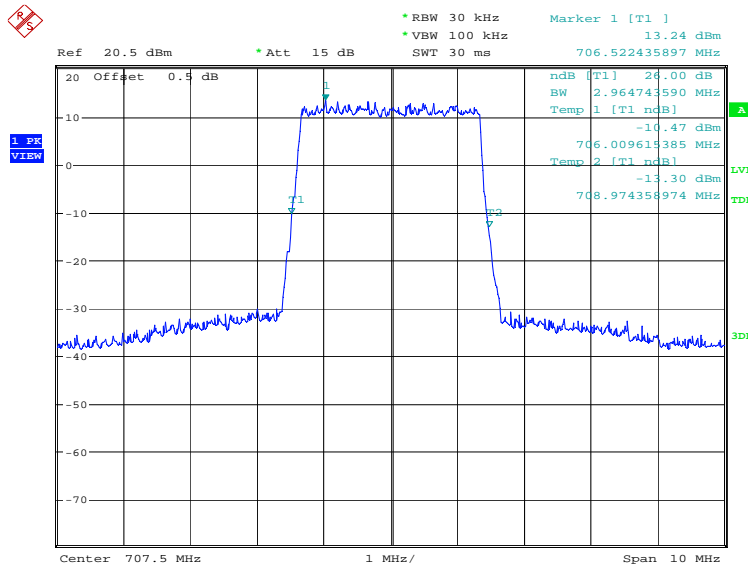
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
707.5	QPSK	16QAM
	2980.77	2964.74

LTE band 12, 3MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:32:12

LTE band 12, 3MHz Bandwidth, 16QAM (-26dBc BW)

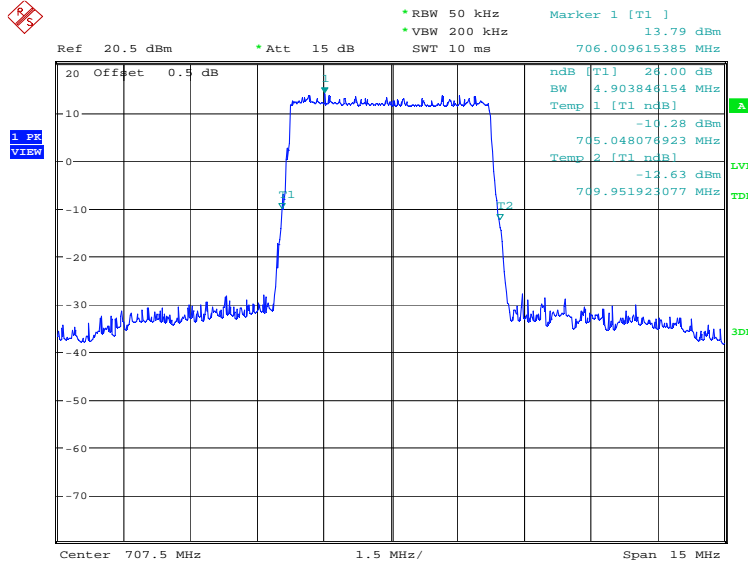


Date: 24.AUG.2023 10:32:53

LTE band 12, 5MHz (-26dBc)

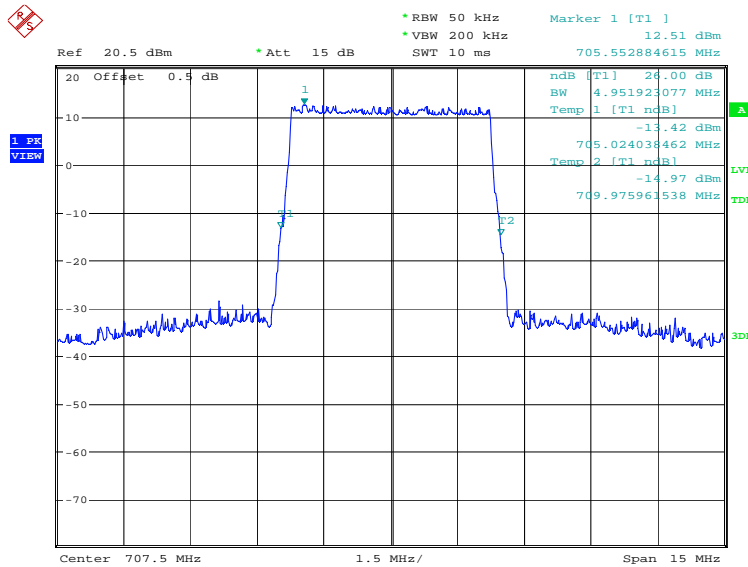
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
707.5	QPSK	16QAM
	4903.85	4951.92

LTE band 12, 5MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:33:35

LTE band 12, 5MHz Bandwidth, 16QAM (-26dBc BW)

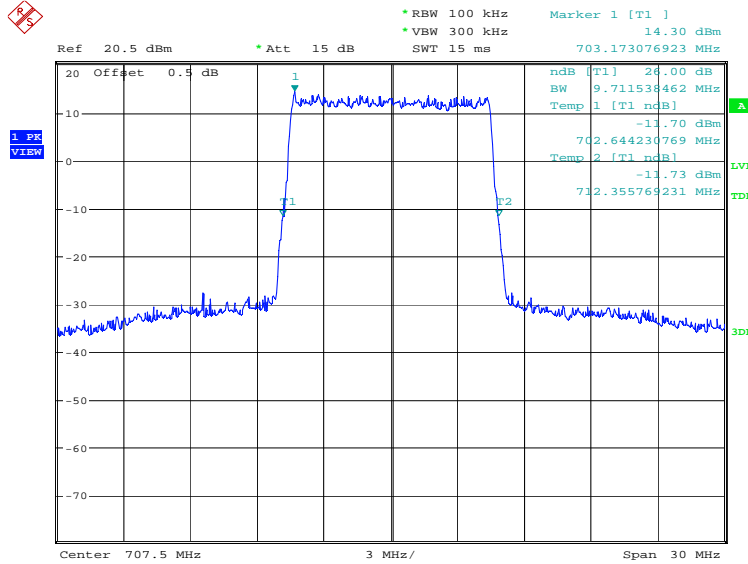


Date: 24.AUG.2023 10:34:16

LTE band 12, 10MHz (-26dBc)

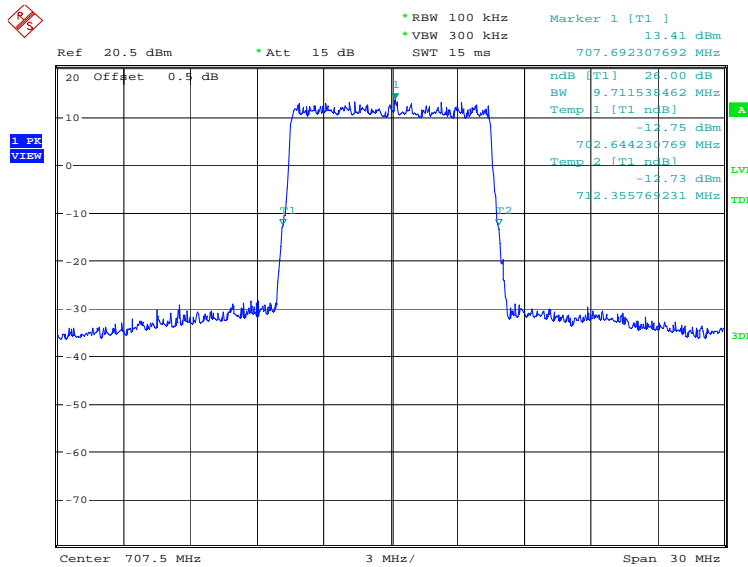
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
707.5	QPSK	16QAM
	9711.54	9711.54

LTE band 12, 10MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:34:58

LTE band 12, 10MHz Bandwidth, 16QAM (-26dBc BW)

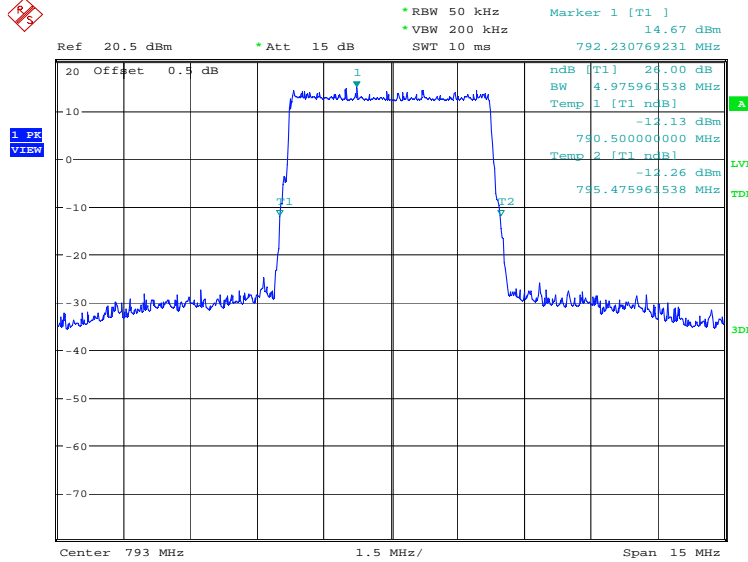


Date: 24.AUG.2023 10:35:39

LTE band 14, 5MHz (-26dBc)

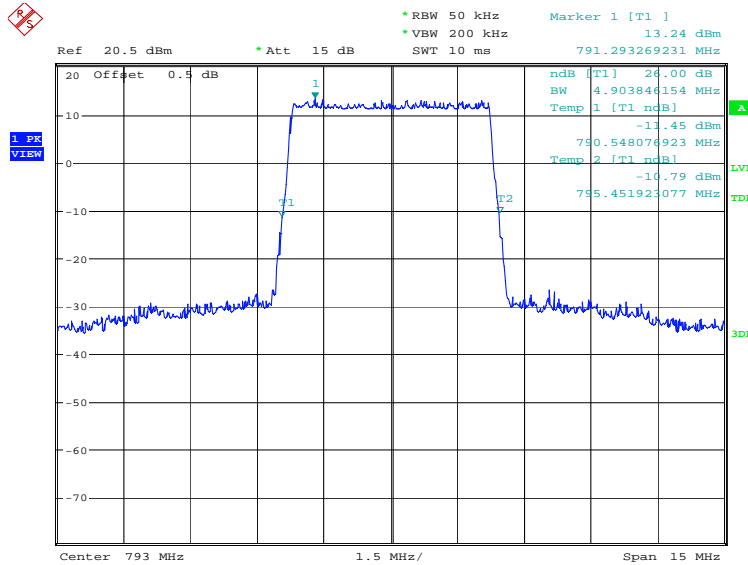
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
793.0	QPSK	16QAM
	4975.96	4903.85

LTE band 14, 5MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:36:23

LTE band 14, 5MHz Bandwidth, 16QAM (-26dBc BW)

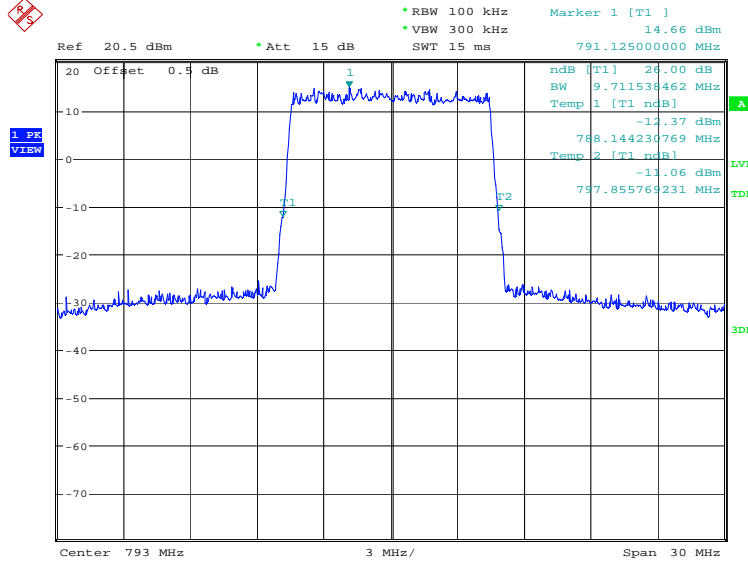


Date: 24.AUG.2023 10:37:03

LTE band 14, 10MHz (-26dBc)

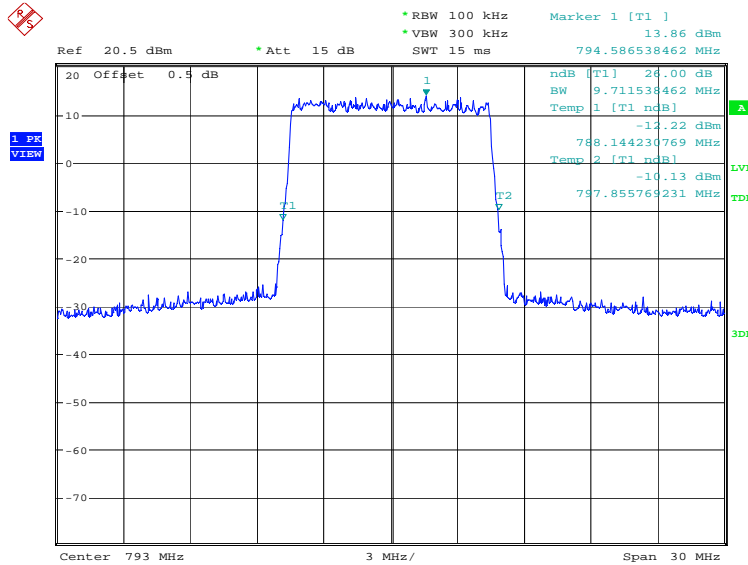
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
793.0	QPSK	16QAM
	9711.54	9711.54

LTE band 14, 10MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:37:45

LTE band 14, 10MHz Bandwidth,16QAM (-26dBc BW)

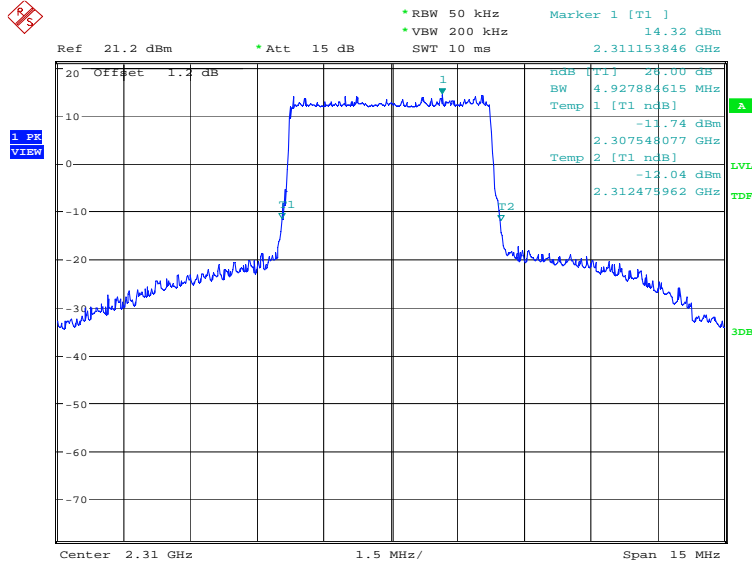


Date: 24.AUG.2023 10:38:26

LTE band 30, 5MHz (-26dBc)

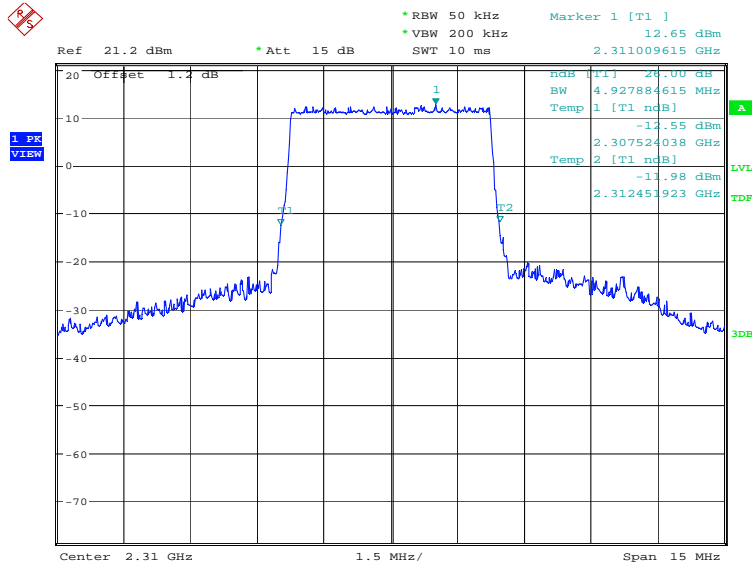
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
2310.0	QPSK	16QAM
	4927.88	4927.88

LTE band 30, 5MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:39:10

LTE band 30, 5MHz Bandwidth, 16QAM (-26dBc BW)

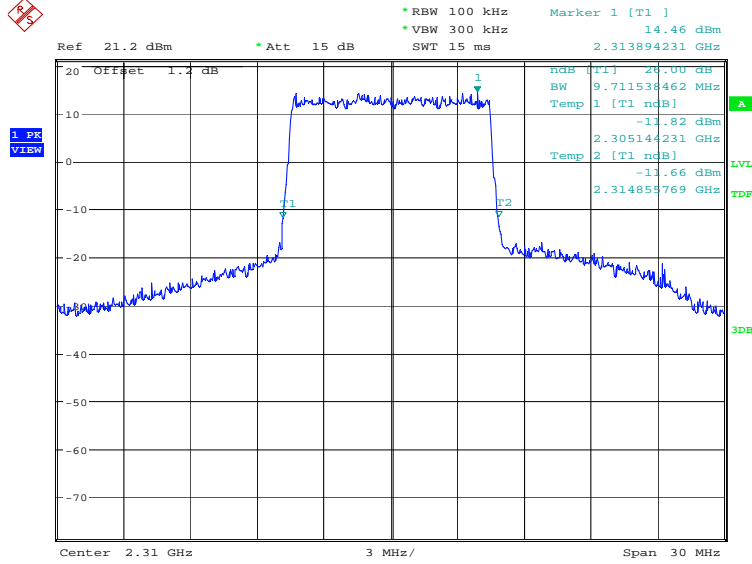


Date: 24.AUG.2023 10:39:51

LTE band 30, 10MHz (-26dBc)

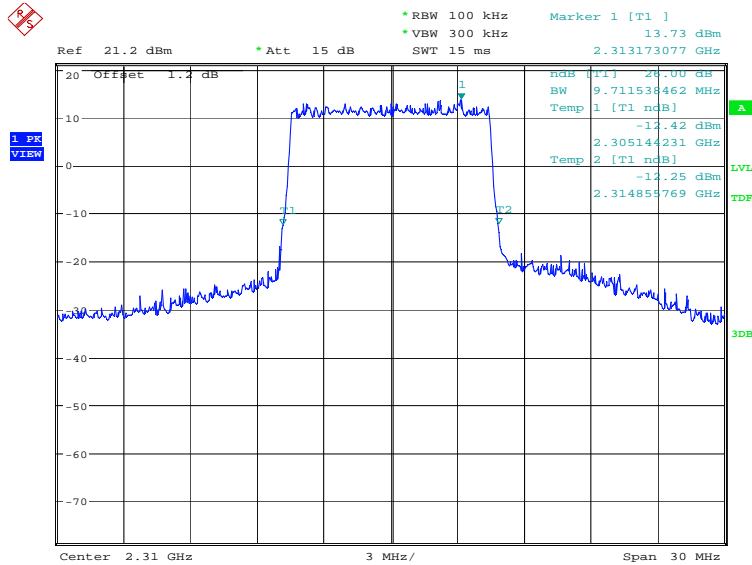
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
2310.0	QPSK	16QAM
	9711.54	9711.54

LTE band 30, 10MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:40:33

LTE band 30, 10MHz Bandwidth,16QAM (-26dBc BW)

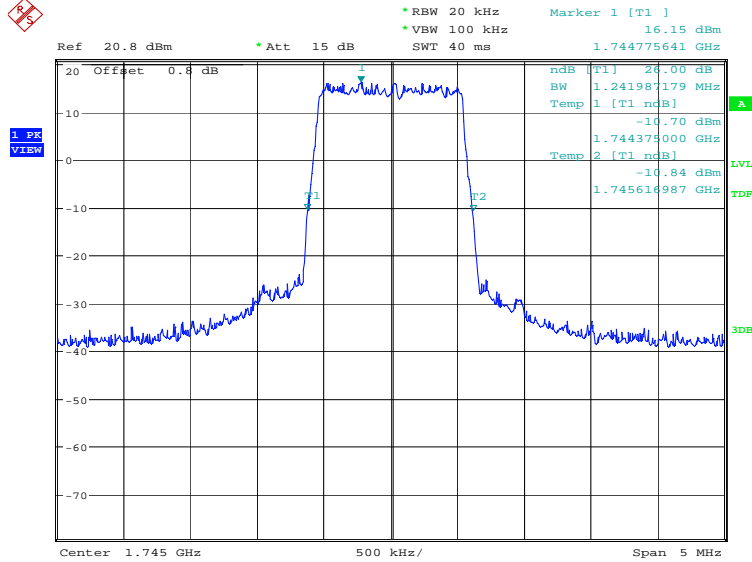


Date: 24.AUG.2023 10:41:14

LTE band 66, 1.4MHz (-26dBc)

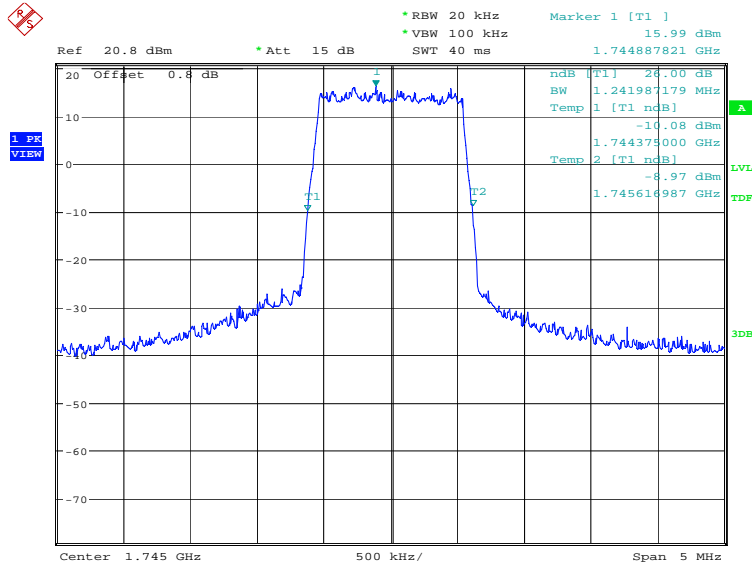
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1745.0	QPSK	16QAM
	1241.99	1241.99

LTE band 66, 1.4MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:41:58

LTE band 66, 1.4MHz Bandwidth, 16QAM (-26dBc BW)

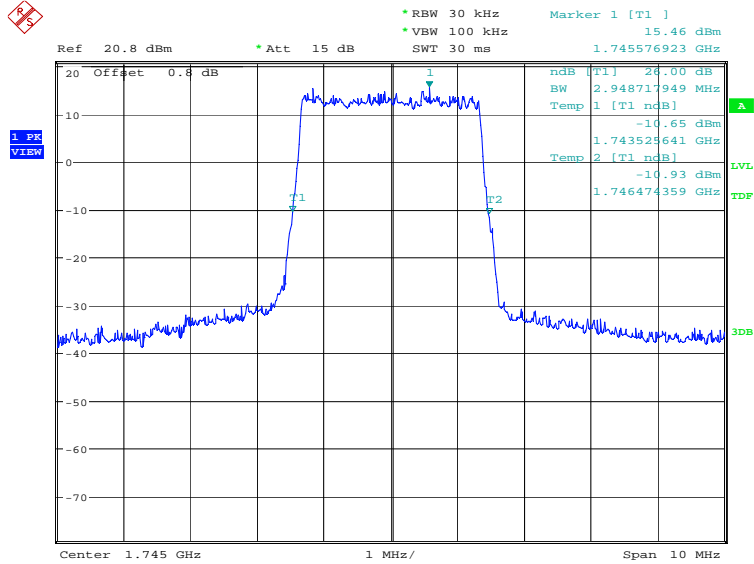


Date: 24.AUG.2023 10:42:38

LTE band 66, 3MHz (-26dBc)

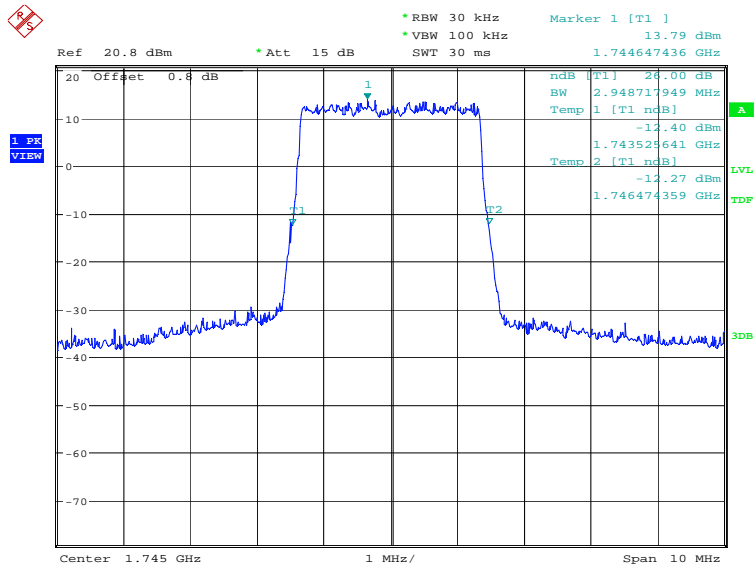
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1745.0	QPSK	16QAM
	2948.72	2948.72

LTE band 66, 3MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:43:20

LTE band 66, 3MHz Bandwidth, 16QAM (-26dBc BW)

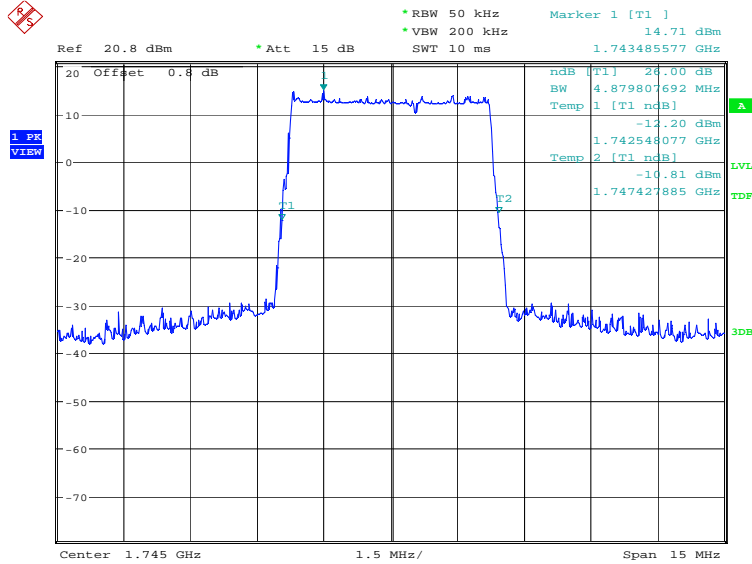


Date: 24.AUG.2023 10:44:01

LTE band 66, 5MHz (-26dBc)

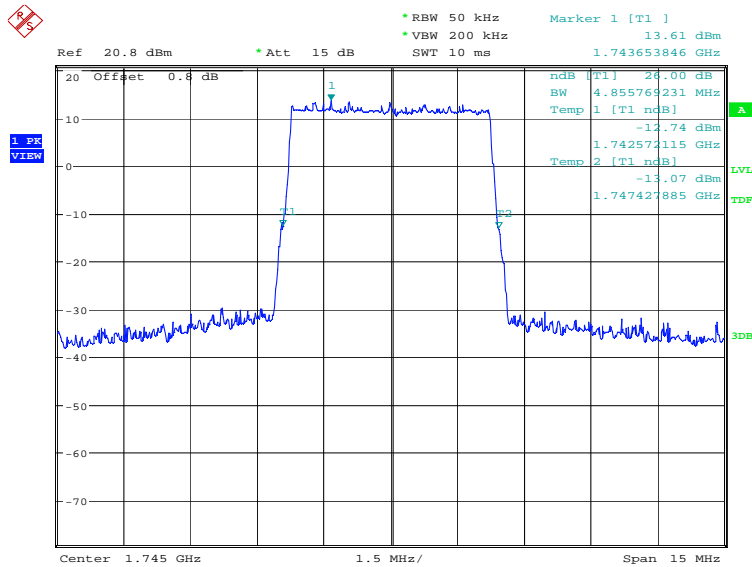
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1745.0	QPSK	16QAM
	4879.81	4855.77

LTE band 66, 5MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:44:44

LTE band 66, 5MHz Bandwidth, 16QAM (-26dBc BW)

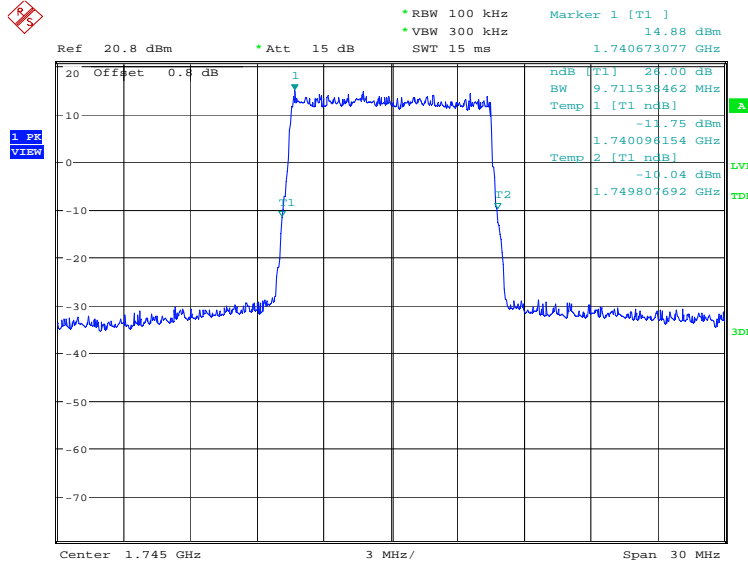


Date: 24.AUG.2023 10:45:24

LTE band 66, 10MHz (-26dBc)

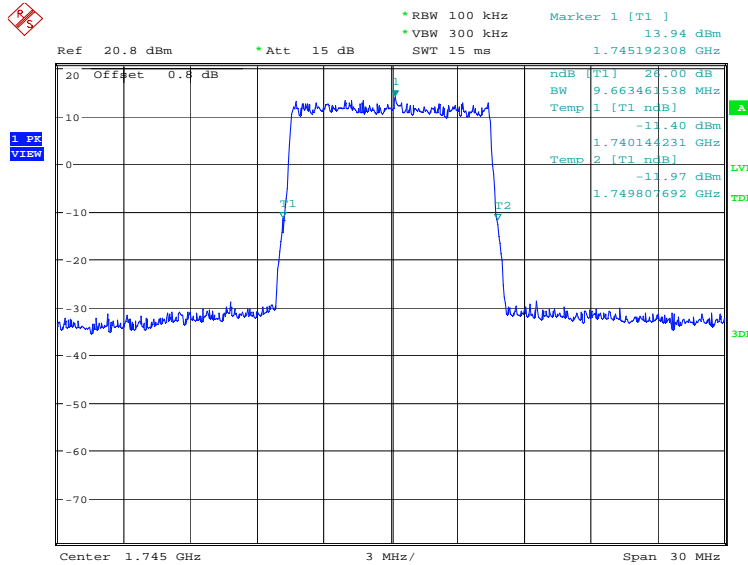
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1745.0	QPSK	16QAM
	9711.54	9663.46

LTE band 66, 10MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:46:07

LTE band 66, 10MHz Bandwidth, 16QAM (-26dBc BW)

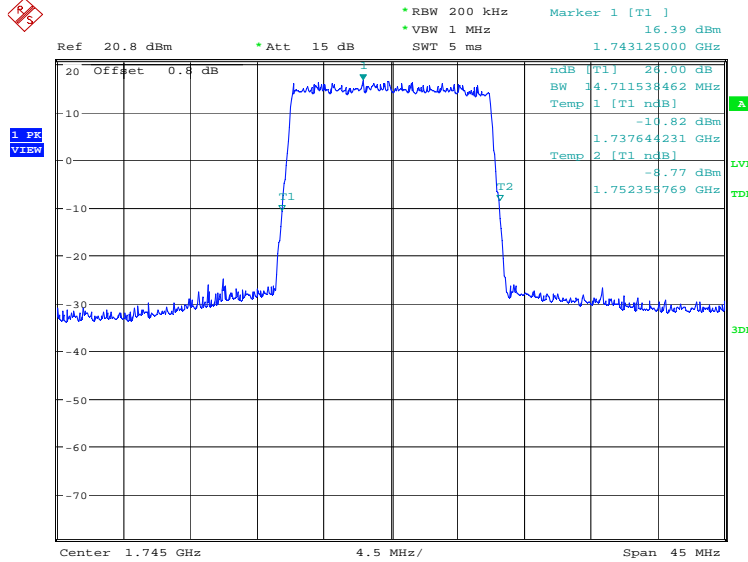


Date: 24.AUG.2023 10:46:48

LTE band 66, 15MHz (-26dBc)

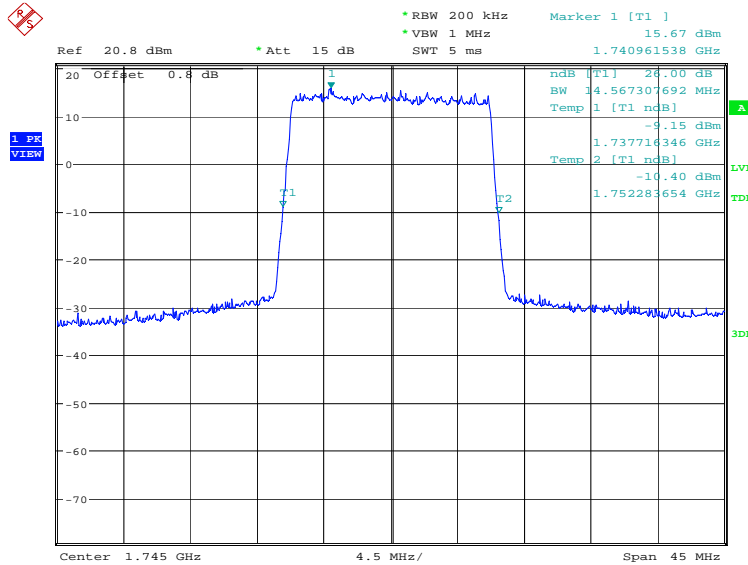
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1745.0	QPSK	16QAM
	14711.54	14567.31

LTE band 66, 15MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:47:30

LTE band 66, 15MHz Bandwidth, 16QAM (-26dBc BW)

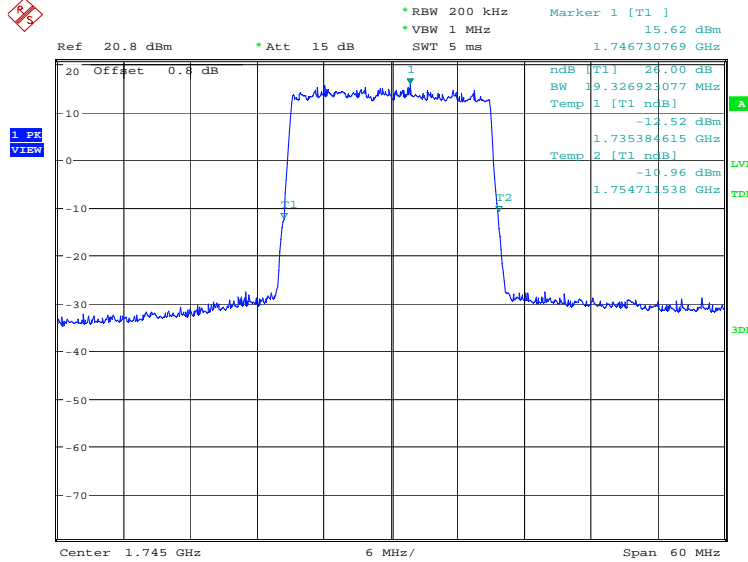


Date: 24.AUG.2023 10:48:11

LTE band 66, 20MHz (-26dBc)

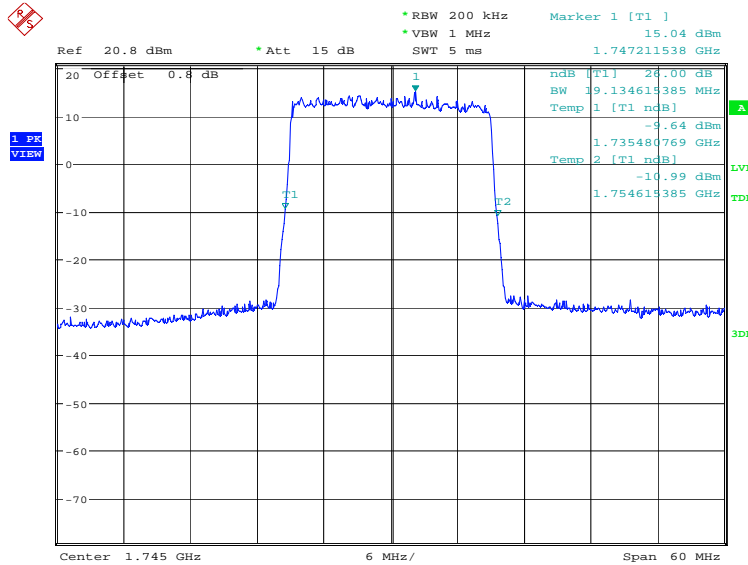
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1745.0	QPSK	16QAM
	19326.92	19134.62

LTE band 66, 20MHz Bandwidth, QPSK (-26dBc BW)



Date: 24.AUG.2023 10:48:54

LTE band 66, 20MHz Bandwidth, 16QAM (-26dBc BW)



Date: 24.AUG.2023 10:49:35

Note: Expanded measurement uncertainty is $U = 3428 \text{ Hz}$, $k = 2$.

A.6 Band Edge Compliance

A.6.1 Measurement limit

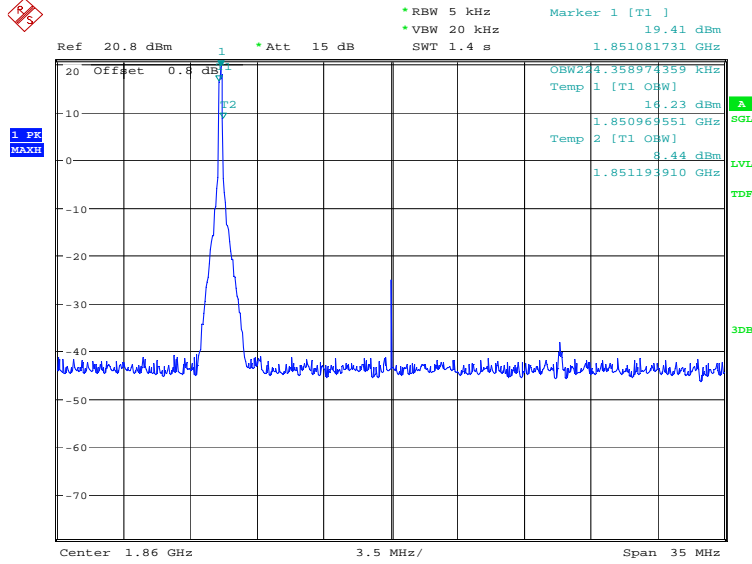
Part 22.917, Part 24.238 and Part 27.53(h) specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Part 27.53(g) states for operations in the 600 MHz band and the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Part 27.53(a) states for mobile and portable stations operating in the 2305–2315 MHz and 2350–2360 MHz bands: By a factor of not less than: $43 + 10 \log(P)$ dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than $55 + 10 \log(P)$ dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than $61 + 10 \log(P)$ dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than $67 + 10 \log(P)$ dB on all frequencies between 2328 and 2337 MHz; By a factor of not less than $43 + 10 \log(P)$ dB on all frequencies between 2300 and 2305 MHz, $55 + 10 \log(P)$ dB on all frequencies between 2296 and 2300 MHz, $61 + 10 \log(P)$ dB on all frequencies between 2292 and 2296 MHz, $67 + 10 \log(P)$ dB on all frequencies between 2288 and 2292 MHz, and $70 + 10 \log(P)$ dB below 2288 MHz; By a factor of not less than $43 + 10 \log(P)$ dB on all frequencies between 2360 and 2365 MHz, and not less than $70 + 10 \log(P)$ dB above 2365 MHz.

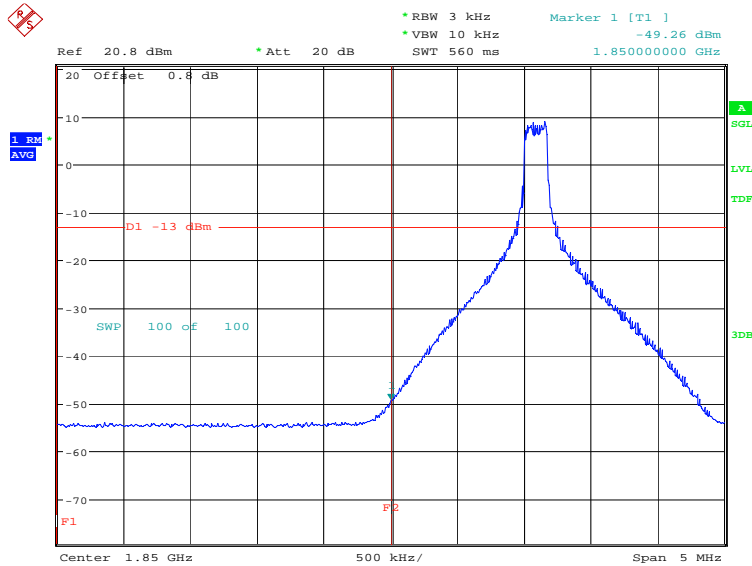
Part 90.543 states that for operations in the 758–768 MHz and the 788–798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following: (1) On all frequencies between 769–775 MHz and 799–805 MHz, by a factor not less than $76 + 10 \log(P)$ dB in a 6.25 kHz band segment, for base and fixed stations. (2) On all frequencies between 769–775 MHz and 799–805 MHz, by a factor not less than $65 + 10 \log(P)$ dB in a 6.25 kHz band segment, for mobile and portable stations. (3) On any frequency between 775–788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log(P)$ dB. (4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment. (5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

A.6.2 Measurement result
Only the worst case result is given below
LTE band 2
OBW: 1RB-low_offset



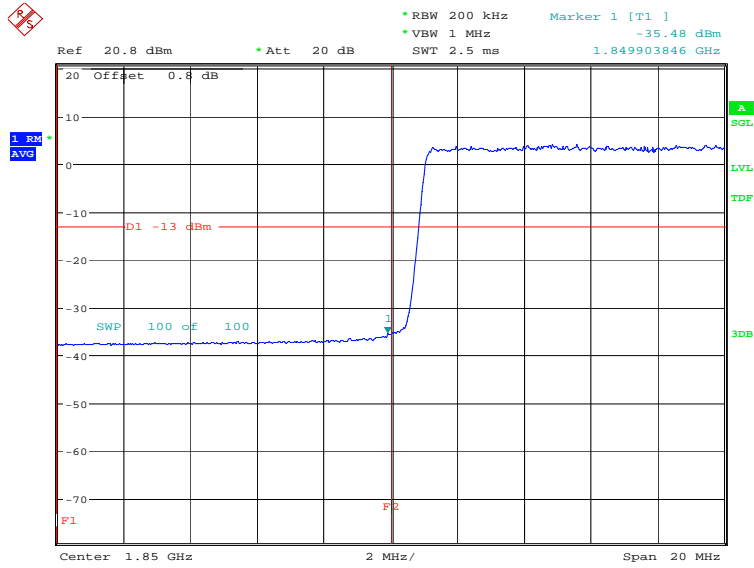
Date: 18.SEP.2023 08:42:34

LOW BAND EDGE BLOCK-1RB-low_offset



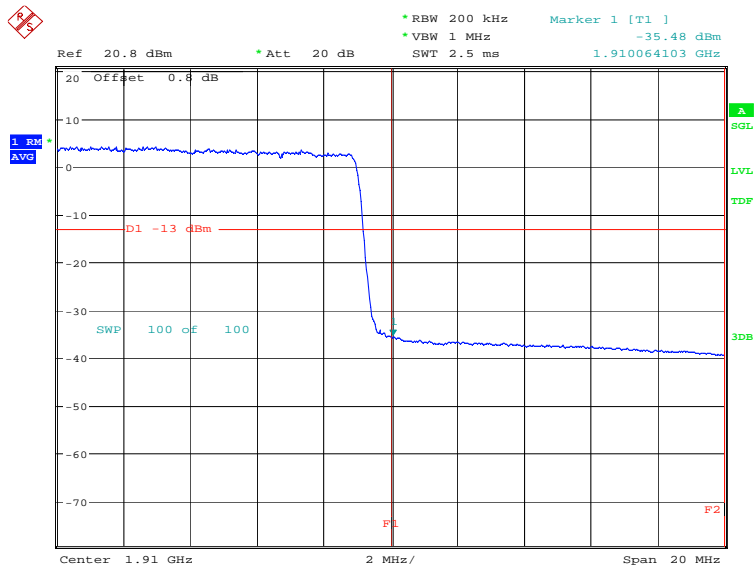
Date: 18.SEP.2023 08:43:48

LOW BAND EDGE BLOCK-20MHz-100%RB



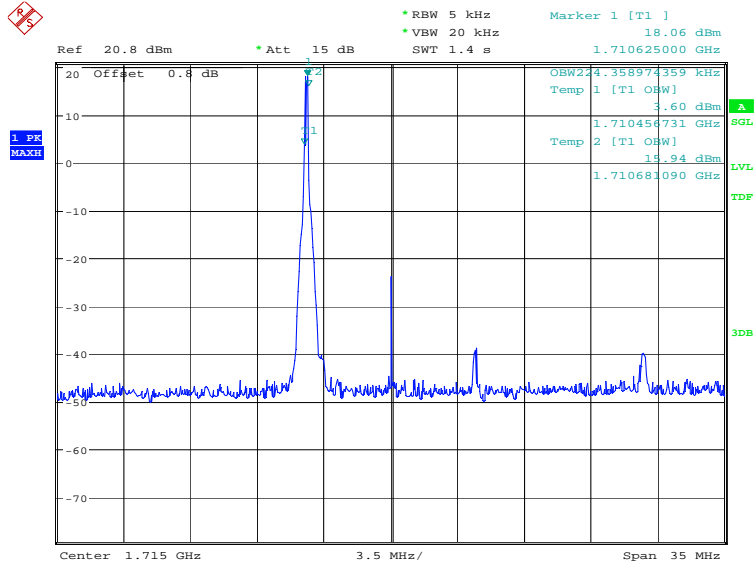
Date: 24.AUG.2023 10:51:07

HIGH BAND EDGE BLOCK-20MHz-100%RB



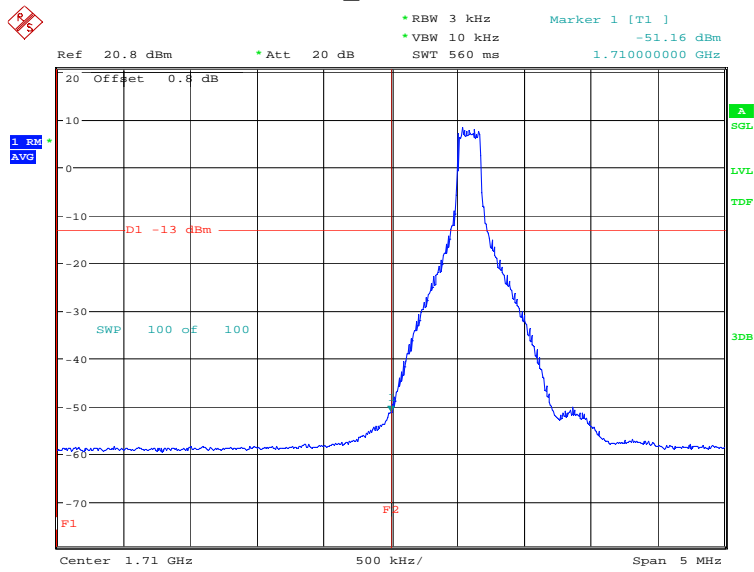
Date: 24.AUG.2023 10:52:40

LTE band 4
OBW: 1RB-low_offset



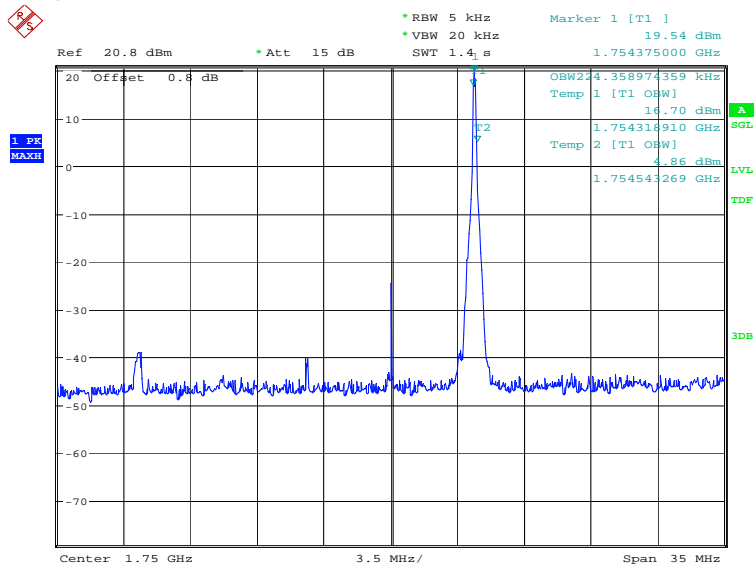
Date: 18.SEP.2023 14:47:10

LOW BAND EDGE BLOCK-1RB-low_offset



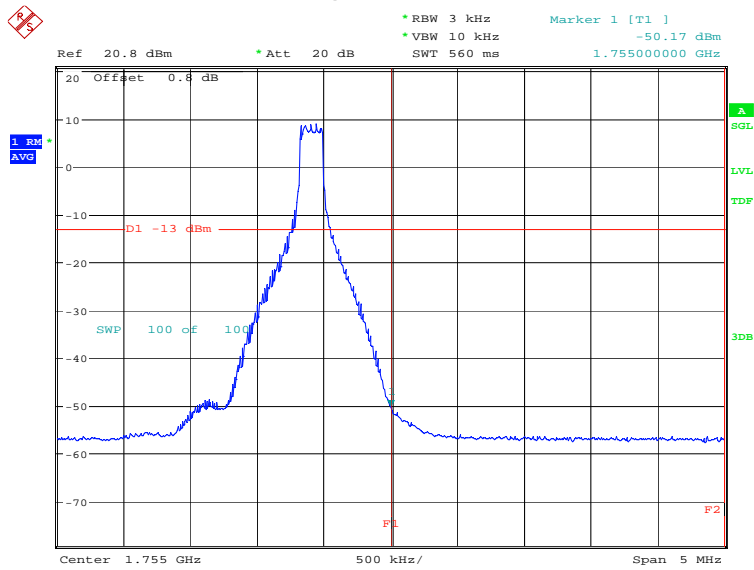
Date: 18.SEP.2023 14:48:25

OBW: 1RB-high_offset



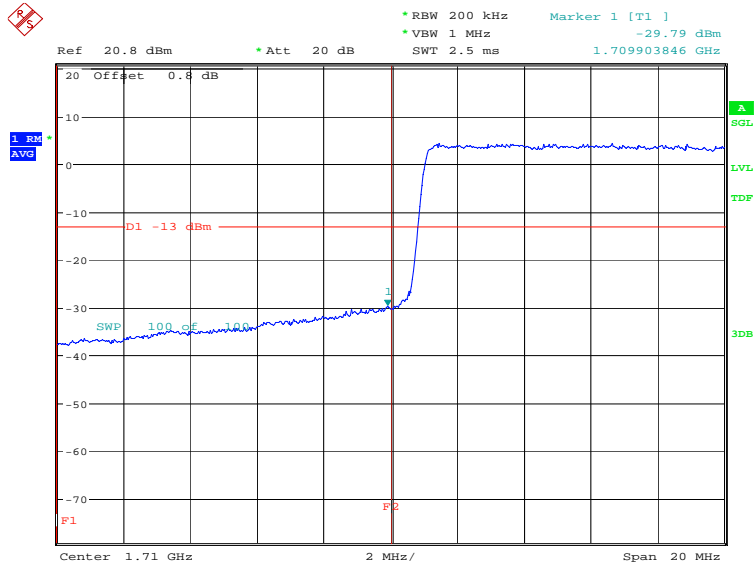
Date: 18.SEP.2023 14:51:30

HIGH BAND EDGE BLOCK-1RB-high_offset



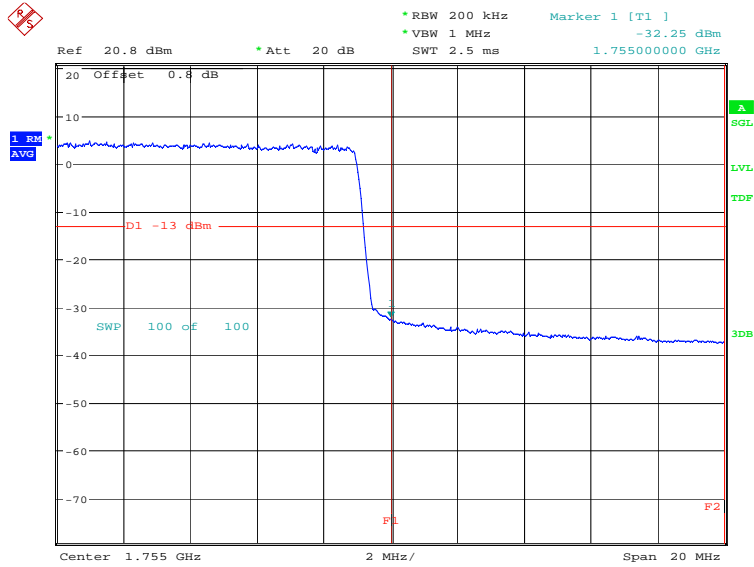
Date: 18.SEP.2023 14:52:45

LOW BAND EDGE BLOCK-20MHz-100%RB



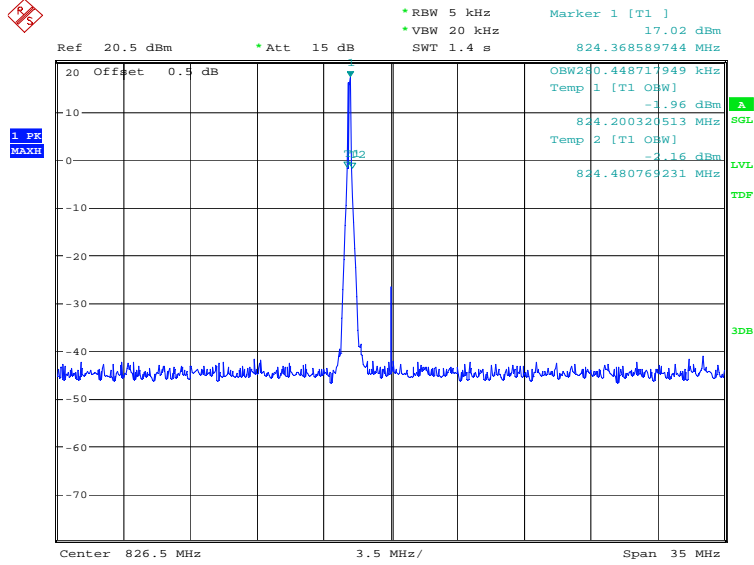
Date: 18.SEP.2023 14:49:01

HIGH BAND EDGE BLOCK-20MHz-100%RB



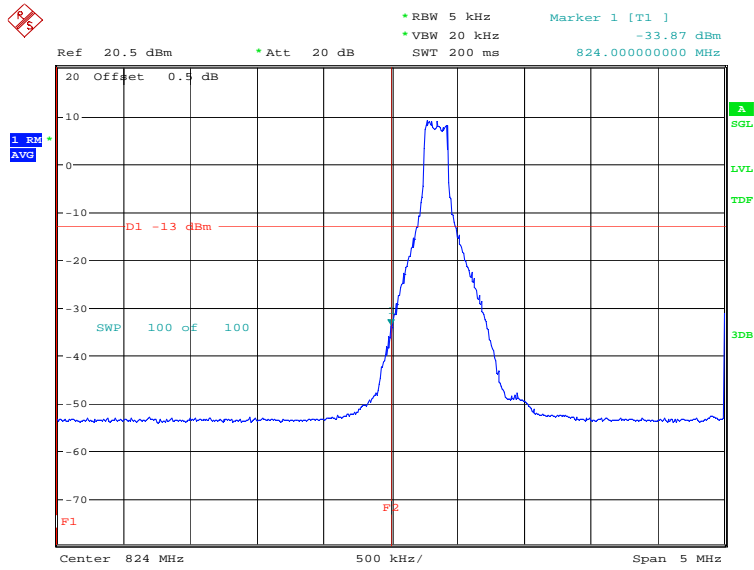
Date: 18.SEP.2023 14:53:31

LTE band 5
OBW: 1RB-low_offset



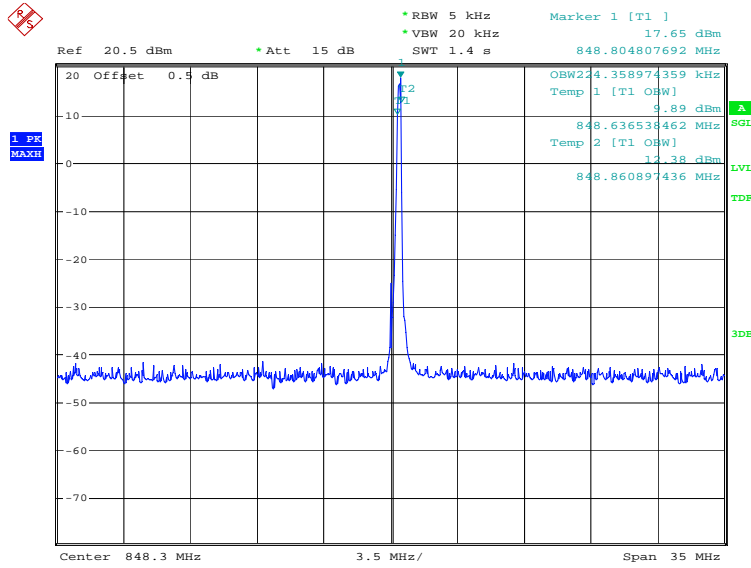
Date: 18.SEP.2023 15:06:35

LOW BAND EDGE BLOCK-1RB-low_offset



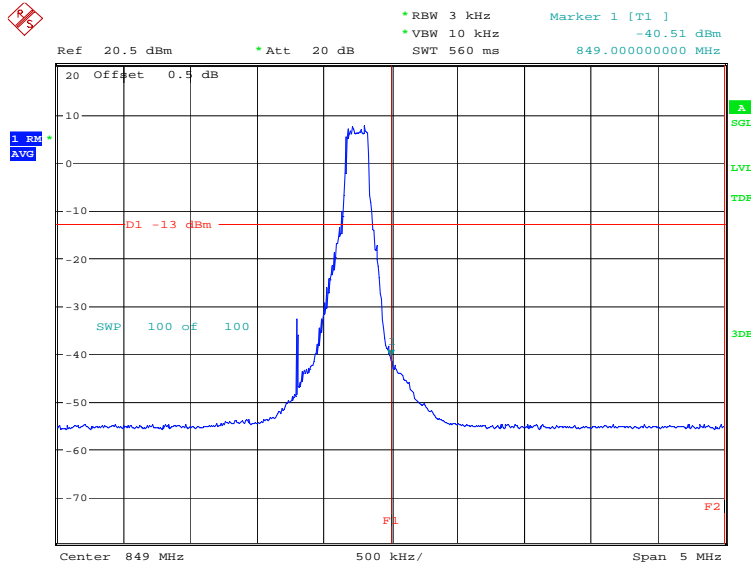
Date: 18.SEP.2023 15:07:50

OBW: 1RB-high_offset



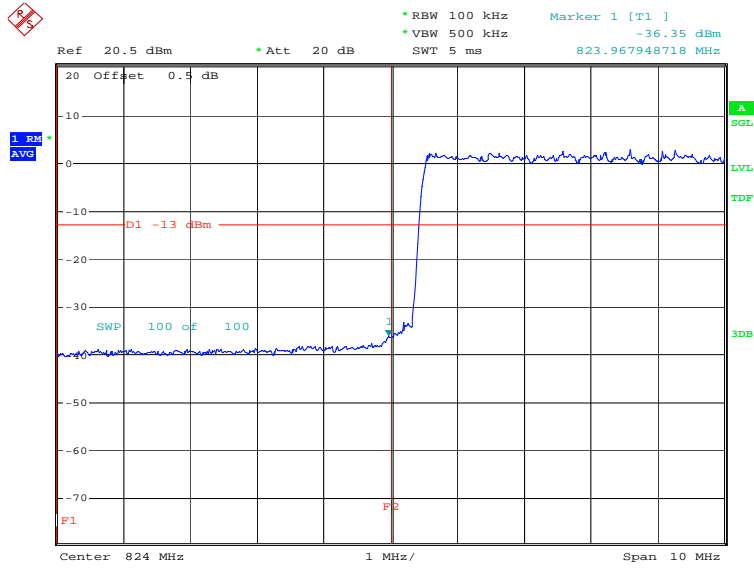
Date: 18.SEP.2023 15:09:21

HIGH BAND EDGE BLOCK-1RB-high_offset



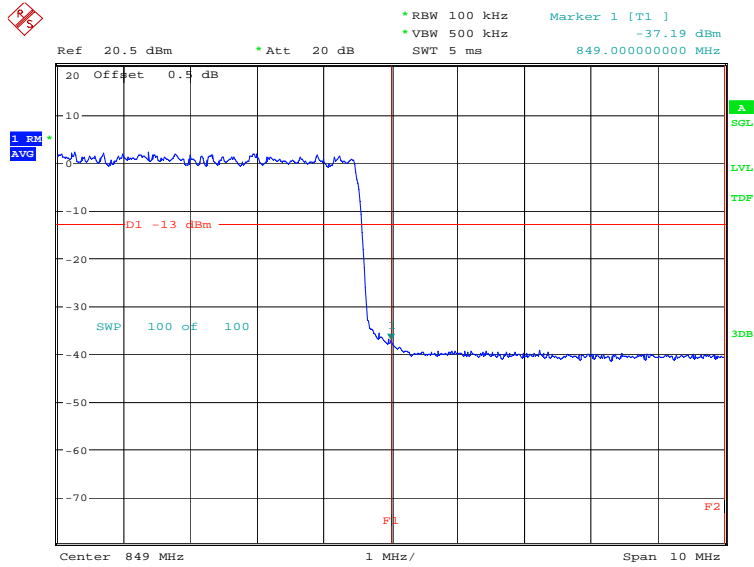
Date: 18.SEP.2023 15:10:35

LOW BAND EDGE BLOCK-10MHz-100%RB



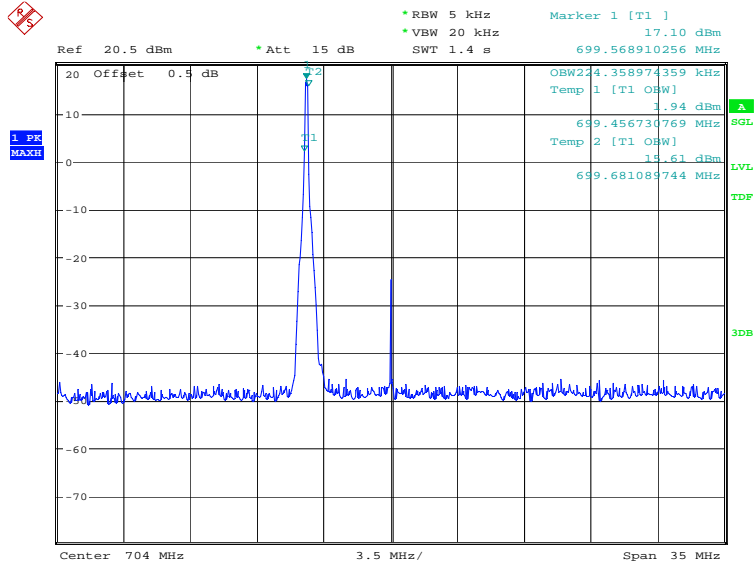
Date: 24.AUG.2023 10:55:10

HIGH BAND EDGE BLOCK-10MHz-100%RB



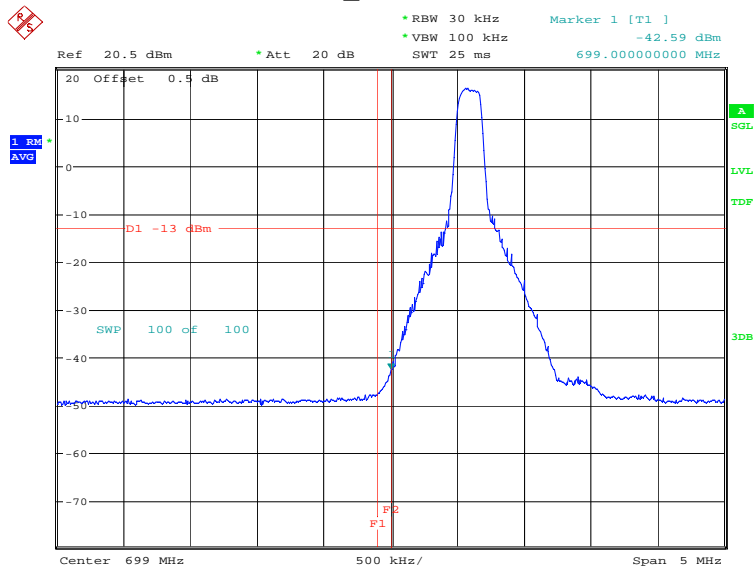
Date: 24.AUG.2023 10:56:42

LTE band 12
OBW: 1RB-low_offset



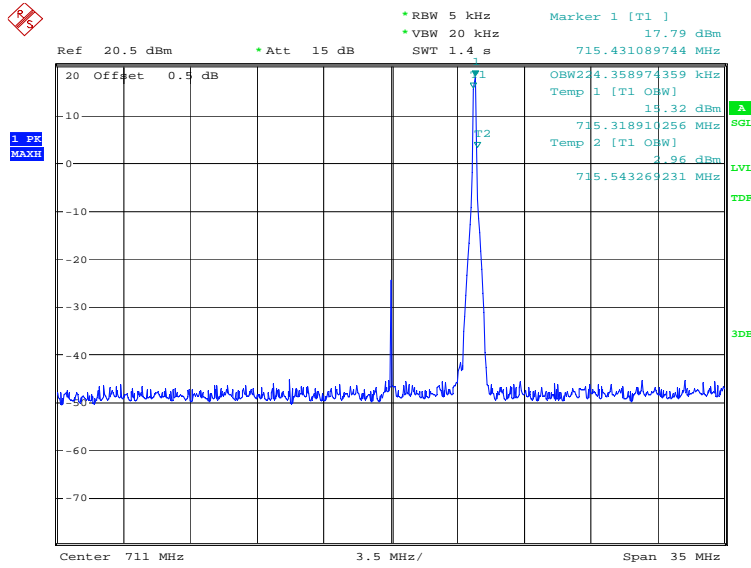
Date: 18.SEP.2023 09:07:08

LOW BAND EDGE BLOCK-1RB-low_offset



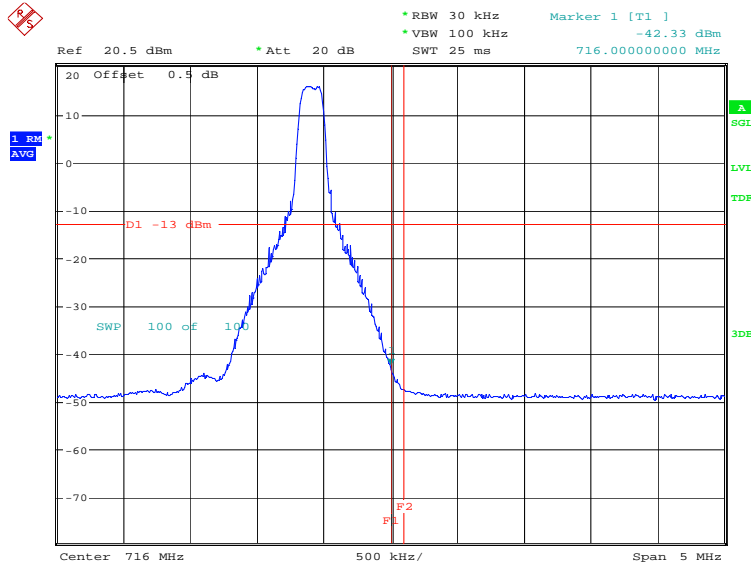
Date: 18.SEP.2023 09:07:28

OBW: 1RB-high_offset



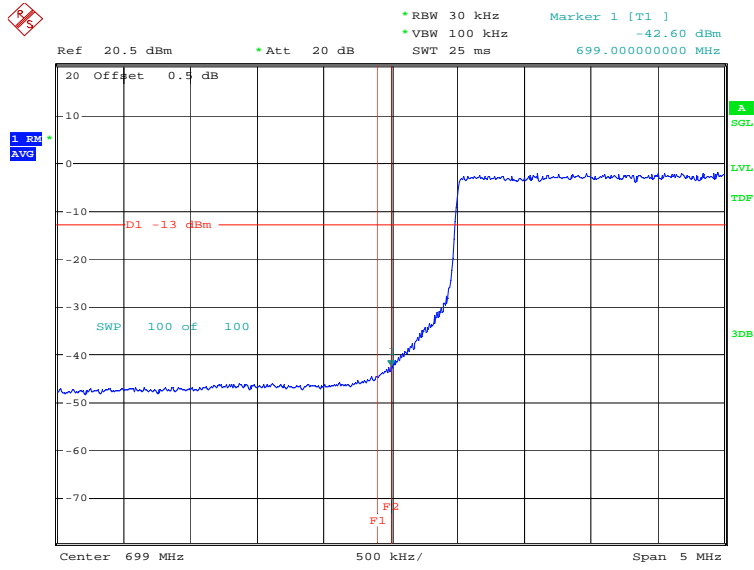
Date: 18.SEP.2023 09:08:04

HIGH BAND EDGE BLOCK-1RB-high_offset



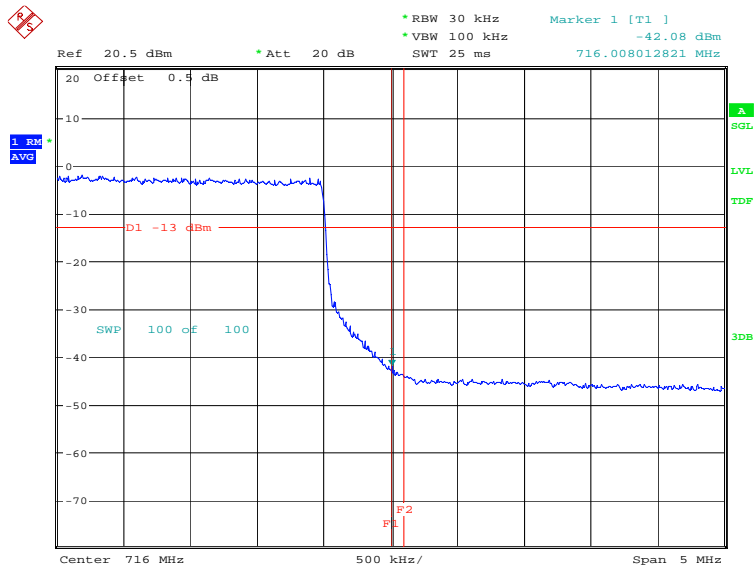
Date: 18.SEP.2023 09:08:23

LOW BAND EDGE BLOCK-10MHz-100%RB



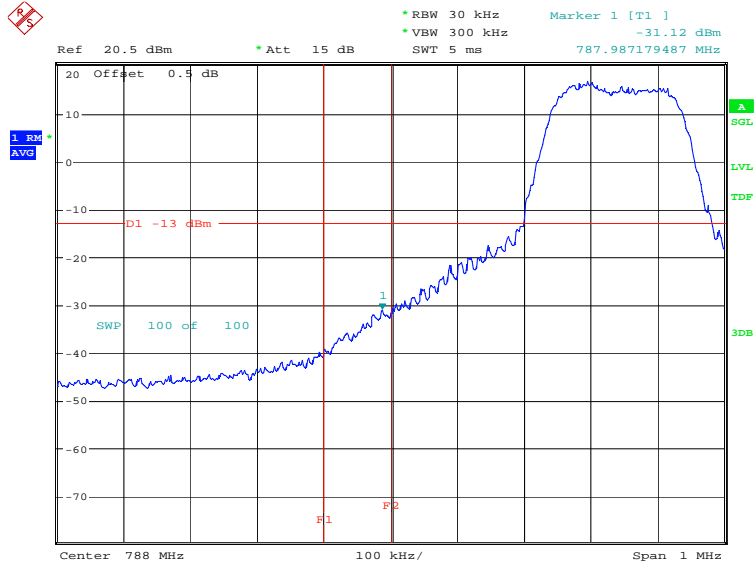
Date: 24.AUG.2023 10:58:16

HIGH BAND EDGE BLOCK-10MHz-100%RB



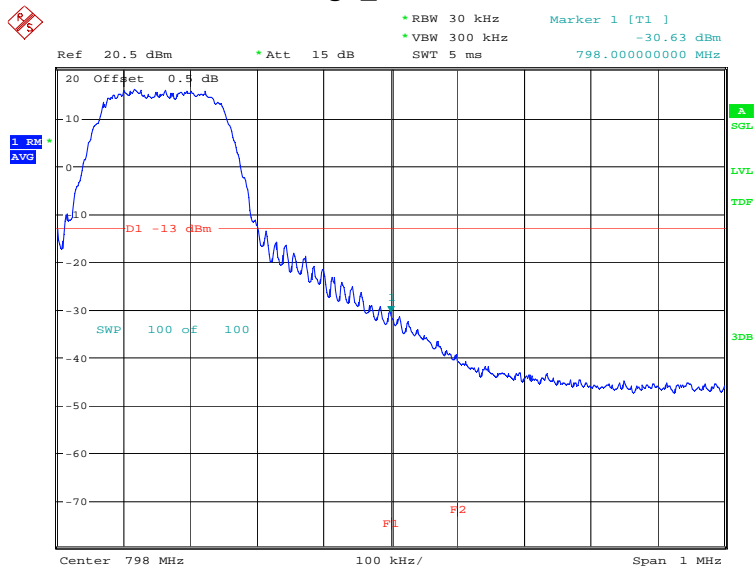
Date: 24.AUG.2023 10:59:48

LTE band 14
LOW BAND EDGE BLOCK-1RB-low_offset



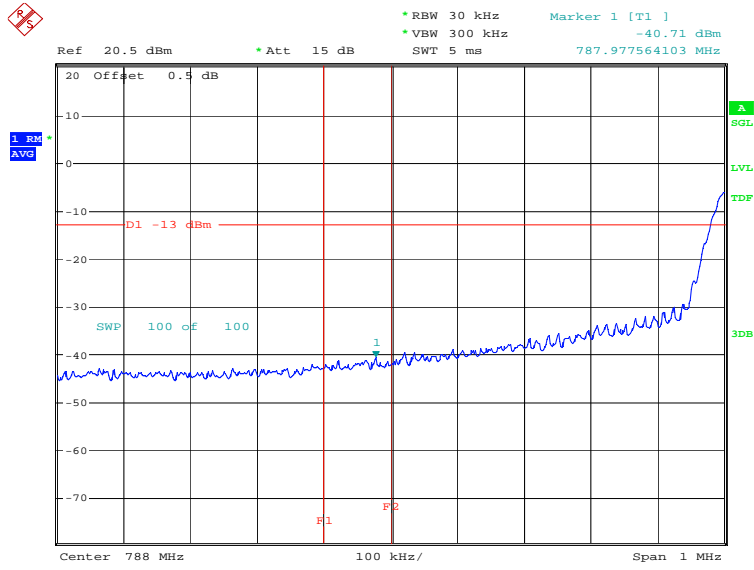
Date: 18.SEP.2023 09:32:13

HIGH BAND EDGE BLOCK-1RB-high_offset



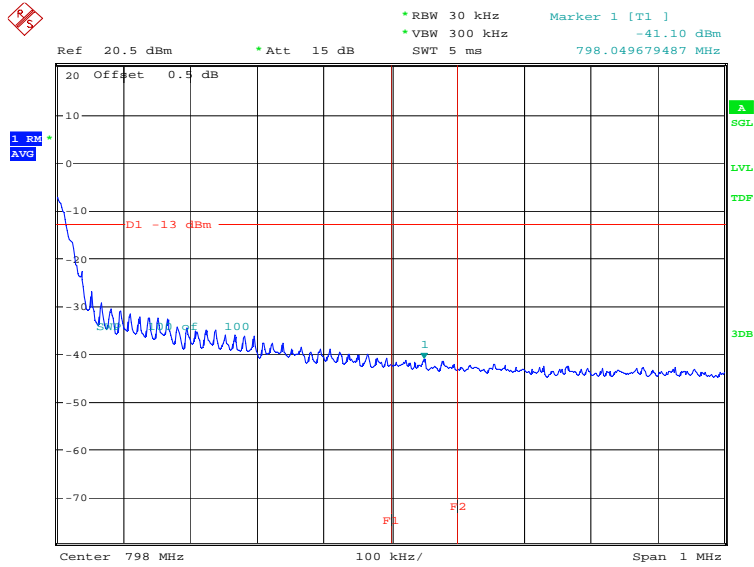
Date: 18.SEP.2023 09:32:50

LOW BAND EDGE BLOCK-10MHz-100%RB



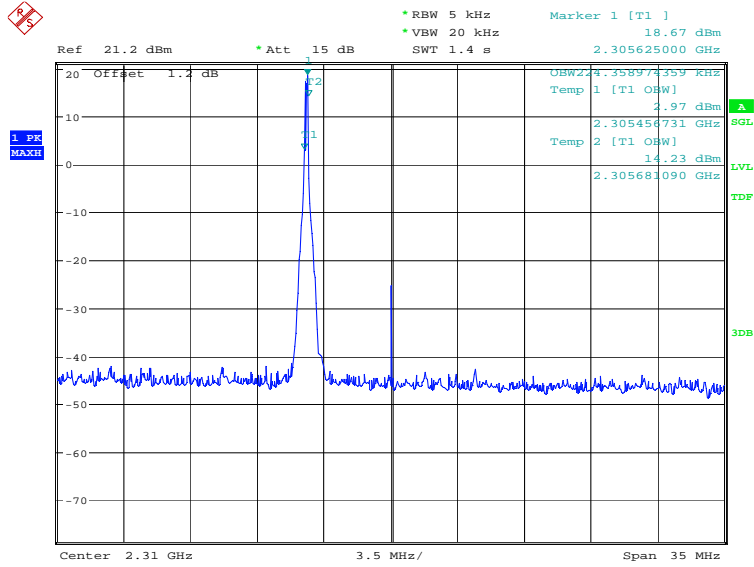
Date: 24.AUG.2023 13:52:31

HIGH BAND EDGE BLOCK-10MHz-100%RB



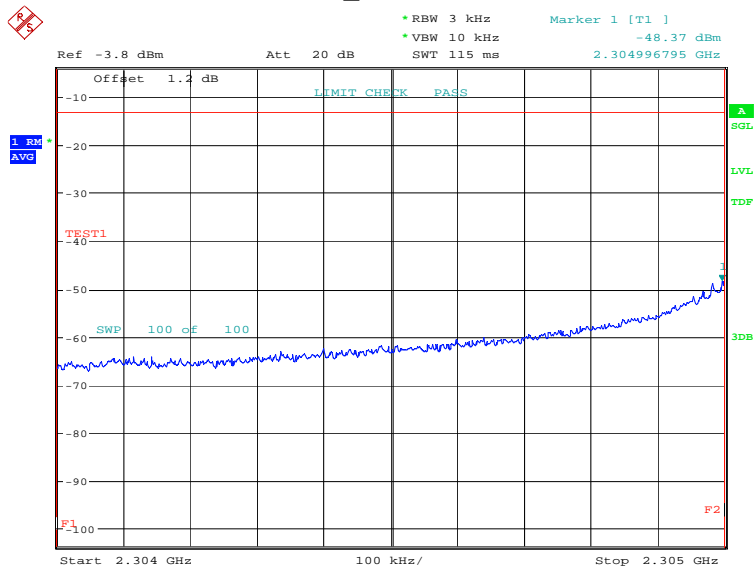
Date: 24.AUG.2023 13:54:04

LTE band 30
OBW: 1RB-low_offset

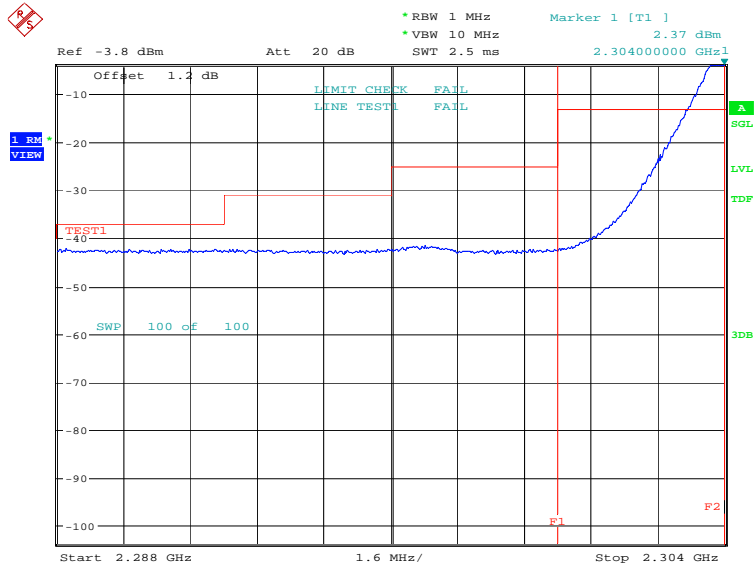


Date: 18.SEP.2023 09:09:01

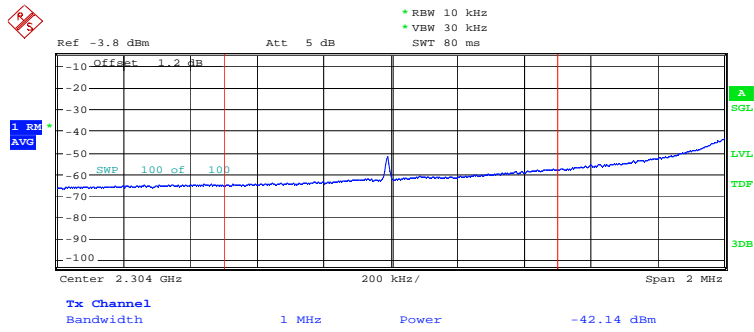
LOW BAND EDGE BLOCK-1RB-low_offset



Date: 18.SEP.2023 09:10:30

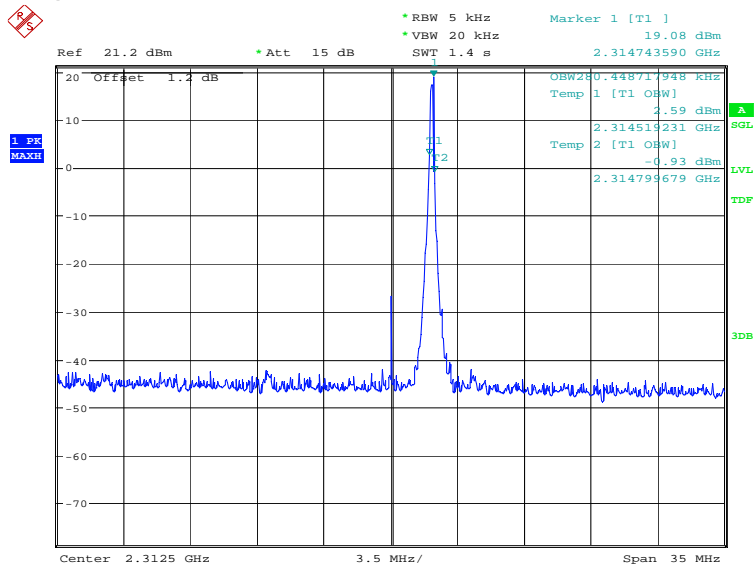


Date: 18.SEP.2023 09:12:21



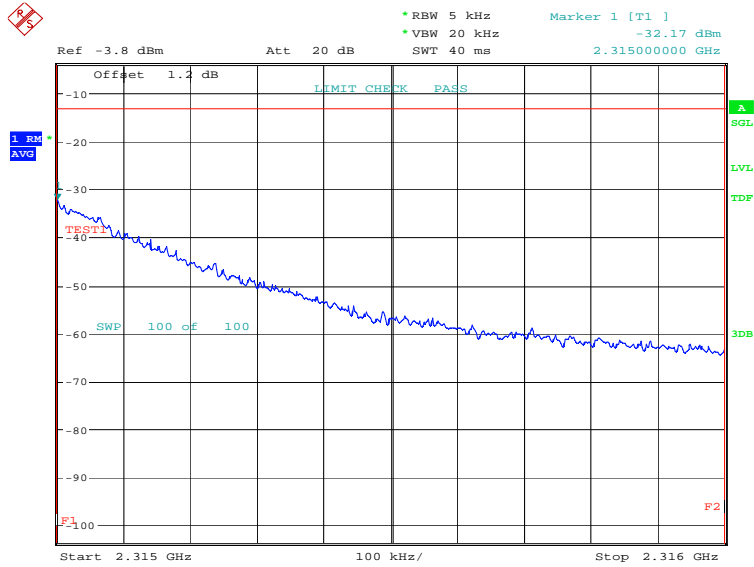
Date: 18.SEP.2023 09:12:49

OBW: 1RB-high_offset

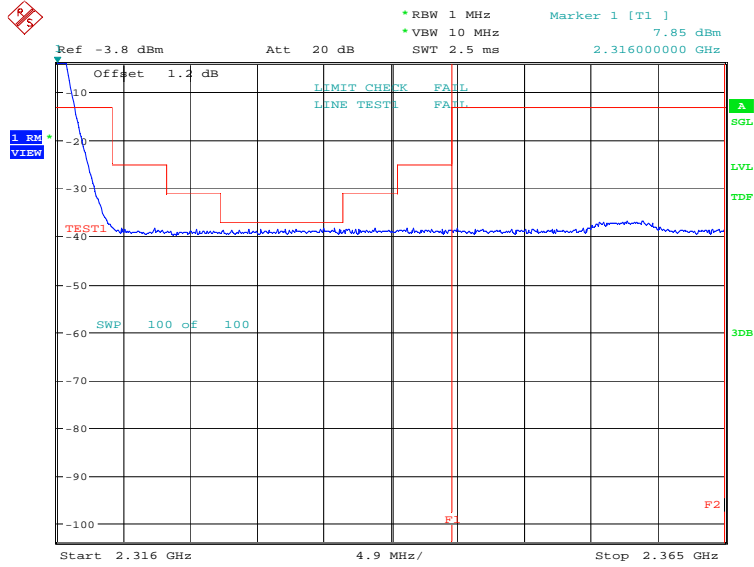


Date: 18.SEP.2023 09:14:07

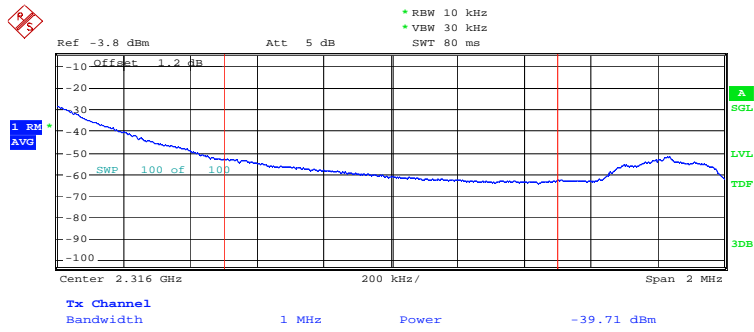
HIGH BAND EDGE BLOCK-1RB-high_offset



Date: 18.SEP.2023 09:15:29

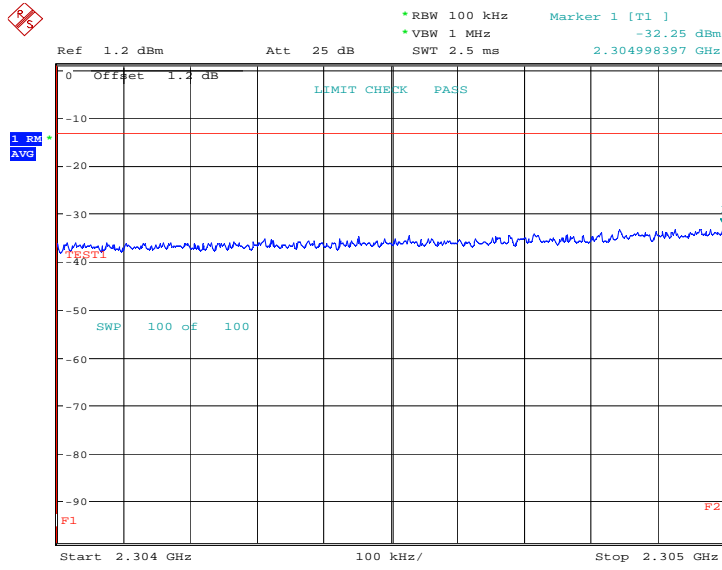


Date: 18.SEP.2023 09:17:29

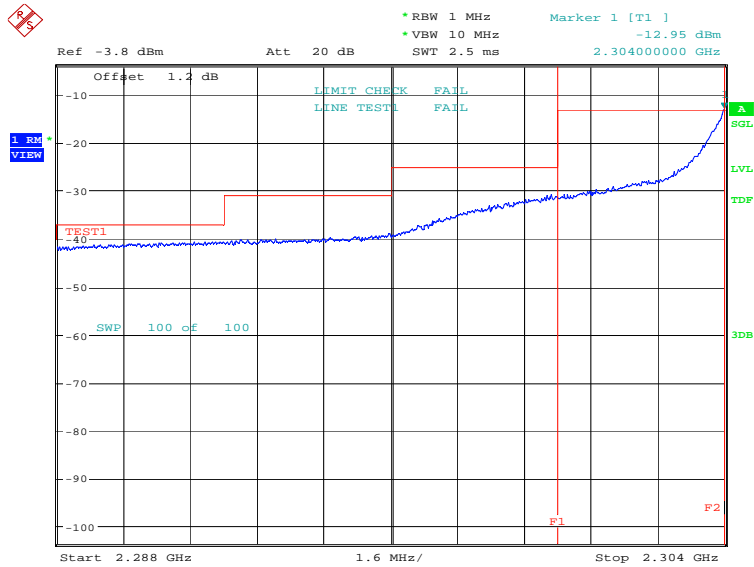


Date: 18.SEP.2023 09:17:56

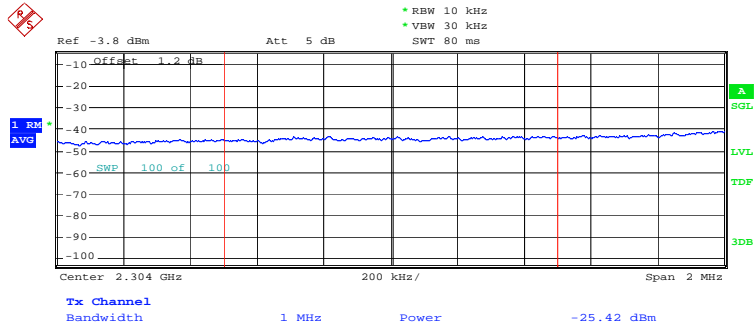
LOW BAND EDGE BLOCK-10MHz-100%RB



Date: 24.AUG.2023 13:59:41

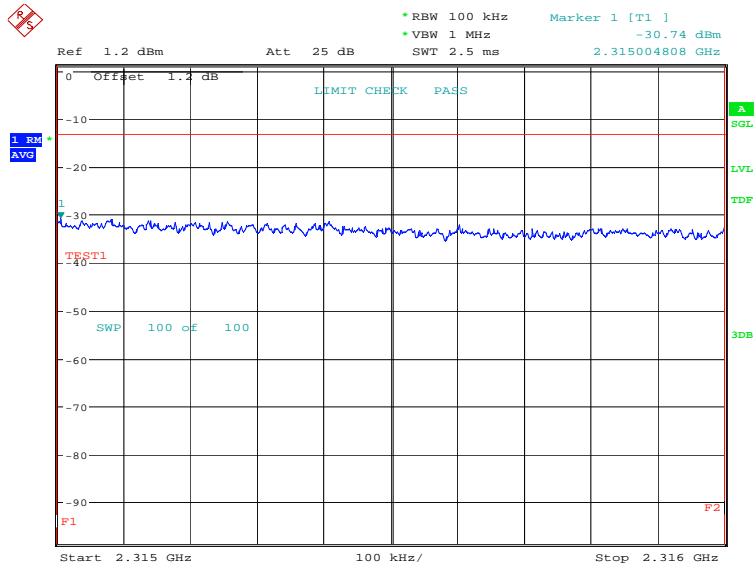


Date: 24.AUG.2023 14:01:32

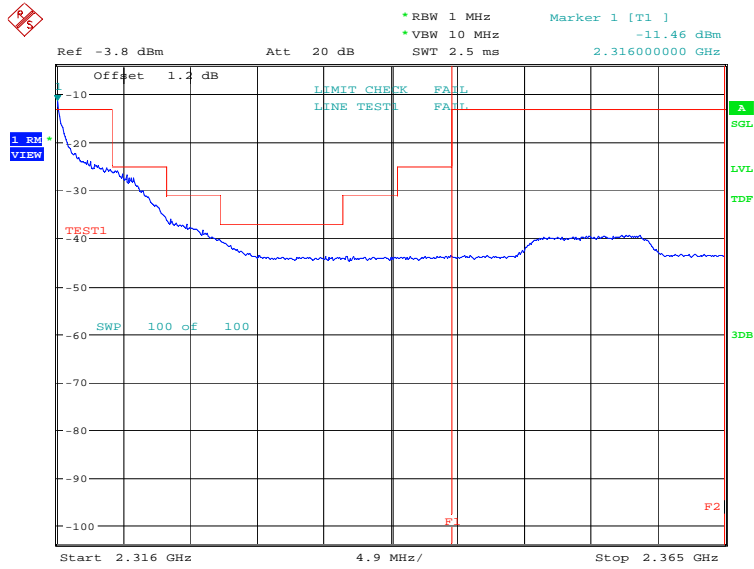


Date: 24.AUG.2023 14:02:00

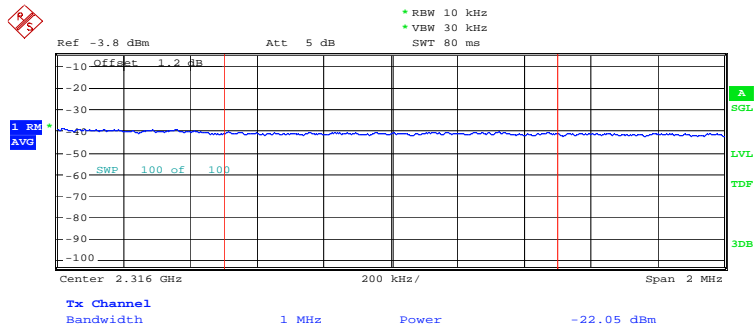
HIGH BAND EDGE BLOCK-10MHz-100%RB



Date: 24.AUG.2023 14:04:55

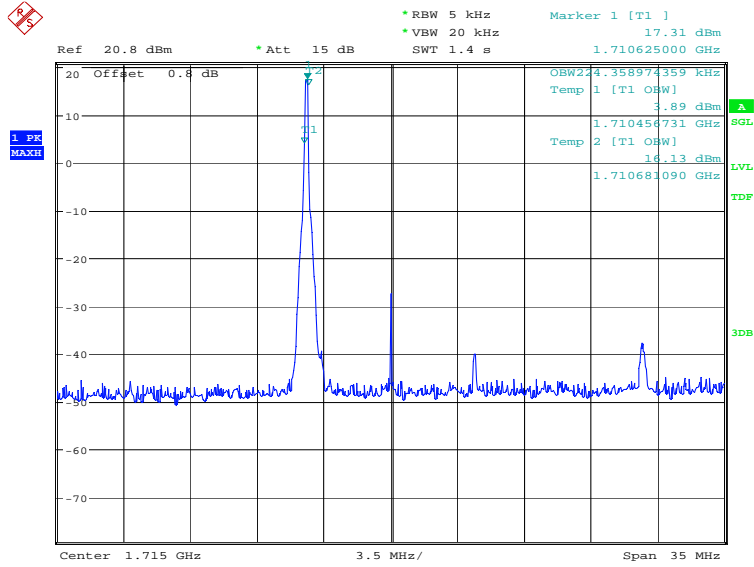


Date: 24.AUG.2023 14:06:54



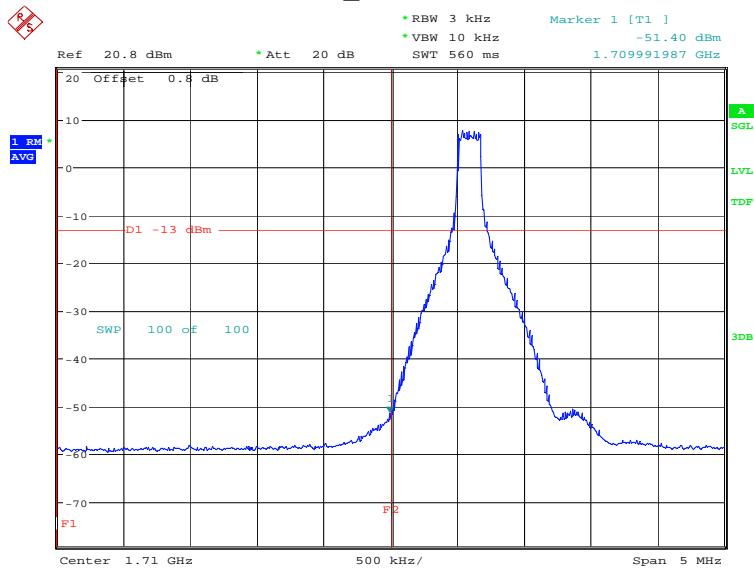
Date: 24.AUG.2023 14:07:22

LTE band 66
OBW: 1RB-low_offset



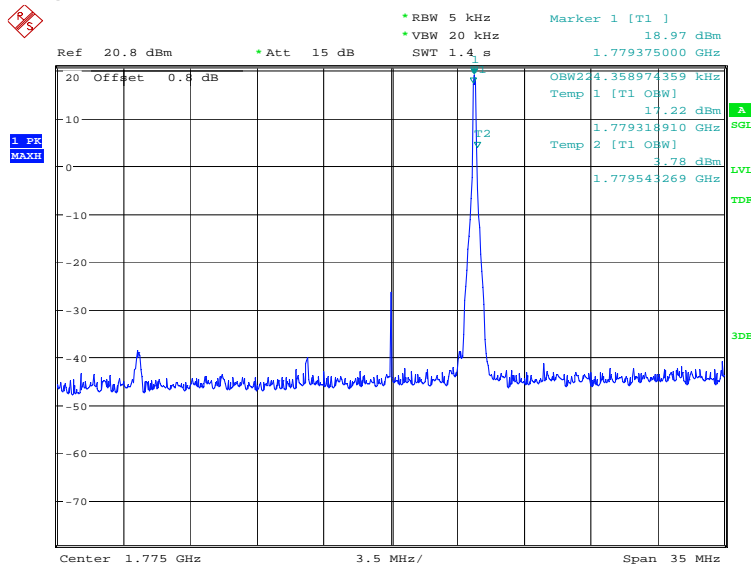
Date: 18.SEP.2023 09:19:10

LOW BAND EDGE BLOCK-1RB-low_offset



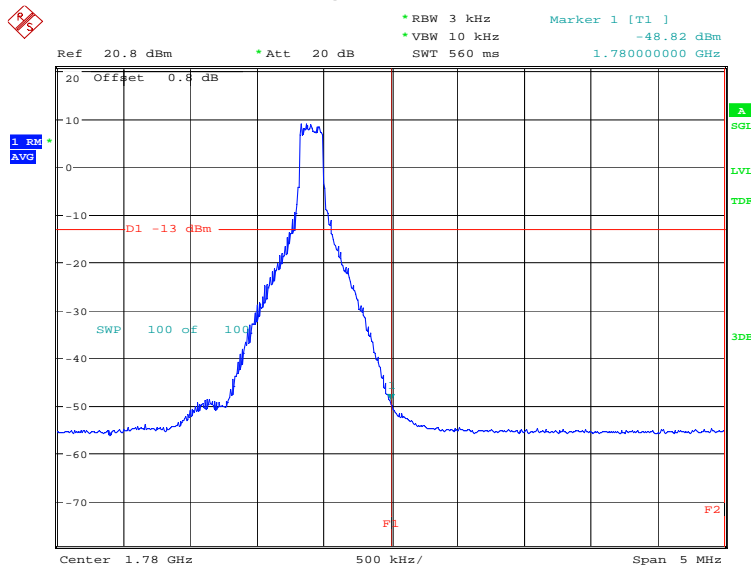
Date: 18.SEP.2023 09:20:25

OBW: 1RB-high_offset



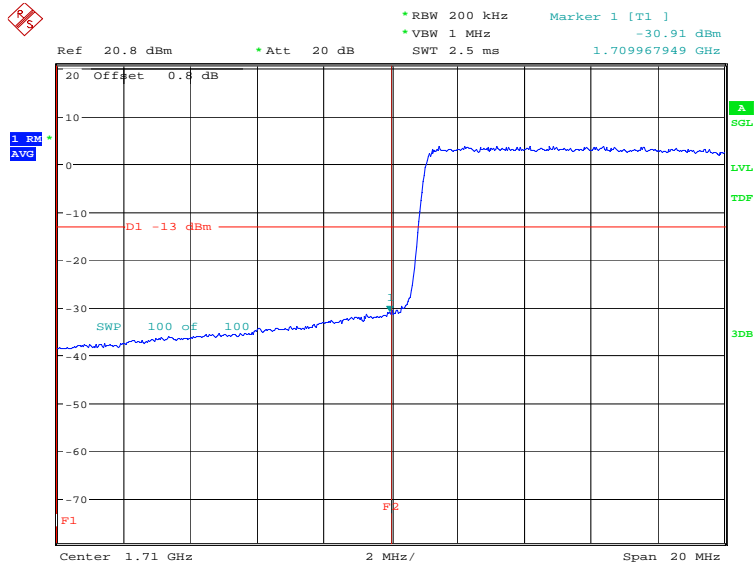
Date: 18.SEP.2023 09:21:01

HIGH BAND EDGE BLOCK-1RB-high_offset



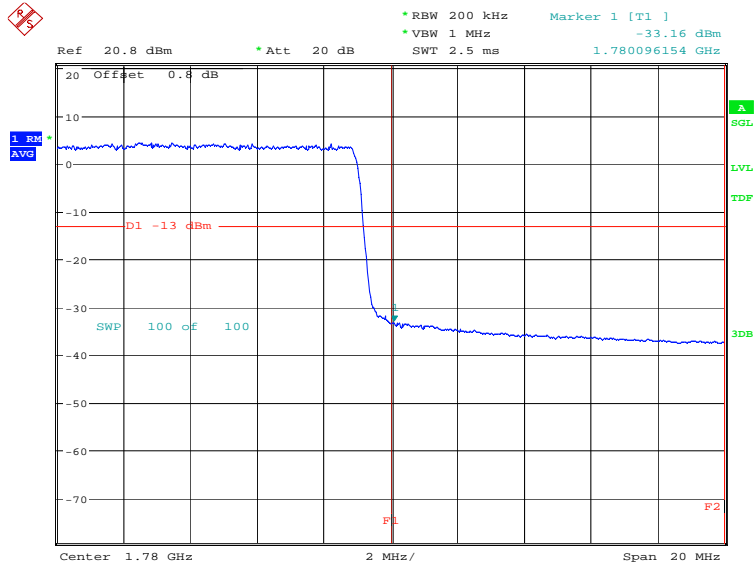
Date: 18.SEP.2023 09:22:15

LOW BAND EDGE BLOCK-20MHz-100%RB



Date: 24.AUG.2023 11:11:54

HIGH BAND EDGE BLOCK-20MHz-100%RB



Date: 24.AUG.2023 11:13:26

Note: Expanded measurement uncertainty is $U = 0.622$ dB, $k = 2$.

A.7 Conducted Spurious Emission

A.7.1 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 $2 \times \text{span}/\text{RBW}$.

A. 7.2 Measurement Limit

Part 22.917, Part 24.238 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.

Part 27.53(g) states for operations in the 600 MHz band and the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Part 27.53(a) states for mobile and portable stations operating in the 2305–2315 MHz and 2350–2360 MHz bands: By a factor of not less than: $43 + 10 \log(P)$ dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than $55 + 10 \log(P)$ dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than $61 + 10 \log(P)$ dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than $67 + 10 \log(P)$ dB on all frequencies between 2328 and 2337 MHz; By a factor of not less than $43 + 10 \log(P)$ dB on all frequencies between 2300 and 2305 MHz, $55 + 10 \log(P)$ dB on all frequencies between 2296 and 2300 MHz, $61 + 10 \log(P)$ dB on all frequencies between 2292 and 2296 MHz, $67 + 10 \log(P)$ dB on all frequencies between 2288 and 2292 MHz, and $70 + 10 \log(P)$ dB below 2288 MHz; By a factor of not less than $43 + 10 \log(P)$ dB on all frequencies between 2360 and 2365 MHz, and not less than $70 + 10 \log(P)$ dB above 2365 MHz.

Part 90.543 states that for operations in the 758–768 MHz and the 788–798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following: (1) On all frequencies between 769–775 MHz and 799–805 MHz, by a factor not less than $76 + 10 \log(P)$ dB in a 6.25 kHz band segment, for base and fixed stations. (2) On all frequencies between 769–775 MHz and 799–805 MHz, by a factor not less



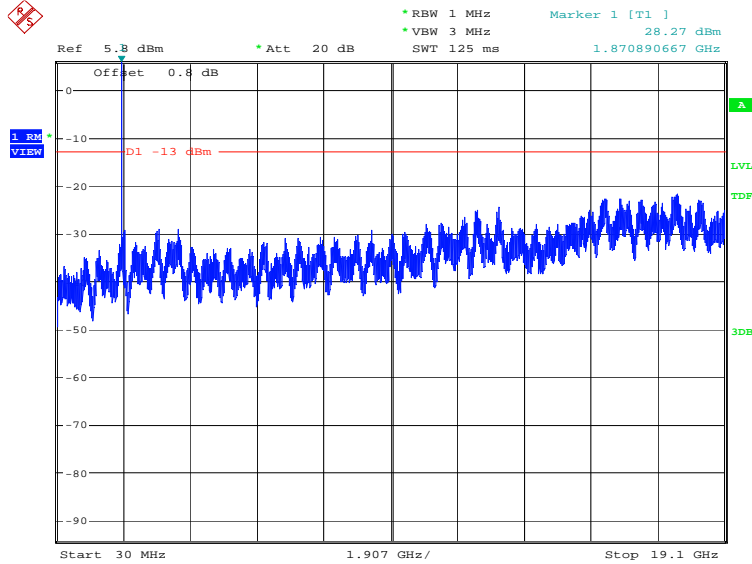
than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations. (3) On any frequency between 775–788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log (P)$ dB. (4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment. (5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

A. 7.3 Measurement result

Only the worst case result is given below

LTE band 2: 30MHz – 19.1GHz

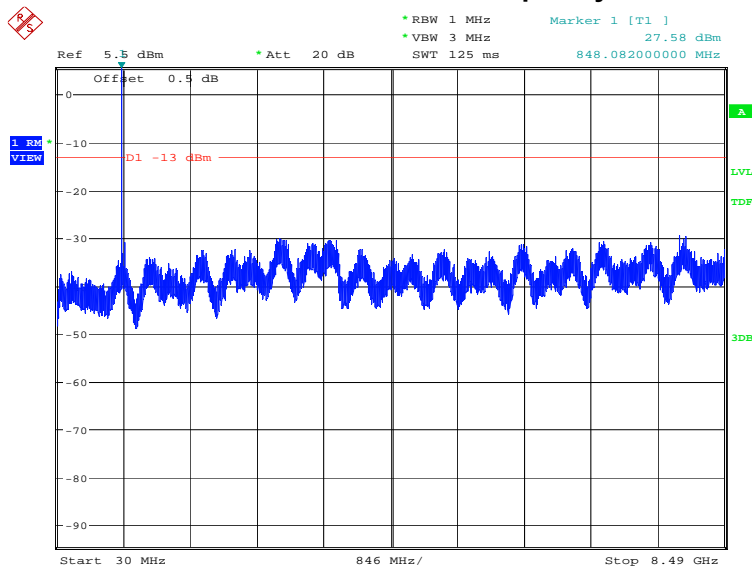
NOTE: peak above the limit line is the carrier frequency.



Date: 18.SEP.2023 09:23:53

LTE band 5: 30MHz – 8.49GHz

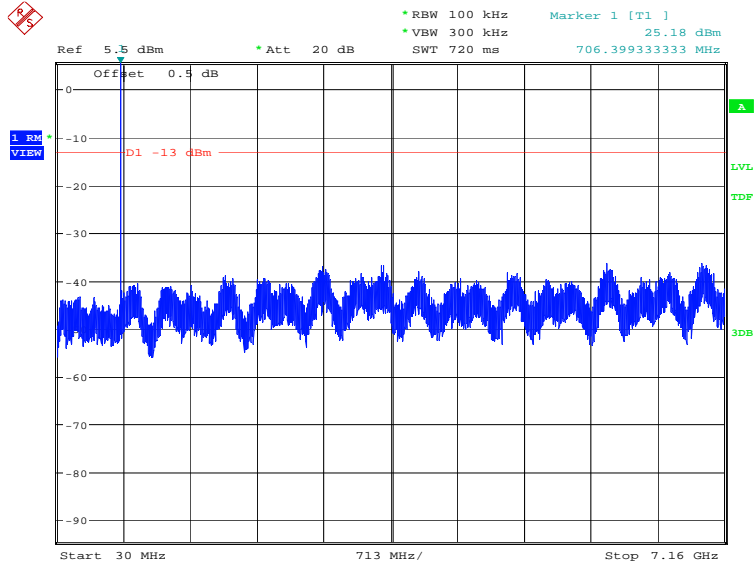
NOTE: peak above the limit line is the carrier frequency.



Date: 18.SEP.2023 09:25:48

LTE band 12: 30MHz – 7.16GHz

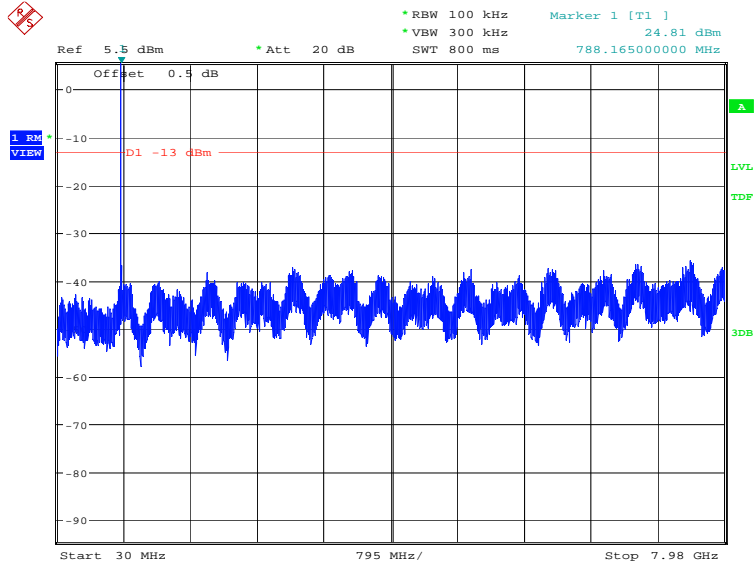
NOTE: peak above the limit line is the carrier frequency.



Date: 18.SEP.2023 09:26:32

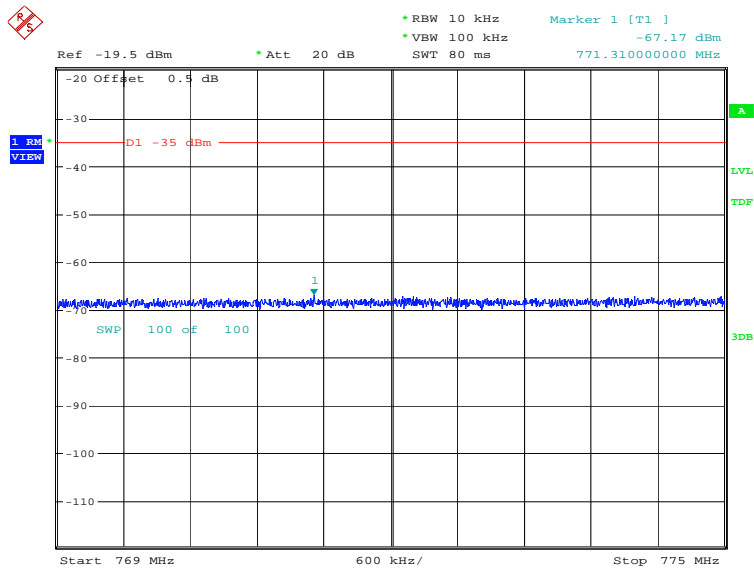
LTE band 14: 30MHz – 7.98GHz

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



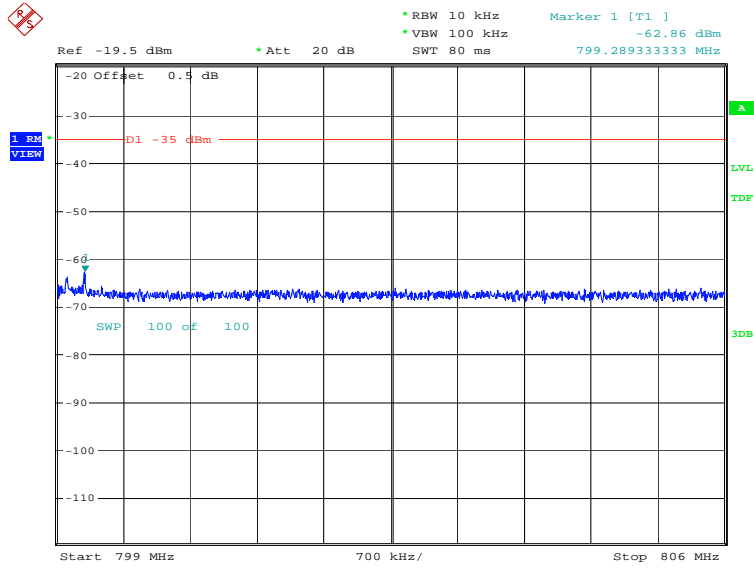
Date: 18.SEP.2023 09:27:51

LTE band 14: 769MHz~775MHz



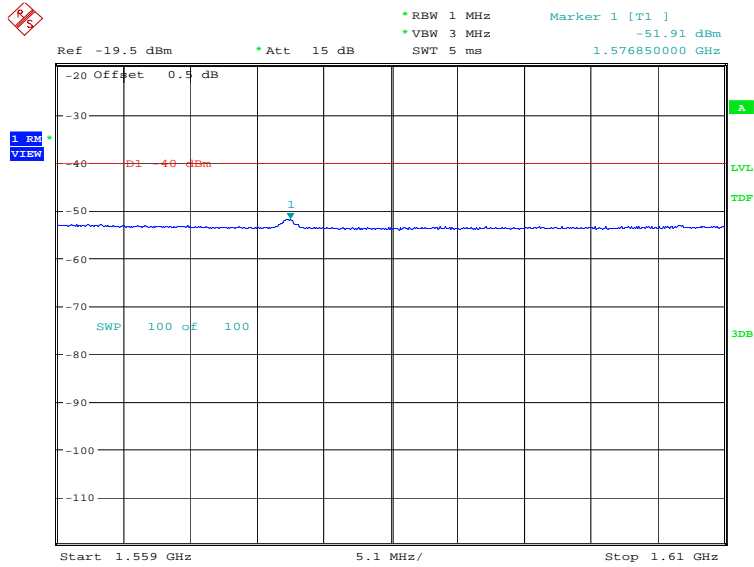
Date: 18.SEP.2023 09:28:16

LTE band 14: 799MHz~806MHz



Date: 18.SEP.2023 09:28:41

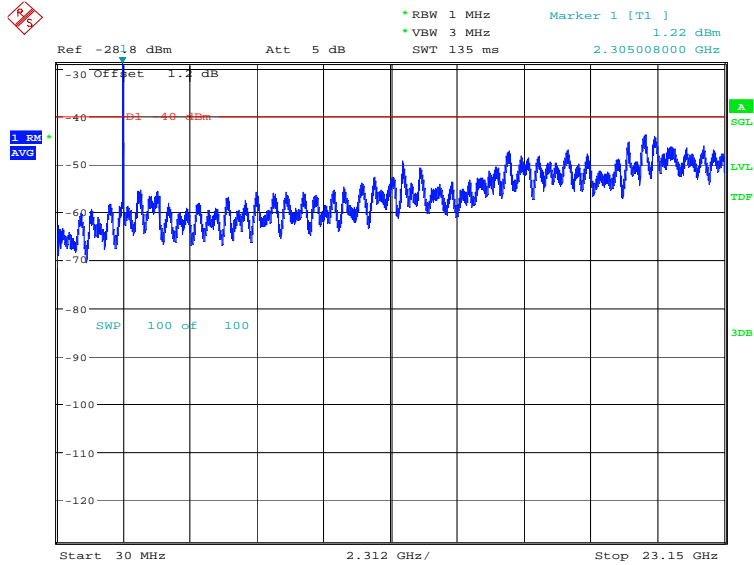
LTE band 14: 1559MHz~1610MHz



Date: 18.SEP.2023 09:29:07

LTE band 30: 30MHz – 23.15GHz

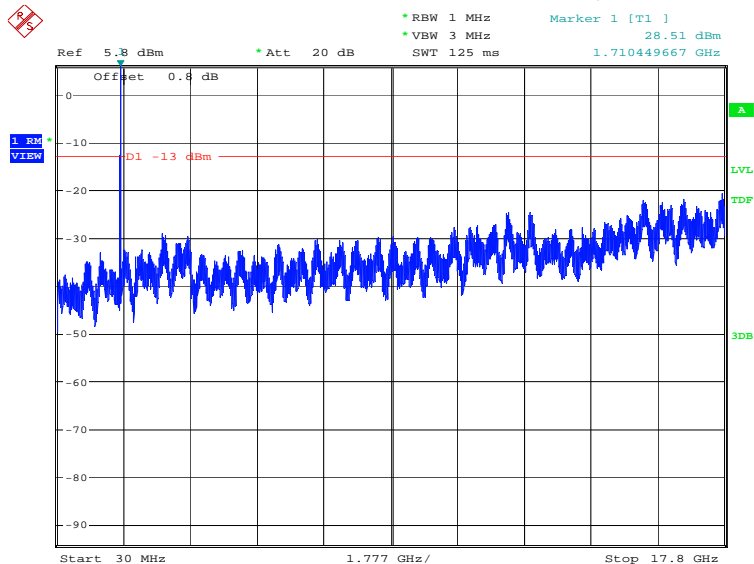
NOTE: peak above the limit line is the carrier frequency.



Date: 18.SEP.2023 09:47:14

LTE band 66: 30MHz – 17.8GHz

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



Date: 18.SEP.2023 09:30:58

Note: Expanded measurement uncertainty is $U = 0.622$ dB, $k = 2$.

A.8 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 \geq 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%.

LTE band 2, 20MHz

Frequency(MHz)	PAPR(dB)	
1880.0	QPSK	16QAM
	6.70	7.40

LTE band 12,10MHz

Frequency(MHz)	PAPR(dB)	
707.5	QPSK	16QAM
	5.64	6.51

LTE band 30,10MHz

Frequency(MHz)	PAPR(dB)	
2310.0	QPSK	16QAM
	5.51	6.28

LTE band 66, 20MHz

Frequency(MHz)	PAPR(dB)	
1745.0	QPSK	16QAM
	6.51	7.28

Note: Expanded measurement uncertainty is $U = 0.578$ dB, $k = 2$.

Annex B: Accreditation Certificate



Accredited Laboratory

A2LA has accredited

TELECOMMUNICATION TECHNOLOGY LABS, CAICT

Beijing, People's Republic of China

for technical competence in the field of

Electrical Testing

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



Presented this 26th day of June 2023.



Mr. Trace McInturf, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 7049.01
Valid to July 31, 2024

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

END OF REPORT