



# TEST REPORT

## No. I23Z60660-WMD03

for

**TCL Communication Ltd.**

**Tablet PC**

**Model Name: 9166G**

**FCC ID: 2ACCJB204**

with

**Hardware Version: PIO**

**Software Version: JY1H**

**Issued Date: 2023-05-29**

**Note:**

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

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I23Z60660-WMD03	Rev.0	1 <sup>st</sup> edition	2023-05-29

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 NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0 and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

### **1.2. Testing Location**

Location 1: CTTL (huayuan North Road)

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

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°C  
Relative Humidity: 20-75%

### 1.4. Project Data

Testing Start Date: 2023-04-13  
Testing End Date: 2023-05-19

### 1.5. Signature



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**Dong Yuan**  
**(Prepared this test report)**



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**Zhou Yu**  
**(Reviewed this test report)**



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**Zhao Hui Lin**  
**Deputy Director of the laboratory**  
**(Approved this test report)**



## **2. Client Information**

### **2.1. Applicant Information**

Company Name: TCL Communication Ltd.  
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### **2.2. Manufacturer Information**

Company Name: TCL Communication Ltd.  
Address /Post: 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong  
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Fax: +86 755 3661 2000-81722

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

#### **3.1. About EUT**

Description	Tablet PC
Model Name	9166G
FCC ID	2ACCJB204
Antenna	Embedded
Output power	22.83dBm maximum EIRP measured for LTE Band 66
Extreme vol. Limits	3.6VDC to 4.4VDC (nominal: 3.85VDC)
Extreme temp. Tolerance	-10°C to +55°C

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

#### **3.2. Internal Identification of EUT used during the test**

<b>EUT ID*</b>	<b>IMEI</b>	<b>HW Version</b>	<b>SW Version</b>	<b>Date of receipt</b>
UT05a	351556360001339	PIO	JY1H	2023-04-13
UT12a	351556360001289	PIO	JY1H	2023-04-18

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

#### **3.3. Internal Identification of AE used during the test**

<b>AE ID*</b>	<b>Description</b>
AE1	Battery

AE1

Model	TLp078CA
Manufacturer	tianmao
Capacitance	8000mAh

\*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.

<b>Reference</b>	<b>Title</b>	<b>Version</b>
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-21 Edition
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-21 Edition
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-21 Edition
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
ANSI C63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
KDB 971168 D01	MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS	v03r01



## 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 7

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 17**

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 41 (38)**

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.

Band 66 and Band 41 overlaps the entire frequency range of LTE Band 4 and Band 38. Therefore, test data provided in this report covers Band 4, Band 38 as well as Band 66, Band 41.

LTE Band 41 is tested by power class 3.

#### 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 and 64QAM 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	2023-05-25	1 year
Radio Communication Analyzer	MT8821C	6201763159	Anritsu	2023-08-02	1 year
Climate Chamber	SH-242	93008556	ESPEC	2023-12-23	3 years
EMI Antenna	VULB9163	9163-482	Schwarzbeck	2023-11-28	1 year
EMI Antenna	3115	00167252	ETS-Lindgren	2024-01-28	1 year
EMI Antenna	3116	2663	ETS-Lindgren	2023-11-22	1 year
EMI Antenna	LB-180400-25-C-KF	J211060826	A-INFO	2024-03-02	1 year
Signal Generator	N5183A	MY49060052	Agilent	2023-07-19	1 year
Test Receiver	FSV40	101047	R&S	2023-06-09	1 year
Universal Radio Communication Tester	CMW500	143008	R&S	2024-01-03	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	64QAM
1.4MHz	1 RB high	1909.3	23.67	22.78	21.76
		1880.0	23.65	22.80	21.76
		1850.7	23.78	22.88	21.87
	1 RB low	1909.3	23.69	22.81	21.83
		1880.0	23.67	22.93	21.80
		1850.7	23.75	22.90	21.97
	50% RB mid	1909.3	23.83	22.69	21.93
		1880.0	23.82	22.66	21.94
		1850.7	23.96	22.88	21.97
	100% RB	1909.3	22.83	21.91	20.84
		1880.0	22.84	21.87	20.83
		1850.7	22.95	22.00	20.94
3MHz	1 RB high	1908.5	23.71	22.78	21.79
		1880.0	23.66	22.77	21.81
		1851.5	23.77	22.96	21.95
	1 RB low	1908.5	23.68	22.88	21.91
		1880.0	23.67	22.85	21.84
		1851.5	23.77	22.89	21.89
	50% RB mid	1908.5	22.79	21.84	20.86
		1880.0	22.78	21.80	20.83
		1851.5	22.91	21.94	20.94

	100% RB	1908.5	22.76	21.79	20.78
		1880.0	22.78	21.79	20.72
		1851.5	22.92	21.88	20.87
5MHz	1 RB high	1907.5	23.61	22.65	21.72
		1880.0	23.55	22.72	21.72
		1852.5	23.66	22.85	21.82
	1 RB low	1907.5	23.56	22.79	21.80
		1880.0	23.58	22.84	21.71
		1852.5	23.67	22.87	21.78
	50% RB mid	1907.5	22.79	21.80	20.88
		1880.0	22.81	21.77	20.80
		1852.5	22.92	21.89	20.94
	100% RB	1907.5	22.77	21.83	20.82
		1880.0	22.79	21.78	20.78
		1852.5	22.85	21.86	20.87
10MHz	1 RB high	1905.0	23.67	22.83	21.79
		1880.0	23.63	22.75	21.79
		1855.0	23.72	22.92	21.96
	1 RB low	1905.0	23.68	22.98	21.89
		1880.0	23.68	22.91	21.89
		1855.0	23.80	23.02	21.95
	50% RB mid	1905.0	22.85	21.86	20.86
		1880.0	22.85	21.81	20.80
		1855.0	22.95	21.93	20.94
	100% RB	1905.0	22.91	21.88	20.92
		1880.0	22.83	21.82	20.80
		1855.0	22.96	21.92	20.93
15MHz	1 RB high	1902.5	23.62	22.74	21.74
		1880.0	23.59	22.74	21.69
		1857.5	23.64	22.94	21.84
	1 RB low	1902.5	23.65	22.93	21.79
		1880.0	23.65	22.97	21.83
		1857.5	23.75	22.99	21.91
	50% RB mid	1902.5	22.83	21.79	20.83
		1880.0	22.83	21.77	20.82
		1857.5	22.93	21.86	20.91
	100% RB	1902.5	22.85	21.83	20.81
		1880.0	22.79	21.75	20.74
		1857.5	22.90	21.91	20.88
20MHz	1 RB high	1900.0	23.43	22.61	21.55
		1880.0	23.36	22.56	21.55
		1860.0	23.43	22.66	21.66
	1 RB low	1900.0	23.40	22.61	21.53



		1880.0	23.44	22.74	21.69
		1860.0	23.51	22.77	21.72
	50% RB mid	1900.0	22.72	21.68	20.72
		1880.0	22.68	21.65	20.67
		1860.0	22.78	21.75	20.73
	100% RB	1900.0	22.68	21.66	20.68
		1880.0	22.59	21.55	20.55
		1860.0	22.75	21.73	20.73

**LTE band 5**

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	848.3	23.27	22.61	21.45
		836.5	23.13	22.59	21.44
		824.7	23.20	22.40	21.44
	1 RB low	848.3	23.31	22.55	21.46
		836.5	23.24	22.54	21.46
		824.7	23.24	22.36	21.47
	50% RB mid	848.3	23.25	22.66	21.35
		836.5	23.30	22.51	21.32
		824.7	23.40	22.59	21.45
	100% RB	848.3	22.26	21.30	20.45
		836.5	22.28	21.38	20.42
		824.7	22.15	21.37	20.19
3MHz	1 RB high	847.5	23.10	22.47	21.25
		836.5	23.23	22.37	21.38
		825.5	23.05	22.52	21.24
	1 RB low	847.5	23.26	22.41	21.48
		836.5	23.26	22.50	21.48
		825.5	23.08	22.41	21.45
	50% RB mid	847.5	22.29	21.32	20.33
		836.5	22.31	21.42	20.18
		825.5	22.38	21.33	20.25
	100% RB	847.5	22.23	21.37	20.22
		836.5	22.18	21.34	20.23
		825.5	22.30	21.19	20.37
5MHz	1 RB high	846.5	23.10	22.45	21.33
		836.5	23.27	22.36	21.52
		826.5	23.07	22.41	21.26
	1 RB low	846.5	23.23	22.51	21.26
		836.5	23.23	22.55	21.33
		826.5	23.19	22.56	21.36
	50% RB mid	846.5	22.23	21.39	20.32
		836.5	22.23	21.35	20.17
		826.5	22.39	21.33	20.20
	100% RB	846.5	22.39	21.28	20.22
		836.5	22.33	21.38	20.17
		826.5	22.37	21.18	20.29
10MHz	1 RB high	844.0	23.21	22.52	21.36
		836.5	23.18	22.50	21.43
		829.0	23.17	22.42	21.34
	1 RB low	844.0	23.26	22.49	21.41





		836.5	23.22	22.47	21.46
		829.0	23.18	22.49	21.37
	50% RB mid	844.0	22.37	21.35	20.37
		836.5	22.30	21.32	20.30
		829.0	22.34	21.33	20.31
	100% RB	844.0	22.36	21.36	20.36
		836.5	22.33	21.32	20.32
		829.0	22.30	21.32	20.32

**LTE band 7**

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	2567.5	23.37	22.47	21.53
		2535.0	23.53	22.66	21.68
		2502.5	23.53	22.79	21.71
	1 RB low	2567.5	23.43	22.56	21.67
		2535.0	23.57	22.80	21.79
		2502.5	23.52	22.72	21.77
	50% RB mid	2567.5	22.61	21.62	20.73
		2535.0	22.75	21.76	20.85
		2502.5	22.75	21.79	20.91
	100% RB	2567.5	22.60	21.55	20.67
		2535.0	22.72	21.72	20.77
		2502.5	22.74	21.74	20.81
10MHz	1 RB high	2565.0	23.46	22.51	21.54
		2535.0	23.57	22.72	21.72
		2505.0	23.65	22.87	21.90
	1 RB low	2565.0	23.61	22.90	21.82
		2535.0	23.66	22.84	21.93
		2505.0	23.63	22.77	21.85
	50% RB mid	2565.0	22.72	21.72	20.79
		2535.0	22.78	21.77	20.83
		2505.0	22.79	21.79	20.85
	100% RB	2565.0	22.75	21.74	20.82
		2535.0	22.77	21.75	20.80
		2505.0	22.81	21.80	20.86
15MHz	1 RB high	2562.5	23.40	22.57	21.51
		2535.0	23.50	22.63	21.66
		2507.5	23.63	22.93	21.87
	1 RB low	2562.5	23.49	22.74	21.80
		2535.0	23.66	22.95	21.94
		2507.5	23.58	22.75	21.75
	50% RB mid	2562.5	22.73	21.74	20.78
		2535.0	22.78	21.74	20.82
		2507.5	22.83	21.82	20.86
	100% RB	2562.5	22.67	21.67	20.70
		2535.0	22.73	21.74	20.76
		2507.5	22.77	21.78	20.82
20MHz	1 RB high	2560.0	23.33	22.32	21.41
		2535.0	23.40	22.57	21.59
		2510.0	23.41	22.69	21.75
	1 RB low	2560.0	23.51	22.68	21.73



		2535.0	23.52	22.78	21.79
		2510.0	23.33	22.58	21.58
	50% RB mid	2560.0	22.75	21.76	20.82
		2535.0	22.76	21.75	20.80
		2510.0	22.67	21.68	20.71
	100% RB	2560.0	22.68	21.66	20.71
		2535.0	22.67	21.64	20.69
		2510.0	22.61	21.63	20.67

**LTE band 17**

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	713.5	23.60	22.73	21.78
		710.0	23.58	22.76	21.76
		706.5	23.59	22.92	21.71
	1 RB low	713.5	23.60	22.75	21.79
		710.0	23.66	22.79	21.76
		706.5	23.65	22.83	21.81
	50% RB mid	713.5	22.80	21.76	20.86
		710.0	22.79	21.73	20.85
		706.5	22.82	21.78	20.88
	100% RB	713.5	22.74	21.73	20.79
		710.0	22.76	21.74	20.79
		706.5	22.76	21.77	20.80
10MHz	1 RB high	711.0	23.69	22.89	21.82
		710.0	23.67	22.83	21.85
		709.0	23.68	22.83	21.83
	1 RB low	711.0	23.79	22.99	21.94
		710.0	23.77	23.01	21.85
		709.0	23.75	22.91	21.82
	50% RB mid	711.0	22.81	21.79	20.84
		710.0	22.85	21.83	20.87
		709.0	22.81	21.81	20.85
	100% RB	711.0	22.83	21.81	20.83
		710.0	22.84	21.84	20.88
		709.0	22.84	21.82	20.87

**LTE band 41**

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	2687.5	23.51	22.30	21.04
		2593.0	23.39	22.50	21.17
		2498.5	23.50	22.57	21.03
	1 RB low	2687.5	23.49	22.64	21.14
		2593.0	23.69	22.70	21.20
		2498.5	23.42	22.47	21.03
	50% RB mid	2687.5	22.39	21.50	20.77
		2593.0	22.71	21.86	20.75
		2498.5	22.53	21.65	20.53
	100% RB	2687.5	22.72	21.51	20.71
		2593.0	22.64	21.66	20.69
		2498.5	22.49	21.62	20.49
10MHz	1 RB high	2685.0	23.31	22.34	21.13
		2593.0	23.60	22.57	21.08
		2501.0	23.25	22.53	21.19
	1 RB low	2685.0	23.59	22.58	21.09
		2593.0	23.50	22.64	21.24
		2501.0	23.22	22.61	20.98
	50% RB mid	2685.0	22.39	21.54	20.79
		2593.0	22.81	21.71	20.81
		2501.0	22.59	21.48	20.44
	100% RB	2685.0	22.56	21.69	20.79
		2593.0	22.59	21.81	20.75
		2501.0	22.63	21.57	20.48
15MHz	1 RB high	2682.5	23.34	22.39	21.00
		2593.0	23.40	22.52	21.25
		2503.5	23.48	22.59	21.02
	1 RB low	2682.5	23.53	22.42	21.12
		2593.0	23.50	22.64	21.32
		2503.5	23.41	22.56	21.07
	50% RB mid	2682.5	22.47	21.74	20.69
		2593.0	22.56	21.82	20.56
		2503.5	22.58	21.53	20.53
	100% RB	2682.5	22.69	21.64	20.82
		2593.0	22.73	21.81	20.60
		2503.5	22.59	21.46	20.43
20MHz	1 RB high	2680.0	23.41	22.40	21.03
		2593.0	23.53	22.63	21.21
		2506.0	23.40	22.57	21.12
	1 RB low	2680.0	23.55	22.55	21.17



		2593.0	23.59	22.72	21.31
		2506.0	23.37	22.51	21.11
	50% RB mid	2680.0	22.54	21.65	20.70
		2593.0	22.71	21.76	20.71
		2506.0	22.53	21.63	20.55
	100% RB	2680.0	22.62	21.66	20.72
		2593.0	22.72	21.76	20.69
		2506.0	22.58	21.60	20.53

**LTE band 66**

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	1779.3	23.70	22.91	21.83
		1745.0	23.61	22.88	21.82
		1710.7	23.63	22.95	21.83
	1 RB low	1779.3	23.70	22.80	21.81
		1745.0	23.61	22.74	21.79
		1710.7	23.64	22.94	21.94
	50% RB mid	1779.3	23.83	22.78	21.93
		1745.0	23.73	22.63	21.87
		1710.7	23.78	22.81	21.90
	100% RB	1779.3	22.82	21.90	20.80
		1745.0	22.70	21.81	20.73
		1710.7	22.76	21.89	20.84
3MHz	1 RB high	1778.5	23.77	22.86	21.94
		1745.0	23.69	22.96	21.92
		1711.5	23.73	23.03	22.00
	1 RB low	1778.5	23.76	22.93	21.98
		1745.0	23.71	22.89	21.81
		1711.5	23.74	23.04	21.93
	50% RB mid	1778.5	22.85	21.90	20.91
		1745.0	22.74	21.85	20.86
		1711.5	22.79	21.92	20.92
	100% RB	1778.5	22.83	21.84	20.83
		1745.0	22.77	21.78	20.76
		1711.5	22.78	21.86	20.84
5MHz	1 RB high	1777.5	23.68	22.89	21.83
		1745.0	23.58	22.79	21.80
		1712.5	23.62	22.90	21.85
	1 RB low	1777.5	23.68	22.81	21.86
		1745.0	23.61	22.82	21.87
		1712.5	23.63	22.89	21.87
	50% RB mid	1777.5	22.85	21.85	20.89
		1745.0	22.80	21.82	20.87
		1712.5	22.83	21.88	20.91
	100% RB	1777.5	22.85	21.83	20.84
		1745.0	22.76	21.79	20.82
		1712.5	22.80	21.85	20.85
10MHz	1 RB high	1775.0	23.78	22.84	21.96
		1745.0	23.65	22.81	21.87
		1715.0	23.70	22.99	22.00
	1 RB low	1775.0	23.80	22.91	21.95

		1745.0	23.70	22.90	21.87	
		1715.0	23.74	23.02	21.95	
	50% RB mid	1775.0	22.87	21.88	20.89	
		1745.0	22.82	21.83	20.85	
		1715.0	22.85	21.90	20.93	
	100% RB	1775.0	22.91	21.89	20.89	
		1745.0	22.80	21.84	20.84	
1715.0		22.90	21.93	20.93		
15MHz	1 RB high	1772.5	23.71	22.84	21.79	
		1745.0	23.62	22.89	21.82	
		1717.5	23.69	22.96	21.92	
	1 RB low	1772.5	23.72	22.82	22.01	
		1745.0	23.67	22.94	21.84	
		1717.5	23.71	22.94	21.93	
	50% RB mid	1772.5	22.90	21.86	20.90	
		1745.0	22.79	21.80	20.83	
		1717.5	22.85	21.88	20.91	
	100% RB	1772.5	22.87	21.84	20.87	
		1745.0	22.80	21.83	20.84	
		1717.5	22.83	21.86	20.86	
	20MHz	1 RB high	1770.0	23.49	22.66	21.65
			1745.0	23.47	22.73	21.63
			1720.0	23.53	22.73	21.78
1 RB low		1770.0	23.52	22.82	21.73	
		1745.0	23.56	22.71	21.75	
		1720.0	23.56	22.78	21.78	
50% RB mid		1770.0	22.76	21.78	20.77	
		1745.0	22.72	21.74	20.73	
		1720.0	22.79	21.81	20.80	
100% RB		1770.0	22.72	21.71	20.72	
		1745.0	22.73	21.73	20.73	
		1720.0	22.74	21.74	20.77	



### 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 7:** Rule Part 27.50(h)(2) specifies, " Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power."

**LTE Band 17:** 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."

**FDD Band 41/38:** 27.50(h)(2) specifies " *Mobile and other user stations.* Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power".

**LTE Band 66/4:** 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  $P_{\text{Mea}}$ , e.g., dBm or dBW)

$P_{\text{Mea}}$       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 ERP: 22.46dBm

Band width	RB size/offset	Frequency (MHz)	Conducted Power (dBm)				Radiated Power (dBm) GT = -1.5dBi			
			QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
1.4MHz	1 RB high	1909.3	23.67	22.78	21.76	/	22.17	21.28	20.26	/
		1880.0	23.65	22.80	21.76	/	22.15	21.30	20.26	/
		1850.7	23.78	22.88	21.87	/	22.28	21.38	20.37	/
	1 RB low	1909.3	23.69	22.81	21.83	/	22.19	21.31	20.33	/
		1880.0	23.67	22.93	21.80	/	22.17	21.43	20.30	/
		1850.7	23.75	22.90	21.97	/	22.25	21.40	20.47	/
	50% RB mid	1909.3	23.83	22.69	21.93	/	22.33	21.19	20.43	/
		1880.0	23.82	22.66	21.94	/	22.32	21.16	20.44	/
		1850.7	23.96	22.88	21.97	/	22.46	21.38	20.47	/
	100% RB	1909.3	22.83	21.91	20.84	/	21.33	20.41	19.34	/
		1880.0	22.84	21.87	20.83	/	21.34	20.37	19.33	/
		1850.7	22.95	22.00	20.94	/	21.45	20.50	19.44	/
3MHz	1 RB high	1908.5	23.71	22.78	21.79	/	22.21	21.28	20.29	/
		1880.0	23.66	22.77	21.81	/	22.16	21.27	20.31	/
		1851.5	23.77	22.96	21.95	/	22.27	21.46	20.45	/
	1 RB low	1908.5	23.68	22.88	21.91	/	22.18	21.38	20.41	/
		1880.0	23.67	22.85	21.84	/	22.17	21.35	20.34	/
		1851.5	23.77	22.89	21.89	/	22.27	21.39	20.39	/
	50% RB mid	1908.5	22.79	21.84	20.86	/	21.29	20.34	19.36	/
		1880.0	22.78	21.80	20.83	/	21.28	20.30	19.33	/
		1851.5	22.91	21.94	20.94	/	21.41	20.44	19.44	/
	100% RB	1908.5	22.76	21.79	20.78	/	21.26	20.29	19.28	/
		1880.0	22.78	21.79	20.72	/	21.28	20.29	19.22	/
		1851.5	22.92	21.88	20.87	/	21.42	20.38	19.37	/
5MHz	1 RB high	1907.5	23.61	22.65	21.72	/	22.11	21.15	20.22	/
		1880.0	23.55	22.72	21.72	/	22.05	21.22	20.22	/
		1852.5	23.66	22.85	21.82	/	22.16	21.35	20.32	/
	1 RB low	1907.5	23.56	22.79	21.80	/	22.06	21.29	20.30	/
		1880.0	23.58	22.84	21.71	/	22.08	21.34	20.21	/
		1852.5	23.67	22.87	21.78	/	22.17	21.37	20.28	/
	50% RB mid	1907.5	22.79	21.80	20.88	/	21.29	20.30	19.38	/
		1880.0	22.81	21.77	20.80	/	21.31	20.27	19.30	/
		1852.5	22.92	21.89	20.94	/	21.42	20.39	19.44	/
	100% RB	1907.5	22.77	21.83	20.82	/	21.27	20.33	19.32	/
		1880.0	22.79	21.78	20.78	/	21.29	20.28	19.28	/

	RB	1852.5	22.85	21.86	20.87	/	21.35	20.36	19.37	/
10MH z	1 RB high	1905.0	23.67	22.83	21.79	/	22.17	21.33	20.29	/
		1880.0	23.63	22.75	21.79	/	22.13	21.25	20.29	/
		1855.0	23.72	22.92	21.96	/	22.22	21.42	20.46	/
	1 RB low	1905.0	23.68	22.98	21.89	/	22.18	21.48	20.39	/
		1880.0	23.68	22.91	21.89	/	22.18	21.41	20.39	/
		1855.0	23.80	23.02	21.95	/	22.30	21.52	20.45	/
	50% RB mid	1905.0	22.85	21.86	20.86	/	21.35	20.36	19.36	/
		1880.0	22.85	21.81	20.80	/	21.35	20.31	19.30	/
		1855.0	22.95	21.93	20.94	/	21.45	20.43	19.44	/
	100 % RB	1905.0	22.91	21.88	20.92	/	21.41	20.38	19.42	/
		1880.0	22.83	21.82	20.80	/	21.33	20.32	19.30	/
		1855.0	22.96	21.92	20.93	/	21.46	20.42	19.43	/
15MH z	1 RB high	1902.5	23.62	22.74	21.74	/	22.12	21.24	20.24	/
		1880.0	23.59	22.74	21.69	/	22.09	21.24	20.19	/
		1857.5	23.64	22.94	21.84	/	22.14	21.44	20.34	/
	1 RB low	1902.5	23.65	22.93	21.79	/	22.15	21.43	20.29	/
		1880.0	23.65	22.97	21.83	/	22.15	21.47	20.33	/
		1857.5	23.75	22.99	21.91	/	22.25	21.49	20.41	/
	50% RB mid	1902.5	22.83	21.79	20.83	/	21.33	20.29	19.33	/
		1880.0	22.83	21.77	20.82	/	21.33	20.27	19.32	/
		1857.5	22.93	21.86	20.91	/	21.43	20.36	19.41	/
	100 % RB	1902.5	22.85	21.83	20.81	/	21.35	20.33	19.31	/
		1880.0	22.79	21.75	20.74	/	21.29	20.25	19.24	/
		1857.5	22.90	21.91	20.88	/	21.40	20.41	19.38	/
20MH z	1 RB high	1900.0	23.43	22.61	21.55	/	21.93	21.11	20.05	/
		1880.0	23.36	22.56	21.55	/	21.86	21.06	20.05	/
		1860.0	23.43	22.66	21.66	/	21.93	21.16	20.16	/
	1 RB low	1900.0	23.40	22.61	21.53	/	21.90	21.11	20.03	/
		1880.0	23.44	22.74	21.69	/	21.94	21.24	20.19	/
		1860.0	23.51	22.77	21.72	/	22.01	21.27	20.22	/
	50% RB mid	1900.0	22.72	21.68	20.72	/	21.22	20.18	19.22	/
		1880.0	22.68	21.65	20.67	/	21.18	20.15	19.17	/
		1860.0	22.78	21.75	20.73	/	21.28	20.25	19.23	/
	100 % RB	1900.0	22.68	21.66	20.68	/	21.18	20.16	19.18	/
		1880.0	22.59	21.55	20.55	/	21.09	20.05	19.05	/
		1860.0	22.75	21.73	20.73	/	21.25	20.23	19.23	/

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

Max ERP: 19.75dBm

Band width	RB size/offset	Frequency (MHz)	Conducted Power (dBm)				Radiated Power (dBm) GT = -1.5dBi			
			QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
1.4M Hz	1 RB high	848.3	23.27	22.61	21.45	/	19.62	18.96	17.80	/
		836.5	23.13	22.59	21.44	/	19.48	18.94	17.79	/
		824.7	23.20	22.40	21.44	/	19.55	18.75	17.79	/
	1 RB low	848.3	23.31	22.55	21.46	/	19.66	18.90	17.81	/
		836.5	23.24	22.54	21.46	/	19.59	18.89	17.81	/
		824.7	23.24	22.36	21.47	/	19.59	18.71	17.82	/
	50% RB mid	848.3	23.25	22.66	21.35	/	19.60	19.01	17.70	/
		836.5	23.30	22.51	21.32	/	19.65	18.86	17.67	/
		824.7	23.40	22.59	21.45	/	19.75	18.94	17.80	/
	100% RB	848.3	22.26	21.30	20.45	/	18.61	17.65	16.80	/
		836.5	22.28	21.38	20.42	/	18.63	17.73	16.77	/
		824.7	22.15	21.37	20.19	/	18.50	17.72	16.54	/
3MHz	1 RB high	847.5	23.10	22.47	21.25	/	19.45	18.82	17.60	/
		836.5	23.23	22.37	21.38	/	19.58	18.72	17.73	/
		825.5	23.05	22.52	21.24	/	19.40	18.87	17.59	/
	1 RB low	847.5	23.26	22.41	21.48	/	19.61	18.76	17.83	/
		836.5	23.26	22.50	21.48	/	19.61	18.85	17.83	/
		825.5	23.08	22.41	21.45	/	19.43	18.76	17.80	/
	50% RB mid	847.5	22.29	21.32	20.33	/	18.64	17.67	16.68	/
		836.5	22.31	21.42	20.18	/	18.66	17.77	16.53	/
		825.5	22.38	21.33	20.25	/	18.73	17.68	16.60	/
	100% RB	847.5	22.23	21.37	20.22	/	18.58	17.72	16.57	/
		836.5	22.18	21.34	20.23	/	18.53	17.69	16.58	/
		825.5	22.30	21.19	20.37	/	18.65	17.54	16.72	/
5MHz	1 RB high	846.5	23.10	22.45	21.33	/	19.45	18.80	17.68	/
		836.5	23.27	22.36	21.52	/	19.62	18.71	17.87	/
		826.5	23.07	22.41	21.26	/	19.42	18.76	17.61	/
	1 RB low	846.5	23.23	22.51	21.26	/	19.58	18.86	17.61	/
		836.5	23.23	22.55	21.33	/	19.58	18.90	17.68	/
		826.5	23.19	22.56	21.36	/	19.54	18.91	17.71	/
	50% RB mid	846.5	22.23	21.39	20.32	/	18.58	17.74	16.67	/
		836.5	22.23	21.35	20.17	/	18.58	17.70	16.52	/
		826.5	22.39	21.33	20.20	/	18.74	17.68	16.55	/
	100% RB	846.5	22.39	21.28	20.22	/	18.74	17.63	16.57	/
		836.5	22.33	21.38	20.17	/	18.68	17.73	16.52	/

		826.5	22.37	21.18	20.29	/	18.72	17.53	16.64	/
10MH z	1 RB high	844.0	23.21	22.52	21.36	/	19.56	18.87	17.71	/
		836.5	23.18	22.50	21.43	/	19.53	18.85	17.78	/
		829.0	23.17	22.42	21.34	/	19.52	18.77	17.69	/
	1 RB low	844.0	23.26	22.49	21.41	/	19.61	18.84	17.76	/
		836.5	23.22	22.47	21.46	/	19.57	18.82	17.81	/
		829.0	23.18	22.49	21.37	/	19.53	18.84	17.72	/
	50% RB mid	844.0	22.37	21.35	20.37	/	18.72	17.70	16.72	/
		836.5	22.30	21.32	20.30	/	18.65	17.67	16.65	/
		829.0	22.34	21.33	20.31	/	18.69	17.68	16.66	/
	100% RB	844.0	22.36	21.36	20.36	/	18.71	17.71	16.71	/
		836.5	22.33	21.32	20.32	/	18.68	17.67	16.67	/
		829.0	22.30	21.32	20.32	/	18.65	17.67	16.67	/

**LTE band 7-EIRP**
**Limits:** ≤33dBm (2W)

Max EIRP: 22.16dBm

Band width	RB size/offset	Frequency (MHz)	Conducted Power (dBm)				Radiated Power (dBm) GT = -1.5dBi			
			QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
5MHz	1 RB high	2567.5	23.37	22.47	21.53	/	21.87	20.97	20.03	/
		2535.0	23.53	22.66	21.68	/	22.03	21.16	20.18	/
		2502.5	23.53	22.79	21.71	/	22.03	21.29	20.21	/
	1 RB low	2567.5	23.43	22.56	21.67	/	21.93	21.06	20.17	/
		2535.0	23.57	22.80	21.79	/	22.07	21.30	20.29	/
		2502.5	23.52	22.72	21.77	/	22.02	21.22	20.27	/
	50% RB mid	2567.5	22.61	21.62	20.73	/	21.11	20.12	19.23	/
		2535.0	22.75	21.76	20.85	/	21.25	20.26	19.35	/
		2502.5	22.75	21.79	20.91	/	21.25	20.29	19.41	/
	100% RB	2567.5	22.60	21.55	20.67	/	21.10	20.05	19.17	/
		2535.0	22.72	21.72	20.77	/	21.22	20.22	19.27	/
		2502.5	22.74	21.74	20.81	/	21.24	20.24	19.31	/
10MHz	1 RB high	2565.0	23.46	22.51	21.54	/	21.96	21.01	20.04	/
		2535.0	23.57	22.72	21.72	/	22.07	21.22	20.22	/
		2505.0	23.65	22.87	21.90	/	22.15	21.37	20.40	/
	1 RB low	2565.0	23.61	22.90	21.82	/	22.11	21.40	20.32	/
		2535.0	23.66	22.84	21.93	/	22.16	21.34	20.43	/
		2505.0	23.63	22.77	21.85	/	22.13	21.27	20.35	/
	50% RB mid	2565.0	22.72	21.72	20.79	/	21.22	20.22	19.29	/
		2535.0	22.78	21.77	20.83	/	21.28	20.27	19.33	/
		2505.0	22.79	21.79	20.85	/	21.29	20.29	19.35	/
	100% RB	2565.0	22.75	21.74	20.82	/	21.25	20.24	19.32	/
		2535.0	22.77	21.75	20.80	/	21.27	20.25	19.30	/
		2505.0	22.81	21.80	20.86	/	21.31	20.30	19.36	/
15MHz	1 RB high	2562.5	23.40	22.57	21.51	/	21.90	21.07	20.01	/
		2535.0	23.50	22.63	21.66	/	22.00	21.13	20.16	/
		2507.5	23.63	22.93	21.87	/	22.13	21.43	20.37	/
	1 RB low	2562.5	23.49	22.74	21.80	/	21.99	21.24	20.30	/
		2535.0	23.66	22.95	21.94	/	22.16	21.45	20.44	/
		2507.5	23.58	22.75	21.75	/	22.08	21.25	20.25	/
	50% RB mid	2562.5	22.73	21.74	20.78	/	21.23	20.24	19.28	/
		2535.0	22.78	21.74	20.82	/	21.28	20.24	19.32	/
		2507.5	22.83	21.82	20.86	/	21.33	20.32	19.36	/
	100% RB	2562.5	22.67	21.67	20.70	/	21.17	20.17	19.20	/
		2535.0	22.73	21.74	20.76	/	21.23	20.24	19.26	/

		2507.5	22.77	21.78	20.82	/	21.27	20.28	19.32	/
20MH z	1 RB high	2560.0	23.33	22.32	21.41	/	21.83	20.82	19.91	/
		2535.0	23.40	22.57	21.59	/	21.90	21.07	20.09	/
		2510.0	23.41	22.69	21.75	/	21.91	21.19	20.25	/
	1 RB low	2560.0	23.51	22.68	21.73	/	22.01	21.18	20.23	/
		2535.0	23.52	22.78	21.79	/	22.02	21.28	20.29	/
		2510.0	23.33	22.58	21.58	/	21.83	21.08	20.08	/
	50% RB mid	2560.0	22.75	21.76	20.82	/	21.25	20.26	19.32	/
		2535.0	22.76	21.75	20.80	/	21.26	20.25	19.30	/
		2510.0	22.67	21.68	20.71	/	21.17	20.18	19.21	/
	100% RB	2560.0	22.68	21.66	20.71	/	21.18	20.16	19.21	/
		2535.0	22.67	21.64	20.69	/	21.17	20.14	19.19	/
		2510.0	22.61	21.63	20.67	/	21.11	20.13	19.17	/

**LTE band 17-ERP**
**Limits:** ≤34.77dBm (3W)

Max ERP: 19.64dBm

Band width	RB size/offset	Frequency (MHz)	Conducted Power (dBm)				Radiated Power (dBm) GT = -2.0dBi			
			QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
5MHz	1 RB high	713.5	23.60	22.73	21.78	/	19.45	18.58	17.63	/
		710.0	23.58	22.76	21.76	/	19.43	18.61	17.61	/
		706.5	23.59	22.92	21.71	/	19.44	18.77	17.56	/
	1 RB low	713.5	23.60	22.75	21.79	/	19.45	18.60	17.64	/
		710.0	23.66	22.79	21.76	/	19.51	18.64	17.61	/
		706.5	23.65	22.83	21.81	/	19.50	18.68	17.66	/
	50% RB mid	713.5	22.80	21.76	20.86	/	18.65	17.61	16.71	/
		710.0	22.79	21.73	20.85	/	18.64	17.58	16.70	/
		706.5	22.82	21.78	20.88	/	18.67	17.63	16.73	/
	100% RB	713.5	22.74	21.73	20.79	/	18.59	17.58	16.64	/
		710.0	22.76	21.74	20.79	/	18.61	17.59	16.64	/
		706.5	22.76	21.77	20.80	/	18.61	17.62	16.65	/
10MHz	1 RB high	711.0	23.69	22.89	21.82	/	19.54	18.74	17.67	/
		710.0	23.67	22.83	21.85	/	19.52	18.68	17.70	/
		709.0	23.68	22.83	21.83	/	19.53	18.68	17.68	/
	1 RB low	711.0	23.79	22.99	21.94	/	19.64	18.84	17.79	/
		710.0	23.77	23.01	21.85	/	19.62	18.86	17.70	/
		709.0	23.75	22.91	21.82	/	19.60	18.76	17.67	/
	50% RB mid	711.0	22.81	21.79	20.84	/	18.66	17.64	16.69	/
		710.0	22.85	21.83	20.87	/	18.70	17.68	16.72	/
		709.0	22.81	21.81	20.85	/	18.66	17.66	16.70	/
	100% RB	711.0	22.83	21.81	20.83	/	18.68	17.66	16.68	/
		710.0	22.84	21.84	20.88	/	18.69	17.69	16.73	/
		709.0	22.84	21.82	20.87	/	18.69	17.67	16.72	/



**LTE band 41- EIRP**
**Limits:** ≤33 dBm (2W)

Max EIRP: 21.69dBm

Band width	RB size/offset	Frequency (MHz)	Conducted Power (dBm)				Radiated Power (dBm) GT = -2.0dBi			
			QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
5MHz	1 RB high	2687.5	23.51	22.30	21.04	/	21.51	20.30	19.04	/
		2593.0	23.39	22.50	21.17	/	21.39	20.50	19.17	/
		2498.5	23.50	22.57	21.03	/	21.50	20.57	19.03	/
	1 RB low	2687.5	23.49	22.64	21.14	/	21.49	20.64	19.14	/
		2593.0	23.69	22.70	21.20	/	21.69	20.70	19.20	/
		2498.5	23.42	22.47	21.03	/	21.42	20.47	19.03	/
	50% RB mid	2687.5	22.39	21.50	20.77	/	20.39	19.50	18.77	/
		2593.0	22.71	21.86	20.75	/	20.71	19.86	18.75	/
		2498.5	22.53	21.65	20.53	/	20.53	19.65	18.53	/
	100% RB	2687.5	22.72	21.51	20.71	/	20.72	19.51	18.71	/
		2593.0	22.64	21.66	20.69	/	20.64	19.66	18.69	/
		2498.5	22.49	21.62	20.49	/	20.49	19.62	18.49	/
10MHz	1 RB high	2685.0	23.31	22.34	21.13	/	21.31	20.34	19.13	/
		2593.0	23.60	22.57	21.08	/	21.60	20.57	19.08	/
		2501.0	23.25	22.53	21.19	/	21.25	20.53	19.19	/
	1 RB low	2685.0	23.59	22.58	21.09	/	21.59	20.58	19.09	/
		2593.0	23.50	22.64	21.24	/	21.50	20.64	19.24	/
		2501.0	23.22	22.61	20.98	/	21.22	20.61	18.98	/
	50% RB mid	2685.0	22.39	21.54	20.79	/	20.39	19.54	18.79	/
		2593.0	22.81	21.71	20.81	/	20.81	19.71	18.81	/
		2501.0	22.59	21.48	20.44	/	20.59	19.48	18.44	/
	100% RB	2685.0	22.56	21.69	20.79	/	20.56	19.69	18.79	/
		2593.0	22.59	21.81	20.75	/	20.59	19.81	18.75	/
		2501.0	22.63	21.57	20.48	/	20.63	19.57	18.48	/
15MHz	1 RB high	2682.5	23.34	22.39	21.00	/	21.34	20.39	19.00	/
		2593.0	23.40	22.52	21.25	/	21.40	20.52	19.25	/
		2503.5	23.48	22.59	21.02	/	21.48	20.59	19.02	/
	1 RB low	2682.5	23.53	22.42	21.12	/	21.53	20.42	19.12	/
		2593.0	23.50	22.64	21.32	/	21.50	20.64	19.32	/
		2503.5	23.41	22.56	21.07	/	21.41	20.56	19.07	/
	50% RB mid	2682.5	22.47	21.74	20.69	/	20.47	19.74	18.69	/
		2593.0	22.56	21.82	20.56	/	20.56	19.82	18.56	/
		2503.5	22.58	21.53	20.53	/	20.58	19.53	18.53	/
	100% RB	2682.5	22.69	21.64	20.82	/	20.69	19.64	18.82	/
		2593.0	22.73	21.81	20.60	/	20.73	19.81	18.60	/

		2503.5	22.59	21.46	20.43	/	20.59	19.46	18.43	/
20MH z	1 RB high	2680.0	23.41	22.40	21.03	/	21.41	20.40	19.03	/
		2593.0	23.53	22.63	21.21	/	21.53	20.63	19.21	/
		2506.0	23.40	22.57	21.12	/	21.40	20.57	19.12	/
	1 RB low	2680.0	23.55	22.55	21.17	/	21.55	20.55	19.17	/
		2593.0	23.59	22.72	21.31	/	21.59	20.72	19.31	/
		2506.0	23.37	22.51	21.11	/	21.37	20.51	19.11	/
	50% RB mid	2680.0	22.54	21.65	20.70	/	20.54	19.65	18.70	/
		2593.0	22.71	21.76	20.71	/	20.71	19.76	18.71	/
		2506.0	22.53	21.63	20.55	/	20.53	19.63	18.55	/
	100% RB	2680.0	22.62	21.66	20.72	/	20.62	19.66	18.72	/
		2593.0	22.72	21.76	20.69	/	20.72	19.76	18.69	/
		2506.0	22.58	21.60	20.53	/	20.58	19.60	18.53	/

**LTE band 66- EIRP**
**Limits:** ≤30dBm (1W)

Max EIRP: 22.83dBm

Band width	RB size/offset	Frequency (MHz)	Conducted Power (dBm)				Radiated Power (dBm) GT = -1.0dBi			
			QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
1.4M Hz	1 RB high	1779.3	23.70	22.91	21.83	/	22.70	21.91	20.83	/
		1745.0	23.61	22.88	21.82	/	22.61	21.88	20.82	/
		1710.7	23.63	22.95	21.83	/	22.63	21.95	20.83	/
	1 RB low	1779.3	23.70	22.80	21.81	/	22.70	21.80	20.81	/
		1745.0	23.61	22.74	21.79	/	22.61	21.74	20.79	/
		1710.7	23.64	22.94	21.94	/	22.64	21.94	20.94	/
	50% RB mid	1779.3	23.83	22.78	21.93	/	22.83	21.78	20.93	/
		1745.0	23.73	22.63	21.87	/	22.73	21.63	20.87	/
		1710.7	23.78	22.81	21.90	/	22.78	21.81	20.90	/
	100% RB	1779.3	22.82	21.90	20.80	/	21.82	20.90	19.80	/
		1745.0	22.70	21.81	20.73	/	21.70	20.81	19.73	/
		1710.7	22.76	21.89	20.84	/	21.76	20.89	19.84	/
3MHz	1 RB high	1778.5	23.77	22.86	21.94	/	22.77	21.86	20.94	/
		1745.0	23.69	22.96	21.92	/	22.69	21.96	20.92	/
		1711.5	23.73	23.03	22.00	/	22.73	22.03	21.00	/
	1 RB low	1778.5	23.76	22.93	21.98	/	22.76	21.93	20.98	/
		1745.0	23.71	22.89	21.81	/	22.71	21.89	20.81	/
		1711.5	23.74	23.04	21.93	/	22.74	22.04	20.93	/
	50% RB mid	1778.5	22.85	21.90	20.91	/	21.85	20.90	19.91	/
		1745.0	22.74	21.85	20.86	/	21.74	20.85	19.86	/
		1711.5	22.79	21.92	20.92	/	21.79	20.92	19.92	/
	100% RB	1778.5	22.83	21.84	20.83	/	21.83	20.84	19.83	/
		1745.0	22.77	21.78	20.76	/	21.77	20.78	19.76	/
		1711.5	22.78	21.86	20.84	/	21.78	20.86	19.84	/
5MHz	1 RB high	1777.5	23.68	22.89	21.83	/	22.68	21.89	20.83	/
		1745.0	23.58	22.79	21.80	/	22.58	21.79	20.80	/
		1712.5	23.62	22.90	21.85	/	22.62	21.90	20.85	/
	1 RB low	1777.5	23.68	22.81	21.86	/	22.68	21.81	20.86	/
		1745.0	23.61	22.82	21.87	/	22.61	21.82	20.87	/
		1712.5	23.63	22.89	21.87	/	22.63	21.89	20.87	/
	50% RB mid	1777.5	22.85	21.85	20.89	/	21.85	20.85	19.89	/
		1745.0	22.80	21.82	20.87	/	21.80	20.82	19.87	/
		1712.5	22.83	21.88	20.91	/	21.83	20.88	19.91	/
	100% RB	1777.5	22.85	21.83	20.84	/	21.85	20.83	19.84	/
		1745.0	22.76	21.79	20.82	/	21.76	20.79	19.82	/

		1712.5	22.80	21.85	20.85	/	21.80	20.85	19.85	/
10MH z	1 RB high	1775.0	23.78	22.84	21.96	/	22.78	21.84	20.96	/
		1745.0	23.65	22.81	21.87	/	22.65	21.81	20.87	/
		1715.0	23.70	22.99	22.00	/	22.70	21.99	21.00	/
	1 RB low	1775.0	23.80	22.91	21.95	/	22.80	21.91	20.95	/
		1745.0	23.70	22.90	21.87	/	22.70	21.90	20.87	/
		1715.0	23.74	23.02	21.95	/	22.74	22.02	20.95	/
	50% RB mid	1775.0	22.87	21.88	20.89	/	21.87	20.88	19.89	/
		1745.0	22.82	21.83	20.85	/	21.82	20.83	19.85	/
		1715.0	22.85	21.90	20.93	/	21.85	20.90	19.93	/
	100% RB	1775.0	22.91	21.89	20.89	/	21.91	20.89	19.89	/
		1745.0	22.80	21.84	20.84	/	21.80	20.84	19.84	/
		1715.0	22.90	21.93	20.93	/	21.90	20.93	19.93	/
15MH z	1 RB high	1772.5	23.71	22.84	21.79	/	22.71	21.84	20.79	/
		1745.0	23.62	22.89	21.82	/	22.62	21.89	20.82	/
		1717.5	23.69	22.96	21.92	/	22.69	21.96	20.92	/
	1 RB low	1772.5	23.72	22.82	22.01	/	22.72	21.82	21.01	/
		1745.0	23.67	22.94	21.84	/	22.67	21.94	20.84	/
		1717.5	23.71	22.94	21.93	/	22.71	21.94	20.93	/
	50% RB mid	1772.5	22.90	21.86	20.90	/	21.90	20.86	19.90	/
		1745.0	22.79	21.80	20.83	/	21.79	20.80	19.83	/
		1717.5	22.85	21.88	20.91	/	21.85	20.88	19.91	/
	100% RB	1772.5	22.87	21.84	20.87	/	21.87	20.84	19.87	/
		1745.0	22.80	21.83	20.84	/	21.80	20.83	19.84	/
		1717.5	22.83	21.86	20.86	/	21.83	20.86	19.86	/
20MH z	1 RB high	1770.0	23.49	22.66	21.65	/	22.49	21.66	20.65	/
		1745.0	23.47	22.73	21.63	/	22.47	21.73	20.63	/
		1720.0	23.53	22.73	21.78	/	22.53	21.73	20.78	/
	1 RB low	1770.0	23.52	22.82	21.73	/	22.52	21.82	20.73	/
		1745.0	23.56	22.71	21.75	/	22.56	21.71	20.75	/
		1720.0	23.56	22.78	21.78	/	22.56	21.78	20.78	/
	50% RB mid	1770.0	22.76	21.78	20.77	/	21.76	20.78	19.77	/
		1745.0	22.72	21.74	20.73	/	21.72	20.74	19.73	/
		1720.0	22.79	21.81	20.80	/	21.79	20.81	19.80	/
	100% RB	1770.0	22.72	21.71	20.72	/	21.72	20.71	19.72	/
		1745.0	22.73	21.73	20.73	/	21.73	20.73	19.73	/
		1720.0	22.74	21.74	20.77	/	21.74	20.74	19.77	/

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

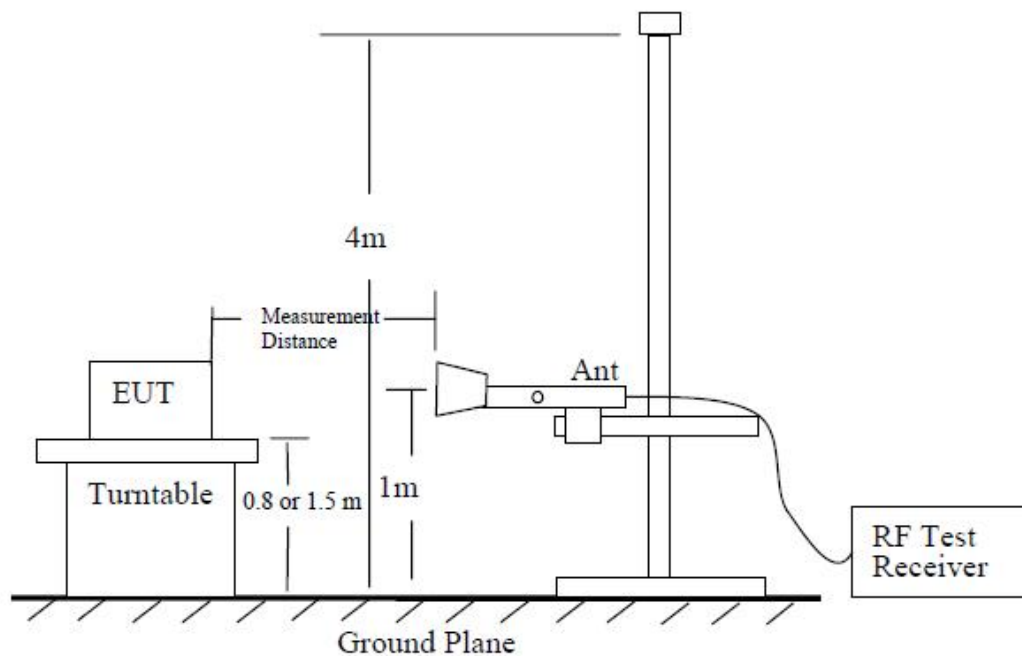
## **A.2 Emission Limit**

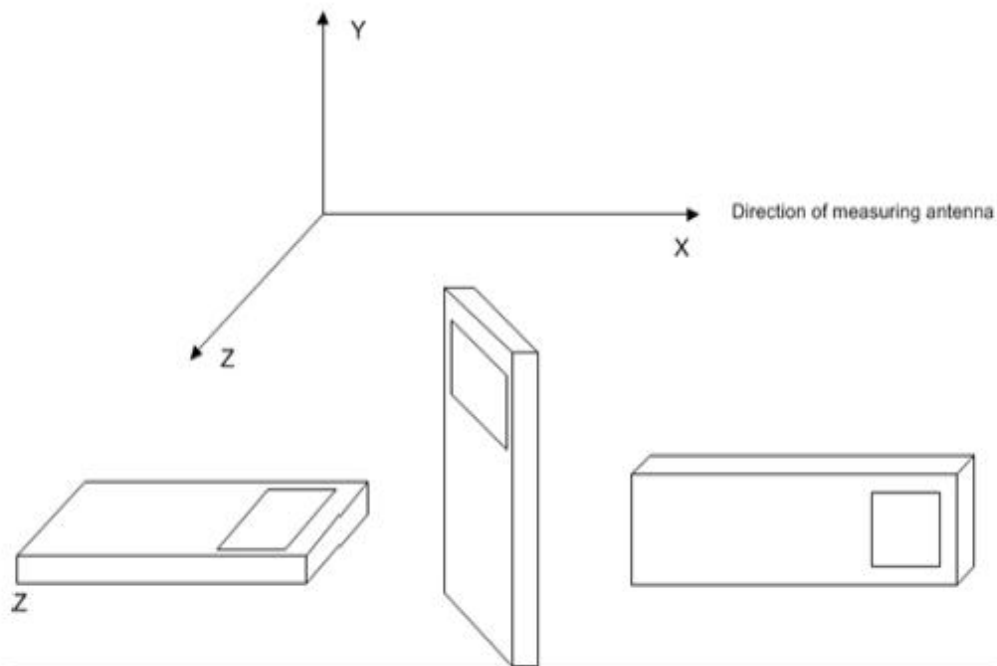
The measurements procedures in C63.26 are used.

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 2/5/7/17/41/66.

### **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 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.

**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 7:** 27.53(m) (4) specifies " For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. "

**FDD Band 17:** 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 66/4:** 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"

**FDD Band 41/38:** 27.53(m) specifies " For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts in accordance with the standards below. If a licensee has multiple contiguous channels, out-of-band emissions shall be measured from the upper and lower edges of the contiguous channels.

(4) For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1



on the same terms and conditions as adjacent channel BRS or EBS licensees.”

### **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 2/5/7/17/41/66 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 <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3702.02	-52.31	6.42	10.49	-48.24	-13.00	35.24	H
5552.02	-40.02	7.18	11.20	-36.00	-13.00	23.00	V
7404.01	-38.24	8.13	10.11	-36.26	-13.00	23.26	H
9257.01	-43.34	9.06	11.69	-40.71	-13.00	27.71	V
11100.01	-52.62	9.84	12.70	-49.76	-13.00	36.76	H
12961.01	-52.19	10.48	12.74	-49.93	-13.00	36.93	H

**LTE Band 2, 1.4MHz, QPSK, Channel 18900**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3760.02	-61.64	6.26	10.30	-57.60	-13.00	44.60	H
5641.02	-39.35	7.27	11.20	-35.42	-13.00	22.42	V
7521.01	-41.43	8.31	10.30	-39.44	-13.00	26.44	H
9401.01	-47.77	9.04	11.60	-45.21	-13.00	32.21	V
11319.01	-51.88	10.01	12.78	-49.11	-13.00	36.11	V
13151.01	-51.69	10.71	12.65	-49.75	-13.00	36.75	H

**LTE Band 2, 1.4MHz, QPSK, Channel 19193**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3819.02	-60.02	6.08	10.34	-55.76	-13.00	42.76	V
5729.02	-41.94	7.29	11.14	-38.09	-13.00	25.09	V
7639.01	-43.35	8.15	10.48	-41.02	-13.00	28.02	H
9550.01	-49.31	9.36	11.90	-46.77	-13.00	33.77	H
11420.01	-52.77	10.01	12.70	-50.08	-13.00	37.08	H
13405.01	-51.05	10.57	12.41	-49.21	-13.00	36.21	V

**LTE Band 5, 1.4MHz, QPSK, Channel 20407**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1649.01	-48.60	3.56	9.50	2.15	-44.81	-13.00	31.81	V
2474.00	-41.29	4.60	10.30	2.15	-37.74	-13.00	24.74	V
3299.02	-61.27	5.29	10.40	2.15	-58.31	-13.00	45.31	H
4125.02	-55.91	6.04	10.40	2.15	-53.70	-13.00	40.70	H
6598.01	-48.52	7.79	10.60	2.15	-47.86	-13.00	34.86	V
9081.00	-52.81	8.99	11.80	2.15	-52.15	-13.00	39.15	V

**LTE Band 5, 1.4MHz, QPSK, Channel 20525**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.01	-47.87	3.58	9.55	2.15	-44.05	-13.00	31.05	V
2510.00	-38.78	4.63	10.18	2.15	-35.38	-13.00	22.38	H
3346.02	-61.07	5.31	10.49	2.15	-58.04	-13.00	45.04	H
4183.02	-55.77	6.17	10.47	2.15	-53.62	-13.00	40.62	H
6694.01	-44.18	7.96	10.31	2.15	-43.98	-13.00	30.98	V
7529.01	-49.44	8.27	10.30	2.15	-49.56	-13.00	36.56	H

**LTE Band 5, 1.4MHz, QPSK, Channel 20643**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1697.01	-48.32	3.60	9.59	2.15	-44.48	-13.00	31.48	V
2545.00	-41.35	4.66	10.11	2.15	-38.05	-13.00	25.05	H
3394.02	-63.06	5.36	10.50	2.15	-60.07	-13.00	47.07	H
4242.02	-56.97	6.25	10.58	2.15	-54.79	-13.00	41.79	H
5104.01	-60.63	6.78	11.51	2.15	-58.05	-13.00	45.05	H
5941.01	-57.71	7.47	10.50	2.15	-56.83	-13.00	43.83	V

**LTE Band 7, 5MHz, QPSK, Channel 20775**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5006.02	-57.05	6.59	11.31	-52.33	-25.00	27.33	H
7510.01	-37.98	8.35	10.30	-36.03	-25.00	11.03	H
10014.01	-44.98	9.22	11.91	-42.29	-25.00	17.29	H
12514.01	-50.96	10.21	13.30	-47.87	-25.00	22.87	H
15013.00	-53.36	11.23	14.51	-50.08	-25.00	25.08	V
17521.00	-45.19	12.80	13.06	-44.93	-25.00	19.93	H

**LTE Band 7, 5MHz, QPSK, Channel 21100**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5070.02	-56.84	6.69	11.44	-52.09	-25.00	27.09	H
7606.01	-40.42	8.00	10.41	-38.01	-25.00	13.01	V
10144.01	-47.87	9.39	12.00	-45.26	-25.00	20.26	H
12655.01	-53.17	10.37	13.19	-50.35	-25.00	25.35	V
15192.00	-54.19	11.40	14.88	-50.71	-25.00	25.71	V
17753.00	-47.53	12.47	13.55	-46.45	-25.00	21.45	H

**LTE Band 7, 5MHz, QPSK, Channel 21425**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5135.02	-52.08	6.86	11.57	-47.37	-25.00	22.37	H
7703.01	-39.85	8.42	10.70	-37.57	-25.00	12.57	H
10284.01	-53.65	9.59	12.00	-51.24	-25.00	26.24	H
12847.01	-52.79	10.64	12.85	-50.58	-25.00	25.58	H
15393.00	-54.09	11.38	15.09	-50.38	-25.00	25.38	H
17991.00	-45.99	12.90	13.40	-45.49	-25.00	20.49	V

**LTE Band 17, 1.4MHz, QPSK, Channel 23755**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1413.01	-49.66	3.25	7.83	2.15	-47.23	-13.00	34.23	V
2120.00	-40.43	4.21	8.18	2.15	-38.61	-13.00	25.61	V
2825.00	-48.76	4.95	10.60	2.15	-45.26	-13.00	32.26	H
3534.02	-58.90	5.66	10.60	2.15	-56.11	-13.00	43.11	H
4240.02	-58.58	6.25	10.58	2.15	-56.40	-13.00	43.40	H
4947.01	-59.64	6.69	11.21	2.15	-57.27	-13.00	44.27	H

**LTE Band 17, 1.4MHz, QPSK, Channel 23790**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1420.01	-48.12	3.26	7.84	2.15	-45.69	-13.00	32.69	V
2131.00	-39.91	4.22	8.33	2.15	-37.95	-13.00	24.95	V
2851.00	-49.59	4.96	10.70	2.15	-46.00	-13.00	33.00	H
3551.02	-61.12	5.83	10.60	2.15	-58.50	-13.00	45.50	V
4261.02	-59.57	6.23	10.64	2.15	-57.31	-13.00	44.31	H
4971.01	-59.73	6.65	11.24	2.15	-57.29	-13.00	44.29	V

**LTE Band 17, 1.4MHz, QPSK, Channel 23825**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1427.01	-48.27	3.27	7.85	2.15	-45.84	-13.00	32.84	V
2141.00	-44.40	4.24	8.47	2.15	-42.32	-13.00	29.32	V
2849.00	-48.76	4.96	10.70	2.15	-45.17	-13.00	32.17	H
3568.02	-55.01	6.01	10.60	2.15	-52.57	-13.00	39.57	H
4283.02	-58.63	6.21	10.73	2.15	-56.26	-13.00	43.26	H
4996.01	-55.28	6.61	11.29	2.15	-52.75	-13.00	39.75	H

**LTE Band 41, 5MHz, QPSK, Channel 39675**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
4997.02	-57.71	6.61	11.29	-53.03	-25.00	28.03	H
7496.01	-40.14	8.38	10.29	-38.23	-25.00	13.23	V
9991.01	-54.87	9.17	11.92	-52.12	-25.00	27.12	H
12497.01	-52.84	10.18	13.30	-49.72	-25.00	24.72	V
14993.00	-53.66	11.21	14.47	-50.40	-25.00	25.40	H
17490.00	-45.18	12.70	13.04	-44.84	-25.00	19.84	V

**LTE Band 41, 5MHz, QPSK, Channel 40620**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5187.02	-56.69	6.94	11.67	-51.96	-25.00	26.96	H
7781.01	-39.72	8.31	10.82	-37.21	-25.00	12.21	H
10351.01	-53.25	9.72	12.05	-50.92	-25.00	25.92	V
12968.01	-52.62	10.48	12.73	-50.37	-25.00	25.37	V
15548.00	-54.55	11.51	15.35	-50.71	-25.00	25.71	V
16866.00	-51.39	12.04	14.07	-49.36	-25.00	24.36	V

**LTE Band 41, 5MHz, QPSK, Channel 41565**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5376.02	-56.18	6.88	11.45	-51.61	-25.00	26.61	H
8064.01	-50.32	8.32	11.27	-47.37	-25.00	22.37	H
10754.01	-46.99	9.44	12.15	-44.28	-25.00	19.28	V
13444.01	-46.86	10.60	12.44	-45.02	-25.00	20.02	V
16101.00	-53.87	11.85	15.40	-50.32	-25.00	25.32	V
17465.00	-45.51	12.65	13.14	-45.02	-25.00	20.02	V

**LTE Band 66, 1.4MHz, QPSK, Channel 131979**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3422.02	-70.75	5.38	10.46	-65.67	-13.00	52.67	H
5134.02	-60.13	6.86	11.57	-55.42	-13.00	42.42	V
6845.01	-61.33	7.83	10.40	-58.76	-13.00	45.76	V
8556.01	-48.24	8.57	11.31	-45.50	-13.00	32.50	H
10265.01	-63.55	9.52	12.00	-61.07	-13.00	48.07	H
11941.01	-63.77	10.33	13.14	-60.96	-13.00	47.96	H

**LTE Band 66, 1.4MHz, QPSK, Channel 132322**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3490.02	-71.47	5.50	10.56	-66.41	-13.00	53.41	H
5237.02	-57.14	7.00	11.70	-52.44	-13.00	39.44	V
6982.01	-60.53	8.16	10.40	-58.29	-13.00	45.29	H
8727.01	-51.48	8.44	11.30	-48.62	-13.00	35.62	H
10470.01	-62.98	9.70	12.17	-60.51	-13.00	47.51	H
12172.01	-63.64	10.14	13.32	-60.46	-13.00	47.46	H

**LTE Band 66, 1.4MHz, QPSK, Channel 132665**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3559.02	-68.43	5.92	10.60	-63.75	-13.00	50.75	H
5340.02	-56.52	6.96	11.52	-51.96	-13.00	38.96	V
7119.01	-55.11	8.16	10.50	-52.77	-13.00	39.77	H
8898.01	-48.78	8.84	11.50	-46.12	-13.00	33.12	H
10676.01	-61.05	9.30	12.12	-58.23	-13.00	45.23	H
12500.01	-63.70	10.17	13.30	-60.57	-13.00	47.57	V

Sample: 3559.02MHz

Power (EIRP) = P<sub>Mea</sub> - P<sub>pl</sub> + G<sub>a</sub>

Power (-63.75dBm) = P<sub>Mea</sub> (-68.43dBm) - P<sub>pl</sub> (5.92dB) + G<sub>a</sub>(10.60dBi)

Note: Expanded measurement uncertainty

Frequency range	Expanded measurement uncertainty
30MHz-1GHz	5.76dB, k=2
1GHz-18GHz	4.69dB, k=2
18GHz-40GHz	3.37dB, 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 <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.85	1850.833	1909.199		
50				-1.65	0.0009
40				-3.91	0.0021
30				-1.04	0.0006
10				-1.42	0.0008
0				-6.49	0.0035
-10				-3.23	0.0017
-20				-5.71	0.0030
-30				-3.42	0.0018

##### Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	1850.833	1909.199	-1.54	0.0008
4.4				-2.13	0.0011

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

##### Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.85	824.417	848.583		
50				-4.09	0.0049
40				2.73	0.0033
30				-1.20	0.0014
10				1.34	0.0016
0				-0.79	0.0009
-10				-4.09	0.0049
-20				-0.67	0.0008
-30				-3.92	0.0047

##### Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	824.417	848.583	-1.76	0.0021
4.4				0.13	0.0002



**LTE Band 7, 20MHz bandwidth QPSK (worst case of all bandwidths)**
**Frequency Error vs Temperature**

Temperature(°C)	Voltage(V)	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.85	2500.833	2569.199		
50				-13.66	0.0054
40				-4.84	0.0019
30				-8.94	0.0035
10				-0.41	0.0002
0				-0.99	0.0004
-10				0.51	0.0002
-20				-2.20	0.0009
-30				0.70	0.0003

**Frequency Error vs Voltage**

Voltage(V)	Temperature(°C)	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	2500.833	2569.199	-5.87	0.0023
4.4				-1.76	0.0007

**LTE Band 17, 10MHz bandwidth QPSK (worst case of all bandwidths)**
**Frequency Error vs Temperature**

Temperature(°C)	Voltage(V)	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.85	704.481	715.519		
50				1.44	0.0020
40				-0.76	0.0011
30				-0.26	0.0004
10				0.86	0.0012
0				-1.42	0.0020
-10				2.72	0.0038
-20				-0.70	0.0010
-30				0.93	0.0013

**Frequency Error vs Voltage**

Voltage(V)	Temperature(°C)	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	704.481	715.519	1.30	0.0018
4.4				-7.21	0.0102

**LTE Band 41, 20MHz bandwidth QPSK (worst case of all bandwidths)**
**Frequency Error vs Temperature**

Temperature(°C)	Voltage(V)	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.85	2496.449	2689.487		
50				1.42	0.0005
40				7.30	0.0028
30				-0.06	0.0000
10				1.82	0.0007
0				2.03	0.0008
-10				3.68	0.0014
-20				0.19	0.0001
-30				4.09	0.0016

**Frequency Error vs Voltage**

Voltage(V)	Temperature(°C)	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	2496.449	2689.487	3.35	0.0013
4.4				2.39	0.0009

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

Temperature(°C)	Voltage(V)	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.85	1710.833	1779.199		
50				4.62	0.0026
40				1.99	0.0011
30				-2.56	0.0015
10				1.27	0.0007
0				-3.22	0.0018
-10				2.25	0.0013
-20				1.06	0.0006
-30				2.19	0.0013

**Frequency Error vs Voltage**

Voltage(V)	Temperature(°C)	F <sub>L</sub> (MHz)	F <sub>H</sub> (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	1710.833	1779.199	2.05	0.0012
4.4				3.00	0.0017

Note: Expanded measurement uncertainty is U = 0.01 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.

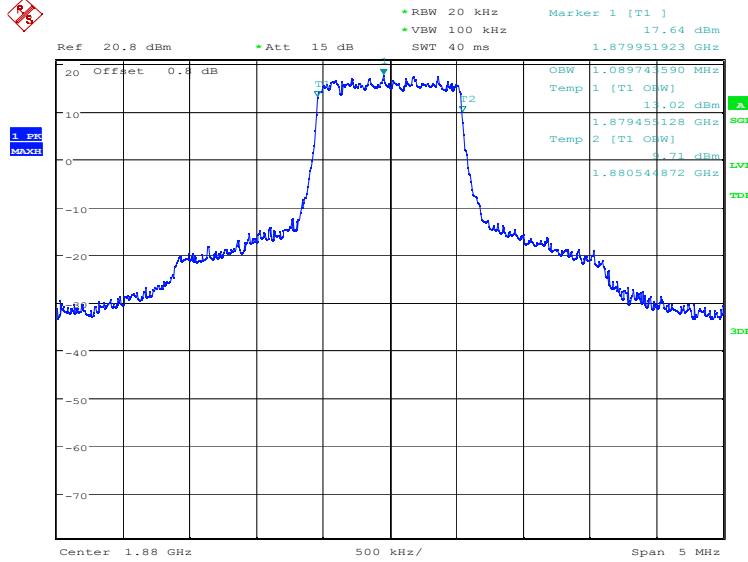
The measurement method is from ANSI C63.26:

- 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%)

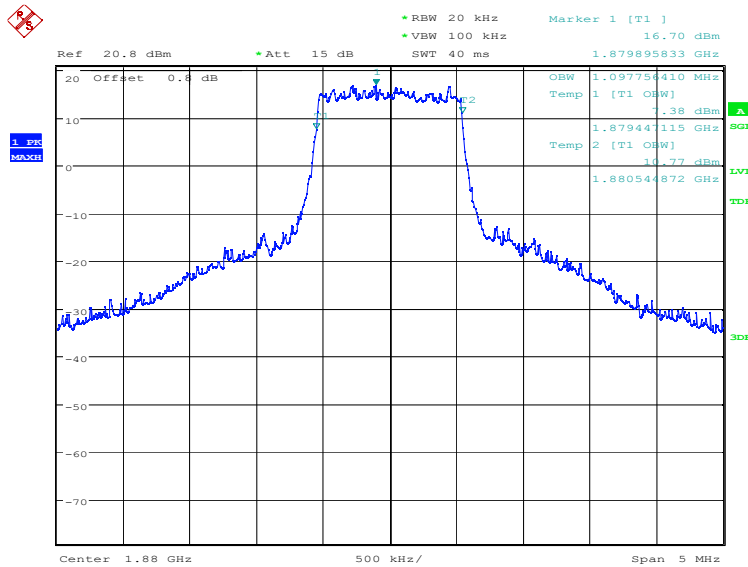
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	1089.74	1097.76

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



Date: 14.APR.2023 15:39:25

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

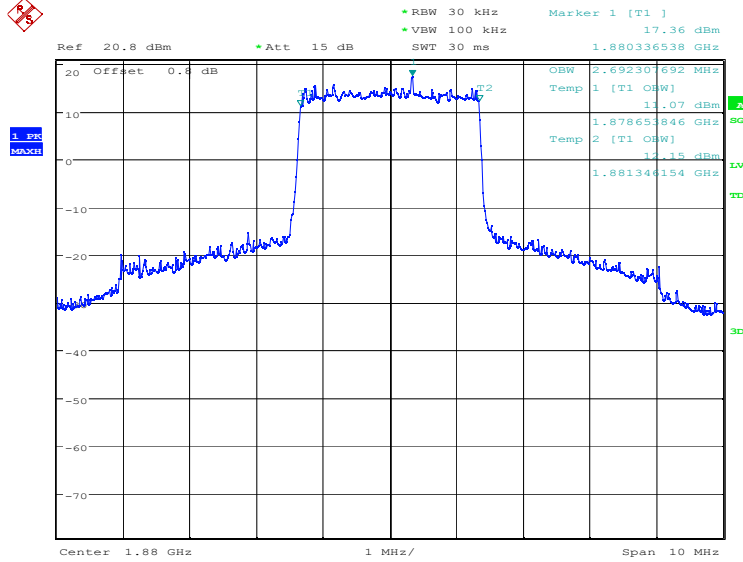


Date: 14.APR.2023 15:40:06

**LTE band 2, 3MHz (99%)**

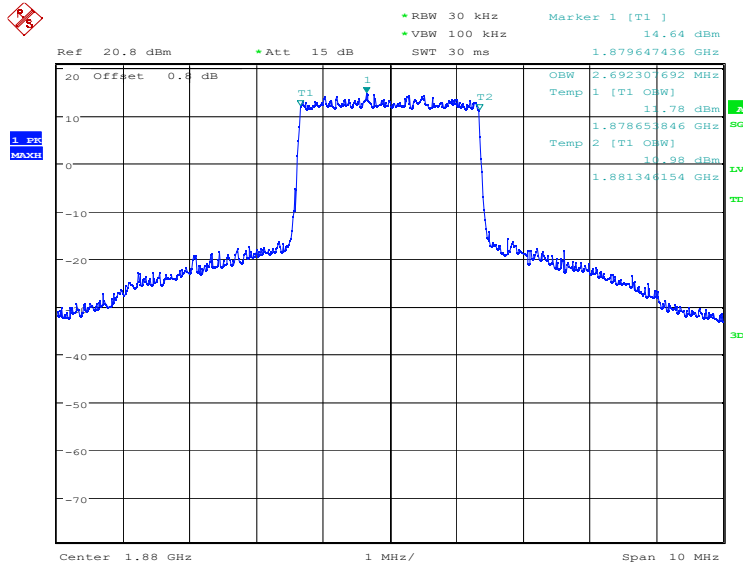
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	2692.31	2692.31

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



Date: 14.APR.2023 15:40:47

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

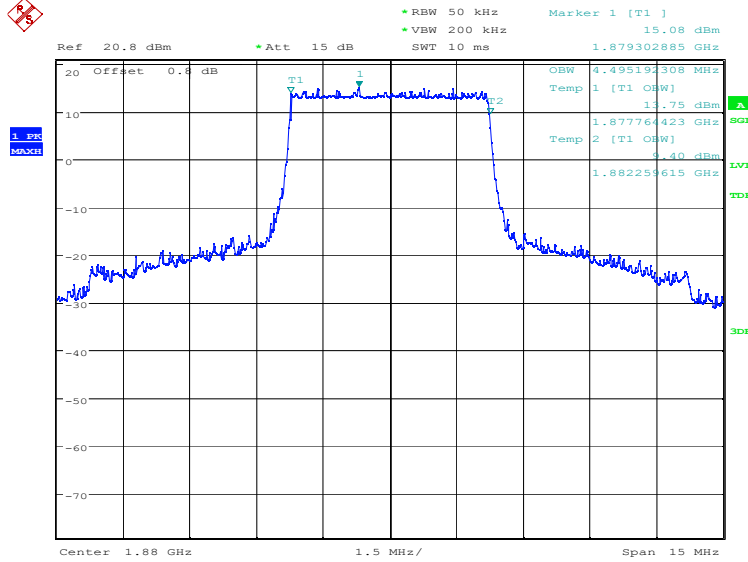


Date: 14.APR.2023 15:41:27

**LTE band 2, 5MHz (99%)**

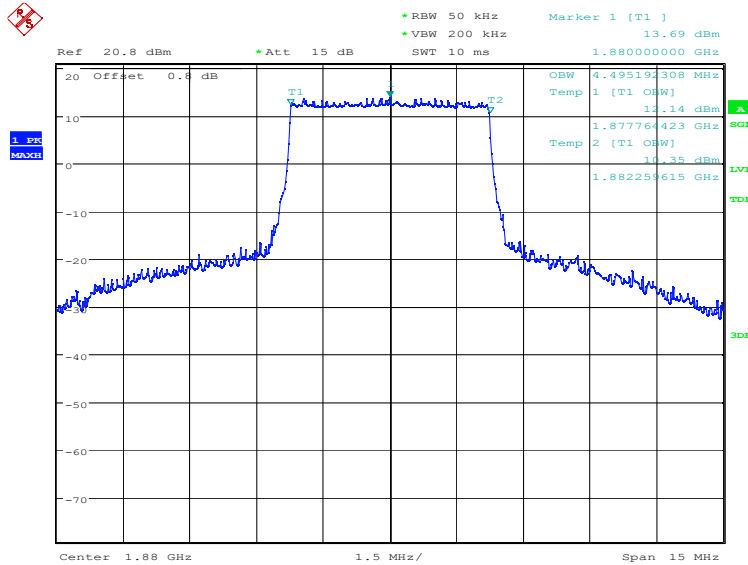
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	4495.19	4495.19

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



Date: 14.APR.2023 15:42:09

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

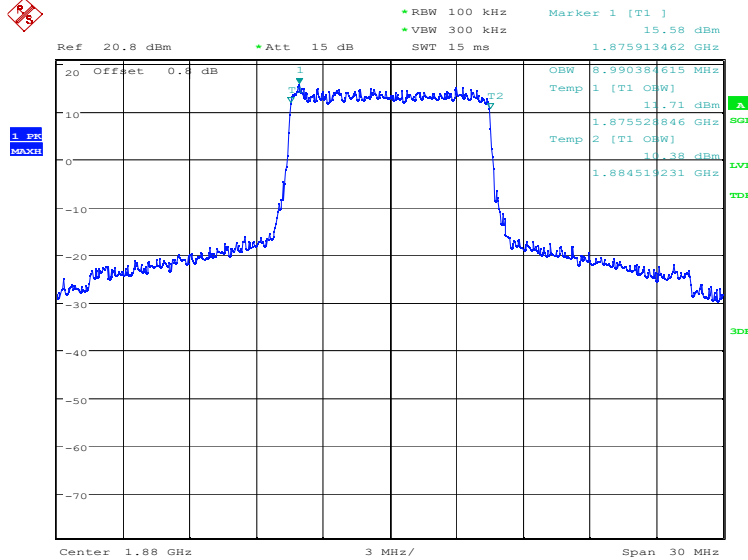


Date: 14.APR.2023 15:42:49

**LTE band 2, 10MHz (99%)**

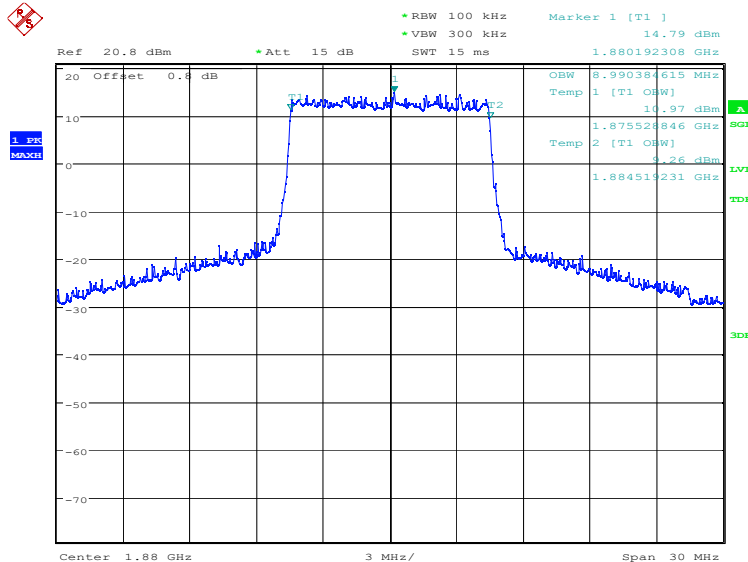
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	8990.38	8990.38

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



Date: 14.APR.2023 15:43:31

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

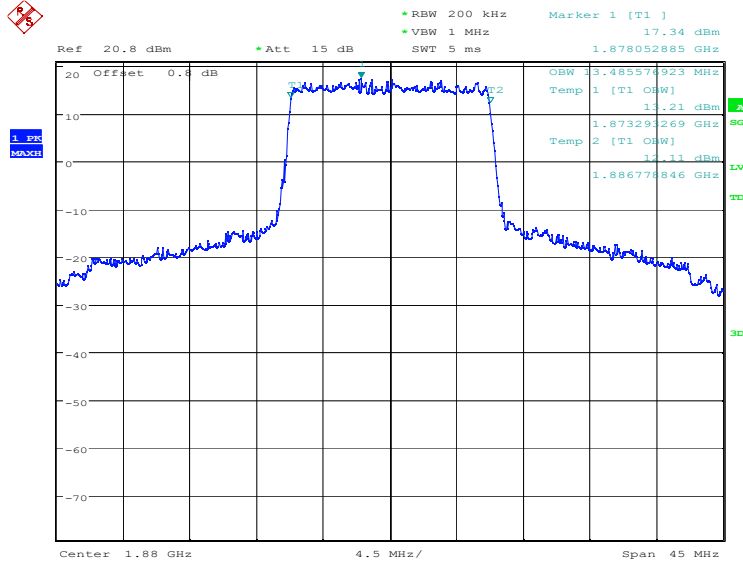


Date: 14.APR.2023 15:44:11

**LTE band 2, 15MHz (99%)**

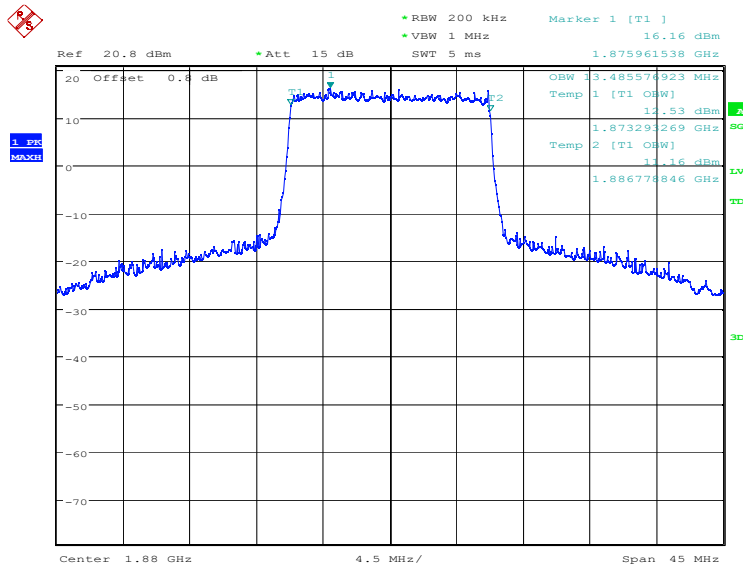
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	13485.58	13485.58

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



Date: 14.APR.2023 15:44:53

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



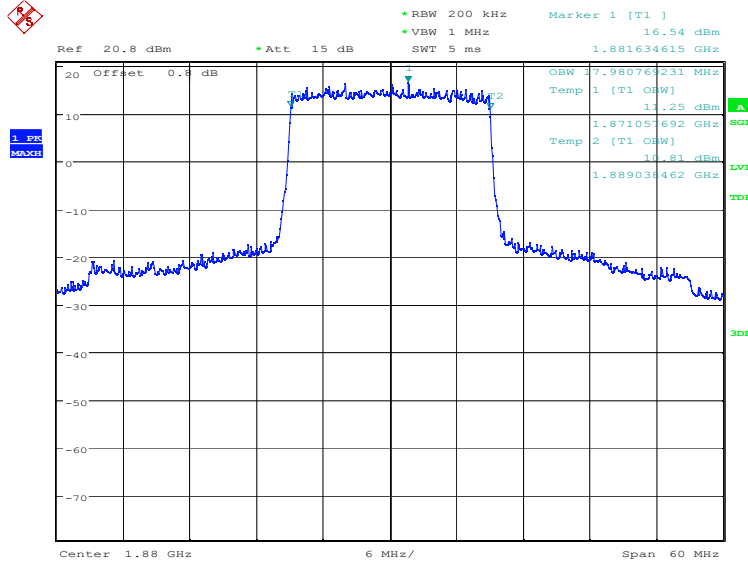
Date: 14.APR.2023 15:45:33



**LTE band 2, 20MHz (99%)**

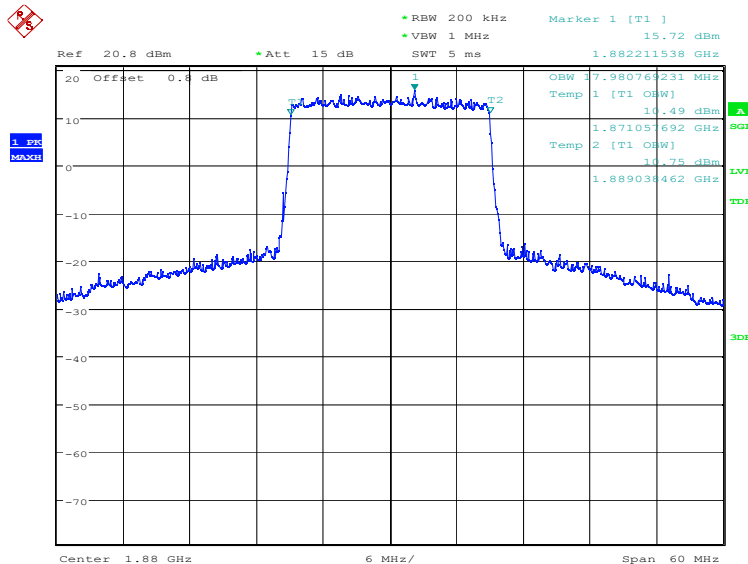
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	17980.77	17980.77

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



Date: 14.APR.2023 15:46:15

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

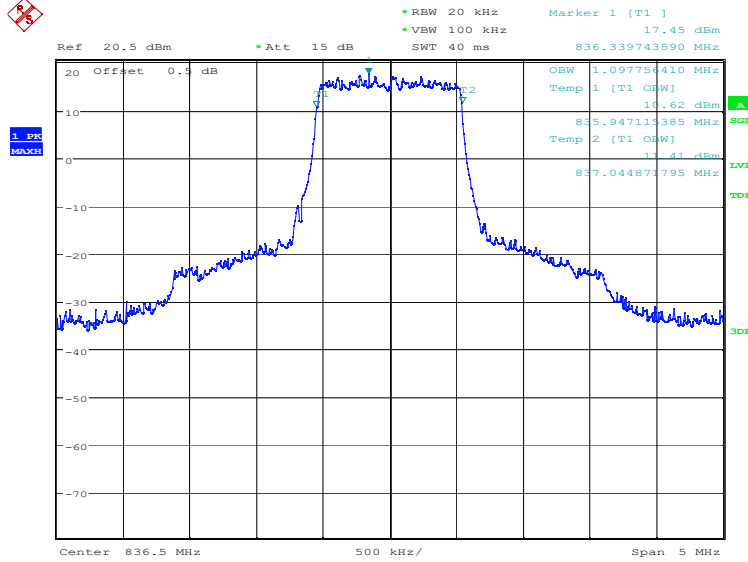


Date: 14.APR.2023 15:46:55

**LTE band 5, 1.4MHz (99%)**

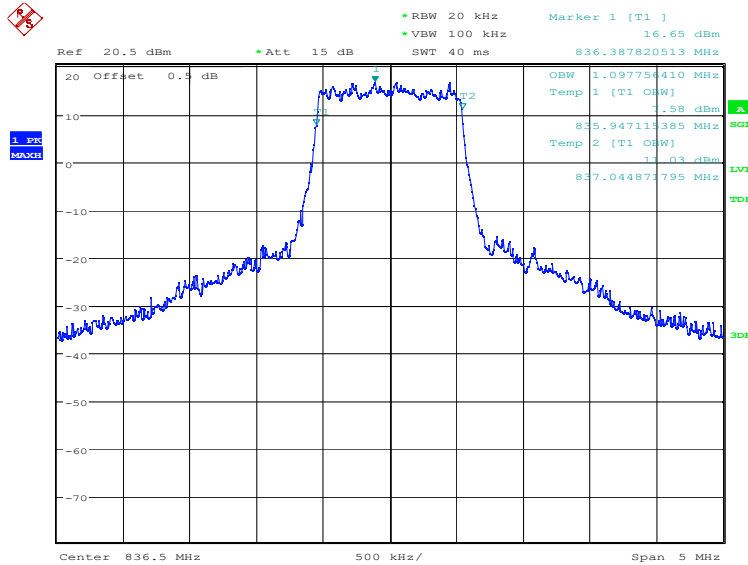
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	1097.76	1097.76

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



Date: 14.APR.2023 15:47:38

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

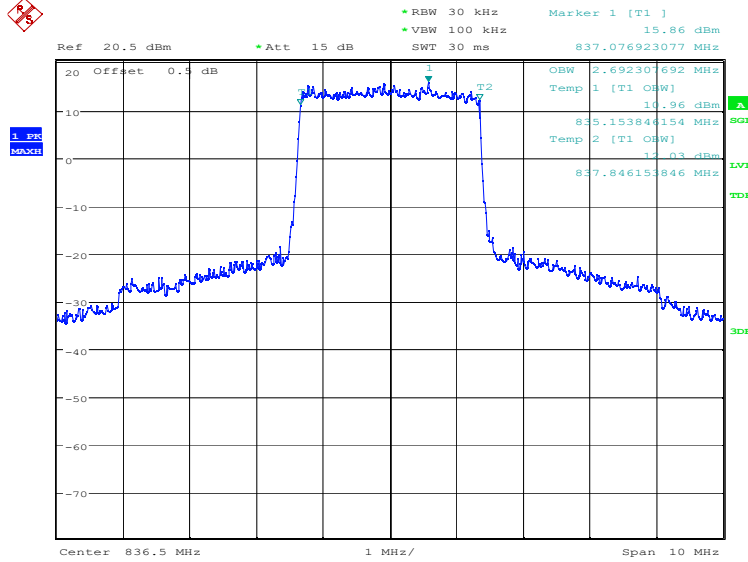


Date: 14.APR.2023 15:48:18

**LTE band 5, 3MHz (99%)**

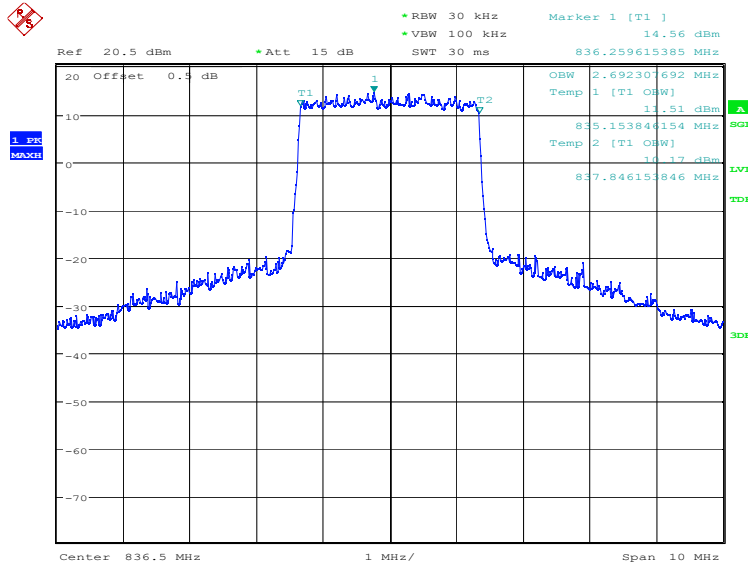
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	2692.31	2692.31

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



Date: 14.APR.2023 15:49:00

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

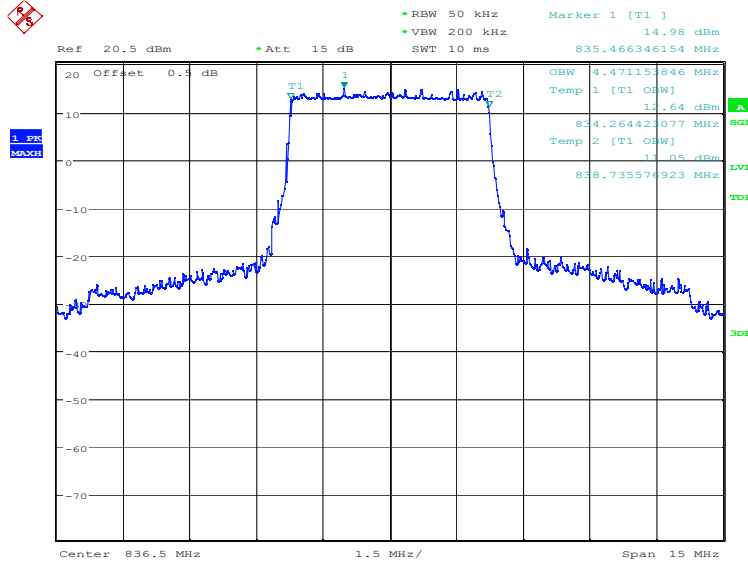


Date: 14.APR.2023 15:49:40

### LTE band 5, 5MHz (99%)

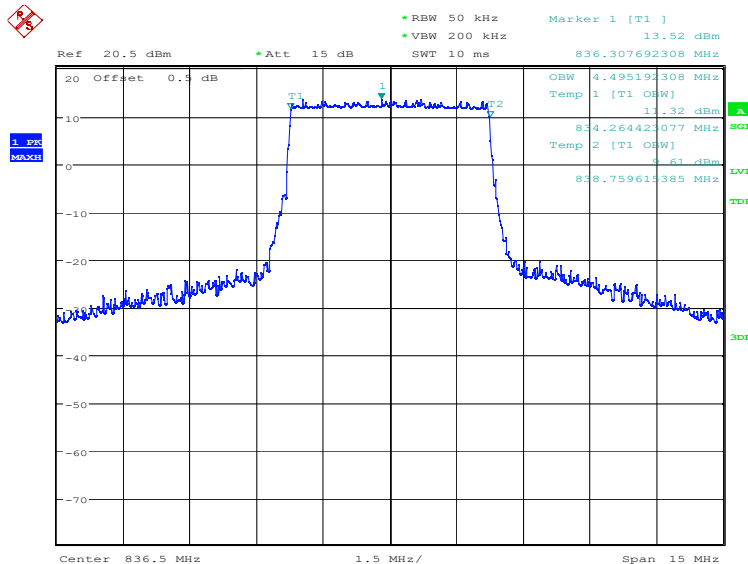
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	4471.15	4495.19

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



Date: 14.APR.2023 15:50:22

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

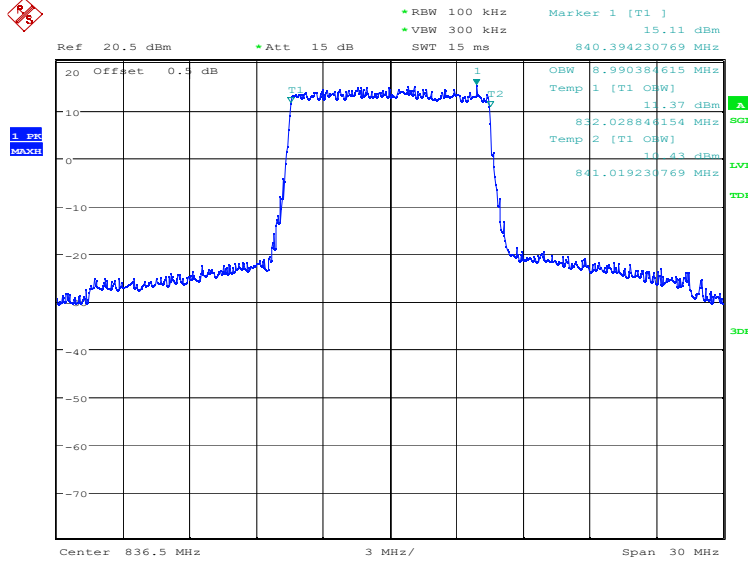


Date: 14.APR.2023 15:51:02

**LTE band 5, 10MHz (99%)**

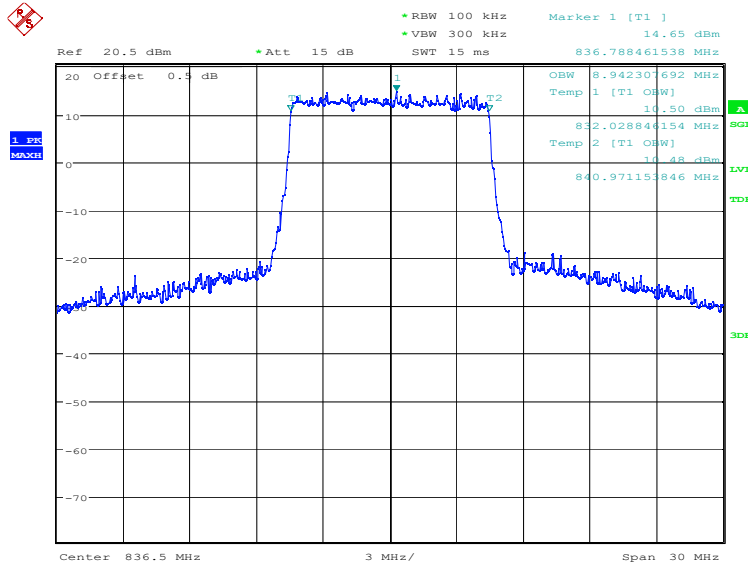
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	8990.38	8942.31

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



Date: 14.APR.2023 15:51:44

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

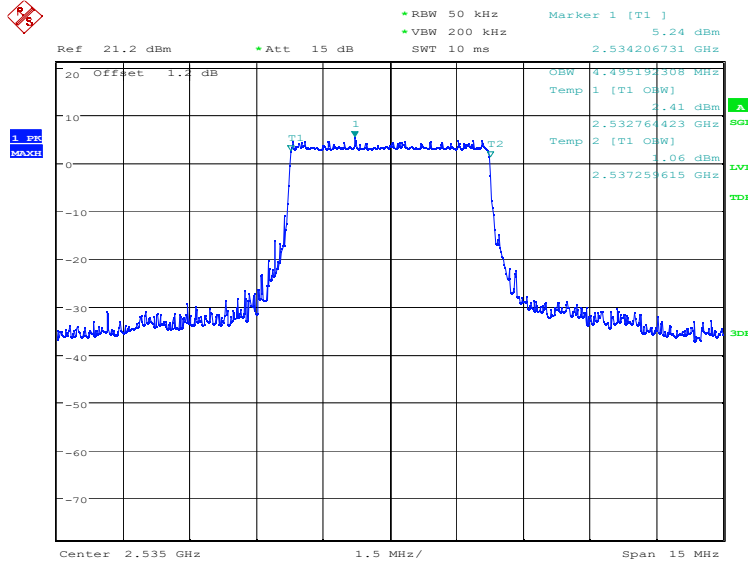


Date: 14.APR.2023 15:52:24

**LTE band 7, 5MHz (99%)**

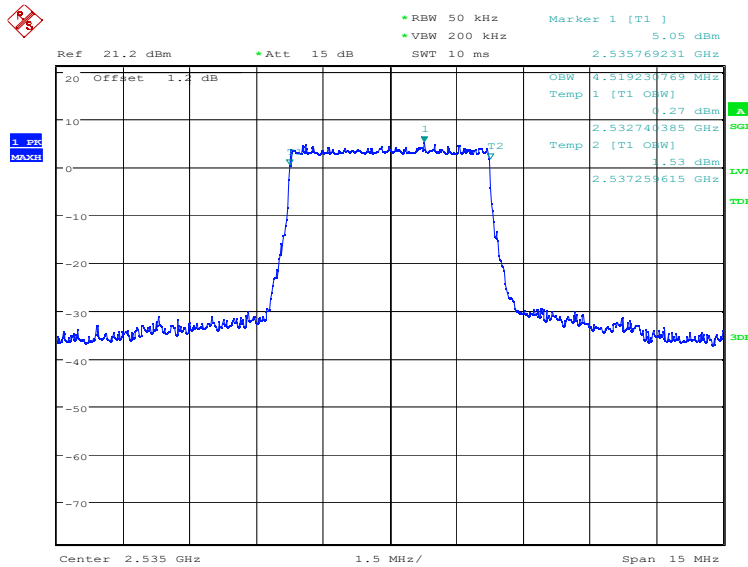
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2535.0	QPSK	16QAM
	4495.19	4519.23

**LTE band 7, 5MHz Bandwidth, QPSK (99% BW)**



Date: 14.APR.2023 15:53:07

**LTE band 7, 5MHz Bandwidth, 16QAM (99% BW)**

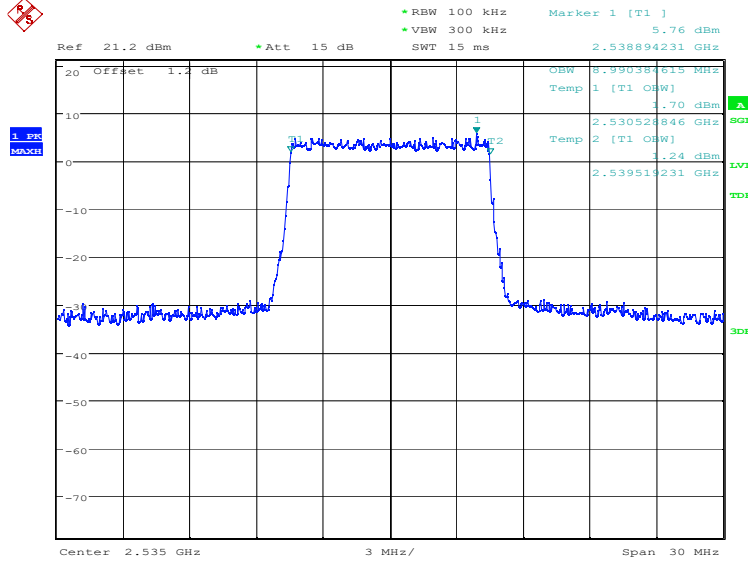


Date: 14.APR.2023 15:53:48

**LTE band 7, 10MHz (99%)**

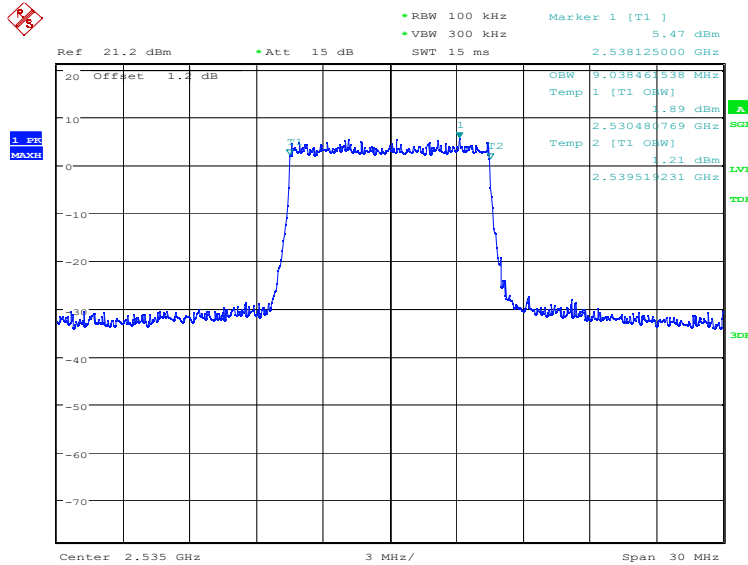
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2535.0	QPSK	16QAM
	8990.38	9038.46

**LTE band 7, 10MHz Bandwidth, QPSK (99% BW)**



Date: 14.APR.2023 15:54:29

**LTE band 7, 10MHz Bandwidth, 16QAM (99% BW)**

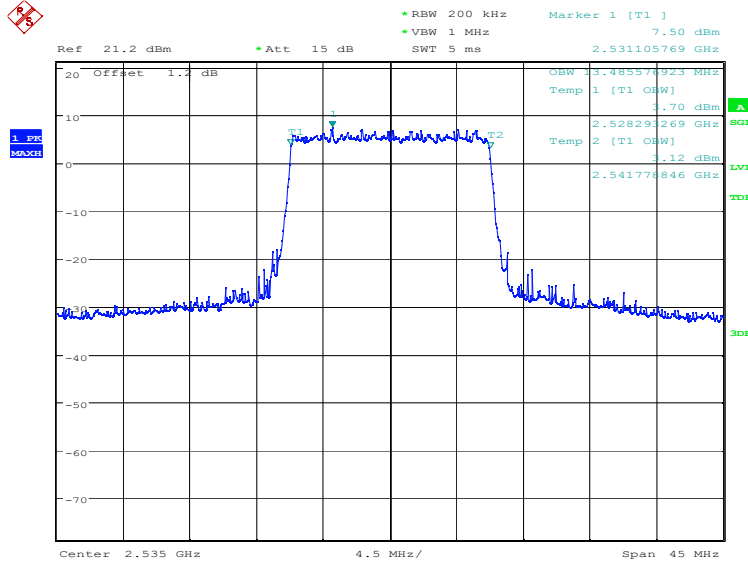


Date: 14.APR.2023 15:55:10

**LTE band 7, 15MHz (99%)**

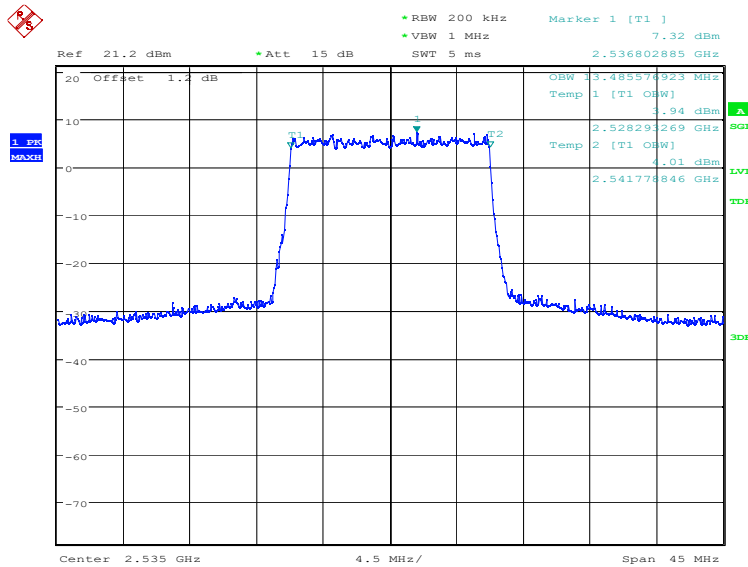
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2535.0	QPSK	16QAM
	13485.58	13485.58

**LTE band 7, 15MHz Bandwidth, QPSK (99% BW)**



Date: 14.APR.2023 15:55:51

**LTE band 7, 15MHz Bandwidth, 16QAM (99% BW)**



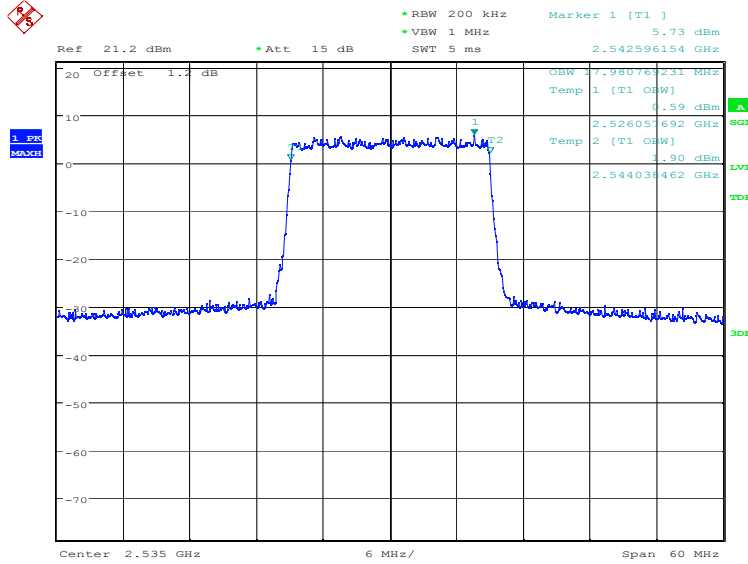
Date: 14.APR.2023 15:56:32



**LTE band 7, 20MHz (99%)**

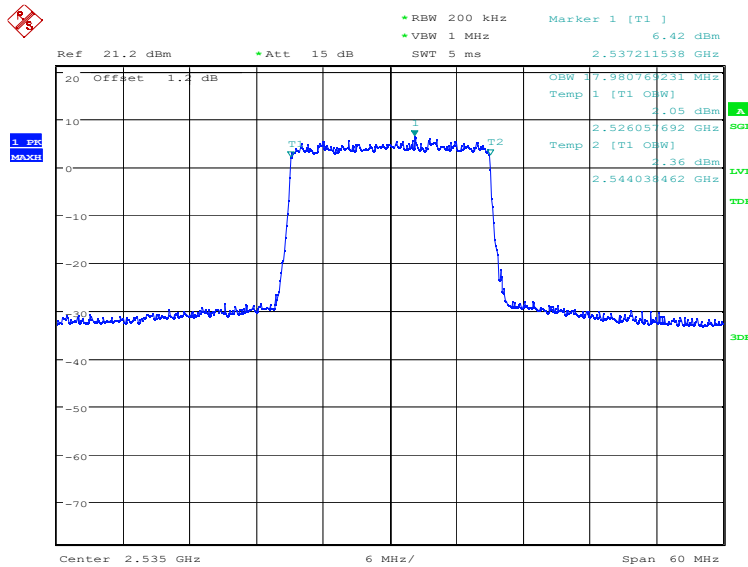
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2535.0	QPSK	16QAM
	17980.77	17980.77

**LTE band 7, 20MHz Bandwidth, QPSK (99% BW)**



Date: 14.APR.2023 15:57:14

**LTE band 7, 20MHz Bandwidth, 16QAM (99% BW)**

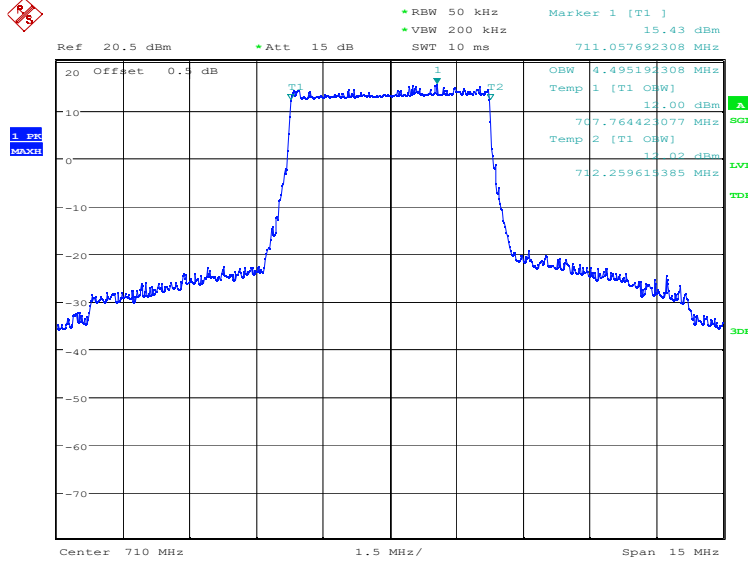


Date: 14.APR.2023 15:57:54

**LTE band 17, 5MHz(99% BW)**

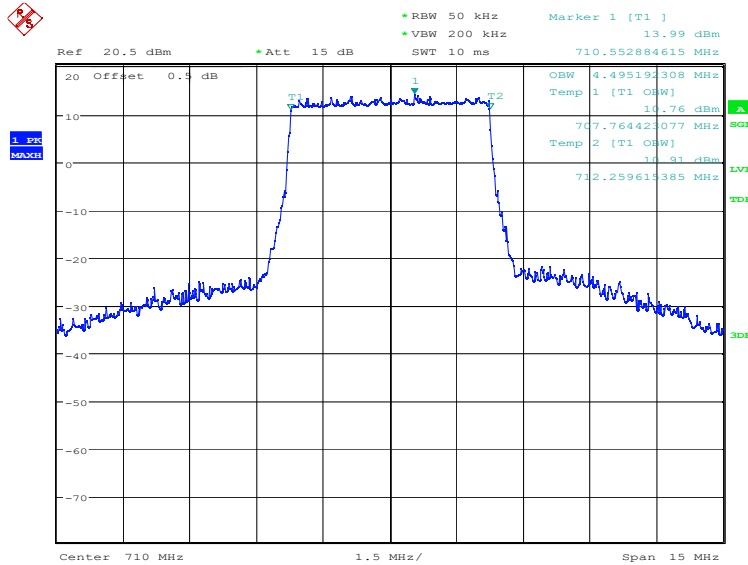
Frequency(MHz)	Occupied Bandwidth (99% BW) (kHz)	
	710.0	QPSK
4495.19		4495.19

**LTE band 17, 5MHz Bandwidth, QPSK (99% BW)**



Date: 14.APR.2023 15:59:32

**LTE band 17, 5MHz Bandwidth,16QAM (99% BW)**

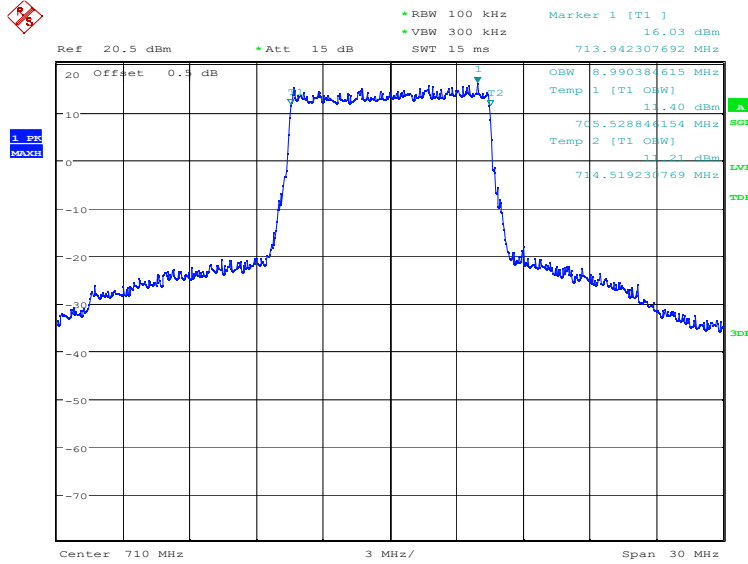


Date: 14.APR.2023 16:00:12

**LTE band 17, 10MHz(99% BW)**

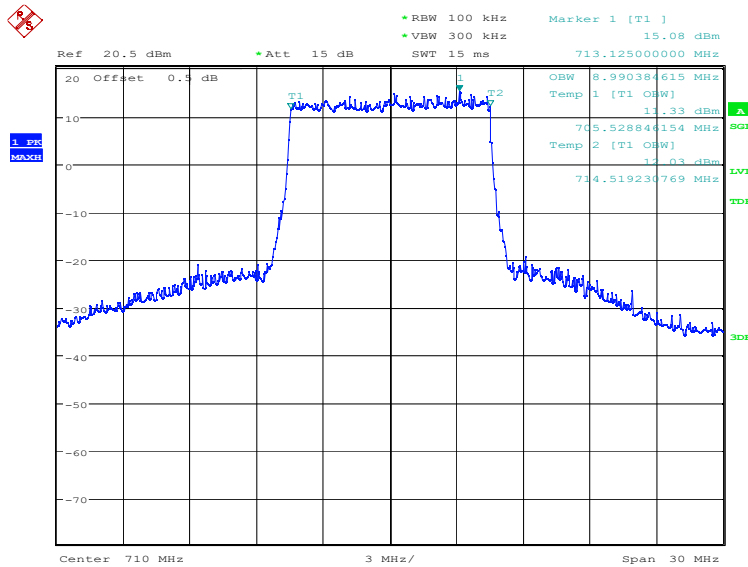
Frequency(MHz)	Occupied Bandwidth (99% BW) (kHz)	
	710.0	QPSK
8990.38		8990.38

**LTE band 17, 10MHz Bandwidth, QPSK (99% BW)**



Date: 14.APR.2023 16:00:54

**LTE band 17, 10MHz Bandwidth,16QAM (99% BW)**

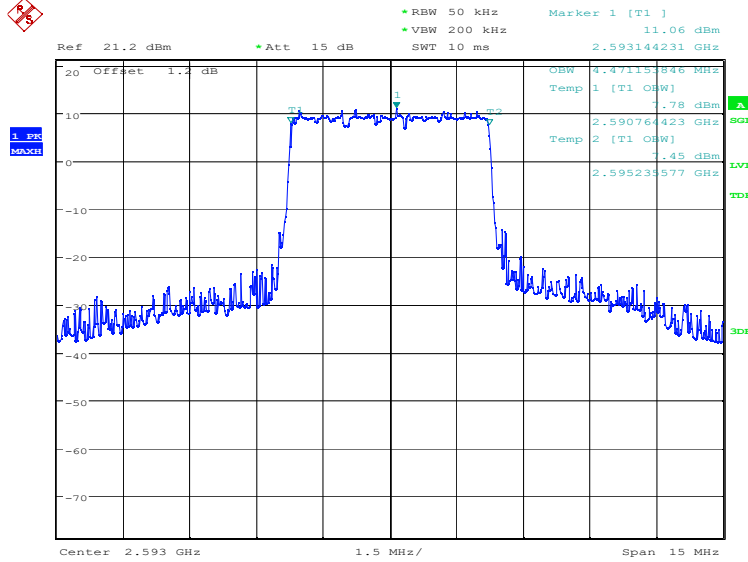


Date: 14.APR.2023 16:01:34

**LTE band 41, 5MHz (99%)**

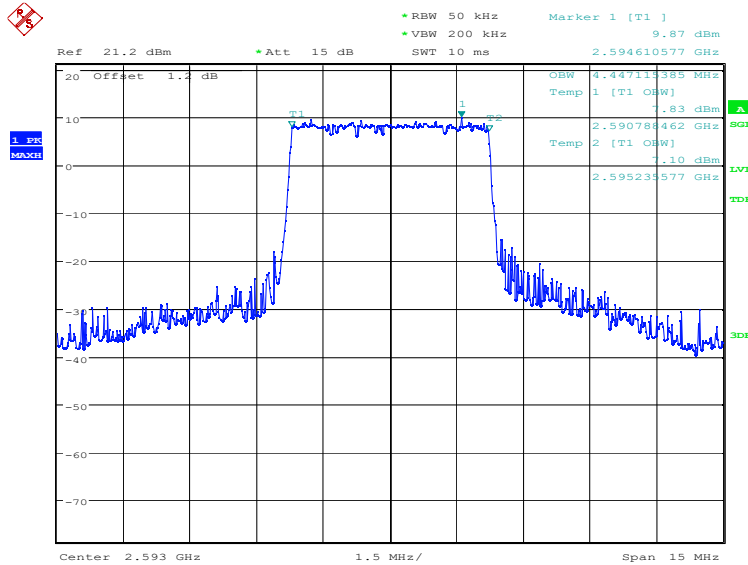
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2593.0	QPSK	16QAM
	4471.15	4447.12

**LTE band 41, 5MHz Bandwidth, QPSK (99% BW)**



Date: 14.APR.2023 16:11:15

**LTE band 41, 5MHz Bandwidth,16QAM (99% BW)**

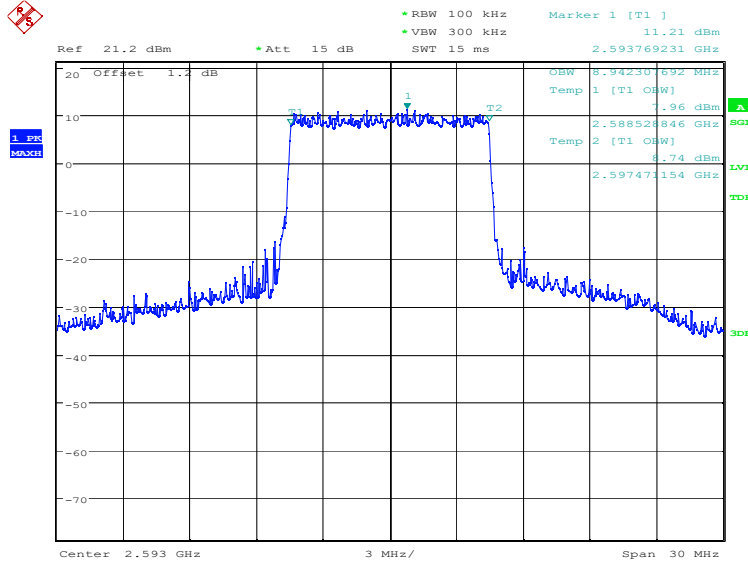


Date: 14.APR.2023 16:11:55

**LTE band 41, 10MHz (99%)**

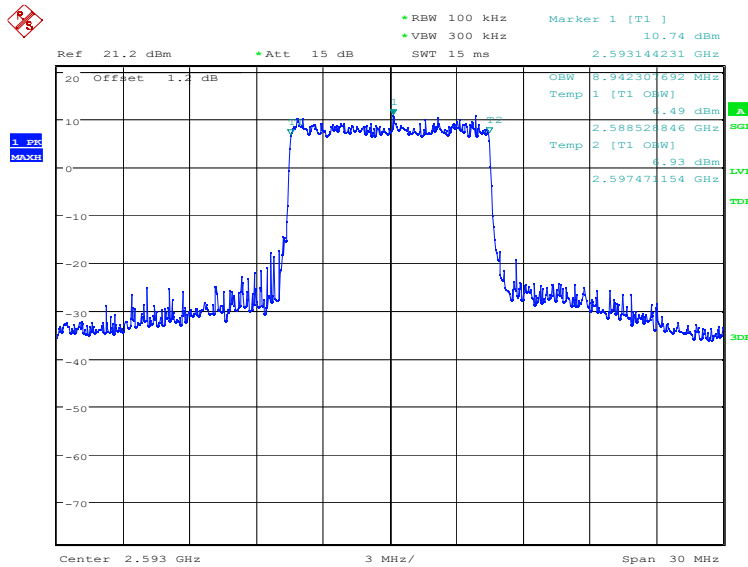
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2593.0	QPSK	16QAM
	8942.31	8942.31

**LTE band 41, 10MHz Bandwidth, QPSK (99% BW)**



Date: 14.APR.2023 16:12:37

**LTE band 41, 10MHz Bandwidth,16QAM (99% BW)**

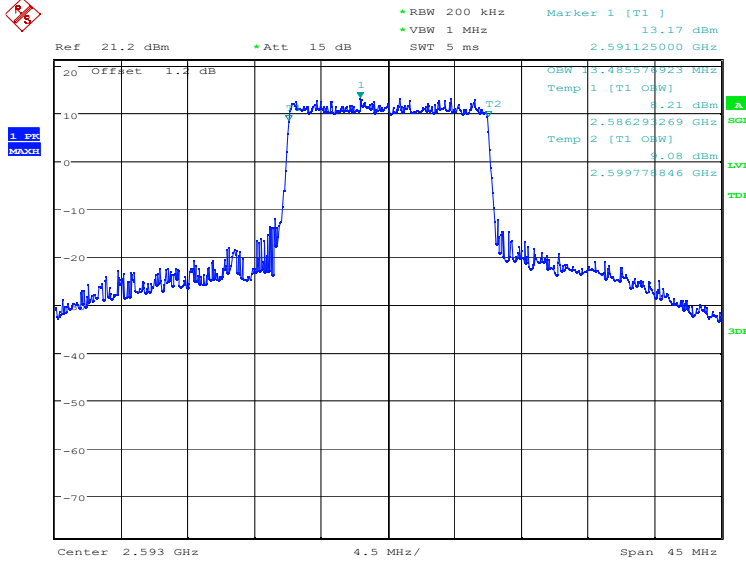


Date: 14.APR.2023 16:13:18

**LTE band 41, 15MHz (99%)**

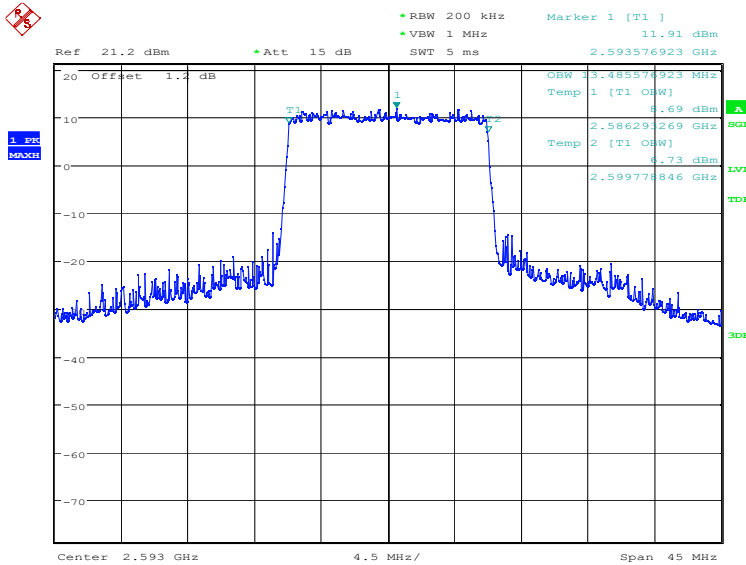
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2593.0	QPSK	16QAM
	13485.58	13485.58

**LTE band 41, 15MHz Bandwidth, QPSK (99% BW)**



Date: 14.APR.2023 16:14:00

**LTE band 41, 15MHz Bandwidth,16QAM (99% BW)**

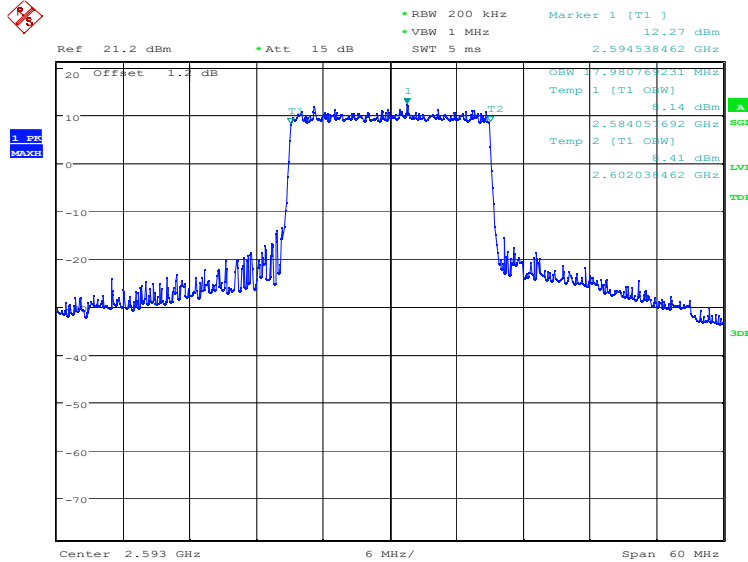


Date: 14.APR.2023 16:14:40

**LTE band 41, 20MHz (99%)**

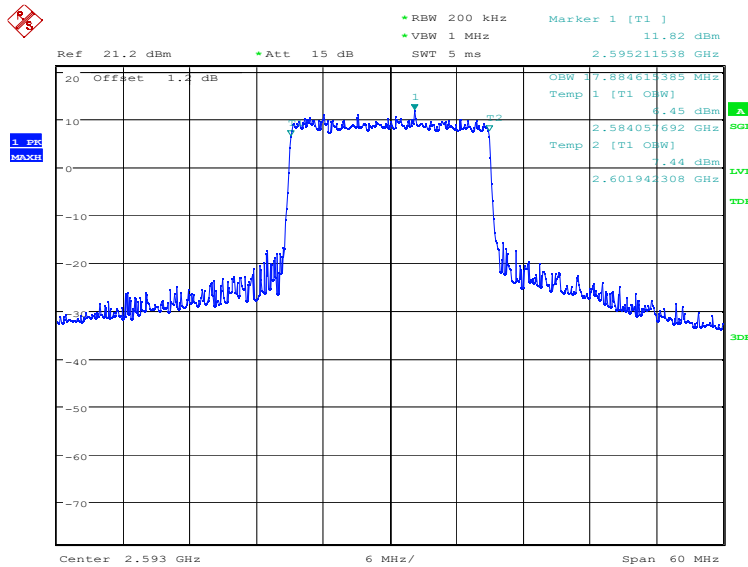
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2593.0	QPSK	16QAM
	17980.77	17884.62

**LTE band 41, 20MHz Bandwidth, QPSK (99% BW)**



Date: 14.APR.2023 16:15:23

**LTE band 41, 20MHz Bandwidth,16QAM (99% BW)**

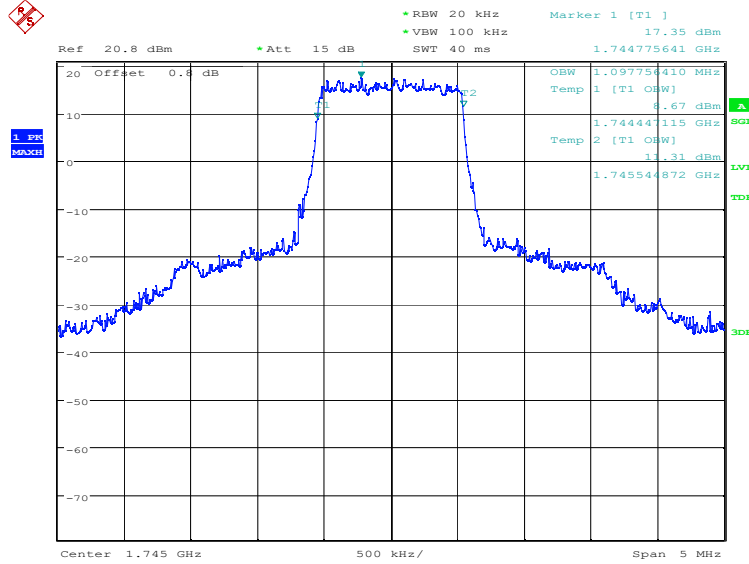


Date: 14.APR.2023 16:16:03

**LTE band 66, 1.4MHz (99%)**

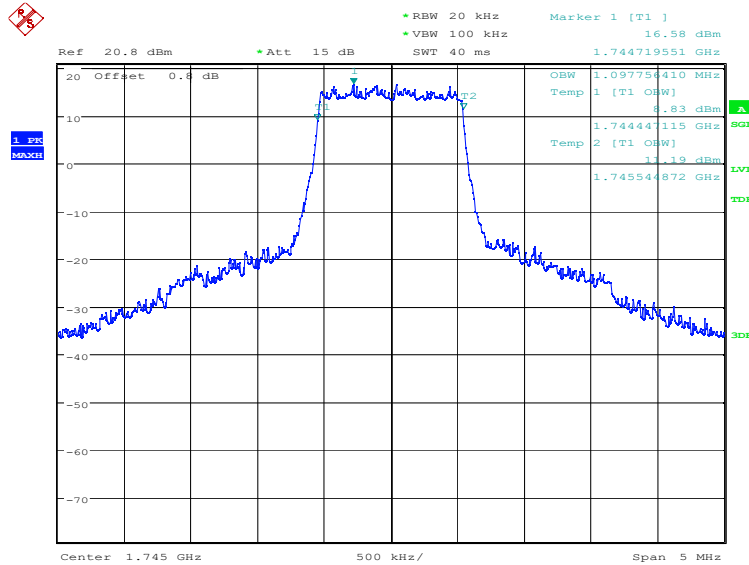
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1745.0	QPSK	16QAM
	1097.76	1097.76

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



Date: 14.APR.2023 16:02:17

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



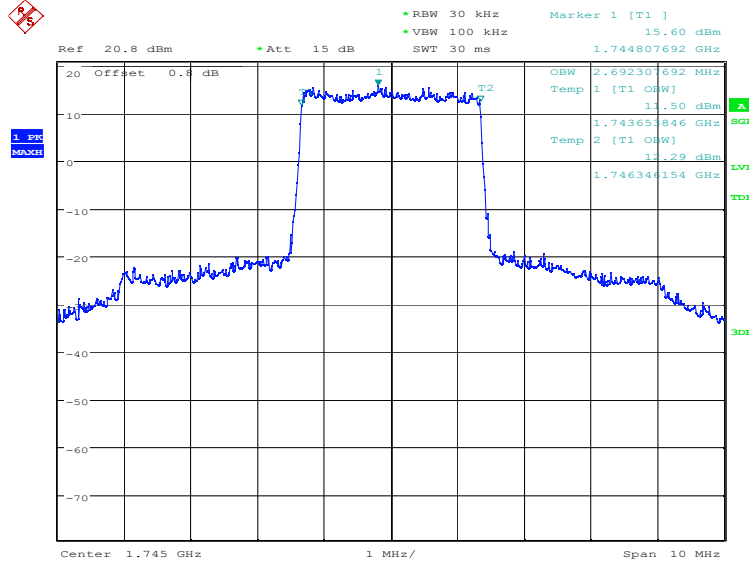
Date: 14.APR.2023 16:02:58



**LTE band 66, 3MHz (99%)**

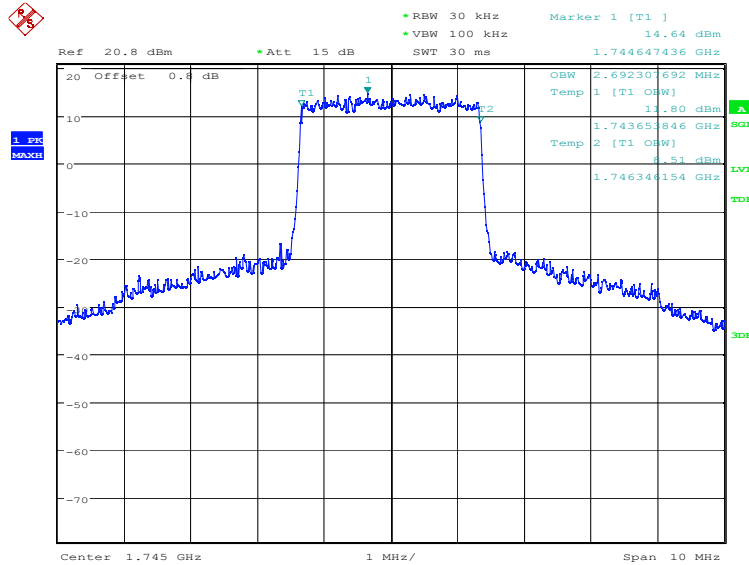
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1745.0	QPSK	16QAM
	2692.31	2692.31

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



Date: 14.APR.2023 16:03:39

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

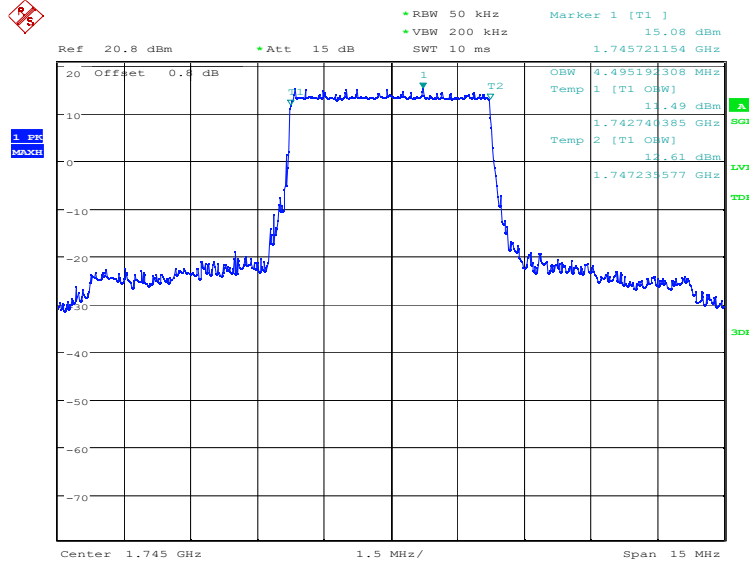


Date: 14.APR.2023 16:04:20

**LTE band 66, 5MHz (99%)**

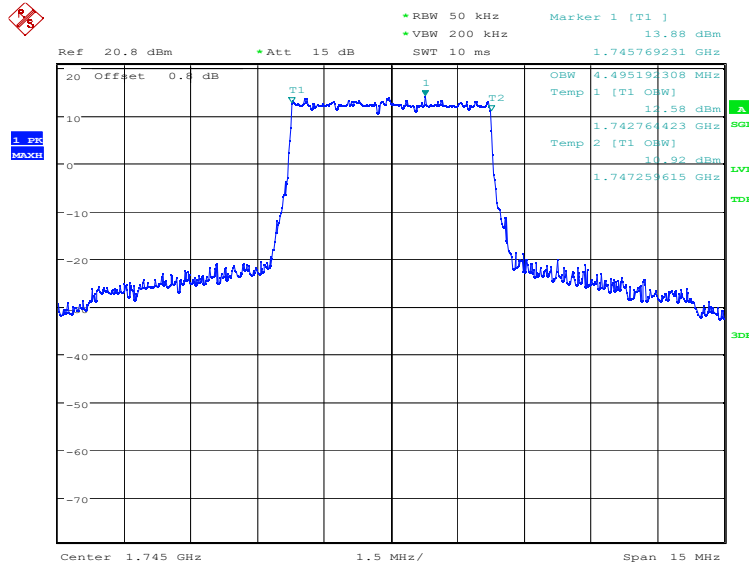
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1745.0	QPSK	16QAM
	4495.19	4495.19

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



Date: 14.APR.2023 16:05:01

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

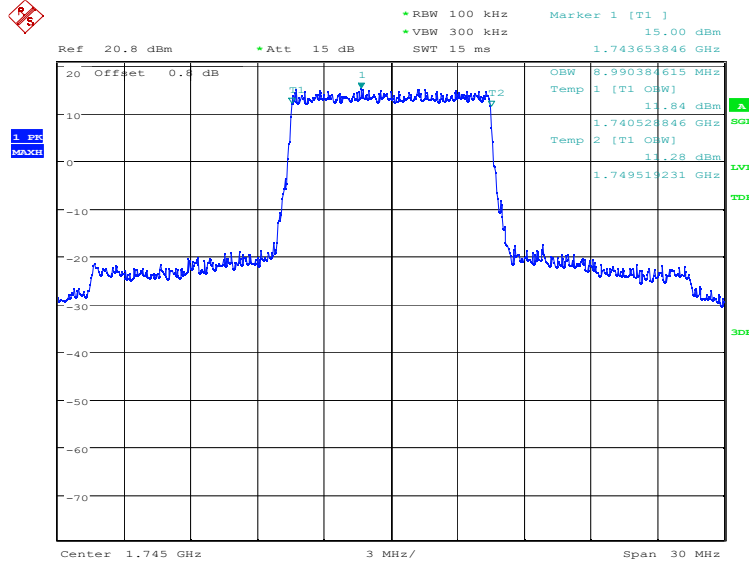


Date: 14.APR.2023 16:05:42

**LTE band 66, 10MHz (99%)**

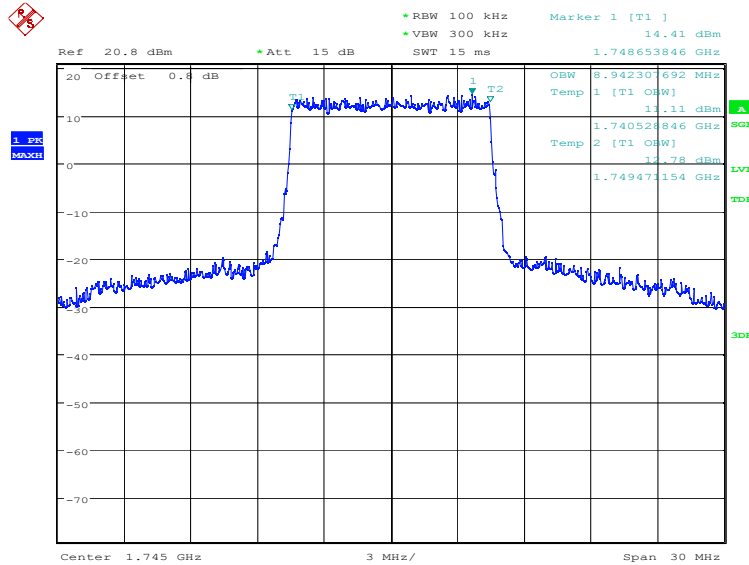
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1745.0	QPSK	16QAM
	8990.38	8942.31

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



Date: 14.APR.2023 16:06:24

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

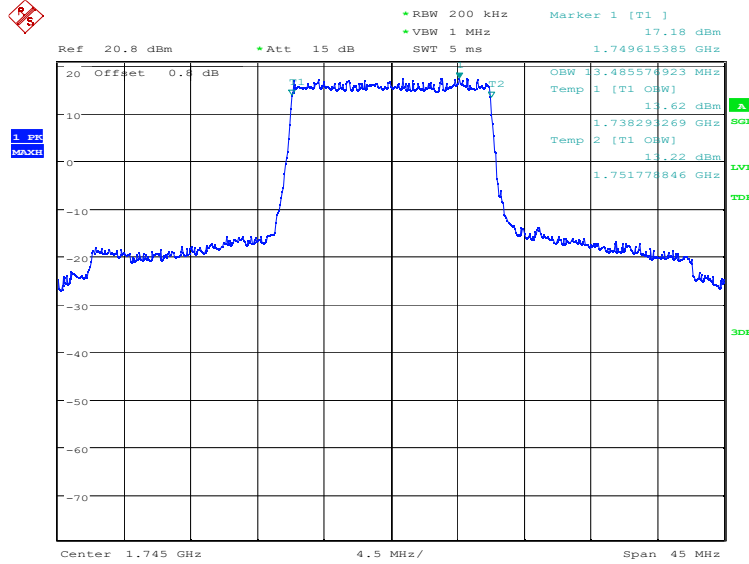


Date: 14.APR.2023 16:07:04

**LTE band 66, 15MHz (99%)**

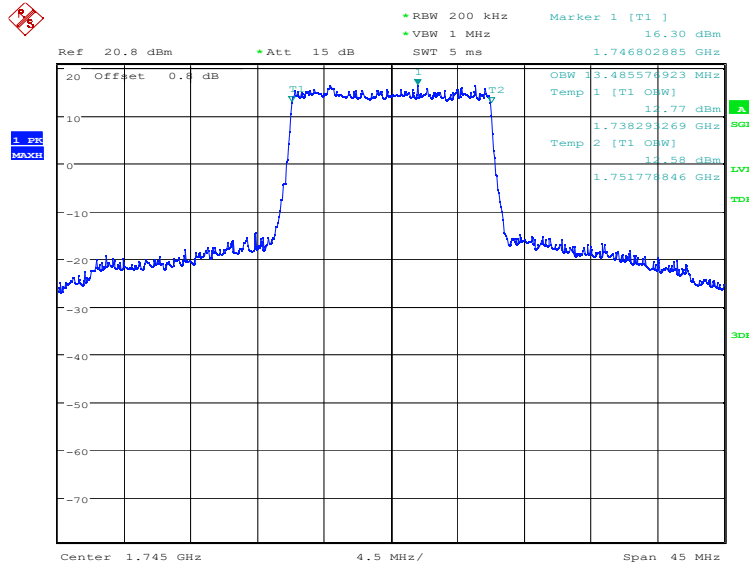
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1745.0	QPSK	16QAM
	13485.58	13485.58

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



Date: 14.APR.2023 16:07:46

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

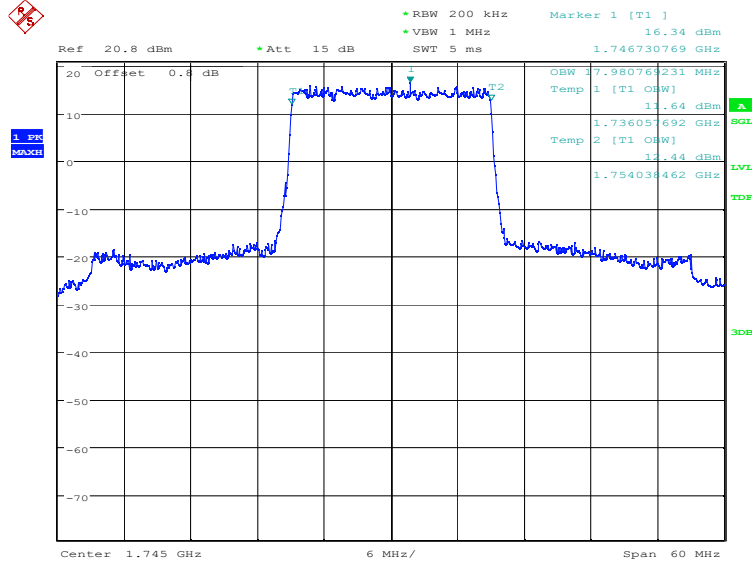


Date: 14.APR.2023 16:08:26

**LTE band 66, 20MHz (99%)**

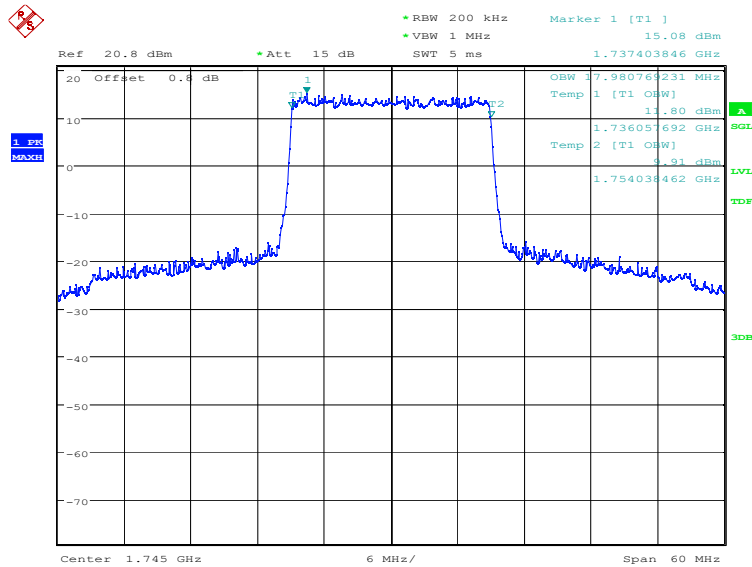
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1745.0	QPSK	16QAM
	17980.77	17980.77

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



Date: 14.APR.2023 16:09:08

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



Date: 14.APR.2023 16:09:48

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.

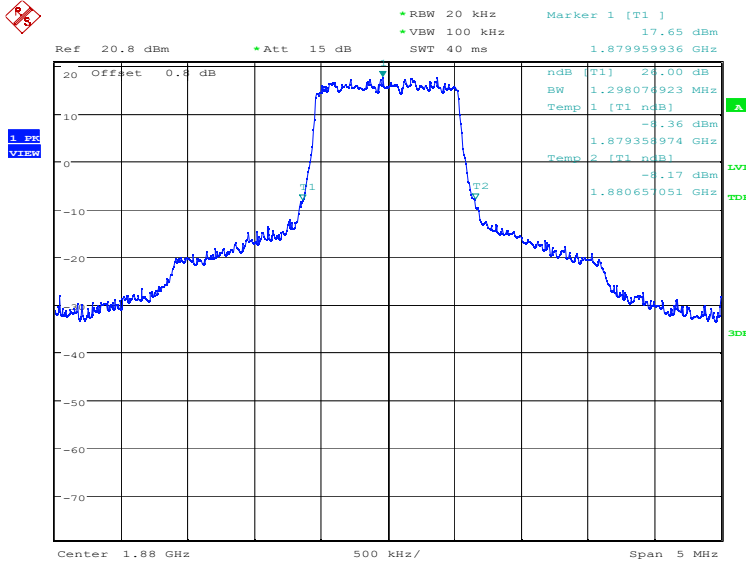
The measurement method is from ANSI C63.26:

- 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)**

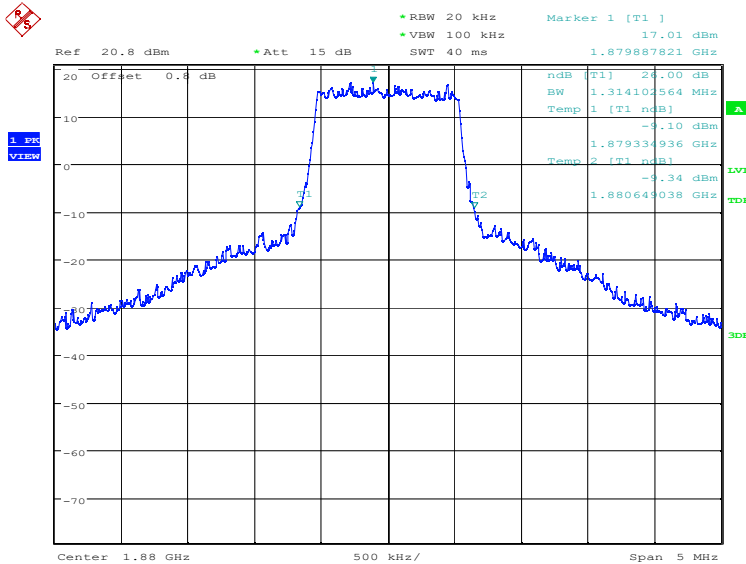
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	1880.0	QPSK
	1298.08	1314.10

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



Date: 14.APR.2023 16:17:22

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

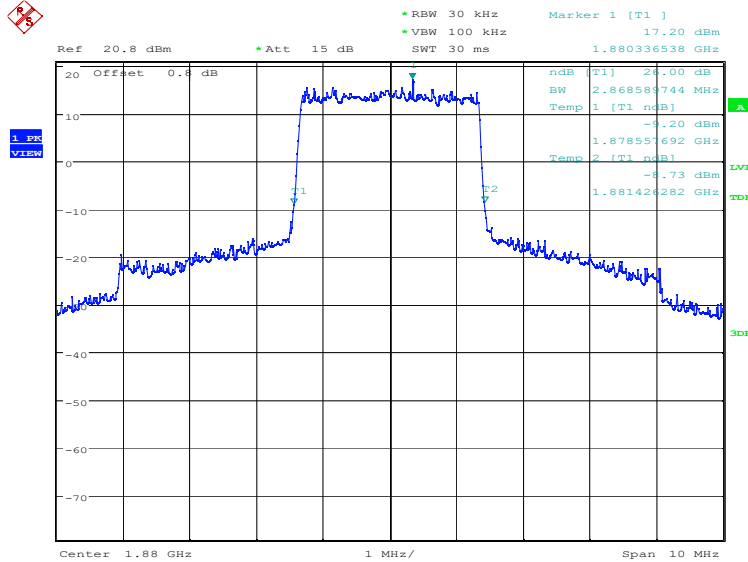


Date: 14.APR.2023 16:18:03

### LTE band 2, 3MHz (-26dBc)

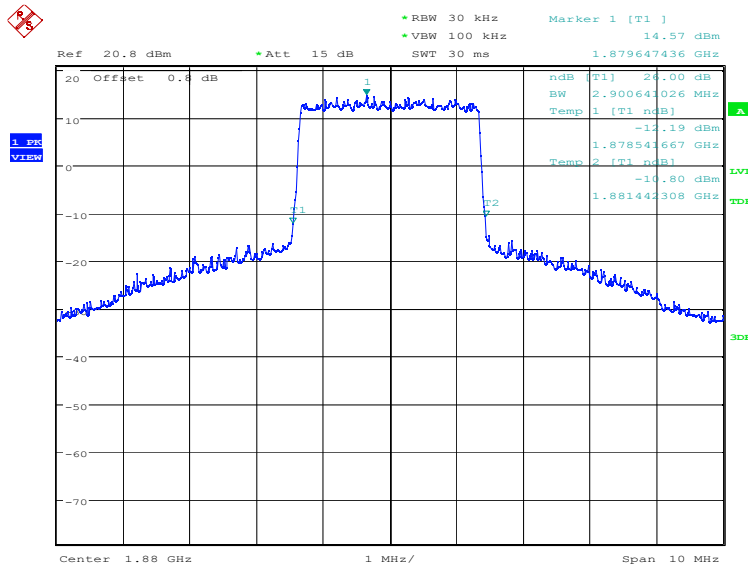
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	1880.0	QPSK
	2868.59	2900.64

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



Date: 14.APR.2023 16:18:45

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



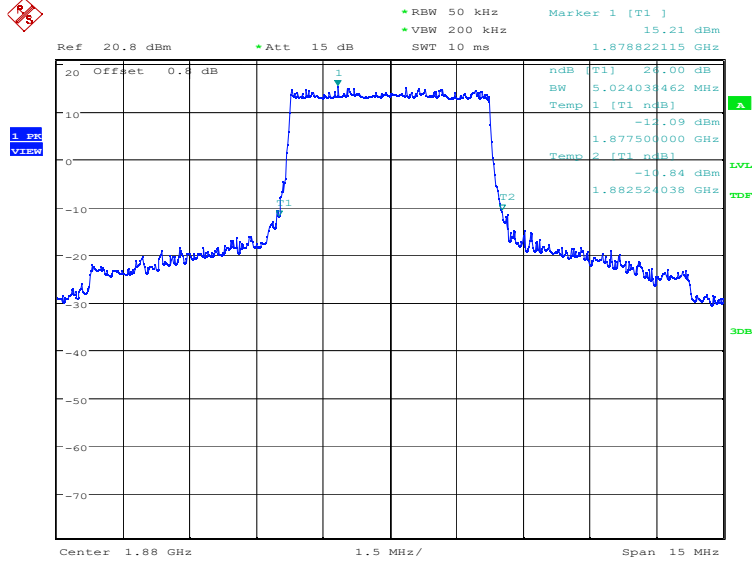
Date: 14.APR.2023 16:19:25



### LTE band 2, 5MHz (-26dBc)

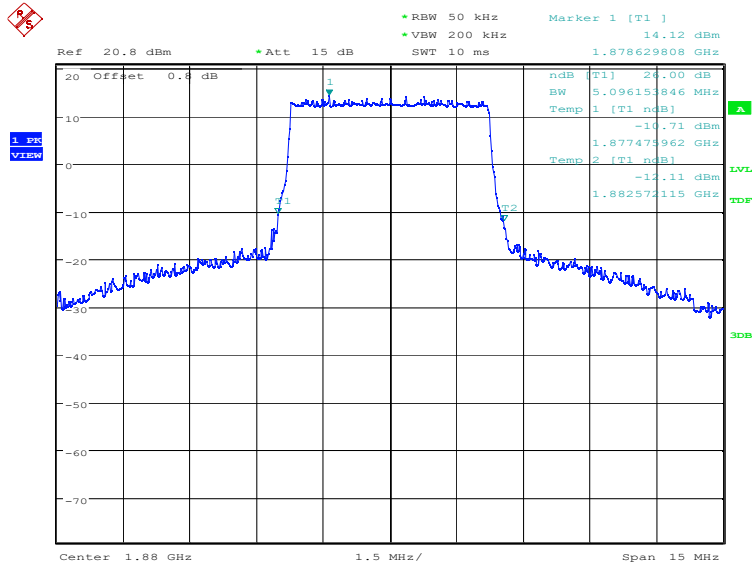
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	1880.0	QPSK
	5024.04	5096.15

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



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

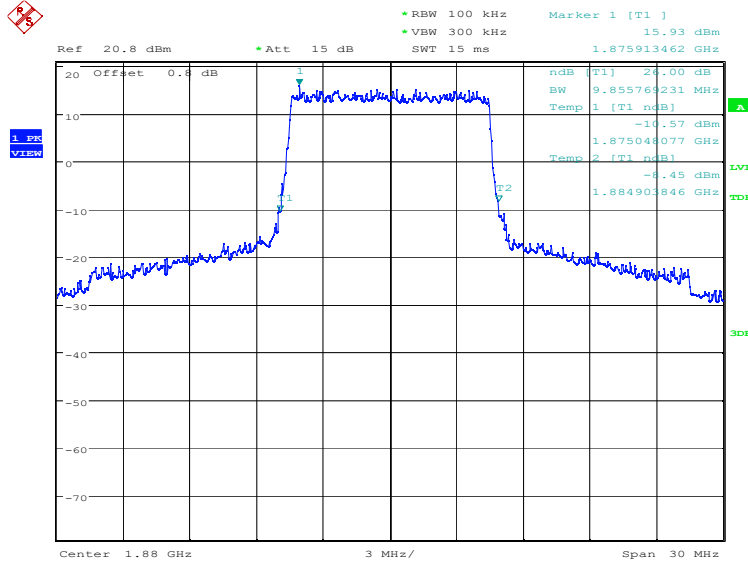


Date: 14.APR.2023 16:20:48

**LTE band 2, 10MHz (-26dBc)**

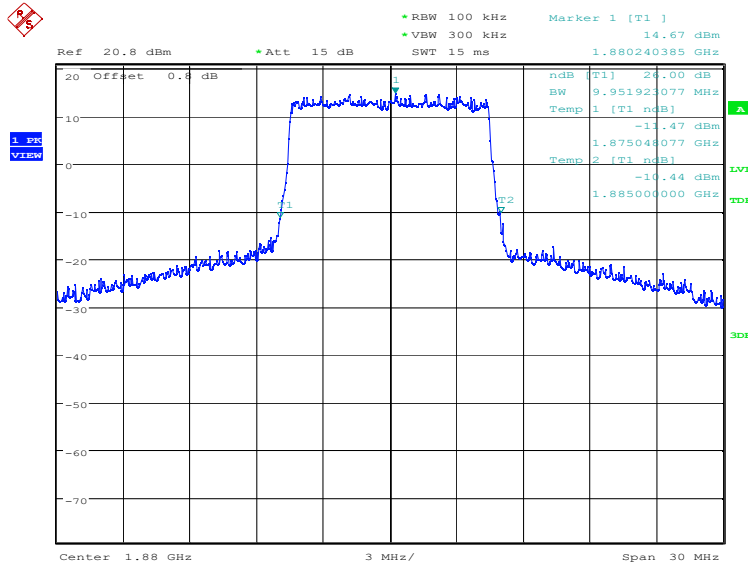
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	1880.0	QPSK
	9855.77	9951.92

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



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

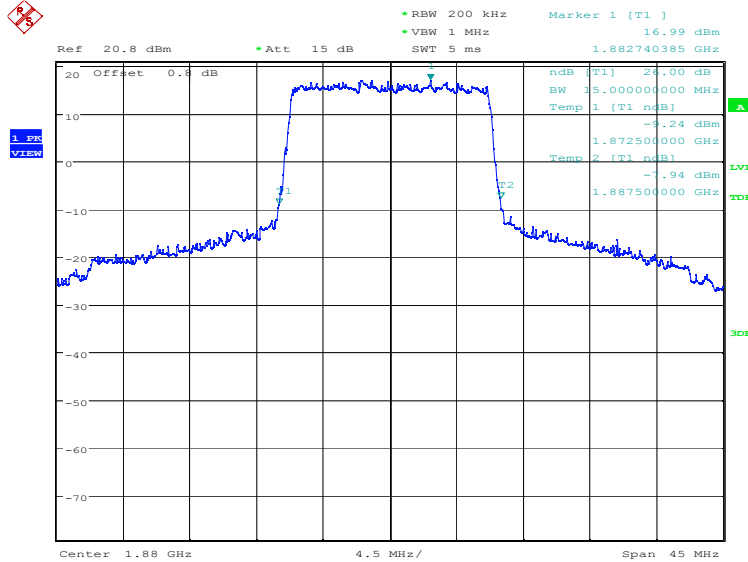


Date: 14.APR.2023 16:22:11

**LTE band 2, 15MHz (-26dBc)**

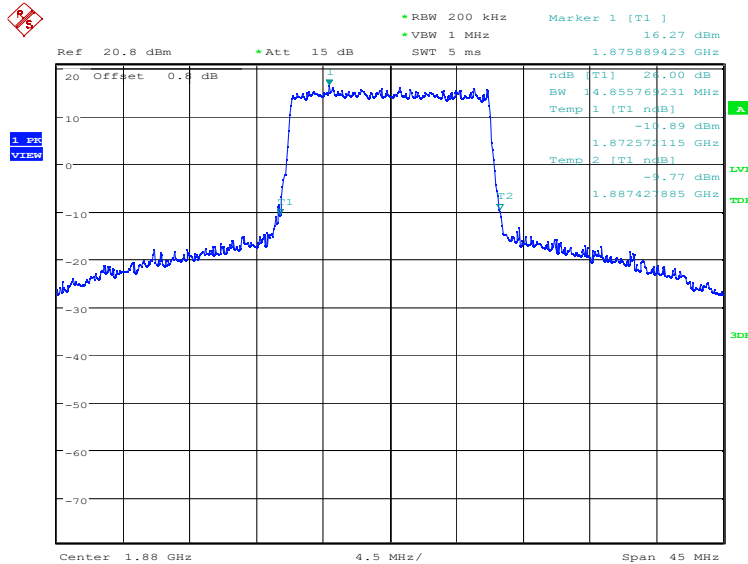
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	15000.00	14855.77

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



Date: 14.APR.2023 16:22:53

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

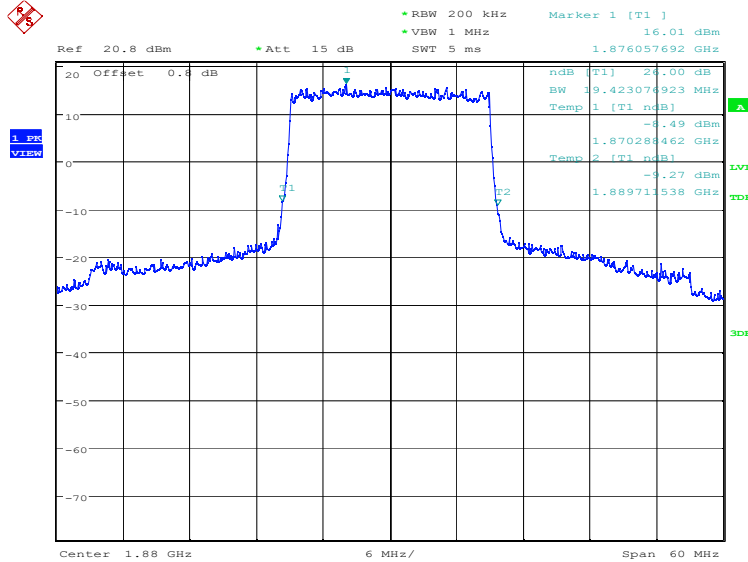


Date: 14.APR.2023 16:23:33

### LTE band 2, 20MHz (-26dBc)

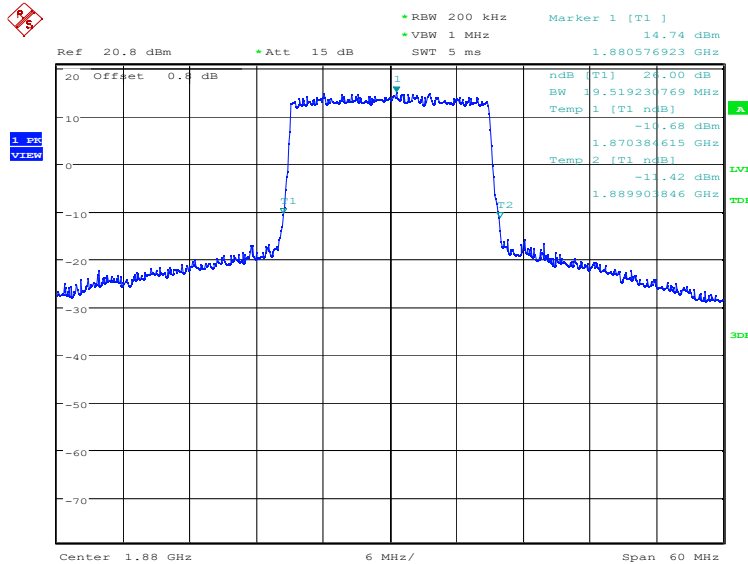
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	1880.0	QPSK
	19423.08	19519.23

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



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

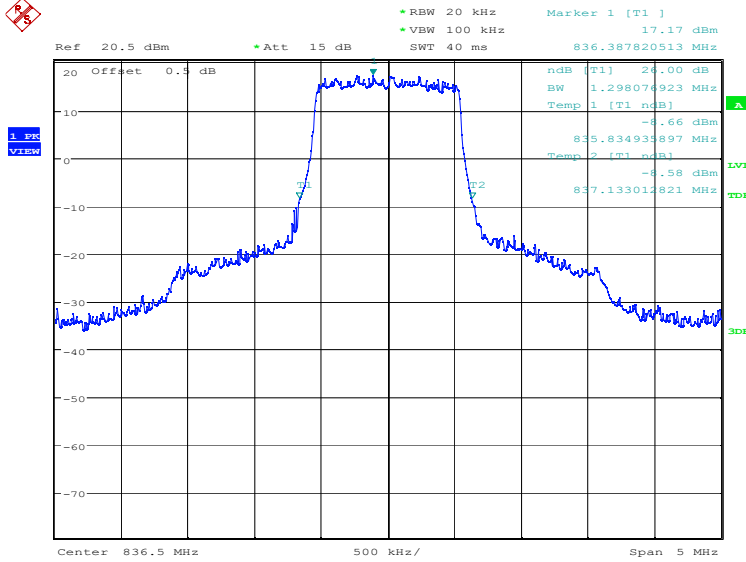


Date: 14.APR.2023 16:24:56

**LTE band 5, 1.4MHz (-26dBc)**

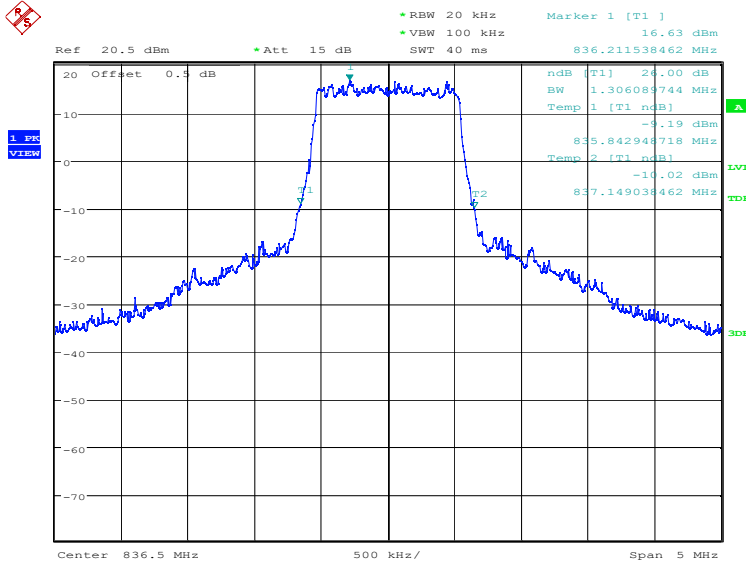
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
836.5	QPSK	16QAM
	1298.08	1306.09

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



Date: 14.APR.2023 16:25:40

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

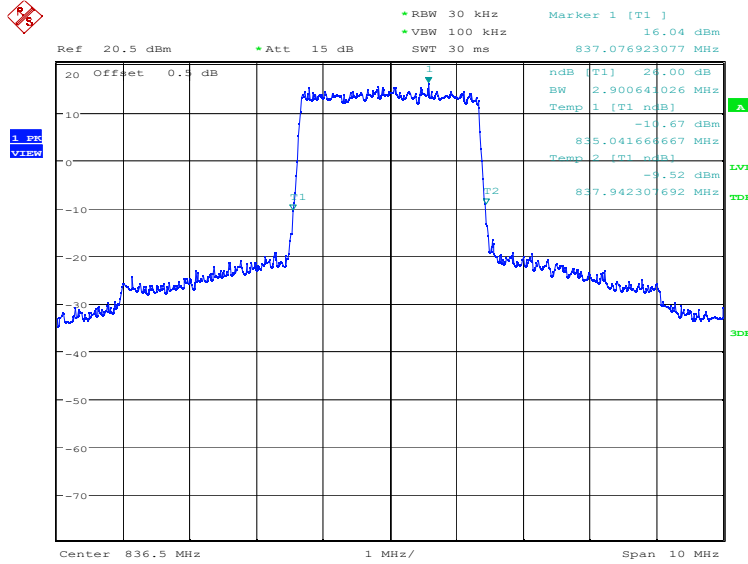


Date: 14.APR.2023 16:26:20

**LTE band 5, 3MHz (-26dBc)**

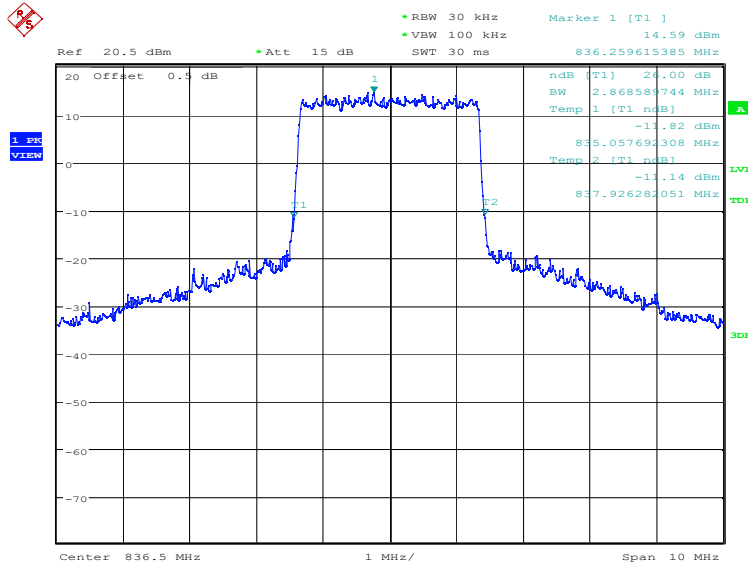
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	836.5	QPSK
2900.64		2868.59

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



Date: 14.APR.2023 16:27:02

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

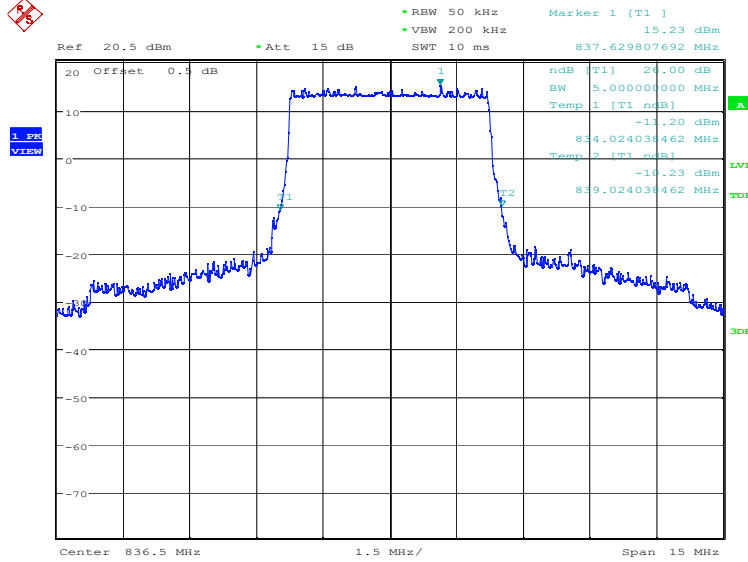


Date: 14.APR.2023 16:27:43

### LTE band 5, 5MHz (-26dBc)

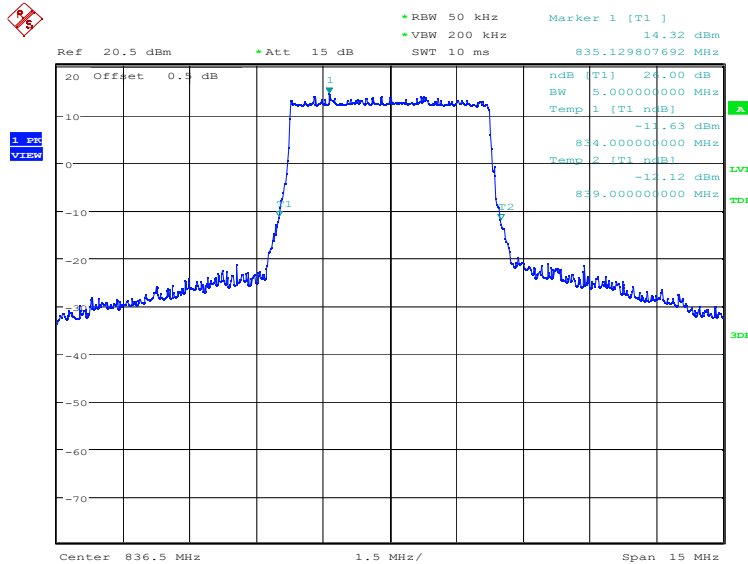
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	836.5	QPSK
	5000.00	5000.00

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



Date: 14.APR.2023 16:28:25

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

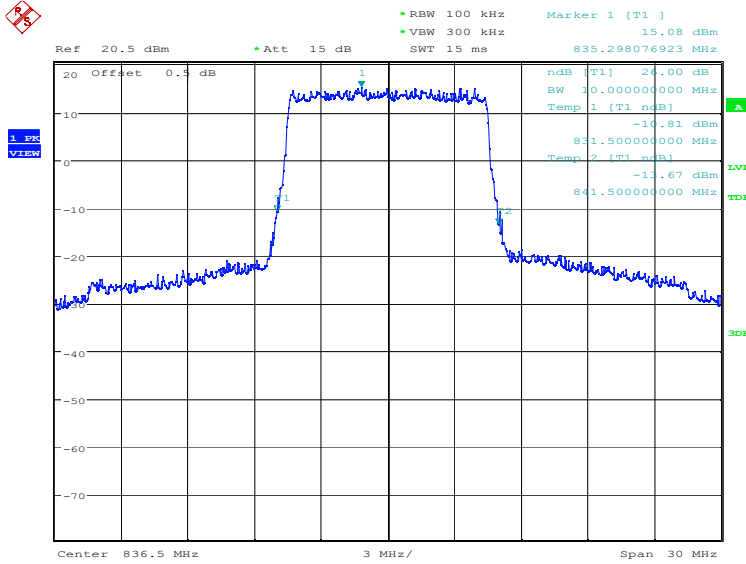


Date: 14.APR.2023 16:29:06

**LTE band 5, 10MHz (-26dBc)**

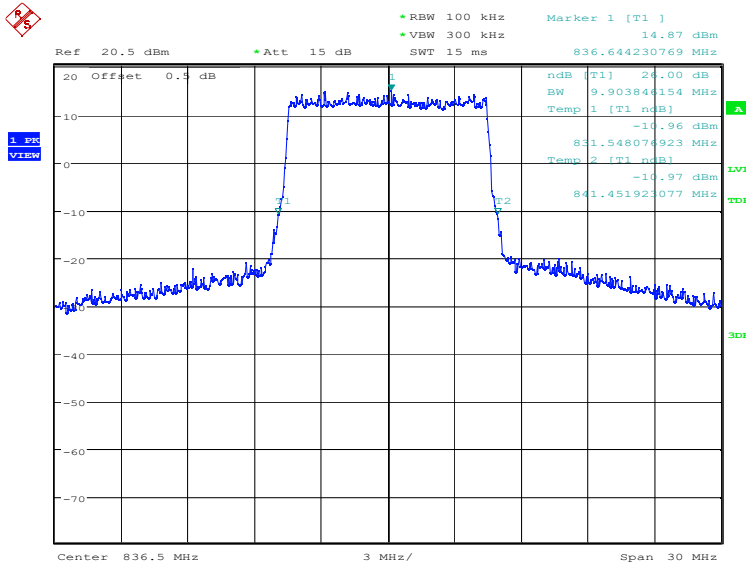
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
836.5	QPSK	16QAM
	10000.00	9903.85

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



Date: 14.APR.2023 16:29:48

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



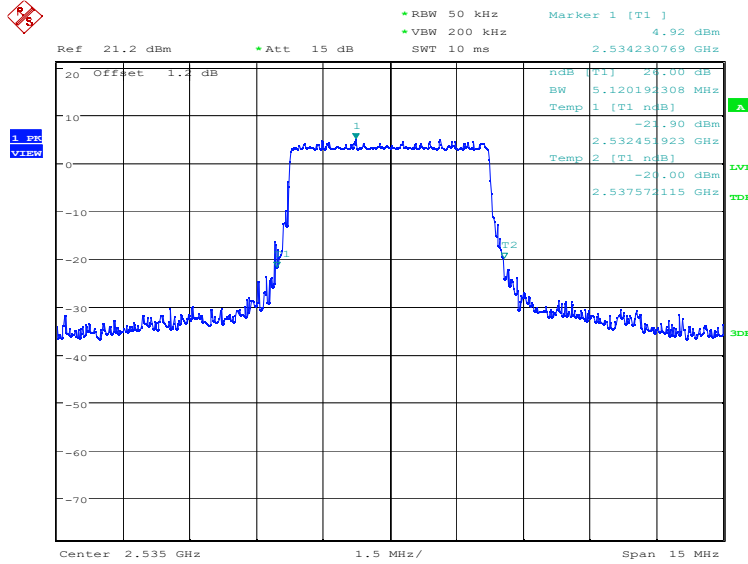
Date: 14.APR.2023 16:30:28



**LTE band 7, 5MHz (-26dBc)**

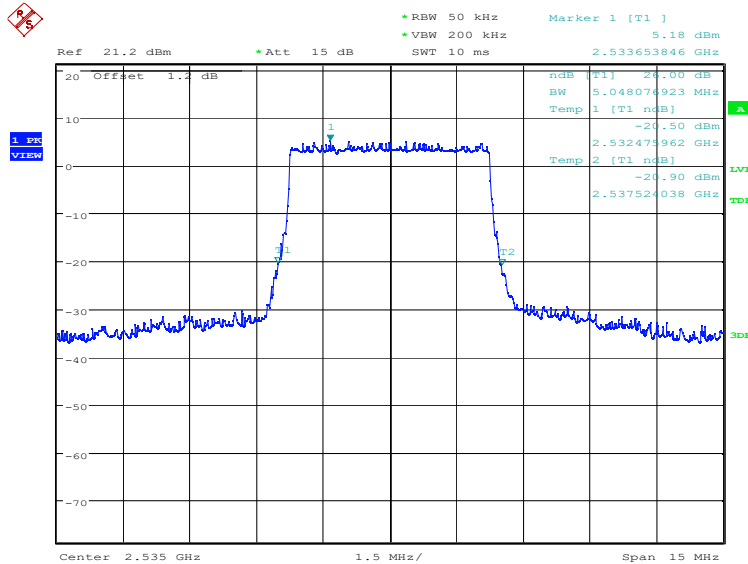
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
2535.0	QPSK	16QAM
	5120.19	5048.08

**LTE band 7, 5MHz Bandwidth, QPSK (-26dBc BW)**



Date: 14.APR.2023 16:31:12

**LTE band 7, 5MHz Bandwidth,16QAM (-26dBc BW)**

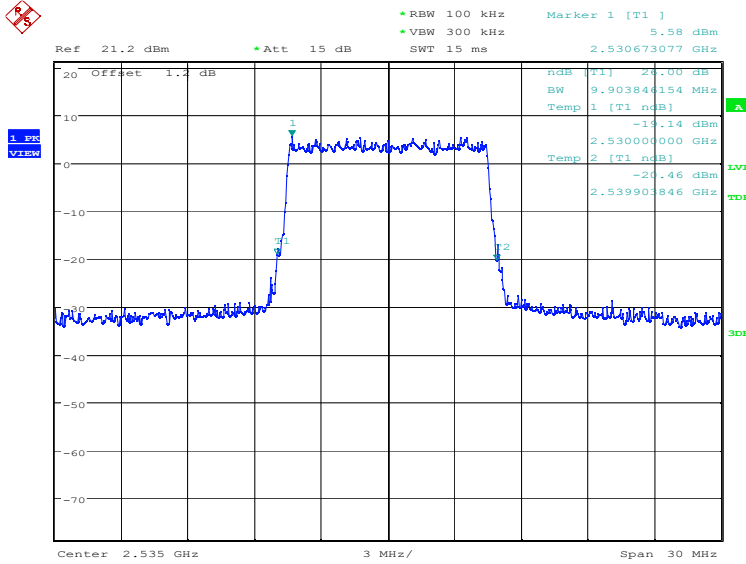


Date: 14.APR.2023 16:31:53

**LTE band 7, 10MHz (-26dBc)**

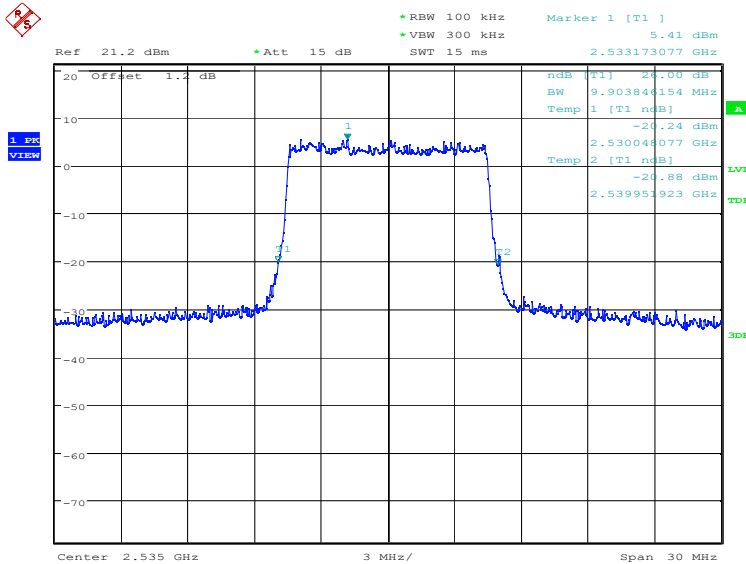
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
2535.0	QPSK	16QAM
	9903.85	9903.85

**LTE band 7, 10MHz Bandwidth, QPSK (-26dBc BW)**



Date: 14.APR.2023 16:32:35

**LTE band 7, 10MHz Bandwidth, 16QAM (-26dBc BW)**

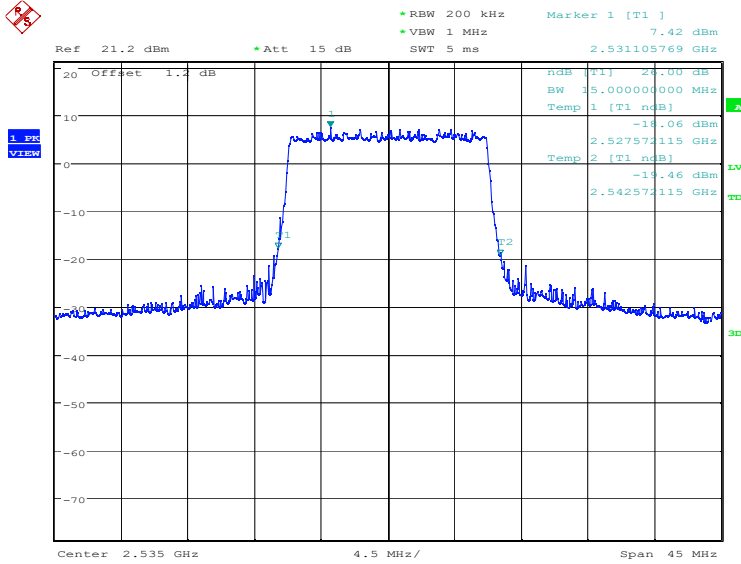


Date: 14.APR.2023 16:33:15

**LTE band 7, 15MHz (-26dBc)**

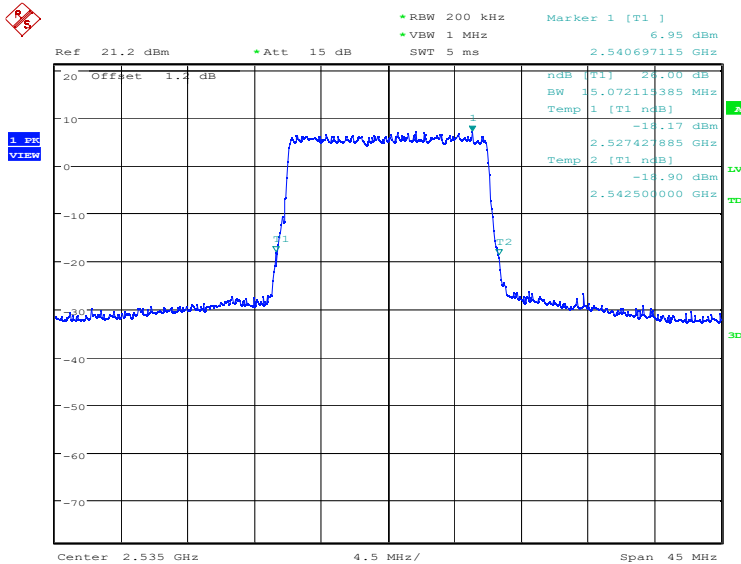
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
2535.0	QPSK	16QAM
	15000.00	15072.12

**LTE band 7, 15MHz Bandwidth, QPSK (-26dBc BW)**



Date: 14.APR.2023 16:33:57

**LTE band 7, 15MHz Bandwidth, 16QAM (-26dBc BW)**

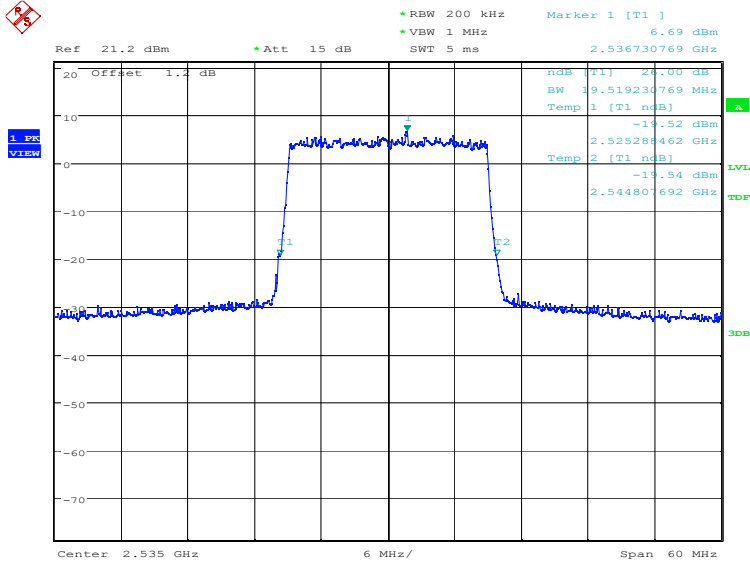


Date: 14.APR.2023 16:34:38

**LTE band 7, 20MHz (-26dBc)**

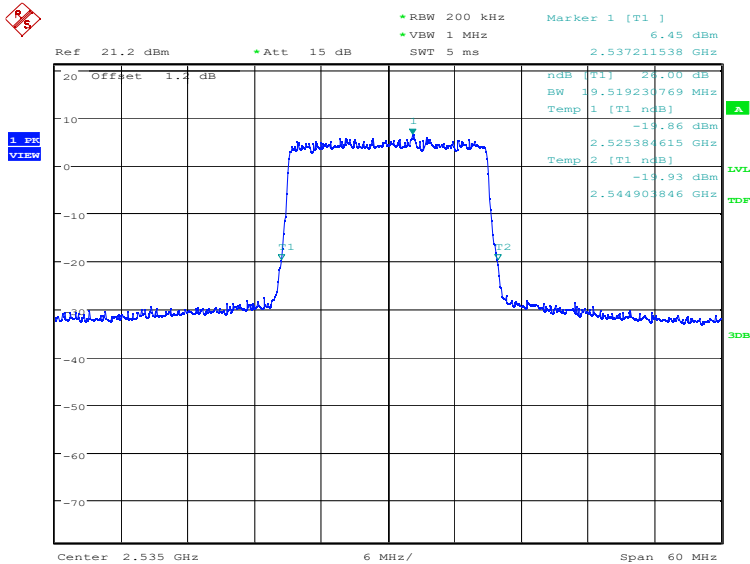
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
2535.0	QPSK	16QAM
	19519.23	19519.23

**LTE band 7, 20MHz Bandwidth, QPSK (-26dBc BW)**



Date: 14.APR.2023 16:35:20

**LTE band 7, 20MHz Bandwidth, 16QAM (-26dBc BW)**

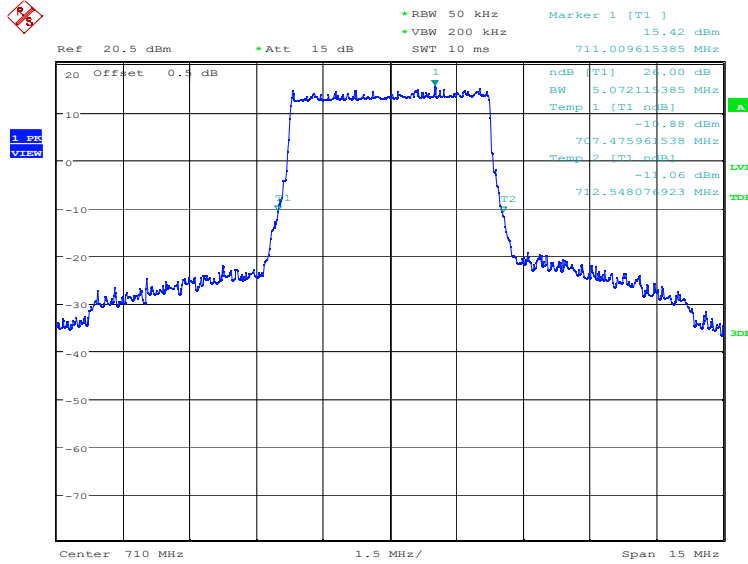


Date: 14.APR.2023 16:36:01

**LTE band 17, 5MHz (-26dBc)**

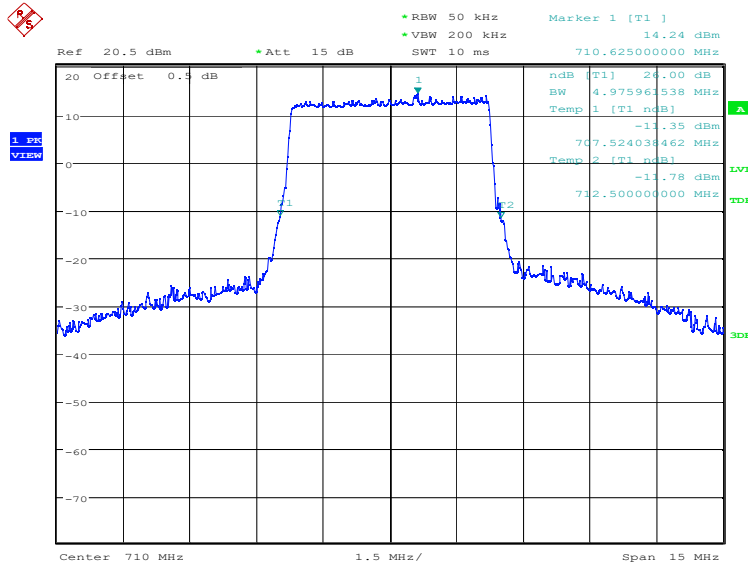
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
710.0	QPSK	16QAM
	5072.12	4975.96

**LTE band 17, 5MHz Bandwidth, QPSK (-26dBc BW)**



Date: 14.APR.2023 16:37:39

**LTE band 17, 5MHz Bandwidth, 16QAM (-26dBc BW)**

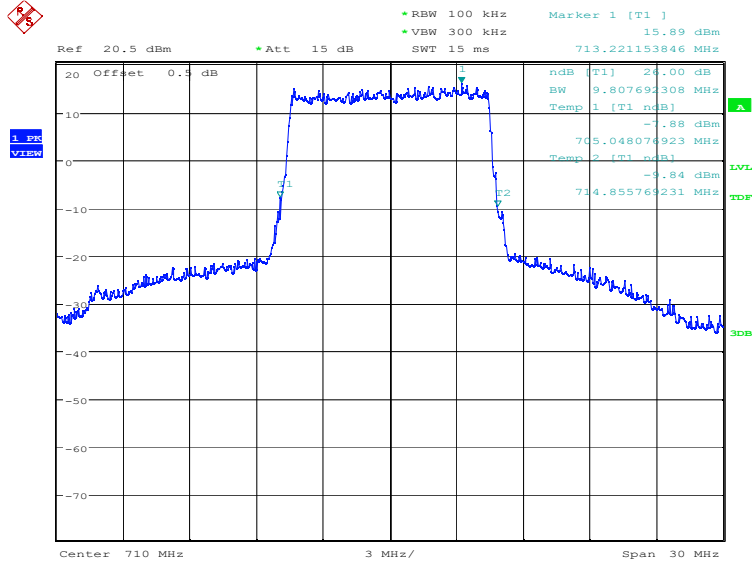


Date: 14.APR.2023 16:38:20

**LTE band 17, 10MHz (-26dBc)**

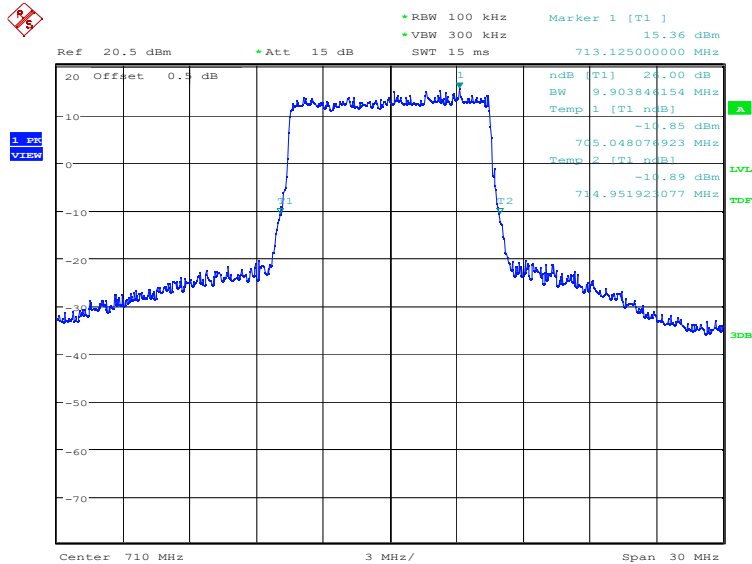
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
710.0	QPSK	16QAM
	9807.69	9903.85

**LTE band 17, 10MHz Bandwidth, QPSK (-26dBc BW)**



Date: 14.APR.2023 16:39:02

**LTE band 17, 10MHz Bandwidth,16QAM (-26dBc BW)**

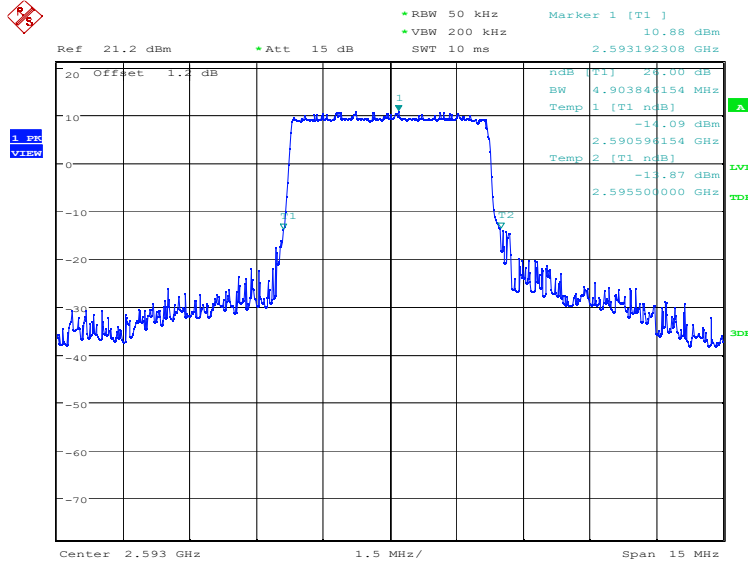


Date: 14.APR.2023 16:39:43

**LTE band 41, 5MHz (-26dBc)**

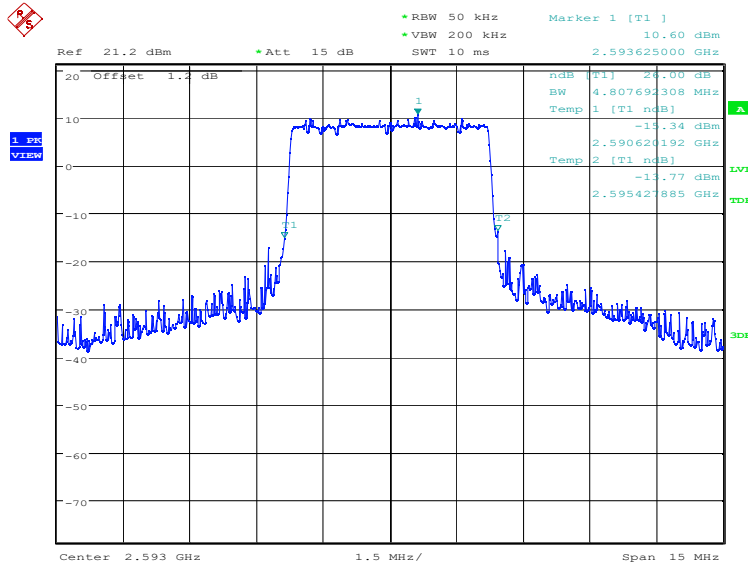
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
2593.0	QPSK	16QAM
	4903.85	4807.69

**LTE band 41, 5MHz Bandwidth, QPSK (-26dBc BW)**



Date: 14.APR.2023 16:49:29

**LTE band 41, 5MHz Bandwidth, 16QAM (-26dBc BW)**

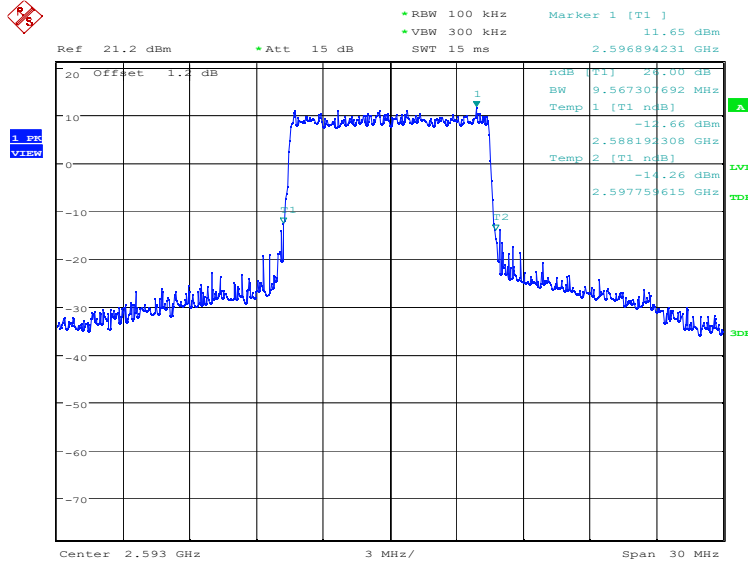


Date: 14.APR.2023 16:50:10

**LTE band 41, 10MHz (-26dBc)**

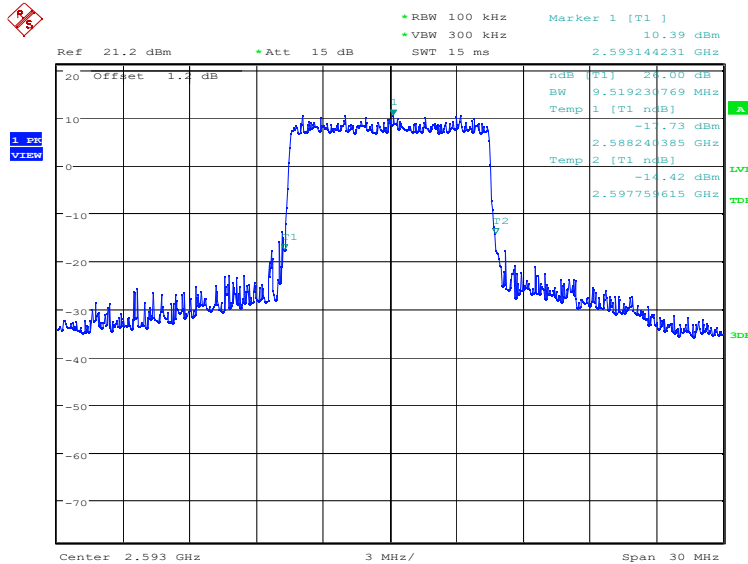
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
2593.0	QPSK	16QAM
	9567.31	9519.23

**LTE band 41, 10MHz Bandwidth, QPSK (-26dBc BW)**



Date: 14.APR.2023 16:50:52

**LTE band 41, 10MHz Bandwidth, 16QAM (-26dBc BW)**



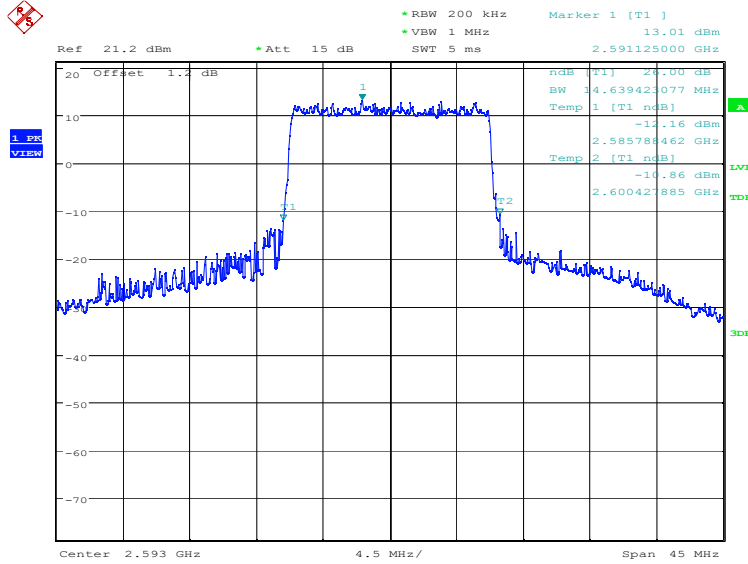
Date: 14.APR.2023 16:51:33



**LTE band 41, 15MHz (-26dBc)**

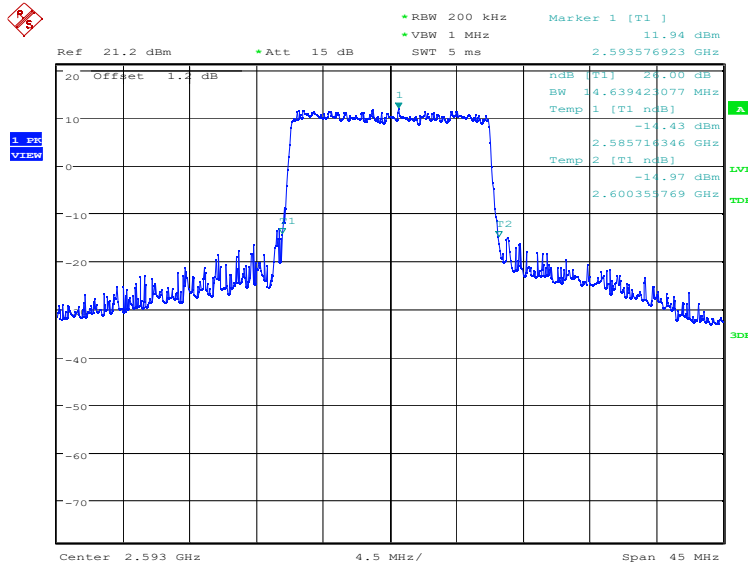
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
2593.0	QPSK	16QAM
	14639.42	14639.42

**LTE band 41, 15MHz Bandwidth, QPSK (-26dBc BW)**



Date: 14.APR.2023 16:52:16

**LTE band 41, 15MHz Bandwidth, 16QAM (-26dBc BW)**

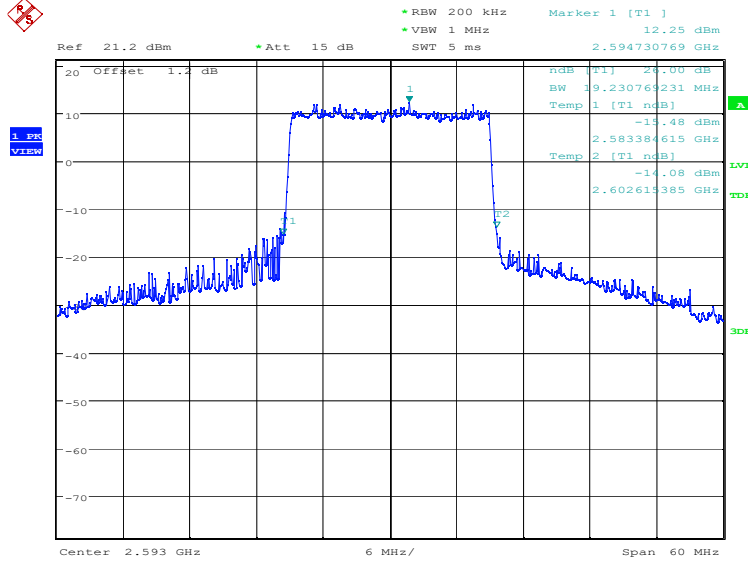


Date: 14.APR.2023 16:52:56

**LTE band 41, 20MHz (-26dBc)**

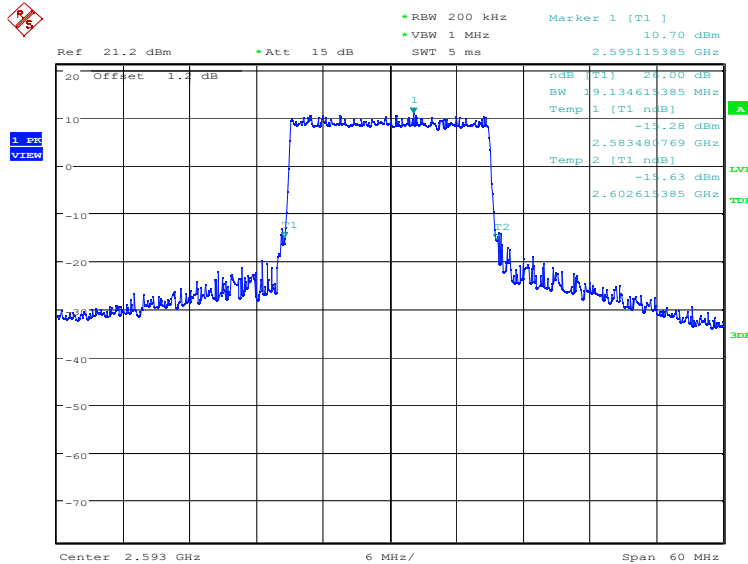
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	2593.0	QPSK
	19230.77	19134.62

**LTE band 41, 20MHz Bandwidth, QPSK (-26dBc BW)**



Date: 14.APR.2023 16:53:39

**LTE band 41, 20MHz Bandwidth,16QAM (-26dBc BW)**

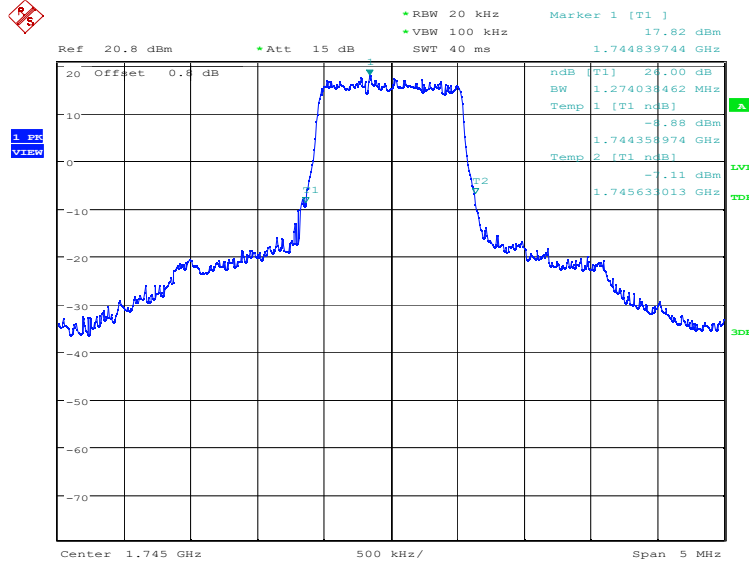


Date: 14.APR.2023 16:54:20

### LTE band 66, 1.4MHz (-26dBc)

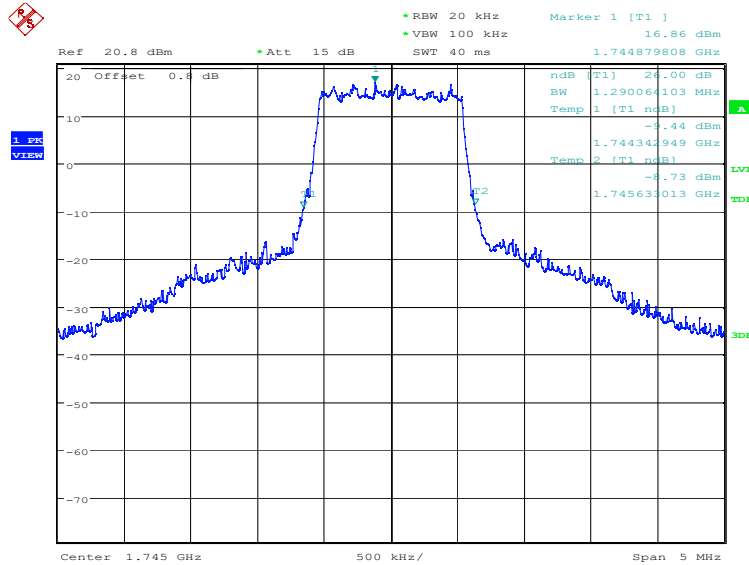
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	1745.0	QPSK
	1274.04	1290.06

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



Date: 14.APR.2023 16:40:27

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

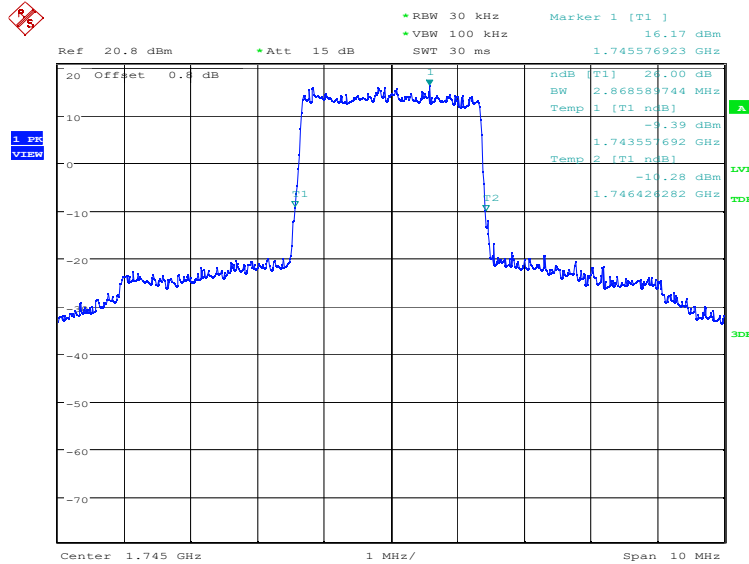


Date: 14.APR.2023 16:41:08

### LTE band 66, 3MHz (-26dBc)

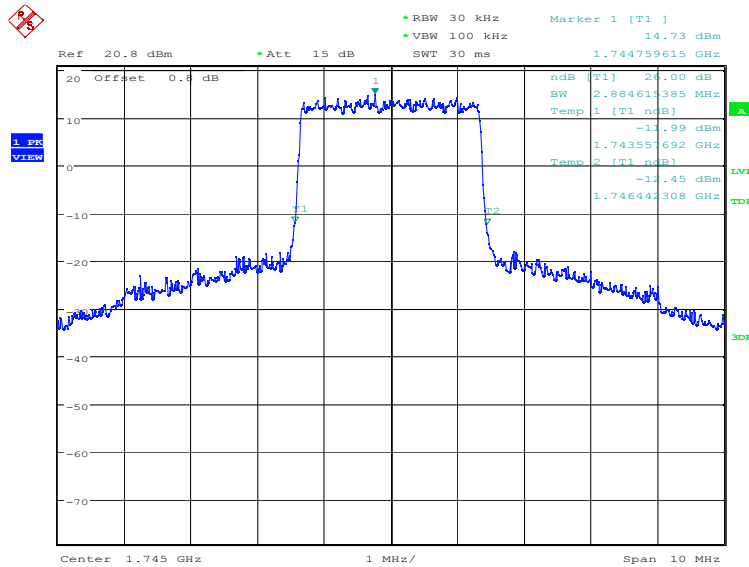
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	1745.0	QPSK
	2868.59	2884.62

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



Date: 14.APR.2023 16:41:50

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

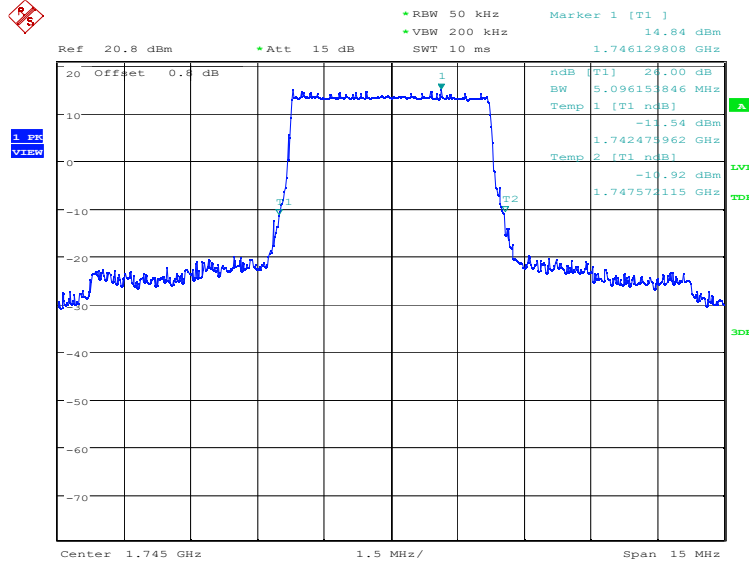


Date: 14.APR.2023 16:42:30

**LTE band 66, 5MHz (-26dBc)**

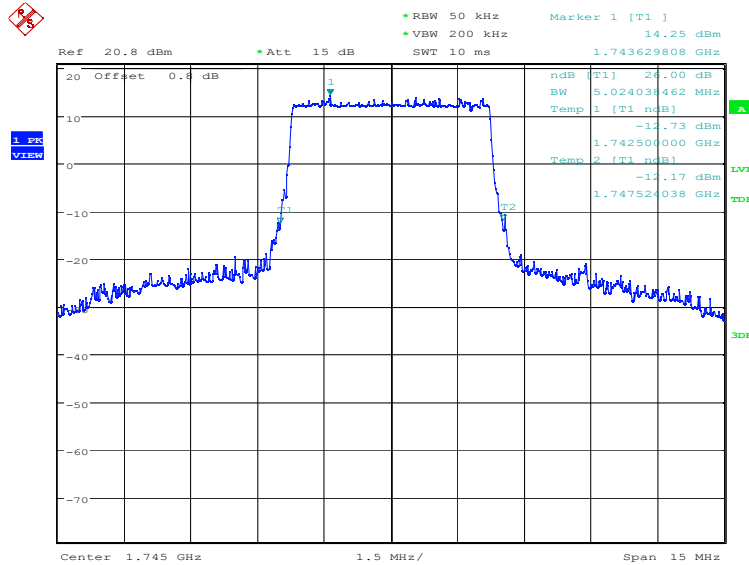
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	1745.0	QPSK
	5096.15	5024.04

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



Date: 14.APR.2023 16:43:12

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

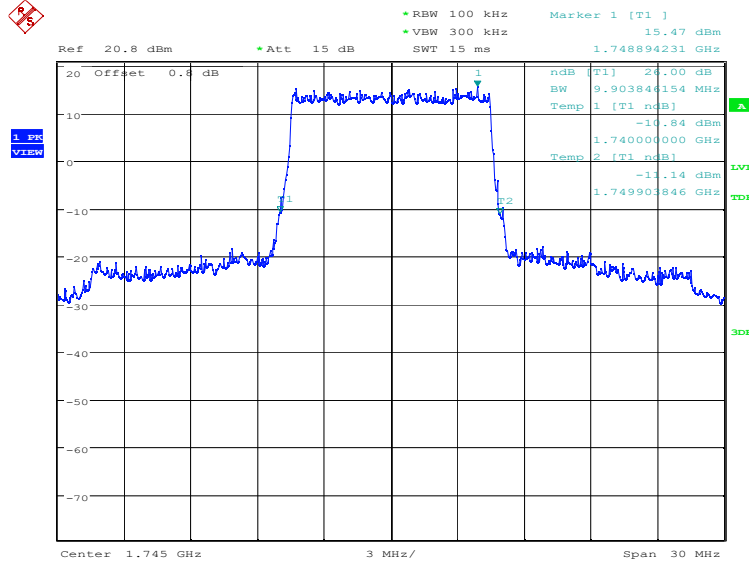


Date: 14.APR.2023 16:43:53

### LTE band 66, 10MHz (-26dBc)

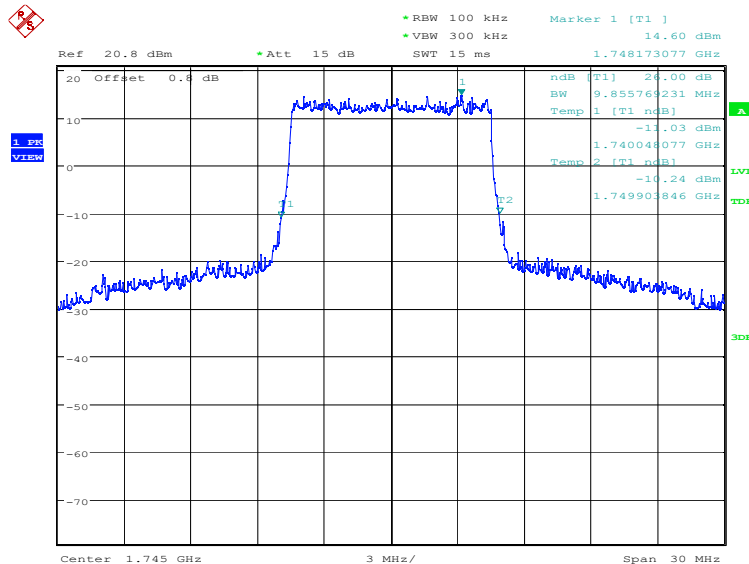
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	1745.0	QPSK
	9903.85	9855.77

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



Date: 14.APR.2023 16:44:35

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

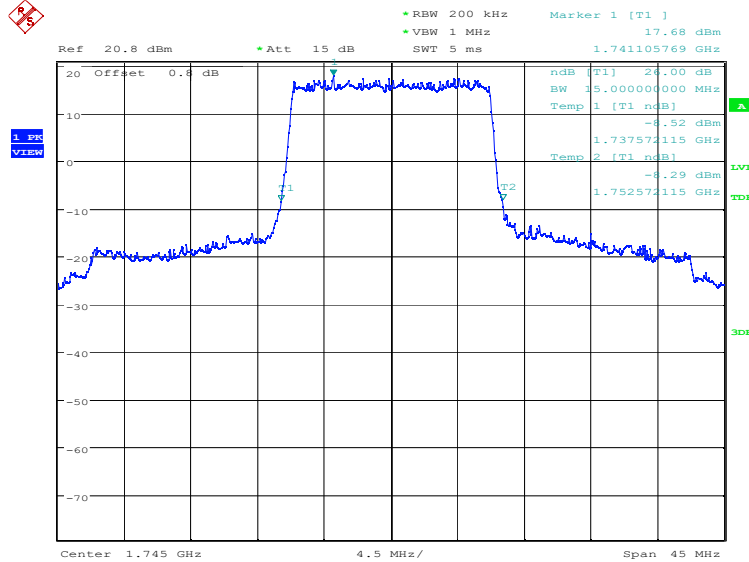


Date: 14.APR.2023 16:45:16

### LTE band 66, 15MHz (-26dBc)

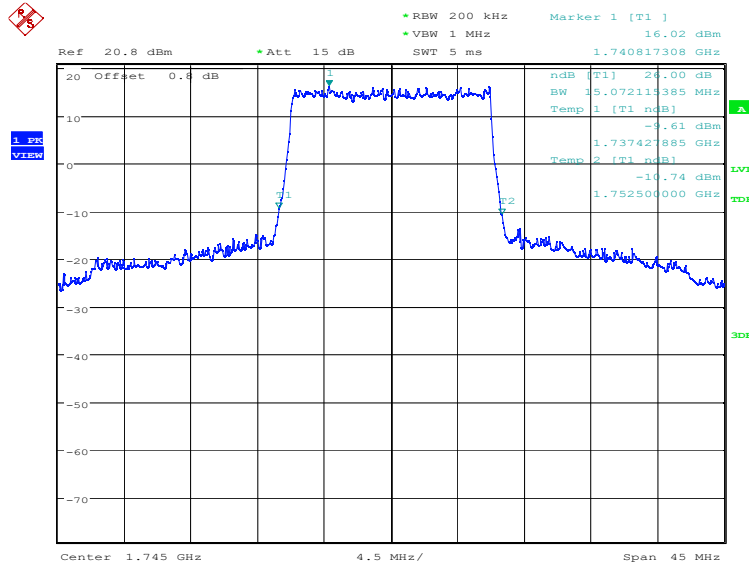
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	1745.0	QPSK
	15000.00	15072.12

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



Date: 14.APR.2023 16:45:59

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

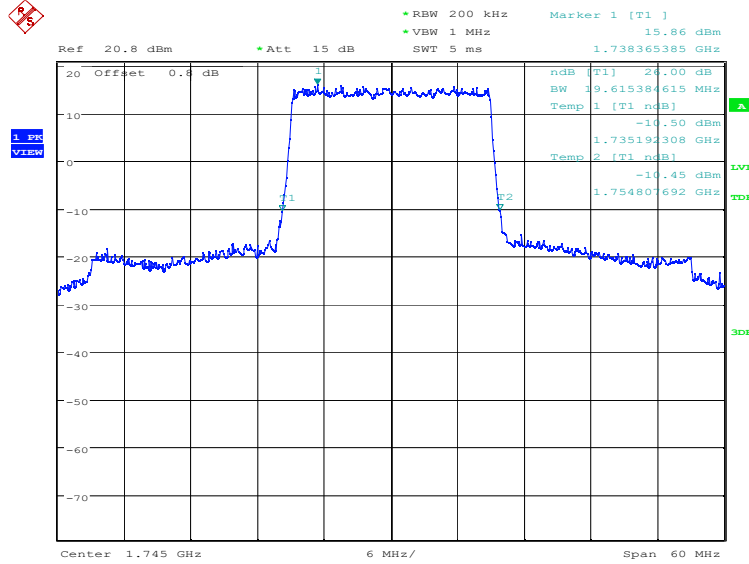


Date: 14.APR.2023 16:46:39

### LTE band 66, 20MHz (-26dBc)

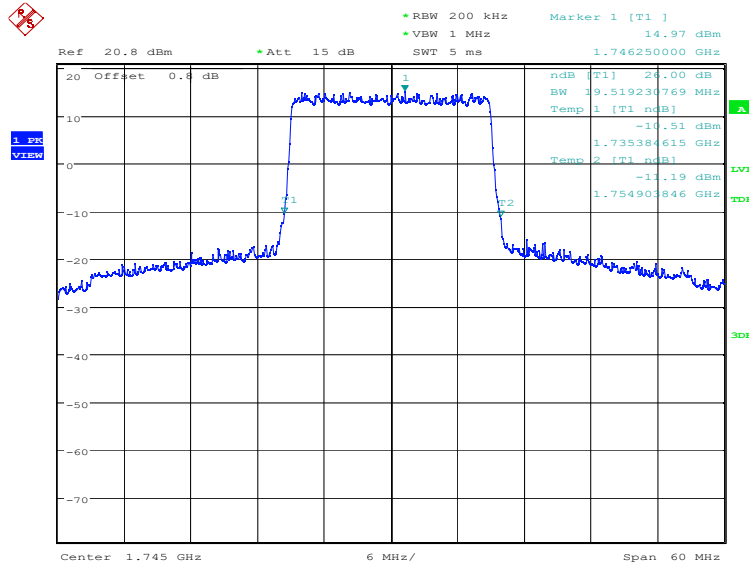
Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)	
	1745.0	QPSK
	19615.38	19519.23

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



Date: 14.APR.2023 16:47:21

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



Date: 14.APR.2023 16:48:02

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



## **A.6 Band Edge Compliance**

### **A.6.1 Measurement limit**

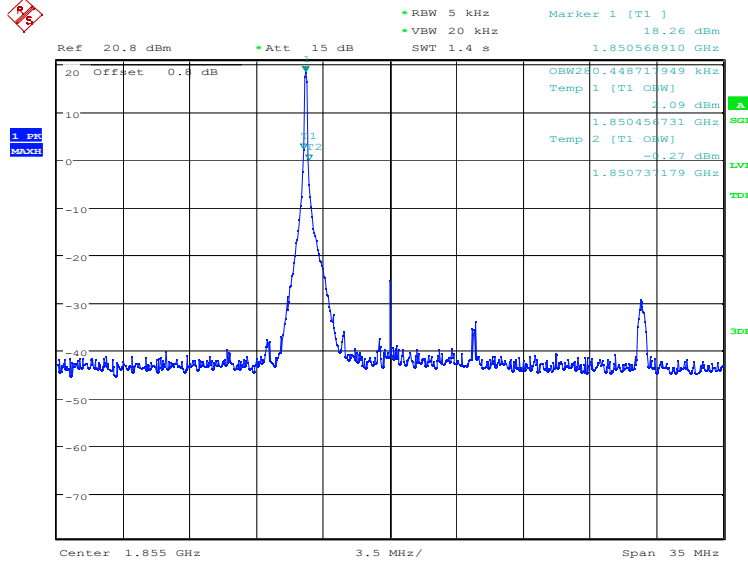
Part 22.917, Part 24.238 and Part 27.53(h) specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

Part 27.53(m) specifies for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log(P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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.

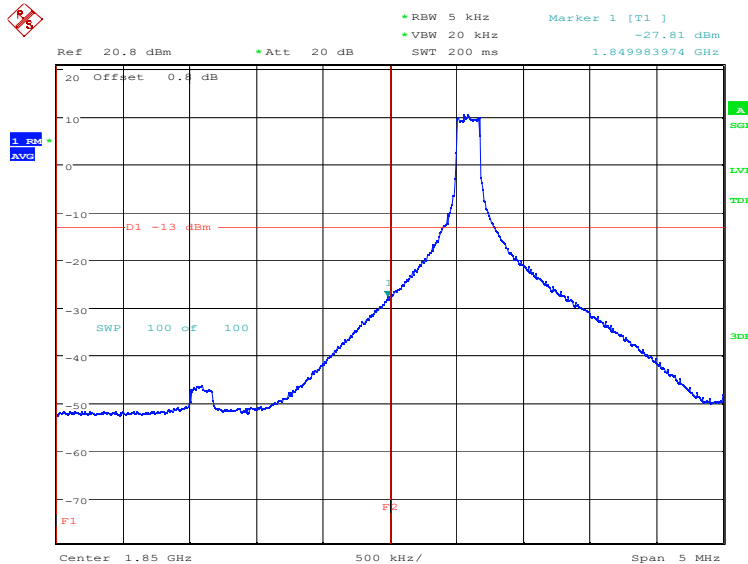
The spectrum analyzer readings are corrected by  $[10 \log(1/\text{duty cycle})]$  for the non-continuous transmitting scenario.

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



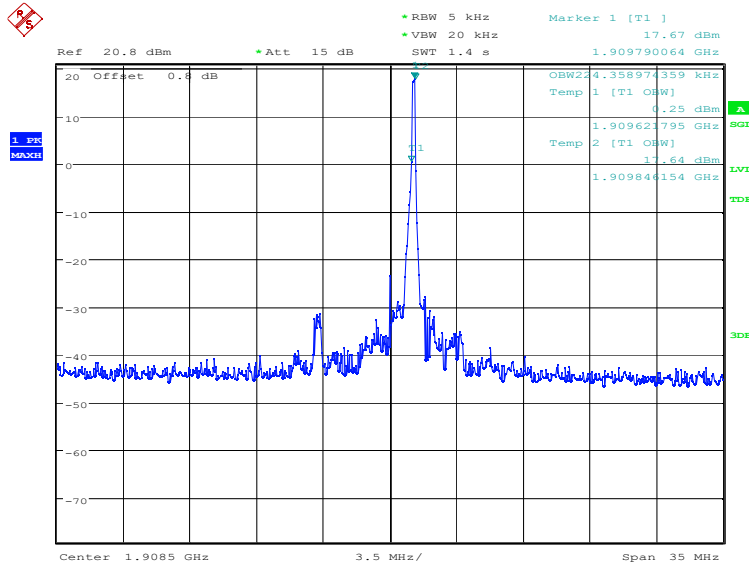
Date: 15.MAY.2023 14:50:21

**LOW BAND EDGE BLOCK-1RB-low\_offset**



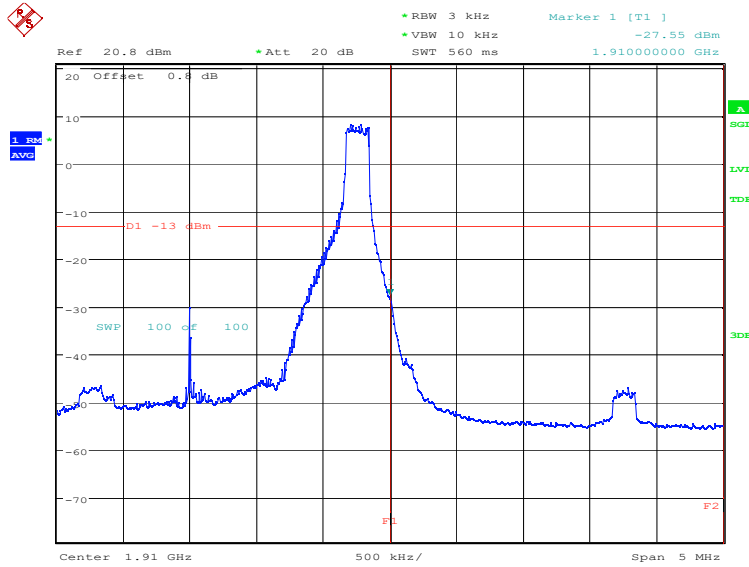
Date: 15.MAY.2023 14:51:36

**OBW: 1RB-high\_offset**



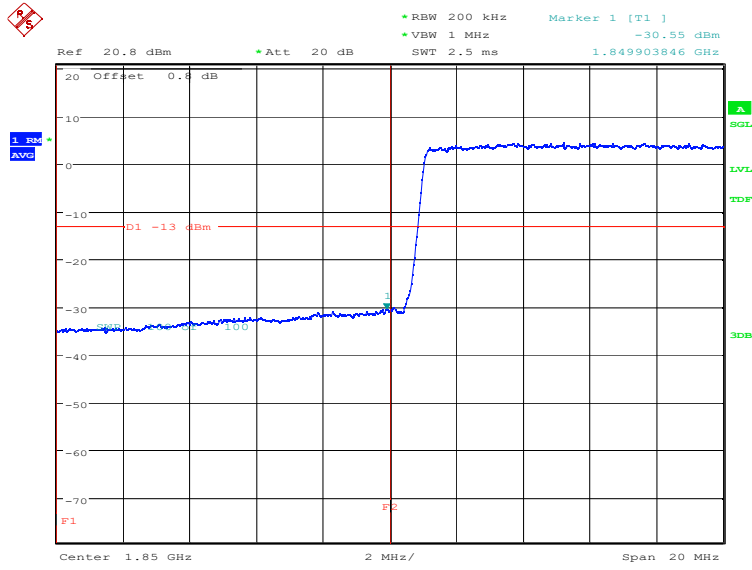
Date: 15.MAY.2023 14:53:10

**HIGH BAND EDGE BLOCK-1RB-high\_offset**



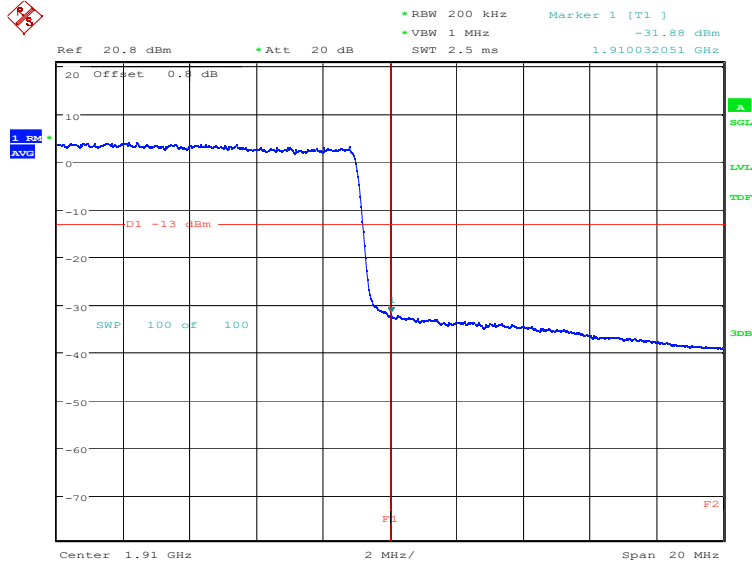
Date: 15.MAY.2023 14:54:24

**LOW BAND EDGE BLOCK-20MHz-100%RB**



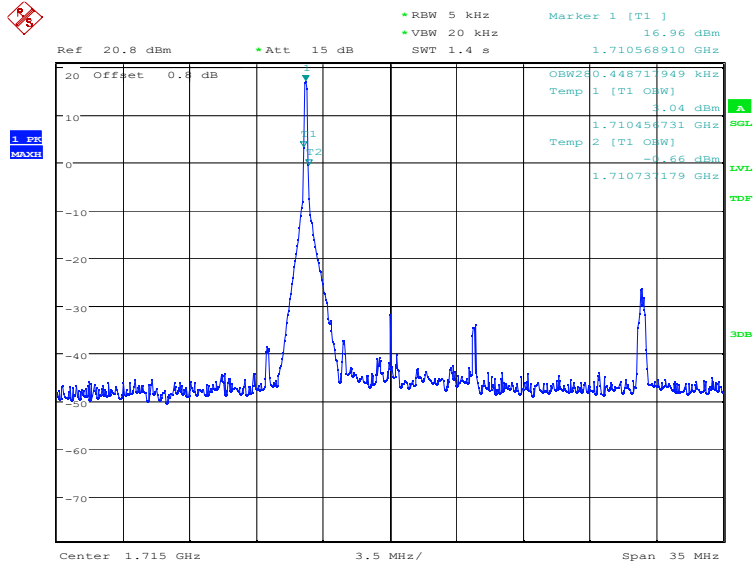
Date: 14.APR.2023 16:55:57

**HIGH BAND EDGE BLOCK-20MHz-100%RB**



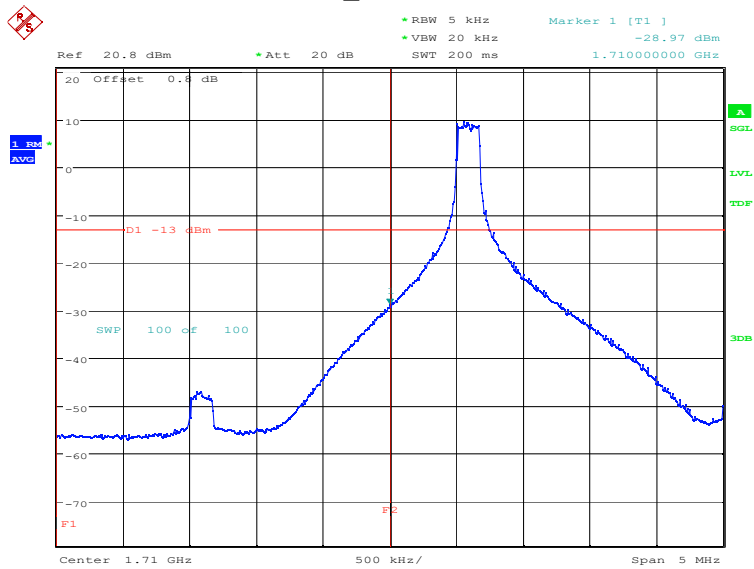
Date: 14.APR.2023 16:57:29

**LTE band 4**  
**OBW: 1RB-low\_offset**



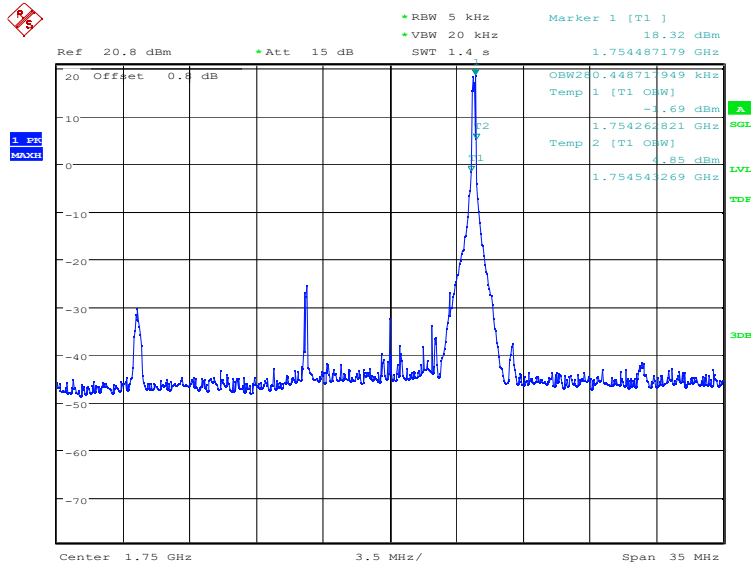
Date: 15.MAY.2023 14:55:03

**LOW BAND EDGE BLOCK-1RB-low\_offset**



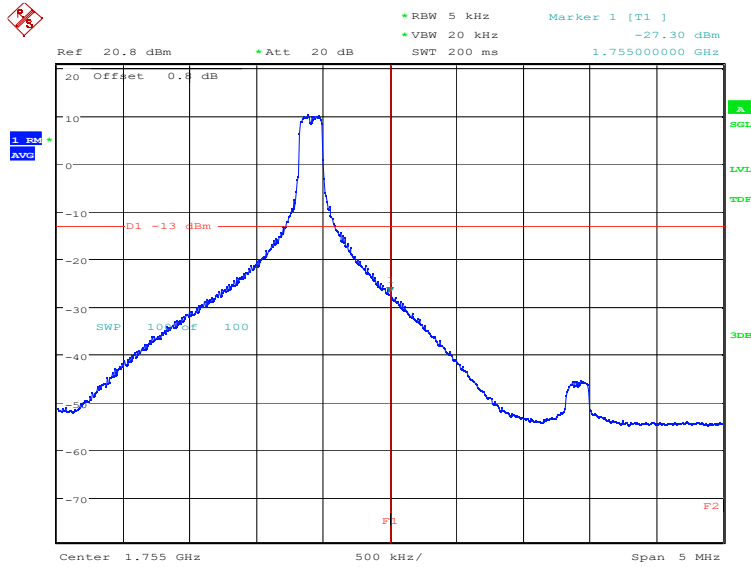
Date: 15.MAY.2023 14:56:18

**OBW: 1RB-high\_offset**



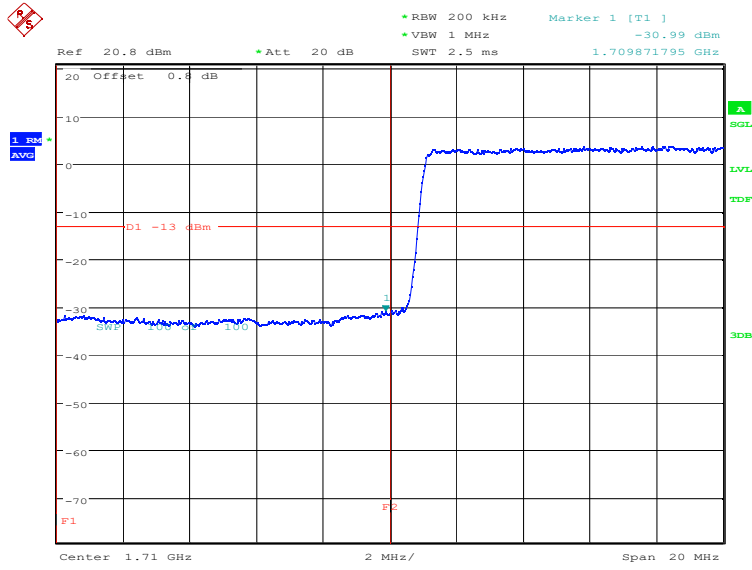
Date: 15.MAY.2023 14:56:54

**HIGH BAND EDGE BLOCK-1RB-high\_offset**



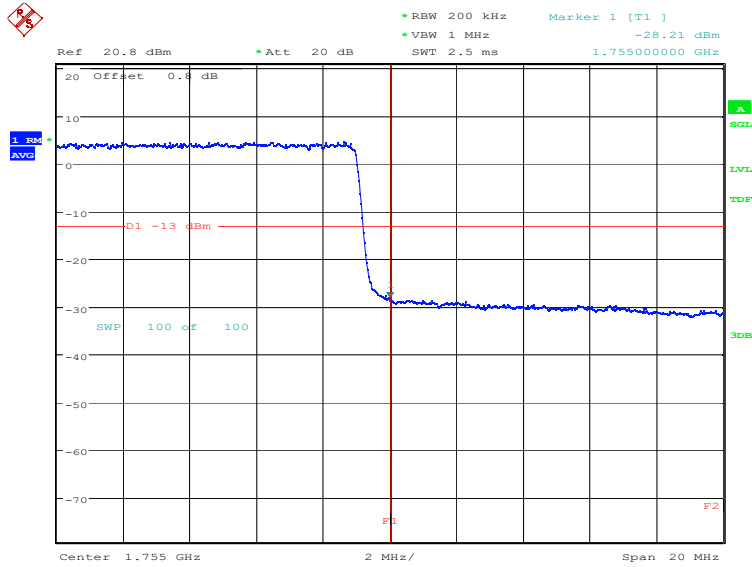
Date: 15.MAY.2023 14:58:08

### LOW BAND EDGE BLOCK-20MHz-100%RB



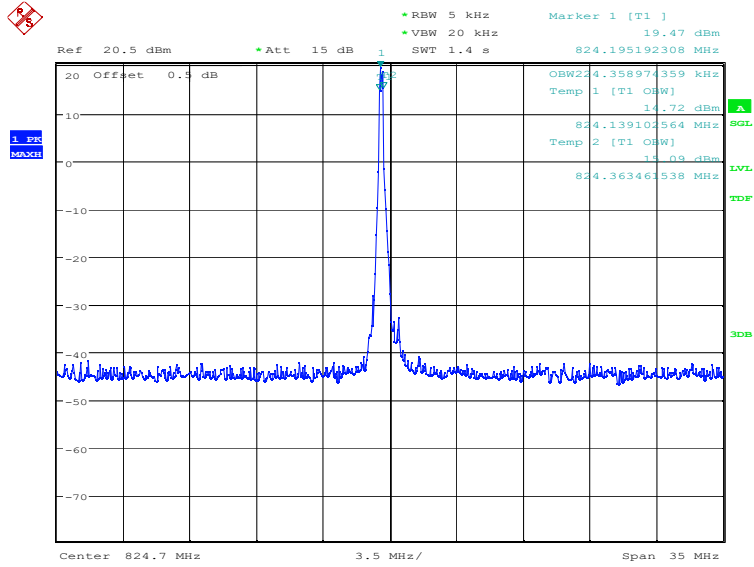
Date: 14.APR.2023 17:47:35

### HIGH BAND EDGE BLOCK-20MHz-100%RB



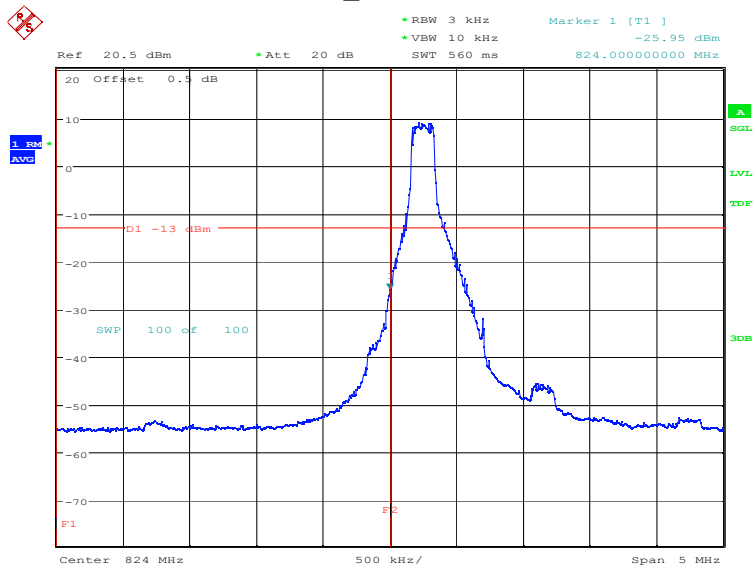
Date: 14.APR.2023 17:49:07

**LTE band 5**  
**OBW: 1RB-low\_offset**



Date: 15.MAY.2023 14:59:28

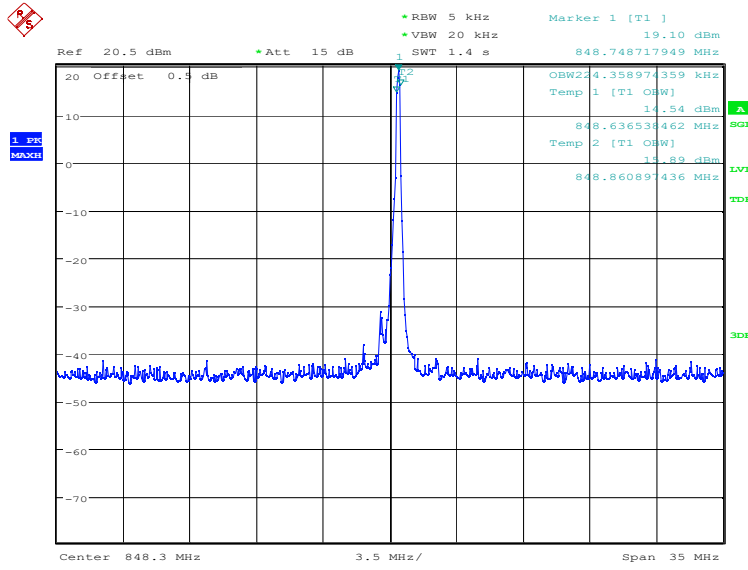
**LOW BAND EDGE BLOCK-1RB-low\_offset**



Date: 15.MAY.2023 15:00:42

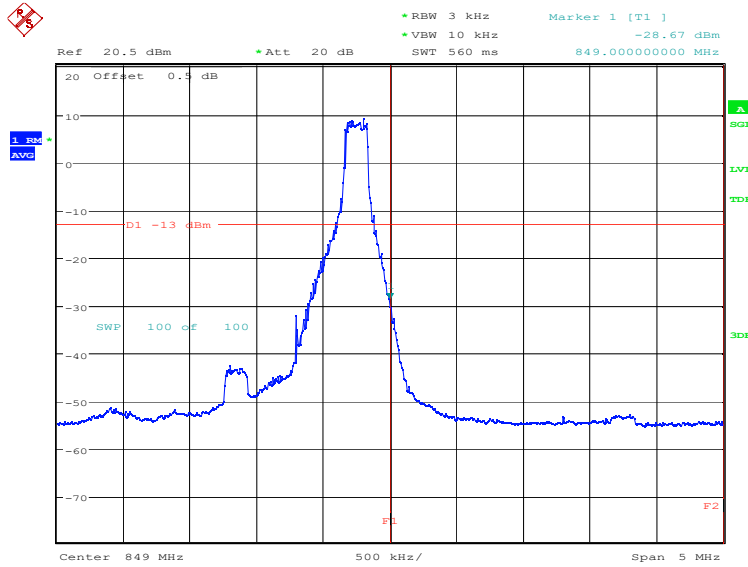


### OBW: 1RB-high\_offset



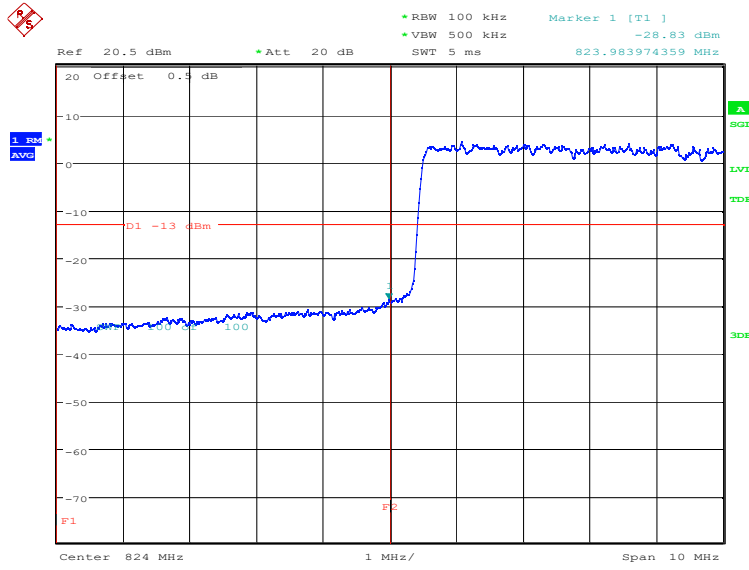
Date: 15.MAY.2023 15:01:18

### HIGH BAND EDGE BLOCK-1RB-high\_offset



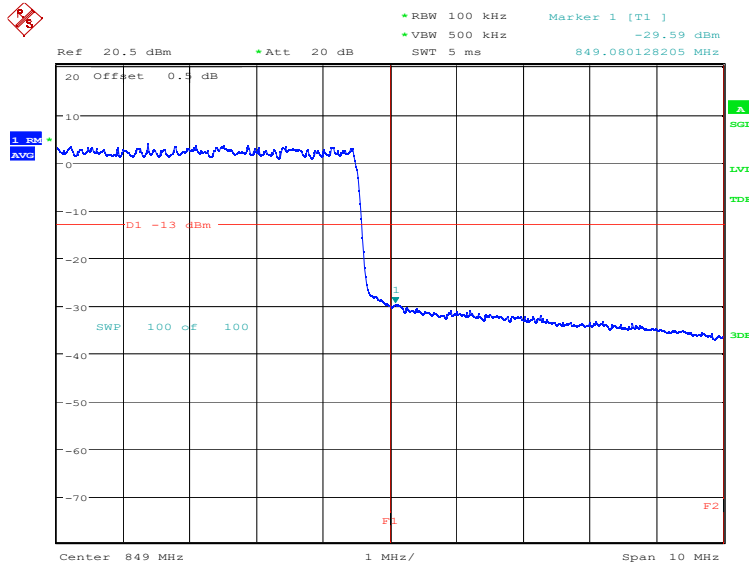
Date: 15.MAY.2023 15:02:33

**LOW BAND EDGE BLOCK-10MHz-100%RB**



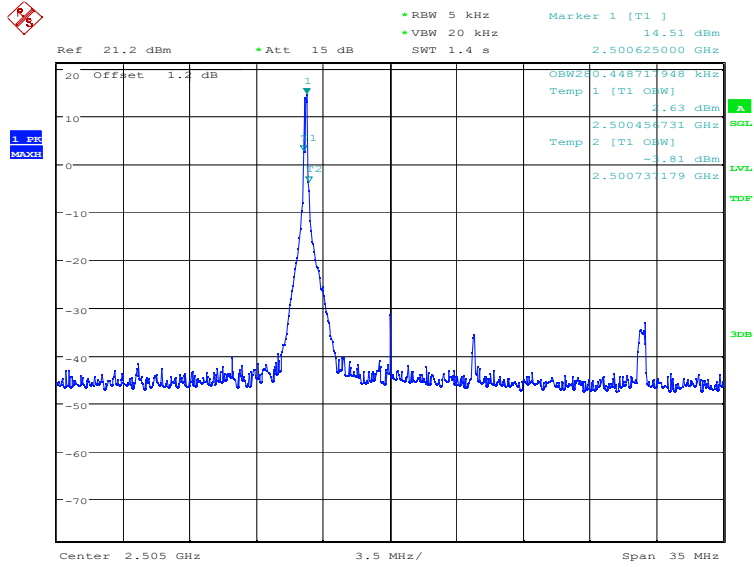
Date: 14.APR.2023 16:59:45

**HIGH BAND EDGE BLOCK-10MHz-100%RB**



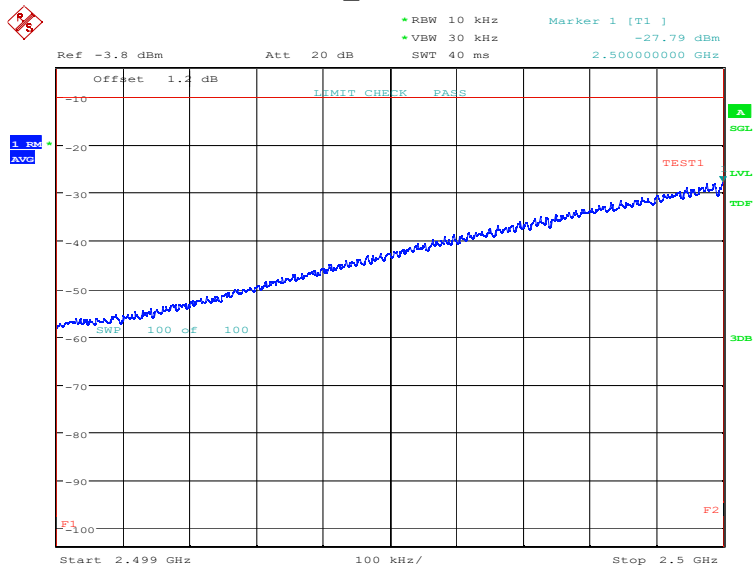
Date: 14.APR.2023 17:01:18

**LTE band 7**  
**OBW: 1RB-low\_offset**

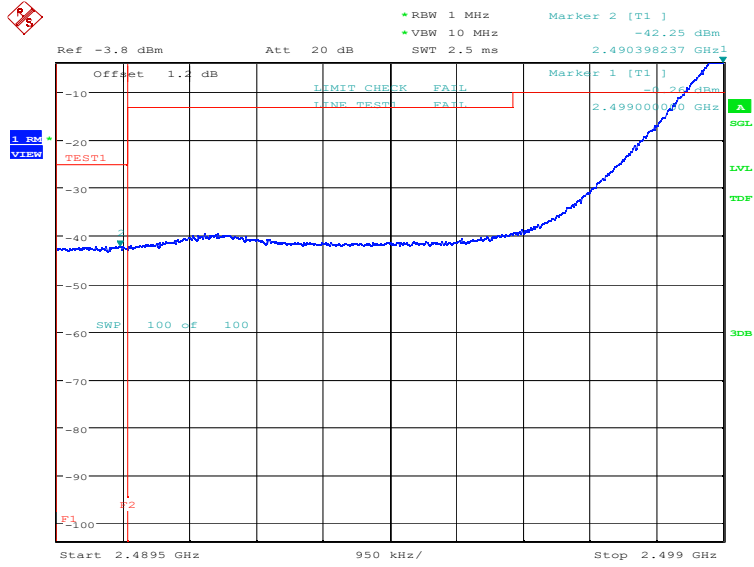


Date: 15.MAY.2023 15:03:13

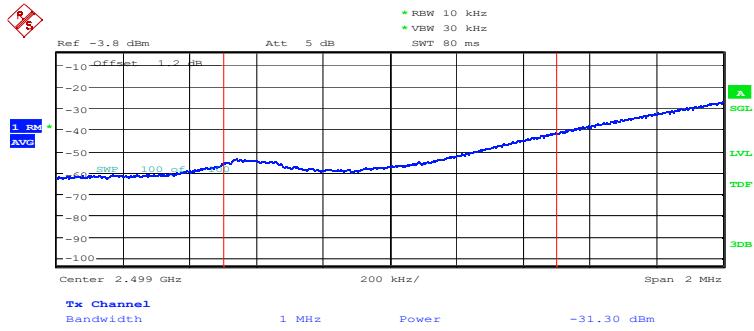
**LOW BAND EDGE BLOCK-1RB-low\_offset**



Date: 15.MAY.2023 15:04:34

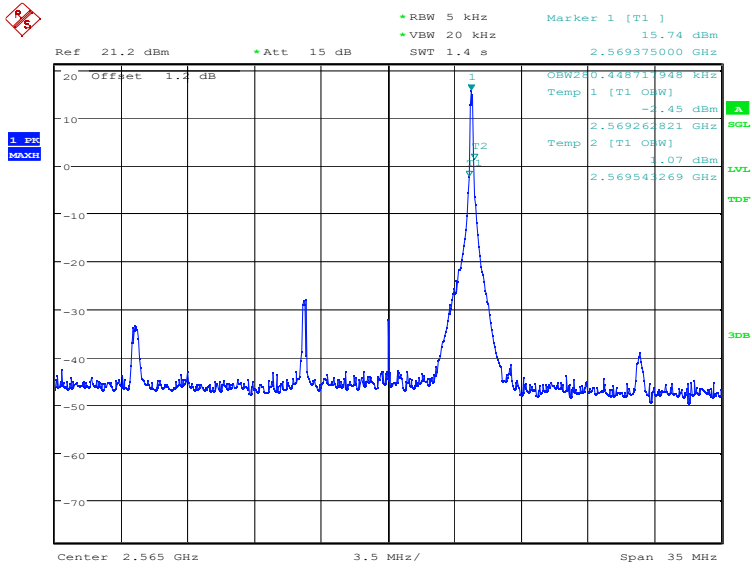


Date: 15.MAY.2023 15:06:23



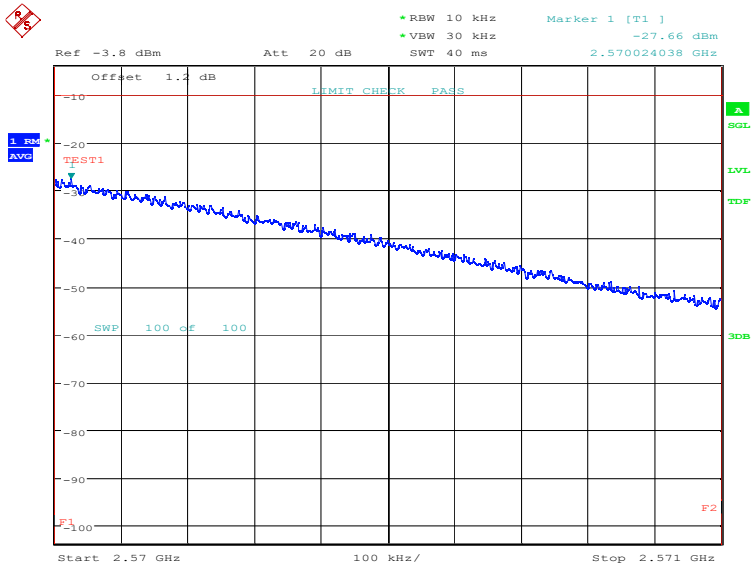
Date: 15.MAY.2023 15:06:51

**OBW: 1RB-high\_offset**

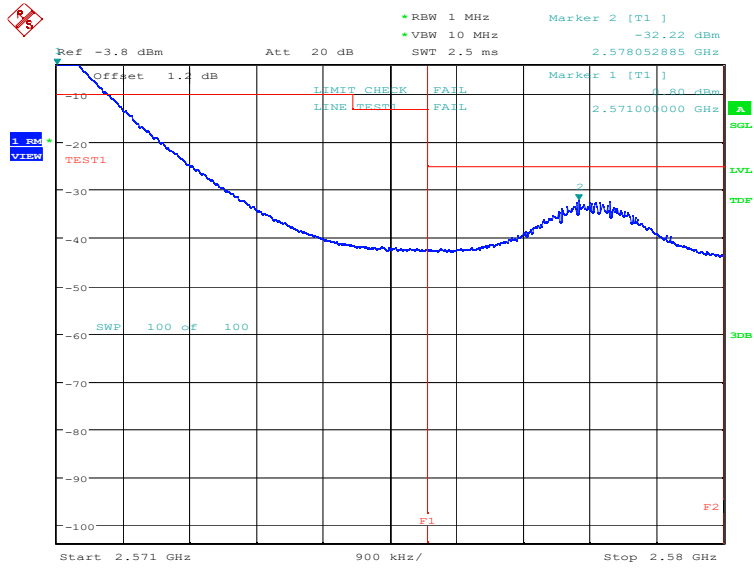


Date: 15.MAY.2023 15:07:27

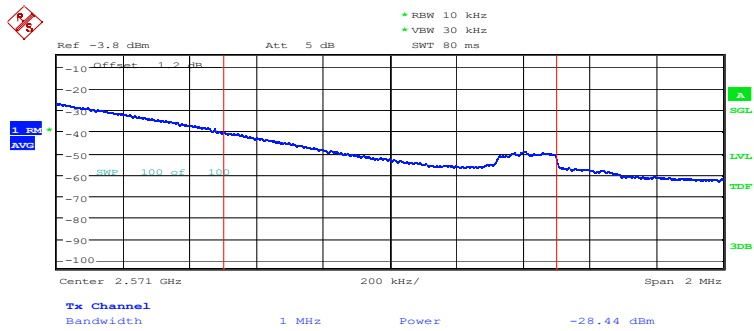
**HIGH BAND EDGE BLOCK-1RB-high\_offset**



Date: 15.MAY.2023 15:08:48

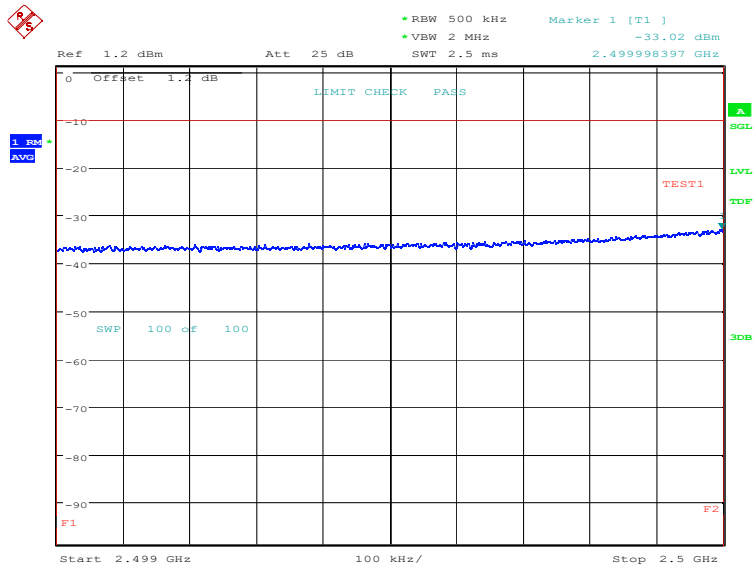


Date: 15.MAY.2023 15:10:37

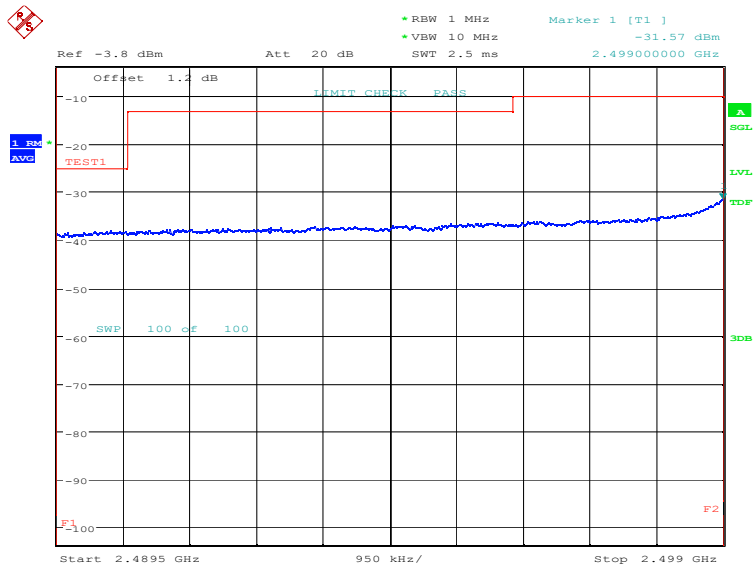


Date: 15.MAY.2023 15:11:05

### LOW BAND EDGE BLOCK-20MHz-100%RB

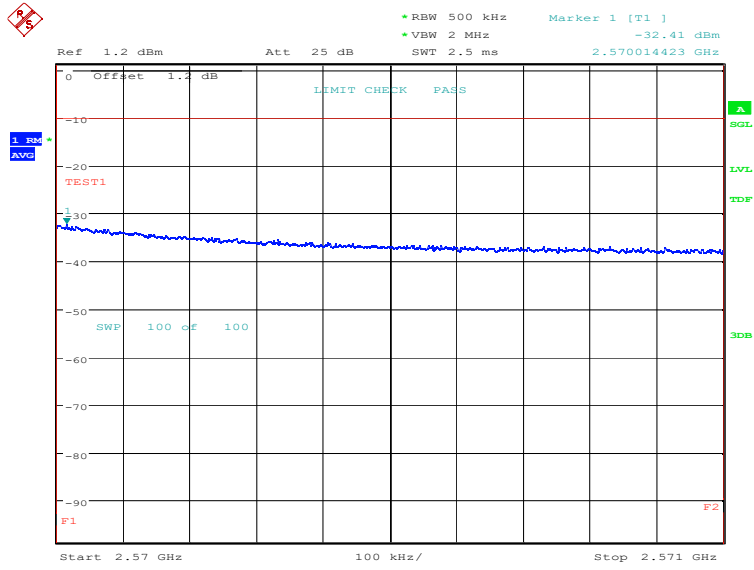


Date: 14.APR.2023 17:04:18

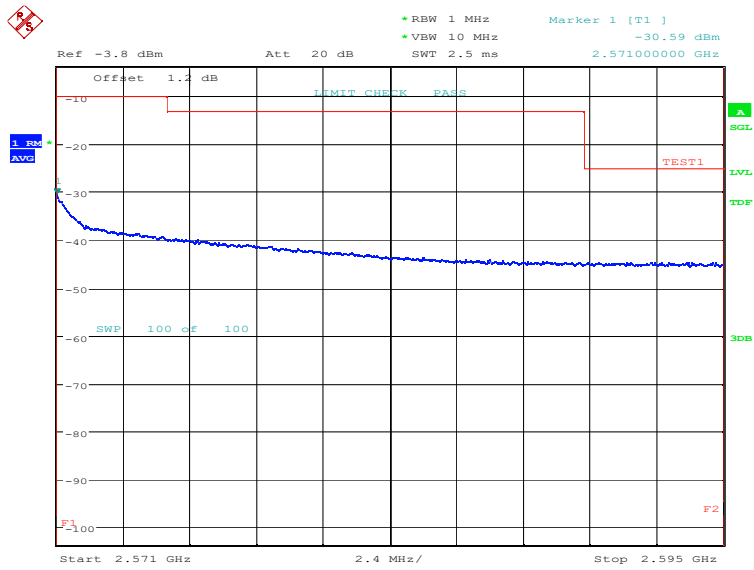


Date: 14.APR.2023 17:05:59

### HIGH BAND EDGE BLOCK-20MHz-100%RB



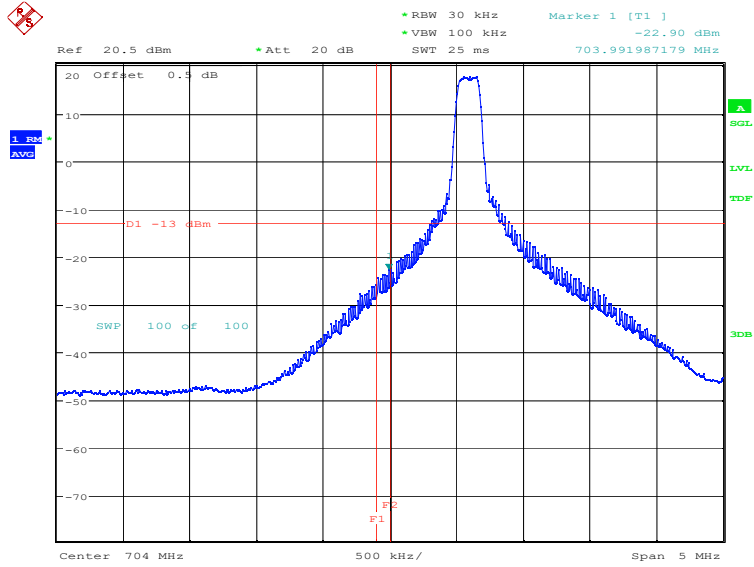
Date: 14.APR.2023 17:08:58



Date: 14.APR.2023 17:10:39

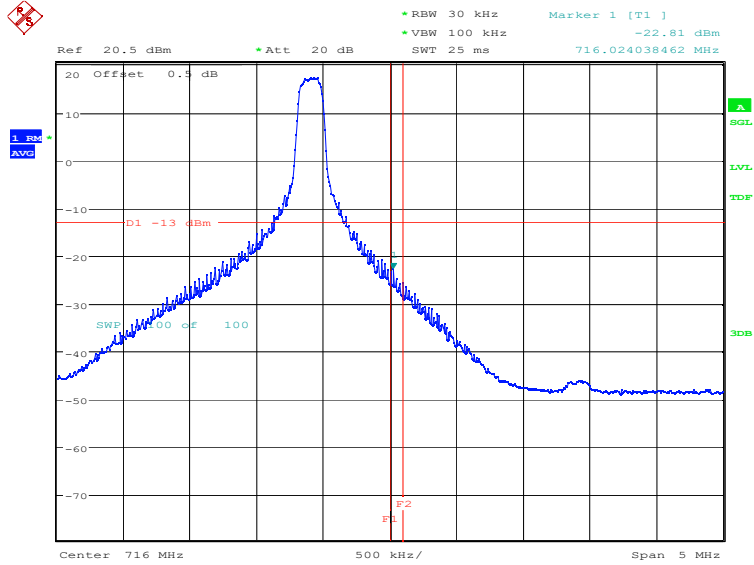


**LTE band 17**  
**LOW BAND EDGE BLOCK-1RB-low\_offset**



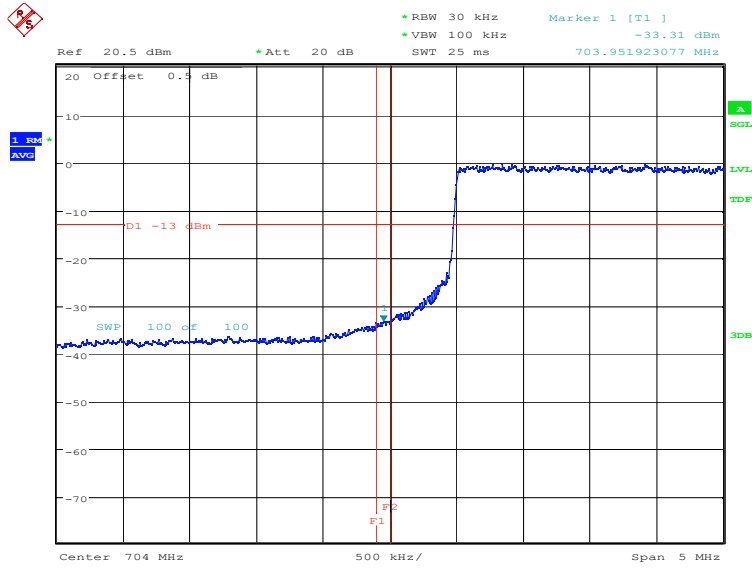
Date: 15.MAY.2023 15:12:02

**HIGH BAND EDGE BLOCK-1RB-high\_offset**



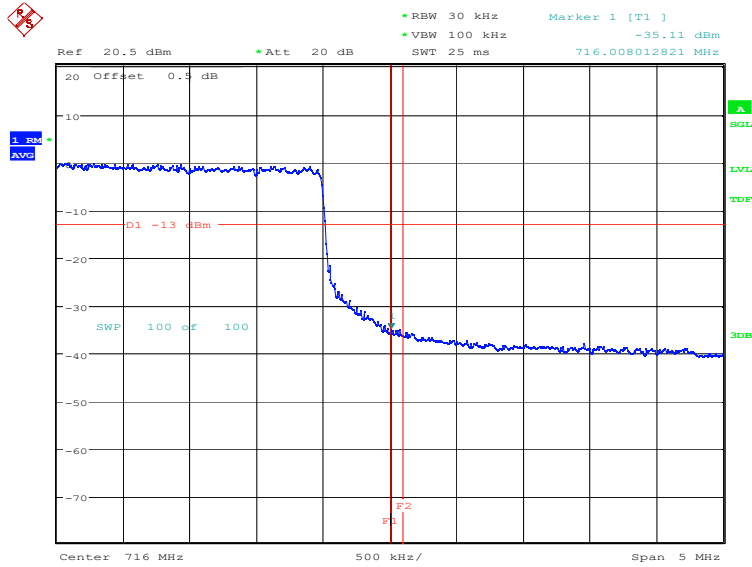
Date: 15.MAY.2023 15:12:57

**LOW BAND EDGE BLOCK-10MHz-100%RB**



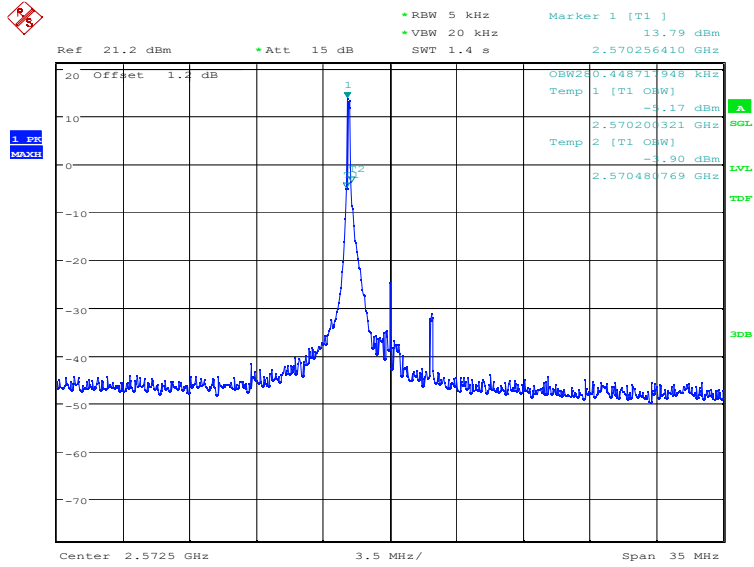
Date: 14.APR.2023 17:13:17

**HIGH BAND EDGE BLOCK-10MHz-100%RB**



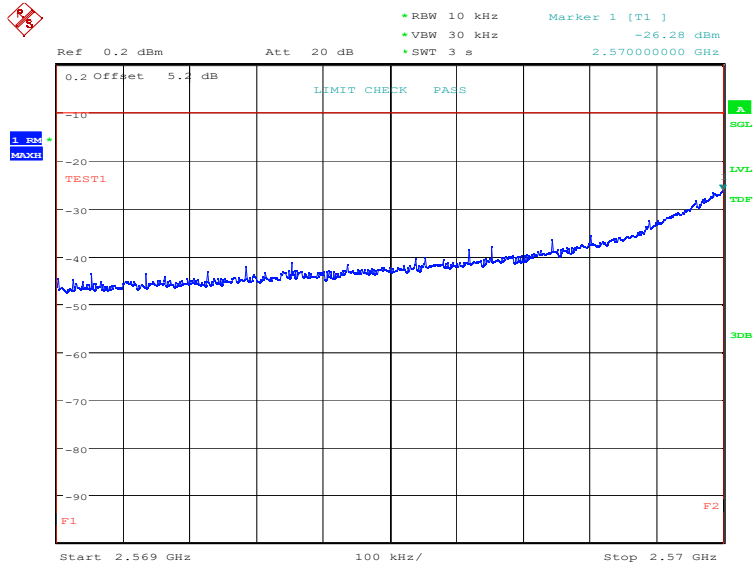
Date: 14.APR.2023 17:14:49

**LTE band 38**  
**OBW: 1RB-low\_offset**

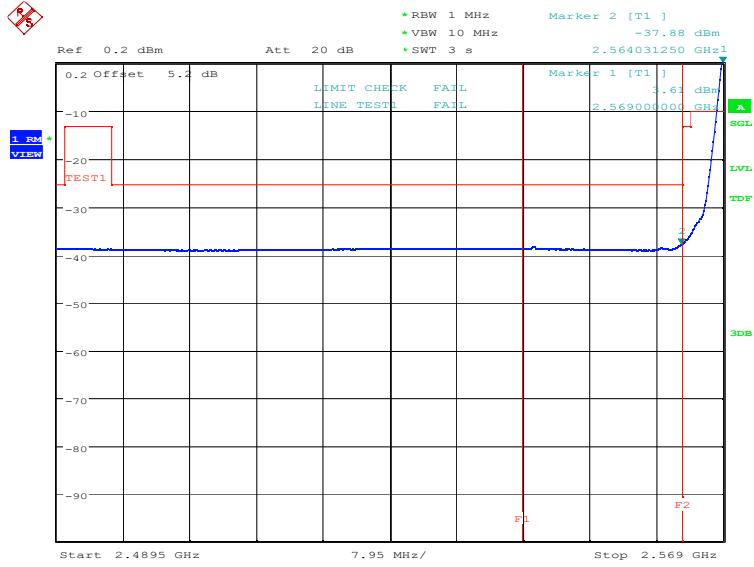


Date: 15.MAY.2023 15:18:03

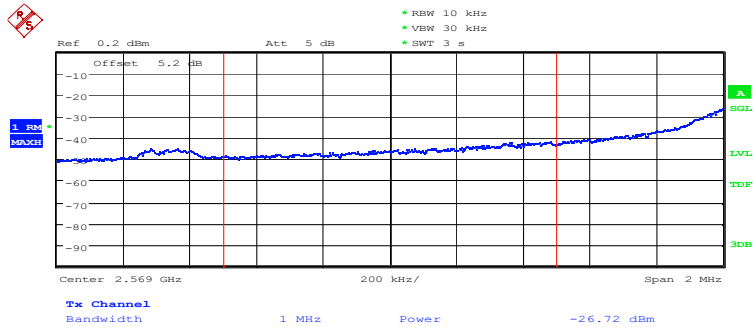
**LOW BAND EDGE BLOCK-1RB-low\_offset**



Date: 15.MAY.2023 15:18:44

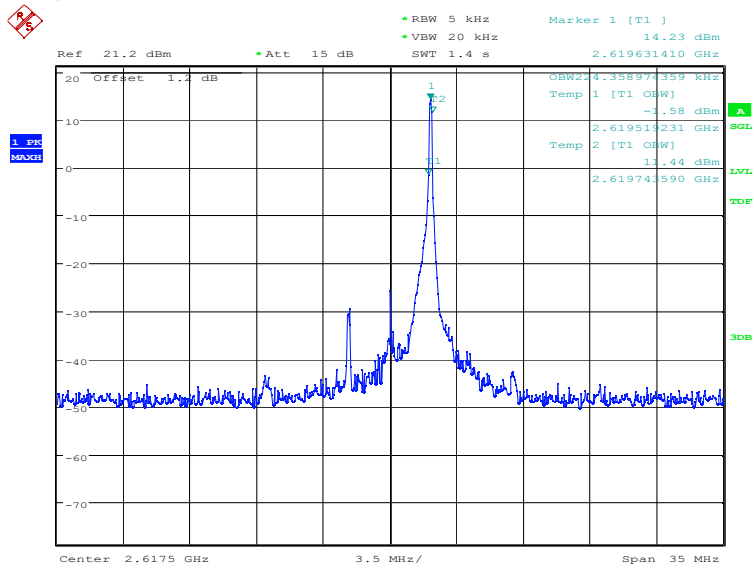


Date: 15.MAY.2023 15:19:31



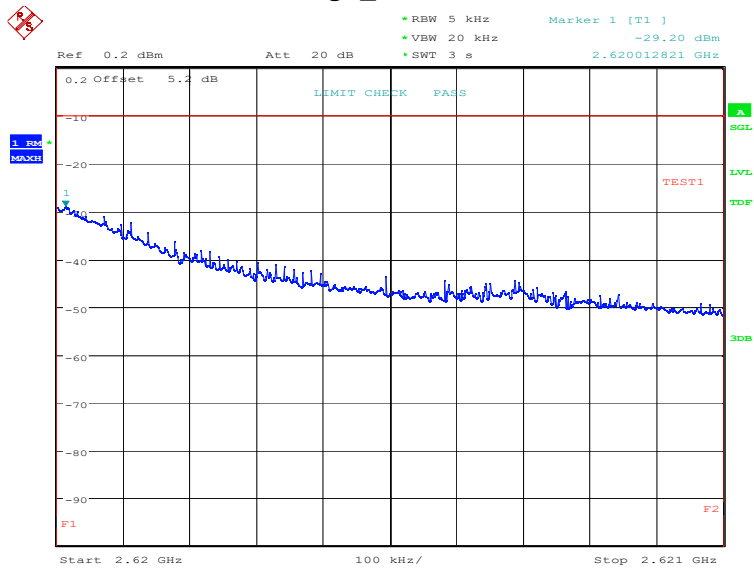
Date: 15.MAY.2023 15:19:49

### OBW: 1RB-high\_offset

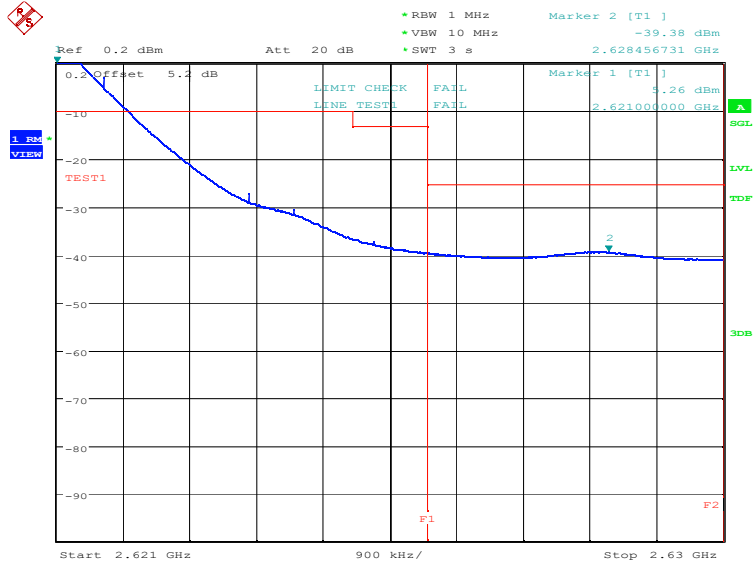


Date: 15.MAY.2023 15:20:25

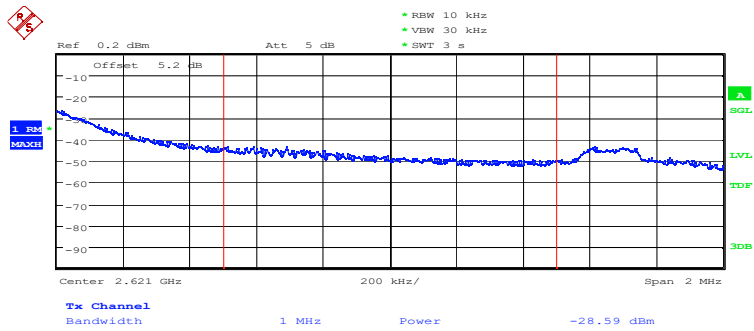
### HIGH BAND EDGE BLOCK-1RB-high\_offset



Date: 15.MAY.2023 15:21:06

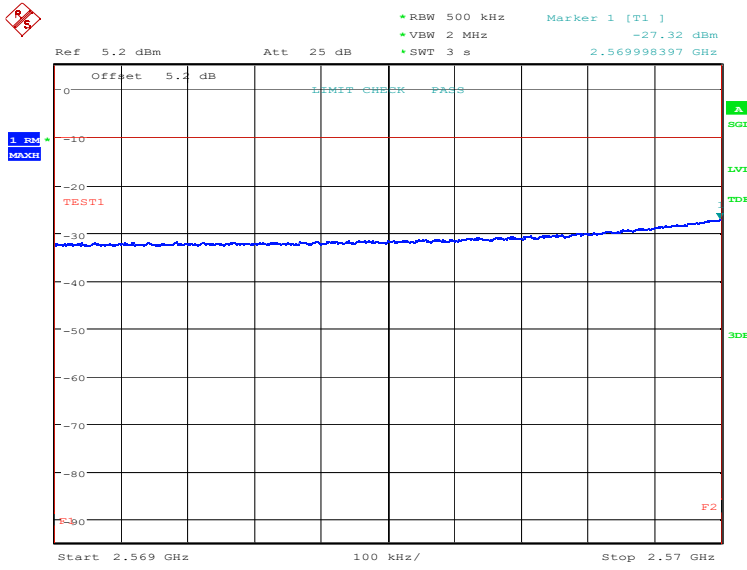


Date: 15.MAY.2023 15:21:54

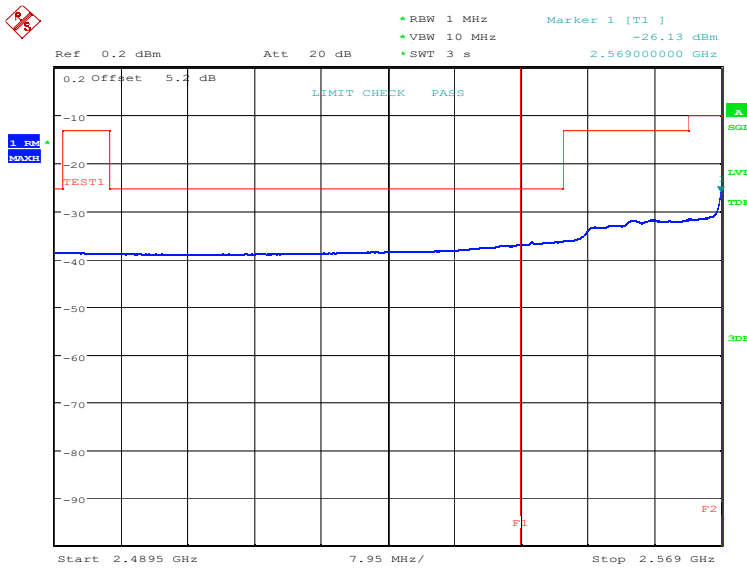


Date: 15.MAY.2023 15:22:11

### LOW BAND EDGE BLOCK-20MHz-100%RB

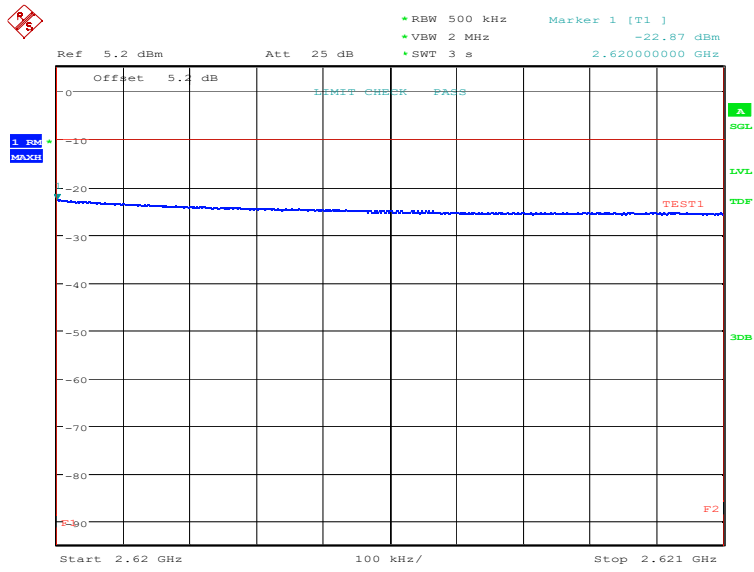


Date: 14.APR.2023 17:51:46

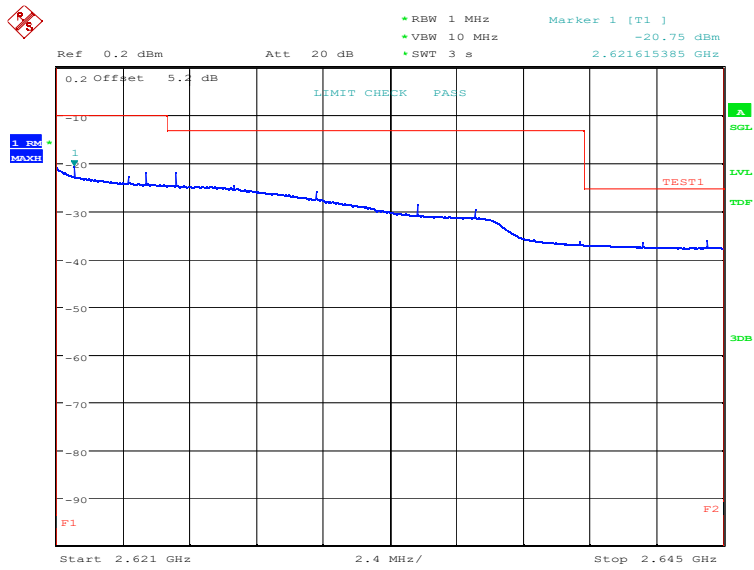


Date: 14.APR.2023 17:52:24

### HIGH BAND EDGE BLOCK-20MHz-100%RB



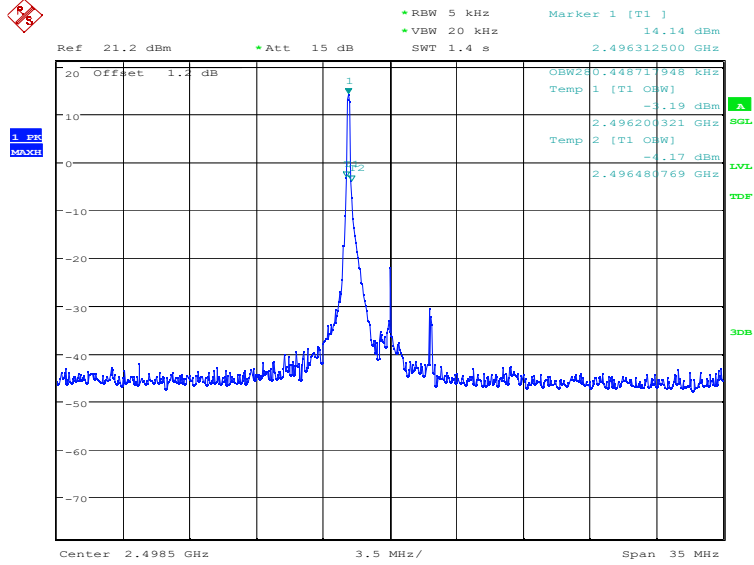
Date: 14.APR.2023 17:54:20



Date: 14.APR.2023 17:54:59

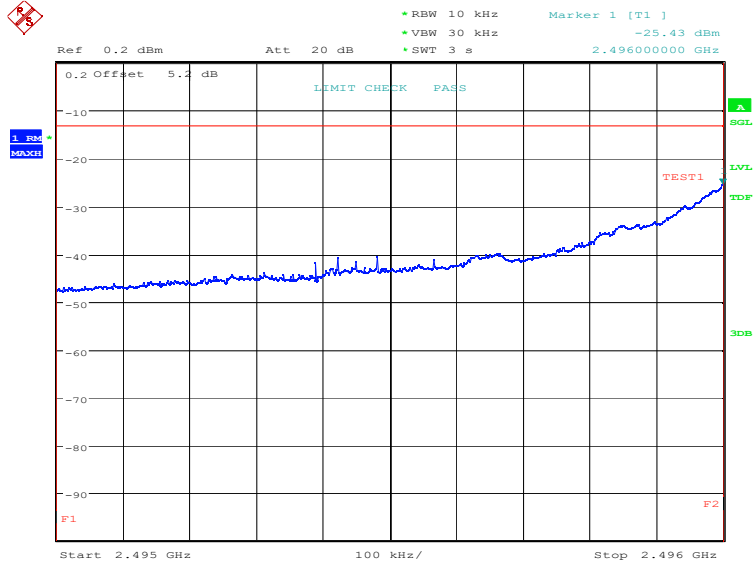


**LTE band 41**  
**OBW: 1RB-low\_offset**

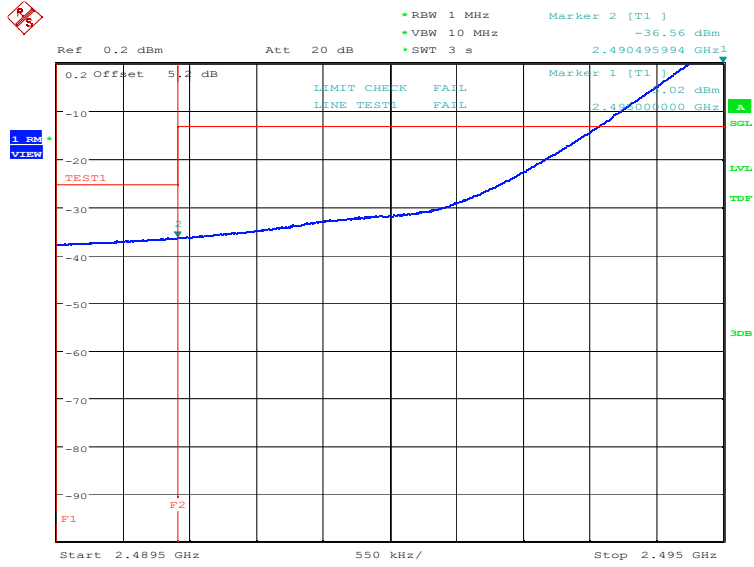


Date: 15.MAY.2023 15:22:48

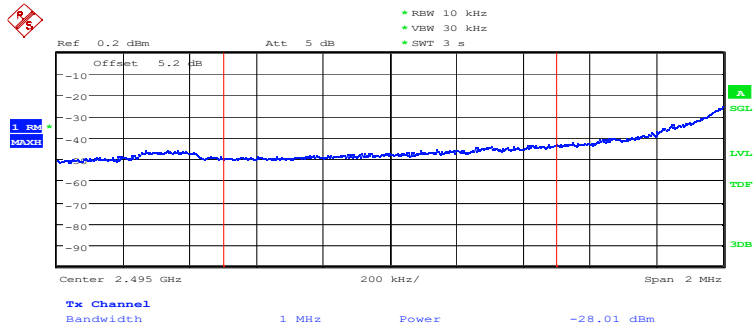
**LOW BAND EDGE BLOCK-1RB-low\_offset**



Date: 15.MAY.2023 15:23:30

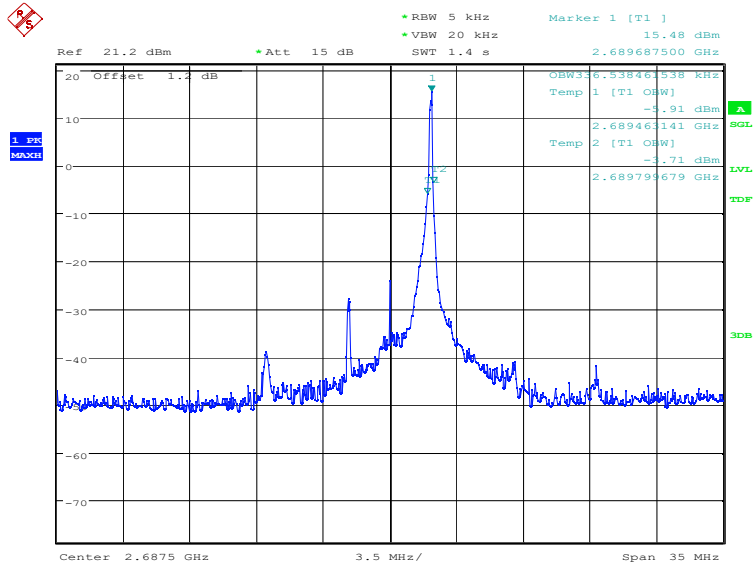


Date: 15.MAY.2023 15:24:14



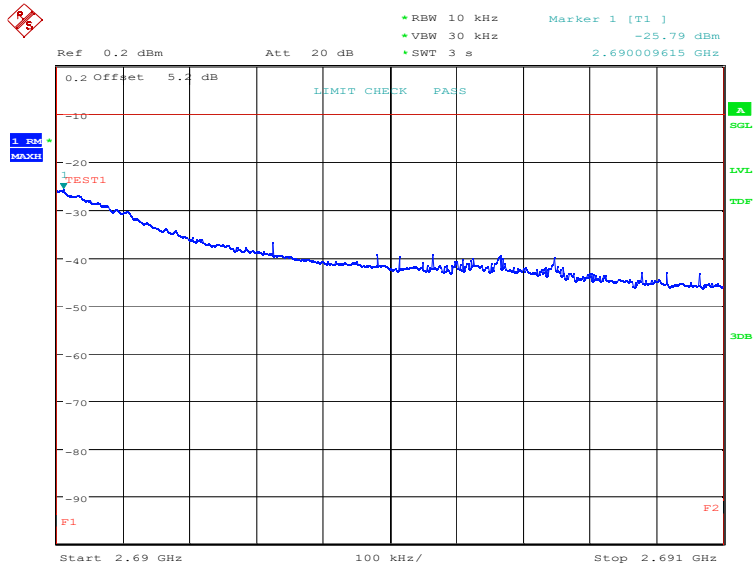
Date: 15.MAY.2023 15:24:32

**OBW: 1RB-high\_offset**

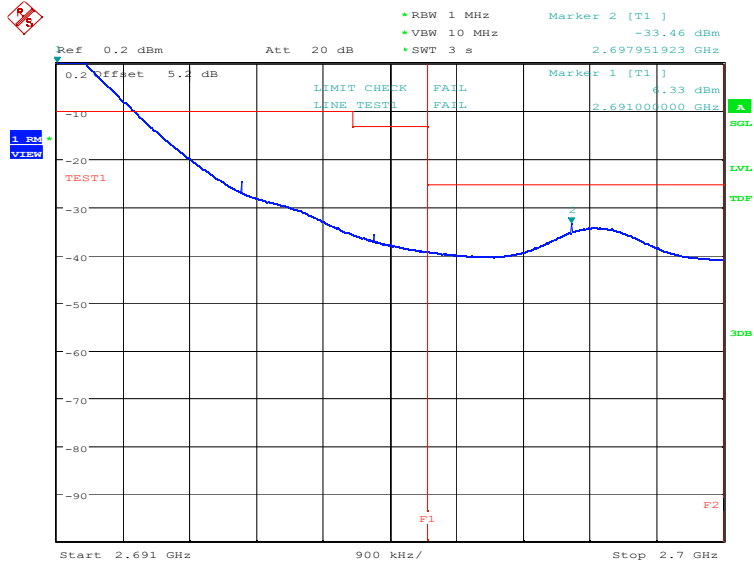


Date: 15.MAY.2023 15:25:08

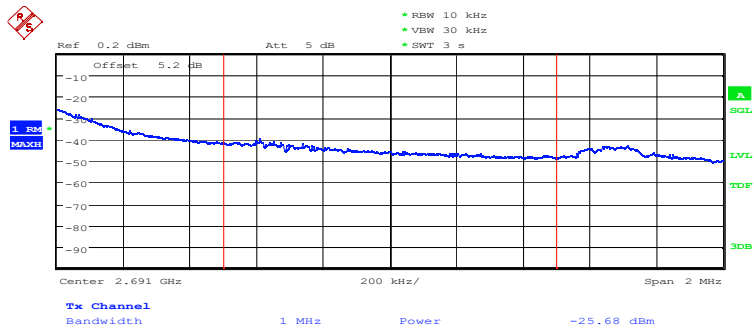
**HIGH BAND EDGE BLOCK-1RB-high\_offset**



Date: 15.MAY.2023 15:25:49

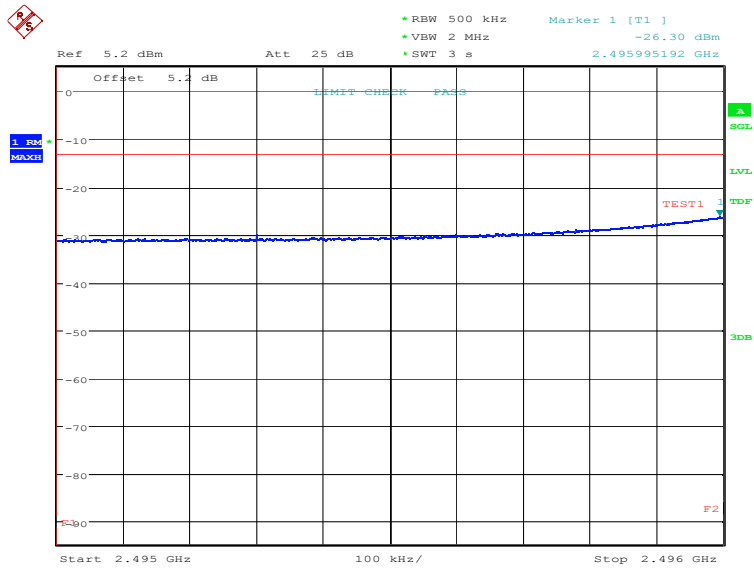


Date: 15.MAY.2023 15:26:36

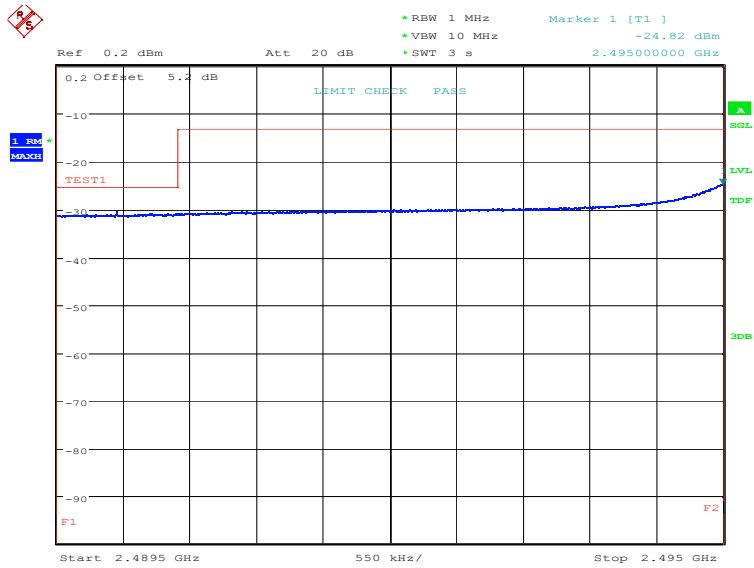


Date: 15.MAY.2023 15:26:54

### LOW BAND EDGE BLOCK-20MHz-100%RB

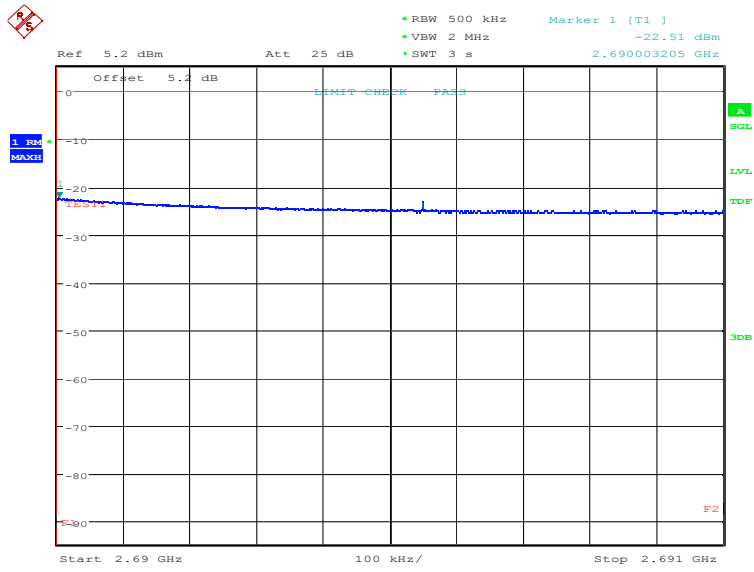


Date: 14.APR.2023 17:20:37

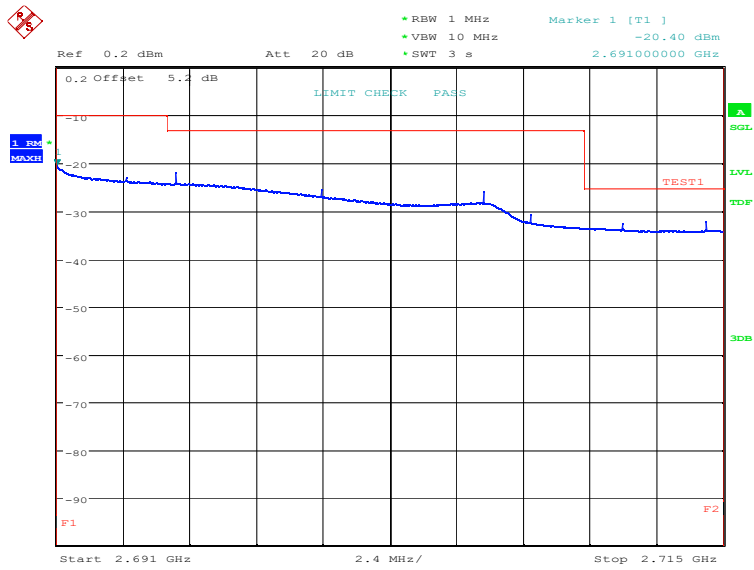


Date: 14.APR.2023 17:21:16

### HIGH BAND EDGE BLOCK-20MHz-100%RB

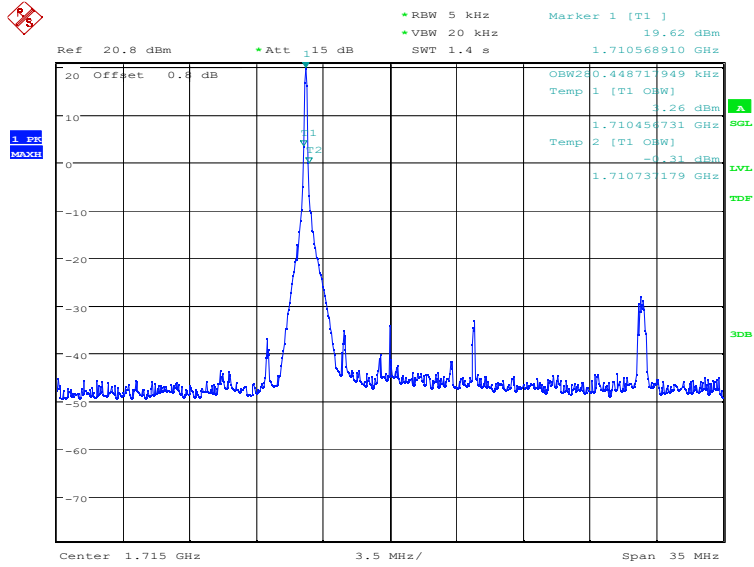


Date: 14.APR.2023 17:23:13



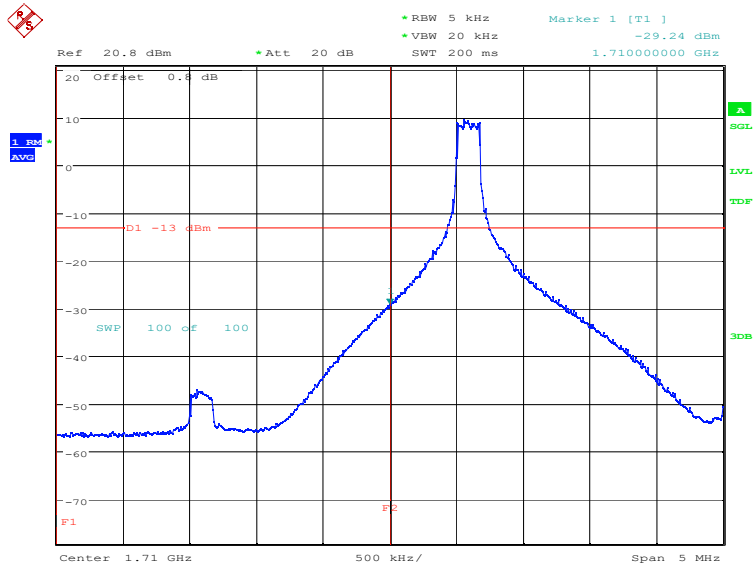
Date: 14.APR.2023 17:23:53

**LTE band 66**  
**OBW: 1RB-low\_offset**



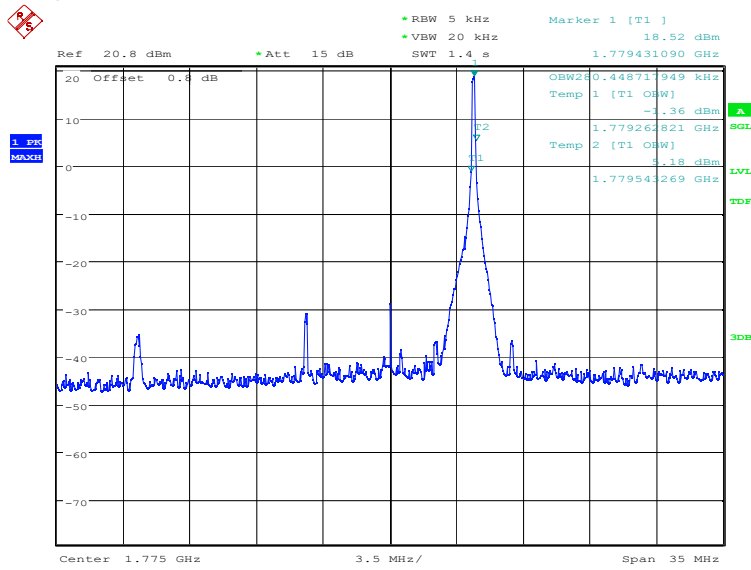
Date: 15.MAY.2023 15:13:35

**LOW BAND EDGE BLOCK-1RB-low\_offset**



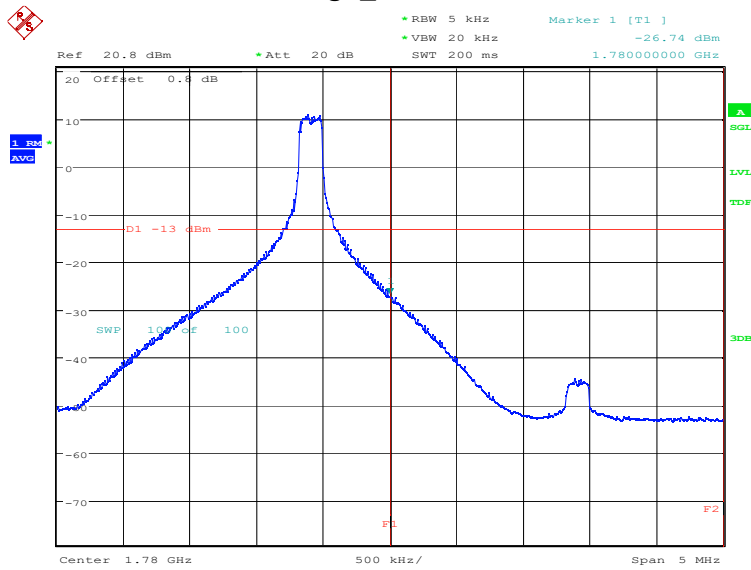
Date: 15.MAY.2023 15:14:50

### OBW: 1RB-high\_offset



Date: 15.MAY.2023 15:15:26

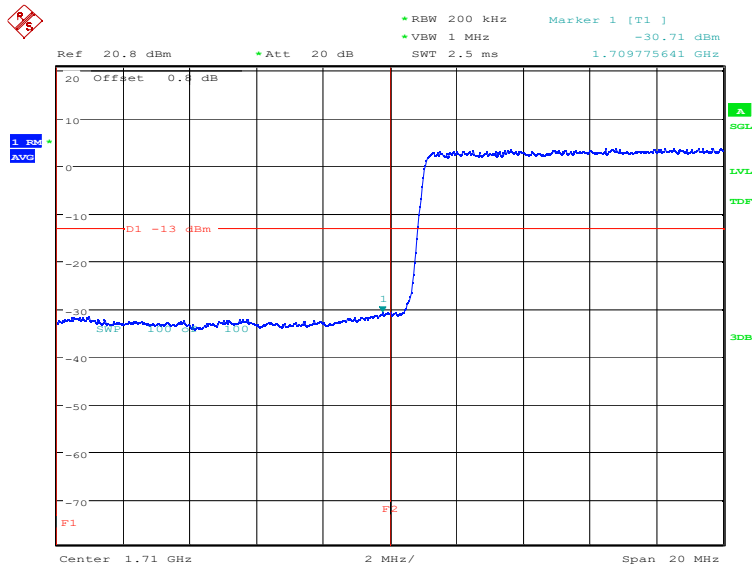
### HIGH BAND EDGE BLOCK-1RB-high\_offset



Date: 15.MAY.2023 15:16:40

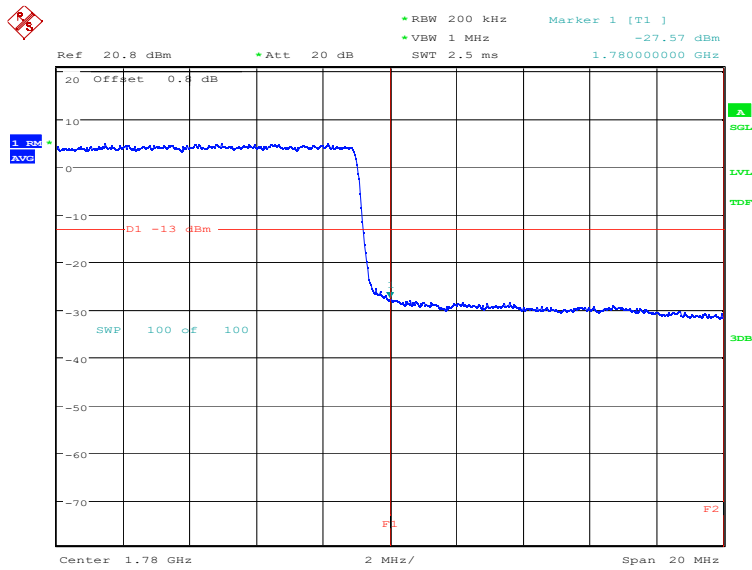


### LOW BAND EDGE BLOCK-20MHz-100%RB



Date: 14.APR.2023 17:16:24

### HIGH BAND EDGE BLOCK-20MHz-100%RB



Date: 14.APR.2023 17:17:57

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

### **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(m) specifies for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log(P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

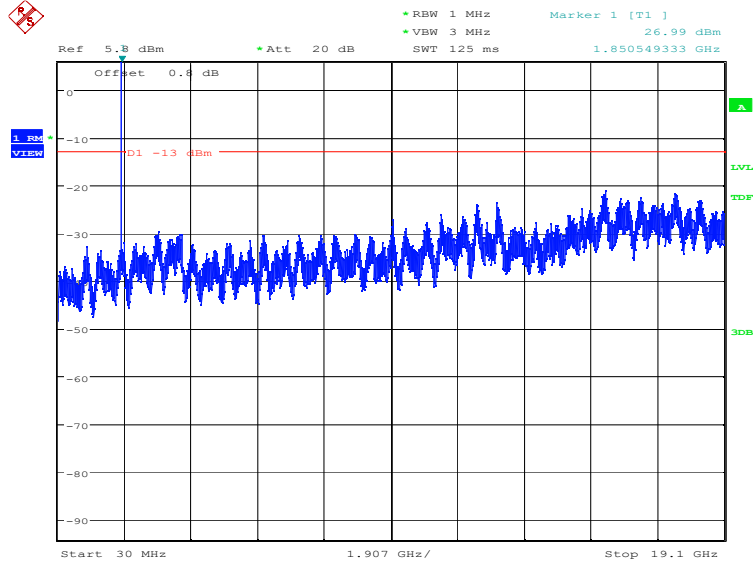
Part 27.53(g) states for operations in the 600 MHz band and the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log(P)$  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.

### A. 7.3 Measurement result

Only the worst case result is given below

#### LTE band 2: 30MHz – 19.1GHz

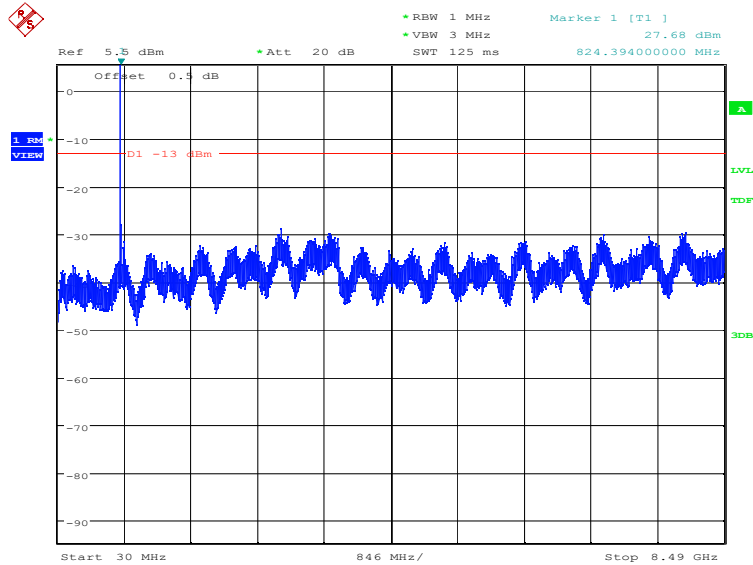
NOTE: peak above the limit line is the carrier frequency.



Date: 15.MAY.2023 15:28:53

#### LTE band 5: 30MHz – 8.49GHz

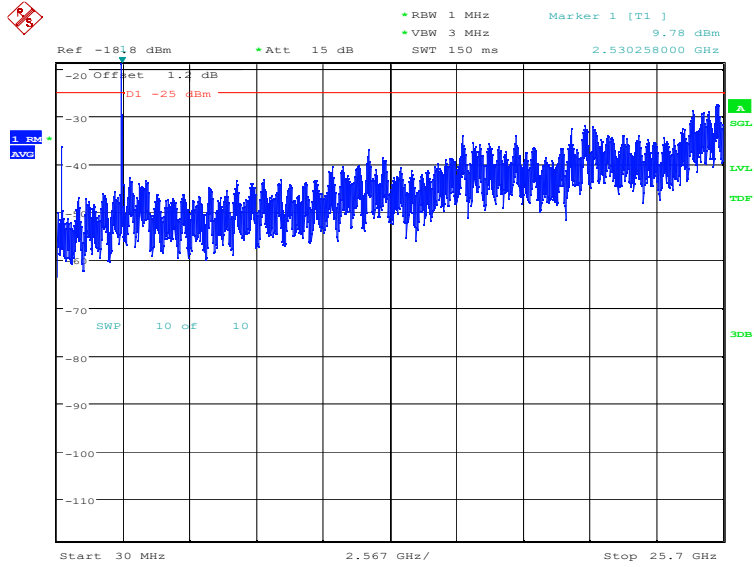
NOTE: peak above the limit line is the carrier frequency.



Date: 15.MAY.2023 15:29:35

**LTE band 7: 30MHz – 25.7GHz**

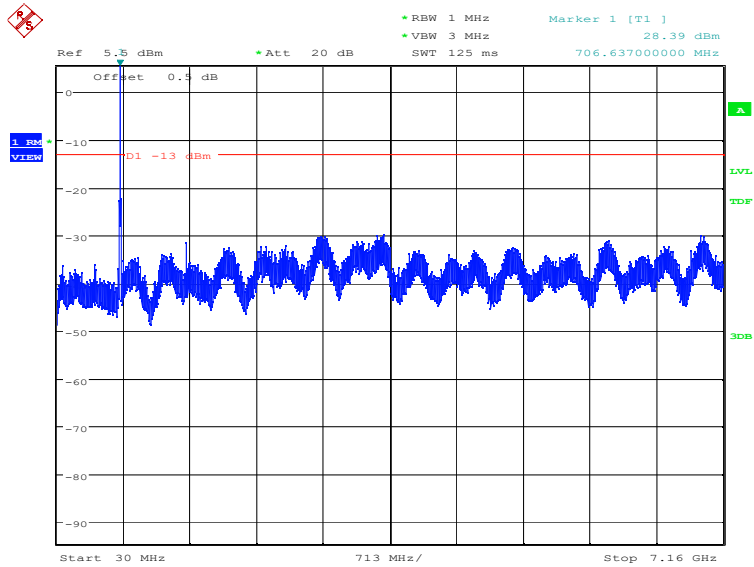
**NOTE: peak above the limit line is the carrier frequency.**



Date: 15.MAY.2023 15:30:03

**LTE band 17: 30MHz – 7.16GHz**

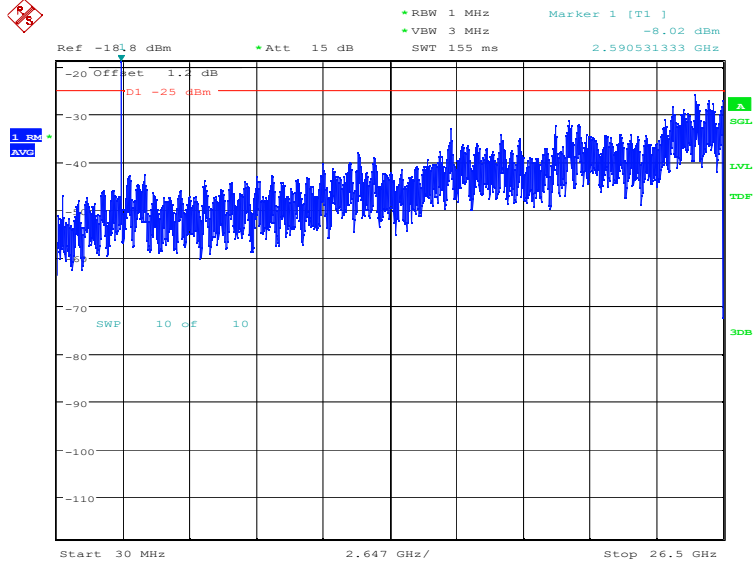
**NOTE: peak above the limit line is the carrier frequency.**



Date: 15.MAY.2023 15:31:20

**LTE band 41: 30MHz – 26.5GHz**

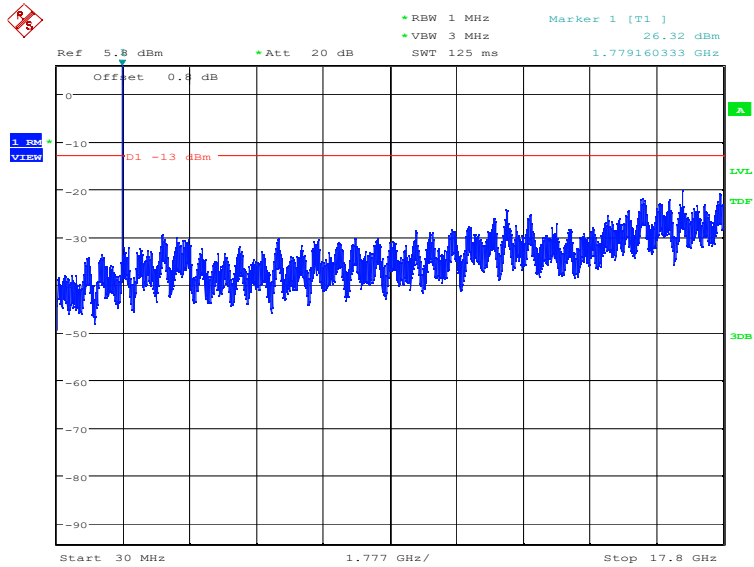
**NOTE: peak above the limit line is the carrier frequency.**



Date: 15.MAY.2023 15:36:51

**LTE band 66: 30MHz – 17.8GHz**

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



Date: 15.MAY.2023 15:32:04

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	64QAM
	6.70	7.28	7.37

### **LTE band 7, 20MHz**

Frequency(MHz)	PAPR(dB)		
2535.0	QPSK	16QAM	64QAM
	7.66	7.82	7.98

### **LTE band 17, 10MHz**

Frequency(MHz)	PAPR(dB)		
710.0	QPSK	16QAM	64QAM
	5.51	6.38	6.57

### **LTE band 41, 20MHz**

Frequency (MHz)	PAPR (dB)		
2593.0	QPSK	16QAM	64QAM
	8.37	8.91	9.01

### **LTE band 66, 20MHz**

Frequency(MHz)	PAPR(dB)		
1745.0	QPSK	16QAM	64QAM
	6.67	7.31	7.40

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

## Annex B: Accreditation Certificate

<p>United States Department of Commerce National Institute of Standards and Technology</p>  	
<hr/> <b>Certificate of Accreditation to ISO/IEC 17025:2017</b> <hr/>	
NVLAP LAB CODE: 600118-0	
<b>Telecommunication Technology Labs, CAICT</b> Beijing China	
<i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:</i>	
<b>Electromagnetic Compatibility &amp; Telecommunications</b>	
<i>This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).</i>	
<hr/> 2022-10-01 through 2023-09-30 <i>Effective Dates</i>	 <hr/> <i>[Signature]</i> For the National Voluntary Laboratory Accreditation Program

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