



# TEST REPORT

## No. I19Z70327-WMD03

for

**Samsung Electronics. Co., Ltd.**

**Mobile phone**

**Model Name: SM-A015T1**

**FCC ID: ZCASMA015T1**

**with**

**Hardware Version: REV3.0**

**Software Version: A015T1.001 (A015T1UVE0ASJ6)**

**Issued Date: 2020-01-15**

**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.

**Test Laboratory:**

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## REPORT HISTORY

Report Number	Revision	Description	Issue Date
I19Z70327-WMD03	Rev.0	1 <sup>st</sup> edition	2020-01-15

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 17025:2005 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 (CN0066). 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 (Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road,  
Haidian District, Beijing, P. R. China 100191

### 1.3. Testing Environment

Normal Temperature: 15-35 °C

Relative Humidity: 20-75%

### 1.4. Project data

Testing Start Date: 2019-10-20

Testing End Date: 2020-01-15

### 1.5. Signature



Dong Yuan

(Prepared this test report)



Zhou Yu

(Reviewed this test report)



Zhao Hui Lin

Deputy Director of the laboratory

(Approved this test report)

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: Samsung Electronics. Co., Ltd.  
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### **2.2. Manufacturer Information**

Company Name: Samsung Electronics. Co., Ltd.  
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Contact: Youngtong gu, Suwon city 443 742, Korea  
Email: JP KIM  
Telephone: jp426.kim@samsung.com  
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### **3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

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

Description	Mobile phone
Model Name	SM-A015T1
FCC ID	ZCASMA015T1
Antenna	Embedded
Output power	24.38dBm maximum EIRP measured for LTE Band 2
Extreme vol. Limits	3.6VDC to 4.2VDC (nominal: 3.85VDC)
Extreme temp. Tolerance	-10C to +55C

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

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

EUT ID*	IMEI	HW Version	SW Version	Date of receipt
UT11a	351765110000265	REV3.0	A015T1.001 (A015T1UVE0ASJ6)	2019-11-10
UT29a	351767110019782	REV3.0	A015T1.001 (A015T1UVE0ASJ6)	2019-11-10

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

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

AE ID*	Description
AE1	Battery
AE2	Battery
AE1	
Model	Secondary Li-ion Battery
Manufacturer	Ningde Amperex Technology Limited
Capacitance	2920mAh/3000mAh
Nominal voltage	3.85 V
AE2	
Model	Secondary Li-ion Battery
Manufacturer	SCUD(Fujian) Electronics Co., Ltd.
Capacitance	2920mAh/3000mAh
Nominal voltage	3.85 V

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

## 4. Reference Documents

### 4.1. Reference Documents for testing

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

Reference	Title	Version
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-18 Edition
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-18 Edition
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-18 Edition
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
ANSI/TIA-102.CAAA -E	DIGITAL C4FMCQPSK TRANSCEIVER MEASUREMENT METHODS	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. LABORATORY ENVIRONMENT

**Fully-anechoic chamber FAC-3** (9 meters×6.5 meters×4 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

## 6. SUMMARY OF TEST RESULT

### 6.1. Summary of test results

#### LTE Band 2

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

#### LTE Band 5

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

#### LTE Band 7

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	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 12**

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	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**

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	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 71**

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	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.

## 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.

**6.2. Explanation of re-use of test data**

The Equipment Under Test (EUT) model SM-A015T1 (FCC ID: ZCASMA015T1) is a variant product of SM-A015V (ZCASMA015V). According to the declaration of changes provided by the applicant and FCC KDB publication 484596 D01, spot check measurements were performed on this device. LTE Bands 7,12,66,71 are tested, the frequency stability of LTE Bands 2,5 are tested, other test results are derived from test report No.I19Z70303-WMD03. Please refer Annex A for detail spot check verification data and reference data. The spot check test results are consistent with basic model.

For detail differences between two models please refer the Declaration of Changes document.

## 7. Test Equipment Utilized

NO.	Description	Type	Series Number	Manufacture	Cal Due Date	Calibration Interval
1	Universal Radio Communication Tester	CMW500	159082	R&S	2020-12-24	1 year
2	Spectrum Analyzer	FSU26	200030	R&S	2020-06-03	1 year
3	Climate chamber	SH-242	93008556	ESPEC	2020-12-21	3 year
4	EMI Antenna	VULB9163	9163-235	Schwarzbeck	2020-11-20	1 year
5	EMI Antenna	3117	00058889	ETS-Lindgren	2020-02-02	1 year
6	EMI Antenna	3117	00119024	ETS-Lindgren	2020-02-25	1 year
7	EMI Antenna	9117	167	Schwarzbeck	2020-05-27	1 year
8	Signal Generator	N5183A	MY49060052	R&S	2020-06-24	1 year
9	Test Receiver	E4440A	MY48250642	Agilent	2020-03-18	1 year
10	Universal Radio Communication Tester	CMW500	143008	R&S	2020-11-26	1 year

## **ANNEX A: MEASUREMENT RESULTS**

### **A.1 OUTPUT POWER**

#### **A.1.1 Summary**

During the process of testing, the EUT was controlled via Rhode & Schwarz Universal Radio Communication Tester (CMW500) or Anritsu Radio Communication Analyzer (MT8821C) 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.

##### **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	23.12	22.88	21.93
		1880.0	23.50	22.67	21.91
		1850.7	23.11	22.31	21.53
	1 RB low	1909.3	23.20	22.21	21.85
		1880.0	23.34	22.34	21.84
		1850.7	23.40	22.57	22.10
	50% RB mid	1909.3	23.09	22.62	21.53
		1880.0	23.17	22.74	21.83
		1850.7	23.22	22.76	21.83
	100% RB	1909.3	22.57	21.62	20.97
		1880.0	22.63	21.88	20.91
		1850.7	22.76	21.75	21.13
3MHz	1 RB high	1908.5	23.00	22.14	21.70
		1880.0	23.28	22.79	21.84
		1851.5	23.45	22.96	21.98
	1 RB low	1908.5	23.19	23.02	21.86
		1880.0	23.39	22.64	22.02
		1851.5	23.29	22.97	22.08
	50% RB mid	1908.5	22.58	21.49	20.95
		1880.0	22.77	21.74	20.87

		1851.5	22.82	21.73	21.05
5MHz	100% RB	1908.5	22.65	21.74	20.94
		1880.0	22.76	21.53	20.53
		1851.5	22.88	21.80	20.92
		1907.5	22.88	22.19	20.98
10MHz	1 RB high	1880.0	23.21	22.36	21.64
		1852.5	23.30	22.23	21.59
		1907.5	23.04	22.09	21.36
	1 RB low	1880.0	23.35	22.40	21.73
		1852.5	23.36	21.92	21.83
		1907.5	22.79	21.57	21.03
	50% RB mid	1880.0	22.86	21.70	21.15
		1852.5	22.80	21.60	20.89
		1907.5	22.57	21.62	20.83
	100% RB	1880.0	22.72	21.80	20.99
		1852.5	22.83	21.82	20.97
		1905.0	23.12	23.01	21.70
15MHz	1 RB high	1880.0	23.24	22.76	21.49
		1855.0	23.38	22.89	21.74
		1905.0	23.28	23.12	21.95
	1 RB low	1880.0	23.27	22.82	21.89
		1855.0	23.49	23.02	21.76
		1905.0	22.60	21.76	20.81
	50% RB mid	1880.0	22.88	21.93	21.15
		1855.0	22.86	21.75	21.19
		1905.0	22.65	21.58	21.12
	100% RB	1880.0	22.73	21.75	21.06
		1855.0	22.85	21.81	21.17
		1902.5	23.02	22.49	21.68
20MHz	1 RB high	1880.0	23.14	22.25	21.76
		1857.5	23.47	22.25	21.82
		1902.5	23.27	23.01	21.85
	1 RB low	1880.0	23.22	22.53	21.45
		1857.5	23.09	23.13	21.76
		1902.5	22.58	21.55	20.92
	50% RB mid	1880.0	22.76	21.82	21.19
		1857.5	22.73	21.79	21.18
		1902.5	22.56	21.63	21.13
	100% RB	1880.0	22.58	21.64	20.76

		1857.5	22.65	21.74	21.10
20MHz	1 RB high	1900.0	23.09	22.56	21.86
		1880.0	23.01	22.28	21.86
		1860.0	23.06	22.40	21.80
	1 RB low	1900.0	23.31	22.45	22.07
		1880.0	22.91	22.71	21.74
		1860.0	23.11	22.31	21.94
	50% RB mid	1900.0	22.70	21.70	20.83
		1880.0	22.75	21.69	21.10
		1860.0	22.66	21.82	21.07
	100% RB	1900.0	22.56	21.51	21.02
		1880.0	22.56	21.71	20.70
		1860.0	22.58	21.66	21.03

**LTE band 5**

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	848.3	23.98	22.96	22.04
		836.5	23.76	22.64	21.72
		824.7	23.99	23.03	22.11
	1 RB low	848.3	23.99	22.64	21.72
		836.5	23.82	22.56	21.64
		824.7	23.83	22.77	21.85
	50% RB mid	848.3	23.64	22.47	21.55
		836.5	23.90	22.79	21.87
		824.7	23.80	22.62	21.70
	100% RB	848.3	22.18	22.02	21.10
		836.5	22.80	21.61	20.69
		824.7	22.82	21.92	21.00
3MHz	1 RB high	847.5	23.30	22.46	21.54
		836.5	23.78	22.58	21.66
		825.5	23.88	22.88	21.96
	1 RB low	847.5	23.49	22.71	21.79
		836.5	23.82	22.78	21.86
		825.5	23.89	22.84	21.92
	50% RB mid	847.5	22.46	22.13	21.11
		836.5	23.03	22.00	21.08
		825.5	22.98	21.59	20.67
	100% RB	847.5	22.45	21.96	21.04
		836.5	22.93	21.98	21.06
		825.5	22.90	21.94	21.02
5MHz	1 RB high	846.5	23.25	22.57	21.65
		836.5	23.53	22.53	21.61
		826.5	23.72	22.26	21.34
	1 RB low	846.5	23.20	22.23	21.31
		836.5	23.51	22.48	21.56
		826.5	23.66	22.38	21.46
	50% RB mid	846.5	22.40	21.94	21.02
		836.5	23.04	21.80	20.88
		826.5	22.88	21.97	21.05
	100% RB	846.5	22.36	22.14	21.13
		836.5	22.92	21.82	20.90
		826.5	22.84	21.83	20.91
10MHz	1 RB high	844.0	23.58	23.07	22.15
		836.5	23.77	22.82	21.90

		829.0	23.91	22.91	21.99
1 RB low		844.0	23.60	23.10	22.18
		836.5	23.73	22.71	21.79
		829.0	23.85	22.73	21.81
50% RB mid		844.0	22.95	22.05	21.13
		836.5	22.90	22.16	21.15
		829.0	22.68	21.71	20.79
100% RB		844.0	22.85	21.91	20.99
		836.5	22.81	21.88	20.96
		829.0	22.67	21.88	20.96

**LTE band 7**

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	2567.5	23.44	22.17	21.15
		2535	23.23	22.28	21.26
		2502.5	23.81	22.62	21.59
	1 RB low	2567.5	23.31	22.12	21.10
		2535	23.26	22.25	21.23
		2502.5	23.75	22.82	21.77
	50% RB mid	2567.5	22.65	21.72	20.73
		2535	22.71	21.65	20.66
		2502.5	23.06	22.11	21.10
	100% RB	2567.5	22.57	21.59	20.60
		2535	22.62	21.71	20.72
		2502.5	22.96	21.84	20.84
10MHz	1 RB high	2565	23.55	22.68	21.64
		2535	23.64	22.05	21.04
		2505	23.52	22.42	21.39
	1 RB low	2565	23.39	22.66	21.62
		2535	23.58	22.13	21.12
		2505	23.86	22.86	21.81
	50% RB mid	2565	22.62	21.67	20.68
		2535	22.74	21.61	20.62
		2505	23.05	21.34	20.36
	100% RB	2565	22.58	21.62	20.62
		2535	22.70	21.86	20.86
		2505	22.85	21.87	20.87
15MHz	1 RB high	2562.5	23.14	22.16	21.15
		2535	23.38	23.18	22.12
		2507.5	23.49	22.68	21.64
	1 RB low	2562.5	23.34	21.96	20.95
		2535	23.38	23.15	22.09
		2507.5	23.97	23.07	22.01
	50% RB mid	2562.5	22.54	21.57	20.58
		2535	22.62	21.62	20.63
		2507.5	22.74	21.86	20.86
	100% RB	2562.5	22.47	21.47	20.48
		2535	22.64	21.67	20.68
		2507.5	22.69	21.71	20.72

20MHz	1 RB high	2560	23.42	22.47	21.44
		2535	23.30	22.56	21.75
		2510	23.08	21.92	22.04
	1 RB low	2560	23.27	22.18	21.81
		2535	23.34	22.05	21.92
		2510	23.27	22.36	21.92
	50% RB mid	2560	22.56	21.45	20.98
		2535	22.70	21.53	21.12
		2510	22.68	21.73	21.12
	100% RB	2560	22.51	21.60	20.82
		2535	22.71	21.64	21.20
		2510	22.54	21.69	21.01

**LTE band 12**

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	715.3	23.73	22.89	21.76
		707.5	23.73	22.63	21.51
		699.7	23.63	22.46	21.34
	1 RB low	715.3	23.88	22.62	21.50
		707.5	23.83	22.72	21.60
		699.7	24.05	22.63	21.51
	50% RB mid	715.3	23.91	22.97	21.84
		707.5	23.79	22.73	21.60
		699.7	23.97	22.70	21.58
	100% RB	715.3	22.72	21.78	20.68
		707.5	22.81	21.92	20.81
		699.7	22.81	21.53	20.44
3MHz	1 RB high	714.5	23.73	22.95	21.82
		707.5	23.83	22.61	21.49
		700.5	23.90	23.17	22.03
	1 RB low	714.5	23.85	22.53	21.41
		707.5	23.85	22.91	21.78
		700.5	23.86	22.59	21.47
	50% RB mid	714.5	22.64	21.45	20.36
		707.5	22.83	21.99	20.89
		700.5	22.74	21.96	20.85
	100% RB	714.5	22.71	21.68	20.58
		707.5	22.75	21.84	20.73
		700.5	22.75	21.84	20.74
5MHz	1 RB high	713.5	23.65	22.17	21.56
		707.5	23.50	22.46	21.84
		701.5	23.60	22.57	21.95
	1 RB low	713.5	23.62	22.28	21.67
		707.5	23.76	22.30	21.69
		701.5	23.87	22.36	21.74
	50% RB mid	713.5	22.65	21.71	21.12
		707.5	22.79	21.83	20.73
		701.5	22.73	21.78	20.68
	100% RB	713.5	22.61	21.81	20.71
		707.5	22.65	21.71	21.11
		701.5	22.72	21.75	21.15
10MHz	1 RB high	711.0	23.54	22.54	21.92
		707.5	23.67	22.82	22.18

		704.0	23.68	22.33	21.78
1 RB low	711.0	23.88	22.94	21.82	
	707.5	23.57	22.65	21.72	
	704.0	23.69	22.37	21.81	
50% RB mid	711.0	22.96	22.08	20.77	
	707.5	22.85	21.88	21.11	
	704.0	22.87	21.88	21.15	
100% RB	711.0	22.70	21.79	21.07	
	707.5	22.64	21.72	21.05	
	704.0	22.80	21.89	21.04	

**LTE band 66**

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	1779.3	23.15	22.05	20.84
		1745.0	23.20	22.08	20.87
		1710.7	23.06	21.84	20.63
	1 RB low	1779.3	23.32	22.07	20.86
		1745.0	23.20	22.34	21.13
		1710.7	23.00	21.88	20.67
	50% RB mid	1779.3	23.39	22.53	21.31
		1745.0	23.31	22.39	21.17
		1710.7	22.87	22.07	20.85
	100% RB	1779.3	22.30	21.54	20.33
		1745.0	22.35	21.26	20.05
		1710.7	22.14	21.12	19.92
3MHz	1 RB high	1778.5	22.08	22.26	21.04
		1745.0	23.32	22.29	21.07
		1711.5	22.84	21.99	20.77
	1 RB low	1778.5	23.07	22.01	20.80
		1745.0	23.28	22.27	21.06
		1711.5	22.95	22.01	20.80
	50% RB mid	1778.5	22.12	20.98	19.78
		1745.0	22.37	21.52	20.32
		1711.5	22.01	20.77	19.57
	100% RB	1778.5	22.24	21.51	20.31
		1745.0	22.36	21.43	20.22
		1711.5	21.95	20.91	19.71
5MHz	1 RB high	1777.5	23.22	21.77	20.56
		1745.0	23.22	22.39	21.18
		1712.5	23.03	21.69	20.48
	1 RB low	1777.5	23.14	21.76	20.55
		1745.0	23.15	21.89	20.68
		1712.5	22.79	21.53	20.32
	50% RB mid	1777.5	22.39	21.15	19.94
		1745.0	22.26	21.28	20.08
		1712.5	21.99	20.92	19.72
	100% RB	1777.5	22.32	21.10	19.90
		1745.0	22.33	21.36	20.15
		1712.5	21.93	20.79	19.59
10MHz	1 RB high	1775.0	23.26	22.36	21.15
		1745.0	23.38	21.86	20.65

		1715.0	22.94	21.78	20.57
15MHz	1 RB low	1775.0	23.38	22.36	21.15
		1745.0	23.27	22.03	20.82
		1715.0	22.96	21.65	20.44
	50% RB mid	1775.0	22.44	21.21	20.01
		1745.0	22.36	21.29	20.08
		1715.0	22.01	21.20	19.99
	100% RB	1775.0	22.19	21.26	20.06
		1745.0	22.24	21.23	20.03
		1715.0	21.97	20.97	19.77
20MHz	1 RB high	1772.5	23.03	22.61	21.40
		1745.0	23.20	22.43	21.21
		1717.5	23.20	22.19	20.97
	1 RB low	1772.5	23.06	22.24	21.02
		1745.0	22.96	22.66	21.45
		1717.5	23.21	22.10	20.89
	50% RB mid	1772.5	22.34	21.36	20.15
		1745.0	22.35	21.27	20.06
		1717.5	22.12	20.90	19.70
	100% RB	1772.5	22.22	21.25	20.05
		1745.0	22.36	21.26	20.06
		1717.5	22.03	20.95	19.74
30MHz	1 RB high	1770.0	23.25	21.86	20.65
		1745.0	23.31	21.93	20.82
		1720.0	22.78	21.72	20.38
	1 RB low	1770.0	23.44	21.93	20.41
		1745.0	23.29	21.68	20.67
		1720.0	23.10	21.31	19.99
	50% RB mid	1770.0	22.22	21.22	19.72
		1745.0	22.30	21.36	19.70
		1720.0	22.12	21.14	19.37
	100% RB	1770.0	22.25	20.98	19.53
		1745.0	22.17	21.26	19.66
		1720.0	22.01	21.03	19.34

**LTE band 71**

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	695.5	22.44	21.46	20.40
		680.5	22.99	21.63	20.81
		665.5	22.79	21.95	20.97
	1 RB low	695.5	22.67	21.73	20.84
		680.5	23.08	21.63	20.70
		665.5	22.49	21.53	20.59
	50% RB mid	695.5	21.89	20.92	19.97
		680.5	22.38	21.33	20.40
		665.5	22.04	21.02	20.19
	100% RB	695.5	21.92	21.08	20.05
		680.5	22.31	21.59	20.68
		665.5	22.08	21.13	20.16
10MHz	1 RB high	693	22.76	21.97	21.16
		680.5	22.80	21.79	20.89
		668	22.99	22.28	21.32
	1 RB low	693	22.80	22.05	21.02
		680.5	23.07	21.87	20.95
		668	22.78	21.83	20.92
	50% RB mid	693	21.99	21.22	20.26
		680.5	22.28	21.47	20.44
		668	22.24	21.32	20.30
	100% RB	693	21.93	21.06	19.97
		680.5	22.20	21.38	20.36
		668	22.19	21.31	20.27
15MHz	1 RB high	690.5	22.85	21.94	21.02
		680.5	22.85	21.84	20.78
		670.5	22.79	22.77	21.95
	1 RB low	690.5	23.12	22.15	21.10
		680.5	23.02	22.21	21.27
		670.5	22.67	21.95	21.05
	50% RB mid	690.5	22.07	21.15	20.22
		680.5	22.27	21.39	20.47
		670.5	22.20	21.37	20.31
	100% RB	690.5	22.07	21.19	20.16
		680.5	22.20	21.45	20.41
		670.5	22.12	21.28	20.24

20MHz	1 RB high	688	23.06	22.09	21.11
		680.5	23.08	22.15	21.16
		673	23.55	22.04	21.15
	1 RB low	688	23.29	22.12	21.14
		680.5	23.12	22.22	21.35
		673	23.50	22.02	20.94
	50% RB mid	688	22.08	21.15	20.33
		680.5	22.12	21.39	20.52
		673	22.22	21.37	20.46
	100% RB	688	22.04	21.13	20.04
		680.5	22.24	21.43	20.45
		673	22.21	21.41	20.37

### A.1.3 Radiated

#### A.1.3.1 Description

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

Rule Part 22.913(a) specifies "Mobile stations are limited to 2.0 watts EIRP".

Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

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

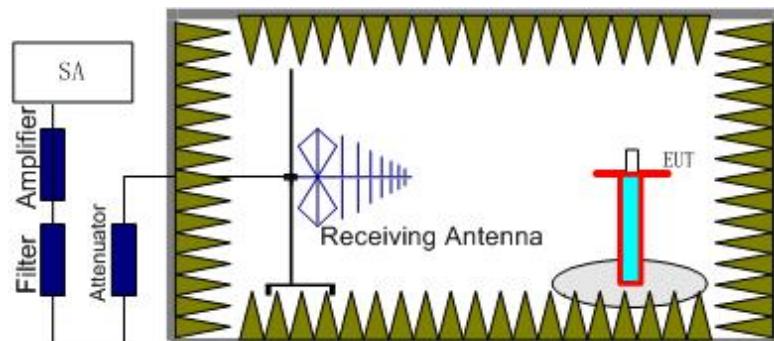
Rule Part 27.50(h)(2) specifies "Mobile stations are limited to 2.0 watts EIRP".

Rule Part 27.50(c) specifies "Portable stations (hand-held devices) are limited to 3 watts ERP".

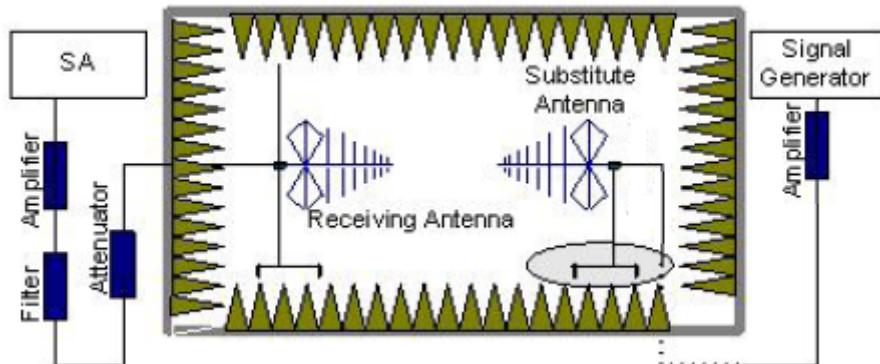
#### A.1.3.2 Method of Measurement

The measurements procedures in TIA-603E-2016 are used.

1. EUT was placed on a 1.5-meter-high non-conductive stand at a 3-meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360 and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with RMS detector.



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



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

4. An amplifier should be connected to the Signal Source output port. And the cable should be connected between the amplifier and the substitution antenna.

The cable loss ( $P_{cl}$ ), the substitution antenna Gain ( $G_a$ ) and the amplifier Gain ( $P_{Ag}$ ) should be recorded after test.

The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{Mea} - P_{Ag} - P_{cl} - G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15$ .

### A.1.3.3 Measurement result

#### LTE Band 7- EIRP

Limits: ≤33 dBm (2W)

#### LTE Band 7\_5MHz\_QPSK

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2502.50	-24.44	3.58	45.68	6.10	23.76	33.00	9.24	H
2535.00	-22.22	3.63	44.82	6.16	25.13	33.00	7.87	H
2567.50	-22.39	3.65	44.92	6.22	25.10	33.00	7.90	H

#### LTE Band 7\_10MHz\_QPSK

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2505.00	-24.30	3.59	45.64	6.11	23.86	33.00	9.14	H
2535.00	-22.74	3.63	44.82	6.16	24.61	33.00	8.39	H
2565.00	-22.28	3.65	44.97	6.22	25.26	33.00	7.74	H

#### LTE Band 7\_15MHz\_QPSK

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2507.50	-23.57	3.59	44.92	6.11	23.87	33.00	9.13	H
2535.00	-22.72	3.63	44.82	6.16	24.63	33.00	8.37	H
2562.50	-22.92	3.65	45.67	6.21	25.31	33.00	7.69	H

#### LTE Band 7\_20 MHz\_QPSK

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2510.00	-23.85	3.58	45.36	6.12	24.05	33.00	8.95	H
2535.00	-22.91	3.63	44.82	6.16	24.44	33.00	8.56	H
2560.00	-23.32	3.64	45.98	6.21	25.23	33.00	7.77	H

**LTE Band 7\_5MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2502.50	-25.37	3.58	45.68	6.10	22.83	33.00	10.17	H
2535.00	-23.25	3.63	44.82	6.16	24.10	33.00	8.90	H
2567.50	-23.87	3.65	44.92	6.22	23.62	33.00	9.38	H

**LTE Band 7\_10MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2505.00	-25.50	3.59	45.64	6.11	22.66	33.00	10.34	H
2535.00	-24.23	3.63	44.82	6.16	23.12	33.00	9.88	H
2565.00	-23.75	3.65	44.97	6.22	23.79	33.00	9.21	H

**LTE Band 7\_15MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2507.50	-24.93	3.59	44.92	6.11	22.51	33.00	10.49	H
2535.00	-23.50	3.63	44.82	6.16	23.85	33.00	9.15	H
2562.50	-24.27	3.65	45.67	6.21	23.96	33.00	9.04	H

**LTE Band 7\_20 MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2510.00	-25.23	3.58	45.36	6.12	22.67	33.00	10.33	H
2535.00	-24.15	3.63	44.82	6.16	23.20	33.00	9.80	H
2560.00	-24.54	3.64	45.98	6.21	24.01	33.00	8.99	H

**LTE Band 7\_5MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2502.50	-26.94	3.58	45.68	6.10	21.26	33.00	11.74	H
2535.00	-24.60	3.63	44.82	6.16	22.75	33.00	10.25	H
2567.50	-24.74	3.65	44.92	6.22	22.75	33.00	10.25	H

**LTE Band 7\_10MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2505.00	-26.49	3.59	45.64	6.11	21.67	33.00	11.33	H
2535.00	-25.06	3.63	44.82	6.16	22.29	33.00	10.71	H
2565.00	-24.63	3.65	44.97	6.22	22.91	33.00	10.09	H

**LTE Band 7\_15MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2507.50	-25.51	3.59	44.92	6.11	21.93	33.00	11.07	H
2535.00	-25.17	3.63	44.82	6.16	22.18	33.00	10.82	H
2562.50	-25.15	3.65	45.67	6.21	23.08	33.00	9.92	H

**LTE Band 7\_20 MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2510.00	-25.74	3.58	45.36	6.12	22.16	33.00	10.84	H
2535.00	-25.02	3.63	44.82	6.16	22.33	33.00	10.67	H
2560.00	-25.46	3.64	45.98	6.21	23.09	33.00	9.91	H

**LTE Band 12 - ERP**

**Limits:** ≤34.77dBm (3W)

**LTE Band 12\_1.4MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
699.70	-23.05	1.90	44.66	0.77	2.15	18.33	34.77	16.44	H
707.50	-22.07	1.91	44.94	0.62	2.15	19.43	34.77	15.34	H
715.30	-21.43	1.92	45.26	0.50	2.15	20.26	34.77	14.51	H

**LTE Band 12\_3MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
700.50	-22.99	1.90	44.68	0.76	2.15	18.40	34.77	16.37	H
707.50	-22.25	1.91	44.94	0.62	2.15	19.25	34.77	15.52	H
714.50	-21.68	1.92	45.26	0.50	2.15	20.01	34.77	14.76	H

**LTE Band 12\_5MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
701.50	-23.07	1.90	44.81	0.74	2.15	18.43	34.77	16.34	H
707.50	-22.28	1.91	44.94	0.62	2.15	19.22	34.77	15.55	H
713.50	-21.93	1.92	45.22	0.50	2.15	19.72	34.77	15.05	H

**LTE Band 12\_10MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
704.00	-22.68	1.91	44.93	0.70	2.15	18.89	34.77	15.88	H
707.50	-22.39	1.91	44.94	0.62	2.15	19.11	34.77	15.66	H
711.00	-22.15	1.92	45.19	0.53	2.15	19.50	34.77	15.27	H

**LTE Band 12\_1.4MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
699.70	-24.52	1.90	44.66	0.77	2.15	16.86	34.77	17.91	H
707.50	-23.44	1.91	44.94	0.62	2.15	18.06	34.77	16.71	H
715.30	-22.74	1.92	45.26	0.50	2.15	18.95	34.77	15.82	H

**LTE Band 12\_3MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
700.50	-24.55	1.90	44.68	0.76	2.15	16.84	34.77	17.93	H
707.50	-23.65	1.91	44.94	0.62	2.15	17.85	34.77	16.92	H
714.50	-23.05	1.92	45.26	0.50	2.15	18.64	34.77	16.13	H

**LTE Band 12\_5MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
701.50	-24.43	1.90	44.81	0.74	2.15	17.07	34.77	17.70	H
707.50	-23.91	1.91	44.94	0.62	2.15	17.59	34.77	17.18	H
713.50	-23.16	1.92	45.22	0.50	2.15	18.49	34.77	16.28	H

**LTE Band 12\_10MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
704.00	-23.32	1.91	44.93	0.70	2.15	18.25	34.77	16.52	H
707.50	-23.37	1.91	44.94	0.62	2.15	18.13	34.77	16.64	H
711.00	-23.64	1.92	45.19	0.53	2.15	18.01	34.77	16.76	H

**LTE Band 12\_1.4MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
699.70	-25.48	1.90	44.66	0.77	2.15	15.90	34.77	18.87	H
707.50	-24.46	1.91	44.94	0.62	2.15	17.04	34.77	17.73	H
715.30	-23.35	1.92	45.26	0.50	2.15	18.34	34.77	16.43	H

**LTE Band 12\_3MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
700.50	-25.51	1.90	44.68	0.76	2.15	15.88	34.77	18.89	H
707.50	-24.39	1.91	44.94	0.62	2.15	17.11	34.77	17.66	H
714.50	-24.10	1.92	45.26	0.50	2.15	17.59	34.77	17.18	H

**LTE Band 12\_5MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
701.50	-25.01	1.90	44.81	0.74	2.15	16.49	34.77	18.28	H
707.50	-24.73	1.91	44.94	0.62	2.15	16.77	34.77	18.00	H
713.50	-24.12	1.92	45.22	0.50	2.15	17.53	34.77	17.24	H

**LTE Band 12\_10MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
704.00	-24.87	1.91	44.93	0.70	2.15	16.70	34.77	18.07	H
707.50	-24.30	1.91	44.94	0.62	2.15	17.20	34.77	17.57	H
711.00	-24.60	1.92	45.19	0.53	2.15	17.05	34.77	17.72	H

**LTE Band 66- EIRP**

**Limits:** ≤30dBm (1W)

**LTE Band 66\_1.4MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1710.70	-30.27	3.17	44.10	5.12	22.12	30.00	7.88	H
1745.00	-30.37	3.68	44.16	5.06	22.53	30.00	7.47	H
1779.30	-28.05	3.04	44.03	5.00	24.02	30.00	5.98	H

**LTE Band 66\_3MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1711.50	-30.57	3.40	44.10	5.12	22.05	30.00	7.95	H
1745.00	-30.48	3.68	44.16	5.06	22.42	30.00	7.58	H
1778.50	-28.26	3.04	44.03	5.00	23.81	30.00	6.19	H

**LTE Band 66\_5MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.50	-23.78	3.66	44.10	5.12	21.78	30.00	8.22	H
1745.00	-22.87	3.68	44.16	5.06	22.67	30.00	7.33	H
1777.50	-22.14	3.04	44.04	5.00	23.86	30.00	6.14	H

**LTE Band 66\_10MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1715.00	-23.86	3.56	44.10	5.11	21.79	30.00	8.21	H
1745.00	-23.13	3.68	44.16	5.06	22.41	30.00	7.59	H
1775.00	-22.12	3.05	44.05	5.01	23.88	30.00	6.12	H

**LTE Band 66\_15MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1717.50	-24.19	3.47	44.11	5.11	21.56	30.00	8.44	H
1745.00	-23.09	3.68	44.16	5.06	22.45	30.00	7.55	H
1772.50	-22.37	3.05	44.06	5.01	23.65	30.00	6.35	H

**LTE Band 66\_20MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1720.00	-24.35	3.37	44.11	5.10	21.49	30.00	8.51	H
1745.00	-23.11	3.68	44.16	5.06	22.43	30.00	7.57	H
1770.00	-22.22	3.05	44.07	5.01	23.82	30.00	6.18	H

**LTE Band 66\_1.4MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1710.70	-31.42	3.17	44.10	5.12	20.97	30.00	9.03	H
1745.00	-31.89	3.68	44.16	5.06	21.01	30.00	8.99	H
1779.30	-29.37	3.04	44.03	5.00	22.70	30.00	7.30	H

**LTE Band 66\_3MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1711.50	-32.20	3.40	44.10	5.12	20.42	30.00	9.58	H
1745.00	-31.24	3.68	44.16	5.06	21.66	30.00	8.34	H
1778.50	-29.16	3.04	44.03	5.00	22.91	30.00	7.09	H

**LTE Band 66\_5MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.50	-25.01	3.66	44.10	5.12	20.55	30.00	9.45	H
1745.00	-24.66	3.68	44.16	5.06	20.88	30.00	9.12	H
1777.50	-23.13	3.04	44.04	5.00	22.87	30.00	7.13	H

**LTE Band 66\_10MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1715.00	-24.82	3.56	44.10	5.11	20.83	30.00	9.17	H
1745.00	-24.43	3.68	44.16	5.06	21.11	30.00	8.89	H
1775.00	-23.28	3.05	44.05	5.01	22.72	30.00	7.28	H

**LTE Band 66\_15MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1717.50	-25.61	3.47	44.11	5.11	20.14	30.00	9.86	H
1745.00	-24.67	3.68	44.16	5.06	20.87	30.00	9.13	H
1772.50	-23.28	3.05	44.06	5.01	22.74	30.00	7.26	H

**LTE Band 66\_20MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1720.00	-25.71	3.37	44.11	5.10	20.13	30.00	9.87	H
1745.00	-24.63	3.68	44.16	5.06	20.91	30.00	9.09	H
1770.00	-23.43	3.05	44.07	5.01	22.61	30.00	7.39	H

**LTE Band 66\_1.4MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1710.70	-32.31	3.17	44.10	5.12	20.08	30.00	9.92	H
1745.00	-32.68	3.68	44.16	5.06	20.22	30.00	9.78	H
1779.30	-30.41	3.04	44.03	5.00	21.66	30.00	8.34	H

**LTE Band 66\_3MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1711.50	-32.68	3.40	44.10	5.12	19.94	30.00	10.06	H
1745.00	-32.88	3.68	44.16	5.06	20.02	30.00	9.98	H
1778.50	-30.35	3.04	44.03	5.00	21.72	30.00	8.28	H

**LTE Band 66\_5MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.50	-25.75	3.66	44.10	5.12	19.81	30.00	10.19	H
1745.00	-25.28	3.68	44.16	5.06	20.26	30.00	9.74	H
1777.50	-24.46	3.04	44.04	5.00	21.54	30.00	8.46	H

**LTE Band 66\_10MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1715.00	-25.76	3.56	44.10	5.11	19.89	30.00	10.11	H
1745.00	-25.32	3.68	44.16	5.06	20.22	30.00	9.78	H
1775.00	-23.92	3.05	44.05	5.01	22.08	30.00	7.92	H

**LTE Band 66\_15MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1717.50	-26.43	3.47	44.11	5.11	19.32	30.00	10.68	H
1745.00	-25.05	3.68	44.16	5.06	20.49	30.00	9.51	H
1772.50	-24.32	3.05	44.06	5.01	21.70	30.00	8.30	H

**LTE Band 66\_20MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1720.00	-26.43	3.37	44.11	5.10	19.41	30.00	10.59	H
1745.00	-25.38	3.68	44.16	5.06	20.16	30.00	9.84	H
1770.00	-24.35	3.05	44.07	5.01	21.69	30.00	8.31	H

**LTE Band 71- ERP**

**Limits:** ≤34.77 dBm (3W)

**LTE Band 71\_5MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
665.50	-24.81	1.87	44.73	0.78	2.15	16.68	34.77	18.09	V
680.50	-21.76	1.88	44.72	0.78	2.15	19.70	34.77	15.07	V
695.50	-21.55	1.89	44.67	0.77	2.15	19.85	34.77	14.92	V

**LTE Band 71\_10MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
668.00	-24.14	1.87	44.75	0.78	2.15	17.38	34.77	17.39	V
680.50	-21.75	1.88	44.72	0.78	2.15	19.71	34.77	15.06	V
693.00	-21.17	1.89	44.67	0.77	2.15	20.23	34.77	14.54	V

**LTE Band 71\_15MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
670.50	-23.13	1.88	44.75	0.78	2.15	18.37	34.77	16.40	V
680.50	-21.79	1.88	44.72	0.78	2.15	19.67	34.77	15.10	V
690.50	-21.19	1.89	44.73	0.77	2.15	20.27	34.77	14.50	V

**LTE Band 71\_20MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
673.00	-22.95	1.88	44.71	0.78	2.15	18.51	34.77	16.26	V
680.50	-21.68	1.88	44.72	0.78	2.15	19.78	34.77	14.99	V
688.00	-21.10	1.89	44.72	0.77	2.15	20.36	34.77	14.41	V

**LTE Band 71\_5MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
665.50	-26.24	1.87	44.73	0.78	2.15	15.25	34.77	19.52	V
680.50	-23.53	1.88	44.72	0.78	2.15	17.93	34.77	16.84	V
695.50	-23.14	1.89	44.67	0.77	2.15	18.26	34.77	16.51	V

**LTE Band 71\_10MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
668.00	-25.15	1.87	44.75	0.78	2.15	16.37	34.77	18.40	V
680.50	-23.49	1.88	44.72	0.78	2.15	17.97	34.77	16.80	V
693.00	-22.94	1.89	44.67	0.77	2.15	18.46	34.77	16.31	V

**LTE Band 71\_15MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
670.50	-24.84	1.88	44.75	0.78	2.15	16.66	34.77	18.11	V
680.50	-23.40	1.88	44.72	0.78	2.15	18.06	34.77	16.71	V
690.50	-22.21	1.89	44.73	0.77	2.15	19.25	34.77	15.52	V

**LTE Band 71\_20MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
673.00	-24.18	1.88	44.71	0.78	2.15	17.28	34.77	17.49	V
680.50	-23.37	1.88	44.72	0.78	2.15	18.09	34.77	16.68	V
688.00	-22.72	1.89	44.72	0.77	2.15	18.74	34.77	16.03	V

**LTE Band 71\_5MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
665.50	-27.02	1.87	44.73	0.78	2.15	14.47	34.77	20.30	V
680.50	-24.09	1.88	44.72	0.78	2.15	17.37	34.77	17.40	V
695.50	-23.82	1.89	44.67	0.77	2.15	17.58	34.77	17.19	V

**LTE Band 71\_10MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
668.00	-25.92	1.87	44.75	0.78	2.15	15.60	34.77	19.17	V
680.50	-23.64	1.88	44.72	0.78	2.15	17.82	34.77	16.95	V
693.00	-23.45	1.89	44.67	0.77	2.15	17.95	34.77	16.82	V

**LTE Band 71\_15MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
670.50	-25.11	1.88	44.75	0.78	2.15	16.39	34.77	18.38	V
680.50	-23.74	1.88	44.72	0.78	2.15	17.72	34.77	17.05	V
690.50	-23.46	1.89	44.73	0.77	2.15	18.00	34.77	16.77	V

**LTE Band 71\_20MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
673.00	-25.00	1.88	44.71	0.78	2.15	16.46	34.77	18.31	V
680.50	-23.78	1.88	44.72	0.78	2.15	17.68	34.77	17.09	V
688.00	-23.55	1.89	44.72	0.77	2.15	17.91	34.77	16.86	V

**Spot Check Measurement Results:**
**LTE Band 5- ERP**
**Limits:** <38.45dBm (7W)

**LTE Band 5\_1.4MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.70	-21.36	2.26	45.79	0.95	2.15	20.97	38.45	17.48	H
836.50	-20.41	2.26	45.66	0.82	2.15	21.66	38.45	16.79	H
848.30	-20.42	2.27	45.55	0.80	2.15	21.51	38.45	16.94	H

**LTE Band 5\_3MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.50	-21.67	2.26	45.79	0.94	2.15	20.65	38.45	17.80	H
836.50	-20.61	2.26	45.66	0.82	2.15	21.46	38.45	16.99	H
847.50	-20.63	2.27	45.56	0.81	2.15	21.32	38.45	17.13	H

**LTE Band 5\_5MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.50	-21.71	2.25	45.77	0.93	2.15	20.59	38.45	17.86	H
836.50	-20.52	2.26	45.66	0.82	2.15	21.55	38.45	16.90	H
846.50	-20.72	2.26	45.56	0.82	2.15	21.25	38.45	17.20	H

**LTE Band 5\_10MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.00	-21.54	2.13	45.74	0.90	2.15	20.82	38.45	17.63	H
836.50	-20.43	2.26	45.66	0.82	2.15	21.64	38.45	16.81	H
844.00	-20.70	2.26	45.59	0.82	2.15	21.30	38.45	17.15	H

**LTE Band 5\_1.4MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.70	-22.98	2.26	45.79	0.95	2.15	19.35	38.45	19.10	H
836.50	-21.82	2.26	45.66	0.82	2.15	20.25	38.45	18.20	H
848.30	-21.71	2.27	45.55	0.80	2.15	20.22	38.45	18.23	H

**LTE Band 5\_3MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.50	-23.40	2.26	45.79	0.94	2.15	18.92	38.45	19.53	H
836.50	-22.13	2.26	45.66	0.82	2.15	19.94	38.45	18.51	H
847.50	-22.05	2.27	45.56	0.81	2.15	19.90	38.45	18.55	H

**LTE Band 5\_5MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.50	-23.34	2.25	45.77	0.93	2.15	18.96	38.45	19.49	H
836.50	-22.23	2.26	45.66	0.82	2.15	19.84	38.45	18.61	H
846.50	-22.22	2.26	45.56	0.82	2.15	19.75	38.45	18.70	H

**LTE Band 5\_10MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.00	-23.03	2.13	45.74	0.90	2.15	19.33	38.45	19.12	H
836.50	-21.66	2.26	45.66	0.82	2.15	20.41	38.45	18.04	H
844.00	-22.15	2.26	45.59	0.82	2.15	19.85	38.45	18.60	H

**LTE Band 5\_1.4MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.70	-23.89	2.26	45.79	0.95	2.15	18.44	38.45	20.01	H
836.50	-22.85	2.26	45.66	0.82	2.15	19.22	38.45	19.23	H
848.30	-22.61	2.27	45.55	0.80	2.15	19.32	38.45	19.13	H

**LTE Band 5\_3MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.50	-23.83	2.26	45.79	0.94	2.15	18.49	38.45	19.96	H
836.50	-22.99	2.26	45.66	0.82	2.15	19.08	38.45	19.37	H
847.50	-22.85	2.27	45.56	0.81	2.15	19.10	38.45	19.35	H

**LTE Band 5\_5MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.50	-23.81	2.25	45.77	0.93	2.15	18.49	38.45	19.96	H
836.50	-22.93	2.26	45.66	0.82	2.15	19.14	38.45	19.31	H
846.50	-22.97	2.26	45.56	0.82	2.15	19.00	38.45	19.45	H

**LTE Band 5\_10MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.00	-23.70	2.13	45.74	0.90	2.15	18.66	38.45	19.79	H
836.50	-23.16	2.26	45.66	0.82	2.15	18.91	38.45	19.54	H
844.00	-23.03	2.26	45.59	0.82	2.15	18.97	38.45	19.48	H

**Reference Measurement Results from basic model:**
**LTE Band 2- EIRP**

Limits: &lt;33dBm (2W)

**LTE Band 2\_1.4MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.70	-22.18	2.92	43.75	4.87	23.52	33.00	9.48	H
1880.00	-21.34	2.85	43.75	4.82	24.38	33.00	8.62	V
1909.30	-22.00	2.87	43.77	4.76	23.66	33.00	9.34	H

**LTE Band 2\_3MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1851.50	-22.42	2.87	43.75	4.87	23.33	33.00	9.67	H
1880.00	-21.87	2.85	43.75	4.82	23.85	33.00	9.15	V
1908.50	-22.10	2.89	43.78	4.76	23.55	33.00	9.45	H

**LTE Band 2\_5MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1852.50	-22.81	2.87	43.75	4.87	22.94	33.00	10.06	H
1880.00	-21.71	2.85	43.75	4.82	24.01	33.00	8.99	V
1907.50	-22.07	2.84	43.77	4.77	23.63	33.00	9.37	H

**LTE Band 2\_10MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1855.00	-22.29	2.88	43.74	4.86	23.43	33.00	9.57	H
1880.00	-21.54	2.85	43.75	4.82	24.18	33.00	8.82	V
1905.00	-22.13	2.87	43.77	4.77	23.54	33.00	9.46	H

**LTE Band 2\_15MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1857.50	-22.68	2.87	43.75	4.86	23.06	33.00	9.94	H
1880.00	-21.52	2.85	43.75	4.82	24.20	33.00	8.80	V
1902.50	-22.38	2.86	43.77	4.78	23.31	33.00	9.69	H

**LTE Band 2\_20 MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1860.00	-22.35	2.86	43.75	4.85	23.39	33.00	9.61	H
1880.00	-21.55	2.85	43.75	4.82	24.17	33.00	8.83	V
1900.00	-21.97	2.87	43.77	4.78	23.71	33.00	9.29	V

**LTE Band 2\_1.4MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.70	-22.52	2.92	43.75	4.87	23.18	33.00	9.82	H
1880.00	-22.22	2.85	43.75	4.82	23.50	33.00	9.50	V
1909.30	-22.22	2.87	43.77	4.76	23.44	33.00	9.56	H

**LTE Band 2\_3MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1851.50	-23.16	2.87	43.75	4.87	22.59	33.00	10.41	H
1880.00	-22.31	2.85	43.75	4.82	23.41	33.00	9.59	V
1908.50	-22.17	2.89	43.78	4.76	23.48	33.00	9.52	H

**LTE Band 2\_5MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1852.50	-23.04	2.87	43.75	4.87	22.71	33.00	10.29	H
1880.00	-22.37	2.85	43.75	4.82	23.35	33.00	9.65	V
1907.50	-22.34	2.84	43.77	4.77	23.36	33.00	9.64	H

**LTE Band 2\_10MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1855.00	-23.01	2.88	43.74	4.86	22.71	33.00	10.29	H
1880.00	-22.32	2.85	43.75	4.82	23.40	33.00	9.60	V
1905.00	-22.54	2.87	43.77	4.77	23.13	33.00	9.87	H

**LTE Band 2\_15MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1857.50	-23.09	2.87	43.75	4.86	22.65	33.00	10.35	H
1880.00	-22.17	2.85	43.75	4.82	23.55	33.00	9.45	V
1902.50	-22.93	2.86	43.77	4.78	22.76	33.00	10.24	H

**LTE Band 2\_20 MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1860.00	-22.61	2.86	43.75	4.85	23.13	33.00	9.87	H
1880.00	-22.14	2.85	43.75	4.82	23.58	33.00	9.42	V
1900.00	-22.58	2.87	43.77	4.78	23.10	33.00	9.90	H

**LTE Band 2\_1.4MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.70	-24.68	2.92	43.75	4.87	21.02	33.00	11.98	H
1880.00	-23.89	2.85	43.75	4.82	21.83	33.00	11.17	V
1909.30	-23.41	2.87	43.77	4.76	22.25	33.00	10.75	H

**LTE Band 2\_3MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1851.50	-25.28	2.87	43.75	4.87	20.47	33.00	12.53	H
1880.00	-24.00	2.85	43.75	4.82	21.72	33.00	11.28	V
1908.50	-23.39	2.89	43.78	4.76	22.26	33.00	10.74	H

**LTE Band 2\_5MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1852.50	-25.12	2.87	43.75	4.87	20.63	33.00	12.37	H
1880.00	-24.09	2.85	43.75	4.82	21.63	33.00	11.37	V
1907.50	-23.50	2.84	43.77	4.77	22.20	33.00	10.80	H

**LTE Band 2\_10MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1855.00	-25.22	2.88	43.74	4.86	20.50	33.00	12.50	H
1880.00	-24.15	2.85	43.75	4.82	21.57	33.00	11.43	V
1905.00	-23.67	2.87	43.77	4.77	22.00	33.00	11.00	H

**LTE Band 2\_15MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1857.50	-25.19	2.87	43.75	4.86	20.55	33.00	12.45	H
1880.00	-24.02	2.85	43.75	4.82	21.70	33.00	11.30	V
1902.50	-23.79	2.86	43.77	4.78	21.90	33.00	11.10	H

**LTE Band 2\_20 MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1860.00	-24.74	2.86	43.75	4.85	21.00	33.00	12.00	H
1880.00	-23.89	2.85	43.75	4.82	21.83	33.00	11.17	V
1900.00	-24.46	2.87	43.77	4.78	21.22	33.00	11.78	H

**LTE Band 5- ERP**

**Limits:** ≤38.45dBm (7W)

**LTE Band 5\_1.4MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.70	-20.95	2.26	45.79	0.95	2.15	21.38	38.45	17.07	H
836.50	-20.21	2.26	45.66	0.82	2.15	21.86	38.45	16.59	H
848.30	-20.91	2.27	45.55	0.80	2.15	21.02	38.45	17.43	H

**LTE Band 5\_3MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.50	-21.17	2.26	45.79	0.94	2.15	21.15	38.45	17.30	H
836.50	-20.14	2.26	45.66	0.82	2.15	21.93	38.45	16.52	H
847.50	-20.93	2.27	45.56	0.81	2.15	21.02	38.45	17.43	H

**LTE Band 5\_5MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.50	-21.21	2.25	45.77	0.93	2.15	21.09	38.45	17.36	H
836.50	-20.41	2.26	45.66	0.82	2.15	21.66	38.45	16.79	H
846.50	-20.97	2.26	45.56	0.82	2.15	21.00	38.45	17.45	H

**LTE Band 5\_10MHz\_QPSK**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.00	-21.05	2.13	45.74	0.90	2.15	21.31	38.45	17.14	H
836.50	-20.22	2.26	45.66	0.82	2.15	21.85	38.45	16.60	H
844.00	-20.98	2.26	45.59	0.82	2.15	21.02	38.45	17.43	H

**LTE Band 5\_1.4MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.70	-21.30	2.26	45.79	0.95	2.15	21.03	38.45	17.42	H
836.50	-20.60	2.26	45.66	0.82	2.15	21.47	38.45	16.98	H
848.30	-21.19	2.27	45.55	0.80	2.15	20.74	38.45	17.71	H

**LTE Band 5\_3MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.50	-21.52	2.26	45.79	0.94	2.15	20.80	38.45	17.65	H
836.50	-20.77	2.26	45.66	0.82	2.15	21.30	38.45	17.15	H
847.50	-21.48	2.27	45.56	0.81	2.15	20.47	38.45	17.98	H

**LTE Band 5\_5MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.50	-21.51	2.25	45.77	0.93	2.15	20.79	38.45	17.66	H
836.50	-20.98	2.26	45.66	0.82	2.15	21.09	38.45	17.36	H
846.50	-21.13	2.26	45.56	0.82	2.15	20.84	38.45	17.61	H

**LTE Band 5\_10MHz\_16QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.00	-21.53	2.13	45.74	0.90	2.15	20.83	38.45	17.62	H
836.50	-20.85	2.26	45.66	0.82	2.15	21.22	38.45	17.23	H
844.00	-21.29	2.26	45.59	0.82	2.15	20.71	38.45	17.74	H

**LTE Band 5\_1.4MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.70	-22.50	2.26	45.79	0.95	2.15	19.83	38.45	18.62	H
836.50	-21.95	2.26	45.66	0.82	2.15	20.12	38.45	18.33	H
848.30	-22.62	2.27	45.55	0.80	2.15	19.31	38.45	19.14	H

**LTE Band 5\_3MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.50	-22.74	2.26	45.79	0.94	2.15	19.58	38.45	18.87	H
836.50	-22.01	2.26	45.66	0.82	2.15	20.06	38.45	18.39	H
847.50	-22.90	2.27	45.56	0.81	2.15	19.05	38.45	19.40	H

**LTE Band 5\_5MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.50	-22.68	2.25	45.77	0.93	2.15	19.62	38.45	18.83	H
836.50	-22.22	2.26	45.66	0.82	2.15	19.85	38.45	18.60	H
846.50	-22.45	2.26	45.56	0.82	2.15	19.52	38.45	18.93	H

**LTE Band 5\_10MHz\_64QAM**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.00	-22.74	2.13	45.74	0.90	2.15	19.62	38.45	18.83	H
836.50	-22.17	2.26	45.66	0.82	2.15	19.90	38.45	18.55	H
844.00	-22.65	2.26	45.59	0.82	2.15	19.35	38.45	19.10	H

Frequency: 782.00MHz

Peak EIRP(dBm) = P<sub>Mea</sub>(-23.95dBm) - G<sub>a</sub>(-0.09dB) - P<sub>Ag</sub>(-45.65dB) - P<sub>cl</sub>(2.01dB)-2.15=17.63dBm

Note: Expanded measurement uncertainty is  $U = 2.84$  dB,  $k = 2$ .

## **A.2 EMISSION LIMIT**

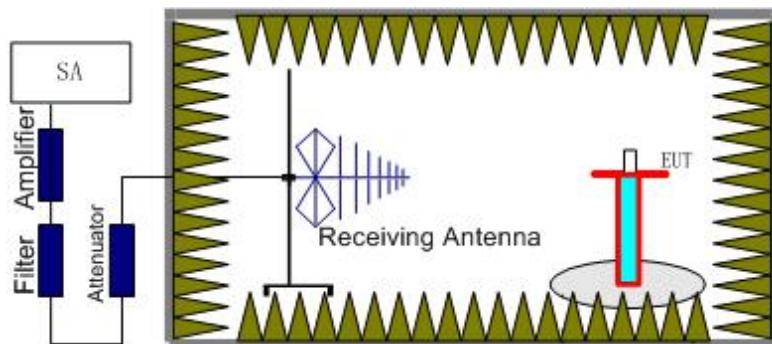
### **A.2.1 Measurement Method**

The measurements procedures in TIA-603E-2016 are used. This measurement is carried out in fully anechoic chamber FAC-3.

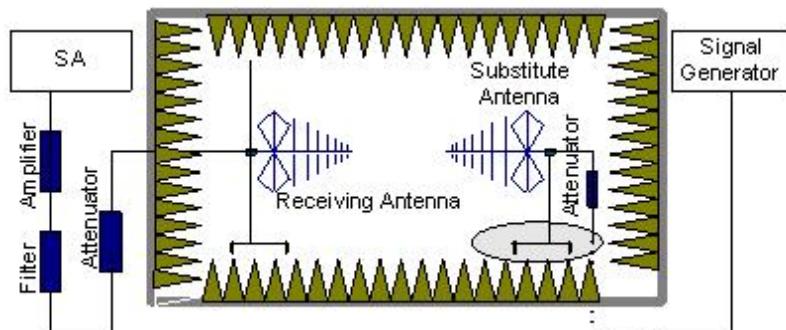
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE Bands 2,5,7,12,66,71.

**The procedure of radiated spurious emissions is as follows:**

1. EUT was placed on a 1.5-meter-high non-conductive stand at a 3-meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360 and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



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



In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere

with the radiation pattern of the antenna. A power ( $P_{Mea}$ ) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded ( $P_r$ ). The power of signal source ( $P_{Mea}$ ) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss ( $P_{pl}$ ) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain ( $G_a$ ) should be recorded after test.

An amplifier should be connected in for the test.

The Path loss ( $P_{pl}$ ) is the summation of the cable loss and the gain of the amplifier.

The measurement results are obtained as described below:

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

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit: dB) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15\text{dB}$ .

### A.2.2 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.

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

### A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE Bands 2,5,7,12,66,71. 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 2,5,7,12,66,71 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.

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

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5011.02	-56.30	6.58	9.92	-52.96	-25.00	27.96	H
7509.01	-53.68	8.36	12.21	-49.83	-25.00	24.83	V
10026.01	-34.52	9.25	12.91	-30.86	-25.00	5.86	H
12514.01	-44.51	10.21	13.21	-41.51	-25.00	16.51	H
15023.00	-43.81	11.25	13.99	-41.07	-25.00	16.07	V
17531.00	-42.75	12.84	14.94	-40.65	-25.00	15.65	H

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

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5077.02	-57.35	6.71	10.01	-54.05	-25.00	29.05	H
7623.01	-54.72	8.08	12.30	-50.50	-25.00	25.50	H
10156.01	-35.82	9.37	12.96	-32.23	-25.00	7.23	H
12686.01	-44.86	10.32	13.31	-41.87	-25.00	16.87	H
15219.00	-45.50	11.38	13.87	-43.01	-25.00	18.01	H
17727.00	-44.14	12.33	15.22	-41.25	-25.00	16.25	H

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

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5136.02	-56.92	6.86	10.09	-53.69	-25.00	28.69	H
7705.01	-53.90	8.42	12.36	-49.96	-25.00	24.96	H
10285.01	-38.52	9.59	13.01	-35.10	-25.00	10.10	H
12844.01	-43.51	10.65	13.41	-40.75	-25.00	15.75	H
15407.00	-43.81	11.40	13.76	-41.45	-25.00	16.45	H
17988.00	-39.59	12.90	15.58	-36.91	-25.00	11.91	V

**LTE Band 12, 1.4MHz, QPSK, Channel 23017**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1400.01	-58.37	3.24	4.98	2.15	-58.78	-13.00	45.78	H
2099.00	-54.69	4.19	4.90	2.15	-56.13	-13.00	43.13	H
2798.00	-51.66	4.91	6.64	2.15	-52.08	-13.00	39.08	H
3499.02	-53.86	5.52	8.20	2.15	-53.33	-13.00	40.33	H
4189.02	-55.60	6.18	9.09	2.15	-54.84	-13.00	41.84	V
4896.01	-55.18	6.73	9.80	2.15	-54.26	-13.00	41.26	H

**LTE Band 12, 1.4MHz, QPSK, Channel 23095**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1410.01	-59.49	3.25	5.03	2.15	-59.86	-13.00	46.86	V
2123.00	-53.49	4.21	4.97	2.15	-54.88	-13.00	41.88	H
2825.00	-51.83	4.95	6.69	2.15	-52.24	-13.00	39.24	H
3546.02	-54.20	5.78	8.26	2.15	-53.87	-13.00	40.87	H
4250.02	-54.63	6.24	9.15	2.15	-53.87	-13.00	40.87	H
4949.01	-55.18	6.69	9.85	2.15	-54.17	-13.00	41.17	V

**LTE Band 12, 1.4MHz, QPSK, Channel 23173**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1441.01	-60.47	3.29	5.19	2.15	-60.72	-13.00	47.72	V
2146.00	-50.16	4.24	5.04	2.15	-51.51	-13.00	38.51	V
2862.00	-50.03	4.96	6.75	2.15	-50.39	-13.00	37.39	H
3577.02	-53.45	6.10	8.31	2.15	-53.39	-13.00	40.39	H
4305.02	-54.22	6.19	9.21	2.15	-53.35	-13.00	40.35	H
5019.01	-55.81	6.57	9.93	2.15	-54.60	-13.00	41.60	H

**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	-53.76	5.38	8.01	-51.13	-13.00	38.13	H
5136.02	-40.97	6.86	10.09	-37.74	-13.00	24.74	V
6847.01	-50.90	7.83	11.42	-47.31	-13.00	34.31	V
8554.01	-46.05	8.58	13.01	-41.62	-13.00	28.62	H
10265.01	-45.24	9.52	13.01	-41.75	-13.00	28.75	H
11979.01	-50.86	10.15	13.00	-48.01	-13.00	35.01	V

**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	-57.48	5.50	8.18	-54.80	-13.00	41.80	H
5238.02	-48.94	7.00	10.23	-45.71	-13.00	32.71	H
6984.01	-52.31	8.17	11.58	-48.90	-13.00	35.90	H
8729.01	-45.45	8.45	13.05	-40.85	-13.00	27.85	H
10471.01	-45.98	9.70	13.09	-42.59	-13.00	29.59	H
12216.01	-50.28	10.05	13.09	-47.24	-13.00	34.24	V

**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	-57.74	5.92	8.28	-55.38	-13.00	42.38	H
5339.02	-49.54	6.96	10.37	-46.13	-13.00	33.13	V
7118.01	-51.03	8.16	11.74	-47.45	-13.00	34.45	V
8898.01	-43.18	8.84	13.08	-38.94	-13.00	25.94	V
10680.01	-46.28	9.30	13.14	-42.44	-13.00	29.44	V
12456.01	-45.16	10.29	13.18	-42.27	-13.00	29.27	V

**LTE Band 71, 5MHz, QPSK, Channel 133147**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1321.01	-58.24	3.14	4.57	2.15	-58.96	-13.00	45.96	H
1997.01	-45.42	4.04	4.61	2.15	-47.00	-13.00	34.00	H
2663.00	-47.34	4.75	6.39	2.15	-47.85	-13.00	34.85	H
3344.02	-54.02	5.31	7.83	2.15	-53.65	-13.00	40.65	H
3984.02	-55.66	6.08	8.88	2.15	-55.01	-13.00	42.01	H
4654.02	-54.13	6.47	9.55	2.15	-53.20	-13.00	40.20	V

**LTE Band 71, 5MHz, QPSK, Channel 133297**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1361.01	-59.44	3.19	4.78	2.15	-60.00	-13.00	47.00	V
2042.00	-50.22	4.14	4.73	2.15	-51.78	-13.00	38.78	H
2723.00	-47.51	4.81	6.50	2.15	-47.97	-13.00	34.97	H
3388.02	-54.32	5.35	7.93	2.15	-53.89	-13.00	40.89	V
4097.02	-54.69	6.04	9.00	2.15	-53.88	-13.00	40.88	H
4757.01	-55.33	6.58	9.66	2.15	-54.40	-13.00	41.40	H

**LTE Band 71, 5MHz, QPSK, Channel 133447**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1392.01	-58.59	3.23	4.94	2.15	-59.03	-13.00	46.03	H
2087.00	-46.12	4.18	4.86	2.15	-47.59	-13.00	34.59	H
2783.00	-52.01	4.89	6.61	2.15	-52.44	-13.00	39.44	H
3473.02	-54.91	5.47	8.14	2.15	-54.39	-13.00	41.39	H
4199.02	-54.28	6.20	9.10	2.15	-53.53	-13.00	40.53	V
4844.01	-54.93	6.72	9.74	2.15	-54.06	-13.00	41.06	V

**Spot Check Measurement Results:**
**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
1647.01	-59.96	3.56	5.24	2.15	-60.43	-13.00	47.43	H
2476.00	-52.94	4.60	6.03	2.15	-53.66	-13.00	40.66	V
3298.02	-54.71	5.29	7.72	2.15	-54.43	-13.00	41.43	H
4112.02	-54.70	6.04	9.01	2.15	-53.88	-13.00	40.88	H
4952.01	-54.84	6.69	9.85	2.15	-53.83	-13.00	40.83	H
5786.01	-54.33	7.21	10.54	2.15	-53.15	-13.00	40.15	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	-57.73	3.58	5.19	2.15	-58.27	-13.00	45.27	H
2521.00	-52.71	4.65	6.14	2.15	-53.37	-13.00	40.37	H
3351.02	-54.54	5.32	7.84	2.15	-54.17	-13.00	41.17	H
4190.02	-54.58	6.18	9.09	2.15	-53.82	-13.00	40.82	V
5013.01	-55.40	6.58	9.92	2.15	-54.21	-13.00	41.21	V
5848.01	-54.20	7.23	10.53	2.15	-53.05	-13.00	40.05	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	-58.63	3.60	5.15	2.15	-59.23	-13.00	46.23	H
2545.00	-50.69	4.66	6.18	2.15	-51.32	-13.00	38.32	H
3394.02	-54.31	5.36	7.95	2.15	-53.87	-13.00	40.87	V
4247.02	-55.07	6.24	9.15	2.15	-54.31	-13.00	41.31	H
5098.01	-55.40	6.77	10.04	2.15	-54.28	-13.00	41.28	H
5943.01	-52.40	7.47	10.51	2.15	-51.51	-13.00	38.51	H

**Reference Measurement Results from basic model:**
**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
3683.02	-56.38	6.46	8.46	-54.38	-13.00	41.38	H
5553.02	-52.00	7.18	10.59	-48.59	-13.00	35.59	H
7408.01	-51.94	8.14	12.09	-47.99	-13.00	34.99	V
9264.01	-53.76	9.07	13.26	-49.57	-13.00	36.57	V
11105.01	-49.93	9.81	13.18	-46.56	-13.00	33.56	V
12905.01	-49.23	10.50	13.44	-46.29	-13.00	33.29	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
3781.02	-56.83	6.20	8.59	-54.44	-13.00	41.44	V
5645.02	-52.59	7.27	10.57	-49.29	-13.00	36.29	H
7522.01	-52.18	8.30	12.22	-48.26	-13.00	35.26	V
9405.01	-52.82	9.06	13.34	-48.54	-13.00	35.54	V
11281.01	-50.22	9.88	13.14	-46.96	-13.00	33.96	V
13125.01	-47.91	10.83	13.68	-45.06	-13.00	32.06	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
3773.02	-56.34	6.22	8.58	-53.98	-13.00	40.98	H
5733.02	-53.84	7.29	10.55	-50.58	-13.00	37.58	V
7639.01	-51.97	8.15	12.31	-47.81	-13.00	34.81	V
9547.01	-52.16	9.37	13.35	-48.18	-13.00	35.18	V
11504.01	-50.95	9.81	13.10	-47.66	-13.00	34.66	H
13371.01	-47.56	10.57	14.02	-44.11	-13.00	31.11	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	-51.77	3.56	5.23	2.15	-52.25	-13.00	39.25	H
2474.00	-51.14	4.60	6.02	2.15	-51.87	-13.00	38.87	H
3296.02	-54.77	5.29	7.71	2.15	-54.50	-13.00	41.50	V
4113.02	-55.23	6.04	9.01	2.15	-54.41	-13.00	41.41	H
4943.01	-54.16	6.70	9.84	2.15	-53.17	-13.00	40.17	V
5781.01	-53.81	7.22	10.54	2.15	-52.64	-13.00	39.64	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	-57.30	3.58	5.19	2.15	-57.84	-13.00	44.84	H
2510.00	-51.95	4.63	6.12	2.15	-52.61	-13.00	39.61	H
3340.02	-54.32	5.31	7.82	2.15	-53.96	-13.00	40.96	H
4187.02	-54.35	6.18	9.09	2.15	-53.59	-13.00	40.59	V
5006.01	-49.81	6.59	9.91	2.15	-48.64	-13.00	35.64	V
5866.01	-53.71	7.29	10.53	2.15	-52.62	-13.00	39.62	V

**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
1699.01	-59.51	3.60	5.14	2.15	-60.12	-13.00	47.12	V
2545.00	-52.24	4.66	6.18	2.15	-52.87	-13.00	39.87	H
3386.02	-54.58	5.35	7.93	2.15	-54.15	-13.00	41.15	V
4256.02	-55.61	6.23	9.16	2.15	-54.83	-13.00	41.83	H
5079.01	-55.41	6.71	10.01	2.15	-54.26	-13.00	41.26	V
5942.01	-53.14	7.47	10.51	2.15	-52.25	-13.00	39.25	V

Note: The maximum value of expanded measurement uncertainty for this test item is  $U = 5.16 \text{ dB}$ ,  $k = 2$ .

## **A.3 FREQUENCY STABILITY**

### **A.3.1 Method of Measurement**

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER and Anritsu MT8821C Radio Communication Analyzer.

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 or MT8821C, and in a simulated call on middle channel for LTE band 2,5,7,12,66,71, 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 increments from -30°C to +50°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 between 3.6VDC and 4.2VDC, with a nominal voltage of 3.85VDC. 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	1850.865	1909.135		
50			-0.75	0.0003	
40			0.37	0.0002	
30			-0.47	0.0002	
10			-0.36	0.0002	
0			-0.09	0.0000	
-10			0.77	0.0003	
-20			1.36	0.0004	
-30			0.73	0.0004	

##### 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	1850.865	1909.135	-0.89	0.0004
4.2				1.01	0.0004

#### 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	824.449	848.551		
50			7.76	0.0093	
40			0.58	0.0007	
30			-0.28	0.0003	
10			7.38	0.0088	
0			6.82	0.0082	
-10			0.10	0.0001	
-20			0.90	0.0011	
-30			0.23	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	824.449	848.551	6.29	0.0075
4.2				0.78	0.0009

**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	2500.641	2569.327	-1.22	0.0007
50				0.37	0.0002
40				-0.45	0.0003
30				0.71	0.0004
10				-0.1	0.0001
0				1.37	0.0008
-10				-2.06	0.0012
-20				0.61	0.0004
-30					

**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	2500.641	2569.327	1.57	0.0009
4.2				0.37	0.0002

**LTE Band 12, 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	699.497	715.503	0.07	0.0000
50				0.17	0.0001
40				0.24	0.0001
30				0.64	0.0004
10				-0.08	0.0000
0				0.3	0.0002
-10				-0.02	0.0000
-20				0.74	0.0004
-30					

**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	699.497	715.503	-0.26	0.0002
4.2				-0.86	0.0005

**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	1710.881	1779.119	-1.30	0.0008
50				1.00	0.0006
40				-0.85	0.0005
30				0.96	0.0006
10				0.03	0.0000
0				-0.04	0.0000
-10				0.20	0.0001
-20				-0.63	0.0004
-30					

**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	1710.881	1779.119	-1.30	0.0008
4.2				-0.85	0.0005

**LTE Band 71, 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	664.010	697.006	-0.33	0.0002
50				0.21	0.0001
40				0.79	0.0005
30				0.59	0.0003
10				1.77	0.0010
0				0.41	0.0002
-10				0.07	0.0000
-20				1.13	0.0007
-30					

**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	664.010	697.006	0.41	0.0002
4.2				0.39	0.0002

## **A.4 OCCUPIED BANDWIDTH**

### **A.4.1 Occupied Bandwidth Results**

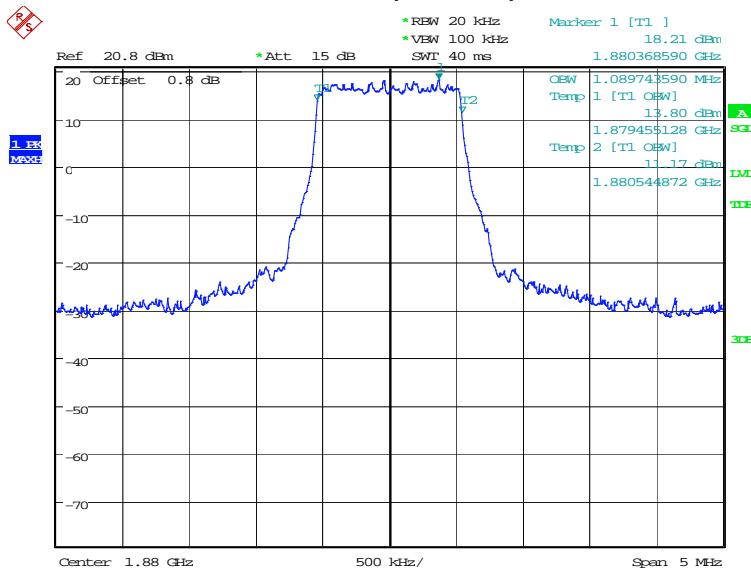
Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at mid frequencies. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from ANSI C63.26:

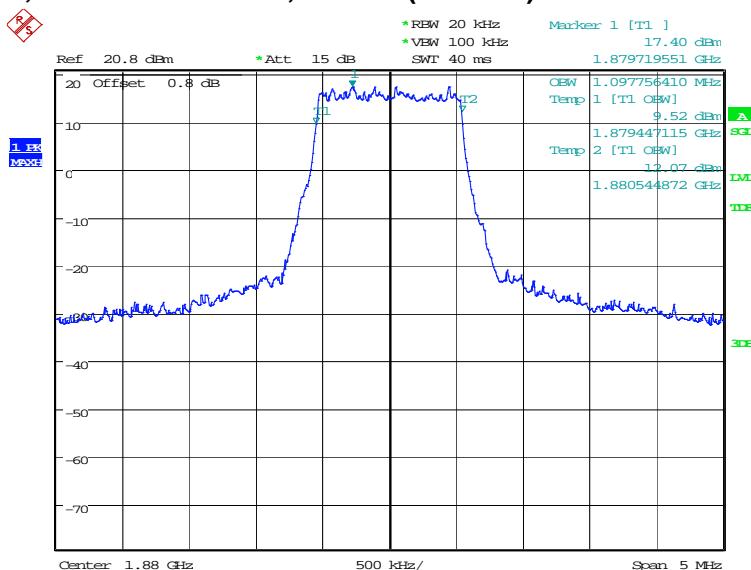
- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts.
- b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range 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%)**

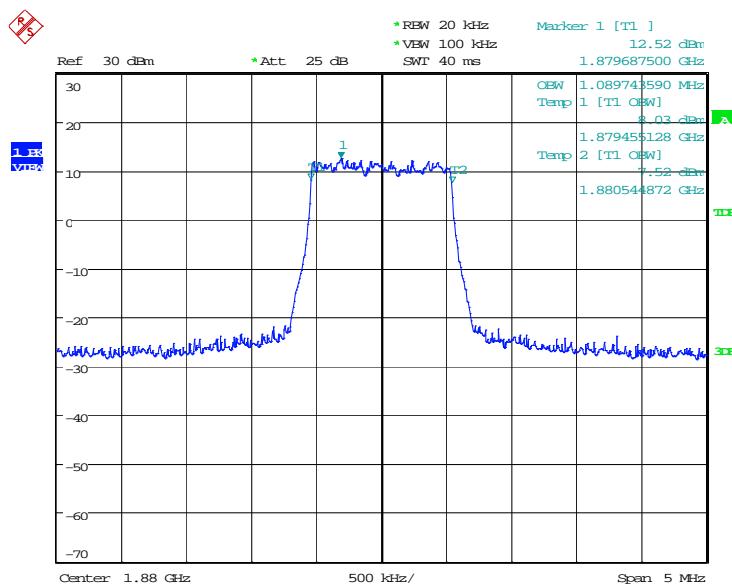
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
1880.0	1089.74	1097.76	1089.74

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


Date: 23.OCT.2019 20:06:26

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


Date: 23.OCT.2019 20:07:50

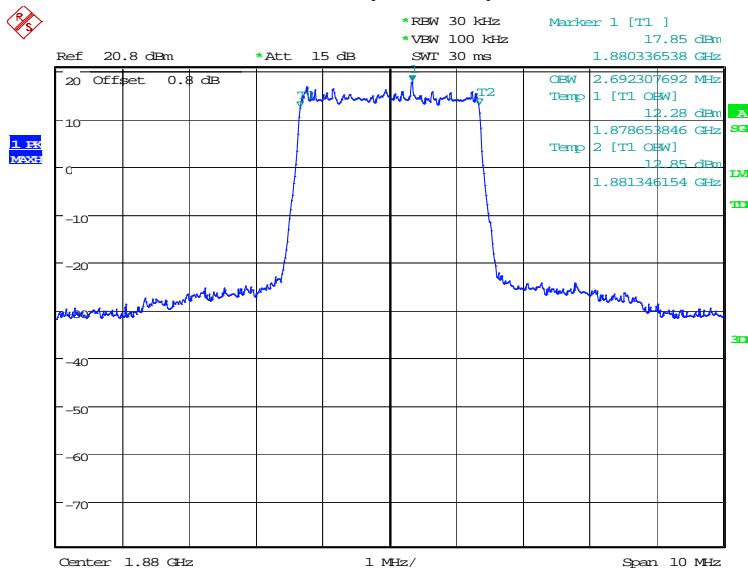
**LTE band 2, 1.4MHz Bandwidth, 64QAM (99% BW)**


Date: 4.DEC.2019 14:30:32

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

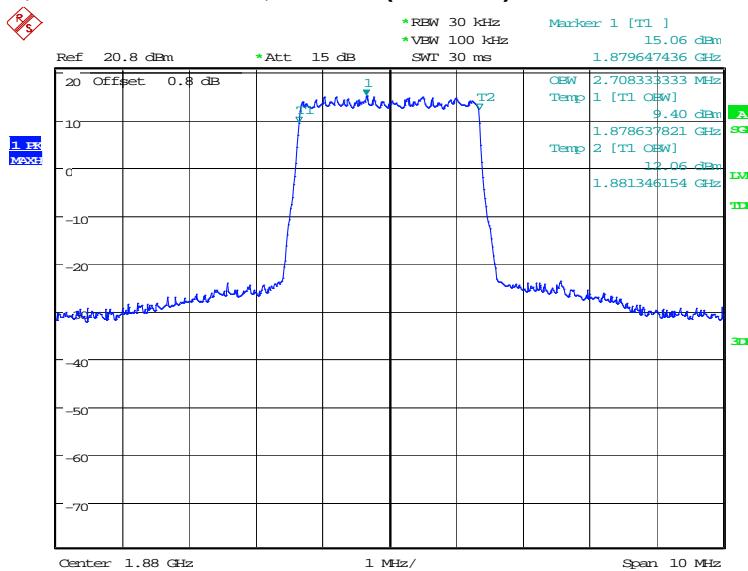
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
1880.0	QPSK	16QAM	64QAM
	2692.31	2708.33	2692.31

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

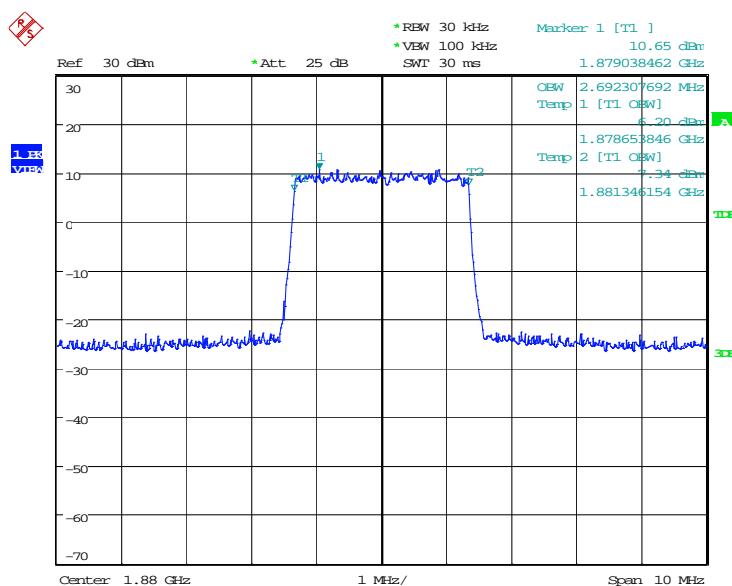


Date: 23.OCT.2019 20:09:16

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



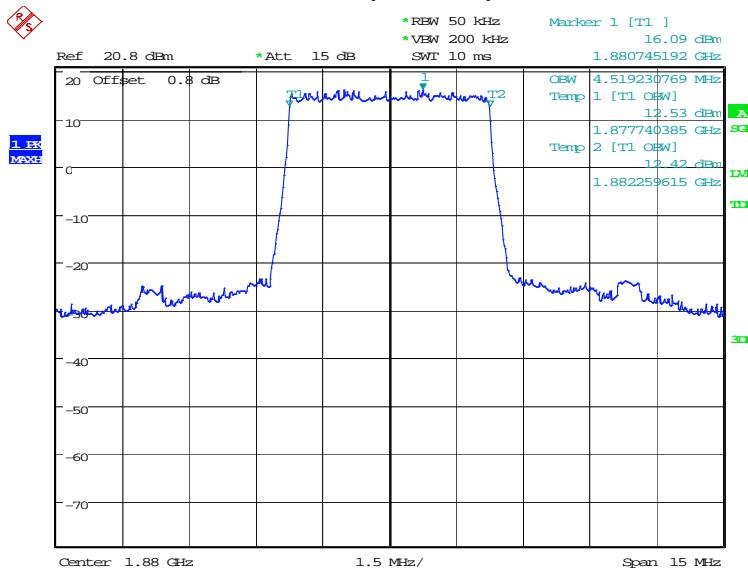
Date: 23.OCT.2019 20:10:40

**LTE band 2, 3MHz Bandwidth, 64QAM (99% BW)**


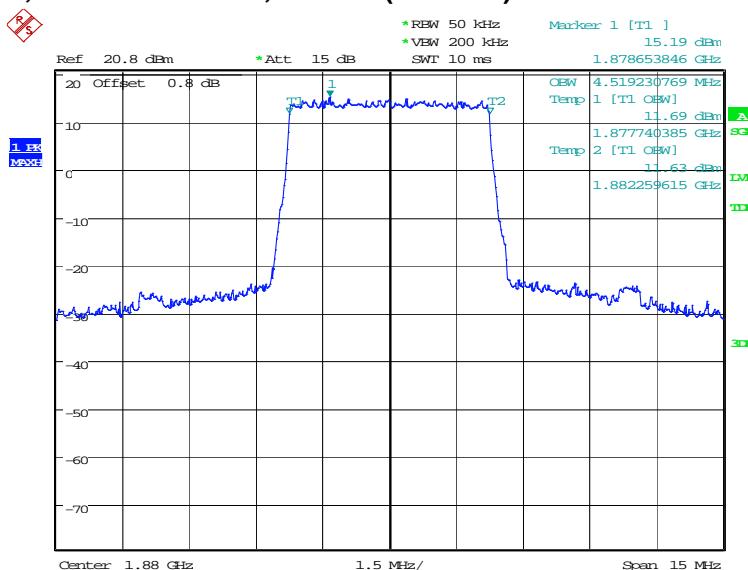
Date: 4.DEC.2019 14:32:01

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

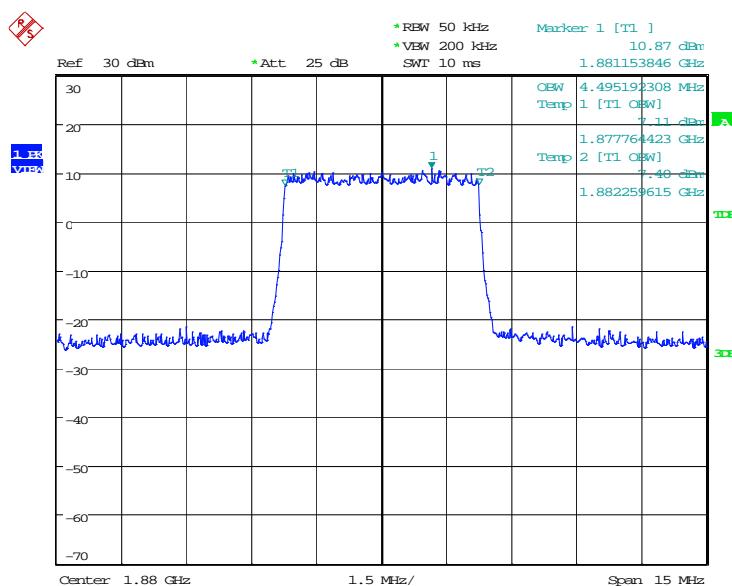
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
1880.0	4519.23	4519.23	4495.19

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


Date: 23.OCT.2019 20:12:06

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


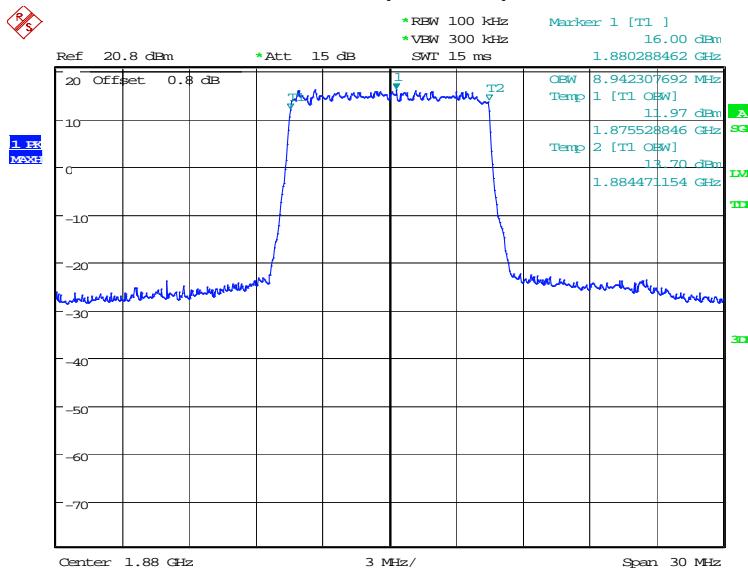
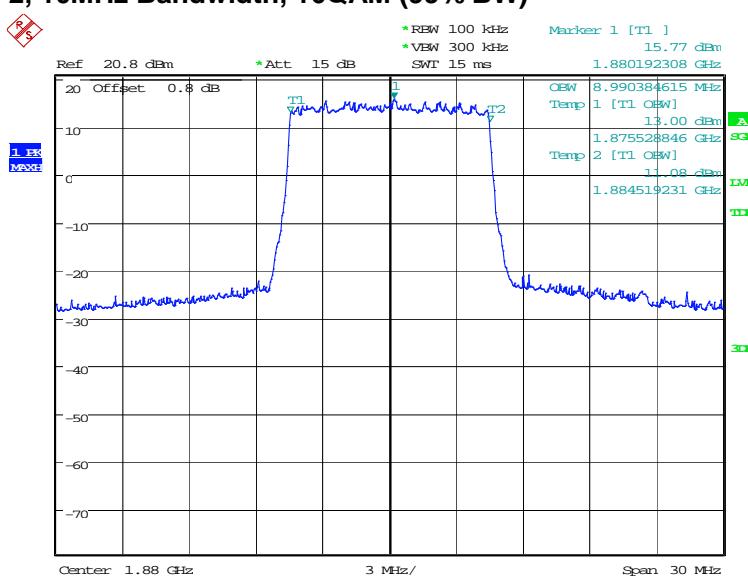
Date: 23.OCT.2019 20:13:30

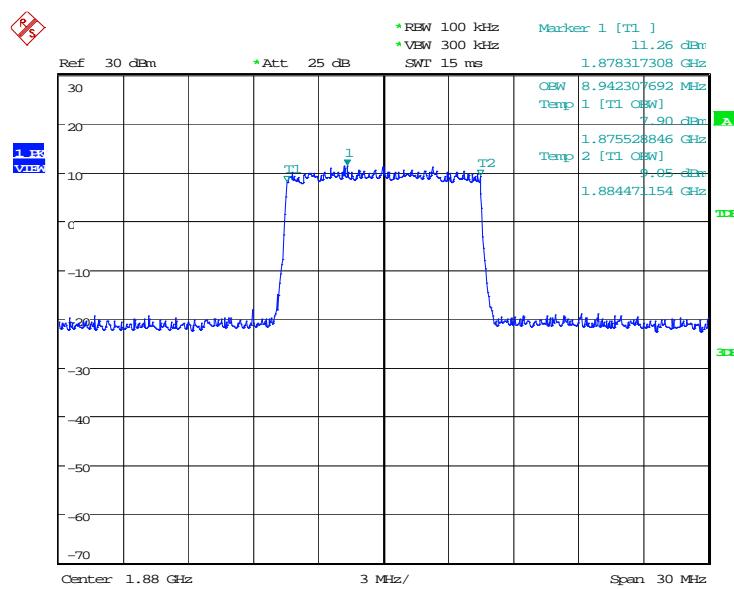
**LTE band 2, 5MHz Bandwidth,64QAM (99% BW)**


Date: 4.DEC.2019 14:33:20

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

Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
1880.0	8942.31	8990.38	8942.31

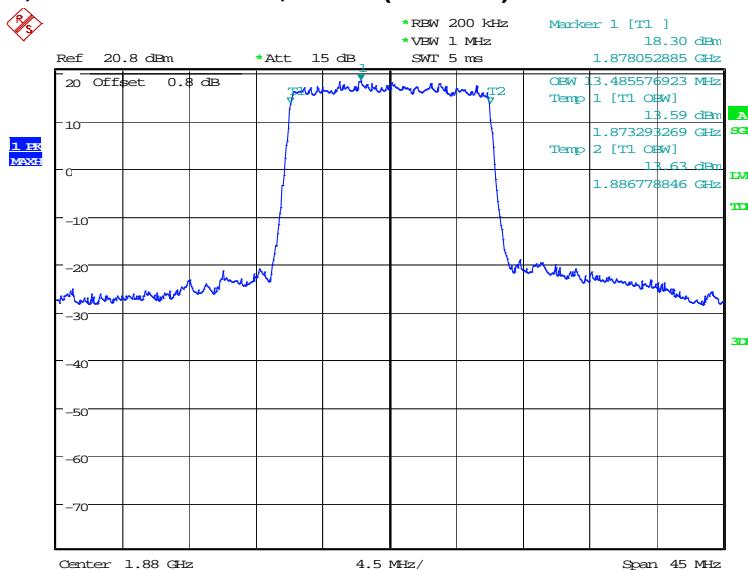
**LTE band 2, 10MHz Bandwidth, QPSK (99% BW)**

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


**LTE band 2, 10MHz Bandwidth, 64QAM (99% BW)**


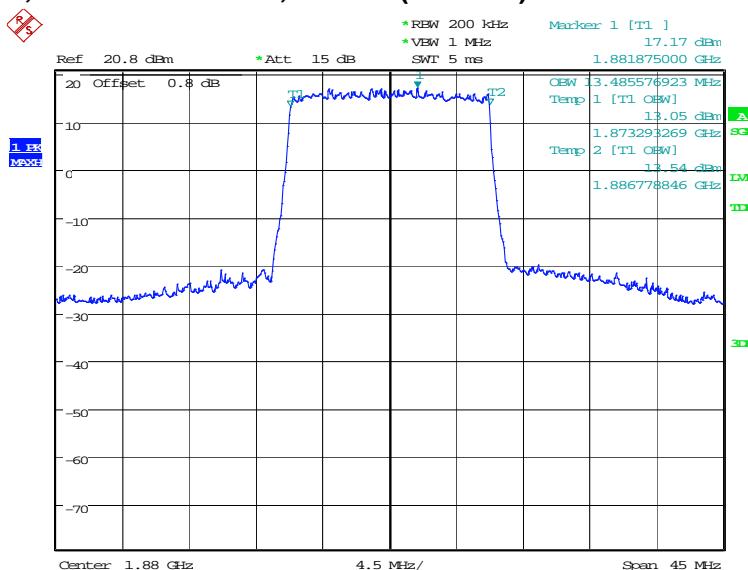
Date: 4.DEC.2019 14:34:40

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

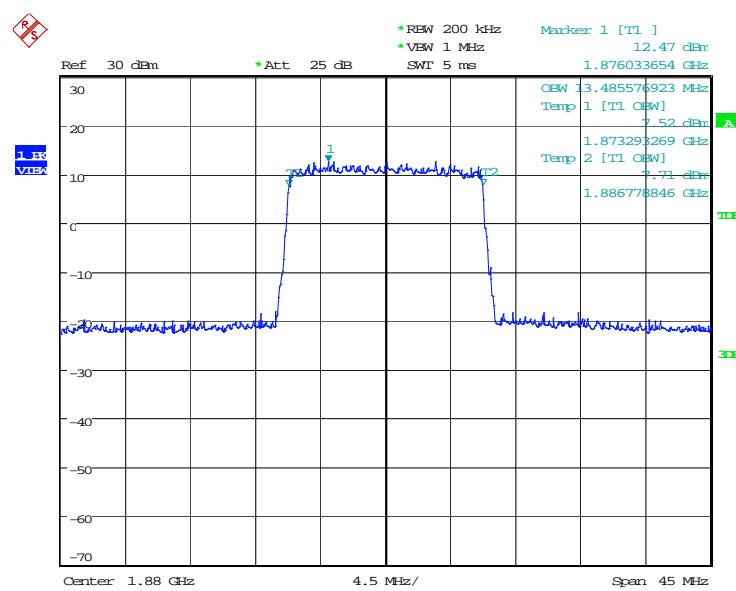
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
	13485.58	13485.58	13485.58

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


Date: 23.OCT.2019 20:17:47

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


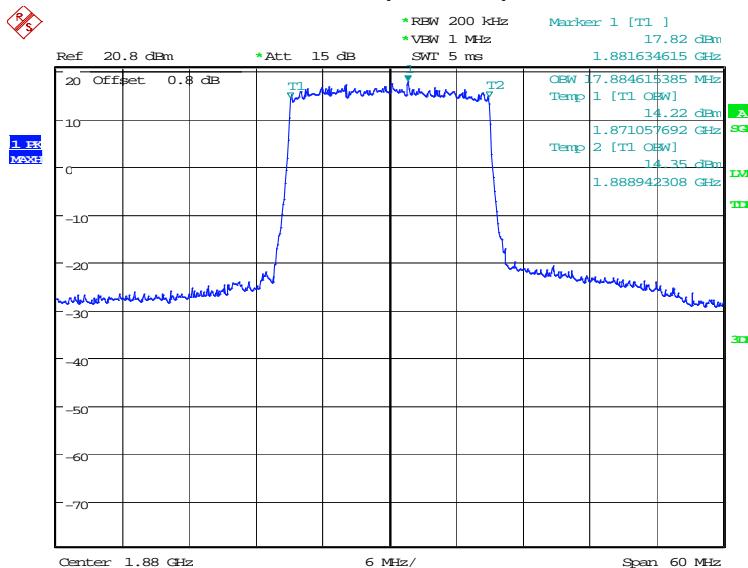
Date: 23.OCT.2019 20:19:11

**LTE band 2, 15MHz Bandwidth, 64QAM (99% BW)**


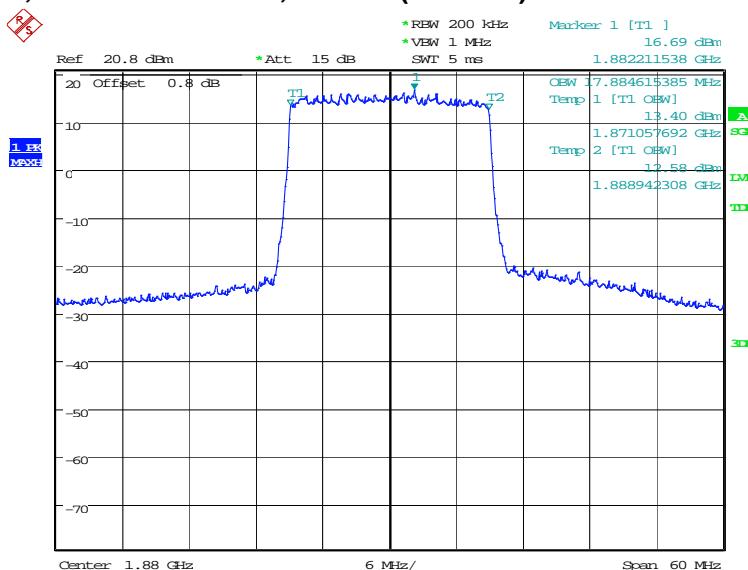
Date: 4.DEC.2019 14:35:56

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

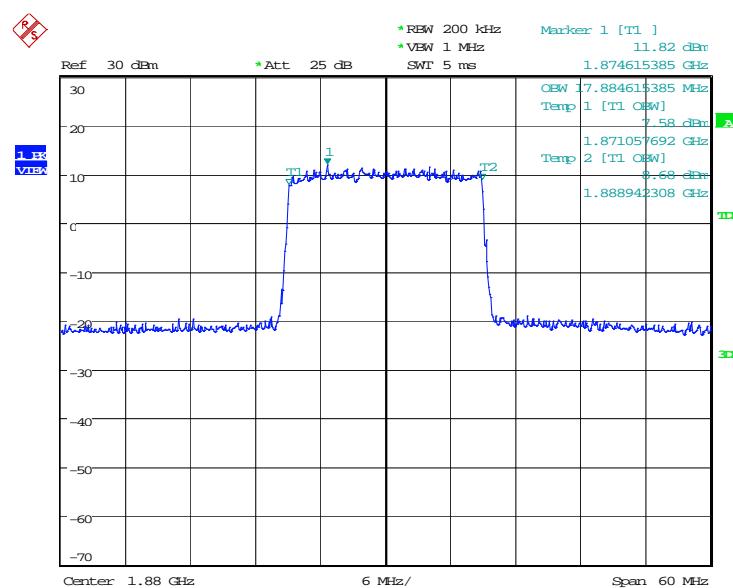
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
1880.0	17884.62	17884.62	17884.62

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


Date: 23.OCT.2019 20:20:37

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


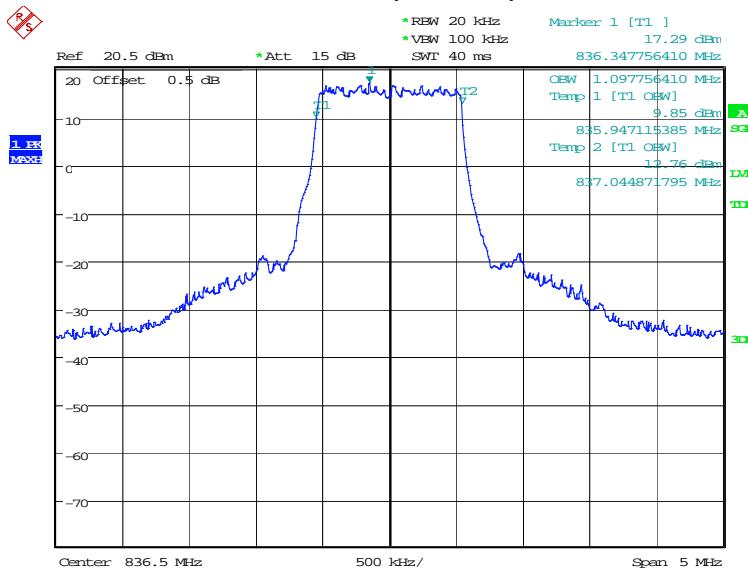
Date: 23.OCT.2019 20:22:02

**LTE band 2, 20MHz Bandwidth, 64QAM (99% BW)**


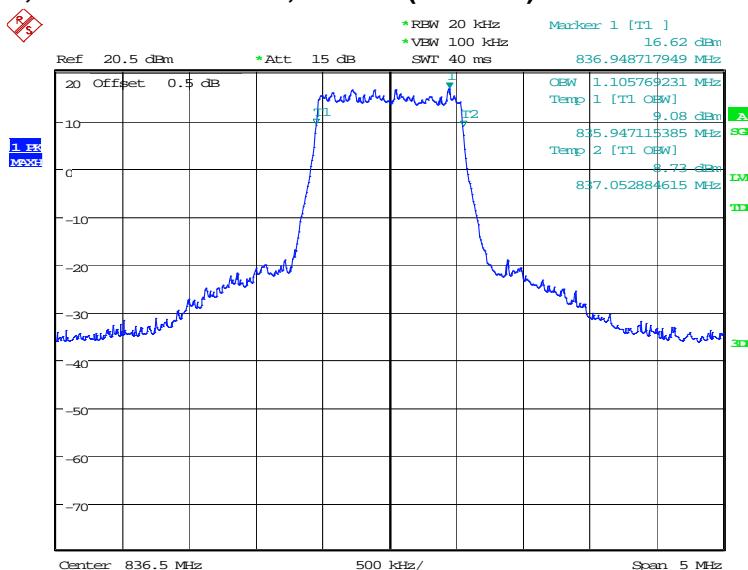
Date: 4.DEC.2019 14:37:18

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

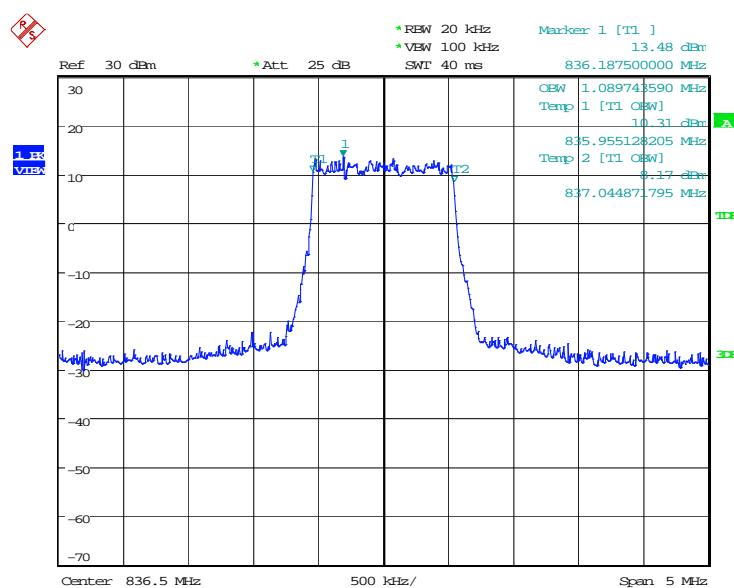
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
836.5	1097.76	1105.77	1089.74

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


Date: 23.OCT.2019 20:41:24

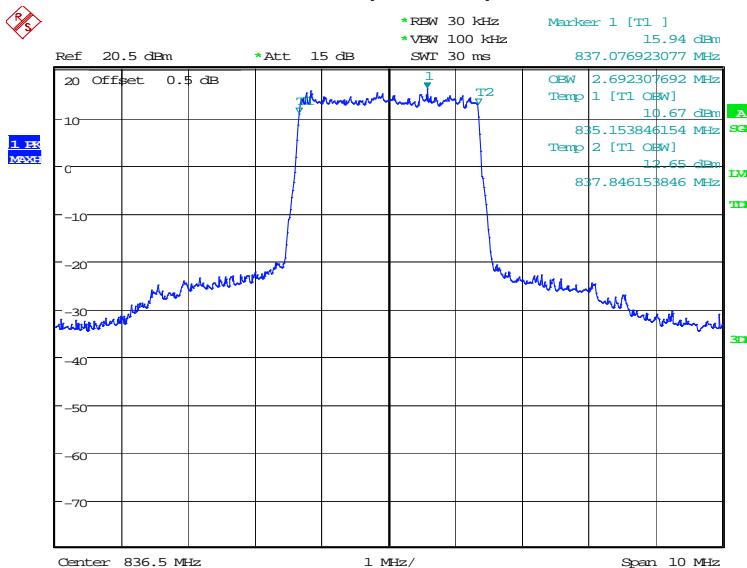
**LTE band 5, 1.4MHz Bandwidth, 16QAM (99% BW)**


Date: 23.OCT.2019 20:42:48

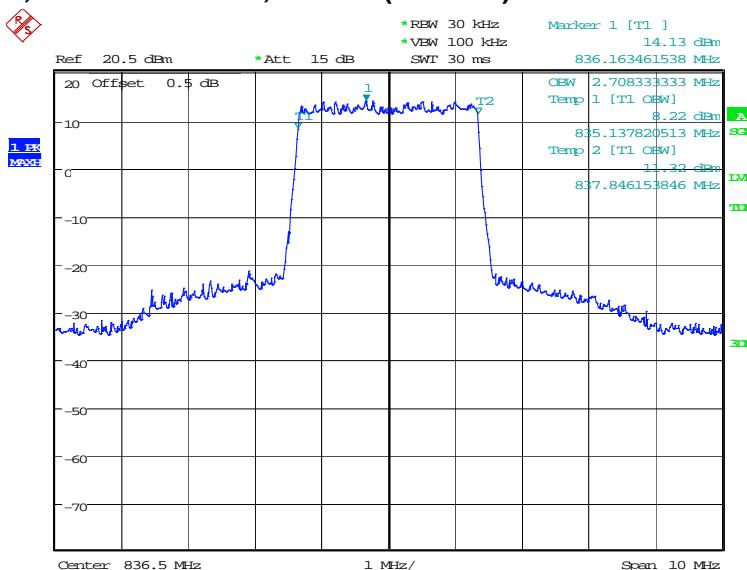
**LTE band 5, 1.4MHz Bandwidth, 64QAM (99% BW)**


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

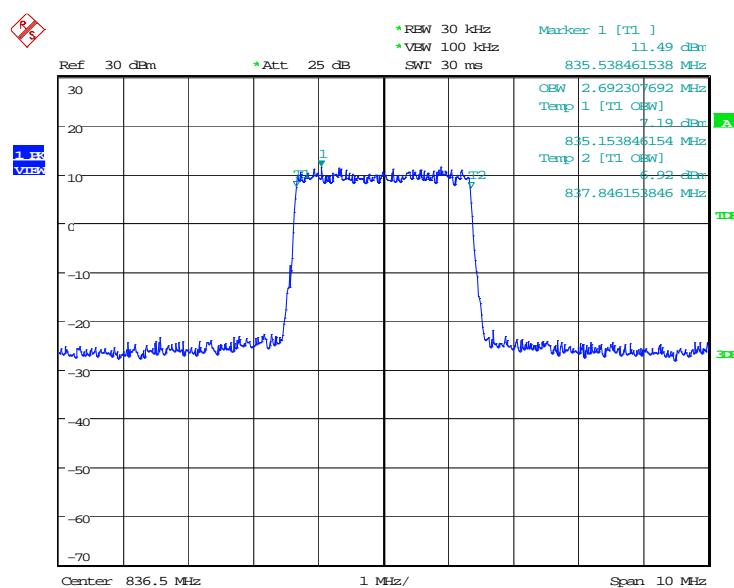
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
836.5	2692.31	2708.33	2692.31

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


Date: 23.OCT.2019 20:44:15

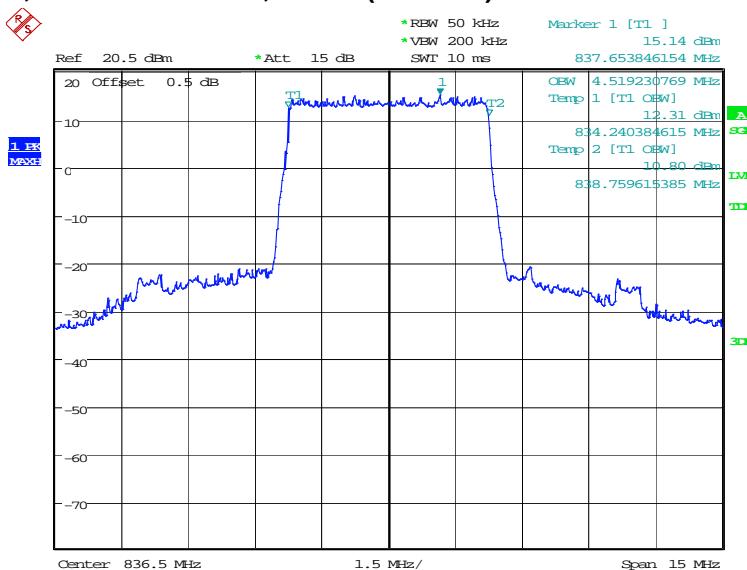
**LTE band 5, 3MHz Bandwidth, 16QAM (99% BW)**


Date: 23.OCT.2019 20:45:39

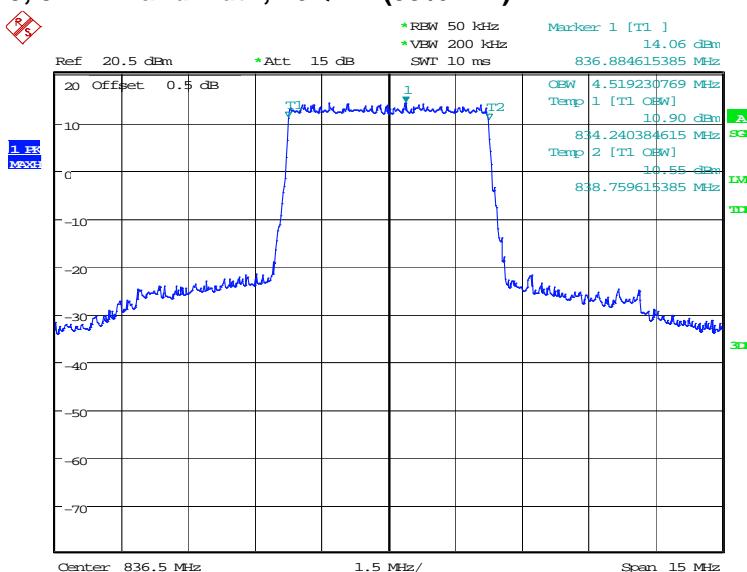
**LTE band 5, 3MHz Bandwidth, 64QAM (99% BW)**


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

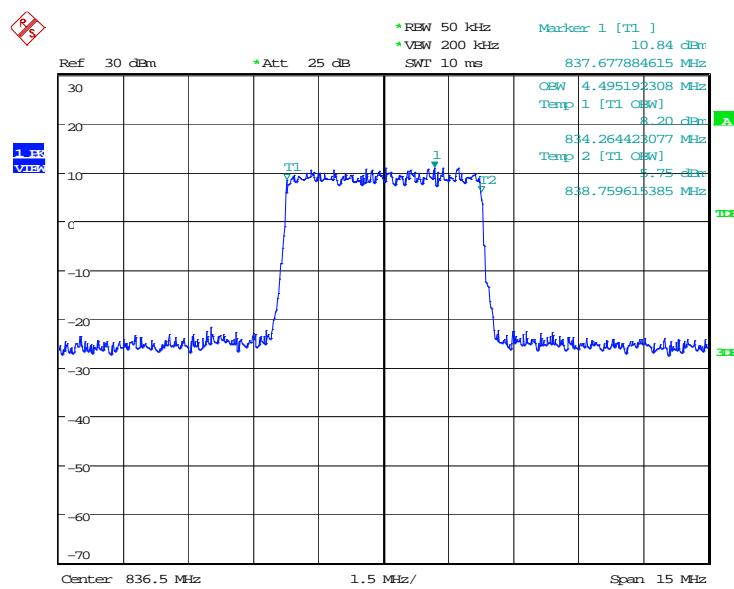
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
836.5	QPSK	16QAM	64QAM
	4519.23	4519.23	4495.19

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


Date: 23.OCT.2019 20:47:05

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


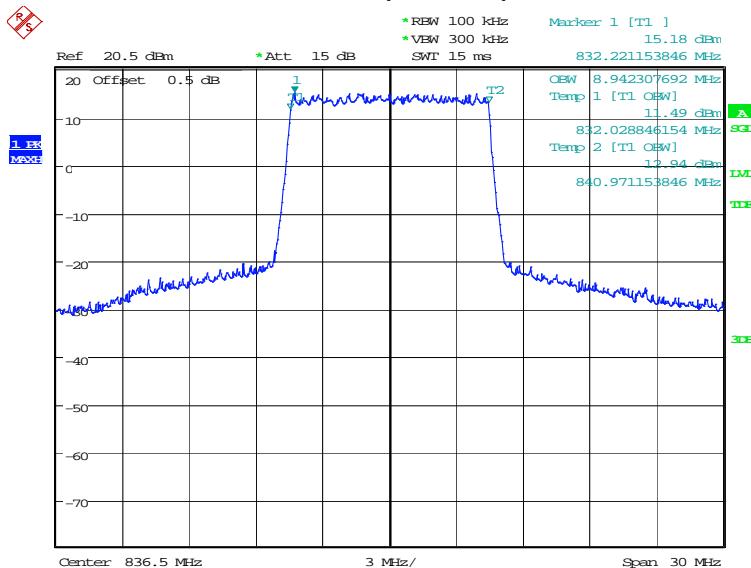
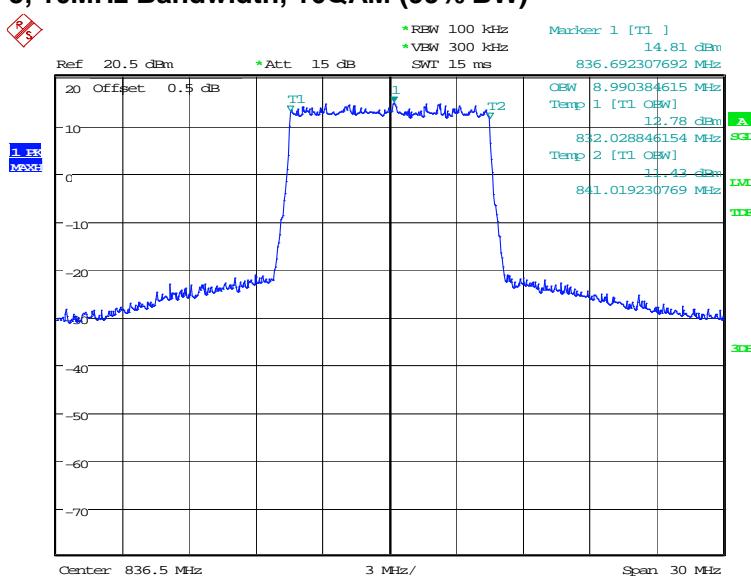
Date: 23.OCT.2019 20:48:30

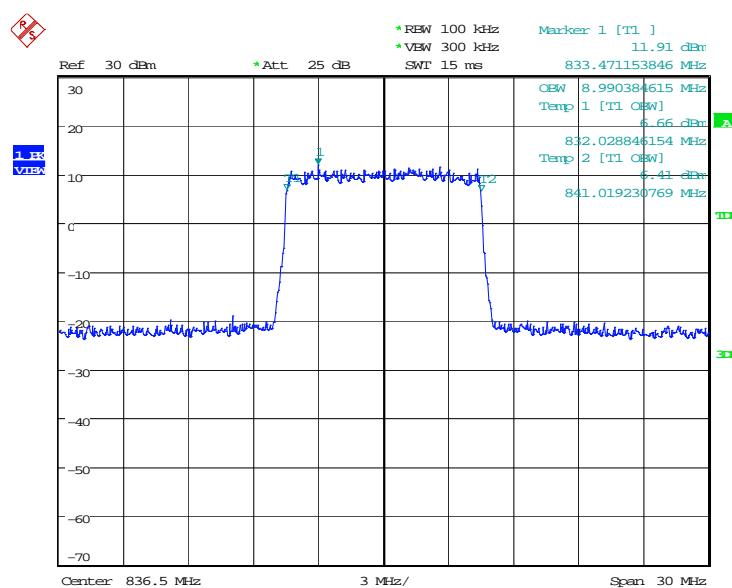
**LTE band 5, 5MHz Bandwidth,64QAM (99% BW)**


Date: 4.DEC.2019 14:56:04

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

Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
836.5	8942.31	8990.38	8990.38

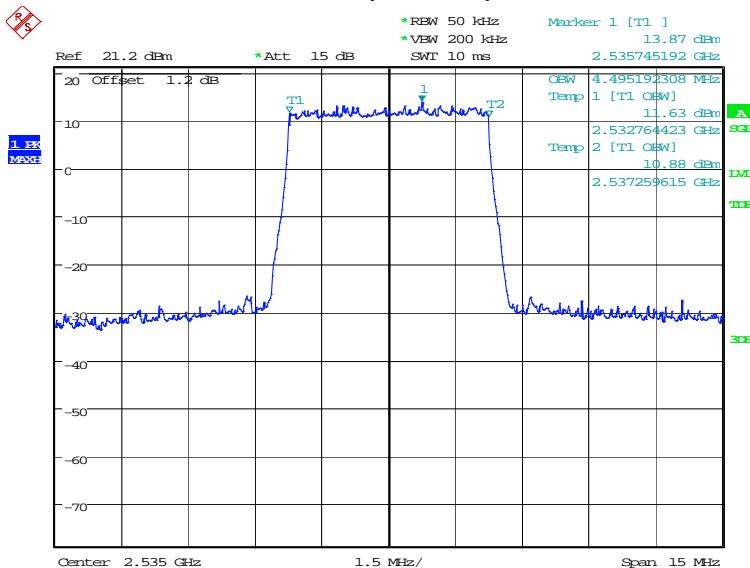
**LTE band 5, 10MHz Bandwidth, QPSK (99% BW)**

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


**LTE band 5, 10MHz Bandwidth, 64QAM (99% BW)**


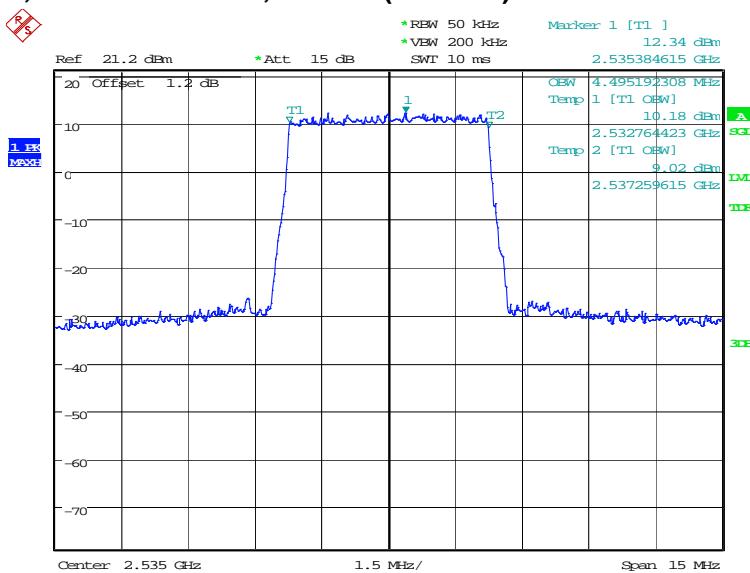
Date: 4.DEC.2019 14:57:23

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

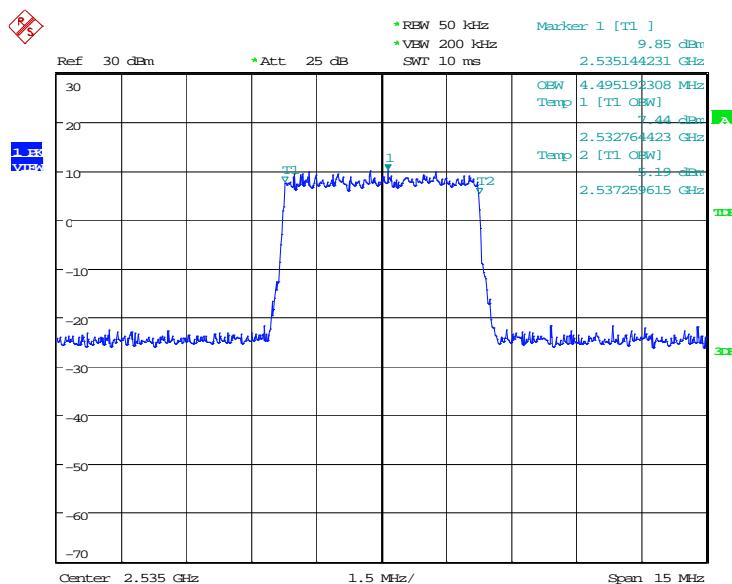
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
2535.0	4495.19	4495.19	4495.19

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


Date: 30.DEC.2019 18:15:26

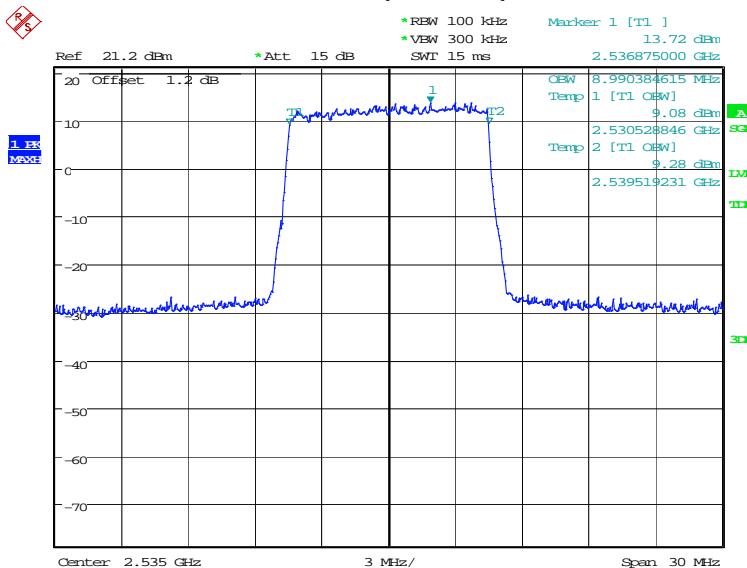
**LTE band 7, 5MHz Bandwidth, 16QAM (99% BW)**


Date: 30.DEC.2019 18:16:50

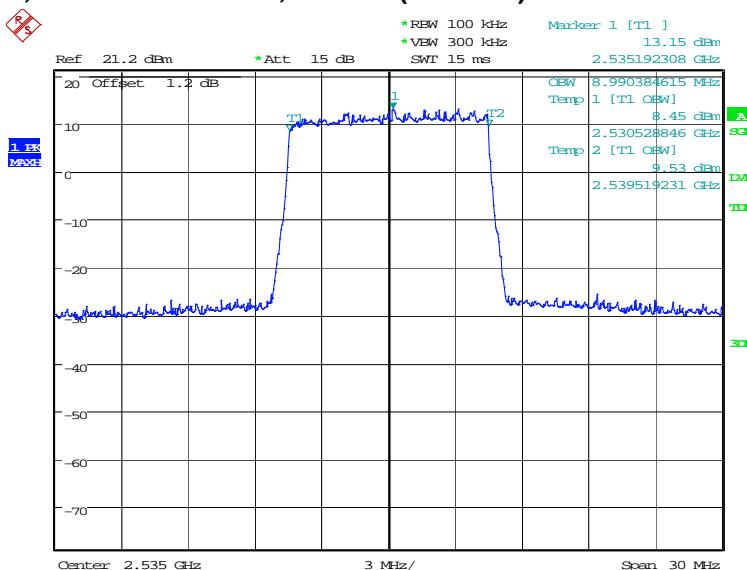
**LTE band 7, 5MHz Bandwidth,64QAM (99% BW)**


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

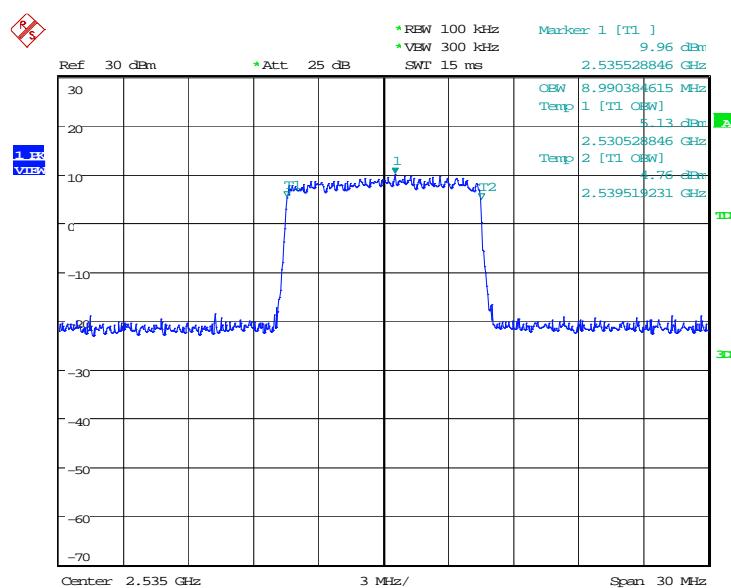
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
2535.0	8990.38	8990.38	8990.38

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


Date: 30.DEC.2019 18:18:16

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


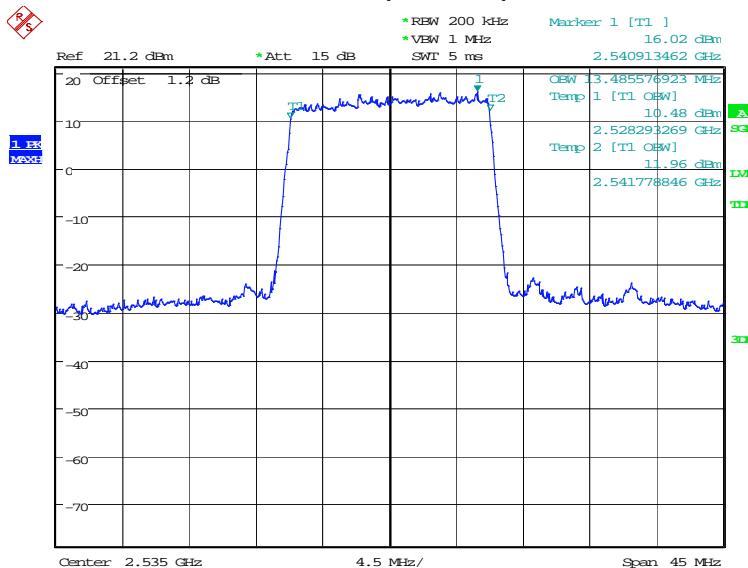
Date: 30.DEC.2019 18:19:41

**LTE band 7, 10MHz Bandwidth, 64QAM (99% BW)**


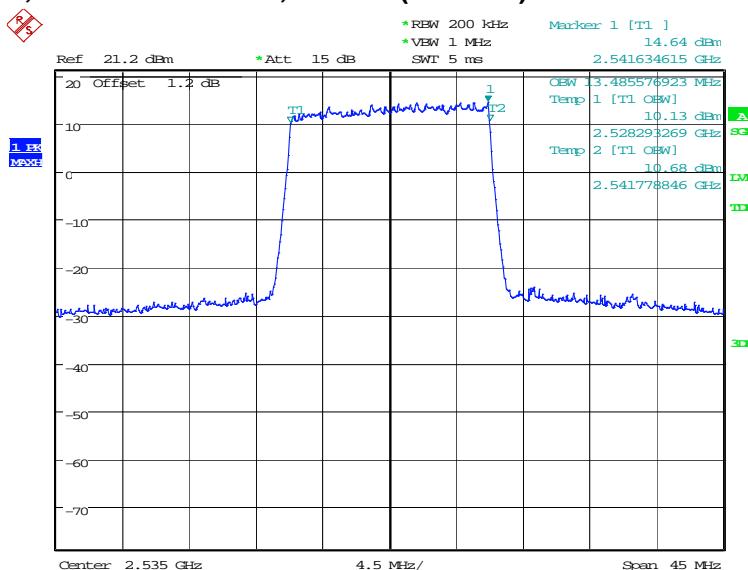
Date: 31.DEC.2019 09:19:06

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

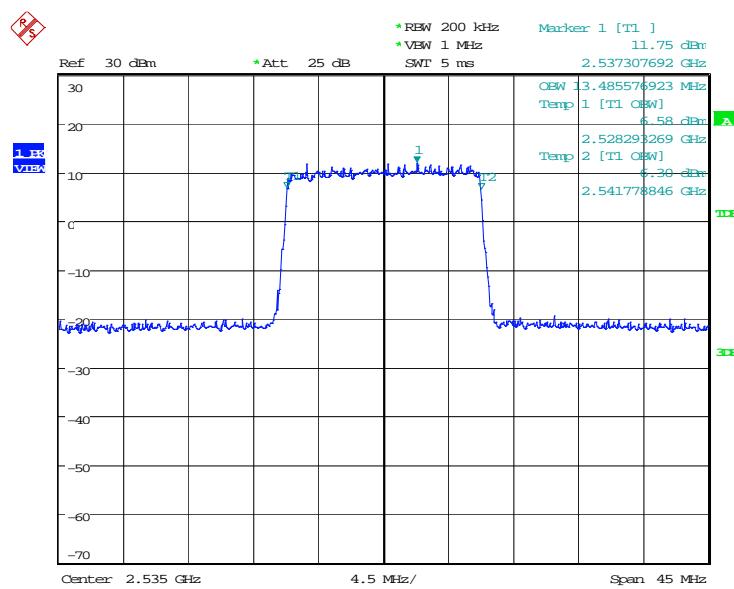
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
2535.0	13485.58	13485.58	13485.58

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


Date: 30.DEC.2019 18:21:07

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


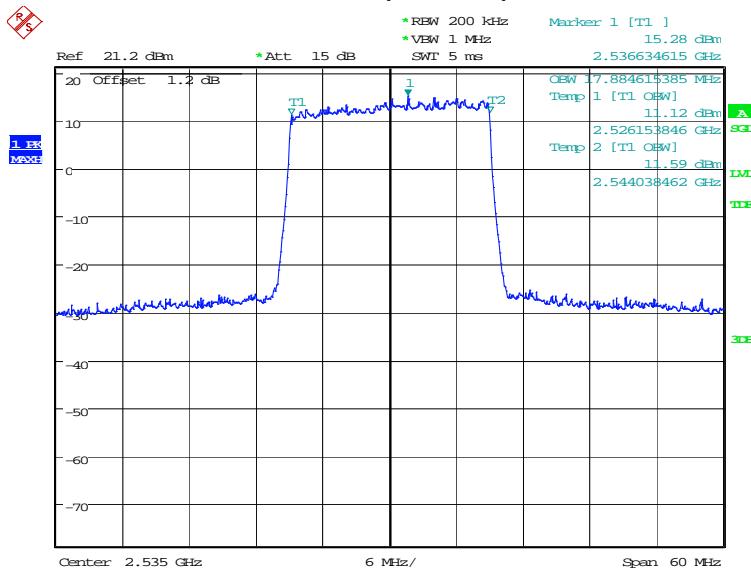
Date: 30.DEC.2019 18:22:31

**LTE band 7, 15MHz Bandwidth, 64QAM (99% BW)**


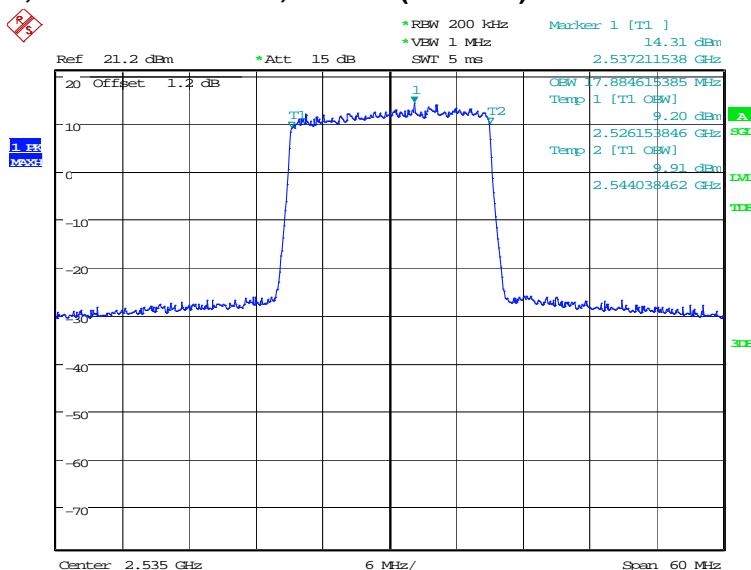
Date: 31.DEC.2019 09:21:28

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

Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
2535.0	17884.62	17884.62	17884.62

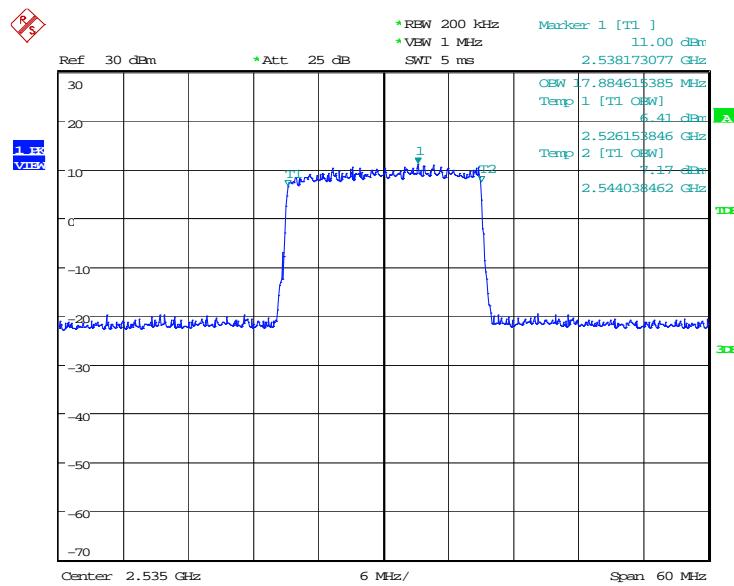
**LTE band 7, 20MHz Bandwidth, QPSK (99% BW)**


Date: 30.DEC.2019 18:23:57

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


Date: 30.DEC.2019 18:25:22

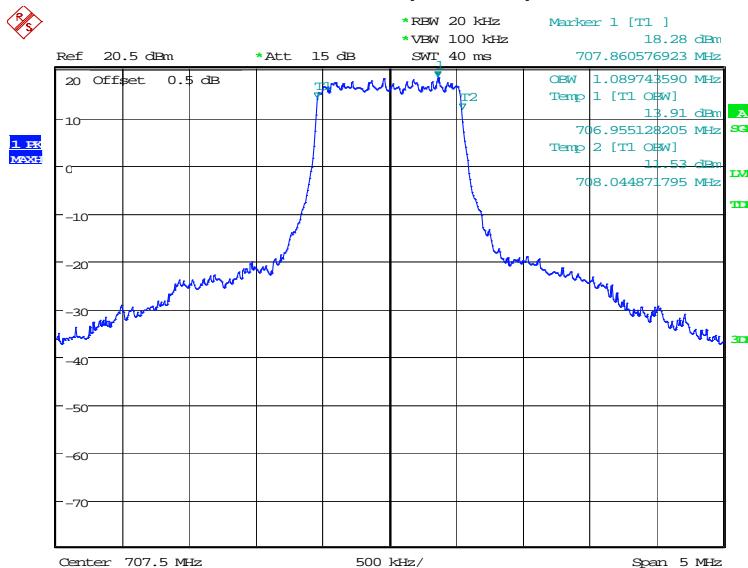
## LTE band 7, 20MHz Bandwidth, 64QAM (99% BW)



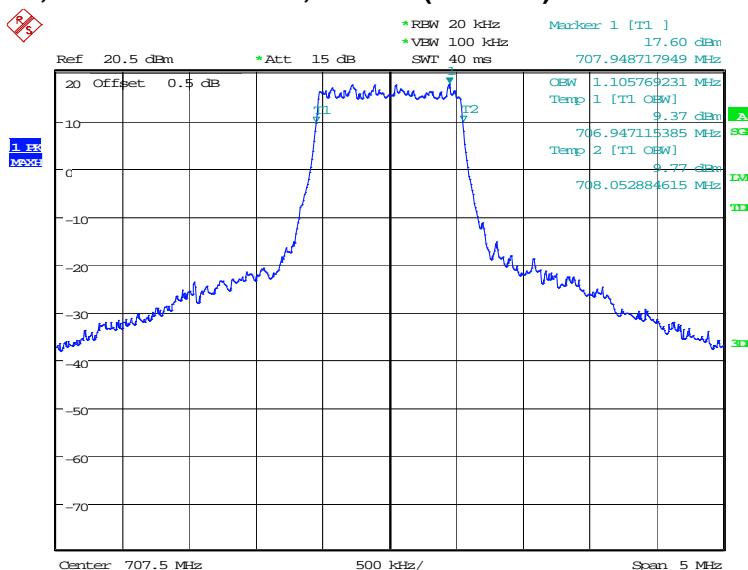
Date: 31.DEC.2019 09:23:10

**LTE band 12, 1.4MHz (99%)**

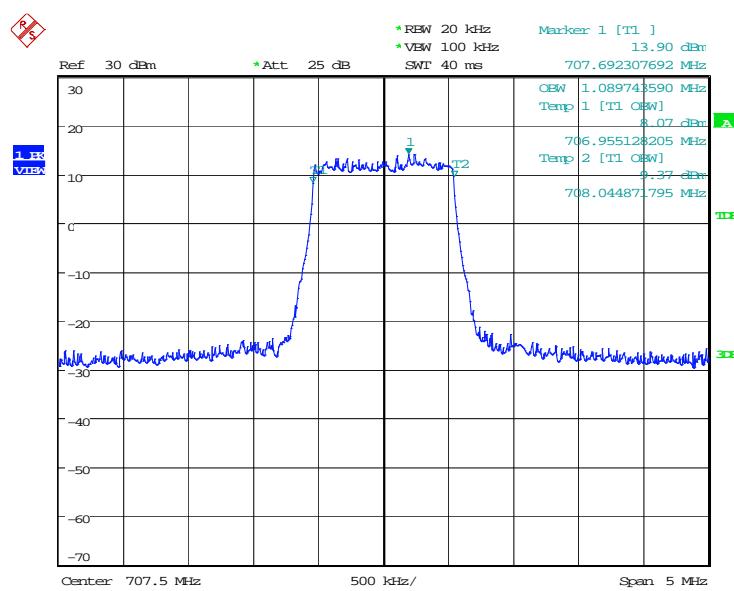
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
707.5	1089.74	1105.77	1089.74

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


Date: 30.DEC.2019 18:27:36

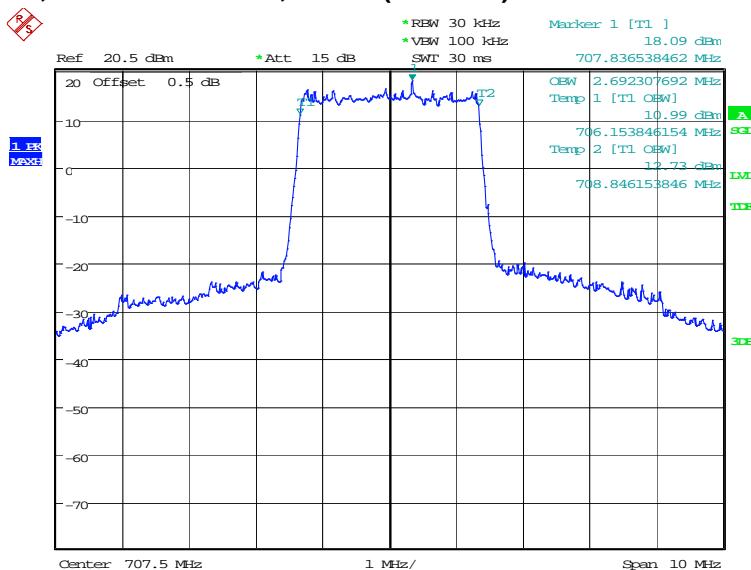
**LTE band 12, 1.4MHz Bandwidth, 16QAM (99% BW)**


Date: 30.DEC.2019 18:29:00

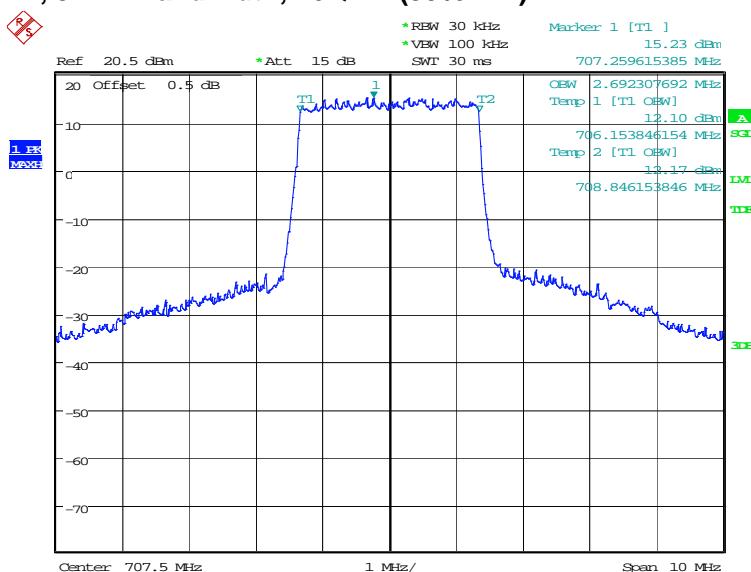
**LTE band 12, 1.4MHz Bandwidth, 64QAM (99% BW)**


**LTE band 12, 3MHz (99%)**

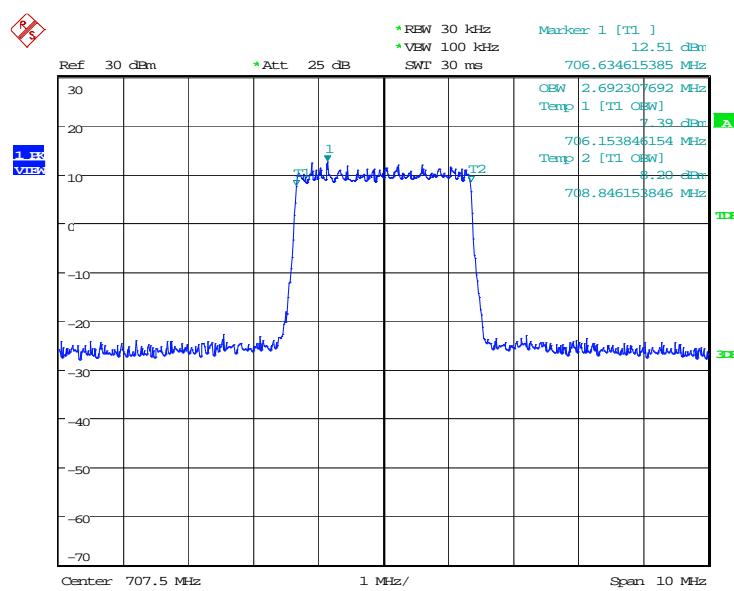
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
707.5	QPSK	16QAM	64QAM
	2692.31	2692.31	2692.31

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


Date: 30.DEC.2019 18:30:26

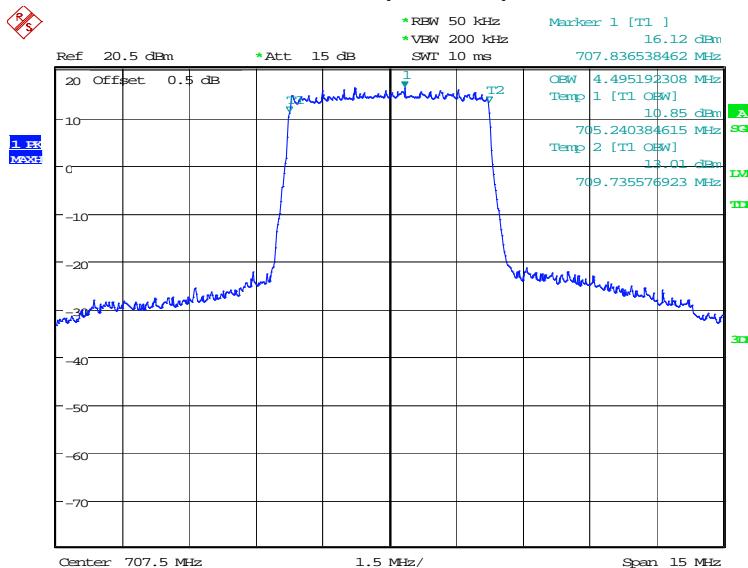
**LTE band 12, 3MHz Bandwidth, 16QAM (99% BW)**


Date: 30.DEC.2019 18:31:50

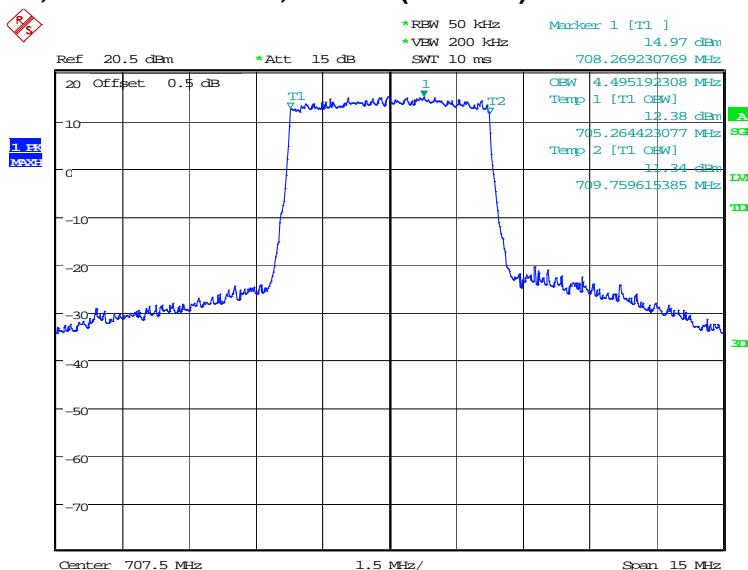
**LTE band 12, 3MHz Bandwidth, 64QAM (99% BW)**


**LTE band 12, 5MHz (99%)**

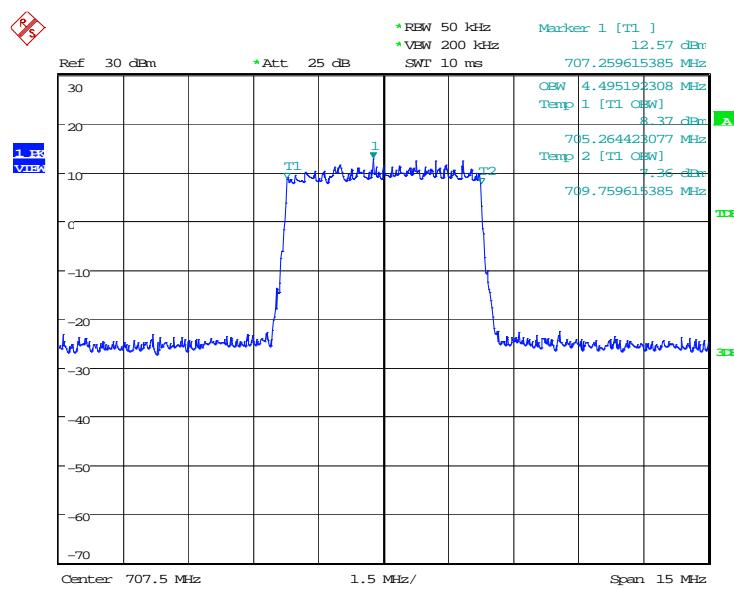
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
707.5	QPSK	16QAM	64QAM
	4495.19	4495.19	4495.19

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


Date: 30.DEC.2019 18:33:16

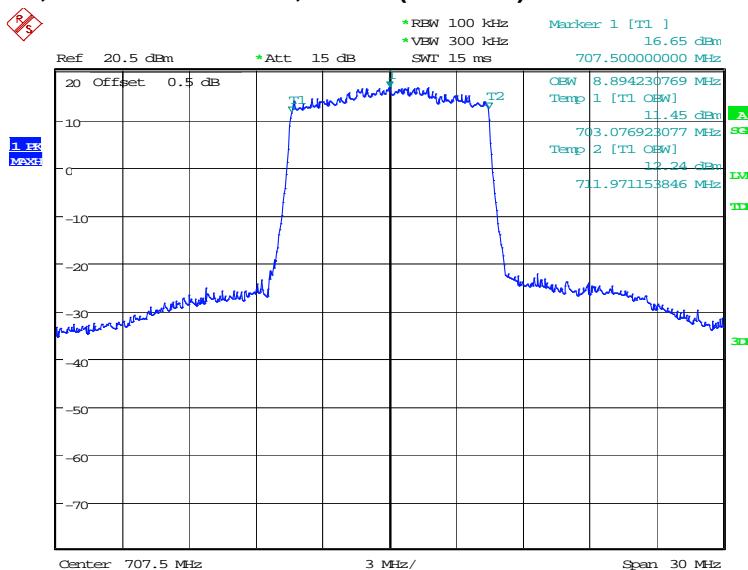
**LTE band 12, 5MHz Bandwidth, 16QAM (99% BW)**


Date: 30.DEC.2019 18:34:41

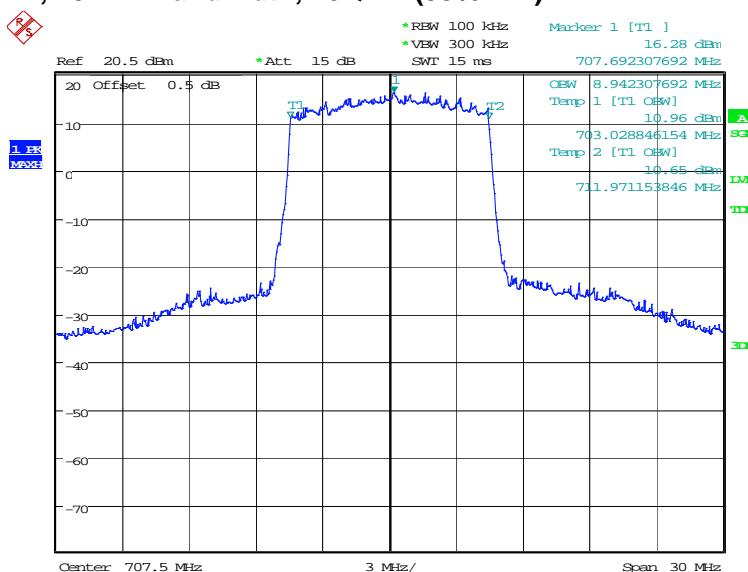
**LTE band 12, 5MHz Bandwidth,64QAM (99% BW)**


**LTE band 12, 10MHz (99%)**

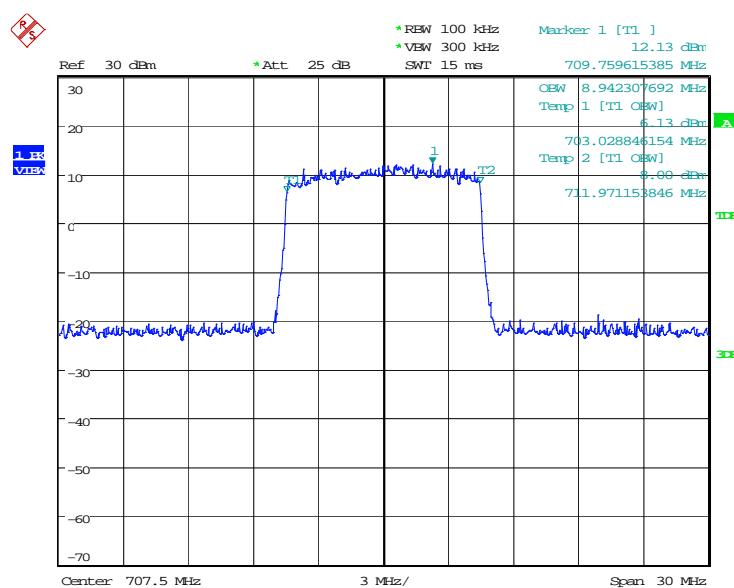
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
707.5	QPSK	16QAM	64QAM
	8894.23	8942.31	8942.31

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


Date: 30.DEC.2019 18:36:07

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


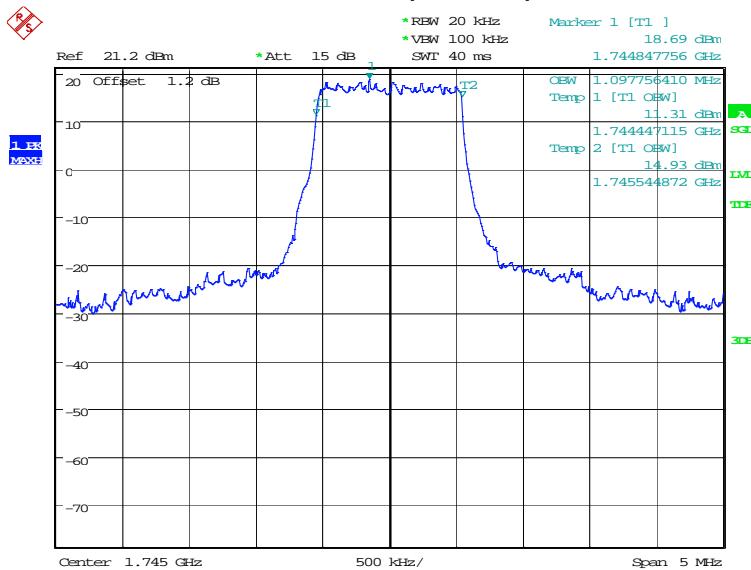
Date: 30.DEC.2019 18:37:31

**LTE band 12, 10MHz Bandwidth, 64QAM (99% BW)**


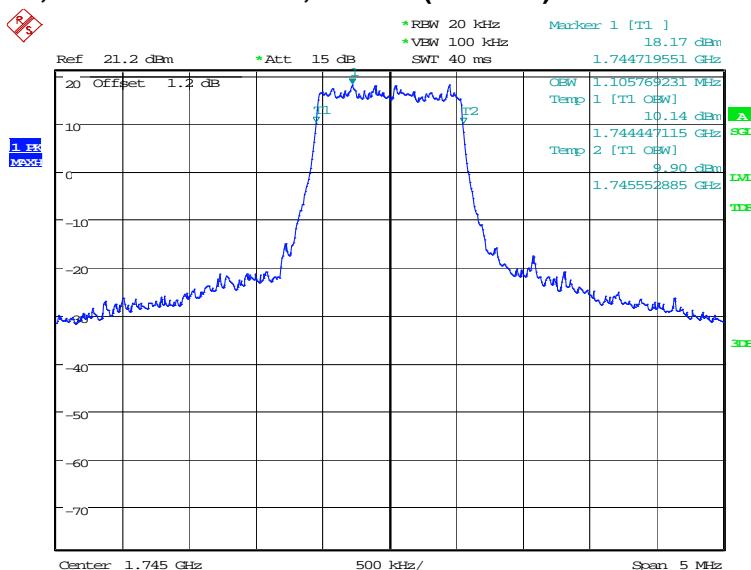
Date: 31.DEC.2019 09:43:12

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

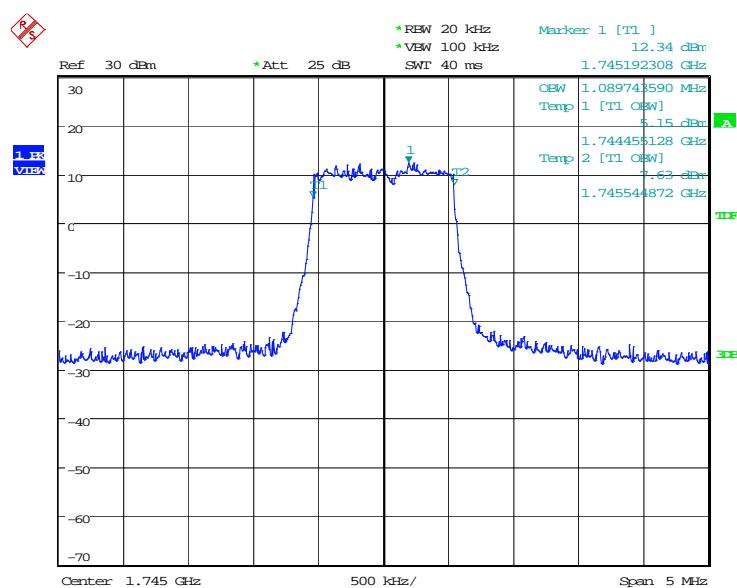
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
1745.0	1097.76	1105.77	1089.74

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


Date: 30.DEC.2019 18:39:01

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


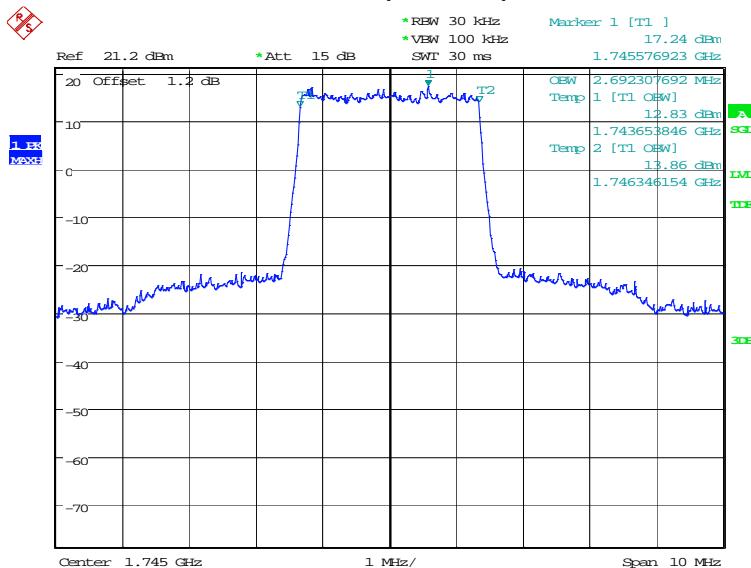
Date: 30.DEC.2019 18:40:26

**LTE band 66, 1.4MHz Bandwidth, 64QAM (99% BW)**


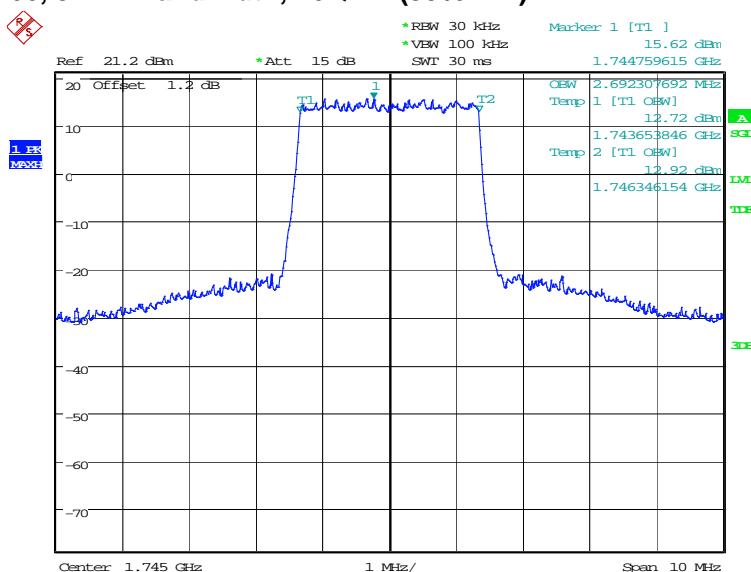
Date: 31.DEC.2019 09:47:33

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

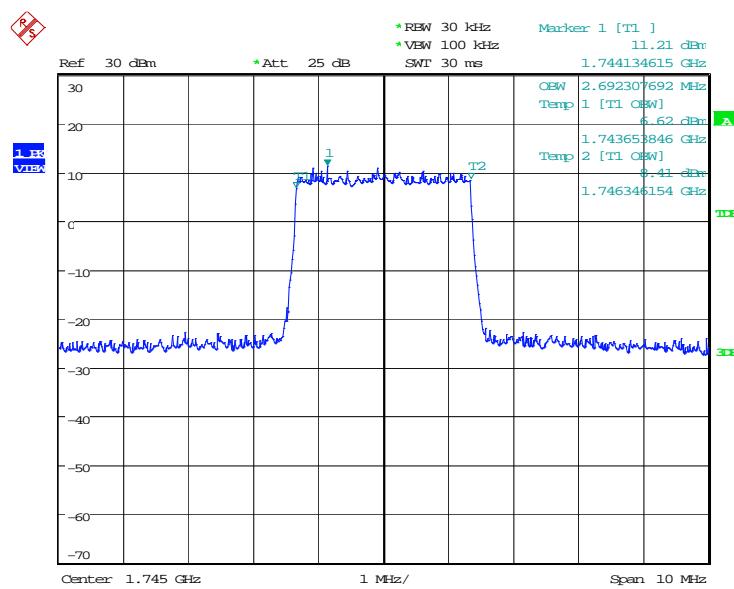
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
1745.0	2692.31	2692.31	2692.31

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


Date: 30.DEC.2019 18:41:51

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


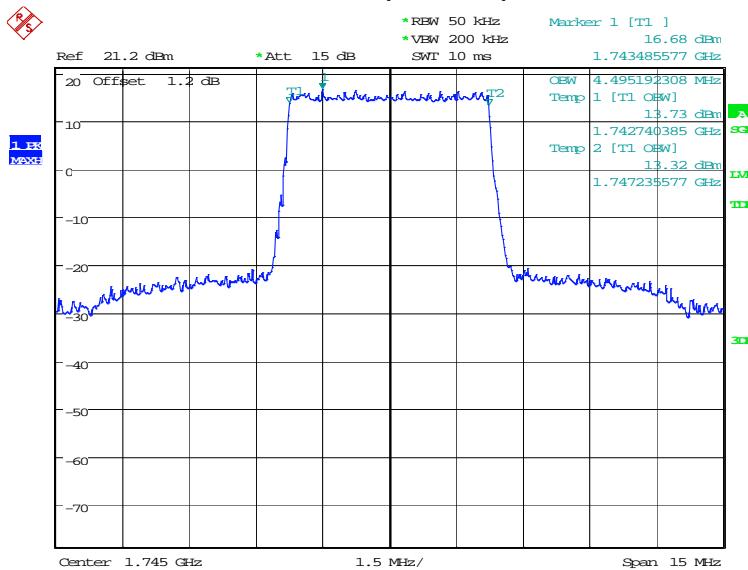
Date: 30.DEC.2019 18:43:16

**LTE band 66, 3MHz Bandwidth, 64QAM (99% BW)**


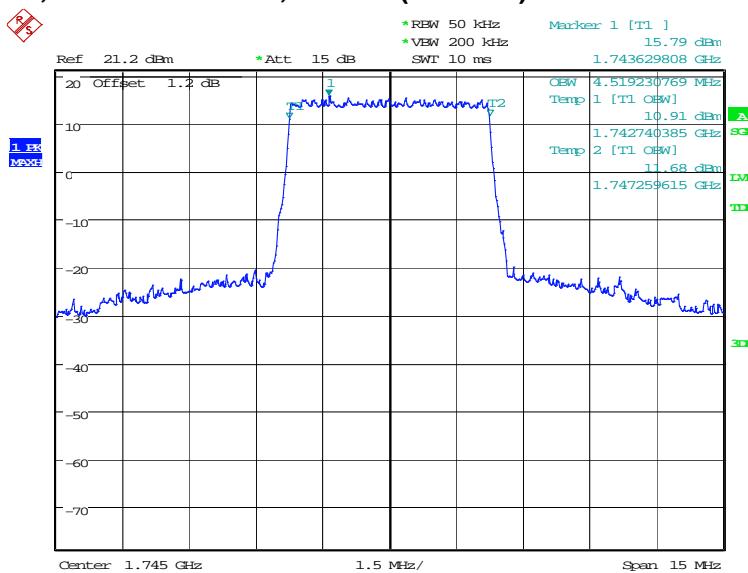
Date: 31.DEC.2019 09:48:52

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

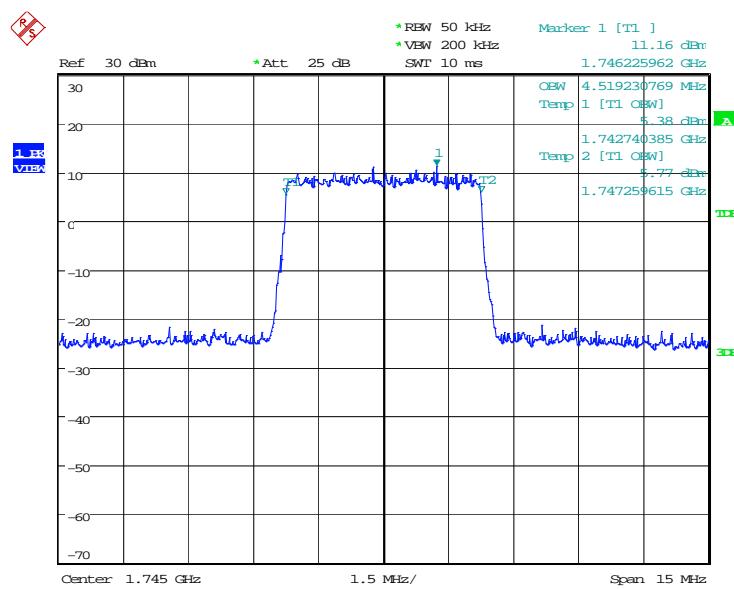
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
1745.0	4495.19	4519.23	4519.23

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


Date: 30.DEC.2019 18:44:42

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


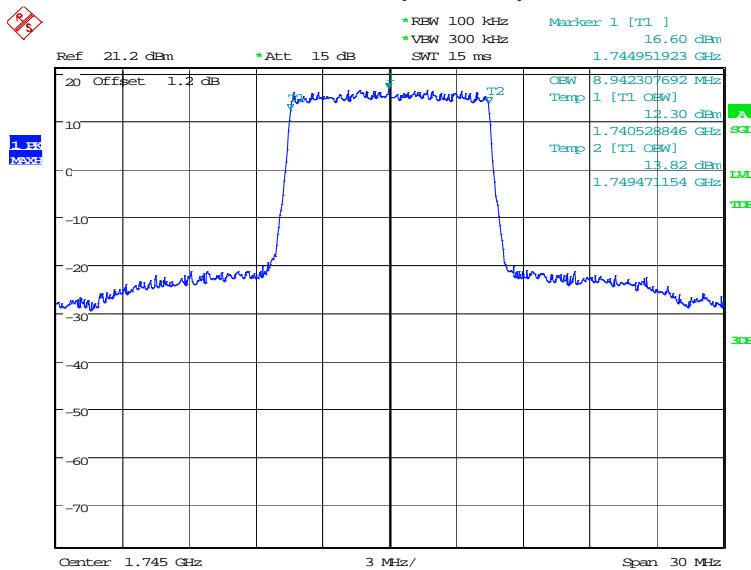
Date: 30.DEC.2019 18:46:06

**LTE band 66, 5MHz Bandwidth,64QAM (99% BW)**


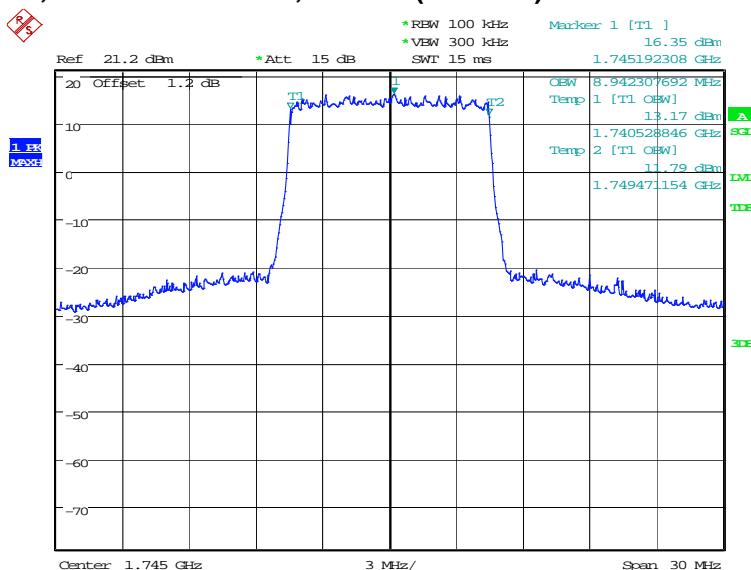
Date: 31.DEC.2019 09:50:30

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

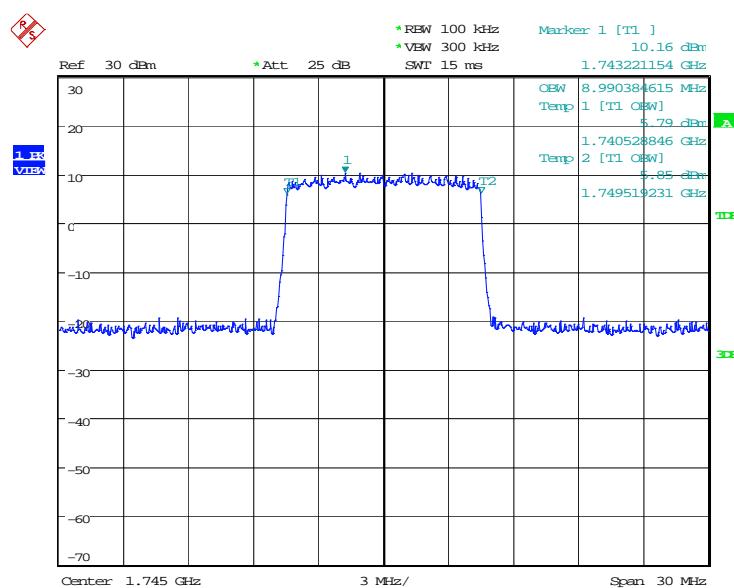
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
1745.0	8942.31	8942.31	8990.38

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


Date: 30.DEC.2019 18:47:32

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


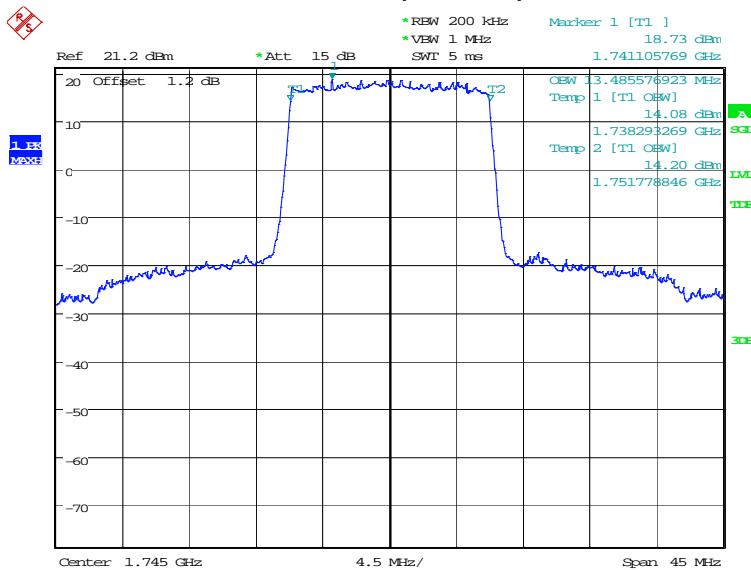
Date: 30.DEC.2019 18:48:57

**LTE band 66, 10MHz Bandwidth, 64QAM (99% BW)**


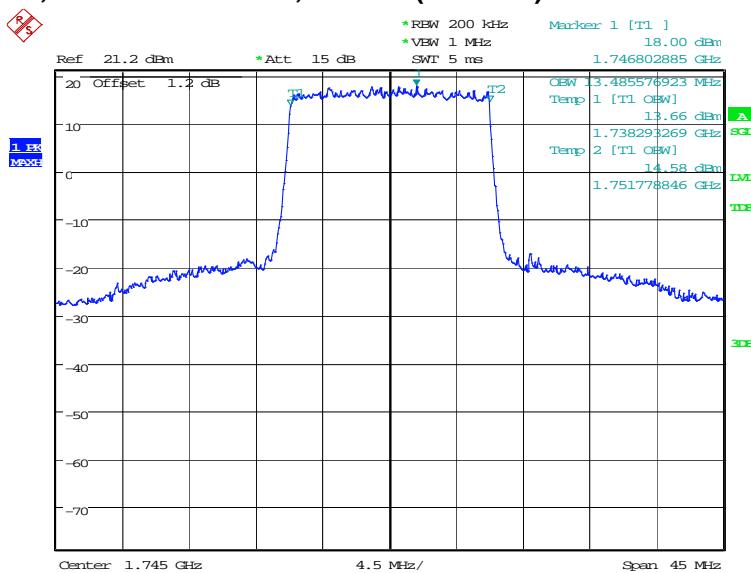
Date: 31.DEC.2019 09:52:02

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

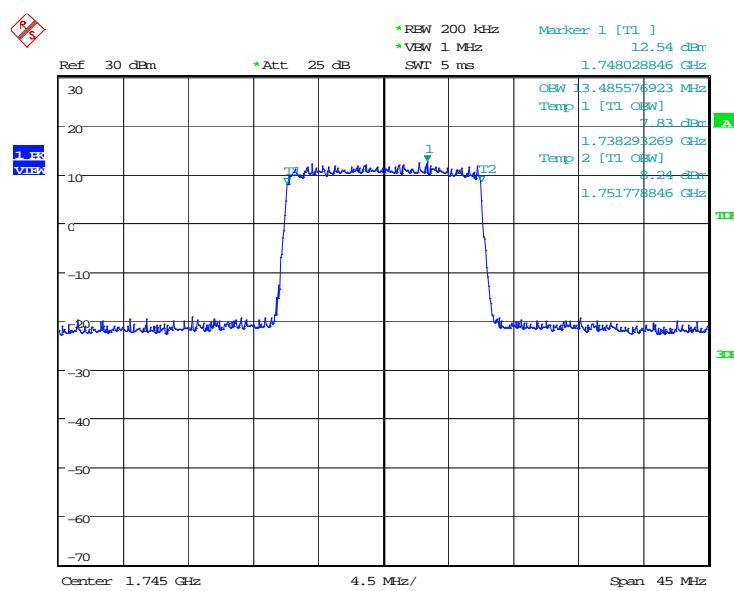
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
1745.0	13485.58	13485.58	13485.58

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


Date: 30.DEC.2019 18:50:23

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


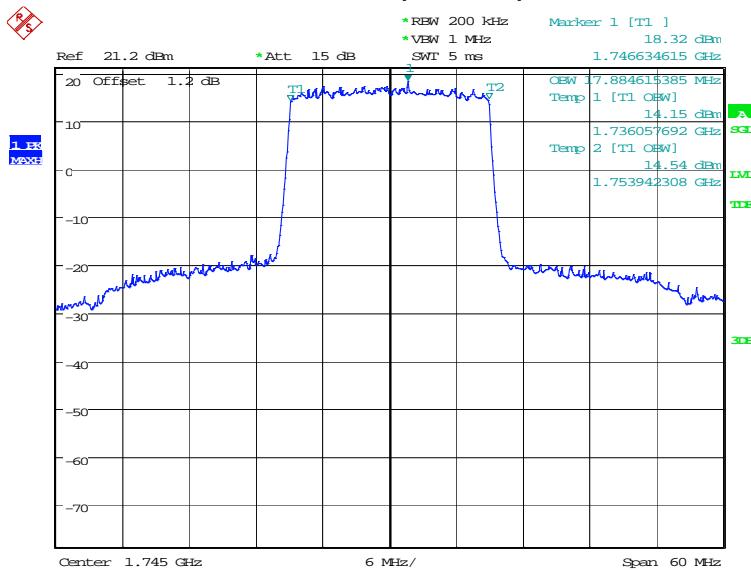
Date: 30.DEC.2019 18:51:47

**LTE band 66, 15MHz Bandwidth, 64QAM (99% BW)**


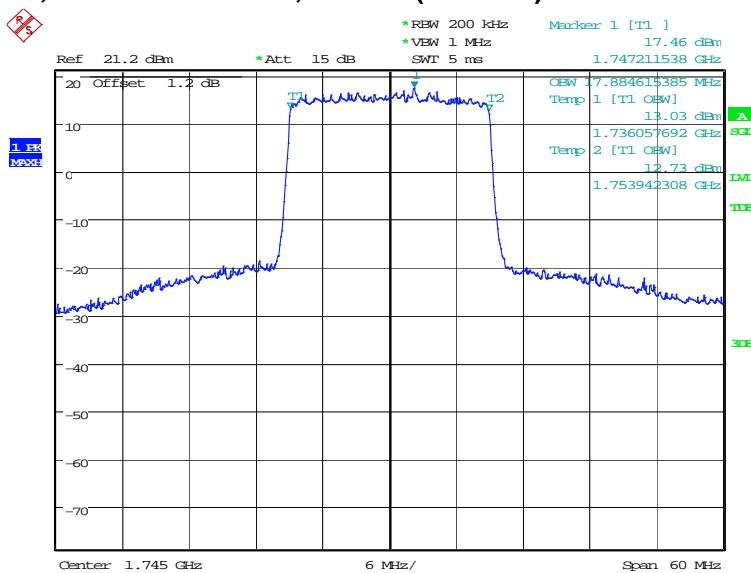
Date: 31.DEC.2019 09:53:31

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

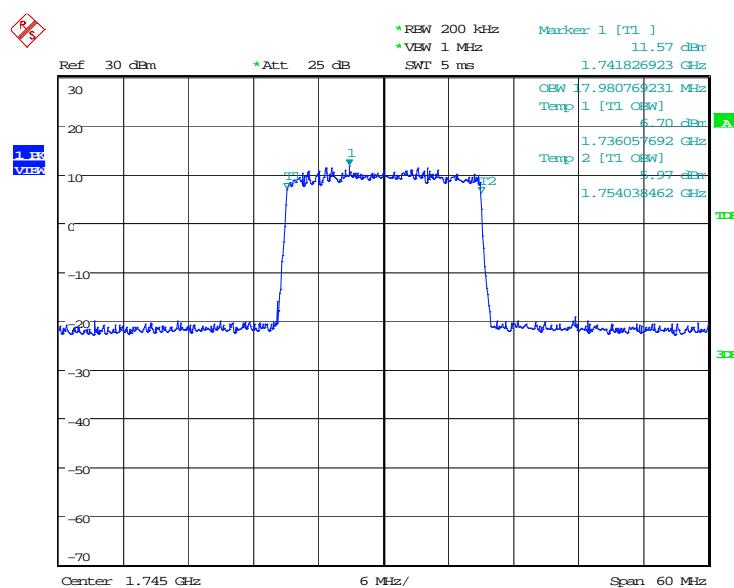
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
1745.0	17884.62	17884.62	17980.77

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


Date: 30.DEC.2019 18:53:14

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


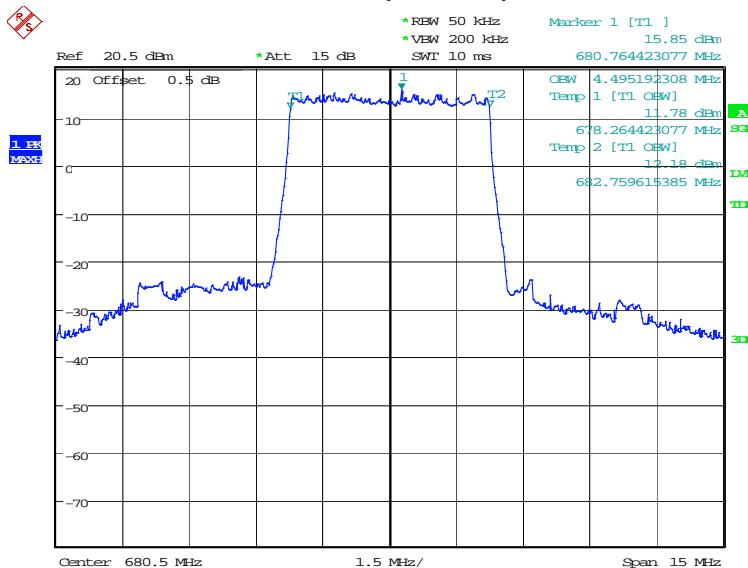
Date: 30.DEC.2019 18:54:38

**LTE band 66, 20MHz Bandwidth, 64QAM (99% BW)**


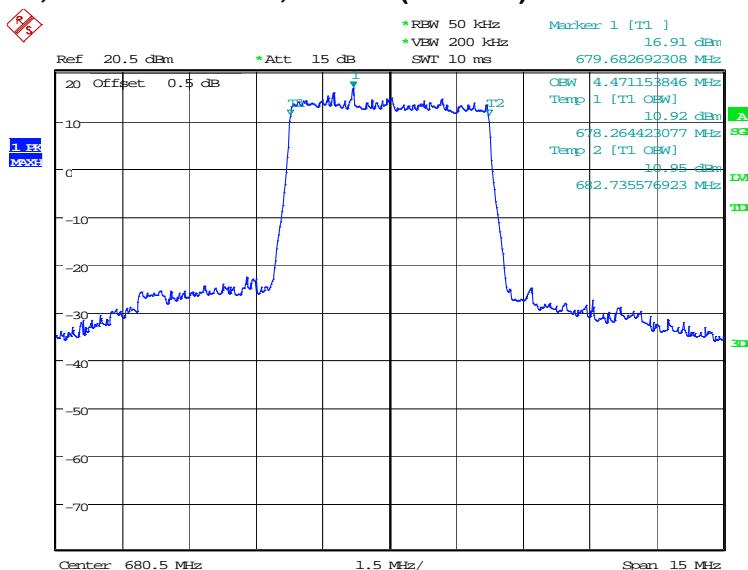
Date: 31.DEC.2019 09:57:25

**LTE band 71, 5MHz (99%)**

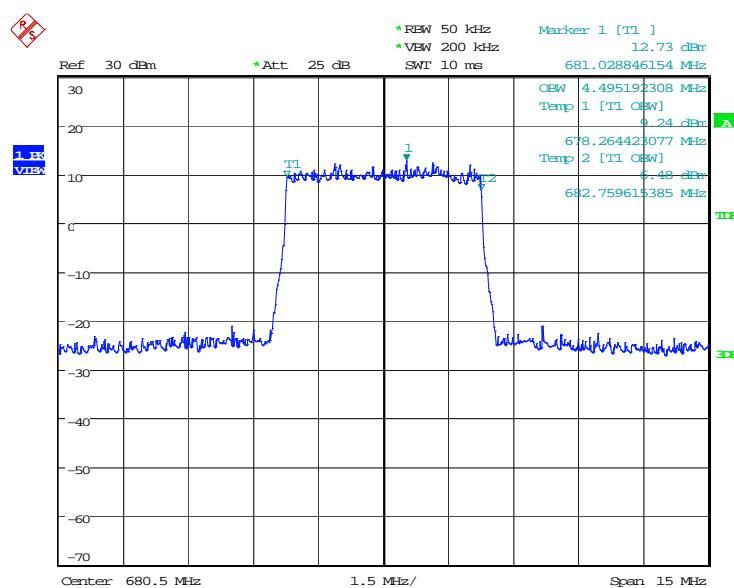
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
680.5	QPSK	16QAM	64QAM
	4495.19	4471.15	4495.19

**LTE band 71, 5MHz Bandwidth, QPSK (99% BW)**


Date: 30.DEC.2019 18:56:45

**LTE band 71, 5MHz Bandwidth, 16QAM (99% BW)**


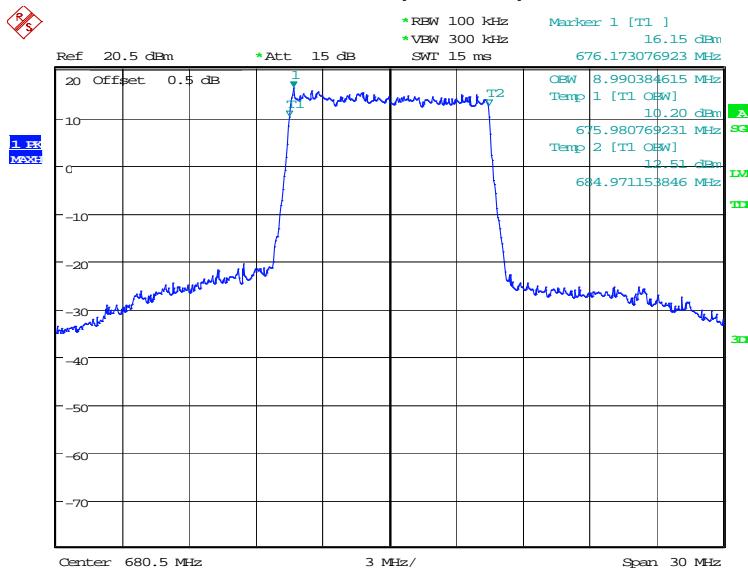
Date: 30.DEC.2019 18:58:10

**LTE band 71, 5MHz Bandwidth,64QAM (99% BW)**


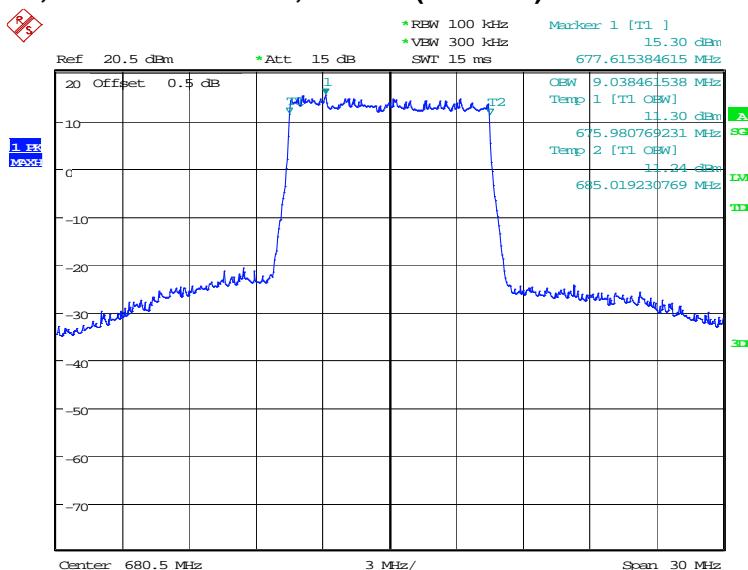
Date: 31.DEC.2019 10:04:43

**LTE band 71, 10MHz (99%)**

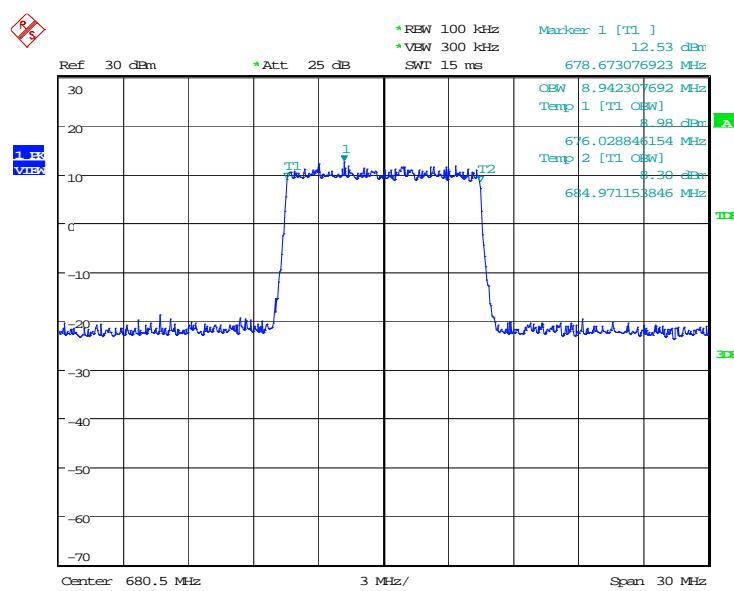
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
680.5	QPSK	16QAM	64QAM
	8990.38	9038.46	8942.31

**LTE band 71, 10MHz Bandwidth, QPSK (99% BW)**


Date: 30.DEC.2019 18:59:36

**LTE band 71, 10MHz Bandwidth, 16QAM (99% BW)**


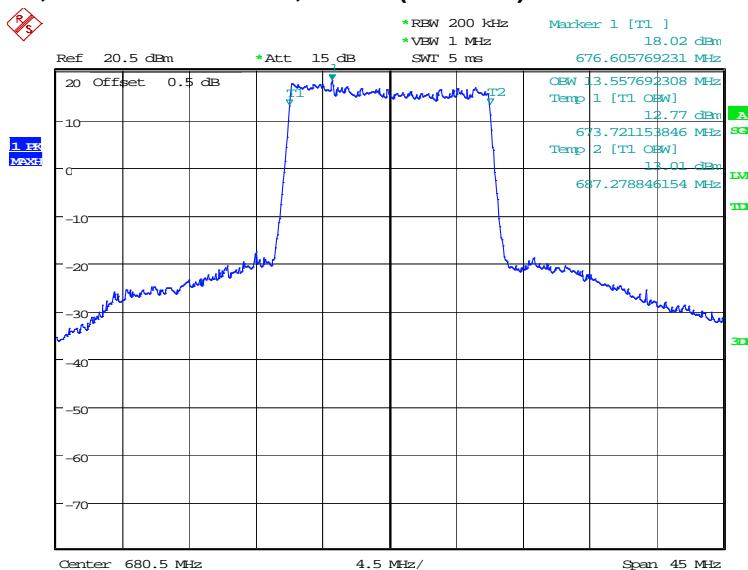
Date: 30.DEC.2019 19:01:00

**LTE band 71, 10MHz Bandwidth, 64QAM (99% BW)**


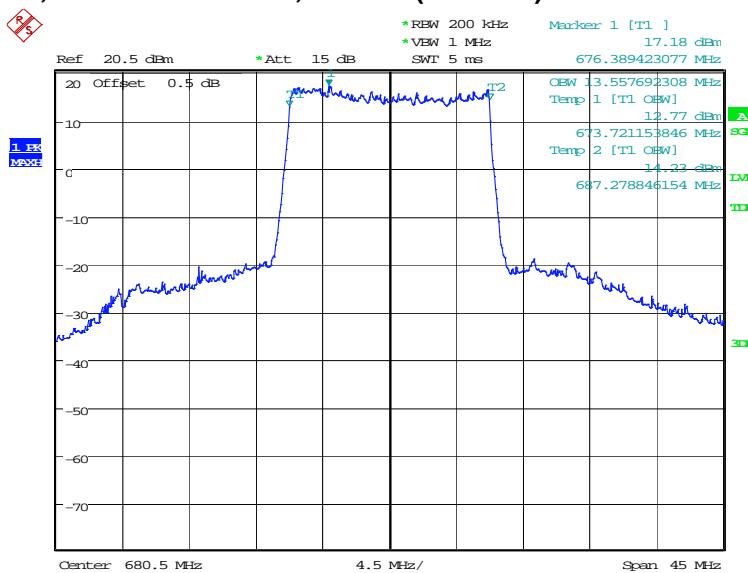
Date: 31.DEC.2019 10:05:56

**LTE band 71, 15MHz (99%)**

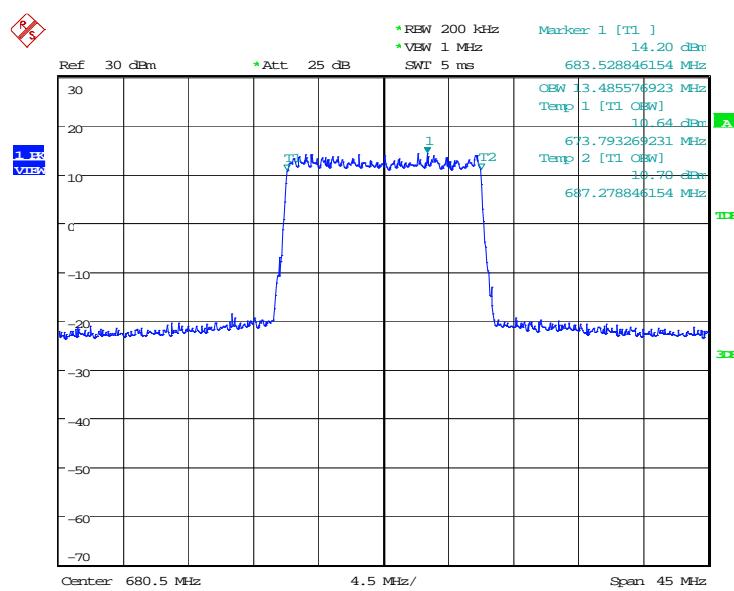
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
680.5	QPSK	16QAM	64QAM
	13557.69	13557.69	13485.58

**LTE band 71, 15MHz Bandwidth, QPSK (99% BW)**


Date: 30.DEC.2019 19:02:26

**LTE band 71, 15MHz Bandwidth, 16QAM (99% BW)**


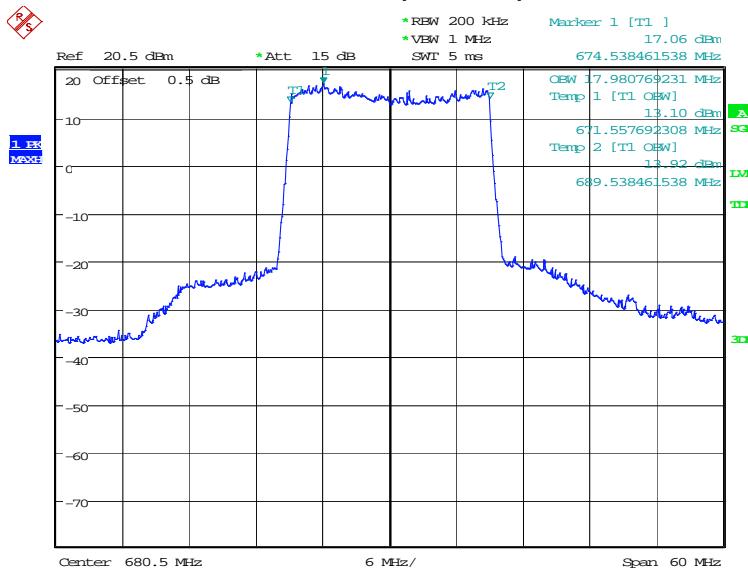
Date: 30.DEC.2019 19:03:51

**LTE band 71, 15MHz Bandwidth, 64QAM (99% BW)**


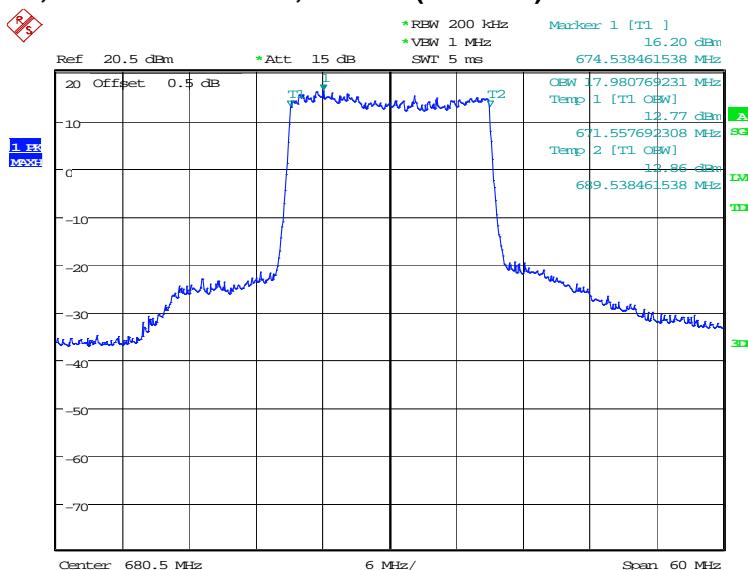
Date: 31.DEC.2019 10:07:13

**LTE band 71, 20MHz (99%)**

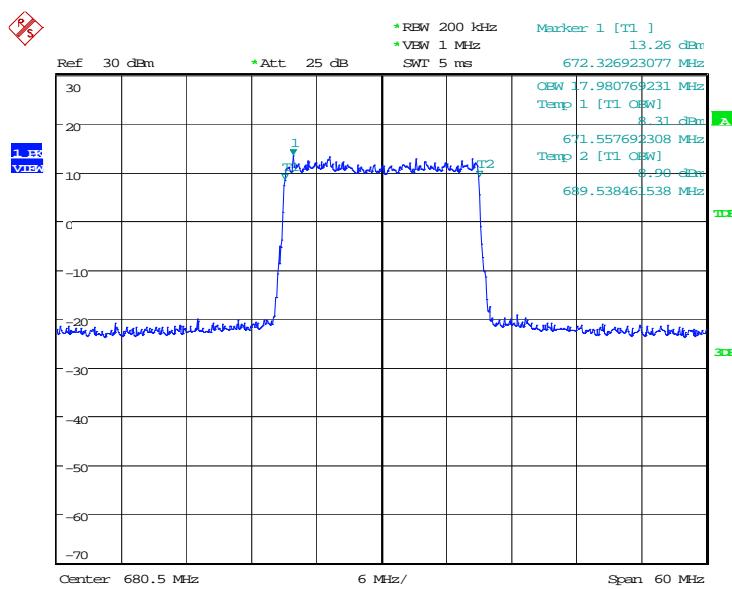
Frequency (MHz)	Occupied Bandwidth (99%) (kHz)		
	QPSK	16QAM	64QAM
680.5	17980.77	17980.77	17980.77

**LTE band 71, 20MHz Bandwidth, QPSK (99% BW)**


Date: 30.DEC.2019 19:05:17

**LTE band 71, 20MHz Bandwidth, 16QAM (99% BW)**


Date: 30.DEC.2019 19:06:41

**LTE band 71, 20MHz Bandwidth, 64QAM (99% BW)**


Date: 31.DEC.2019 10:08:50

## **A.5 EMISSION BANDWIDTH**

### **A.5.1 Emission Bandwidth Results**

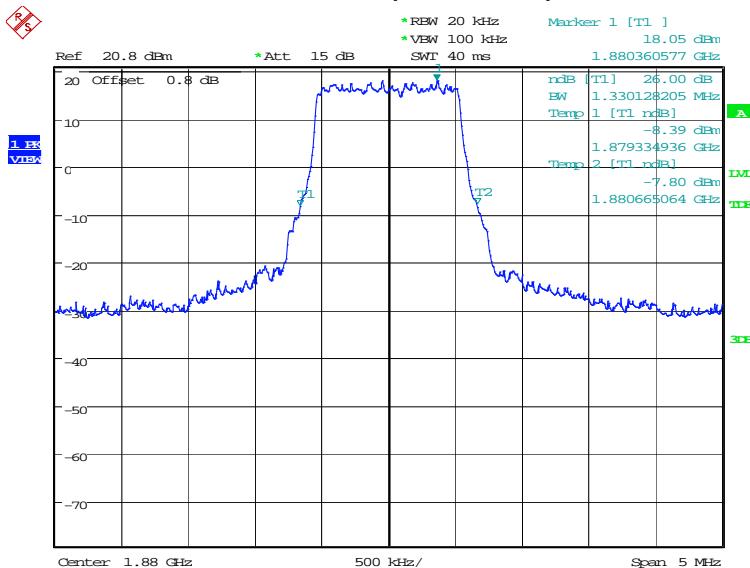
The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from ANSI C63.26:

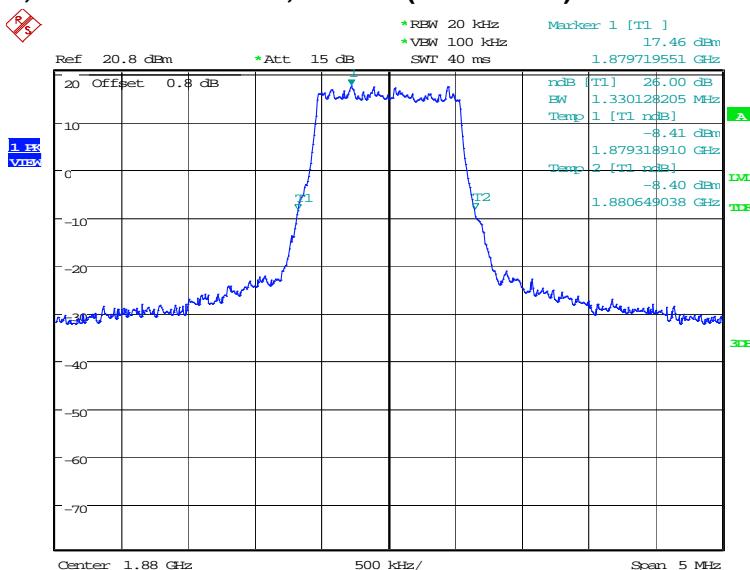
- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, 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)**

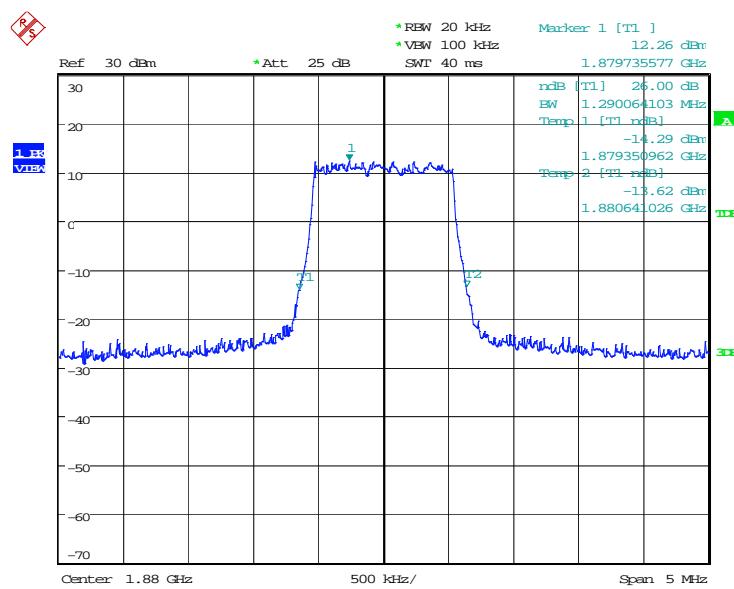
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
1880.0	1330.13	1330.13	1290.06

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


Date: 23.OCT.2019 20:59:03

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


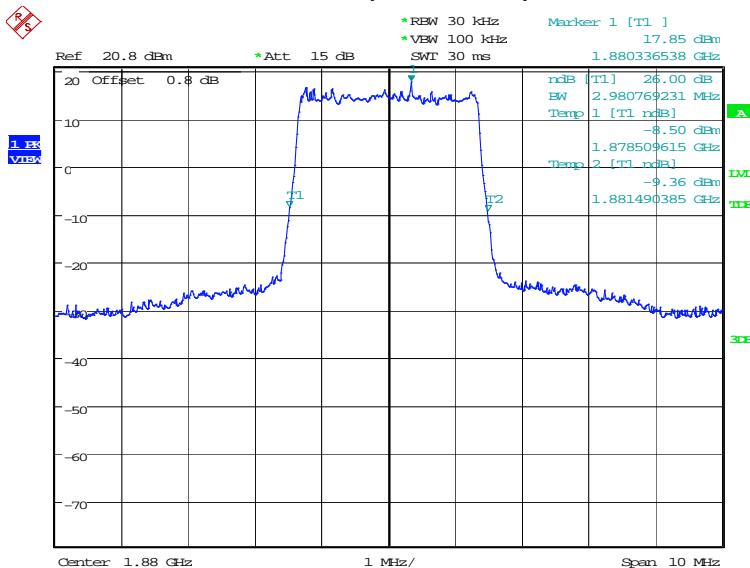
Date: 23.OCT.2019 21:00:27

**LTE band 2, 1.4MHz Bandwidth, 64QAM (-26dBc BW)**


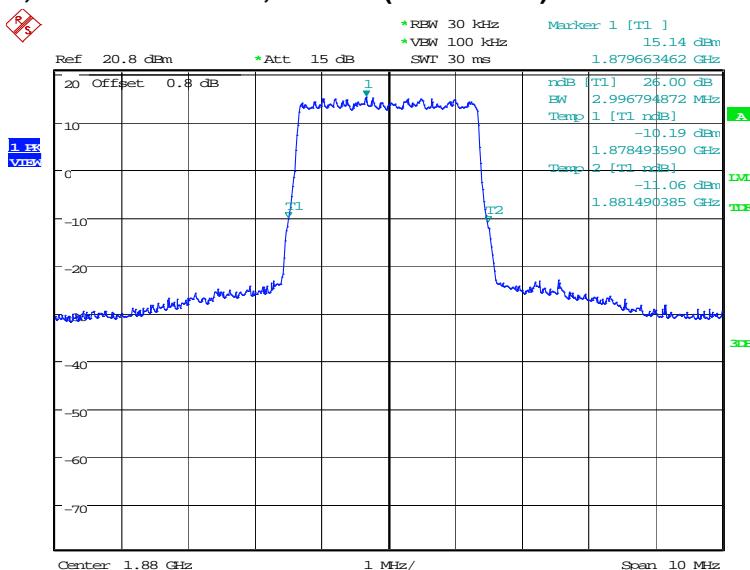
Date: 4.DEC.2019 14:30:54

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

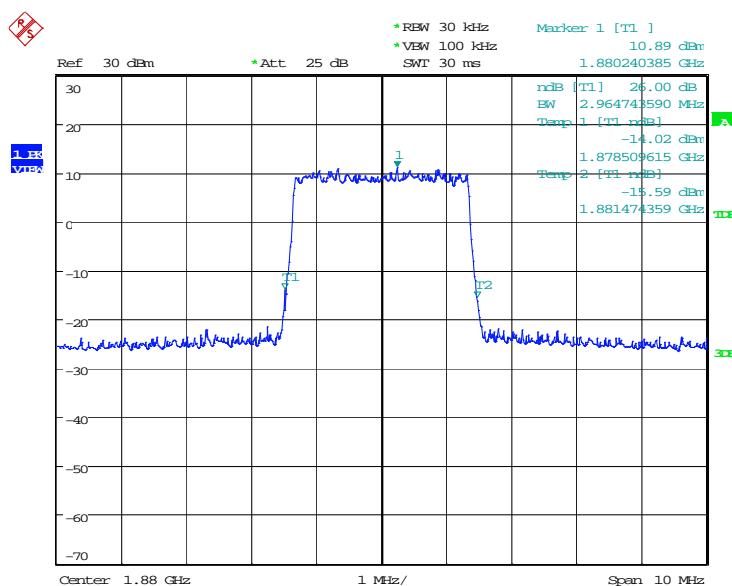
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
1880.0	2980.77	2996.79	2964.74

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


Date: 23.OCT.2019 21:01:54

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


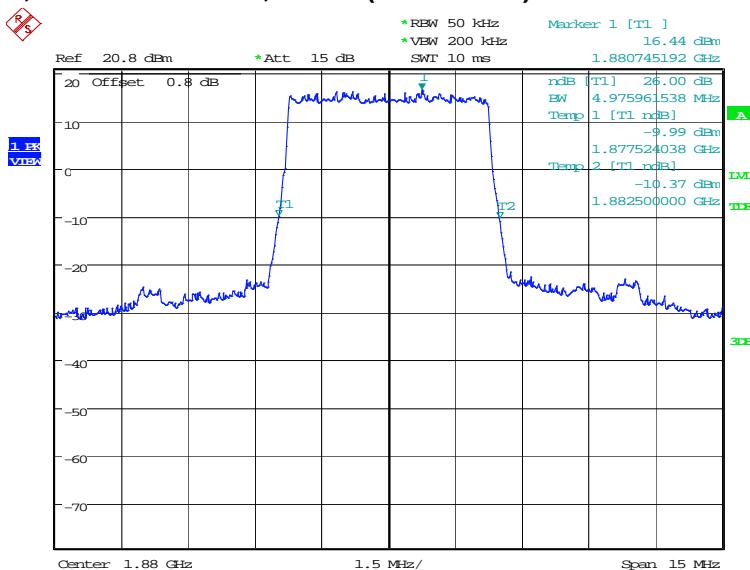
Date: 23.OCT.2019 21:03:19

**LTE band 2, 3MHz Bandwidth, 64QAM (-26dBc BW)**


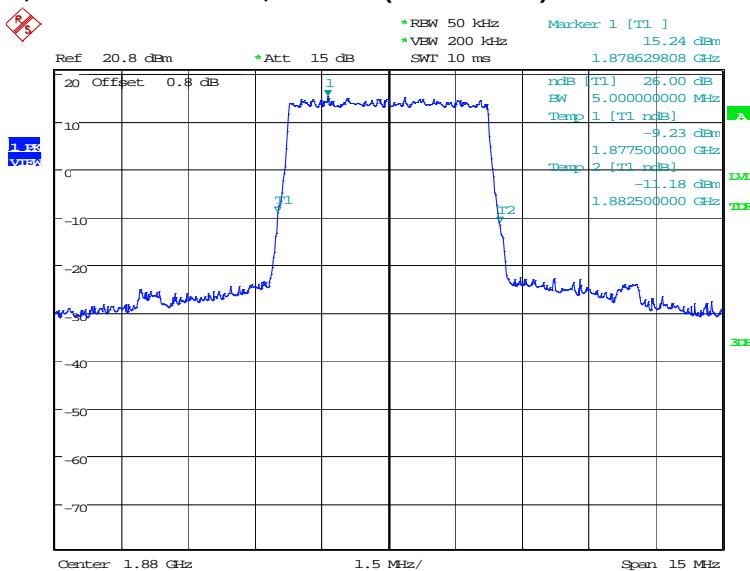
Date: 4.DEC.2019 14:32:25

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

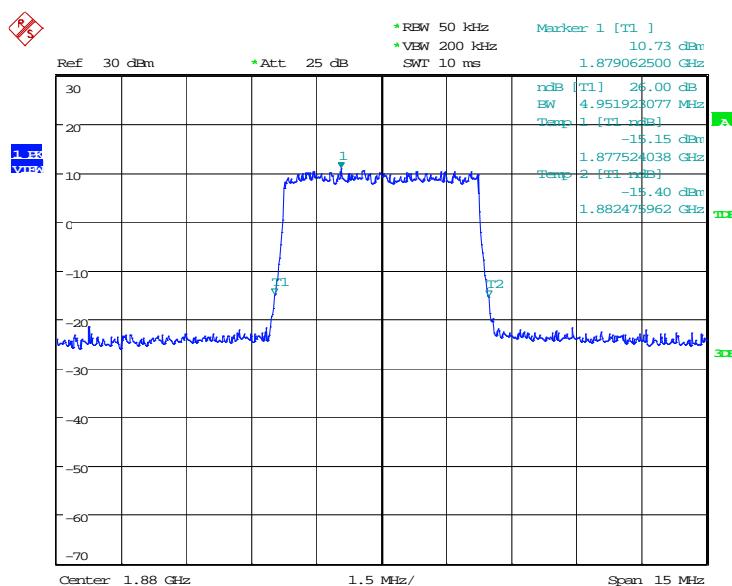
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
1880.0	4975.96	5000.00	4951.92

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


Date: 23.OCT.2019 21:04:45

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


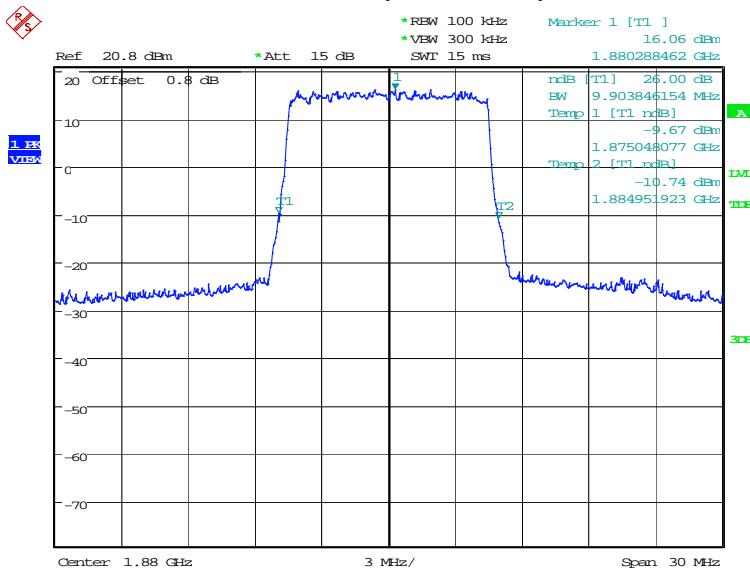
Date: 23.OCT.2019 21:06:10

**LTE band 2, 5MHz Bandwidth,64QAM (-26dBc BW)**


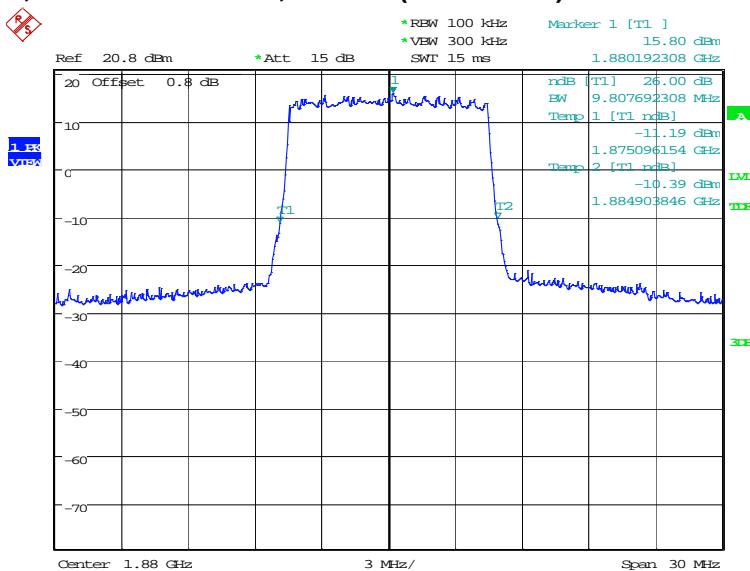
Date: 4.DEC.2019 14:33:40

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

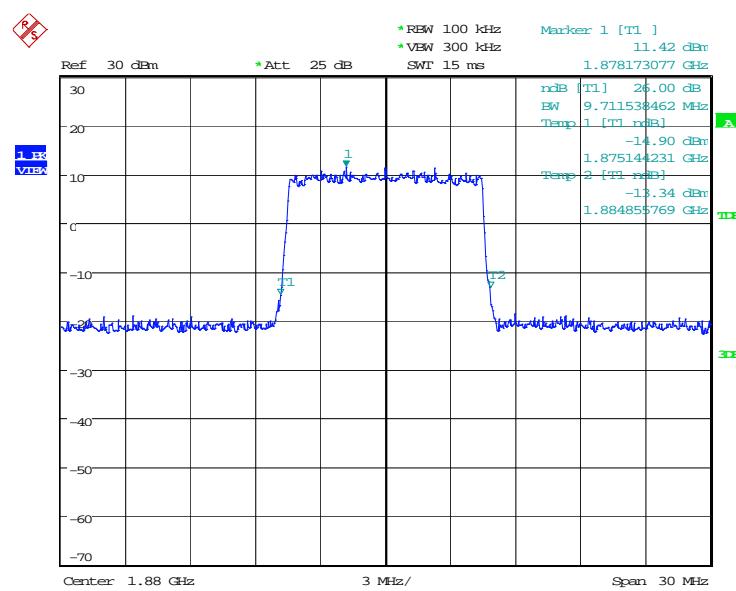
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
1880.0	9903.85	9807.69	9711.54

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


Date: 23.OCT.2019 21:07:36

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


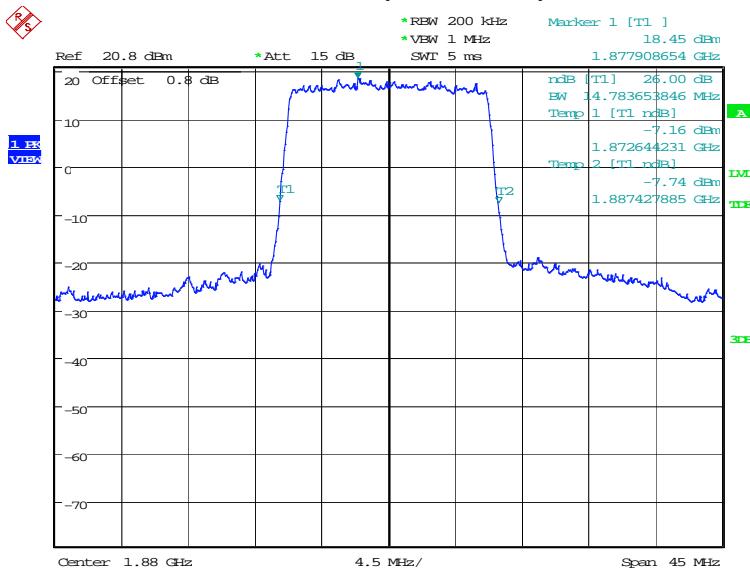
Date: 23.OCT.2019 21:09:01

**LTE band 2, 10MHz Bandwidth, 64QAM (-26dBc BW)**


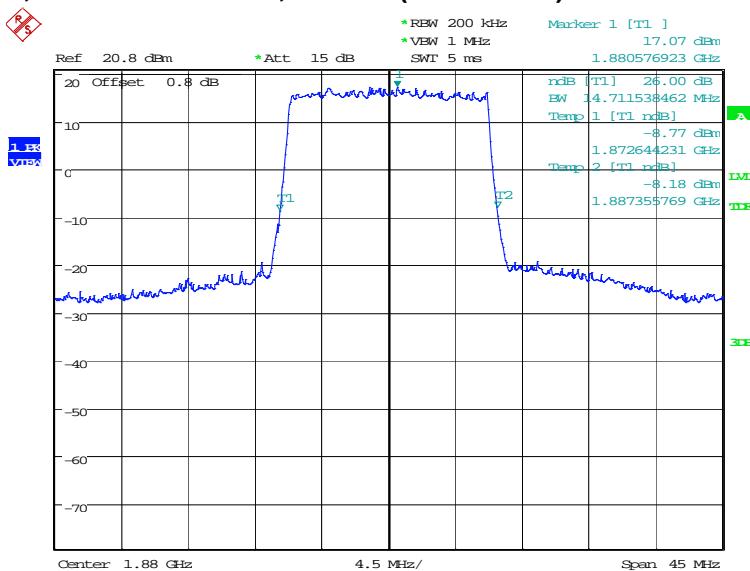
Date: 4.DEC.2019 14:35:01

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

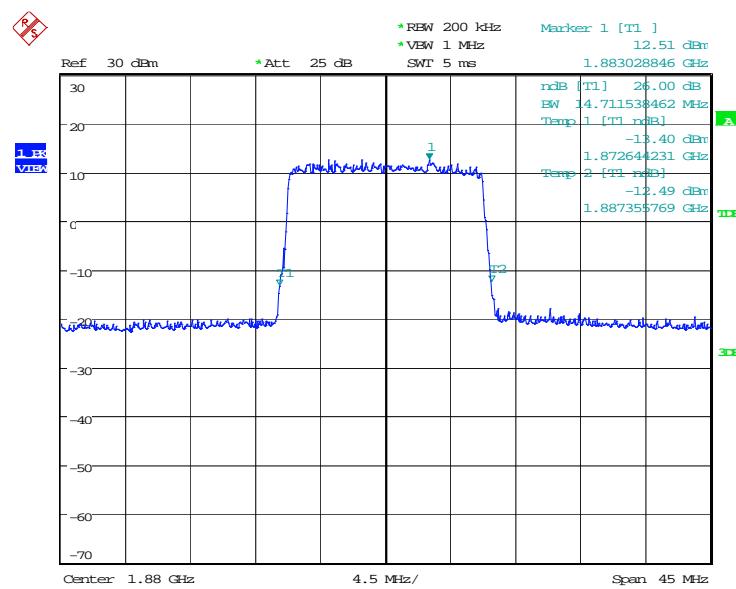
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
1880.0	QPSK	16QAM	64QAM
	14783.65	14711.54	14711.54

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


Date: 23.OCT.2019 21:10:27

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


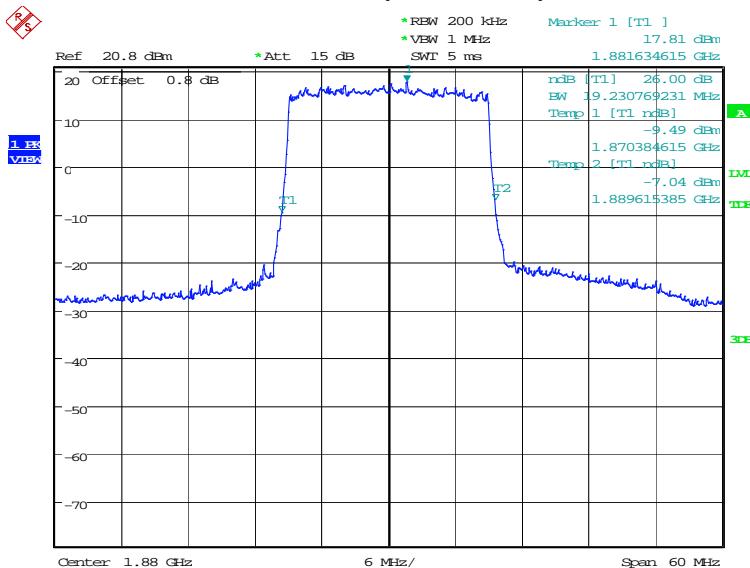
Date: 23.OCT.2019 21:11:52

**LTE band 2, 15MHz Bandwidth, 64QAM (-26dBc BW)**


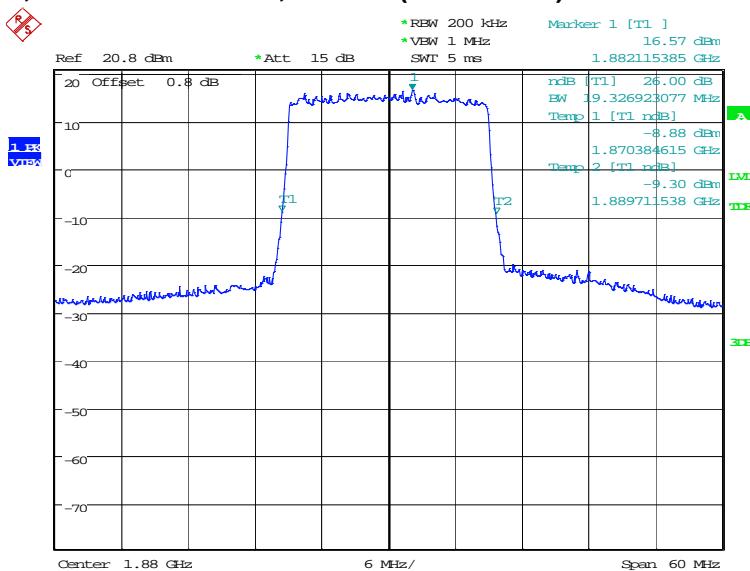
Date: 4.DEC.2019 14:36:16

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

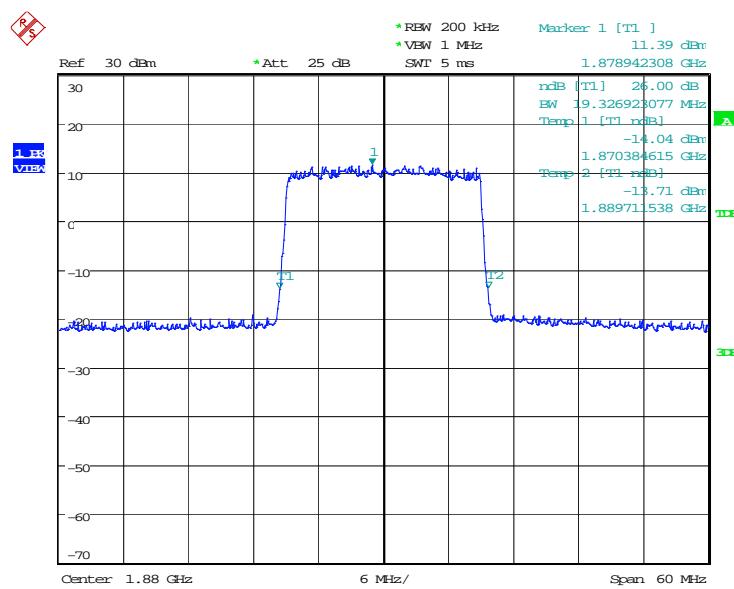
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
1880.0	19230.77	19326.92	19326.92

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


Date: 23.OCT.2019 21:13:19

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


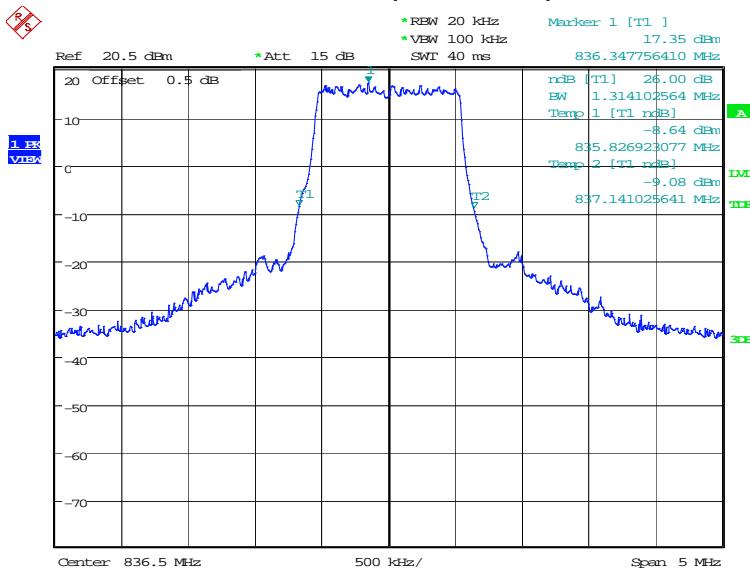
Date: 23.OCT.2019 21:14:43

**LTE band 2, 20MHz Bandwidth, 64QAM (-26dBc BW)**


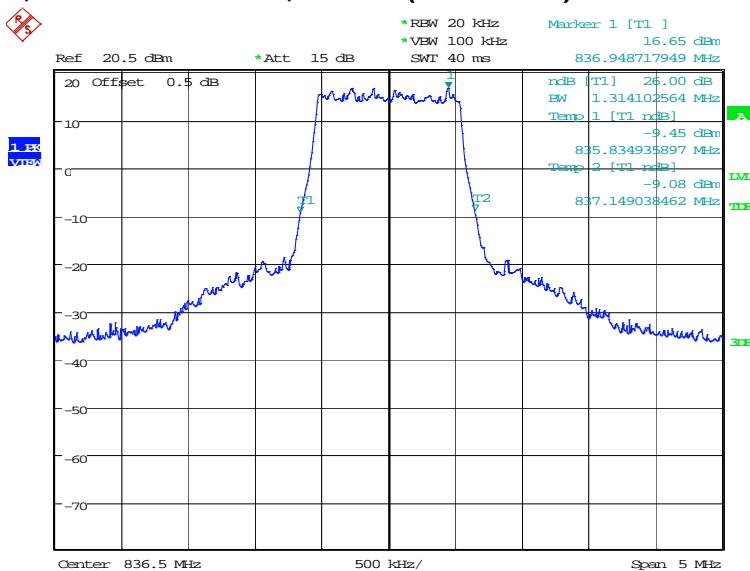
Date: 4.DEC.2019 14:37:39

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

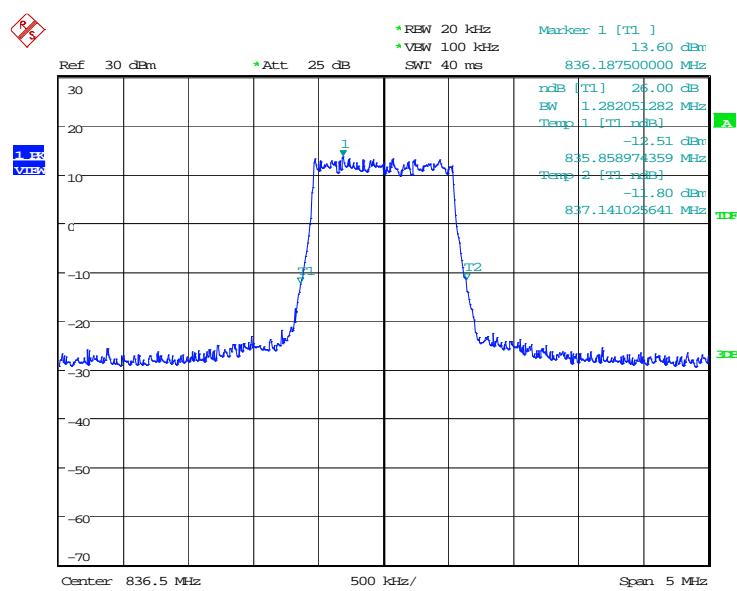
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
836.5	1314.10	1314.10	1282.05

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


Date: 23.OCT.2019 21:34:08

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


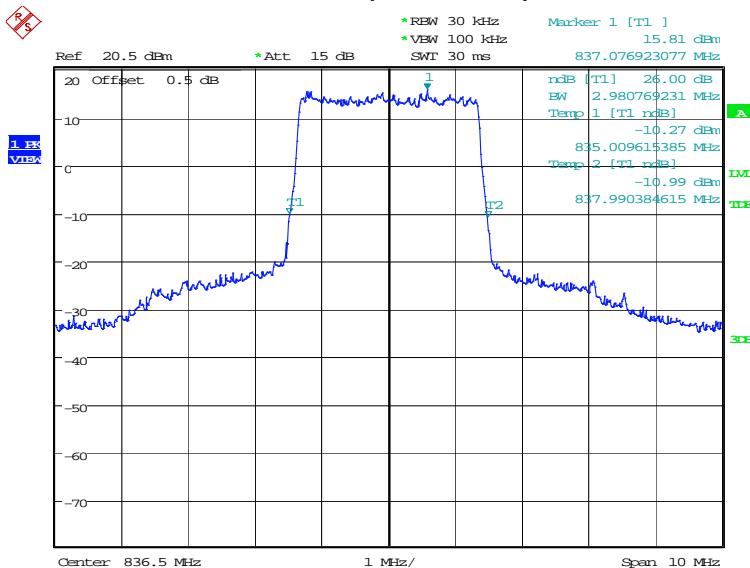
Date: 23.OCT.2019 21:35:33

**LTE band 5, 1.4MHz Bandwidth, 64QAM (-26dBc BW)**


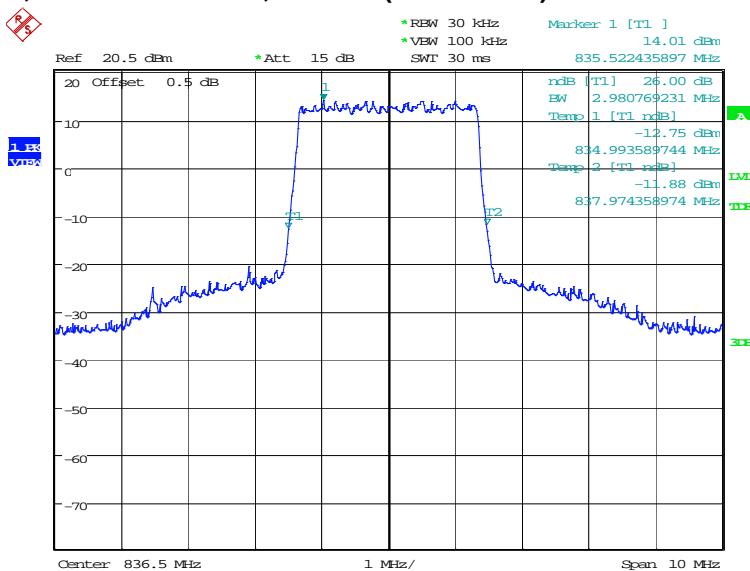
Date: 4.DEC.2019 14:53:47

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

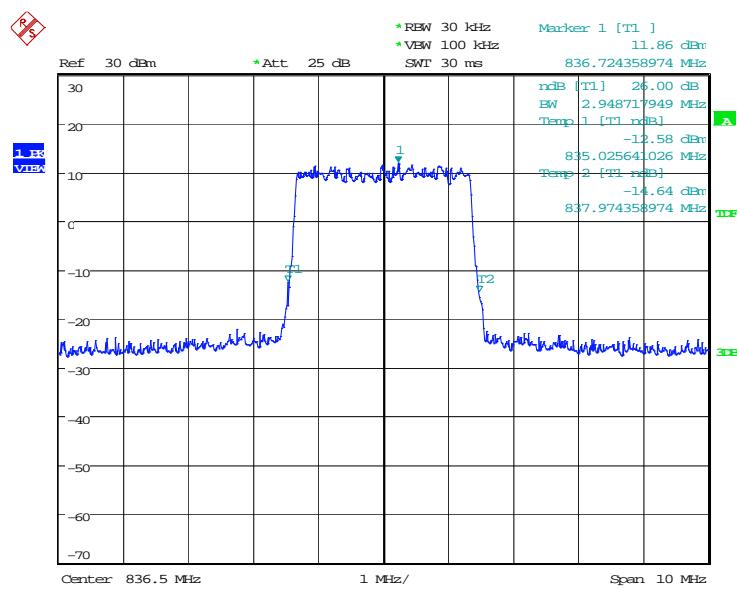
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
836.5	2980.77	2980.77	2948.72

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


Date: 23.OCT.2019 21:36:59

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


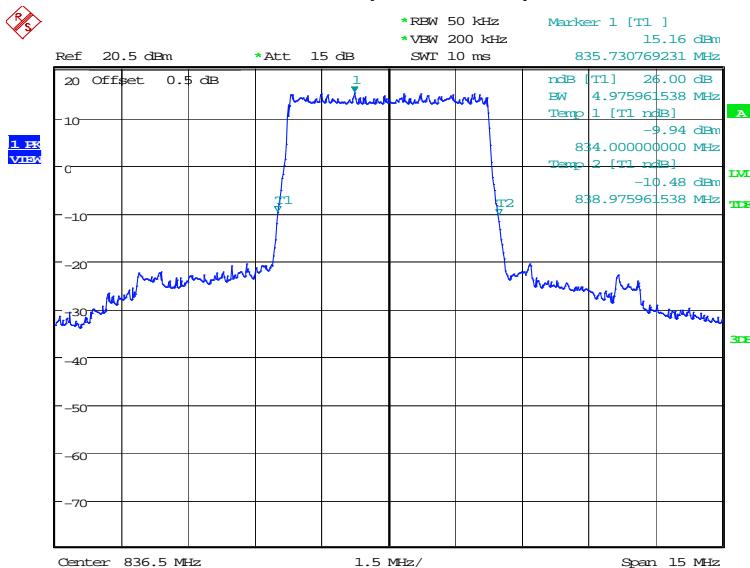
Date: 23.OCT.2019 21:38:24

**LTE band 5, 3MHz Bandwidth, 64QAM (-26dBc BW)**


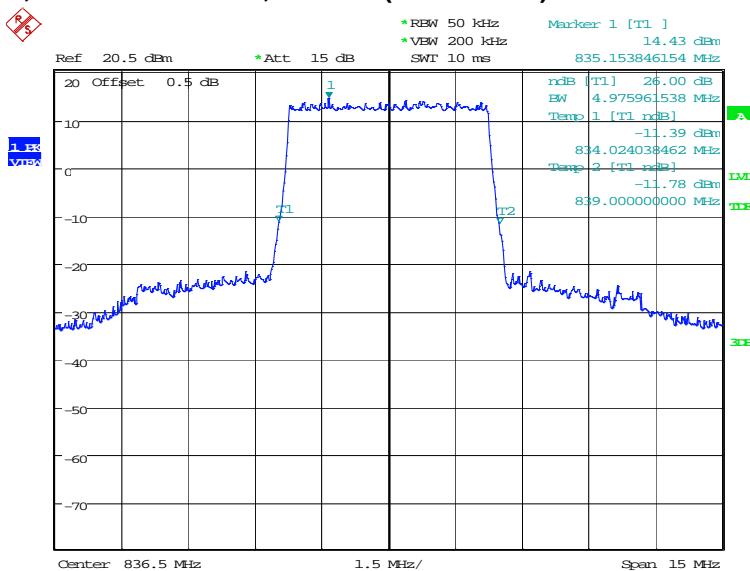
Date: 4.DEC.2019 14:55:06

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

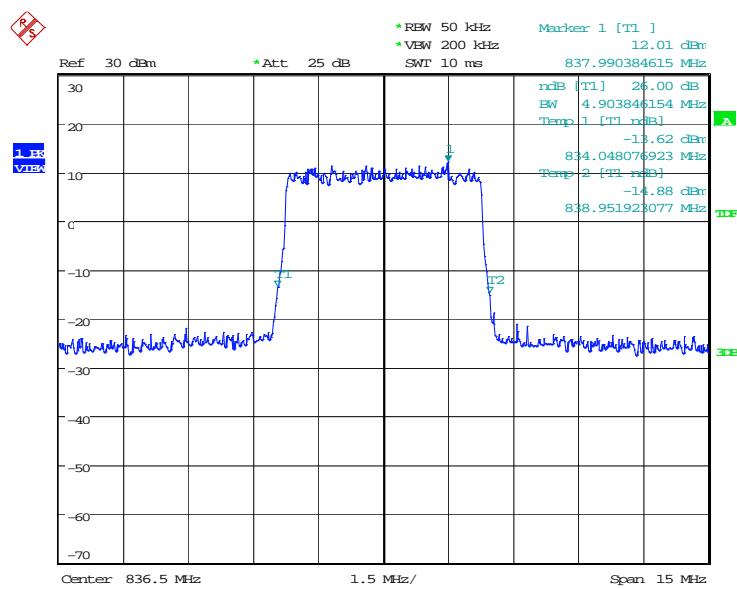
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
836.5	4975.96	4975.96	4903.85

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


Date: 23.OCT.2019 21:39:50

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


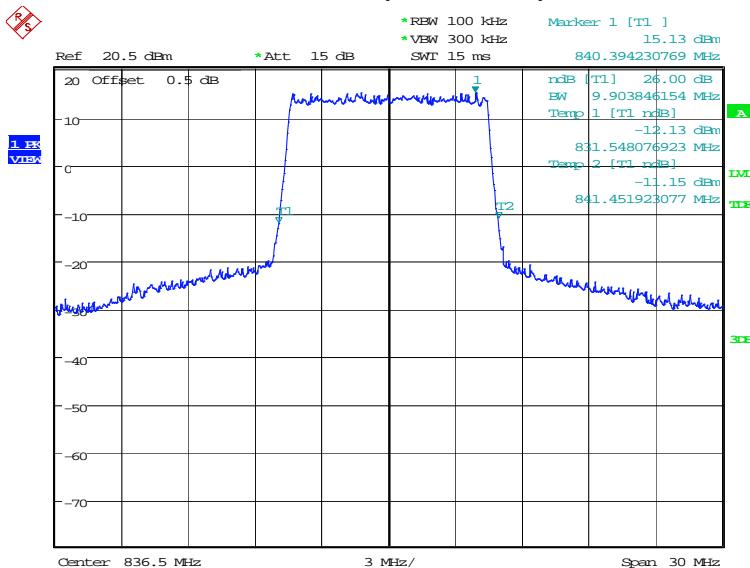
Date: 23.OCT.2019 21:41:15

**LTE band 5, 5MHz Bandwidth,64QAM (-26dBc BW)**


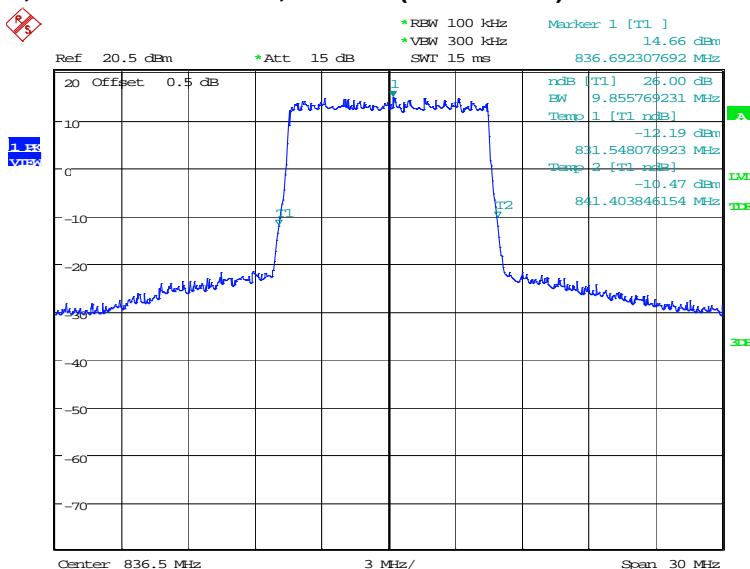
Date: 4.DEC.2019 14:56:27

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

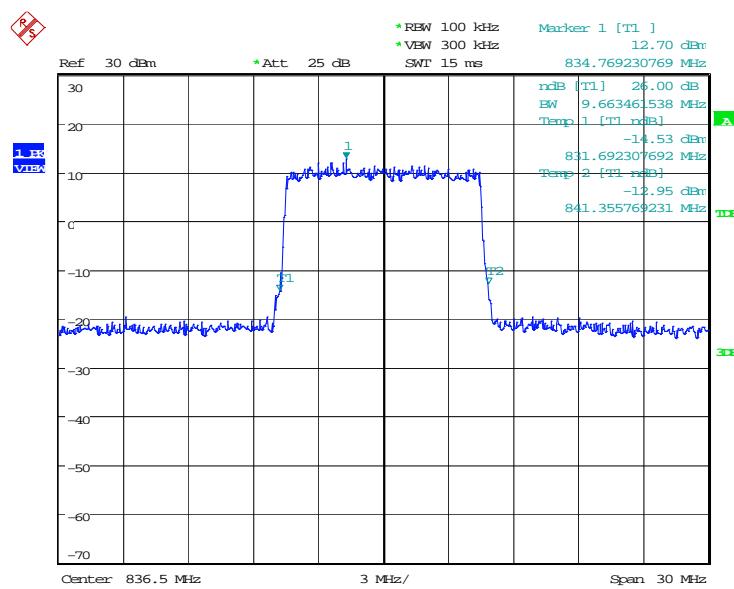
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
836.5	QPSK	16QAM	64QAM
	9903.85	9855.77	9663.46

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


Date: 23.OCT.2019 21:42:42

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


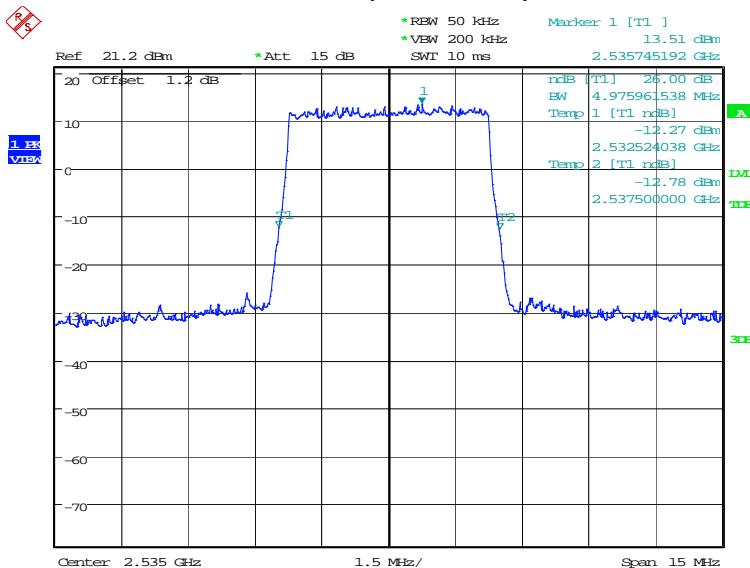
Date: 23.OCT.2019 21:44:06

**LTE band 5, 10MHz Bandwidth, 64QAM (-26dBc BW)**


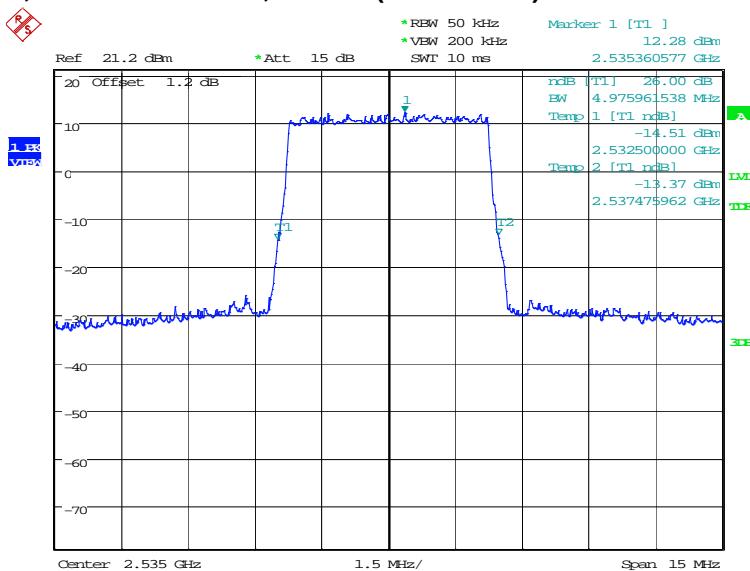
Date: 4.DEC.2019 14:57:41

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

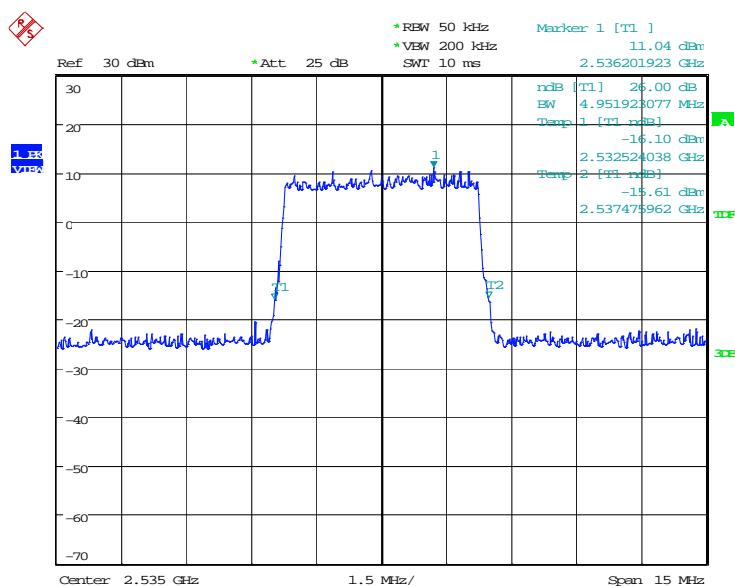
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
2535.0	QPSK	16QAM	64QAM
	4975.96	4975.96	4951.92

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


Date: 30.DEC.2019 19:08:42

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


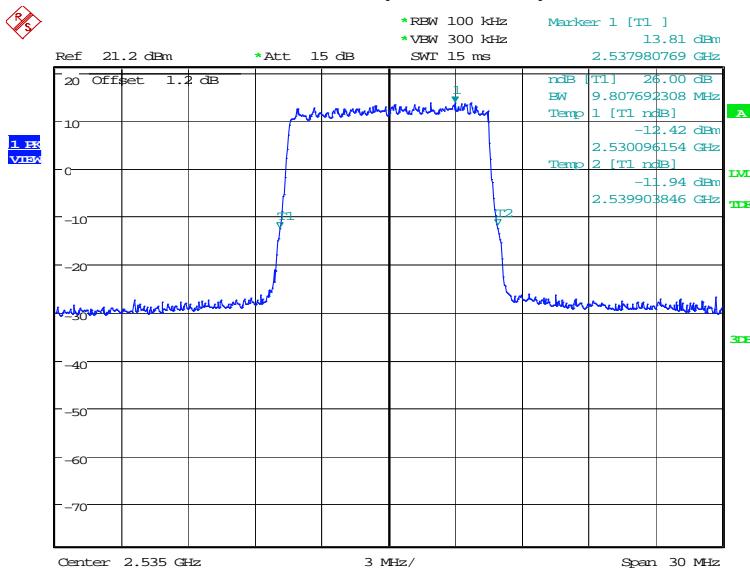
Date: 30.DEC.2019 19:10:06

**LTE band 7, 5MHz Bandwidth,64QAM (-26dBc BW)**


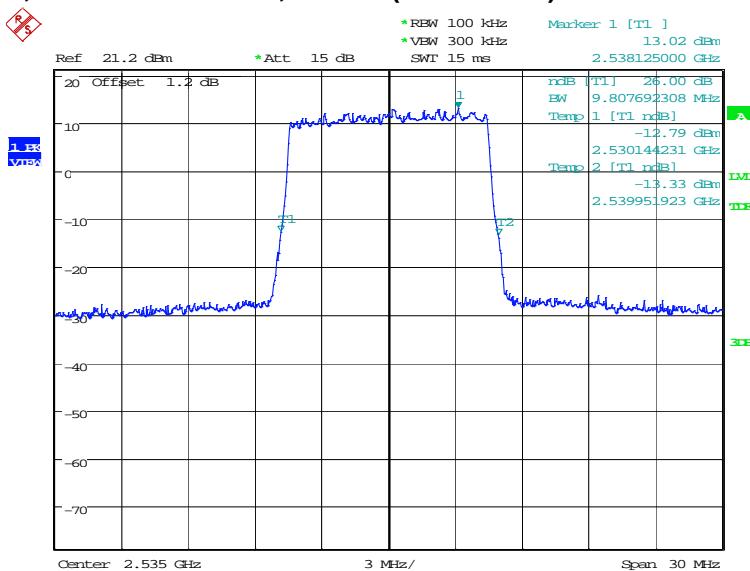
Date: 31.DEC.2019 09:17:57

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

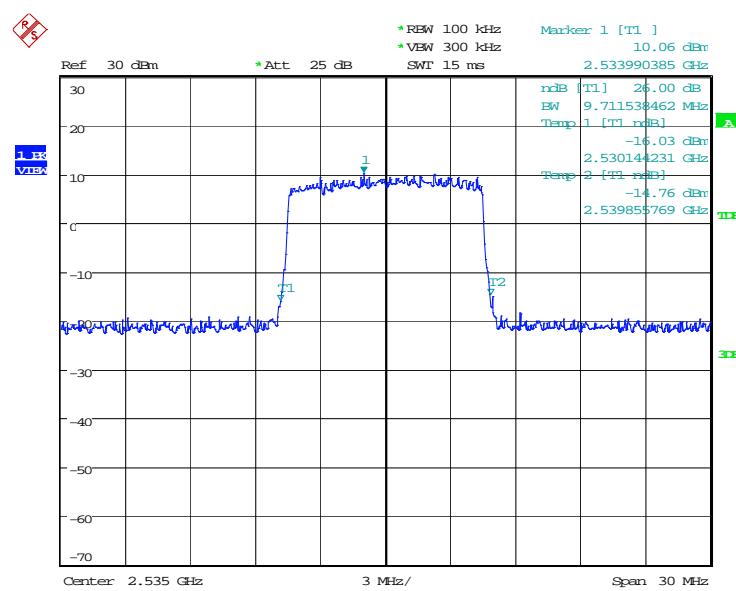
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
2535.0	QPSK	16QAM	64QAM
	9807.69	9807.69	9711.54

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


Date: 30.DEC.2019 19:11:33

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


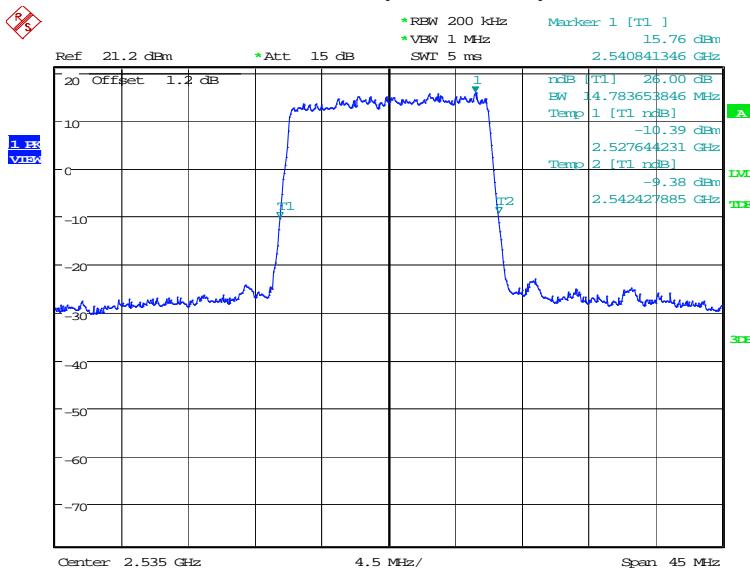
Date: 30.DEC.2019 19:12:58

**LTE band 7, 10MHz Bandwidth, 64QAM (-26dBc BW)**


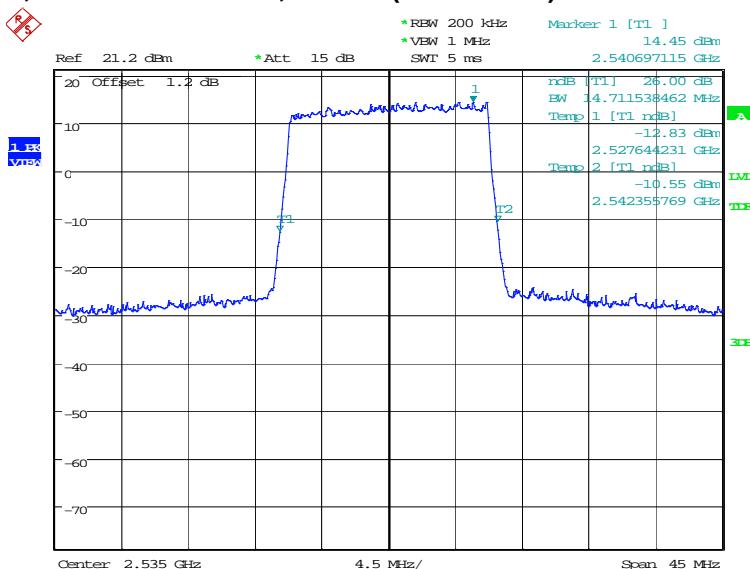
Date: 31.DEC.2019 09:19:26

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

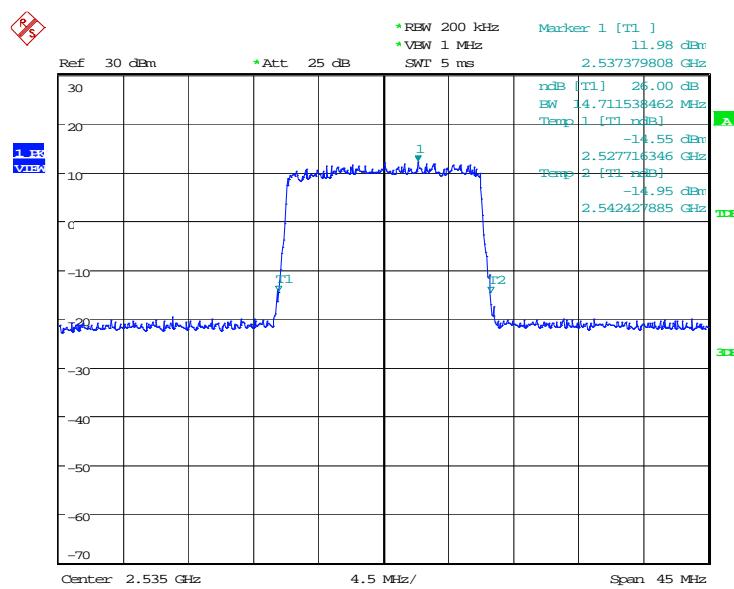
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
2535.0	QPSK	16QAM	64QAM
	14783.65	14711.54	14711.54

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


Date: 30.DEC.2019 19:14:24

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


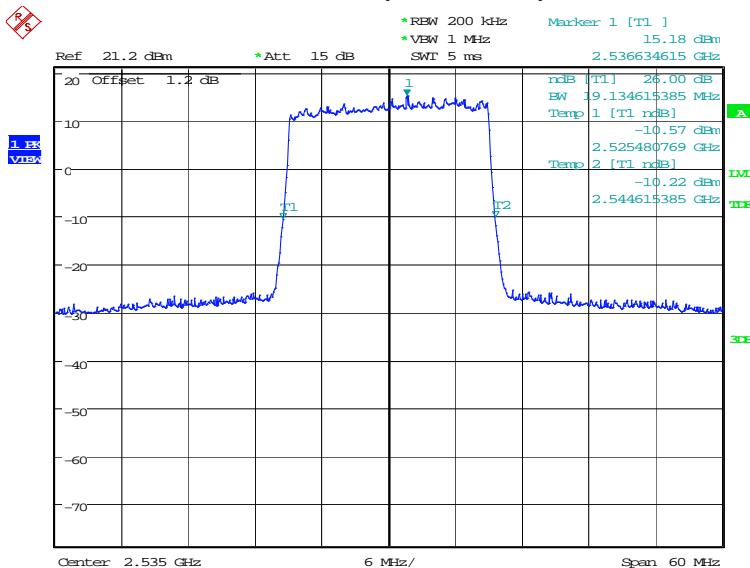
Date: 30.DEC.2019 19:15:49

**LTE band 7, 15MHz Bandwidth, 64QAM (-26dBc BW)**


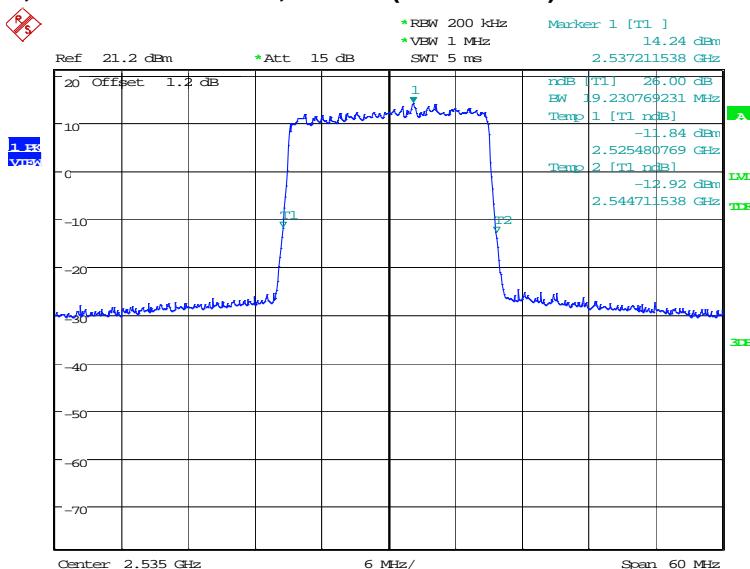
Date: 31.DEC.2019 09:21:50

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

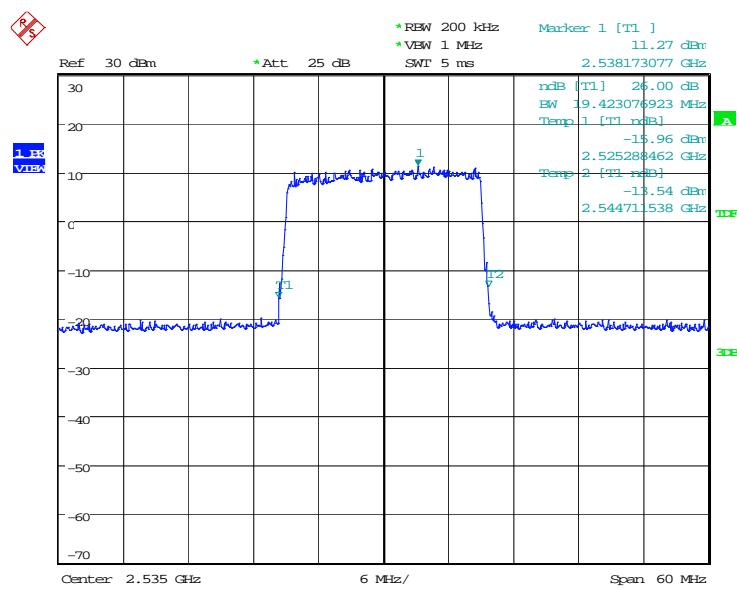
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
2535.0	QPSK	16QAM	64QAM
	19134.62	19230.77	19432.08

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


Date: 30.DEC.2019 19:17:15

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


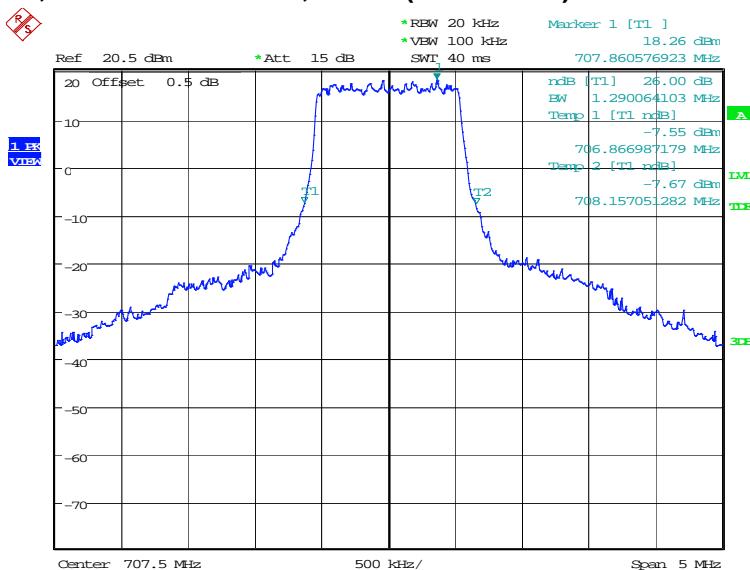
Date: 30.DEC.2019 19:18:40

**LTE band 7, 20MHz Bandwidth, 64QAM (-26dBc BW)**


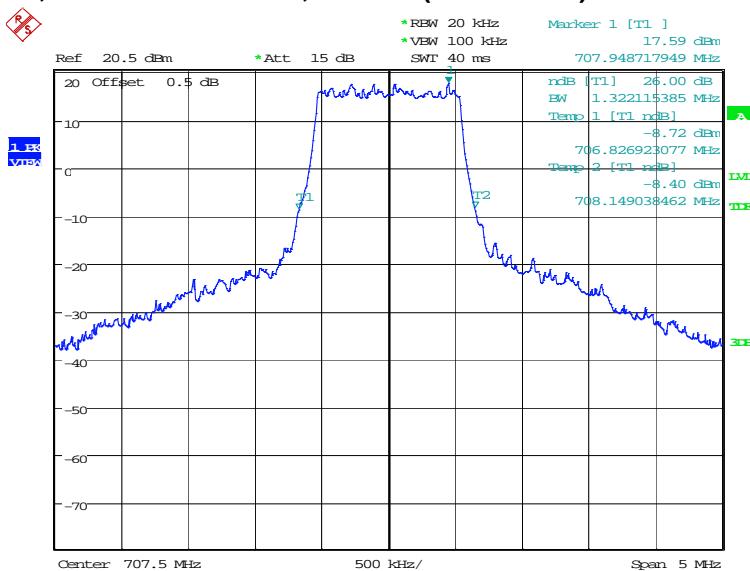
Date: 31.DEC.2019 09:24:27

**LTE band 12, 1.4MHz (-26dBc)**

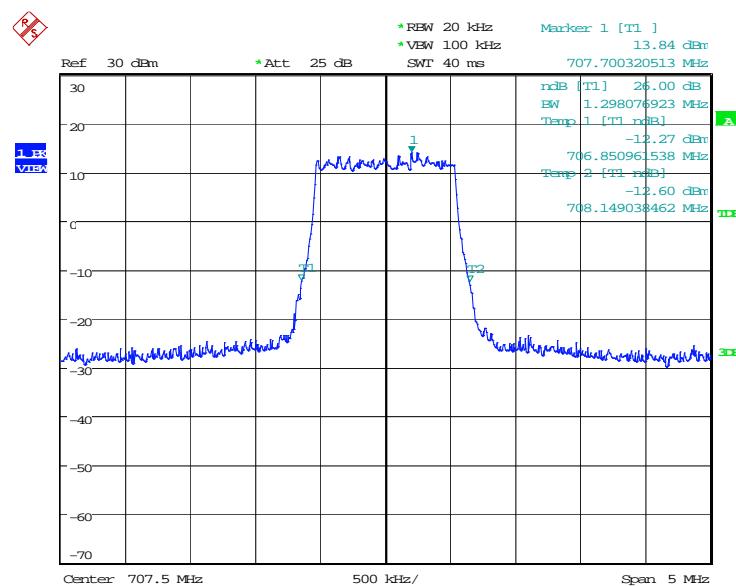
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
707.5			
	1290.06	1322.12	1298.08

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


Date: 30.DEC.2019 19:20:55

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


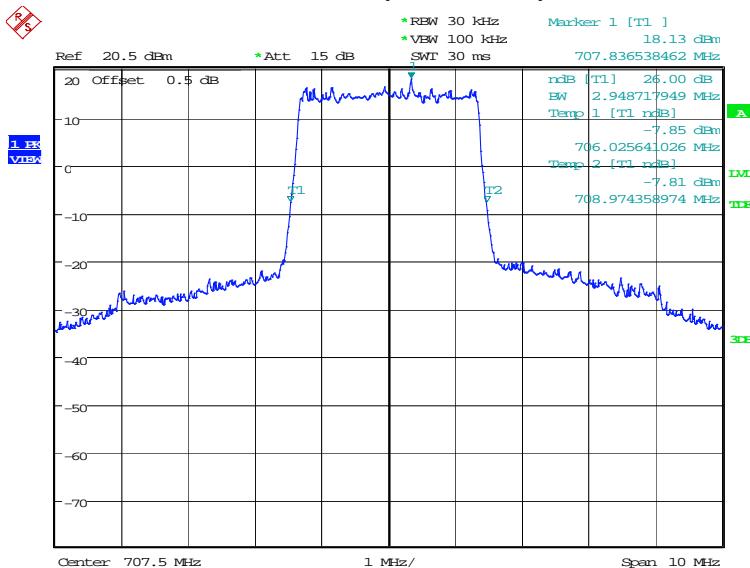
Date: 30.DEC.2019 19:22:19

**LTE band 12, 1.4MHz Bandwidth, 64QAM (-26dBc BW)**


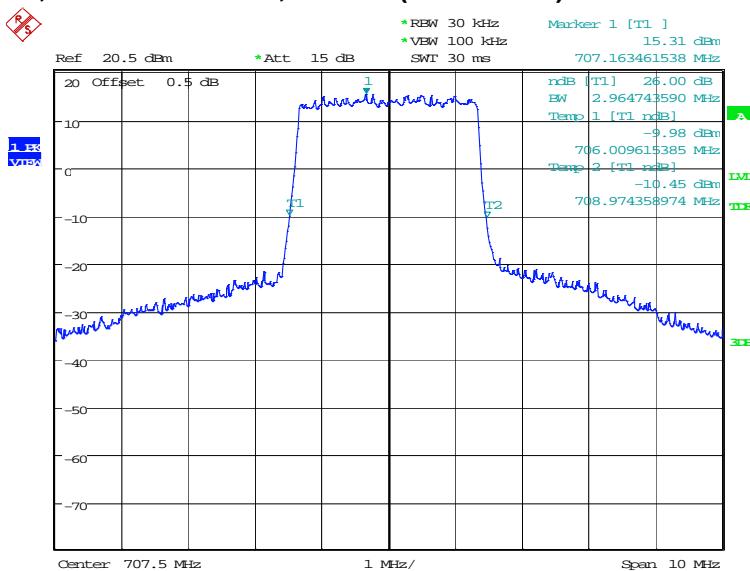
Date: 31.DEC.2019 09:28:57

**LTE band 12, 3MHz (-26dBc)**

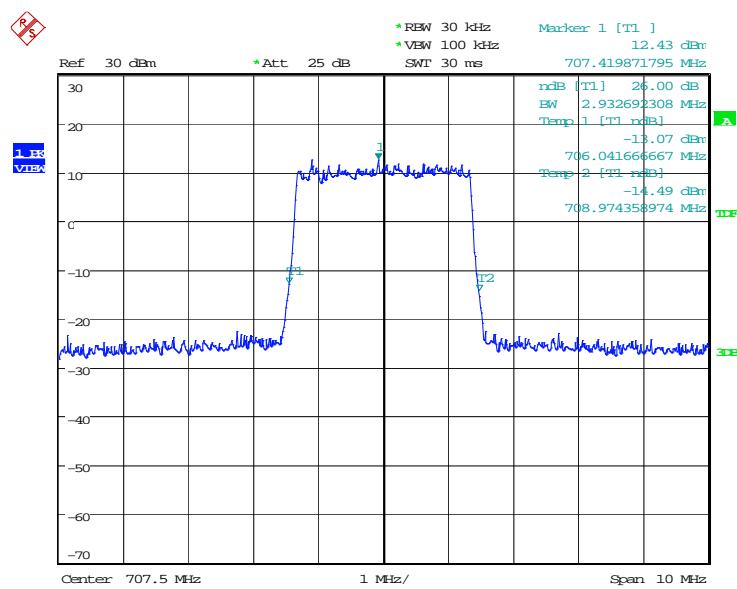
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
707.5	QPSK	16QAM	64QAM
	2948.72	2964.74	2932.69

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


Date: 30.DEC.2019 19:23:46

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


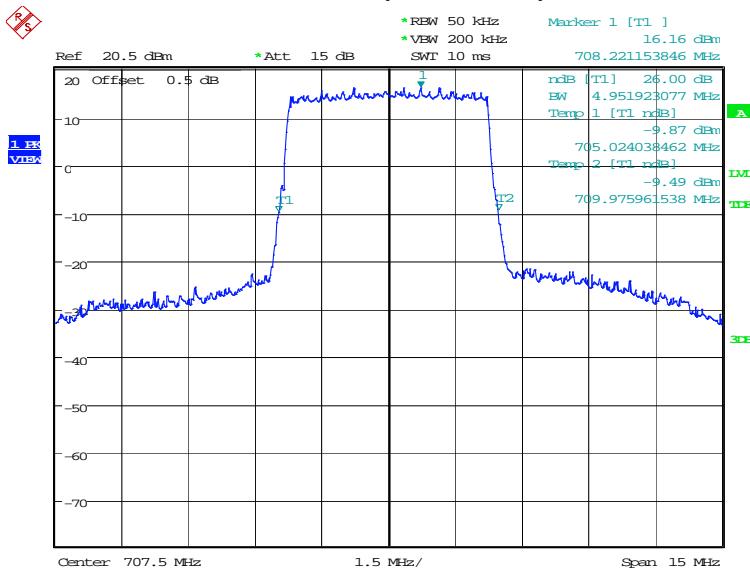
Date: 30.DEC.2019 19:25:11

**LTE band 12, 3MHz Bandwidth, 64QAM (-26dBc BW)**


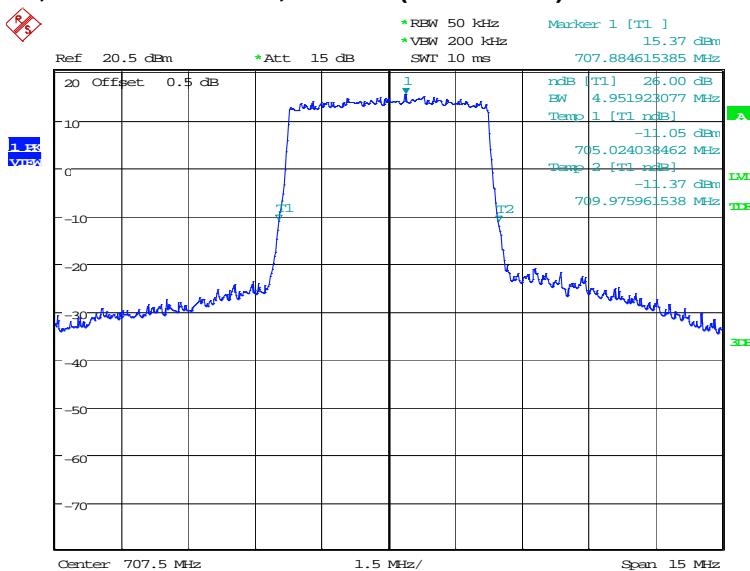
Date: 31.DEC.2019 09:40:50

**LTE band 12, 5MHz (-26dBc)**

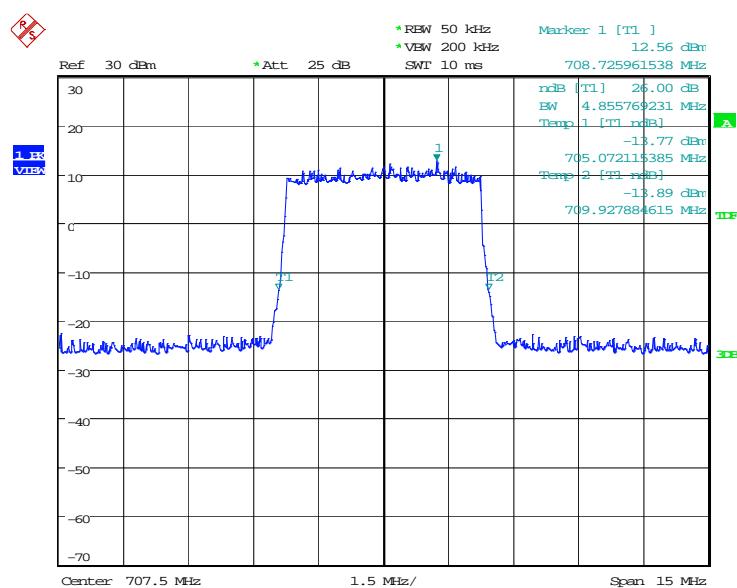
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
707.5	QPSK	16QAM	64QAM
	4951.92	4951.92	4855.77

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


Date: 30.DEC.2019 19:26:37

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


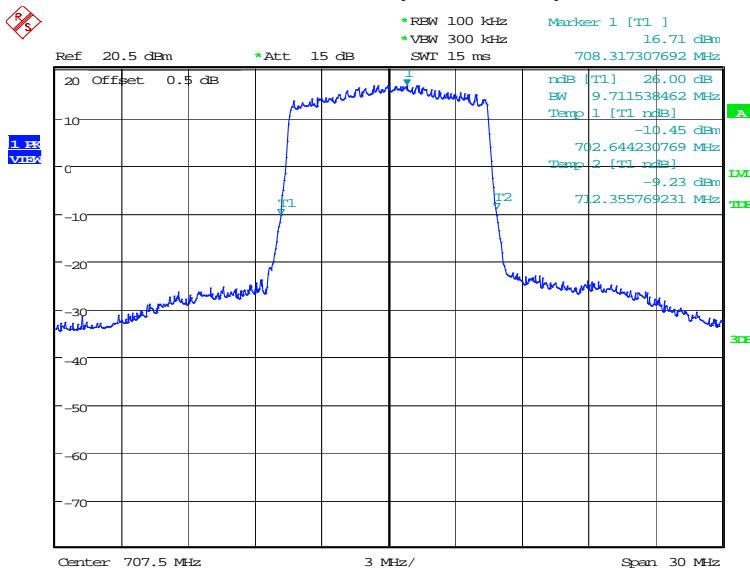
Date: 30.DEC.2019 19:28:02

**LTE band 12, 5MHz Bandwidth,64QAM (-26dBc BW)**


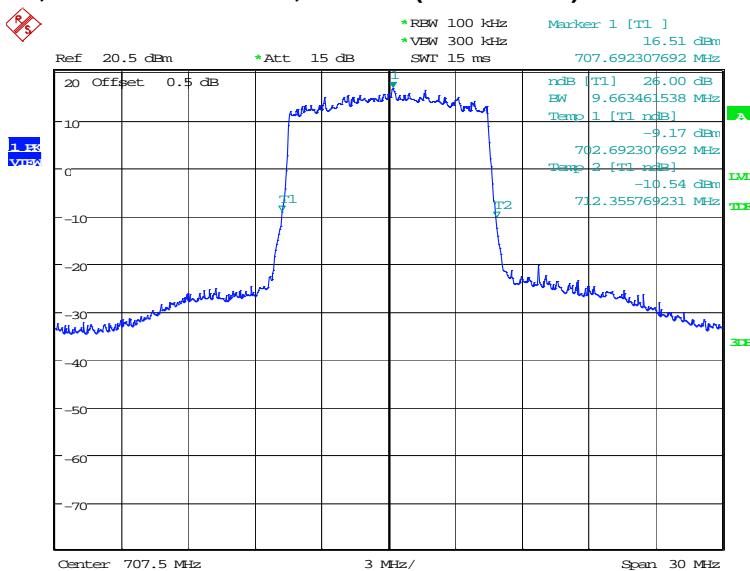
Date: 31.DEC.2019 09:42:08

**LTE band 12, 10MHz (-26dBc)**

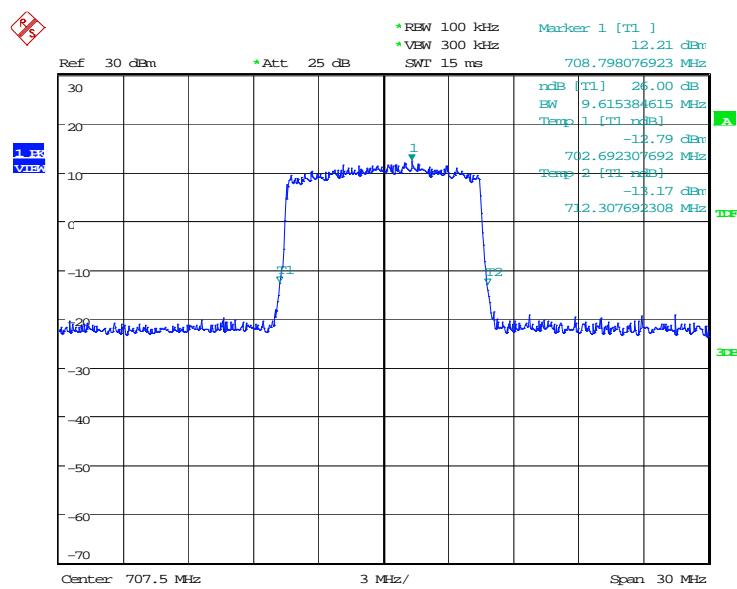
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
707.5			
	9711.54	9663.46	9615.38

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


Date: 30.DEC.2019 19:29:28

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


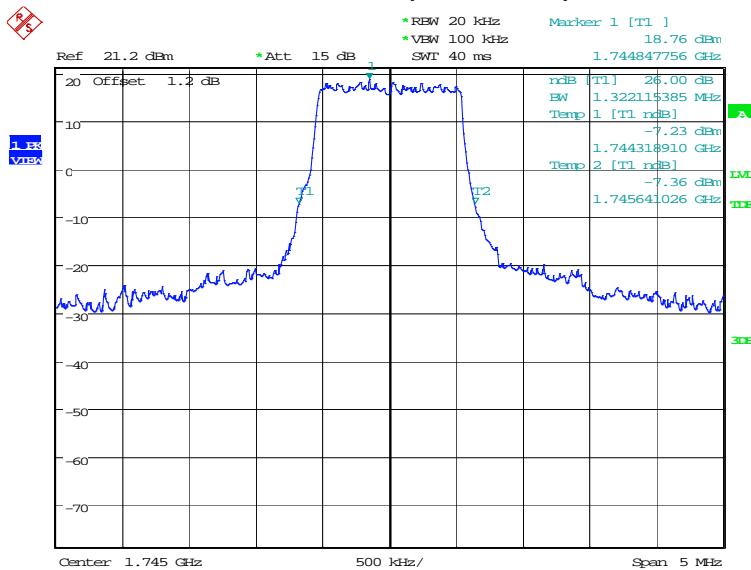
Date: 30.DEC.2019 19:30:53

**LTE band 12, 10MHz Bandwidth, 64QAM (-26dBc BW)**


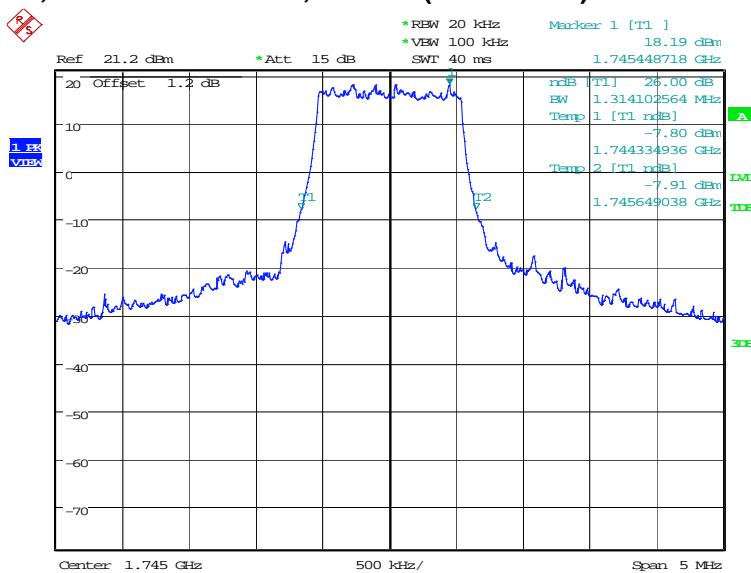
Date: 31.DEC.2019 09:43:44

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

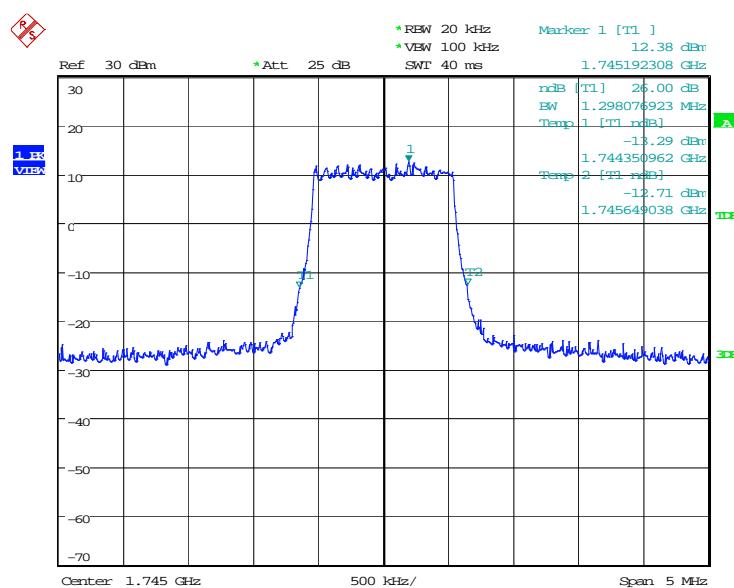
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
1745.0			
	1322.12	1314.10	1298.08

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


Date: 30.DEC.2019 19:32:21

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


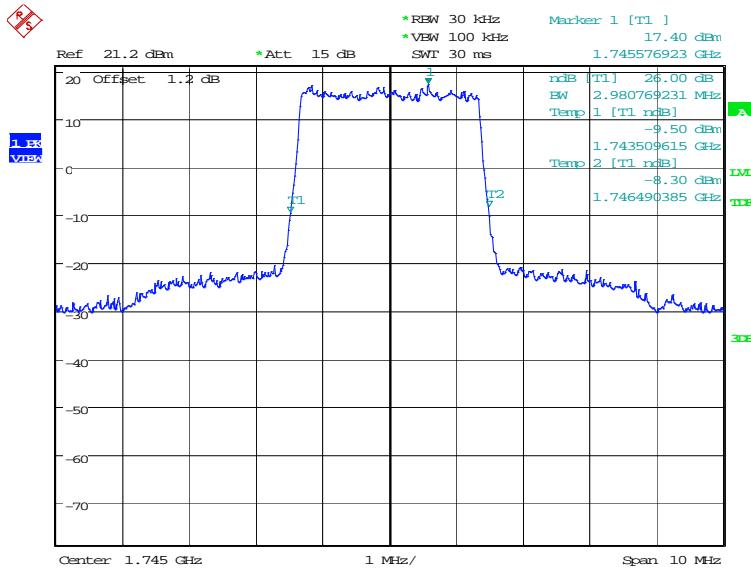
Date: 30.DEC.2019 19:33:46

**LTE band 66, 1.4MHz Bandwidth, 64QAM (-26dBc BW)**


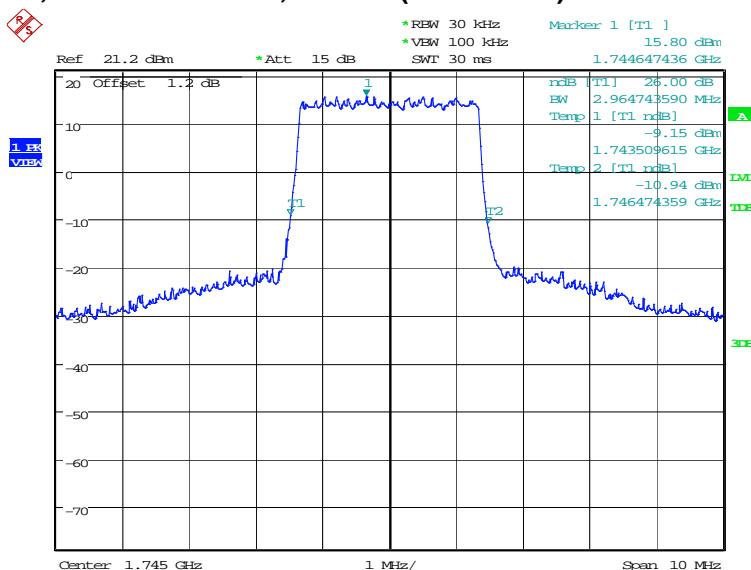
Date: 31.DEC.2019 09:47:59

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

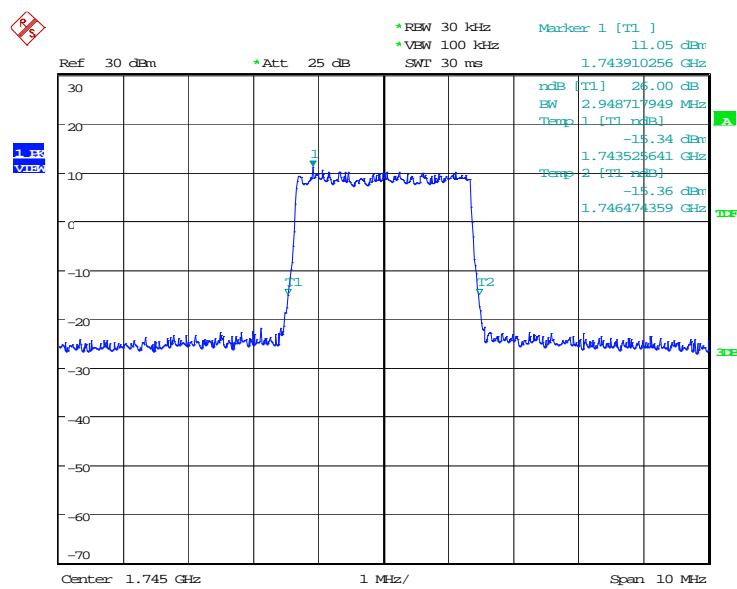
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
1745.0	QPSK	16QAM	64QAM
	2980.77	2964.74	2948.72

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


Date: 30.DEC.2019 19:35:12

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


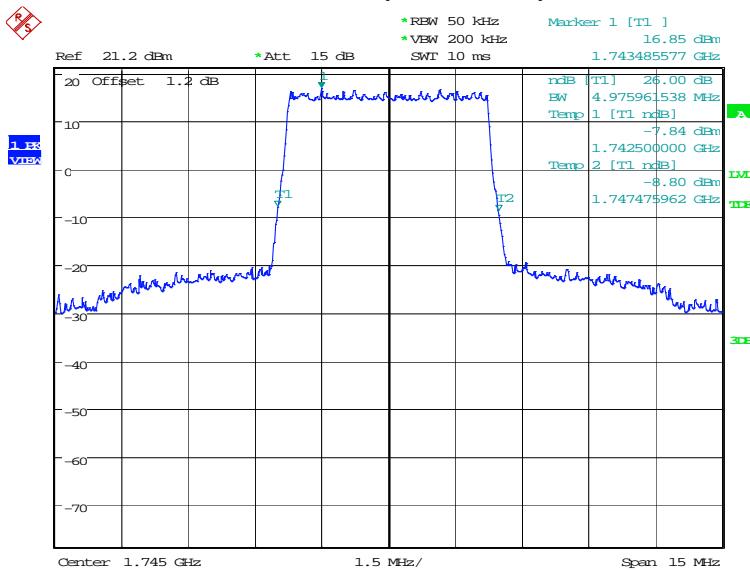
Date: 30.DEC.2019 19:36:37

**LTE band 66, 3MHz Bandwidth, 64QAM (-26dBc BW)**


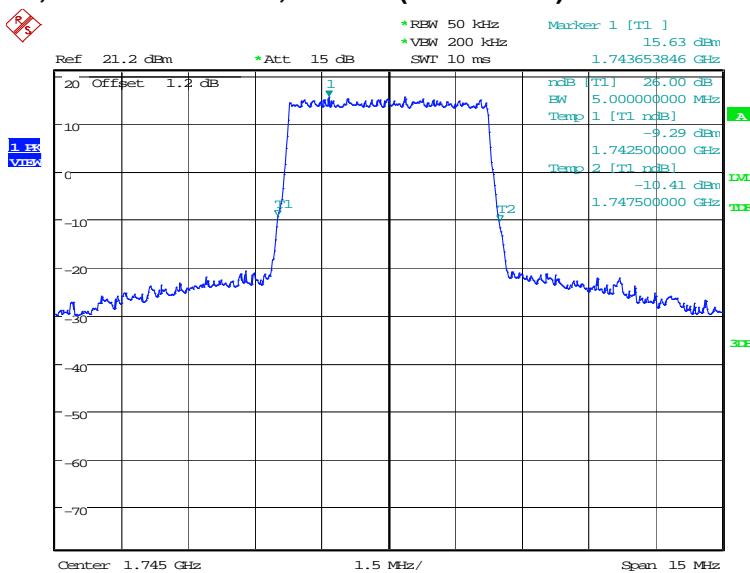
Date: 31.DEC.2019 09:49:25

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

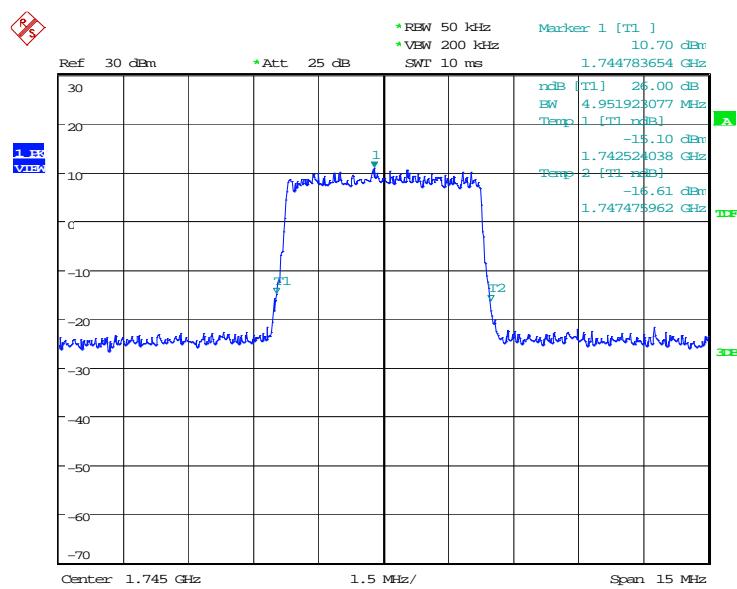
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
1745.0	4975.96	5000.00	4951.92

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


Date: 30.DEC.2019 19:38:03

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


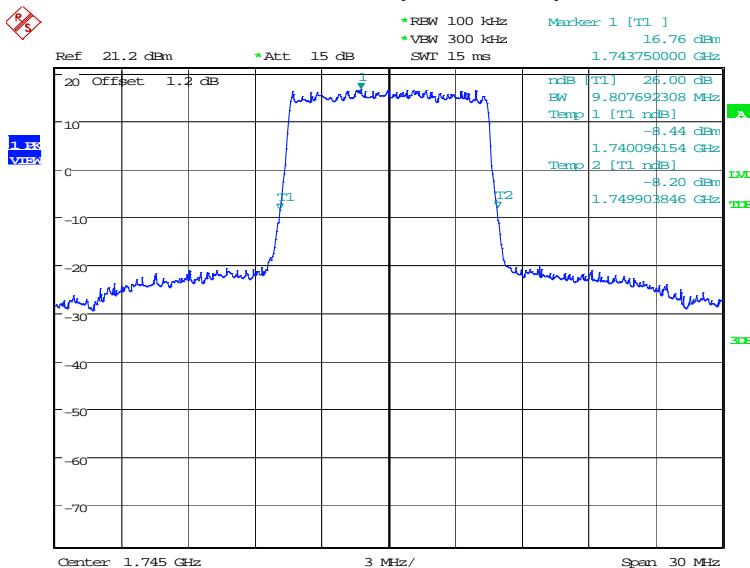
Date: 30.DEC.2019 19:39:28

**LTE band 66, 5MHz Bandwidth,64QAM (-26dBc BW)**


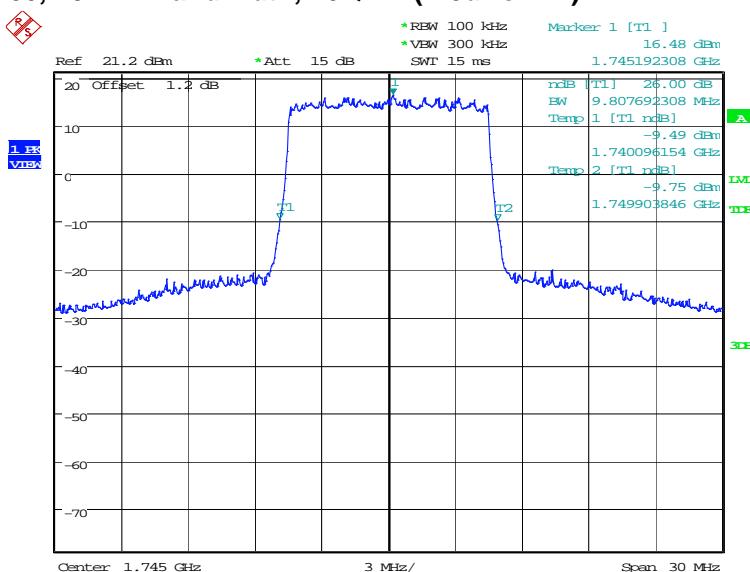
Date: 31.DEC.2019 09:50:53

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

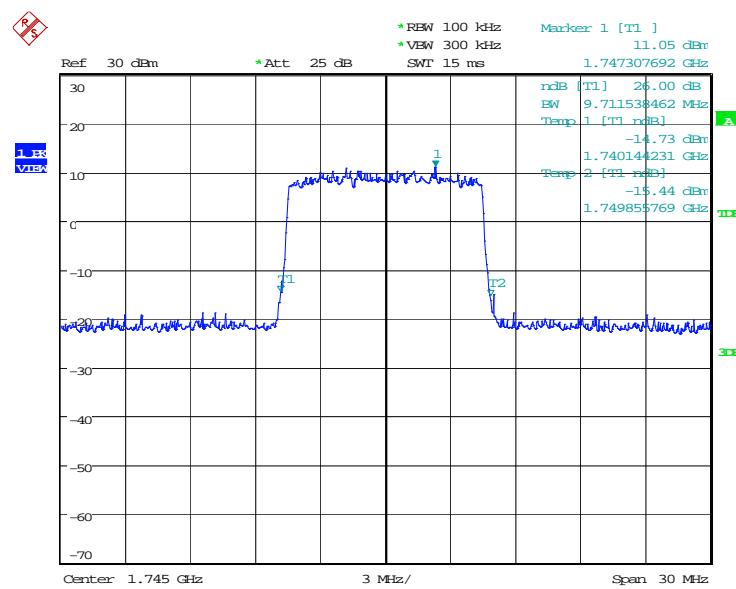
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
1745.0	9807.69	9807.69	9711.54

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


Date: 30.DEC.2019 19:40:55

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


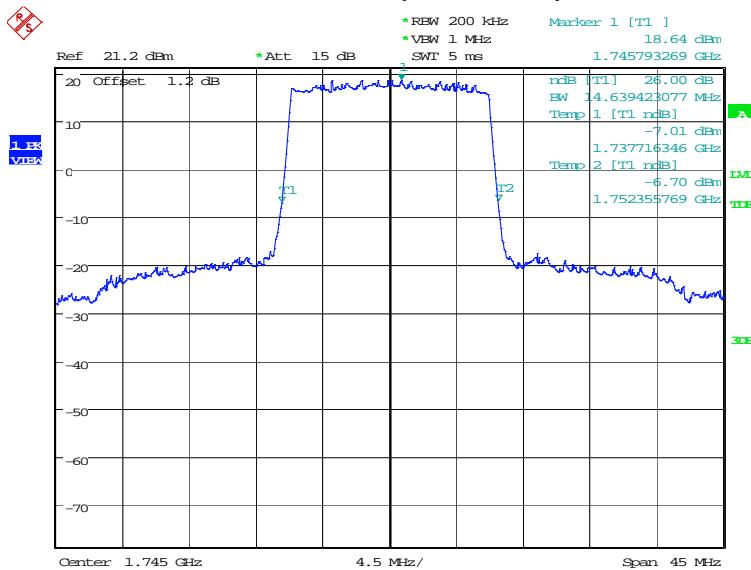
Date: 30.DEC.2019 19:42:19

**LTE band 66, 10MHz Bandwidth, 64QAM (-26dBc BW)**


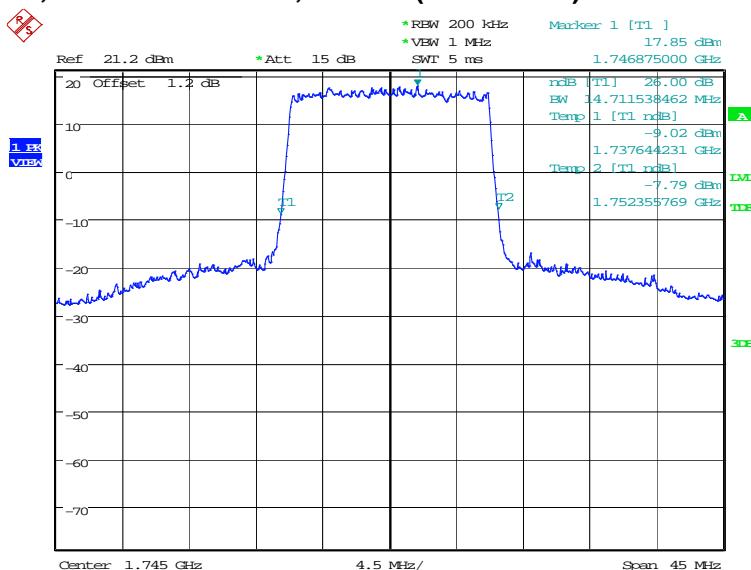
Date: 31.DEC.2019 09:52:23

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

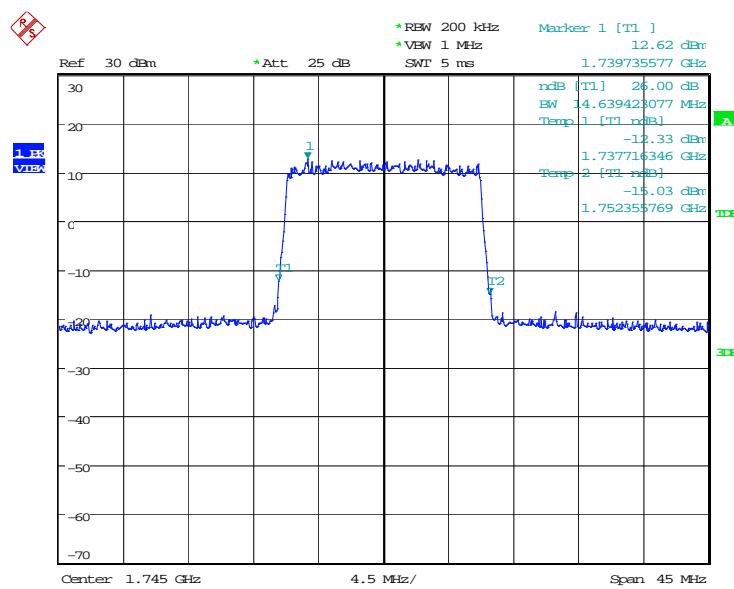
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
1745.0			
	14639.42	14711.54	14639.42

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


Date: 30.DEC.2019 19:43:46

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


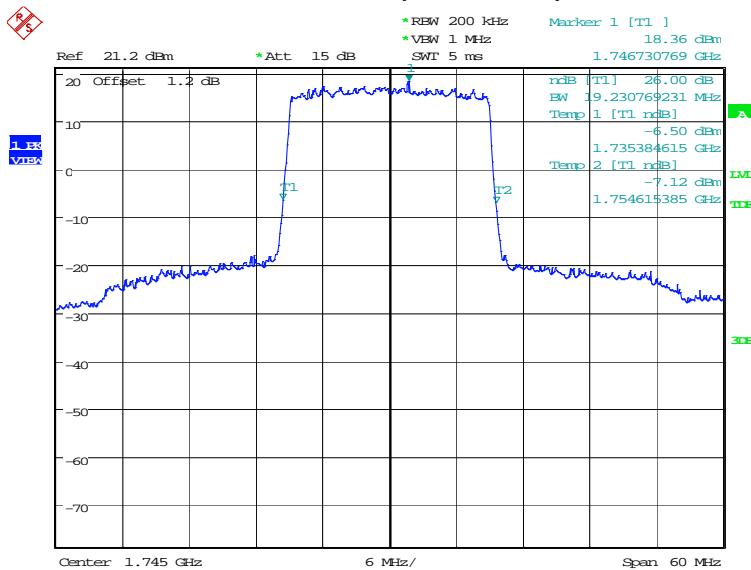
Date: 30.DEC.2019 19:45:11

**LTE band 66, 15MHz Bandwidth, 64QAM (-26dBc BW)**


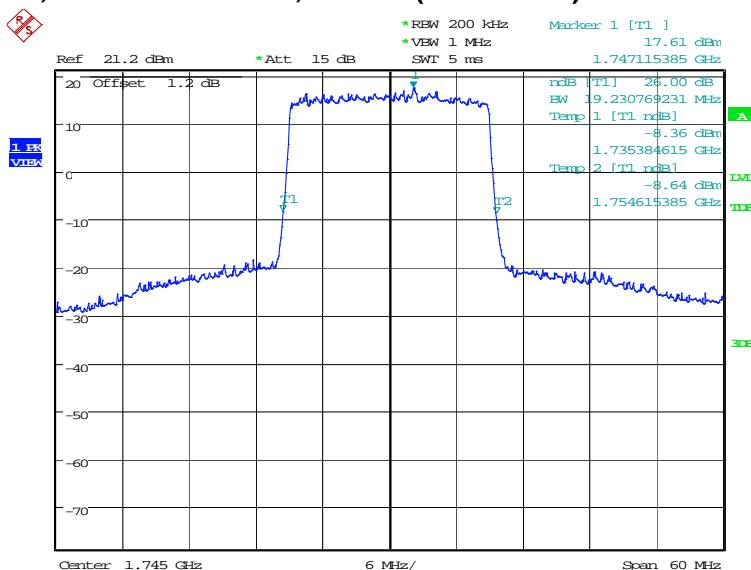
Date: 31.DEC.2019 09:54:01

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

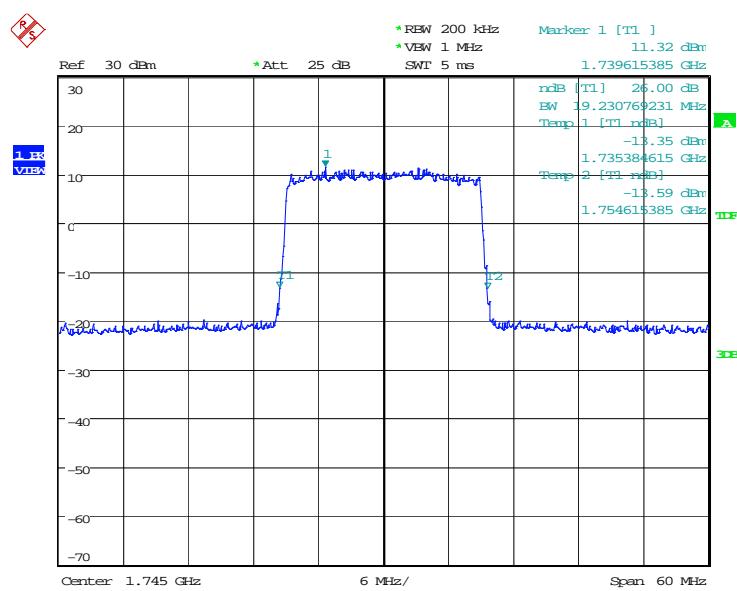
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
1745.0	19230.77	19230.77	19230.77

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


Date: 30.DEC.2019 19:46:37

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


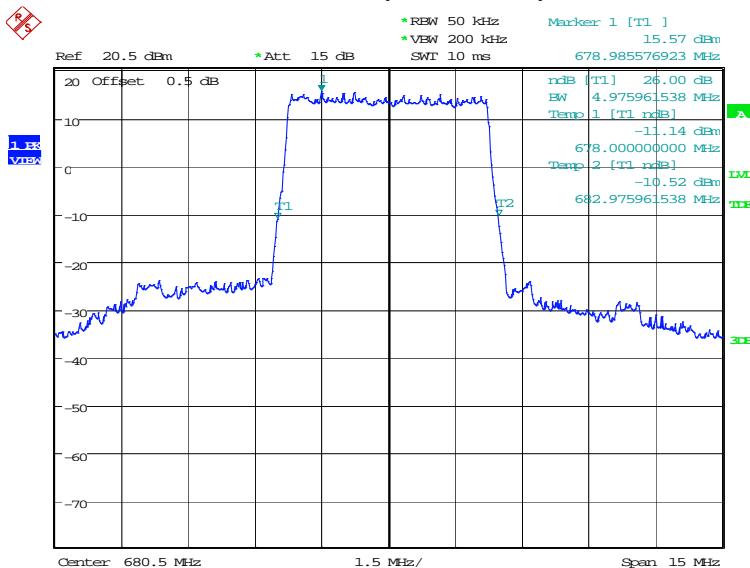
Date: 30.DEC.2019 19:48:02

**LTE band 66, 20MHz Bandwidth, 64QAM (-26dBc BW)**


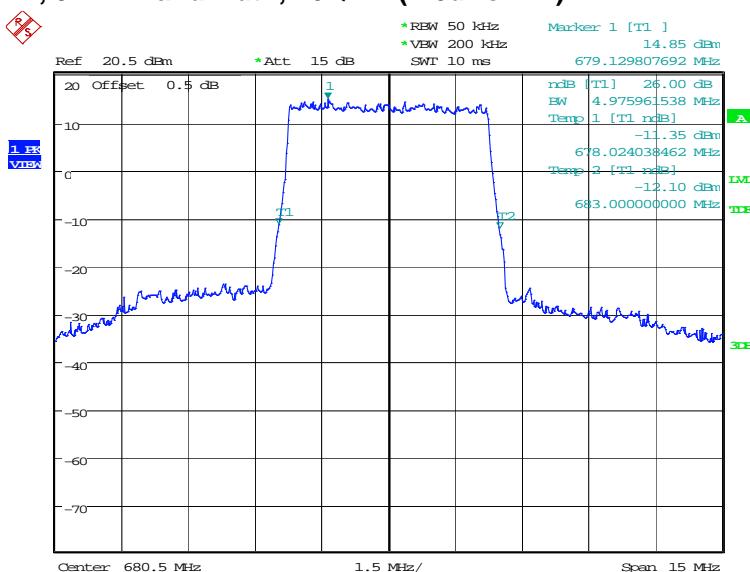
Date: 31.DEC.2019 09:57:50

**LTE band 71, 5MHz (-26dBc)**

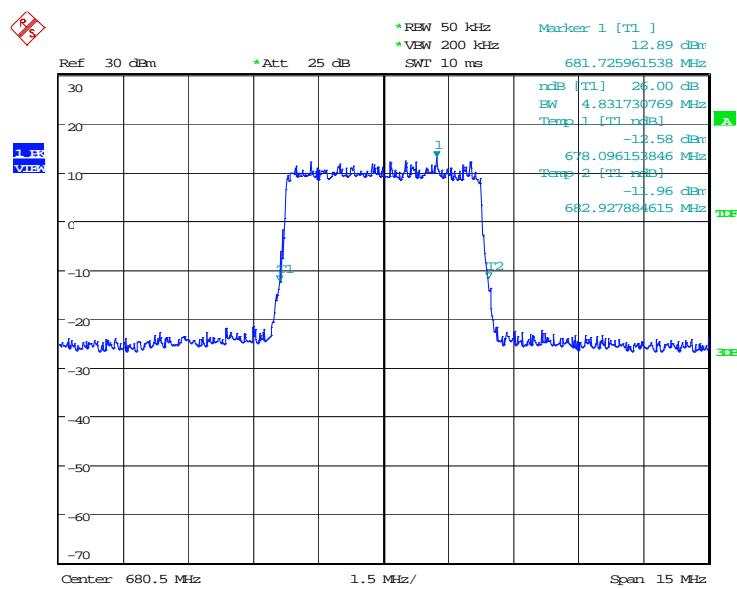
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
680.5	4975.96	4975.96	4831.73

**LTE band 71, 5MHz Bandwidth, QPSK (-26dBc BW)**


Date: 30.DEC.2019 19:50:10

**LTE band 71, 5MHz Bandwidth, 16QAM (-26dBc BW)**


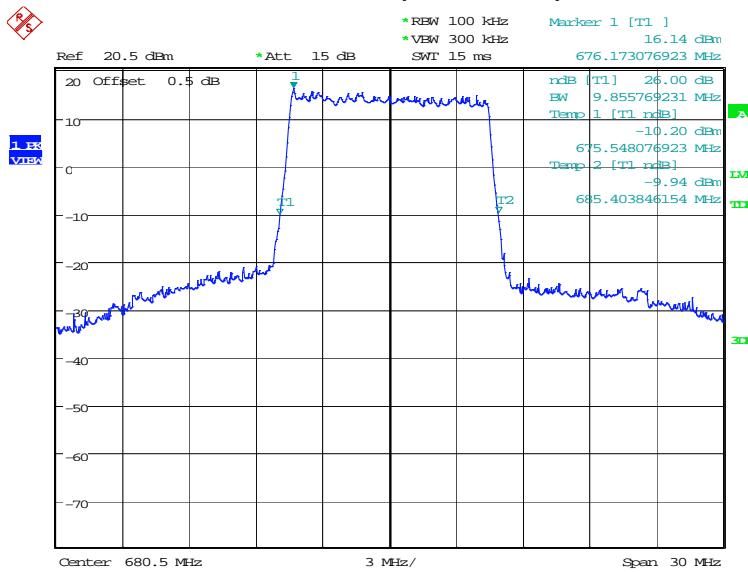
Date: 30.DEC.2019 19:51:35

**LTE band 71, 5MHz Bandwidth,64QAM (-26dBc BW)**


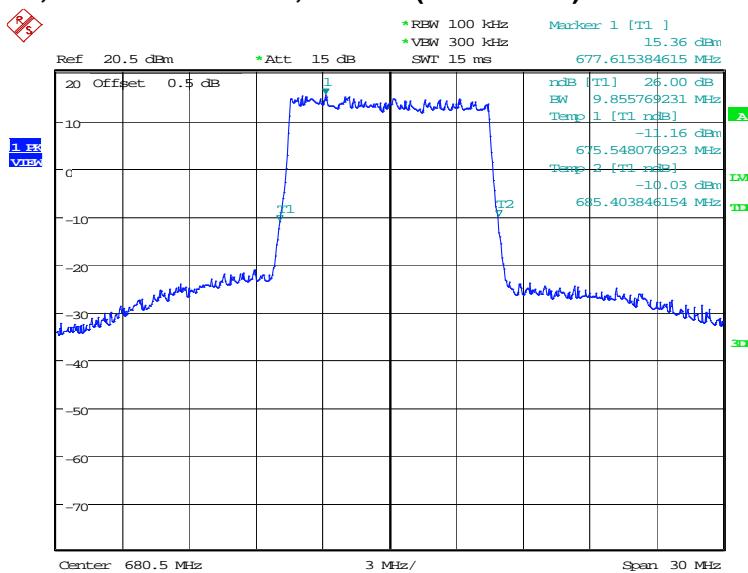
Date: 31.DEC.2019 10:05:05

**LTE band 71, 10MHz (-26dBc)**

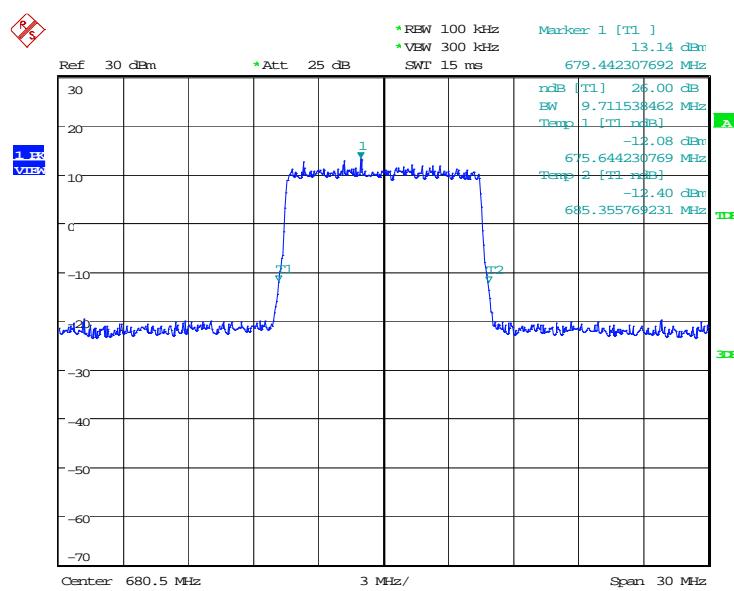
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
680.5			
	9855.77	9855.77	9711.54

**LTE band 71, 10MHz Bandwidth, QPSK (-26dBc BW)**


Date: 30.DEC.2019 19:53:01

**LTE band 71, 10MHz Bandwidth, 16QAM (-26dBc BW)**


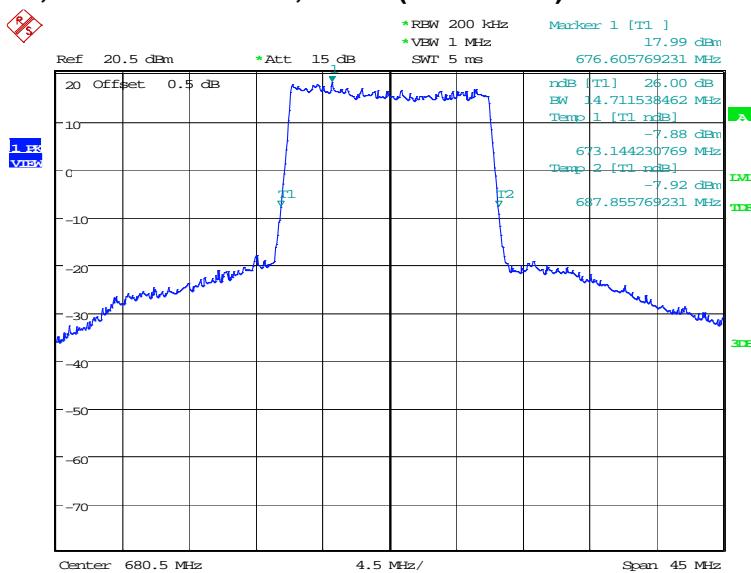
Date: 30.DEC.2019 19:54:26

**LTE band 71, 10MHz Bandwidth, 64QAM (-26dBc BW)**


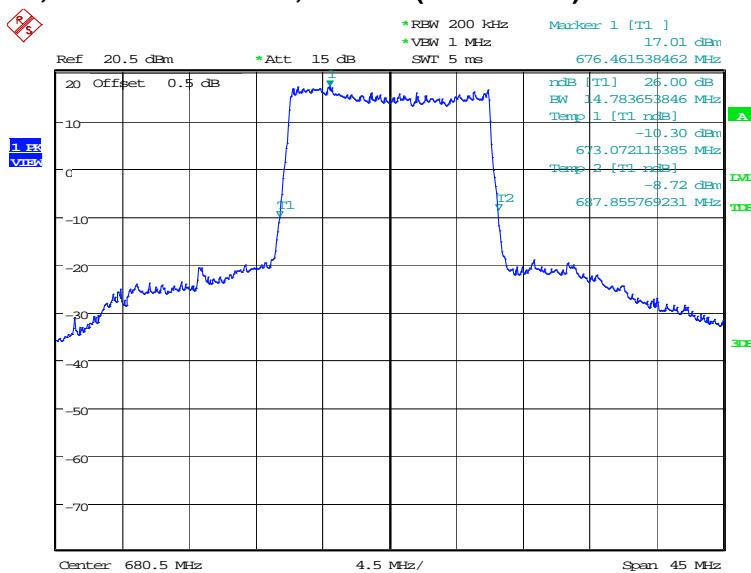
Date: 31.DEC.2019 10:06:22

**LTE band 71, 15MHz (-26dBc)**

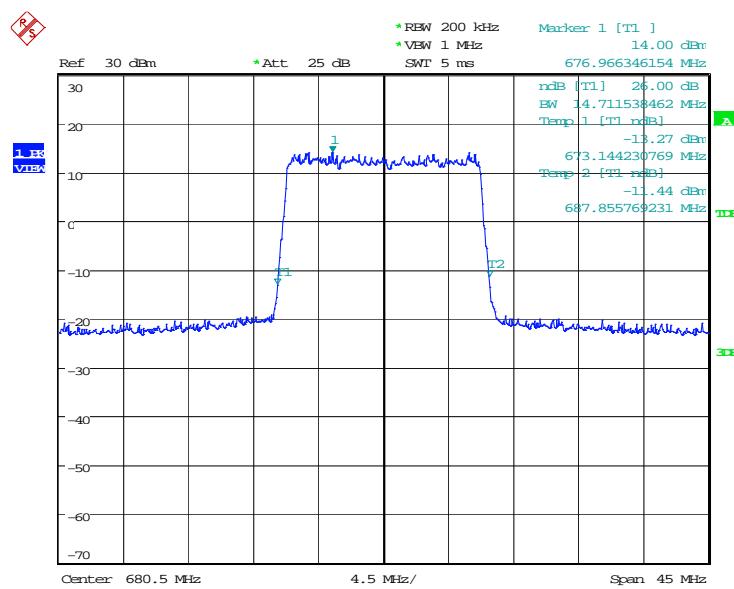
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
680.5	QPSK	16QAM	64QAM
	14711.54	14783.65	14711.54

**LTE band 71, 15MHz Bandwidth, QPSK (-26dBc BW)**


Date: 30.DEC.2019 19:55:53

**LTE band 71, 15MHz Bandwidth, 16QAM (-26dBc BW)**


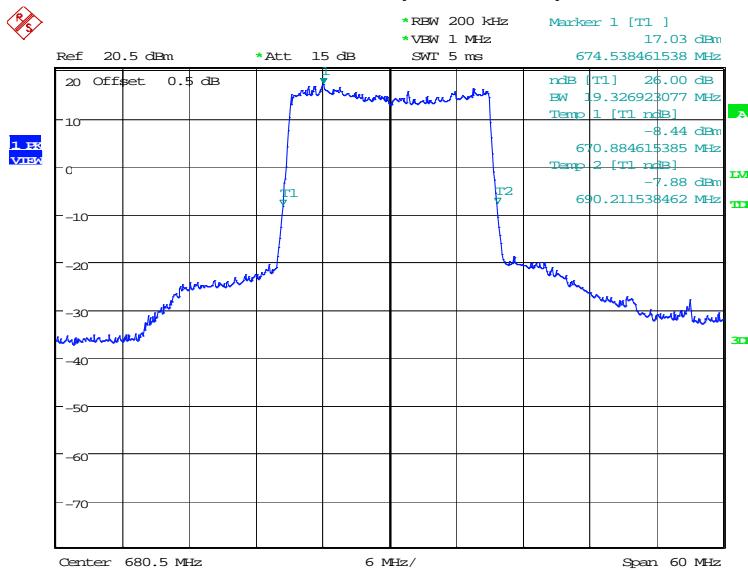
Date: 30.DEC.2019 19:57:18

**LTE band 71, 15MHz Bandwidth, 64QAM (-26dBc BW)**


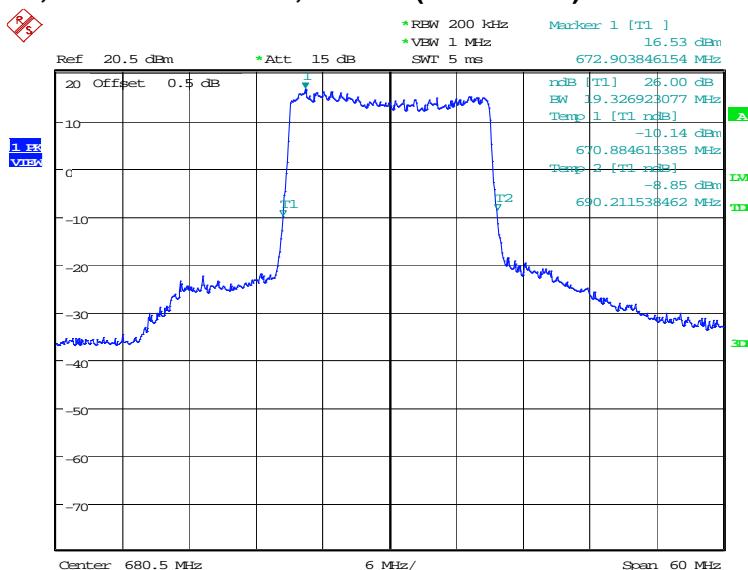
Date: 31.DEC.2019 10:07:51

**LTE band 71, 20MHz (-26dBc)**

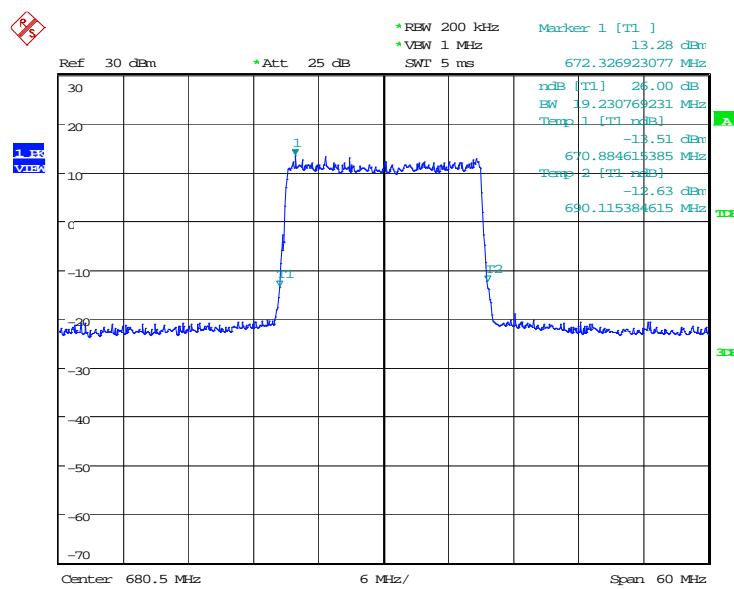
Frequency (MHz)	Occupied Bandwidth (-26dBc) (kHz)		
	QPSK	16QAM	64QAM
680.5			
	19326.92	19326.92	19230.77

**LTE band 71, 20MHz Bandwidth, QPSK (-26dBc BW)**


Date: 30.DEC.2019 19:58:44

**LTE band 71, 20MHz Bandwidth, 16QAM (-26dBc BW)**


Date: 30.DEC.2019 20:00:09

**LTE band 71, 20MHz Bandwidth, 64QAM (-26dBc BW)**


Date: 31.DEC.2019 10:09:15

## 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.

According to KDB 971168, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

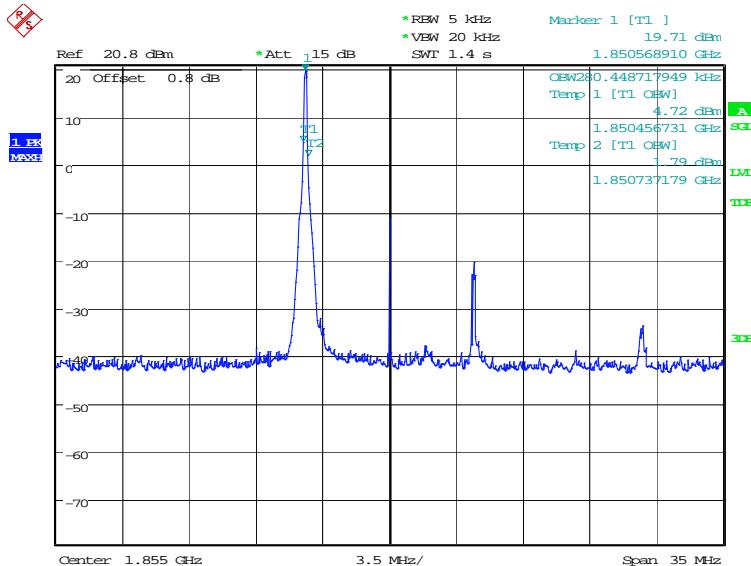
The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13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

### A.6.2 Measurement result

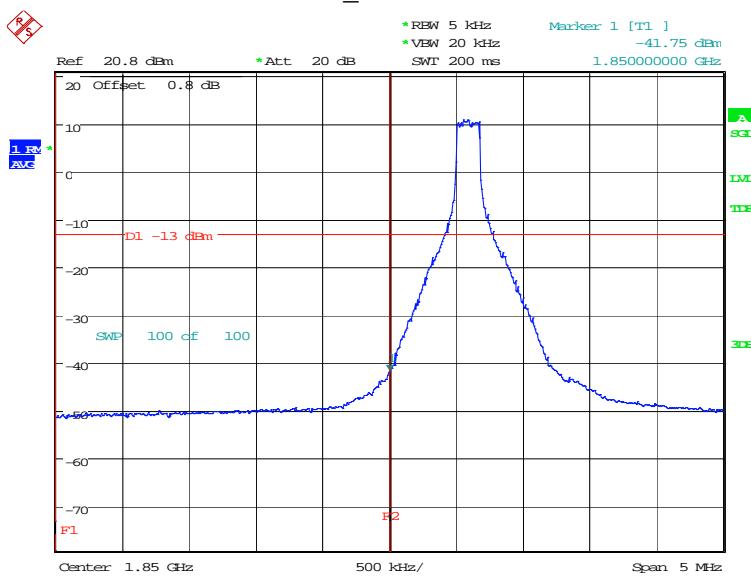
Only the worst case result is given below

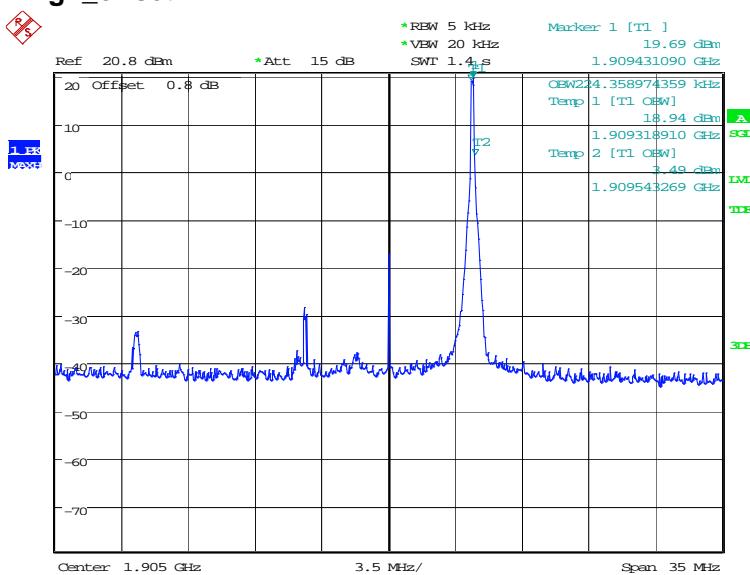
LTE band 2

OBW: 1RB-low\_offset

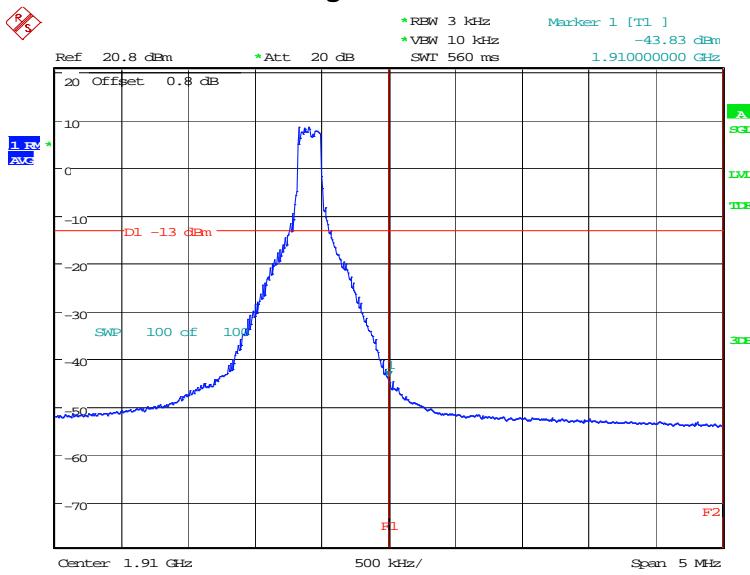


LOW BAND EDGE BLOCK-1RB-low\_offset

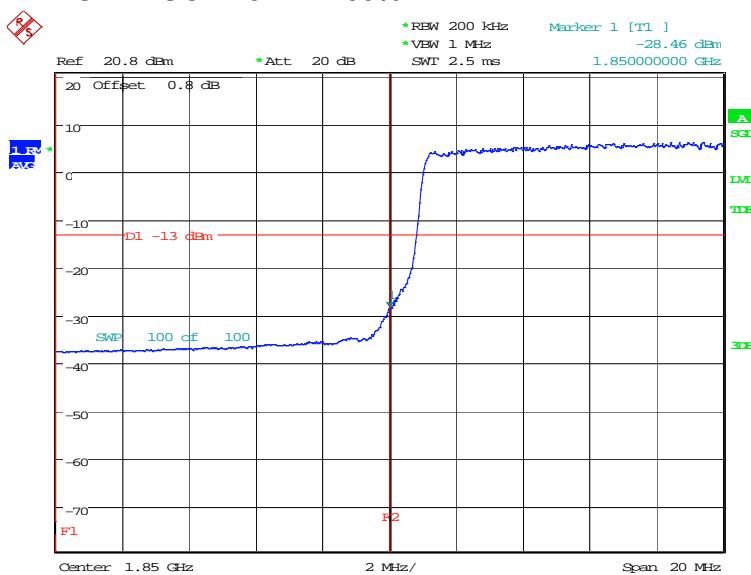


**OBW: 1RB-high\_offset**


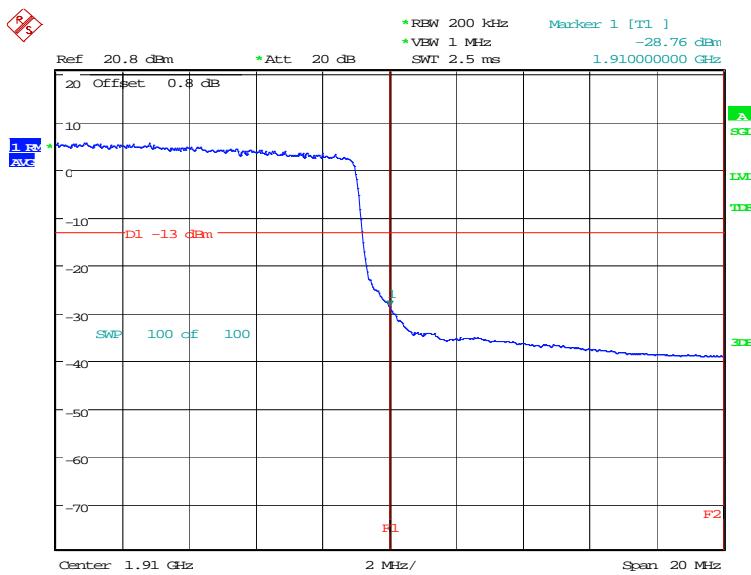
Date: 9.DEC.2019 12:28:21

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


Date: 9.DEC.2019 12:30:00

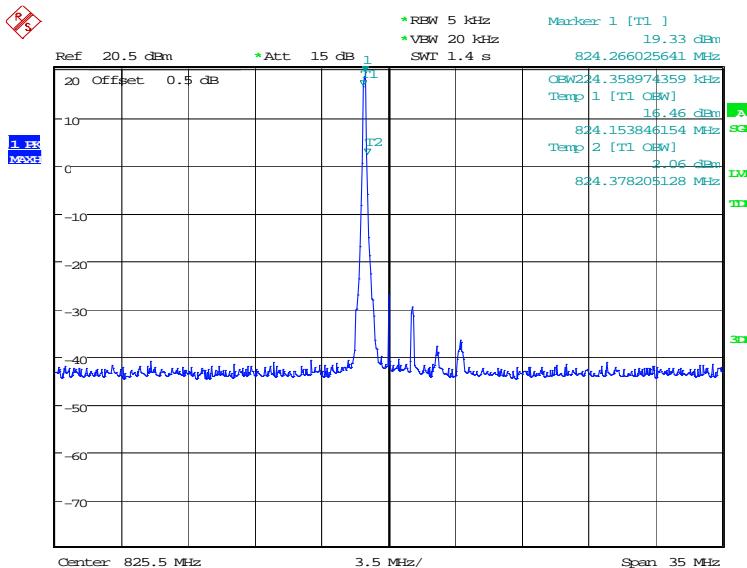
**LOW BAND EDGE BLOCK-20MHz-100%RB**


Date: 9.DEC.2019 12:26:22

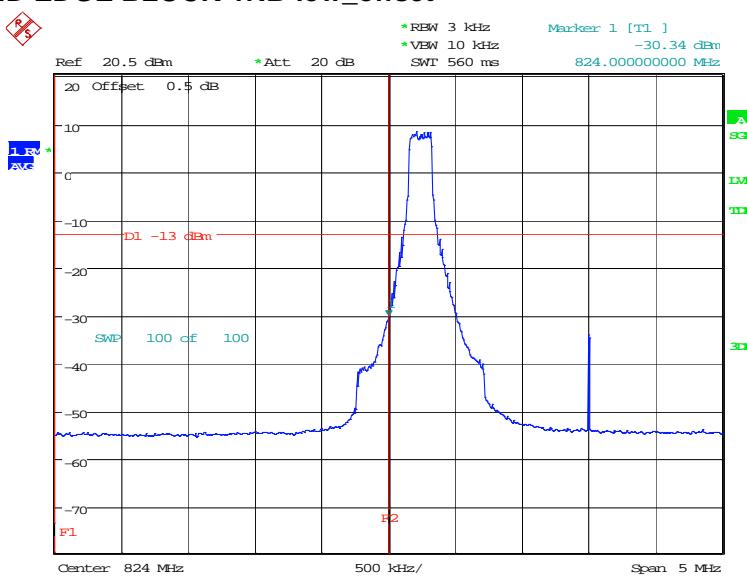
**HIGH BAND EDGE BLOCK-20MHz-100%RB**


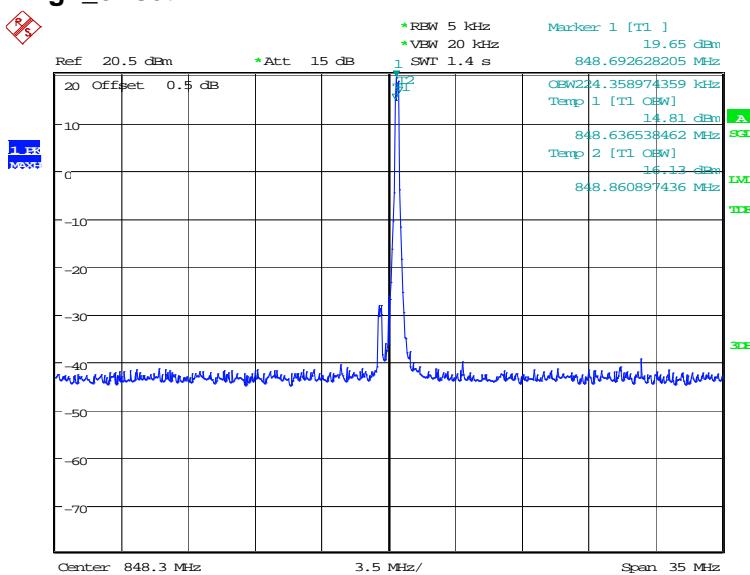
Date: 9.DEC.2019 12:31:54

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

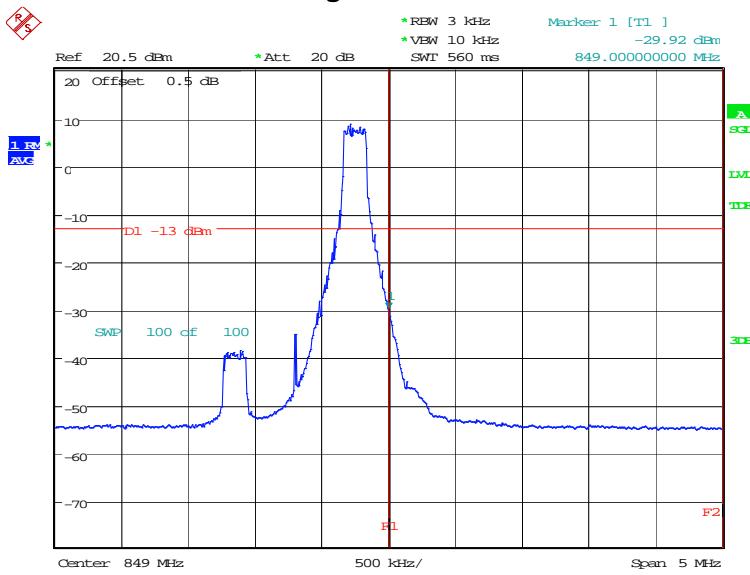


### LOW BAND EDGE BLOCK-1RB-low\_offset

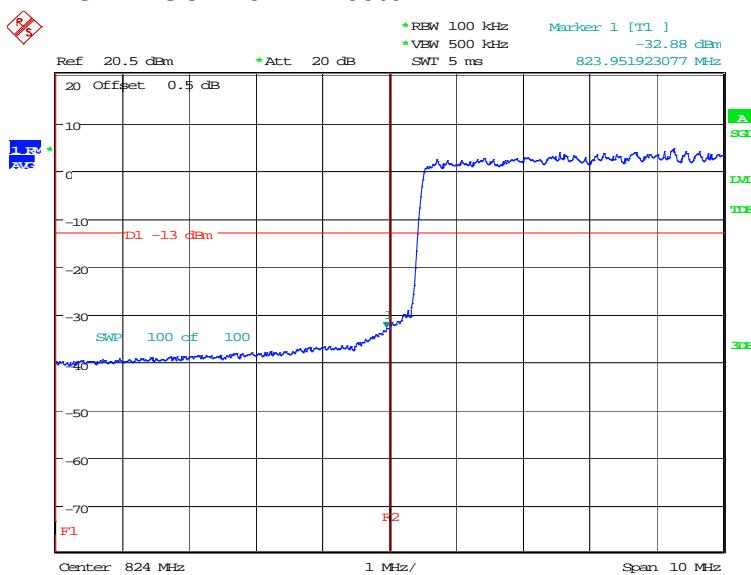


**OBW: 1RB-high\_offset**


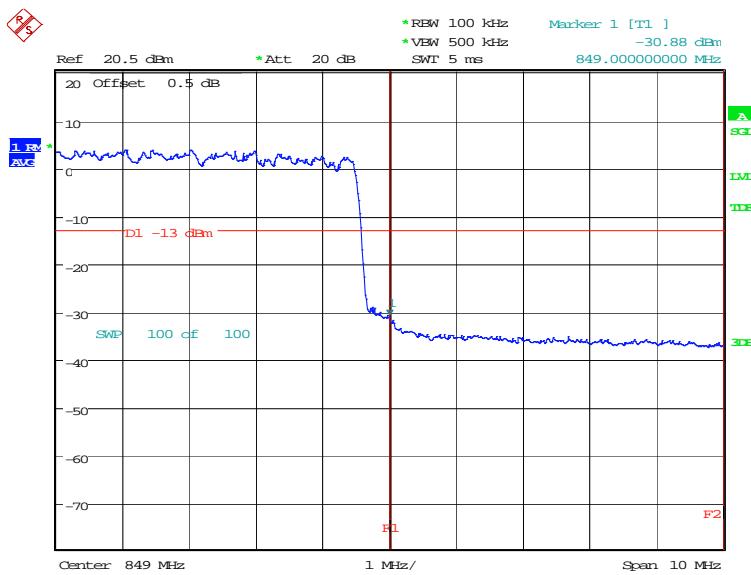
Date: 9.DEC.2019 13:15:45

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


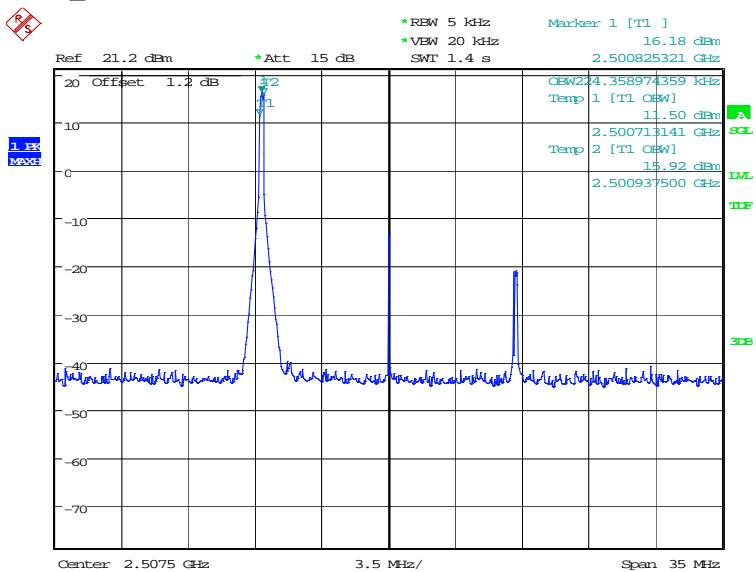
Date: 9.DEC.2019 13:17:24

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


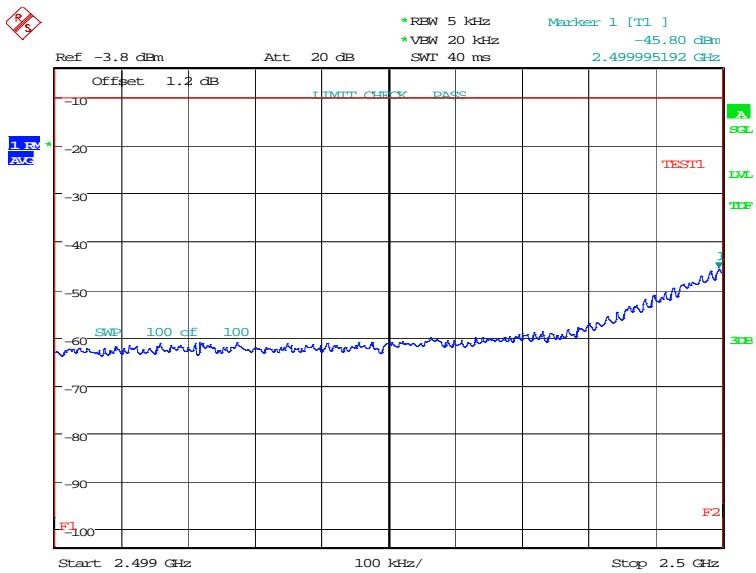
Date: 9.DEC.2019 13:13:04

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


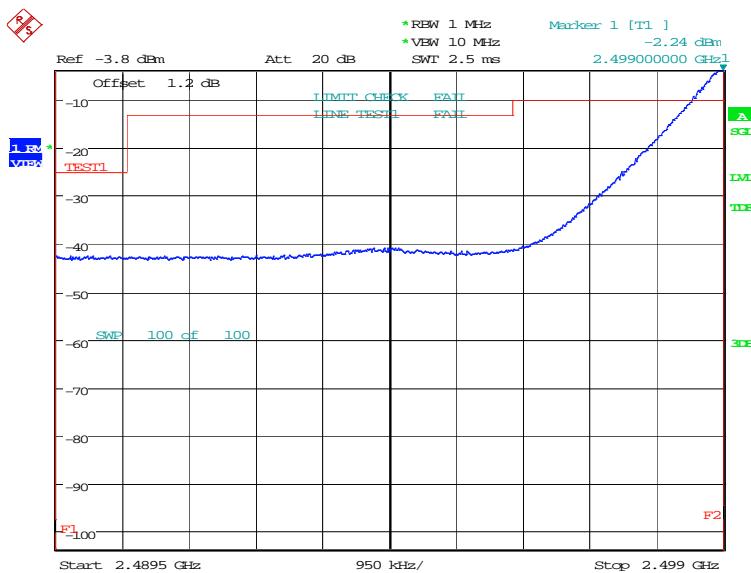
Date: 9.DEC.2019 13:19:22

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


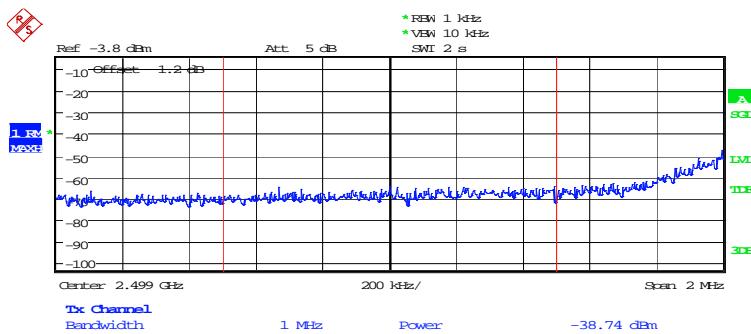
Date: 13.JAN.2020 09:22:17

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


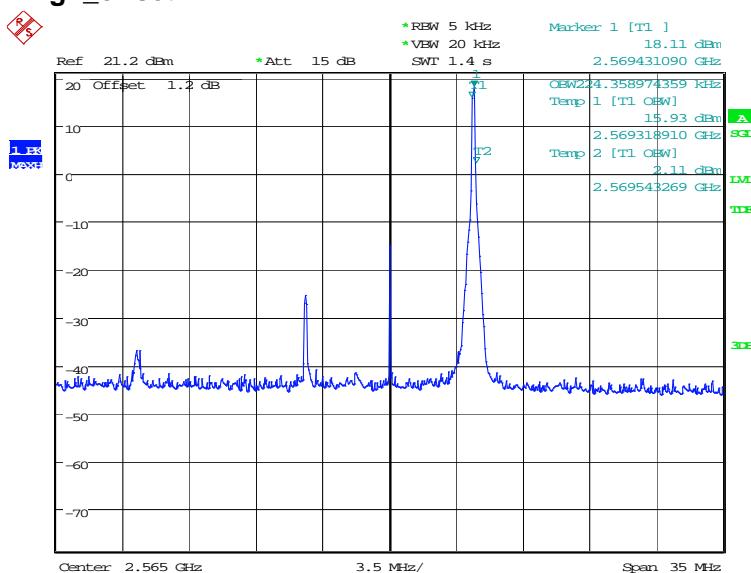
Date: 13.JAN.2020 09:24:03



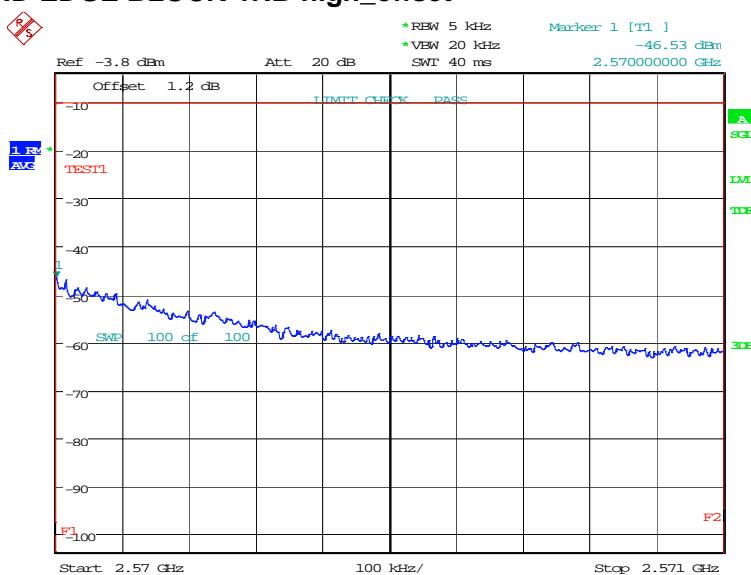
Date: 13.JAN.2020 09:25:46



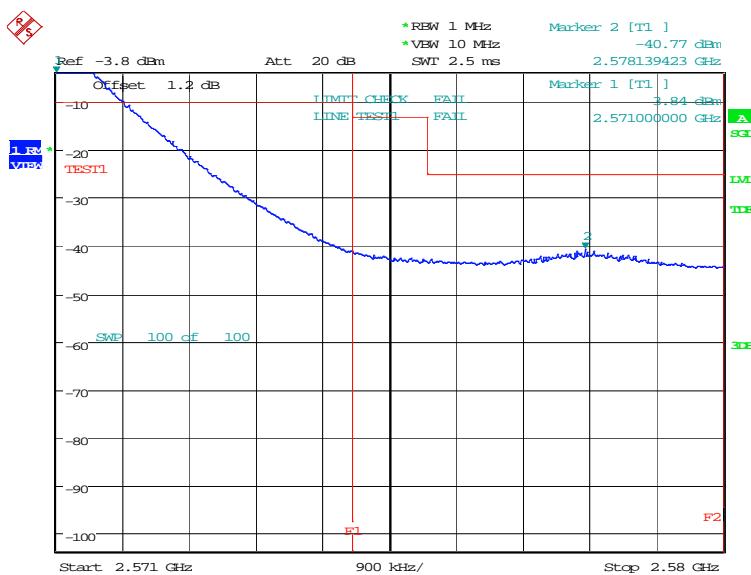
Date: 13.JAN.2020 09:25:57

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


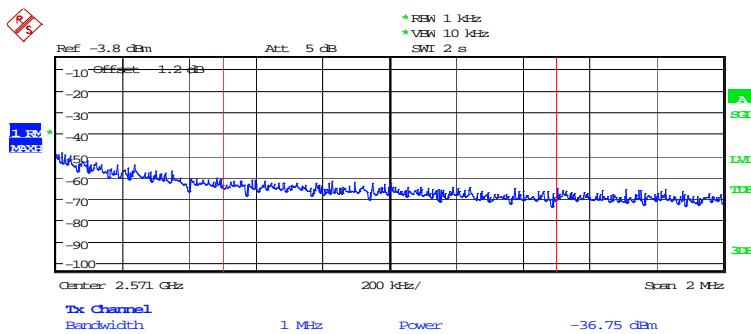
Date: 13.JAN.2020 09:31:37

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


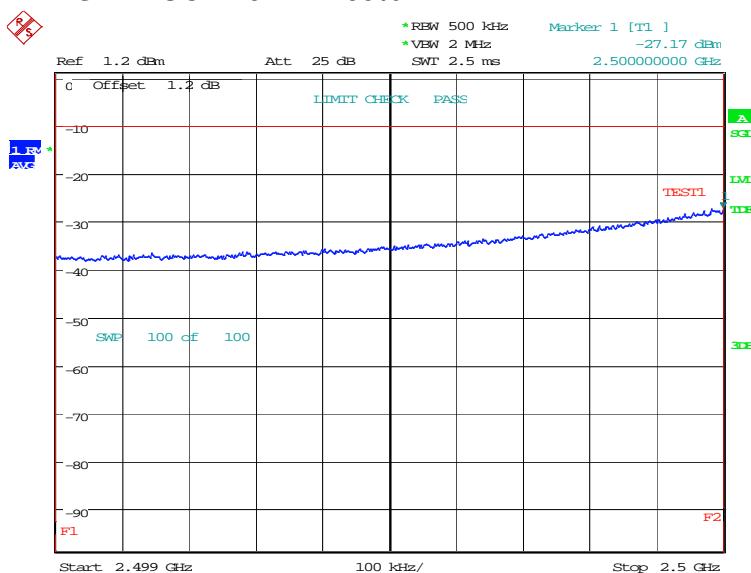
Date: 13.JAN.2020 09:33:23



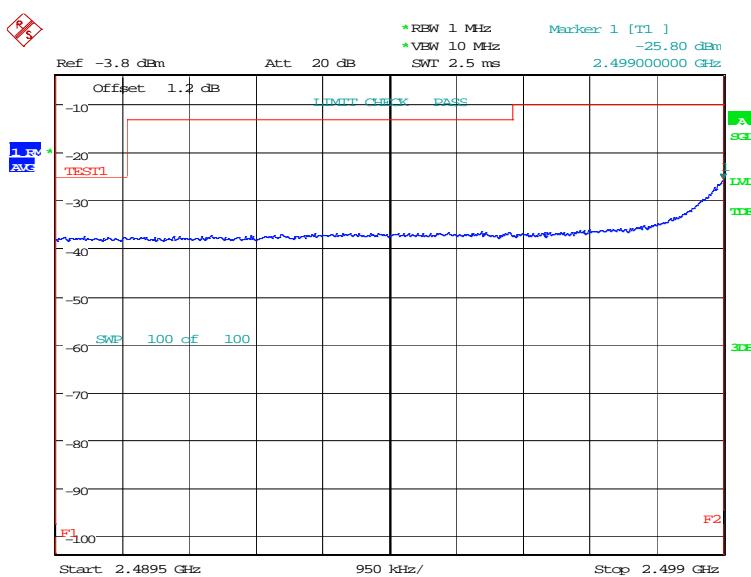
Date: 13.JAN.2020 09:35:08



Date: 13.JAN.2020 09:35:20

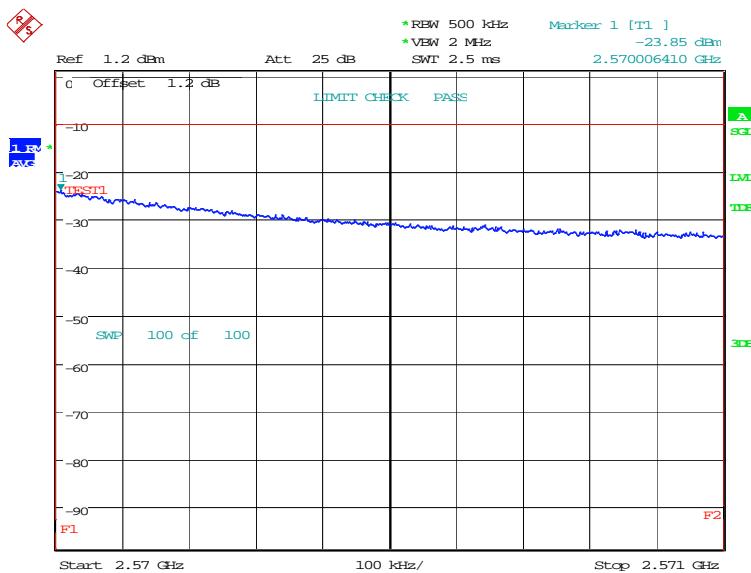
**LOW BAND EDGE BLOCK-20MHz-100%RB**


Date: 13.JAN.2020 09:27:56

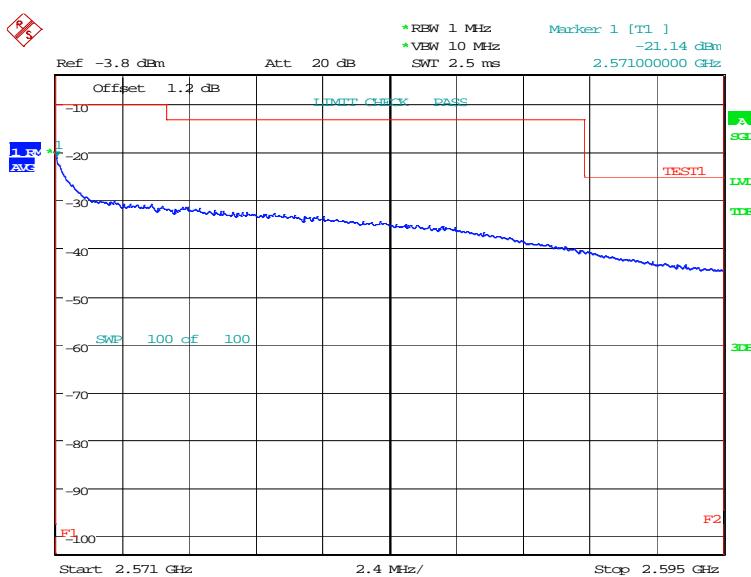


Date: 13.JAN.2020 09:29:36

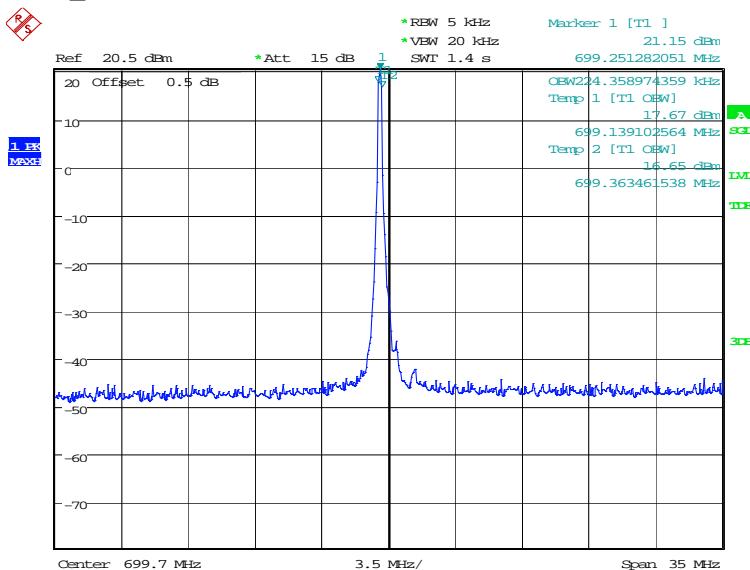
### HIGH BAND EDGE BLOCK-20MHz-100%RB



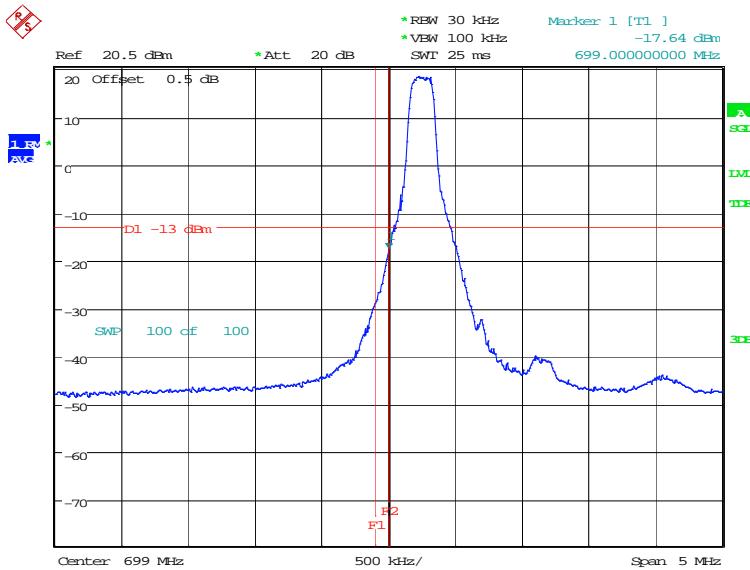
Date: 13.JAN.2020 09:37:19



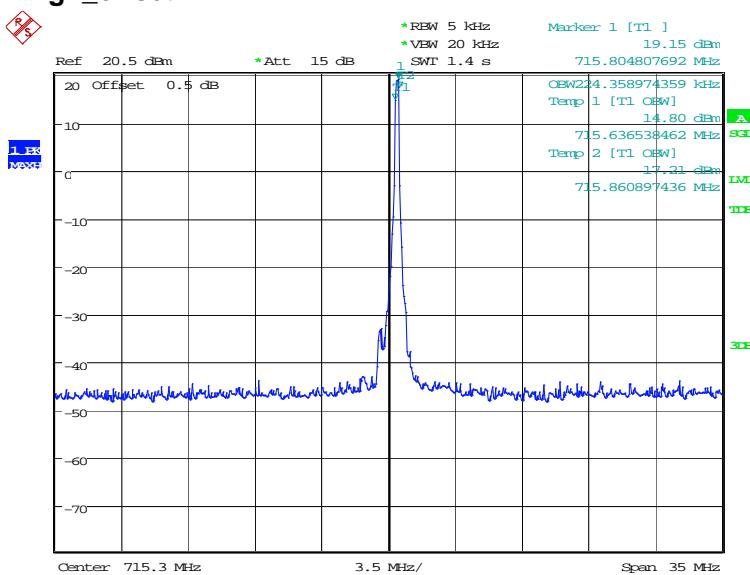
Date: 13.JAN.2020 09:38:59

**LTE band 12**
**OBW: 1RB-low\_offset**


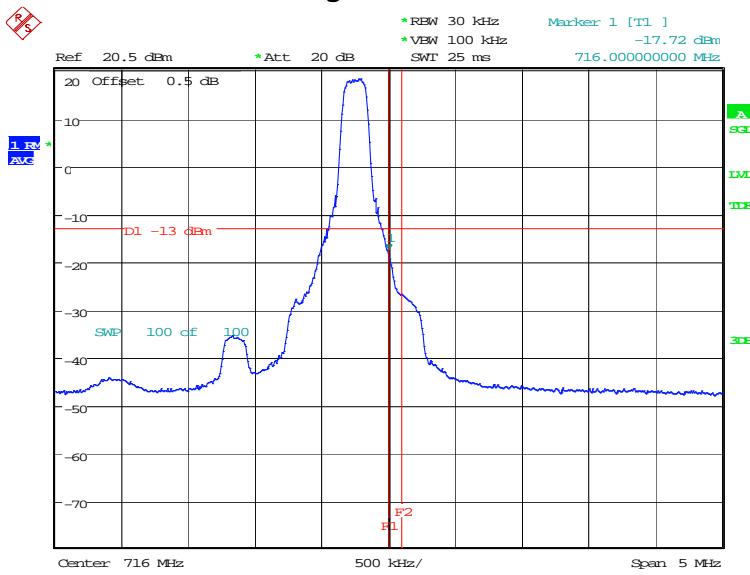
Date: 13.JAN.2020 09:41:10

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


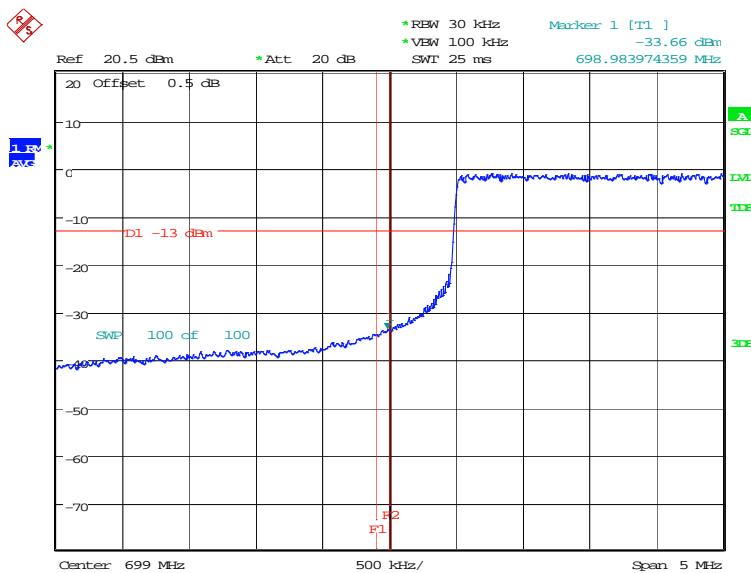
Date: 13.JAN.2020 09:42:48

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


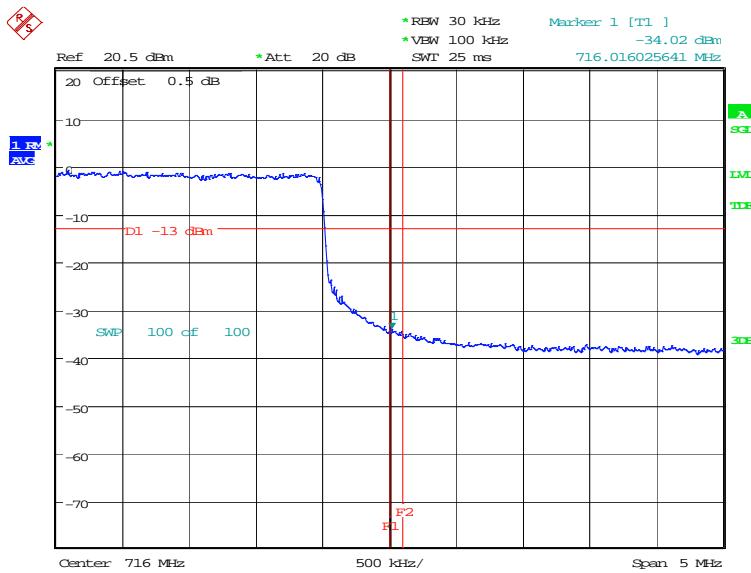
Date: 13.JAN.2020 09:46:44

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


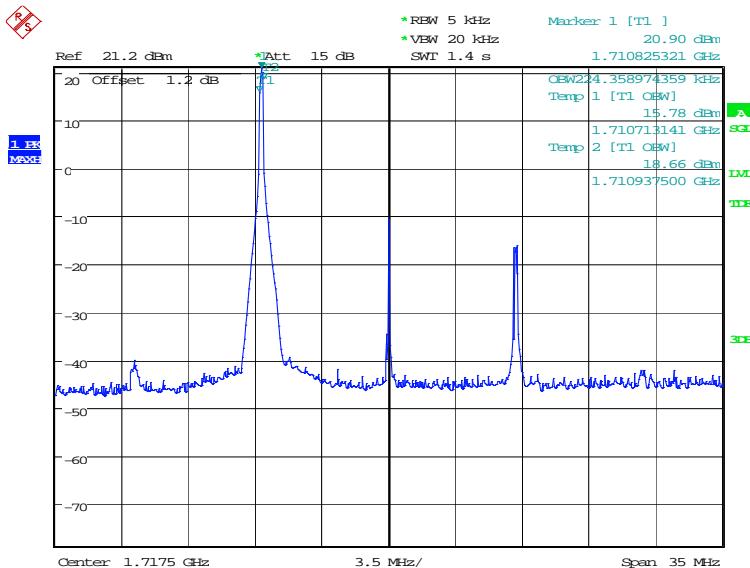
Date: 13.JAN.2020 09:48:23

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


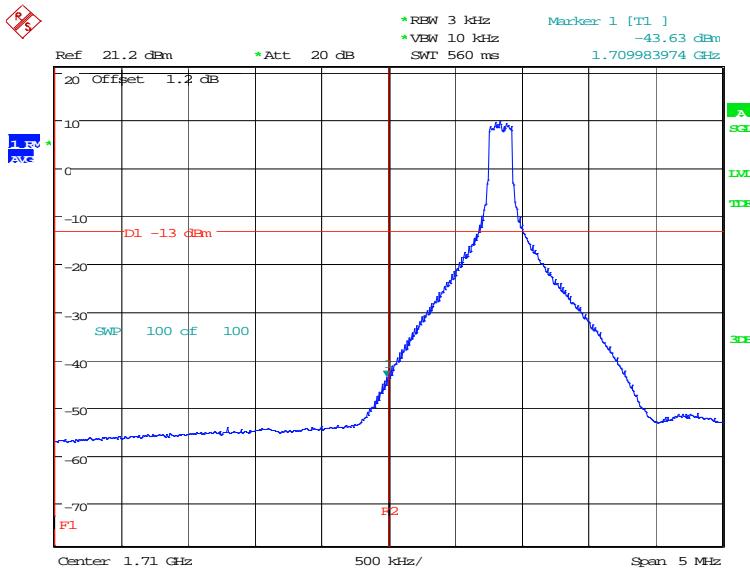
Date: 13.JAN.2020 09:44:45

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


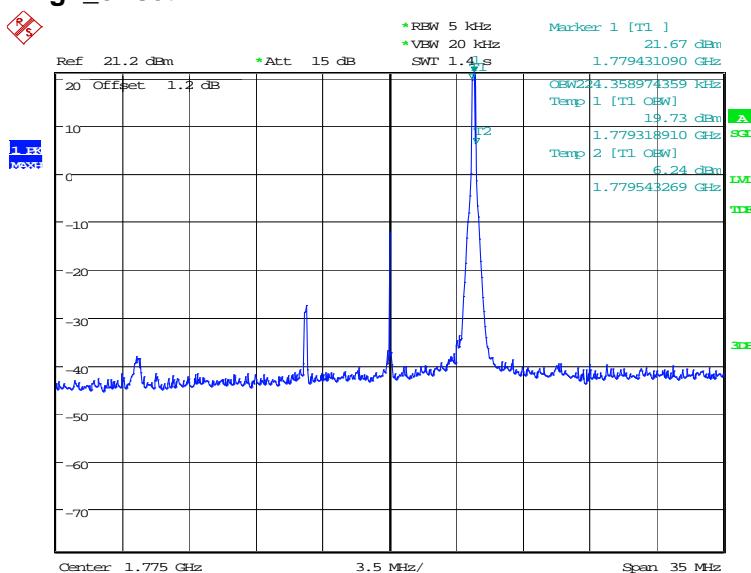
Date: 13.JAN.2020 09:50:17

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


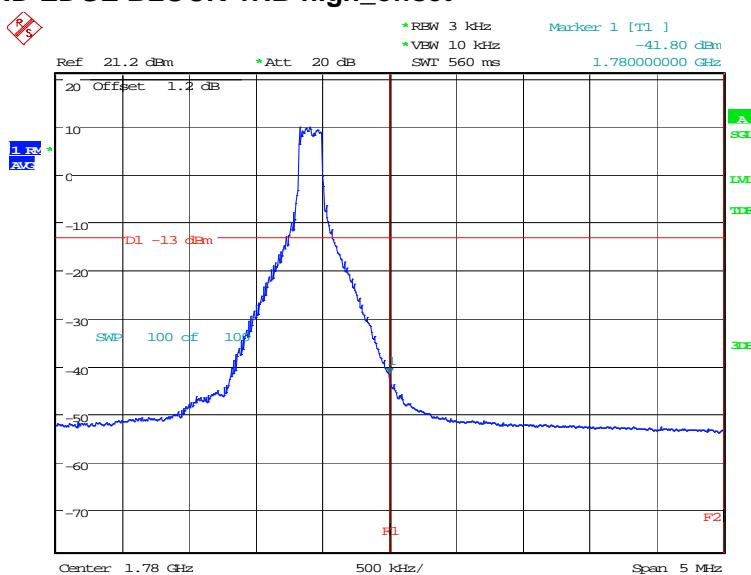
Date: 13.JAN.2020 09:51:40

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


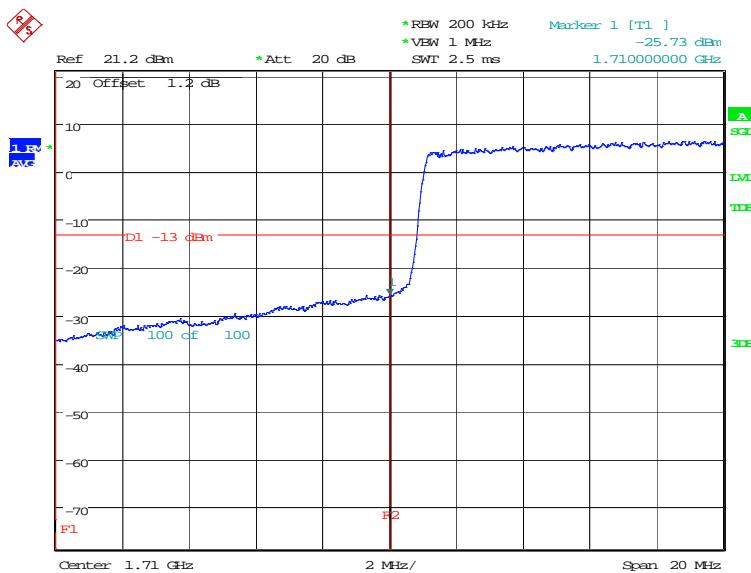
Date: 13.JAN.2020 09:53:19

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


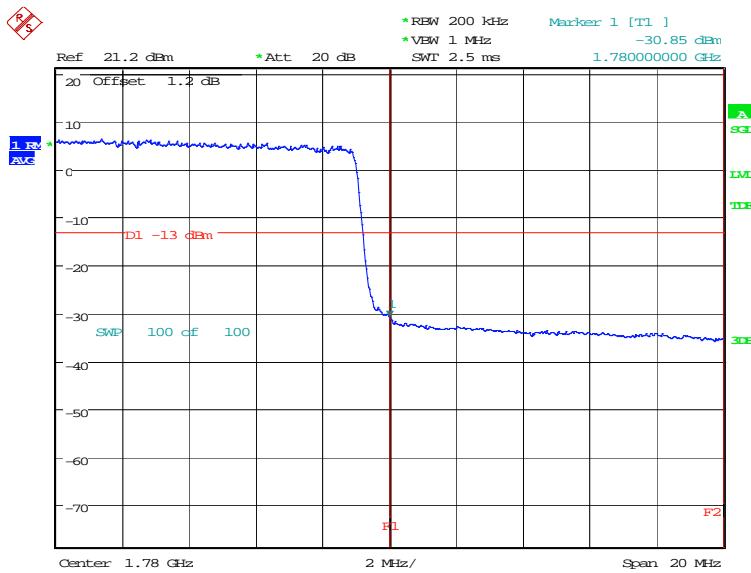
Date: 13.JAN.2020 09:58:01

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


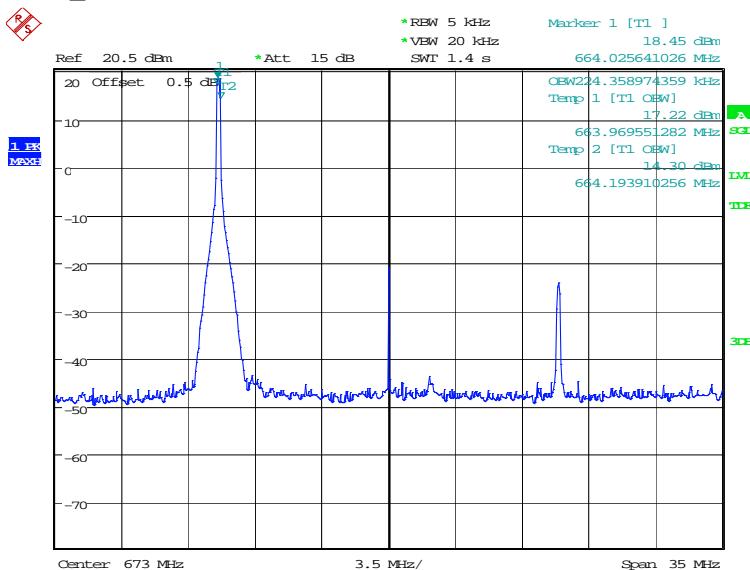
Date: 13.JAN.2020 09:59:39

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


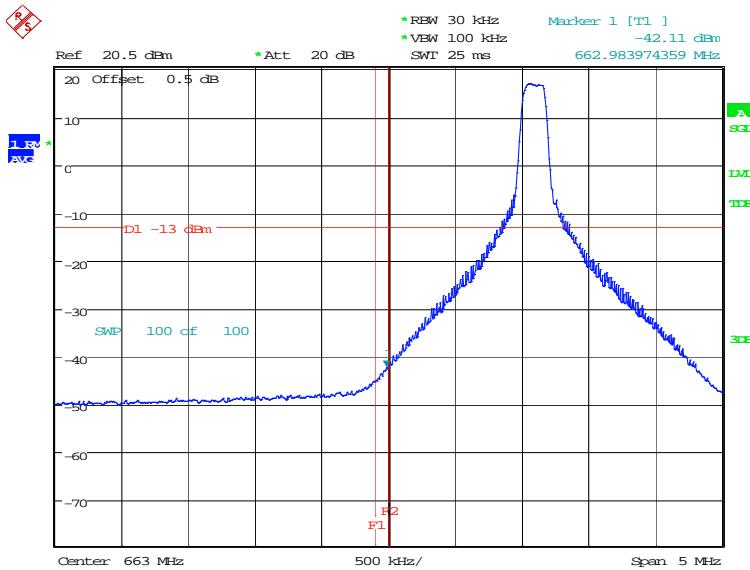
Date: 13.JAN.2020 09:56:02

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


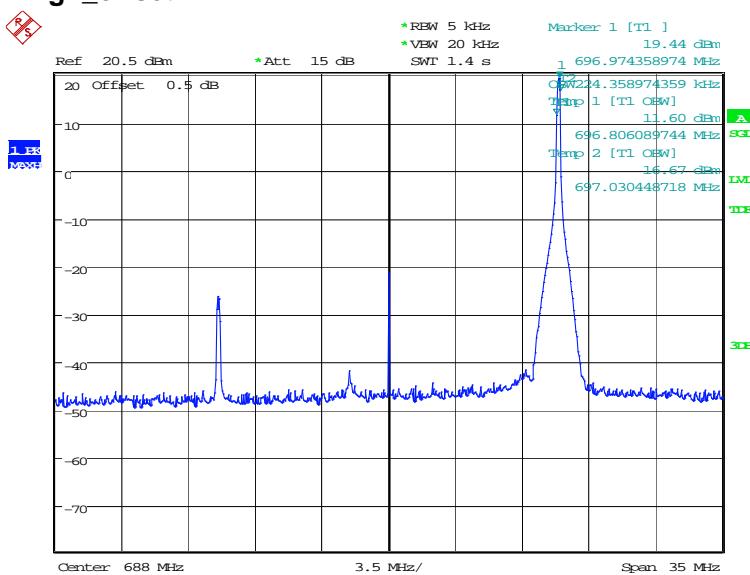
Date: 13.JAN.2020 10:01:34

**LTE band 71**
**OBW: 1RB-low\_offset**


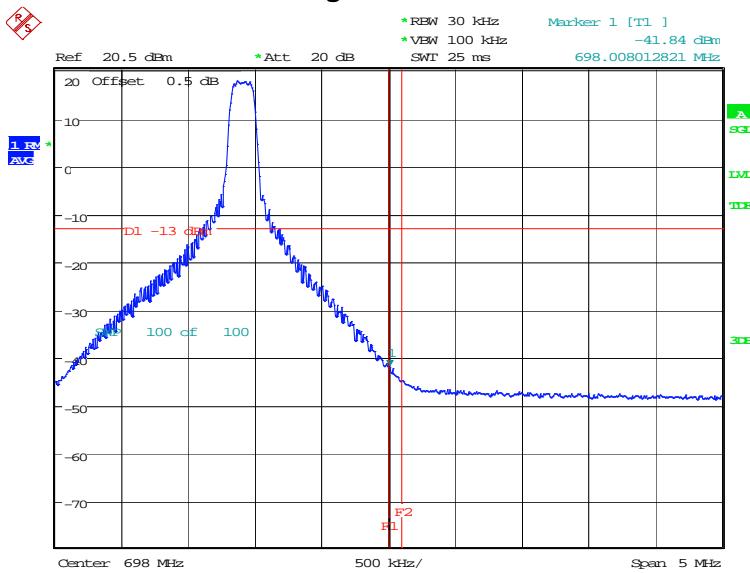
Date: 13.JAN.2020 10:03:33

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


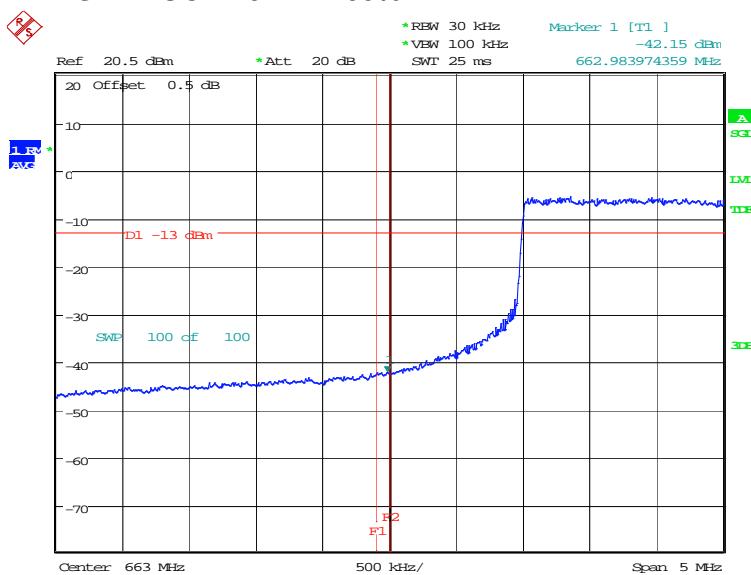
Date: 13.JAN.2020 10:05:12

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


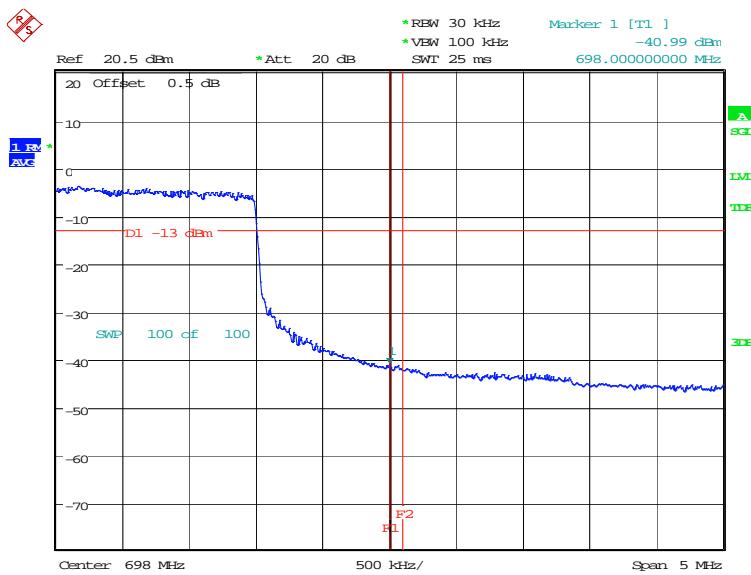
Date: 13.JAN.2020 10:08:24

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


Date: 13.JAN.2020 10:10:03

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


Date: 13.JAN.2020 10:07:04

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


Date: 13.JAN.2020 10:11:56

## **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. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 9 GHz, data taken from 10 MHz to 25 GHz.
2. Determine EUT transmit frequencies below outlines the band edge frequencies pertinent to conducted emissions testing.
3. The number of sweep points of spectrum analyzer is set to 30001 which is greater than 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.

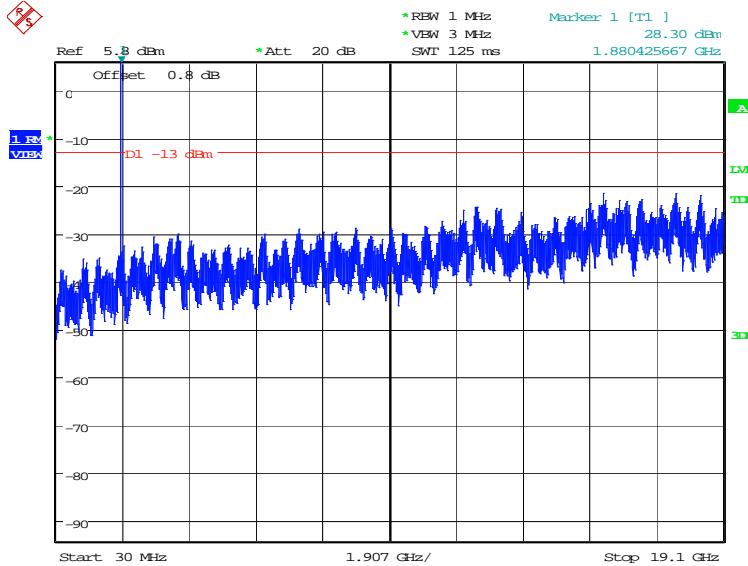
The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13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

Part 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 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.

### A. 7.2 Measurement result

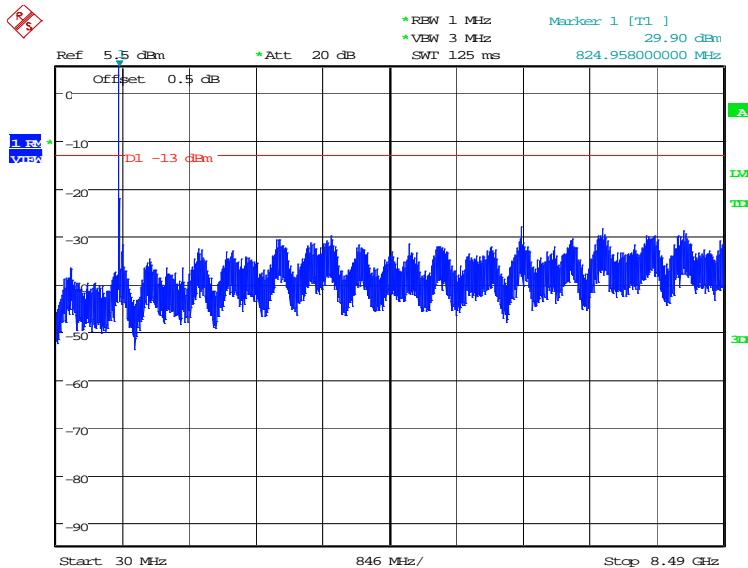
Only the worst case result is given below

#### LTE band 2: 30MHz – 19.1GHz

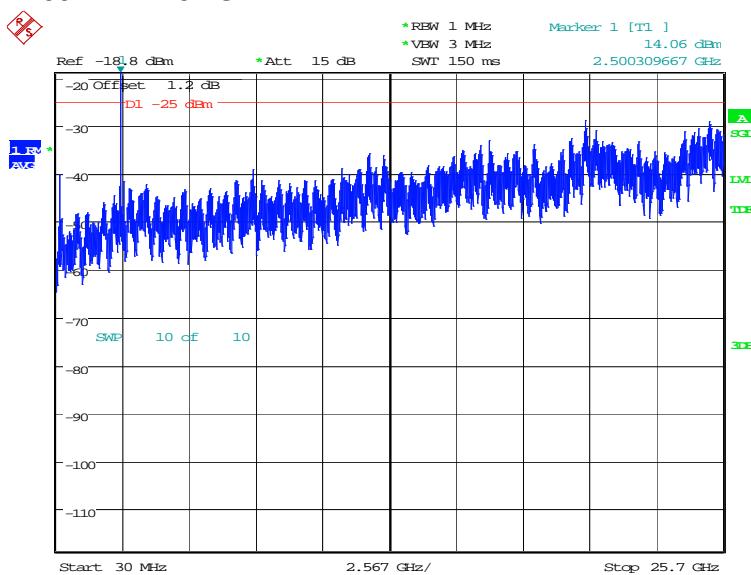


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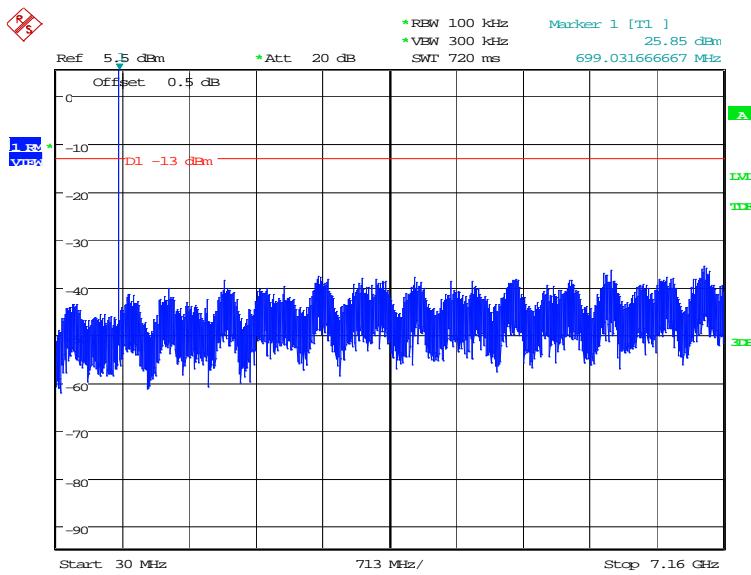
#### LTE band 5: 30MHz – 8.49GHz



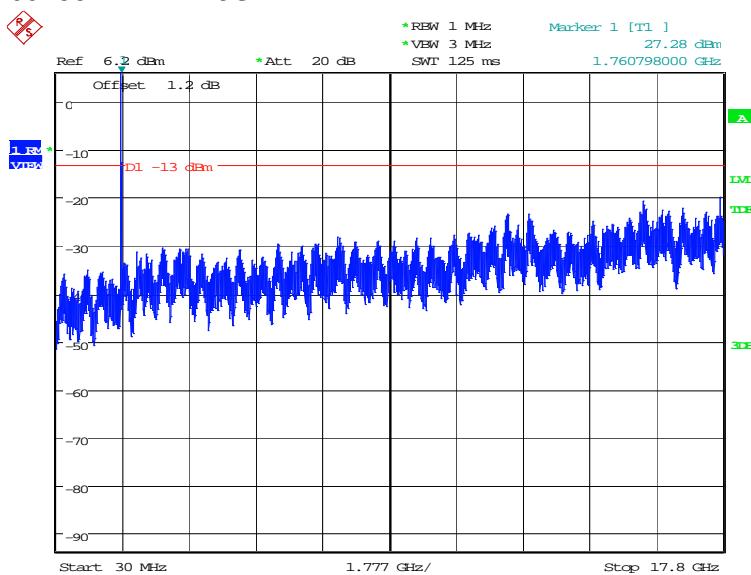
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**LTE band 7: 30MHz – 25.7GHz**


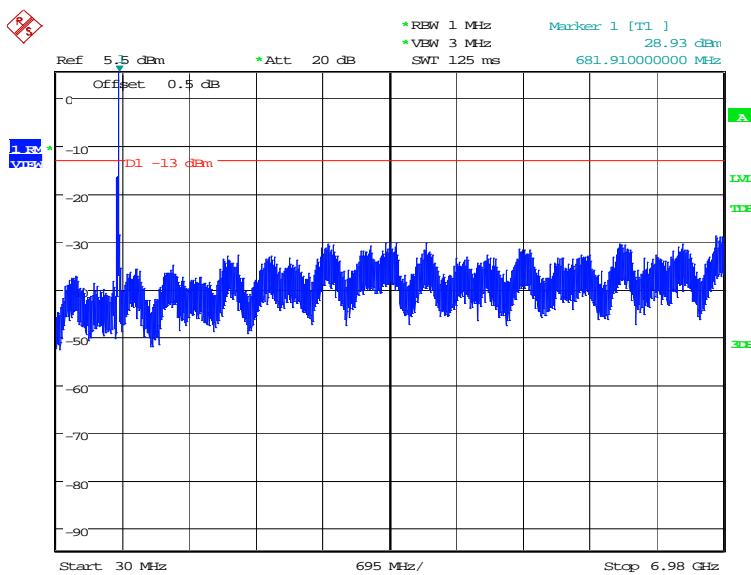
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**LTE band 12: 30MHz – 7.16GHz**


Date: 13.JAN.2020 10:14:11

**LTE band 66: 30MHz – 17.8GHz**


Date: 13.JAN.2020 10:14:42

**LTE band 71: 30MHz – 6.98GHz**


Date: 13.JAN.2020 10:15:47

## A.8 PEAK-TO-AVERAGE POWER RATIO

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

- a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
- b) Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
- c) Set the number of counts to a value that stabilizes the measured CCDF curve;
- d) Set the measurement interval to 1ms;
- e) Record the maximum PAPR level associated with a probability of 0.1%.

### **A.8.1 Measurement limit**

not exceed 13 dB

### **A.8.2 Measurement results**

#### **LTE band 2, 20MHz**

Frequency (MHz)	PAPR (dB)		
	QPSK	16QAM	64QAM
	1880.0	6.70	7.34
	6.70	7.34	7.63

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

Frequency (MHz)	PAPR (dB)		
	QPSK	16QAM	64QAM
	2535.0	6.86	7.40
	6.86	7.40	7.63

#### **LTE band 12, 10MHz**

Frequency (MHz)	PAPR (dB)		
	QPSK	16QAM	64QAM
	707.5	4.90	5.80
	4.90	5.80	6.53

**LTE band 66, 20MHz**

Frequency (MHz)	PAPR (dB)		
1745.0	QPSK	16QAM	64QAM
	6.54	7.28	7.50

**LTE band 71, 20MHz**

Frequency (MHz)	PAPR (dB)		
680.5	QPSK	16QAM	64QAM
	6.51	7.24	7.53

## ANNEX B: Accreditation Certificate

United States Department of Commerce  
National Institute of Standards and Technology



### Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT  
Beijing  
China

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

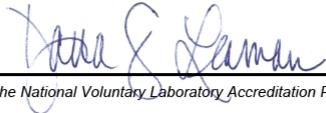
**Electromagnetic Compatibility & Telecommunications**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
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).*

2019-09-26 through 2020-09-30

Effective Dates



For the National Voluntary Laboratory Accreditation Program

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