

LTE Band 66, 1.4MHz QPSK, Channel 131979

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2768.80	-51.85	1.00	10.70	-42.15	-13.00	V
3420.40	-46.85	1.20	11.50	-36.55	-13.00	H
5130.40	-50.65	1.30	12.50	-39.45	-13.00	V
6841.20	-40.55	1.80	12.40	-29.95	-13.00	V
13506.45	-48.95	2.50	12.40	-39.05	-13.00	H
17892.30	-47.45	3.60	12.80	-38.25	-13.00	H

LTE Band 66, 1.4MHz, QPSK, Channel 132322

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
3489.20	-42.15	1.10	11.50	-31.75	-13.00	H
5233.60	-52.35	1.80	12.50	-41.65	-13.00	V
6978.40	-42.45	1.80	12.40	-31.85	-13.00	V
9904.80	-52.55	2.20	11.20	-43.55	-13.00	V
13508.70	-49.05	2.50	12.40	-39.15	-13.00	H
17817.60	-47.45	3.60	12.80	-38.25	-13.00	V

LTE Band 66, 1.4MHz, QPSK, Channel 132665

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
3557.60	-41.85	1.20	12.20	-30.85	-13.00	H
5336.40	-58.35	1.30	12.50	-47.15	-13.00	V
7115.20	-45.65	1.90	12.00	-35.55	-13.00	V
9965.20	-52.05	2.20	11.20	-43.05	-13.00	V
13380.00	-50.95	2.30	13.30	-39.95	-13.00	V
17811.30	-47.55	3.60	12.80	-38.35	-13.00	V

LTE Band 66, 1.4MHz, 16QAM, Channel 131979

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
3420.40	-47.45	1.20	11.50	-37.15	-13.00	H
5130.40	-50.65	1.30	12.50	-39.45	-13.00	V
6841.60	-42.25	1.80	12.40	-31.65	-13.00	V
9963.20	-51.95	2.20	11.20	-42.95	-13.00	V
13441.20	-50.65	2.50	13.30	-39.85	-13.00	V
17823.30	-46.75	3.60	12.80	-37.55	-13.00	V

LTE Band 66, 1.4MHz, 16QAM, Channel 132322

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2987.20	-50.55	1.00	10.70	-40.85	-13.00	H
3488.80	-41.85	1.10	11.50	-31.45	-13.00	H
5233.60	-52.45	1.80	12.50	-41.75	-13.00	V
6978.80	-44.45	1.80	12.40	-33.85	-13.00	V
9920.40	-51.25	2.20	11.20	-42.25	-13.00	V
17787.90	-46.85	3.60	12.80	-37.65	-13.00	V

LTE Band 66, 1.4MHz, 16QAM, Channel 132665

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
3557.60	-42.35	1.20	12.20	-31.35	-13.00	H
5336.40	-57.75	1.30	12.50	-46.55	-13.00	V
7115.20	-45.65	1.90	12.00	-35.55	-13.00	V
9968.80	-51.95	2.20	11.20	-42.95	-13.00	V
13505.55	-48.85	2.50	12.40	-38.95	-13.00	V
17823.60	-46.95	3.60	12.80	-37.75	-13.00	V

Note: The maximum value of expanded measurement uncertainty for this test item is $U = 2.90\text{dB}(30\text{MHz}-3\text{GHz})/3.50\text{dB}(3\text{GHz}-18\text{GHz})/3.90\text{dB}(18\text{GHz}-40\text{GHz})$, $k = 2$

A.3 FREQUENCY STABILITY

Reference

FCC: CFR Part 2.1055, 22.355, 24.235, 27.54, 90.213.

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.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at 0°C.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel, 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 0°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 centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 °C increments from +50°C to 0°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.

A.3.2 Measurement Limit

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. 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 3.5VDC and 4.4VDC, with a nominal voltage of 3.8VDC. 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. These voltages represent a tolerance from -5.4% to 10.8%. For the purposes of measuring frequency stability these voltage limits are to be used.

A.3.3 Measurement results

LTE Band 2, 1.4MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.5	23	11	0.012	0.006
3.8	15	7	0.008	0.004
4.4	11	15	0.006	0.008

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
0	21	13	0.011	0.007
10	18	21	0.010	0.011
20	9	8	0.005	0.004
30	23	16	0.012	0.009
40	6	22	0.003	0.012
50	11	18	0.006	0.010

Expanded measurement uncertainty is 10 Hz, $k = 2$

LTE Band 5, 1.4MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.5	9	32	0.011	0.038
3.8	11	15	0.013	0.018
4.4	16	18	0.019	0.022

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
0	14	7	0.017	0.008
10	16	18	0.019	0.022
20	35	14	0.042	0.017
30	28	17	0.033	0.020
40	19	15	0.023	0.018
50	26	8	0.031	0.010

Expanded measurement uncertainty is 10Hz, $k = 2$

LTE Band 12, 1.4MHz bandwidth (worst case of all bandwidths)
Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.5	9	12	0.013	0.017
3.8	6	17	0.008	0.024
4.4	11	4	0.016	0.006

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
0	8	13	0.011	0.018
10	2	19	0.003	0.027
20	14	5	0.020	0.007
30	6	16	0.008	0.023
40	3	11	0.004	0.016
50	18	3	0.025	0.004

Expanded measurement uncertainty is 10Hz, k = 2

LTE Band 14, 5MHz bandwidth (worst case of all bandwidths)
Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.5	18	22	0.023	0.028
3.85	14	15	0.018	0.019
4.4	15	26	0.019	0.033

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
0	9	16	0.011	0.020
10	14	3	0.018	0.004
20	21	30	0.026	0.038
30	17	14	0.021	0.018
40	14	12	0.018	0.015
50	8	8	0.010	0.010

Expanded measurement uncertainty is 10Hz, k = 2

LTE Band 30, 5MHz bandwidth (worst case of all bandwidths)
Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.5	19	16	0.008	0.007
3.85	5	25	0.002	0.011
4.4	17	17	0.007	0.007

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
0	12	7	0.005	0.003
10	17	15	0.007	0.006
20	22	41	0.010	0.018
30	13	15	0.006	0.006
40	15	8	0.006	0.003
50	27	6	0.012	0.003

Expanded measurement uncertainty is 10 Hz, $k = 2$
LTE Band 66, 1.4MHz bandwidth (worst case of all bandwidths)
Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.5	23	33	0.013	0.019
3.85	35	26	0.020	0.015
4.4	26	38	0.015	0.022

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
0	26	19	0.015	0.011
10	13	9	0.007	0.005
20	26	22	0.015	0.013
30	38	16	0.022	0.009
40	41	28	0.023	0.016
50	42	19	0.024	0.011

Expanded measurement uncertainty is 10Hz, $k = 2$

A.4 OCCUPIED BANDWIDTH

Reference

FCC: CFR Part 2.1049, 22.917, 24.238, 27.53, 90.1215.

A.4.1 Occupied Bandwidth Results

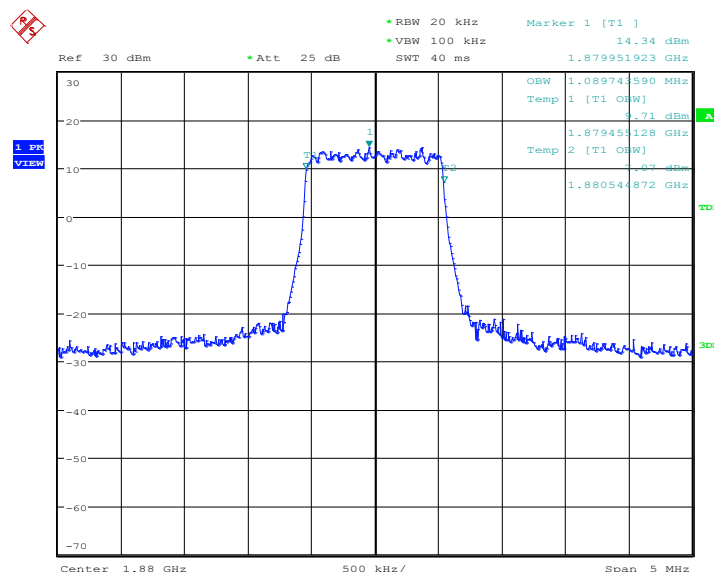
Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the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

- The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
- Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- Set the detection mode to peak, and the trace mode to max hold.
- Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

LTE band 2, 1.4MHz (99% BW)

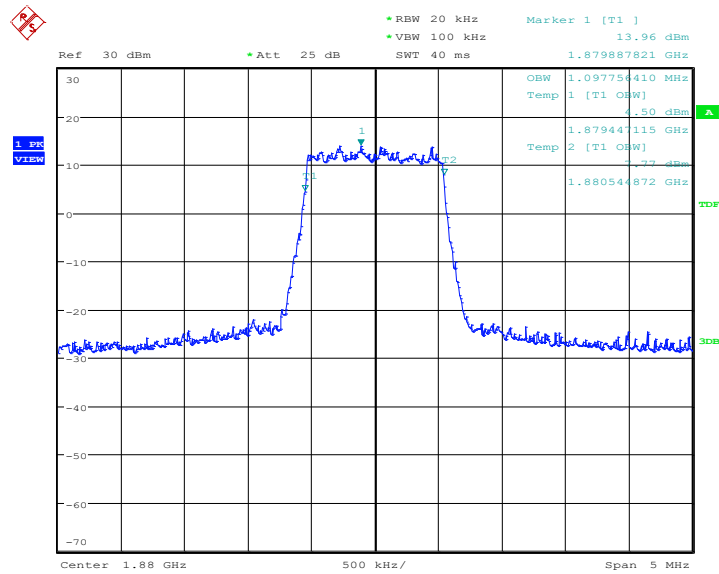
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
1880.0	QPSK	16QAM
	1089.74	1097.76

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



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

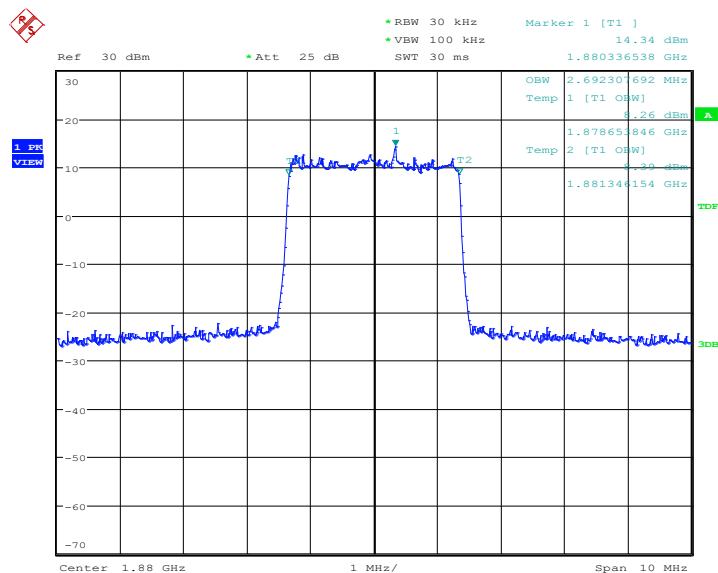


Date: 12.MAY.2020 07:47:35

LTE band 2, 3MHz (99% BW)

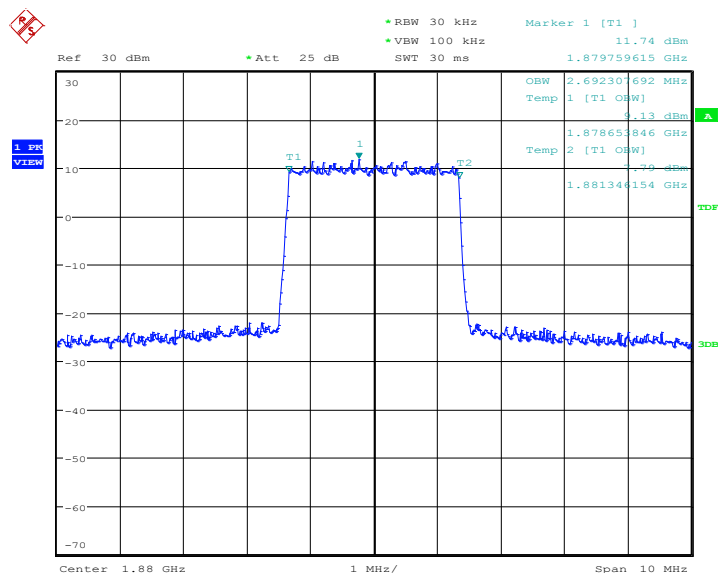
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
1880.0	QPSK	16QAM
	2692.31	2692.31

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



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

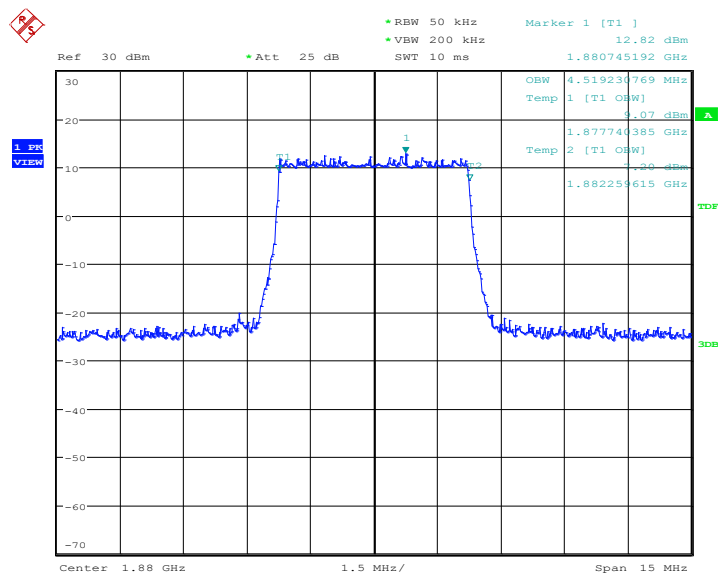


Date: 12.MAY.2020 07:53:02

LTE band 2, 5MHz (99% BW)

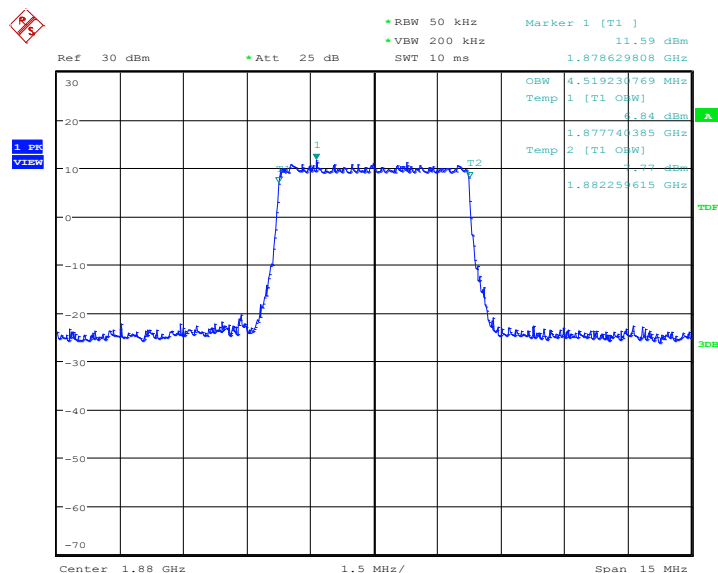
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
1880.0	QPSK	16QAM
	4519.23	4519.23

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



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

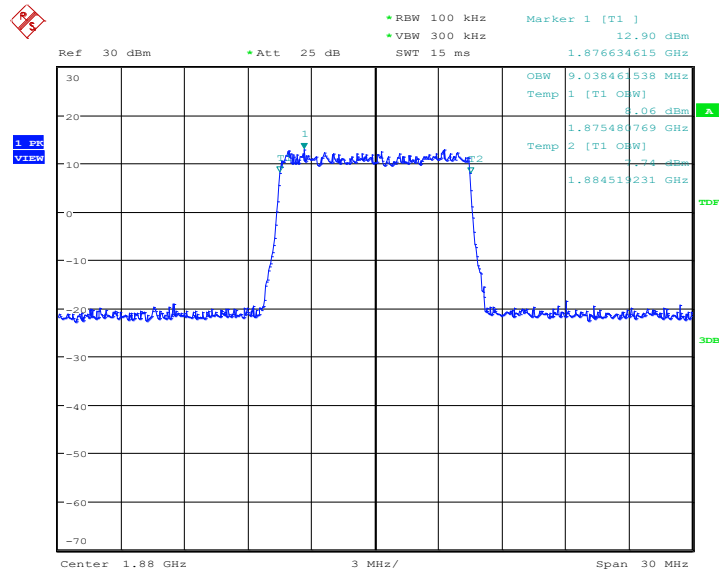


Date: 12.MAY.2020 07:58:27

LTE band 2, 10MHz (99% BW)

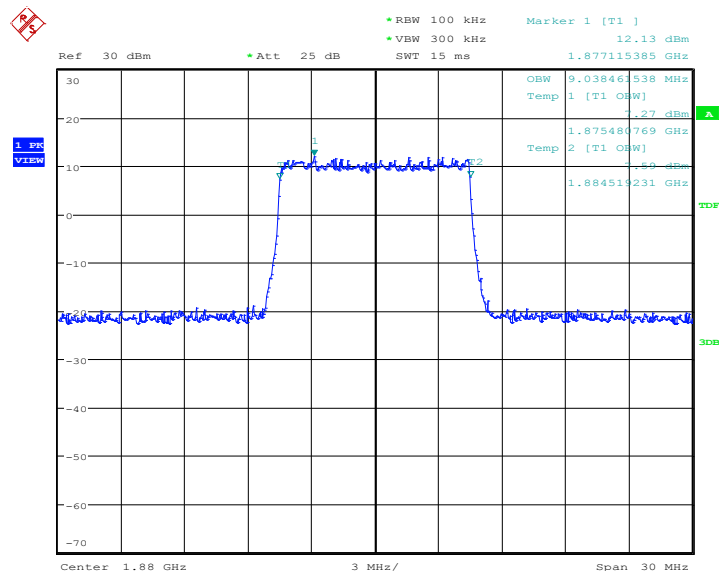
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
1880.0	QPSK	16QAM
	9038.46	9038.46

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



Date: 12.MAY.2020 08:03:38

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

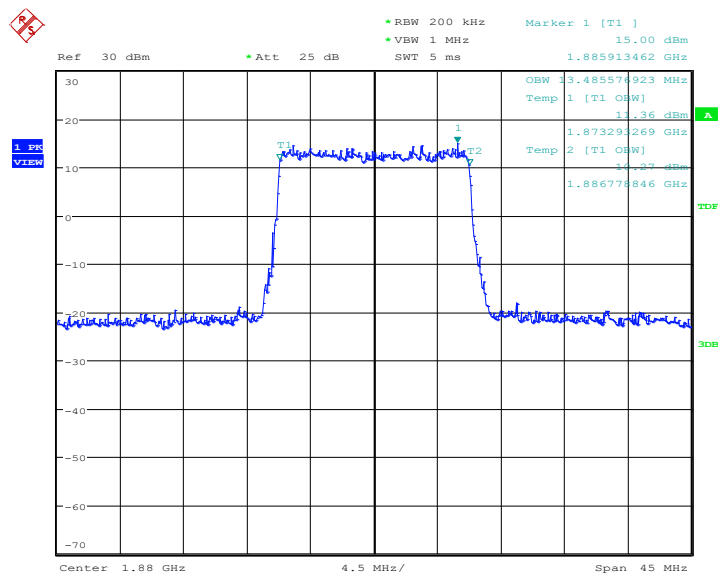


Date: 12.MAY.2020 08:03:52

LTE band 2, 15MHz (99% BW)

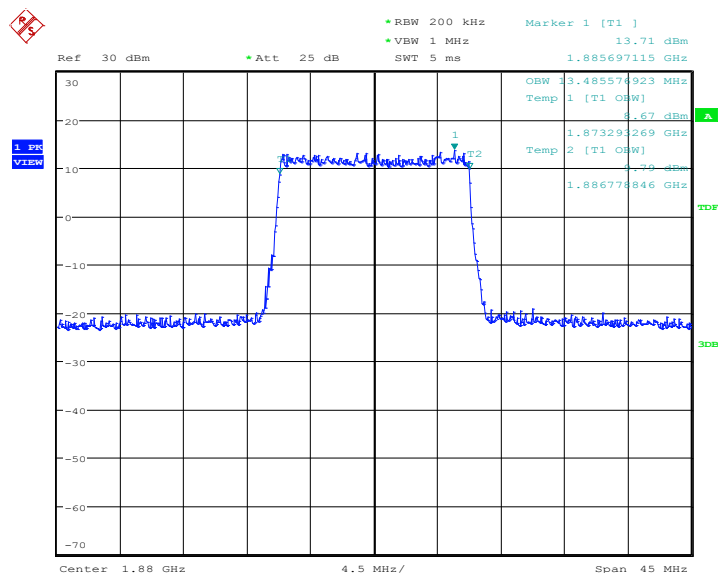
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
1880.0	QPSK	16QAM
	13485.58	13485.58

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



Date: 12.MAY.2020 08:09:04

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

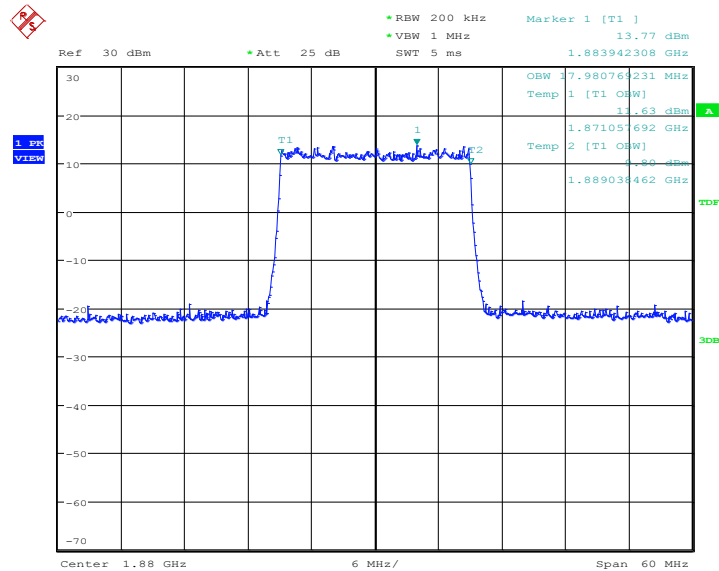


Date: 12.MAY.2020 08:09:18

LTE band 2, 20MHz (99% BW)

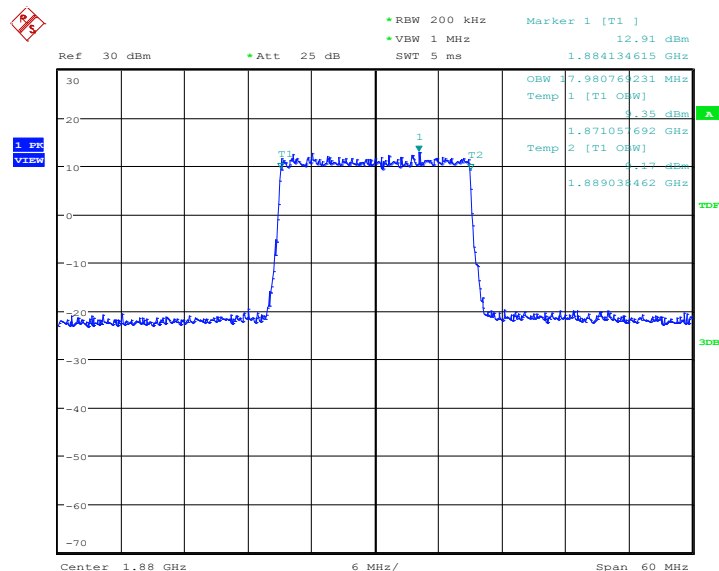
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
1880.0	QPSK	16QAM
	17980.77	17980.77

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



Date: 12.MAY.2020 08:14:30

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

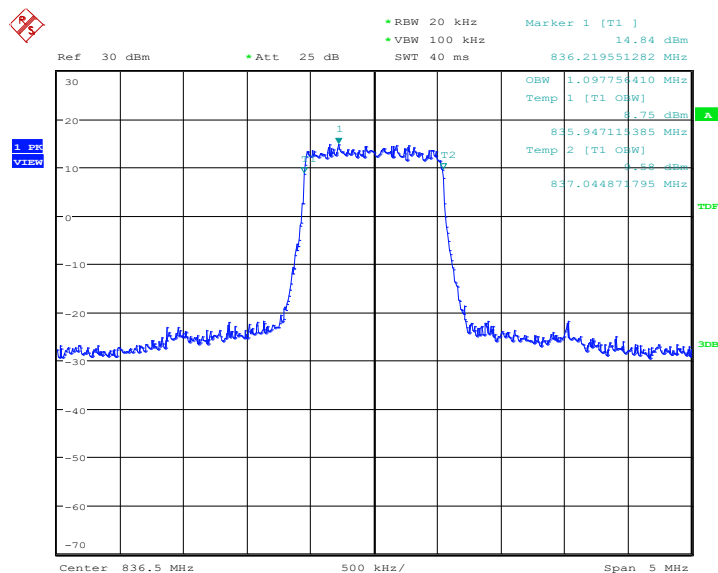


Date: 12.MAY.2020 08:14:44

LTE band 5, 1.4MHz (99% BW)

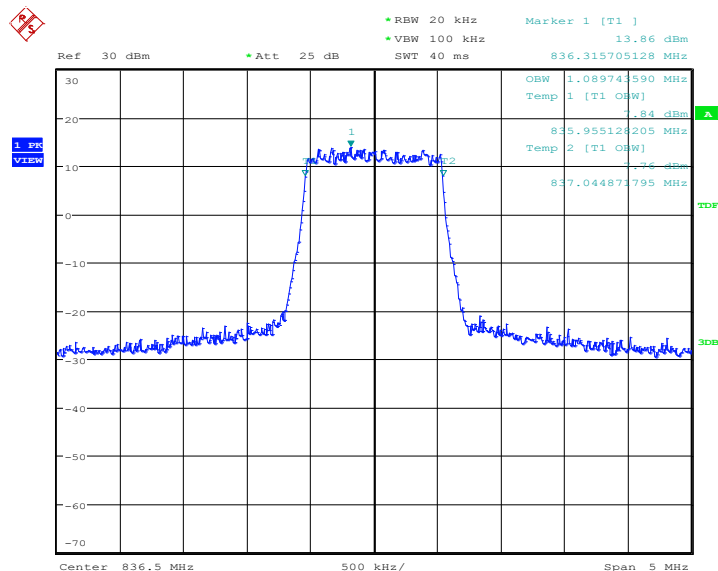
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
836.5	QPSK	16QAM
	1097.76	1089.74

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



Date: 12.MAY.2020 08:57:44

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

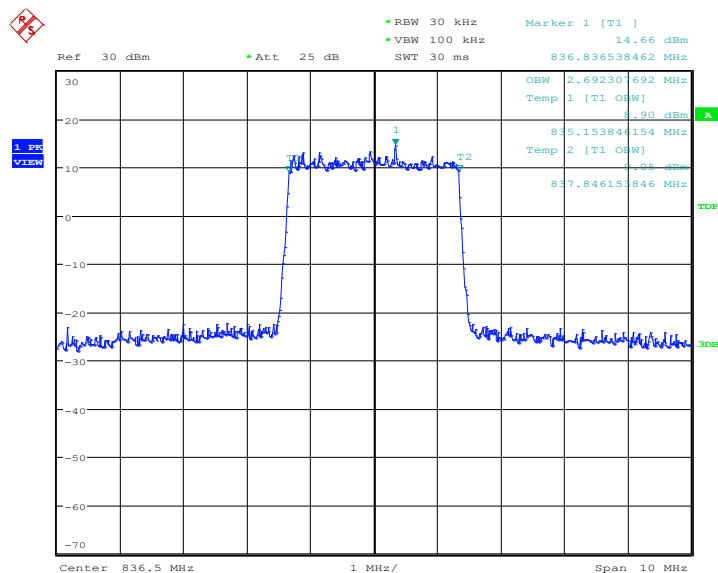


Date: 12.MAY.2020 08:57:57

LTE band 5, 3MHz (99% BW)

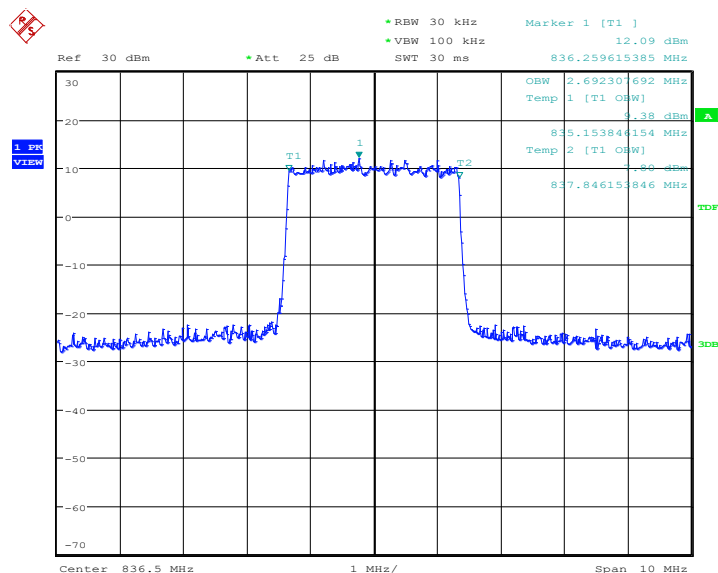
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
836.5	QPSK	16QAM
	2692.31	2692.31

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



Date: 12.MAY.2020 09:03:09

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

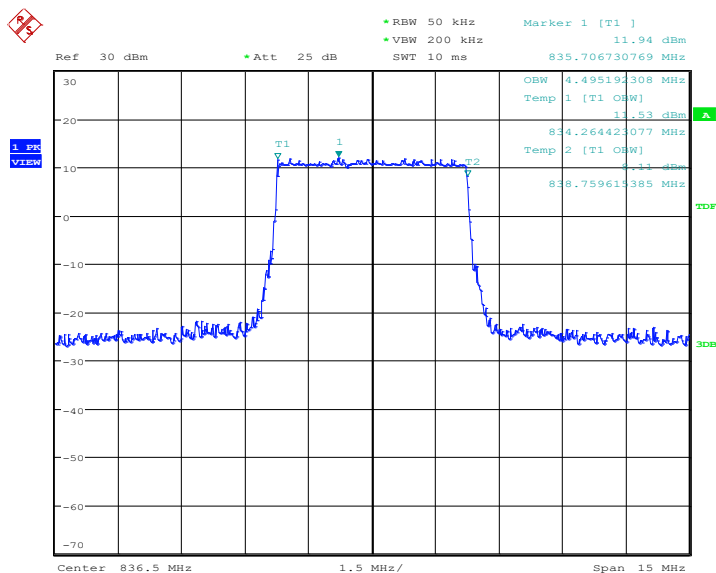


Date: 12.MAY.2020 09:03:22

LTE band 5, 5MHz (99% BW)

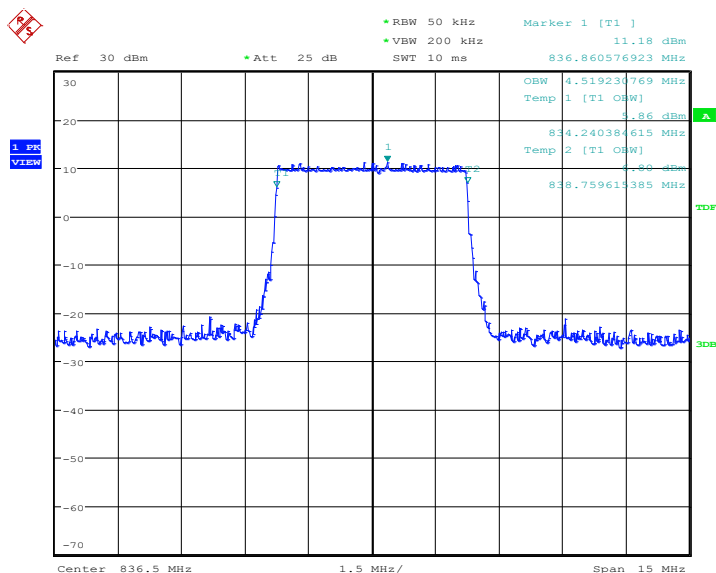
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
836.5	QPSK	16QAM
	4495.19	4519.23

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



Date: 12.MAY.2020 09:08:34

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

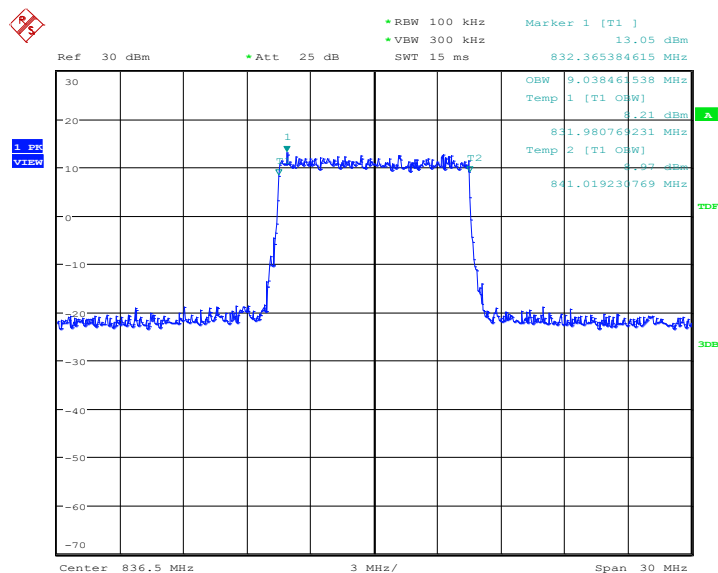


Date: 12.MAY.2020 09:08:47

LTE band 5, 10MHz (99% BW)

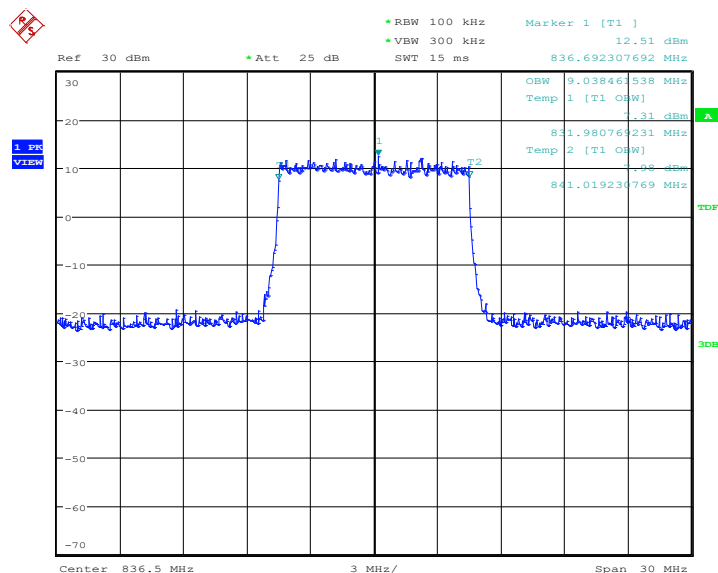
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
836.5	QPSK	16QAM
	9038.46	9038.46

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



Date: 12.MAY.2020 09:13:59

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

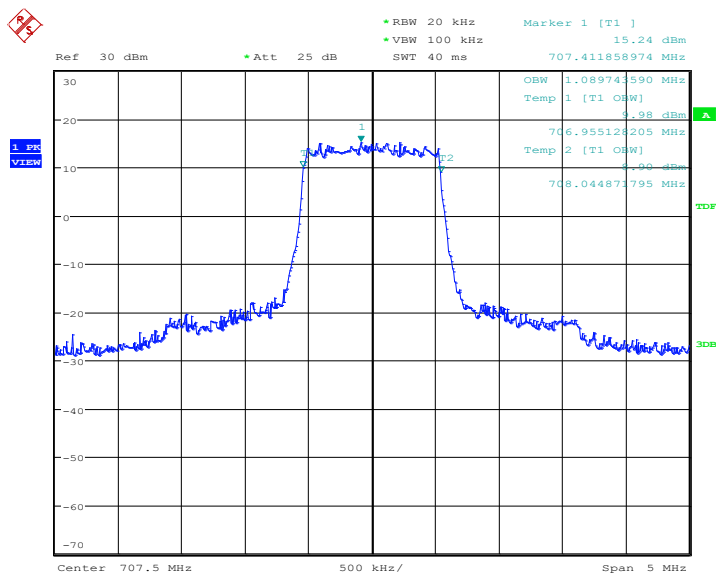


Date: 12.MAY.2020 09:14:12

LTE band 12, 1.4MHz (99% BW)

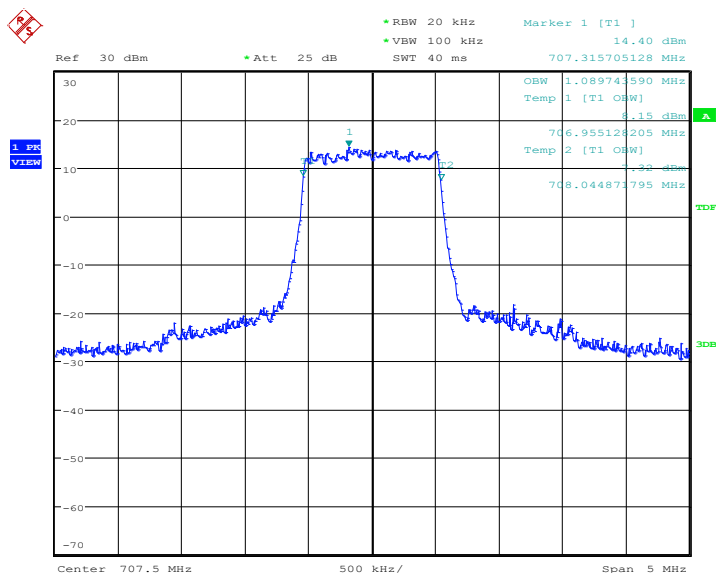
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
707.5	QPSK	16QAM
	1089.74	1089.74

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



Date: 18.MAY.2020 14:18:05

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

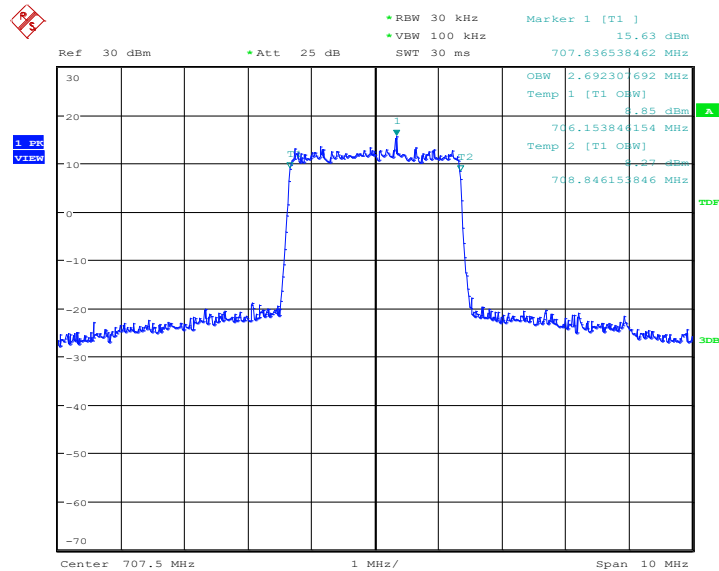


Date: 18.MAY.2020 14:18:19

LTE band 12, 3MHz (99% BW)

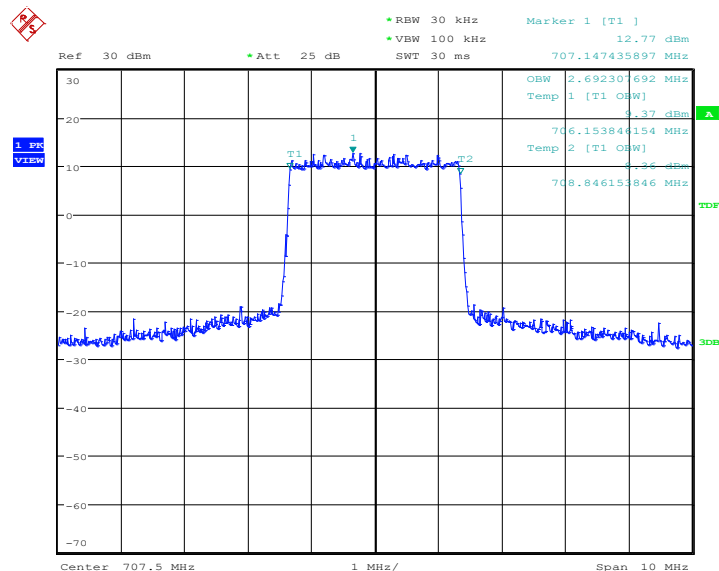
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
707.5	QPSK	16QAM
	2692.31	2692.31

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



Date: 18.MAY.2020 14:23:31

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

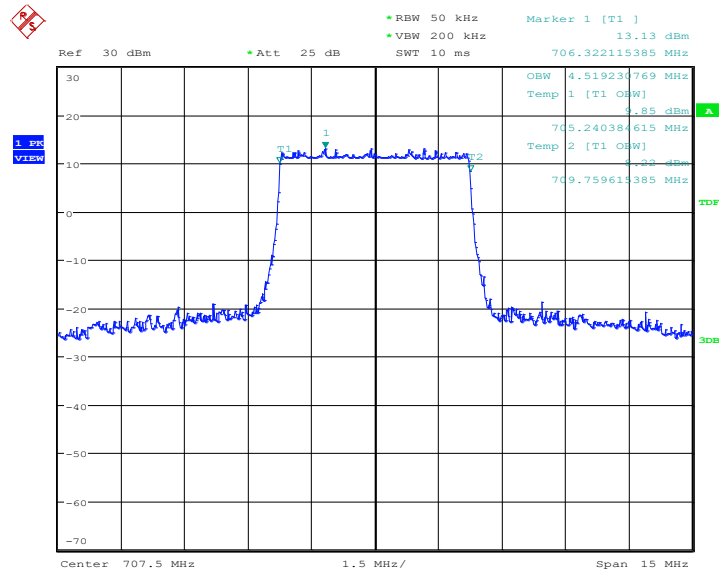


Date: 18.MAY.2020 14:23:45

LTE band 12, 5MHz (99% BW)

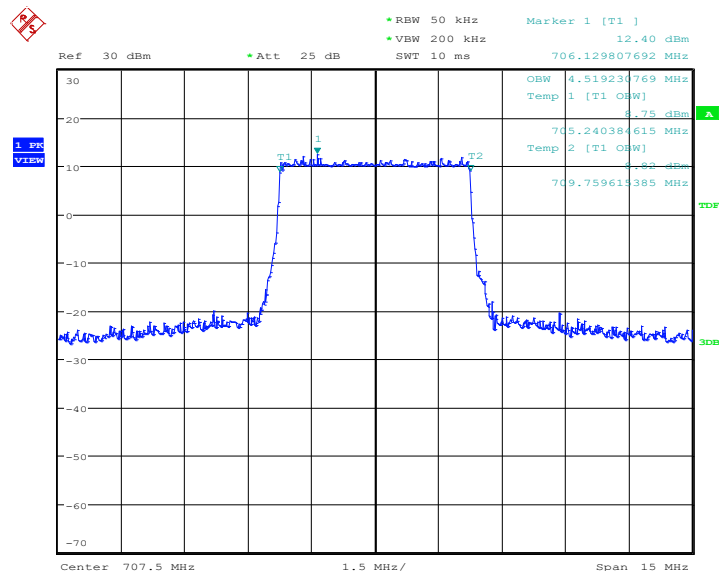
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
707.5	QPSK	16QAM
	4519.23	4519.23

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



Date: 18.MAY.2020 14:28:58

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

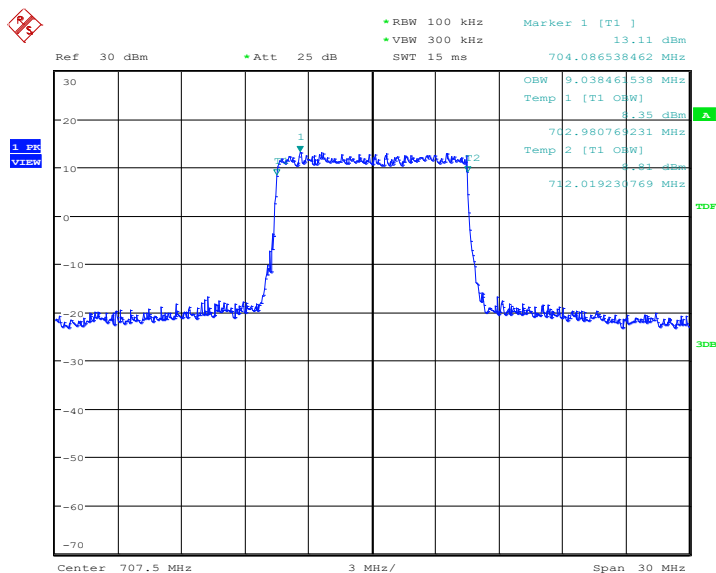


Date: 18.MAY.2020 14:29:12

LTE band 12, 10MHz (99% BW)

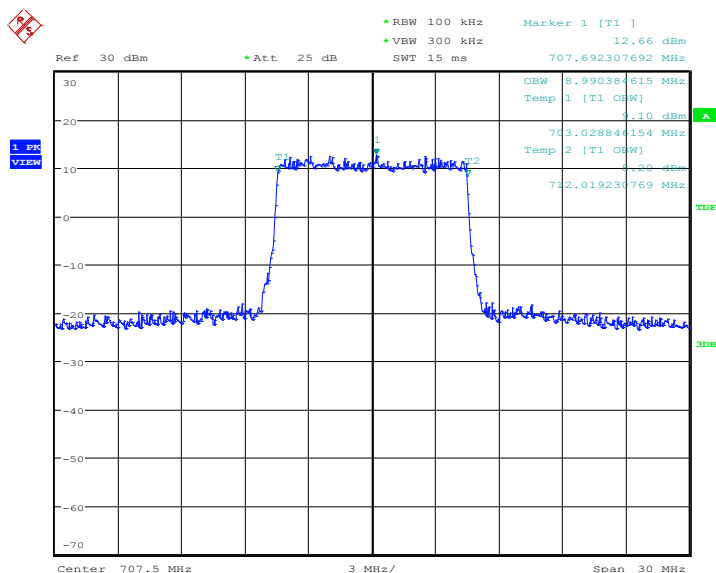
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
707.5	QPSK	16QAM
	9038.46	8990.38

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



Date: 18.MAY.2020 14:34:23

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

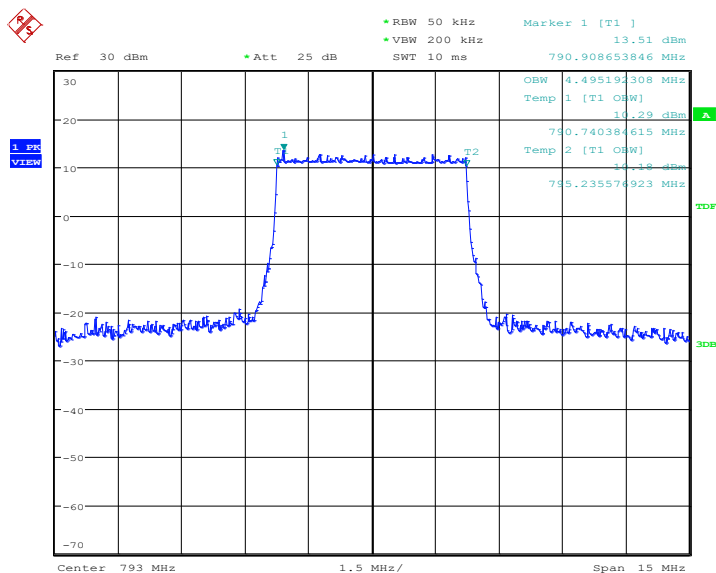


Date: 18.MAY.2020 14:34:37

LTE band 14, 5MHz (99% BW)

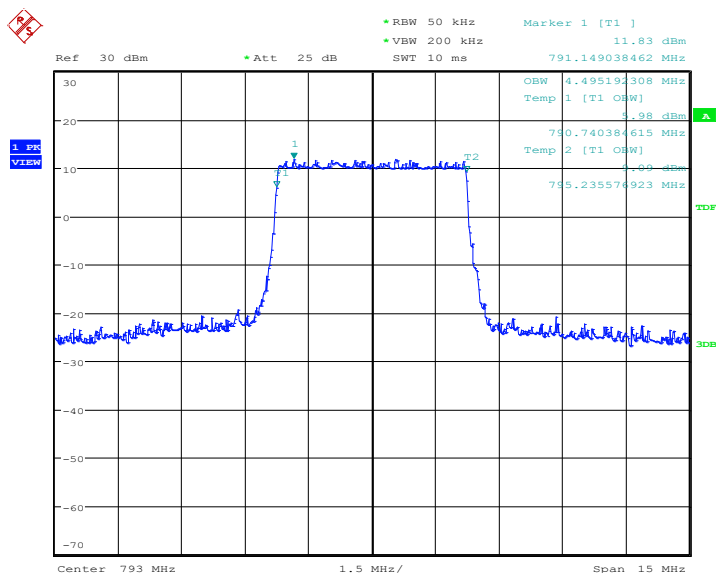
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
793.0	QPSK	16QAM
	4495.19	4495.19

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



Date: 18.MAY.2020 14:43:54

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

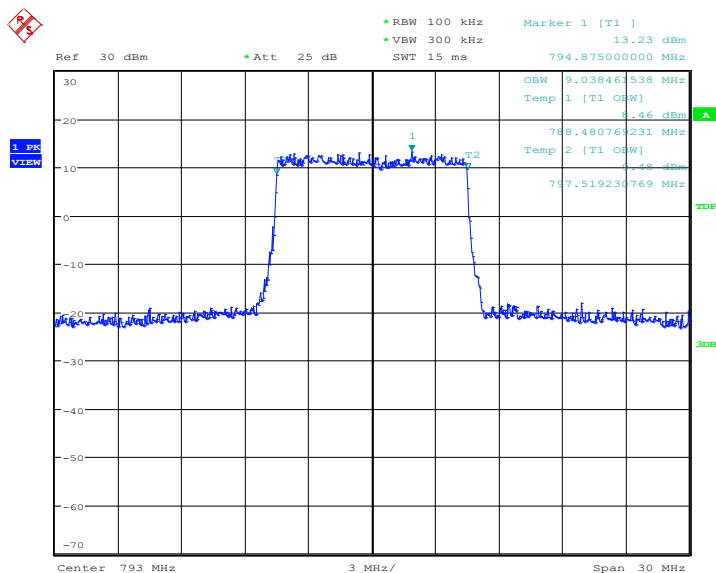


Date: 18.MAY.2020 14:44:08

LTE band 14, 10MHz (99% BW)

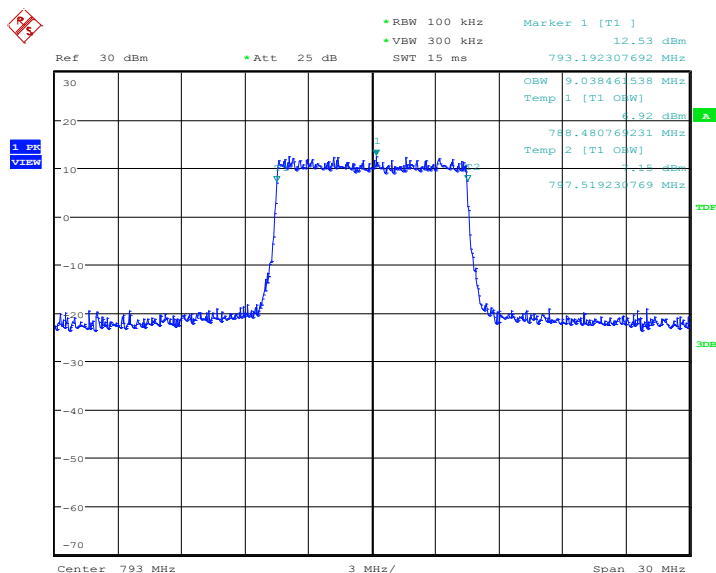
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
793.0	QPSK	16QAM
	9038.46	9038.46

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



Date: 18.MAY.2020 14:49:22

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

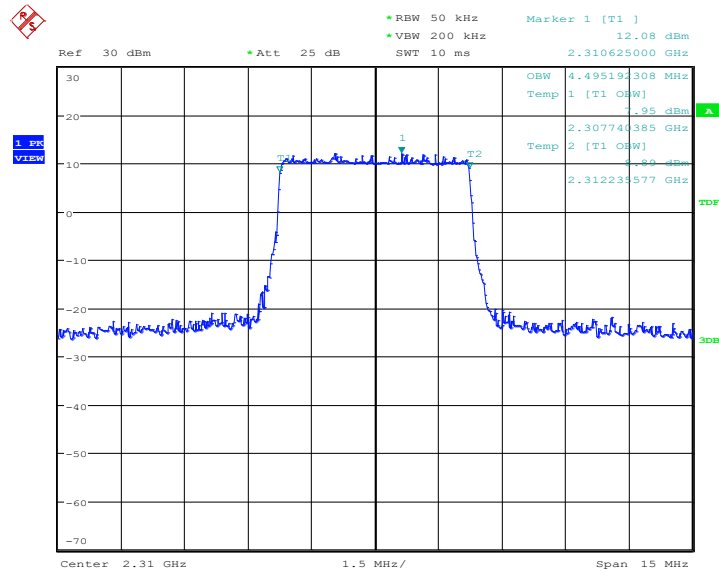


Date: 18.MAY.2020 14:49:35

LTE band 30, 5MHz (99% BW)

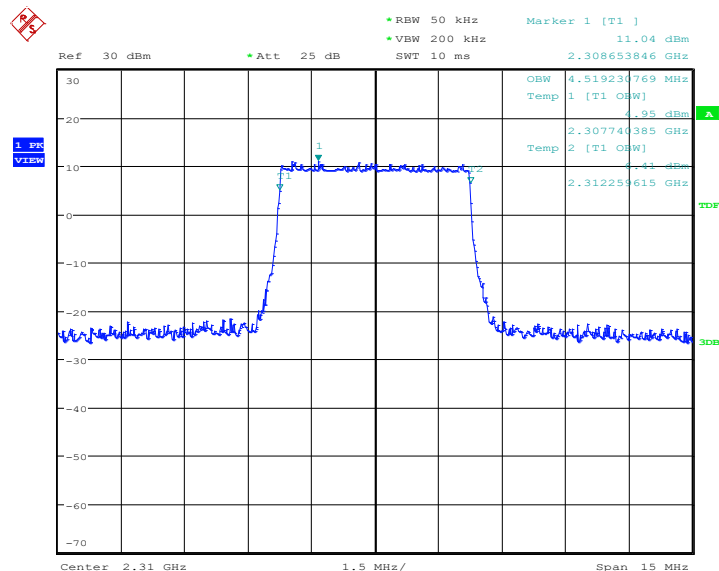
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
2310.0	QPSK	16QAM
	4495.19	4519.23

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



Date: 18.MAY.2020 14:54:53

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

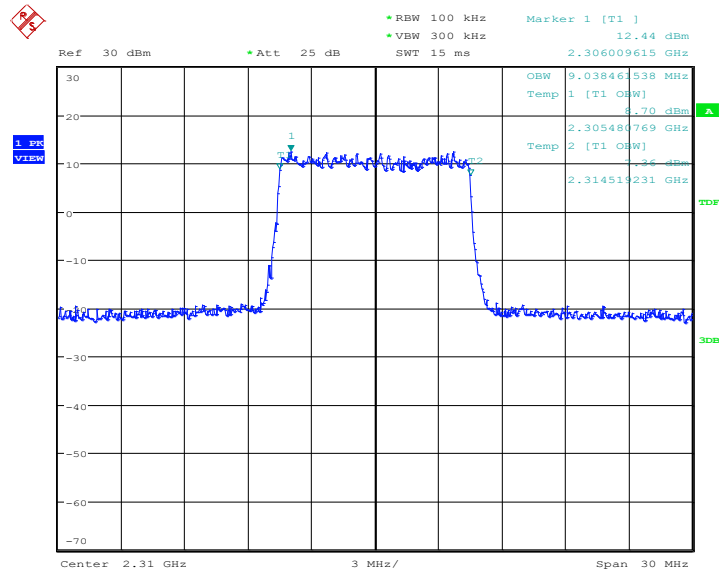


Date: 18.MAY.2020 14:55:07

LTE band 30, 10MHz (99% BW)

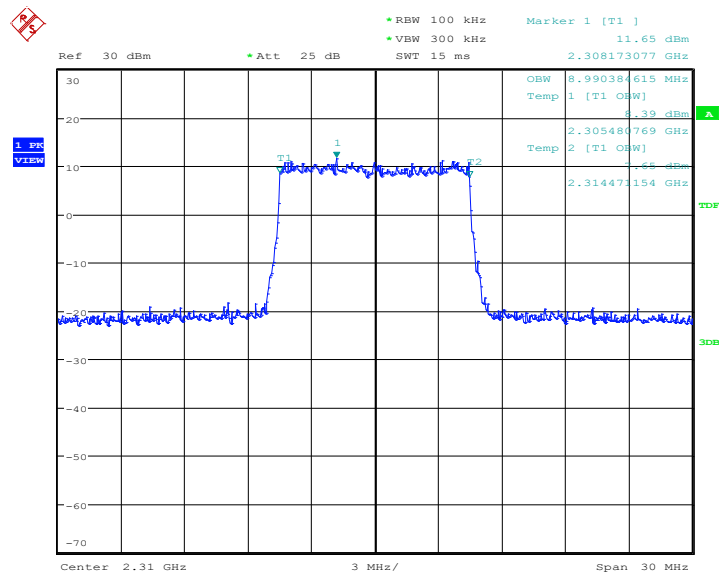
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
2310.0	QPSK	16QAM
	9038.46	8990.38

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



Date: 18.MAY.2020 15:00:09

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

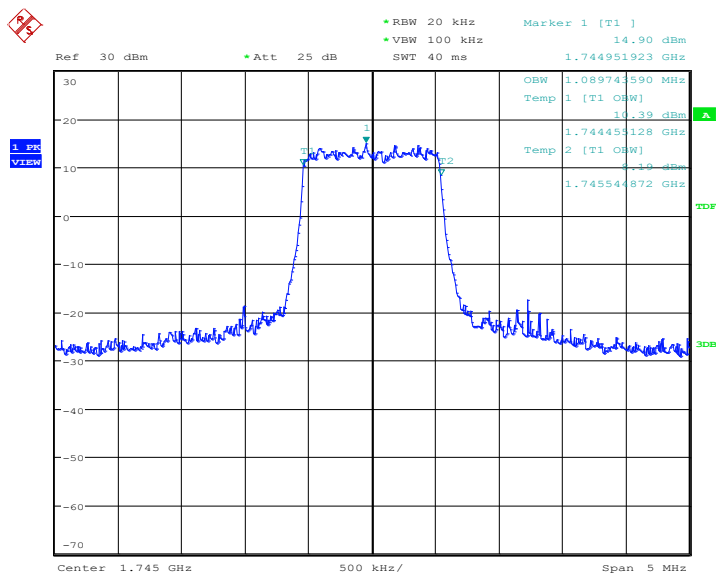


Date: 18.MAY.2020 15:00:22

LTE band 66, 1.4MHz (99% BW)

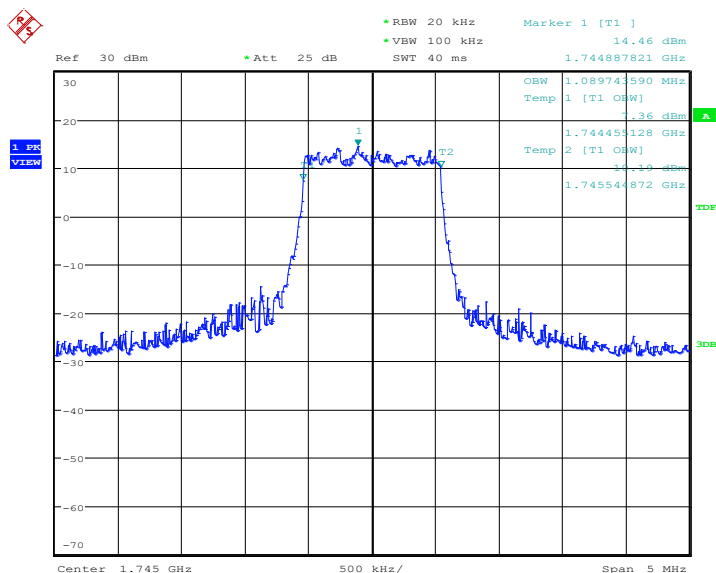
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
1745.0	QPSK	16QAM
	1089.74	1089.74

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



Date: 19.MAY.2020 11:56:16

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

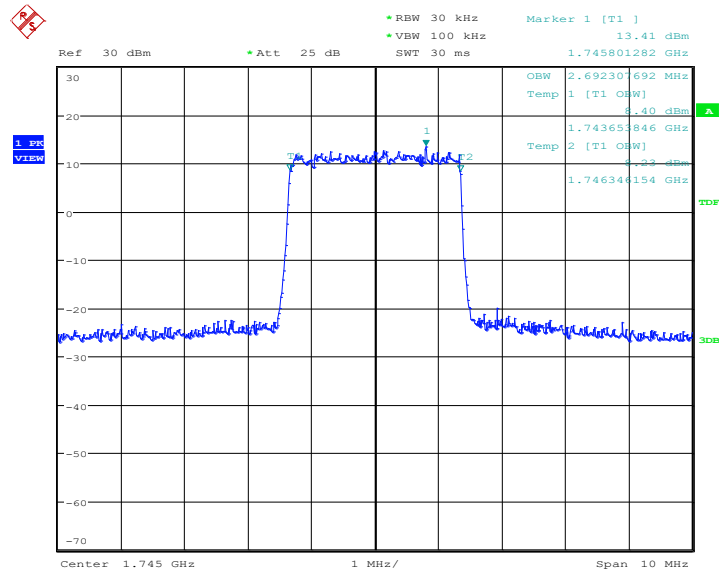


Date: 19.MAY.2020 11:56:29

LTE band 66, 3MHz (99% BW)

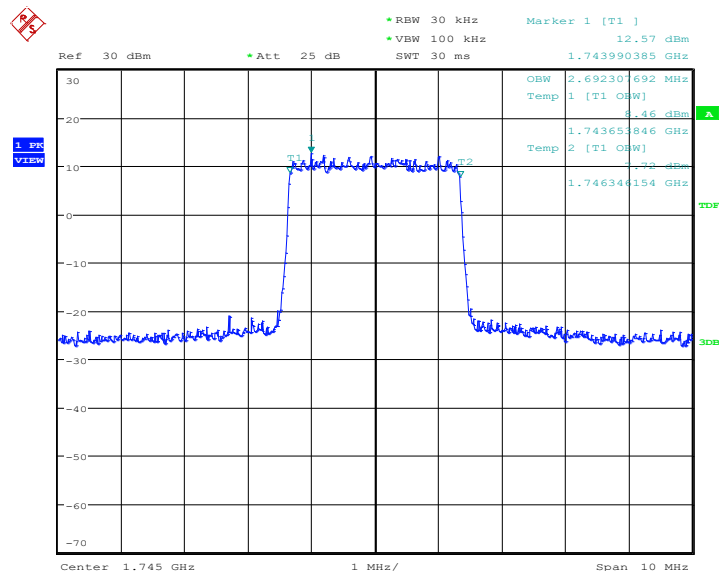
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
1745.0	QPSK	16QAM
	2692.31	2692.31

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



Date: 19.MAY.2020 12:00:35

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

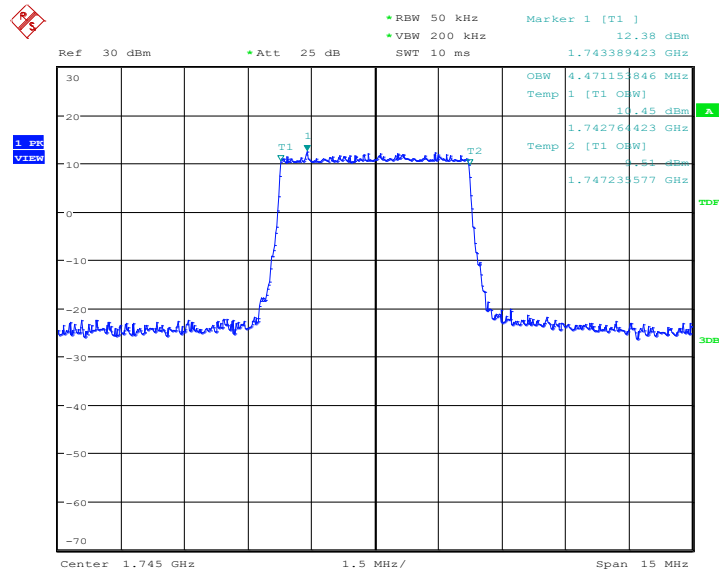


Date: 19.MAY.2020 12:00:49

LTE band 66, 5MHz (99% BW)

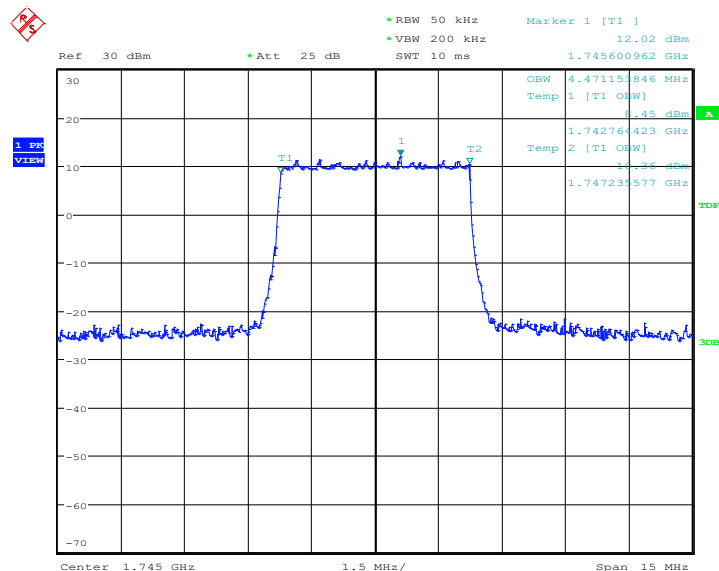
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
1745.0	QPSK	16QAM
	4471.15	4471.15

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



Date: 19.MAY.2020 12:04:55

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

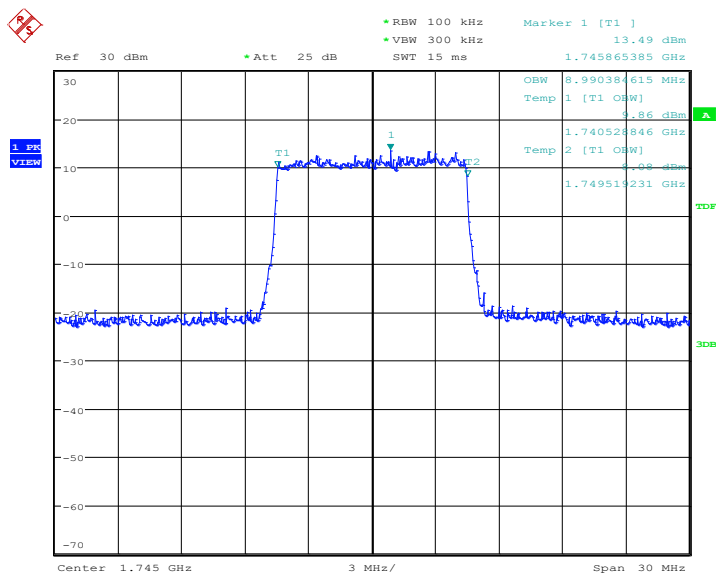


Date: 19.MAY.2020 12:05:08

LTE band 66, 10MHz (99% BW)

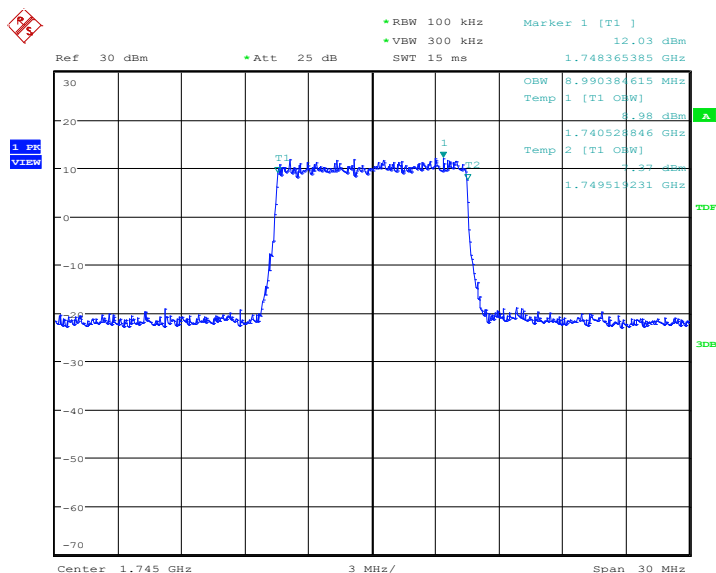
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
1745.0	QPSK	16QAM
	8990.38	8990.38

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



Date: 19.MAY.2020 12:09:14

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

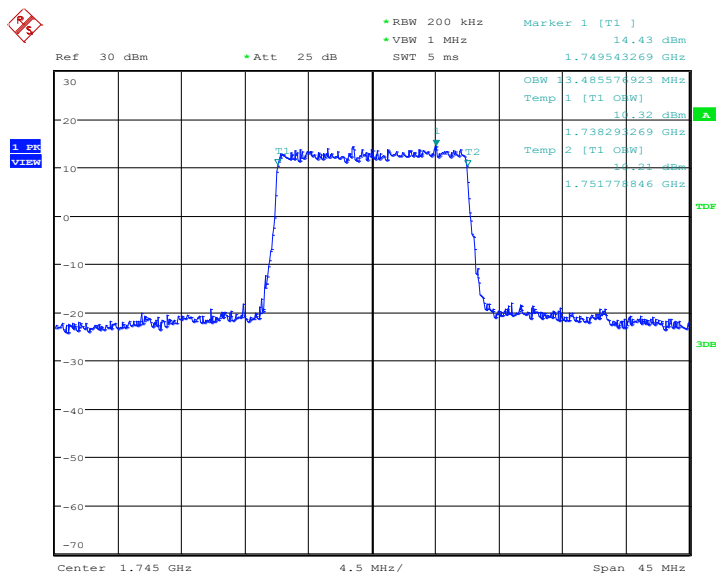


Date: 19.MAY.2020 12:09:28

LTE band 66, 15MHz (99% BW)

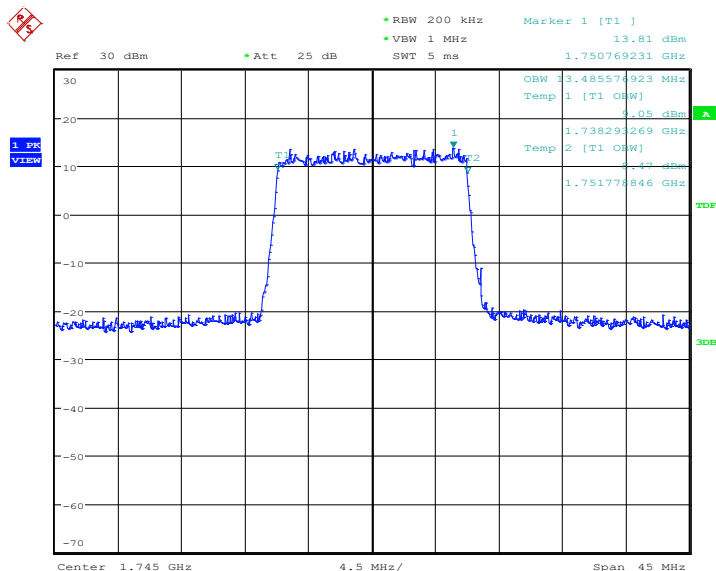
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
1745.0	QPSK	16QAM
	13485.58	13485.58

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



Date: 19.MAY.2020 12:13:34

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

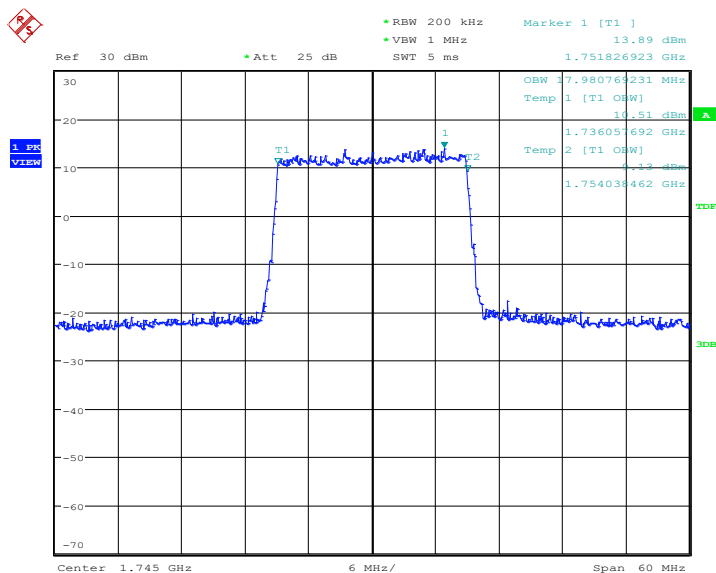


Date: 19.MAY.2020 12:13:48

LTE band 66, 20MHz (99% BW)

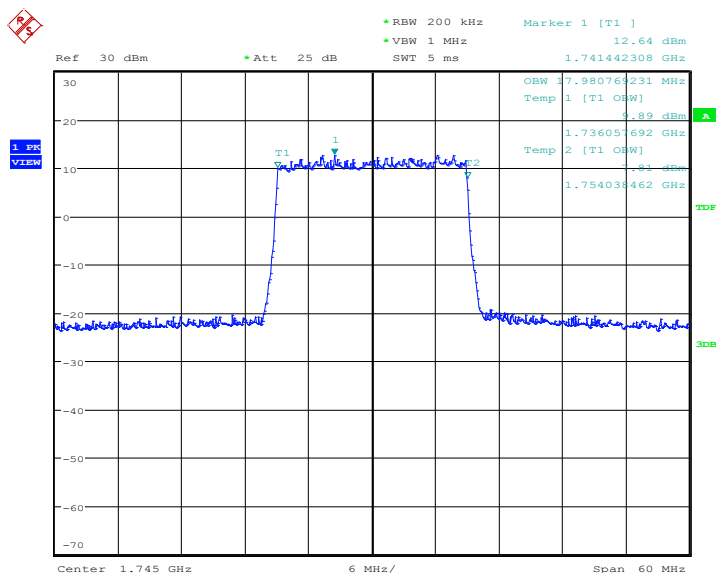
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)	
1745.0	QPSK	16QAM
	17980.77	17980.77

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



Date: 19.MAY.2020 12:30:41

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



Date: 19.MAY.2020 12:18:08

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

A.5 EMISSION BANDWIDTH

Reference

FCC: CFR Part 2.1049, 22.917, 24.238, 27.53, 90.1215.

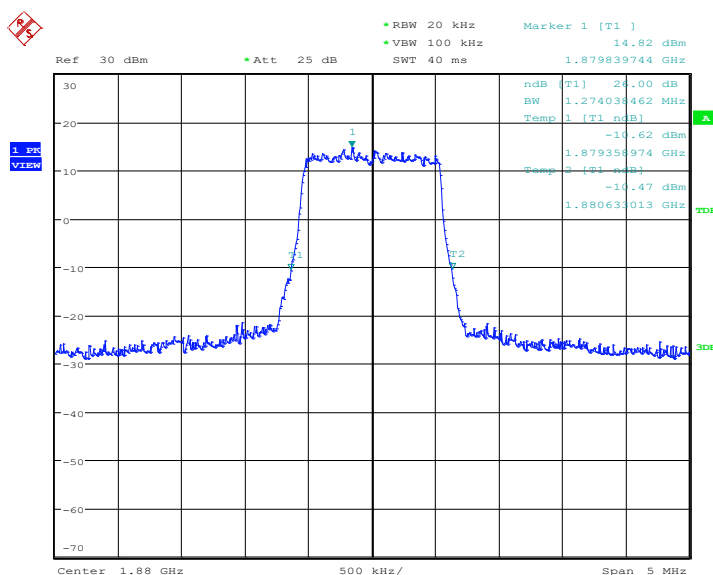
A.5.1 Emission Bandwidth Results

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.

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

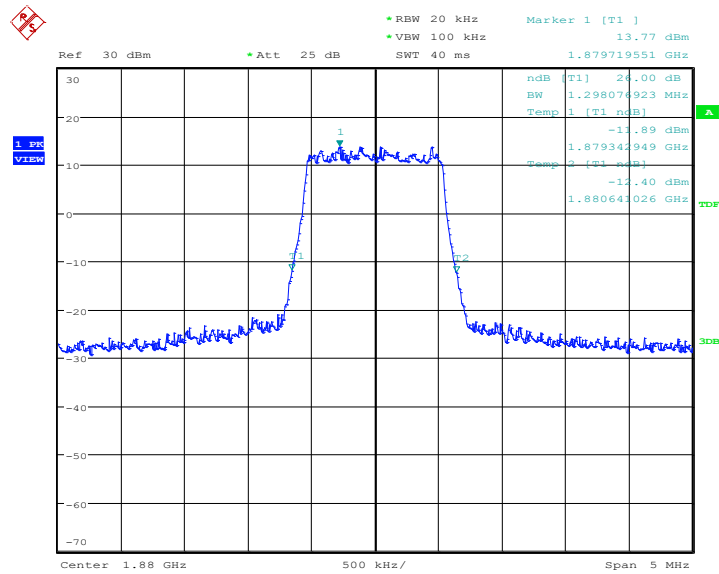
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
1880.0	QPSK	16QAM
	1274.04	1298.08

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



Date: 12.MAY.2020 07:48:29

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

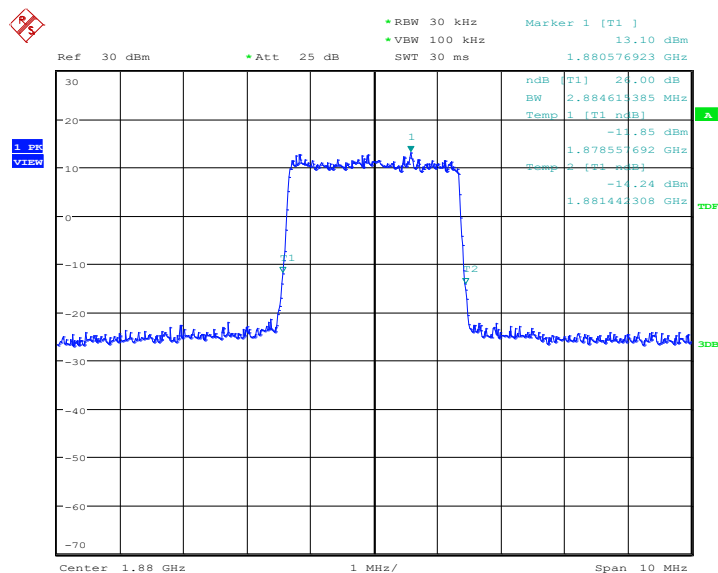


Date: 12.MAY.2020 07:48:44

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

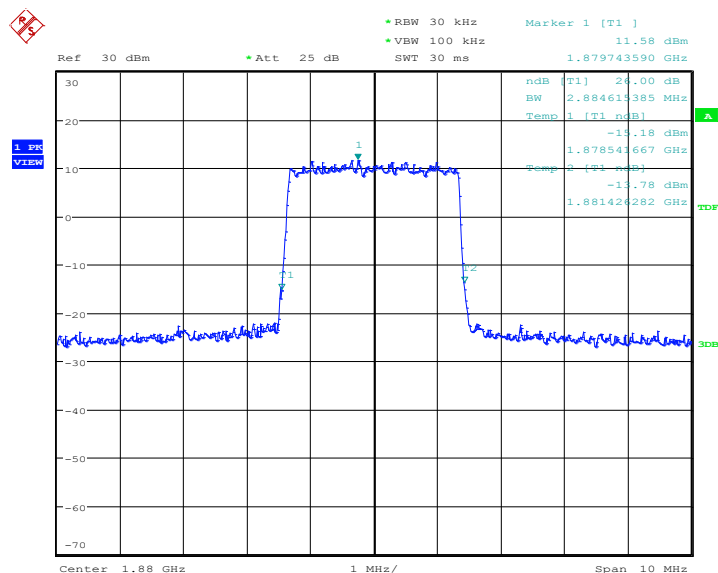
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
1880.0	QPSK	16QAM
	2884.62	2884.62

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



Date: 12.MAY.2020 07:53:56

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

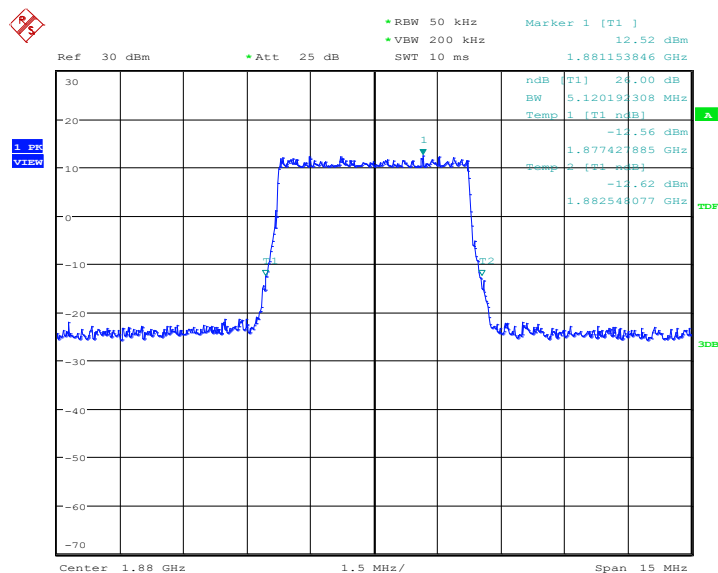


Date: 12.MAY.2020 07:54:12

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

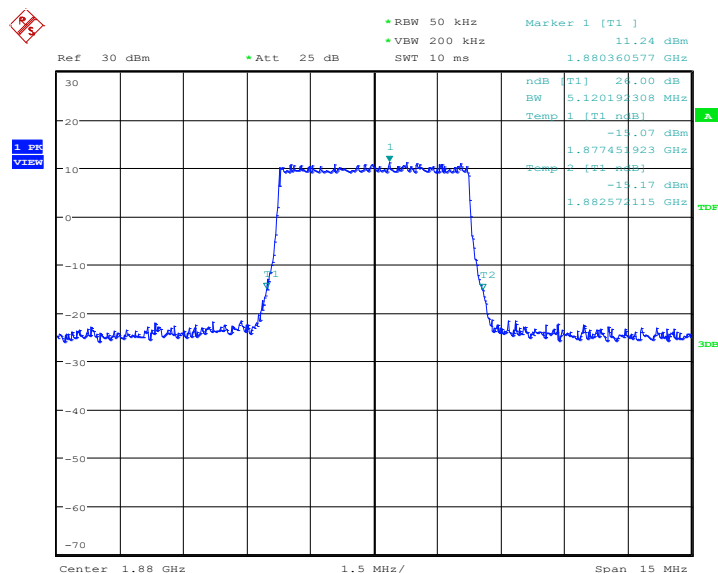
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
1880.0	QPSK	16QAM
	5120.19	5120.19

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



Date: 12.MAY.2020 07:59:21

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

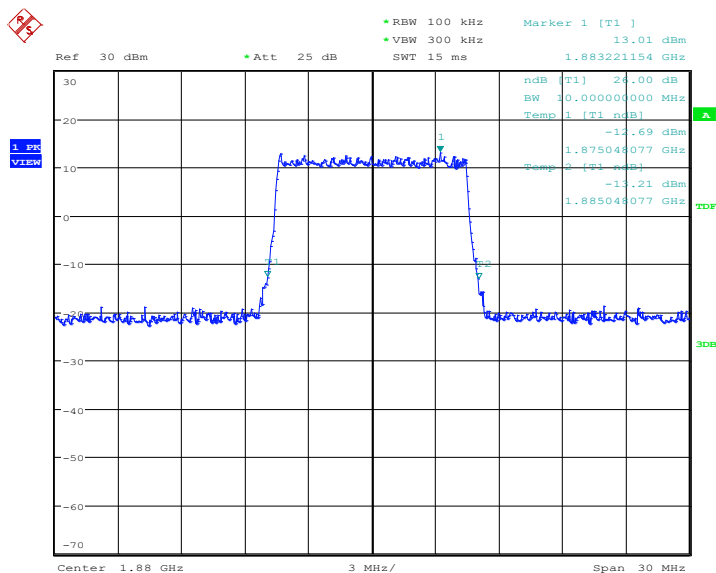


Date: 12.MAY.2020 07:59:37

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

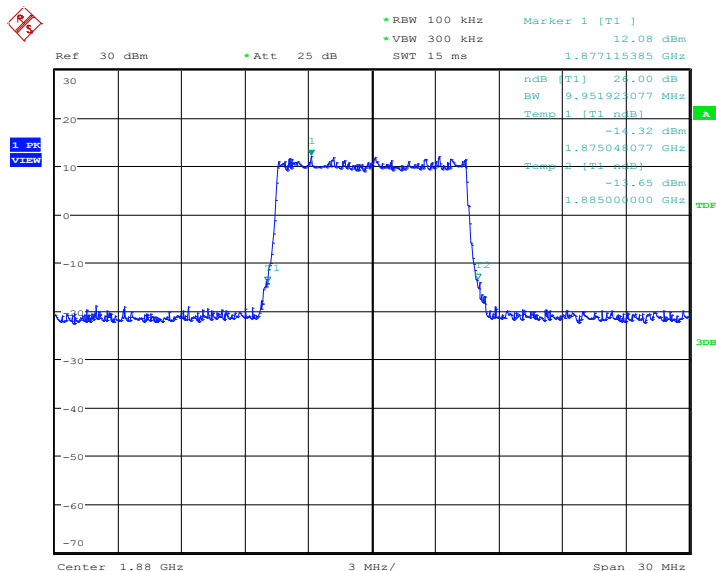
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
1880.0	QPSK	16QAM
	10000.00	9951.92

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



Date: 12.MAY.2020 08:04:46

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

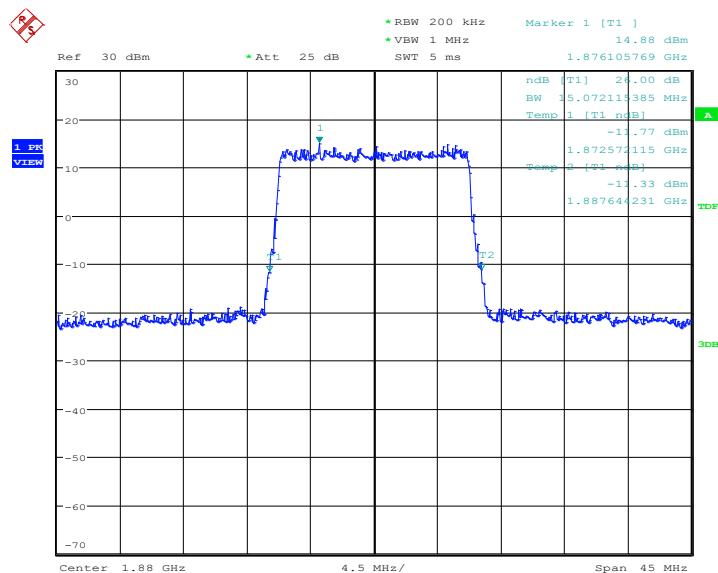


Date: 12.MAY.2020 08:05:02

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

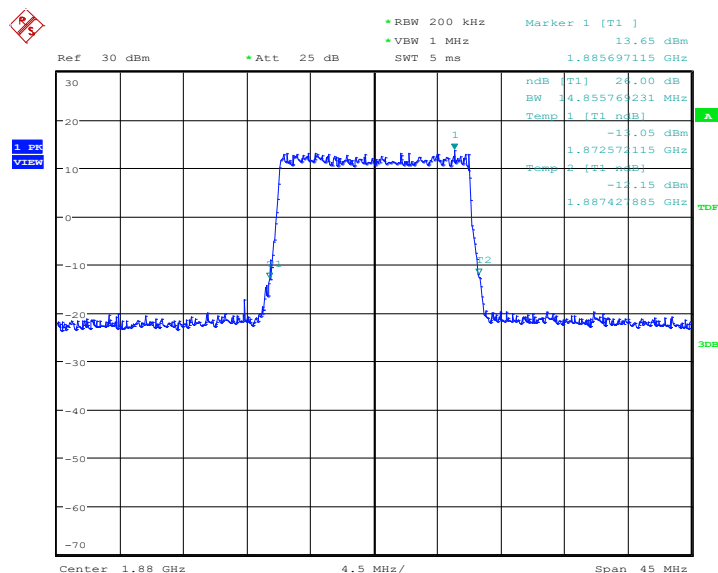
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
1880.0	QPSK	16QAM
	15072.12	14855.77

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



Date: 12.MAY.2020 08:10:12

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

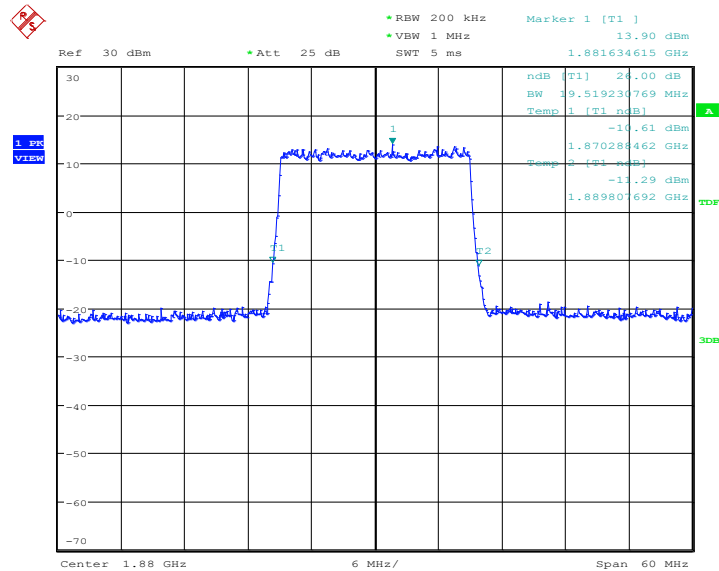


Date: 12.MAY.2020 08:10:28

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

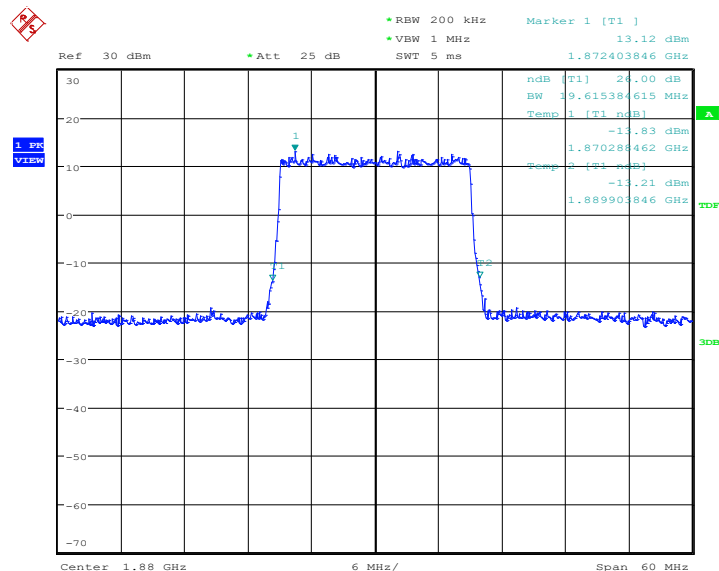
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
1880.0	QPSK	16QAM
	19519.23	19615.38

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



Date: 12.MAY.2020 08:15:38

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

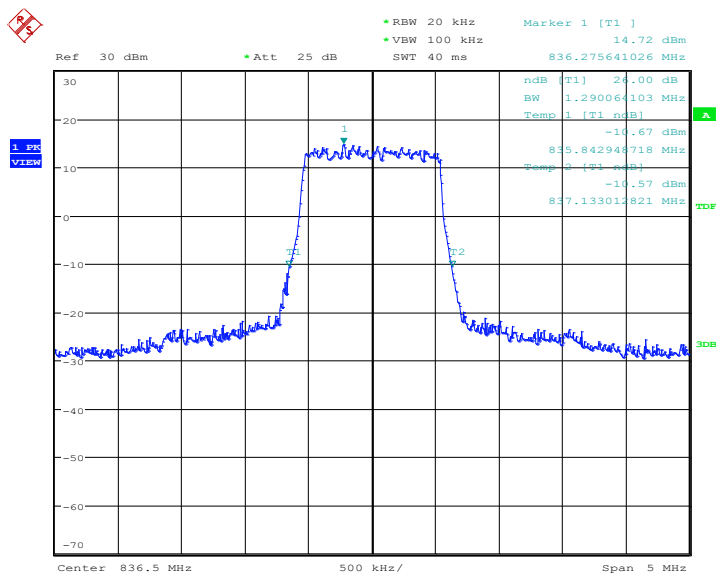


Date: 12.MAY.2020 08:15:54

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

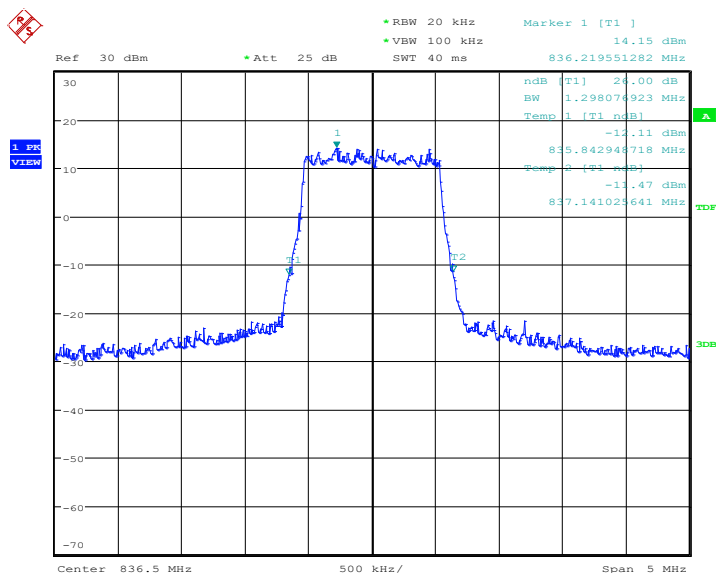
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
836.5	QPSK	16QAM
	1290.06	1298.08

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



Date: 12.MAY.2020 08:58:51

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

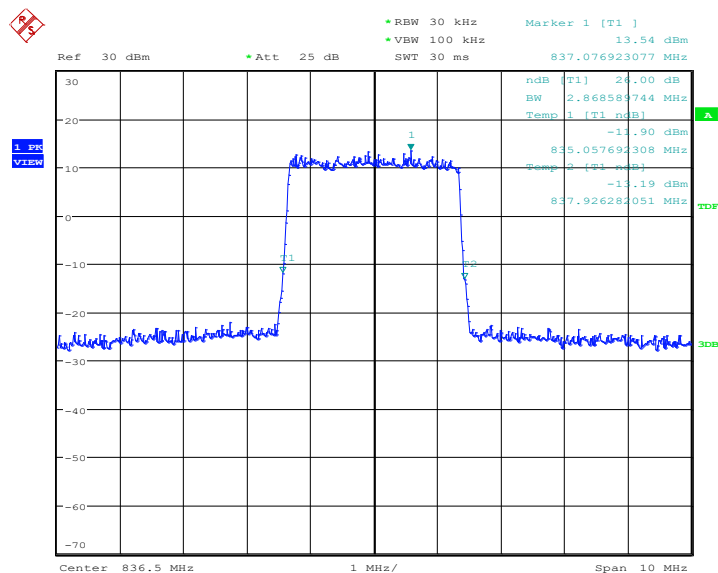


Date: 12.MAY.2020 08:59:07

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

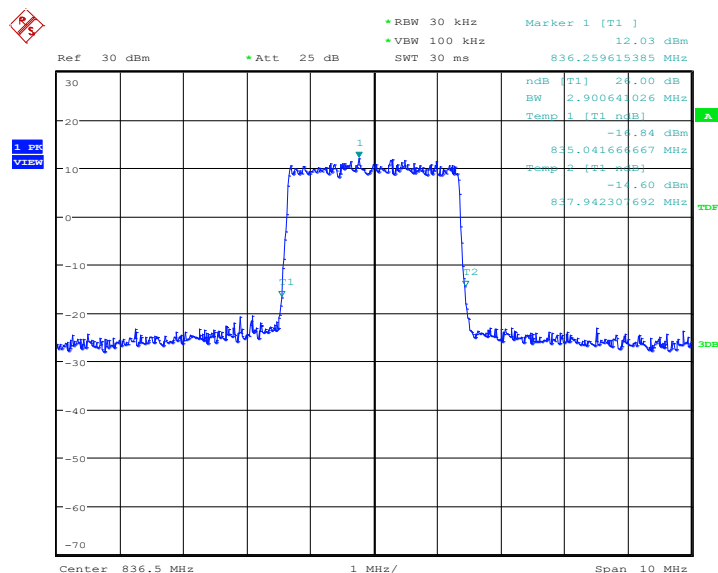
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
836.5	QPSK	16QAM
	2868.59	2900.64

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



Date: 12.MAY.2020 09:04:16

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

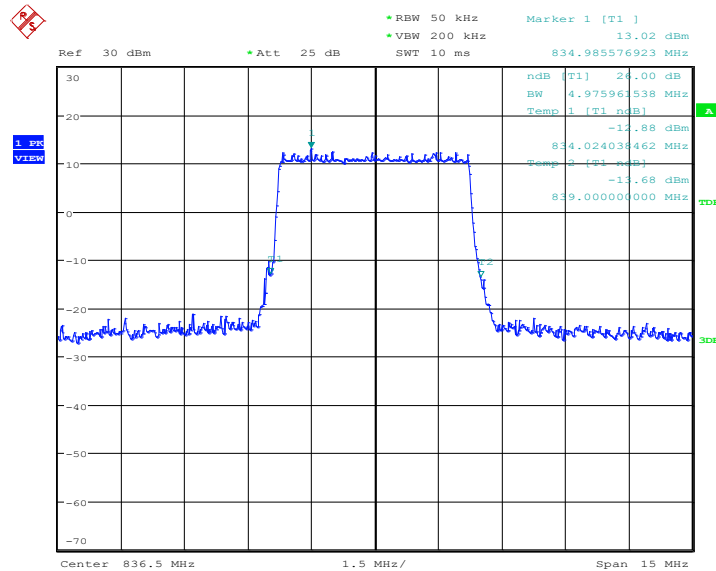


Date: 12.MAY.2020 09:04:32

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

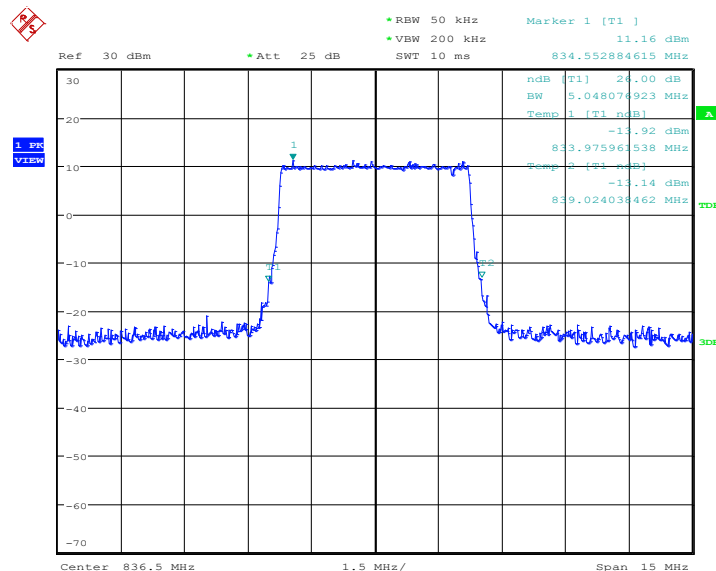
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
836.5	QPSK	16QAM
	4975.96	5048.08

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



Date: 12.MAY.2020 09:09:41

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

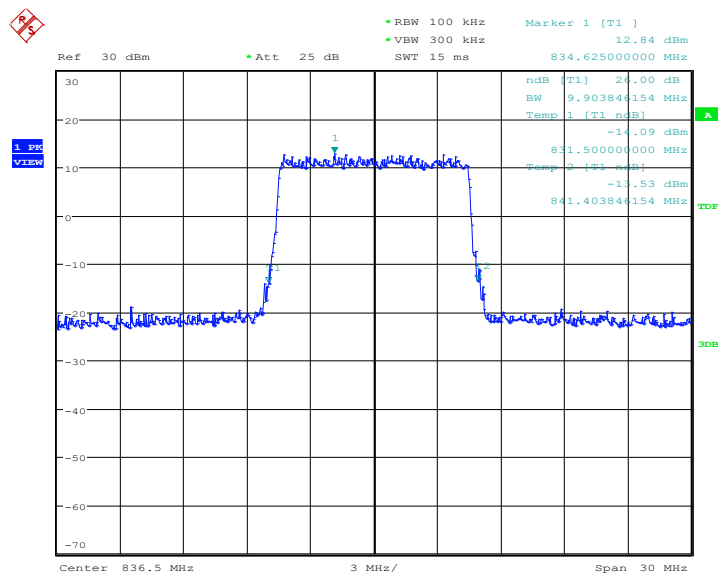


Date: 12.MAY.2020 09:09:57

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

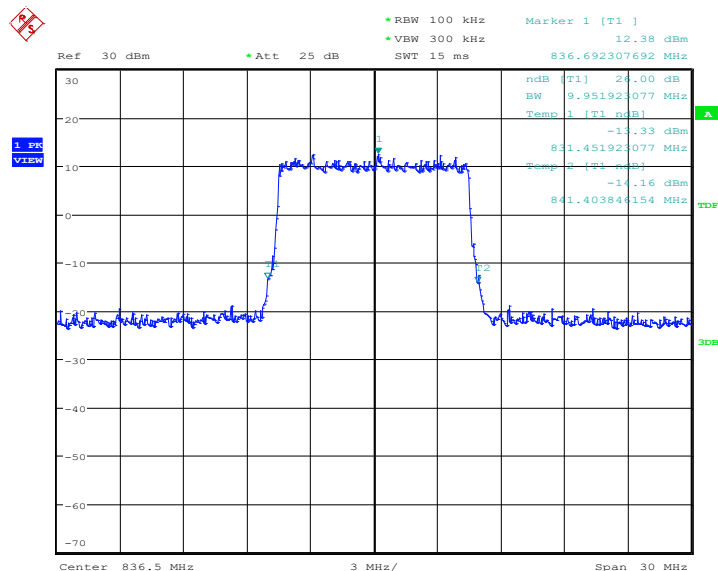
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
836.5	QPSK	16QAM
	9903.85	9951.92

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



Date: 12.MAY.2020 09:15:07

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

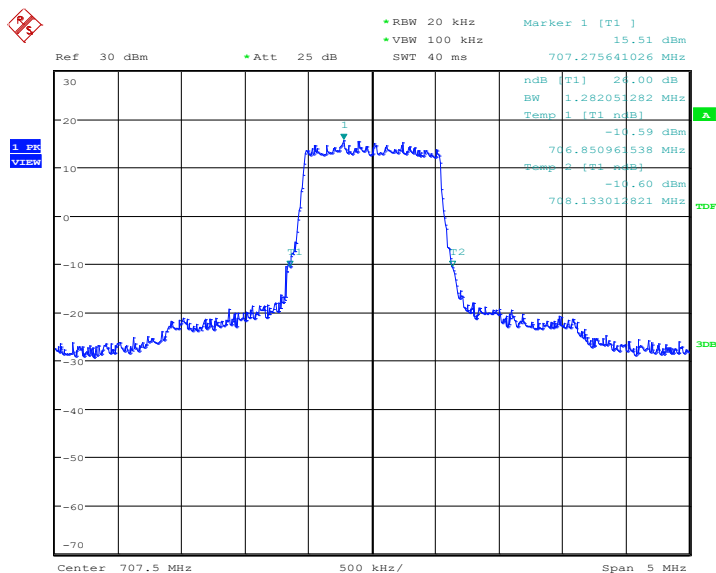


Date: 12.MAY.2020 09:15:22

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

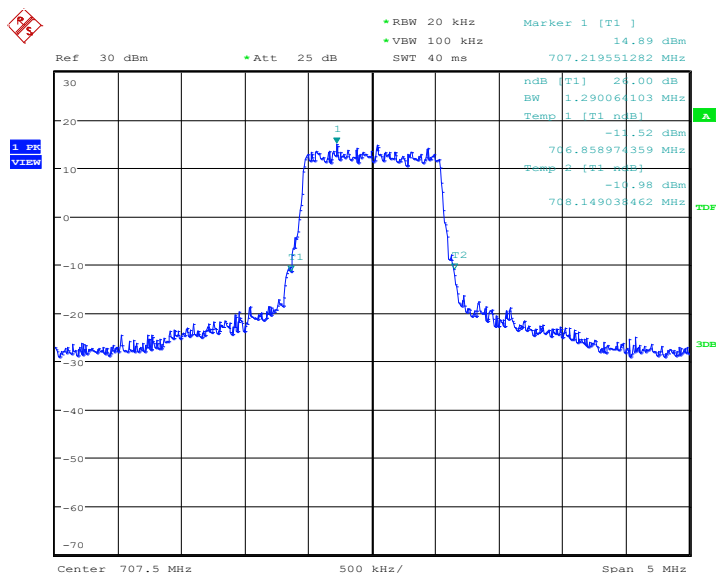
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
707.5	QPSK	16QAM
	1282.05	1290.06

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



Date: 18.MAY.2020 14:19:13

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

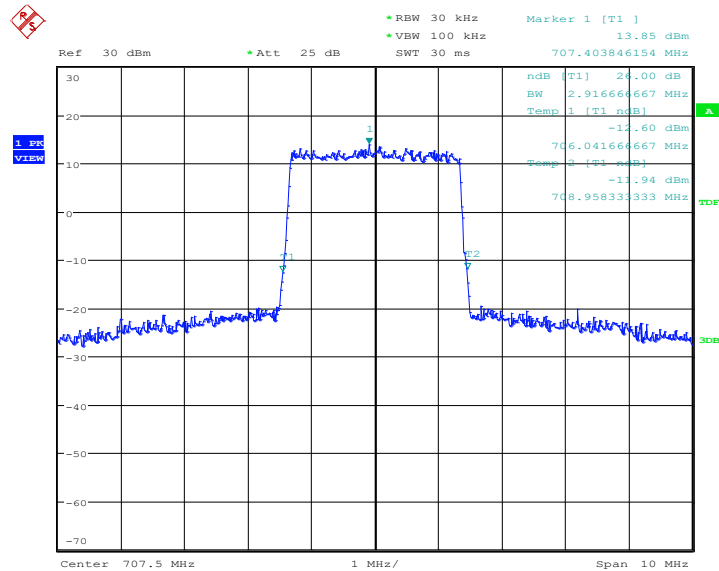


Date: 18.MAY.2020 14:19:29

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

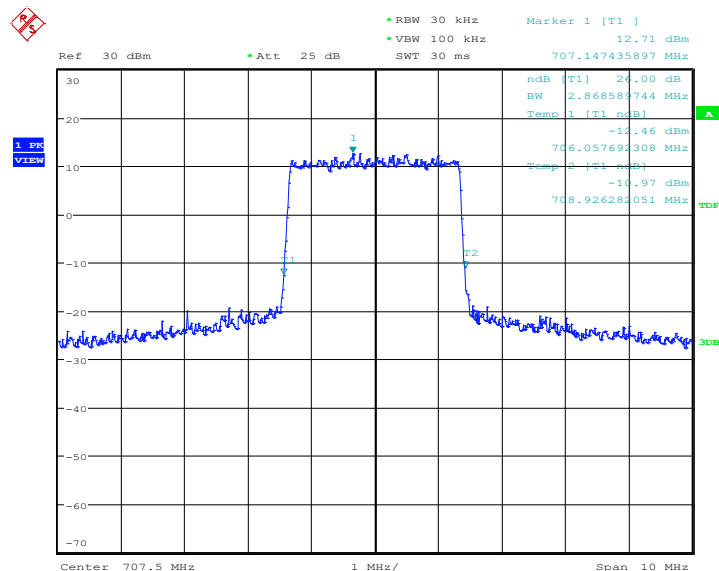
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
707.5	QPSK	16QAM
	2916.67	2868.59

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



Date: 18.MAY.2020 14:24:39

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

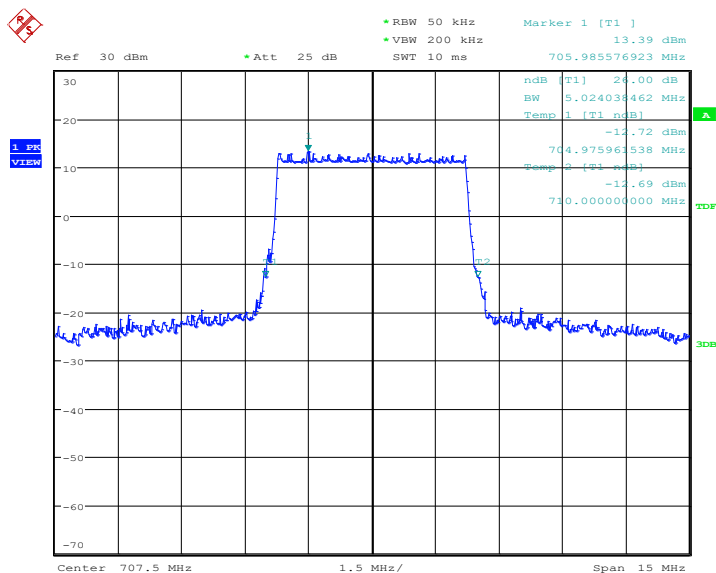


Date: 18.MAY.2020 14:24:54

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

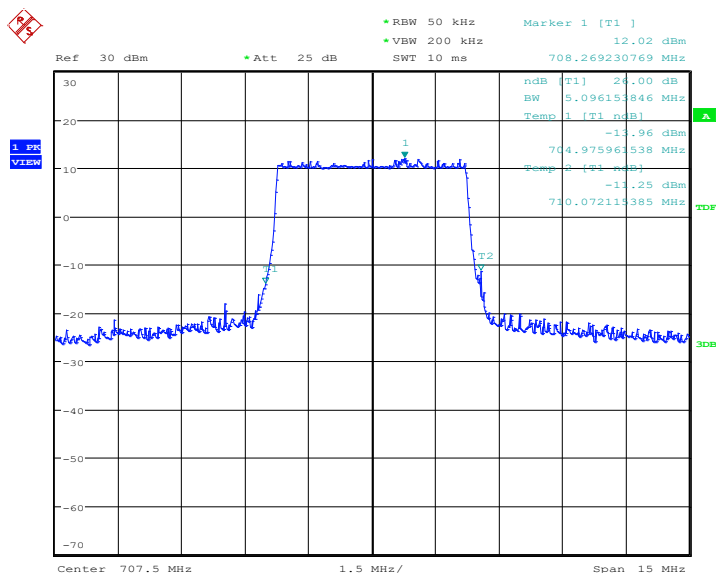
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
707.5	QPSK	16QAM
	5024.04	5096.15

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



Date: 18.MAY.2020 14:30:06

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

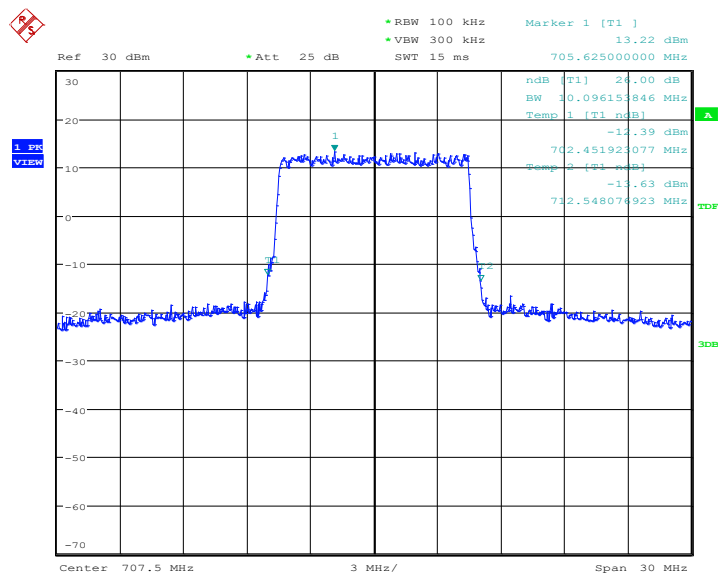


Date: 18.MAY.2020 14:30:22

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

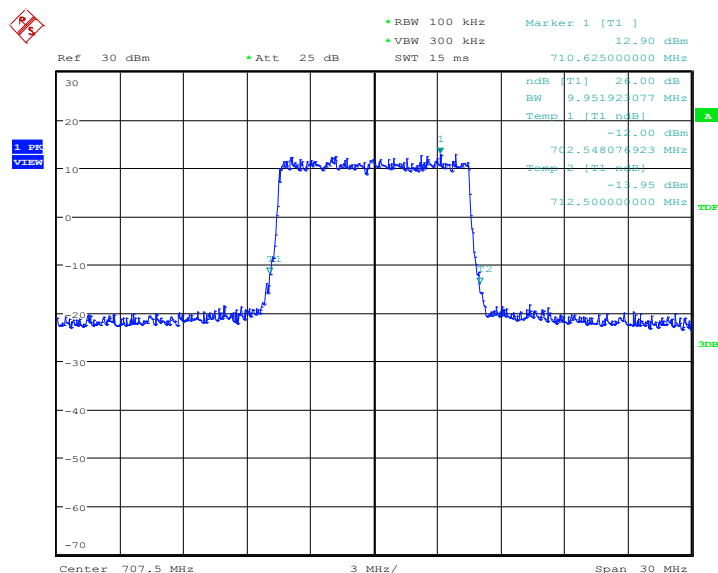
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
707.5	QPSK	16QAM
	10096.15	9951.92

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



Date: 18.MAY.2020 14:35:31

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

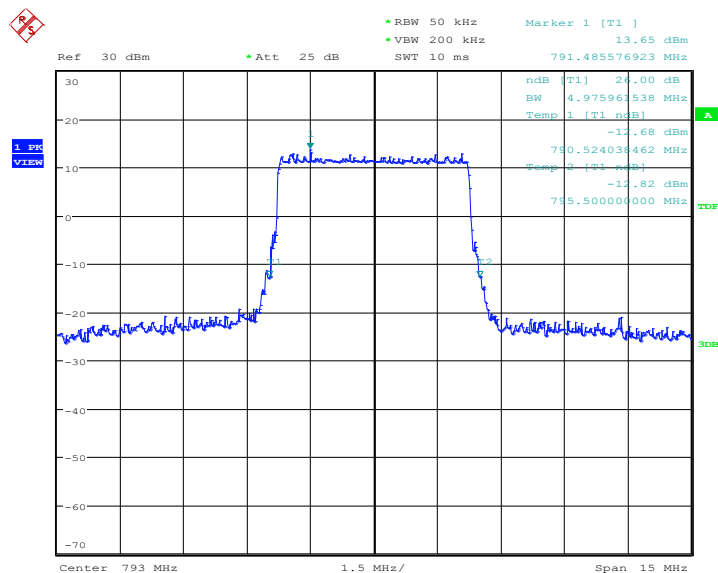


Date: 18.MAY.2020 14:35:47

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

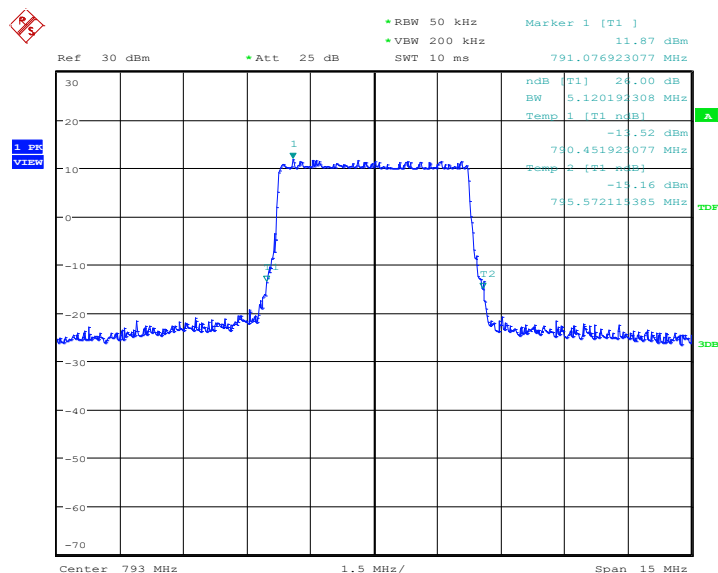
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
793.0	QPSK	16QAM
	4975.96	5120.19

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



Date: 18.MAY.2020 14:45:02

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

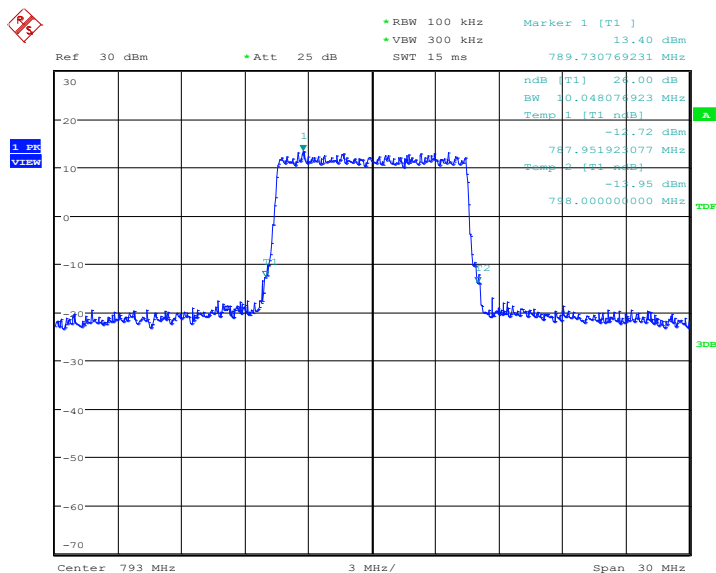


Date: 18.MAY.2020 14:45:18

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

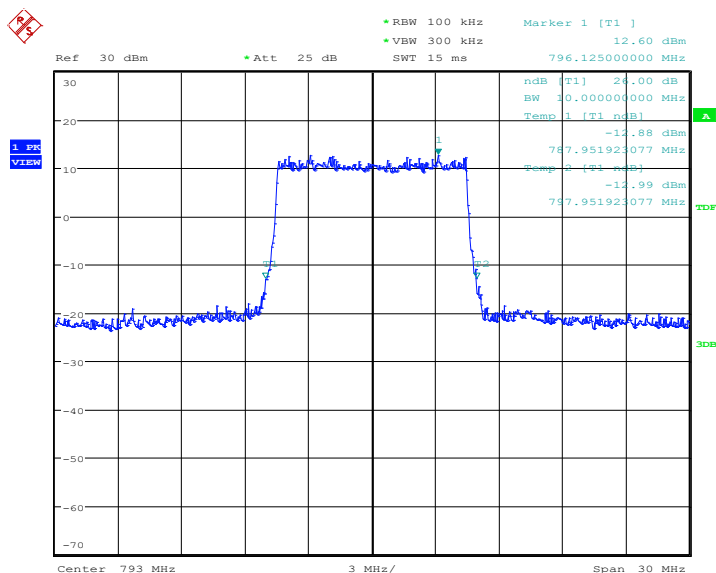
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
793.0	QPSK	16QAM
	10048.08	10000.00

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



Date: 18.MAY.2020 14:50:29

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

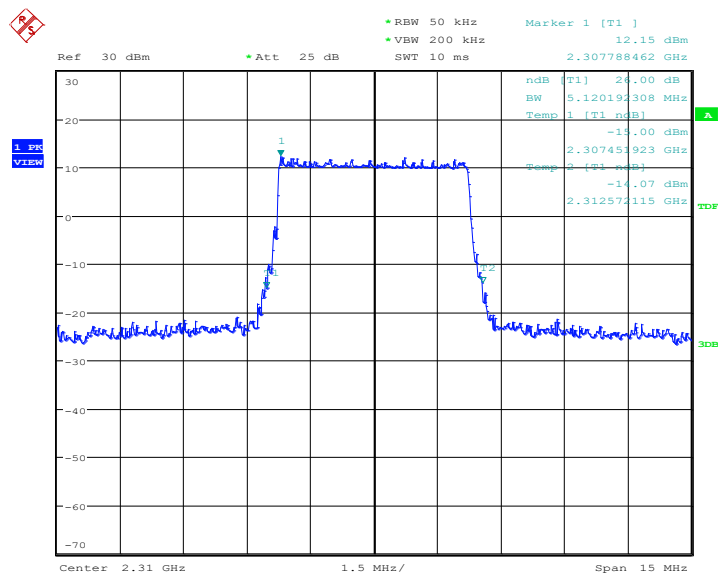


Date: 18.MAY.2020 14:50:45

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

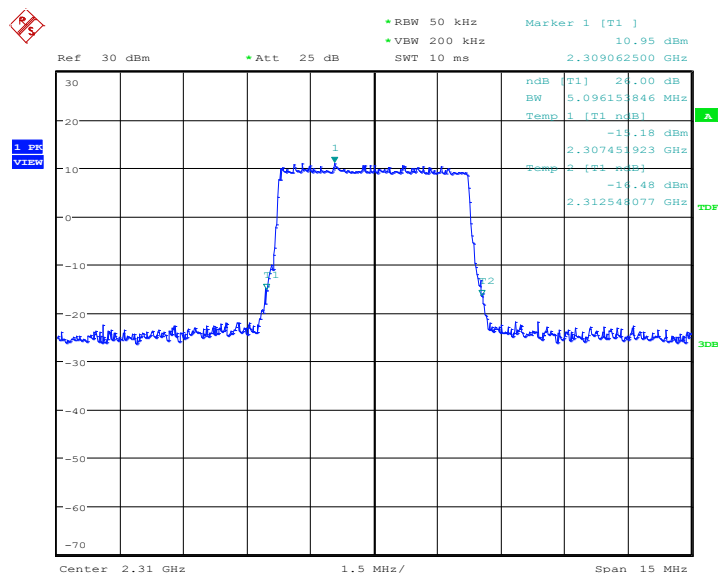
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
2310.0	QPSK	16QAM
	5120.19	5096.15

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



Date: 18.MAY.2020 14:56:01

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

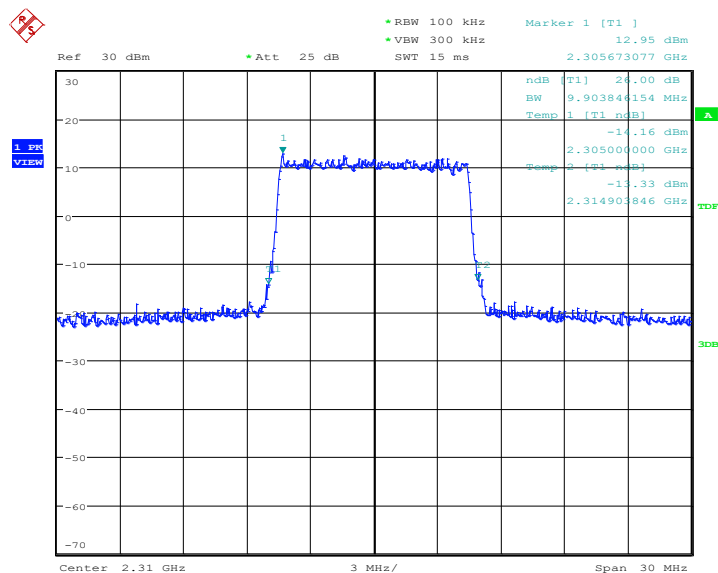


Date: 18.MAY.2020 14:56:17

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

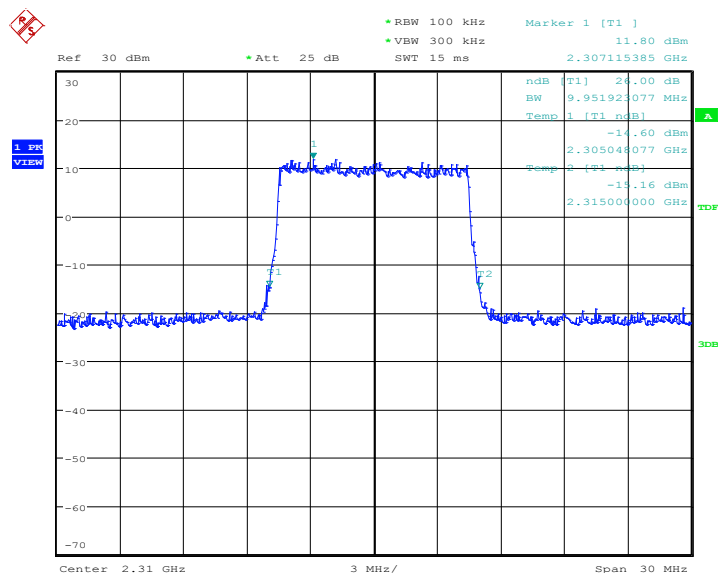
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
2310.0	QPSK	16QAM
	9903.85	9951.92

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



Date: 18.MAY.2020 15:01:16

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

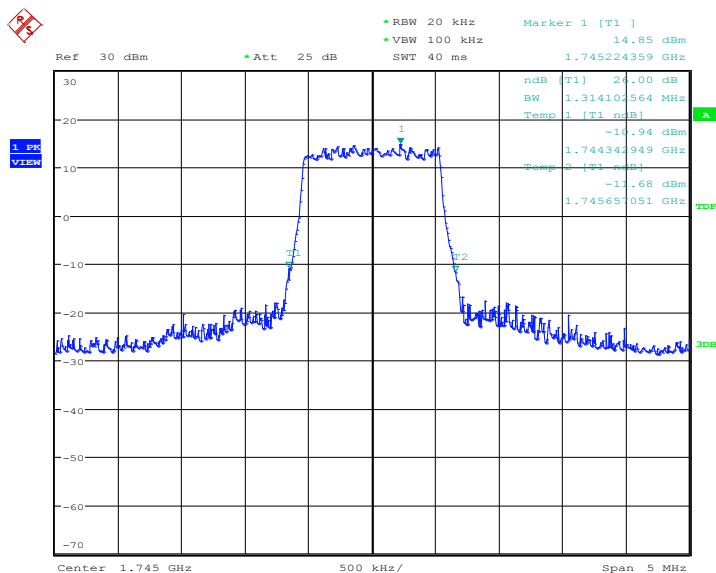


Date: 18.MAY.2020 15:01:32

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

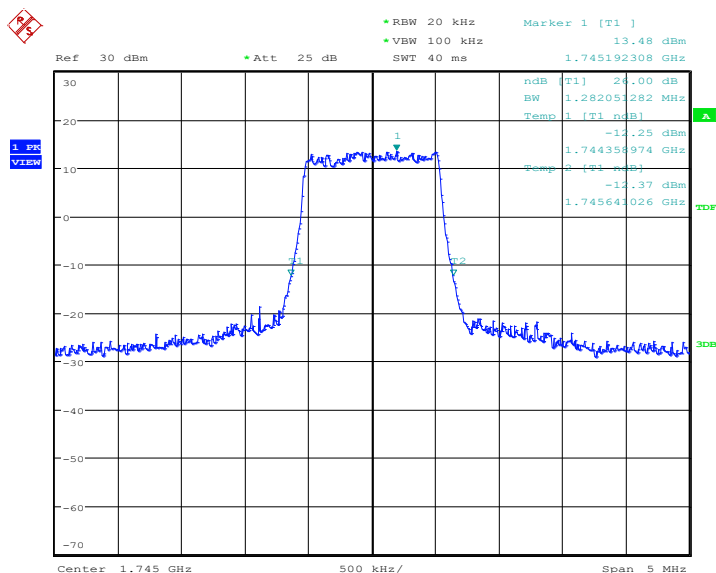
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
1745.0	QPSK	16QAM
	1314.10	1282.05

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



Date: 19.MAY.2020 11:57:23

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

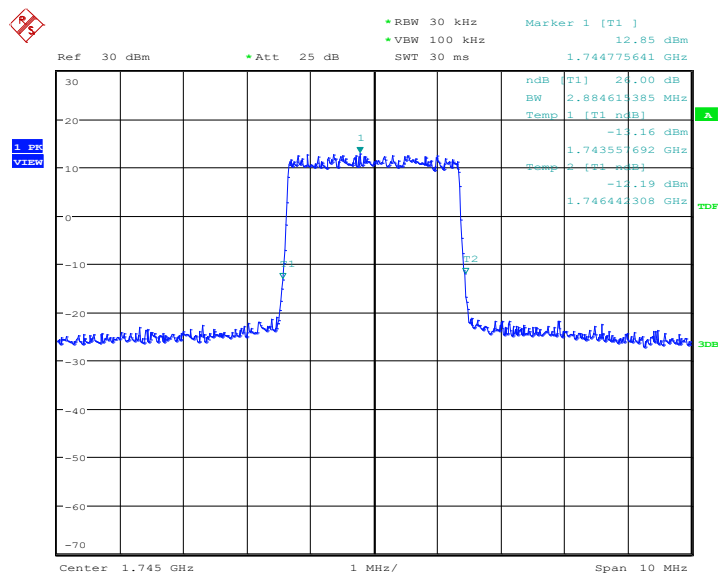


Date: 19.MAY.2020 11:57:39

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

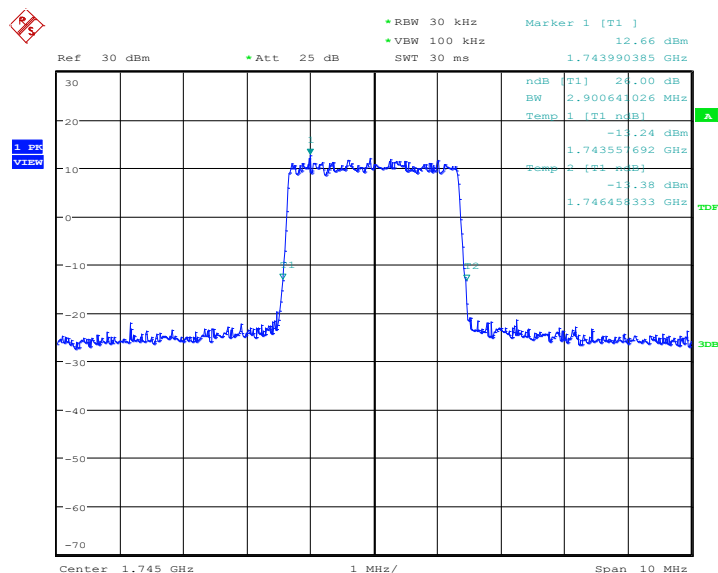
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
1745.0	QPSK	16QAM
	2884.62	2900.64

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



Date: 19.MAY.2020 12:01:43

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

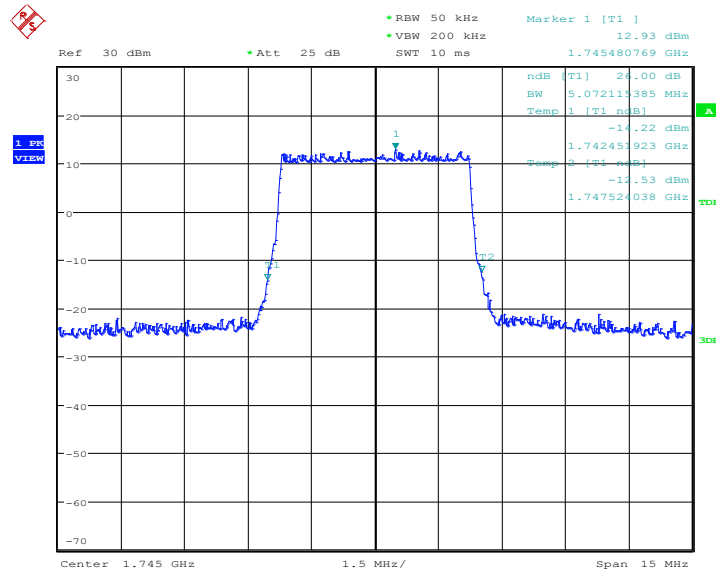


Date: 19.MAY.2020 12:01:59

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

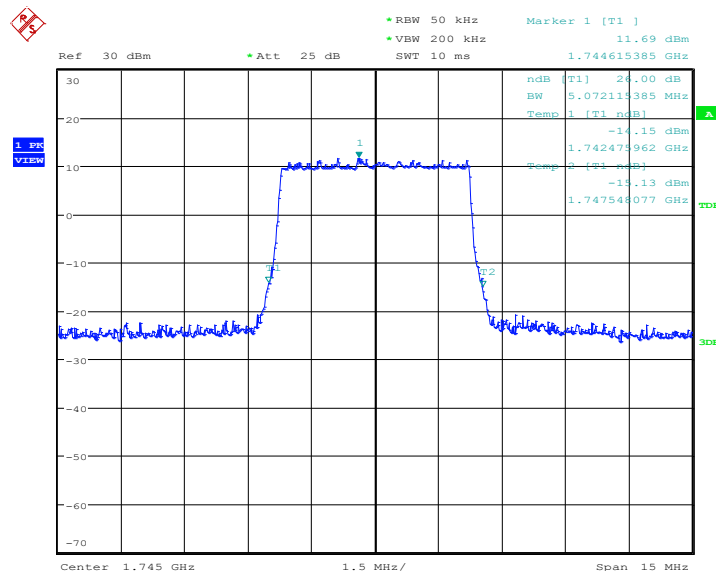
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
1745.0	QPSK	16QAM
	5072.12	5072.12

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



Date: 19.MAY.2020 12:06:02

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

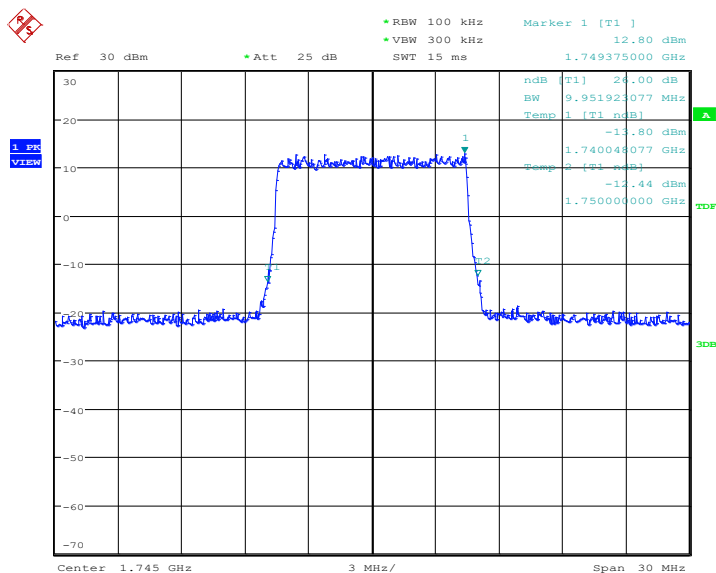


Date: 19.MAY.2020 12:06:18

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

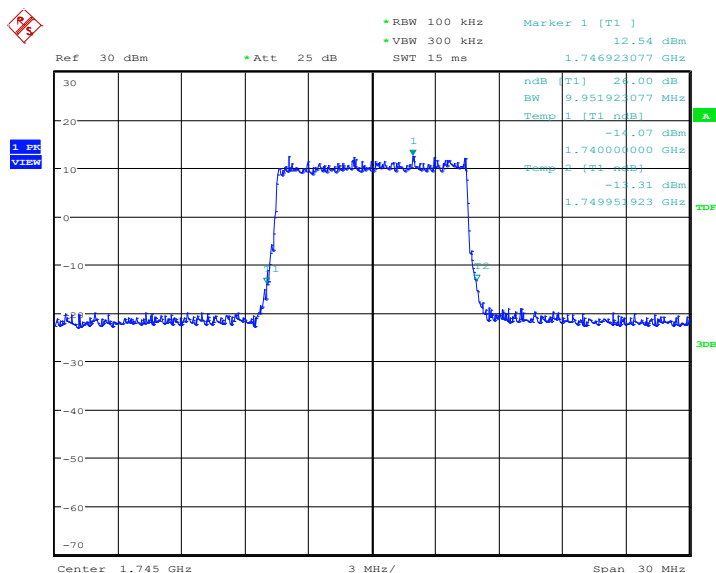
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
1745.0	QPSK	16QAM
	9951.92	9951.92

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



Date: 19.MAY.2020 12:10:22

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

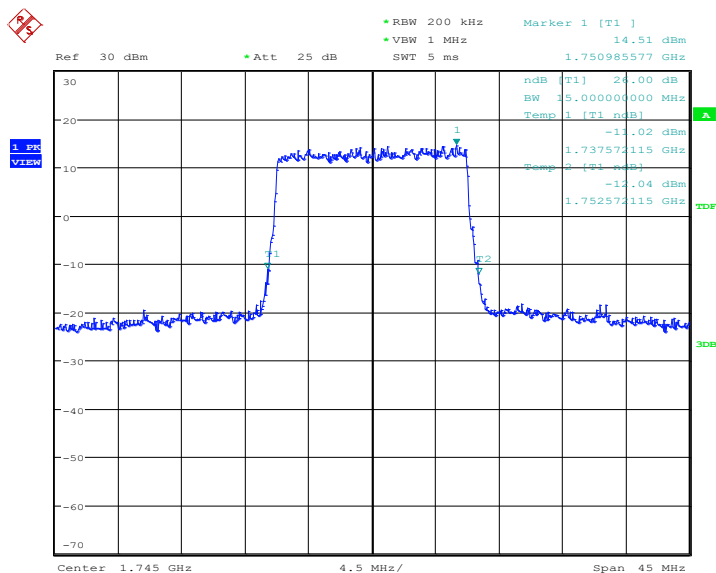


Date: 19.MAY.2020 12:10:38

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

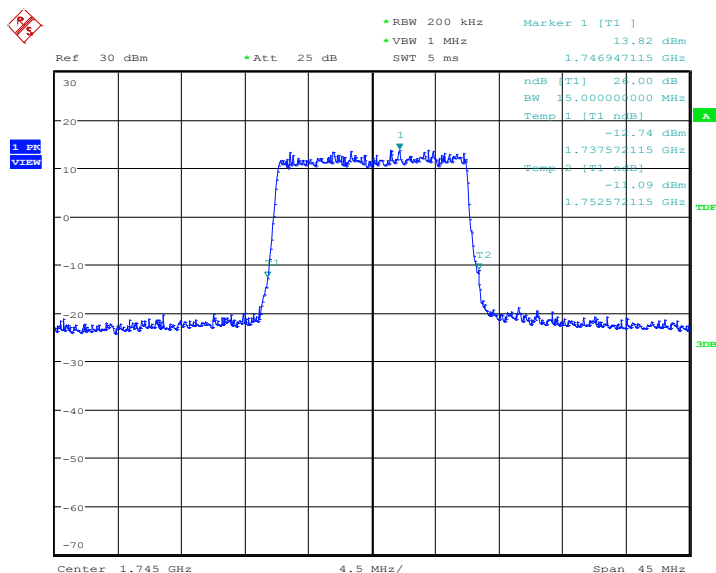
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
1745.0	QPSK	16QAM
	15000.00	15000.00

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



Date: 19.MAY.2020 12:14:42

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

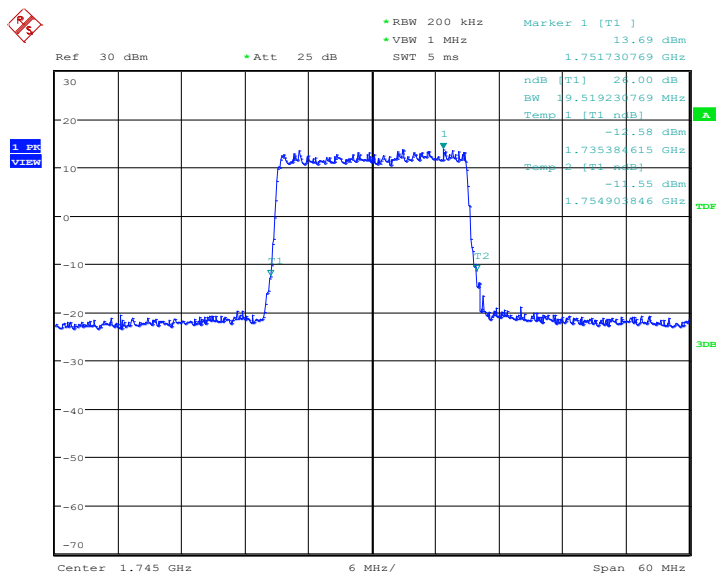


Date: 19.MAY.2020 12:14:58

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

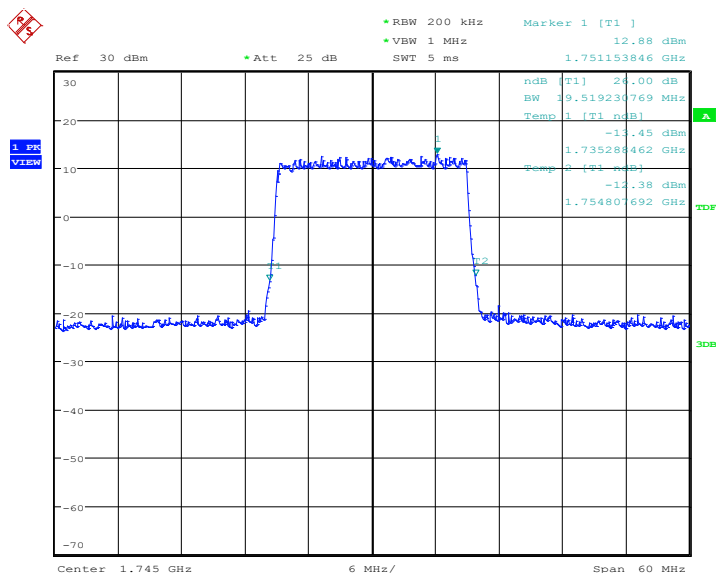
Frequency(MHz)	Emission Bandwidth (-26dBc BW)(kHz)	
1745.0	QPSK	16QAM
	19519.23	19519.23

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



Date: 19.MAY.2020 12:19:02

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



Date: 19.MAY.2020 12:19:18

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

A.6 BAND EDGE COMPLIANCE

Reference

FCC: CFR Part 2.1051, 22.917, 24.238, 27.53, 90.691.

A.6.1 Measurement limit

On any frequency outside frequency band

d of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least $43+10\log(P)$ dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

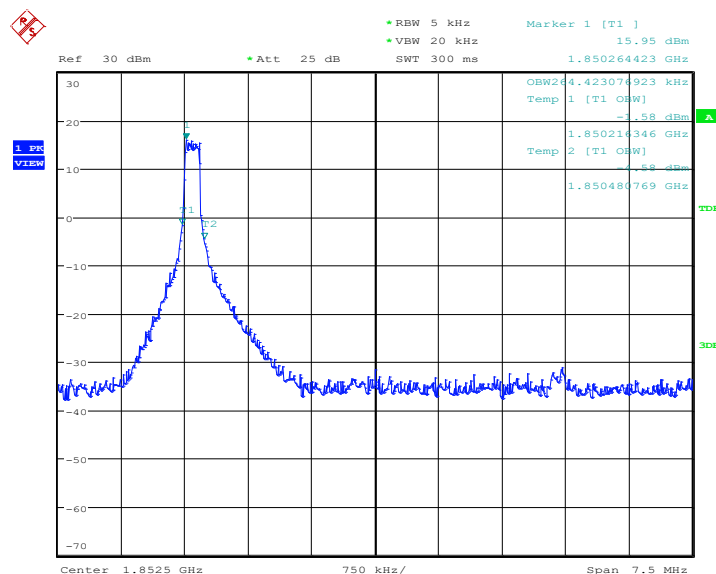
A relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band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

A.6.2 Measurement result

Only worst case result is given below

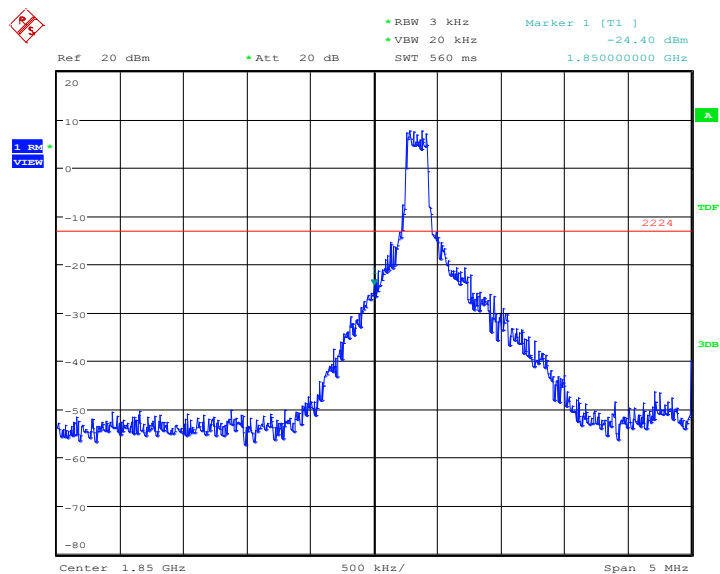
LTE band 2

OBW: 1RB-low_offset



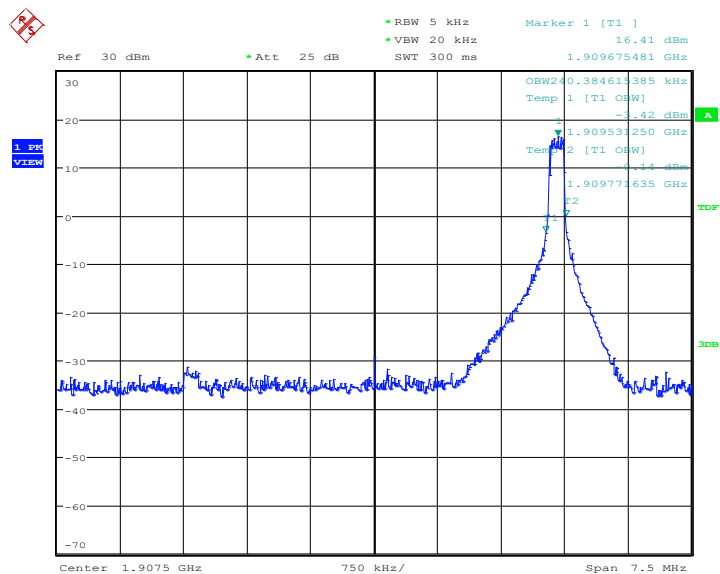
Date: 19.MAY.2020 06:33:26

LOW BAND EDGE BLOCK-1RB-low_offset



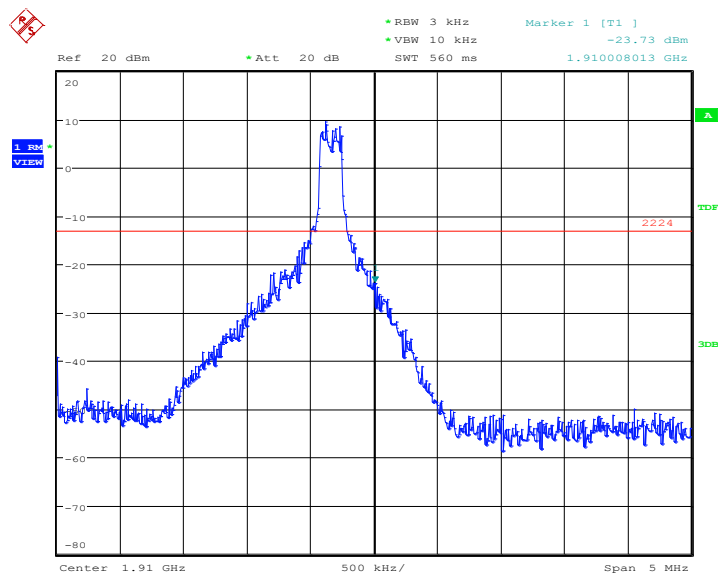
Date: 19.MAY.2020 06:34:10

OBW: 1RB-high_offset



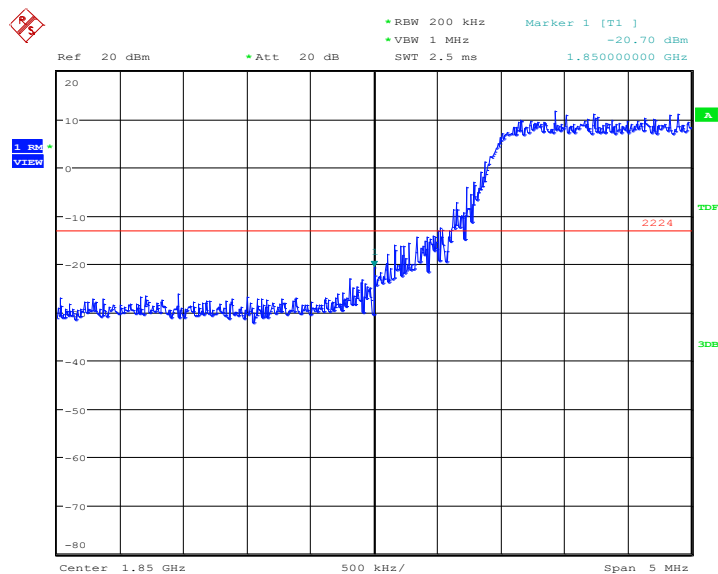
Date: 19.MAY.2020 06:05:44

HIGH BAND EDGE BLOCK-1RB-high_offset



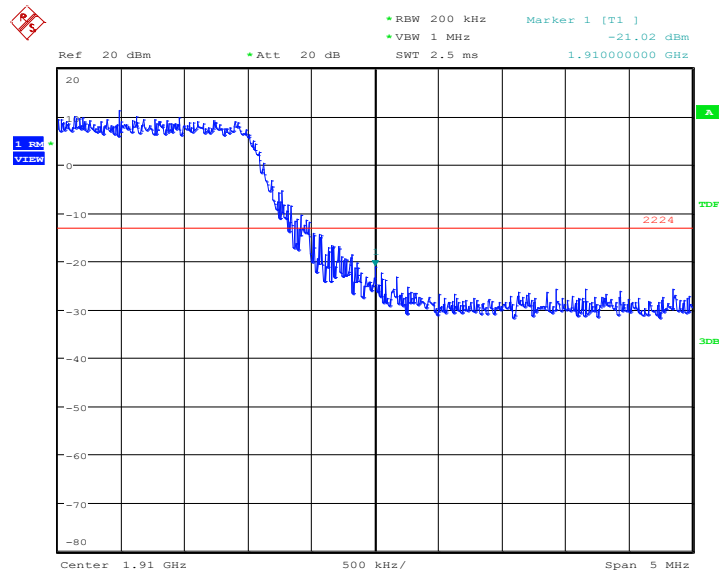
Date: 19.MAY.2020 06:06:42

LOW BAND EDGE BLOCK-20MHz-100%RB



Date: 19.MAY.2020 06:58:54

HIGH BAND EDGE BLOCK-20MHz-100%RB



Date: 19.MAY.2020 06:59:40