

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	10MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
V _{nor}	0.0033	0.0032	2.5
V _{min}	-0.0038	-0.0037	2.5
V _{max}	0.0033	0.003	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} Vdc to V_{max} Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	10MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0151	-0.0135	2.5
-20	-0.0123	-0.0131	2.5
-10	-0.0104	-0.0102	2.5
0	-0.0094	-0.0091	2.5
10	-0.0057	-0.0054	2.5
20	-0.0047	-0.0047	2.5
30	-0.0053	-0.0047	2.5
40	-0.0026	-0.0023	2.5
50	-0.0004	-0.0005	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	15MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
V _{nor}	0.0032	0.0031	2.5
V _{min}	-0.0038	-0.0038	2.5
V _{max}	0.0032	0.0029	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} Vdc to V_{max} Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	15MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0147	-0.0139	2.5
-20	-0.0131	-0.0123	2.5
-10	-0.0103	-0.0103	2.5
0	-0.0095	-0.0088	2.5
10	-0.0069	-0.0054	2.5
20	-0.0052	-0.0051	2.5
30	-0.004	-0.0044	2.5
40	-0.0028	-0.0021	2.5
50	-0.0007	-0.0003	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	20MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
V _{nor}	0.0031	0.0029	2.5
V _{min}	-0.0038	-0.0037	2.5
V _{max}	0.003	0.0029	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} Vdc to V_{max} Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

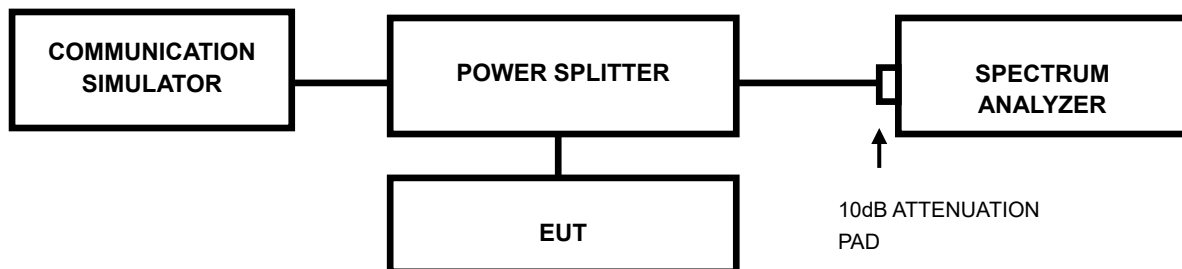
TEMP. (°C)	20MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0151	-0.0145	2.5
-20	-0.0128	-0.0118	2.5
-10	-0.0106	-0.0097	2.5
0	-0.0093	-0.0093	2.5
10	-0.0059	-0.0067	2.5
20	-0.0048	-0.0047	2.5
30	-0.0047	-0.003	2.5
40	-0.0018	-0.0021	2.5
50	-0.0004	-0.0006	2.5

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

3.3.2 TEST SETUP



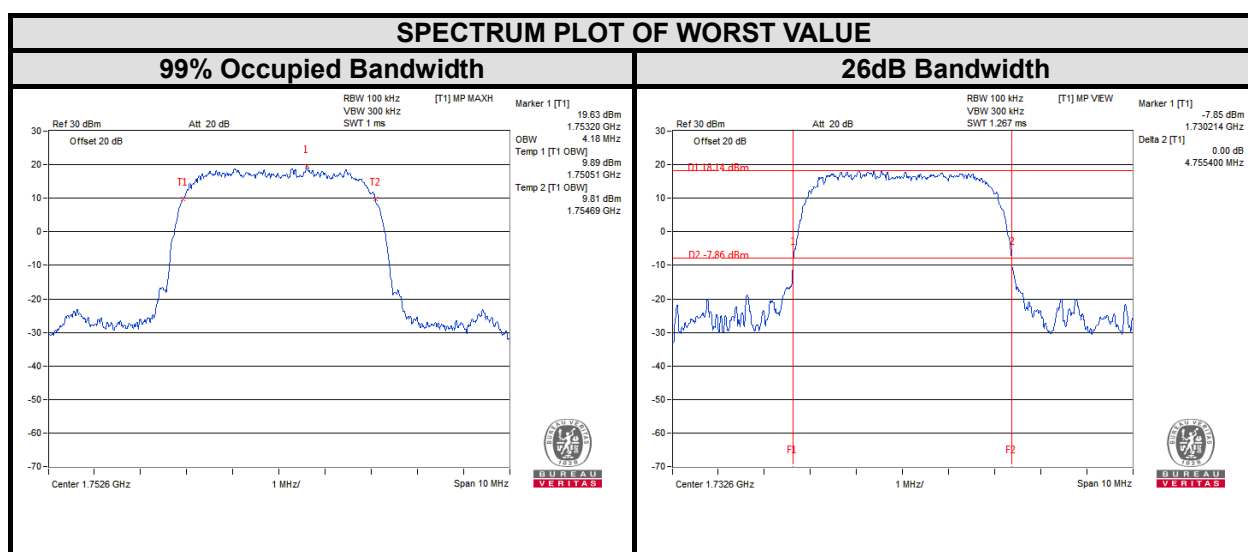
3.3.3 TEST PROCEDURES

- The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

3.3.4 TEST RESULTS

WCDMA BAND IV

Channel	FREQ. (MHz)	99% Occupied Bandwidth (MHz)	Channel	FREQ. (MHz)	26dB Bandwidth (MHz)
		WCDMA			WCDMA
1312	1712.40	4.17	1312	1712.40	4.730
1413	1732.60	4.17	1413	1732.60	4.755
1513	1752.60	4.18	1513	1752.60	4.706



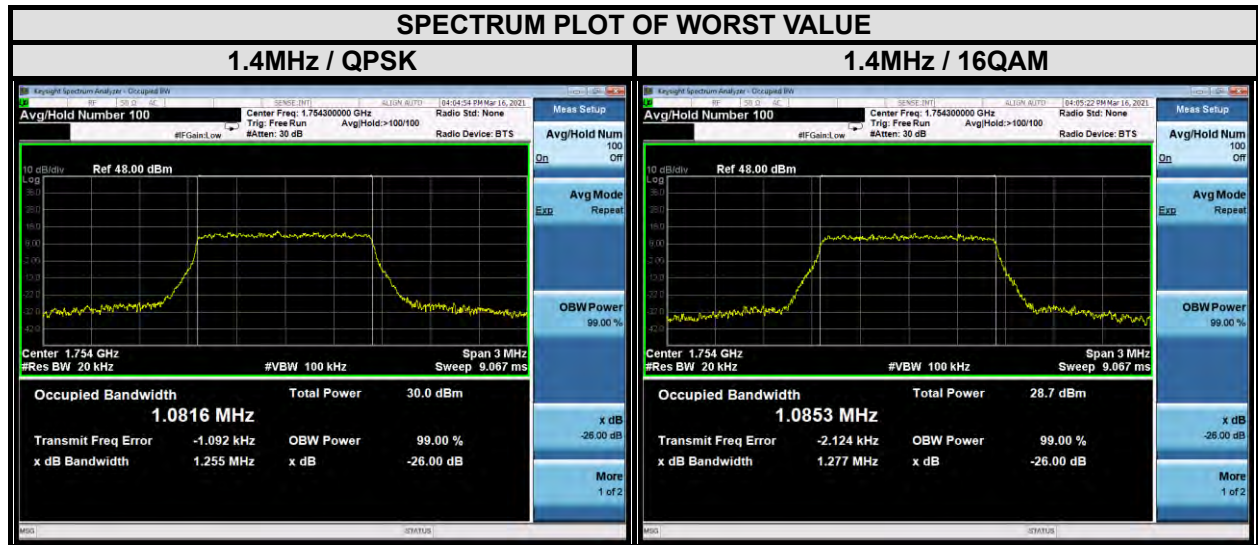


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VERITAS**

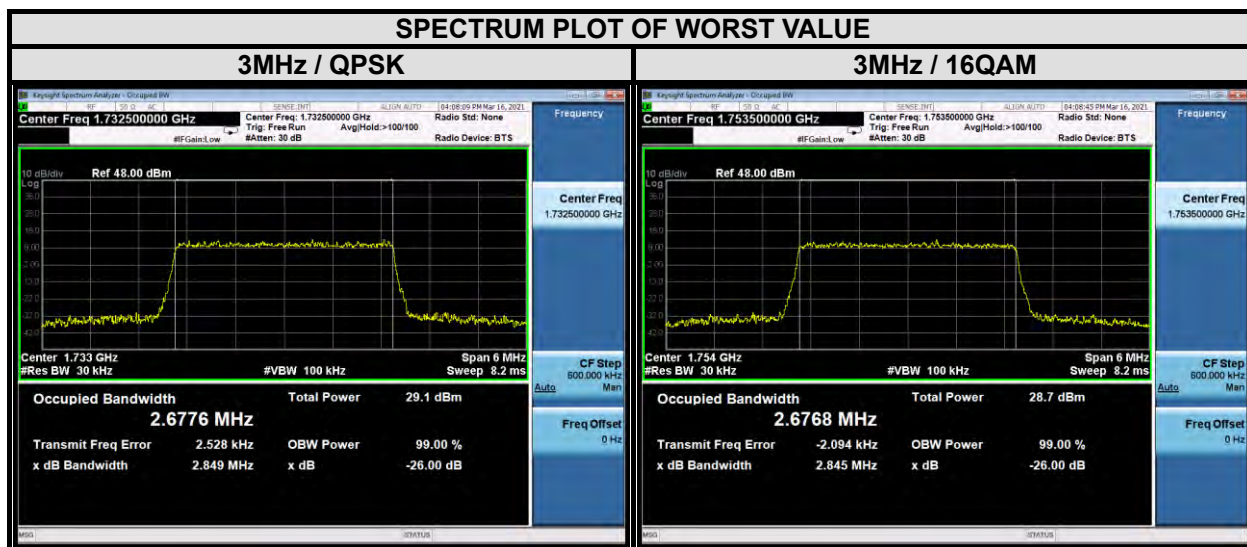
Test Report No.: RF210603W002-3

LTE BAND 4

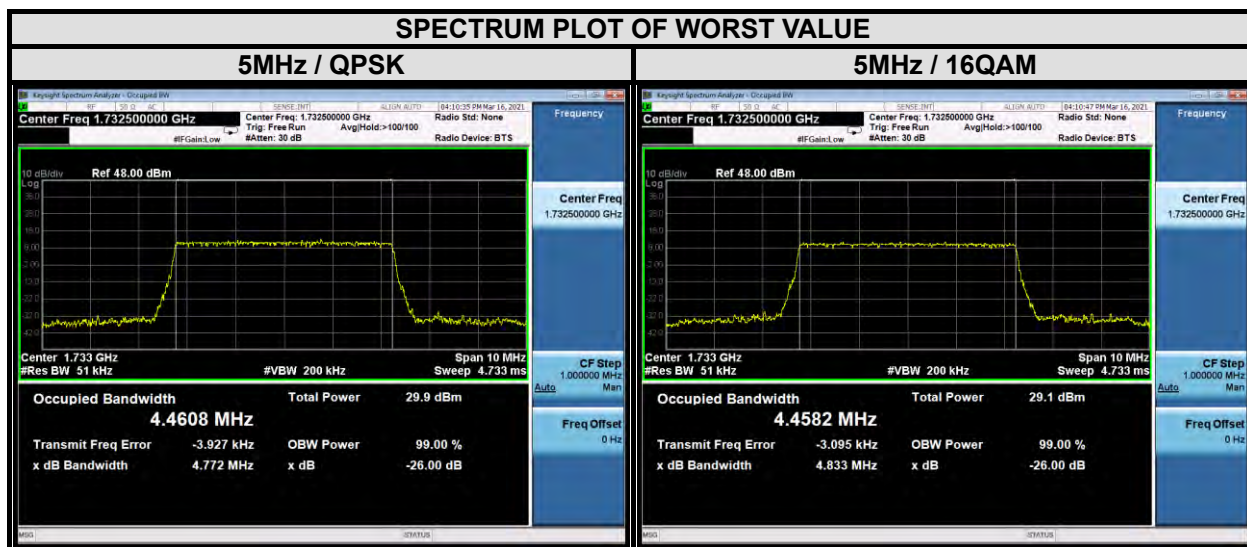
LTE BAND 4					
CHANNEL BANDWIDTH: 1.4MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
19957	1710.7	1.08	1.08	1.24	1.26
20175	1732.5	1.08	1.08	1.27	1.24
20393	1754.3	1.08	1.09	1.26	1.28



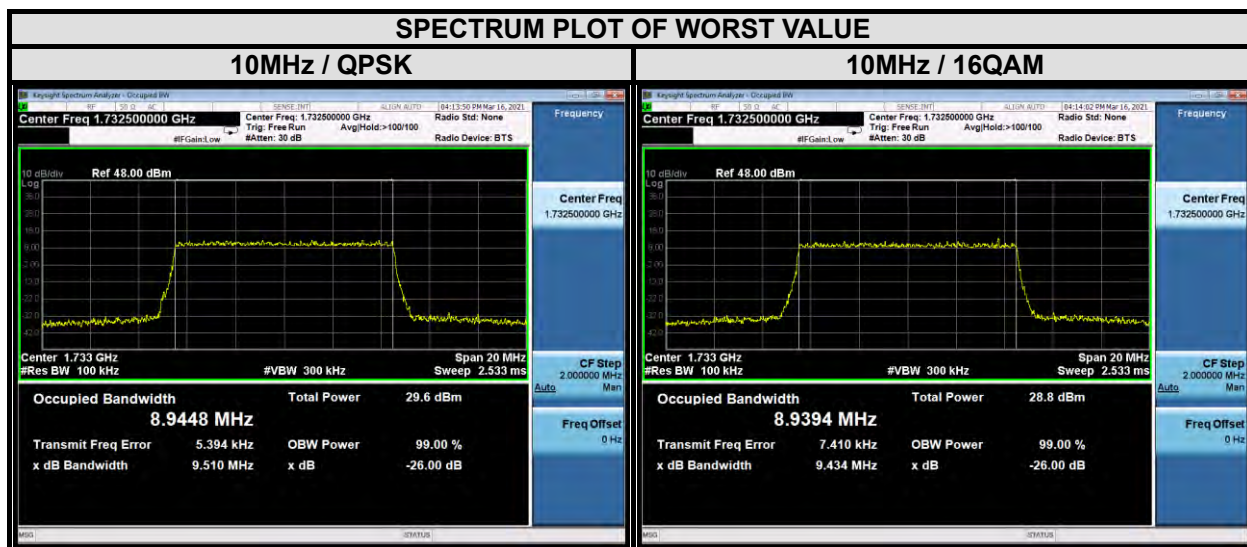
LTE BAND 4					
CHANNEL BANDWIDTH: 3MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
19965	1711.5	2.68	2.67	2.86	2.86
20175	1732.5	2.68	2.67	2.85	2.86
20385	1753.5	2.68	2.68	2.86	2.85



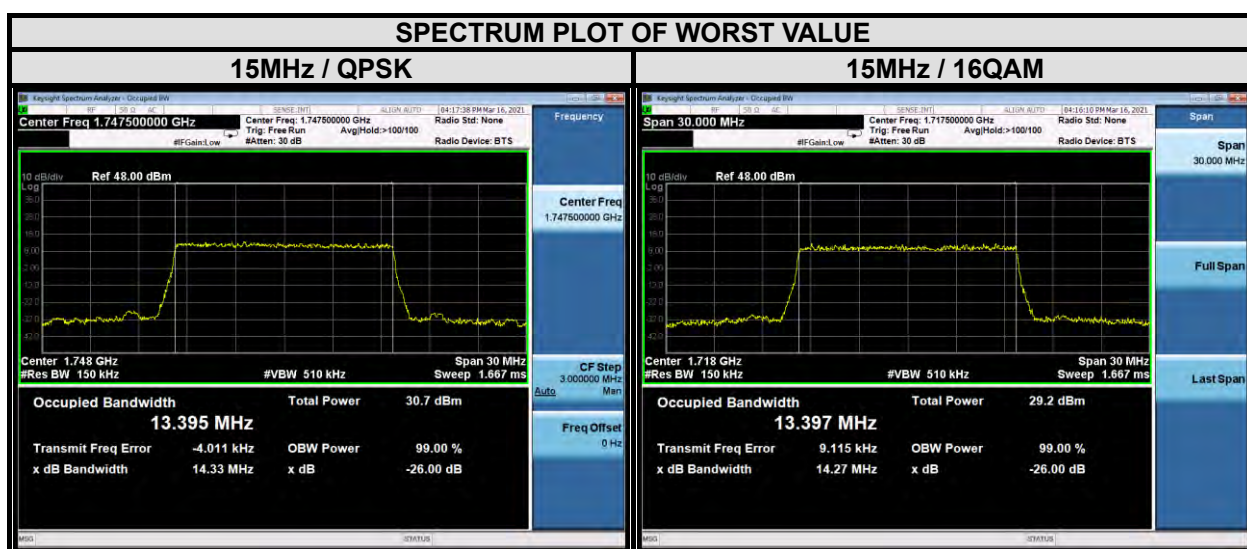
LTE BAND 4					
CHANNEL BANDWIDTH: 5MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
19975	1712.5	4.46	4.46	4.81	4.81
20175	1732.5	4.46	4.46	4.77	4.83
20375	1752.5	4.46	4.45	4.80	4.83



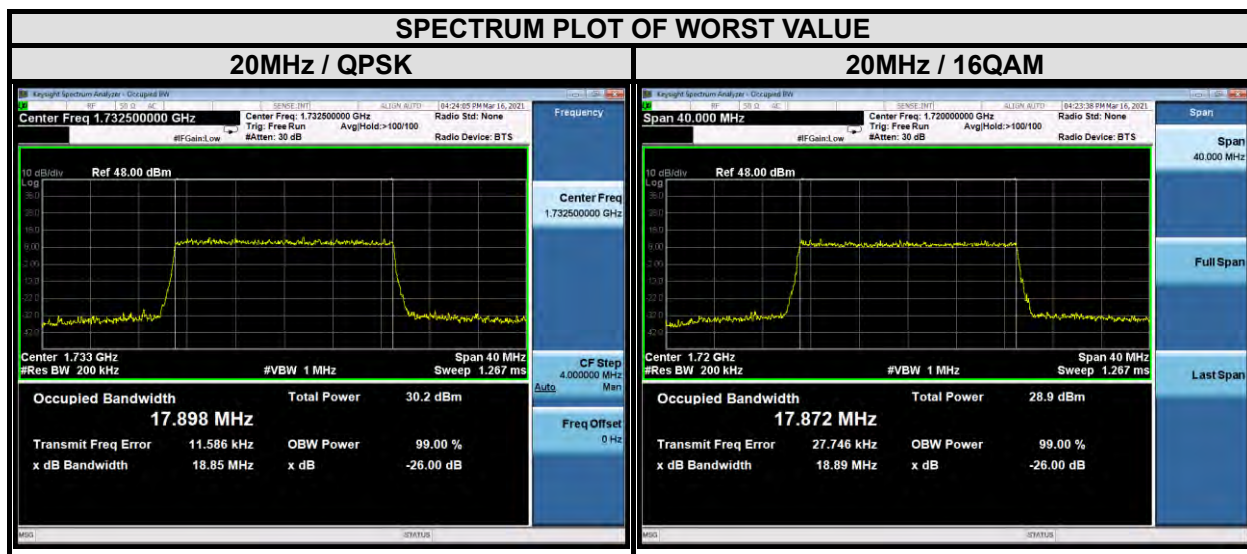
LTE BAND 4					
CHANNEL BANDWIDTH: 10MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
20000	1715	8.93	8.93	9.51	9.56
20175	1732.5	8.94	8.94	9.51	9.43
20350	1750	8.93	8.93	9.50	9.52



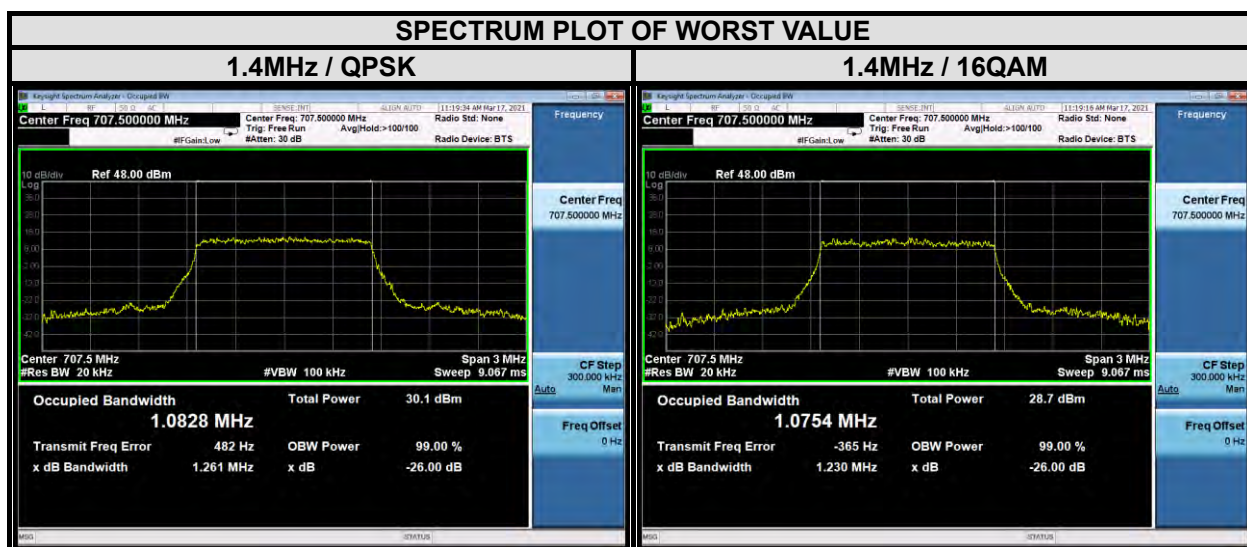
LTE BAND 4					
CHANNEL BANDWIDTH:15MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
20025	1717.5	13.40	13.40	14.30	14.27
20175	1732.5	13.38	13.39	14.18	14.31
20325	1747.5	13.40	13.39	14.33	14.23



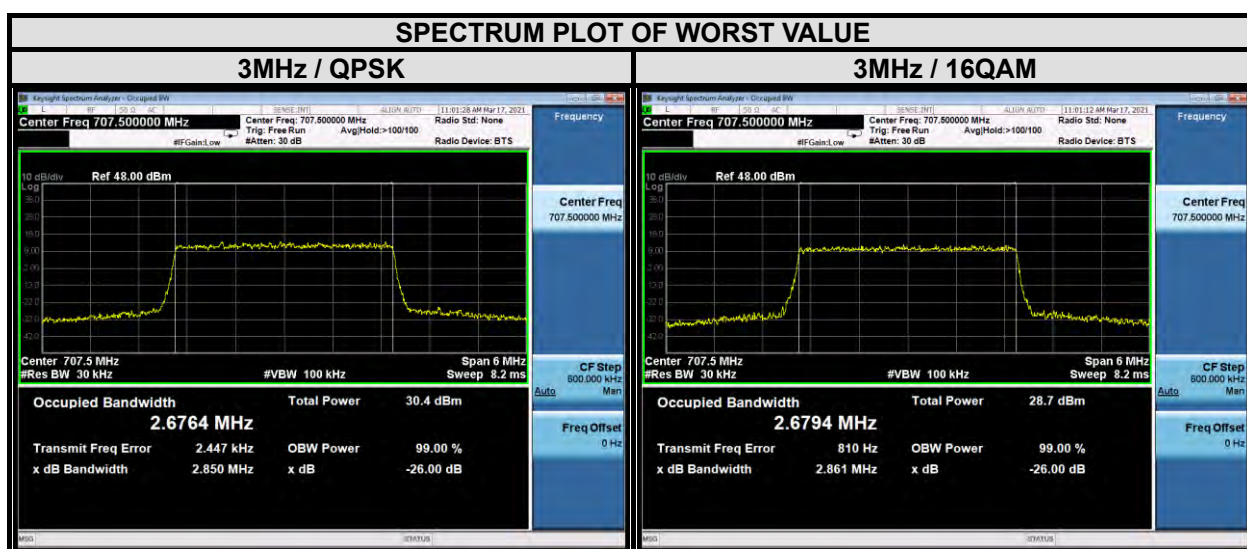
LTE BAND 4					
CHANNEL BANDWIDTH: 20MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
20050	1720	17.90	17.87	18.84	18.89
20175	1732.5	17.90	17.85	18.85	18.84
20300	1745	17.86	17.87	18.89	19.01



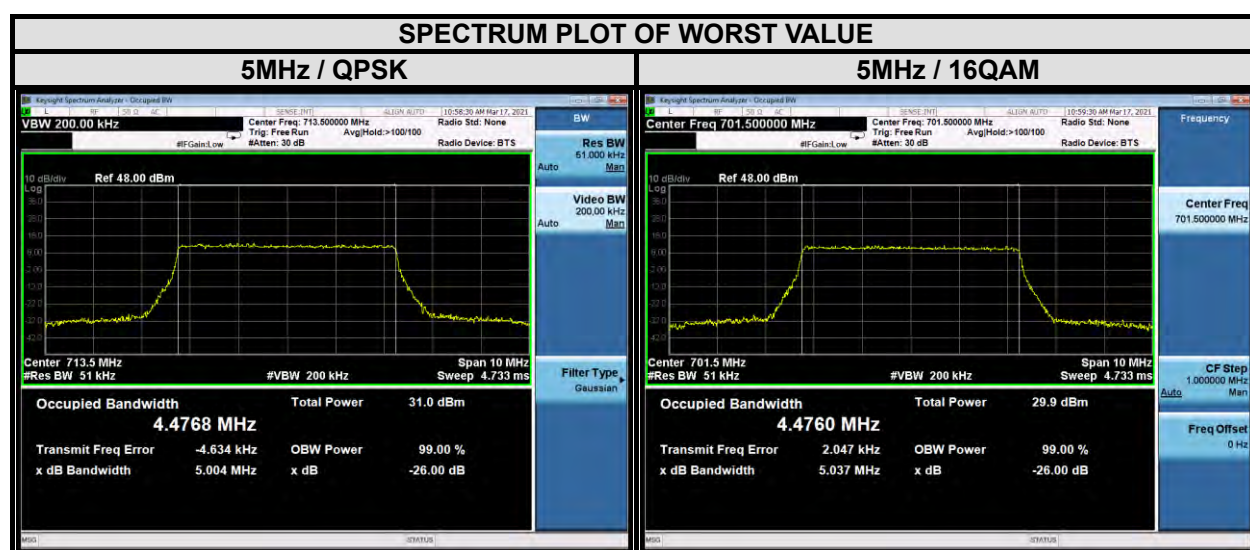
LTE BAND 12					
CHANNEL BANDWIDTH: 1.4MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
23017	699.7	1.08	1.09	1.24	1.28
23095	707.5	1.08	1.08	1.26	1.23
23173	715.3	1.08	1.08	1.25	1.25



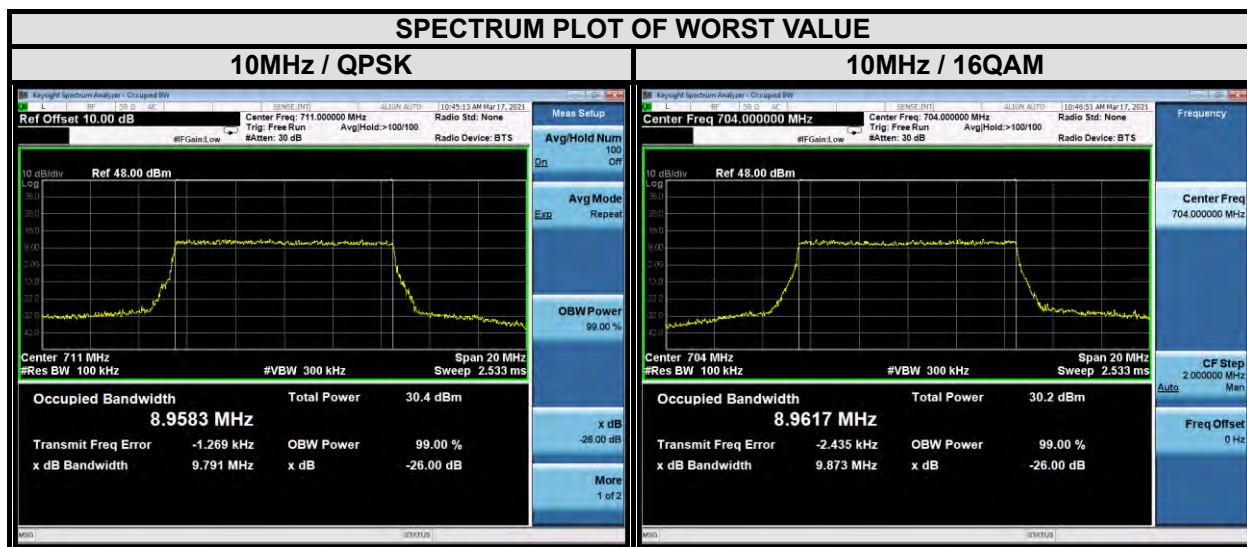
LTE BAND 12					
CHANNEL BANDWIDTH: 3MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
23025	700.5	2.68	2.67	2.86	2.86
23095	707.5	2.68	2.68	2.85	2.86
23165	714.5	2.67	2.67	2.85	2.84



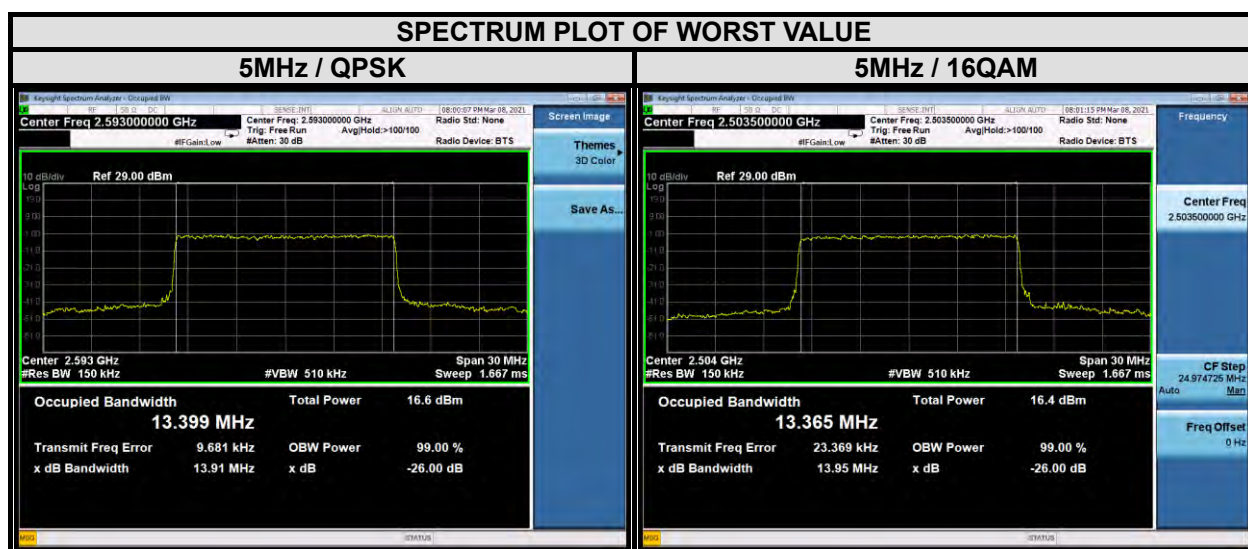
LTE BAND 12					
CHANNEL BANDWIDTH:5MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
23035	701.5	4.47	4.48	5.00	5.04
23095	707.5	4.46	4.47	5.00	5.04
23155	713.5	4.48	4.47	5.00	4.92



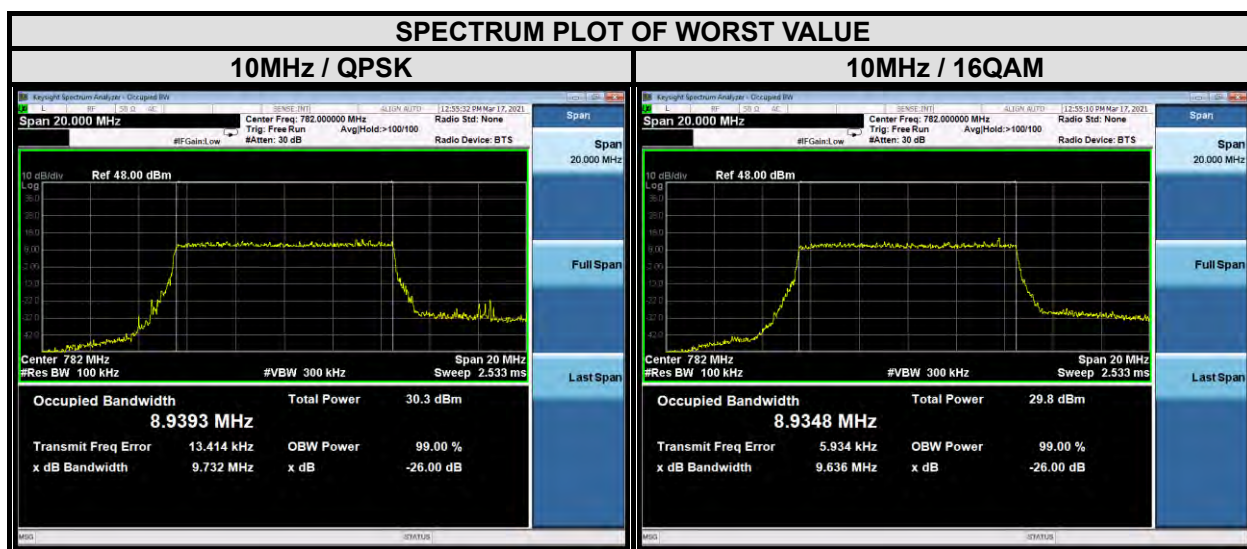
LTE BAND 12					
CHANNEL BANDWIDTH:10MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
23060	704	8.95	8.96	9.29	9.28
23095	707.5	8.93	8.93	9.27	9.29
23130	711	8.95	8.95	9.30	9.27



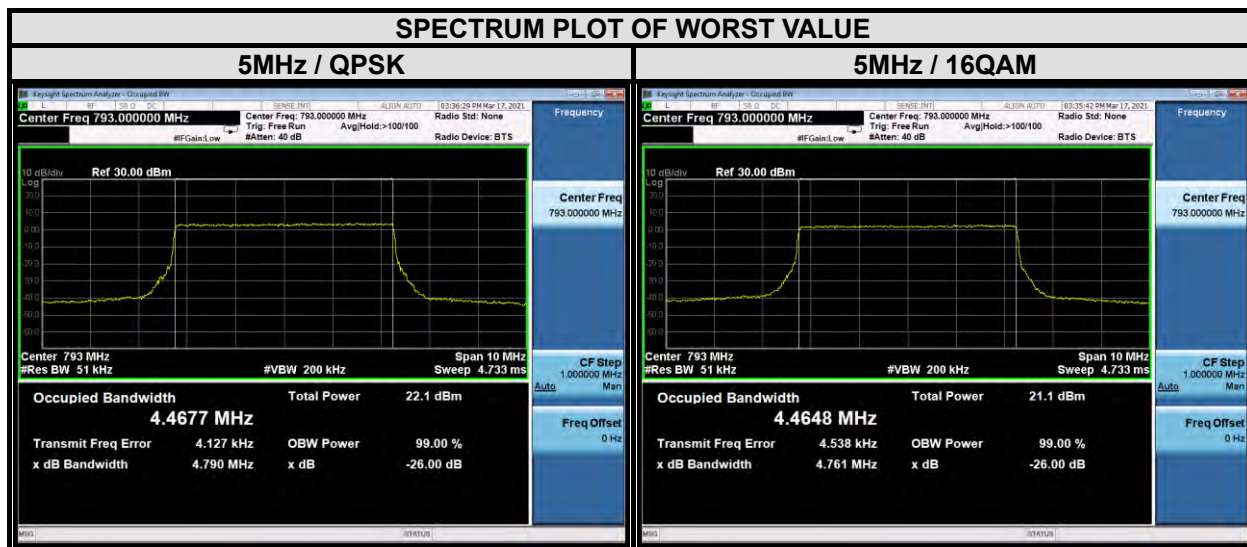
LTE BAND 13					
CHANNEL BANDWIDTH:5MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
23205	779.5	4.46	4.45	4.99	4.99
23230	782	4.47	4.48	5.00	5.04
23255	784.5	4.49	4.48	5.04	4.95



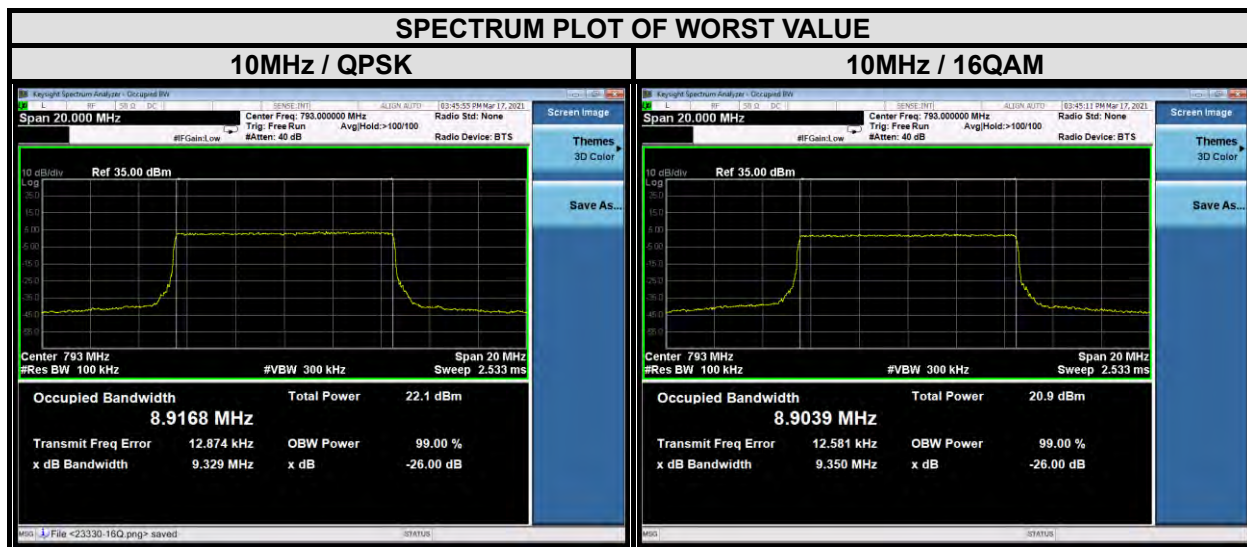
LTE BAND 13					
CHANNEL BANDWIDTH:10MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
-	-	-	-	-	-
23230	782	8.94	8.93	9.73	9.64
-	-	-	-	-	-



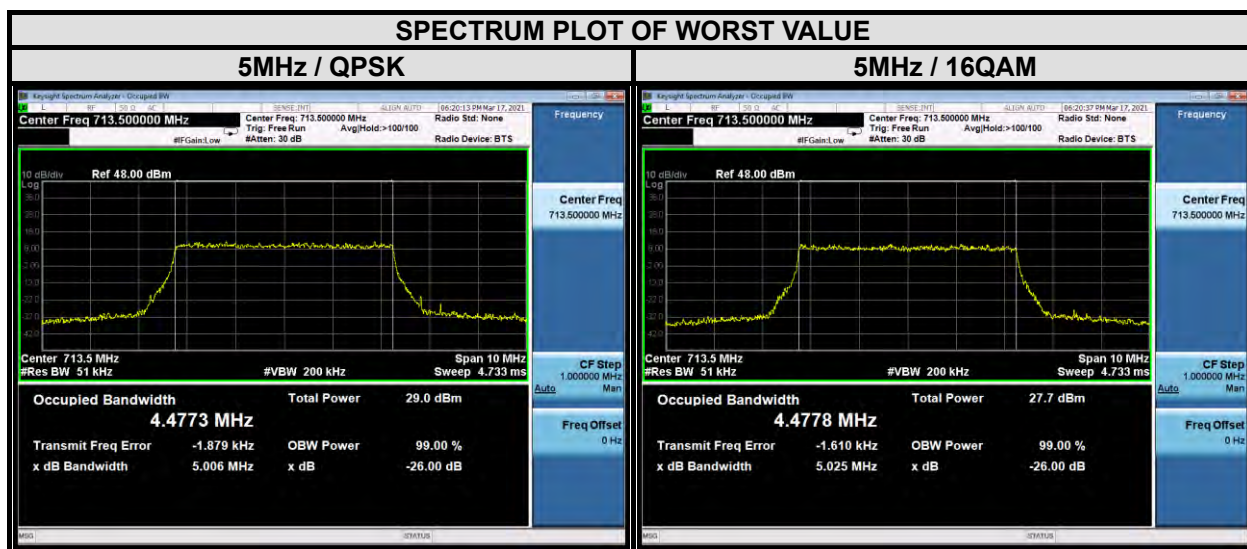
LTE BAND 14					
CHANNEL BANDWIDTH:5MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
23305	790.5	4.47	4.46	4.81	4.78
23330	793	4.47	4.46	4.79	4.76
23355	795.5	4.46	4.46	4.75	4.77



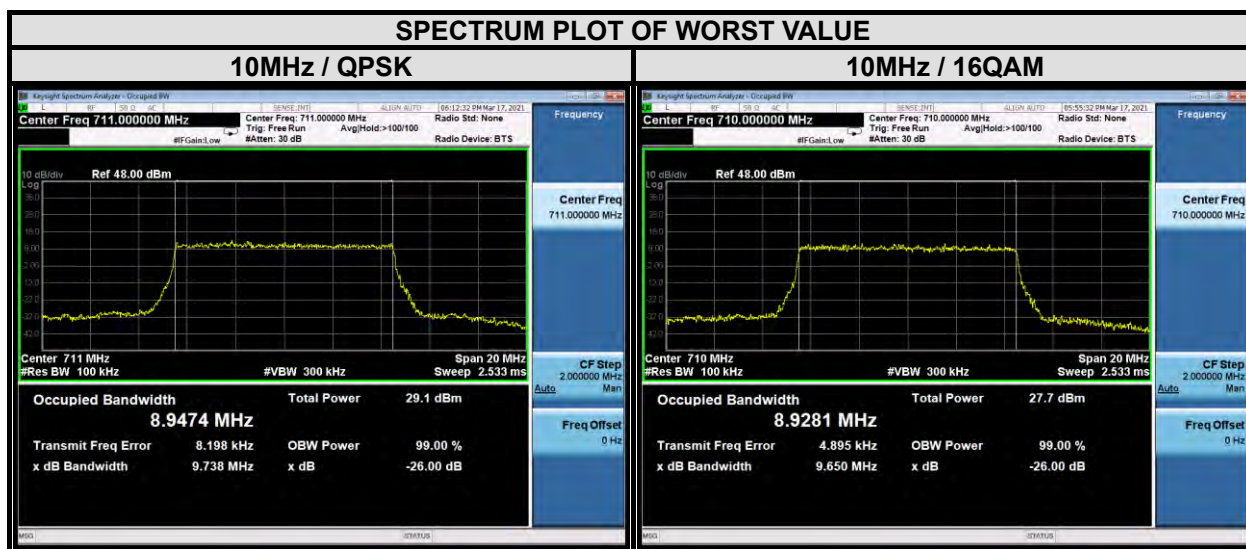
LTE BAND 14					
CHANNEL BANDWIDTH:10MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
-	-	-	-	-	-
23330	793	8.92	8.90	9.33	9.35
-	-	-	-	-	-



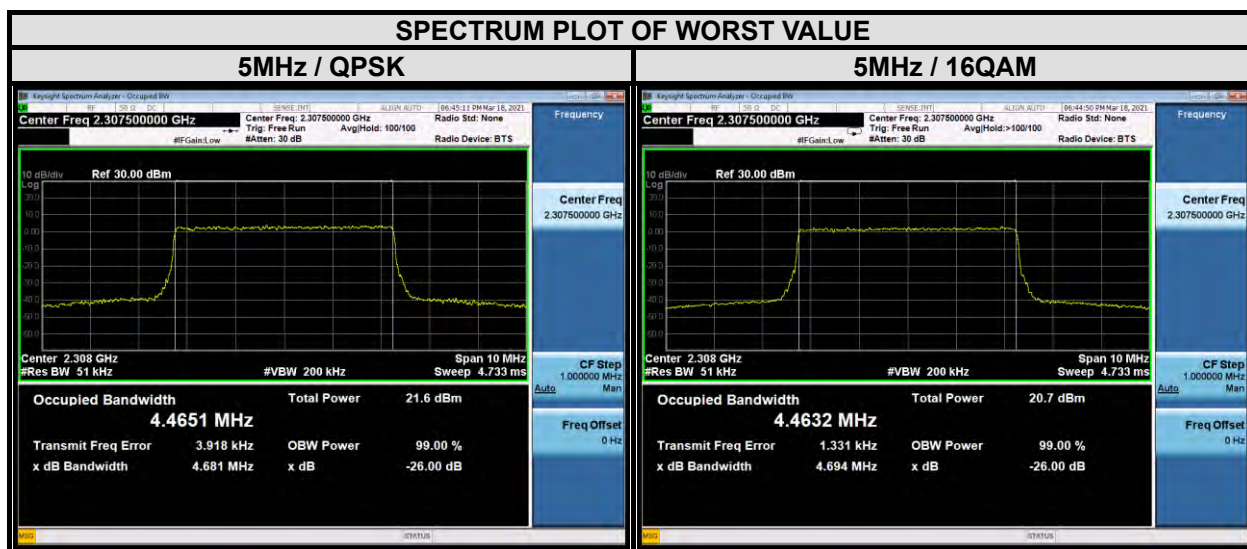
LTE BAND 17					
CHANNEL BANDWIDTH:5MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
23755	706.5	4.48	4.47	5.09	5.00
23790	710	4.47	4.47	5.02	5.00
23825	713.5	4.48	4.48	5.00	5.03



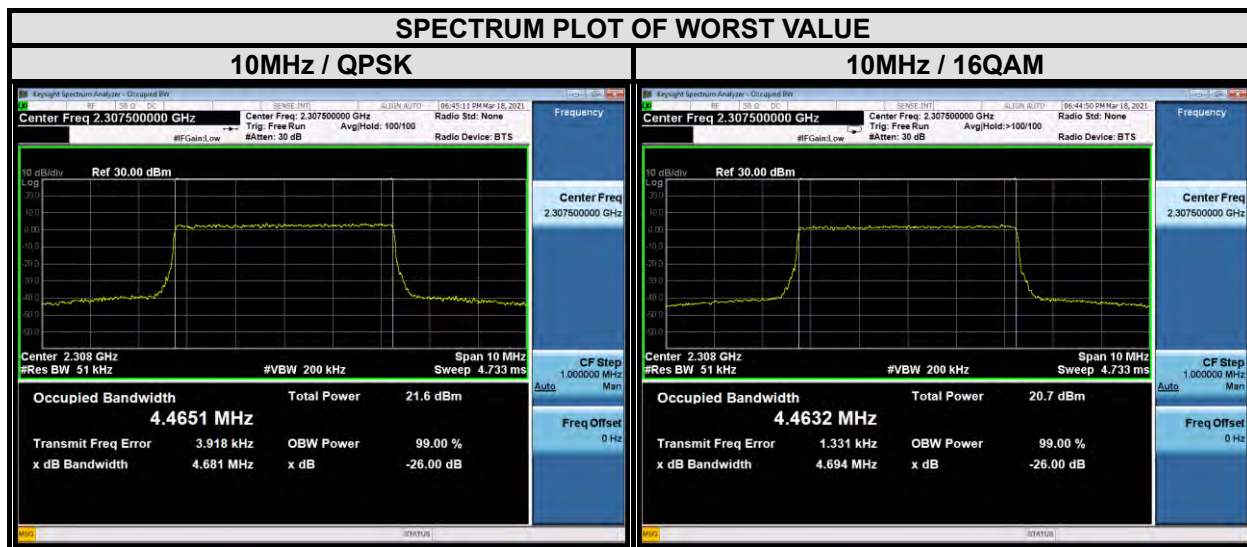
LTE BAND 17					
CHANNEL BANDWIDTH:10MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
23780	709	8.91	8.91	9.69	9.73
23790	710	8.94	8.93	9.64	9.65
23800	711	8.95	8.93	9.74	9.68



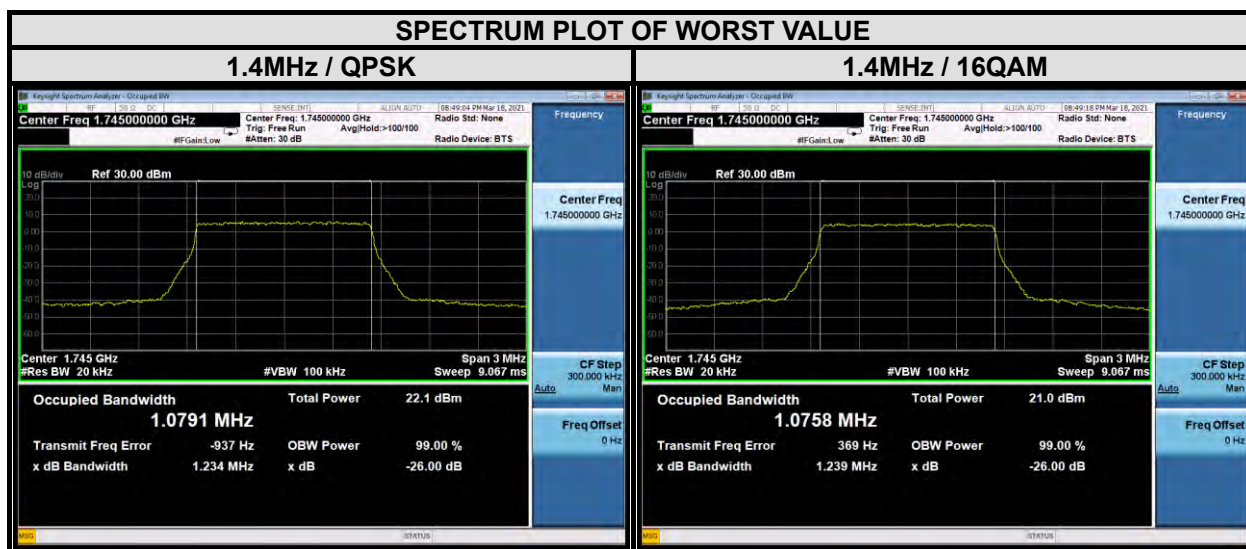
LTE BAND 30					
CHANNEL BANDWIDTH:5MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
27685	2307.5	4.47	4.46	4.68	4.69
27710	2310	4.46	4.46	4.66	4.69
27735	2312.5	4.46	4.46	4.70	4.69



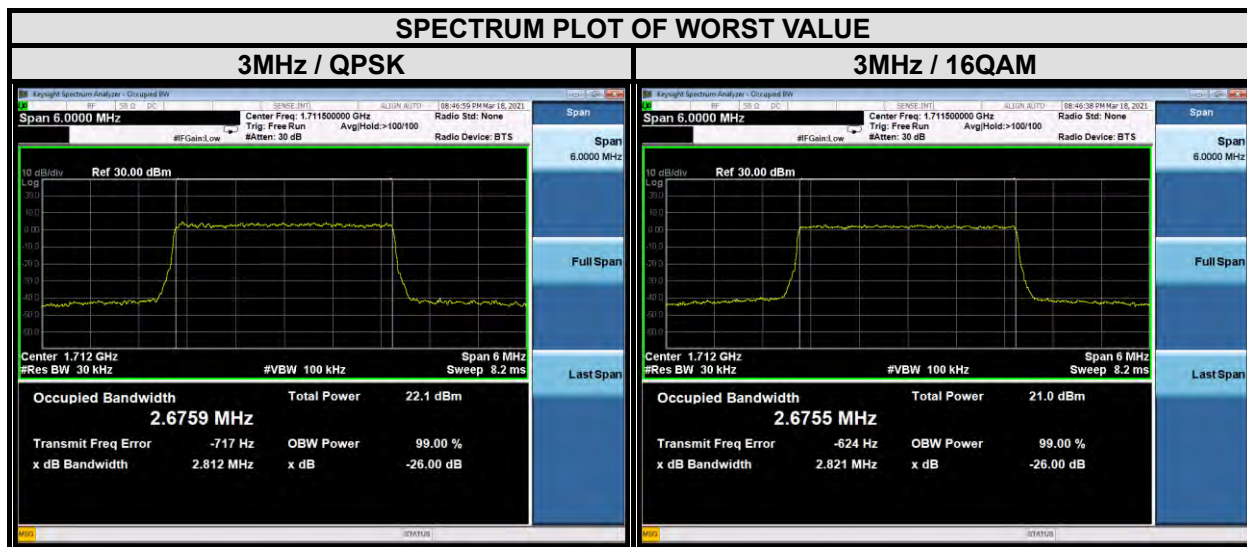
LTE BAND 30					
CHANNEL BANDWIDTH:10MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
-	-	-	-	-	-
27710	2310	8.92	8.93	9.31	9.29
-	-	-	-	-	-



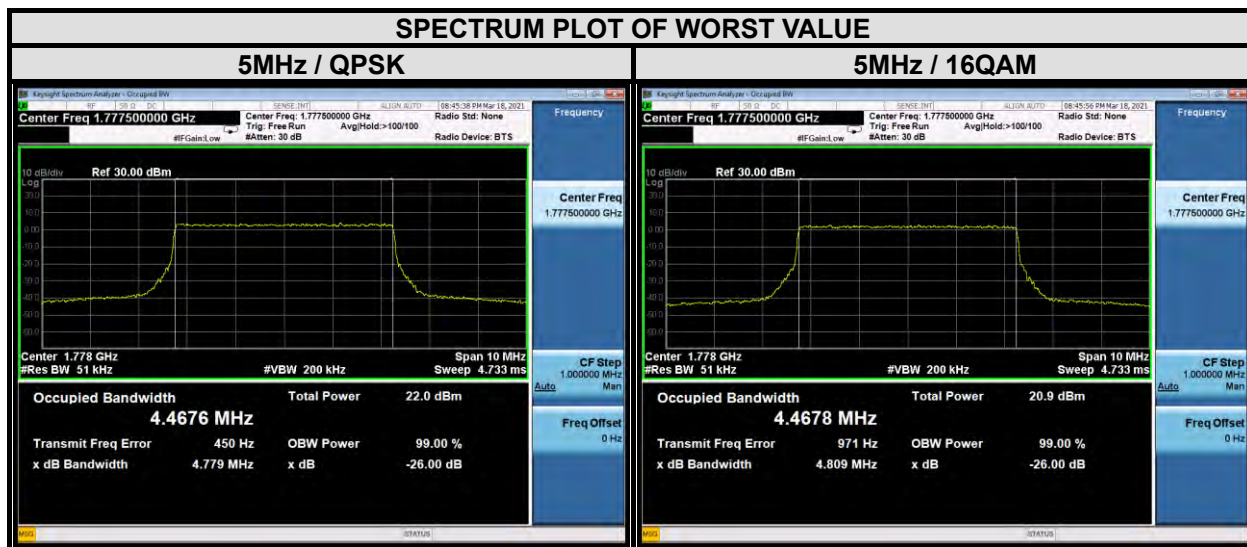
LTE BAND 66					
CHANNEL BANDWIDTH:1.4MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
131979	1710.7	1.08	1.08	1.24	1.22
132322	1745	1.08	1.08	1.23	1.24
132665	1779.3	1.08	1.08	1.24	1.23



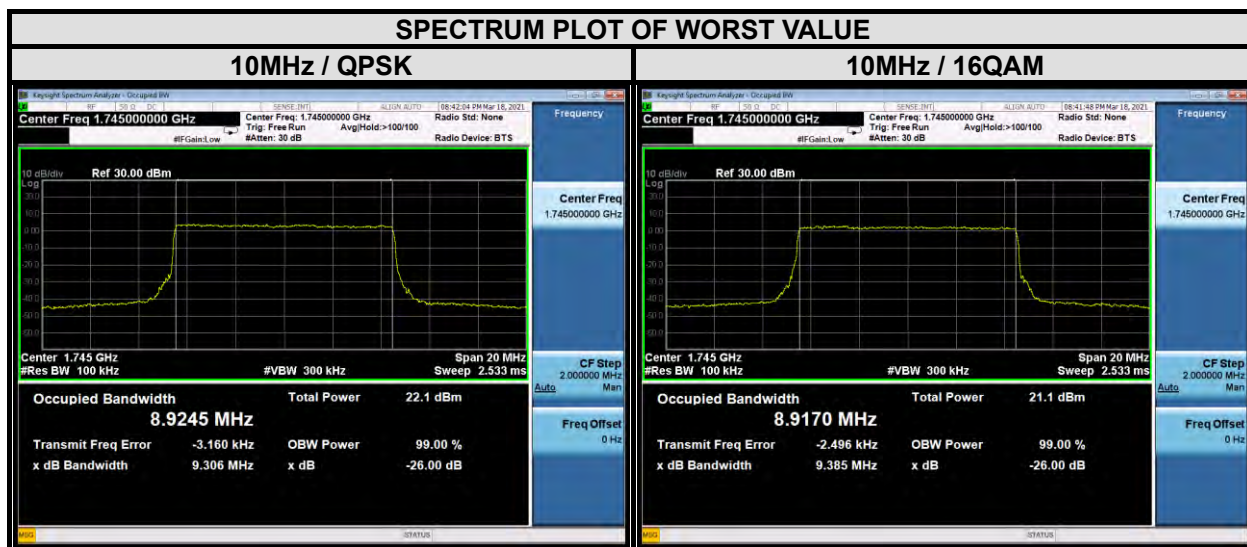
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CHANNEL BANDWIDTH:3MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
131987	1711.5	2.68	2.68	2.81	2.82
132322	1745	2.67	2.67	2.81	2.81
132657	1778.5	2.68	2.67	2.82	2.81



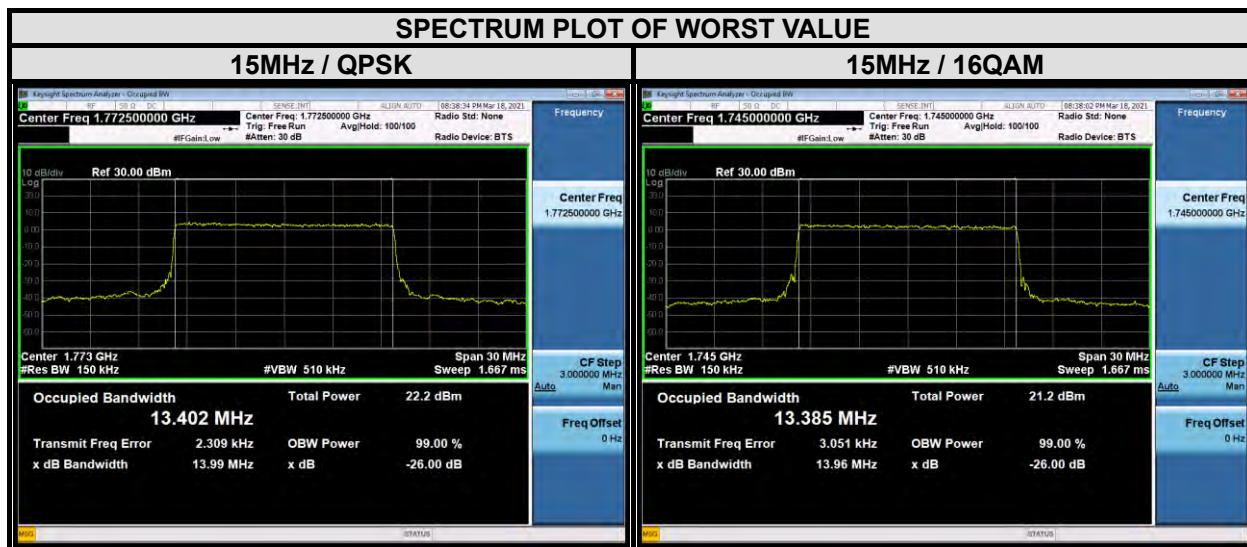
LTE BAND 66					
CHANNEL BANDWIDTH:5MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
131997	1712.5	4.46	4.47	4.76	4.80
132322	1745	4.45	4.47	4.76	4.81
132647	1777.5	4.47	4.47	4.78	4.81



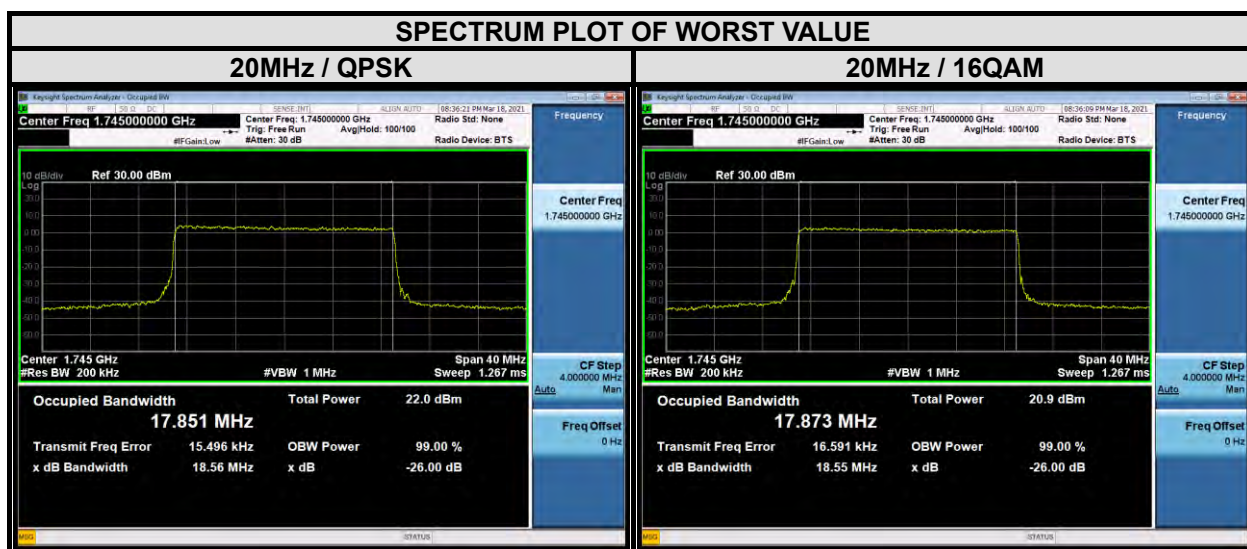
LTE BAND 66					
CHANNEL BANDWIDTH:10MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
132022	1715	8.92	8.92	9.32	9.36
132322	1745	8.92	8.92	9.31	9.39
132622	1775	8.92	8.92	9.37	9.36



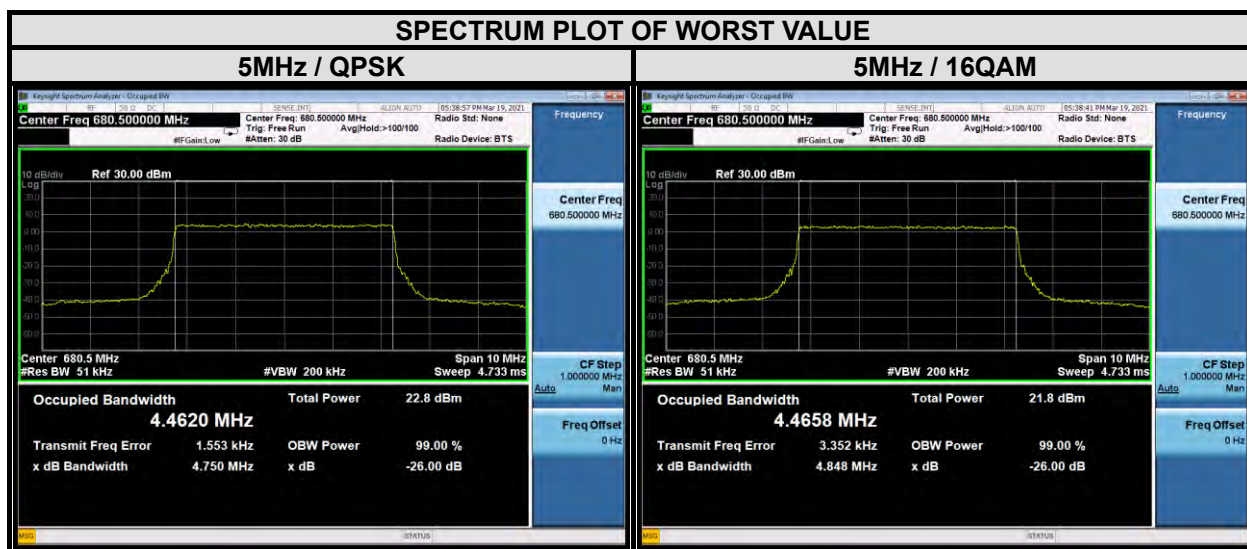
LTE BAND 66					
CHANNEL BANDWIDTH:15MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
132047	1717.5	13.40	13.37	13.93	13.96
132322	1745	13.38	13.39	13.92	13.96
132597	1772.5	13.40	13.38	13.99	13.90



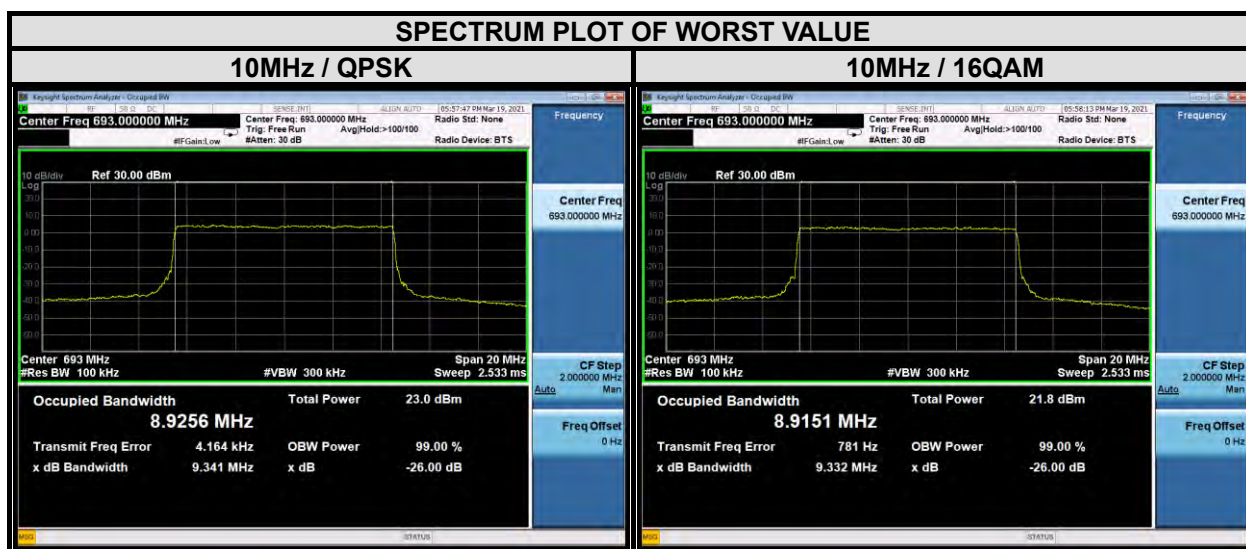
LTE BAND 66					
CHANNEL BANDWIDTH:20MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
132072	1720	17.84	17.84	18.57	18.57
132322	1745	17.85	17.87	18.56	18.55
132572	1770	17.84	17.86	18.59	18.57



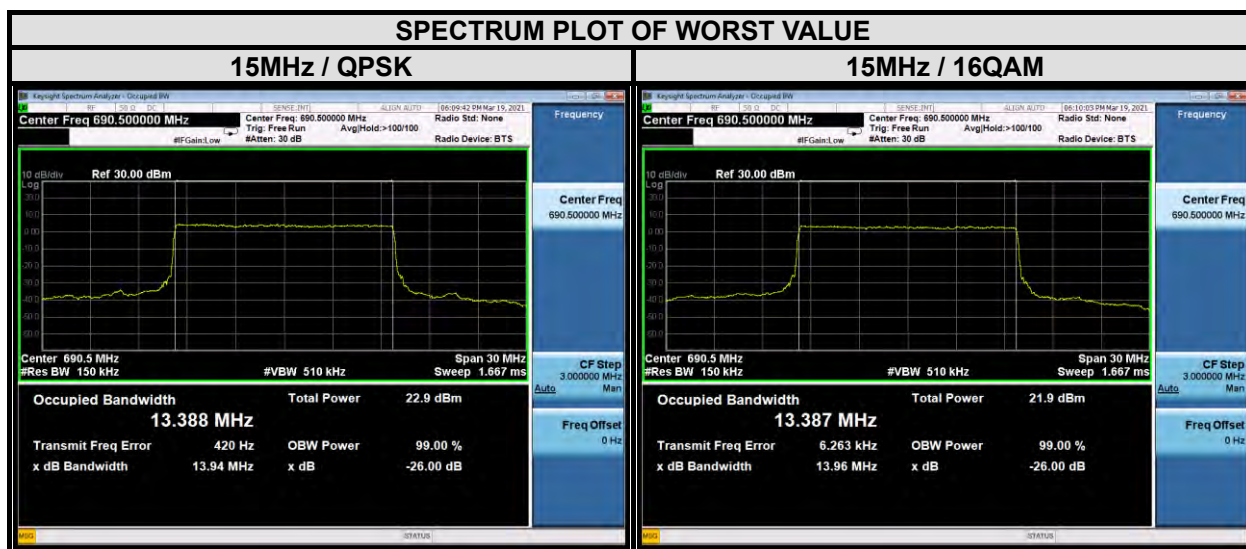
LTE BAND 71					
CHANNEL BANDWIDTH:5MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
133147	665.5	4.46	4.47	4.78	4.84
133297	680.5	4.46	4.47	4.75	4.85
133447	695.5	4.46	4.46	4.79	4.79



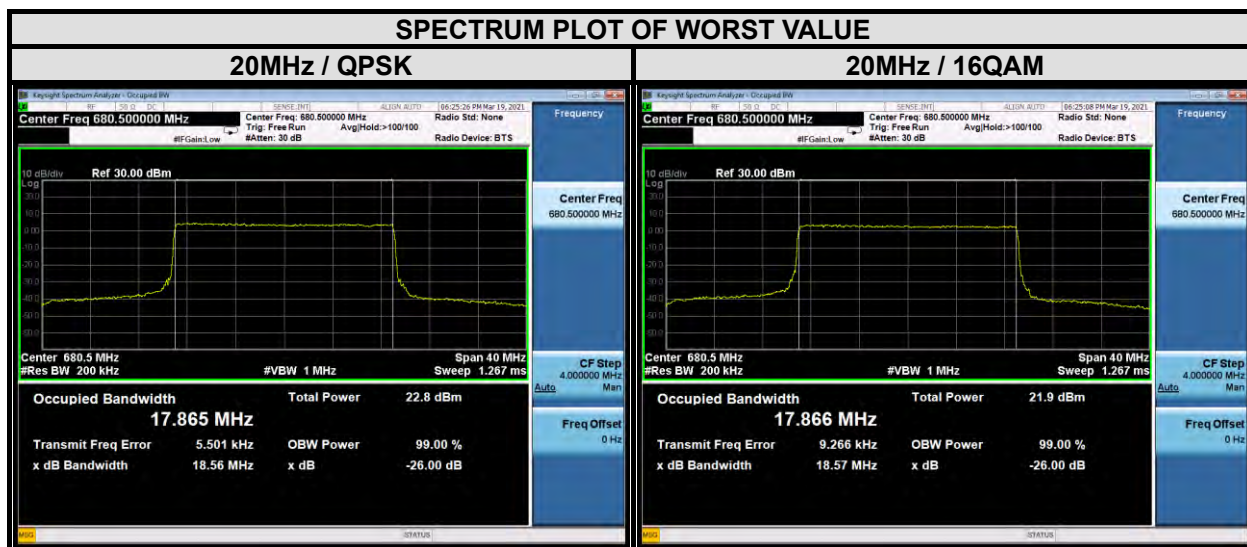
LTE BAND 71					
CHANNEL BANDWIDTH:10MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
133172	668	8.92	8.91	9.36	9.31
133297	680.5	8.92	8.92	9.41	9.40
133422	693	8.93	8.92	9.34	9.33



LTE BAND 71					
CHANNEL BANDWIDTH:15MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
133197	670.5	13.38	13.38	14.00	13.93
133297	680.5	13.39	13.38	13.97	13.96
133397	690.5	13.39	13.39	13.94	13.96



LTE BAND 71					
CHANNEL BANDWIDTH:20MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		26dB BANDWIDTH (MHz)	
		QPSK	16QAM	QPSK	16QAM
133222	673	17.84	17.83	18.60	18.56
133297	680.5	17.87	17.87	18.56	18.57
133372	688	17.84	17.85	18.55	18.59

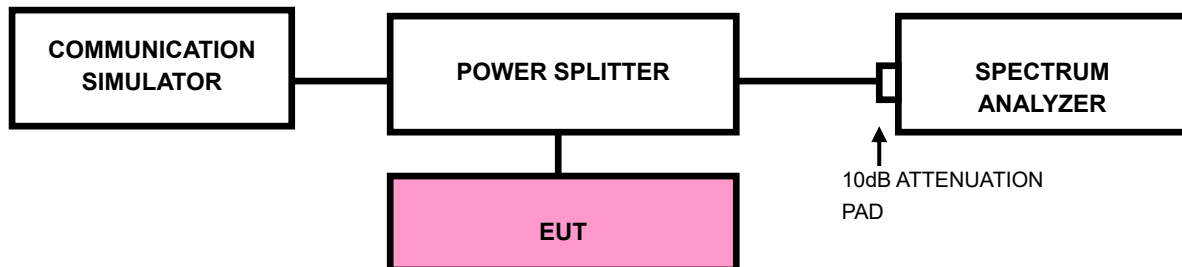


3.4 BAND EDGE MEASUREMENT

3.4.1 LIMITS OF BAND EDGE MEASUREMENT

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

3.4.2 TEST SETUP



3.4.3 TEST PROCEDURES

- a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
- b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz (WCDMA).
- d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 20kHz and VBW of the spectrum is 100 kHz. (LTE bandwidth 1.4MHz)
- e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 30kHz and VBW of the spectrum is 100kHz. (LTE bandwidth 3MHz)
- f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 50kHz and VBW of the spectrum is 200kHz. (LTE bandwidth 5MHz)
- g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz. (LTE bandwidth 10MHz)
- h. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 150kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 15MHz)
- i. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 20MHz)
- j. Record the max trace plot into the test report.

3.4.4 TEST RESULTS

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