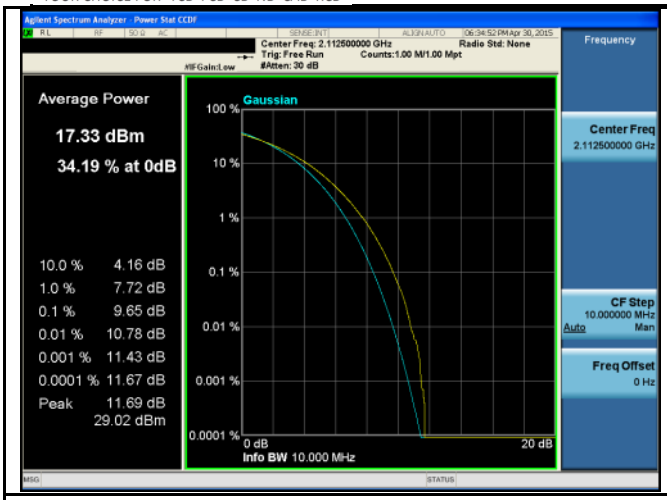
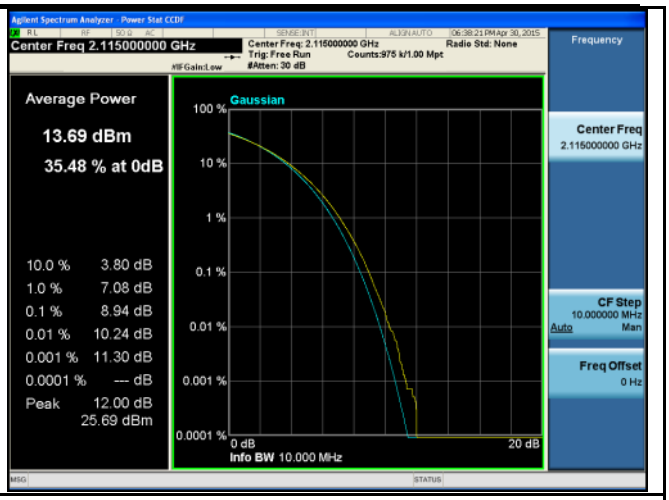
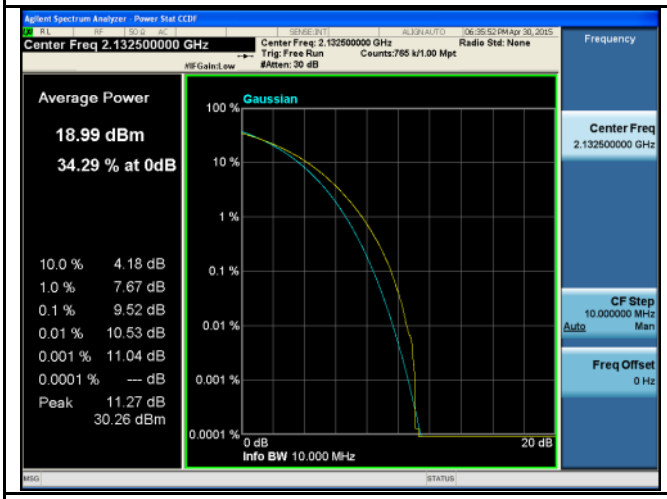


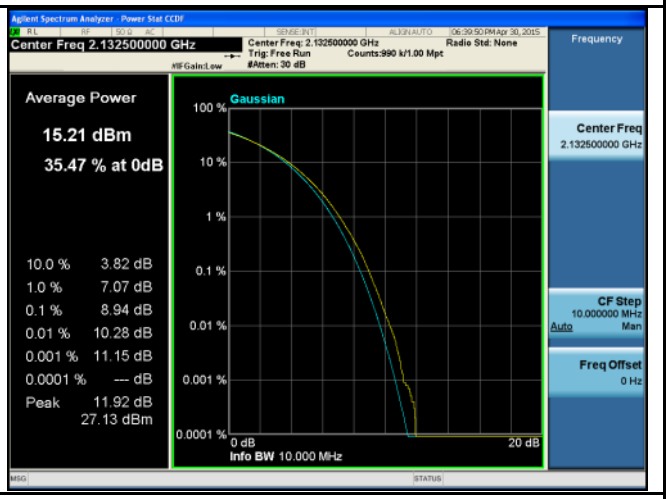
PK-AV-Ratio-Band4-64QAM-5M BW-Low



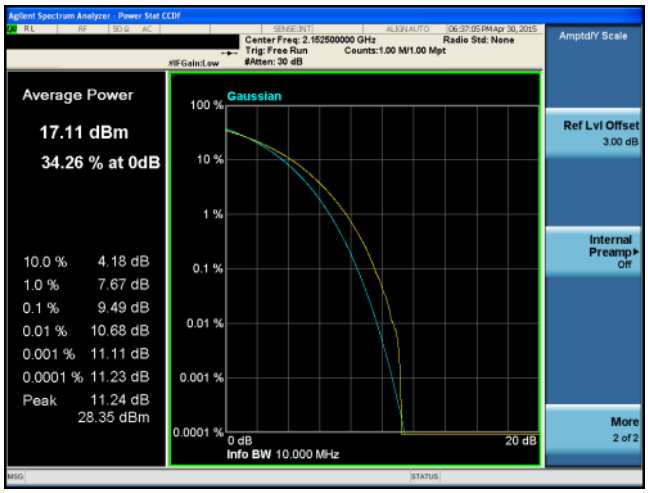
PK-AV-Ratio-Band4-64QAM-10M BW-Low



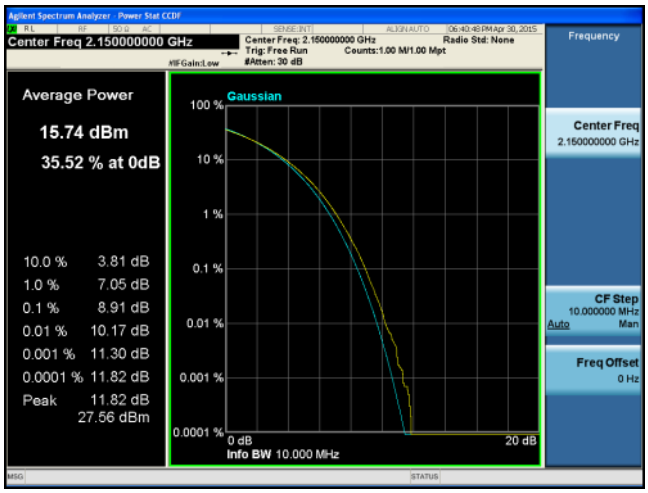
PK-AV-Ratio-Band4-64QAM-5M BW-Mid



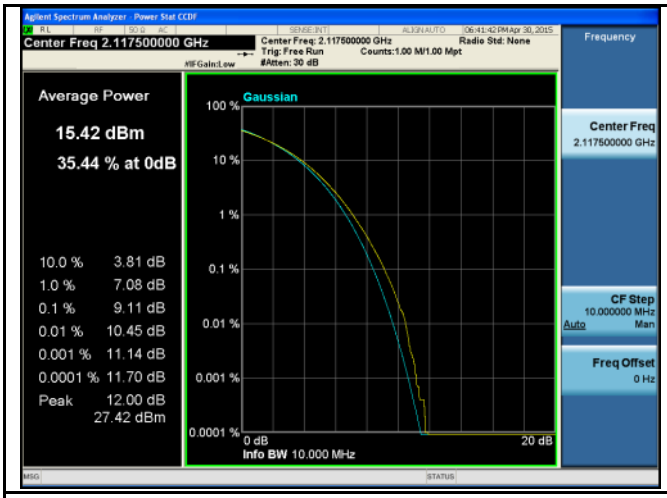
PK-AV-Ratio-Band4-64QAM-10M BW-Mid



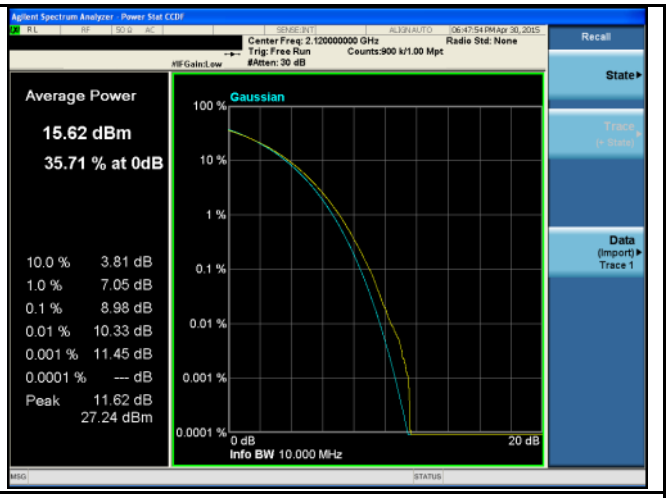
PK-AV-Ratio-Band4-64QAM-5M BW-High



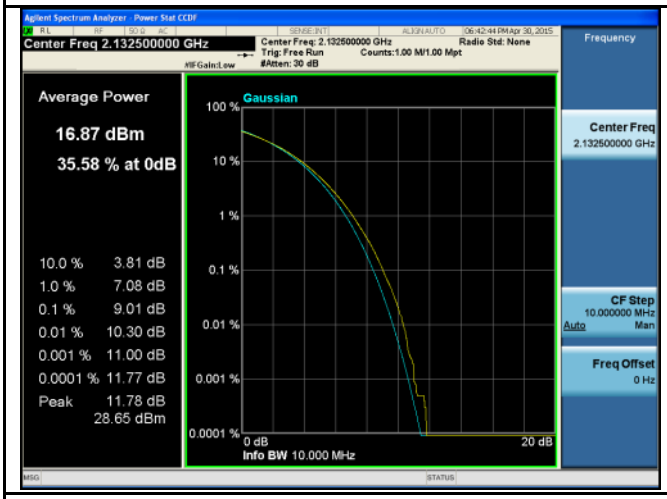
PK-AV-Ratio-Band4-64QAM-10M BW-High



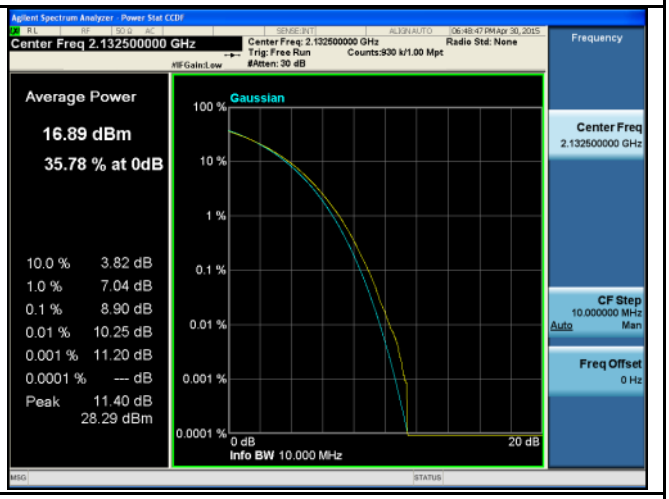
PK-AV-Ratio-Band4-QPSK-15M BW-Low



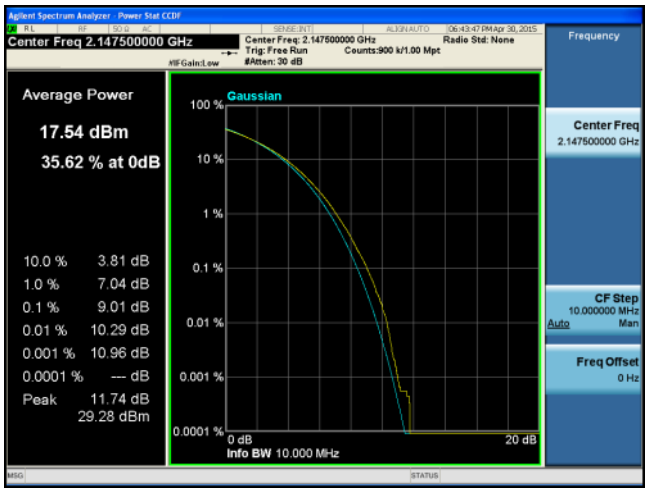
PK-AV-Ratio-Band4-QPSK-20M BW-Low



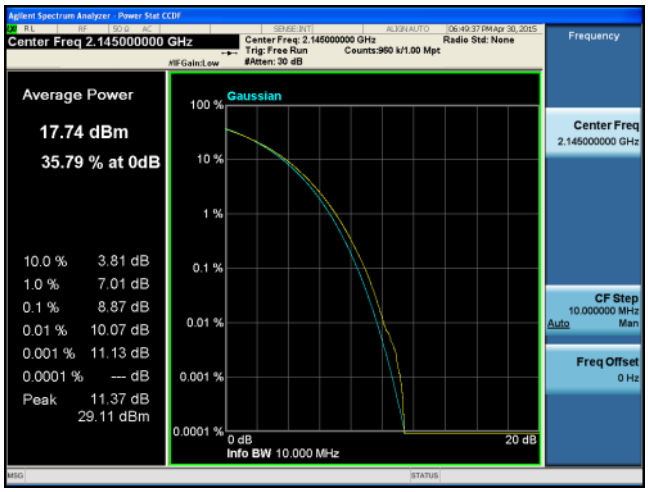
PK-AV-Ratio-Band4-QPSK-15M BW-Mid



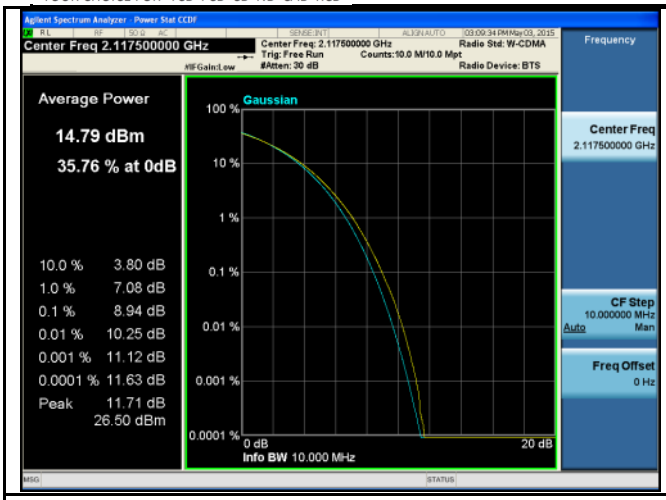
PK-AV-Ratio-Band4-QPSK-20M BW-Mid



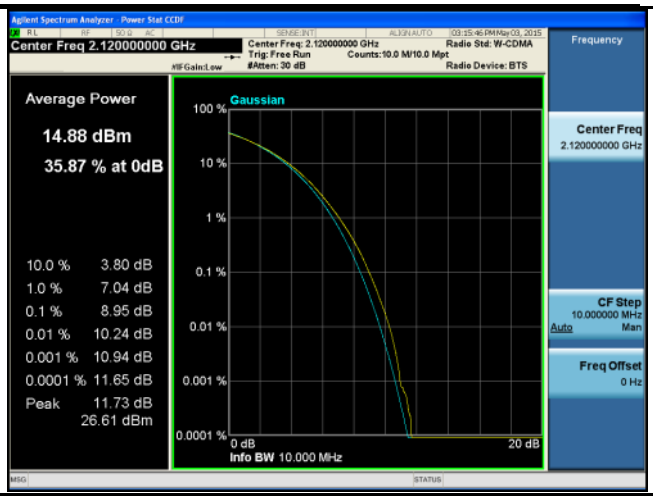
PK-AV-Ratio-Band4-QPSK-15M BW-High



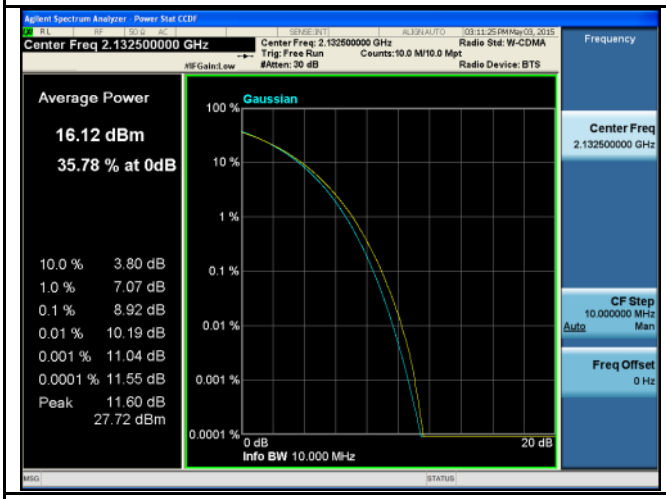
PK-AV-Ratio-Band4-QPSK-20M BW-High



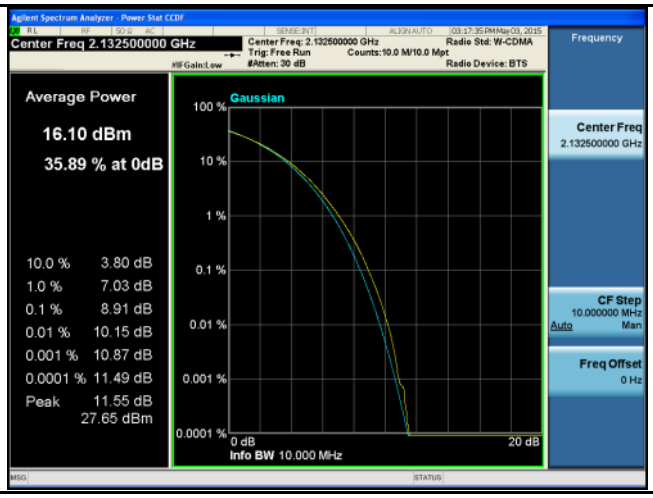
PK-AV-Ratio-Band4-16QAM-15M BW-Low



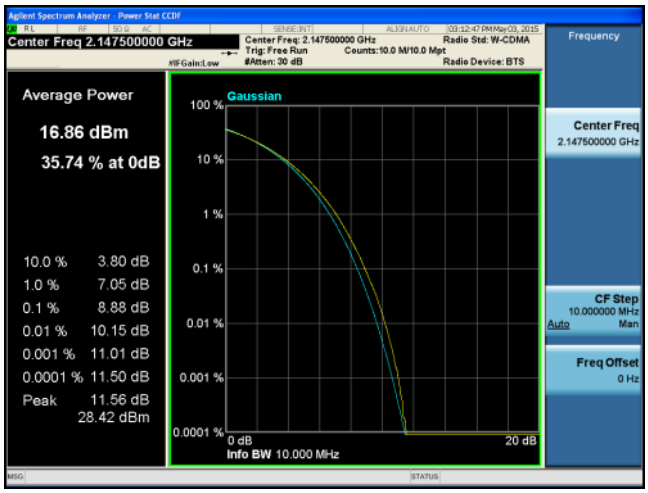
PK-AV-Ratio-Band4-16QAM-20M BW-Low



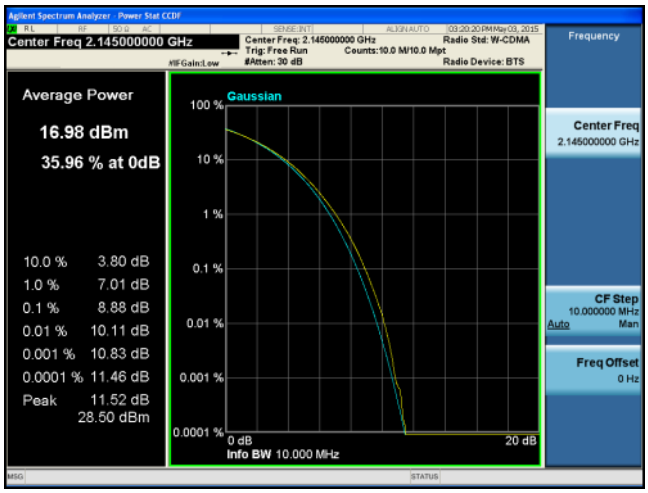
PK-AV-Ratio-Band4-16QAM-15M BW-Mid



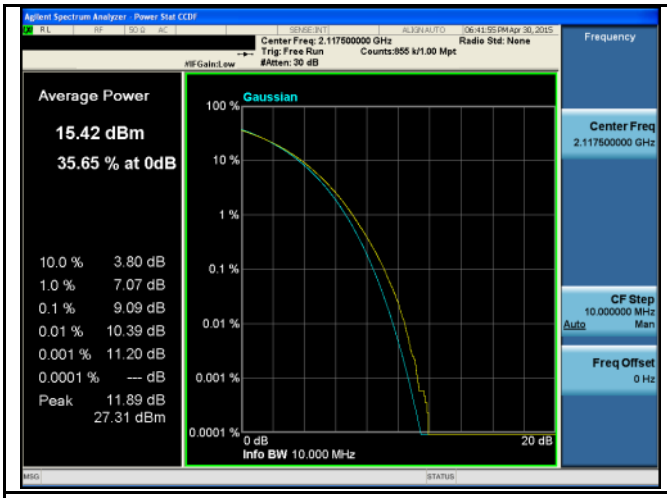
PK-AV-Ratio-Band4-16QAM-20M BW-Mid



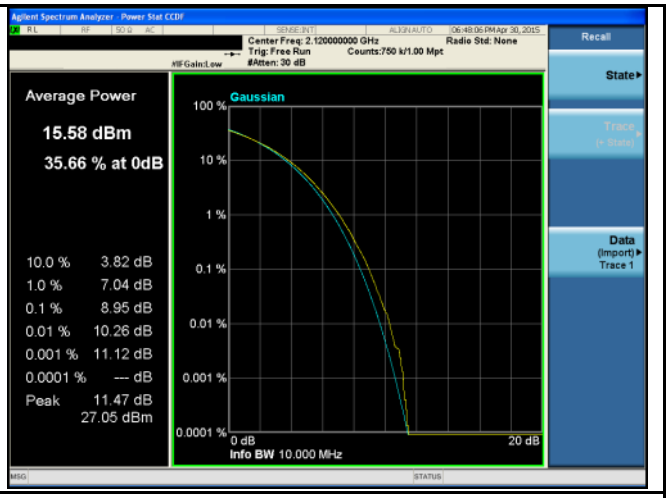
PK-AV-Ratio-Band4-16QAM-15M BW-High



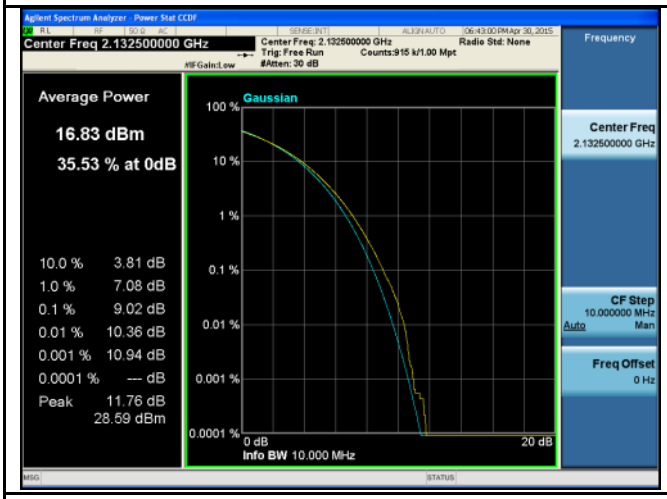
PK-AV-Ratio-Band4-16QAM-20M BW-High



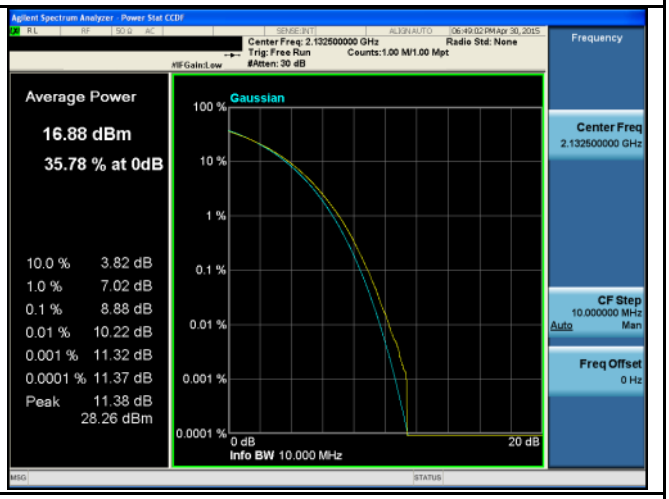
PK-AV-Ratio-Band4-64QAM-15M BW-Low



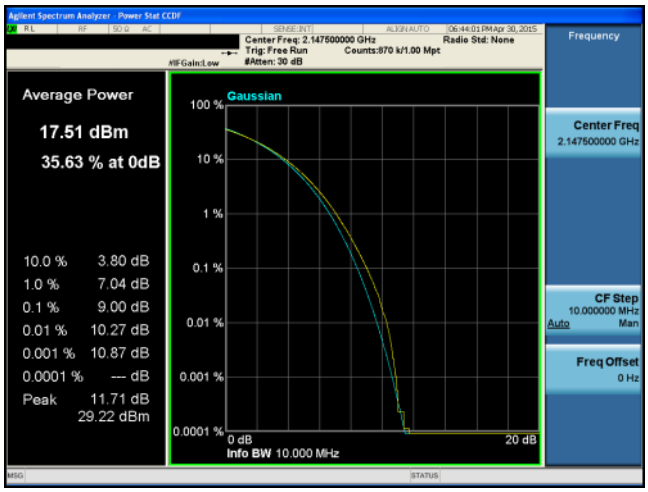
PK-AV-Ratio-Band4-64QAM-20M BW-Low



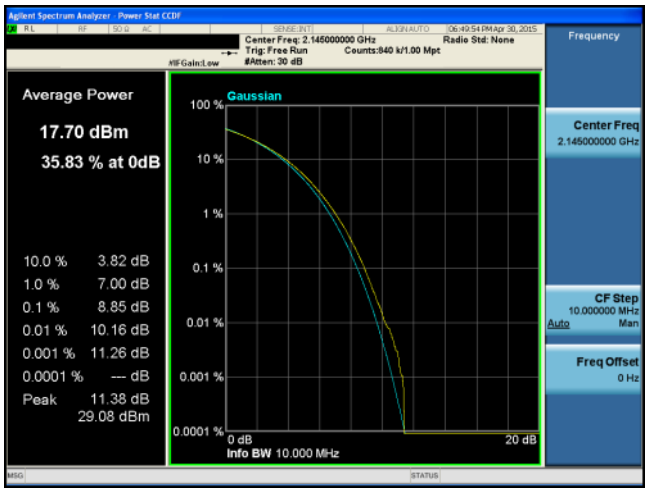
PK-AV-Ratio-Band4-64QAM-15M BW-Mid



PK-AV-Ratio-Band4-64QAM-20M BW-Mid

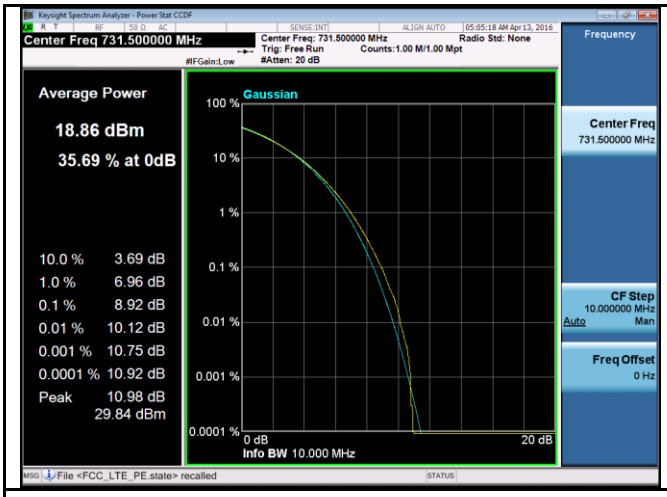


PK-AV-Ratio-Band4-64QAM-15M BW-High

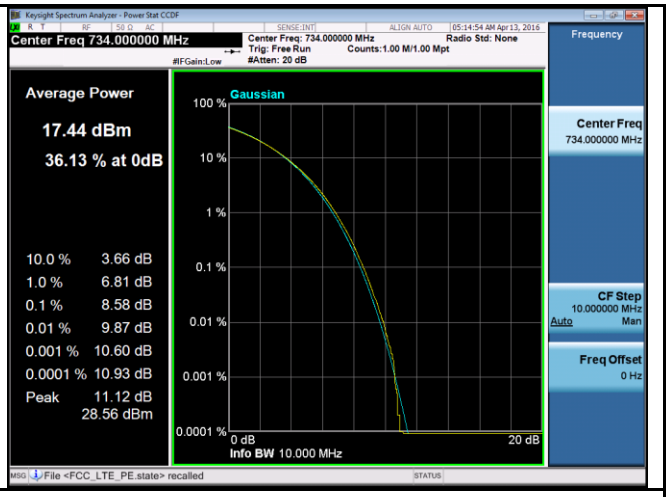


PK-AV-Ratio-Band4-64QAM-20M BW-High

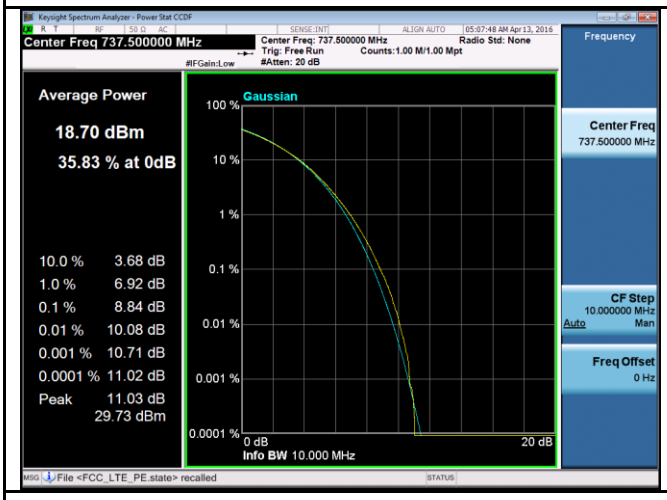
Test Plots for Band 12:



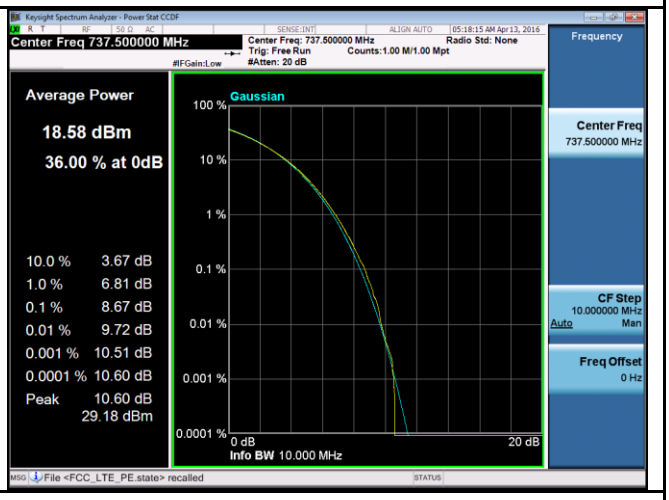
PK-AV-Ratio-Band12-QPSK-5M BW-Low



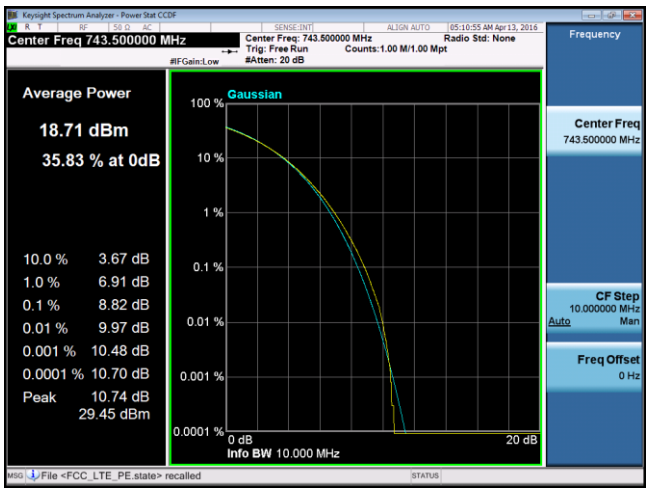
PK-AV-Ratio- Band12-QPSK-10M BW-Low



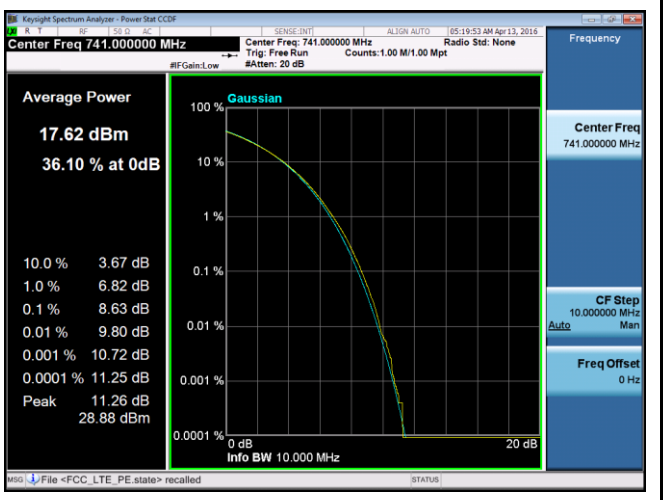
PK-AV-Ratio- Band12-QPSK-5M BW-Mid



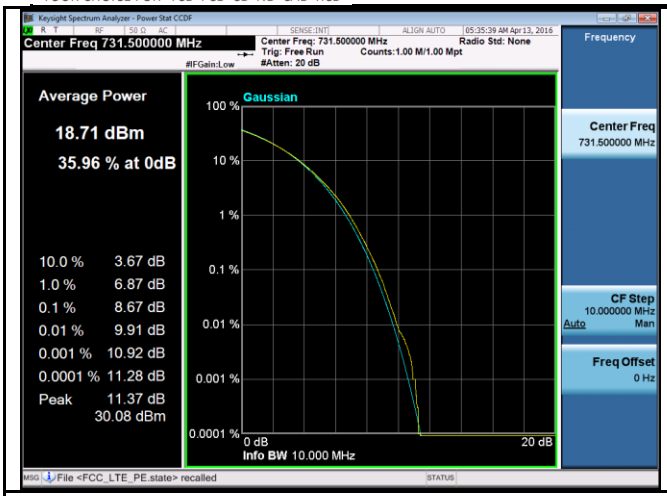
PK-AV-Ratio- Band12-QPSK-10M BW-Mid



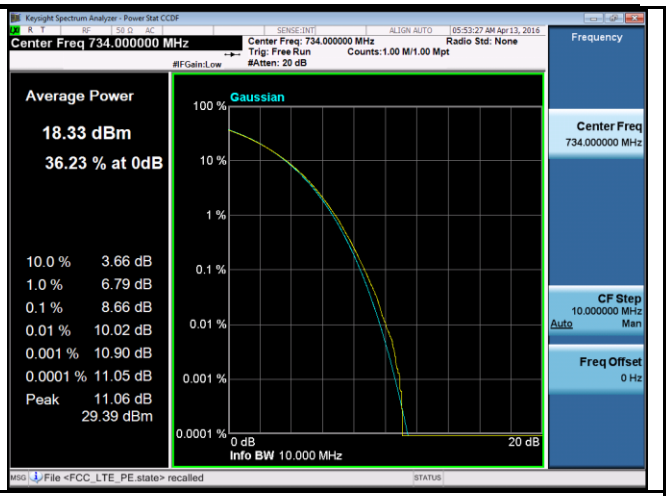
PK-AV-Ratio- Band12-QPSK-5M BW-High



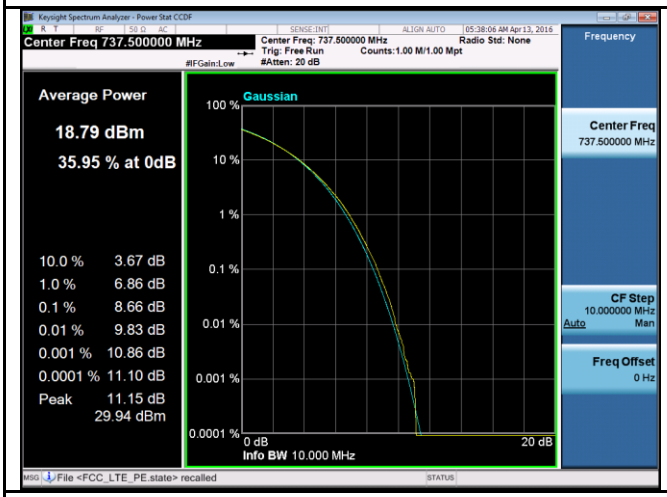
PK-AV-Ratio- Band12-QPSK-10M BW-High



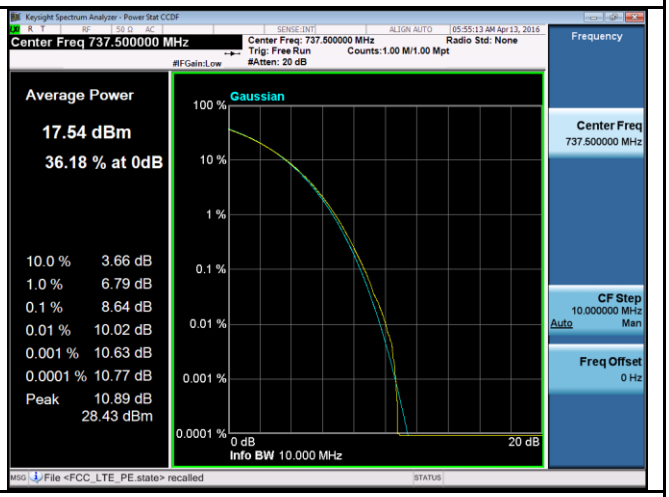
PK-AV-Ratio-Band4-64QAM-5M BW-Low



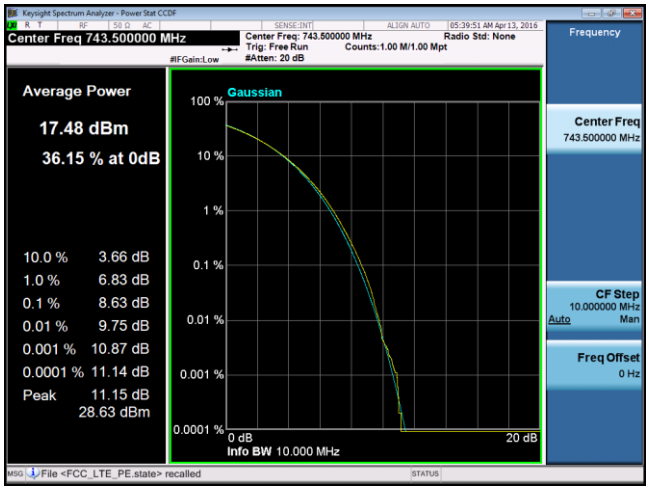
PK-AV-Ratio-Band4-64QAM-10M BW-Low



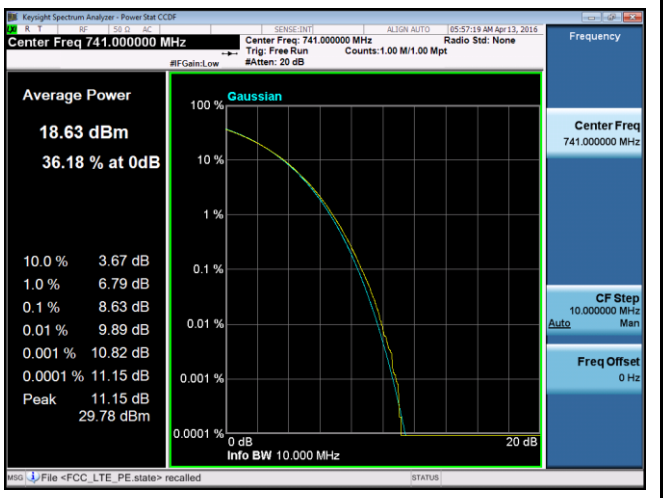
PK-AV-Ratio-Band4-64QAM-5M BW-Mid



PK-AV-Ratio-Band4-64QAM-10M BW-Mid



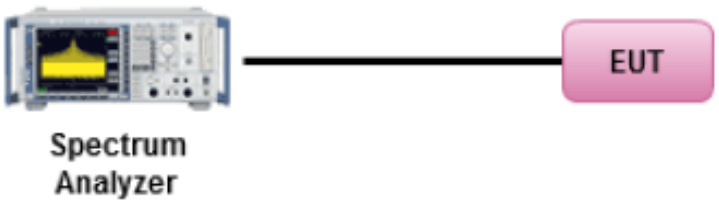
PK-AV-Ratio-Band4-64QAM-5M BW-High



PK-AV-Ratio-Band4-64QAM-10M BW-High

10.3 Occupied Bandwidth

Requirement(s):

Spec	Requirement	Applicable
47 CFR §2.1049	The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions of § 2.1049 (a) through (i)	☒
Test Setup		
Procedure	99% Occupied bandwidth measurement procedure - Allow the trace to stabilize. - Use the spectrum analyzer built-in measurement function to determine the 26 dB bandwidth 99% OBW. o Set RBW = 1% -5% of Emission Bandwidth o Set VBW = approximately 3 x RBW o Detector = Peak o Trace mode = max hold o Sweep = auto couple - Capture the plot. Repeat above steps for different test channel and other modulation type.	

Test Date	10/26/2015 – 11/02/2015 04/11/2016 – 04/15/2016	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	23°C 48% 1008mbar
Remark	NONE			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by *Chen Ge* at *RF test site*.

Test Data

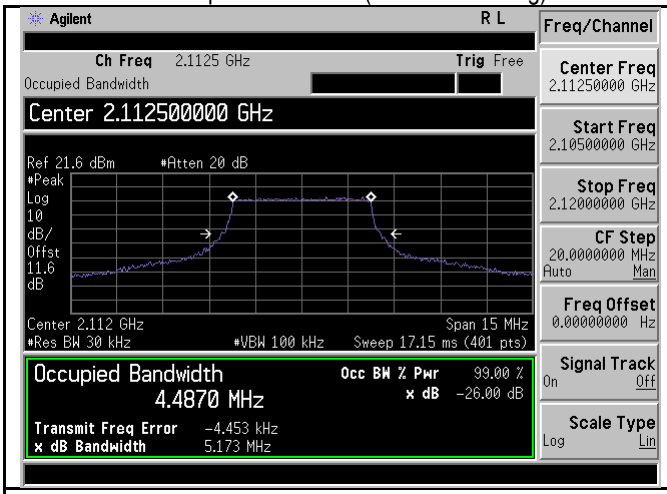
99% Bandwidth measurement result for LTE band 4:

Type	Channel	Channel Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
5MHz BW, QPSK	Low	2112.5	4.487	5.173
	Mid	2132.5	4.481	5.228
	High	2152.5	4.497	5.137
5MHz BW, 64QAM	Low	2112.5	4.479	5.107
	Mid	2132.5	4.488	5.044
	High	2152.5	4.479	5.011
10MHz BW, QPSK	Low	2115.0	8.931	9.609
	Mid	2132.5	8.916	9.756
	High	2150.0	8.933	9.789
10MHz BW, 64QAM	Low	2115.0	8.936	9.751
	Mid	2132.5	8.913	9.648
	High	2150.0	8.931	9.725
15MHz BW, QPSK	Low	2117.5	13.402	14.309
	Mid	2132.5	13.379	14.431
	High	2147.5	13.361	14.332
15MHz BW, 64QAM	Low	2117.5	13.401	14.430
	Mid	2132.5	13.399	14.315
	High	2147.5	13.370	14.045
20MHz BW, QPSK	Low	2120.0	17.808	18.828
	Mid	2132.5	17.782	18.623
	High	2145.0	17.992	18.756
20MHz BW, 64QAM	Low	2120.0	17.819	18.685
	Mid	2132.5	17.808	18.712
	High	2145.0	17.805	18.607

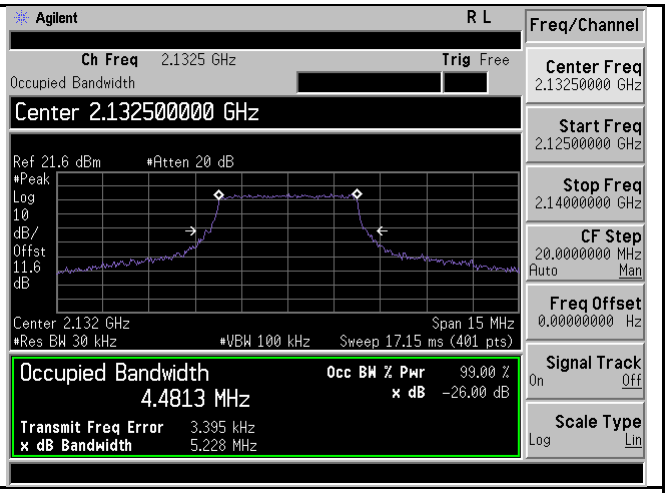
99% Bandwidth measurement result for LTE band 12:

Type	Channel	Channel Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
5MHz BW, QPSK	Low	731.5	4.42	4.70
	Mid	737.5	4.41	4.70
	High	743.5	4.41	4.67
5MHz BW, 64QAM	Low	731.5	4.42	4.68
	Mid	737.5	4.42	4.66
	High	743.5	4.41	4.65
10MHz BW, QPSK	Low	734.0	8.90	9.45
	Mid	737.5	8.89	9.37
	High	741.0	8.84	9.33
10MHz BW, 64QAM	Low	734.0	8.90	9.35
	Mid	737.5	8.89	9.36
	High	741.0	8.85	9.26

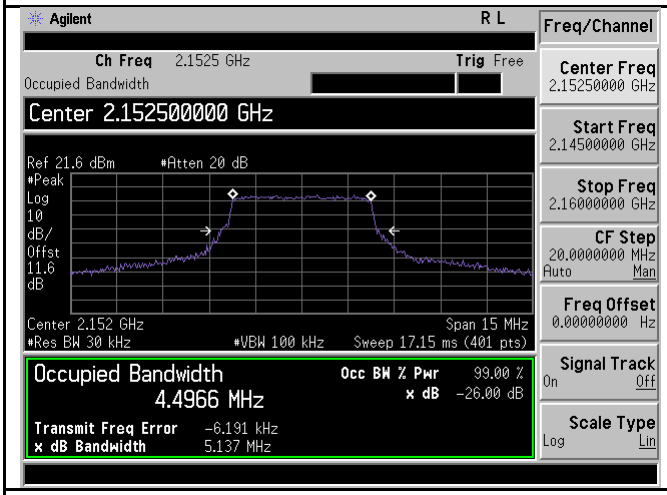
Test Plot for Occupied Bandwidth (5MHz BW setting)



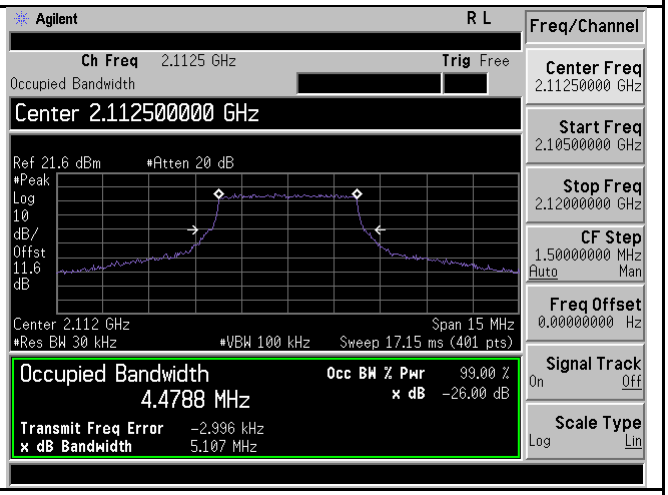
OBW-Band4-5M BW-Low- QPSK



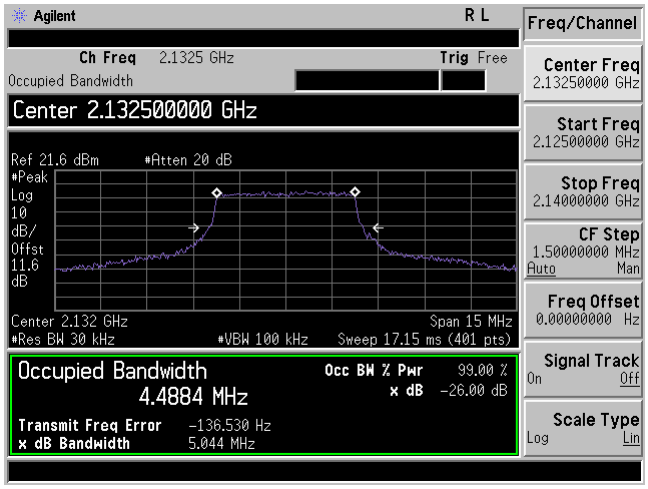
OBW-Band4-5M BW-Mid- QPSK



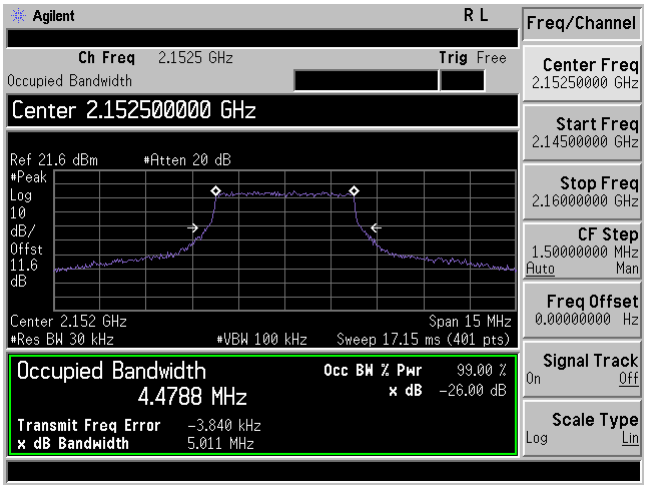
OBW-Band4-5M BW-High- QPSK



OBW-Band4-5M BW-Low- 64QAM

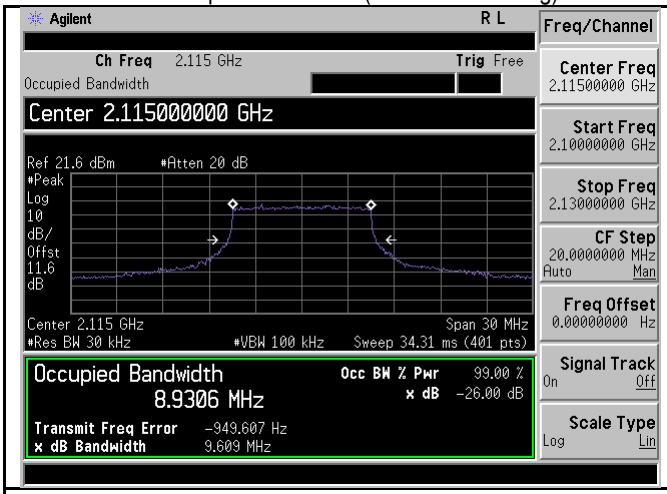


OBW-Band4-5M BW-Mid- 64QAM

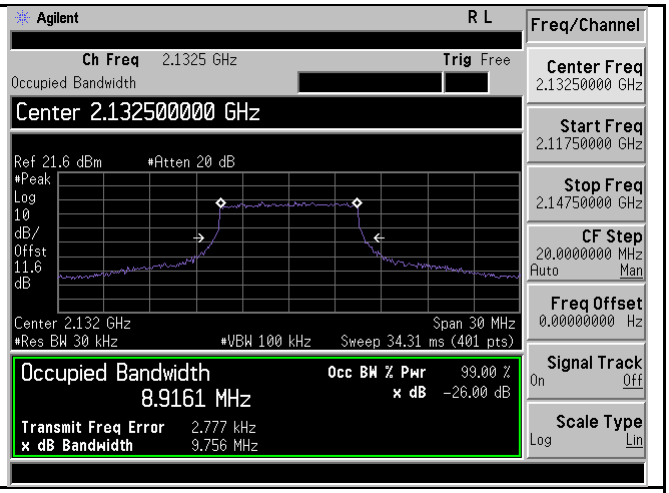


OBW-Band4-5M BW-High- 64QAM

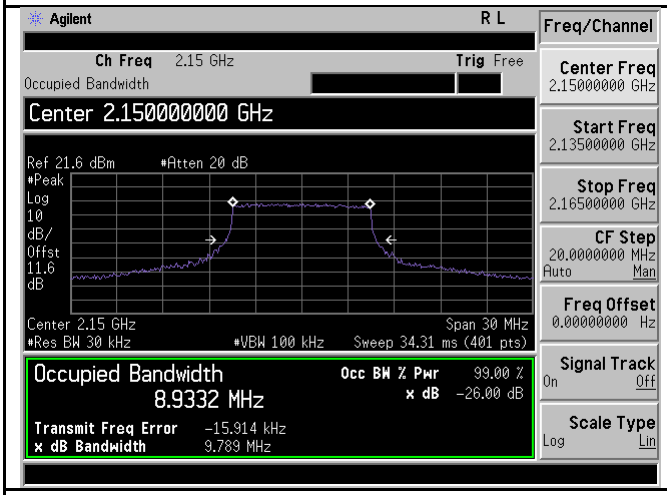
Test Plot for Occupied Bandwidth (10MHz BW setting)



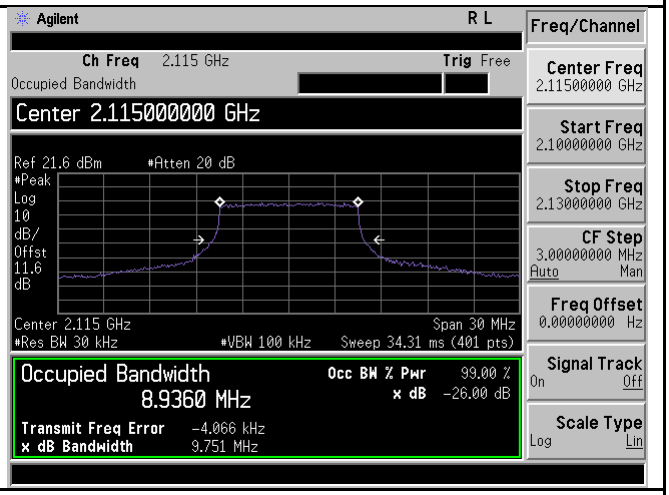
OBW-Band4-10M BW-Low- QPSK



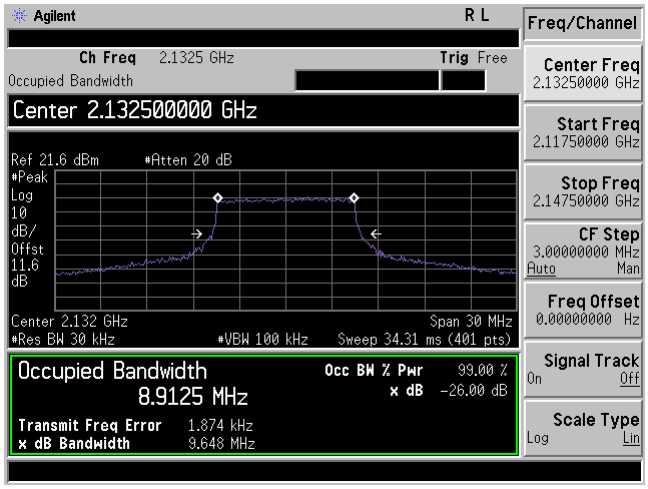
OBW-Band4-10M BW-Mid- QPSK



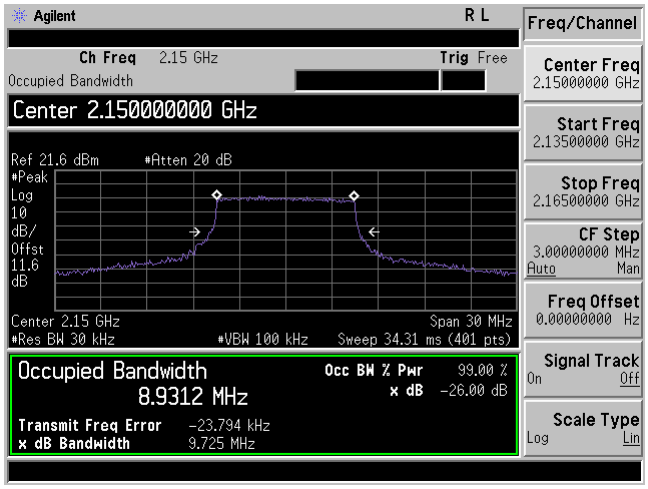
OBW-Band4-10M BW-High- QPSK



OBW-Band4-10M BW-Low- 64QAM

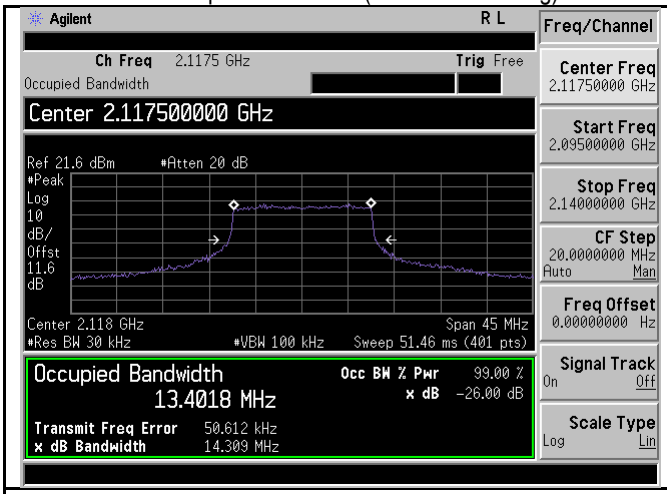


OBW-Band4-10M BW-Mid- 64QAM

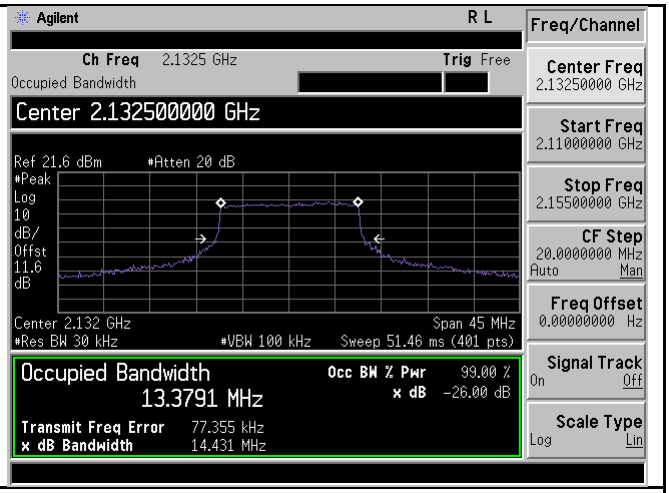


OBW-Band4-10M BW-High- 64QAM

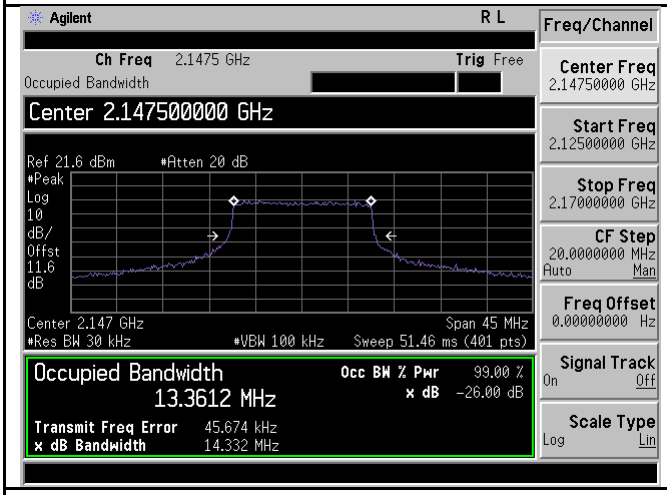
Test Plot for Occupied Bandwidth (15MHz BW setting)



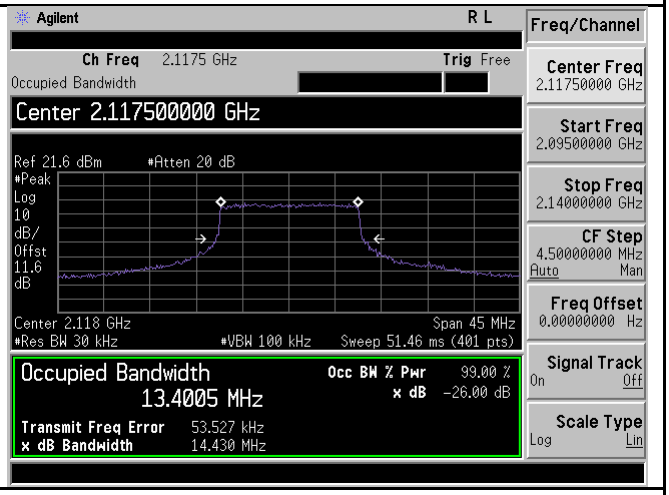
OBW-Band4-15M BW-Low- QPSK



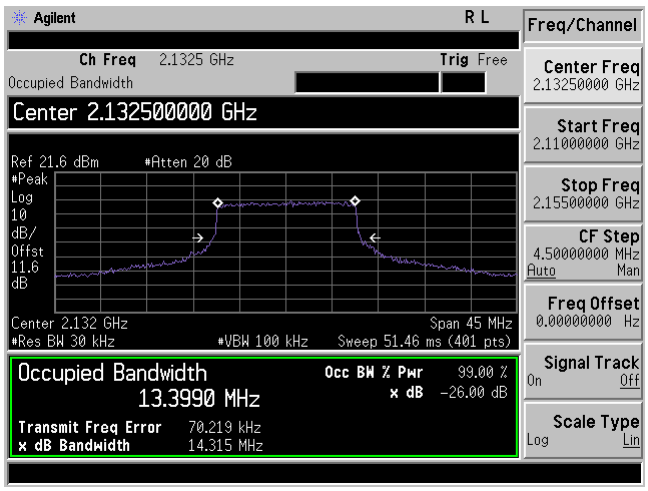
OBW-Band4-15M BW-Mid- QPSK



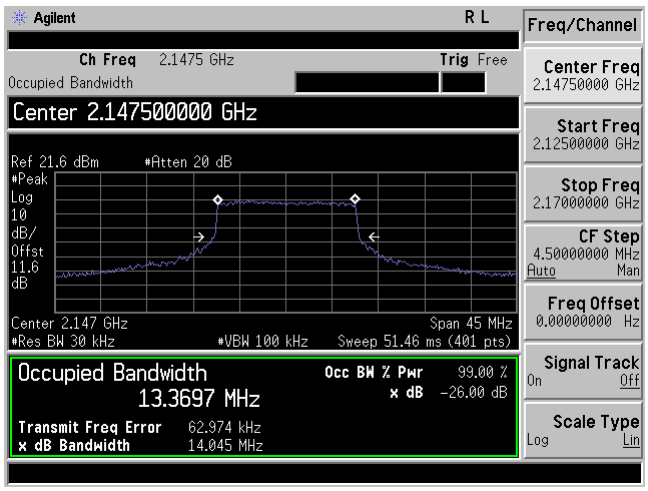
OBW-Band4-15M BW-High- QPSK



OBW-Band4-15M BW-Low- 64QAM

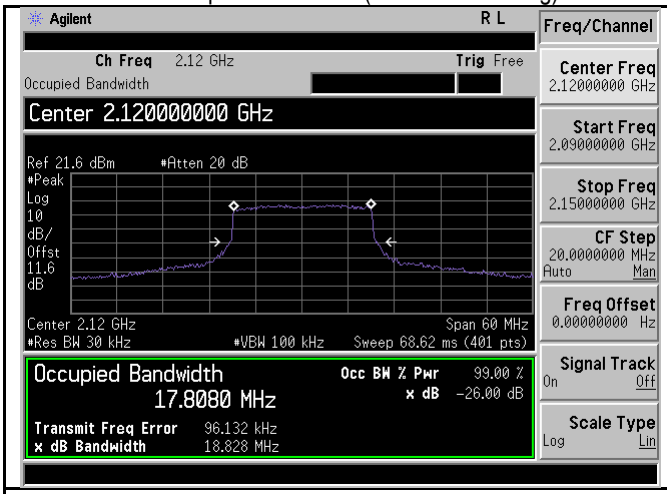


OBW-Band4-15M BW-Mid- 64QAM

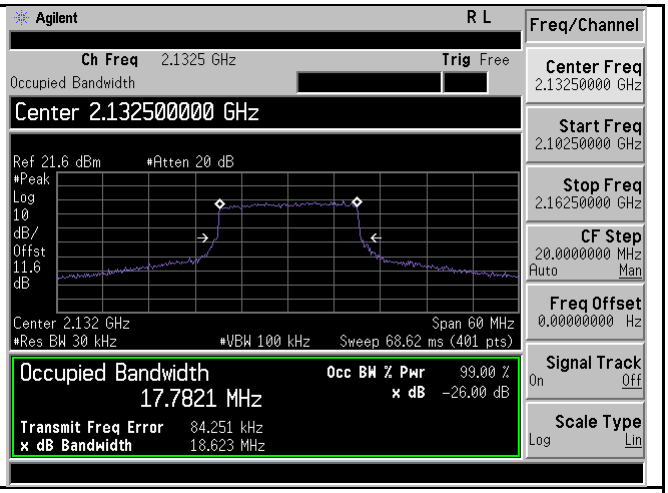


OBW-Band4-15M BW-High- 64QAM

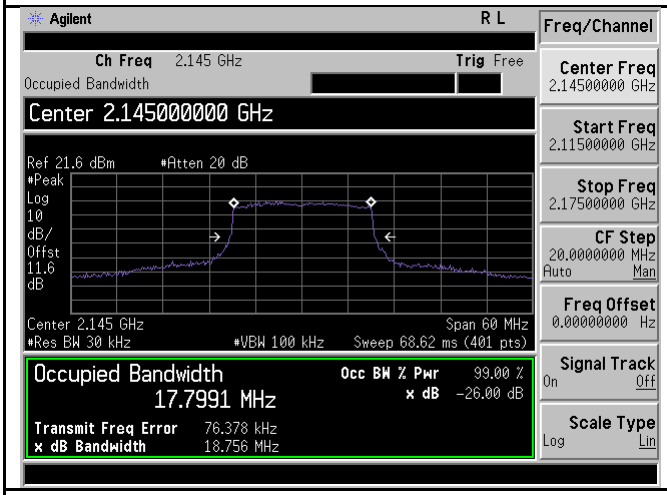
Test Plot for Occupied Bandwidth (20MHz BW setting)



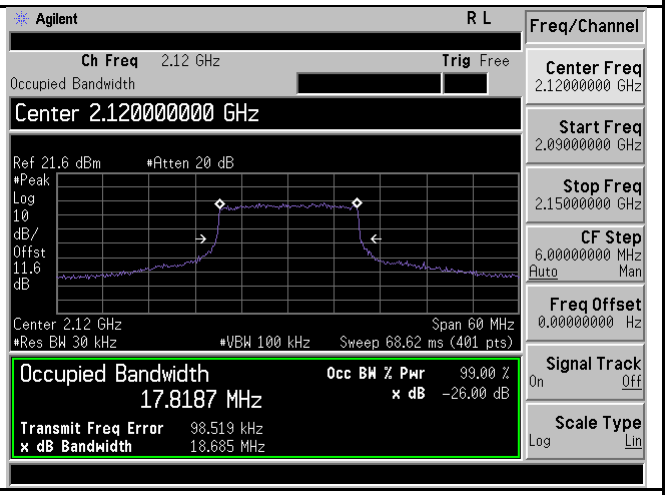
OBW-Band4-20M BW-Low- QPSK



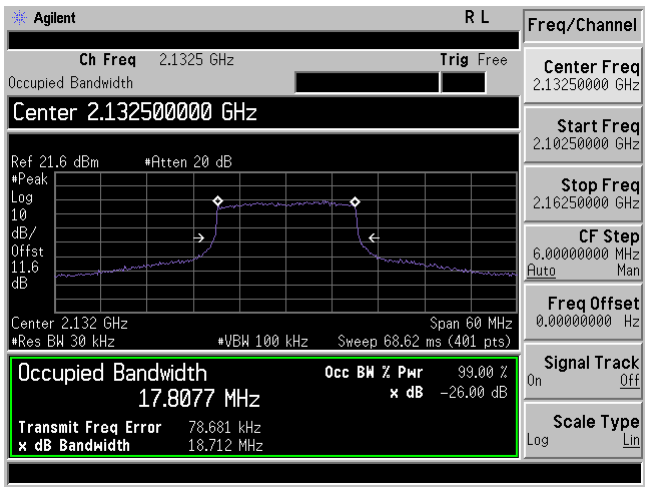
OBW-Band4-20M BW-Mid- QPSK



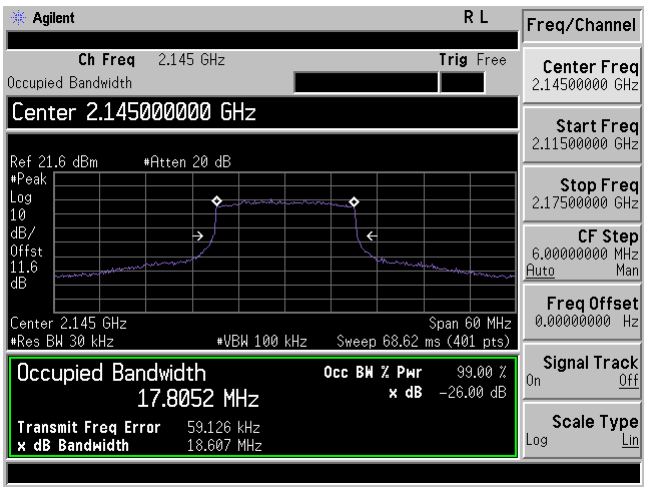
OBW-Band4-20M BW-High- QPSK



OBW-Band4-20M BW-Low- 64QAM

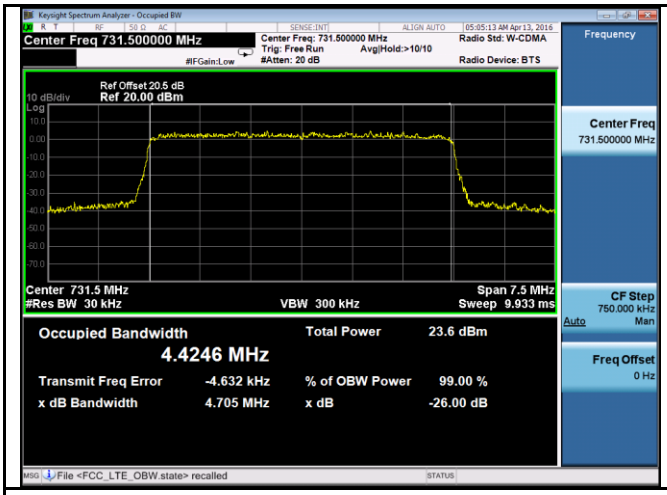


OBW-Band4-20M BW-Mid- 64QAM

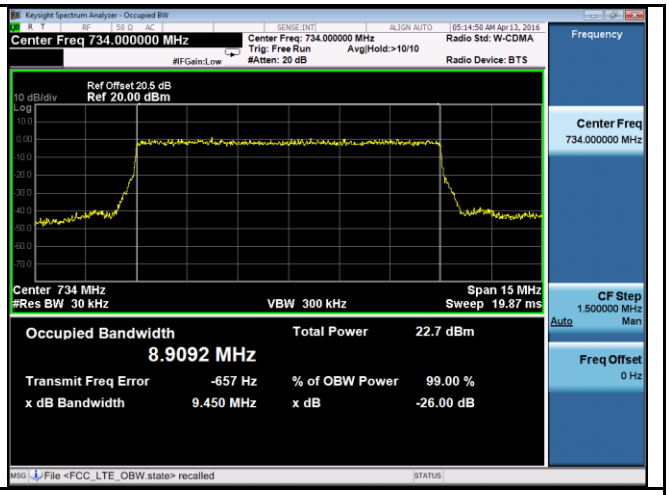


OBW-Band4-20M BW-High- 64QAM

Test Plots for LTE Band12 QPSK

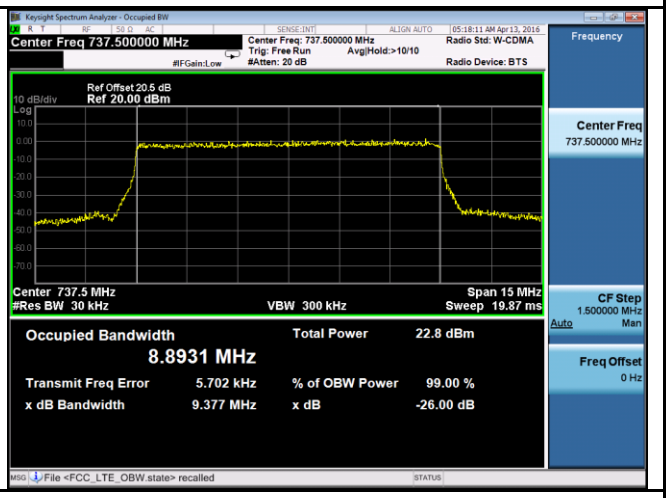


OBW- Band12-5M BW-Low

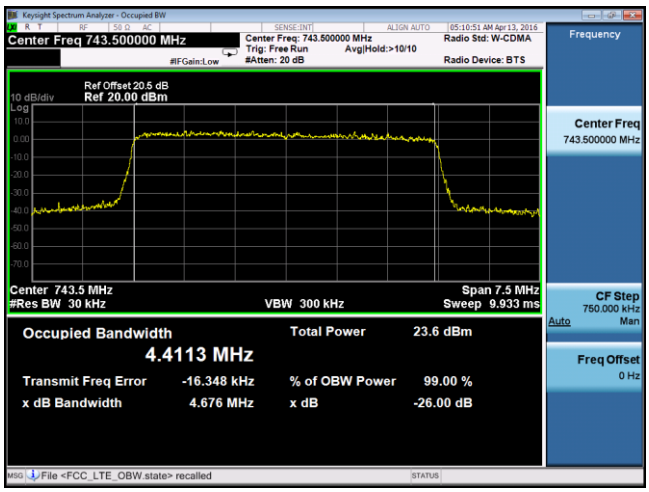


OBW- Band12-10M BW-Low

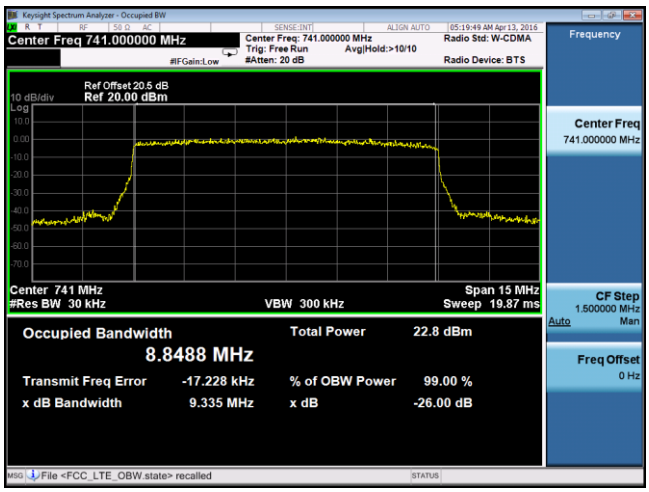
OBW- Band12-5M BW-Mid



OBW- Band12-10M BW-Mid

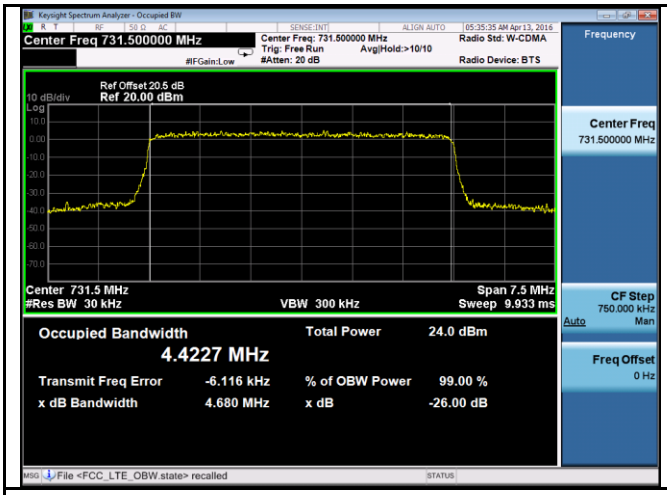


OBW- Band12-5M BW-High

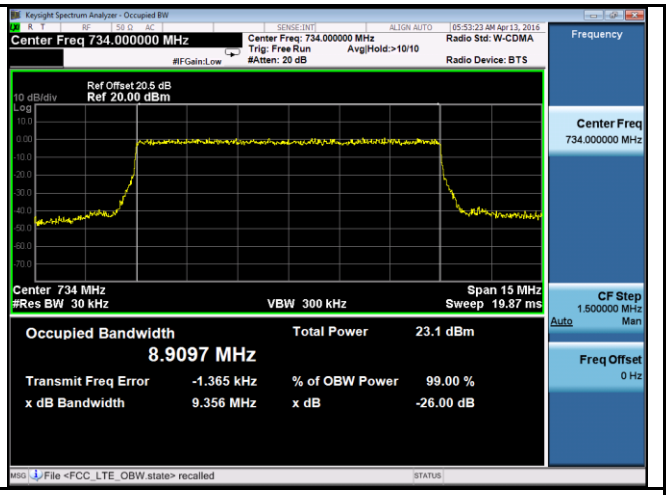


OBW- Band12-10M BW-High

Test Plots for LTE Band12 64QAM

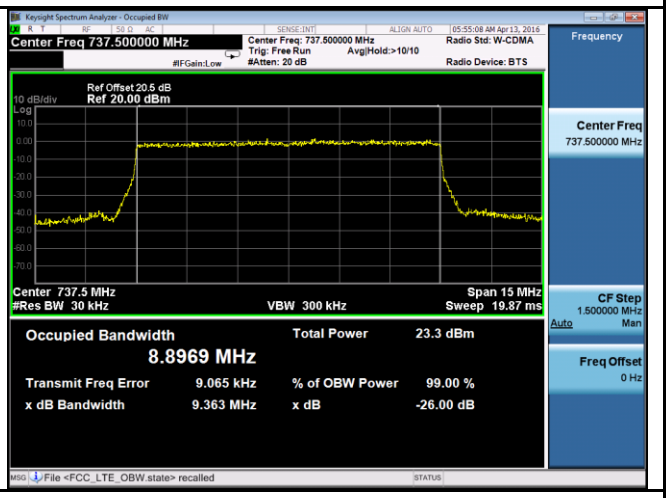


OBW- Band12-5M BW-Low

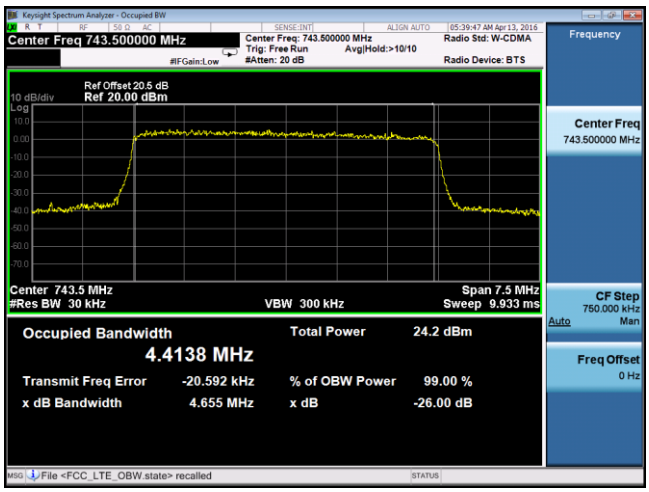


OBW- Band12-10M BW-Low

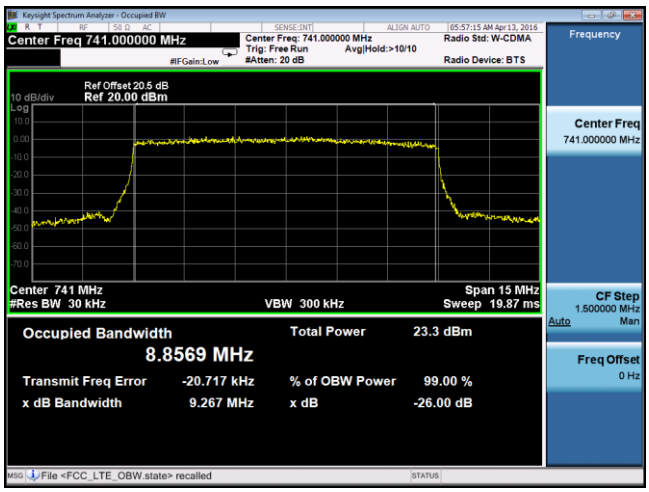
OBW- Band12-5M BW-Mid



OBW- Band12-10M BW-Mid



OBW- Band12-5M BW-High

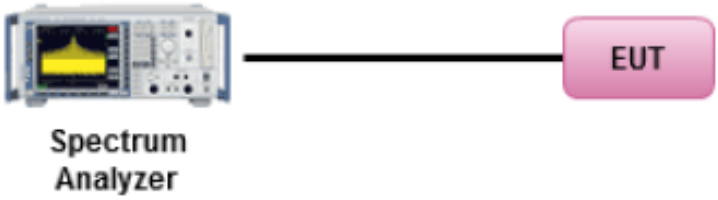


OBW- Band12-10M BW-High

10.4 Band Edge

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR27.53	-	Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.	☒

Test Setup				
Test Procedure	1. EUT was set for low , mid, high channel with modulated mode and highest RF output power. 2. The spectrum analyzer was connected to the antenna terminal. 3. A RBW of 1% greater than the 26 dB emission bandwidth should be used for band edge measurement or if narrower RBW is used, a correct factor calculated with formula 10*log (EBW/BW_{meas}) will be added to the result.			
Test Date	10/26/2015 – 11/02/2015 04/11/2016 – 04/15/2016	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	22°C 48% 1008mbar
Remark	The EUT was scanned up to 25GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case. Limit calculation: Emission limit = PdBm – [43+ 10 log (PW)] = 10log(1000 x PW) - 43 - 10log(PW) = 30 dBm - 43 = -13 dBm			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by *Chen Ge* at *RF test site*.

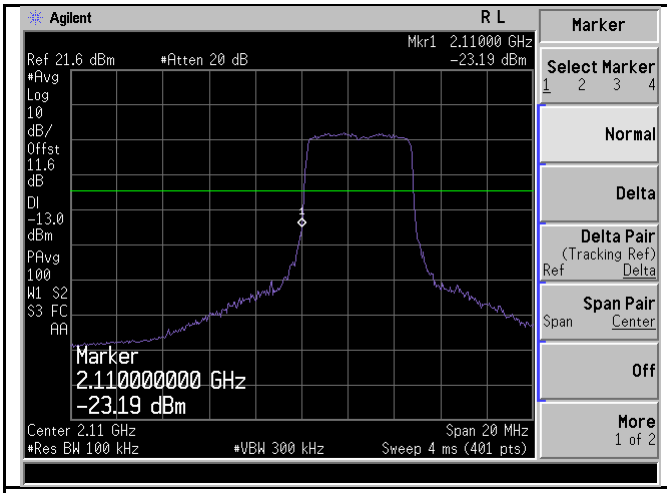
Band Edge Measurement Data for LTE band 4

Type	Channel	Channel Frequency (MHz)	Measurement Band Edge (dBm)	RBW Correction factor (dB)	Corrected Band Edge (dBm)	Limit (dBm)
5MHz BW, QPSK	Low	2115	-23.19	0	-23.19	-13
	High	2150	-26.13	0	-26.13	-13
5MHz BW, 16QAM	Low	2115	-38.97	0	-38.97	-13
	High	2150	-34.55	0	-34.55	-13
5MHz BW, 64QAM	Low	2115	-26.10	0	-26.10	-13
	High	2150	-29.02	0	-29.02	-13
10MHz BW, QPSK	Low	2120	-32.03	0	-32.03	-13
	High	2145	-32.66	0	-32.66	-13
10MHz BW, 16QAM	Low	2120	-42.35	0	-42.35	-13
	High	2145	-42.59	0	-42.59	-13
10MHz BW, 64QAM	Low	2120	-34.03	0	-34.03	-13
	High	2145	-35.73	0	-35.73	-13
15MHz BW, QPSK	Low	2115	-36.39	3.01	-33.38	-13
	High	2150	-37.51	3.01	-34.50	-13
15MHz BW, 16QAM	Low	2115	-41.83	3.01	-38.82	-13
	High	2150	-40.24	3.01	-37.23	-13
15MHz BW, 64QAM	Low	2115	-38.90	3.01	-35.89	-13
	High	2150	-37.41	3.01	-34.40	-13
20MHz BW, QPSK	Low	2120	-37.83	3.01	-34.82	-13
	High	2145	-39.44	3.01	-36.43	-13
20MHz BW, 16QAM	Low	2120	-45.58	3.01	-42.57	-13
	High	2145	-43.42	3.01	-40.41	-13
20MHz BW, 64QAM	Low	2120	-40.24	3.01	-37.23	-13
	High	2145	-40.52	3.01	-37.51	-13

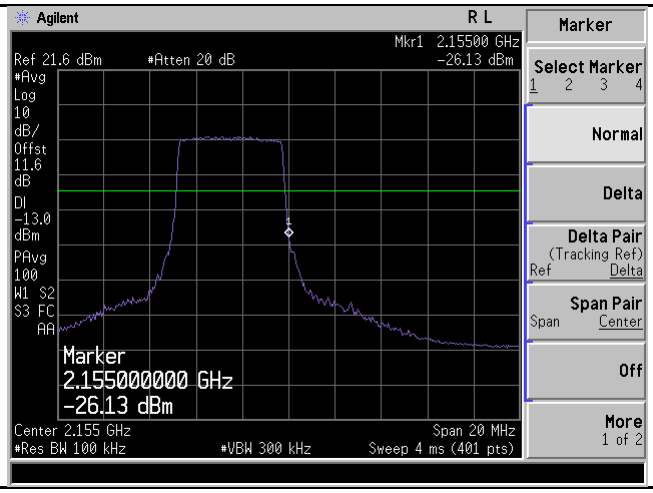
Band Edge Measurement Data for LTE band 12

Type	Channel	Channel Frequency (MHz)	Measurement Band Edge (dBm)	Limit (dBm)
5MHz BW, QPSK	Low	731.5	-33.82	-13
	High	743.5	-36.26	-13
5MHz BW, 64QAM	Low	731.5	-33.94	-13
	High	743.5	-35.29	-13
10MHz BW, QPSK	Low	734.0	-36.12	-13
	High	741.0	-36.30	-13
10MHz BW, 64QAM	Low	734.0	-37.72	-13
	High	741.0	-37.95	-13

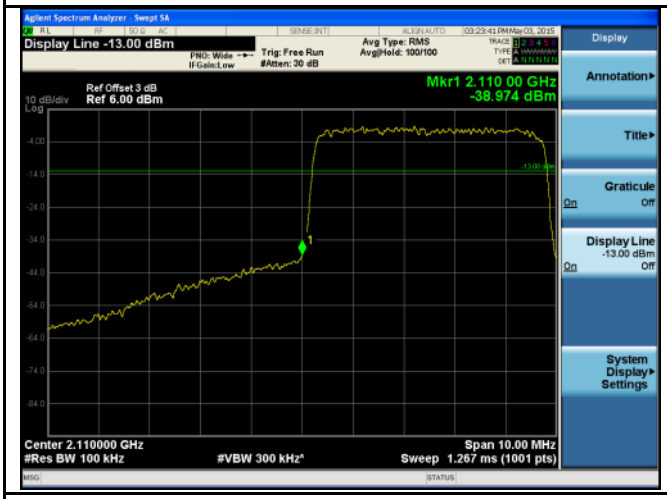
Test Plots



BandEdge-LTE-Band4-5MHz-QPSK-Low

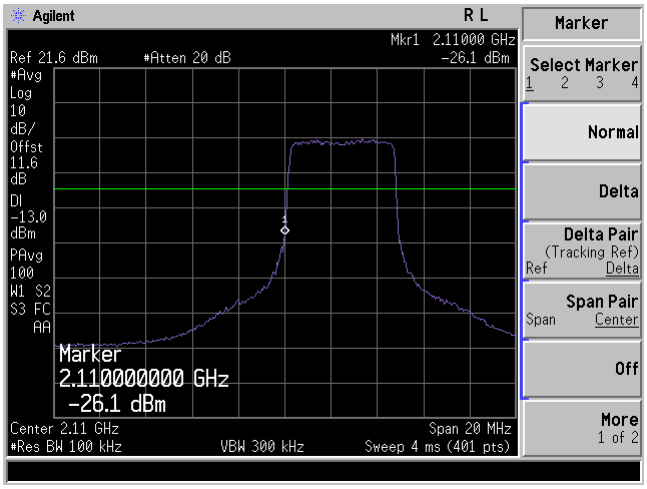


BandEdge-LTE-Band4-5MHz-QPSK-High

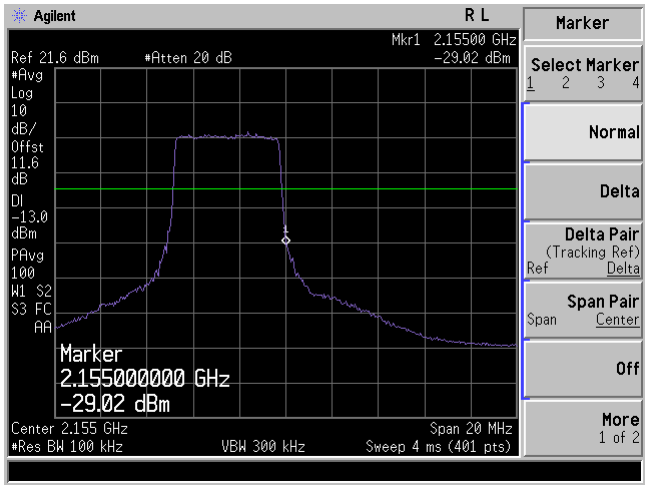


BandEdge-LTE-Band4-5MHz-16QAM-Low

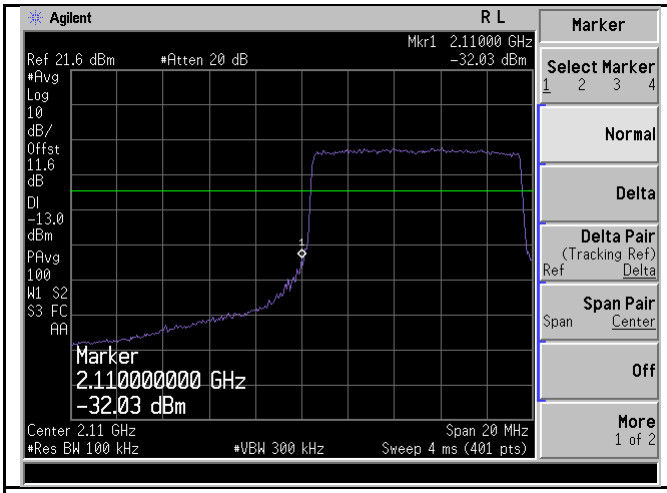
BandEdge-LTE-Band4-5MHz-16QAM-High



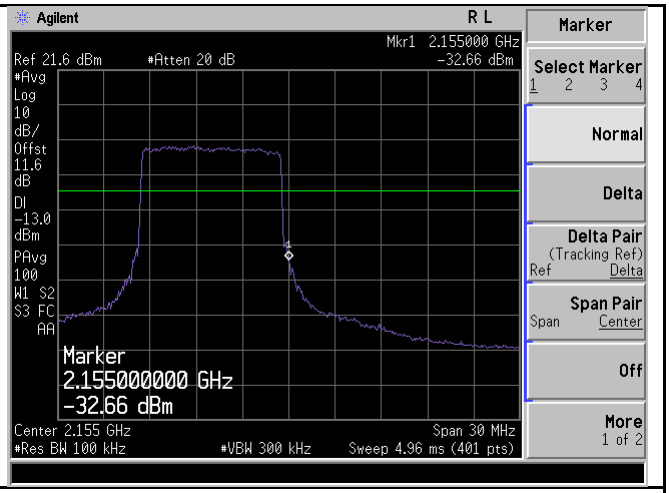
BandEdge-LTE-Band4-5MHz-64QAM-Low



BandEdge-LTE-Band4-5MHz-64QAM-High



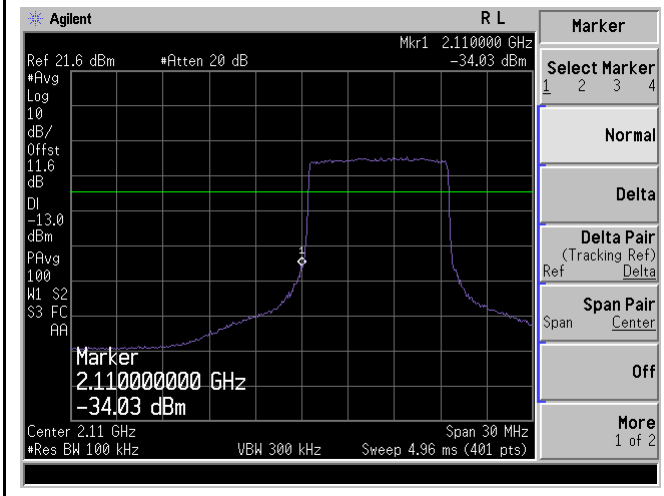
BandEdge-LTE-Band4-10MHz-QPSK-Low



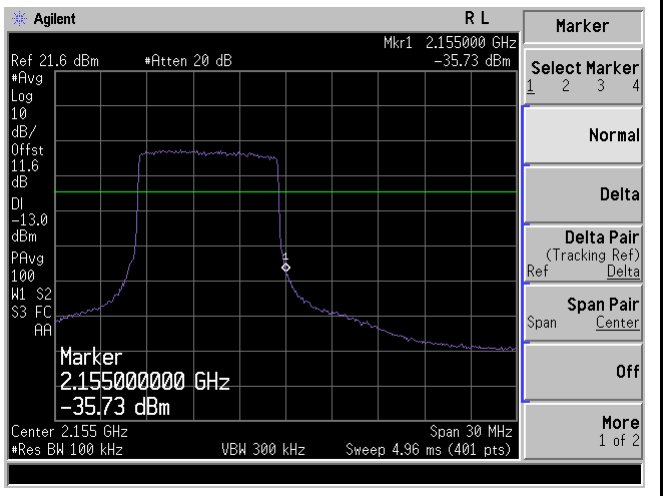
BandEdge-LTE-Band4-10MHz-QPSK-High

BandEdge-LTE-Band4-10MHz-16QAM-Low

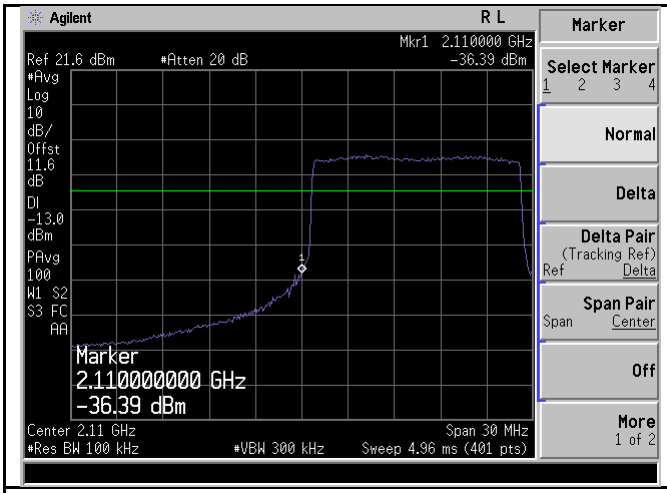
BandEdge-LTE-Band4-10MHz-16QAM-High



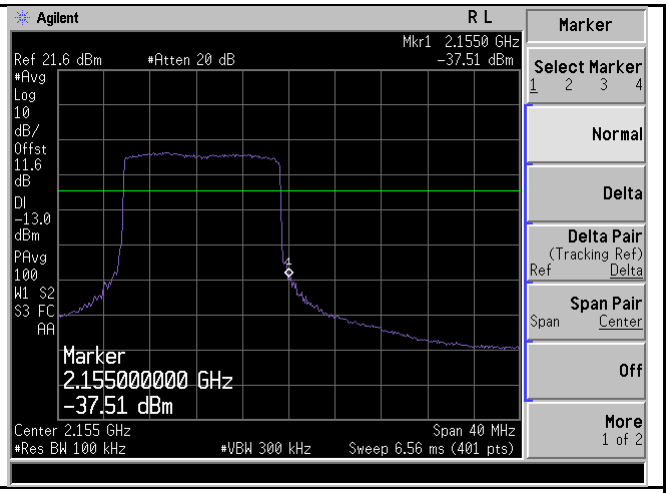
BandEdge-LTE-Band4-10MHz-64QAM-Low



BandEdge-LTE-Band4-10MHz-64QAM-High



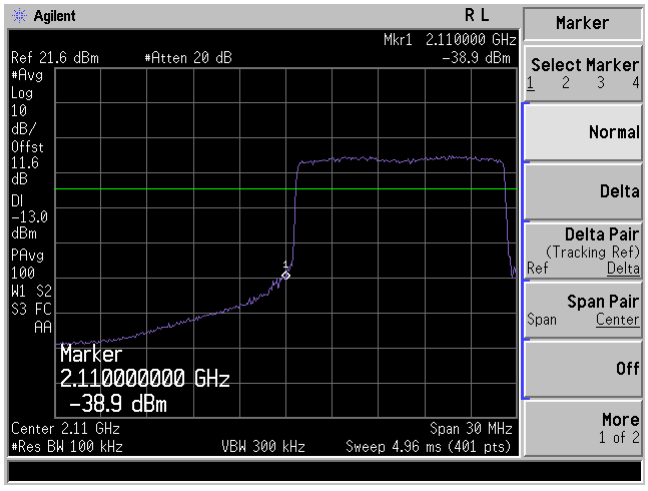
BandEdge-LTE-Band4-15MHz-QPSK-Low



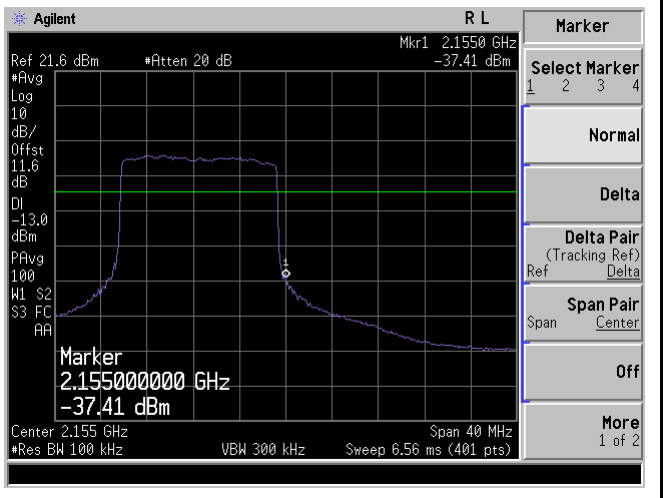
BandEdge-LTE-Band4-15MHz-QPSK-High

BandEdge-LTE-Band4-15MHz-16QAM-Low

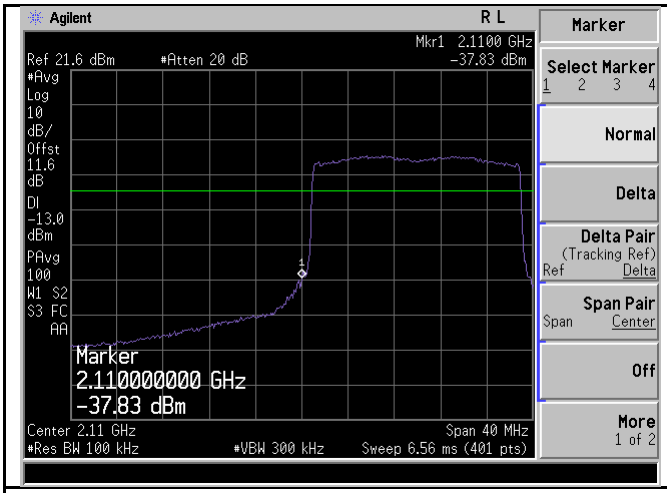
BandEdge-LTE-Band4-15MHz-16QAM-High



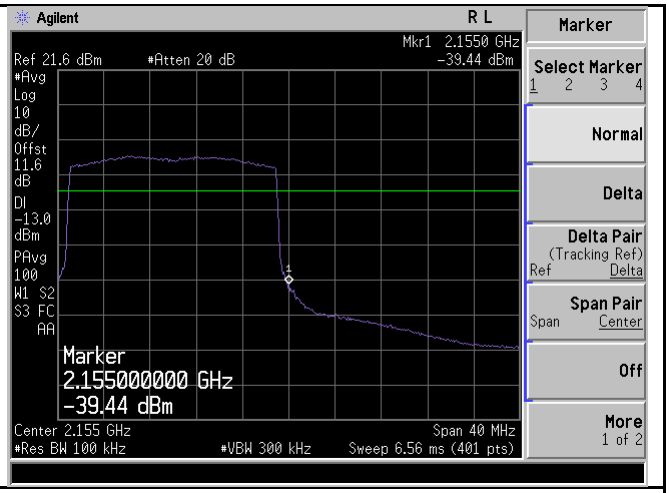
BandEdge-LTE-Band4-15MHz-64QAM-Low



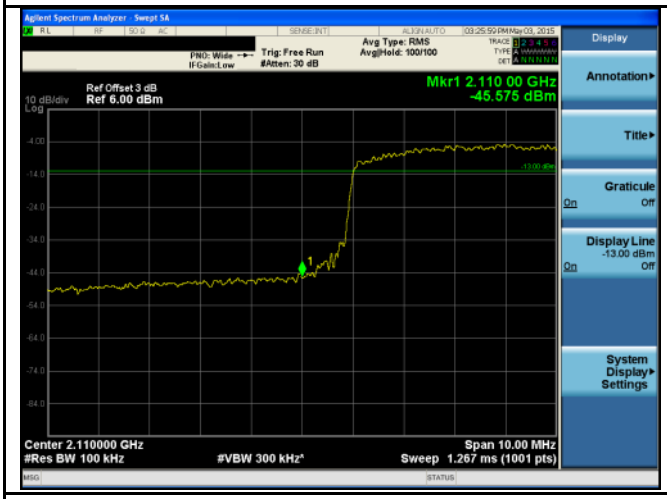
BandEdge-LTE-Band4-15MHz-64QAM-High



BandEdge-LTE-Band4-20MHz-QPSK-Low

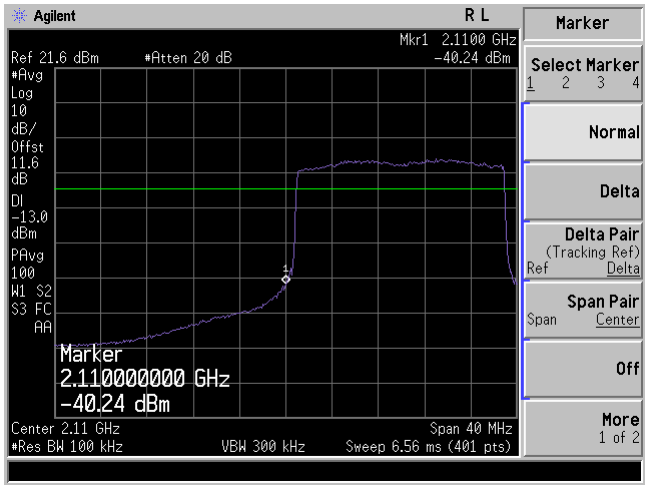


BandEdge-LTE-Band4-20MHz-QPSK-High

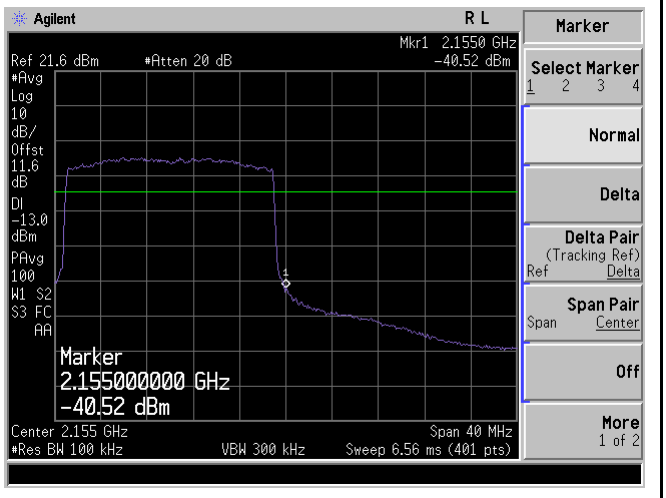


BandEdge-LTE-Band4-20MHz-16QAM-Low

BandEdge-LTE-Band4-20MHz-16QAM-High

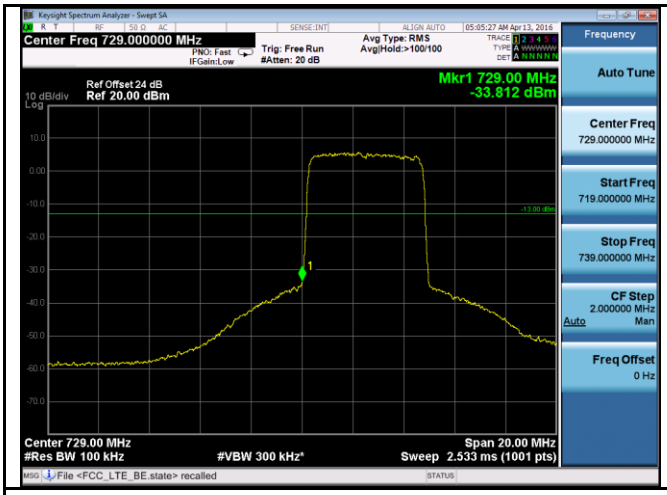


BandEdge-LTE-Band4-20MHz-64QAM-Low



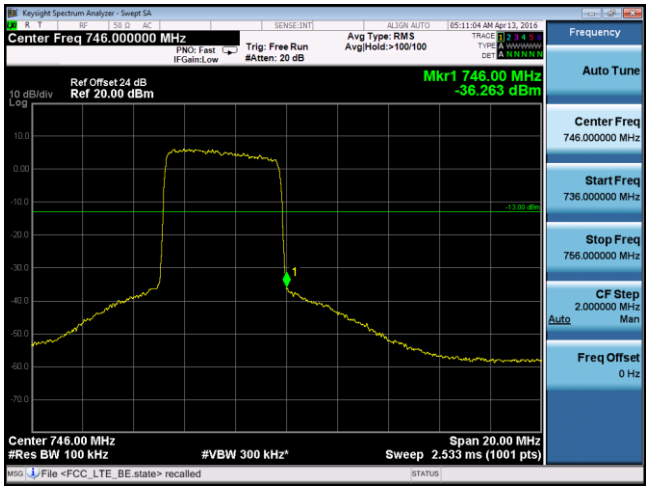
BandEdge-LTE-Band4-20MHz-64QAM-High

Test Plots for Band 12:



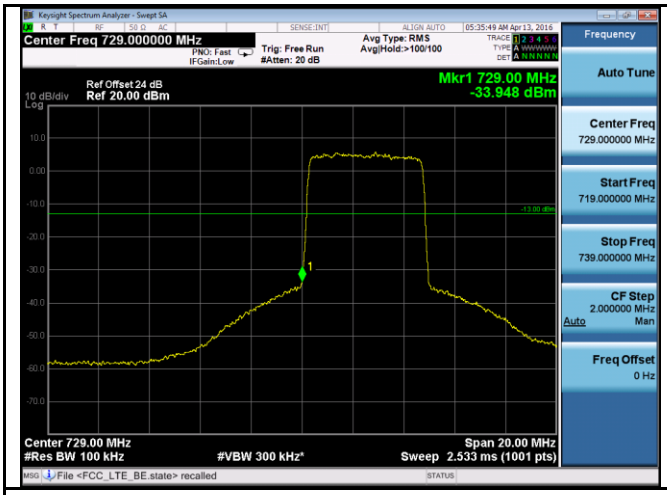
BandEdge-LTE-Band12-5MHz-QPSK-Low

BandEdge-LTE-Band12-10MHz-QPSK-High



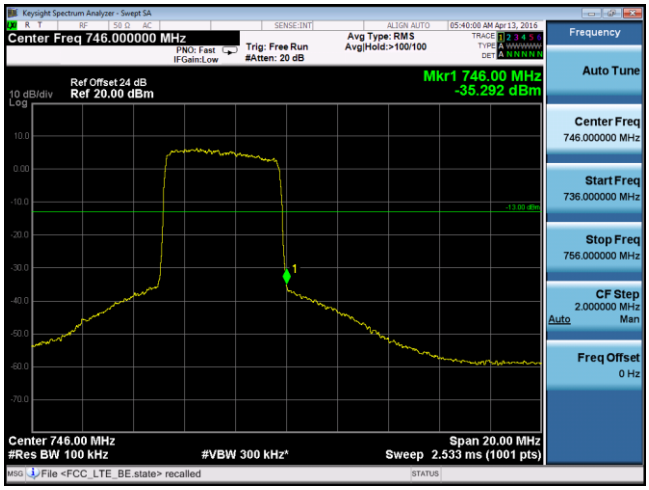
BandEdge-LTE- Band12-5MHz - QPSK -Low

BandEdge-LTE- Band12-10MHz- QPSK -High

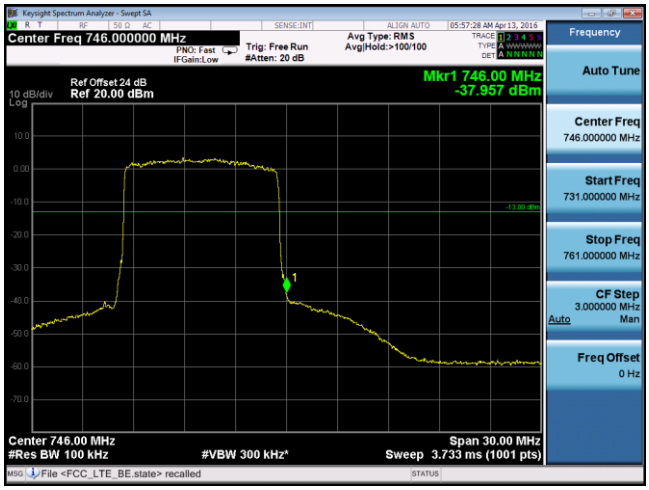


BandEdge-LTE- Band12-5MHz-64QAM -Low

BandEdge-LTE- Band12-10MHz -64QAM -Low



BandEdge-LTE- Band12-5MHz -64QAM-High



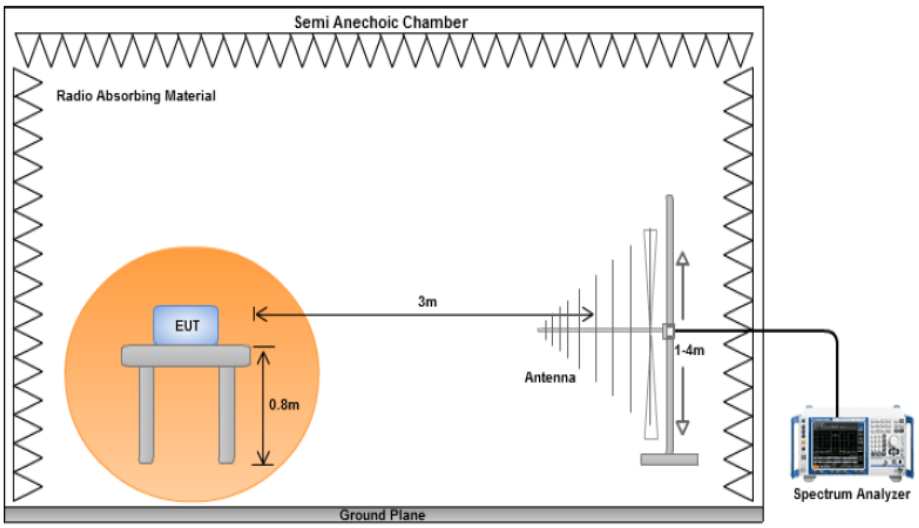
BandEdge-LTE- Band12-10MHz -64QAM -High

10.5 Radiated Spurious Emission below 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR27.53	-	Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.	☒

Test Setup



Test Procedure

Substitution method:

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
   a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
   b. The EUT was then rotated to the direction that gave the maximum emission.
   c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter.
4. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained.
5. Steps 4 were repeated for the next frequency point, until all selected frequency points were measured.

Test Date		Environmental condition		
	10/26/2015 – 11/02/2015 04/11/2016 – 04/15/2016		Temperature Relative Humidity Atmospheric Pressure	23°C 48% 1008mbar

Remark

The EUT was scanned up to 25GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.

Limit calculation:
Emission limit = PdBm – [43+ 10 log (PW)] = 10log(1000 x PW) - 43 - 10log(PW) = 30 dBm - 43 = -13 dBm
All different modulation and bandwidth configuration has been verified and only the test data of worst case with QPSK modulation and greatest bandwidth was presented in this report.

Result ☒ Pass ☐ Fail

Test Data ☒ Yes (See below) ☐ N/A
Test Plot ☒ Yes (See below) ☐ N/A

Test was done by *Gary Chou* at *10m chamber*.

Radiated Emission Test Results for LTE band 4

Test specification	below 1GHz		Result	Pass
Environmental Conditions:	Temp (°C):	22		
	Humidity (%)	45		
	Atmospheric (mbar):	1008		
Mains Power:	48VDC			
Tested by:	David Zhang			
Test Date:	04/30/2015			
Remarks:	LTE band4-Mid CH-20MHz BW, QPSK			

Indicated		Test Antenna		Substituted						
Frequency (MHz)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dBm)
500	315	186	V	500	-45.94	0	0.30	-45.64	-13	-32.64
500	293	133	H	500	-52.48	0	0.30	-52.18	-13	-39.18
69	224	151	V	69	-48.12	0	0.10	-48.02	-13	-35.02
69	344	162	H	69	-43.67	0	0.10	-43.57	-13	-30.57
125	145	147	V	125	-46.92	0	0.14	-46.78	-13	-33.78
125	356	157	H	125	-47.08	0	0.14	-46.94	-13	-33.94

Note: Dipole antenna was used for substitution method.

Radiated Emission Test Results for LTE band 12

Test specification	below 1GHz		Result	Pass
Environmental Conditions:	Temp (°C):	24		
	Humidity (%)	39		
	Atmospheric (mbar):	1012		
Mains Power:	48VDC			
Tested by:	Gary Chou			
Test Date:	04/11/2016 – 04/15/2016			
Remarks:	LTE band12-Mid CH-10MHz BW, QPSK			

Indicated		Test Antenna		Substituted						
Frequency (MHz)	Degree	Height (cm)	Polarity	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dBm)
375	30	150	V	375	-40	0	0.29	-40.29	-13	-27.29
375	25	153	H	375	-40	0	0.29	-40.29	-13	-27.29
625	29	150	V	625	-43.74	0	0.31	-44.05	-13	-31.05
625	27	149	H	625	-43.74	0	0.31	-44.05	-13	-31.05
875	25	148	V	875	-47.65	0	0.33	-47.98	-13	-34.98
875	23	147	H	875	-47.8	0	0.33	-48.13	-13	-35.13

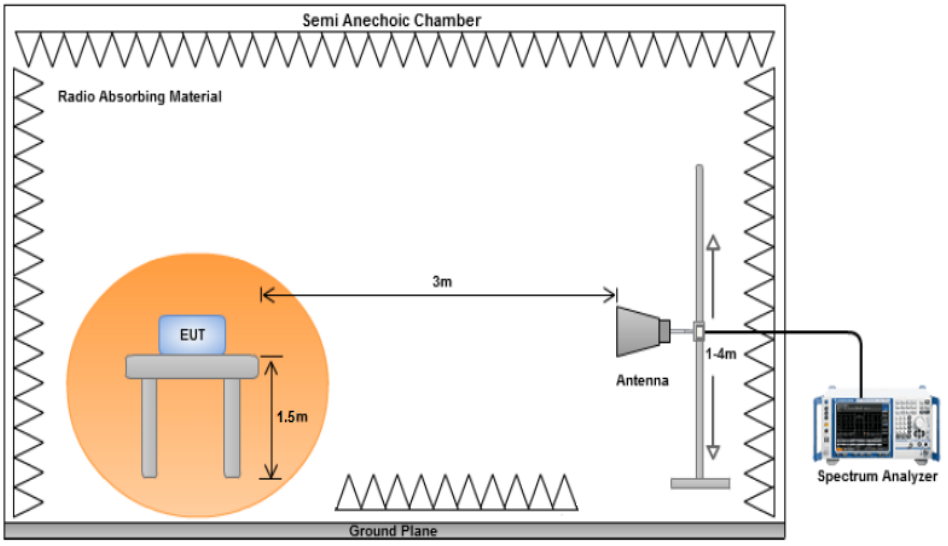
Note: Dipole antenna was used for substitution method.

10.6 Radiated Spurious Emissions above 1GHz

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR27.53	-	Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.	☒

Test Setup



Test Procedure

Substitution method:

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
   a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
   b. The EUT was then rotated to the direction that gave the maximum emission.
   c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter.
4. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained.
5. Steps 4 were repeated for the next frequency point, until all selected frequency points were measured.

Test Date	10/26/2015 – 11/02/2015 04/11/2016 – 04/11/2016	Environmental condition	Temperature 23°C Relative Humidity 48% Atmospheric Pressure 1008mbar

Remark

The EUT was scanned up to 25GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.
Limit calculation:
Emission limit = PdBm – [43+ 10 log (PW)] = 10log(1000 x PW) - 43 - 10log(PW) = 30 dBm - 43 = -13 dBm

All different modulation and bandwidth configuration has been verified and only the test data of worst case with QPSK modulation and greatest bandwidth was presented in this report.

Result ☒ Pass ☐ Fail

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by *Gary Chou* at *3m chamber*.

Radiated Emission Test Results (Above 1GHz)

LTE band 4 Low Channel, 20MHz BW, QPSK

Indicated			Test Antenna		Substituted					
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
4237.78	-59.25	30	150	V	4237.78	10.44	0.72	-49.53	-13	-36.53
4237.78	-61.18	25	153	H	4237.78	10.44	0.72	-51.46	-13	-38.46
5324.44	-52.73	29	150	V	5324.44	11.24	0.78	-42.27	-13	-29.27
5324.44	-63.09	27	149	H	5324.44	11.24	0.78	-52.63	-13	-39.63

LTE band 4 Mid Channel, 20MHz BW, QPSK

Indicated			Test Antenna		Substituted					
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
4100.97	-57.90	30	150	V	4100.97	9.97	0.72	-48.65	-13	-35.65
4100.97	-60.67	25	153	H	4100.97	9.97	0.72	-51.42	-13	-38.42
6024.69	-60.58	29	150	V	6024.69	12.19	0.78	-49.17	-13	-36.17
6024.69	-63.80	27	149	H	6024.69	12.19	0.78	-52.39	-13	-39.39

LTE band 4 High Channel, 20MHz BW, QPSK

Indicated			Test Antenna		Substituted					
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
4102.98	-60.60	30	150	V	4102.98	9.97	0.72	-51.35	-13	-38.35
4102.98	-57.25	25	153	H	4102.98	9.97	0.72	-53.48	-13	-40.48
4309.53	-59.60	29	150	V	4309.53	10.87	0.78	-49.51	-13	-36.51
4309.53	-61.73	27	149	H	4309.53	10.87	0.78	-51.64	-13	-38.64

LTE band 12 Low Channel, 10MHz BW, QPSK

Indicated			Test Antenna		Substituted					
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
2222	30	150	V	2222	-57.58	8.56	0.47	-49.49	-13	-36.49
2222	25	153	H	2222	-58.27	8.56	0.47	-50.18	-13	-37.18
4452	29	150	V	4452	-60.08	10.99	0.78	-49.87	-13	-36.87
4452	27	149	H	4452	-60.89	10.99	0.78	-50.68	-13	-37.68

LTE band 12 Mid Channel, 10MHz BW, QPSK

Indicated			Test Antenna		Substituted					
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
2220	30	150	V	2220	-57.58	8.56	0.47	-49.49	-13	-36.49
2220	25	153	H	2220	-58.27	8.56	0.47	-50.18	-13	-37.18
4433	29	150	V	4433	-60.08	10.99	0.78	-49.87	-13	-36.87
4433	27	149	H	4433	-60.89	10.99	0.78	-50.68	-13	-37.68

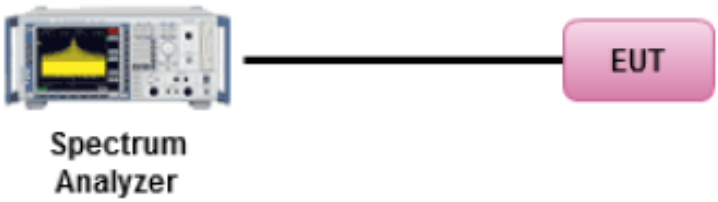
LTE band 12 High Channel, 10MHz BW, QPSK

Indicated			Test Antenna		Substituted					
Frequency (MHz)	Raw (dBm)	Degree	Height (cm)	Polarity	Frequency (MHz)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
2202	30	150	V	2202	-57.58	8.556	0.47	-49.49	-13	-36.49
2202	25	153	H	2202	-58.27	8.556	0.47	-50.18	-13	-37.18
4410	29	150	V	4410	-60.08	10.98	0.78	-49.87	-13	-36.87
4410	27	149	H	4410	-60.89	10.98	0.78	-50.68	-13	-37.68

10.7 Frequency Stability

Requirement(s):

Spec	Item	Requirement	Applicable
47 CFR 2.1055, 47 CFR	-	The frequency stability of the transmitter shall be maintained within ±0.0001 percent (±1 ppm) of the center frequency over a temperature variation of −30 °Celsius to +50 °Celsius at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of 20 °Celsius.	☒
47 CFR 2.1055, 47 CFR 27.54	-	The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.	☒

Test Setup				
Test Procedure	The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference). 1. The equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter. 2. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half hour is provided to allow stabilization of the equipment at each temperature level.			
Test Date	10/26/2015 – 11/02/2015 04/11/2016 – 04/15/2016	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	23°C 48% 1008mbar
Remark	NONE			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test Data for LTE Band 4:

Voltage (%)	Power (VDC)	Temp. (°)	Frequency (KHz)	Frequency Error (Hz)	Deviation (ppm)
100%	48	20 (ref)	2132000.006	0	0.000
100%		0	2132000.008	2	0.001
100%		10	2132000.025	19	0.009
100%		30	2132000.024	18	0.008
100%		40	2132000.018	12	0.006
115%	55.2	20	2132000.019	13	0.006
85%	40.8	20	2132000.024	18	0.008

Test Data for LTE Band 12:

Voltage (%)	Power (VDC)	Temp. (°)	Frequency (KHz)	Frequency Error (Hz)	Deviation (ppm)
100%	48	20 (ref)	737500.010	0	0.000
100%		0	737500.018	8	0.011
100%		10	737500.010	0	0.000
100%		30	737500.014	4	0.005
100%		40	737500.022	12	0.016
115%	55.2	20	737500.012	2	0.003
85%	40.8	20	737500.020	10	0.014

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Radiated Emissions						
R & S Receiver	ESL6	100178	05/27/2015	1 Year	05/27/2016	☑
Agilent Spectrum Analyzer	N9010A	10SL0219	08/20/2015	1 Year	08/20/2016	☑
Agilent Signal Generator	MXG N5182A	MY47071065	04/13/2016	1 Year	04/13/2017	☑
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	03/30/2016	1 Year	03/30/2017	☑
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	08/12/2015	1 Year	08/12/2016	☑
Horn Antenna (1-26.5GHz)	3115	10SL0059	08/25/2015	1 Year	08/25/2016	☑
Horn Antenna (1-26.5GHz)	SAS-571	411	08/25/2015	1 Year	08/25/2016	☑
Tuned Dipole Antenna 30 - 1000 MHz (4pcs set)	AD-100	40133	10/02/2015	1 Year	10/02/2016	☑
RF Preamplifier	LPA-6-30	11140711	02/10/2016	1 Year	02/10/2017	☑
3 Meters SAC	3M	N/A	08/08/2015	1 Year	08/08/2016	☑
10 Meters SAC	10M	N/A	09/05/2015	1 Year	09/05/2016	☑
RF Conducted Measurement						
Agilent Spectrum Analyzer	N9010A	10SL0219	08/20/2015	1 Year	08/20/2016	☑
Test Equity Environment Chamber	1007H	61201	07/31/2015	1 Year	07/31/2016	☑

Annex B. SIEMIC Accreditation

Accreditations	Document	Scope / Remark
ISO 17025 (A2LA)		Please see the documents for the detailed scope
ISO Guide 65 (A2LA)		Please see the documents for the detailed scope
TCB Designation		A1, A2, A3, A4, B1, B2, B3, B4, C
FCC DoC Accreditation		FCC Declaration of Conformity Accreditation
FCC Site Registration		3 meter site
FCC Site Registration		10 meter site
IC Site Registration		3 meter site
IC Site Registration		10 meter site
EU NB		**Radio & Telecommunications Terminal Equipment:** EN45001 – EN ISO/IEC 17025
		Electromagnetic Compatibility: EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)		Phase I, Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
HongKong OFCA		**(Phase II)** OFCA Foreign Certification Body for Radio and Telecom
		(Phase I) Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		**Radio:** Scope A – All Radio Standard Specification in Category I
		Telecom: CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		**Radio** : A1. Terminal equipment for purpose of calling **Telecom** : B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law
Korea CAB Accreditation		**EMI:** KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI**EMS:** KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS
		Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68
		Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		R-3083: Radiation 3 meter site C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measuremet
Australia CAB Regocnition		**EMC:** AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4
		Radiocommunications: AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771
		Telecommunications: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016,AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2