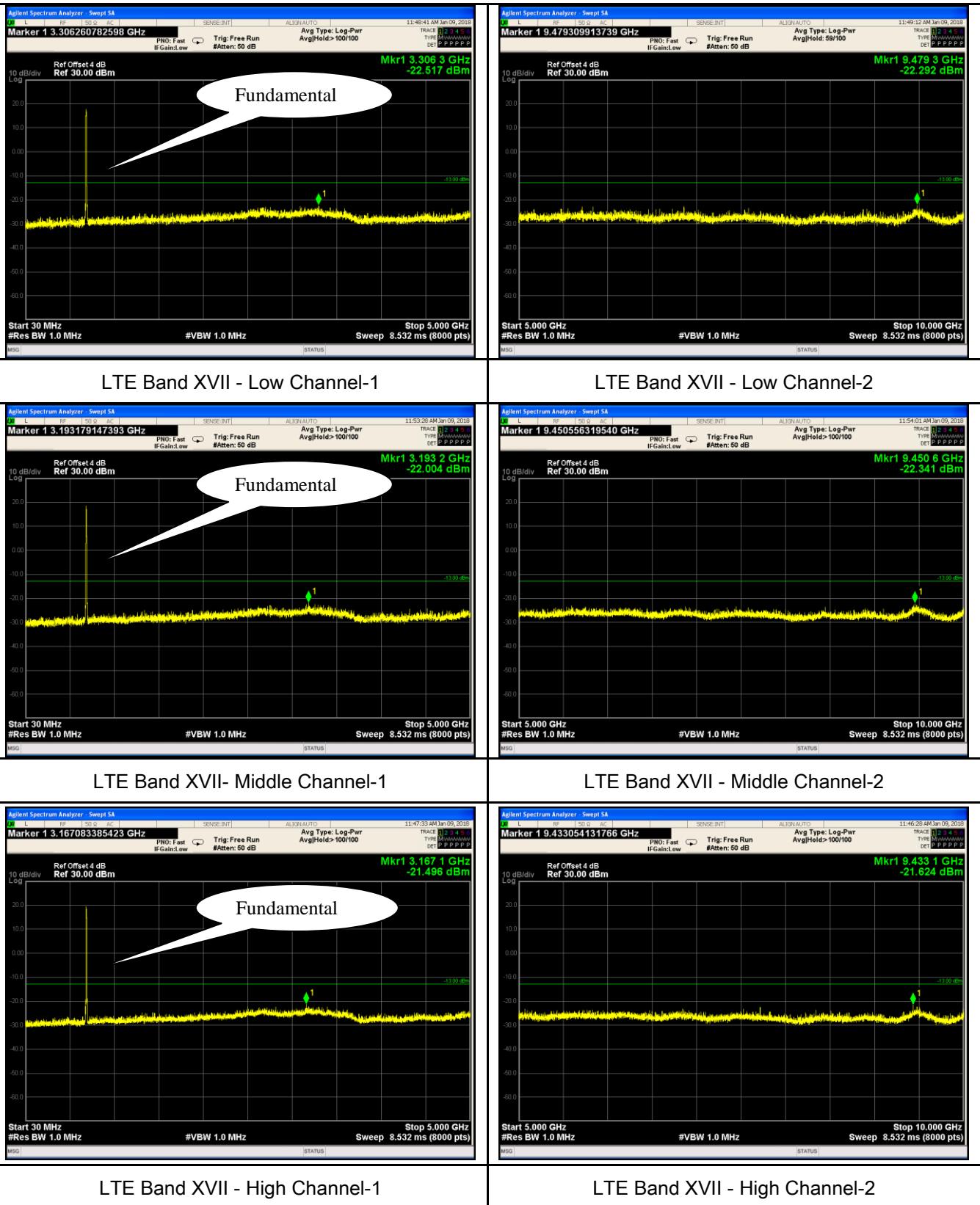


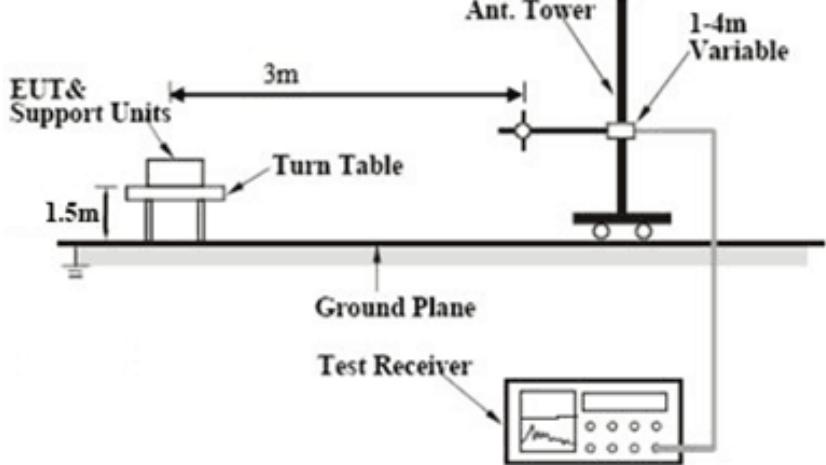
## LTE Band XVII (Part 27)



## 6.6 Spurious Radiated Emissions

Temperature	25 °C
Relative Humidity	56%
Atmospheric Pressure	1018mbar
Test date :	January 09, 2018
Tested By :	Aaron Liang

**Requirement(s):**

Spec	Item	Requirement	Applicable
§2.1053, §22.917 & §24.238 § 27.53(h)	a)	The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.	<input checked="" type="checkbox"/>
Test setup			
Test Procedure	<ol style="list-style-type: none"> <li>1. The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.</li> <li>2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.</li> <li>3. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.</li> </ol> <p>Sample Calculation:</p> <p>EUT Field Strength = Raw Amplitude (dB<math>\mu</math>V/m) – Amplifier Gain (dB) + Antenna Factor (dB) + Cable Loss (dB) + Filter Attenuation (dB, if used)</p>		

Remark		
Result	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

Test Data  Yes  N/A

Test Plot  Yes (See below)  N/A

## LTE Band II (Part 24E) result

### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3720	-48.55	V	10.25	2.73	-41.03	-13	-28.03
3720	-49.48	H	10.25	2.73	-41.96	-13	-28.96
234.78	-53.29	V	5.9	0.24	-47.63	-13	-34.63
357.85	-53.41	H	5.89	0.28	-47.8	-13	-34.8

### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3760	-49.4	V	10.25	2.73	-41.88	-13	-28.88
3760	-48.73	H	10.25	2.73	-41.21	-13	-28.21
555.41	-53.07	V	6.15	0.41	-47.33	-13	-34.33
564.99	-52.47	H	6.11	0.4	-46.76	-13	-33.76

### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3800	-49.43	V	10.36	2.73	-41.8	-13	-28.8
3800	-49.26	H	10.36	2.73	-41.63	-13	-28.63
802.37	-53.02	V	6.11	0.39	-47.3	-13	-34.3
828.47	-53.04	H	6.06	0.37	-47.35	-13	-34.35

#### Note:

- 1, The testing has been conformed to 10\*1907.5MHz=19,075MHz
- 2, All other emissions more than 30 dB below the limit
- 3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.
- 4, The radiated spurious test above 18GHz is subcontracted to SIEMIC (Nanjing-China) Laboratories. and found 30dB below the limit at least.

### LTE Band IV (Part27) result

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3440	-49.83	V	10.06	2.52	-42.29	-13	-29.29
3440	-49.55	H	10.06	2.52	-42.01	-13	-29.01
602.34	-53.43	V	6.09	0.42	-47.76	-13	-34.76
647.21	-52.97	H	6.07	0.39	-47.29	-13	-34.29

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3465	-49.64	V	10.09	2.52	-42.07	-13	-29.07
3465	-50.57	H	10.09	2.52	-43	-13	-30
731.54	-52.83	V	6.07	0.42	-47.18	-13	-34.18
707.22	-52.99	H	6.07	0.41	-47.33	-13	-34.33

#### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3490	-50.14	V	10.09	2.52	-42.57	-13	-29.57
3490	-50.15	H	10.09	2.52	-42.58	-13	-29.58
773.31	-53.97	V	6.12	0.41	-48.26	-13	-35.26
303.96	-53.07	H	5.88	0.25	-47.44	-13	-34.44

#### Note:

- 1, The testing has been conformed to 10\*1752.5MHz=17,525MHz
- 2, All other emissions more than 30 dB below the limit
- 3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

### LTE Band VII (Part27) result

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
5020	-46.03	V	10.29	0.98	-36.72	-13	-23.72
5020	-45.06	H	10.29	0.98	-35.75	-13	-22.75
347.37	-52.88	V	5.88	0.26	-47.26	-13	-34.26
535.22	-52.62	H	6.05	0.36	-46.93	-13	-33.93

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
5070	-46.09	V	10.3	0.99	-36.78	-13	-23.78
5070	-45.79	H	10.3	0.99	-36.48	-13	-23.48
665.27	-52.15	V	6.06	0.38	-46.47	-13	-33.47
627.83	-51.94	H	6.11	0.4	-46.23	-13	-33.23

#### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
5120	-46.67	V	10.32	1	-37.35	-13	-24.35
5120	-45.68	H	10.32	1	-36.36	-13	-23.36
706.94	-51.66	V	6.14	0.38	-45.9	-13	-32.9
298.24	-52.6	H	5.86	0.27	-47.01	-13	-34.01

#### Note:

- 1, The testing has been conformed to  $10 * 2567.5 \text{ MHz} = 25,675 \text{ MHz}$
- 2, All other emissions more than 30 dB below the limit
- 3, X-Axis, Y-Axis and Z -Axis were investigated. The results above show only the worst case.
- 4, The radiated spurious test above 18GHz is subcontracted to SIEMIC (Nanjing-China) Laboratories. and found 30dB below the limit at least.

### LTE Band XII (Part27) result

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1408	-48.83	V	7.65	0.75	-41.93	-13	-28.93
1408	-49.13	H	7.65	0.75	-42.23	-13	-29.23
636.93	-52.57	V	6.15	0.41	-46.83	-13	-33.83
386.19	-52.84	H	5.87	0.3	-47.27	-13	-34.27

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1415	-50	V	7.65	0.75	-43.1	-13	-30.1
1415	-49.13	H	7.65	0.75	-42.23	-13	-29.23
664.88	-52.66	V	6.1	0.42	-46.98	-13	-33.98
836.67	-54.04	H	6.11	0.36	-48.29	-13	-35.29

#### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1422	-50.15	V	7.65	0.75	-43.25	-13	-30.25
1422	-49.11	H	7.65	0.75	-42.21	-13	-29.21
629.42	-53.26	V	6.08	0.4	-47.58	-13	-34.58
282.47	-52.83	H	5.94	0.26	-47.15	-13	-34.15

#### Note:

- 1, The testing has been conformed to 10\*715.3MHz=7,153MHz
- 2, All other emissions more than 30 dB below the limit
- 3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

## LTE Band XVII (Part27) result

### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1418	-47.2	V	7.65	0.75	-40.3	-13	-27.3
1418	-45.85	H	7.65	0.75	-38.95	-13	-25.95
654.77	-52.37	V	6.07	0.37	-46.67	-13	-33.67
350.71	-52.9	H	5.95	0.3	-47.25	-13	-34.25

### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1420	-45.44	V	7.65	0.75	-38.54	-13	-25.54
1420	-44.88	H	7.65	0.75	-37.98	-13	-24.98
464.06	-52.06	V	5.88	0.28	-46.46	-13	-33.46
831.03	-52.69	H	6.15	0.37	-46.91	-13	-33.91

### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1422	-46.35	V	7.65	0.75	-39.45	-13	-26.45
1422	-46.13	H	7.65	0.75	-39.23	-13	-26.23
353.82	-52.92	V	5.89	0.3	-47.33	-13	-34.33
711.79	-53.7	H	6.1	0.38	-47.98	-13	-34.98

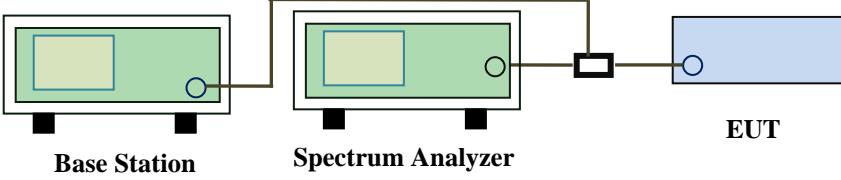
#### Note:

- 1, The testing has been conformed to  $10 \times 713.5\text{MHz} = 7,135\text{MHz}$
- 2, All other emissions more than 30 dB below the limit
- 3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

## 6.7 Band Edge

Temperature	24 °C
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	January 05, 2018
Tested By :	Aaron Liang

### Requirement(s):

Spec	Item	Requirement	Applicable
§22.917(a) §24.238(a) § 27.53(h)	a)	The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.	<input checked="" type="checkbox"/>
Test setup		 <p>Base Station      Spectrum Analyzer      EUT</p>	
Procedure		<ul style="list-style-type: none"> <li>- The EUT was connected to Spectrum Analyzer and Base Station via power divider.</li> <li>- The Band Edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.</li> </ul>	
Remark			
Result		<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	

Test Data  Yes  N/A

Test Plot  Yes (See below)  N/A

### LTE Band II (Part 24E) result

BW(MHz)	Channel	Frequency (MHz)	Mode	Emission (dBm)	Limit (dBm)
1.4	18607	1850	QPSK	-23.828	-13
			16QAM	-34.960	-13
1.4	18900	1910	QPSK	-23.103	-13
			16QAM	-21.068	-13
3	18615	1850	QPSK	-28.915	-13
			16QAM	-30.917	-13
3	19185	1910	QPSK	-19.401	-13
			16QAM	-18.564	-13
5	18625	1850	QPSK	-16.261	-13
			16QAM	-17.800	-13
5	19175	1910	QPSK	-15.225	-13
			16QAM	-15.695	-13
10	18650	1850	QPSK	-19.071	-13
			16QAM	-18.766	-13
10	19150	1910	QPSK	-14.474	-13
			16QAM	-13.796	-13
15	18675	1850	QPSK	-17.343	-13
			16QAM	-19.251	-13
15	19125	1910	QPSK	-20.383	-13
			16QAM	-17.882	-13
20	18700	1850	QPSK	-25.969	-13
			16QAM	-25.457	-13
20	19100	1910	QPSK	-17.630	-13
			16QAM	-18.195	-13

### LTE Band IV (Part 27) result

BW(MHz)	Channel	Frequency (MHz)	Mode	Emission (dBm)	Limit (dBm)
1.4	19957	1709.9	QPSK	-29.096	-13
			16QAM	-26.419	-13
1.4	20393	1755	QPSK	-23.275	-13
			16QAM	-26.657	-13
3	19965	1709.9	QPSK	-28.494	-13
			16QAM	-28.183	-13
3	20385	1755	QPSK	-23.912	-13
			16QAM	-26.484	-13
5	19975	1709.9	QPSK	-18.622	-13
			16QAM	-19.166	-13
5	20375	1755	QPSK	-18.714	-13
			16QAM	-19.978	-13
10	20000	1709.9	QPSK	-18.642	-13
			16QAM	-22.403	-13
10	20350	1755	QPSK	-19.939	-13
			16QAM	-18.409	-13
15	20025	1709.9	QPSK	-20.029	-13
			16QAM	-20.363	-13
15	20325	1755	QPSK	-18.490	-13
			16QAM	-19.093	-13
20	20050	1709.9	QPSK	-22.259	-13
			16QAM	-22.951	-13
20	20300	1755	QPSK	-23.482	-13
			16QAM	-23.894	-13

### LTE Band XII (Part 27) result

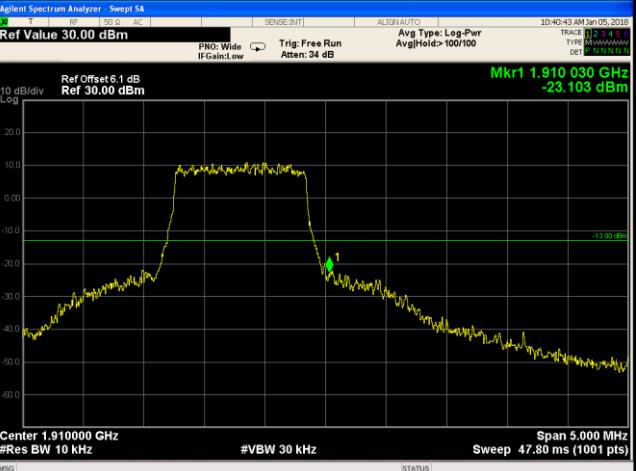
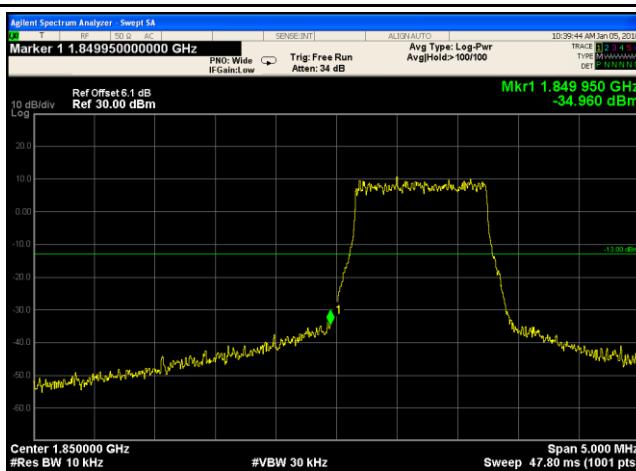
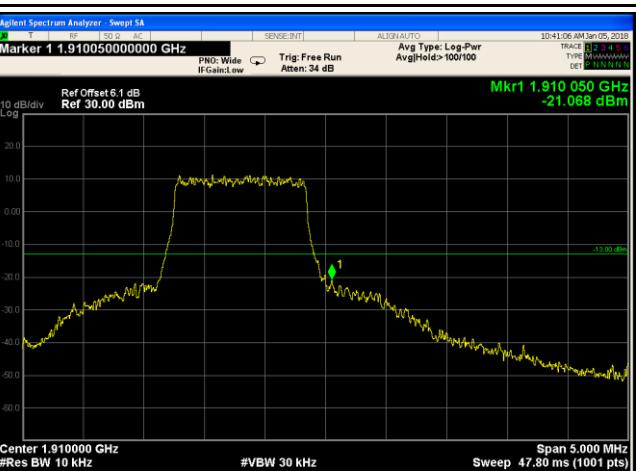
BW(MHz)	Channel	Frequency (MHz)	Mode	Emission (dBm)	Limit (dBm)
1.4	23017	699	QPSK	-25.952	-13
			16QAM	-25.959	-13
1.4	23173	716	QPSK	-22.958	-13
			16QAM	-25.069	-13
3	23025	699	QPSK	-21.084	-13
			16QAM	-25.942	-13
3	23165	716	QPSK	-23.145	-13
			16QAM	-21.527	-13
5	23035	699	QPSK	-18.593	-13
			16QAM	-18.593	-13
5	23155	716	QPSK	-17.299	-13
			16QAM	-18.836	-13
10	23060	698	QPSK	-18.528	-13
			16QAM	-19.089	-13
10	23130	716	QPSK	-18.844	-13
			16QAM	-18.913	-13

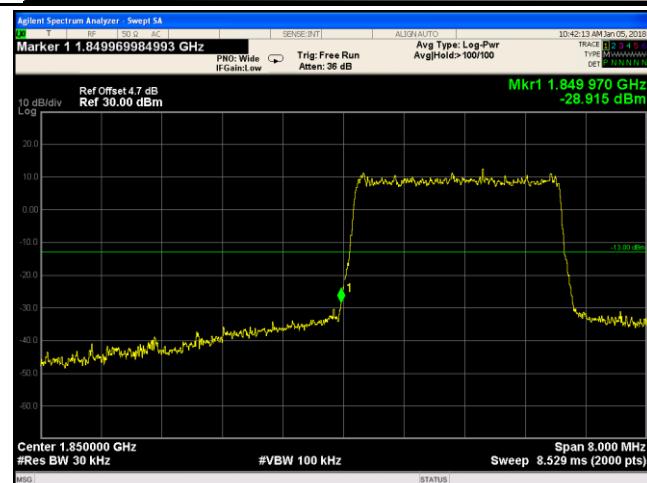
### LTE Band XVII (Part 27) result

BW(MHz)	Channel	Frequency (MHz)	Mode	Emission (dBm)	Limit (dBm)
5	23755	704	QPSK	-18.622	-13
			16QAM	-17.661	-13
5	23825	716	QPSK	-19.894	-13
			16QAM	-18.978	-13
10	23780	704	QPSK	-17.604	-13
			16QAM	-18.305	-13
10	23800	716	QPSK	-19.128	-13
			16QAM	-17.734	-13

## Test Plots

### LTE Band II (Part 24E)

 <p>Marker 1 1.849950000000 GHz Mkr1 1.849 950 GHz -23.828 dBm</p> <p>Center 1.850000 GHz #Res BW 10 kHz #VBW 30 kHz Span 5.000 MHz Sweep 47.80 ms (1001 pts)</p>	 <p>Marker 1 1.910 030 GHz -23.103 dBm Mkr1 1.910 030 GHz -23.103 dBm</p> <p>Center 1.910000 GHz #Res BW 10 kHz #VBW 30 kHz Span 5.000 MHz Sweep 47.80 ms (1001 pts)</p>
<p>LTE Band II - Low Channel QPSK-1.4</p> <p>Note: Offset=Cable loss (4.5) + 10log (13.03)=4.5+1.6=6.1dB</p>	<p>LTE Band II - High Channel QPSK-1.4</p> <p>Note: Offset=Cable loss (4.5) + 10log (12.98)=4.5+1.6=6.1dB</p>
 <p>Marker 1 1.849950000000 GHz Mkr1 1.849 950 GHz -34.960 dBm</p> <p>Center 1.850000 GHz #Res BW 10 kHz #VBW 30 kHz Span 5.000 MHz Sweep 47.80 ms (1001 pts)</p>	 <p>Marker 1 1.910050000000 GHz Mkr1 1.910 050 GHz -21.068 dBm</p> <p>Center 1.910000 GHz #Res BW 10 kHz #VBW 30 kHz Span 5.000 MHz Sweep 47.80 ms (1001 pts)</p>
<p>LTE Band II - Low Channel 16QAM-1.4</p> <p>Note: Offset=Cable loss (4.5) + 10log (13.18/10)=4.5+1.6=6.1 dB</p>	<p>LTE Band II - High Channel 16QAM-1.4</p> <p>Note: Offset=Cable loss (4.5) + 10log (13.18/10)=4.5+1.6=6.1 dB</p>



#### LTE Band II - Low Channel QPSK-3

Note: Offset=Cable loss (4.5) + 10log  
 $(29.95/30)=4.5+0.2=4.7$  dB



#### LTE Band II - High Channel QPSK-3

Note: Offset=Cable loss (4.5) + 10log  
 $(30.09/30)=4.5+0.2=4.7$  dB

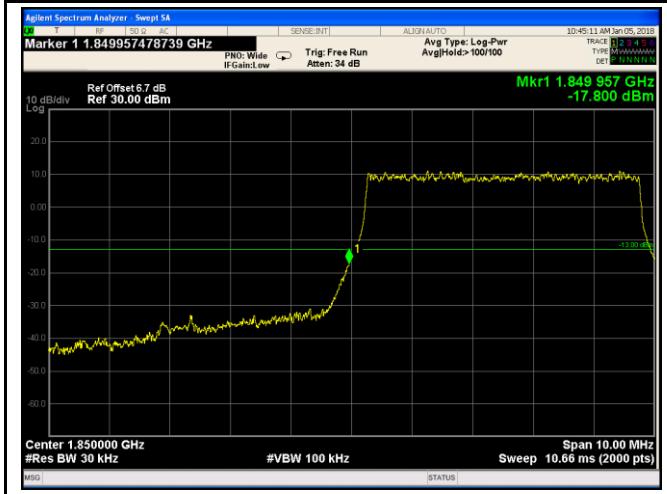
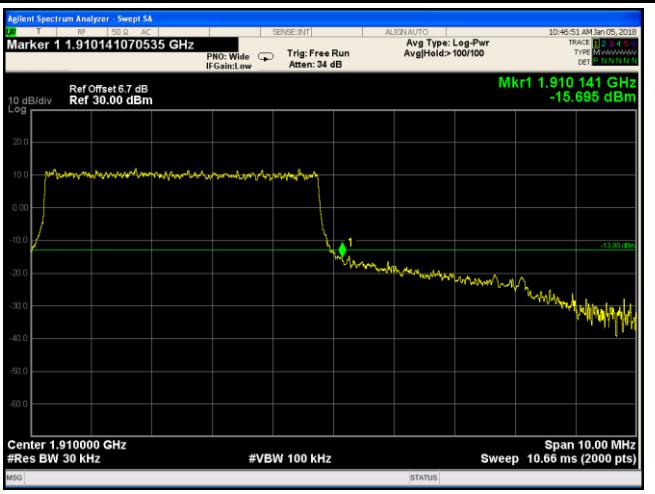


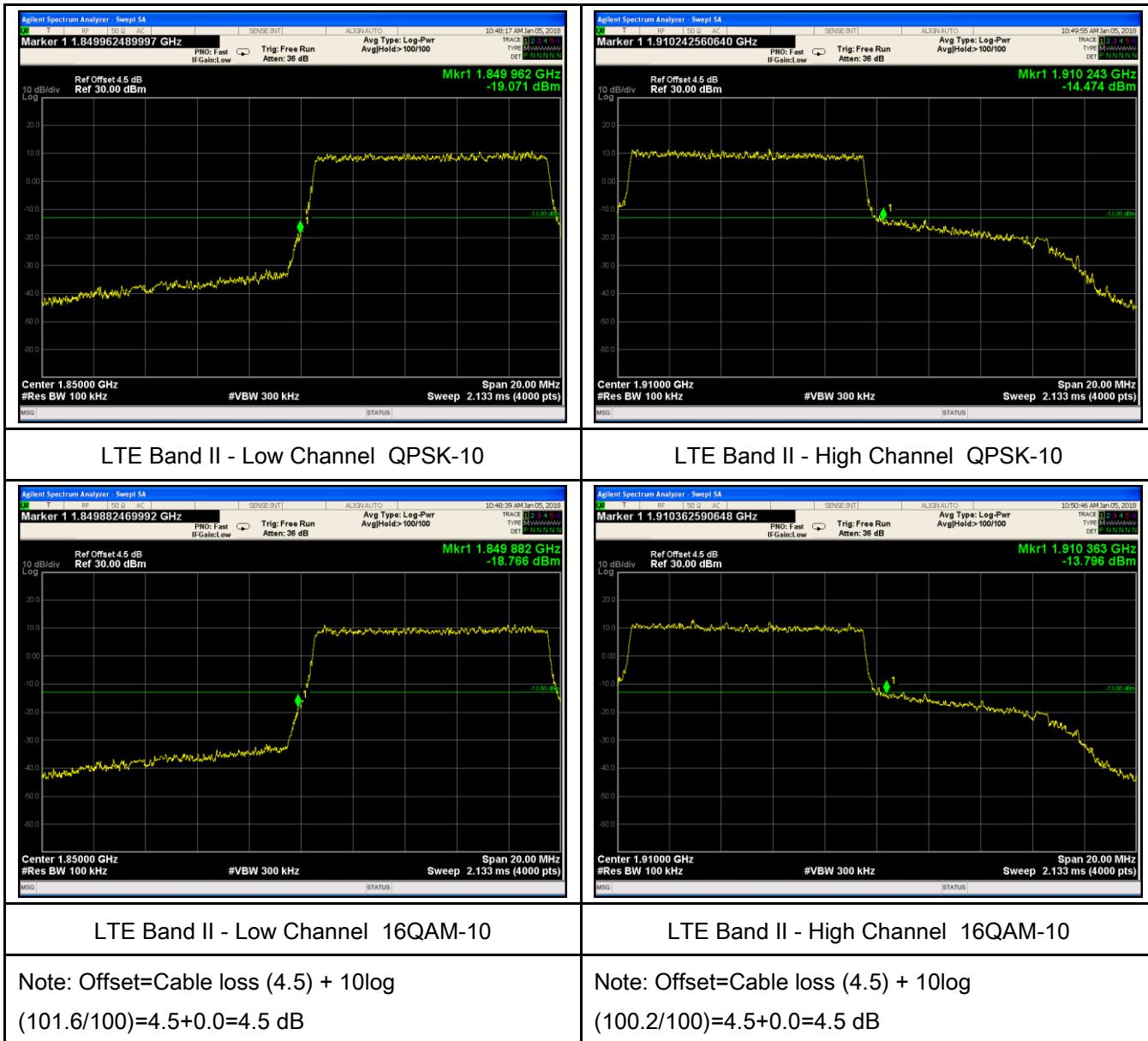
#### LTE Band II - Low Channel 16QAM-3

Note: Offset=Cable loss (4.5) + 10log  
 $(29.81/30)=4.5+0.2=4.7$  dB

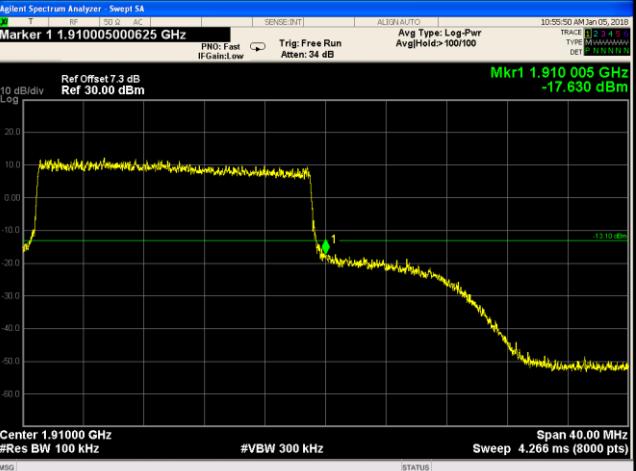
#### LTE Band II - High Channel 16QAM-3

Note: Offset=Cable loss (4.5) + 10log  
 $(30.04/30)=4.5+0.2=4.7$  dB

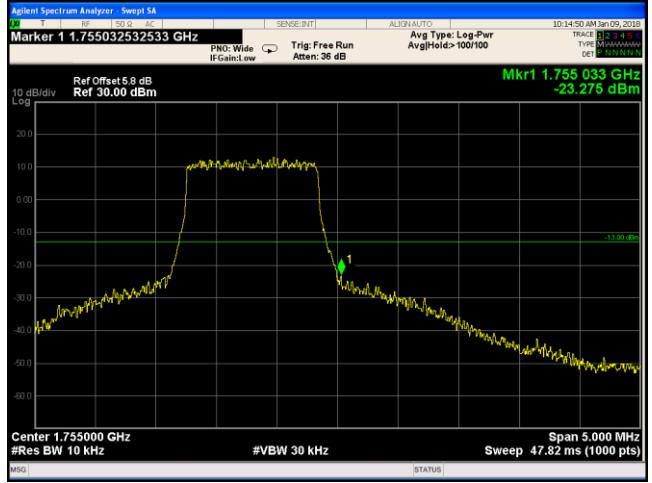
 <p>Marker 1 1.849982491246 GHz PNO: Wide IFGain:Low Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.849 982 GHz -16.261 dBm</p> <p>10 dB/div Ref Offset 5.7 dB Ref 30.00 dBm</p> <p>Center 1.850000 GHz #Res BW 30 kHz #VBW 100 kHz Span 10.00 MHz Sweep 10.66 ms (2000 pts)</p>	 <p>Marker 1 1.910071035518 GHz PNO: Wide IFGain:Low Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.910 071 GHz -15.225 dBm</p> <p>10 dB/div Ref Offset 5.7 dB Ref 30.00 dBm</p> <p>Center 1.910000 GHz #Res BW 30 kHz #VBW 100 kHz Span 10.00 MHz Sweep 10.66 ms (2000 pts)</p>
<p>LTE Band II - Low Channel QPSK-5</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(51.18/30)=4.5+2.2=6.7\text{ dB}</math></p>	<p>LTE Band II - High Channel QPSK-5</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(57.42/30)=4.5+2.2=6.7\text{ dB}</math></p>
 <p>Marker 1 1.849957478739 GHz PNO: Wide IFGain:Low Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.849 957 GHz -17.800 dBm</p> <p>10 dB/div Ref Offset 5.7 dB Ref 30.00 dBm</p> <p>Center 1.850000 GHz #Res BW 30 kHz #VBW 100 kHz Span 10.00 MHz Sweep 10.66 ms (2000 pts)</p>	 <p>Marker 1 1.910141070535 GHz PNO: Wide IFGain:Low Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.910 141 GHz -15.695 dBm</p> <p>10 dB/div Ref Offset 5.7 dB Ref 30.00 dBm</p> <p>Center 1.910000 GHz #Res BW 30 kHz #VBW 100 kHz Span 10.00 MHz Sweep 10.66 ms (2000 pts)</p>
<p>LTE Band II - Low Channel 16QAM-5</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(50.21/30)=4.5+2.2=6.7\text{ dB}</math></p>	<p>LTE Band II - High Channel 16QAM-5</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(61.56/30)=4.5+2.2=6.7\text{ dB}</math></p>



 <p>Marker 1 1.849994374297 GHz PN0: Fast IfGainLow Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.849 994 GHz -17.343 dBm</p> <p>10 dB/div Ref Offset 5.2 dB Ref 30.00 dBm</p> <p>Center 1.85000 GHz #Res BW 100 kHz #VBW 300 kHz Span 30.00 MHz Sweep 3.200 ms (8000 pts)</p>	 <p>Marker 1 1.910608827666 GHz PN0: Fast IfGainLow Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.910 609 GHz -20.383 dBm</p> <p>10 dB/div Ref Offset 6.1 dB Ref 30.00 dBm</p> <p>Center 1.91000 GHz #Res BW 100 kHz #VBW 300 kHz Span 30.00 MHz Sweep 3.200 ms (8000 pts)</p>
<p>LTE Band II - Low Channel QPSK-15</p> <p>Note: Offset=Cable loss (4.5) + 10log (148/100)=4.5+1.7=6.2 dB</p>	<p>LTE Band II - High Channel QPSK-15</p> <p>Note: Offset=Cable loss (4.5) + 10log (146/100)=4.5+1.6=6.1 dB</p>
 <p>Marker 1 1.849938117265 GHz PN0: Fast IfGainLow Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.849 938 GHz -19.251 dBm</p> <p>10 dB/div Ref Offset 5.2 dB Ref 30.00 dBm</p> <p>Center 1.85000 GHz #Res BW 100 kHz #VBW 300 kHz Span 30.00 MHz Sweep 3.200 ms (8000 pts)</p>	 <p>Marker 1 1.9105468820165 GHz PN0: Fast IfGainLow Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.910 549 GHz -17.882 dBm</p> <p>10 dB/div Ref Offset 6.1 dB Ref 30.00 dBm</p> <p>Center 1.91000 GHz #Res BW 100 kHz #VBW 300 kHz Span 30.00 MHz Sweep 3.200 ms (8000 pts)</p>
<p>LTE Band II - Low Channel 16QAM-15</p> <p>Note: Offset=Cable loss (4.5) + 10log (147.4/100)=4.5+1.7=6.2 dB</p>	<p>LTE Band II - High Channel 16QAM-15</p> <p>Note: Offset=Cable loss (4.5) + 10log (145.9/100)=4.5+1.6=6.1 dB</p>

 <p>Agilent Spectrum Analyzer - Swept SA Marker 1 1.849759344918 GHz</p> <p>PWD: Fast IFGain:Low Trig: Free Run Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Ref Offset 7.3 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Mkr1 1.849 759 GHz -25.969 dBm</p> <p>Center 1.85000 GHz #Res BW 100 kHz #VBW 300 kHz Span 4.00 MHz Sweep 4.266 ms (8000 pts)</p>	 <p>Agilent Spectrum Analyzer - Swept SA Marker 1 1.910005000625 GHz</p> <p>PWD: Fast IFGain:Low Trig: Free Run Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Ref Offset 7.3 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Mkr1 1.910 005 GHz -17.630 dBm</p> <p>Center 1.91000 GHz #Res BW 100 kHz #VBW 300 kHz Span 4.00 MHz Sweep 4.266 ms (8000 pts)</p>
<p>LTE Band II - Low Channel QPSK-20</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(192.3/100)=4.5+2.8=7.3</math> dB</p>	<p>LTE Band II - High Channel QPSK-20</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(194.4/100)=4.5+2.8=7.3</math> dB</p>
 <p>Agilent Spectrum Analyzer - Swept SA Marker 1 1.849384298037 GHz</p> <p>PWD: Fast IFGain:Low Trig: Free Run Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Ref Offset 7.3 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Mkr1 1.849 384 GHz -25.457 dBm</p> <p>Center 1.85000 GHz #Res BW 100 kHz #VBW 300 kHz Span 4.00 MHz Sweep 4.266 ms (8000 pts)</p>	 <p>Agilent Spectrum Analyzer - Swept SA Marker 1 1.9100860010001 GHz</p> <p>PWD: Fast IFGain:Low Trig: Free Run Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Ref Offset 7.3 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Mkr1 1.910 080 GHz -18.195 dBm</p> <p>Center 1.91000 GHz #Res BW 100 kHz #VBW 300 kHz Span 4.00 MHz Sweep 4.266 ms (8000 pts)</p>
<p>LTE Band II - Low Channel 16QAM-20</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(194.8/100)=4.5+2.8=7.3</math> dB</p>	<p>LTE Band II - High Channel 16QAM-20</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(197.6/100)=4.5+2.8=7.3</math> dB</p>

## LTE Band IV (Part 27)

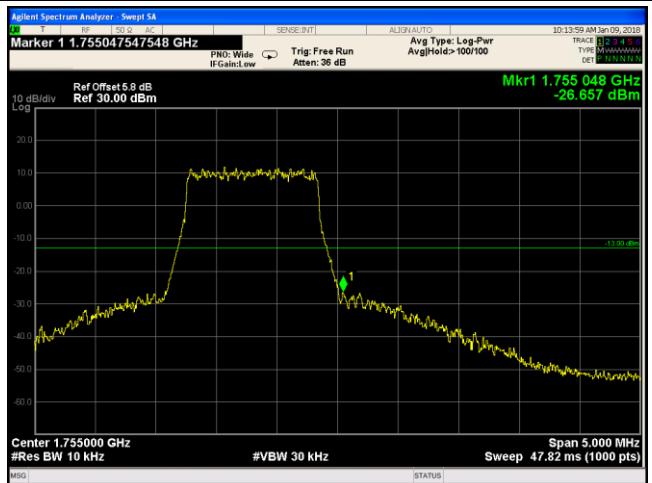
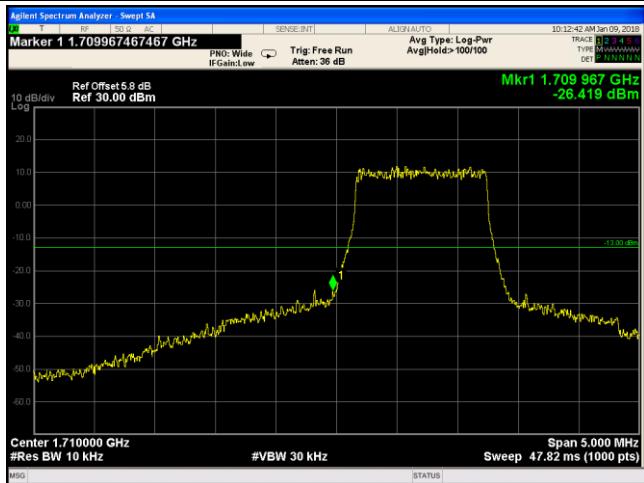


LTE Band IV - Low Channel QPSK-1.4

Note: Offset=Cable loss (4.5) + 10log  
 $(13.12/10)=4.5+1.3=5.8$  dB

LTE Band IV - High Channel QPSK-1.4

Note: Offset=Cable loss (4.5) + 10log  
 $(12.84/10)=4.5+1.3=5.8$  dB

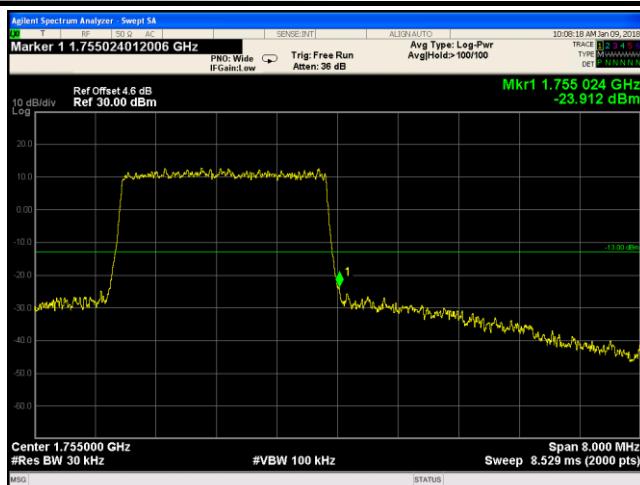


LTE Band IV - Low Channel 16QAM-1.4

Note: Offset=Cable loss (4.5) + 10log  
 $(12.81/10)=4.5+1.3=5.8$  dB

LTE Band IV - High Channel 16QAM-1.4

Note: Offset=Cable loss (4.5) + 10log  
 $(12.81/10)=4.5+1.3=5.8$  dB



LTE Band IV - Low Channel QPSK-3

LTE Band IV - High Channel QPSK-3

Note: Offset=Cable loss (4.5) + 10log  
 $(29.96/30)=4.5+0.1=4.6$  dB

Note: Offset=Cable loss (4.5) + 10log  
 $(29.81/30)=4.5+0.1=4.6$  dB

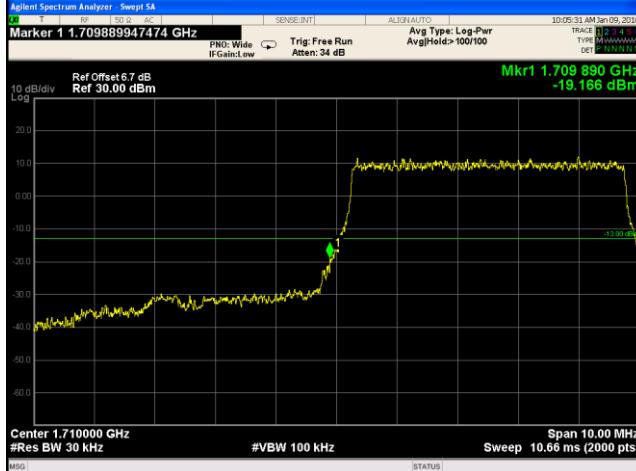


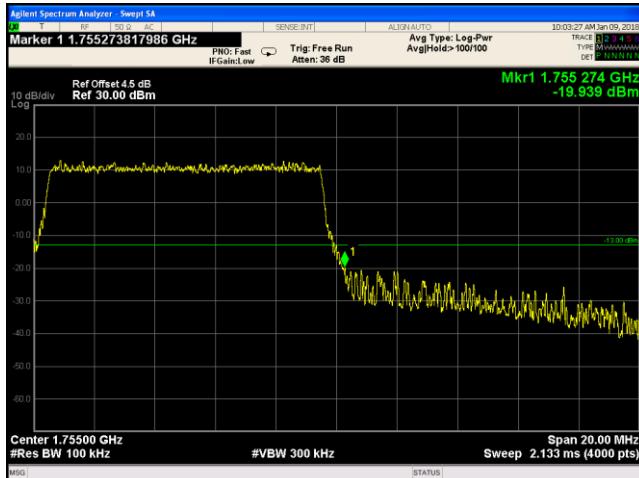
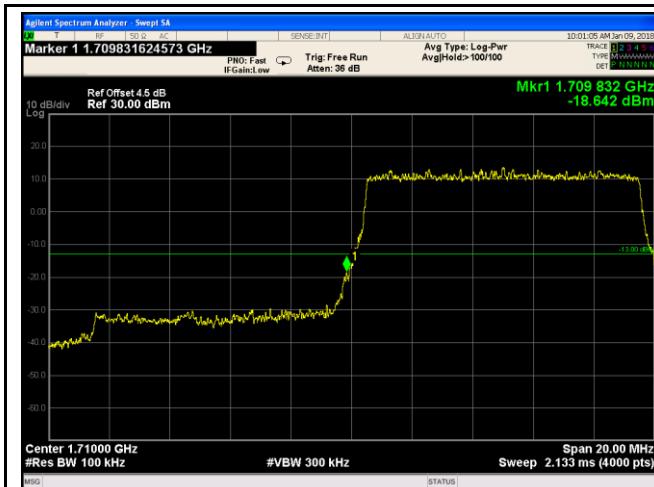
LTE Band IV - Low Channel 16QAM-3

LTE Band IV - High Channel 16QAM-3

Note: Offset=Cable loss (4.5) + 10log  
 $(30.24/30)=4.5+0.1=4.6$  dB

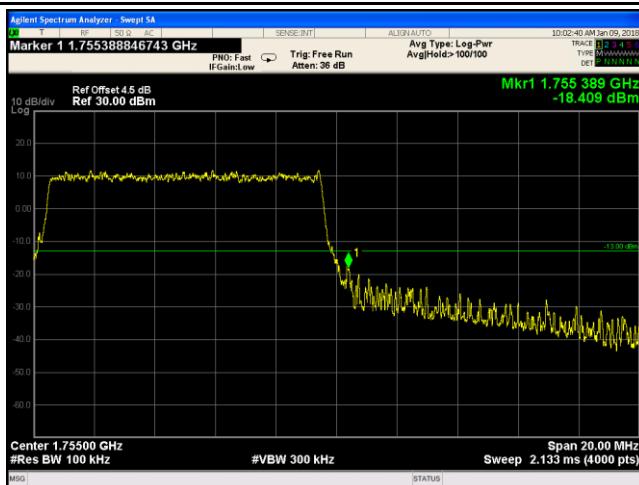
Note: Offset=Cable loss (4.5) + 10log  
 $(30.03/30)=4.5+0.1=4.6$  dB

 <p>Marker 1 1.709889947474 GHz PNO: Wide IFGain:Low Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.709 890 GHz -18.622 dBm</p> <p>Center 1.710000 GHz #Res BW 30 kHz #VBW 100 kHz Span 10.00 MHz Sweep 10.66 ms (2000 pts)</p>	 <p>Marker 1 1.755070035018 GHz PNO: Wide IFGain:Low Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.755 070 GHz -18.714 dBm</p> <p>Center 1.755000 GHz #Res BW 30 kHz #VBW 100 kHz Span 10.00 MHz Sweep 10.66 ms (2000 pts)</p>
<p>LTE Band IV - Low Channel QPSK-5</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(52.87/30)=4.5+2.2=6.7</math> dB</p>	<p>LTE Band IV - High Channel QPSK-5</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(51.06/30)=4.5+2.2=6.7</math> dB</p>
 <p>Marker 1 1.709889947474 GHz PNO: Wide IFGain:Low Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.709 890 GHz -19.166 dBm</p> <p>Center 1.710000 GHz #Res BW 30 kHz #VBW 100 kHz Span 10.00 MHz Sweep 10.66 ms (2000 pts)</p>	 <p>Marker 1 1.755070035018 GHz PNO: Wide IFGain:Low Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.755 070 GHz -19.978 dBm</p> <p>Center 1.755000 GHz #Res BW 30 kHz #VBW 100 kHz Span 10.00 MHz Sweep 10.66 ms (2000 pts)</p>
<p>LTE Band IV - Low Channel 16QAM-5</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(50.54/30)=4.5+2.2=6.7</math> dB</p>	<p>LTE Band IV - High Channel 16QAM-5</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(50.89/30)=4.5+2.2=6.7</math> dB</p>



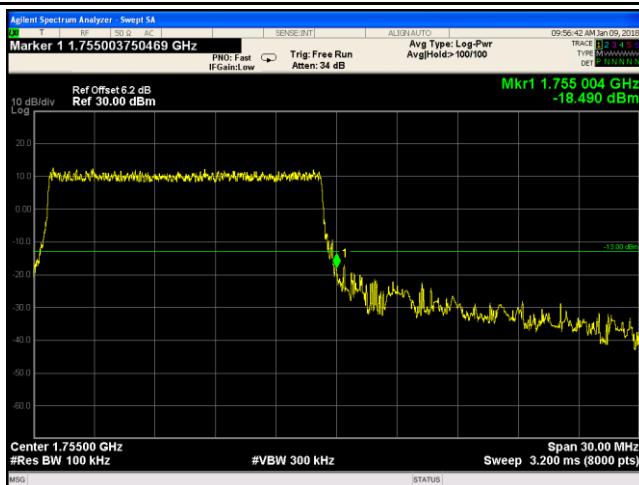
LTE Band IV - Low Channel QPSK-10

LTE Band IV - High Channel QPSK-10



LTE Band IV - Low Channel 16QAM-10

LTE Band IV - High Channel 16QAM-10

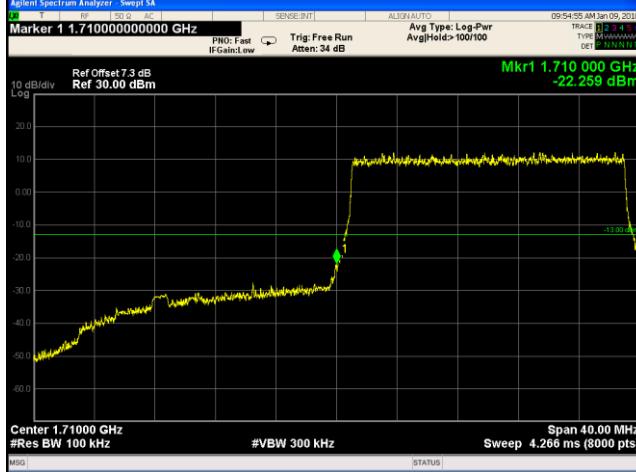
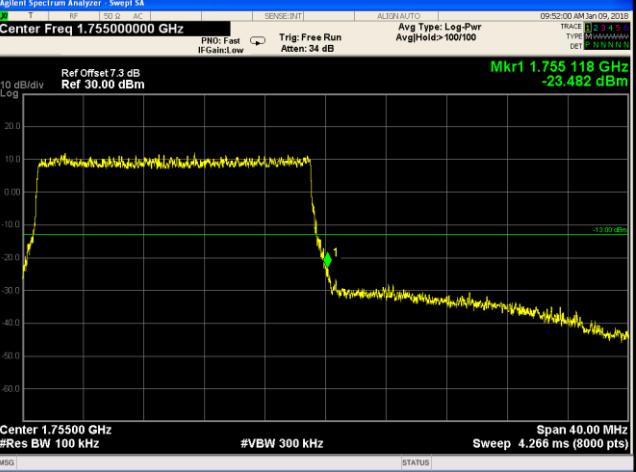


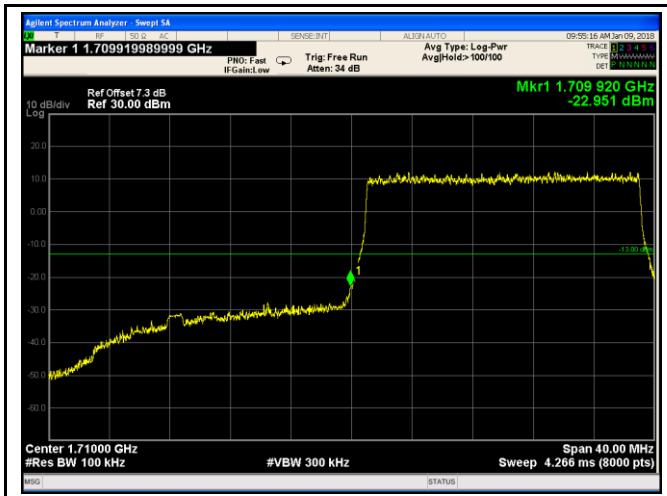
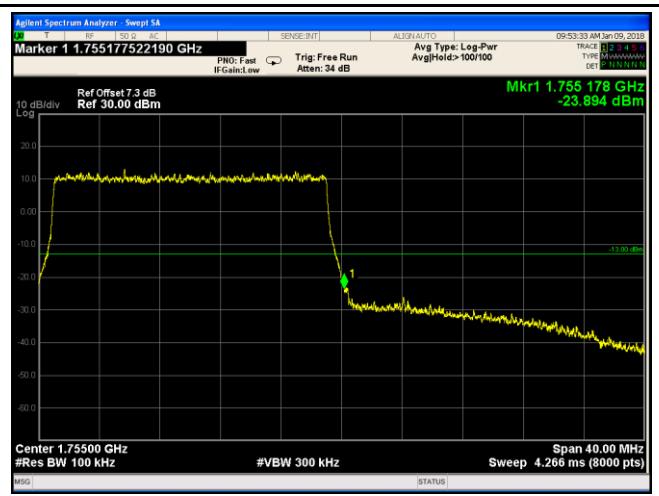
LTE Band IV - Low Channel QPSK-15

LTE Band IV - High Channel QPSK-15

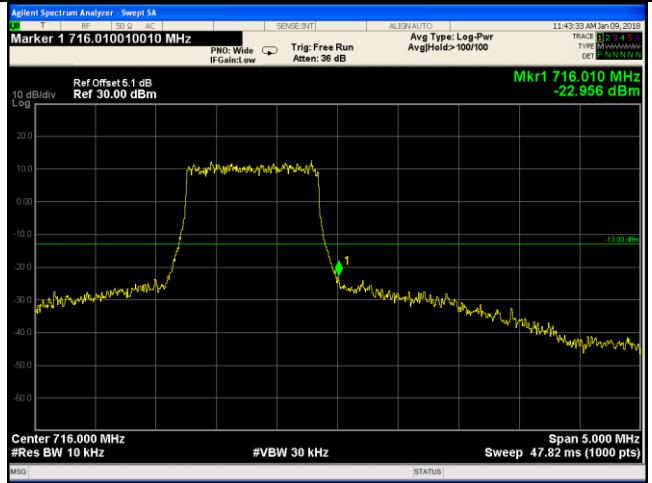
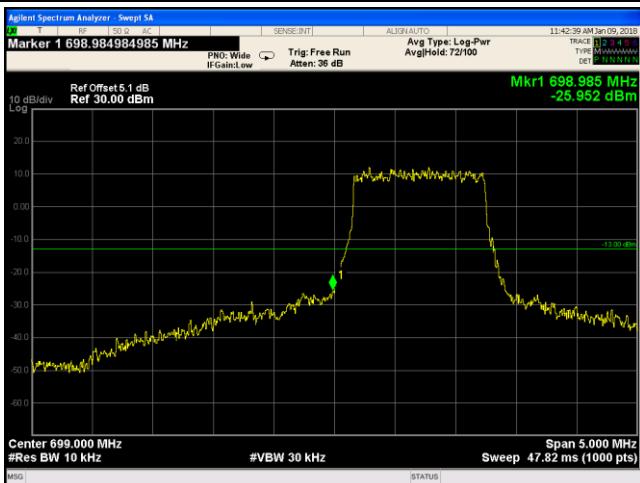
Note: Offset=Cable loss (4.5) + 10log  
(150.1/100)=4.5+1.7=6.2 dB

Note: Offset=Cable loss (4.5) + 10log  
(170.6/100)=4.5+1.7=6.2 dB

 <p>Marker 1 1.709964995624 GHz PN0: Fast IFGain:Low Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.709 985 GHz -20.363 dBm</p> <p>Center 1.71000 GHz #Res BW 100 kHz #VBW 300 kHz Span 30.00 MHz Sweep 3.200 ms (8000 pts)</p>	 <p>Marker 1 1.755033754219 GHz PN0: Fast IFGain:Low Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.755 034 GHz -19.093 dBm</p> <p>Center 1.75500 GHz #Res BW 100 kHz #VBW 300 kHz Span 30.00 MHz Sweep 3.200 ms (8000 pts)</p>
<p>LTE Band IV - Low Channel 16QAM-15</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(150.1/100)=4.5+1.7=6.2</math> dB</p>	<p>LTE Band IV - High Channel 16QAM-15</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(149.2/100)=4.5+1.7=6.2</math> dB</p>
 <p>Marker 1 1.710000000000 GHz PN0: Fast IFGain:Low Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.710 000 GHz -22.259 dBm</p> <p>Center 1.71000 GHz #Res BW 100 kHz #VBW 300 kHz Span 40.00 MHz Sweep 4.266 ms (8000 pts)</p>	 <p>Marker 1 1.755000000000 GHz PN0: Fast IFGain:Low Trig: Free Run Atten: 34 dB Avg Type: Log-Pwr AvgHold&gt;100/100</p> <p>Mkr1 1.755 118 GHz -23.482 dBm</p> <p>Center 1.75500 GHz #Res BW 100 kHz #VBW 300 kHz Span 40.00 MHz Sweep 4.266 ms (8000 pts)</p>
<p>LTE Band IV - Low Channel QPSK-20</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(193.9/100)=4.5+2.8=7.3</math> dB</p>	<p>LTE Band IV - High Channel QPSK-20</p> <p>Note: Offset=Cable loss (4.5) + 10log <math>(199.4/100)=4.5+2.8=7.3</math> dB</p>

 <p>Marker 1 1.709919989999 GHz</p> <p>Mkr1 1.709 920 GHz -22.951 dBm</p>	 <p>Marker 1 1.755177522190 GHz</p> <p>Mkr1 1.755 178 GHz -23.894 dBm</p>
<p>LTE Band IV - Low Channel 16QAM-20</p>	<p>LTE Band IV - High Channel 16QAM-20</p>
<p>Note: Offset=Cable loss (4.5) + 10log (193.1/100)=4.5+2.8=7.3dB</p>	<p>Note: Offset=Cable loss (4.5) + 10log (194.9/100)=4.5+2.8=7.3 dB</p>

## LTE Band XII (Part 27)

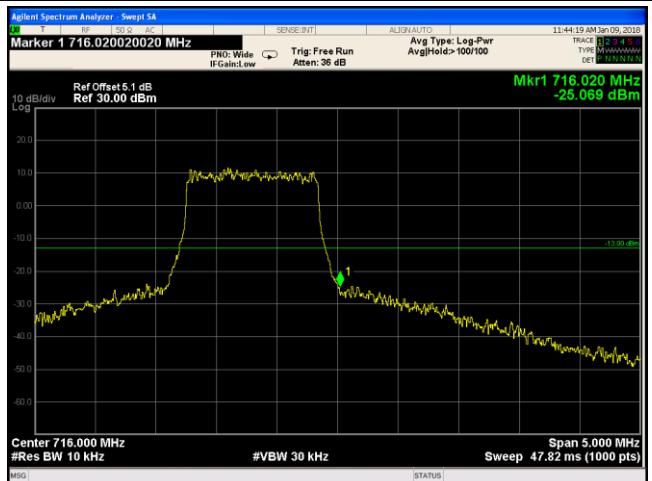
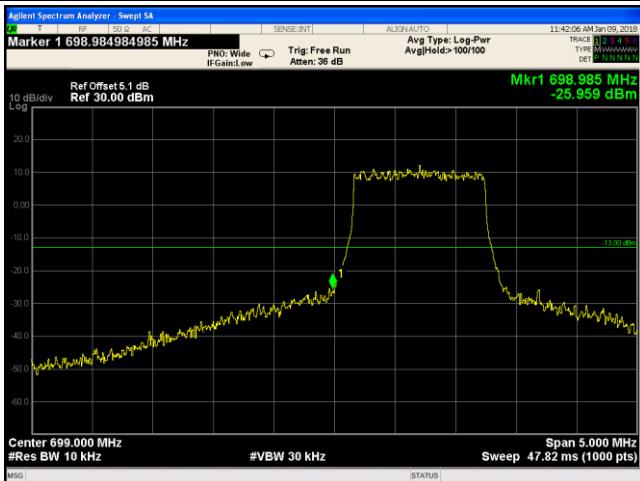


LTE Band XII - Low Channel QPSK-1.4

Note: Offset=Cable loss (4.5) + 10log  
 $(12.97/10)=4.0+1.1=5.1$  dB

LTE Band XII - High Channel QPSK-1.4

Note: Offset=Cable loss (4.5) + 10log  
 $(12.98/10)=4.0+1.1=5.1$  dB



LTE Band XII - Low Channel 16QAM-1.4

Note: Offset=Cable loss (4.5) + 10log  
 $(13.08/10)=4.0+1.1=5.1$  dB

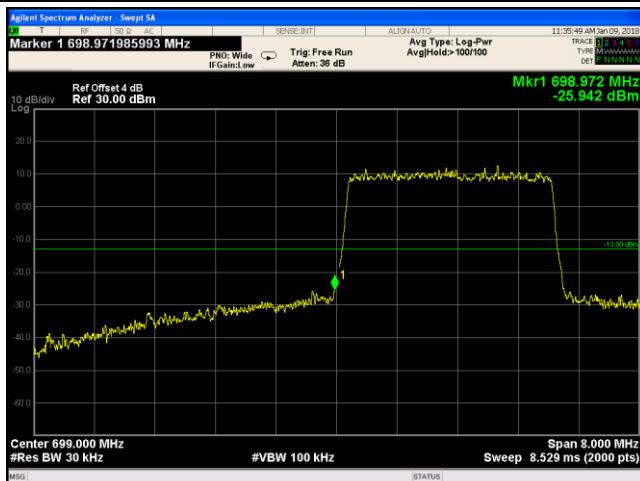
LTE Band XII - High Channel 16QAM-1.4

Note: Offset=Cable loss (4.5) + 10log  
 $(13.03/10)=4.0+1.1=5.1$  dB



#### LTE Band XII - Low Channel QPSK-3

Note: Offset=Cable loss (4.5) + 10log  
 $(29.98/30)=4.0+0.0=4.0$  dB

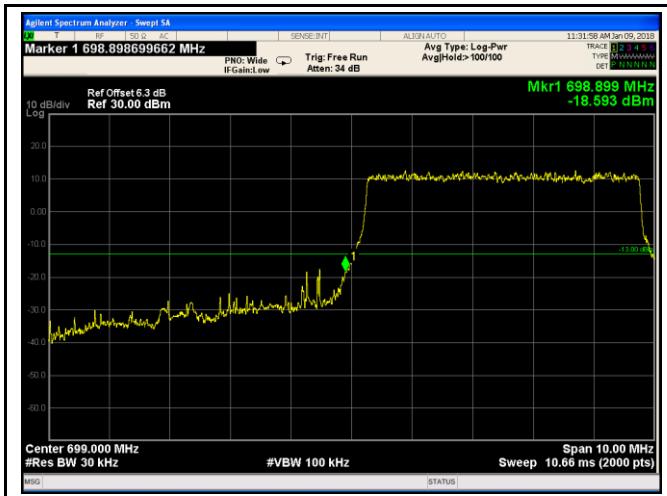
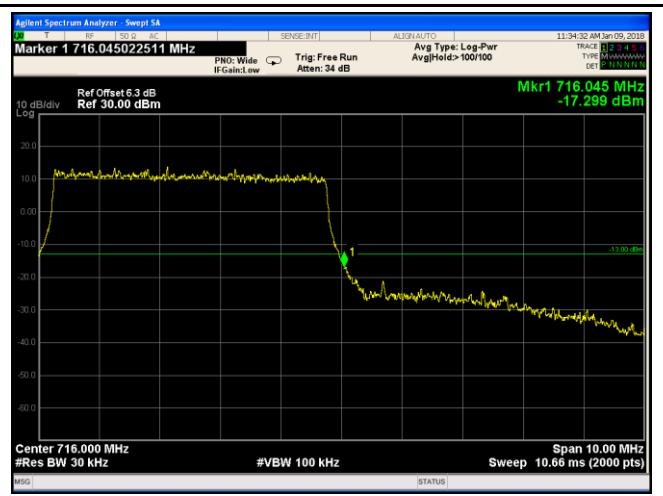
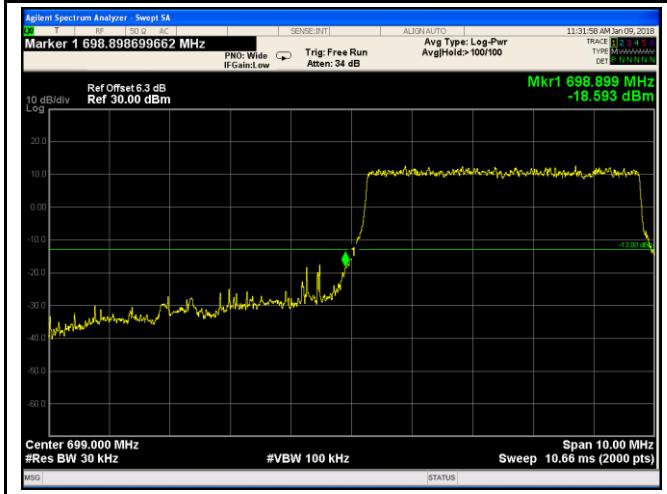


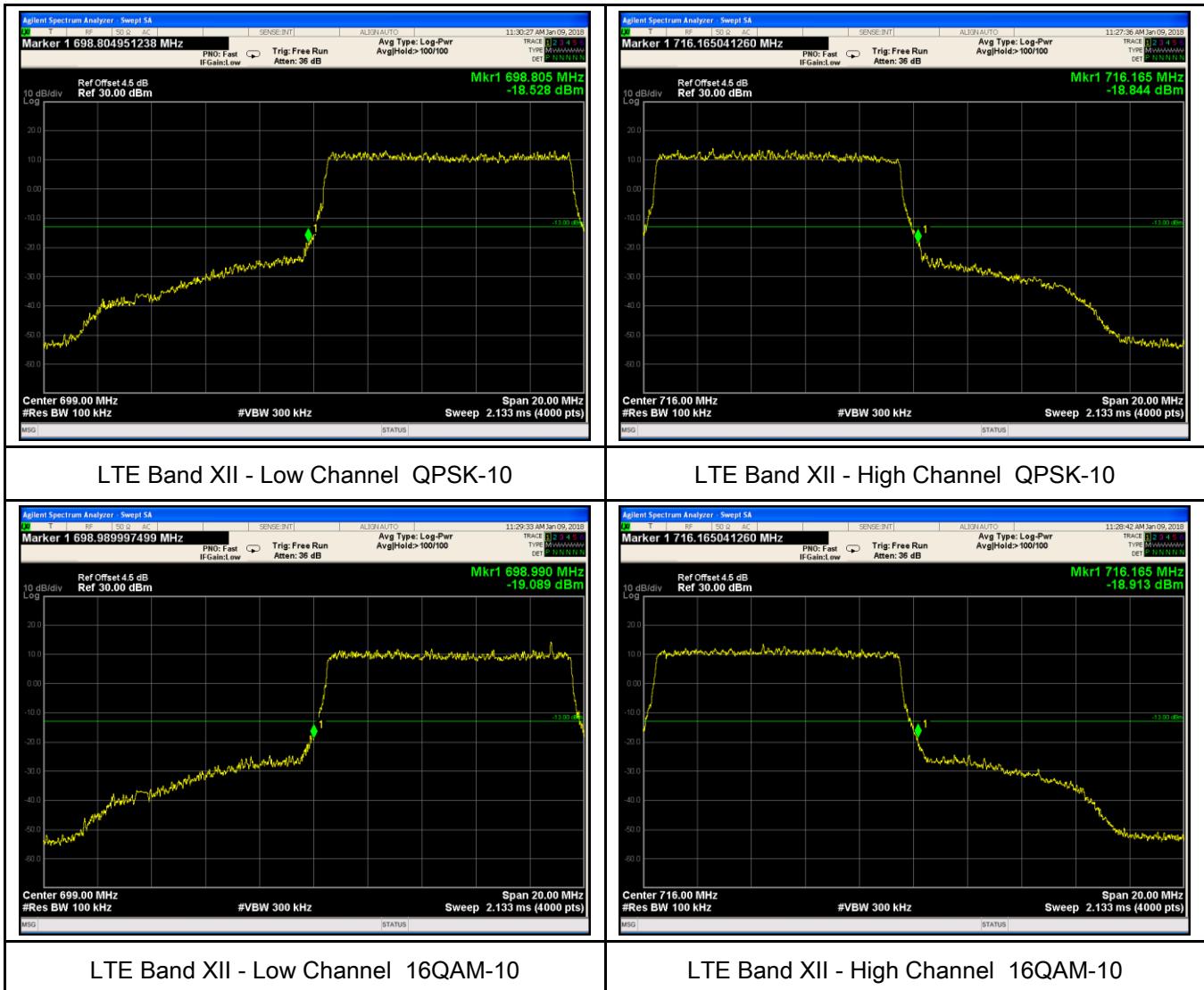
#### LTE Band XII - Low Channel 16QAM-3

Note: Offset=Cable loss (4.5) + 10log  
 $(29.78/30)=4.0+0.0=4.0$  dB

#### LTE Band XII - High Channel QPSK-3

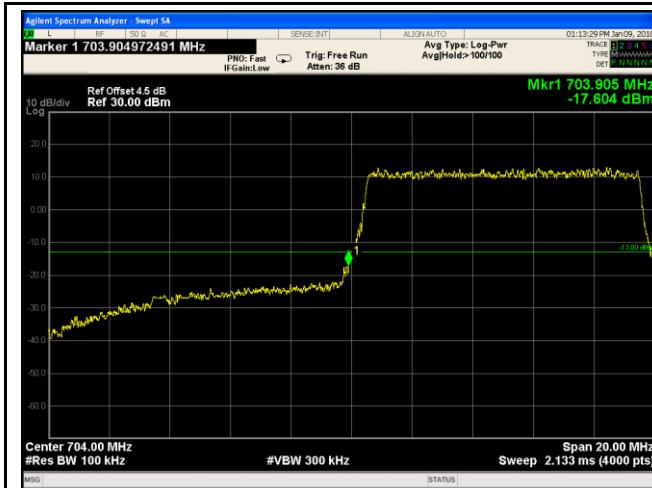
Note: Offset=Cable loss (4.5) + 10log  
 $(30.09/30)=4.0+0.0=4.0$  dB

	
<p>LTE Band XII - Low Channel QPSK-5</p> <p>Note: Offset=Cable loss (4.5) + 10log  <math>(51.85/30)=4.0+2.3=6.3</math> dB</p>	<p>LTE Band XII - High Channel QPSK-5</p> <p>Note: Offset=Cable loss (4.5) + 10log  <math>(52.03/30)=4.0+2.3=6.3</math> dB</p>
	
<p>LTE Band XII - Low Channel 16QAM-5</p> <p>Note: Offset=Cable loss (4.5) + 10log  <math>(52.20/30)=4.0+2.3=6.3</math> dB</p>	<p>LTE Band XII - High Channel 16QAM-5</p> <p>Note: Offset=Cable loss (4.5) + 10log  <math>(52.23/30)=4.2+2.1=6.3</math> dB</p>



## LTE Band XVII (Part 27)

 <p>Agilent Spectrum Analyzer - Swept SA      Marker 1 703.9052476 MHz      PNO: Wide IF-Gain:Low Trig: Free Run Aten: 34 dB Avg Type: Log-Pwr Avg Hold&gt;100/100</p> <p>Mkr1 703.905 MHz -18.622 dBm</p> <p>Ref Offset 6.3 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Center 704.000 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 10.66 ms (2000 pts)</p>	 <p>Agilent Spectrum Analyzer - Swept SA      Marker 1 716.088044022 MHz      PNO: Wide IF-Gain:Low Trig: Free Run Aten: 34 dB Avg Type: Log-Pwr Avg Hold&gt;100/100</p> <p>Mkr1 716.088 MHz -19.894 dBm</p> <p>Ref Offset 6.3 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Center 716.000 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 10.66 ms (2000 pts)</p>
<h3>LTE Band XVII - Low Channel QPSK-5</h3>	<h3>LTE Band XVII - High Channel QPSK-5</h3>
<p>Note: Offset=Cable loss (4.0) + 10log  <math>(51.90/30)=4.0+2.3=6.3 \text{ dB}</math></p>	<p>Note: Offset=Cable loss (4.0) + 10log  <math>(51.91/30)=4.0+2.3=6.3 \text{ dB}</math></p>
 <p>Agilent Spectrum Analyzer - Swept SA      Marker 1 703.939969985 MHz      PNO: Wide IF-Gain:Low Trig: Free Run Aten: 34 dB Avg Type: Log-Pwr Avg Hold&gt;100/100</p> <p>Mkr1 703.940 MHz -17.661 dBm</p> <p>Ref Offset 6.3 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Center 704.000 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 10.66 ms (2000 pts)</p>	 <p>Agilent Spectrum Analyzer - Swept SA      Marker 1 716.088044022 MHz      PNO: Wide IF-Gain:Low Trig: Free Run Aten: 34 dB Avg Type: Log-Pwr Avg Hold&gt;100/100</p> <p>Mkr1 716.088 MHz -18.978 dBm</p> <p>Ref Offset 6.3 dB Ref 30.00 dBm</p> <p>10 dB/div Log</p> <p>Center 716.000 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 10.66 ms (2000 pts)</p>
<h3>LTE Band XVII - Low Channel 16QAM-5</h3>	<h3>LTE Band XVII - High Channel 16QAM-5</h3>
<p>Note: Offset=Cable loss (4.0) + 10log  <math>(51.82/30)=4.0+2.3=6.3 \text{ dB}</math></p>	<p>Note: Offset=Cable loss (4.0) + 10log  <math>(51.94/30)=4.0+2.3=6.3 \text{ dB}</math></p>



LTE Band XVII - Low Channel QPSK-10

LTE Band XVII - High Channel QPSK-10



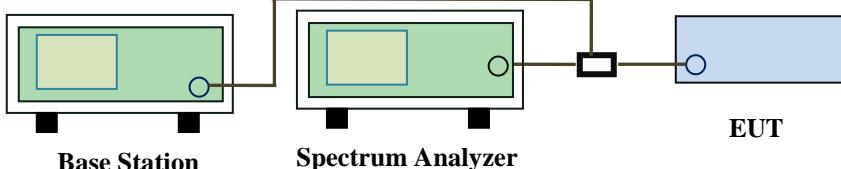
LTE Band XVII - Low Channel 16QAM-10

LTE Band XVII - High Channel 16QAM-10

## 6.8 Band Edge 27.53(m)

Temperature	24 °C
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	January 05, 2018
Tested By :	Aaron Liang

### Requirement(s):

Spec	Requirement	Applicable
§27.53(m)	<p>According to FCC 27.53(m)(4) specified that power of any emmission ouutside of the channel edge must be attenuated below the transmitting power(P) by a factor shall be not less than <math>43+10\log(P)</math>dB at the channel edge, the limit of emission equal to -13dBm.</p> <p>And <math>55+10\log(P)</math>dB at 5.5MHz from the channel edges, the limit of emission equal to -25dBm. In the 1MHz bands immediately outside and adjacent to the frenqency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.</p>	<input checked="" type="checkbox"/>
Test Setup	 <p>Base Station      Spectrum Analyzer      EUT</p>	
Test Procedure	<ul style="list-style-type: none"> <li>The EUT was connected to Spectrum Analyzer and Base Station via power divider.</li> <li>The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers.</li> </ul>	
Remark		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	

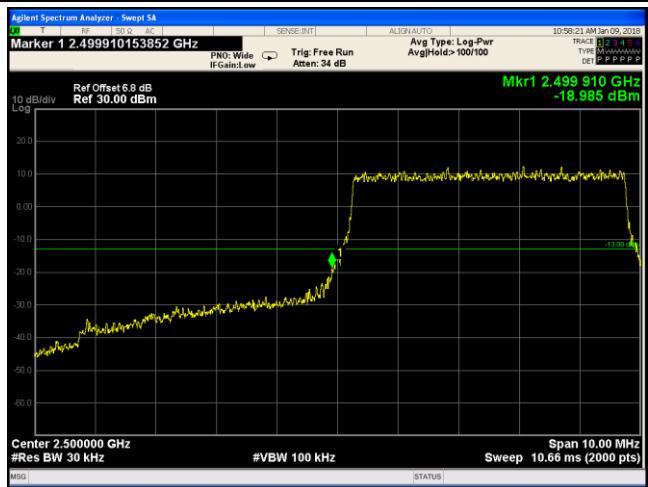
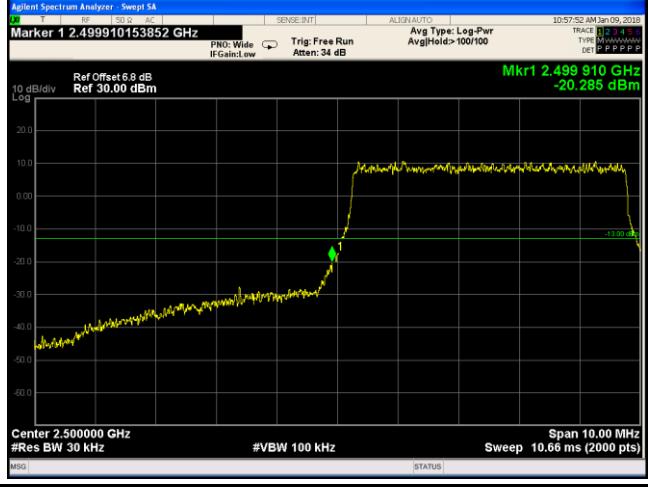
Test Data  Yes  N/A

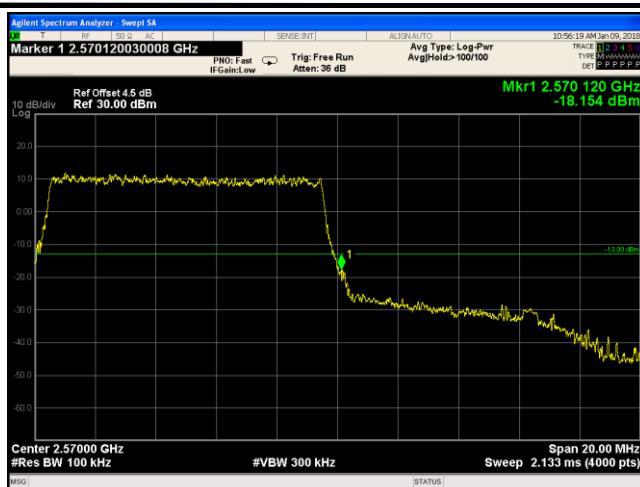
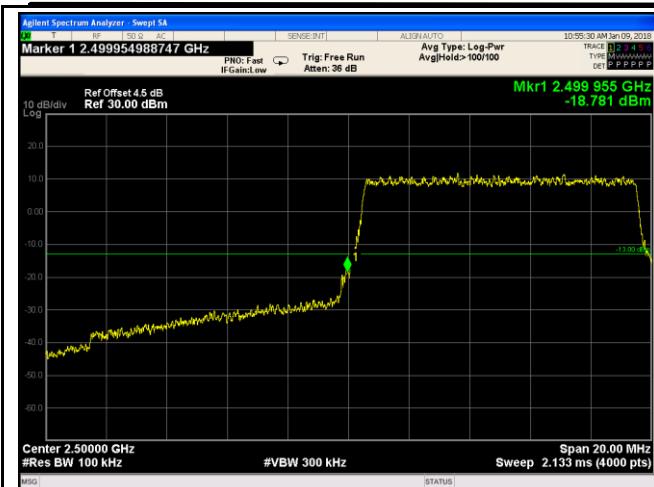
Test Plot  Yes (See below)  N/A

### LTE Band VII (Part 27) result

BW(MHz)	Channel	Frequency (MHz)	Mode	Emission (dBm)	Limit (dBm)
5	20775	2500	QPSK	-18.985	-13
			16QAM	-20.285	-13
5	21425	2570	QPSK	-18.169	-13
			16QAM	-20.613	-13
10	20800	2500	QPSK	-18.781	-13
			16QAM	-19.294	-13
10	21400	2570	QPSK	-18.154	-13
			16QAM	-22.699	-13
15	20825	2500	QPSK	-22.291	-13
			16QAM	-25.139	-13
15	21400	2570	QPSK	-19.331	-13
			16QAM	-21.526	-13
20	20850	2500	QPSK	-22.872	-13
			16QAM	-28.985	-13
20	21350	2571	QPSK	-24.900	-13
			16QAM	-29.328	-13

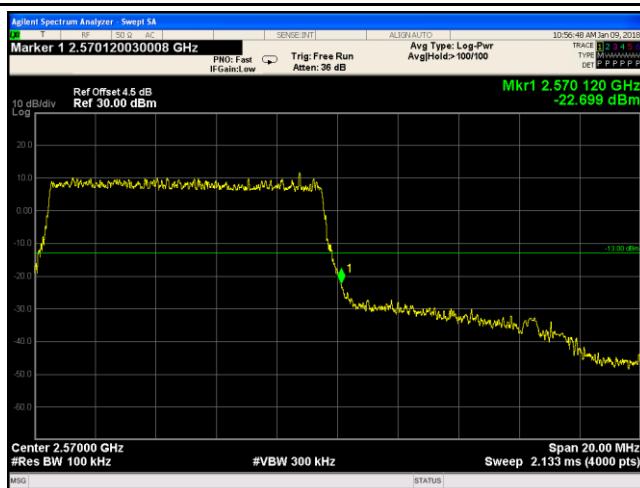
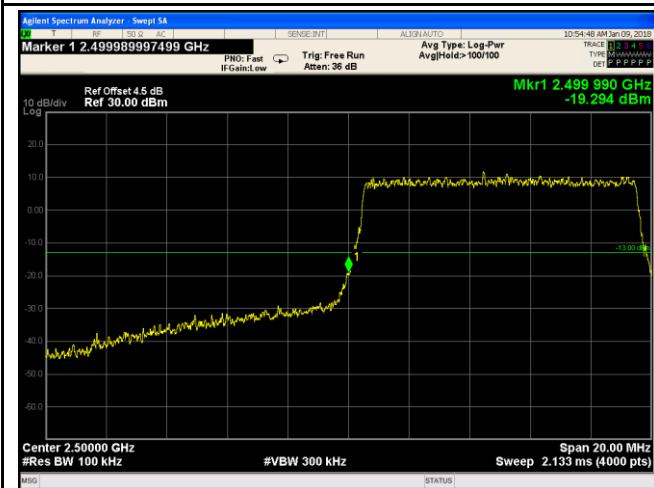
## LTE Band VII (Part 27)

 <p>Marker 1 2.499910153852 GHz Mkr1 2.499 910 GHz -18.985 dBm</p> <p>Center 2.500000 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 10.00 MHz Span 10.66 ms (2000 pts)</p>	 <p>Marker 1 2.570040020010 GHz Mkr1 2.570 040 GHz -18.169 dBm</p> <p>Center 2.570000 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 10.00 MHz Span 10.66 ms (2000 pts)</p>
<p>LTE Band VII - Low Channel QPSK-5</p>	<p>LTE Band VII - High Channel QPSK-5</p>
<p>Note: Offset=Cable loss (4.5) + 10log (52.36/30)=4.5+2.3=6.8 dB</p>	<p>Note: Offset=Cable loss (4.5) + 10log (51.30/30)=4.5+2.3=6.8 dB</p>
 <p>Marker 1 2.499910153852 GHz Mkr1 2.499 910 GHz -20.285 dBm</p> <p>Center 2.500000 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 10.00 MHz Span 10.66 ms (2000 pts)</p>	 <p>Marker 1 2.570075037519 GHz Mkr1 2.570 075 GHz -20.613 dBm</p> <p>Center 2.570000 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 10.00 MHz Span 10.66 ms (2000 pts)</p>
<p>LTE Band VII - Low Channel 16QAM-5</p>	<p>LTE Band VII - High Channel 16QAM-5</p>
<p>Note: Offset=Cable loss (4.5) + 10log (51.28/30)=4.5+2.3=6.8 dB</p>	<p>Note: Offset=Cable loss (4.5) + 10log (52.10/30)=4.5+2.3=6.8 dB</p>



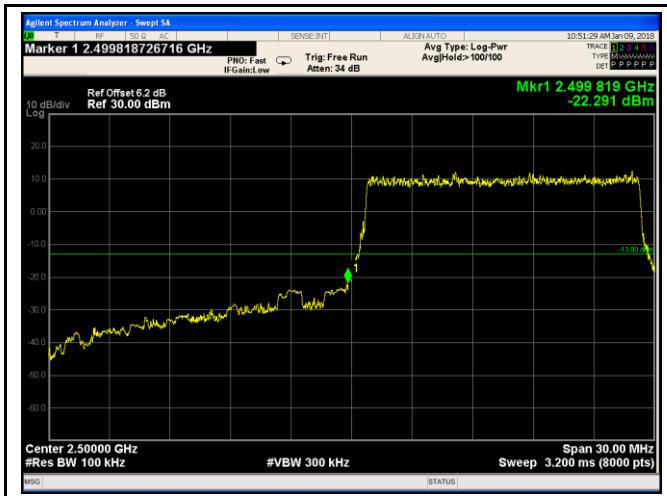
LTE Band VII - Low Channel QPSK-10

LTE Band VII - High Channel QPSK-10



LTE Band VII - Low Channel 16QAM-10

LTE Band VII - High Channel 16QAM-10

 <p>Marker 1 2.49981872616 GHz PNO: Fast IFGain:Low Trig: Free Run AvgType: Log-Pwr AvgHold: &gt;100/100</p> <p>Ref Offset 6.2 dB Ref 30.00 dBm</p> <p>Center 2.50000 GHz #Res BW 100 kHz #VBW 300 kHz Span 30.00 MHz Sweep 3.200 ms (8000 pts)</p>	 <p>Marker 1 2.570093761720 GHz PNO: Fast IFGain:Low Trig: Free Run AvgType: Log-Pwr AvgHold: &gt;100/100</p> <p>Ref Offset 6.2 dB Ref 30.00 dBm</p> <p>Center 2.57000 GHz #Res BW 100 kHz #VBW 300 kHz Span 30.00 MHz Sweep 3.200 ms (8000 pts)</p>
LTE Band VII - Low Channel QPSK-15	LTE Band VII - High Channel QPSK-15
Note: Offset=Cable loss (4.5) + 10log (151/100)=4.5+1.7=6.2 dB	Note: Offset=Cable loss (4.5) + 10log (150.4/100)=4.5+1.7=6.2 dB
 <p>Marker 1 2.499859981873 GHz PNO: Fast IFGain:Low Trig: Free Run AvgType: Log-Pwr AvgHold: &gt;100/100</p> <p>Ref Offset 6.2 dB Ref 30.00 dBm</p> <p>Center 2.50000 GHz #Res BW 100 kHz #VBW 300 kHz Span 30.00 MHz Sweep 3.200 ms (8000 pts)</p>	 <p>Marker 1 2.570093761720 GHz PNO: Fast IFGain:Low Trig: Free Run AvgType: Log-Pwr AvgHold: &gt;100/100</p> <p>Ref Offset 6.2 dB Ref 30.00 dBm</p> <p>Center 2.57000 GHz #Res BW 100 kHz #VBW 300 kHz Span 30.00 MHz Sweep 3.200 ms (8000 pts)</p>
LTE Band VII - Low Channel 16QAM-15	LTE Band VII - High Channel 16QAM-15
Note: Offset=Cable loss (4.5) + 10log (147.4/100)=4.5+1.7=6.2 dB	Note: Offset=Cable loss (4.5) + 10log (149.3/100)=4.5+1.7=6.2 dB