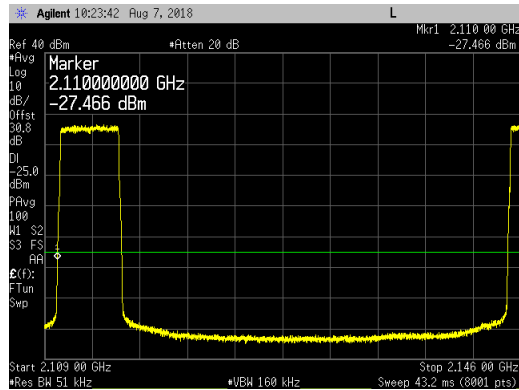
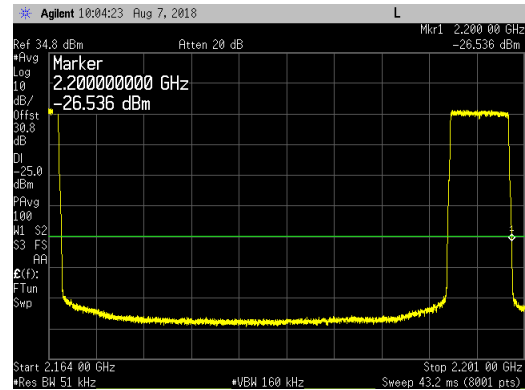


Dual LTE5_Max Spacing_Band Edge Plots for Antenna Port 15 and QPSK Modulation:

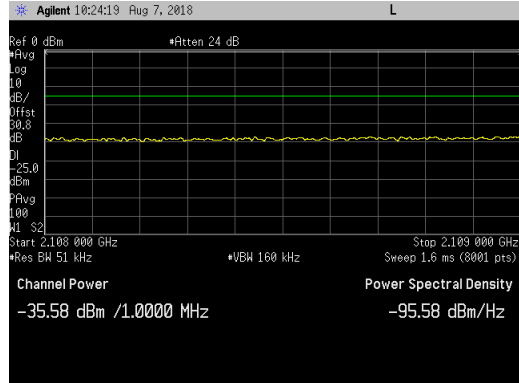
Dual LTE5_Bot Ch_LBE_2109 to 2146MHz



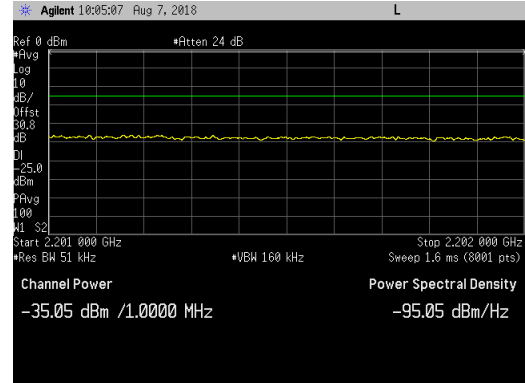
Dual LTE5_Top Ch_UBE_2164 to 2201MHz



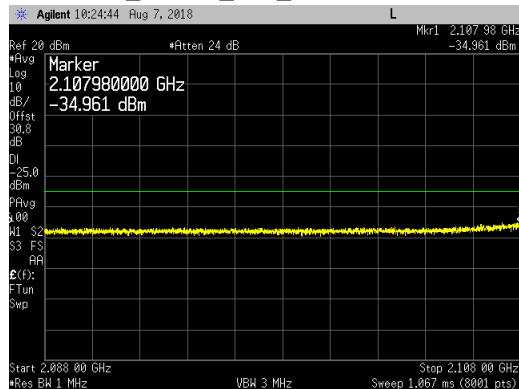
Dual LTE5_Bot Ch_LBE_2108 to 2109MHz



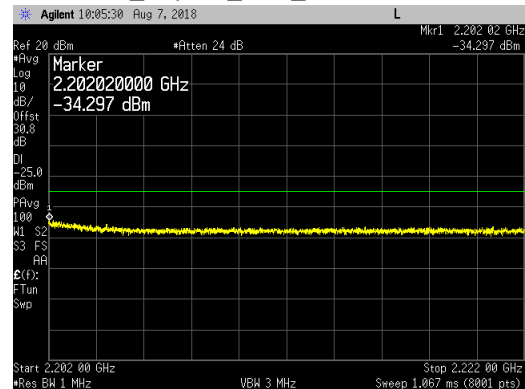
Dual LTE5_Top Ch_UBE_2201 to 2202MHz



Dual LTE5_Bot Ch_LBE_2088 to 2108MHz

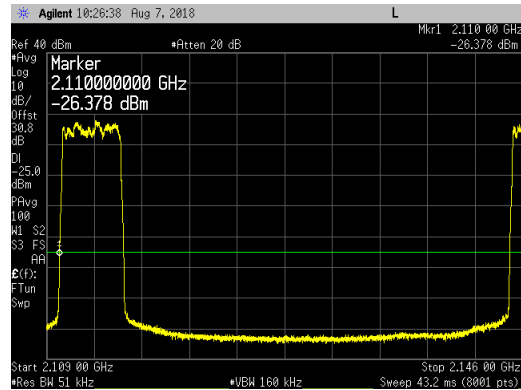


Dual LTE5_Top Ch_UBE_2202 to 2222MHz

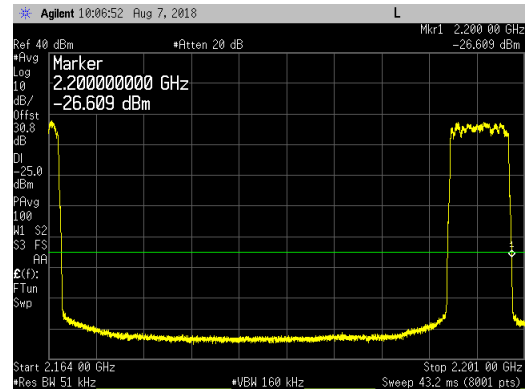


Dual LTE5_ Max Spacing _Band Edge Plots for Antenna Port 15 and 16QAM Modulation:

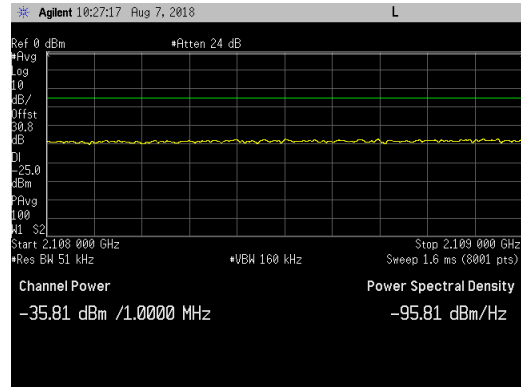
Dual LTE5_Bot Ch_LBE_2109 to 2146MHz



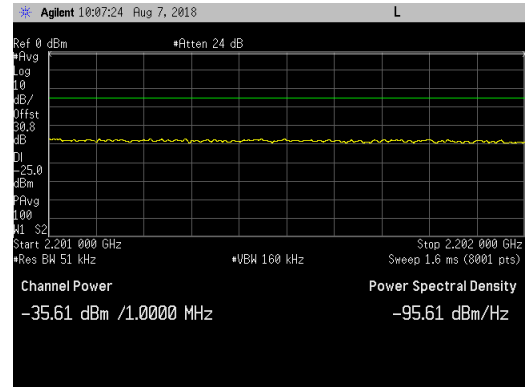
Dual LTE5_Top Ch_UBE_2164 to 2201MHz



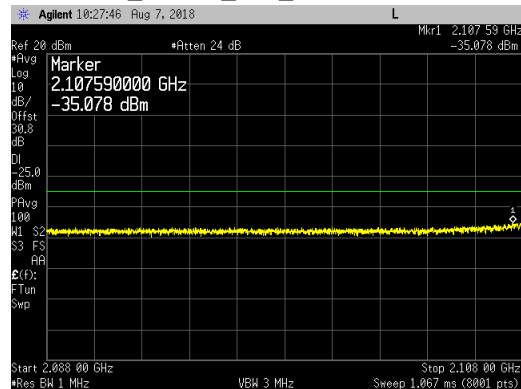
Dual LTE5_Bot Ch_LBE_2108 to 2109MHz



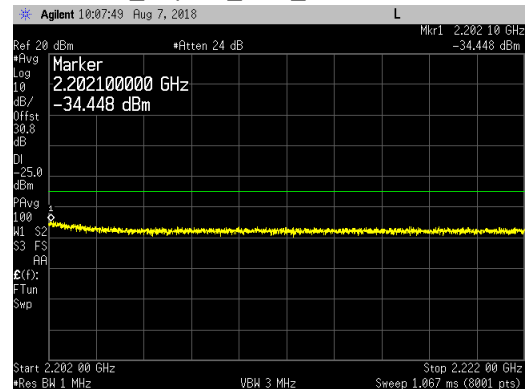
Dual LTE5_Top Ch_UBE_2201 to 2202MHz



Dual LTE5_Bot Ch_LBE_2088 to 2108MHz

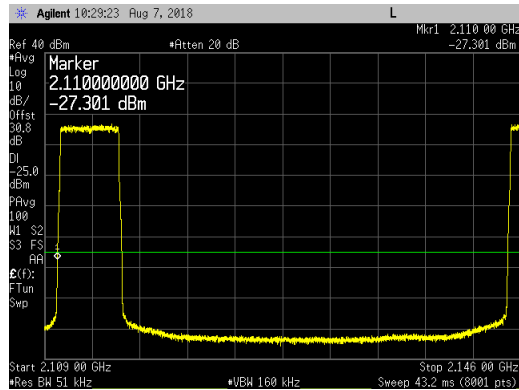


Dual LTE5_Top Ch_UBE_2202 to 2222MHz

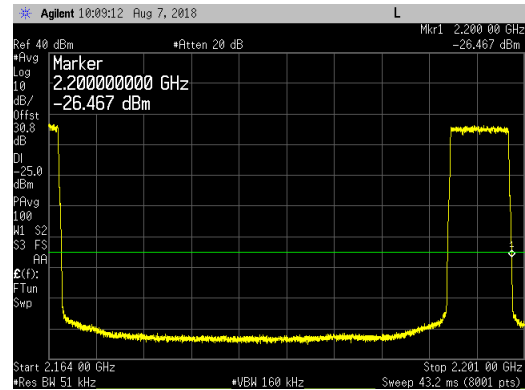


Dual LTE5_ Max Spacing _Band Edge Plots for Antenna Port 15 and 64QAM Modulation:

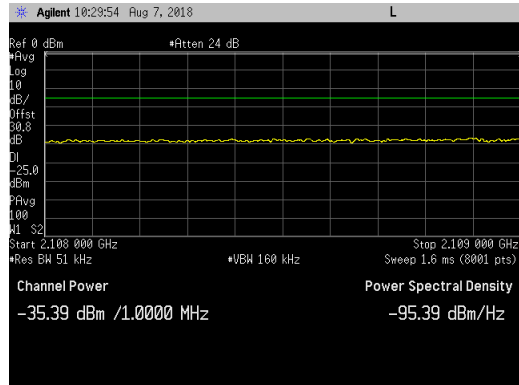
Dual LTE5_Bot Ch_LBE_2109 to 2146MHz



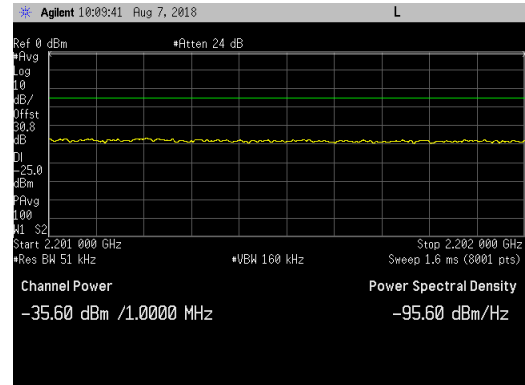
Dual LTE5_Top Ch_UBE_2164 to 2201MHz



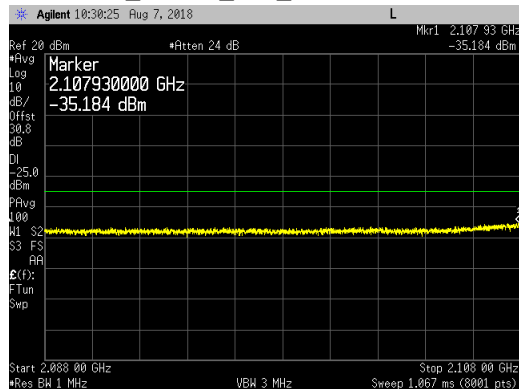
Dual LTE5_Bot Ch_LBE_2108 to 2109MHz



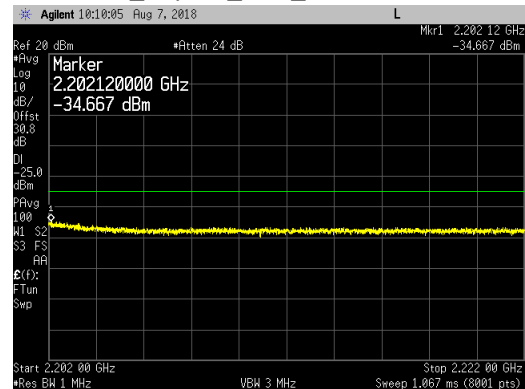
Dual LTE5_Top Ch_UBE_2201 to 2202MHz



Dual LTE5_Bot Ch_LBE_2088 to 2108MHz

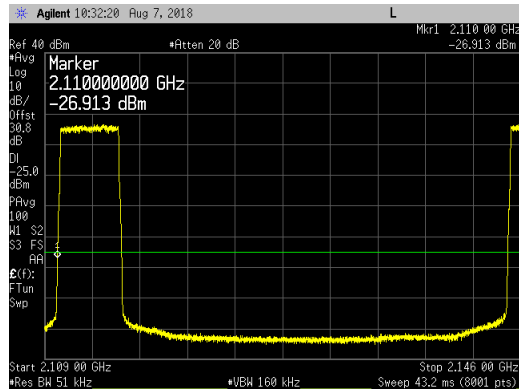


Dual LTE5_Top Ch_UBE_2202 to 2222MHz

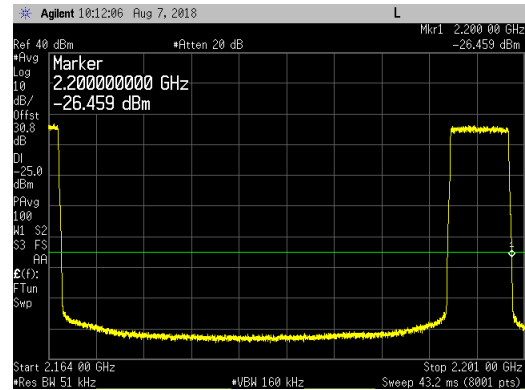


Dual LTE5_ Max Spacing _Band Edge Plots for Antenna Port 15 and 256QAM Modulation:

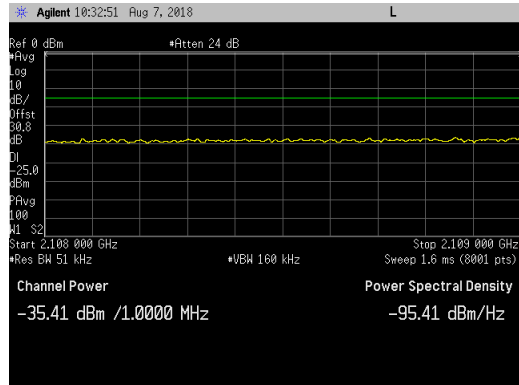
Dual LTE5_Bot Ch_LBE_2109 to 2146MHz



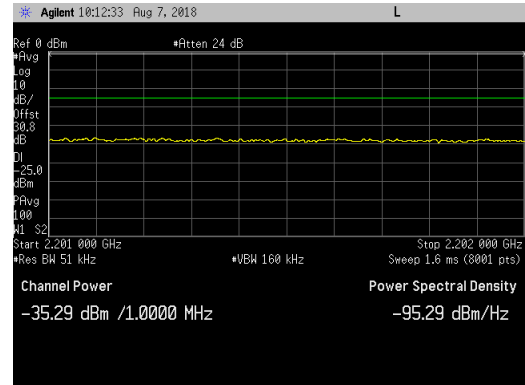
Dual LTE5_Top Ch_UBE_2164 to 2201MHz



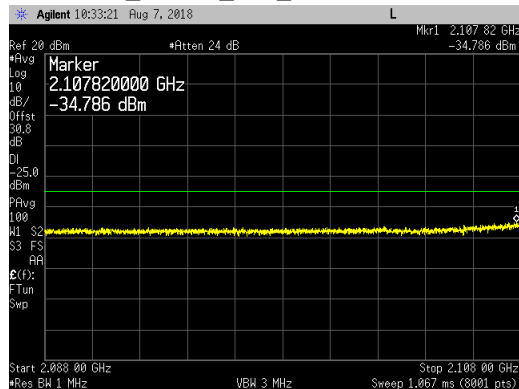
Dual LTE5_Bot Ch_LBE_2108 to 2109MHz



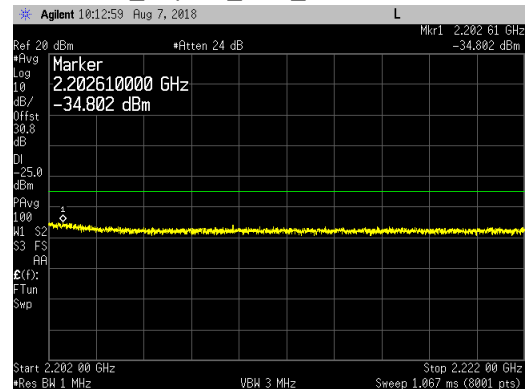
Dual LTE5_Top Ch_UBE_2201 to 2202MHz



Dual LTE5_Bot Ch_LBE_2088 to 2108MHz



Dual LTE5_Top Ch_UBE_2202 to 2222MHz



Transmitter Antenna Port Conducted Emissions

Transmitter conducted emission measurements were made at radio module antenna port 15. Measurements were performed over the 9kHz to 22GHz frequency range. The radio module was operated on the AWS middle channel (2155MHz) with all LTE modulation types (QPSK, 16QAM, 64QAM and 256QAM) for LTE bandwidths of 5MHz, 10MHz, 15MHz and 20MHz. In addition, multicarrier operation was verified using LTE5 bandwidth and all modulation types using two carriers with minimum spacing at the bottom end of the band (2112.5MHz and 2117.5MHz), two carriers with minimum spacing at the top end of the band (2192.5MHz and 2197.5MHz), two carriers with maximum spacing at the bottom end of the band (2112.5MHz and 2147.5MHz), and two carriers with maximum spacing at the top end of the band (2162.5MHz and 2197.5MHz). The multicarrier test cases are based upon KDB 971168 D03v01 requirements using two carriers.

The limit of -25dBm was used in the certification testing. The limit is adjusted to -25dBm [-13dBm -10 log (16)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 16 port MIMO transmitter. The required measurement parameters include a 1MHz bandwidth with power measured in average value (since transmitter power was measured in average value).

Measurements were performed with a spectrum analyzer using a peak detector with max hold over 50 sweeps (except for the 9k to 150kHz and the 20MHz to 3GHz frequency ranges). Measurements for the 9k to 150kHz and the 20MHz to 3GHz frequency range were performed with the spectrum analyzer in the RMS average mode over 100 traces.

The limit for the 9kHz to 150kHz frequency range was adjusted to -55dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 1MHz [i.e.: -55dBm = -25dBm -10log(1MHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to -45dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 1MHz [i.e.: -45dBm = -25dBm -10log(1MHz/10kHz)]. The required limit of -25dBm with a RBW of ≥ 1 MHz was used for all other frequency ranges.

The spectrum analyzer settings that were used for this test are summarized in the following table.

Frequency Range	RBW	VBW	Number of Data Points	Detector	Sweep Time	Max Hold over	Offset Note (1)
9kHz to 150kHz	1kHz	3kHz	8001	Average	Auto	Note (2)	9.4dB
150kHz to 20MHz	10kHz	30kHz	8001	Peak	Auto	50 Sweeps	9.5dB
20MHz to 3GHz	1MHz	3MHz	8001	Average	Auto	Note (2)	30.4dB
3GHz to 10GHz	2MHz	6MHz	8001	Peak	Auto	50 Sweeps	31.9dB
10GHz to 18GHz	2MHz	6MHz	8001	Peak	Auto	50 Sweeps	33.3dB
18GHz to 22GHz	1MHz	3MHz	8001	Peak	Auto	50 Sweeps	36.0dB

Note 1: The total measurement RF path loss of the test setup (attenuators, test cables and filters) is accounted for by the spectrum analyzer reference level offset.

Note 2: Max Hold not used and instead measurements were performed with the spectrum analyzer in the RMS average mode over 100 traces.

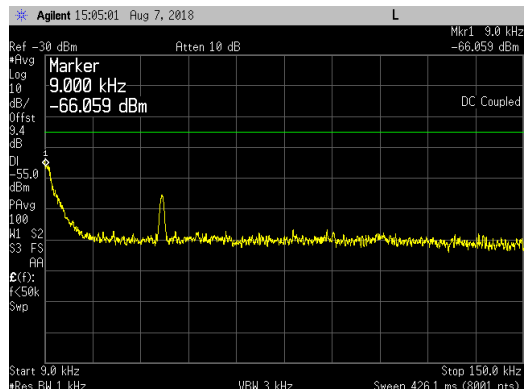
A low pass filter was used to reduce measurement instrumentation noise floor for the frequency ranges less than 20MHz. A high pass filter was used to reduce measurement instrumentation noise floor for the frequency ranges above 3GHz. The total measurement RF path loss of the test setup (attenuators, low pass filter, high pass filter and test cables) as shown in the table is accounted for by the spectrum



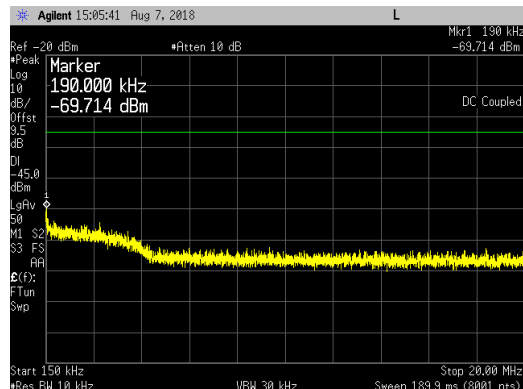
analyzer reference level offset. The display line on the plots reflects the required limit. Conducted spurious emission plots/measurements are provided in the following pages.

LTE5 Channel Bandwidth _ QPSK _ Middle Channel 2155MHz):

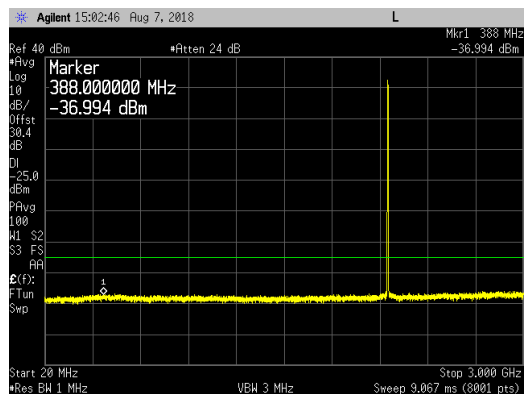
9kHz to 150kHz



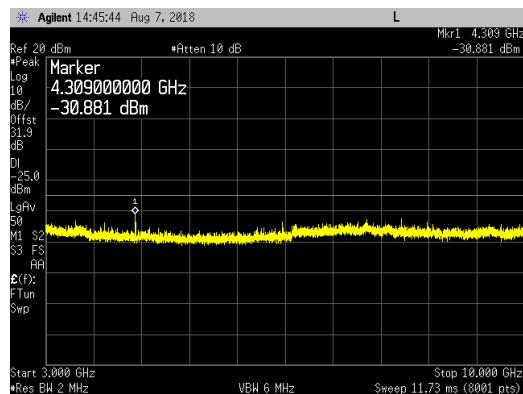
150kHz to 20MHz



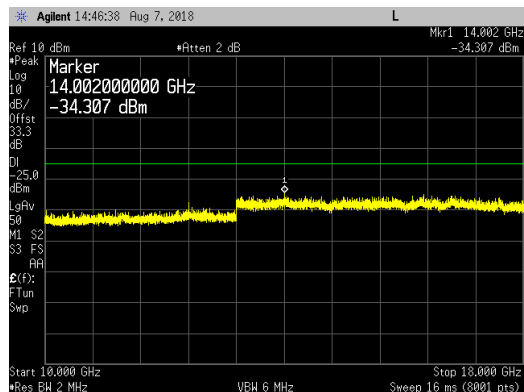
20MHz to 3GHz



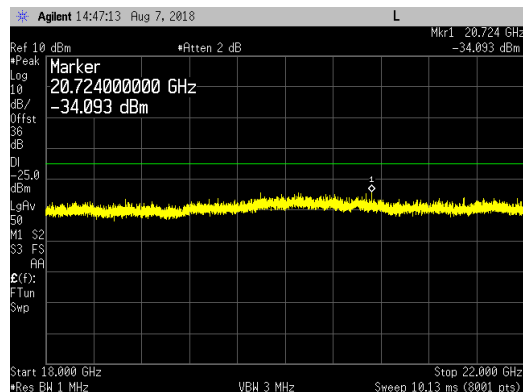
3GHz to 10GHz



10GHz to 18GHz

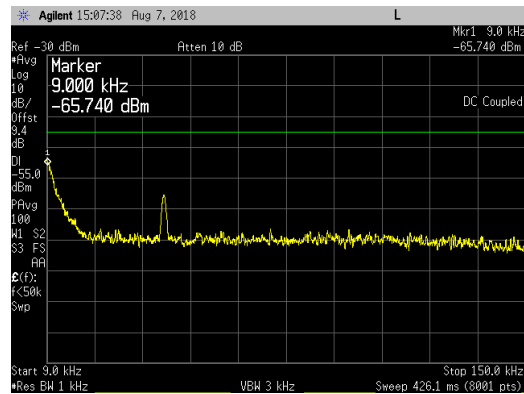


18GHz to 22GHz

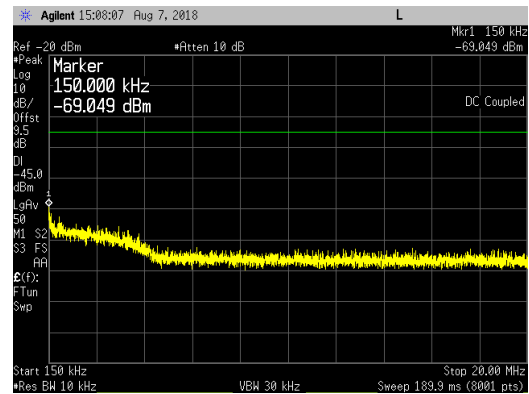


LTE5 Channel Bandwidth _ 16QAM _ Middle Channel (2155MHz):

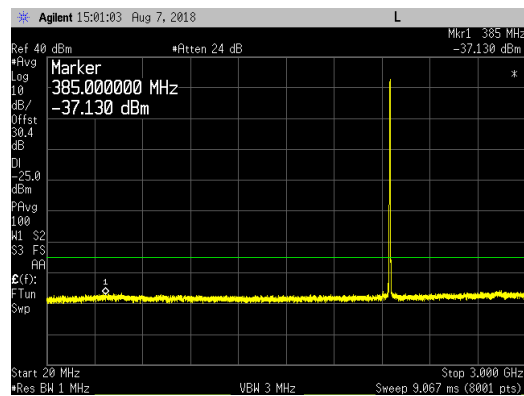
9kHz to 150kHz



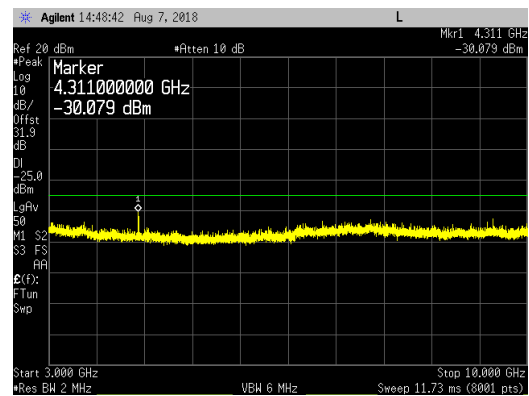
150kHz to 20MHz



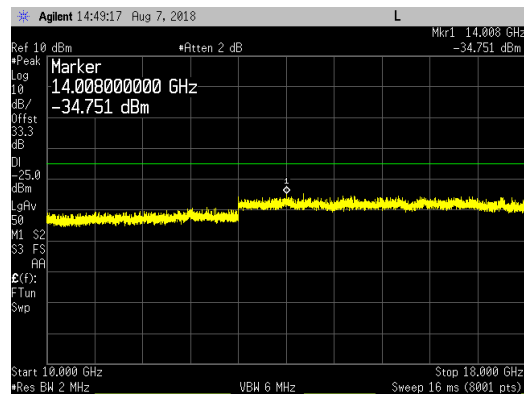
20MHz to 3GHz



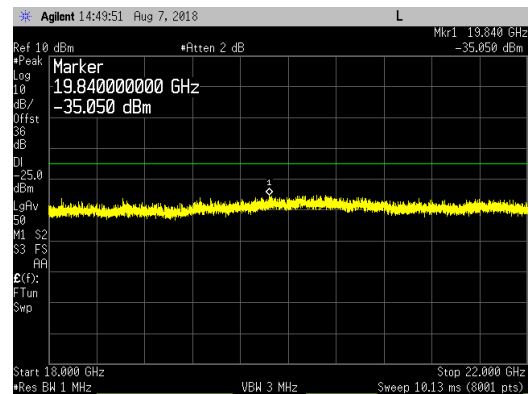
3GHz to 10GHz



10GHz to 18GHz

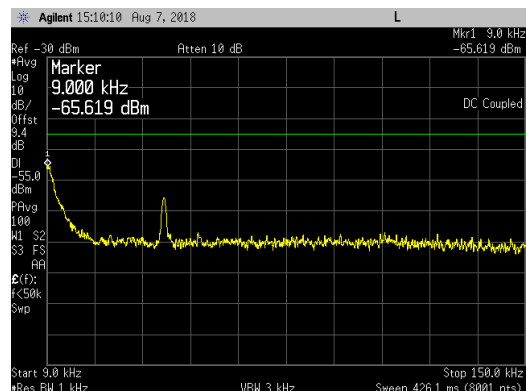


18GHz to 22GHz

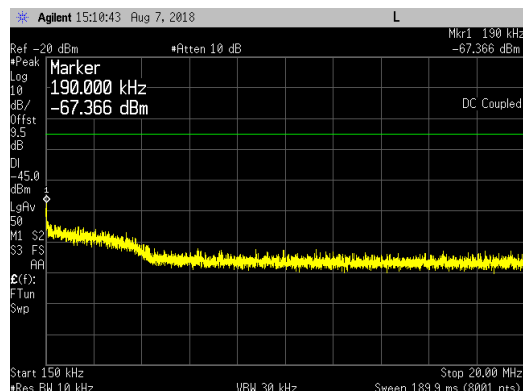


LTE5 Channel Bandwidth _64QAM_ Middle Channel (2155MHz):

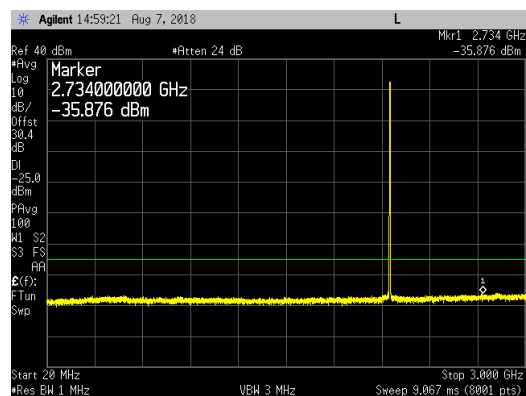
9kHz to 150kHz



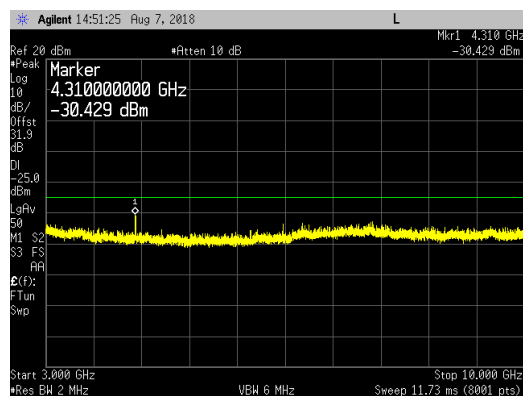
150kHz to 20MHz



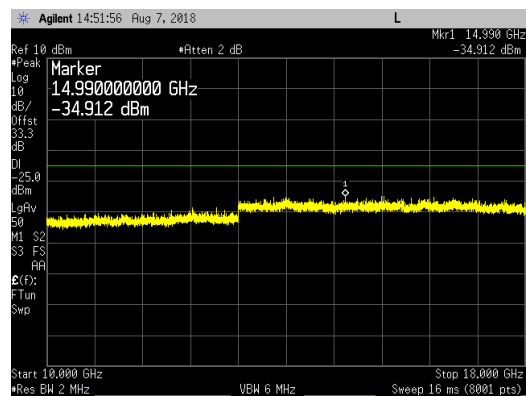
20MHz to 3GHz



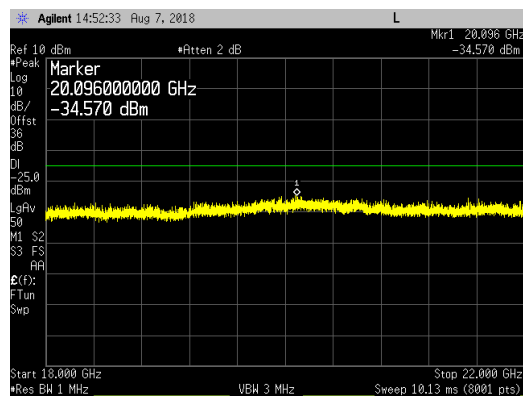
3GHz to 10GHz



10GHz to 18GHz

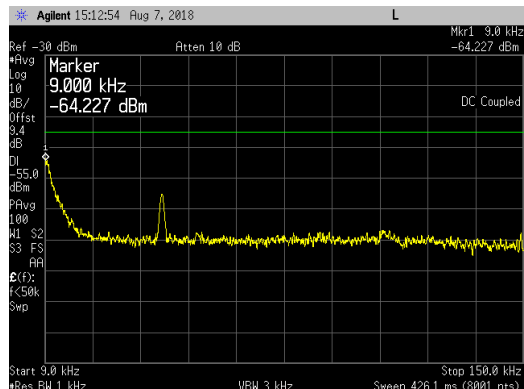


18GHz to 22GHz

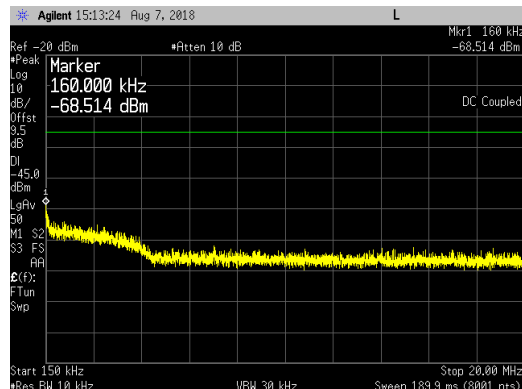


LTE5 Channel Bandwidth _256QAM_ Middle Channel (2155MHz):

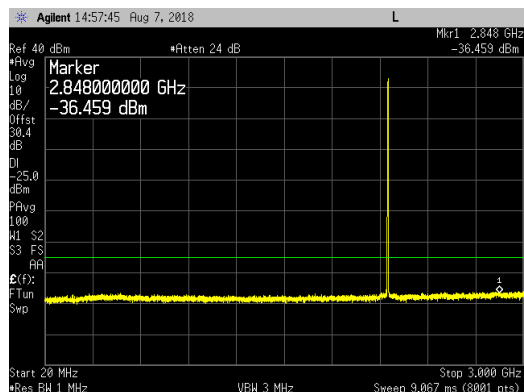
9kHz to 150kHz



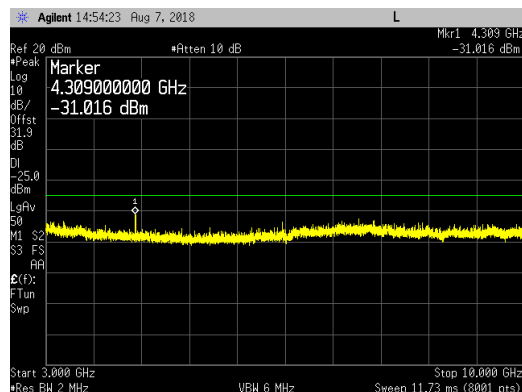
150kHz to 20MHz



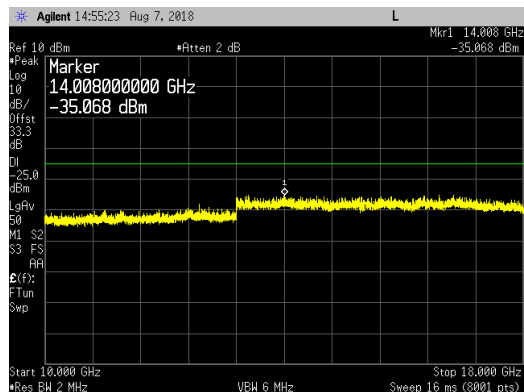
20MHz to 3GHz



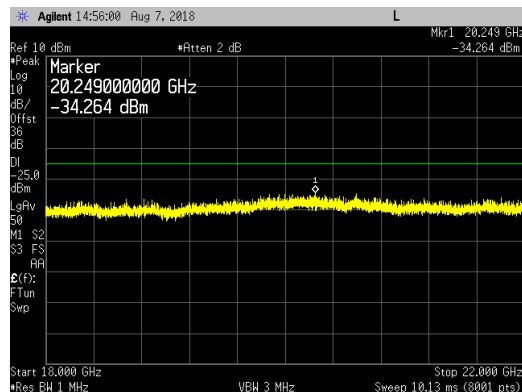
3GHz to 10GHz



10GHz to 18GHz

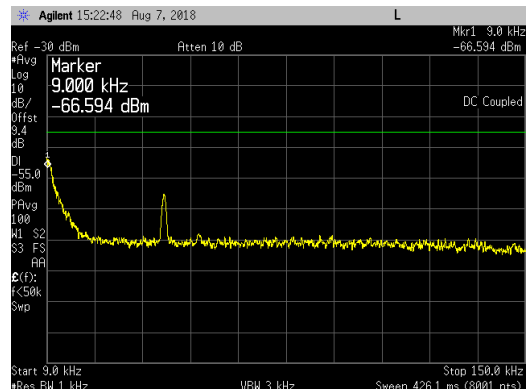


18GHz to 22GHz

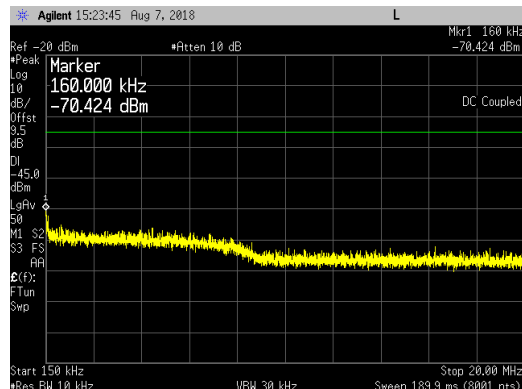


LTE10 Channel Bandwidth _ QPSK _ Middle Channel (2155MHz):

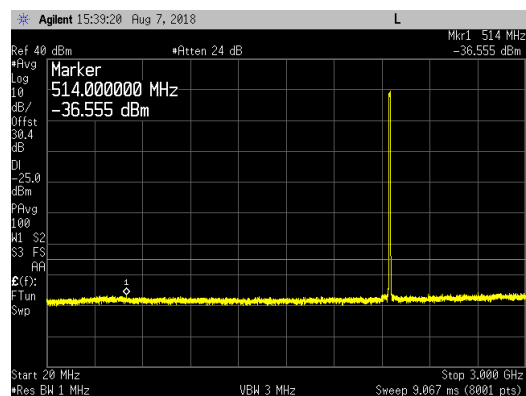
9kHz to 150kHz



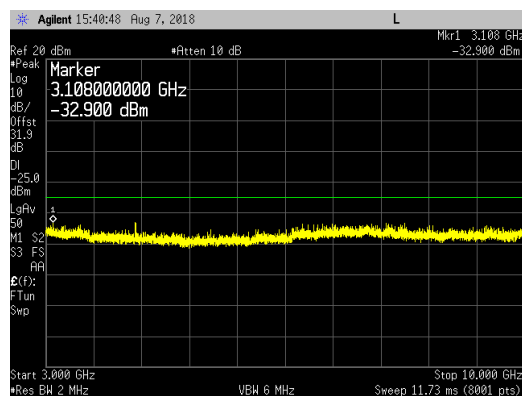
150kHz to 20MHz



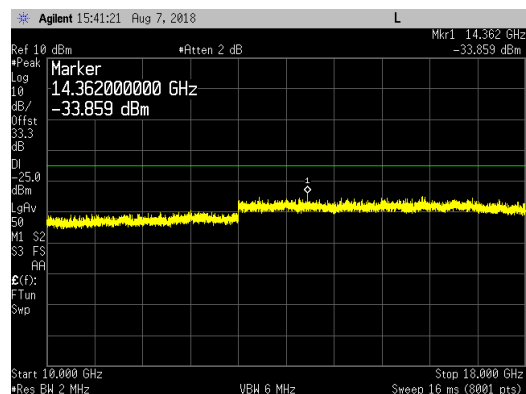
20MHz to 3GHz



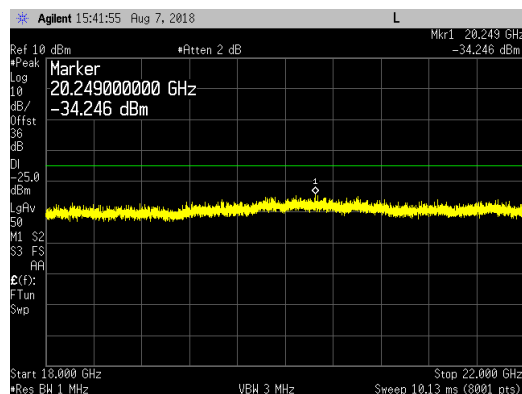
3GHz to 10GHz



10GHz to 18GHz

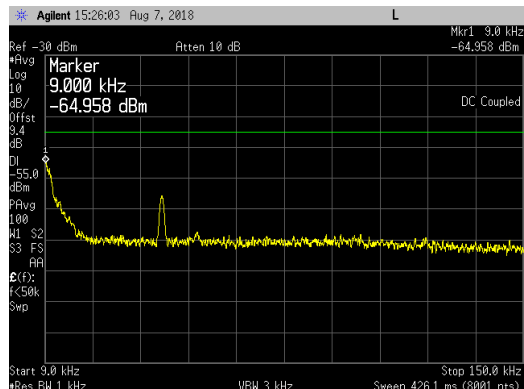


18GHz to 22GHz

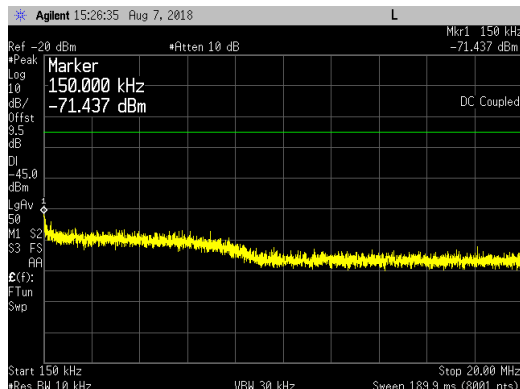


LTE10 Channel Bandwidth _ 16QAM _ Middle Channel (2155MHz):

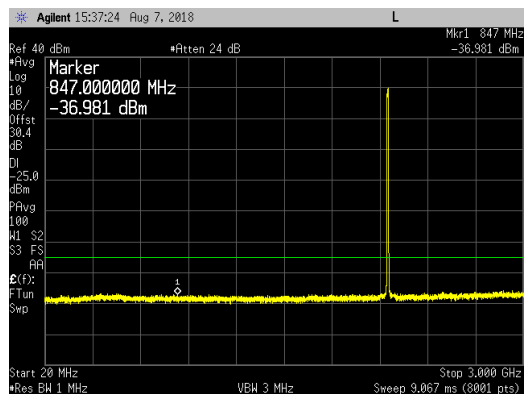
9kHz to 150kHz



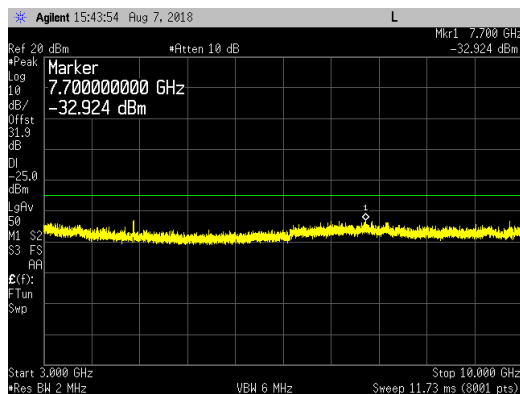
150kHz to 20MHz



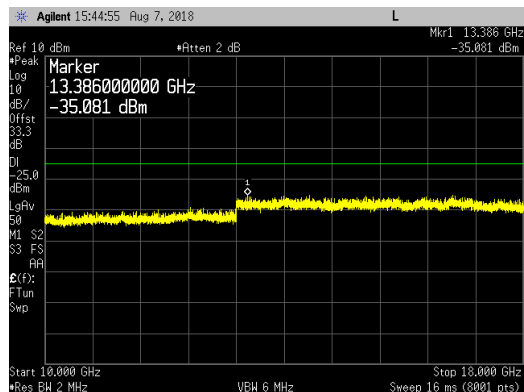
20MHz to 3GHz



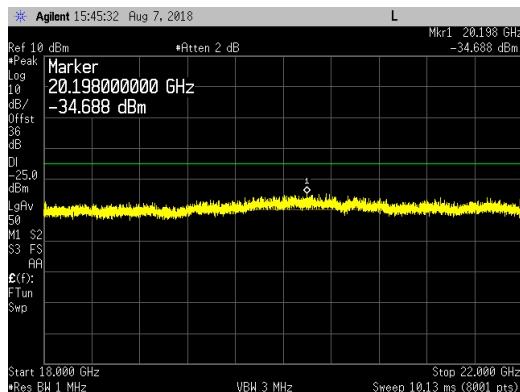
3GHz to 10GHz



10GHz to 18GHz

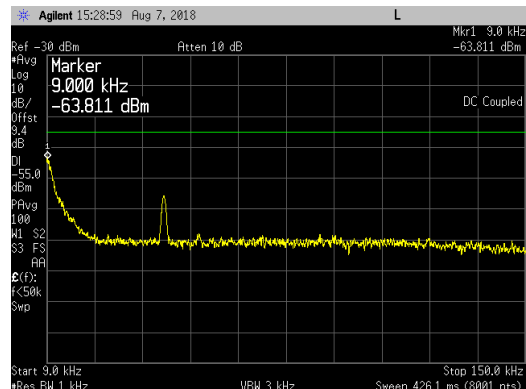


18GHz to 22GHz

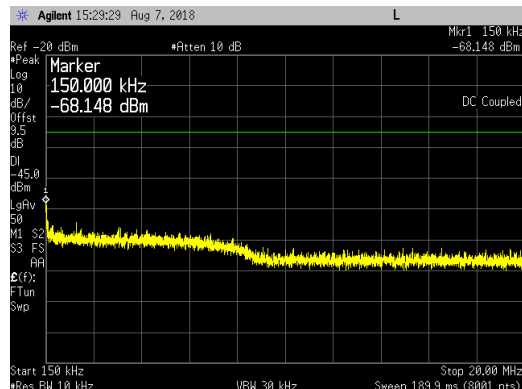


LTE10 Channel Bandwidth _64QAM_ Middle Channel (2155MHz):

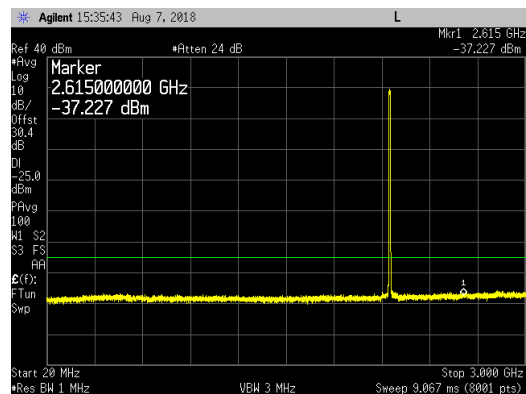
9kHz to 150kHz



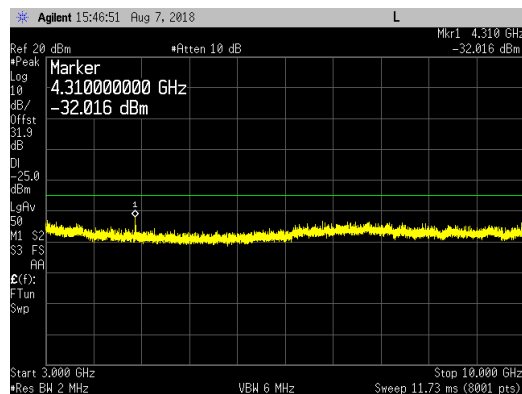
150kHz to 20MHz



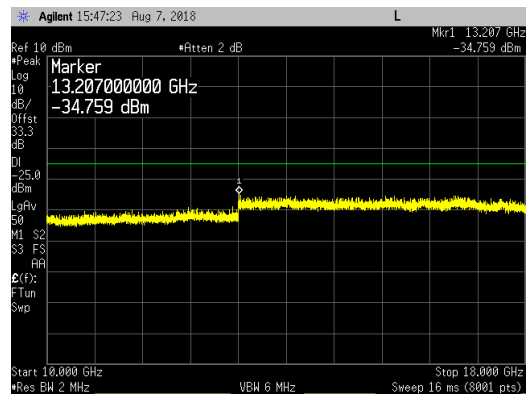
20MHz to 3GHz



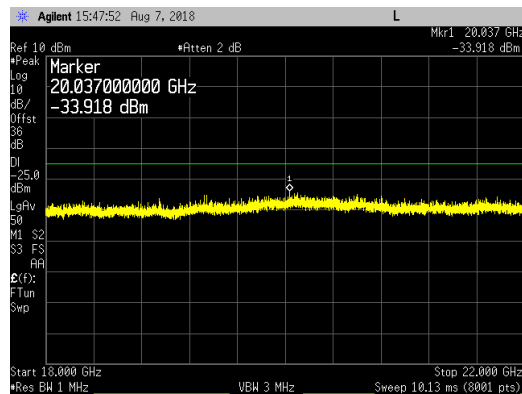
3GHz to 10GHz



10GHz to 18GHz

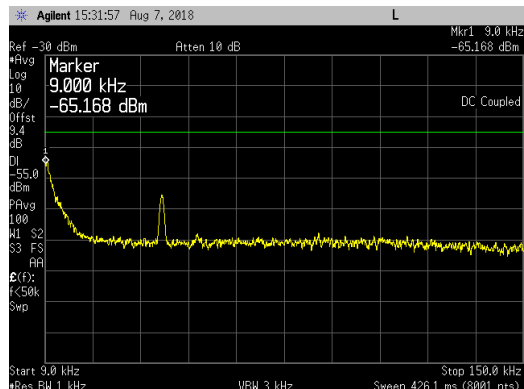


18GHz to 22GHz

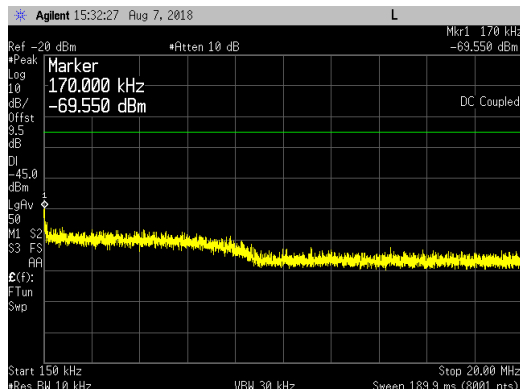


LTE10 Channel Bandwidth _256QAM_ Middle Channel (2155MHz):

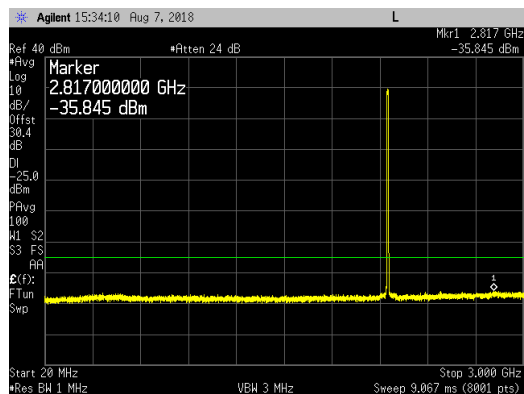
9kHz to 150kHz



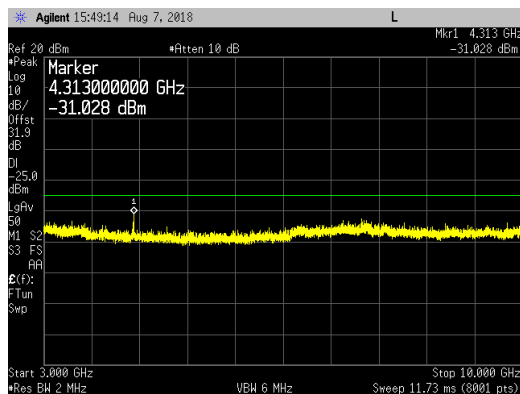
150kHz to 20MHz



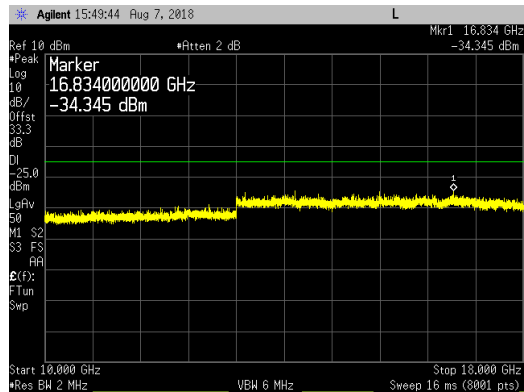
20MHz to 3GHz



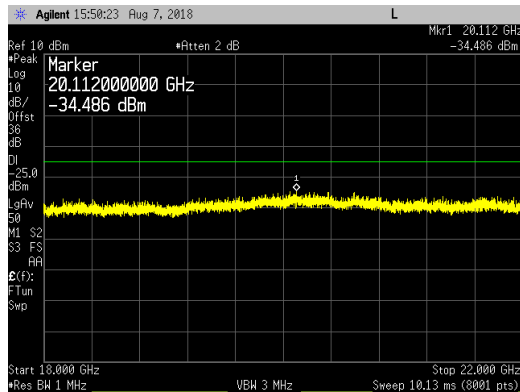
3GHz to 10GHz



10GHz to 18GHz

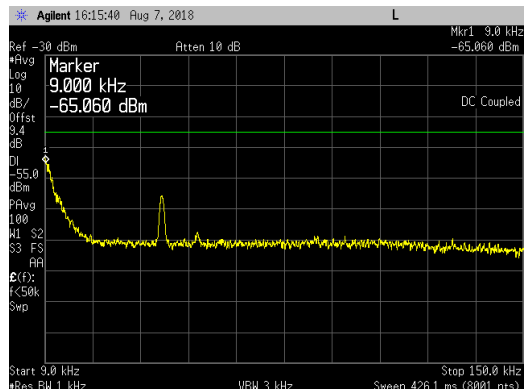


18GHz to 22GHz

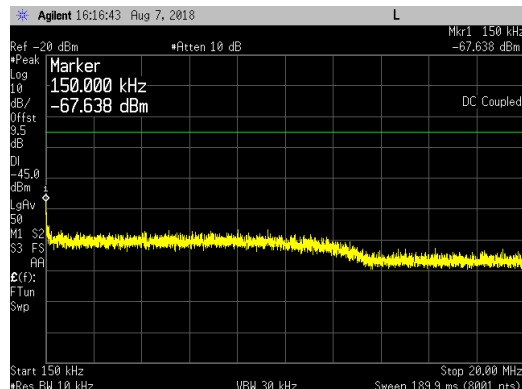


LTE15 Channel Bandwidth _ QPSK _ Middle Channel (2155MHz):

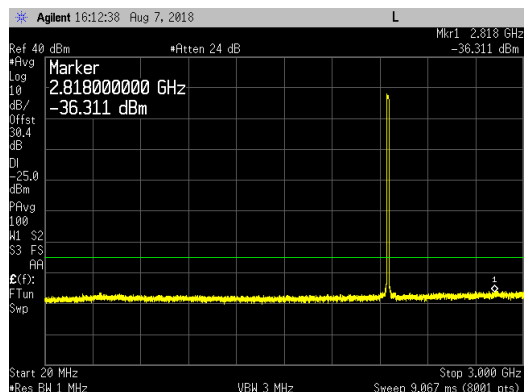
9kHz to 150kHz



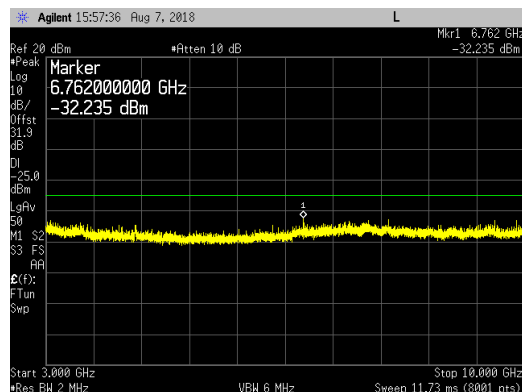
150kHz to 20MHz



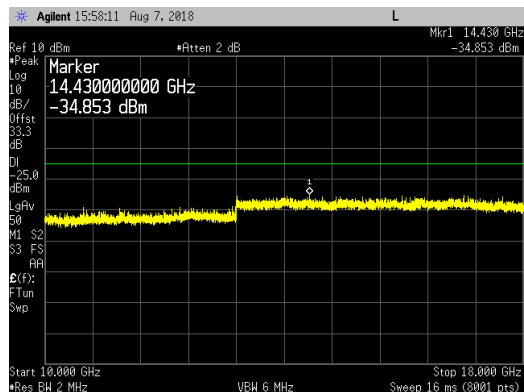
20MHz to 3GHz



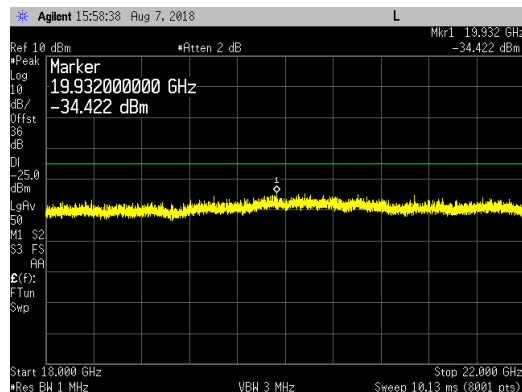
3GHz to 10GHz



10GHz to 18GHz

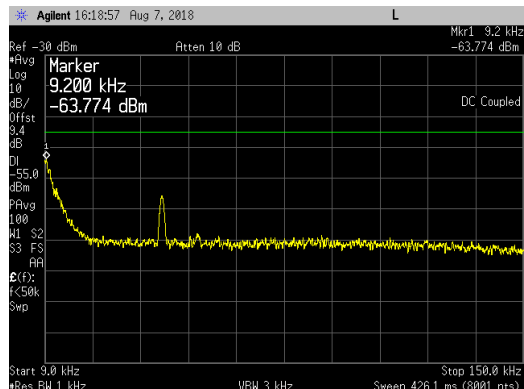


18GHz to 22GHz

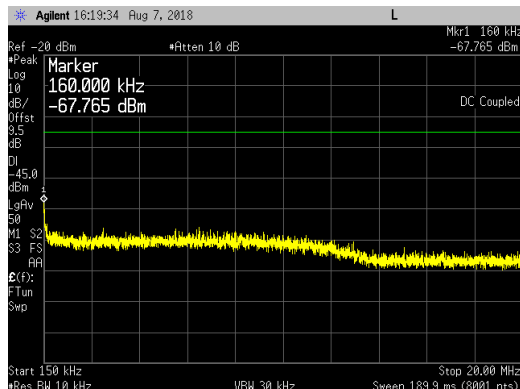


LTE15 Channel Bandwidth _ 16QAM _ Middle Channel (2155MHz):

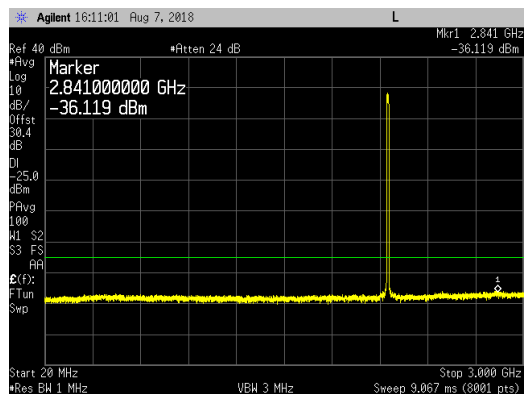
9kHz to 150kHz



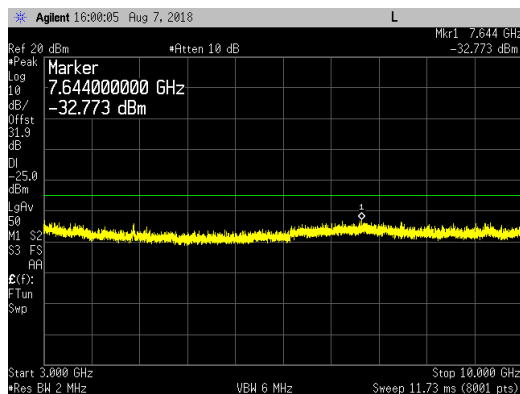
150kHz to 20MHz



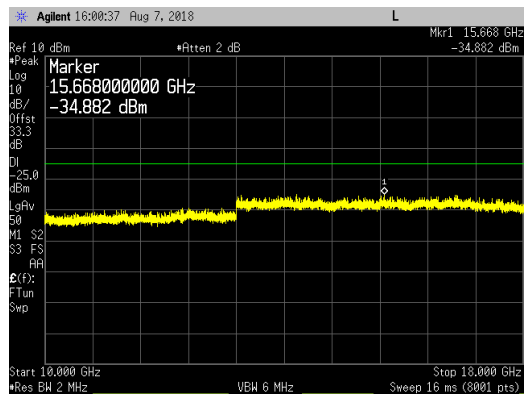
20MHz to 3GHz



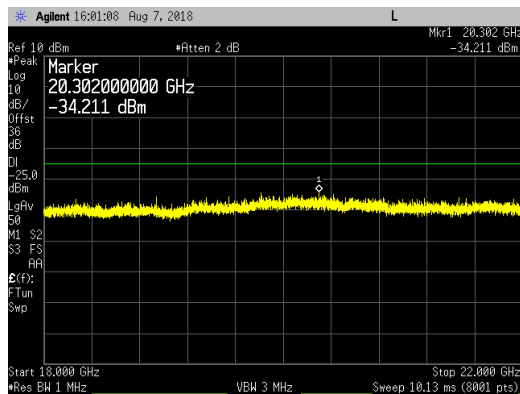
3GHz to 10GHz



10GHz to 18GHz

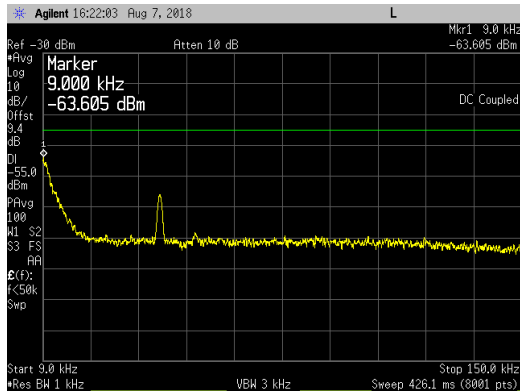


18GHz to 22GHz

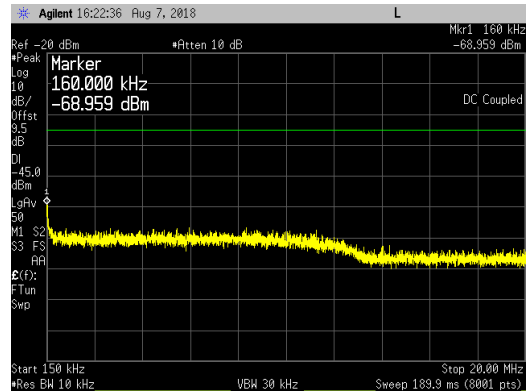


LTE15 Channel Bandwidth _64QAM_ Middle Channel (2155MHz):

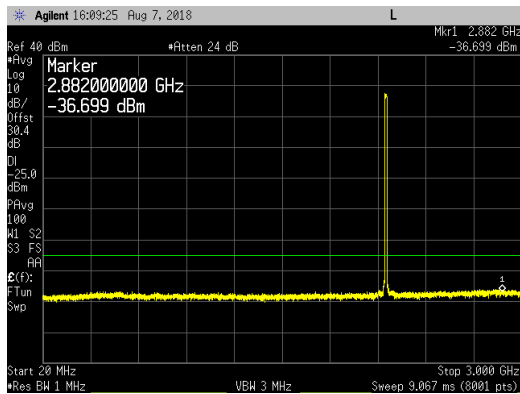
9kHz to 150kHz



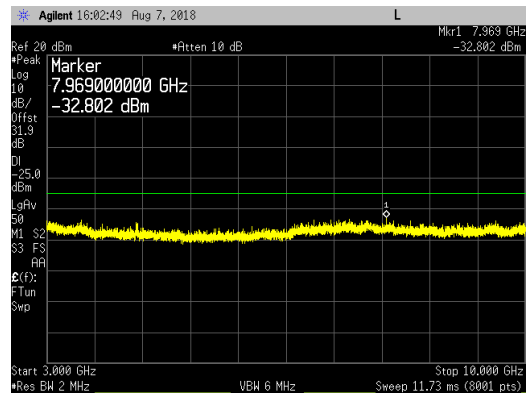
150kHz to 20MHz



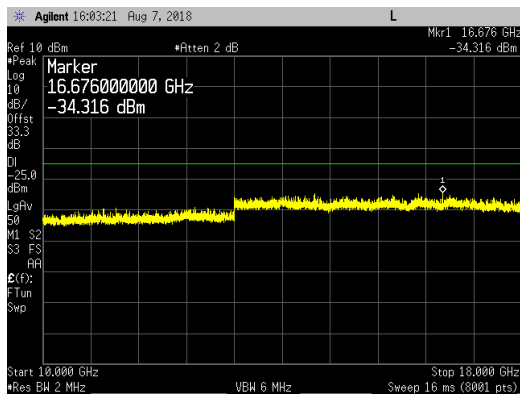
20MHz to 3GHz



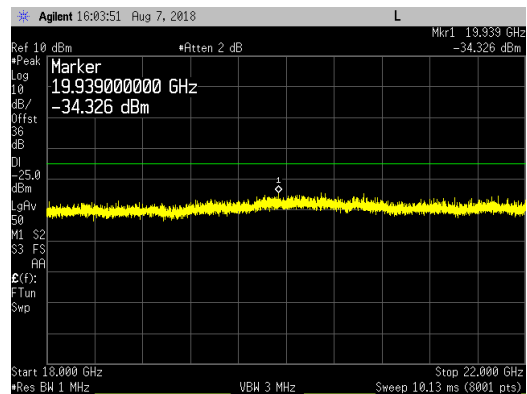
3GHz to 10GHz



10GHz to 18GHz

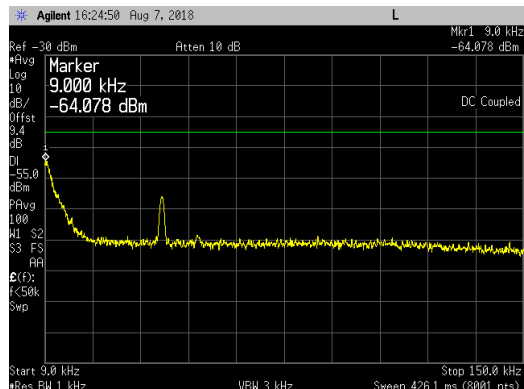


18GHz to 22GHz

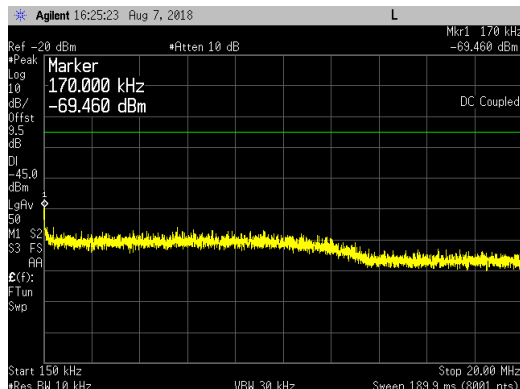


LTE15 Channel Bandwidth _256QAM_ Middle Channel (2155MHz):

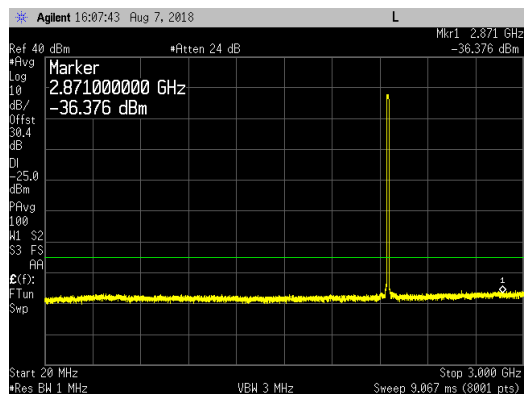
9kHz to 150kHz



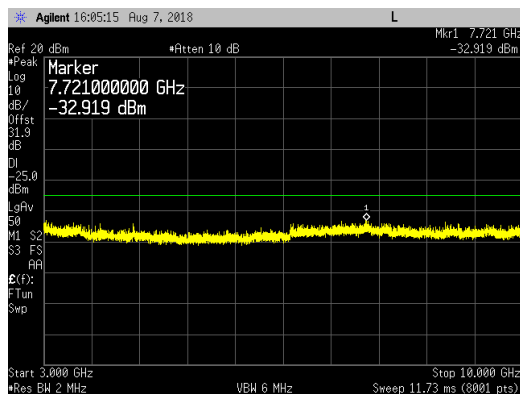
150kHz to 20MHz



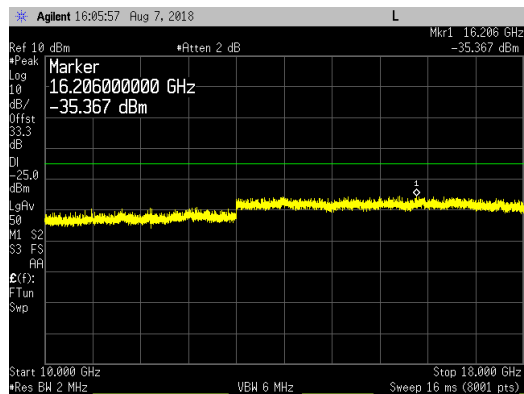
20MHz to 3GHz



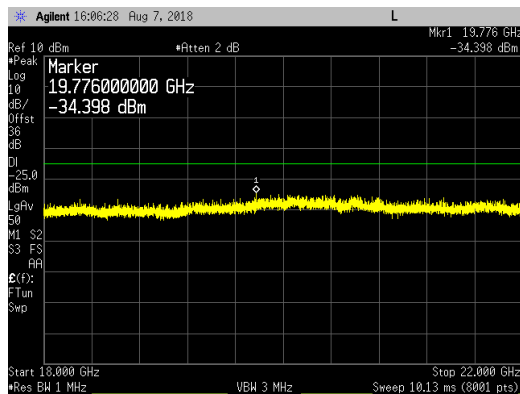
3GHz to 10GHz



10GHz to 18GHz

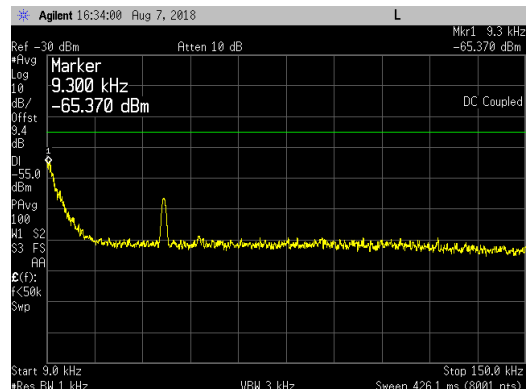


18GHz to 22GHz

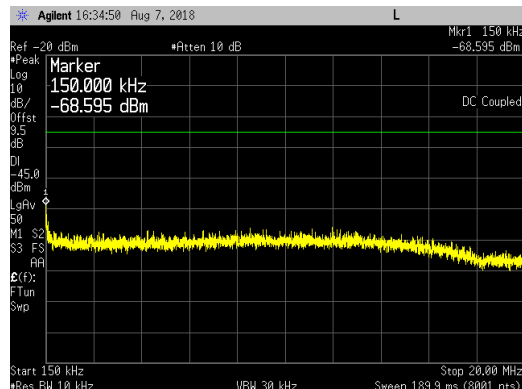


LTE20 Channel Bandwidth _ QPSK _ Middle Channel (2155MHz):

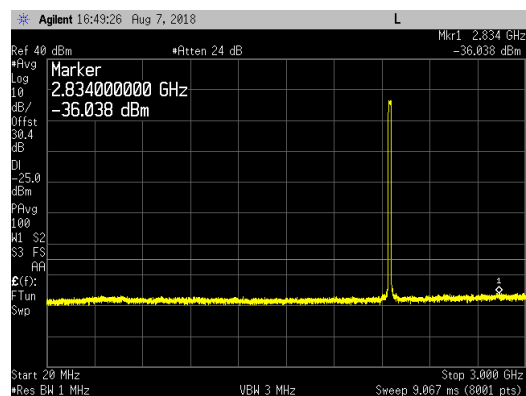
9kHz to 150kHz



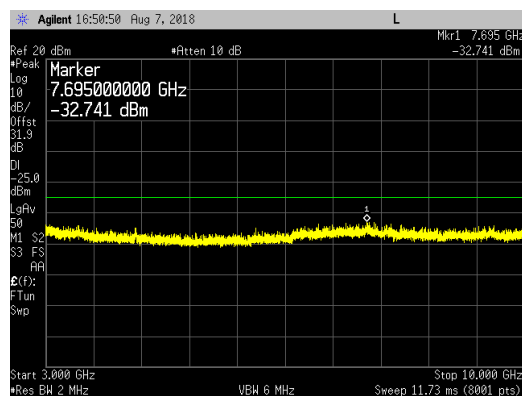
150kHz to 20MHz



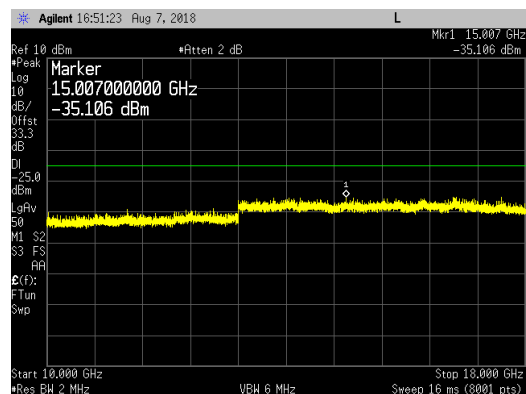
20MHz to 3GHz



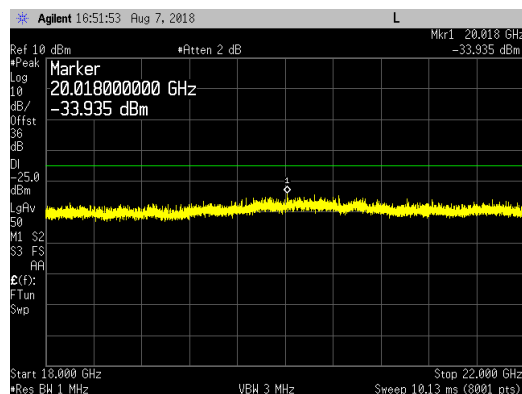
3GHz to 10GHz



10GHz to 18GHz

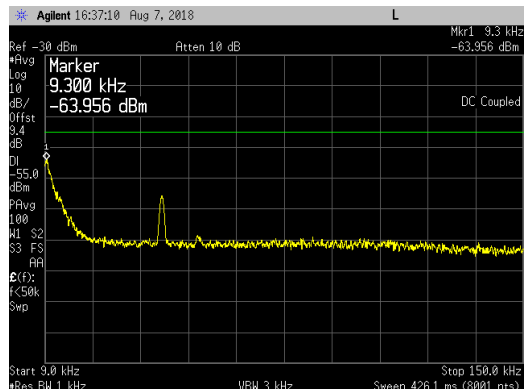


18GHz to 22GHz

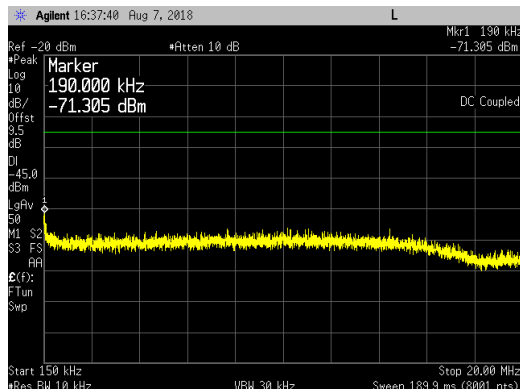


LTE20 Channel Bandwidth _ 16QAM _ Middle Channel (2155MHz):

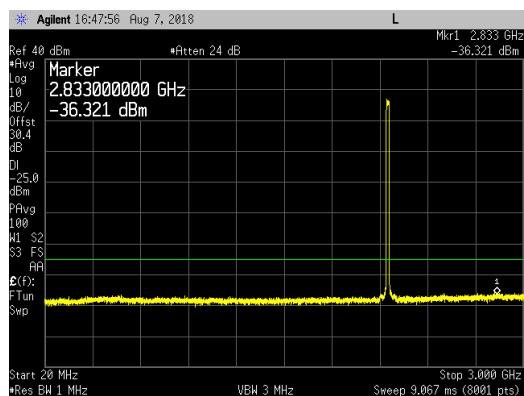
9kHz to 150kHz



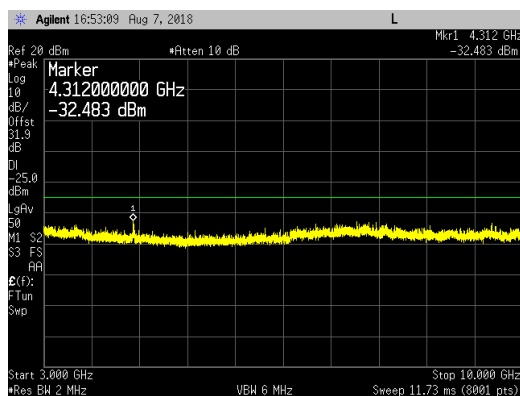
150kHz to 20MHz



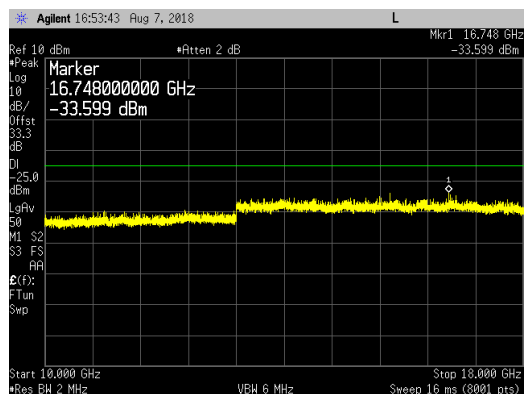
20MHz to 3GHz



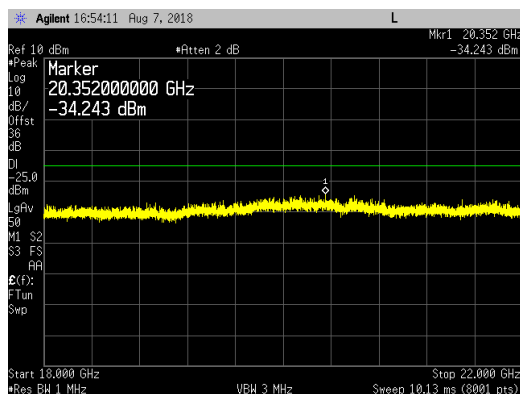
3GHz to 10GHz



10GHz to 18GHz

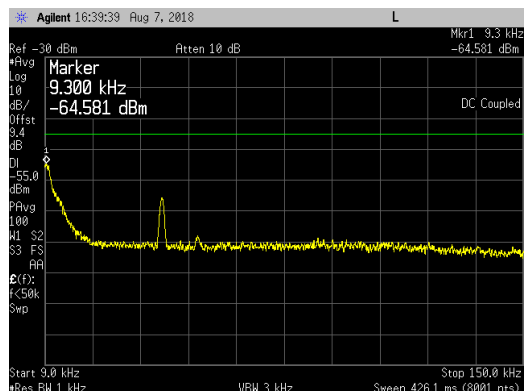


18GHz to 22GHz

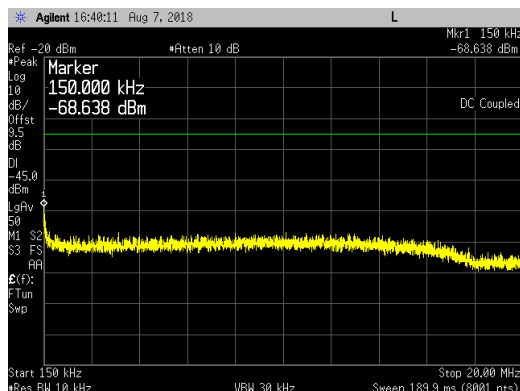


LTE20 Channel Bandwidth _64QAM_ Middle Channel (2155MHz):

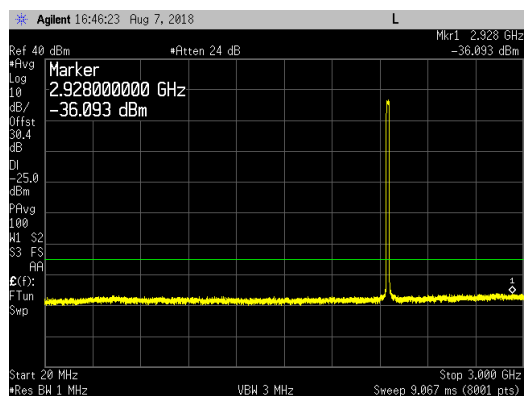
9kHz to 150kHz



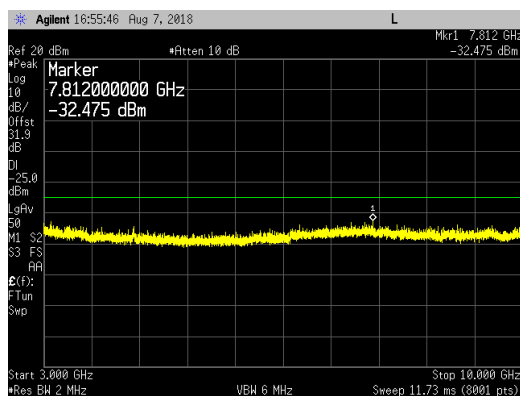
150kHz to 20MHz



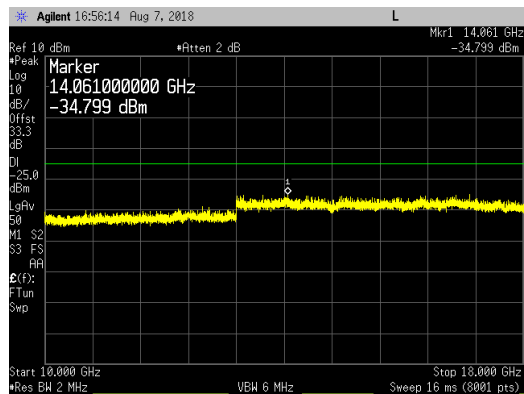
20MHz to 3GHz



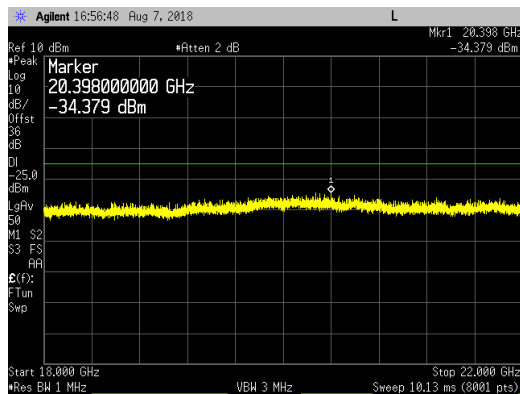
3GHz to 10GHz



10GHz to 18GHz

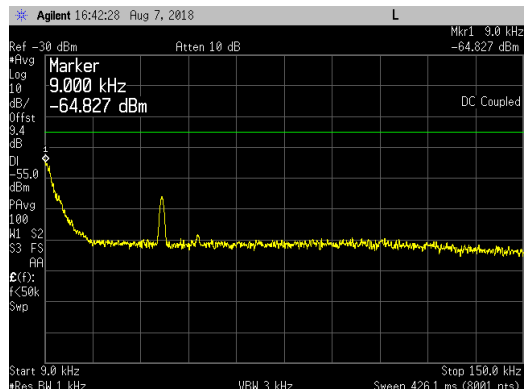


18GHz to 22GHz

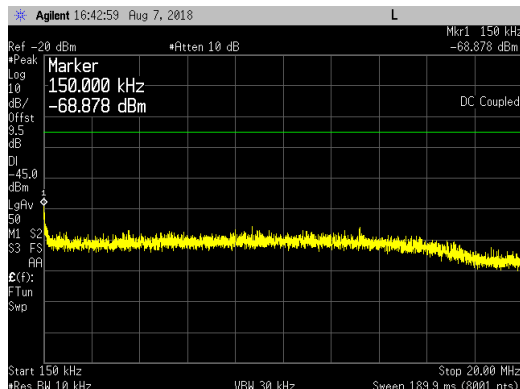


LTE20 Channel Bandwidth _256QAM_ Middle Channel (2155MHz):

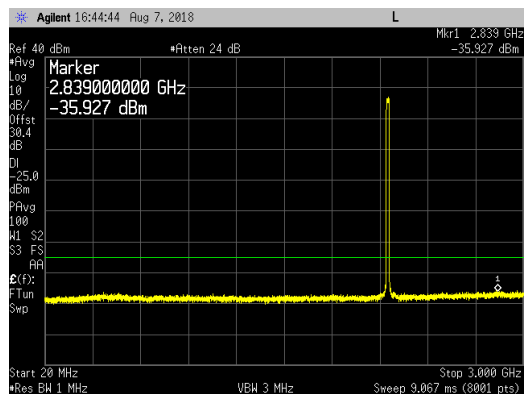
9kHz to 150kHz



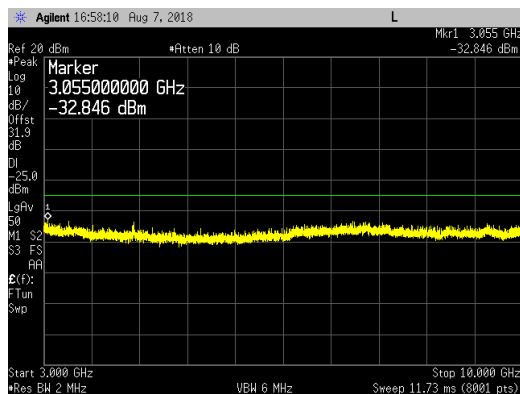
150kHz to 20MHz



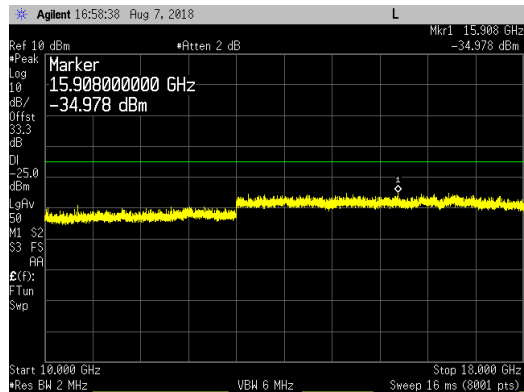
20MHz to 3GHz



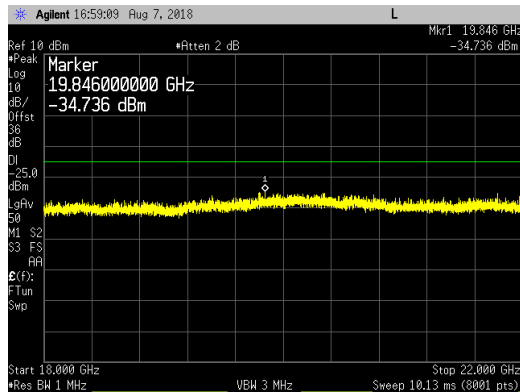
3GHz to 10GHz



10GHz to 18GHz

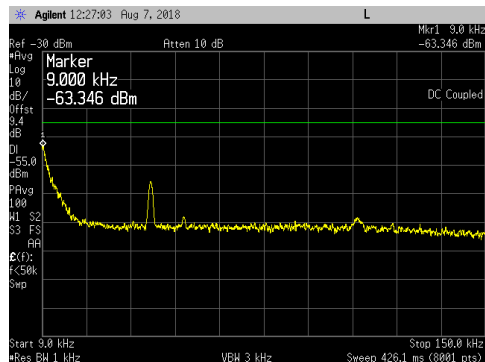


18GHz to 22GHz

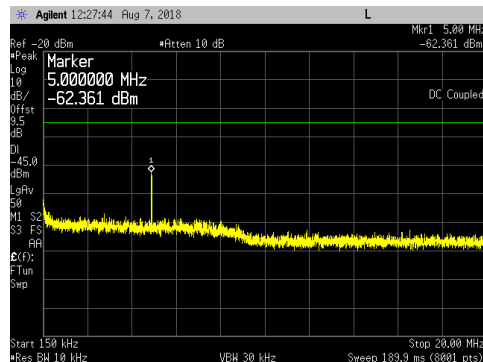


DUAL LTE5 Channel Bandwidth _ QPSK _ Bot Ch_ Minimum Spacing (2112.5MHz & 2117.5MHz):

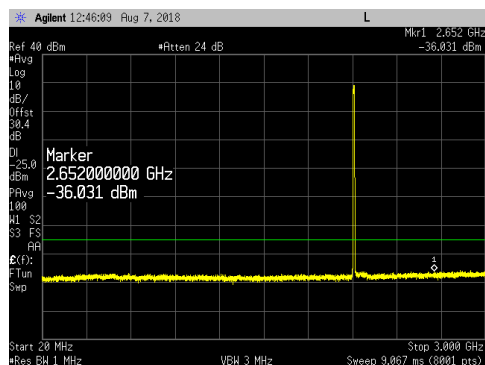
9kHz to 150kHz



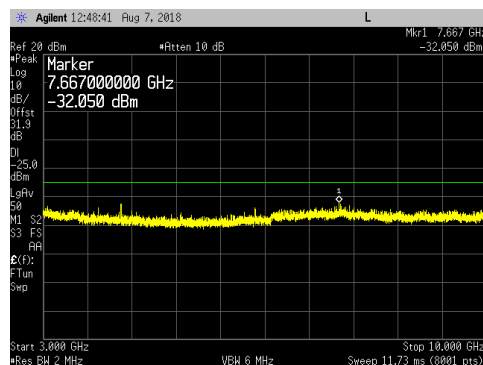
150kHz to 20MHz



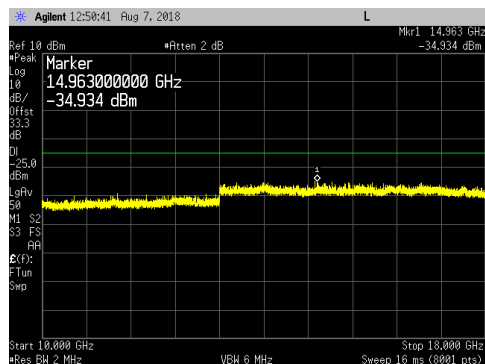
20MHz to 3GHz



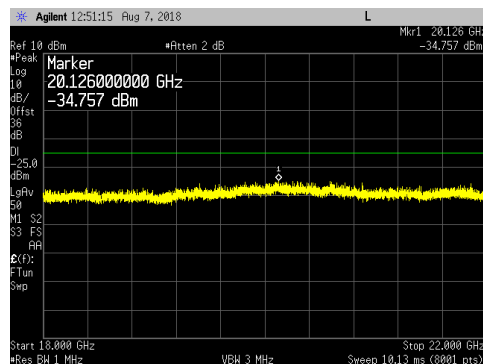
3GHz to 10GHz



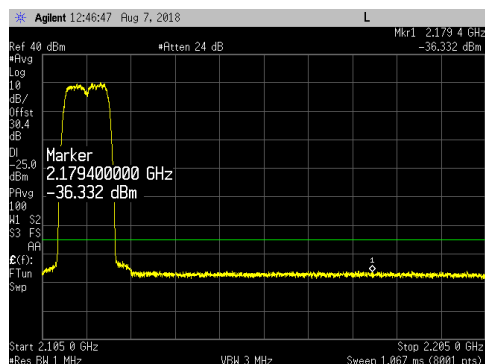
10GHz to 18GHz



18GHz to 22GHz

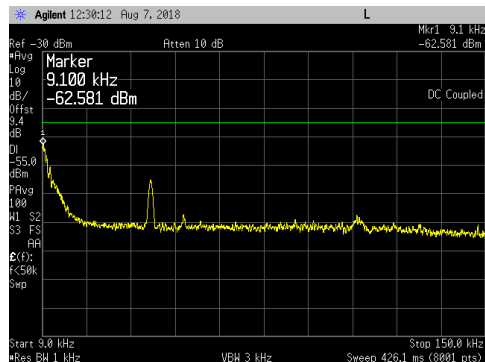


2105MHz to 2205MHz

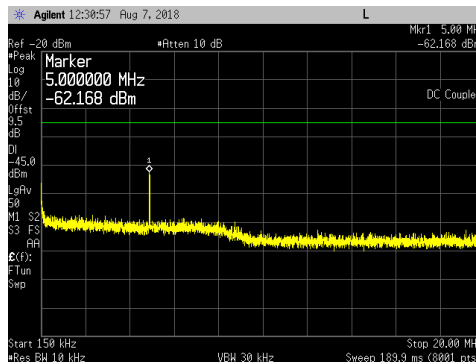


DUAL LTE5 Channel Bandwidth _ 16QAM _ Bot Ch _ Minimum Spacing (2112.5MHz & 2117.5MHz):

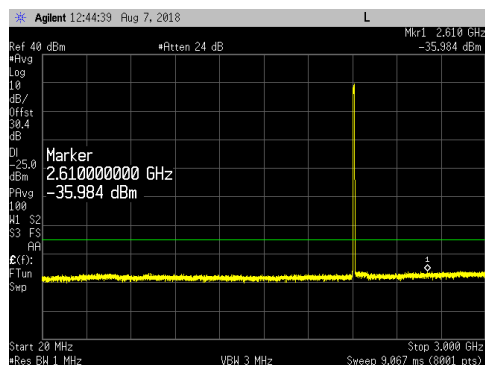
9kHz to 150kHz



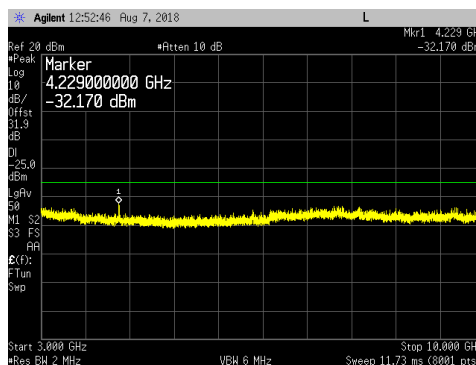
150kHz to 20MHz



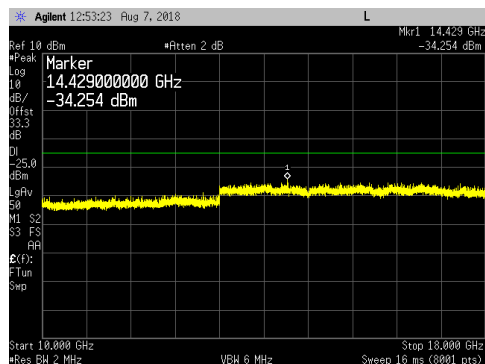
20MHz to 3GHz



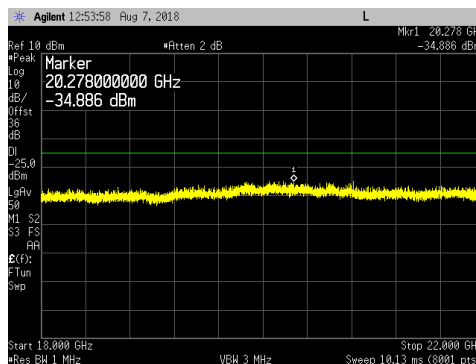
3GHz to 10GHz



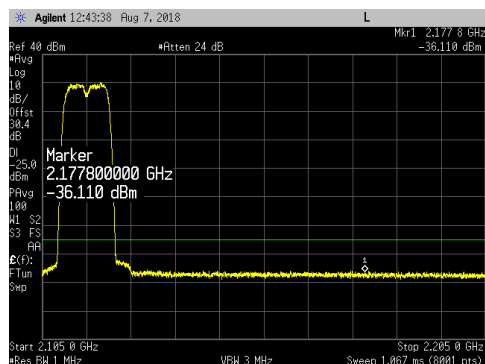
10GHz to 18GHz



18GHz to 22GHz

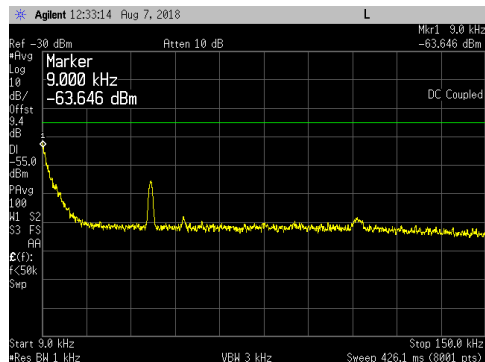


2105MHz to 2205MHz

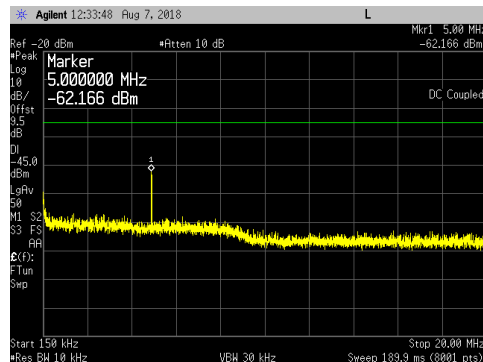


DUAL LTE5 Channel Bandwidth _ 64QAM _ Bot Ch _ Minimum Spacing (2112.5MHz & 2117.5MHz):

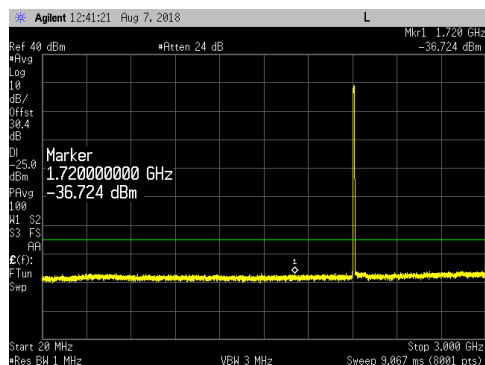
9kHz to 150kHz



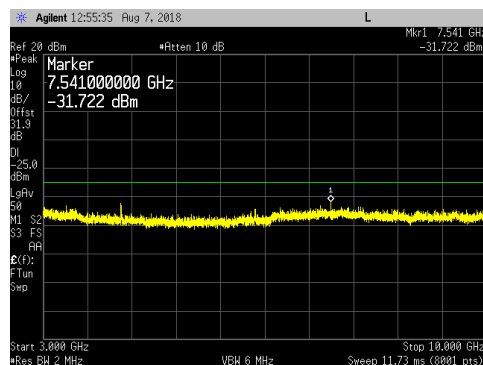
150kHz to 20MHz



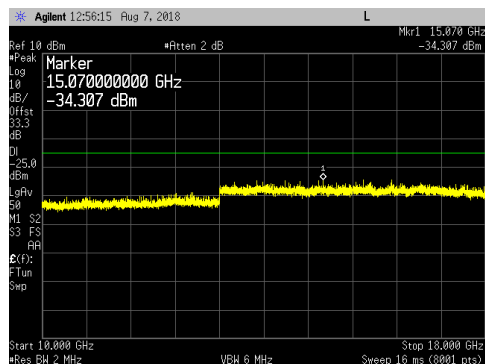
20MHz to 3GHz



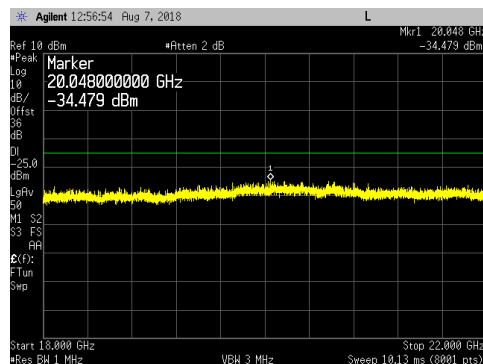
3GHz to 10GHz



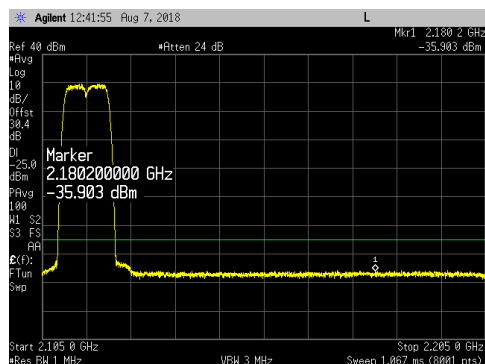
10GHz to 18GHz



18GHz to 22GHz

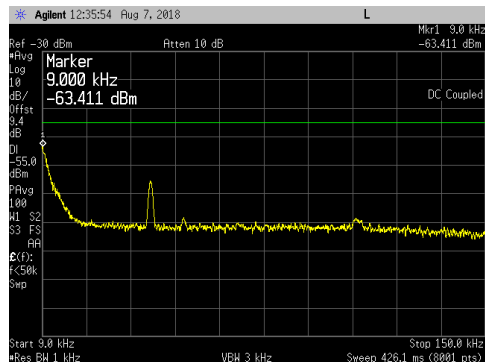


2105MHz to 2205MHz

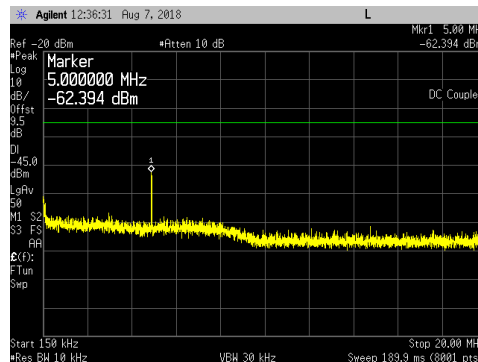


DUAL LTE5 Channel Bandwidth _ 256QAM _ Bot Ch _ Minimum Spacing (2112.5MHz & 2117.5MHz):

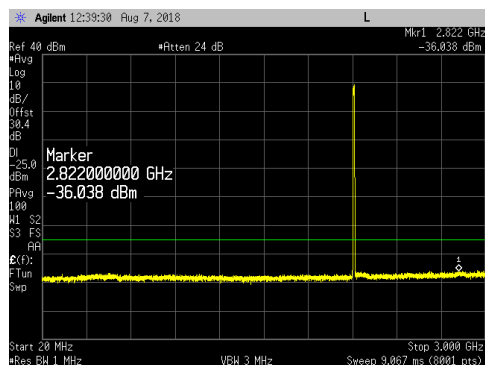
9kHz to 150kHz



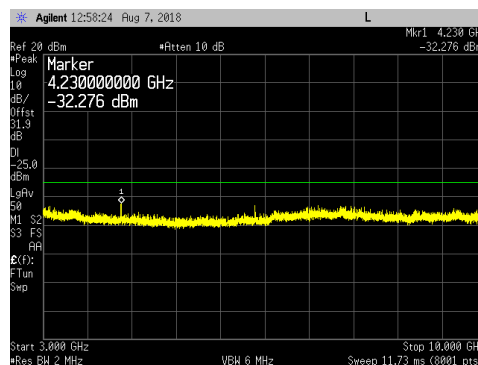
150kHz to 20MHz



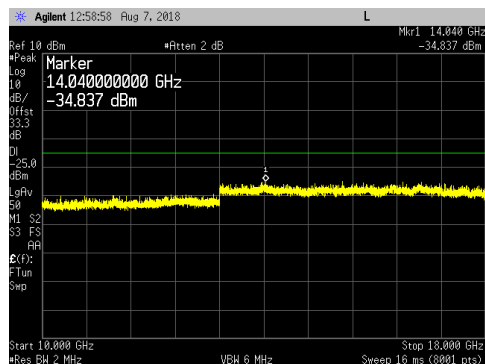
20MHz to 3GHz



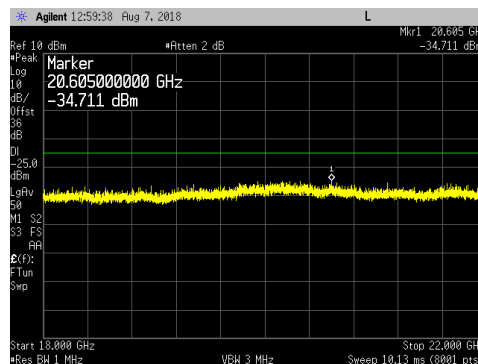
3GHz to 10GHz



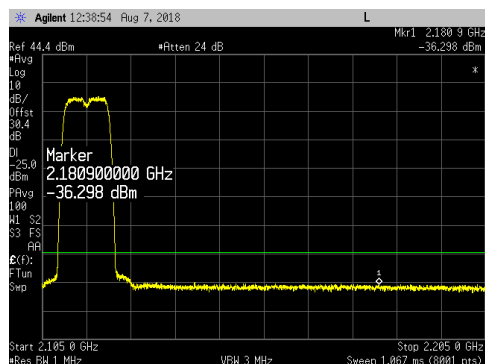
10GHz to 18GHz



18GHz to 22GHz

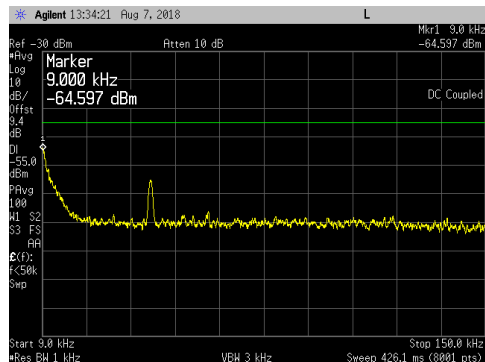


2105MHz to 2205MHz

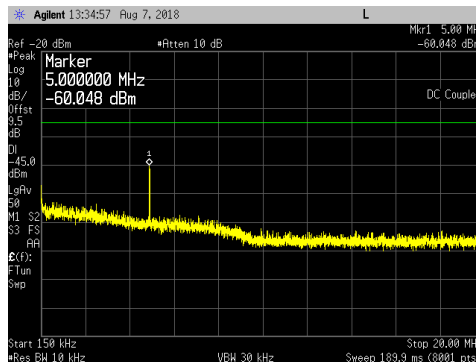


DUAL LTE5 Channel Bandwidth _ QPSK _ Top Ch _ Minimum Spacing (2192.5MHz & 2197.5MHz):

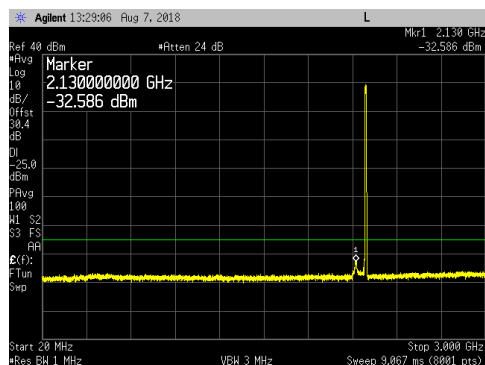
9kHz to 150kHz



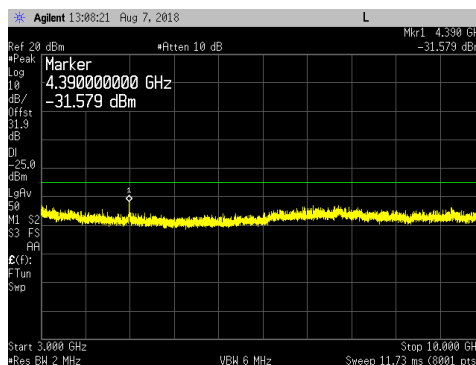
150kHz to 20MHz



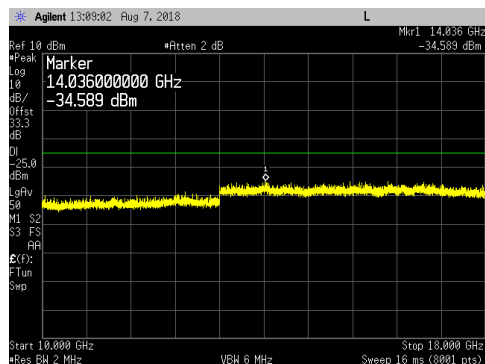
20MHz to 3GHz



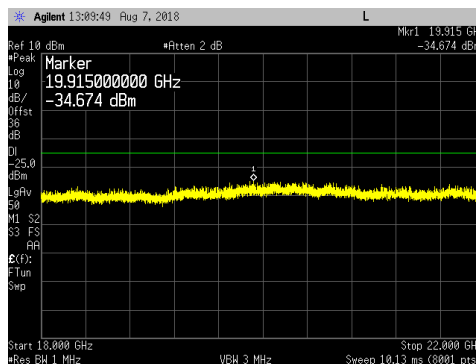
3GHz to 10GHz



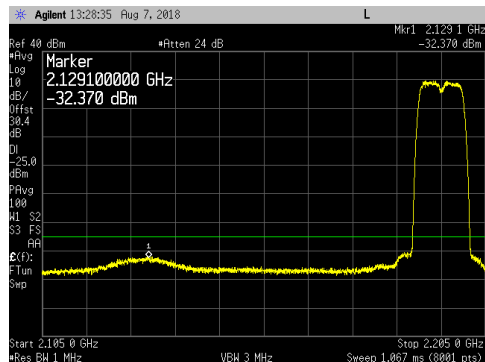
10GHz to 18GHz



18GHz to 22GHz

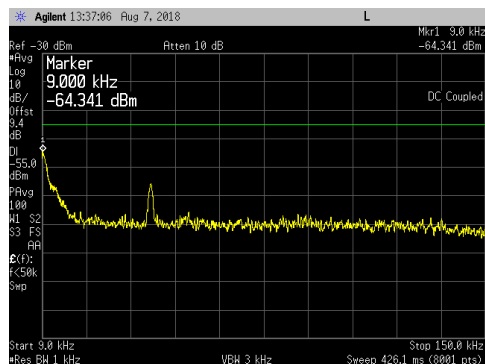


2105MHz to 2205MHz

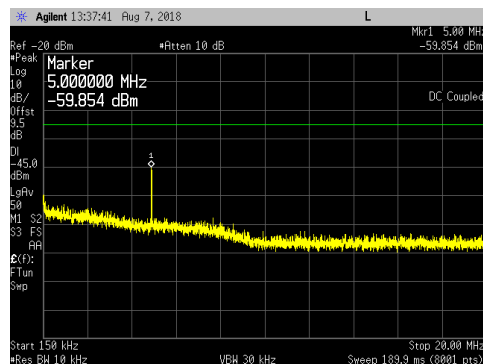


DUAL LTE5 Channel Bandwidth _ 16QAM _ Top Ch _ Minimum Spacing (2192.5MHz & 2197.5MHz):

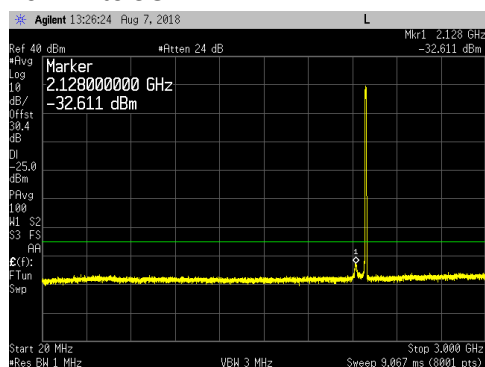
9kHz to 150kHz



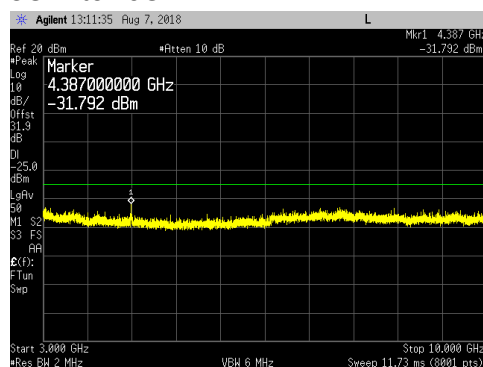
150kHz to 20MHz



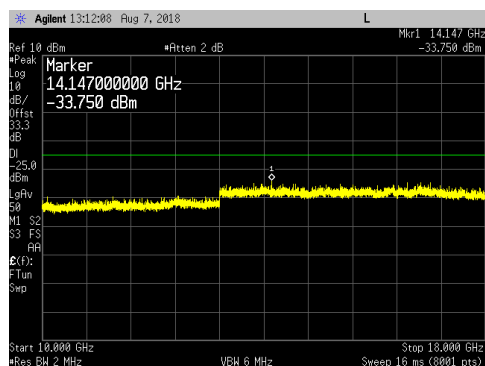
20MHz to 3GHz



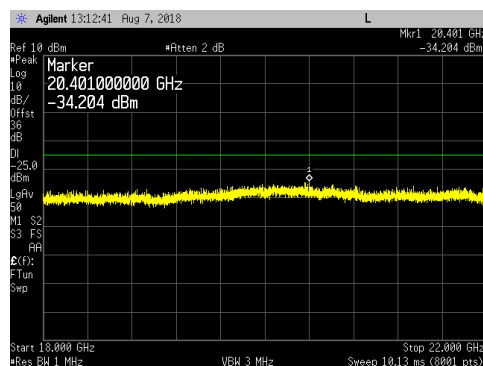
3GHz to 10GHz



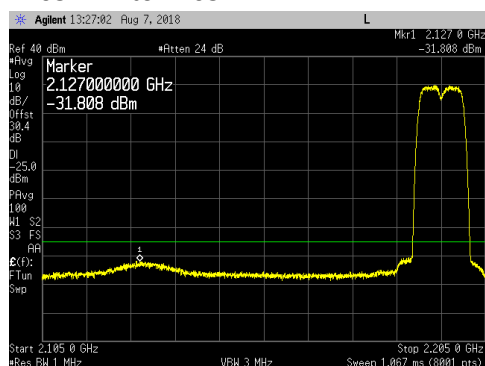
10GHz to 18GHz



18GHz to 22GHz

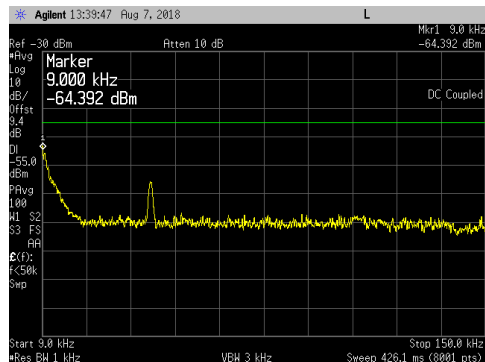


2105MHz to 2205MHz

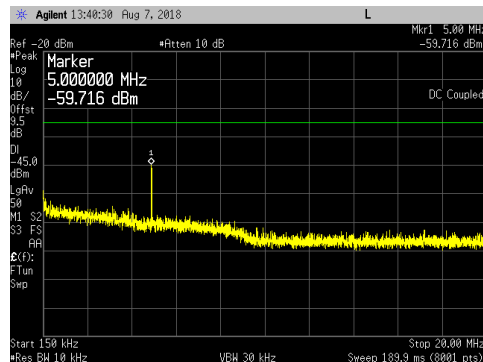


DUAL LTE5 Channel Bandwidth _ 64QAM _ Top Ch _ Minimum Spacing (2192.5MHz & 2197.5MHz):

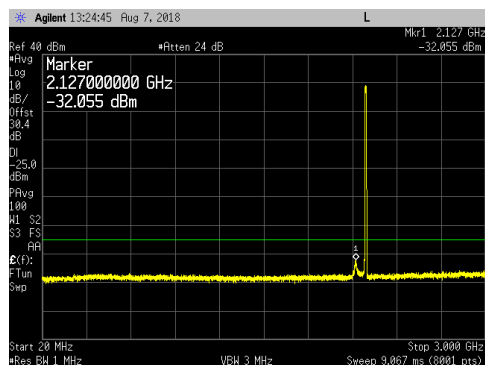
9kHz to 150kHz



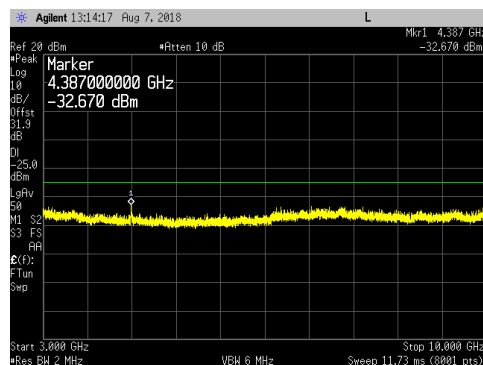
150kHz to 20MHz



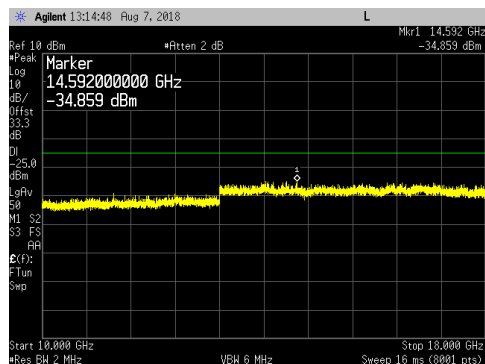
20MHz to 3GHz



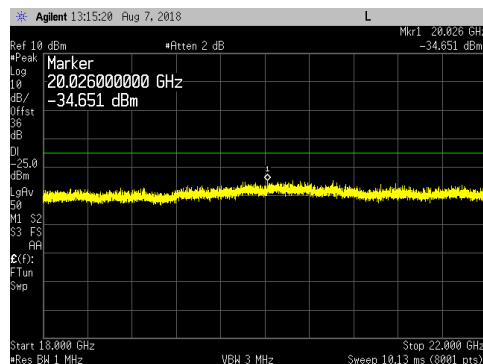
3GHz to 10GHz



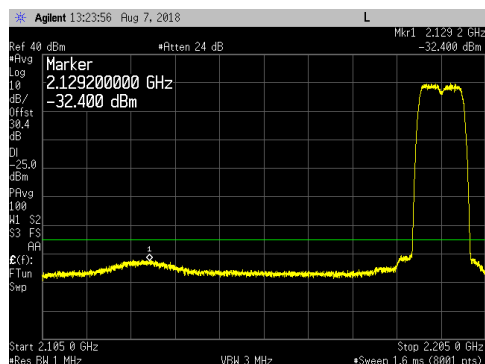
10GHz to 18GHz



18GHz to 22GHz

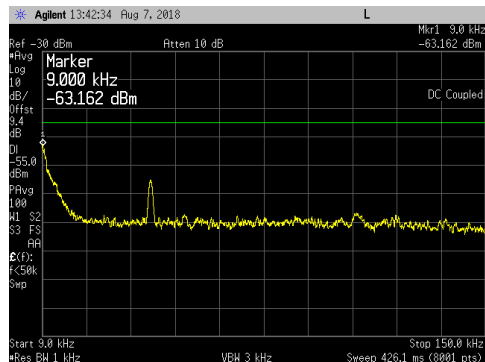


2105MHz to 2205MHz

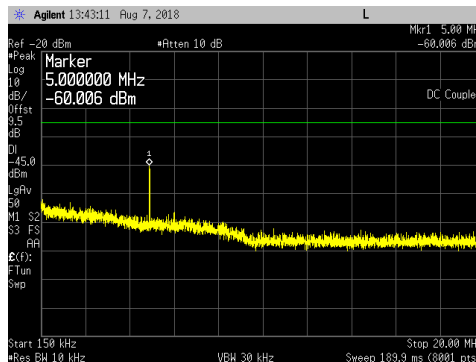


DUAL LTE5 Channel Bandwidth _ 256QAM _ Top Ch _ Minimum Spacing (2192.5MHz & 2197.5MHz):

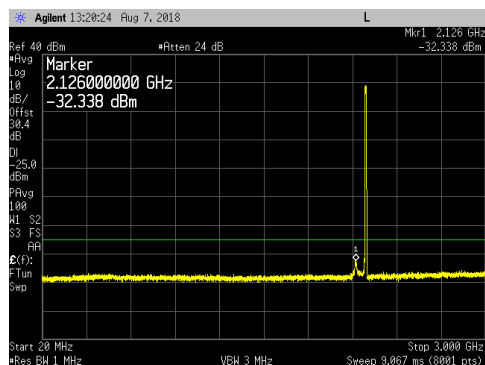
9kHz to 150kHz



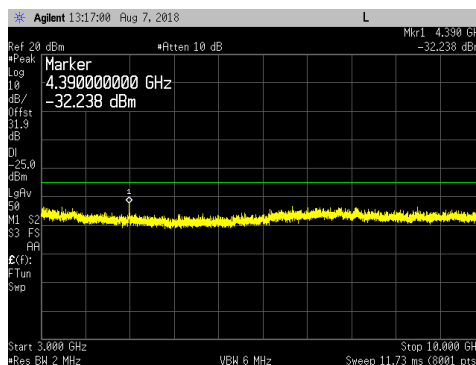
150kHz to 20MHz



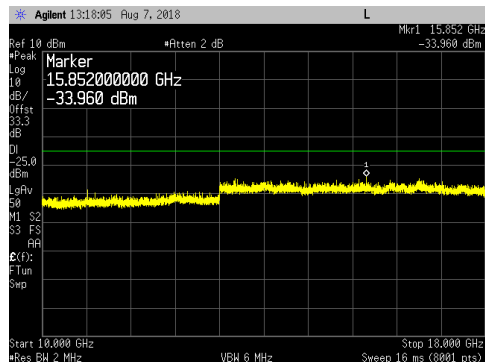
20MHz to 3GHz



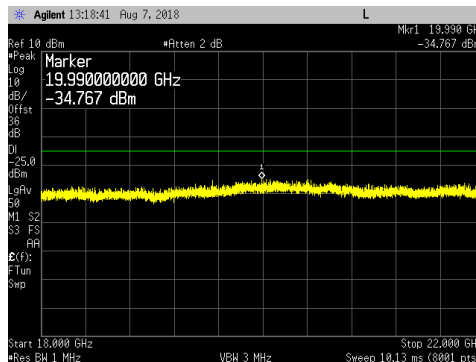
3GHz to 10GHz



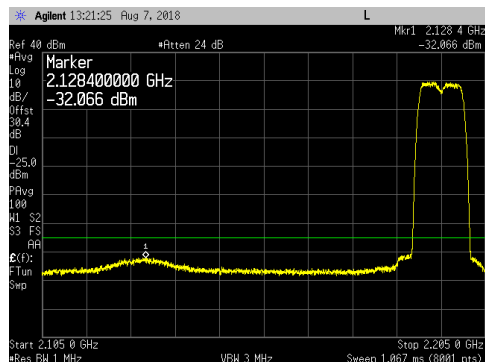
10GHz to 18GHz



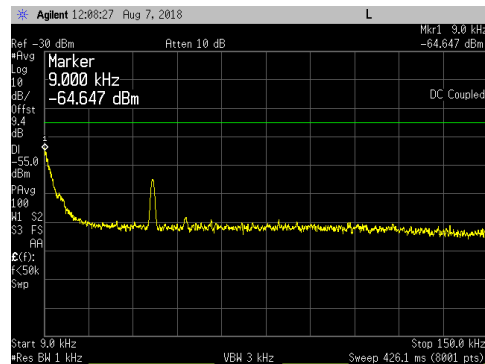
18GHz to 22GHz



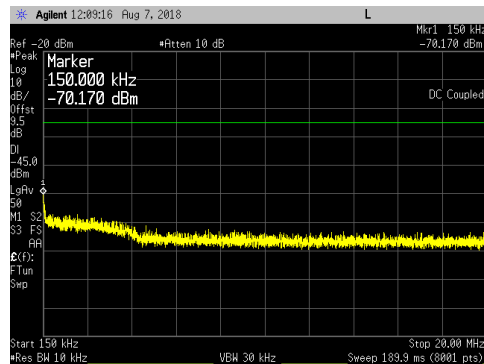
2105MHz to 2205MHz



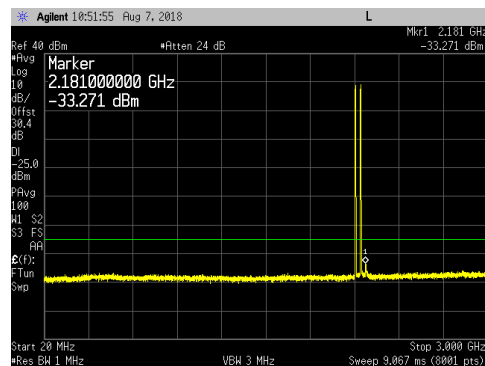
DUAL LTE5 Channel Bandwidth _ QPSK _ Bot Ch_ Maximum Spacing (2112.5MHz & 2147.5MHz):
9kHz to 150kHz



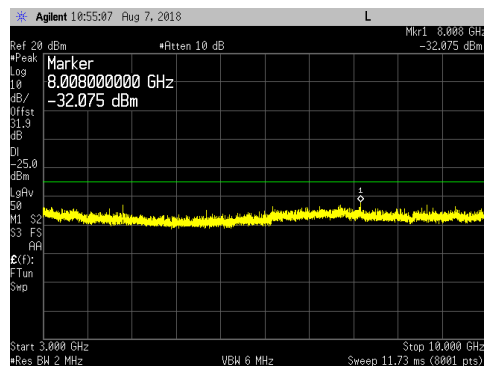
150kHz to 20MHz



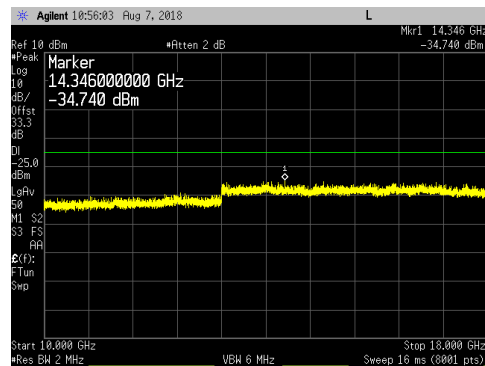
20MHz to 3GHz



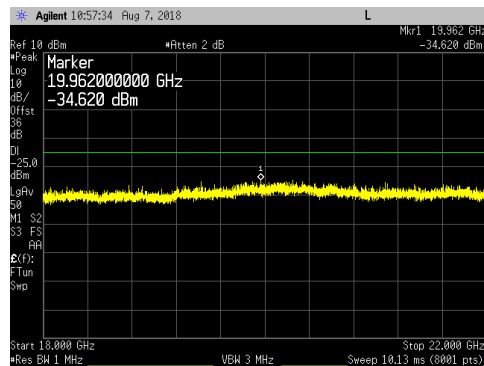
3GHz to 10GHz



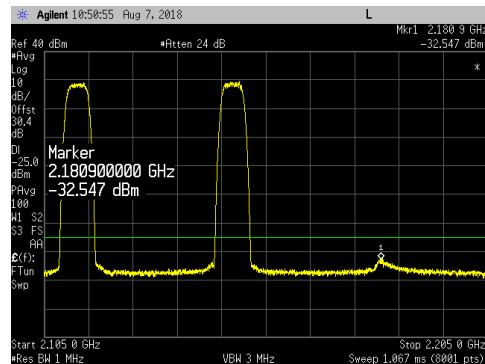
10GHz to 18GHz



18GHz to 22GHz

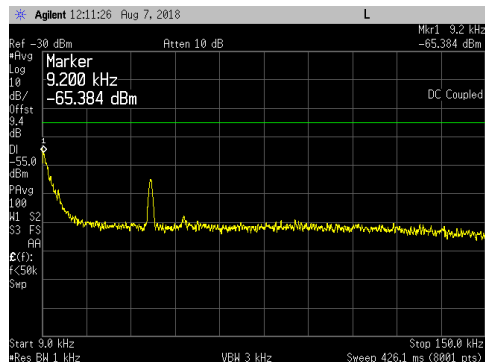


2105MHz to 2205MHz

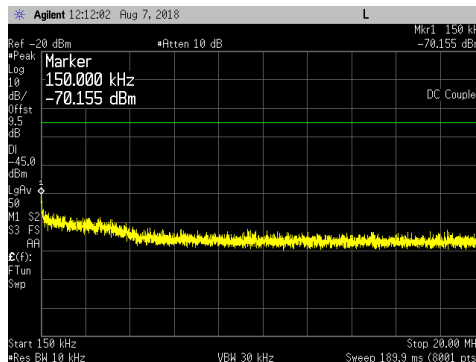


DUAL LTE5 Channel Bandwidth _ 16QAM _ Bot Ch _ Maximum Spacing (2112.5MHz & 2147.5MHz):

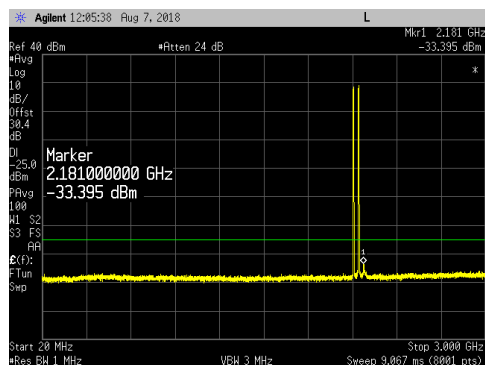
9kHz to 150kHz



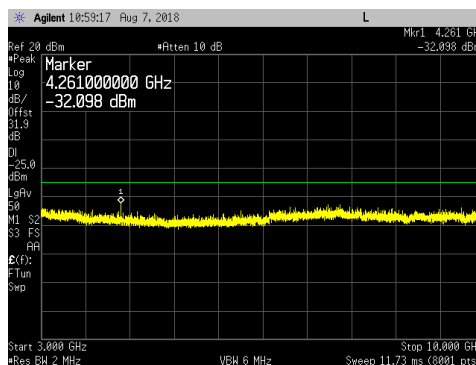
150kHz to 20MHz



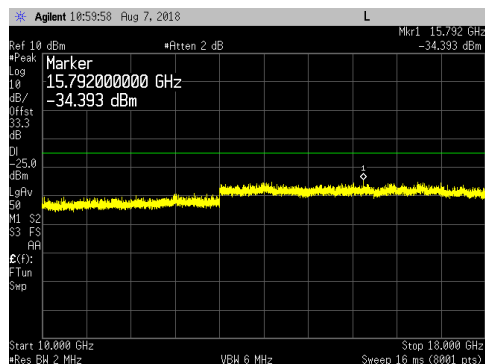
20MHz to 3GHz



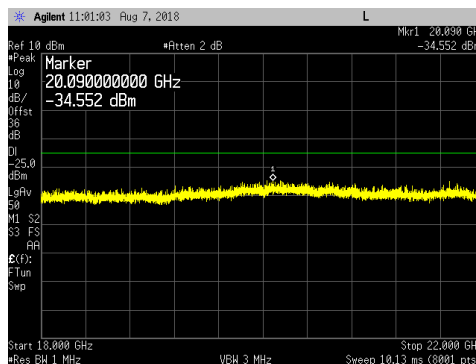
3GHz to 10GHz



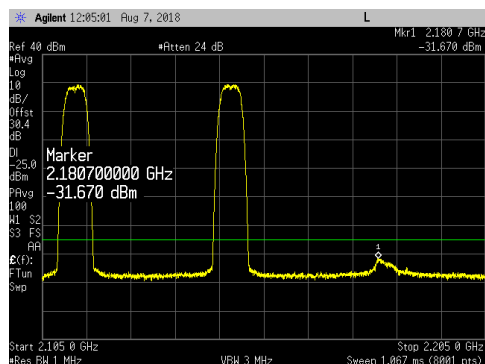
10GHz to 18GHz



18GHz to 22GHz

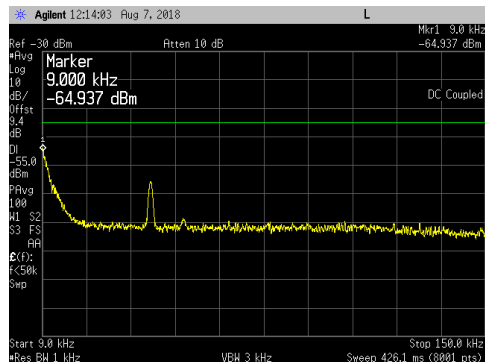


2105MHz to 2205MHz

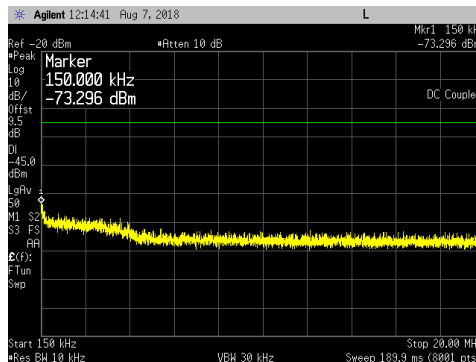


DUAL LTE5 Channel Bandwidth _ 64QAM _ Bot Ch _ Maximum Spacing (2112.5MHz & 2147.5MHz):

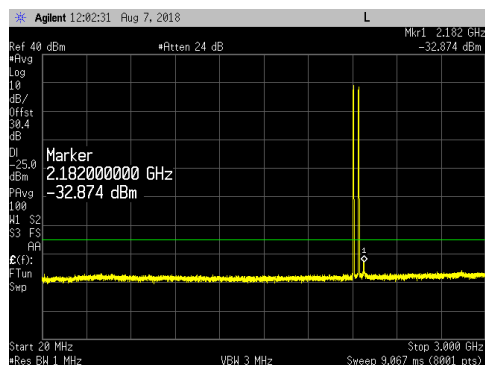
9kHz to 150kHz



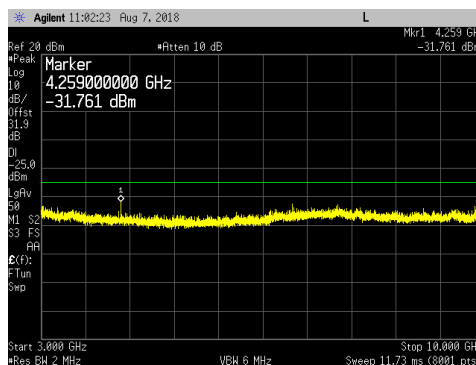
150kHz to 20MHz



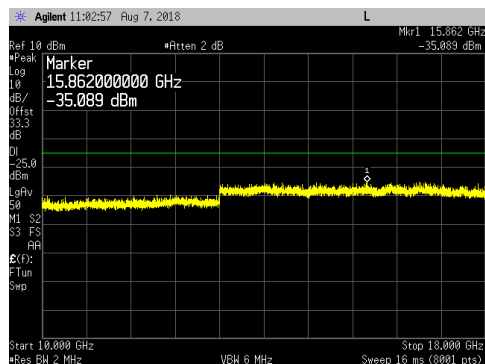
20MHz to 3GHz



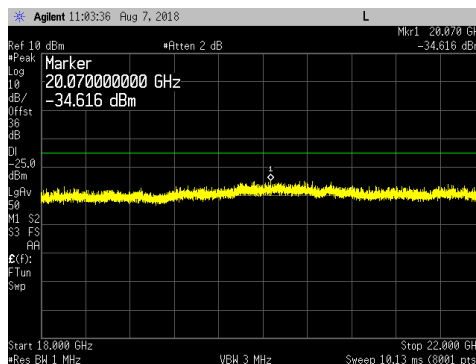
3GHz to 10GHz



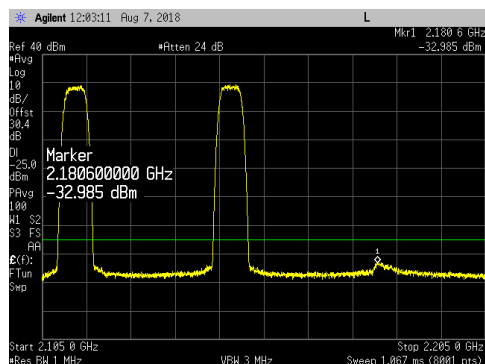
10GHz to 18GHz



18GHz to 22GHz

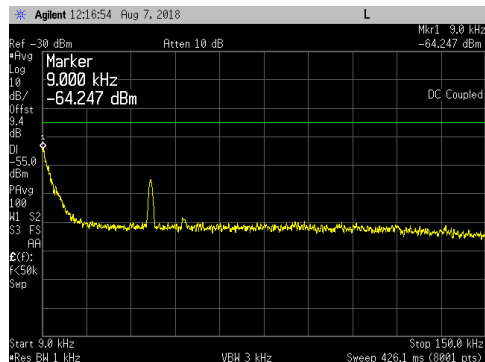


2105MHz to 2205MHz

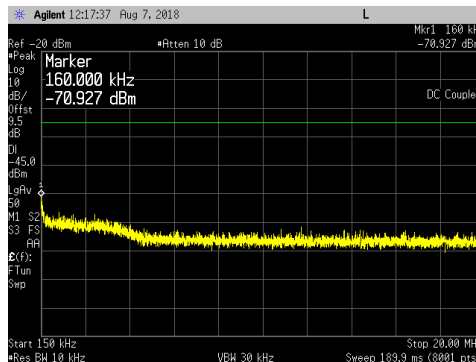


DUAL LTE5 Channel Bandwidth _ 256QAM _ Bot Ch _ Maximum Spacing (2112.5MHz & 2147.5MHz):

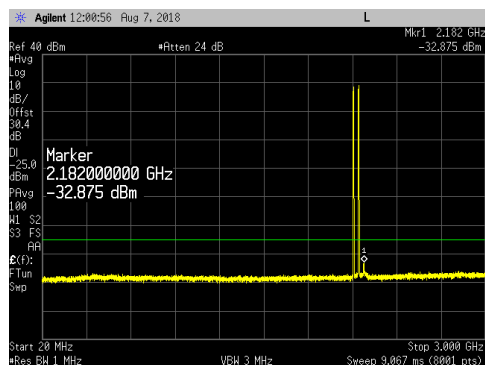
9kHz to 150kHz



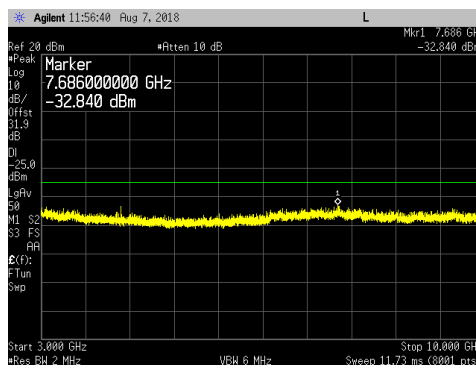
150kHz to 20MHz



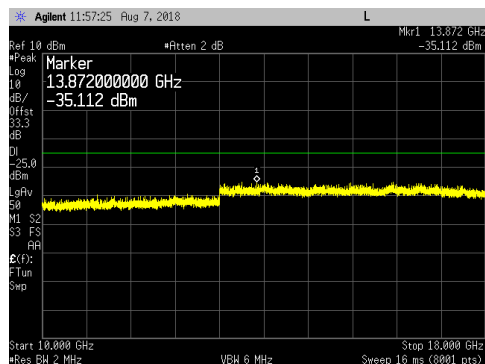
20MHz to 3GHz



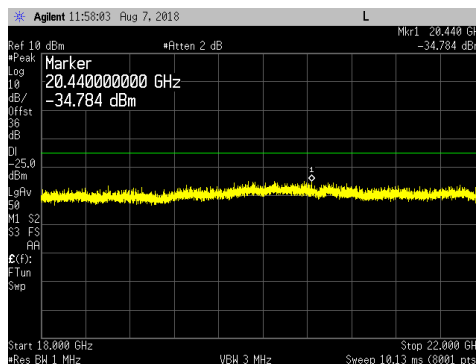
3GHz to 10GHz



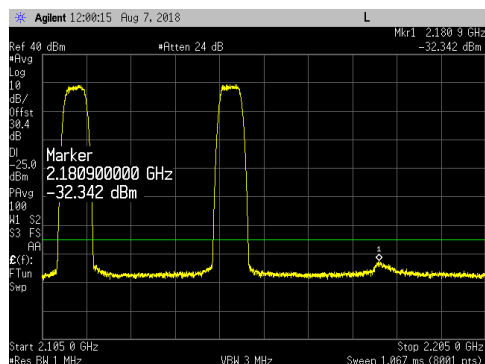
10GHz to 18GHz



18GHz to 22GHz

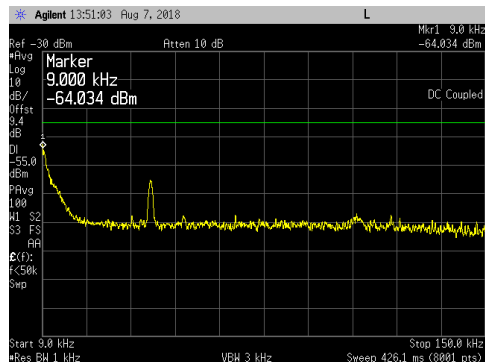


2105MHz to 2205MHz

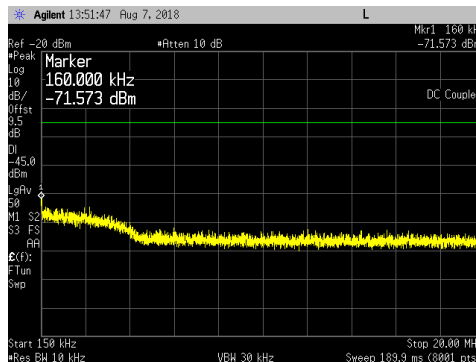


DUAL LTE5 Channel Bandwidth _ QPSK _ Top Ch _ Maximum Spacing (2162.5MHz & 2197.5MHz):

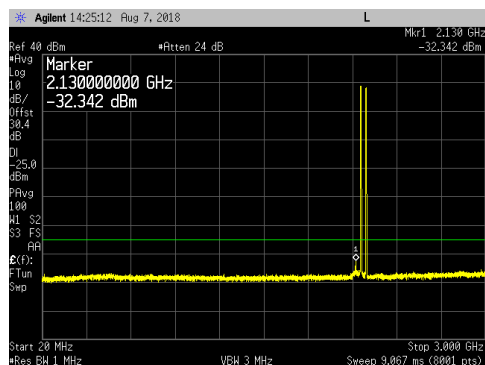
9kHz to 150kHz



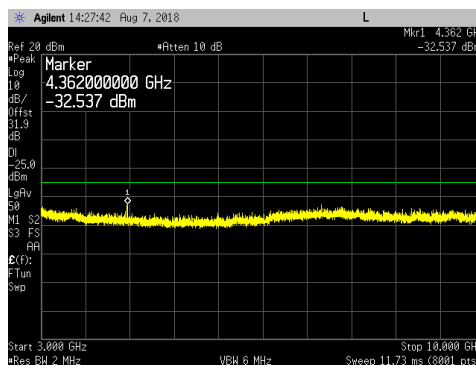
150kHz to 20MHz



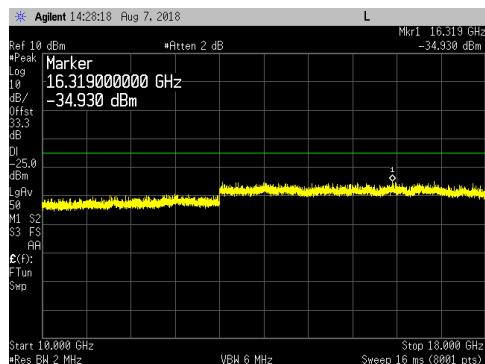
20MHz to 3GHz



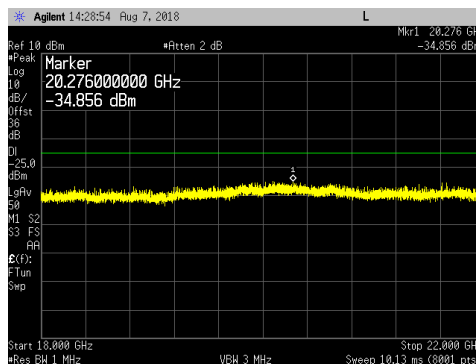
3GHz to 10GHz



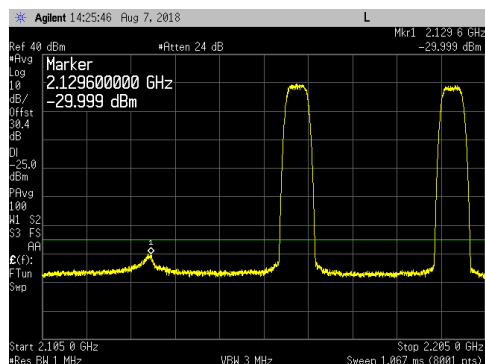
10GHz to 18GHz



18GHz to 22GHz

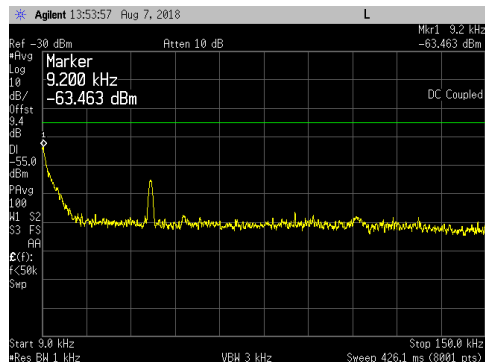


2105MHz to 2205MHz

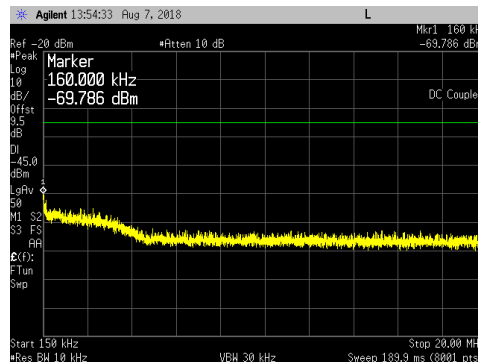


DUAL LTE5 Channel Bandwidth _ 16QAM _ Top Ch _ Maximum Spacing (2162.5MHz & 2197.5MHz):

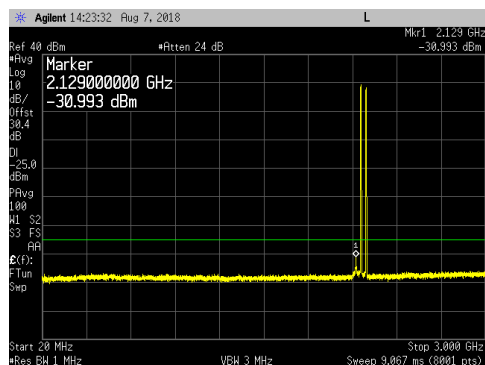
9kHz to 150kHz



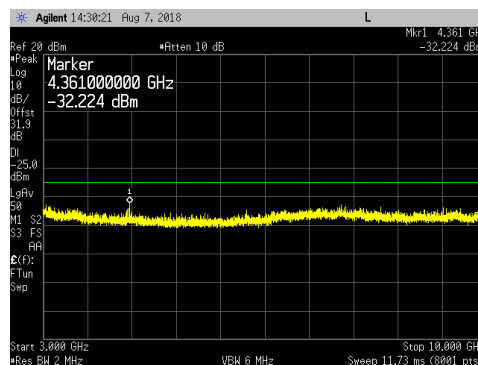
150kHz to 20MHz



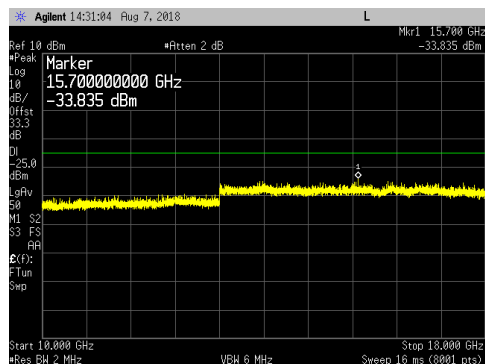
20MHz to 3GHz



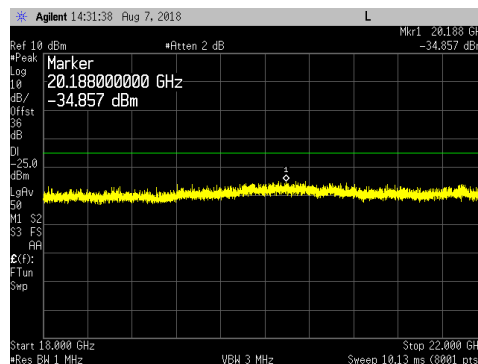
3GHz to 10GHz



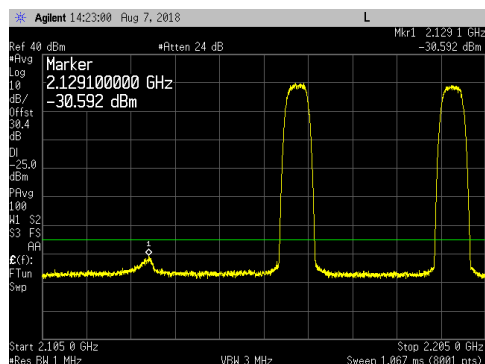
10GHz to 18GHz



18GHz to 22GHz

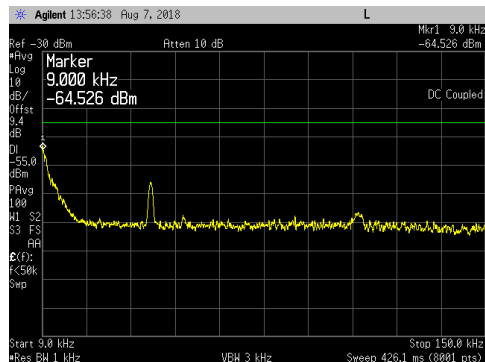


2105MHz to 2205MHz

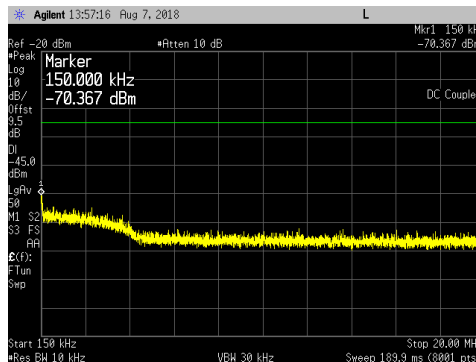


DUAL LTE5 Channel Bandwidth _ 64QAM _ Top Ch _ Maximum Spacing (2162.5MHz & 2197.5MHz):

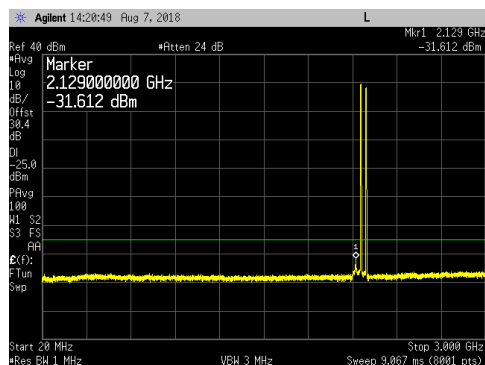
9kHz to 150kHz



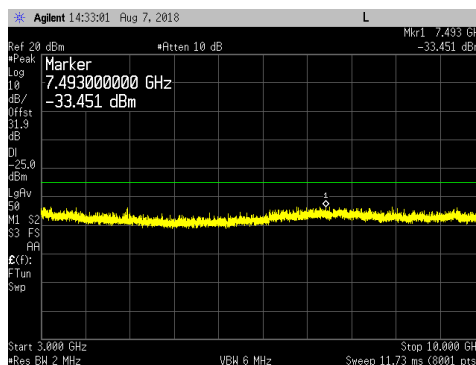
150kHz to 20MHz



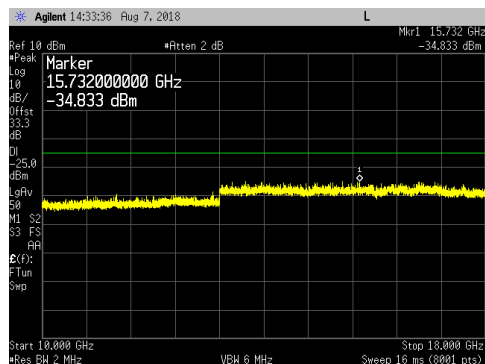
20MHz to 3GHz



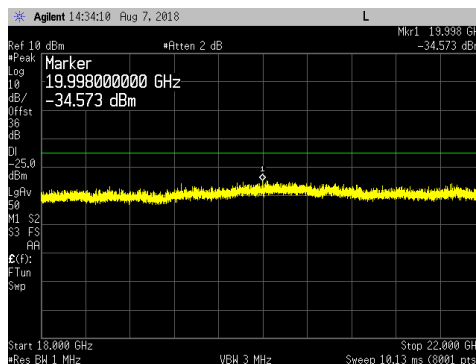
3GHz to 10GHz



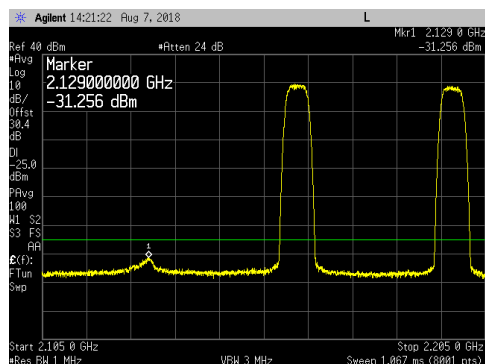
10GHz to 18GHz



18GHz to 22GHz

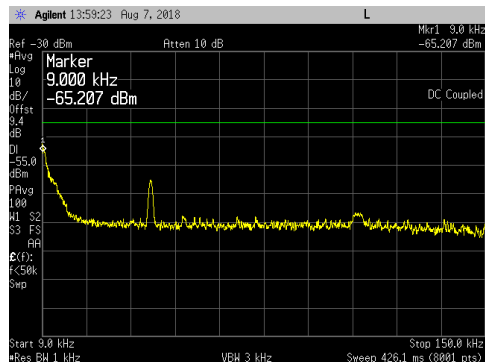


2105MHz to 2205MHz

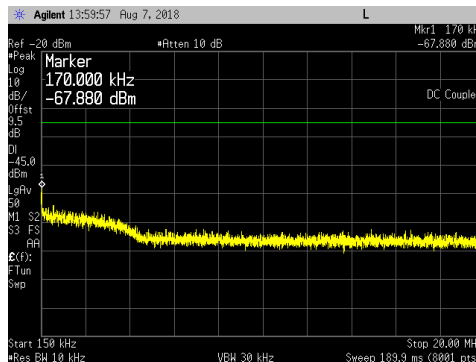


DUAL LTE5 Channel Bandwidth _ 256QAM _ Top Ch _ Maximum Spacing (2162.5MHz & 2197.5MHz):

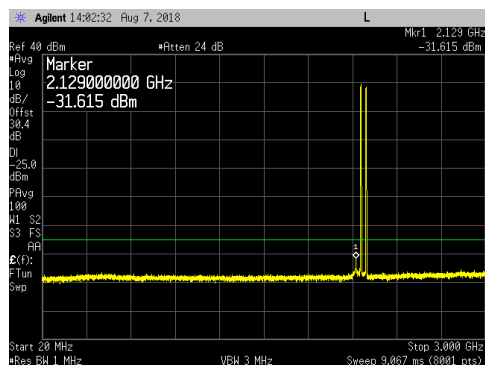
9kHz to 150kHz



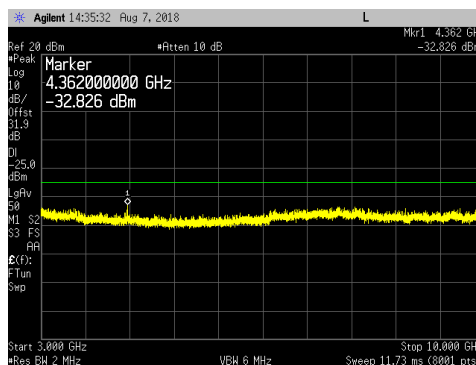
150kHz to 20MHz



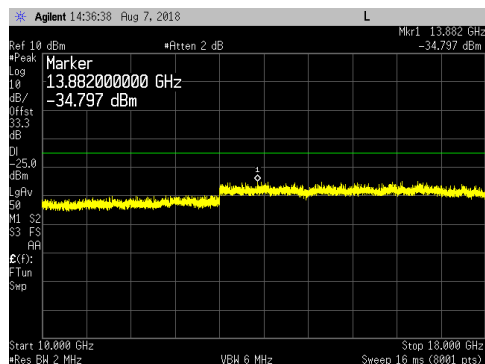
20MHz to 3GHz



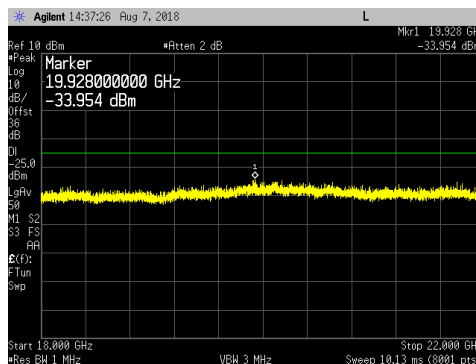
3GHz to 10GHz



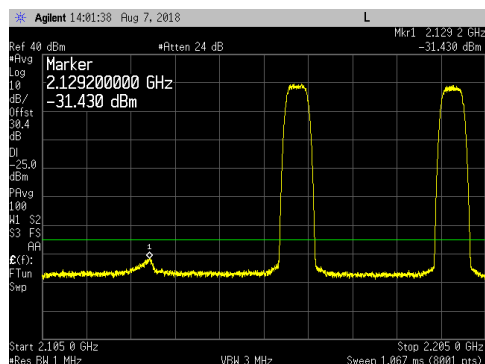
10GHz to 18GHz



18GHz to 22GHz

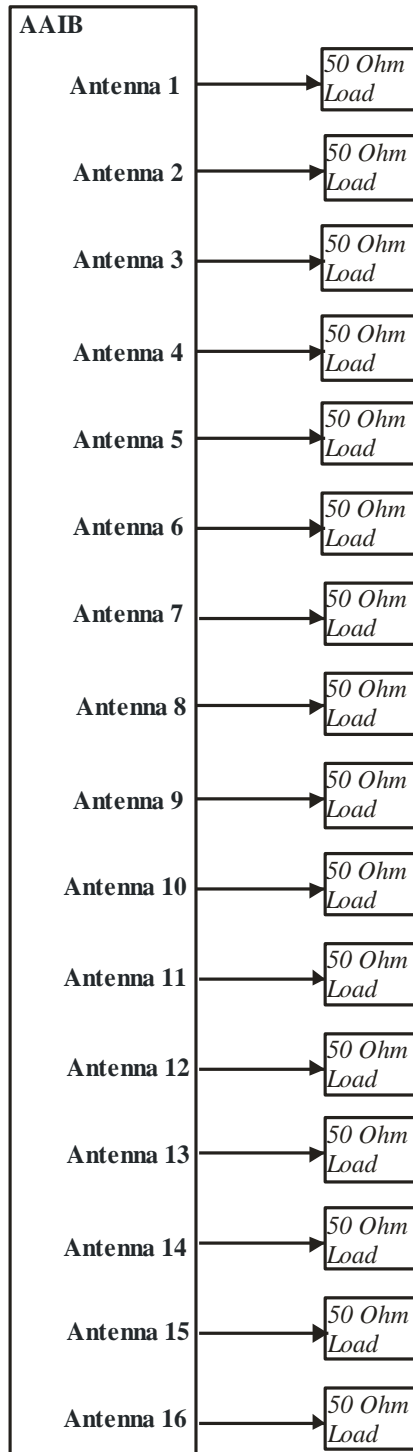


2105MHz to 2205MHz



Transmitter Radiated Spurious Emissions

During radiated emission testing all antenna ports of the base station were terminated with 50ohm termination blocks as shown in the diagram below.



Test Setup Used for Radiated Emission Measurements on AAIB

See ANSI C63.26-2015 paragraph 5.1 for details of test setup requirements. Based on antenna port conducted spurious emissions tests results, preliminary scans for radiated spurious emissions were performed in 30MHz – 22GHz frequency range. Three radiated emission test configurations were used to prove compliance. The transmitters were enabled simultaneously at maximum power using QPSK modulation on all sixteen ports for this test. The test includes channel bandwidth with the highest spectral density (LTE5). The bottom, middle and top frequency channels were enabled. The carrier configurations for the radiated emission testing is provided below. Final maximized peak radiated emissions were measured in these modes.

Test Configuration	Antenna Ports	RF Bandwidth	EARFCN	Transmit Frequency
1	1-16	5 MHz	66461 (Bottom Channel)	2112.5 MHz
2	1-16	5 MHz	66886 (Middle Channel)	2155.0 MHz
3	1-16	5 MHz	67311 (Top Channel)	2197.5 MHz

Radiated Spurious Emissions Testing Transmit Characteristics

RE Data LTE5-QPSK-High Channel

Frequency MHz	Peaks Raw dBuV/m	Antenna dB	Pre Amp dB	Cables dB	Peaks dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Turn Table Degrees	Position H/V
17822.4	31.205	47.763	-37.067	8.314	50.186	91.7	-41.514	199.1	359.1	H
14192	32.358	42.112	-34.292	3.021	43.199	91.7	-48.501	199.1	359.2	H
13340.4	26.874	41.056	-34.382	9.224	42.772	91.7	-48.928	199	359.1	H
15016.2	31.478	39.256	-32.404	3.391	41.771	91.7	-49.929	199	359.1	V
17980.5	18.131	48.662	-36.562	9.03	39.065	91.7	-52.635	199	359.1	H
14266.8	27.81	41.908	-34.247	3.059	38.53	91.7	-53.17	199	359.1	V
12665.1	27.324	39.368	-35.935	7.361	38.372	91.7	-53.328	199.1	359.1	V
13293.5	22.014	40.825	-34.495	9.15	37.794	91.7	-53.906	199	359	V
12665.1	25.593	39.368	-35.935	7.361	36.641	91.7	-55.059	199	359.2	H
7880.01	30.893	36.565	-38.172	6.068	35.355	82.2	-46.845	199.1	355.1	V
8511.99	30.899	37.308	-38.139	4.968	35.036	82.2	-47.164	199.1	358.8	H
8549.23	30.549	37.365	-38.259	4.833	34.489	82.2	-47.711	199	355.1	V
14988.7	22.866	39.236	-32.426	3.394	33.195	91.7	-58.505	199.2	359.2	H
575.02	48.062	20.1	-36.913	1.775	33.023	82.2	-49.177	178	77	V
17981.1	11.029	48.666	-36.56	9.032	31.97	91.7	-59.73	199	359.1	V
9468.55	29.435	37.744	-38.8	3.348	31.727	82.2	-50.473	199	271.2	V
1891.55	33.234	27.473	-38.042	9.035	31.7	82.2	-50.5	200.1	358.9	H
549.99	46.644	20.099	-36.913	1.775	31.605	82.2	-50.595	100	359	H
7879.94	26.996	36.565	-38.171	6.068	31.458	82.2	-50.742	199.9	359.9	H
322.12	39.525	25.7	-36.956	2.968	31.242	82.2	-50.958	300	109	H
11796.2	24.797	39.546	-36.9	3.687	31.131	91.7	-60.569	199.1	359	V
9857.83	28.959	37.842	-38.666	2.968	31.1	82.2	-51.1	199.1	360.2	V
9424.41	27.437	37.738	-38.8	3.381	29.756	82.2	-52.444	199	357.9	H
7243.64	24.288	36.041	-37.31	6.597	29.616	82.2	-52.584	200.1	340	H
549.99	44.596	19.6	-36.892	1.878	29.183	82.2	-53.017	142	359	V
755.08	43.874	20.202	-36.934	1.821	28.964	82.2	-53.236	100	1	V
6593.56	25.028	34.456	-36.951	6.343	28.876	82.2	-53.324	199	355.9	V
929.64	37.538	23.3	-36.685	2.487	26.64	82.2	-55.56	100	1	V
524.98	46.746	14.795	-37.294	1.549	25.795	82.2	-56.405	100	232	V
748.39	36.56	23.2	-36.664	2.458	25.555	82.2	-56.645	100	359	H
929.66	33.79	25.7	-36.956	2.968	25.507	82.2	-56.693	285	99	H
574.99	40.285	20.2	-36.934	1.821	25.373	82.2	-56.827	107	304	H
869.62	30.791	24.238	-36.771	2.959	21.218	82.2	-60.982	100	359	H
1891.65	22.529	27.473	-38.042	9.031	20.991	82.2	-61.209	199	356.8	V
4707.24	14.674	32.76	-36.633	5.599	16.399	82.2	-65.801	200.1	358	H

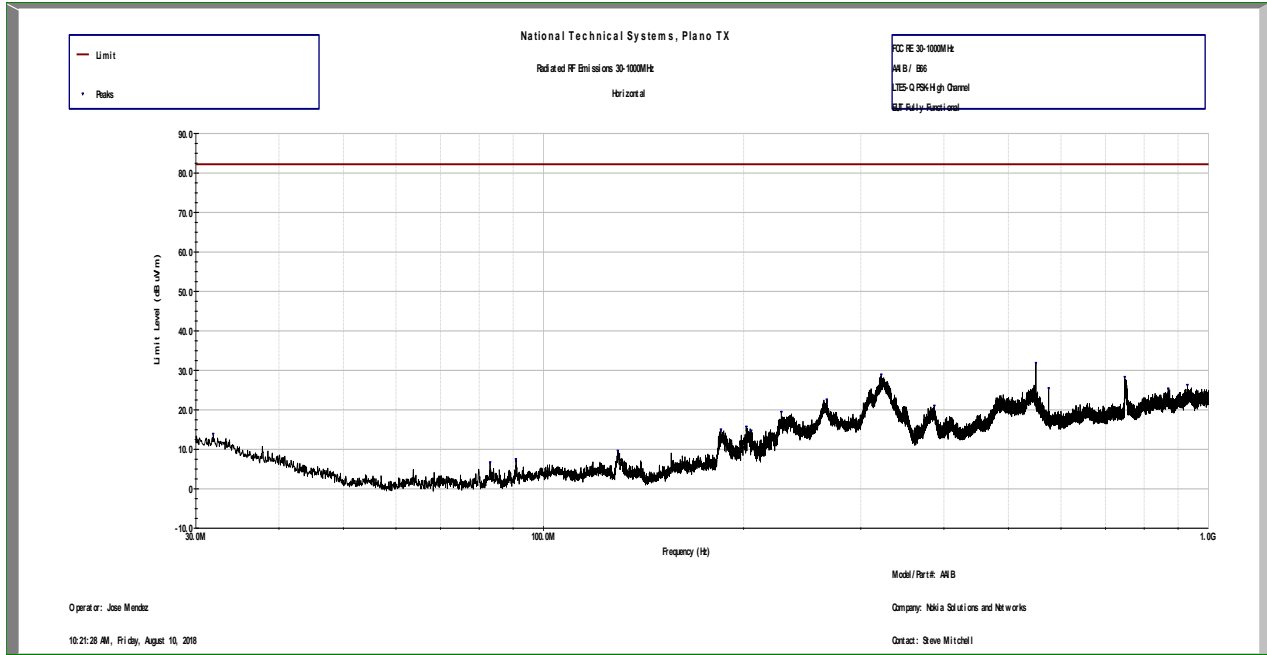
RE Data LTE5-QPSK-Mid Channel

Frequency MHz	Peaks Raw dBuV/m	Antenna dB	Pre Amp dB	Cables dB	Peaks dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Turn Table Degrees	Position H/V
17992.7	30.764	48.746	-36.523	9.085	51.846	91.7	-39.854	199	358.9	V
17843.7	28.901	47.891	-36.999	8.41	48.149	91.7	-43.551	199.2	360.1	H
17871.9	26.425	48.06	-36.908	8.538	46.026	91.7	-45.674	199	359	V
12718.9	34.252	39.722	-35.849	7.517	45.641	91.7	-46.059	199.9	359	V
13301.6	29.1	41.155	-34.475	9.172	44.952	91.7	-46.748	199.1	357.1	H
17996.1	21.379	48.769	-36.513	9.1	42.503	91.7	-49.197	199	359.9	H
17790.9	23.414	47.496	-37.168	8.171	41.962	91.7	-49.738	199	360.1	H
13424.1	25.426	41.137	-34.181	8.546	40.717	91.7	-50.983	199.1	359	V
12731.9	28.966	39.717	-35.829	7.555	40.409	91.7	-51.291	199.1	357.9	H
11784.1	29.428	39.538	-36.9	3.682	35.748	91.7	-55.952	200.1	359	V
8528.72	31.271	37.334	-38.193	4.907	35.32	82.2	-46.88	199	360.1	H
14959.7	25.169	39.382	-32.748	3.397	35.199	91.7	-56.501	199	359	V
638.28	46.834	21.4	-36.621	2.256	33.868	82.2	-48.332	100	1	V
549.98	48.211	20.099	-36.913	1.775	33.171	82.2	-49.029	100	359	V
14170.8	22.342	42.077	-34.326	3.011	33.103	91.7	-58.597	199	210.1	H
7738.99	26.822	36.357	-37.709	6.297	31.767	82.2	-50.433	199	360.1	H
517.7	46.93	19.5	-36.867	1.909	31.472	82.2	-50.728	100	271	V
8596.99	27.827	37.388	-38.413	4.661	31.465	82.2	-50.735	199.1	359.1	V
6466.76	27.691	34.271	-36.787	6.206	31.381	82.2	-50.819	199.9	359.1	V
5764.76	29.167	33.936	-37.376	5.483	31.209	82.2	-50.991	200.2	359.1	V
550.00	46.105	20.1	-36.913	1.775	31.066	82.2	-51.134	156	359	H
575.01	45.476	20.202	-36.934	1.821	30.565	82.2	-51.635	100	26	V
9370.95	27.937	37.714	-38.8	3.396	30.247	82.2	-51.953	199	359.1	V
6469.49	25.384	34.27	-36.788	6.209	29.075	82.2	-53.125	199	184.1	H
324.32	50.074	14.732	-37.298	1.548	29.056	82.2	-53.144	100	242	H
321.87	48.788	14.588	-37.311	1.543	27.606	82.2	-54.594	100	226	V
9357.26	25.185	37.705	-38.8	3.4	27.49	82.2	-54.71	199.1	360	H
7724.58	22.407	36.355	-37.72	6.32	27.361	82.2	-54.839	199	359	V
263.32	49.416	13.767	-37.341	1.457	27.3	82.2	-54.9	100	261	H
574.99	40.999	20.2	-36.934	1.821	26.086	82.2	-56.114	100	347	H
749.21	36.774	23.221	-36.666	2.461	25.791	82.2	-56.409	100	359	H
929.48	32.095	25.7	-36.955	2.968	23.813	82.2	-58.387	100	254	V
1892.03	25.051	27.473	-38.042	9.017	23.5	82.2	-58.7	200.1	359.1	V
754.56	32.721	23.343	-36.684	2.485	21.866	82.2	-60.334	206	359	H
5752.62	12.999	33.933	-37.396	5.475	15.011	82.2	-67.189	199	359.2	H
1890.58	14.623	27.473	-38.042	9.07	13.124	82.2	-69.076	199.1	359.1	H

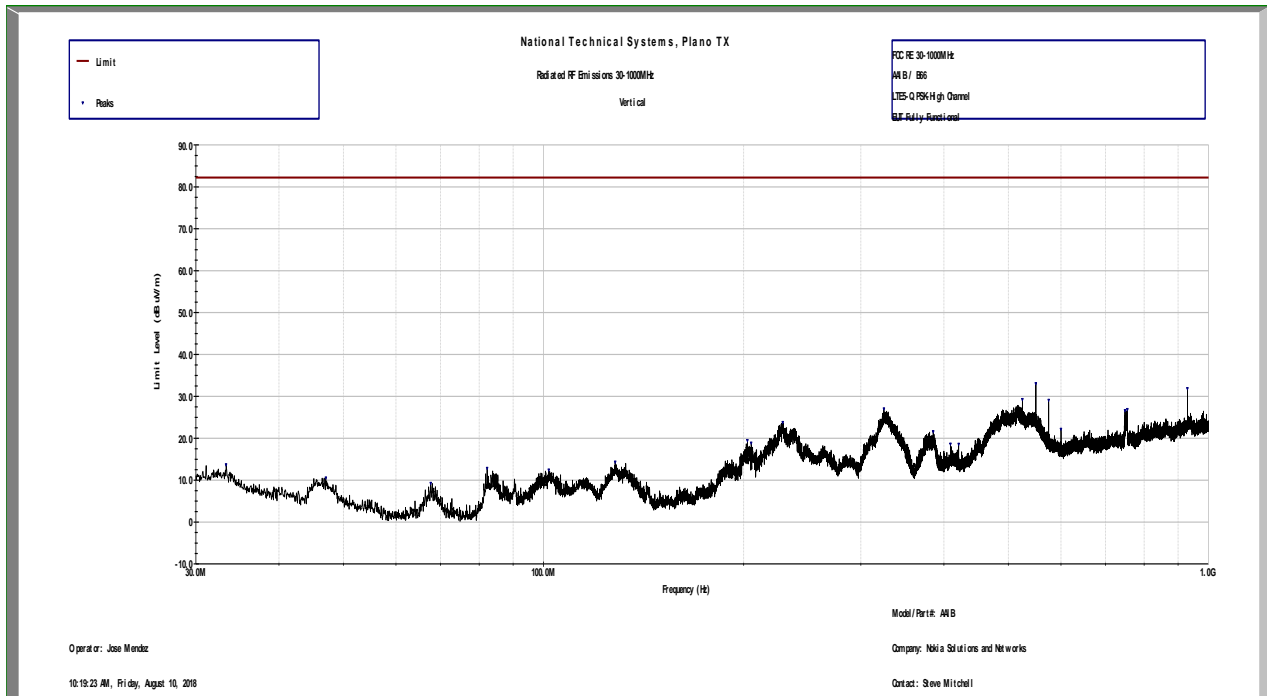
RE Data LTE5-QPSK-Low Channel

Frequency MHz	Peaks Raw dBuV/m	Antenna dB	Pre Amp dB	Cables dB	Peaks dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Turn Table Degrees	Position H/V
17835.4	29.861	47.841	-37.025	8.372	49.005	91.7	-42.695	199	356.9	H
17997	26.305	48.775	-36.51	9.104	47.44	91.7	-44.26	199	359	V
17982.4	21.52	48.675	-36.556	9.038	42.477	91.7	-49.223	199.2	356	H
13353.7	26.401	41.022	-34.35	9.116	42.189	91.7	-49.511	200.1	359.1	V
12728.5	30.253	39.719	-35.834	7.545	41.682	91.7	-50.018	200.1	359	V
14178.4	27.456	42.089	-34.314	3.014	38.245	91.7	-53.455	200	359.1	V
7749.4	33.108	36.359	-37.7	6.28	38.046	82.2	-44.154	200.1	359.1	H
7862.35	32.412	36.513	-38.108	6.096	36.915	82.2	-45.285	200.1	359	V
8542.76	32.583	37.355	-38.238	4.857	36.557	82.2	-45.643	200	359.1	H
8541.46	32.407	37.353	-38.234	4.861	36.388	82.2	-45.812	200	359.1	V
14935.9	26.162	39.502	-33.013	3.385	36.032	91.7	-55.668	199	357.9	H
14971.4	24.208	39.323	-32.618	3.397	34.353	91.7	-57.347	199.9	359.1	V
11781.7	27.912	39.537	-36.9	3.68	34.229	91.7	-57.471	199.1	359	H
517.03	49.658	19.5	-36.865	1.911	34.205	82.2	-47.995	100	264	V
550.03	48.937	20.103	-36.914	1.774	33.901	82.2	-48.299	100	359	V
9421.58	31.482	37.738	-38.8	3.382	33.801	82.2	-48.399	200.1	359.1	V
325.06	53.27	14.806	-37.294	1.549	32.331	82.2	-49.869	100	349	H
550.00	47.192	20.1	-36.913	1.775	32.154	82.2	-50.046	113	301	H
13305.5	15.787	41.145	-34.466	9.183	31.649	91.7	-60.051	199.1	359	H
574.99	46.237	20.2	-36.934	1.821	31.324	82.2	-50.876	100	359	V
326.02	51.102	14.903	-37.288	1.551	30.268	82.2	-51.932	100	283	V
9376.32	27.624	37.717	-38.8	3.395	29.936	82.2	-52.264	199.9	359.1	H
5749.98	27.431	33.932	-37.4	5.473	29.436	82.2	-52.764	200.1	359	H
2023.07	34.455	27.483	-37.981	5.081	29.038	82.2	-53.162	200.1	359	H
14171.3	17.081	42.078	-34.325	3.011	27.844	91.7	-63.856	199	358.9	H
537.22	43.052	19.522	-36.903	1.828	27.5	82.2	-54.7	121	323	H
1475.14	35.539	25.094	-38.146	4.968	27.453	82.2	-54.747	200	359	V
750.77	37.975	23.3	-36.671	2.468	27.073	82.2	-55.127	100	164	H
9991.75	24.128	38.036	-38.133	2.839	26.87	82.2	-55.33	199	359.1	H
2023.89	32.219	27.482	-37.98	5.076	26.796	82.2	-55.404	200.1	359.1	V
929.60	34.992	25.7	-36.955	2.968	26.709	82.2	-55.491	100	241	H
1931.93	28.508	27.502	-38.026	7.562	25.545	82.2	-56.655	200	359	V
210.36	48.869	11.4	-37.52	1.232	23.981	82.2	-58.219	100	1	V
929.90	31.247	25.7	-36.957	2.968	22.961	82.2	-59.239	100	117	V
11755.8	15.473	39.519	-36.9	3.668	21.76	91.7	-69.94	200.1	359	V
146.94	31.678	8.294	-37.654	0.85	3.168	82.2	-79.032	100	1	H

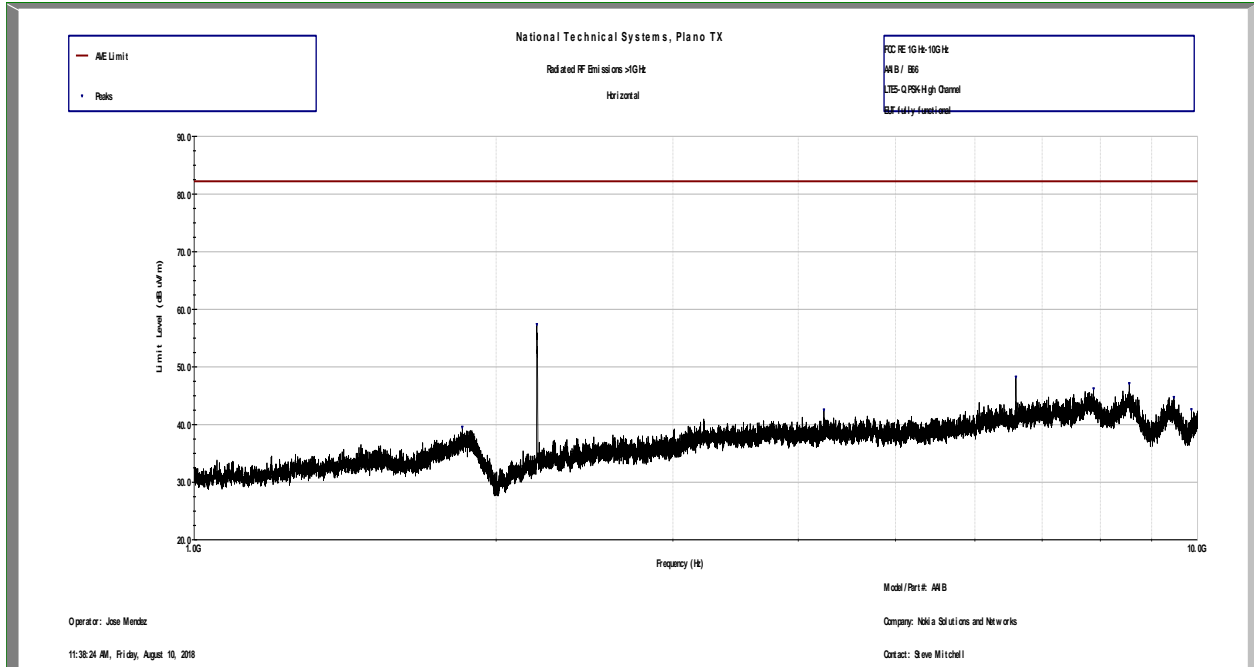
A three-meter measurement distance was used for radiated emission measurements less than 10GHz. A one-meter measurement was used for radiated emission greater than 10GHz. The highest radiated emissions detected were more than 20dB below the three-meter limit of 82.2dBuV/m (equivalent to -13dBm EIRP) and the one-meter limit of 91.7dBuV/m (equivalent to -13dBm EIRP). Since all maximized measurements were more than 20dB below these levels, substitution measurements were not performed. TILE software was used for all preliminary scans and plots that are included on the following pages.



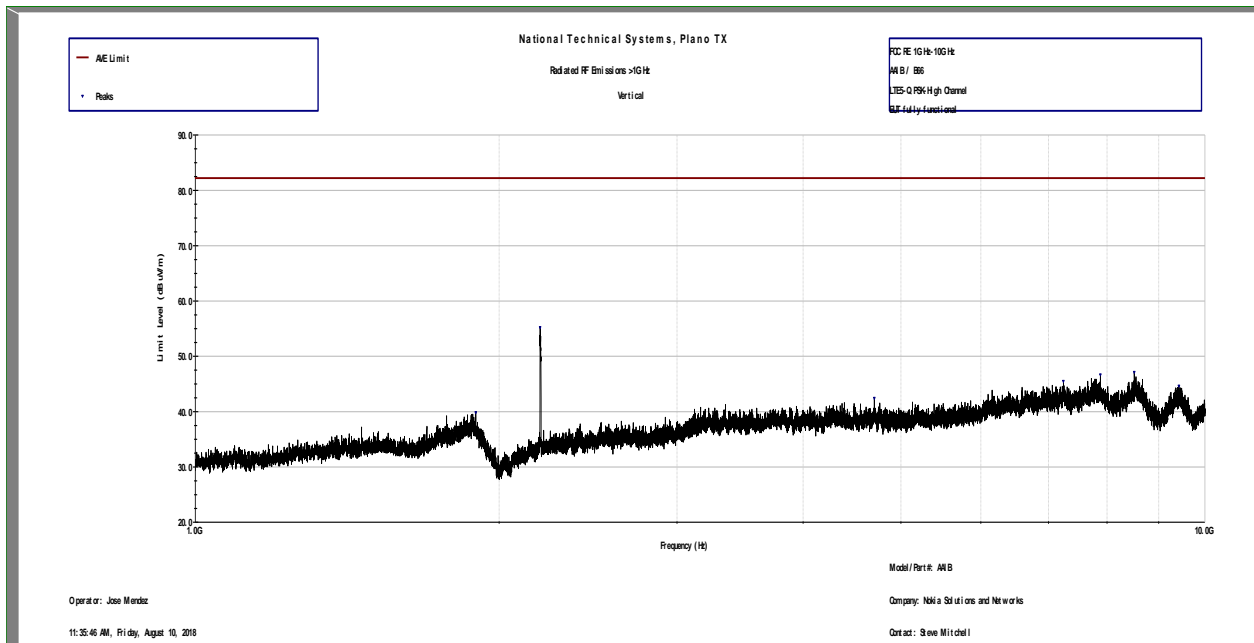
Radiated Spurious Emissions 30MHz-1GHz Horizontal at 3m LTE5-QPSK-High Channel



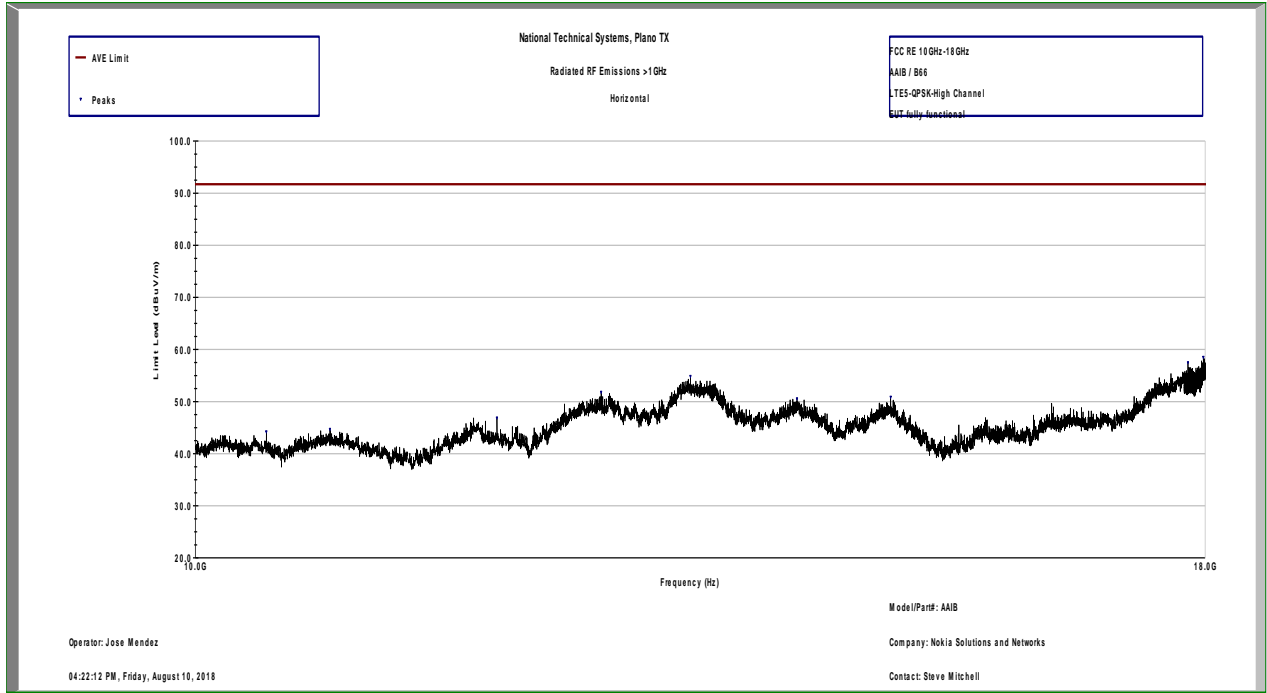
Radiated Spurious Emissions 30MHz-1GHz Vertical at 3m LTE5-QPSK-High Channel



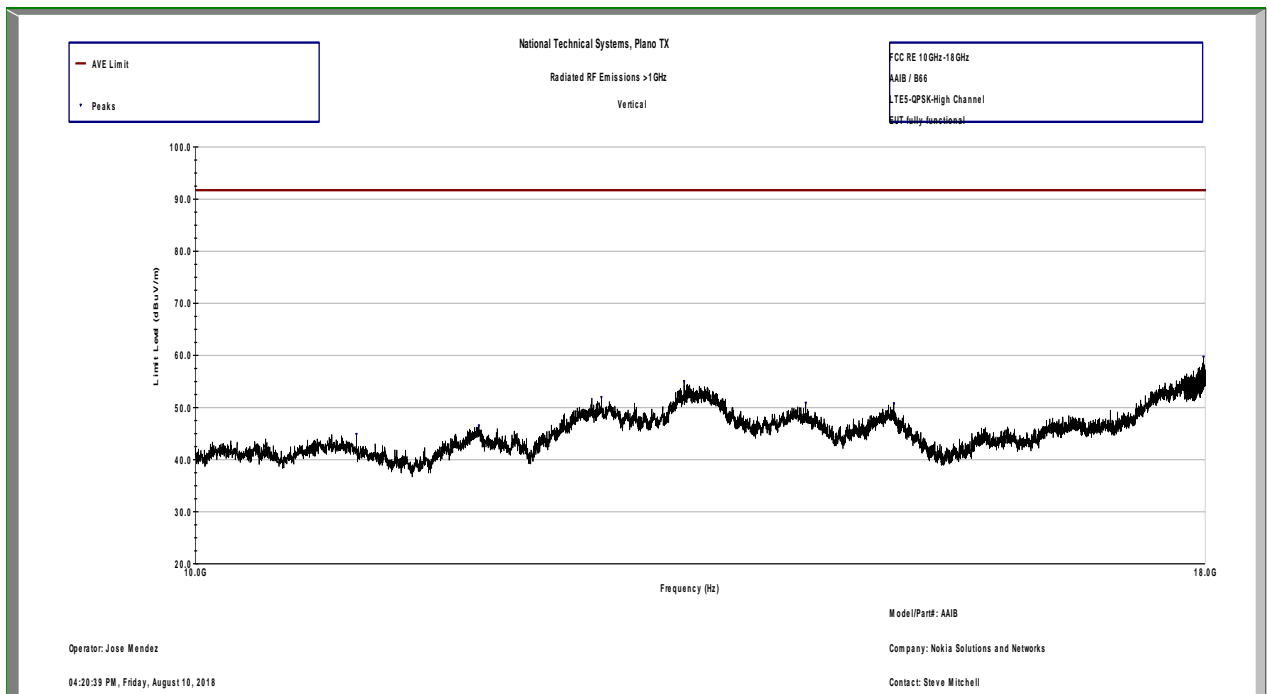
Radiated Spurious Emissions 1-10GHz Horizontal at 3m LTE5-QPSK-High Channel



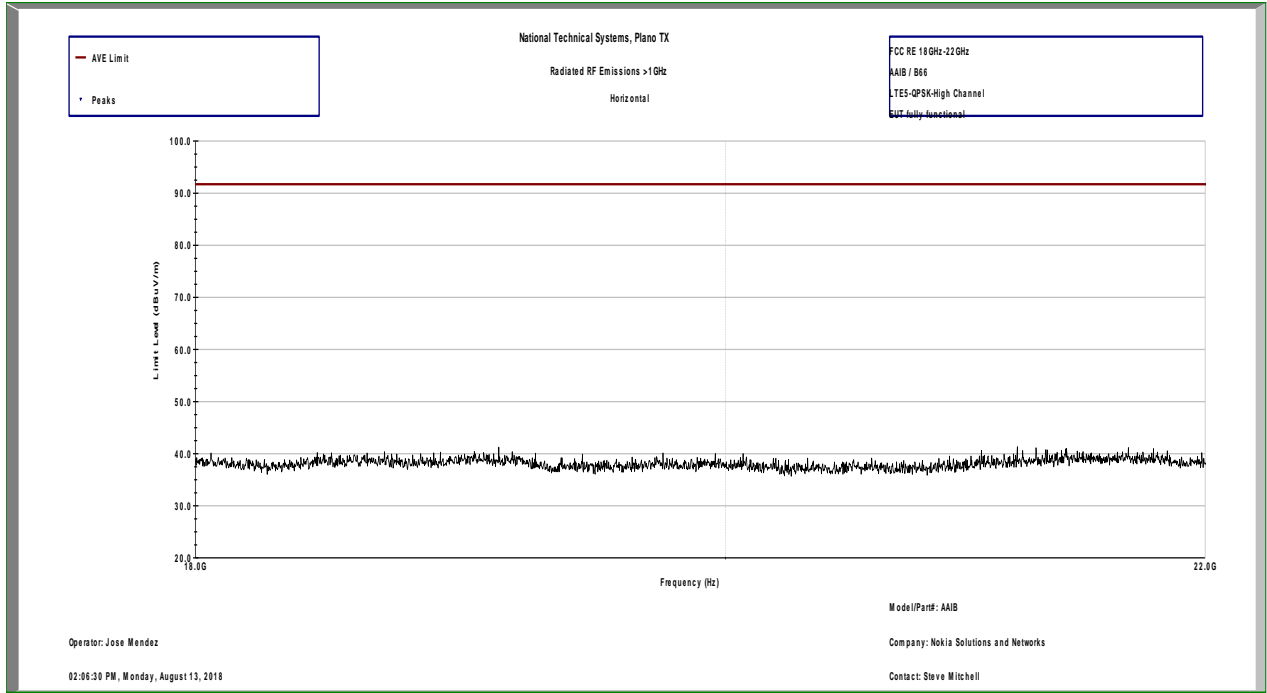
Radiated Spurious Emissions 1-10GHz Vertical at 3m LTE5-QPSK-High Channel



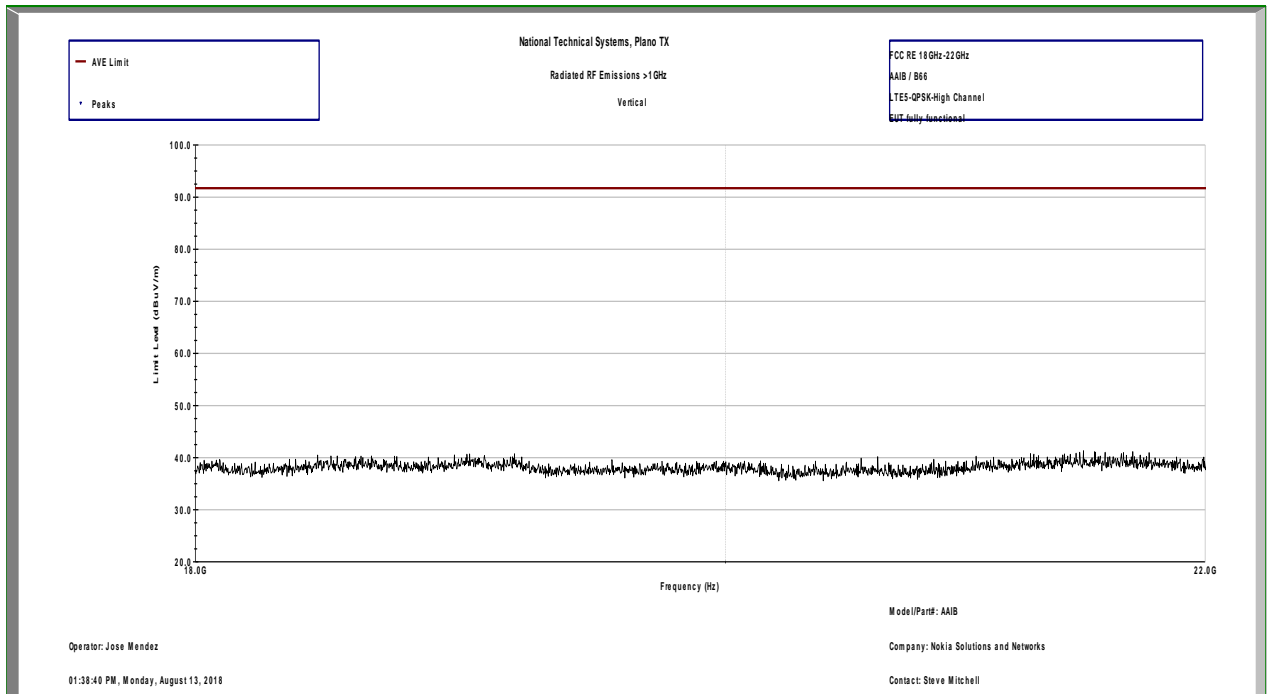
Radiated Spurious Emissions 10-18GHz Horizontal at 1m LTE5-QPSK-High Channel



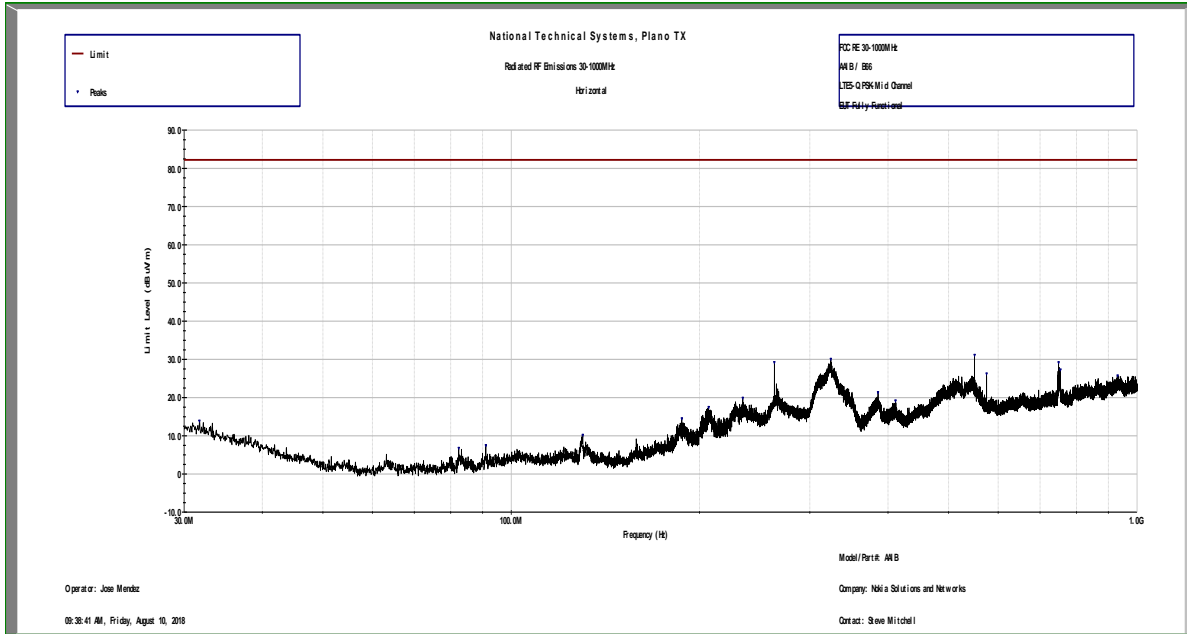
Radiated Spurious Emissions 10-18GHz Vertical at 1m LTE5-QPSK-High Channel



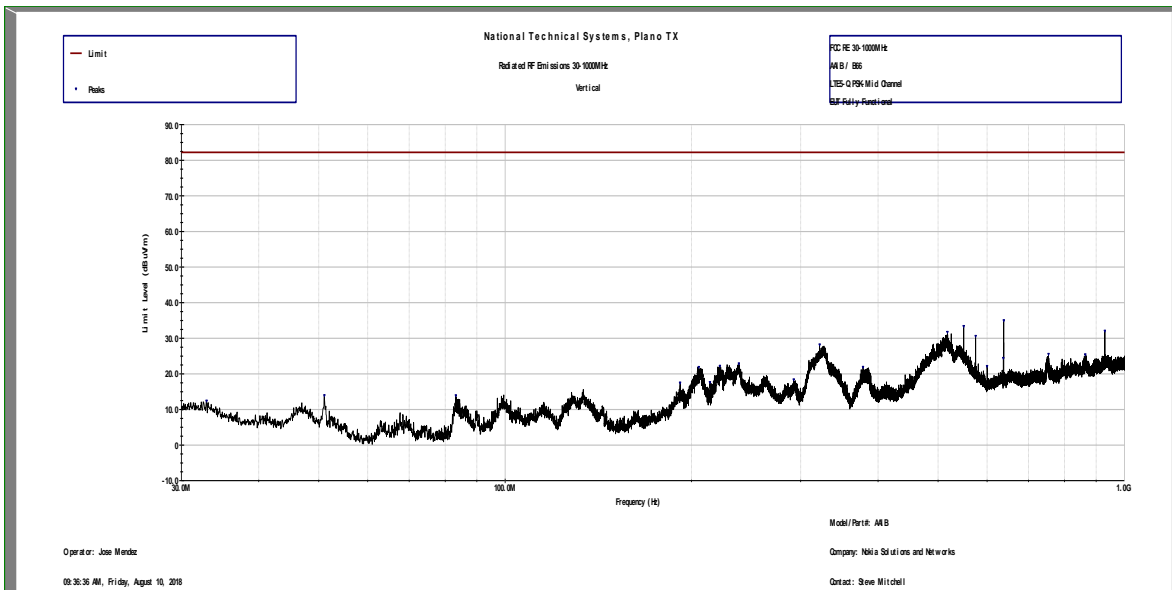
Radiated Spurious Emissions 18-22GHz Horizontal at 1m LTE5-QPSK-High Channel



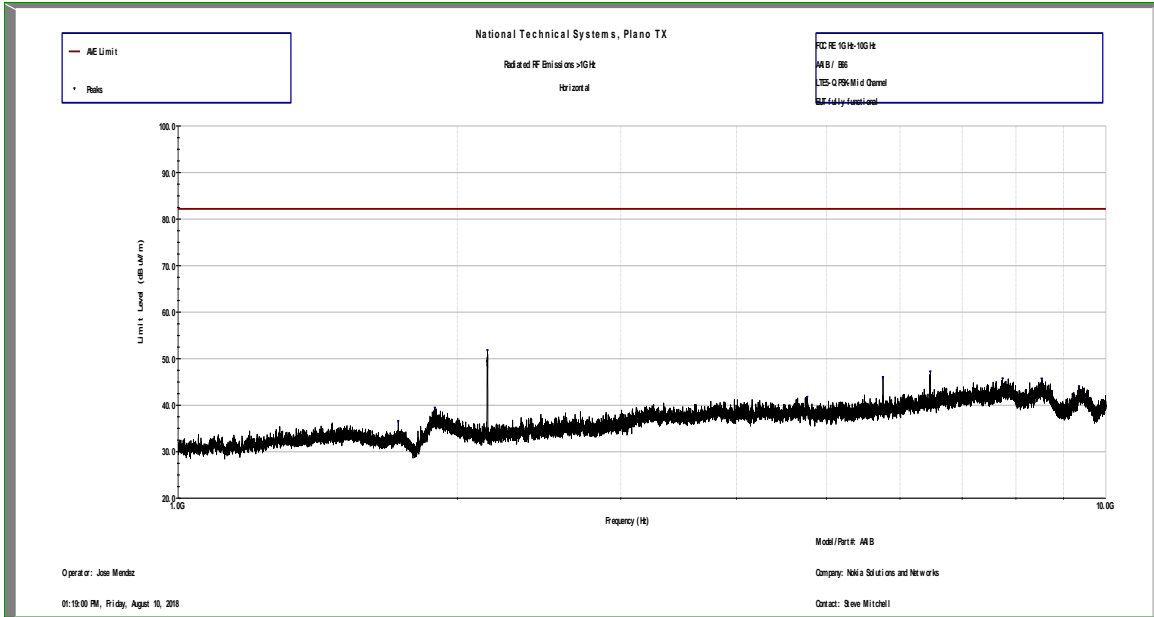
Radiated Spurious Emissions 18-22GHz Vertical at 1m LTE5-QPSK-High Channel



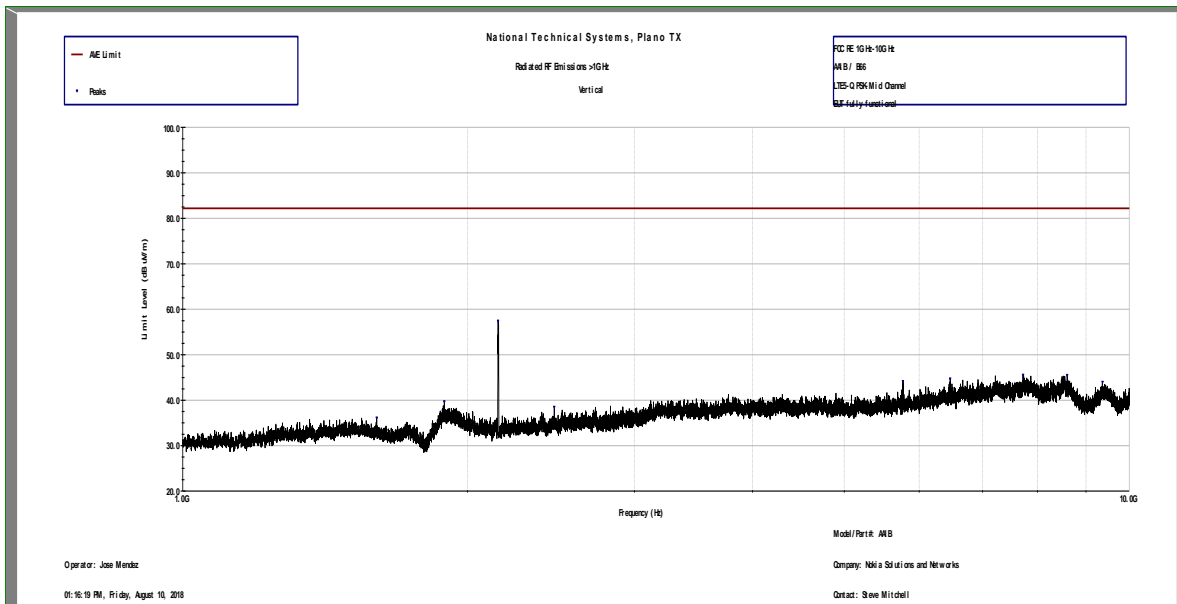
Radiated Spurious Emissions 30MHz-1GHz Horizontal at 3m LTE5-QPSK-Mid Channel



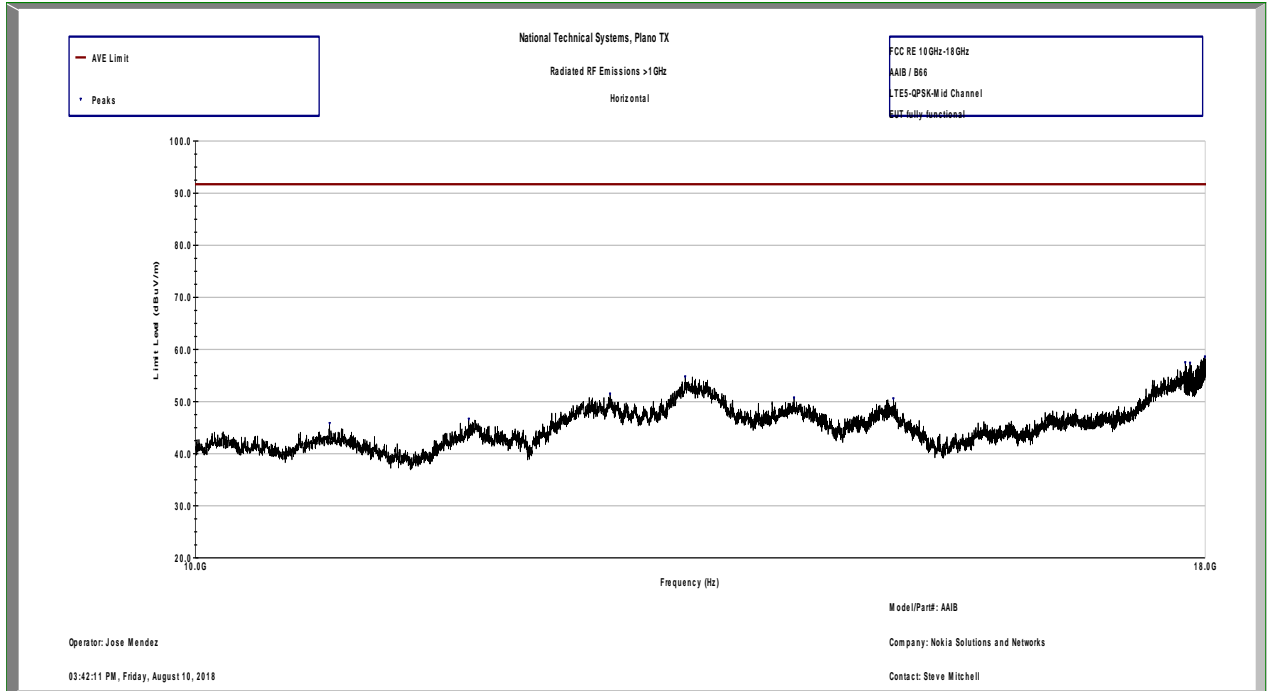
Radiated Spurious Emissions 30MHz-1GHz Vertical at 3m LTE5-QPSK-Mid Channel



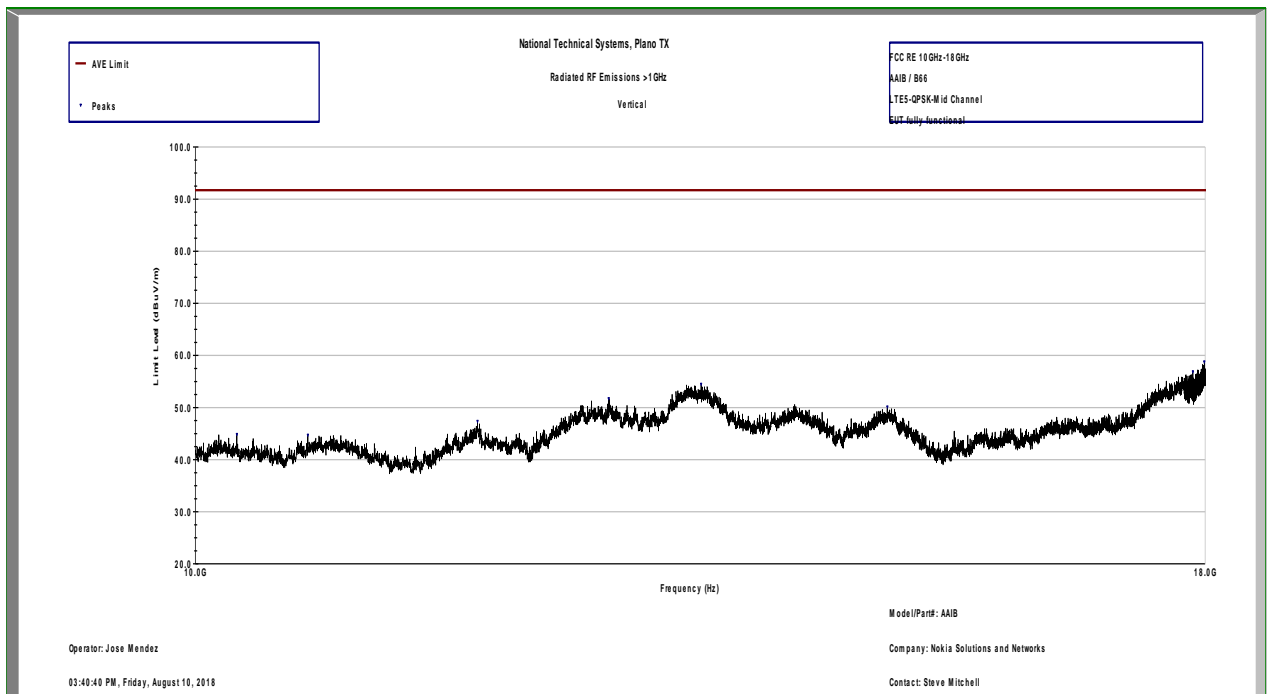
Radiated Spurious Emissions 1-10GHz Horizontal at 3m LTE5-QPSK-Mid Channel



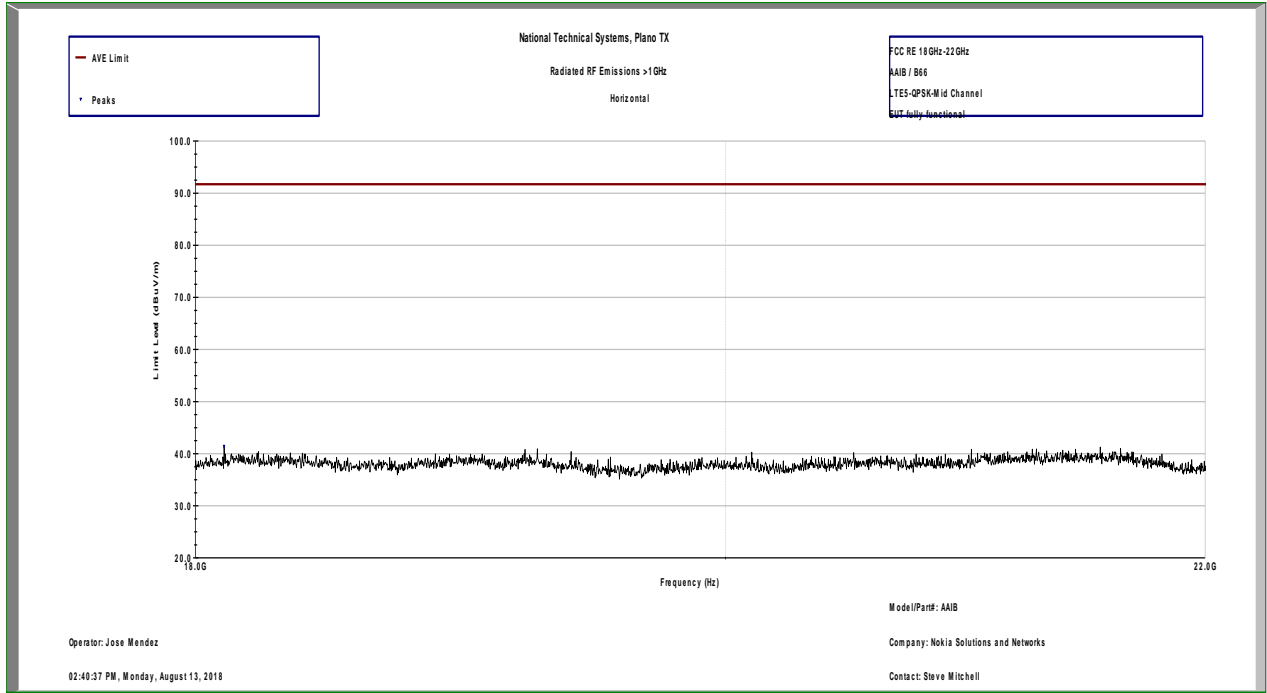
Radiated Spurious Emissions 1-10GHz Vertical at 3m LTE5-QPSK-Mid Channel



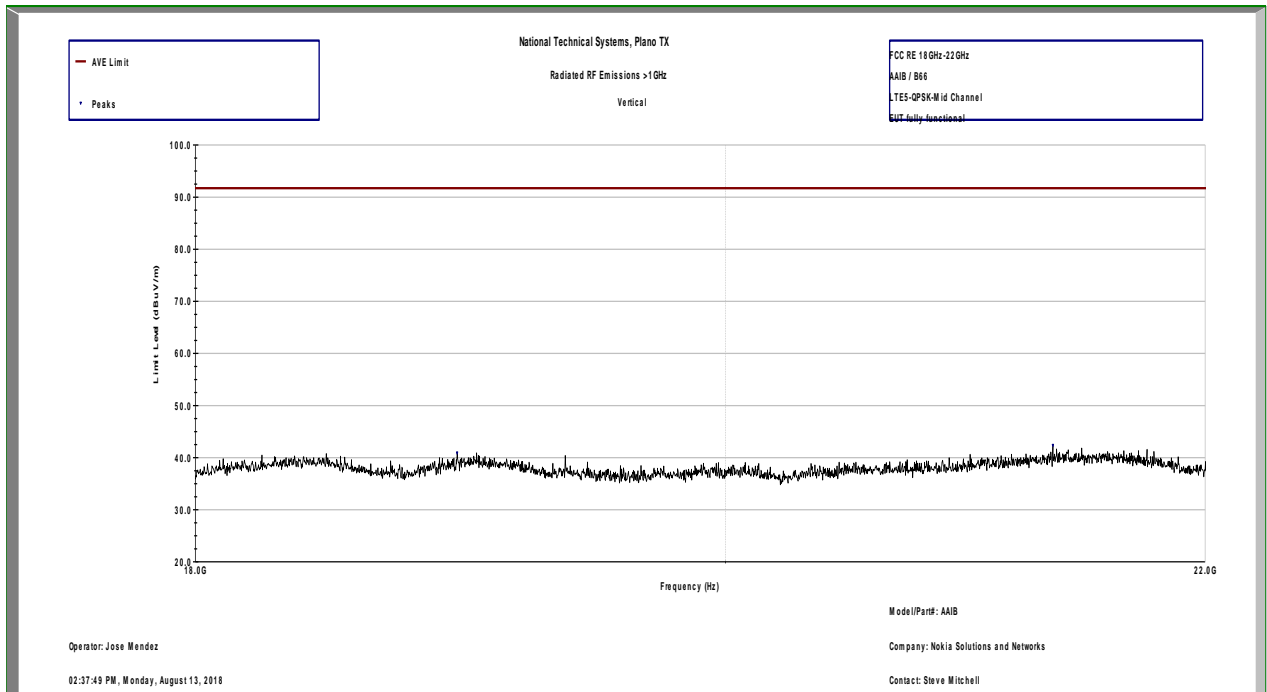
Radiated Spurious Emissions 10-18GHz Horizontal at 1m LTE5-QPSK-Mid Channel



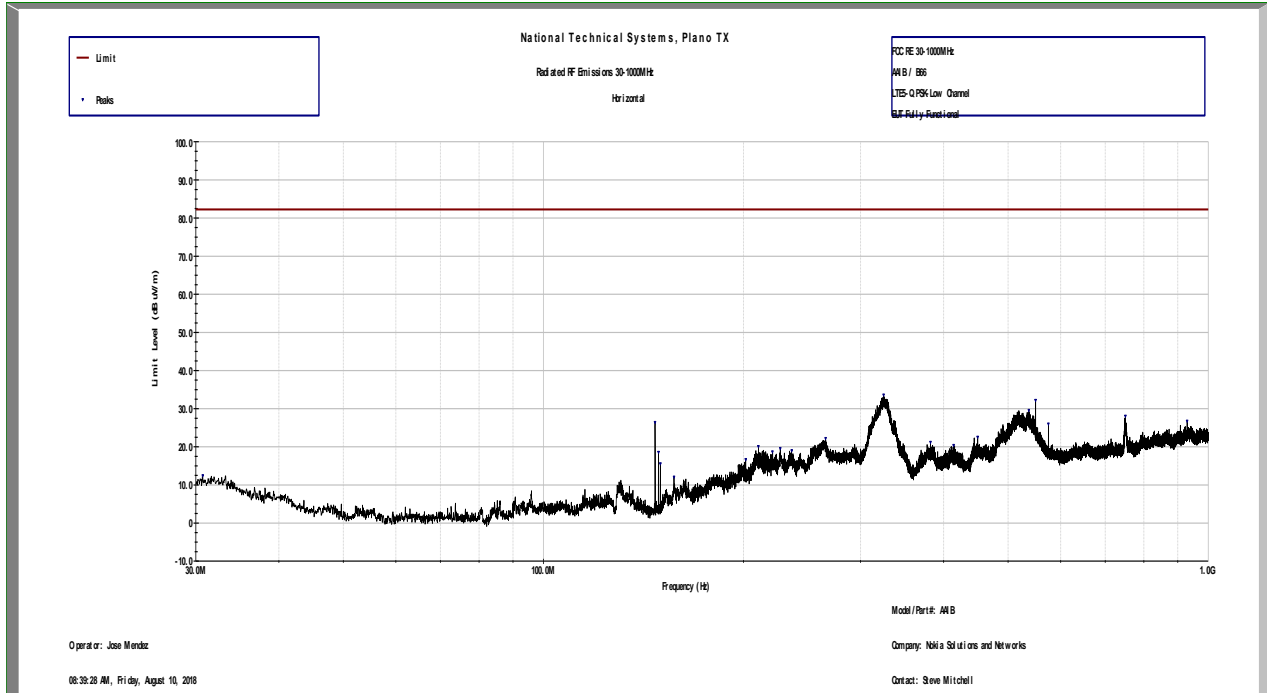
Radiated Spurious Emissions 10-18GHz Vertical at 1m LTE5-QPSK-Mid Channel



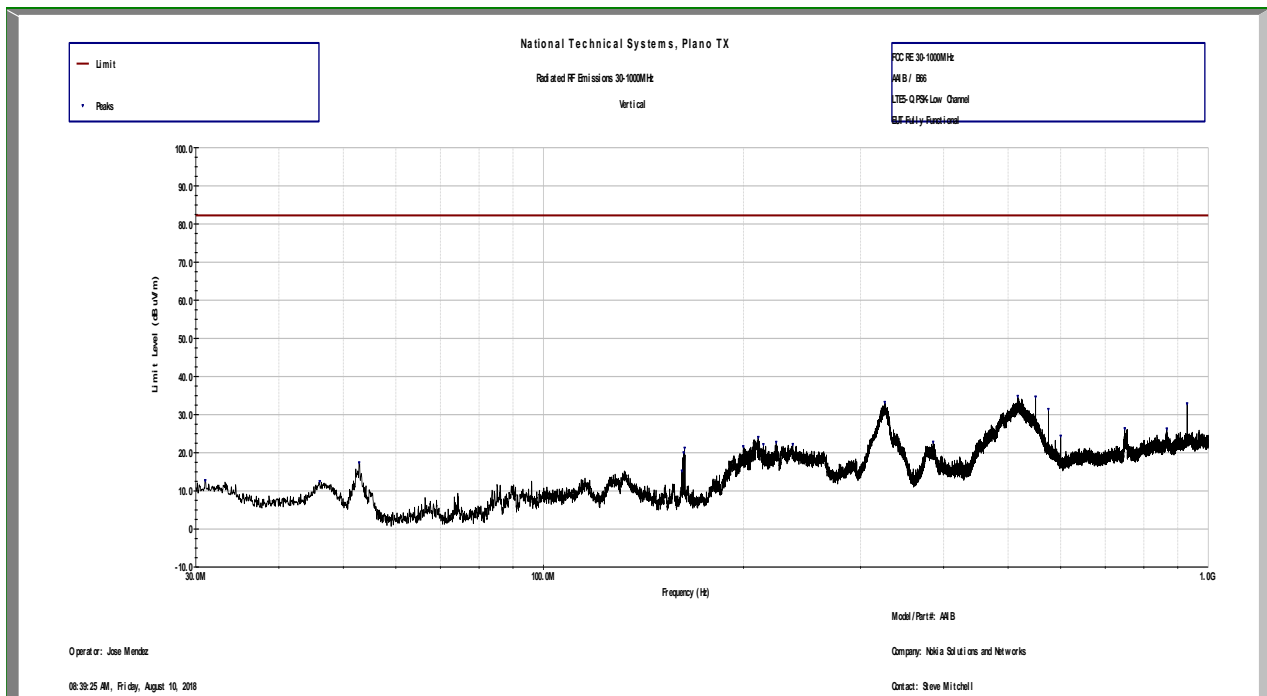
Radiated Spurious Emissions 18-22GHz Horizontal at 1m LTE5-QPSK-Mid Channel



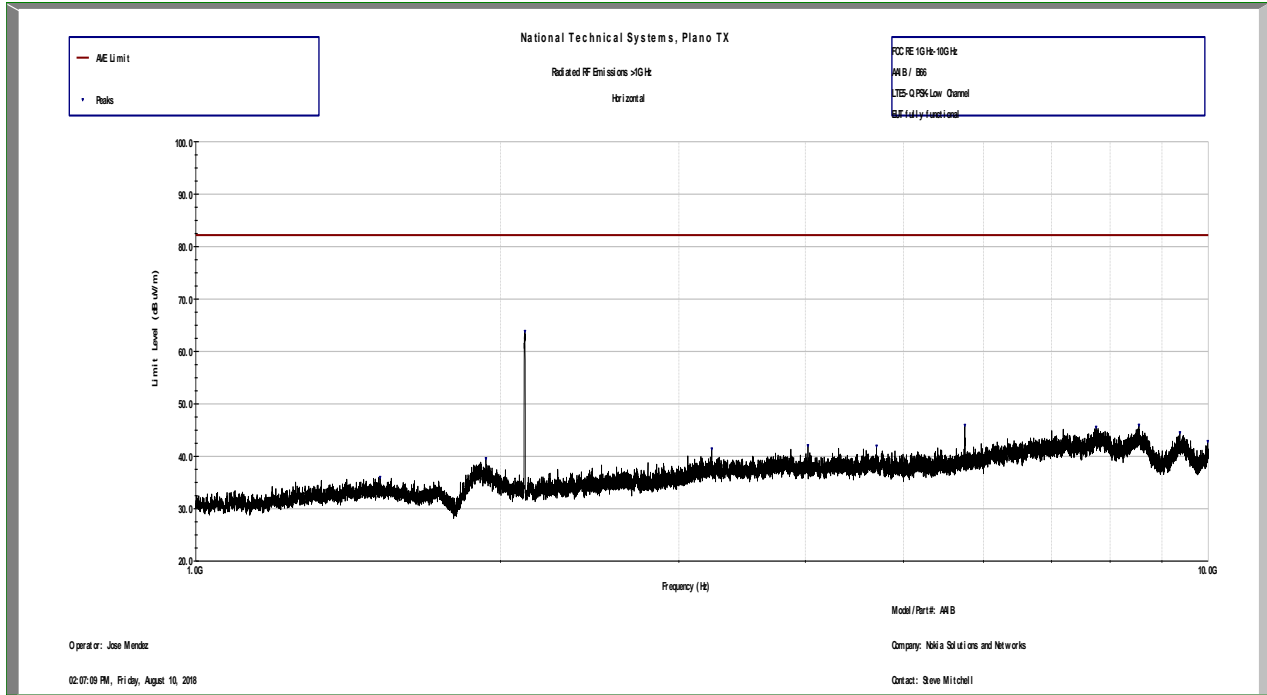
Radiated Spurious Emissions 18-22GHz Vertical at 1m LTE5-QPSK-Mid Channel



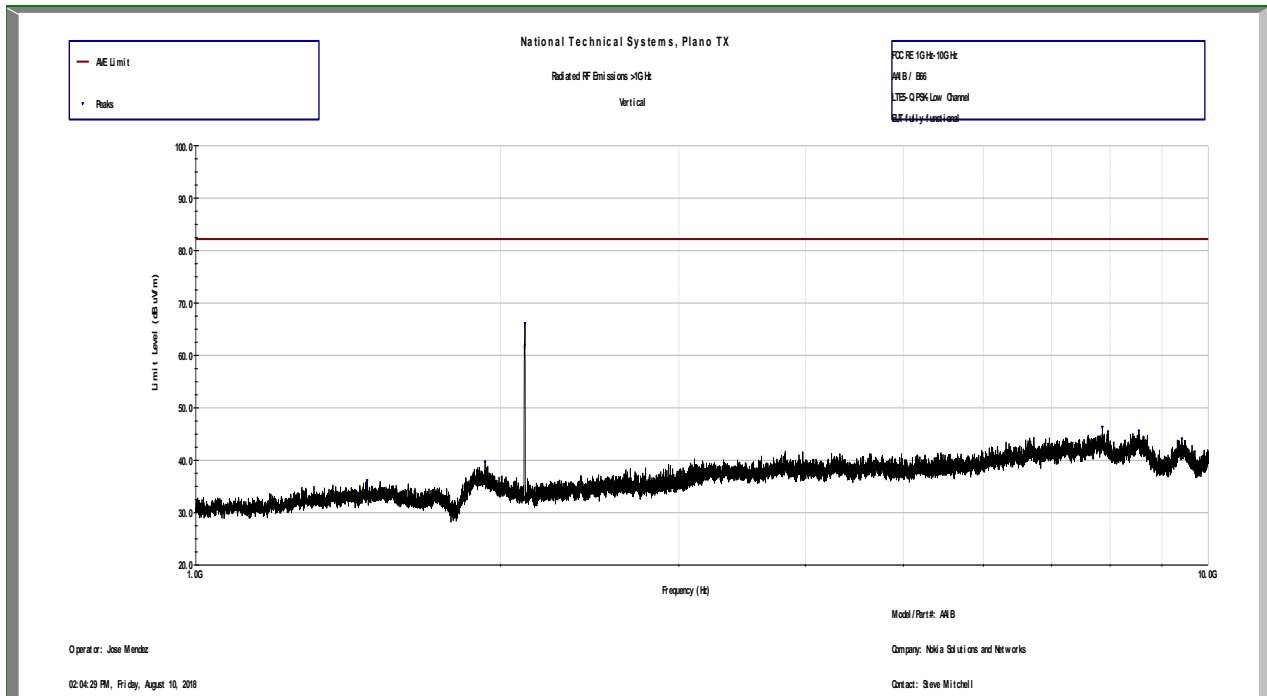
Radiated Spurious Emissions 30MHz-1GHz Horizontal at 3m LTE5-QPSK-Low Channel



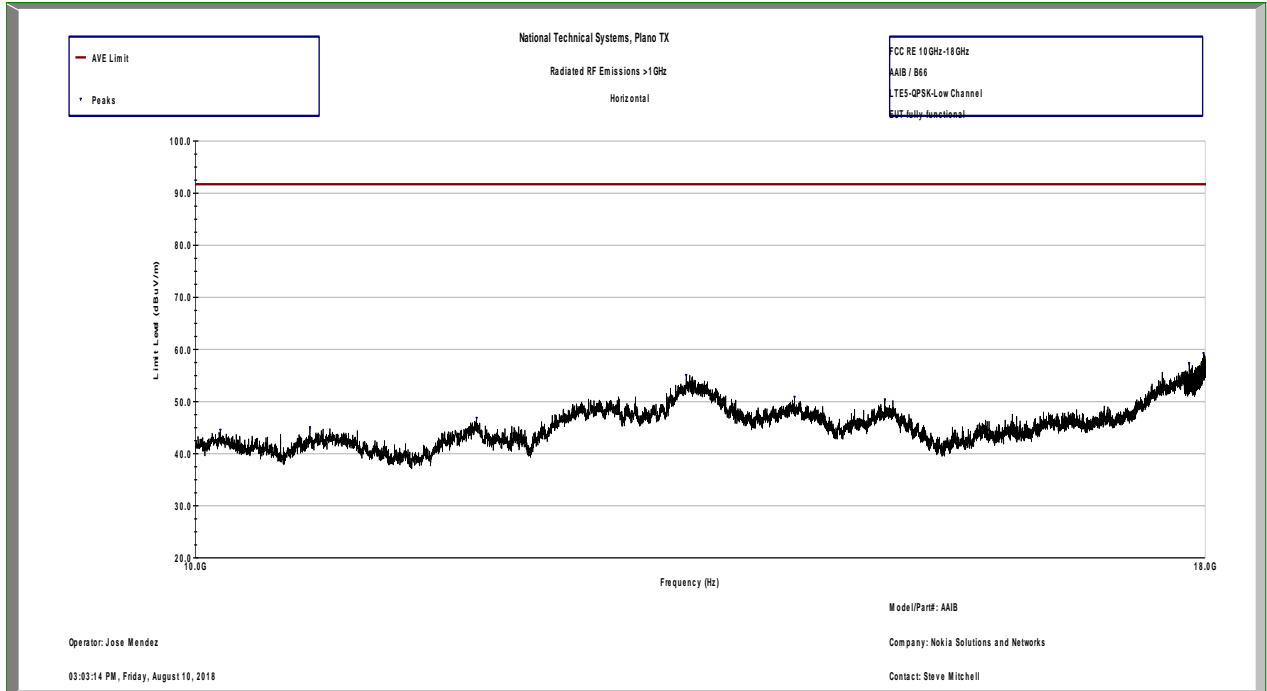
Radiated Spurious Emissions 30MHz-1GHz Vertical at 3m LTE5-QPSK-Low Channel



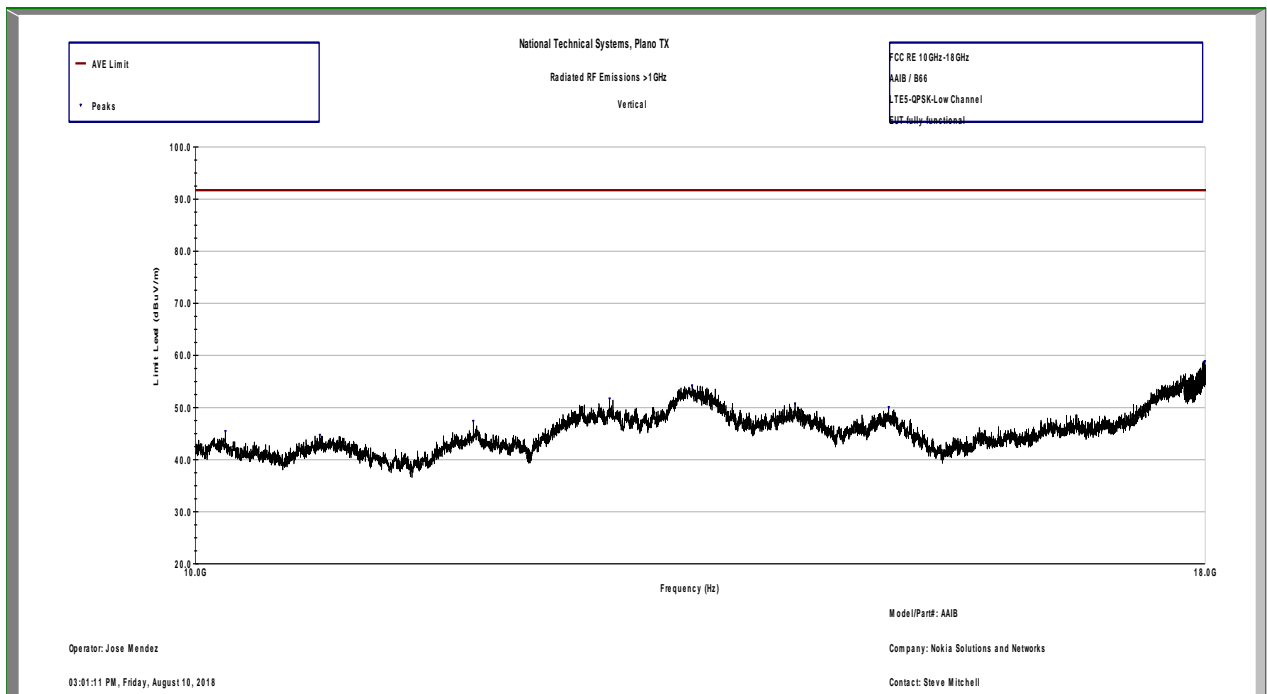
Radiated Spurious Emissions 1-10GHz Horizontal at 3m LTE5-QPSK-Low Channel



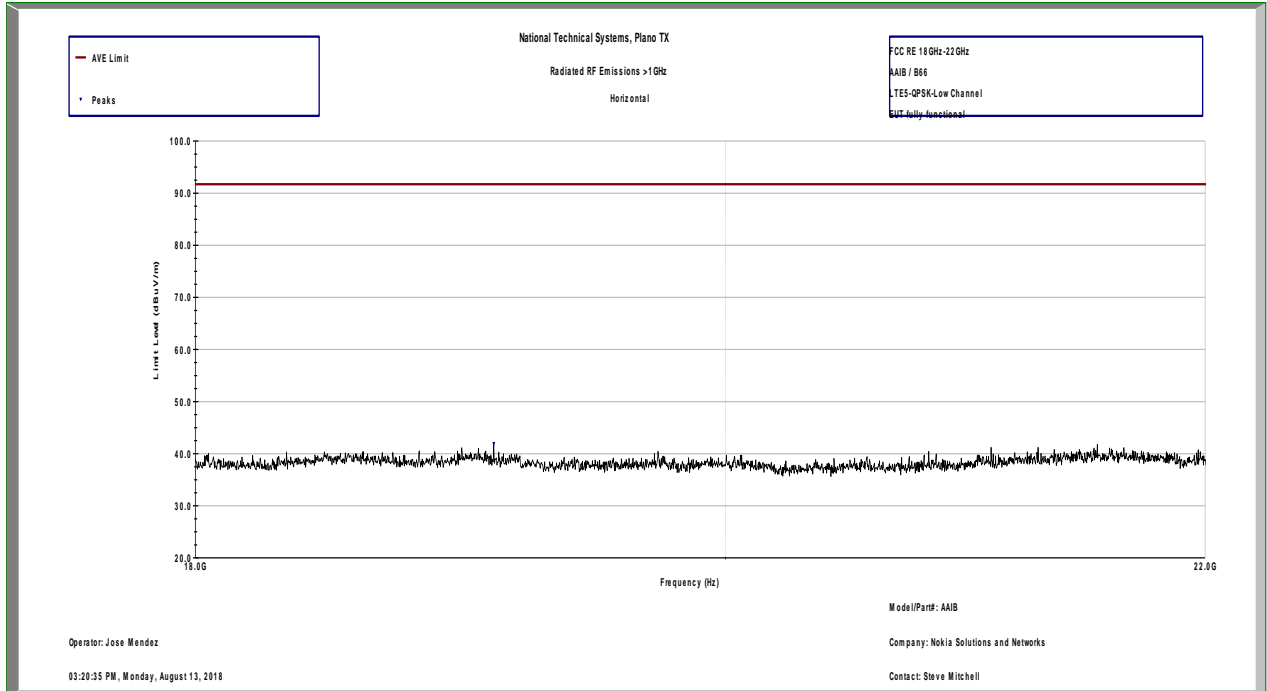
Radiated Spurious Emissions 1-10GHz Vertical at 3m LTE5-QPSK-Low Channel



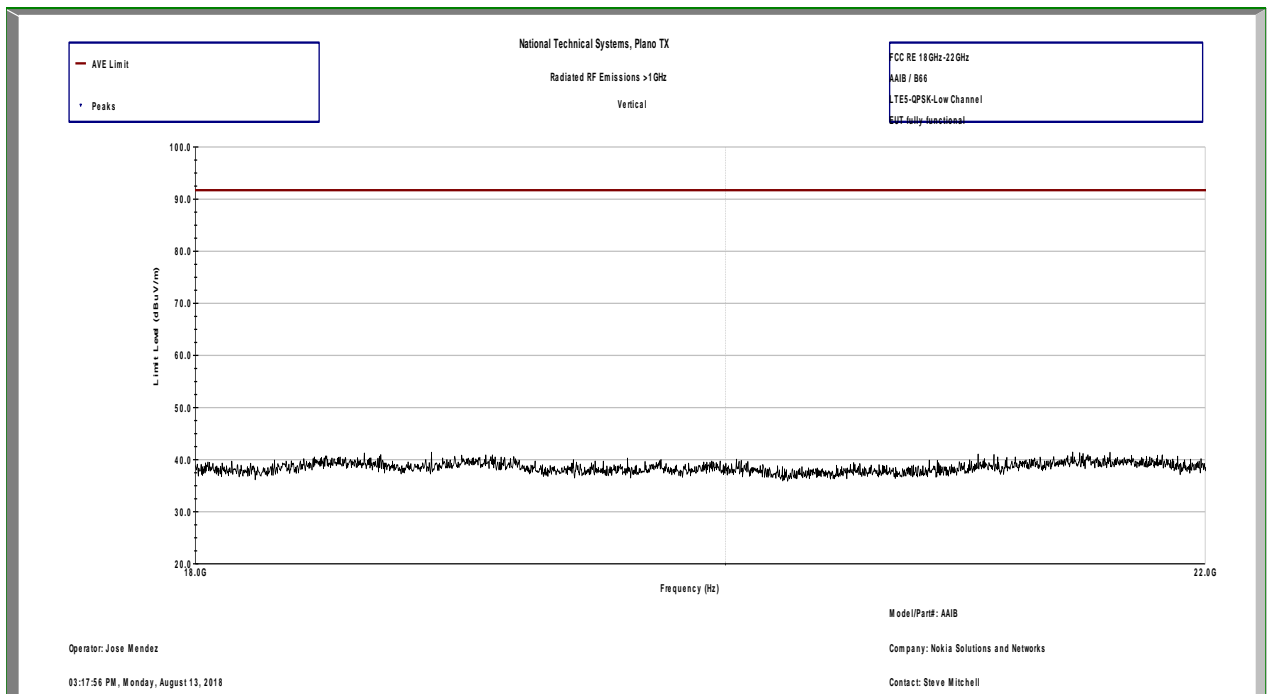
Radiated Spurious Emissions 10-18GHz Horizontal at 1m LTE5-QPSK-Low Channel



Radiated Spurious Emissions 10-18GHz Vertical at 1m LTE5-QPSK-Low Channel



Radiated Spurious Emissions 18-22GHz Horizontal at 1m LTE5-QPSK-Mid Channel



Radiated Spurious Emissions 18-22GHz Vertical at 1m LTE5-QPSK-Mid Channel

Frequency Stability/Accuracy

Measurement methods are detailed in KDB 971168 D01v03r01 section 9 and ANSI C63.26-2015. Carrier frequency stability at extreme temperatures and voltages, frequency error was measured as follows:

- (1) Transmitting in 5MHz-QPSK-LTE mode at center channel (2155.0MHz) on port 15.
- (2) The EUT temperature was stabilized at each temperature step (for a minimum of 30 minutes) prior to frequency accuracy measurement.

Nominal operating voltage of the product is declared as 48VDC.

Frequency error results are listed below for extreme voltages and temperatures.

Extreme Voltages:

Percentage of Rated Supply	DC Voltage (VDC)	Frequency Error (Hz) at 20°C
85%	40.8	1.82
100%	48.0	1.94
115%	55.2	2.02

Extreme Temperatures:

Temperature	Frequency Error (Hz) at 48VDC
-30 °C	1.66
-20 °C	1.75
-10 °C	1.61
0 °C	1.52
10 °C	1.96
20 °C	1.94
30 °C	1.82
40 °C	1.78
50 °C	1.70

Based on the results above, highest recorded frequency error (2.02Hz or 0.0009ppm) ensures that the transmitted signal remains in its authorized frequency block at extreme voltages and temperatures. The results above are deemed sufficient to demonstrate carrier frequency stability for all other channel bandwidth modes and modulations since all carriers are controlled by the same frequency stabilization circuitry that was subjected to the extreme conditions under this test.

End of Report

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