

Band 14 LTE5 80W Carrier Lower Band Edge Plots for Antenna Port 1:

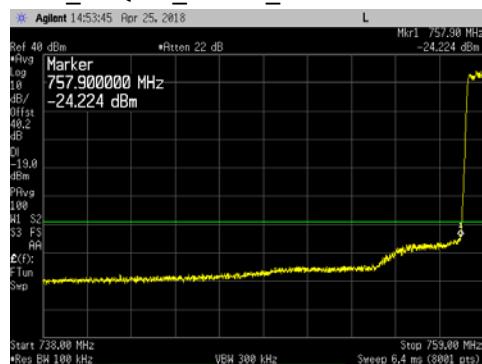
LTE5_QPSK_Bot Ch_738MHz to 759MHz



LTE5_QPSK_Bot Ch_757.9Mz to 758.1MHz



LTE5_16QAM_Bot Ch_738MHz to 759MHz



LTE5_16QAM_Bot Ch_757.9Mz to 758.1MHz



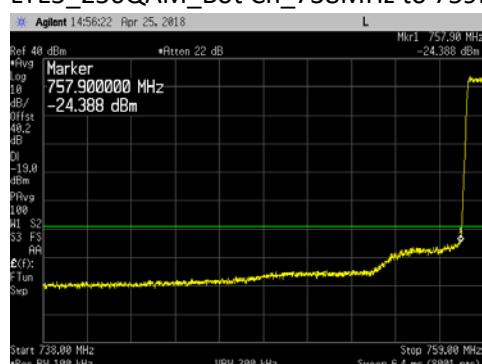
LTE5_64QAM_Bot Ch_738MHz to 759MHz



LTE5_64QAM_Bot Ch_757.9Mz to 758.1MHz



LTE5_256QAM_Bot Ch_738MHz to 759MHz

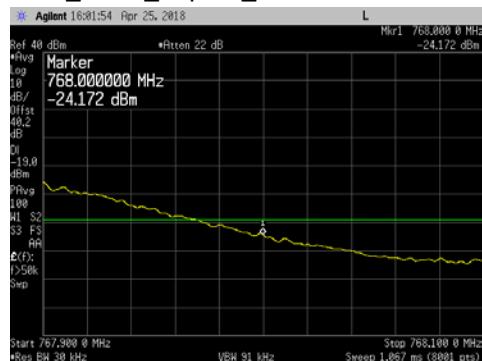


LTE5_256QAM_Bot Ch_757.9Mz to 758.1MHz

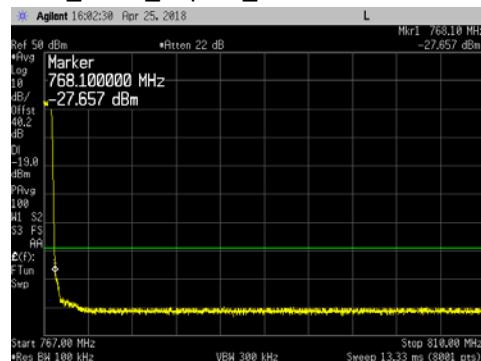


Band 14 LTE5 80W Carrier Upper Band Edge Plots for Antenna Port 1:

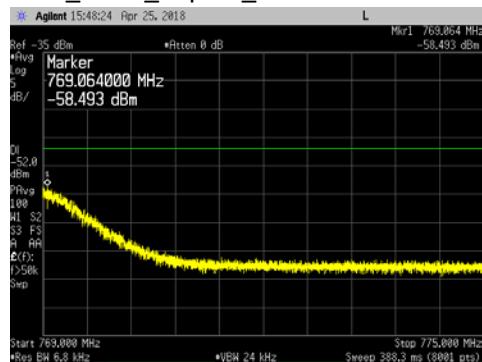
LTE5_QPSK_Top Ch_767.9Mz to 768.1MHz



LTE5_QPSK_Top Ch_767Mz to 810MHz



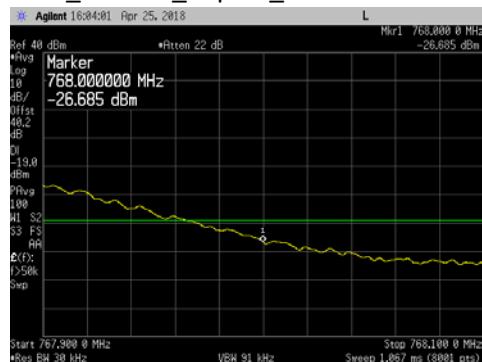
LTE5_QPSK_Top Ch_769MHz to 775MHz



LTE5_QPSK_Top Ch_798MHz to 807MHz



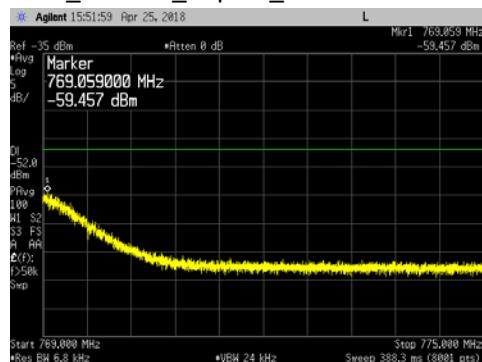
LTE5_16QAM_Top Ch_767.9Mz to 768.1MHz



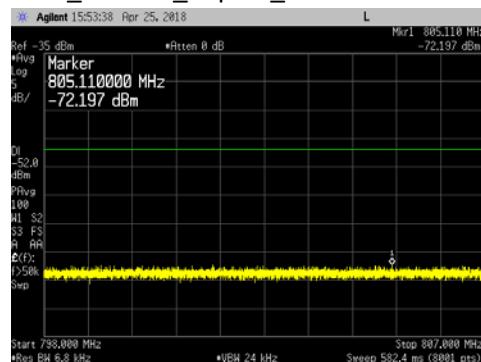
LTE5_16QAM_Top Ch_767Mz to 810MHz



LTE5_16QAM_Top Ch_769MHz to 775MHz

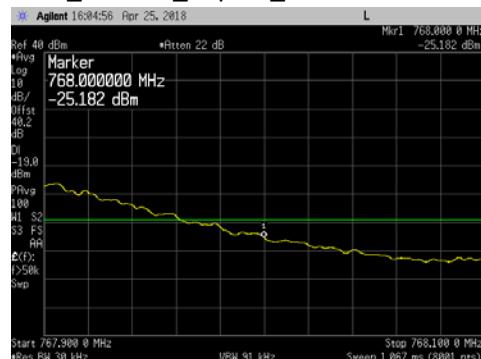


LTE5_16QAM_Top Ch_798MHz to 807MHz



Band 14 LTE5 80W Carrier Upper Band Edge Plots for Antenna Port 1:

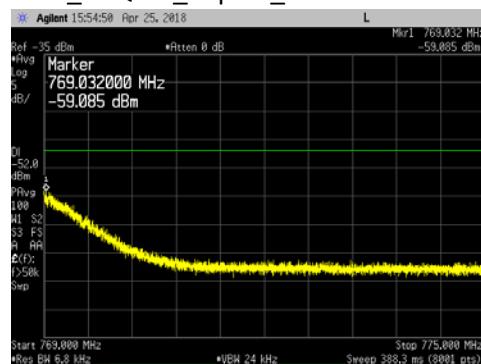
LTE5_64QAM_Top Ch_767.9Mz to 768.1MHz



LTE5_64QAM_Top Ch_767Mz to 810MHz



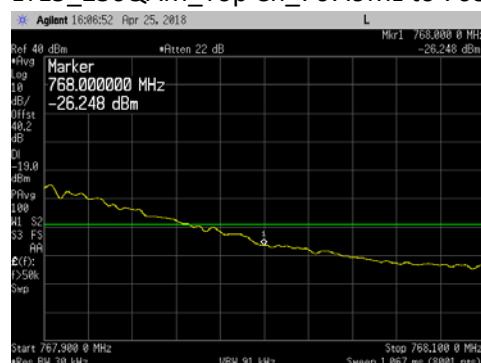
LTE5 64QAM Top Ch 769MHz to 775MHz



LTE5 64QAM Top Ch 798MHz to 807MHz



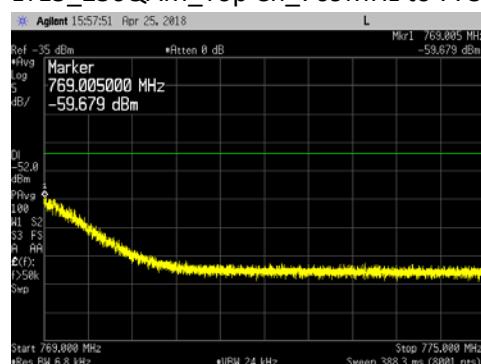
LTE5 256QAM Top Ch 767.9MHz to 768.1MHz



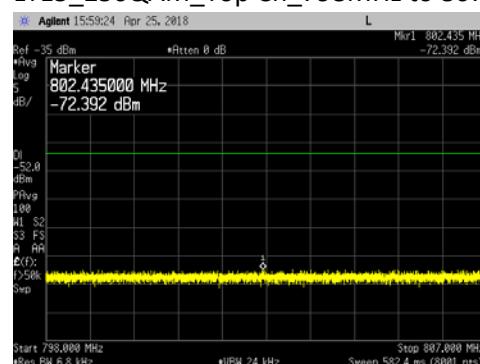
LTE5 256QAM Top Ch 767MHz to 810MHz



LTE5 256QAM Top Ch 769MHz to 775MHz

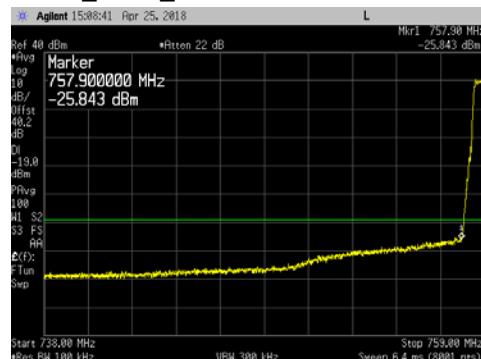


LTE5 256QAM Top Ch 798MHz to 807MHz

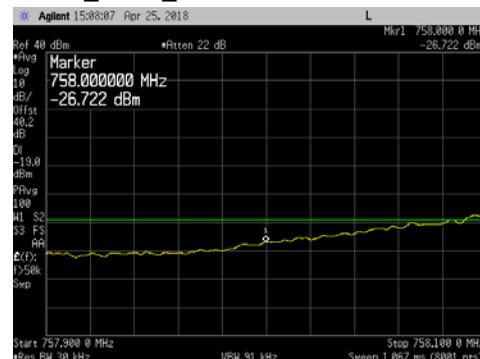


Band 14 LTE10 80W Carrier Lower Band Edge Plots for Antenna Port 1:

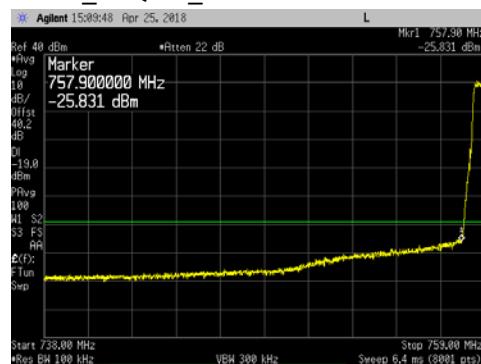
LTE10_QPSK_738MHz to 759MHz



LTE10_QPSK_757.9Mz to 758.1MHz



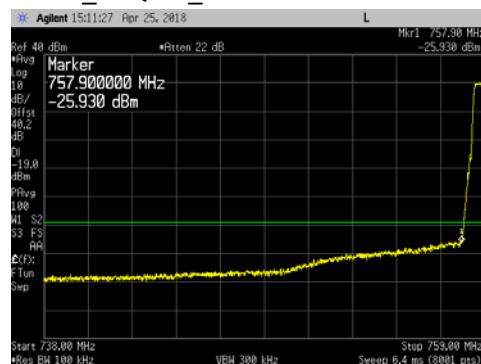
LTE10_16QAM_738MHz to 759MHz



LTE10_16QAM_757.9Mz to 758.1MHz



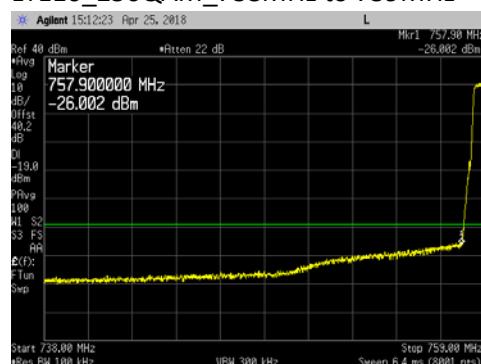
LTE10_64QAM_738MHz to 759MHz



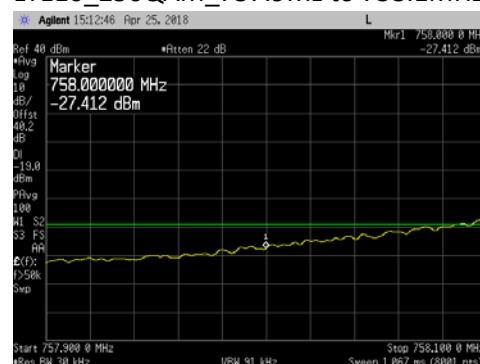
LTE10_64QAM_757.9Mz to 758.1MHz



LTE10_256QAM_738MHz to 759MHz

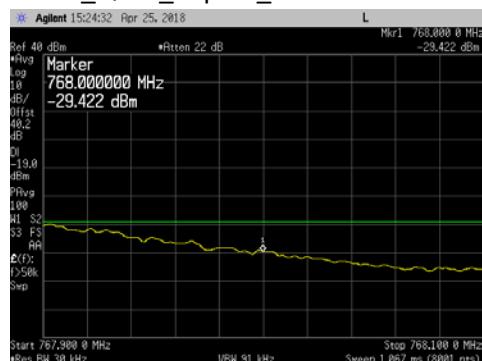


LTE10_256QAM_757.9Mz to 758.1MHz

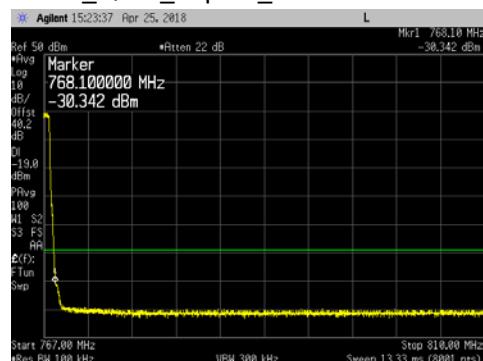


Band 14 LTE10 80W Carrier Upper Band Edge Plots for Antenna Port 1:

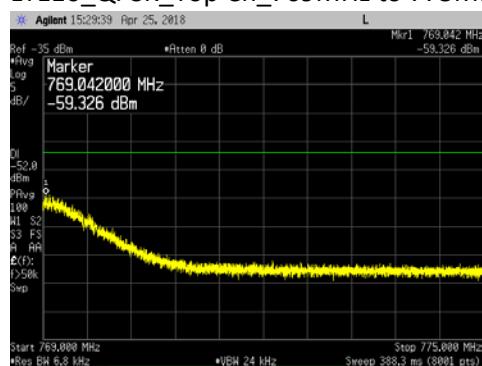
LTE10_QPSK_Top Ch_767.9Mz to 768.1MHz



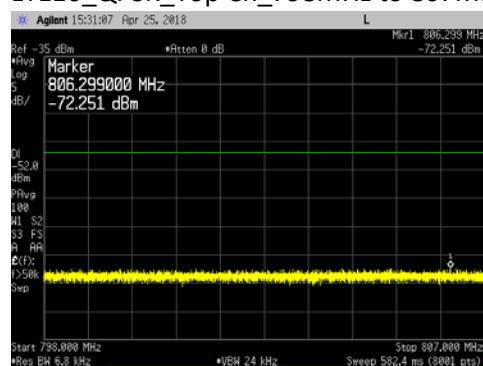
LTE10_QPSK_Top Ch_767Mz to 810MHz



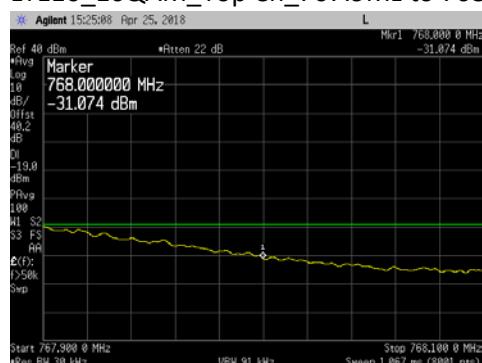
LTE10_QPSK_Top Ch_769MHz to 775MHz



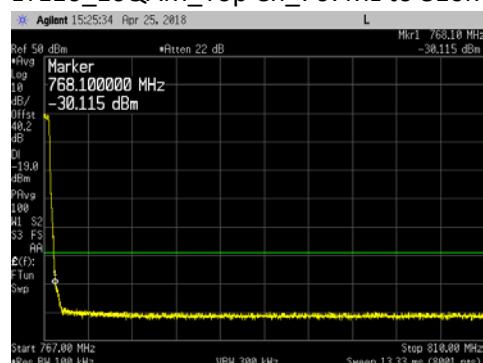
LTE10_QPSK_Top Ch_798MHz to 807MHz



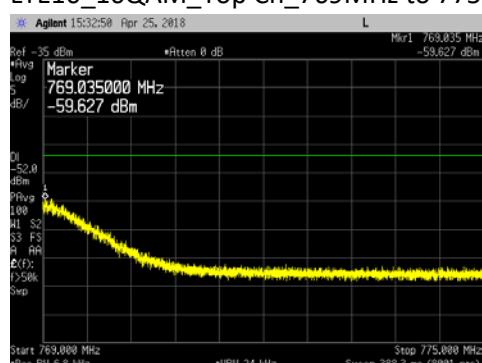
LTE10_16QAM_Top Ch_767.9Mz to 768.1MHz



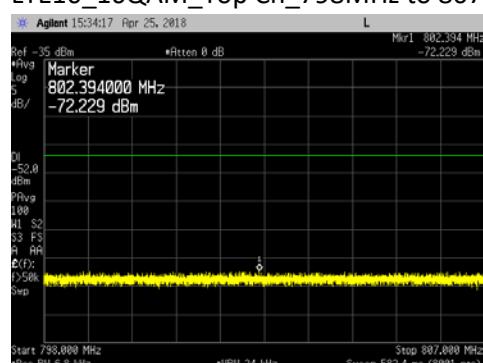
LTE10_16QAM_Top Ch_767Mz to 810MHz



LTE10_16QAM_Top Ch_769MHz to 775MHz

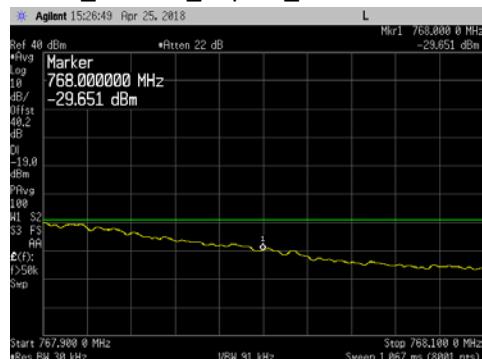


LTE10_16QAM_Top Ch_798MHz to 807MHz

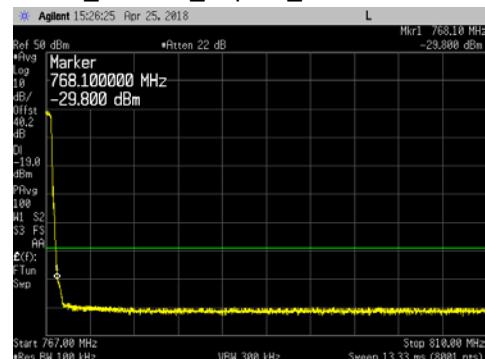


Band 14 LTE10 80W Carrier Upper Band Edge Plots for Antenna Port 1:

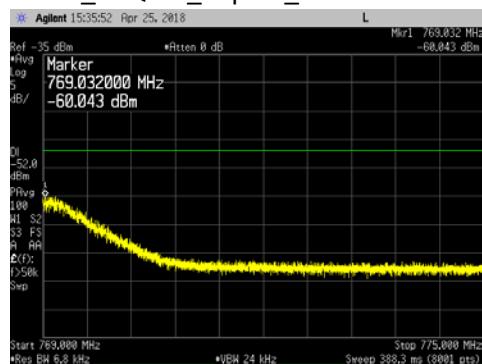
LTE10_64QAM_Top Ch_767.9Mz to 768.1MHz



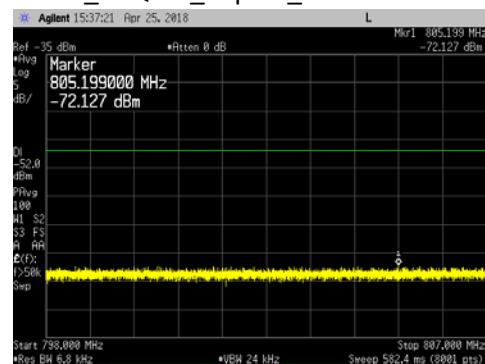
LTE10_64QAM_Top Ch_767Mz to 810MHz



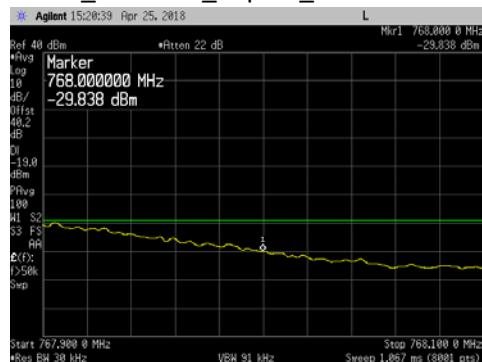
LTE10 64QAM Top Ch 769MHz to 775MHz



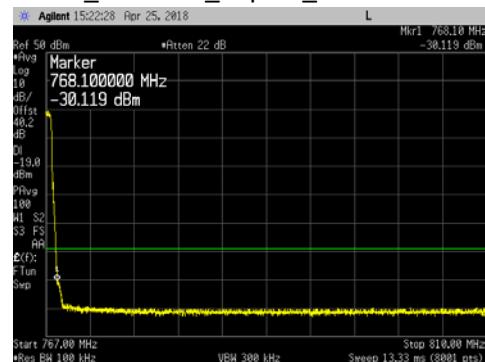
LTE10 64QAM Top Ch 798MHz to 807MHz



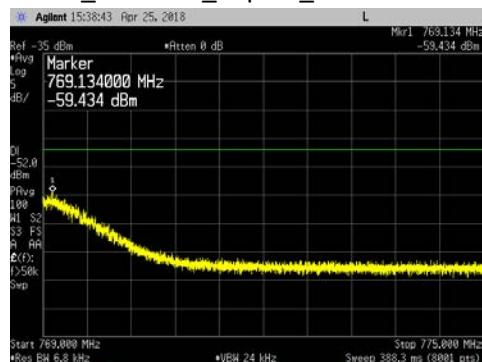
LTE10 256QAM Top Ch 767.9MHz to 768.1MHz



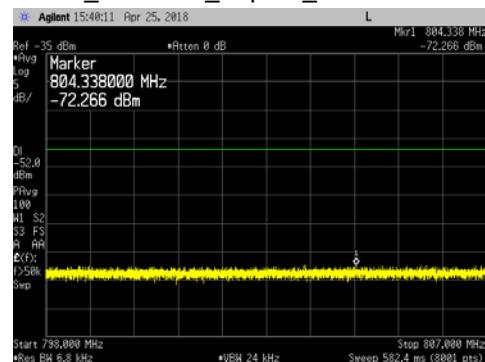
LTE10 256QAM Top Ch 767Mz to 810MHz



LTE10 256QAM Top Ch 769MHz to 775MHz

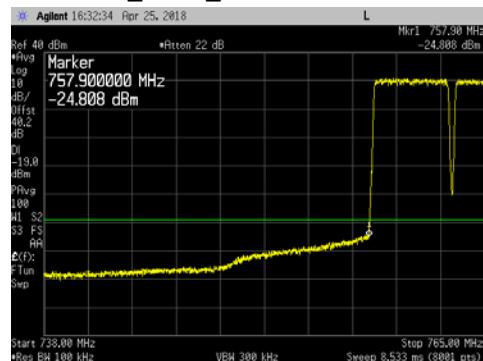


LTE10 256QAM Top Ch 798MHz to 807MHz



Band 14 Dual LTE5 40W + 40W Carriers Lower Band Edge Plots for Antenna Port 1:

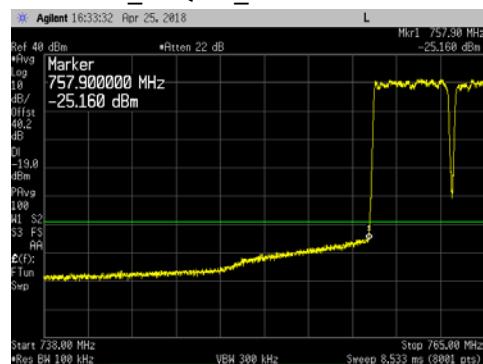
Dual LTE5_QPSK_738MHz to 765MHz



Dual LTE5_QPSK_757.9Mz to 758.1MHz



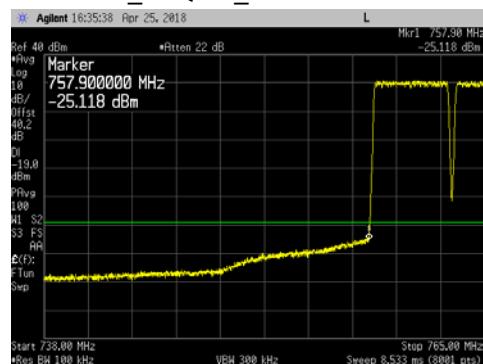
Dual LTE5_16QAM_738MHz to 765MHz



Dual LTE5_16QAM_757.9Mz to 758.1MHz



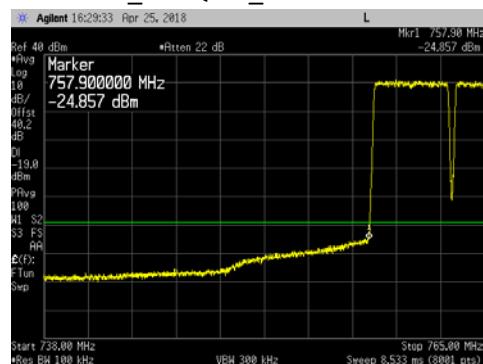
Dual LTE5_64QAM_738MHz to 765MHz



Dual LTE5_64QAM_757.9Mz to 758.1MHz



Dual LTE5_256QAM_738MHz to 765MHz

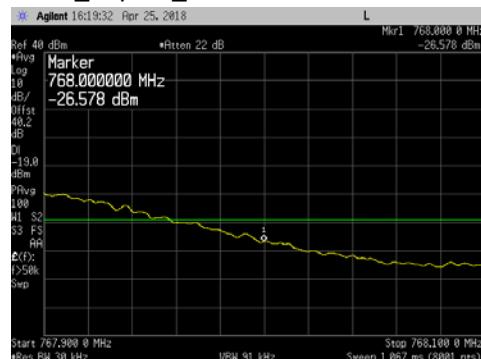


Dual LTE5_256QAM_757.9Mz to 758.1MHz

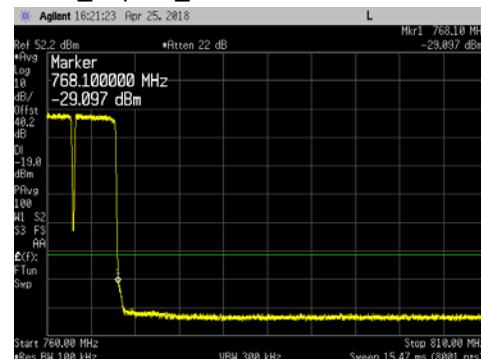


Band 14 Dual LTE5 40W + 40W Carriers Upper Band Edge Plots for Antenna Port 1:

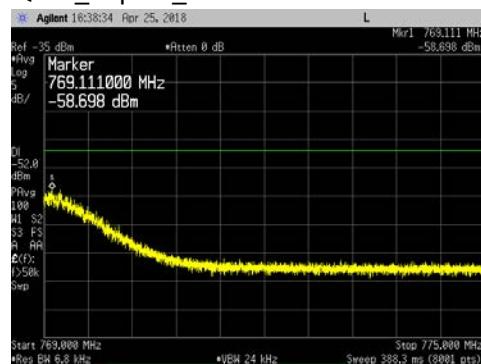
QPSK_Top Ch_767.9Mz to 768.1MHz



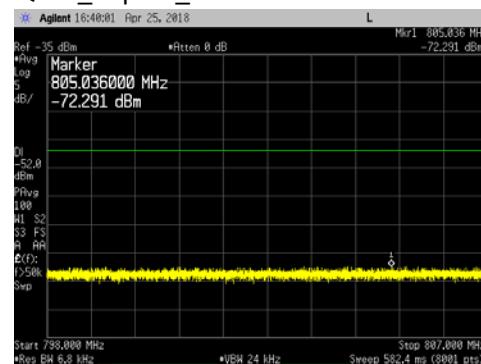
QPSK_Top Ch_760Mz to 810MHz



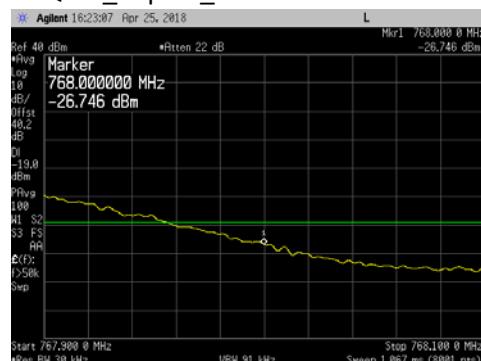
QPSK_Top Ch_769MHz to 775MHz



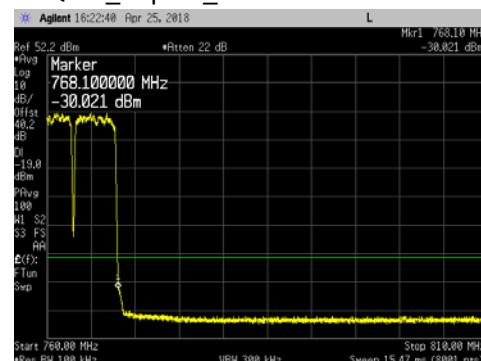
QPSK_Top Ch_798MHz to 807MHz



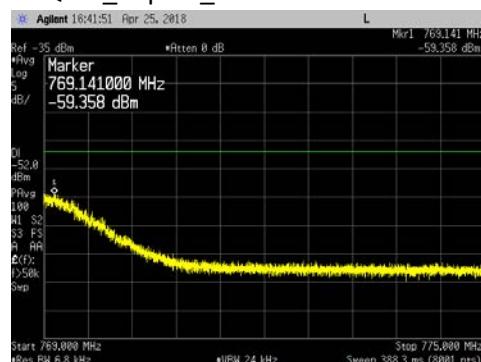
16QAM Top Ch 767.9Mz to 768.1MHz



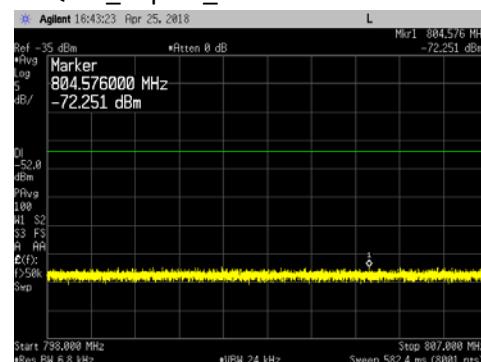
16QAM Top Ch 760Mz to 810MHz



16QAM Top Ch 769MHz to 775MHz

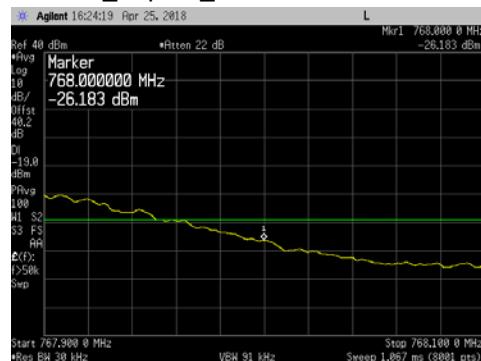


16QAM Top Ch 798MHz to 807MHz

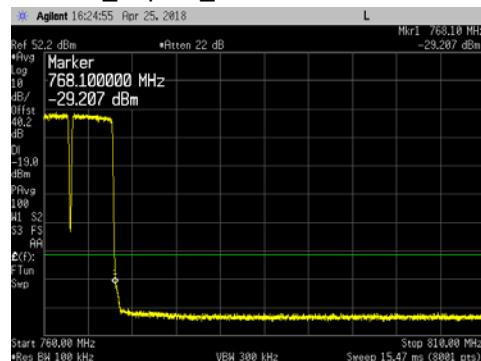


Band 14 Dual LTE5 40W + 40W Carriers Upper Band Edge Plots for Antenna Port 1:

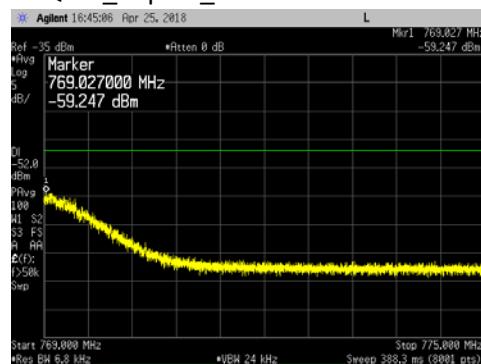
64QAM_Top Ch_767.9Mz to 768.1MHz



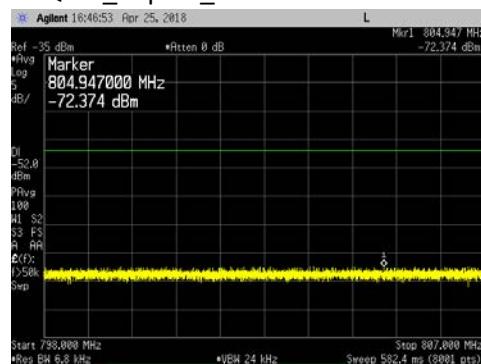
64QAM_Top Ch_760Mz to 810MHz



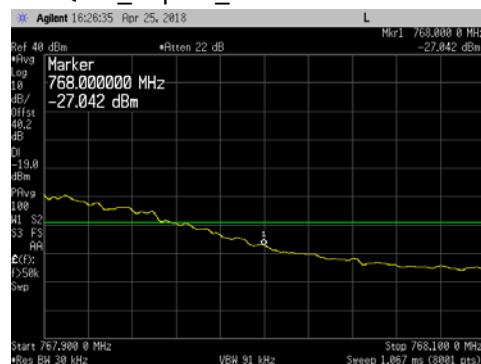
64QAM Top Ch 769MHz to 775MHz



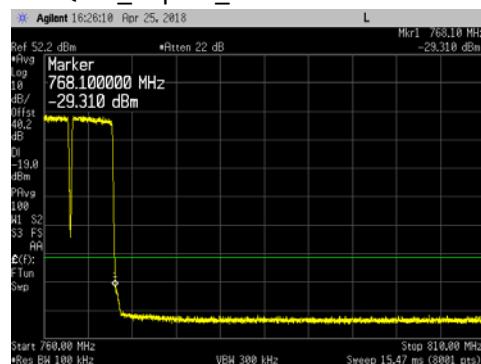
64QAM Top Ch 798MHz to 807MHz



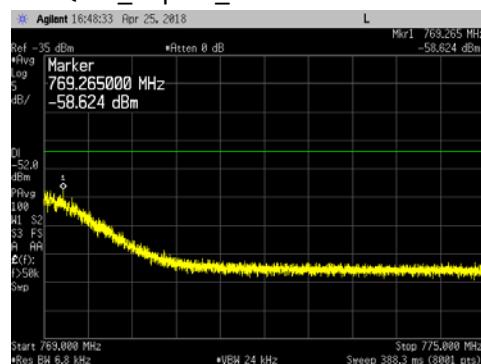
256QAM Top Ch 767.9MHz to 768.1MHz



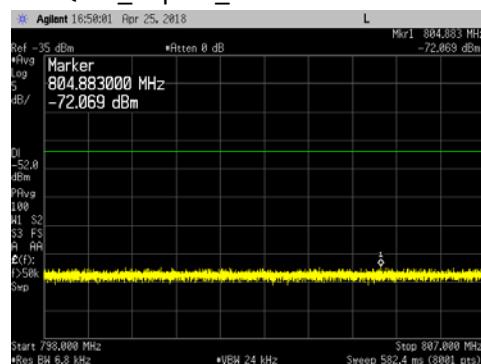
256QAM Top Ch 760Mz to 810MHz



256QAM Top Ch 769MHz to 775MHz

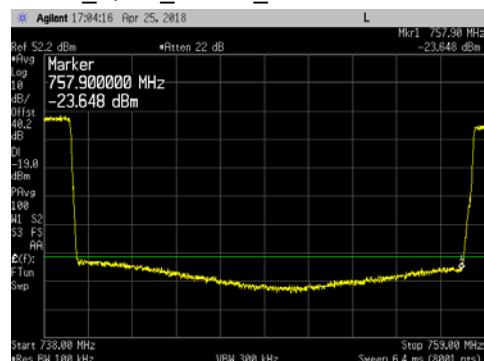


256QAM Top Ch 798MHz to 807MHz

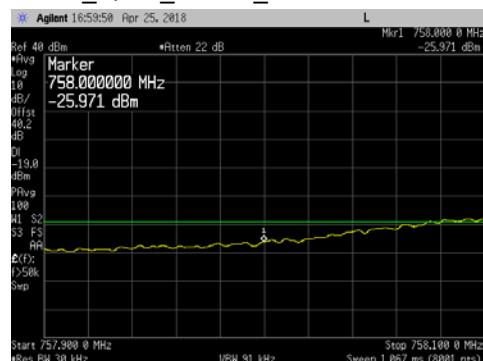


Dual Band (Band 12 LTE 5 & Band 14 LTE10) 40W + 40W Carriers Lower Band Edge Plots for Antenna Port 1:

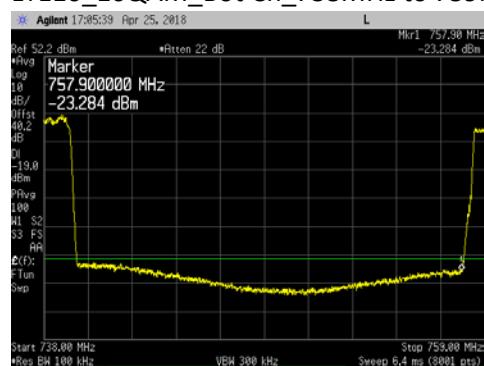
LTE10_QPSK_Bot Ch_738MHz to 759MHz



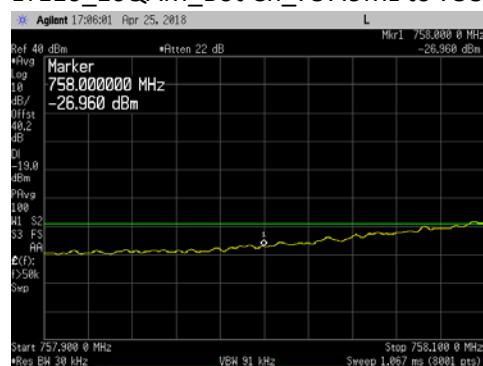
LTE10_QPSK_Bot Ch_757.9Mz to 758.1MHz



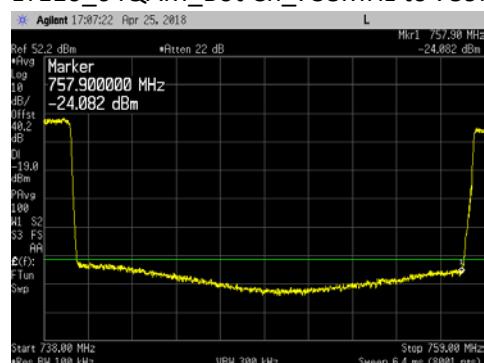
LTE10_16QAM_Bot Ch_738MHz to 759MHz



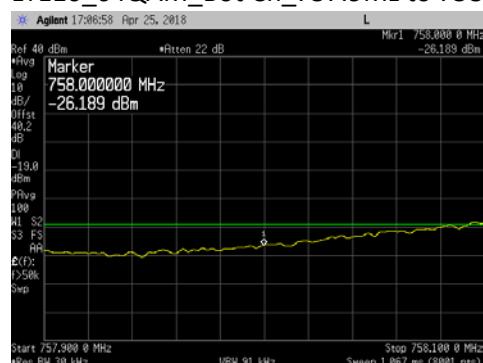
LTE10_16QAM_Bot Ch_757.9Mz to 758.1MHz



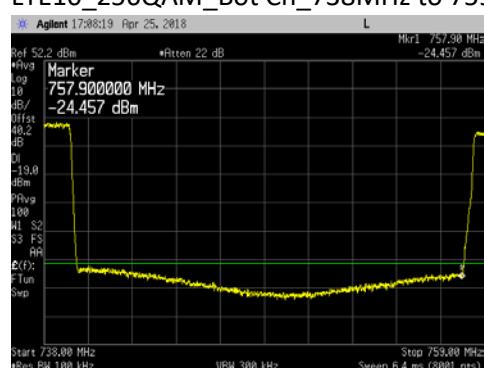
LTE10_64QAM_Bot Ch_738MHz to 759MHz



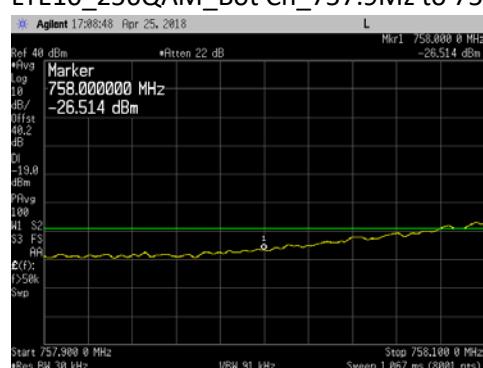
LTE10_64QAM_Bot Ch_757.9Mz to 758.1MHz



LTE10_256QAM_Bot Ch_738MHz to 759MHz

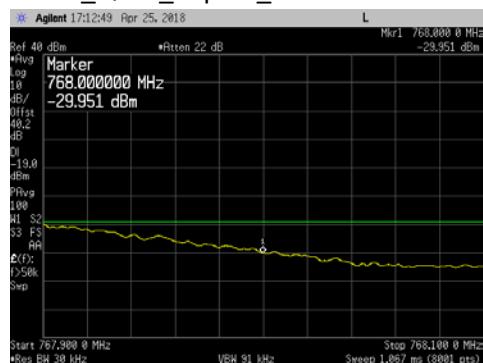


LTE10_256QAM_Bot Ch_757.9Mz to 758.1MHz

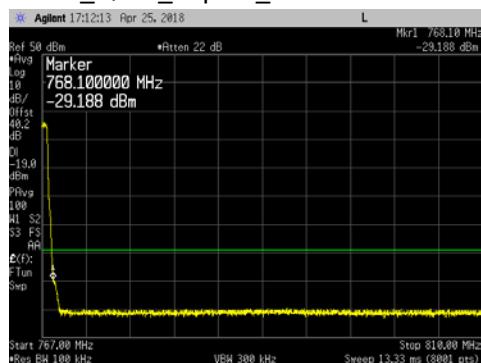


Dual Band (Band 12 LTE 5 & Band 14 LTE10) 40W + 40W Carriers Upper Band Edge Plots for Antenna Port 1:

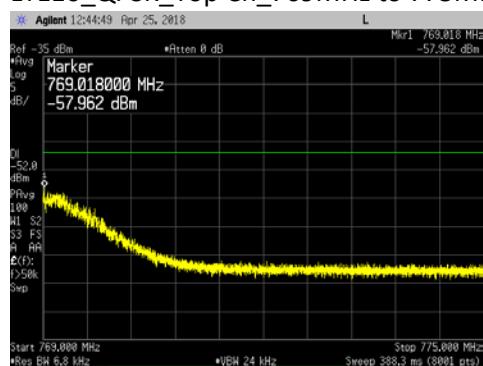
LTE10_QPSK_Top Ch_767.9Mz to 768.1MHz



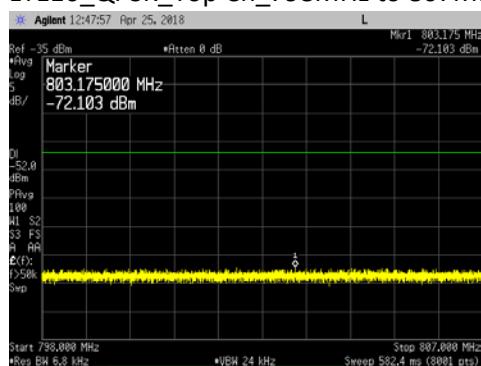
LTE10_QPSK_Top Ch_767Mz to 810MHz



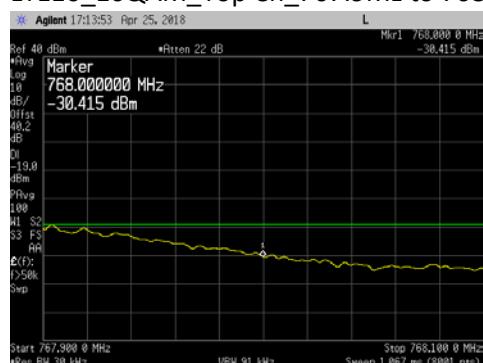
LTE10_QPSK_Top Ch_769MHz to 775MHz



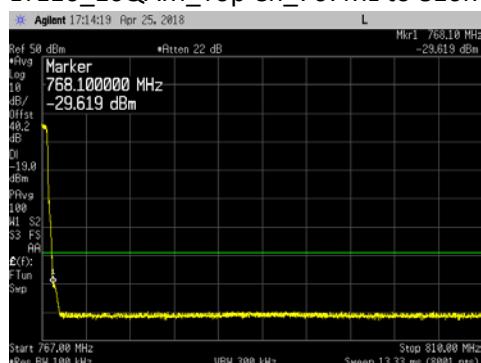
LTE10_QPSK_Top Ch_798MHz to 807MHz



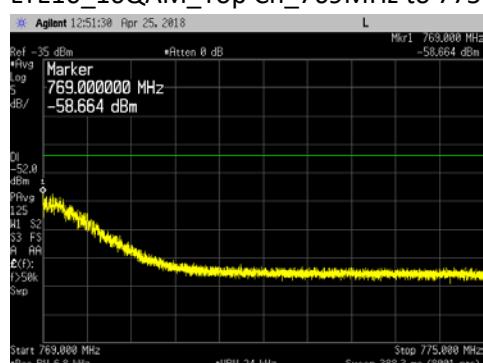
LTE10_16QAM_Top Ch_767.9Mz to 768.1MHz



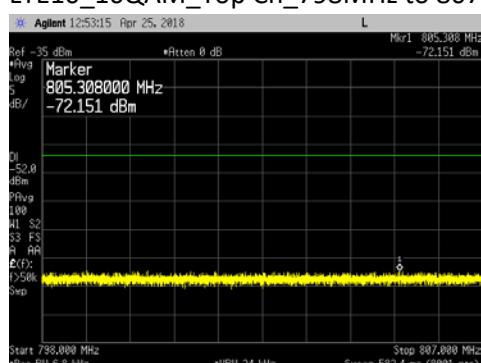
LTE10_16QAM_Top Ch_767Mz to 810MHz



LTE10_16QAM_Top Ch_769MHz to 775MHz

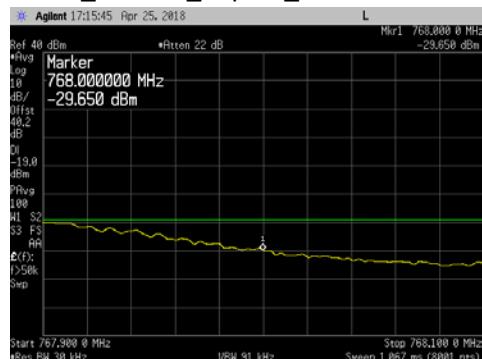


LTE10_16QAM_Top Ch_798MHz to 807MHz

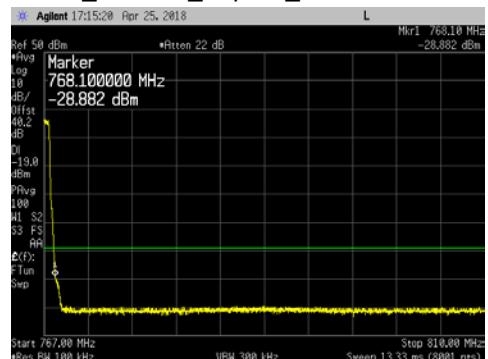


Dual Band (Band 12 LTE 5 & Band 14 LTE10) 40W + 40W Carriers Upper Band Edge Plots for Antenna Port 1:

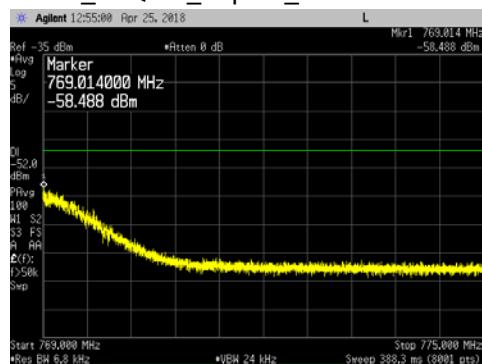
LTE10_64QAM_Top Ch_767.9Mz to 768.1MHz



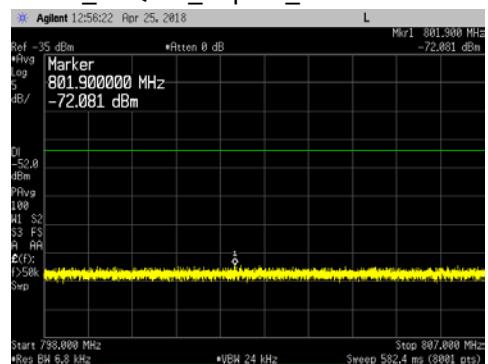
LTE10_64QAM_Top Ch_767Mz to 810MHz



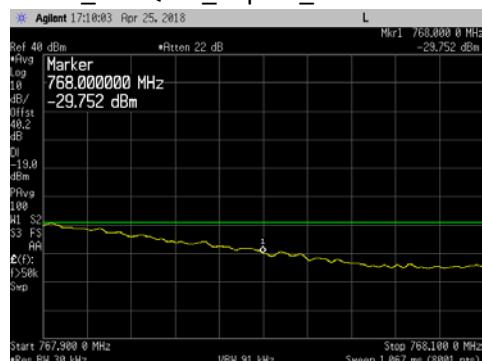
LTE10_64QAM_Top Ch_769MHz to 775MHz



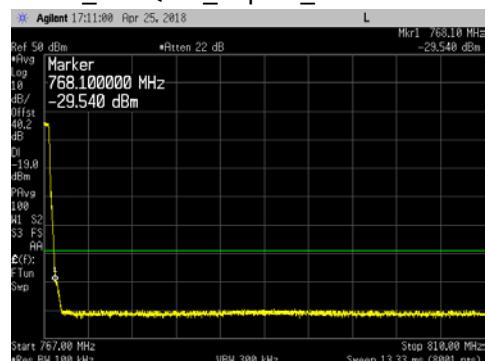
LTE10_64QAM_Top Ch_798MHz to 807MHz



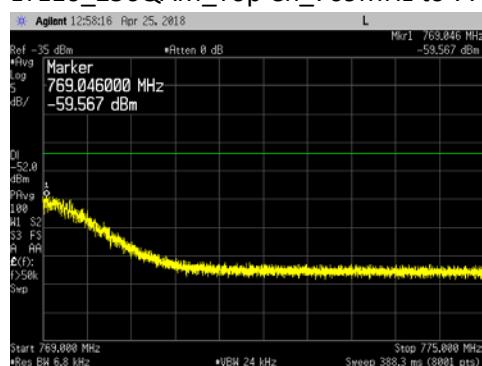
LTE10_256QAM_Top Ch_767.9Mz to 768.1MHz



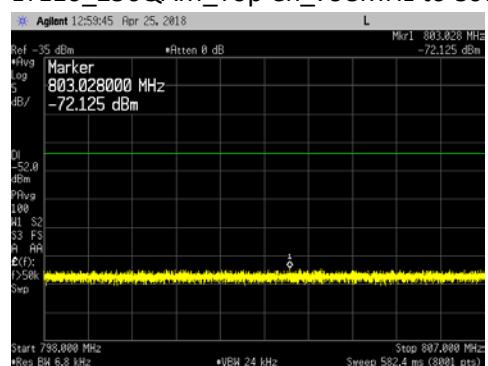
LTE10_256QAM_Top Ch_767Mz to 810MHz



LTE10_256QAM_Top Ch_769MHz to 775MHz

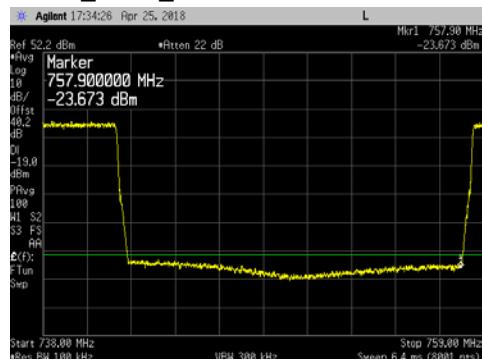


LTE10_256QAM_Top Ch_798MHz to 807MHz

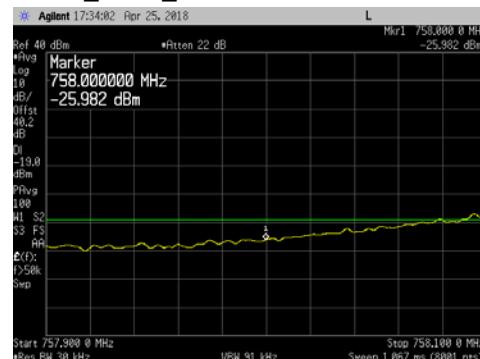


Dual Band (Band 12 LTE 10 & Band 14 LTE10) 40W + 40W Carriers Lower Band Edge Plots for Antenna Port 1:

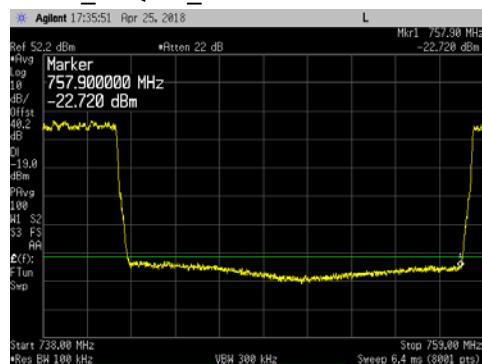
LTE10_QPSK_738MHz to 759MHz



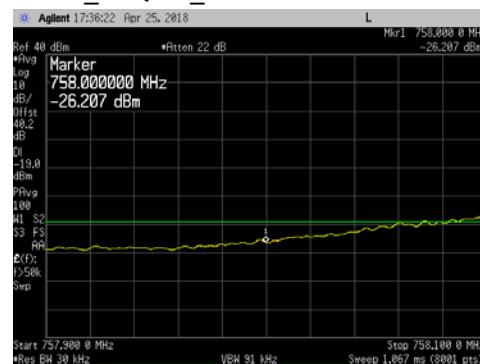
LTE10_QPSK_757.9Mz to 758.1MHz



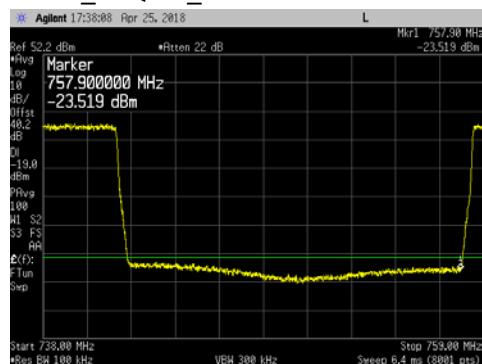
LTE10_16QAM_738MHz to 759MHz



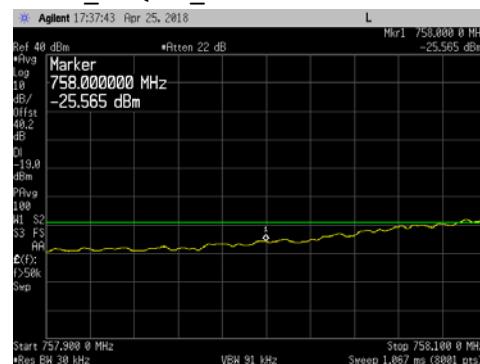
LTE10_16QAM_757.9Mz to 758.1MHz



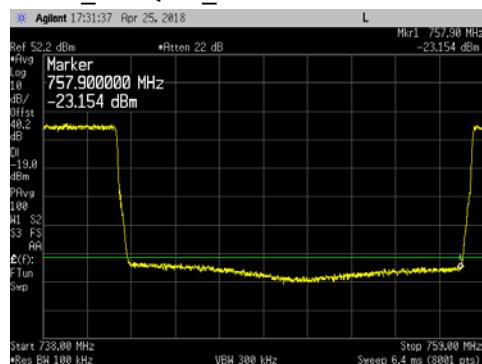
LTE10_64QAM_738MHz to 759MHz



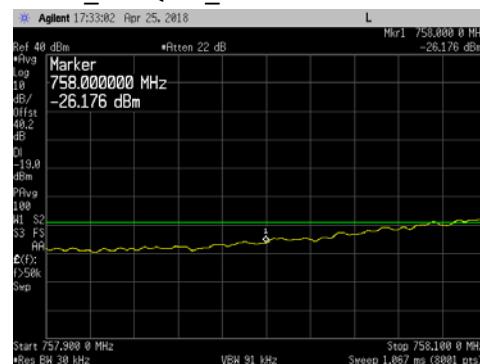
LTE10_64QAM_757.9Mz to 758.1MHz



LTE10_256QAM_738MHz to 759MHz

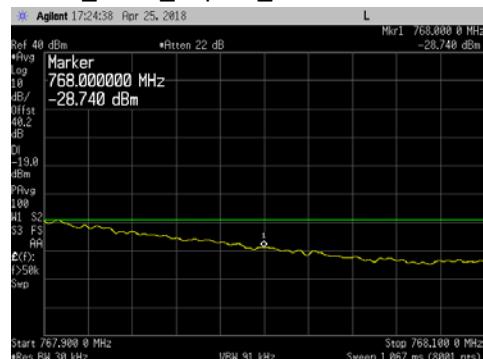


LTE10_256QAM_757.9Mz to 758.1MHz

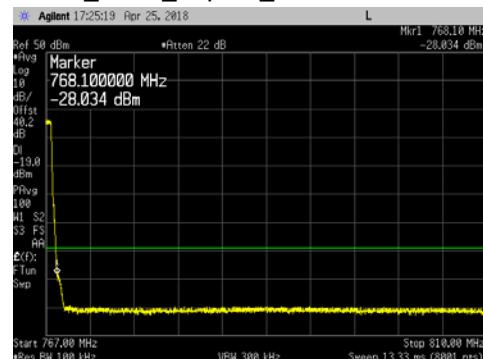


Dual Band (Band 12 LTE 10 & Band 14 LTE10) 40W + 40W Carriers Upper Band Edge Plots for Antenna Port 1:

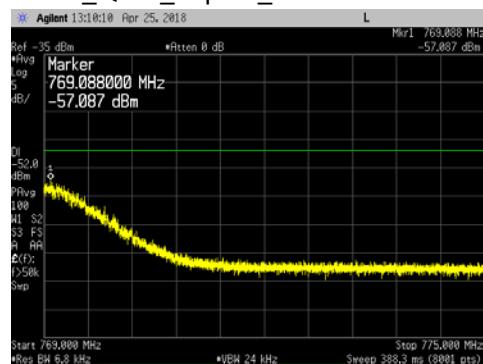
LTE10_QPSK_Top Ch_767.9Mz to 768.1MHz



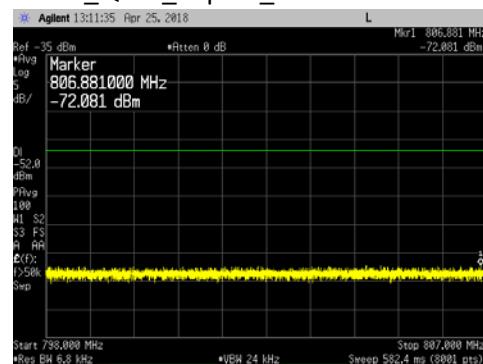
LTE10_QPSK_Top Ch_767Mz to 810MHz



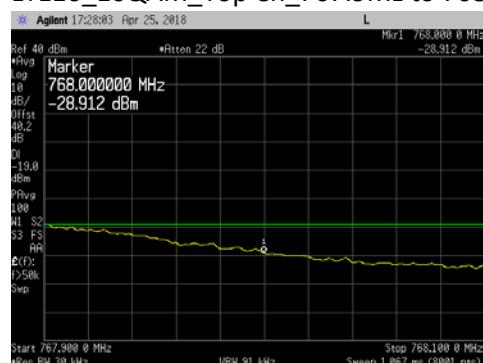
LTE10 QPSK Top Ch 769MHz to 775MHz



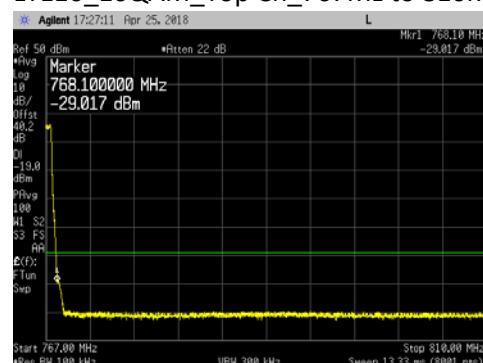
LTE10 QPSK Top Ch 798MHz to 807MHz



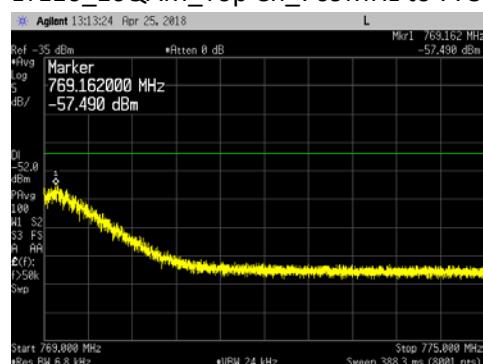
LTE10 16QAM Top Ch 767.9MHz to 768.1MHz



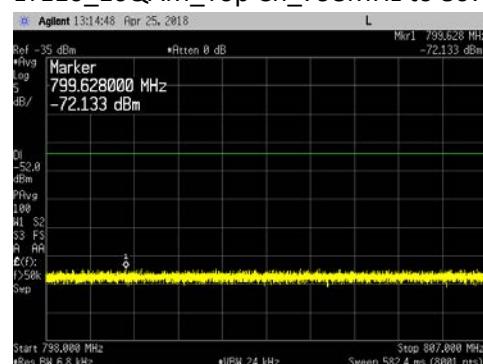
LTE10 16QAM Top Ch 767MHz to 810MHz



LTE10 16QAM Top Ch 769MHz to 775MHz

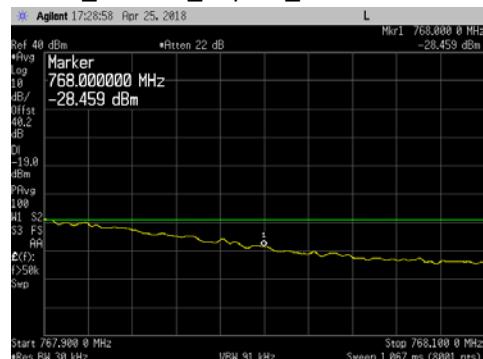


LTE10 16QAM Top Ch 798MHz to 807MHz

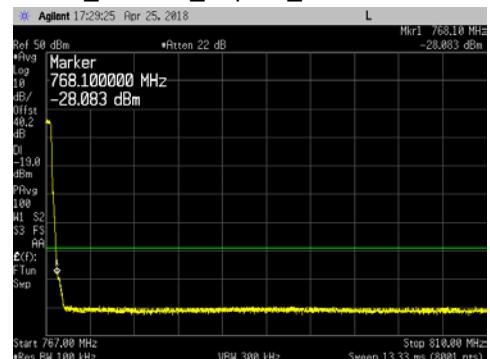


Dual Band (Band 12 LTE 10 & Band 14 LTE10) 40W + 40W Carriers Upper Band Edge Plots for Antenna Port 1:

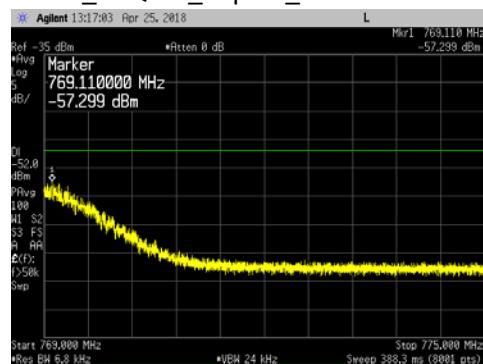
LTE10_64QAM_Top Ch_767.9Mz to 768.1MHz



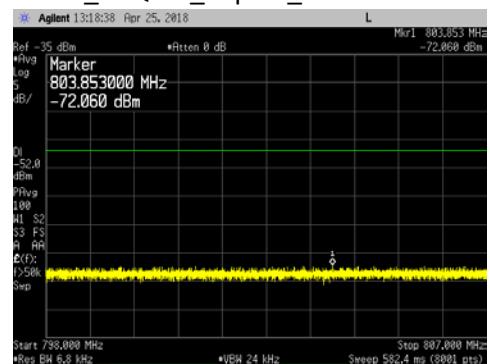
LTE10_64QAM_Top Ch_767Mz to 810MHz



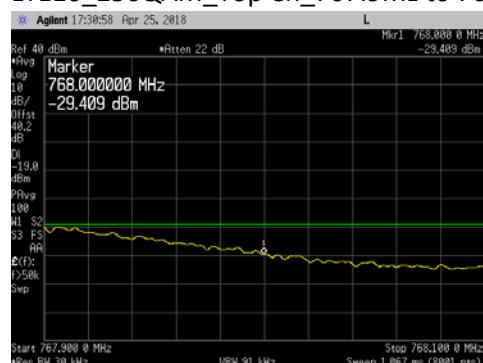
LTE10 64QAM Top Ch 769MHz to 775MHz



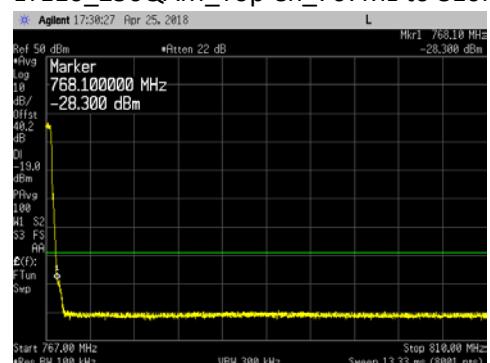
LTE10 64QAM Top Ch 798MHz to 807MHz



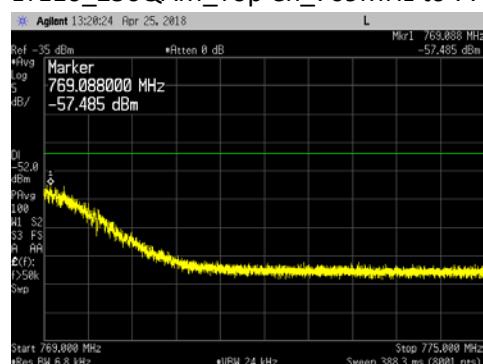
LTE10 256QAM Top Ch 767.9MHz to 768.1MHz



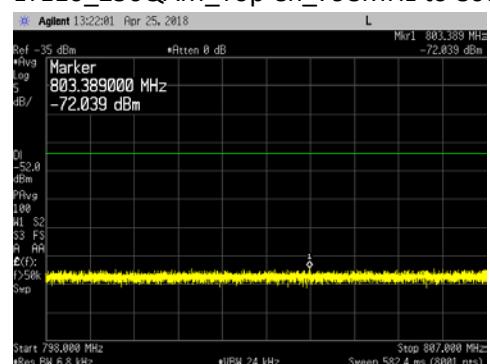
LTE10 256QAM Top Ch 767MHz to 810MHz



LTE10 256QAM Top Ch 769MHz to 775MHz



LTE10 256QAM Top Ch 798MHz to 807MHz



Transmitter Antenna Port Conducted Emissions

Transmitter conducted emission measurements were made at RRH antenna port 1. Measurements were performed over the 9kHz to 8GHz frequency range. Two test configurations are needed for conducted spurious emission measurements to prove compliance for the 3GPP Band 14 transmitters. The first test will be with the 3GPP Band 14 transmitters enabled at 80 watts per carrier (the 3GPP Band 12 transmitters will not be enabled). The second test will be with the 3GPP Band 12 and the 3GPP Band 14 transmitters enabled simultaneously at 40 watts per carrier (or 80 watts/antenna port).

The RRH was operated on the Band 12 middle channel (737.0MHz) and Band 14 middle channel (763.0MHz) simultaneously with all LTE modulation types (QPSK, 16QAM, 64QAM and 256QAM) for all available LTE bandwidths (Band 12: 5MHz and 10MHz; Band 14: 5MHz and 10MHz). The same LTE bandwidth was used for both frequency bands.

The parameters of the first test configuration are provided below:

3GPP Band 12 Transmission Parameters			3GPP Band 14 Transmission Parameters		
Carrier Frequency	Channel Bandwidth	Carrier Power	Carrier Frequency	Channel Bandwidth	Carrier Power
Carrier Idle/Off	N/A	0 Watts	763.0MHz (Mid Ch)	LTE5	80 Watts
Carrier Idle/Off	N/A	0 Watts	763.0MHz (Mid Ch)	LTE10	80 Watts

The parameters of the second test configuration are provided below:

3GPP Band 12 Transmission Parameters			3GPP Band 14 Transmission Parameters		
Carrier Frequency	Channel Bandwidth	Carrier Power	Carrier Frequency	Channel Bandwidth	Carrier Power
737.0MHz (Mid Ch)	LTE5	40 Watts	763.0MHz (Mid Ch)	LTE5	40 Watts
737.0MHz (Mid Ch)	LTE10	40 Watts	763.0MHz (Mid Ch)	LTE10	40 Watts

Note that the conducted spurious emission plots/measurement results for the second test with the 3GPP Band 12 and the 3GPP Band 14 transmitters enabled simultaneously at 40 watts per carrier (or 80 watts/antenna port) are in Appendix A.

The limit of -19dBm was used in the certification testing. The limit is adjusted to -19dBm [-13dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter. The required measurement parameters include a 100kHz 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 9kHz to 150kHz, 150kHz to 20MHz and 400MHz to 800MHz frequency ranges). Measurements for the 9kHz to 150kHz, 150kHz to 20MHz and 400MHz to 800MHz frequency ranges 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 -39dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 100kHz [i.e.: $-39\text{dBm} = -19\text{dBm} - 10\log(100\text{kHz}/1\text{kHz})$]. The required limit of -19dBm with a RBW of $\geq 100\text{kHz}$ 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	40.1dB
150kHz to 20MHz	100kHz	300kHz	8001	Average	Auto	Note 2	40.2dB
20MHz to 700MHz	1MHz	3MHz	8001	Peak	Auto	50 Sweeps	39.9dB
700MHz to 1.1GHz	100kHz	300kHz	8001	Average	Auto	Note 2	40.2dB
1.1GHz to 8GHz	2MHz	6MHz	8001	Peak	Auto	50 Sweeps	17.5dB

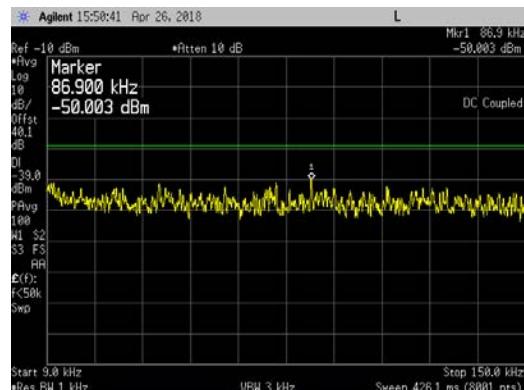
Note 1: The total measurement RF path loss of the test setup (attenuators, filters and test cables) is accounted for by the spectrum analyzer reference level offset.
Note 2: Max Hold not used and instead measurements were performed with the spectrum analyzer in the RMS average mode over 100 traces.

A high pass filter was used to reduce measurement instrumentation noise floor for the frequency ranges above 1100MHz. The total measurement RF path loss of the test setup (attenuators, 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.

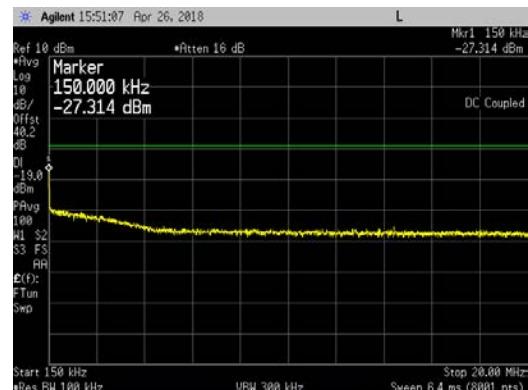
Conducted spurious emission plots/measurements are provided in the following pages.

Band 14 LTE5 Ch BW _ QPSK _ Middle Channel (763.0MHz) at 80 watts/carrier:

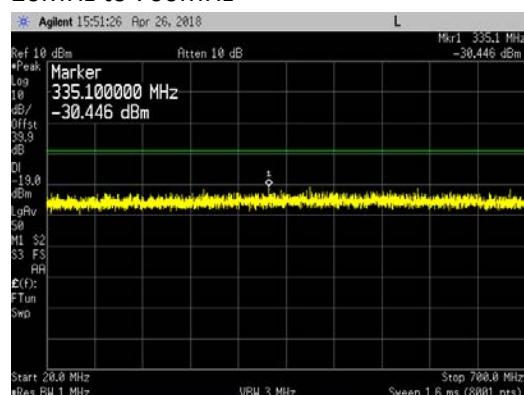
9kHz to 150kHz



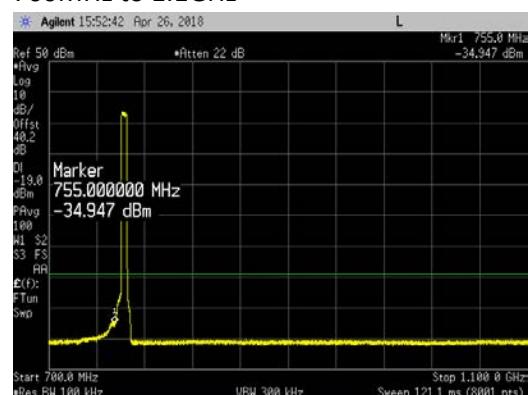
150kHz to 20MHz



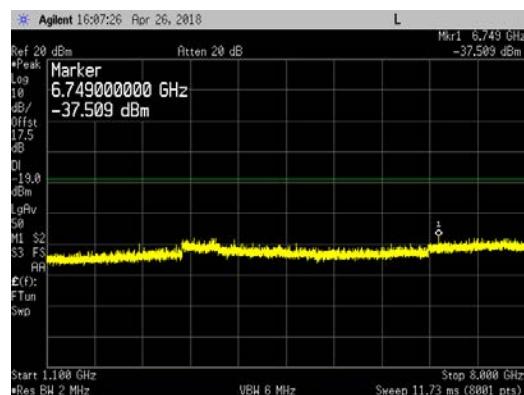
20MHz to 700MHz



700MHz to 1.1GHz

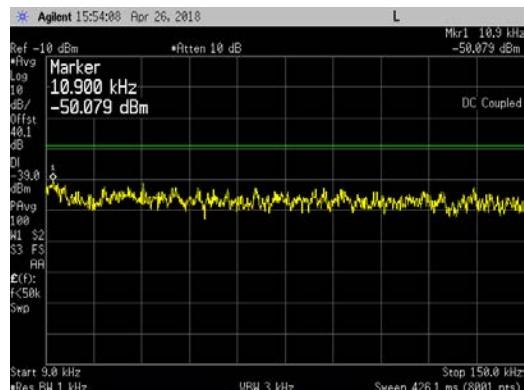


1.1GHz to 8GHz

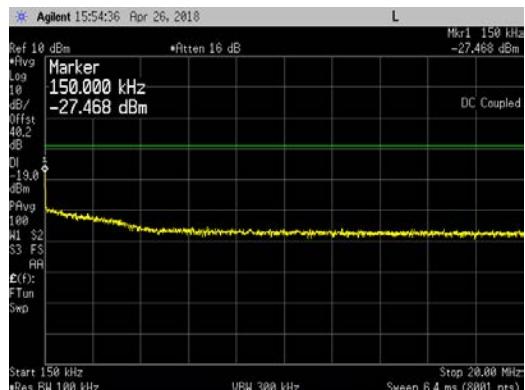


Band 14 LTE5 Ch BW _ 16QAM _ Middle Channel (763.0MHz) at 80 watts/carrier:

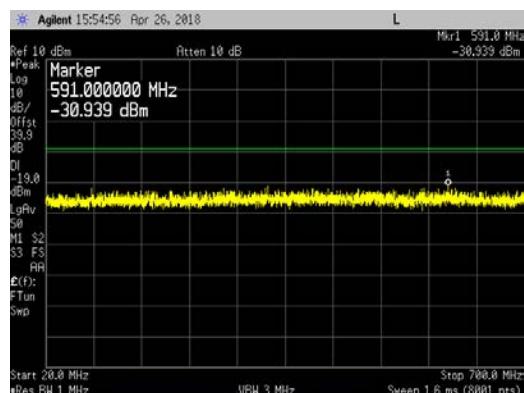
9kHz to 150kHz



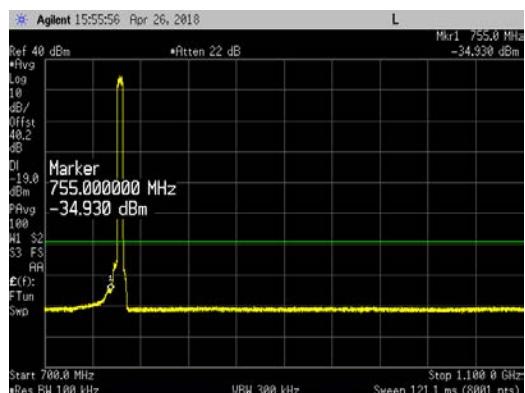
150kHz to 20MHz



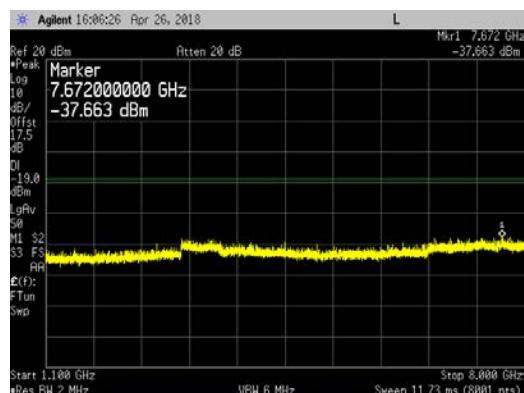
20MHz to 700MHz



700MHz to 1.1GHz

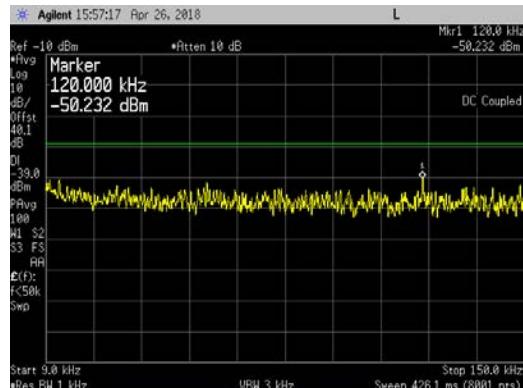


1.1GHz to 8GHz

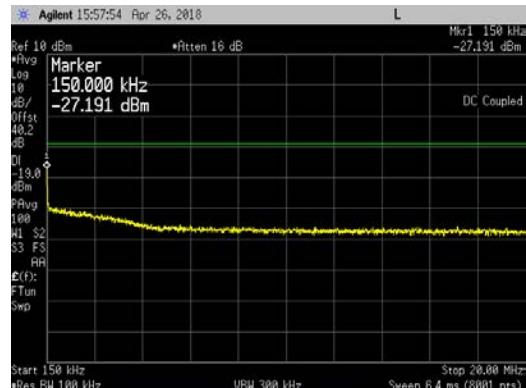


Band 14 LTE5 Ch BW _ 64QAM _ Middle Channel (763.0MHz) at 80 watts/carrier:

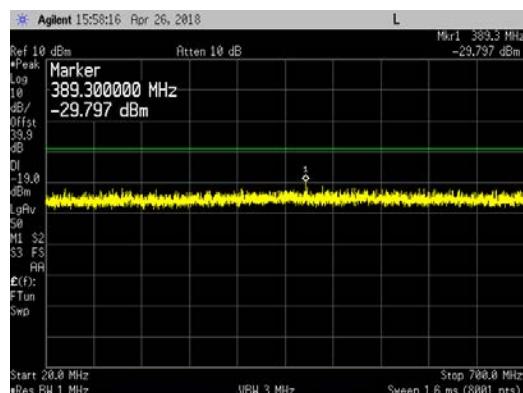
9kHz to 150kHz



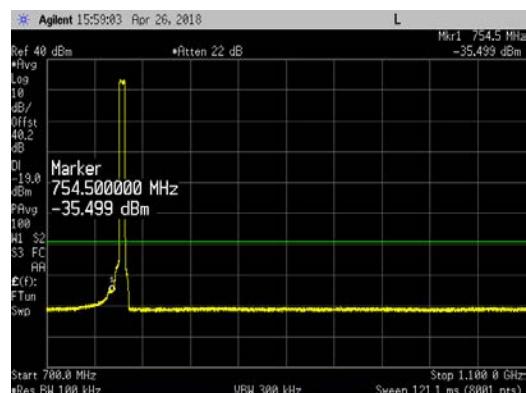
150kHz to 20MHz



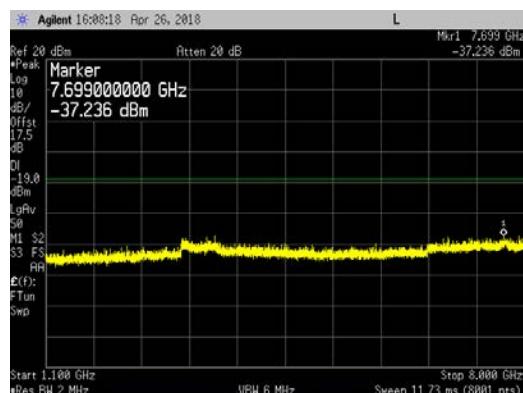
20MHz to 700MHz



700MHz to 1.1GHz

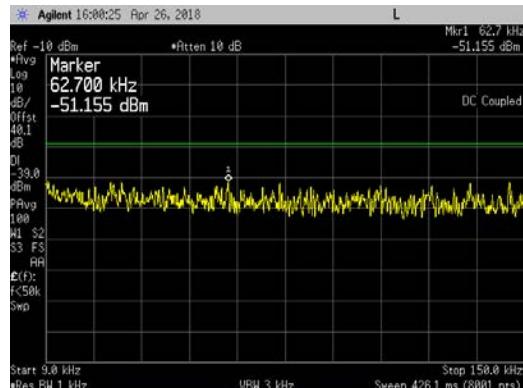


1.1GHz to 8GHz

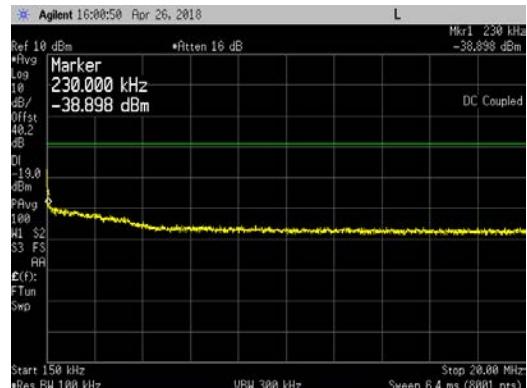


Band 14 LTE5 Ch BW _ 256QAM _ Middle Channel (763.0MHz) at 80 watts/carrier:

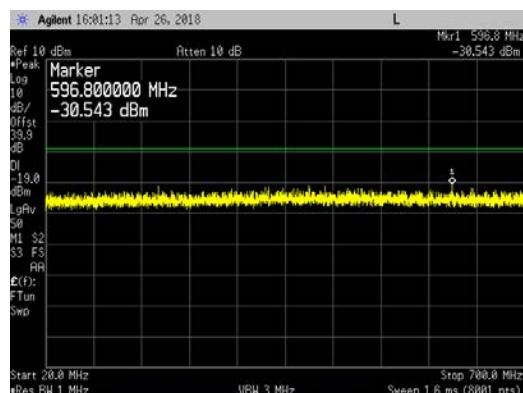
9kHz to 150kHz



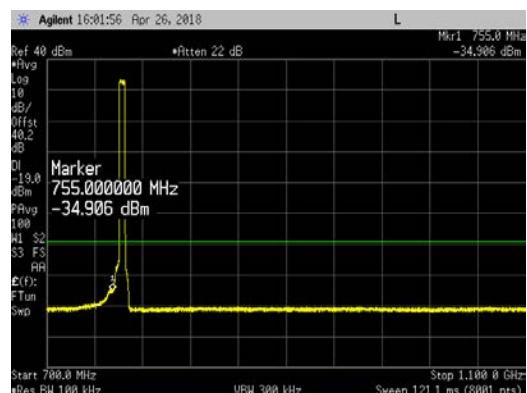
150kHz to 20MHz



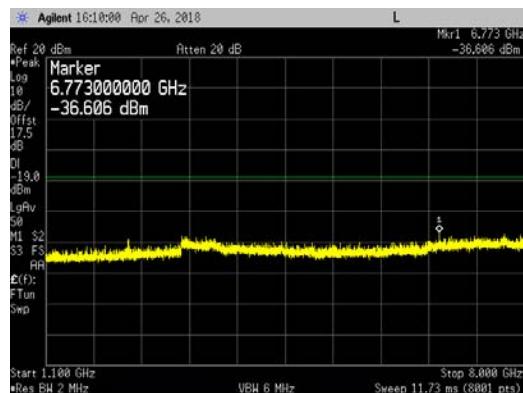
20MHz to 700MHz



700MHz to 1.1GHz

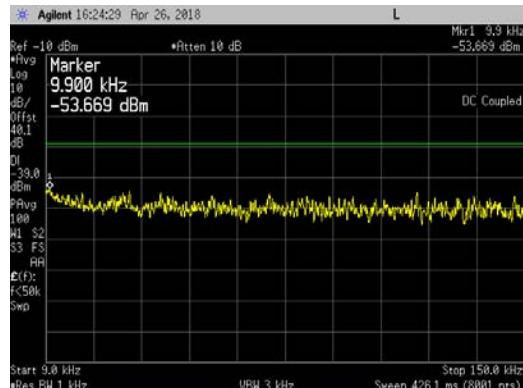


1.1GHz to 8GHz

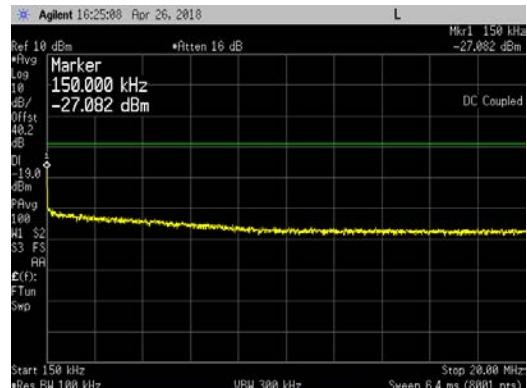


Band 14 LTE10 Ch BW _ QPSK _ Middle Channel (763.0MHz) at 80 watts/carrier:

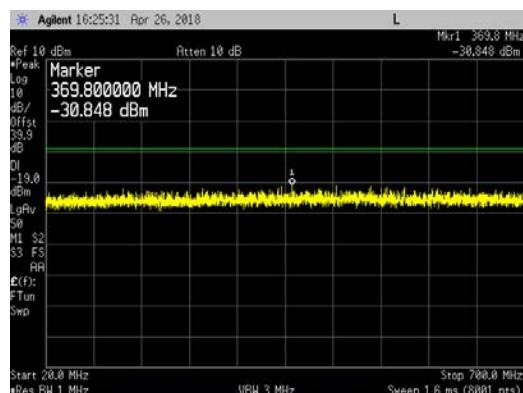
9kHz to 150kHz



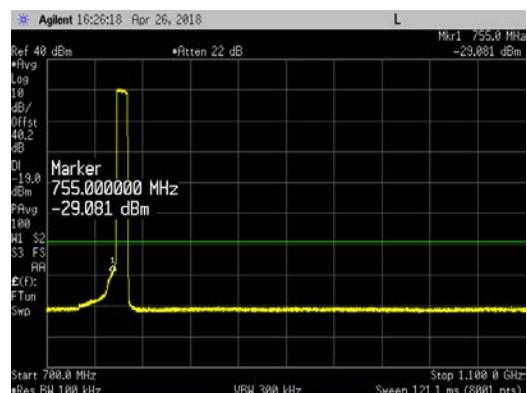
150kHz to 20MHz



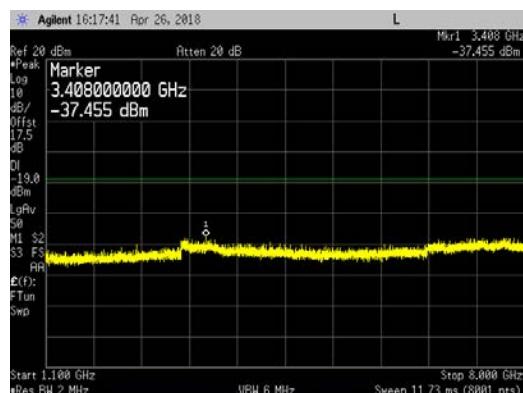
20MHz to 700MHz



700MHz to 1.1GHz

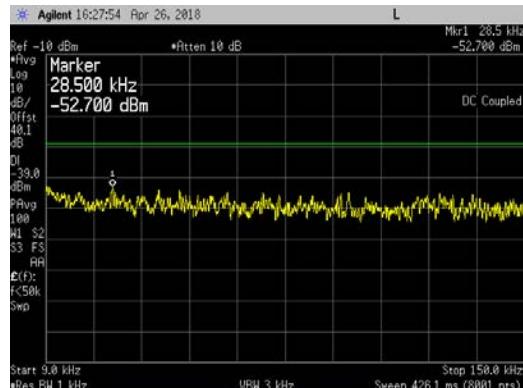


1.1GHz to 8GHz

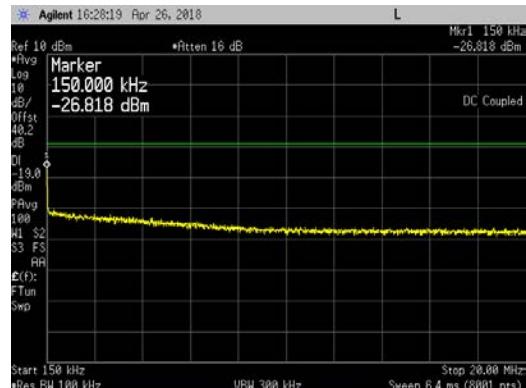


Band 14 LTE10 Ch BW _ 16QAM _ Middle Channel (763.0MHz) at 80 watts/carrier:

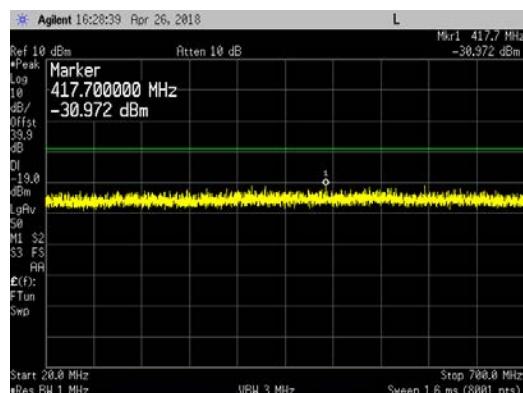
9kHz to 150kHz



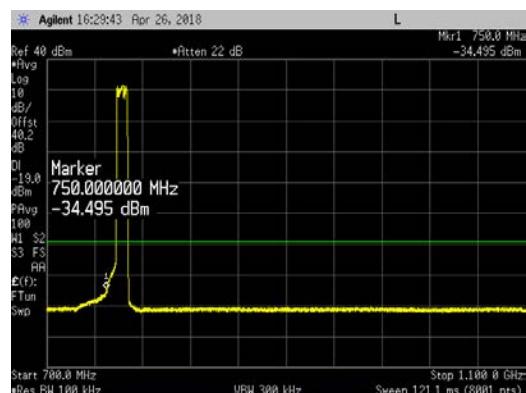
150kHz to 20MHz



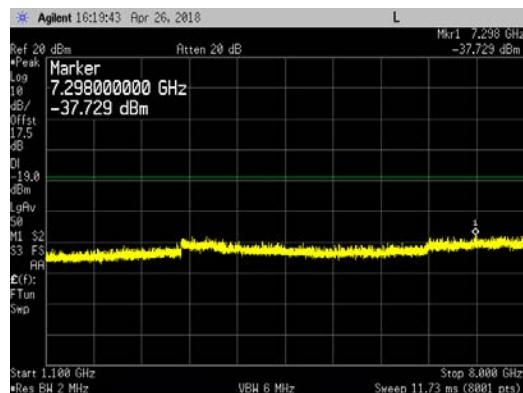
20MHz to 700MHz



700MHz to 1.1GHz

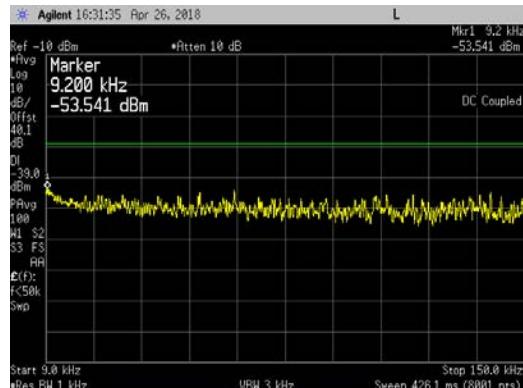


1.1GHz to 8GHz

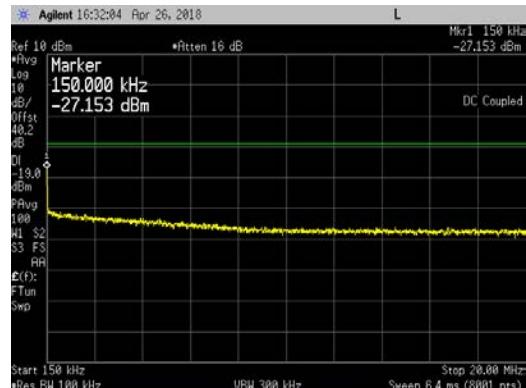


Band 14 LTE10 Ch BW _ 64QAM _ Middle Channel (763.0MHz) at 80 watts/carrier:

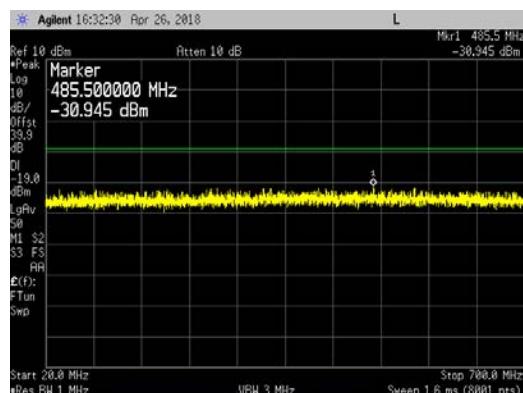
9kHz to 150kHz



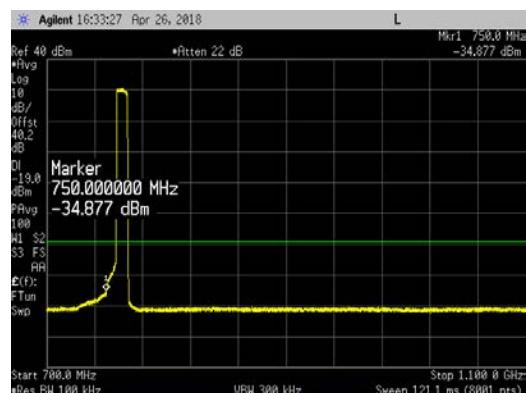
150kHz to 20MHz



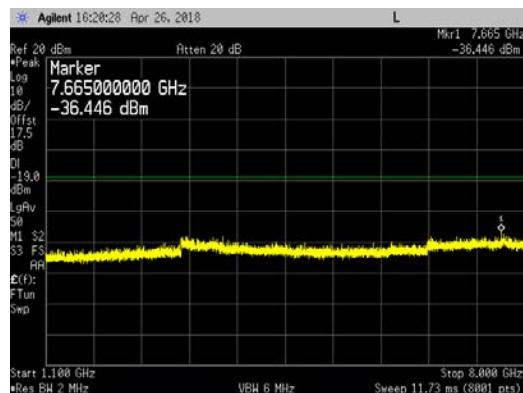
20MHz to 700MHz



700MHz to 1.1GHz



1.1GHz to 8GHz

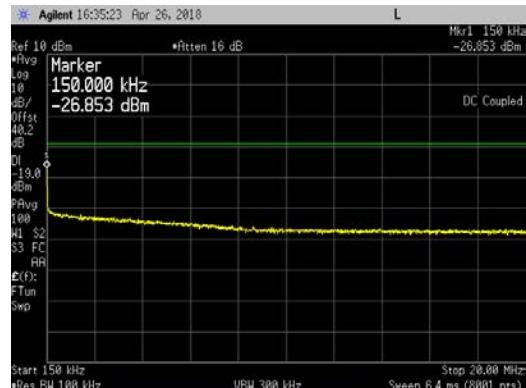


Band 14 LTE10 Ch BW _ 256QAM _ Middle Channel (763.0MHz) at 80 watts/carrier:

9kHz to 150kHz



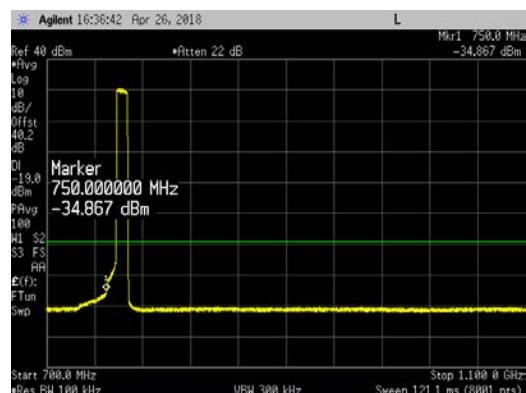
150kHz to 20MHz



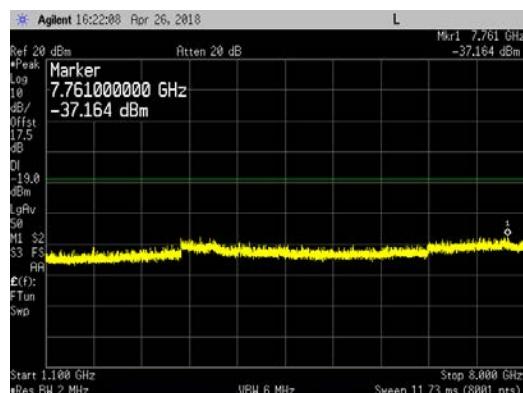
20MHz to 700MHz



700MHz to 1.1GHz



1.1GHz to 8GHz



Note that the conducted spurious emission plots/measurement results for the second test with the 3GPP Band 12 and the 3GPP Band 14 transmitters enabled simultaneously at 40 watts per carrier (or 80 watts/antenna port) are in Appendix A.

Transmitter Antenna Port Conducted Emissions in 1559MHz to 1610MHz Frequency Range

Conducted emissions in the frequency range 1559MHz to 1610MHz were measured. The EIRP limit in this band is -70dBW/MHz for wideband signals and -80dBW for discrete emissions of bandwidths less than 700Hz as shown in FCC 90.543(f). This equates to an EIRP of -40dBm/MHz for wideband emissions and -50dBm/MHz for discrete emissions.

The limit is adjusted to -46 dBm [-40 dBm -10 log (4)] for wideband signals and -56dBm [-50 dBm -10 log (4)] for discrete emissions per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

All measurements were made at AHLBA antenna port 1. Tests were conducted with carriers at maximum power with single and dual band operation. A Band 14 Dual Carrier LTE 5 test case was also performed. The RRH was tested with all LTE modulation types (QPSK, 16QAM, 64QAM and 256QAM) for all available LTE bandwidths (5MHz and 10MHz). Test cases with Band 12 and Band 14 carriers at the bottom, middle and top channels were conducted. The AHLBA configured for Band 14 LTE10 may operate only on the middle channel since the operational bandwidth is 10MHz wide.

Measurements were performed with the spectrum analyzer in the RMS average mode over 100 traces. A 1MHz RBW and 3MHz VBW was used for all measurements. A 1.1GHz high pass filter was used to block the carrier fundamental frequency to reduce the measurement instrumentation noise floor level. The total measurement RF path loss of the test setup (attenuator, filter and test cables) of 9.7dB is accounted for by the spectrum analyzer reference level offset.

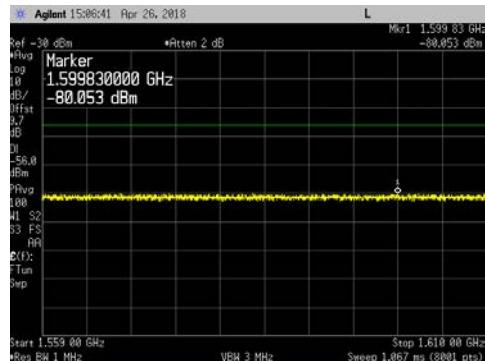
All readings were at the measurement instrumentation noise floor. The highest (worst case) emission from the measurement data was -79.641dBm or -109.641 dBW. The results are summarized in the following table.

Channel BW, Ch Frequency, Carrier Power		Conducted Emissions in 1559MHz to 1610MHz Frequency Range (dBm)			
Band 12	Band 14	QPSK	16QAM	64QAM	256QAM
LTE5, MC, 80 Watts	Carrier Off	-80.053	-79.868	-79.641	-80.042
LTE10, MC, 80 Watts	Carrier Off	-80.008	-79.686	-80.068	-80.038
Carrier Off	LTE5, MC, 80 Watts	-80.001	-80.010	-79.867	-79.949
Carrier Off	LTE10, MC, 80 Watts	-80.183	-79.931	-79.895	-80.006
Carrier Off	Dual LTE 5, BC & TC, 40W + 40W	-79.952	-80.165	-80.146	-80.062
LTE5, MC, 40 Watts	LTE5, MC, 40 Watts	-79.982	-79.881	-80.140	-79.811
LTE10, MC, 40 Watts	LTE10, MC, 40 Watts	-79.940	-80.524	-80.100	-79.925
LTE5, BC, 40 Watts	LTE10, MC, 40 Watts	-79.915	-80.103	-80.075	-79.709
LTE5, TC, 40 Watts	LTE10, MC, 40 Watts	-79.876	-79.998	-80.076	-79.706

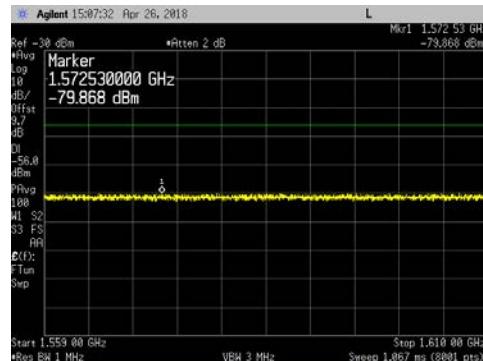
Conducted emission plots/measurements for the 1559MHz to 1610MHz frequency range are provided in the following pages. The display line on the plots reflects the required worse case limit (-56dBm).

Band 12_LTE5_Middle Channel (737MHz) at 80W & Band 14_Carrier Off:

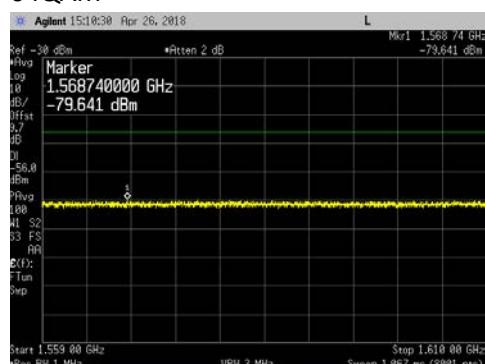
QPSK



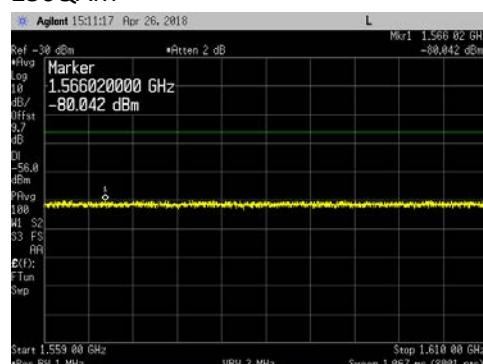
16QAM



64QAM

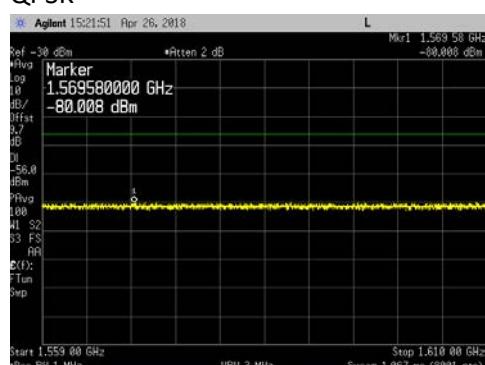


256QAM

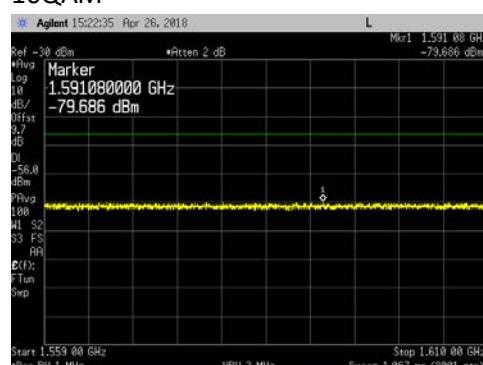


Band 12_LTE10_Middle Channel (737MHz) at 80W & Band 14_Carrier Off:

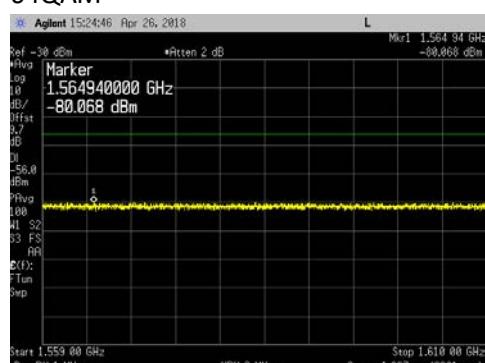
QPSK



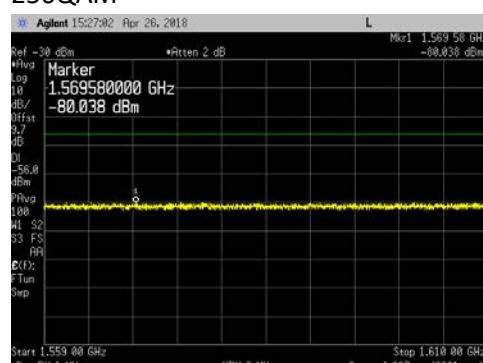
16QAM



64QAM

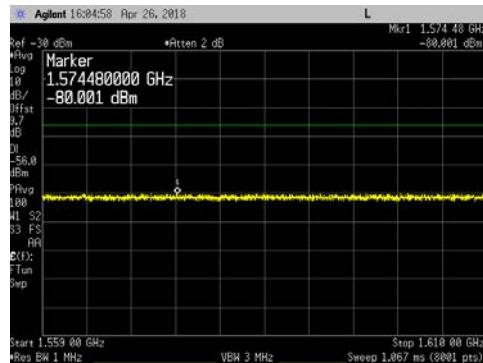


256QAM

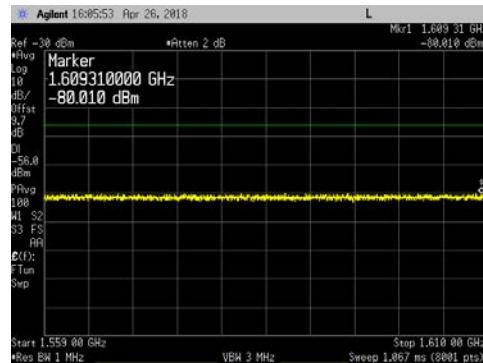


Band 12_Carrier Off & Band 14_LTE5_Middle Channel (763MHz) at 80W:

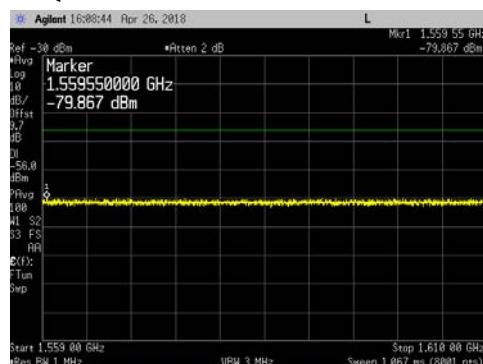
QPSK



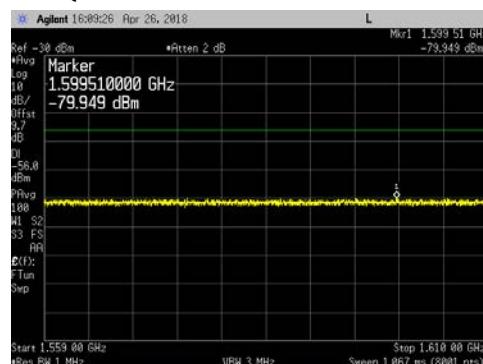
16QAM



64QAM

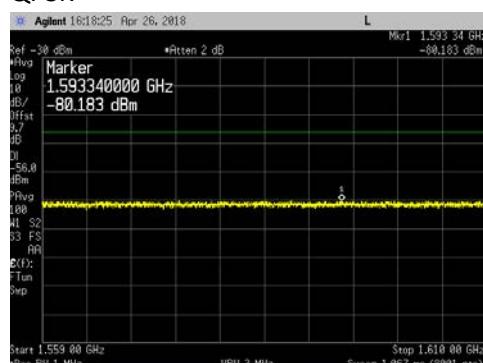


256QAM

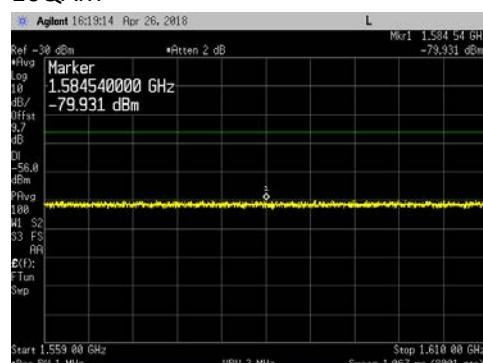


Band 12_Carrier Off & Band 14_LTE10_Middle Channel (763MHz) at 80W:

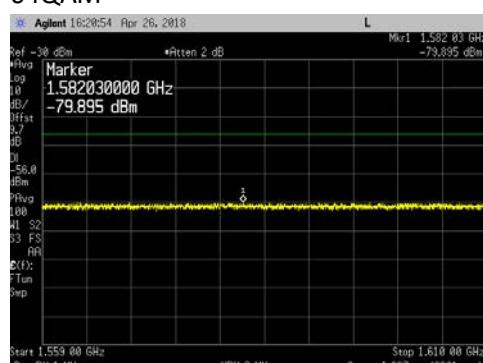
QPSK



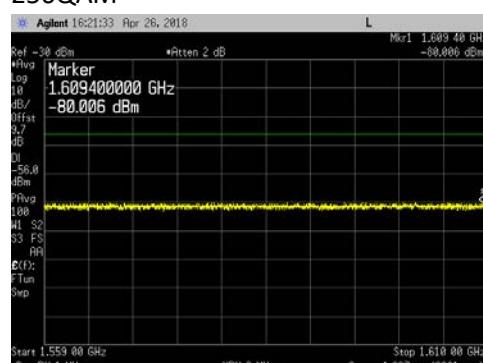
16QAM



64QAM

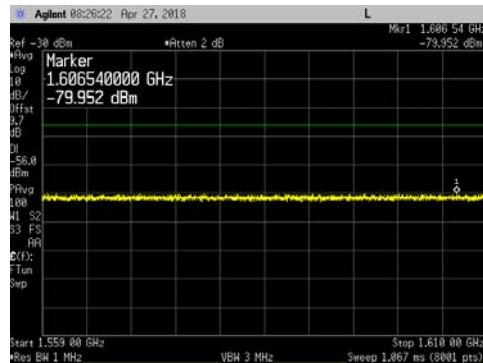


256QAM

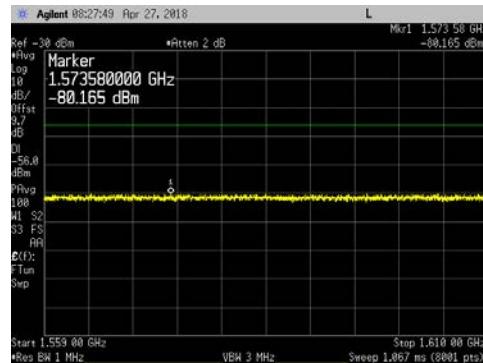


Band 12_Carrier Off & Band 14_Dual LTE5_BC & TC (760.5MHz & 765.5MHz) at 40W + 40W:

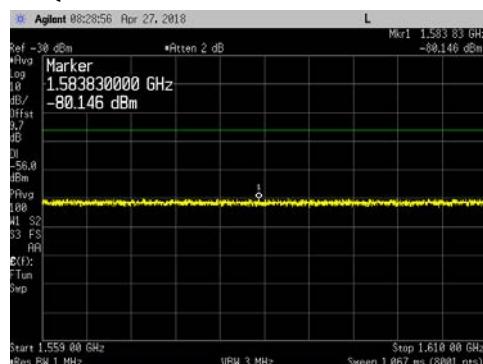
QPSK



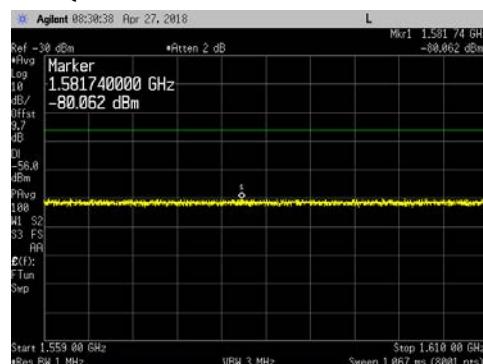
16QAM



64QAM

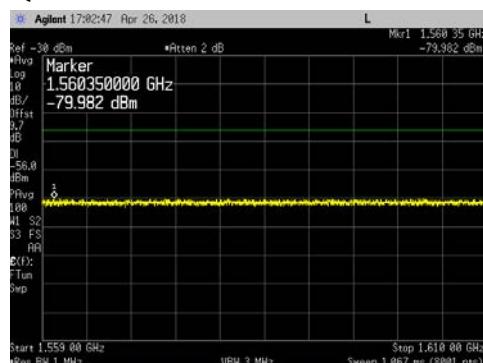


256QAM

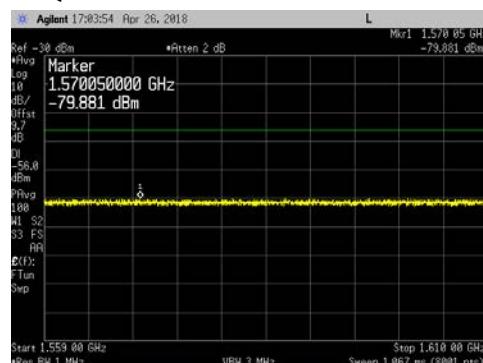


Band 12_LTE5_Middle Channel (737MHz) at 40W & Band 14_LTE5_Middle Channel (763MHz) at 40W:

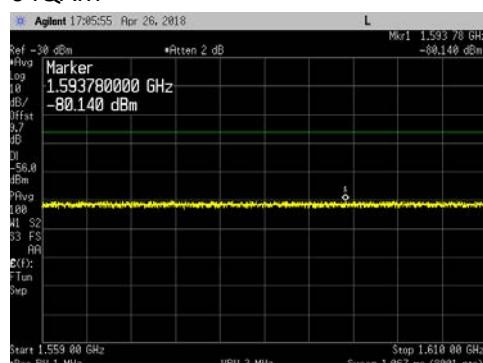
QPSK



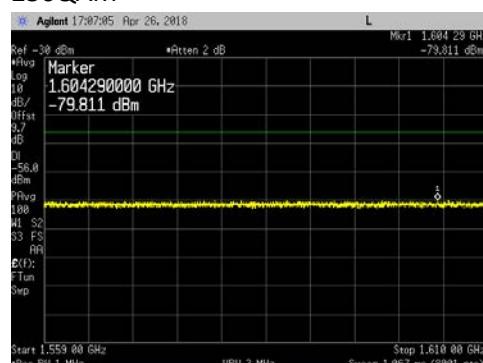
16QAM



64QAM

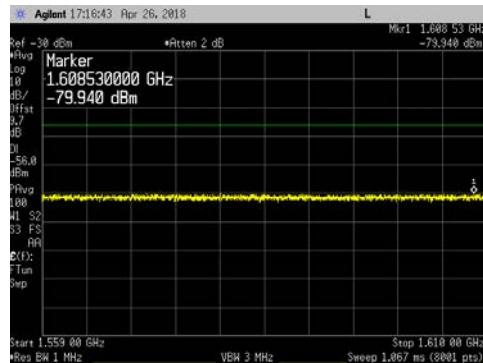


256QAM

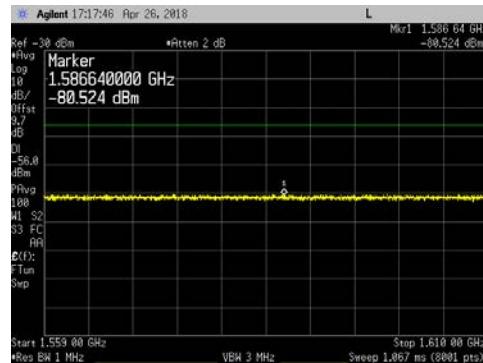


Band 12_LTE10_Middle Ch (737MHz) at 40W & Band 14_LTE10_Middle Ch (763MHz) at 40W:

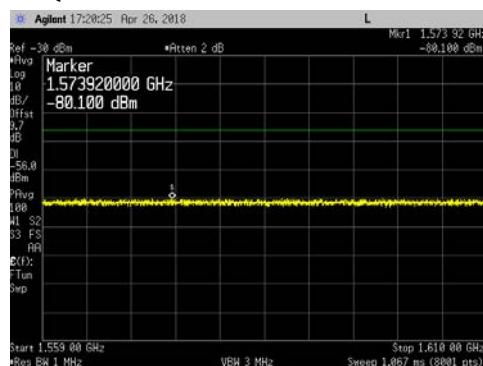
QPSK



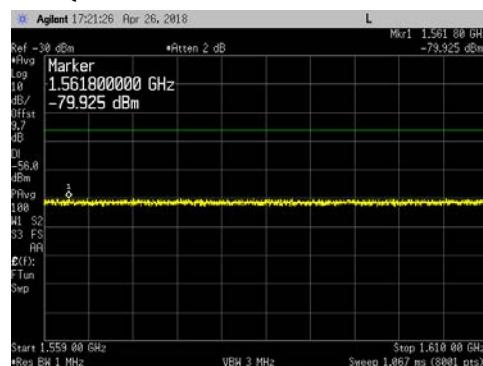
16QAM



64QAM

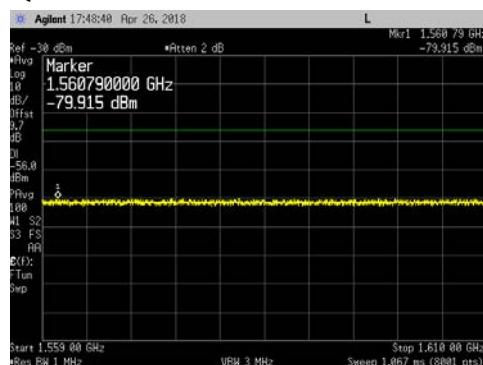


256QAM

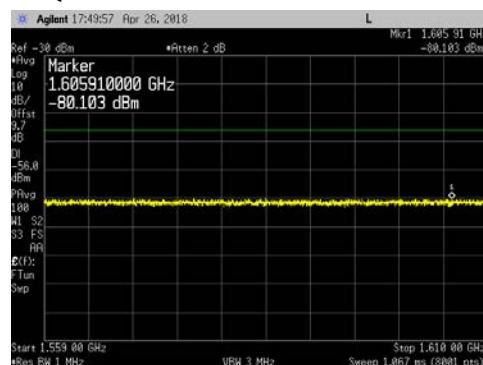


Band 12_LTE5_Bottom Ch (731.5MHz) at 40W & Band 14_LTE10_Middle Ch (763MHz) at 40W:

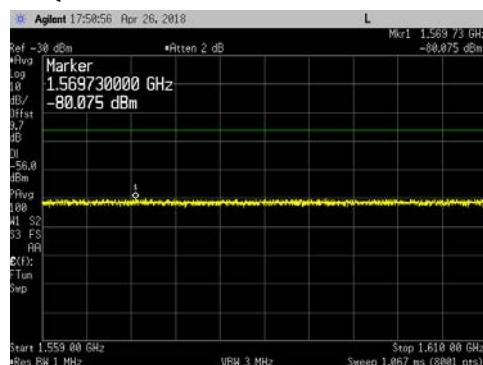
QPSK



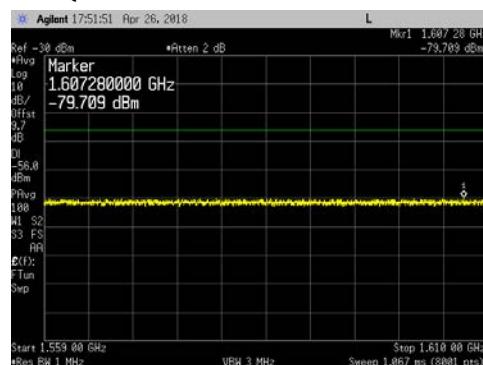
16QAM



64QAM

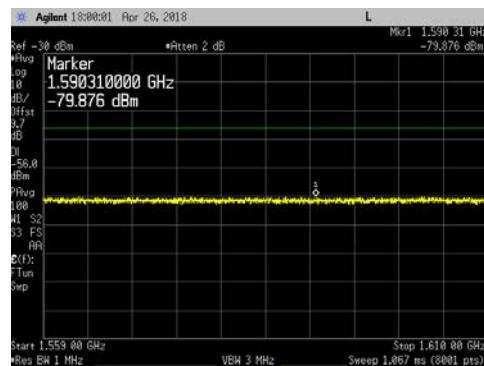


256QAM

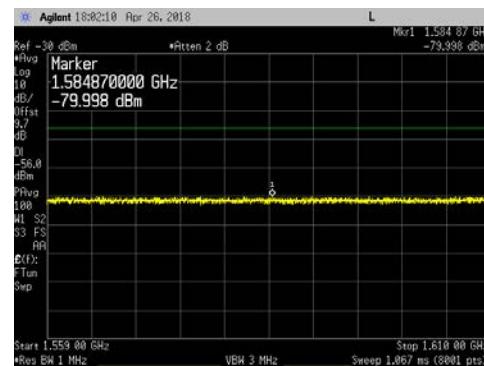


Band 12_LTE5_Top Ch (742.5MHz) at 40W & Band 14_LTE10_Middle Ch (763MHz) at 40W:

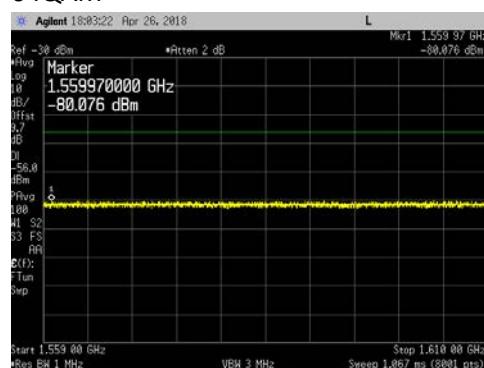
QPSK



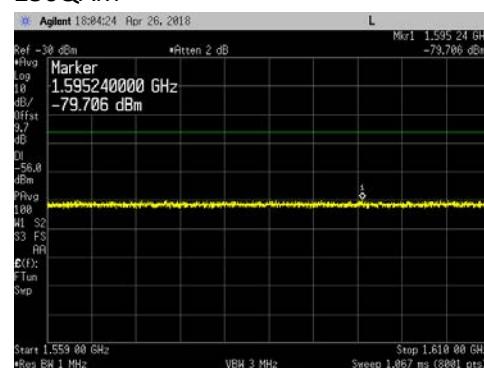
16QAM



64QAM

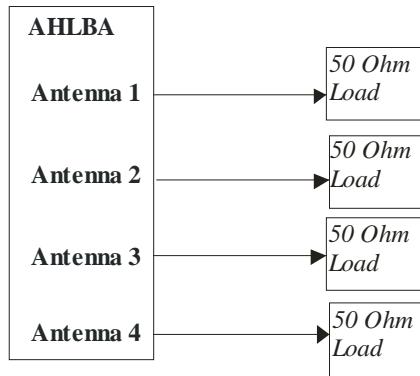


256QAM



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.



Based on antenna port conducted spurious emissions tests results, preliminary scans for radiated spurious emissions were performed in 30MHz – 8GHz frequency range.

Two test configurations (with the RRH fan assembly) are needed for radiated spurious emission measurements to prove compliance in the 3GPP Band 14 frequency range. The first test is with 3GPP Band 14 carriers operating at 80W/carrier (3GPP Band 12 carriers are not enabled). The second test is with the 3GPP Band 12 carriers and 3GPP Band 14 carriers operating simultaneously (at 40 watts per carrier and total carrier power of 80 watts per antenna port).

The bottom, middle and top frequency channels for each band are enabled. The AHLBA band 14 transmitters are configured for LTE10 and may operate only on the middle channel since the operational bandwidth is 10MHz wide (the band 14 carrier covers the entire downlink band). The carrier configurations for the radiated emission testing are provided below. Final maximized radiated emissions are measured in these modes.

Frequency Band	Antenna Port	RF BW	EARFCN	Transmit Frequency	Carrier Power
Band 12	1	5 MHz	5035 (Bottom Channel)	731.5 MHz	0 Watts
Band 12	2	5 MHz	5090 (Middle Channel)	737.0 MHz	0 Watts
Band 12	3	5 MHz	5090 (Middle Channel)	737.0 MHz	0 Watts
Band 12	4	5 MHz	5145 (Top Channel)	742.5 MHz	0 Watts
Band 14	1	10 MHz	5330 (B, M, T Channels)	763.0 MHz	80 Watts
Band 14	2	10 MHz	5330 (B, M, T Channels)	763.0 MHz	80 Watts
Band 14	3	10 MHz	5330 (B, M, T Channels)	763.0 MHz	80 Watts
Band 14	4	10 MHz	5330 (B, M, T Channels)	763.0 MHz	80 Watts

Band 14 at Maximum (80W/carrier) and Band 12 Carriers not Enabled

Frequency Band	Antenna Port	RF BW	EARFCN	Transmit Frequency	Carrier Power
Band 12	1	5 MHz	5035 (Bottom Channel)	731.5 MHz	40 Watts
Band 12	2	5 MHz	5090 (Middle Channel)	737.0 MHz	40 Watts
Band 12	3	5 MHz	5090 (Middle Channel)	737.0 MHz	40 Watts
Band 12	4	5 MHz	5145 (Top Channel)	742.5 MHz	40 Watts
Band 14	1	10 MHz	5330 (B, M, T Channels)	763.0 MHz	40 Watts
Band 14	2	10 MHz	5330 (B, M, T Channels)	763.0 MHz	40 Watts
Band 14	3	10 MHz	5330 (B, M, T Channels)	763.0 MHz	40 Watts
Band 14	4	10 MHz	5330 (B, M, T Channels)	763.0 MHz	40 Watts

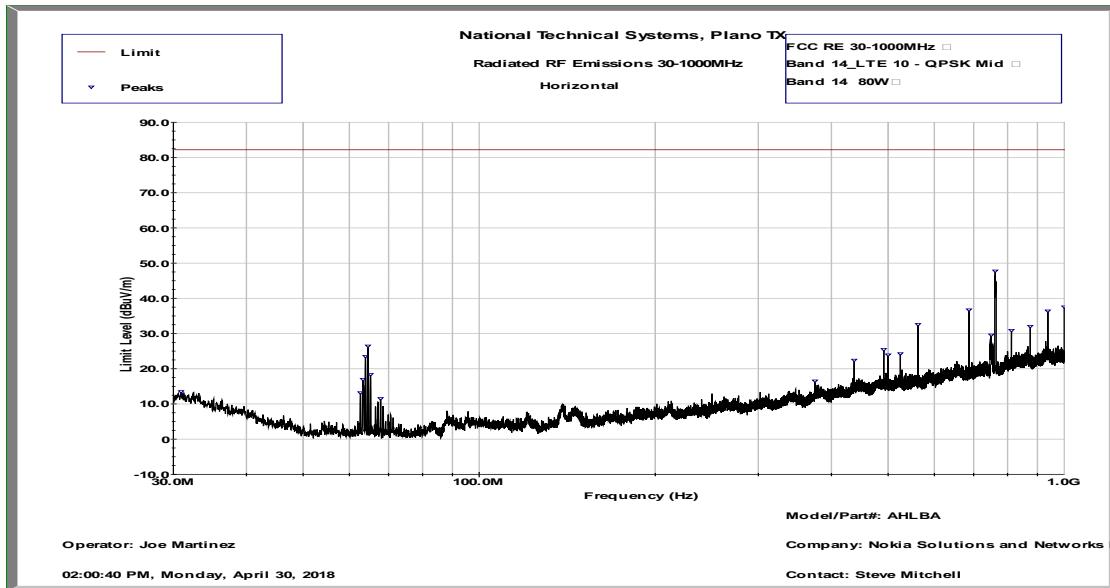
Band 12 and Band 14 Carriers Enabled Simultaneously (40W/carrier)

Note that the radiated spurious emission plots/measurement results for the second test with the 3GPP Band 12 and the 3GPP Band 14 transmitters enabled simultaneously at 40 watts per carrier (or 80 watts/antenna port) are in Appendix A.

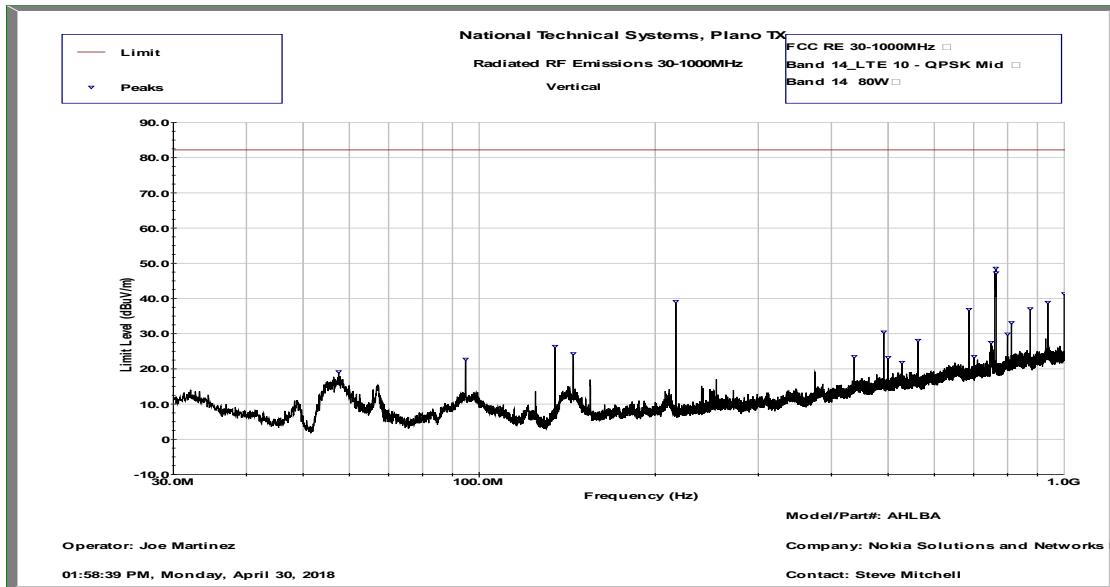
RE Data - Band 14

Frequency	Polarity	Peaks Raw	Antenna	Pre Amp	Cables	Peaks	Limit	Margin	Tower	Turntable
MHz	V/H	dBuV/m	dB	dB	dB	dBuV/m	dBuV/m	dB	cm	Degrees
3932.26	V	42.877	32.64	-36.953	4.967	43.53	82.2	-38.67	200	307.1
6881.36	V	37.629	35.455	-37.465	6.488	42.108	82.2	-40.092	176.9	360.1
937.48	V	46.377	25.7	-37.002	3.755	38.835	82.2	-43.365	131	23.2
3932.01	V	37.57	32.64	-36.953	4.967	38.223	82.2	-43.977	99.9	359.9
2949.19	V	41.032	29.566	-37.32	4.492	37.77	82.2	-44.43	200.1	360
875.01	V	45.889	24.199	-36.781	3.651	36.959	82.2	-45.241	300.1	270.9
687.49	V	49.423	21.3	-36.485	2.596	36.833	82.2	-45.367	183	0.9
2948.92	H	40.007	29.565	-37.32	4.492	36.744	82.2	-45.456	147	63.8
687.49	H	49.219	21.3	-36.485	2.596	36.629	82.2	-45.571	100	189
937.50	H	43.895	25.7	-37.002	3.755	36.352	82.2	-45.848	105.9	220.1
7791.72	H	31.294	36.63	-37.852	6.211	36.284	82.2	-45.916	199	-0.1
7865.12	H	30.715	36.692	-38.118	6.092	35.383	82.2	-46.817	199	0
5898.19	V	32.567	34.344	-37.161	5.567	35.315	82.2	-46.885	111	360
812.49	V	41.894	24.6	-36.698	3.232	33.028	82.2	-49.172	177.1	165.1
3932.20	H	32.049	32.64	-36.953	4.967	32.702	82.2	-49.498	200.1	14.8
562.48	H	47.112	20.2	-36.924	1.98	32.368	82.2	-49.832	135	359.1
875.00	H	40.859	24.2	-36.781	3.651	31.929	82.2	-50.271	100	234.2
8532.89	H	26.623	37.372	-38.207	4.892	30.682	82.2	-51.518	199.1	-0.1
491.50	V	45.615	19.1	-36.775	2.186	30.126	82.2	-52.074	149	134.9
6880.37	H	23.924	35.454	-37.463	6.488	28.404	82.2	-53.796	199.9	-0.2
749.06	H	38.705	23.206	-36.666	2.845	28.091	82.2	-54.109	100.1	261
562.49	V	42.711	20.2	-36.924	1.98	27.967	82.2	-54.233	148	51.1
7779.59	V	21.448	36.61	-37.808	6.231	26.481	82.2	-55.719	200	360.2
437.48	H	38.419	18.548	-36.704	2.028	22.29	82.2	-59.91	100	191.1

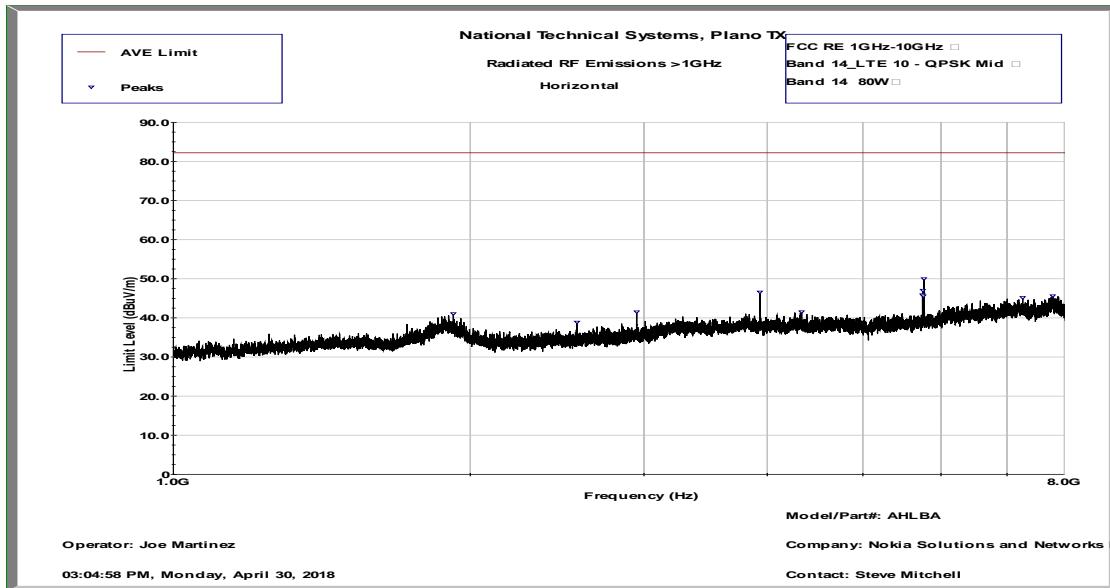
A three-meter measurement distance was used for radiated emission measurements. The highest radiated emissions detected were more than 20dB below the three-meter limit of 82.2dBuV/m (equivalent to -13dBm EIRP). Since all maximized measurements were more than 20dB below these levels, substitution measurements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



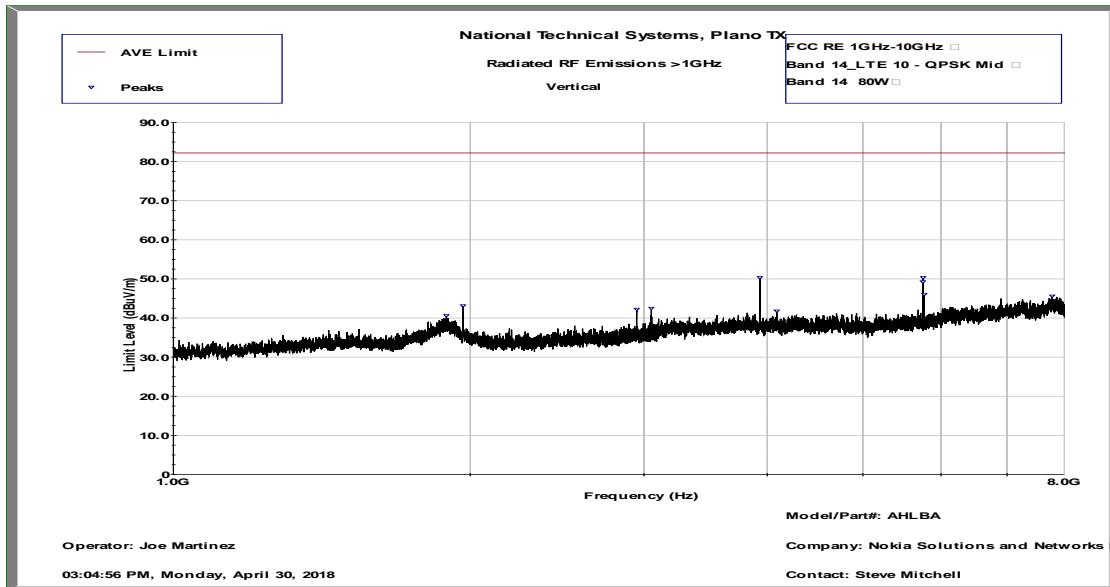
Radiated Spurious Emissions 30-1000MHz Horizontal - Band 14



Radiated Spurious Emissions 30-1000MHz Vertical - Band 14



Radiated Spurious Emissions 1-8GHz Horizontal - Band 14



Radiated Spurious Emissions 1-8GHz Vertical - Band 14

Frequency Stability/Accuracy

Carrier frequency stability of the EUT at extreme temperatures and voltages was measured. The frequency error was measured as follows:

- (1) EUT transmitting in 5MHz-QPSK-LTE mode at center channel (763.0MHz) on port 1.
- (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	0.67
100%	48.0	0.78
115%	55.2	0.71

Extreme Temperatures:

Temperature	Frequency Error (Hz) at 48VDC
-30 °C	0.53
-20 °C	0.75
-10 °C	0.70
0 °C	0.85
10 °C	0.82
20 °C	0.78
30 °C	0.63
40 °C	0.58
50 °C	0.76

Based on the results above, highest recorded frequency error (0.85Hz or ~0.001 ppm) ensures that the transmitted signal remains in its authorized frequency block at extreme voltages and temperatures. FCC 90.539(d) defines the frequency stability limit for base transmitters as 1 part per million or better.

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.