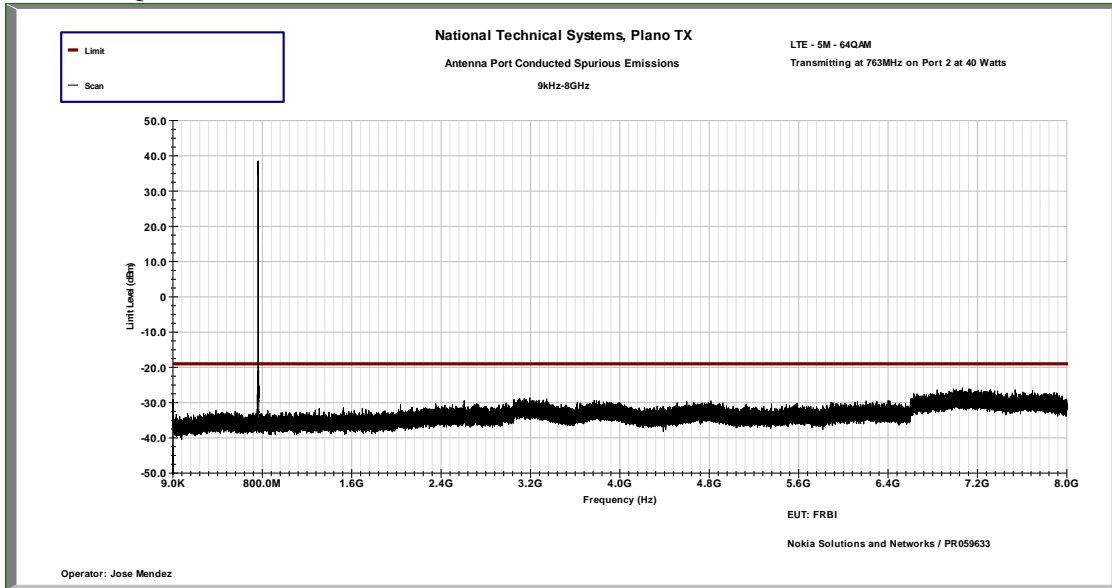
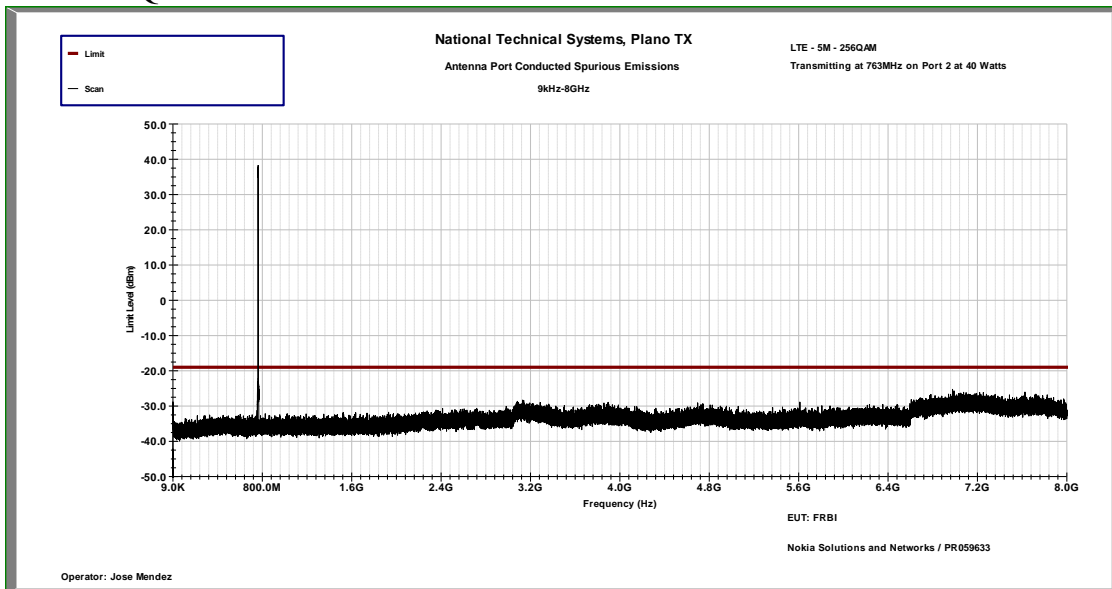


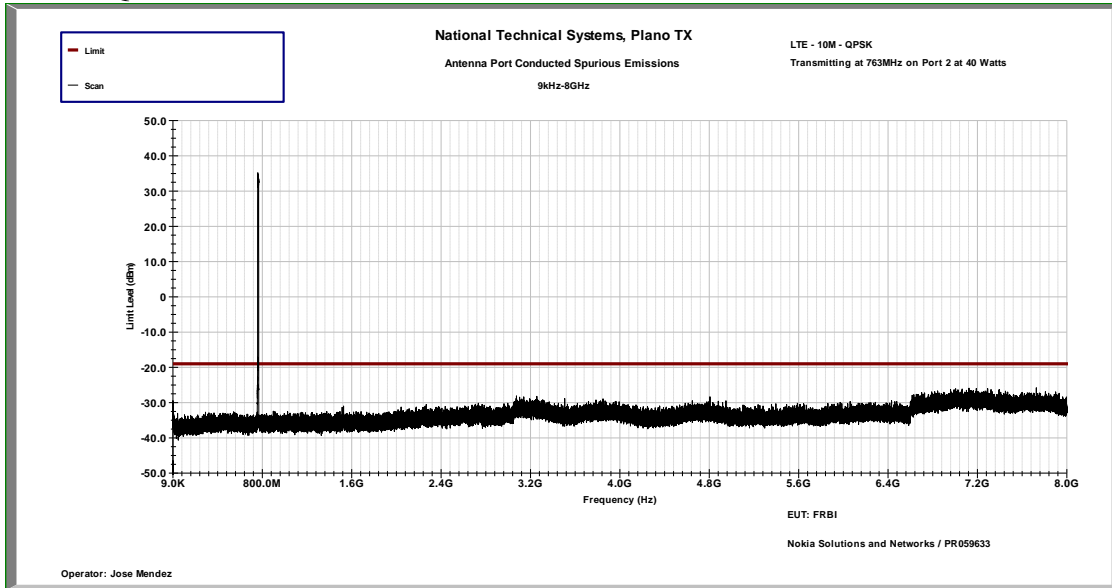
5M - LTE - 64QAM



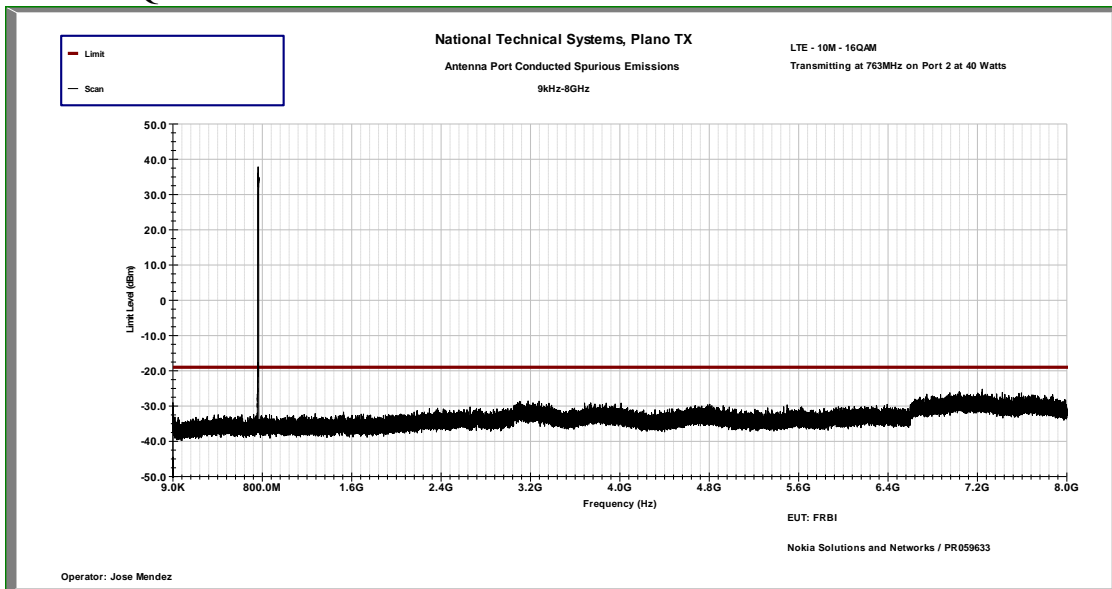
5M - LTE - 256QAM



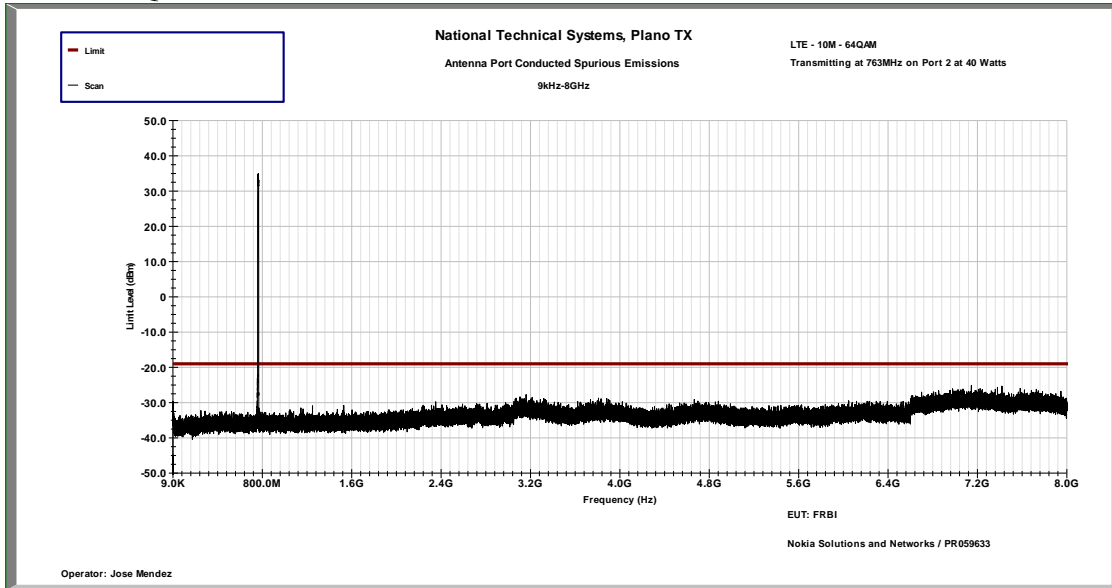
10M – LTE – QPSK



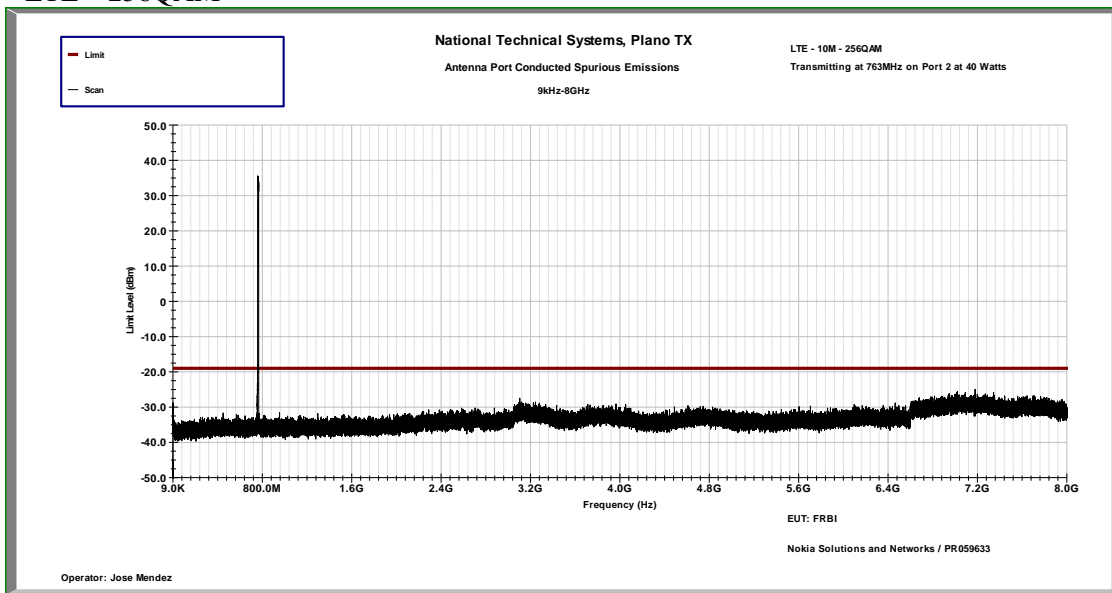
10M – LTE – 16QAM



10M - LTE - 64QAM



10M - LTE - 256QAM



The FCC section 90.543(e)(1) requires an emission limit of -46dBm for any 6.25 kHz bandwidth (i.e.:  $76 + 10\log P$ ) between frequency bands 769-775 MHz and 799-805 MHz.

Adjusting for the required measurement RBW and four port MIMO requirement the emission limit in these frequency ranges is -40 dBm [i.e.: Limit = -46 dBm/6.25kHz (FCC Limit) + 12dB (BW conversion  $10 \log [100\text{kHz}/6.25\text{kHz}] - 6\text{dB}$  (4 port MIMO))].

The FCC section 90.543(f) EIRP limit in 1559 to 1610 MHz frequency band is -70dBW/MHz for wideband signals and -80dBW for discrete emissions of bandwidths less than 700Hz. This equates to an EIRP of -40dBm/MHz for wideband emissions and -50dBm/MHz for discrete emissions. Adjusting for four port MIMO (-6dB) the emission limit is -46dBm/MHz for wideband emissions and -56dBm/MHz for discrete emissions.

In 5MHz channel bandwidth mode, low and high channels as well as dual carrier mode (low Channel + high channel) configurations were tested. In 10MHz channel bandwidth mode, unit can only operate in single carrier mode at the center channel.

All measurements were performed on Antenna Port 2. Measurements were made for three frequency ranges; FR1 at 769MHz to 775MHz, FR2 at 799MHz to 805MHz and FR3 at 1559MHz to 1610MHz.

Results summary:

	LTE - QPSK (dBm)			LTE - 16QAM (dBm)			LTE - 64QAM (dBm)			LTE - 256QAM (dBm)		
	FR1	FR2	FR3	FR1	FR2	FR3	FR1	FR2	FR3	FR1	FR2	FR3
5M	-41.616	-73.656	-80.52	-41.621	-73.543	-80.38	-41.795	-73.827	-80.368	-41.626	-73.463	-80.243
10M	-42.236	-73.499	-80.429	-42.178	-73.485	-80.305	-42.317	-73.716	-80.535	-42.134	-73.585	-80.344
5M Dual	-42.326	-73.554	-80.411	-42.238	-73.649	-80.253	-42.273	-73.66	-80.367	-42.286	-73.844	-80.424

For FR1, the measurements were performed in RMS average mode with 100kHz RBW and 300kHz VBW over 1000 traces. The total path loss of 39.9 dB was accounted for via reference level offset of the spectrum analyzer.

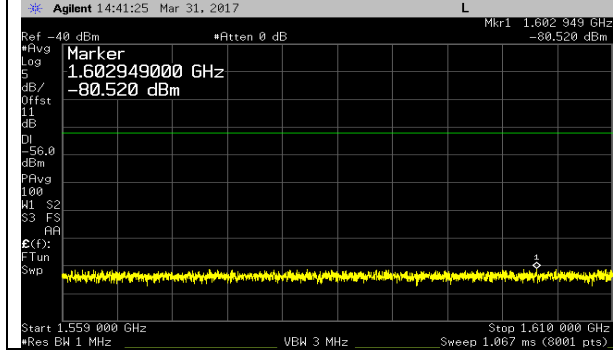
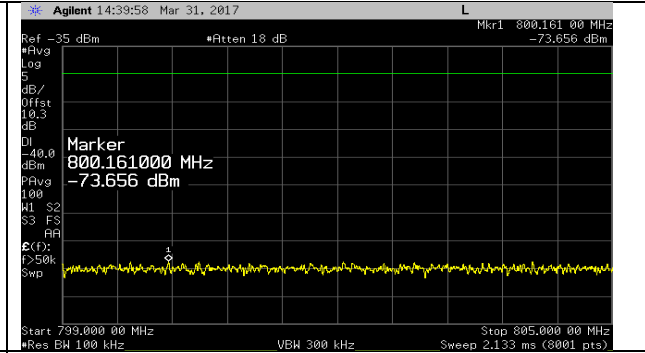
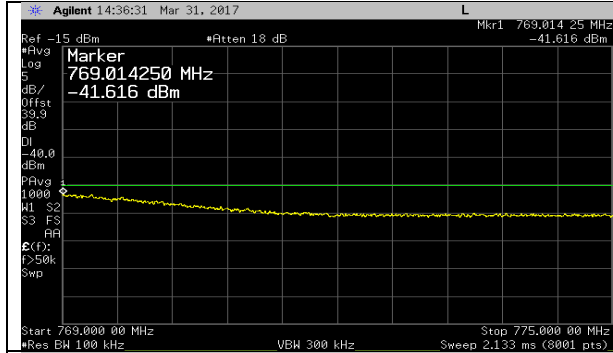
For FR2, the measurements were performed in RMS average mode with 100kHz RBW and 300kHz VBW over 100 traces. In order to reduce instrumentation noise floor a carrier blocking filter with a 10dB attenuator was used. The total path loss of 10.3dB was accounted for via reference level offset of the spectrum analyzer.

For FR3, the measurements were performed in RMS average mode with 1MHz RBW and 3MHz VBW over 100 traces. In order to reduce instrumentation noise floor a carrier blocking filter with a 10dB attenuator was used. The total path loss of 11dB was accounted for via reference level offset of the spectrum analyzer.

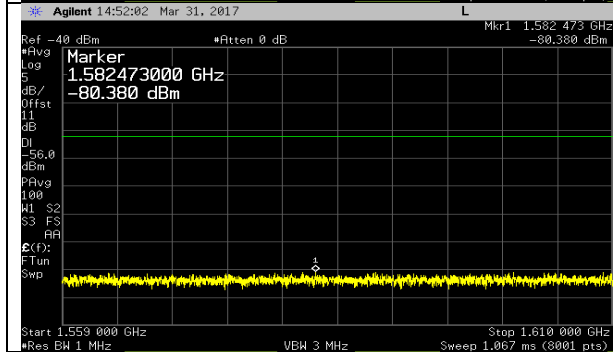
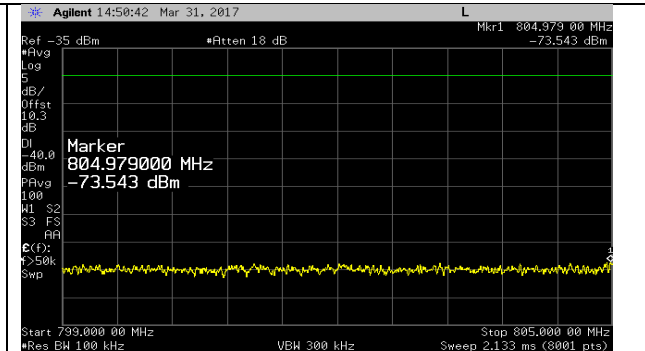
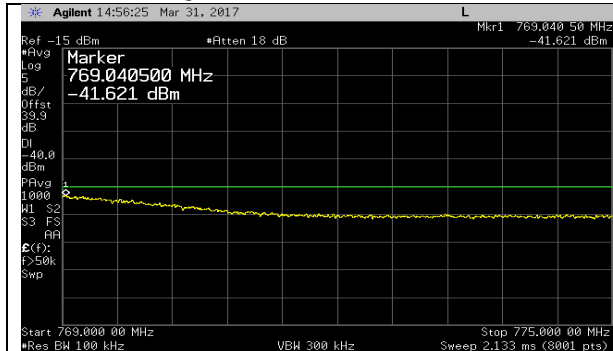
All corresponding plots are included on the following pages.

### 40 Watts Data

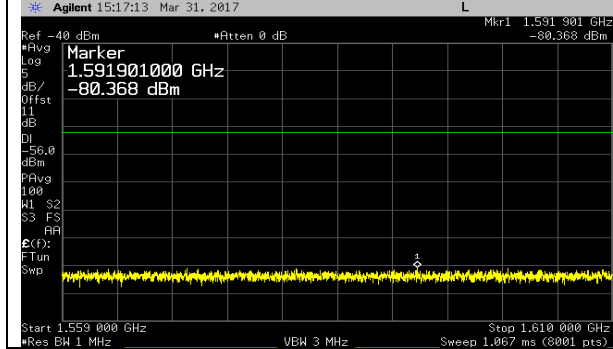
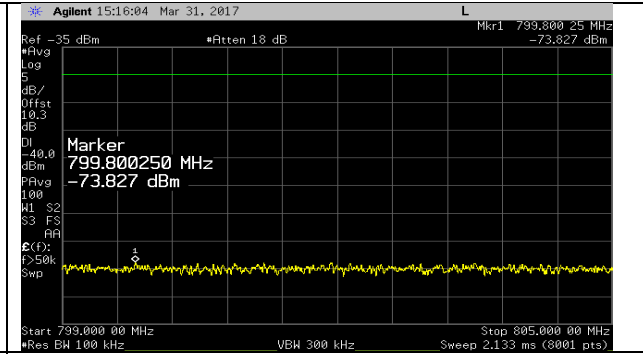
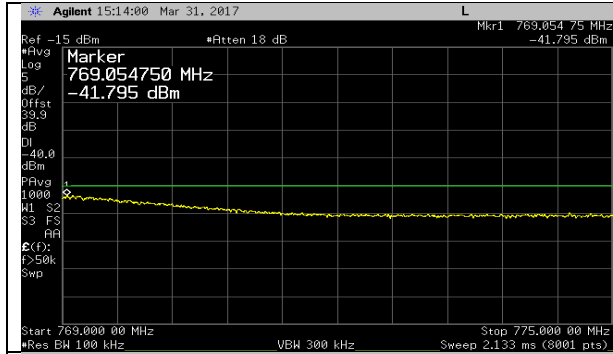
#### 5M - LTE - QPSK



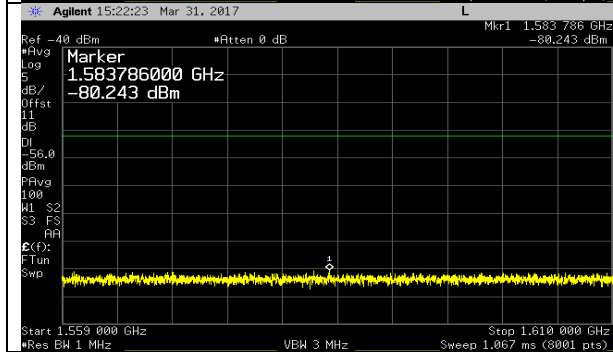
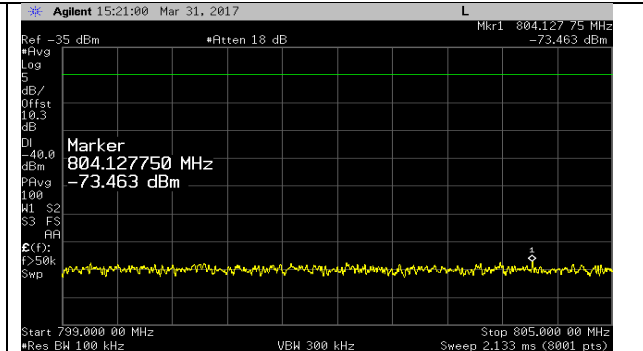
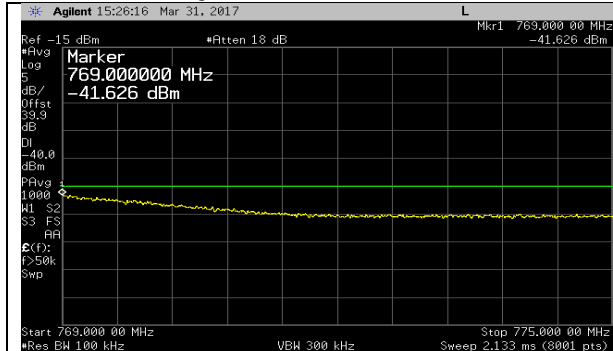
#### 5M - LTE - 16QAM



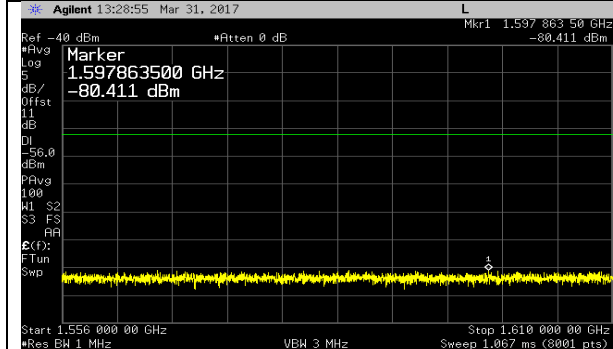
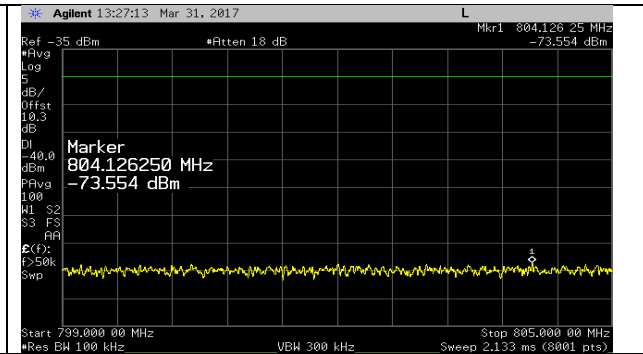
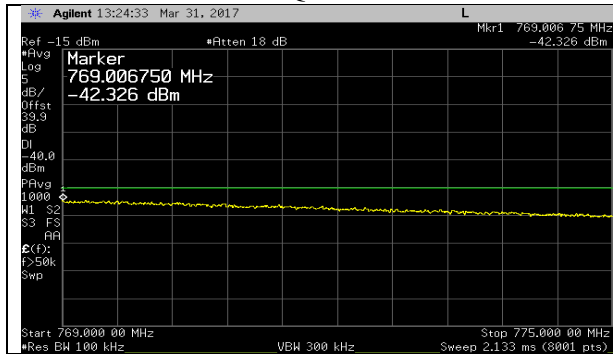
5M - LTE - 64QAM



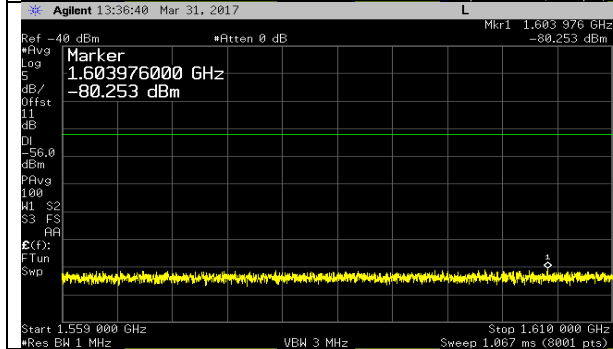
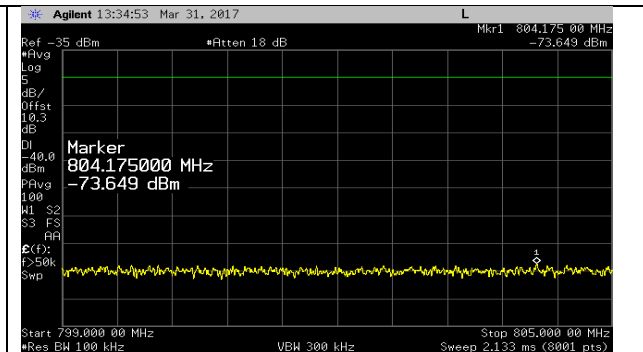
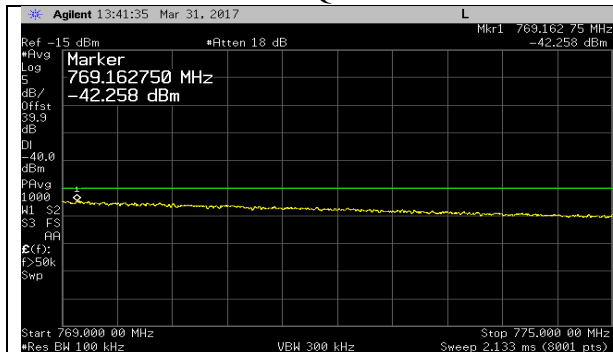
5M - LTE - 256QAM



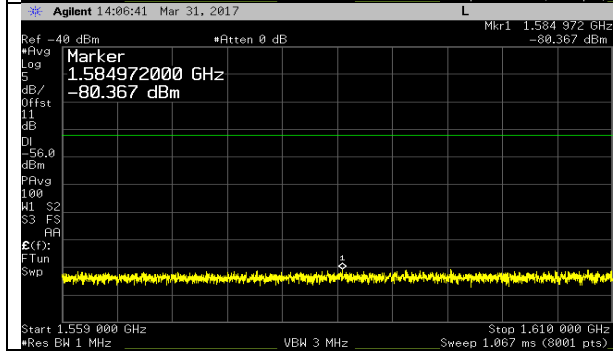
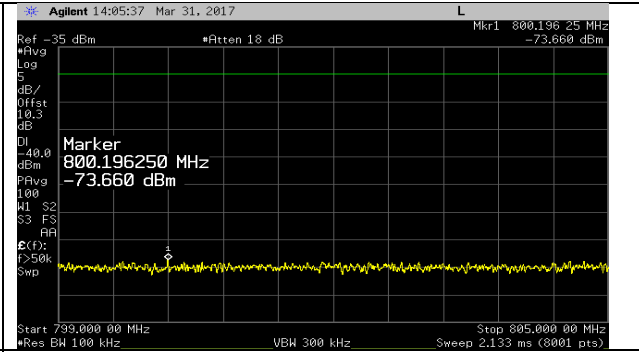
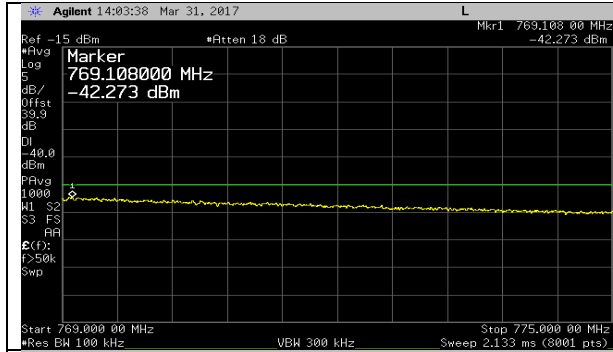
5M Dual Carrier – LTE – QPSK



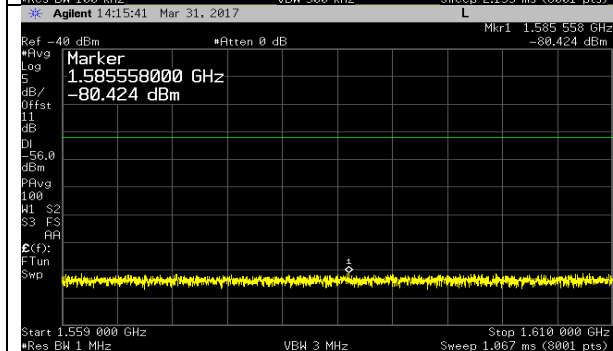
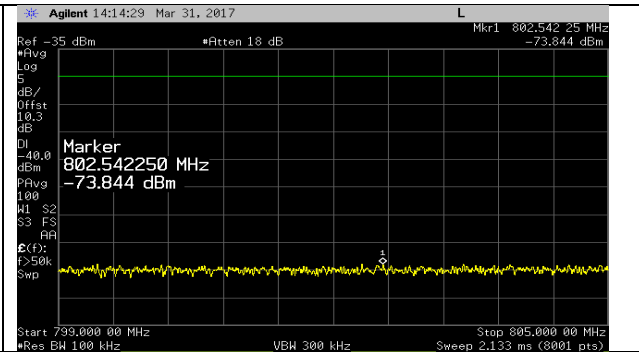
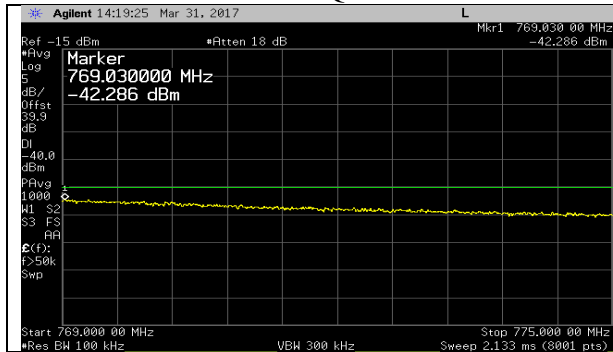
5M Dual Carrier – LTE – 16QAM



5M Dual Carrier - LTE - 64QAM

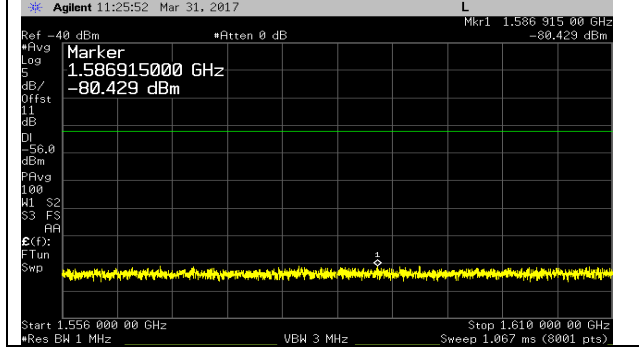
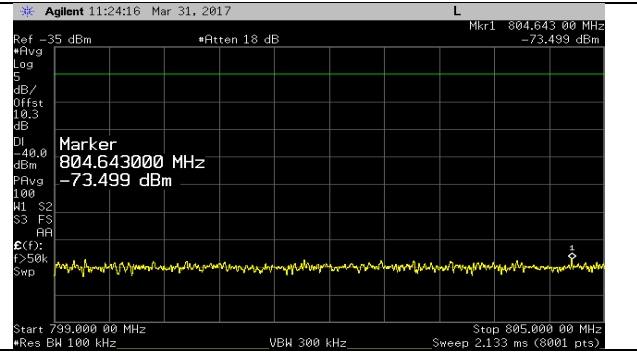
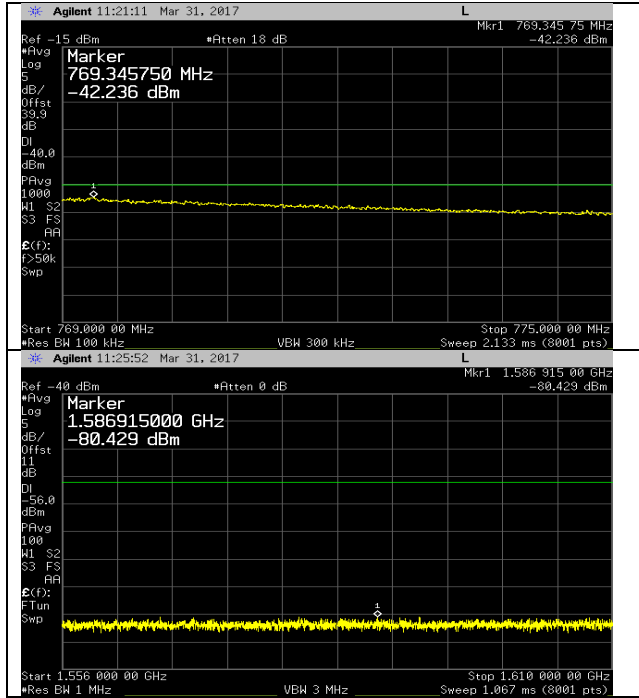


5M Dual Carrier - LTE - 256QAM

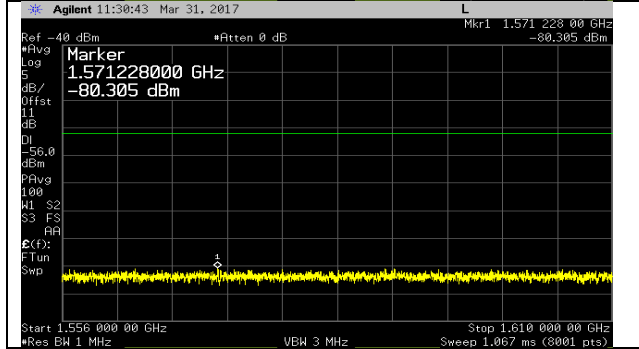
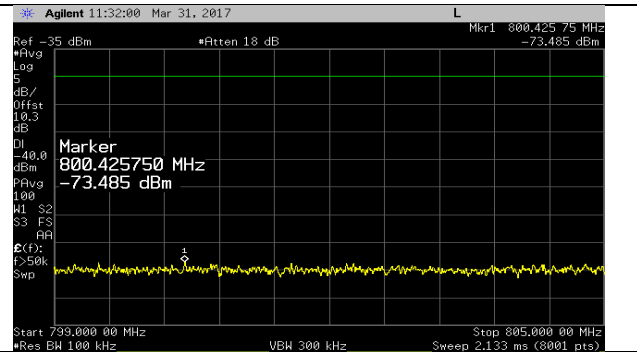
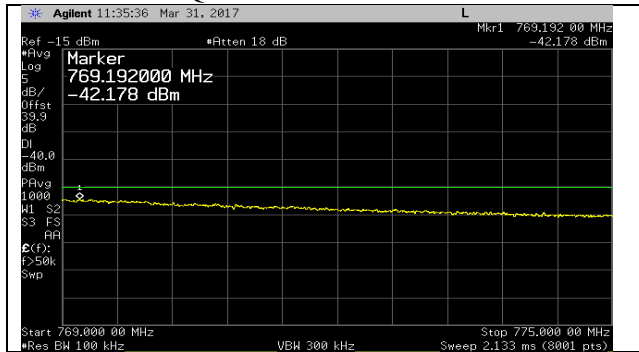




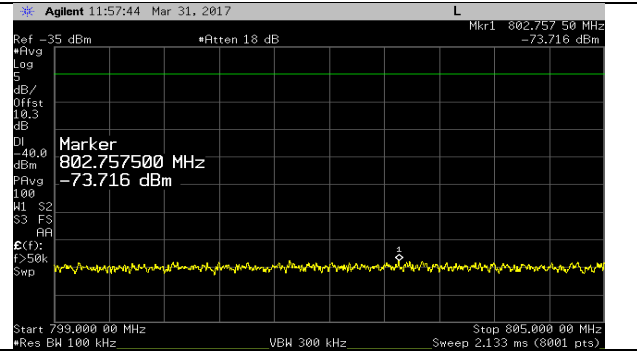
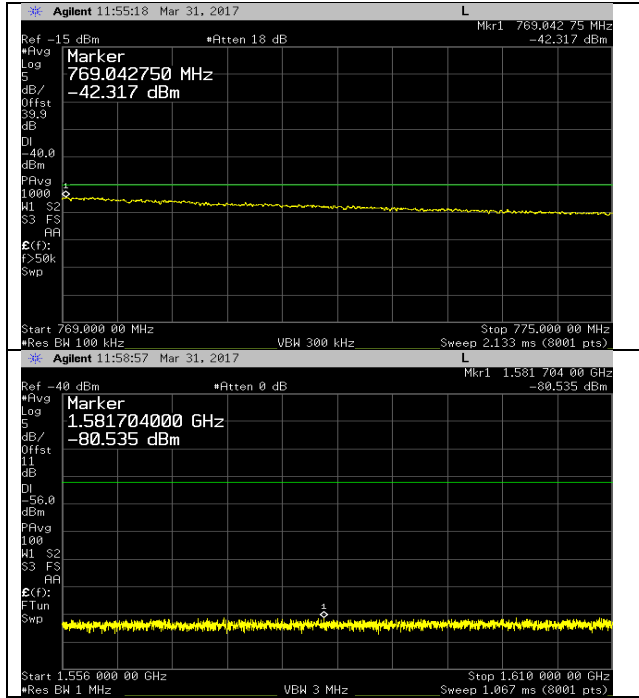
10M - LTE - QPSK



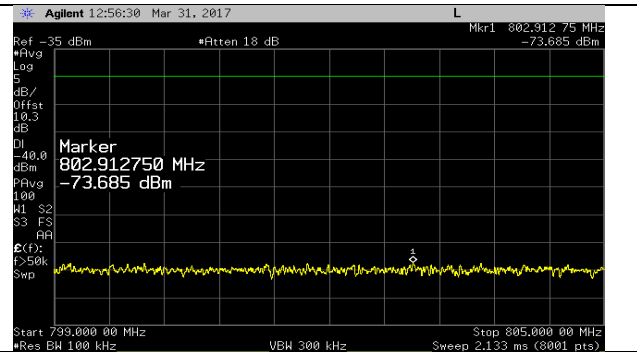
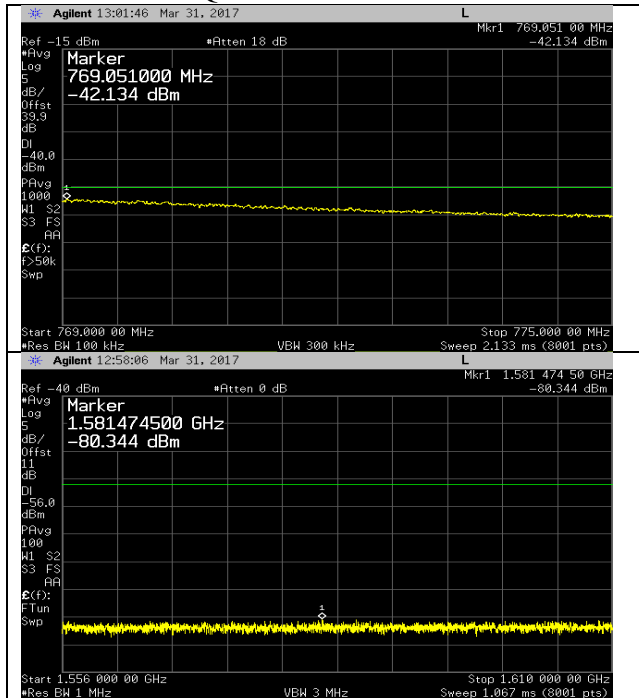
10M - LTE - 16QAM



10M - LTE - 64QAM



10M - LTE - 256QAM



**Transmitter Radiated Spurious Emissions**

Antenna port conducted spurious emissions tests produced similar results for all modulations and channel bandwidth modes. Preliminary scans for radiated spurious emissions were performed in 30MHz – 8GHz frequency range in the following configuration:

The FRBI operation was at maximum power (40 watts per port) on all four antenna ports using QPSK modulation and 5MHz LTE bandwidth. Ant 1 transmit frequency was bottom channel (760.5MHz), Ant 2/Ant 3 transmit frequency was center channel (763MHz) and Ant 4 transmit frequency was top channel (765.5MHz).

Final maximized peak radiated emissions were measured in this mode. During testing all 4 antenna ports of the base station were terminated with 50ohm termination blocks.

Frequency	Polarity	Peaks Raw	Preamp	Antenna	Cable-Loss	Peak Corrected	Limit	Margin
MHz	V/H	dVuV/m	dB	dB	dB	dBuV/m	dBuV/m	dB
7864.23	V	44.753	-46.1	36.517	5.122	40.292	82.2	-41.908
7472.52	H	44.528	-46.3	36.444	5.356	40.028	82.2	-42.172
7850.00	H	44.219	-46.1	36.487	5.094	39.699	82.2	-42.501
7695.73	V	44.069	-46.108	36.308	5.322	39.59	82.2	-42.61
7174.91	H	44.241	-46.125	35.692	5.714	39.521	82.2	-42.679
7314.42	H	43.716	-46.215	36.298	5.662	39.461	82.2	-42.739
6942.41	V	45.024	-46	35.221	5.019	39.264	82.2	-42.936
7086.29	V	44.091	-46.173	35.374	5.509	38.8	82.2	-43.4
6942.41	H	44.423	-46	35.221	5.019	38.663	82.2	-43.537
8933.21	V	41.207	-46.333	37.678	6.026	38.578	82.2	-43.622
37.19	H	59.096	-38.66	14.225	0.293	34.954	82.2	-47.246
385.55	H	55.582	-38.9	16.333	1.215	34.23	82.2	-47.97
4829.70	V	41.131	-46.23	33.034	4.601	32.535	82.2	-49.665
5446.83	H	39.642	-46.2	34.065	4.935	32.442	82.2	-49.758
3990.14	V	41.473	-46.2	32.589	4.27	32.132	82.2	-50.068

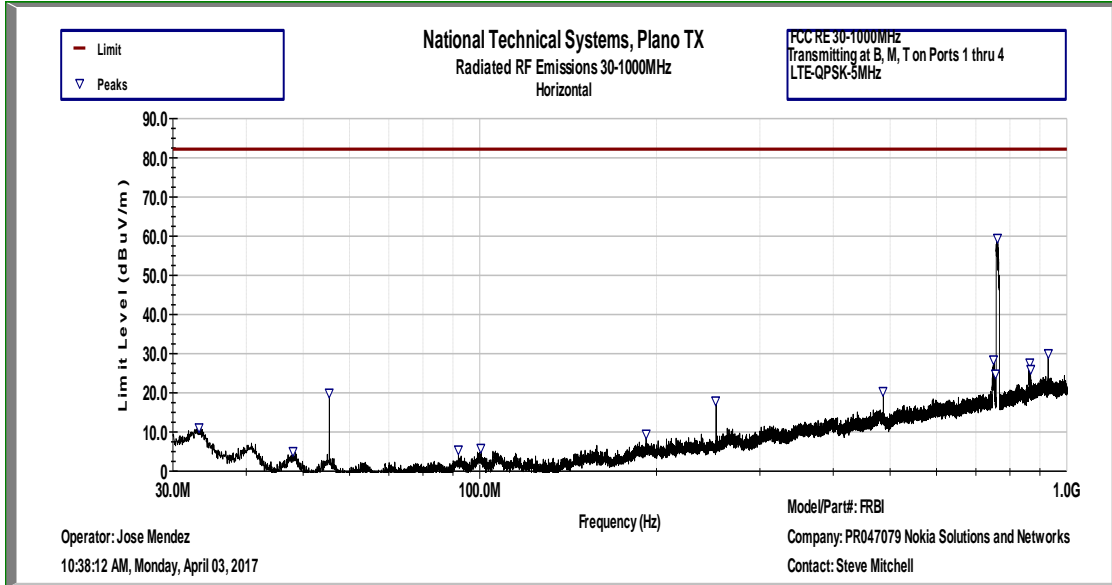
Corrected Field Strength = Raw Readings + Amplifier Gain + Antenna Factor + Cable Loss  
 Negative Margin Indicates a Passing Result  
 Detector: Peak, RBW= 100kHz <1GHz> 1MHz, VBW= 300kHz<1GHz>3MHz, Max-Hold

Highest noise floor of the measurement instrumentation was more than 20dB below the 82.2dBuV/m at 3m limit (equivalent to -13dBm EIRP).

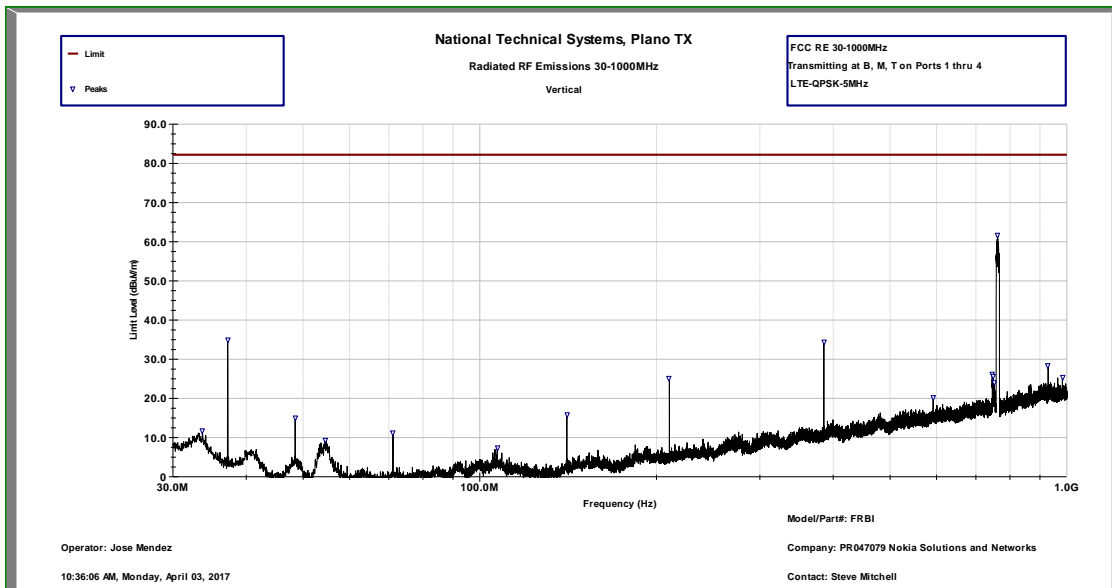
Since all maximized readings were more than 20dB below the 82.2dBuV/m at 3m limit (equivalent to -13dBm EIRP), substitution measurements were not performed.

TILE software was used for all prescans and plots included on the following pages.

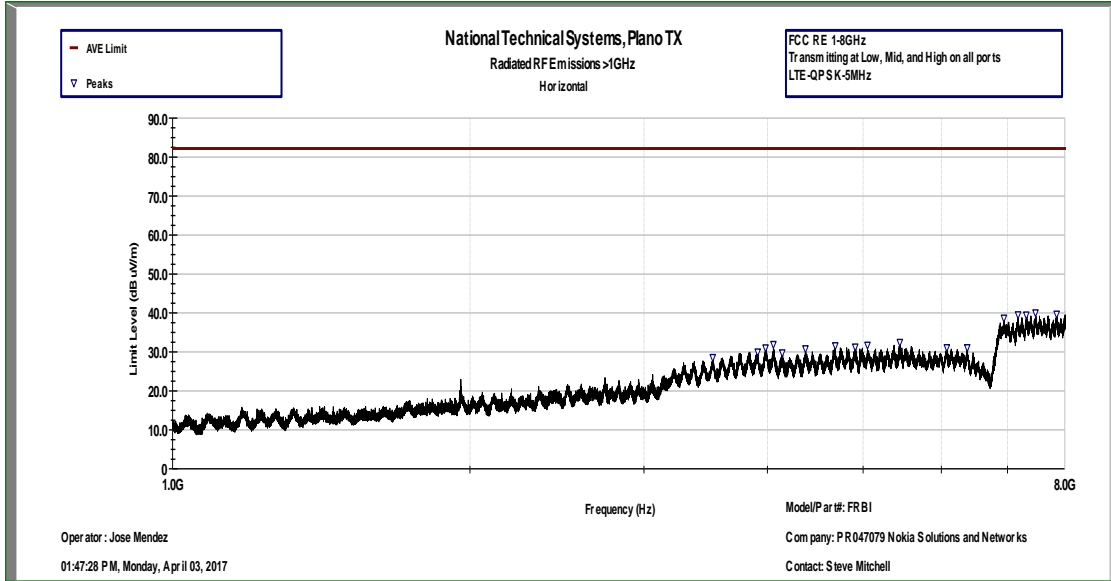
30MHz – 1GHz Peak Prescan at 3m – H



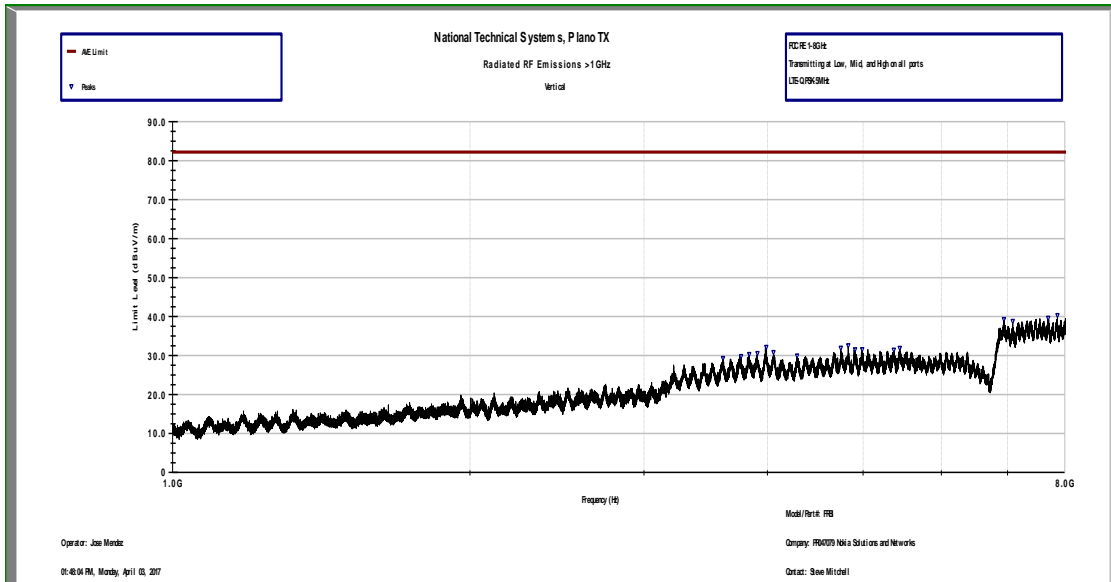
30MHz – 1GHz Peak Prescan at 3m – V



1GHz – 8GHz Peak Prescan at 3m – H



1GHz – 8GHz Peak Prescan at 3m – V



**Frequency Stability**

In order to demonstrate carrier frequency stability at extreme temperatures and voltages, frequency error was measured in the following configuration:

Transmitting in 10MHz-64QAM-LTE mode at center channel (763MHz) on Port 1.

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

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

Extreme Voltages

20C	Freq. Error (mHz)
40.8VDC	471
55.2VDC	391

Extreme Temperatures

48VDC	Freq. Error (mHz)
-30	761
-20	666
-10	390
0	550
10	680
20	390
30	593
40	617
50	654

Based on the results above, highest recorded frequency error is 0.000891ppm, which is below the 1ppm limit.

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.

## **Appendix B Test Data 60Watt Configuration**

**RF Output Power**

RF output power has been measured in both Peak and RMS Average terms for each transmit chain at the center channel for all modulations and bandwidth modes. Peak to average ratio (PAR) has been calculated as described in Section 5.7.2 of KDB971168 D01 v02r02 and all results are presented in tabular form below.

Results on center channel:

		LTE - QPSK			LTE - 16QAM			LTE - 64QAM			LTE - 256QAM		
		Peak (dBm)	Average (dBm)	PAR (dB)	Peak (dBm)	Average (dBm)	PAR (dB)	Peak (dBm)	Average (dBm)	PAR (dB)	Peak (dBm)	Average (dBm)	PAR (dB)
Port 1 Center	5M	55.48	47.73	7.75	55.41	47.63	7.78	55.49	47.71	7.78	55.45	47.67	7.78
	10M	55.58	47.58	8	55.6	47.63	7.97	55.5	47.57	7.93	55.54	47.47	8.07
Port 4 Center	5M	55.4	47.65	7.75	55.35	47.64	7.71	55.42	47.6	7.82	55.39	47.65	7.74
	10M	55.48	47.53	7.95	55.48	47.51	7.97	55.45	47.48	7.97	55.5	47.54	7.96
Combined Center	5M	58.45	50.7	7.75	58.39	50.65	7.74	58.47	50.67	7.8	58.43	50.67	7.76
	10M	58.54	50.57	7.97	58.55	50.58	7.97	58.49	50.54	7.95	58.53	50.52	8.01

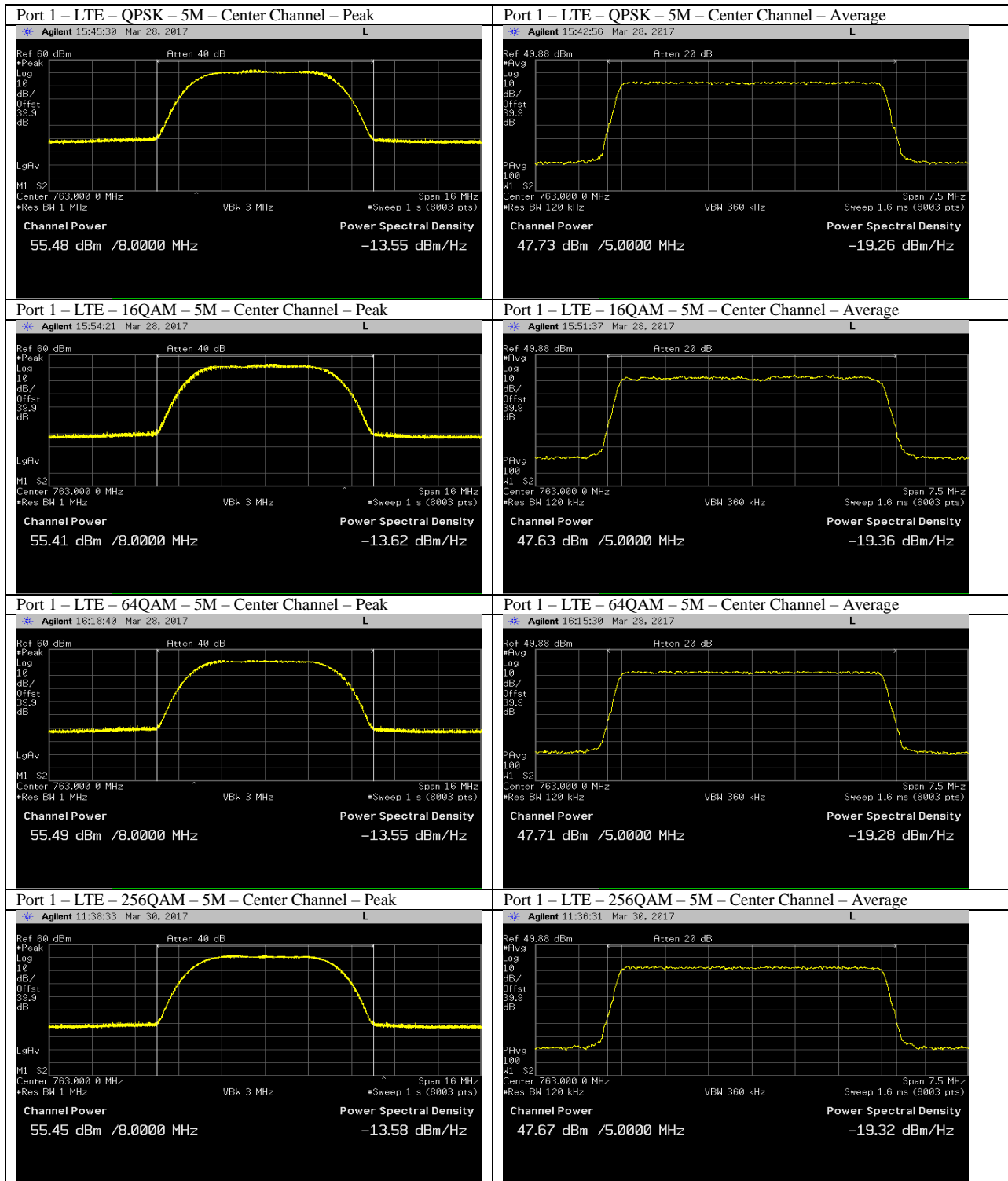
Based on the results above, Port 1 had the highest RMS average power and therefore it was selected for all the remaining antenna port tests on the product.

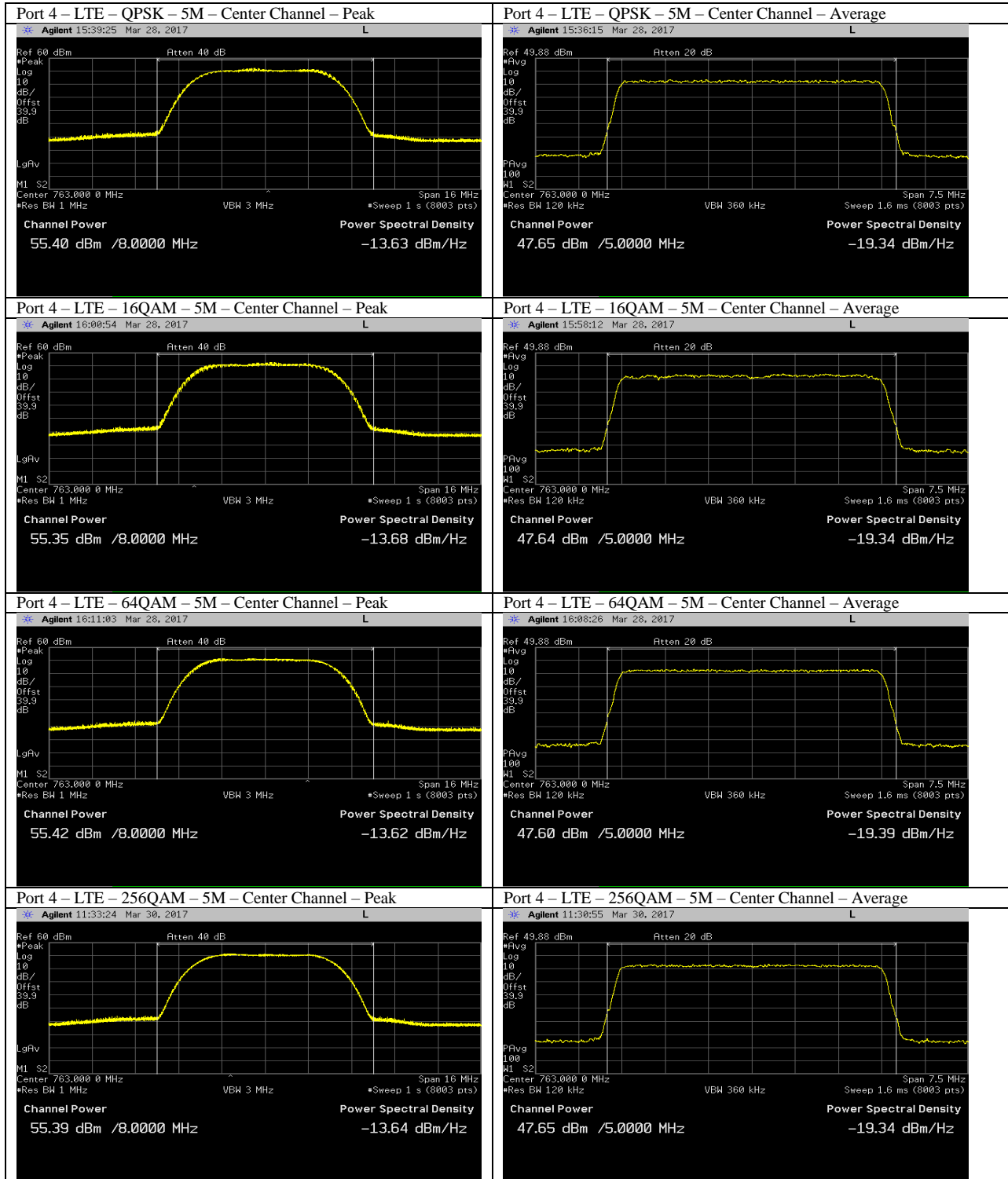
Subsequently output power levels on lowest and highest channels in 5MHz channel bandwidth mode were tested only at Port 1 and results presented below. 10MHz channel bandwidth mode had only 1 channel of operation at the center.

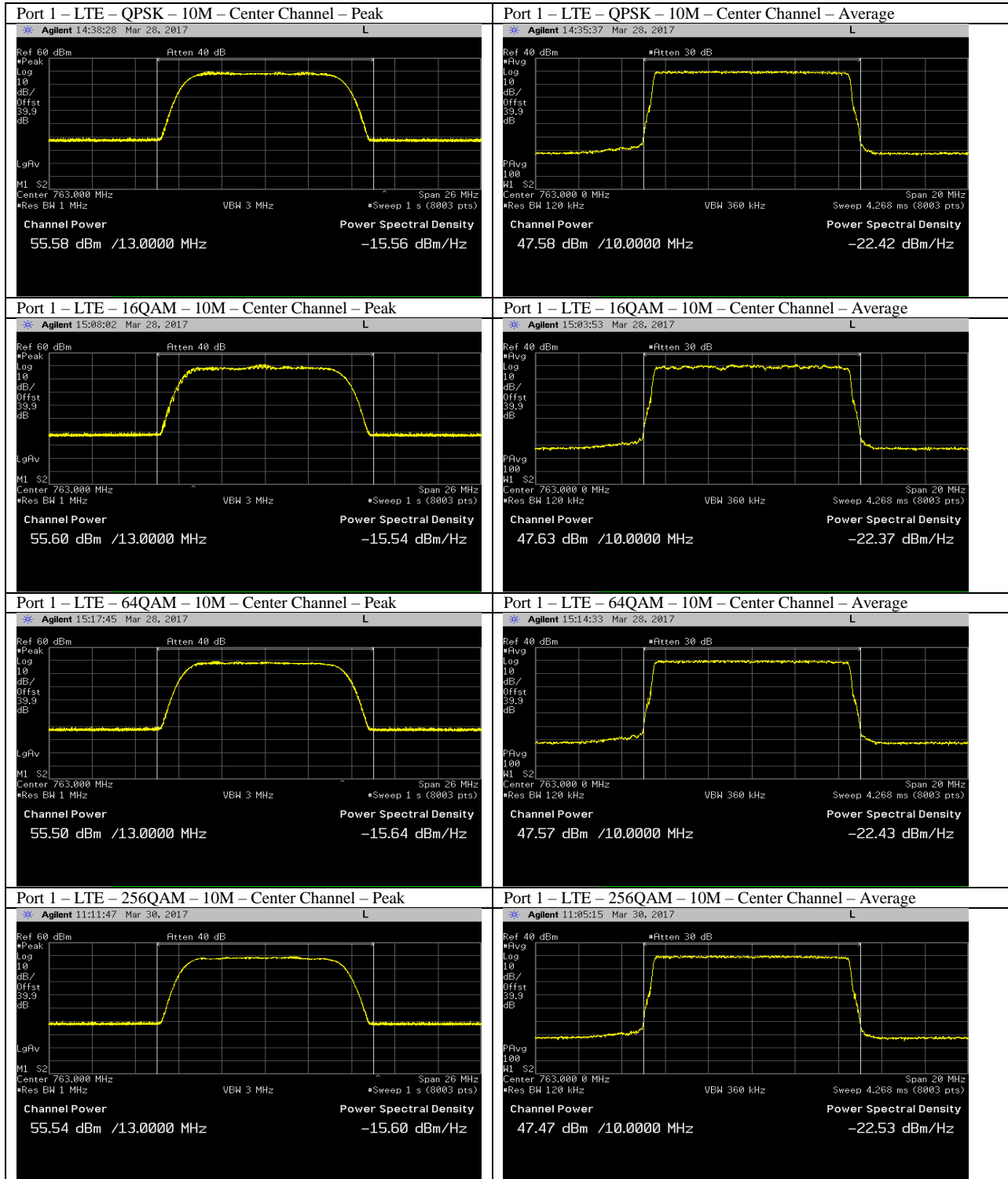
		LTE - QPSK			LTE - 16QAM			LTE - 64QAM			LTE - 256QAM		
		Peak (dBm)	Average (dBm)	PAR (dB)	Peak (dBm)	Average (dBm)	PAR (dB)	Peak (dBm)	Average (dBm)	PAR (dB)	Peak (dBm)	Average (dBm)	PAR (dB)
Port 1 Bottom Channel	5M	55.47	47.57	7.9	55.37	47.71	7.66	55.44	47.6	7.84	55.41	47.61	7.8
Port 1 Top Channel	5M	55.24	47.52	7.72	55.15	47.44	7.71	55.23	47.43	7.8	55.16	47.45	7.71

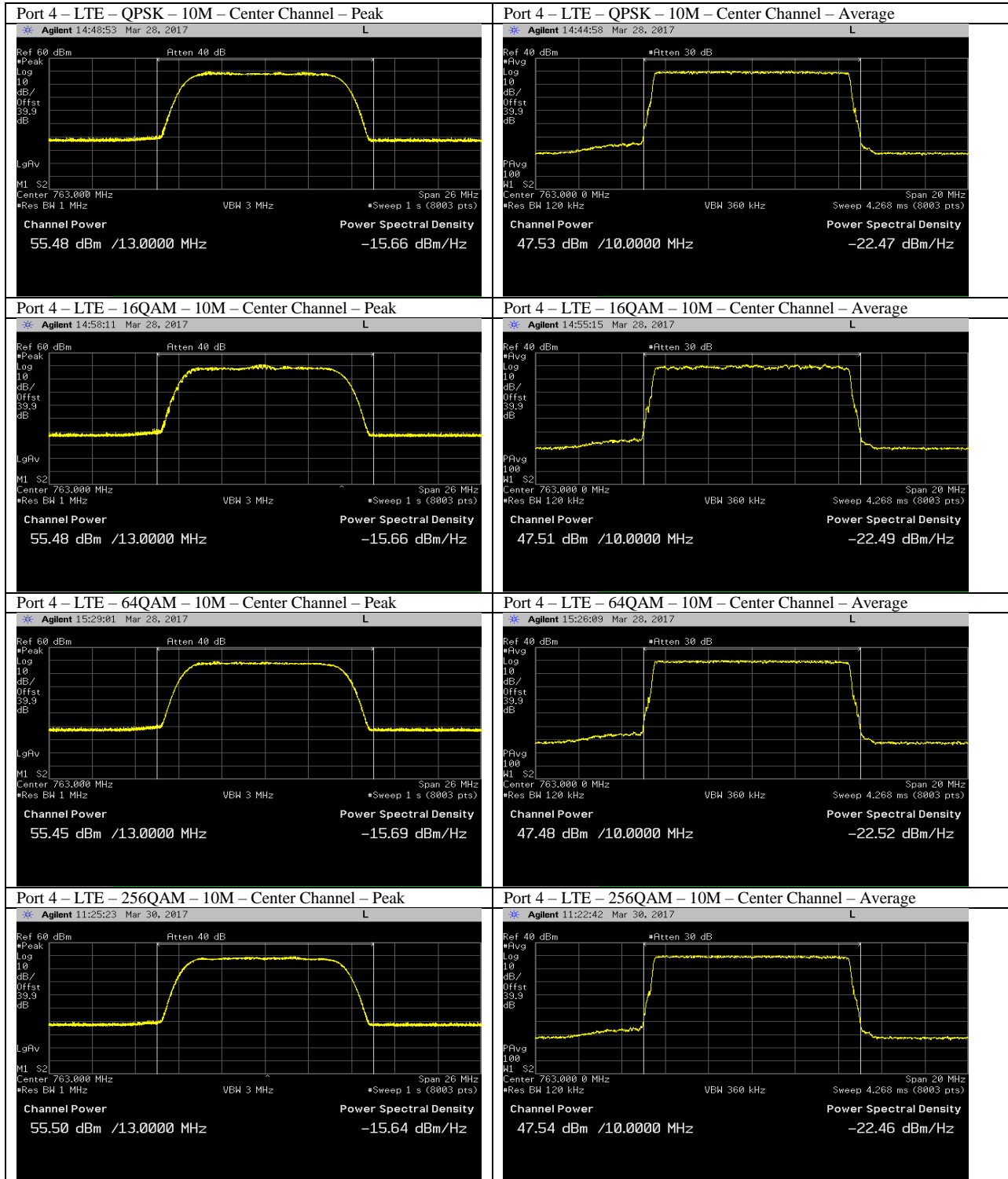
All corresponding plots included on the following pages. Total path loss of 39.9dB (Attenuator & RF cable) accounted in via reference level offset to the spectrum analyzer.

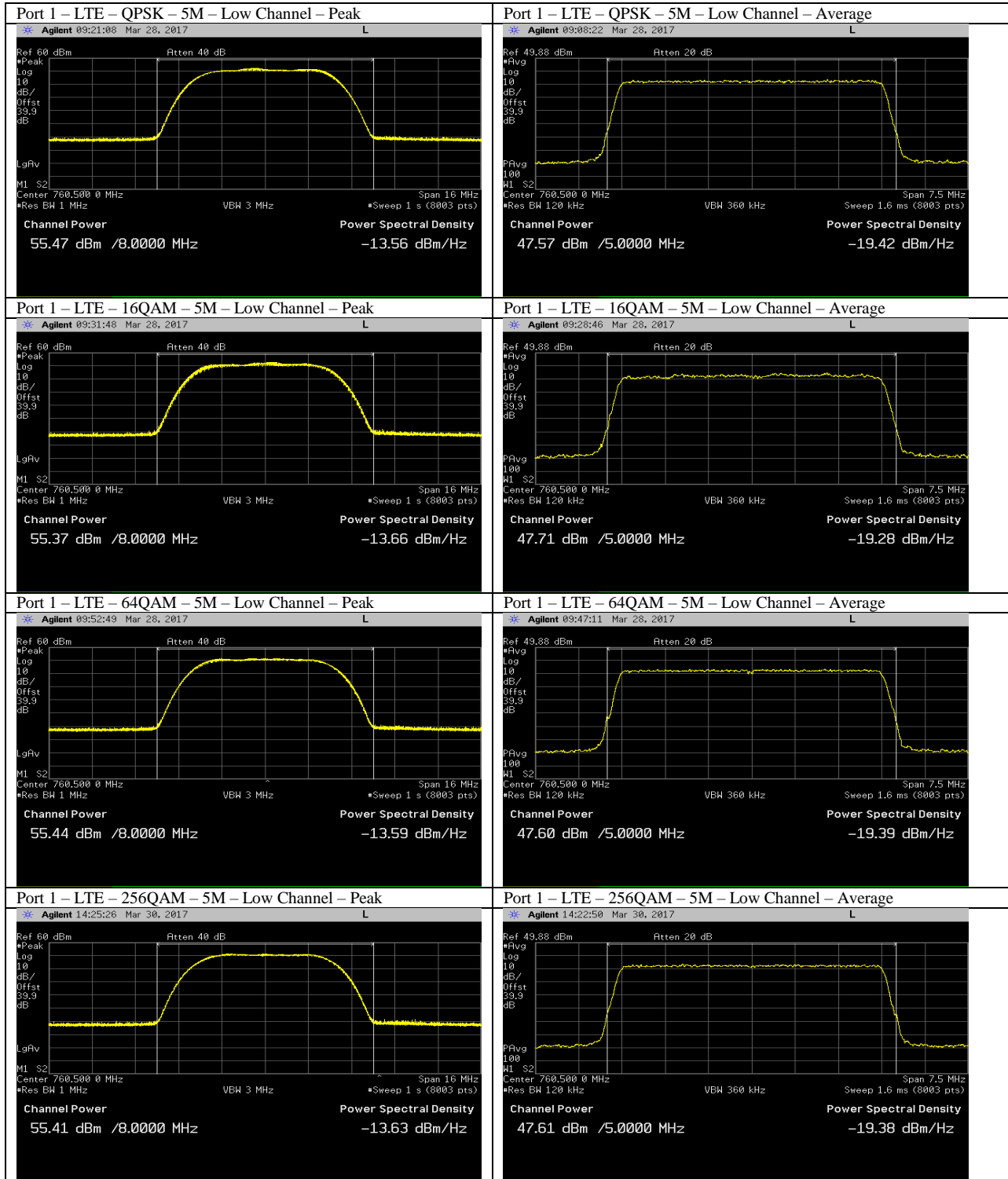














**Emission Bandwidths (26dB and 99%)**

Emissions bandwidths were measured at Port 1 on low and high channels in 5MHz channel bandwidth mode and on center channel in 10MHz channel bandwidth mode for all modulations and results presented below. Highest emission bandwidths are marked in bold.

	LTE - QPSK				LTE - 16QAM				LTE - 64QAM				LTE - 256QAM			
	Low		High		Low		High		Low		High		Low		High	
	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)
5M	4.882	4.4869	4.875	4.4834	4.859	4.4769	4.852	4.465	4.86	<b>4.4981</b>	4.871	4.4949	<b>4.888</b>	4.4959	4.87	4.4916

	LTE - QPSK		LTE - 16QAM		LTE - 64QAM		LTE - 256QAM	
	Center		Center		Center		Center	
	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)
10M	9.711	8.9751	9.711	<b>8.986</b>	9.726	8.9803	9.7	8.9652

Corresponding plots included on the following pages.