Appendix A: Test Data for E-UTRA Band 4

Product Name: Industrial LoRaWAN Gateway Trade Mark: N/A **Test Model: GW300**

Environmental Conditions

Temperature:	24.3 ° C
Relative Humidity:	53.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Tom Liu
Supervised by:	Jayden Zhuo

A.1 Conducted Output Power

	Conducted Output Power Test Result (Channel Bandwidth: 1.4 MHz)								
Modulation	Channel	RB Configuration		Average Power [dBm]	Average Power [dBm]	Verdict			
Modulation	Channel	Size	Offset	QPSK	16QAM	verdict			
		1	0	23.39	21.98	PASS			
		1	3	22.84	22.00	PASS			
		1	5	22.89	21.98	PASS			
	LCH	3	0	22.91	21.95	PASS			
		3	2	22.88	21.90	PASS			
		3	3	22.87	21.90	PASS			
		6	0	22.02	20.88	PASS			
		1	0	24.04	23.31	PASS			
	МСН	1	3	23.99	23.32	PASS			
ODOK /		1	5	24.00	23.31	PASS			
QPSK /		3	0	24.13	23.04	PASS			
16QAM		3	2	24.04	23.01	PASS			
		3	3	24.08	23.04	PASS			
		6	0	23.10	22.01	PASS			
		1	0	23.26	22.50	PASS			
		1	3	23.04	22.40	PASS			
		1	5	23.02	22.46	PASS			
	нсн	3	0	23.10	22.30	PASS			
		3	2	22.96	22.20	PASS			
		3	3	22.93	22.21	PASS			
		6	0	22.30	21.54	PASS			

Conducted Output Power Test Result (Channel Bandwidth: 3 MHz)								
Modulation	Channel	RB Con	figuration	Average Power [dBm]	Average Power [dBm]	Verdict		
Woddiation	Onamie	Size	Offset	QPSK	16QAM	Verdict		
		1	0	22.92	22.10	PASS		
		1	7	22.94	22.14	PASS		
		1	14	22.86	22.08	PASS		
	LCH	8	0	22.10	21.07	PASS		
		8	4	22.05	21.08	PASS		
		8	7	22.05	21.04	PASS		
		15	0	22.04	20.94	PASS		
	мсн	1	0	24.00	23.23	PASS		
		1	7	24.06	23.31	PASS		
QPSK /		1	14	24.00	23.21	PASS		
16QAM		8	0	23.21	22.24	PASS		
TOQAM		8	4	23.20	22.24	PASS		
		8	7	23.20	22.21	PASS		
		15	0	23.16	22.13	PASS		
		1	0	23.38	22.60	PASS		
		1	7	22.96	22.51	PASS		
		1	14	22.85	22.44	PASS		
	HCH	8	0	22.49	21.42	PASS		
		8	4	22.31	21.44	PASS		
		8	7	22.24	21.40	PASS		
		15	0	22.31	21.43	PASS		

Conducted Output Power Test Result (Channel Bandwidth: 5 MHz)								
Modulation	Channel	RB Con	figuration	Average Power [dBm]	Average Power [dBm]	Verdict		
Modulation	Channel	Size	Offset	QPSK	16QAM	verdict		
		1	0	23.13	22.32	PASS		
		1	12	22.93	22.26	PASS		
		1	24	22.85	22.30	PASS		
	LCH	12	0	22.13	21.19	PASS		
		12	6	22.08	21.18	PASS		
		12	13	22.05	21.19	PASS		
		25	0	22.06	21.03	PASS		
		1	0	24.15	23.41	PASS		
	MCH	1	12	24.14	23.43	PASS		
QPSK /		1	24	24.08	23.38	PASS		
16QAM		12	0	23.25	22.35	PASS		
TOQAM		12	6	23.26	22.36	PASS		
		12	13	23.25	22.35	PASS		
		25	0	23.17	22.19	PASS		
		1	0	23.38	22.34	PASS		
		1	12	22.66	21.76	PASS		
		1	24	22.62	21.77	PASS		
	HCH	12	0	22.16	21.32	PASS		
		12	6	21.87	21.04	PASS		
		12	13	21.74	20.92	PASS		
		25	0	21.96	21.09	PASS		

	Conducted Output Power Test Result (Channel Bandwidth: 10 MHz)								
Modulation	Channel	RB Con	figuration	Average Power [dBm]	Average Power [dBm]	Verdict			
Modulation	Channel	Size	Offset	QPSK	16QAM	verdict			
		1	0	23.00	22.28	PASS			
		1	24	22.49	21.89	PASS			
		1	49	21.70	21.13	PASS			
	LCH	25	0	22.10	21.06	PASS			
		25	12	21.73	20.86	PASS			
		25	25	21.31	20.46	PASS			
		50	0	21.78	20.89	PASS			
	мсн	1	0	23.60	23.04	PASS			
		1	24	24.08	23.41	PASS			
QPSK /		1	49	23.22	22.66	PASS			
16QAM		25	0	23.19	22.18	PASS			
TOQAIVI		25	12	23.24	22.21	PASS			
		25	25	23.06	22.17	PASS			
		50	0	23.18	22.16	PASS			
		1	0	23.09	22.59	PASS			
		1	24	22.95	22.43	PASS			
		1	49	22.04	21.66	PASS			
	HCH	25	0	22.46	21.43	PASS			
		25	12	22.27	21.41	PASS			
		25	25	21.85	21.06	PASS			
		50	0	22.27	21.38	PASS			

	Conducted Output Power Test Result (Channel Bandwidth: 15 MHz)								
Modulation	Channel	RB Conf	figuration	Average Power [dBm]	Average Power [dBm]	Vardiet			
Modulation	Channel	Size	Offset	QPSK	16QAM	Verdict			
		1	0	23.07	22.26	PASS			
		1	37	22.09	21.48	PASS			
		1	74	22.46	21.88	PASS			
	LCH	37	0	21.91	20.99	PASS			
		37	18	21.33	20.42	PASS			
		37	38	21.21	20.35	PASS			
		75	0	21.56	20.69	PASS			
		1	0	23.13	22.57	PASS			
	MCH	1	37	23.94	23.40	PASS			
QPSK /		1	74	23.04	22.53	PASS			
16QAM		37	0	23.13	22.20	PASS			
TOQAIVI		37	18	23.24	22.29	PASS			
		37	38	22.81	21.95	PASS			
		75	0	23.00	22.09	PASS			
		1	0	23.29	22.68	PASS			
		1	37	23.06	22.44	PASS			
		1	74	22.13	21.62	PASS			
	HCH	37	0	22.55	21.65	PASS			
		37	18	22.39	21.50	PASS			
		37	38	22.00	21.16	PASS			
	_	75	0	22.34	21.40	PASS			

	Conducted Output Power Test Result (Channel Bandwidth: 20 MHz)								
Modulation	Channel	RB Con	figuration	Average Power [dBm]	Average Power [dBm]	Verdict			
Modulation	Channel	Size	Offset	QPSK	16QAM	verdict			
		1	0	23.21	22.30	PASS			
		1	49	22.04	21.32	PASS			
		1	99	23.75	22.96	PASS			
	LCH	50	0	21.70	20.80	PASS			
		50	25	21.31	20.39	PASS			
		50	50	22.00	21.09	PASS			
		100	0	21.84	20.95	PASS			
	MCH	1	0	22.63	21.82	PASS			
		1	49	24.09	23.42	PASS			
QPSK /		1	99	22.95	22.18	PASS			
16QAM		50	0	22.91	21.95	PASS			
TOGAW		50	25	23.13	22.18	PASS			
		50	50	22.65	21.77	PASS			
		100	0	22.79	21.88	PASS			
		1	0	23.92	23.27	PASS			
		1	49	23.22	22.64	PASS			
		1	99	22.11	21.54	PASS			
	HCH	50	0	22.62	21.74	PASS			
		50	25	22.39	21.53	PASS			
		50	50	22.02	21.23	PASS			
<u> </u>		100	0	22.39	21.50	PASS			

A.2 Peak-to-Average Ratio

	Peak-to Average Ratio Test Result (Channel Bandwidth: 1.4 MHz)							
Modulation	Channel	Peak-to-Average Ratio	Limit	Verdict				
IVIOGUIATION	Griannei	[dB]	[dB]	verdict				
	LCH	4.68	<13	PASS				
QPSK	MCH	4.84	<13	PASS				
	HCH	4.72	<13	PASS				
	LCH	5.49	<13	PASS				
16QAM	MCH	5.68	<13	PASS				
	HCH	5.46	<13	PASS				

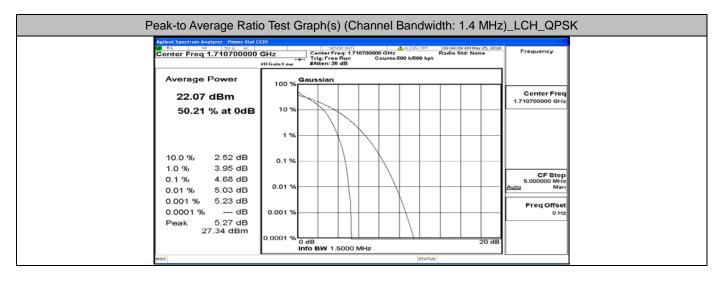
Peak-to Average Ratio Test Result (Channel Bandwidth: 3 MHz)							
Modulation	Channel	Peak-to-Average Ratio	Limit	Verdict			
Modulation	Chame	[dB]	[dB]	verdict			
	LCH	5	<13	PASS			
QPSK	MCH	5.02	<13	PASS			
	HCH	4.98	<13	PASS			
	LCH	5.84	<13	PASS			
16QAM	MCH	5.86	<13	PASS			
	HCH	5.69	<13	PASS			

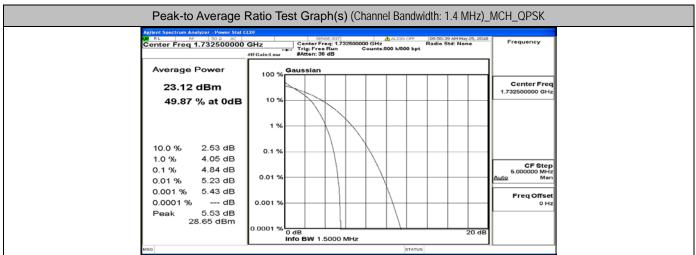
Peak-to Average Ratio Test Result (Channel Bandwidth: 5 MHz)							
Modulation		Peak-to-Average Ratio	Limit	Vordiet			
Modulation	Channel	[dB]	[dB]	Verdict			
	LCH	5.08	<13	PASS			
QPSK	MCH	5.07	<13	PASS			
	HCH	5.05	<13	PASS			
	LCH	5.85	<13	PASS			
16QAM	MCH	5.81	<13	PASS			
	HCH	5.79	<13	PASS			

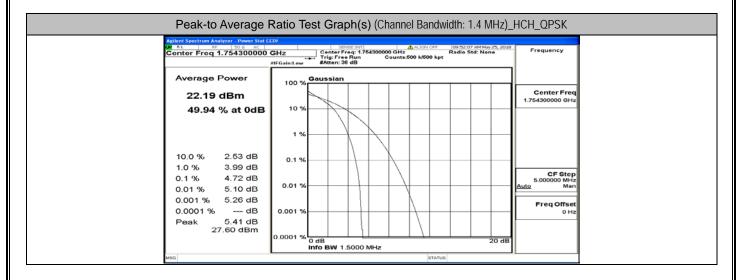
Peak-to Average Ratio Test Result (Channel Bandwidth: 10 MHz)							
Modulation	Channel	Peak-to-Average Ratio	Limit	Vordiet			
Modulation	Griannei	[dB]	[dB]	Verdict			
	LCH	5.37	<13	PASS			
QPSK	MCH	5.11	<13	PASS			
	HCH	4.99	<13	PASS			
	LCH	6.09	<13	PASS			
16QAM	MCH	5.85	<13	PASS			
	HCH	5.71	<13	PASS			

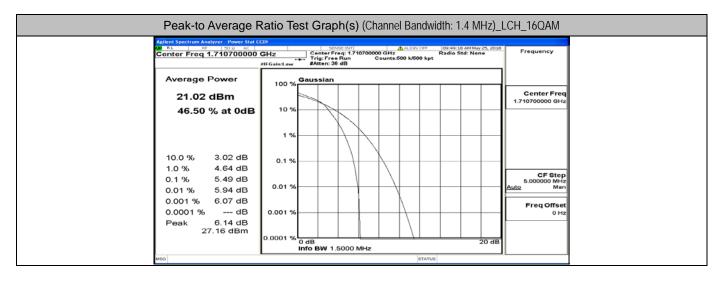
	Peak-to Average Ratio Test Result (Channel Bandwidth: 15 MHz)							
Modulation	Channel	Peak-to-Average Ratio	Limit	Verdict				
Modulation	Chame	[dB]	[dB]	verdict				
	LCH	5.08	<13	PASS				
QPSK	MCH	4.93	<13	PASS				
	HCH	4.94	<13	PASS				
	LCH	6.29	<13	PASS				
16QAM	MCH	6.18	<13	PASS				
	HCH	6.06	<13	PASS				

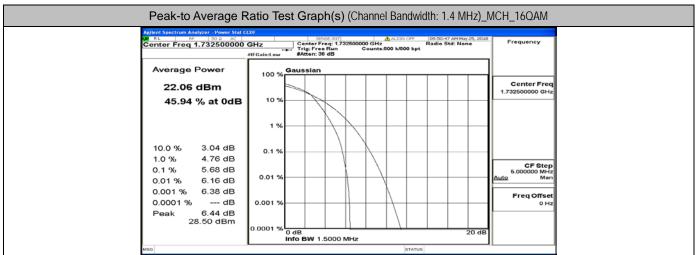
Peak-to Average Ratio Test Result (Channel Bandwidth: 20 MHz)					
Mandadatian	Channel	Peak-to-Average Ratio	Limit	Verdict	
Modulation		[dB]	[dB]		
QPSK	LCH	5.77	<13	PASS	
	MCH	5.72	<13	PASS	
	HCH	5.68	<13	PASS	
16QAM	LCH	6.87	<13	PASS	
	MCH	6.78	<13	PASS	
	HCH	6.69	<13	PASS	

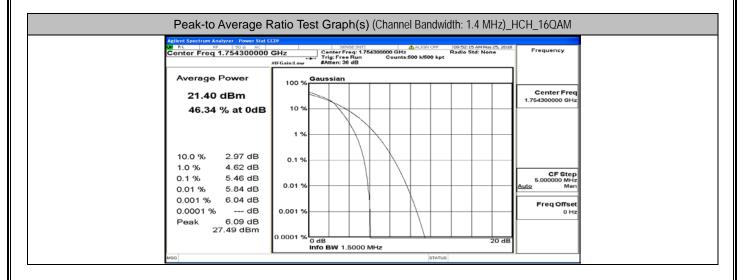


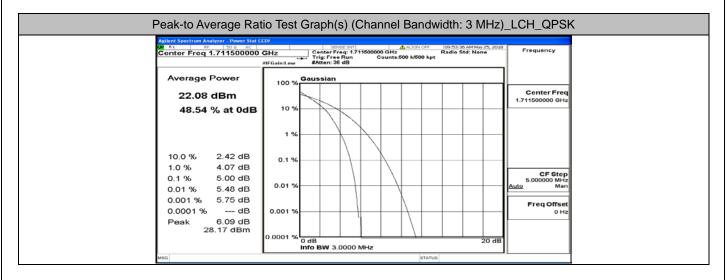


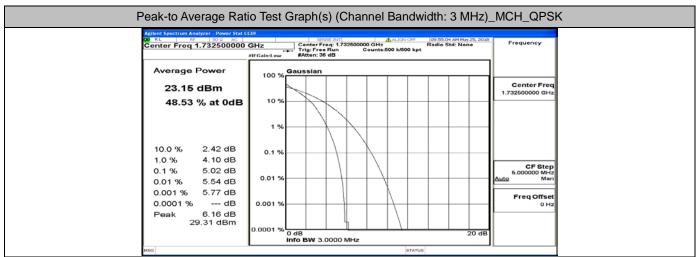


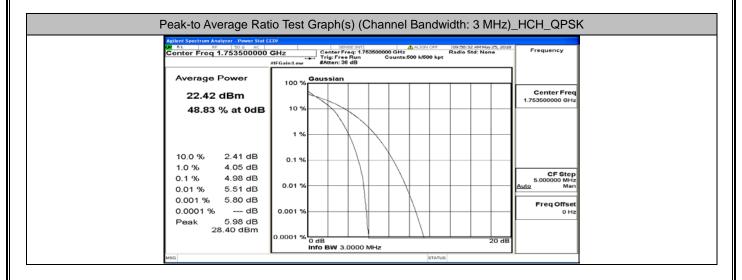


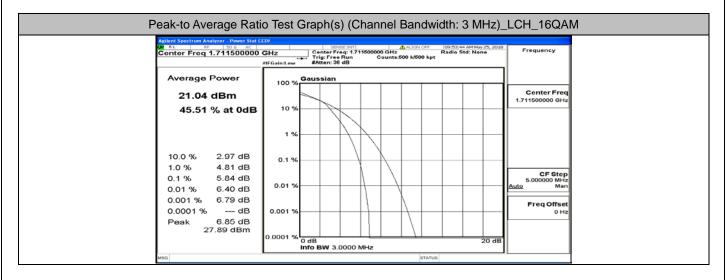


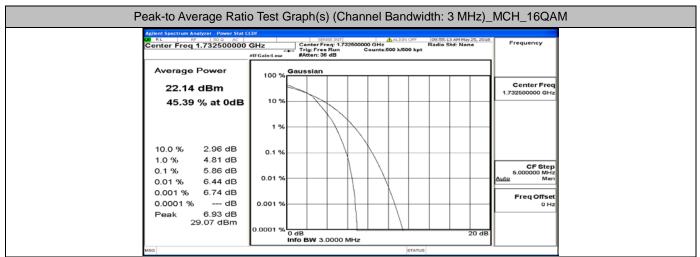


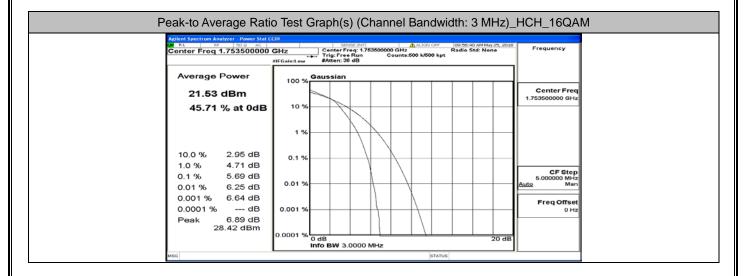


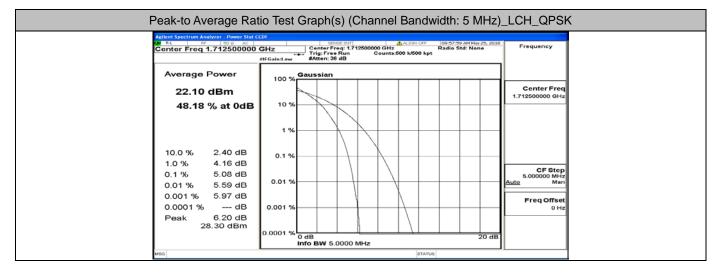


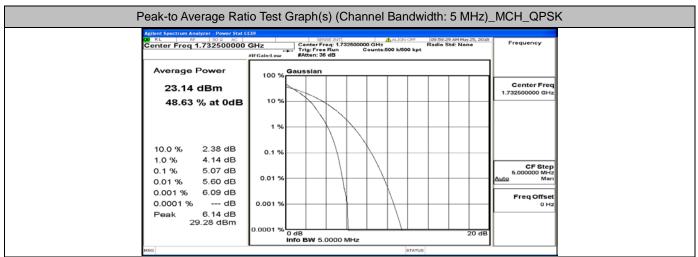


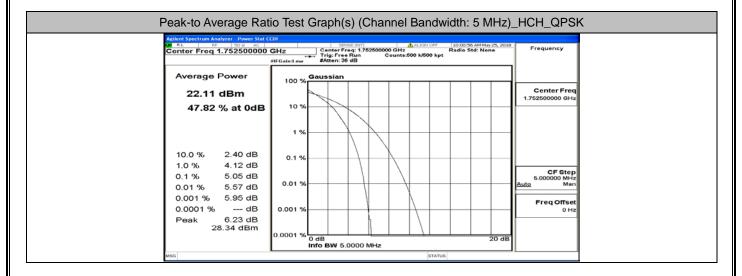


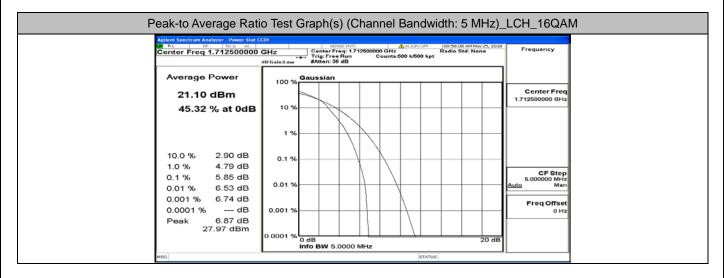


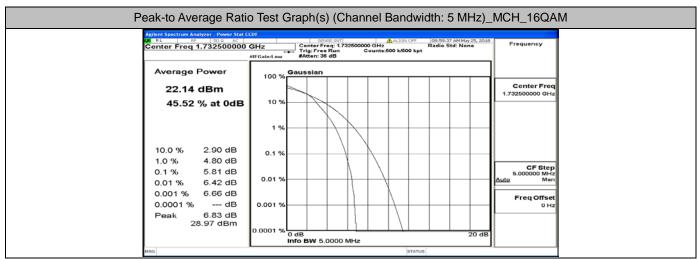


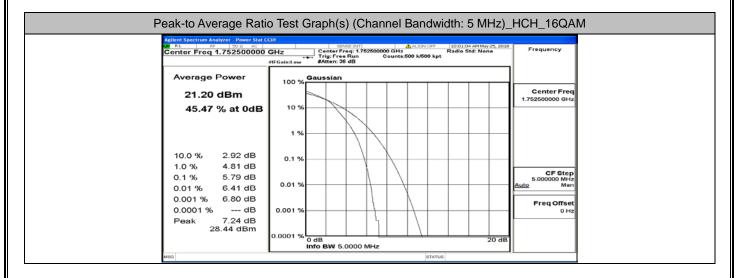




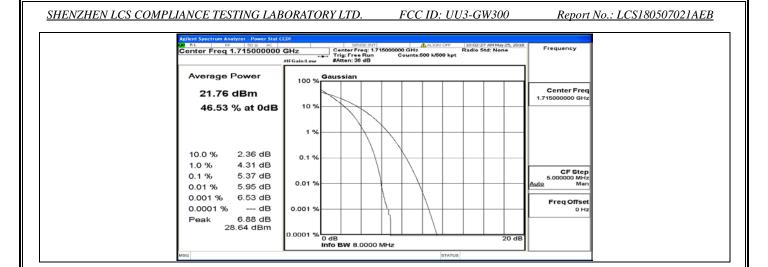


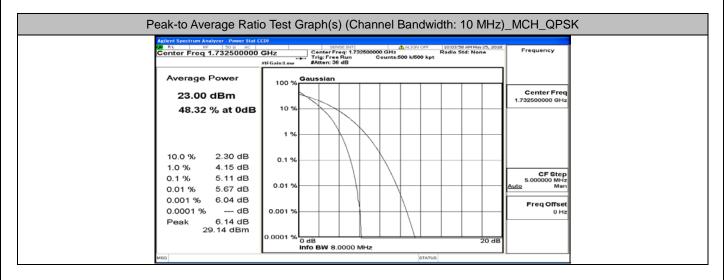


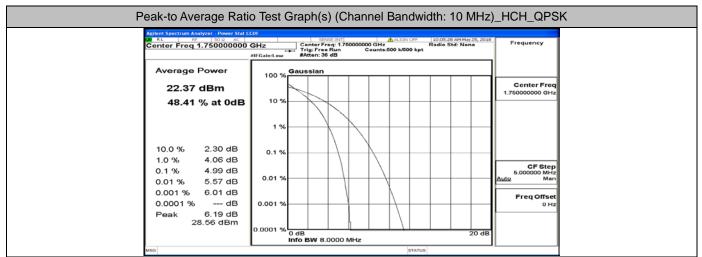


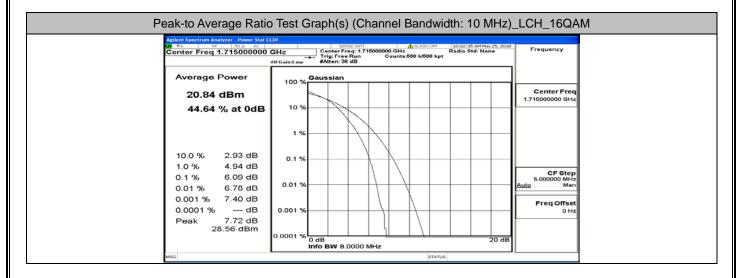


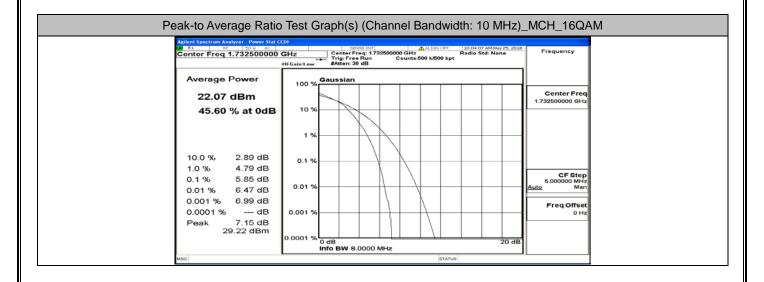
Peak-to Average Ratio Test Graph(s) (Channel Bandwidth: 10 MHz)_LCH_QPSK

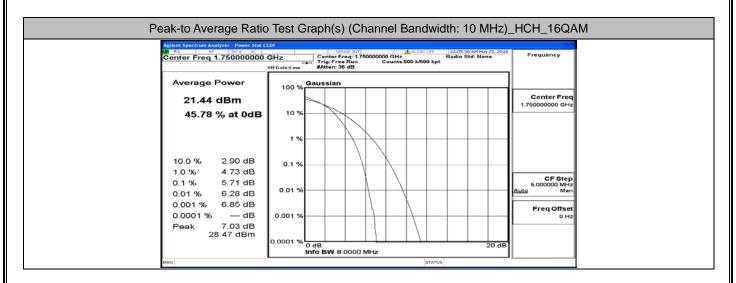


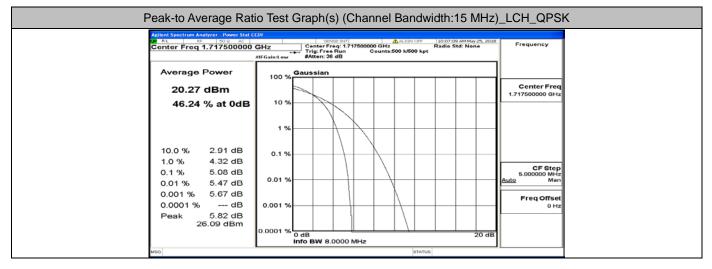


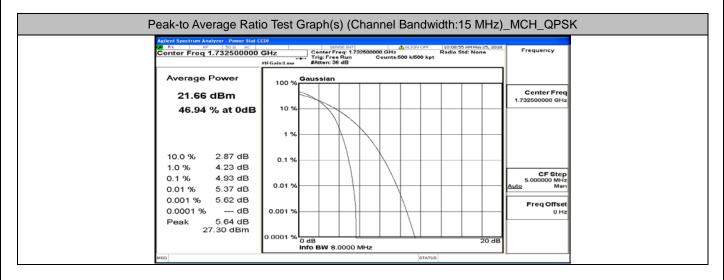


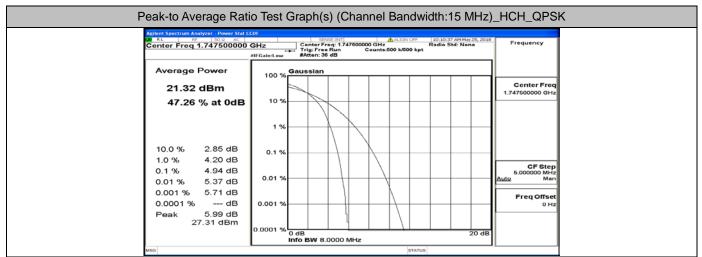


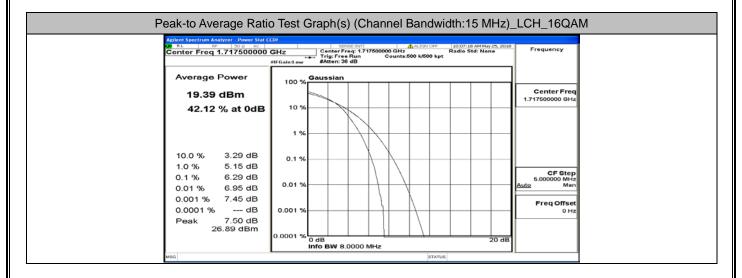


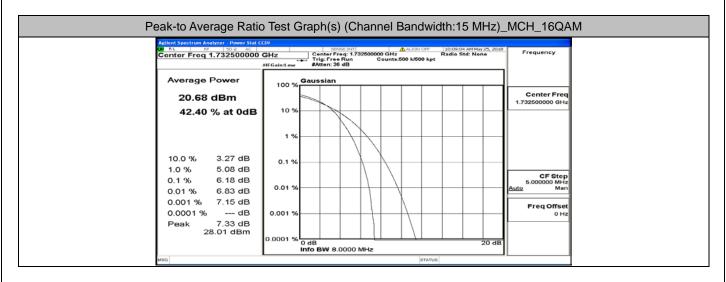


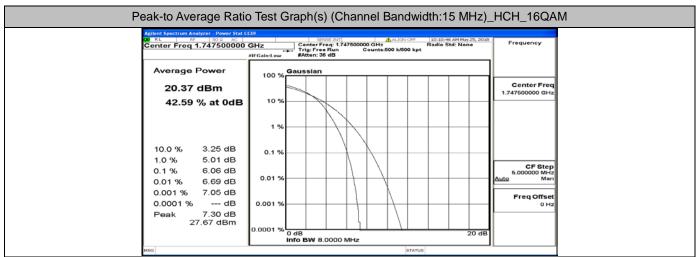


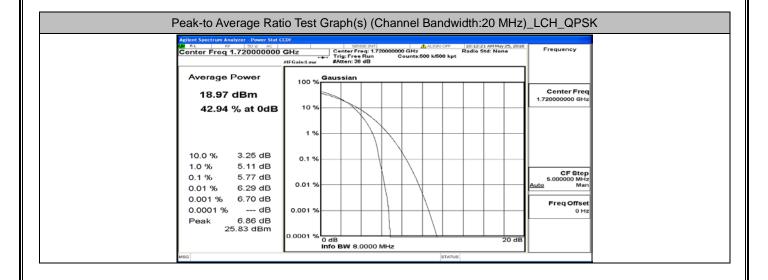


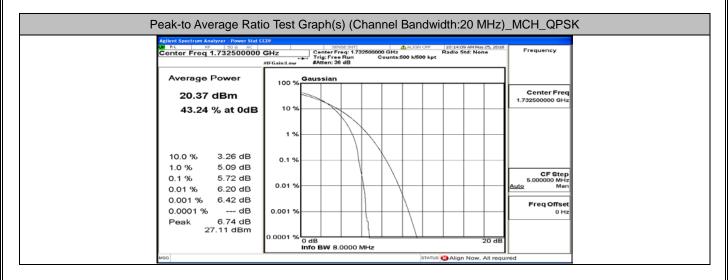


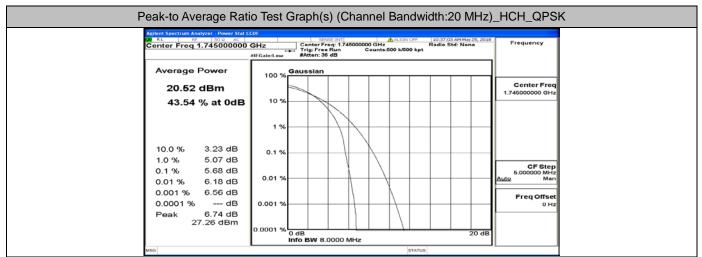


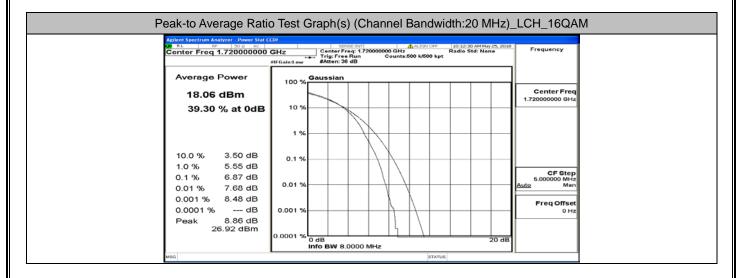


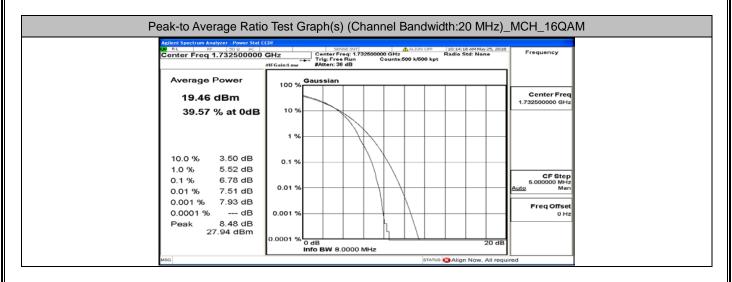


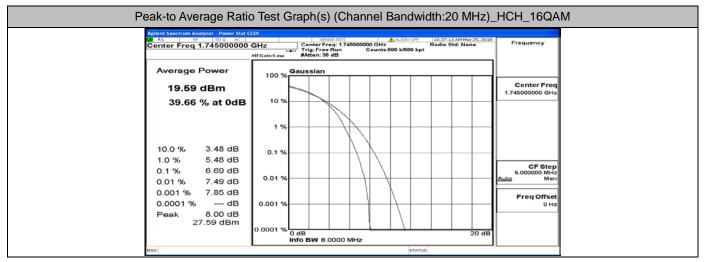












A.3 26dB Bandwidth and Occupied Bandwidth

EBW & OBW Test Result (Channel Bandwidth: 1.4 MHz)					
Modulation	Channel	Occupied Bandwidth	26dB Bandwidth	Verdict	
		(MHz)	(MHz)		
QPSK	LCH	1.0772	1.234	PASS	
	MCH	1.0748	1.205	PASS	
	HCH	1.0787	1.226	PASS	
16QAM	LCH	1.0813	1.238	PASS	
	MCH	1.0790	1.215	PASS	
	HCH	1.0788	1.230	PASS	

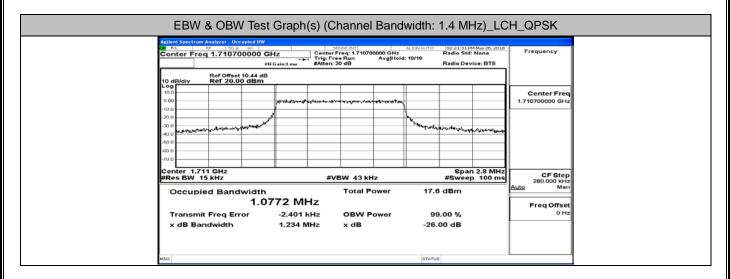
EBW & OBW Test Result (Channel Bandwidth: 3 MHz)					
Modulation	Channel	Occupied Bandwidth	26dB Bandwidth	Verdict	
Modulation		(MHz)	(MHz)		
QPSK	LCH	2.6815	2.880	PASS	
	MCH	2.6828	2.871	PASS	
	HCH	2.6857	2.897	PASS	
16QAM	LCH	2.6836	2.881	PASS	
	MCH	2.6841	2.860	PASS	
	HCH	2.6858	2.875	PASS	

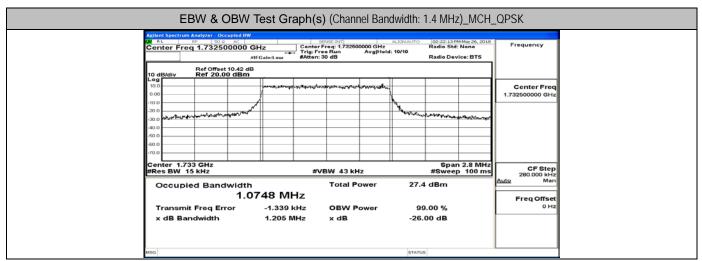
EBW & OBW Test Result (Channel Bandwidth: 5 MHz)					
Modulation	Channel	Occupied Bandwidth	26dB Bandwidth	Verdict	
Modulation		(MHz)	(MHz)		
QPSK	LCH	4.4826	4.851	PASS	
	MCH	4.4858	4.873	PASS	
	HCH	4.4816	4.869	PASS	
16QAM	LCH	4.4814	4.848	PASS	
	MCH	4.4748	4.867	PASS	
	HCH	4.4877	4.838	PASS	

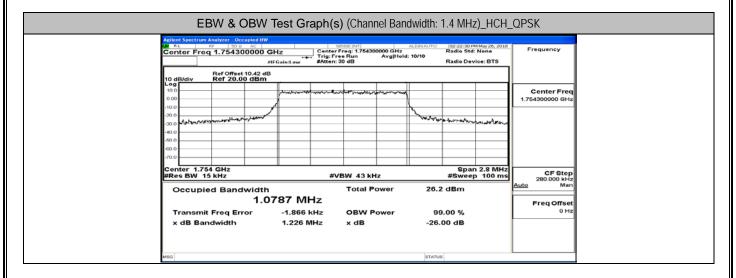
EBW & OBW Test Result (Channel Bandwidth: 10 MHz)					
Modulation	Channel	Occupied Bandwidth	26dB Bandwidth	Verdict	
Modulation		(MHz)	(MHz)		
QPSK	LCH	8.9236	9.457	PASS	
	MCH	8.9303	9.516	PASS	
	HCH	8.9419	9.496	PASS	
16QAM	LCH	8.9394	9.468	PASS	
	MCH	8.9274	9.440	PASS	
	HCH	8.9471	9.392	PASS	

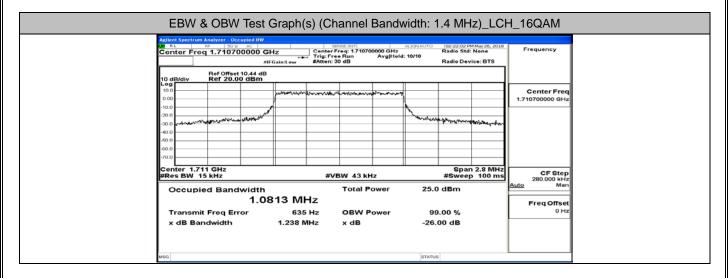
EBW & OBW Test Result (Channel Bandwidth: 15 MHz)					
Modulation	Channel	Occupied Bandwidth	26dB Bandwidth	Verdict	
Modulation		(MHz)	(MHz)		
QPSK	LCH	13.420	14.06	PASS	
	MCH	13.398	14.07	PASS	
	HCH	13.413	14.09	PASS	
16QAM	LCH	13.427	14.05	PASS	
	MCH	13.399	14.06	PASS	
	HCH	13.409	14.14	PASS	

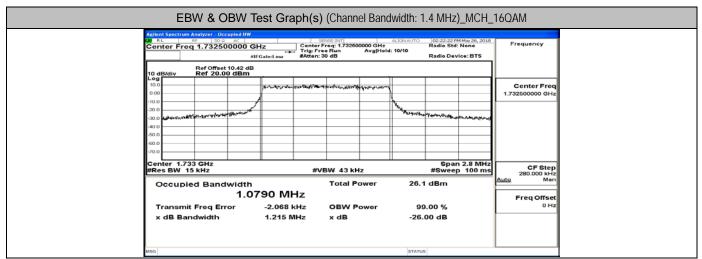
EBW & OBW Test Result (Channel Bandwidth: 20 MHz)					
Modulation	Channel	Occupied Bandwidth	26dB Bandwidth	Verdict	
		(MHz)	(MHz)		
QPSK	LCH	17.906	18.75	PASS	
	MCH	17.848	18.64	PASS	
	HCH	17.863	18.73	PASS	
16QAM	LCH	17.922	18.67	PASS	
	MCH	17.833	18.61	PASS	
	HCH	17.848	18.59	PASS	

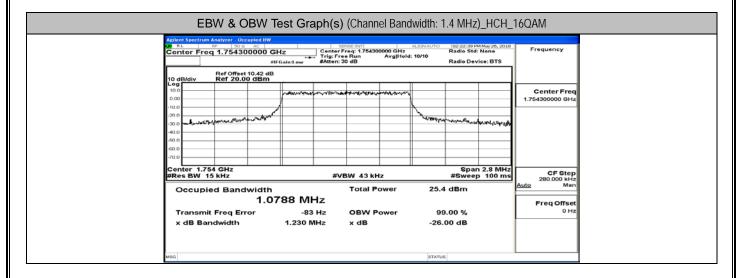


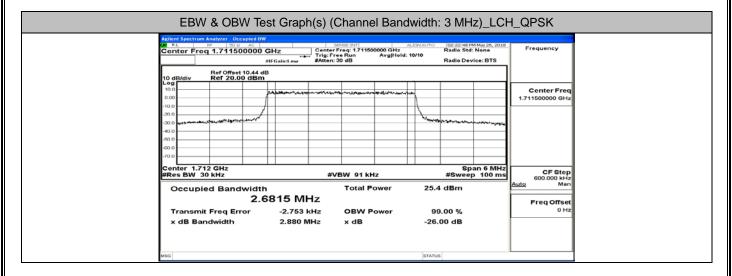


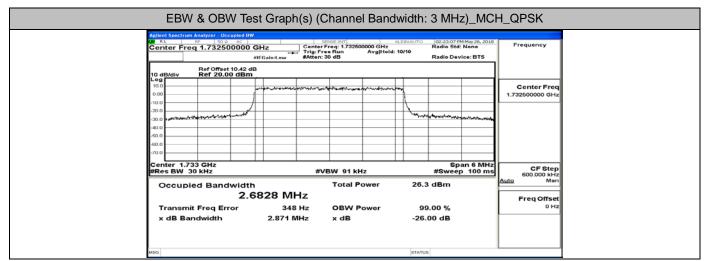


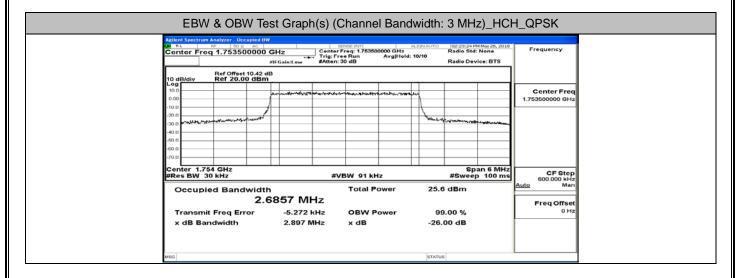


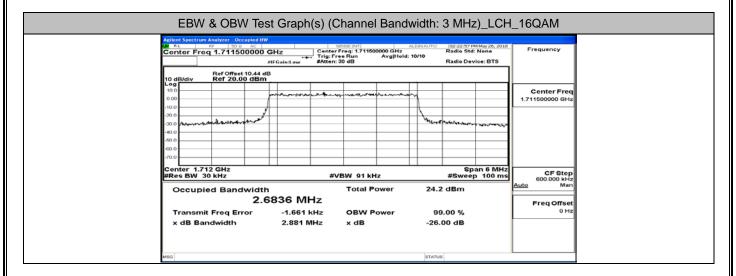


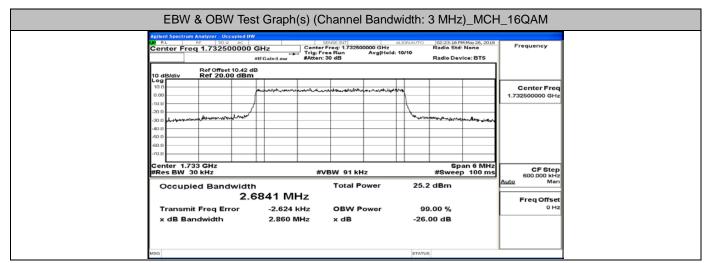


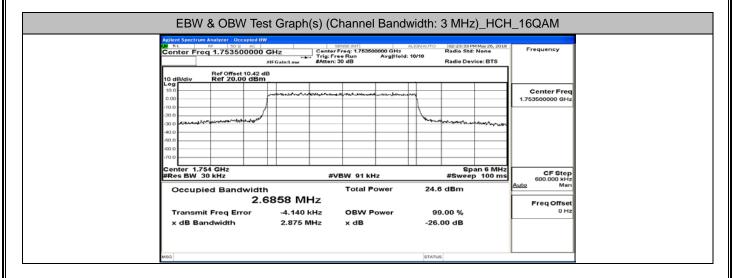


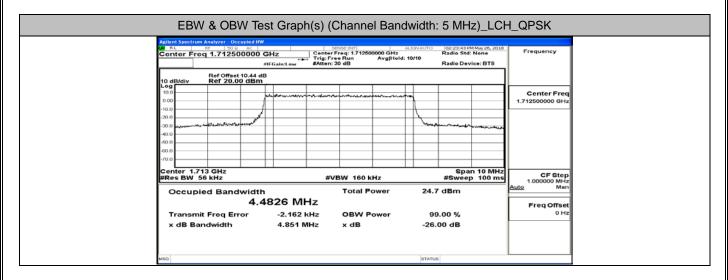


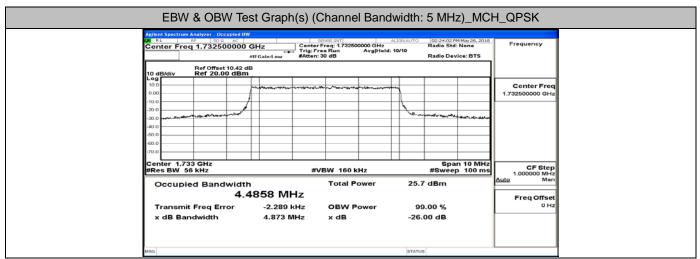


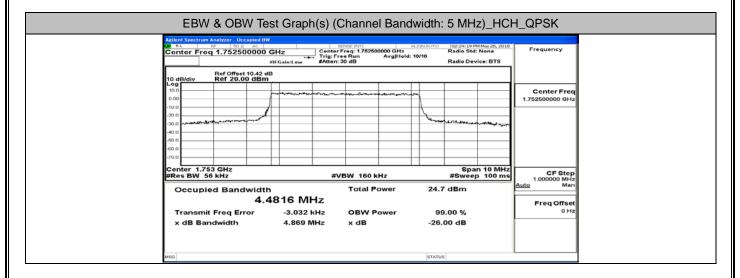


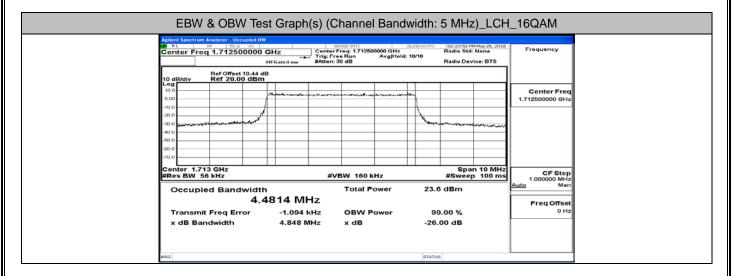


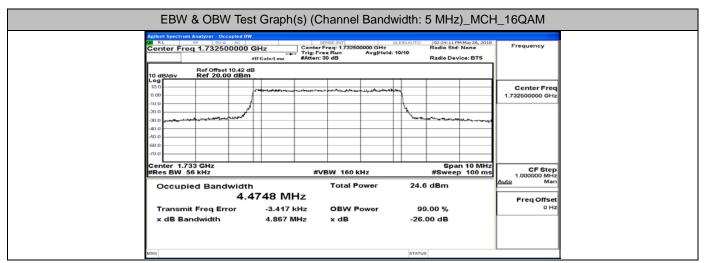


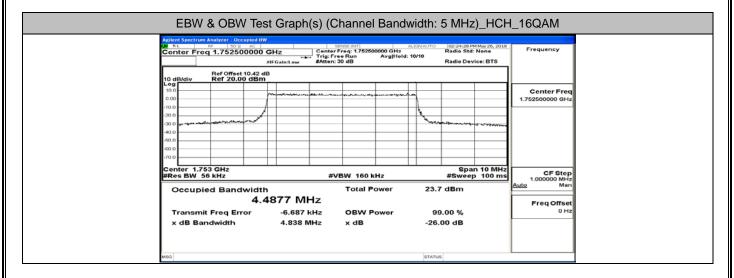


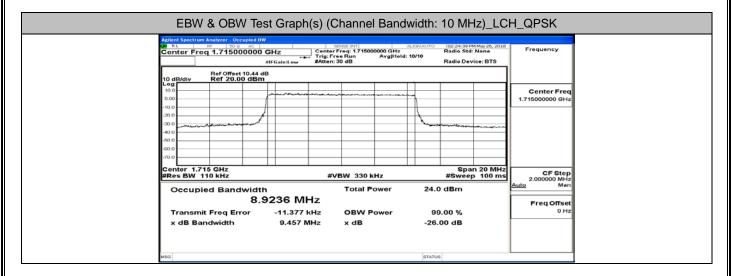


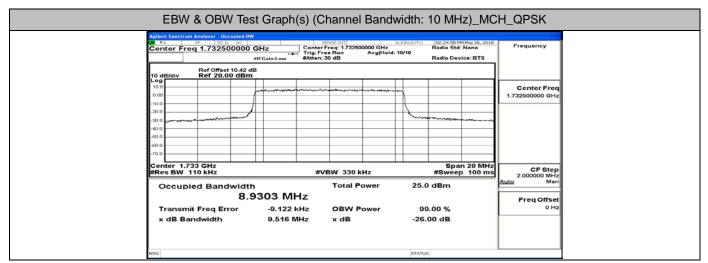


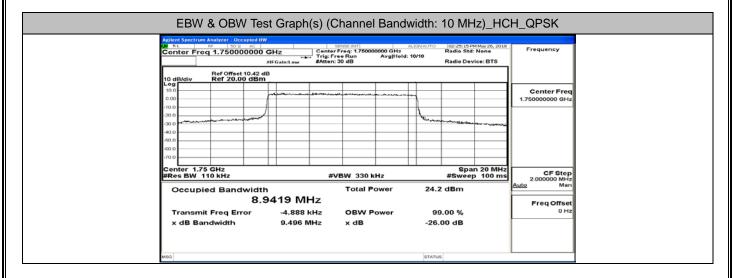


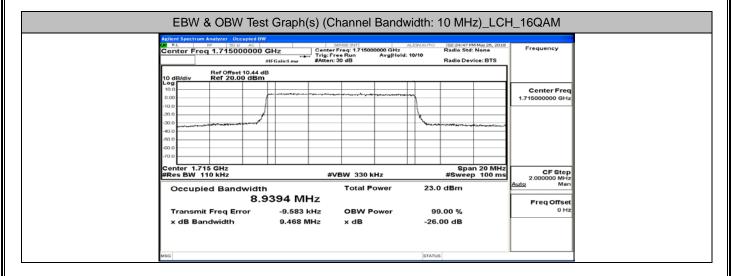


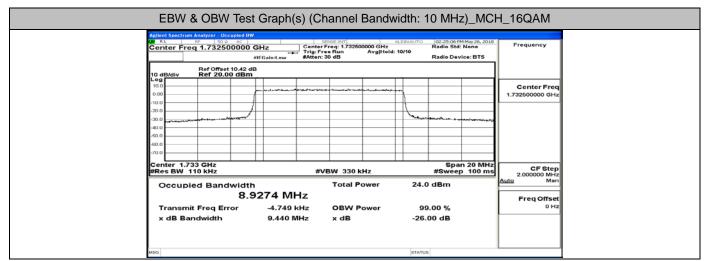


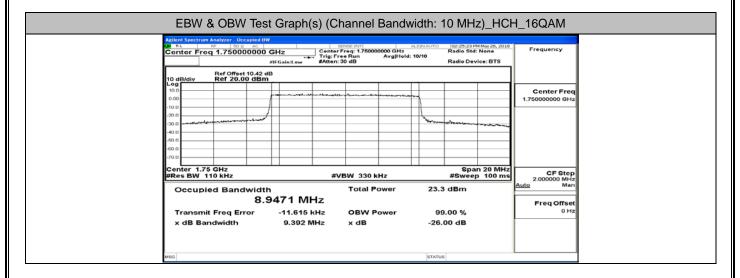


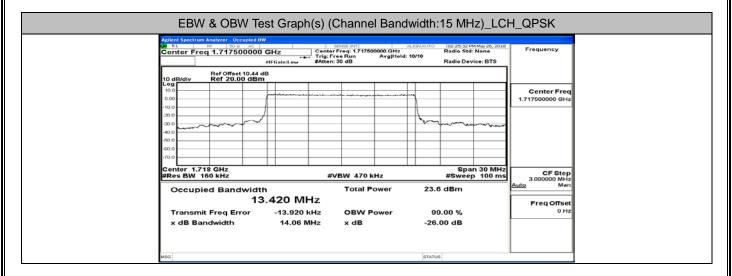


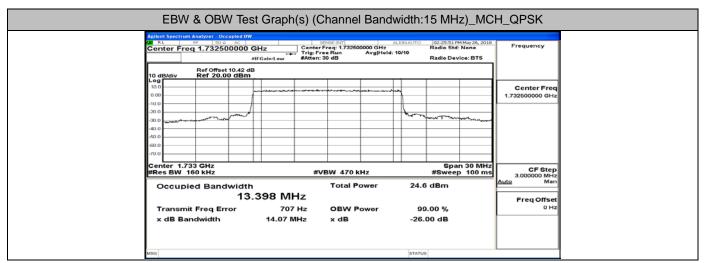


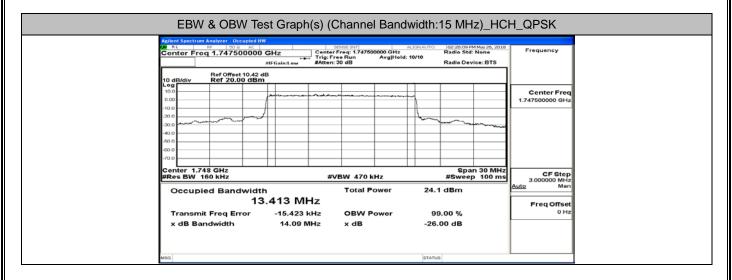


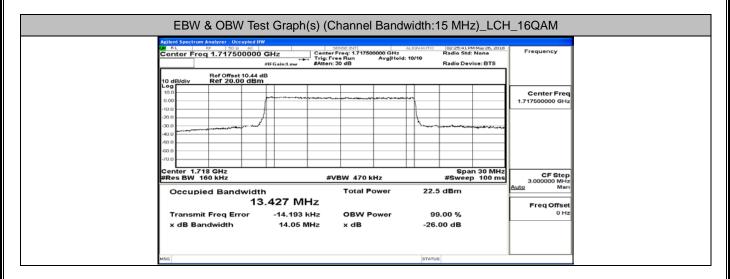


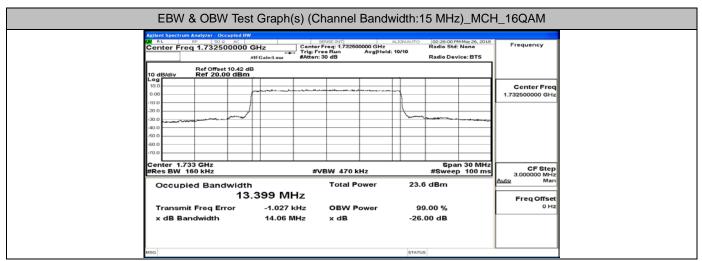


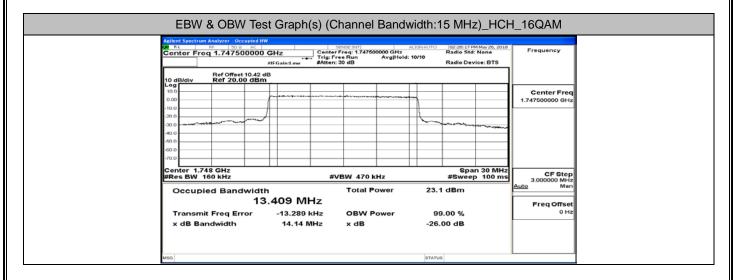


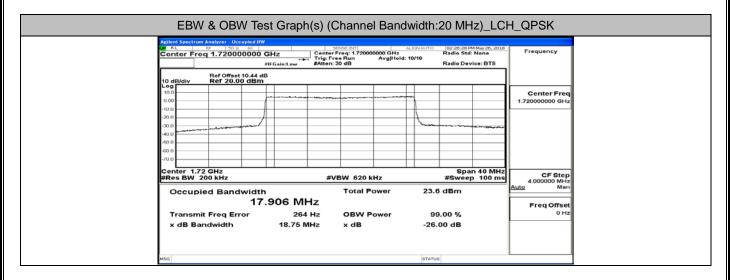


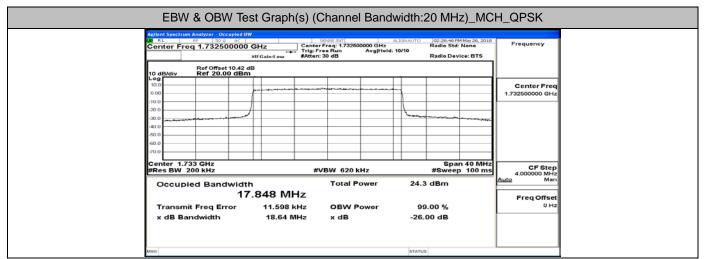


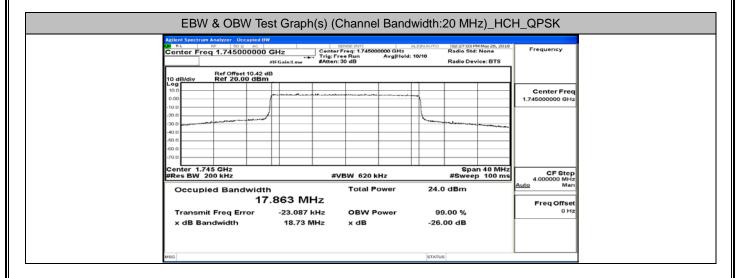


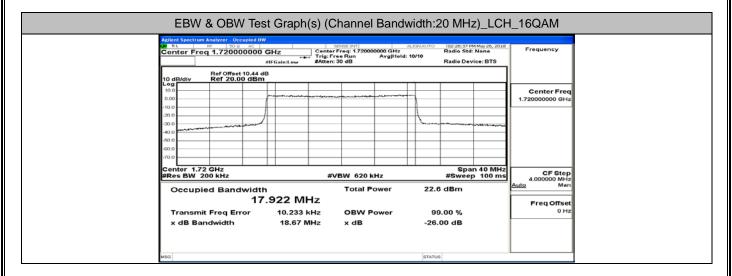


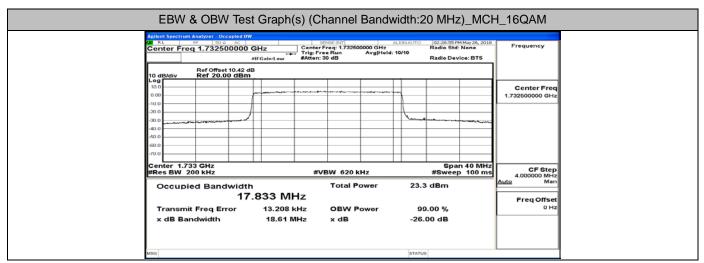


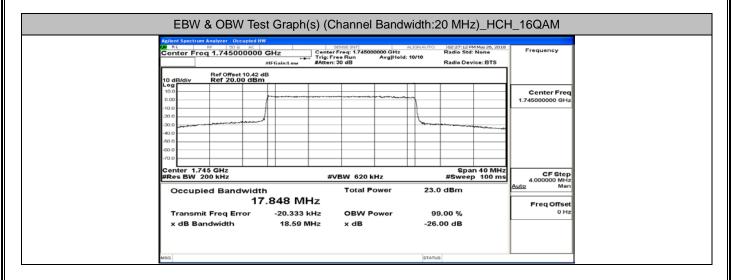












A.4 Band Edge

