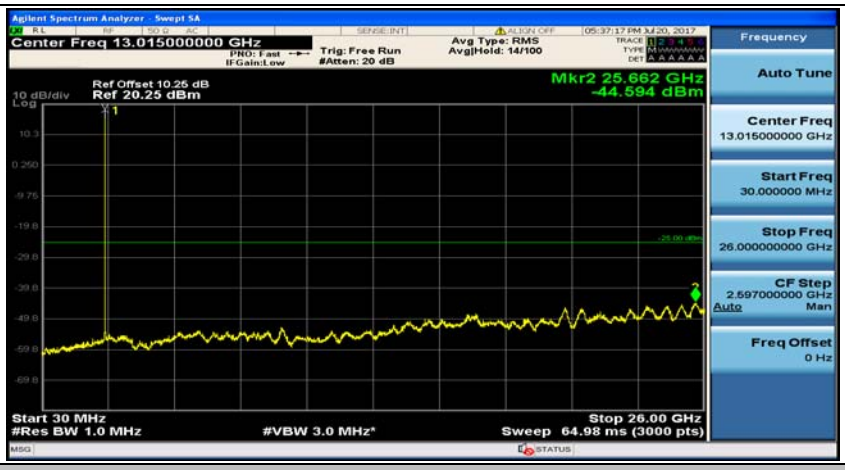
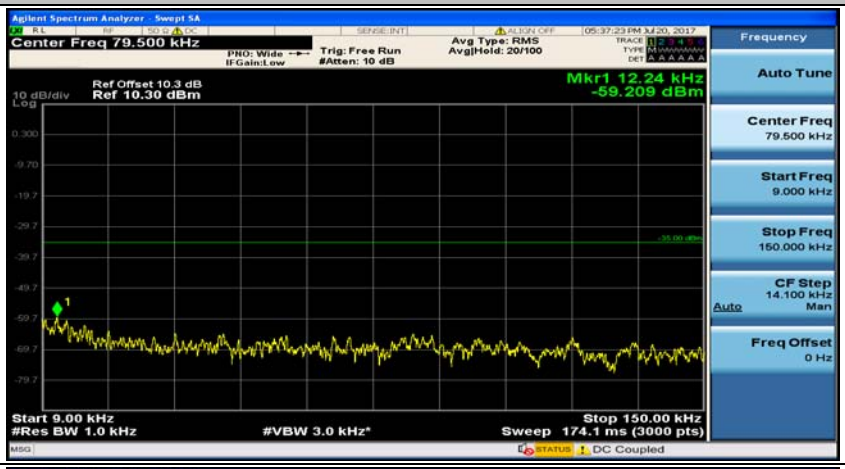
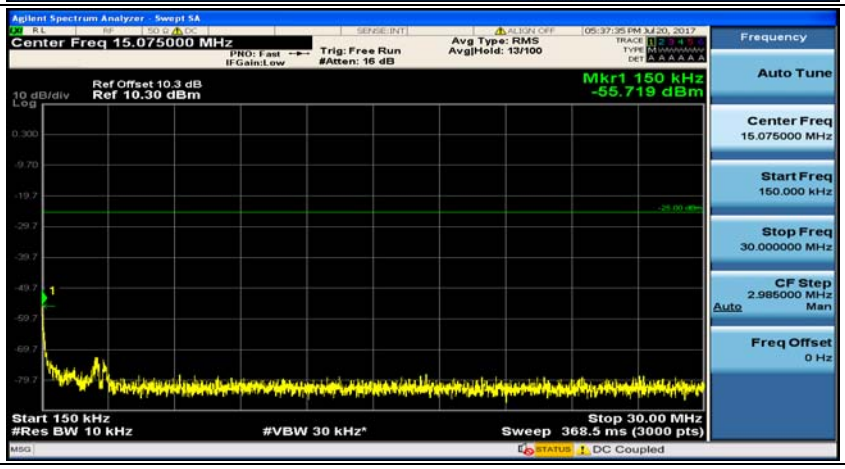
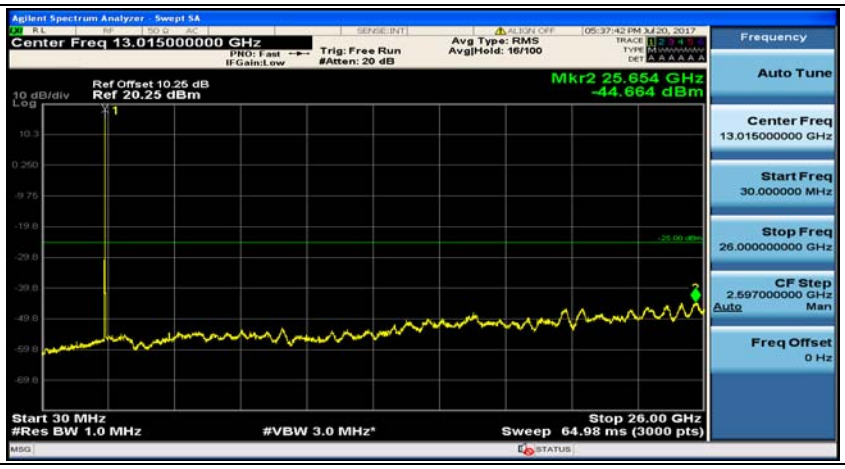


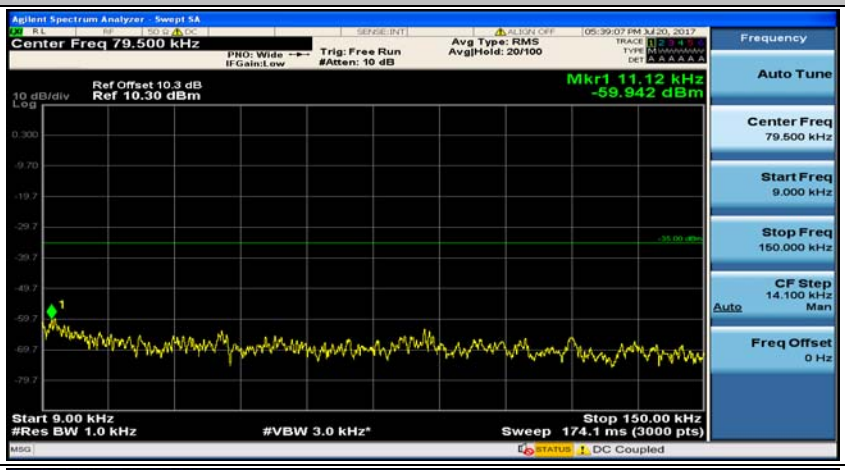
(Channel Bandwidth:15 MHz)_LCH_QPSK_1RB#74

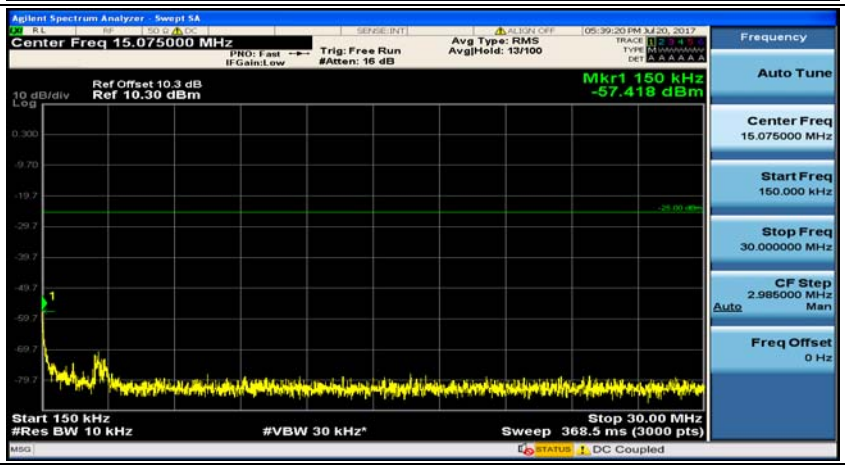


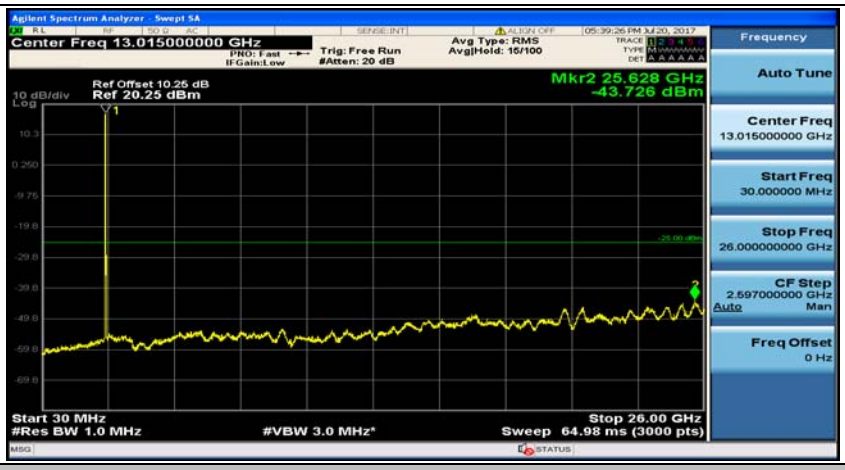




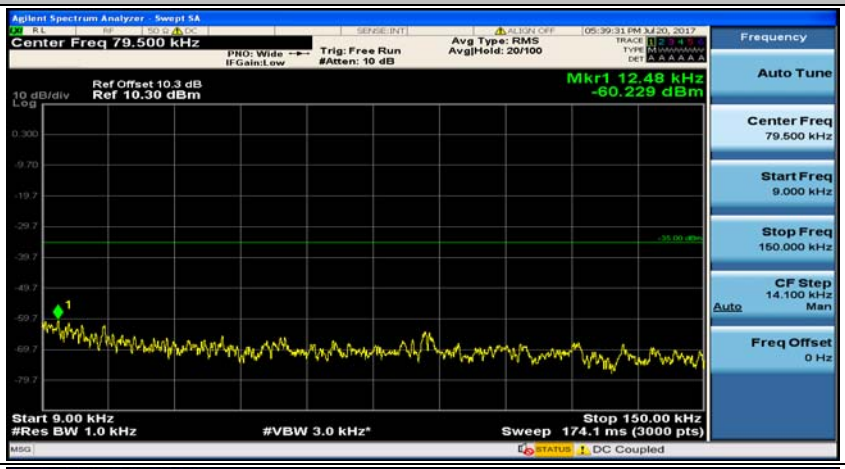
(Channel Bandwidth:15 MHz)_MCH_QPSK_1RB#0

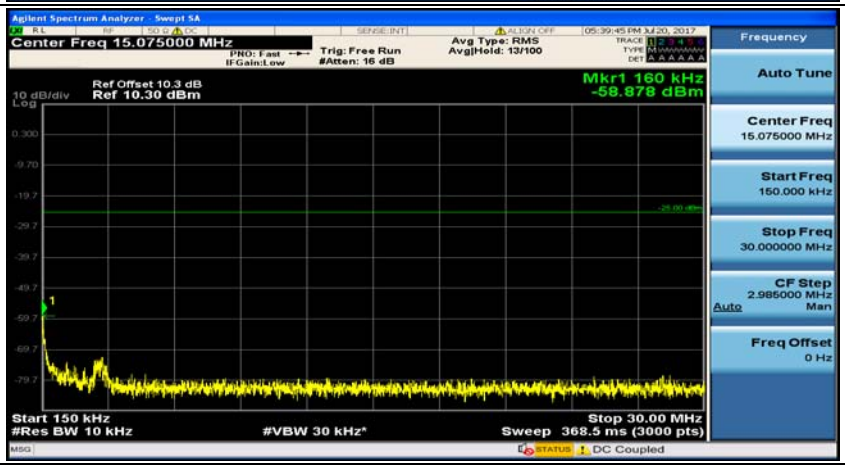


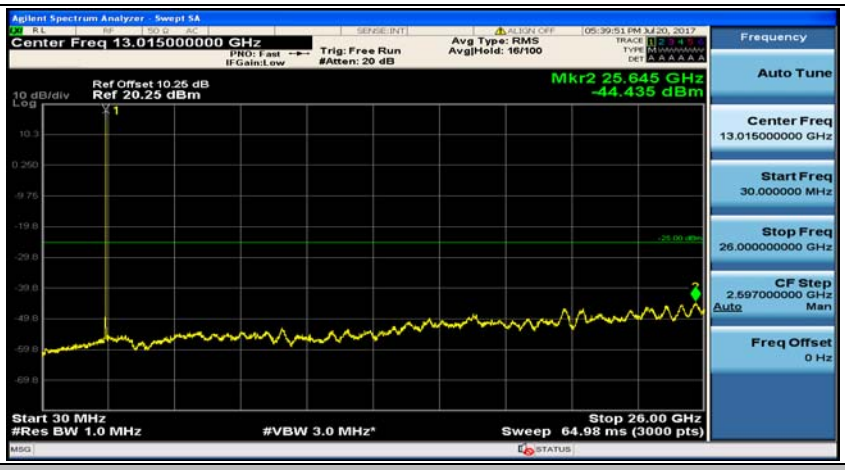




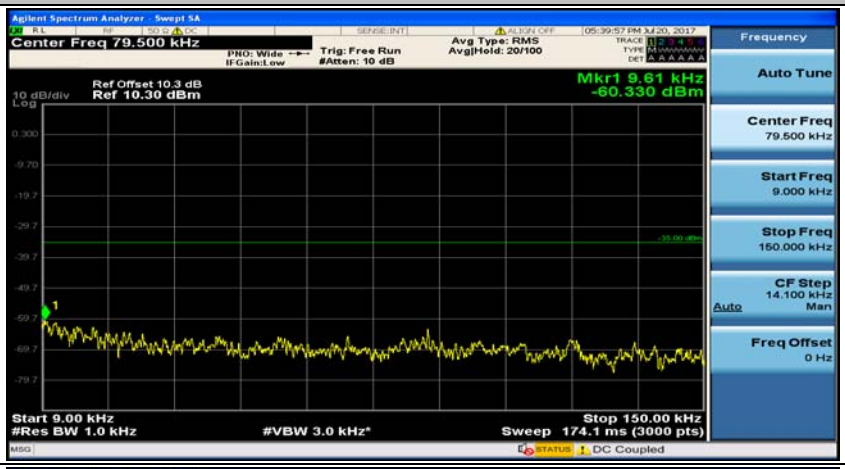
(Channel Bandwidth:15 MHz)_MCH_QPSK_1RB#37

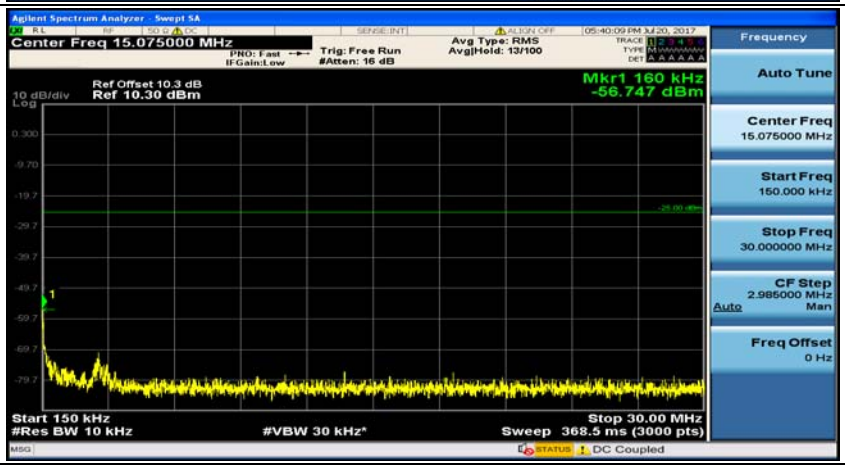


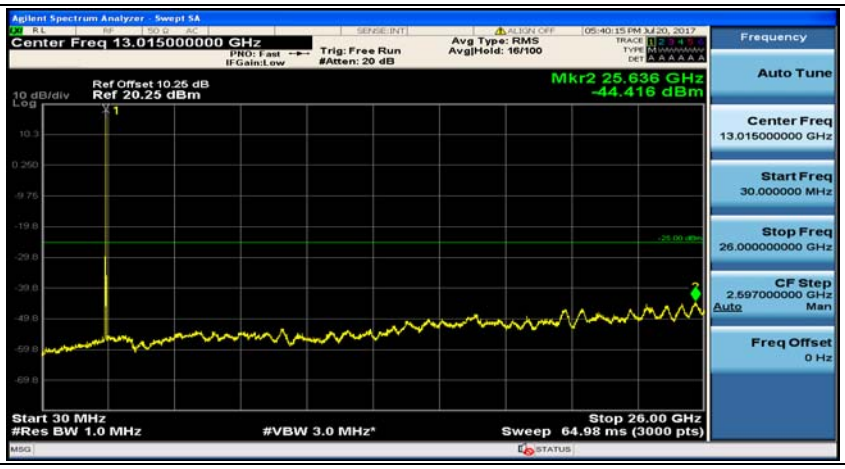




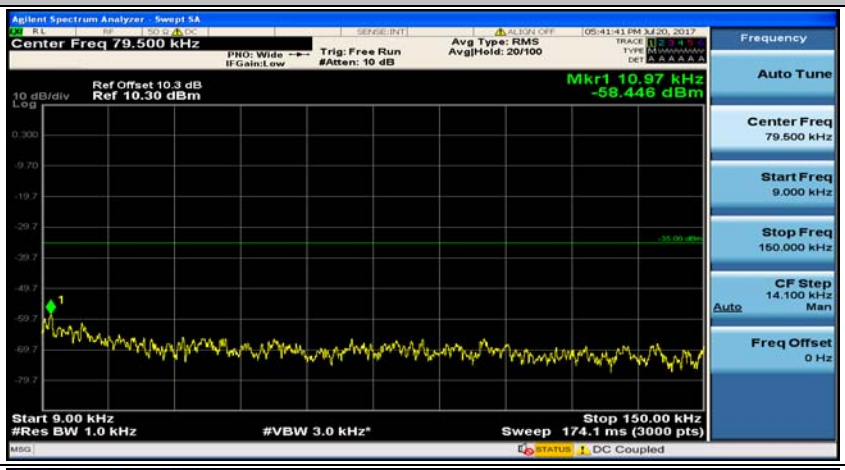
(Channel Bandwidth:15 MHz)_MCH_QPSK_1RB#74

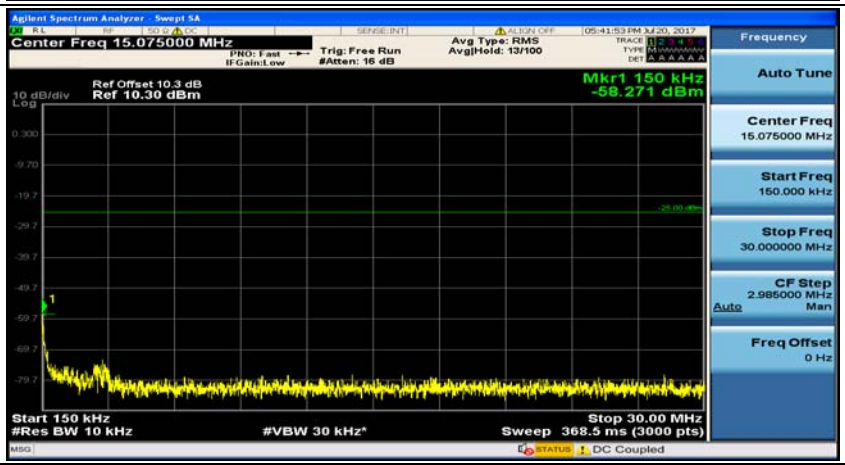


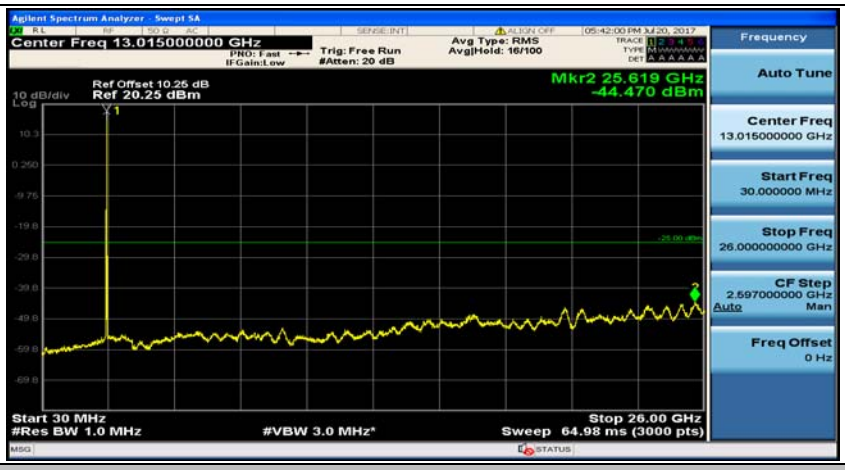




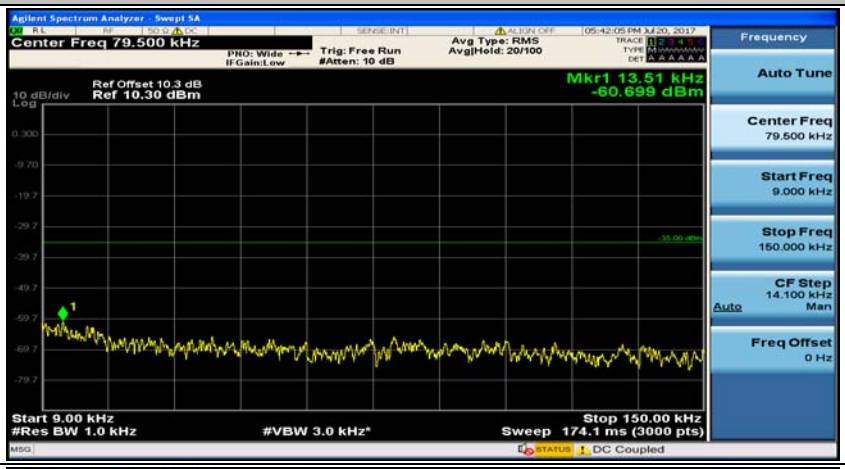
(Channel Bandwidth:15 MHz)_HCH_QPSK_1RB#0

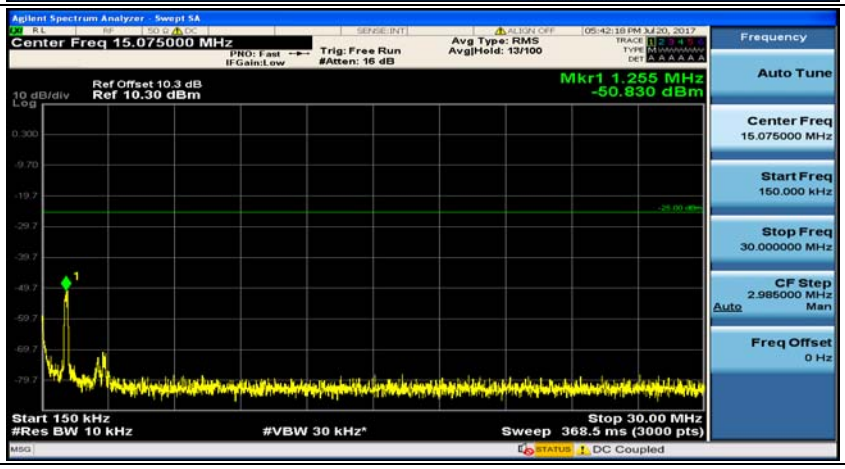


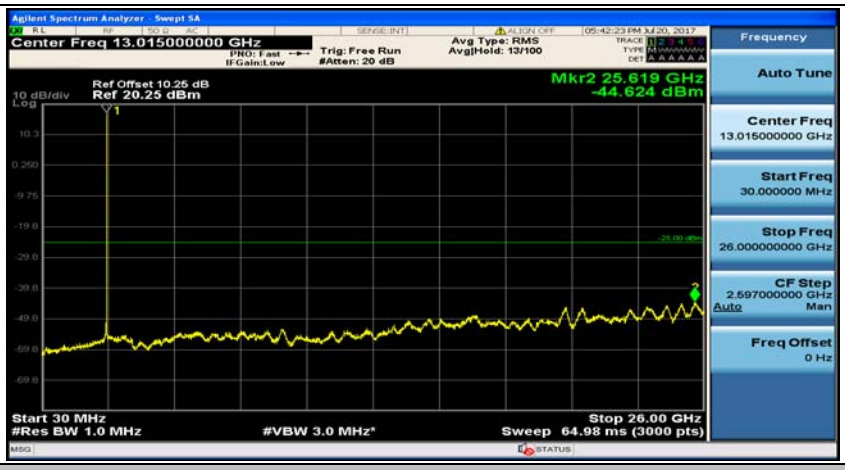




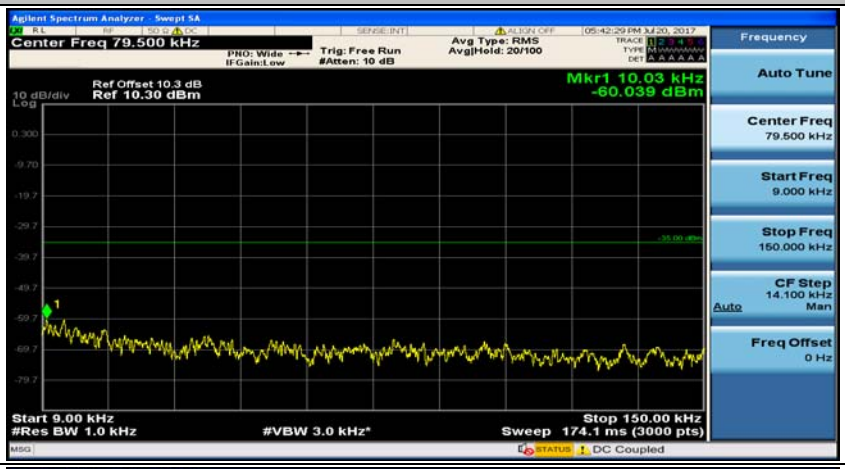
(Channel Bandwidth:15 MHz)_HCH_QPSK_1RB#37

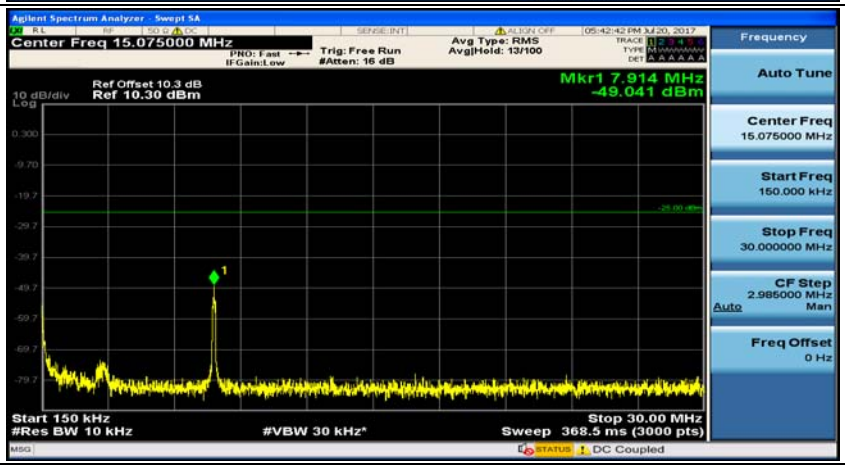


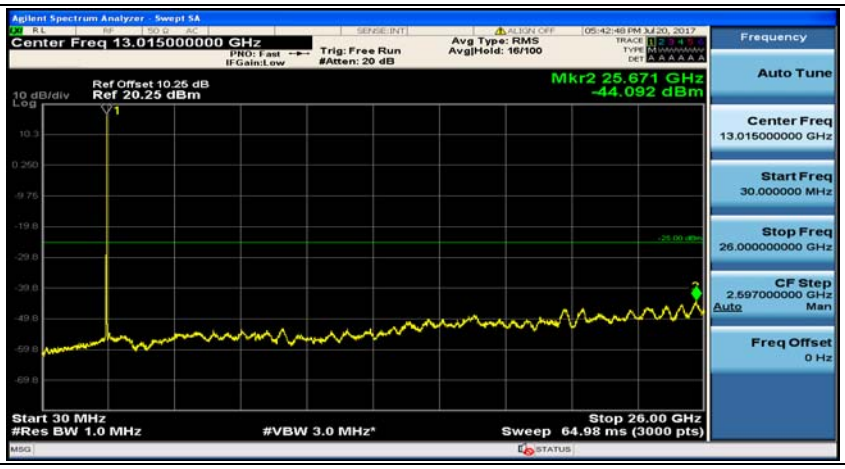




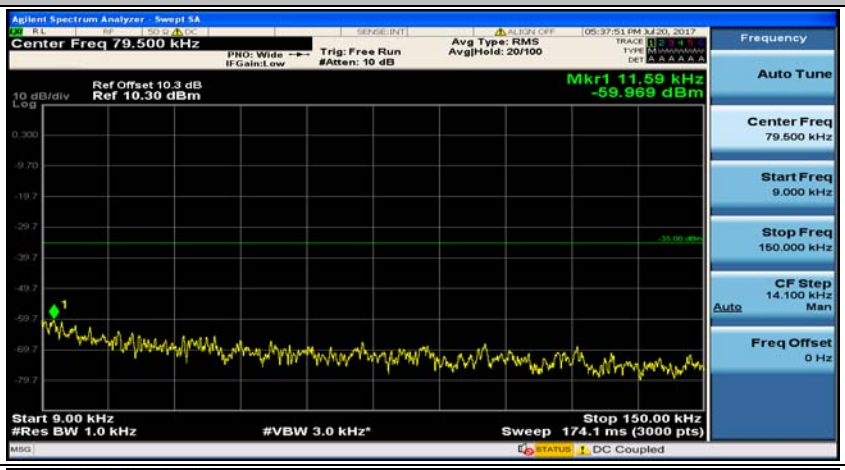
(Channel Bandwidth:15 MHz)_HCH_QPSK_1RB#74

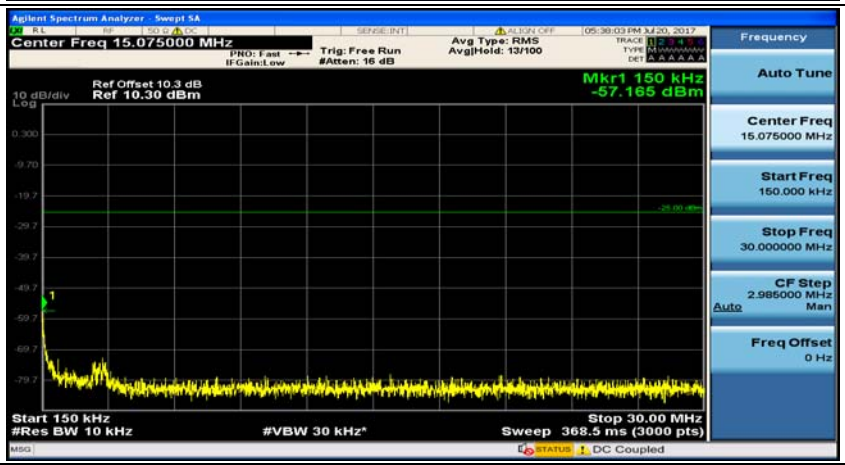


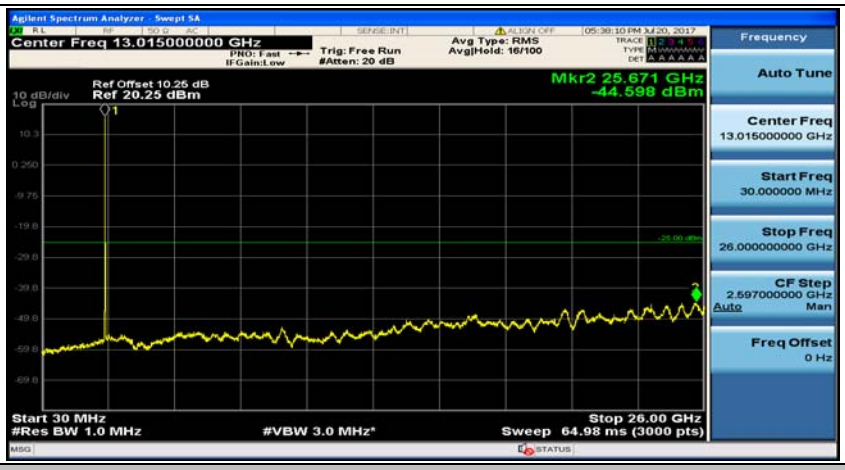




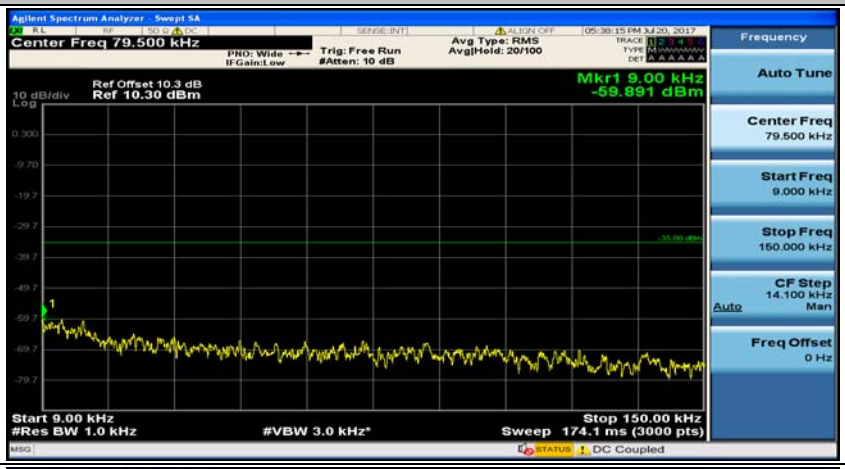
(Channel Bandwidth:15 MHz)_LCH_16QAM_1RB#0

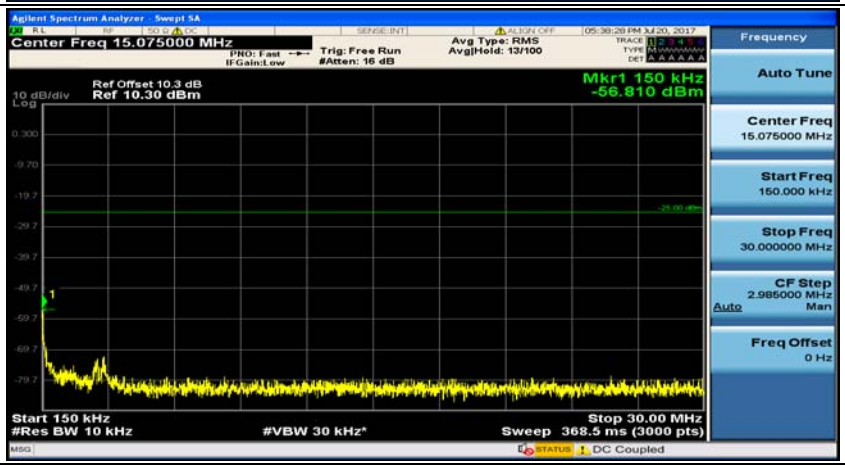


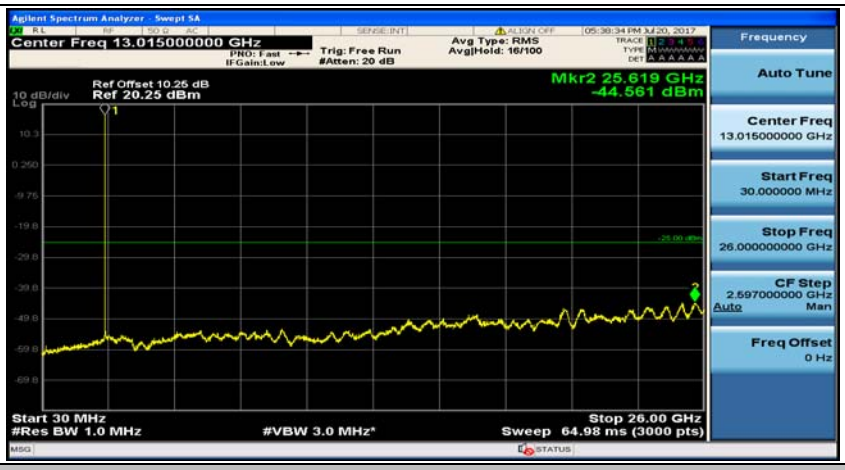




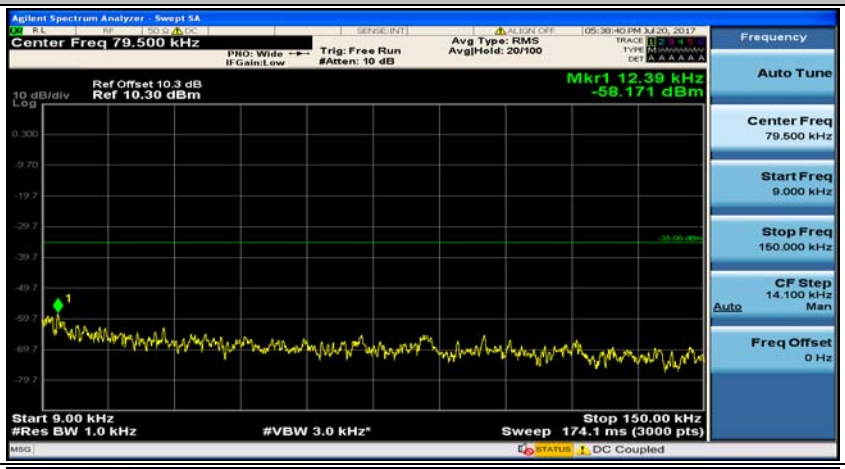
(Channel Bandwidth:15 MHz)_LCH_16QAM_1RB#37

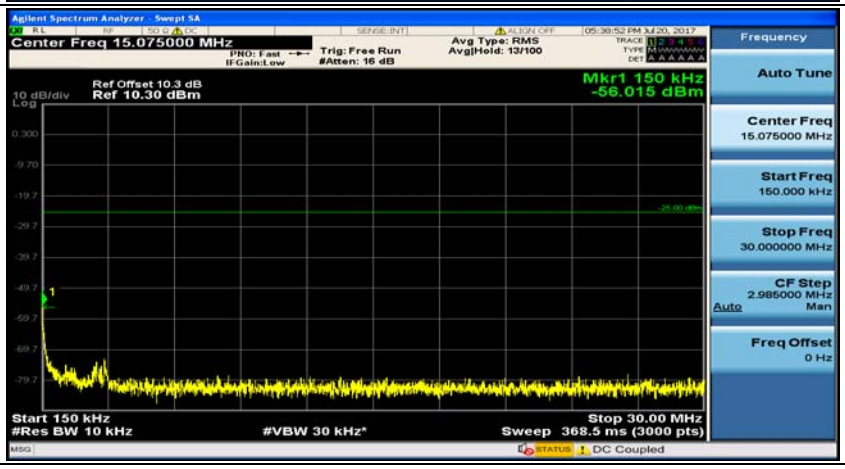


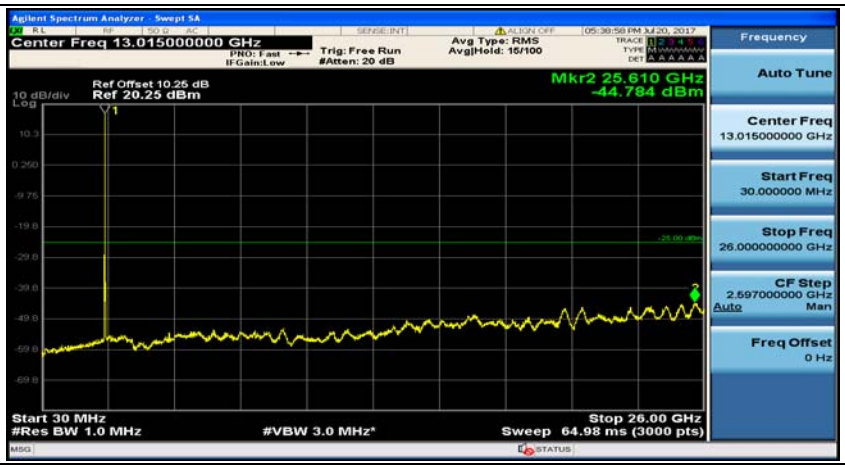




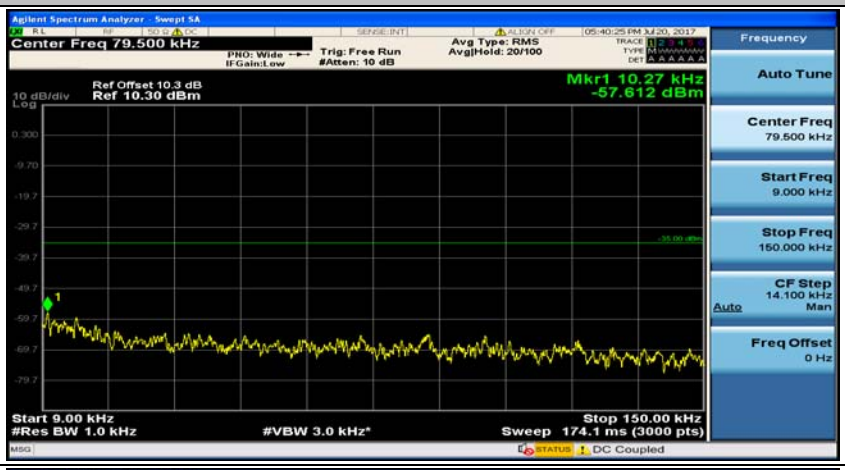
(Channel Bandwidth:15 MHz)_LCH_16QAM_1RB#74

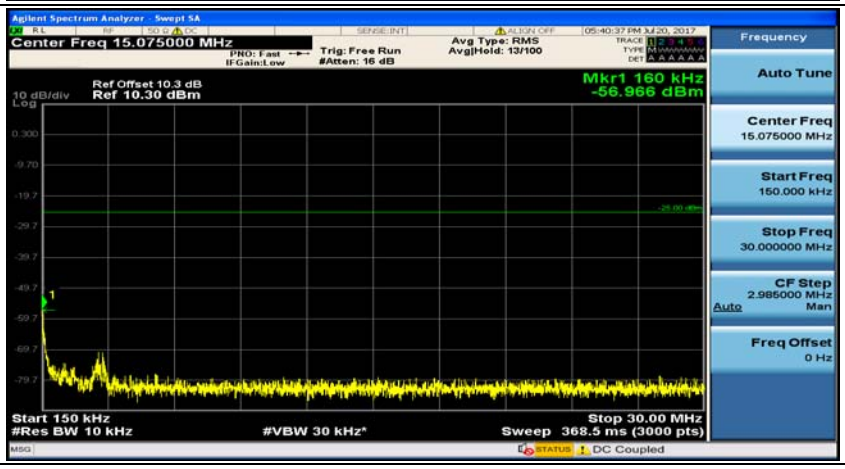


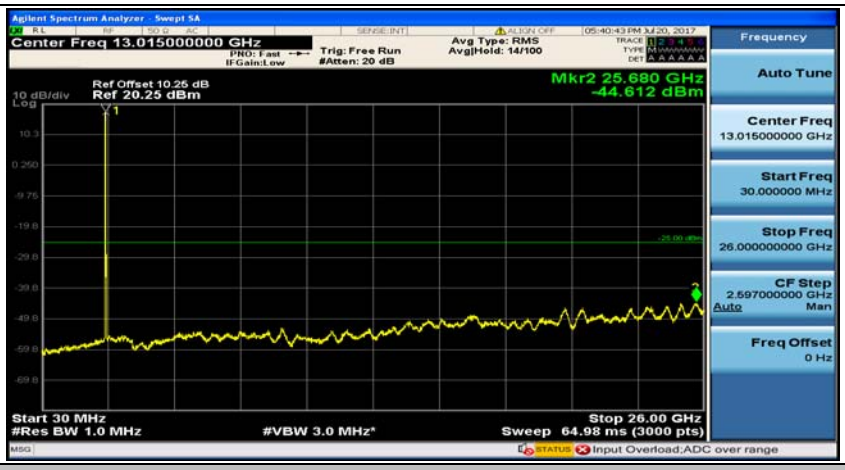




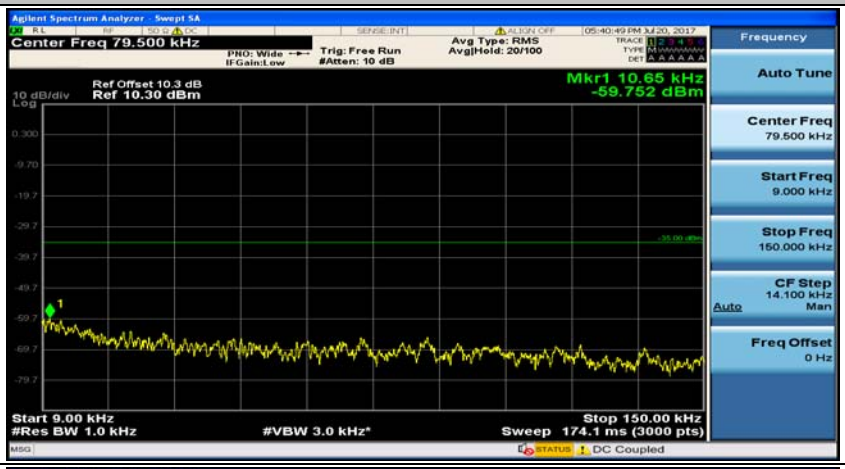
(Channel Bandwidth:15 MHz)_MCH_16QAM_1RB#0

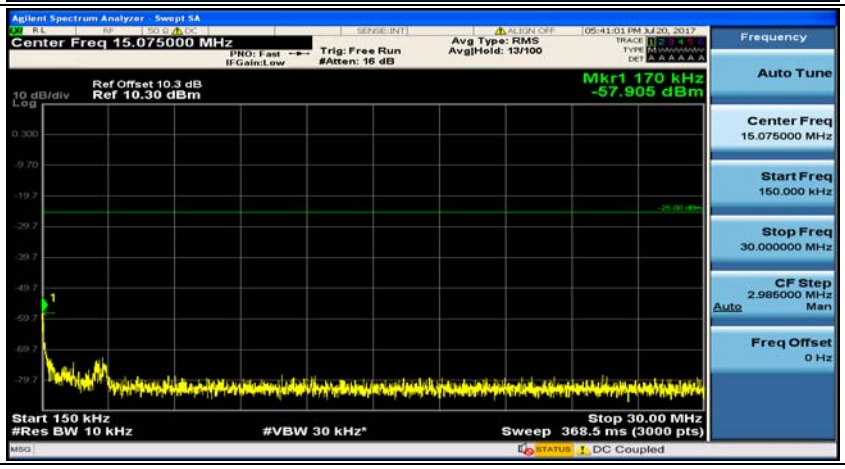


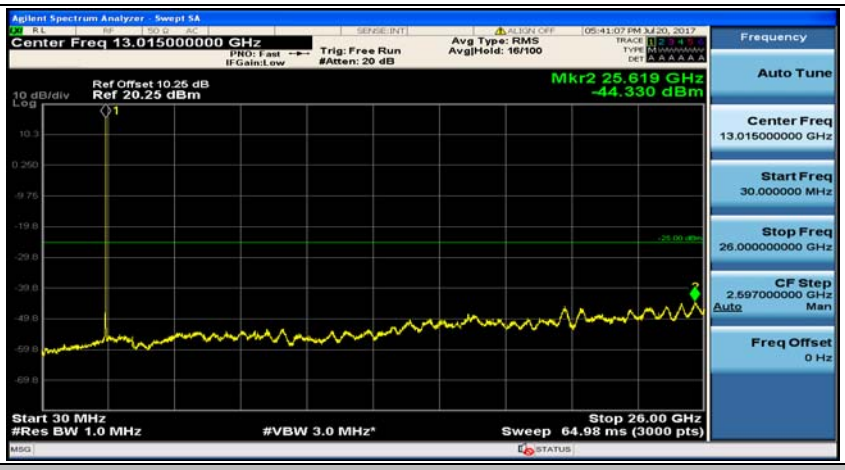




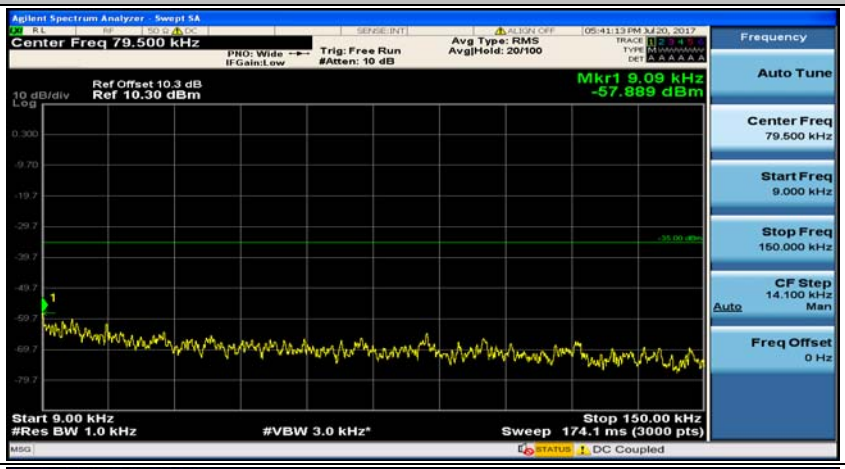
(Channel Bandwidth:15 MHz)_MCH_16QAM_1RB#37

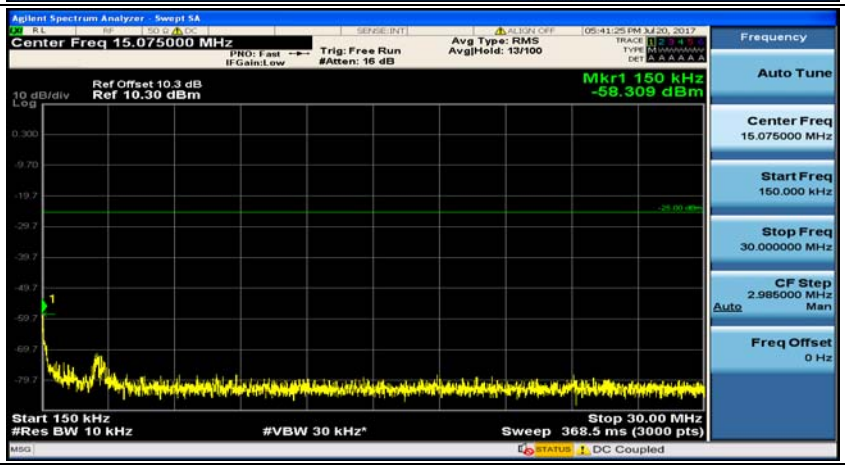


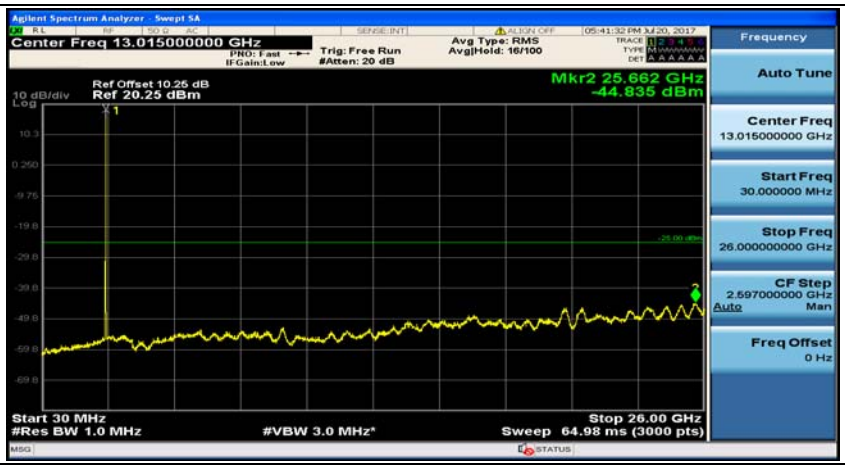




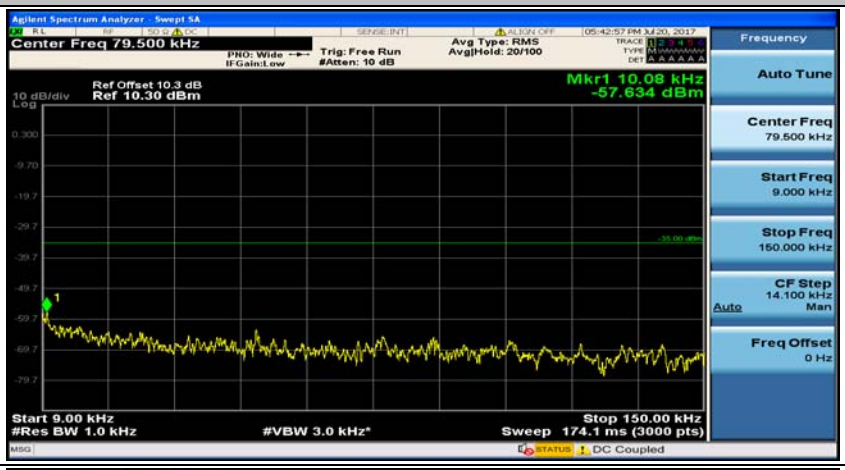
(Channel Bandwidth:15 MHz)_MCH_16QAM_1RB#74

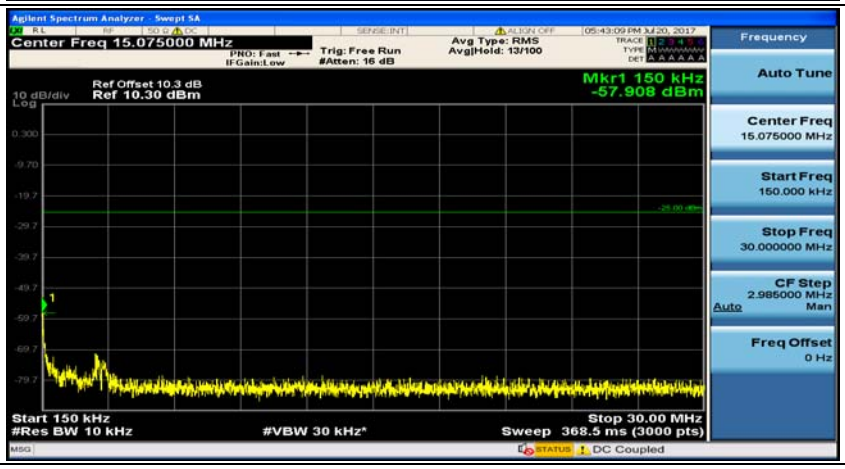


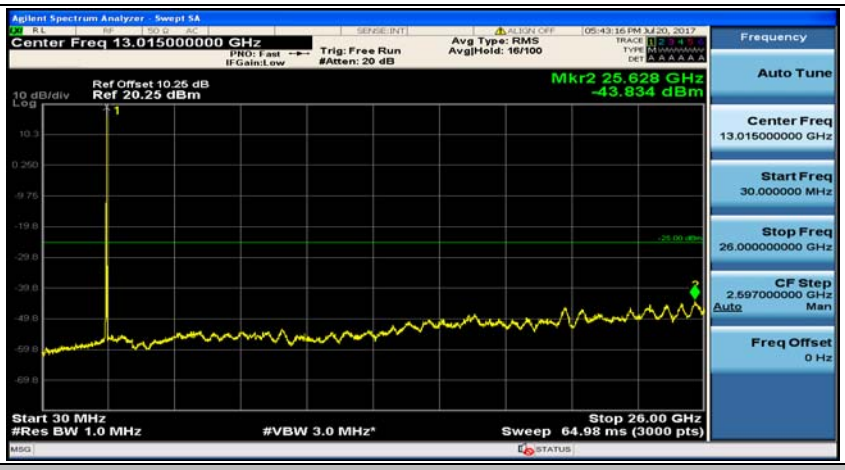




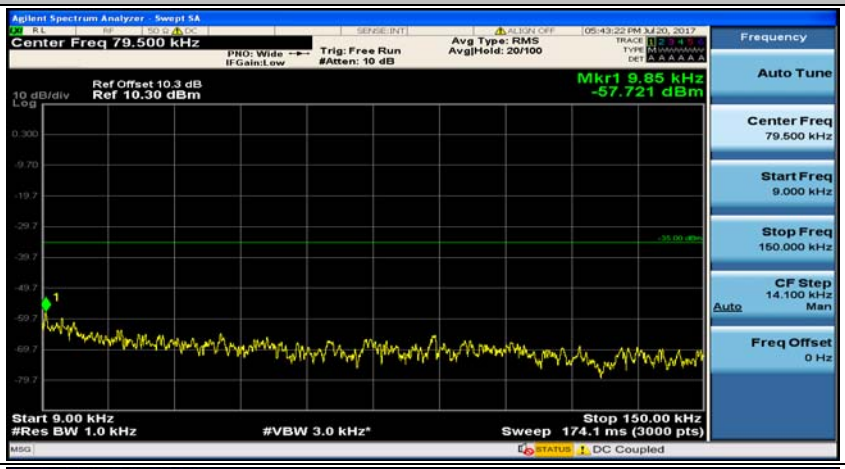
(Channel Bandwidth:15 MHz)_HCH_16QAM_1RB#0

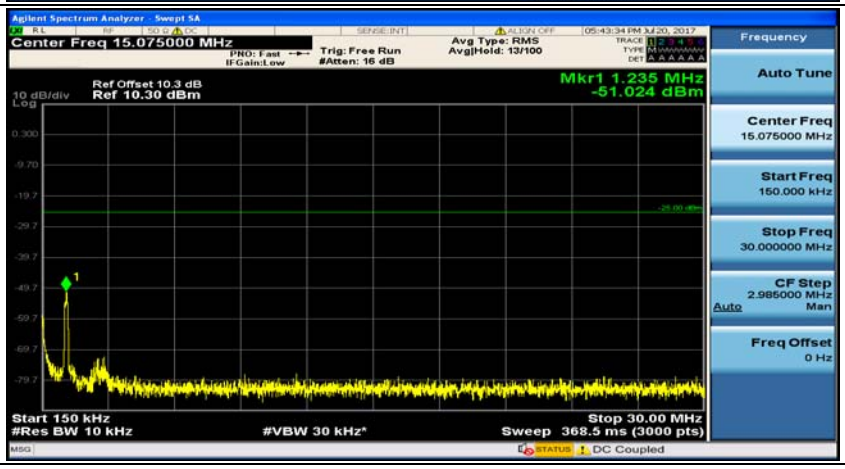


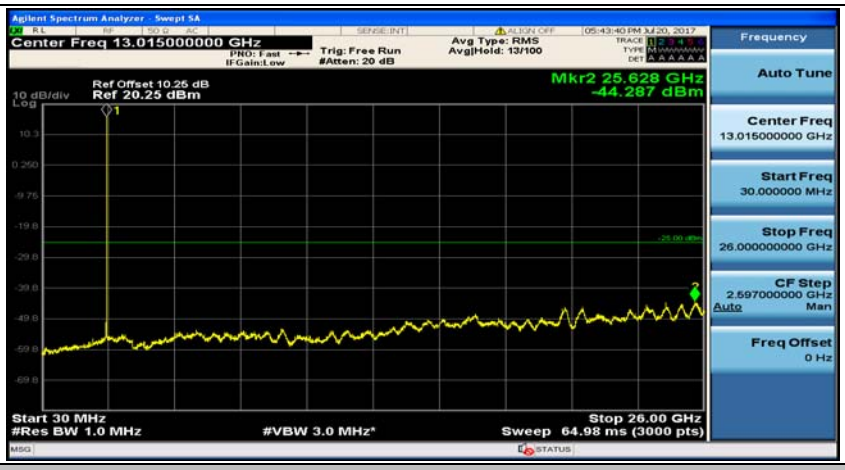




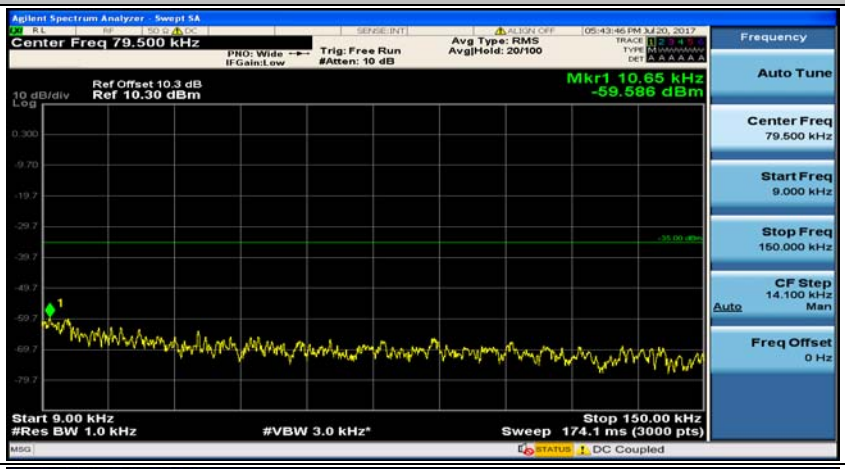
(Channel Bandwidth:15 MHz)_HCH_16QAM_1RB#37

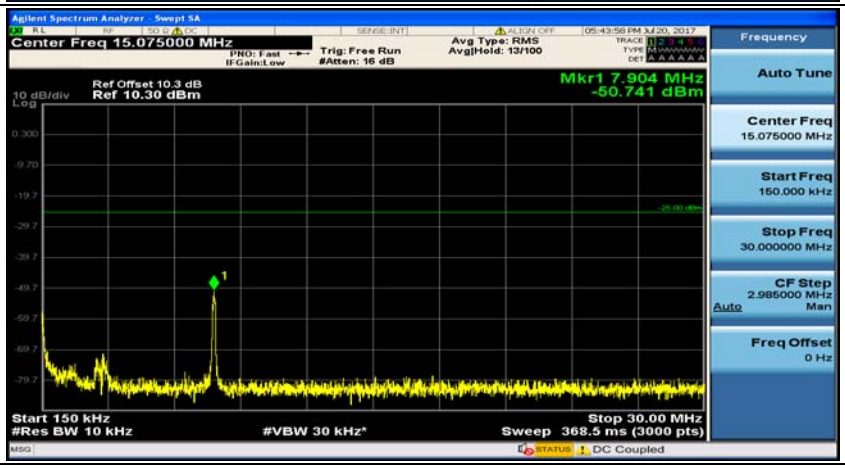


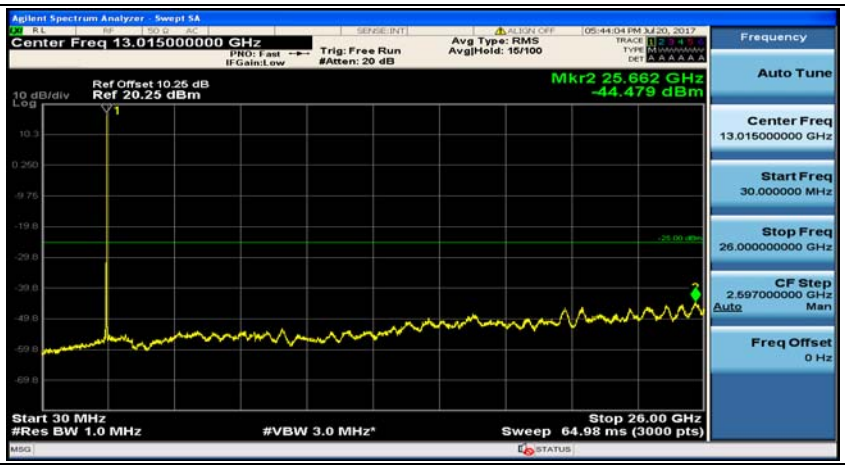




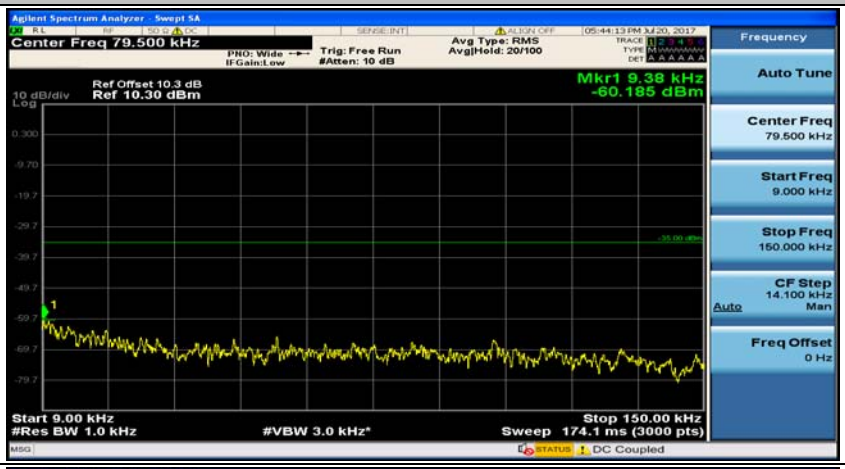
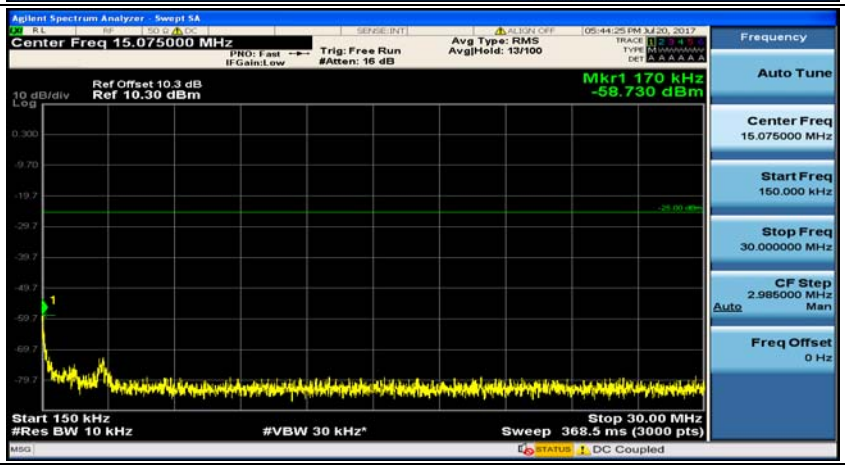
(Channel Bandwidth:15 MHz)_HCH_16QAM_1RB#74

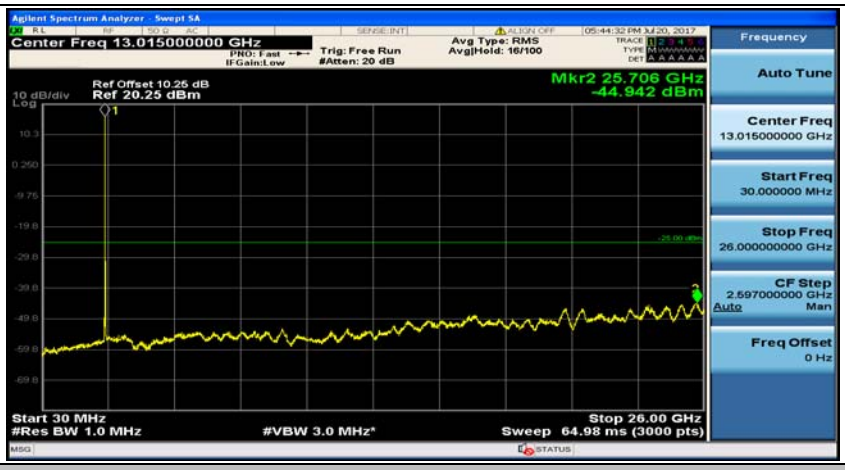




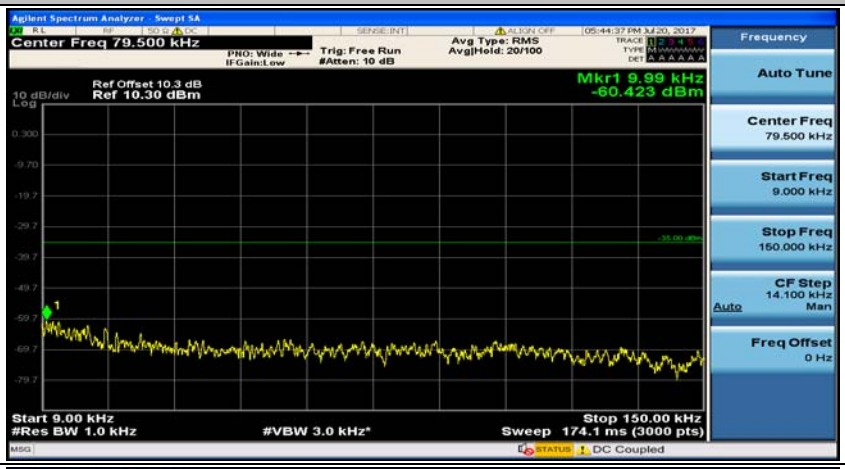


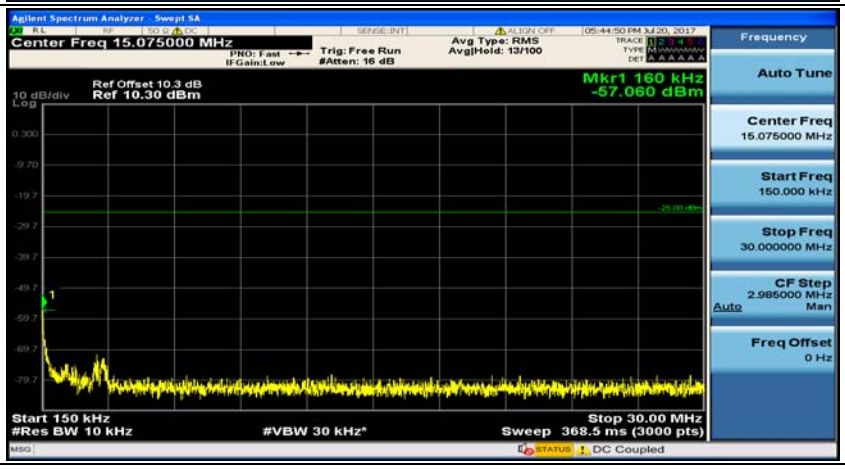
Channel Bandwidth: 20 MHz

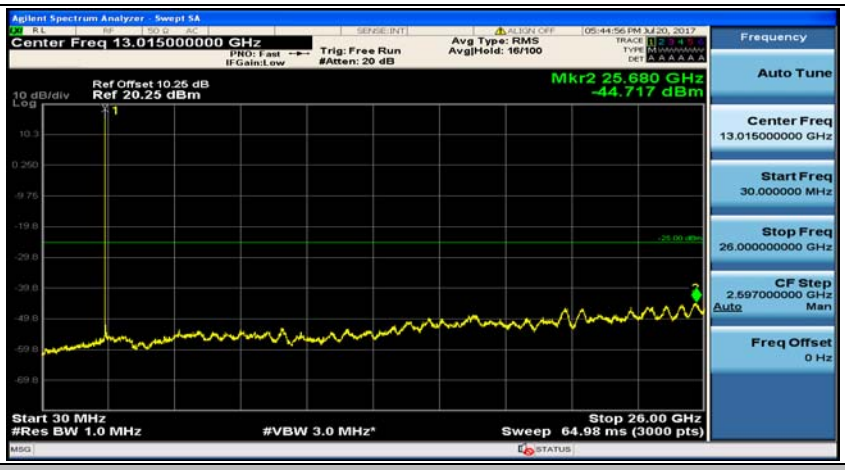
(Channel Bandwidth:20 MHz)_LCH_QPSK_1RB#0





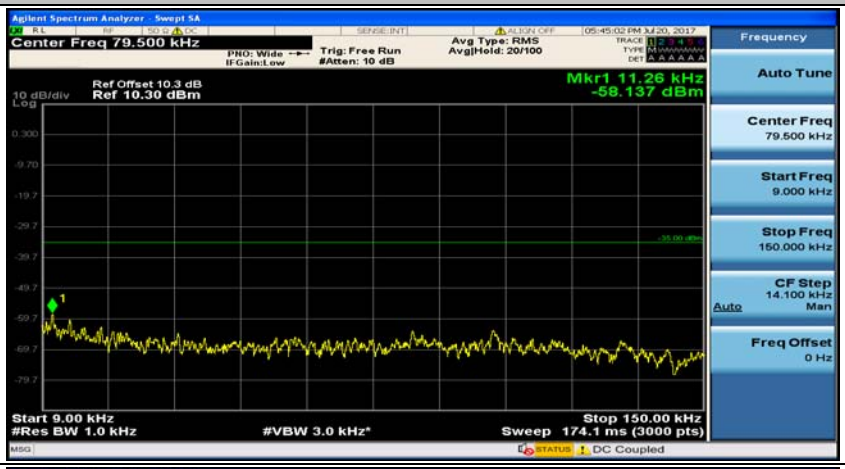
(Channel Bandwidth:20 MHz)_LCH_QPSK_1RB#49

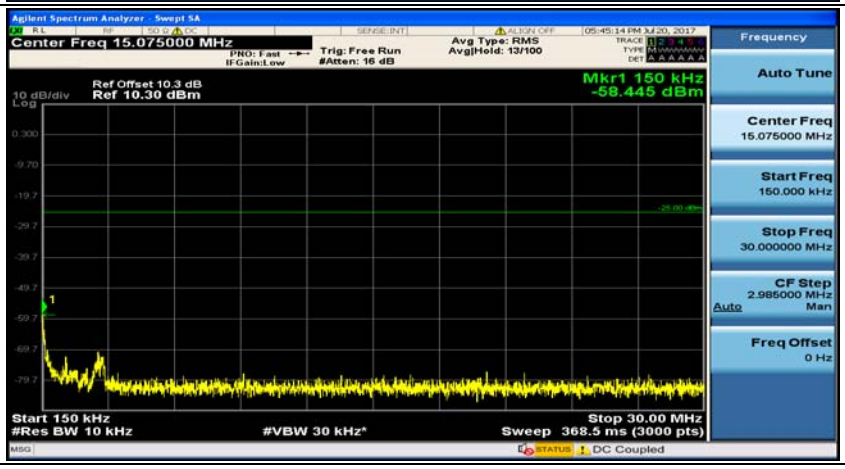


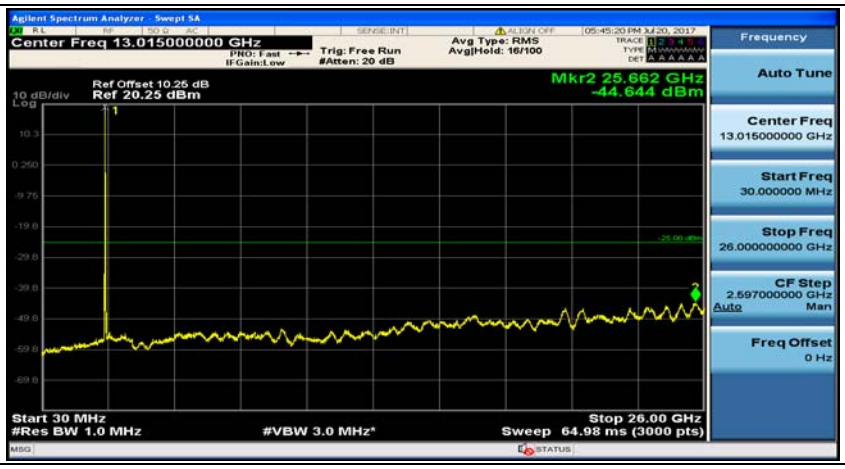




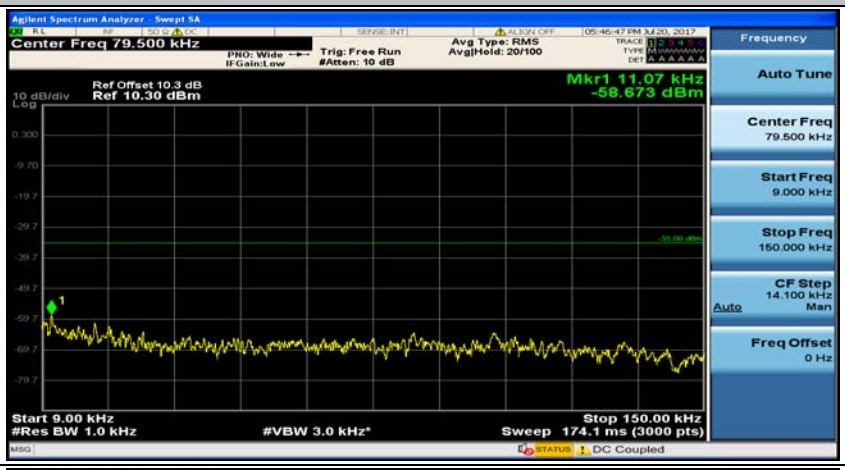
(Channel Bandwidth:20 MHz)_LCH_QPSK_1RB#99

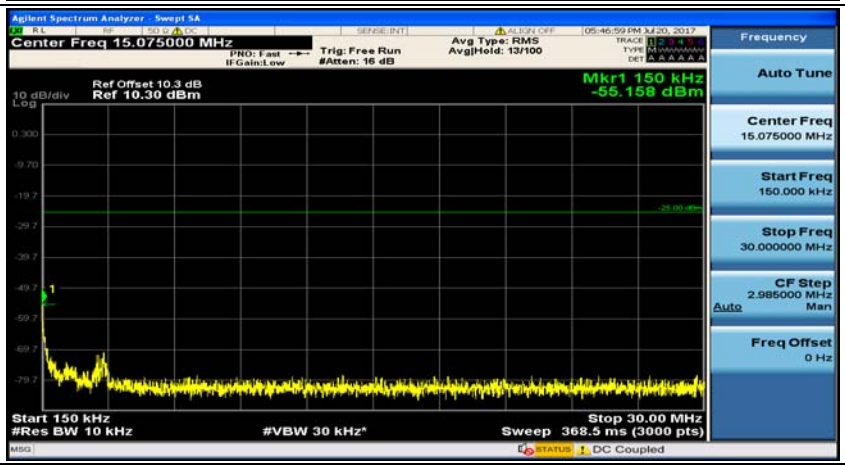


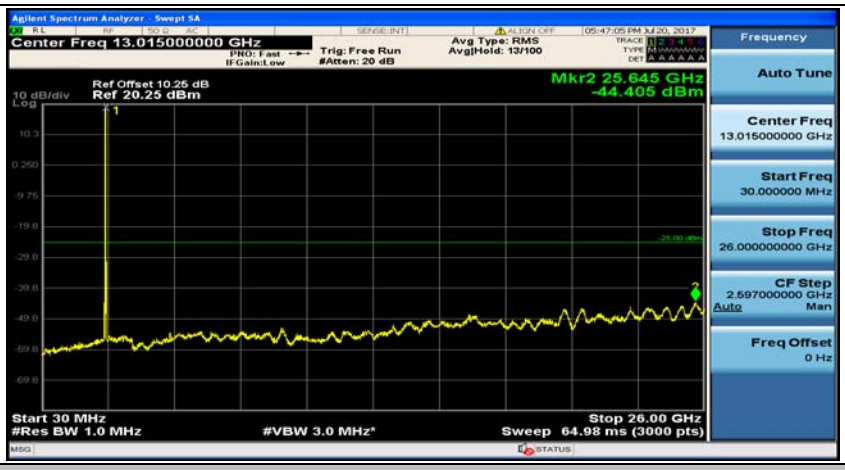




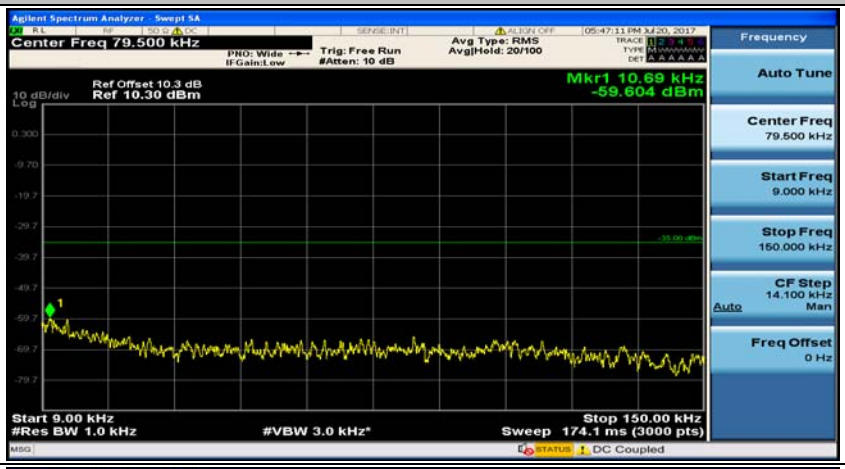
(Channel Bandwidth:20 MHz)_MCH_QPSK_1RB#0

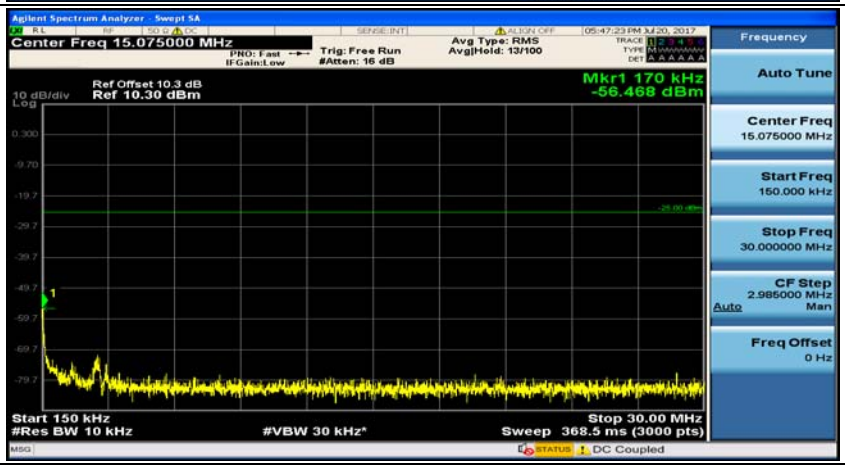


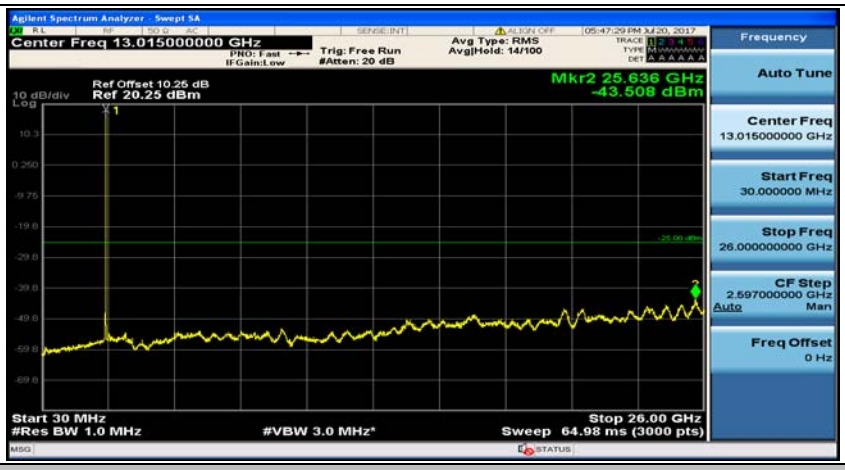




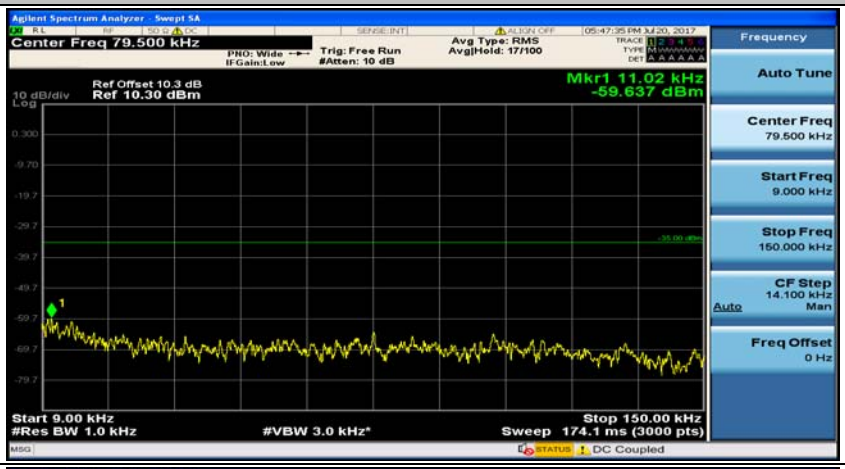
(Channel Bandwidth:20 MHz)_MCH_QPSK_1RB#49

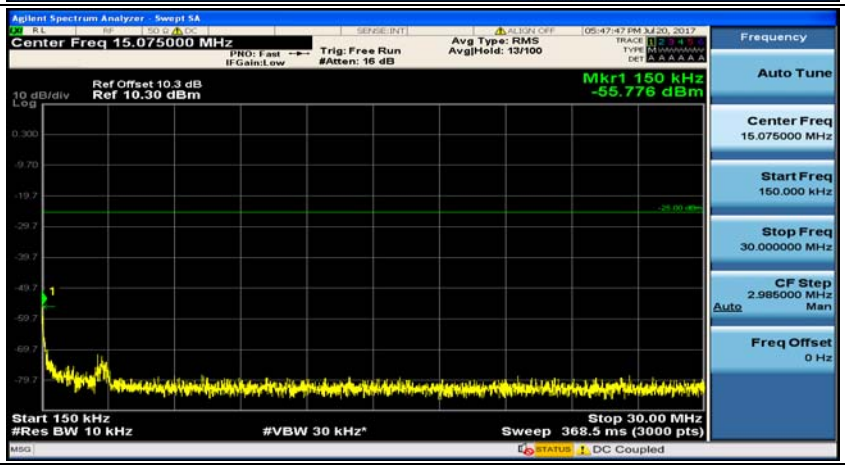


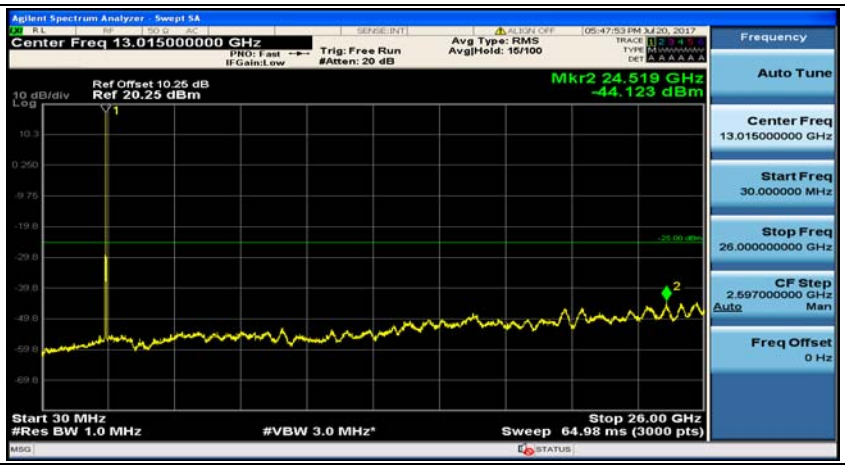




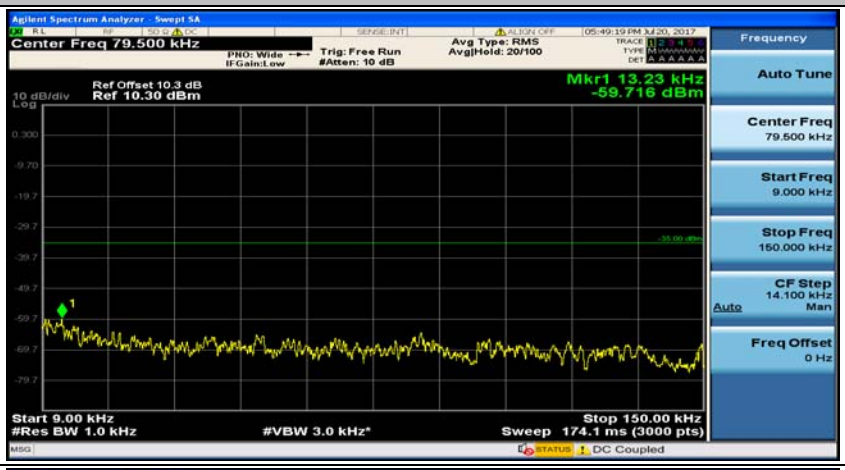
(Channel Bandwidth:20 MHz)_MCH_QPSK_1RB#99

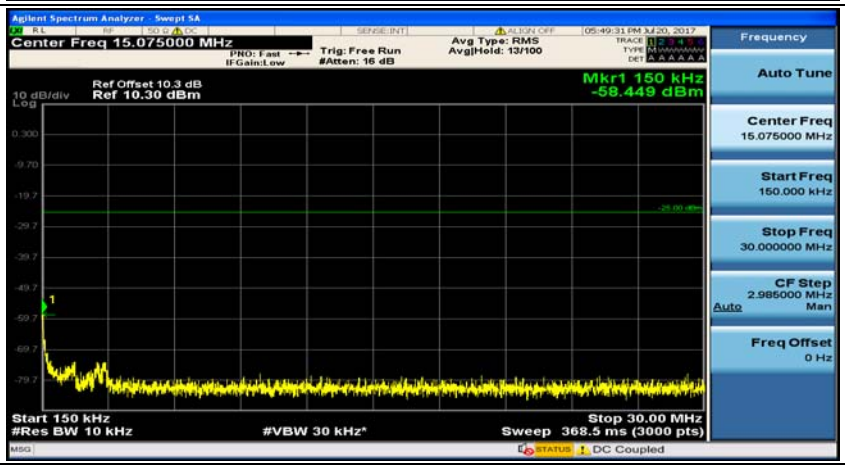


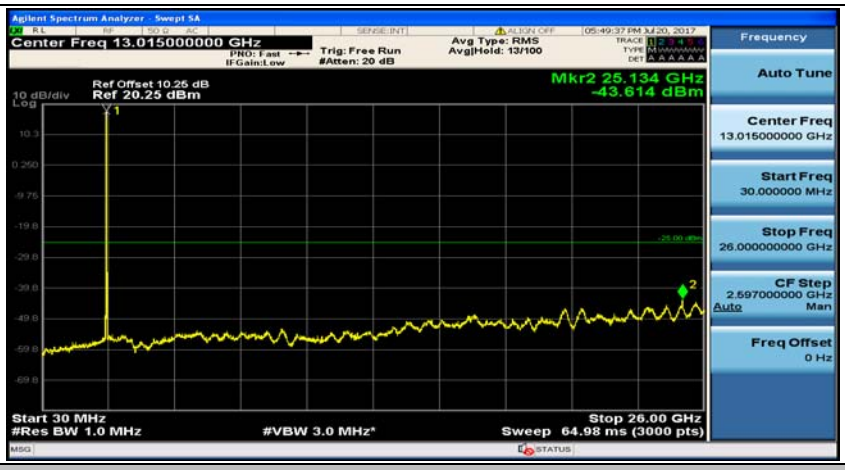




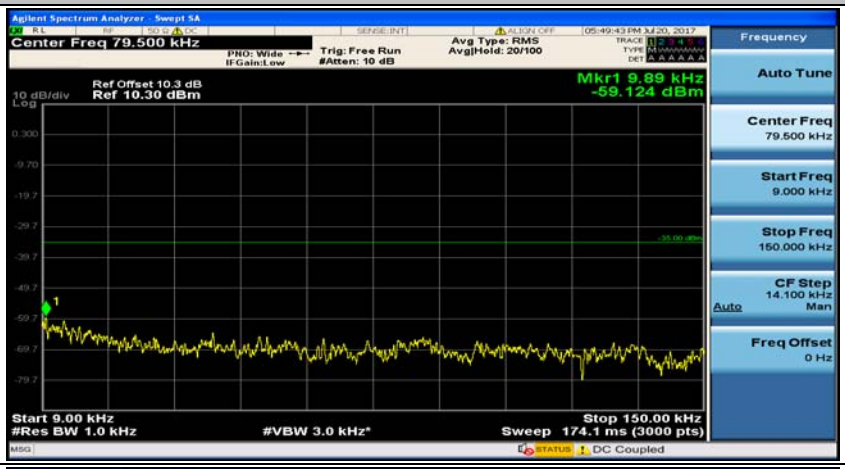
(Channel Bandwidth:20 MHz)_HCH_QPSK_1RB#0

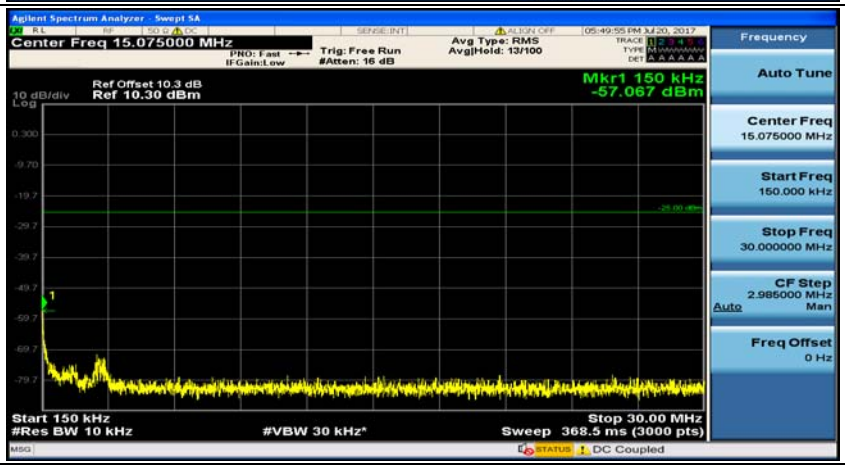


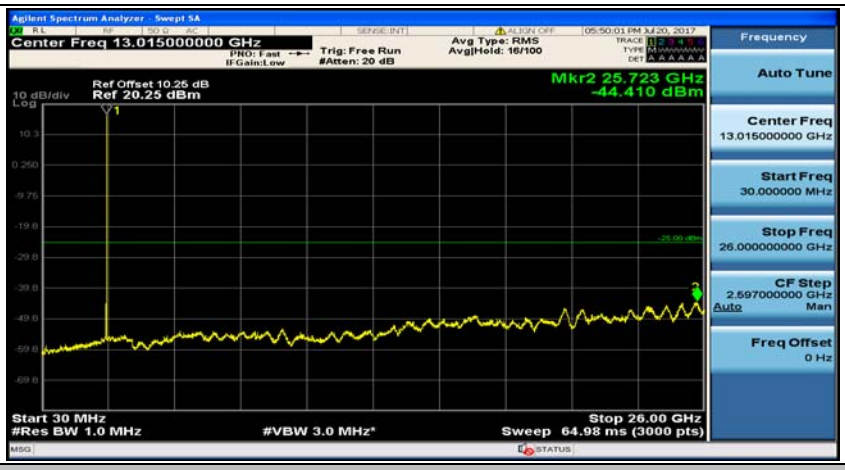




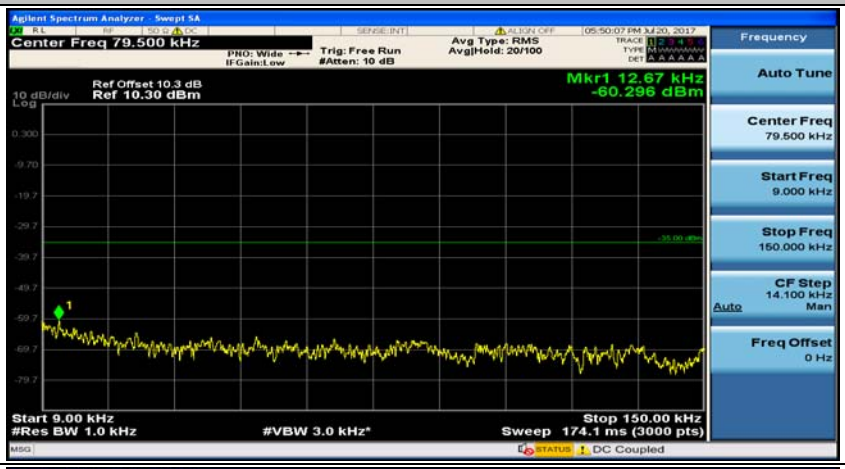
(Channel Bandwidth:20 MHz)_HCH_QPSK_1RB#49

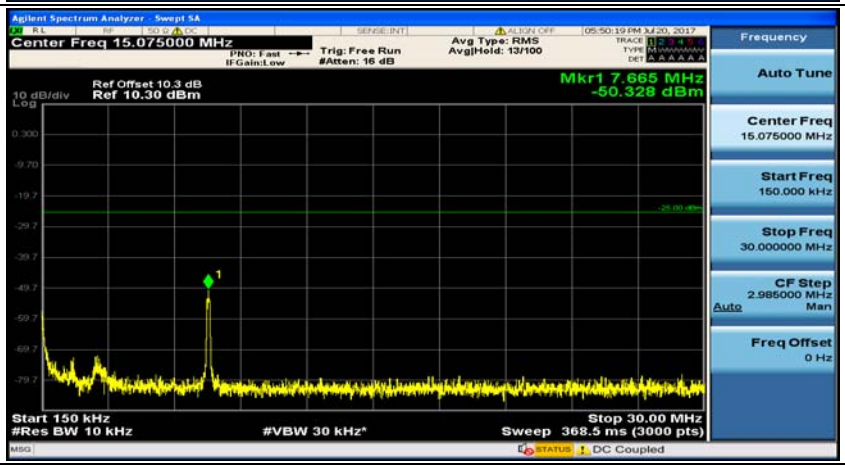


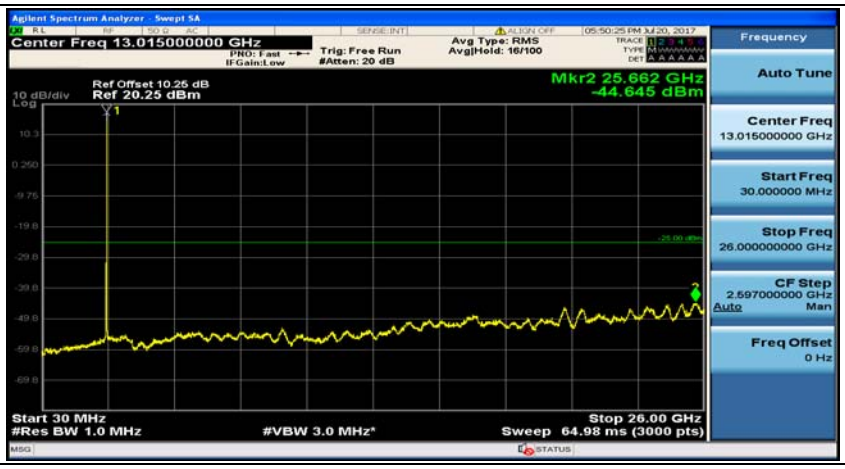




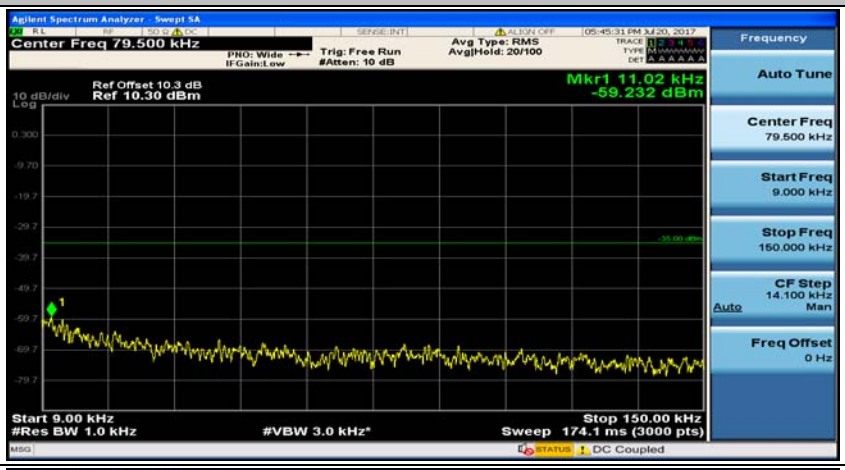
(Channel Bandwidth:20 MHz)_HCH_QPSK_1RB#99

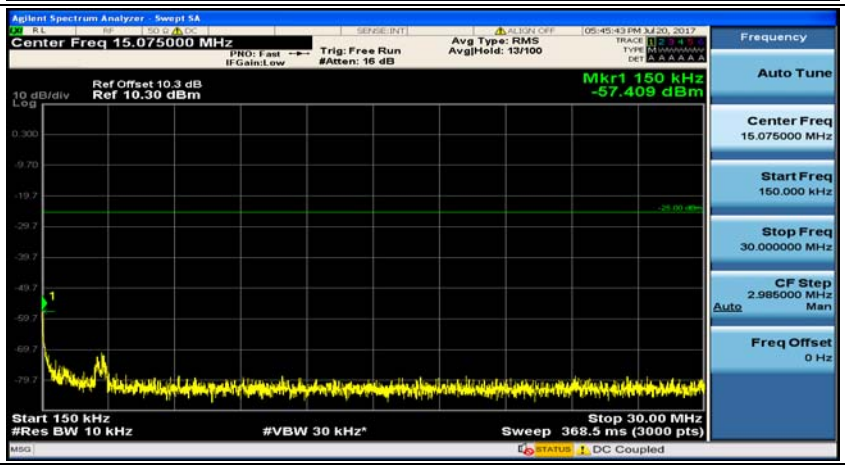


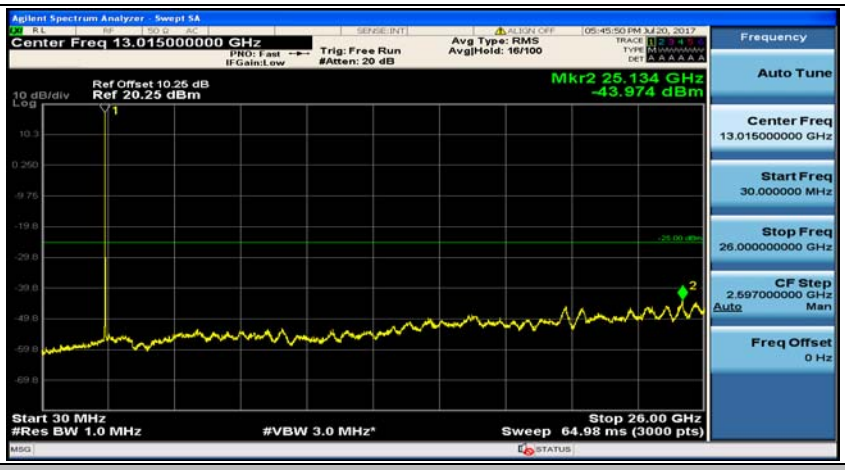




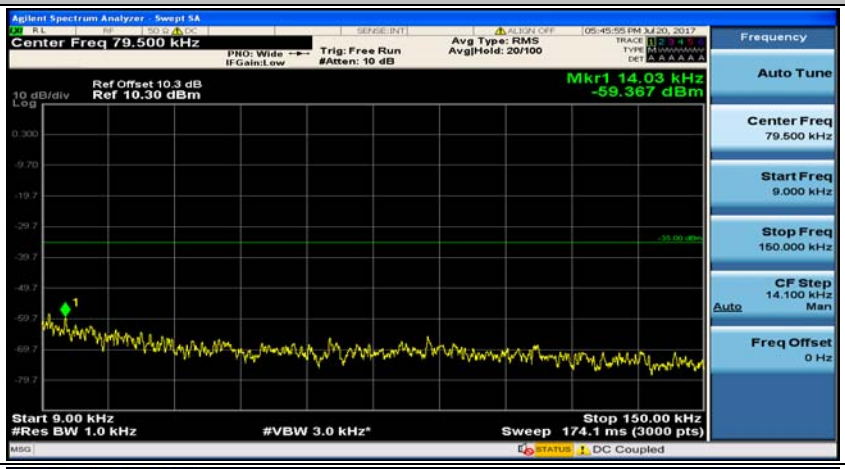
(Channel Bandwidth:20 MHz)_LCH_16QAM_1RB#0

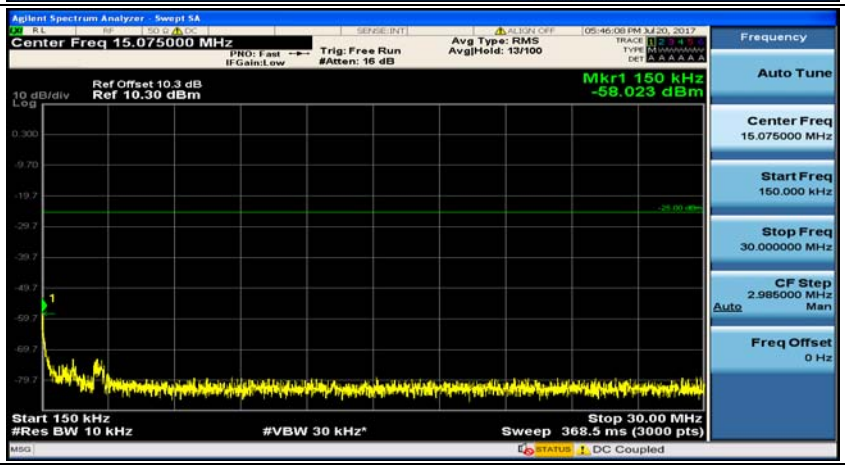


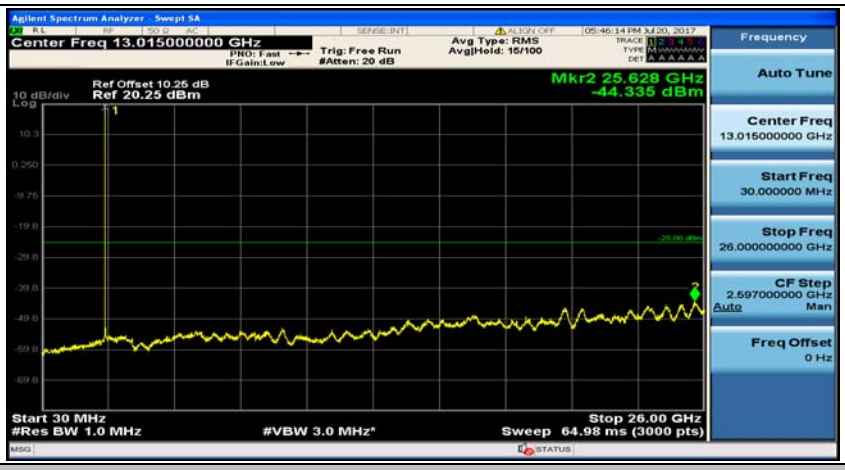




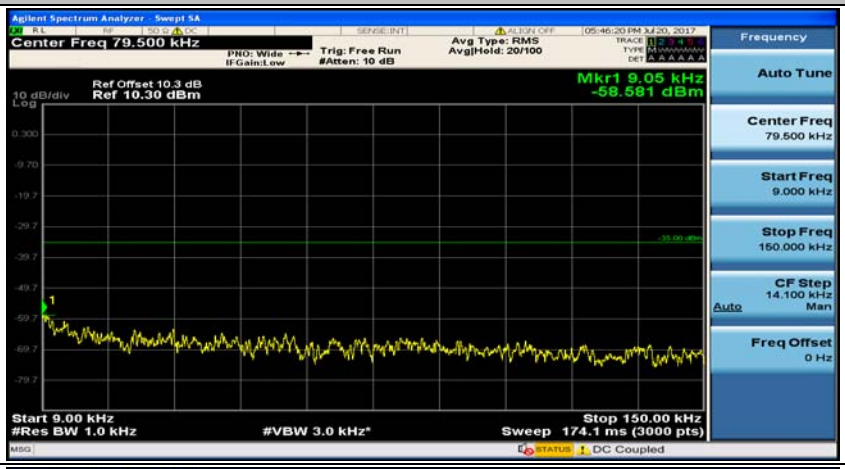
(Channel Bandwidth:20 MHz)_LCH_16QAM_1RB#49

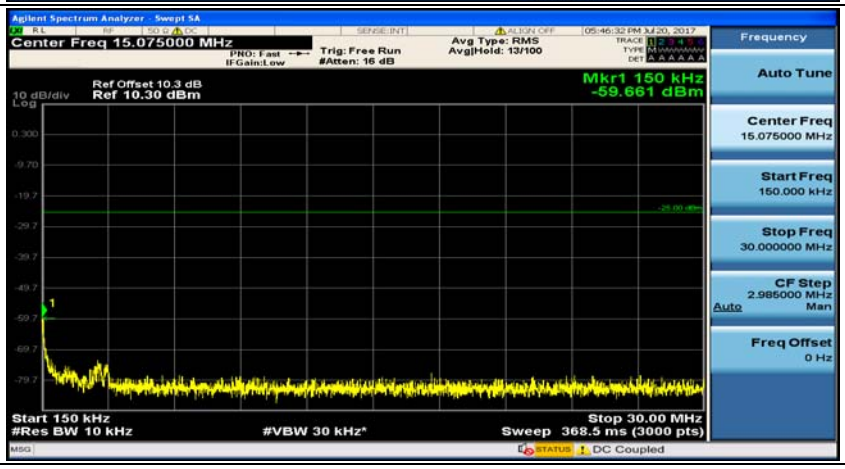


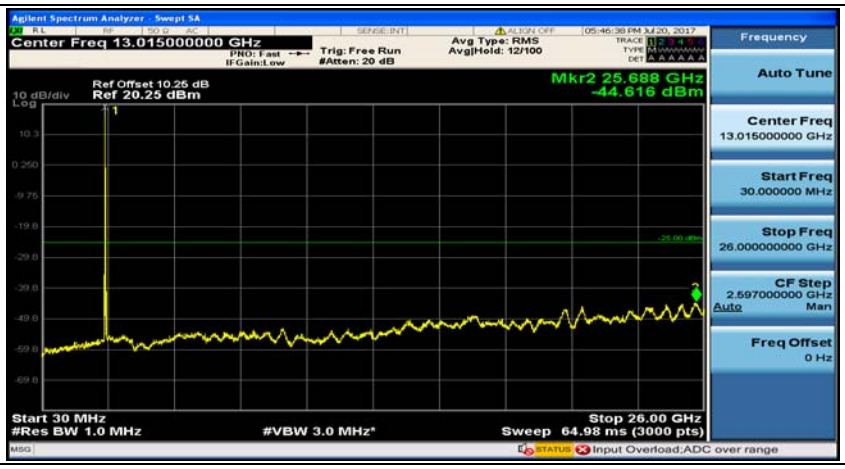




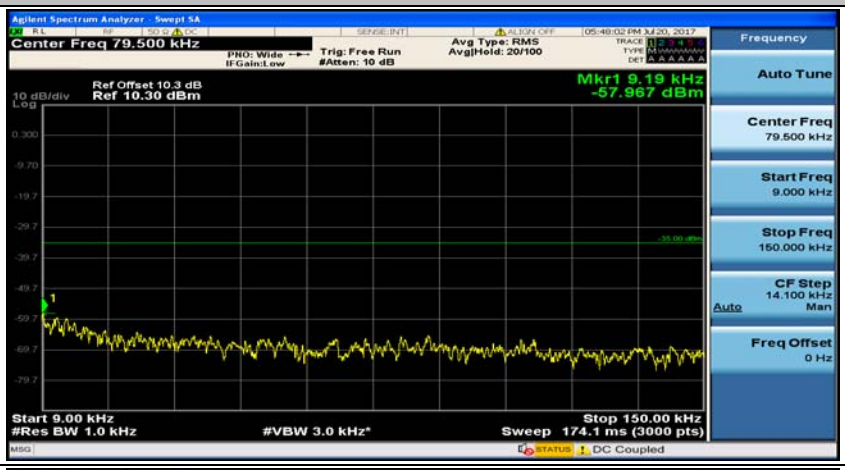
(Channel Bandwidth:20 MHz)_LCH_16QAM_1RB#99

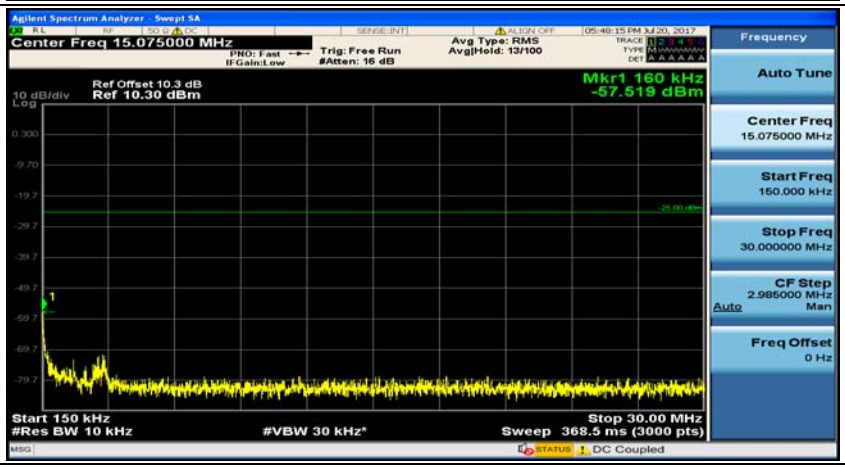


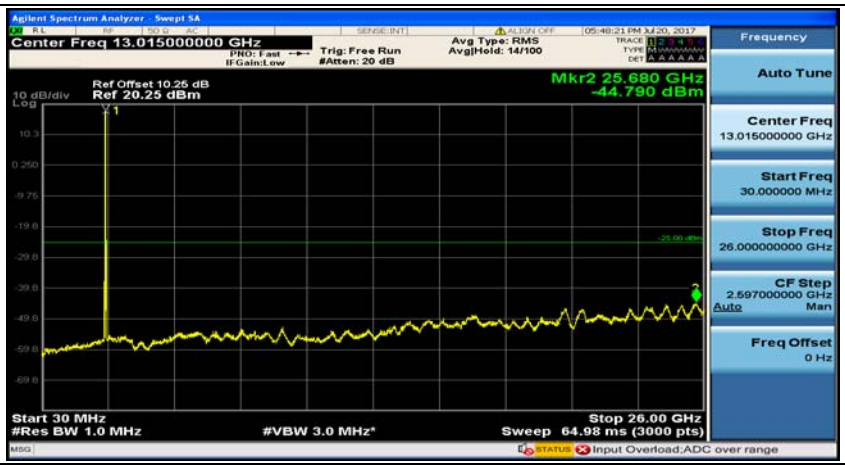




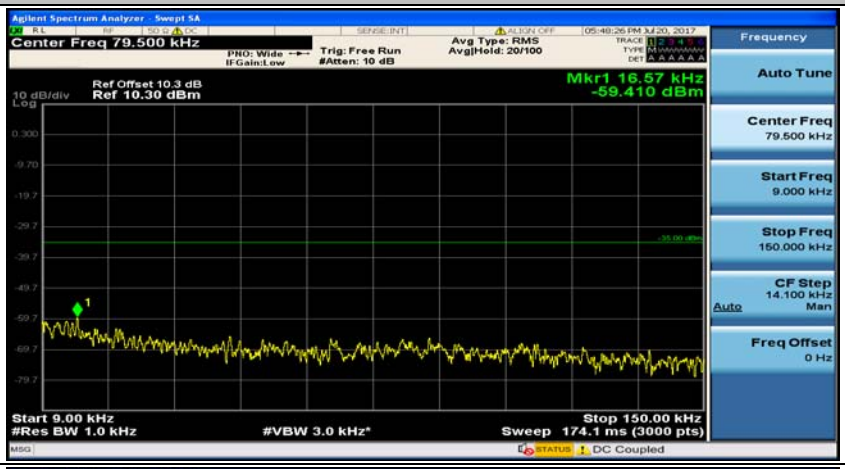
(Channel Bandwidth:20 MHz)_MCH_16QAM_1RB#0

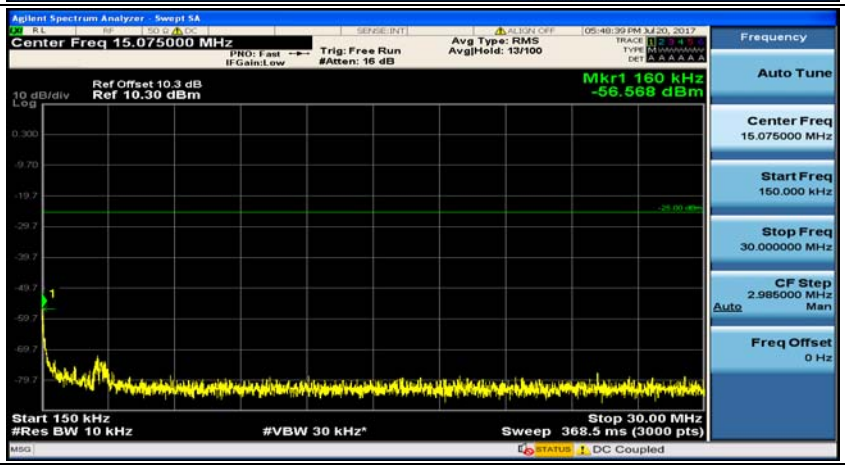


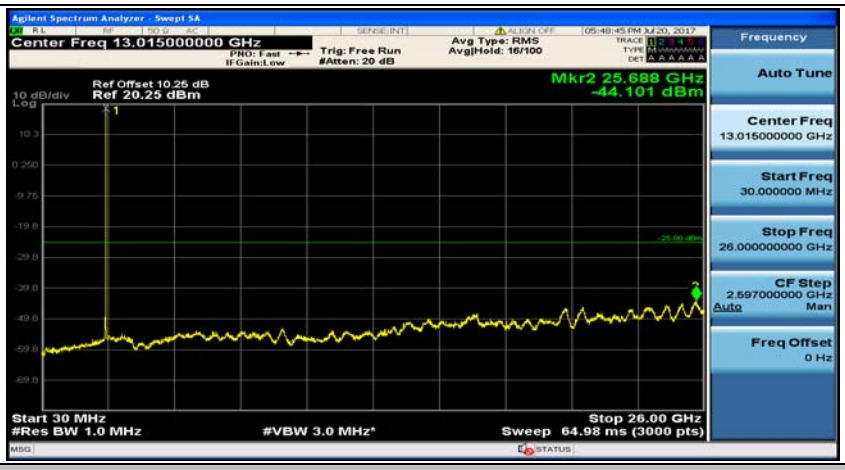




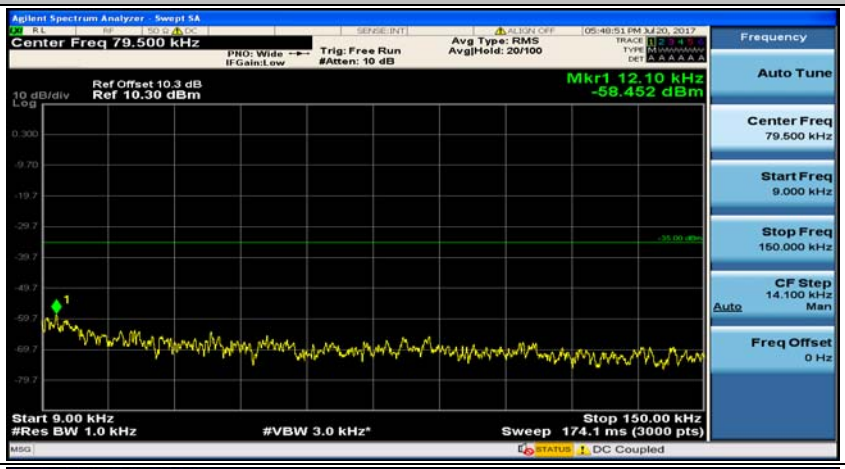
(Channel Bandwidth:20 MHz)_MCH_16QAM_1RB#49

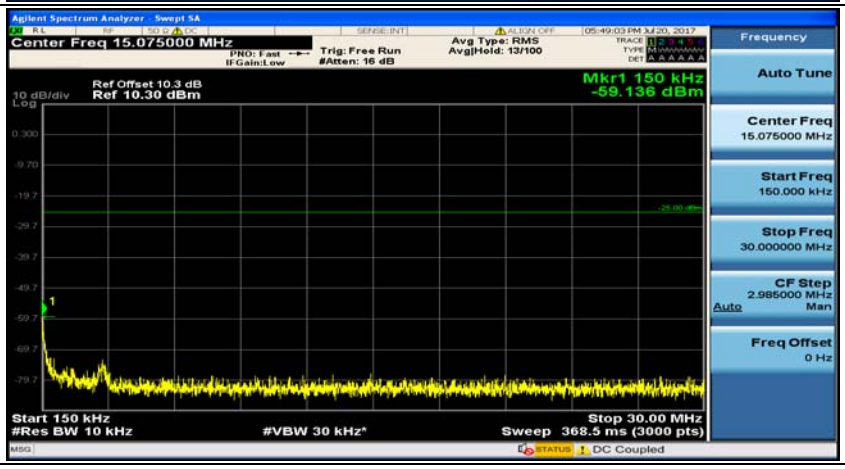


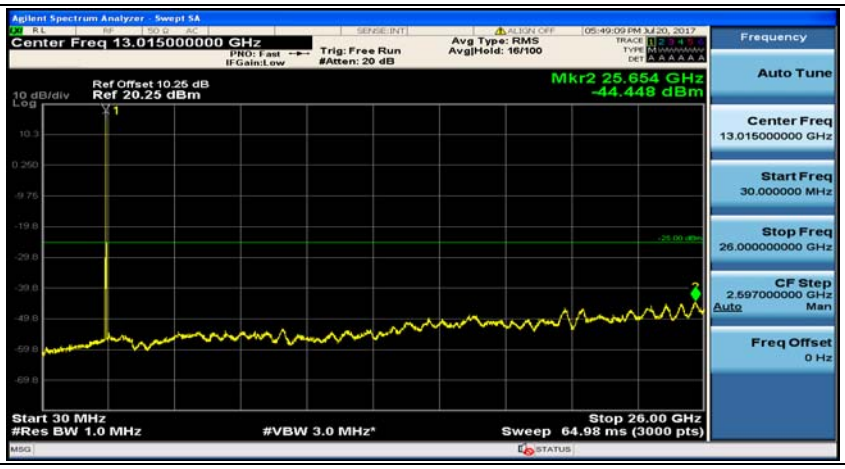




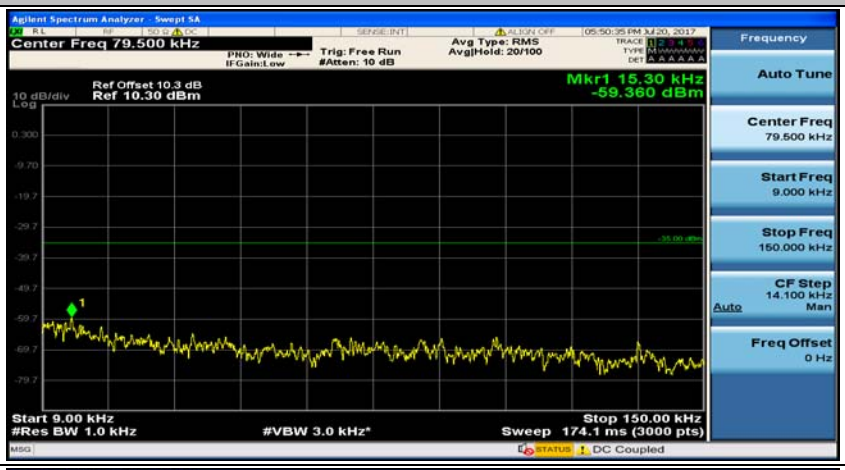
(Channel Bandwidth:20 MHz)_MCH_16QAM_1RB#99

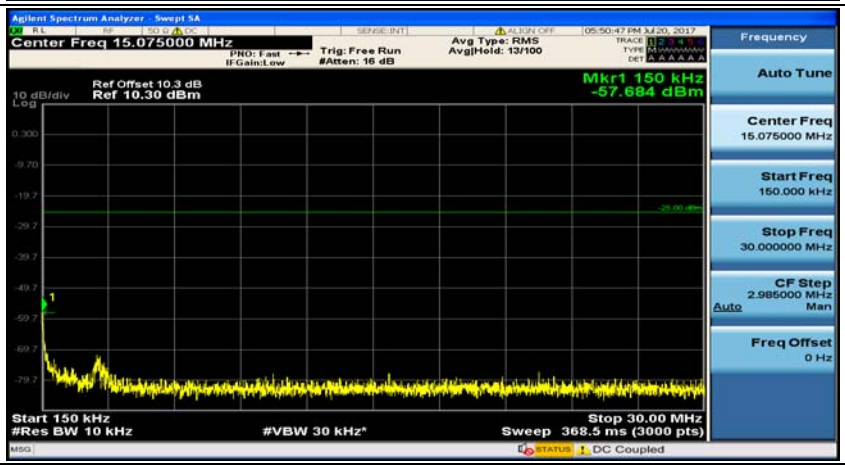


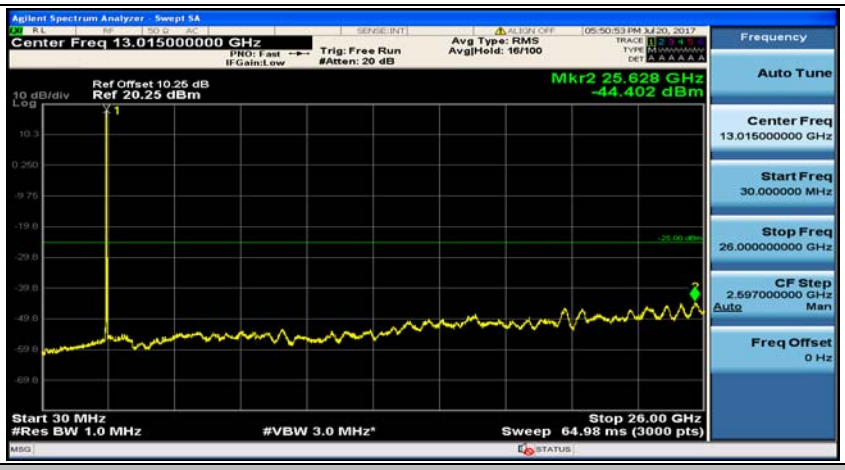




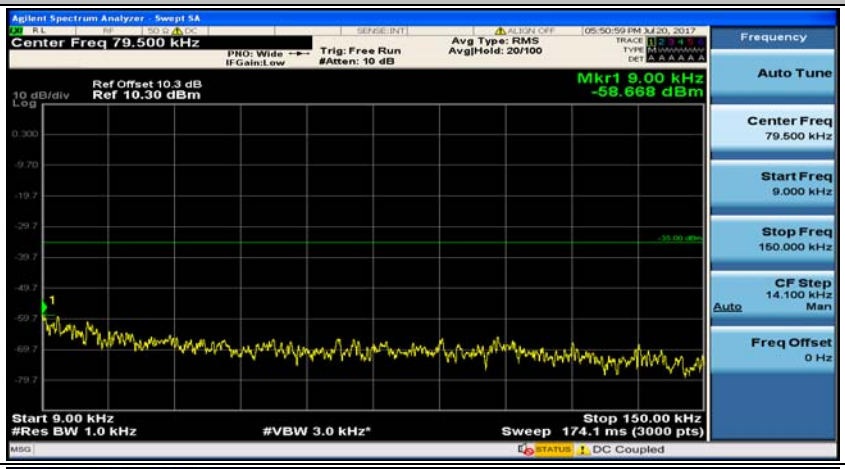
(Channel Bandwidth:20 MHz)_HCH_16QAM_1RB#0

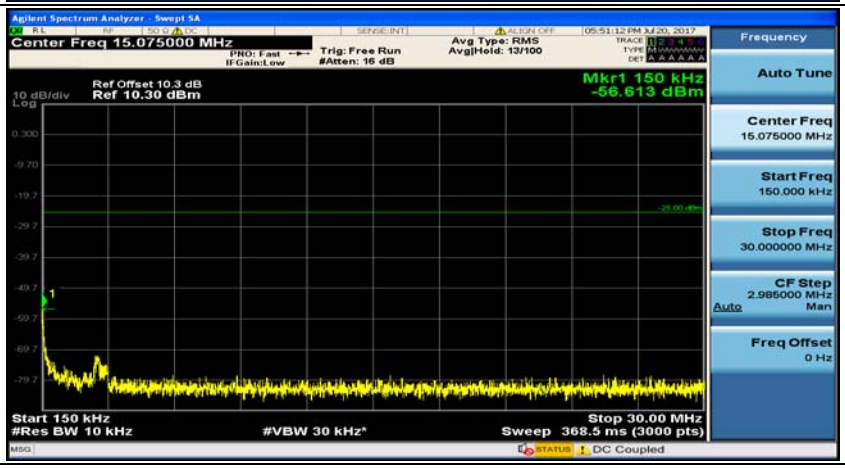


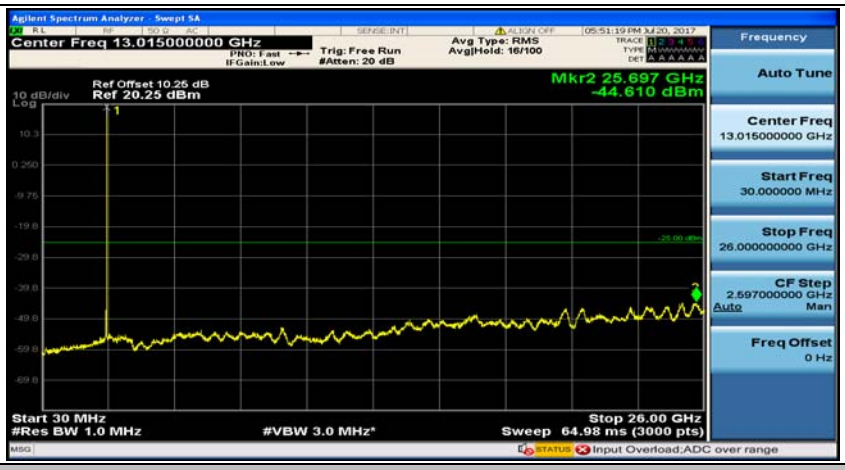




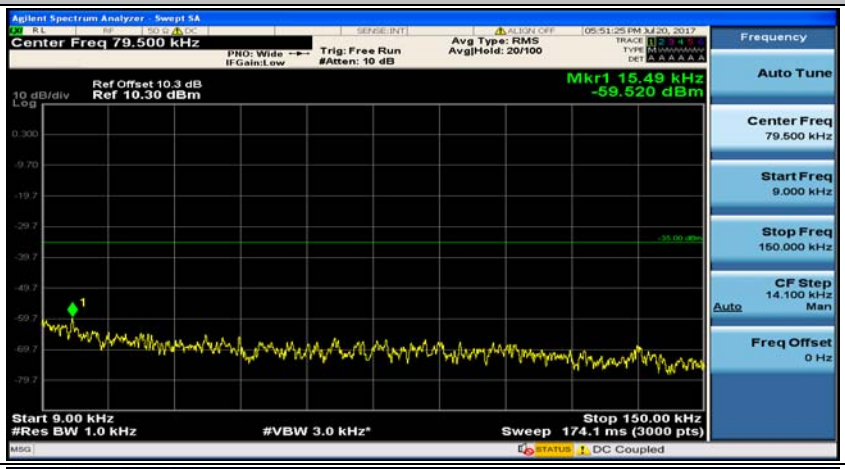
(Channel Bandwidth:20 MHz)_HCH_16QAM_1RB#49

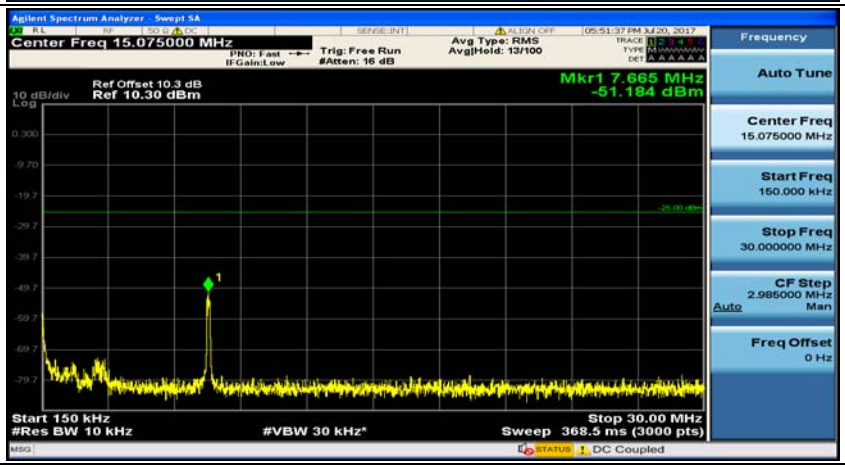


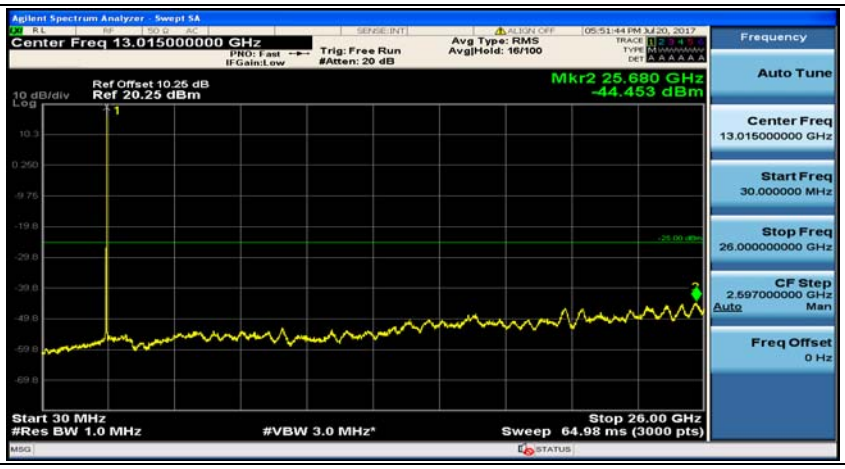




(Channel Bandwidth:20 MHz)_HCH_16QAM_1RB#99






Agilent Spectrum Analyzer - Swept SA
Center Freq 13.015000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: RMS
Avg|Hold: 16/100
05:51:44 PM Jul 20, 2017
Frequency
Ref Offset 10.25 dB
10 dB/div
Log
Ref 20.25 dBm
Mkr2 25.680 GHz
-44.453 dBm
Auto Tune
Center Freq
13.015000000 GHz
Start Freq
30.000000 MHz
Stop Freq
26.000000000 GHz
CF Step
2.597000000 GHz
Auto
Man
Freq Offset
0 Hz
Start 30 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 26.00 GHz
Sweep 64.98 ms (3000 pts)

Appendix F: Frequency Stability

Test Result

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz							
Voltage							
Modulation	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VL	TN	2.65	0.001056	± 2.5	PASS
		VN	TN	1.48	0.000590	± 2.5	PASS
		VH	TN	-0.02	-0.000008	± 2.5	PASS
	MCH	VL	TN	4.07	0.001606	± 2.5	PASS
		VN	TN	3.67	0.001448	± 2.5	PASS
		VH	TN	1.26	0.000497	± 2.5	PASS
	HCH	VL	TN	-1.64	-0.000641	± 2.5	PASS
		VN	TN	2.51	0.000980	± 2.5	PASS
		VH	TN	1	0.000391	± 2.5	PASS
16QAM	LCH	VL	TN	1.49	0.000594	± 2.5	PASS
		VN	TN	2.19	0.000873	± 2.5	PASS
		VH	TN	4.59	0.001829	± 2.5	PASS
	MCH	VL	TN	-0.08	-0.000032	± 2.5	PASS
		VN	TN	4.01	0.001582	± 2.5	PASS
		VH	TN	-1.88	-0.000742	± 2.5	PASS
	HCH	VL	TN	2.99	0.001168	± 2.5	PASS
		VN	TN	-1.64	-0.000641	± 2.5	PASS
		VH	TN	4.26	0.001664	± 2.5	PASS
Temperature							
Modulation	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VN	-30	1.65	0.000657	± 2.5	PASS
		VN	-20	4.43	0.001765	± 2.5	PASS
		VN	-10	3.14	0.001251	± 2.5	PASS
		VN	0	1.87	0.000745	± 2.5	PASS
		VN	10	-0.47	-0.000187	± 2.5	PASS
		VN	20	3.15	0.001255	± 2.5	PASS

		VN	30	4.6	0.001833	± 2.5	PASS
		VN	40	4.3	0.001713	± 2.5	PASS
		VN	50	-1.11	-0.000442	± 2.5	PASS
	MCH	VN	-30	-1.16	-0.000458	± 2.5	PASS
		VN	-20	3.95	0.001558	± 2.5	PASS
		VN	-10	0.12	0.000047	± 2.5	PASS
		VN	0	1.14	0.000450	± 2.5	PASS
		VN	10	4.26	0.001680	± 2.5	PASS
		VN	20	4.88	0.001925	± 2.5	PASS
		VN	30	-0.11	-0.000043	± 2.5	PASS
		VN	40	0.23	0.000091	± 2.5	PASS
		VN	50	2.33	0.000919	± 2.5	PASS
	HCH	VN	-30	3.7	0.001445	± 2.5	PASS
		VN	-20	-0.47	-0.000184	± 2.5	PASS
		VN	-10	1.33	0.000520	± 2.5	PASS
		VN	0	-1.45	-0.000566	± 2.5	PASS
		VN	10	4.43	0.001730	± 2.5	PASS
		VN	20	1.7	0.000664	± 2.5	PASS
		VN	30	-0.39	-0.000152	± 2.5	PASS
		VN	40	4.55	0.001777	± 2.5	PASS
		VN	50	3.96	0.001547	± 2.5	PASS
16QAM	LCH	VN	-30	1.92	0.000765	± 2.5	PASS
		VN	-20	-1.38	-0.000550	± 2.5	PASS
		VN	-10	2.85	0.001135	± 2.5	PASS
		VN	0	3.74	0.001490	± 2.5	PASS
		VN	10	-0.36	-0.000143	± 2.5	PASS
		VN	20	2.41	0.000960	± 2.5	PASS
		VN	30	0.85	0.000339	± 2.5	PASS
		VN	40	-0.59	-0.000235	± 2.5	PASS
		VN	50	0.6	0.000239	± 2.5	PASS
	MCH	VN	-30	1.94	0.000765	± 2.5	PASS
		VN	-20	3.83	0.001511	± 2.5	PASS
		VN	-10	2.25	0.000888	± 2.5	PASS
		VN	0	1.72	0.000679	± 2.5	PASS
		VN	10	2.42	0.000955	± 2.5	PASS
		VN	20	4.9	0.001933	± 2.5	PASS
		VN	30	-0.42	-0.000166	± 2.5	PASS
		VN	40	2.28	0.000899	± 2.5	PASS
		VN	50	1.3	0.000513	± 2.5	PASS
	HCH	VN	-30	3.74	0.001461	± 2.5	PASS
		VN	-20	-0.83	-0.000324	± 2.5	PASS

		VN	-10	-0.83	-0.000324	± 2.5	PASS
		VN	0	0.93	0.000363	± 2.5	PASS
		VN	10	4.81	0.001879	± 2.5	PASS
		VN	20	-1.56	-0.000609	± 2.5	PASS
		VN	30	4.76	0.001859	± 2.5	PASS
		VN	40	3.27	0.001277	± 2.5	PASS
		VN	50	3.66	0.001430	± 2.5	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz							
Voltage							
Modulation	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VL	TN	0.95	0.000378	± 2.5	PASS
		VN	TN	-1.35	-0.000538	± 2.5	PASS
		VH	TN	1.59	0.000633	± 2.5	PASS
	MCH	VL	TN	-1.88	-0.000742	± 2.5	PASS
		VN	TN	1.2	0.000473	± 2.5	PASS
		VH	TN	-1.74	-0.000686	± 2.5	PASS
	HCH	VL	TN	0.54	0.000211	± 2.5	PASS
		VN	TN	1.11	0.000434	± 2.5	PASS
		VH	TN	0.92	0.000359	± 2.5	PASS
16QAM	LCH	VL	TN	-1.4	-0.000558	± 2.5	PASS
		VN	TN	1.38	0.000550	± 2.5	PASS
		VH	TN	2.07	0.000825	± 2.5	PASS
	MCH	VL	TN	2.67	0.001053	± 2.5	PASS
		VN	TN	3.24	0.001278	± 2.5	PASS
		VH	TN	-1.5	-0.000592	± 2.5	PASS
	HCH	VL	TN	2.7	0.001055	± 2.5	PASS
		VN	TN	3.61	0.001410	± 2.5	PASS
		VH	TN	-1.84	-0.000719	± 2.5	PASS
Temperature							
Modulation	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VN	-30	4.66	0.001857	± 2.5	PASS
		VN	-20	0.57	0.000227	± 2.5	PASS
		VN	-10	0.33	0.000131	± 2.5	PASS
		VN	0	0.05	0.000020	± 2.5	PASS
		VN	10	1.36	0.000542	± 2.5	PASS
		VN	20	-0.11	-0.000044	± 2.5	PASS
		VN	30	0.85	0.000339	± 2.5	PASS

		VN	40	-1.65	-0.000657	± 2.5	PASS
		VN	50	0.46	0.000183	± 2.5	PASS
	MCH	VN	-30	2.4	0.000947	± 2.5	PASS
		VN	-20	3.64	0.001436	± 2.5	PASS
		VN	-10	1.02	0.000402	± 2.5	PASS
		VN	0	2.68	0.001057	± 2.5	PASS
		VN	10	-0.02	-0.000008	± 2.5	PASS
		VN	20	3.31	0.001306	± 2.5	PASS
		VN	30	0.19	0.000075	± 2.5	PASS
		VN	40	4.14	0.001633	± 2.5	PASS
		VN	50	3.57	0.001408	± 2.5	PASS
	HCH	VN	-30	0.89	0.000348	± 2.5	PASS
		VN	-20	0.66	0.000258	± 2.5	PASS
		VN	-10	-0.92	-0.000359	± 2.5	PASS
		VN	0	3.56	0.001391	± 2.5	PASS
		VN	10	2.49	0.000973	± 2.5	PASS
		VN	20	4.72	0.001844	± 2.5	PASS
		VN	30	-1.86	-0.000727	± 2.5	PASS
		VN	40	2.31	0.000902	± 2.5	PASS
		VN	50	3.39	0.001324	± 2.5	PASS
16QAM	LCH	VN	-30	-1.07	-0.000426	± 2.5	PASS
		VN	-20	-1.75	-0.000697	± 2.5	PASS
		VN	-10	3.16	0.001259	± 2.5	PASS
		VN	0	1.97	0.000785	± 2.5	PASS
		VN	10	-1.3	-0.000518	± 2.5	PASS
		VN	20	2.88	0.001147	± 2.5	PASS
		VN	30	2.99	0.001191	± 2.5	PASS
		VN	40	3.71	0.001478	± 2.5	PASS
		VN	50	3.03	0.001207	± 2.5	PASS
	MCH	VN	-30	0.77	0.000304	± 2.5	PASS
		VN	-20	0.56	0.000221	± 2.5	PASS
		VN	-10	2.64	0.001041	± 2.5	PASS
		VN	0	-1.78	-0.000702	± 2.5	PASS
		VN	10	0.57	0.000225	± 2.5	PASS
		VN	20	3.19	0.001258	± 2.5	PASS
		VN	30	1.12	0.000442	± 2.5	PASS
		VN	40	2.69	0.001061	± 2.5	PASS
		VN	50	-0.63	-0.000249	± 2.5	PASS
	HCH	VN	-30	0.2	0.000078	± 2.5	PASS
		VN	-20	-1.08	-0.000422	± 2.5	PASS
		VN	-10	2.48	0.000969	± 2.5	PASS

		VN	0	4.13	0.001613	± 2.5	PASS
		VN	10	-1.85	-0.000723	± 2.5	PASS
		VN	20	3.91	0.001527	± 2.5	PASS
		VN	30	-1.45	-0.000566	± 2.5	PASS
		VN	40	2.69	0.001051	± 2.5	PASS
		VN	50	4.72	0.001844	± 2.5	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz							
Voltage							
Modulation	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VL	TN	1.21	0.000482	± 2.5	PASS
		VN	TN	-1.17	-0.000466	± 2.5	PASS
		VH	TN	0.45	0.000179	± 2.5	PASS
	MCH	VL	TN	0.33	0.000130	± 2.5	PASS
		VN	TN	4.08	0.001609	± 2.5	PASS
		VH	TN	4.34	0.001712	± 2.5	PASS
	HCH	VL	TN	-0.31	-0.000121	± 2.5	PASS
		VN	TN	4.01	0.001566	± 2.5	PASS
		VH	TN	3.63	0.001418	± 2.5	PASS
16QAM	LCH	VL	TN	0.98	0.000390	± 2.5	PASS
		VN	TN	0.39	0.000155	± 2.5	PASS
		VH	TN	0.36	0.000143	± 2.5	PASS
	MCH	VL	TN	4.38	0.001728	± 2.5	PASS
		VN	TN	3.13	0.001235	± 2.5	PASS
		VH	TN	-0.7	-0.000276	± 2.5	PASS
	HCH	VL	TN	-0.42	-0.000164	± 2.5	PASS
		VN	TN	-0.39	-0.000152	± 2.5	PASS
		VH	TN	3.78	0.001477	± 2.5	PASS
Temperature							
Modulation	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VN	-30	-0.1	-0.000040	± 2.5	PASS
		VN	-20	0.97	0.000386	± 2.5	PASS
		VN	-10	0.07	0.000028	± 2.5	PASS
		VN	0	0.67	0.000267	± 2.5	PASS
		VN	10	-1.26	-0.000502	± 2.5	PASS
		VN	20	1.27	0.000506	± 2.5	PASS
		VN	30	0.47	0.000187	± 2.5	PASS
		VN	40	-1.8	-0.000717	± 2.5	PASS

		VN	50	2.5	0.000996	± 2.5	PASS
	MCH	VN	-30	2.67	0.001053	± 2.5	PASS
		VN	-20	0.28	0.000110	± 2.5	PASS
		VN	-10	1.78	0.000702	± 2.5	PASS
		VN	0	-1.77	-0.000698	± 2.5	PASS
		VN	10	2.75	0.001085	± 2.5	PASS
		VN	20	1.76	0.000694	± 2.5	PASS
		VN	30	-0.98	-0.000387	± 2.5	PASS
		VN	40	1.96	0.000773	± 2.5	PASS
		VN	50	4.33	0.001708	± 2.5	PASS
	HCH	VN	-30	2.42	0.000945	± 2.5	PASS
		VN	-20	0.46	0.000180	± 2.5	PASS
		VN	-10	4.96	0.001938	± 2.5	PASS
		VN	0	4.77	0.001863	± 2.5	PASS
		VN	10	-0.4	-0.000156	± 2.5	PASS
		VN	20	-0.07	-0.000027	± 2.5	PASS
		VN	30	0.01	0.000004	± 2.5	PASS
		VN	40	-0.21	-0.000082	± 2.5	PASS
		VN	50	4.04	0.001578	± 2.5	PASS
16QAM	LCH	VN	-30	0.62	0.000247	± 2.5	PASS
		VN	-20	4.82	0.001920	± 2.5	PASS
		VN	-10	0.25	0.000100	± 2.5	PASS
		VN	0	1.31	0.000522	± 2.5	PASS
		VN	10	1.66	0.000661	± 2.5	PASS
		VN	20	-0.29	-0.000116	± 2.5	PASS
		VN	30	2.64	0.001052	± 2.5	PASS
		VN	40	3.97	0.001582	± 2.5	PASS
		VN	50	3.9	0.001554	± 2.5	PASS
	MCH	VN	-30	-0.64	-0.000252	± 2.5	PASS
		VN	-20	2.51	0.000990	± 2.5	PASS
		VN	-10	1.39	0.000548	± 2.5	PASS
		VN	0	3.83	0.001511	± 2.5	PASS
		VN	10	4.78	0.001886	± 2.5	PASS
		VN	20	4.37	0.001724	± 2.5	PASS
		VN	30	1.43	0.000564	± 2.5	PASS
		VN	40	1.06	0.000418	± 2.5	PASS
		VN	50	1.98	0.000781	± 2.5	PASS
	HCH	VN	-30	3.15	0.001230	± 2.5	PASS
		VN	-20	0.08	0.000031	± 2.5	PASS
		VN	-10	0.63	0.000246	± 2.5	PASS
		VN	0	0.16	0.000063	± 2.5	PASS

		VN	10	-0.73	-0.000285	± 2.5	PASS
		VN	20	3.55	0.001387	± 2.5	PASS
		VN	30	0.97	0.000379	± 2.5	PASS
		VN	40	3.58	0.001398	± 2.5	PASS
		VN	50	0.38	0.000148	± 2.5	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz							
Voltage							
Modulation	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VL	TN	0.73	0.000291	± 2.5	PASS
		VN	TN	0.92	0.000367	± 2.5	PASS
		VH	TN	-1.37	-0.000546	± 2.5	PASS
	MCH	VL	TN	2.86	0.001128	± 2.5	PASS
		VN	TN	4.19	0.001653	± 2.5	PASS
		VH	TN	1.79	0.000706	± 2.5	PASS
	HCH	VL	TN	2.71	0.001059	± 2.5	PASS
		VN	TN	-1.03	-0.000402	± 2.5	PASS
		VH	TN	2.94	0.001148	± 2.5	PASS
16QAM	LCH	VL	TN	2.13	0.000849	± 2.5	PASS
		VN	TN	1.32	0.000526	± 2.5	PASS
		VH	TN	-1.75	-0.000697	± 2.5	PASS
	MCH	VL	TN	0.3	0.000118	± 2.5	PASS
		VN	TN	3.52	0.001389	± 2.5	PASS
		VH	TN	3.27	0.001290	± 2.5	PASS
	HCH	VL	TN	1.29	0.000504	± 2.5	PASS
		VN	TN	2	0.000781	± 2.5	PASS
		VH	TN	3.83	0.001496	± 2.5	PASS
Temperature							
Modulation	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VN	-30	2.16	0.000861	± 2.5	PASS
		VN	-20	2.93	0.001167	± 2.5	PASS
		VN	-10	1.15	0.000458	± 2.5	PASS
		VN	0	-0.48	-0.000191	± 2.5	PASS
		VN	10	-0.28	-0.000112	± 2.5	PASS
		VN	20	4.04	0.001610	± 2.5	PASS
		VN	30	3.84	0.001530	± 2.5	PASS
		VN	40	3.48	0.001386	± 2.5	PASS
		VN	50	-1.8	-0.000717	± 2.5	PASS

	MCH	VN	-30	-0.04	-0.000016	± 2.5	PASS
		VN	-20	0.03	0.000012	± 2.5	PASS
		VN	-10	1.98	0.000781	± 2.5	PASS
		VN	0	-0.13	-0.000051	± 2.5	PASS
		VN	10	3.57	0.001408	± 2.5	PASS
		VN	20	3.17	0.001250	± 2.5	PASS
		VN	30	1.11	0.000438	± 2.5	PASS
		VN	40	4.71	0.001858	± 2.5	PASS
		VN	50	2.77	0.001093	± 2.5	PASS
	HCH	VN	-30	0.74	0.000289	± 2.5	PASS
		VN	-20	4.74	0.001852	± 2.5	PASS
		VN	-10	3.31	0.001293	± 2.5	PASS
		VN	0	0.01	0.000004	± 2.5	PASS
		VN	10	-0.88	-0.000344	± 2.5	PASS
		VN	20	-1.7	-0.000664	± 2.5	PASS
		VN	30	1.33	0.000520	± 2.5	PASS
		VN	40	2.03	0.000793	± 2.5	PASS
		VN	50	-1.43	-0.000559	± 2.5	PASS
16QAM	LCH	VN	-30	0.89	0.000355	± 2.5	PASS
		VN	-20	1.86	0.000741	± 2.5	PASS
		VN	-10	-0.58	-0.000231	± 2.5	PASS
		VN	0	3.46	0.001378	± 2.5	PASS
		VN	10	4.95	0.001972	± 2.5	PASS
		VN	20	1.7	0.000677	± 2.5	PASS
		VN	30	1.16	0.000462	± 2.5	PASS
		VN	40	4.33	0.001725	± 2.5	PASS
		VN	50	1.38	0.000550	± 2.5	PASS
	MCH	VN	-30	2.53	0.000998	± 2.5	PASS
		VN	-20	-0.71	-0.000280	± 2.5	PASS
		VN	-10	0.61	0.000241	± 2.5	PASS
		VN	0	2.23	0.000880	± 2.5	PASS
		VN	10	1.03	0.000406	± 2.5	PASS
		VN	20	-0.64	-0.000252	± 2.5	PASS
		VN	30	-1.33	-0.000525	± 2.5	PASS
		VN	40	3.83	0.001511	± 2.5	PASS
		VN	50	-1.5	-0.000592	± 2.5	PASS
	HCH	VN	-30	3.13	0.001223	± 2.5	PASS
		VN	-20	-0.23	-0.000090	± 2.5	PASS
		VN	-10	3.93	0.001535	± 2.5	PASS
		VN	0	4.21	0.001645	± 2.5	PASS
		VN	10	0.95	0.000371	± 2.5	PASS

		VN	20	-1.89	-0.000738	± 2.5	PASS
		VN	30	-0.55	-0.000215	± 2.5	PASS
		VN	40	-1.37	-0.000535	± 2.5	PASS
		VN	50	4.63	0.001809	± 2.5	PASS