































Appendix F: Frequency Stability

Test Result

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz							
Voltage							
Modulation	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VL	TN	0.82	0.001172	± 2.5	PASS
		VN	TN	2.34	0.003344	± 2.5	PASS
		VH	TN	3.65	0.005217	± 2.5	PASS
	MCH	VL	TN	-0.01	-0.000014	± 2.5	PASS
		VN	TN	4.75	0.006714	± 2.5	PASS
		VH	TN	1.15	0.001625	± 2.5	PASS
	HCH	VL	TN	-0.27	-0.000377	± 2.5	PASS
		VN	TN	1.29	0.001803	± 2.5	PASS
		VH	TN	-1.17	-0.001636	± 2.5	PASS
16QAM	LCH	VL	TN	0.71	0.001015	± 2.5	PASS
		VN	TN	1.87	0.002673	± 2.5	PASS
		VH	TN	2.31	0.003301	± 2.5	PASS
	MCH	VL	TN	3.99	0.005640	± 2.5	PASS
		VN	TN	2.83	0.004000	± 2.5	PASS
		VH	TN	-0.86	-0.001216	± 2.5	PASS
	HCH	VL	TN	1.46	0.002041	± 2.5	PASS
		VN	TN	-1.61	-0.002251	± 2.5	PASS
		VH	TN	4.48	0.006263	± 2.5	PASS
Temperature							
Modulation	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VN	-30	0.8	0.001143	± 2.5	PASS
		VN	-20	-1.82	-0.002601	± 2.5	PASS
		VN	-10	0.68	0.000972	± 2.5	PASS
		VN	0	0.18	0.000257	± 2.5	PASS
		VN	10	0.54	0.000772	± 2.5	PASS
		VN	20	4.8	0.006860	± 2.5	PASS
		VN	30	1.31	0.001872	± 2.5	PASS
		VN	40	3.06	0.004373	± 2.5	PASS
		VN	50	0.03	0.000043	± 2.5	PASS

	MCH	VN	-30	3.41	0.004820	± 2.5	PASS
		VN	-20	2.49	0.003519	± 2.5	PASS
		VN	-10	0.54	0.000763	± 2.5	PASS
		VN	0	-0.72	-0.001018	± 2.5	PASS
		VN	10	-1.63	-0.002304	± 2.5	PASS
		VN	20	-1.67	-0.002360	± 2.5	PASS
		VN	30	-1.7	-0.002403	± 2.5	PASS
		VN	40	-0.89	-0.001258	± 2.5	PASS
		VN	50	-1.05	-0.001484	± 2.5	PASS
	HCH	VN	-30	-0.81	-0.001132	± 2.5	PASS
		VN	-20	0.46	0.000643	± 2.5	PASS
		VN	-10	-0.67	-0.000937	± 2.5	PASS
		VN	0	4.71	0.006585	± 2.5	PASS
		VN	10	2.2	0.003076	± 2.5	PASS
		VN	20	2.61	0.003649	± 2.5	PASS
		VN	30	4.15	0.005802	± 2.5	PASS
		VN	40	1.89	0.002642	± 2.5	PASS
		VN	50	2.19	0.003062	± 2.5	PASS
16QAM	LCH	VN	-30	4.52	0.006460	± 2.5	PASS
		VN	-20	-0.45	-0.000643	± 2.5	PASS
		VN	-10	0.9	0.001286	± 2.5	PASS
		VN	0	4.1	0.005860	± 2.5	PASS
		VN	10	-1.38	-0.001972	± 2.5	PASS
		VN	20	-1.96	-0.002801	± 2.5	PASS
		VN	30	1.11	0.001586	± 2.5	PASS
		VN	40	2.75	0.003930	± 2.5	PASS
		VN	50	2.95	0.004216	± 2.5	PASS
	MCH	VN	-30	0.78	0.001102	± 2.5	PASS
		VN	-20	2.87	0.004057	± 2.5	PASS
		VN	-10	-0.2	-0.000283	± 2.5	PASS
		VN	0	-1.17	-0.001654	± 2.5	PASS
		VN	10	4.03	0.005696	± 2.5	PASS
		VN	20	1.2	0.001696	± 2.5	PASS
		VN	30	3.76	0.005314	± 2.5	PASS
		VN	40	2.2	0.003110	± 2.5	PASS
		VN	50	4.84	0.006841	± 2.5	PASS
HCH	VN	-30	2.98	0.004166	± 2.5	PASS	
	VN	-20	0.73	0.001021	± 2.5	PASS	
	VN	-10	-1.54	-0.002153	± 2.5	PASS	
	VN	0	-1.29	-0.001803	± 2.5	PASS	
	VN	10	-1.41	-0.001971	± 2.5	PASS	

		VN	20	-1.34	-0.001873	± 2.5	PASS
		VN	30	-0.89	-0.001244	± 2.5	PASS
		VN	40	0.92	0.001286	± 2.5	PASS
		VN	50	4.82	0.006738	± 2.5	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz+							
Voltage							
Modulation	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VL	TN	0.19	0.000271	± 2.5	PASS
		VN	TN	-1.15	-0.001642	± 2.5	PASS
		VH	TN	1.8	0.002570	± 2.5	PASS
	MCH	VL	TN	0.21	0.000297	± 2.5	PASS
		VN	TN	-0.76	-0.001074	± 2.5	PASS
		VH	TN	0.62	0.000876	± 2.5	PASS
	HCH	VL	TN	4.34	0.006074	± 2.5	PASS
		VN	TN	-0.94	-0.001316	± 2.5	PASS
		VH	TN	-0.48	-0.000672	± 2.5	PASS
16QAM	LCH	VL	TN	-0.84	-0.001199	± 2.5	PASS
		VN	TN	4.72	0.006738	± 2.5	PASS
		VH	TN	-1.47	-0.002099	± 2.5	PASS
	MCH	VL	TN	2.46	0.003477	± 2.5	PASS
		VN	TN	0.55	0.000777	± 2.5	PASS
		VH	TN	0.79	0.001117	± 2.5	PASS
	HCH	VL	TN	4.69	0.006564	± 2.5	PASS
		VN	TN	2.66	0.003723	± 2.5	PASS
		VH	TN	-0.35	-0.000490	± 2.5	PASS
Temperature							
Modulation	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VN	-30	0.56	0.000799	± 2.5	PASS
		VN	-20	0.41	0.000585	± 2.5	PASS
		VN	-10	-1.19	-0.001699	± 2.5	PASS
		VN	0	1.12	0.001599	± 2.5	PASS
		VN	10	-1.08	-0.001542	± 2.5	PASS
		VN	20	-1.18	-0.001685	± 2.5	PASS
		VN	30	0.56	0.000799	± 2.5	PASS
		VN	40	-0.07	-0.000100	± 2.5	PASS
		VN	50	0.04	0.000057	± 2.5	PASS
	MCH	VN	-30	-1.31	-0.001852	± 2.5	PASS

	VN	VN	-20	-0.06	-0.000085	± 2.5	PASS
		VN	-10	4.53	0.006403	± 2.5	PASS
		VN	0	2.26	0.003194	± 2.5	PASS
		VN	10	-1.88	-0.002657	± 2.5	PASS
		VN	20	4.7	0.006643	± 2.5	PASS
		VN	30	1.12	0.001583	± 2.5	PASS
		VN	40	3.72	0.005258	± 2.5	PASS
		VN	50	1.38	0.001951	± 2.5	PASS
	HCH	VN	-30	-0.83	-0.001162	± 2.5	PASS
		VN	-20	-0.32	-0.000448	± 2.5	PASS
		VN	-10	2.9	0.004059	± 2.5	PASS
		VN	0	2.14	0.002995	± 2.5	PASS
		VN	10	-0.85	-0.001190	± 2.5	PASS
		VN	20	1.3	0.001819	± 2.5	PASS
		VN	30	1.32	0.001847	± 2.5	PASS
		VN	40	-1.74	-0.002435	± 2.5	PASS
		VN	50	4.14	0.005794	± 2.5	PASS
		16QAM	LCH	VN	-30	1.5	0.002141
VN	-20			-1.75	-0.002498	± 2.5	PASS
VN	-10			2.43	0.003469	± 2.5	PASS
VN	0			2.39	0.003412	± 2.5	PASS
VN	10			0.71	0.001014	± 2.5	PASS
VN	20			3.56	0.005082	± 2.5	PASS
VN	30			1.21	0.001727	± 2.5	PASS
VN	40			4.28	0.006110	± 2.5	PASS
VN	50			1.55	0.002213	± 2.5	PASS
MCH	VN		-30	2.72	0.003845	± 2.5	PASS
	VN		-20	-1.19	-0.001682	± 2.5	PASS
	VN		-10	-1.95	-0.002756	± 2.5	PASS
	VN		0	-0.1	-0.000141	± 2.5	PASS
	VN		10	1.17	0.001654	± 2.5	PASS
	VN		20	-1.57	-0.002219	± 2.5	PASS
	VN		30	-1.16	-0.001640	± 2.5	PASS
	VN		40	-1.61	-0.002276	± 2.5	PASS
	VN		50	-1.17	-0.001654	± 2.5	PASS
HCH	VN		-30	3.3	0.004619	± 2.5	PASS
	VN		-20	-0.25	-0.000350	± 2.5	PASS
	VN		-10	2.6	0.003639	± 2.5	PASS
	VN		0	-1.24	-0.001735	± 2.5	PASS
	VN		10	-0.97	-0.001358	± 2.5	PASS
	VN		20	0.09	0.000126	± 2.5	PASS

		VN	30	2.55	0.003569	± 2.5	PASS
		VN	40	1.11	0.001554	± 2.5	PASS
		VN	50	4.12	0.005766	± 2.5	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz							
Voltage							
Modulation	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VL	TN	4.01	0.005716	± 2.5	PASS
		VN	TN	3.92	0.005588	± 2.5	PASS
		VH	TN	1.3	0.001853	± 2.5	PASS
	MCH	VL	TN	4.98	0.007039	± 2.5	PASS
		VN	TN	-1.06	-0.001498	± 2.5	PASS
		VH	TN	1.56	0.002205	± 2.5	PASS
	HCH	VL	TN	-0.54	-0.000757	± 2.5	PASS
		VN	TN	-0.25	-0.000350	± 2.5	PASS
		VH	TN	0.21	0.000294	± 2.5	PASS
16QAM	LCH	VL	TN	1.16	0.001654	± 2.5	PASS
		VN	TN	-1.45	-0.002067	± 2.5	PASS
		VH	TN	1.46	0.002081	± 2.5	PASS
	MCH	VL	TN	4.58	0.006473	± 2.5	PASS
		VN	TN	3.29	0.004650	± 2.5	PASS
		VH	TN	-0.93	-0.001314	± 2.5	PASS
	HCH	VL	TN	2.75	0.003854	± 2.5	PASS
		VN	TN	4.31	0.006041	± 2.5	PASS
		VH	TN	-1.16	-0.001626	± 2.5	PASS
Temperature							
Modulation	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VN	-30	1.29	0.001839	± 2.5	PASS
		VN	-20	-0.89	-0.001269	± 2.5	PASS
		VN	-10	0.75	0.001069	± 2.5	PASS
		VN	0	0.28	0.000399	± 2.5	PASS
		VN	10	1.93	0.002751	± 2.5	PASS
		VN	20	0.12	0.000171	± 2.5	PASS
		VN	30	-1.18	-0.001682	± 2.5	PASS
		VN	40	-1.76	-0.002509	± 2.5	PASS
		VN	50	-1.47	-0.002096	± 2.5	PASS
	MCH	VN	-30	-0.5	-0.000707	± 2.5	PASS
		VN	-20	-0.95	-0.001343	± 2.5	PASS

		VN	-10	-0.22	-0.000311	± 2.5	PASS		
		VN	0	2.52	0.003562	± 2.5	PASS		
		VN	10	2.26	0.003194	± 2.5	PASS		
		VN	20	3.7	0.005230	± 2.5	PASS		
		VN	30	0.81	0.001145	± 2.5	PASS		
		VN	40	4.29	0.006064	± 2.5	PASS		
		VN	50	-0.51	-0.000721	± 2.5	PASS		
	HCH	VN	-30	4.5	0.006307	± 2.5	PASS		
		VN	-20	3.29	0.004611	± 2.5	PASS		
		VN	-10	-0.3	-0.000420	± 2.5	PASS		
		VN	0	4.66	0.006531	± 2.5	PASS		
		VN	10	-0.97	-0.001359	± 2.5	PASS		
		VN	20	3.93	0.005508	± 2.5	PASS		
		VN	30	-1.24	-0.001738	± 2.5	PASS		
		VN	40	1.39	0.001948	± 2.5	PASS		
		VN	50	3.1	0.004345	± 2.5	PASS		
		16QAM	LCH	VN	-30	2.84	0.004048	± 2.5	PASS
				VN	-20	-1.57	-0.002238	± 2.5	PASS
				VN	-10	3.14	0.004476	± 2.5	PASS
VN	0			3.72	0.005303	± 2.5	PASS		
VN	10			3.06	0.004362	± 2.5	PASS		
VN	20			-1.58	-0.002252	± 2.5	PASS		
VN	30			0.01	0.000014	± 2.5	PASS		
VN	40			0.65	0.000927	± 2.5	PASS		
VN	50			-1.32	-0.001882	± 2.5	PASS		
MCH	VN		-30	1.36	0.001922	± 2.5	PASS		
	VN		-20	-0.78	-0.001102	± 2.5	PASS		
	VN		-10	3.62	0.005117	± 2.5	PASS		
	VN		0	4.72	0.006671	± 2.5	PASS		
	VN		10	1.59	0.002247	± 2.5	PASS		
	VN		20	2.98	0.004212	± 2.5	PASS		
	VN		30	-1.1	-0.001555	± 2.5	PASS		
	VN		40	-0.14	-0.000198	± 2.5	PASS		
	VN		50	-0.25	-0.000353	± 2.5	PASS		
HCH	VN		-30	-1.19	-0.001668	± 2.5	PASS		
	VN		-20	-1.72	-0.002411	± 2.5	PASS		
	VN		-10	4.61	0.006461	± 2.5	PASS		
	VN		0	1.44	0.002018	± 2.5	PASS		
	VN		10	-0.31	-0.000434	± 2.5	PASS		
	VN		20	4.78	0.006699	± 2.5	PASS		
	VN		30	1.55	0.002172	± 2.5	PASS		

		VN	40	3.48	0.004877	± 2.5	PASS
		VN	50	1.2	0.001682	± 2.5	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz							
Voltage							
Modulation	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VL	TN	3.52	0.005000	± 2.5	PASS
		VN	TN	-1.8	-0.002557	± 2.5	PASS
		VH	TN	3.07	0.004361	± 2.5	PASS
	MCH	VL	TN	2.41	0.003406	± 2.5	PASS
		VN	TN	-1.8	-0.002544	± 2.5	PASS
		VH	TN	0.89	0.001258	± 2.5	PASS
	HCH	VL	TN	0.15	0.000211	± 2.5	PASS
		VN	TN	-0.88	-0.001238	± 2.5	PASS
		VH	TN	0.26	0.000366	± 2.5	PASS
16QAM	LCH	VL	TN	4.1	0.005824	± 2.5	PASS
		VN	TN	4.08	0.005795	± 2.5	PASS
		VH	TN	3.02	0.004290	± 2.5	PASS
	MCH	VL	TN	-1.95	-0.002756	± 2.5	PASS
		VN	TN	4.34	0.006134	± 2.5	PASS
		VH	TN	2.87	0.004057	± 2.5	PASS
	HCH	VL	TN	3	0.004219	± 2.5	PASS
		VN	TN	1.4	0.001969	± 2.5	PASS
		VH	TN	2.15	0.003024	± 2.5	PASS
Temperature							
Modulation	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VN	-30	2.67	0.003793	± 2.5	PASS
		VN	-20	1.28	0.001818	± 2.5	PASS
		VN	-10	2.91	0.004134	± 2.5	PASS
		VN	0	-1.44	-0.002045	± 2.5	PASS
		VN	10	0.02	0.000028	± 2.5	PASS
		VN	20	-1.59	-0.002259	± 2.5	PASS
		VN	30	0.92	0.001307	± 2.5	PASS
		VN	40	0	0.000000	± 2.5	PASS
		VN	50	4.75	0.006747	± 2.5	PASS
	MCH	VN	-30	3.5	0.004947	± 2.5	PASS
		VN	-20	3.91	0.005527	± 2.5	PASS
		VN	-10	2.31	0.003265	± 2.5	PASS

		VN	0	2.85	0.004028	± 2.5	PASS		
		VN	10	4.56	0.006445	± 2.5	PASS		
		VN	20	2.37	0.003350	± 2.5	PASS		
		VN	30	0.1	0.000141	± 2.5	PASS		
		VN	40	-0.05	-0.000071	± 2.5	PASS		
		VN	50	4.15	0.005866	± 2.5	PASS		
	HCH	VN	-30	1.28	0.001800	± 2.5	PASS		
		VN	-20	1.25	0.001758	± 2.5	PASS		
		VN	-10	2.72	0.003826	± 2.5	PASS		
		VN	0	0.71	0.000999	± 2.5	PASS		
		VN	10	-0.48	-0.000675	± 2.5	PASS		
		VN	20	4.74	0.006667	± 2.5	PASS		
		VN	30	3.31	0.004655	± 2.5	PASS		
		VN	40	0.49	0.000689	± 2.5	PASS		
		VN	50	-1.43	-0.002011	± 2.5	PASS		
		16QAM	LCH	VN	-30	1.54	0.002188	± 2.5	PASS
				VN	-20	-1.72	-0.002443	± 2.5	PASS
				VN	-10	4.5	0.006392	± 2.5	PASS
VN	0			4.33	0.006151	± 2.5	PASS		
VN	10			1.43	0.002031	± 2.5	PASS		
VN	20			3.25	0.004616	± 2.5	PASS		
VN	30			-1.93	-0.002741	± 2.5	PASS		
VN	40			-1.24	-0.001761	± 2.5	PASS		
VN	50			2.52	0.003580	± 2.5	PASS		
MCH	VN		-30	1.46	0.002064	± 2.5	PASS		
	VN		-20	3.49	0.004933	± 2.5	PASS		
	VN		-10	3.19	0.004509	± 2.5	PASS		
	VN		0	2.3	0.003251	± 2.5	PASS		
	VN		10	-1.26	-0.001781	± 2.5	PASS		
	VN		20	0.25	0.000353	± 2.5	PASS		
	VN		30	-0.7	-0.000989	± 2.5	PASS		
	VN		40	-1.16	-0.001640	± 2.5	PASS		
	VN		50	-0.19	-0.000269	± 2.5	PASS		
HCH	VN		-30	-1.33	-0.001871	± 2.5	PASS		
	VN		-20	5	0.007032	± 2.5	PASS		
	VN		-10	-1.76	-0.002475	± 2.5	PASS		
	VN		0	1.83	0.002574	± 2.5	PASS		
	VN		10	-1.44	-0.002025	± 2.5	PASS		
	VN		20	1.45	0.002039	± 2.5	PASS		
	VN	30	3.35	0.004712	± 2.5	PASS			
	VN	40	4.48	0.006301	± 2.5	PASS			

		VN	50	1.68	0.002363	± 2.5	PASS
--	--	----	----	------	----------	-------	------