































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	0.47	0.000672	± 2.5	PASS
		VN	TN	3.37	0.004816	± 2.5	PASS
		VH	TN	2.85	0.004073	± 2.5	PASS
	MCH	VL	TN	3	0.004240	± 2.5	PASS
		VN	TN	3.27	0.004622	± 2.5	PASS
		VH	TN	-0.96	-0.001357	± 2.5	PASS
	HCH	VL	TN	3.48	0.004865	± 2.5	PASS
		VN	TN	4.58	0.006403	± 2.5	PASS
		VH	TN	2.11	0.002950	± 2.5	PASS
16QAM	LCH	VL	TN	0.27	0.000386	± 2.5	PASS
		VN	TN	2.47	0.003530	± 2.5	PASS
		VH	TN	0.96	0.001372	± 2.5	PASS
	MCH	VL	TN	0.94	0.001329	± 2.5	PASS
		VN	TN	0.19	0.000269	± 2.5	PASS
		VH	TN	-1.95	-0.002756	± 2.5	PASS
	HCH	VL	TN	3.64	0.005089	± 2.5	PASS
		VN	TN	-1.13	-0.001580	± 2.5	PASS
		VH	TN	-1.18	-0.001650	± 2.5	PASS
Temperature							
Modulation	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VN	-30	-0.77	-0.001100	± 2.5	PASS
		VN	-20	-0.3	-0.000429	± 2.5	PASS
		VN	-10	-1.06	-0.001515	± 2.5	PASS
		VN	0	0.3	0.000429	± 2.5	PASS
		VN	10	4.77	0.006817	± 2.5	PASS
		VN	20	-1.07	-0.001529	± 2.5	PASS
		VN	30	-0.45	-0.000643	± 2.5	PASS
		VN	40	-0.51	-0.000729	± 2.5	PASS
		VN	50	-1.57	-0.002244	± 2.5	PASS

	MCH	VN	-30	0.7	0.000989	± 2.5	PASS
		VN	-20	-1.06	-0.001498	± 2.5	PASS
		VN	-10	2.42	0.003420	± 2.5	PASS
		VN	0	3.91	0.005527	± 2.5	PASS
		VN	10	2.34	0.003307	± 2.5	PASS
		VN	20	-1.5	-0.002120	± 2.5	PASS
		VN	30	-1.67	-0.002360	± 2.5	PASS
		VN	40	0.95	0.001343	± 2.5	PASS
		VN	50	2.44	0.003449	± 2.5	PASS
	HCH	VN	-30	-1.1	-0.001538	± 2.5	PASS
		VN	-20	2.45	0.003425	± 2.5	PASS
		VN	-10	2.96	0.004138	± 2.5	PASS
		VN	0	3.55	0.004963	± 2.5	PASS
		VN	10	1.79	0.002502	± 2.5	PASS
		VN	20	2.6	0.003635	± 2.5	PASS
		VN	30	3.4	0.004753	± 2.5	PASS
		VN	40	-0.4	-0.000559	± 2.5	PASS
		VN	50	-1.03	-0.001440	± 2.5	PASS
16QAM	LCH	VN	-30	-1.29	-0.001844	± 2.5	PASS
		VN	-20	1.98	0.002830	± 2.5	PASS
		VN	-10	-0.41	-0.000586	± 2.5	PASS
		VN	0	2.44	0.003487	± 2.5	PASS
		VN	10	-0.59	-0.000843	± 2.5	PASS
		VN	20	-1.86	-0.002658	± 2.5	PASS
		VN	30	3.57	0.005102	± 2.5	PASS
		VN	40	-0.01	-0.000014	± 2.5	PASS
		VN	50	2.34	0.003344	± 2.5	PASS
	MCH	VN	-30	1.87	0.002643	± 2.5	PASS
		VN	-20	4.4	0.006219	± 2.5	PASS
		VN	-10	-1.2	-0.001696	± 2.5	PASS
		VN	0	-0.14	-0.000198	± 2.5	PASS
		VN	10	3.09	0.004367	± 2.5	PASS
		VN	20	2.7	0.003816	± 2.5	PASS
		VN	30	2.2	0.003110	± 2.5	PASS
		VN	40	4.39	0.006205	± 2.5	PASS
		VN	50	2.96	0.004184	± 2.5	PASS
	HCH	VN	-30	2.83	0.003956	± 2.5	PASS
		VN	-20	4.31	0.006025	± 2.5	PASS
		VN	-10	-0.88	-0.001230	± 2.5	PASS
		VN	0	4.9	0.006850	± 2.5	PASS
		VN	10	0.48	0.000671	± 2.5	PASS

		VN	20	3.01	0.004208	± 2.5	PASS
		VN	30	3	0.004194	± 2.5	PASS
		VN	40	4.46	0.006235	± 2.5	PASS
		VN	50	4.52	0.006319	± 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	3.93	0.005610	± 2.5	PASS
		VN	TN	4.61	0.006581	± 2.5	PASS
		VH	TN	2.31	0.003298	± 2.5	PASS
	MCH	VL	TN	-1.57	-0.002219	± 2.5	PASS
		VN	TN	0.52	0.000735	± 2.5	PASS
		VH	TN	3.45	0.004876	± 2.5	PASS
	HCH	VL	TN	-0.26	-0.000364	± 2.5	PASS
		VN	TN	1.44	0.002015	± 2.5	PASS
		VH	TN	2.02	0.002827	± 2.5	PASS
16QAM	LCH	VL	TN	-0.02	-0.000029	± 2.5	PASS
		VN	TN	3.5	0.004996	± 2.5	PASS
		VH	TN	4.91	0.007009	± 2.5	PASS
	MCH	VL	TN	-1.91	-0.002700	± 2.5	PASS
		VN	TN	0.1	0.000141	± 2.5	PASS
		VH	TN	-0.05	-0.000071	± 2.5	PASS
	HCH	VL	TN	-1.9	-0.002659	± 2.5	PASS
		VN	TN	-0.56	-0.000784	± 2.5	PASS
		VH	TN	4.57	0.006396	± 2.5	PASS
Temperature							
Modulation	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VN	-30	-0.03	-0.000043	± 2.5	PASS
		VN	-20	-1.88	-0.002684	± 2.5	PASS
		VN	-10	4.38	0.006253	± 2.5	PASS
		VN	0	1.56	0.002227	± 2.5	PASS
		VN	10	2.16	0.003084	± 2.5	PASS
		VN	20	-0.55	-0.000785	± 2.5	PASS
		VN	30	0.81	0.001156	± 2.5	PASS
		VN	40	0.62	0.000885	± 2.5	PASS
	MCH	VN	-30	1.14	0.001611	± 2.5	PASS

	VN	VN	-20	1.36	0.001922	± 2.5	PASS
		VN	-10	-0.21	-0.000297	± 2.5	PASS
		VN	0	4.95	0.006996	± 2.5	PASS
		VN	10	0.71	0.001004	± 2.5	PASS
		VN	20	2.95	0.004170	± 2.5	PASS
		VN	30	-1.18	-0.001668	± 2.5	PASS
		VN	40	2.85	0.004028	± 2.5	PASS
		VN	50	4.29	0.006064	± 2.5	PASS
	HCH	VN	-30	4.84	0.006774	± 2.5	PASS
		VN	-20	-0.34	-0.000476	± 2.5	PASS
		VN	-10	1.5	0.002099	± 2.5	PASS
		VN	0	0.74	0.001036	± 2.5	PASS
		VN	10	4.77	0.006676	± 2.5	PASS
		VN	20	3.62	0.005066	± 2.5	PASS
		VN	30	2.16	0.003023	± 2.5	PASS
		VN	40	4.3	0.006018	± 2.5	PASS
		VN	50	3.86	0.005402	± 2.5	PASS
		16QAM	LCH	VN	-30	2.98	0.004254
VN	-20			2.38	0.003398	± 2.5	PASS
VN	-10			3.66	0.005225	± 2.5	PASS
VN	0			-1.74	-0.002484	± 2.5	PASS
VN	10			-0.74	-0.001056	± 2.5	PASS
VN	20			-0.09	-0.000128	± 2.5	PASS
VN	30			4.79	0.006838	± 2.5	PASS
VN	40			4.81	0.006867	± 2.5	PASS
VN	50			1.89	0.002698	± 2.5	PASS
MCH	VN		-30	-0.24	-0.000339	± 2.5	PASS
	VN		-20	3.16	0.004466	± 2.5	PASS
	VN		-10	-0.62	-0.000876	± 2.5	PASS
	VN		0	4.94	0.006982	± 2.5	PASS
	VN		10	4.86	0.006869	± 2.5	PASS
	VN		20	1.31	0.001852	± 2.5	PASS
	VN		30	0.64	0.000905	± 2.5	PASS
	VN		40	-0.49	-0.000693	± 2.5	PASS
	VN		50	2.97	0.004198	± 2.5	PASS
HCH	VN		-30	0.77	0.001078	± 2.5	PASS
	VN		-20	-1.12	-0.001568	± 2.5	PASS
	VN		-10	2.95	0.004129	± 2.5	PASS
	VN		0	4.08	0.005710	± 2.5	PASS
	VN		10	1.48	0.002071	± 2.5	PASS
	VN		20	-0.25	-0.000350	± 2.5	PASS

		VN	30	3.45	0.004829	± 2.5	PASS
		VN	40	-0.4	-0.000560	± 2.5	PASS
		VN	50	2.99	0.004185	± 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	-1.04	-0.001483	± 2.5	PASS
		VN	TN	2.65	0.003778	± 2.5	PASS
		VH	TN	1.45	0.002067	± 2.5	PASS
	MCH	VL	TN	-1.27	-0.001795	± 2.5	PASS
		VN	TN	2.29	0.003237	± 2.5	PASS
		VH	TN	0.75	0.001060	± 2.5	PASS
	HCH	VL	TN	0.25	0.000350	± 2.5	PASS
		VN	TN	4.35	0.006097	± 2.5	PASS
		VH	TN	2.31	0.003238	± 2.5	PASS
16QAM	LCH	VL	TN	-1.93	-0.002751	± 2.5	PASS
		VN	TN	1.16	0.001654	± 2.5	PASS
		VH	TN	0	0.000000	± 2.5	PASS
	MCH	VL	TN	4.94	0.006982	± 2.5	PASS
		VN	TN	2.57	0.003633	± 2.5	PASS
		VH	TN	0.59	0.000834	± 2.5	PASS
	HCH	VL	TN	-1.28	-0.001794	± 2.5	PASS
		VN	TN	2.84	0.003980	± 2.5	PASS
		VH	TN	0.72	0.001009	± 2.5	PASS
Temperature							
Modulation	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VN	-30	-1.71	-0.002438	± 2.5	PASS
		VN	-20	4.09	0.005830	± 2.5	PASS
		VN	-10	1.28	0.001825	± 2.5	PASS
		VN	0	4.55	0.006486	± 2.5	PASS
		VN	10	-1.66	-0.002366	± 2.5	PASS
		VN	20	0.48	0.000684	± 2.5	PASS
		VN	30	3.89	0.005545	± 2.5	PASS
		VN	40	1.1	0.001568	± 2.5	PASS
		VN	50	1.3	0.001853	± 2.5	PASS
	MCH	VN	-30	-0.31	-0.000438	± 2.5	PASS
		VN	-20	-0.9	-0.001272	± 2.5	PASS

	VN	VN	-10	-0.52	-0.000735	± 2.5	PASS		
		VN	0	0.16	0.000226	± 2.5	PASS		
		VN	10	1.36	0.001922	± 2.5	PASS		
		VN	20	4.13	0.005837	± 2.5	PASS		
		VN	30	-0.52	-0.000735	± 2.5	PASS		
		VN	40	2.95	0.004170	± 2.5	PASS		
		VN	50	-0.18	-0.000254	± 2.5	PASS		
	HCH	VN	-30	2.24	0.003139	± 2.5	PASS		
		VN	-20	3.85	0.005396	± 2.5	PASS		
		VN	-10	4.81	0.006741	± 2.5	PASS		
		VN	0	4.95	0.006938	± 2.5	PASS		
		VN	10	-0.3	-0.000420	± 2.5	PASS		
		VN	20	1.84	0.002579	± 2.5	PASS		
		VN	30	1.55	0.002172	± 2.5	PASS		
		VN	40	-1.09	-0.001528	± 2.5	PASS		
		VN	50	0.24	0.000336	± 2.5	PASS		
		16QAM	LCH	VN	-30	-1.06	-0.001511	± 2.5	PASS
				VN	-20	2.06	0.002937	± 2.5	PASS
				VN	-10	2.88	0.004105	± 2.5	PASS
VN	0			1.76	0.002509	± 2.5	PASS		
VN	10			-0.7	-0.000998	± 2.5	PASS		
VN	20			1.02	0.001454	± 2.5	PASS		
VN	30			-1.84	-0.002623	± 2.5	PASS		
VN	40			3.02	0.004305	± 2.5	PASS		
VN	50			2.53	0.003607	± 2.5	PASS		
MCH	VN		-30	-1.19	-0.001682	± 2.5	PASS		
	VN		-20	-0.16	-0.000226	± 2.5	PASS		
	VN		-10	-1.25	-0.001767	± 2.5	PASS		
	VN		0	3.73	0.005272	± 2.5	PASS		
	VN		10	4.26	0.006021	± 2.5	PASS		
	VN		20	3.2	0.004523	± 2.5	PASS		
	VN		30	4.73	0.006686	± 2.5	PASS		
	VN		40	-0.7	-0.000989	± 2.5	PASS		
	VN		50	-1.73	-0.002445	± 2.5	PASS		
HCH	VN		-30	-0.77	-0.001079	± 2.5	PASS		
	VN		-20	-0.83	-0.001163	± 2.5	PASS		
	VN		-10	0.98	0.001374	± 2.5	PASS		
	VN		0	2.5	0.003504	± 2.5	PASS		
	VN		10	-0.96	-0.001345	± 2.5	PASS		
	VN		20	-0.91	-0.001275	± 2.5	PASS		
	VN		30	2.11	0.002957	± 2.5	PASS		

		VN	40	0.9	0.001261	± 2.5	PASS
		VN	50	1.77	0.002481	± 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	1.36	0.001932	± 2.5	PASS
		VN	TN	4	0.005682	± 2.5	PASS
		VH	TN	-0.45	-0.000639	± 2.5	PASS
	MCH	VL	TN	3.47	0.004905	± 2.5	PASS
		VN	TN	-1.75	-0.002473	± 2.5	PASS
		VH	TN	-0.48	-0.000678	± 2.5	PASS
	HCH	VL	TN	0.96	0.001350	± 2.5	PASS
		VN	TN	4.32	0.006076	± 2.5	PASS
		VH	TN	3.99	0.005612	± 2.5	PASS
16QAM	LCH	VL	TN	1.11	0.001577	± 2.5	PASS
		VN	TN	0.93	0.001321	± 2.5	PASS
		VH	TN	4.14	0.005881	± 2.5	PASS
	MCH	VL	TN	-0.15	-0.000212	± 2.5	PASS
		VN	TN	2.99	0.004226	± 2.5	PASS
		VH	TN	1.71	0.002417	± 2.5	PASS
	HCH	VL	TN	-0.53	-0.000745	± 2.5	PASS
		VN	TN	1.54	0.002166	± 2.5	PASS
		VH	TN	0.56	0.000788	± 2.5	PASS
Temperature							
Modulation	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
QPSK	LCH	VN	-30	-1.94	-0.002756	± 2.5	PASS
		VN	-20	4.08	0.005795	± 2.5	PASS
		VN	-10	-1.38	-0.001960	± 2.5	PASS
		VN	0	1.62	0.002301	± 2.5	PASS
		VN	10	4.33	0.006151	± 2.5	PASS
		VN	20	1.87	0.002656	± 2.5	PASS
		VN	30	0.56	0.000795	± 2.5	PASS
		VN	40	0.09	0.000128	± 2.5	PASS
		VN	50	0.07	0.000099	± 2.5	PASS
	MCH	VN	-30	-1.12	-0.001583	± 2.5	PASS
		VN	-20	4.6	0.006502	± 2.5	PASS
		VN	-10	0.46	0.000650	± 2.5	PASS

		VN	0	0.39	0.000551	± 2.5	PASS		
		VN	10	-0.25	-0.000353	± 2.5	PASS		
		VN	20	3.86	0.005456	± 2.5	PASS		
		VN	30	1.74	0.002459	± 2.5	PASS		
		VN	40	2.47	0.003491	± 2.5	PASS		
		VN	50	4.79	0.006770	± 2.5	PASS		
	HCH	VN	-30	-0.13	-0.000183	± 2.5	PASS		
		VN	-20	-1.18	-0.001660	± 2.5	PASS		
		VN	-10	-0.89	-0.001252	± 2.5	PASS		
		VN	0	4.74	0.006667	± 2.5	PASS		
		VN	10	3.78	0.005316	± 2.5	PASS		
		VN	20	1.26	0.001772	± 2.5	PASS		
		VN	30	2.84	0.003994	± 2.5	PASS		
		VN	40	3.73	0.005246	± 2.5	PASS		
		VN	50	2.14	0.003010	± 2.5	PASS		
		16QAM	LCH	VN	-30	1.55	0.002202	± 2.5	PASS
				VN	-20	3.96	0.005625	± 2.5	PASS
				VN	-10	1.03	0.001463	± 2.5	PASS
				VN	0	1.58	0.002244	± 2.5	PASS
VN	10			-0.56	-0.000795	± 2.5	PASS		
VN	20			4.36	0.006193	± 2.5	PASS		
VN	30			2.66	0.003778	± 2.5	PASS		
VN	40			4.31	0.006122	± 2.5	PASS		
VN	50			4.37	0.006207	± 2.5	PASS		
MCH	VN			-30	4.39	0.006205	± 2.5	PASS	
	VN		-20	-1.8	-0.002544	± 2.5	PASS		
	VN		-10	4.86	0.006869	± 2.5	PASS		
	VN		0	4.93	0.006968	± 2.5	PASS		
	VN		10	4.8	0.006784	± 2.5	PASS		
	VN		20	3.02	0.004269	± 2.5	PASS		
	VN		30	3.25	0.004594	± 2.5	PASS		
	VN		40	2.27	0.003208	± 2.5	PASS		
	VN		50	-1.85	-0.002615	± 2.5	PASS		
	HCH		VN	-30	-0.34	-0.000478	± 2.5	PASS	
VN			-20	2.42	0.003404	± 2.5	PASS		
VN			-10	-1.11	-0.001561	± 2.5	PASS		
VN			0	3.21	0.004515	± 2.5	PASS		
VN			10	-1.71	-0.002405	± 2.5	PASS		
VN			20	0.17	0.000239	± 2.5	PASS		
VN			30	0.24	0.000338	± 2.5	PASS		
VN			40	3.53	0.004965	± 2.5	PASS		

		VN	50	-0.67	-0.000942	± 2.5	PASS
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