

7 Appendix_G: Frequency Stability

7.1 Test Results

Frequency Error vs. Voltage

Test Mode	Test Bandwidth [MHz]	Test Channel	Modulation	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict	
TM1	1.4	LCH	QPSK	TN	VH	-15.69	-0.02	PASS	
			QPSK	TN	VN	5.93	0.01	PASS	
			QPSK	TN	VL	0.74	0.0	PASS	
		MCH	QPSK	TN	VH	-10.77	-0.01	PASS	
			QPSK	TN	VN	-9.26	-0.01	PASS	
			QPSK	TN	VL	-9.80	-0.01	PASS	
			HCH	QPSK	TN	VH	8.10	0.01	PASS
				QPSK	TN	VN	30.8	0.04	PASS
				QPSK	TN	VL	1.12	0.0	PASS
	5	LCH	QPSK	TN	VH	11.18	0.01	PASS	
			QPSK	TN	VN	0.55	0.0	PASS	
			QPSK	TN	VL	4.13	0.0	PASS	
		MCH	QPSK	TN	VH	0.49	0.0	PASS	
			QPSK	TN	VN	3.97	0.0	PASS	
			QPSK	TN	VL	2.36	0.0	PASS	
		HCH	QPSK	TN	VH	9.58	0.01	PASS	
			QPSK	TN	VN	11.15	0.01	PASS	
			QPSK	TN	VL	-1.99	-0.0	PASS	
	10	LCH	QPSK	TN	VH	-0.83	-0.0	PASS	
			QPSK	TN	VN	3.37	0.0	PASS	
			QPSK	TN	VL	5.87	0.01	PASS	
		MCH	QPSK	TN	VH	0.05	0.0	PASS	
			QPSK	TN	VN	-1.31	-0.0	PASS	
			QPSK	TN	VL	2.21	0.0	PASS	
		HCH	QPSK	TN	VH	-1.43	-0.0	PASS	
			QPSK	TN	VN	3.52	0.0	PASS	
			QPSK	TN	VL	7.15	0.01	PASS	

Test Mode	Test Bandwidth [MHz]	Test Channel	Modulation	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
TM2	1.4	LCH	16QAM	TN	VH	29.02	0.04	PASS
			16QAM	TN	VN	-4.46	-0.01	PASS
			16QAM	TN	VL	4.40	0.01	PASS
		MCH	16QAM	TN	VH	2.62	0.0	PASS
			16QAM	TN	VN	6.60	0.01	PASS
			16QAM	TN	VL	21.77	0.03	PASS
		HCH	16QAM	TN	VH	-14.69	-0.02	PASS
			16QAM	TN	VN	-22.99	-0.03	PASS
			16QAM	TN	VL	-8.61	-0.01	PASS
	5	LCH	16QAM	TN	VH	-4.10	-0.0	PASS
			16QAM	TN	VN	4.16	0.01	PASS
			16QAM	TN	VL	0.39	0.0	PASS
		MCH	16QAM	TN	VH	-4.76	-0.01	PASS
			16QAM	TN	VN	-1.14	-0.0	PASS
			16QAM	TN	VL	-5.14	-0.01	PASS
		HCH	16QAM	TN	VH	-1.04	-0.0	PASS
			16QAM	TN	VN	1.93	0.0	PASS
			16QAM	TN	VL	5.20	0.01	PASS
	10	LCH	16QAM	TN	VH	-0.39	-0.0	PASS
			16QAM	TN	VN	0.90	0.0	PASS
			16QAM	TN	VL	2.48	0.0	PASS
		MCH	16QAM	TN	VH	-2.29	-0.0	PASS
			16QAM	TN	VN	1.63	0.0	PASS
			16QAM	TN	VL	-6.47	-0.01	PASS
		HCH	16QAM	TN	VH	0.95	0.0	PASS
			16QAM	TN	VN	-6.83	-0.01	PASS
			16QAM	TN	VL	1.25	0.0	PASS

Frequency Error vs. Temperature

Test Mode	Test Bandwidth [MHz]	Test Channel	Modulation	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
TM1	1.4	LCH	QPSK	VN	-30	9.36	0.01	PASS
			QPSK	VN	-20	6.51	0.01	PASS
			QPSK	VN	-10	5.16	0.01	PASS
			QPSK	VN	0	-0.85	-0.0	PASS
			QPSK	VN	10	11.35	0.01	PASS
			QPSK	VN	20	6.03	0.01	PASS
			QPSK	VN	30	9.54	0.01	PASS
			QPSK	VN	40	3.12	0.0	PASS
			QPSK	VN	50	11.95	0.01	PASS
		MCH	QPSK	VN	-30	-35.53	-0.04	PASS
			QPSK	VN	-20	-7.16	-0.01	PASS
			QPSK	VN	-10	-9.35	-0.01	PASS
			QPSK	VN	0	-9.83	-0.01	PASS
			QPSK	VN	10	-0.31	-0.0	PASS
			QPSK	VN	20	-8.59	-0.01	PASS
			QPSK	VN	30	12.46	0.01	PASS
			QPSK	VN	40	-12.46	-0.01	PASS
			QPSK	VN	50	-8.31	-0.01	PASS
		HCH	QPSK	VN	-30	10.44	0.01	PASS
			QPSK	VN	-20	9.06	0.01	PASS
			QPSK	VN	-10	15.8	0.02	PASS
			QPSK	VN	0	11.18	0.01	PASS
			QPSK	VN	10	-0.84	-0.0	PASS
			QPSK	VN	20	0.59	0.0	PASS
			QPSK	VN	30	1.65	0.0	PASS
			QPSK	VN	40	-4.80	-0.01	PASS
			QPSK	VN	50	6.48	0.01	PASS

Test Mode	Test Bandwidth [MHz]	Test Channel	Modulation	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
TM1	3	LCH	QPSK	VN	-30	5.72	0.01	PASS
			QPSK	VN	-20	8.67	0.01	PASS
			QPSK	VN	-10	4.19	0.01	PASS
			QPSK	VN	0	6.23	0.01	PASS
			QPSK	VN	10	-2.50	-0.0	PASS
			QPSK	VN	20	9.05	0.01	PASS
			QPSK	VN	30	-1.68	-0.0	PASS
			QPSK	VN	40	0.62	0.0	PASS
			QPSK	VN	50	3.37	0.0	PASS
		MCH	QPSK	VN	-30	3.42	0.0	PASS
			QPSK	VN	-20	7.88	0.01	PASS
			QPSK	VN	-10	3.32	0.0	PASS
			QPSK	VN	0	-0.02	-0.0	PASS
			QPSK	VN	10	7.21	0.01	PASS
			QPSK	VN	20	-7.08	-0.01	PASS
			QPSK	VN	30	-4.52	-0.01	PASS
			QPSK	VN	40	-3.80	-0.0	PASS
			QPSK	VN	50	-4.14	-0.0	PASS
		HCH	QPSK	VN	-30	0.21	0.0	PASS
			QPSK	VN	-20	-0.33	-0.0	PASS
			QPSK	VN	-10	-0.93	-0.0	PASS
			QPSK	VN	0	2.58	0.0	PASS
			QPSK	VN	10	7.26	0.01	PASS
			QPSK	VN	20	-6.17	-0.01	PASS
			QPSK	VN	30	11.2	0.01	PASS
			QPSK	VN	40	3.46	0.0	PASS
			QPSK	VN	50	-9.68	-0.01	PASS

Test Mode	Test Bandwidth [MHz]	Test Channel	Modulation	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
TM1	5	LCH	QPSK	VN	-30	3.26	0.0	PASS
			QPSK	VN	-20	-6.67	-0.01	PASS
			QPSK	VN	-10	2.54	0.0	PASS
			QPSK	VN	0	5.21	0.01	PASS
			QPSK	VN	10	0.81	0.0	PASS
			QPSK	VN	20	-5.75	-0.01	PASS
			QPSK	VN	30	9.22	0.01	PASS
			QPSK	VN	40	-4.14	-0.01	PASS
			QPSK	VN	50	2.29	0.0	PASS
		MCH	QPSK	VN	-30	2.99	0.0	PASS
			QPSK	VN	-20	4.05	0.0	PASS
			QPSK	VN	-10	-2.52	-0.0	PASS
			QPSK	VN	0	2.09	0.0	PASS
			QPSK	VN	10	3.37	0.0	PASS
			QPSK	VN	20	-0.94	-0.0	PASS
			QPSK	VN	30	-2.61	-0.0	PASS
			QPSK	VN	40	2.47	0.0	PASS
			QPSK	VN	50	11.12	0.01	PASS
		HCH	QPSK	VN	-30	5.30	0.01	PASS
			QPSK	VN	-20	2.20	0.0	PASS
			QPSK	VN	-10	-1.21	-0.0	PASS
			QPSK	VN	0	1.35	0.0	PASS
			QPSK	VN	10	6.89	0.01	PASS
			QPSK	VN	20	4.51	0.01	PASS
			QPSK	VN	30	4.33	0.01	PASS
			QPSK	VN	40	9.94	0.01	PASS
			QPSK	VN	50	-3.69	-0.0	PASS

Test Mode	Test Bandwidth [MHz]	Test Channel	Modulation	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
TM1	10	LCH	QPSK	VN	-30	-3.64	-0.0	PASS
			QPSK	VN	-20	4.35	0.01	PASS
			QPSK	VN	-10	-0.56	-0.0	PASS
			QPSK	VN	0	1.61	0.0	PASS
			QPSK	VN	10	-4.67	-0.01	PASS
			QPSK	VN	20	7.96	0.01	PASS
			QPSK	VN	30	0.05	0.0	PASS
			QPSK	VN	40	2.04	0.0	PASS
			QPSK	VN	50	-2.86	-0.0	PASS
		MCH	QPSK	VN	-30	0.29	0.0	PASS
			QPSK	VN	-20	5.20	0.01	PASS
			QPSK	VN	-10	3.06	0.0	PASS
			QPSK	VN	0	1.22	0.0	PASS
			QPSK	VN	10	2.37	0.0	PASS
			QPSK	VN	20	-0.32	-0.0	PASS
			QPSK	VN	30	5.20	0.01	PASS
			QPSK	VN	40	-1.50	-0.0	PASS
		HCH	QPSK	VN	50	1.28	0.0	PASS
			QPSK	VN	-30	4.90	0.01	PASS
			QPSK	VN	-20	-2.71	-0.0	PASS
			QPSK	VN	-10	-1.01	-0.0	PASS
			QPSK	VN	0	-1.04	-0.0	PASS
			QPSK	VN	10	1.63	0.0	PASS
			QPSK	VN	20	-1.37	-0.0	PASS
			QPSK	VN	30	2.32	0.0	PASS
		QPSK	VN	40	0.23	0.0	PASS	
		QPSK	VN	50	0.02	0.0	PASS	

Test Mode	Test Bandwidth [MHz]	Test Channel	Modulation	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
TM2	1.4	LCH	16QAM	VN	-30	1.87	0.0	PASS
			16QAM	VN	-20	9.63	0.01	PASS
			16QAM	VN	-10	-8.66	-0.01	PASS
			16QAM	VN	0	-8.63	-0.01	PASS
			16QAM	VN	10	2.88	0.0	PASS
			16QAM	VN	20	3.82	0.0	PASS
			16QAM	VN	30	11.08	0.01	PASS
			16QAM	VN	40	0.03	0.0	PASS
			16QAM	VN	50	-8.34	-0.01	PASS
		MCH	16QAM	VN	-30	9.06	0.01	PASS
			16QAM	VN	-20	12.56	0.02	PASS
			16QAM	VN	-10	8.44	0.01	PASS
			16QAM	VN	0	-7.69	-0.01	PASS
			16QAM	VN	10	6.52	0.01	PASS
			16QAM	VN	20	-5.23	-0.01	PASS
			16QAM	VN	30	6.52	0.01	PASS
			16QAM	VN	40	4.02	0.0	PASS
			16QAM	VN	50	-1.82	-0.0	PASS
		HCH	16QAM	VN	-30	12.09	0.01	PASS
			16QAM	VN	-20	6.91	0.01	PASS
			16QAM	VN	-10	11.11	0.01	PASS
			16QAM	VN	0	6.56	0.01	PASS
			16QAM	VN	10	-17.0	-0.02	PASS
			16QAM	VN	20	-1.88	-0.0	PASS
			16QAM	VN	30	-5.26	-0.01	PASS
			16QAM	VN	40	10.94	0.01	PASS
			16QAM	VN	50	-20.55	-0.02	PASS

Test Mode	Test Bandwidth [MHz]	Test Channel	Modulation	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
TM2	3	LCH	16QAM	VN	-30	-0.10	-0.0	PASS
			16QAM	VN	-20	-7.63	-0.01	PASS
			16QAM	VN	-10	-5.04	-0.01	PASS
			16QAM	VN	0	3.70	0.0	PASS
			16QAM	VN	10	8.41	0.01	PASS
			16QAM	VN	20	-8.97	-0.01	PASS
			16QAM	VN	30	-0.81	-0.0	PASS
			16QAM	VN	40	0.79	0.0	PASS
			16QAM	VN	50	3.21	0.0	PASS
		MCH	16QAM	VN	-30	-1.36	-0.0	PASS
			16QAM	VN	-20	-1.76	-0.0	PASS
			16QAM	VN	-10	-1.29	-0.0	PASS
			16QAM	VN	0	5.35	0.01	PASS
			16QAM	VN	10	3.26	0.0	PASS
			16QAM	VN	20	0.88	0.0	PASS
			16QAM	VN	30	-8.38	-0.01	PASS
			16QAM	VN	40	-15.79	-0.02	PASS
		HCH	16QAM	VN	50	-2.59	-0.0	PASS
			16QAM	VN	-30	-1.70	-0.0	PASS
			16QAM	VN	-20	4.81	0.01	PASS
			16QAM	VN	-10	2.09	0.0	PASS
			16QAM	VN	0	8.26	0.01	PASS
			16QAM	VN	10	9.17	0.01	PASS
			16QAM	VN	20	14.67	0.02	PASS
			16QAM	VN	30	6.82	0.01	PASS
		16QAM	VN	40	6.44	0.01	PASS	
		16QAM	VN	50	6.51	0.01	PASS	

Test Mode	Test Bandwidth [MHz]	Test Channel	Modulation	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
TM2	5	LCH	16QAM	VN	-30	7.09	0.01	PASS
			16QAM	VN	-20	1.67	0.0	PASS
			16QAM	VN	-10	4.17	0.01	PASS
			16QAM	VN	0	-1.03	-0.0	PASS
			16QAM	VN	10	2.10	0.0	PASS
			16QAM	VN	20	3.10	0.0	PASS
			16QAM	VN	30	5.74	0.01	PASS
			16QAM	VN	40	14.45	0.02	PASS
			16QAM	VN	50	6.03	0.01	PASS
		MCH	16QAM	VN	-30	-0.68	-0.0	PASS
			16QAM	VN	-20	0.11	0.0	PASS
			16QAM	VN	-10	-2.73	-0.0	PASS
			16QAM	VN	0	-0.51	-0.0	PASS
			16QAM	VN	10	1.48	0.0	PASS
			16QAM	VN	20	-4.21	-0.01	PASS
			16QAM	VN	30	8.14	0.01	PASS
			16QAM	VN	40	9.61	0.01	PASS
		HCH	16QAM	VN	50	-9.62	-0.01	PASS
			16QAM	VN	-30	3.47	0.0	PASS
			16QAM	VN	-20	0.75	0.0	PASS
			16QAM	VN	-10	-0.10	-0.0	PASS
			16QAM	VN	0	0.03	0.0	PASS
			16QAM	VN	10	0.78	0.0	PASS
			16QAM	VN	20	8.01	0.01	PASS
			16QAM	VN	30	-7.19	-0.01	PASS
		16QAM	VN	40	4.25	0.01	PASS	
		16QAM	VN	50	-8.06	-0.01	PASS	

Test Mode	Test Bandwidth [MHz]	Test Channel	Modulation	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
TM2	10	LCH	16QAM	VN	-30	-1.47	-0.0	PASS
			16QAM	VN	-20	-2.30	-0.0	PASS
			16QAM	VN	-10	1.33	0.0	PASS
			16QAM	VN	0	-1.28	-0.0	PASS
			16QAM	VN	10	2.21	0.0	PASS
			16QAM	VN	20	1.63	0.0	PASS
			16QAM	VN	30	5.28	0.01	PASS
			16QAM	VN	40	4.06	0.0	PASS
			16QAM	VN	50	-0.73	-0.0	PASS
		MCH	16QAM	VN	-30	-1.06	-0.0	PASS
			16QAM	VN	-20	2.33	0.0	PASS
			16QAM	VN	-10	2.59	0.0	PASS
			16QAM	VN	0	-3.78	-0.0	PASS
			16QAM	VN	10	6.82	0.01	PASS
			16QAM	VN	20	1.71	0.0	PASS
			16QAM	VN	30	-1.53	-0.0	PASS
			16QAM	VN	40	5.79	0.01	PASS
		HCH	16QAM	VN	50	3.72	0.0	PASS
			16QAM	VN	-30	4.09	0.0	PASS
			16QAM	VN	-20	4.44	0.01	PASS
			16QAM	VN	-10	5.05	0.01	PASS
			16QAM	VN	0	1.68	0.0	PASS
			16QAM	VN	10	-1.86	-0.0	PASS
			16QAM	VN	20	1.02	0.0	PASS
			16QAM	VN	30	0.15	0.0	PASS
		16QAM	VN	40	1.29	0.0	PASS	
		16QAM	VN	50	4.48	0.01	PASS	

End of Test Report