Appendix B: Test Results of Band 4 for NB-IoT operation

Appendix B.1: RF Power Output and Effective (Isotropic) Radiated Power Output Data for NB

Test Result

Band	OpMode	Bandwidth	Modulation	Channel	Tones	SCS	Result	EIRP		Limit (watts)	Verdict
							dBm	dBm	Watts		
Band4	Stand-Alone	NaN	QPSK	19951	1@0	3.75kHz	12.35	14.49	0.028	1	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@11	15kHz	12.03	14.17	0.026	1	PASS
Band4	Stand-Alone	NaN	QPSK	19951	3@3	15kHz	11.99	14.13	0.026	1	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@47	3.75kHz	12.26	14.40	0.028	1	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@0	15kHz	12.1	14.24	0.027	1	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	21.53	23.67	0.233	1	PASS
Band4	Stand-Alone	NaN	QPSK	20175	3@3	15kHz	21.37	23.51	0.224	1	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	21.56	23.70	0.234	1	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	21.32	23.46	0.222	1	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	21.46	23.60	0.229	1	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@11	15kHz	11.86	14.00	0.025	1	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@0	15kHz	12.09	14.23	0.026	1	PASS
Band4	Stand-Alone	NaN	QPSK	20399	3@3	15kHz	12.21	14.35	0.027	1	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@47	3.75kHz	12.42	14.56	0.029	1	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@0	3.75kHz	12.43	14.57	0.029	1	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@11	15kHz	12.17	14.31	0.027	1	PASS
Band4	Stand-Alone	NaN	BPSK	19951	3@3	15kHz	11.79	13.93	0.025	1	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@0	3.75kHz	12.28	14.42	0.028	1	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@0	15kHz	12	14.14	0.026	1	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@47	3.75kHz	12.22	14.36	0.027	1	PASS
Band4	Stand-Alone	NaN	BPSK	20175	3@3	15kHz	21.35	23.49	0.223	1	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@0	15kHz	21.2	23.34	0.216	1	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@11	15kHz	21.1	23.24	0.211	1	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@0	3.75kHz	20.95	23.09	0.204	1	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@47	3.75kHz	21.46	23.60	0.229	1	PASS
Band4	Stand-Alone	NaN	BPSK	20399	3@3	15kHz	12.01	14.15	0.026	1	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@11	15kHz	12.19	14.33	0.027	1	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@0	3.75kHz	12.41	14.55	0.029	1	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@0	15kHz	11.84	13.98	0.025	1	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@47	3.75kHz	12.37	14.51	0.028	1	PASS

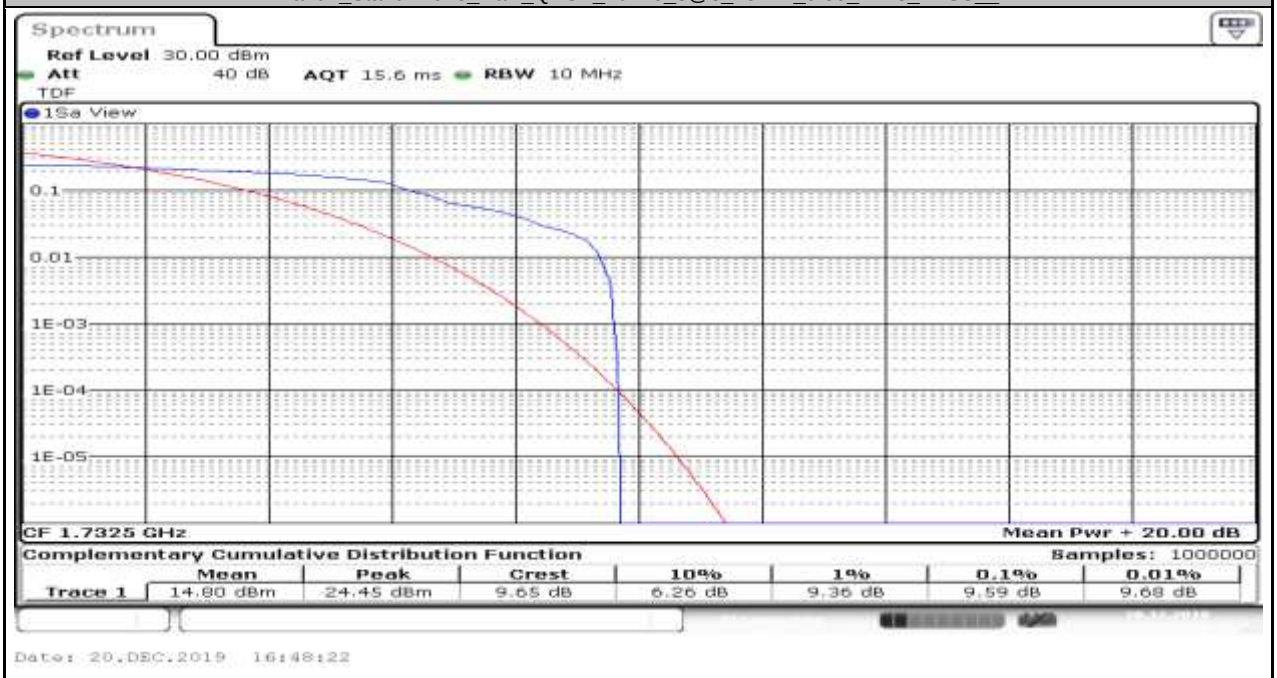
Appendix B.2: Peak-to-Average Ratio (CCDF) for NB

Test Result

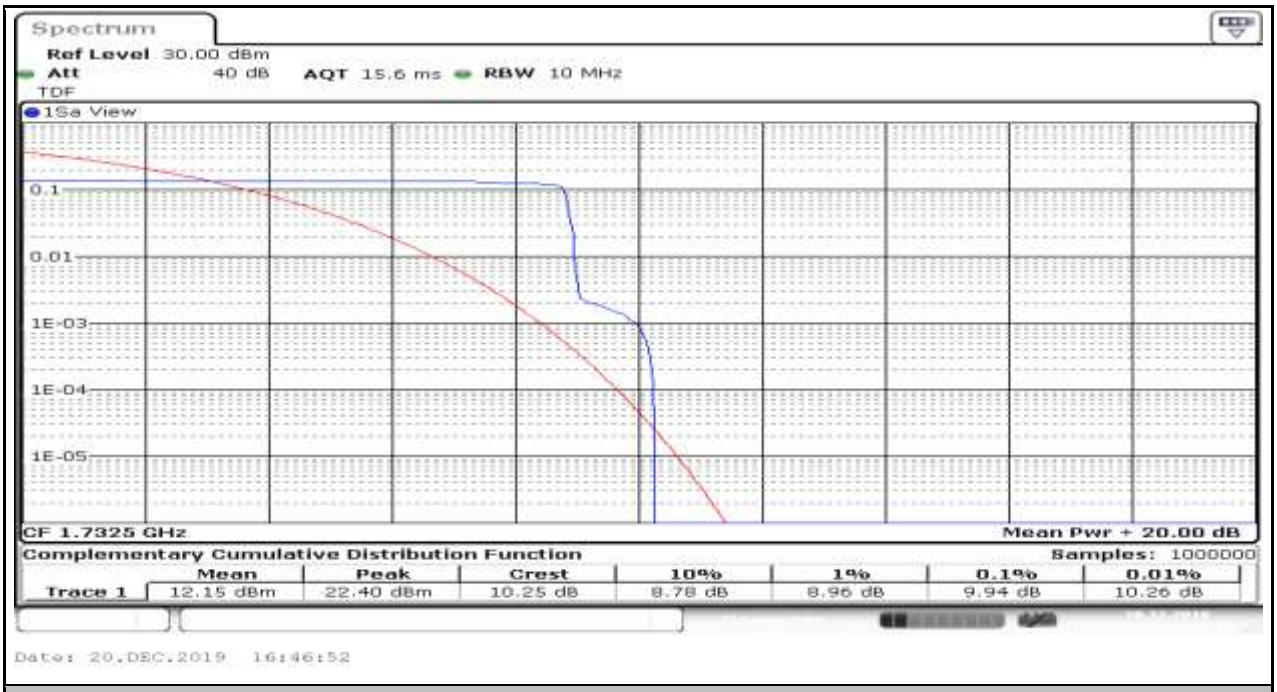
Band	OpMode	Bandwidth	Modulation	Channel	Tones	SCS	Result (dB)	Limit (dB)	Verdict
Band4	Stand-Alone	NaN	QPSK	20175	3@3	15kHz	9.59	<=13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	9.94	<=13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	6.14	<=13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	1.74	<=13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	1.65	<=13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	3@3	15kHz	10.12	<=13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@11	15kHz	11.48	<=13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@0	15kHz	1.48	<=13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@47	3.75kHz	2.78	<=13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@0	3.75kHz	1.77	<=13	PASS

Test Graphs

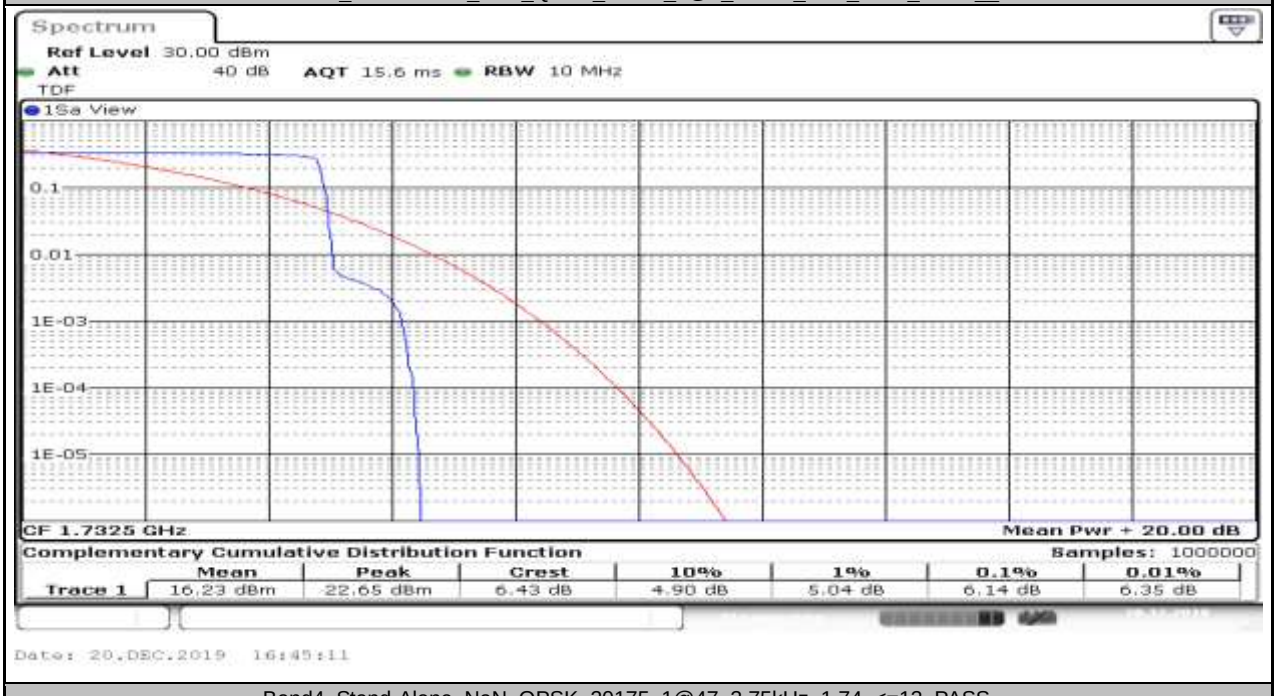
Band4_Stand-Alone_NaN_QPSK_20175_3@3_15kHz_9.59_<=13_PASS__



Band4_Stand-Alone_NaN_QPSK_20175_1@11_15kHz_9.94_<=13_PASS__



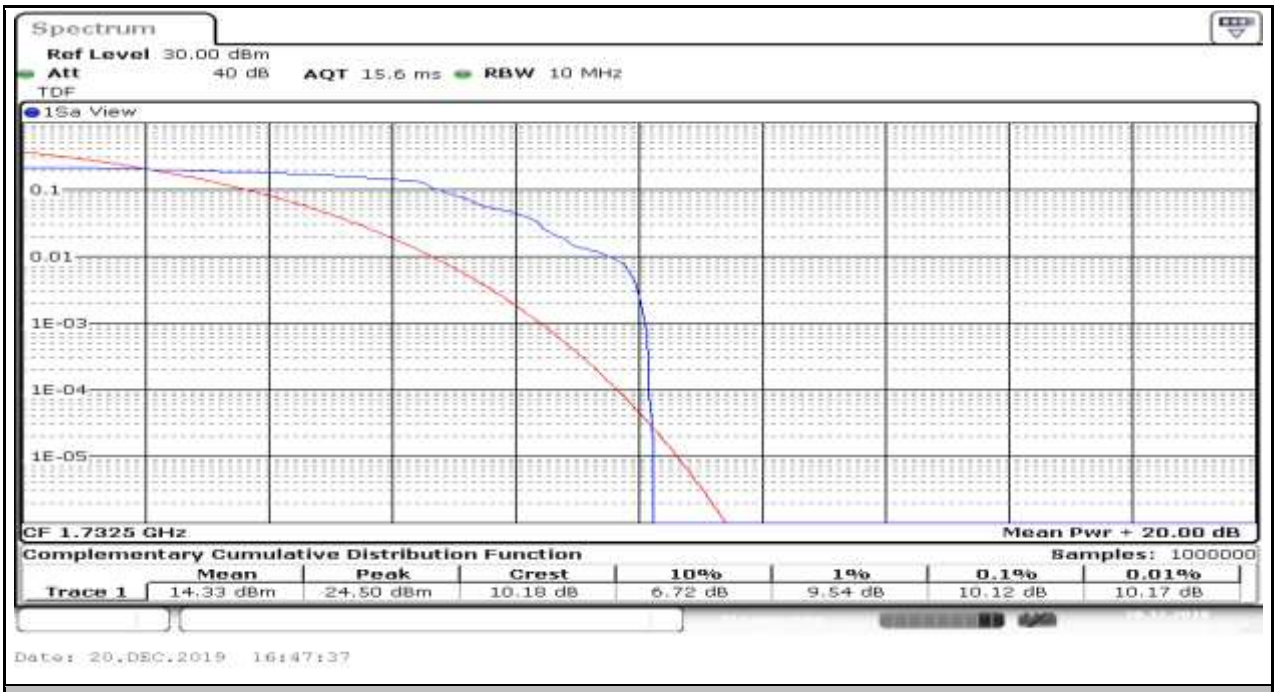
Band4_Stand-Alone_NaN_QPSK_20175_1@0_15kHz_6.14_<=13_PASS__



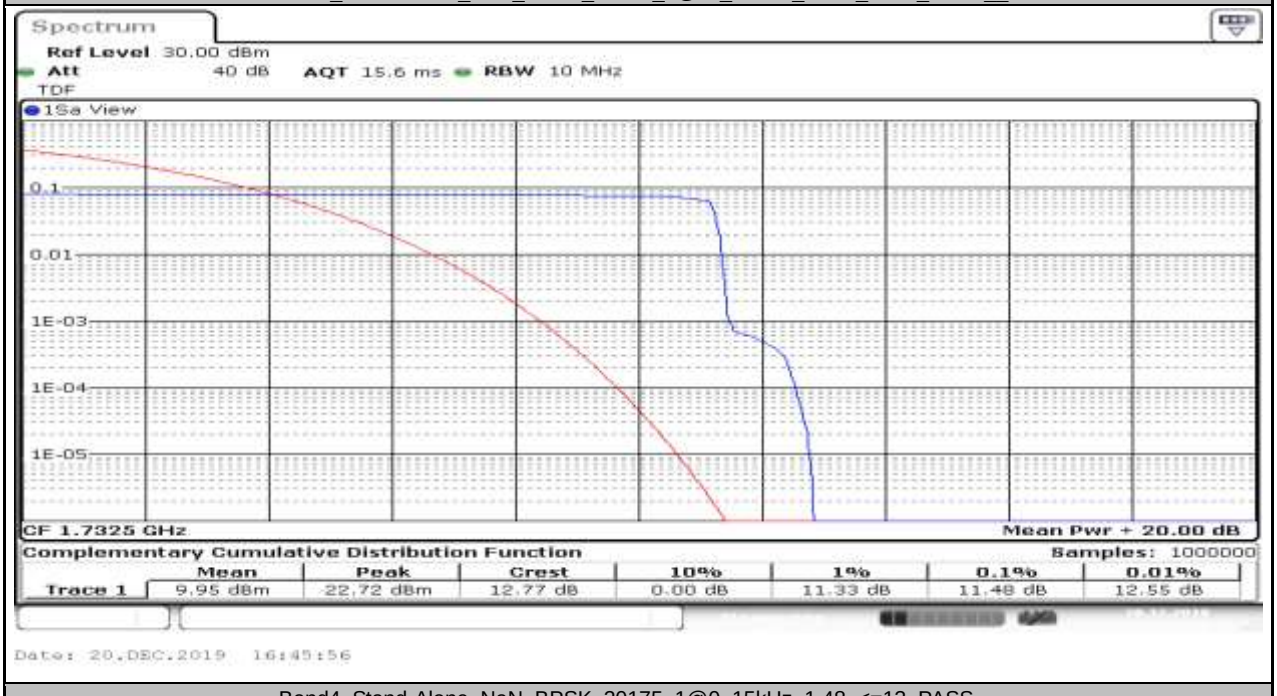
Band4_Stand-Alone_NaN_QPSK_20175_1@47_3.75kHz_1.74_<=13_PASS__

Band4_Stand-Alone_NaN_QPSK_20175_1@0_3.75kHz_1.65_<=13_PASS__

Band4_Stand-Alone_NaN_BPSK_20175_3@3_15kHz_10.12_<=13_PASS__

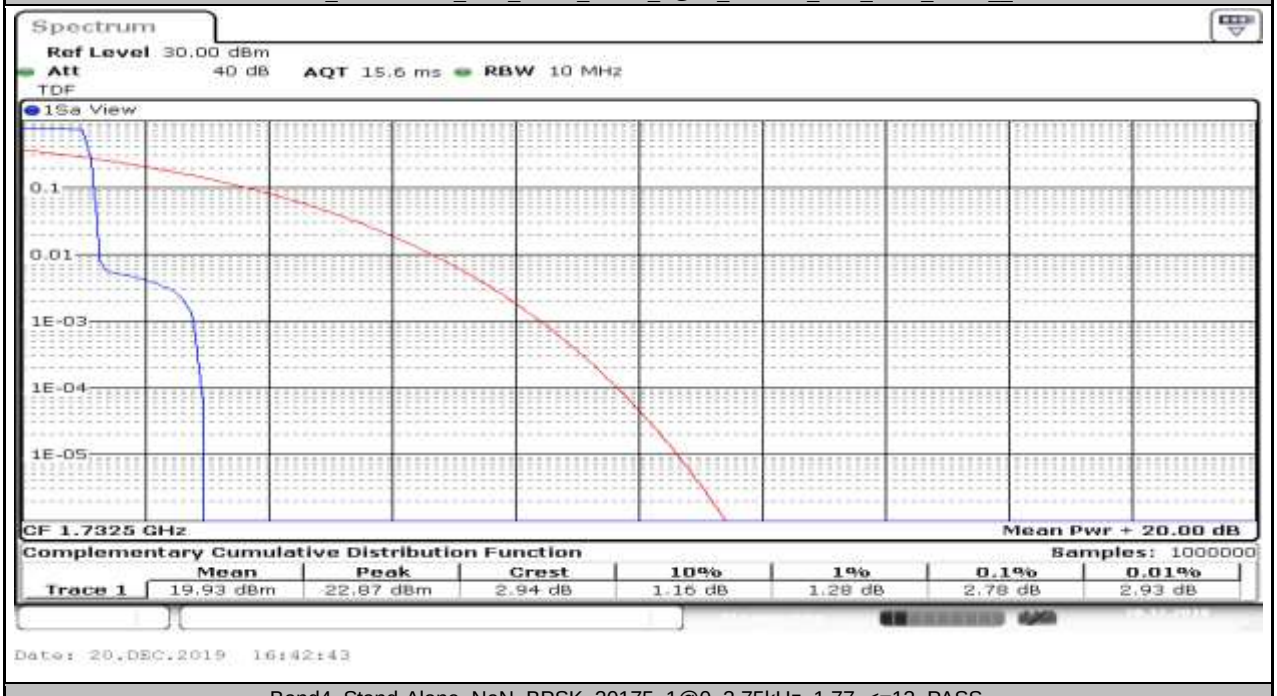


Band4_Stand-Alone_NaN_BPSK_20175_1@11_15kHz_11.48_<=13_PASS__

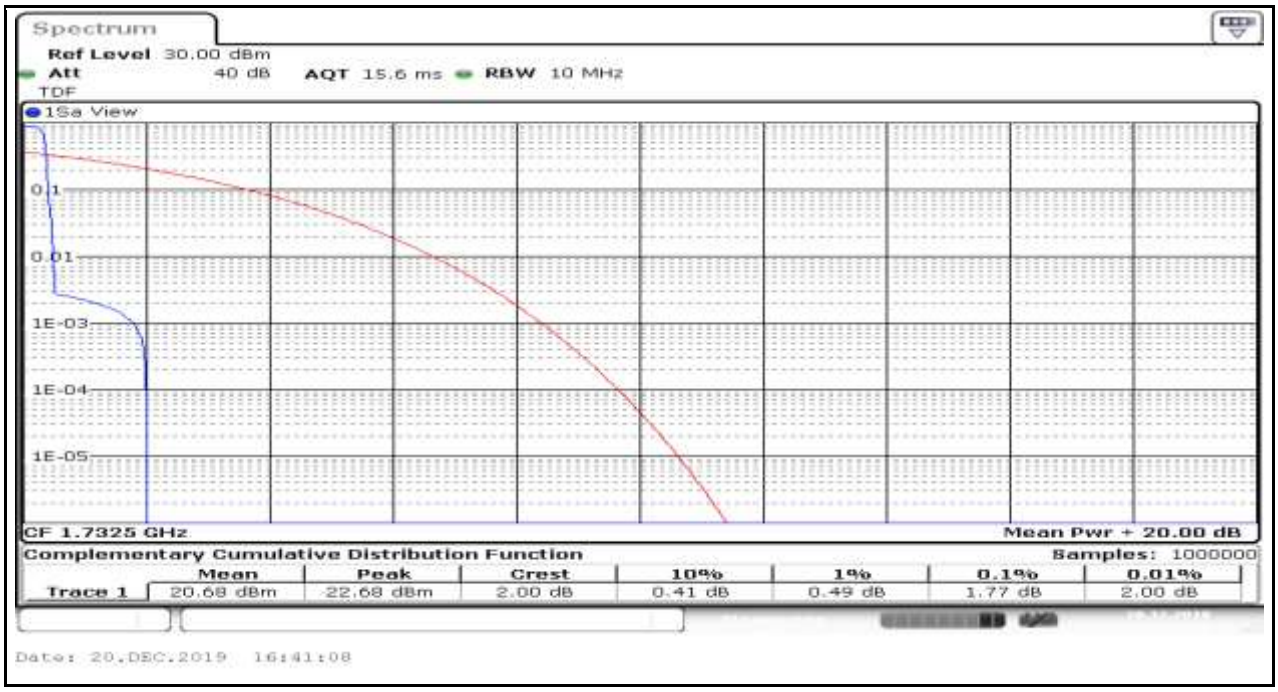


Band4_Stand-Alone_NaN_BPSK_20175_1@0_15kHz_1.48_<=13_PASS__

Band4_Stand-Alone_NaN_BPSK_20175_1@47_3.75kHz_2.78_<=13_PASS__



Band4_Stand-Alone_NaN_BPSK_20175_1@0_3.75kHz_1.77_<=13_PASS__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Att 40 dB
AQT 15.6 ms
RBW 10 MHz
TDF
1Sa View
0.1
0.01
1E-03
1E-04
1E-05
CF 1.7325 GHz
Mean Pwr + 20.00 dB
Complementary Cumulative Distribution Function
Samples: 1000000
Mean
Peak
Crest
10%
1%
0.1%
0.01%
Trace 1
20.68 dBm
22.68 dBm
2.00 dB
0.41 dB
0.49 dB
1.77 dB
2.00 dB
Date: 20.DEC.2019 16:41:08

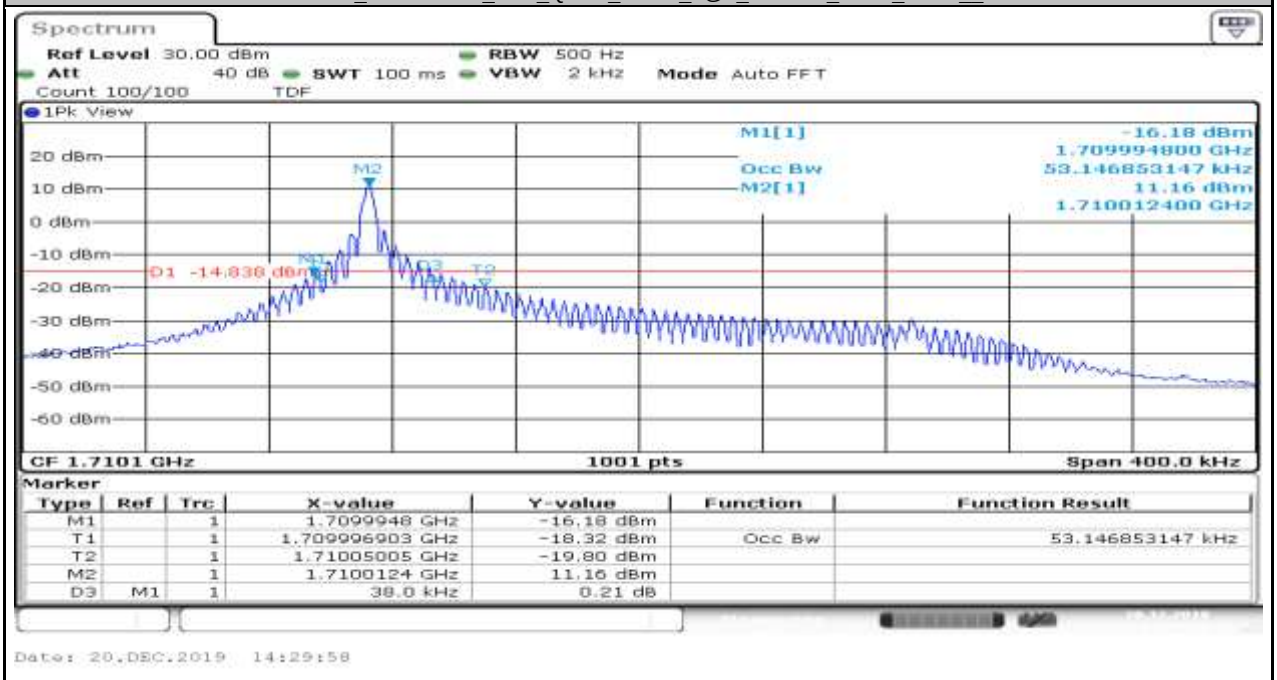
Appendix B.3: 26dB Emission Bandwidth and Occupied Bandwidth for NB

Test Result

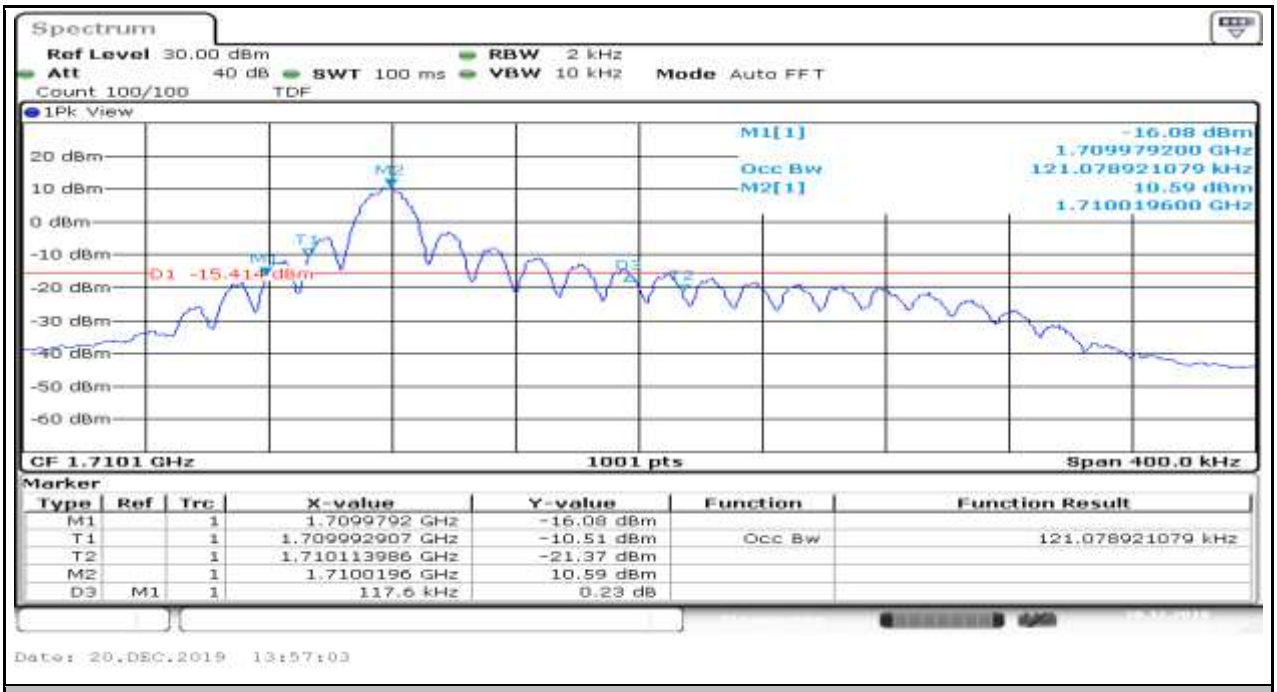
Band	OpMode	Bandwidth	Modulation	Channel	Tones	SCS	26dB Bandwidth (MHz)	Occupied Bandwidth (MHz)	Verdict
Band4	Stand-Alone	NaN	QPSK	19951	1@0	3.75kHz	0.038	0.053	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@0	15kHz	0.118	0.121	PASS
Band4	Stand-Alone	NaN	QPSK	19951	12@0	15kHz	0.251	0.185	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	0.038	0.053	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	0.117	0.120	PASS
Band4	Stand-Alone	NaN	QPSK	20175	12@0	15kHz	0.250	0.185	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@0	3.75kHz	0.038	0.053	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@0	15kHz	0.118	0.122	PASS
Band4	Stand-Alone	NaN	QPSK	20399	12@0	15kHz	0.251	0.185	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@0	3.75kHz	0.032	0.057	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@0	15kHz	0.105	0.129	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@0	3.75kHz	0.035	0.056	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@0	15kHz	0.106	0.129	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@0	3.75kHz	0.034	0.057	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@0	15kHz	0.106	0.130	PASS

Test Graphs

Band4_Stand-Alone_NaN_QPSK_19951_1@0_3.75kHz_0.038_PASS__

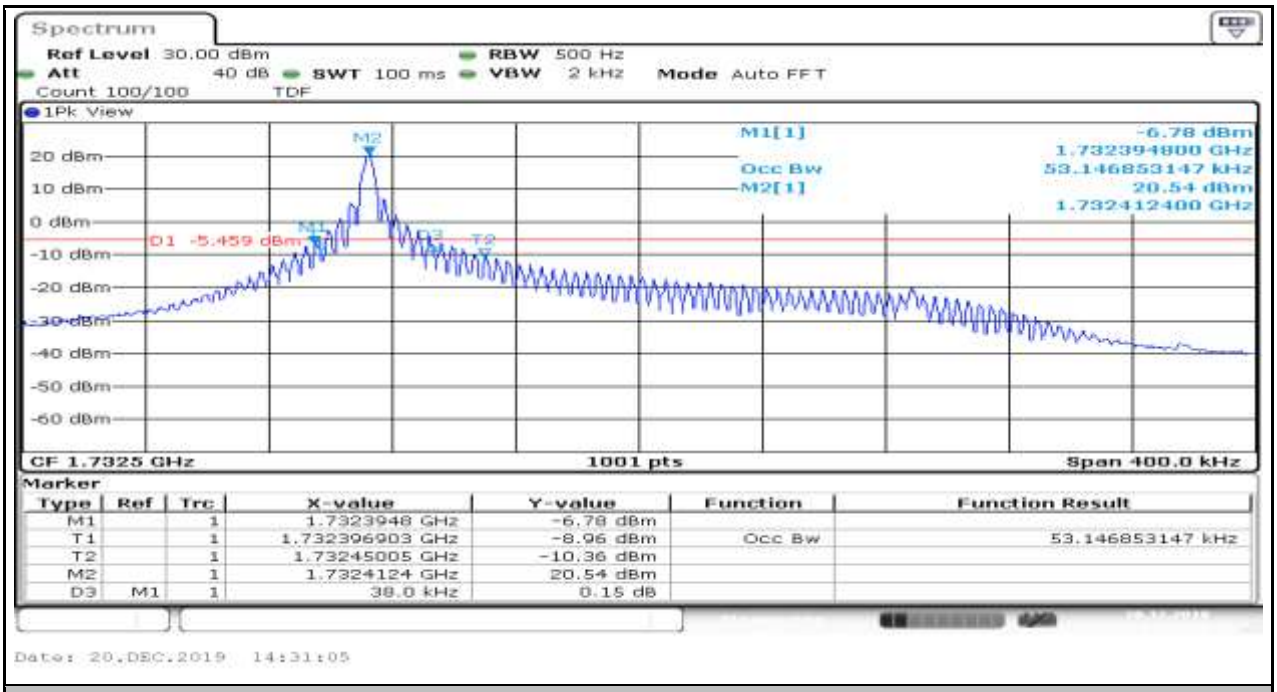


Band4_Stand-Alone_NaN_QPSK_19951_1@0_15kHz_0.118_PASS__

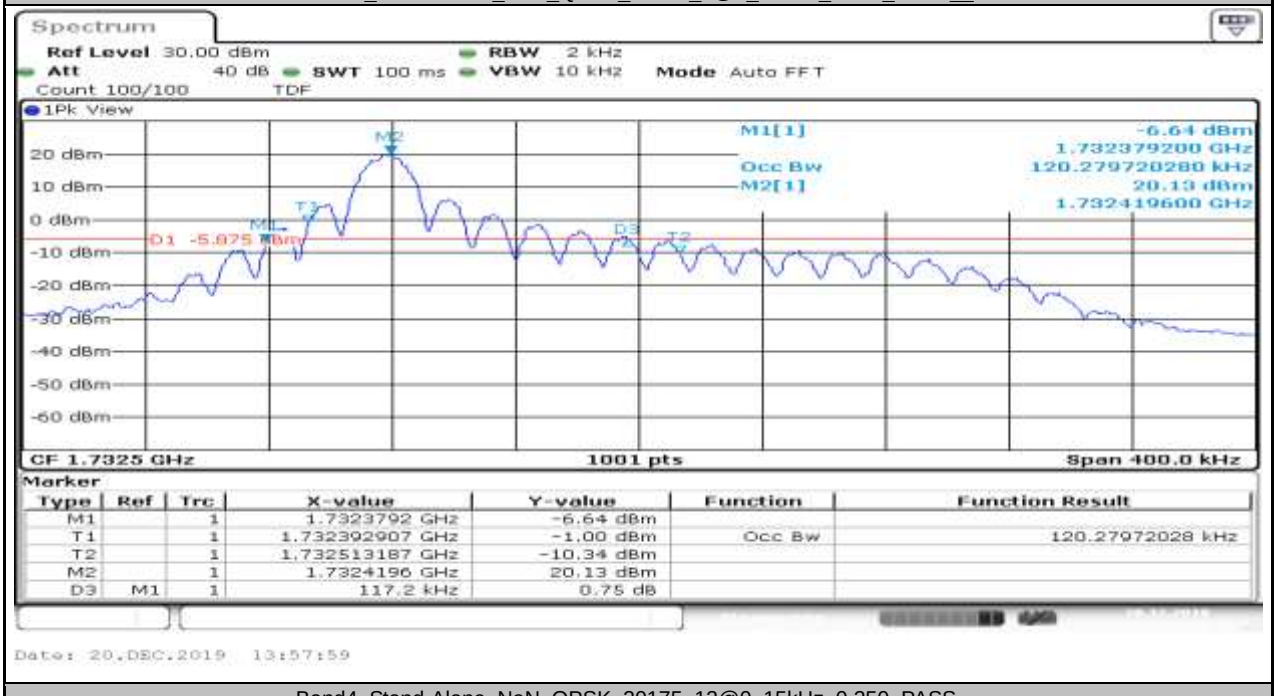


Band4_Stand-Alone_NaN_QPSK_19951_12@0_15kHz_0.251_PASS__

Band4_Stand-Alone_NaN_QPSK_20175_1@0_3.75kHz_0.038_PASS__

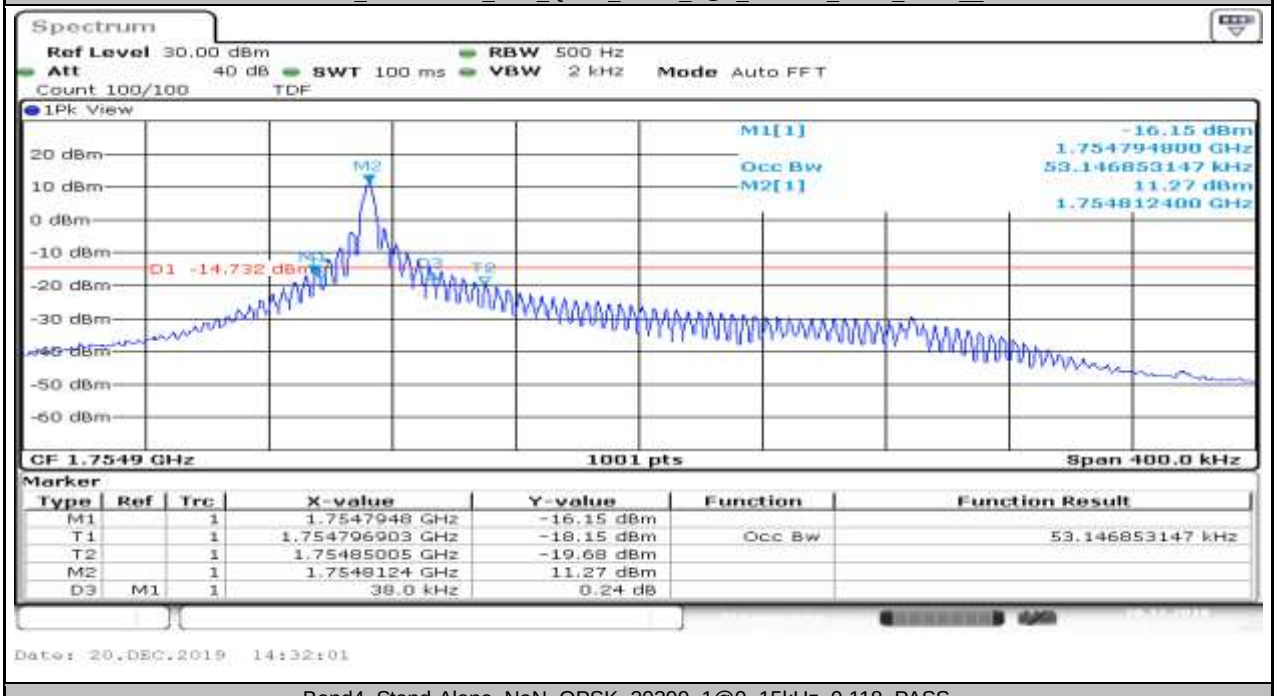


Band4_Stand-Alone_NaN_QPSK_20175_1@0_15kHz_0.117_PASS__

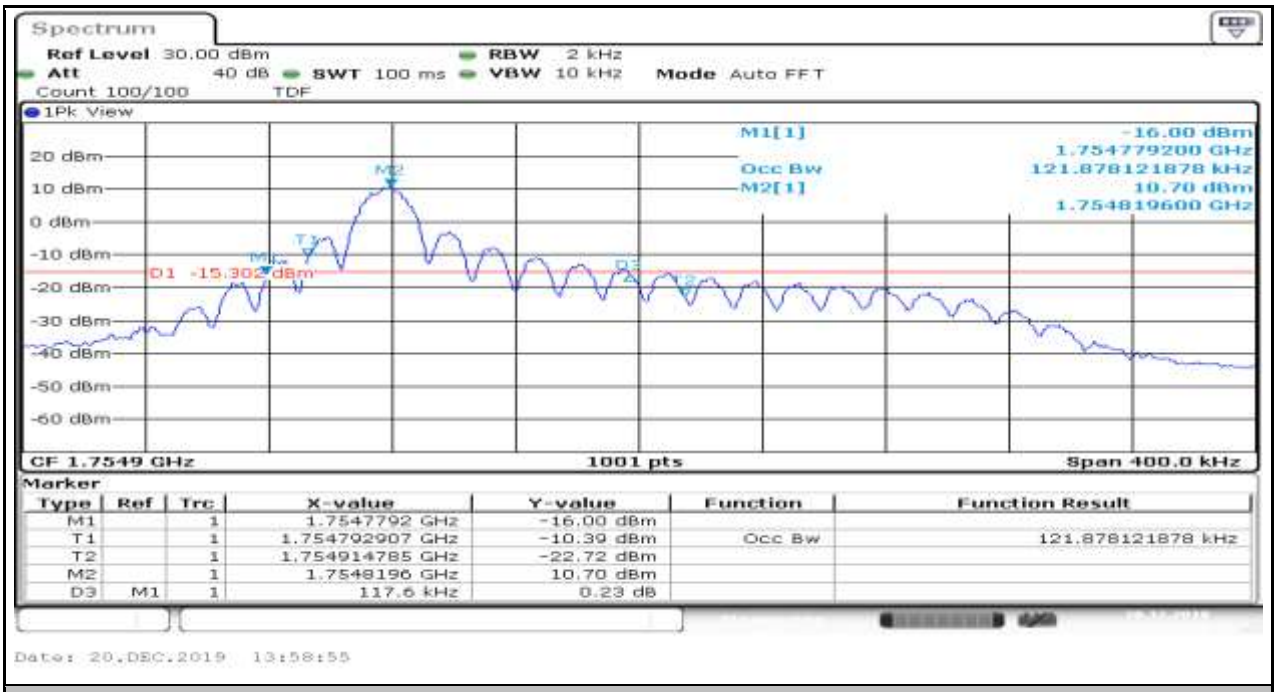


Band4_Stand-Alone_NaN_QPSK_20175_12@0_15kHz_0.250_PASS__

Band4_Stand-Alone_NaN_QPSK_20399_1@0_3.75kHz_0.038_PASS__

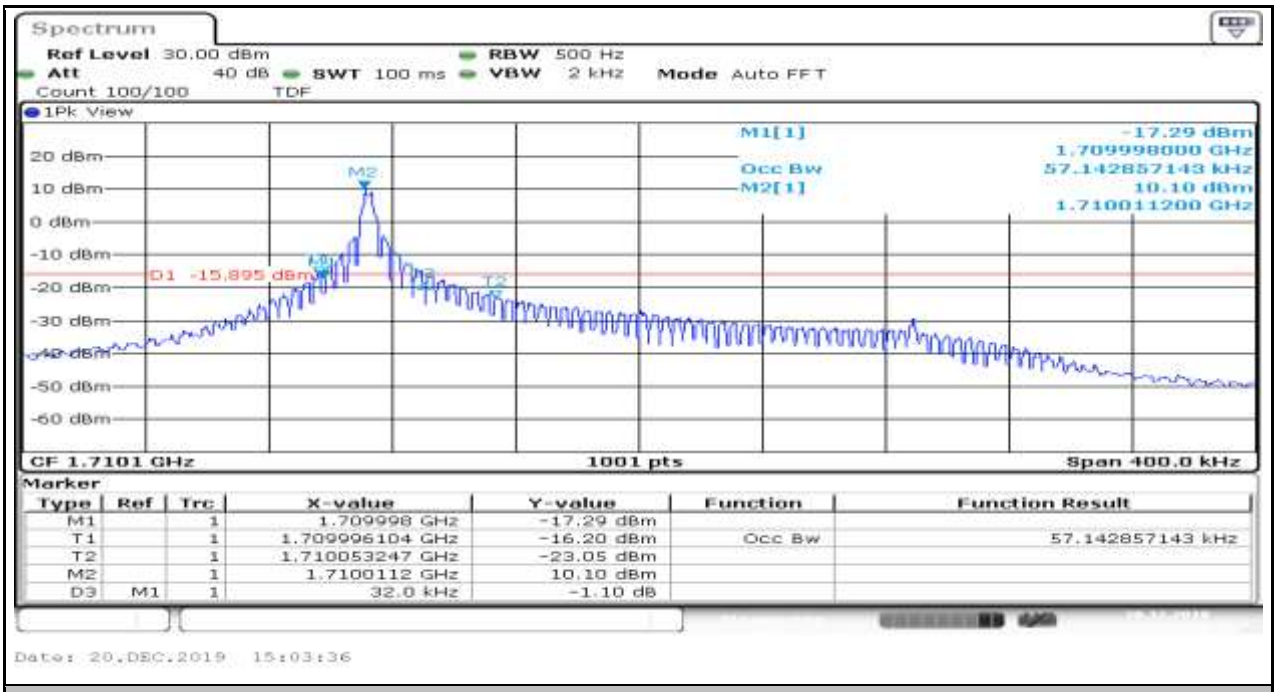


Band4_Stand-Alone_NaN_QPSK_20399_1@0_15kHz_0.118_PASS__

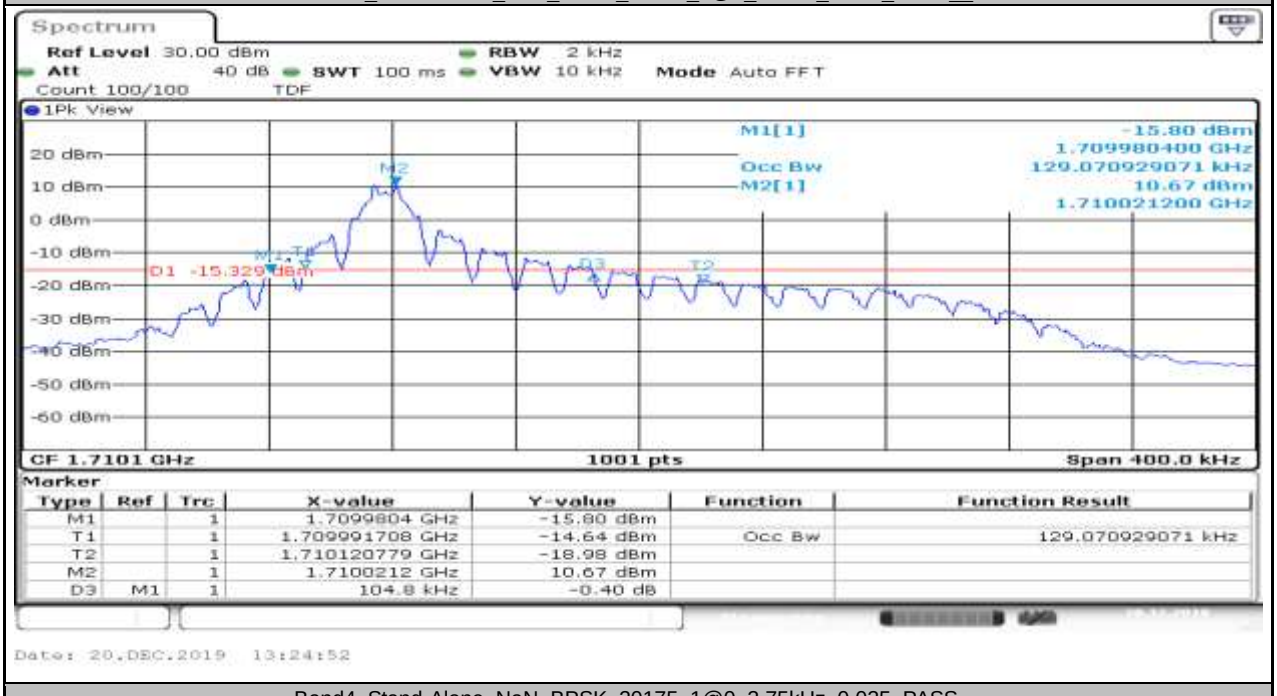


Band4_Stand-Alone_NaN_QPSK_20399_12@0_15kHz_0.251_PASS__

Band4_Stand-Alone_NaN_BPSK_19951_1@0_3.75kHz_0.032_PASS__

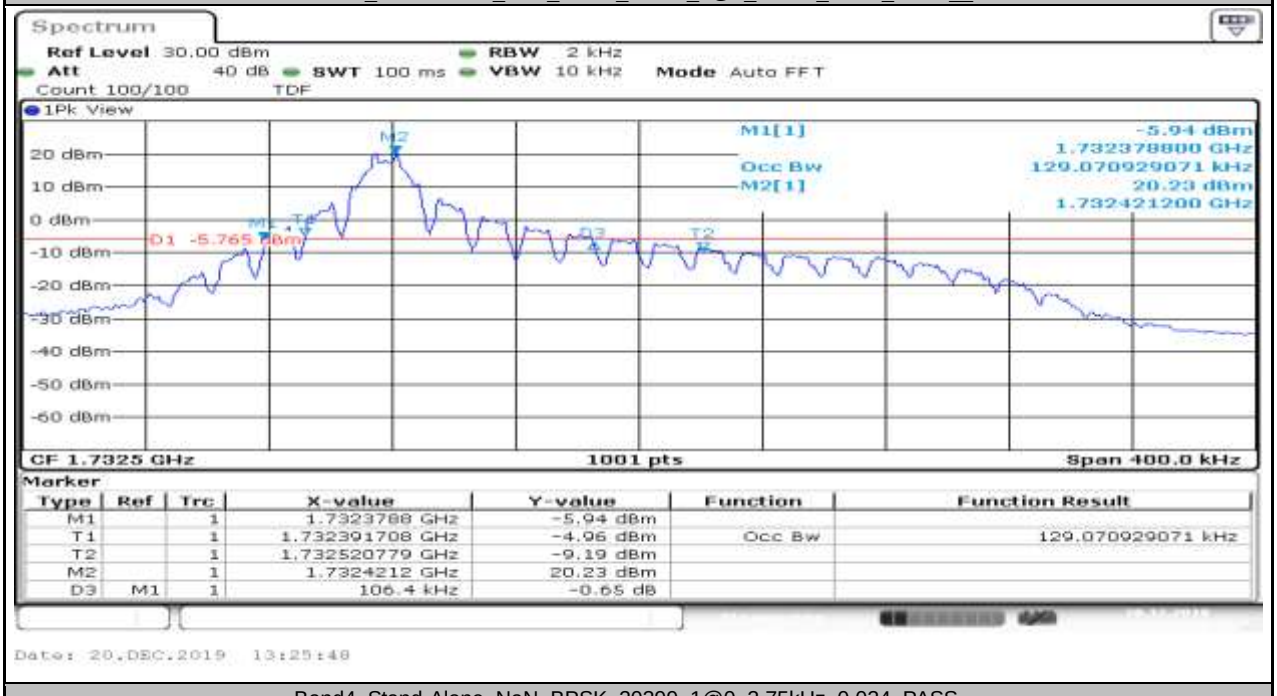


Band4_Stand-Alone_NaN_BPSK_19951_1@0_15kHz_0.105_PASS__

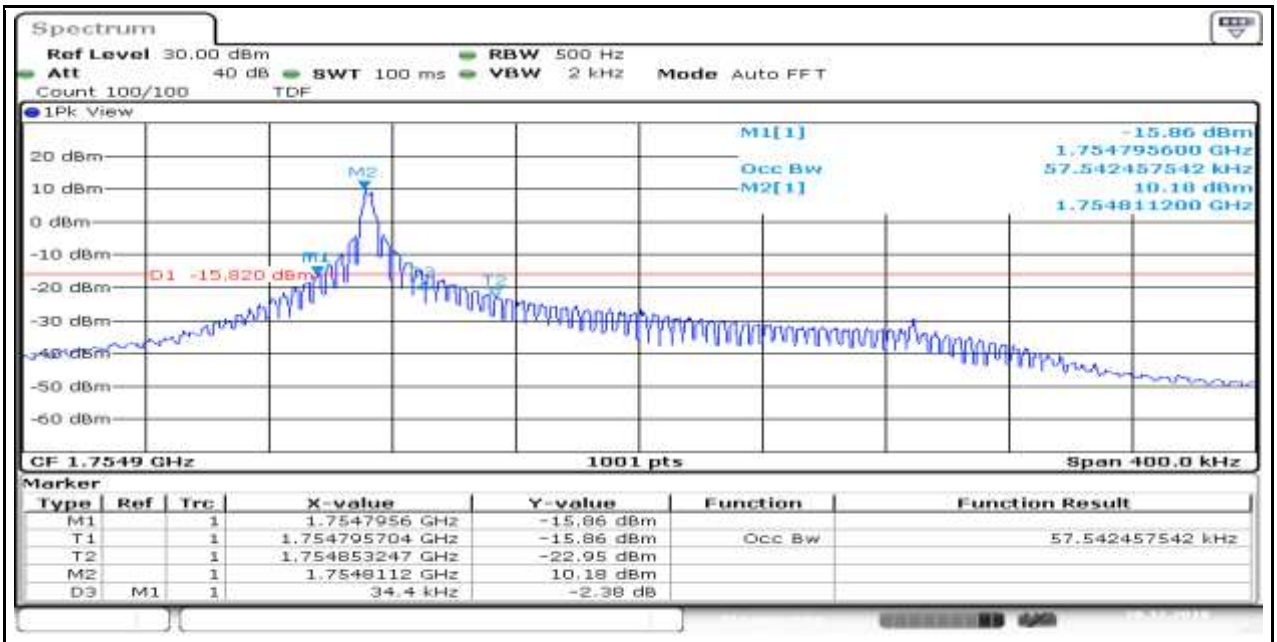


Band4_Stand-Alone_NaN_BPSK_20175_1@0_3.75kHz_0.035_PASS__

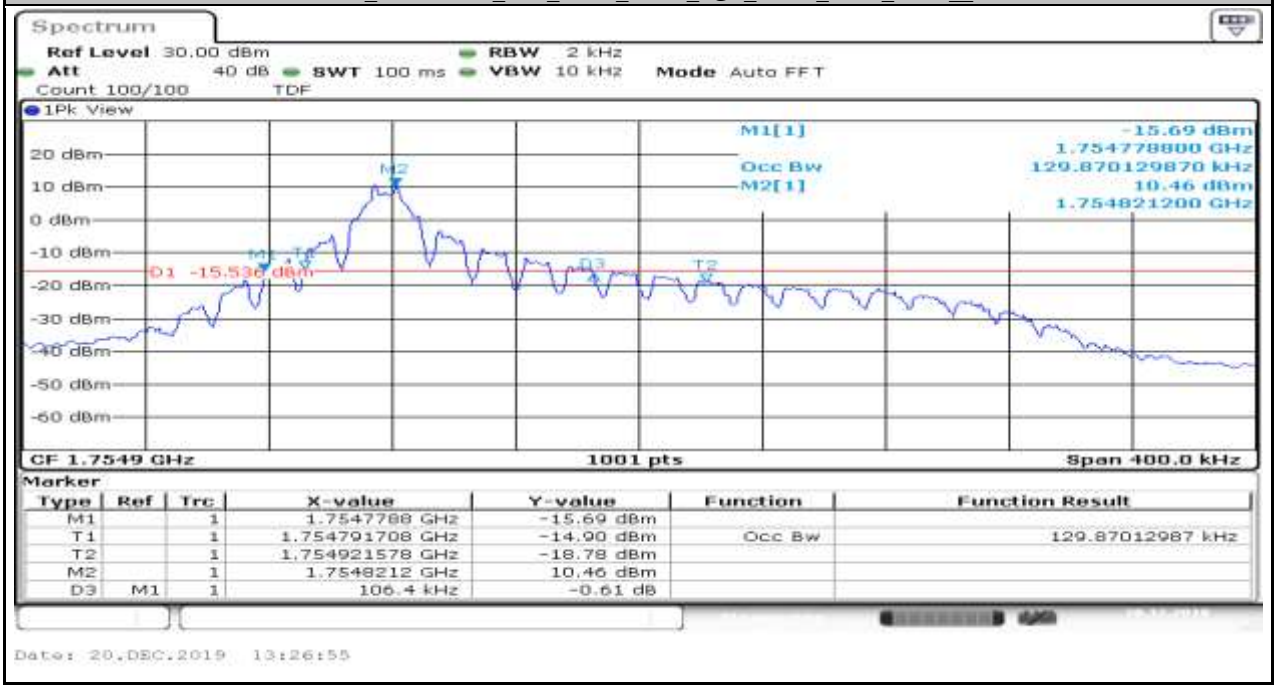
Band4_Stand-Alone_NaN_BPSK_20175_1@0_15kHz_0.106_PASS__



Band4_Stand-Alone_NaN_BPSK_20399_1@0_3.75kHz_0.034_PASS__



Band4_Stand-Alone_NaN_BPSK_20399_1@0_15kHz_0.106_PASS__



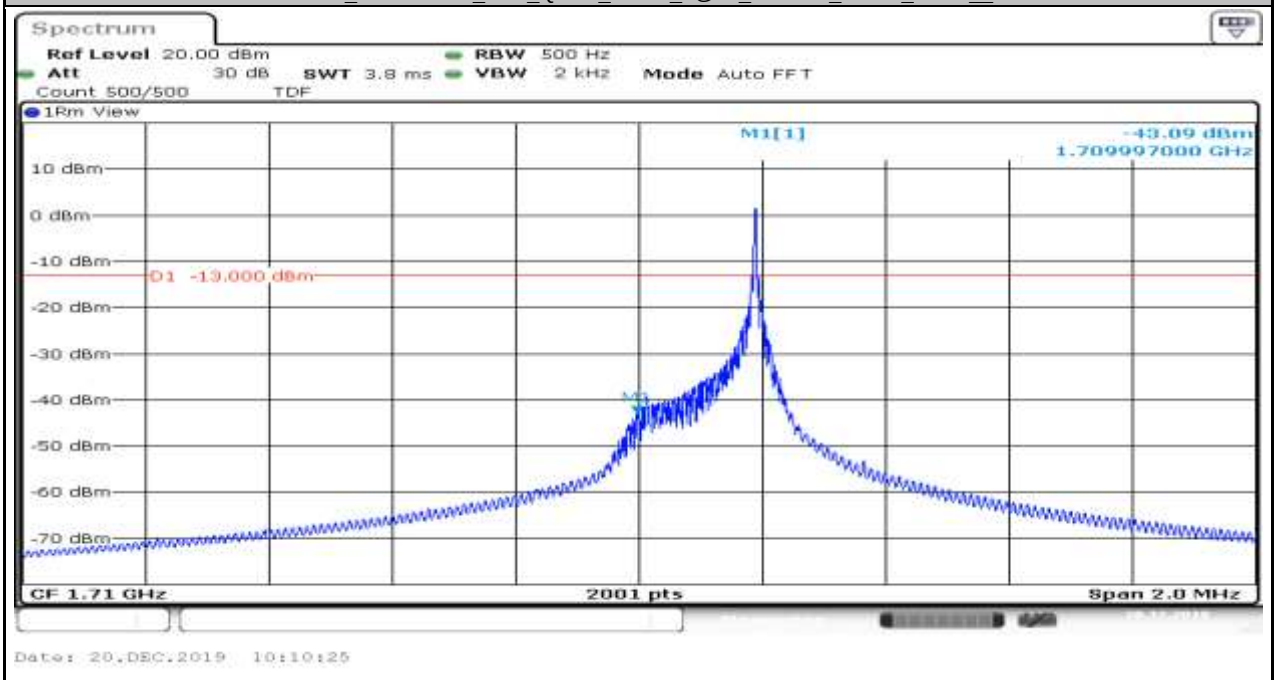
Appendix B.4: Band Edge for NB

Test Result

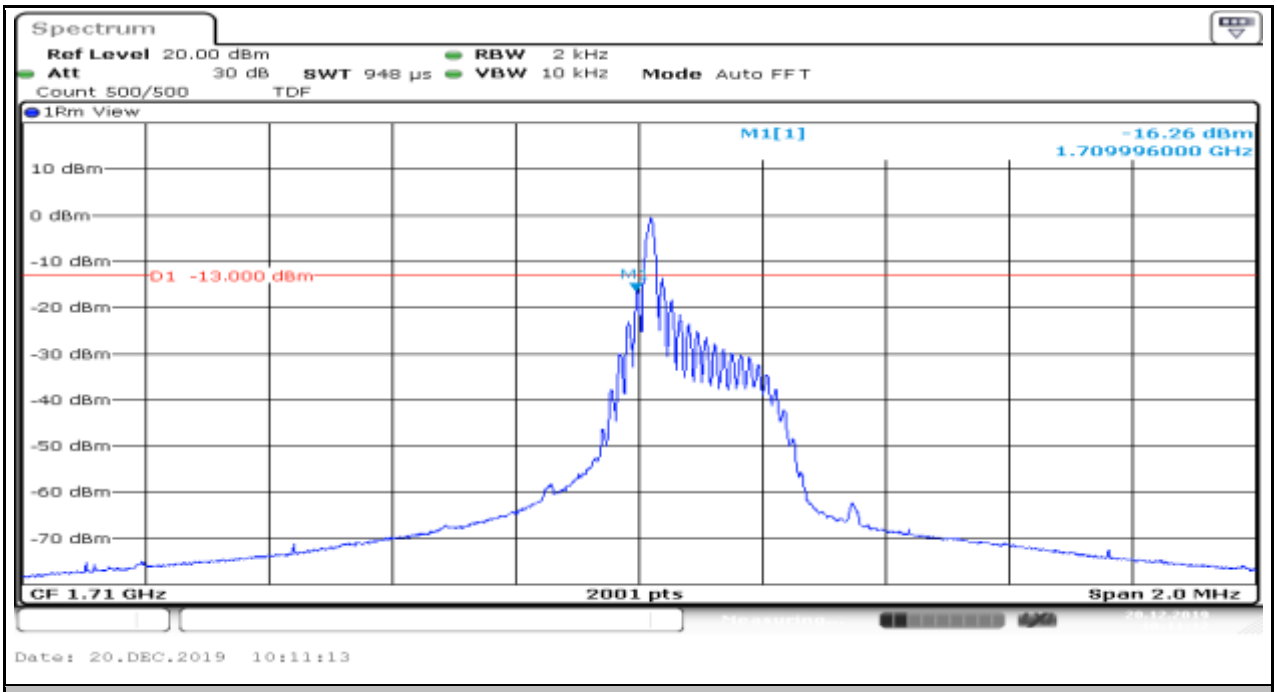
Band	OpMode	Bandwidth	Modulation	Channel	Tones	SCS	Result (dBm)	Verdict
Band4	Stand-Alone	NaN	QPSK	19951	1@47	3.75kHz	-43.09	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@0	15kHz	-16.26	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@11	15kHz	-34.48	PASS
Band4	Stand-Alone	NaN	QPSK	19951	12@0	15kHz	-32.37	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@0	3.75kHz	-22.32	PASS
Band4	Stand-Alone	NaN	QPSK	20399	12@0	15kHz	-29.76	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@0	3.75kHz	-43.17	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@47	3.75kHz	-21.42	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@11	15kHz	-16.06	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@0	15kHz	-35.01	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@0	3.75kHz	-20.43	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@47	3.75kHz	-42.23	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@0	15kHz	-14.29	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@11	15kHz	-33.07	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@11	15kHz	-14.74	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@0	3.75kHz	-42.10	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@47	3.75kHz	-20.71	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@0	15kHz	-33.76	PASS

Test Graphs

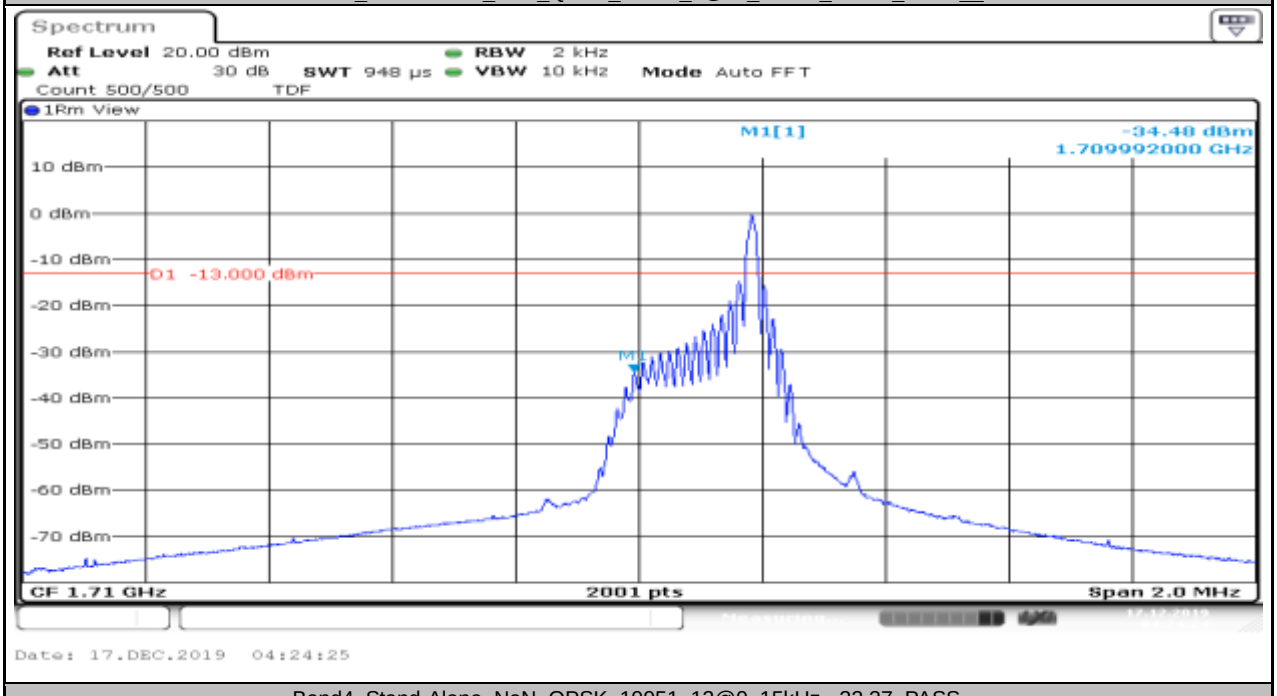
Band4_Stand-Alone_NaN_QPSK_19951_1@47_3.75kHz_-43.09_PASS__



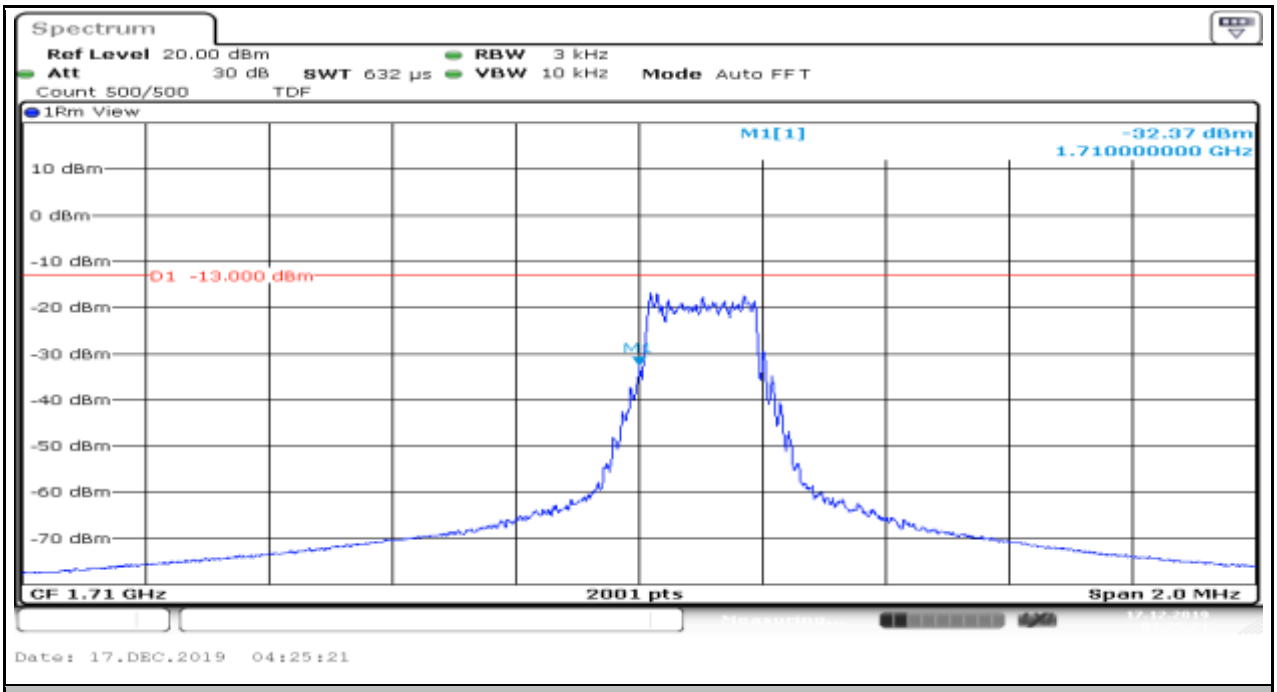
Band4_Stand-Alone_NaN_QPSK_19951_1@0_15kHz_-16.26_PASS__



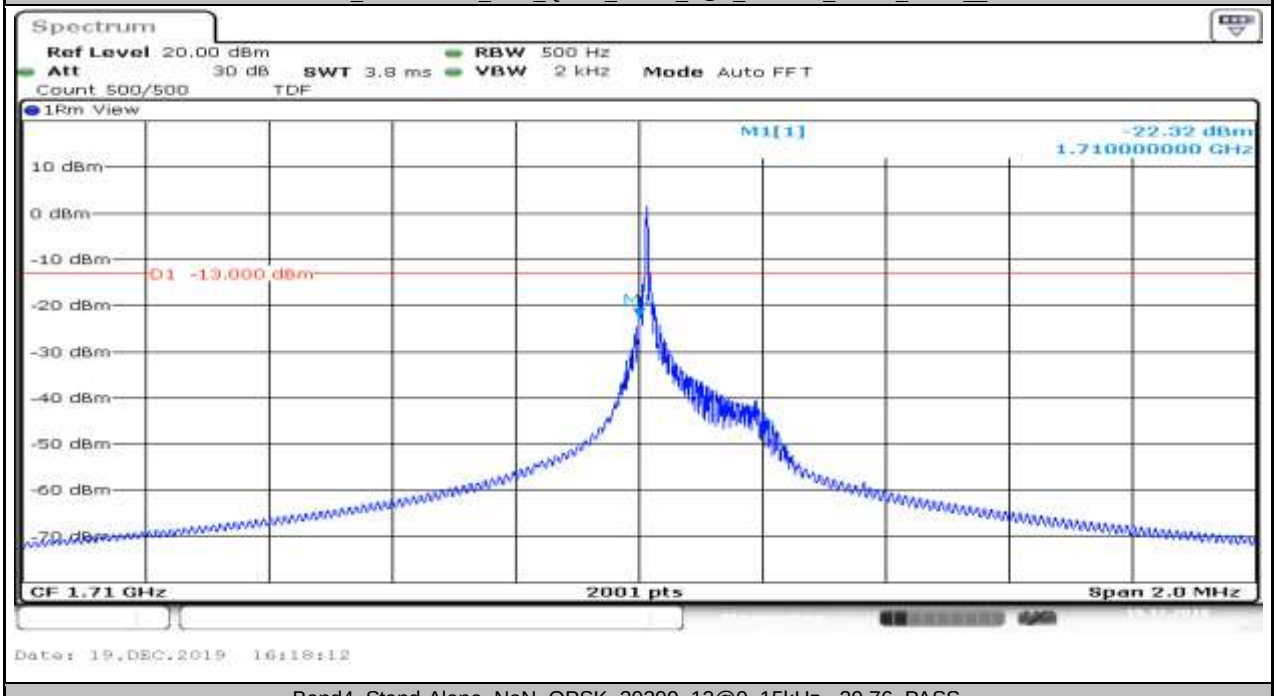
Band4_Stand-Alone_NaN_QPSK_19951_1@11_15kHz_-34.48_PASS__



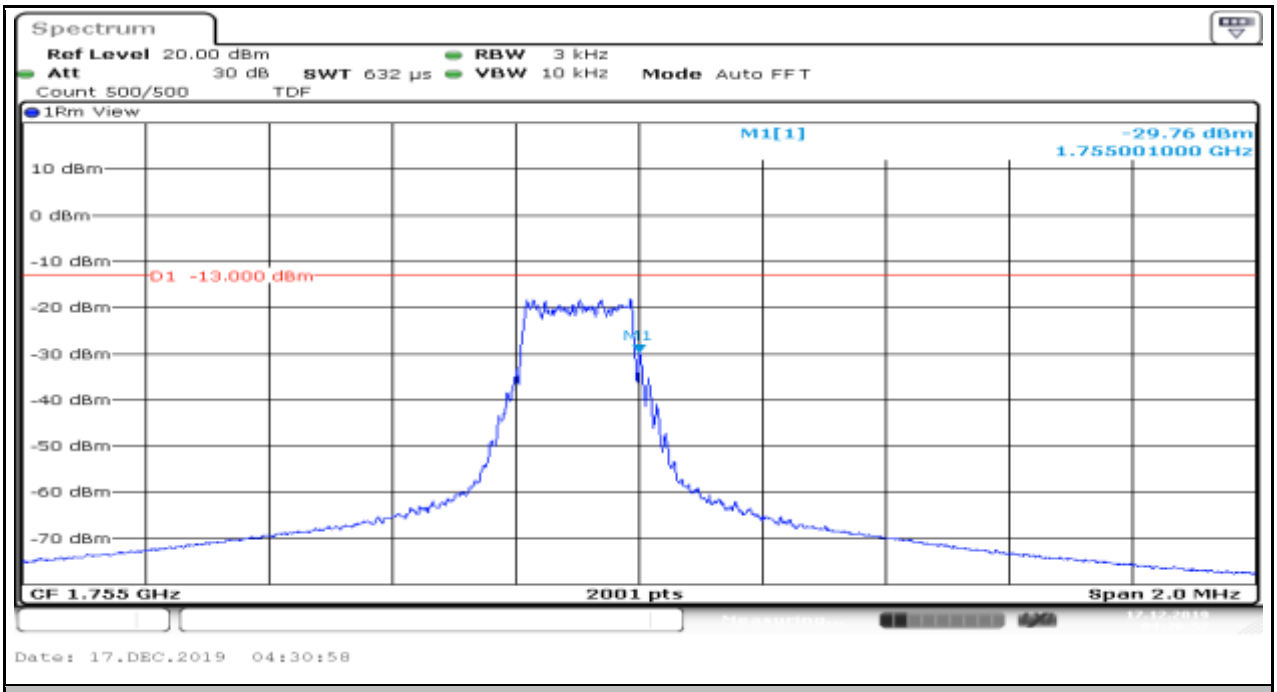
Band4_Stand-Alone_NaN_QPSK_19951_12@0_15kHz_-32.37_PASS__



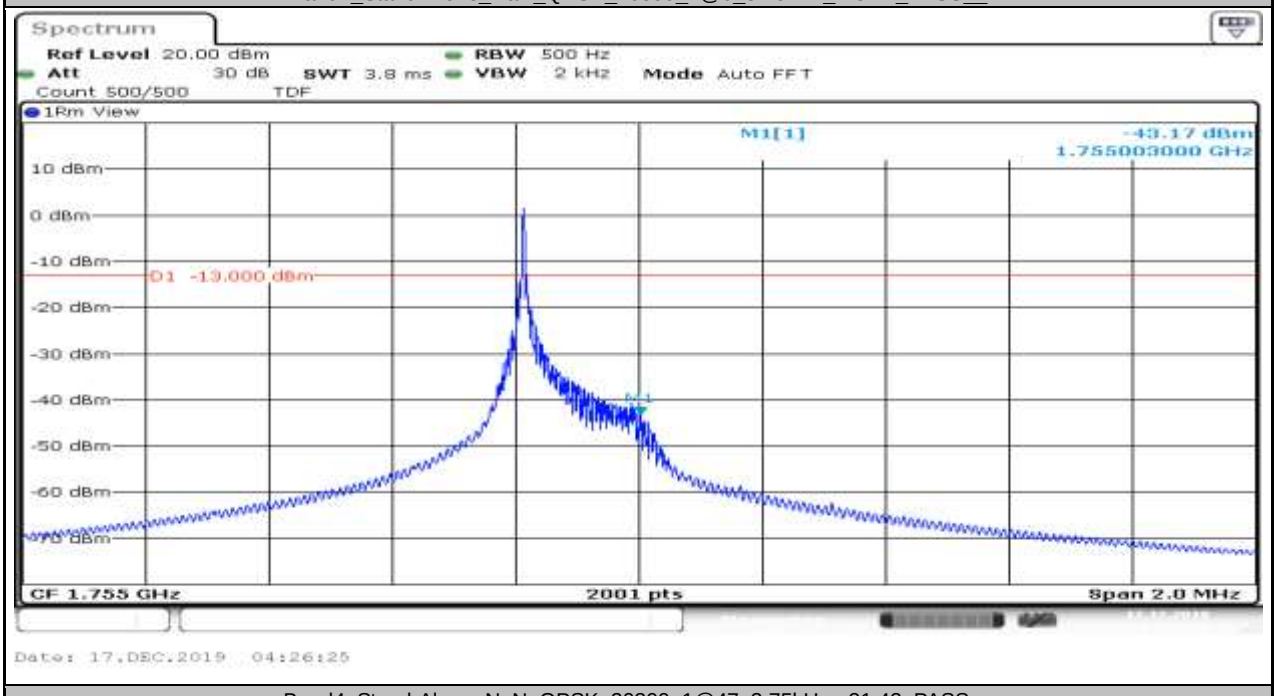
Band4_Stand-Alone_NaN_QPSK_19951_1@0_3.75kHz_-22.32_PASS__



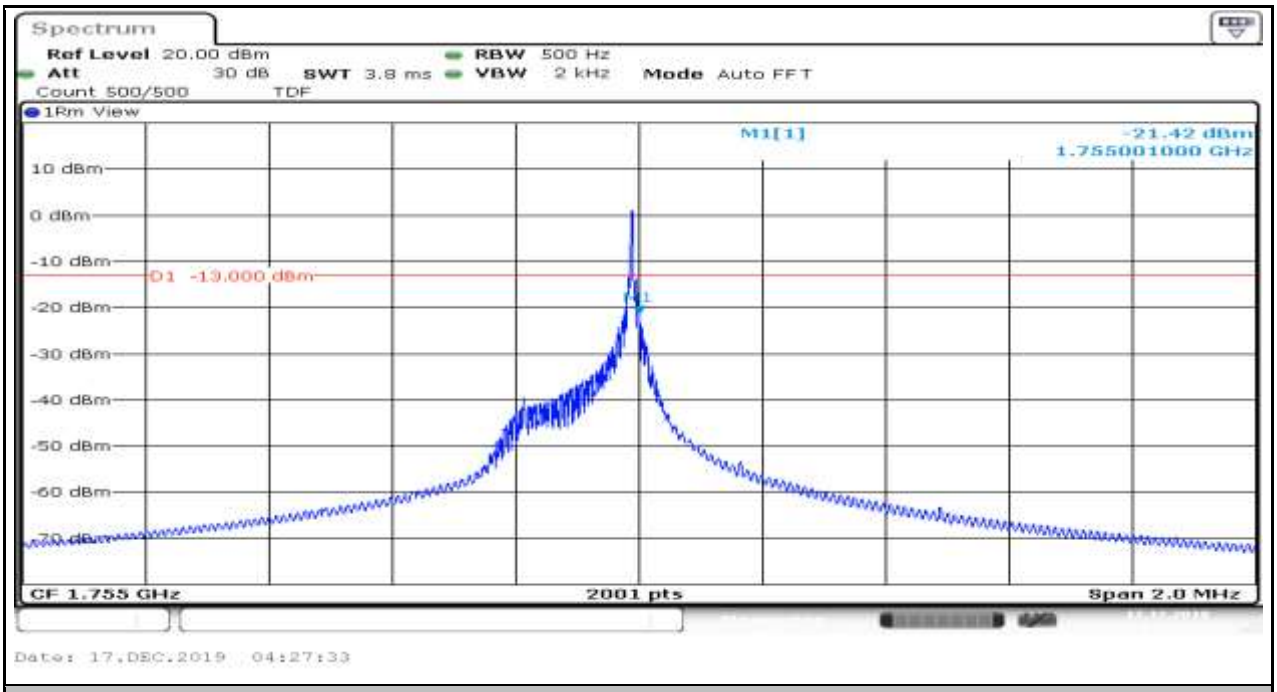
Band4_Stand-Alone_NaN_QPSK_20399_12@0_15kHz_-29.76_PASS__



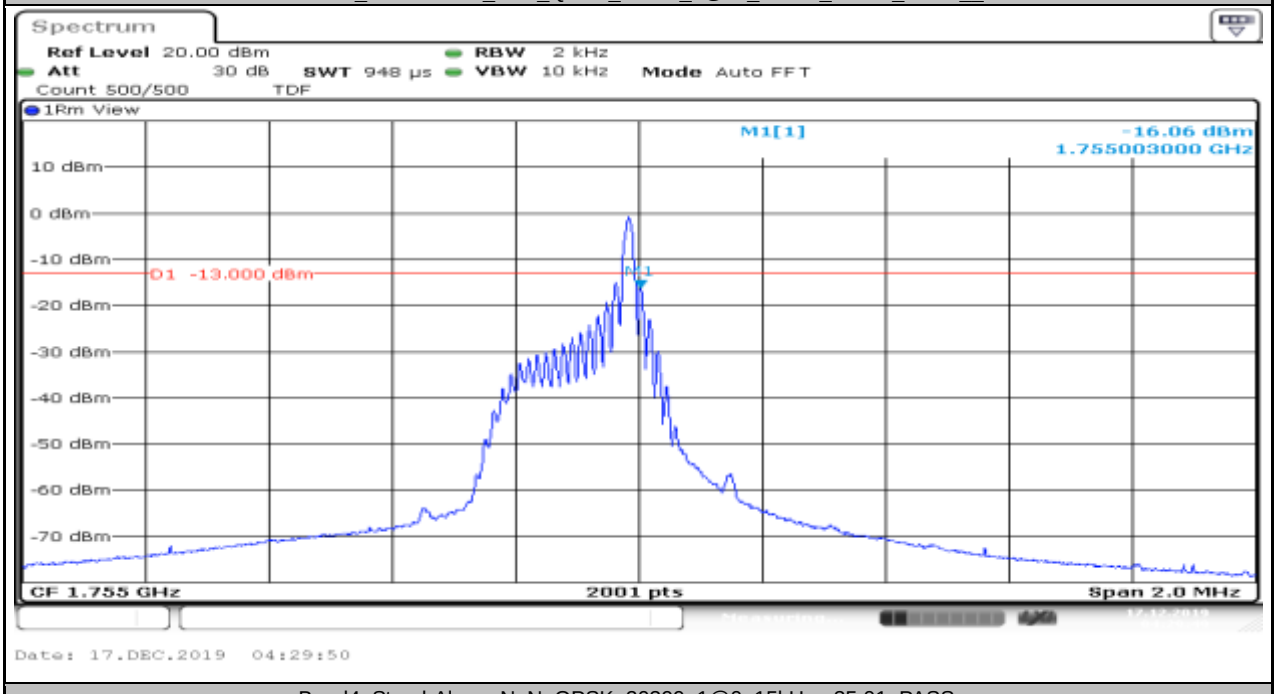
Band4_Stand-Alone_NaN_QPSK_20399_1@0_3.75kHz_-43.17_PASS__



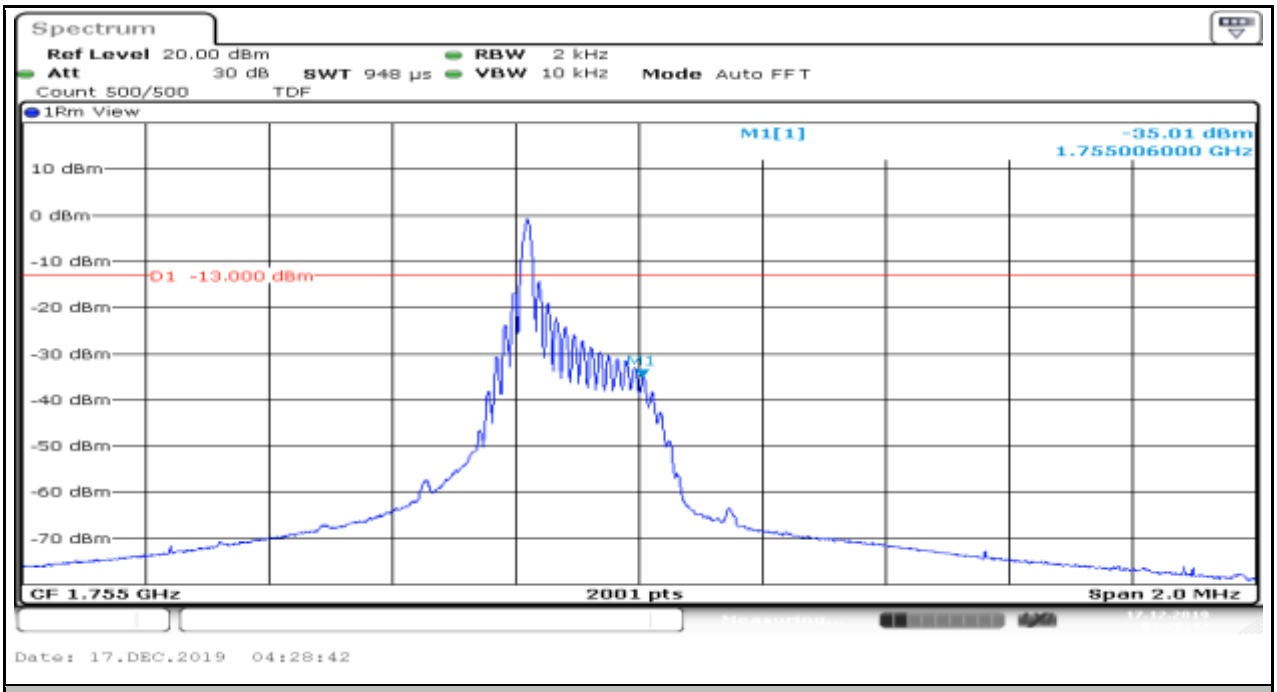
Band4_Stand-Alone_NaN_QPSK_20399_1@47_3.75kHz_-21.42_PASS__



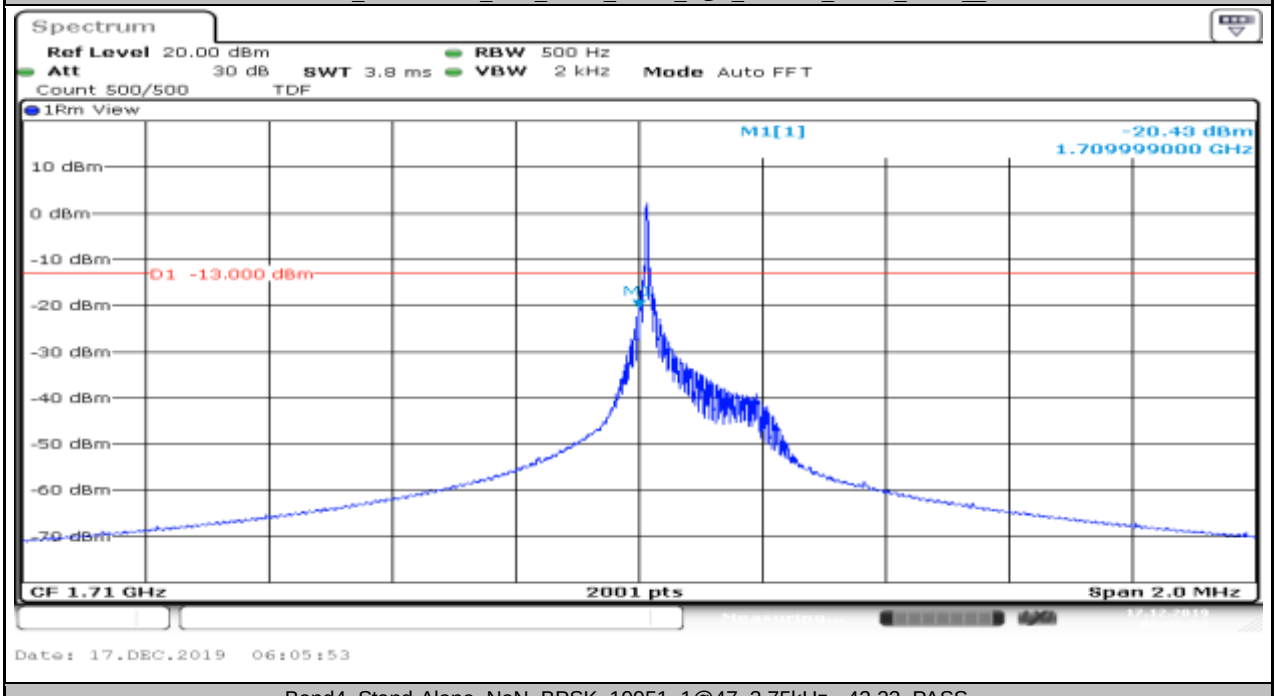
Band4_Stand-Alone_NaN_QPSK_20399_1@11_15kHz_-16.06_PASS__



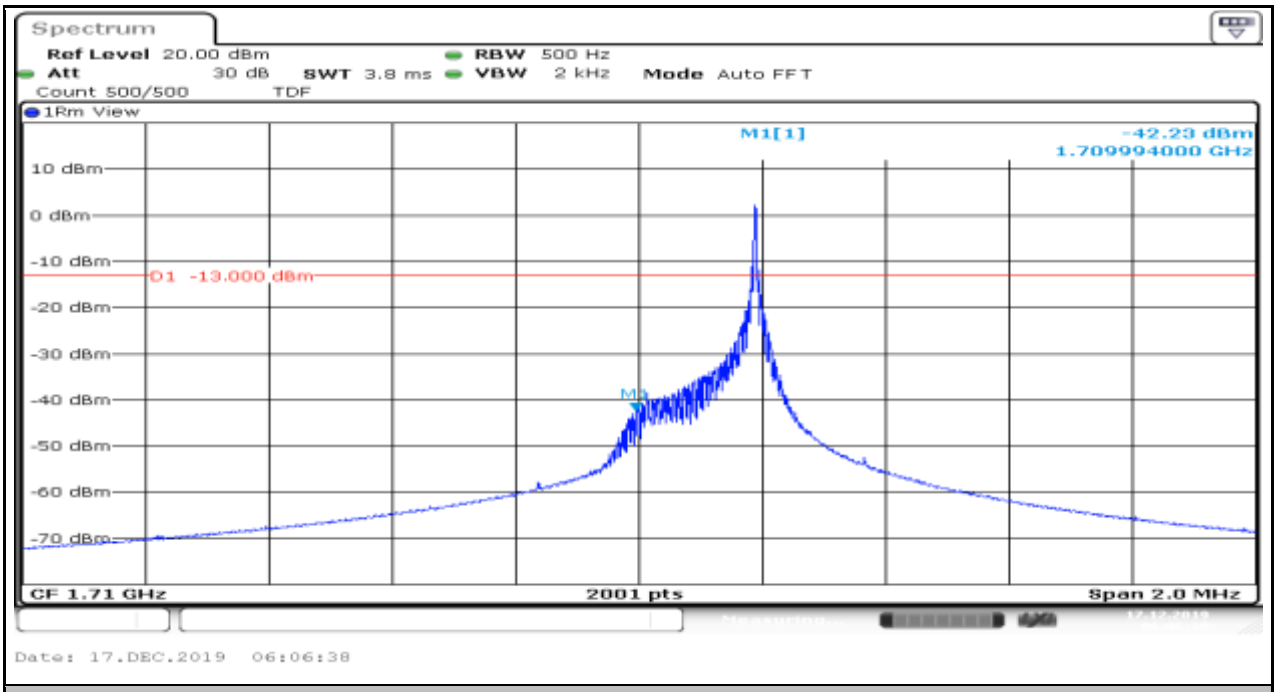
Band4_Stand-Alone_NaN_QPSK_20399_1@0_15kHz_-35.01_PASS__



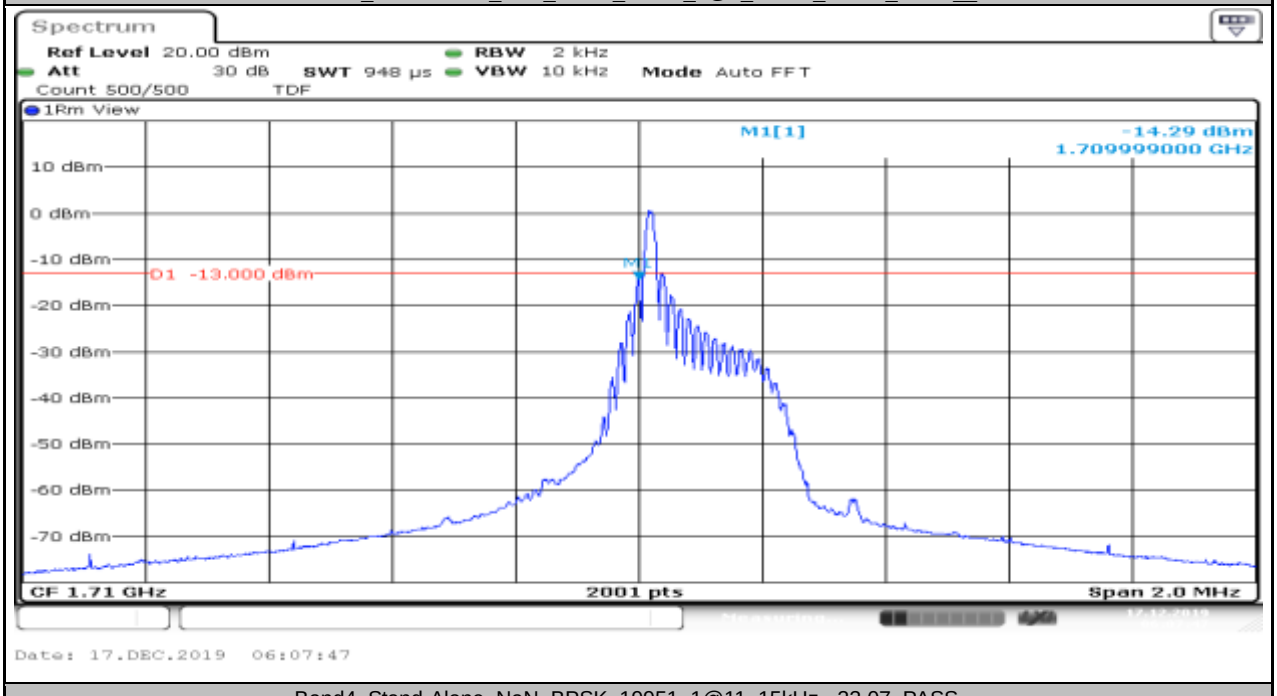
Band4_Stand-Alone_NaN_BPSK_19951_1@0_3.75kHz_-20.43_PASS__



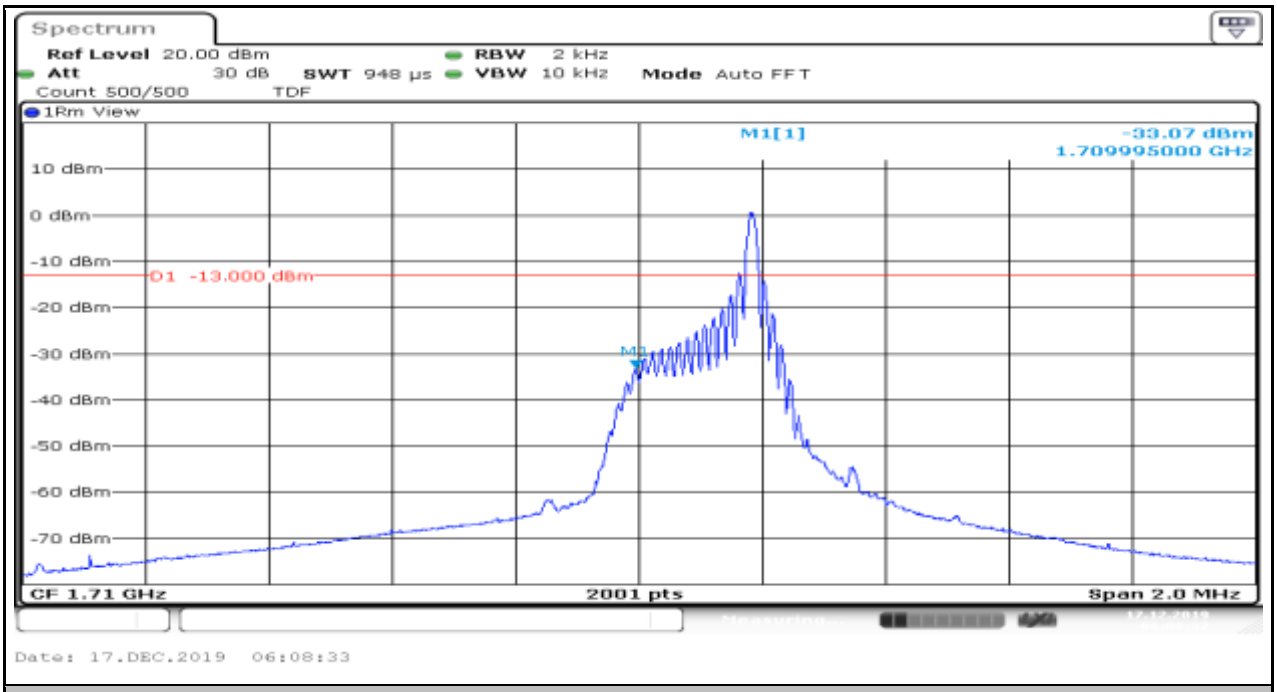
Band4_Stand-Alone_NaN_BPSK_19951_1@47_3.75kHz_-42.23_PASS__



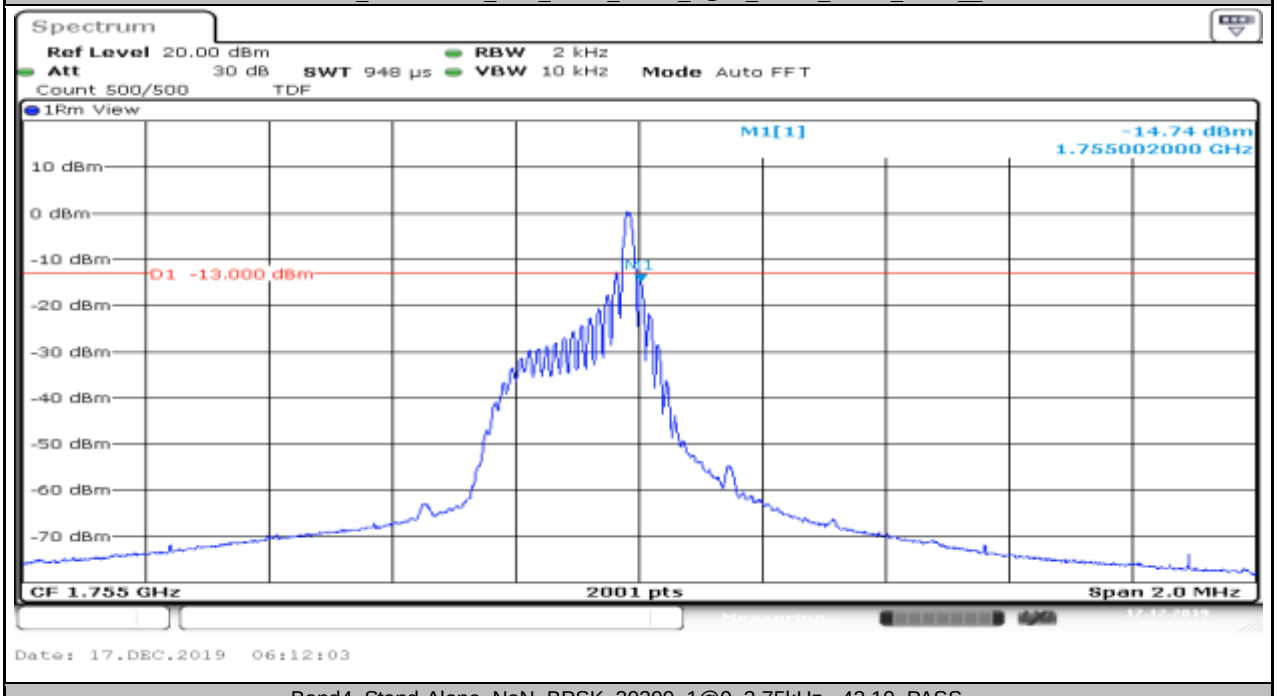
Band4_Stand-Alone_NaN_BPSK_19951_1@0_15kHz_-14.29_PASS__



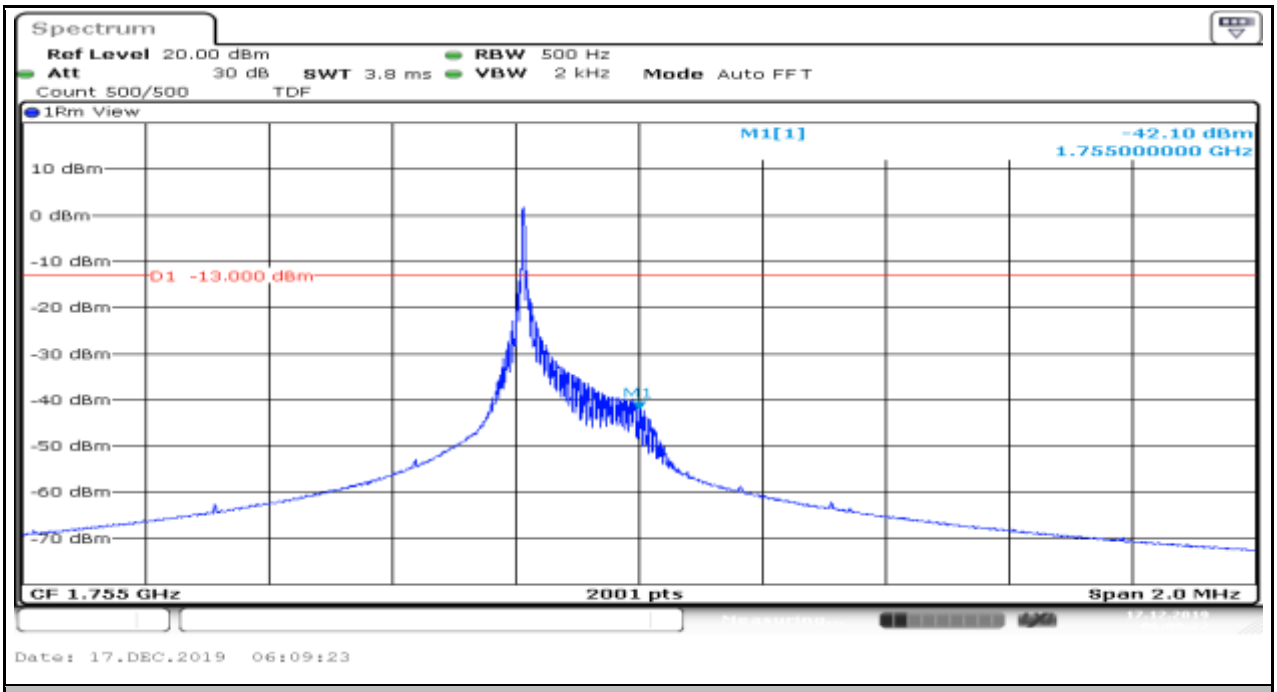
Band4_Stand-Alone_NaN_BPSK_19951_1@11_15kHz_-33.07_PASS__



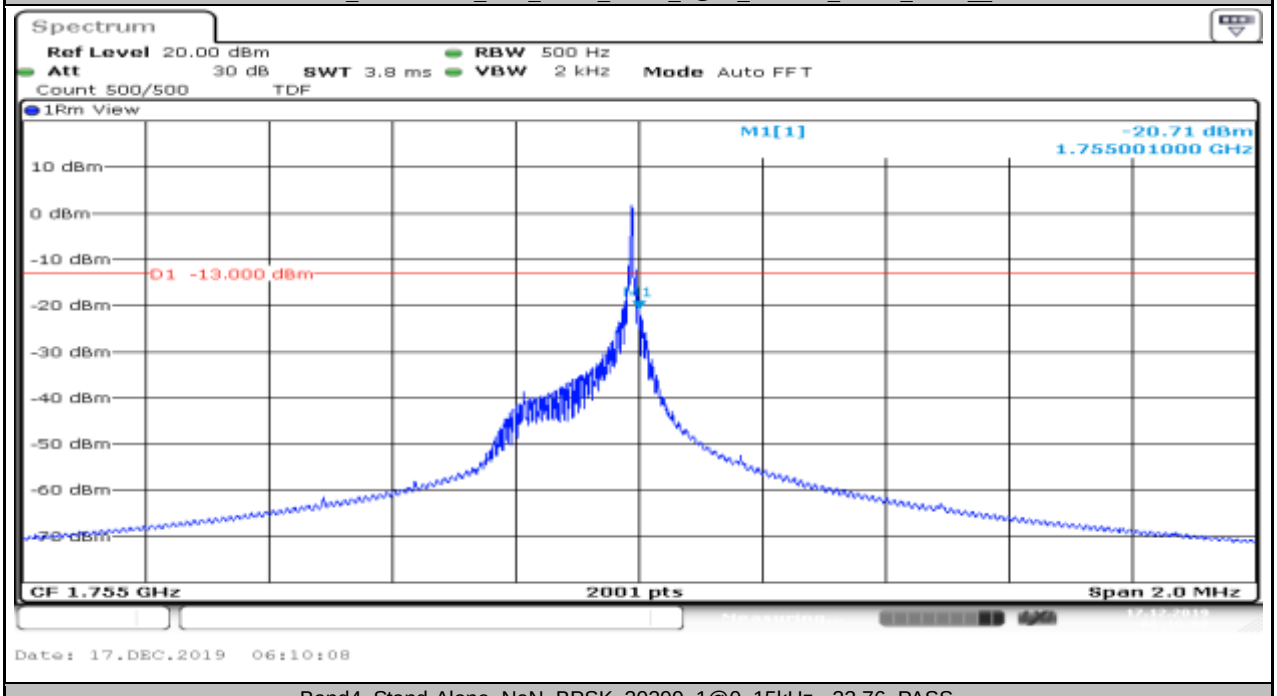
Band4_Stand-Alone_NaN_BPSK_20399_1@11_15kHz_-14.74_PASS__



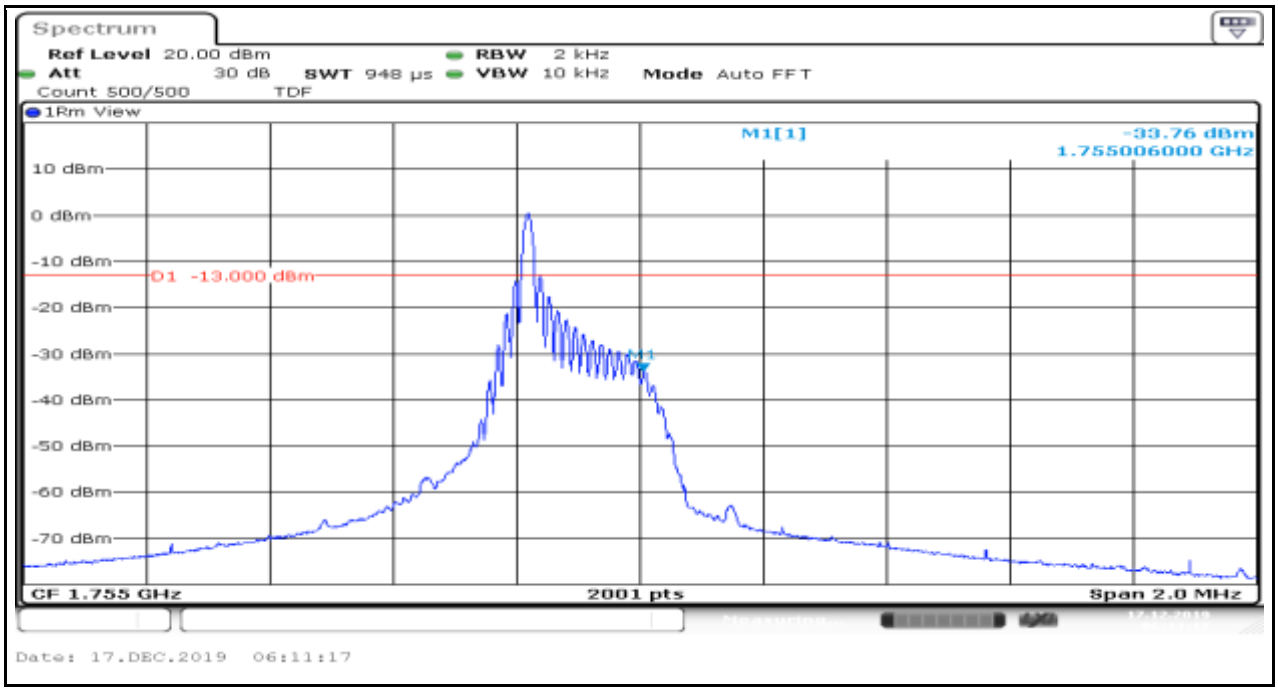
Band4_Stand-Alone_NaN_BPSK_20399_1@0_3.75kHz_-42.10_PASS__



Band4_Stand-Alone_NaN_BPSK_20399_1@47_3.75kHz_-20.71_PASS__



Band4_Stand-Alone_NaN_BPSK_20399_1@0_15kHz_-33.76_PASS__


Spectrum
Ref Level 20.00 dBm
RBW 2 kHz
Att 30 dB
SWT 948 µs
VBW 10 kHz
Mode Auto FFT
Count 500/500
TDF
1Rm View
M1[1]
-33.76 dBm
1.755006000 GHz
10 dBm
0 dBm
-10 dBm
D1 -13.000 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 1.755 GHz
2001 pts
Span 2.0 MHz
Date: 17.DEC.2019 06:11:17

Appendix B.5: Conducted Spurious Emission for NB

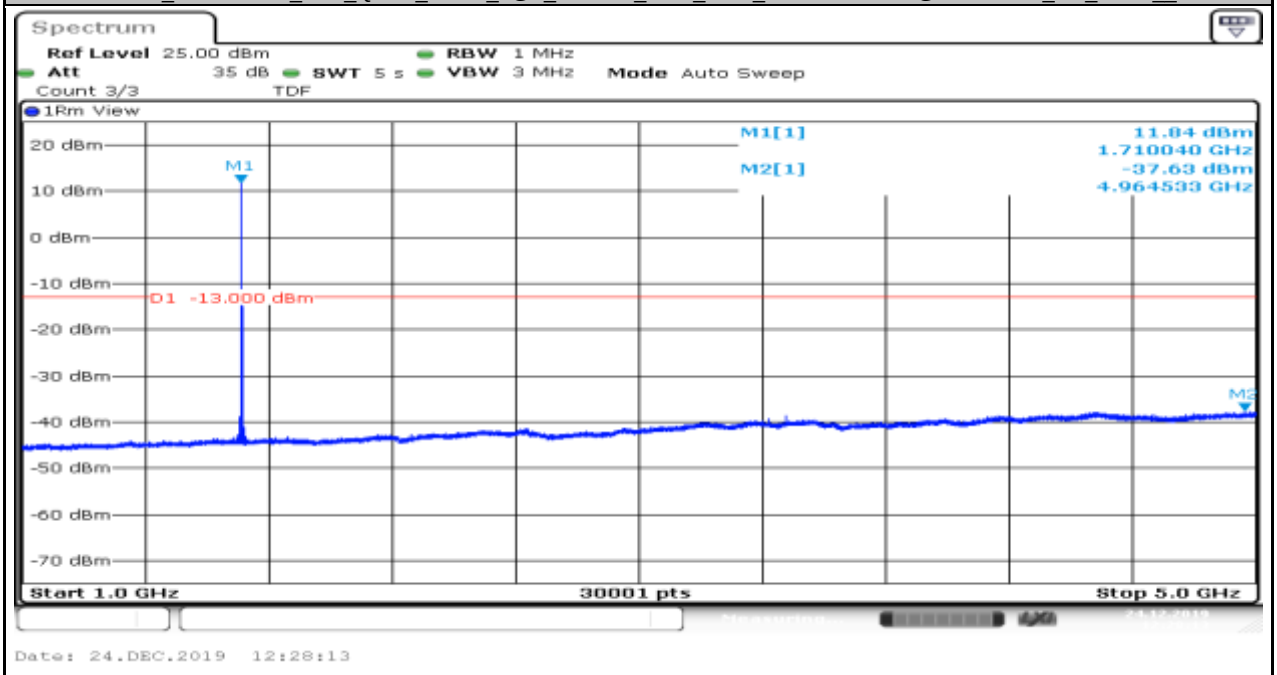
Test Result

Band	OpMode	Bandwidth	Modulation	Channel	Tones	SCS	StartFreq (MHz)	StopFreq (MHz)	Result (dBm)	Limit (dBm)	Verdict
Band4	Stand-Alone	NaN	QPSK	19951	1@0	3.75kHz	1000	5000	1000~5000MHz@-37.63dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@0	3.75kHz	5000	12000	5000~12000MHz@-47.61dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@0	3.75kHz	12000	26500	12000~26500MHz@-41.56dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@47	3.75kHz	30	1000	30~1000MHz@-36.4dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@47	3.75kHz	1000	5000	1000~5000MHz@-37.7dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@47	3.75kHz	5000	12000	5000~12000MHz@-47.51dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@47	3.75kHz	12000	26500	12000~26500MHz@-41.56dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	19951	1@0	3.75kHz	30	1000	30~1000MHz@-35.22dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	19951	12@0	15kHz	12000	26500	12000~26500MHz@-41.33dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	19951	12@0	15kHz	5000	12000	5000~12000MHz@-47.33dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	19951	12@0	15kHz	1000	5000	1000~5000MHz@-37.8dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	19951	12@0	15kHz	30	1000	30~1000MHz@-35.43dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	5000	12000	5000~12000MHz@-45.22dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	12@0	15kHz	1000	5000	1000~5000MHz@-37.71dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	12000	26500	12000~26500MHz@-41.44dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	5000	12000	5000~12000MHz@-45.02dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	1000	5000	1000~5000MHz@-37.87dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	12@0	15kHz	12000	26500	12000~26500MHz@-41.53dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	12000	26500	12000~26500MHz@-41.21dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	12@0	15kHz	5000	12000	5000~12000MHz@-47.37dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	1000	5000	1000~5000MHz@-37.93dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	30	1000	30~1000MHz@-35.78dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	30	1000	30~1000MHz@-34.51dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20175	12@0	15kHz	30	1000	30~1000MHz@-35.46dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@0	3.75kHz	12000	26500	12000~26500MHz@-41.5dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@0	3.75kHz	30	1000	30~1000MHz@-34.7dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@0	3.75kHz	5000	12000	5000~12000MHz@-47.39dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@47	3.75kHz	30	1000	30~1000MHz@-34.72dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@47	3.75kHz	1000	5000	1000~5000MHz@-37.92dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@47	3.75kHz	5000	12000	5000~12000MHz@-47.21dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@47	3.75kHz	12000	26500	12000~26500MHz@-41.52dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20399	12@0	15kHz	30	1000	30~1000MHz@-35.61dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20399	1@0	3.75kHz	1000	5000	1000~5000MHz@-37.86dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20399	12@0	15kHz	12000	26500	12000~26500MHz@-41.43dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20399	12@0	15kHz	5000	12000	5000~12000MHz@-47.59dBm	-13	PASS
Band4	Stand-Alone	NaN	QPSK	20399	12@0	15kHz	1000	5000	1000~5000MHz@-37.89dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@0	15kHz	12000	26500	12000~26500MHz@-41.27dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@0	15kHz	1000	5000	1000~5000MHz@-37.86dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@0	15kHz	5000	12000	5000~12000MHz@-47.57dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@11	15kHz	12000	26500	12000~26500MHz@-41.5dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@11	15kHz	5000	12000	5000~12000MHz@-47.51dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@11	15kHz	1000	5000	1000~5000MHz@-37.94dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@11	15kHz	30	1000	30~1000MHz@-35.5dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	19951	1@0	15kHz	30	1000	30~1000MHz@-36.22dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@0	15kHz	30	1000	30~1000MHz@-36.02dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@11	15kHz	12000	26500	12000~26500MHz@-41.53dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@11	15kHz	1000	5000	1000~5000MHz@-37.75dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@11	15kHz	5000	12000	5000~12000MHz@-44.76dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@11	15kHz	30	1000	30~1000MHz@-35.64dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@0	15kHz	12000	26500	12000~26500MHz@-41.41dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@0	15kHz	1000	5000	1000~5000MHz@-37.81dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20175	1@0	15kHz	5000	12000	5000~12000MHz@-44.73dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@11	15kHz	12000	26500	12000~26500MHz@-41.31dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@0	15kHz	30	1000	30~1000MHz@-35.16dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@0	15kHz	1000	5000	1000~5000MHz@-37.91dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@0	15kHz	5000	12000	5000~12000MHz@-47.59dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@0	15kHz	12000	26500	12000~26500MHz@-41.53dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@11	15kHz	30	1000	30~1000MHz@-35.98dBm	-13	PASS

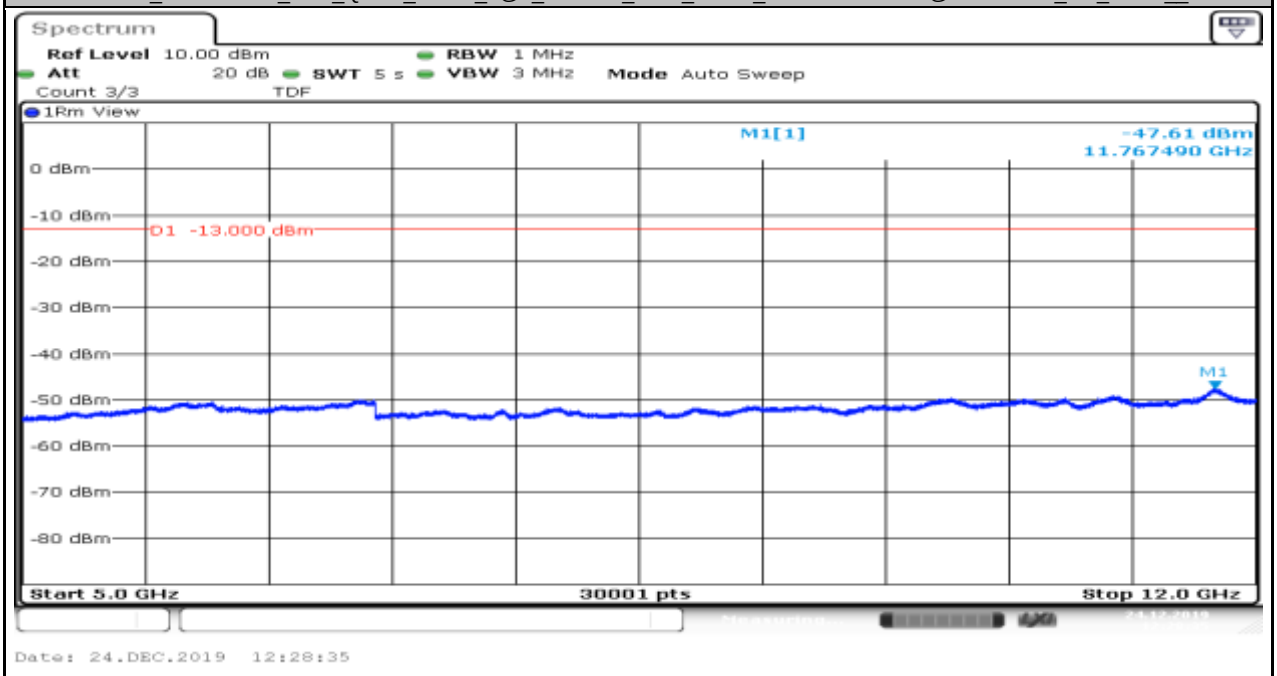
Band4	Stand-Alone	NaN	BPSK	20399	1@11	15kHz	1000	5000	1000~5000MHz@-37.78dBm	-13	PASS
Band4	Stand-Alone	NaN	BPSK	20399	1@11	15kHz	5000	12000	5000~12000MHz@-47.34dBm	-13	PASS

Test Graphs

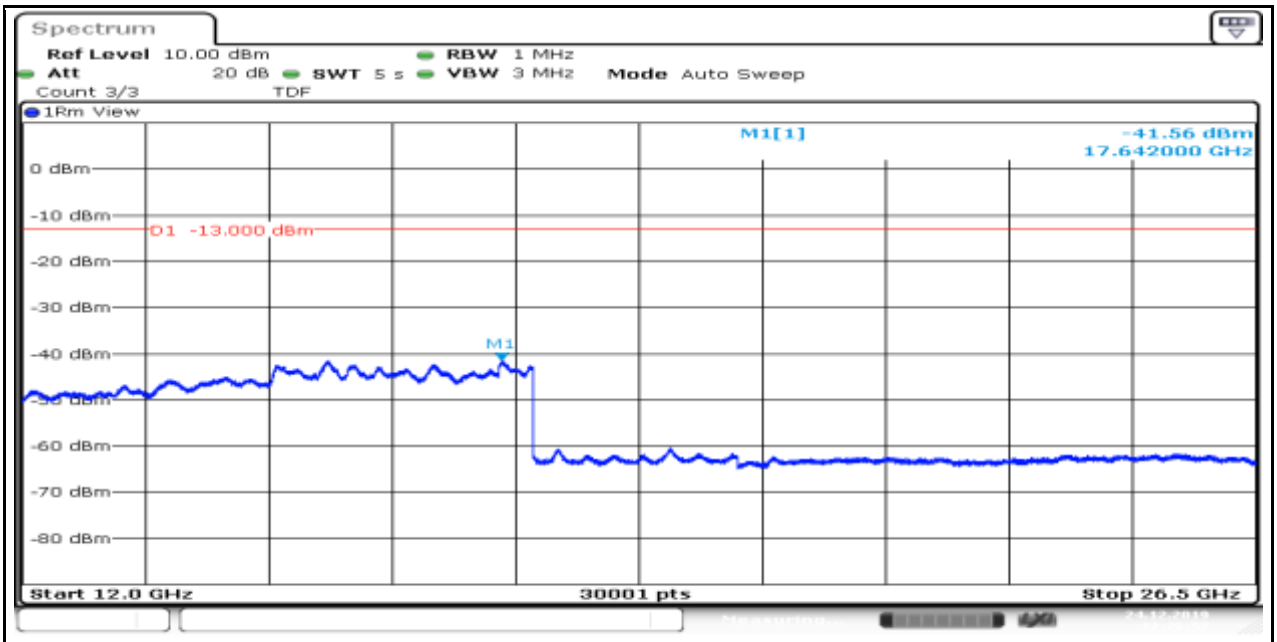
Band4_Stand-Alone_NaN_QPSK_19951_1@0_3.75kHz_1000_5000_1000~5000MHz@-37.63dBm_-13_PASS__



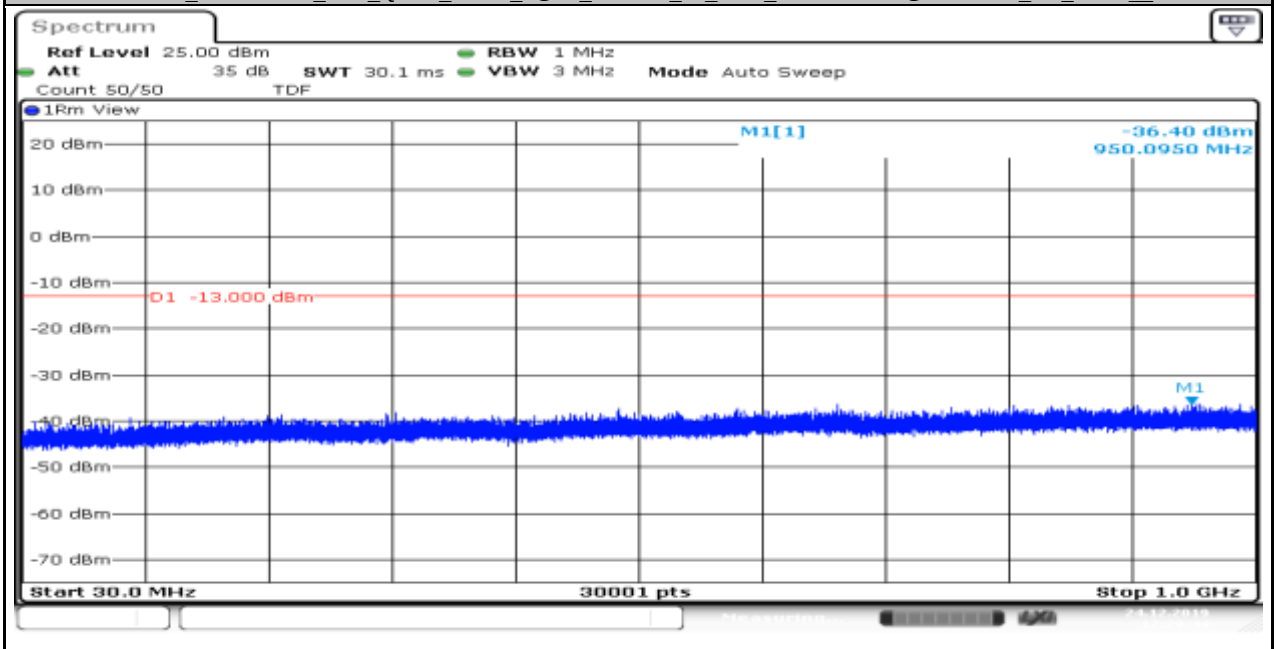
Band4_Stand-Alone_NaN_QPSK_19951_1@0_3.75kHz_5000_12000_5000~12000MHz@-47.61dBm_-13_PASS__



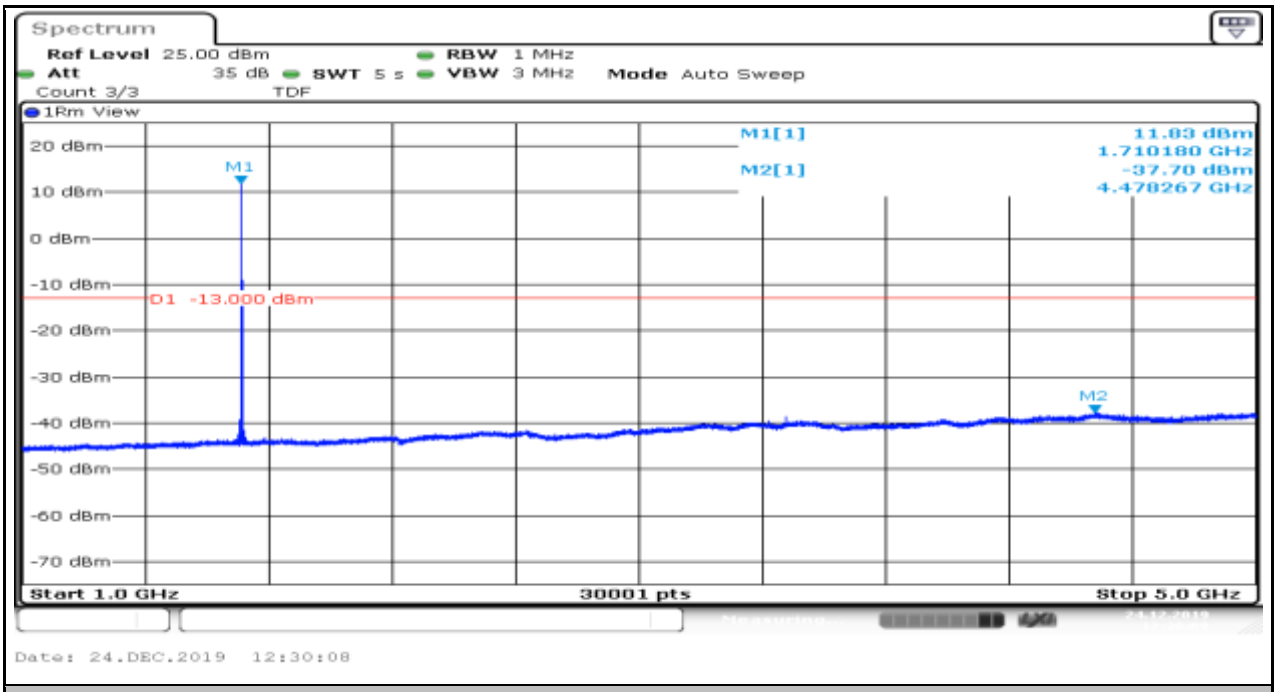
Band4_Stand-Alone_NaN_QPSK_19951_1@0_3.75kHz_12000_26500_12000~26500MHz@-41.56dBm_-13_PASS__



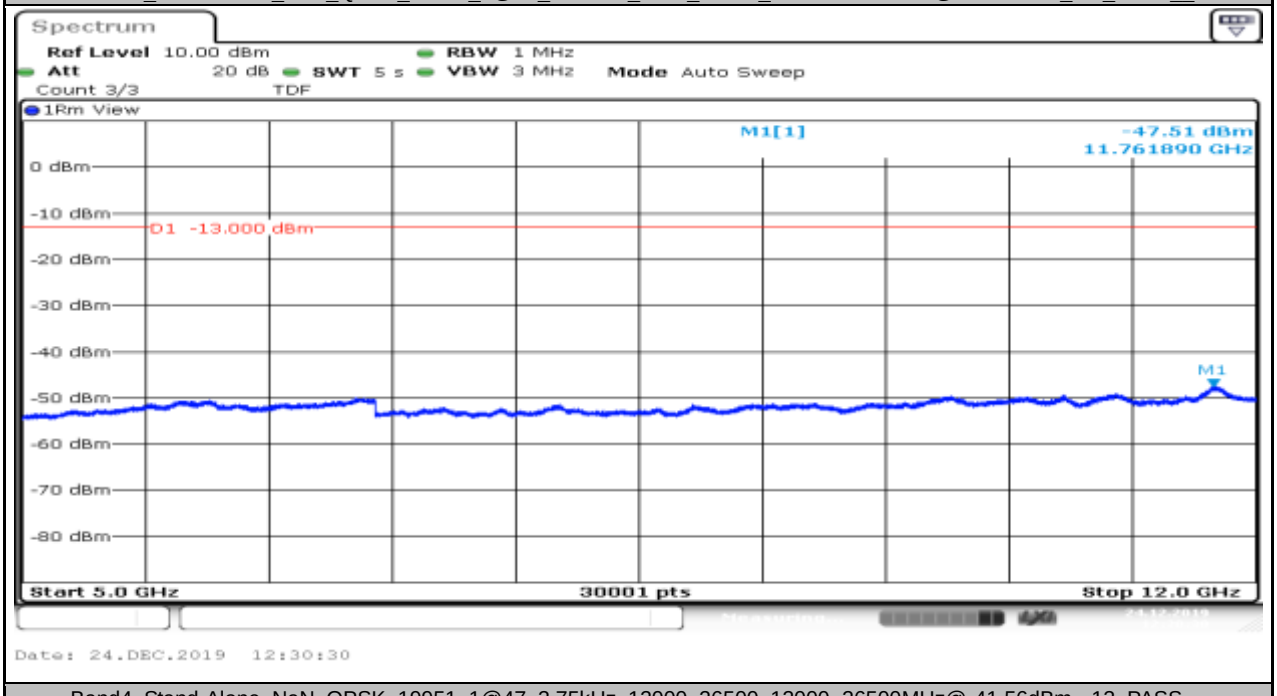
Band4_Stand-Alone_NaN_QPSK_19951_1@47_3.75kHz_30_1000_30~1000MHz@-36.4dBm_-13_PASS__



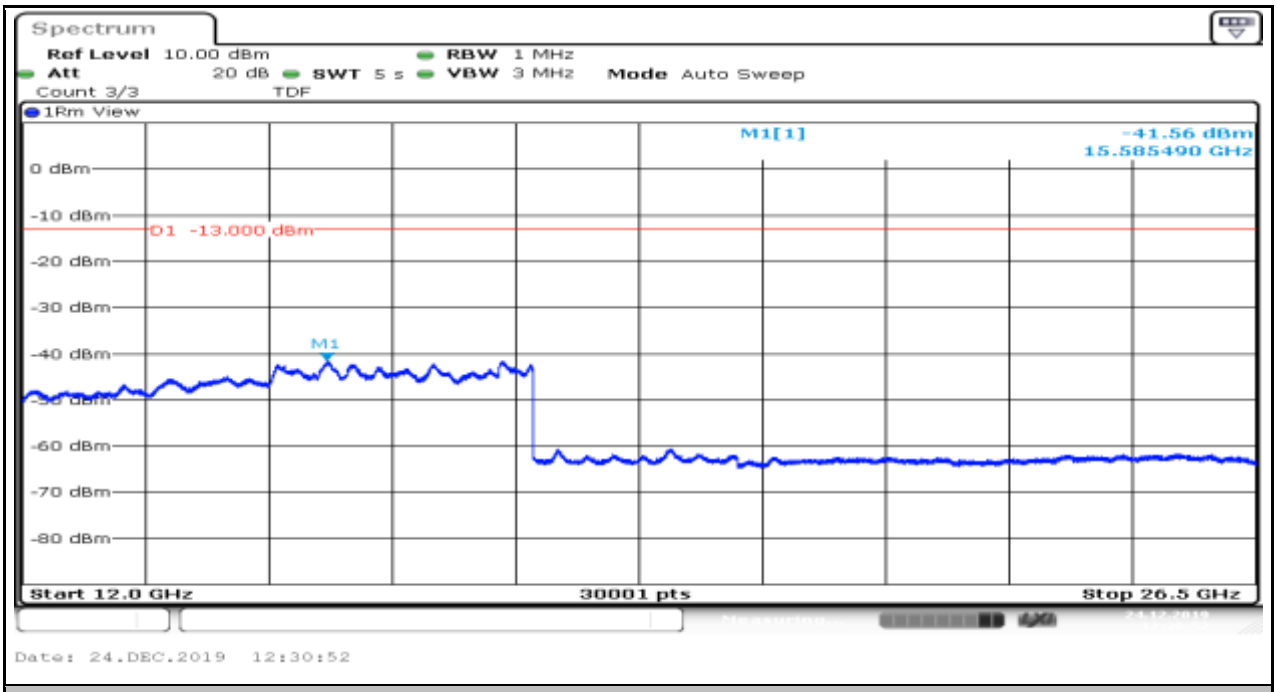
Band4_Stand-Alone_NaN_QPSK_19951_1@47_3.75kHz_1000_5000_1000~5000MHz@-37.7dBm_-13_PASS__



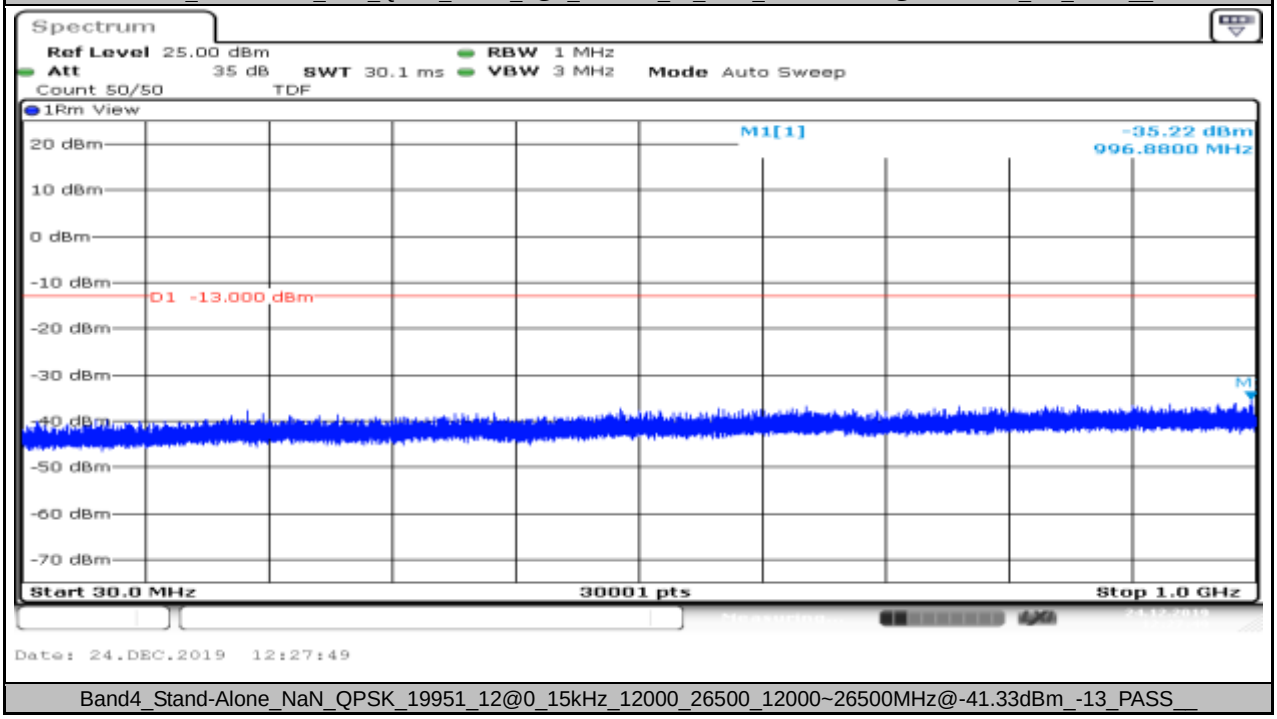
Band4_Stand-Alone_NaN_QPSK_19951_1@47_3.75kHz_5000_12000_5000~12000MHz@-47.51dBm_-13_PASS__



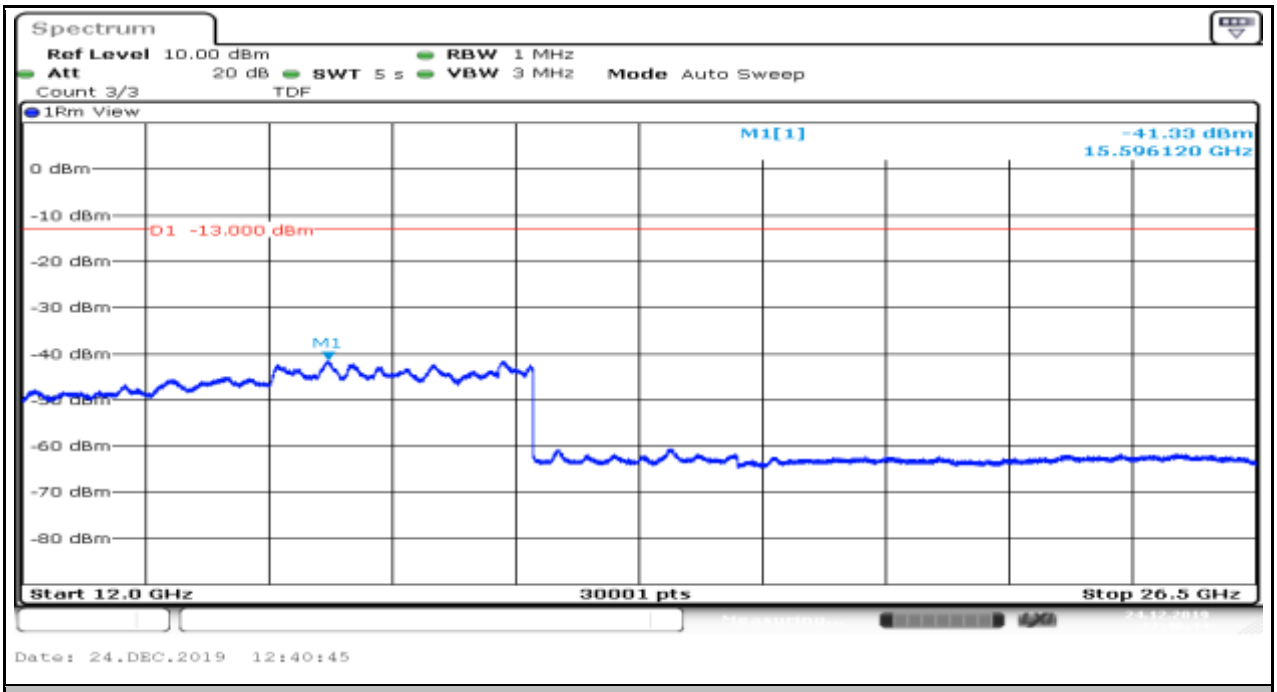
Band4_Stand-Alone_NaN_QPSK_19951_1@47_3.75kHz_12000_26500_12000~26500MHz@-41.56dBm_-13_PASS__



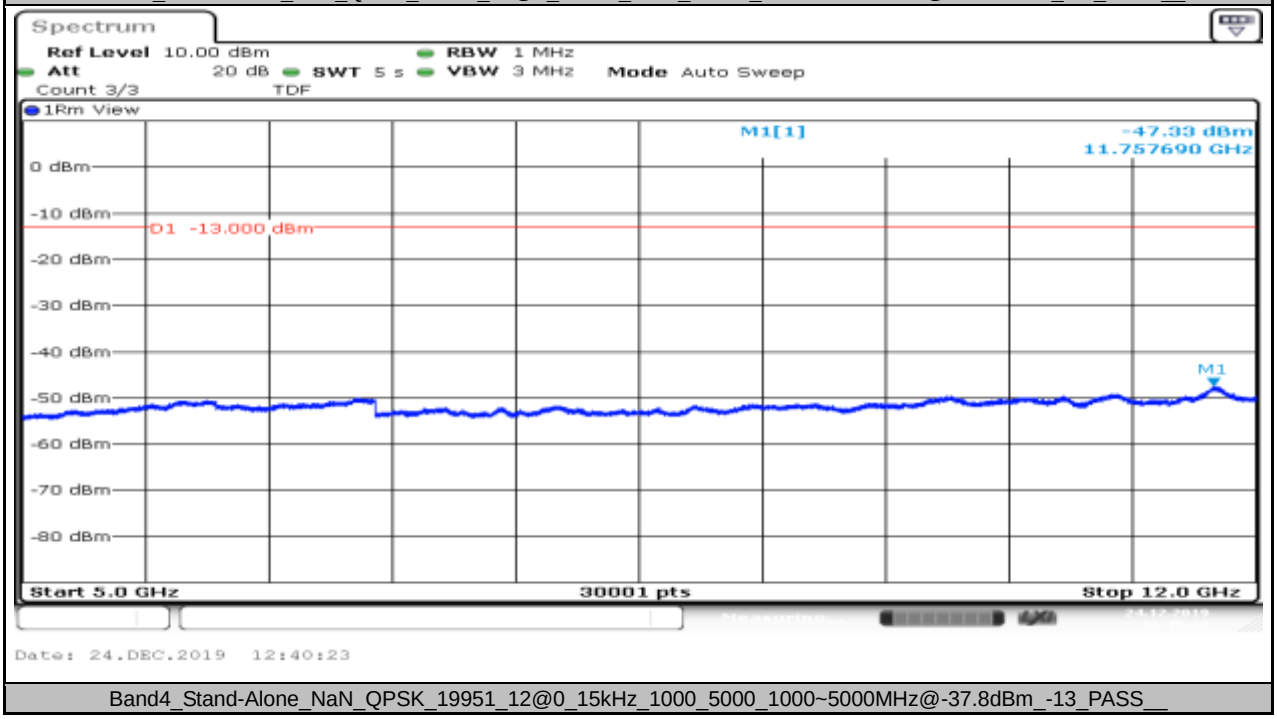
Band4_Stand-Alone_NaN_QPSK_19951_1@0_3.75kHz_30_1000_30~1000MHz@-35.22dBm_-13_PASS__



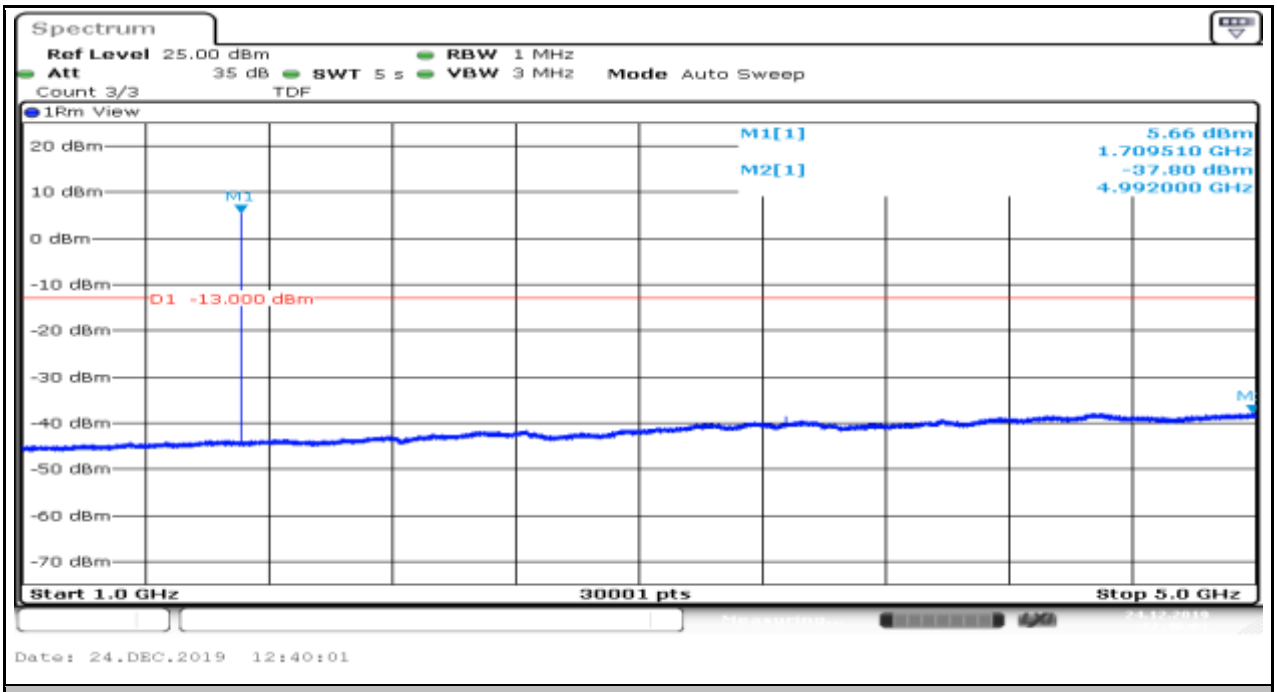
Band4_Stand-Alone_NaN_QPSK_19951_12@0_15kHz_12000_26500_12000~26500MHz@-41.33dBm_-13_PASS__



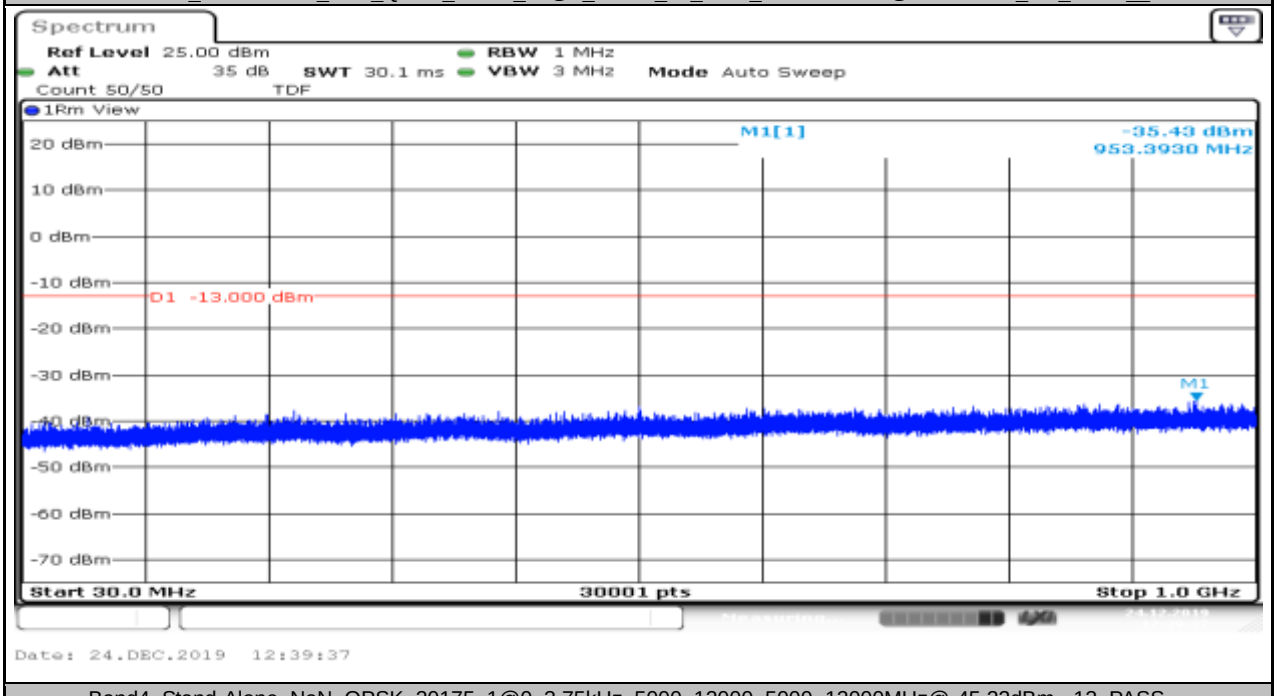
Band4_Stand-Alone_NaN_QPSK_19951_12@0_15kHz_5000_12000_5000~12000MHz@-47.33dBm_-13_PASS__



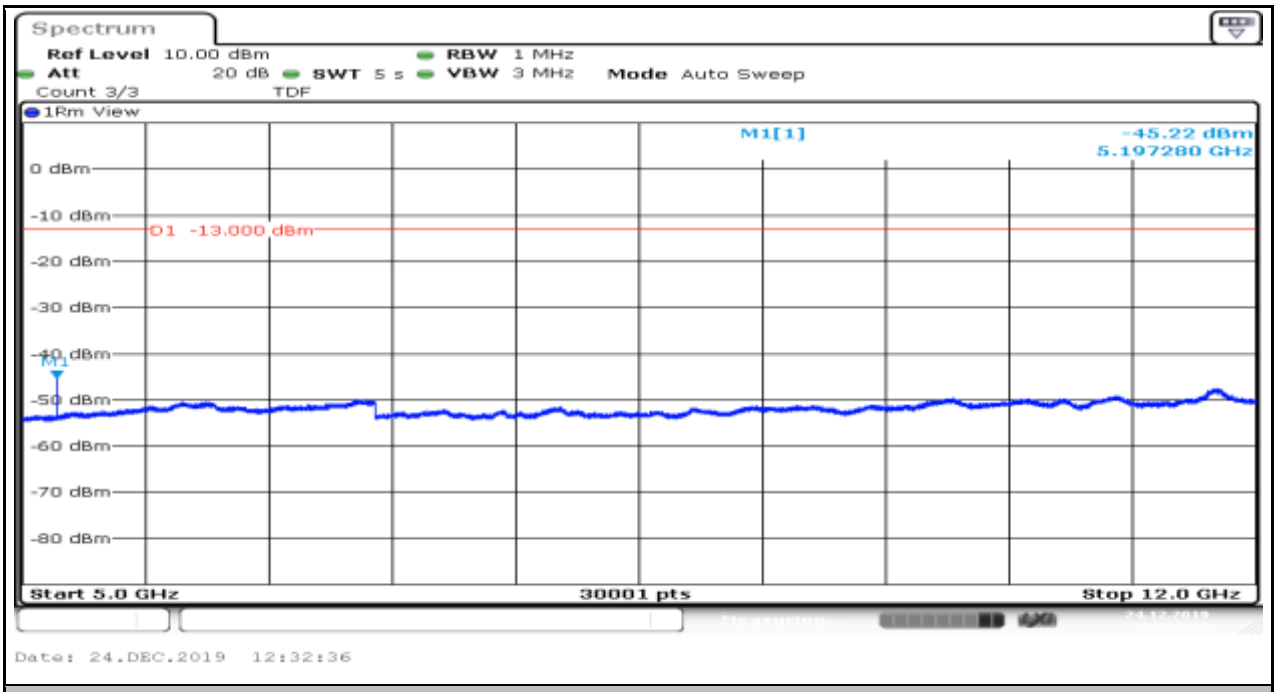
Band4_Stand-Alone_NaN_QPSK_19951_12@0_15kHz_1000_5000_1000~5000MHz@-37.8dBm_-13_PASS__



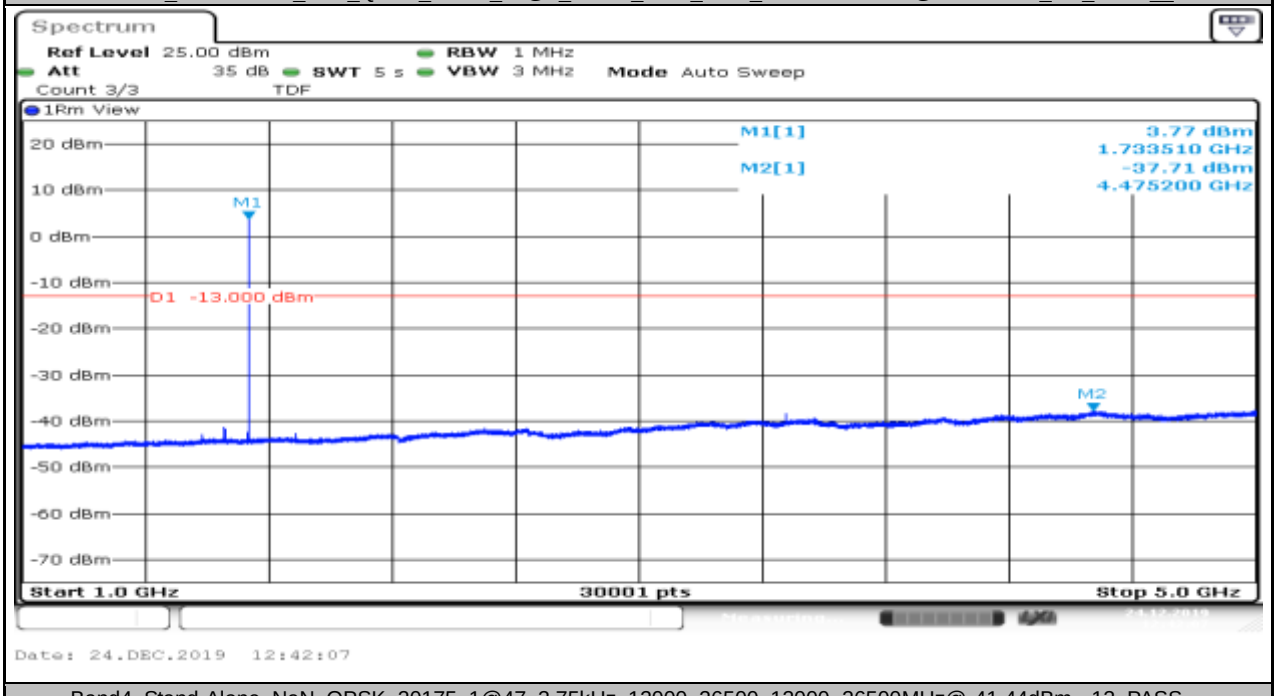
Band4_Stand-Alone_NaN_QPSK_19951_12@0_15kHz_30_1000_30~1000MHz@-35.43dBm_-13_PASS__



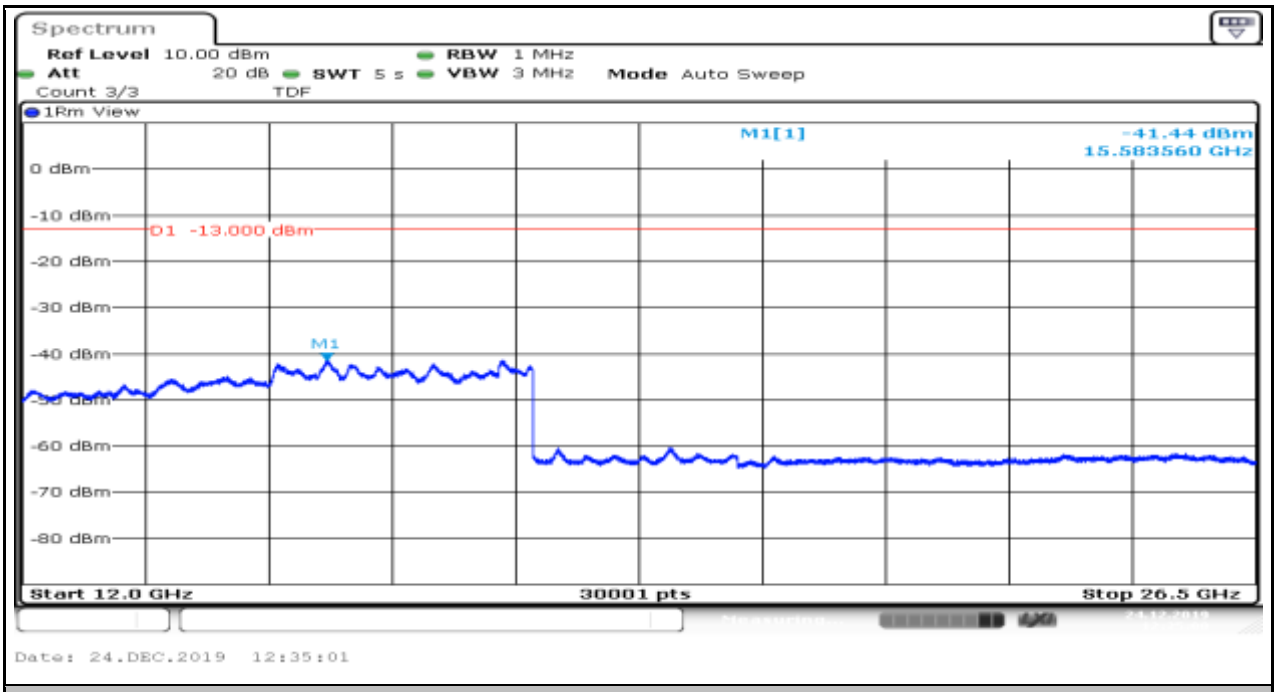
Band4_Stand-Alone_NaN_QPSK_20175_1@0_3.75kHz_5000_12000_5000~12000MHz@-45.22dBm_-13_PASS__



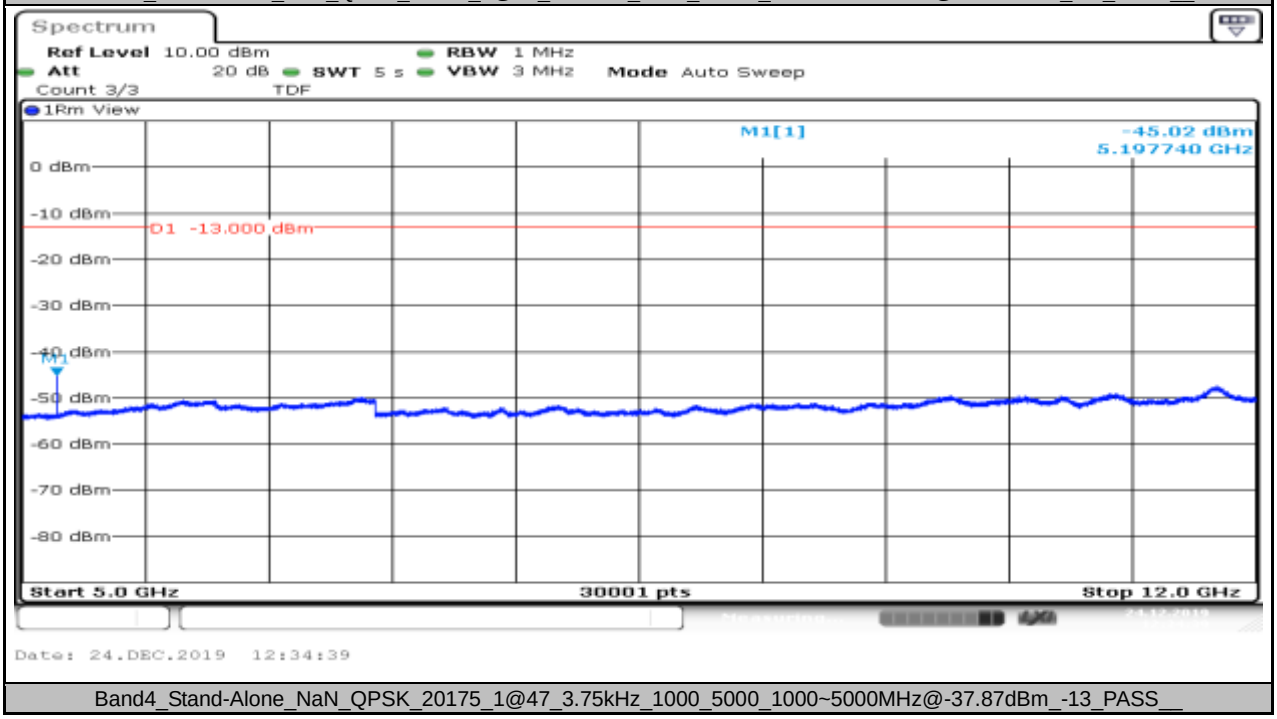
Band4_Stand-Alone_NaN_QPSK_20175_12@0_15kHz_1000_5000_1000~5000MHz@-37.71dBm_-13_PASS__



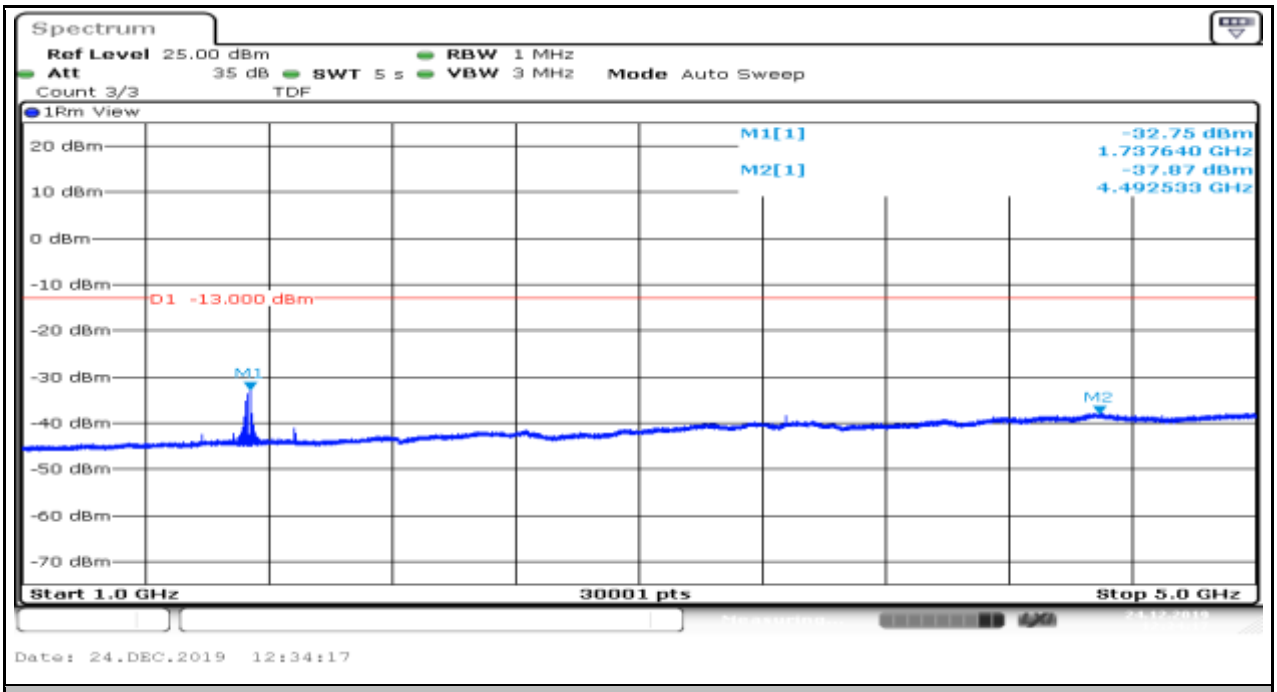
Band4_Stand-Alone_NaN_QPSK_20175_1@47_3.75kHz_12000_26500_12000~26500MHz@-41.44dBm_-13_PASS__



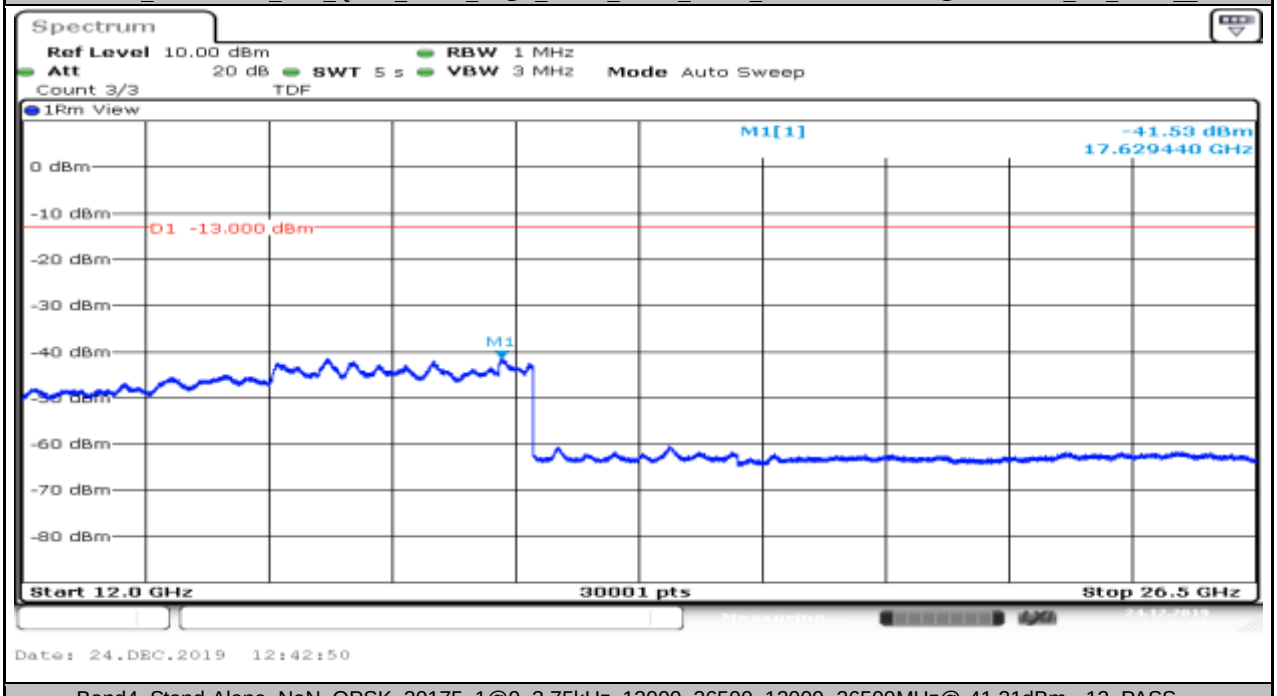
Band4_Stand-Alone_NaN_QPSK_20175_1@47_3.75kHz_5000_12000_5000~12000MHz@-45.02dBm_-13_PASS__



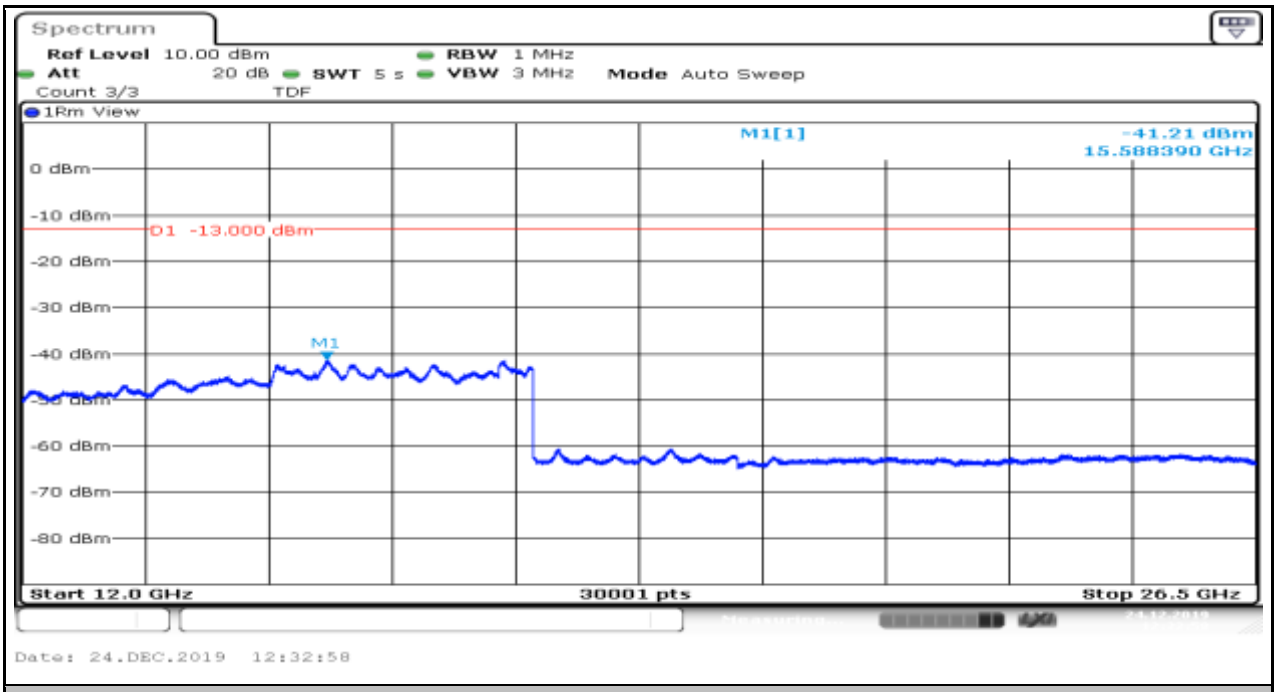
Band4_Stand-Alone_NaN_QPSK_20175_1@47_3.75kHz_1000_5000_1000~5000MHz@-37.87dBm_-13_PASS__



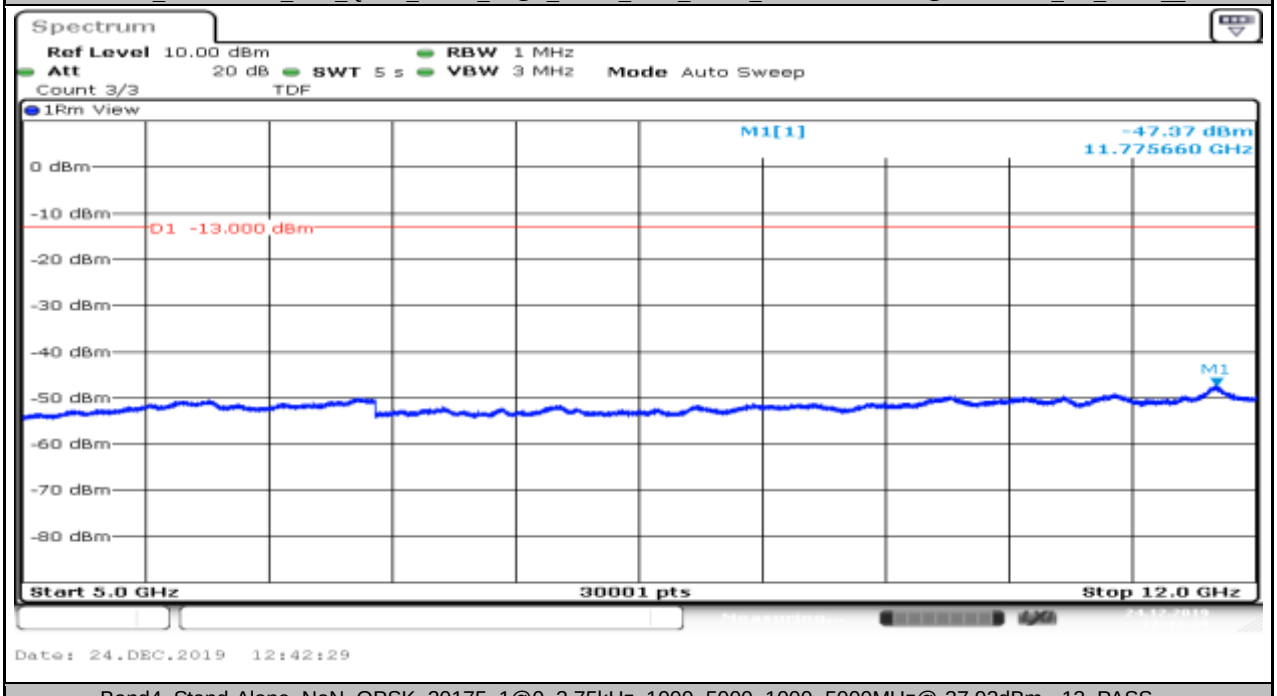
Band4_Stand-Alone_NaN_QPSK_20175_12@0_15kHz_12000_26500_12000~26500MHz@-41.53dBm_-13_PASS__



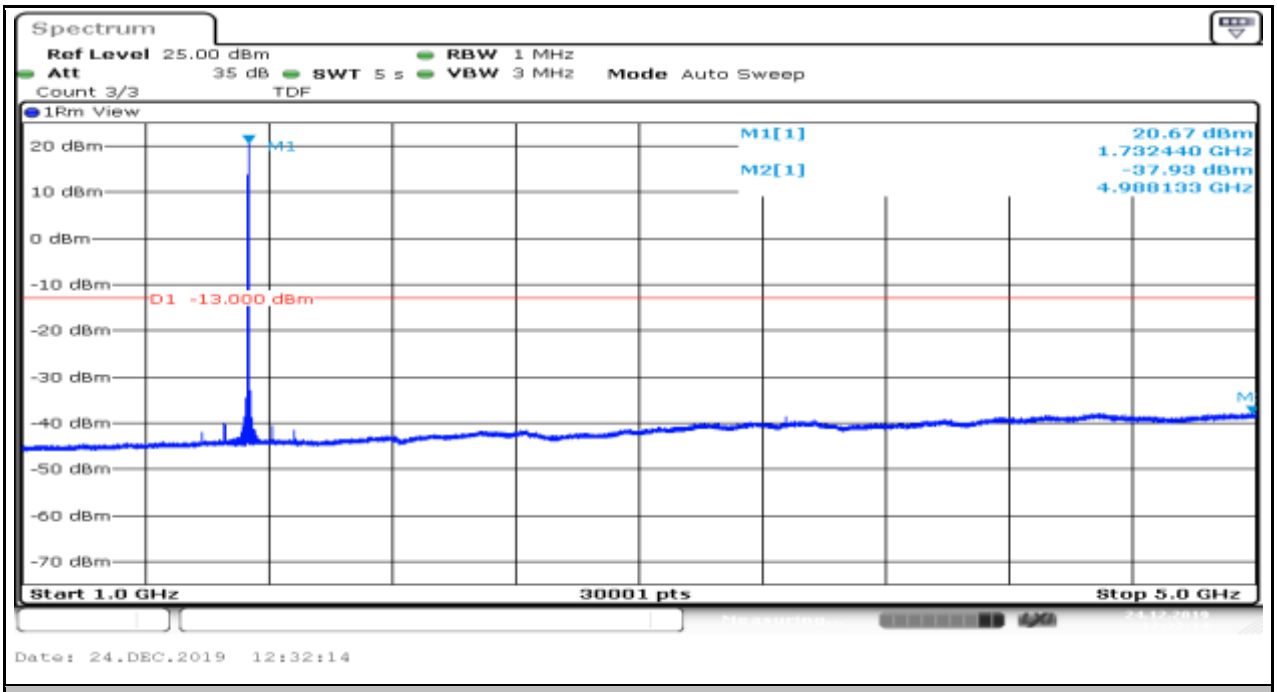
Band4_Stand-Alone_NaN_QPSK_20175_1@0_3.75kHz_12000_26500_12000~26500MHz@-41.21dBm_-13_PASS__



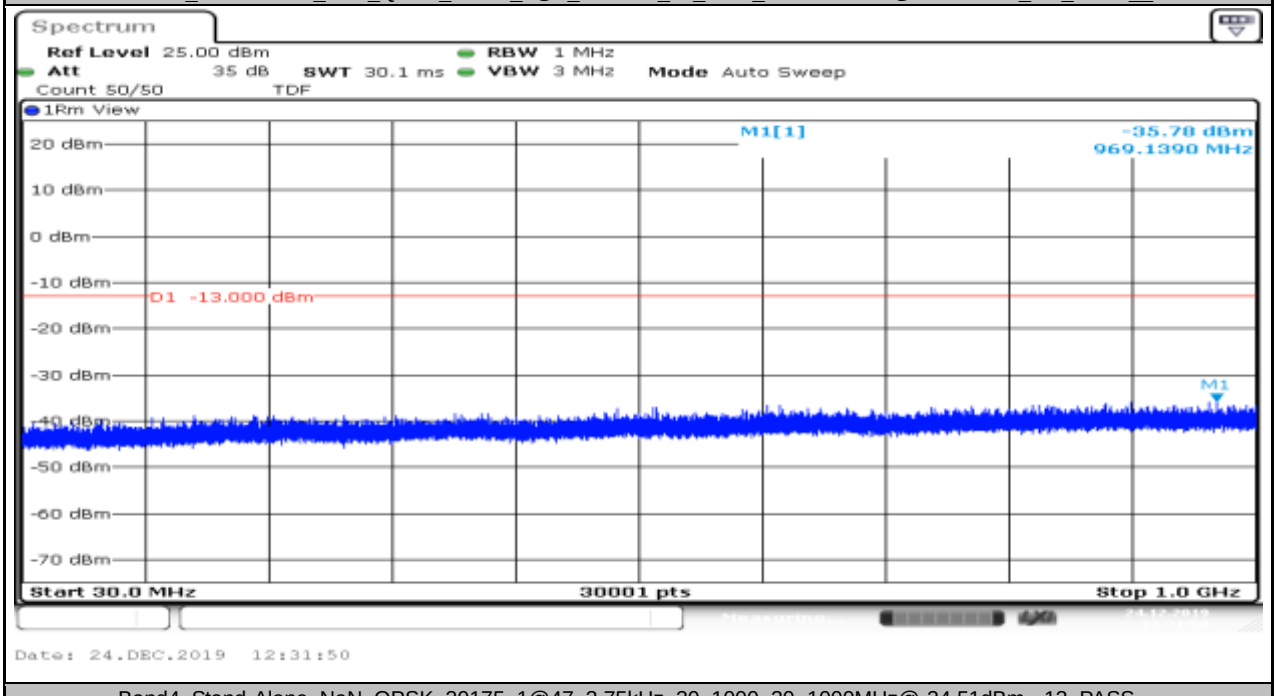
Band4_Stand-Alone_NaN_QPSK_20175_12@0_15kHz_5000_12000_5000~12000MHz@-47.37dBm_-13_PASS__



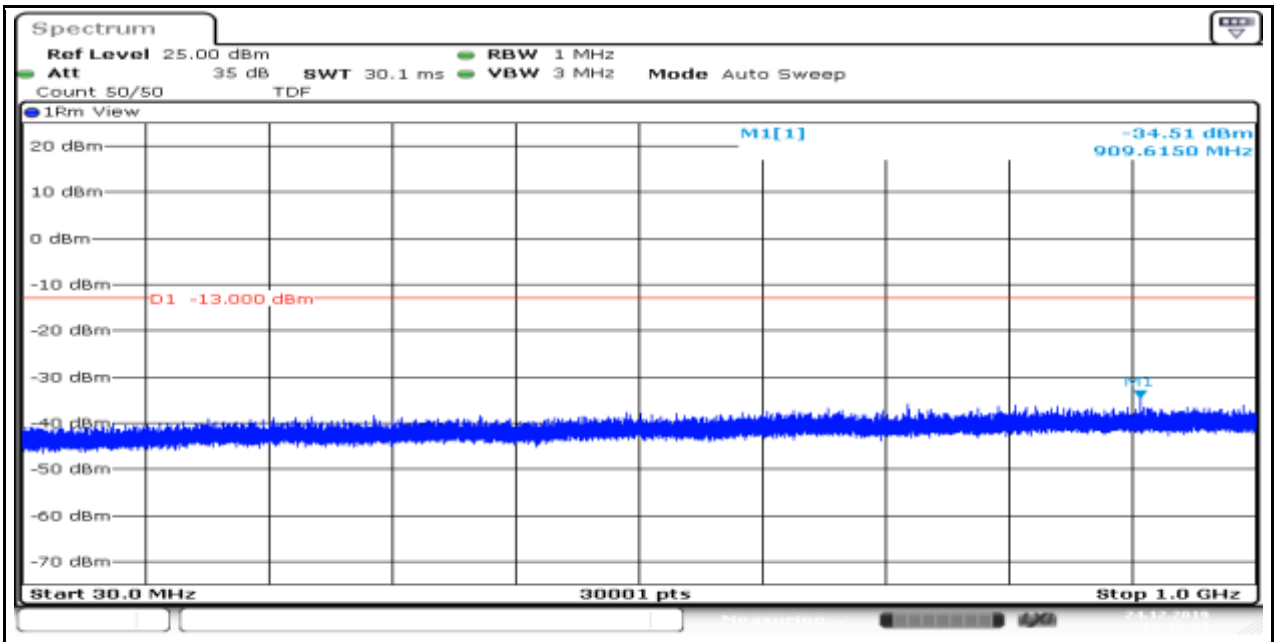
Band4_Stand-Alone_NaN_QPSK_20175_1@0_3.75kHz_1000_5000_1000~5000MHz@-37.93dBm_-13_PASS__



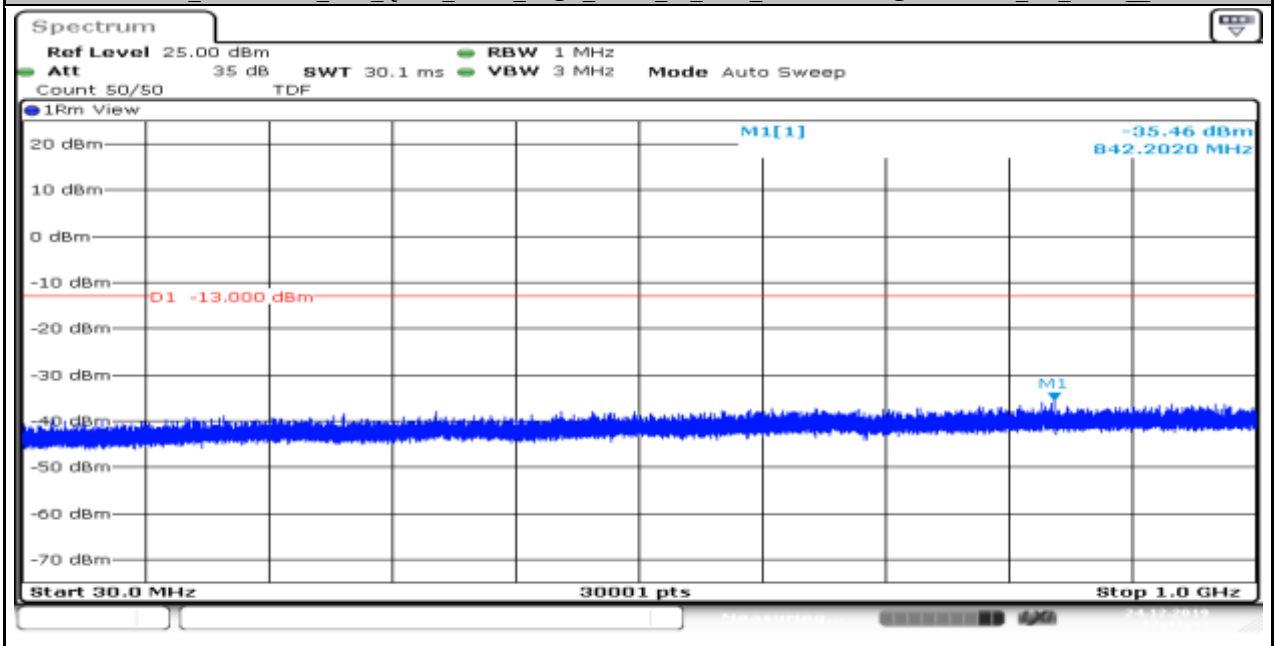
Band4_Stand-Alone_NaN_QPSK_20175_1@0_3.75kHz_30_1000_30~1000MHz@-35.78dBm_-13_PASS__



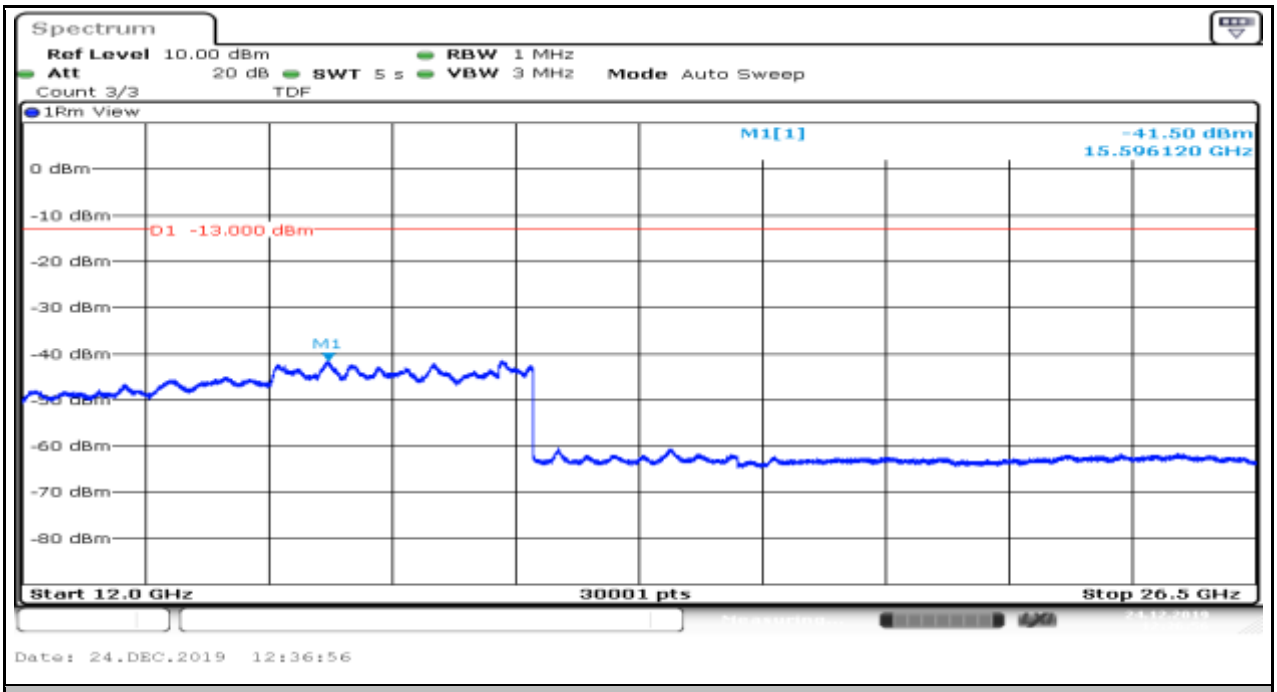
Band4_Stand-Alone_NaN_QPSK_20175_1@47_3.75kHz_30_1000_30~1000MHz@-34.51dBm_-13_PASS__



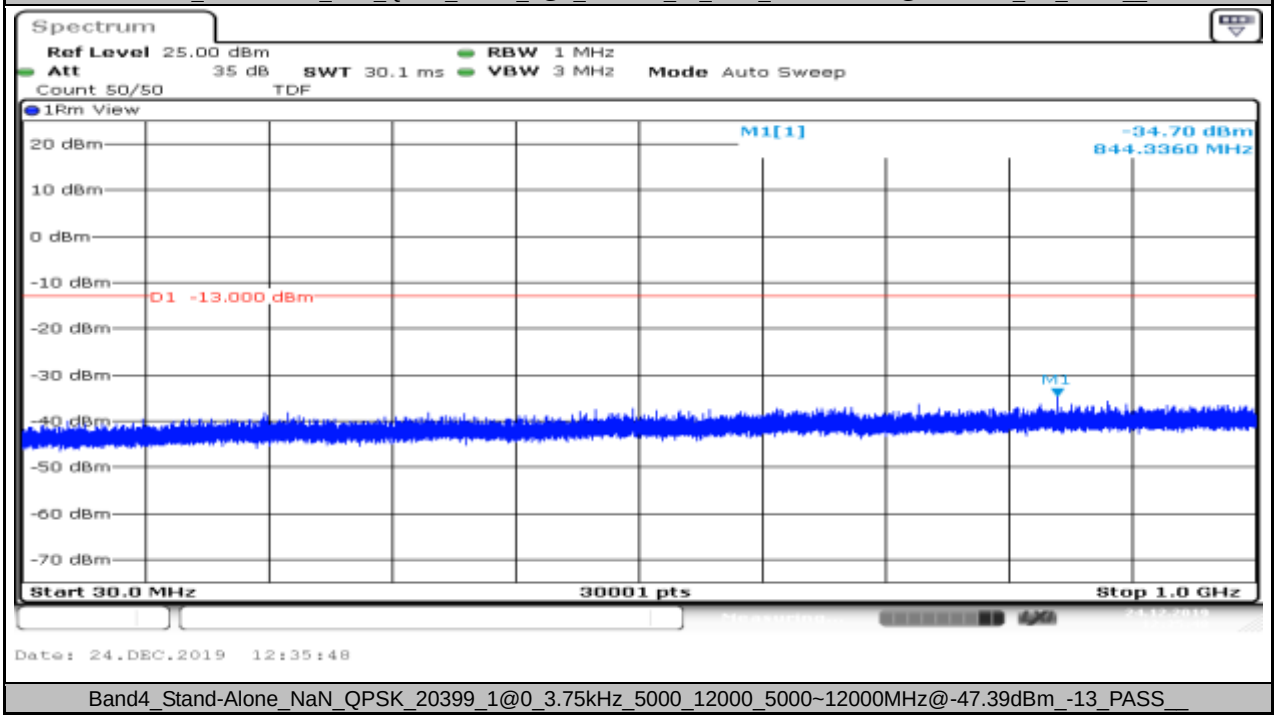
Band4_Stand-Alone_NaN_QPSK_20175_12@0_15kHz_30_1000_30~1000MHz@-35.46dBm_-13_PASS__



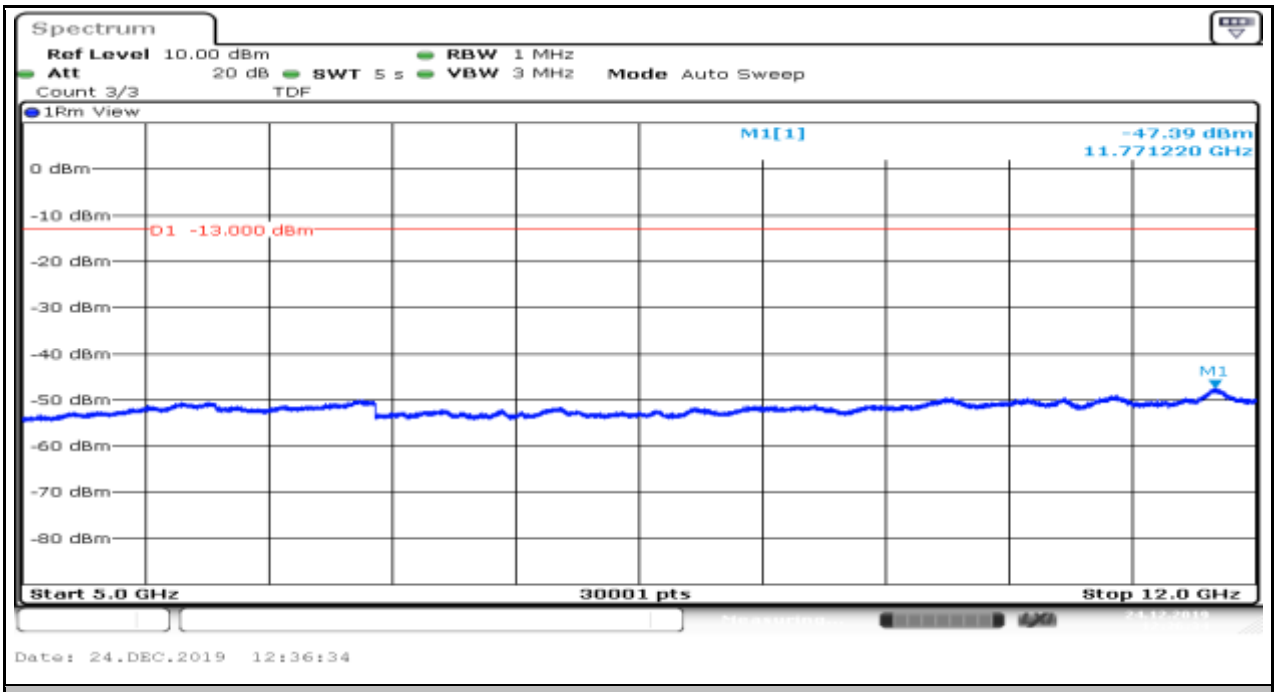
Band4_Stand-Alone_NaN_QPSK_20399_1@0_3.75kHz_12000_26500_12000~26500MHz@-41.5dBm_-13_PASS__



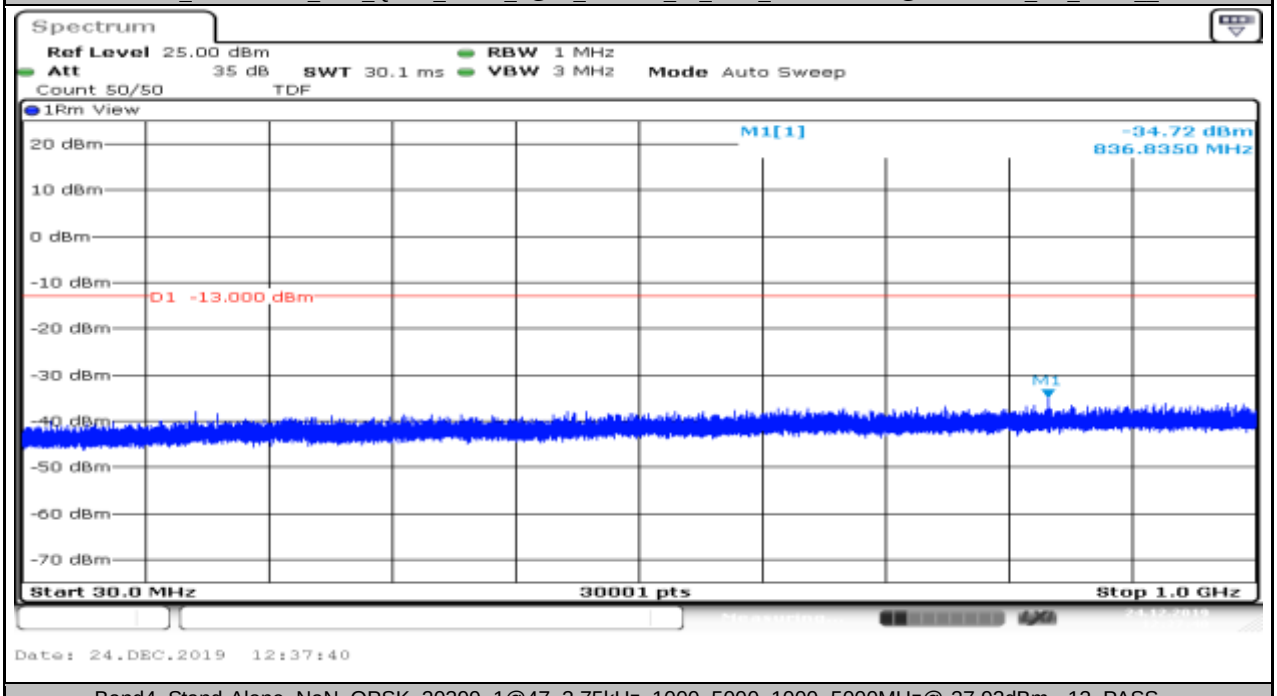
Band4_Stand-Alone_NaN_QPSK_20399_1@0_3.75kHz_30_1000_30~1000MHz@-34.7dBm_-13_PASS__



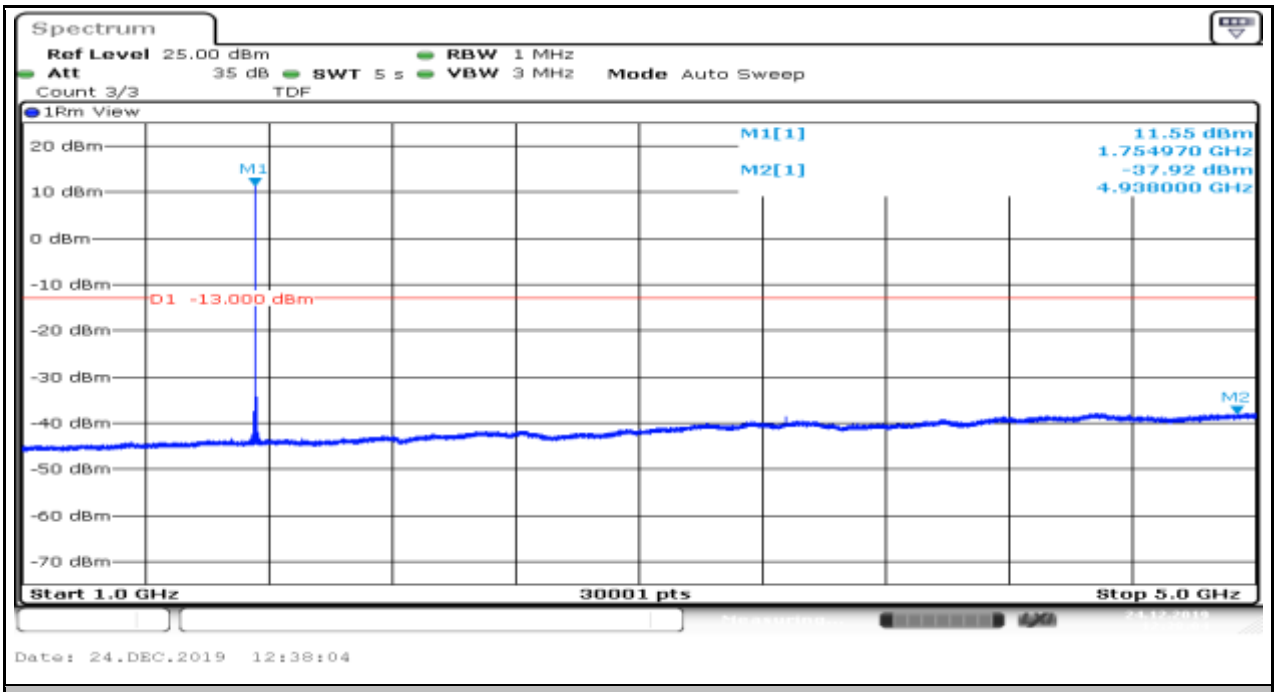
Band4_Stand-Alone_NaN_QPSK_20399_1@0_3.75kHz_5000_12000_5000~12000MHz@-47.39dBm_-13_PASS__



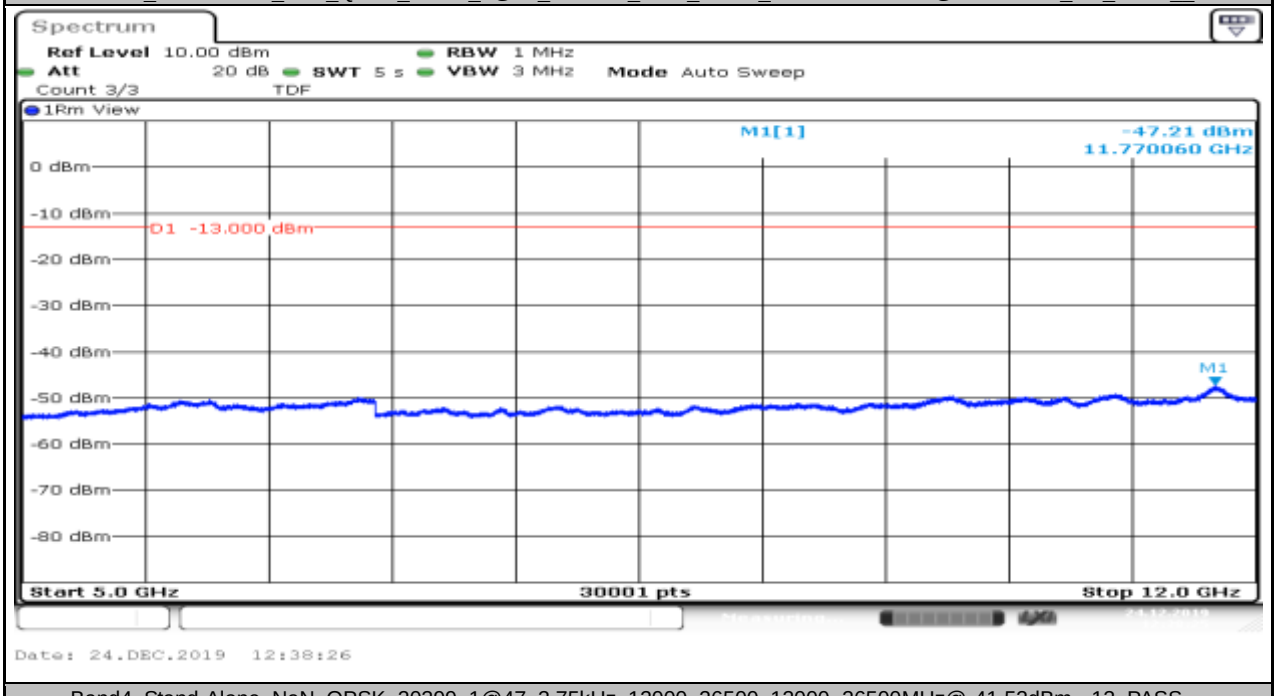
Band4_Stand-Alone_NaN_QPSK_20399_1@47_3.75kHz_30_1000_30~1000MHz@-34.72dBm_-13_PASS__



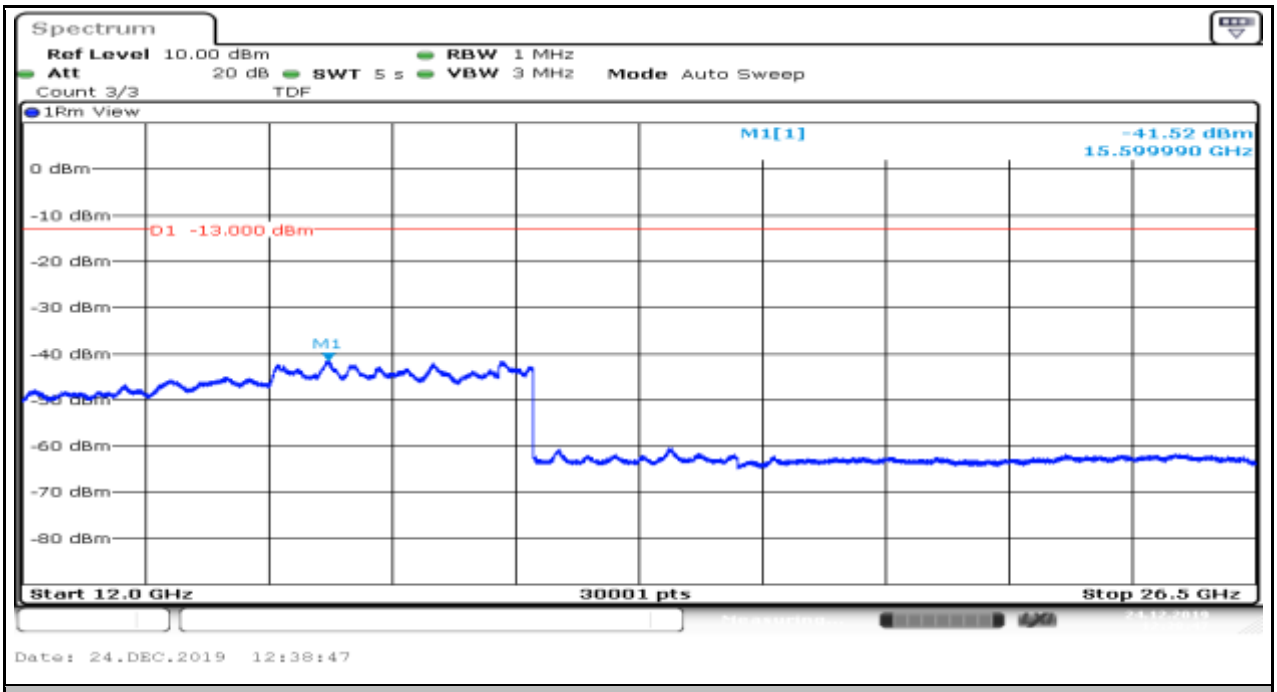
Band4_Stand-Alone_NaN_QPSK_20399_1@47_3.75kHz_1000_5000_1000~5000MHz@-37.92dBm_-13_PASS__



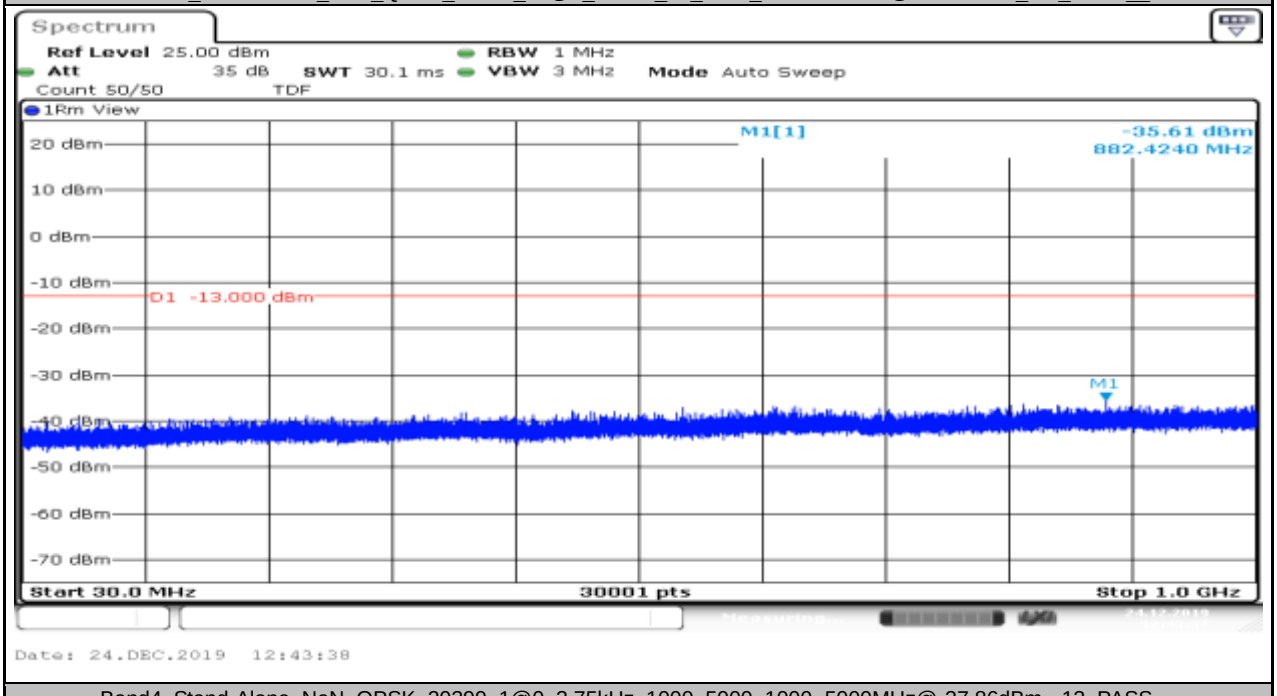
Band4_Stand-Alone_NaN_QPSK_20399_1@47_3.75kHz_5000_12000_5000~12000MHz@-47.21dBm_-13_PASS__



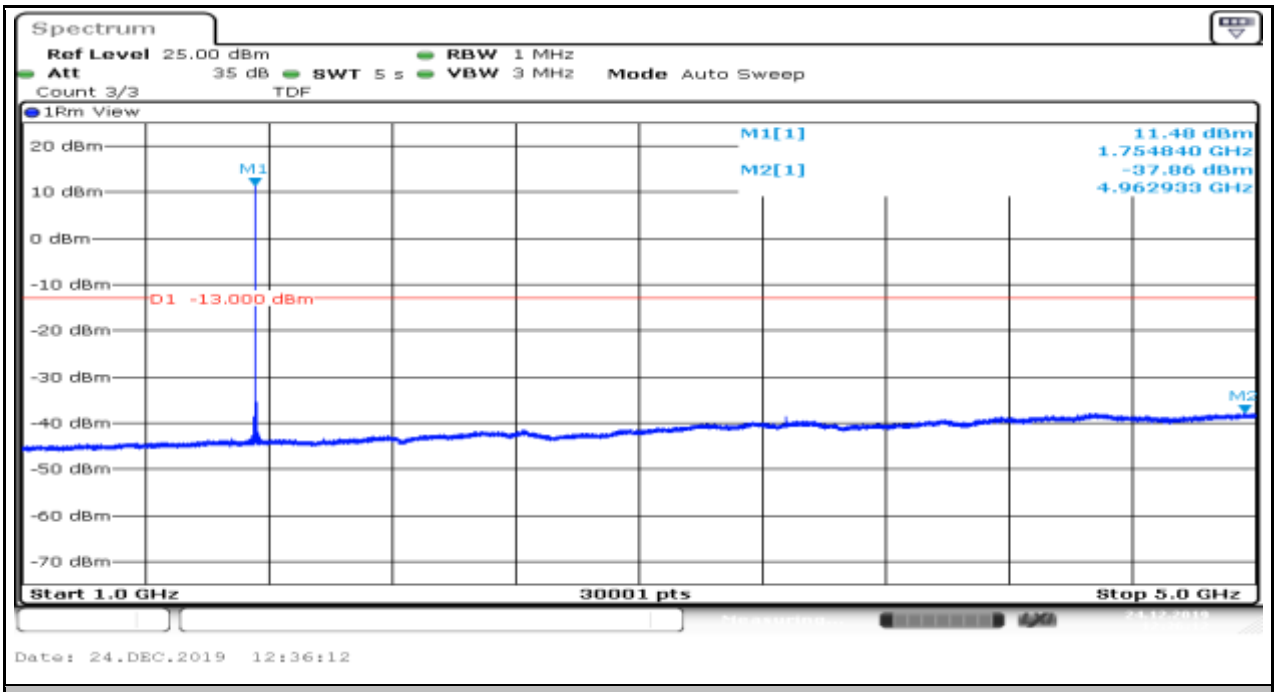
Band4_Stand-Alone_NaN_QPSK_20399_1@47_3.75kHz_12000_26500_12000~26500MHz@-41.52dBm_-13_PASS__



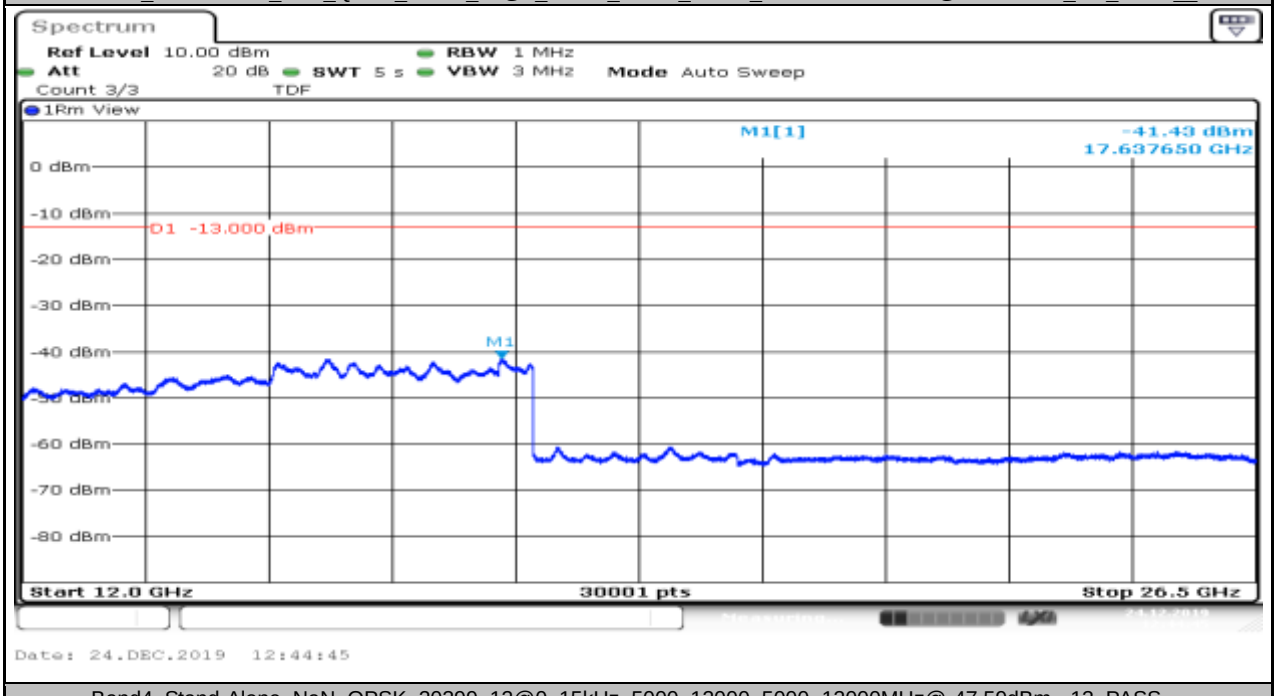
Band4_Stand-Alone_NaN_QPSK_20399_12@0_15kHz_30_1000_30~1000MHz@-35.61dBm_-13_PASS__



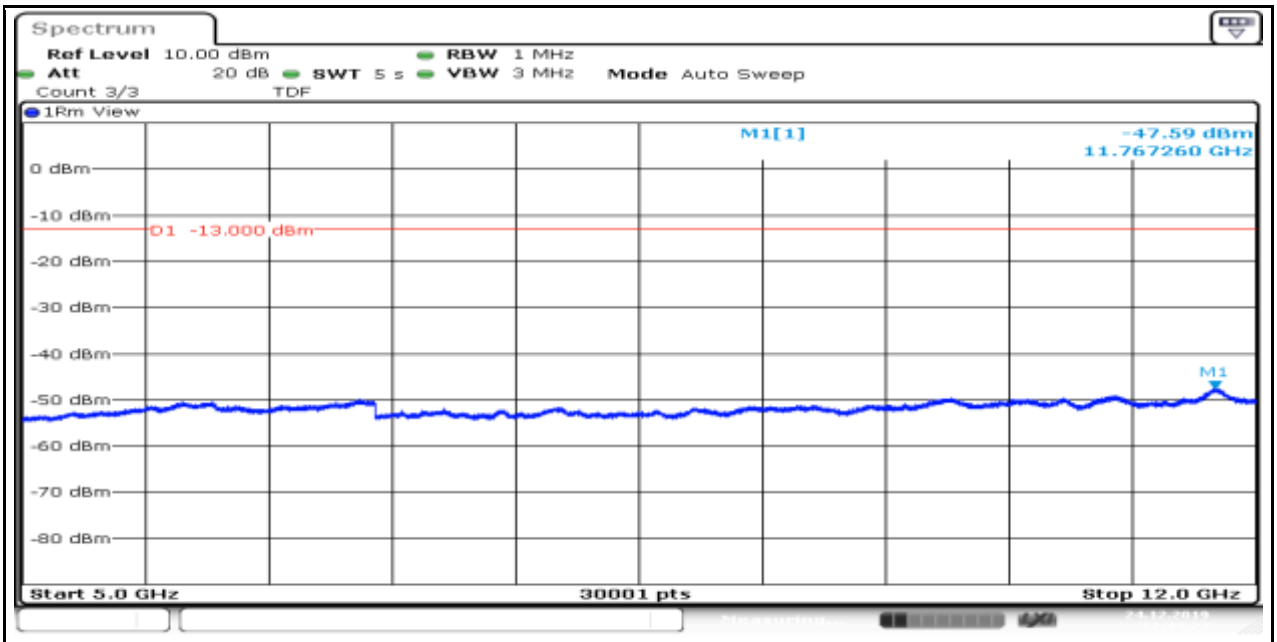
Band4_Stand-Alone_NaN_QPSK_20399_1@0_3.75kHz_1000_5000_1000~5000MHz@-37.86dBm_-13_PASS__



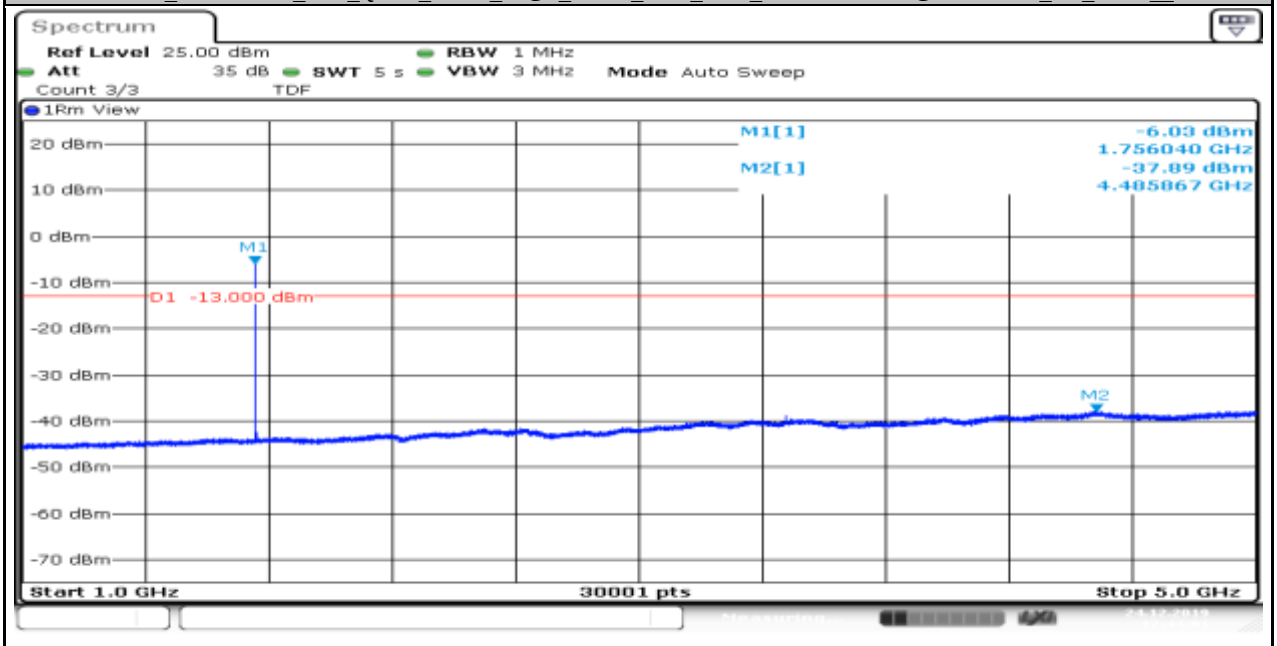
Band4_Stand-Alone_NaN_QPSK_20399_12@0_15kHz_12000_26500_12000~26500MHz@-41.43dBm_-13_PASS__



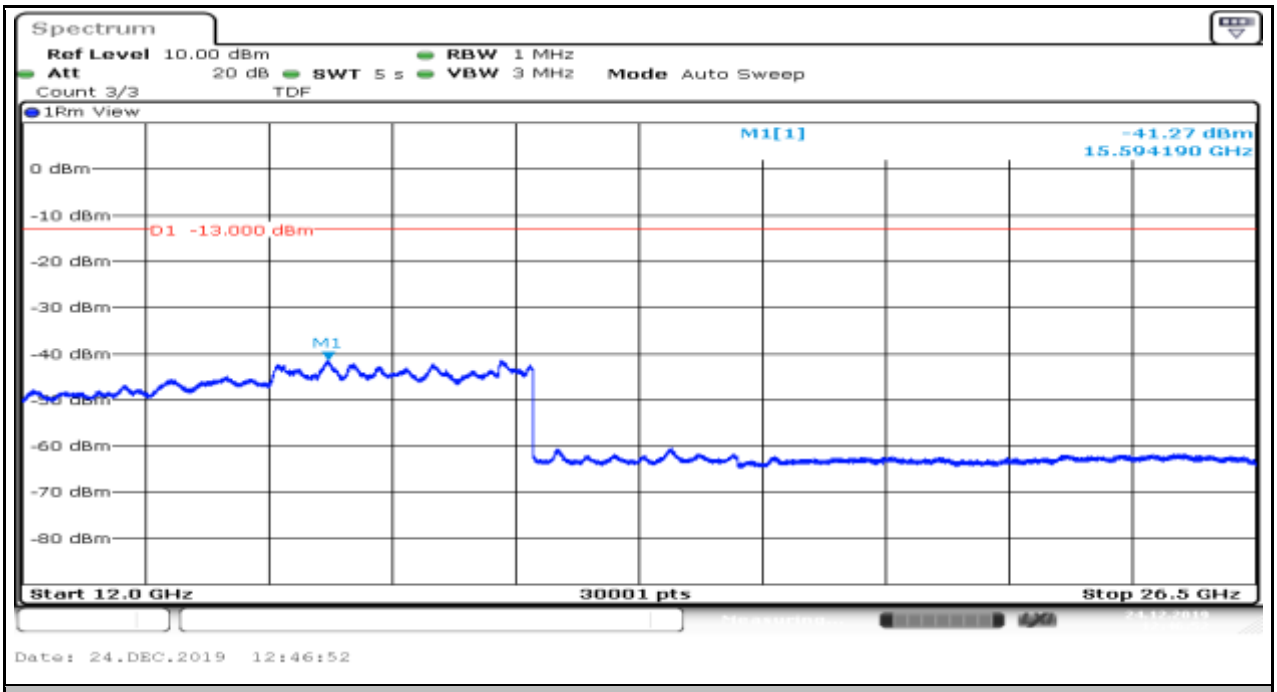
Band4_Stand-Alone_NaN_QPSK_20399_12@0_15kHz_5000_12000_5000~12000MHz@-47.59dBm_-13_PASS__



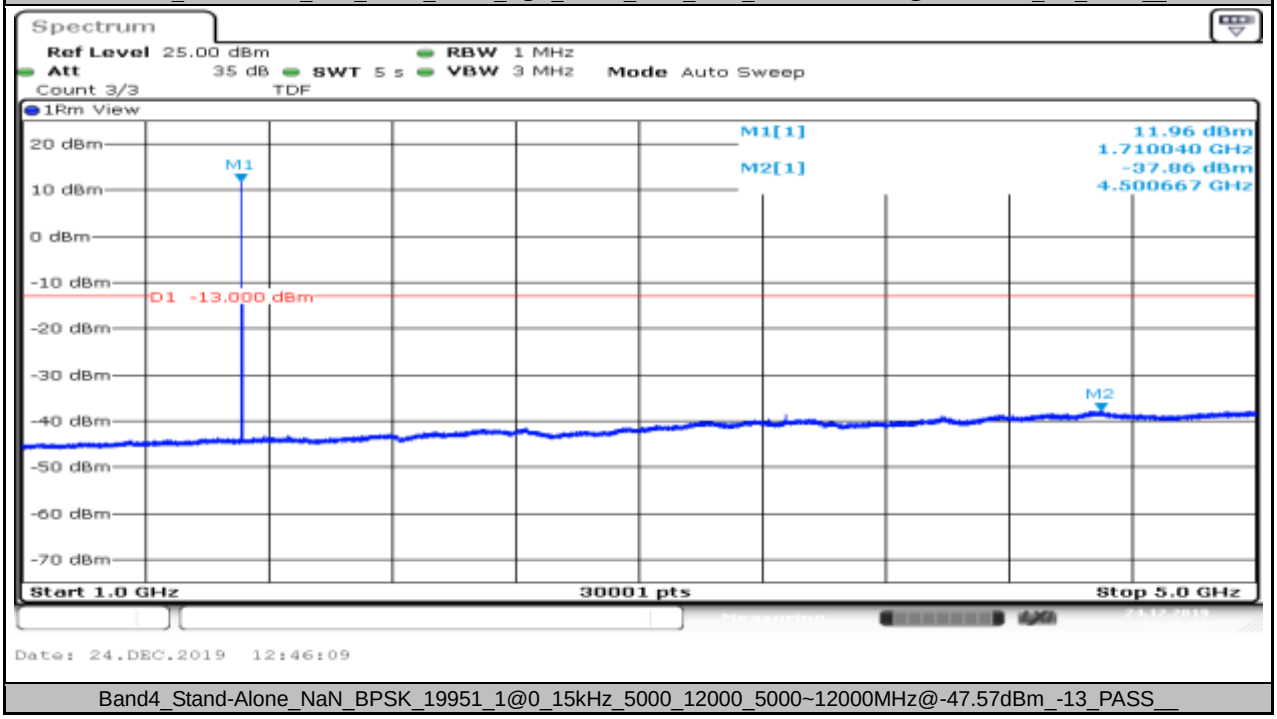
Band4_Stand-Alone_NaN_QPSK_20399_12@0_15kHz_1000_5000_1000~5000MHz@-37.89dBm_-13_PASS__



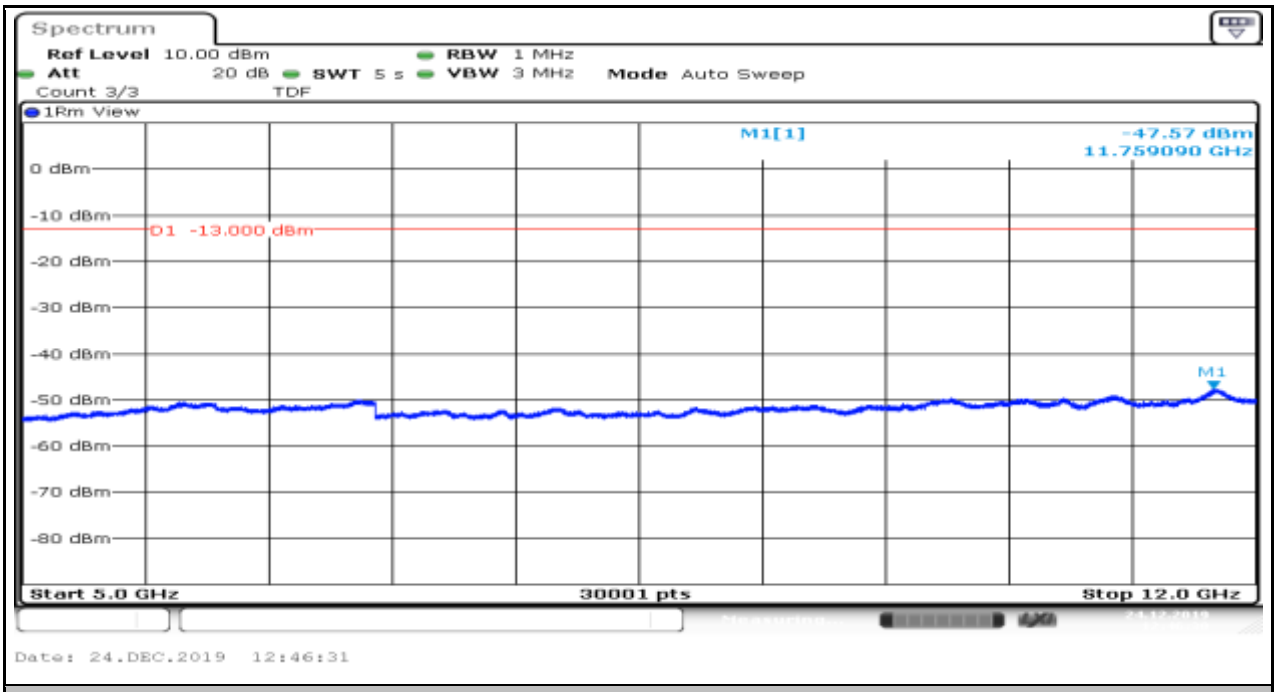
Band4_Stand-Alone_NaN_BPSK_19951_1@0_15kHz_12000_26500_12000~26500MHz@-41.27dBm_-13_PASS__



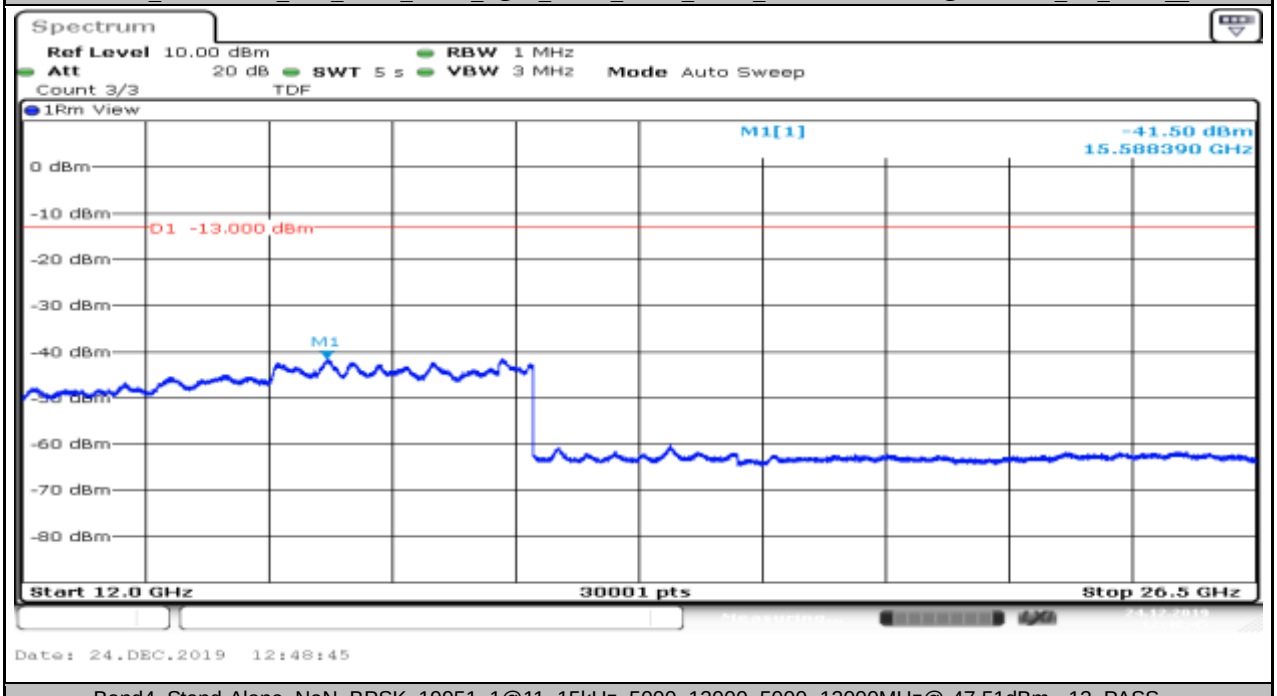
Band4_Stand-Alone_NaN_BPSK_19951_1@0_15kHz_1000_5000_1000~5000MHz@-37.86dBm_-13_PASS__



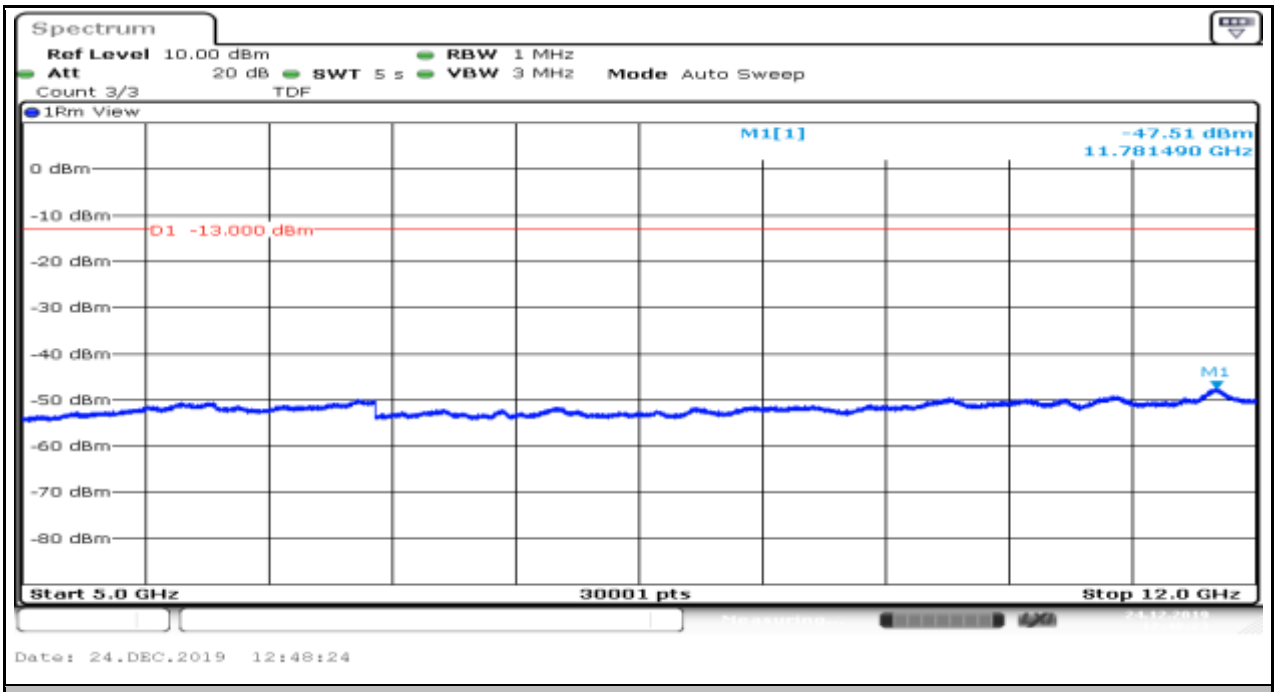
Band4_Stand-Alone_NaN_BPSK_19951_1@0_15kHz_5000_12000_5000~12000MHz@-47.57dBm_-13_PASS__



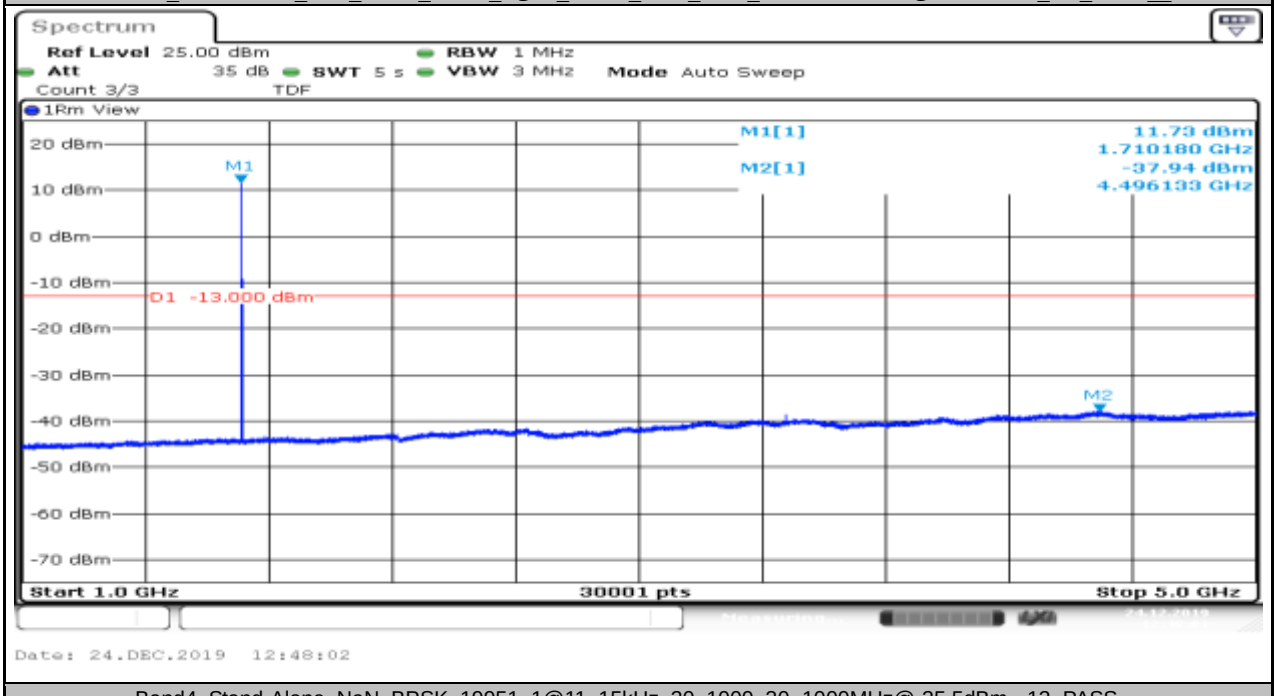
Band4_Stand-Alone_NaN_BPSK_19951_1@11_15kHz_12000_26500_12000~26500MHz@-41.5dBm_-13_PASS__



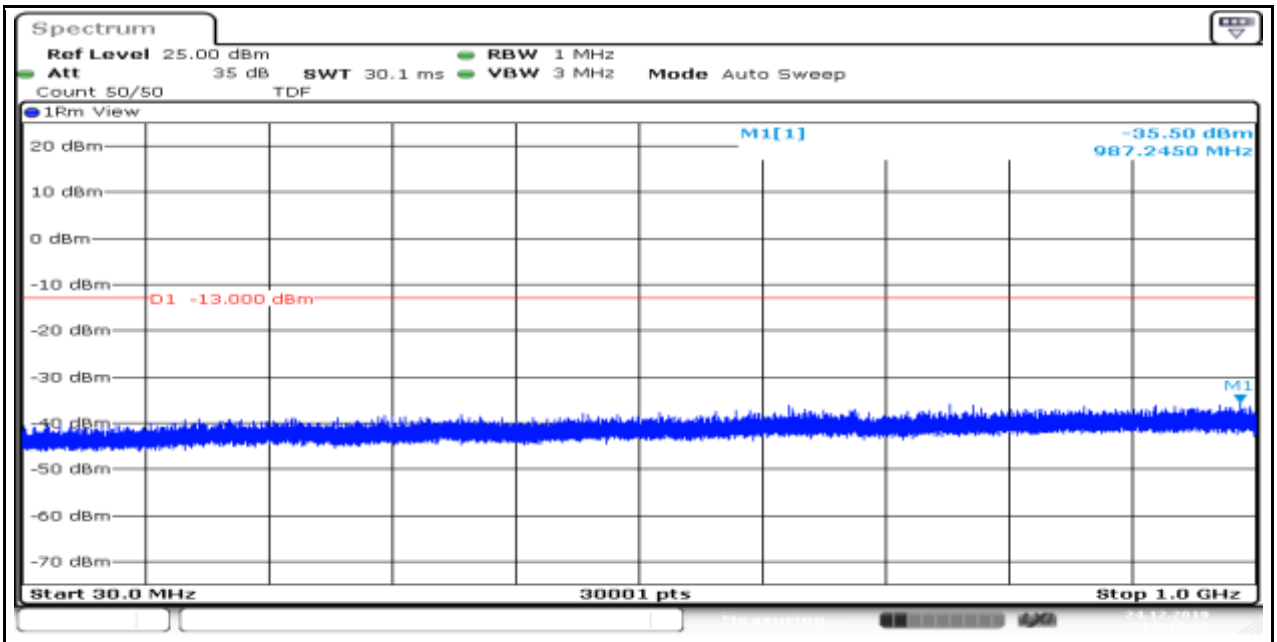
Band4_Stand-Alone_NaN_BPSK_19951_1@11_15kHz_5000_12000_5000~12000MHz@-47.51dBm_-13_PASS__



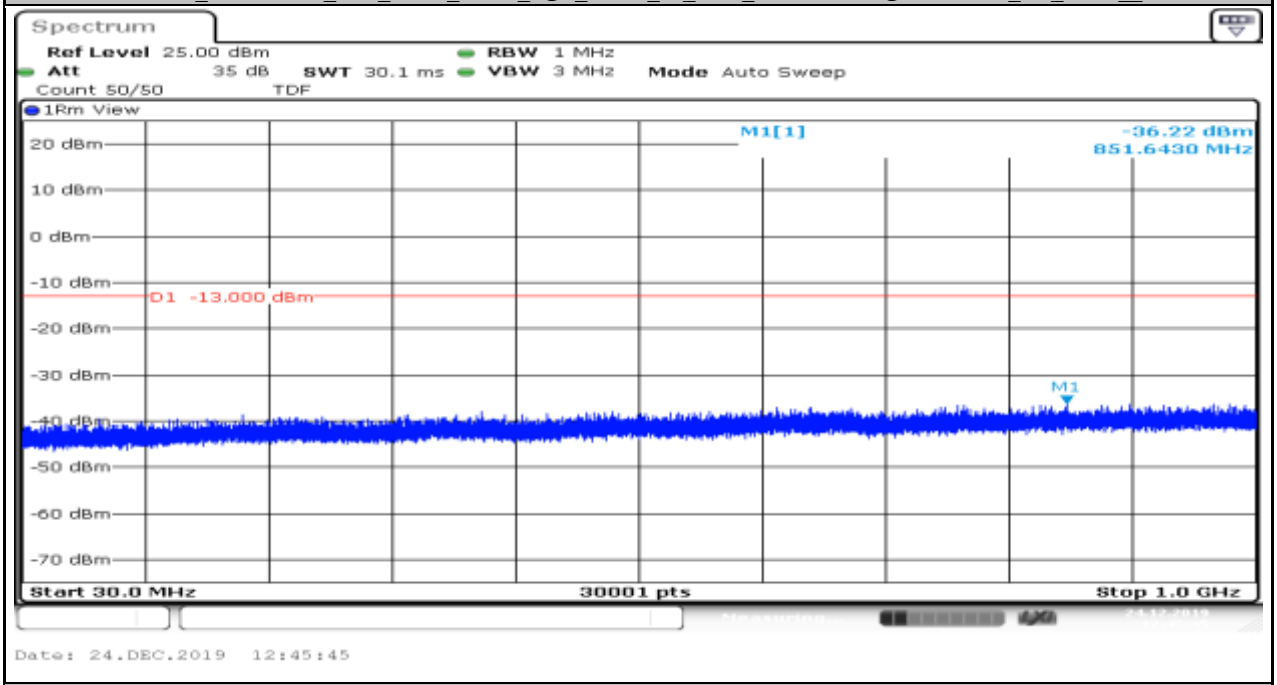
Band4_Stand-Alone_NaN_BPSK_19951_1@11_15kHz_1000_5000_1000~5000MHz@-37.94dBm_-13_PASS__



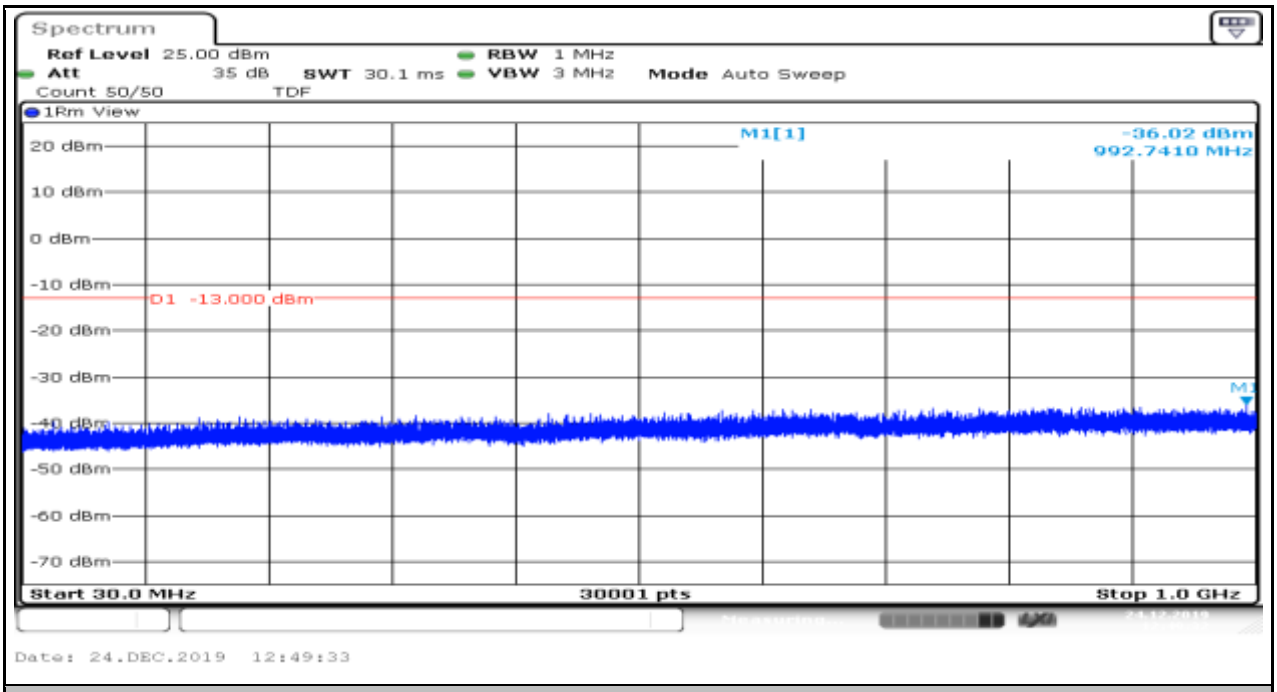
Band4_Stand-Alone_NaN_BPSK_19951_1@11_15kHz_30_1000_30~1000MHz@-35.5dBm_-13_PASS__



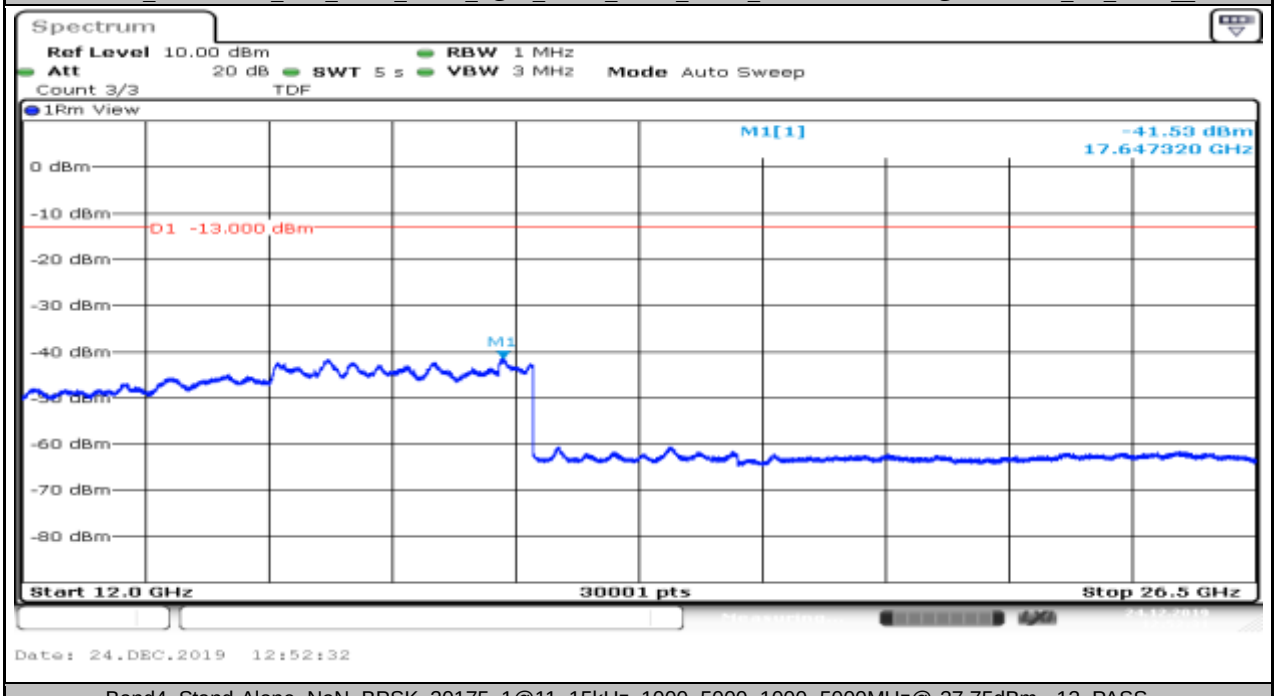
Band4_Stand-Alone_NaN_BPSK_19951_1@0_15kHz_30_1000_30~1000MHz@-36.22dBm_-13_PASS__



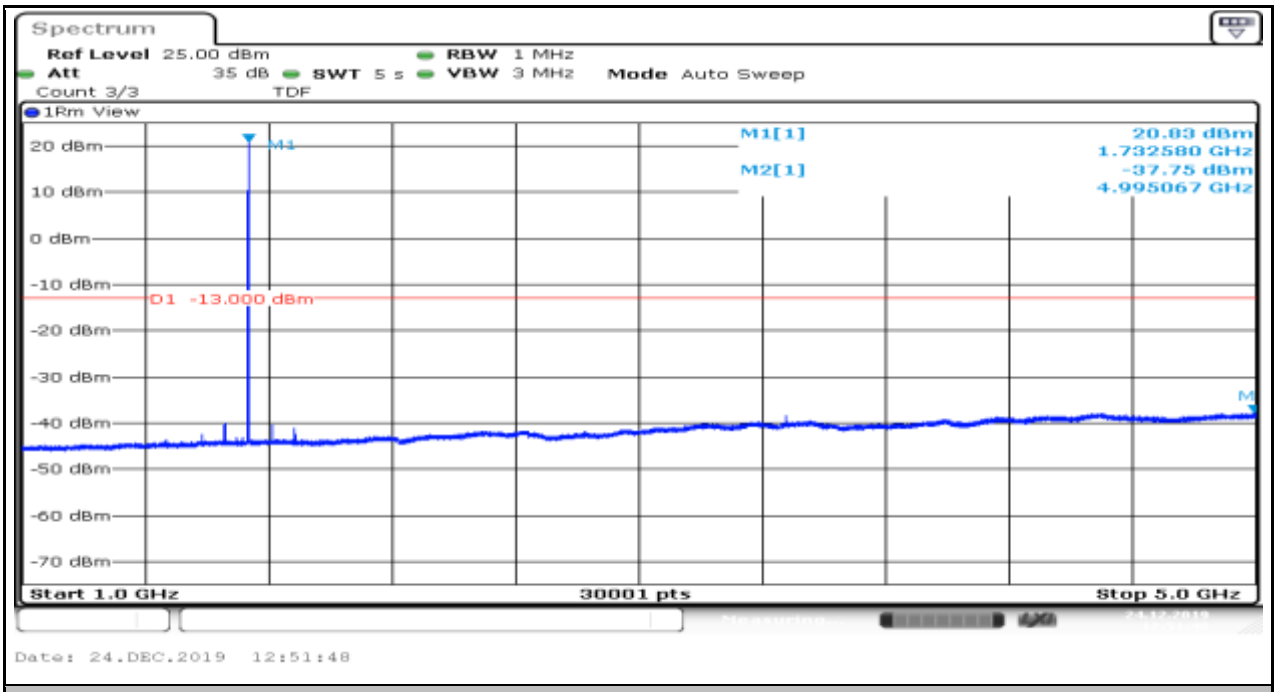
Band4_Stand-Alone_NaN_BPSK_20175_1@0_15kHz_30_1000_30~1000MHz@-36.02dBm_-13_PASS__



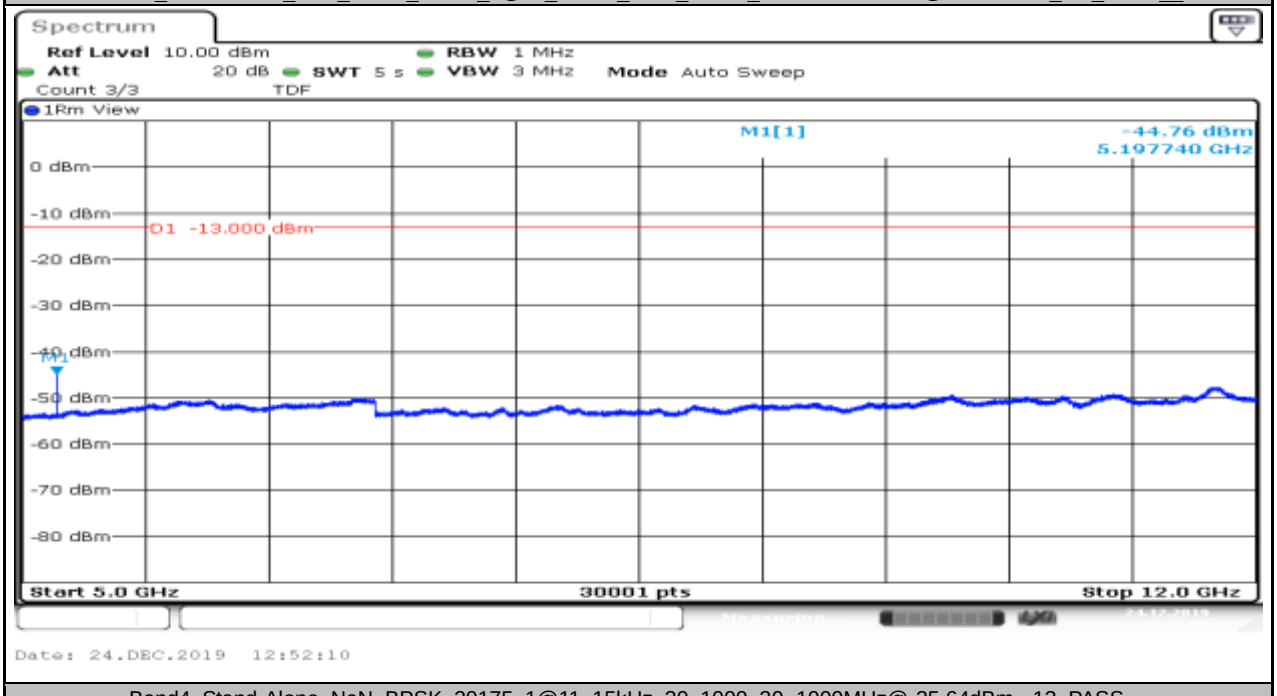
Band4_Stand-Alone_NaN_BPSK_20175_1@11_15kHz_12000_26500_12000~26500MHz@-41.53dBm_-13_PASS__



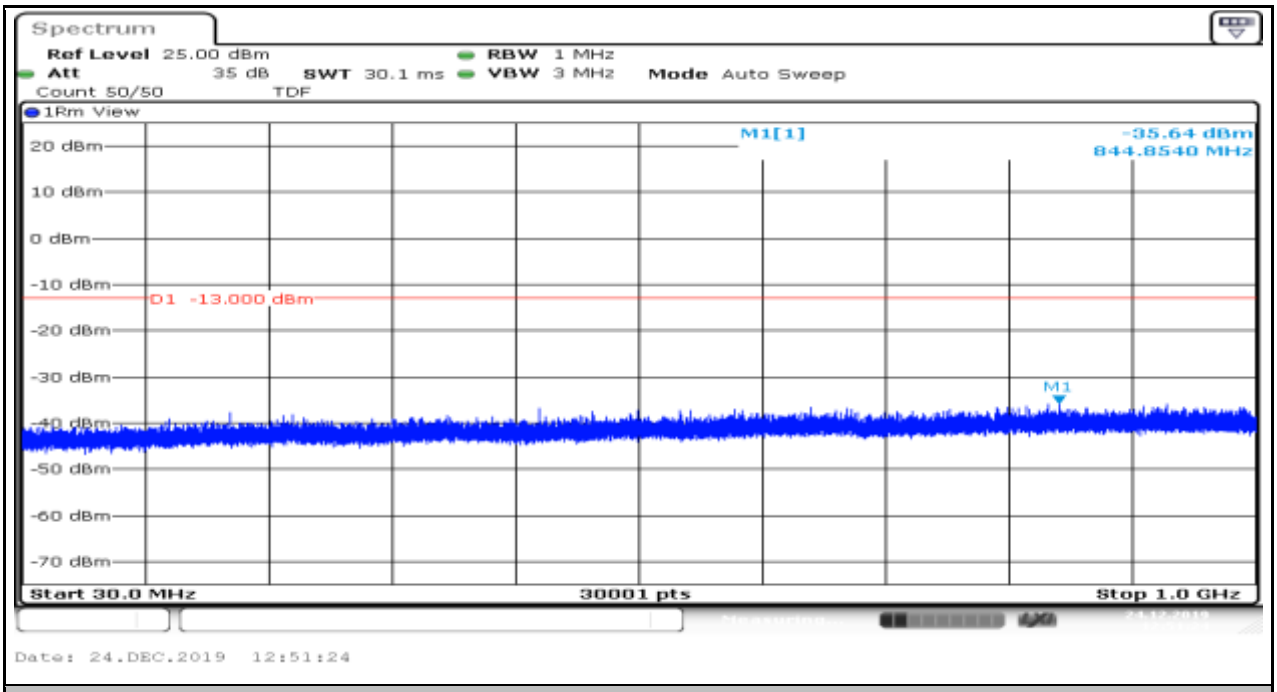
Band4_Stand-Alone_NaN_BPSK_20175_1@11_15kHz_1000_5000_1000~5000MHz@-37.75dBm_-13_PASS__



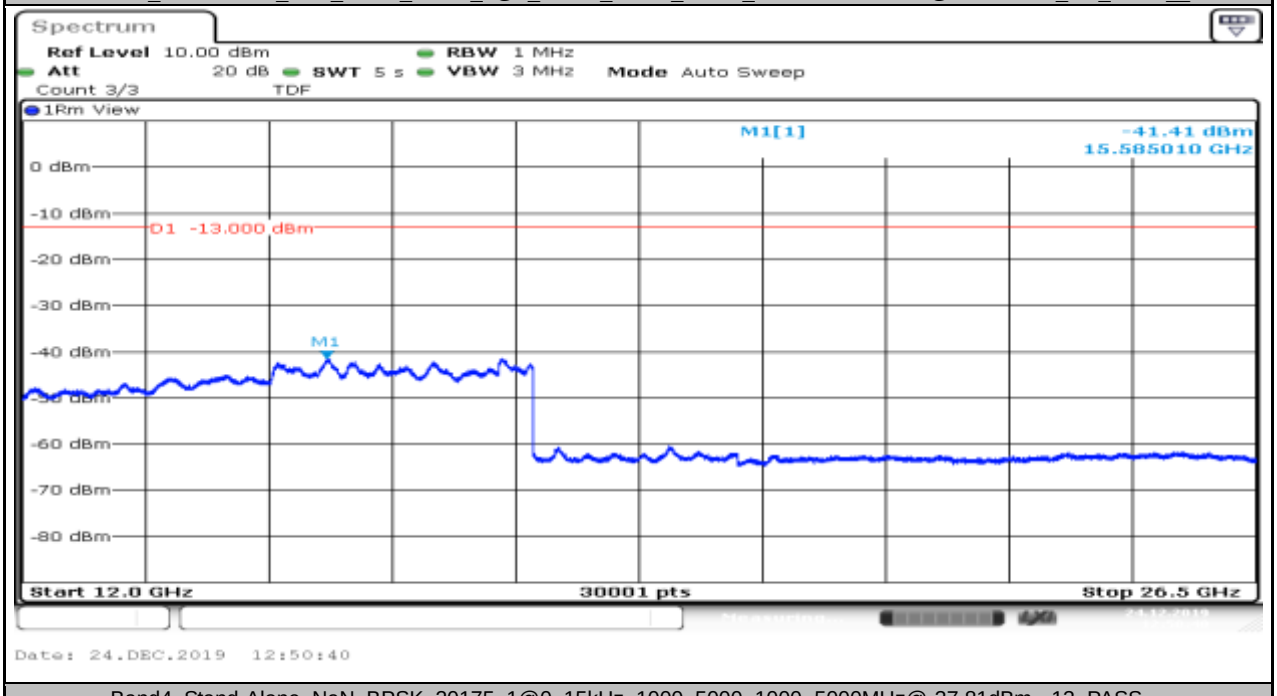
Band4_Stand-Alone_NaN_BPSK_20175_1@11_15kHz_5000_12000_5000~12000MHz@-44.76dBm_-13_PASS__



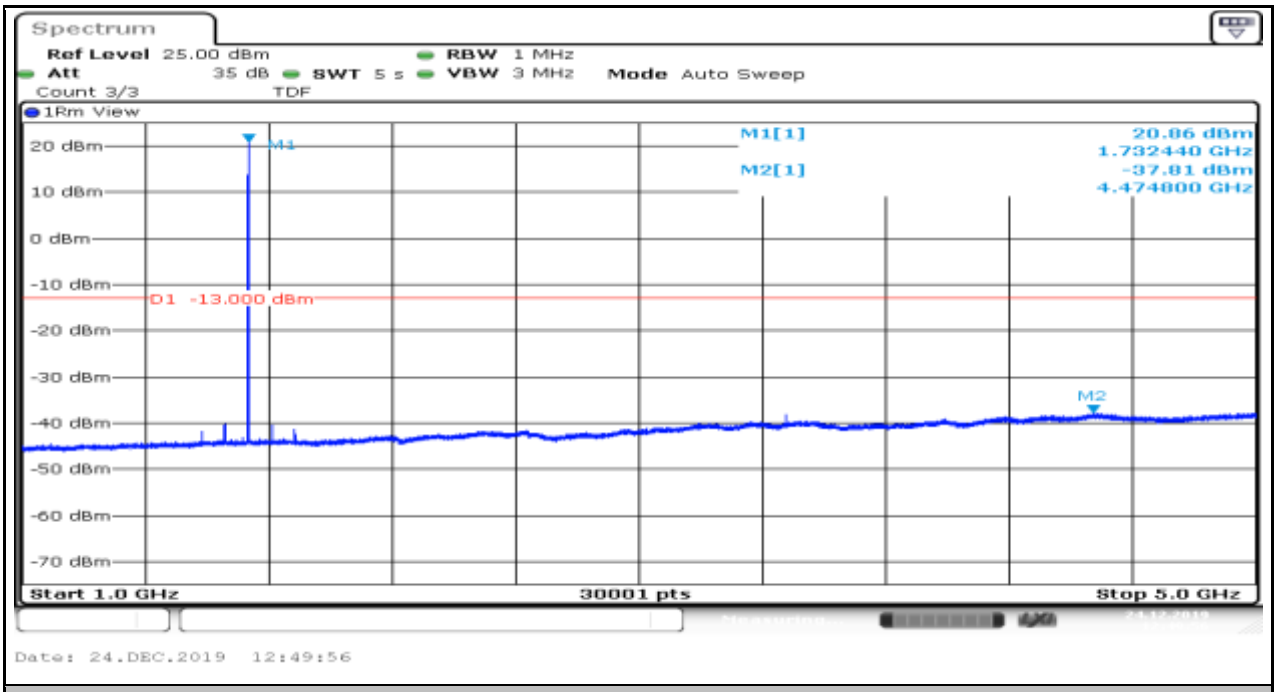
Band4_Stand-Alone_NaN_BPSK_20175_1@11_15kHz_30_1000_30~1000MHz@-35.64dBm_-13_PASS__



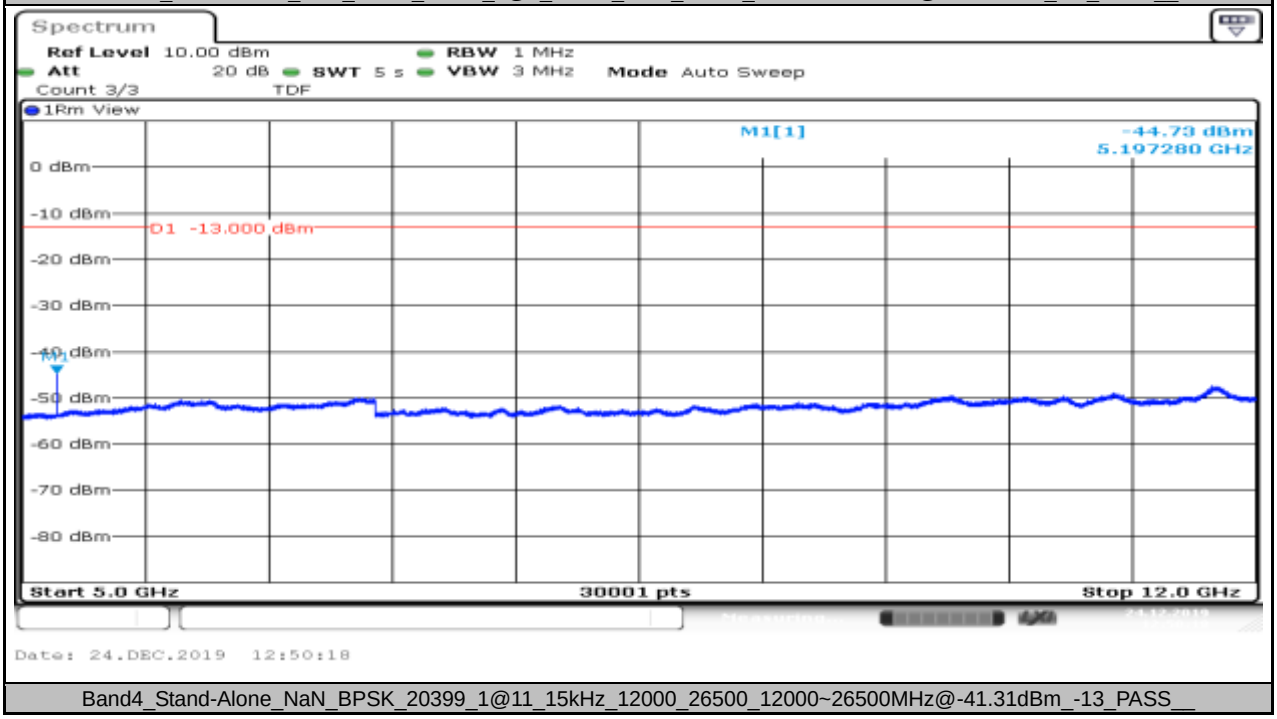
Band4_Stand-Alone_NaN_BPSK_20175_1@0_15kHz_12000_26500_12000~26500MHz@-41.41dBm_-13_PASS__



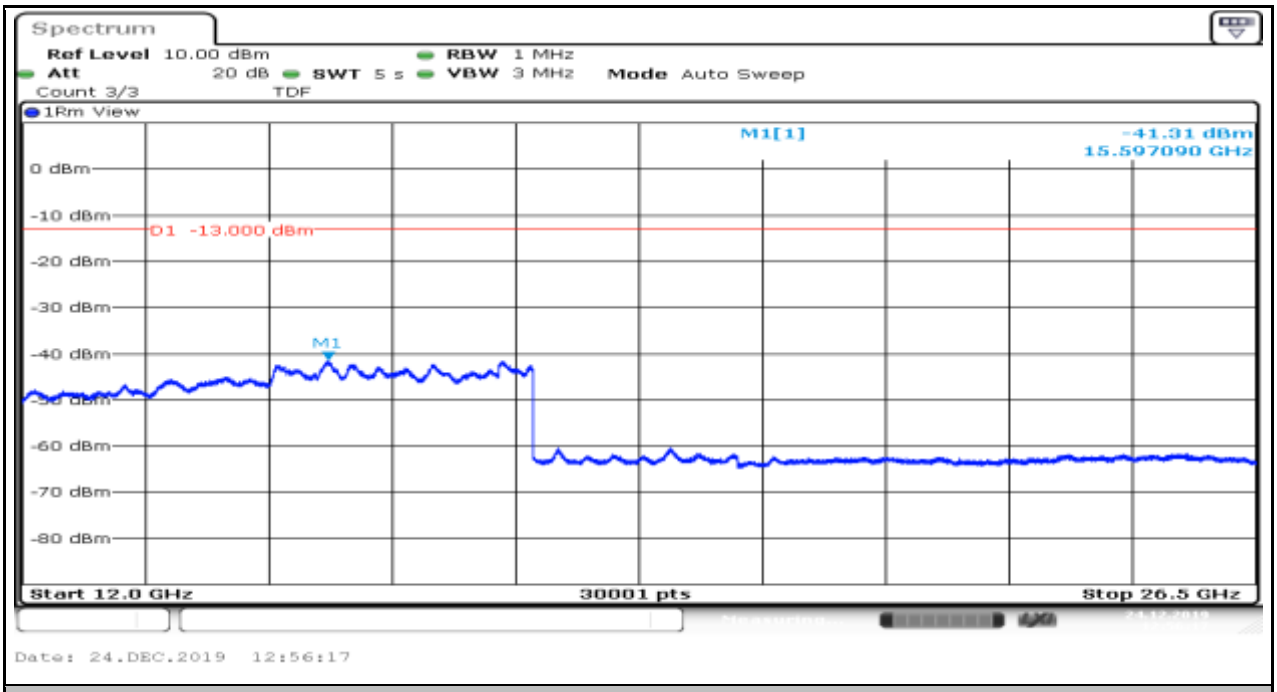
Band4_Stand-Alone_NaN_BPSK_20175_1@0_15kHz_1000_5000_1000~5000MHz@-37.81dBm_-13_PASS__



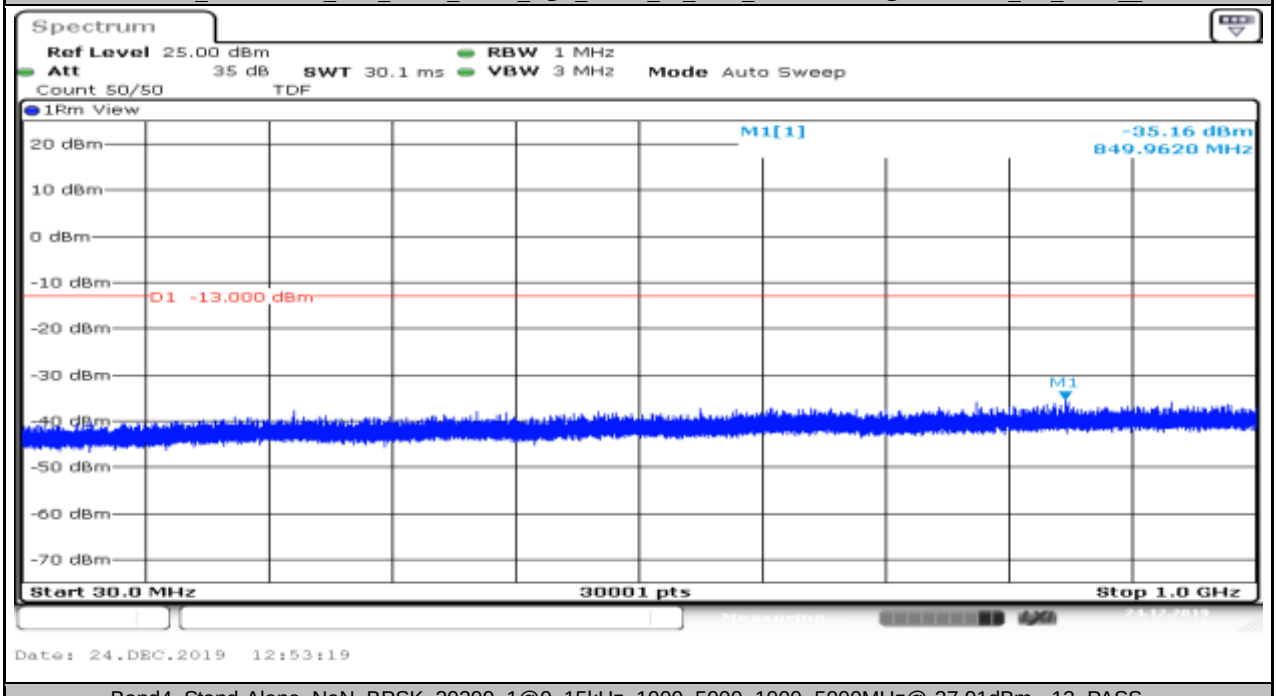
Band4_Stand-Alone_NaN_BPSK_20175_1@0_15kHz_5000_12000_5000~12000MHz@-44.73dBm_-13_PASS__



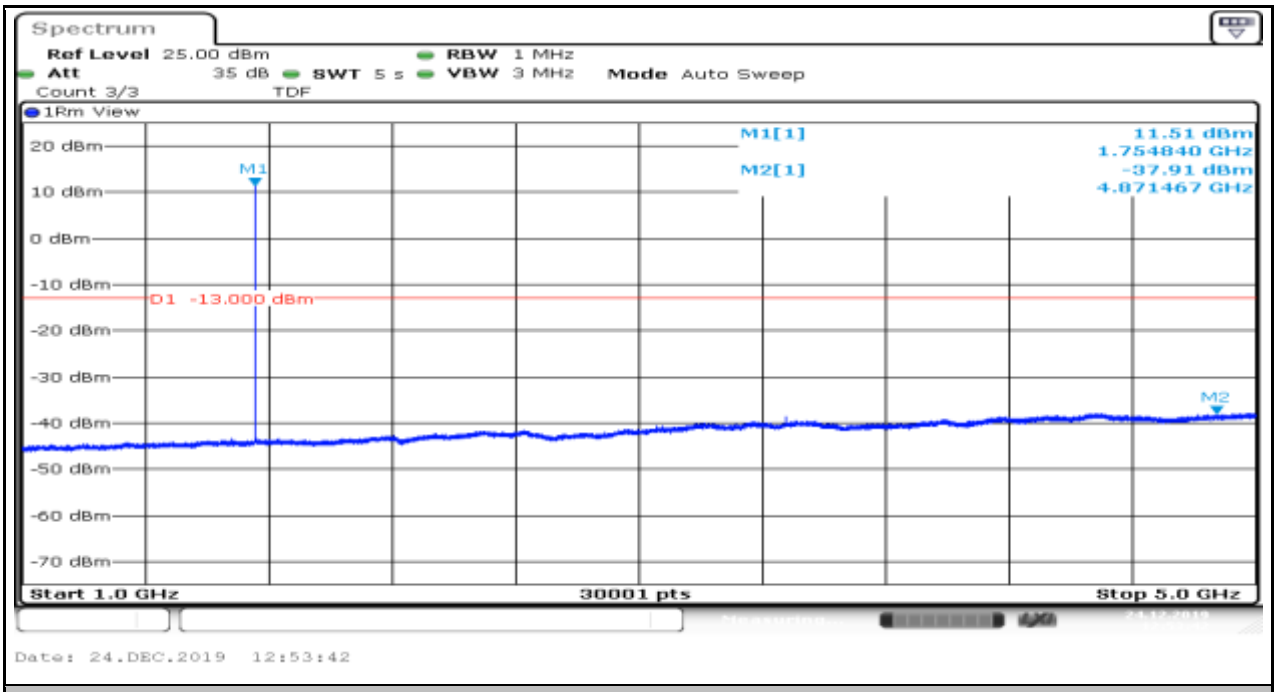
Band4_Stand-Alone_NaN_BPSK_20399_1@11_15kHz_12000_26500_12000~26500MHz@-41.31dBm_-13_PASS__



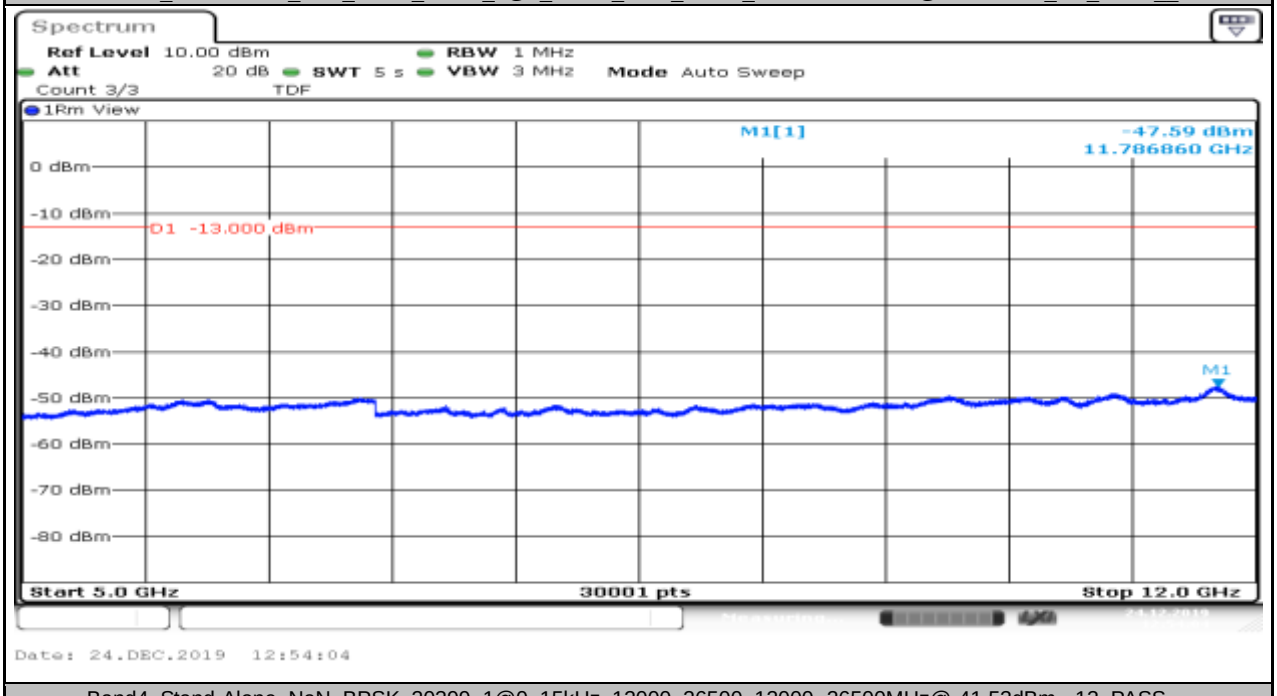
Band4_Stand-Alone_NaN_BPSK_20399_1@0_15kHz_30_1000_30~1000MHz@-35.16dBm_-13_PASS__



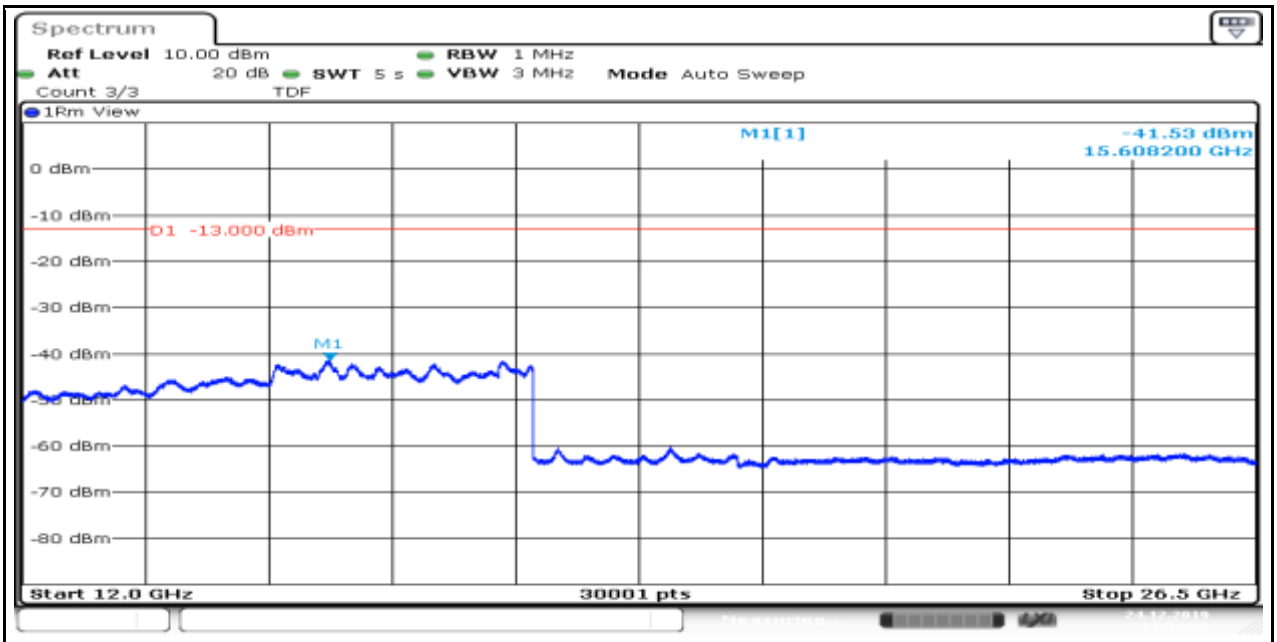
Band4_Stand-Alone_NaN_BPSK_20399_1@0_15kHz_1000_5000_1000~5000MHz@-37.91dBm_-13_PASS__



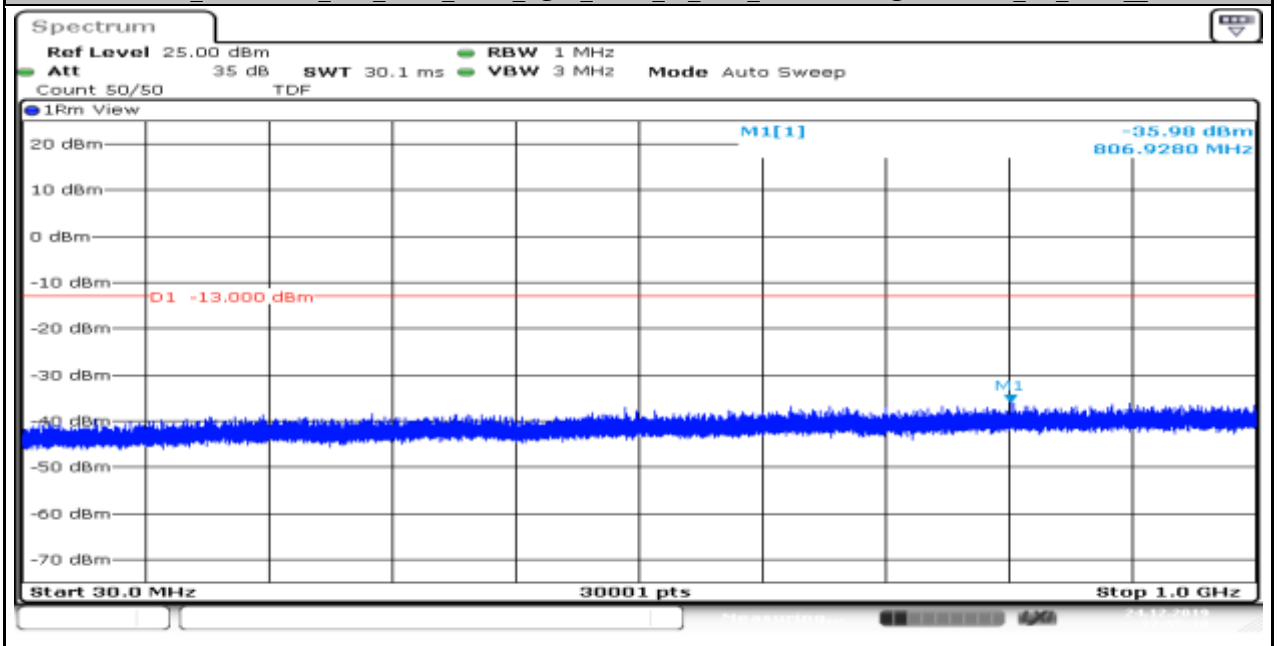
Band4_Stand-Alone_NaN_BPSK_20399_1@0_15kHz_5000_12000_5000~12000MHz@-47.59dBm_-13_PASS__



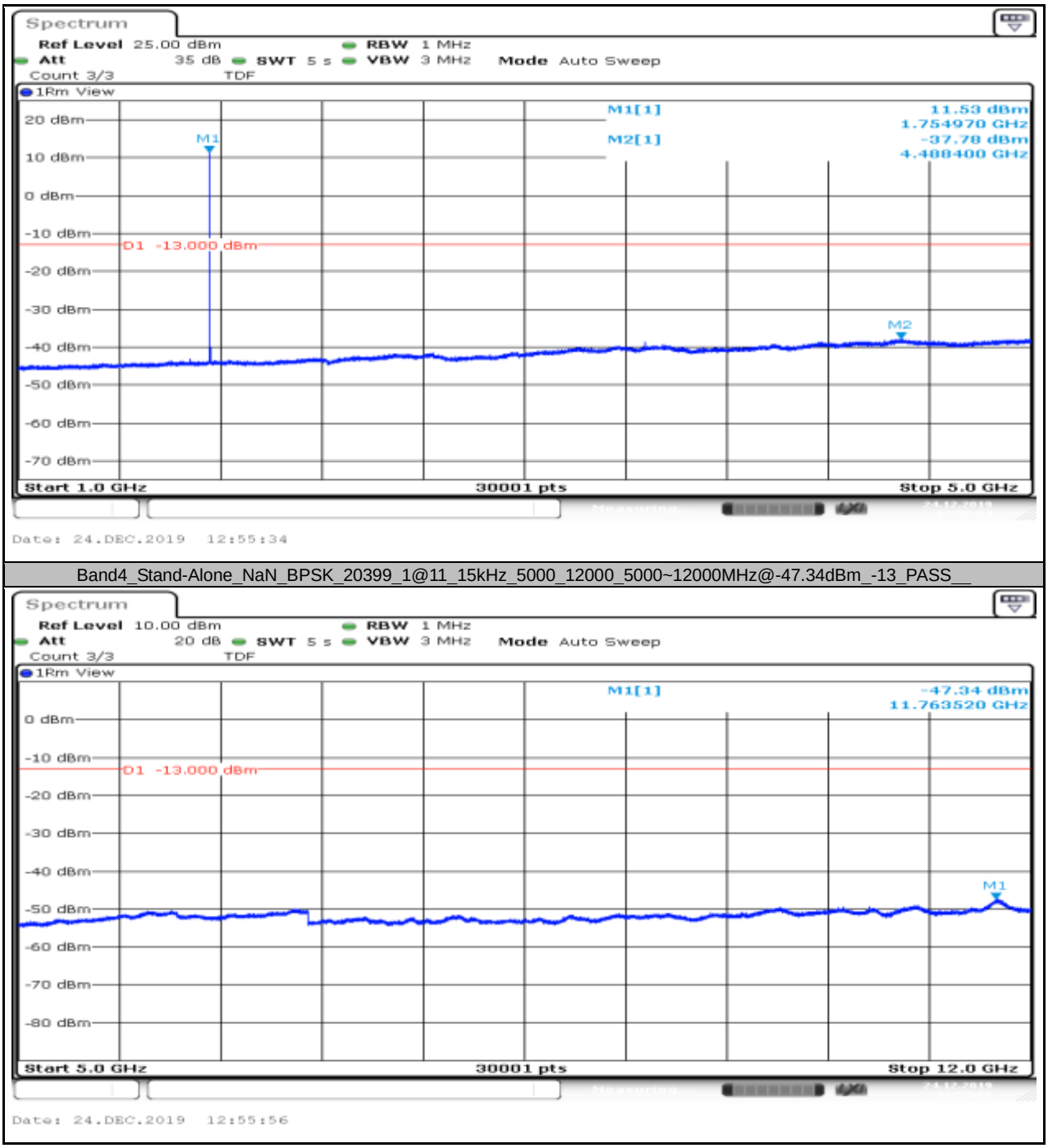
Band4_Stand-Alone_NaN_BPSK_20399_1@0_15kHz_12000_26500_12000~26500MHz@-41.53dBm_-13_PASS__



Band4_Stand-Alone_NaN_BPSK_20399_1@11_15kHz_30_1000_30~1000MHz@-35.98dBm_-13_PASS__



Band4_Stand-Alone_NaN_BPSK_20399_1@11_15kHz_1000_5000_1000~5000MHz@-37.78dBm_-13_PASS__


Spectrum
Ref Level 25.00 dBm
RBW 1 MHz
Att 35 dB SWT 5 s VBW 3 MHz Mode Auto Sweep
Count 3/3 TDF
1Rm View
M1[1] 11.53 dBm
1.754970 GHz
M2[1] -37.78 dBm
4.488400 GHz
D1 -13.000 dBm
Start 1.0 GHz 30001 pts Stop 5.0 GHz
Date: 24.DEC.2019 12:55:34
Band4_Stand-Alone_NaN_BPSK_20399_1@11_15kHz_5000_12000_5000~12000MHz@-47.34dBm_-13_PASS__
Spectrum
Ref Level 10.00 dBm
RBW 1 MHz
Att 20 dB SWT 5 s VBW 3 MHz Mode Auto Sweep
Count 3/3 TDF
1Rm View
M1[1] -47.34 dBm
11.763520 GHz
D1 -13.000 dBm
Start 5.0 GHz 30001 pts Stop 12.0 GHz
Date: 24.DEC.2019 12:55:56

Appendix B.6: Frequency Stability for NB

Test Result

Voltage												
Band	OpMode	Bandwidth	Modulation	Channel	Tones	SCS	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	LV	NT	-19.21	-0.011088	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	LV	NT	-23.25	-0.013420	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	HV	NT	-21.77	-0.012566	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	LV	NT	-18.73	-0.010811	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	NT	-21.40	-0.012352	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	HV	NT	-22.52	-0.012999	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	NT	-29.54	-0.017051	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	HV	NT	-16.59	-0.009576	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	LV	NT	-20.96	-0.012098	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	HV	NT	-21.09	-0.012173	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	NT	-23.05	-0.013304	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	NT	-22.50	-0.012987	±2.5	PASS

Temperature												
Band	OpMode	Bandwidth	Modulation	Channel	Tones	SCS	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	0	-18.32	-0.010574	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	85	-18.90	-0.010909	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	80	-17.71	-0.010222	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	70	-18.53	-0.010696	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	60	-15.88	-0.009166	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	50	-19.24	-0.011105	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	40	-19.24	-0.011105	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	30	-15.71	-0.009068	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	10	-18.44	-0.010644	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	-10	-21.86	-0.012618	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	-40	-17.32	-0.009997	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	40	-23.07	-0.013316	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	-20	-21.73	-0.012543	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	20	-20.17	-0.011642	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	-30	-32.39	-0.018696	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	-20	-16.89	-0.009749	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	-10	-16.72	-0.009651	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	0	-21.64	-0.012491	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	10	-15.85	-0.009149	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	85	-16.88	-0.009743	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	30	-20.48	-0.011821	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	-30	-16.16	-0.009328	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	50	-14.42	-0.008323	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	60	-17.67	-0.010199	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	70	-22.19	-0.012808	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	80	-20.06	-0.011579	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	80	-15.26	-0.008808	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@11	15kHz	NV	20	-21.94	-0.012664	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	-20	-19.47	-0.011238	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	-40	-17.91	-0.010338	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	-30	-17.29	-0.009980	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	15kHz	NV	-40	-19.20	-0.011082	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	-10	-13.92	-0.008035	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	0	-18.08	-0.010436	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	10	-16.44	-0.009489	±2.5	PASS

Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	20	-11.67	-0.006736	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	30	-15.86	-0.009154	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	40	-14.13	-0.008156	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	50	-15.34	-0.008854	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	60	-14.25	-0.008225	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	70	-15.55	-0.008975	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	85	-15.65	-0.009033	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	70	-11.30	-0.006522	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@0	3.75kHz	NV	-40	-16.98	-0.009801	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	80	-15.94	-0.009201	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	60	-13.62	-0.007861	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	50	-17.58	-0.010147	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	40	-12.72	-0.007342	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	30	-10.93	-0.006309	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	10	-14.20	-0.008196	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	0	-17.78	-0.010263	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	-10	-11.16	-0.006442	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	-20	-17.19	-0.009922	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	20	-17.37	-0.010026	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	-30	-14.71	-0.008491	±2.5	PASS
Band4	Stand-Alone	NaN	QPSK	20175	1@47	3.75kHz	NV	85	-12.77	-0.007371	±2.5	PASS