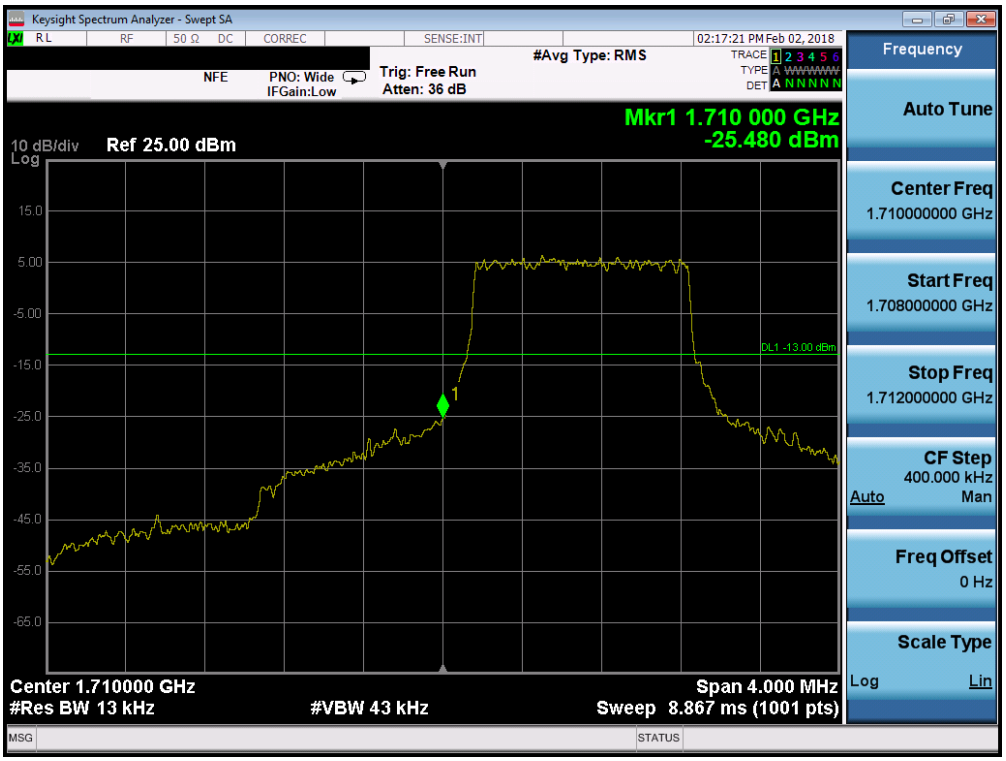
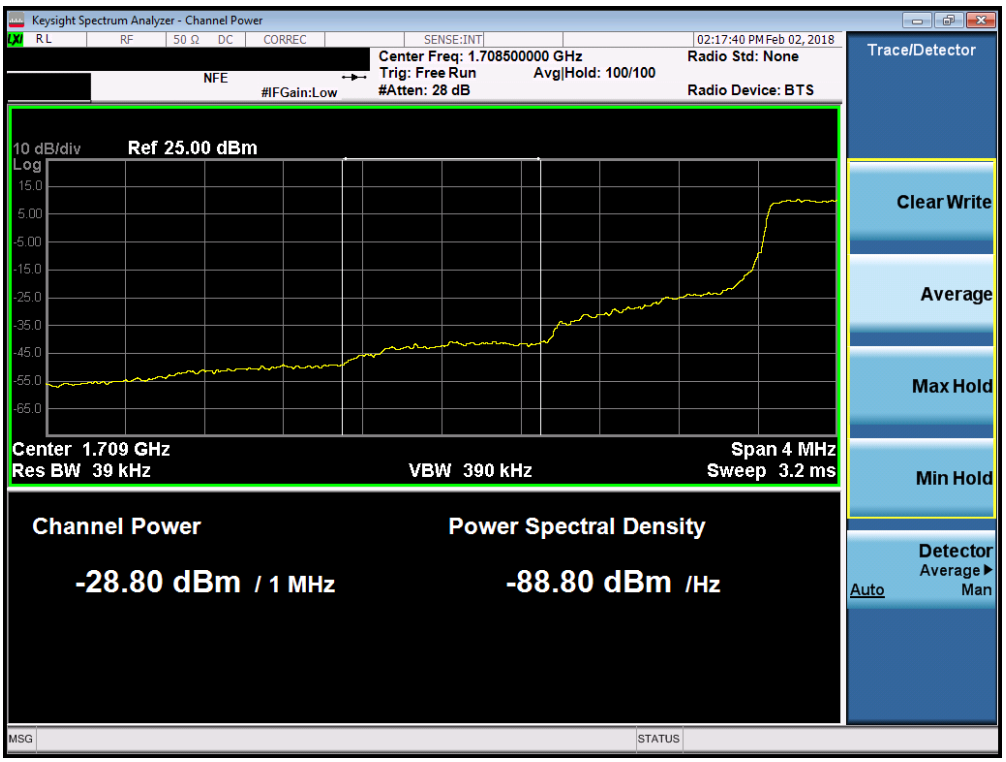
Band 4



Plot 6-89. Lower Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



Plot 6-90. Lower Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

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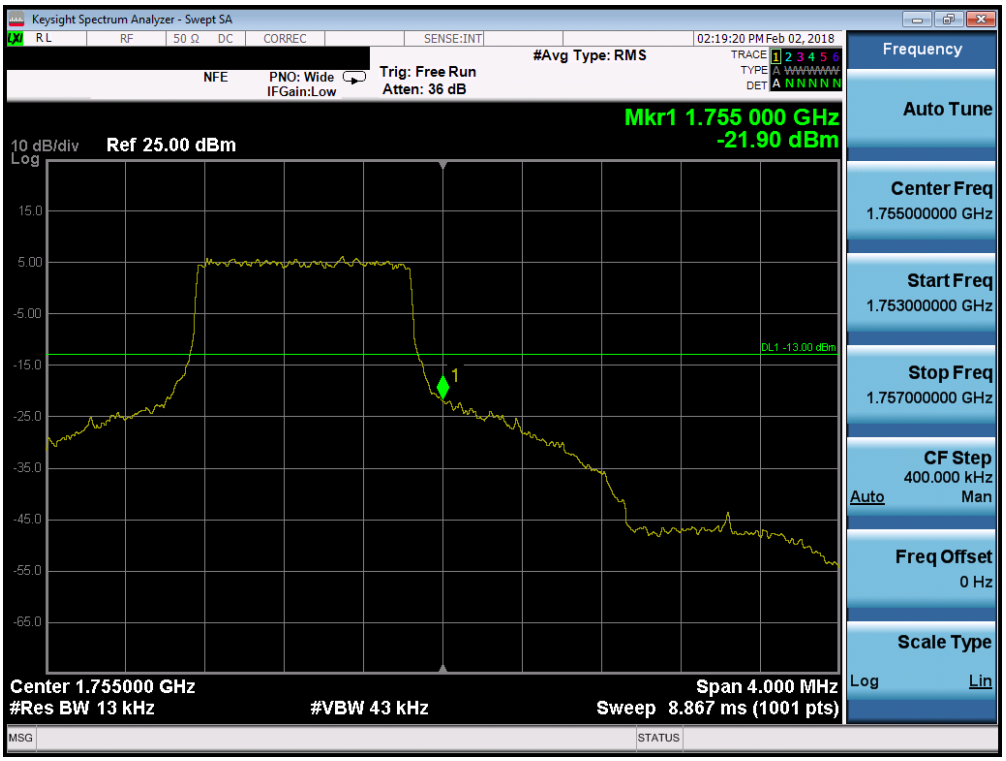
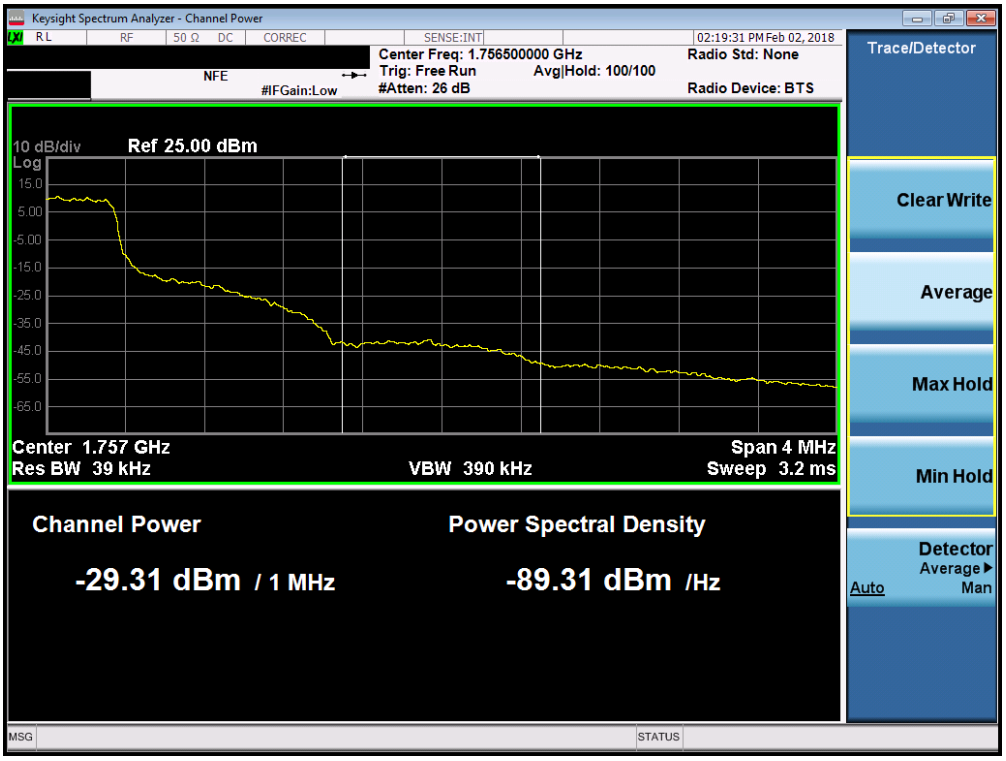


Plot 6-91. Upper Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



Plot 6-92. Upper Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

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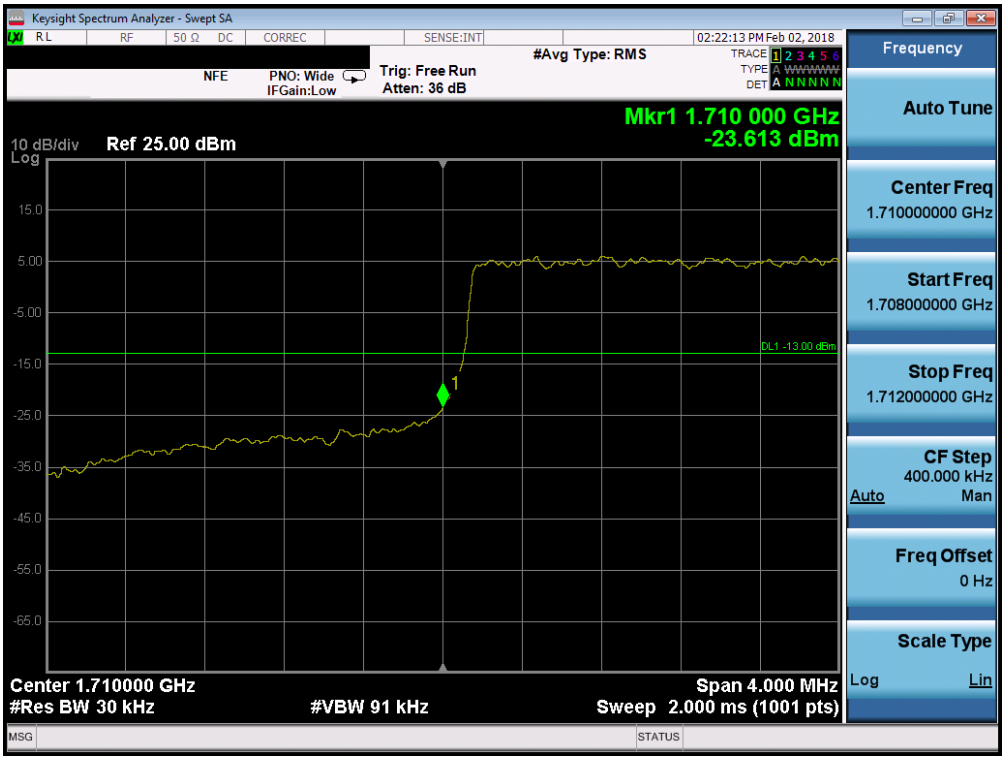
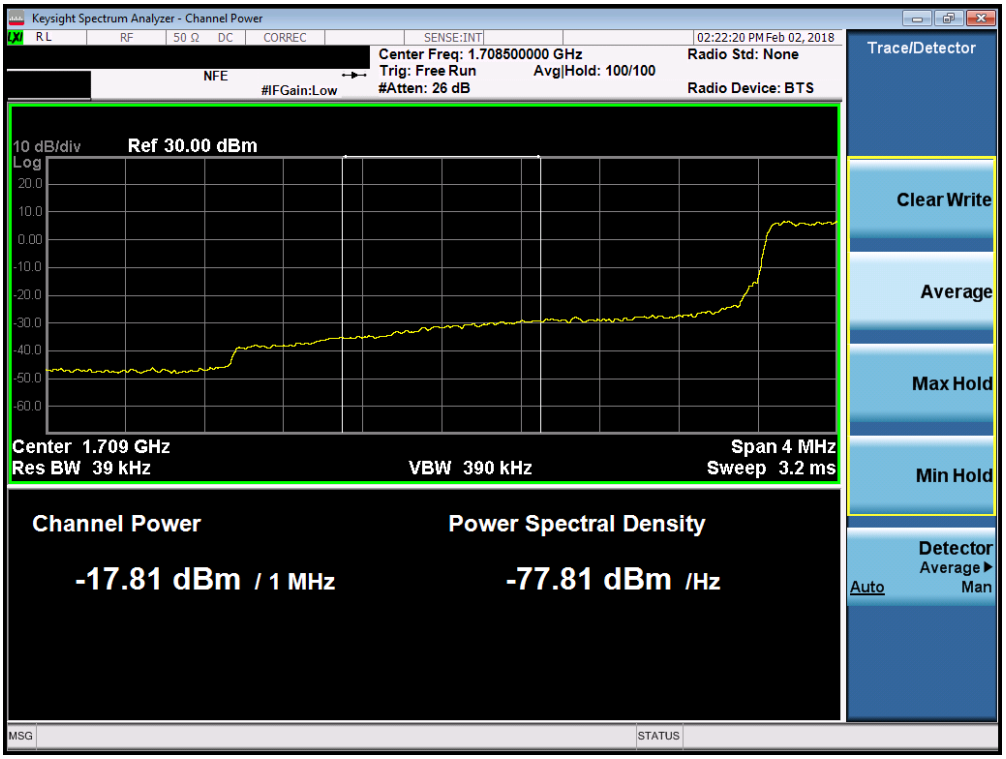


Plot 6-93. Lower Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



Plot 6-94. Lower Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

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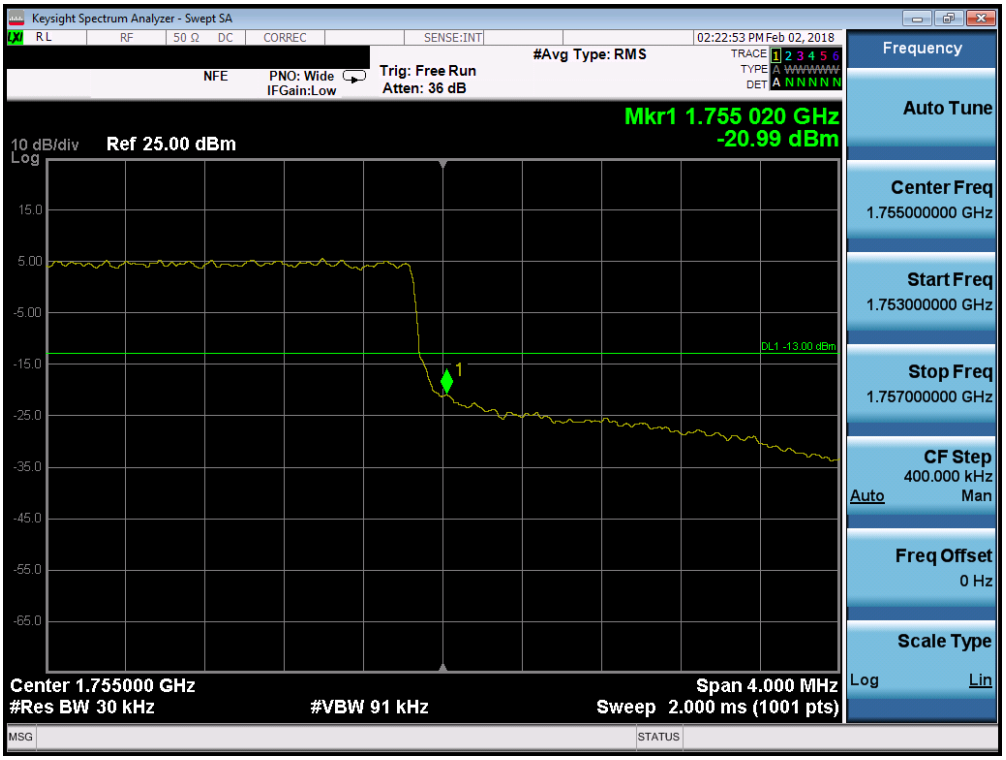
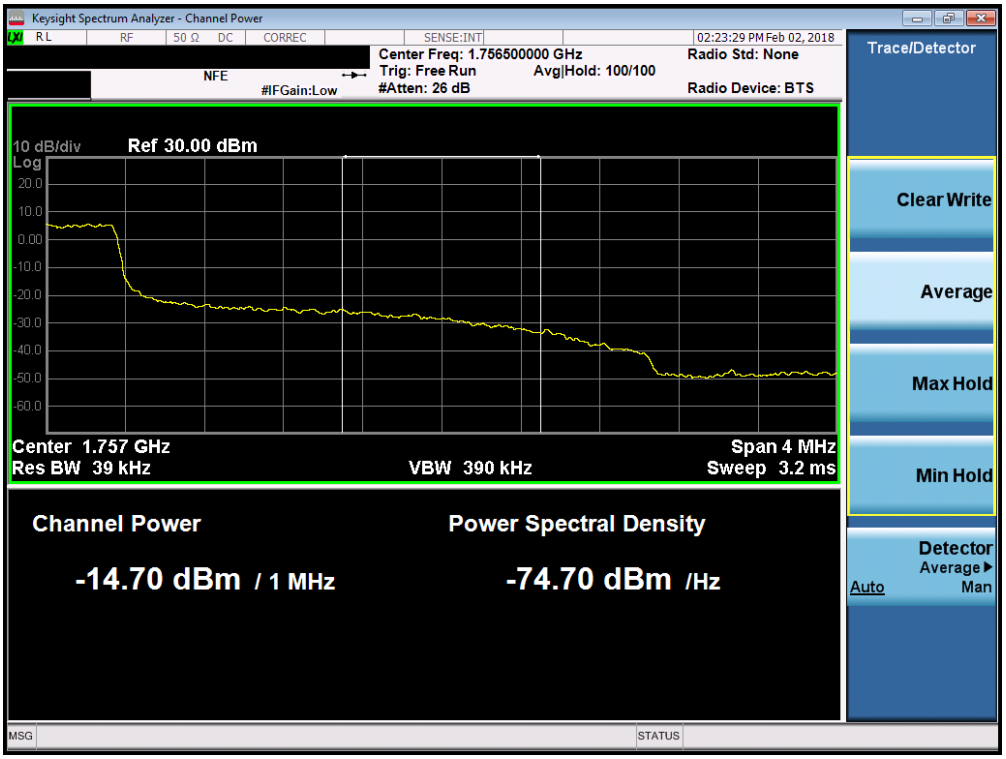


Plot 6-95. Upper Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



Plot 6-96. Upper Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

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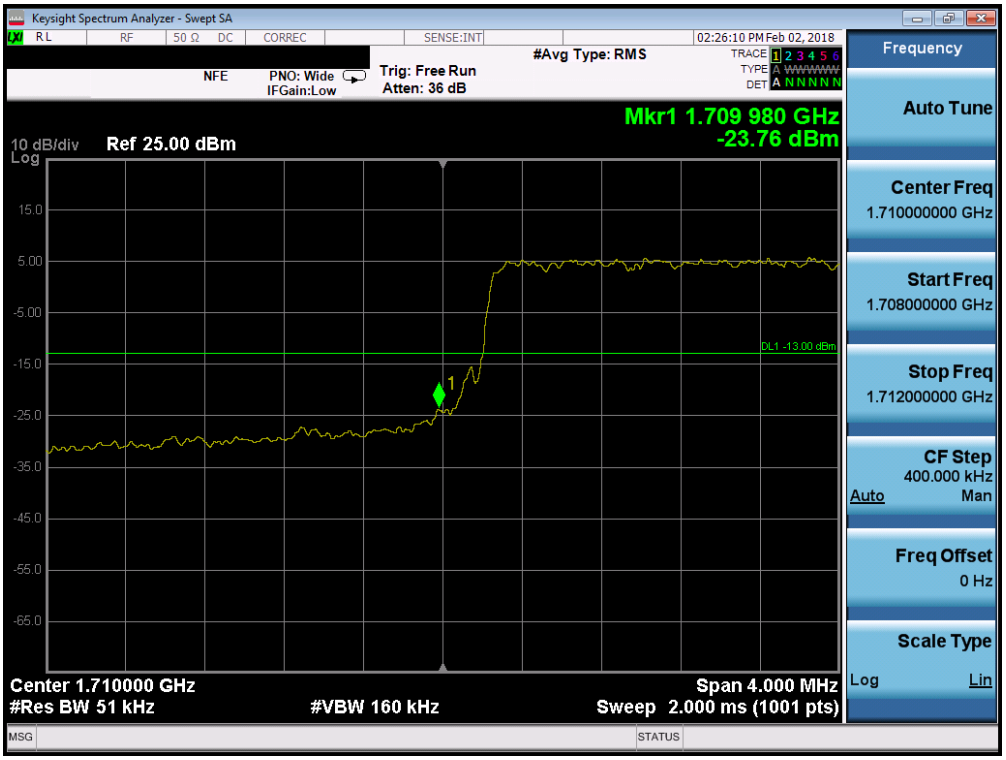
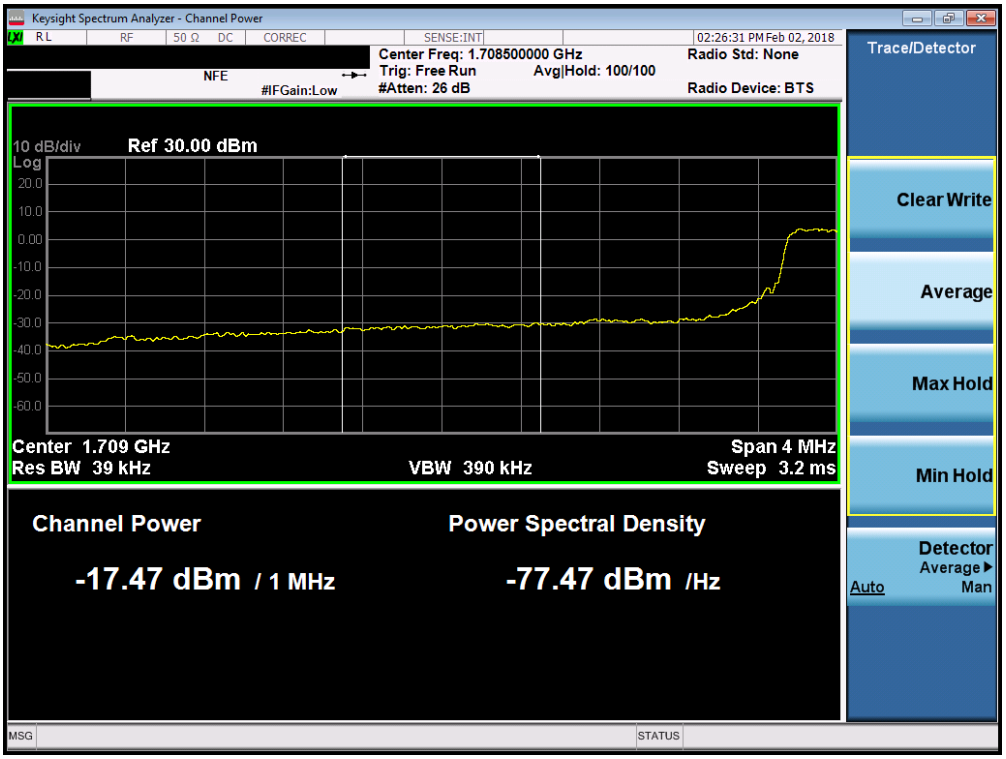


Plot 6-97. Lower Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



Plot 6-98. Lower Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

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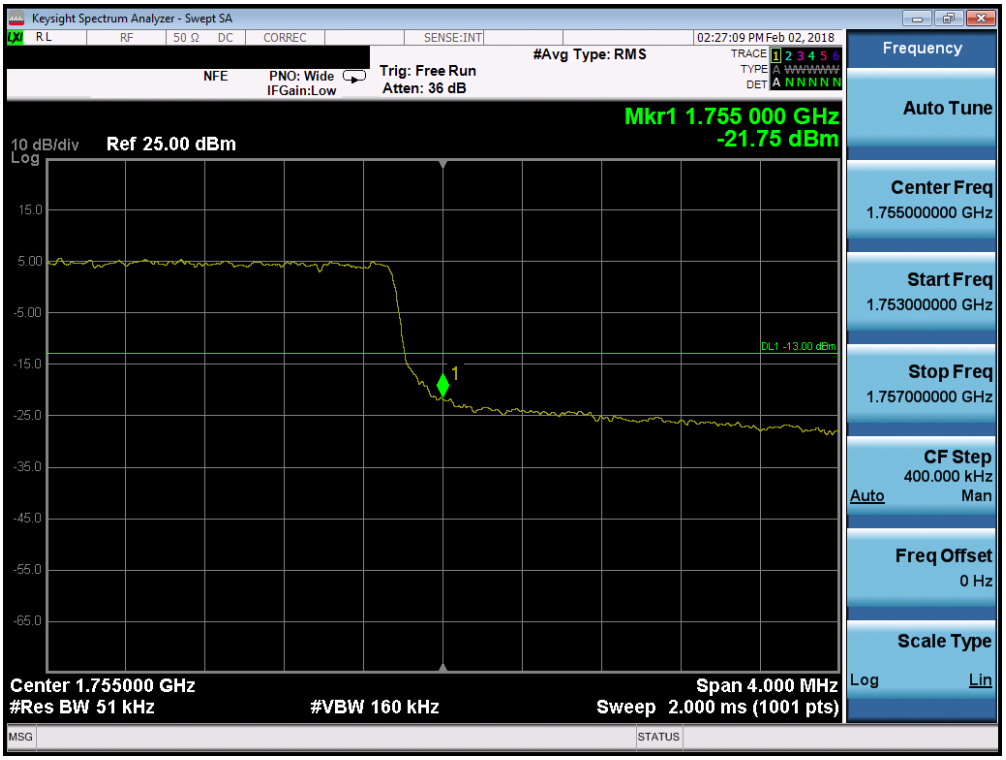
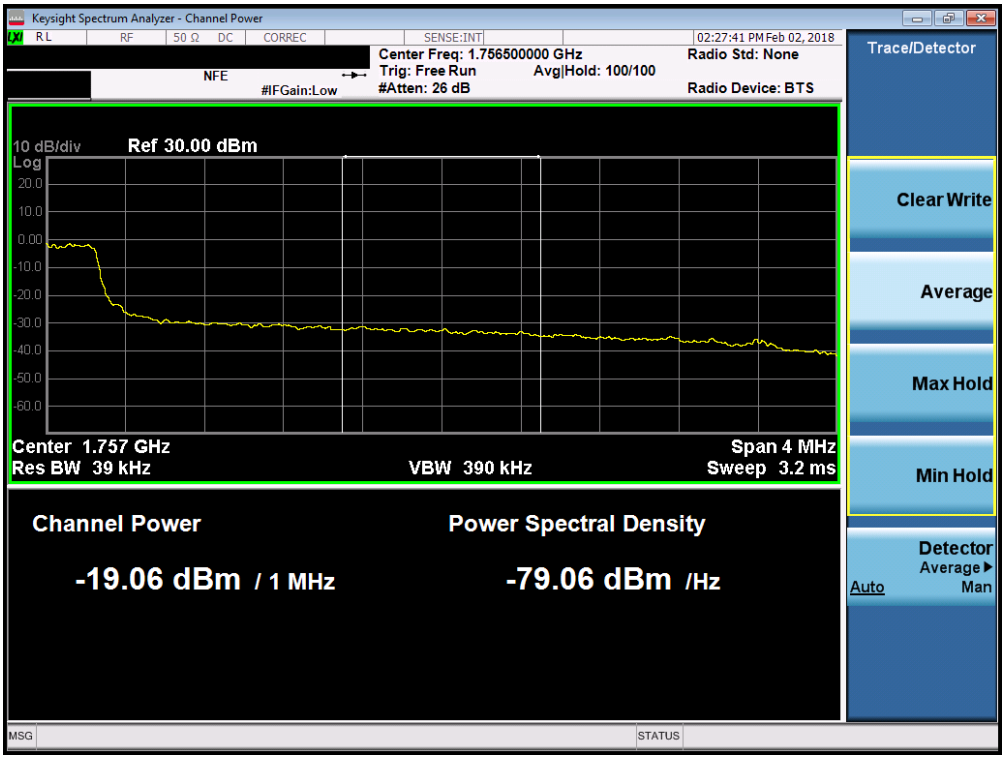


Plot 6-99. Upper Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



Plot 6-100. Upper Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

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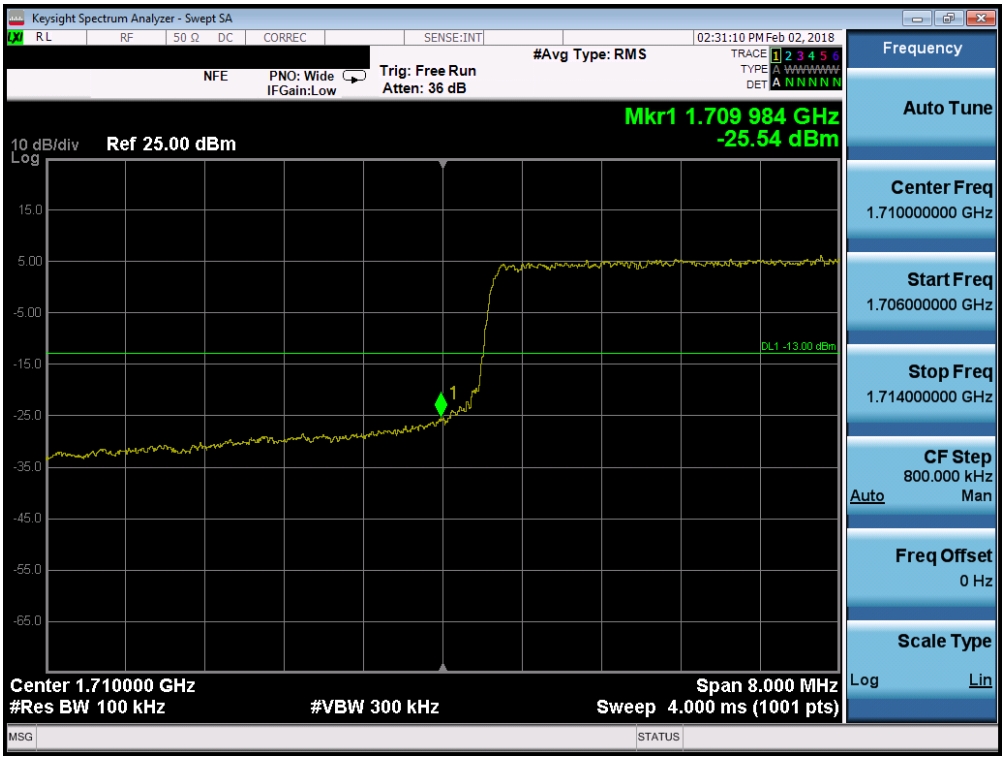
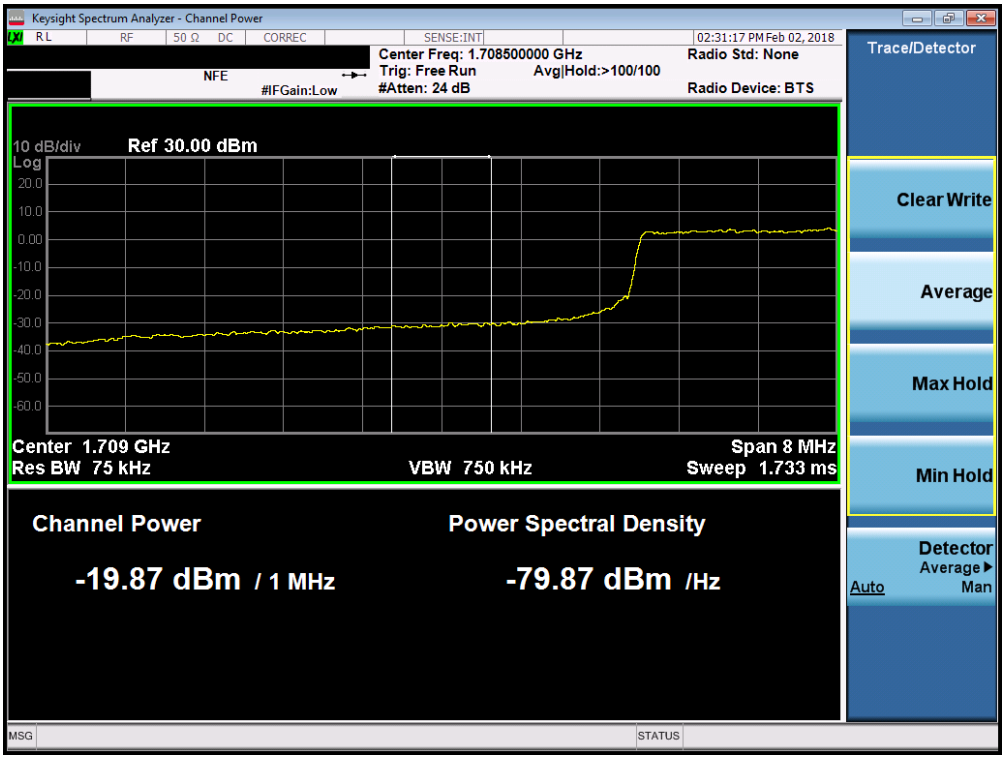


Plot 6-101. Lower Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



Plot 6-102. Lower Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

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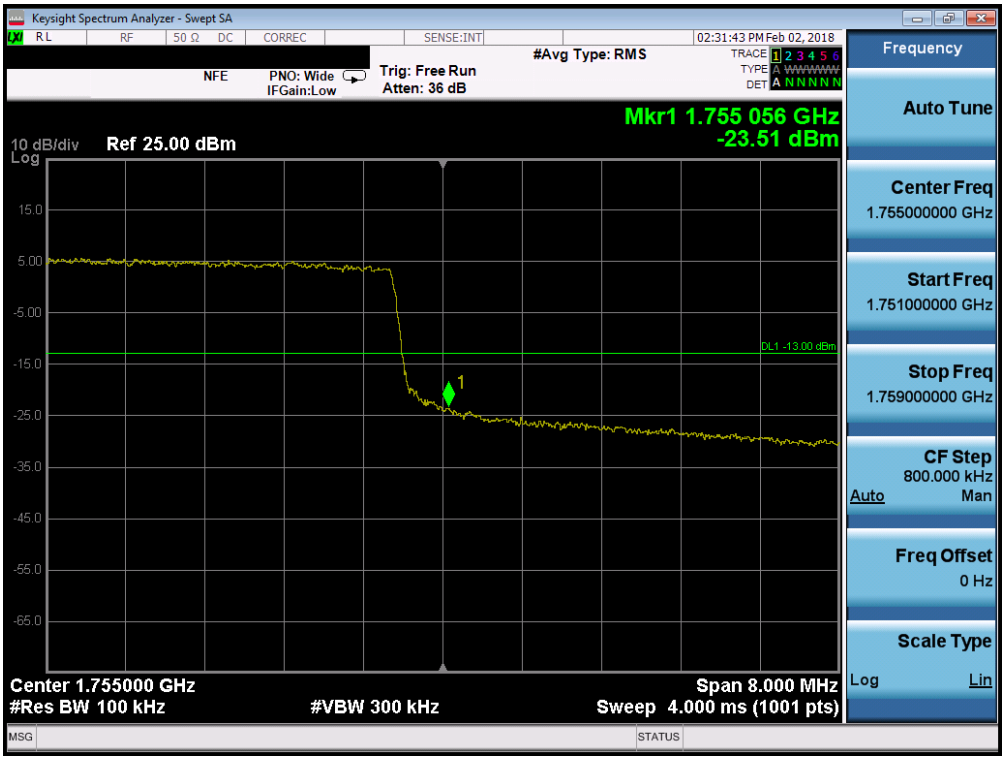
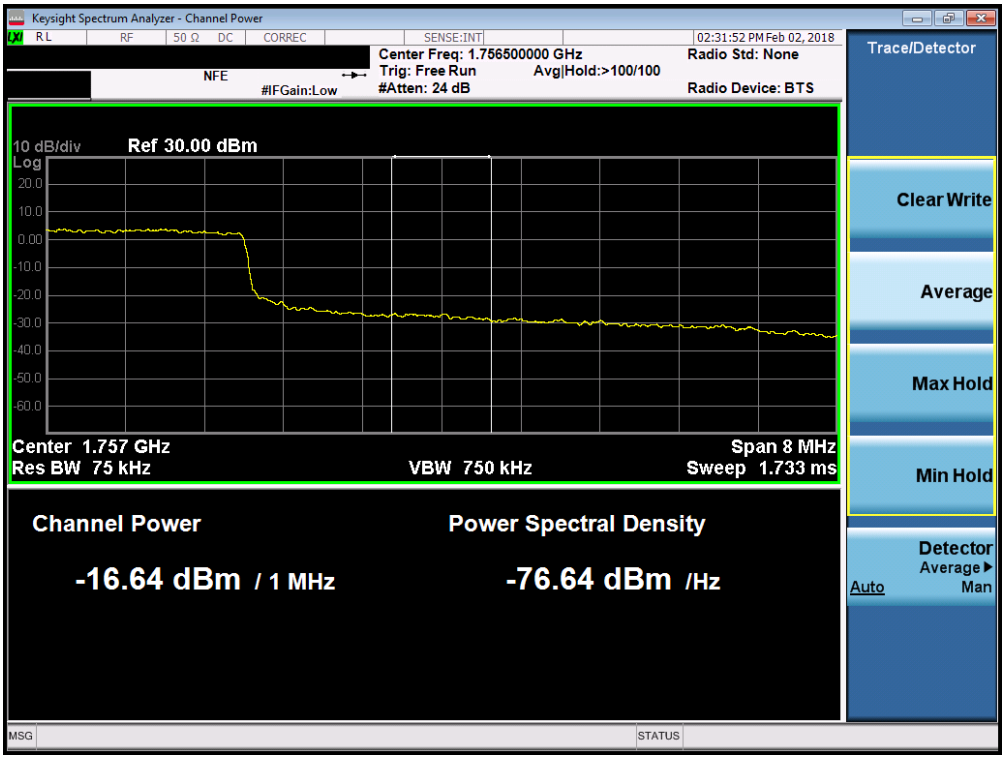


Plot 6-103. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



Plot 6-104. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

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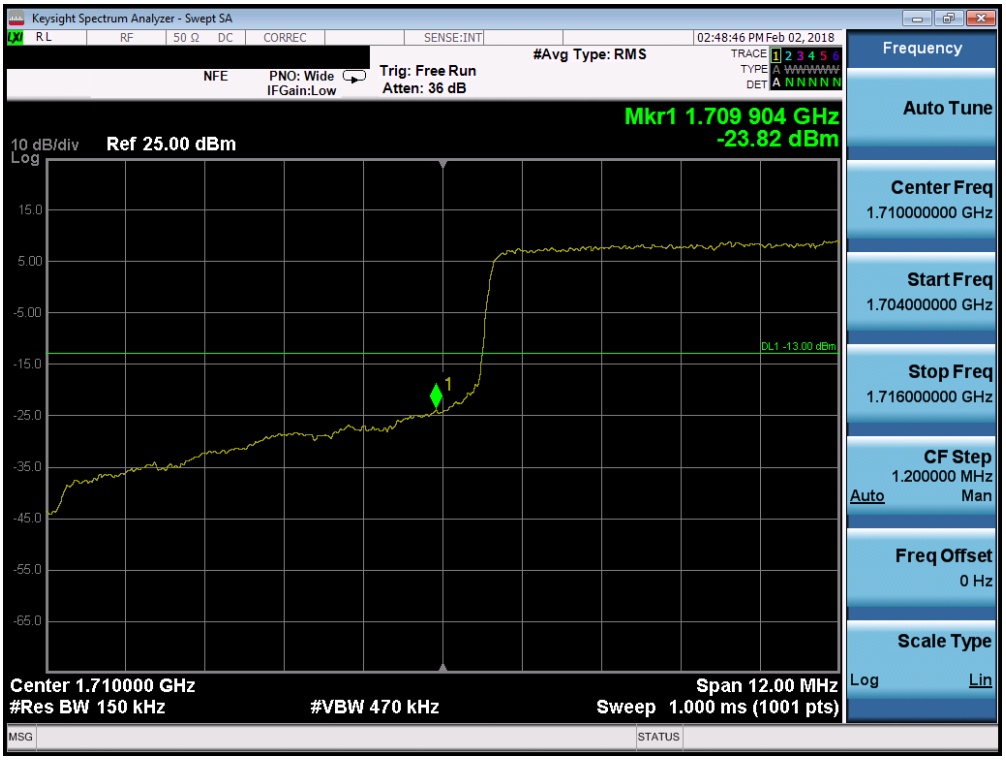
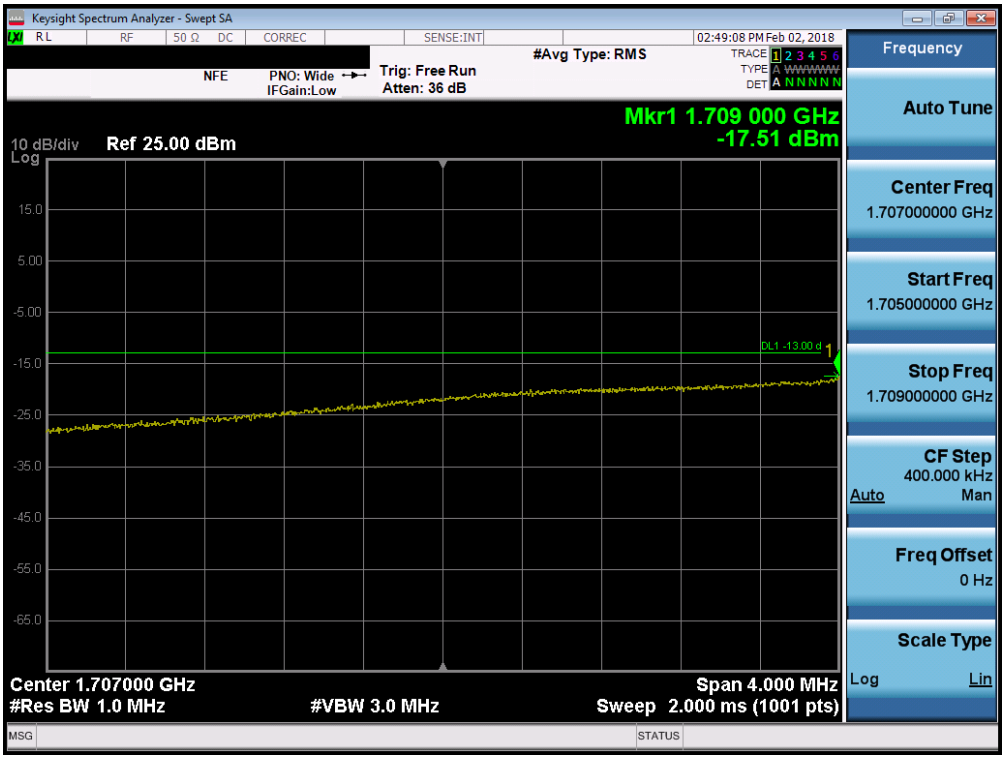


Plot 6-105. Lower Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



Plot 6-106. Lower Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

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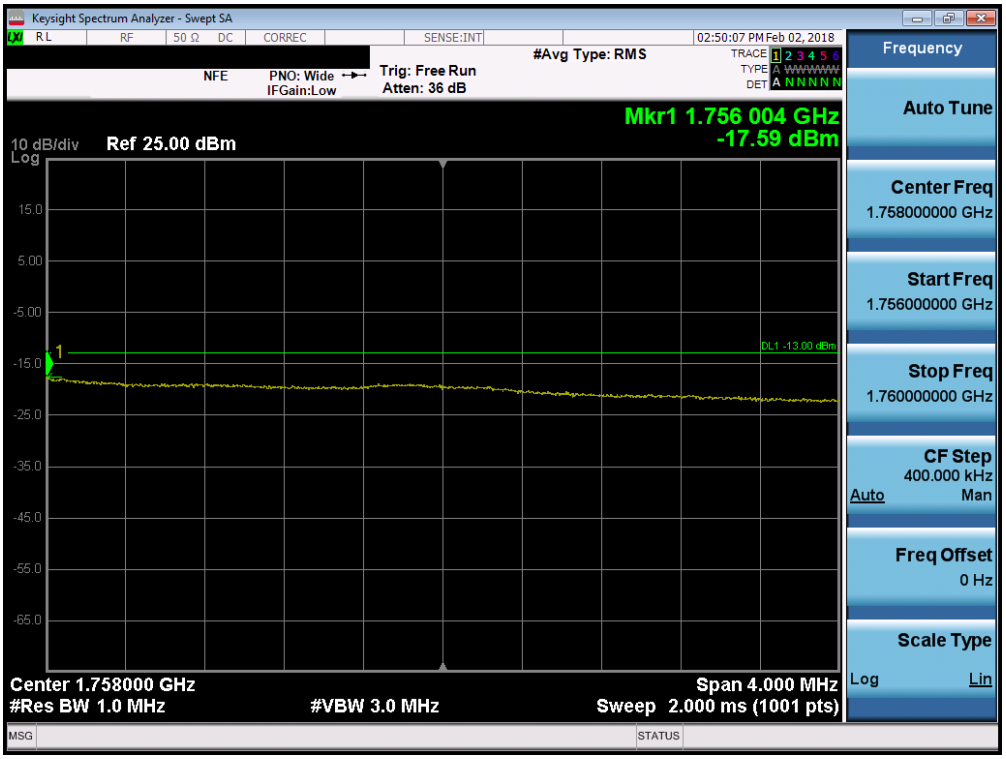
Plot 6-107. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



Plot 6-108. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

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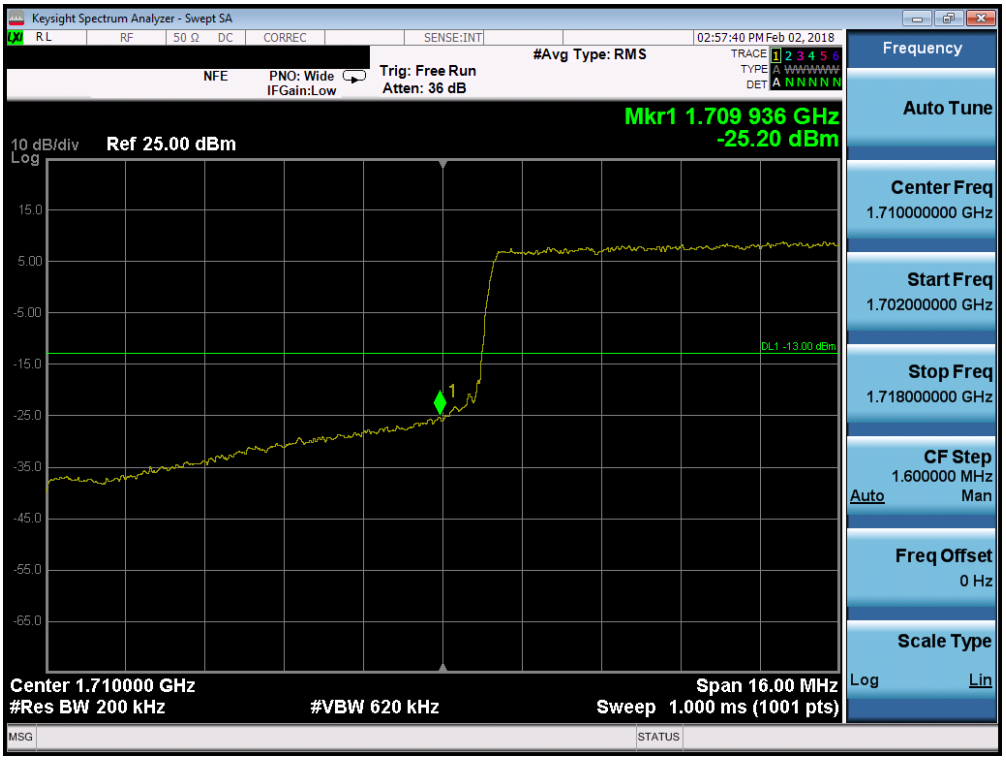
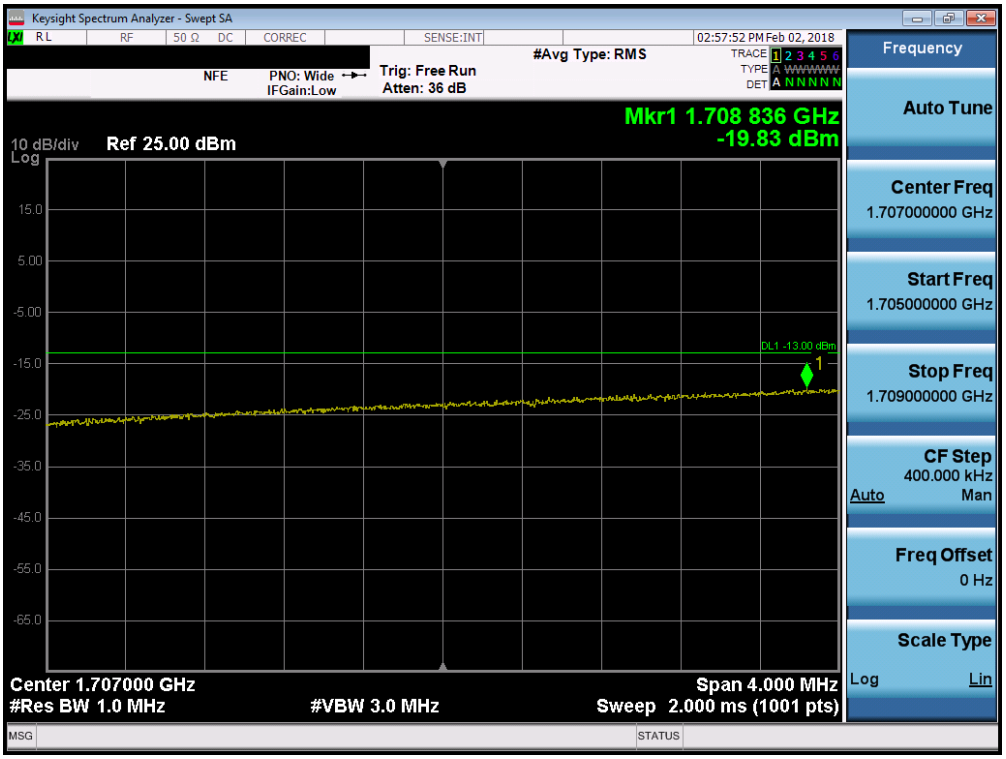


Plot 6-109. Lower Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



Plot 6-110. Lower Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

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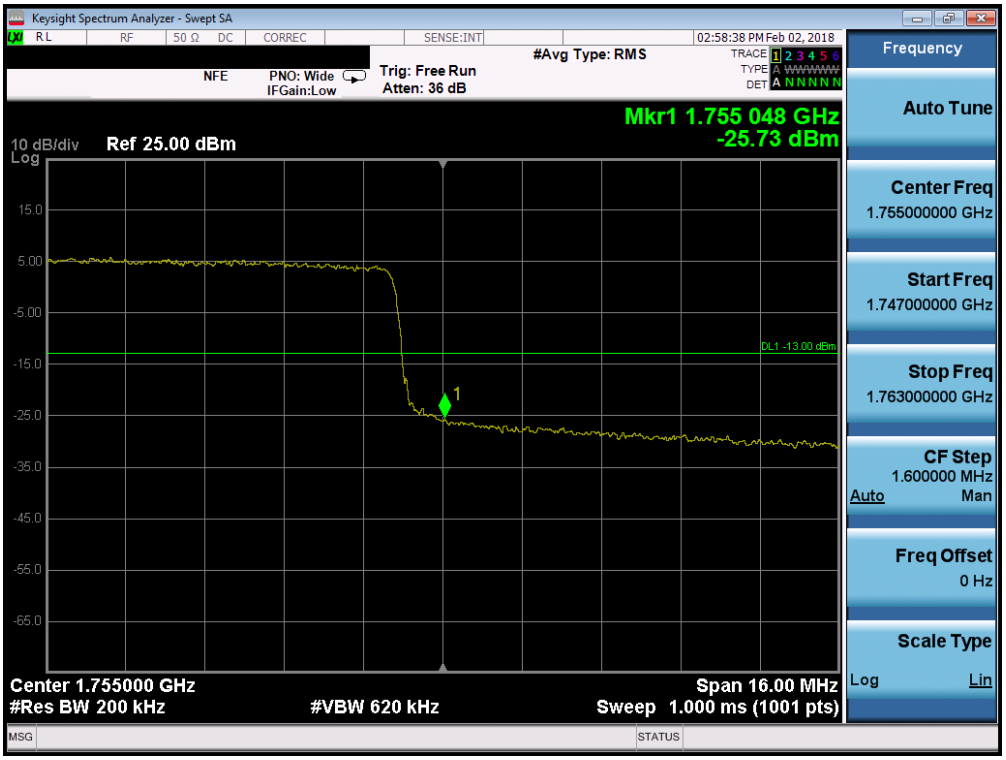
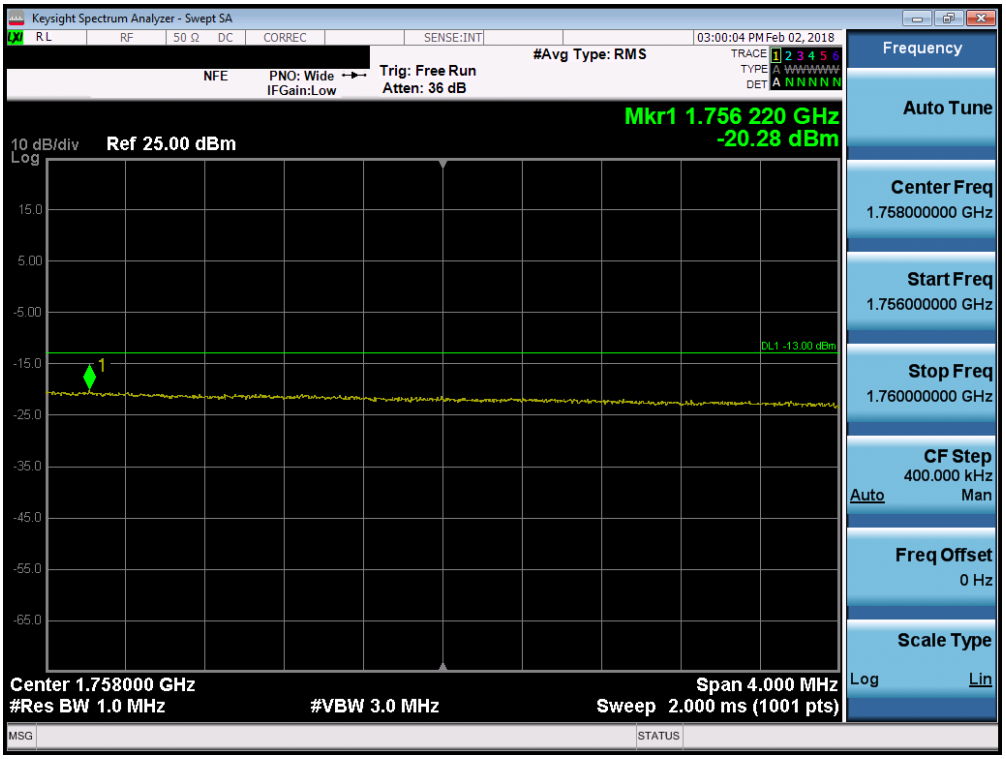


Plot 6-111. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



Plot 6-112. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

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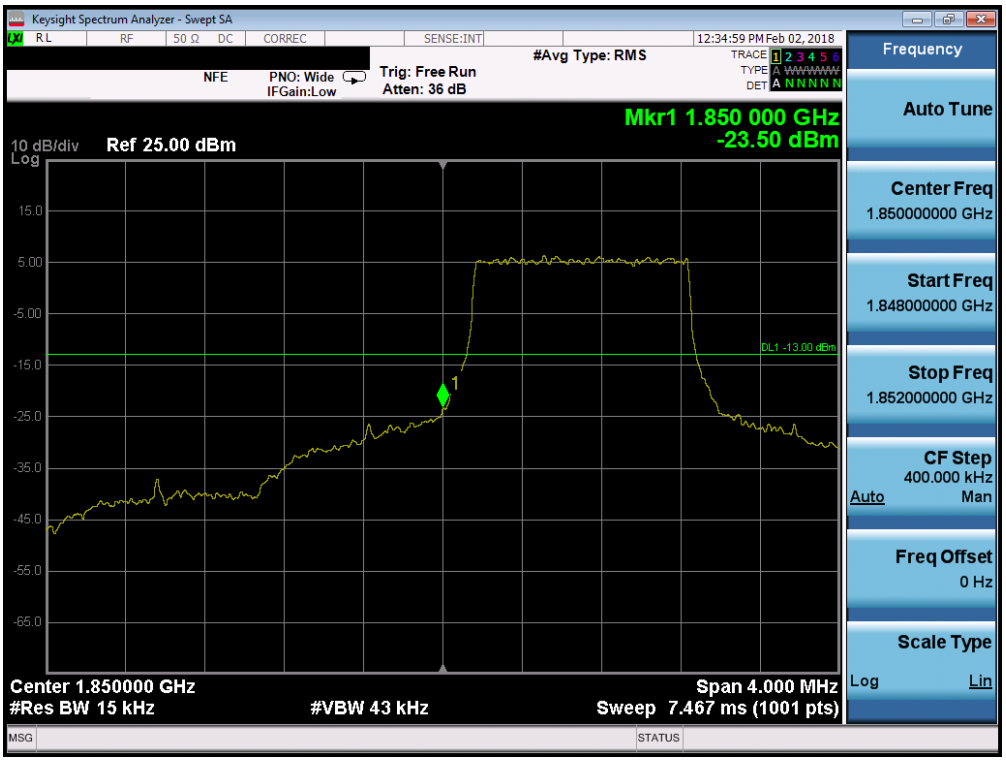
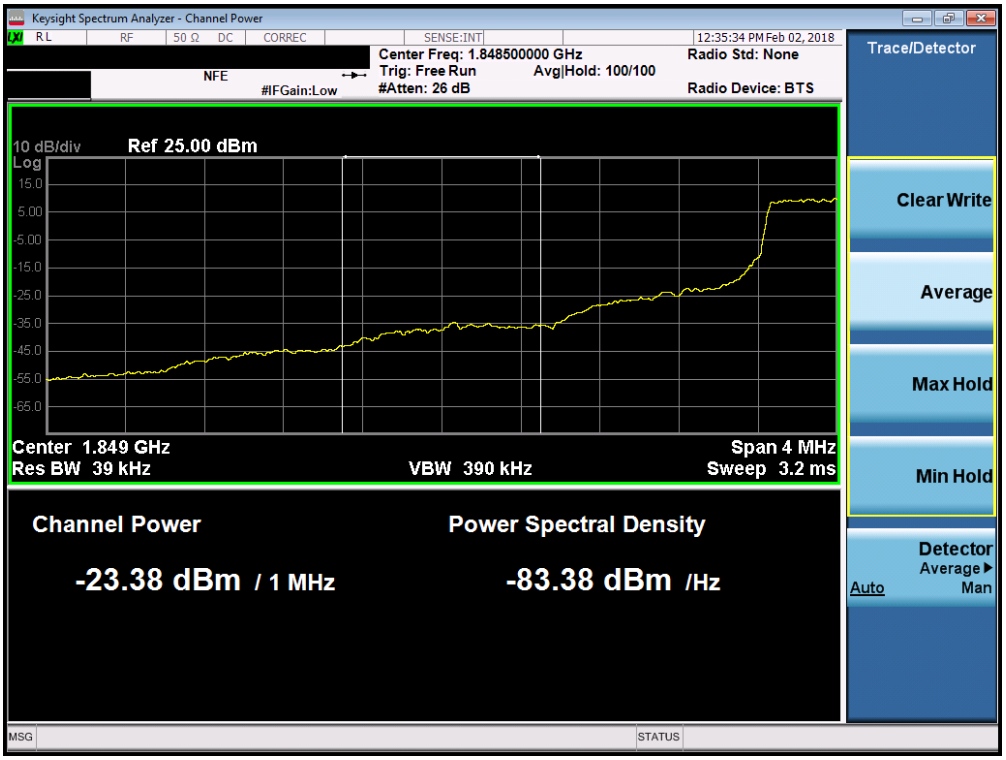
Band 2



Plot 6-113. Lower Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 6-114. Lower Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

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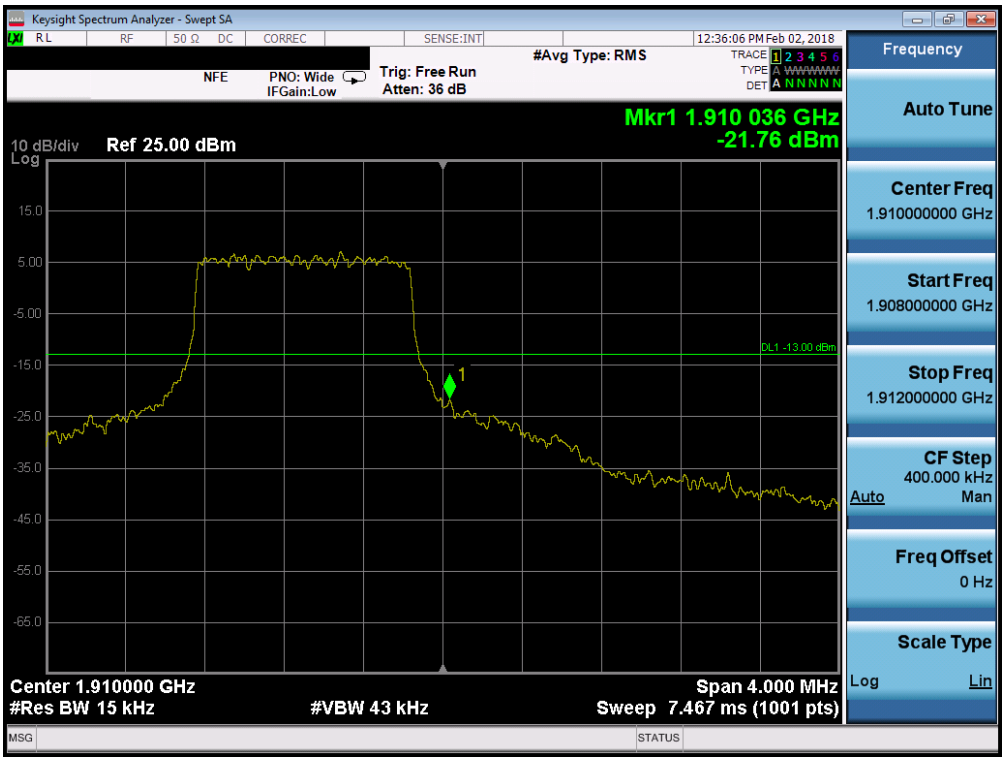
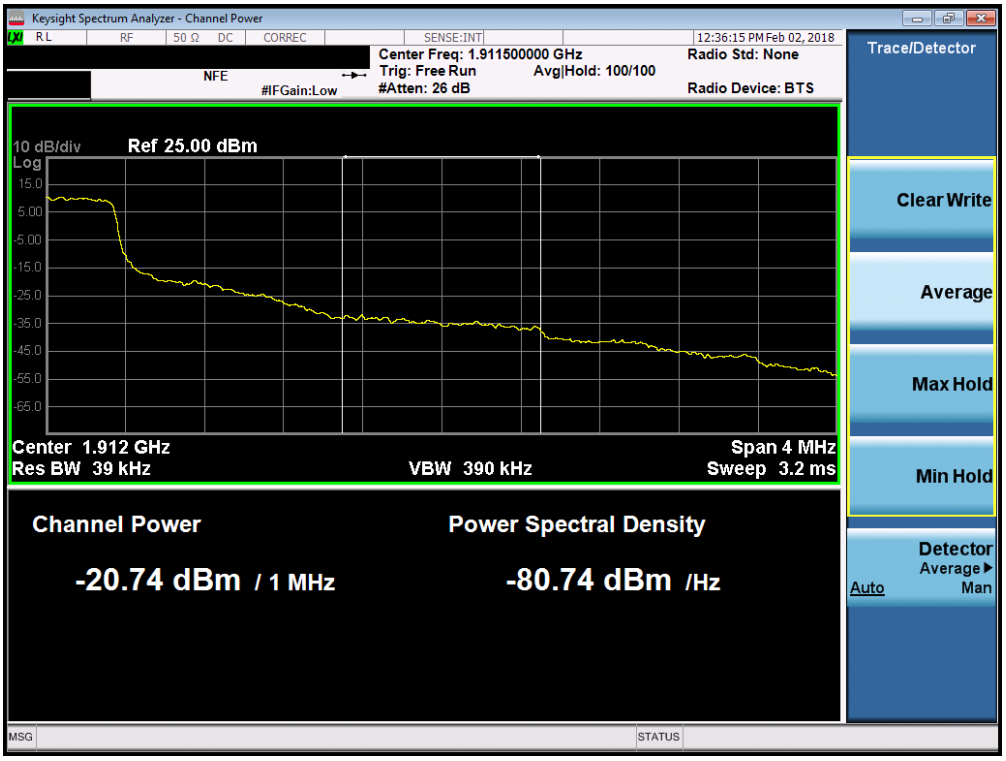


Plot 6-115. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 6-116. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

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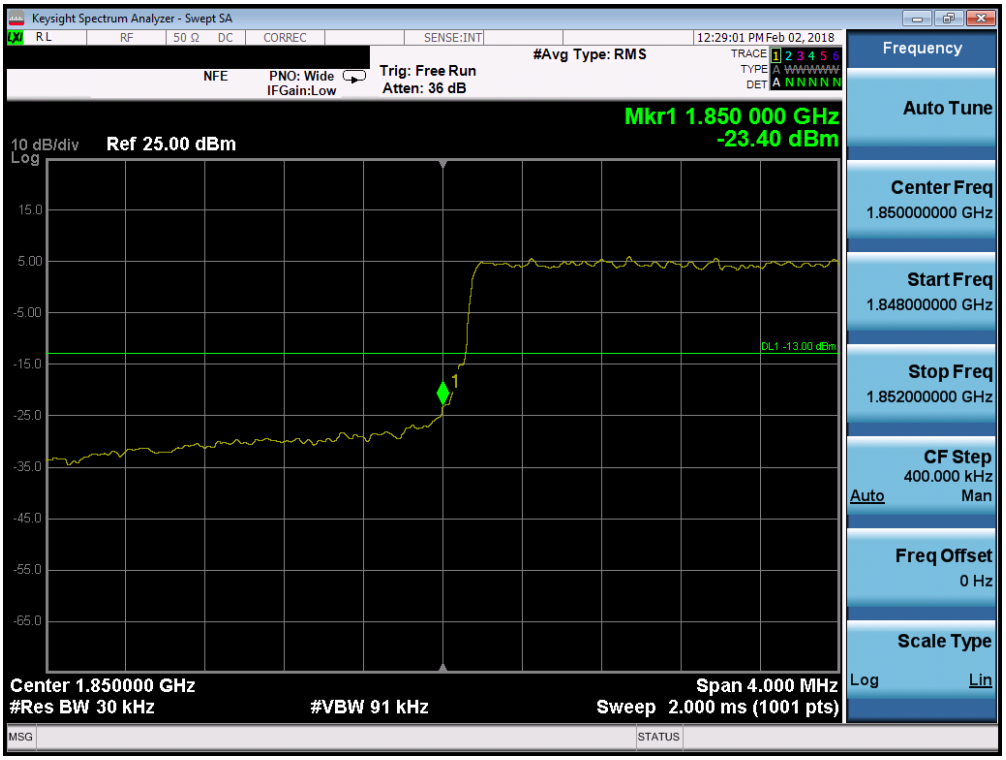
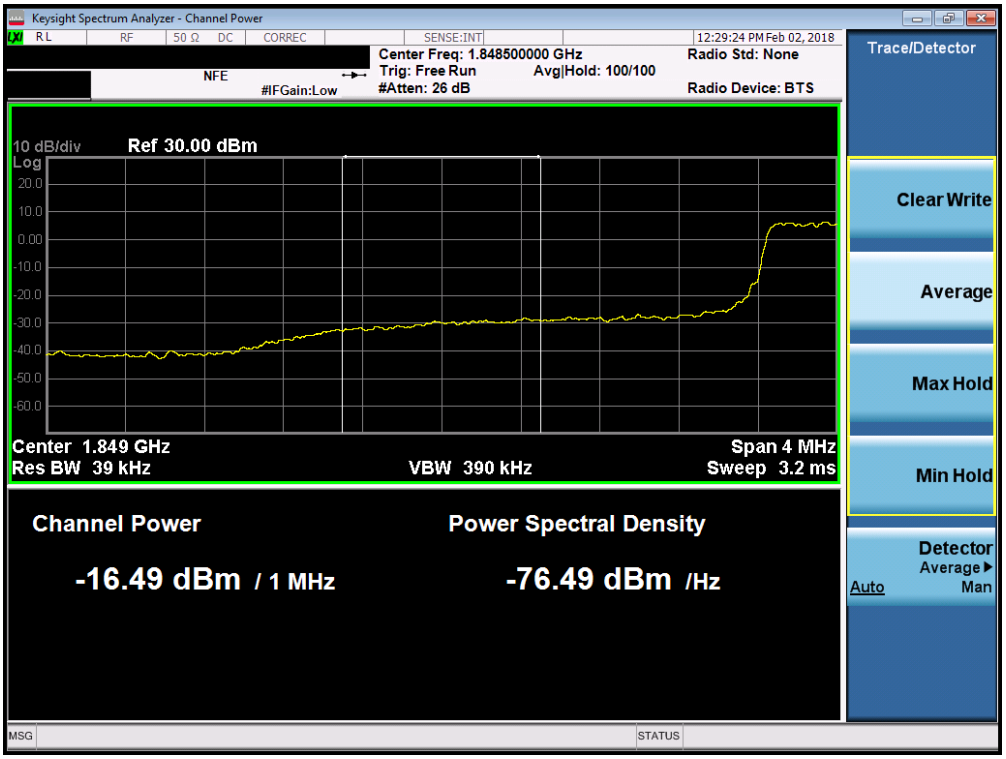


Plot 6-117. Lower Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



Plot 6-118. Lower Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

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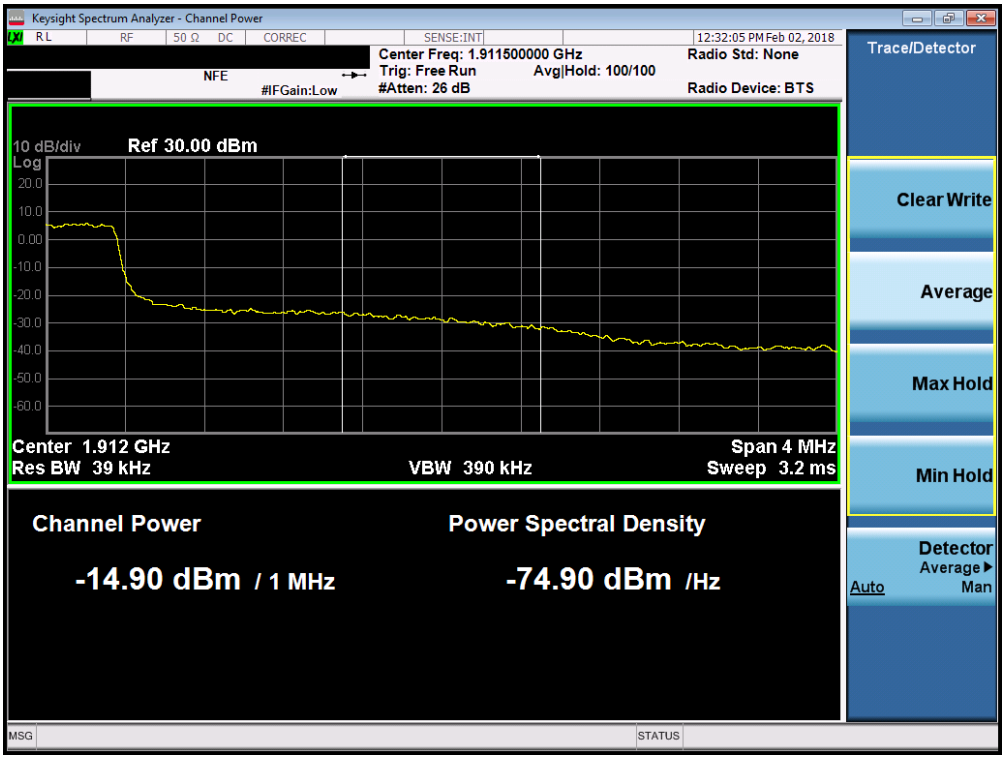
Plot 6-119. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



Plot 6-120. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

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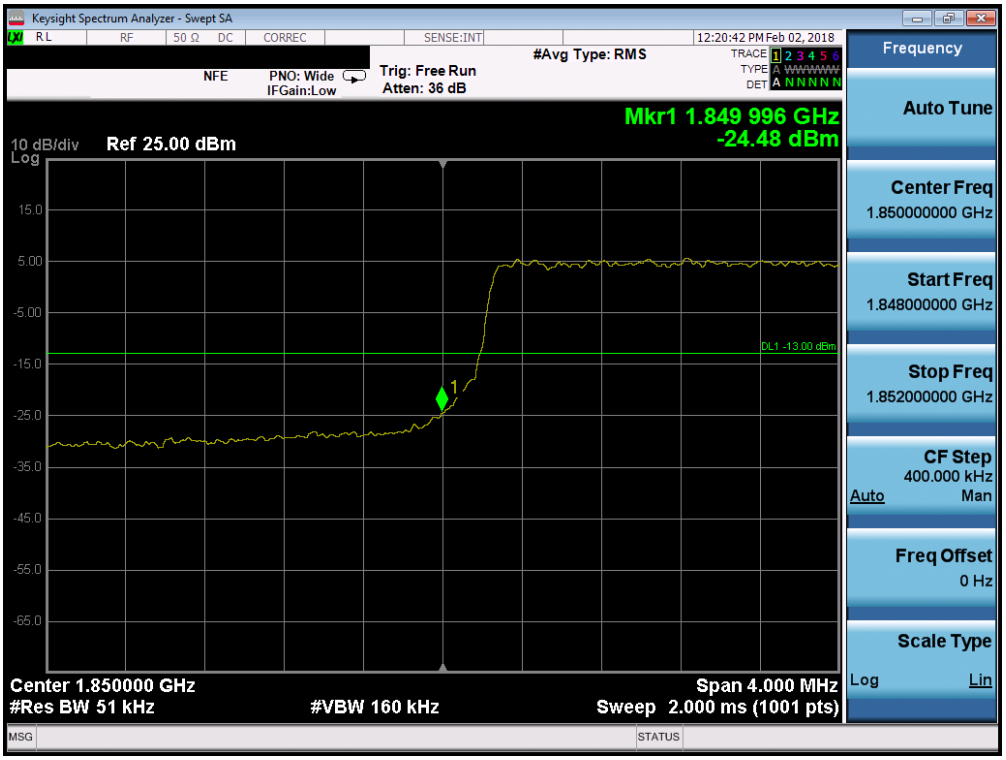
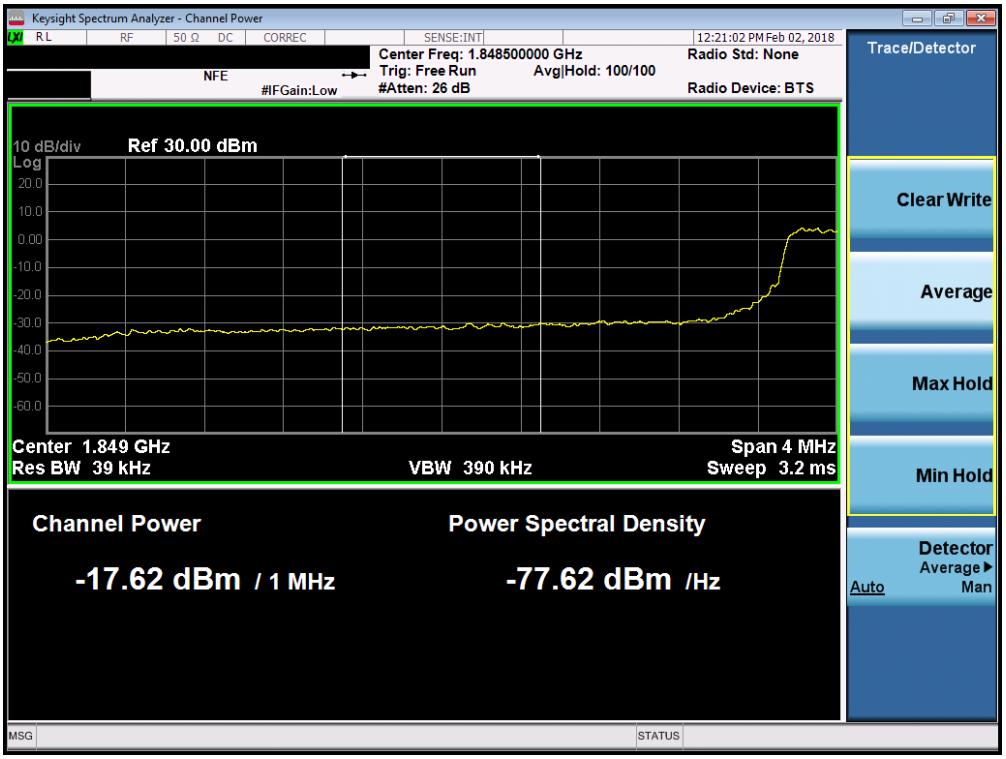


Plot 6-121. Lower Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



Plot 6-122. Lower Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

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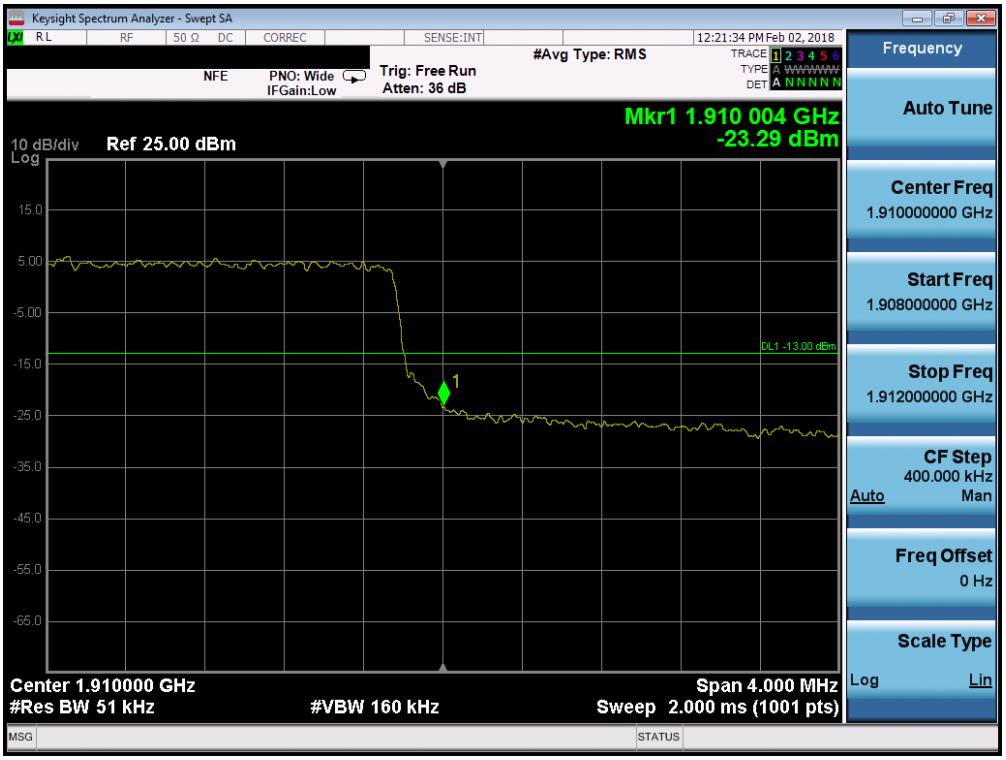
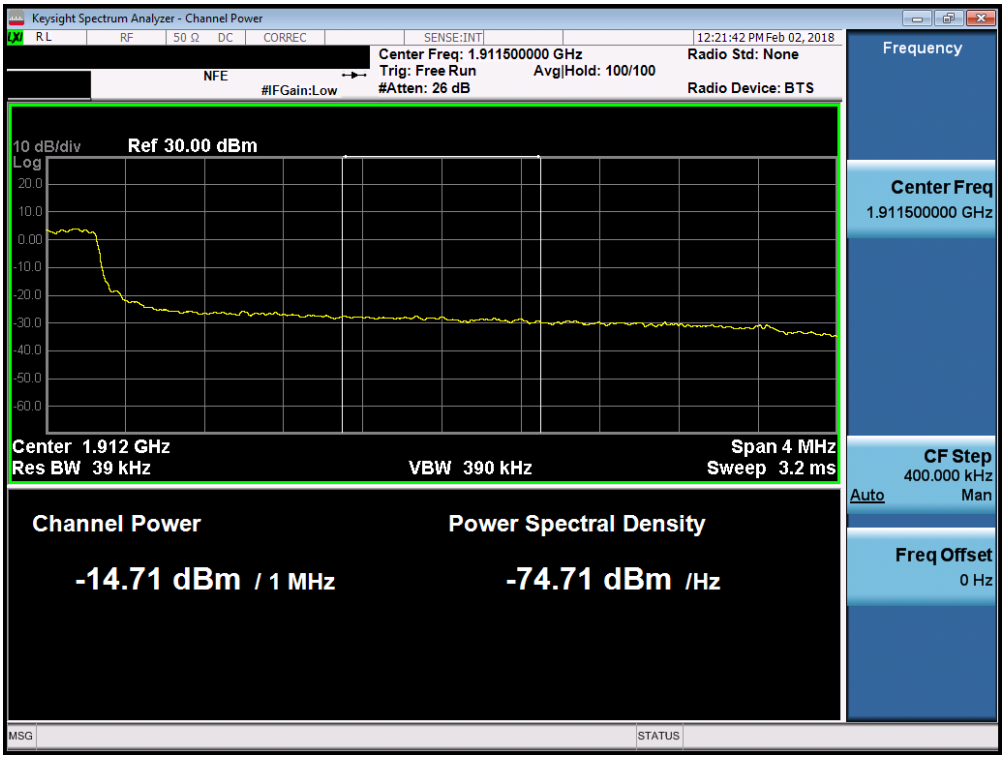


Plot 6-123. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



Plot 6-124. Upper Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

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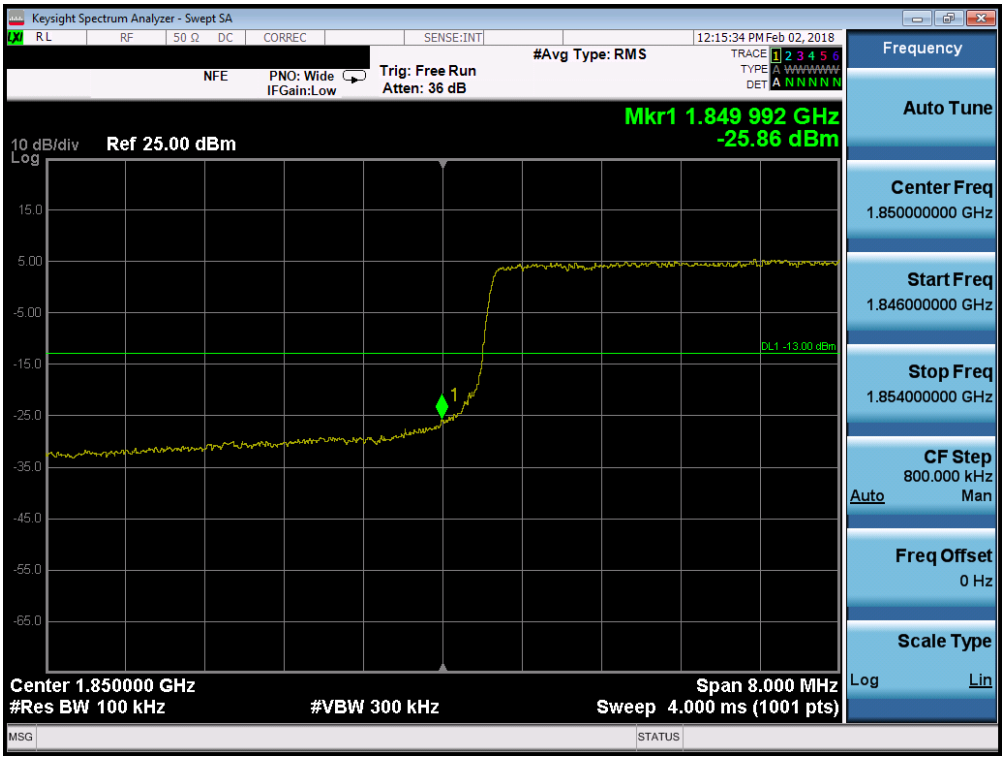
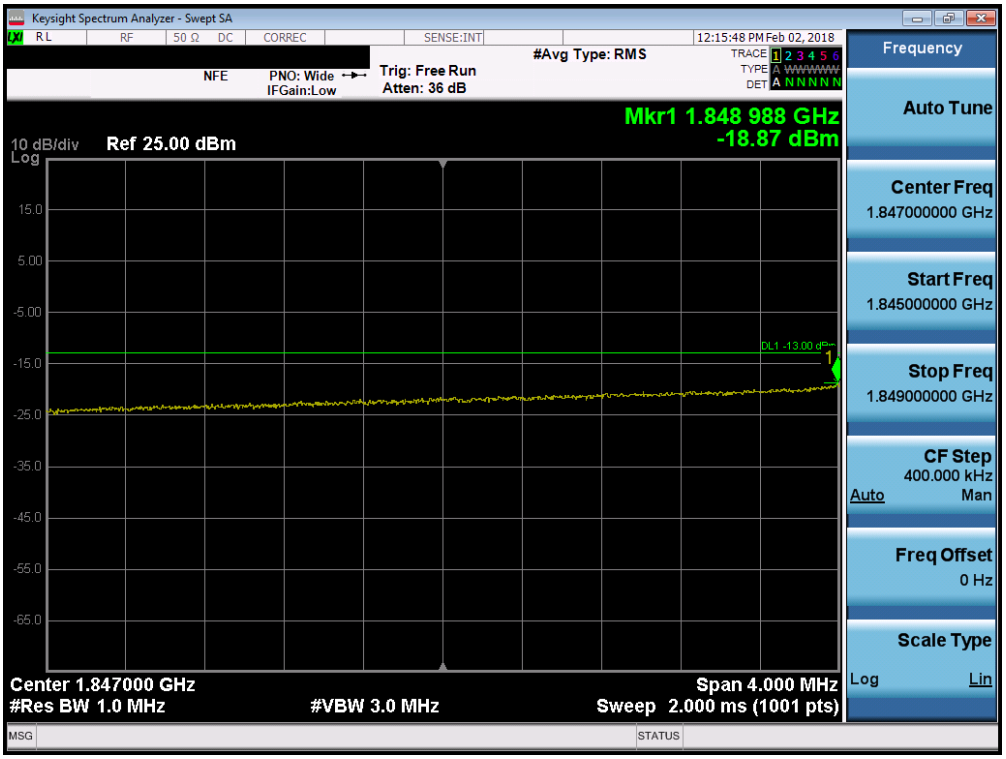


Plot 6-125. Lower Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



Plot 6-126. Lower Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

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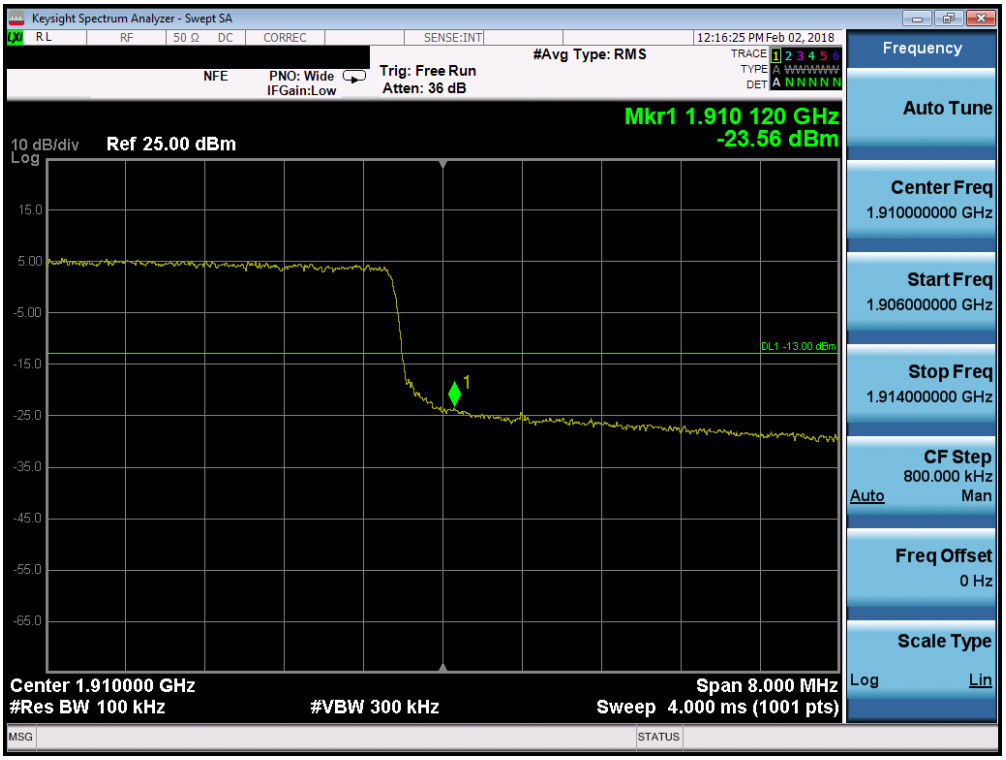
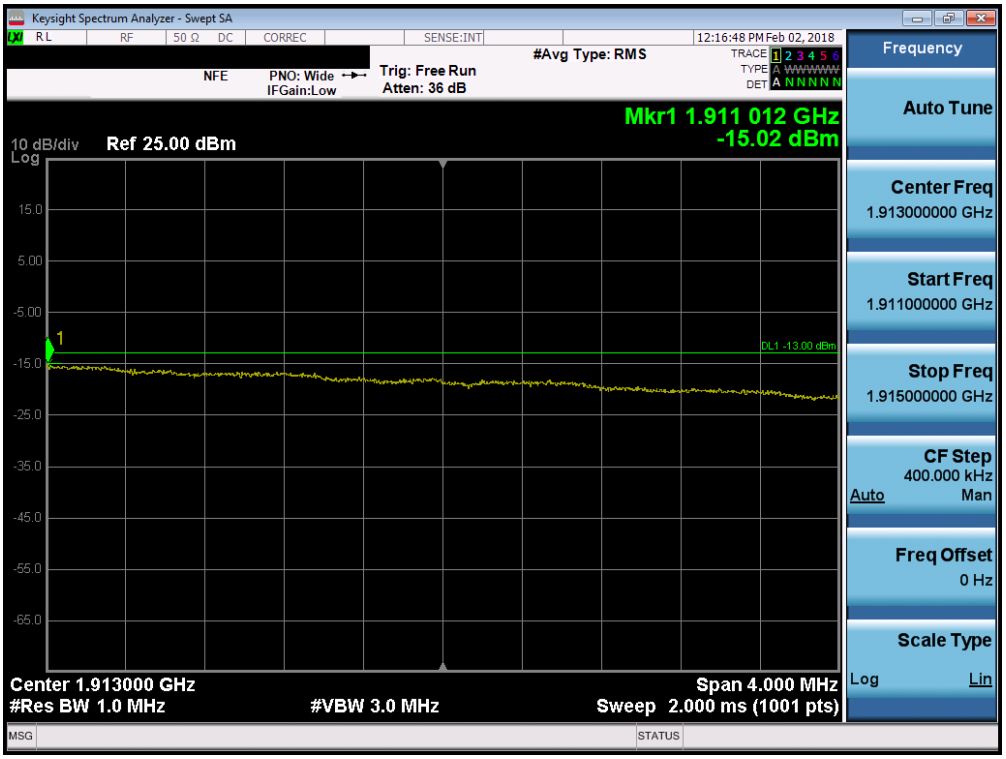


Plot 6-127. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



Plot 6-128. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

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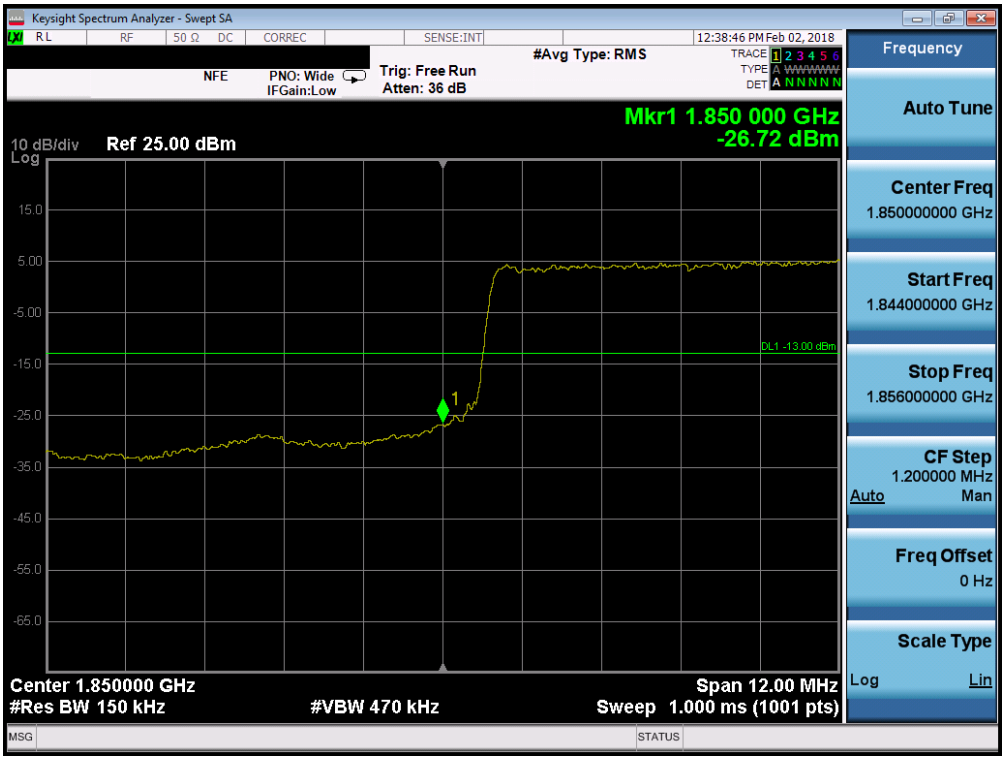
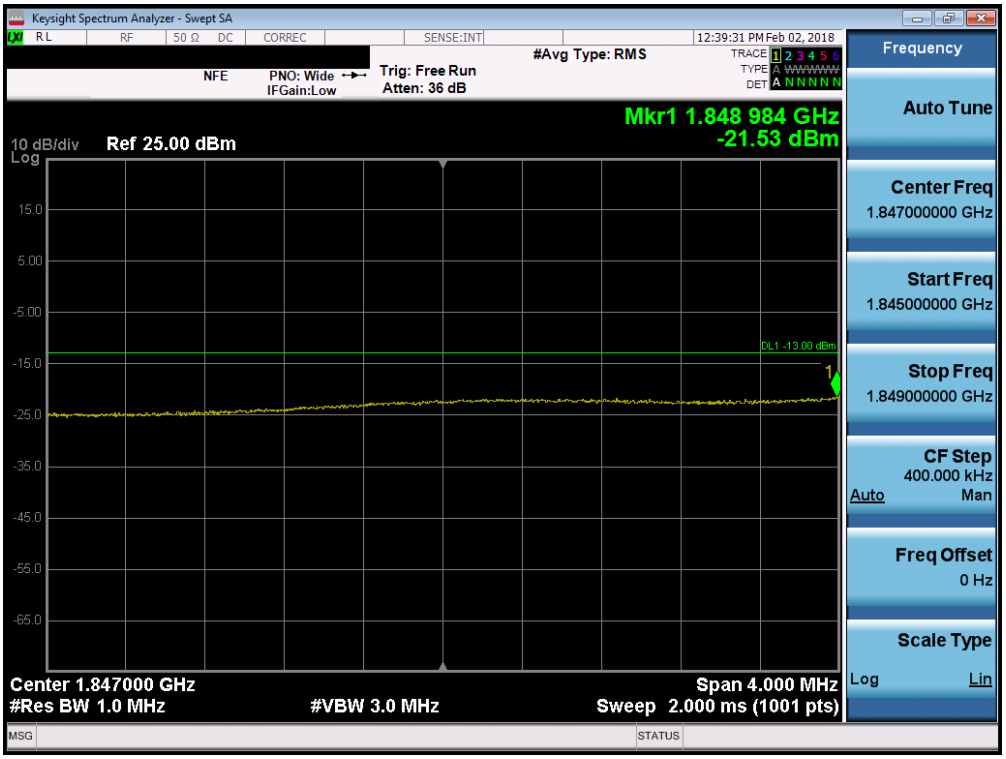


Plot 6-129. Lower Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 6-130. Lower Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

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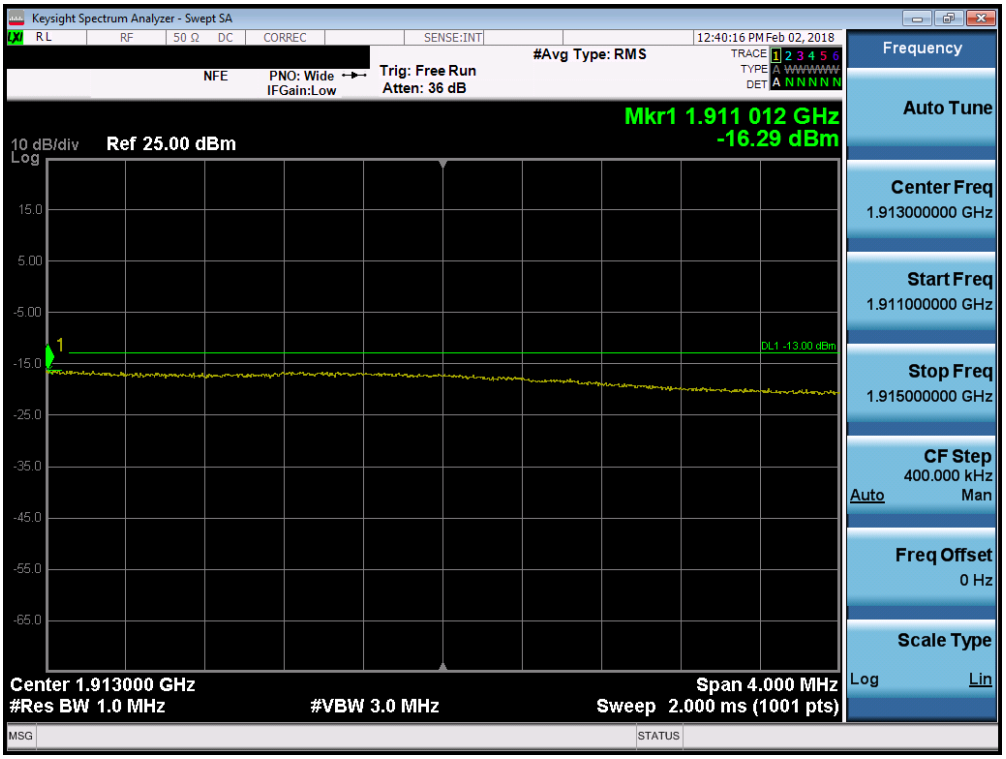
Plot 6-131. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 6-132. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

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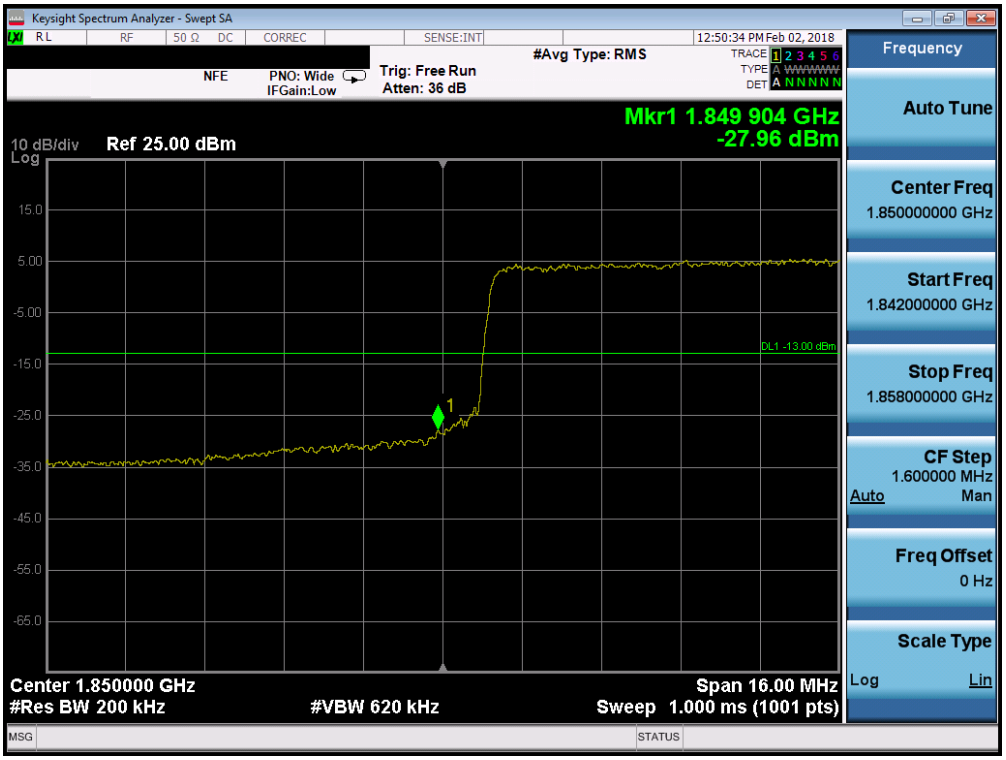
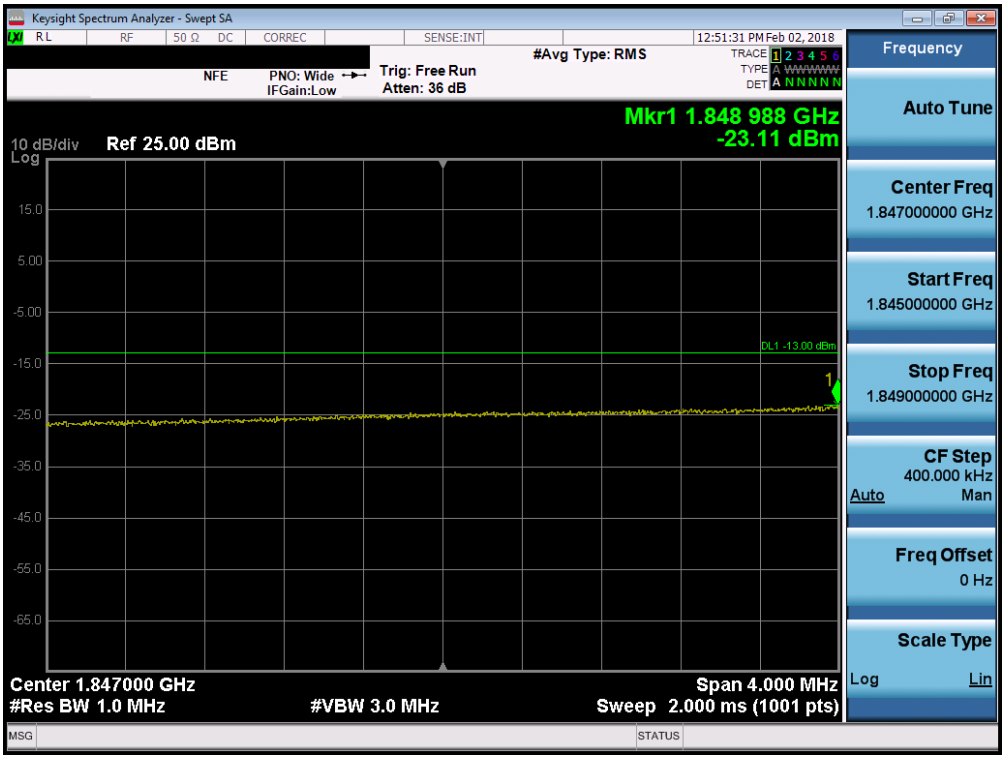


Plot 6-133. Lower Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 6-134. Lower Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

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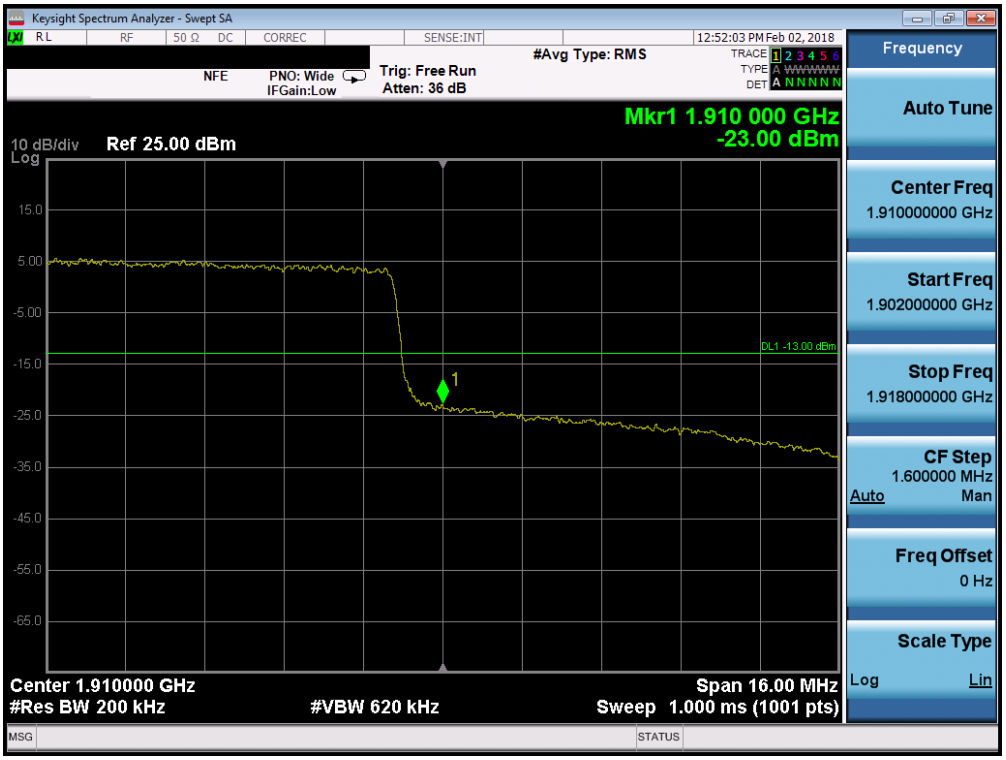
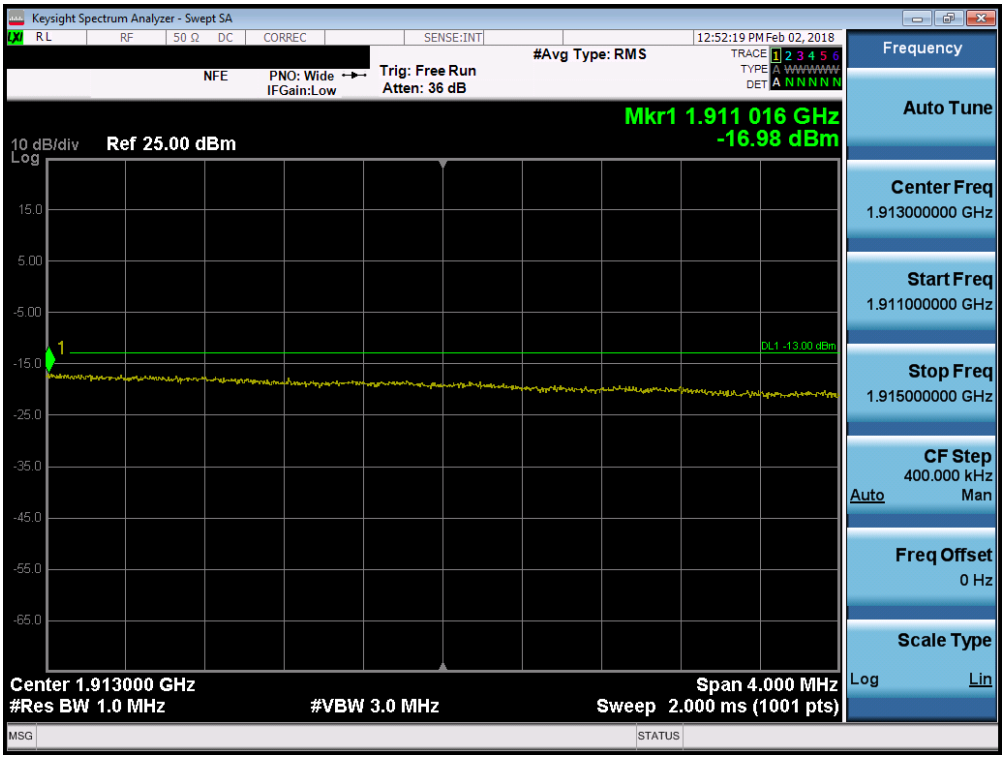


Plot 6-135. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 6-136. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

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6.5 Peak-Average Ratio

Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Test Procedure Used

KDB 971168 D01 v03 – Section 5.7.1

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms.

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

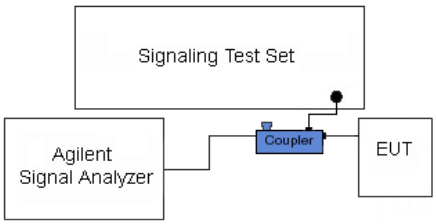

Figure 6-4. Test Instrument & Measurement Setup

Test Notes

None.

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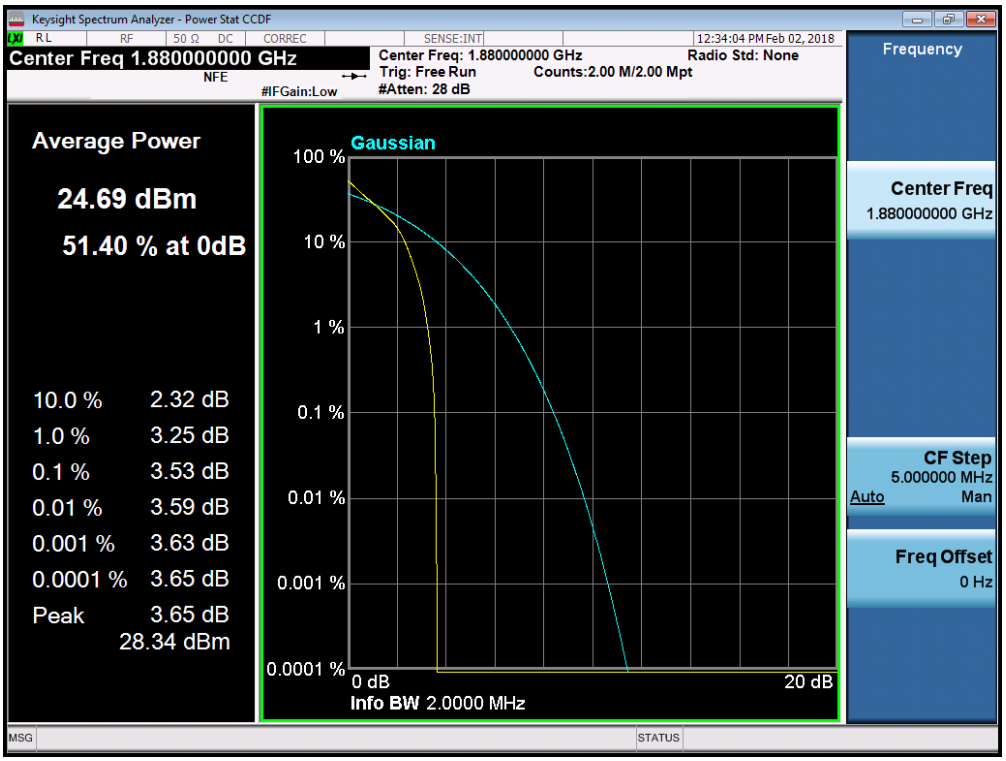
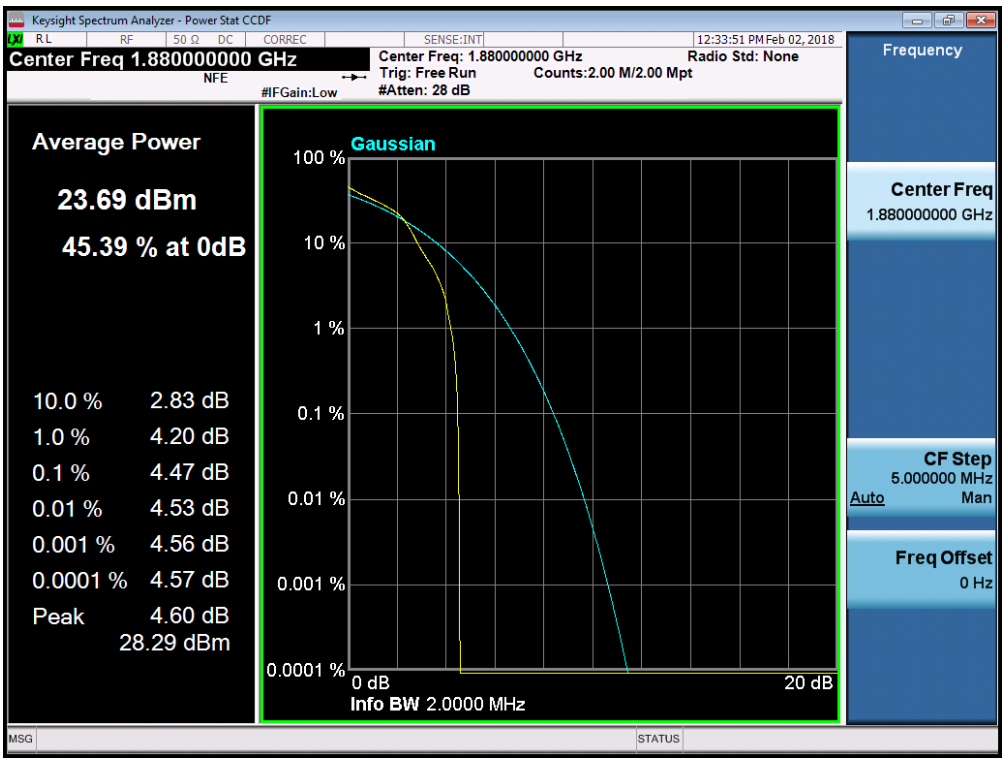
Band 2



Plot 6-137. PAR Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 6-138. PAR Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

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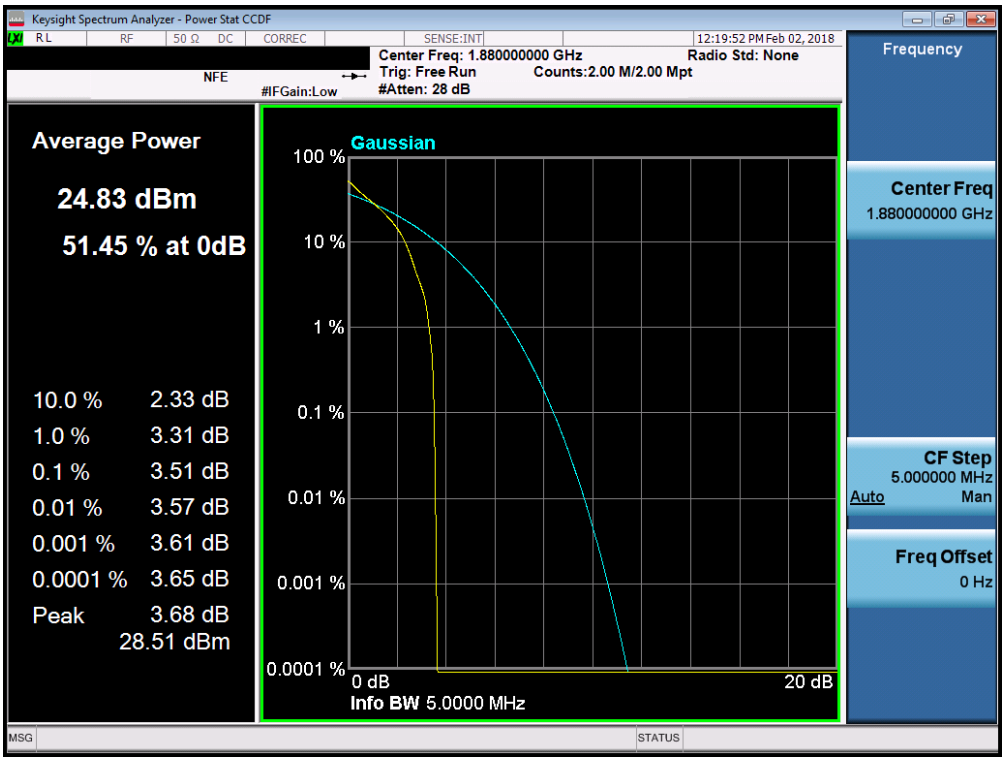
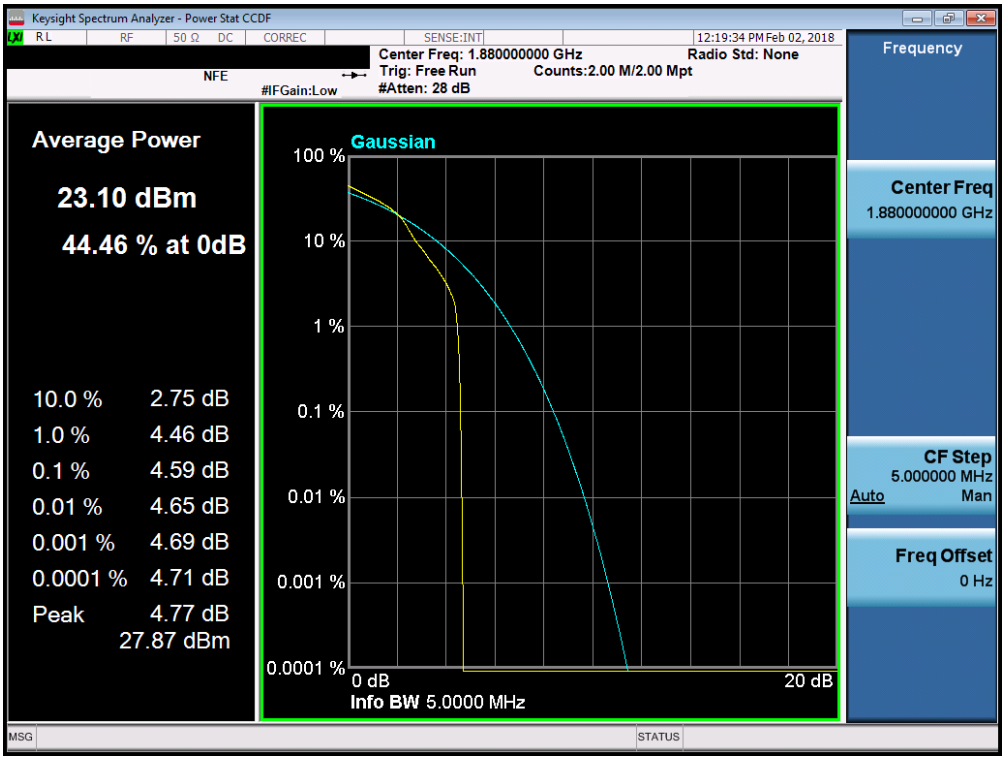


Plot 6-139. PAR Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



Plot 6-140. PAR Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

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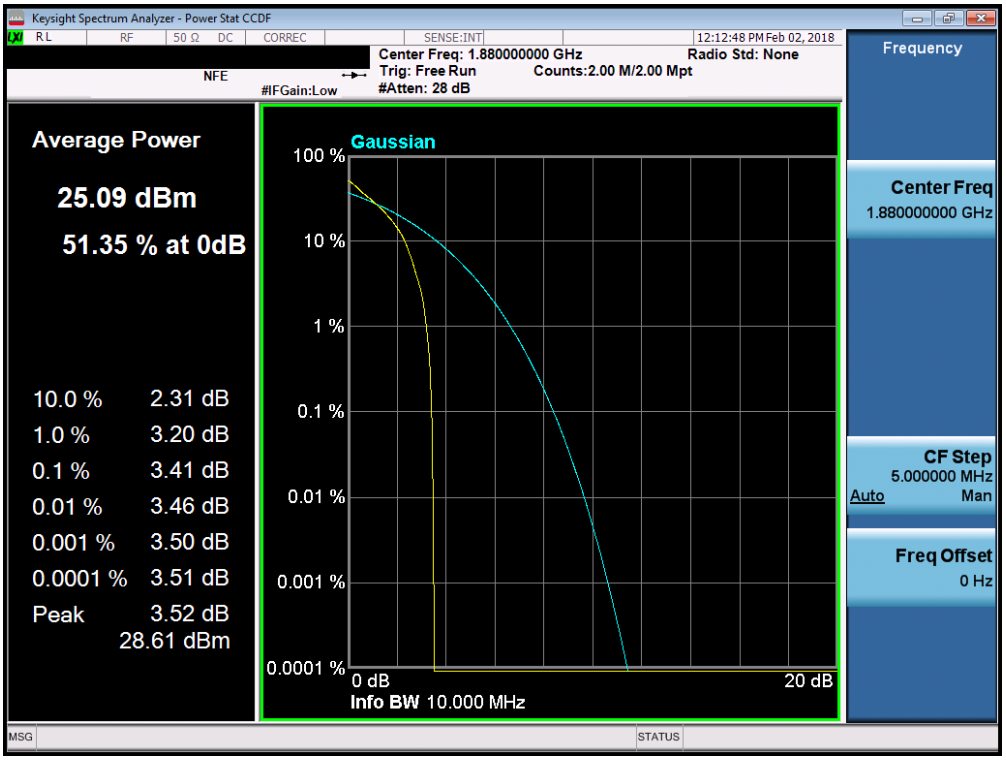
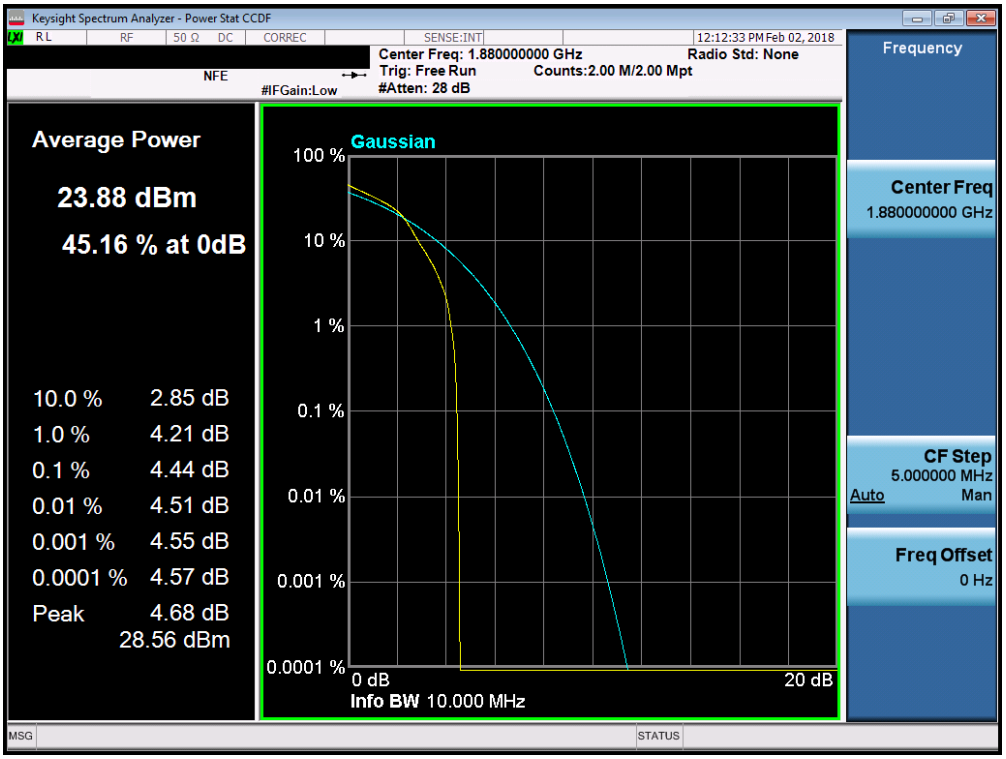


Plot 6-141. PAR Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



Plot 6-142. PAR Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

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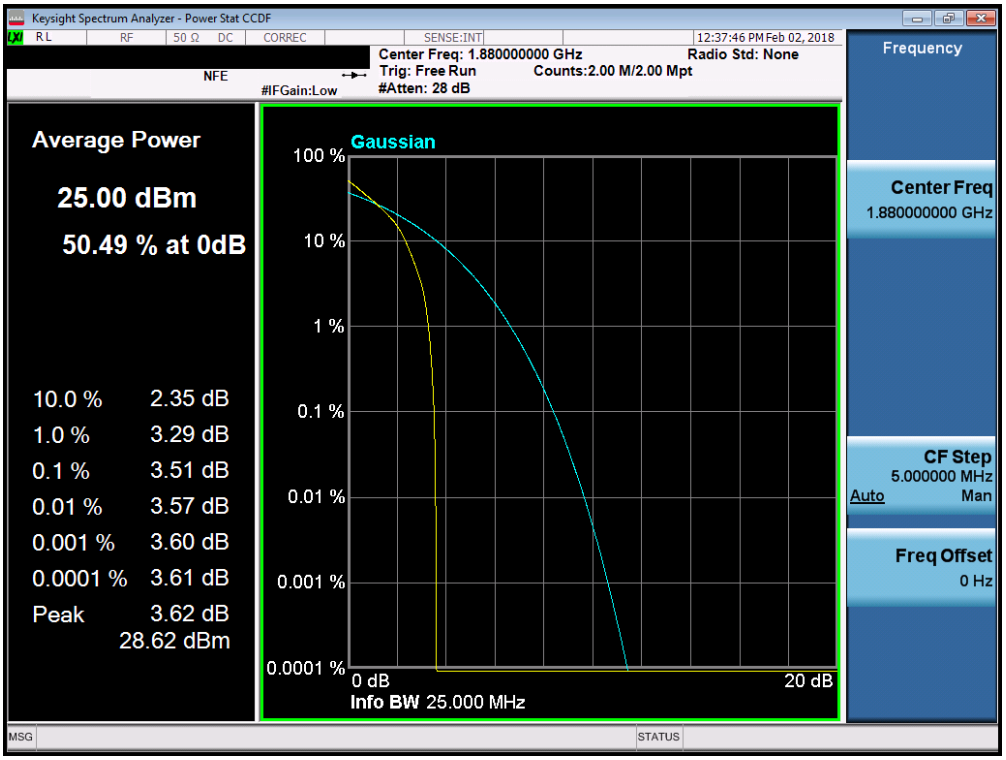
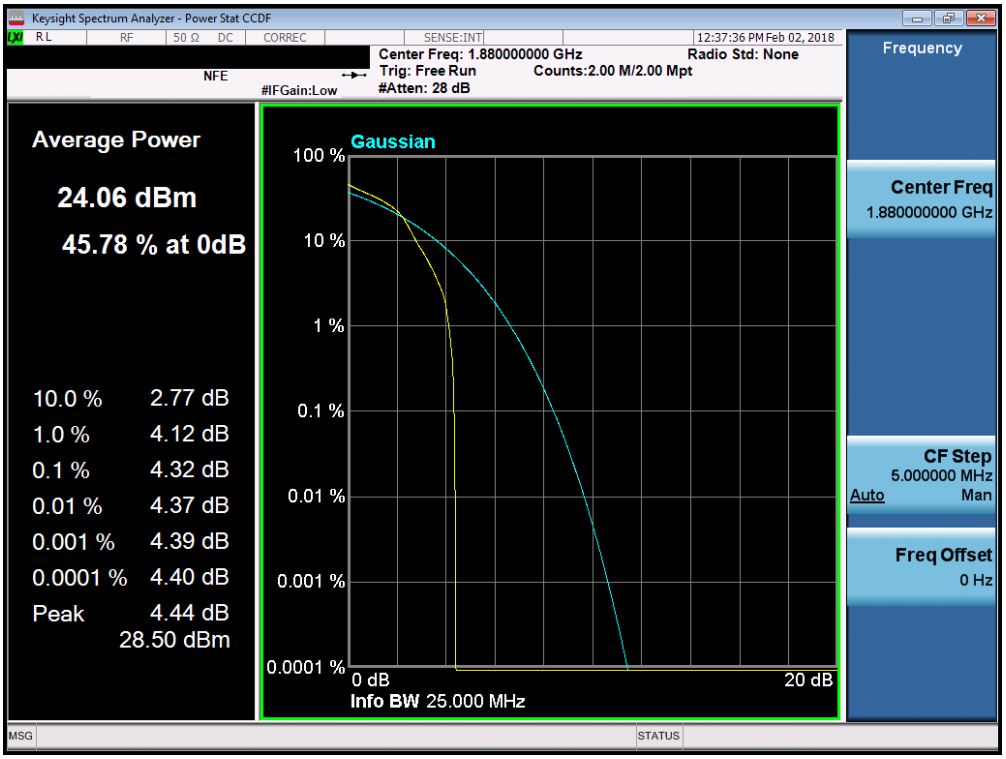


Plot 6-143. PAR Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 6-144. PAR Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

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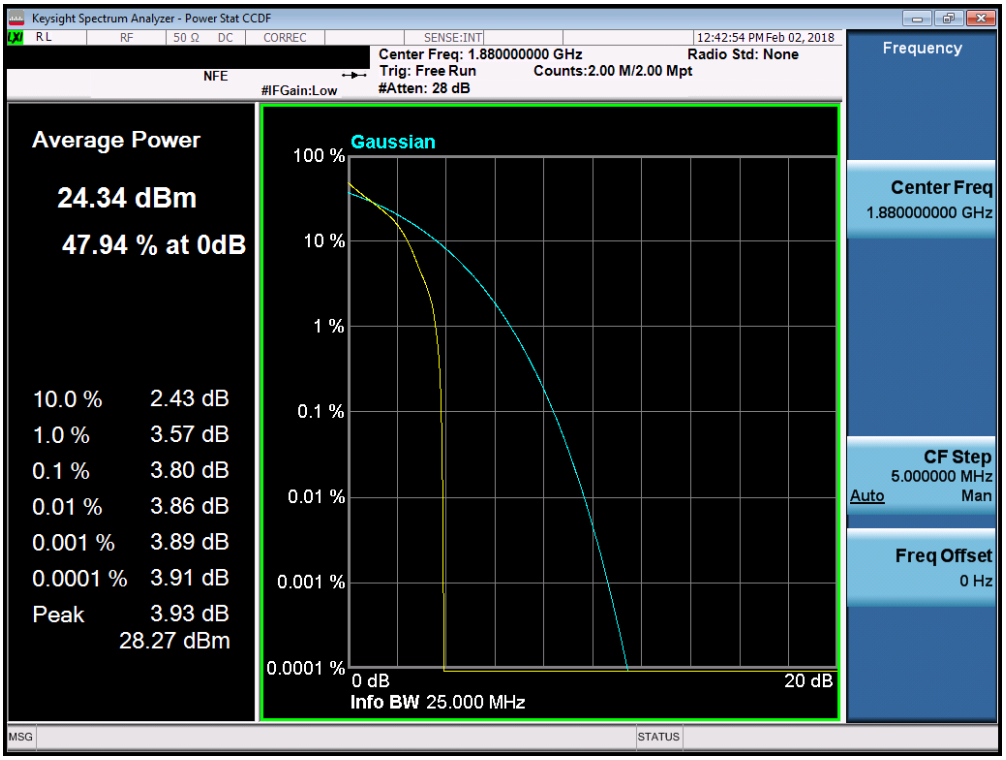
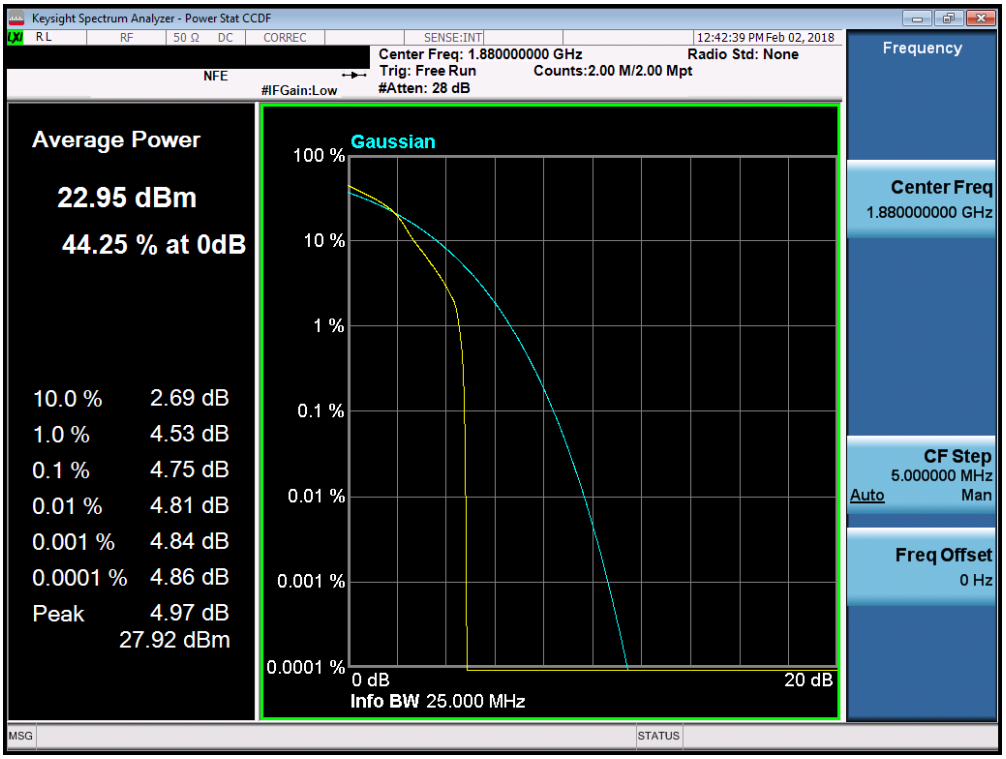


Plot 6-145. PAR Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 6-146. PAR Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)

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6.6 Radiated Power (ERP/EIRP)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

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Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

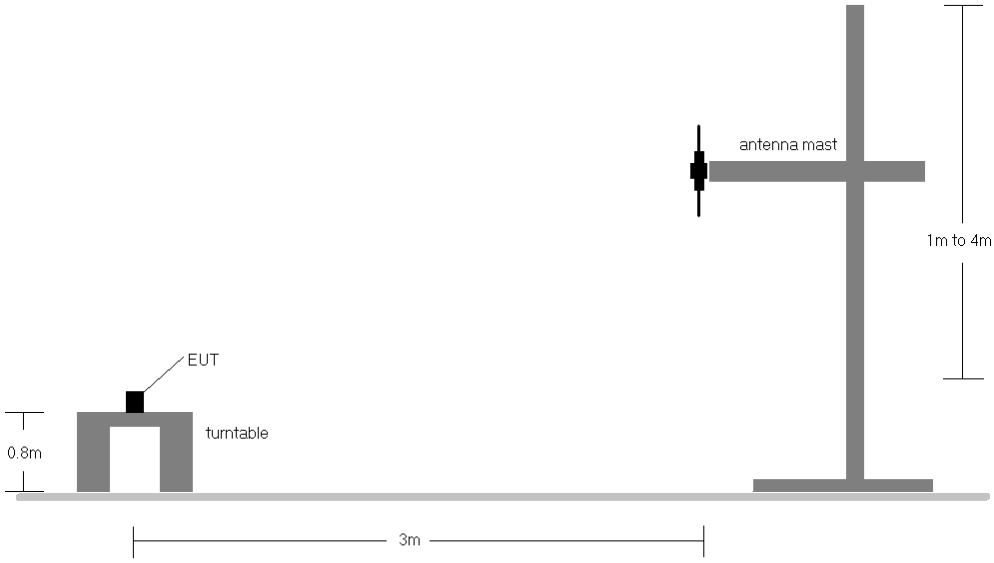

Figure 6-5. Radiated Test Setup <1GHz

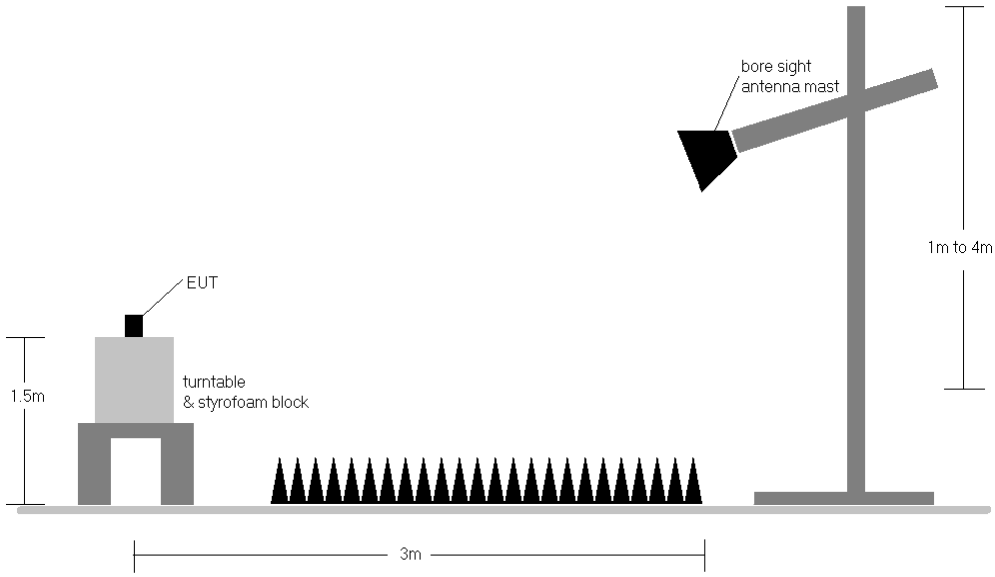

Figure 6-6. Radiated Test Setup >1GHz

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2) This unit was tested with its standard battery.

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
779.50	5	QPSK	V	150	358	1 / 24	21.66	1.32	20.83	0.121	34.77	-13.94	22.98	0.199	36.98	-14.00
782.00	5	QPSK	V	150	351	1 / 0	21.53	1.33	20.71	0.118	34.77	-14.06	22.86	0.193	36.98	-14.12
784.50	5	QPSK	V	150	343	1 / 0	21.92	1.34	**21.11**	**0.129**	34.77	-13.66	**23.26**	0.212	36.98	-13.72
779.50	5	16-QAM	V	150	358	1 / 0	20.26	1.32	19.43	0.088	34.77	-15.34	21.58	0.144	36.98	-15.40
782.00	5	16-QAM	V	150	351	1 / 24	20.52	1.33	19.70	0.093	34.77	-15.07	21.85	0.153	36.98	-15.13
784.50	5	16-QAM	V	150	343	1 / 24	21.20	1.34	**20.39**	0.109	34.77	-14.38	**22.54**	0.179	36.98	-14.44
782.00	10	QPSK	V	150	355	1 / 49	21.92	1.33	**21.10**	0.129	34.77	-13.67	**23.25**	**0.211**	36.98	-13.73
782.00	10	16-QAM	V	150	355	1 / 0	21.64	1.33	**20.82**	0.121	34.77	-13.95	**22.97**	0.198	36.98	-14.01
784.50	5	QPSK	H	150	294	1 / 0	21.74	1.34	20.93	0.124	34.77	-13.84	23.08	0.203	36.98	-13.90

Table 6-3. ERP Data (Band 13)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	150	1	3 / 2	21.77	1.50	21.12	0.129	38.45	-17.33	23.27	0.212	40.61	-17.34
836.50	1.4	QPSK	H	150	10	1 / 5	22.51	1.50	21.86	0.153	38.45	-16.59	24.01	0.252	40.61	-16.60
848.30	1.4	QPSK	H	150	7	3 / 2	23.05	1.50	**22.40**	**0.174**	38.45	-16.05	**24.55**	**0.285**	40.61	-16.06
824.70	1.4	16-QAM	H	150	1	1 / 0	20.80	1.50	20.15	0.103	38.45	-18.30	22.30	0.170	40.61	-18.31
836.50	1.4	16-QAM	H	150	10	1 / 5	21.62	1.50	20.97	0.125	38.45	-17.48	23.12	0.205	40.61	-17.49
848.30	1.4	16-QAM	H	150	7	1 / 0	22.10	1.50	**21.45**	0.140	38.45	-17.00	**23.60**	0.229	40.61	-17.01
825.50	3	QPSK	H	150	8	1 / 14	21.82	1.50	21.17	0.131	38.45	-17.28	23.32	0.215	40.61	-17.29
836.50	3	QPSK	H	150	10	1 / 0	22.25	1.50	21.60	0.145	38.45	-16.85	23.75	0.237	40.61	-16.86
847.50	3	QPSK	H	150	6	1 / 0	23.02	1.50	**22.37**	0.173	38.45	-16.08	**24.52**	0.283	40.61	-16.09
825.50	3	16-QAM	H	150	8	1 / 0	21.85	1.50	21.20	0.132	38.45	-17.25	23.35	0.216	40.61	-17.26
836.50	3	16-QAM	H	150	10	1 / 14	21.70	1.50	21.05	0.127	38.45	-17.40	23.20	0.209	40.61	-17.41
847.50	3	16-QAM	H	150	6	1 / 0	22.85	1.50	**22.20**	0.166	38.45	-16.25	**24.35**	0.272	40.61	-16.26
826.50	5	QPSK	H	150	4	1 / 24	21.83	1.50	21.18	0.131	38.45	-17.27	23.33	0.215	40.61	-17.28
836.50	5	QPSK	H	150	13	1 / 24	22.33	1.50	21.68	0.147	38.45	-16.77	23.83	0.242	40.61	-16.78
846.50	5	QPSK	H	150	13	1 / 0	22.71	1.50	**22.06**	0.161	38.45	-16.39	**24.21**	0.264	40.61	-16.40
826.50	5	16-QAM	H	150	4	1 / 24	20.35	1.50	19.70	0.093	38.45	-18.75	21.85	0.153	40.61	-18.76
836.50	5	16-QAM	H	150	13	1 / 24	21.12	1.50	20.47	0.111	38.45	-17.98	22.62	0.183	40.61	-17.99
846.50	5	16-QAM	H	150	13	1 / 24	21.43	1.50	**20.78**	0.120	38.45	-17.67	**22.93**	0.196	40.61	-17.68
829.00	10	QPSK	H	150	14	1 / 49	22.11	1.50	21.46	0.140	38.45	-16.99	23.61	0.230	40.61	-17.00
836.50	10	QPSK	H	150	16	1 / 49	22.81	1.50	**22.16**	0.164	38.45	-16.29	**24.31**	0.270	40.61	-16.30
844.00	10	QPSK	H	150	12	1 / 49	22.64	1.50	21.99	0.158	38.45	-16.46	24.14	0.259	40.61	-16.47
829.00	10	16-QAM	H	150	14	1 / 49	20.91	1.50	20.26	0.106	38.45	-18.19	22.41	0.174	40.61	-18.20
836.50	10	16-QAM	H	150	16	1 / 49	21.72	1.50	**21.07**	0.128	38.45	-17.38	**23.22**	0.210	40.61	-17.39
844.00	10	16-QAM	H	150	12	1 / 49	21.65	1.50	21.00	0.126	38.45	-17.45	23.15	0.207	40.61	-17.46
848.30	1.4	QPSK	V	150	360	3 / 2	21.98	1.50	21.33	0.136	38.45	-17.12	23.48	0.223	40.61	-17.13

Table 6-4. ERP Data (Band 5)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	H	150	340	1 / 0	19.09	5.56	**24.65**	**0.292**	30.00	-5.35
1732.50	1.4	QPSK	H	150	355	3 / 2	16.42	5.41	21.83	0.152	30.00	-8.17
1754.30	1.4	QPSK	H	150	342	3 / 2	17.72	5.26	22.98	0.199	30.00	-7.02
1710.70	1.4	16-QAM	H	150	340	1 / 0	17.89	5.56	**23.45**	0.221	30.00	-6.55
1732.50	1.4	16-QAM	H	150	355	3 / 2	15.17	5.41	20.58	0.114	30.00	-9.42
1754.30	1.4	16-QAM	H	150	342	1 / 5	16.78	5.26	22.04	0.160	30.00	-7.96
1711.50	3	QPSK	H	150	334	1 / 14	19.09	5.55	**24.64**	0.291	30.00	-5.36
1732.50	3	QPSK	H	150	339	1 / 14	18.39	5.41	23.80	0.240	30.00	-6.20
1753.50	3	QPSK	H	150	339	1 / 14	18.56	5.26	23.82	0.241	30.00	-6.18
1711.50	3	16-QAM	H	150	334	1 / 0	18.19	5.55	**23.74**	0.237	30.00	-6.26
1732.50	3	16-QAM	H	150	339	1 / 14	17.84	5.41	23.25	0.211	30.00	-6.75
1753.50	3	16-QAM	H	150	339	1 / 0	17.76	5.26	23.02	0.201	30.00	-6.98
1712.50	5	QPSK	H	150	333	1 / 0	18.75	5.55	**24.30**	0.269	30.00	-5.70
1732.50	5	QPSK	H	150	342	1 / 0	18.28	5.41	23.69	0.234	30.00	-6.31
1752.50	5	QPSK	H	150	334	1 / 24	17.73	5.27	23.00	0.200	30.00	-7.00
1712.50	5	16-QAM	H	150	333	1 / 0	17.17	5.55	**22.72**	0.187	30.00	-7.28
1732.50	5	16-QAM	H	150	342	1 / 0	17.13	5.41	22.54	0.179	30.00	-7.46
1752.50	5	16-QAM	H	150	334	1 / 24	17.09	5.27	22.36	0.172	30.00	-7.64
1715.00	10	QPSK	H	150	345	1 / 49	18.51	5.53	**24.04**	0.253	30.00	-5.96
1732.50	10	QPSK	H	150	351	1 / 0	16.66	5.41	22.07	0.161	30.00	-7.93
1750.00	10	QPSK	H	150	339	1 / 0	18.40	5.29	23.69	0.234	30.00	-6.31
1715.00	10	16-QAM	H	150	345	1 / 49	16.91	5.53	22.44	0.175	30.00	-7.56
1732.50	10	16-QAM	H	150	351	1 / 0	16.71	5.41	22.12	0.163	30.00	-7.88
1750.00	10	16-QAM	H	150	339	1 / 49	17.40	5.29	**22.69**	0.186	30.00	-7.31
1717.50	15	QPSK	H	150	333	1 / 74	18.27	5.51	23.78	0.239	30.00	-6.22
1732.50	15	QPSK	H	150	339	1 / 0	18.57	5.41	**23.98**	0.250	30.00	-6.02
1747.50	15	QPSK	H	150	341	1 / 0	18.21	5.31	23.52	0.225	30.00	-6.48
1717.50	15	16-QAM	H	150	333	1 / 0	17.69	5.51	23.20	0.209	30.00	-6.80
1732.50	15	16-QAM	H	150	339	1 / 0	18.51	5.41	**23.92**	0.246	30.00	-6.08
1747.50	15	16-QAM	H	150	341	1 / 0	18.03	5.31	23.34	0.216	30.00	-6.66
1720.00	20	QPSK	H	150	265	1 / 0	16.01	5.49	21.50	0.141	30.00	-8.50
1732.50	20	QPSK	H	150	359	1 / 0	16.14	5.41	**21.55**	0.143	30.00	-8.45
1745.00	20	QPSK	H	150	253	1 / 0	15.91	5.32	21.23	0.133	30.00	-8.77
1720.00	20	16-QAM	H	150	265	1 / 0	15.30	5.49	**20.79**	0.120	30.00	-9.21
1732.50	20	16-QAM	H	150	359	1 / 0	14.62	5.41	20.03	0.101	30.00	-9.97
1745.00	20	16-QAM	H	150	253	1 / 0	15.21	5.32	20.53	0.113	30.00	-9.47
1710.70	1.4	QPSK	V	150	276	3 / 2	17.26	5.56	22.82	0.191	30.00	-7.18

Table 6-5. EIRP Data (Band 4)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	H	150	353	1 / 0	21.77	4.82	**26.59**	0.456	33.01	-6.42
1880.00	1.4	QPSK	H	150	353	3 / 2	21.60	4.74	26.34	0.431	33.01	-6.67
1909.30	1.4	QPSK	H	150	357	3 / 2	21.67	4.68	26.35	0.432	33.01	-6.66
1850.70	1.4	16-QAM	H	150	353	1 / 5	20.84	4.82	**25.66**	0.368	33.01	-7.35
1880.00	1.4	16-QAM	H	150	353	3 / 2	20.47	4.74	25.21	0.332	33.01	-7.80
1909.30	1.4	16-QAM	H	150	357	1 / 0	20.77	4.68	25.45	0.351	33.01	-7.56
1851.50	3	QPSK	H	150	0	1 / 14	21.29	4.82	26.11	0.408	33.01	-6.90
1880.00	3	QPSK	H	150	3	1 / 14	21.47	4.74	26.21	0.418	33.01	-6.80
1908.50	3	QPSK	H	150	3	1 / 14	22.13	4.68	**26.81**	**0.480**	33.01	-6.20
1851.50	3	16-QAM	H	150	0	1 / 14	20.72	4.82	**25.54**	0.358	33.01	-7.47
1880.00	3	16-QAM	H	150	3	1 / 14	20.32	4.74	25.06	0.321	33.01	-7.95
1908.50	3	16-QAM	H	150	3	1 / 0	20.67	4.68	25.35	0.343	33.01	-7.66
1852.50	5	QPSK	H	150	354	1 / 0	21.58	4.81	26.39	0.436	33.01	-6.62
1880.00	5	QPSK	H	150	353	1 / 24	21.23	4.74	25.97	0.395	33.01	-7.04
1907.50	5	QPSK	H	150	352	1 / 24	21.74	4.68	**26.42**	0.439	33.01	-6.59
1852.50	5	16-QAM	H	150	354	1 / 0	20.15	4.81	24.96	0.314	33.01	-8.05
1880.00	5	16-QAM	H	150	353	1 / 24	20.08	4.74	24.82	0.303	33.01	-8.19
1907.50	5	16-QAM	H	150	352	1 / 24	20.77	4.68	**25.45**	0.351	33.01	-7.56
1855.00	10	QPSK	H	150	1	1 / 0	21.13	4.81	25.94	0.392	33.01	-7.07
1880.00	10	QPSK	H	150	10	1 / 49	20.84	4.74	25.58	0.361	33.01	-7.43
1905.00	10	QPSK	H	150	356	1 / 49	21.63	4.68	**26.31**	0.428	33.01	-6.70
1855.00	10	16-QAM	H	150	1	1 / 0	20.46	4.81	25.27	0.336	33.01	-7.74
1880.00	10	16-QAM	H	150	10	1 / 49	20.12	4.74	24.86	0.306	33.01	-8.15
1905.00	10	16-QAM	H	150	356	1 / 49	21.12	4.68	**25.80**	0.381	33.01	-7.21
1857.50	15	QPSK	H	150	3	1 / 0	21.13	4.80	25.93	0.392	33.01	-7.08
1880.00	15	QPSK	H	150	356	1 / 0	20.56	4.74	25.30	0.339	33.01	-7.71
1902.50	15	QPSK	H	150	7	1 / 74	21.65	4.69	**26.34**	0.430	33.01	-6.67
1857.50	15	16-QAM	H	150	3	1 / 74	20.32	4.80	25.12	0.325	33.01	-7.89
1880.00	15	16-QAM	H	150	356	1 / 74	19.95	4.74	24.69	0.294	33.01	-8.32
1902.50	15	16-QAM	H	150	7	1 / 74	20.70	4.69	**25.39**	0.346	33.01	-7.62
1860.00	20	QPSK	H	150	3	1 / 0	20.94	4.79	25.73	0.374	33.01	-7.28
1880.00	20	QPSK	H	150	356	1 / 99	20.37	4.74	25.11	0.324	33.01	-7.90
1900.00	20	QPSK	H	150	6	1 / 99	21.35	4.69	**26.04**	0.402	33.01	-6.97
1860.00	20	16-QAM	H	150	3	1 / 0	19.85	4.79	24.64	0.291	33.01	-8.37
1880.00	20	16-QAM	H	150	356	1 / 99	19.49	4.74	24.23	0.265	33.01	-8.78
1900.00	20	16-QAM	H	150	6	1 / 99	20.57	4.69	**25.26**	0.336	33.01	-7.75
1908.50	3	QPSK	V	150	61	1 / 0	19.45	4.68	24.13	0.259	33.01	-8.88

Table 6-6. EIRP Data (Band 2)

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6.7 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas.

Test Procedures Used

KDB 971168 D01 v03 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

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Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

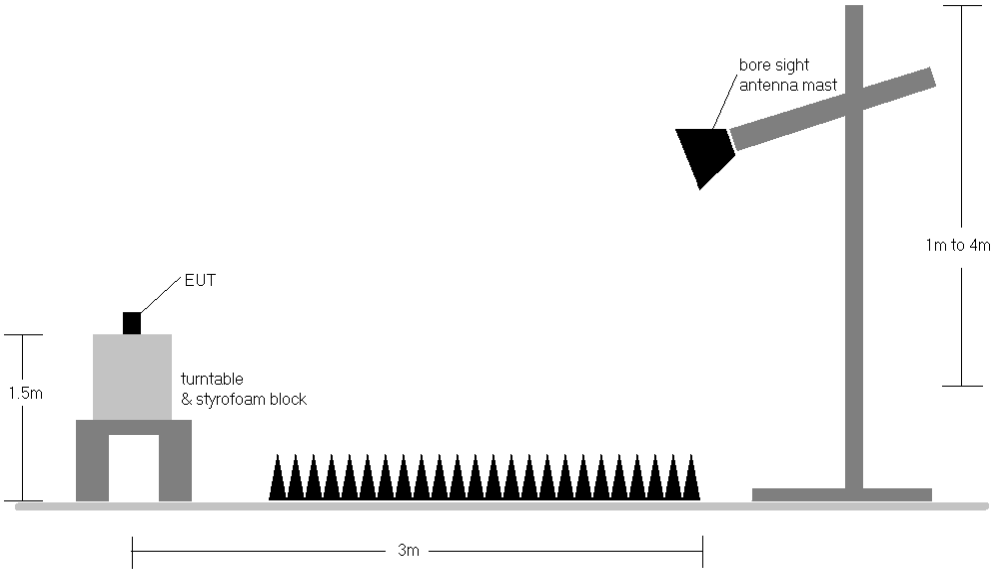

Figure 6-7. Test Instrument & Measurement Setup

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2) This unit was tested with its standard battery.

3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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Band 13

OPERATING FREQUENCY:	782.00	MHz
CHANNEL:	23230	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2346.00	V	150	6	-65.71	4.88	-60.83	-47.8
3128.00	V	-	-	-67.68	6.02	-61.66	-48.7
3910.00	V	-	-	-68.12	7.25	-60.87	-47.9

Table 6-7. Radiated Spurious Data (Band 13)

MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	V	-	-	-69.37	4.50	-64.88	-24.9

Table 6-8. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

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Band 5

OPERATING FREQUENCY:	825.50	MHz
CHANNEL:	20415	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1651.00	H	150	9	-68.84	4.81	-64.03	-51.0
2476.50	H	-	-	-65.92	4.99	-60.93	-47.9
3302.00	H	-	-	-65.23	6.25	-58.98	-46.0

Table 6-9. Radiated Spurious Data (Band 5 – Low Channel)

OPERATING FREQUENCY:	836.50	MHz
CHANNEL:	20525	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	H	150	5	-61.79	4.86	-56.93	-43.9
2509.50	H	-	-	-65.23	5.10	-60.13	-47.1
3346.00	H	-	-	-65.14	6.25	-58.89	-45.9

Table 6-10. Radiated Spurious Data (Band 5 – Mid Channel)

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OPERATING FREQUENCY:	847.50	MHz
CHANNEL:	20635	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1695.00	H	150	361	-59.27	4.91	-54.36	-41.4
2542.50	H	150	241	-64.61	5.27	-59.34	-46.3
3390.00	H	-	-	-65.77	6.39	-59.38	-46.4

Table 6-11. Radiated Spurious Data (Band 5 – High Channel)

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Band 4

OPERATING FREQUENCY:	1711.50	MHz
CHANNEL:	19965	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3423.00	H	150	34	-60.55	6.46	-54.08	-41.1
5134.50	H	-	-	-64.63	8.43	-56.21	-43.2
6846.00	H	-	-	-61.99	8.71	-53.27	-40.3

Table 6-12. Radiated Spurious Data (Band 4 – Low Channel)

OPERATING FREQUENCY:	1732.50	MHz
CHANNEL:	20175	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3465.00	H	150	34	-54.42	6.56	-47.87	-34.9
5197.50	H	150	88	-63.04	8.45	-54.58	-41.6
6930.00	H	-	-	-61.75	8.67	-53.08	-40.1

Table 6-13. Radiated Spurious Data (Band 4 – Mid Channel)

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OPERATING FREQUENCY:	1753.50	MHz
CHANNEL:	20385	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3507.00	H	150	42	-50.54	6.59	-43.96	-31.0
5260.50	H	-	-	-64.17	8.41	-55.76	-42.8
7014.00	H	-	-	-61.54	8.57	-52.96	-40.0

Table 6-14. Radiated Spurious Data (Band 4 – High Channel)

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Band 2

OPERATING FREQUENCY:	1851.50	MHz
CHANNEL:	18615	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3703.00	V	150	111	-50.27	6.76	-43.50	-30.5
5554.50	V	150	306	-61.83	8.44	-53.39	-40.4
7406.00	V	-	-	-60.03	8.27	-51.76	-38.8

Table 6-15. Radiated Spurious Data (Band 2 – Low Channel)

OPERATING FREQUENCY:	1880.00	MHz
CHANNEL:	18900	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3760.00	V	150	102	-48.50	6.84	-41.66	-28.7
5640.00	V	150	158	-61.65	8.52	-53.13	-40.1
7520.00	V	-	-	-59.99	8.44	-51.55	-38.6

Table 6-16. Radiated Spurious Data (Band 2 – Mid Channel)

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OPERATING FREQUENCY:	1908.50	MHz
CHANNEL:	19185	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3817.00	V	150	93	-51.34	6.99	-44.35	-31.3
5725.50	V	150	318	-59.50	8.58	-50.92	-37.9
7634.00	V	-	-	-60.84	8.56	-52.28	-39.3

Table 6-17. Radiated Spurious Data (Band 2 – High Channel)

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7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFX410UM** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

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