7.4 Band Edge Emissions at Antenna Terminal

§2.1051 §22.917(a) §24.238(a) §27.53(c) §27.53(h)

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is 43 + $\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v02r02 – Section 6.0

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW ≥ 1% of the emission bandwidth
4. VBW ≥ 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Setup

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

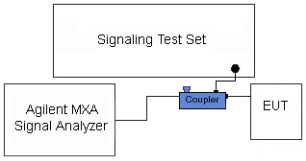


Figure 7-3. Test Instrument & Measurement Setup

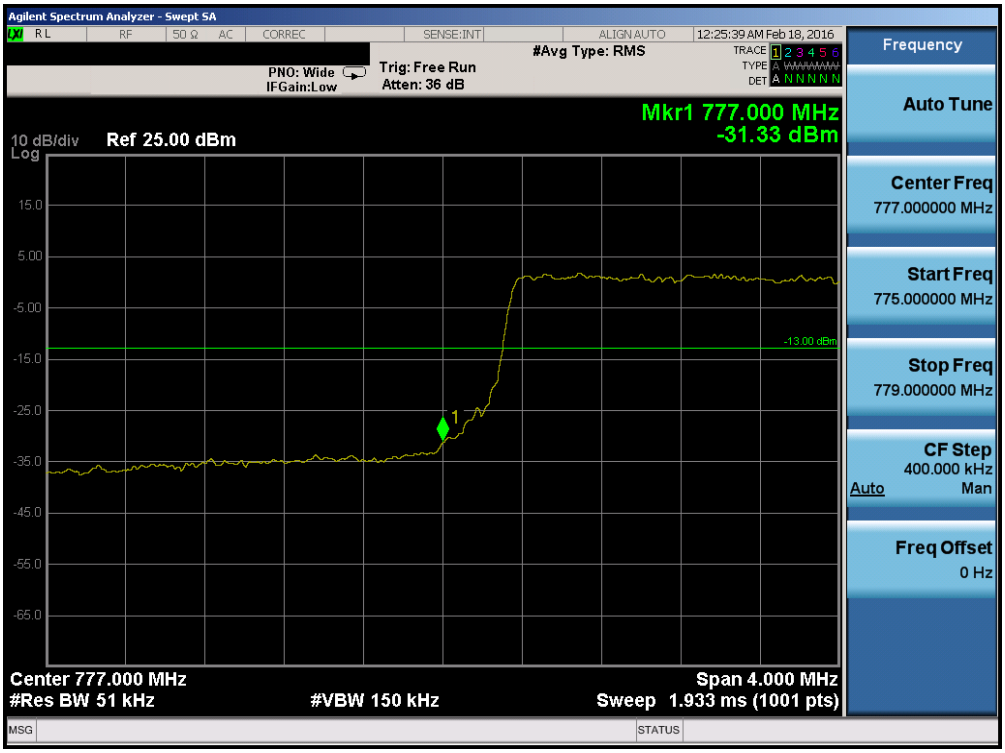
Test Notes

Per 22.917(b), 24.238(a) and 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

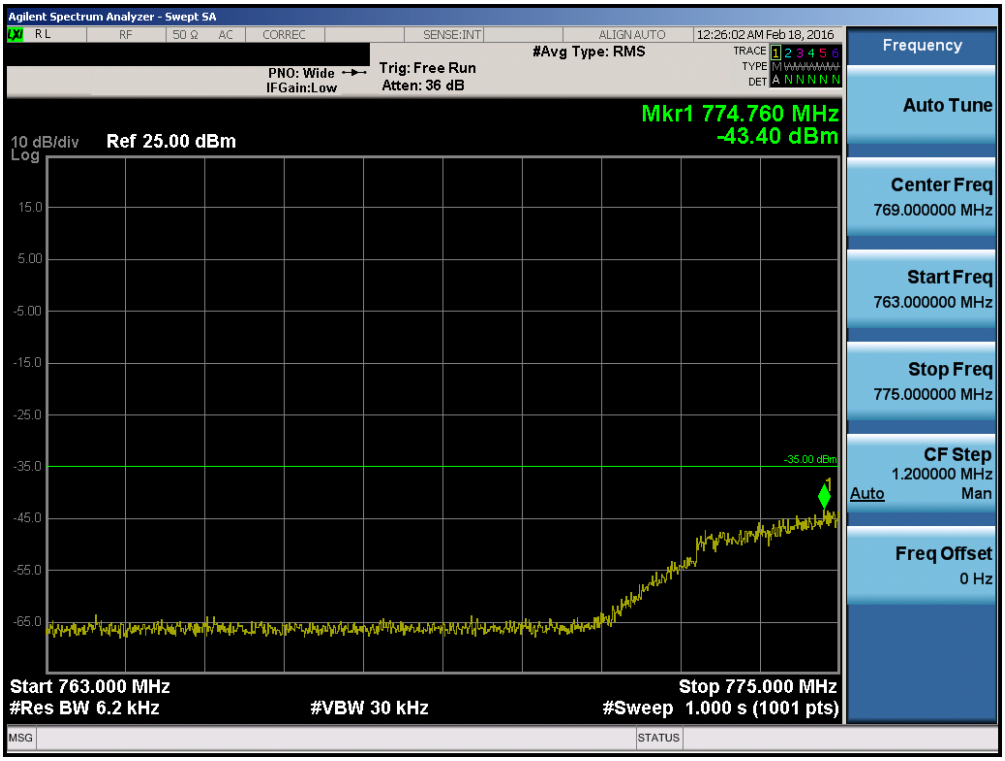
Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is 65 + $10\log_{10}(P)$ = -35dBm in a 6.25kHz bandwidth.

© 2016 PCTEST Engineering Laboratory, Inc.

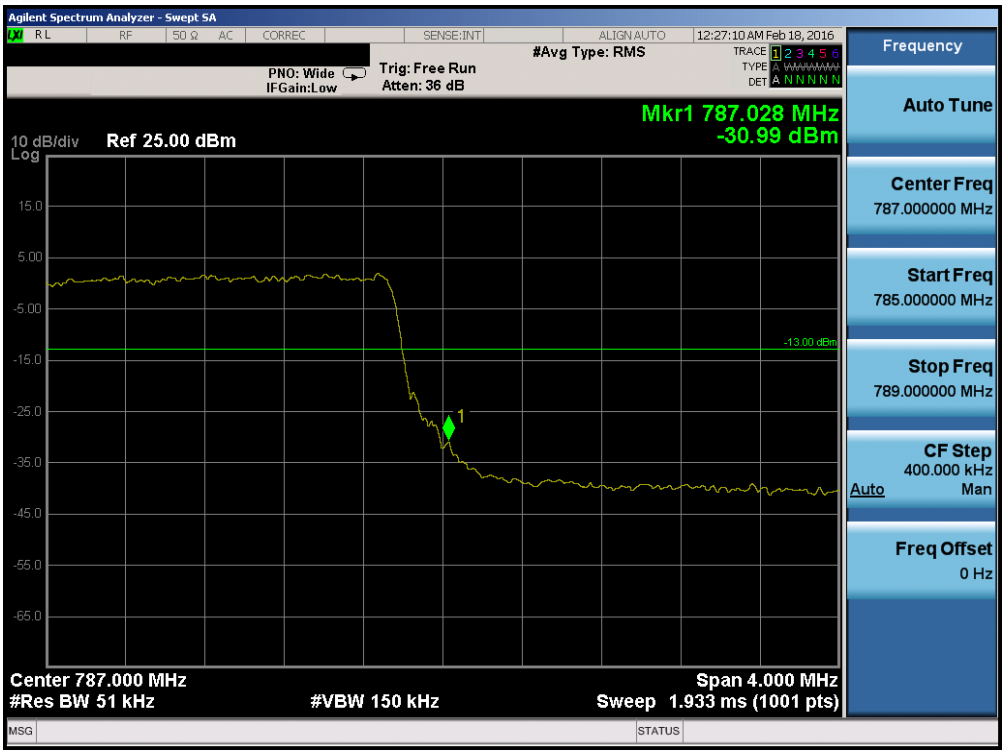


Plot 7-73. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

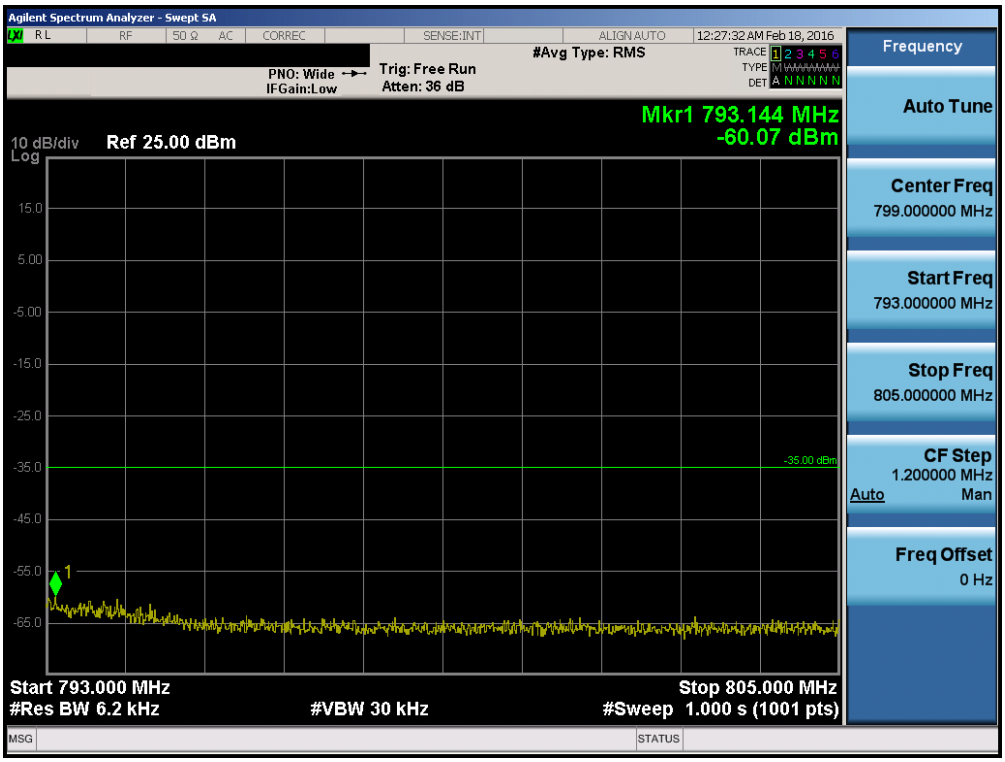


Plot 7-74. Lower Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

© 2016 PCTEST Engineering Laboratory, Inc.

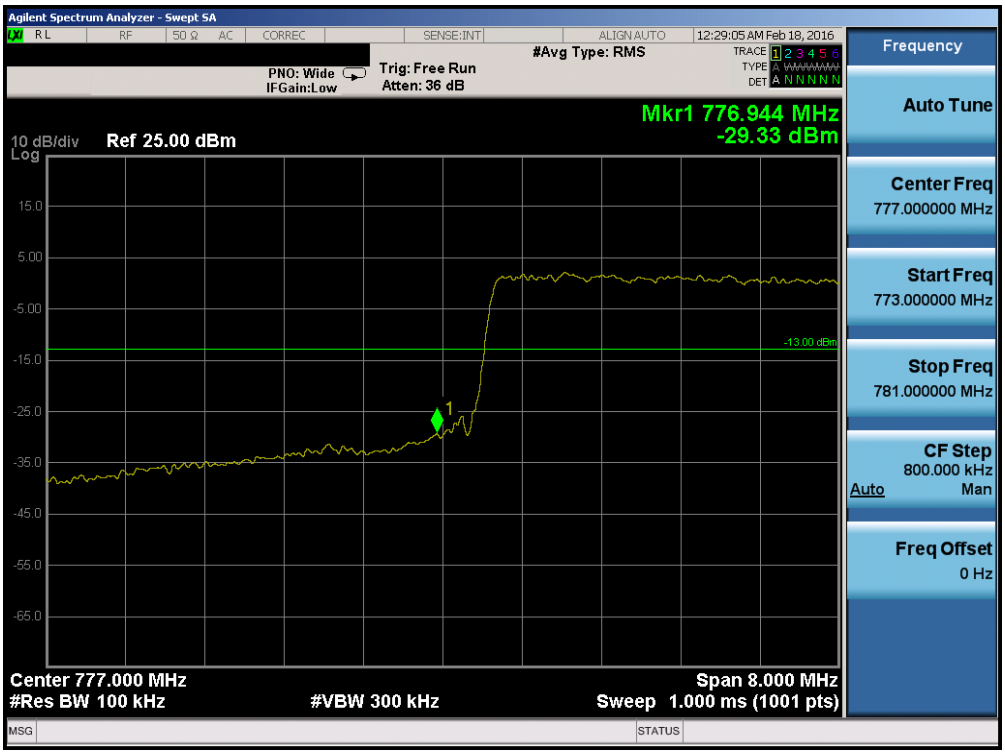


Plot 7-75. Upper Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

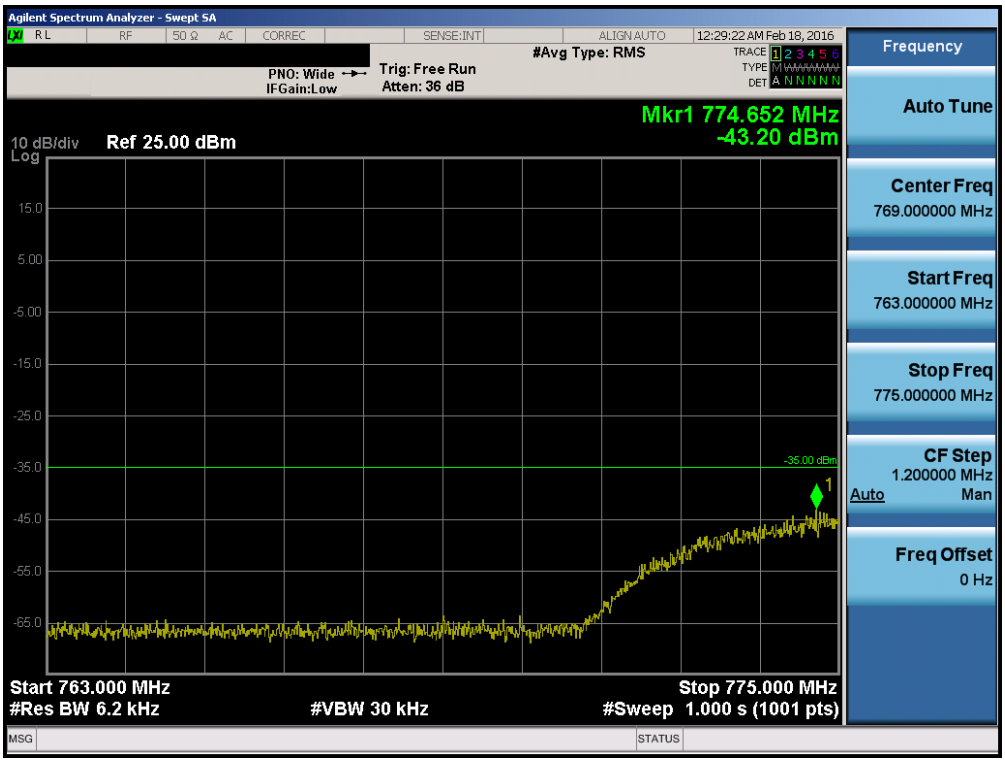


Plot 7-76. Upper Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

© 2016 PCTEST Engineering Laboratory, Inc.

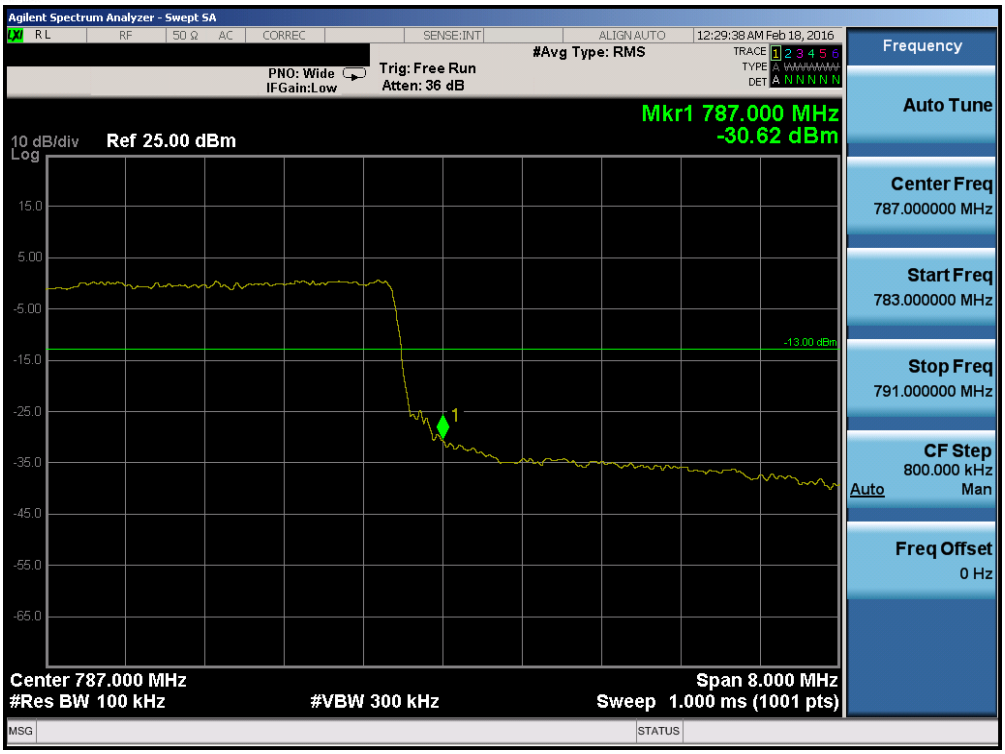


Plot 7-77. Lower Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

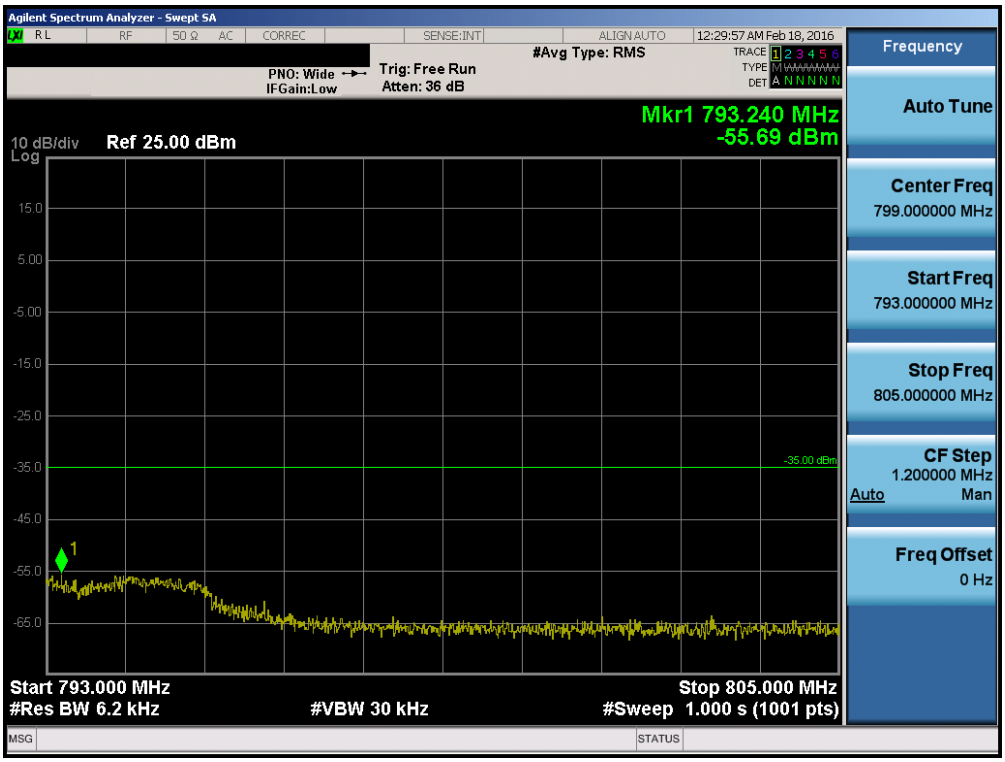


Plot 7-78. Lower Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

© 2016 PCTEST Engineering Laboratory, Inc.

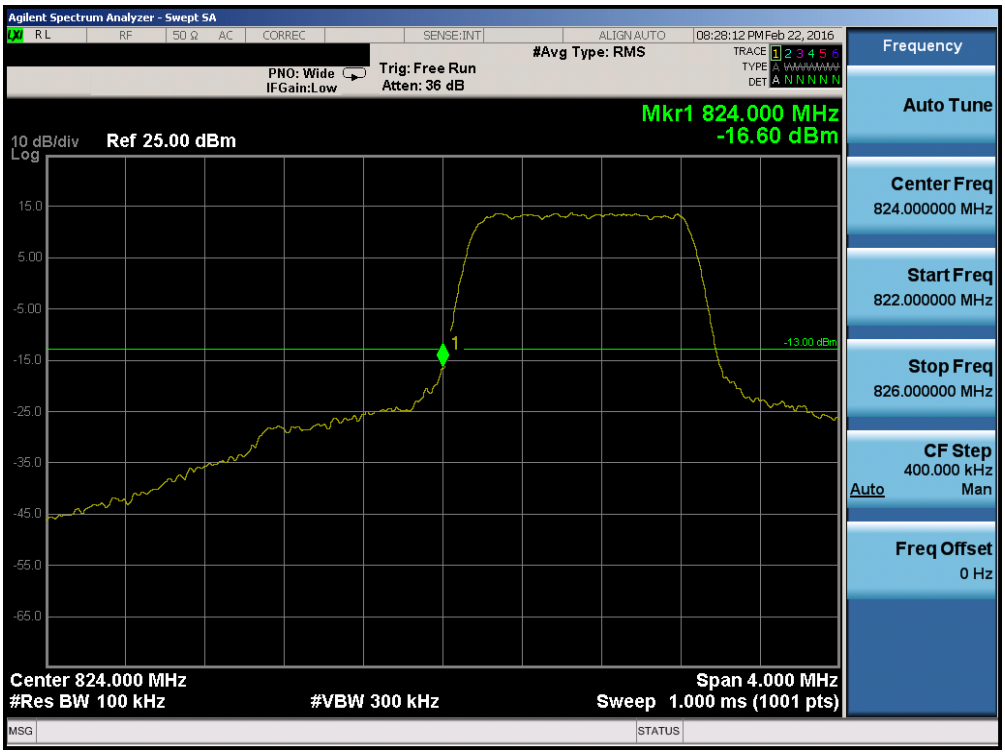


Plot 7-79. Upper Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-80. Upper Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

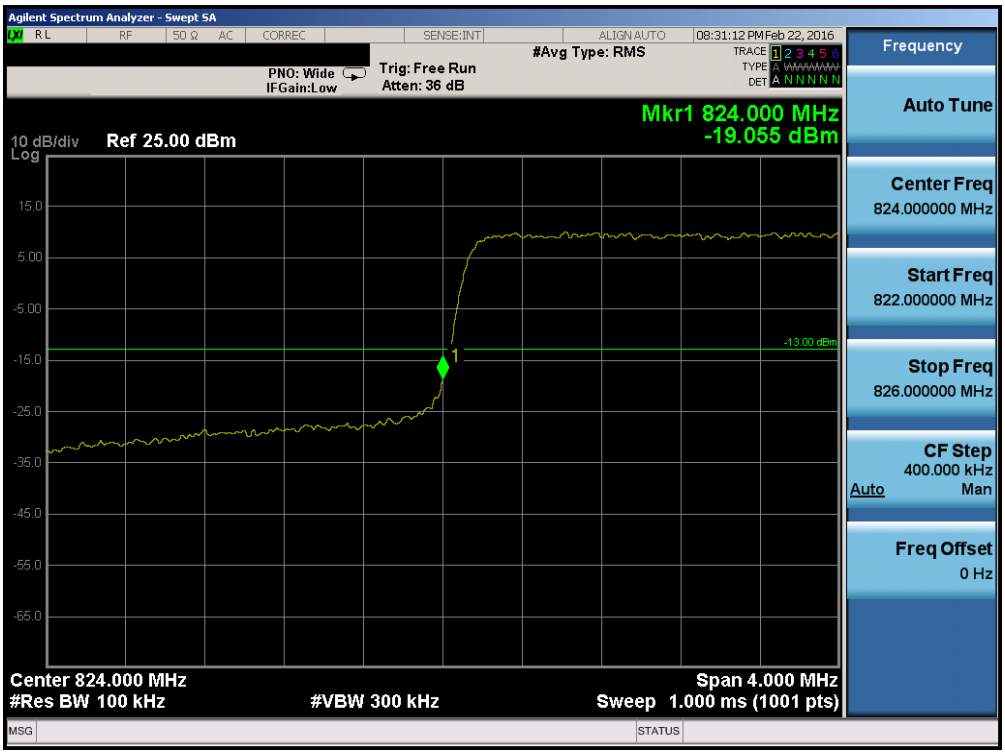
© 2016 PCTEST Engineering Laboratory, Inc.



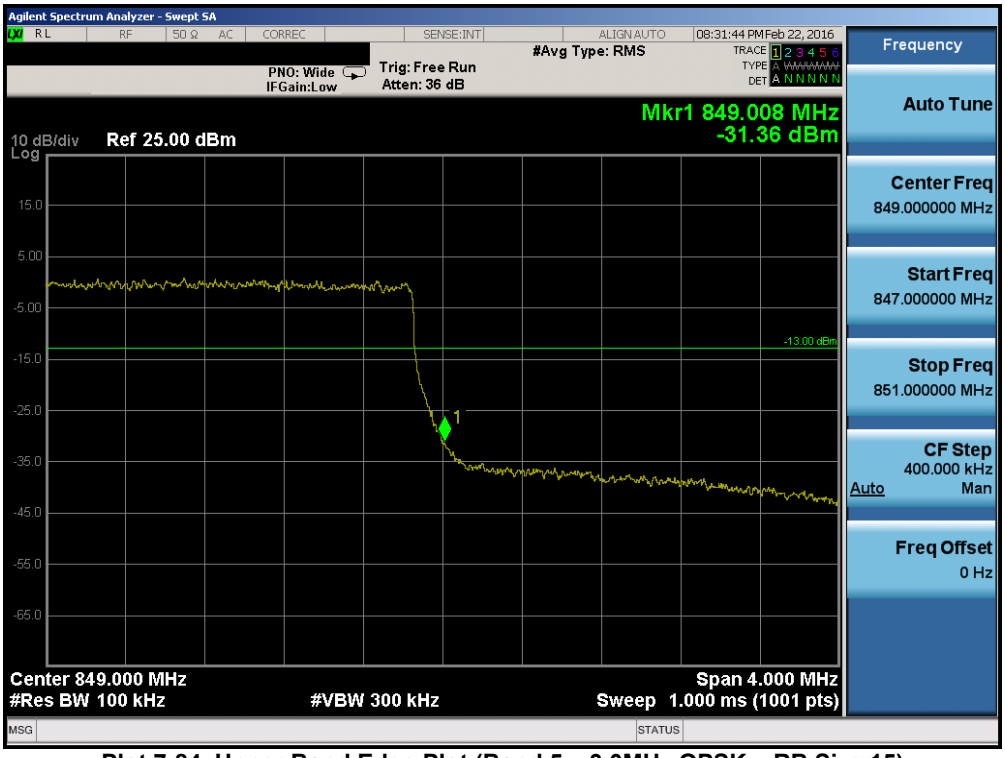
Plot 7-81. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

Plot 7-82. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

© 2016 PCTEST Engineering Laboratory, Inc.

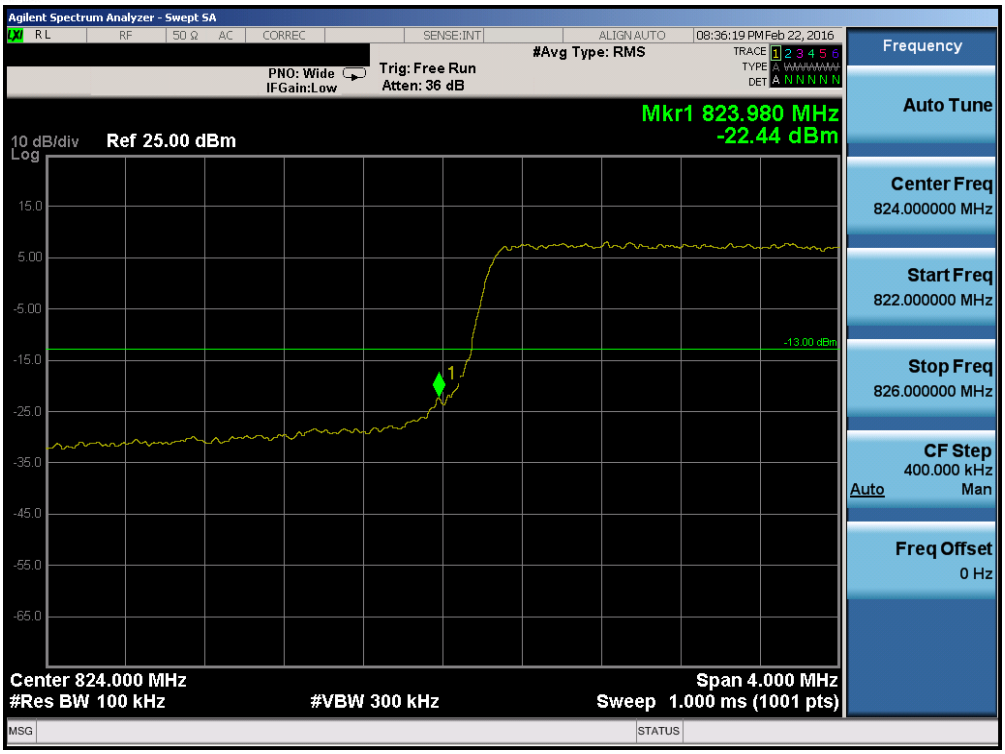


Plot 7-83. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 7-84. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

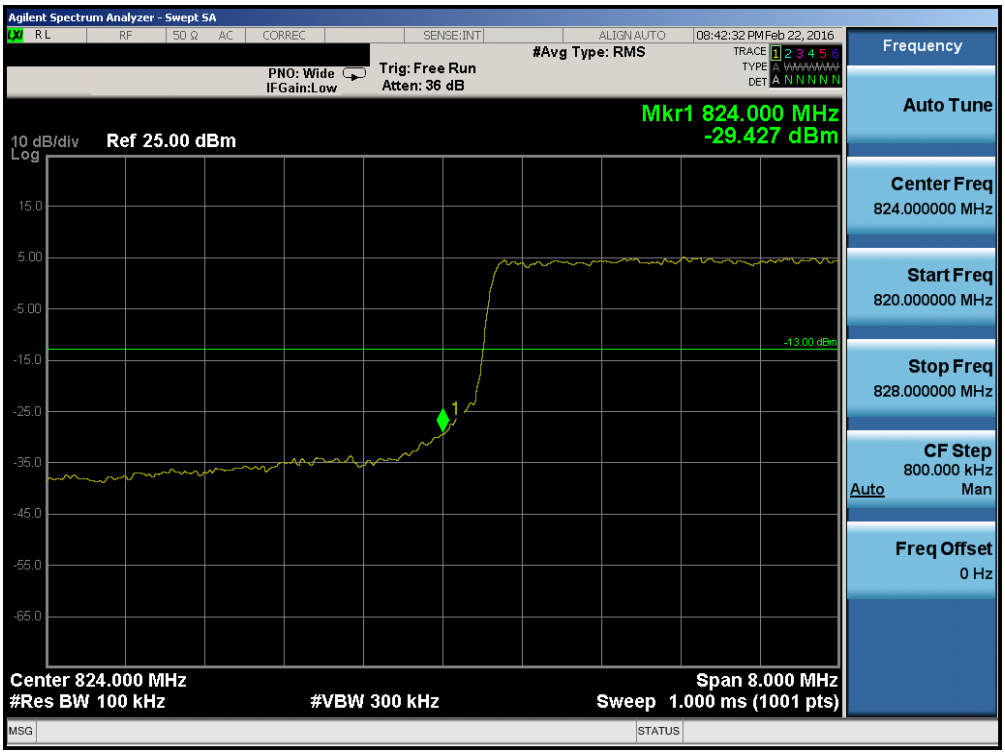
© 2016 PCTEST Engineering Laboratory, Inc.



Plot 7-85. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

Plot 7-86. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

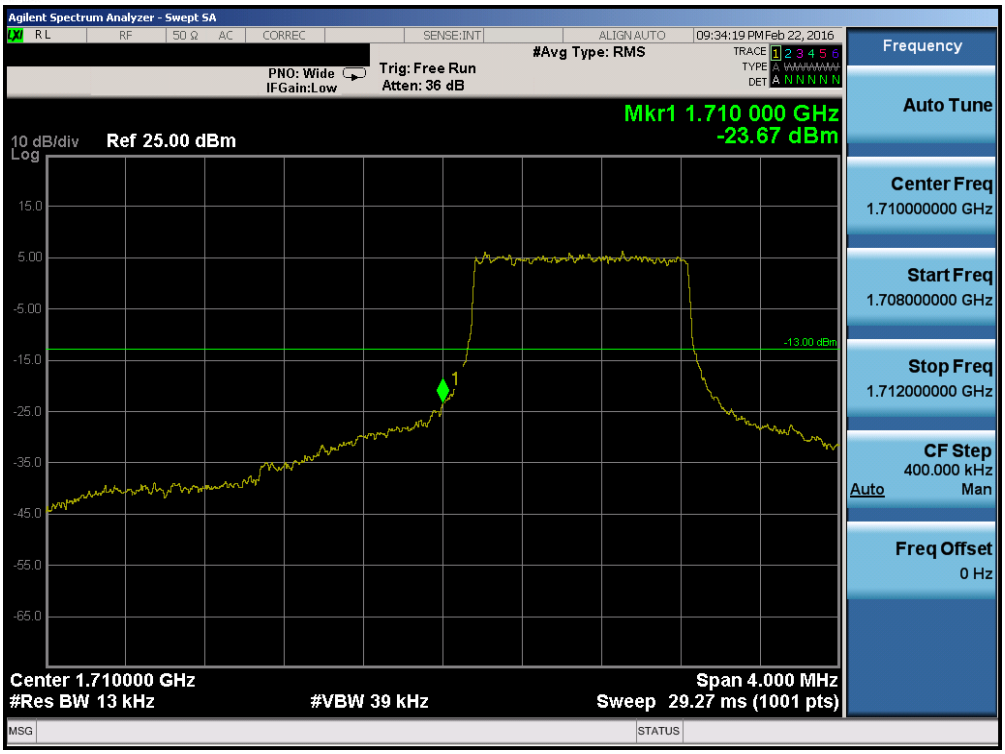
© 2016 PCTEST Engineering Laboratory, Inc.



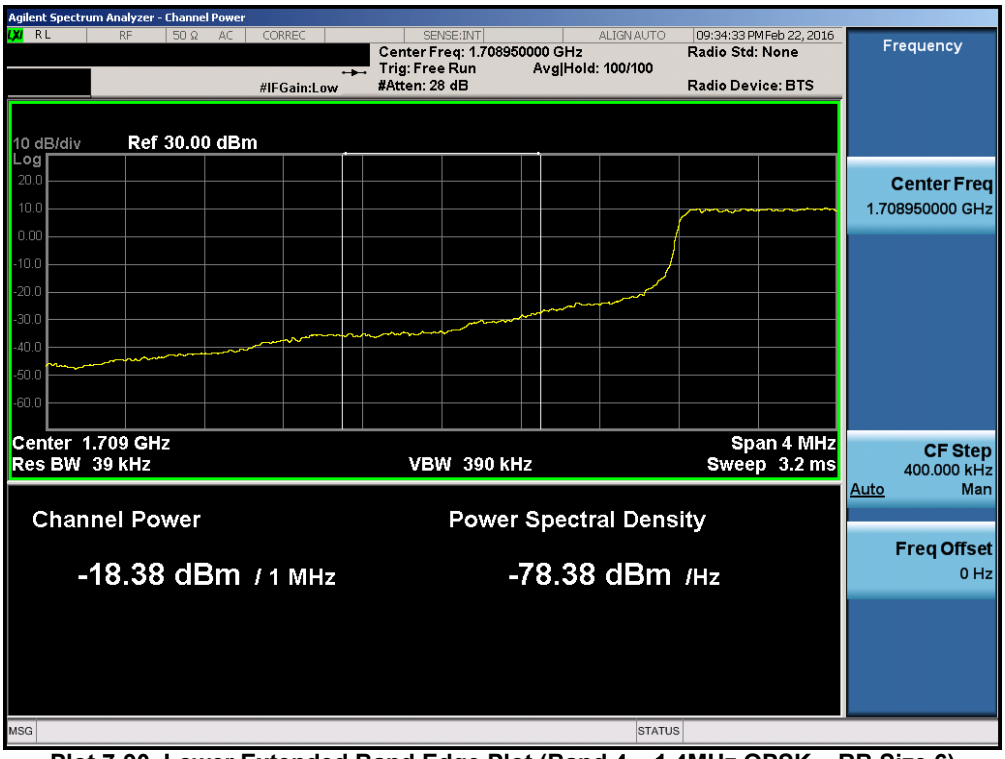
Plot 7-87. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

Plot 7-88. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

© 2016 PCTEST Engineering Laboratory, Inc.



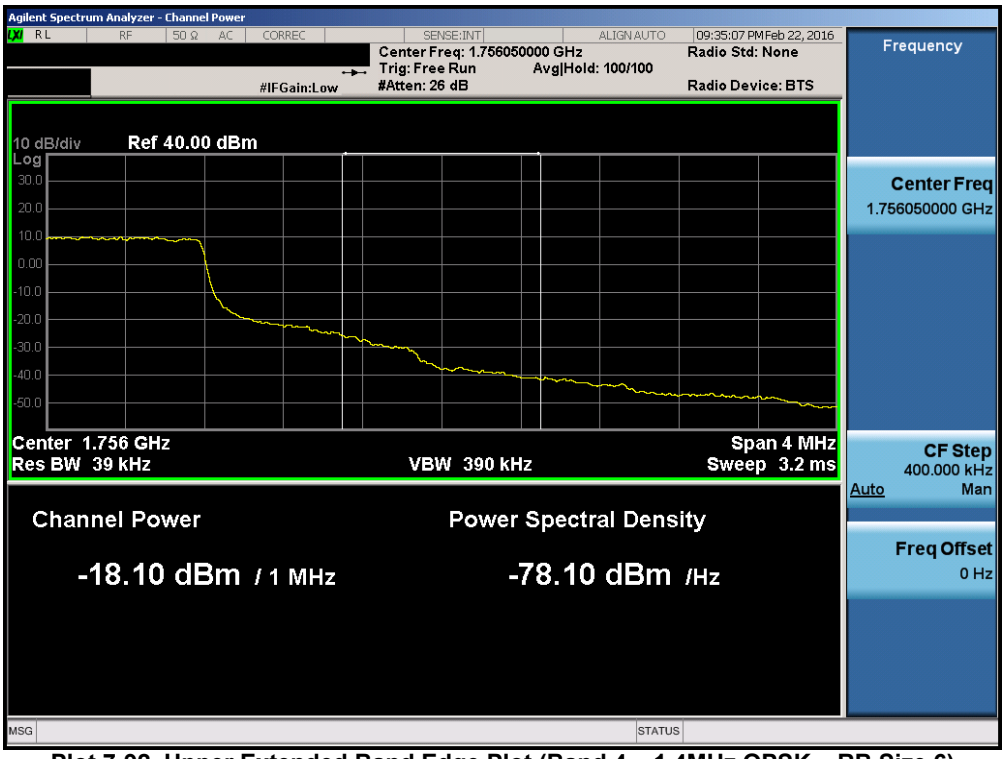
Plot 7-89. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



Plot 7-90. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

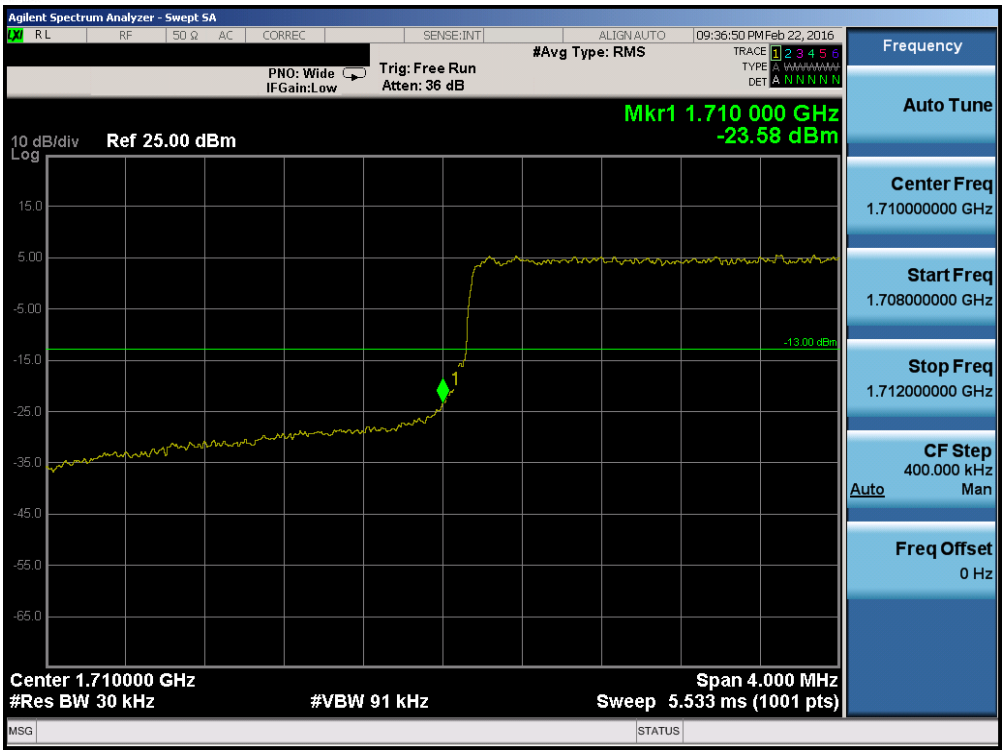
© 2016 PCTEST Engineering Laboratory, Inc.

Plot 7-91. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

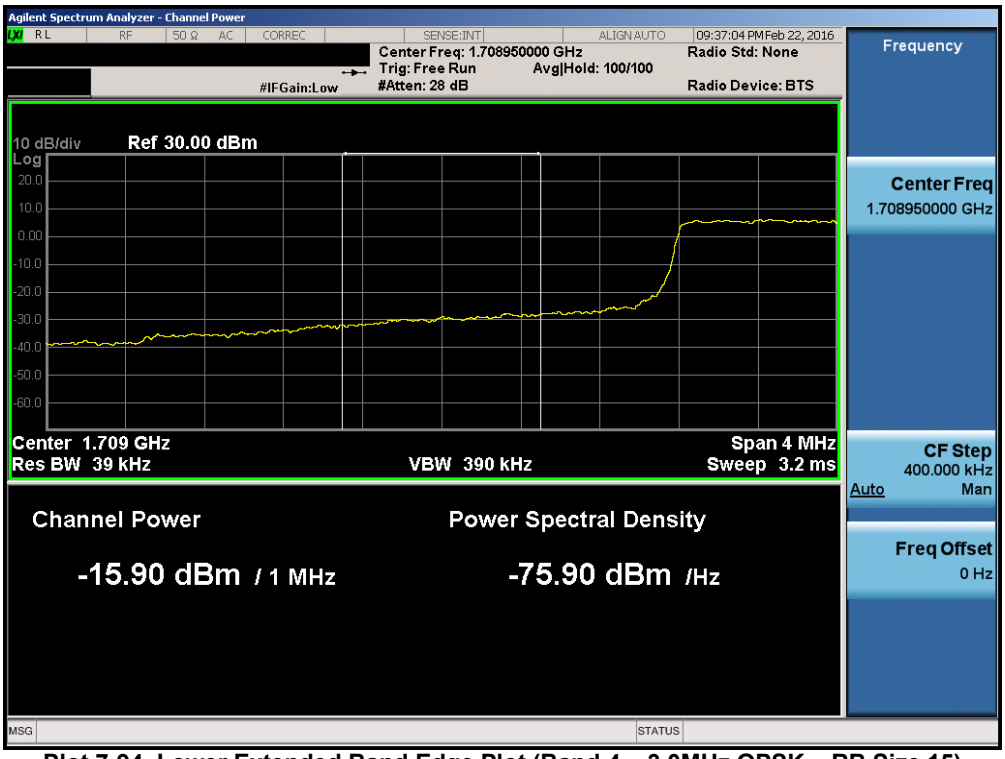


Plot 7-92. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

© 2016 PCTEST Engineering Laboratory, Inc.

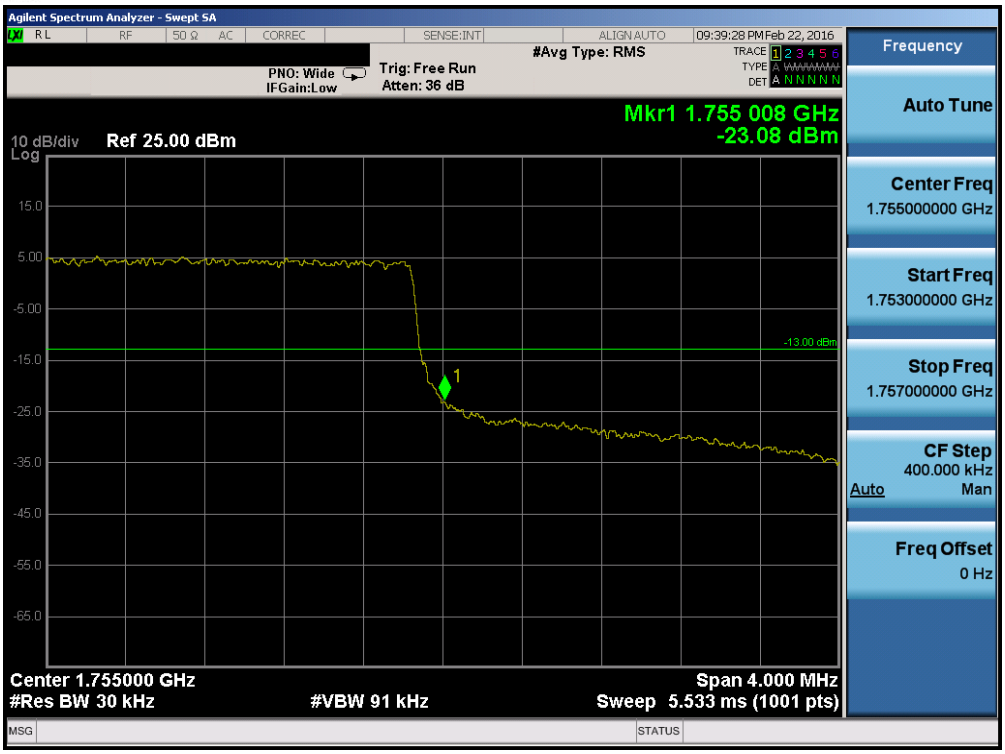


Plot 7-93. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

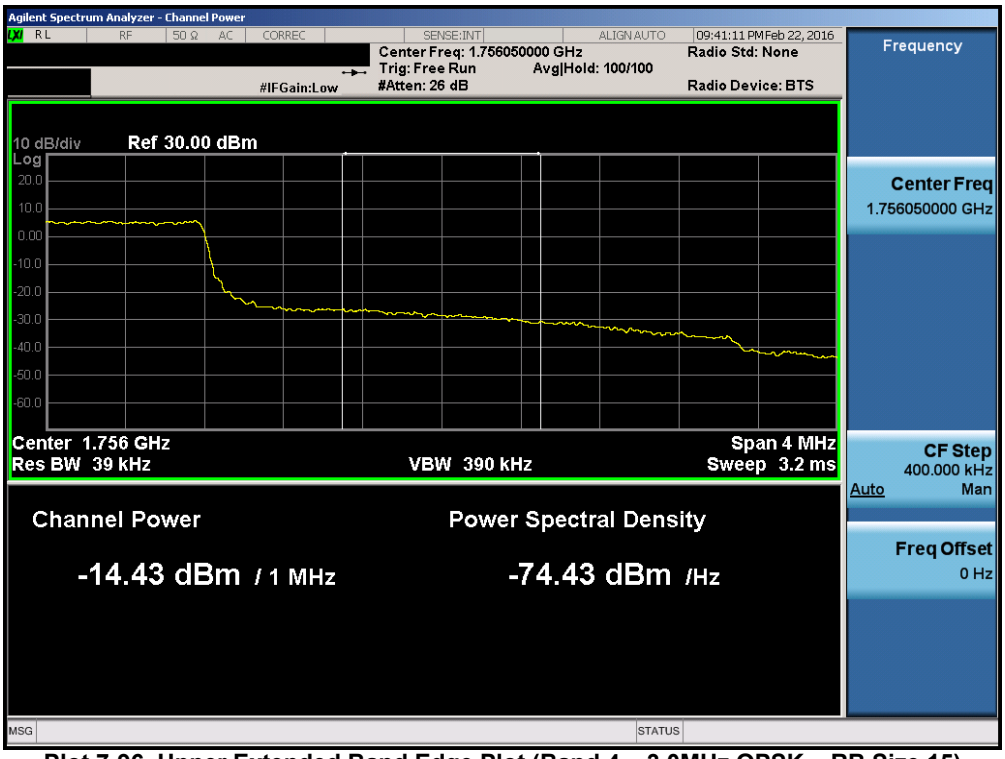


Plot 7-94. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

© 2016 PCTEST Engineering Laboratory, Inc.

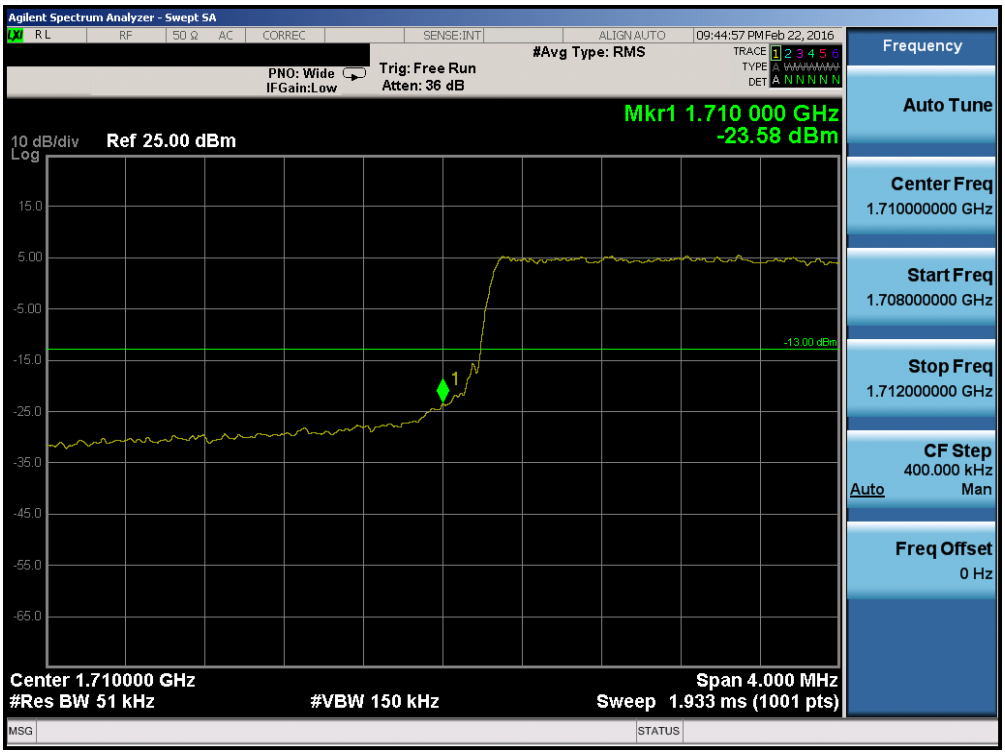


Plot 7-95. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

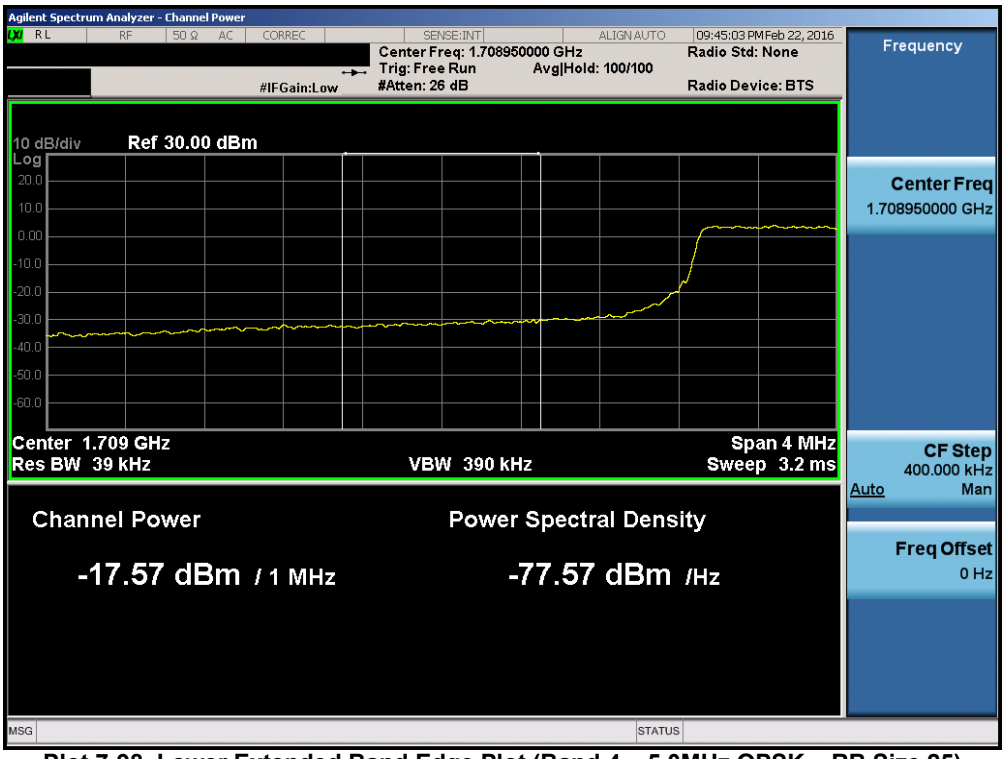


Plot 7-96. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

© 2016 PCTEST Engineering Laboratory, Inc.



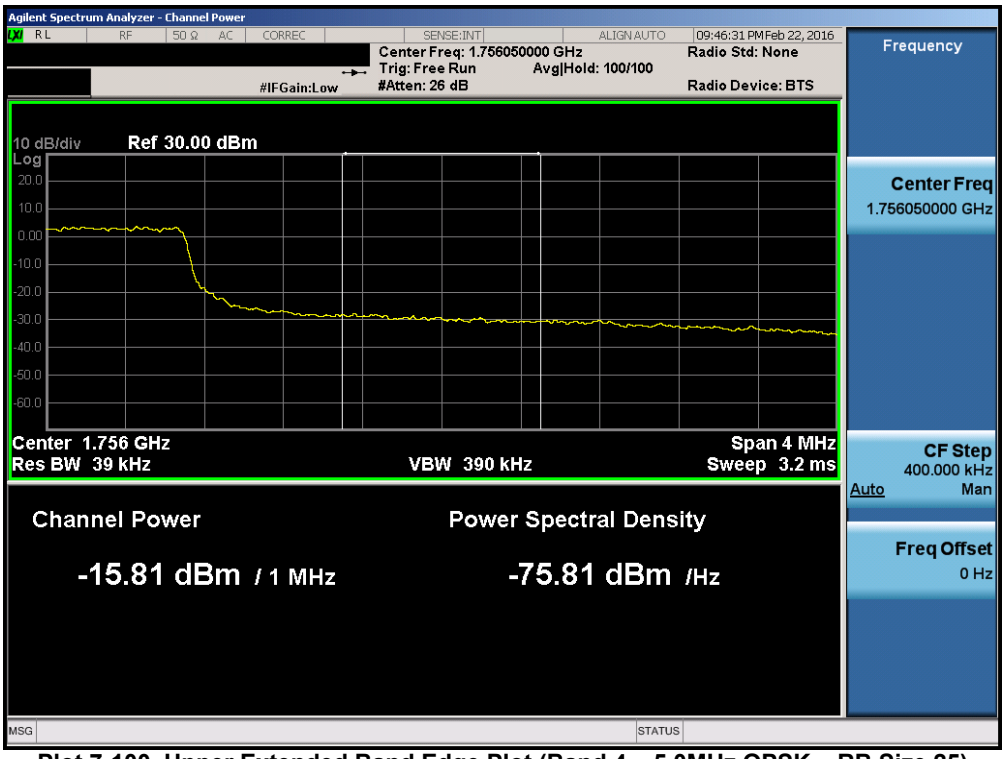
Plot 7-97. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



Plot 7-98. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

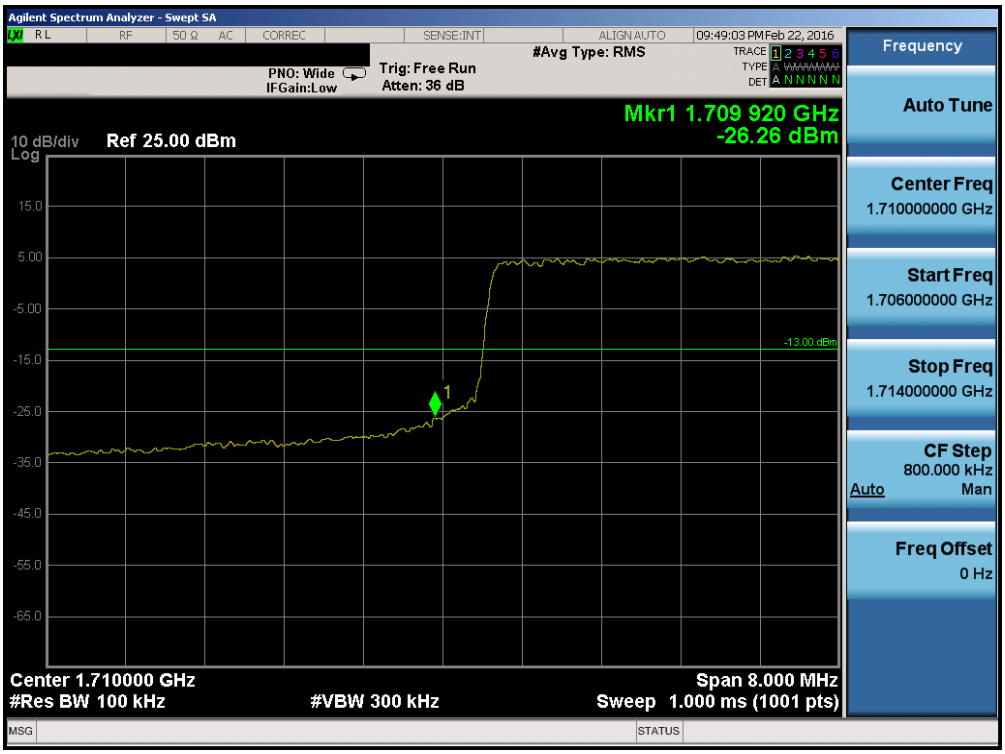
© 2016 PCTEST Engineering Laboratory, Inc.

Plot 7-99. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

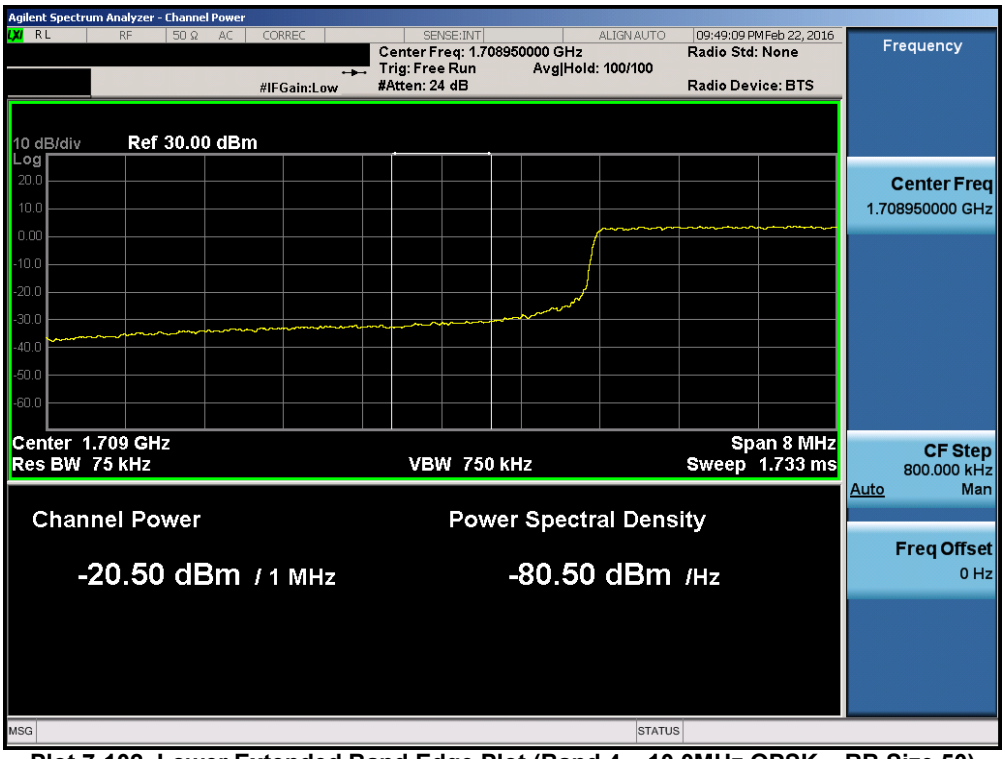


Plot 7-100. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

© 2016 PCTEST Engineering Laboratory, Inc.



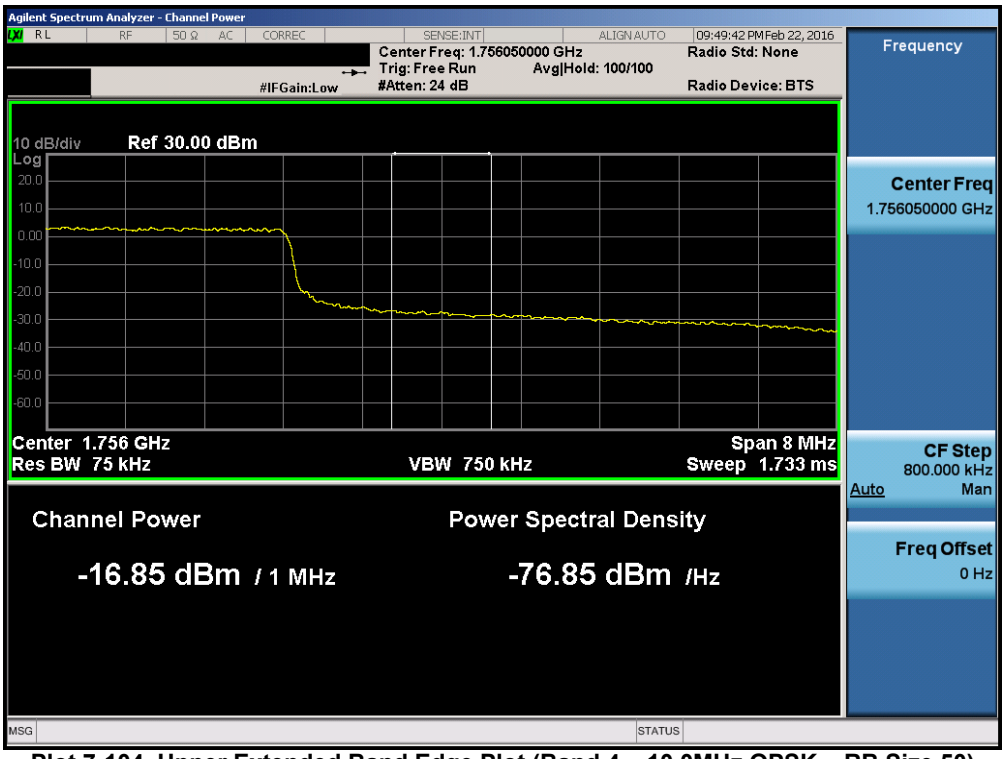
Plot 7-101. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



Plot 7-102. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

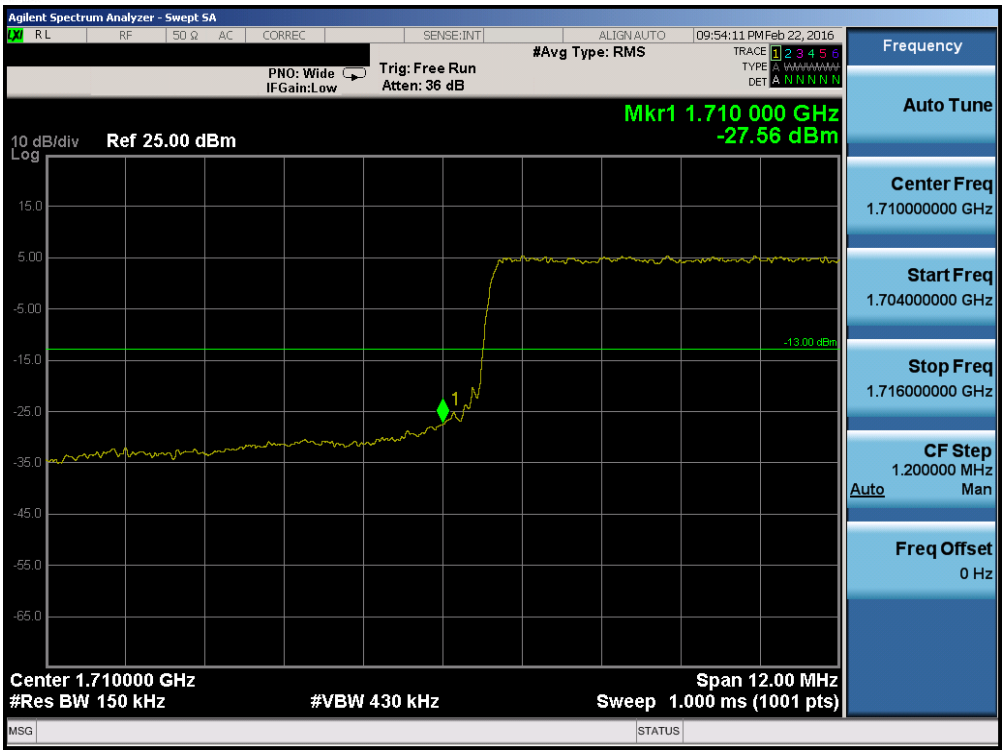
© 2016 PCTEST Engineering Laboratory, Inc.

Plot 7-103. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

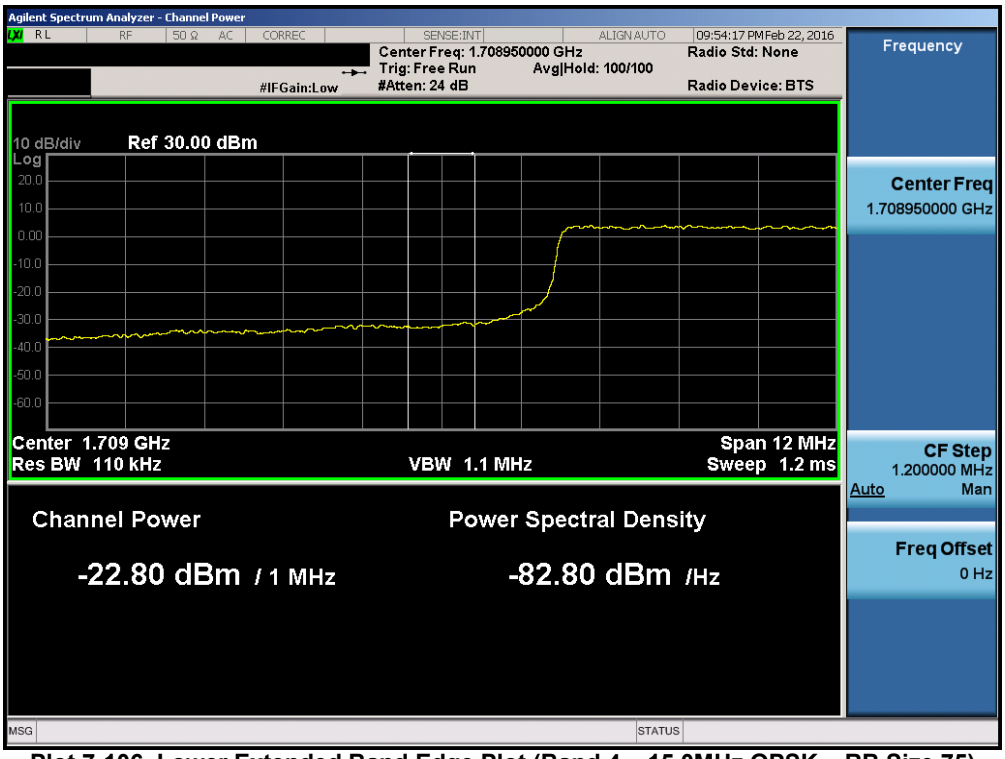


Plot 7-104. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

© 2016 PCTEST Engineering Laboratory, Inc.



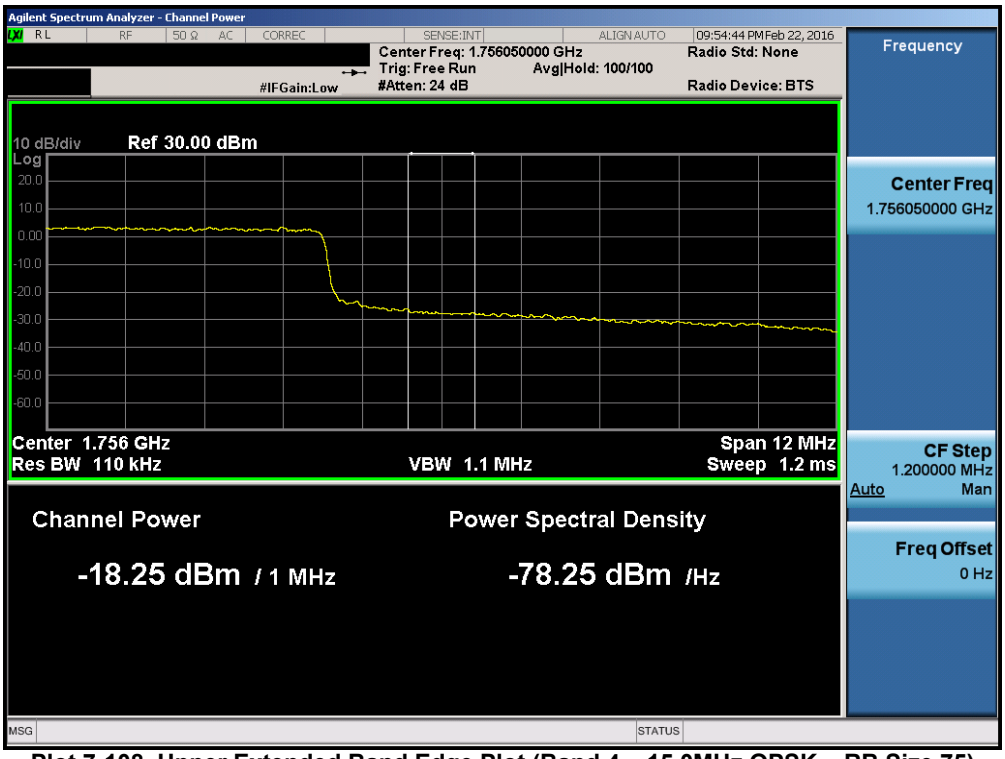
Plot 7-105. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



Plot 7-106. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

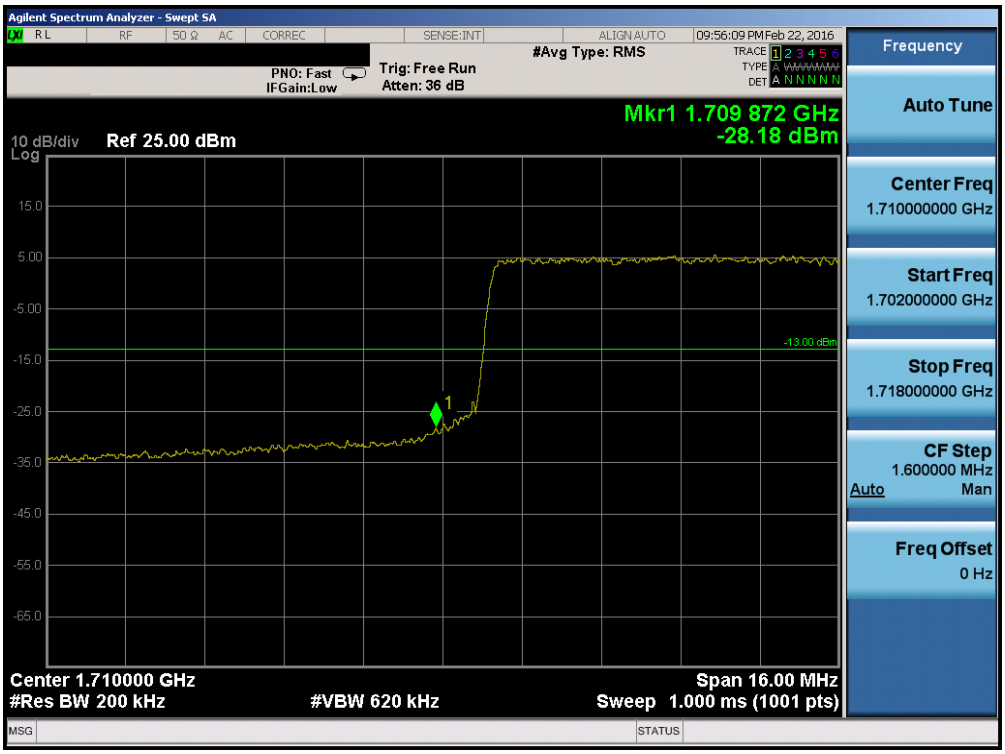
© 2016 PCTEST Engineering Laboratory, Inc.

Plot 7-107. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

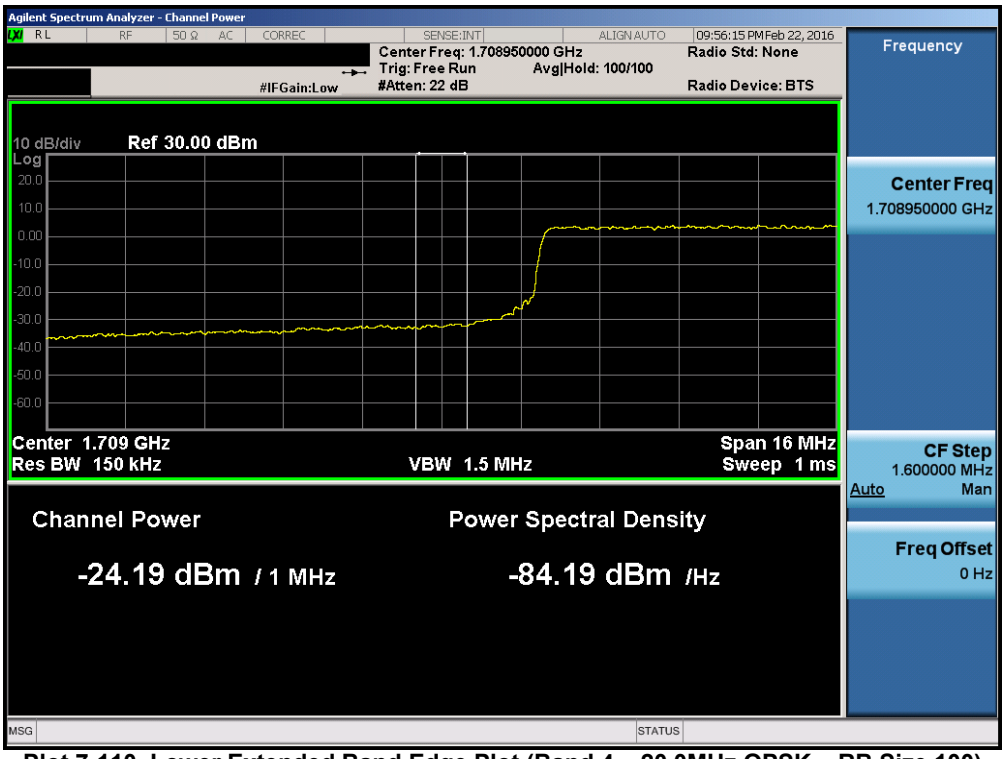


Plot 7-108. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

© 2016 PCTEST Engineering Laboratory, Inc.

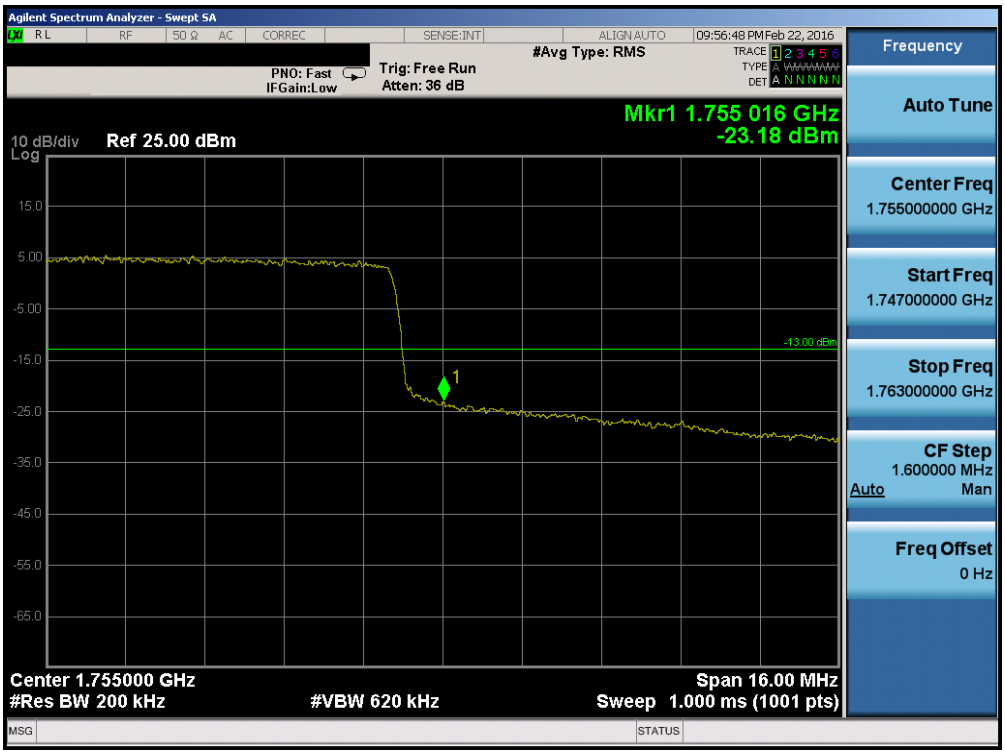


Plot 7-109. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

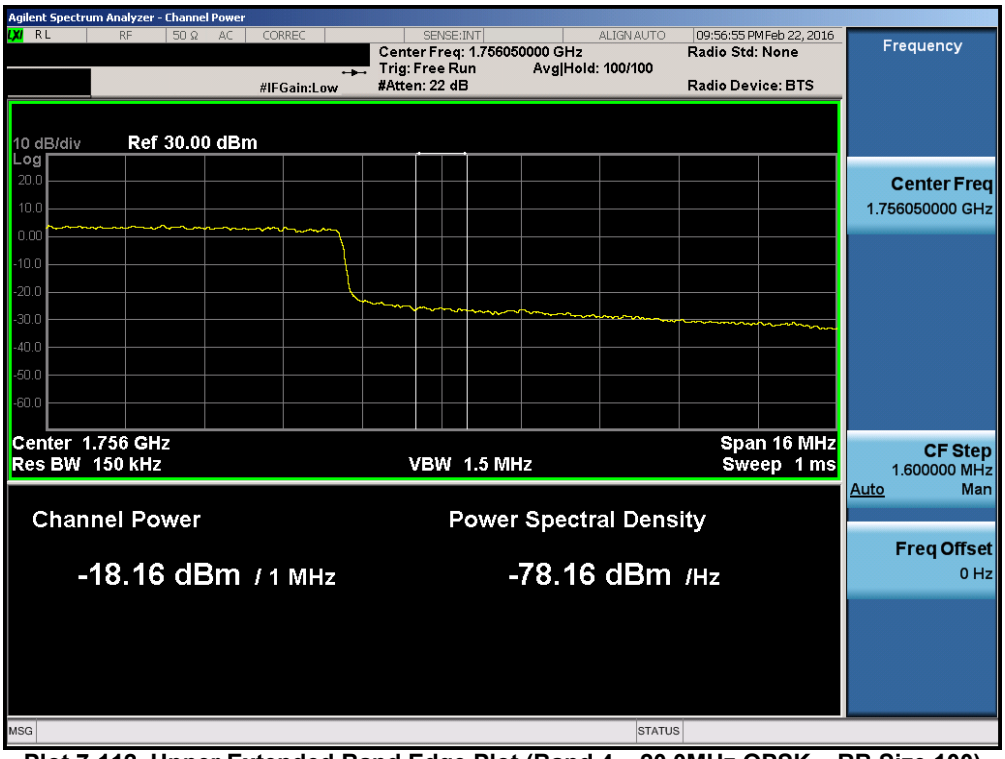


Plot 7-110. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

© 2016 PCTEST Engineering Laboratory, Inc.



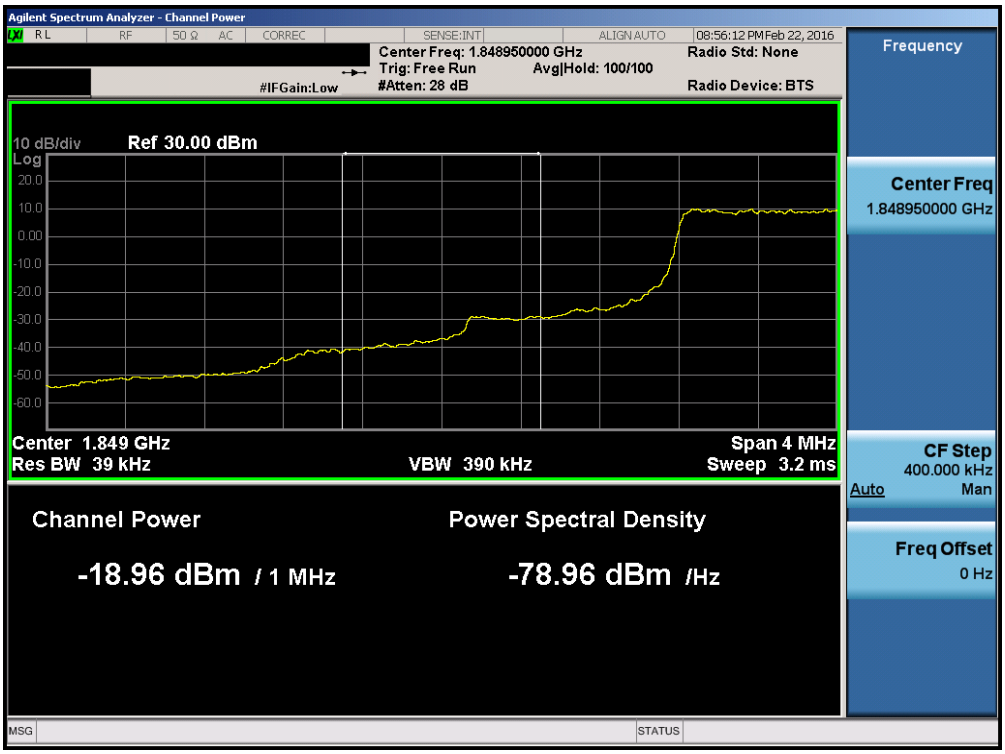
Plot 7-111. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



Plot 7-112. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

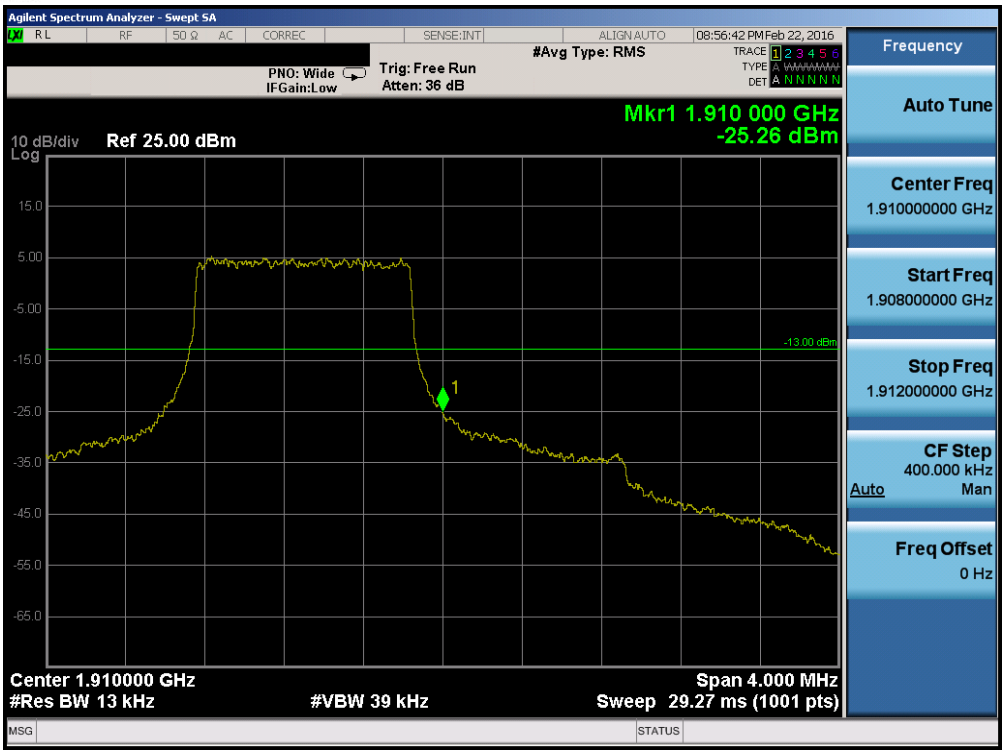
© 2016 PCTEST Engineering Laboratory, Inc.

Plot 7-113. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



Plot 7-114. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

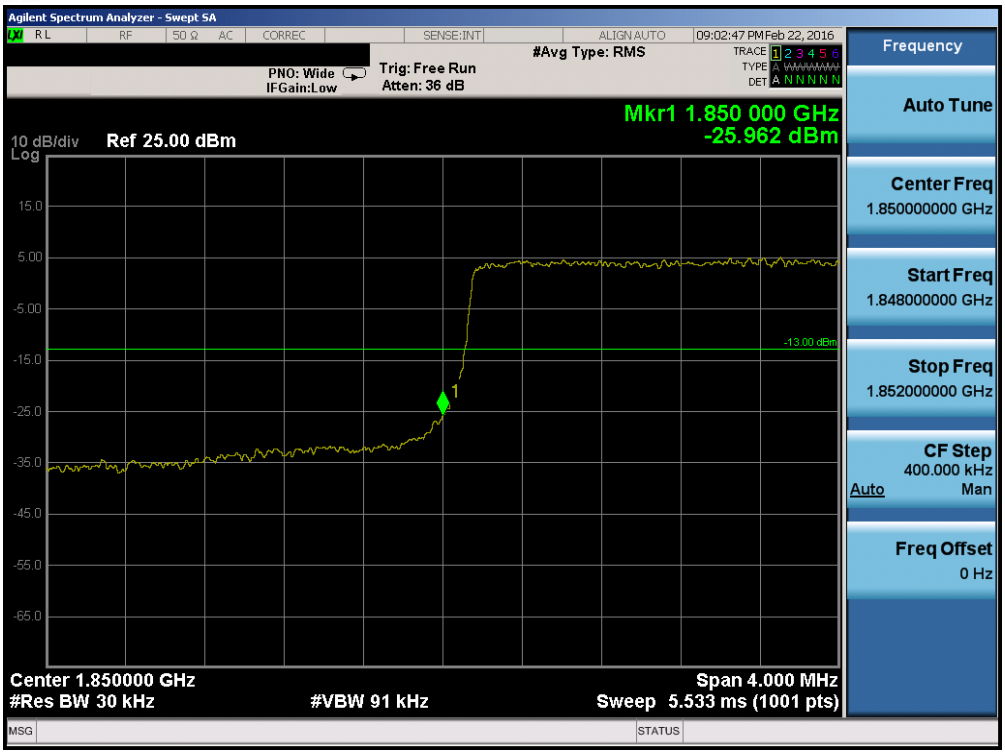
© 2016 PCTEST Engineering Laboratory, Inc.



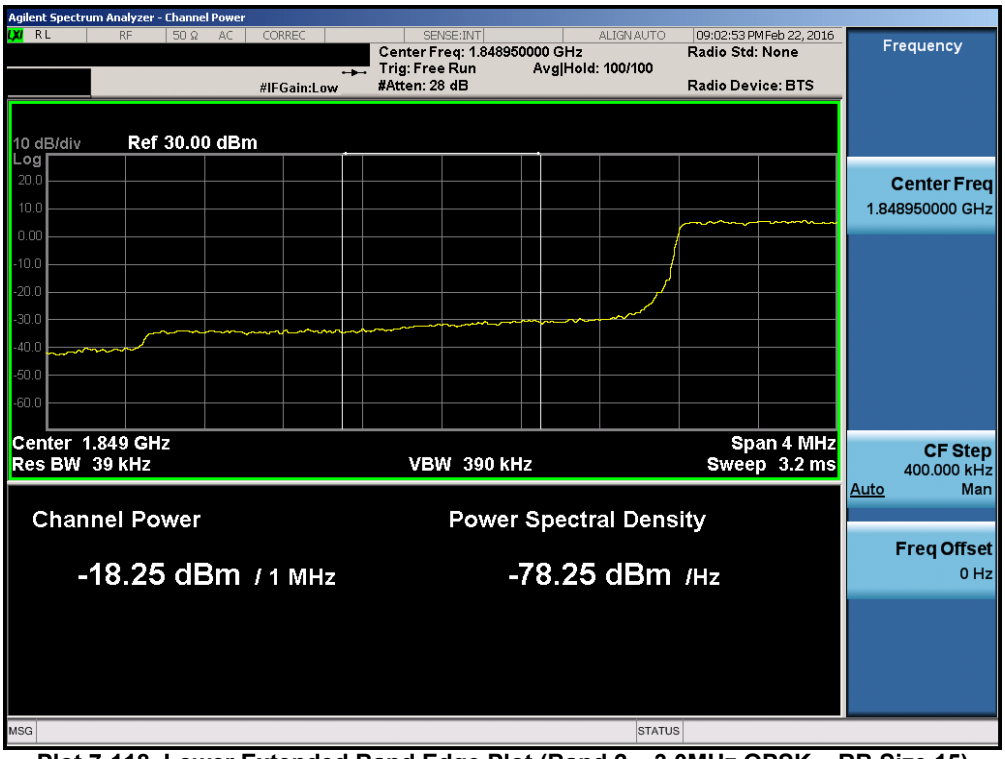
Plot 7-115. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

Plot 7-116. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

© 2016 PCTEST Engineering Laboratory, Inc.

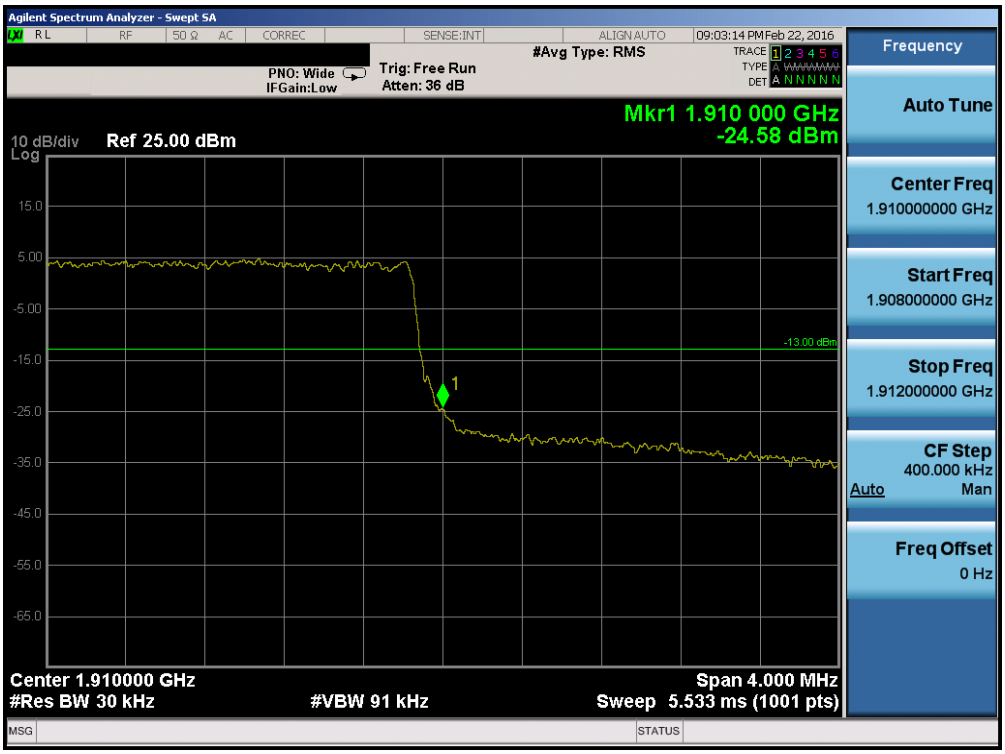


Plot 7-117. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

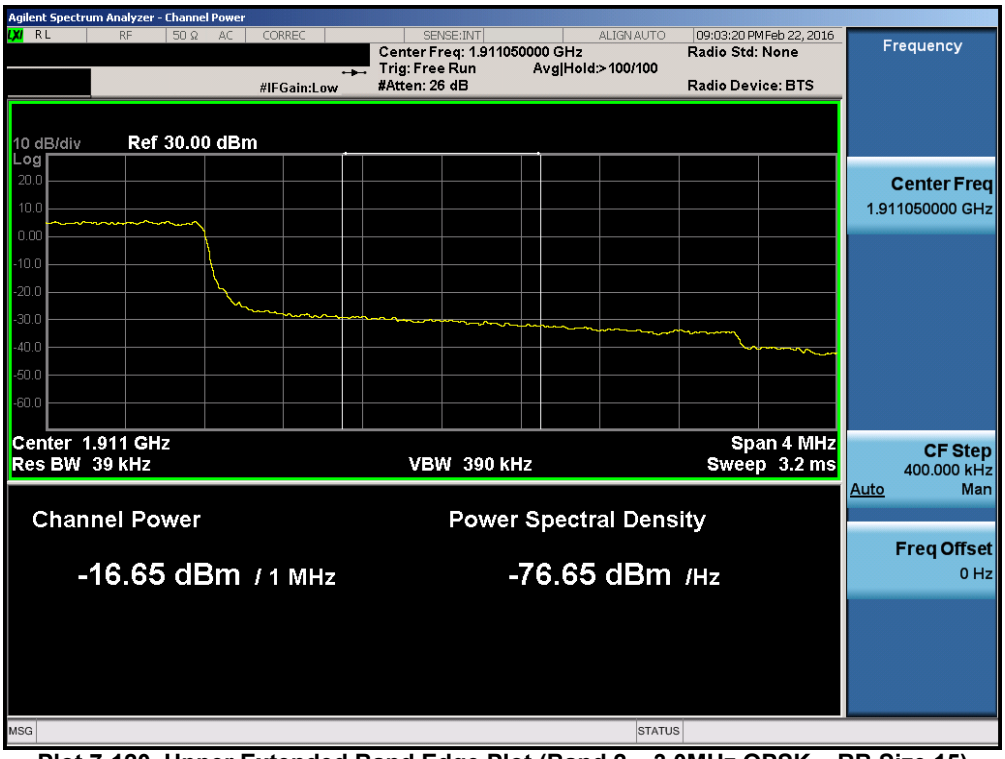


Plot 7-118. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

© 2016 PCTEST Engineering Laboratory, Inc.

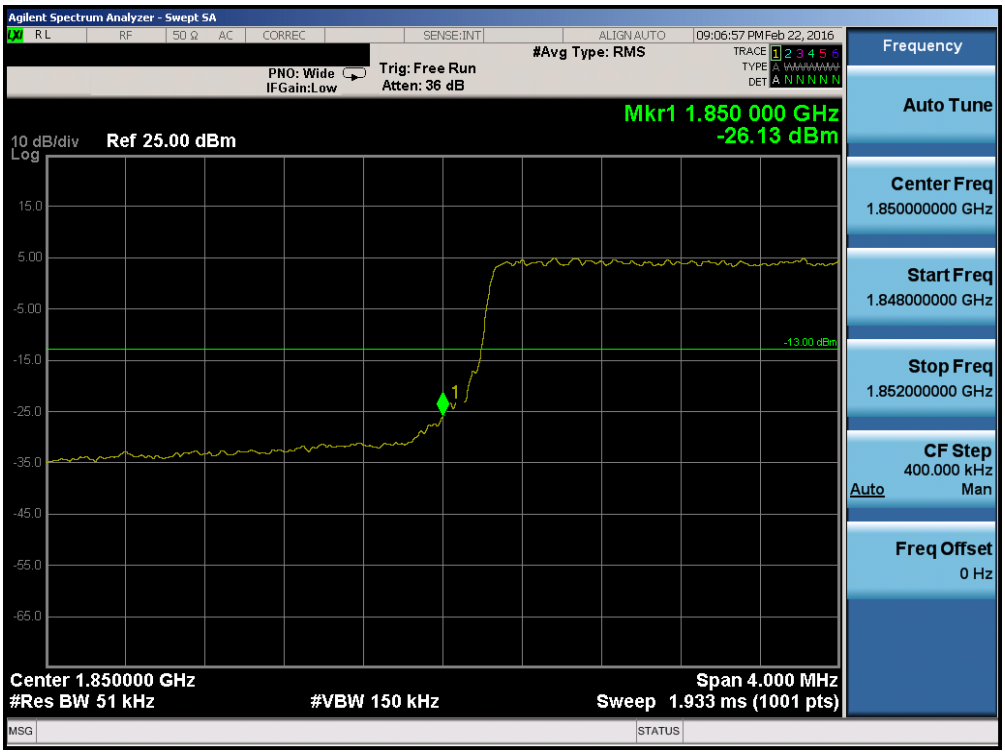


Plot 7-119. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

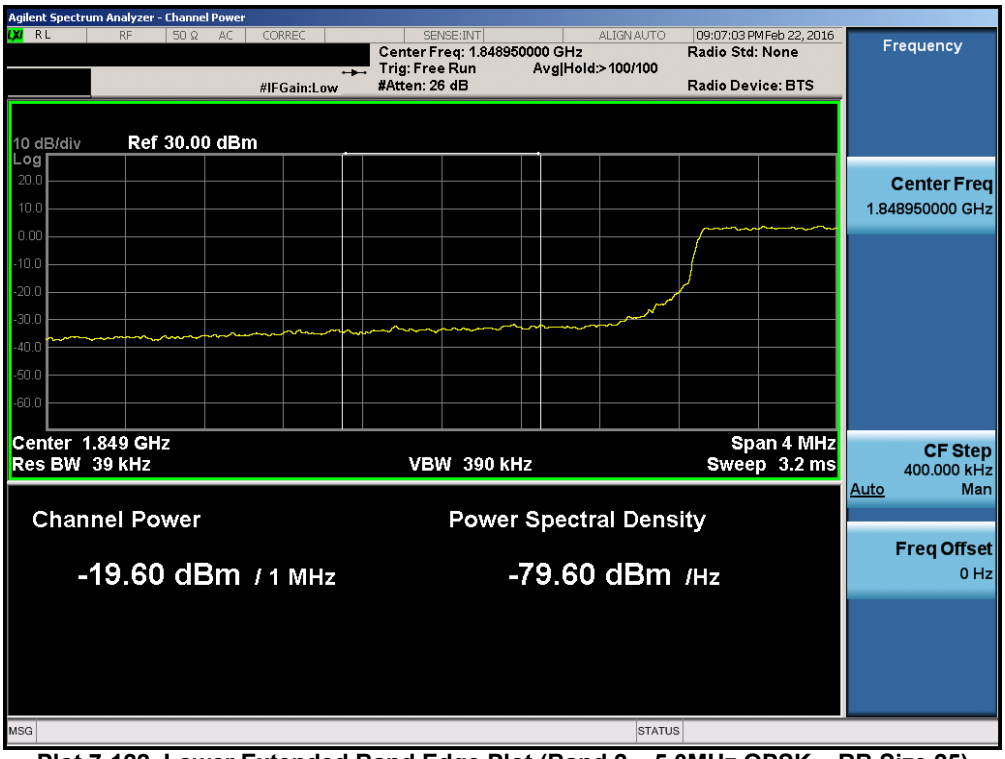


Plot 7-120. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

© 2016 PCTEST Engineering Laboratory, Inc.



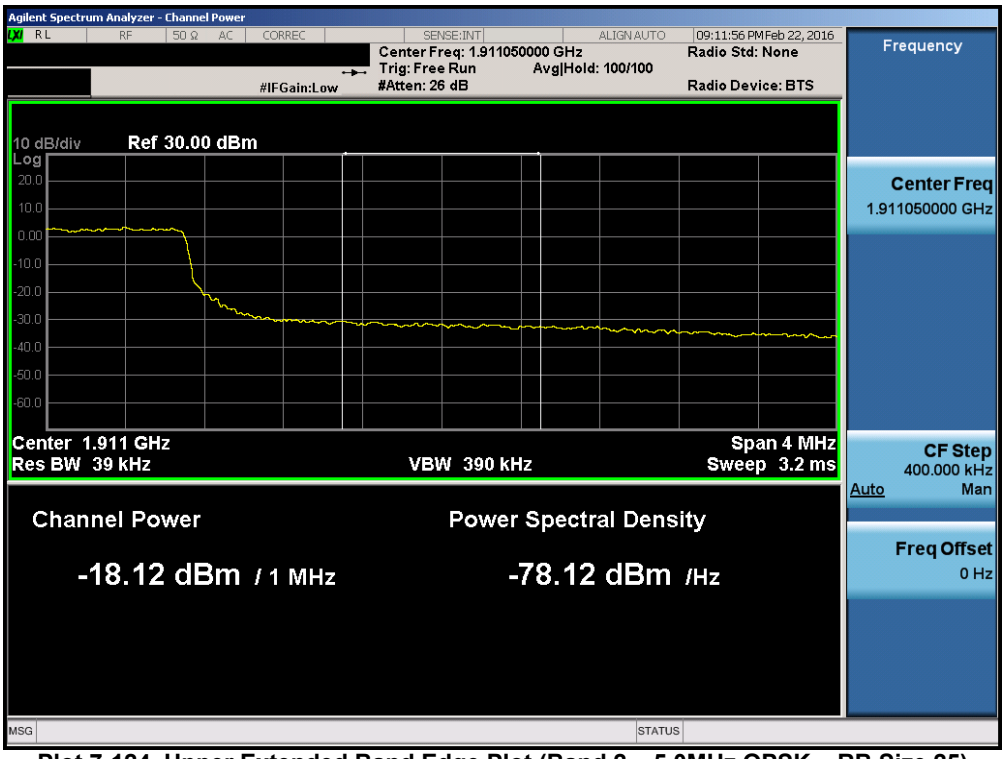
Plot 7-121. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



Plot 7-122. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

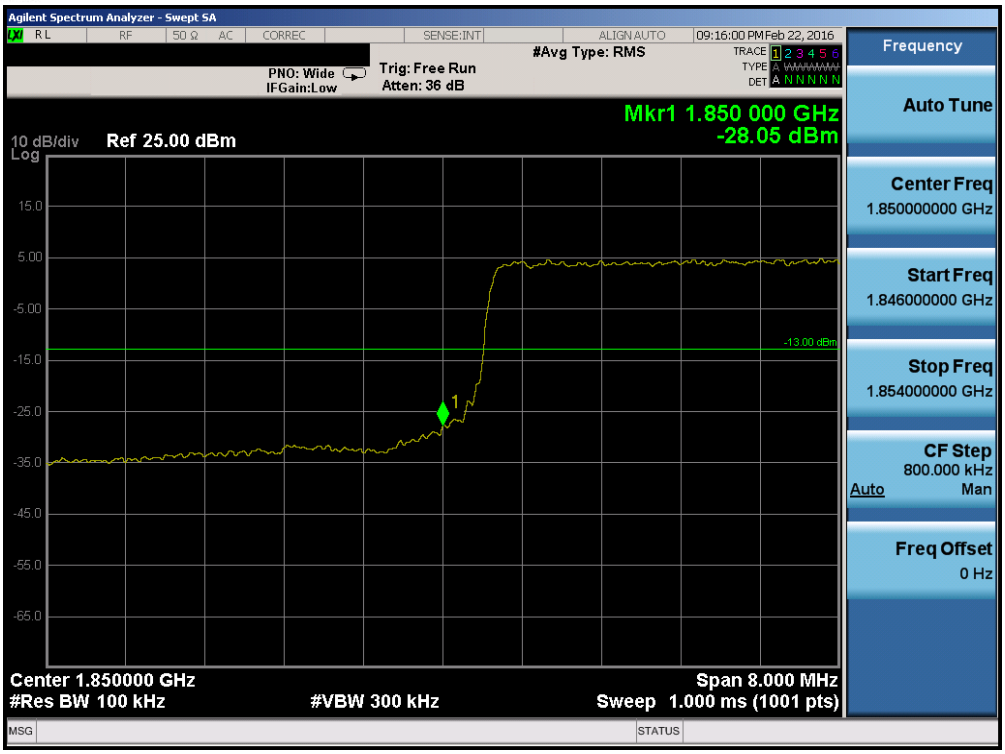
© 2016 PCTEST Engineering Laboratory, Inc.

Plot 7-123. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

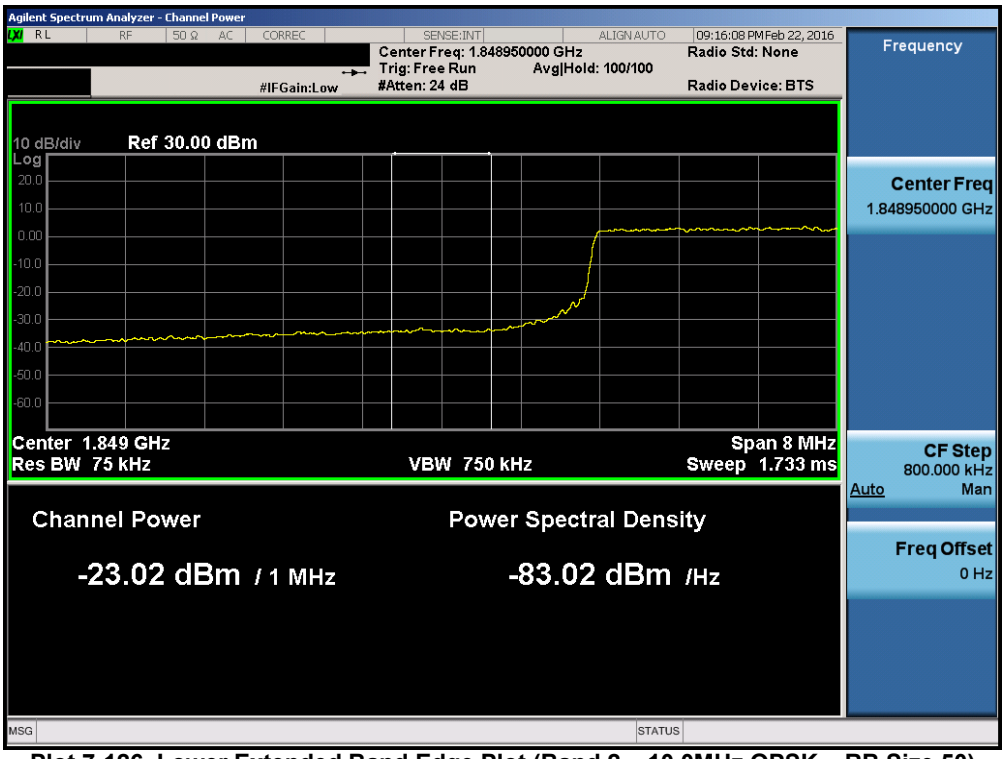


Plot 7-124. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

© 2016 PCTEST Engineering Laboratory, Inc.

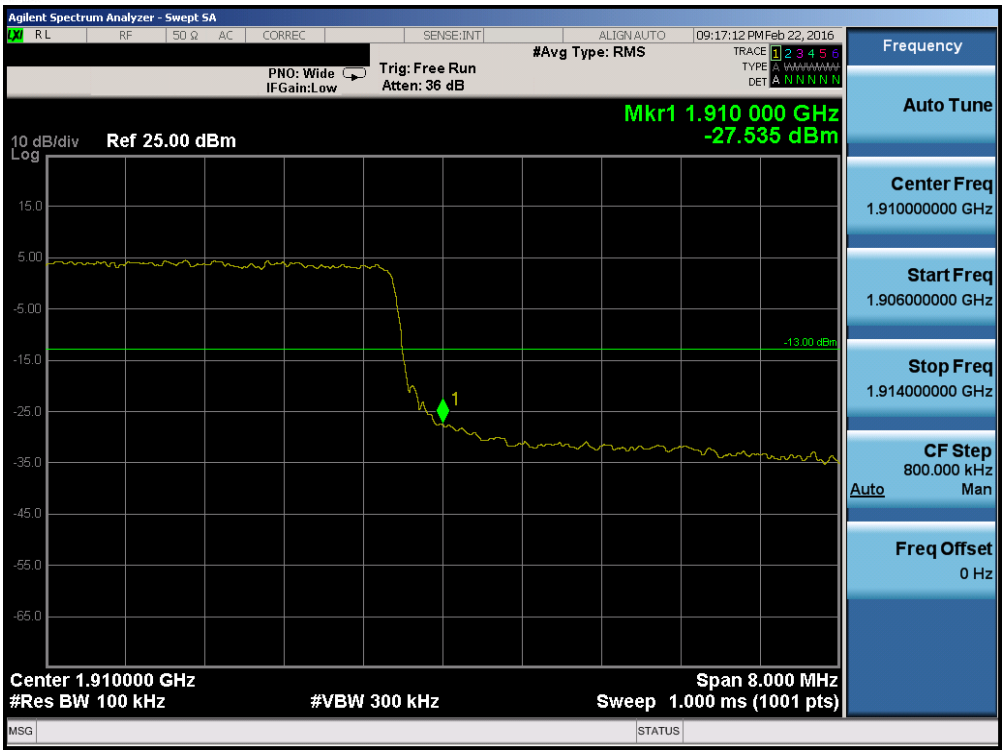


Plot 7-125. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

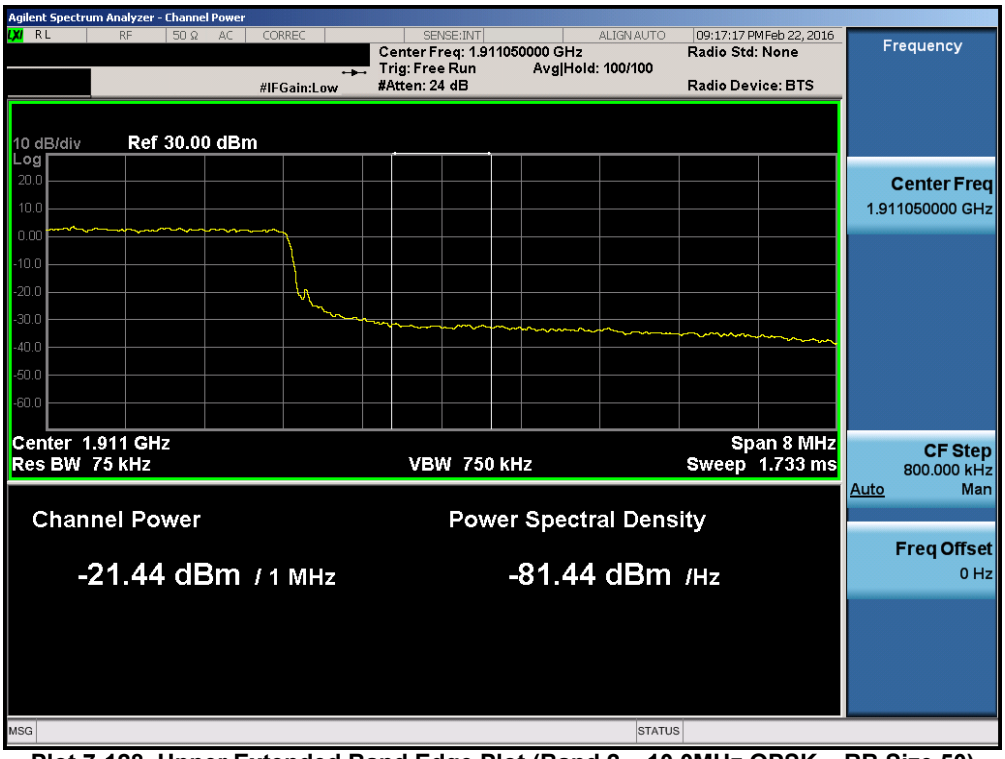


Plot 7-126. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

© 2016 PCTEST Engineering Laboratory, Inc.

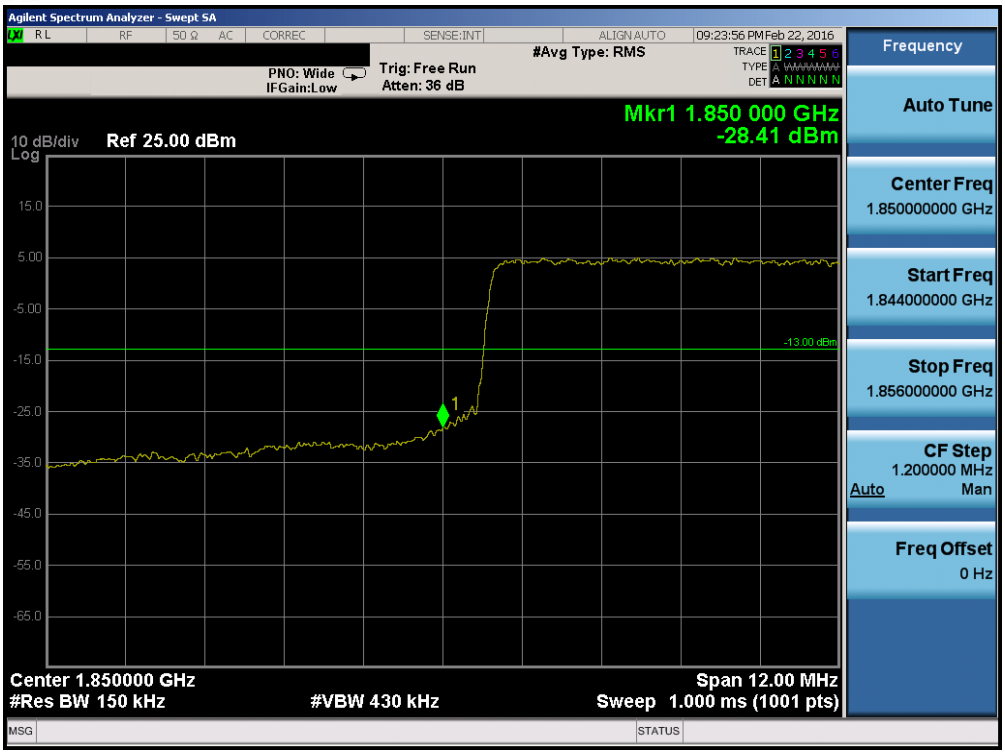


Plot 7-127. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

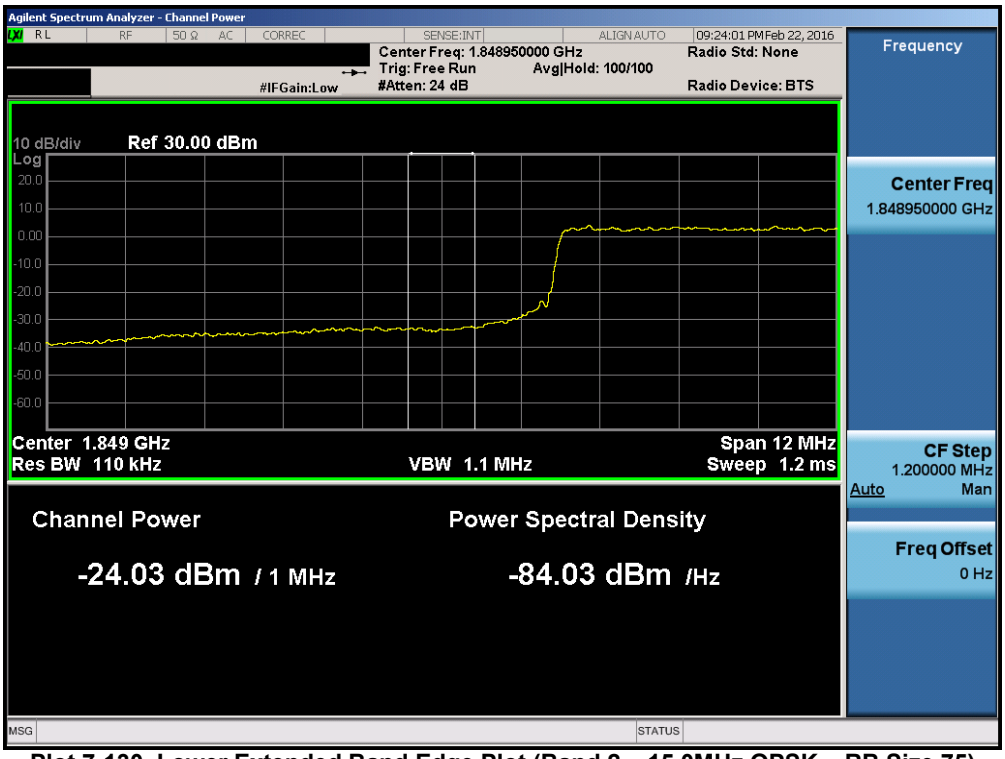


Plot 7-128. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

© 2016 PCTEST Engineering Laboratory, Inc.

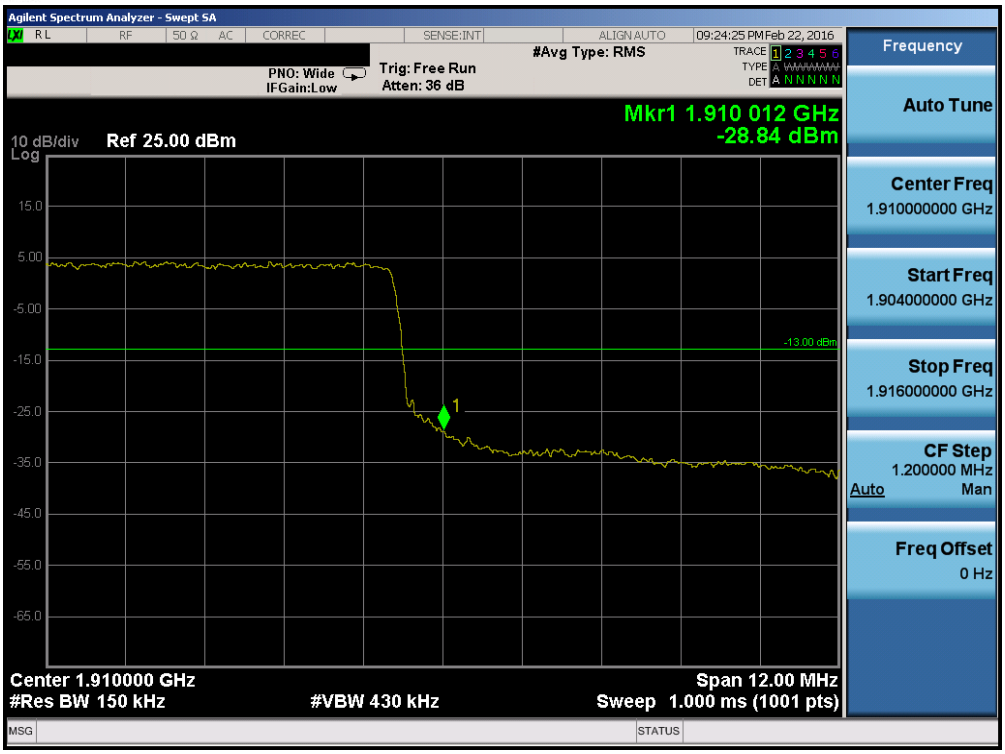


Plot 7-129. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

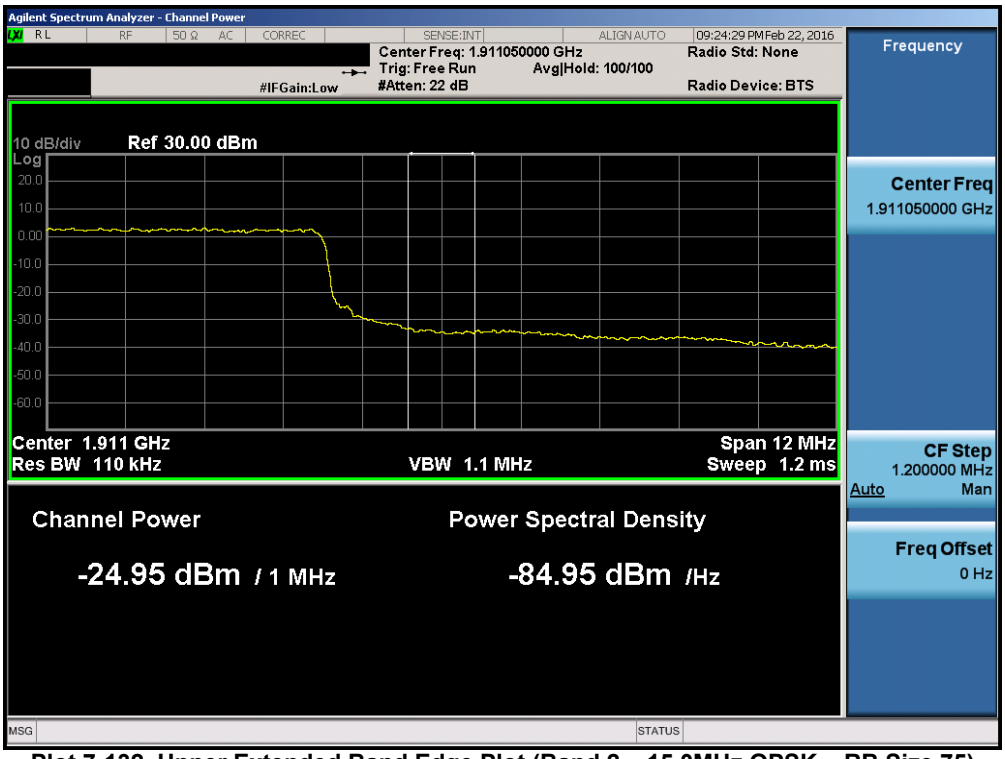


Plot 7-130. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

© 2016 PCTEST Engineering Laboratory, Inc.

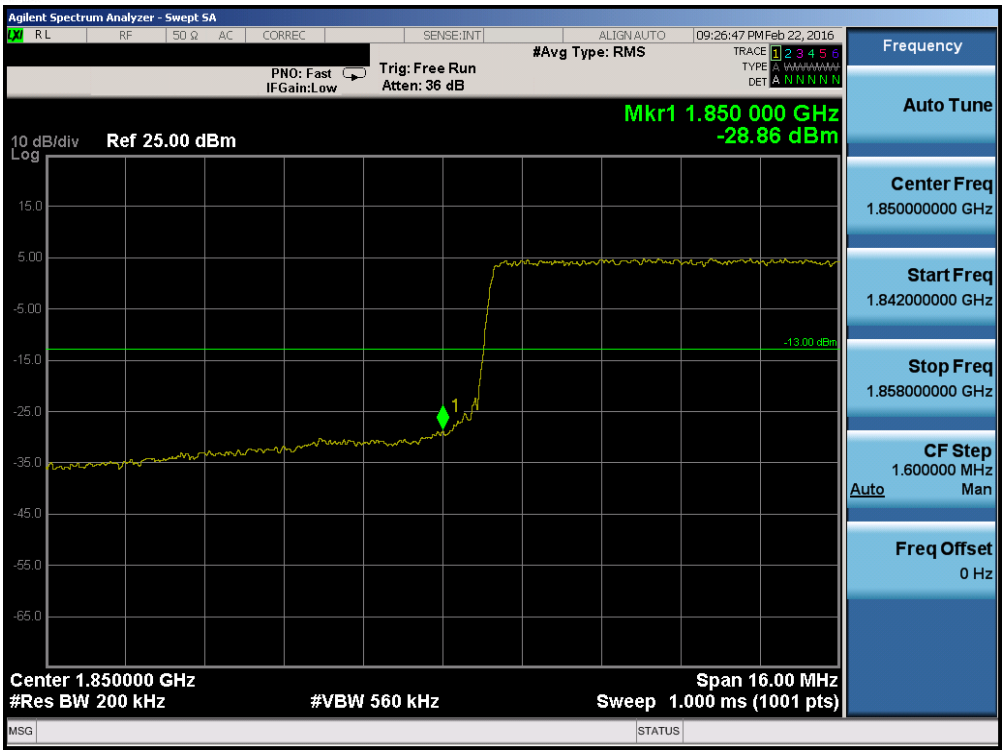


Plot 7-131. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

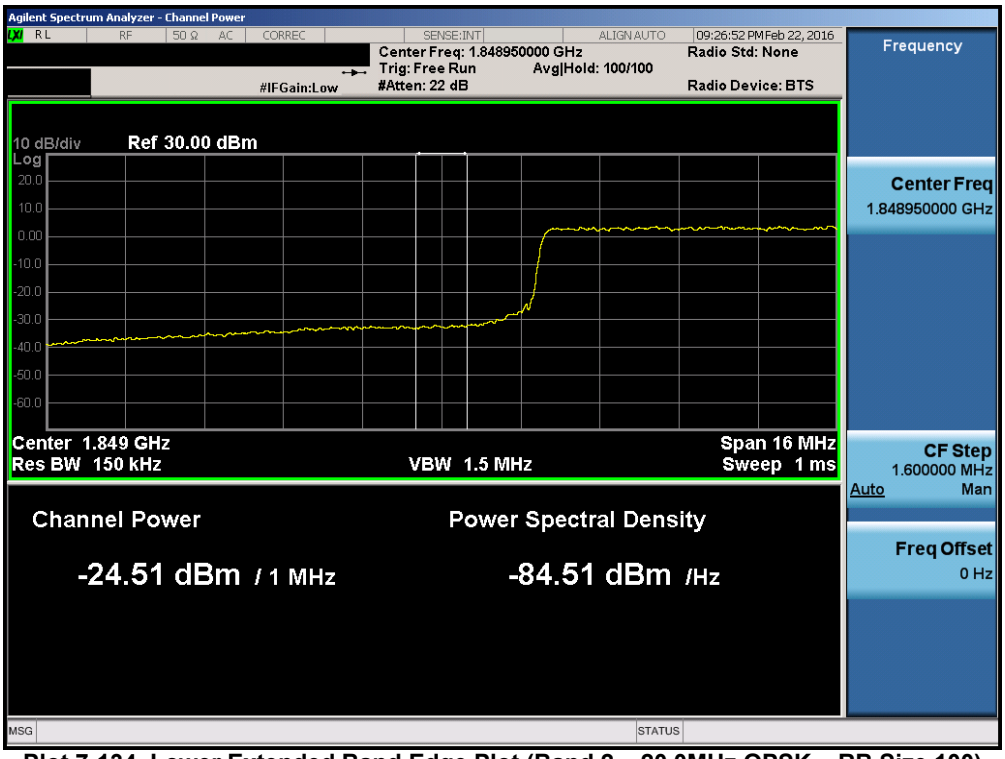


Plot 7-132. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

© 2016 PCTEST Engineering Laboratory, Inc.

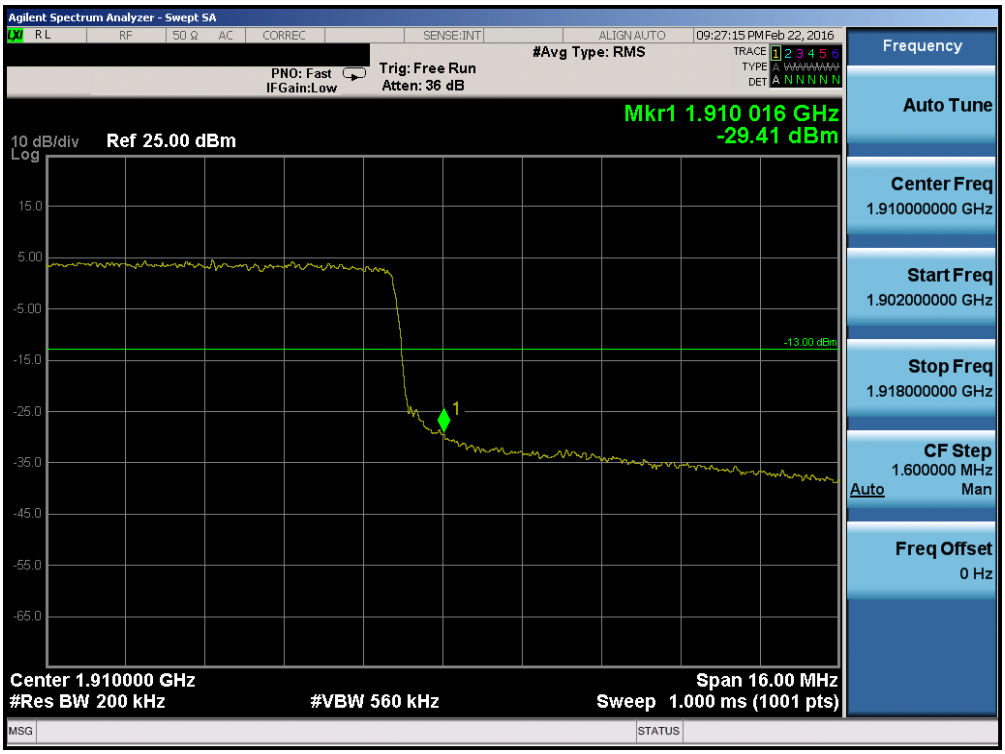


Plot 7-133. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

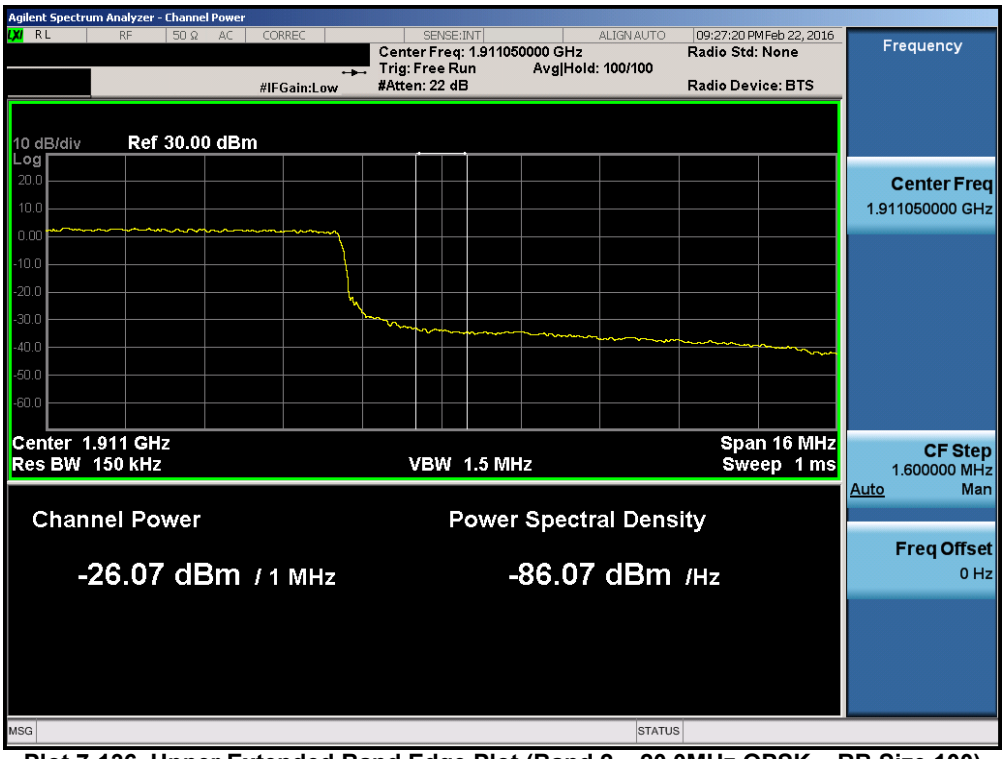


Plot 7-134. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

© 2016 PCTEST Engineering Laboratory, Inc.



Plot 7-135. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-136. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

© 2016 PCTEST Engineering Laboratory, Inc.

7.5 Peak-Average Ratio

§24.232(d)

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 v02r02 – 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.

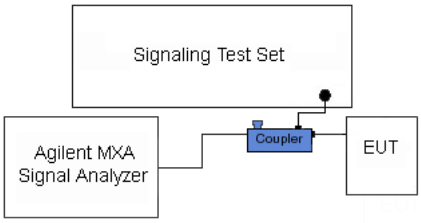
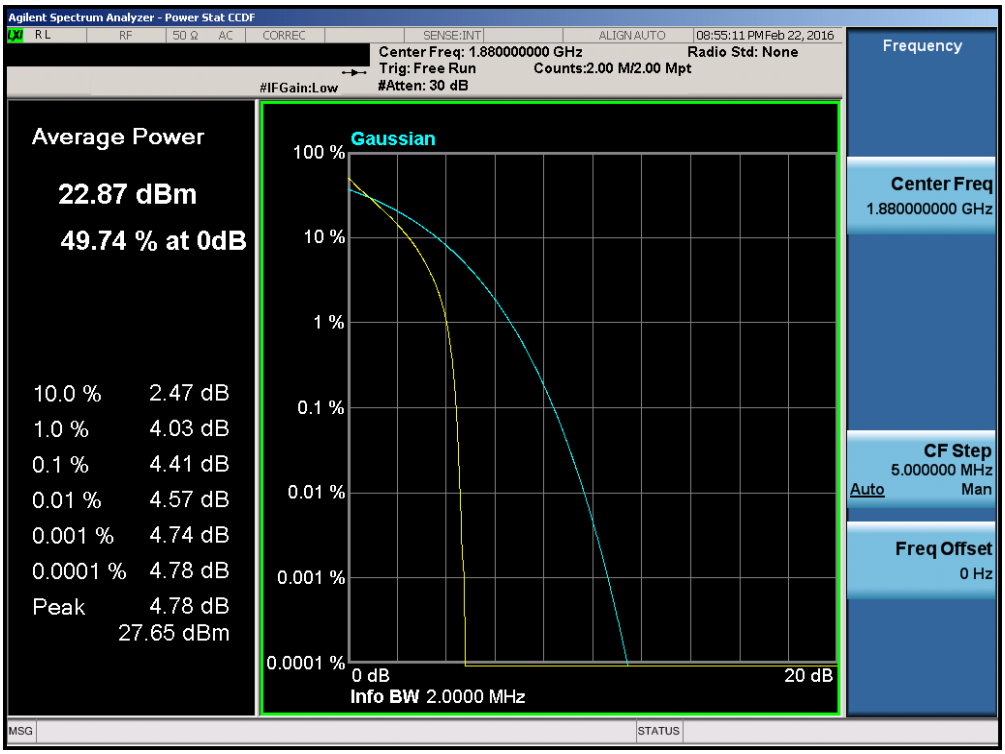


Figure 7-4. Test Instrument & Measurement Setup

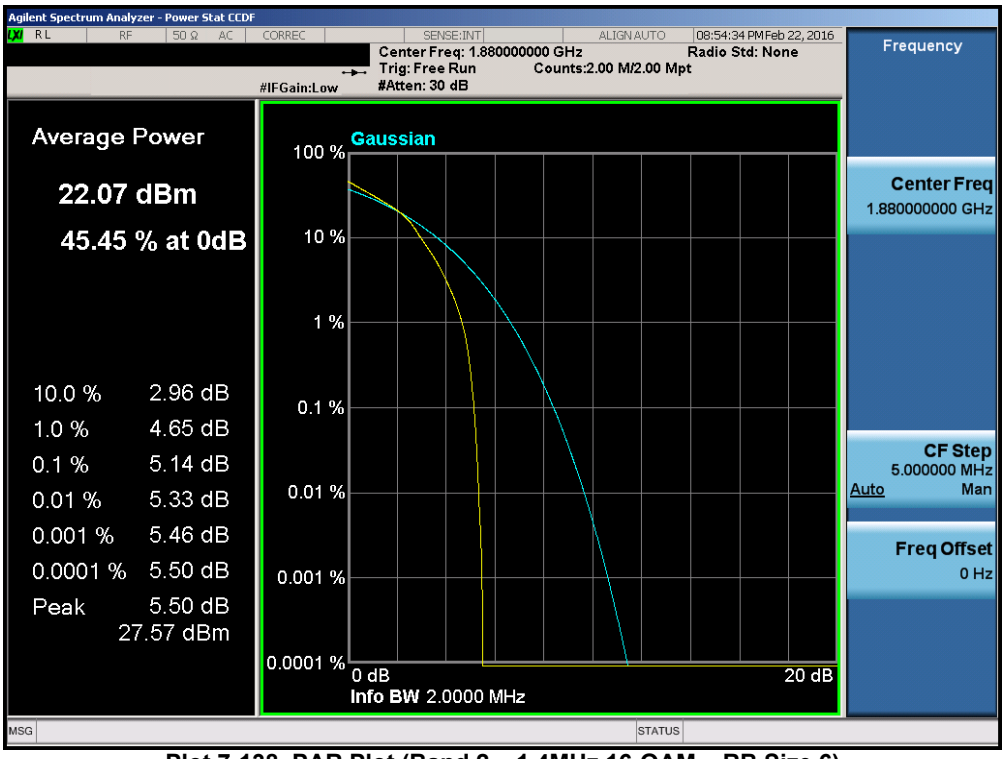
Test Notes

None.

© 2016 PCTEST Engineering Laboratory, Inc.

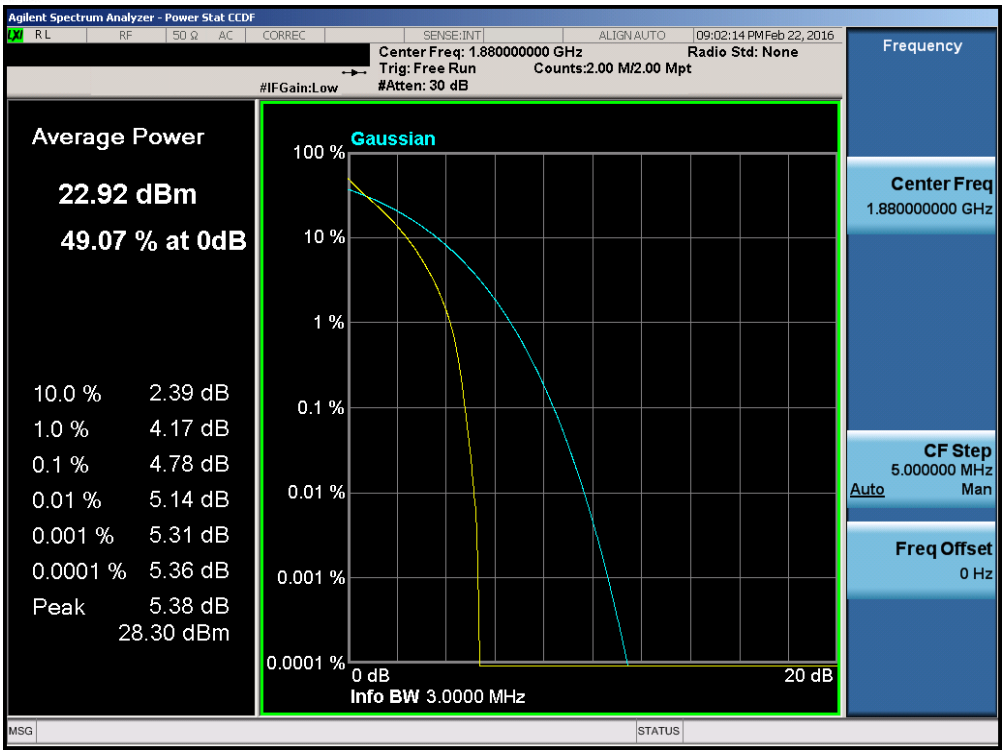


Plot 7-137. PAR Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

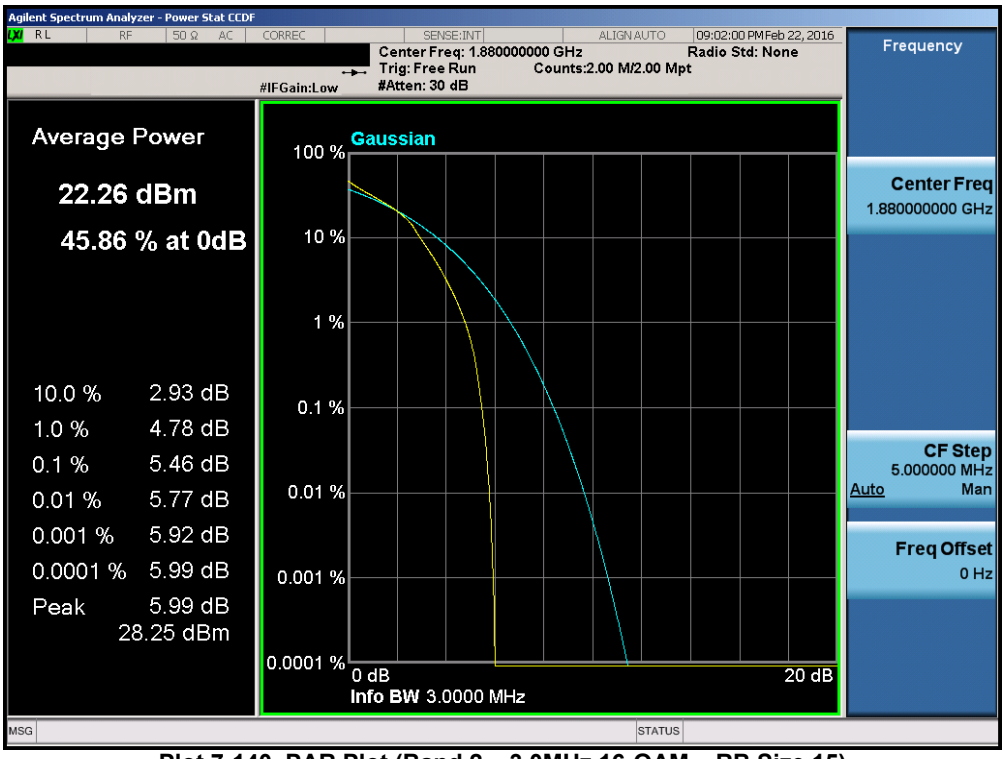


Plot 7-138. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

© 2016 PCTEST Engineering Laboratory, Inc.

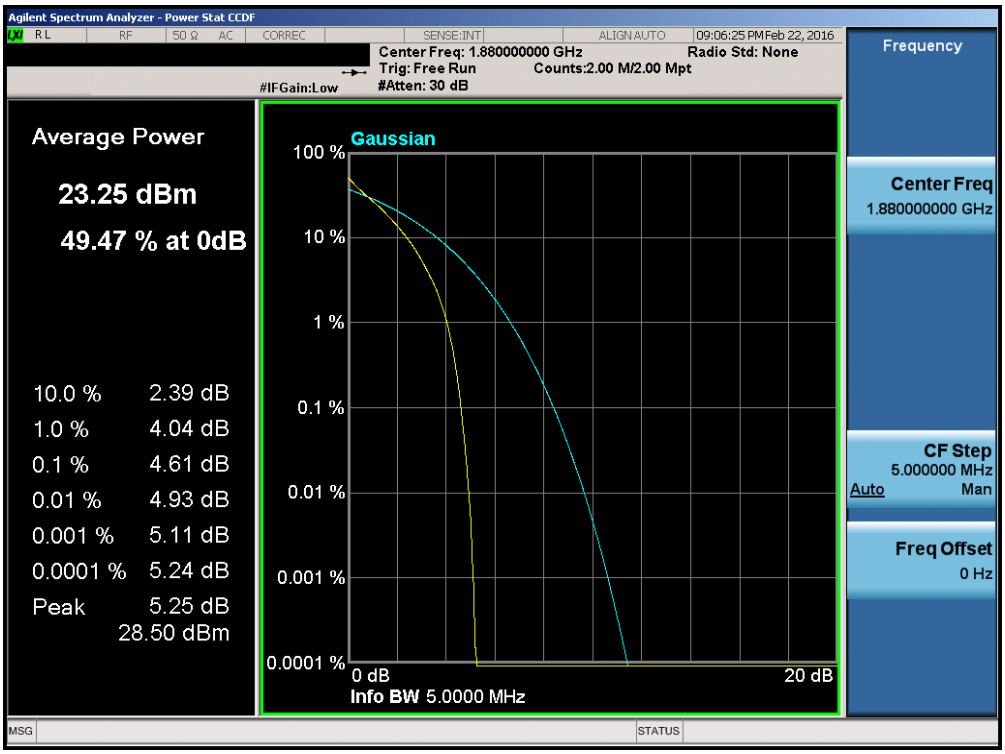


Plot 7-139. PAR Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

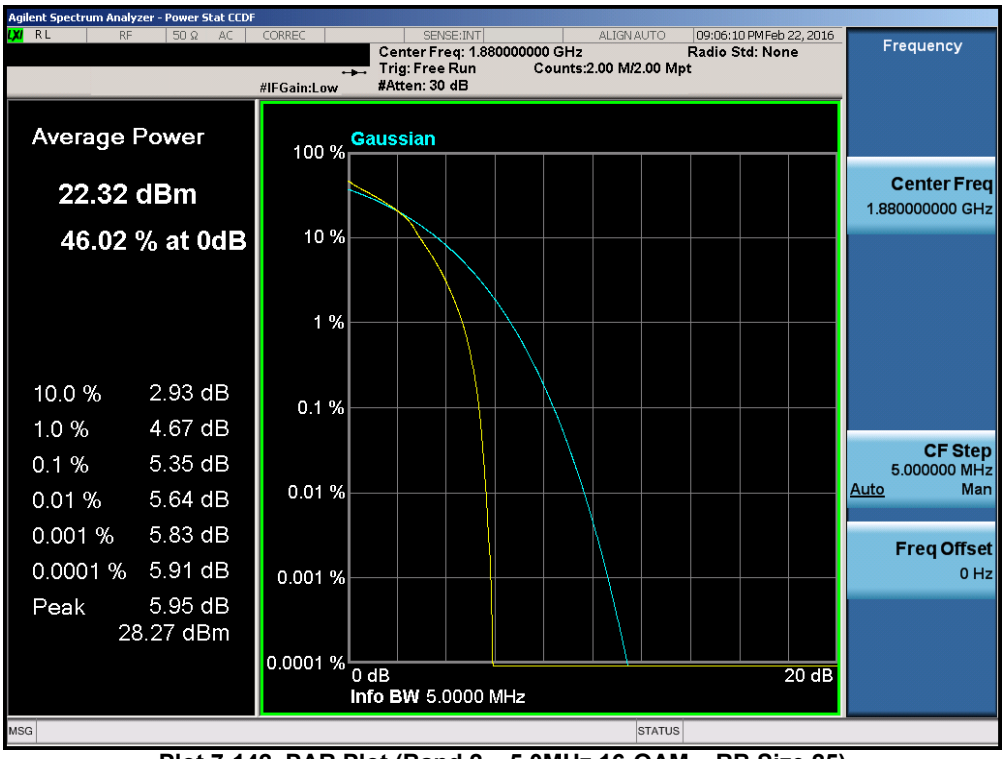


Plot 7-140. PAR Plot (Band 2 – 3.0MHz 16-QAM – RB Size 15)

© 2016 PCTEST Engineering Laboratory, Inc.

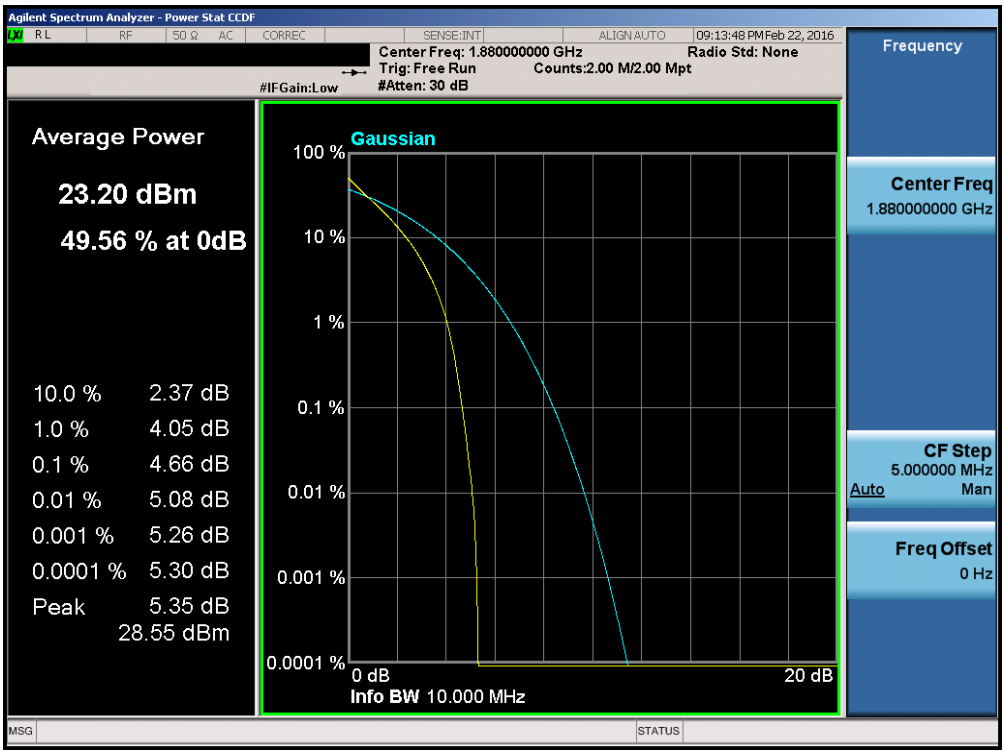


Plot 7-141. PAR Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

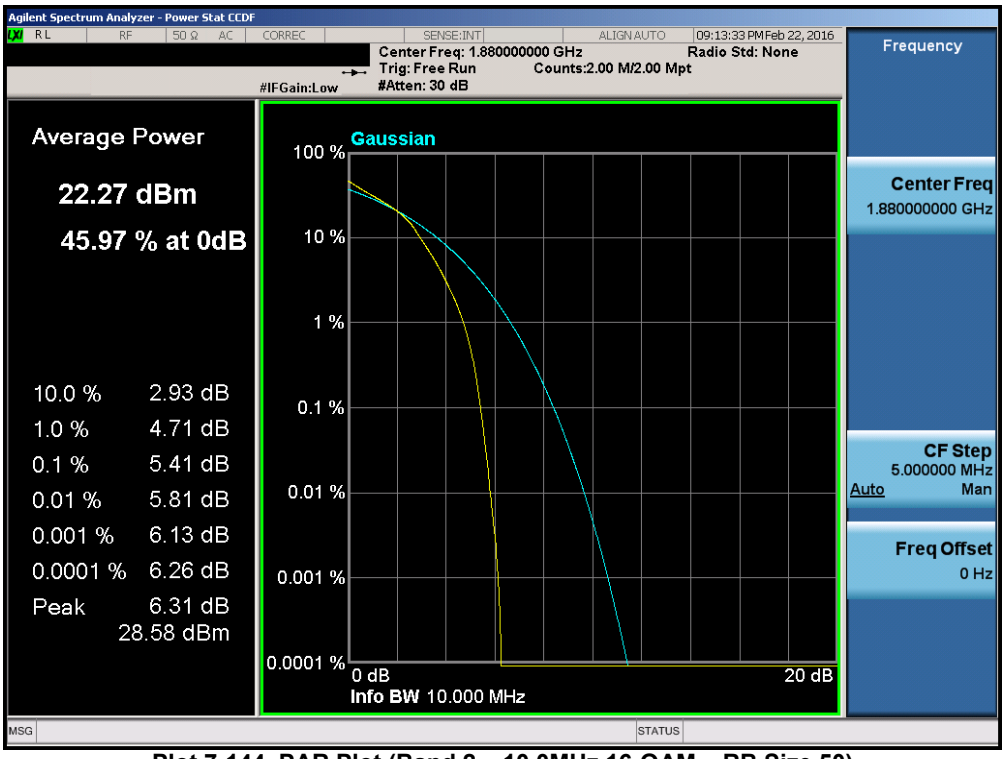


Plot 7-142. PAR Plot (Band 2 – 5.0MHz 16-QAM – RB Size 25)

© 2016 PCTEST Engineering Laboratory, Inc.

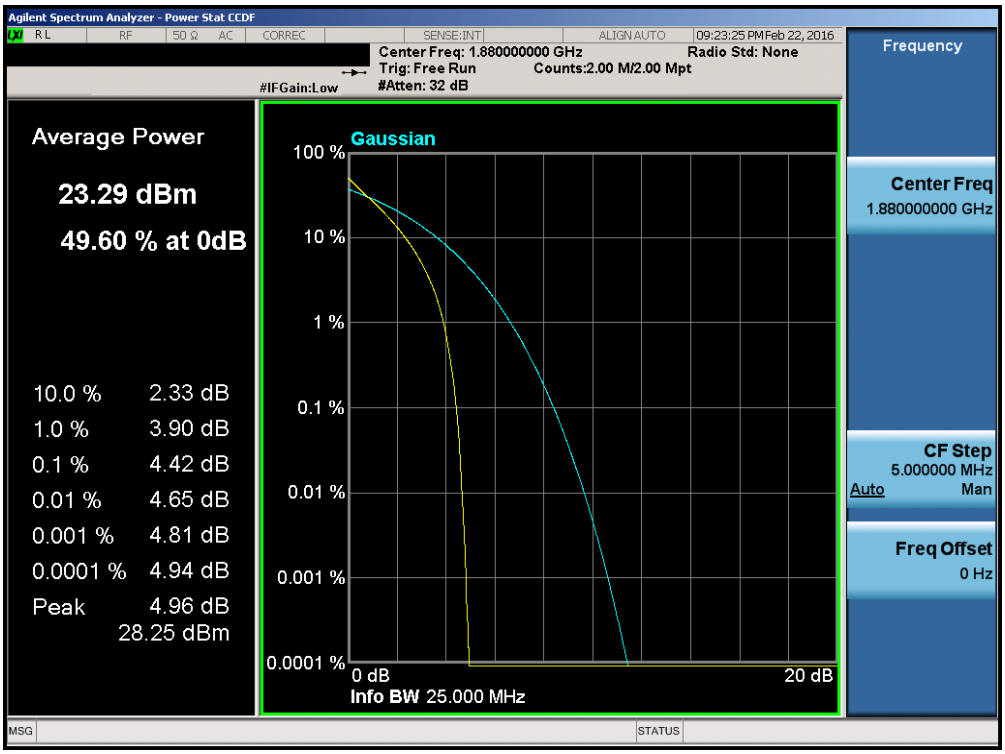


Plot 7-143. PAR Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

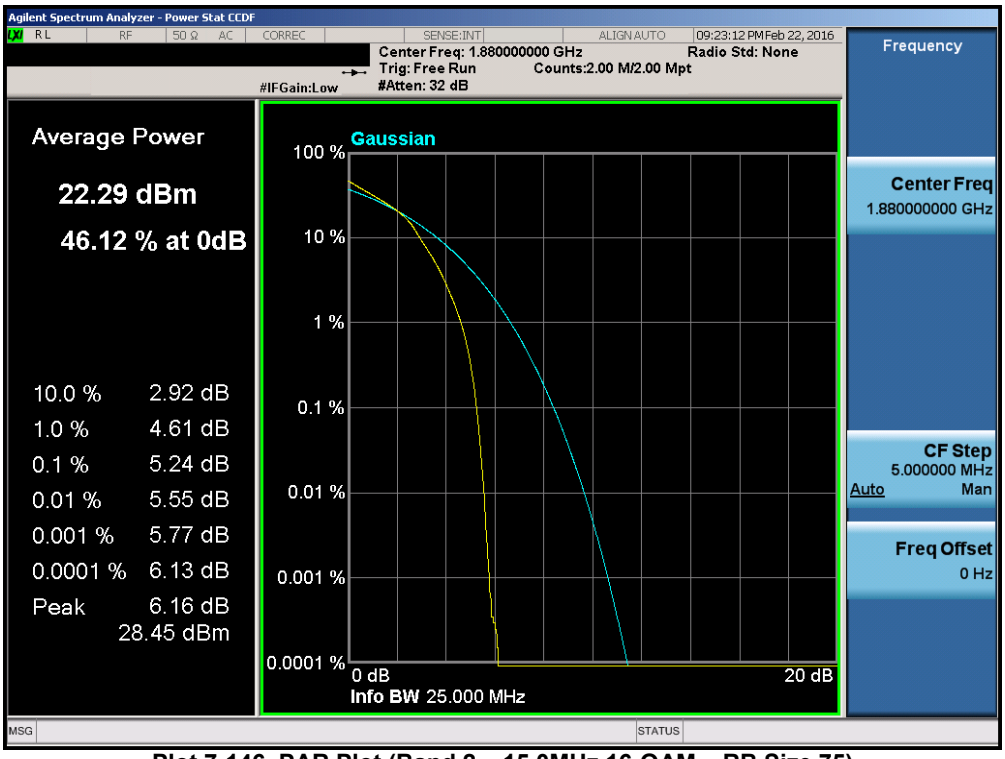


Plot 7-144. PAR Plot (Band 2 – 10.0MHz 16-QAM – RB Size 50)

© 2016 PCTEST Engineering Laboratory, Inc.

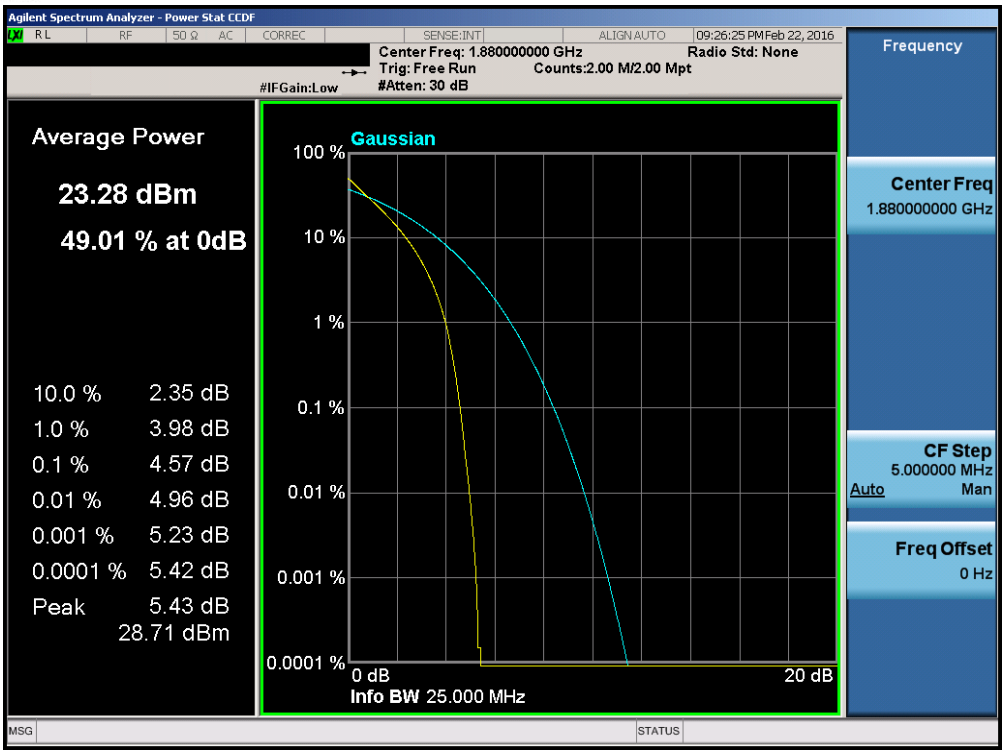


Plot 7-145. PAR Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

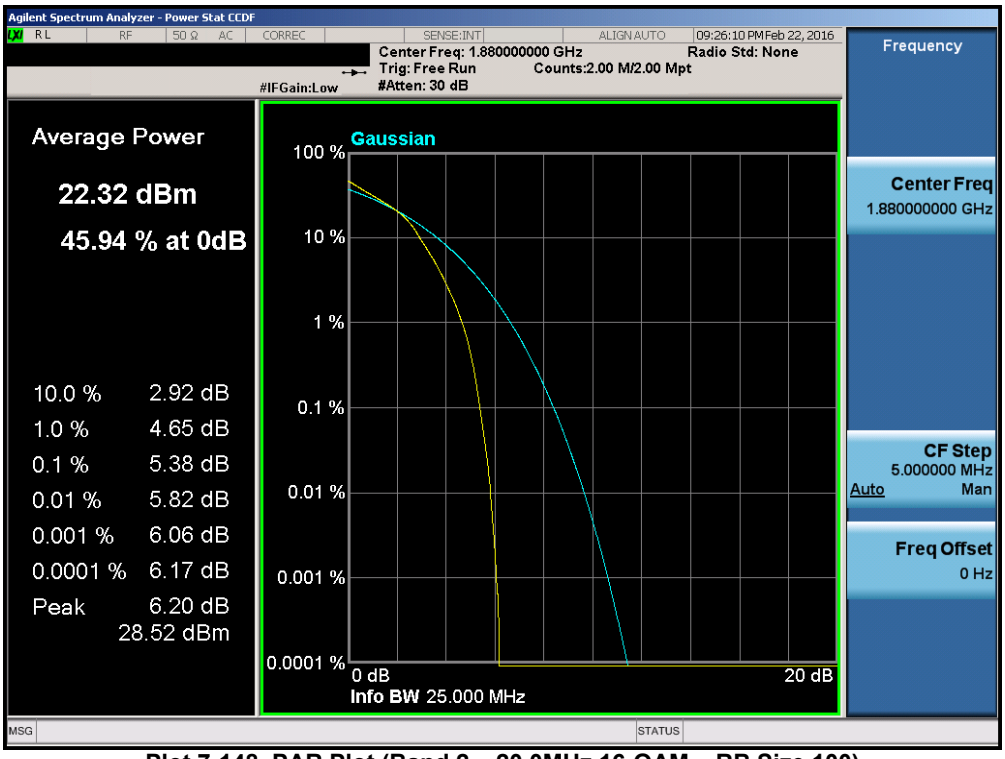


Plot 7-146. PAR Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

© 2016 PCTEST Engineering Laboratory, Inc.



Plot 7-147. PAR Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-148. PAR Plot (Band 2 – 20.0MHz 16-QAM – RB Size 100)

© 2016 PCTEST Engineering Laboratory, Inc.

7.6 Radiated Power (ERP/EIRP)

§22.913(a.2) §24.232(c.2) §27.50(b.10) §27.50(d.4)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using horizontally and vertically 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 v02r02 – Section 5.2.1

ANSI/TIA-603-C-2004 – 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

© 2016 PCTEST Engineering Laboratory, Inc.

Test Setup

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

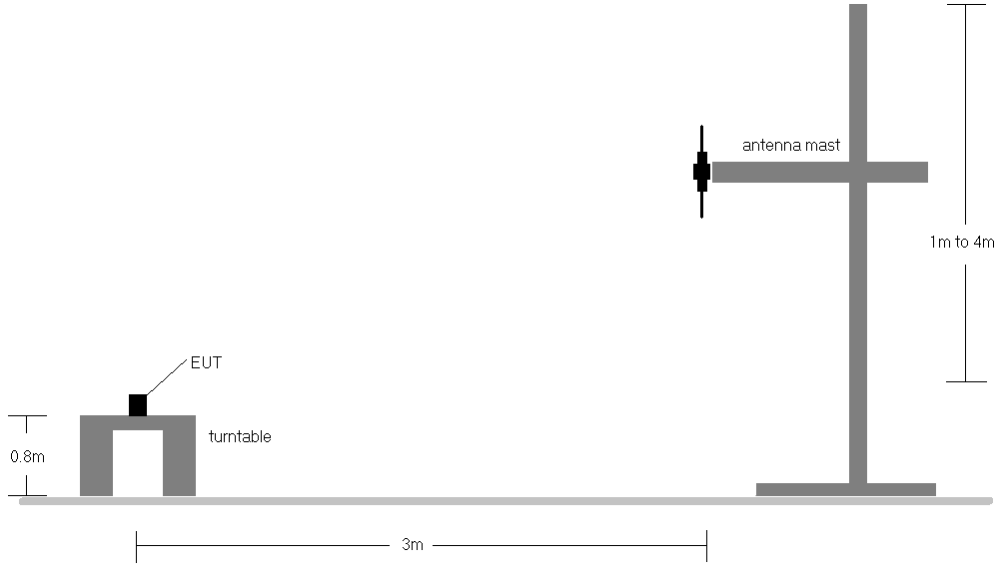


Figure 7-5. Radiated Test Setup <1GHz

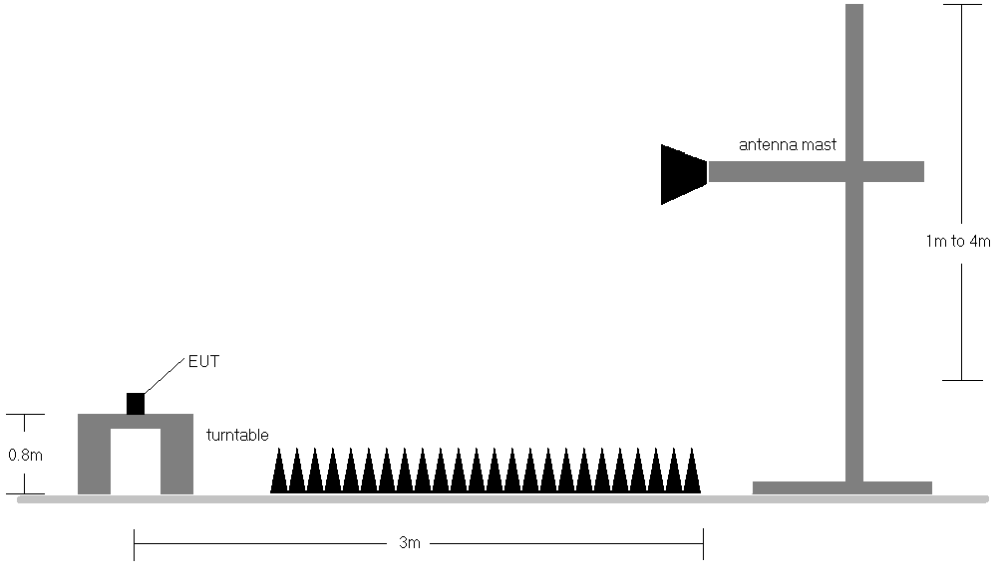


Figure 7-6. Radiated Test Setup >1GHz

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.

© 2016 PCTEST Engineering Laboratory, Inc.

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	V	1.48	310	1 / 0	17.50	4.42	21.92	34.77	-12.85
782.00	5	QPSK	V	1.48	307	1 / 24	17.86	4.47	22.33	34.77	-12.44
784.50	5	QPSK	V	1.48	305	1 / 24	17.67	4.52	22.19	34.77	-12.58
779.50	5	16QAM	V	1.48	310	1 / 0	16.44	4.42	20.86	34.77	-13.91
782.00	5	16QAM	V	1.48	307	1 / 24	16.77	4.47	21.24	34.77	-13.53
784.50	5	16QAM	V	1.48	305	1 / 24	16.61	4.52	21.13	34.77	-13.64
782.00	10	QPSK	V	1.43	350	1 / 0	17.24	4.47	21.71	34.77	-13.06
782.00	10	16QAM	V	1.43	350	1 / 0	16.76	4.47	21.23	34.77	-13.54

Table 7-2. ERP Data (Band 13)

© 2016 PCTEST Engineering Laboratory, Inc.

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	V	1.38	167	1 / 0	17.68	4.95	22.63	38.45	-15.83
836.50	1.4	QPSK	V	1.36	189	1 / 0	17.46	5.00	22.46	38.45	-15.99
848.30	1.4	QPSK	V	1.36	169	1 / 5	15.77	5.05	20.82	38.45	-17.63
824.70	1.4	16-QAM	V	1.38	167	1 / 0	16.97	4.95	21.92	38.45	-16.54
836.50	1.4	16-QAM	V	1.36	189	1 / 0	16.78	5.00	21.78	38.45	-16.67
848.30	1.4	16-QAM	V	1.36	169	1 / 5	14.92	5.05	19.97	38.45	-18.48
825.50	3	QPSK	V	1.44	175	1 / 14	17.78	4.95	22.73	38.45	-15.72
836.50	3	QPSK	V	1.39	194	1 / 0	17.52	5.00	22.52	38.45	-15.93
847.50	3	QPSK	V	1.37	203	1 / 0	15.64	5.05	20.69	38.45	-17.76
825.50	3	16-QAM	V	1.44	175	1 / 14	16.95	4.95	21.90	38.45	-16.55
836.50	3	16-QAM	V	1.39	194	1 / 0	16.72	5.00	21.72	38.45	-16.73
847.50	3	16-QAM	V	1.37	203	1 / 0	14.78	5.05	19.83	38.45	-18.62
826.50	5	QPSK	V	1.36	189	1 / 24	18.37	4.95	23.32	38.45	-15.13
836.50	5	QPSK	V	1.38	192	1 / 0	18.16	5.00	23.16	38.45	-15.29
846.50	5	QPSK	V	1.36	186	1 / 0	16.53	5.04	21.57	38.45	-16.88
826.50	5	16-QAM	V	1.36	189	1 / 24	17.49	4.95	22.44	38.45	-16.01
836.50	5	16-QAM	V	1.38	192	1 / 0	17.19	5.00	22.19	38.45	-16.26
846.50	5	16-QAM	V	1.36	186	1 / 0	15.45	5.04	20.49	38.45	-17.96
829.00	10	QPSK	V	1.42	185	1 / 49	17.99	4.96	22.95	38.45	-15.50
836.50	10	QPSK	V	1.40	187	1 / 0	18.26	5.00	23.26	38.45	-15.19
844.00	10	QPSK	V	1.39	187	1 / 0	17.47	5.03	22.50	38.45	-15.95
829.00	10	16-QAM	V	1.42	185	1 / 49	17.07	4.96	22.03	38.45	-16.42
836.50	10	16-QAM	V	1.40	187	1 / 0	17.21	5.00	22.21	38.45	-16.24
844.00	10	16-QAM	V	1.39	187	1 / 0	16.68	5.03	21.71	38.45	-16.74

Table 7-3. ERP Data (Band 5)

© 2016 PCTEST Engineering Laboratory, Inc.

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	V	213	87	1 / 0	9.50	9.67	19.17	30.00	-10.83
1732.50	1.4	QPSK	V	171	79	1 / 5	10.38	9.53	19.91	30.00	-10.09
1754.30	1.4	QPSK	V	124	97	1 / 0	11.91	9.39	21.30	30.00	-8.70
1710.70	1.4	16-QAM	V	213	87	1 / 0	8.49	9.67	18.16	30.00	-11.84
1732.50	1.4	16-QAM	V	171	79	1 / 5	9.48	9.53	19.01	30.00	-10.99
1754.30	1.4	16-QAM	V	124	97	1 / 0	10.91	9.39	20.30	30.00	-9.70
1711.50	3	QPSK	V	228	84	1 / 14	10.18	9.67	19.85	30.00	-10.15
1732.50	3	QPSK	V	154	76	1 / 14	10.78	9.53	20.31	30.00	-9.69
1753.50	3	QPSK	V	143	112	1 / 0	12.01	9.40	21.41	30.00	-8.59
1711.50	3	16-QAM	V	228	84	1 / 14	9.10	9.67	18.77	30.00	-11.23
1732.50	3	16-QAM	V	154	76	1 / 14	10.06	9.53	19.59	30.00	-10.41
1753.50	3	16-QAM	V	143	112	1 / 0	11.18	9.40	20.58	30.00	-9.42
1712.50	5	QPSK	V	221	99	1 / 24	10.15	9.66	19.81	30.00	-10.19
1732.50	5	QPSK	V	155	66	1 / 24	10.79	9.53	20.32	30.00	-9.68
1752.50	5	QPSK	V	158	124	1 / 0	12.08	9.40	21.48	30.00	-8.52
1712.50	5	16-QAM	V	221	99	1 / 24	9.13	9.66	18.79	30.00	-11.21
1732.50	5	16-QAM	V	155	66	1 / 24	10.02	9.53	19.55	30.00	-10.45
1752.50	5	16-QAM	V	158	124	1 / 0	11.03	9.40	20.43	30.00	-9.57
1715.00	10	QPSK	V	215	118	1 / 49	9.98	9.64	19.62	30.00	-10.38
1732.50	10	QPSK	V	168	85	1 / 49	10.51	9.53	20.04	30.00	-9.96
1750.00	10	QPSK	V	176	107	1 / 0	11.47	9.42	20.89	30.00	-9.11
1715.00	10	16-QAM	V	215	118	1 / 49	9.08	9.64	18.72	30.00	-11.28
1732.50	10	16-QAM	V	168	85	1 / 49	9.77	9.53	19.30	30.00	-10.70
1750.00	10	16-QAM	V	176	107	1 / 0	10.45	9.42	19.87	30.00	-10.13
1717.50	15	QPSK	V	210	130	1 / 0	9.55	9.63	19.18	30.00	-10.82
1732.50	15	QPSK	V	178	85	1 / 74	10.33	9.53	19.86	30.00	-10.14
1747.50	15	QPSK	V	167	97	1 / 74	10.84	9.43	20.27	30.00	-9.73
1717.50	15	16-QAM	V	210	130	1 / 0	8.51	9.63	18.14	30.00	-11.86
1732.50	15	16-QAM	V	178	85	1 / 74	9.58	9.53	19.11	30.00	-10.89
1747.50	15	16-QAM	V	167	97	1 / 74	10.02	9.43	19.45	30.00	-10.55
1720.00	20	QPSK	V	196	111	1 / 99	9.70	9.61	19.31	30.00	-10.69
1732.50	20	QPSK	V	183	100	1 / 99	10.51	9.53	20.04	30.00	-9.96
1745.00	20	QPSK	V	170	101	1 / 99	10.87	9.45	20.32	30.00	-9.68
1720.00	20	16-QAM	V	196	111	1 / 99	8.64	9.61	18.25	30.00	-11.75
1732.50	20	16-QAM	V	183	100	1 / 99	9.83	9.53	19.36	30.00	-10.64
1745.00	20	16-QAM	V	170	101	1 / 99	10.18	9.45	19.63	30.00	-10.37

Table 7-4. EIRP Data (Band 4)

© 2016 PCTEST Engineering Laboratory, Inc.

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	V	180	45	1 / 5	10.42	9.21	19.63	33.01	-13.38
1880.00	1.4	QPSK	V	209	71	1 / 5	12.51	9.27	21.78	33.01	-11.23
1909.30	1.4	QPSK	V	167	64	1 / 5	11.45	9.36	20.81	33.01	-12.20
1850.70	1.4	16-QAM	V	180	45	1 / 5	9.64	9.21	18.85	33.01	-14.16
1880.00	1.4	16-QAM	V	209	71	1 / 5	11.50	9.27	20.77	33.01	-12.24
1909.30	1.4	16-QAM	V	167	64	1 / 5	10.62	9.36	19.98	33.01	-13.03
1851.50	3	QPSK	V	187	65	1 / 14	11.16	9.21	20.37	33.01	-12.64
1880.00	3	QPSK	V	218	70	1 / 14	12.47	9.27	21.74	33.01	-11.27
1908.50	3	QPSK	V	175	66	1 / 14	11.75	9.36	21.11	33.01	-11.90
1851.50	3	16-QAM	V	187	65	1 / 14	10.36	9.21	19.57	33.01	-13.44
1880.00	3	16-QAM	V	218	70	1 / 14	11.86	9.27	21.13	33.01	-11.88
1908.50	3	16-QAM	V	175	66	1 / 14	10.92	9.36	20.28	33.01	-12.73
1852.50	5	QPSK	V	206	55	1 / 24	11.53	9.22	20.75	33.01	-12.26
1880.00	5	QPSK	V	200	78	1 / 24	12.72	9.27	21.99	33.01	-11.02
1907.50	5	QPSK	V	189	58	1 / 24	11.63	9.35	20.98	33.01	-12.03
1852.50	5	16-QAM	V	206	55	1 / 24	10.60	9.22	19.82	33.01	-13.19
1880.00	5	16-QAM	V	200	78	1 / 24	11.90	9.27	21.17	33.01	-11.84
1907.50	5	16-QAM	V	189	58	1 / 24	10.74	9.35	20.09	33.01	-12.92
1855.00	10	QPSK	V	204	67	1 / 49	11.30	9.22	20.52	33.01	-12.49
1880.00	10	QPSK	V	214	64	1 / 49	12.31	9.27	21.58	33.01	-11.43
1905.00	10	QPSK	V	207	74	1 / 49	11.27	9.34	20.61	33.01	-12.40
1855.00	10	16-QAM	V	204	67	1 / 49	10.41	9.22	19.63	33.01	-13.38
1880.00	10	16-QAM	V	214	64	1 / 49	11.37	9.27	20.64	33.01	-12.37
1905.00	10	16-QAM	V	207	74	1 / 49	10.30	9.34	19.64	33.01	-13.37
1857.50	15	QPSK	V	206	80	1 / 74	11.76	9.23	20.99	33.01	-12.02
1880.00	15	QPSK	V	203	76	1 / 0	11.56	9.27	20.83	33.01	-12.18
1902.50	15	QPSK	V	222	65	1 / 0	11.17	9.33	20.50	33.01	-12.51
1857.50	15	16-QAM	V	206	80	1 / 74	10.63	9.23	19.86	33.01	-13.15
1880.00	15	16-QAM	V	203	76	1 / 0	10.33	9.27	19.60	33.01	-13.41
1902.50	15	16-QAM	V	222	65	1 / 0	9.83	9.33	19.16	33.01	-13.85
1860.00	20	QPSK	V	222	61	1 / 99	11.07	9.23	20.30	33.01	-12.71
1880.00	20	QPSK	V	215	67	1 / 99	11.43	9.27	20.70	33.01	-12.31
1900.00	20	QPSK	V	223	51	1 / 0	11.76	9.31	21.07	33.01	-11.94
1860.00	20	16-QAM	V	222	61	1 / 99	9.50	9.23	18.73	33.01	-14.28
1880.00	20	16-QAM	V	215	67	1 / 99	10.32	9.27	19.59	33.01	-13.42
1900.00	20	16-QAM	V	223	51	1 / 0	10.82	9.31	20.13	33.01	-12.88

Table 7-5. EIRP Data (Band 2)

© 2016 PCTEST Engineering Laboratory, Inc.

7.7 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) §24.238(a) §27.53(c) §27.53(f) §27.53(h)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 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 peak 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 v02r02 – Section 5.8

ANSI/TIA-603-C-2004 – 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 = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize

© 2016 PCTEST Engineering Laboratory, Inc.

Test Setup

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

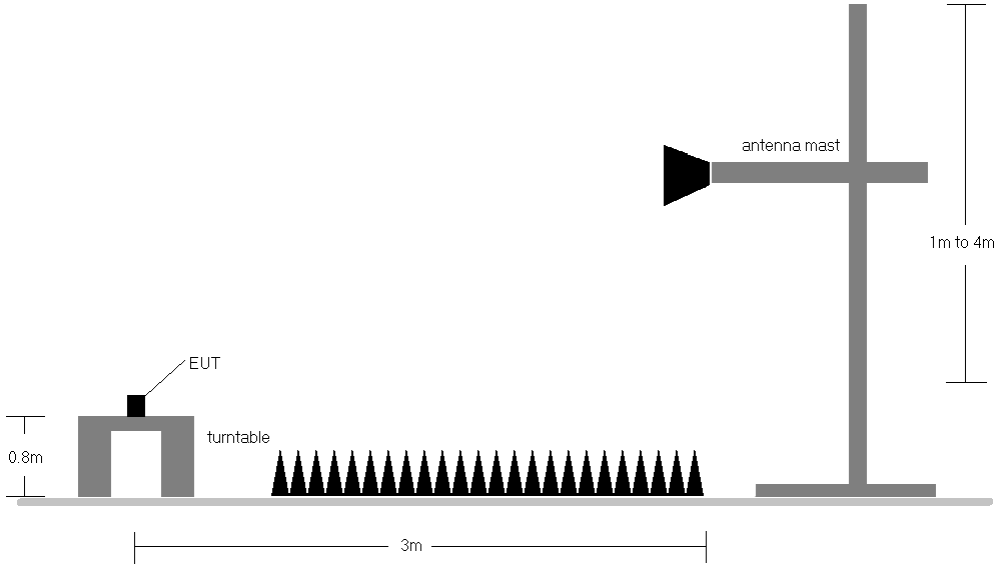


Figure 7-7. Test Instrument & Measurement Setup

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 "-" in the tables below denote a noise floor measurement.

© 2016 PCTEST Engineering Laboratory, Inc.

OPERATING FREQUENCY:	779.50	MHz		
CHANNEL:	23205			
MEASURED OUTPUT POWER:	21.92	dBm	=	0.156 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.92	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2338.50	H	169	65	-59.47	3.67	-55.80	77.7
3118.00	H	-	-	-59.03	5.13	-53.89	75.8

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

OPERATING FREQUENCY:	782.00	MHz		
CHANNEL:	23230			
MEASURED OUTPUT POWER:	22.33	dBm	=	0.171 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	35.33	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	H	252	36	-57.01	3.67	-53.34	75.7
3128.00	H	-	-	-57.60	5.17	-52.43	74.8

Table 7-7. Radiated Spurious Data (Band 13 – Mid Channel)

© 2016 PCTEST Engineering Laboratory, Inc.

OPERATING FREQUENCY:	784.50	MHz		
CHANNEL:	23255			
MEASURED OUTPUT POWER:	22.19	dBm	=	0.166 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	35.19	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2353.50	H	208	257	-57.13	3.66	-53.47	75.7
3138.00	H	-	-	-57.05	5.21	-51.84	74.0

Table 7-8. Radiated Spurious Data (Band 13 – High Channel)

MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	H	125	144	-59.84	3.68	-56.16	-16.2
1564.00	H	240	121	-60.55	3.69	-56.86	-16.9
1569.00	H	29	150	-60.79	3.71	-57.09	-17.1

Table 7-9. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

© 2016 PCTEST Engineering Laboratory, Inc.

OPERATING FREQUENCY:	826.50	MHz		
CHANNEL:	20425			
MEASURED OUTPUT POWER:	23.32	dBm	=	0.215 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	36.32	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1653.00	H	181	10	-58.80	3.60	-55.20	78.5
2479.50	H	181	10	-55.56	3.57	-51.99	75.3
3306.00	H	-	-	-57.38	5.68	-51.69	75.0

Table 7-10. Radiated Spurious Data (Band 5 – Low Channel)

OPERATING FREQUENCY:	836.50	MHz		
CHANNEL:	20525			
MEASURED OUTPUT POWER:	23.16	dBm	=	0.207 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	36.16	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	H	-	-	-60.27	3.53	-56.75	79.9
2509.50	H	221	105	-51.24	3.57	-47.67	70.8
3346.00	H	-	-	-57.65	5.78	-51.86	75.0

Table 7-11. Radiated Spurious Data (Band 5 – Mid Channel)

© 2016 PCTEST Engineering Laboratory, Inc.

OPERATING FREQUENCY:	846.50	MHz		
CHANNEL:	20625			
MEASURED OUTPUT POWER:	21.57	dBm	=	0.144 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.57	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1693.00	H	-	-	-58.75	3.46	-55.29	76.9
2539.50	H	309	196	-51.27	3.63	-47.64	69.2
3386.00	H	-	-	-57.34	5.89	-51.45	73.0

Table 7-12. Radiated Spurious Data (Band 5 – High Channel)

OPERATING FREQUENCY:	1712.50	MHz		
CHANNEL:	19975			
MEASURED OUTPUT POWER:	19.81	dBm	=	0.096 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	32.81	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3425.00	H	1	269	-56.65	8.15	-48.49	68.3
5137.50	H	1	159	-55.49	10.26	-45.23	65.0
6850.00	H	1	311	-54.63	11.39	-43.25	63.1
8562.50	H	-	-	-56.47	13.02	-43.45	63.3

Table 7-13. Radiated Spurious Data (Band 4 – Low Channel)

© 2016 PCTEST Engineering Laboratory, Inc.

OPERATING FREQUENCY:	1732.50	MHz		
CHANNEL:	20175			
MEASURED OUTPUT POWER:	20.32	dBm	=	0.108 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.32	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	H	1	278	-56.23	8.29	-47.95	68.3
5197.50	H	1	149	-55.04	10.35	-44.69	65.0
6930.00	H	1	294	-55.28	11.49	-43.80	64.1
8662.50	H	-	-	-56.48	13.02	-43.46	63.8

Table 7-14. Radiated Spurious Data (Band 4 – Mid Channel)

OPERATING FREQUENCY:	1752.50	MHz		
CHANNEL:	20375			
MEASURED OUTPUT POWER:	21.48	dBm	=	0.141 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.48	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3505.00	H	1	301	-56.17	8.40	-47.76	69.2
5257.50	H	1	145	-55.72	10.36	-45.36	66.8
7010.00	H	1	311	-55.82	11.56	-44.26	65.7
8762.50	H	-	-	-56.71	13.02	-43.69	65.2

Table 7-15. Radiated Spurious Data (Band 4 – High Channel)

© 2016 PCTEST Engineering Laboratory, Inc.

OPERATING FREQUENCY:	1852.50	MHz		
CHANNEL:	18625			
MEASURED OUTPUT POWER:	20.75	dBm	=	0.119 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.75	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3705.00	H	1.10	153	-39.29	9.43	-29.86	50.6
5557.50	H	1.80	184	-44.78	10.80	-33.98	54.7
7410.00	H	-	-	-52.32	10.71	-41.61	62.4

Table 7-16. Radiated Spurious Data (Band 2 – Low Channel)

OPERATING FREQUENCY:	1880.00	MHz		
CHANNEL:	18900			
MEASURED OUTPUT POWER:	21.99	dBm	=	0.158 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	34.99	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	H	1.10	149	-38.71	9.28	-29.43	51.4
5640.00	H	1.84	197	-44.85	11.03	-33.82	55.8
7520.00	H	-	-	-51.89	10.97	-40.92	62.9

Table 7-17. Radiated Spurious Data (Band 2 – Mid Channel)

© 2016 PCTEST Engineering Laboratory, Inc.

OPERATING FREQUENCY:	1907.50	MHz		
CHANNEL:	19175			
MEASURED OUTPUT POWER:	20.98	dBm	=	0.125 W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	33.98	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3815.00	H	1.10	153	-36.75	9.19	-27.56	48.5
5722.50	H	1.76	192	-43.53	11.27	-32.26	53.2
7630.00	H	-	-	-52.71	11.17	-41.54	62.5

Table 7-18. Radiated Spurious Data (Band 2 – High Channel)

© 2016 PCTEST Engineering Laboratory, Inc.

7.8 Frequency Stability / Temperature Variation

§2.1055 §22.355 §24.235 §27.54

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24 and Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-C-2004

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

Test Notes

None

© 2016 PCTEST Engineering Laboratory, Inc.

Band 13 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY: 782,000,000 Hz

CHANNEL: 23230

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	781,999,938	-62	-0.0000079
100 %		- 30	781,999,700	-300	-0.0000384
100 %		- 20	782,000,106	106	0.0000136
100 %		- 10	781,999,632	-368	-0.0000471
100 %		0	781,999,812	-188	-0.0000240
100 %		+ 10	782,000,291	291	0.0000372
100 %		+ 20	782,000,169	169	0.0000216
100 %		+ 30	782,000,076	76	0.0000097
100 %		+ 40	781,999,772	-228	-0.0000292
100 %		+ 50	781,999,891	-109	-0.0000139
BATT. ENDPOINT	3.40	+ 20	782,000,177	177	0.0000226

Table 7-19. Frequency Stability Data (Band 13)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

© 2016 PCTEST Engineering Laboratory, Inc.

Band 13 Frequency Stability Measurements

§2.1055 §27.54

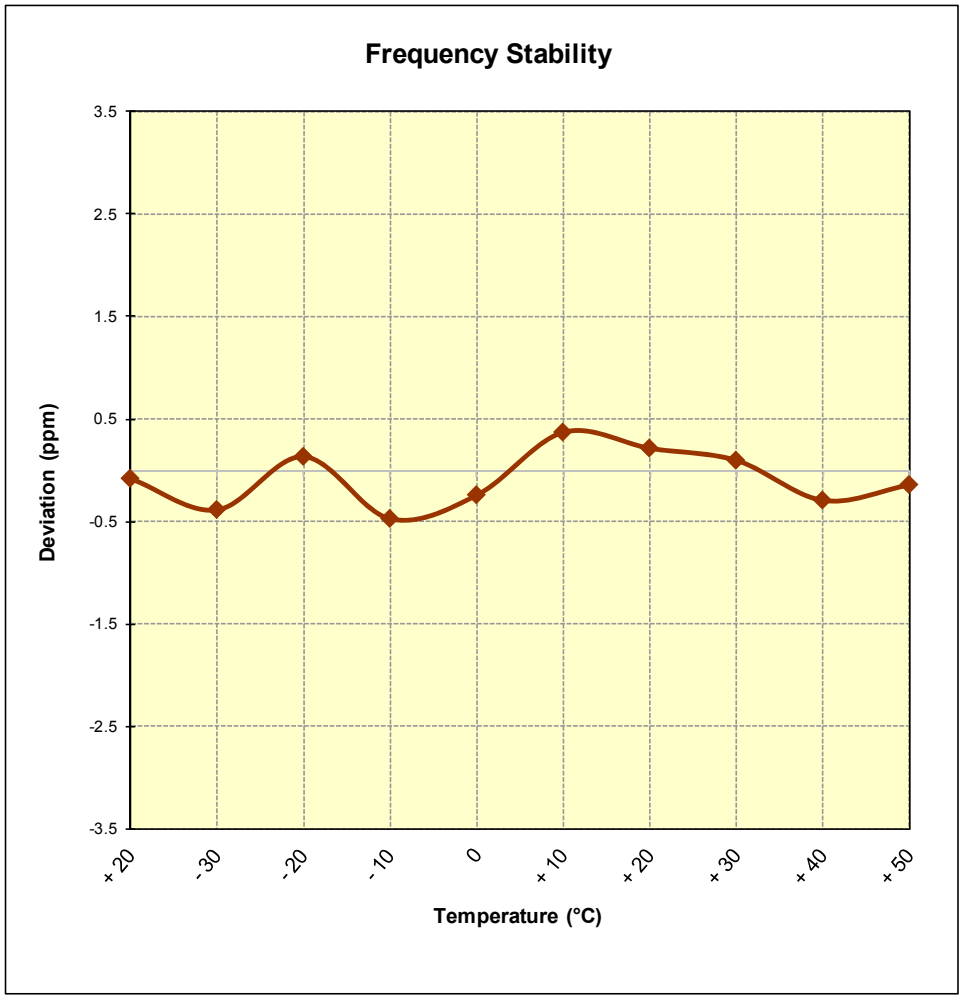


Figure 7-8. Frequency Stability Graph (Band 13)

© 2016 PCTEST Engineering Laboratory, Inc.

Band 5 Frequency Stability Measurements

§2.1055 §22.355

OPERATING FREQUENCY: 836,500,000 Hz

CHANNEL: 20525

REFERENCE VOLTAGE: 3.80 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,500,040	40	0.0000048
100 %		- 30	836,499,934	-66	-0.0000079
100 %		- 20	836,500,120	120	0.0000143
100 %		- 10	836,499,805	-195	-0.0000233
100 %		0	836,500,079	79	0.0000094
100 %		+ 10	836,500,342	342	0.0000409
100 %		+ 20	836,499,961	-39	-0.0000047
100 %		+ 30	836,500,015	15	0.0000018
100 %		+ 40	836,500,047	47	0.0000056
100 %		+ 50	836,500,250	250	0.0000299
BATT. ENDPOINT	3.40	+ 20	836,499,885	-115	-0.0000137

Table 7-20. Frequency Stability Data (Band 5)

© 2016 PCTEST Engineering Laboratory, Inc.

Band 5 Frequency Stability Measurements

§2.1055 §22.355

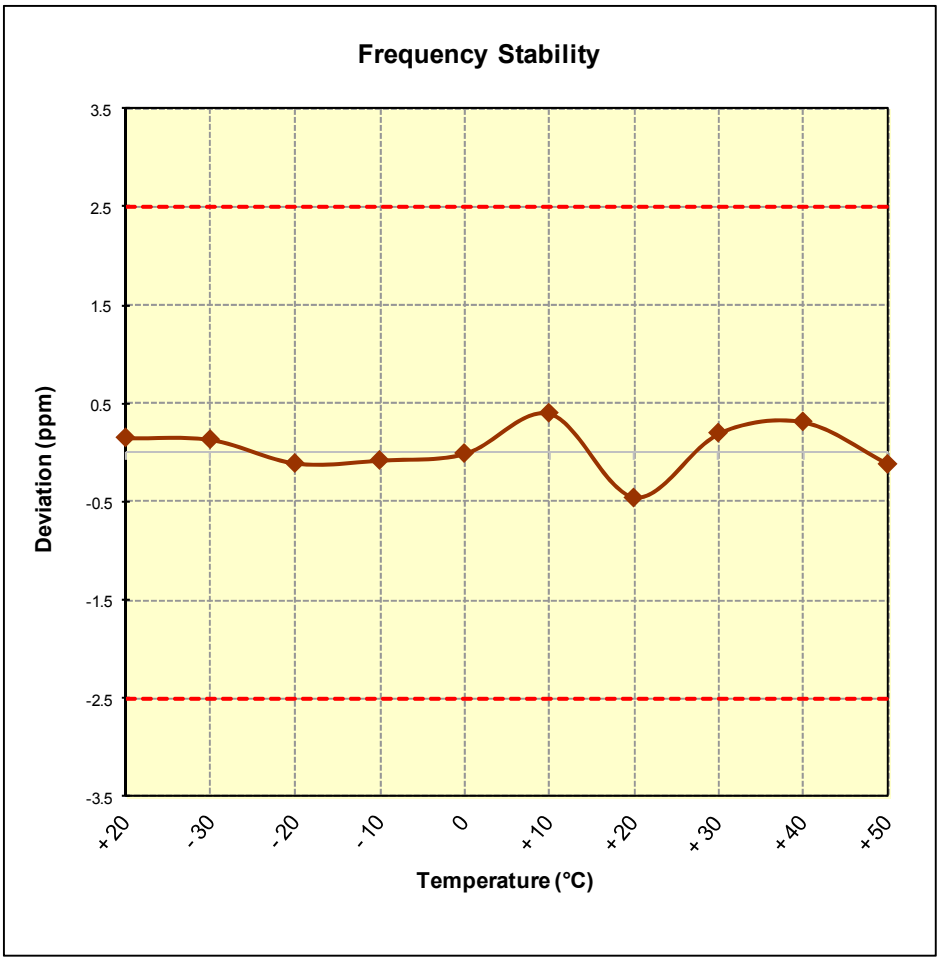


Figure 7-9. Frequency Stability Graph (Band 5)

© 2016 PCTEST Engineering Laboratory, Inc.

Band 4 Frequency Stability Measurements

§2.1055 §§27.54

OPERATING FREQUENCY: 1,732,500,000 Hz

CHANNEL: 20175

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,500,234	234	0.0000135
100 %		- 30	1,732,500,229	229	0.0000132
100 %		- 20	1,732,500,074	74	0.0000043
100 %		- 10	1,732,499,982	-18	-0.0000010
100 %		0	1,732,499,920	-80	-0.0000046
100 %		+ 10	1,732,499,764	-236	-0.0000136
100 %		+ 20	1,732,500,081	81	0.0000047
100 %		+ 30	1,732,499,798	-202	-0.0000117
100 %		+ 40	1,732,500,053	53	0.0000031
100 %		+ 50	1,732,499,985	-15	-0.0000009
BATT. ENDPOINT	3.40	+ 20	1,732,500,270	270	0.0000156

Table 7-21. Frequency Stability Data (Band 4)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

© 2016 PCTEST Engineering Laboratory, Inc.

Band 4 Frequency Stability Measurements

§2.1055 §§27.54

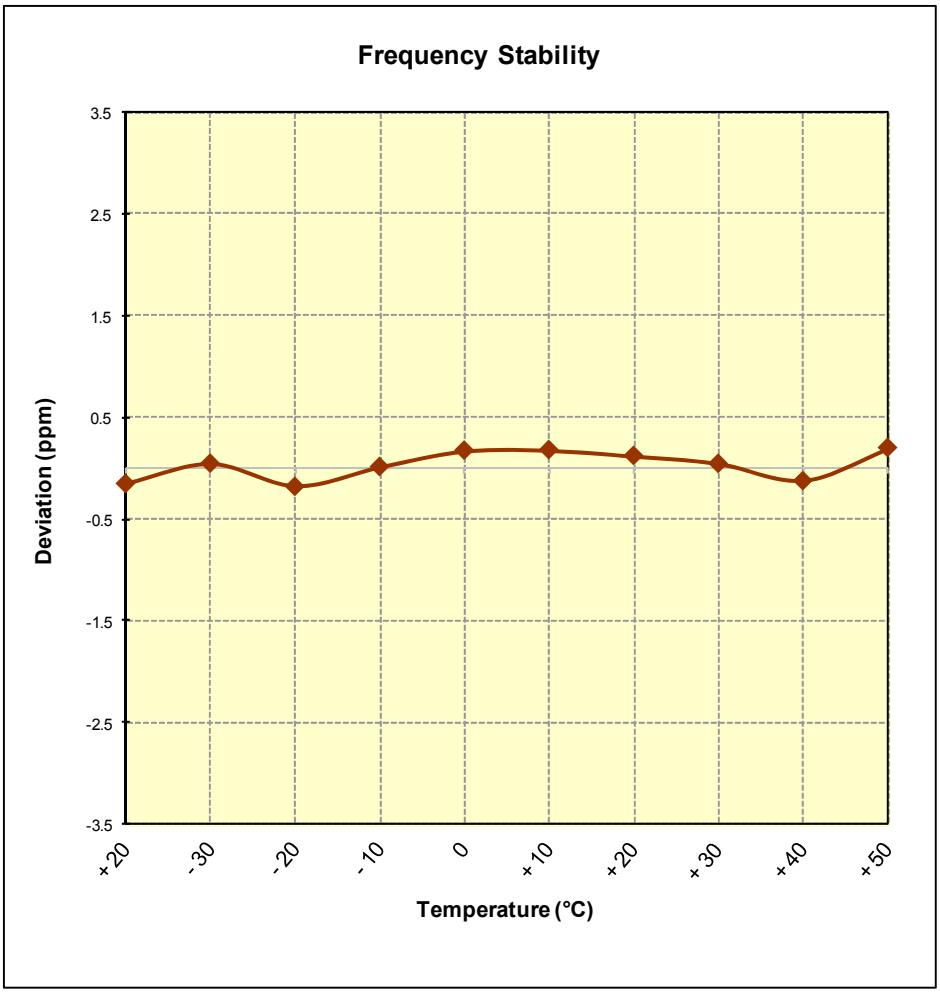


Figure 7-10. Frequency Stability Graph (Band 4)

© 2016 PCTEST Engineering Laboratory, Inc.

Band 2 Frequency Stability Measurements

§2.1055 §24.235

OPERATING FREQUENCY: 1,880,000,000 Hz

CHANNEL: 18900

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,873	-127	-0.0000068
100 %		- 30	1,880,000,017	17	0.0000009
100 %		- 20	1,879,999,923	-77	-0.0000041
100 %		- 10	1,880,000,342	342	0.0000182
100 %		0	1,880,000,353	353	0.0000188
100 %		+ 10	1,880,000,016	16	0.0000009
100 %		+ 20	1,880,000,183	183	0.0000097
100 %		+ 30	1,879,999,900	-100	-0.0000053
100 %		+ 40	1,880,000,100	100	0.0000053
100 %		+ 50	1,879,999,901	-99	-0.0000053
BATT. ENDPOINT	3.40	+ 20	1,880,000,228	228	0.0000121

Table 7-22. Frequency Stability Data (Band 2)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

© 2016 PCTEST Engineering Laboratory, Inc.

Band 2 Frequency Stability Measurements

§2.1055 §24.235

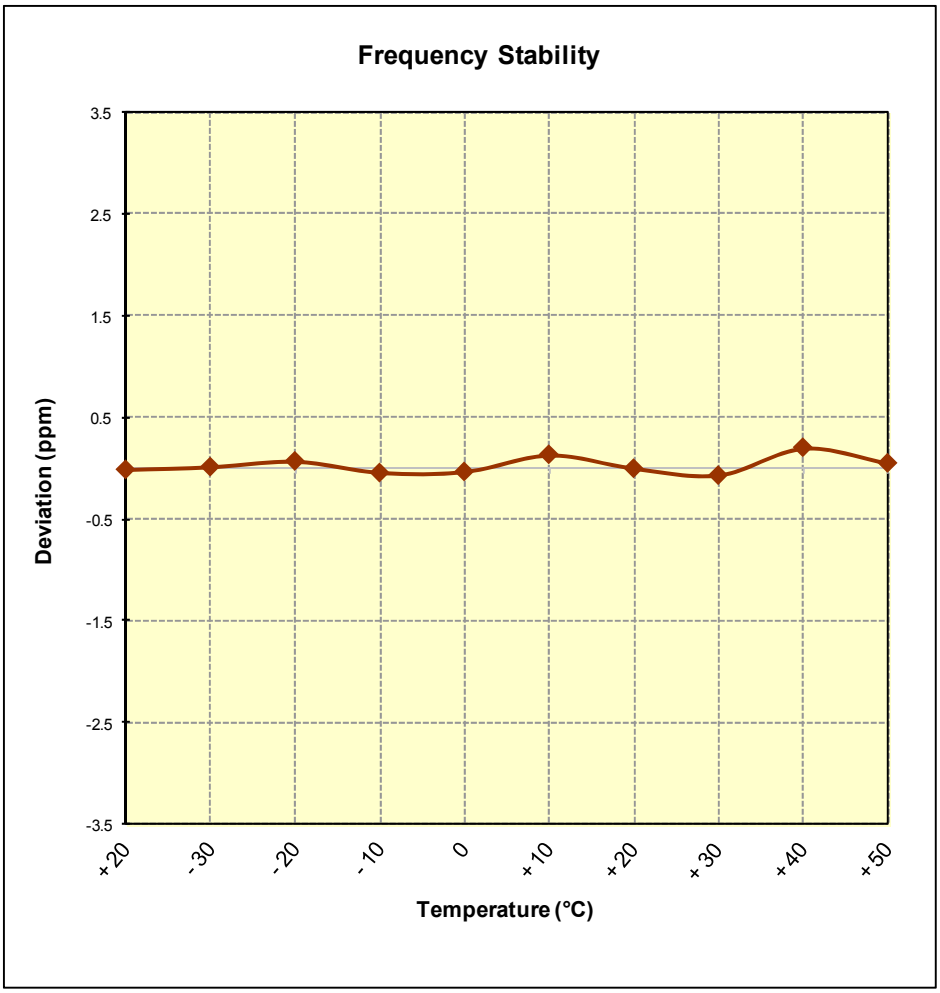


Figure 7-11. Frequency Stability Graph (Band 2)

© 2016 PCTEST Engineering Laboratory, Inc.

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFVS500** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

© 2016 PCTEST Engineering Laboratory, Inc.