

## 7.4 Band Edge Emissions at Antenna Terminal

§2.1051 §24.238(a) §27.53(g) §27.53(h) RSS-130(4.6) RSS-133(6.5) RSS-139(6.6)

### 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

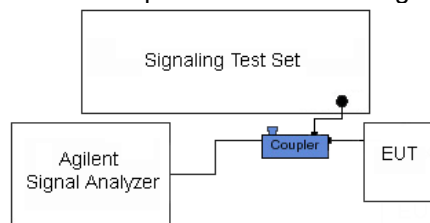
KDB 971168 D01 v03 – Section 6.0

### 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  $\geq$  1% of the emission bandwidth
4. VBW  $\geq$  3 x RBW
5. Detector = RMS
6. Number of sweep points  $\geq$  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**

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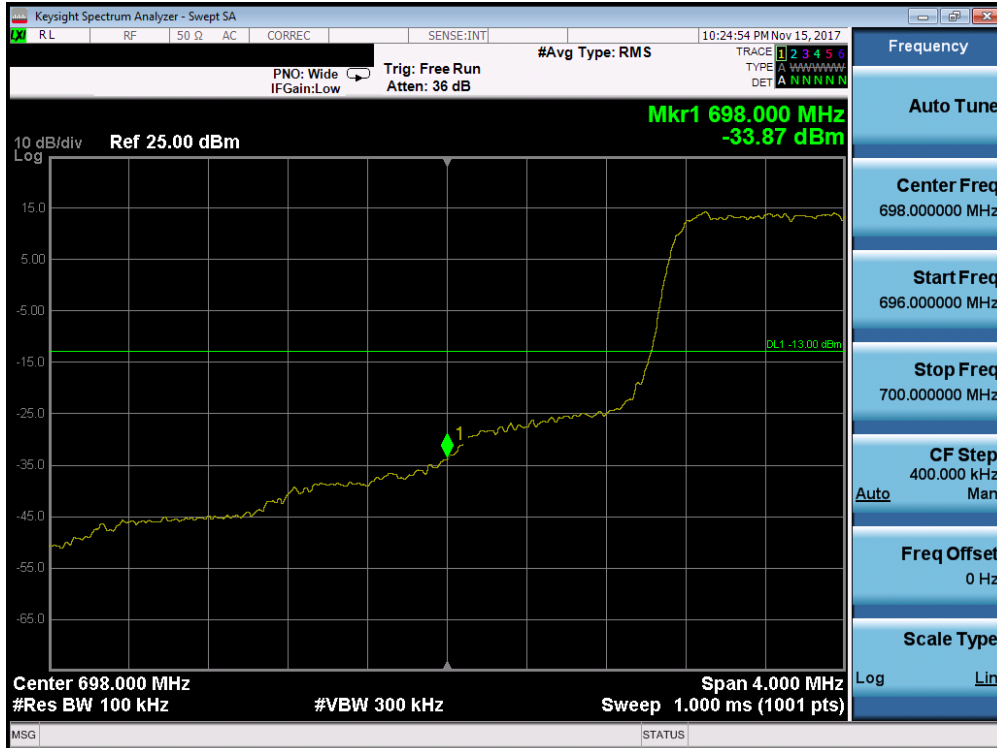
**Test Notes**

Per 22.917(b) 24.238(a) 27.53(h) RSS-130(4.6) RSS-133(6.5) RSS-139(6.5) 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.

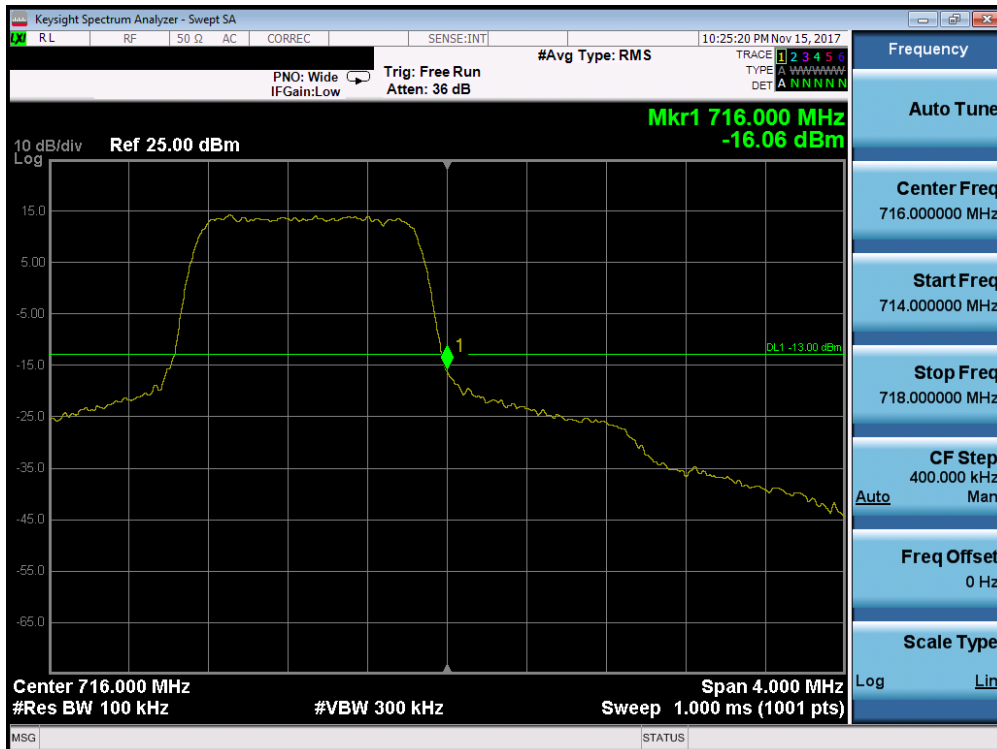
Per 27.53(g) RSS-130(4.6) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

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**Band 12**



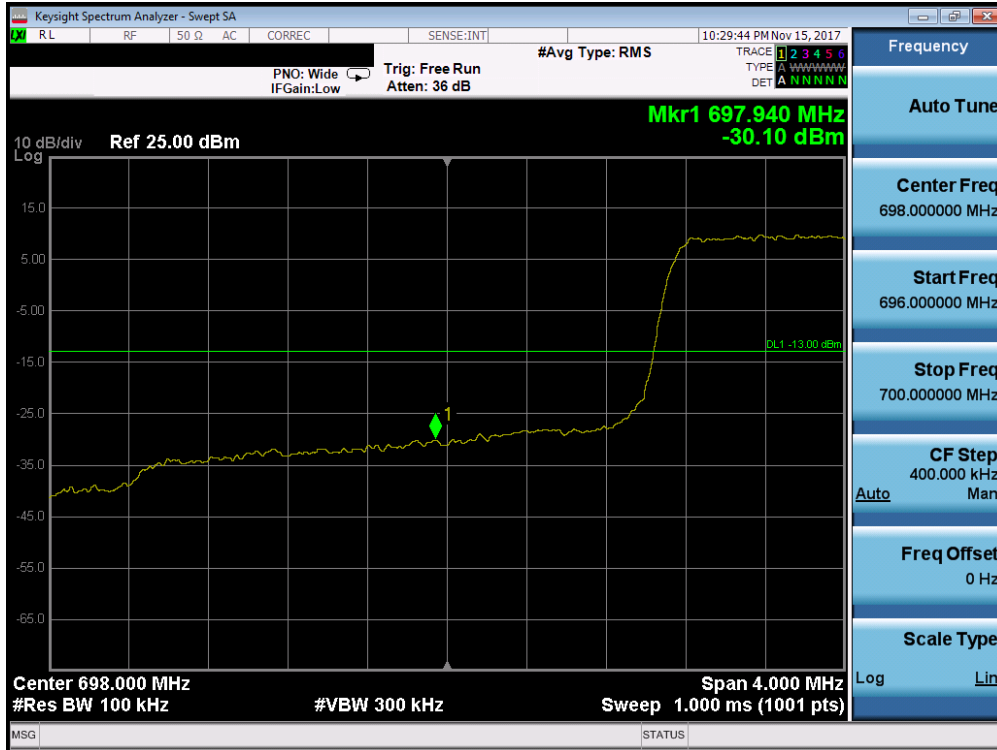
Plot 7-77. Lower Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-78. Upper Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)

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**Band 12**



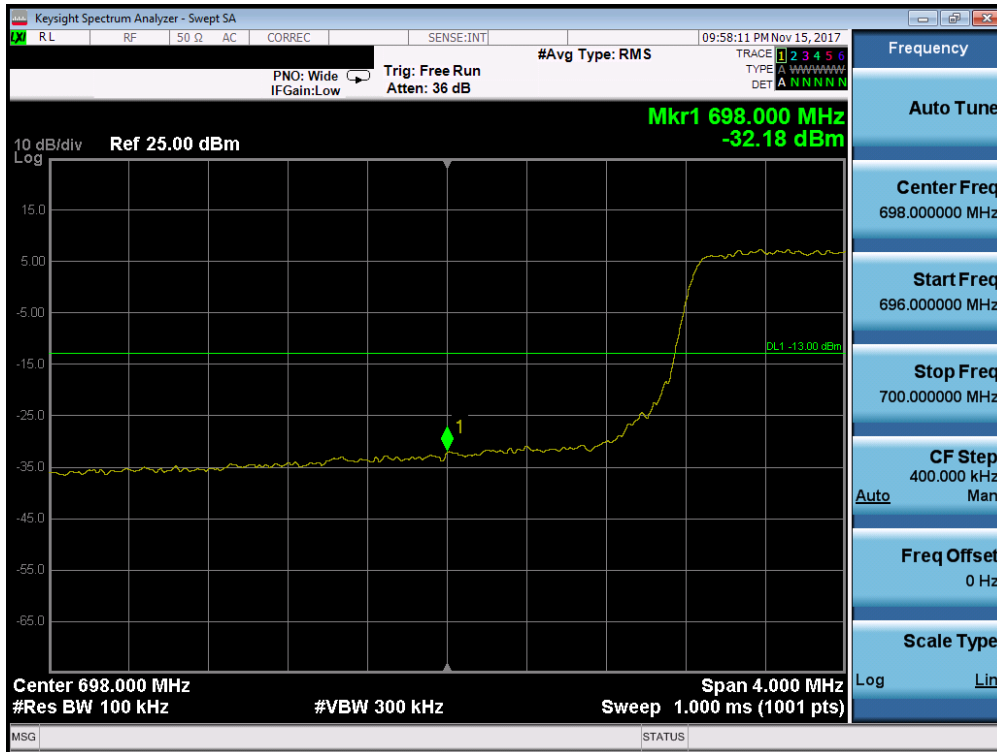
**Plot 7-79. Lower Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)**



**Plot 7-80. Upper Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)**

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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**Band 12**



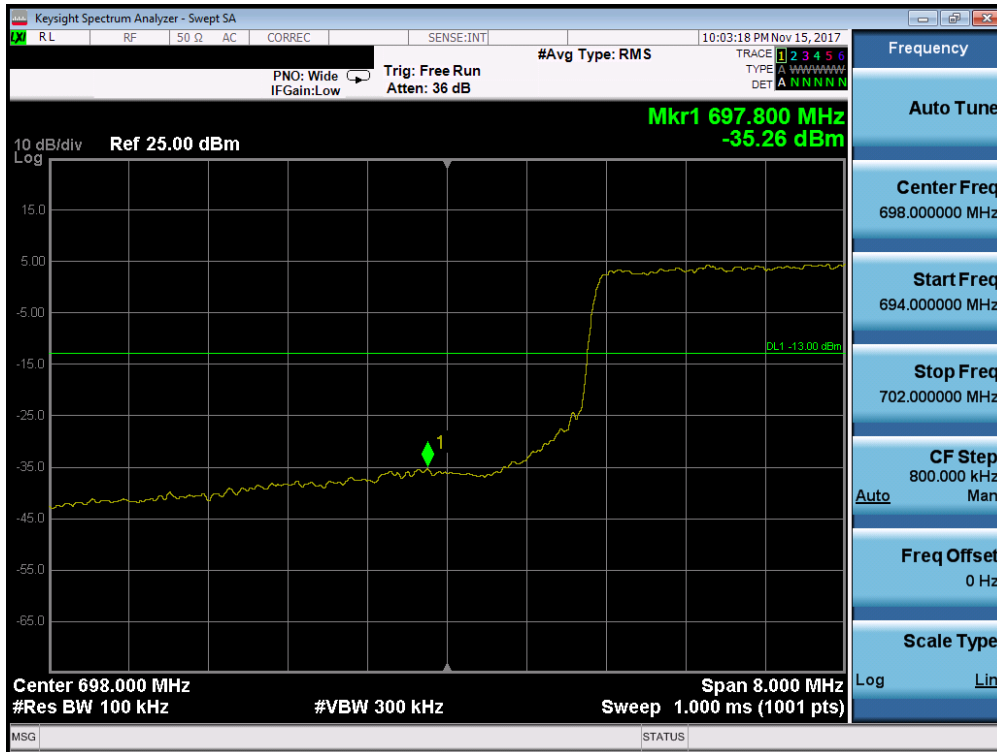
**Plot 7-81. Lower Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)**



**Plot 7-82. Upper Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)**

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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**Band 12**



**Plot 7-83. Lower Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)**



**Plot 7-84. Upper Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)**

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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# Band 5

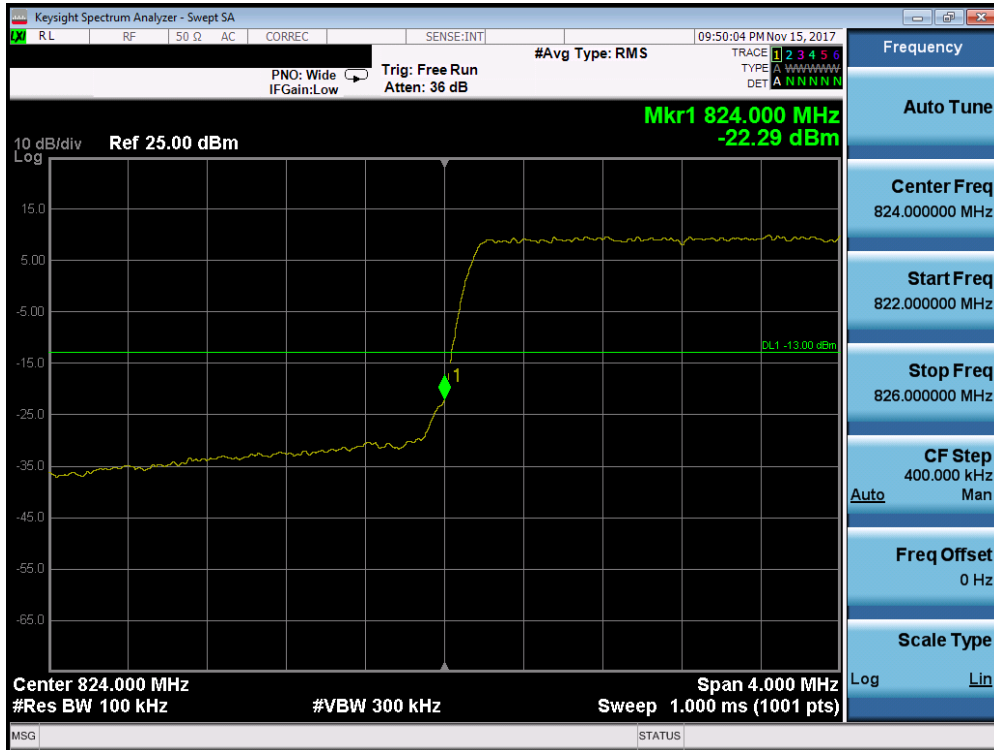


Plot 7-85. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK - Full RB Configuration)



Plot 7-86. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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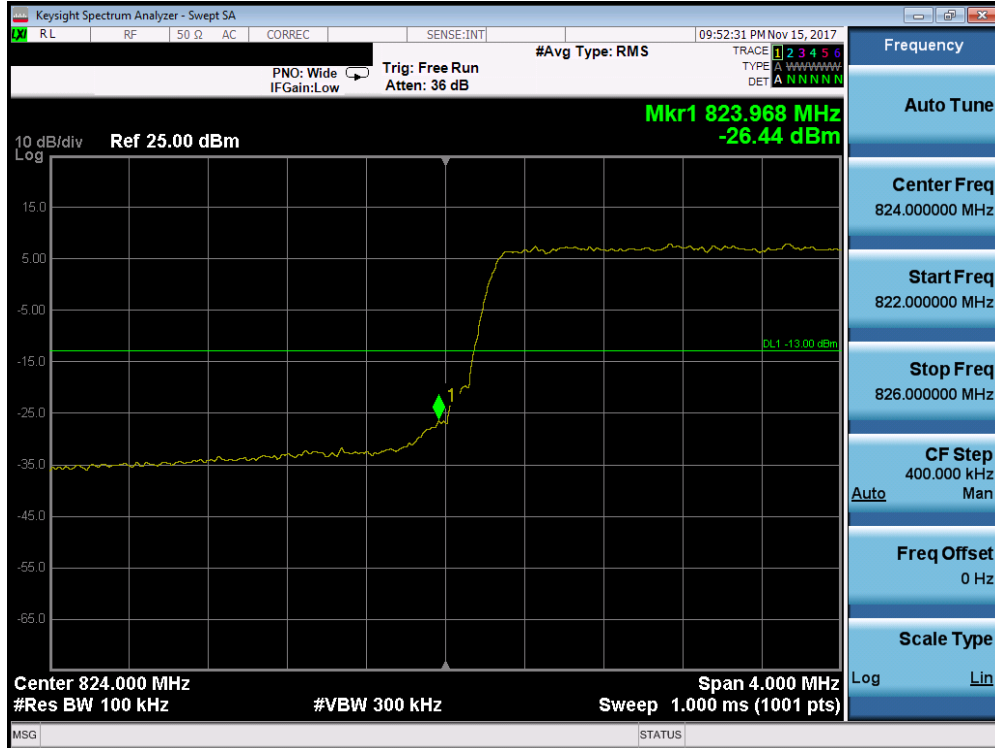
Plot 7-87. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK - Full RB Configuration)



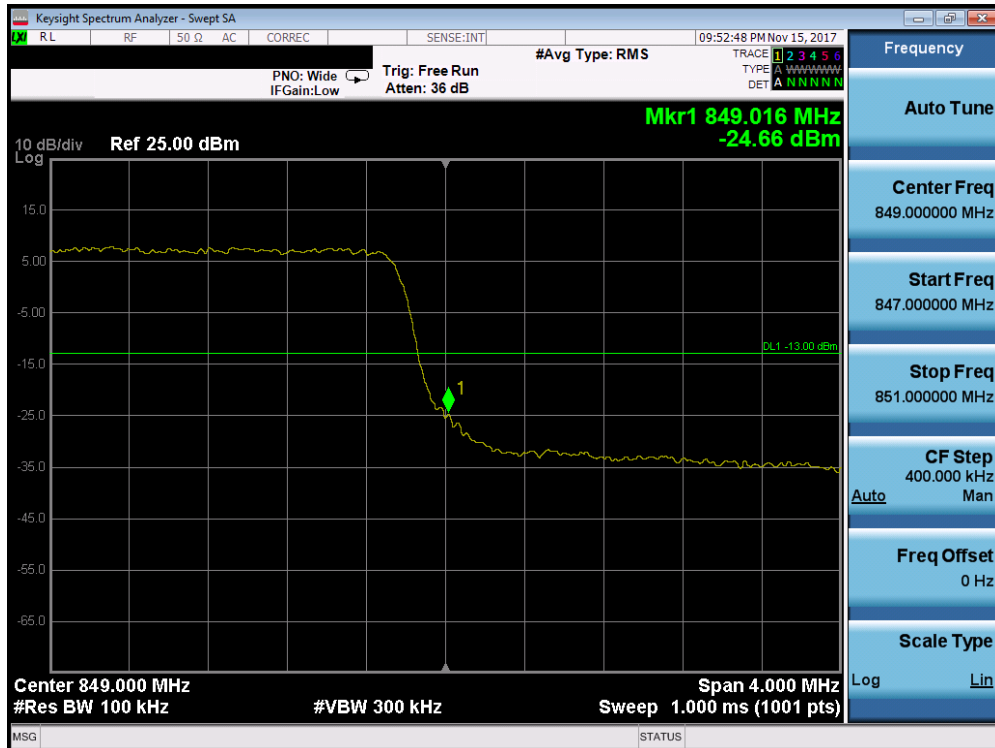
Plot 7-88. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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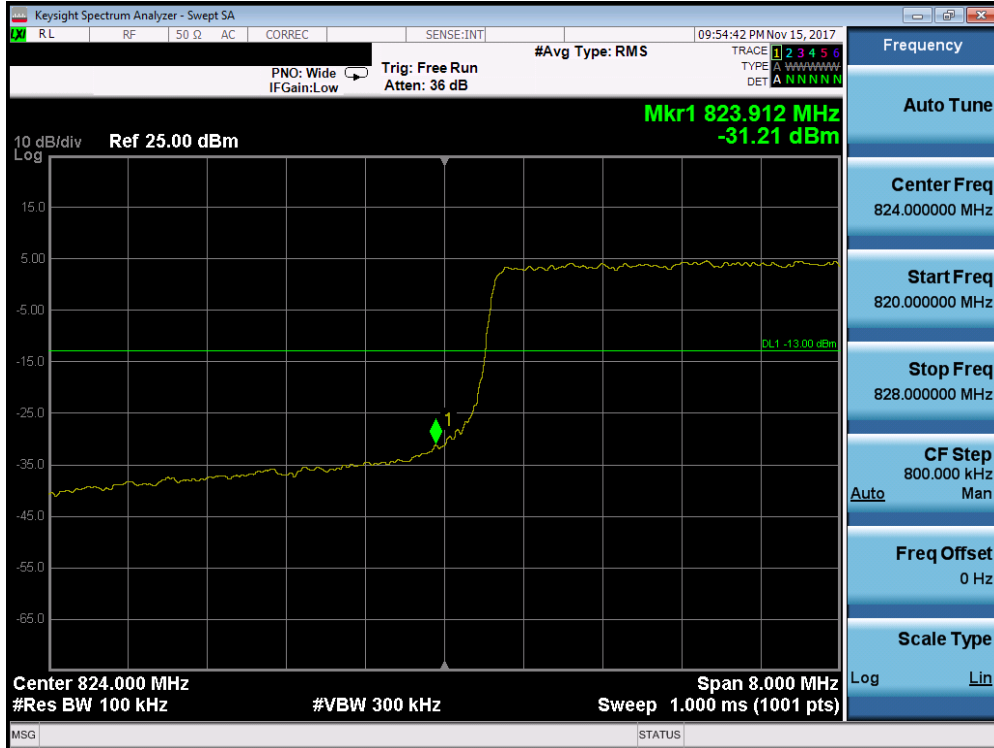


Plot 7-89. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK - Full RB Configuration)



Plot 7-90. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK - Full RB Configuration)

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Plot 7-91. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK - Full RB Configuration)



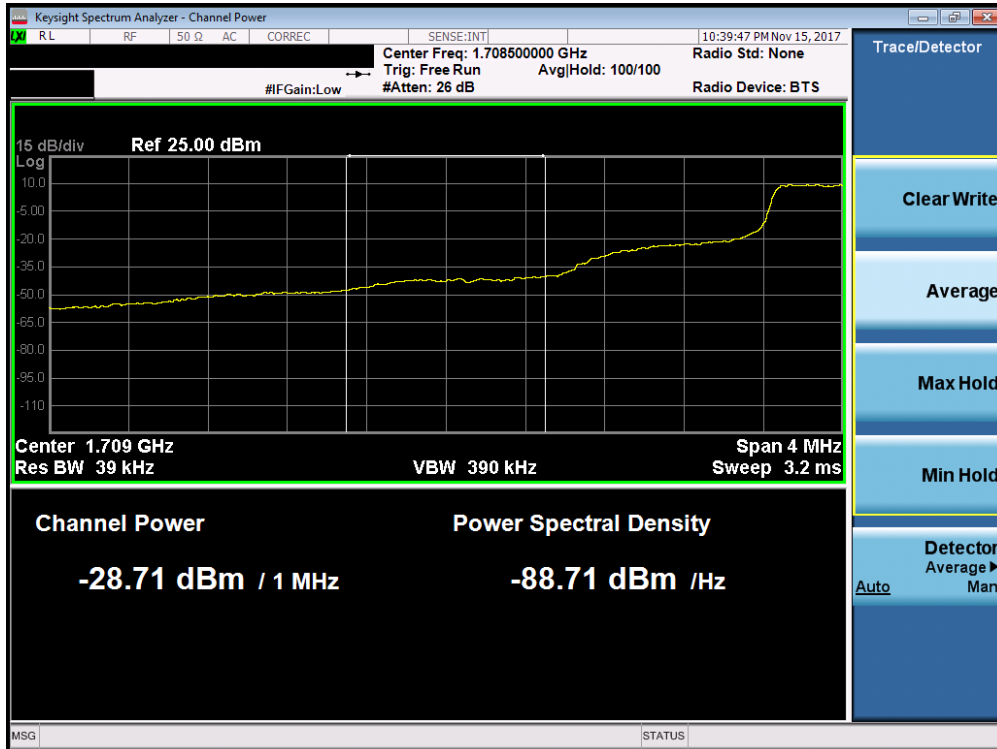
Plot 7-92. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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**Band 4**



**Plot 7-93. Lower Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)**

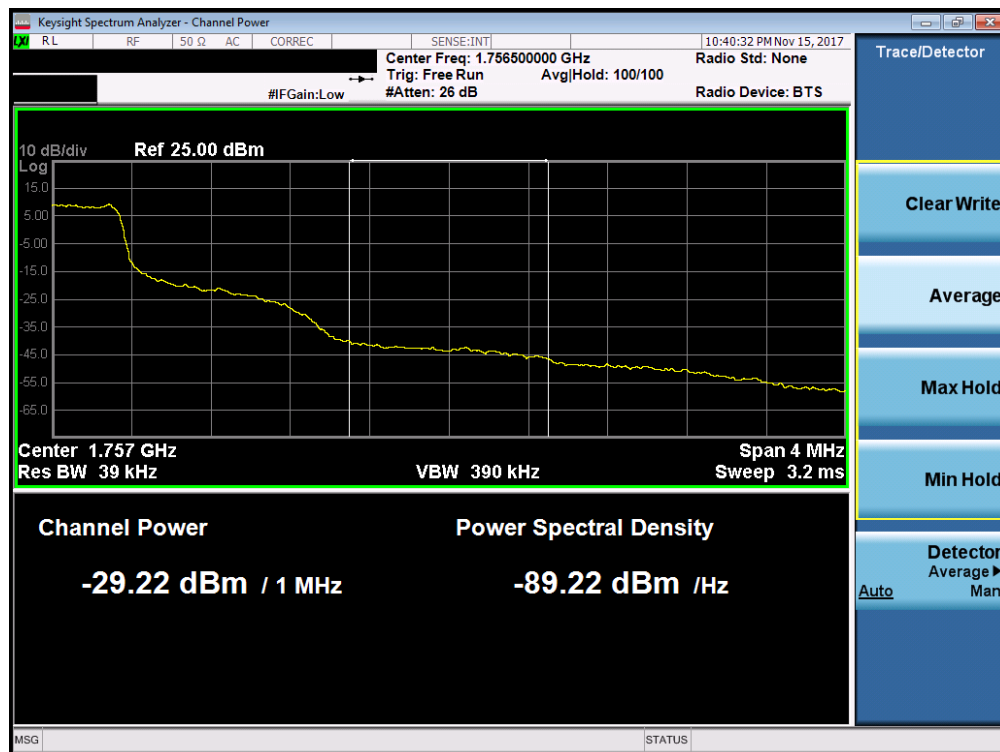


**Plot 7-94. Lower Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)**

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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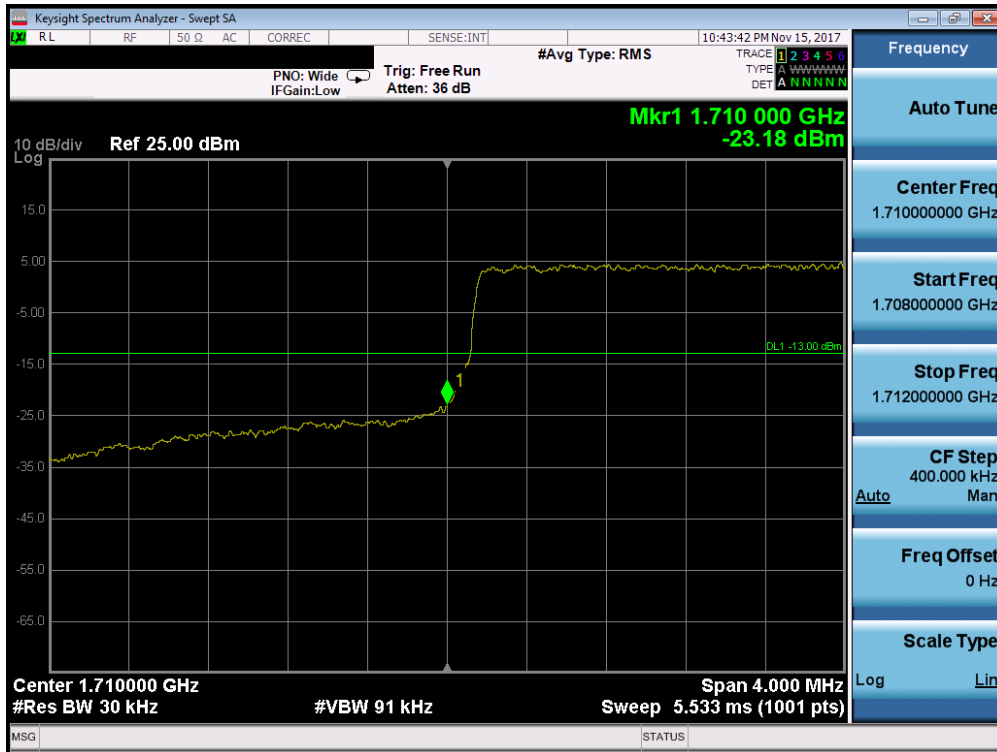
Plot 7-95. Upper Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



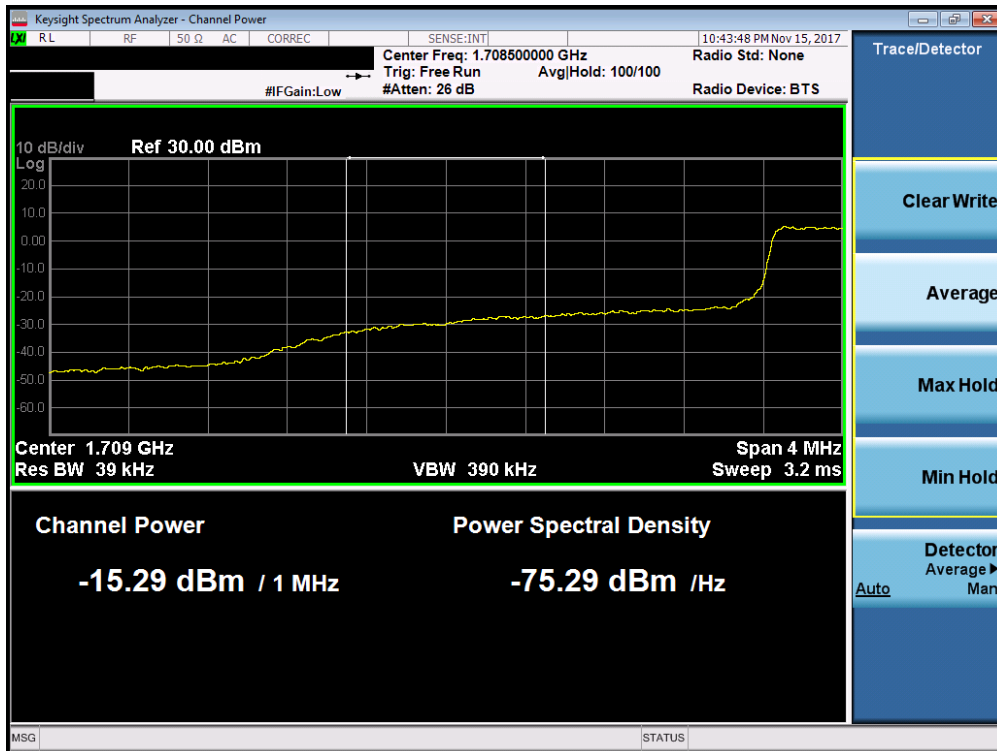
Plot 7-96. Upper Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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**Band 4**



**Plot 7-97. Lower Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)**



**Plot 7-98. Lower Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)**

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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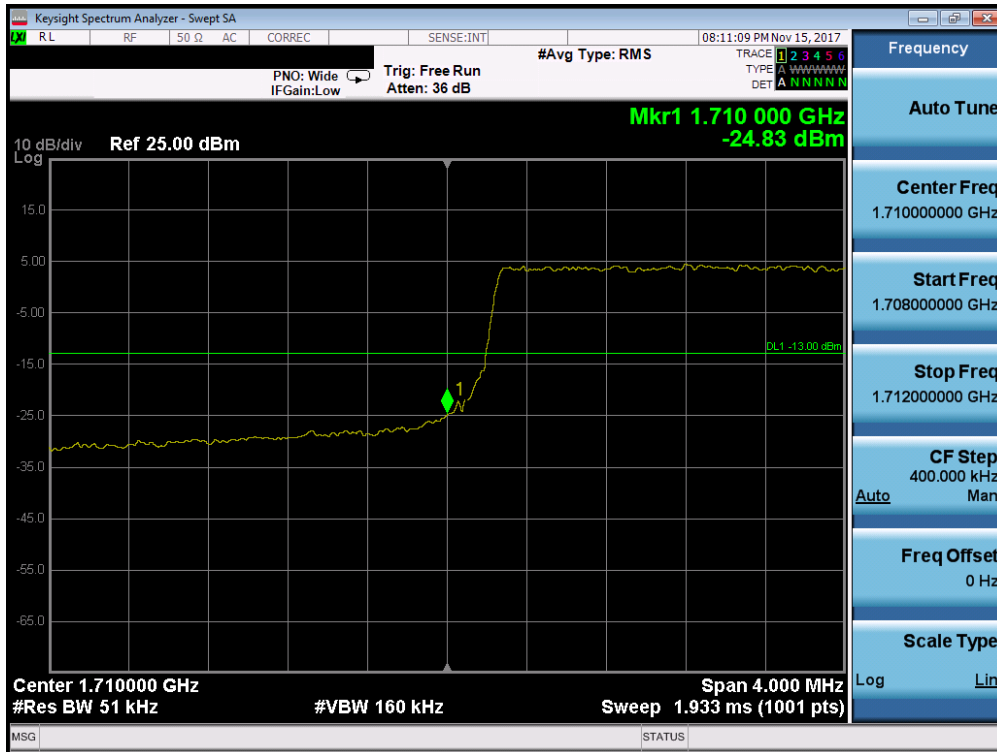
Plot 7-99. Upper Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



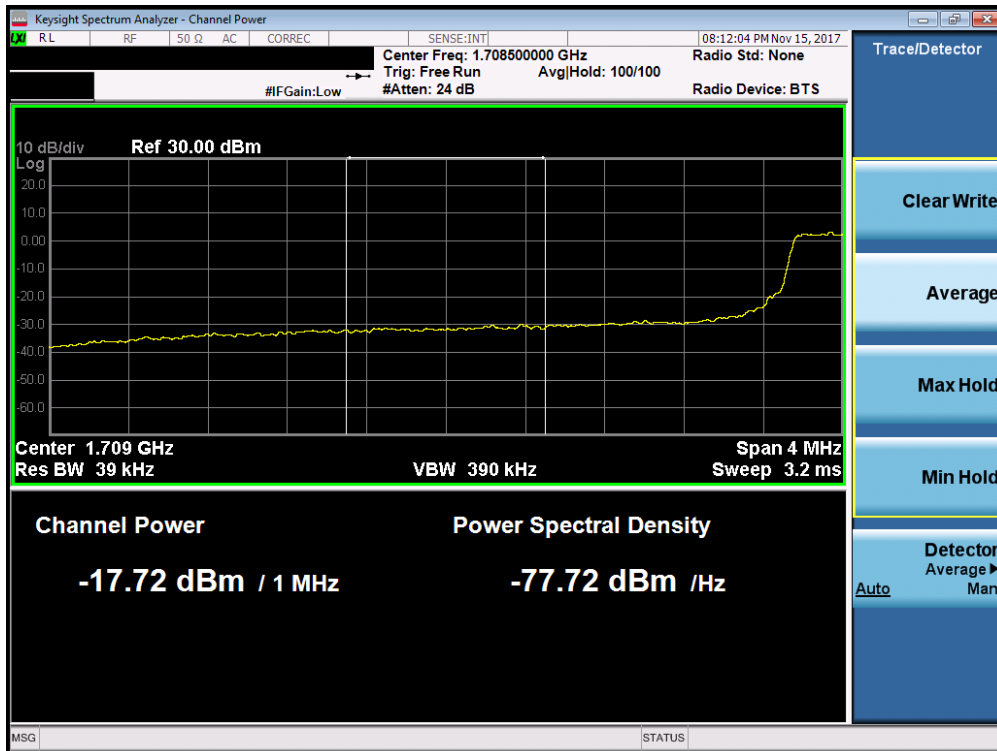
Plot 7-100. Upper Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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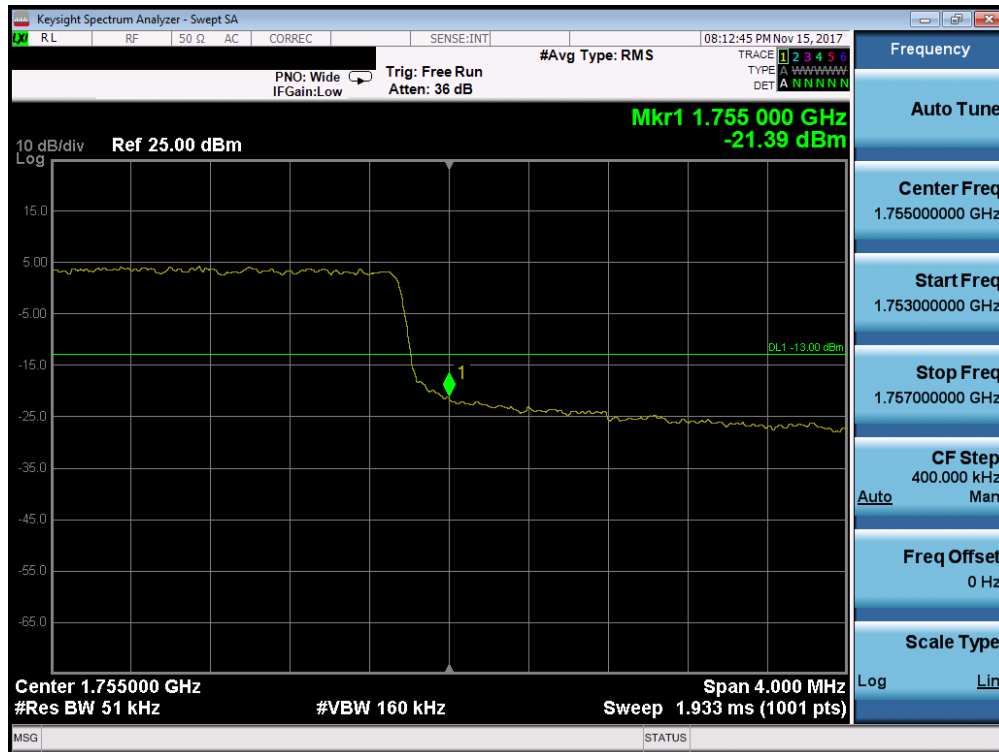
Plot 7-101. Lower Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



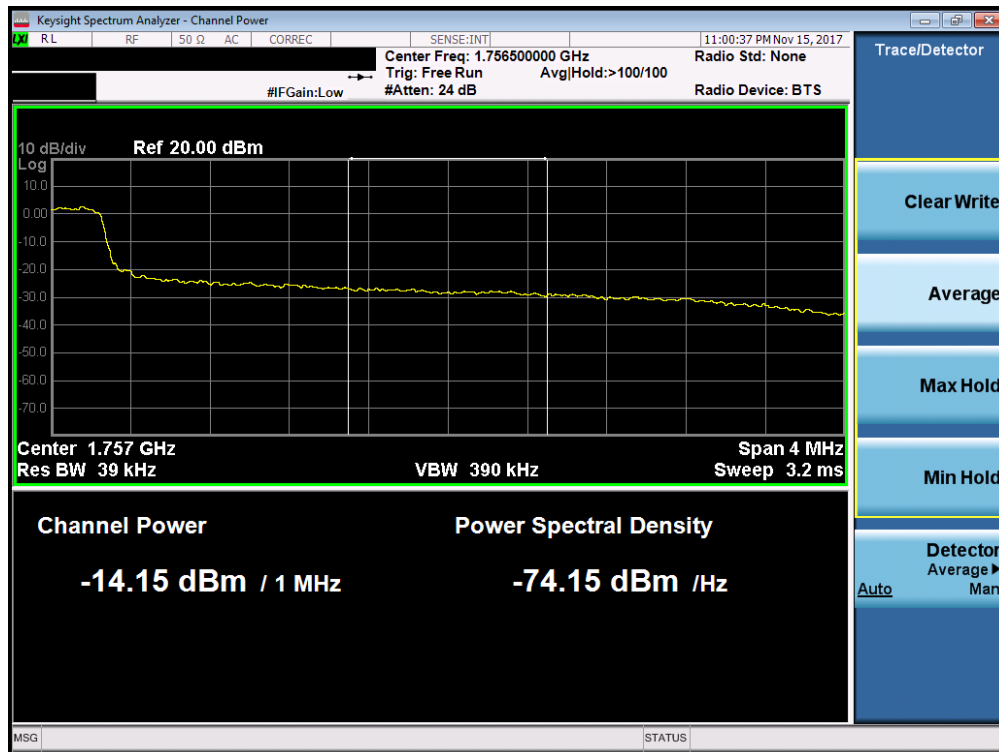
Plot 7-102. Lower Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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Plot 7-103. Upper Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

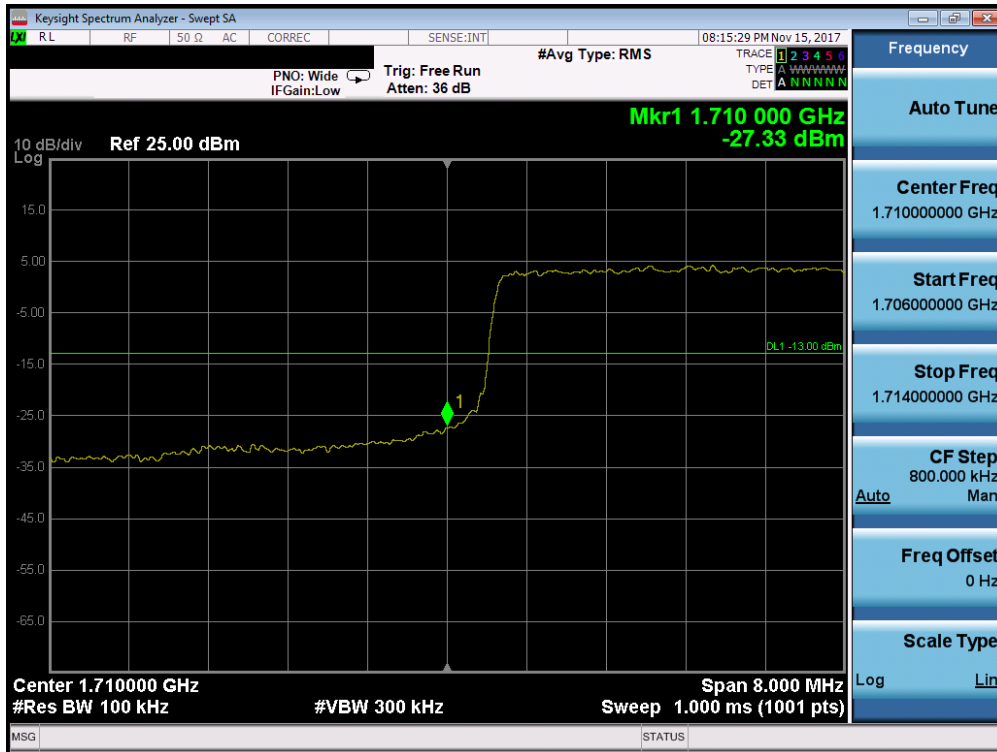


Plot 7-104. Upper Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

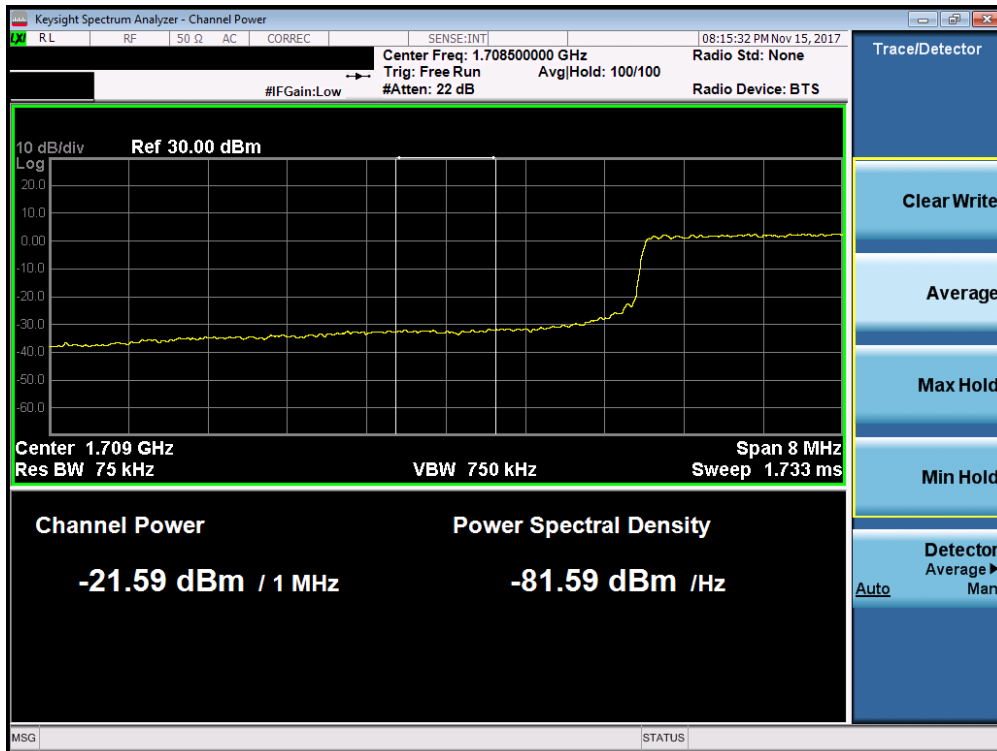
FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-105. Lower Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

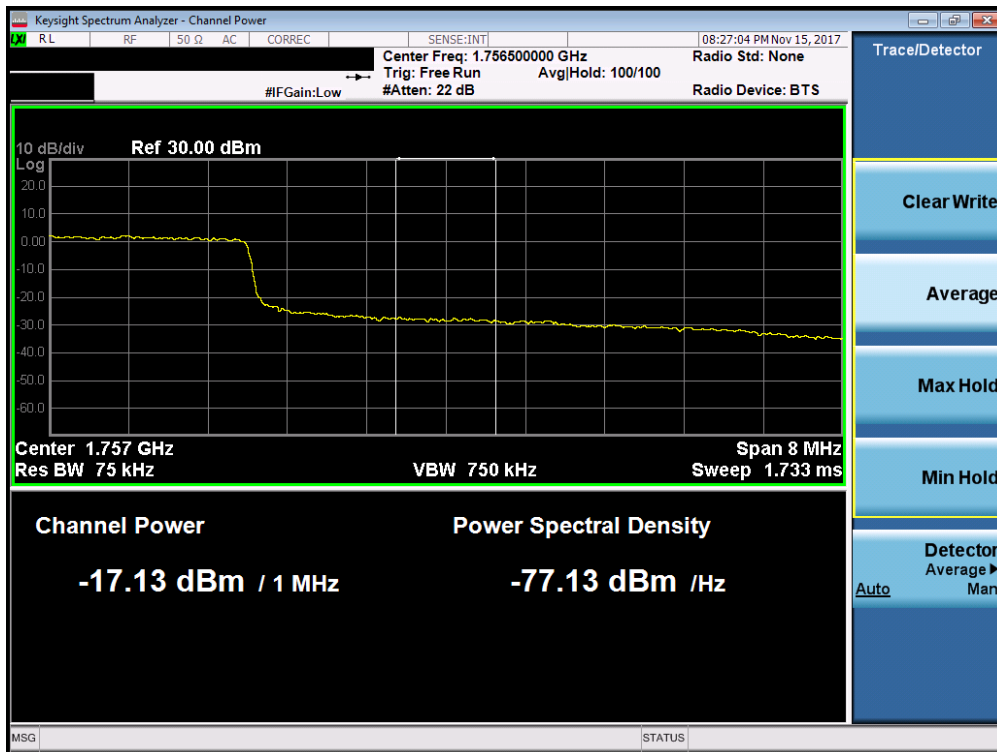


Plot 7-106. Lower Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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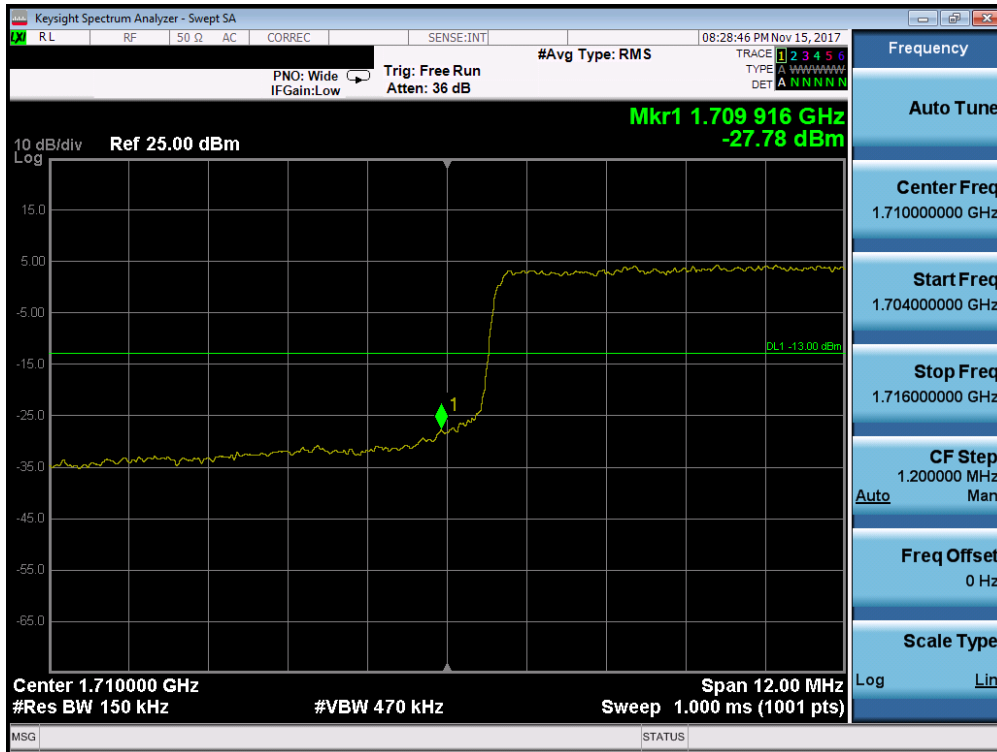
Plot 7-107. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



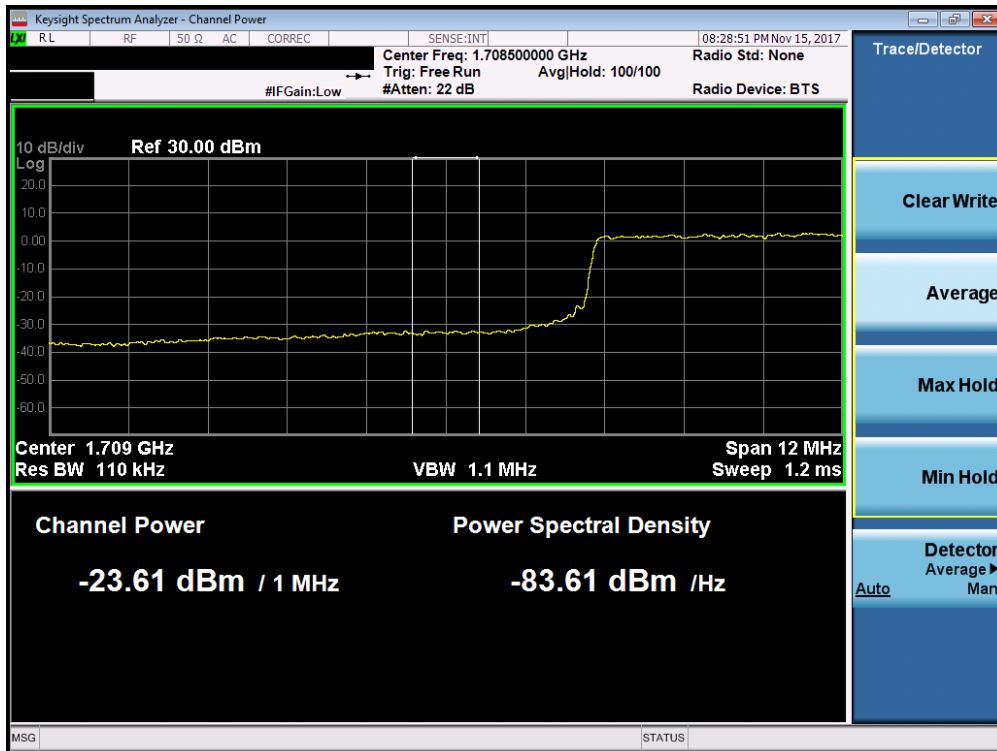
Plot 7-108. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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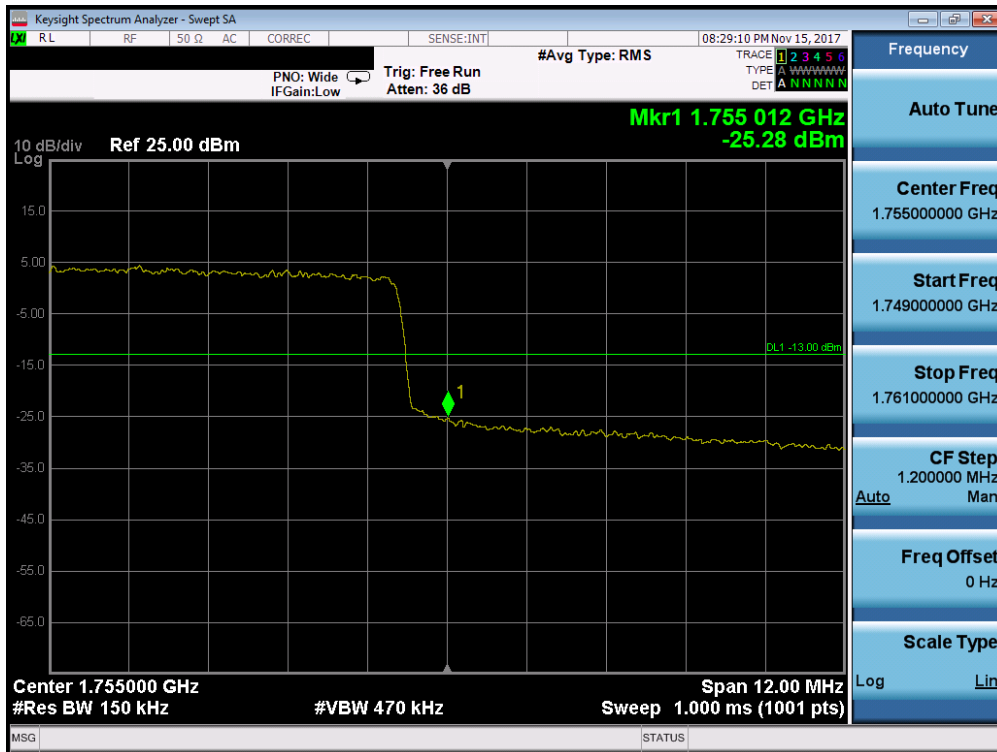


Plot 7-109. Lower Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

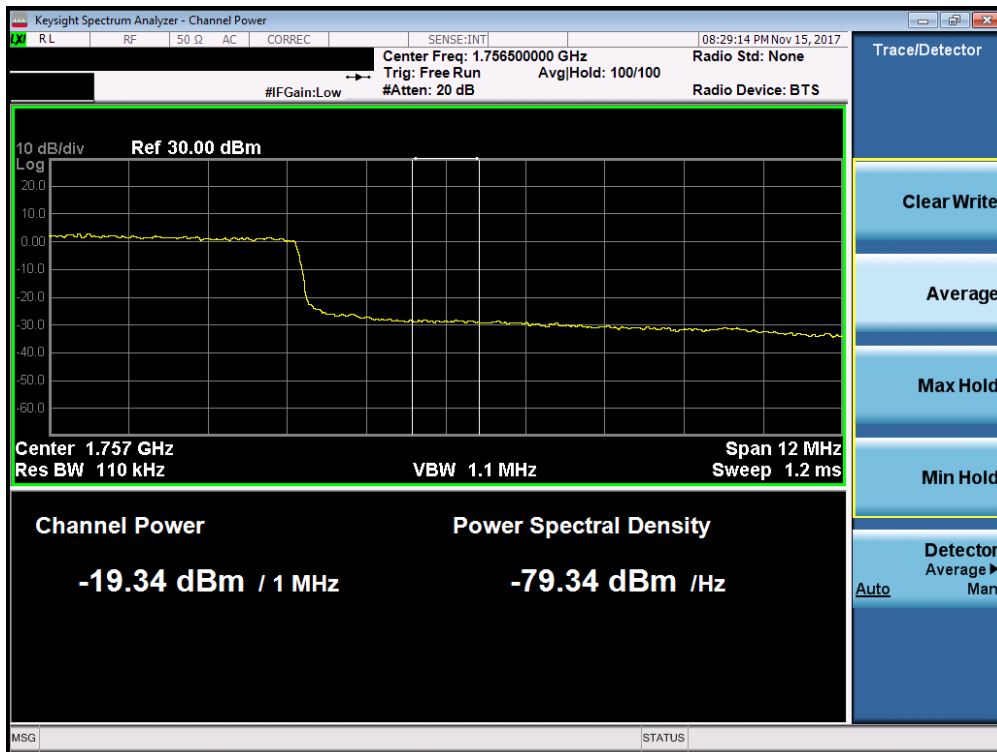


Plot 7-110. Lower Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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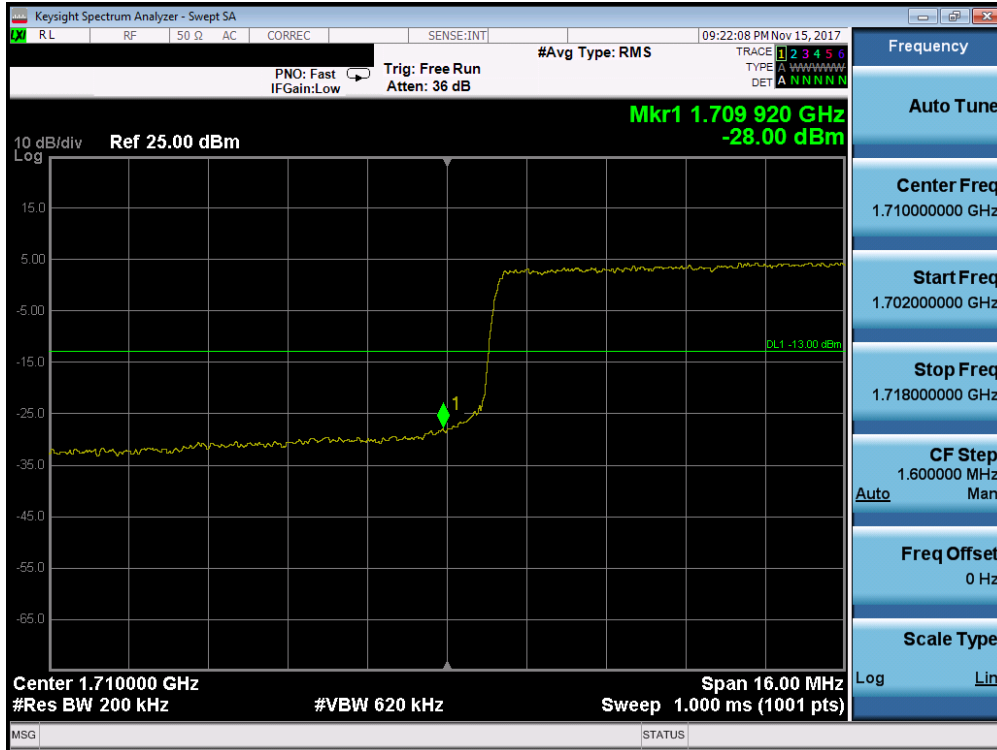
Plot 7-111. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



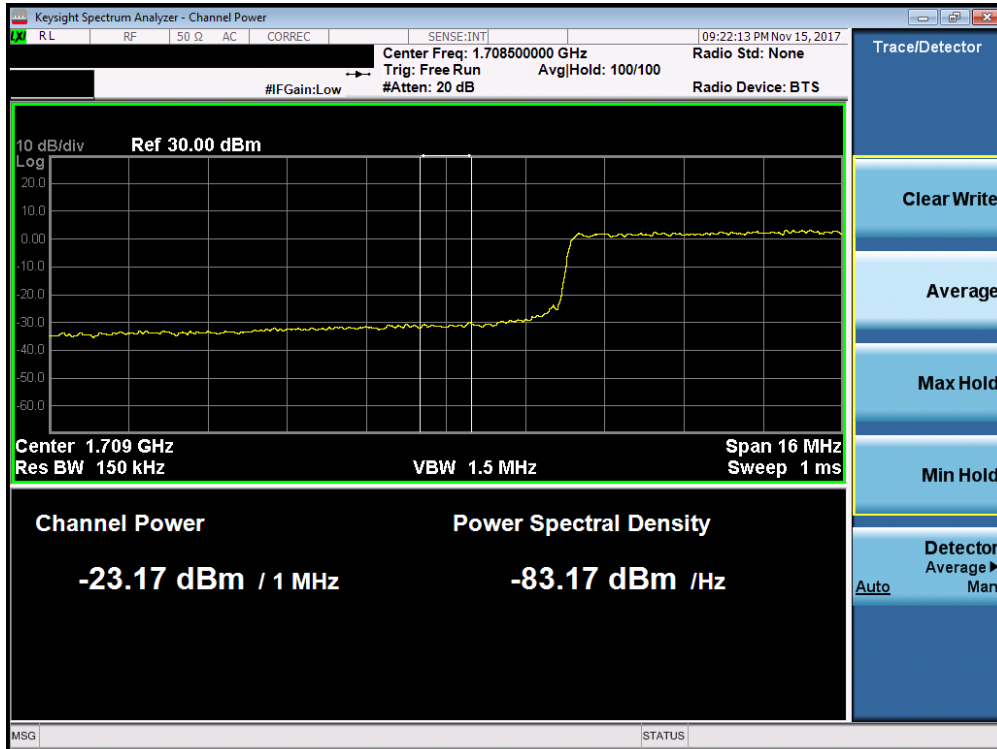
Plot 7-112. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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**Band 4**



Plot 7-113. Lower Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

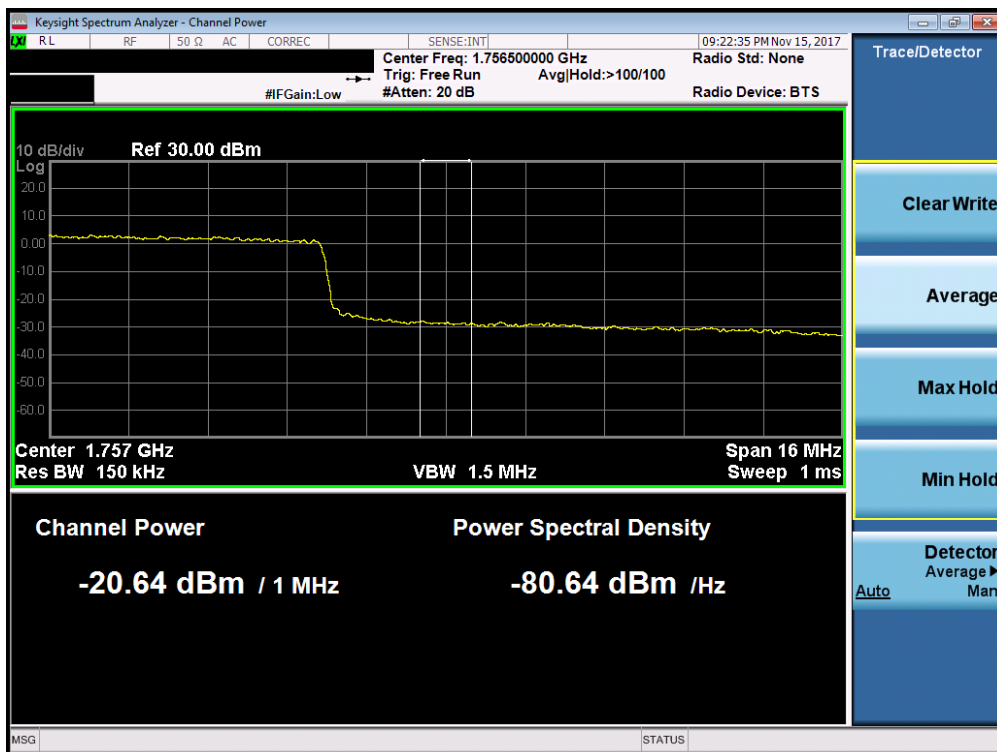


Plot 7-114. Lower Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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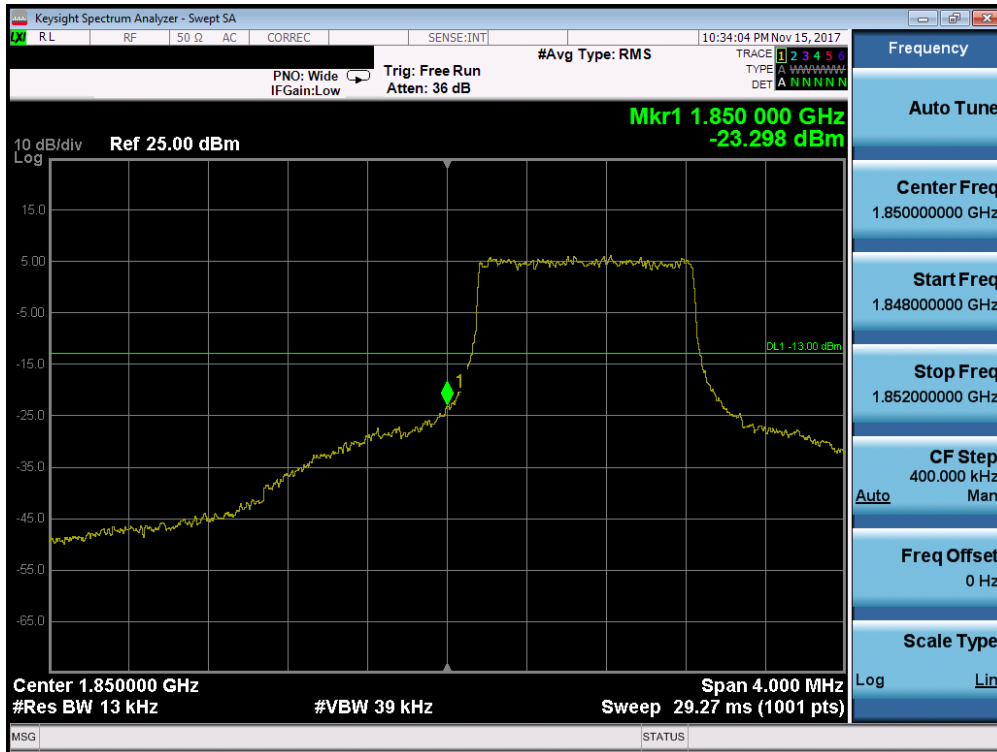
Plot 7-115. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



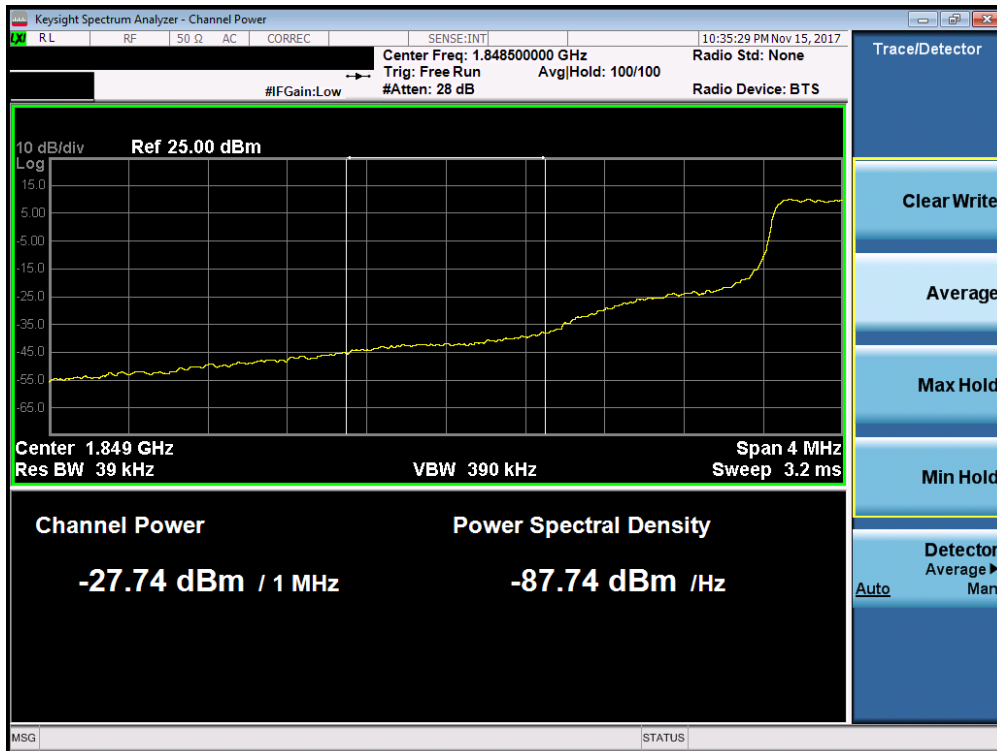
Plot 7-116. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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## Band 2



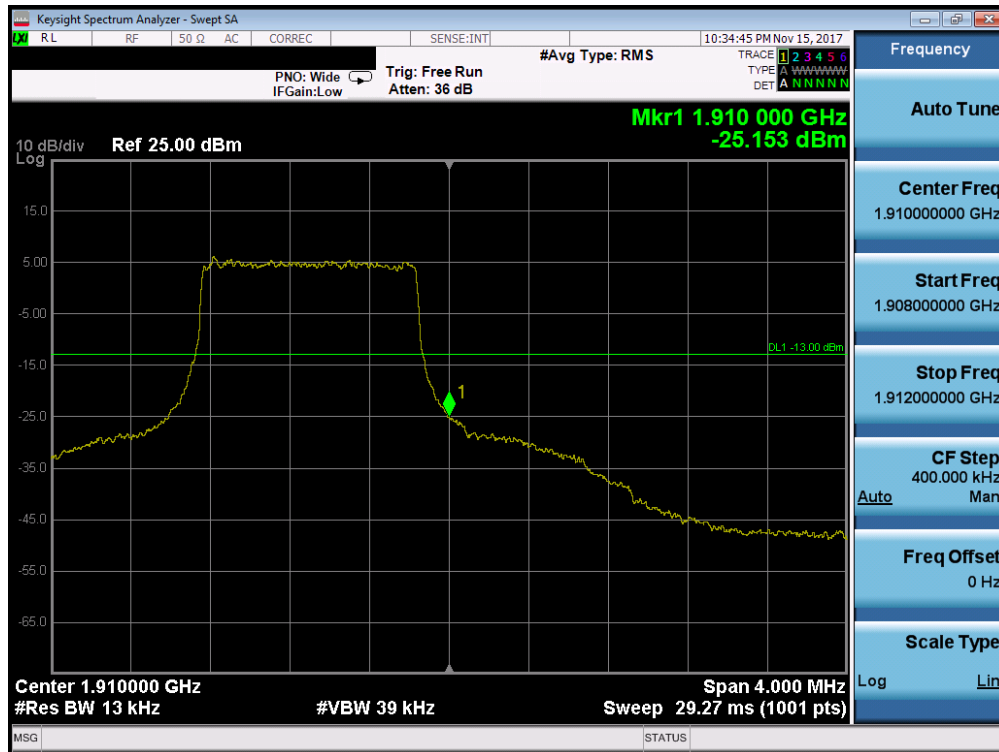
Plot 7-117. Lower Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



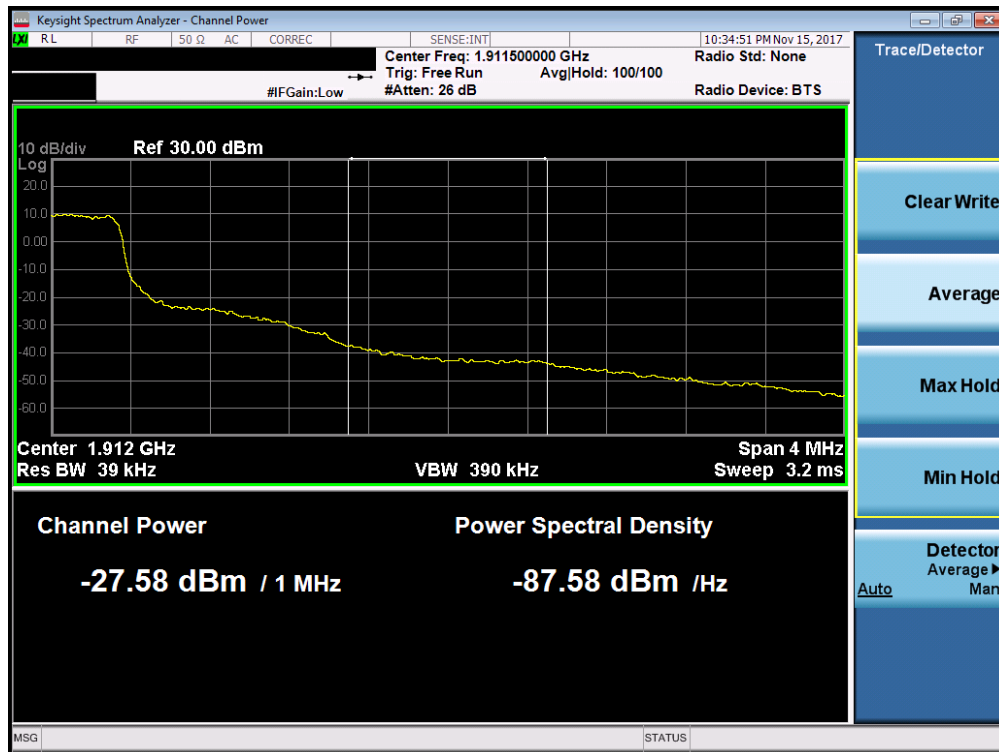
Plot 7-118. Lower Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-119. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

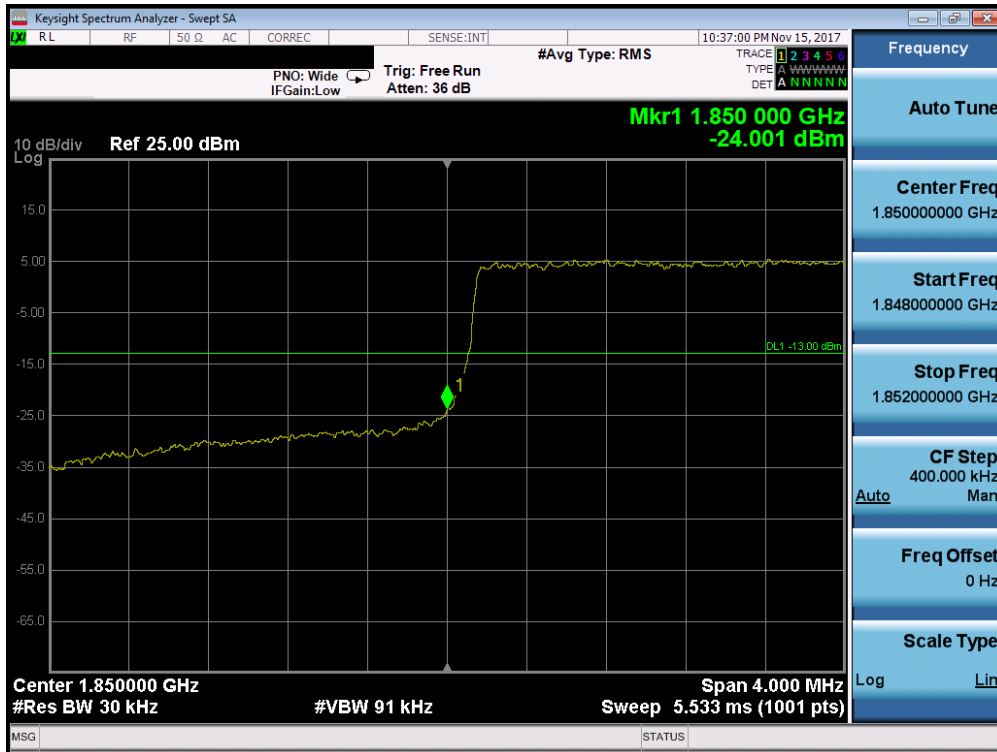


Plot 7-120. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

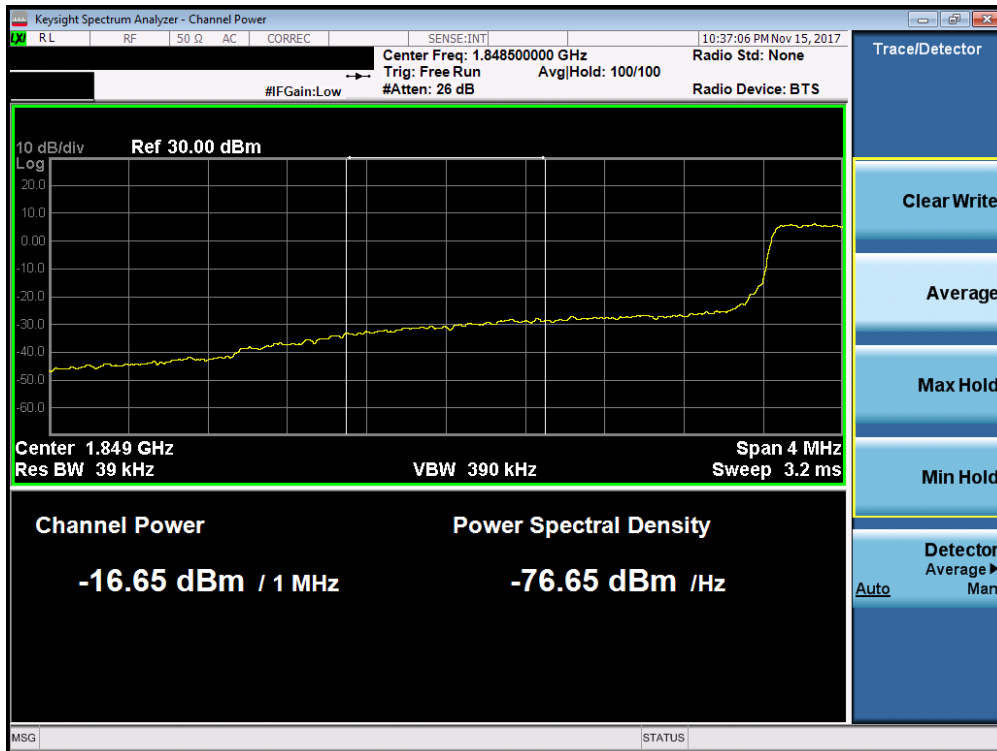
FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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**Band 2**

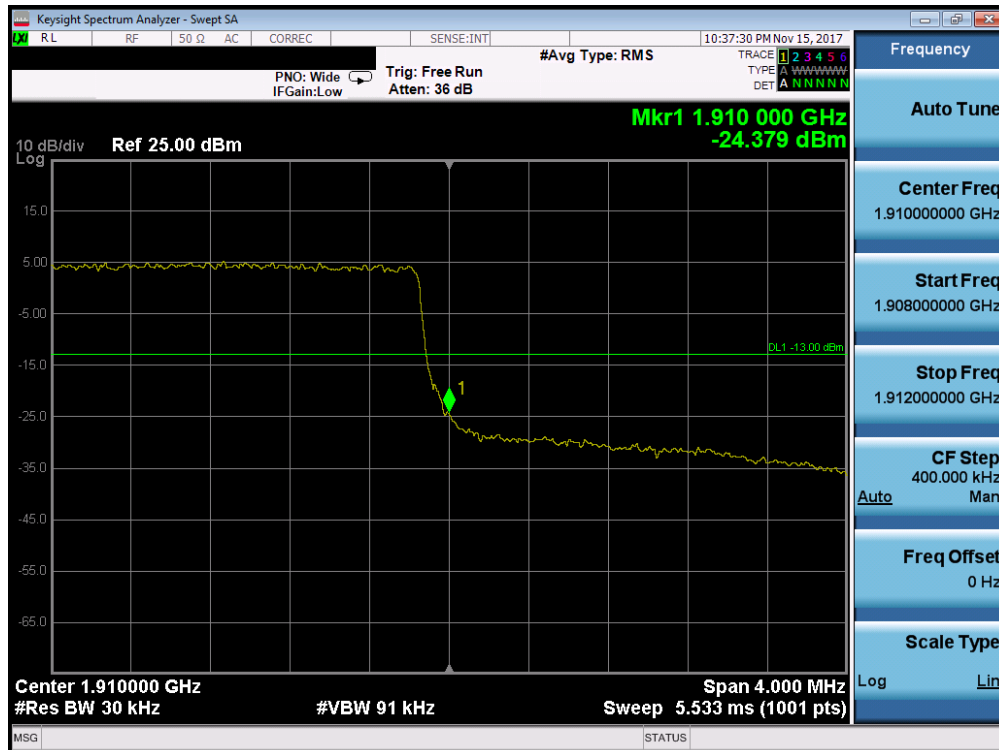


Plot 7-121. Lower Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

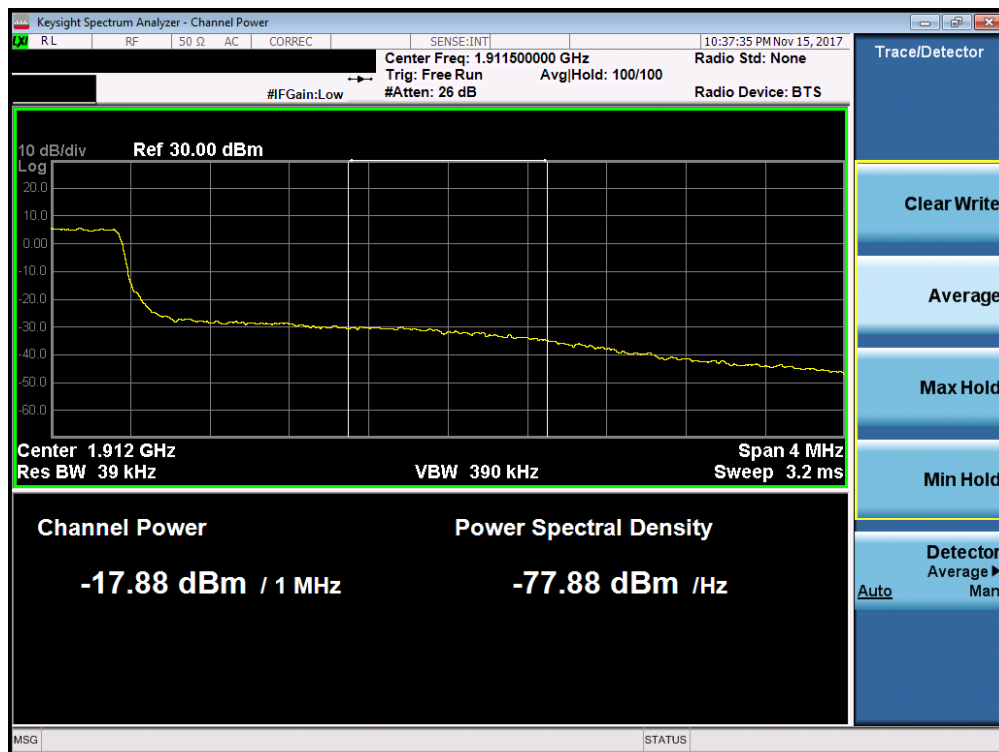


Plot 7-122. Lower Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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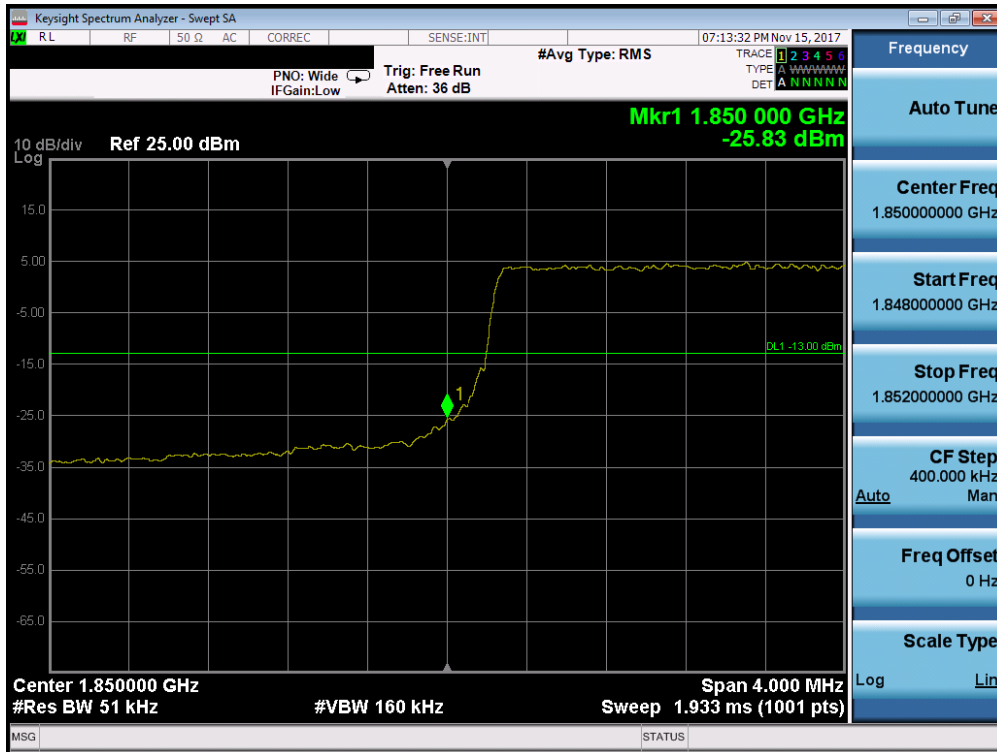
Plot 7-123. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



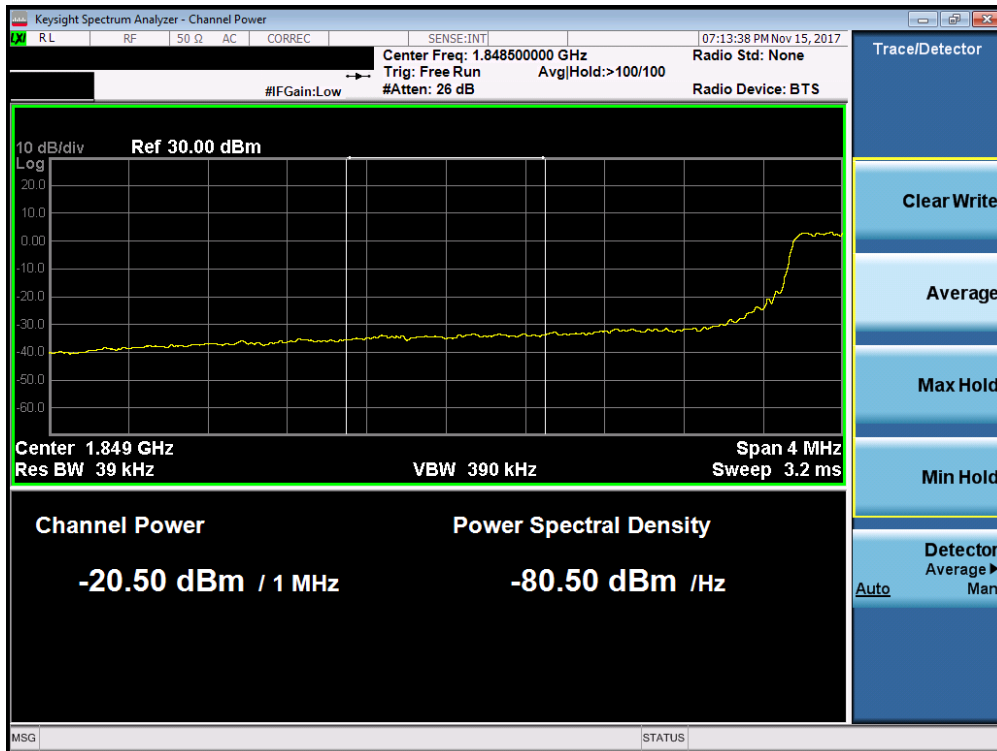
Plot 7-124. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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**Band 2**



**Plot 7-125. Lower Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)**

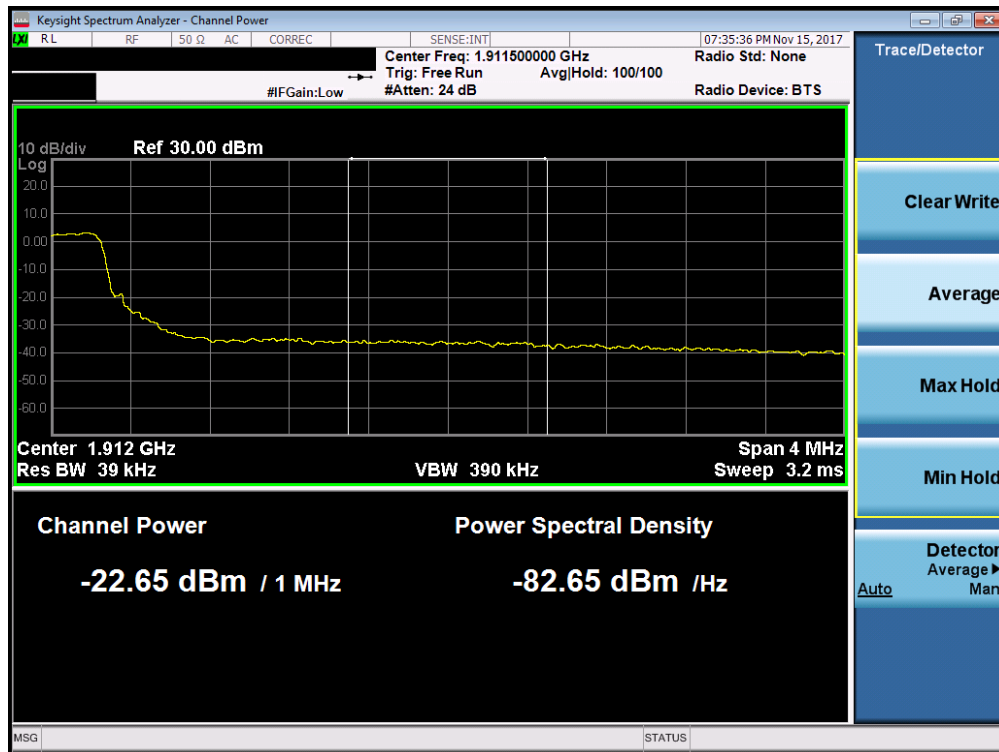


**Plot 7-126. Lower Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)**

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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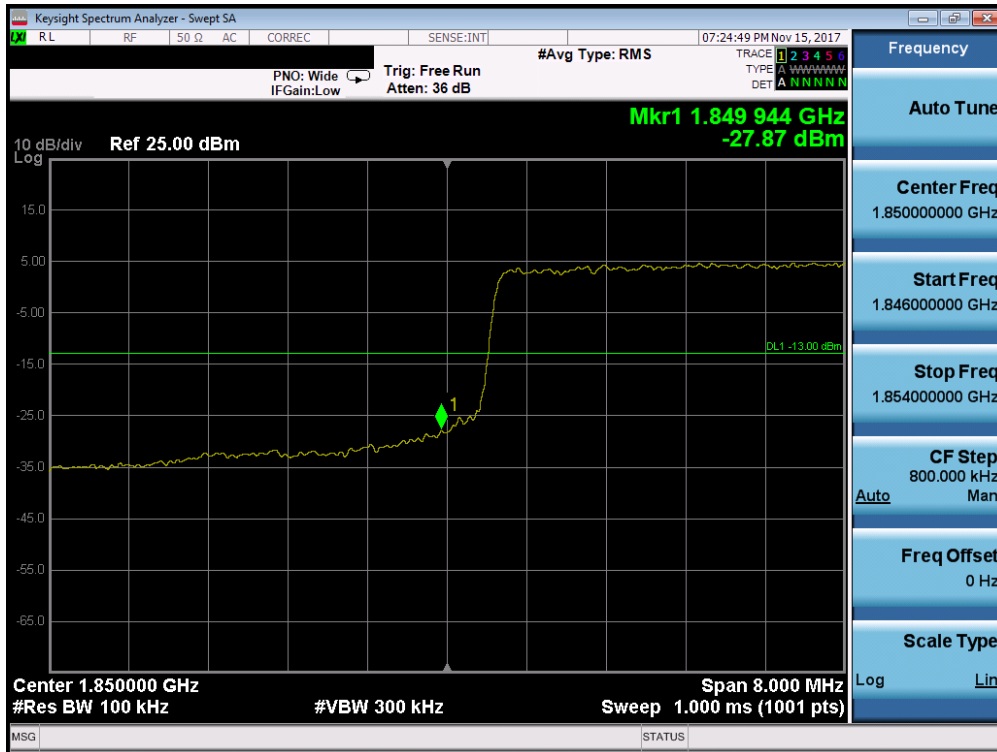
Plot 7-127. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



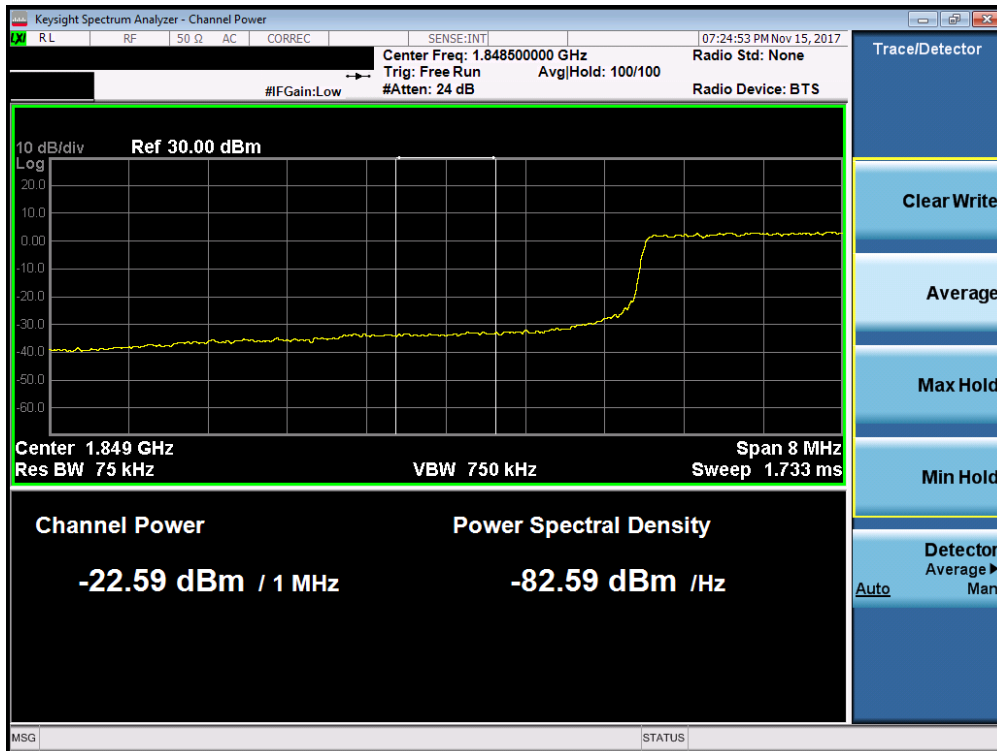
Plot 7-128. Upper Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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**Band 2**

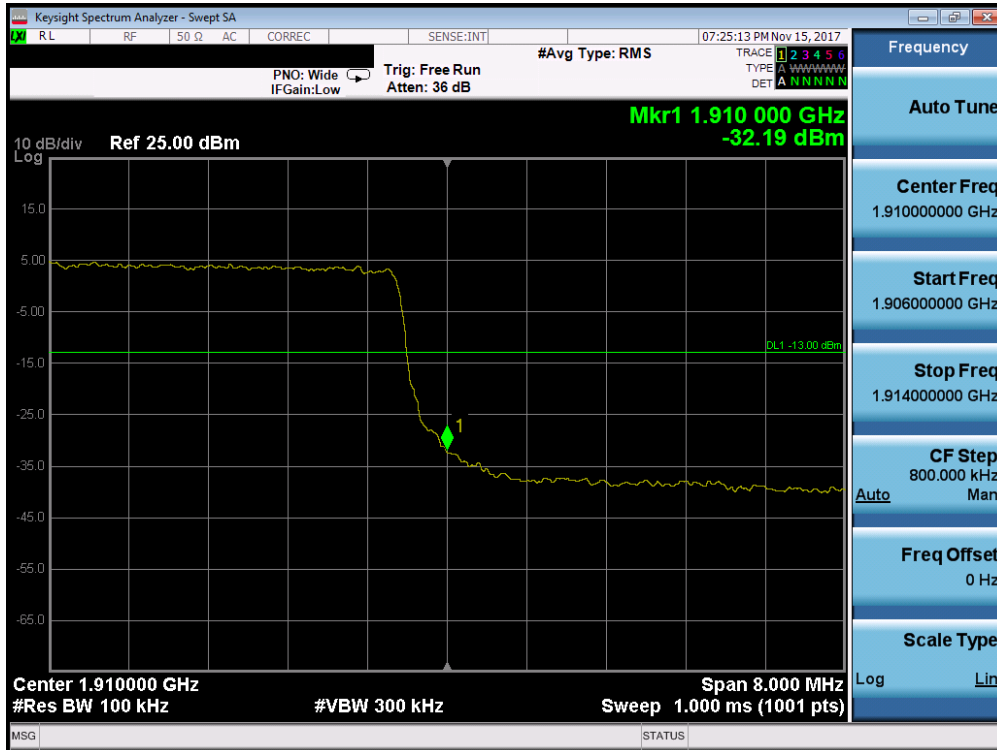


**Plot 7-129. Lower Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)**

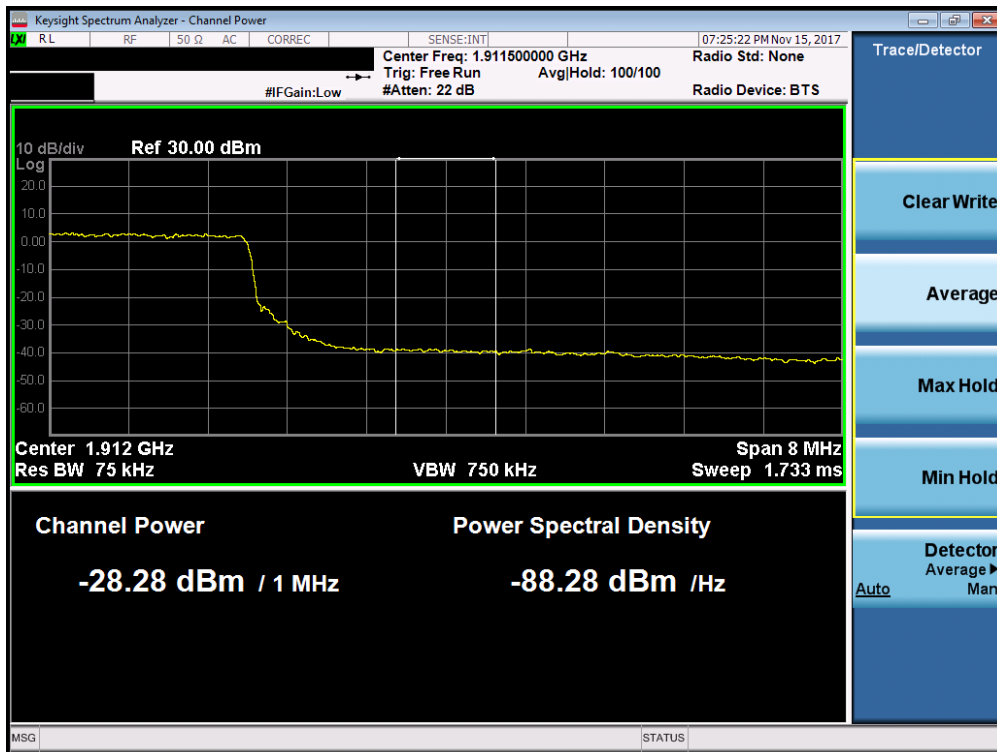


**Plot 7-130. Lower Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)**

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 84 of 120



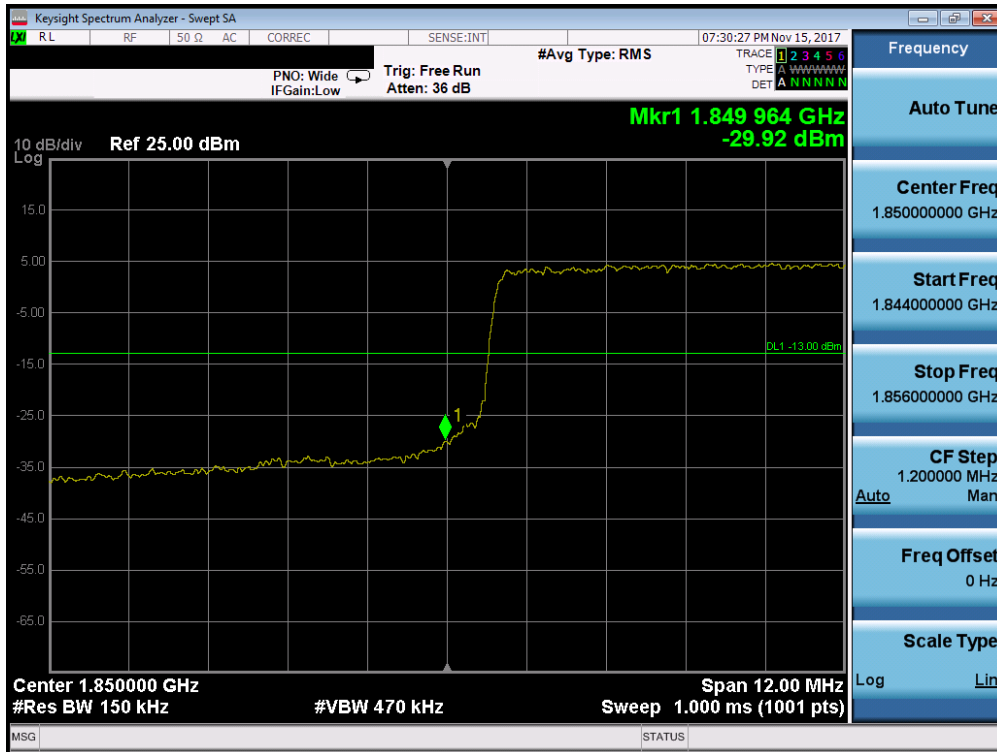
Plot 7-131. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



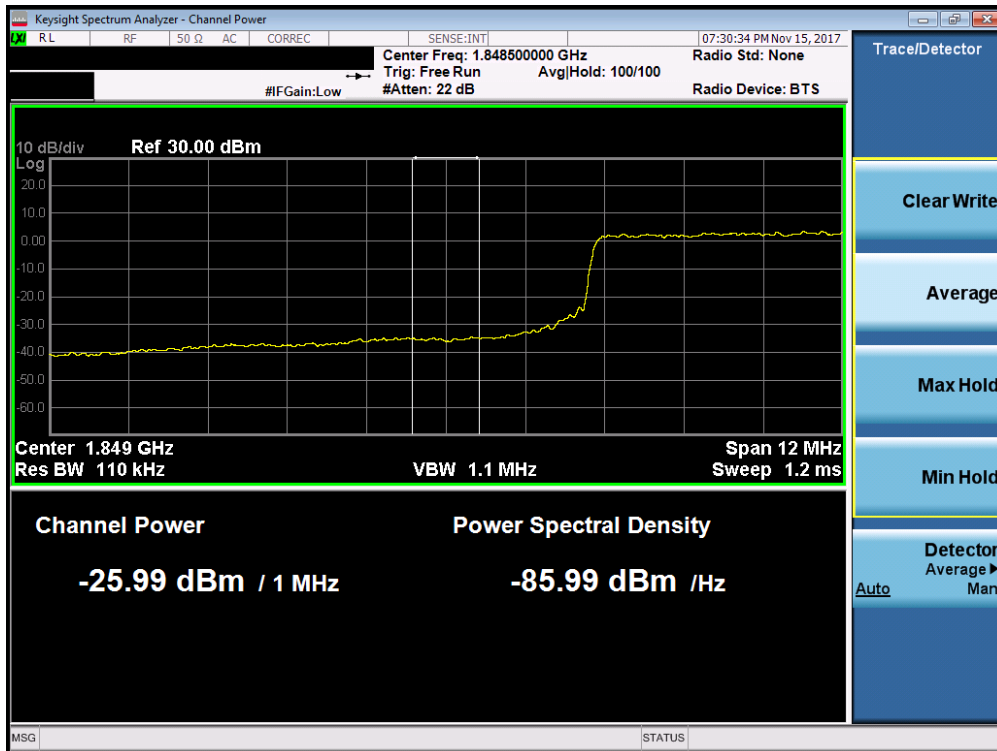
Plot 7-132. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 85 of 120

**Band 2**



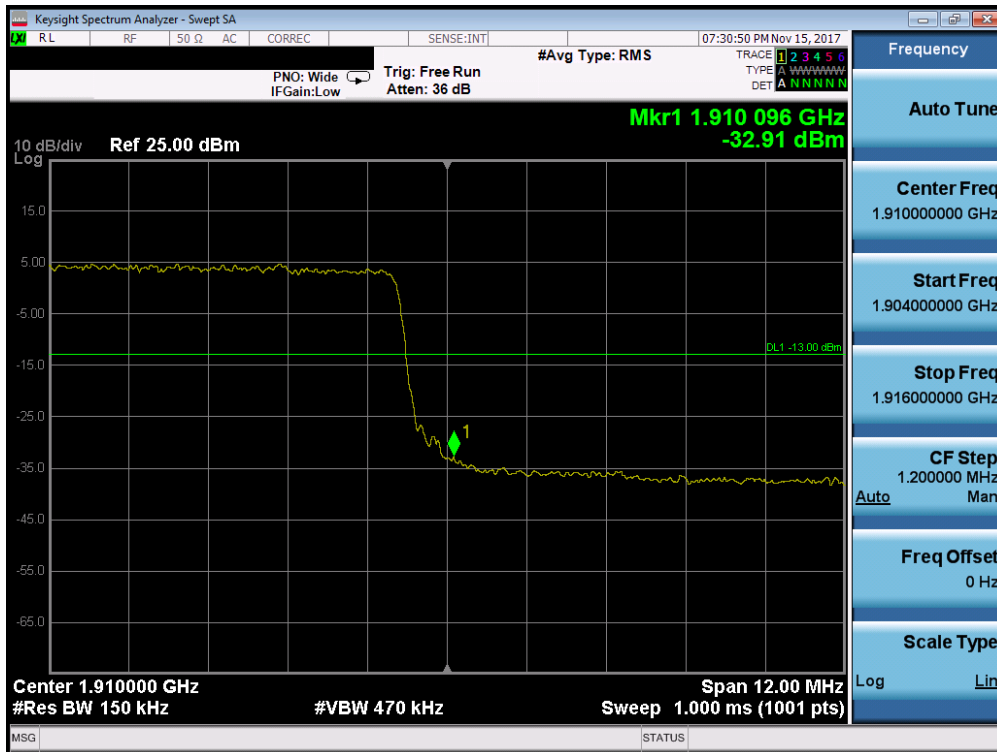
Plot 7-133. Lower Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



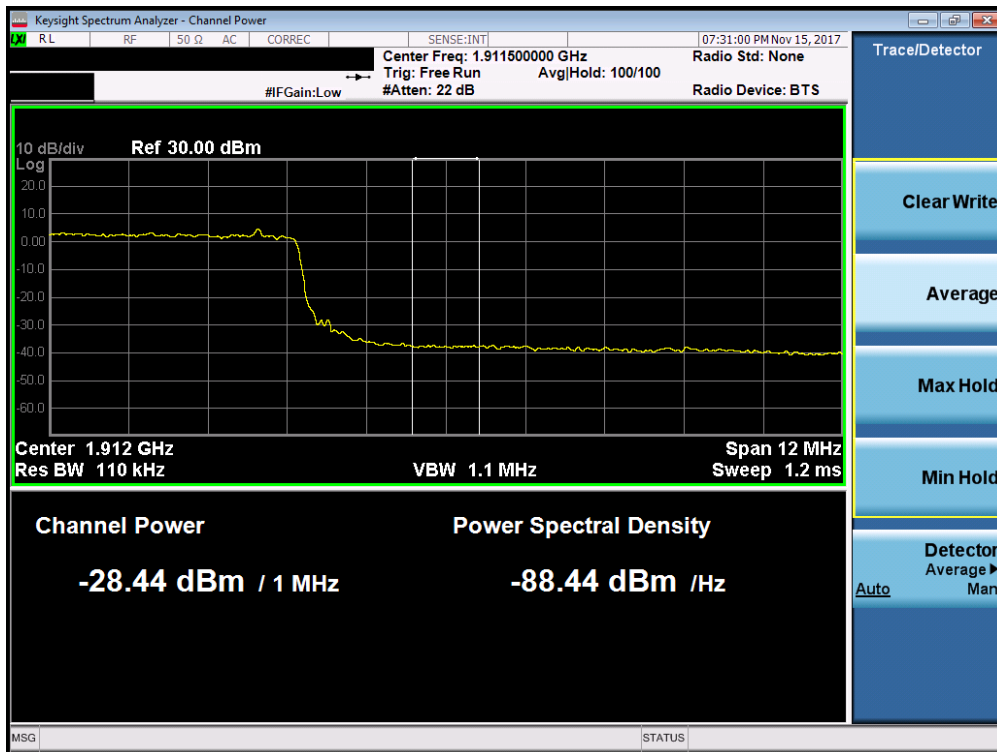
Plot 7-134. Lower Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 86 of 120





Plot 7-135. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

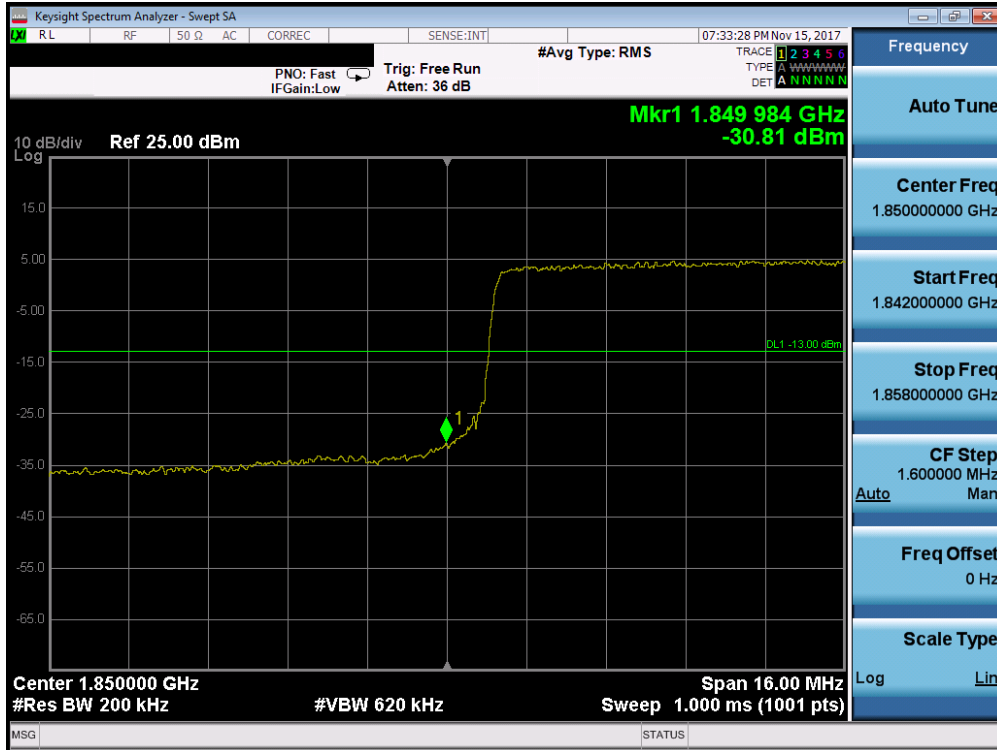


Plot 7-136. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

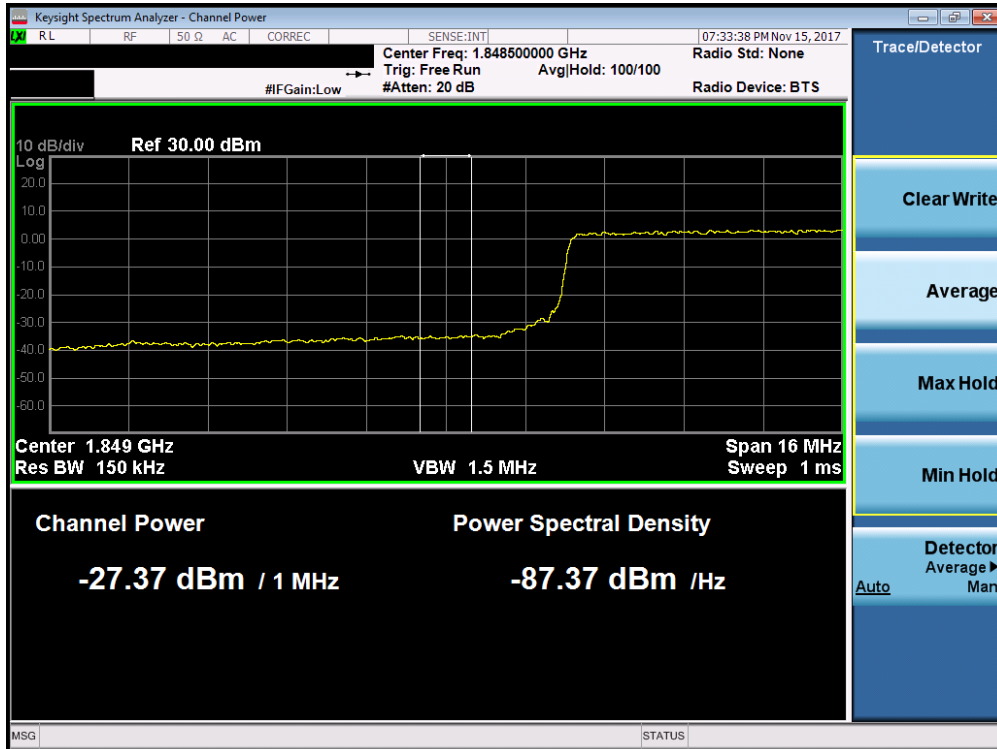
FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 87 of 120



**Band 2**

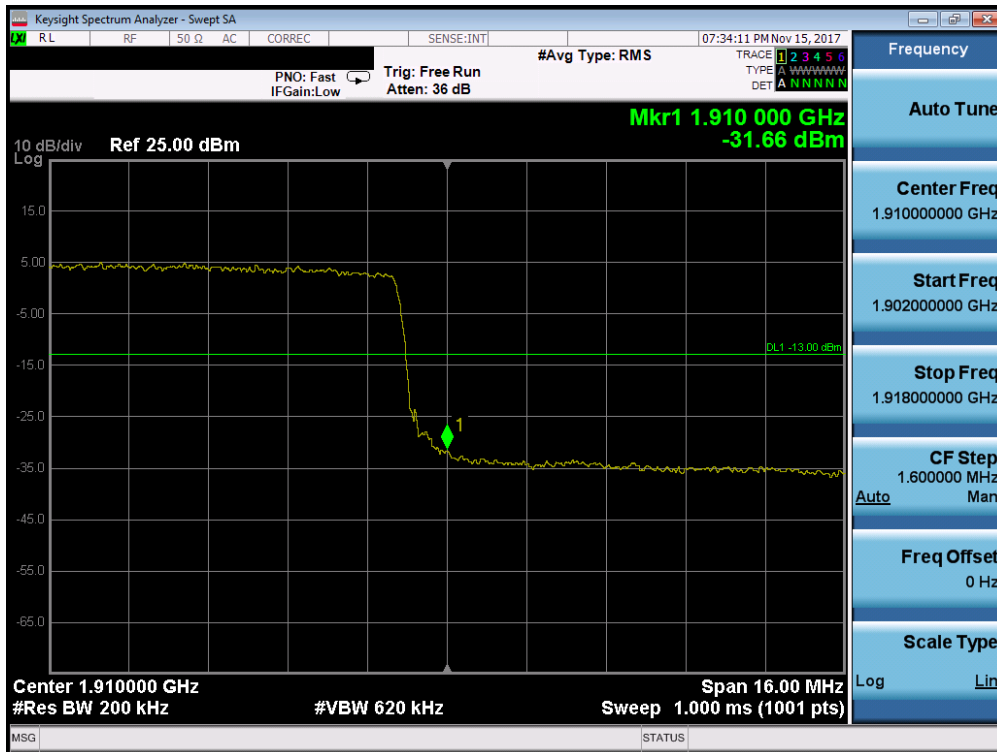


Plot 7-137. Lower Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

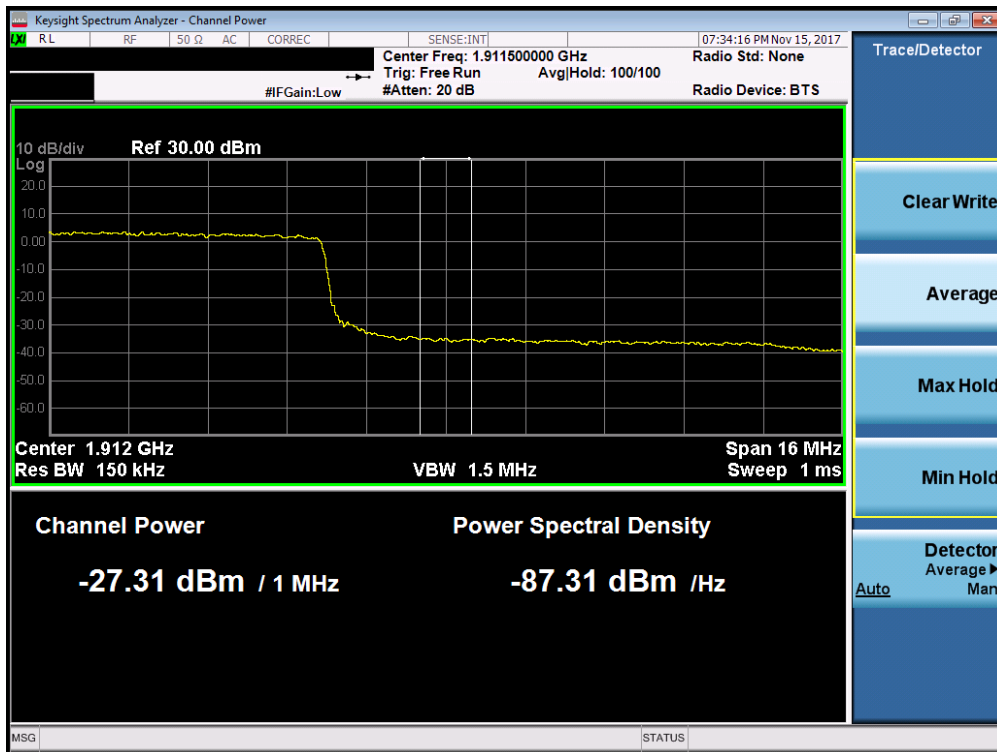


Plot 7-138. Lower Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 88 of 120



Plot 7-139. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-140. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 89 of 120

## 7.5 Peak-Average Ratio

§24.232(d) RSS-130(4.4) RSS-133(6.4) RSS-139(6.5)

### 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

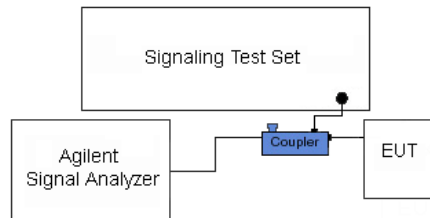
KDB 971168 D01 v03 – Section 5.7.1

### 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.



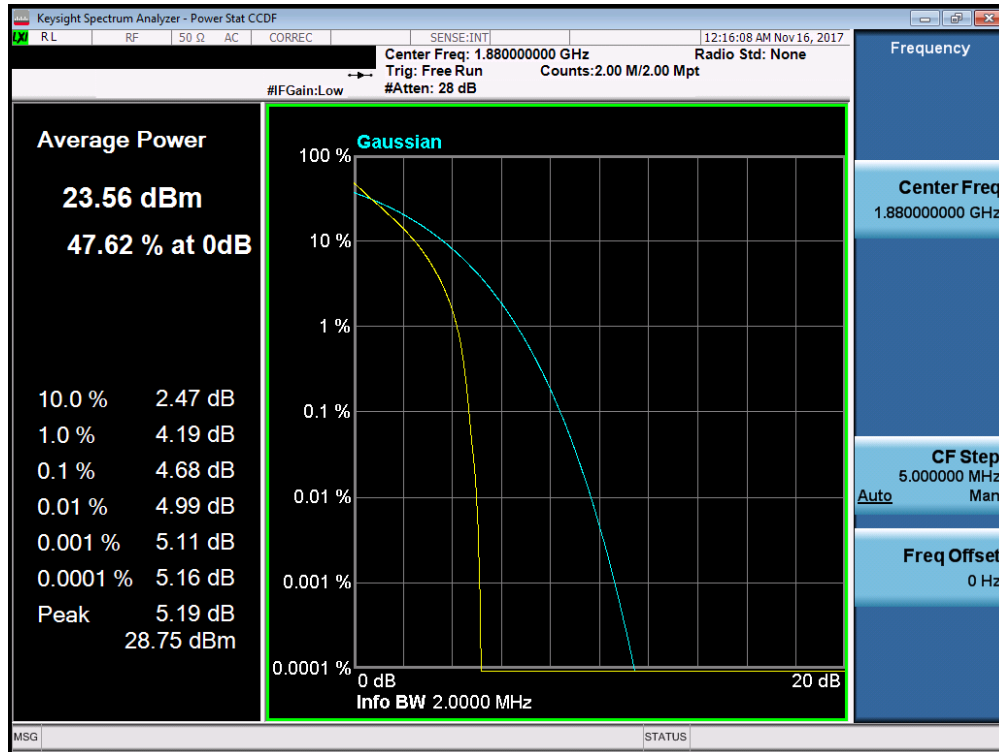
**Figure 7-4. Test Instrument & Measurement Setup**

### Test Notes

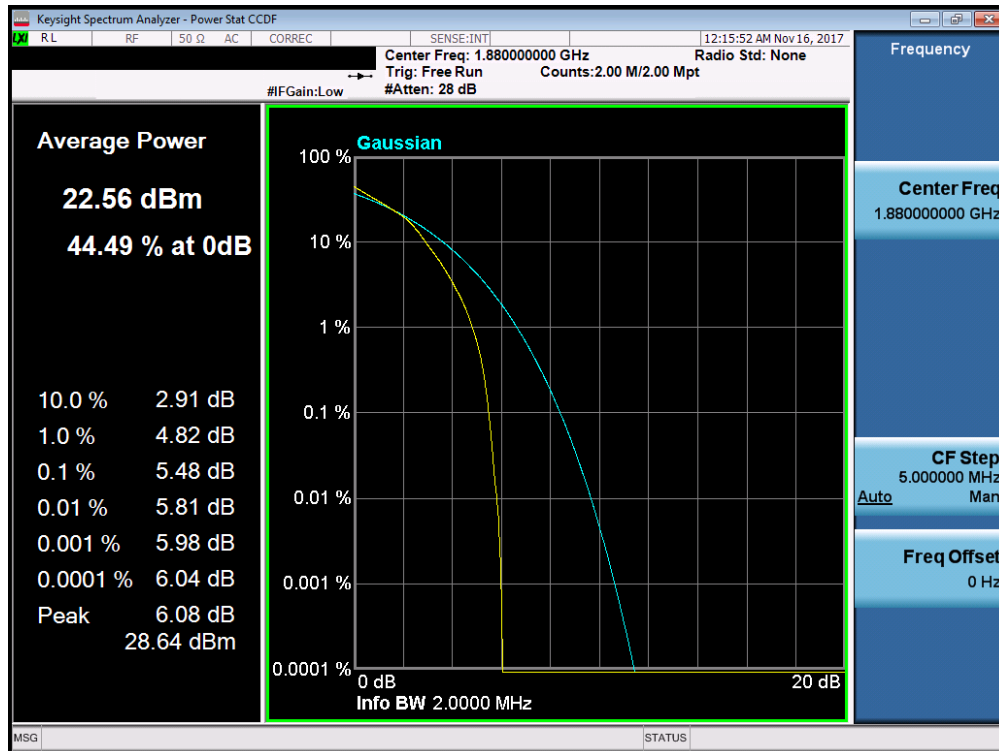
None.

FCC ID: ZNFX210APM	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset	Page 90 of 120

## Band 2



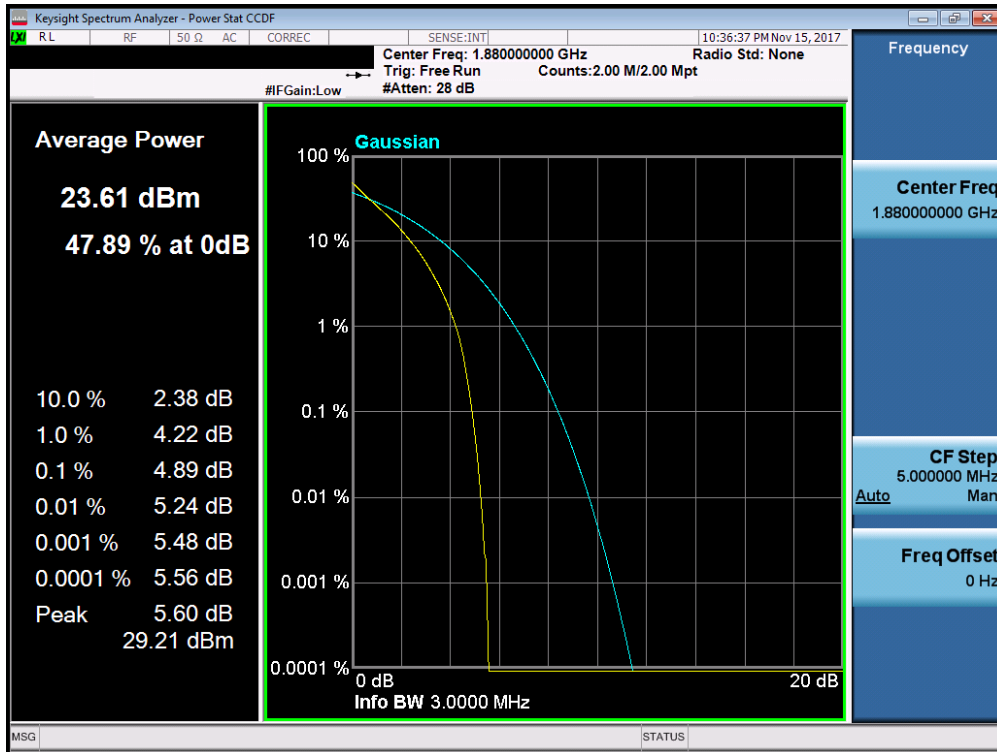
Plot 7-141. PAR Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



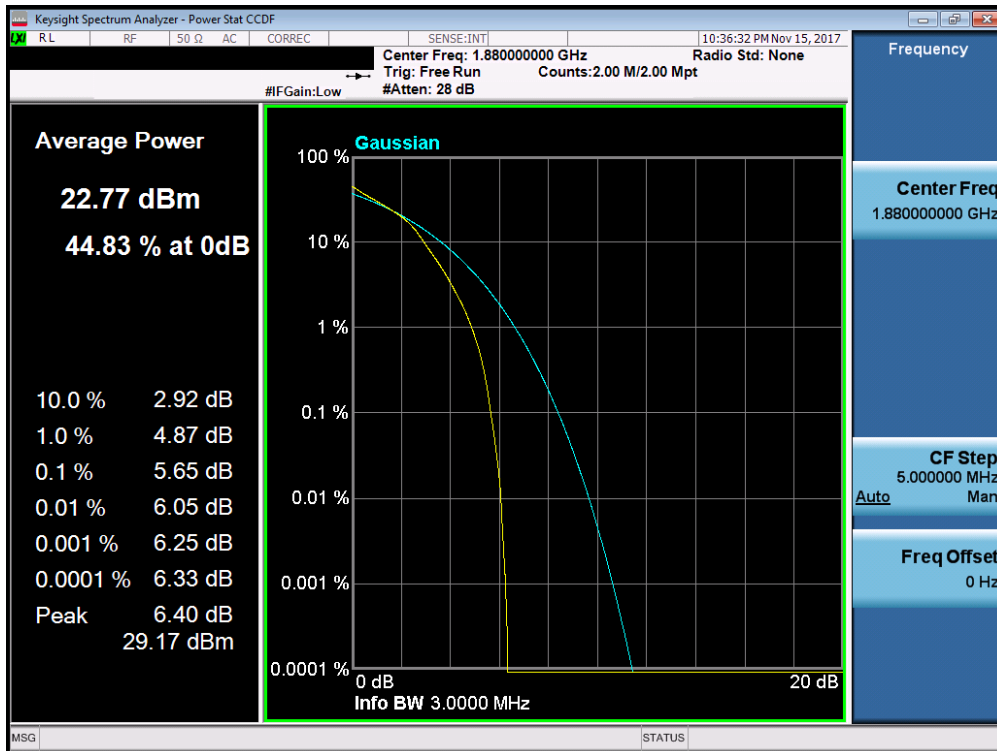
Plot 7-142. PAR Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 91 of 120

**Band 2**



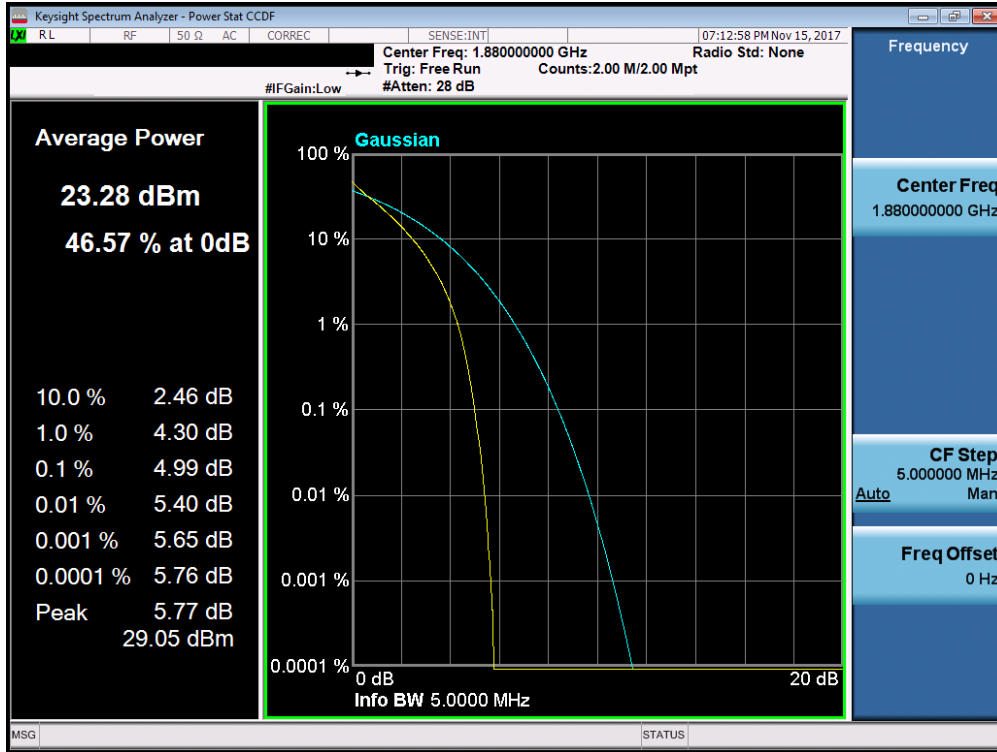
**Plot 7-143. PAR Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)**



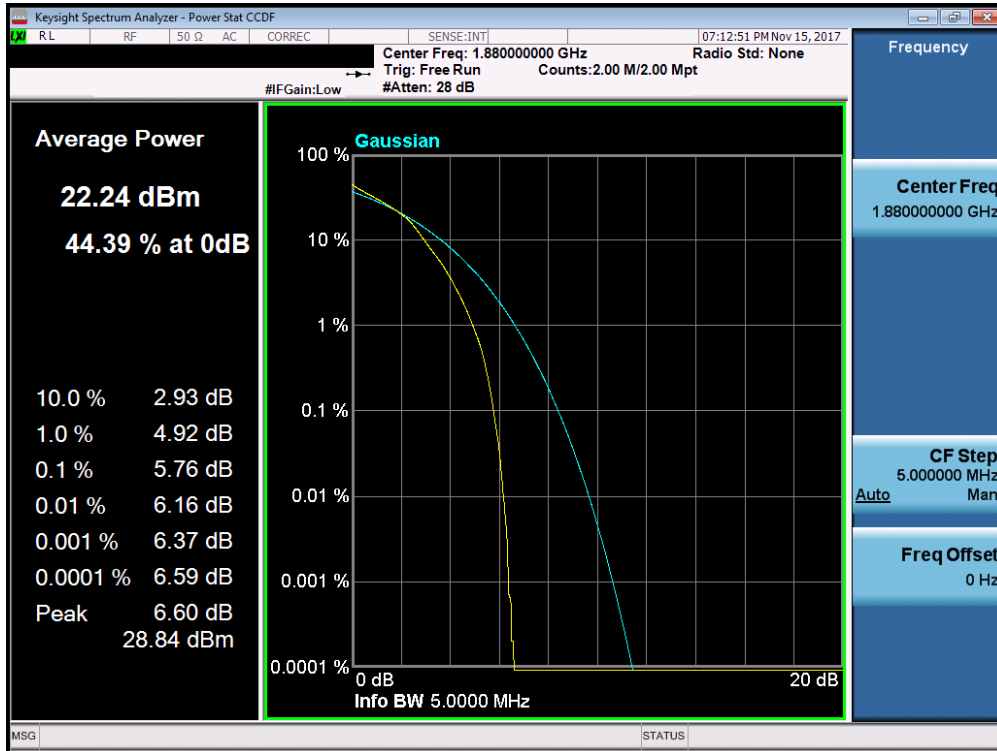
**Plot 7-144. PAR Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)**

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 92 of 120

**Band 2**



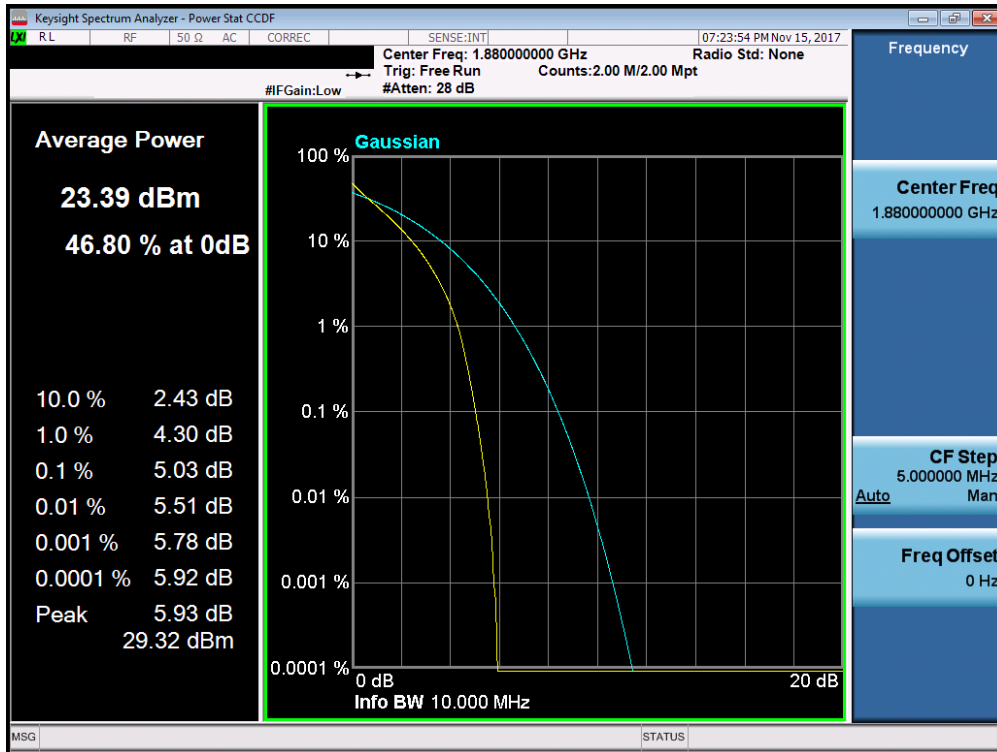
**Plot 7-145. PAR Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)**



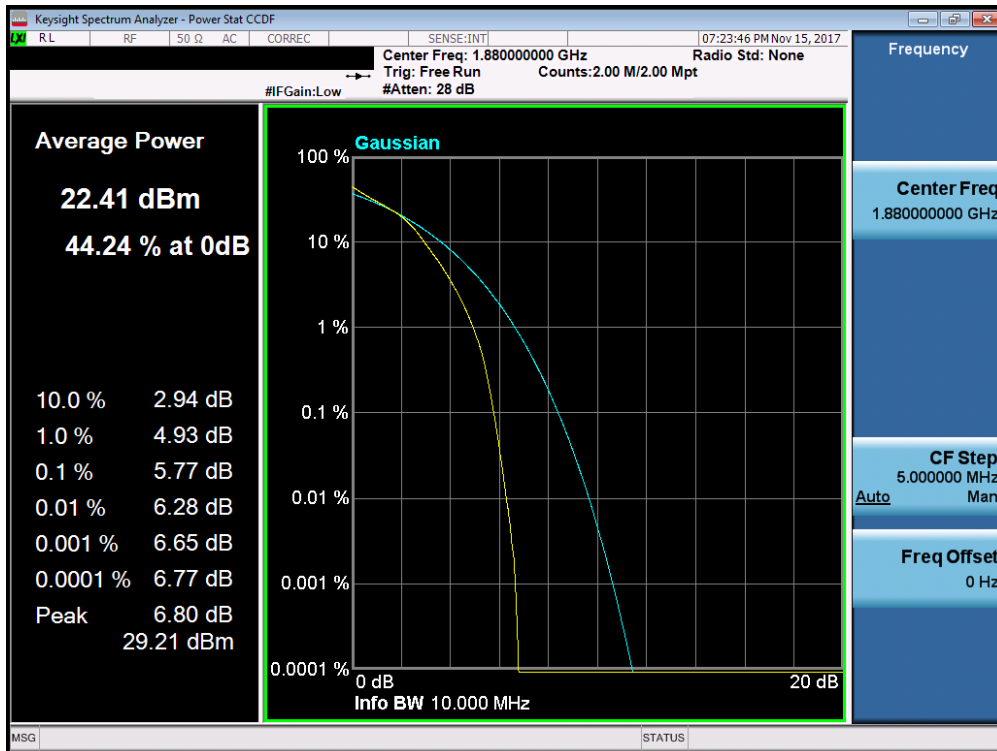
**Plot 7-146. PAR Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)**

FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 93 of 120

**Band 2**



**Plot 7-147. PAR Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)**

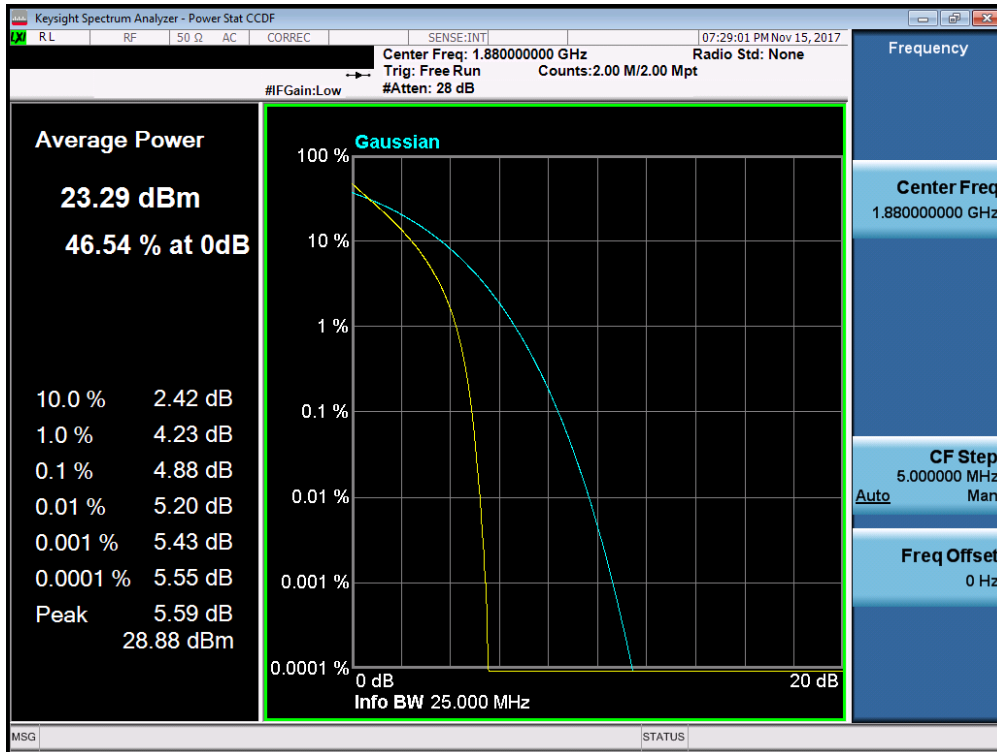


**Plot 7-148. PAR Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)**

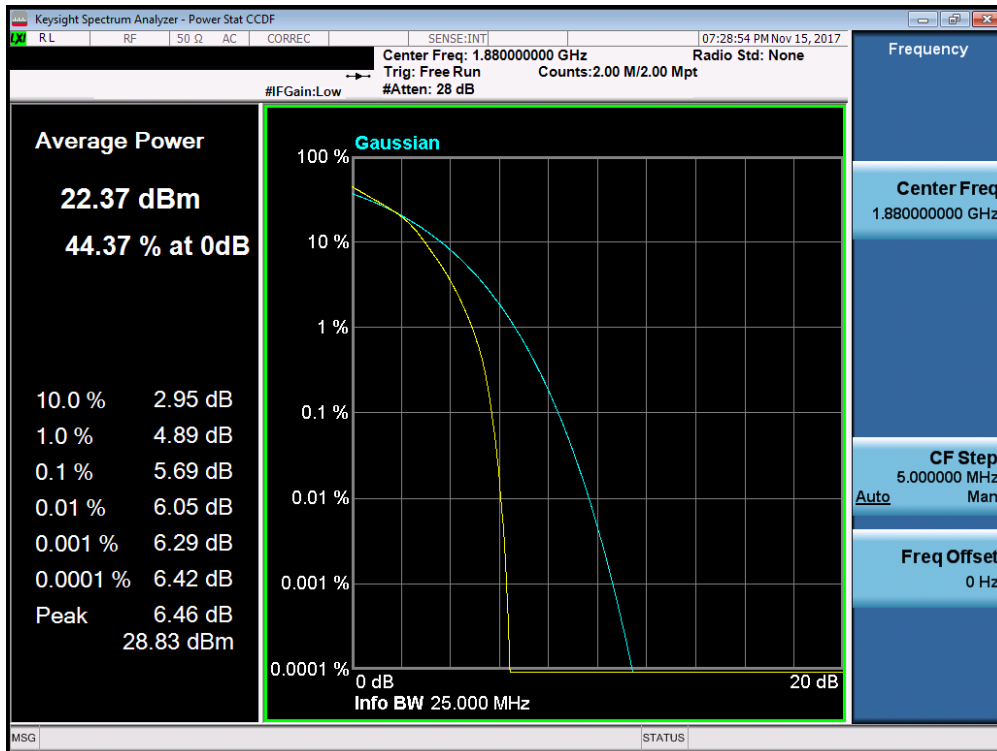
FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 94 of 120



**Band 2**



**Plot 7-149. PAR Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)**

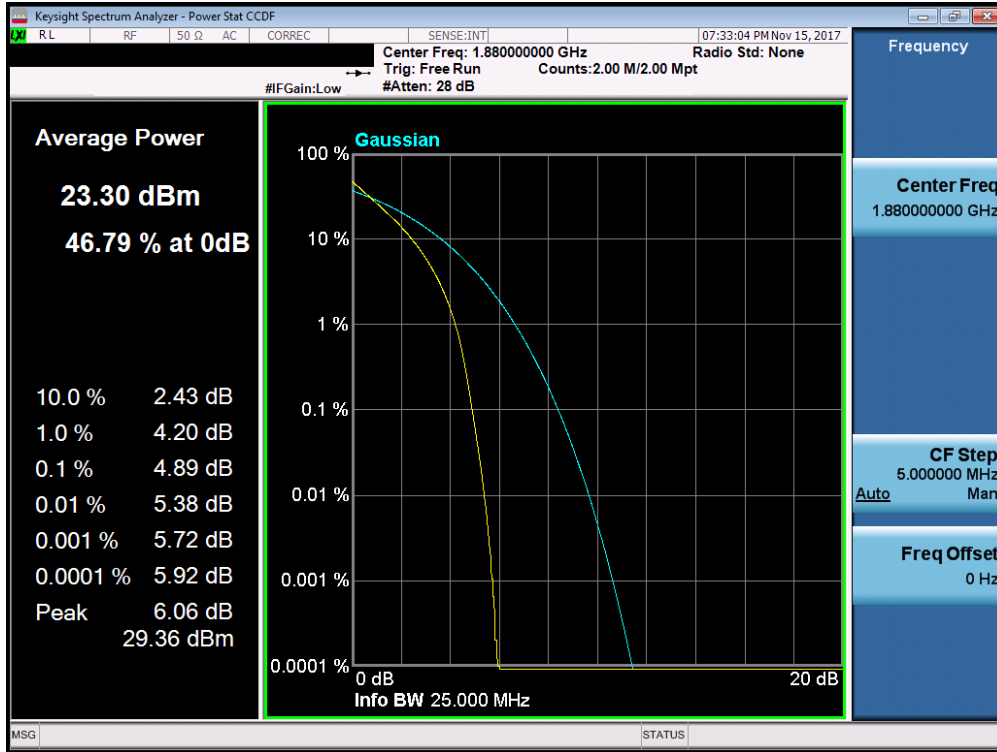


**Plot 7-150. PAR Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)**

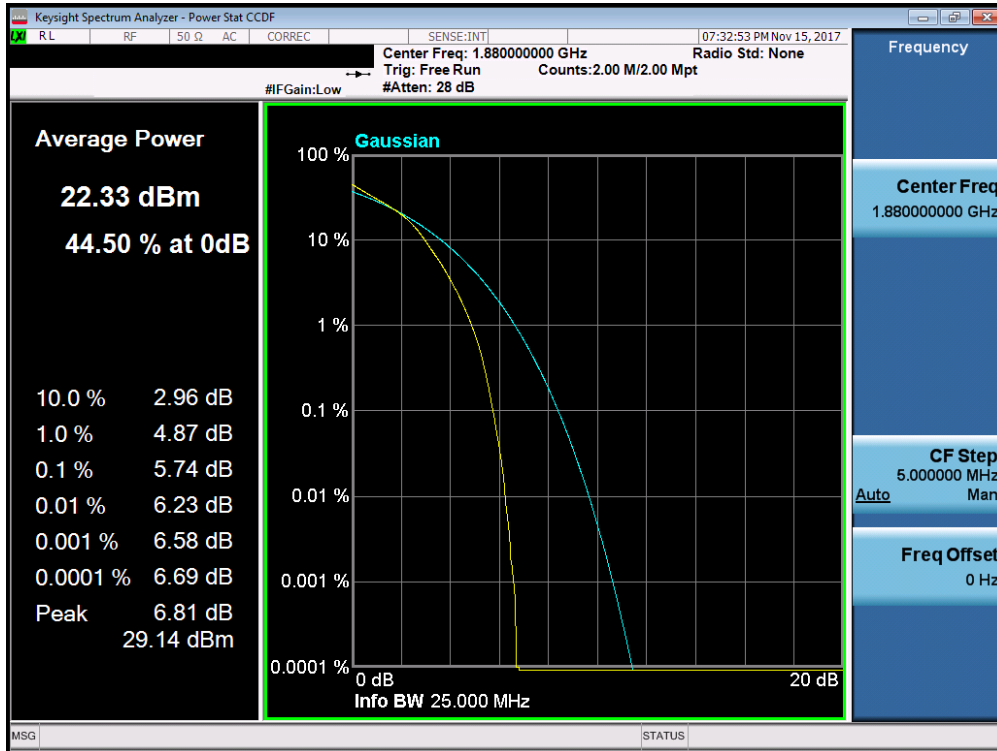
FCC ID: ZNFX210APM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 95 of 120



**Band 2**



**Plot 7-151. PAR Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)**



**Plot 7-152. PAR Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)**

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 96 of 120

## 7.6 Radiated Power (ERP/EIRP)

§24.232(c.2) §27.50(c)(10) §27.50(d)(4) RSS-130(4.4) RSS-133(6.4) RSS-139(6.5)

### 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

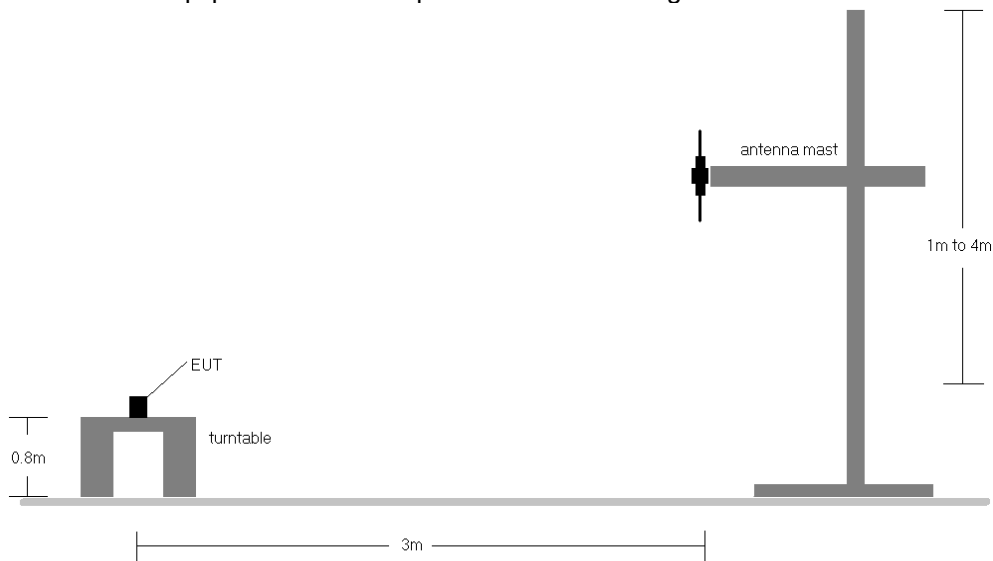
### Test Settings

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  $\geq$  3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points  $\geq$  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

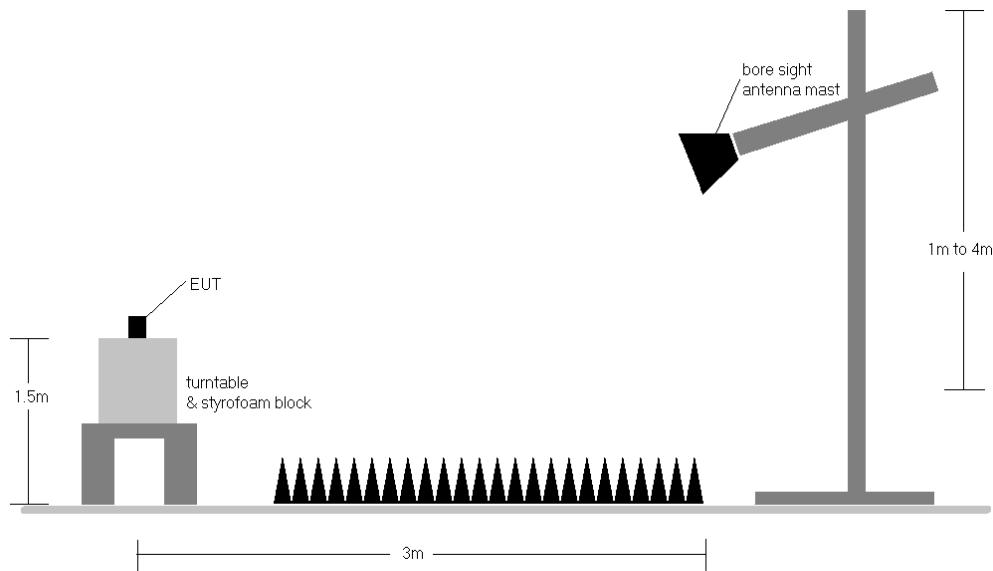
FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset	Page 97 of 120	

### 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.

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset		Page 98 of 120

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]
699.70	1.4	QPSK	V	150	4	1 / 5	21.35	1.10	20.30	0.107	34.77	-14.47	22.45	0.176	36.99	-14.54
707.50	1.4	QPSK	V	150	6	1 / 5	21.80	1.13	20.78	0.120	34.77	-13.99	22.93	0.196	36.99	-14.06
715.30	1.4	QPSK	V	150	3	1 / 5	22.24	1.16	21.25	0.133	34.77	-13.52	23.40	0.219	36.99	-13.59
707.50	1.4	16-QAM	V	150	6	1 / 5	20.41	1.13	19.39	0.087	34.77	-15.38	21.54	0.143	36.99	-15.45
700.50	3	QPSK	V	150	356	1 / 14	21.79	1.10	20.74	0.119	34.77	-14.03	22.89	0.195	36.99	-14.10
707.50	3	QPSK	V	150	1	1 / 14	21.80	1.13	20.78	0.120	34.77	-13.99	22.93	0.196	36.99	-14.06
714.50	3	QPSK	V	150	2	1 / 0	22.05	1.16	21.06	0.128	34.77	-13.71	23.21	0.209	36.99	-13.78
714.50	3	16-QAM	V	150	2	1 / 14	21.10	1.16	20.11	0.103	34.77	-14.66	22.26	0.168	36.99	-14.73
701.50	5	QPSK	V	150	355	1 / 24	21.46	1.11	20.42	0.110	34.77	-14.36	22.57	0.181	36.99	-14.42
707.50	5	QPSK	V	150	8	1 / 24	21.79	1.13	20.77	0.119	34.77	-14.00	22.92	0.196	36.99	-14.07
713.50	5	QPSK	V	150	3	1 / 24	22.01	1.15	21.01	0.126	34.77	-13.76	23.16	0.207	36.99	-13.83
713.50	5	16-QAM	V	150	3	1 / 0	20.74	1.15	19.74	0.094	34.77	-15.03	21.89	0.155	36.99	-15.10
704.00	10	QPSK	V	150	5	1 / 49	21.46	1.12	20.43	0.110	34.77	-14.34	22.58	0.181	36.99	-14.41
707.50	10	QPSK	V	150	357	1 / 49	21.81	1.13	20.79	0.120	34.77	-13.98	22.94	0.197	36.99	-14.05
711.00	10	QPSK	V	150	3	1 / 49	21.40	1.14	20.39	0.110	34.77	-14.38	22.54	0.180	36.99	-14.45
711.00	10	16-QAM	V	150	3	1 / 49	20.57	1.14	19.56	0.090	34.77	-15.21	21.71	0.148	36.99	-15.28
715.30	1.4	QPSK	H	150	31	1 / 74	20.61	1.16	19.62	0.092	34.77	-15.15	21.77	0.150	36.99	-15.22

**Table 7-2. ERP/EIRP Data (Band 12)**

FCC ID: ZNFX210APM		<b>MEASUREMENT REPORT (CERTIFICATION)</b>			<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1711080290-03-R1.ZNF	<b>Test Dates:</b> 11/10 - 11/22/2017	<b>EUT Type:</b> Portable Handset			Page 99 of 120

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	V	150	9	1 / 0	22.50	1.50	21.85	0.153	38.45	-16.61	24.00	0.251	40.61	-16.61
836.50	1.4	QPSK	V	150	3	1 / 0	21.98	1.50	21.33	0.136	38.45	-17.13	23.48	0.223	40.61	-17.13
848.30	1.4	QPSK	V	150	7	1 / 0	22.66	1.50	22.01	0.159	38.45	-16.45	24.16	0.261	40.61	-16.45
836.50	1.4	16-QAM	V	150	3	1 / 0	21.60	1.50	20.95	0.124	38.45	-17.51	23.10	0.204	40.61	-17.51
825.50	3	QPSK	V	150	14	1 / 14	22.53	1.50	21.88	0.154	38.45	-16.58	24.03	0.253	40.61	-16.58
836.50	3	QPSK	V	150	3	1 / 0	21.83	1.50	21.18	0.131	38.45	-17.28	23.33	0.215	40.61	-17.28
847.50	3	QPSK	V	150	4	1 / 14	22.79	1.50	22.14	0.164	38.45	-16.32	24.29	0.269	40.61	-16.32
836.50	3	16-QAM	V	150	3	1 / 14	21.18	1.50	20.53	0.113	38.45	-17.93	22.68	0.185	40.61	-17.93
826.50	5	QPSK	V	150	8	1 / 24	22.96	1.50	22.31	0.170	38.45	-16.15	24.46	0.279	40.61	-16.15
836.50	5	QPSK	V	150	3	1 / 0	22.10	1.50	21.45	0.140	38.45	-17.01	23.60	0.229	40.61	-17.01
846.50	5	QPSK	V	150	6	1 / 24	22.54	1.50	21.89	0.155	38.45	-16.57	24.04	0.254	40.61	-16.57
836.50	5	16-QAM	V	150	3	1 / 24	21.44	1.50	20.79	0.120	38.45	-17.67	22.94	0.197	40.61	-17.67
829.00	10	QPSK	V	150	10	1 / 49	22.50	1.50	21.85	0.153	38.45	-16.61	24.00	0.251	40.61	-16.61
836.50	10	QPSK	V	150	13	1 / 49	22.95	1.50	22.30	0.170	38.45	-16.16	24.45	0.279	40.61	-16.16
844.00	10	QPSK	V	150	5	1 / 49	22.68	1.50	22.03	0.160	38.45	-16.43	24.18	0.262	40.61	-16.43
836.50	10	16-QAM	V	150	13	1 / 49	21.76	1.50	21.11	0.129	38.45	-17.35	23.26	0.212	40.61	-17.35
826.50	5	QPSK	H	150	303	1 / 0	21.92	1.50	21.27	0.134	38.45	-17.19	23.42	0.220	40.61	-17.19

**Table 7-3. ERP/EIRP Data (Band 5)**

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset	Page 100 of 120	

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	10	1 / 5	19.39	5.56	24.95	0.312	30.00	-5.05
1732.50	1.4	QPSK	H	150	7	1 / 5	19.86	5.41	25.27	0.336	30.00	-4.73
1754.30	1.4	QPSK	H	150	8	1 / 5	20.17	5.26	25.43	0.349	30.00	-4.57
1732.50	1.4	16-QAM	H	150	7	1 / 5	18.68	5.41	24.09	0.256	30.00	-5.91
1711.50	3	QPSK	H	150	5	1 / 14	17.99	5.55	23.54	0.226	30.00	-6.46
1732.50	3	QPSK	H	150	10	1 / 14	19.96	5.41	25.37	0.344	30.00	-4.63
1753.50	3	QPSK	H	150	6	1 / 14	19.59	5.26	24.85	0.306	30.00	-5.15
1732.50	3	16-QAM	H	150	10	1 / 14	18.55	5.41	23.96	0.249	30.00	-6.04
1712.50	5	QPSK	H	150	11	1 / 0	19.72	5.55	25.27	0.336	30.00	-4.73
1732.50	5	QPSK	H	150	14	1 / 0	19.72	5.41	25.13	0.326	30.00	-4.87
1752.50	5	QPSK	H	150	9	1 / 0	19.82	5.27	25.09	0.323	30.00	-4.91
1752.50	5	16-QAM	H	150	9	1 / 24	18.72	5.27	23.99	0.251	30.00	-6.01
1715.00	10	QPSK	H	150	10	1 / 0	19.92	5.53	25.45	0.351	30.00	-4.55
1732.50	10	QPSK	H	150	9	1 / 49	19.77	5.41	25.18	0.329	30.00	-4.82
1750.00	10	QPSK	H	150	10	1 / 49	20.17	5.29	25.46	0.351	30.00	-4.54
1715.00	10	16-QAM	H	150	10	1 / 49	18.54	5.53	24.07	0.255	30.00	-5.93
1717.50	15	QPSK	H	150	16	1 / 74	19.75	5.51	25.26	0.336	30.00	-4.74
1732.50	15	QPSK	H	150	8	1 / 74	19.84	5.41	25.25	0.335	30.00	-4.75
1747.50	15	QPSK	H	150	11	1 / 74	20.31	5.31	25.62	0.364	30.00	-4.38
1747.50	15	16-QAM	H	150	11	1 / 74	19.49	5.31	24.80	0.302	30.00	-5.20
1720.00	20	QPSK	H	150	11	1 / 99	19.69	5.49	25.18	0.330	30.00	-4.82
1732.50	20	QPSK	H	150	10	1 / 99	20.11	5.41	25.52	0.356	30.00	-4.48
1745.00	20	QPSK	H	150	6	1 / 99	19.95	5.32	25.27	0.337	30.00	-4.73
1745.00	20	16-QAM	H	150	6	1 / 99	19.09	5.32	24.41	0.276	30.00	-5.59
1747.50	15	QPSK	V	150	278	1 / 99	19.21	5.41	24.62	0.290	30.00	-5.38

Table 7-4. EIRP Data (Band 4)

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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	34	1 / 0	22.06	4.82	26.88	0.487	33.01	-6.13
1880.00	1.4	QPSK	H	150	34	1 / 0	21.86	4.74	26.60	0.457	33.01	-6.41
1909.30	1.4	QPSK	H	150	34	1 / 0	21.21	4.68	25.89	0.388	33.01	-7.12
1850.70	1.4	16-QAM	H	150	34	1 / 0	21.31	4.82	26.13	0.410	33.01	-6.88
1851.50	3	QPSK	H	150	34	1 / 0	21.94	4.82	26.76	0.474	33.01	-6.25
1880.00	3	QPSK	H	150	34	1 / 0	21.55	4.74	26.29	0.426	33.01	-6.72
1908.50	3	QPSK	H	150	34	1 / 0	21.45	4.68	26.13	0.410	33.01	-6.88
1851.50	3	16-QAM	H	150	34	1 / 0	20.99	4.82	25.81	0.381	33.01	-7.20
1852.50	5	QPSK	H	150	34	1 / 0	21.97	4.81	26.78	0.477	33.01	-6.23
1880.00	5	QPSK	H	150	34	1 / 0	21.69	4.74	26.43	0.440	33.01	-6.58
1907.50	5	QPSK	H	150	34	1 / 0	21.47	4.68	26.15	0.412	33.01	-6.86
1852.50	5	16-QAM	H	150	34	1 / 0	21.20	4.81	26.01	0.399	33.01	-7.00
1855.00	10	QPSK	H	150	32	1 / 0	22.01	4.81	26.82	0.480	33.01	-6.19
1880.00	10	QPSK	H	150	32	1 / 0	21.97	4.74	26.71	0.469	33.01	-6.30
1905.00	10	QPSK	H	150	32	1 / 0	21.35	4.68	26.03	0.401	33.01	-6.98
1880.00	10	16-QAM	H	150	32	1 / 0	21.13	4.74	25.87	0.386	33.01	-7.14
1857.50	15	QPSK	H	150	34	1 / 0	22.14	4.80	26.94	0.494	33.01	-6.07
1880.00	15	QPSK	H	150	34	1 / 0	22.15	4.74	26.89	0.489	33.01	-6.12
1902.50	15	QPSK	H	150	34	1 / 0	21.56	4.69	26.25	0.421	33.01	-6.76
1857.50	15	16-QAM	H	150	34	1 / 0	20.70	4.80	25.50	0.355	33.01	-7.51
1860.00	20	QPSK	H	150	34	1 / 0	22.46	4.79	27.25	0.531	33.01	-5.76
1880.00	20	QPSK	H	150	34	1 / 0	22.02	4.74	26.76	0.474	33.01	-6.25
1900.00	20	QPSK	H	150	34	1 / 0	21.43	4.69	26.12	0.409	33.01	-6.89
1860.00	20	16-QAM	H	150	34	1 / 0	21.25	4.79	26.04	0.402	33.01	-6.97
1860.00	20	QPSK	V	150	21	1 / 0	21.21	4.79	26.00	0.398	33.01	-7.01

**Table 7-5. EIRP Data (Band 2)**

FCC ID: ZNFX210APM		<b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
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**7.7 Radiated Spurious Emissions Measurements**  
§2.1053 §24.238(a) §27.53(g) §27.53(h) RSS-130(4.6) RSS-133(6.5) RSS-139(6.6)

**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

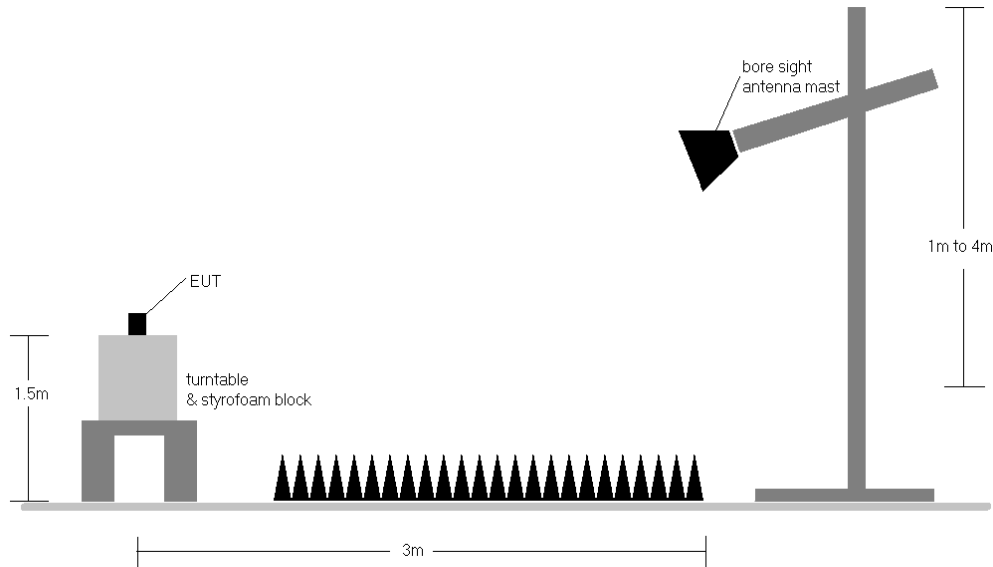
**Test Settings**

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW  $\geq$  3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points  $\geq$  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 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 "-" shown in the following RSE tables are used to denote a noise floor measurement.

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## Band 12

OPERATING FREQUENCY: 699.70 MHz  
 CHANNEL: 23017  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 1.4 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]
1399.40	V	150	25	-66.59	3.77	-62.82	-49.8
2099.10	V	-	-	-69.52	4.80	-64.72	-51.7
2798.80	V	-	-	-69.45	5.64	-63.82	-50.8
3498.50	V	-	-	-68.44	6.60	-61.84	-48.8

**Table 7-6. Radiated Spurious Data (Band 12 – Low Channel)**

OPERATING FREQUENCY: 707.50 MHz  
 CHANNEL: 23095  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 1.4 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]
1415.00	V	150	300	-68.73	3.90	-64.83	-51.8
2122.50	V	-	-	-69.32	4.78	-64.53	-51.5
2830.00	V	-	-	-69.15	5.73	-63.42	-50.4
3537.50	V	-	-	-69.05	6.54	-62.51	-49.5

**Table 7-7. Radiated Spurious Data (Band 12 – Mid Channel)**

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 715.30 MHz  
 CHANNEL: 23173  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 1.4 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]
1430.60	V	150	29	-68.42	4.04	-64.38	-51.4
2145.90	V	-	-	-69.71	4.76	-64.95	-51.9
2861.20	V	-	-	-68.68	5.79	-62.89	-49.9
3576.50	V	-	-	-68.07	6.59	-61.48	-48.5

Table 7-8. Radiated Spurious Data (Band 12 – High Channel)

FCC ID: ZNFX210APM			<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
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## Band 5

OPERATING FREQUENCY: 826.50 MHz  
 CHANNEL: 20425  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 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]
1653.00	V	150	107	-63.61	4.82	-58.79	-45.8
2479.50	V	-	-	-67.83	5.01	-62.83	-49.8
3306.00	V	-	-	-67.32	6.25	-61.07	-48.1
4132.50	V	-	-	-66.48	7.60	-58.89	-45.9

**Table 7-9. Radiated Spurious Data (Band 5 – Low Channel)**

OPERATING FREQUENCY: 836.50 MHz  
 CHANNEL: 20525  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 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	V	150	108	-63.64	4.86	-58.78	-45.8
2509.50	V	-	-	-68.52	5.10	-63.42	-50.4
3346.00	V	-	-	-67.13	6.25	-60.88	-47.9
4182.50	V	-	-	-67.11	7.67	-59.44	-46.4

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

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY: 846.50 MHz  
 CHANNEL: 20625  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 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]
1693.00	V	150	106	-63.80	4.90	-58.90	-45.9
2539.50	V	-	-	-68.53	5.25	-63.29	-50.3
3386.00	V	-	-	-67.22	6.36	-60.86	-47.9
4232.50	V	-	-	-67.03	7.73	-59.30	-46.3

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

FCC ID: ZNFX210APM	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
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### Band 4

OPERATING FREQUENCY: 1717.50 MHz  
 CHANNEL: 20025  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 15.0 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]
3435.00	H	-	-	-67.13	6.50	-60.63	-47.6

**Table 7-12. Radiated Spurious Data (Band 4 – Low Channel)**

OPERATING FREQUENCY: 1732.50 MHz  
 CHANNEL: 20175  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 15.0 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	-	-	-66.48	6.56	-59.92	-46.9

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

OPERATING FREQUENCY: 1747.50 MHz  
 CHANNEL: 20325  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 15.0 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]
3495.00	H	-	-	-67.79	6.59	-61.20	-48.2

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

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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## Band 2

OPERATING FREQUENCY: 1860.00 MHz  
 CHANNEL: 18700  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 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]
3720.00	H	-	-	-66.88	6.78	-60.10	-47.1

Table 7-15. Radiated Spurious Data (Band 2 – Low Channel)

OPERATING FREQUENCY: 1880.00 MHz  
 CHANNEL: 18900  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 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	H	-	-	-66.84	6.84	-60.00	-47.0

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

OPERATING FREQUENCY: 1900.00 MHz  
 CHANNEL: 19100  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 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]
3800.00	H	-	-	-65.15	6.94	-58.21	-45.2

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

FCC ID: ZNFX210APM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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**7.8 Frequency Stability / Temperature Variation**  
§2.1055 §24.235 §27.54 RSS-130(4.3) RSS-133(6.3) RSS-139(6.3) RSS-195(5.4)

**Test Overview and Limit**

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. 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, and RSS-133, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24, Part 2RSS-130, RSS-139 and RSS-199, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.***

**Test Procedure Used**

ANSI/TIA-603-E-2016

**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

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**Band 12 Frequency Stability Measurements**  
§2.1055 §27.54 RSS-130(4.3)

OPERATING FREQUENCY: 707,500,000 Hz  
 CHANNEL: 23790  
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	707,500,085	85	0.0000120
100 %		- 30	707,499,851	-149	-0.0000211
100 %		- 20	707,500,375	375	0.0000530
100 %		- 10	707,499,746	-254	-0.0000359
100 %		0	707,500,285	285	0.0000403
100 %		+ 10	707,500,019	19	0.0000027
100 %		+ 20	707,500,210	210	0.0000297
100 %		+ 30	707,500,054	54	0.0000076
100 %		+ 40	707,499,872	-128	-0.0000181
100 %		+ 50	707,499,842	-158	-0.0000223
BATT. ENDPOINT	3.40	+ 20	707,499,755	-245	-0.0000346

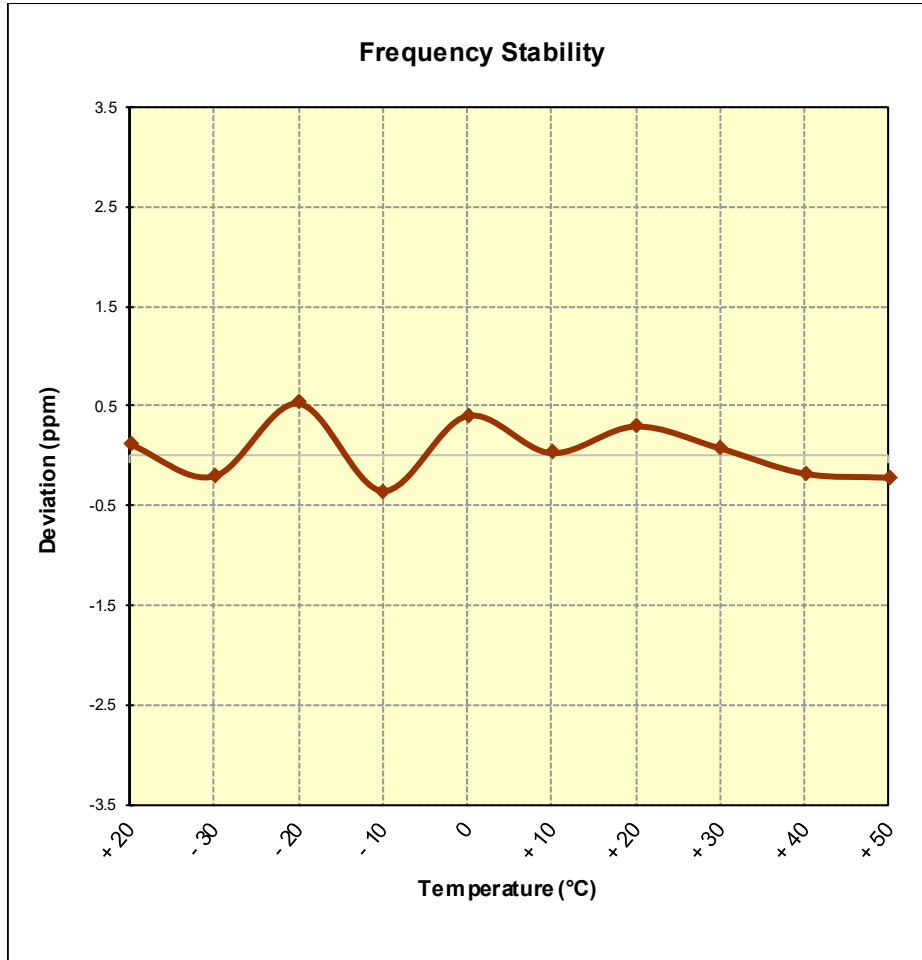
**Table 7-18. Frequency Stability Data (Band 12)**

**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.

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**Band 12 Frequency Stability Measurements**  
§2.1055 §27.54 RSS-130(4.3)



**Figure 7-8. Frequency Stability Graph (Band 12)**

FCC ID: ZNFX210APM	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
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**Band 5 Frequency Stability Measurements**  
§2.1055 §22.355 RSS-132(5.3)

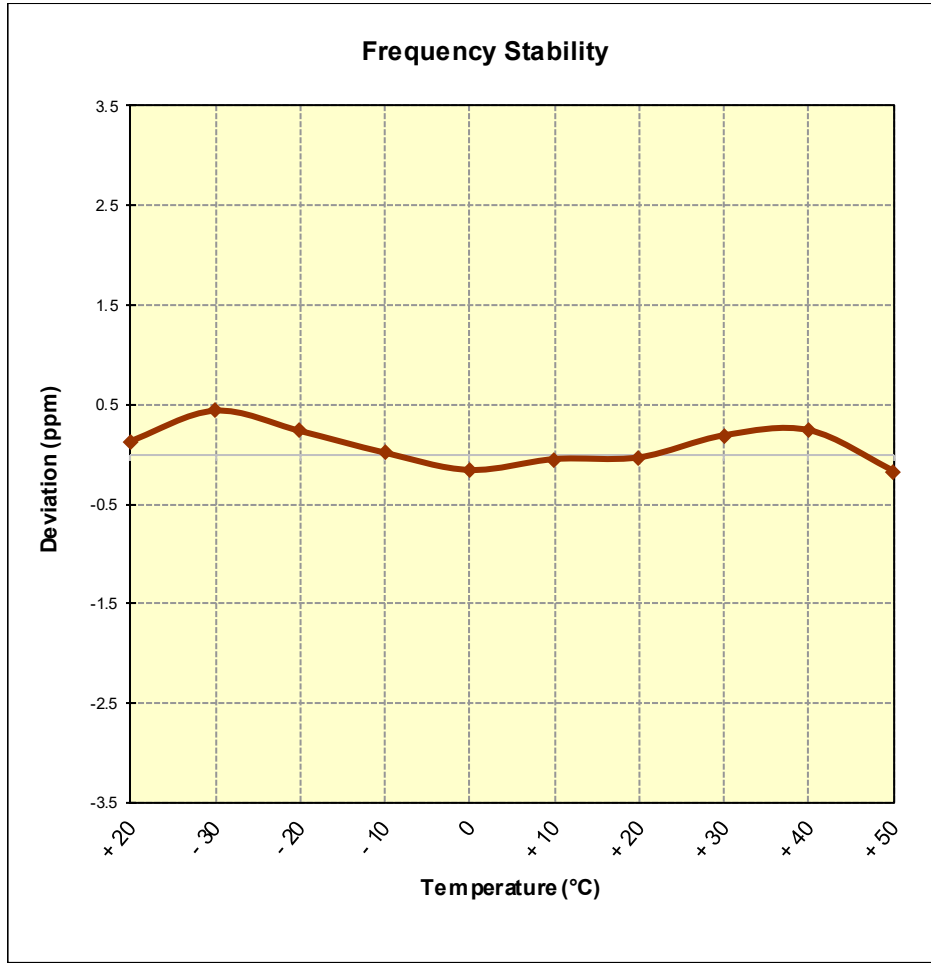
OPERATING FREQUENCY: 836,500,000 Hz  
 CHANNEL: 20525  
 REFERENCE VOLTAGE: 3.80 VDC  
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,500,111	111	0.0000133
100 %		- 30	836,500,373	373	0.0000446
100 %		- 20	836,500,200	200	0.0000239
100 %		- 10	836,500,013	13	0.0000016
100 %		0	836,499,864	-136	-0.0000163
100 %		+ 10	836,499,958	-42	-0.0000050
100 %		+ 20	836,499,973	-27	-0.0000032
100 %		+ 30	836,500,163	163	0.0000195
100 %		+ 40	836,500,205	205	0.0000245
100 %		+ 50	836,499,855	-145	-0.0000173
BATT. ENDPOINT	3.40	+ 20	836,500,044	44	0.0000053

**Table 7-19. Frequency Stability Data (Band 5)**

FCC ID: ZNFX210APM	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset	Page 114 of 120

**Band 5 Frequency Stability Measurements**  
§2.1055 §22.355 RSS-132(5.3)



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

FCC ID: ZNFX210APM	 <b>MEASUREMENT REPORT</b> (CERTIFICATION)			<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1711080290-03-R1.ZNF	<b>Test Dates:</b> 11/10 - 11/22/2017	<b>EUT Type:</b> Portable Handset		Page 115 of 120

**Band 4 Frequency Stability Measurements**  
§2.1055 §§27.54 RSS-139(6.4)

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)	1,732,499,795	-205	-0.0000118
100 %		- 30	1,732,500,280	280	0.0000162
100 %		- 20	1,732,499,858	-142	-0.0000082
100 %		- 10	1,732,499,573	-427	-0.0000246
100 %		0	1,732,500,268	268	0.0000155
100 %		+ 10	1,732,500,142	142	0.0000082
100 %		+ 20	1,732,500,060	60	0.0000035
100 %		+ 30	1,732,500,147	147	0.0000085
100 %		+ 40	1,732,499,913	-87	-0.0000050
100 %		+ 50	1,732,499,823	-177	-0.0000102
BATT. ENDPOINT	3.40	+ 20	1,732,499,987	-13	-0.0000008

**Table 7-20. Frequency Stability Data (Band 4)**

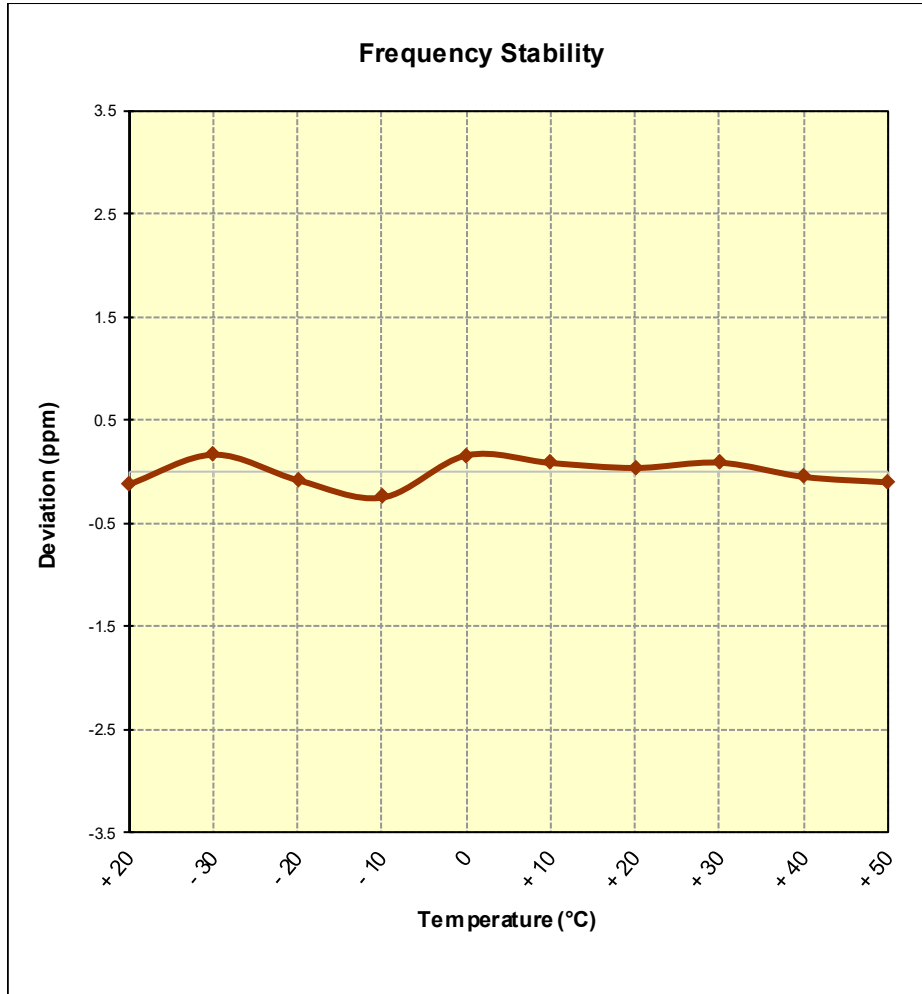
**Note:**

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.

FCC ID: ZNFX210APM	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
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**Band 4 Frequency Stability Measurements**  
§2.1055 §§27.54 RSS-139(6.4)



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

FCC ID: ZNFX210APM	 <b>MEASUREMENT REPORT</b> (CERTIFICATION) 		Approved by: Quality Manager
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**Band 2 Frequency Stability Measurements**  
§2.1055 §24.235 RSS-133(6.3)

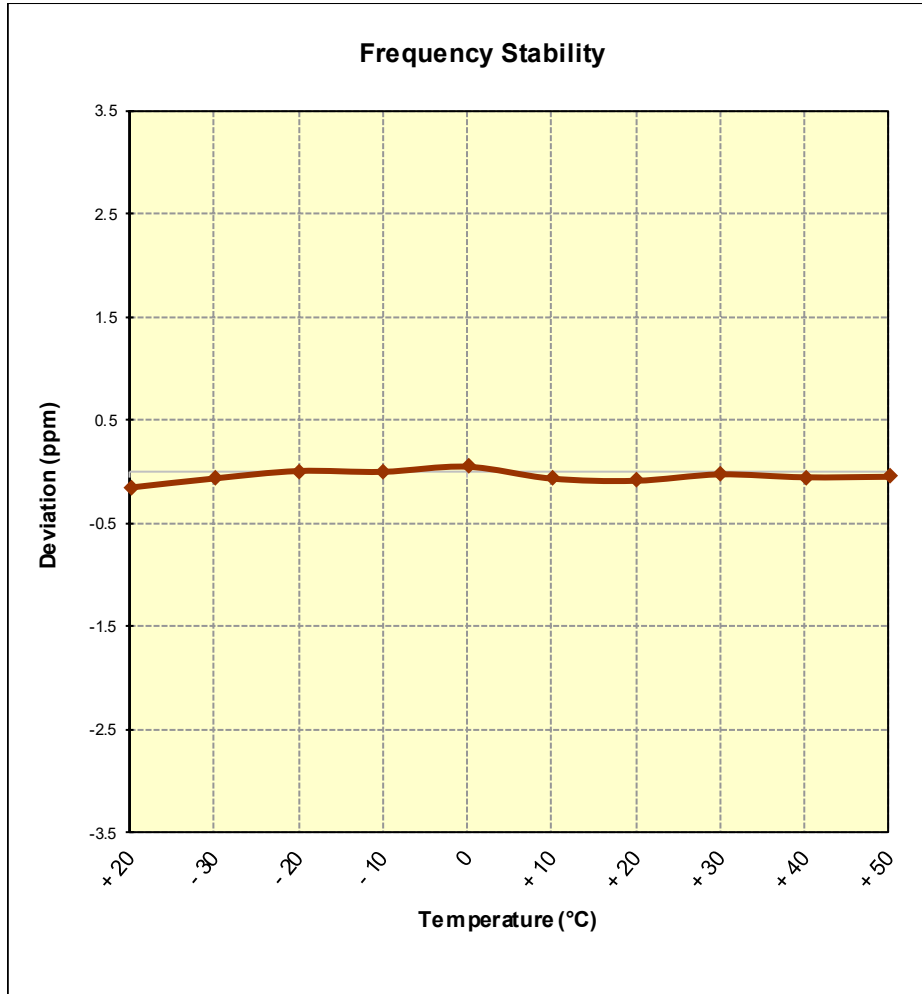
OPERATING FREQUENCY: 1,880,000,000 Hz  
 CHANNEL: 18900  
 REFERENCE VOLTAGE: 3.80 VDC  
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,699	-301	-0.0000160
100 %		- 30	1,879,999,866	-134	-0.0000071
100 %		- 20	1,880,000,001	1	0.0000001
100 %		- 10	1,879,999,986	-14	-0.0000007
100 %		0	1,880,000,080	80	0.0000043
100 %		+ 10	1,879,999,866	-134	-0.0000071
100 %		+ 20	1,879,999,823	-177	-0.0000094
100 %		+ 30	1,879,999,940	-60	-0.0000032
100 %		+ 40	1,879,999,887	-113	-0.0000060
100 %		+ 50	1,879,999,896	-104	-0.0000055
BATT. ENDPOINT	3.40	+ 20	1,879,999,859	-141	-0.0000075

**Table 7-21. Frequency Stability Data (Band 2)**

FCC ID: ZNFX210APM	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset	Page 118 of 120

**Band 2 Frequency Stability Measurements**  
§2.1055 §24.235 RSS-133(6.3)



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

FCC ID: ZNFX210APM	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
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## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFX210APM** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFX210APM	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1711080290-03-R1.ZNF	Test Dates: 11/10 - 11/22/2017	EUT Type: Portable Handset	Page 120 of 120