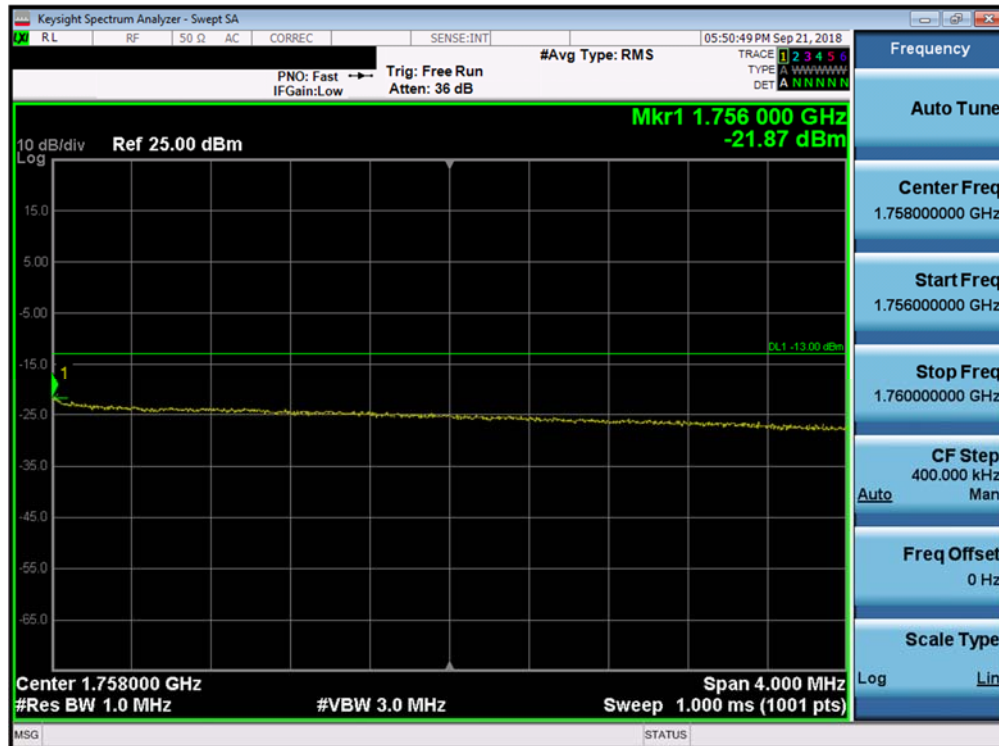


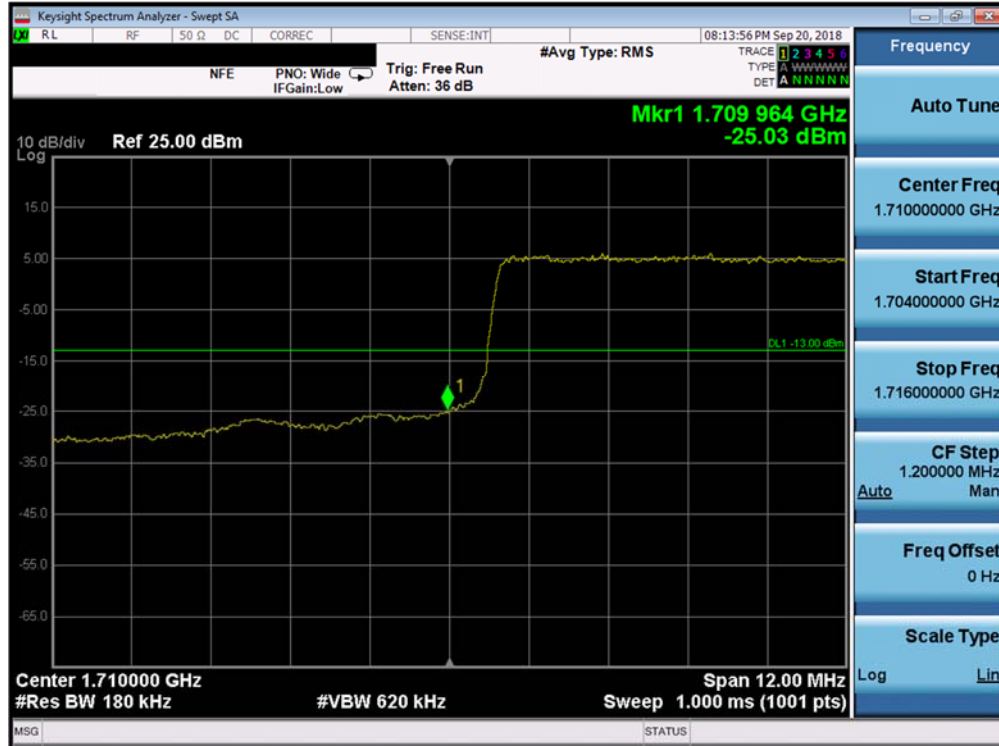


Plot 7-123. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

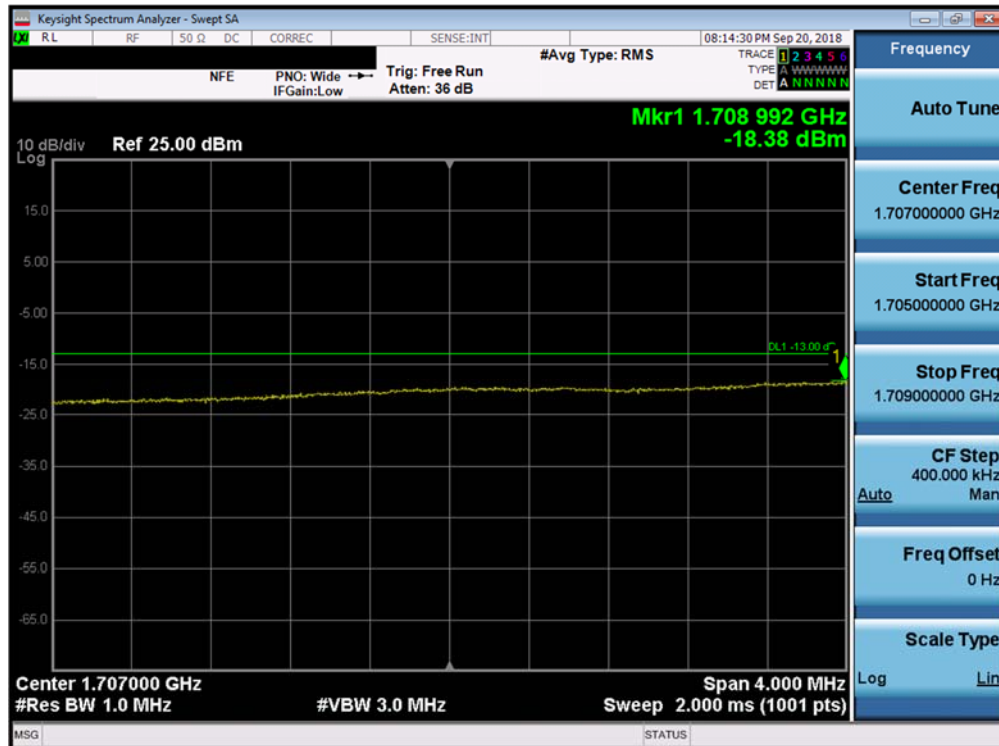


Plot 7-124. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA9200	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 82 of 143



Plot 7-125. Lower Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

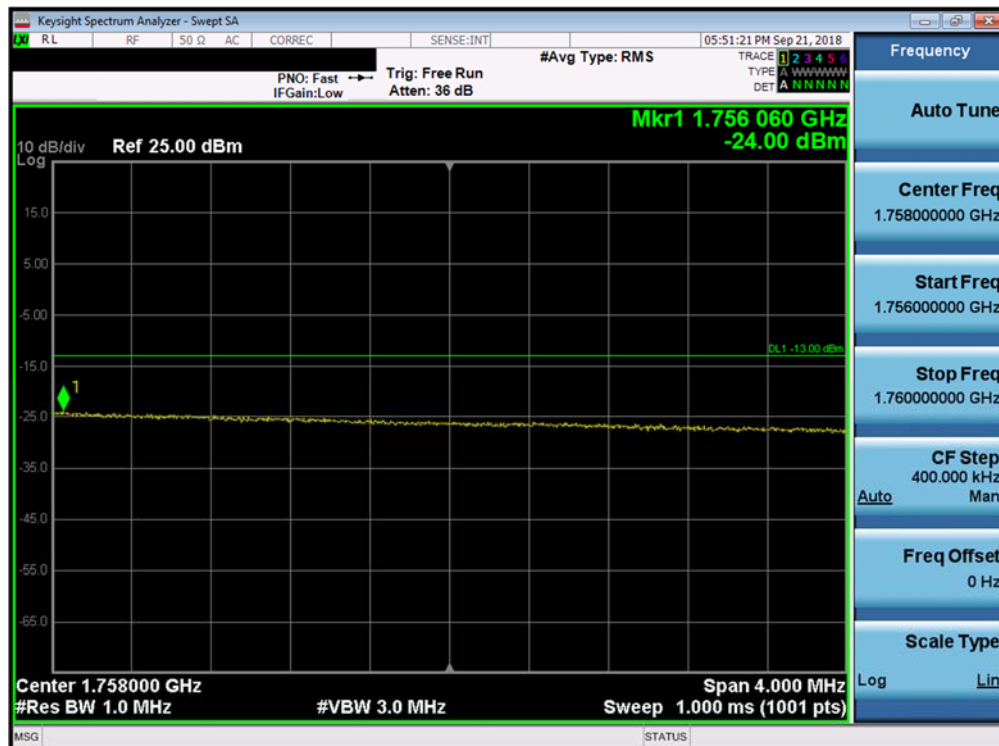


Plot 7-126. Lower Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA9200	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset	Page 83 of 143

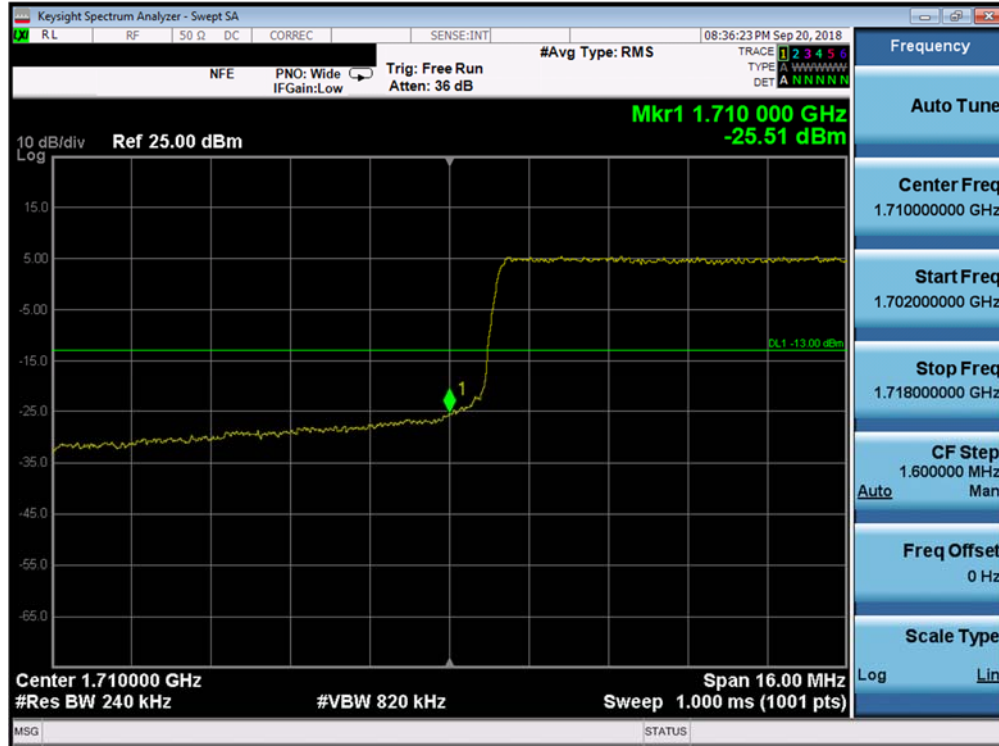


Plot 7-127. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

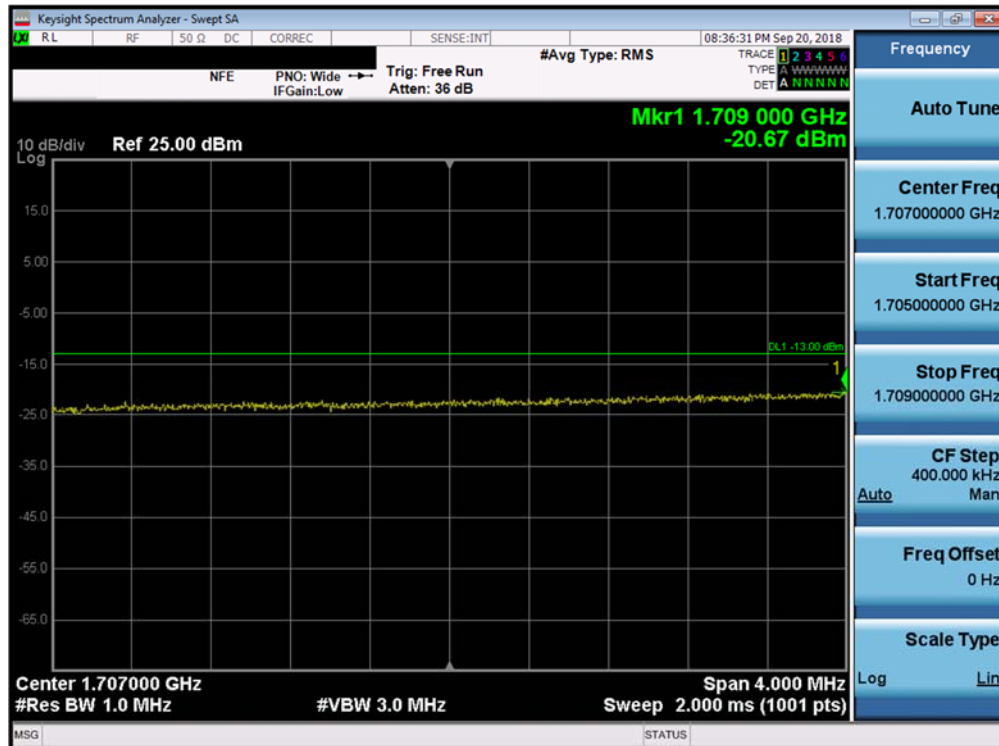


Plot 7-128. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA9200	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 84 of 143



Plot 7-129. Lower Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

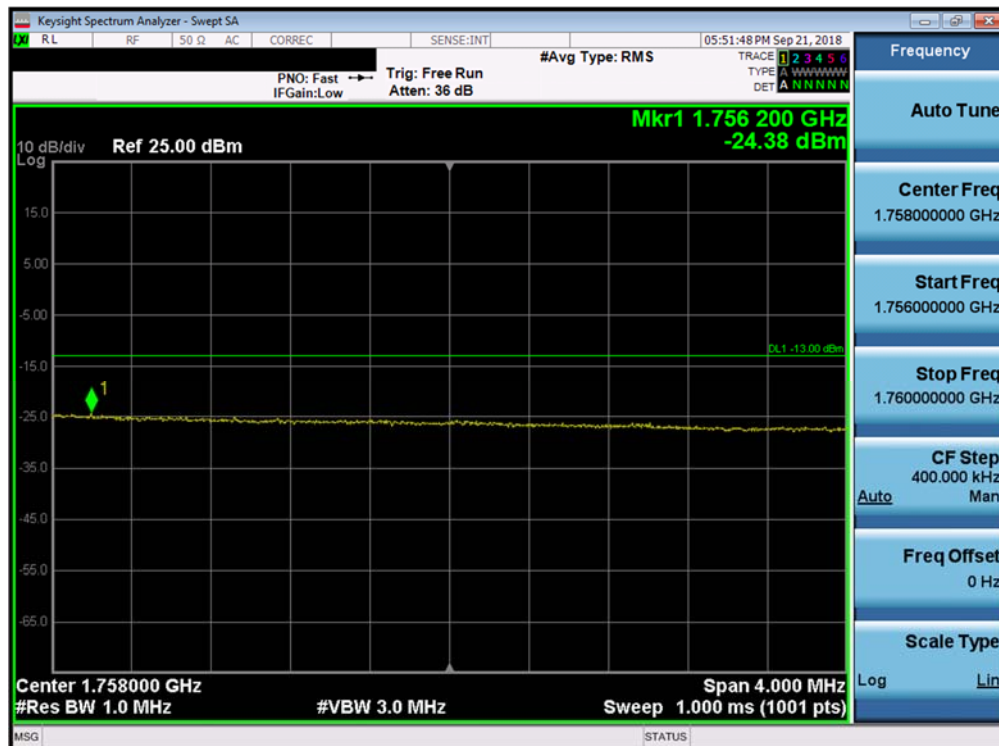


Plot 7-130. Lower Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA9200	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 85 of 143



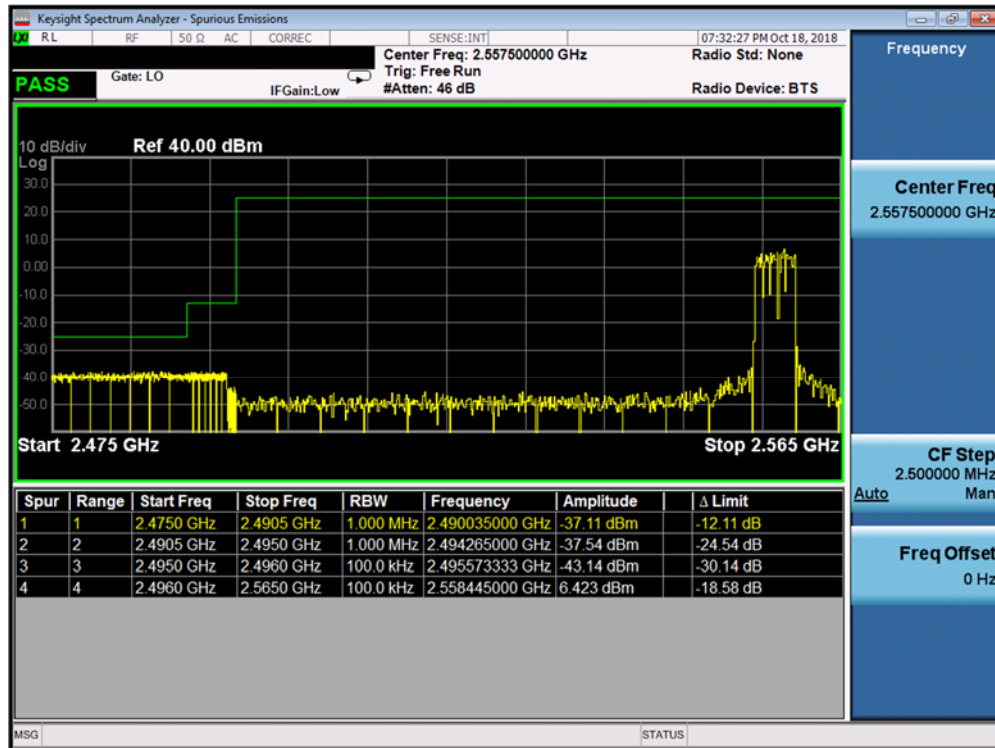
Plot 7-131. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



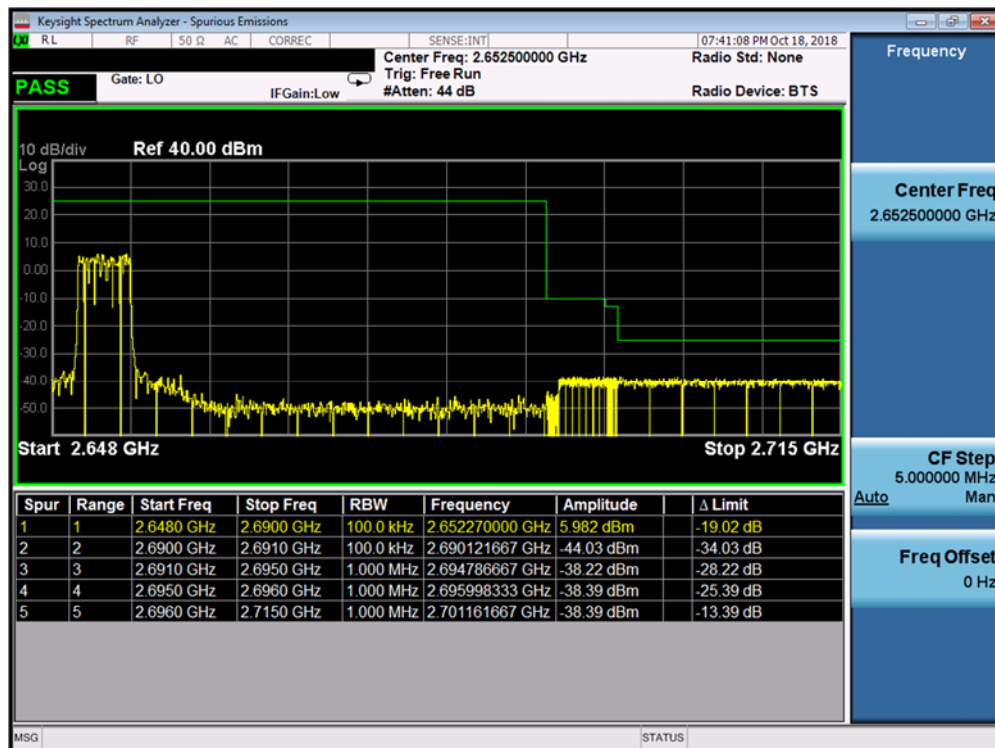
Plot 7-132. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA9200	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 86 of 143

Band 41 (Narrow Band)

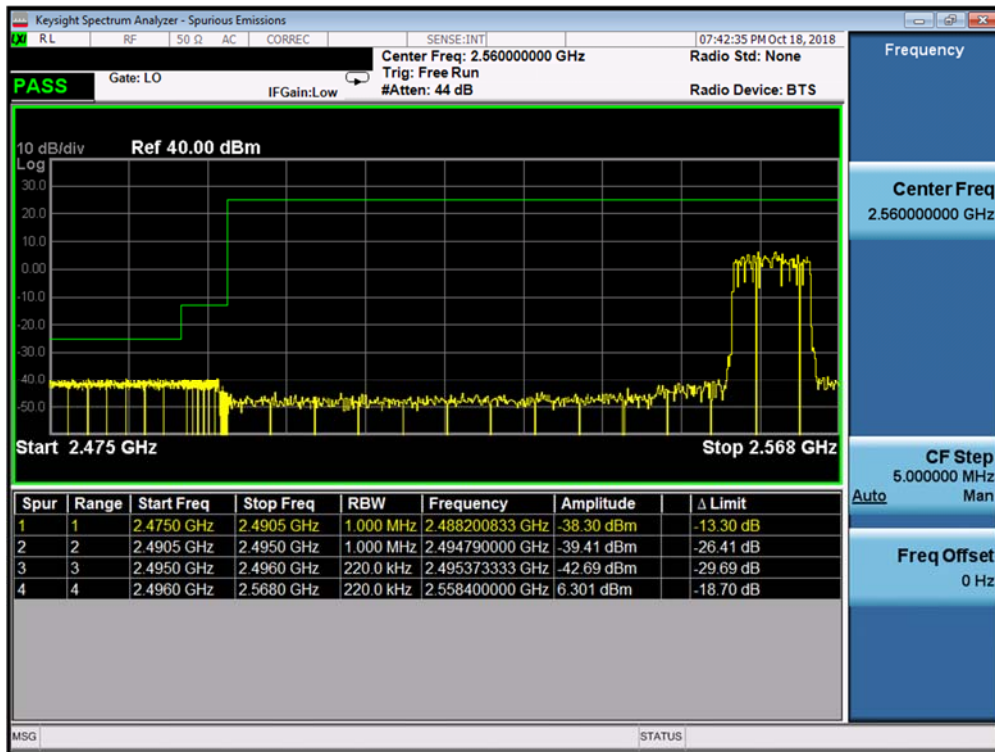


Plot 7-133. Lower ACP Plot at 2496 MHz (Band 41 - 5.0MHz QPSK - Full RB Configuration)

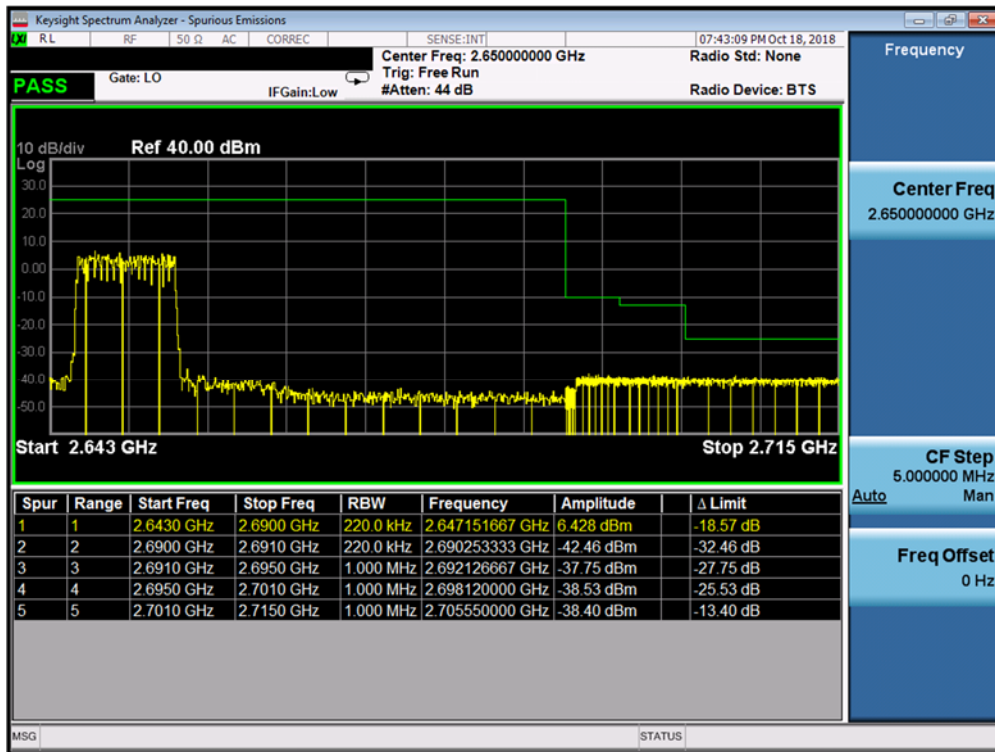


Plot 7-134. Upper ACP Plot (Band 41 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA9200	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset	Page 87 of 143	

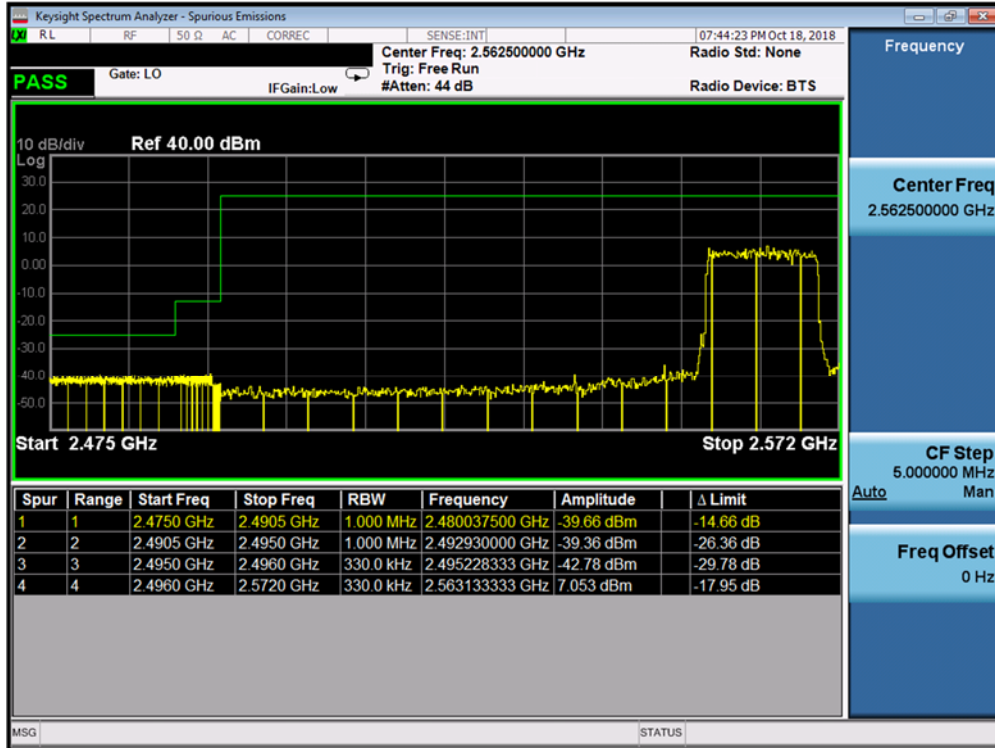


Plot 7-135. Lower ACP Plot at 2496 MHz (Band 41 - 10.0MHz QPSK - Full RB Configuration)

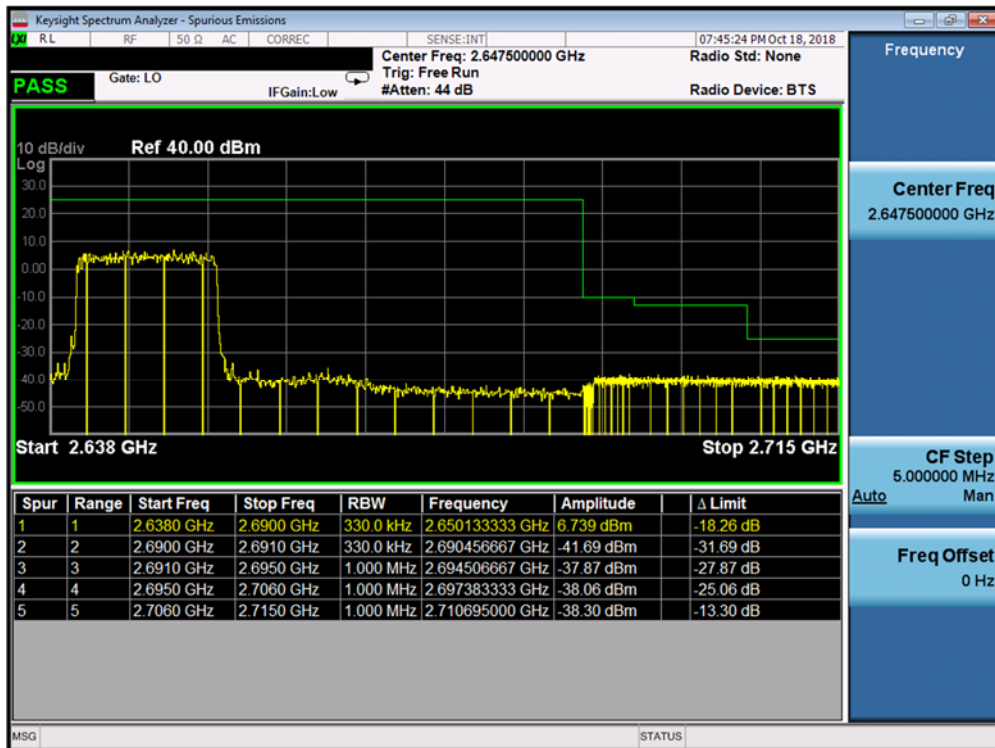


Plot 7-136. Upper ACP Plot (Band 41 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA9200	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset	Page 88 of 143

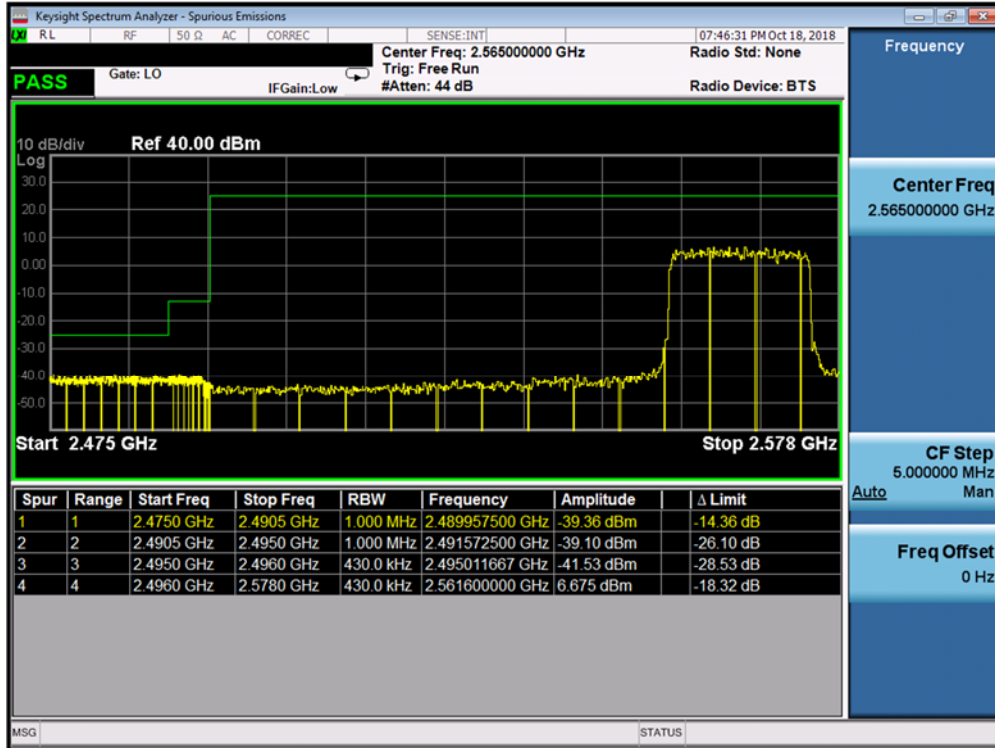


Plot 7-137. Lower ACP Plot at 2496 MHz (Band 41 - 15.0MHz QPSK - Full RB Configuration)

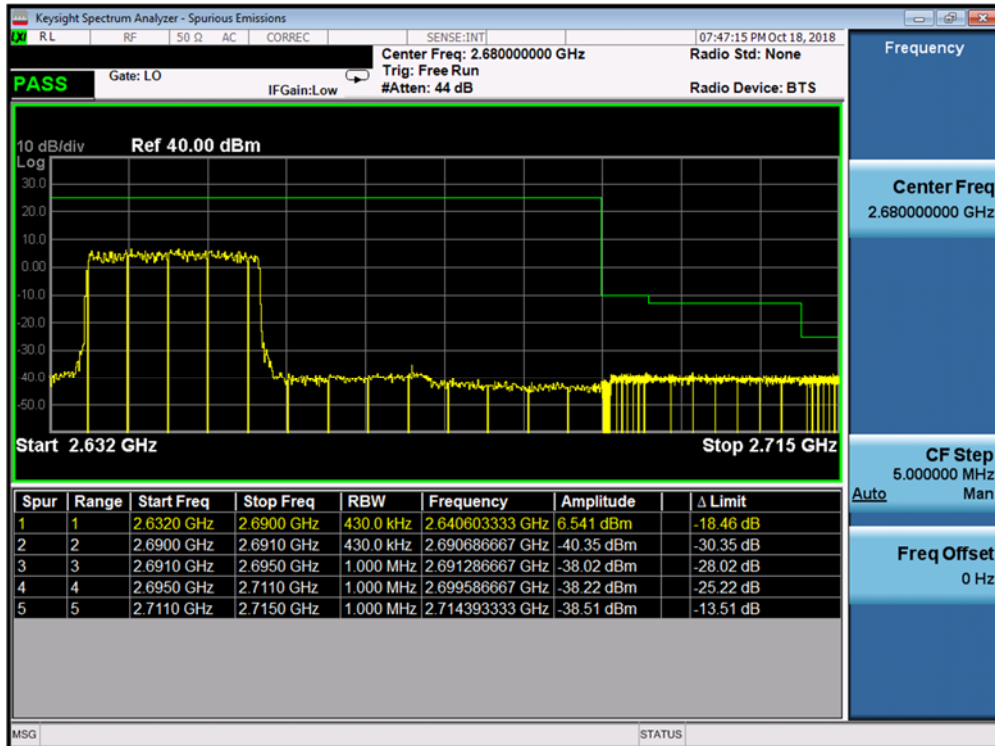


Plot 7-138. Upper ACP Plot (Band 41 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA9200	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 89 of 143



Plot 7-139. Lower ACP Plot at 2496 MHz (Band 41 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-140. Upper ACP Plot (Band 41 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA9200	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 90 of 143

7.5 Peak-Average Ratio

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.7.1

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW $\geq$ OBW or specified reference bandwidth
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. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Test Setup

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



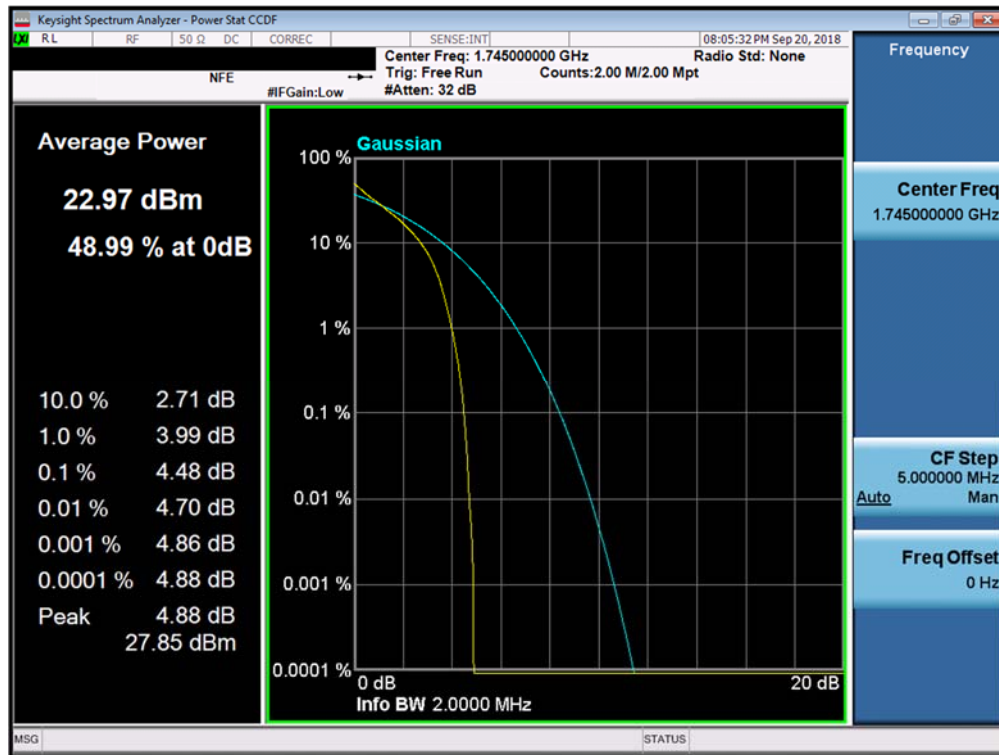
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

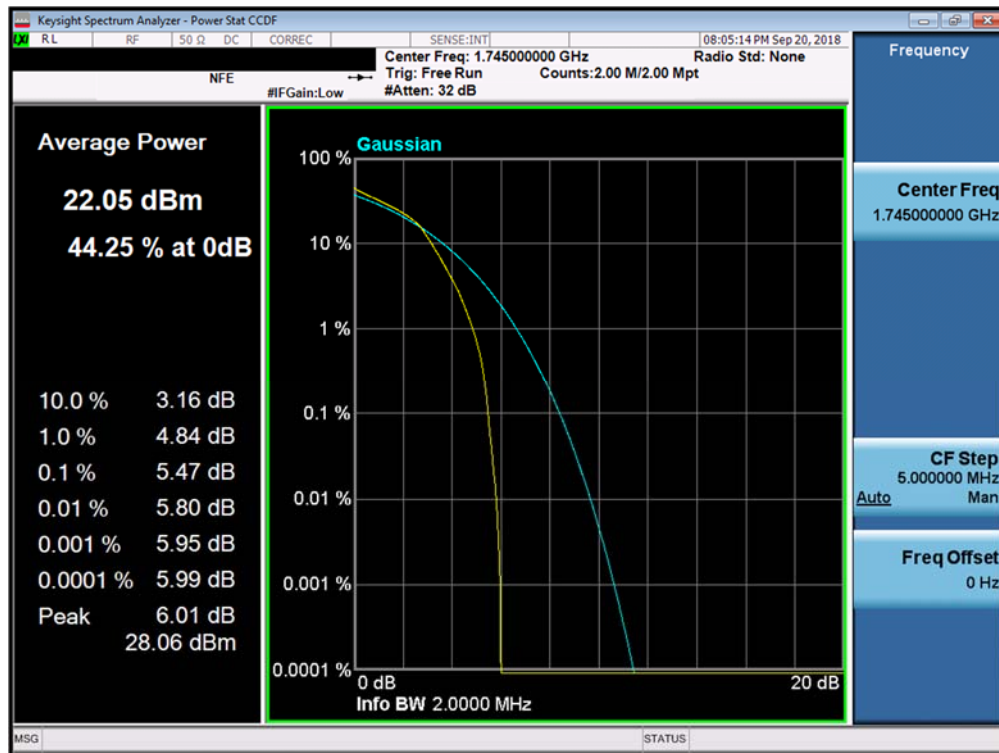
None.

FCC ID: A3LSMA9200	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset	Page 91 of 143

Band 4

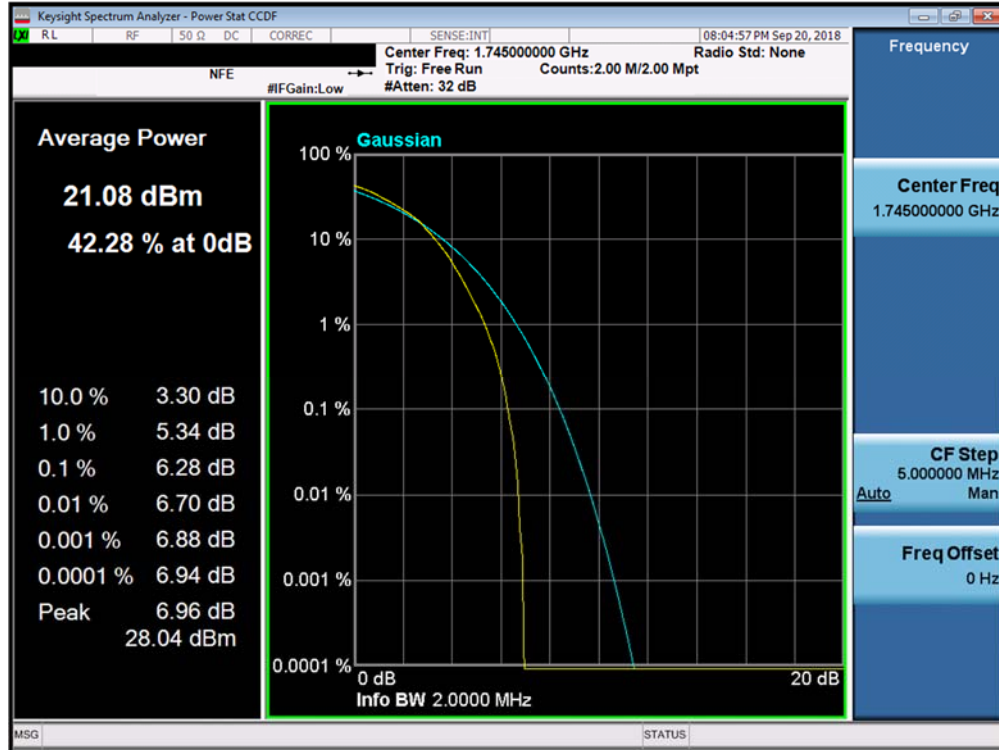


Plot 7-141. PAR Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

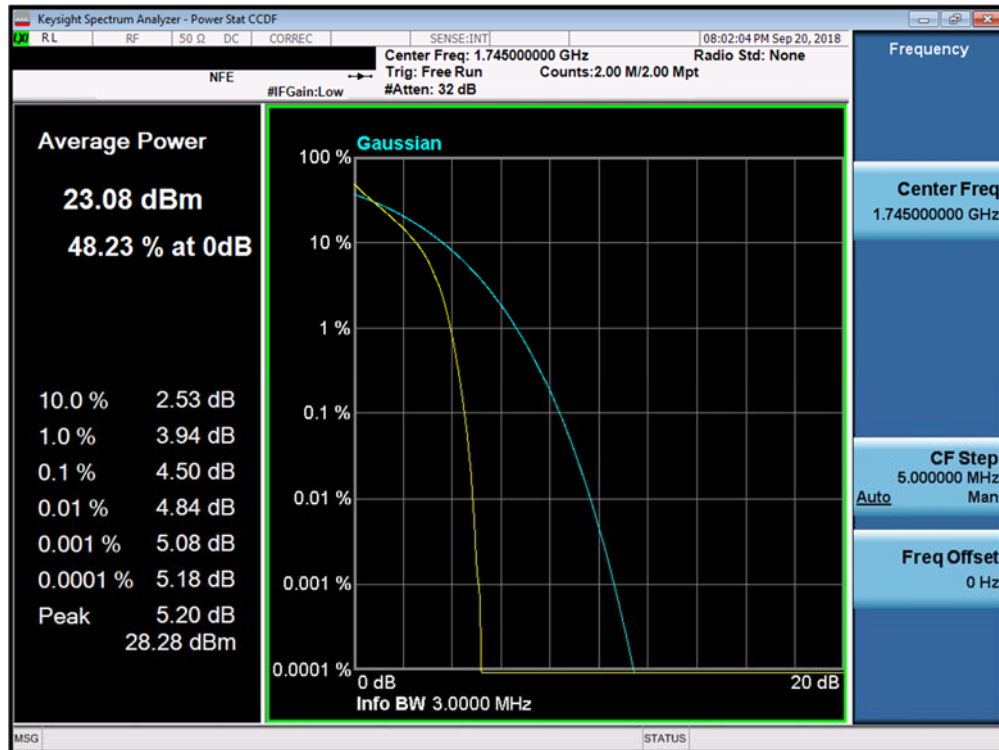


Plot 7-142. PAR Plot (Band 4 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA9200	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 92 of 143

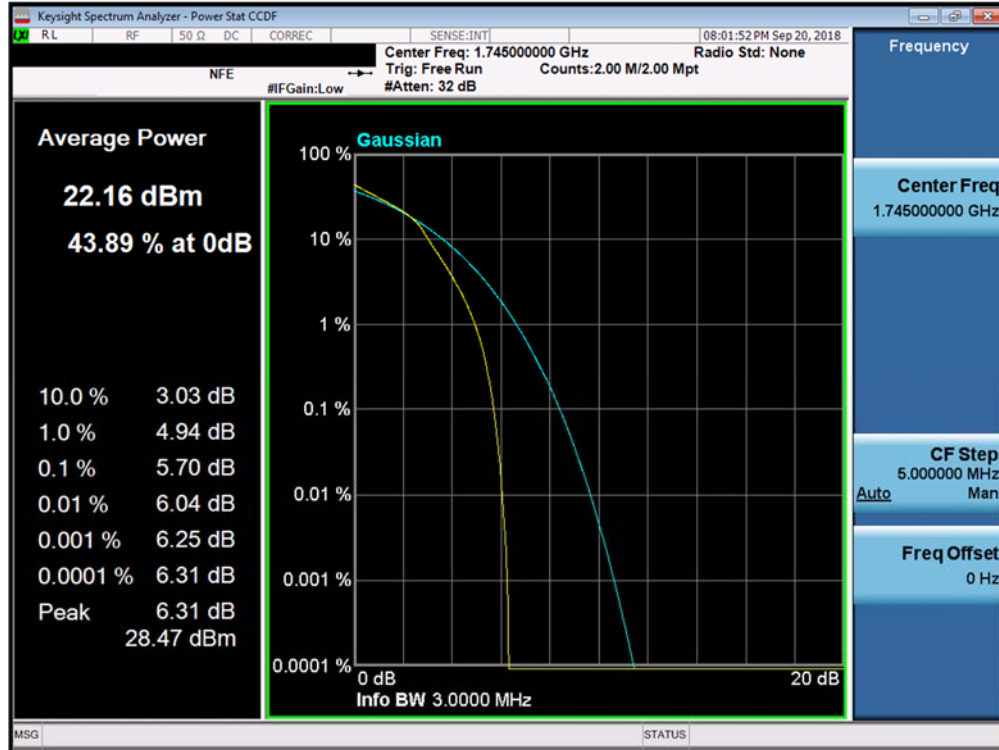


Plot 7-143. PAR Plot (Band 4 - 1.4MHz 64-QAM - Full RB Configuration)

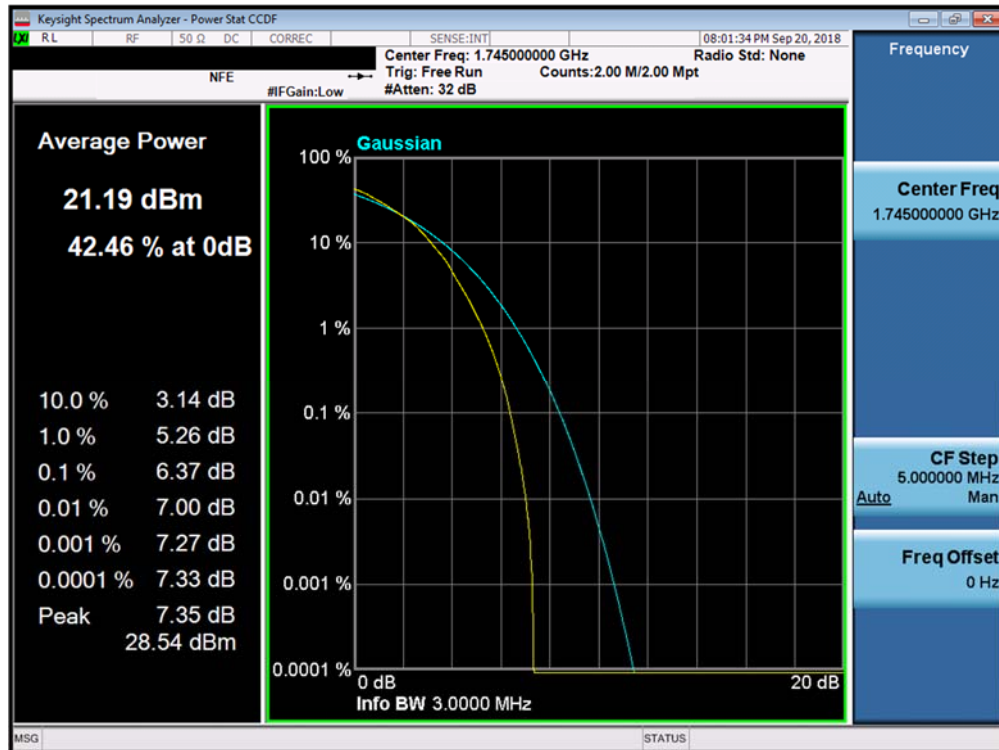


Plot 7-144. PAR Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA9200	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 93 of 143

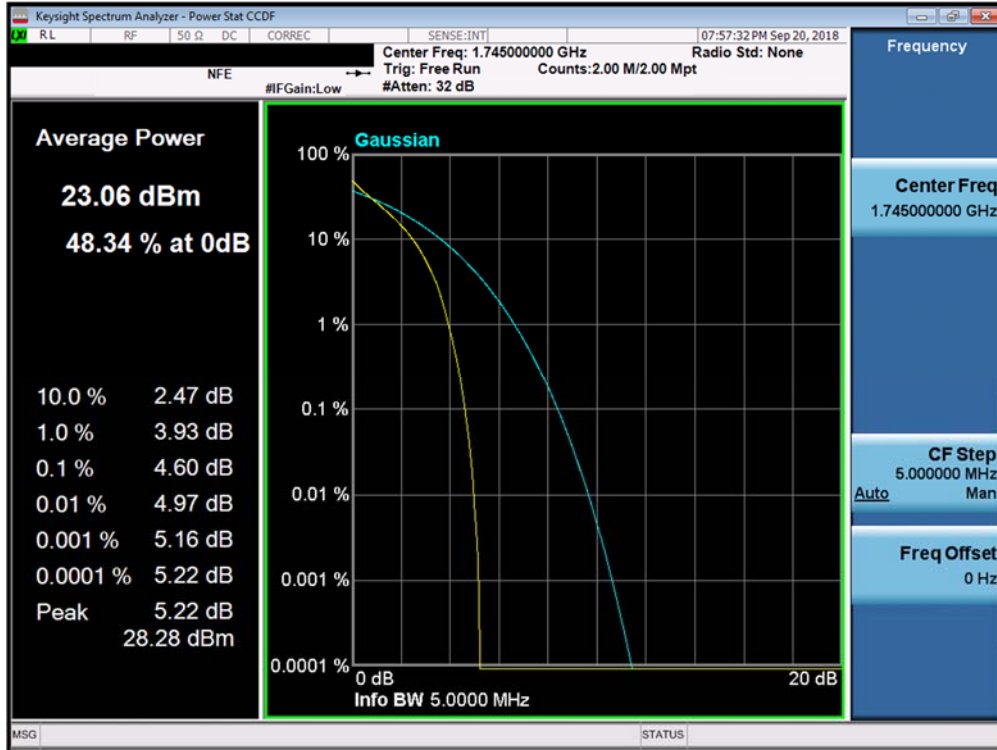


Plot 7-145. PAR Plot (Band 4 - 3.0MHz 16-QAM - Full RB Configuration)

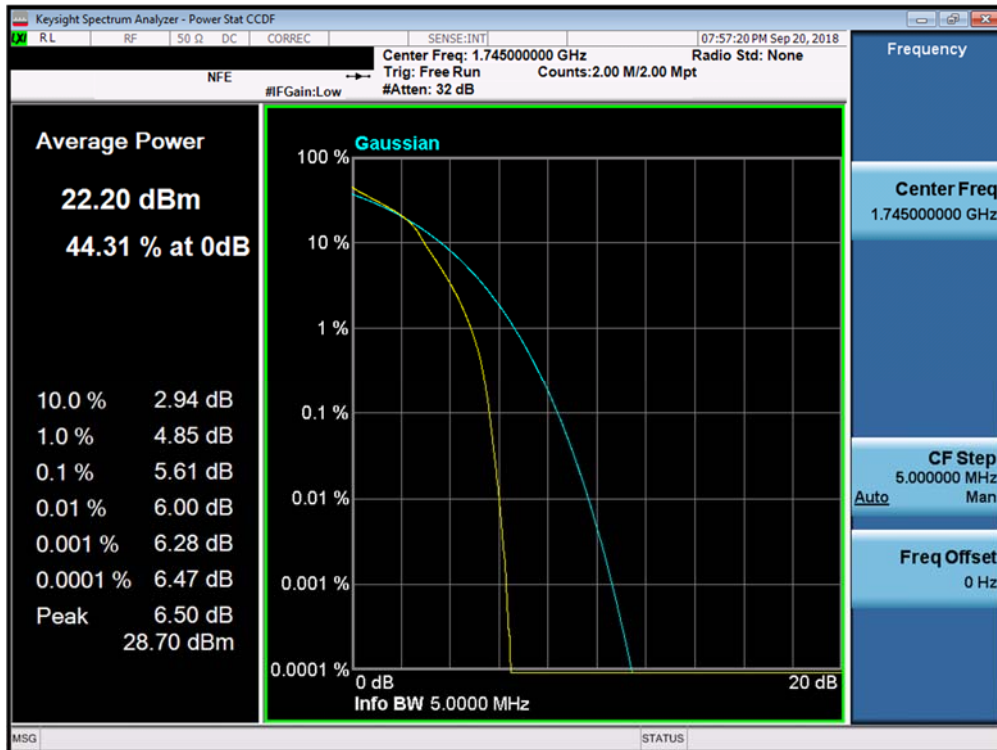


Plot 7-146. PAR Plot (Band 4 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA9200	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset	Page 94 of 143

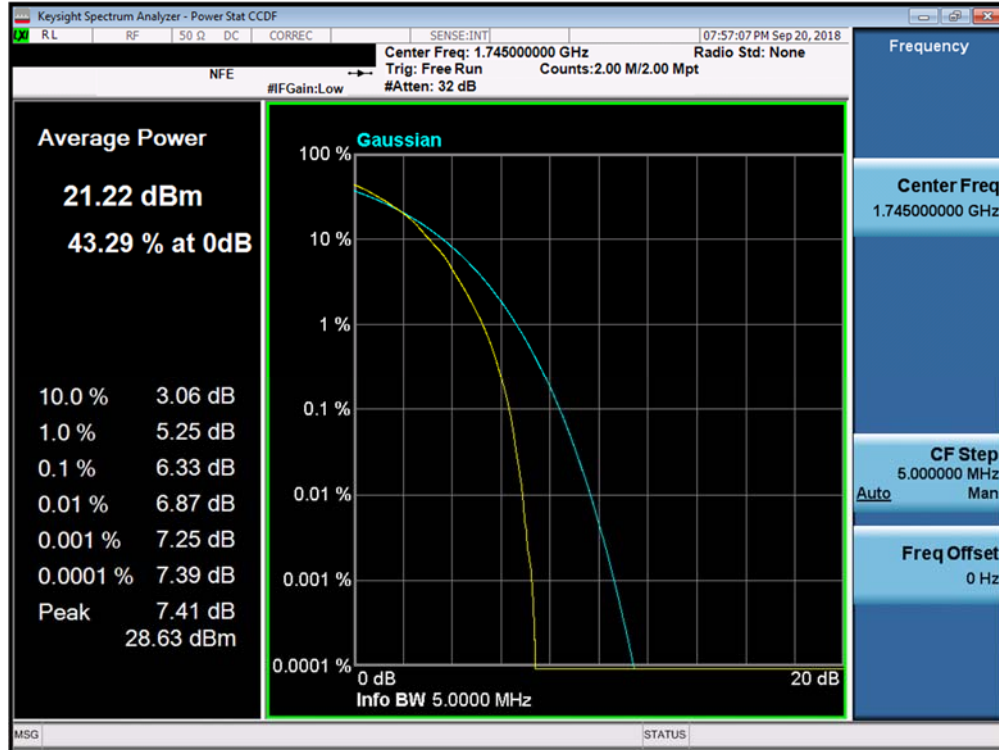


Plot 7-147. PAR Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

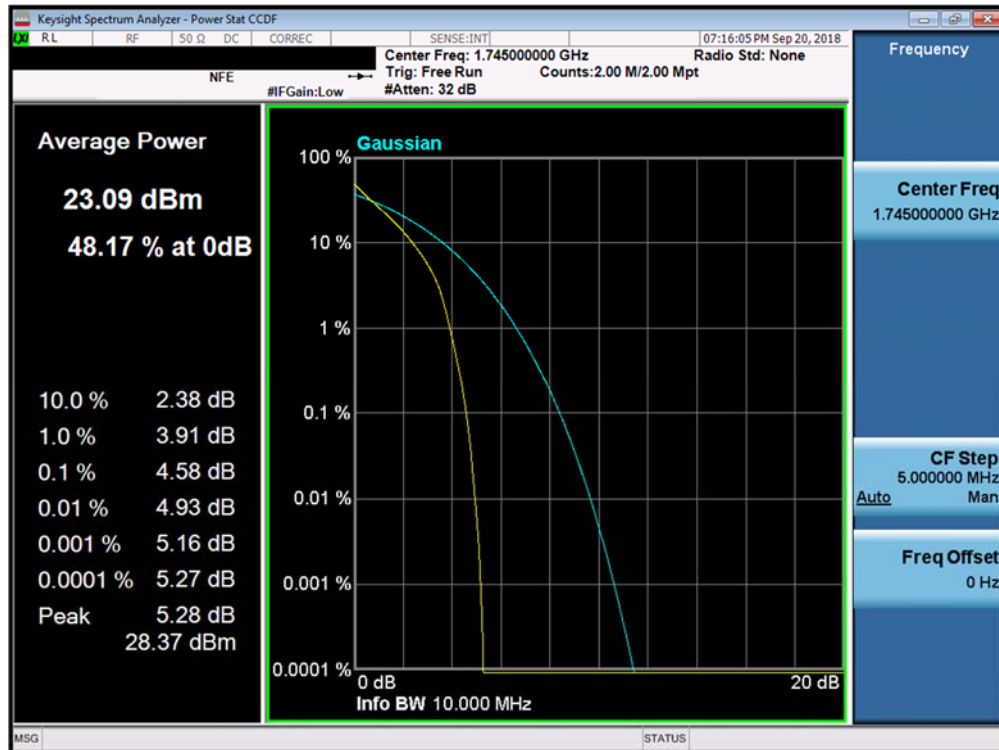


Plot 7-148. PAR Plot (Band 4 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA9200	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 95 of 143

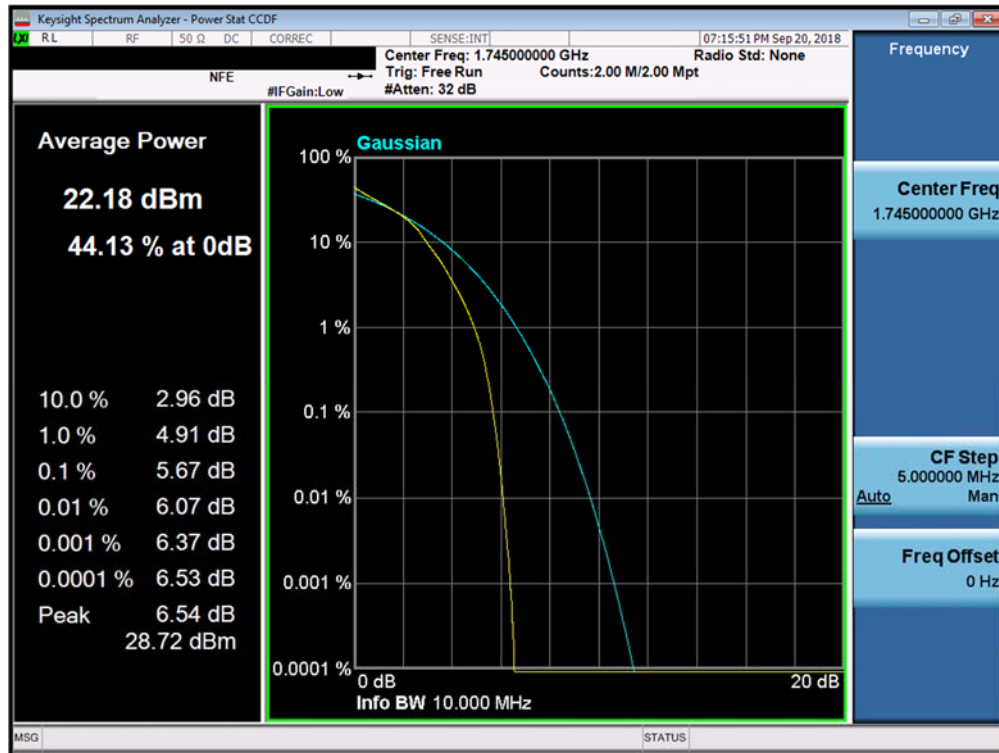


Plot 7-149. PAR Plot (Band 4 - 5.0MHz 64-QAM - Full RB Configuration)

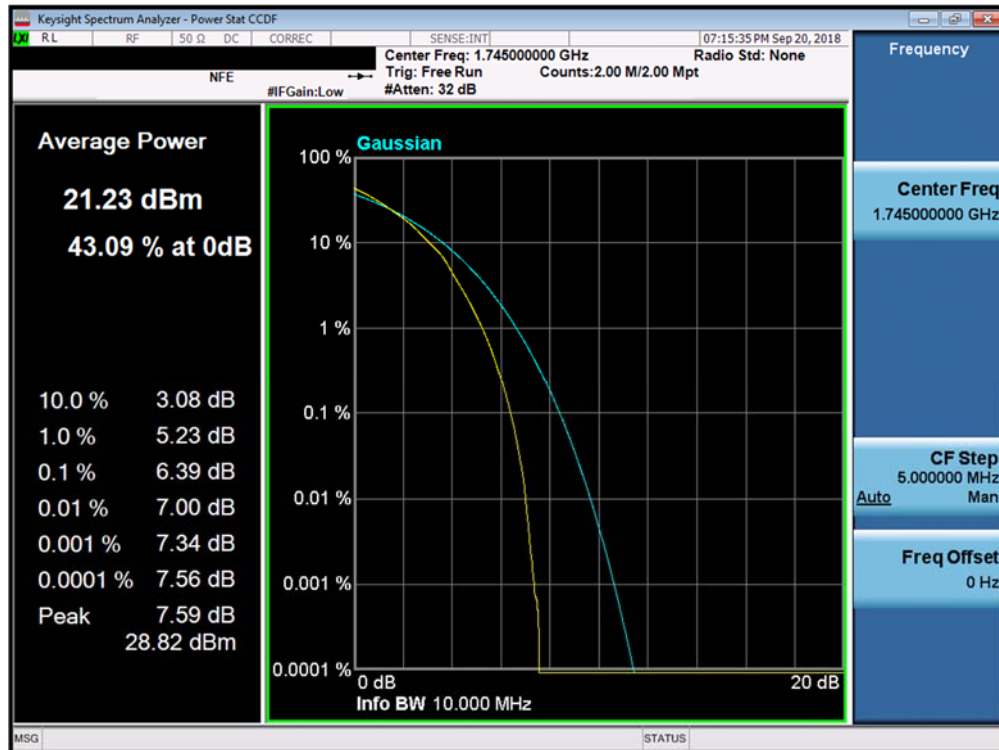


Plot 7-150. PAR Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA9200	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 96 of 143

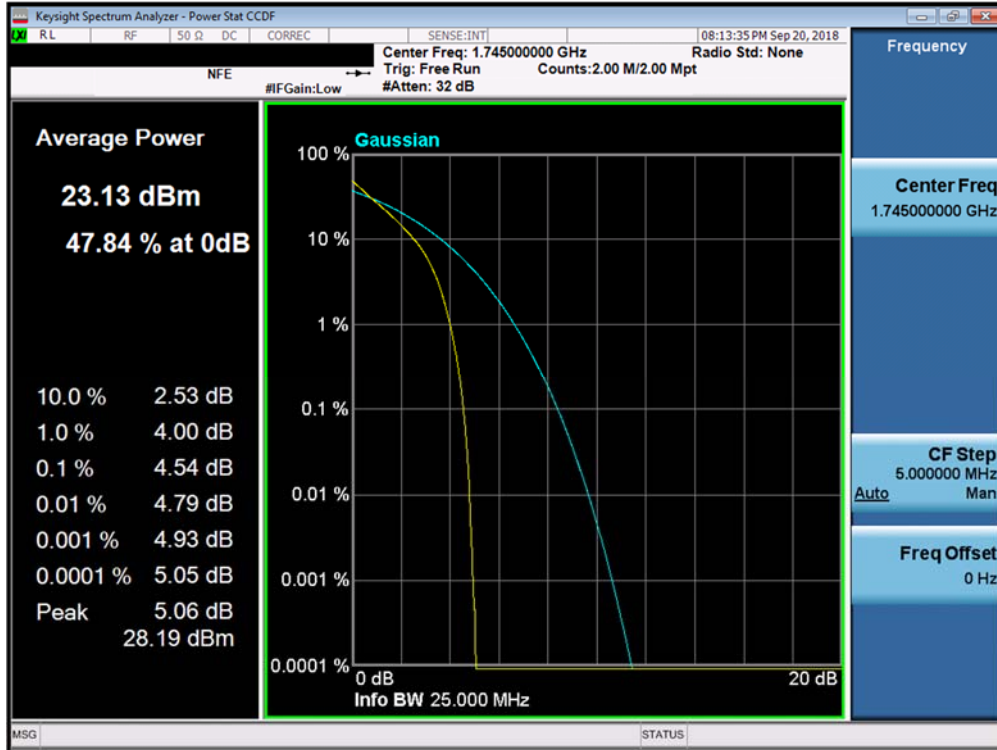


Plot 7-151. PAR Plot (Band 4 - 10.0MHz 16-QAM - Full RB Configuration)

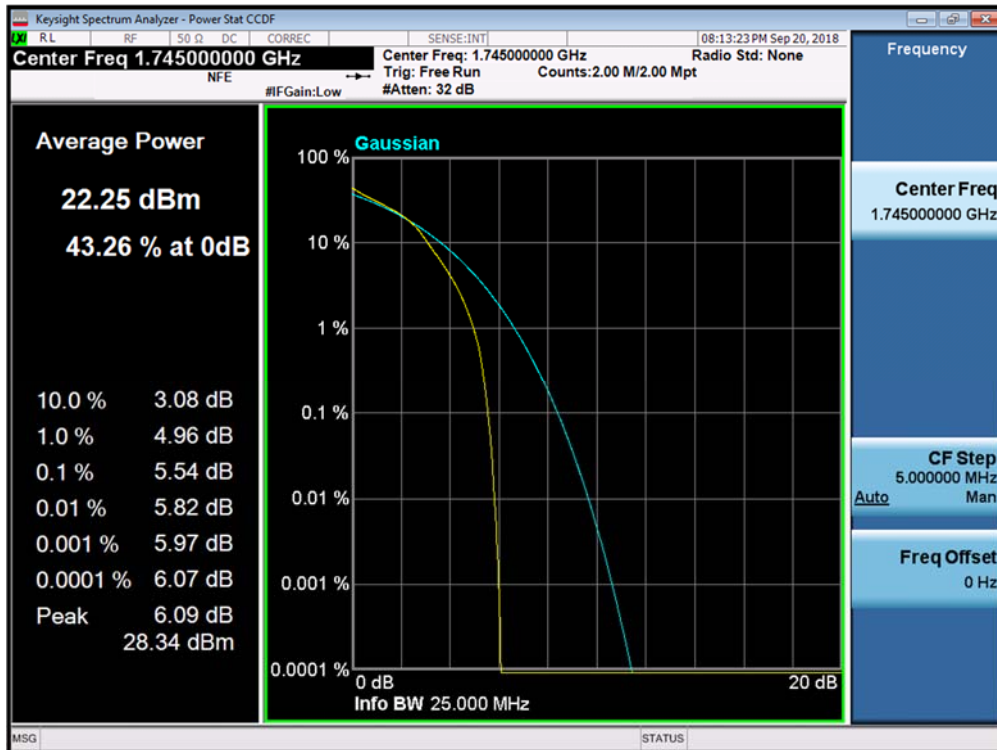


Plot 7-152. PAR Plot (Band 4 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA9200	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset	Page 97 of 143

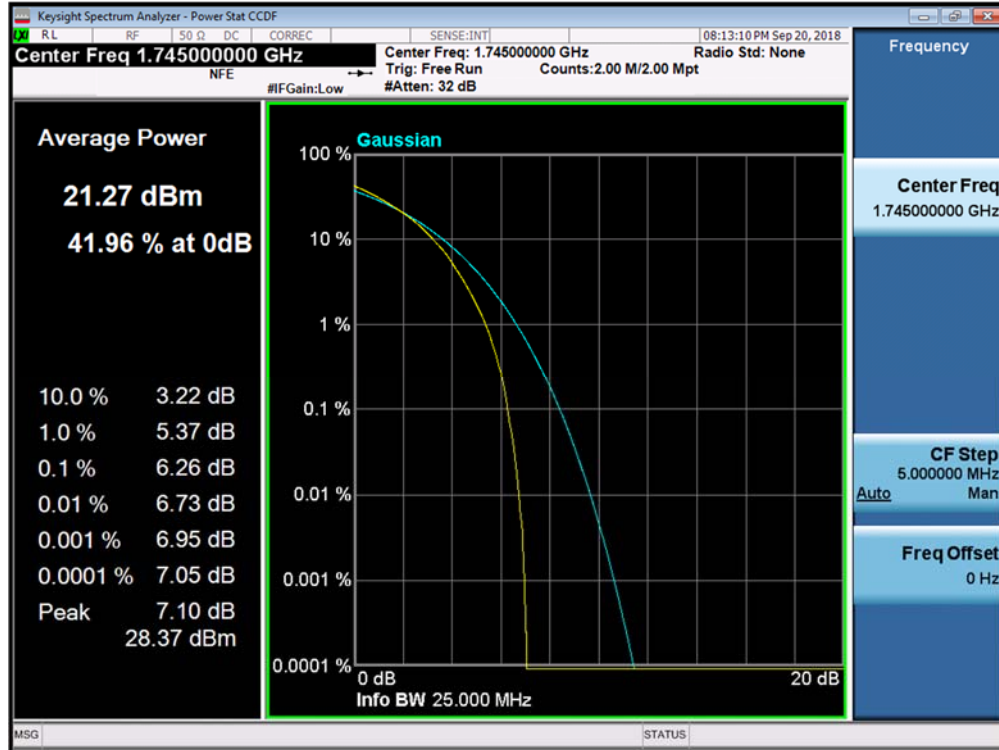


Plot 7-153. PAR Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

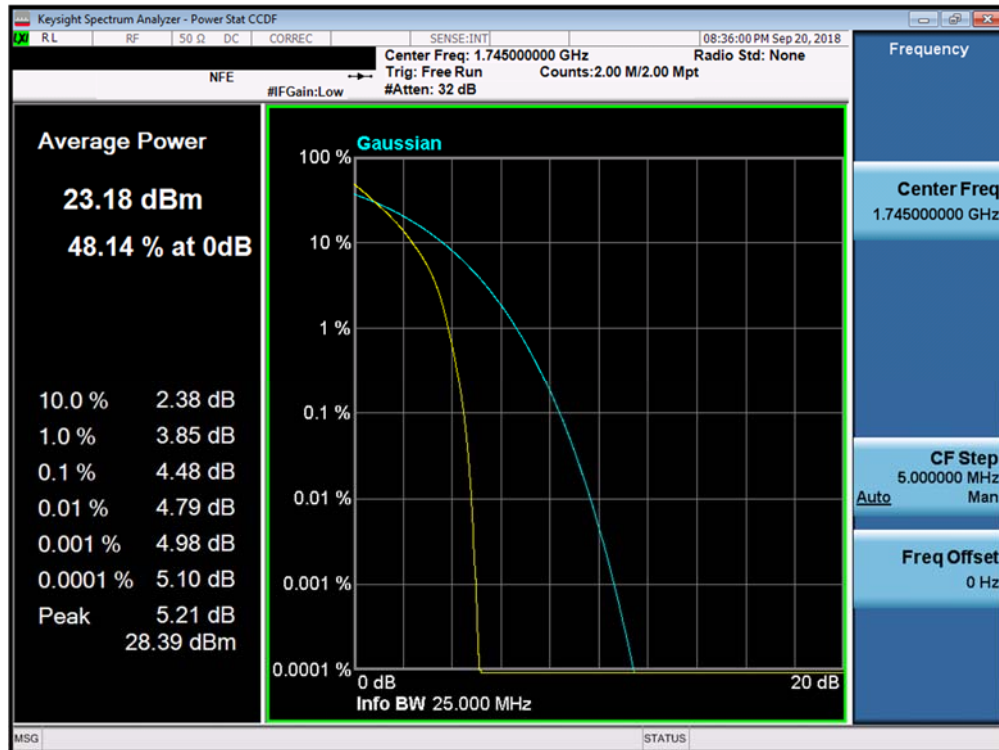


Plot 7-154. PAR Plot (Band 4 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA9200	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 98 of 143

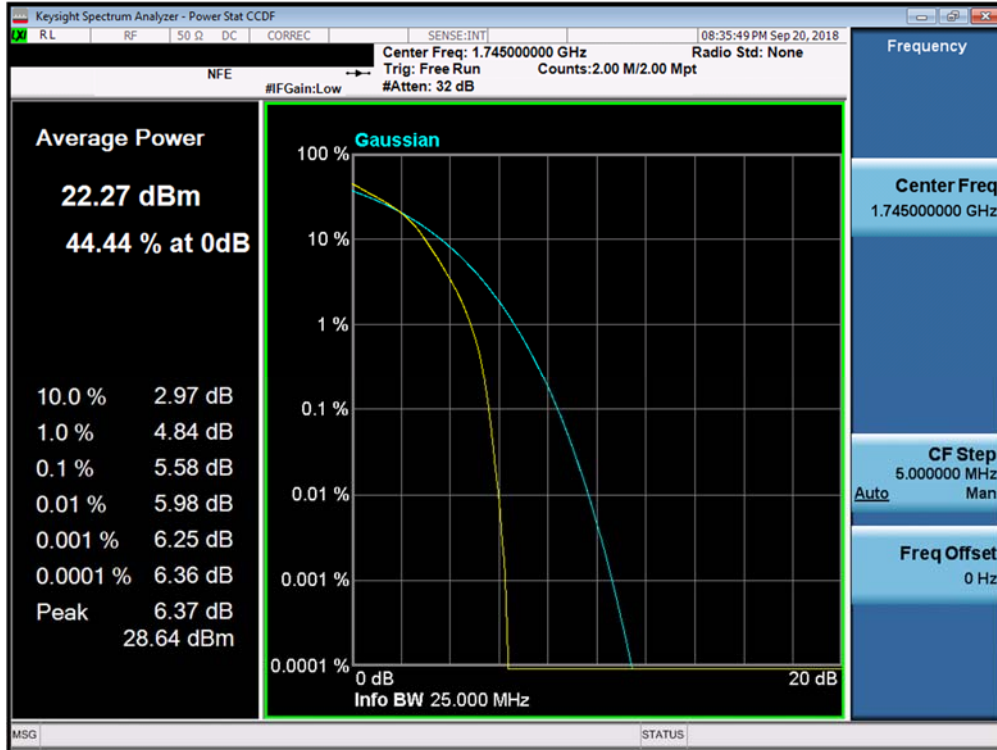


Plot 7-155. PAR Plot (Band 4 - 15.0MHz 64-QAM - Full RB Configuration)

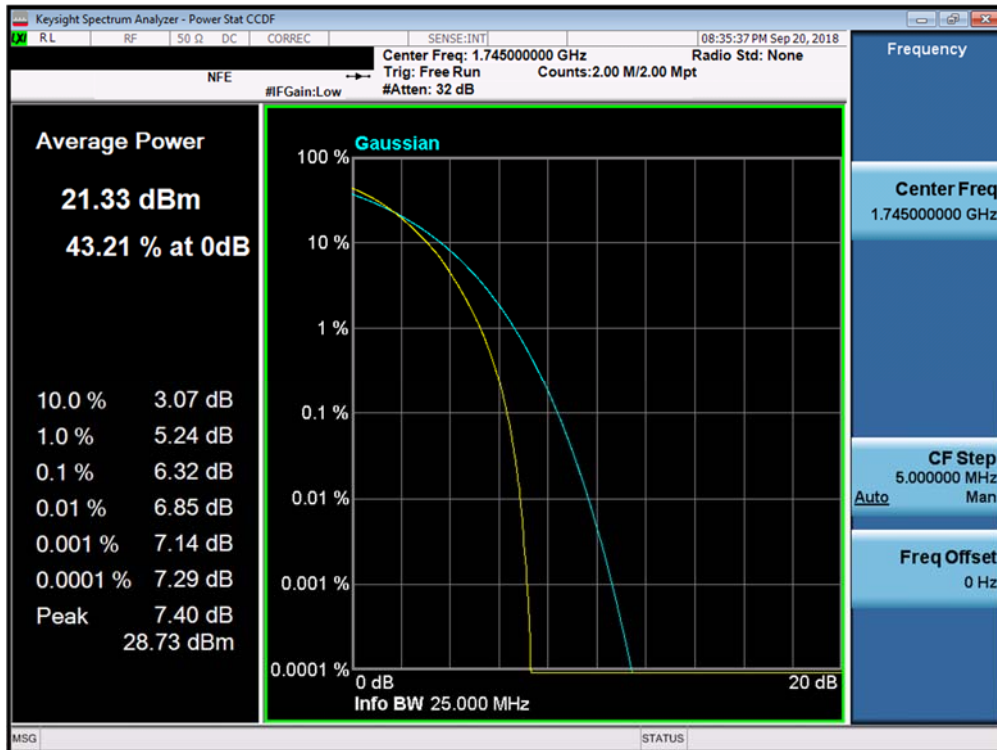


Plot 7-156. PAR Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA9200	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 99 of 143



Plot 7-157. PAR Plot (Band 4 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-158. PAR Plot (Band 4 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA9200	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1809140179-03.A3L	Test Dates: 8/30 - 10/18/2018	EUT Type: Portable Handset		Page 100 of 143

7.6 Uplink Carrier Aggregation

§27.53(m)

Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. 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.

For Band 41, the minimum permissible attenuation level of any spurious emission is $55 + \log_{10}(P_{[Watts]})$.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

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

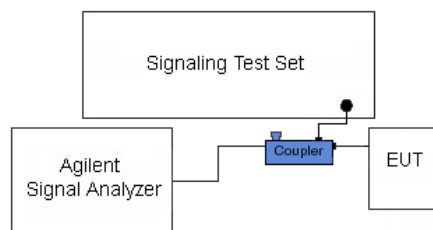


Figure 7-5. Test Instrument & Measurement Setup

FCC ID: A3LSMA9200	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Test Notes

1. Uplink carrier aggregation is only supported in this EUT while operating in Power Class 3.
2. Conducted power and spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device. The worst case (highest) powers were found while operating with QPSK modulation, as shown in Table 7-503 and 7-504 below, with both carriers set to transmit using 1RB.
3. Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, 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.

FCC ID: A3LSMA9200		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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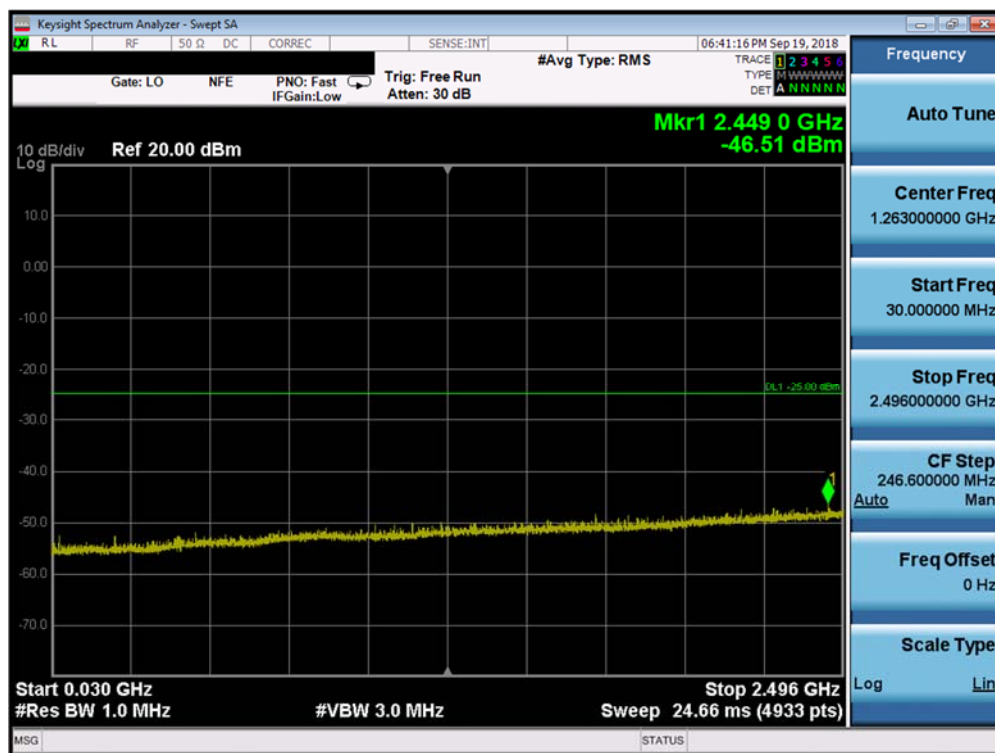
Power State	PCC							SCC							Power
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	5	40265	2557.5	QPSK	1	24	LTE B41	20	40382	2569.2	QPSK	1	0	24.73
Max	LTE B41	10	40290	2560	QPSK	1	49	LTE B41	15	40410	2572	QPSK	1	0	24.43
Max	LTE B41	10	40290	2560	QPSK	1	49	LTE B41	20	40434	2574.4	QPSK	1	0	24.36
Max	LTE B41	15	40315	2562.5	QPSK	1	74	LTE B41	10	40435	2574.5	QPSK	1	0	24.56
Max	LTE B41	15	40315	2562.5	QPSK	1	74	LTE B41	15	40465	2577.5	QPSK	1	0	24.27
Max	LTE B41	15	40315	2562.5	QPSK	1	74	LTE B41	20	40486	2579.6	QPSK	1	0	24.34
Max	LTE B41	20	40340	2565	QPSK	1	99	LTE B41	5	40457	2576.7	QPSK	1	0	24.41
Max	LTE B41	20	40340	2565	QPSK	1	99	LTE B41	10	40484	2579.4	QPSK	1	0	24.34
Max	LTE B41	20	40340	2565	QPSK	1	99	LTE B41	15	40511	2582.1	QPSK	1	0	24.36
Max	LTE B41	20	40340	2565	QPSK	1	99	LTE B41	20	40538	2584.8	QPSK	1	0	24.20
Max	LTE B41	5	40740	2605	QPSK	1	24	LTE B41	20	40857	2616.7	QPSK	1	0	24.05
Max	LTE B41	10	40740	2605	QPSK	1	49	LTE B41	15	40860	2617	QPSK	1	0	23.77
Max	LTE B41	10	40740	2605	QPSK	1	49	LTE B41	20	40884	2619.4	QPSK	1	0	23.67
Max	LTE B41	15	40740	2605	QPSK	1	74	LTE B41	10	40860	2617	QPSK	1	0	24.01
Max	LTE B41	15	40740	2605	QPSK	1	74	LTE B41	15	40890	2620	QPSK	1	0	23.68
Max	LTE B41	15	40740	2605	QPSK	1	74	LTE B41	20	40911	2622.1	QPSK	1	0	23.79
Max	LTE B41	20	40740	2605	QPSK	1	99	LTE B41	5	40857	2616.7	QPSK	1	0	23.99
Max	LTE B41	20	40740	2605	QPSK	1	99	LTE B41	10	40884	2619.4	QPSK	1	0	23.97
Max	LTE B41	20	40740	2605	QPSK	1	99	LTE B41	15	40911	2622.1	QPSK	1	0	23.99
Max	LTE B41	20	40740	2605	QPSK	1	99	LTE B41	20	40938	2624.8	QPSK	1	0	23.73
Max	LTE B41	5	41215	2652.5	QPSK	1	24	LTE B41	20	41332	2664.2	QPSK	1	0	23.95
Max	LTE B41	10	41190	2650	QPSK	1	49	LTE B41	15	41310	2662	QPSK	1	0	23.78
Max	LTE B41	10	41190	2650	QPSK	1	49	LTE B41	20	41334	2664.4	QPSK	1	0	23.69
Max	LTE B41	15	41165	2647.5	QPSK	1	74	LTE B41	10	41285	2659.5	QPSK	1	0	24.09
Max	LTE B41	15	41165	2647.5	QPSK	1	74	LTE B41	15	41315	2662.5	QPSK	1	0	23.72
Max	LTE B41	15	41165	2647.5	QPSK	1	74	LTE B41	20	41336	2664.6	QPSK	1	0	23.84
Max	LTE B41	20	41140	2645	QPSK	1	99	LTE B41	5	41257	2656.7	QPSK	1	0	24.16
Max	LTE B41	20	41140	2645	QPSK	1	99	LTE B41	10	41284	2659.4	QPSK	1	0	24.11
Max	LTE B41	20	41140	2645	QPSK	1	99	LTE B41	15	41311	2662.1	QPSK	1	0	24.09
Max	LTE B41	20	41140	2645	QPSK	1	99	LTE B41	20	41338	2664.8	QPSK	1	0	23.76

Table 7-3. Conducted Powers (B41 – PCC: RB Size 1 Offset Max SCC: RB Size 1 Offset 0)

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Power State	PCC							SCC							Power
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	40340	2565	QPSK	1	0	LTE B41	20	40538	2584.8	QPSK	1	0	20.57
Max	LTE B41	20	40340	2565	QPSK	1	99	LTE B41	20	40538	2584.8	QPSK	1	99	20.25
Max	LTE B41	20	40340	2565	QPSK	1	0	LTE B41	20	40538	2584.8	QPSK	1	99	16.18
Max	LTE B41	20	40340	2565	QPSK	1	50	LTE B41	20	40538	2584.8	QPSK	1	50	20.40
Max	LTE B41	20	40340	2565	QPSK	1	99	LTE B41	20	40538	2584.8	QPSK	1	0	24.16
Max	LTE B41	20	40340	2565	QPSK	100	0	LTE B41	20	40538	2584.8	QPSK	100	0	22.49
Max	LTE B41	20	40340	2565	16-QAM	100	0	LTE B41	20	40538	2584.8	16-QAM	100	0	21.52
Max	LTE B41	20	40340	2565	64-QAM	100	0	LTE B41	20	40538	2584.8	64-QAM	100	0	21.56

Table 7-4. Conducted Powers (B41 with Various Combinations for 20MHz Channel Bandwidth)



Plot 7-159. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

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