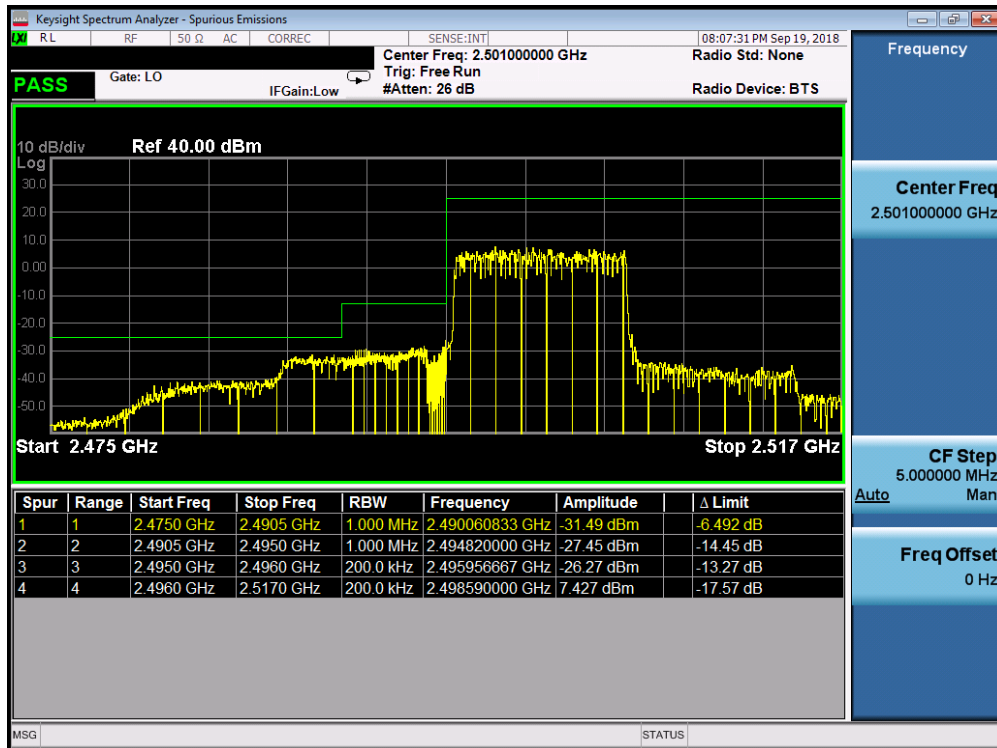
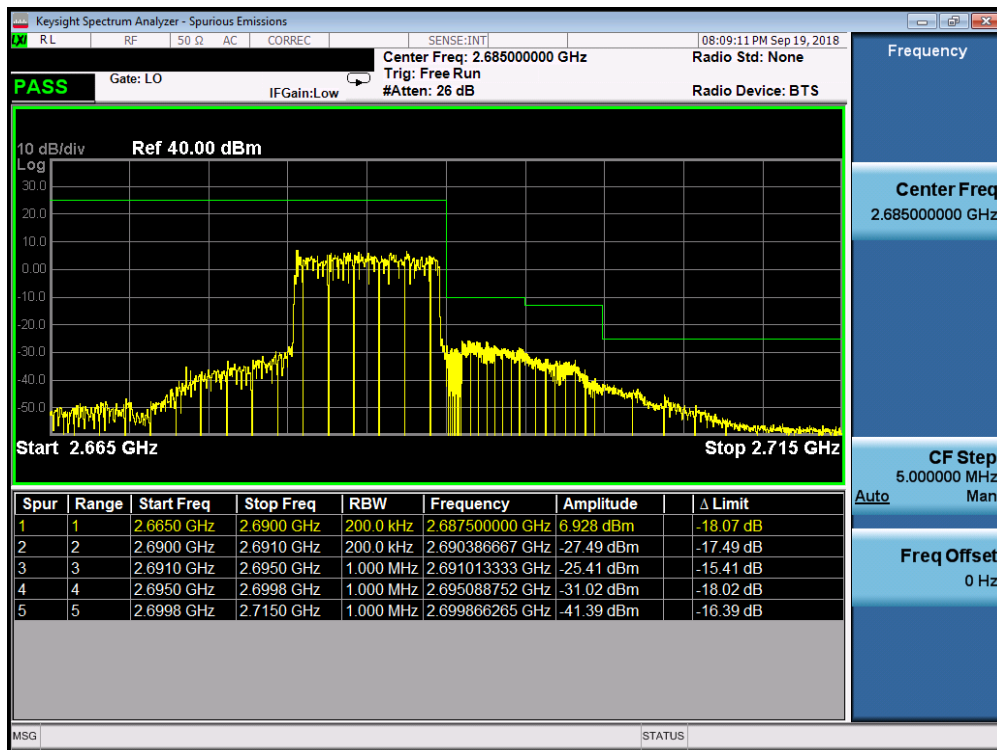


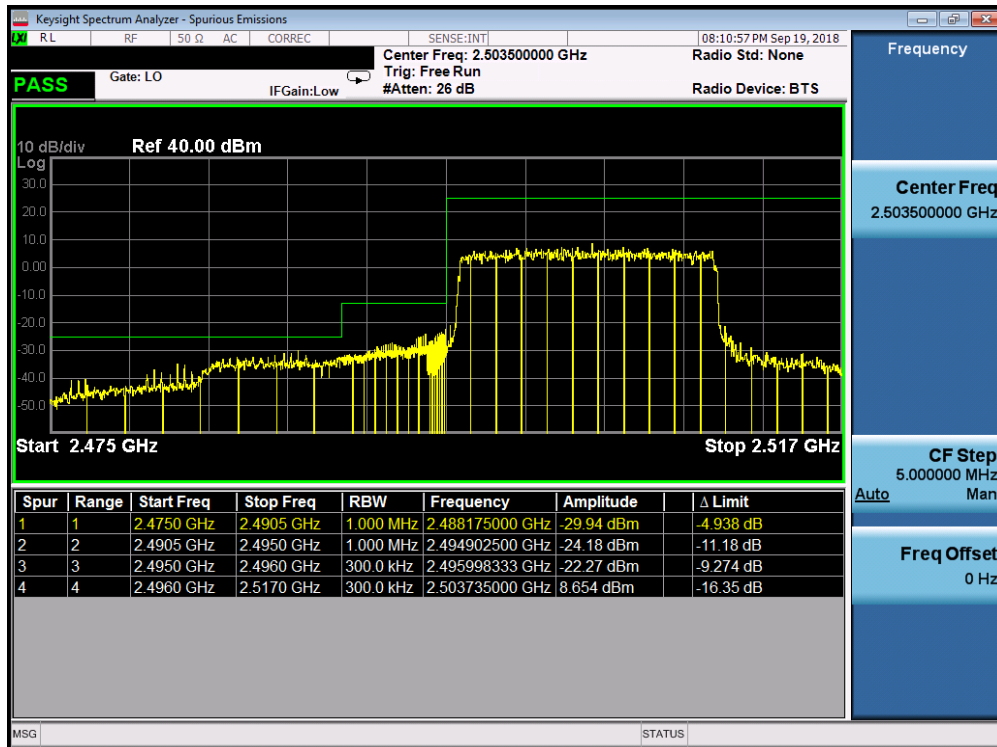


Plot 7-220. Lower ACP Plot at 2496 MHz (Band 41 - 10.0MHz QPSK - Full RB Configuration)

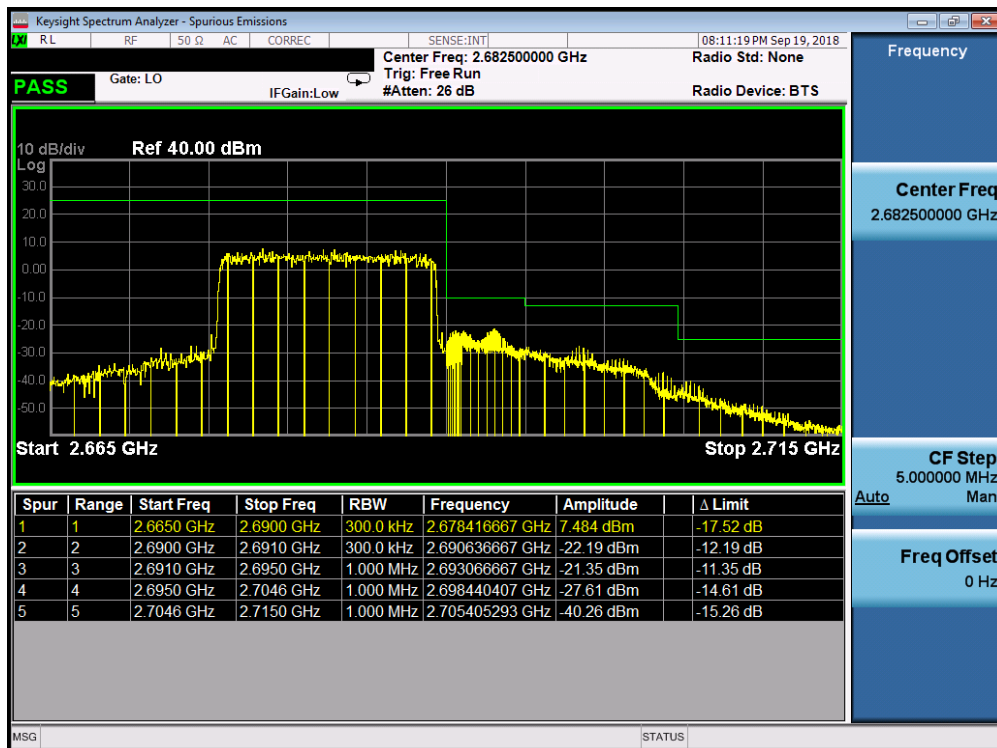


Plot 7-221. Upper ACP Plot (Band 41 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 133 of 189	

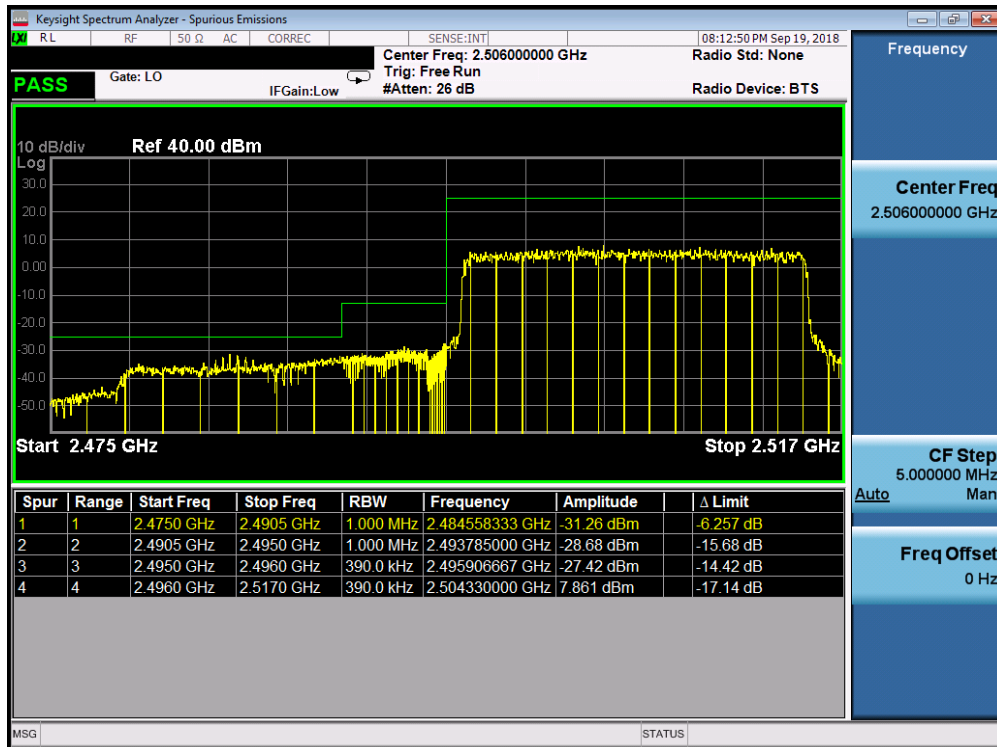


Plot 7-222. Lower ACP Plot at 2496 MHz (Band 41 - 15.0MHz QPSK - Full RB Configuration)

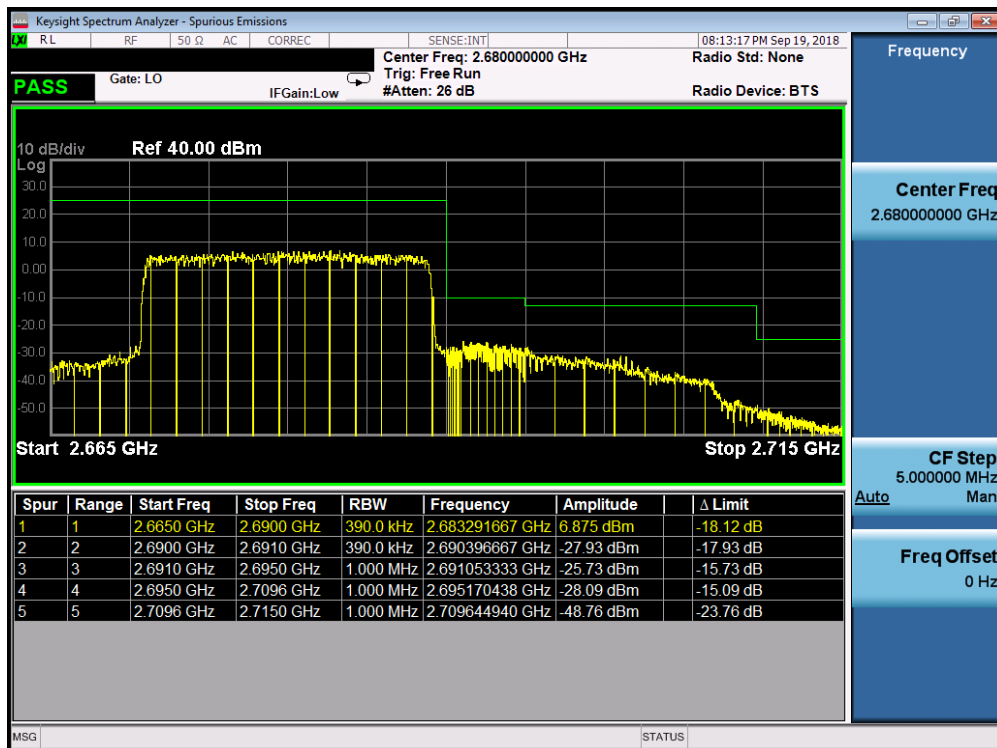


Plot 7-223. Upper ACP Plot (Band 41 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 134 of 189	



Plot 7-224. Lower ACP Plot at 2496 MHz (Band 41 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-225. Upper ACP Plot (Band 41 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 135 of 189

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.

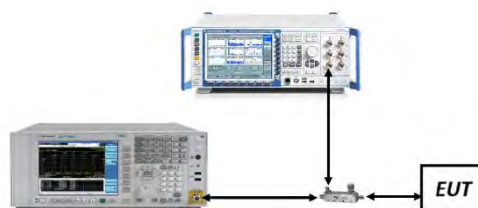


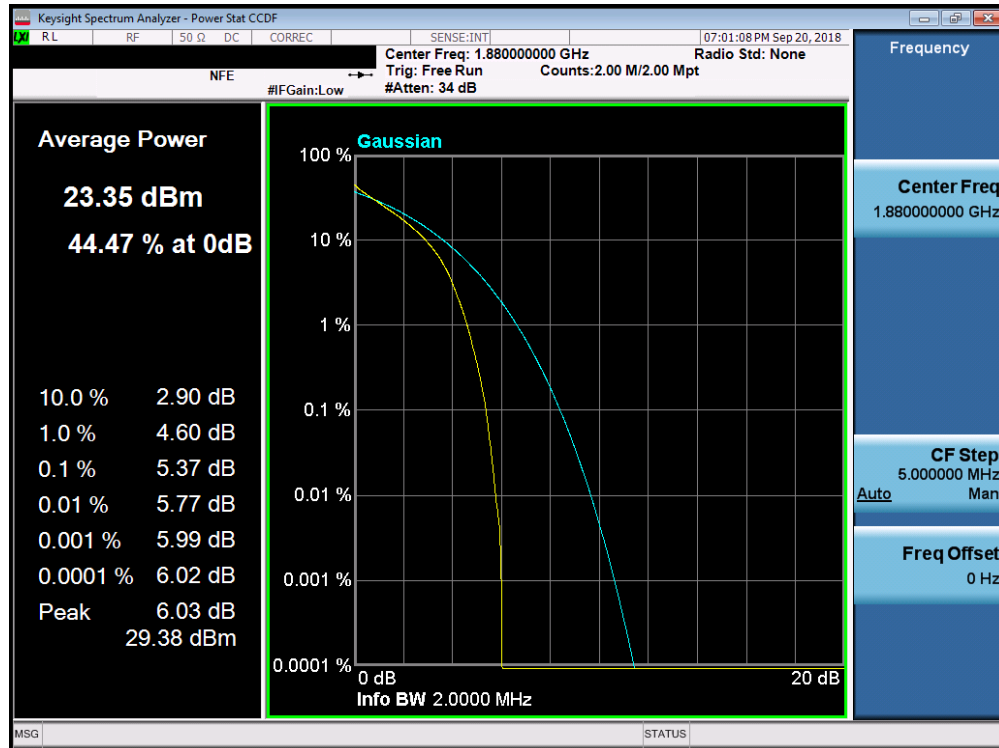
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

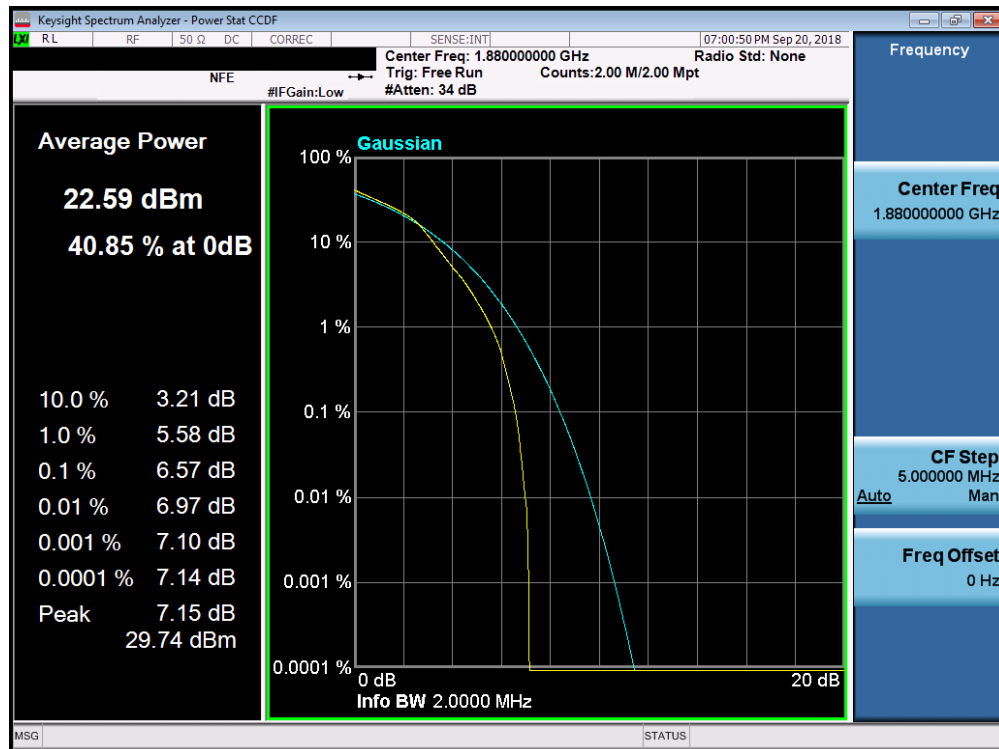
None.

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 136 of 189

Band 2

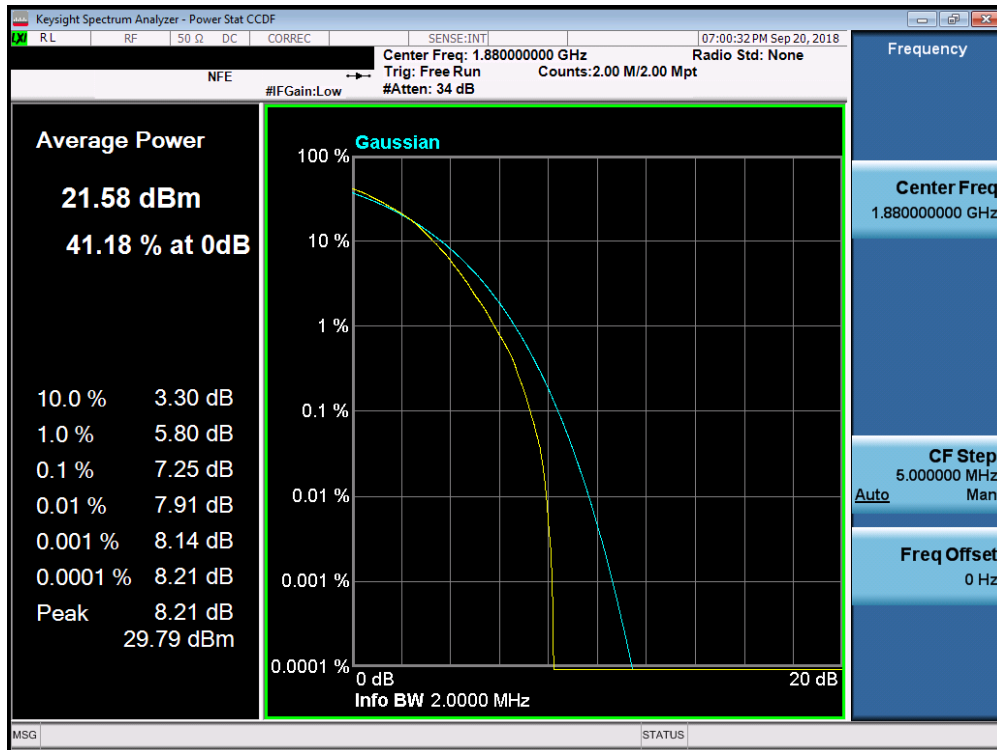


Plot 7-226. PAR Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

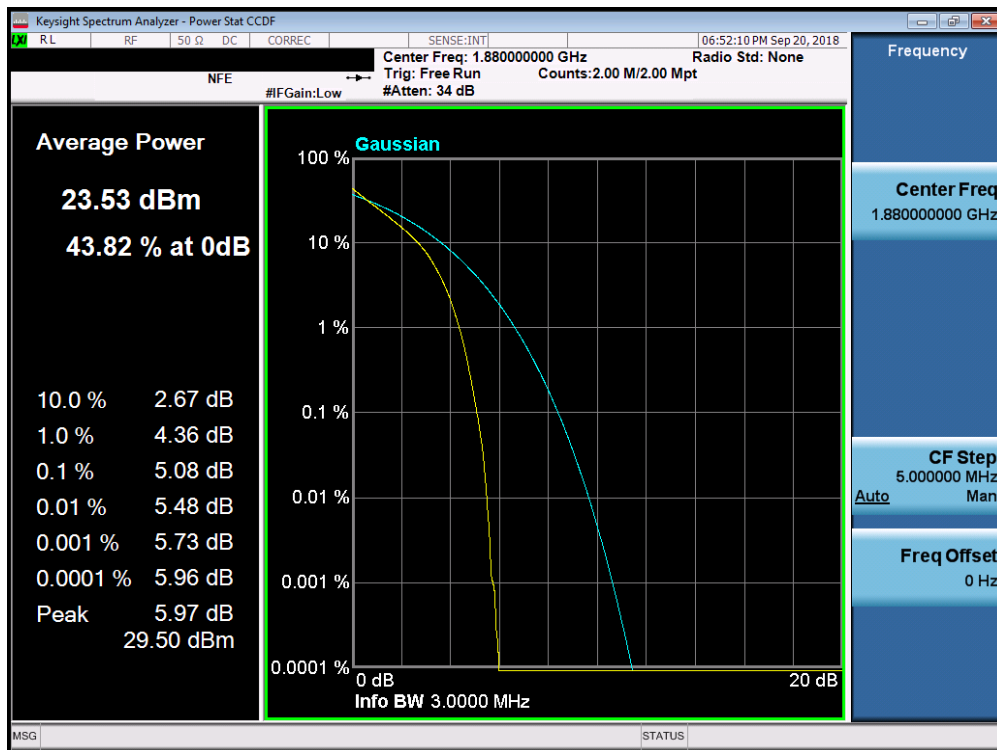


Plot 7-227. PAR Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA920F	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 137 of 189

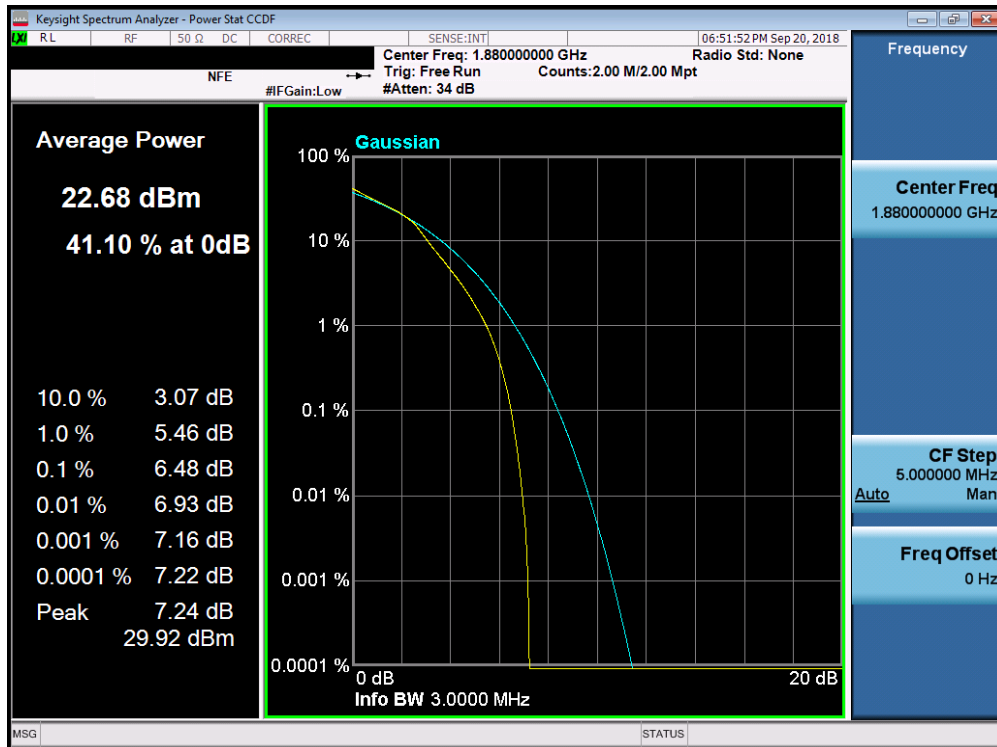


Plot 7-228. PAR Plot (Band 2 - 1.4MHz 64-QAM - Full RB Configuration)

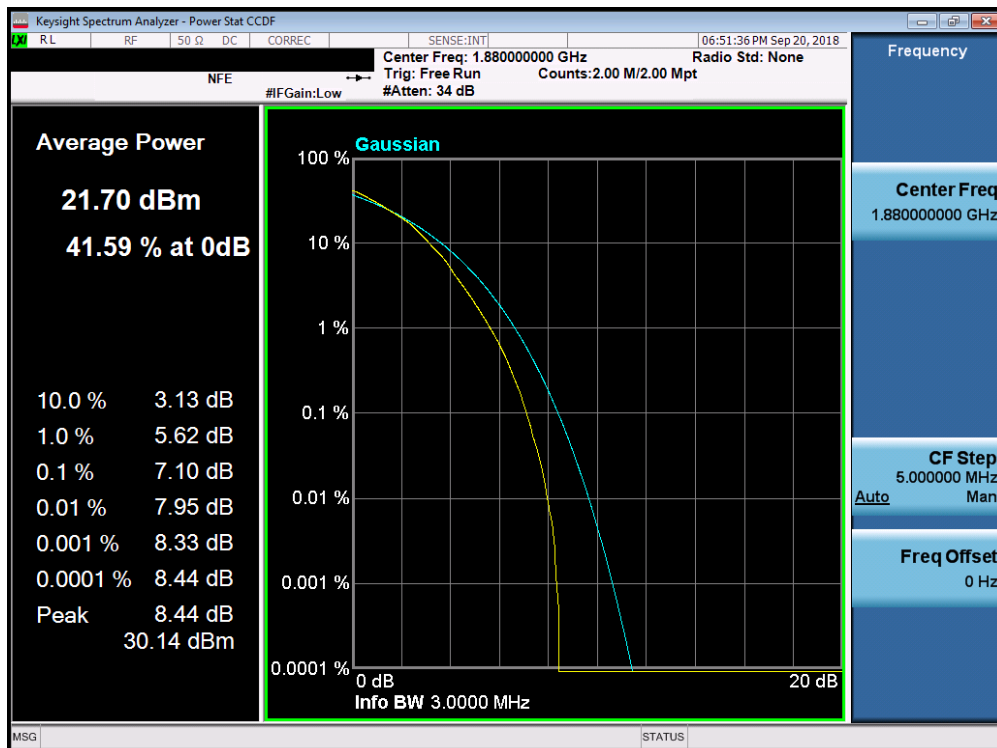


Plot 7-229. PAR Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 138 of 189

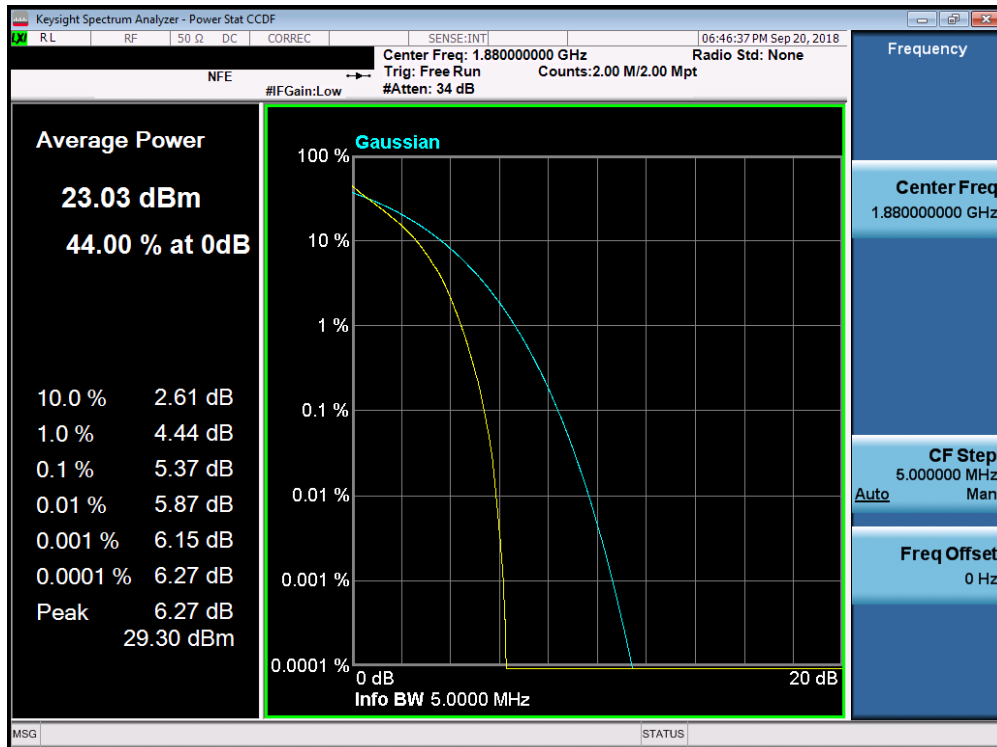


Plot 7-230. PAR Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)

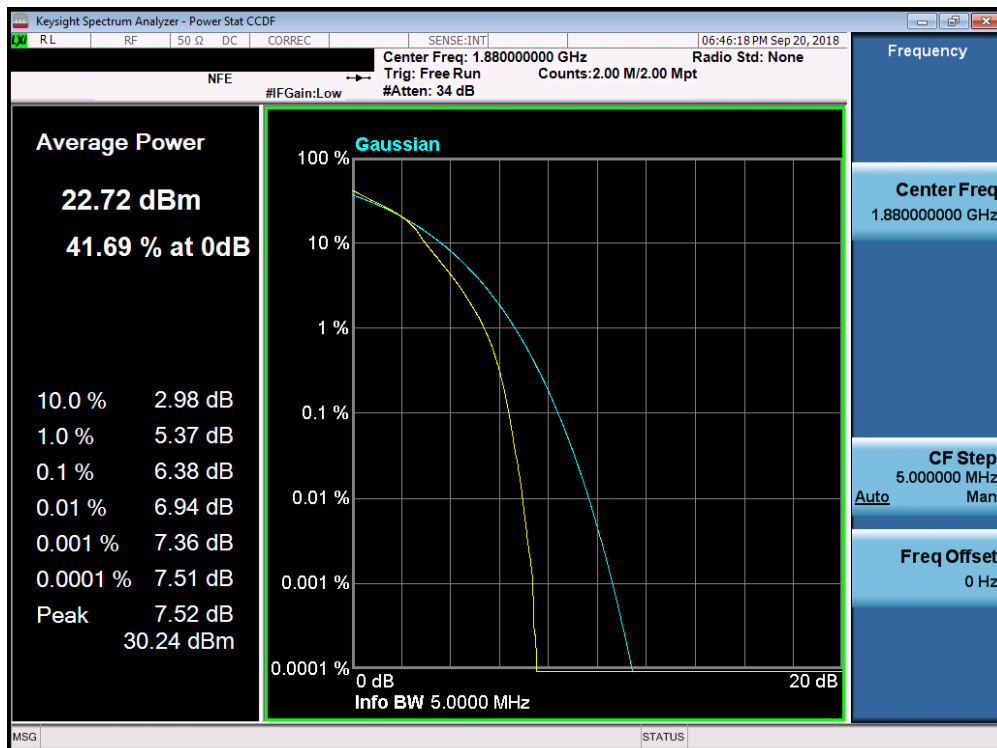


Plot 7-231. PAR Plot (Band 2 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA920F	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 139 of 189

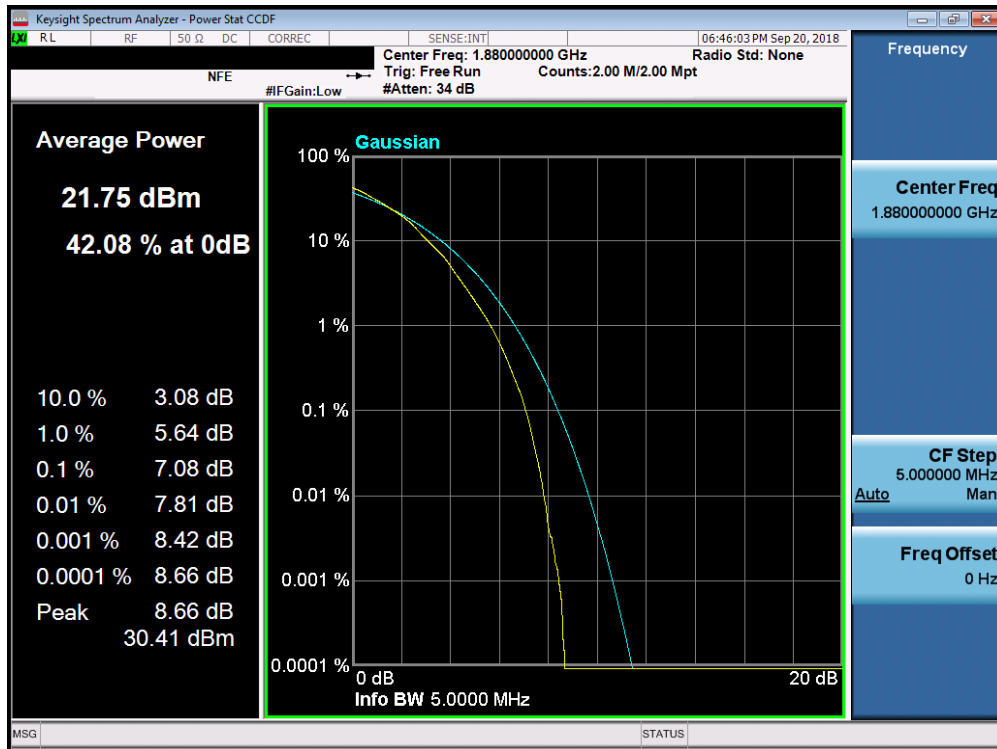


Plot 7-232. PAR Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

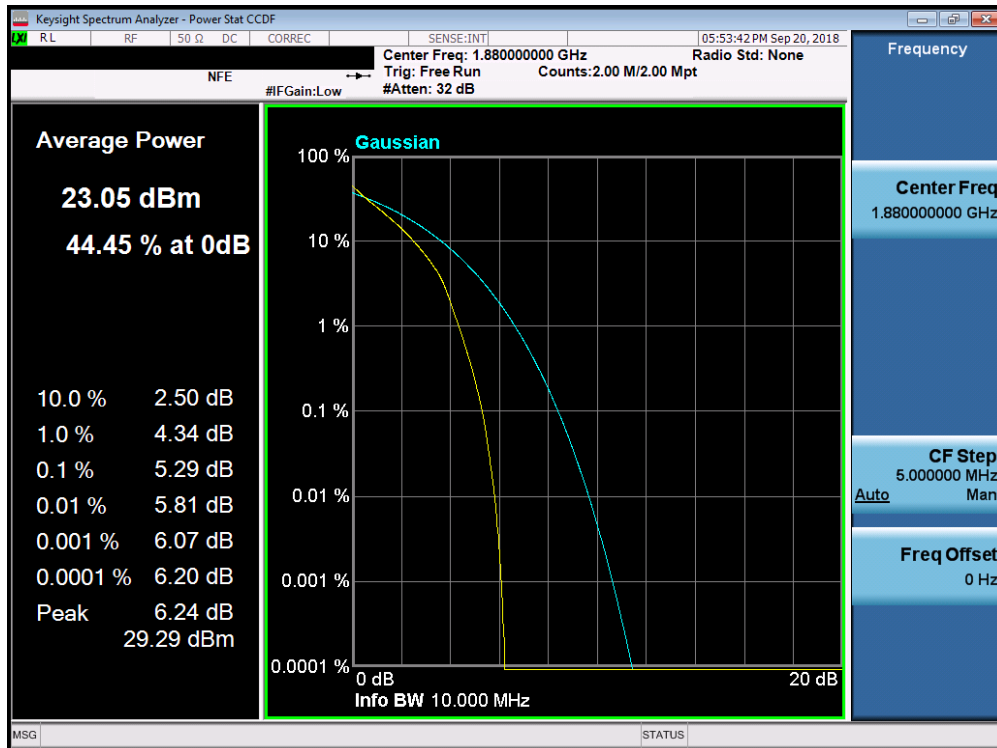


Plot 7-233. PAR Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 140 of 189

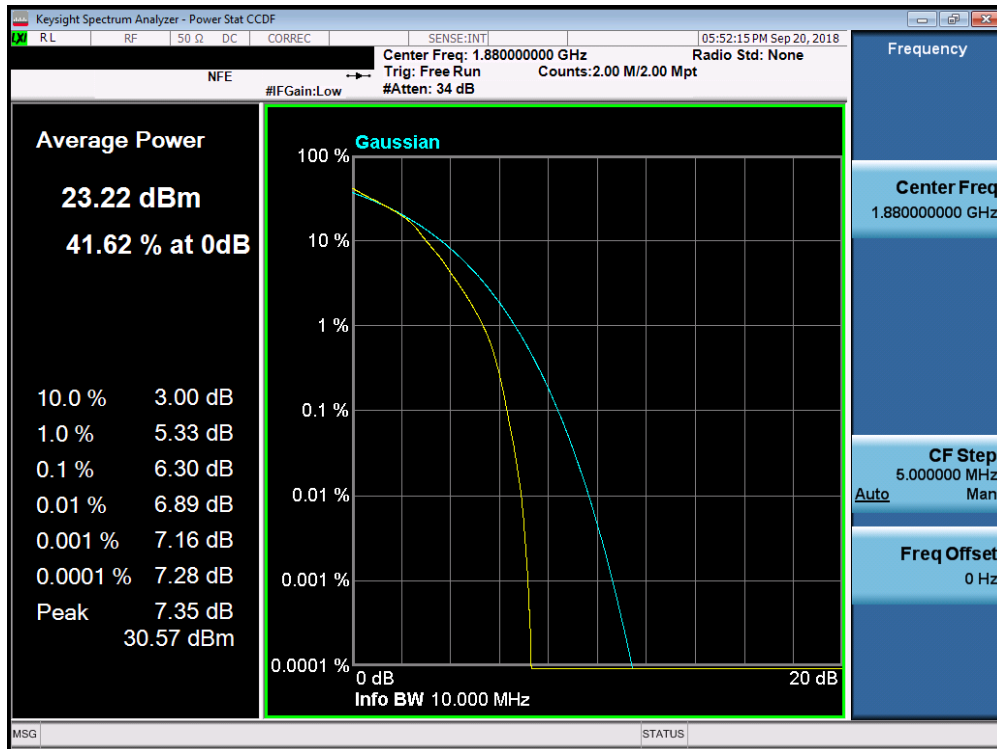


Plot 7-234. PAR Plot (Band 2 - 5.0MHz 64-QAM - Full RB Configuration)

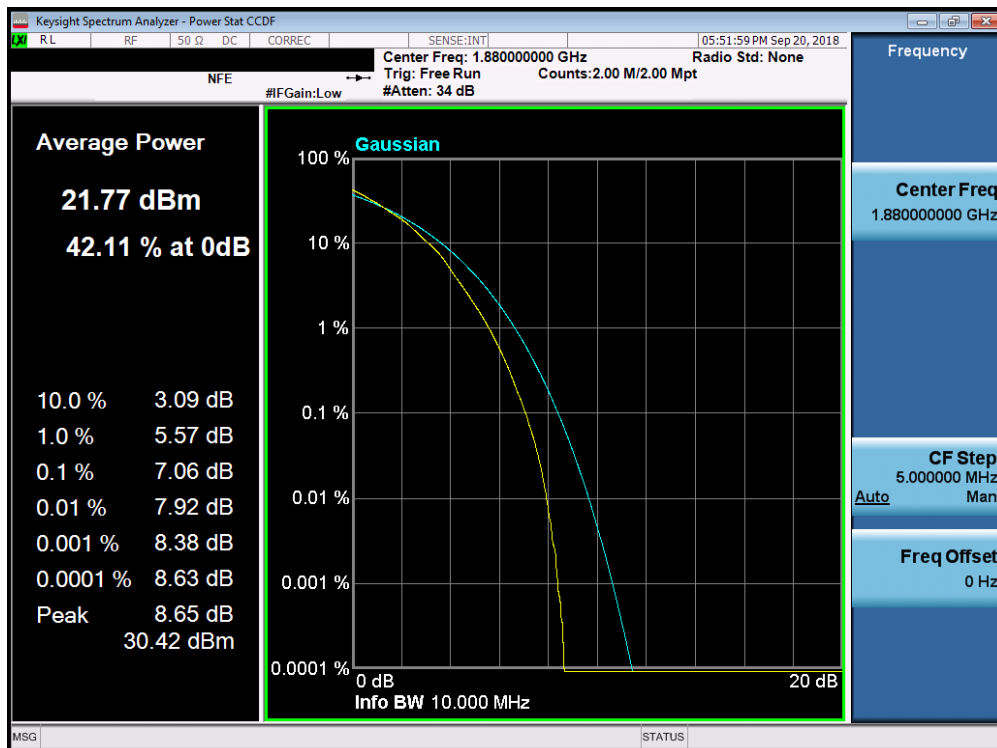


Plot 7-235. PAR Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 141 of 189

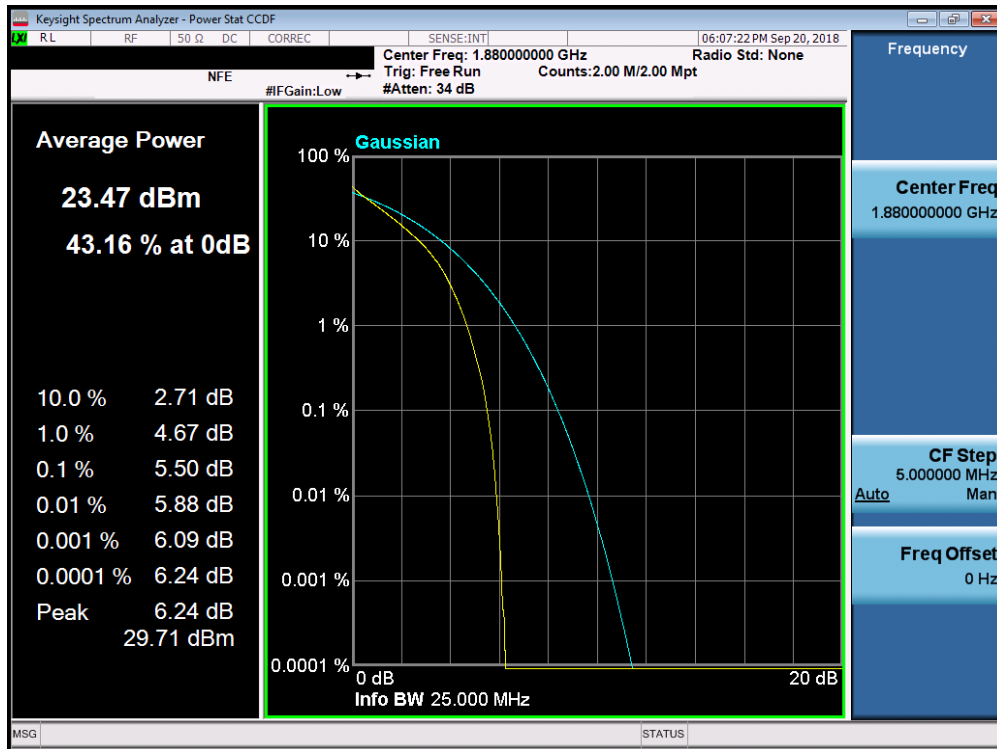


Plot 7-236. PAR Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

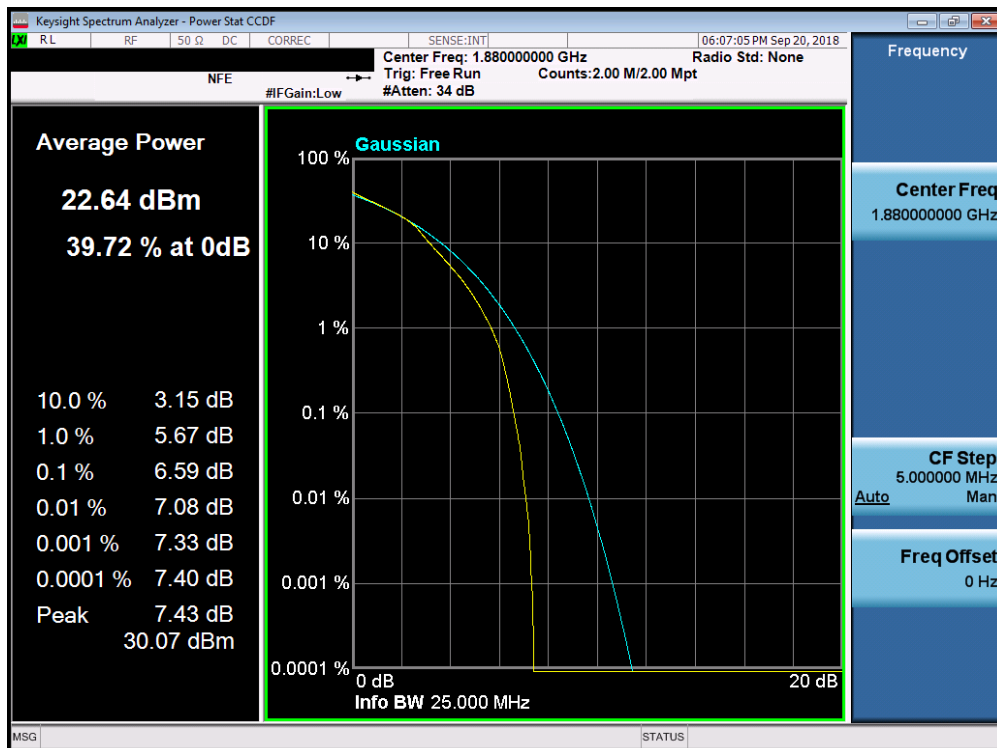


Plot 7-237. PAR Plot (Band 2 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 142 of 189

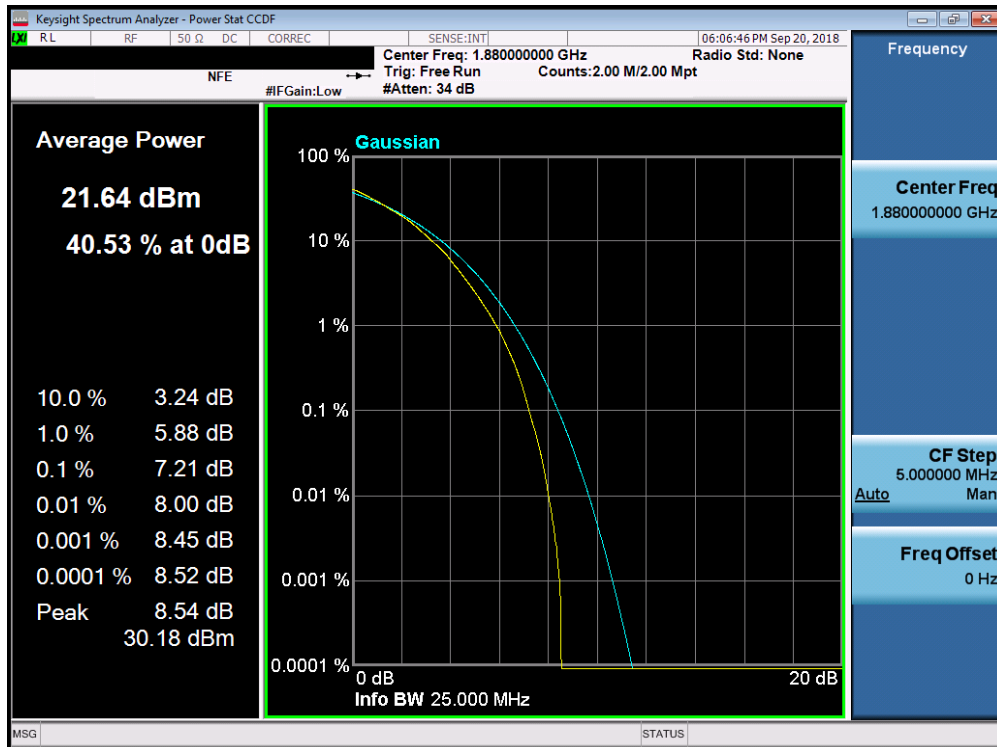


Plot 7-238. PAR Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

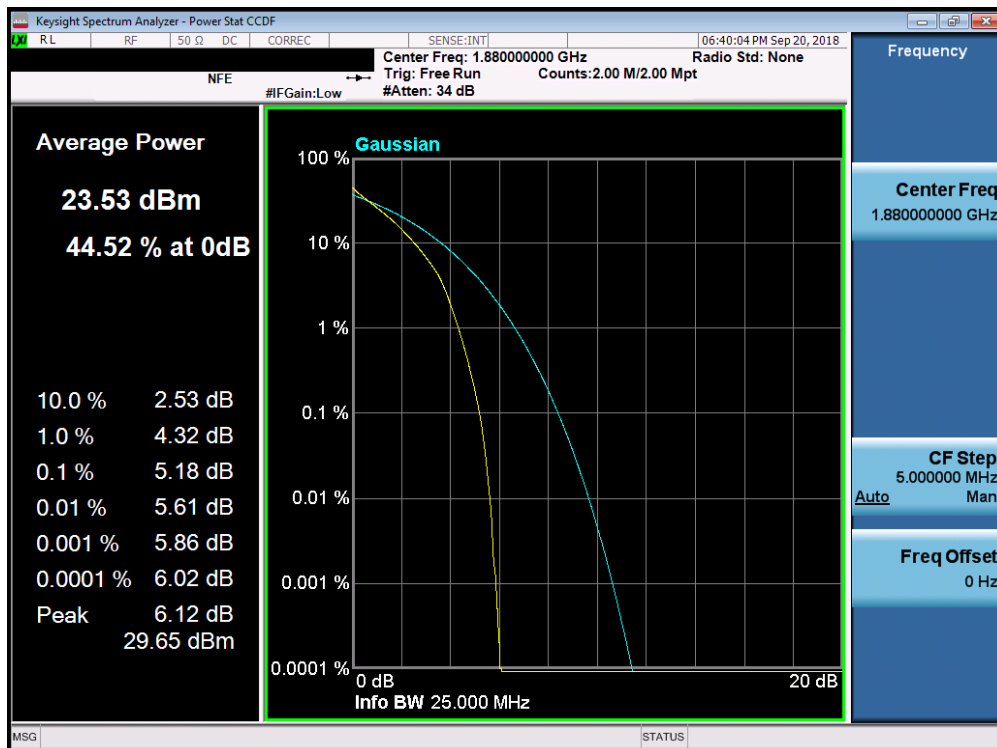


Plot 7-239. PAR Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 143 of 189

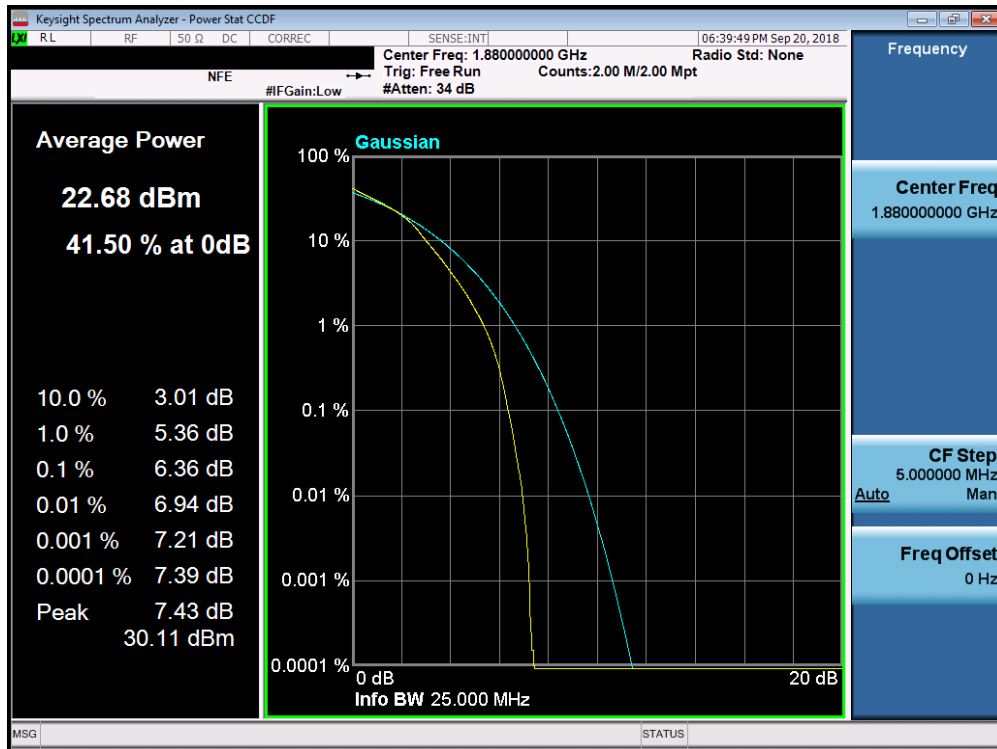


Plot 7-240. PAR Plot (Band 2 - 15.0MHz 64-QAM - Full RB Configuration)

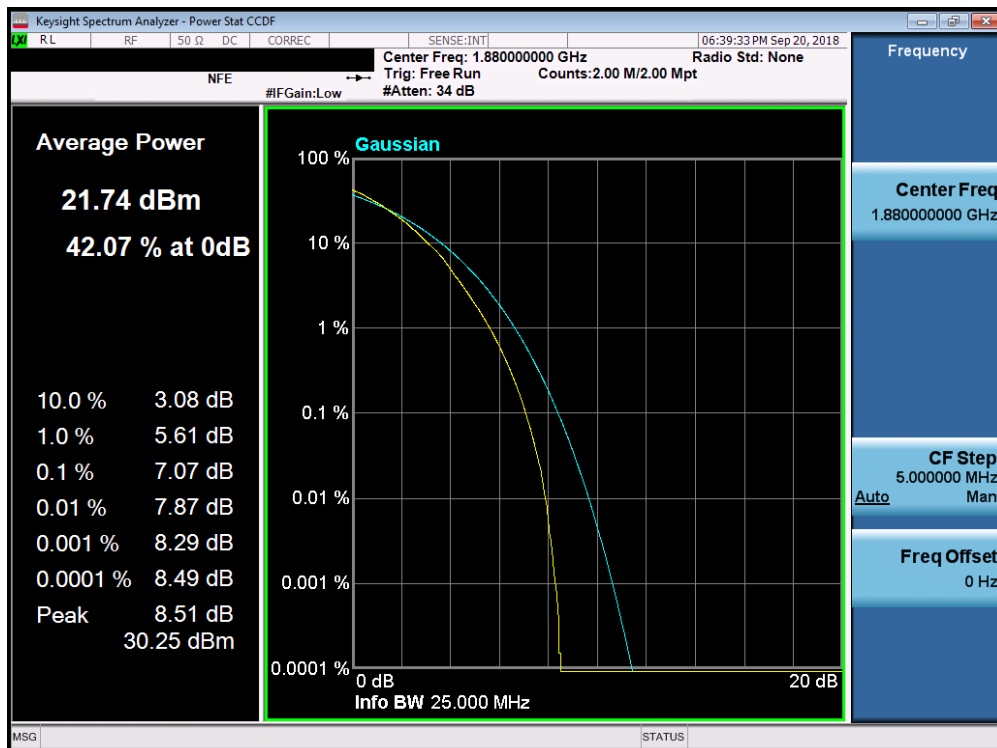


Plot 7-241. PAR Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 144 of 189



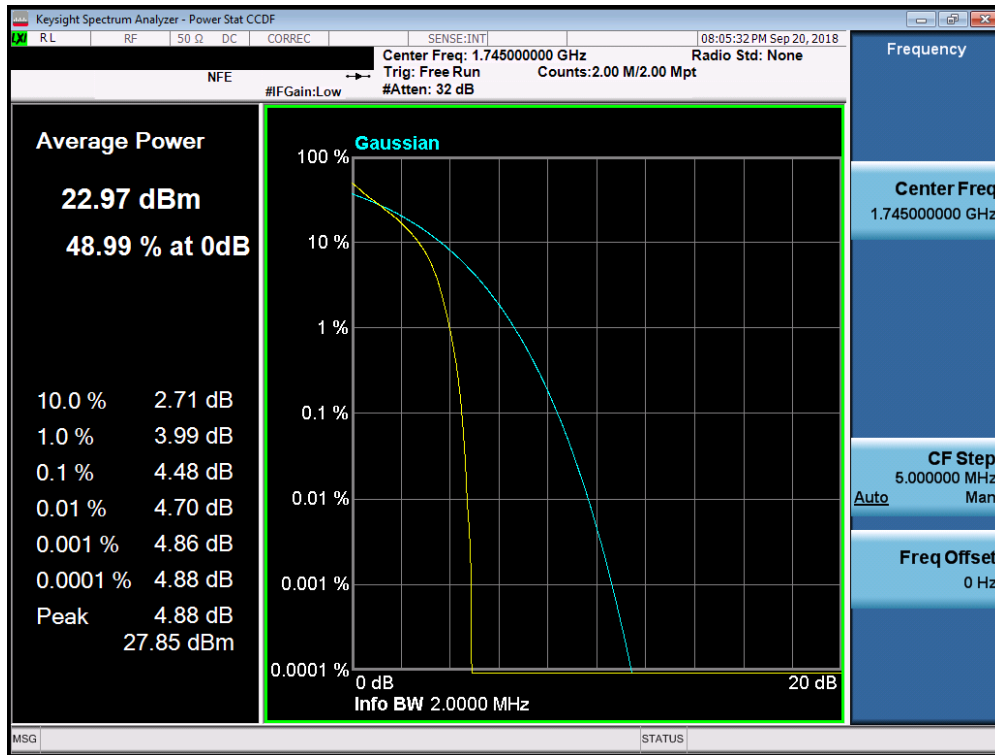
Plot 7-242. PAR Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)



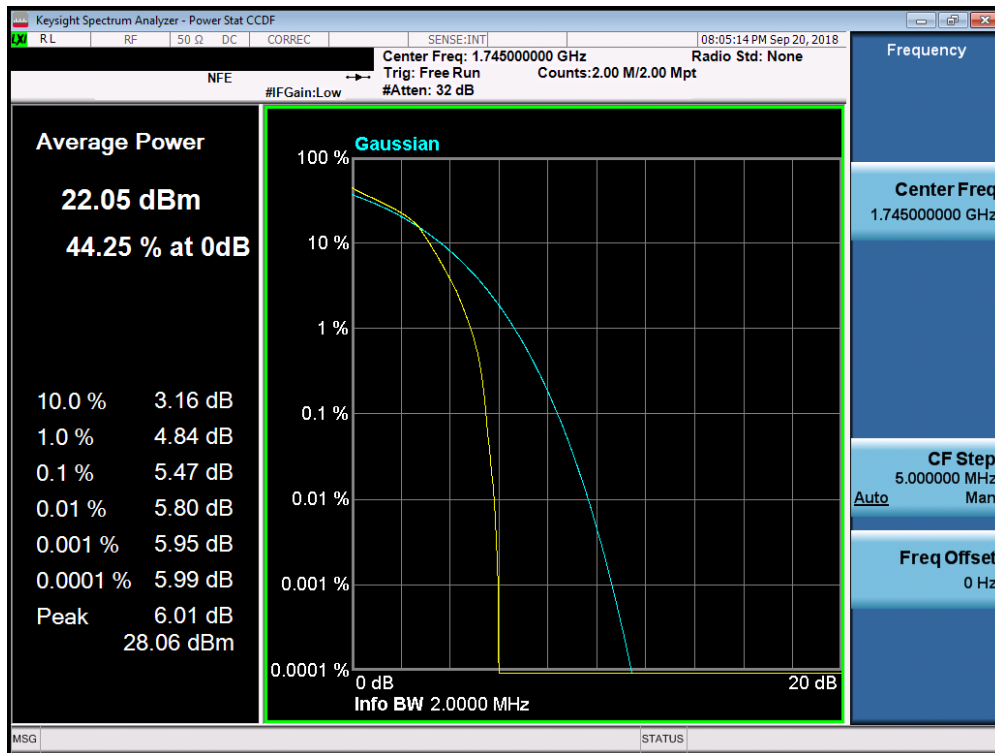
Plot 7-243. PAR Plot (Band 2 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 145 of 189

Band 66/4

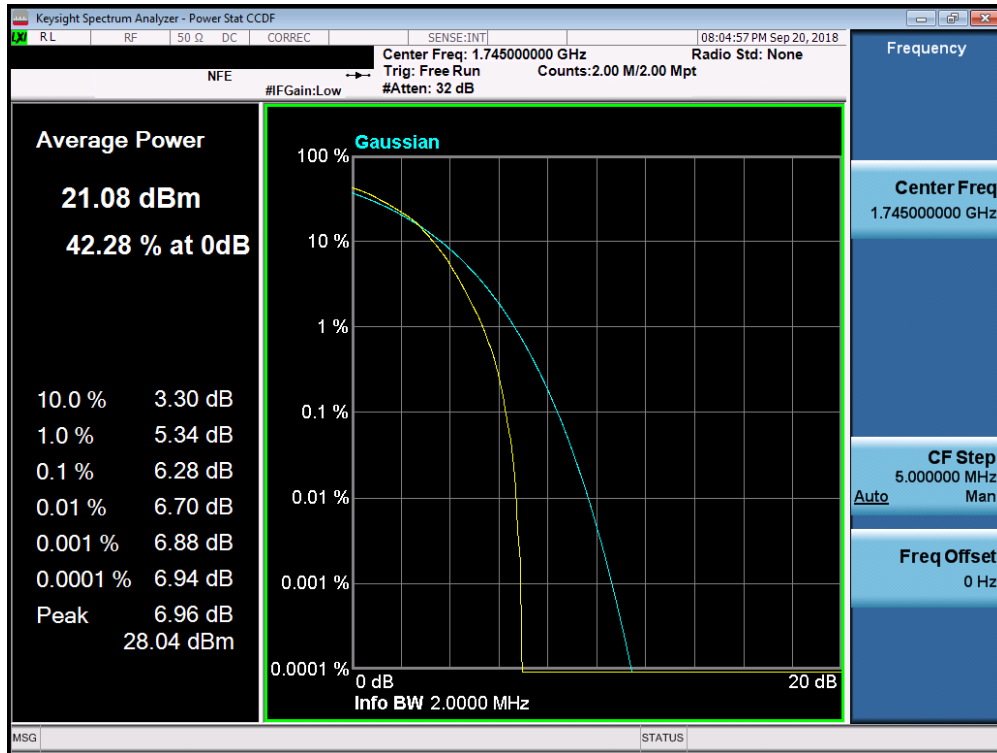


Plot 7-244. PAR Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)

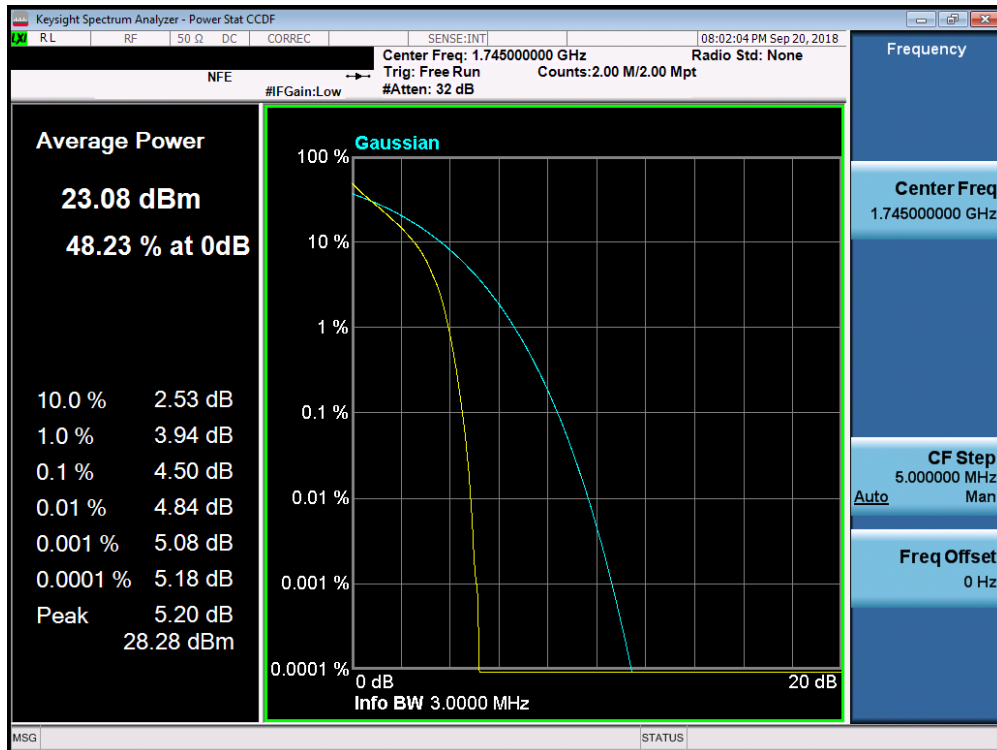


Plot 7-245. PAR Plot (Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA920F	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 146 of 189

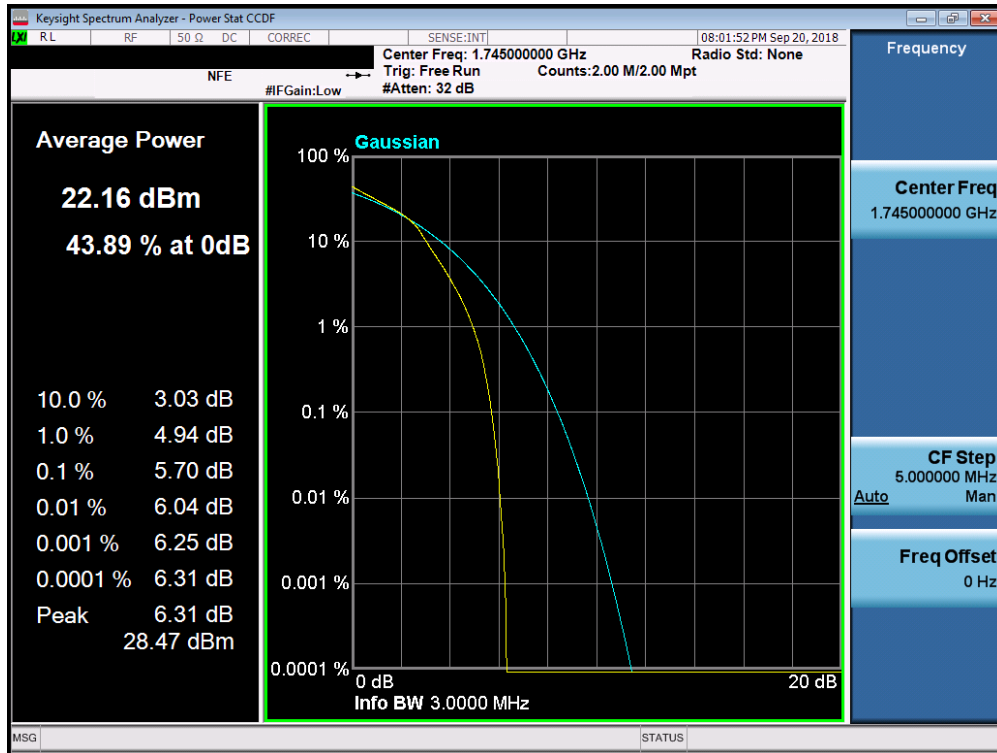


Plot 7-246. PAR Plot (Band 66/4 - 1.4MHz 64-QAM - Full RB Configuration)

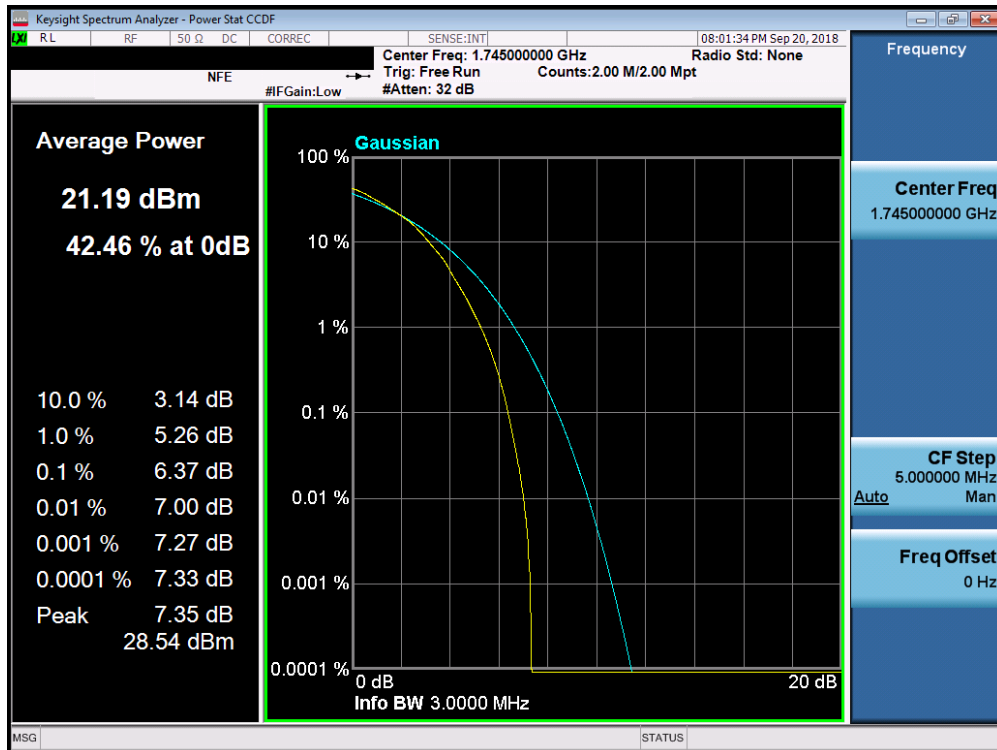


Plot 7-247. PAR Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA920F	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 147 of 189

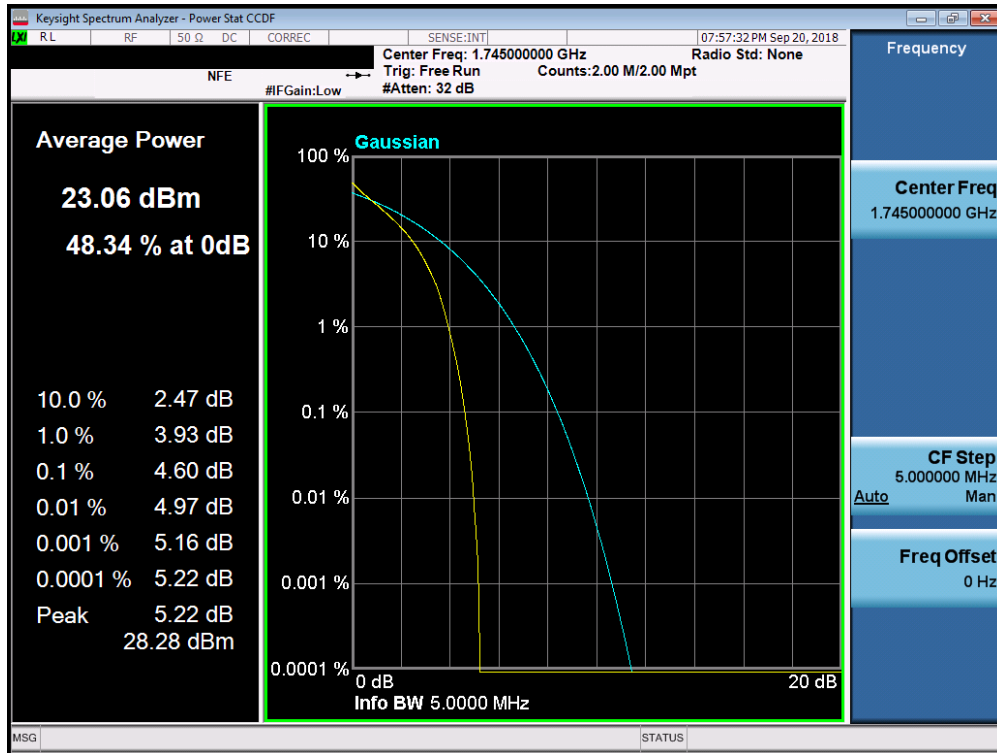


Plot 7-248. PAR Plot (Band 66/4 - 3.0MHz 16-QAM - Full RB Configuration)

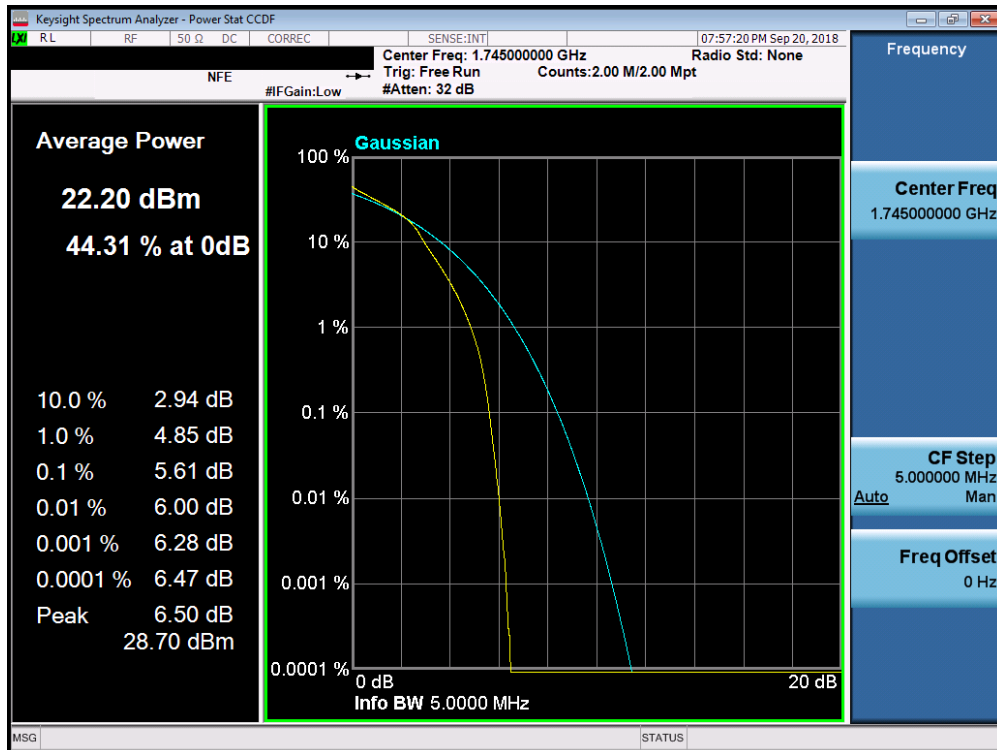


Plot 7-249. PAR Plot (Band 66/4 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 148 of 189

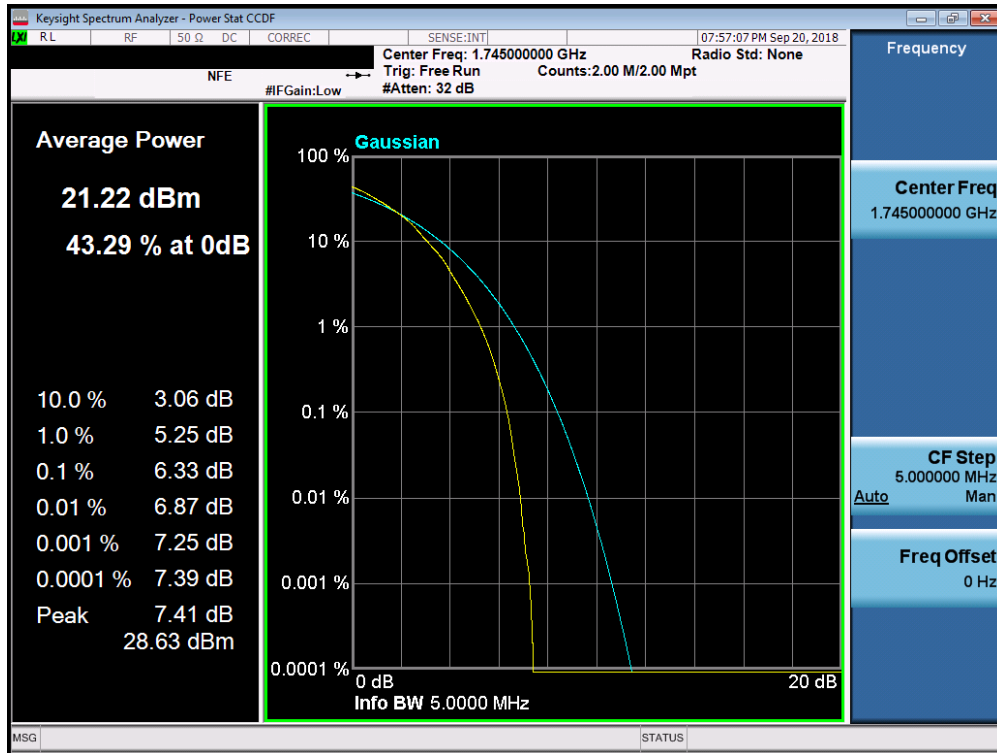


Plot 7-250. PAR Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)

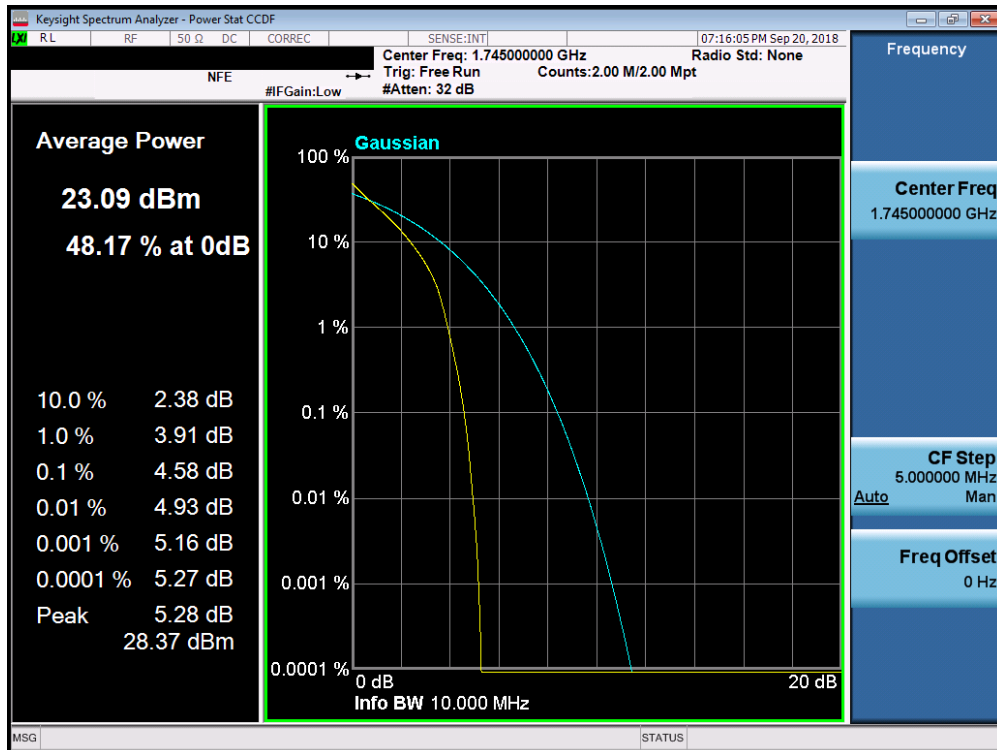


Plot 7-251. PAR Plot (Band 66/4 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 149 of 189

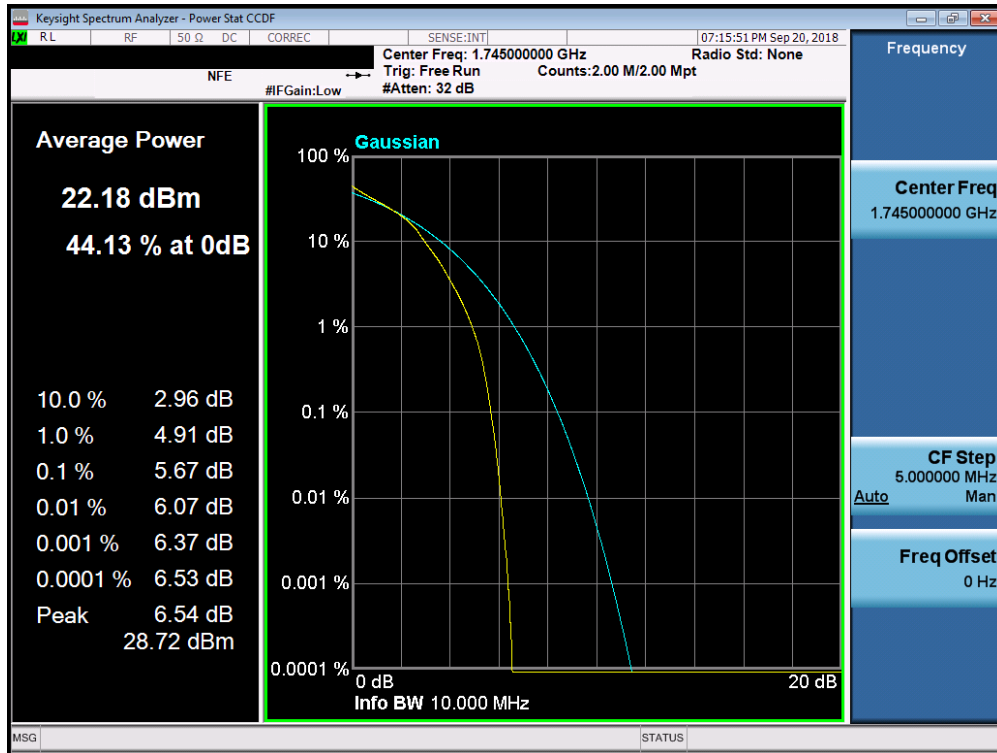


Plot 7-252. PAR Plot (Band 66/4 - 5.0MHz 64-QAM - Full RB Configuration)

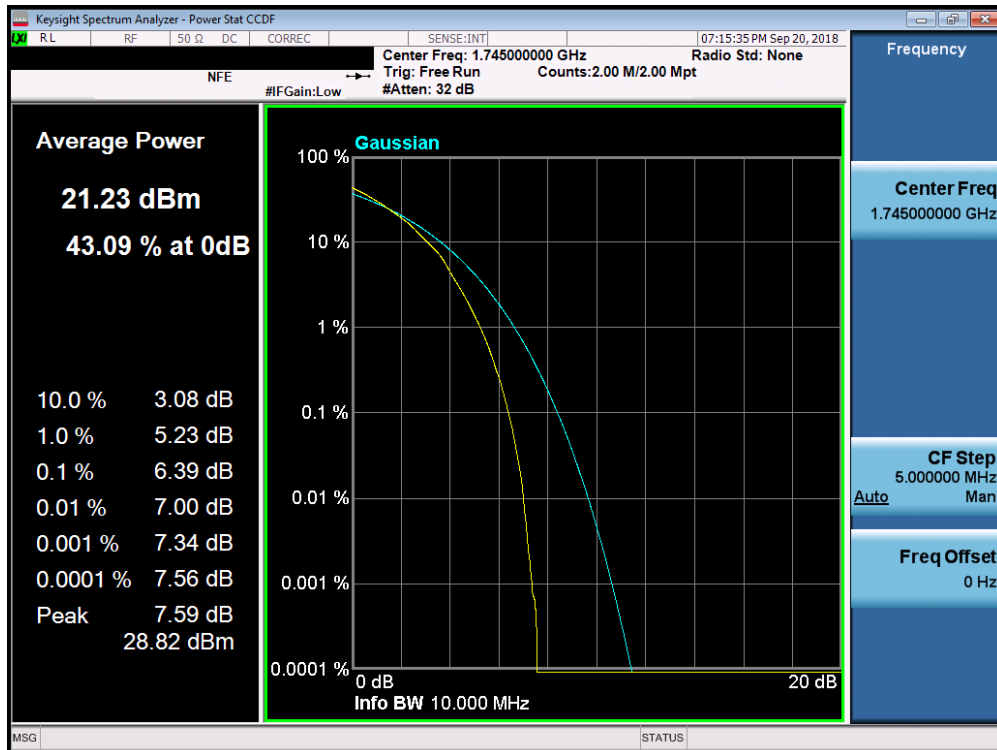


Plot 7-253. PAR Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 150 of 189

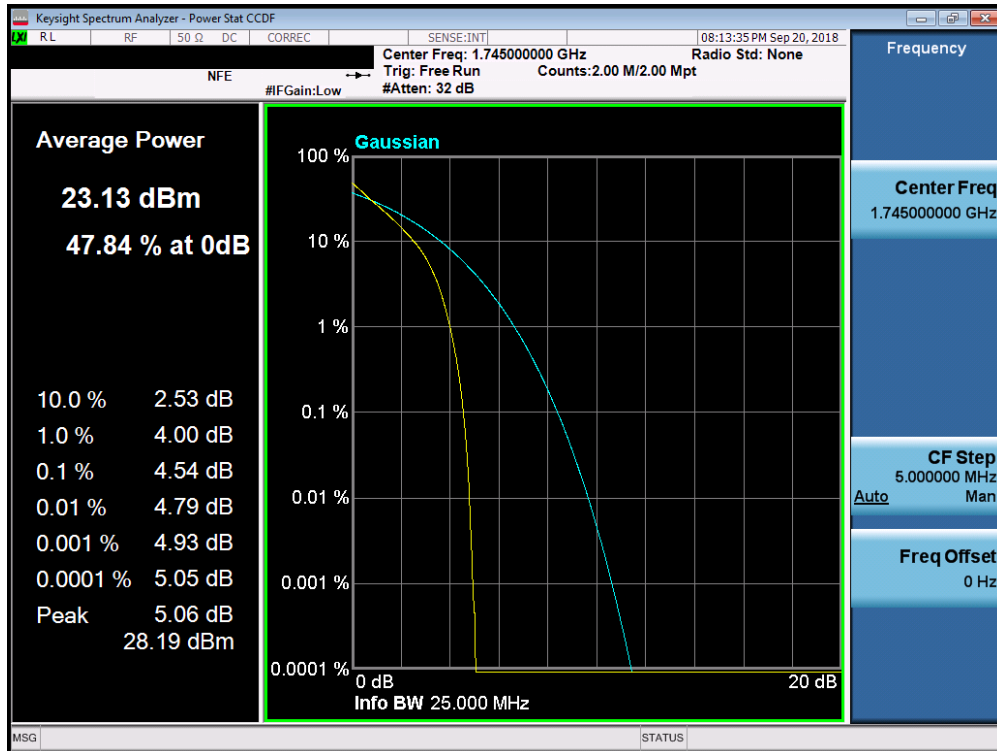


Plot 7-254. PAR Plot (Band 66/4 - 10.0MHz 16-QAM - Full RB Configuration)

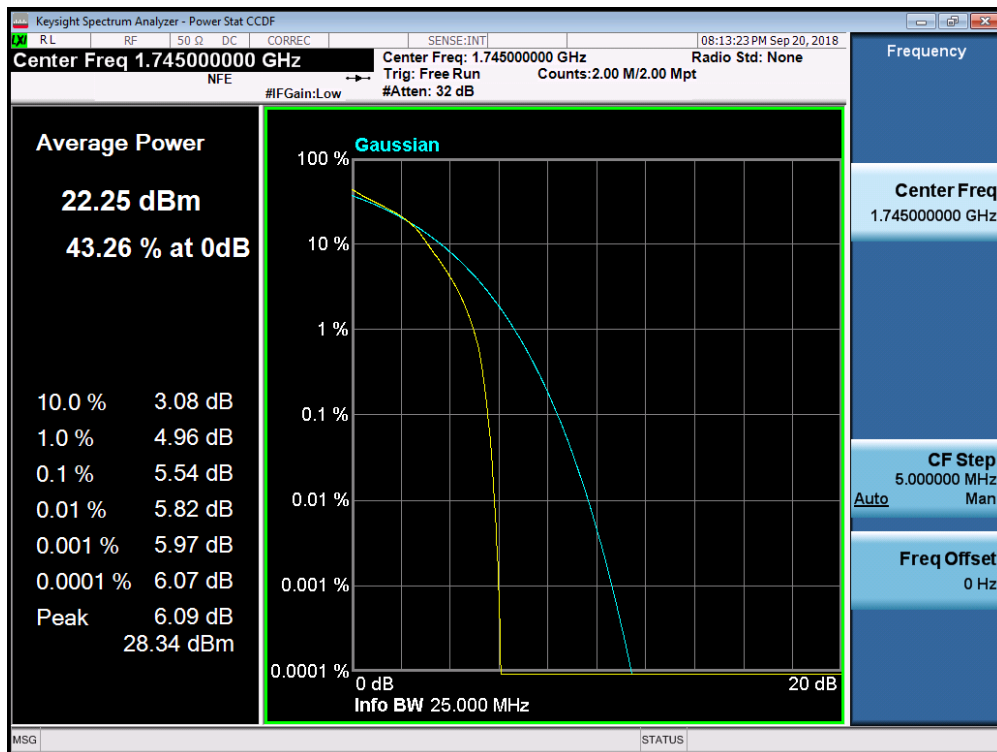


Plot 7-255. PAR Plot (Band 66/4 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 151 of 189

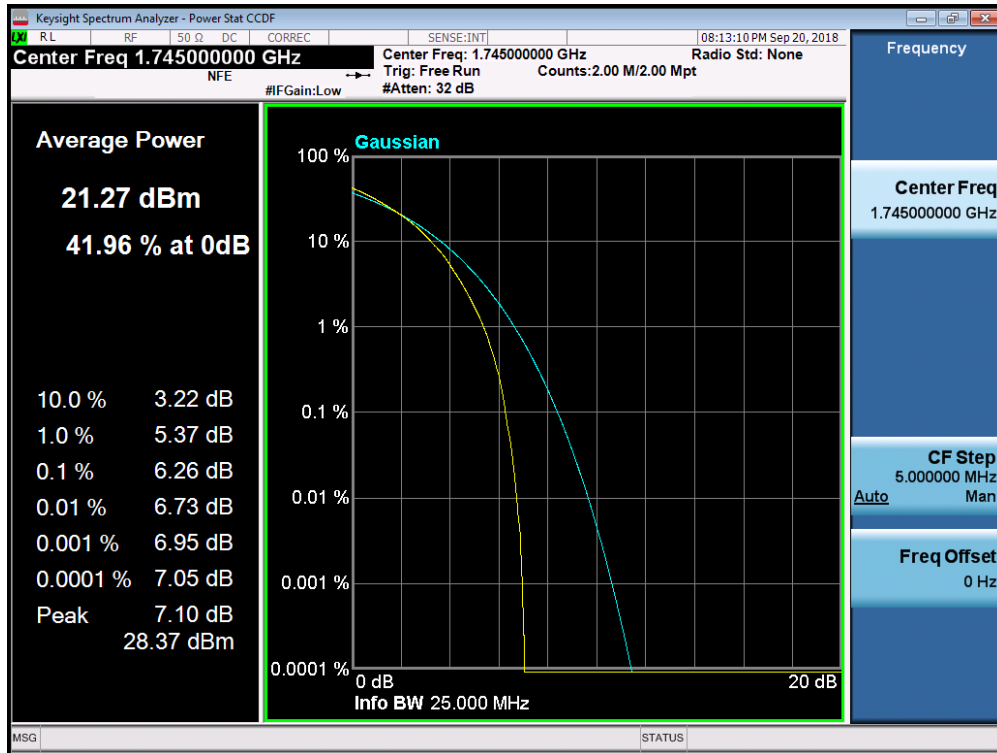


Plot 7-256. PAR Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)

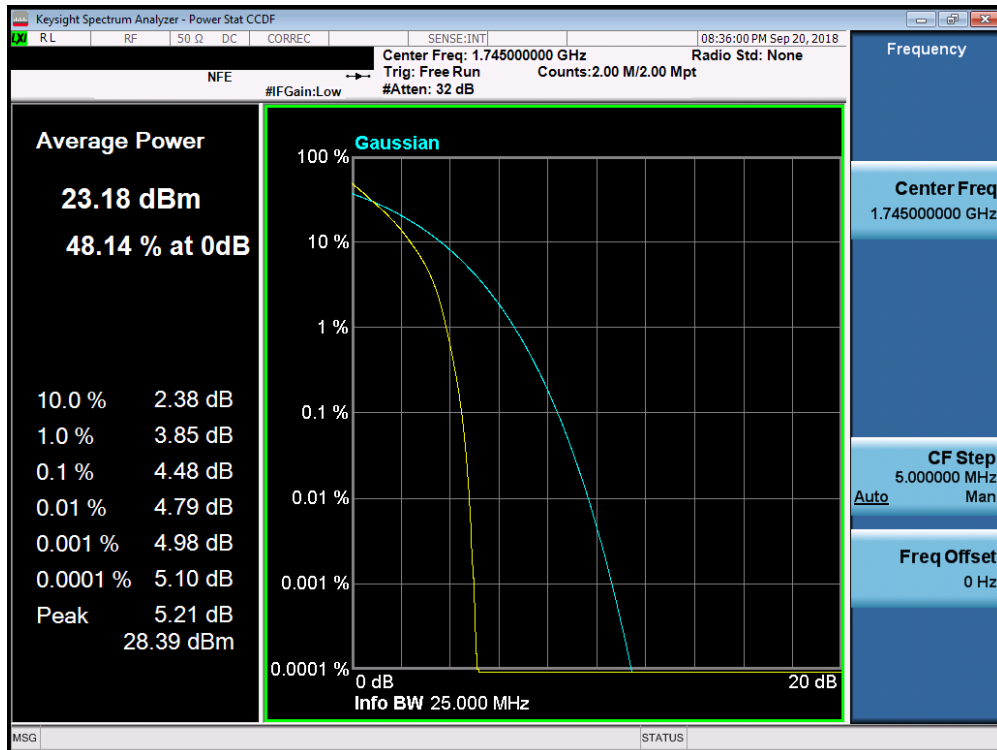


Plot 7-257. PAR Plot (Band 66/4 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 152 of 189

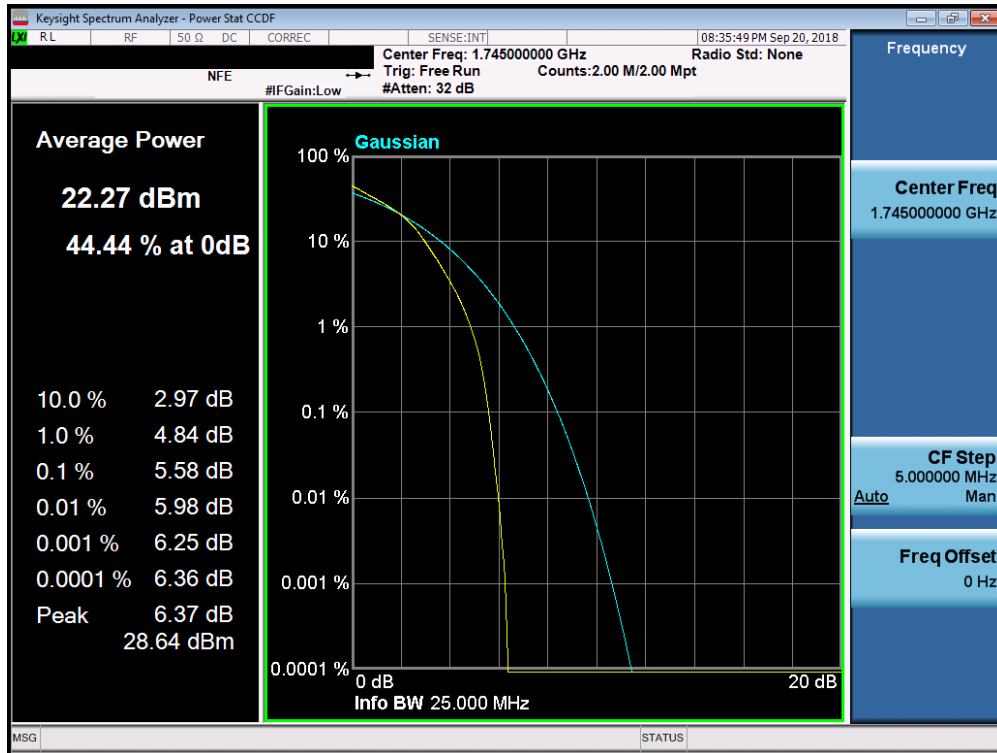


Plot 7-258. PAR Plot (Band 66/4 - 15.0MHz 64-QAM - Full RB Configuration)

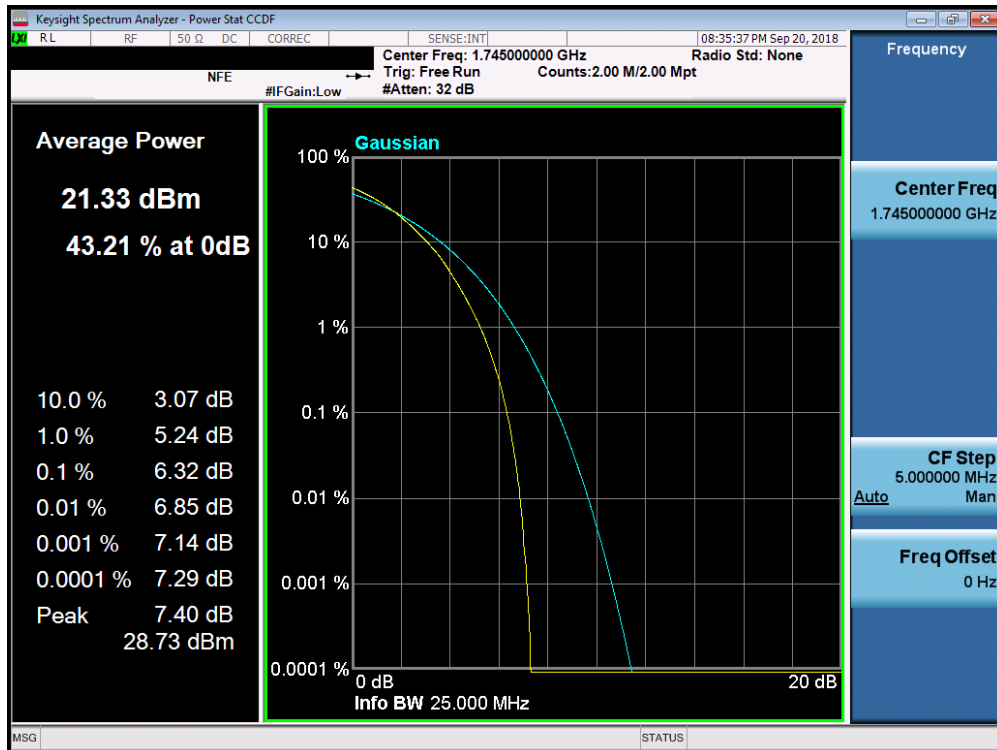


Plot 7-259. PAR Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA920F	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 153 of 189



Plot 7-260. PAR Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-261. PAR Plot (Band 2 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 154 of 189

7.6 Radiated Power (ERP/EIRP)

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – 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. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW $\geq 3 \times$ RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $\geq 2 \times$ span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Test Setup

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

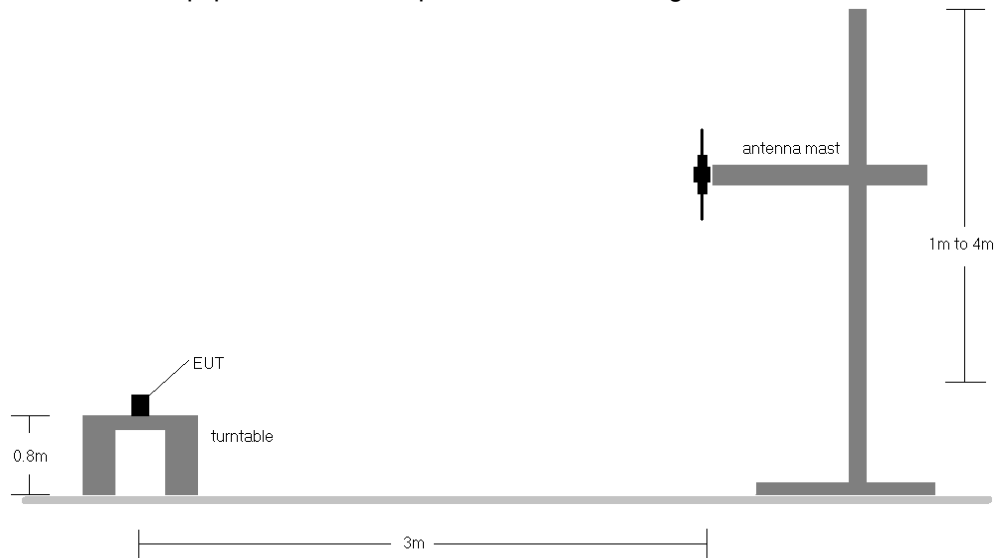


Figure 7-5. Radiated Test Setup <1GHz

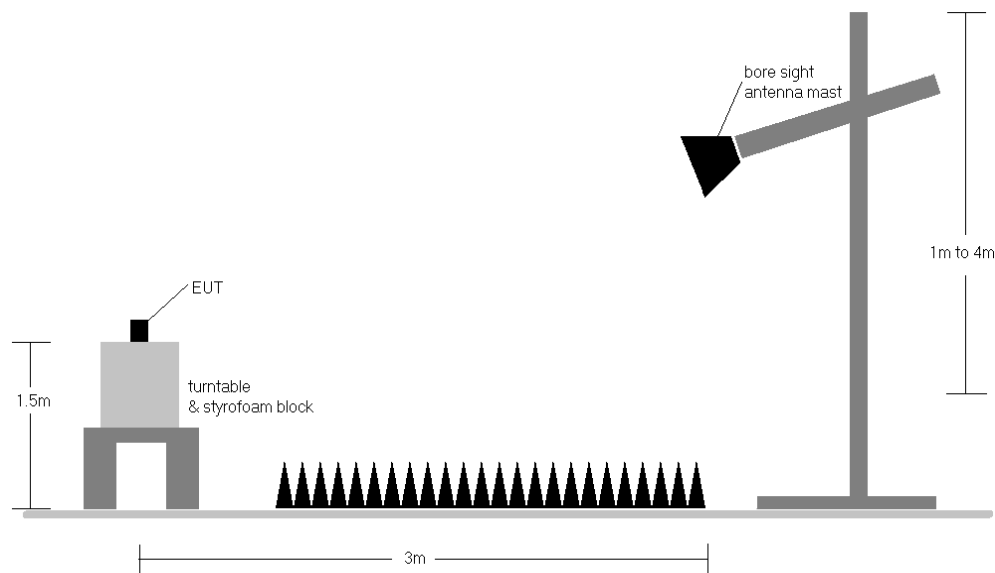


Figure 7-6. Radiated Test Setup >1GHz

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: A3LSMA920F		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 156 of 189

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	H	150	358	1 / 0	19.96	1.10	18.91	0.078	34.77	-15.86	21.06	0.128	36.99	-15.93
707.50	1.4	QPSK	H	150	2	1 / 0	20.16	1.13	19.14	0.082	34.77	-15.63	21.29	0.135	36.99	-15.70
715.30	1.4	QPSK	H	150	1	1 / 0	20.00	1.16	19.01	0.080	34.77	-15.76	21.16	0.131	36.99	-15.83
715.30	1.4	16-QAM	H	150	1	1 / 0	19.57	1.16	18.58	0.072	34.77	-16.19	20.73	0.118	36.99	-16.26
699.70	1.4	64-QAM	H	150	358	1 / 0	18.66	1.10	17.61	0.058	34.77	-17.16	19.76	0.095	36.99	-17.23
700.50	3	QPSK	H	150	0	1 / 0	19.96	1.10	18.91	0.078	34.77	-15.86	21.06	0.128	36.99	-15.93
707.50	3	QPSK	H	150	0	1 / 0	19.91	1.13	18.89	0.077	34.77	-15.88	21.04	0.127	36.99	-15.95
714.50	3	QPSK	H	150	3	1 / 0	20.25	1.16	19.26	0.084	34.77	-15.51	21.41	0.138	36.99	-15.58
714.50	3	16-QAM	H	150	0	1 / 0	19.96	1.16	18.97	0.079	34.77	-15.80	21.12	0.129	36.99	-15.87
714.50	3	64-QAM	H	150	0	1 / 0	18.76	1.16	17.77	0.060	34.77	-17.00	19.92	0.098	36.99	-17.07

Table 7-3. ERP Data (Band 12)

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]
701.50	5	QPSK	H	150	1	1 / 0	20.05	1.11	19.01	0.080	34.77	-15.77	21.16	0.130	36.99	-15.83
707.50	5	QPSK	H	150	8	1 / 0	20.06	1.13	19.04	0.080	34.77	-15.73	21.19	0.132	36.99	-15.80
713.50	5	QPSK	H	150	5	1 / 0	19.96	1.15	18.96	0.079	34.77	-15.81	21.11	0.129	36.99	-15.88
701.50	5	16-QAM	H	150	1	1 / 0	19.57	1.11	18.53	0.071	34.77	-16.25	20.68	0.117	36.99	-16.31
713.50	5	64-QAM	H	150	5	1 / 0	18.51	1.15	17.51	0.056	34.77	-17.26	19.66	0.093	36.99	-17.33
704.00	10	QPSK	H	150	358	1 / 0	19.96	1.12	18.93	0.078	34.77	-15.84	21.08	0.128	36.99	-15.91
707.50	10	QPSK	H	150	1	1 / 0	20.46	1.13	19.44	0.088	34.77	-15.33	21.59	0.144	36.99	-15.40
711.00	10	QPSK	H	150	5	1 / 0	19.96	1.14	18.95	0.079	34.77	-15.82	21.10	0.129	36.99	-15.89
707.50	10	16-QAM	H	150	1	1 / 0	19.56	1.13	18.54	0.071	34.77	-16.23	20.69	0.117	36.99	-16.30
704.00	10	64-QAM	H	150	358	1 / 0	18.46	1.12	17.43	0.055	34.77	-17.34	19.58	0.091	36.99	-17.41
707.50	10	QPSK	V	150	80	1 / 0	18.56	1.16	17.57	0.057	34.77	-17.20	19.72	0.094	36.99	-17.27

Table 7-4. ERP Data (Band 12/17)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
779.50	5	QPSK	H	150	16	1 / 24	18.96	1.32	18.13	0.065	34.77	-16.64	20.28	0.107	36.99	-16.71
782.00	5	QPSK	H	150	13	1 / 24	19.16	1.33	18.34	0.068	34.77	-16.43	20.49	0.112	36.99	-16.50
784.50	5	QPSK	H	150	19	1 / 24	18.86	1.34	18.05	0.064	34.77	-16.72	20.20	0.105	36.99	-16.79
782.00	5	16-QAM	H	150	13	1 / 24	18.56	1.33	17.74	0.059	34.77	-17.03	19.89	0.097	36.99	-17.10
782.00	5	64-QAM	H	150	13	1 / 24	17.86	1.33	17.04	0.051	34.77	-17.73	19.19	0.083	36.99	-17.80
782.00	10	QPSK	H	150	10	1 / 49	19.26	1.33	18.44	0.070	34.77	-16.33	20.59	0.115	36.99	-16.40
782.00	10	16-QAM	H	150	10	1 / 49	18.56	1.33	17.74	0.059	34.77	-17.03	19.89	0.097	36.99	-17.10
782.00	10	64-QAM	H	150	10	1 / 49	17.54	1.33	16.72	0.047	34.77	-18.05	18.87	0.077	36.99	-18.12
782.00	10	QPSK	V	150	75	1 / 49	18.94	1.33	18.12	0.065	34.77	-16.65	20.27	0.106	36.99	-16.72

Table 7-5. ERP Data (Band 13)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 157 of 189

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	150	15	1 / 0	22.68	1.50	22.03	0.160	38.45	-16.42	24.18	0.262	40.61	-16.43
836.50	1.4	QPSK	H	150	15	1 / 0	22.93	1.50	22.28	0.169	38.45	-16.17	24.43	0.277	40.61	-16.18
848.30	1.4	QPSK	H	150	5	1 / 0	23.64	1.50	22.99	0.199	38.45	-15.46	25.14	0.327	40.61	-15.47
848.30	1.4	16-QAM	H	150	5	1 / 0	22.76	1.50	22.11	0.163	38.45	-16.34	24.26	0.267	40.61	-16.35
848.30	1.4	64-QAM	H	150	5	1 / 0	21.94	1.50	21.29	0.135	38.45	-17.16	23.44	0.221	40.61	-17.17
825.50	3	QPSK	H	150	8	1 / 0	22.93	1.50	22.28	0.169	38.45	-16.17	24.43	0.277	40.61	-16.18
836.50	3	QPSK	H	150	8	1 / 0	23.48	1.50	22.83	0.192	38.45	-15.62	24.98	0.315	40.61	-15.63
847.50	3	QPSK	H	150	4	1 / 0	23.67	1.50	23.02	0.200	38.45	-15.43	25.17	0.329	40.61	-15.44
847.50	3	16-QAM	H	150	4	1 / 0	22.86	1.50	22.21	0.166	38.45	-16.24	24.36	0.273	40.61	-16.25
836.50	3	64-QAM	H	150	8	1 / 0	21.66	1.50	21.01	0.126	38.45	-17.44	23.16	0.207	40.61	-17.45
826.50	5	QPSK	H	150	8	1 / 0	22.82	1.50	22.17	0.165	38.45	-16.28	24.32	0.270	40.61	-16.29
836.50	5	QPSK	H	150	8	1 / 0	23.49	1.50	22.84	0.192	38.45	-15.61	24.99	0.316	40.61	-15.62
846.50	5	QPSK	H	150	4	1 / 0	23.42	1.50	22.77	0.189	38.45	-15.68	24.92	0.310	40.61	-15.69
836.50	5	16-QAM	H	150	8	1 / 0	22.65	1.50	22.00	0.158	38.45	-16.45	24.15	0.260	40.61	-16.46
846.50	5	64-QAM	H	150	4	1 / 0	21.67	1.50	21.02	0.126	38.45	-17.43	23.17	0.207	40.61	-17.44
829.00	10	QPSK	H	150	8	1 / 0	22.85	1.50	22.20	0.166	38.45	-16.25	24.35	0.272	40.61	-16.26
836.50	10	QPSK	H	150	11	1 / 0	23.33	1.50	22.68	0.185	38.45	-15.77	24.83	0.304	40.61	-15.78
844.00	10	QPSK	H	150	8	1 / 0	22.71	1.50	22.06	0.161	38.45	-16.39	24.21	0.264	40.61	-16.40
836.50	10	16-QAM	H	150	11	1 / 0	22.77	1.50	22.12	0.163	38.45	-16.33	24.27	0.267	40.61	-16.34
836.50	10	64-QAM	H	150	11	1 / 0	22.40	1.50	21.75	0.150	38.45	-16.70	23.90	0.245	40.61	-16.71

Table 7-6. ERP Data (Band 26/5)

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]
831.50	15	QPSK	H	150	11	1 / 0	23.05	1.50	22.40	0.174	38.45	-16.05	24.55	0.285	40.61	-16.06
836.50	15	QPSK	H	150	11	1 / 0	23.31	1.50	22.66	0.185	38.45	-15.79	24.81	0.303	40.61	-15.80
841.50	15	QPSK	H	150	1	1 / 0	22.00	1.50	21.35	0.136	38.45	-17.10	23.50	0.224	40.61	-17.11
2593.00	15	16-QAM	H	150	11	1 / 0	22.43	1.50	21.78	0.151	38.45	-16.67	23.93	0.247	40.61	-16.68
836.50	15	64-QAM	H	150	11	1 / 0	21.49	1.50	20.84	0.121	38.45	-17.61	22.99	0.199	40.61	-17.62

Table 7-7. ERP Data (Band 26)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 158 of 189

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	50	1 / 5	16.78	5.56	22.34	0.171	30.00	-7.66
1745.00	1.4	QPSK	H	150	337	1 / 5	17.42	5.32	22.74	0.188	30.00	-7.26
1779.30	1.4	QPSK	H	150	50	1 / 5	16.02	5.09	21.11	0.129	30.00	-8.89
1745.00	1.4	16-QAM	H	150	337	1 / 5	16.34	5.32	21.66	0.147	30.00	-8.34
1745.00	1.4	64-QAM	H	150	337	1 / 5	15.00	5.32	20.32	0.108	30.00	-9.68
1711.50	3	QPSK	H	150	8	1 / 0	16.75	5.55	22.30	0.170	30.00	-7.70
1745.00	3	QPSK	H	150	8	1 / 0	17.09	5.32	22.41	0.174	30.00	-7.59
1778.50	3	QPSK	H	150	8	1 / 0	16.20	5.10	21.30	0.135	30.00	-8.70
1711.50	3	16-QAM	H	150	8	1 / 0	15.66	5.55	21.21	0.132	30.00	-8.79
1711.50	3	64-QAM	H	150	8	1 / 0	14.57	5.55	20.12	0.103	30.00	-9.88
1712.50	5	QPSK	H	150	346	1 / 0	15.45	5.55	21.00	0.126	30.00	-9.00
1745.00	5	QPSK	H	150	346	1 / 0	16.97	5.32	22.29	0.170	30.00	-7.71
1777.50	5	QPSK	H	150	346	1 / 0	16.05	5.10	21.15	0.130	30.00	-8.85
1745.00	5	16-QAM	H	150	346	1 / 0	16.04	5.32	21.36	0.137	30.00	-8.64
1745.00	5	64-QAM	H	150	346	1 / 0	15.17	5.32	20.49	0.112	30.00	-9.51
1715.00	10	QPSK	H	150	337	1 / 0	15.89	5.53	21.42	0.139	30.00	-8.58
1745.00	10	QPSK	H	150	337	1 / 0	16.85	5.32	22.17	0.165	30.00	-7.83
1775.00	10	QPSK	H	150	337	1 / 0	15.97	5.12	21.09	0.129	30.00	-8.91
1745.00	10	16-QAM	H	150	337	1 / 0	15.83	5.32	21.15	0.130	30.00	-8.85
1745.00	10	64-QAM	H	150	337	1 / 0	14.76	5.32	20.08	0.102	30.00	-9.92
1717.50	15	QPSK	H	150	363	1 / 74	16.57	5.51	22.08	0.161	30.00	-7.92
1745.00	15	QPSK	H	150	363	1 / 74	17.49	5.32	22.81	0.191	30.00	-7.19
1772.50	15	QPSK	H	150	363	1 / 74	16.17	5.14	21.31	0.135	30.00	-8.69
1745.00	15	16-QAM	H	150	363	1 / 74	16.47	5.32	21.79	0.151	30.00	-8.21
1745.00	15	64-QAM	H	150	363	1 / 74	15.36	5.32	20.68	0.117	30.00	-9.32
1720.00	20	QPSK	H	150	346	1 / 99	16.36	5.49	21.85	0.153	30.00	-8.15
1745.00	20	QPSK	H	150	346	1 / 99	17.09	5.32	22.41	0.174	30.00	-7.59
1770.00	20	QPSK	H	150	346	1 / 99	16.22	5.15	21.37	0.137	30.00	-8.63
1745.00	20	16-QAM	H	150	346	1 / 99	16.20	5.32	21.52	0.142	30.00	-8.48
1745.00	20	64-QAM	H	150	346	1 / 99	15.45	5.32	20.77	0.119	30.00	-9.23
1745.00	15	QPSK	V	150	136	1 / 74	15.82	5.32	21.14	0.130	30.00	-8.86

Table 7-8. EIRP Data (Band 66/4)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 159 of 189

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	90	1 / 5	18.71	4.82	23.53	0.225	33.01	-9.48
1880.00	1.4	QPSK	H	150	90	1 / 0	19.01	4.74	23.75	0.237	33.01	-9.26
1909.30	1.4	QPSK	H	279	284	1 / 0	18.97	4.68	23.65	0.232	33.01	-9.36
1880.00	1.4	16-QAM	H	150	90	1 / 0	17.83	4.74	22.57	0.181	33.01	-10.44
1880.00	1.4	64-QAM	H	150	90	1 / 0	16.83	4.74	21.57	0.144	33.01	-11.44
1851.50	3	QPSK	H	150	341	1 / 0	17.69	4.82	22.50	0.178	33.01	-10.51
1880.00	3	QPSK	H	150	341	1 / 0	18.38	4.74	23.12	0.205	33.01	-9.89
1908.50	3	QPSK	H	279	284	1 / 0	18.39	4.68	23.07	0.203	33.01	-9.94
1880.00	3	16-QAM	H	150	341	1 / 0	17.26	4.74	22.00	0.158	33.01	-11.01
1880.00	3	64-QAM	H	150	341	1 / 0	16.03	4.74	20.77	0.119	33.01	-12.24
1852.50	5	QPSK	H	150	67	1 / 0	19.04	4.81	23.85	0.243	33.01	-9.16
1880.00	5	QPSK	H	150	351	1 / 0	18.16	4.74	22.90	0.195	33.01	-10.11
1907.50	5	QPSK	H	279	284	1 / 24	18.52	4.68	23.20	0.209	33.01	-9.81
1852.50	5	16-QAM	H	150	67	1 / 0	18.11	4.81	22.92	0.196	33.01	-10.09
1852.50	5	64-QAM	H	150	67	1 / 0	17.25	4.81	22.06	0.161	33.01	-10.95
1855.00	10	QPSK	H	150	72	1 / 0	18.23	4.81	23.04	0.201	33.01	-9.97
1880.00	10	QPSK	H	150	72	1 / 0	19.06	4.74	23.80	0.240	33.01	-9.21
1905.00	10	QPSK	H	279	284	1 / 0	18.01	4.68	22.69	0.186	33.01	-10.32
1880.00	10	16-QAM	H	150	72	1 / 0	18.13	4.74	22.87	0.194	33.01	-10.14
1880.00	10	64-QAM	H	150	72	1 / 0	16.76	4.74	21.50	0.141	33.01	-11.51
1857.50	15	QPSK	H	150	63	1 / 0	18.62	4.80	23.42	0.220	33.01	-9.59
1880.00	15	QPSK	H	150	63	1 / 0	18.96	4.74	23.70	0.234	33.01	-9.31
1902.50	15	QPSK	H	279	284	1 / 0	17.73	4.69	22.42	0.174	33.01	-10.59
1880.00	15	16-QAM	H	150	63	1 / 0	18.10	4.74	22.84	0.192	33.01	-10.17
1880.00	15	64-QAM	H	150	63	1 / 0	16.78	4.74	21.52	0.142	33.01	-11.49
1860.00	20	QPSK	H	150	4	1 / 99	18.10	4.79	22.89	0.195	33.01	-10.12
1880.00	20	QPSK	H	150	4	1 / 99	18.95	4.74	23.69	0.234	33.01	-9.32
1900.00	20	QPSK	H	279	284	1 / 0	17.97	4.69	22.66	0.184	33.01	-10.35
1880.00	20	16-QAM	H	150	4	1 / 99	17.77	4.74	22.51	0.178	33.01	-10.50
1880.00	20	64-QAM	H	150	4	1 / 99	15.85	4.74	20.59	0.115	33.01	-12.42
1852.50	5	QPSK	V	150	84	1 / 0	17.35	4.81	22.16	0.165	33.01	-10.85

Table 7-9. EIRP Data (Band 2)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 160 of 189

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]
2498.50	5	QPSK	V	122	322	1 / 24	13.22	7.70	20.92	0.124	33.01	-12.09
2593.00	5	QPSK	V	142	347	1 / 24	10.82	7.66	18.48	0.070	33.01	-14.53
2687.50	5	QPSK	V	110	329	1 / 24	11.86	7.62	19.48	0.089	33.01	-13.53
2498.50	5	16-QAM	V	122	322	1 / 24	10.27	7.70	17.97	0.063	33.01	-15.04
2502.50	5	64-QAM	V	122	322	1 / 24	9.26	7.70	16.96	0.050	33.01	-16.05
2501.00	10	QPSK	V	122	322	1 / 49	13.10	7.70	20.80	0.120	33.01	-12.21
2593.00	10	QPSK	V	142	347	1 / 49	10.78	7.66	18.44	0.070	33.01	-14.57
2685.00	10	QPSK	V	110	329	1 / 49	12.24	7.63	19.87	0.097	33.01	-13.15
2501.00	10	16-QAM	V	122	322	1 / 49	11.29	7.70	18.99	0.079	33.01	-14.02
2505.00	10	64-QAM	V	122	322	1 / 49	9.75	7.70	17.45	0.056	33.01	-15.56
2503.50	15	QPSK	V	122	322	1 / 74	13.77	7.70	21.47	0.140	33.01	-11.54
2593.00	15	QPSK	V	142	347	1 / 74	10.82	7.66	18.48	0.070	33.01	-14.53
2682.50	15	QPSK	V	110	329	1 / 74	12.77	7.63	20.40	0.110	33.01	-12.61
2503.50	15	16-QAM	V	122	322	1 / 74	10.38	7.70	18.08	0.064	33.01	-14.93
2507.50	15	64-QAM	V	122	322	1 / 74	10.22	7.70	17.92	0.062	33.01	-15.09
2506.00	20	QPSK	V	122	322	1 / 99	14.29	7.70	21.99	0.158	33.01	-11.02
2593.00	20	QPSK	V	142	347	1 / 99	10.72	7.66	18.38	0.069	33.01	-14.63
2680.00	20	QPSK	V	110	329	1 / 99	12.49	7.63	20.12	0.103	33.01	-12.89
2506.00	20	16-QAM	V	122	322	1 / 99	10.86	7.70	18.56	0.072	33.01	-14.45
2510.00	20	64-QAM	V	122	322	1 / 99	10.30	7.70	18.00	0.063	33.01	-15.01
2506.00	20	QPSK	H	139	128	1 / 99	10.44	7.70	18.15	0.065	33.01	-14.86

Table 7-10. EIRP Data (Band 41)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 161 of 189

7.7 Radiated Spurious Emissions Measurements

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – 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 $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $\geq 2 \times$ span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 162 of 189

Test Setup

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

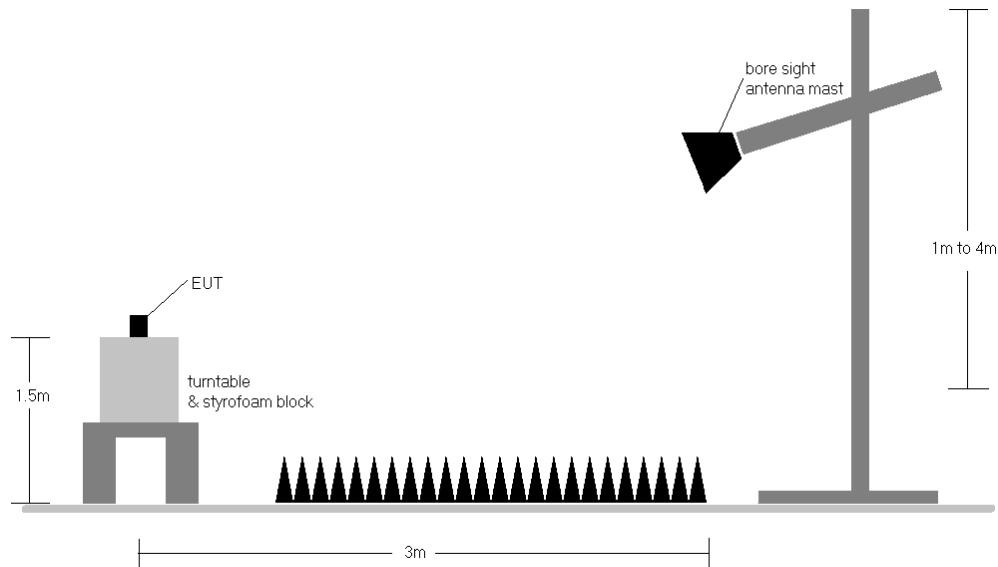


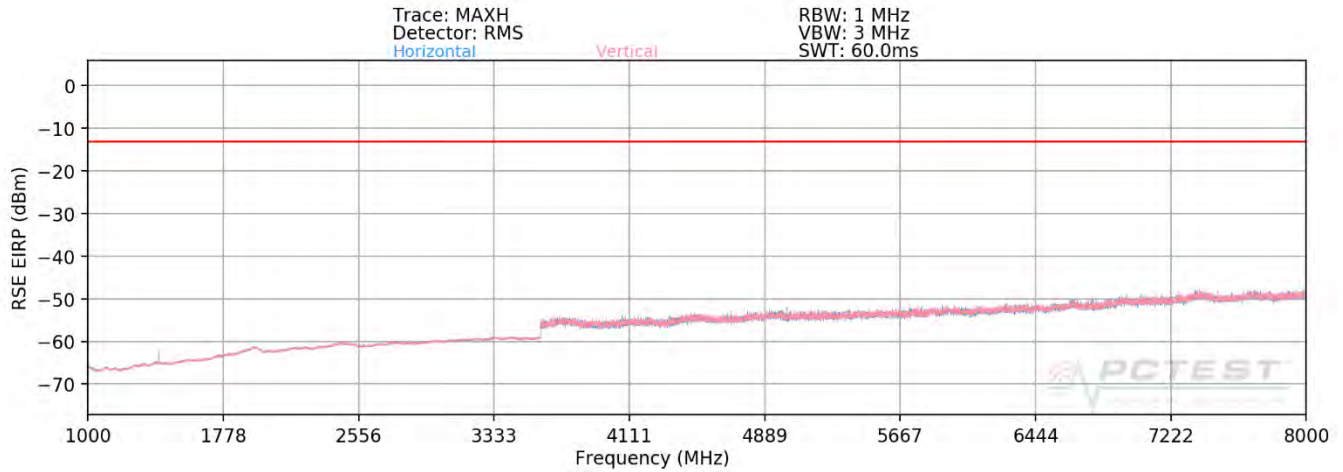
Figure 7-7. Test Instrument & Measurement Setup

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.

FCC ID: A3LSMA920F	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 163 of 189

Band 17/12



Plot 7-262. Radiated Spurious Plot above 1GHz (Band 17/12)

OPERATING FREQUENCY: 704.00 MHz
CHANNEL: 23060
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]
1408.00	H	164	271	-77.75	7.54	-70.21	-57.2
2112.00	H	150	130	-78.21	8.85	-69.36	-56.4
2816.00	H	-	-	-79.64	10.12	-69.52	-56.5

Table 7-11. Radiated Spurious Data (Band 17/12– Low Channel)

FCC ID: A3LSMA920F	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 164 of 189

OPERATING FREQUENCY: 707.50 MHz
 CHANNEL: 23095
 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]
1415.00	H	215	249	-78.03	7.63	-70.40	-57.4
2122.50	H	-	-	-78.41	8.86	-69.55	-56.5
2830.00	H	-	-	-79.34	10.10	-69.25	-56.2

Table 7-12. Radiated Spurious Data (Band 17/12– Mid Channel)

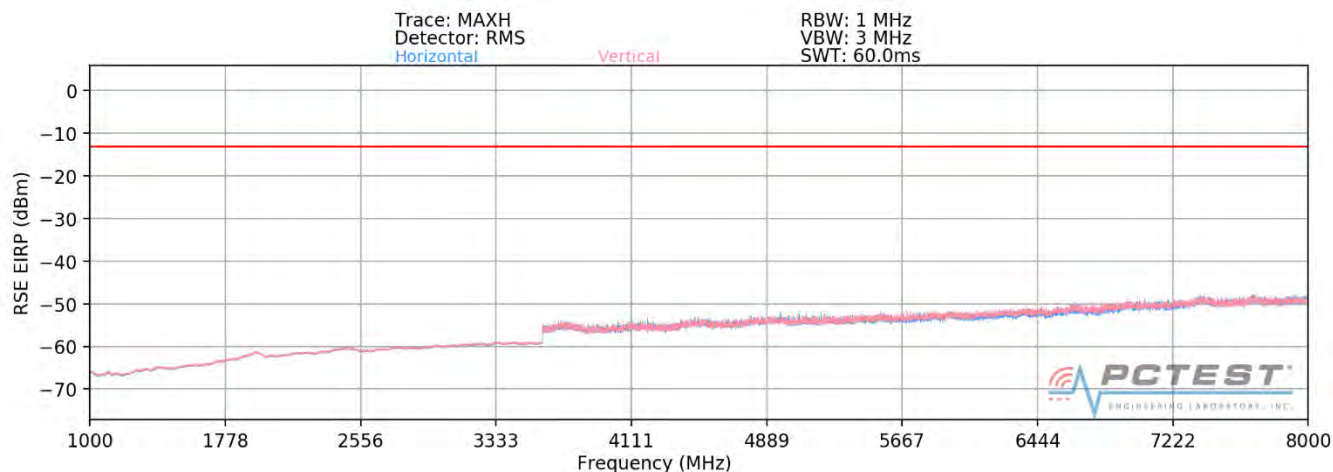
OPERATING FREQUENCY: 711.00 MHz
 CHANNEL: 23130
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
1422.00	H	147	115	-76.23	7.72	-68.51	-55.5
2133.00	H	147	188	-73.06	8.87	-64.19	-51.2
2844.00	H	-	-	-77.97	10.07	-67.90	-54.9

Table 7-13. Radiated Spurious Data (Band 17/12– High Channel)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 165 of 189

Band 13



Plot 7-263. Radiated Spurious Plot above 1GHz (Band 13)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2346.00	H	121	353	-70.73	8.90	-61.83	-48.8
3128.00	H	-	-	-70.56	8.30	-62.26	-49.3

Table 7-14. Radiated Spurious Data (Band 13 – Mid Channel)

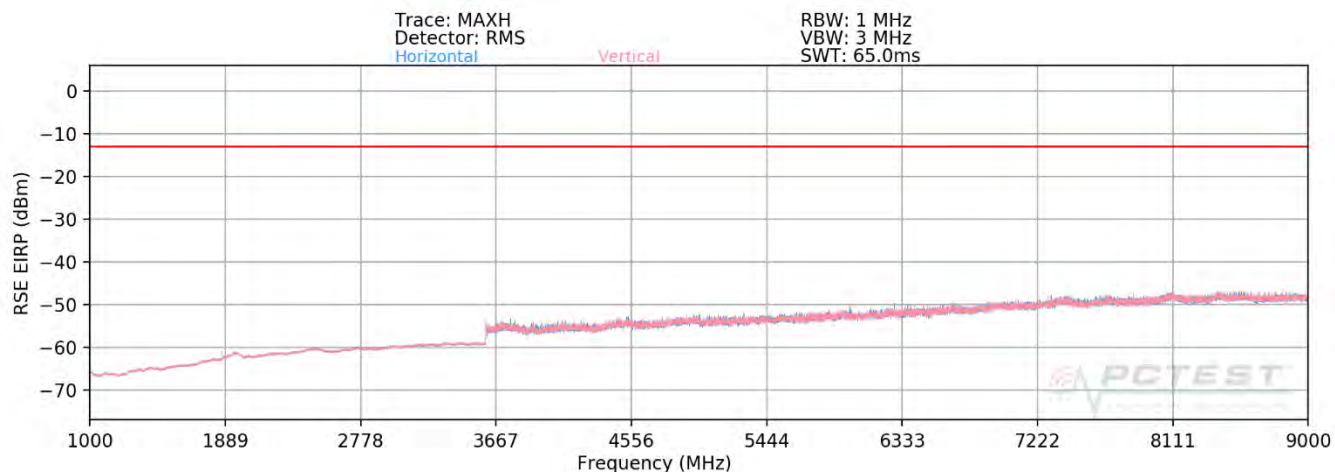
MODULATION SIGNAL: QPSK
BANDWIDTH: 10.00 MHz
DISTANCE: 3 meters
NARROWBAND EMISSION LIMIT: -50 dBm
WIDEBAND EMISSION LIMIT: -40 dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	H	206	296	-75.01	9.03	-65.98	-26.0

Table 7-15. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: A3LSMA920F	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)				SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset				Page 166 of 189	

Band 26/5



Plot 7-264. Radiated Spurious Plot above 1GHz (Band 26/5)

OPERATING FREQUENCY: 825.50 MHz
CHANNEL: 26805
MODULATION SIGNAL: QPSK
BANDWIDTH: 3.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1651.00	H	-	-	-75.32	9.39	-65.93	-52.9
2476.50	H	102	116	-70.06	8.78	-61.28	-48.3
3302.00	H	-	-	-70.46	8.43	-62.03	-49.0

Table 7-16. Radiated Spurious Data (Band 26/5 – Low Channel)

FCC ID: A3LSMA920F	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 167 of 189

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 26915
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	V	113	267	-74.54	9.44	-65.10	-52.1
2509.50	V	118	121	-70.39	8.72	-61.67	-48.7
3346.00	V	-	-	-70.43	8.72	-61.71	-48.7

Table 7-17. Radiated Spurious Data (Band 26/5 – Mid Channel)

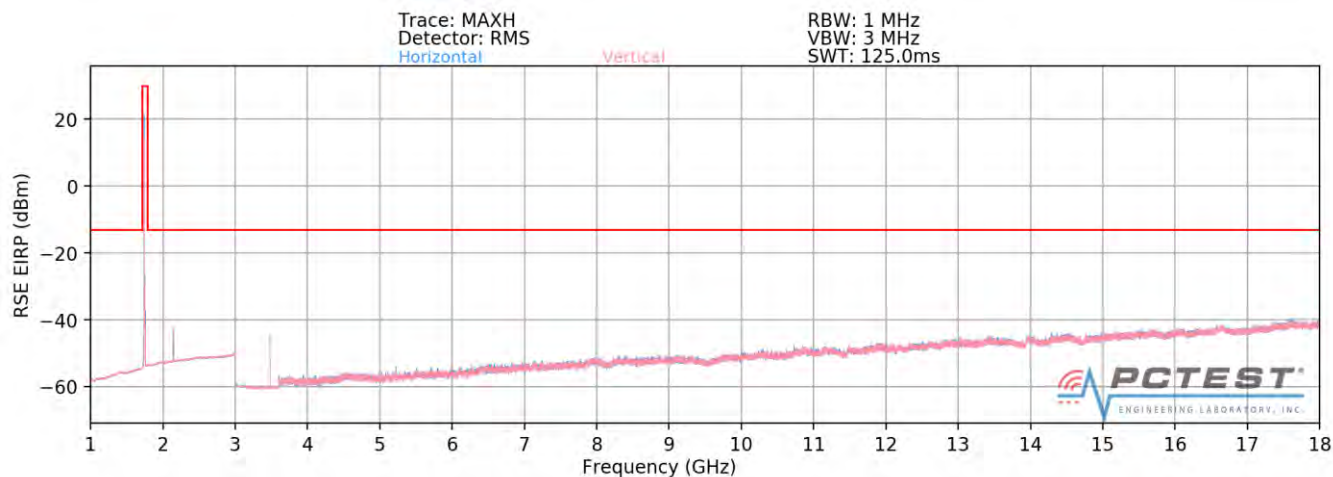
OPERATING FREQUENCY: 847.50 MHz
 CHANNEL: 27025
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1695.00	V	-	-	-75.32	9.48	-65.84	-52.8
2542.50	V	314	8	-71.01	8.57	-62.44	-49.4
3390.00	V	-	-	-70.94	9.01	-61.93	-48.9

Table 7-18. Radiated Spurious Data (Band 26/5 – High Channel)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 168 of 189

Band 66/4



Plot 7-265. Radiated Spurious Plot above 1GHz (Band 66/4)

OPERATING FREQUENCY: 1717.50 MHz
CHANNEL: 132047
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	113	326	-57.68	9.84	-47.84	-34.8
5152.50	H	319	125	-67.66	10.70	-56.96	-44.0
6870.00	H	182	350	-65.95	11.67	-54.28	-41.3
8587.50	H	-	-	-67.96	11.10	-56.86	-43.9

Table 7-19. Radiated Spurious Data (Band 66/4 – Low Channel)

FCC ID: A3LSMA920F	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)			SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset				Page 169 of 189

OPERATING FREQUENCY: 1745.00 MHz
 CHANNEL: 132322
 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]
3490.00	H	134	325	-58.07	9.91	-48.15	-35.2
5235.00	H	140	319	-68.55	10.73	-57.82	-44.8
6980.00	H	137	45	-68.96	11.82	-57.14	-44.1
8725.00	H	-	-	-68.05	11.00	-57.05	-44.1

Table 7-20. Radiated Spurious Data (Band 66/4 – Mid Channel)

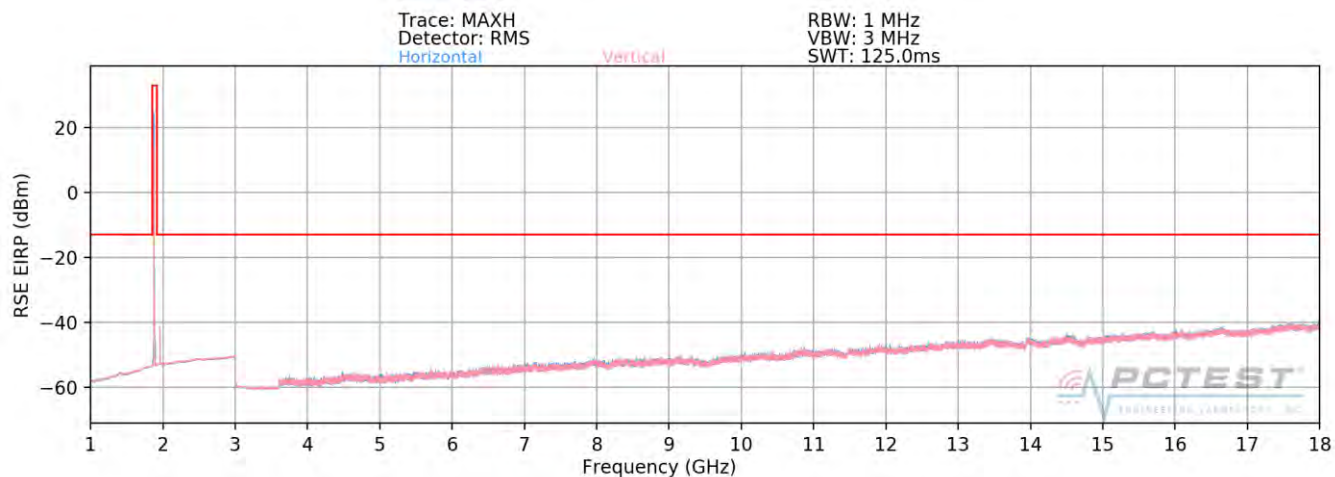
OPERATING FREQUENCY: 1772.50 MHz
 CHANNEL: 132597
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
3545.00	H	149	319	-64.81	9.89	-54.92	-41.9
5317.50	H	129	321	-70.62	10.69	-59.93	-46.9
7090.00	H	118	286	-70.83	11.77	-59.06	-46.1
8862.50	H	-	-	-68.23	11.01	-57.23	-44.2

Table 7-21. Radiated Spurious Data (Band 66/4 – High Channel)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 170 of 189

Band 2



Plot 7-266. Radiated Spurious Plot above 1GHz (Band 2)

OPERATING FREQUENCY: 1852.50 MHz
CHANNEL: 18625
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]
3705.00	V	190	48	-62.47	8.97	-53.50	-40.5
5557.50	V	195	360	-72.63	13.30	-59.33	-46.3
7410.00	V	229	209	-65.53	10.32	-55.21	-42.2
9262.50	V	-	-	-66.88	9.60	-57.28	-44.3

Table 7-22. Radiated Spurious Data (Band 2 – Low Channel)

FCC ID: A3LSMA920F	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 171 of 189

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 18900
 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]
3760.00	V	238	94	-65.50	9.37	-56.13	-43.1
5640.00	V	112	177	-72.34	13.42	-58.92	-45.9
7520.00	V	187	214	-66.33	10.56	-55.77	-42.8
9400.00	V	-	-	-65.54	8.88	-56.67	-43.7

Table 7-23. Radiated Spurious Data (Band 2 – Mid Channel)

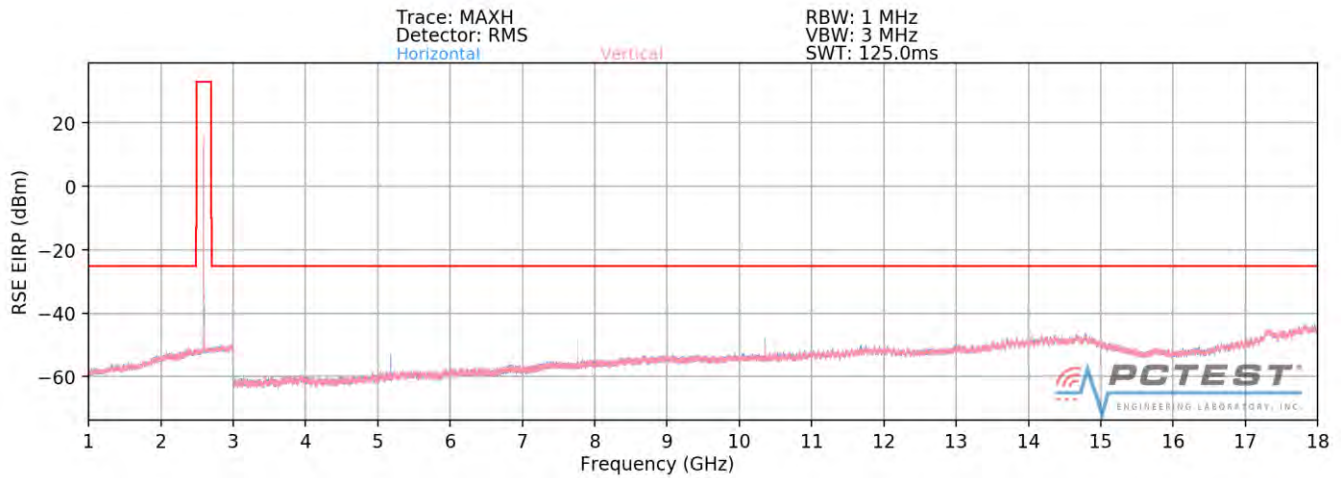
OPERATING FREQUENCY: 1907.50 MHz
 CHANNEL: 19175
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
3815.00	V	176	77	-65.31	9.58	-55.73	-42.7
5722.50	V	179	170	-67.51	13.51	-54.00	-41.0
7630.00	V	172	201	-66.55	10.71	-55.84	-42.8
9537.50	V	-	-	-64.24	7.54	-56.71	-43.7

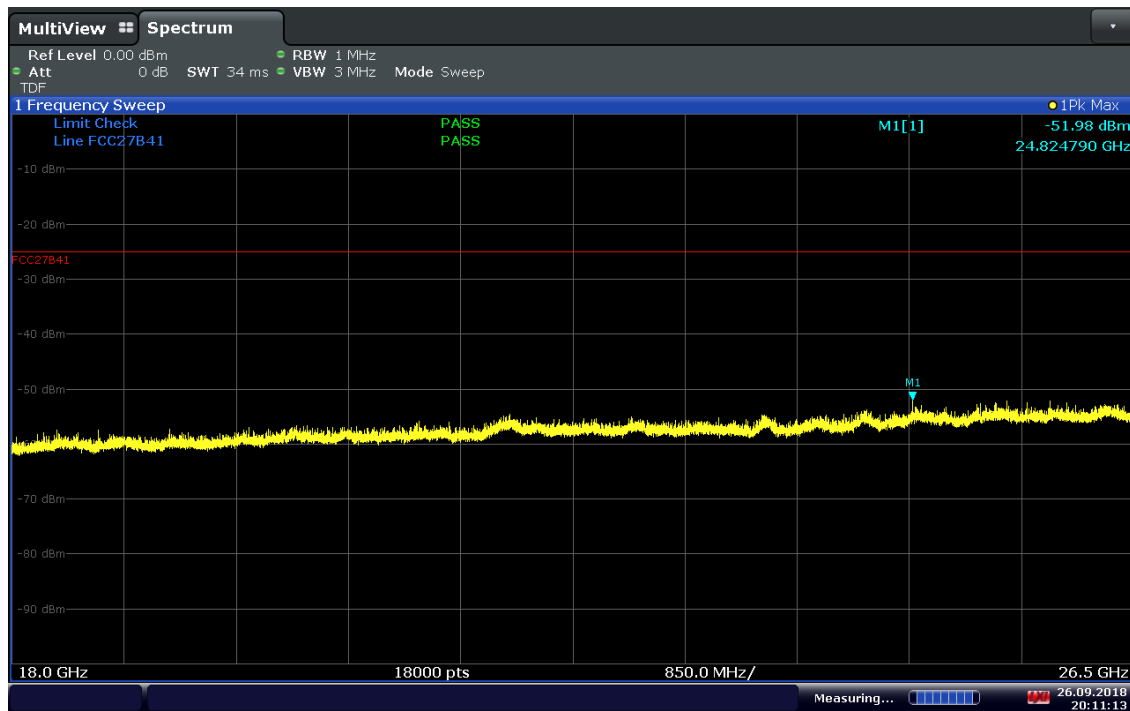
Table 7-24. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 172 of 189

Band 41



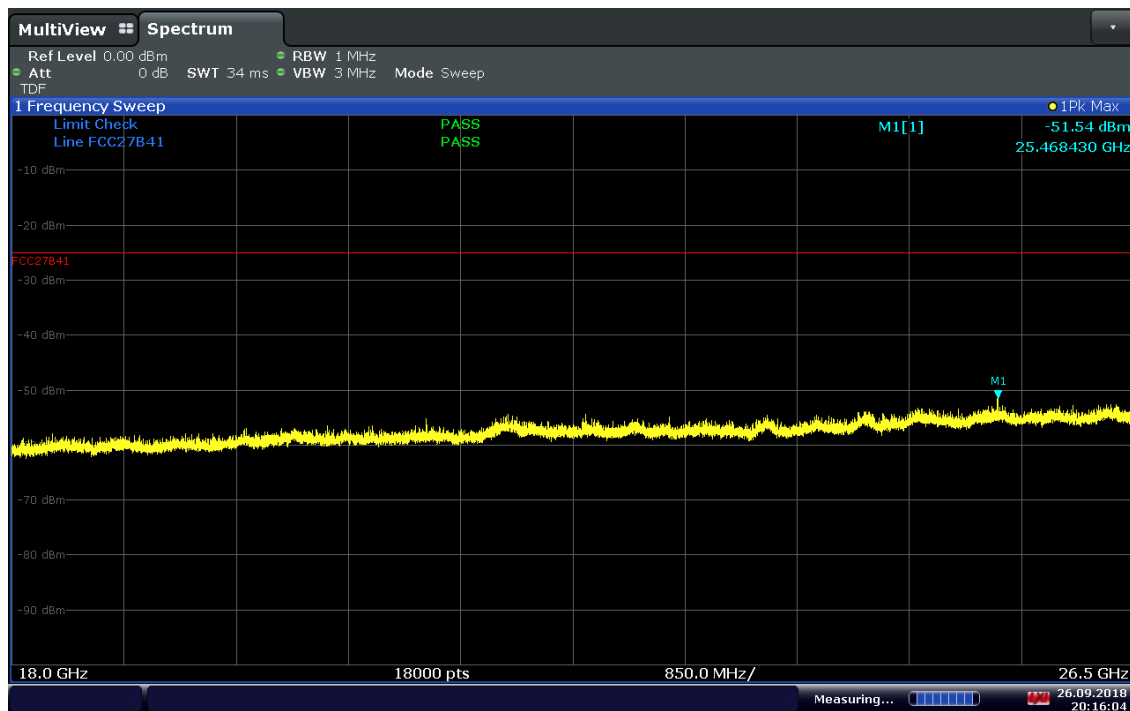
Plot 7-267. Radiated Spurious Plot 1GHz - 18GHz (Band 41)



20:11:13 26.09.2018

Plot 7-268. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41) , H Pol.

FCC ID: A3LSMA920F	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset		Page 173 of 189



20:16:05 26.09.2018

Plot 7-269. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41) , V Pol.

OPERATING FREQUENCY: 2510.00 MHz
CHANNEL: 39790
MODULATION SIGNAL: QPSK
BANDWIDTH: 20.0 MHz
DISTANCE: 3 meters
LIMIT: -25 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]
5020.00	H	313	189	-52.32	8.78	-43.54	-18.5
7530.00	H	100	126	-41.09	9.31	-31.78	-6.8
10040.00	H	246	176	-44.19	9.78	-34.41	-9.4
12550.00	H	111	267	-50.71	8.80	-41.91	-16.9
15060.00	H	-	-	-49.76	8.89	-40.88	-15.9

Table 7-25. Radiated Spurious Data (Band 41 – Low Channel)

FCC ID: A3LSMA920F	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 174 of 189

OPERATING FREQUENCY: 2593.00 MHz
 CHANNEL: 40620
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 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]
5186.00	H	294	172	-56.18	9.03	-47.16	-22.2
7779.00	H	111	295	-52.15	9.29	-42.86	-17.9
10372.00	H	330	116	-50.31	9.50	-40.81	-15.8
12965.00	H	396	152	-51.60	8.75	-42.85	-17.8
15558.00	H	-	-	-48.66	8.47	-40.19	-15.2

Table 7-26. Radiated Spurious Data (Band 41 – Mid Channel)

OPERATING FREQUENCY: 2680.00 MHz
 CHANNEL: 41490
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 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]
5360.00	H	313	189	-51.77	8.99	-42.78	-17.8
8040.00	H	100	126	-40.04	9.35	-30.69	-5.7
10720.00	H	246	176	-42.46	9.39	-33.07	-8.1
13400.00	H	111	267	-48.87	8.67	-40.20	-15.2
16080.00	H	-	-	-48.09	8.46	-39.64	-14.6

Table 7-27. Radiated Spurious Data (Band 41 – High Channel)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1808310176-03.A3L	Test Dates: 8/30 - 10/12/2018	EUT Type: Portable Handset	Page 175 of 189

7.8 Frequency Stability / Temperature Variation

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, the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Part 24, 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-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 12/17 Frequency Stability Measurements

OPERATING FREQUENCY: 707,500,000 Hz
 CHANNEL: 23790
 REFERENCE VOLTAGE: 4.26 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.26	+ 20 (Ref)	707,499,861	-139	-0.0000196
100 %		- 30	707,499,930	-70	-0.0000099
100 %		- 20	707,499,971	-29	-0.0000041
100 %		- 10	707,499,911	-89	-0.0000125
100 %		0	707,499,826	-174	-0.0000247
100 %		+ 10	707,499,837	-163	-0.0000230
100 %		+ 20	707,499,907	-93	-0.0000131
100 %		+ 30	707,499,818	-182	-0.0000257
100 %		+ 40	707,499,829	-171	-0.0000241
100 %		+ 50	707,499,912	-88	-0.0000125
BATT. ENDPOINT	3.42	+ 20	707,499,991	-9	-0.0000012

Table 7-28. Frequency Stability Data (Band 12/17)

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 12/17 Frequency Stability Measurements

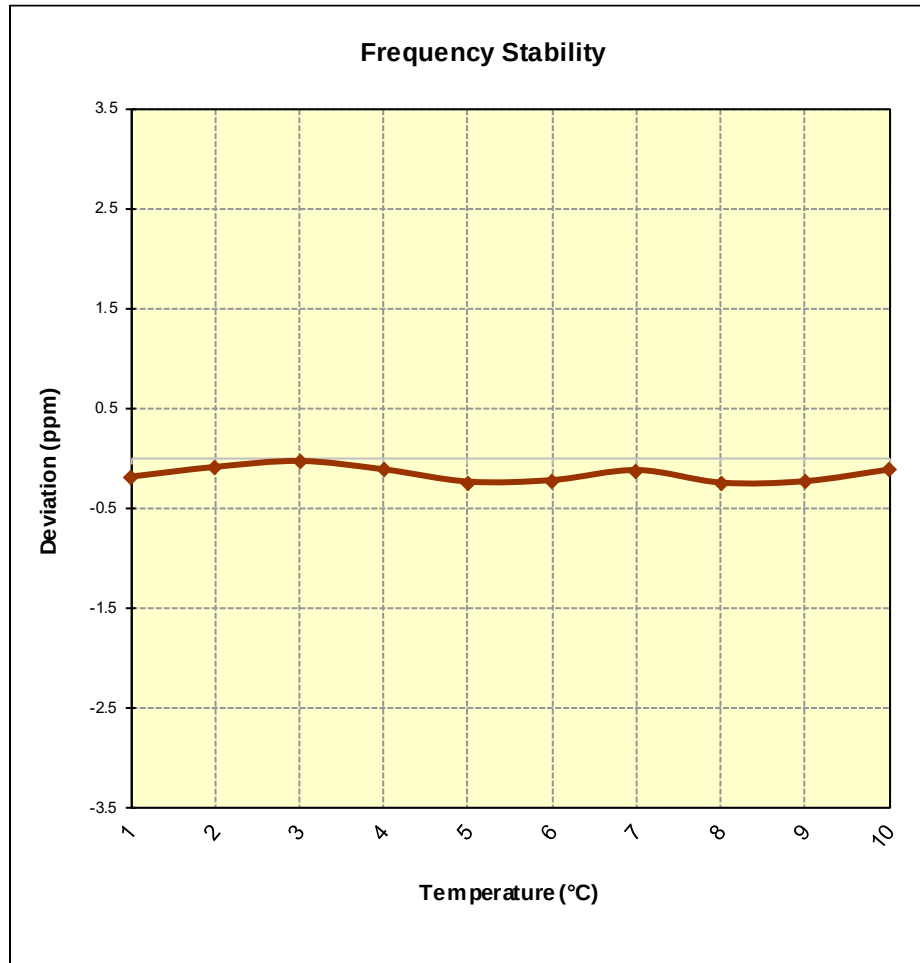


Figure 7-8. Frequency Stability Graph (Band 12/17)

FCC ID: A3LSMA920F		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 13 Frequency Stability Measurements

OPERATING FREQUENCY: 782,000,000 Hz
 CHANNEL: 23230
 REFERENCE VOLTAGE: 4.26 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.26	+ 20 (Ref)	781,999,952	-48	-0.0000061
100 %		- 30	781,999,862	-138	-0.0000176
100 %		- 20	781,999,942	-58	-0.0000074
100 %		- 10	781,999,925	-75	-0.0000096
100 %		0	781,999,983	-17	-0.0000022
100 %		+ 10	781,999,911	-89	-0.0000114
100 %		+ 20	781,999,966	-34	-0.0000043
100 %		+ 30	781,999,969	-31	-0.0000039
100 %		+ 40	781,999,954	-46	-0.0000059
100 %		+ 50	781,999,814	-186	-0.0000238
BATT. ENDPOINT	3.42	+ 20	781,999,867	-133	-0.0000171

Table 7-29. 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.

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Band 13 Frequency Stability Measurements

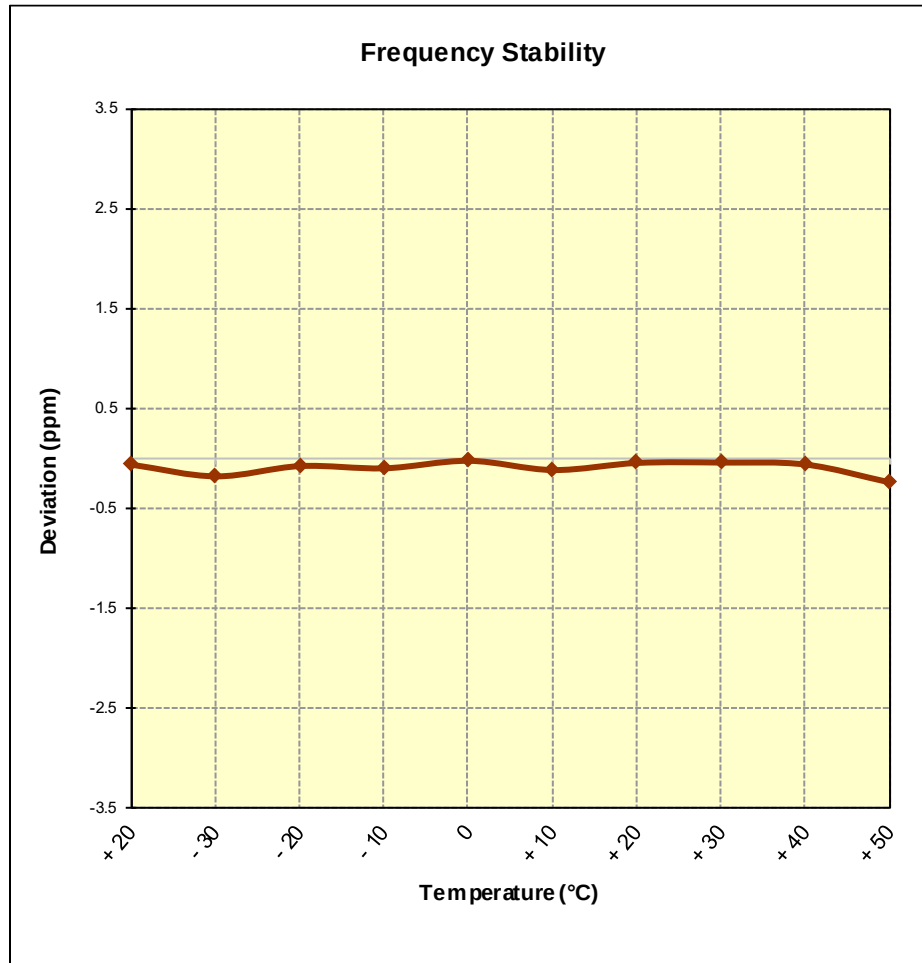


Figure 7-9. Frequency Stability Graph (Band 13)

FCC ID: A3LSMA920F		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY: 831,500,000 Hz
 CHANNEL: 26865
 REFERENCE VOLTAGE: 4.26 VDC
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.26	+ 20 (Ref)	831,499,967	-33	-0.0000040
100 %		- 30	831,499,965	-35	-0.0000043
100 %		- 20	831,499,978	-22	-0.0000026
100 %		- 10	831,499,859	-141	-0.0000170
100 %		0	831,499,966	-34	-0.0000041
100 %		+ 10	831,499,887	-113	-0.0000136
100 %		+ 20	831,499,933	-67	-0.0000081
100 %		+ 30	831,499,854	-146	-0.0000175
100 %		+ 40	831,499,916	-84	-0.0000101
100 %		+ 50	831,499,985	-15	-0.0000018
BATT. ENDPOINT	3.42	+ 20	831,499,885	-115	-0.0000138

Table 7-30. Frequency Stability Data (Band 26/5)

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Band 26/5 Frequency Stability Measurements

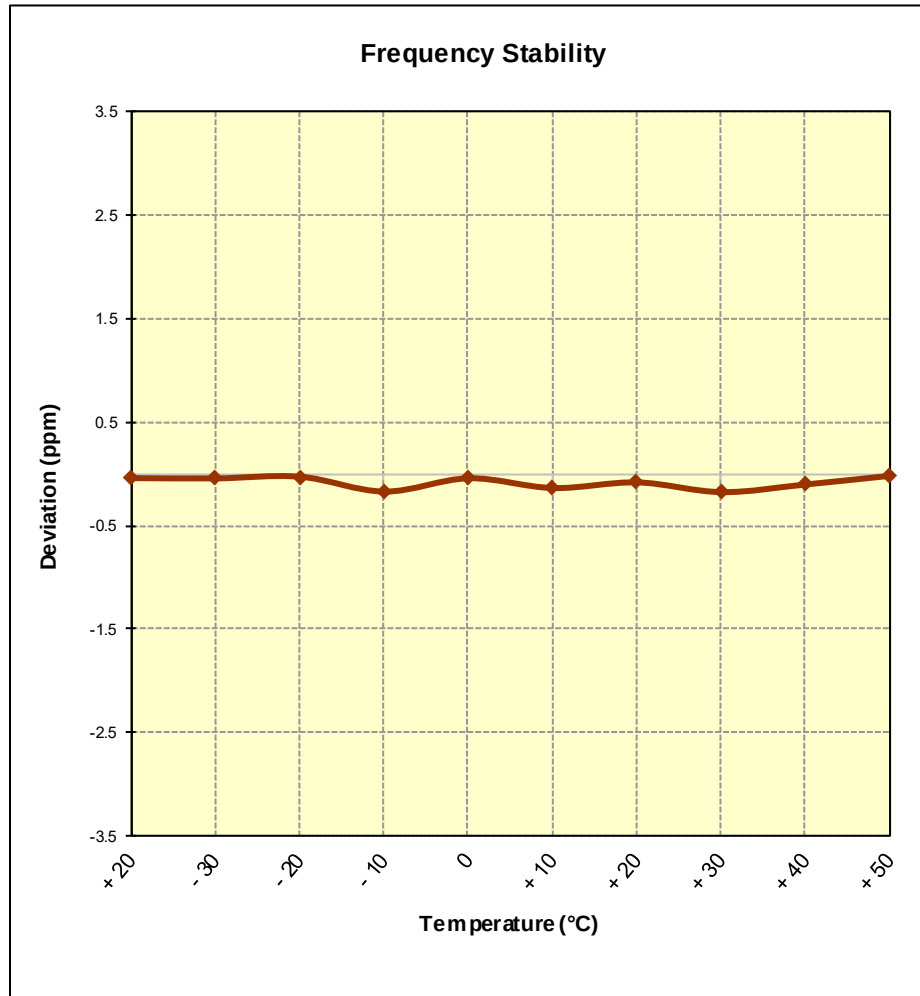


Figure 7-10. Frequency Stability Graph (Band 26/5)

FCC ID: A3LSMA920F		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 66/4 Frequency Stability Measurements

OPERATING FREQUENCY: 1,745,000,000 Hz
 CHANNEL: 132322
 REFERENCE VOLTAGE: 4.26 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.26	+ 20 (Ref)	1,744,999,865	-135	-0.0000077
100 %		- 30	1,744,999,854	-146	-0.0000084
100 %		- 20	1,744,999,948	-52	-0.0000030
100 %		- 10	1,744,999,902	-98	-0.0000056
100 %		0	1,744,999,998	-2	-0.0000001
100 %		+ 10	1,744,999,822	-178	-0.0000102
100 %		+ 20	1,744,999,936	-64	-0.0000037
100 %		+ 30	1,744,999,909	-91	-0.0000052
100 %		+ 40	1,744,999,989	-11	-0.0000006
100 %		+ 50	1,744,999,932	-68	-0.0000039
BATT. ENDPOINT	3.42	+ 20	1,744,999,992	-8	-0.0000005

Table 7-31. Frequency Stability Data (Band 66/4)

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.

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Band 66/4 Frequency Stability Measurements

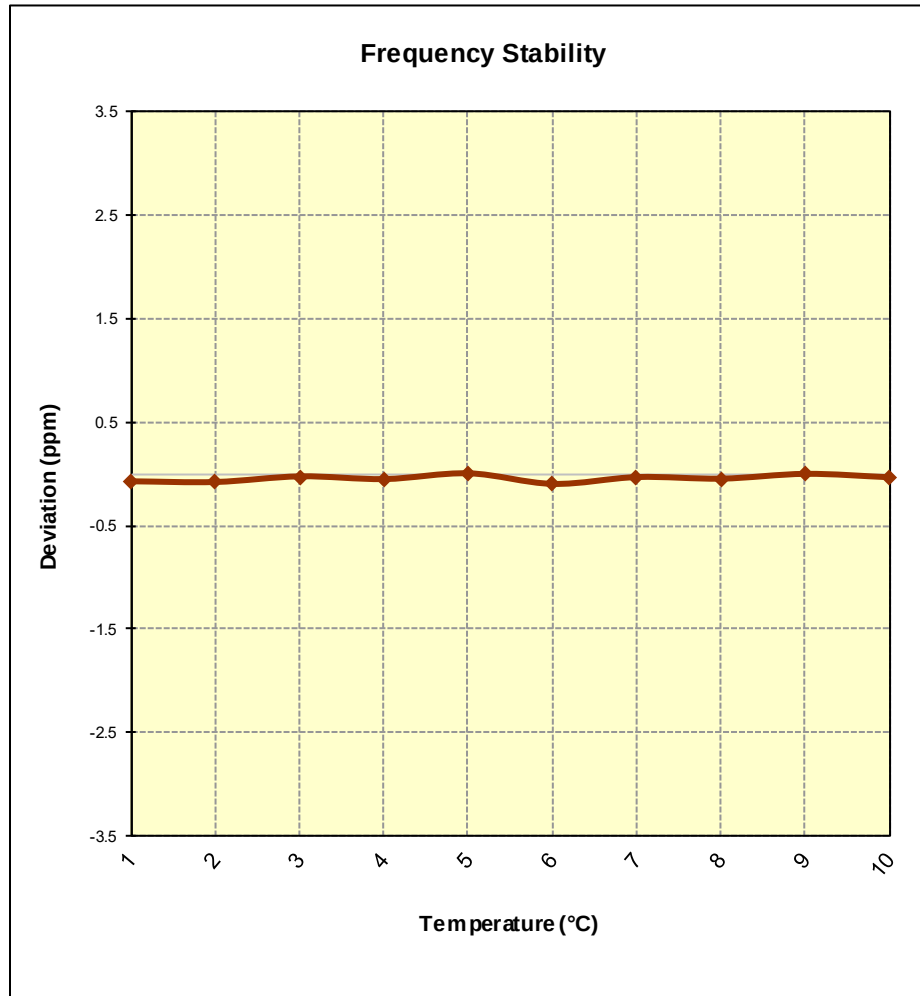


Figure 7-11. Frequency Stability Graph (Band 66/4)

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Band 2 Frequency Stability Measurements

OPERATING FREQUENCY: 1,880,000,000 Hz
 CHANNEL: 18900
 REFERENCE VOLTAGE: 4.26 VDC
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.26	+ 20 (Ref)	1,879,999,944	-56	-0.0000030
100 %		- 30	1,879,999,998	-2	-0.0000001
100 %		- 20	1,879,999,848	-152	-0.0000081
100 %		- 10	1,879,999,813	-187	-0.0000100
100 %		0	1,879,999,848	-152	-0.0000081
100 %		+ 10	1,879,999,983	-17	-0.0000009
100 %		+ 20	1,879,999,858	-142	-0.0000076
100 %		+ 30	1,879,999,940	-60	-0.0000032
100 %		+ 40	1,879,999,841	-159	-0.0000085
100 %		+ 50	1,879,999,959	-41	-0.0000022
BATT. ENDPOINT	3.42	+ 20	1,879,999,919	-81	-0.0000043

Table 7-32. Frequency Stability Data (Band 2)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 2 Frequency Stability Measurements

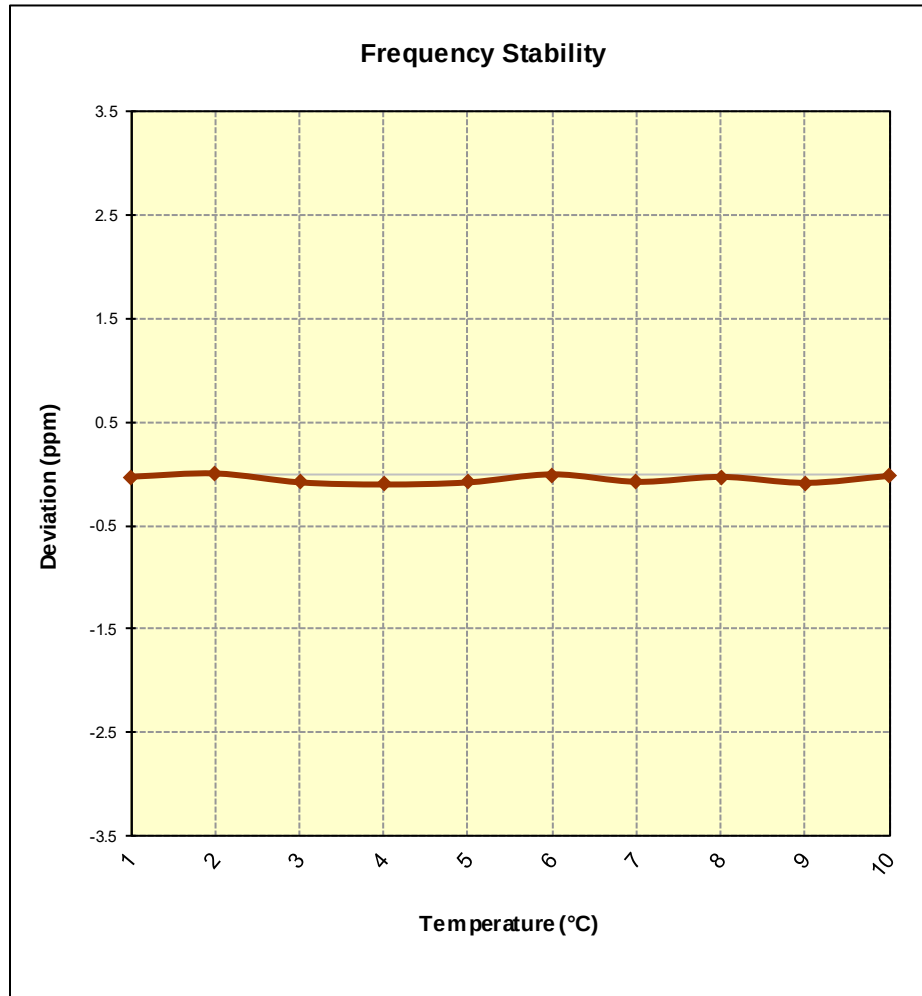


Figure 7-12. Frequency Stability Graph (Band 2)

FCC ID: A3LSMA920F	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 41 Frequency Stability Measurements

OPERATING FREQUENCY: 2,593,000,000 Hz
 CHANNEL: 40620
 REFERENCE VOLTAGE: 4.26 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.26	+ 20 (Ref)	2,592,999,940	-60	-0.0000023
100 %		- 30	2,592,999,849	-151	-0.0000058
100 %		- 20	2,592,999,861	-139	-0.0000053
100 %		- 10	2,592,999,998	-2	-0.0000001
100 %		0	2,592,999,958	-42	-0.0000016
100 %		+ 10	2,592,999,920	-80	-0.0000031
100 %		+ 20	2,592,999,991	-9	-0.0000003
100 %		+ 30	2,592,999,832	-168	-0.0000065
100 %		+ 40	2,592,999,820	-180	-0.0000069
100 %		+ 50	2,592,999,978	-22	-0.0000009
BATT. ENDPOINT	3.42	+ 20	2,592,999,952	-48	-0.0000019

Table 7-33. Frequency Stability Data (Band 41)

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 41 Frequency Stability Measurements

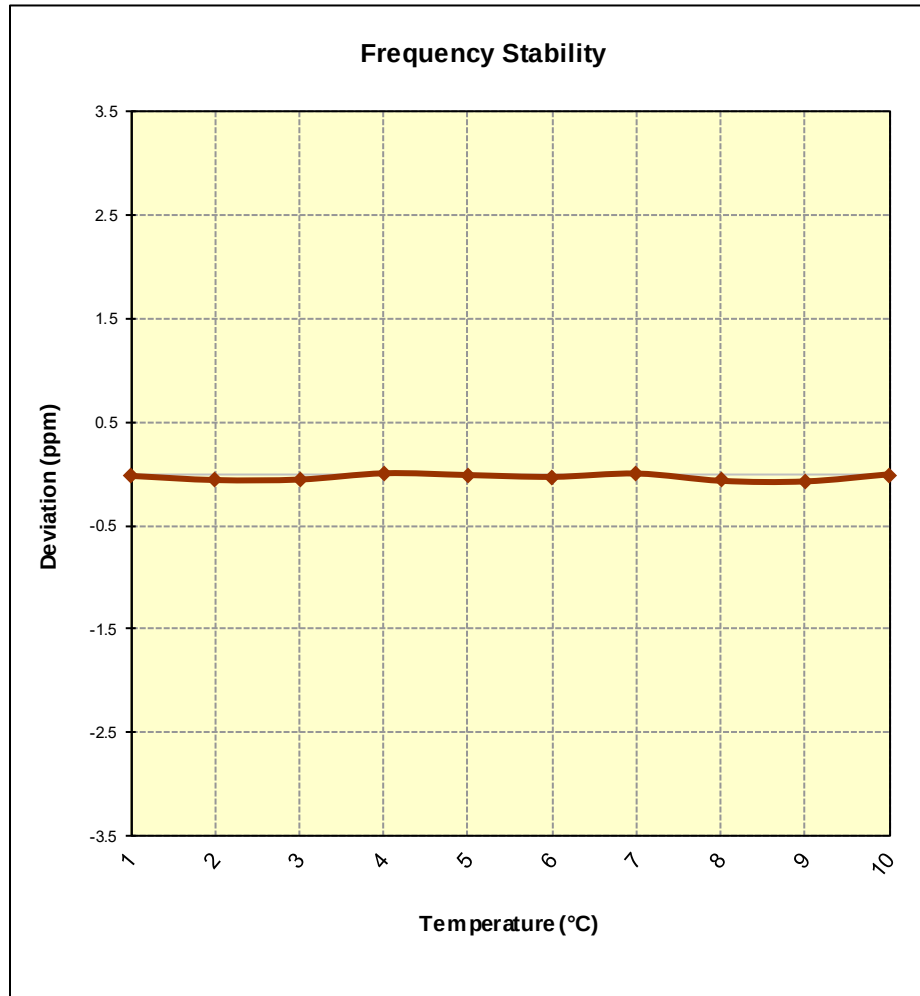


Figure 7-13. Frequency Stability Graph (Band 41)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMA920F** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: A3LSMA920F		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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