

6.5 Peak-Average Ratio

§24.232(d)

Test Overview

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

Test Procedure Used

KDB 971168 v02r02 – Section 5.7.1

Test Settings

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

Test Setup

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

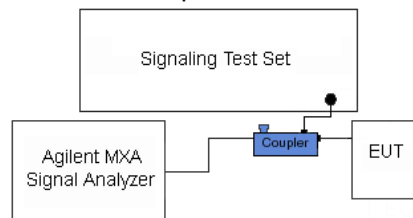
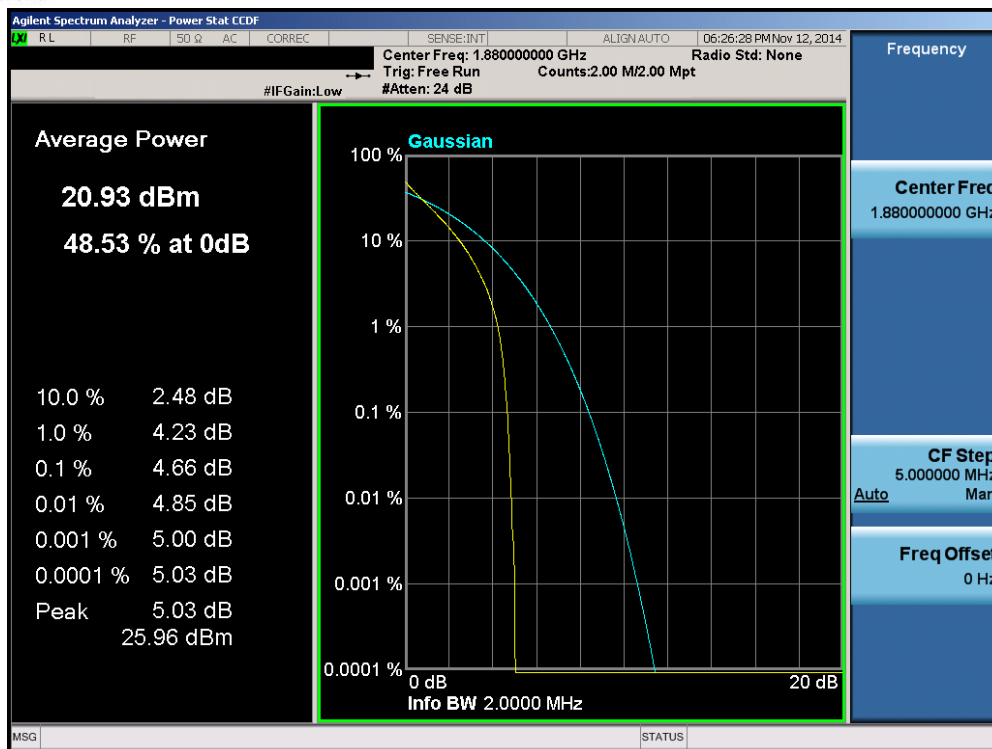


Figure 6-4. Test Instrument & Measurement Setup

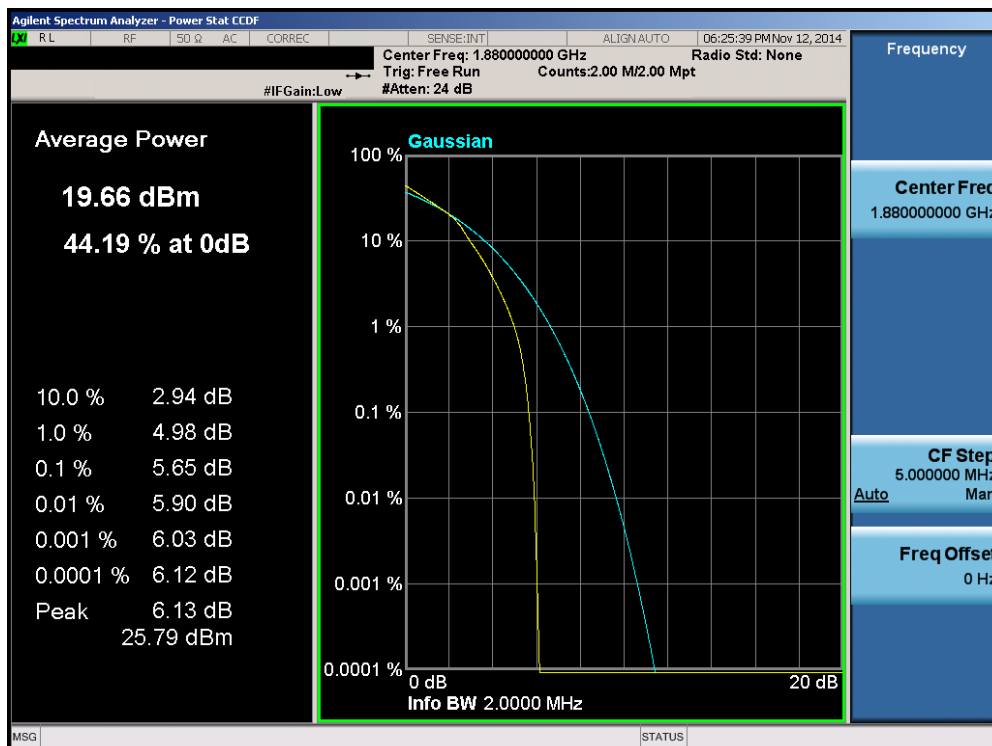
Test Notes

None.

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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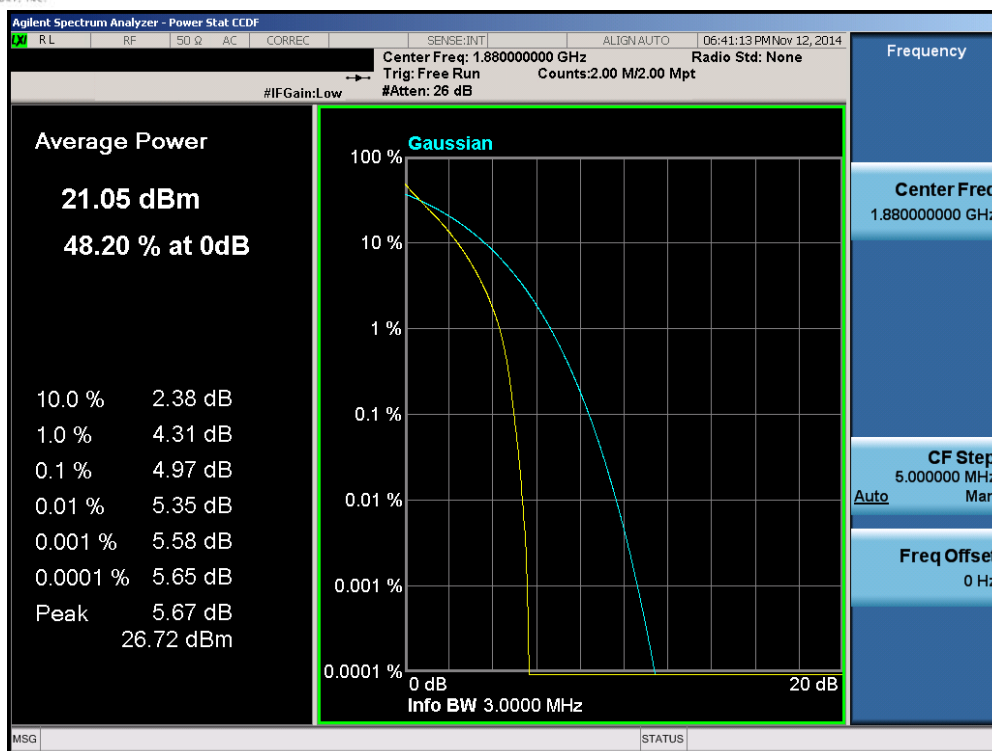


Plot 6-135. PAR Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

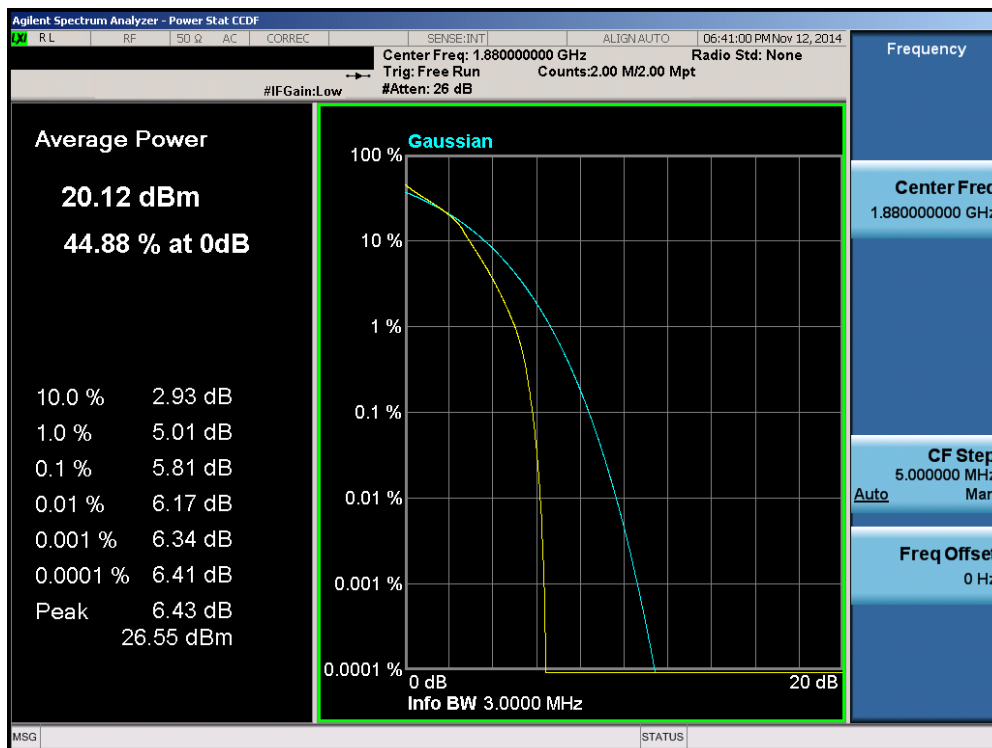


Plot 6-136. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

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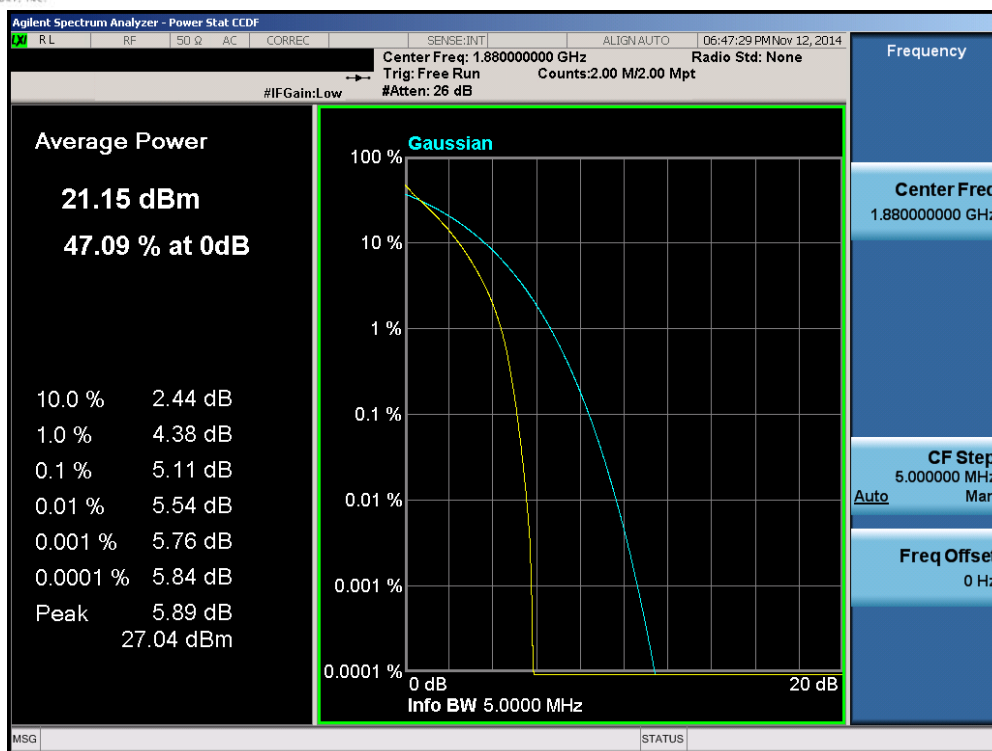


Plot 6-137. PAR Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

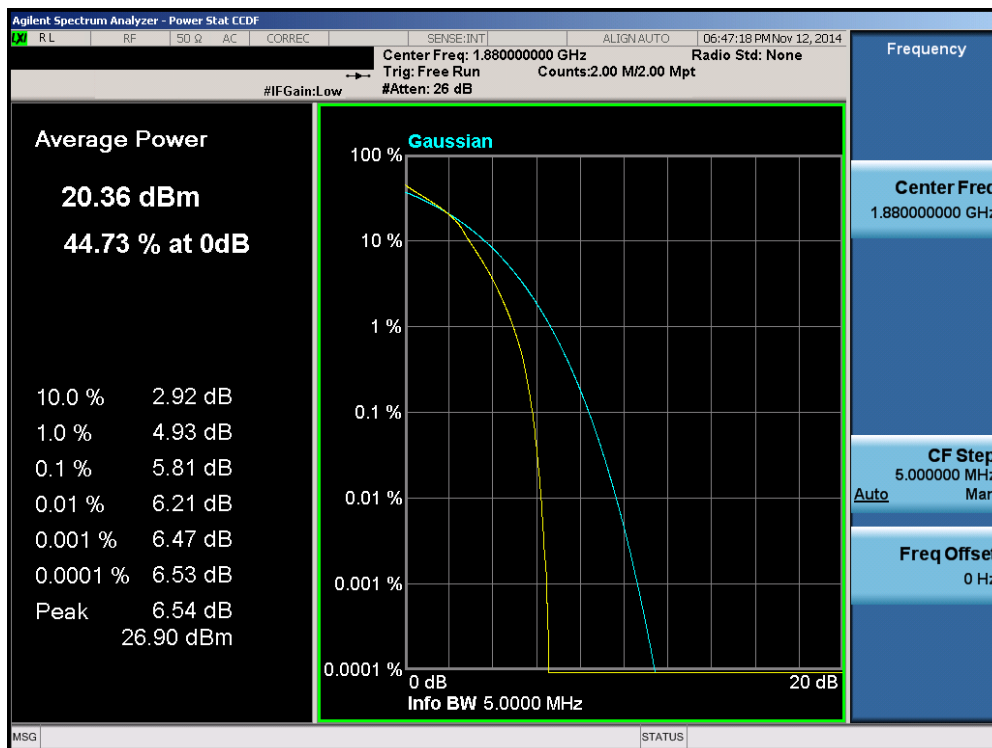


Plot 6-138. PAR Plot (Band 2 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: A3LSMG360M	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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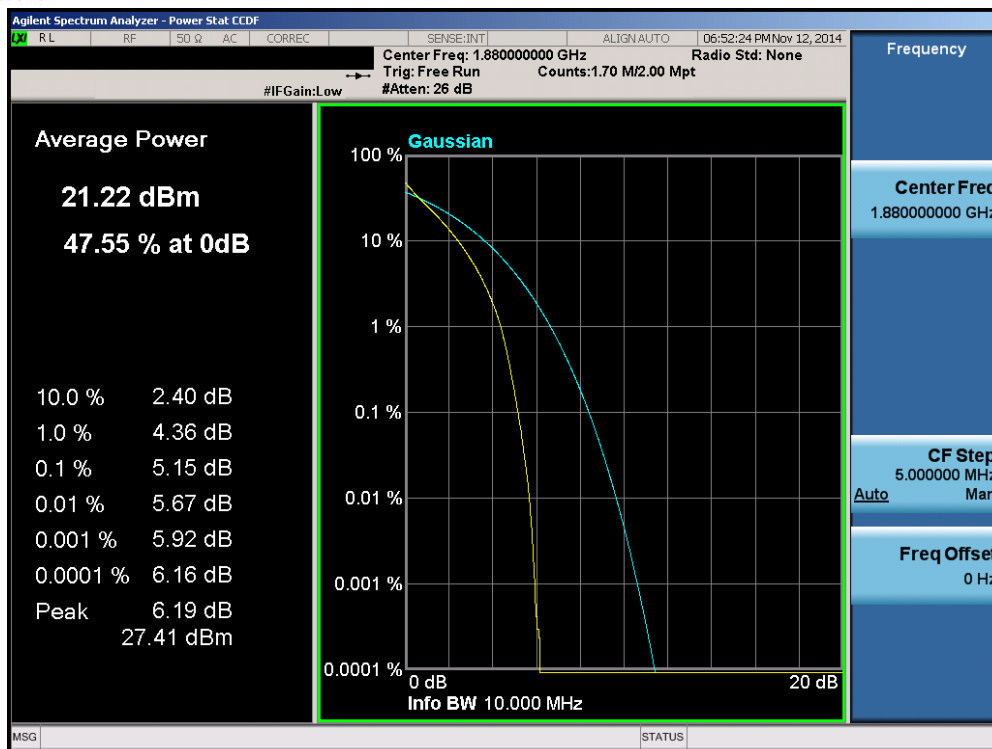


Plot 6-139. PAR Plot (Band 2 - 5.0MHz QPSK - RB Size 25)

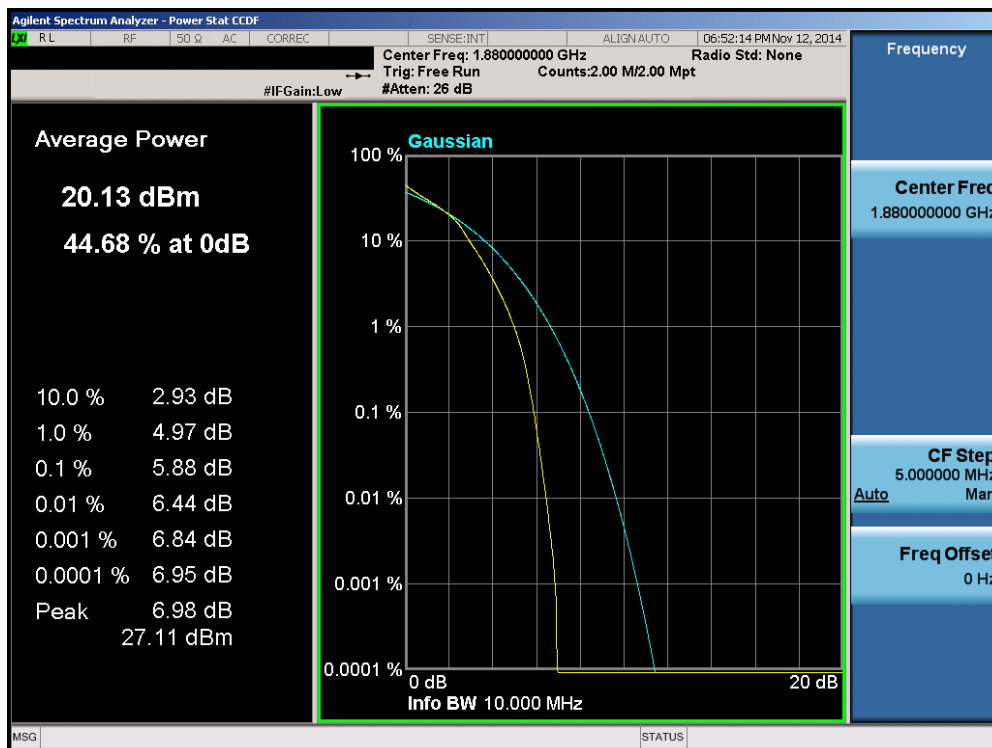


Plot 6-140. PAR Plot (Band 2 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: A3LSMG360M	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1411112105.A3L	Test Dates: 11/11 - 11/19/2014	EUT Type: Portable Handset		Page 85 of 112

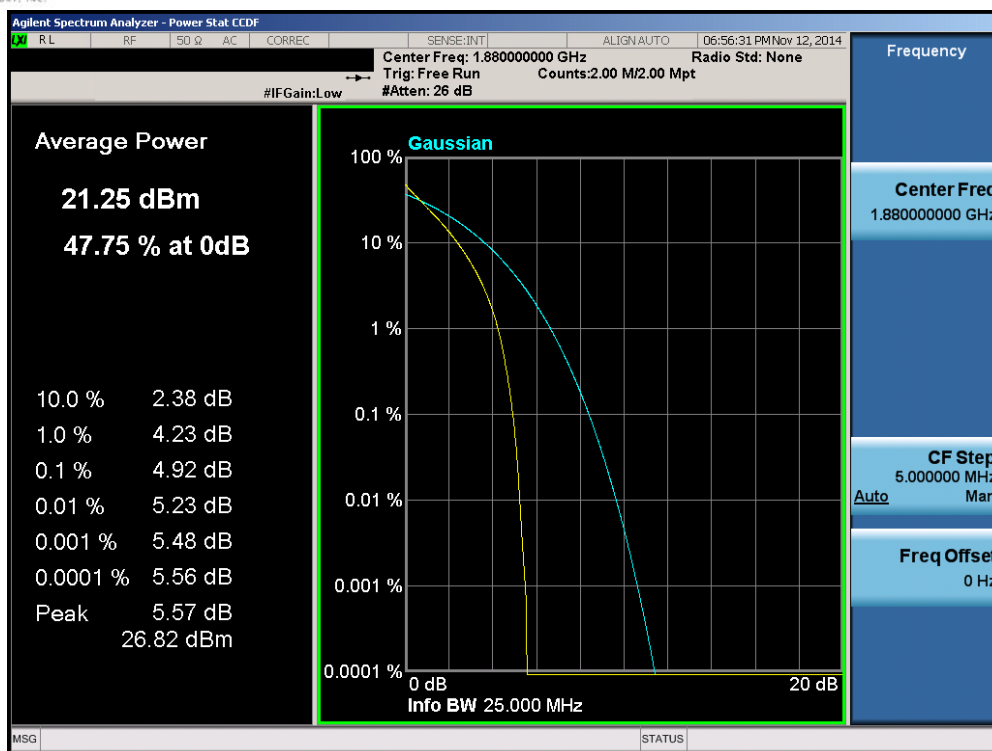


Plot 6-141. PAR Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

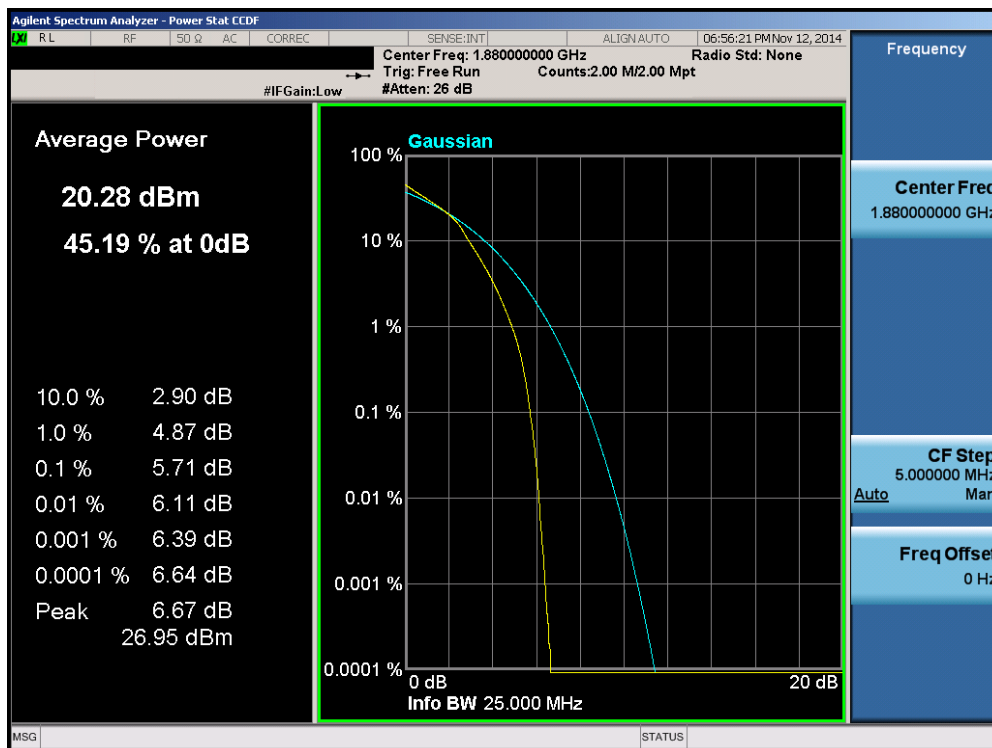


Plot 6-142. PAR Plot (Band 2 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: A3LSMG360M	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1411112105.A3L	Test Dates: 11/11 - 11/19/2014	EUT Type: Portable Handset		Page 86 of 112

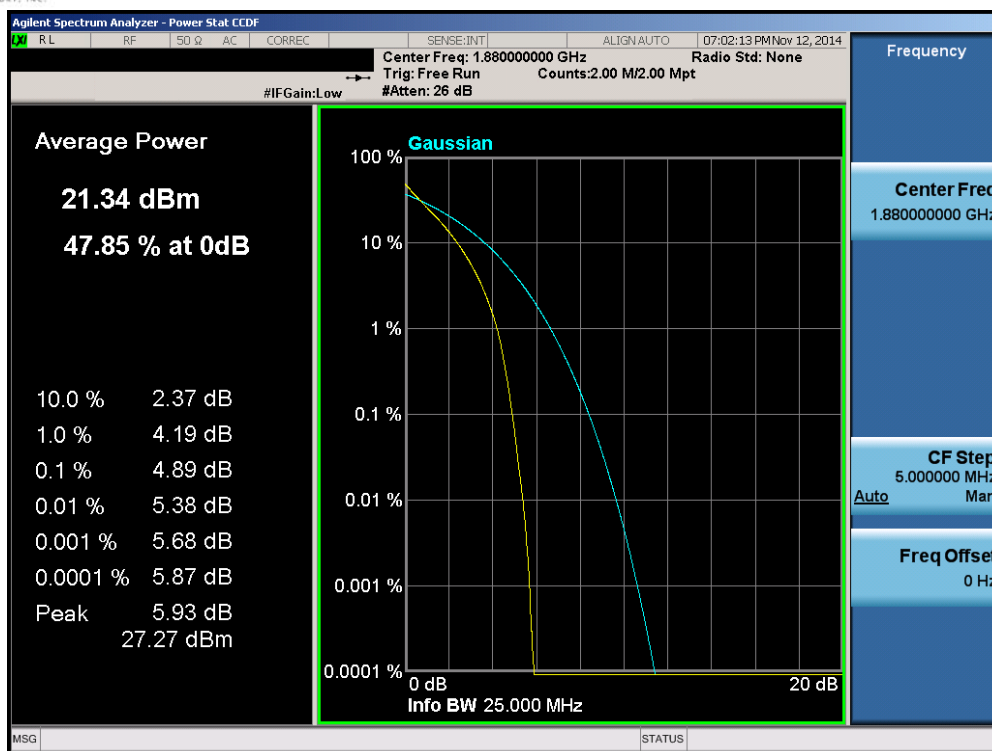


Plot 6-143. PAR Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

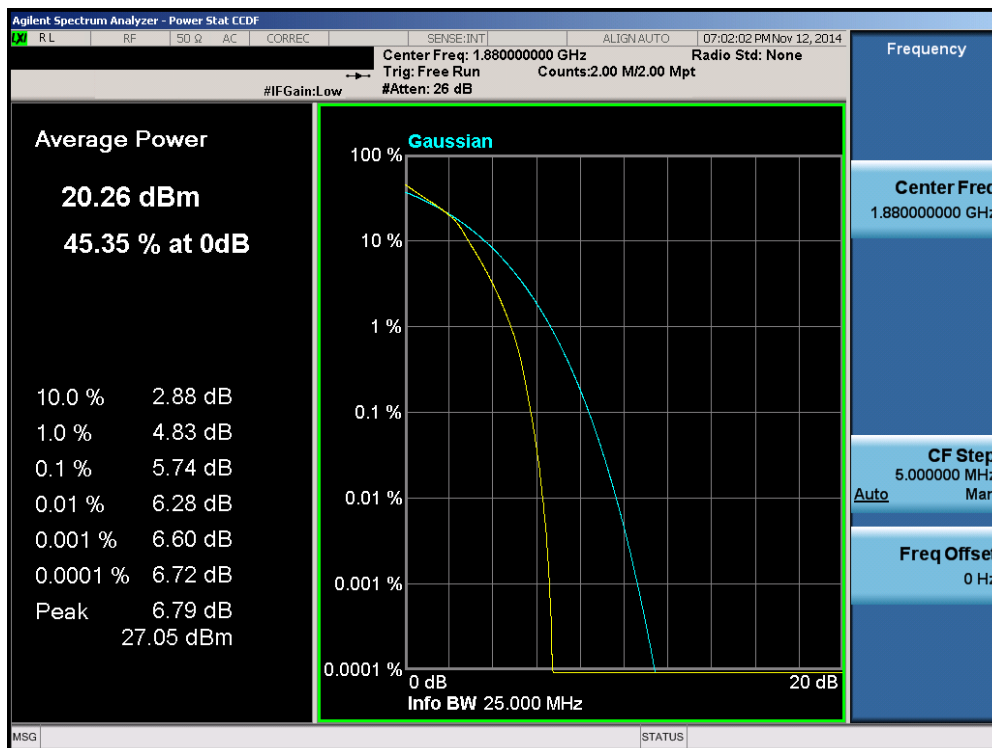


Plot 6-144. PAR Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: A3LSMG360M	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-145. PAR Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 6-146. PAR Plot (Band 2 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: A3LSMG360M	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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6.6 Radiated Power (ERP/EIRP)

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

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 v02r02 – Section 5.2.1

ANSI/TIA-603-C-2004 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW $\geq 3 \times$ 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".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

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Test Setup

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

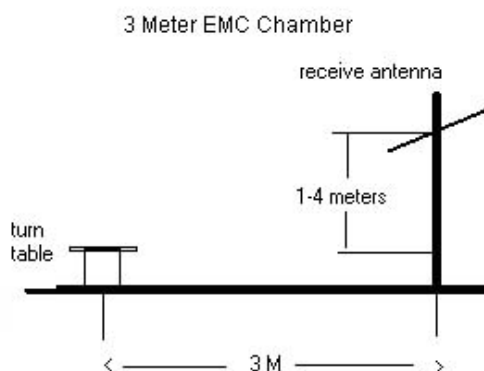


Figure 6-5. Test Instrument & Measurement Setup

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	Ant. Pol. [H/V]	EUT Pol.	ERP [dBm]	ERP [Watts]	Margin [dB]
706.50	5	QPSK	Standard	1 / 24	11.53	2.71	V	V	14.24	0.027	-20.53
710.00	5	QPSK	Standard	1 / 0	11.04	2.71	V	V	13.75	0.024	-21.02
713.50	5	QPSK	Standard	1 / 0	11.37	2.71	V	V	14.08	0.026	-20.69
706.50	5	16-QAM	Standard	1 / 24	10.84	2.71	V	V	13.55	0.023	-21.22
710.00	5	16-QAM	Standard	1 / 0	10.26	2.71	V	V	12.97	0.020	-21.80
713.50	5	16-QAM	Standard	1 / 0	10.62	2.71	V	V	13.33	0.022	-21.44
709.00	10	QPSK	Standard	1 / 49	11.27	2.71	V	V	13.98	0.025	-20.79
710.00	10	QPSK	Standard	1 / 49	11.49	2.71	V	V	14.20	0.026	-20.57
711.00	10	QPSK	Standard	1 / 49	11.62	2.71	V	V	14.33	0.027	-20.44
709.00	10	16-QAM	Standard	1 / 49	10.74	2.71	V	V	13.45	0.022	-21.32
710.00	10	16-QAM	Standard	1 / 49	10.85	2.71	V	V	13.56	0.023	-21.21
711.00	10	16-QAM	Standard	1 / 49	11.09	2.71	V	V	13.80	0.024	-20.97

Table 6-2. ERP Data (Band 17)

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
Test Report S/N: 0Y1411112105.A3L	Test Dates: 11/11 - 11/19/2014	EUT Type: Portable Handset			Page 91 of 112

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	Ant. Pol. [H/V]	EUT Pol.	ERP [dBm]	ERP [Watts]	Margin [dB]
824.70	1.4	QPSK	Standard	1 / 5	13.96	3.01	V	V	16.97	0.050	-21.49
836.50	1.4	QPSK	Standard	1 / 5	13.76	3.15	V	V	16.91	0.049	-21.55
848.30	1.4	QPSK	Standard	1 / 0	13.91	3.28	V	V	17.19	0.052	-21.26
824.70	1.4	16-QAM	Standard	1 / 5	12.84	3.01	V	V	15.85	0.038	-22.61
836.50	1.4	16-QAM	Standard	1 / 5	13.06	3.15	V	V	16.21	0.042	-22.25
848.30	1.4	16-QAM	Standard	1 / 0	12.21	3.28	V	V	15.49	0.035	-22.96
825.50	3	QPSK	Standard	1 / 14	14.17	3.02	V	V	17.19	0.052	-21.27
836.50	3	QPSK	Standard	1 / 0	13.90	3.15	V	V	17.05	0.051	-21.41
847.50	3	QPSK	Standard	1 / 14	13.89	3.27	V	V	17.16	0.052	-21.29
825.50	3	16-QAM	Standard	1 / 14	13.27	3.02	V	V	16.29	0.043	-22.17
836.50	3	16-QAM	Standard	1 / 0	13.02	3.15	V	V	16.17	0.041	-22.29
847.50	3	16-QAM	Standard	1 / 14	13.12	3.27	V	V	16.39	0.044	-22.06
826.50	5	QPSK	Standard	1 / 24	14.41	3.03	V	V	17.44	0.055	-21.01
836.50	5	QPSK	Standard	1 / 0	14.08	3.15	V	V	17.23	0.053	-21.23
846.50	5	QPSK	Standard	1 / 24	13.85	3.26	V	V	17.11	0.051	-21.34
826.50	5	16-QAM	Standard	1 / 24	13.27	3.03	V	V	16.30	0.043	-22.15
836.50	5	16-QAM	Standard	1 / 0	13.25	3.15	V	V	16.40	0.044	-22.06
846.50	5	16-QAM	Standard	1 / 24	13.26	3.26	V	V	16.52	0.045	-21.93
829.00	10	QPSK	Standard	1 / 0	13.96	3.06	V	V	17.02	0.050	-21.43
836.50	10	QPSK	Standard	1 / 0	14.01	3.15	V	V	17.16	0.052	-21.30
844.00	10	QPSK	Standard	1 / 0	13.52	3.23	V	V	16.75	0.047	-21.70
829.00	10	16-QAM	Standard	1 / 0	12.94	3.06	V	V	16.00	0.040	-22.45
836.50	10	16-QAM	Standard	1 / 0	13.17	3.15	V	V	16.32	0.043	-22.14
844.00	10	16-QAM	Standard	1 / 0	12.64	3.23	V	V	15.87	0.039	-22.58

Table 6-3. ERP Data (Band 5)

FCC ID: A3LSMG360M	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1411112105.A3L	Test Dates: 11/11 - 11/19/2014	EUT Type: Portable Handset	Page 92 of 112

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	Ant. Pol. [H/V]	EUT Pol.	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1710.70	1.4	QPSK	Standard	1 / 0	9.56	9.29	V	H2	18.85	0.077	-11.15
1732.50	1.4	QPSK	Standard	1 / 0	9.50	9.34	V	H2	18.84	0.077	-11.16
1754.30	1.4	QPSK	Standard	1 / 0	9.03	9.38	V	H2	18.41	0.069	-11.59
1710.70	1.4	16-QAM	Standard	1 / 0	8.65	9.29	V	H2	17.94	0.062	-12.06
1732.50	1.4	16-QAM	Standard	1 / 0	8.50	9.34	V	H2	17.84	0.061	-12.16
1754.30	1.4	16-QAM	Standard	1 / 0	8.55	9.38	V	H2	17.93	0.062	-12.07
1711.50	3	QPSK	Standard	1 / 0	10.10	9.30	V	H2	19.40	0.087	-10.60
1732.50	3	QPSK	Standard	1 / 0	9.98	9.34	V	H2	19.32	0.085	-10.68
1753.50	3	QPSK	Standard	1 / 0	9.03	9.38	V	H2	18.41	0.069	-11.59
1711.50	3	16-QAM	Standard	1 / 0	8.40	9.30	V	H2	17.70	0.059	-12.30
1732.50	3	16-QAM	Standard	1 / 0	9.38	9.34	V	H2	18.72	0.074	-11.28
1753.50	3	16-QAM	Standard	1 / 0	8.53	9.38	V	H2	17.91	0.062	-12.09
1712.50	5	QPSK	Standard	1 / 0	12.20	9.30	V	H2	21.50	0.141	-8.50
1732.50	5	QPSK	Standard	1 / 0	11.63	9.34	V	H2	20.97	0.125	-9.03
1752.50	5	QPSK	Standard	1 / 24	10.98	9.38	V	H2	20.36	0.109	-9.64
1712.50	5	16-QAM	Standard	1 / 0	10.90	9.30	V	H2	20.20	0.105	-9.80
1732.50	5	16-QAM	Standard	1 / 0	10.09	9.34	V	H2	19.43	0.088	-10.57
1752.50	5	16-QAM	Standard	1 / 24	9.91	9.38	V	H2	19.29	0.085	-10.71
1715.00	10	QPSK	Standard	1 / 0	11.12	9.30	V	H2	20.42	0.110	-9.58
1732.50	10	QPSK	Standard	1 / 0	11.24	9.34	V	H2	20.58	0.114	-9.42
1750.00	10	QPSK	Standard	1 / 0	10.72	9.37	V	H2	20.09	0.102	-9.91
1715.00	10	16-QAM	Standard	1 / 0	10.46	9.30	V	H2	19.76	0.095	-10.24
1732.50	10	16-QAM	Standard	1 / 0	10.56	9.34	V	H2	19.90	0.098	-10.10
1750.00	10	16-QAM	Standard	1 / 0	10.36	9.37	V	H2	19.73	0.094	-10.27
1717.50	15	QPSK	Standard	1 / 0	11.61	9.31	V	H2	20.92	0.124	-9.08
1732.50	15	QPSK	Standard	1 / 0	11.77	9.34	V	H2	21.11	0.129	-8.89
1747.50	15	QPSK	Standard	1 / 74	11.25	9.37	V	H2	20.62	0.115	-9.38
1717.50	15	16-QAM	Standard	1 / 0	11.06	9.31	V	H2	20.37	0.109	-9.63
1732.50	15	16-QAM	Standard	1 / 0	10.71	9.34	V	H2	20.05	0.101	-9.95
1747.50	15	16-QAM	Standard	1 / 74	10.00	9.37	V	H2	19.37	0.086	-10.63
1720.00	20	QPSK	Standard	1 / 0	11.74	9.31	V	H2	21.05	0.127	-8.95
1732.50	20	QPSK	Standard	1 / 0	11.41	9.34	V	H2	20.75	0.119	-9.25
1745.00	20	QPSK	Standard	1 / 0	10.40	9.36	V	H2	19.76	0.095	-10.24
1720.00	20	16-QAM	Standard	1 / 0	10.48	9.31	V	H2	19.79	0.095	-10.21
1732.50	20	16-QAM	Standard	1 / 0	10.54	9.34	V	H2	19.88	0.097	-10.12
1745.00	20	16-QAM	Standard	1 / 0	9.79	9.36	V	H2	19.15	0.082	-10.85

Table 6-4. EIRP Data (Band 4)

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	Ant. Pol. [H/V]	EUT Pol.	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1850.70	1.4	QPSK	Standard	1 / 5	11.74	9.38	V	H2	21.12	0.129	-11.89
1880.00	1.4	QPSK	Standard	1 / 0	11.36	9.33	V	H2	20.69	0.117	-12.32
1909.30	1.4	QPSK	Standard	1 / 5	11.67	9.29	V	H2	20.96	0.125	-12.05
1850.70	1.4	16-QAM	Standard	1 / 5	10.92	9.38	V	H2	20.30	0.107	-12.71
1880.00	1.4	16-QAM	Standard	1 / 0	10.30	9.33	V	H2	19.63	0.092	-13.38
1909.30	1.4	16-QAM	Standard	1 / 5	10.87	9.29	V	H2	20.16	0.104	-12.85
1851.50	3	QPSK	Standard	1 / 14	11.47	9.38	V	H2	20.85	0.122	-12.16
1880.00	3	QPSK	Standard	1 / 14	11.48	9.33	V	H2	20.81	0.121	-12.20
1908.50	3	QPSK	Standard	1 / 14	11.68	9.29	V	H2	20.97	0.125	-12.04
1851.50	3	16-QAM	Standard	1 / 14	10.34	9.38	V	H2	19.72	0.094	-13.29
1880.00	3	16-QAM	Standard	1 / 14	10.96	9.33	V	H2	20.29	0.107	-12.72
1908.50	3	16-QAM	Standard	1 / 14	10.36	9.29	V	H2	19.65	0.092	-13.36
1852.50	5	QPSK	Standard	1 / 24	13.79	9.38	V	H2	23.17	0.207	-9.84
1880.00	5	QPSK	Standard	1 / 24	12.97	9.33	V	H2	22.30	0.170	-10.71
1907.50	5	QPSK	Standard	1 / 24	13.25	9.29	V	H2	22.54	0.179	-10.47
1852.50	5	16-QAM	Standard	1 / 24	13.10	9.38	V	H2	22.48	0.177	-10.53
1880.00	5	16-QAM	Standard	1 / 24	11.61	9.33	V	H2	20.94	0.124	-12.07
1907.50	5	16-QAM	Standard	1 / 24	12.92	9.29	V	H2	22.21	0.166	-10.80
1855.00	10	QPSK	Standard	1 / 0	12.94	9.37	V	H2	22.31	0.170	-10.70
1880.00	10	QPSK	Standard	1 / 49	13.04	9.33	V	H2	22.37	0.173	-10.64
1905.00	10	QPSK	Standard	1 / 49	13.79	9.29	V	H2	23.08	0.203	-9.93
1855.00	10	16-QAM	Standard	1 / 0	11.57	9.37	V	H2	20.94	0.124	-12.07
1880.00	10	16-QAM	Standard	1 / 49	12.14	9.33	V	H2	21.47	0.140	-11.54
1905.00	10	16-QAM	Standard	1 / 49	12.85	9.29	V	H2	22.14	0.164	-10.87
1857.50	15	QPSK	Standard	1 / 0	12.49	9.37	V	H2	21.86	0.153	-11.15
1880.00	15	QPSK	Standard	1 / 74	12.98	9.33	V	H2	22.31	0.170	-10.70
1902.50	15	QPSK	Standard	1 / 0	13.60	9.30	V	H2	22.90	0.195	-10.11
1857.50	15	16-QAM	Standard	1 / 0	12.23	9.37	V	H2	21.60	0.145	-11.41
1880.00	15	16-QAM	Standard	1 / 74	11.48	9.33	V	H2	20.81	0.121	-12.20
1902.50	15	16-QAM	Standard	1 / 0	13.05	9.30	V	H2	22.35	0.172	-10.66
1860.00	20	QPSK	Standard	1 / 0	12.43	9.37	V	H2	21.80	0.151	-11.21
1880.00	20	QPSK	Standard	1 / 99	12.92	9.33	V	H2	22.25	0.168	-10.76
1900.00	20	QPSK	Standard	1 / 99	13.90	9.30	V	H2	23.20	0.209	-9.81
1860.00	20	16-QAM	Standard	1 / 0	11.95	9.37	V	H2	21.32	0.135	-11.69
1880.00	20	16-QAM	Standard	1 / 99	11.36	9.33	V	H2	20.69	0.117	-12.32
1900.00	20	16-QAM	Standard	1 / 99	12.74	9.30	V	H2	22.04	0.160	-10.97

Table 6-5. EIRP Data (Band 2)

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1411112105.A3L	Test Dates: 11/11 - 11/19/2014	EUT Type: Portable Handset		Page 94 of 112

6.7 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) §24.238(a) §27.53(g) §27.53(h)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 v02r02 – Section 5.8

ANSI/TIA-603-C-2004 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $\geq 2 \times$ span / RBW
5. Detector = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize

Test Setup

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

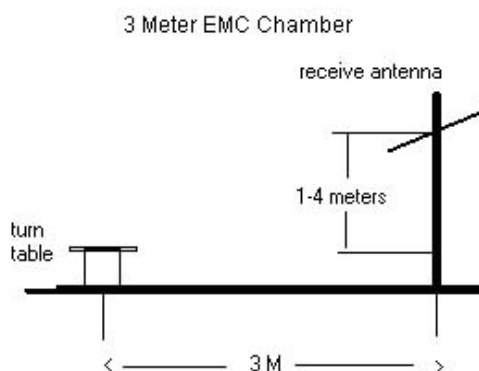


Figure 6-6. Test Instrument & Measurement Setup

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1411112105.A3L	Test Dates: 11/11 - 11/19/2014	EUT Type: Portable Handset		Page 95 of 112

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. 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.

OPERATING FREQUENCY: 709.00 MHz
 CHANNEL: 23780
 MEASURED OUTPUT POWER: 13.98 dBm = 0.025 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 26.98 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
1418.00	-50.47	2.62	-47.85	H	H	61.8
2127.00	-56.65	3.03	-53.61	H	H	67.6

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

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 710.00 MHz
 CHANNEL: 23790
 MEASURED OUTPUT POWER: 14.20 dBm = 0.026 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 27.20 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
1420.00	-52.98	2.64	-50.34	H	H	64.5
2130.00	-56.95	3.04	-53.91	H	H	68.1

Table 6-7. Radiated Spurious Data (Band 17 – Mid Channel)

OPERATING FREQUENCY: 711.00 MHz
 CHANNEL: 23800
 MEASURED OUTPUT POWER: 14.33 dBm = 0.027 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 27.33 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
1422.00	-48.93	2.66	-46.26	H	H	60.6
2133.00	-55.04	3.05	-51.99	H	H	66.3

Table 6-8. Radiated Spurious Data (Band 17 – High Channel)

OPERATING FREQUENCY: 826.50 MHz
 CHANNEL: 20425
 MEASURED OUTPUT POWER: 17.44 dBm = 0.055 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.44 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
1653.00	-61.63	3.57	-58.06	V	H2	75.5
2479.50	-61.23	3.53	-57.70	V	H2	75.1
3306.00	-62.83	5.66	-57.17	V	H2	74.6

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

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 20525
 MEASURED OUTPUT POWER: 17.23 dBm = 0.053 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.23 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
1673.00	-59.68	3.50	-56.19	V	H2	73.4
2509.50	-60.91	3.53	-57.38	V	H2	74.6
3346.00	-62.87	5.77	-57.11	V	H2	74.3
4182.50	-62.22	7.04	-55.18	V	H2	72.4

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

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 846.50 MHz
 CHANNEL: 20625
 MEASURED OUTPUT POWER: 17.11 dBm = 0.051 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.11 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
1693.00	-62.25	3.42	-58.83	V	H2	75.9
2539.50	-61.62	3.60	-58.02	V	H2	75.1
3386.00	-63.19	5.87	-57.31	V	H2	74.4

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

OPERATING FREQUENCY: 1712.50 MHz
 CHANNEL: 19975
 MEASURED OUTPUT POWER: 21.50 dBm = 0.141 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.50 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
3425.00	-56.99	8.15	-48.84	V	H2	70.3
5137.50	-60.33	10.26	-50.07	V	H2	71.6
6850.00	-62.68	11.38	-51.31	V	H2	72.8
8562.50	-54.66	13.01	-41.65	V	H2	63.1
10275.00	-64.77	13.28	-51.49	V	H2	73.0

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

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1732.50 MHz
 CHANNEL: 20175
 MEASURED OUTPUT POWER: 20.97 dBm = 0.125 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 33.97 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
3465.00	-54.58	8.28	-46.30	V	H2	67.3
5197.50	-60.61	10.32	-50.28	V	H2	71.2
6930.00	-63.93	11.48	-52.45	V	H2	73.4
8662.50	-53.65	13.02	-40.64	V	H2	61.6
10395.00	-64.38	13.16	-51.22	V	H2	72.2
12127.50	-62.58	13.09	-49.48	V	H2	70.5
13860.00	-63.65	14.55	-49.10	V	H2	70.1

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

OPERATING FREQUENCY: 1752.50 MHz
 CHANNEL: 20375
 MEASURED OUTPUT POWER: 20.36 dBm = 0.109 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 33.36 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
3505.00	-57.92	8.41	-49.51	V	H2	69.9
5257.50	-57.12	10.34	-46.78	V	H2	67.1
7010.00	-59.37	11.56	-47.82	V	H2	68.2
8762.50	-53.30	13.01	-40.29	V	H2	60.7
10515.00	-61.53	13.00	-48.53	V	H2	68.9
12267.50	-63.23	13.15	-50.09	V	H2	70.4

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

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1860.00 MHz
 CHANNEL: 18700
 MEASURED OUTPUT POWER: 21.80 dBm = 0.151 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.80 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
3720.00	-51.95	8.39	-43.56	H	H	65.4
5580.00	-54.02	10.62	-43.40	H	H	65.2
7440.00	-60.28	12.07	-48.21	H	H	70.0
9300.00	-57.22	13.22	-44.00	H	H	65.8
11160.00	-58.59	13.28	-45.31	H	H	67.1

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

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 18900
 MEASURED OUTPUT POWER: 22.25 dBm = 0.168 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.25 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
3760.00	-55.86	8.38	-47.47	H	H	69.7
5640.00	-56.42	10.70	-45.72	H	H	68.0
7520.00	-57.26	12.10	-45.16	H	H	67.4
9400.00	-60.20	13.19	-47.01	H	H	69.3

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

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)				Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1900.00 MHz
 CHANNEL: 19100
 MEASURED OUTPUT POWER: 23.20 dBm = 0.209 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.20 dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
3800.00	-55.71	8.37	-47.33	H	H	70.5
5700.00	-56.13	10.74	-45.38	H	H	68.6
7600.00	-56.45	12.18	-44.27	H	H	67.5
9500.00	-59.42	13.19	-46.23	H	H	69.4
11400.00	-58.57	13.31	-45.26	H	H	68.5

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

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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6.8 Frequency Stability / Temperature Variation

\$2.1055 \$22.355 \$24.235 \$27.54

Test Overview and Limit

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

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

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

Test Procedure Used

ANSI/TIA-603-C-2004

Test Settings

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

Test Setup

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

Test Notes

None

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Band 17 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY: 710,000,000 Hz

CHANNEL: 23090

REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	709,999,943	-57	-0.0000080
100 %		- 30	709,999,724	-276	-0.0000389
100 %		- 20	710,000,209	209	0.0000294
100 %		- 10	709,999,824	-176	-0.0000248
100 %		0	710,000,204	204	0.0000287
100 %		+ 10	709,999,836	-164	-0.0000231
100 %		+ 20	710,000,014	14	0.0000020
100 %		+ 30	709,999,870	-130	-0.0000183
100 %		+ 40	710,000,004	4	0.0000006
100 %		+ 50	709,999,776	-224	-0.0000315
BATT. ENDPOINT	3.40	+ 20	710,000,262	262	0.0000369

Table 6-18. Frequency Stability Data (Band 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 17 Frequency Stability Measurements

§2.1055 §27.54

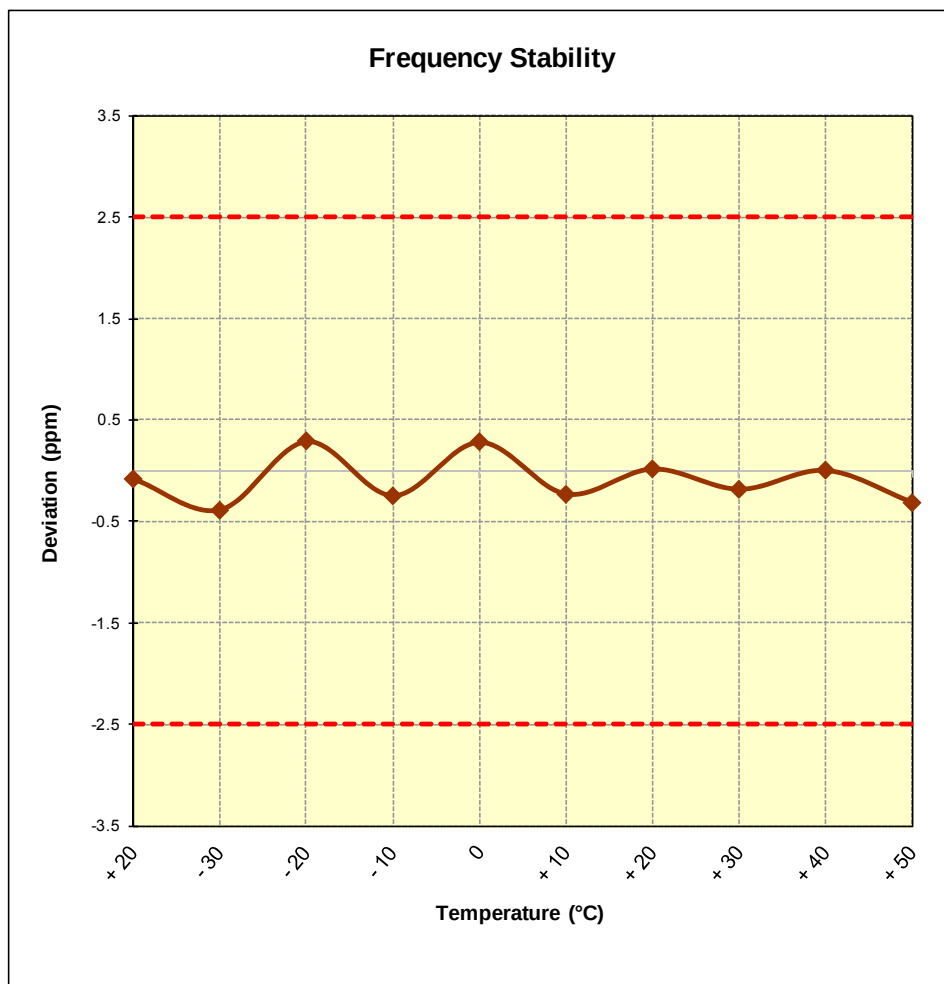


Figure 6-7. Frequency Stability Graph (Band 17)

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 5 Frequency Stability Measurements

§2.1055 §22.355

OPERATING FREQUENCY: 836,500,000 Hz

CHANNEL: 20525

REFERENCE VOLTAGE: 3.85 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,500,146	146	0.0000175
100 %		- 30	836,500,018	18	0.0000022
100 %		- 20	836,500,000	0	0.0000000
100 %		- 10	836,500,082	82	0.0000098
100 %		0	836,499,916	-84	-0.0000100
100 %		+ 10	836,499,683	-317	-0.0000379
100 %		+ 20	836,499,915	-85	-0.0000102
100 %		+ 30	836,500,029	29	0.0000035
100 %		+ 40	836,499,815	-185	-0.0000221
100 %		+ 50	836,499,980	-20	-0.0000024
BATT. ENDPOINT	3.40	+ 20	836,500,011	11	0.0000013

Table 6-19. Frequency Stability Data (Band 5)

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
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Band 5 Frequency Stability Measurements

§2.1055 §22.355

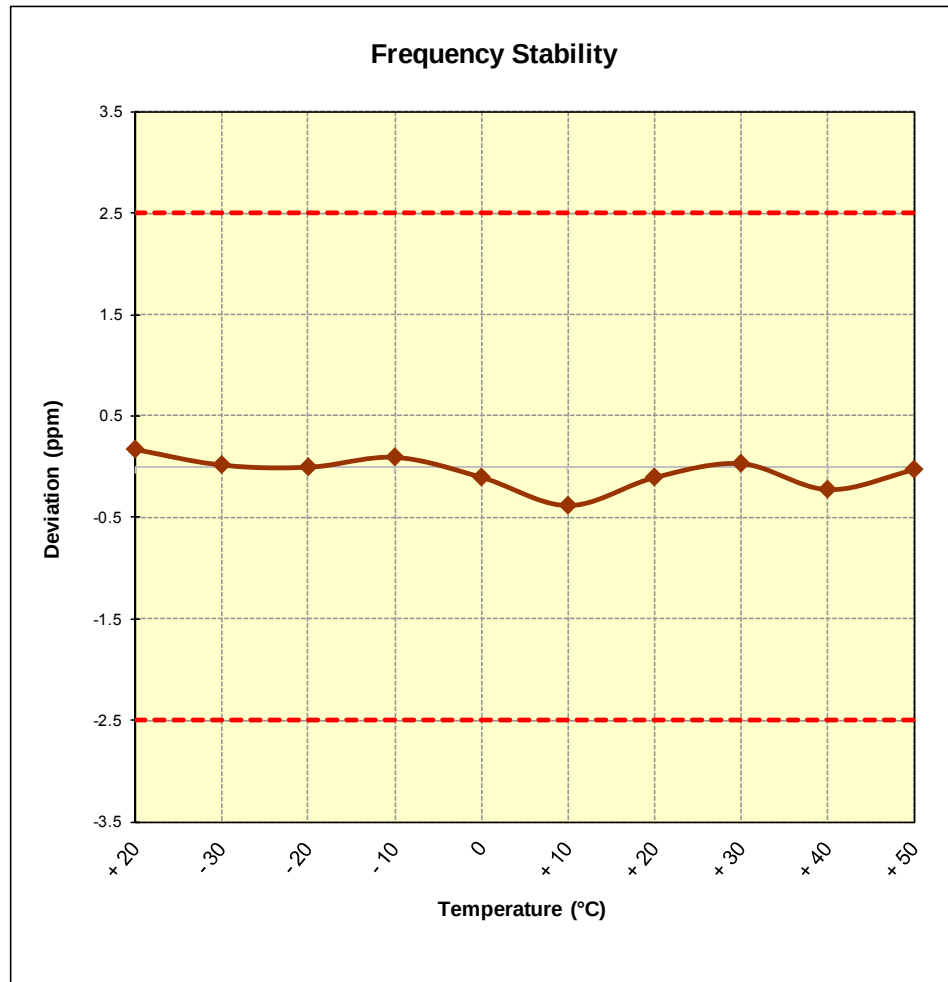


Figure 6-8. Frequency Stability Graph (Band 5)

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 4 Frequency Stability Measurements

§2.1055 §§27.54

OPERATING FREQUENCY: 1,732,500,000 Hz
 CHANNEL: 20175
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,732,500,386	386	0.0000223
100 %		- 30	1,732,499,785	-215	-0.0000124
100 %		- 20	1,732,500,359	359	0.0000207
100 %		- 10	1,732,500,024	24	0.0000014
100 %		0	1,732,500,085	85	0.0000049
100 %		+ 10	1,732,499,842	-158	-0.0000091
100 %		+ 20	1,732,499,660	-340	-0.0000196
100 %		+ 30	1,732,500,106	106	0.0000061
100 %		+ 40	1,732,500,026	26	0.0000015
100 %		+ 50	1,732,499,740	-260	-0.0000150
BATT. ENDPOINT	3.40	+ 20	1,732,500,324	324	0.0000187

Table 6-20. 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: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 4 Frequency Stability Measurements

§2.1055 §§27.54

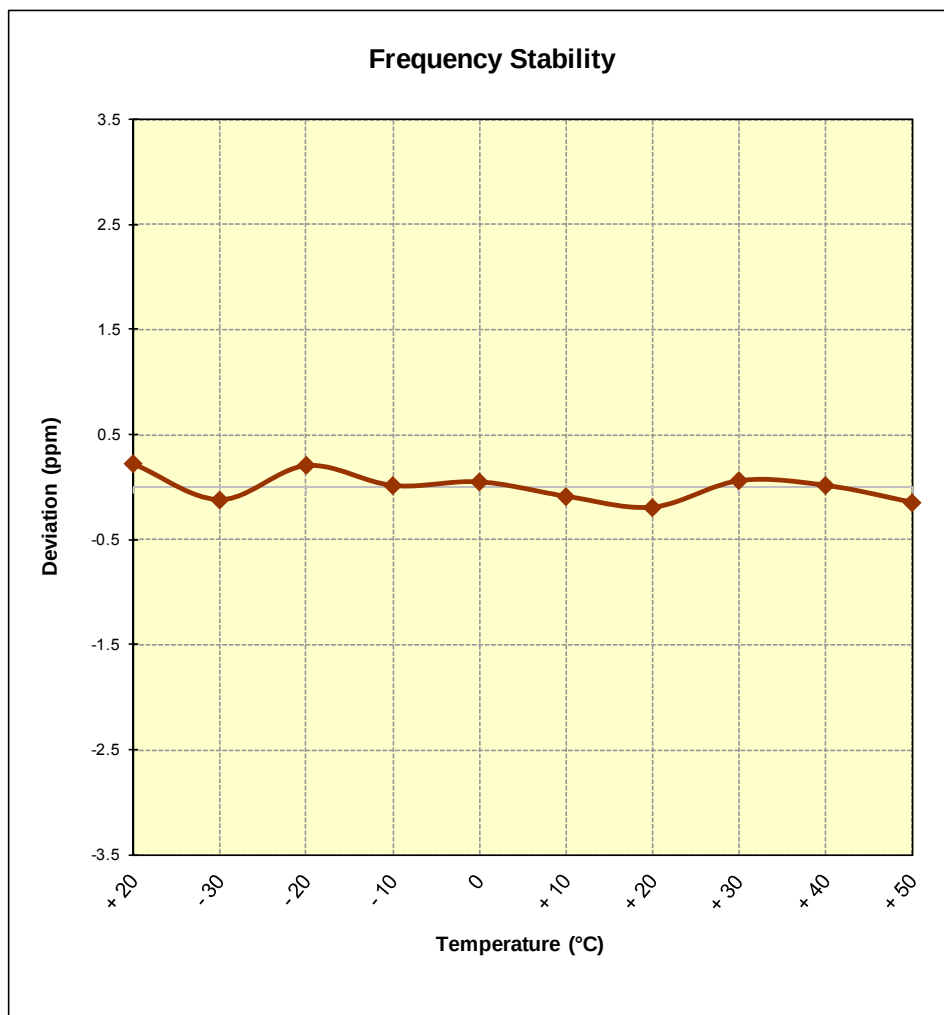


Figure 6-9. Frequency Stability Graph (Band 4)

FCC ID: A3LSMG360M		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Band 2 Frequency Stability Measurements

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OPERATING FREQUENCY: 1,880,000,000 Hz
 CHANNEL: 18900
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,797	-203	-0.0000108
100 %		- 30	1,879,999,721	-279	-0.0000148
100 %		- 20	1,879,999,876	-124	-0.0000066
100 %		- 10	1,880,000,035	35	0.0000019
100 %		0	1,880,000,055	55	0.0000029
100 %		+ 10	1,879,999,927	-73	-0.0000039
100 %		+ 20	1,879,999,879	-121	-0.0000064
100 %		+ 30	1,880,000,011	11	0.0000006
100 %		+ 40	1,880,000,018	18	0.0000010
100 %		+ 50	1,880,000,012	12	0.0000006
BATT. ENDPOINT	3.40	+ 20	1,879,999,859	-141	-0.0000075

Table 6-21. Frequency Stability Data (Band 2)

Note:

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

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Band 2 Frequency Stability Measurements

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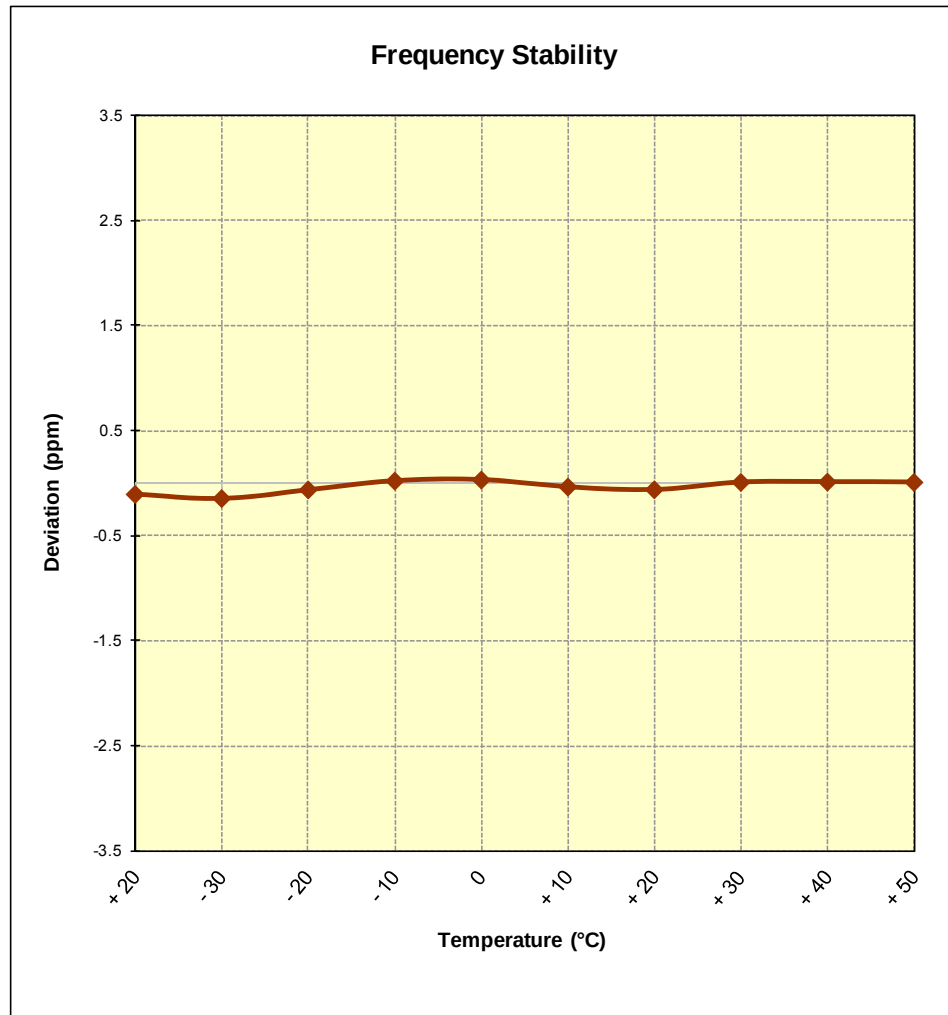


Figure 6-10. Frequency Stability Graph (Band 2)

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7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Electronics, Co. Ltd. Portable Handset FCC ID: A3LSMG360M** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

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