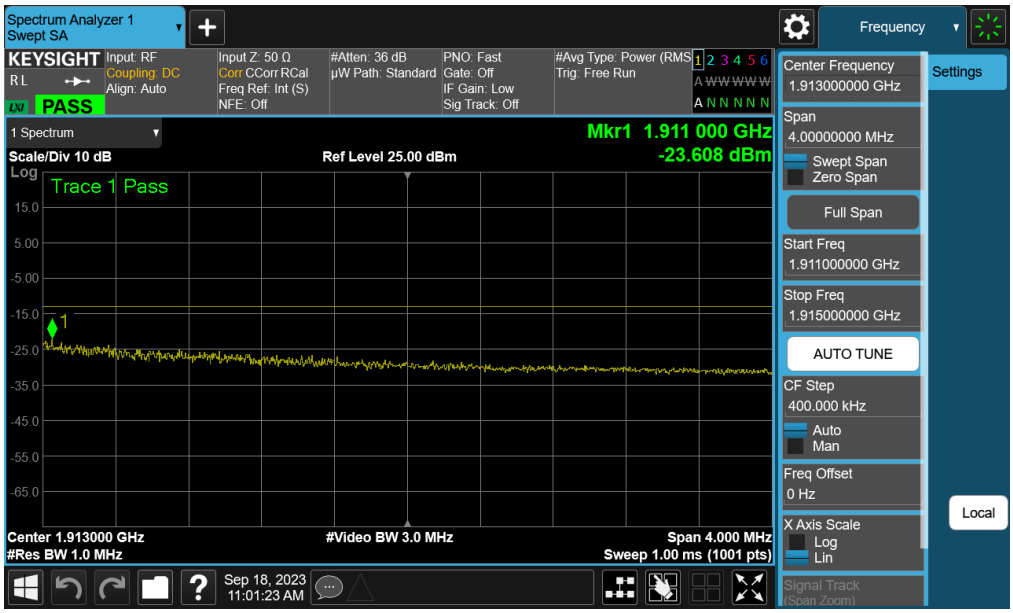
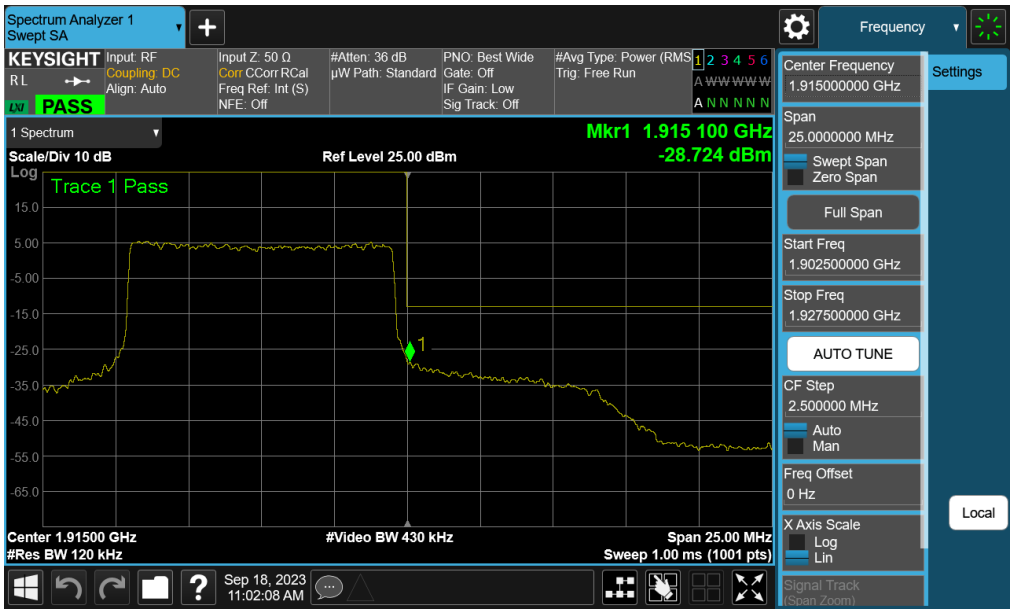
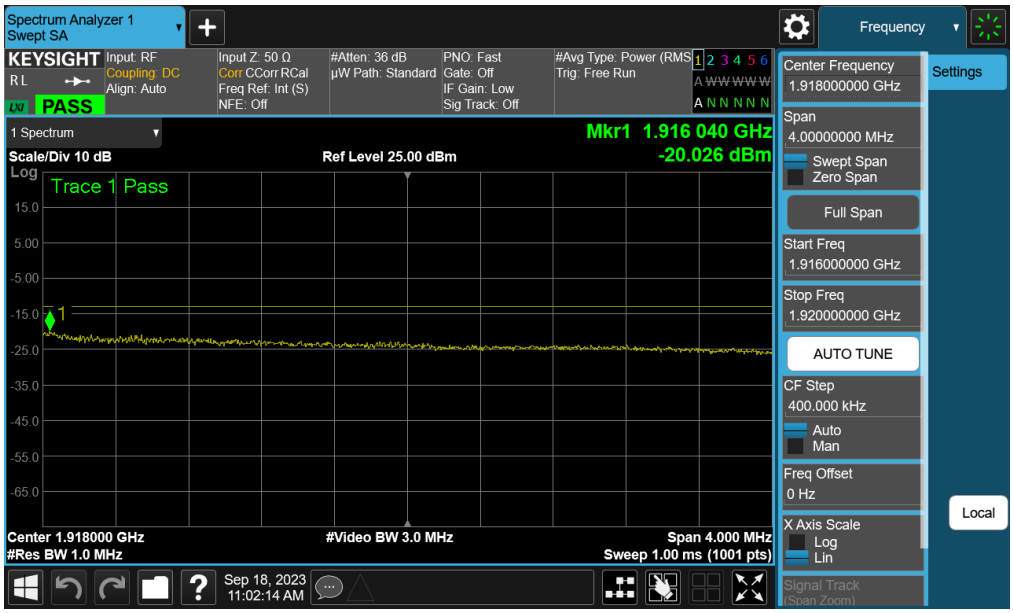
Plot 7-42. Upper Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant A)



Plot 7-43. Extended Upper Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant A)



Plot 7-44. Upper Band Edge Plot (LTE Band 25 - 10MHz QPSK – Full RB - Ant A)

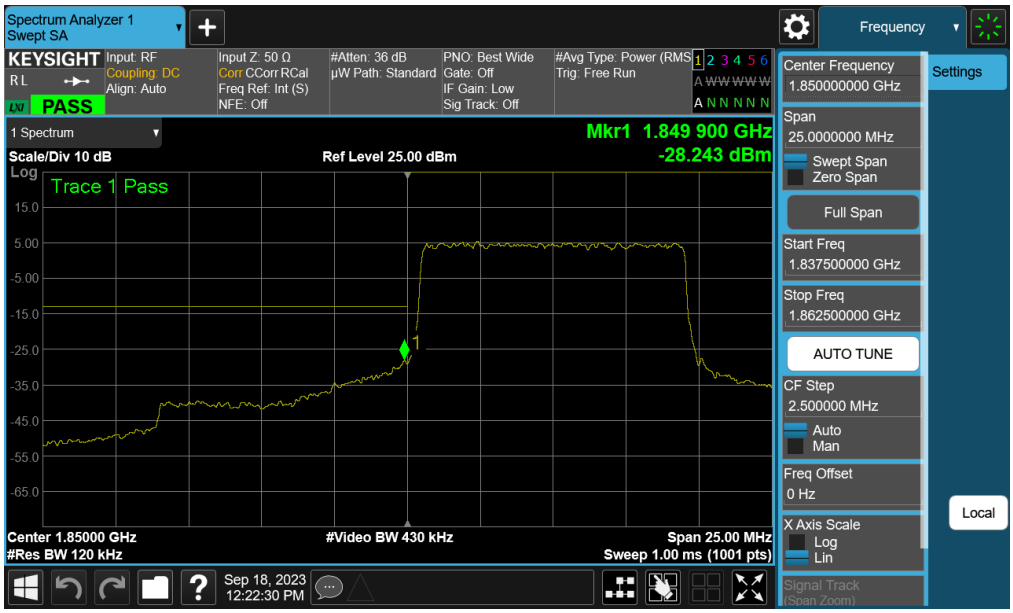


Plot 7-45. Extended Upper Band Edge Plot (LTE Band 25 - 10MHz QPSK – Full RB - Ant A)

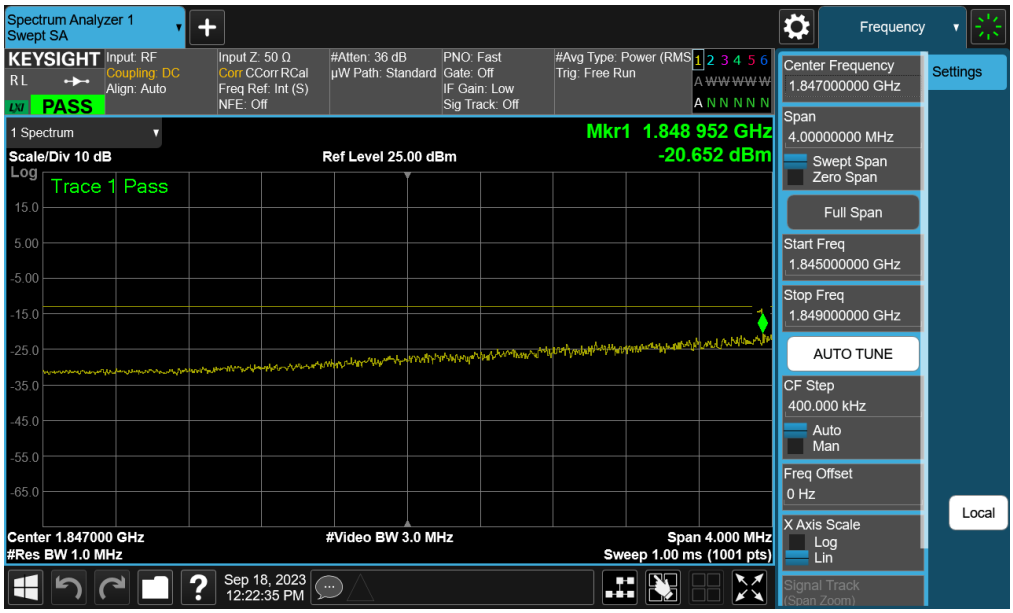
LTE Band 2 – Ant F

Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
LTE-B25-2	20MHz	Low	Band Edge	-29.16	-13	-16.16
		Low	Extended	-22.79	-13	-9.79
		High [B2]	Band Edge	-34.08	-13	-21.08
		High [B2]	Extended	-27.05	-13	-14.05
	15MHz	Low	Band Edge	-27.61	-13	-14.61
		Low	Extended	-20.49	-13	-7.49
		High [B2]	Band Edge	-29.71	-13	-16.71
		High [B2]	Extended	-24.46	-13	-11.46
	10MHz	Low	Band Edge	-28.24	-13	-15.24
		Low	Extended	-20.65	-13	-7.65
		High [B2]	Band Edge	-30.12	-13	-17.12
		High [B2]	Extended	-23.02	-13	-10.02
	5MHz	Low	Band Edge	-25.63	-13	-12.63
		Low	Extended	-25.95	-13	-12.95
		High [B2]	Band Edge	-26.72	-13	-13.72
		High [B2]	Extended	-26.49	-13	-13.49
	3MHz	Low	Band Edge	-23.55	-13	-10.55
		Low	Extended	-26.96	-13	-13.96
		High [B2]	Band Edge	-25.77	-13	-12.77
		High [B2]	Extended	-25.81	-13	-12.81
	1.4MHz	Low	Band Edge	-23.79	-13	-10.79
		Low	Extended	-32.24	-13	-19.24
		High [B2]	Band Edge	-23.97	-13	-10.97
		High [B2]	Extended	-31.19	-13	-18.19

Table 7-10. Band Edge Test Results – Ant F

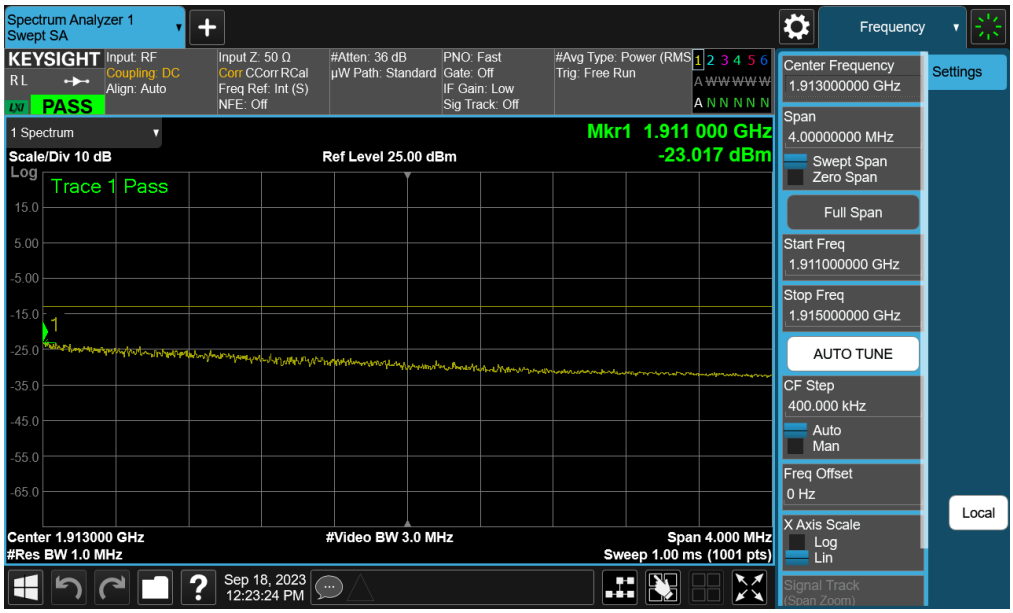


Plot 7-46. Lower Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant F)



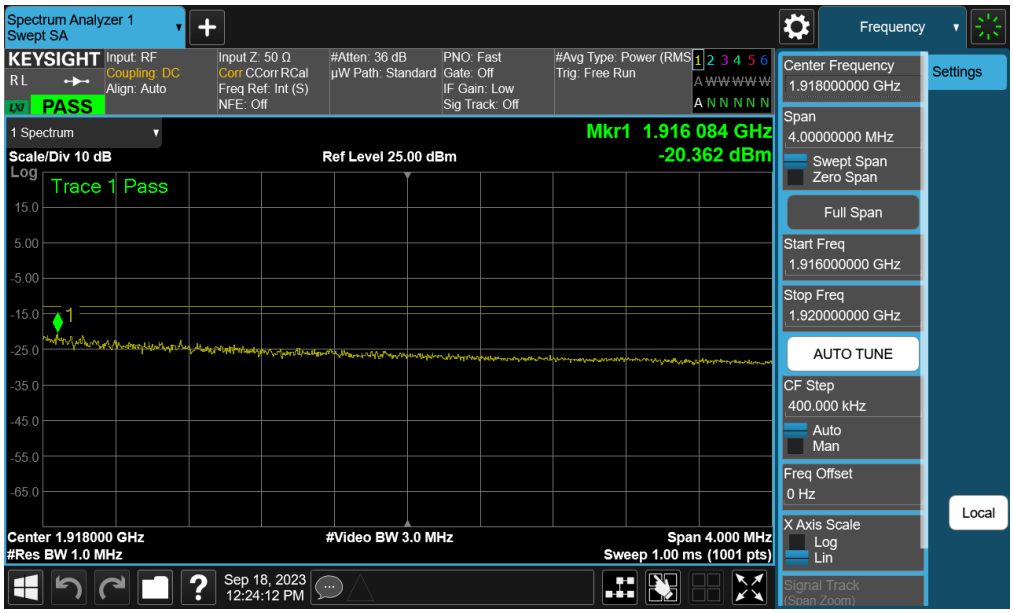
Plot 7-47. Extended Lower Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant F)

Plot 7-48. Upper Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB – Ant F)



Plot 7-49. Extended Upper Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant F)

Plot 7-50. Upper Band Edge Plot (LTE Band 25 - 10MHz QPSK – Full RB - Ant F)



Plot 7-51. Extended Upper Band Edge Plot (LTE Band 25 - 10MHz QPSK – Full RB - Ant F)

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.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

Test Procedure Used

ANSI C63.26-2015 – Section 5.2.3.4

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW ≥ 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.

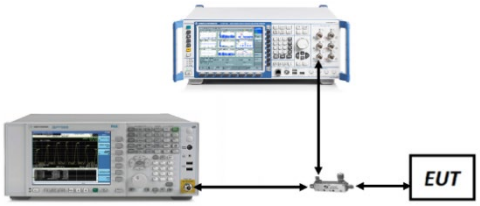


Figure 7-4. Test Instrument & Measurement Setup

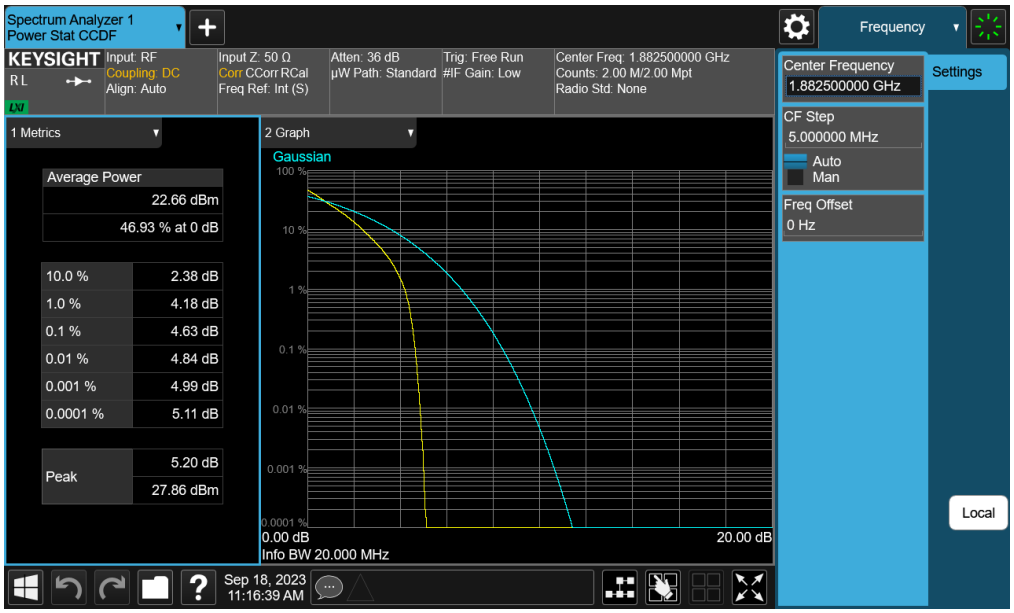
Test Notes

For the QAM modulations, 256QAM was found to have the worst-case peak-to-average ratio so it is the only QAM measurement included in this section.

Mode	Bandwidth	Modulation	Average Power [dBm]	PAR at 0.1% [dB]	PAR Limit [dB]	Margin [dB]
GSM-PCS	N/A	GMSK	25.64	2.68	13	-10.32
GSM-PCS EDGE		8-PSK	22.41	8.19	13	-4.81
LTE-B25-2	20MHz	QPSK	22.66	4.61	13	-8.39
		256QAM	18.65	6.83	13	-6.17
	15MHz	QPSK	22.61	4.61	13	-8.39
		256QAM	18.65	6.83	13	-6.17
	10MHz	QPSK	22.62	4.61	13	-8.39
		256QAM	18.65	6.83	13	-6.17
	5MHz	QPSK	22.64	4.61	13	-8.39
		256QAM	18.85	6.83	13	-6.17
	3MHz	QPSK	22.62	4.61	13	-8.39
		256QAM	18.66	6.83	13	-6.17
	1.4MHz	QPSK	22.65	4.61	13	-8.39
		256QAM	18.71	6.83	13	-6.17

Table 7-11. PAR Test Results – Ant A

LTE Band 2 – Ant A

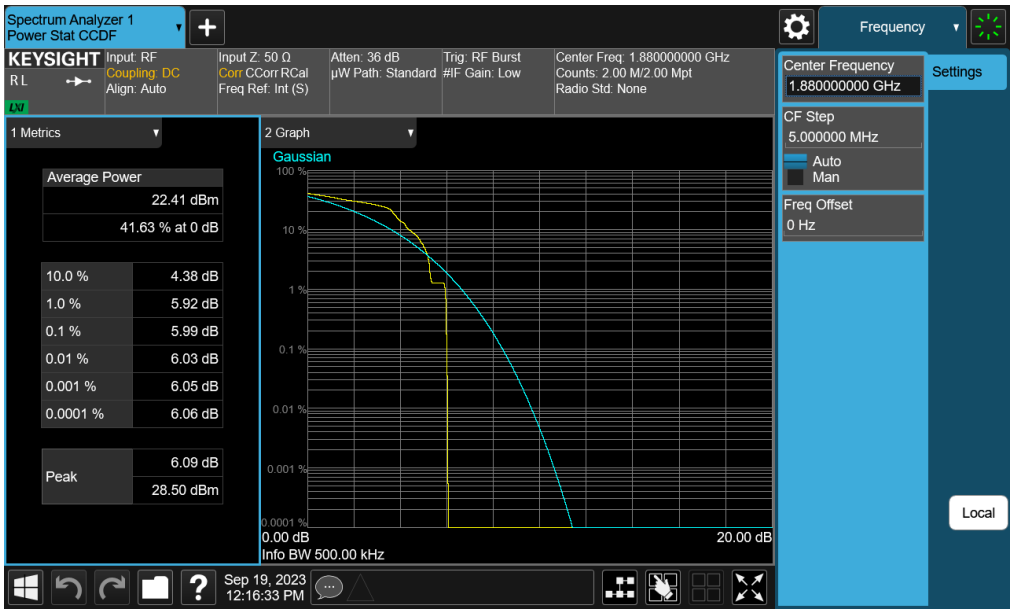


Plot 7-52. PAR Plot (LTE Band 2 - 20MHz QPSK - Full RB - Ant A)

Plot 7-53. PAR Plot (LTE Band 2 - 20MHz 256-QAM - Full RB - Ant A)

GSM/GPRS PCS – Ant A

Plot 7-54. PAR Plot (GPRS, Ch. 661 - Ant A)

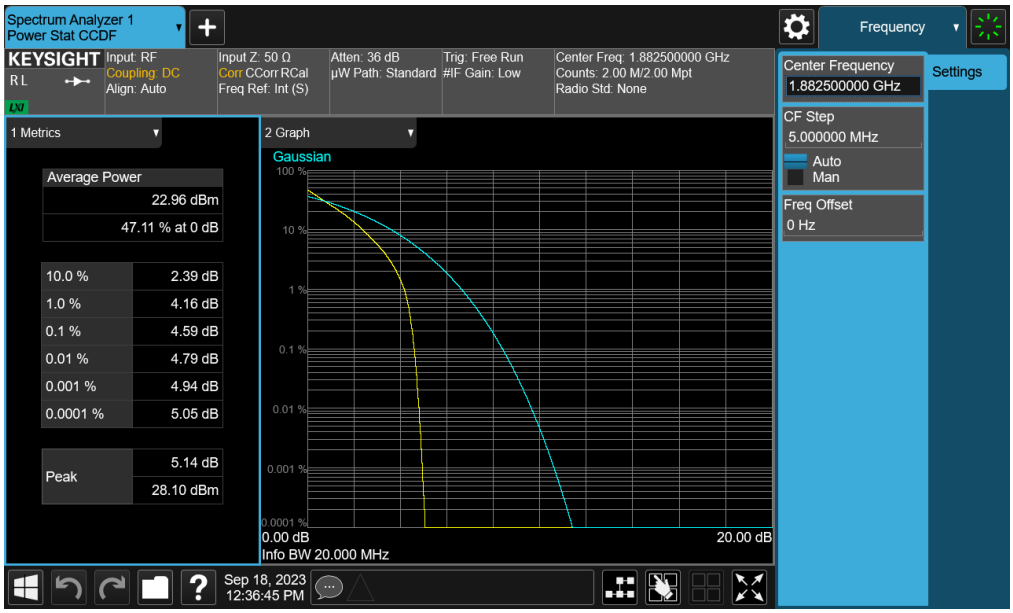


Plot 7-55. PAR Plot (EDGE, Ch. 661 - Ant A)

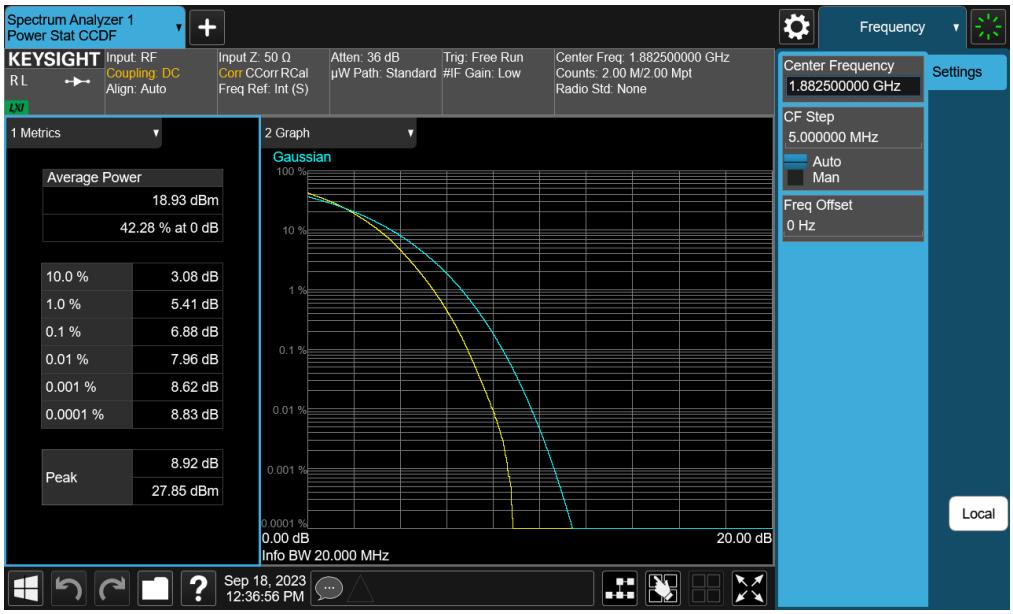
Mode	Bandwidth	Modulation	Average Power [dBm]	PAR at 0.1% [dB]	PAR Limit [dB]	Margin [dB]
LTE-B2	20MHz	QPSK	22.96	4.59	13	-8.41
		256QAM	18.93	6.88	13	-6.12
	15MHz	QPSK	22.94	5.22	13	-7.78
		256QAM	18.96	6.91	13	-6.09
	10MHz	QPSK	22.99	4.54	13	-8.46
		256QAM	19.01	6.91	13	-6.09
	5MHz	QPSK	22.95	4.50	13	-8.50
		256QAM	18.98	6.90	13	-6.10
	3MHz	QPSK	22.95	4.41	13	-8.59
		256QAM	18.97	6.93	13	-6.07
	1.4MHz	QPSK	22.98	4.50	13	-8.50
		256QAM	19.02	6.93	13	-6.07

Table 7-12. PAR Test Results – Ant F

LTE Band 2 – Ant F



Plot 7-56. PAR Plot (LTE Band 2 - 20MHz QPSK - Full RB - Ant F)



Plot 7-57. PAR Plot (LTE Band 2 - 20MHz 256-QAM - Full RB - Ant F)

7.6 Radiated Power (EIRP)

Test Overview

Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

ANSI C63.26-2015 – Section 5.2.4.4

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 ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". 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.

Test Setup

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

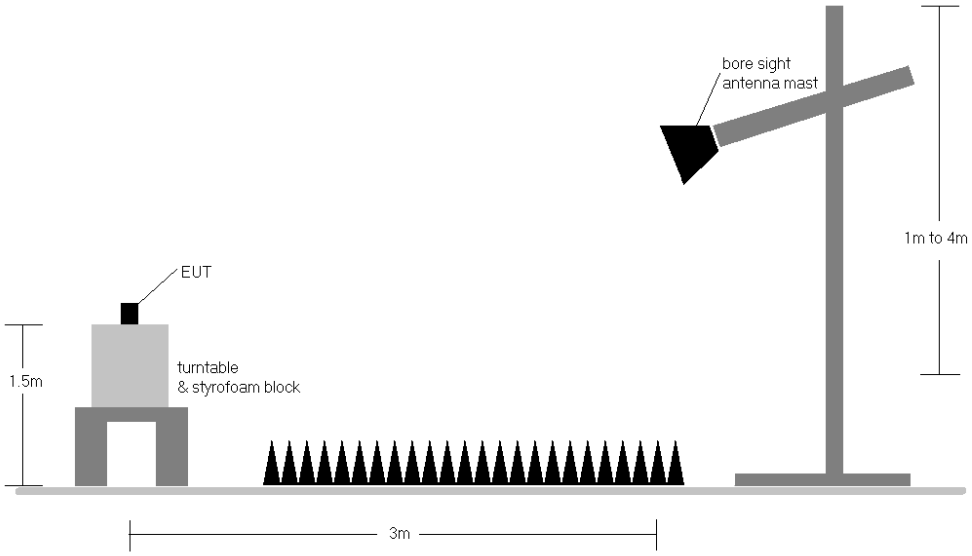


Figure 7-5. Radiated Test Setup >1GHz

Test Notes

1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers are reported in GPRS mode while transmitting with one slot active.

2) 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.

3) This unit was tested with its standard battery.

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.20	GSM1900	V	149	283	19.02	8.72	27.74	0.595	33.01	-5.27
1880.00	GSM1900	V	150	283	19.35	8.73	28.08	0.642	33.01	-4.93
1909.80	GSM1900	V	142	276	19.82	8.73	**28.55**	**0.717**	33.01	-4.46
1909.80	GSM1900	H	112	171	18.40	8.73	27.13	0.517	33.01	-5.88
1909.80	EDGE1900	V	142	276	15.87	8.73	**24.60**	0.289	33.01	-8.41
1909.80	GSM1900 (WCP)	V	145	271	19.49	8.73	28.22	0.664	33.01	-4.79

Table 7-13. EIRP Data (GPRS PCS – Ant A)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	QPSK	1860.00	V	189	308	8.28	1 / 99	15.39	**23.67**	0.233	33.01	-9.34
	QPSK	1882.50	V	193	302	8.29	1 / 0	15.17	23.46	0.222	33.01	-9.55
	QPSK	1905.00	V	203	322	8.32	1 / 0	14.26	22.58	0.181	33.01	-10.43
	16-QAM	1860.00	V	189	308	8.28	1 / 99	14.57	22.85	0.193	33.01	-10.16
15 MHz	QPSK	1857.50	V	189	308	8.28	1 / 0	15.35	**23.63**	0.230	33.01	-9.39
	QPSK	1882.50	V	193	302	8.29	1 / 74	15.27	23.56	0.227	33.01	-9.45
	QPSK	1907.50	V	203	322	8.32	1 / 74	14.32	22.64	0.184	33.01	-10.37
	16-QAM	1857.50	V	189	308	8.28	1 / 0	14.68	22.96	0.198	33.01	-10.05
10 MHz	QPSK	1855.00	V	189	308	8.28	1 / 25	15.72	**24.00**	0.251	33.01	-9.01
	QPSK	1882.50	V	193	302	8.29	1 / 49	15.22	23.52	0.225	33.01	-9.50
	QPSK	1910.00	V	203	322	8.33	1 / 49	14.40	22.73	0.187	33.01	-10.29
	16-QAM	1855.00	V	189	308	8.28	1 / 25	14.93	23.21	0.209	33.01	-9.80
5 MHz	QPSK	1852.50	V	189	308	8.27	1 / 0	15.80	**24.07**	0.255	33.01	-8.94
	QPSK	1882.50	V	193	302	8.29	1 / 12	15.20	23.49	0.223	33.01	-9.52
	QPSK	1912.50	V	203	322	8.34	1 / 24	14.38	22.71	0.187	33.01	-10.30
	16-QAM	1852.50	V	189	308	8.27	1 / 0	15.01	23.29	0.213	33.01	-9.72
3 MHz	QPSK	1851.50	V	189	308	8.27	1 / 7	15.64	**23.92**	0.246	33.01	-9.09
	QPSK	1882.50	V	193	302	8.29	1 / 14	15.19	23.48	0.223	33.01	-9.53
	QPSK	1913.50	V	203	322	8.34	1 / 14	14.42	22.76	0.189	33.01	-10.25
	16-QAM	1851.50	V	189	308	8.27	1 / 7	14.89	23.16	0.207	33.01	-9.85
1.4 MHz	QPSK	1850.70	V	189	308	8.27	1 / 3	15.48	**23.75**	0.237	33.01	-9.26
	QPSK	1882.50	V	193	302	8.29	1 / 0	15.27	23.56	0.227	33.01	-9.45
	QPSK	1914.30	V	203	322	8.34	1 / 0	14.30	22.64	0.184	33.01	-10.37
	16-QAM	1850.70	V	189	308	8.27	1 / 3	14.91	23.18	0.208	33.01	-9.83
20 MHz	Opposite Pol.	1860.00	H	152	168	8.28	1 / 99	13.72	22.00	0.158	33.01	-11.01
	WCP	1860.00	V	189	306	8.28	1 / 99	13.46	21.74	0.149	33.01	-11.27

Table 7-14. EIRP Data (LTE Band 2 – Ant A)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	QPSK	1860.00	H	175	1	8.28	1 / 0	14.47	**22.75**	0.188	33.01	-10.26
	QPSK	1882.50	H	177	1	8.29	1 / 0	14.28	22.57	0.181	33.01	-10.44
	QPSK	1905.00	H	170	5	8.32	1 / 0	14.26	22.58	0.181	33.01	-10.43
	16-QAM	1860.00	H	175	1	8.28	1 / 0	13.65	21.93	0.156	33.01	-11.08
15 MHz	QPSK	1857.50	H	175	1	8.28	1 / 37	14.43	**22.70**	0.186	33.01	-10.31
	QPSK	1882.50	H	177	1	8.29	1 / 37	14.28	22.58	0.181	33.01	-10.43
	QPSK	1907.50	H	170	5	8.32	1 / 74	14.12	22.44	0.175	33.01	-10.57
	16-QAM	1857.50	H	175	1	8.28	1 / 37	13.76	22.03	0.160	33.01	-10.98
10 MHz	QPSK	1855.00	H	175	1	8.28	1 / 49	14.61	**22.89**	0.195	33.01	-10.12
	QPSK	1882.50	H	177	1	8.29	1 / 49	14.27	22.57	0.181	33.01	-10.44
	QPSK	1910.00	H	170	5	8.33	1 / 25	14.01	22.34	0.171	33.01	-10.67
	16-QAM	1855.00	H	175	1	8.28	1 / 49	13.82	22.10	0.162	33.01	-10.91
5 MHz	QPSK	1852.50	H	175	1	8.27	1 / 24	14.43	22.71	0.186	33.01	-10.30
	QPSK	1882.50	H	177	1	8.29	1 / 0	14.41	22.70	0.186	33.01	-10.31
	QPSK	1912.50	H	170	5	8.34	1 / 24	14.41	**22.74**	0.188	33.01	-10.27
	16-QAM	1912.50	H	170	5	8.34	1 / 24	13.36	21.70	0.148	33.01	-11.31
3 MHz	QPSK	1851.50	H	175	1	8.27	1 / 7	14.52	**22.79**	0.190	33.01	-10.22
	QPSK	1882.50	H	177	1	8.29	1 / 14	14.24	22.54	0.179	33.01	-10.47
	QPSK	1913.50	H	170	5	8.34	1 / 7	14.22	22.56	0.180	33.01	-10.45
	16-QAM	1851.50	H	175	1	8.27	1 / 7	13.87	22.14	0.164	33.01	-10.87
1.4 MHz	QPSK	1850.70	H	175	1	8.27	1 / 3	14.35	**22.62**	0.183	33.01	-10.39
	QPSK	1882.50	H	177	1	8.29	1 / 0	14.29	22.58	0.181	33.01	-10.43
	QPSK	1914.30	H	170	5	8.34	1 / 3	14.15	22.49	0.177	33.01	-10.52
	16-QAM	1850.70	H	175	1	8.27	1 / 3	13.68	21.95	0.157	33.01	-11.06
20 MHz	Opposite Pol.	1860.00	V	154	322	8.32	1 / 0	12.30	20.62	0.115	33.01	-12.39
	WCP	1860.00	H	177	2	8.32	1 / 0	13.56	21.88	0.154	33.01	-11.13

Table 7-15. EIRP Data (LTE Band 2 – Ant F)

7.7 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using hybrid (biconical/log) antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

ANSI C63.26-2015 – Section 5.5.4

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

Test Setup

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

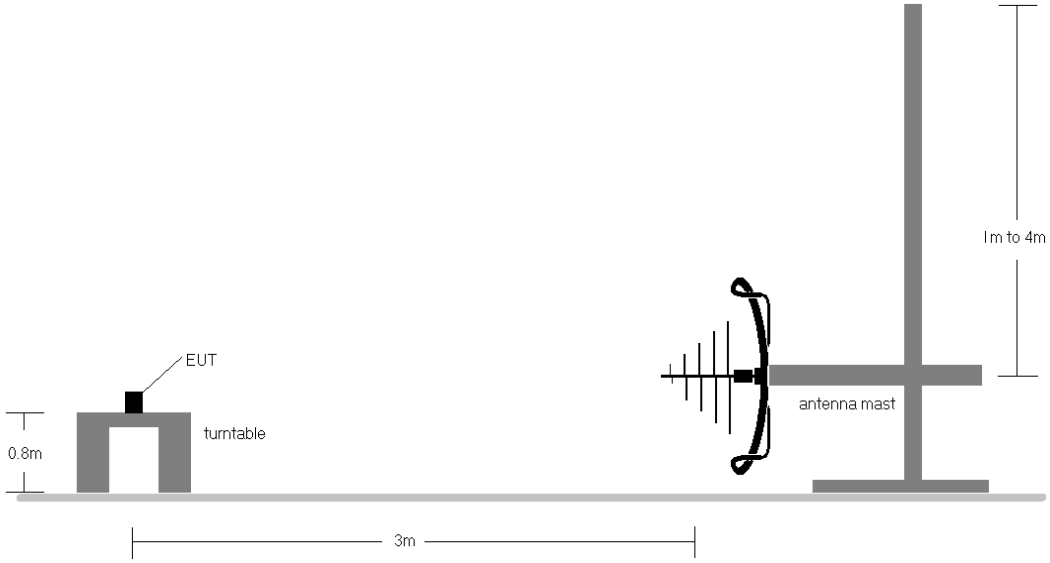


Figure 7-6. Test Instrument & Measurement Setup < 1GHz

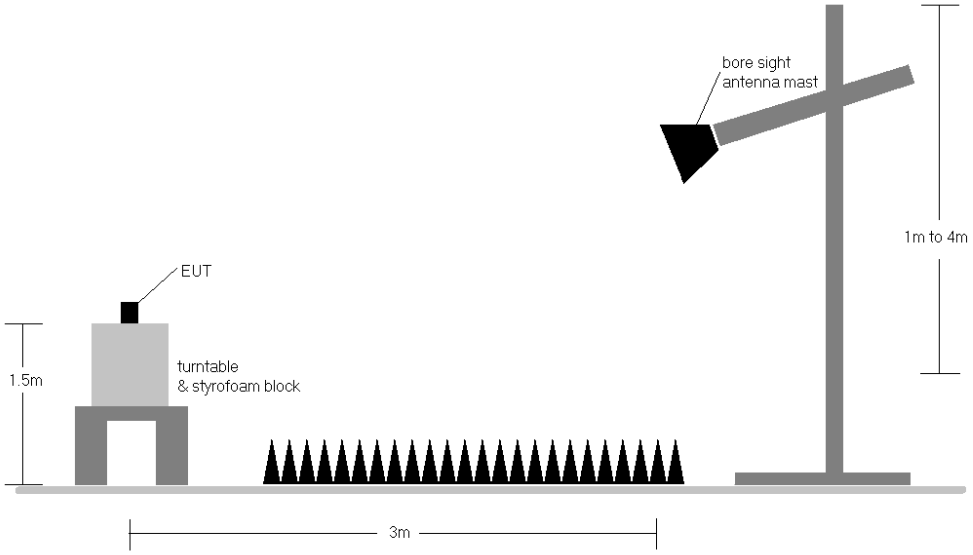


Figure 7-7. Test Instrument & Measurement Setup >1 GHz

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in ANSI C63.26-2015 Section 5.2.7:
   a) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
   b) EIRP (dBm) = E(dBµV/m) + 20logD – 104.8; where D is the measurement distance in meters.

2) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers are reported in GPRS mode while transmitting with one slot active.

3) 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.

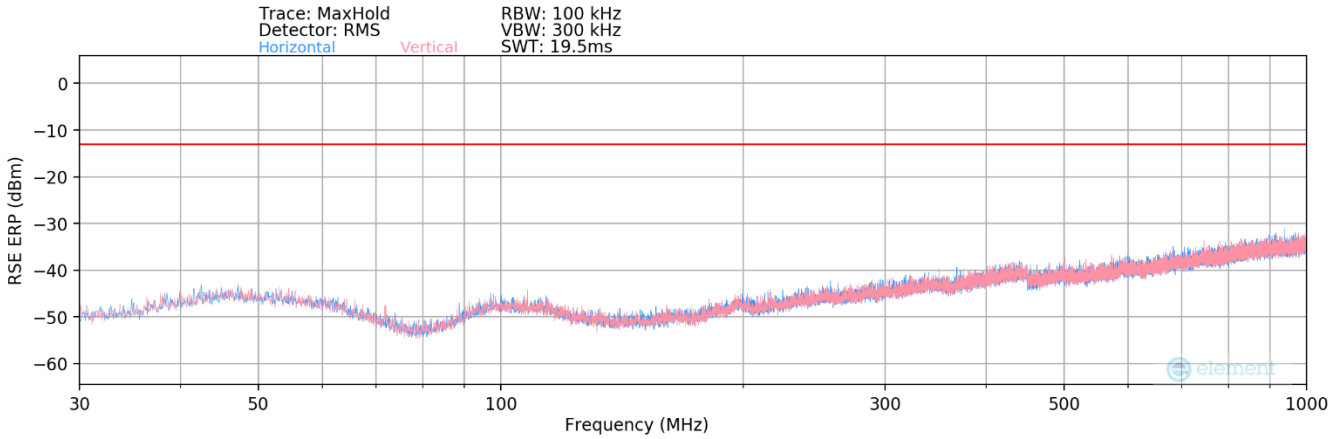
4) This unit was tested with its standard battery.

5) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

6) 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.

7) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

LTE Band 2 – Ant A

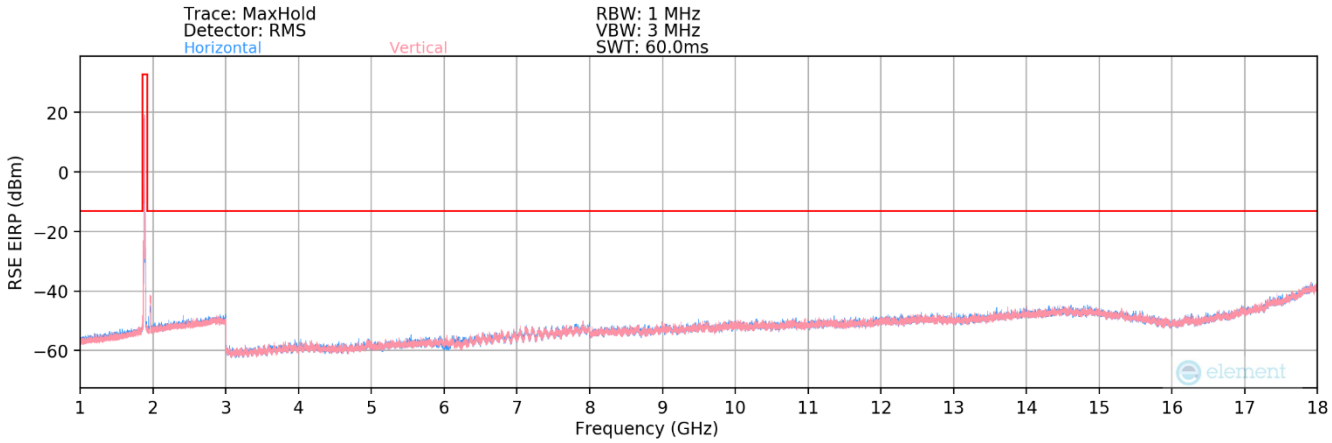


Plot 7-58. Radiated Spurious Plot Below 1GHz (LTE Band 2 – Ant A)

Bandwidth (MHz):	20
Frequency (MHz):	1882.5
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
982.13	H	-	-	-81.85	30.99	56.14	-41.27	-13.00	-28.27

Table 7-16. Radiated Spurious Data Below 1GHz (LTE Band 2 – Ant A)



Plot 7-59. Radiated Spurious Plot Above 1GHz (LTE Band 2 –Ant A)

Bandwidth (MHz):	20
Frequency (MHz):	1860
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3720.00	H	-	-	-76.87	-0.93	29.20	-66.05	-13.00	-53.05
5580.00	H	-	-	-77.70	2.02	31.32	-63.94	-13.00	-50.94
7440.00	H	-	-	-78.64	6.20	34.56	-60.70	-13.00	-47.70

Table 7-17. Radiated Spurious Data Above 1GHz (LTE Band 2 – Low Channel – Ant A)

Bandwidth (MHz):	20
Frequency (MHz):	1882.5
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3765.00	H	-	-	-77.30	-0.30	29.40	-65.86	-13.00	-52.86
5647.50	H	-	-	-78.07	2.40	31.33	-63.93	-13.00	-50.93
7530.00	H	-	-	-78.75	6.16	34.41	-60.84	-13.00	-47.84

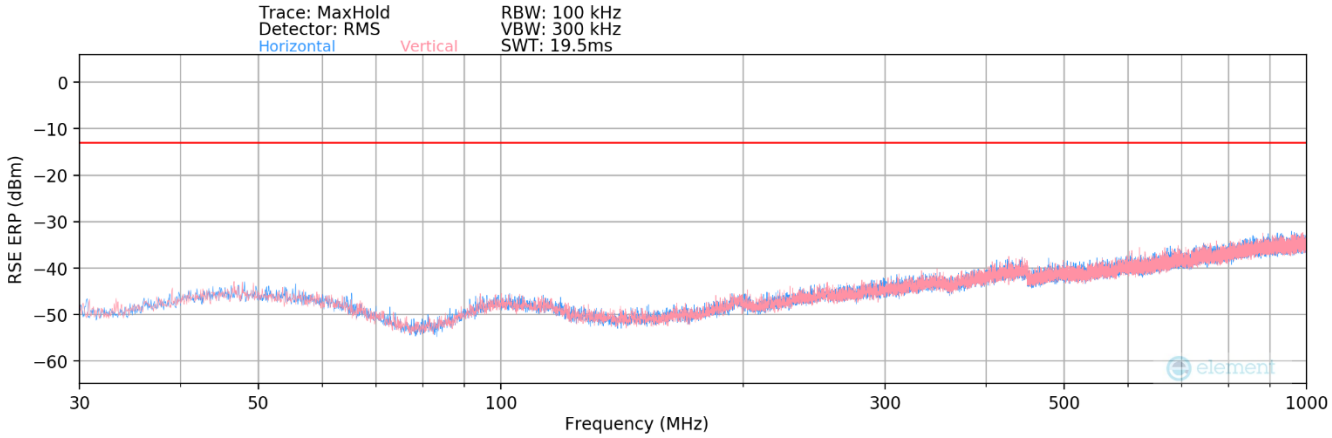
Table 7-18. Radiated Spurious Data Above 1GHz (LTE Band 2 – Mid Channel – Ant A)

Bandwidth (MHz):	20
Frequency (MHz):	1905
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3810.00	H	-	-	-77.07	-0.42	29.51	-65.75	-13.00	-52.75
5715.00	H	-	-	-78.03	2.73	31.70	-63.56	-13.00	-50.56
7620.00	H	-	-	-78.55	6.47	34.92	-60.34	-13.00	-47.34

Table 7-19. Radiated Spurious Data Above 1GHz (LTE Band 2 – High Channel – Ant A)

GSM/GPRS PCS – Ant A

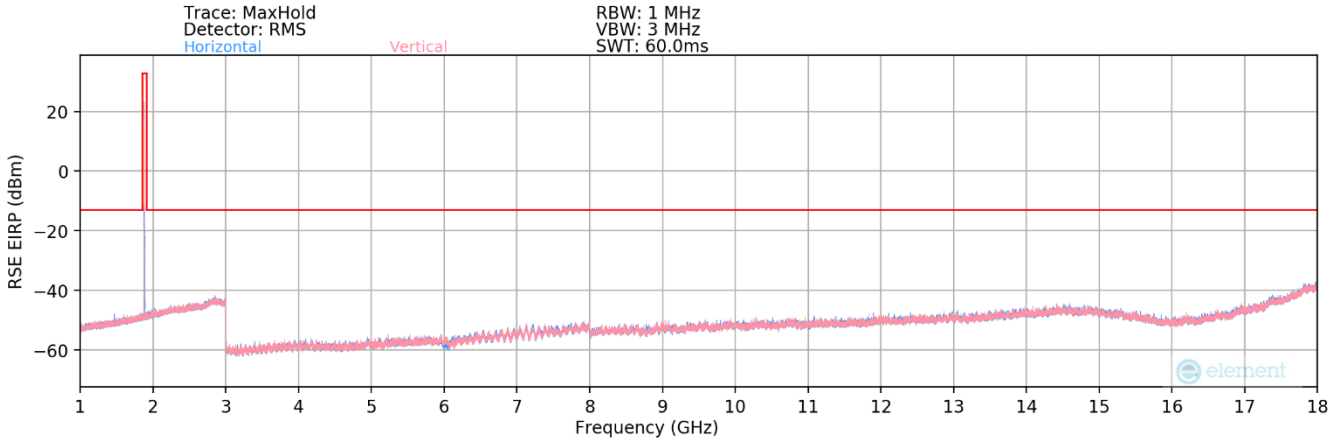


Plot 7-60. Radiated Spurious Plot Below 1GHz (GSM/GPRS PCS – Ant A)

Mode:	GPRS 1 Tx Slot
Channel:	661
Frequency (MHz):	1880

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
953.84	H	-	-	-82.04	30.65	55.61	-41.80	-13.00	-28.80

Table 7-20. Radiated Spurious Data Below 1GHz (GSM/GPRS PCS – Ant A)



Plot 7-61. Radiated Spurious Plot Above 1GHz (GSM/GPRS PCS – Ant A)

Mode:	GPRS 1 Tx Slot
Channel:	512
Frequency (MHz):	1850.2

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3700.40	H	-	-	-66.86	-1.02	39.12	-56.14	-13.00	-43.14
5550.60	H	-	-	-67.63	2.08	41.45	-53.81	-13.00	-40.81
7400.80	H	-	-	-67.96	6.99	46.03	-49.23	-13.00	-36.23

Table 7-21. Radiated Spurious Data Above 1GHz (GSM/GPRS PCS – Low Channel – Ant A)

Mode:	GPRS 1 Tx Slot
Channel:	661
Frequency (MHz):	1880

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3760.00	H	-	-	-66.73	-0.34	39.93	-55.32	-13.00	-42.32
5640.00	H	-	-	-67.13	2.45	42.32	-52.94	-13.00	-39.94
7520.00	H	-	-	-68.86	6.05	44.19	-51.07	-13.00	-38.07

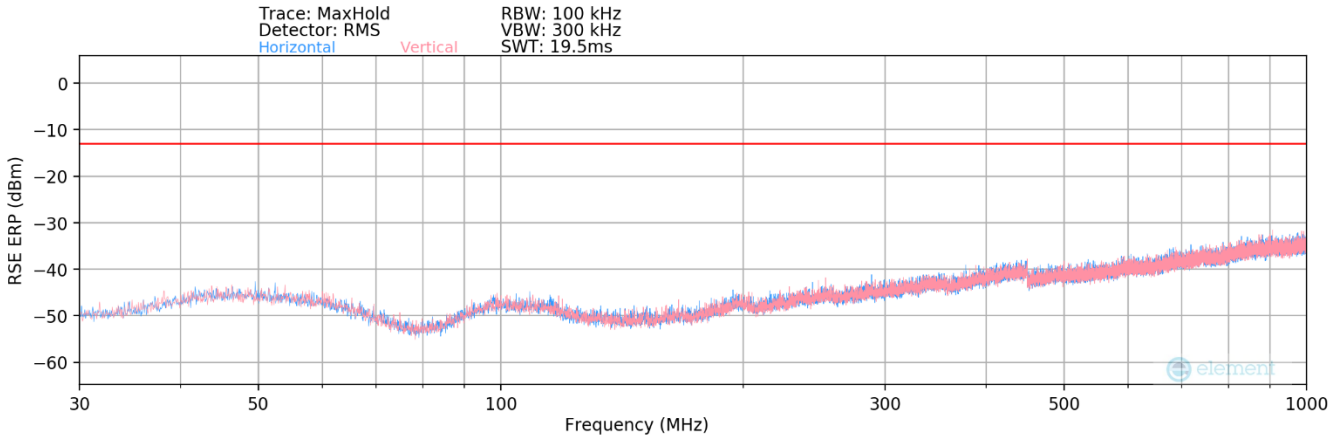
Table 7-22. Radiated Spurious Data Above 1GHz (GSM/GPRS PCS – Mid Channel – Ant A)

Mode:	GPRS 1 Tx Slot
Channel:	810
Frequency (MHz):	1909.8

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3819.60	H	-	-	-66.95	-0.31	39.74	-55.52	-13.00	-42.52
5729.40	H	-	-	-67.01	2.64	42.63	-52.63	-13.00	-39.63
7639.20	H	-	-	-67.80	6.92	46.12	-49.14	-13.00	-36.14

Table 7-23. Radiated Spurious Data Above 1GHz (GSM/GPRS PCS – High Channel – Ant A)

LTE Band 2 – Ant F

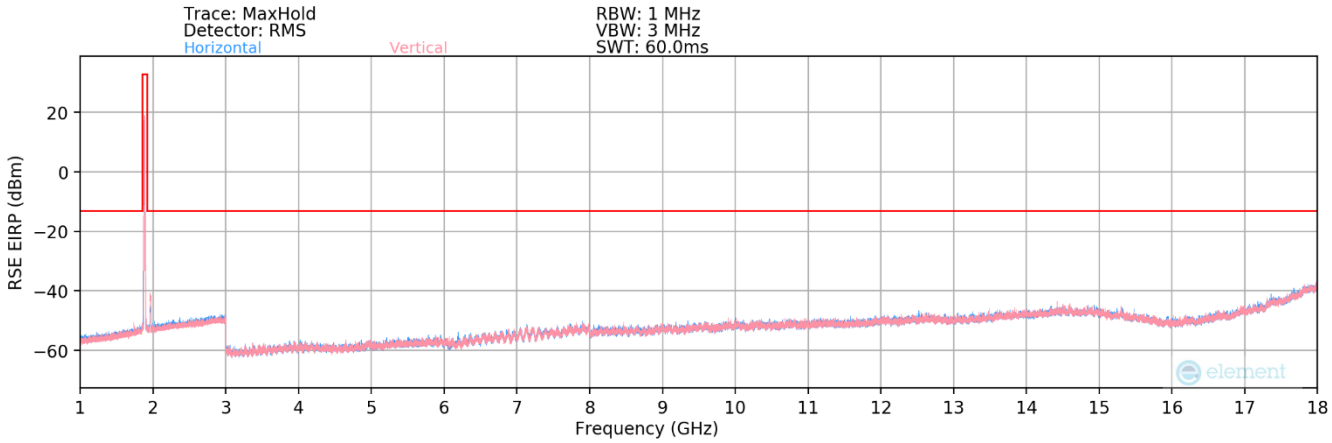


Plot 7-62. Radiated Spurious Plot Below 1GHz (LTE Band 2 – Ant F)

Bandwidth (MHz):	20
Frequency (MHz):	1882.5
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
972.53	H	-	-	-80.93	30.93	57.00	-40.41	-13.00	-27.41

Table 7-24. Radiated Spurious Data Below 1GHz (LTE Band 2 – Ant F)



Plot 7-63. Radiated Spurious Plot Above 1GHz (LTE Band 2 –Ant F)

Bandwidth (MHz):	20
Frequency (MHz):	1860
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3720.00	H	-	-	-77.21	-0.76	29.03	-66.23	-13.00	-53.23
5580.00	H	-	-	-77.38	2.24	31.86	-63.40	-13.00	-50.40
7440.00	H	-	-	-77.88	6.90	36.02	-59.24	-13.00	-46.24

Table 7-25. Radiated Spurious Data Above 1GHz (LTE Band 2 – Low Channel – Ant F)

Bandwidth (MHz):	20
Frequency (MHz):	1882.5
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3765.00	H	-	-	-76.52	0.14	30.62	-64.64	-13.00	-51.64
5647.50	H	-	-	-77.33	2.45	32.12	-63.14	-13.00	-50.14
7530.00	H	-	-	-77.83	6.65	35.82	-59.44	-13.00	-46.44

Table 7-26. Radiated Spurious Data Above 1GHz (LTE Band 2 – Mid Channel – Ant F)

Bandwidth (MHz):	20
Frequency (MHz):	1905
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3810.00	H	-	-	-76.11	0.30	31.19	-64.07	-13.00	-51.07
5715.00	H	-	-	-76.82	2.74	32.92	-62.34	-13.00	-49.34
7620.00	H	-	-	-77.23	6.78	36.55	-58.71	-13.00	-45.71

Table 7-27. Radiated Spurious Data Above 1GHz (LTE Band 2 – High Channel – Ant F)

7.8 Frequency Stability / Temperature Variation

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015. 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 24, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI C63.26-2015 – Section 5.6

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

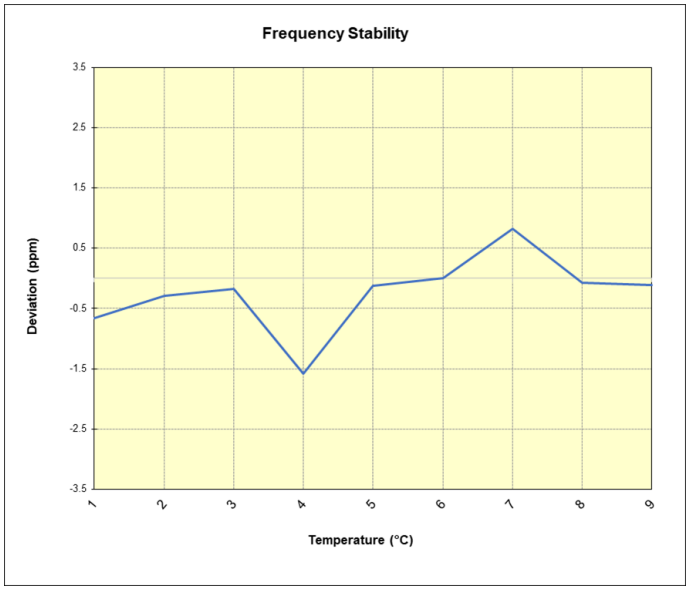
None

LTE Band 2

LTE Band 2	
Operating Frequency (Hz):	1,882,500,000
Ref. Voltage (VDC):	0.00

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	0.00	- 30	1,888,255,554	-1,254	-0.0000664
		- 20	1,888,256,261	-547	-0.0000290
		- 10	1,888,256,472	-336	-0.0000178
		0	1,888,253,821	-2,987	-0.0001582
		+ 10	1,888,256,561	-247	-0.0000131
		+ 20 (Ref)	1,888,256,808	0	0.0000000
		+ 30	1,888,258,355	1,547	0.0000819
		+ 40	1,888,256,667	-141	-0.0000075
		+ 50	1,888,256,597	-211	-0.0000112
Battery Endpoint	0.00	+ 20	1,888,256,955	147	0.0000078

Table 7-28. LTE Band 2 Frequency Stability Data



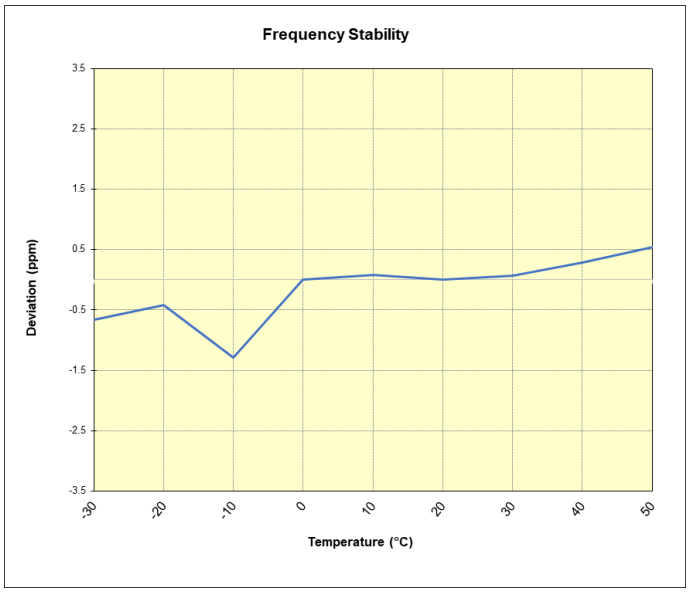
Plot 7-64. LTE Band 2 Frequency Stability Chart

GSM/GPRS PCS

GSM/GPRS PCS	
Operating Frequency (Hz):	1,880,000,000
Ref. Voltage (VDC):	4.27

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	1,880,013,497	-1,255	-0.0000668
		- 20	1,880,013,963	-789	-0.0000420
		- 10	1,880,012,337	-2,415	-0.0001285
		0	1,880,014,762	10	0.0000005
		+ 10	1,880,014,893	141	0.0000075
		+ 20 (Ref)	1,880,014,752	0	0.0000000
		+ 30	1,880,014,875	123	0.0000065
		+ 40	1,880,015,293	541	0.0000288
		+ 50	1,880,015,757	1,005	0.0000535
Battery Endpoint	3.68	+ 20	1,880,015,537	785	0.0000418

Table 7-29. GSM/GPRS PCS Frequency Stability Data



Plot 7-65. GSM/GPRS PCS Frequency Stability Chart

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMS928JPN** complies with all the requirements of Part 24 of the FCC rules.