

Test Notes

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

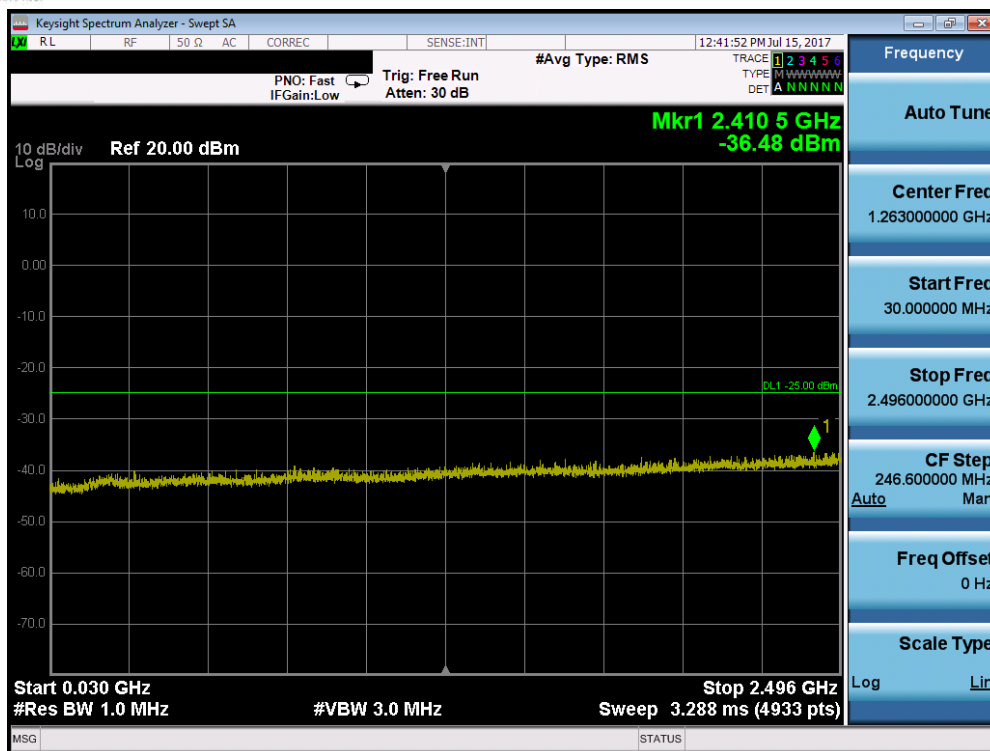
Power State	PCC							SCC							Power ULCA Tx.Power (dBm)
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	
Max	LTE B41	10	40620	2593	QPSK	1	49	LTE B41	15	40740	2605	QPSK	1	0	25.51
Max	LTE B41	10	40620	2593	QPSK	1	49	LTE B41	20	40764	2607.4	QPSK	1	0	25.60
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	10	40740	2605	QPSK	1	0	25.41
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	15	40770	2608	QPSK	1	0	25.36
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	20	40791	2610.1	QPSK	1	0	25.45
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	5	40737	2604.7	QPSK	1	0	25.38
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	10	40764	2607.4	QPSK	1	0	25.43
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	15	40791	2610.1	QPSK	1	0	25.26
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	25.18
Max	LTE B41	20	39750	2506	QPSK	100	0	LTE B41	20	39948	2525.8	QPSK	100	0	22.43
Max	LTE B41	20	39750	2506	QPSK	100	0	LTE B41	20	39948	2525.8	16QAM	100	0	21.63
Max	LTE B41	20	39750	2506	QPSK	100	0	LTE B41	20	39948	2525.8	64QAM	100	0	21.52

Table 7-2. Conducted Powers (B41 – PCC: RB Size 1 Offset Max SCC: RB Size 1 Offset 0)

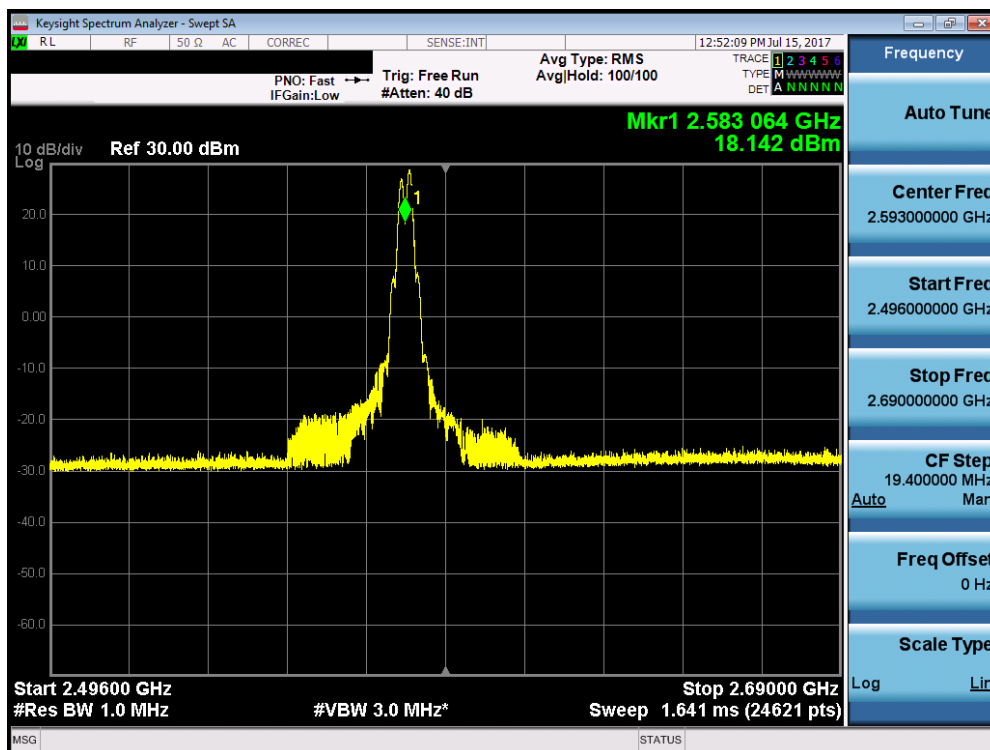
Power State	PCC							SCC							Power ULCA Tx.Power (dBm)
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	
Max	LTE B41	20	39750	2506	QPSK	1	0	LTE B41	20	39948	2525.8	QPSK	1	0	21.40
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	99	18.22
Max	LTE B41	20	39750	2506	QPSK	1	0	LTE B41	20	39948	2525.8	QPSK	1	99	14.46
Max	LTE B41	20	39750	2506	QPSK	1	50	LTE B41	20	39948	2525.8	QPSK	1	50	21.29
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	25.18
Max	LTE B41	20	39750	2506	QPSK	100	0	LTE B41	20	39948	2525.8	QPSK	100	0	22.43
Max	LTE B41	20	39750	2506	QPSK	100	0	LTE B41	20	39948	2525.8	16QAM	100	0	21.63
Max	LTE B41	20	39750	2506	QPSK	100	0	LTE B41	20	39948	2525.8	64QAM	100	0	21.52

Table 7-3. Conducted Powers (B41 with Various Combinations for 20MHz Channel Bandwidth)

FCC ID: ZNLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 134 of 188

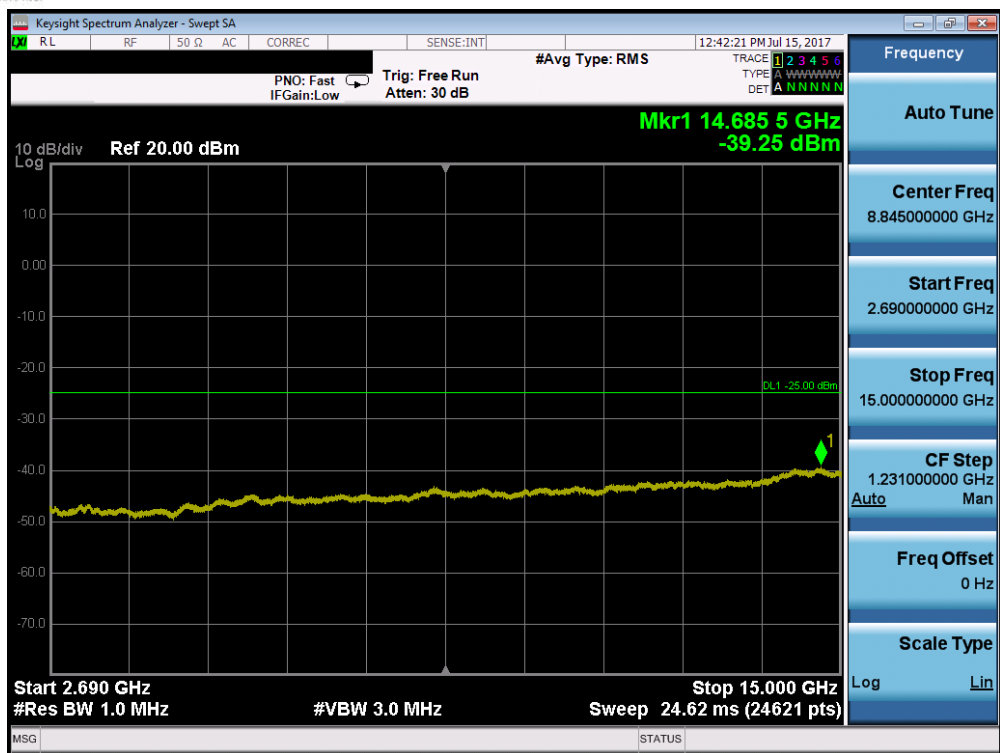


Plot 7-226. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



Plot 7-227. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 135 of 188

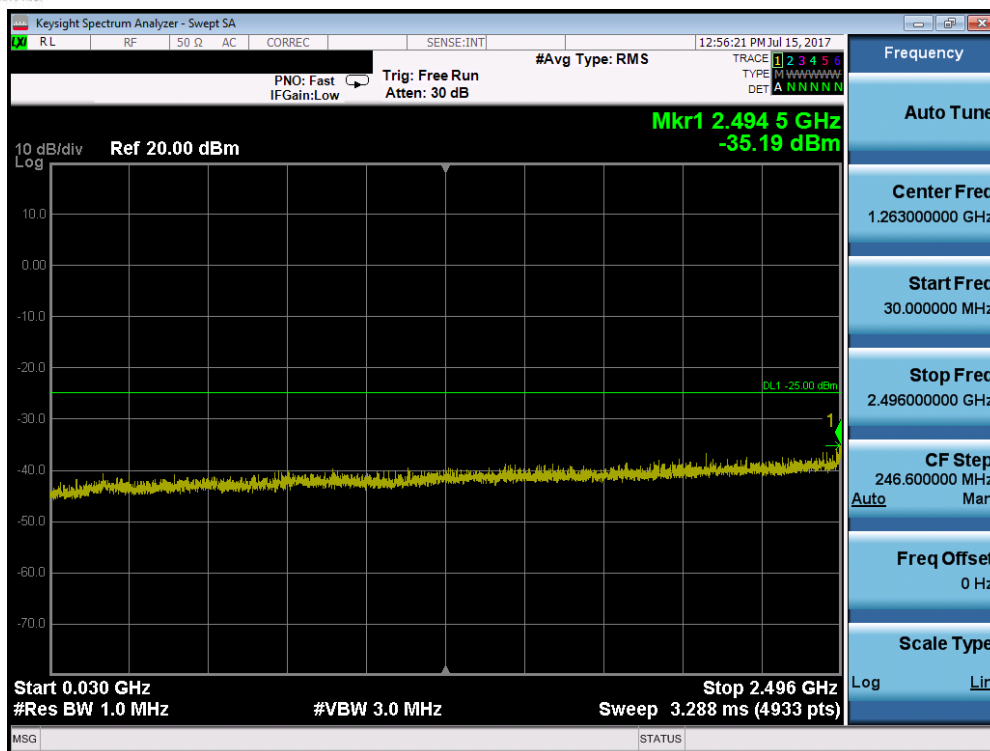


Plot 7-228. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

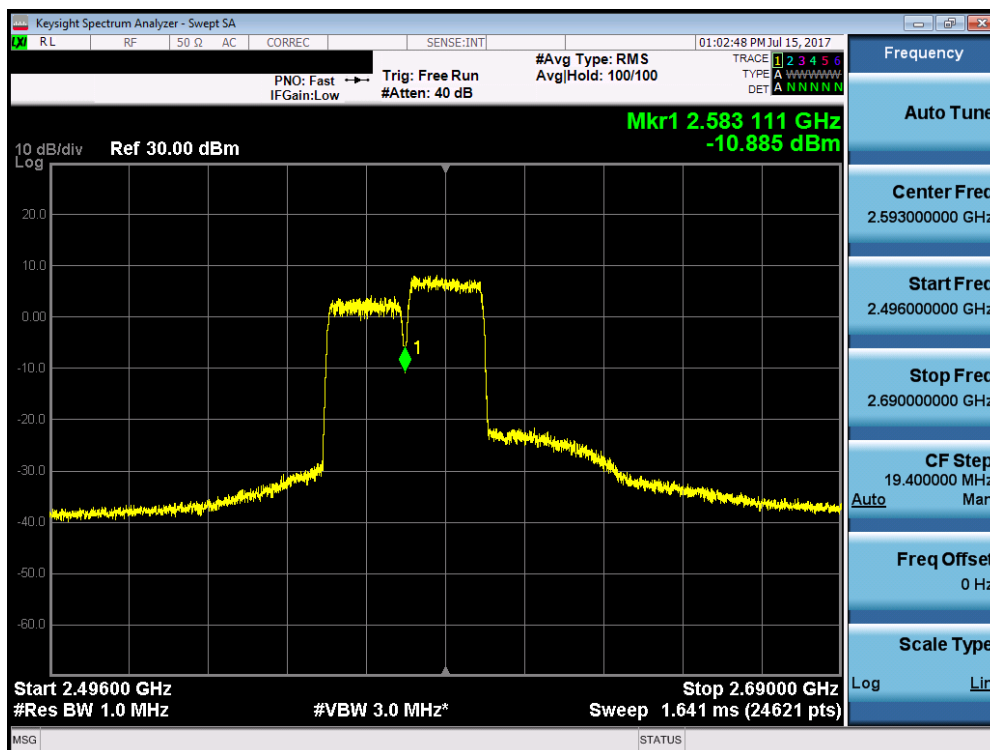


Plot 7-229. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 136 of 188

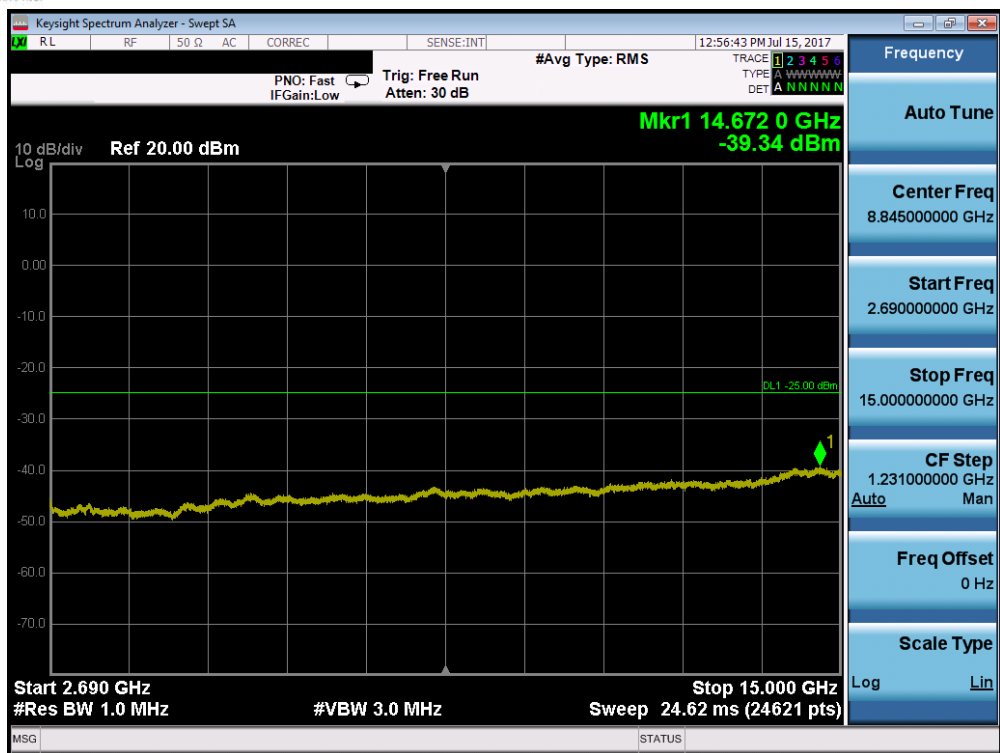


Plot 7-230. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)



Plot 7-231. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 137 of 188



Plot 7-232. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)



Plot 7-233. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 138 of 188

7.6 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 D01 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. 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.

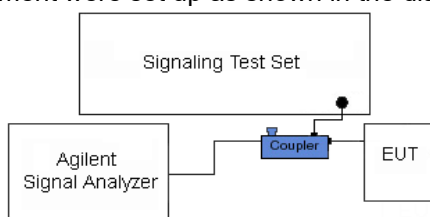
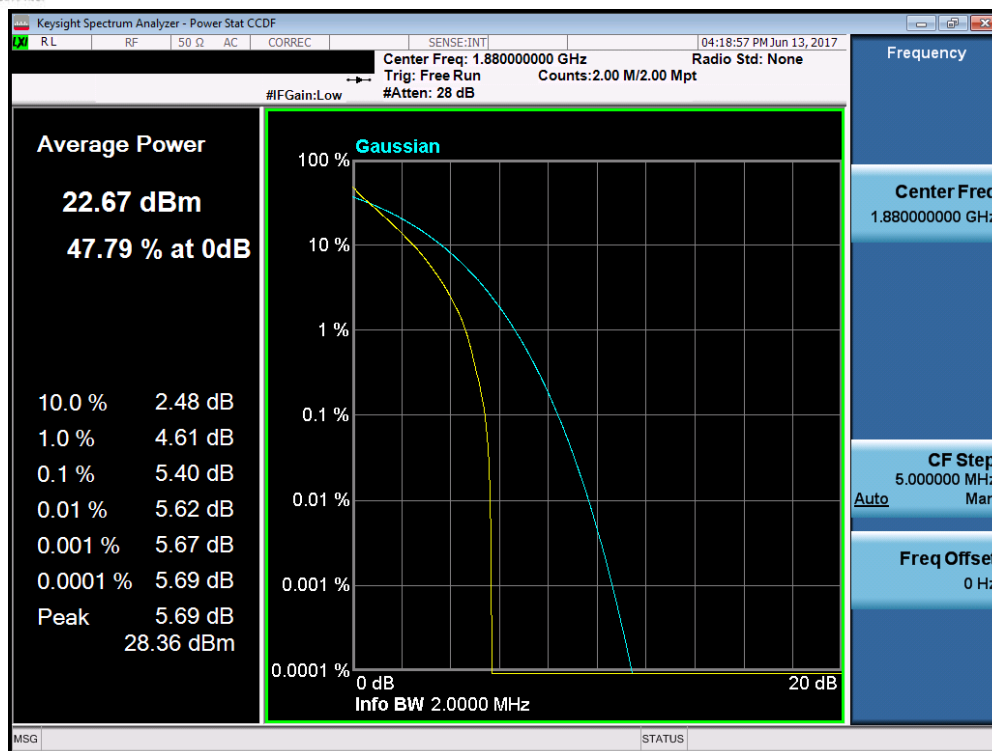


Figure 7-5. Test Instrument & Measurement Setup

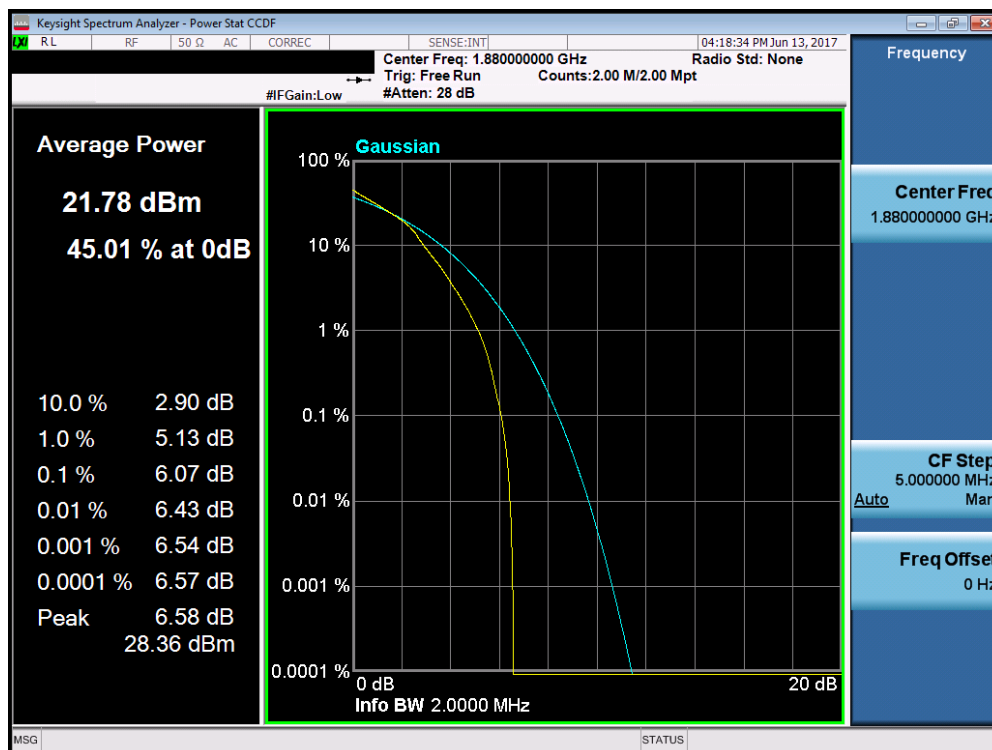
Test Notes

None.

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 139 of 188

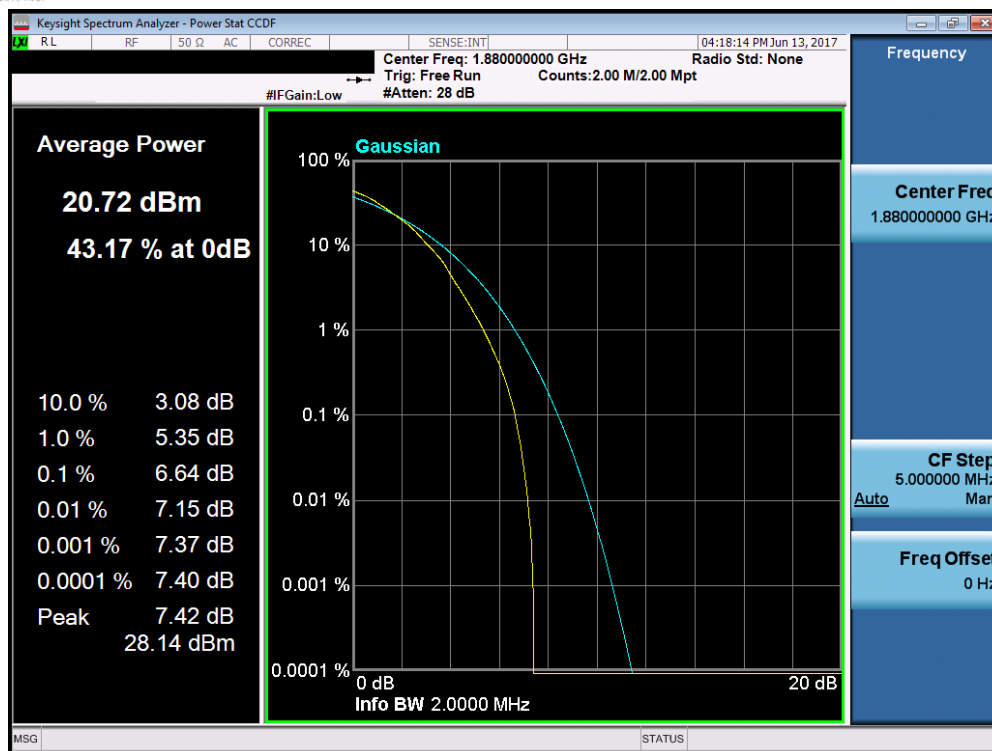


Plot 7-234. PAR Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

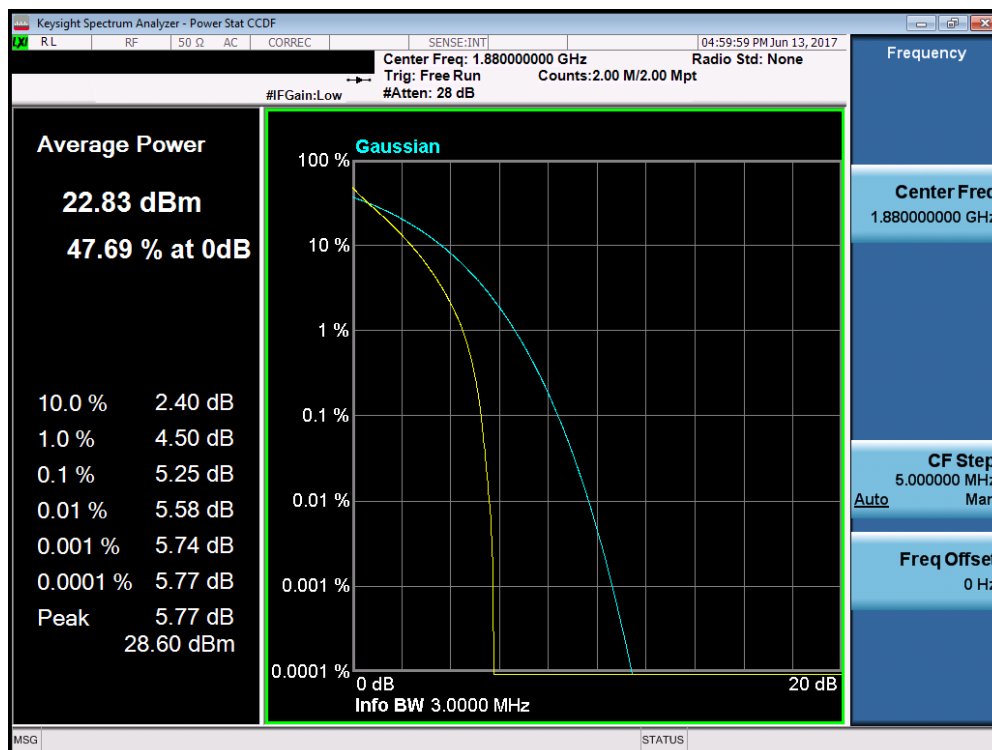


Plot 7-235. PAR Plot (Band 2/25 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFS998	PCTEST ENGINEERING LABORATORY, INC.		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset			Page 140 of 188

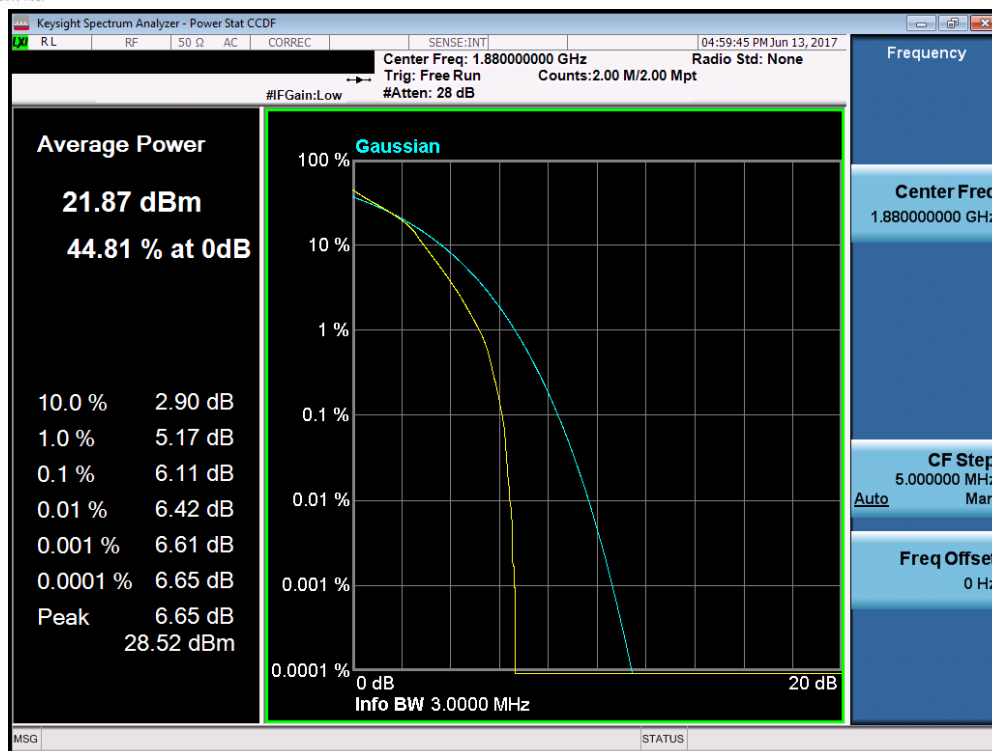


Plot 7-236. PAR Plot (Band 2/25 – 1.4MHz 64-QAM – RB Size 6)

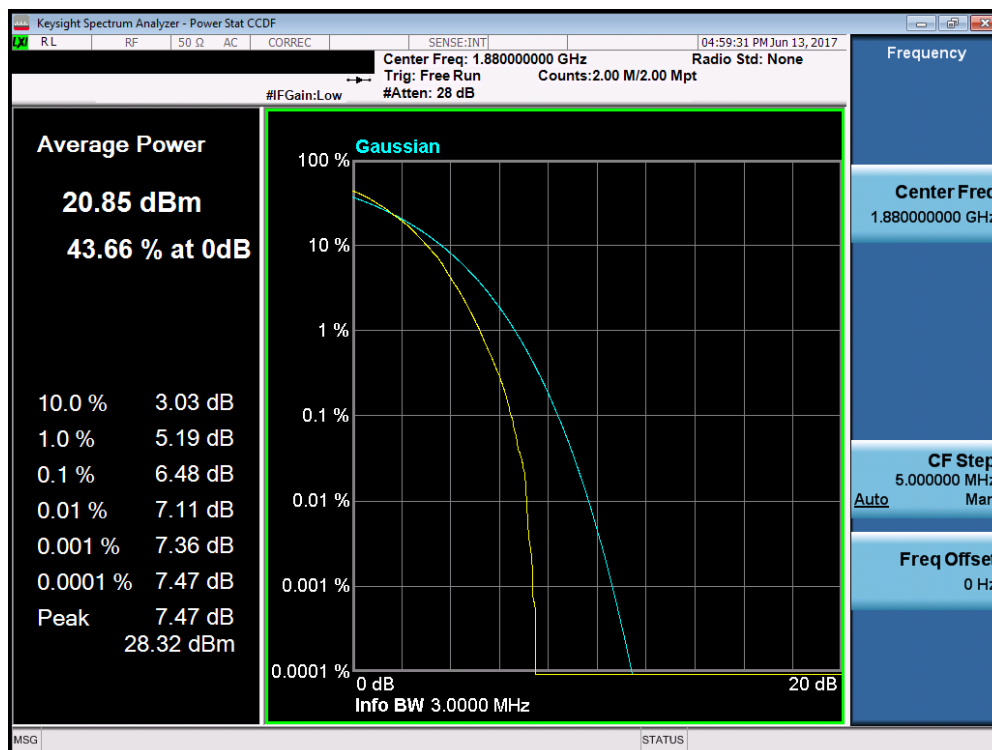


Plot 7-237. PAR Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFS998	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 141 of 188

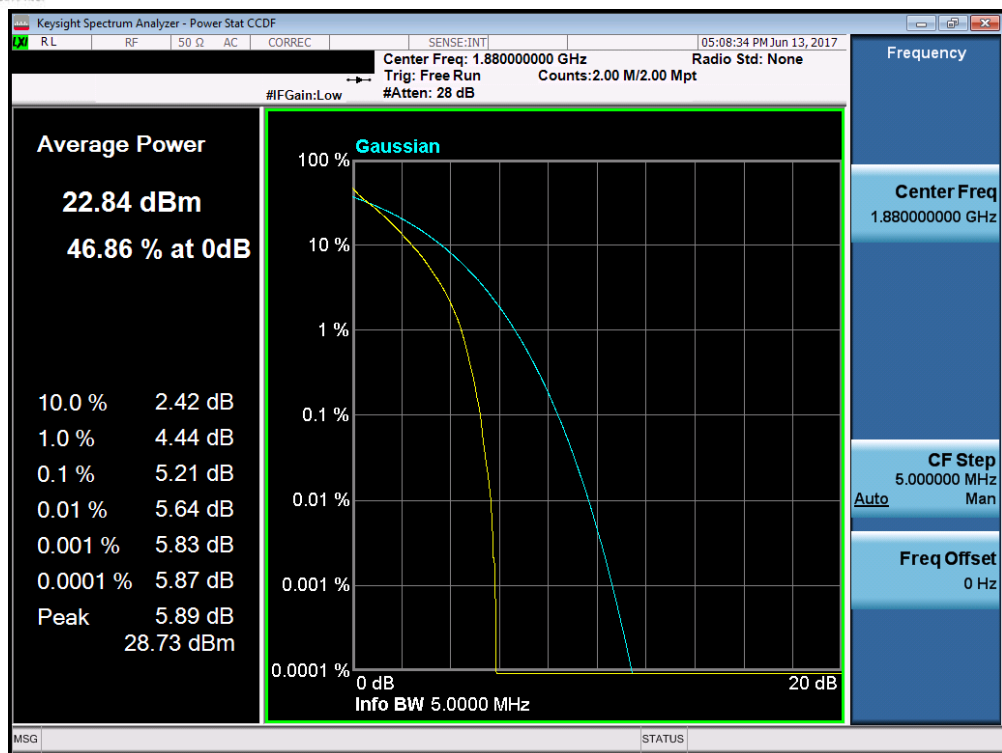


Plot 7-238. PAR Plot (Band 2/25 – 3.0MHz 16-QAM – RB Size 15)

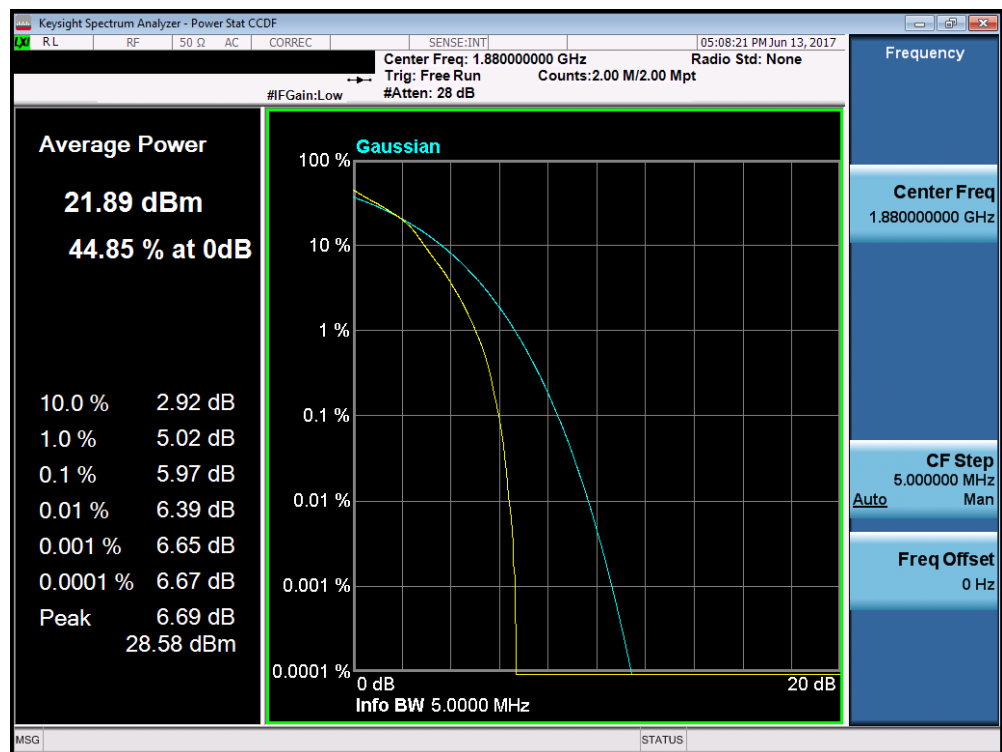


Plot 7-239. PAR Plot (Band 2/25 – 3.0MHz 64-QAM – RB Size 15)

FCC ID: ZNFLS998	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 142 of 188

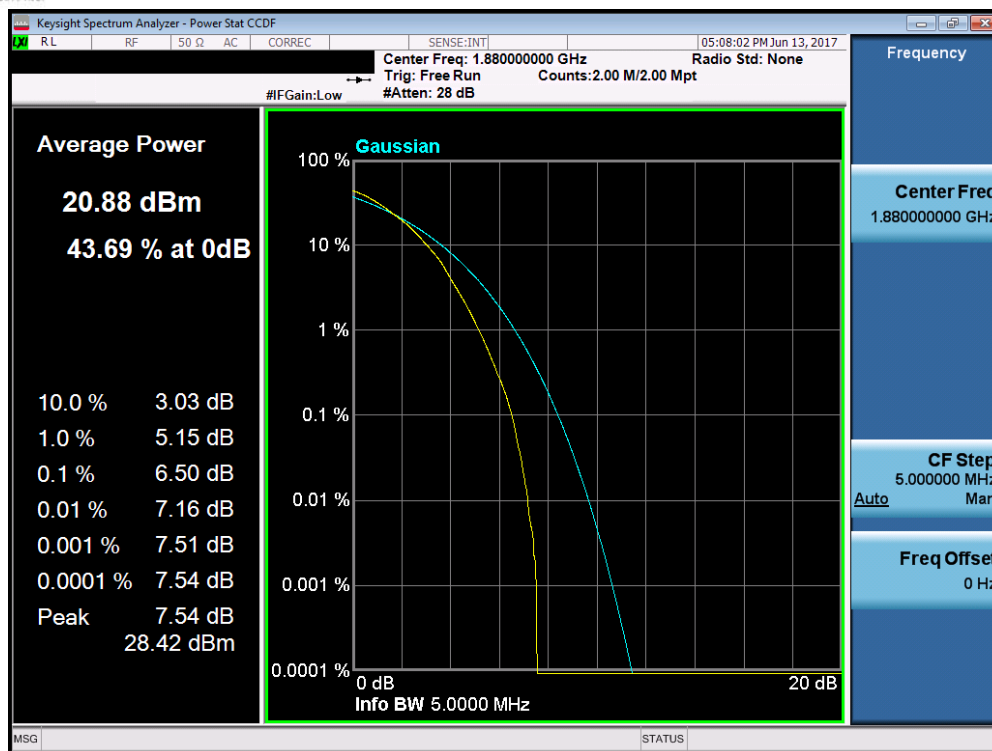


Plot 7-240. PAR Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

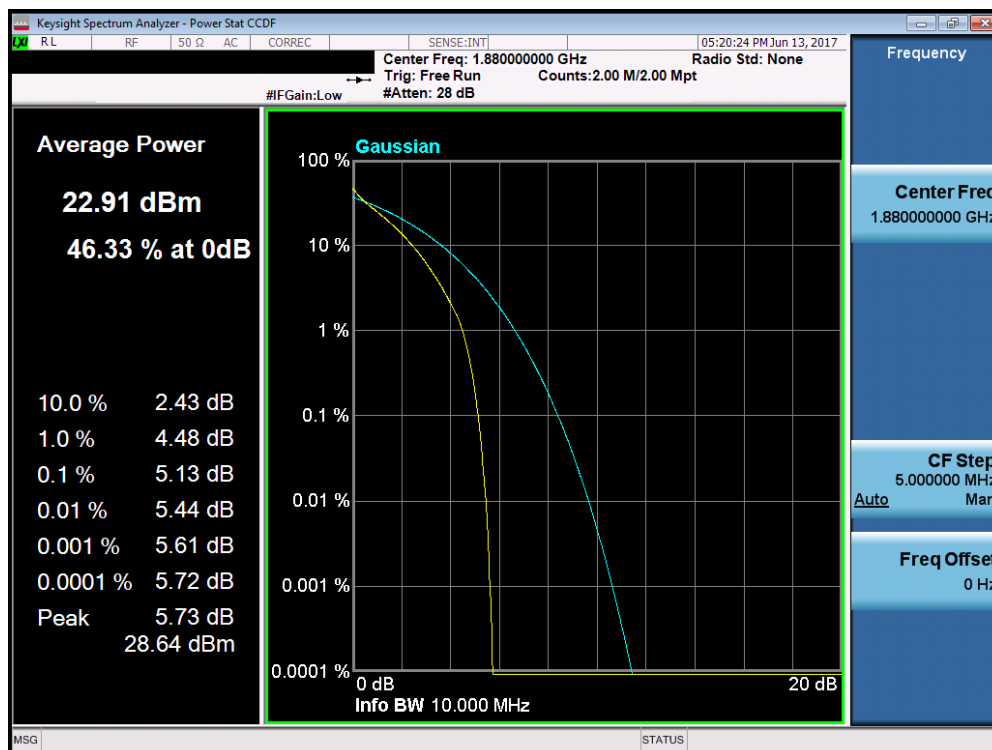


Plot 7-241. PAR Plot (Band 2/25 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: ZNFS998	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 143 of 188

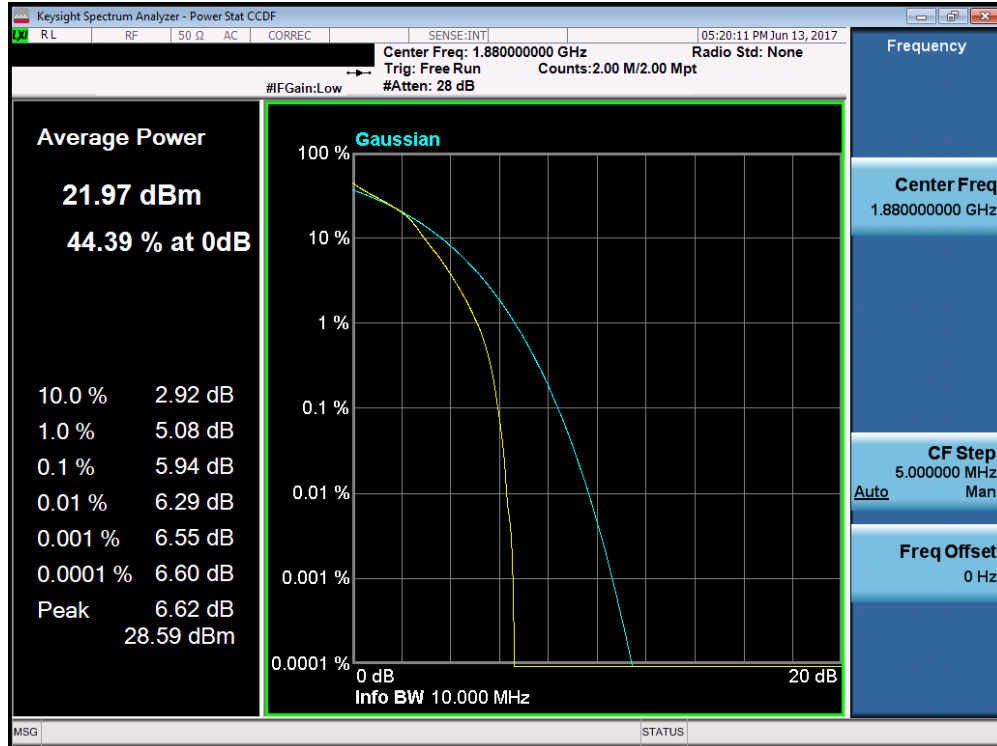


Plot 7-242. PAR Plot (Band 2/25 – 5.0MHz 64-QAM – RB Size 25)

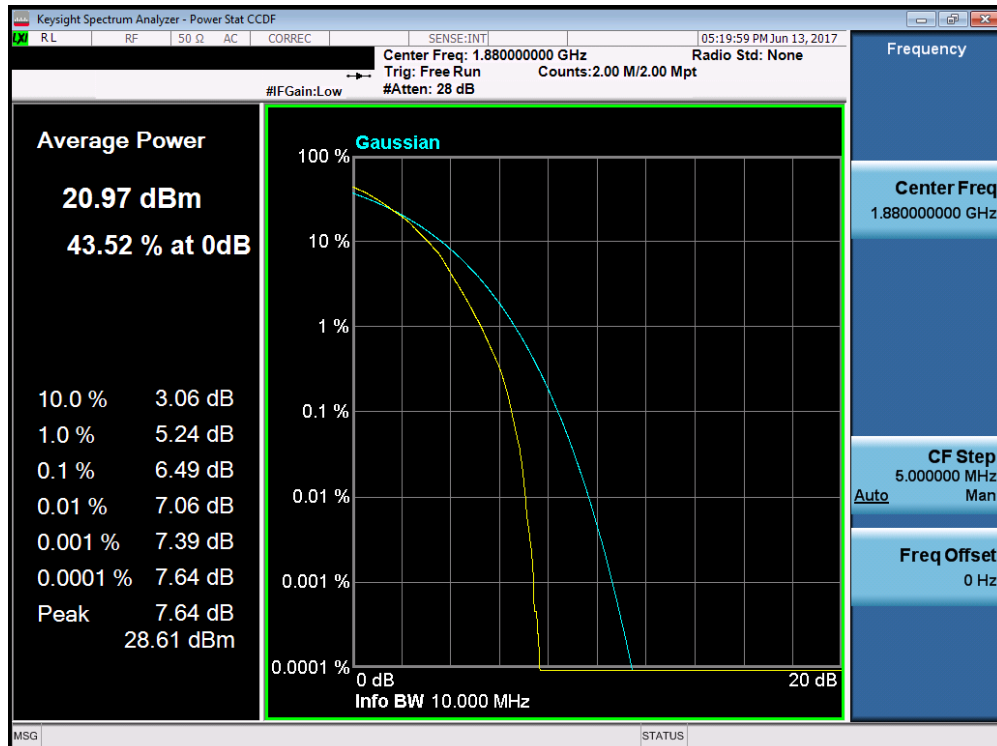


Plot 7-243. PAR Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFS998	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 144 of 188	

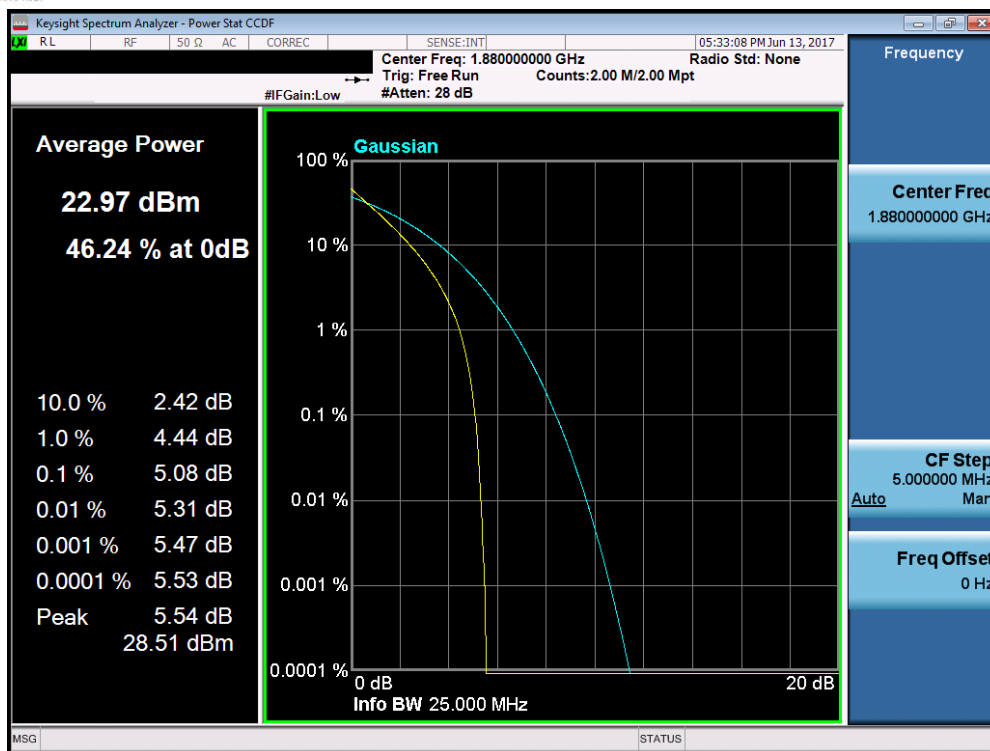


Plot 7-244. PAR Plot (Band 2/25 – 10.0MHz 16-QAM – RB Size 50)

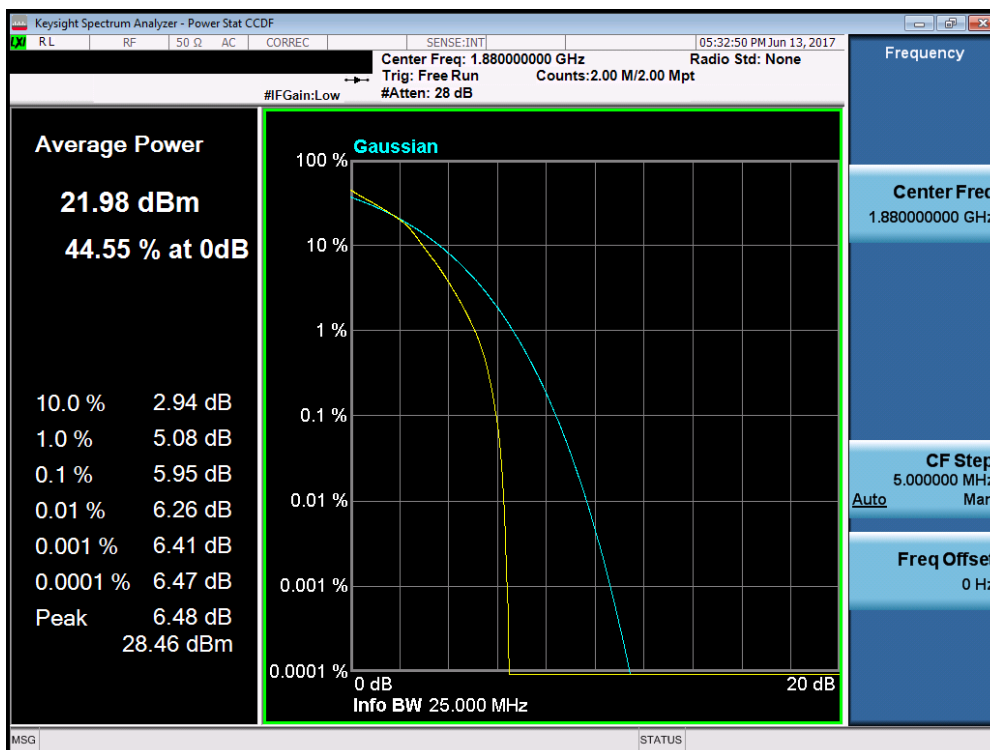


Plot 7-245. PAR Plot (Band 2/25 – 10.0MHz 64-QAM – RB Size 50)

FCC ID: ZNFS998	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 145 of 188	

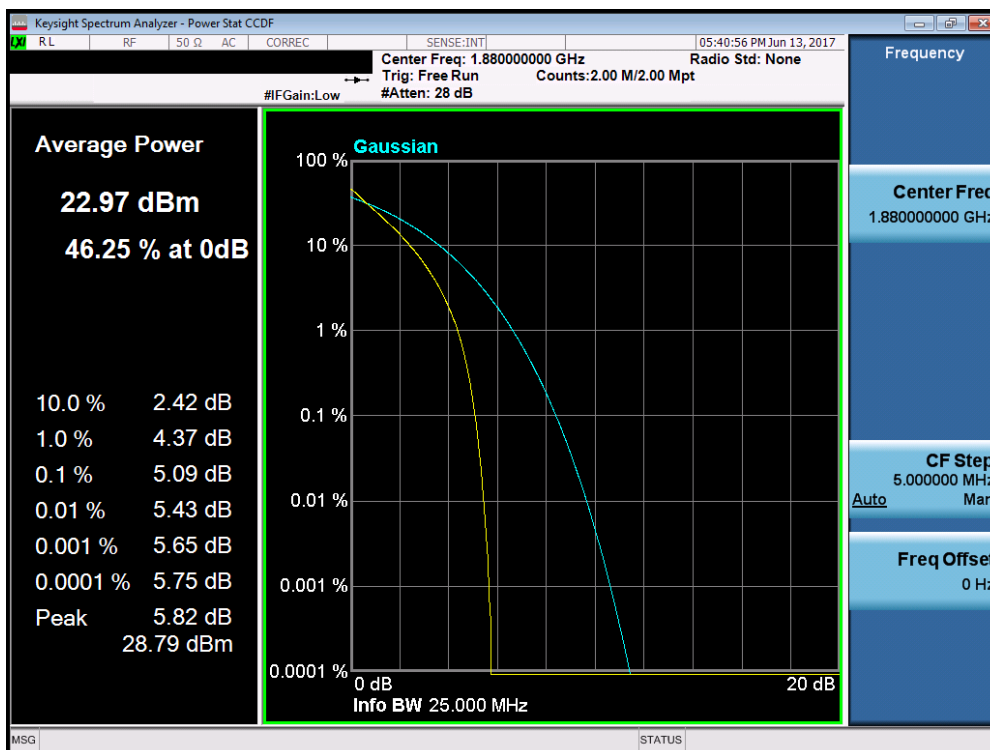
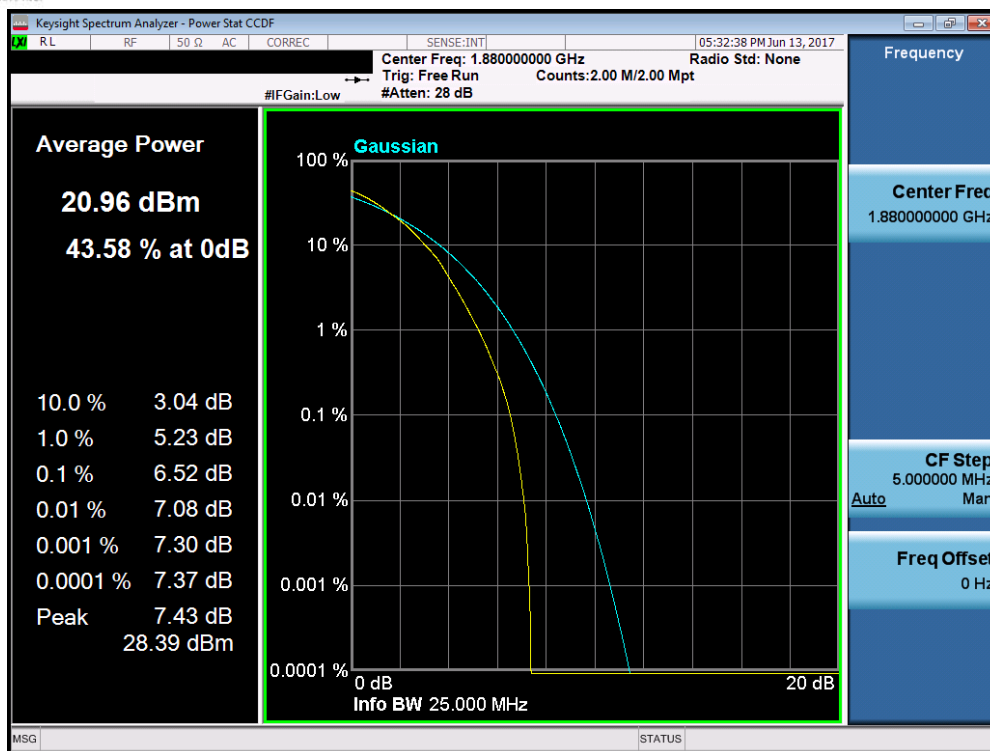


Plot 7-246. PAR Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

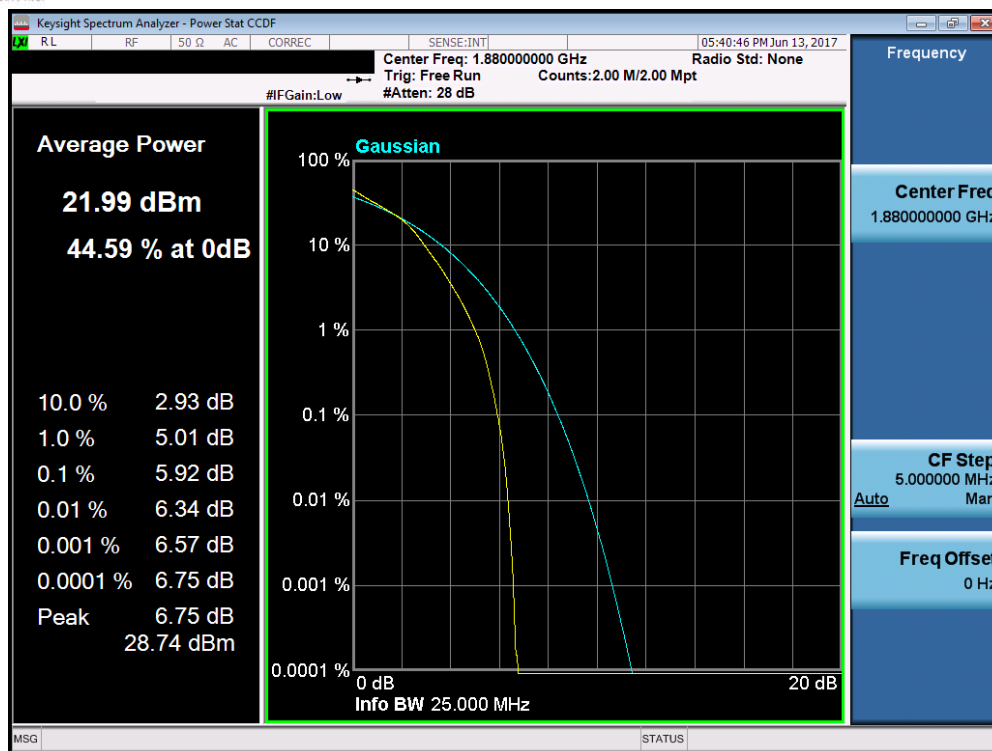


Plot 7-247. PAR Plot (Band 2/25 – 15.0MHz 16-QAM – RB Size 75)

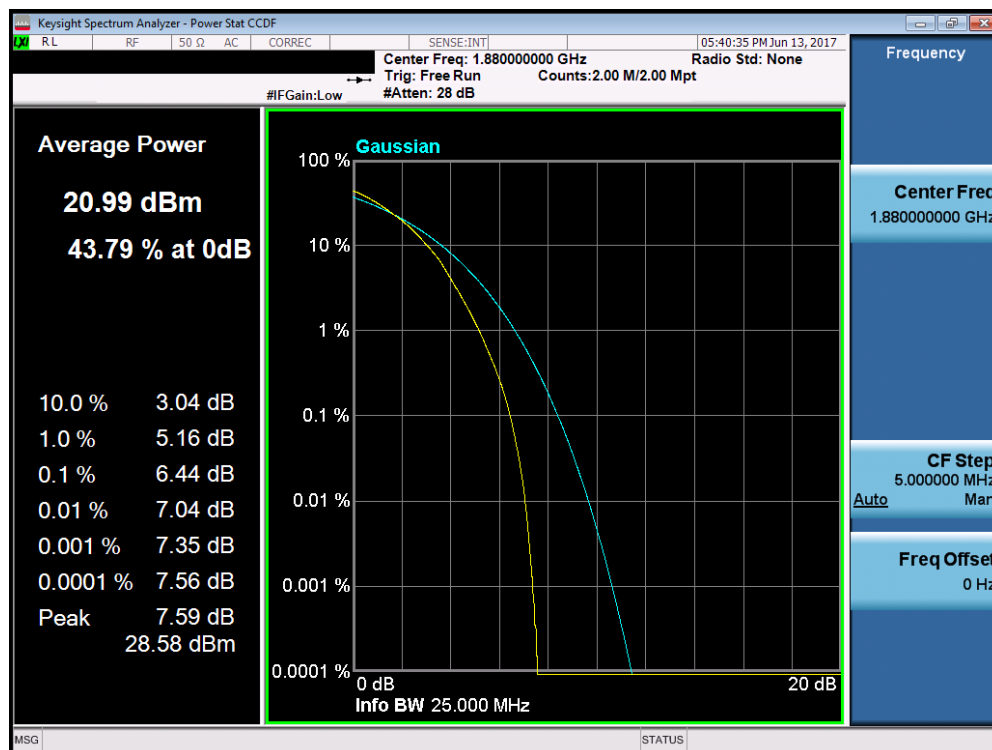
FCC ID: ZNFS998	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 146 of 188	



FCC ID: ZNFLS998	PCTEST ENGINEERING LABORATORY, INC.		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset			Page 147 of 188



Plot 7-250. PAR Plot (Band 2/25 – 20.0MHz 16-QAM – RB Size 100)



Plot 7-251. PAR Plot (Band 2/25 – 20.0MHz 64-QAM – RB Size 100)

FCC ID: ZNFLS998	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 148 of 188	

7.7 Radiated Power (ERP/EIRP)

§22.913(a.2) §24.232(c.2) §27.50(h.2) §27.50(b.10) §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-D-2010 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 v02r02 – Section 5.2.1

ANSI/TIA-603-D-2010 – 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: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 149 of 188

Test Setup

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

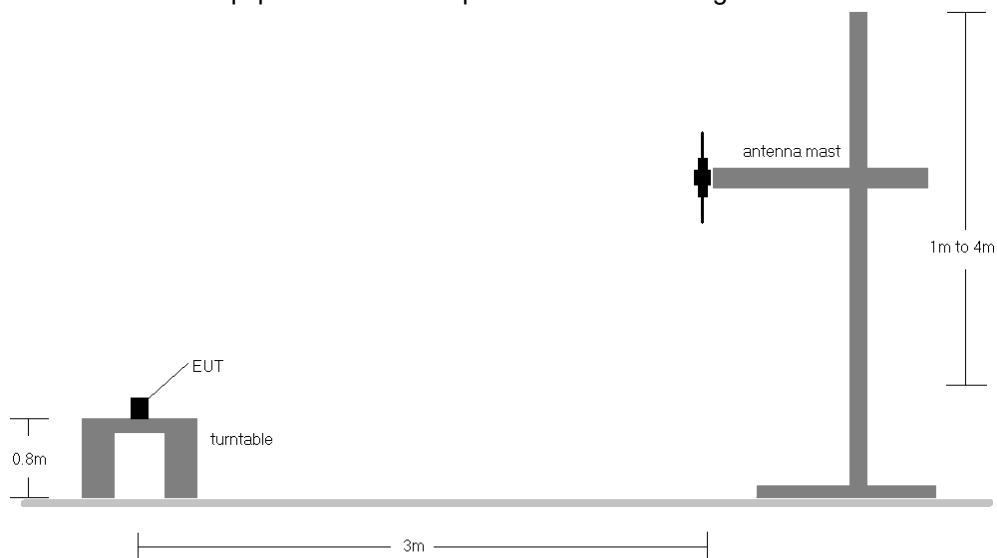


Figure 7-6. Radiated Test Setup <1GHz

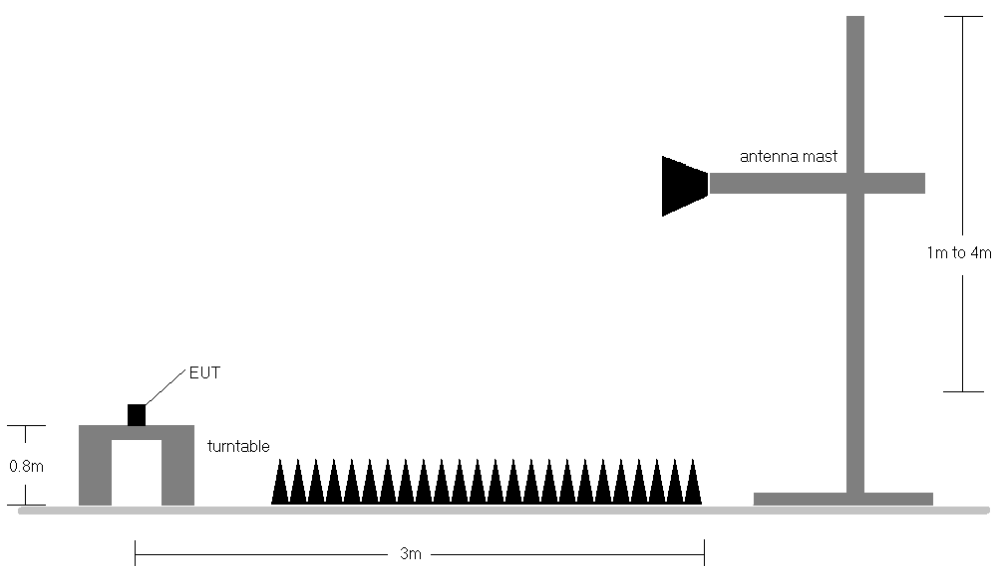


Figure 7-7. Radiated Test Setup >1GHz

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: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 150 of 188

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	150	149	1 / 0	16.82	-1.05	15.77	34.77	-19.00
707.50	1.4	QPSK	H	150	153	1 / 0	17.05	-1.02	16.03	34.77	-18.74
715.30	1.4	QPSK	H	150	138	1 / 0	17.75	-0.99	16.76	34.77	-18.01
715.30	1.4	16-QAM	H	150	138	1 / 0	16.89	-0.99	15.90	34.77	-18.87
715.30	1.4	64-QAM	H	150	138	1 / 0	16.66	-0.99	15.67	34.77	-19.10
700.50	3	QPSK	H	150	138	1 / 0	17.14	-1.05	16.09	34.77	-18.68
707.50	3	QPSK	H	150	145	1 / 0	17.31	-1.02	16.29	34.77	-18.48
714.50	3	QPSK	H	150	149	1 / 0	17.76	-0.99	16.77	34.77	-18.00
714.50	3	16-QAM	H	150	149	1 / 0	16.73	-0.99	15.74	34.77	-19.03
714.50	3	64-QAM	H	150	149	1 / 0	16.59	-0.99	15.60	34.77	-19.17
714.50	3	QPSK	V	150	2	1 / 0	15.91	-0.99	14.92	34.77	-19.85
714.50	3 (WCP)	QPSK	H	150	2	1 / 0	17.31	-0.99	16.32	34.77	-18.45

Table 7-4. 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 [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
701.50	5	QPSK	H	150	147	1 / 0	17.32	-1.04	16.28	34.77	-18.50
707.50	5	QPSK	H	150	158	1 / 0	17.22	-1.02	16.20	34.77	-18.57
713.50	5	QPSK	H	150	140	1 / 0	17.32	-1.00	16.32	34.77	-18.45
713.50	5	16-QAM	H	150	140	1 / 0	16.43	-1.00	15.43	34.77	-19.34
713.50	5	64-QAM	H	150	140	1 / 0	16.26	-1.00	15.26	34.77	-19.51
704.00	10	QPSK	H	150	142	1 / 0	17.61	-1.03	16.58	34.77	-18.19
707.50	10	QPSK	H	150	139	1 / 0	17.46	-1.02	16.44	34.77	-18.33
711.00	10	QPSK	H	150	141	1 / 0	17.41	-1.01	16.40	34.77	-18.37
704.00	10	16-QAM	H	150	142	1 / 0	16.31	-1.03	15.28	34.77	-19.49
704.00	10	64-QAM	H	150	142	1 / 0	16.35	-1.03	15.32	34.77	-19.45

Table 7-5. ERP Data (Band 12/17)

FCC ID: ZNLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 				Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset			Page 151 of 188

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	H	150	193	1 / 0	18.13	-0.83	17.30	34.77	-17.47
782.00	5	QPSK	H	150	183	1 / 0	18.14	-0.82	17.32	34.77	-17.45
784.50	5	QPSK	H	150	194	1 / 0	18.16	-0.81	17.35	34.77	-17.42
784.50	5	16-QAM	H	150	194	1 / 0	17.49	-0.81	16.68	34.77	-18.09
784.50	5	64-QAM	H	150	194	1 / 0	16.84	-0.81	16.03	34.77	-18.74
782.00	10	QPSK	H	150	199	1 / 0	18.06	-0.82	17.24	34.77	-17.53
782.00	10	16-QAM	H	150	199	1 / 0	17.04	-0.82	16.22	34.77	-18.55
782.00	10	64-QAM	H	150	199	1 / 0	16.80	-0.82	15.98	34.77	-18.79
784.50	5	QPSK	V	150	138	1 / 0	16.83	-0.81	16.02	34.77	-18.75
784.50	5 (WCP)	QPSK	H	150	38	1 / 0	17.62	-0.81	16.81	34.77	-17.96

Table 7-6. ERP Data (Band 13)

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 152 of 188

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	150	184	1 / 0	18.12	-0.65	17.47	38.45	-20.98
836.50	1.4	QPSK	H	150	199	1 / 0	17.60	-0.65	16.95	38.45	-21.50
848.30	1.4	QPSK	H	150	187	1 / 0	16.98	-0.65	16.33	38.45	-22.12
824.70	1.4	16-QAM	H	150	184	1 / 0	17.38	-0.65	16.73	38.45	-21.72
824.70	1.4	64-QAM	H	150	184	1 / 0	16.83	-0.65	16.18	38.45	-22.27
825.50	3	QPSK	H	150	177	1 / 0	18.11	-0.65	17.46	38.45	-20.99
836.50	3	QPSK	H	150	184	1 / 0	17.63	-0.65	16.98	38.45	-21.47
847.50	3	QPSK	H	150	180	1 / 0	17.43	-0.65	16.78	38.45	-21.67
825.50	3	16-QAM	H	150	177	1 / 0	16.93	-0.65	16.28	38.45	-22.17
825.50	3	64-QAM	H	150	177	1 / 0	16.59	-0.65	15.94	38.45	-22.51
826.50	5	QPSK	H	150	187	1 / 0	17.98	-0.65	17.33	38.45	-21.12
836.50	5	QPSK	H	150	188	1 / 0	18.01	-0.65	17.36	38.45	-21.09
846.50	5	QPSK	H	150	190	1 / 0	17.06	-0.65	16.41	38.45	-22.04
836.50	5	16-QAM	H	150	188	1 / 0	16.84	-0.65	16.19	38.45	-22.26
836.50	5	64-QAM	H	150	188	1 / 0	16.55	-0.65	15.90	38.45	-22.55
829.00	10	QPSK	H	150	173	1 / 0	18.13	-0.65	17.48	38.45	-20.97
836.50	10	QPSK	H	150	178	1 / 0	18.11	-0.65	17.46	38.45	-20.99
844.00	10	QPSK	H	150	181	1 / 0	17.93	-0.65	17.28	38.45	-21.17
829.00	10	16-QAM	H	150	173	1 / 0	16.95	-0.65	16.30	38.45	-22.15
829.00	10	64-QAM	H	150	173	1 / 0	16.28	-0.65	15.63	38.45	-22.82
831.50	15	QPSK	H	150	184	1 / 0	18.48	-0.65	17.83	38.45	-20.62
836.50	15	QPSK	H	150	191	1 / 0	18.39	-0.65	17.74	38.45	-20.71
841.50	15	QPSK	H	150	181	1 / 0	18.23	-0.65	17.58	38.45	-20.87
831.50	15	16-QAM	H	150	184	1 / 0	17.35	-0.65	16.70	38.45	-21.75
831.50	15	64-QAM	H	150	184	1 / 0	16.81	-0.65	16.16	38.45	-22.29
831.50	15	QPSK	V	150	134	1 / 0	17.45	-0.65	16.80	38.45	-21.65
831.50	15 (WCP)	QPSK	H	150	237	1 / 0	18.55	-0.65	17.90	38.45	-20.55

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

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 153 of 188

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 Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	H	150	8	1 / 0	17.54	5.56	23.10	30.00	-6.90
1732.50	1.4	QPSK	H	150	10	1 / 0	17.68	5.41	23.09	30.00	-6.91
1754.30	1.4	QPSK	H	150	5	1 / 0	17.09	5.26	22.35	30.00	-7.65
1710.70	1.4	16-QAM	H	150	8	1 / 0	16.55	5.56	22.11	30.00	-7.89
1710.70	1.4	64-QAM	H	150	8	1 / 0	16.08	5.56	21.64	30.00	-8.36
1711.50	3	QPSK	H	150	10	1 / 0	17.81	5.55	23.36	30.00	-6.64
1732.50	3	QPSK	H	150	5	1 / 0	17.85	5.41	23.26	30.00	-6.74
1753.50	3	QPSK	H	150	8	1 / 0	17.55	5.26	22.81	30.00	-7.19
1711.50	3	16-QAM	H	150	10	1 / 0	16.69	5.55	22.24	30.00	-7.76
1711.50	3	64-QAM	H	150	10	1 / 0	16.40	5.55	21.95	30.00	-8.05
1712.50	5	QPSK	H	150	5	1 / 0	17.96	5.55	23.51	30.00	-6.49
1732.50	5	QPSK	H	150	8	1 / 0	18.15	5.41	23.56	30.00	-6.44
1752.50	5	QPSK	H	150	6	1 / 0	17.92	5.27	23.19	30.00	-6.81
1732.50	5	16-QAM	H	150	8	1 / 0	17.09	5.41	22.50	30.00	-7.50
1732.50	5	64-QAM	H	150	8	1 / 0	16.64	5.41	22.05	30.00	-7.95
1715.00	10	QPSK	H	150	8	1 / 0	17.88	5.53	23.41	30.00	-6.59
1732.50	10	QPSK	H	150	5	1 / 0	18.39	5.41	23.80	30.00	-6.20
1750.00	10	QPSK	H	150	8	1 / 0	18.22	5.29	23.51	30.00	-6.49
1732.50	10	16-QAM	H	150	5	1 / 0	17.30	5.41	22.71	30.00	-7.29
1732.50	10	64-QAM	H	150	5	1 / 0	16.68	5.41	22.09	30.00	-7.91
1717.50	15	QPSK	H	150	8	1 / 0	17.87	5.51	23.38	30.00	-6.62
1732.50	15	QPSK	H	150	8	1 / 0	18.36	5.41	23.77	30.00	-6.23
1747.50	15	QPSK	H	150	8	1 / 0	18.54	5.31	23.85	30.00	-6.15
1747.50	15	16-QAM	H	150	8	1 / 0	17.39	5.31	22.70	30.00	-7.30
1747.50	15	64-QAM	H	150	8	1 / 0	16.43	5.31	21.74	30.00	-8.26
1720.00	20	QPSK	H	150	4	1 / 0	17.97	5.49	23.46	30.00	-6.54
1732.50	20	QPSK	H	150	6	1 / 0	18.25	5.41	23.66	30.00	-6.34
1745.00	20	QPSK	H	150	5	1 / 0	18.07	5.32	23.39	30.00	-6.61
1732.50	20	16-QAM	H	150	6	1 / 0	17.12	5.41	22.53	30.00	-7.47
1732.50	20	64-QAM	H	150	6	1 / 0	16.39	5.41	21.80	30.00	-8.20
1747.50	15	QPSK	V	150	354	1 / 0	16.79	5.49	22.28	30.00	-7.72
1747.50	15 (WCP)	QPSK	H	150	15	1 / 0	16.83	5.31	22.14	30.00	-7.86

Table 7-8. EIRP Data (Band 4)

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 154 of 188

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 Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	H	150	47	1 / 3	18.05	4.82	22.87	33.01	-10.14
1882.50	1.4	QPSK	H	150	50	1 / 3	17.35	4.73	22.08	33.01	-10.93
1914.30	1.4	QPSK	H	150	52	1 / 0	17.30	4.68	21.98	33.01	-11.03
1850.70	1.4	16-QAM	H	150	47	1 / 3	17.23	4.82	22.05	33.01	-10.96
1850.70	1.4	64-QAM	H	150	47	1 / 3	16.62	4.82	21.44	33.01	-11.57
1851.50	3	QPSK	H	150	47	1 / 0	17.92	4.82	22.74	33.01	-10.27
1882.50	3	QPSK	H	150	50	1 / 0	17.14	4.73	21.87	33.01	-11.14
1913.50	3	QPSK	H	150	52	1 / 0	17.74	4.68	22.42	33.01	-10.59
1851.50	3	16-QAM	H	150	47	1 / 0	17.11	4.82	21.93	33.01	-11.08
1851.50	3	64-QAM	H	150	47	1 / 0	16.27	4.82	21.09	33.01	-11.92
1852.50	5	QPSK	H	150	47	1 / 0	17.82	4.81	22.63	33.01	-10.38
1882.50	5	QPSK	H	150	50	1 / 0	17.22	4.73	21.95	33.01	-11.06
1912.50	5	QPSK	H	150	52	1 / 0	17.84	4.68	22.52	33.01	-10.49
1852.50	5	16-QAM	H	150	47	1 / 0	16.99	4.81	21.80	33.01	-11.21
1852.50	5	64-QAM	H	150	47	1 / 0	16.26	4.81	21.07	33.01	-11.94
1855.00	10	QPSK	H	150	47	1 / 0	17.75	4.81	22.56	33.01	-10.45
1882.50	10	QPSK	H	150	50	1 / 0	17.64	4.73	22.37	33.01	-10.64
1910.00	10	QPSK	H	150	52	1 / 0	17.67	4.68	22.35	33.01	-10.66
1855.00	10	16-QAM	H	150	47	1 / 0	16.00	4.81	20.81	33.01	-12.20
1855.00	10	64-QAM	H	150	47	1 / 0	15.29	4.81	20.10	33.01	-12.91
1857.50	15	QPSK	H	150	47	1 / 0	17.41	4.80	22.21	33.01	-10.80
1882.50	15	QPSK	H	150	50	1 / 0	17.28	4.73	22.01	33.01	-11.00
1907.50	15	QPSK	H	150	52	1 / 0	17.63	4.68	22.31	33.01	-10.70
1907.50	15	16-QAM	H	150	52	1 / 0	16.83	4.68	21.51	33.01	-11.50
1907.50	15	64-QAM	H	150	52	1 / 0	15.75	4.68	20.43	33.01	-12.58
1860.00	20	QPSK	H	150	47	1 / 0	17.80	4.79	22.59	33.01	-10.42
1882.50	20	QPSK	H	150	50	1 / 0	17.33	4.73	22.06	33.01	-10.95
1905.00	20	QPSK	H	150	52	1 / 0	17.65	4.68	22.33	33.01	-10.68
1860.00	20	16-QAM	H	150	47	1 / 0	16.02	4.79	20.81	33.01	-12.20
1860.00	20	64-QAM	H	150	47	1 / 0	15.19	4.79	19.98	33.01	-13.03
1850.70	1.4	QPSK	V	150	38	1 / 0	15.80	4.81	20.61	33.01	-12.40
1850.70	1.4 (WCP)	QPSK	H	150	0	1 / 0	17.36	4.81	22.17	33.01	-10.84

Table 7-9. EIRP Data (Band 25/2)

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 155 of 188

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 Limit [dBm]	Margin [dB]
2498.50	5	QPSK	V	150	288	1 / 0	16.28	5.59	21.87	33.01	-11.14
2593.00	5	QPSK	V	150	296	1 / 0	18.06	6.27	24.33	33.01	-8.68
2687.50	5	QPSK	V	150	300	1 / 0	16.31	6.47	22.78	33.01	-10.23
2593.00	5	16-QAM	V	150	296	1 / 0	17.75	6.27	24.02	33.01	-8.99
2593.00	5	64-QAM	V	150	296	1 / 0	16.20	6.27	22.47	33.01	-10.54
2501.00	10	QPSK	V	150	275	1 / 0	16.43	5.60	22.03	33.01	-10.98
2593.00	10	QPSK	V	150	288	1 / 0	18.25	6.27	24.52	33.01	-8.49
2685.00	10	QPSK	V	150	298	1 / 0	17.43	6.46	23.89	33.01	-9.12
2593.00	10	16-QAM	V	150	288	1 / 0	17.12	6.27	23.39	33.01	-9.62
2593.00	10	64-QAM	V	150	288	1 / 0	16.83	6.27	23.10	33.01	-9.91
2503.50	15	QPSK	V	150	256	1 / 0	16.82	5.61	22.43	33.01	-10.58
2593.00	15	QPSK	V	150	284	1 / 0	18.85	6.27	25.12	33.01	-7.89
2682.50	15	QPSK	V	150	261	1 / 0	16.42	6.46	22.88	33.01	-10.13
2593.00	15	16-QAM	V	150	284	1 / 0	17.95	6.27	24.22	33.01	-8.79
2593.00	15	64-QAM	V	150	284	1 / 0	17.81	6.27	24.08	33.01	-8.93
2506.00	20	QPSK	V	150	275	1 / 0	16.18	5.63	21.81	33.01	-11.20
2593.00	20	QPSK	V	150	288	1 / 0	17.88	6.27	24.15	33.01	-8.86
2680.00	20	QPSK	V	150	298	1 / 0	17.51	6.46	23.97	33.01	-9.04
2593.00	20	16-QAM	V	150	288	1 / 0	16.95	6.27	23.22	33.01	-9.79
2593.00	20	64-QAM	V	150	288	1 / 0	16.70	6.27	22.97	33.01	-10.04
2593.00	15	QPSK	H	150	357	1 / 0	17.72	6.27	23.99	33.01	-9.02
2593.00	15 (WCP)	QPSK	H	150	235	1 / 0	17.92	6.27	24.19	33.01	-8.82
2593.00	15 (PC3)	QPSK	V	150	321	1 / 0	15.53	6.27	21.80	33.01	-11.21

Table 7-10. EIRP Data (Band 41)

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 156 of 188

7.8 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) §24.238(a) §27.53(c) §27.53(f) §27.53(g) §27.53(h) §27.53(m)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 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 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – 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: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 157 of 188

Test Setup

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

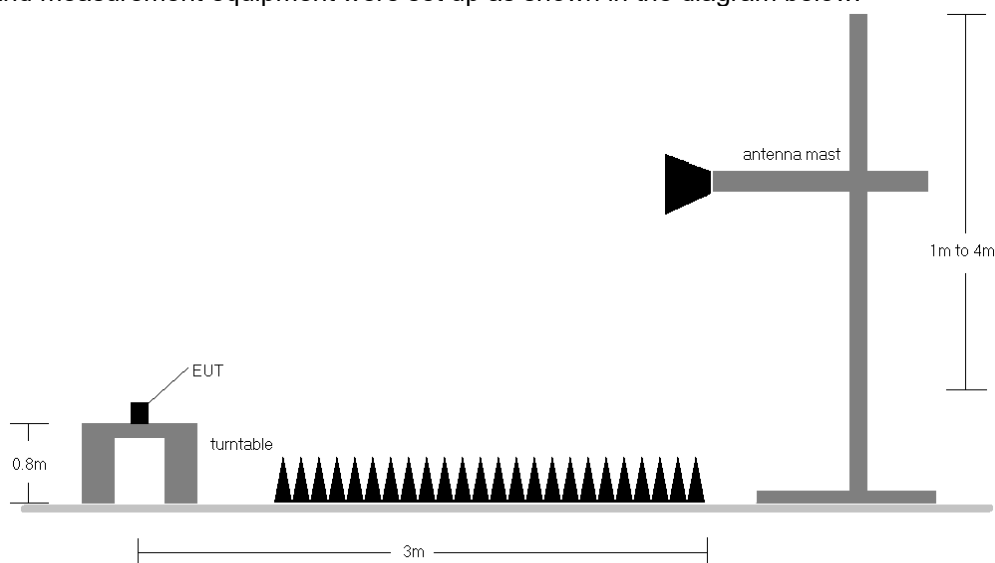


Figure 7-8. Test Instrument & Measurement Setup

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: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 158 of 188	

OPERATING FREQUENCY: 700.50 MHz
 CHANNEL: 23025
 MEASURED OUTPUT POWER: 16.09 dBm = 0.041 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 29.09 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1401.00	V	101	177	-73.29	5.90	-67.39	83.5
2101.50	V	110	225	-64.17	6.81	-57.35	73.4
2802.00	V	-	-	-72.81	8.13	-64.68	80.8

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

OPERATING FREQUENCY: 707.50 MHz
 CHANNEL: 23095
 MEASURED OUTPUT POWER: 16.29 dBm = 0.043 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 29.29 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1415.00	V	103	65	-73.46	5.95	-67.51	83.8
2122.50	V	103	234	-63.94	6.87	-57.07	73.4
2830.00	V	-	-	-72.67	8.14	-64.53	80.8

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

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 159 of 188

OPERATING FREQUENCY: 714.50 MHz
 CHANNEL: 23165
 MEASURED OUTPUT POWER: 16.77 dBm = 0.048 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 29.77 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1429.00	V	114	85	-73.81	6.00	-67.81	84.6
2143.50	V	101	238	-64.40	6.93	-57.47	74.2
2858.00	V	-	-	-69.93	8.15	-61.79	78.6

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

OPERATING FREQUENCY: 714.50 MHz
 CHANNEL: 23165
 MEASURED OUTPUT POWER: 16.32 dBm = 0.043 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 29.32 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1429.00	V	186	151	-76.37	6.00	-70.37	86.7
2143.50	V	112	38	-71.32	6.93	-64.39	80.7
2858.00	V	-	-	-74.02	8.15	-65.88	82.2

Table 7-14. Radiated Spurious Data with WCP (Band 12 – High Channel)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 160 of 188

OPERATING FREQUENCY: 779.50 MHz
 CHANNEL: 23205
 MEASURED OUTPUT POWER: 17.30 dBm = 0.054 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.30 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2338.50	V	115	314	-69.45	7.01	-62.44	79.7
3118.00	V	-	-	-71.51	7.28	-64.23	81.5

Table 7-15. Radiated Spurious Data (Band 13 – Low Channel)

OPERATING FREQUENCY: 782.00 MHz
 CHANNEL: 23230
 MEASURED OUTPUT POWER: 17.32 dBm = 0.054 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.32 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	V	119	305	-68.38	7.00	-61.37	78.7
3128.00	V	-	-	-68.95	7.26	-61.68	79.0

Table 7-16. Radiated Spurious Data (Band 13 – Mid Channel)

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 161 of 188

OPERATING FREQUENCY: 784.50 MHz
 CHANNEL: 23255
 MEASURED OUTPUT POWER: 17.35 dBm = 0.054 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 30.35 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2353.50	V	114	315	-65.39	6.99	-58.39	75.7
3138.00	V	-	-	-69.12	7.25	-61.87	79.2

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

MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.00 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 [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	V	112	247	-60.64	6.36	-54.29	-14.3
1564.00	V	115	245	-62.26	6.37	-55.89	-15.9
1569.00	V	115	287	-60.98	6.38	-54.61	-14.6

Table 7-18. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 162 of 188

OPERATING FREQUENCY: 784.50 MHz
 CHANNEL: 23255
 MEASURED OUTPUT POWER: 16.81 dBm = 0.048 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 29.81 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2353.50	V	100	288	-60.34	6.99	-53.34	70.2
3138.00	V	103	129	-67.36	7.25	-60.11	76.9
3922.50	V	-	-	-67.32	7.19	-60.13	76.9

Table 7-19. Radiated Spurious Data with WCP (Band 13 – High Channel)

OPERATING FREQUENCY: 831.50 MHz
 CHANNEL: 26865
 MEASURED OUTPUT POWER: 17.83 dBm = 0.061 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 30.83 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1663.00	V	160	77	-76.05	6.24	-69.81	87.6
2494.50	V	246	182	-72.29	6.87	-65.42	83.2
3326.00	V	-	-	-70.81	7.19	-63.62	81.4

Table 7-20. Radiated Spurious Data (Band 5/26 – Low Channel)

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 163 of 188

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 26915
 MEASURED OUTPUT POWER: 17.74 dBm = 0.059 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 30.74 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	V	231	53	-72.07	6.21	-65.86	83.6
2509.50	V	100	241	-71.75	6.90	-64.84	82.6
3346.00	V	-	-	-70.89	7.26	-63.63	81.4

Table 7-21. Radiated Spurious Data (Band 5/26 – Mid Channel)

OPERATING FREQUENCY: 841.50 MHz
 CHANNEL: 26965
 MEASURED OUTPUT POWER: 17.58 dBm = 0.057 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 30.58 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1683.00	V	228	64	-72.70	6.18	-66.52	84.1
2524.50	V	103	85	-70.74	6.95	-63.79	81.4
3366.00	V	-	-	-71.05	7.33	-63.72	81.3

Table 7-22. Radiated Spurious Data (Band 5/26 – High Channel)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 164 of 188

OPERATING FREQUENCY: 831.50 MHz
 CHANNEL: 26865
 MEASURED OUTPUT POWER: 17.90 dBm = 0.062 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 30.90 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1663.00	V	127	45	-72.46	6.24	-66.22	84.1
2494.50	V	-	-	-73.74	6.87	-66.87	84.8

Table 7-23. Radiated Spurious Data with WCP (Band 5/26 – Low Channel)

OPERATING FREQUENCY: 1717.50 MHz
 CHANNEL: 20025
 MEASURED OUTPUT POWER: 23.38 dBm = 0.218 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 36.38 dBc

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]	[dBc]
3435.00	V	100	221	-69.10	9.72	-59.38	82.8
5152.50	V	-	-	-66.97	10.90	-56.07	79.5

Table 7-24. Radiated Spurious Data (Band 4 – Low Channel)

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 165 of 188

OPERATING FREQUENCY: 1732.50 MHz
 CHANNEL: 20175
 MEASURED OUTPUT POWER: 23.77 dBm = 0.238 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.77 dBc

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]	[dBc]
3465.00	V	102	345	-69.43	9.81	-59.61	83.4
5197.50	V	-	-	-66.90	10.81	-56.08	79.8

Table 7-25. Radiated Spurious Data (Band 4 – Mid Channel)

OPERATING FREQUENCY: 1747.50 MHz
 CHANNEL: 20325
 MEASURED OUTPUT POWER: 23.85 dBm = 0.242 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.85 dBc

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]	[dBc]
3495.00	V	100	219	-69.29	9.91	-59.38	83.2
5242.50	V	-	-	-66.43	10.89	-55.54	79.4

Table 7-26. Radiated Spurious Data (Band 4 – High Channel)

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 166 of 188

OPERATING FREQUENCY: 1747.50 MHz
 CHANNEL: 20325
 MEASURED OUTPUT POWER: 22.14 dBm = 0.164 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 35.14 dBc

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]	[dBc]
3495.00	H	-	-	-69.19	9.91	-59.28	81.4
5242.50	H	-	-	-66.10	10.89	-55.21	77.3

Table 7-27. Radiated Spurious Data with WCP (Band 4 – High Channel)

OPERATING FREQUENCY: 1850.70 MHz
 CHANNEL: 26047
 MEASURED OUTPUT POWER: 22.87 dBm = 0.194 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 35.87 dBc

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]	[dBc]
3701.40	H	197	47	-68.64	10.01	-58.63	81.5
5552.10	H	-	-	-67.42	11.20	-56.23	79.1

Table 7-28. Radiated Spurious Data (Band 2/25 – Low Channel)

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 167 of 188

OPERATING FREQUENCY: 1882.50 MHz
 CHANNEL: 26365
 MEASURED OUTPUT POWER: 22.08 dBm = 0.162 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.08 dBc

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]	[dBc]
3765.00	H	158	5	-67.50	9.76	-57.73	79.8
5647.50	H	-	-	-67.79	11.36	-56.43	78.5

Table 7-29. Radiated Spurious Data (Band 2/25 – Mid Channel)

OPERATING FREQUENCY: 1914.30 MHz
 CHANNEL: 26683
 MEASURED OUTPUT POWER: 21.98 dBm = 0.158 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.98 dBc

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]	[dBc]
3828.60	H	225	57	-67.34	9.54	-57.80	79.8
5742.90	H	-	-	-67.07	11.44	-55.63	77.6

Table 7-30. Radiated Spurious Data (Band 2/25 – High Channel)

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 168 of 188

OPERATING FREQUENCY: 1850.70 MHz
 CHANNEL: 26047
 MEASURED OUTPUT POWER: 22.17 dBm = 0.165 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 35.17 dBc

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]	[dBc]
3701.40	H	-	-	-68.94	10.01	-58.93	81.1
5552.10	H	-	-	-67.35	11.20	-56.16	78.3

Table 7-31. Radiated Spurious Data with WCP (Band 2/25 – Low Channel)

OPERATING FREQUENCY: 2503.50 MHz
 CHANNEL: 39725
 MEASURED OUTPUT POWER: 22.43 dBm = 0.175 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10}(W) =$ 47.43 dBc

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]	[dBc]
5007.00	H	-	-	-65.58	10.92	-54.65	77.1
7510.50	H	-	-	-56.86	11.08	-45.78	68.2

Table 7-32. Radiated Spurious Data (Band 41 – Low Channel)

FCC ID: ZNFS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 169 of 188

OPERATING FREQUENCY: 2593.00 MHz
 CHANNEL: 40620
 MEASURED OUTPUT POWER: 25.12 dBm = 0.325 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10} (W)$ 50.12 dBc

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]	[dBc]
5186.00	H	-	-	-65.78	10.75	-55.03	80.2
7779.00	H	-	-	-57.13	11.40	-45.73	70.9

Table 7-33. Radiated Spurious Data (Band 41 – Mid Channel)

OPERATING FREQUENCY: 2682.50 MHz
 CHANNEL: 41515
 MEASURED OUTPUT POWER: 22.88 dBm = 0.194 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10} (W)$ 47.88 dBc

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]	[dBc]
5365.00	H	-	-	-64.97	10.75	-54.22	77.1
8047.50	H	-	-	-57.03	11.14	-45.89	68.8

Table 7-34. Radiated Spurious Data (Band 41 – High Channel)

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 170 of 188

OPERATING FREQUENCY: 2593.00 MHz
 CHANNEL: 40620
 MEASURED OUTPUT POWER: 24.19 dBm = 0.263 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: $55 + 10 \log_{10} (W)$ 49.19 dBc

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]	[dBc]
5186.00	H	-	-	-66.48	10.83	-55.65	79.8
7779.00	H	-	-	-59.77	11.60	-48.17	72.4

Table 7-35. Radiated Spurious Data with WCP (Band 41 – Mid Channel)

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 171 of 188

7.9 Uplink Carrier Aggregation Radiated Measurements

\$2.1053, \$27.53(m)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 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 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – 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. No. of sweep points $\geq 2 \times$ span / RBW
4. Detector = RMS
5. Trace mode = Max Hold
6. The trace was allowed to stabilize

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 172 of 188

Test Setup

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

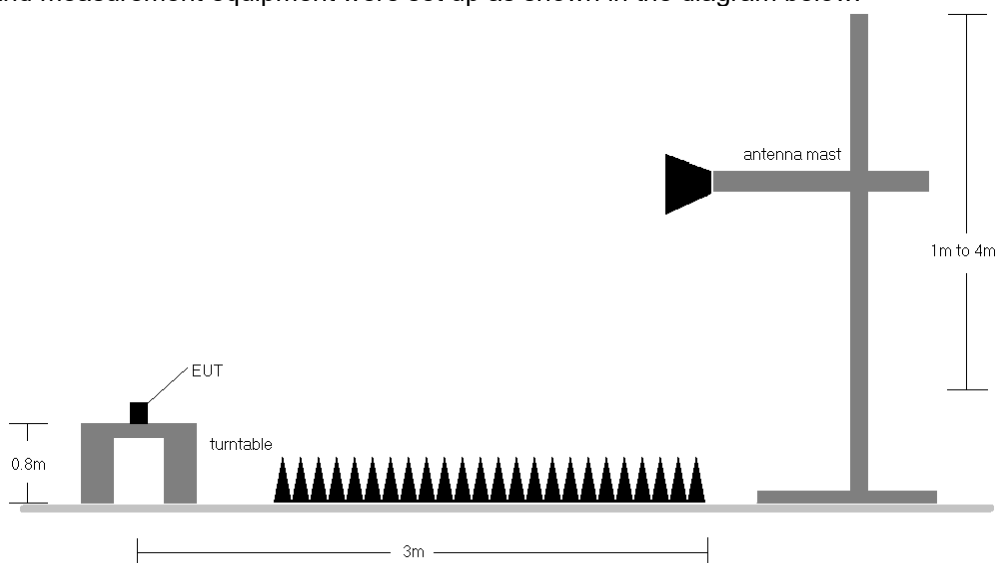
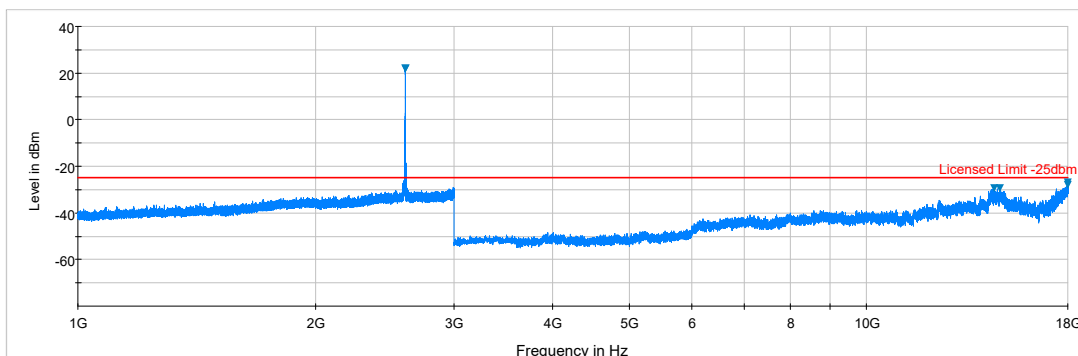


Figure 7-9. Test Instrument & Measurement Setup

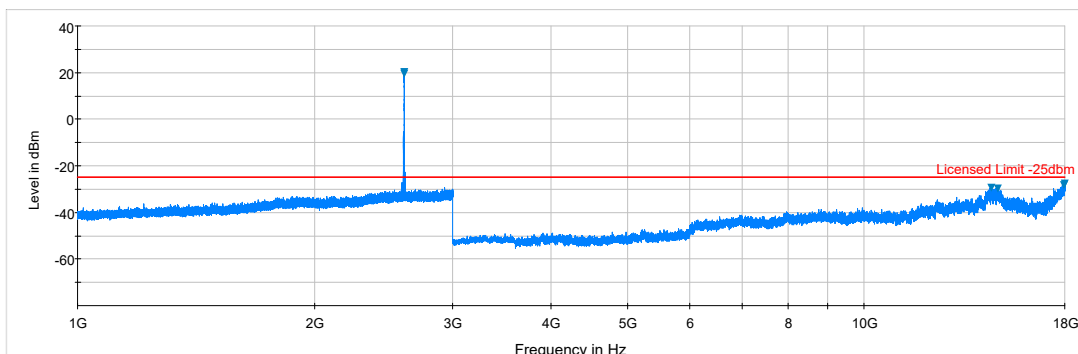
Test Notes

- 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) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.
- 4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 5) 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.
- 6) No significant emissions were found as a result of two uplink carriers operating contiguously.

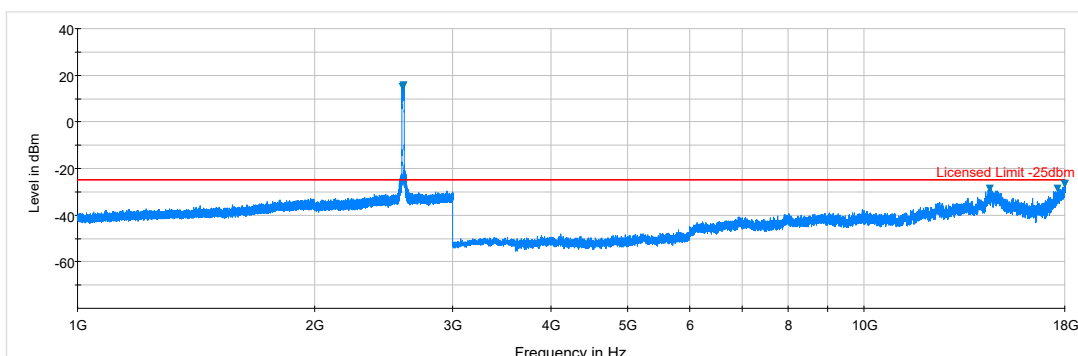
FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 173 of 188	



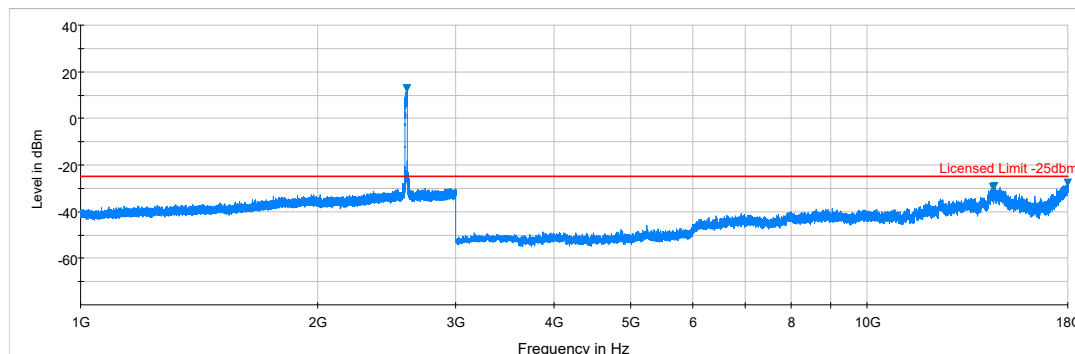
Plot 7-252. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0, Ant. Pol. H)



Plot 7-253. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0, Ant. Pol. V)



Plot 7-254. Radiated Spurious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0, Ant. Pol. H)



Plot 7-255. Radiated Spurious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0, Ant. Pol. V)

FCC ID: ZNFLS998	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 174 of 188

7.10 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-D-2010. 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-D-2010

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

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 175 of 188

Band 12/17 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY: 707,500,000 Hz

CHANNEL: 23790

REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	707,500,173	173	0.0000245
100 %		- 30	707,500,174	174	0.0000246
100 %		- 20	707,499,952	-48	-0.0000068
100 %		- 10	707,500,038	38	0.0000054
100 %		0	707,500,051	51	0.0000072
100 %		+ 10	707,500,041	41	0.0000058
100 %		+ 20	707,499,938	-62	-0.0000088
100 %		+ 30	707,499,789	-211	-0.0000298
100 %		+ 40	707,499,999	-1	-0.0000001
100 %		+ 50	707,500,012	12	0.0000017
BATT. ENDPOINT	3.45	+ 20	707,500,017	17	0.0000024

Table 7-36. Frequency Stability Data (Band 12)

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 176 of 188

Band 12/17 Frequency Stability Measurements

§2.1055 §27.54

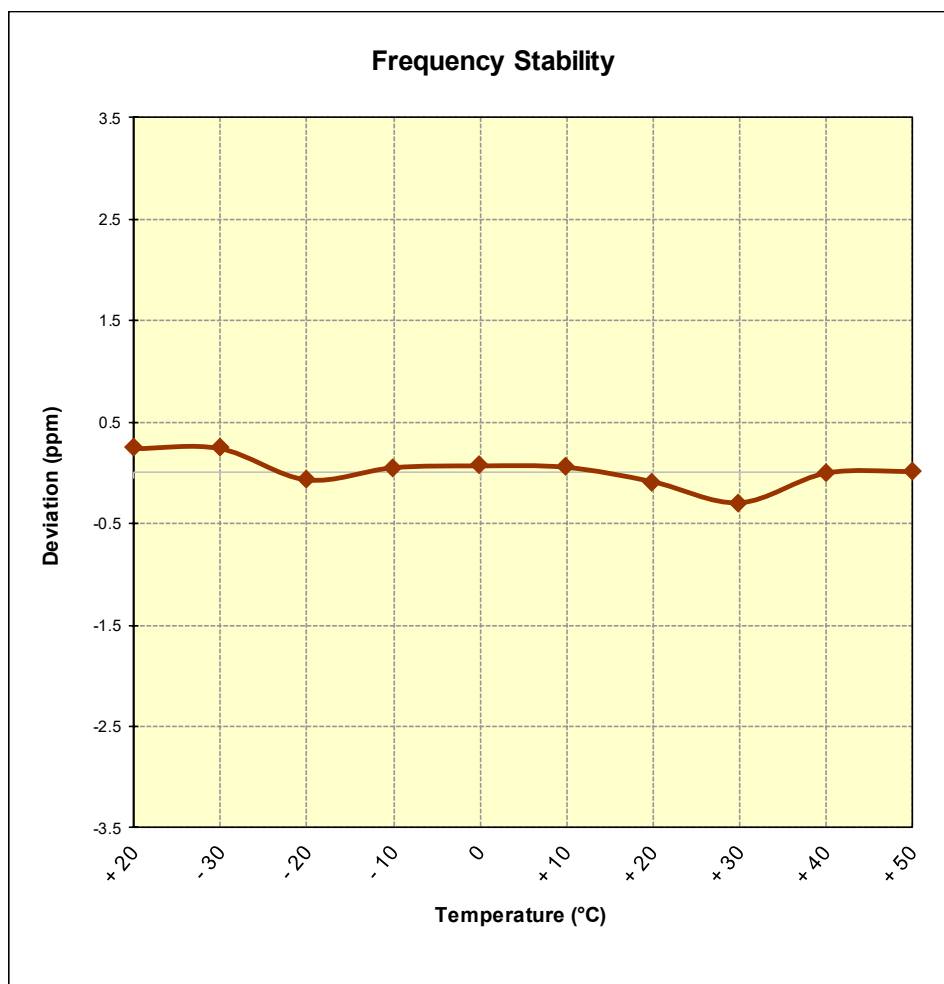


Figure 7-10. Frequency Stability Graph (Band 12)

FCC ID: ZNFLS998	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 177 of 188

Band 13 Frequency Stability Measurements

\$2.1055 \$27.54

OPERATING FREQUENCY: 782,000,000 Hz

CHANNEL: 23230

REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	782,000,072	72	0.0000092
100 %		- 30	782,000,108	108	0.0000138
100 %		- 20	781,999,769	-231	-0.0000295
100 %		- 10	782,000,043	43	0.0000055
100 %		0	781,999,632	-368	-0.0000471
100 %		+ 10	782,000,135	135	0.0000173
100 %		+ 20	782,000,338	338	0.0000432
100 %		+ 30	781,999,894	-106	-0.0000136
100 %		+ 40	781,999,998	-2	-0.0000003
100 %		+ 50	781,999,807	-193	-0.0000247
BATT. ENDPOINT	3.45	+ 20	782,000,069	69	0.0000088

Table 7-37. Frequency Stability Data (Band 13)

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 178 of 188

Band 13 Frequency Stability Measurements

§2.1055 §27.54

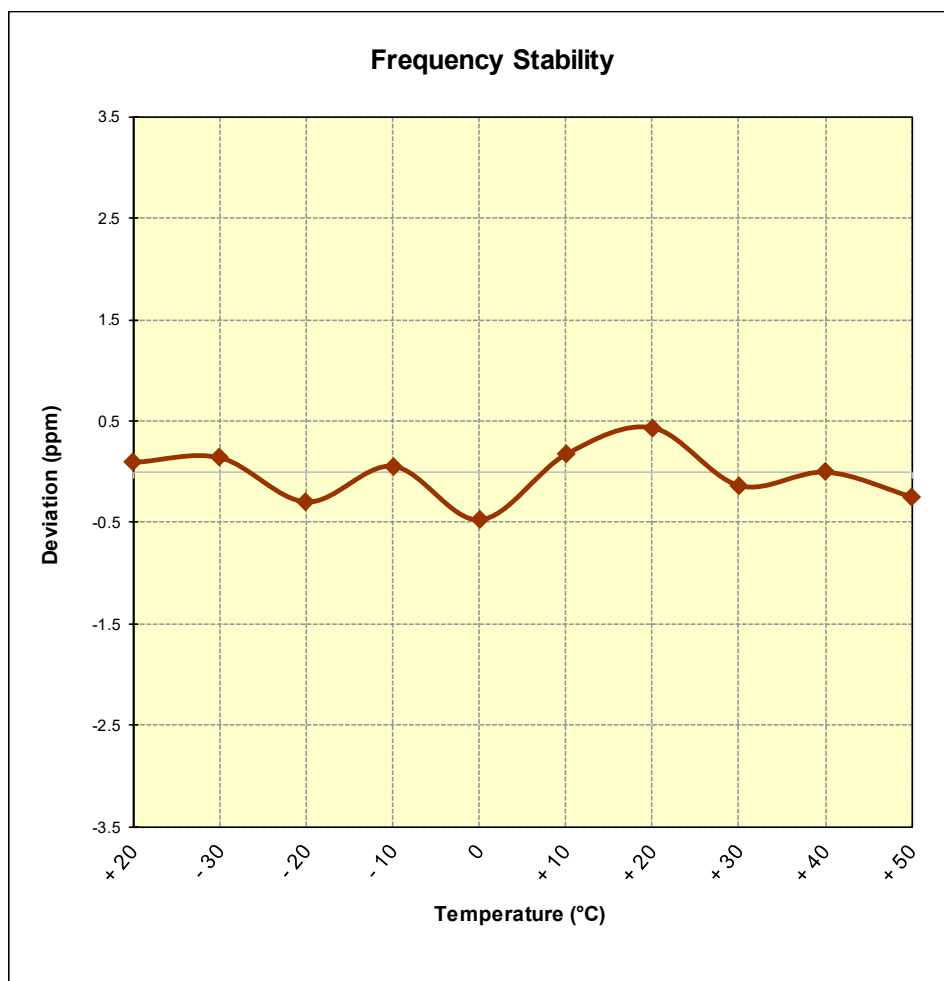


Figure 7-11. Frequency Stability Graph (Band 13)

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 179 of 188

Band 5/26 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)	836,500,198	198	0.0000237
100 %		- 30	836,499,952	-48	-0.0000057
100 %		- 20	836,499,612	-388	-0.0000464
100 %		- 10	836,499,609	-391	-0.0000467
100 %		0	836,500,052	52	0.0000062
100 %		+ 10	836,500,049	49	0.0000059
100 %		+ 20	836,499,822	-178	-0.0000213
100 %		+ 30	836,500,254	254	0.0000304
100 %		+ 40	836,499,937	-63	-0.0000075
100 %		+ 50	836,500,028	28	0.0000033
BATT. ENDPOINT	3.45	+ 20	836,500,207	207	0.0000247

Table 7-38. Frequency Stability Data (Band 5/26)

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 180 of 188

Band 5/26 Frequency Stability Measurements

§2.1055 §22.355

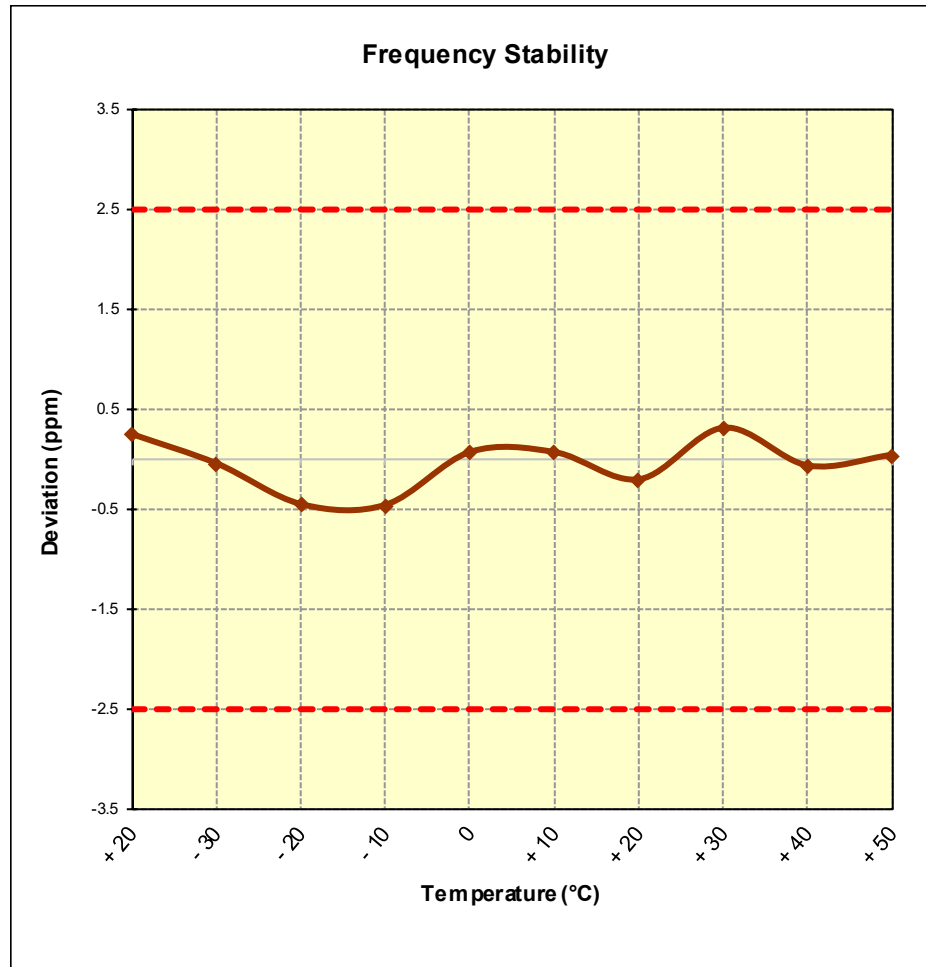


Figure 7-12. Frequency Stability Graph (Band 5/26)

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 181 of 188

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)	1,732,499,815	-185	-0.0000107
100 %		- 30	1,732,500,162	162	0.0000094
100 %		- 20	1,732,499,955	-45	-0.0000026
100 %		- 10	1,732,499,780	-220	-0.0000127
100 %		0	1,732,500,073	73	0.0000042
100 %		+ 10	1,732,499,989	-11	-0.0000006
100 %		+ 20	1,732,500,212	212	0.0000122
100 %		+ 30	1,732,500,027	27	0.0000016
100 %		+ 40	1,732,499,729	-271	-0.0000156
100 %		+ 50	1,732,500,063	63	0.0000036
BATT. ENDPOINT	3.45	+ 20	1,732,500,256	256	0.0000148

Table 7-39. 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: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 182 of 188

Band 4 Frequency Stability Measurements

§2.1055 §§27.54

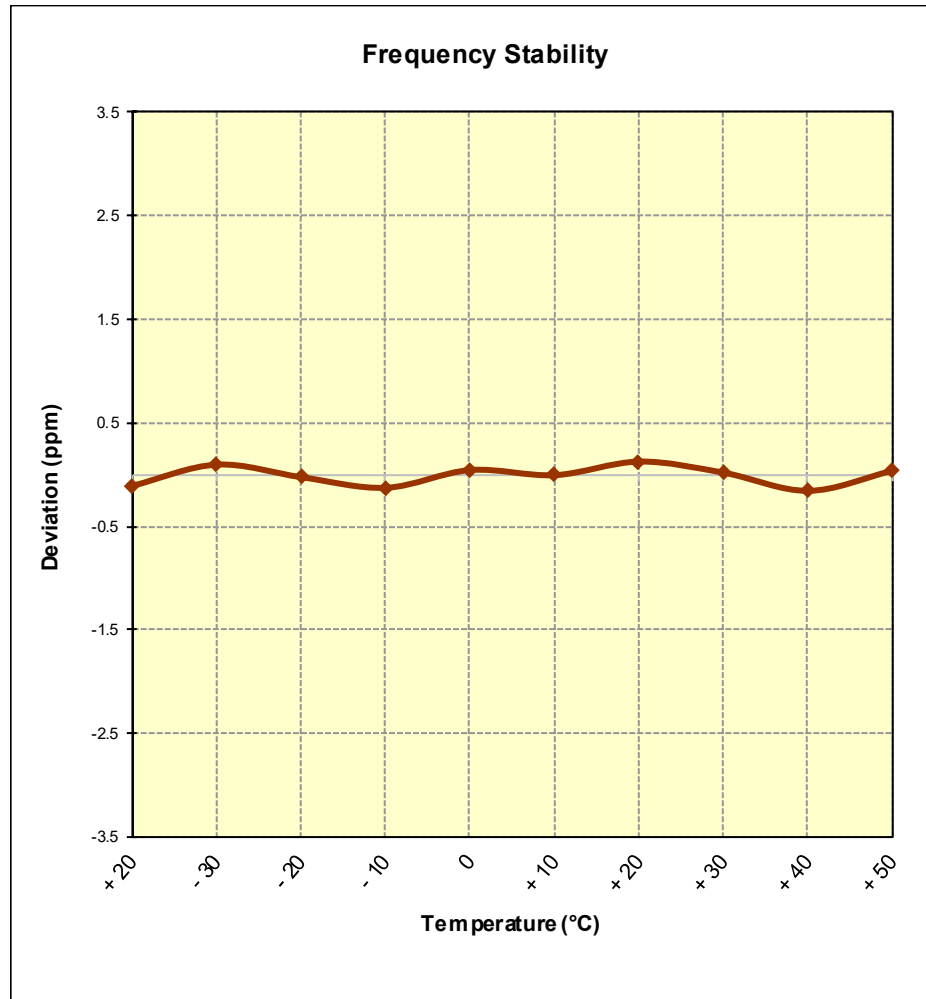


Figure 7-13. Frequency Stability Graph (Band 4)

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 183 of 188

© 2017 PCTEST Engineering Laboratory, Inc.

V 6.6

06/06/2017

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.

Band 2/25 Frequency Stability Measurements

§2.1055 §24.235

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)	1,879,999,704	-296	-0.0000157
100 %		- 30	1,880,000,105	105	0.0000056
100 %		- 20	1,879,999,770	-230	-0.0000122
100 %		- 10	1,880,000,031	31	0.0000016
100 %		0	1,879,999,899	-101	-0.0000054
100 %		+ 10	1,880,000,024	24	0.0000013
100 %		+ 20	1,879,999,820	-180	-0.0000096
100 %		+ 30	1,879,999,994	-6	-0.0000003
100 %		+ 40	1,879,999,922	-78	-0.0000041
100 %		+ 50	1,879,999,944	-56	-0.0000030
BATT. ENDPOINT	3.45	+ 20	1,880,000,095	95	0.0000051

Table 7-40. Frequency Stability Data (Band 2/25)

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: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 184 of 188

Band 2/25 Frequency Stability Measurements

§2.1055 §24.235

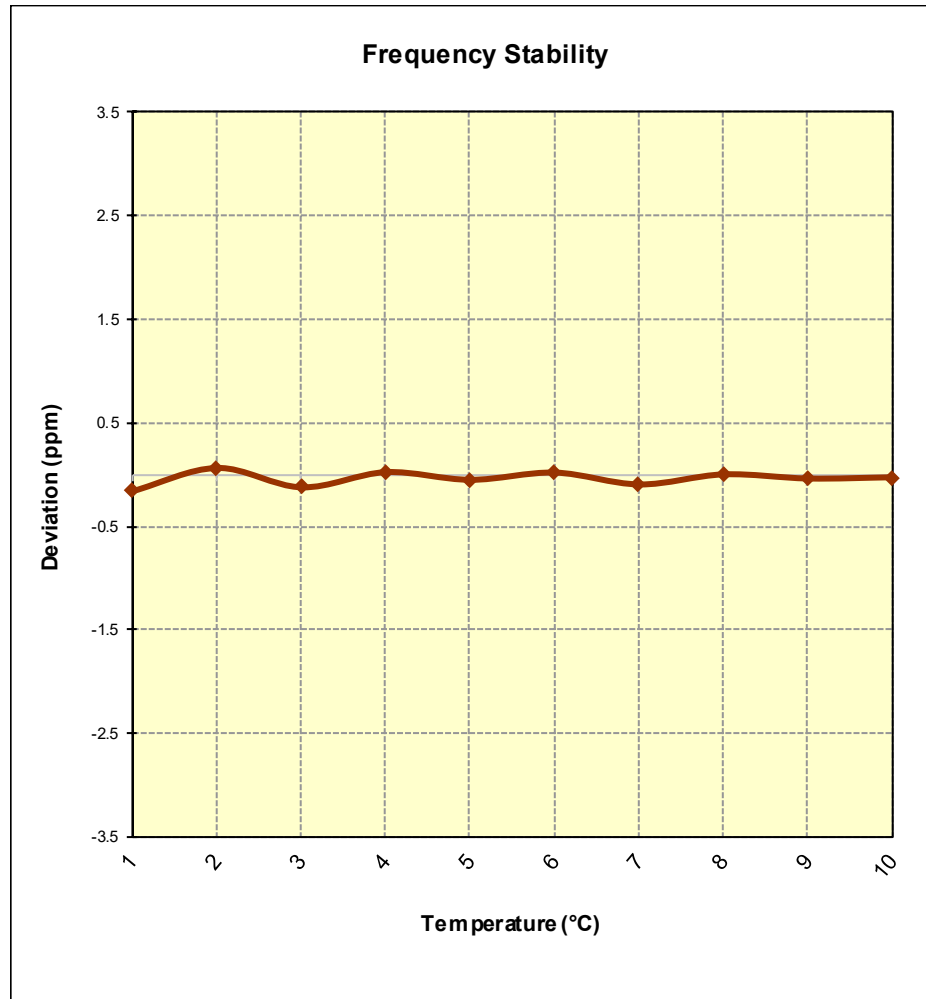


Figure 7-14. Frequency Stability Graph (Band 2/25)

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 185 of 188

Band 41 Frequency Stability Measurements

\$2.1055 \$27.54

OPERATING FREQUENCY: 2,593,000,000 Hz

CHANNEL: 40620

REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,592,999,912	-88	-0.0000034
100 %		- 30	2,592,999,809	-191	-0.0000074
100 %		- 20	2,593,000,009	9	0.0000003
100 %		- 10	2,593,000,222	222	0.0000086
100 %		0	2,593,000,229	229	0.0000088
100 %		+ 10	2,592,999,949	-51	-0.0000020
100 %		+ 20	2,592,999,723	-277	-0.0000107
100 %		+ 30	2,593,000,147	147	0.0000057
100 %		+ 40	2,592,999,756	-244	-0.0000094
100 %		+ 50	2,593,000,058	58	0.0000022
BATT. ENDPOINT	3.45	+ 20	2,592,999,848	-152	-0.0000059

Table 7-41. 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.

FCC ID: ZNFLS998	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset	Page 186 of 188

Band 41 Frequency Stability Measurements

§2.1055 §27.54

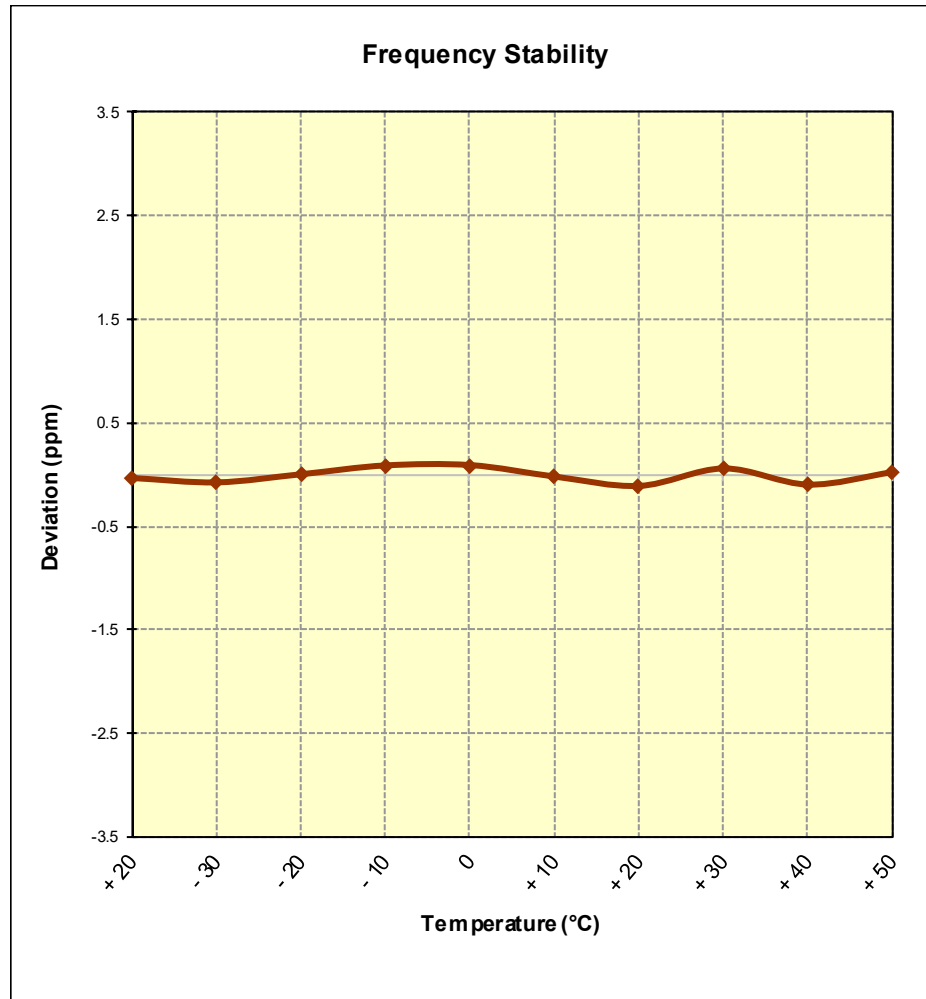


Figure 7-15. Frequency Stability Graph (Band 41)

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 187 of 188

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFLS998** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070186-03.ZNF	Test Dates: 6/7 - 7/15/2017	EUT Type: Portable Handset		Page 188 of 188