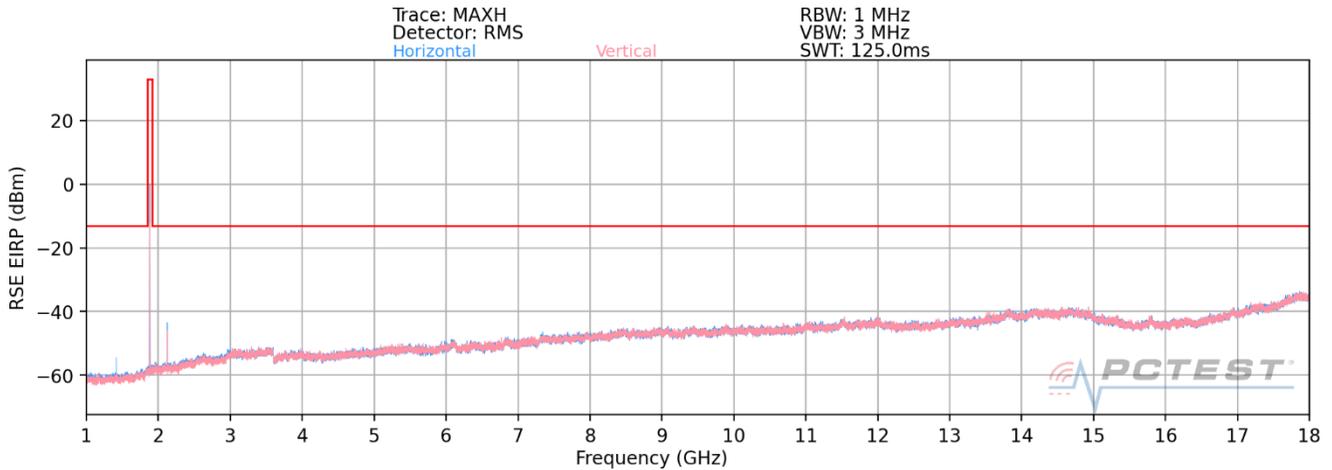


Inter-band Uplink CA 2A-12A



Plot 7-593. Radiated Spurious Plot 1GHz - 18GHz (ULCA 2A-12A)

OPERATING FREQUENCY (PCC): 1860.00 MHz
 OPERATING FREQUENCY (SCC): 704.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20 + 10 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1408.00	H	189	318	-62.19	7.99	-54.19	-41.2
2112.00	H	-	-	-77.78	9.11	-68.67	-55.7
2816.00	H	-	-	-76.59	10.11	-66.48	-53.5
3720.00	H	-	-	-73.38	9.77	-63.60	-50.6
5580.00	H	-	-	-72.77	11.21	-61.56	-48.6

Table 7-61. Radiated Spurious Data (ULCA 2A-12A – Low Channel)

FCC ID: ZNFF100TM		MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 367 of 386	

OPERATING FREQUENCY (PCC): 1880.00 MHz
 OPERATING FREQUENCY (SCC): 707.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20 + 10 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	H	159	227	-77.58	8.09	-69.49	-56.5
2122.50	H	-	-	-67.72	9.11	-58.61	-45.6
2830.00	H	-	-	-76.86	10.14	-66.72	-53.7
3760.00	H	-	-	-71.69	9.59	-62.10	-49.1
5640.00	H	-	-	-72.79	11.30	-61.49	-48.5
7520.00	H	-	-	-68.73	11.08	-57.65	-44.6

Table 7-62. Radiated Spurious Data (ULCA 2A-12A – Mid Channel)

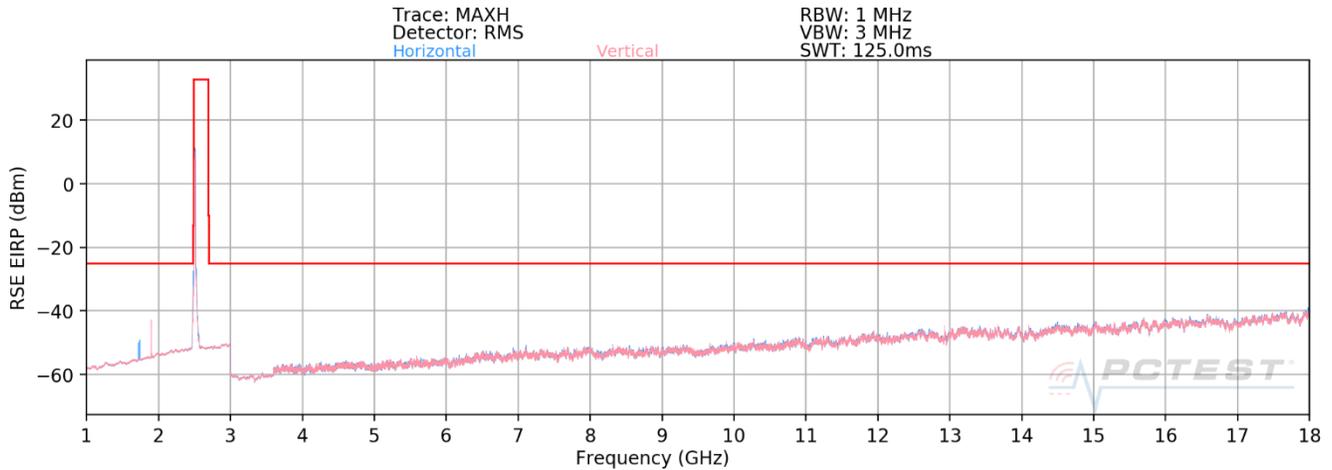
OPERATING FREQUENCY (PCC): 1900.00 MHz
 OPERATING FREQUENCY (SCC): 711.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20 + 10 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1422.00	H	-	-	-66.53	8.18	-58.35	-45.3
2133.00	H	-	-	-78.03	9.11	-68.92	-55.9
3800.00	H	260	280	-68.10	9.31	-58.79	-45.8
5700.00	H	-	-	-72.91	11.38	-61.53	-48.5
7600.00	H	-	-	-69.57	11.28	-58.29	-45.3

Table 7-63. Radiated Spurious Data (ULCA 2A-12A – High Channel)

FCC ID: ZNFF100TM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 368 of 386

Uplink CA 41C



Plot 7-594. Radiated Spurious Plot 1GHz - 18GHz (ULCA 41C)

OPERATING FREQUENCY (PCC): 2506.00 MHz
 OPERATING FREQUENCY (SCC): 2525.80 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5012.00	H	-	-	-58.98	8.54	-50.44	-25.4
7518.00	H	-	-	-55.97	8.70	-47.27	-22.3
10024.00	H	-	-	-56.67	9.93	-46.74	-21.7
12530.00	H	-	-	-57.36	9.31	-48.05	-23.0

Table 7-64. Radiated Spurious Data (ULCA 41C – Low Channel)

OPERATING FREQUENCY (PCC): 2593.00 MHz
 OPERATING FREQUENCY (SCC): 2612.80 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	H	-	-	-58.27	8.60	-49.68	-24.7
7779.00	H	-	-	-54.72	8.95	-45.78	-20.8
10372.00	H	-	-	-53.65	9.79	-43.87	-18.9

Table 7-65. Radiated Spurious Data (ULCA 41C – Mid Channel)

FCC ID: ZNFF100TM		MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 369 of 386	

OPERATING FREQUENCY (PCC): 2680.00 MHz
 OPERATING FREQUENCY (SCC): 2660.20 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5360.00	H	-	-	-57.70	8.58	-49.12	-24.1
8040.00	H	-	-	-56.87	9.36	-47.51	-22.5
10720.00	H	-	-	-53.81	9.56	-44.25	-19.3

Table 7-66. Radiated Spurious Data (ULCA 41C – High Channel)

FCC ID: ZNFF100TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 370 of 386

7.12 Frequency Stability / Temperature Variation

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

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

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

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

Test Setup

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

Test Notes

None

FCC ID: ZNFF100TM	 PCTEST [®] Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	 LG	Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 371 of 386

Band 71 Frequency Stability Measurements

OPERATING FREQUENCY: 680,500,000 Hz
 CHANNEL: 133297
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	680,500,078	78	0.0000115
100 %		- 20	680,500,020	20	0.0000029
100 %		- 10	680,499,906	-94	-0.0000138
100 %		0	680,499,933	-67	-0.0000098
100 %		+ 10	680,500,144	144	0.0000212
100 %		+ 20	680,499,881	-119	-0.0000175
100 %		+ 30	680,500,101	101	0.0000148
100 %		+ 40	680,500,101	101	0.0000148
100 %		+ 50	680,500,011	11	0.0000016
BATT. ENDPOINT		3.40	+ 20	680,499,873	-127

Table 7-67. Frequency Stability Data (Band 71)

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: ZNFF100TM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset	Page 372 of 386	

Band 71 Frequency Stability Measurements

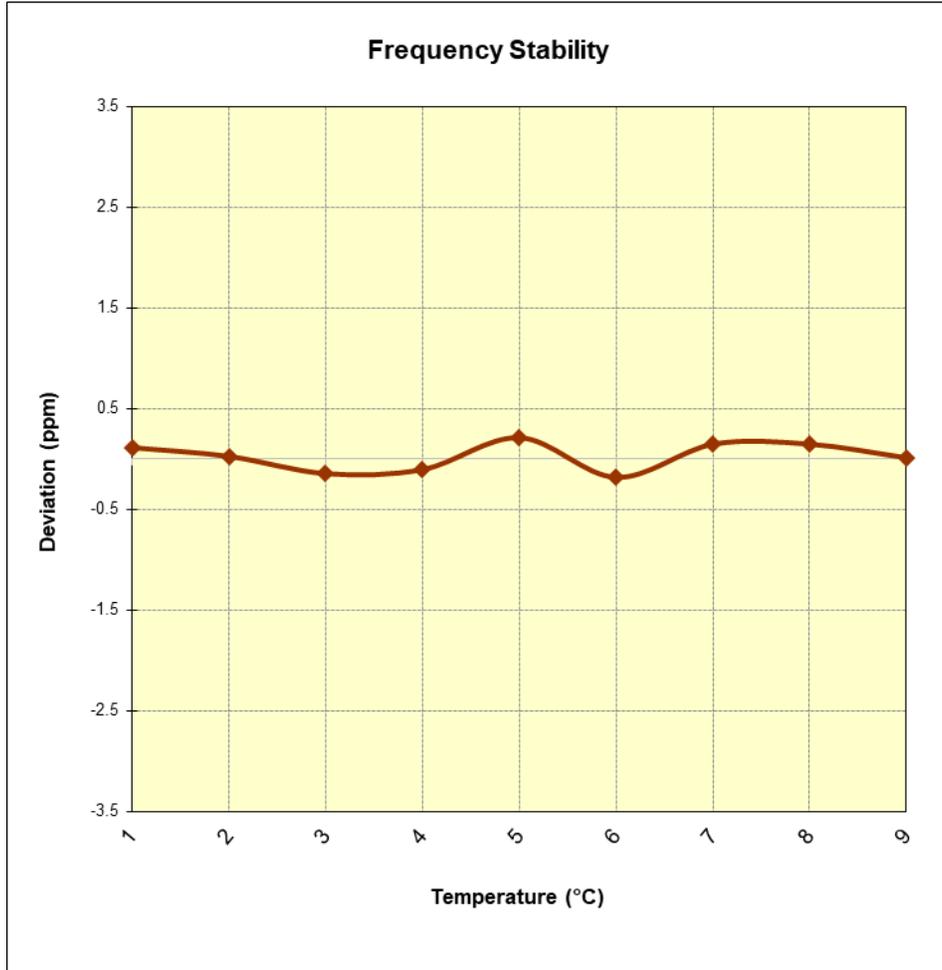


Figure 7-12. Frequency Stability Graph (Band 71)

FCC ID: ZNFF100TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)	 LG	Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 373 of 386

Band 12 Frequency Stability Measurements

OPERATING FREQUENCY: 707,500,000 Hz
 CHANNEL: 23790
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	707,499,902	-98	-0.0000139
100 %		- 20	707,500,122	122	0.0000172
100 %		- 10	707,500,086	86	0.0000122
100 %		0	707,499,917	-83	-0.0000117
100 %		+ 10	707,500,034	34	0.0000048
100 %		+ 20	707,499,928	-72	-0.0000102
100 %		+ 30	707,499,961	-39	-0.0000055
100 %		+ 40	707,499,910	-90	-0.0000127
100 %		+ 50	707,500,096	96	0.0000136
BATT. ENDPOINT		3.40	+ 20	707,499,928	-72

Table 7-68. Frequency Stability Data (Band 12)

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: ZNFF100TM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset	Page 374 of 386	

Band 12 Frequency Stability Measurements

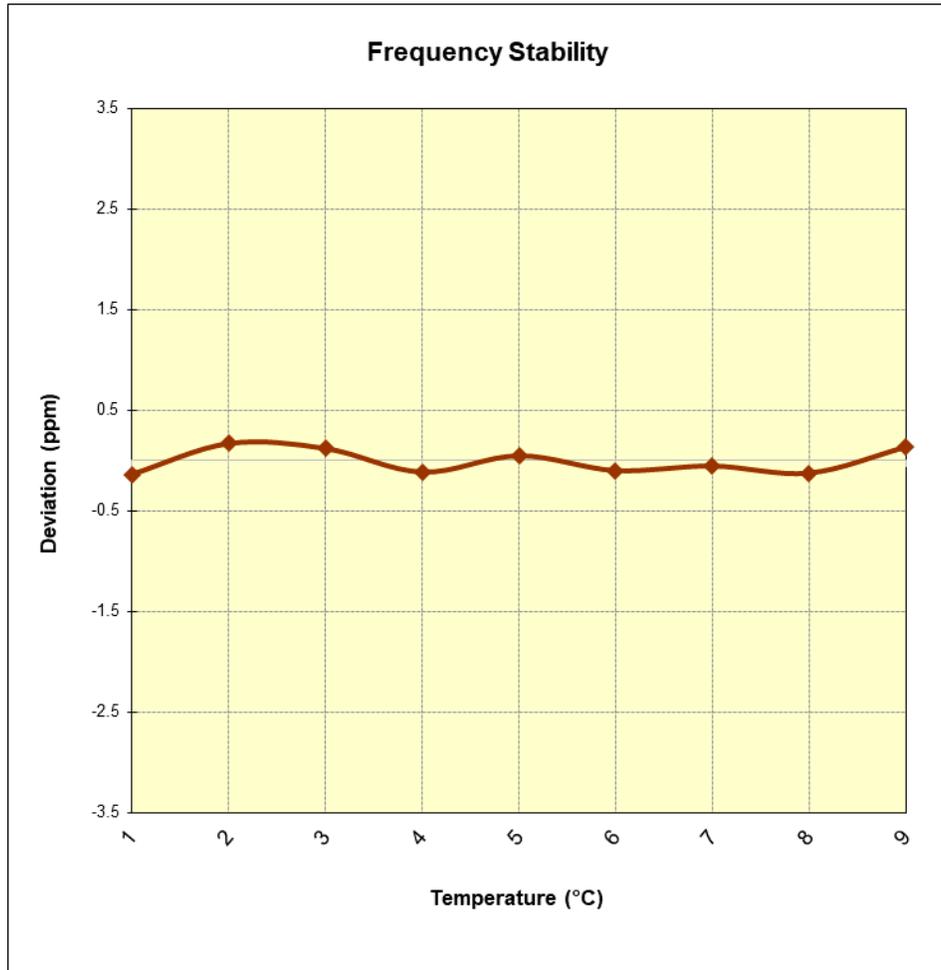


Figure 7-13. Frequency Stability Graph (Band 12)

FCC ID: ZNFF100TM	Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 375 of 386

Band 13 Frequency Stability Measurements

OPERATING FREQUENCY: 782,000,000 Hz
 CHANNEL: 23230
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	782,000,082	82	0.0000105
100 %		- 20	781,999,908	-92	-0.0000118
100 %		- 10	782,000,064	64	0.0000082
100 %		0	782,000,011	11	0.0000014
100 %		+ 10	781,999,870	-130	-0.0000166
100 %		+ 20	781,999,955	-45	-0.0000058
100 %		+ 30	781,999,999	-1	-0.0000001
100 %		+ 40	782,000,038	38	0.0000049
100 %		+ 50	781,999,941	-59	-0.0000075
BATT. ENDPOINT		3.40	+ 20	781,999,985	-15

Table 7-69. Frequency Stability Data (Band 13)

Note:

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

FCC ID: ZNFF100TM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset	Page 376 of 386	

Band 13 Frequency Stability Measurements

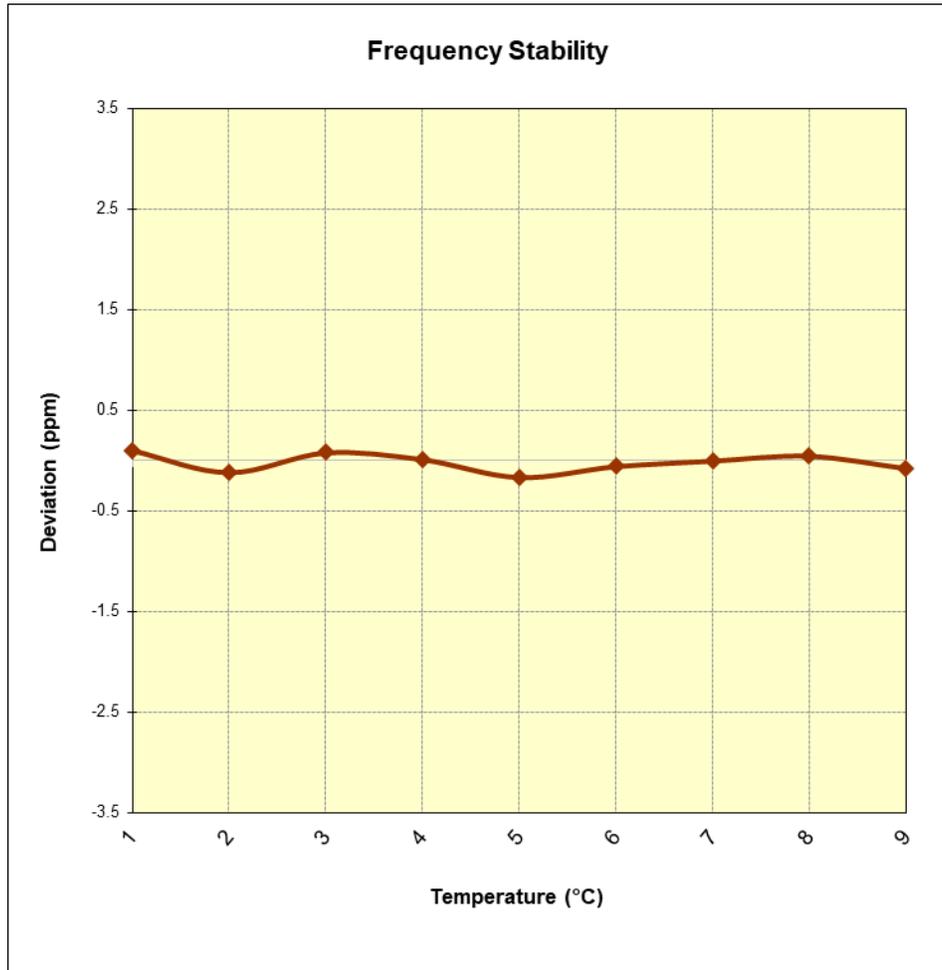


Figure 7-14. Frequency Stability Graph (Band 13)

FCC ID: ZNFF100TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 377 of 386

Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY: 831,500,000 Hz
 CHANNEL: 26865
 REFERENCE VOLTAGE: 3.80 VDC
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	831,499,932	-68	-0.0000082
100 %		- 20	831,500,008	8	0.0000010
100 %		- 10	831,499,885	-115	-0.0000138
100 %		0	831,499,950	-50	-0.0000060
100 %		+ 10	831,500,042	42	0.0000051
100 %		+ 20	831,500,088	88	0.0000106
100 %		+ 30	831,499,851	-149	-0.0000179
100 %		+ 40	831,499,869	-131	-0.0000158
100 %		+ 50	831,499,901	-99	-0.0000119
BATT. ENDPOINT		3.40	+ 20	831,499,934	-66

Table 7-70. Frequency Stability Data (Band 26/5)

FCC ID: ZNFF100TM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 378 of 386

Band 26/5 Frequency Stability Measurements

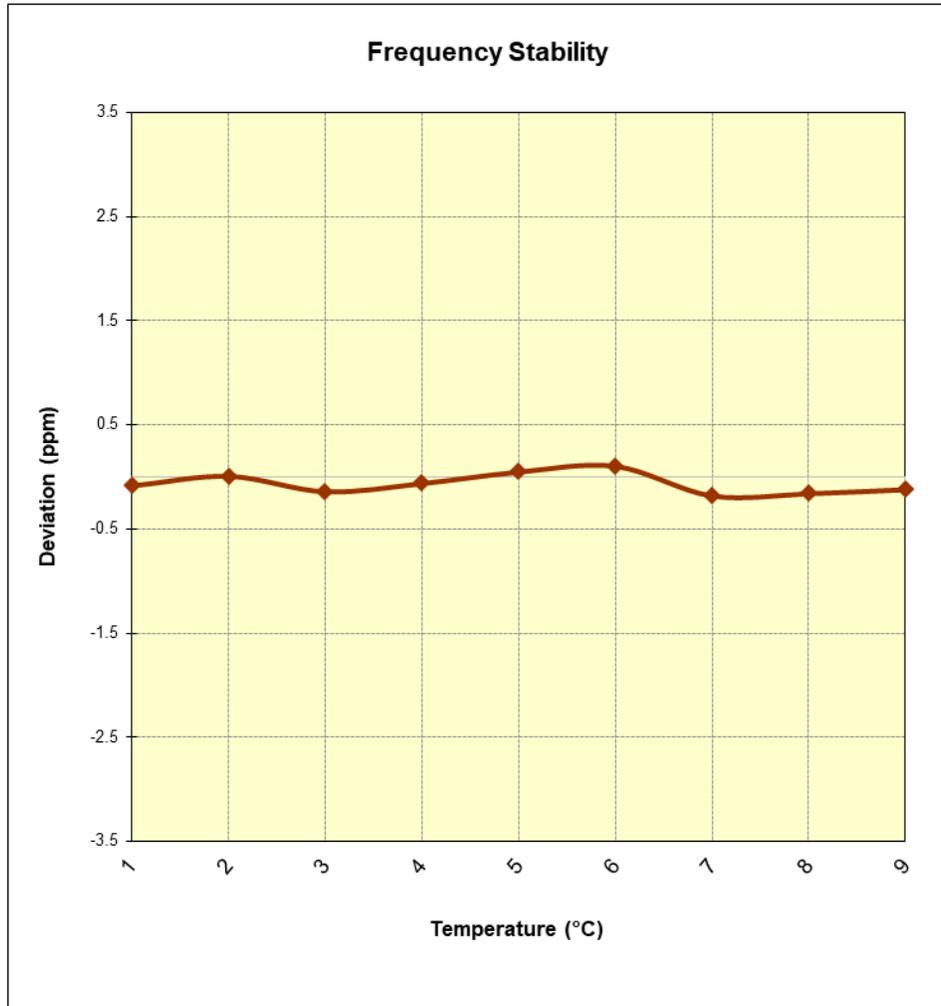


Figure 7-15. Frequency Stability Graph (Band 26/5)

FCC ID: ZNFF100TM	Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 379 of 386

Band 66/4 Frequency Stability Measurements

OPERATING FREQUENCY: 1,745,000,000 Hz
 CHANNEL: 132322
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	1,745,000,093	93	0.0000053
100 %		- 20	1,744,999,905	-95	-0.0000054
100 %		- 10	1,744,999,980	-20	-0.0000011
100 %		0	1,745,000,020	20	0.0000011
100 %		+ 10	1,744,999,850	-150	-0.0000086
100 %		+ 20	1,745,000,118	118	0.0000068
100 %		+ 30	1,744,999,916	-84	-0.0000048
100 %		+ 40	1,745,000,016	16	0.0000009
100 %		+ 50	1,745,000,056	56	0.0000032
BATT. ENDPOINT		3.40	+ 20	1,744,999,862	-138

Table 7-71. Frequency Stability Data (Band 66/4)

Note:

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

FCC ID: ZNFF100TM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset	Page 380 of 386	

Band 66/4 Frequency Stability Measurements

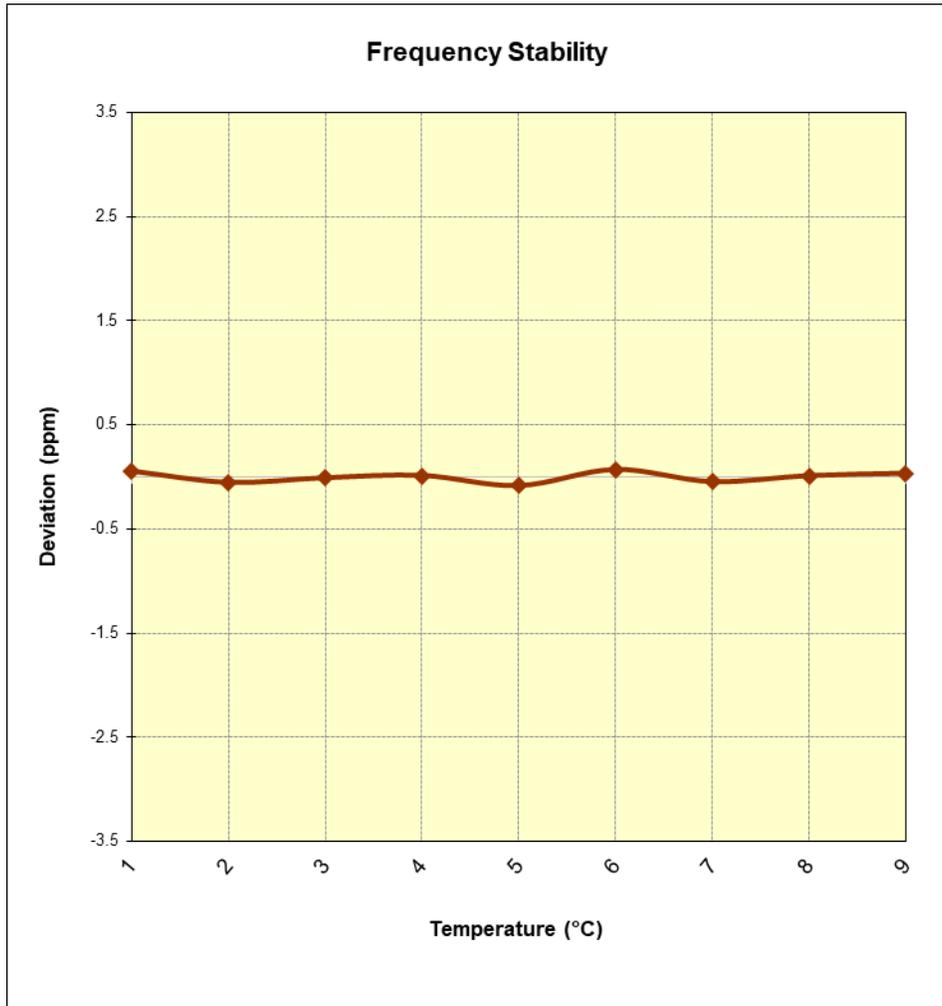


Figure 7-16. Frequency Stability Graph (Band 66/4)

FCC ID: ZNFF100TM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset	Page 381 of 386	

Band 25/2 Frequency Stability Measurements

OPERATING FREQUENCY: 1,882,500,000 Hz
 CHANNEL: 26365
 REFERENCE VOLTAGE: 3.80 VDC
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	1,882,500,148	148	0.0000079
100 %		- 20	1,882,500,065	65	0.0000035
100 %		- 10	1,882,499,851	-149	-0.0000079
100 %		0	1,882,499,983	-17	-0.0000009
100 %		+ 10	1,882,500,005	5	0.0000003
100 %		+ 20	1,882,500,049	49	0.0000026
100 %		+ 30	1,882,499,972	-28	-0.0000015
100 %		+ 40	1,882,500,039	39	0.0000021
100 %		+ 50	1,882,500,040	40	0.0000021
BATT. ENDPOINT		3.40	+ 20	1,882,500,114	114

Table 7-72. Frequency Stability Data (Band 25/2)

FCC ID: ZNFF100TM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset	Page 382 of 386	

Band 25/2 Frequency Stability Measurements

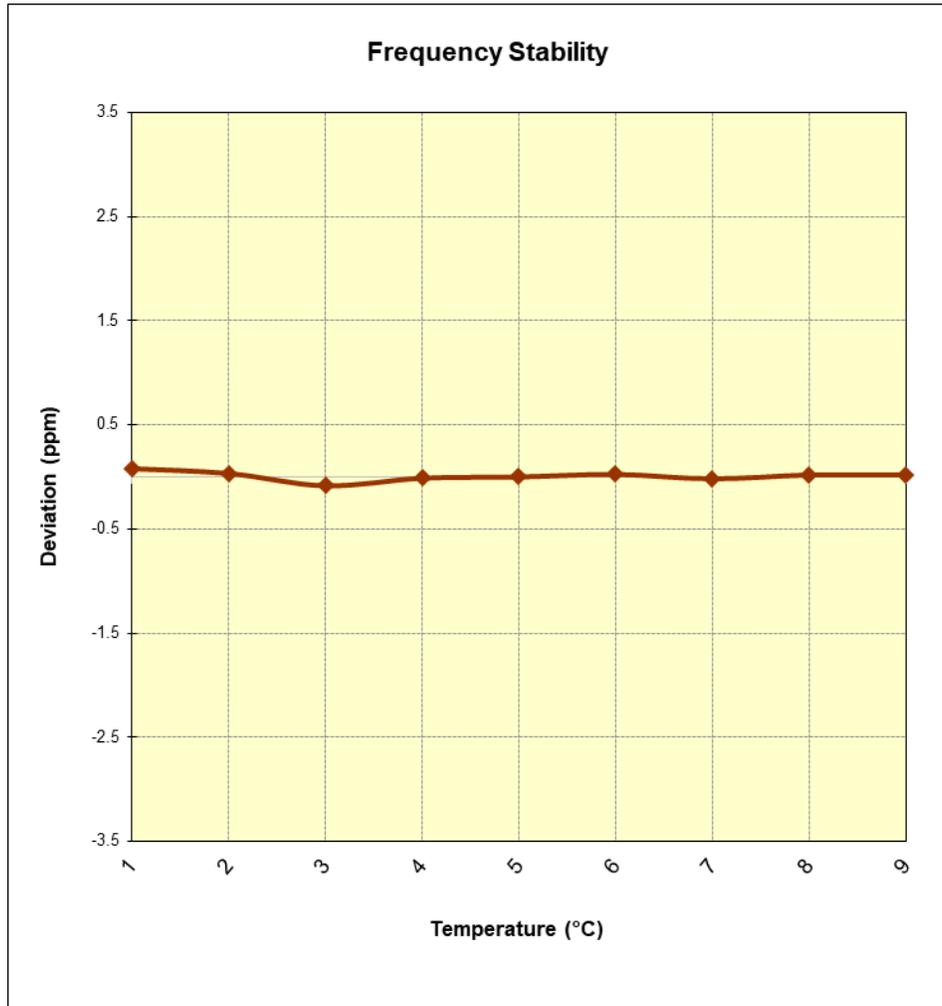


Figure 7-17. Frequency Stability Graph (Band 25/2)

FCC ID: ZNFF100TM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 383 of 386

Band 41 Frequency Stability Measurements

OPERATING FREQUENCY: 2,593,000,000 Hz
 CHANNEL: 40620
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	2,592,999,954	-46	-0.0000018
100 %		- 20	2,593,000,128	128	0.0000049
100 %		- 10	2,593,000,029	29	0.0000011
100 %		0	2,593,000,026	26	0.0000010
100 %		+ 10	2,593,000,140	140	0.0000054
100 %		+ 20	2,592,999,937	-63	-0.0000024
100 %		+ 30	2,592,999,931	-69	-0.0000027
100 %		+ 40	2,593,000,117	117	0.0000045
100 %		+ 50	2,592,999,870	-130	-0.0000050
BATT. ENDPOINT		3.40	+ 20	2,593,000,032	32

Table 7-73. 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: ZNFF100TM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset	Page 384 of 386	

Band 41 Frequency Stability Measurements

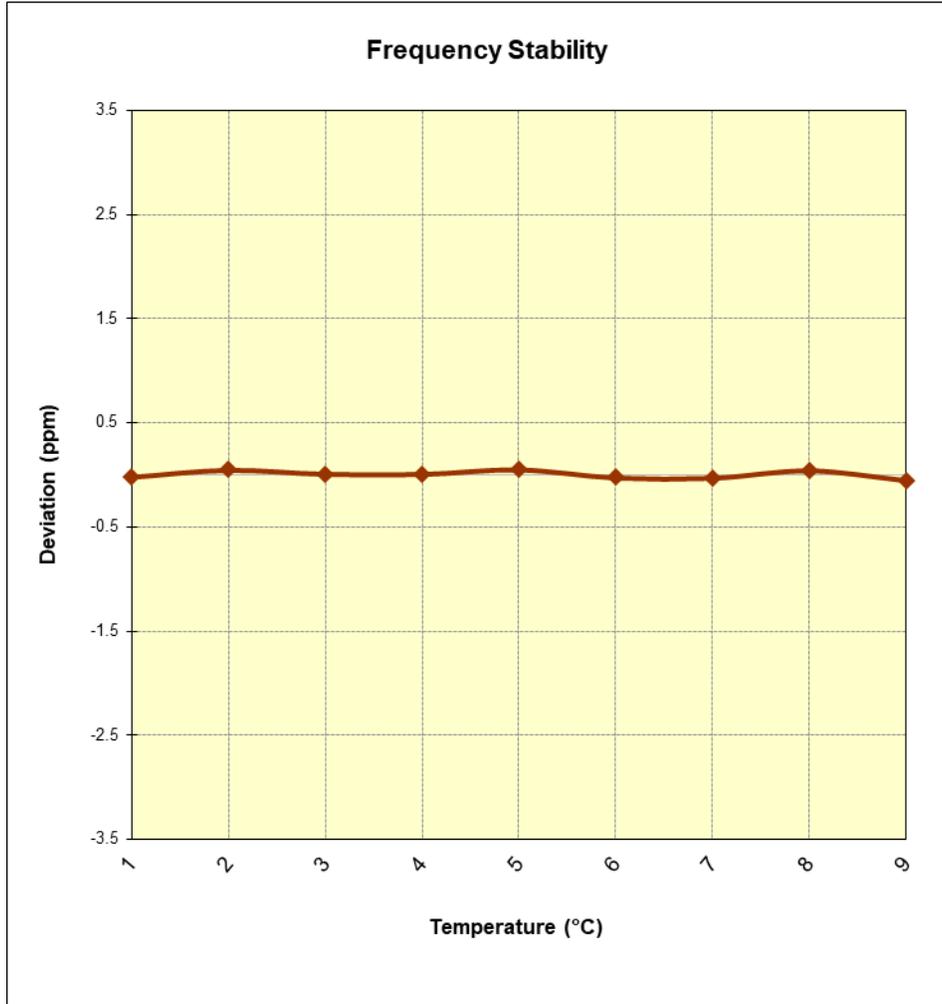


Figure 7-18. Frequency Stability Graph (Band 41)

FCC ID: ZNFF100TM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 385 of 386

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFF100TM** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFF100TM	 <small>Proud to be part of  element</small>	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2006150095-03.ZNF	Test Dates: 6/28 – 9/10/2020	EUT Type: Portable Handset		Page 386 of 386