

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 20525
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	V	327	233	-74.10	8.95	-65.15	-52.1
2509.50	V	135	318	-67.96	9.75	-58.21	-45.2
3346.00	V	-	-	-74.50	9.60	-64.89	-51.9
4182.50	V	-	-	-73.49	10.34	-63.15	-50.1

Table 7-20. Radiated Spurious Data (Band 5 – Mid Channel)

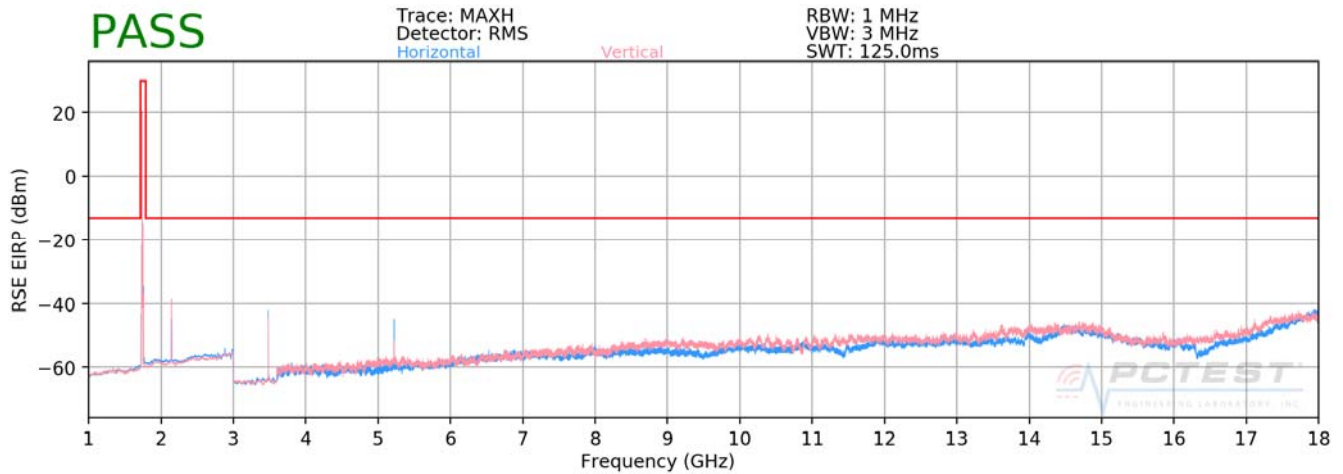
OPERATING FREQUENCY: 847.50 MHz
 CHANNEL: 20635
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1695.00	V	312	243	-75.71	8.95	-66.75	-53.8
2542.50	V	148	325	-67.05	9.74	-57.30	-44.3
3390.00	V	-	-	-75.20	9.76	-65.44	-52.4
4237.50	V	-	-	-74.03	10.55	-63.48	-50.5

Table 7-21. Radiated Spurious Data (Band 5 – High Channel)

FCC ID: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 66/4



Plot 7-215. Radiated Spurious Plot above 1GHz (Band 66/4)

OPERATING FREQUENCY: 1717.50 MHz

CHANNEL: 132047

MODULATION SIGNAL: QPSK

BANDWIDTH: 15.0 MHz

DISTANCE: 3 meters

LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3435.00	H	332	227	-55.71	9.84	-45.88	-32.9
5152.50	H	258	161	-65.37	10.70	-54.67	-41.7
6870.00	H	122	16	-68.34	11.67	-56.67	-43.7
8587.50	H	-	-	-66.87	11.10	-55.76	-42.8
10305.00	H	-	-	-65.27	12.37	-52.90	-39.9

Table 7-22. Radiated Spurious Data (Band 66/4 – Low Channel)

FCC ID: ZNFL414DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1805030091-03.ZNF	Test Dates: 5/8/2018 - 5/25/2018	EUT Type: Portable Handset	Page 146 of 163

OPERATING FREQUENCY: 1745.00 MHz
 CHANNEL: 132322
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	H	317	231	-51.92	9.91	-42.01	-29.0
5235.00	H	399	171	-63.56	10.73	-52.83	-39.8
6980.00	H	111	9	-69.40	11.82	-57.58	-44.6
8725.00	H	-	-	-66.62	11.00	-55.62	-42.6
10470.00	H	-	-	-69.38	12.58	-56.80	-43.8

Table 7-23. Radiated Spurious Data (Band 66/4 – Mid Channel)

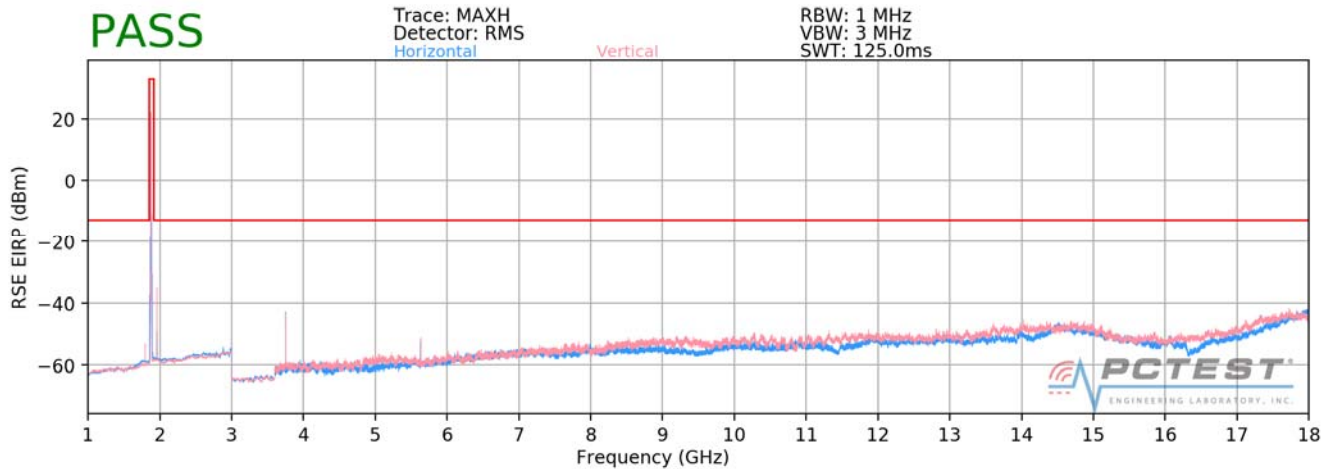
OPERATING FREQUENCY: 1772.50 MHz
 CHANNEL: 132597
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3545.00	H	303	230	-57.56	9.89	-47.67	-34.7
5317.50	H	303	171	-62.94	10.69	-52.25	-39.2
7090.00	H	-	-	-70.11	11.77	-58.34	-45.3
8862.50	H	-	-	-65.70	11.01	-54.69	-41.7

Table 7-24. Radiated Spurious Data (Band 66/4 – High Channel)

FCC ID: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 2



Plot 7-216. Radiated Spurious Plot above 1GHz (Band 2)

OPERATING FREQUENCY: 1857.50 MHz

CHANNEL: 18675

MODULATION SIGNAL: QPSK

BANDWIDTH: 15.0 MHz

DISTANCE: 3 meters

LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3715.00	H	146	31	-58.66	9.53	-49.14	-36.1
5572.50	H	112	20	-70.17	10.97	-59.20	-46.2
7430.00	H	-	-	-69.70	10.98	-58.72	-45.7
9287.50	H	-	-	-68.13	11.61	-56.52	-43.5

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

FCC ID: ZNFL414DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1805030091-03.ZNF	Test Dates: 5/8/2018 - 5/25/2018	EUT Type: Portable Handset		Page 148 of 163

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 18900
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3760.00	H	153	40	-54.70	9.37	-45.34	-32.3
5640.00	H	140	85	-65.77	11.17	-54.60	-41.6
7520.00	H	-	-	-68.95	11.11	-57.84	-44.8
9400.00	H	-	-	-67.56	11.57	-55.99	-43.0

Table 7-26. Radiated Spurious Data (Band 2 – Mid Channel)

OPERATING FREQUENCY: 1902.50 MHz
 CHANNEL: 19125
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3805.00	H	151	36	-53.88	9.29	-44.59	-31.6
5707.50	H	111	22	-69.71	11.33	-58.38	-45.4
7610.00	H	-	-	-68.32	11.26	-57.06	-44.1
9512.50	H	-	-	-67.75	11.70	-56.05	-43.0

Table 7-27. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1805030091-03.ZNF	Test Dates: 5/8/2018 - 5/25/2018	EUT Type: Portable Handset	Page 149 of 163

7.8 Frequency Stability / Temperature Variation

Test Overview and Limit

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

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

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

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

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

Test Setup

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

Test Notes

None

FCC ID: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 71 Frequency Stability Measurements

OPERATING FREQUENCY: 680,500,000 Hz
 CHANNEL: 133297
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	680,499,887	-113	-0.0000166
100 %		- 30	680,500,006	6	0.0000009
100 %		- 20	680,500,145	145	0.0000213
100 %		- 10	680,500,368	368	0.0000541
100 %		0	680,500,232	232	0.0000341
100 %		+ 10	680,499,787	-213	-0.0000313
100 %		+ 20	680,500,174	174	0.0000256
100 %		+ 30	680,499,674	-326	-0.0000479
100 %		+ 40	680,500,139	139	0.0000204
100 %		+ 50	680,499,957	-43	-0.0000063
BATT. ENDPOINT	3.45	+ 20	680,499,941	-59	-0.0000087

Table 7-28. 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: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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Band 71 Frequency Stability Measurements

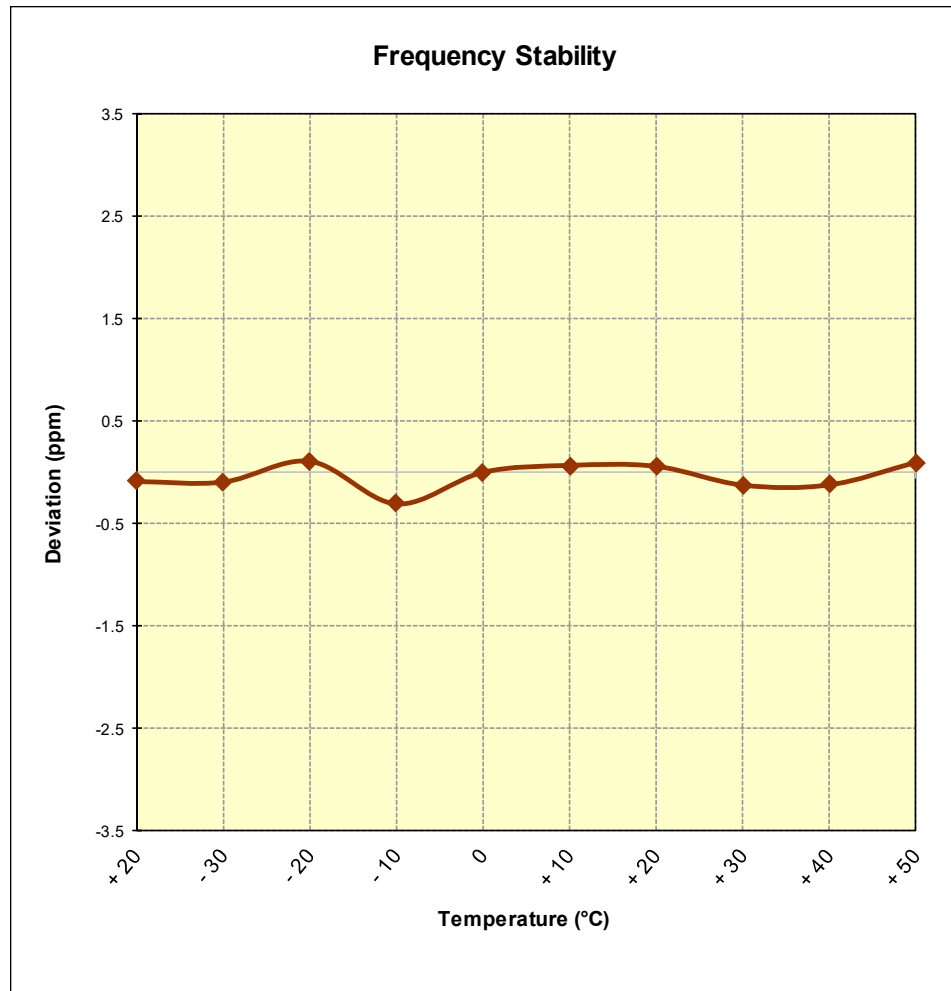


Figure 7-8. Frequency Stability Graph (Band 71)

FCC ID: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1805030091-03.ZNF	Test Dates: 5/8/2018 - 5/25/2018	EUT Type: Portable Handset	Page 152 of 163

Band 12 Frequency Stability Measurements

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)	707,499,938	-62	-0.0000088
100 %		- 30	707,499,934	-66	-0.0000093
100 %		- 20	707,500,073	73	0.0000103
100 %		- 10	707,499,788	-212	-0.0000300
100 %		0	707,500,000	0	0.0000000
100 %		+ 10	707,500,046	46	0.0000065
100 %		+ 20	707,500,040	40	0.0000057
100 %		+ 30	707,499,914	-86	-0.0000122
100 %		+ 40	707,499,915	-85	-0.0000120
100 %		+ 50	707,500,065	65	0.0000092
BATT. ENDPOINT	3.45	+ 20	707,499,626	-374	-0.0000529

Table 7-29. 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: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1805030091-03.ZNF	Test Dates: 5/8/2018 - 5/25/2018	EUT Type: Portable Handset	Page 153 of 163

Band 12 Frequency Stability Measurements

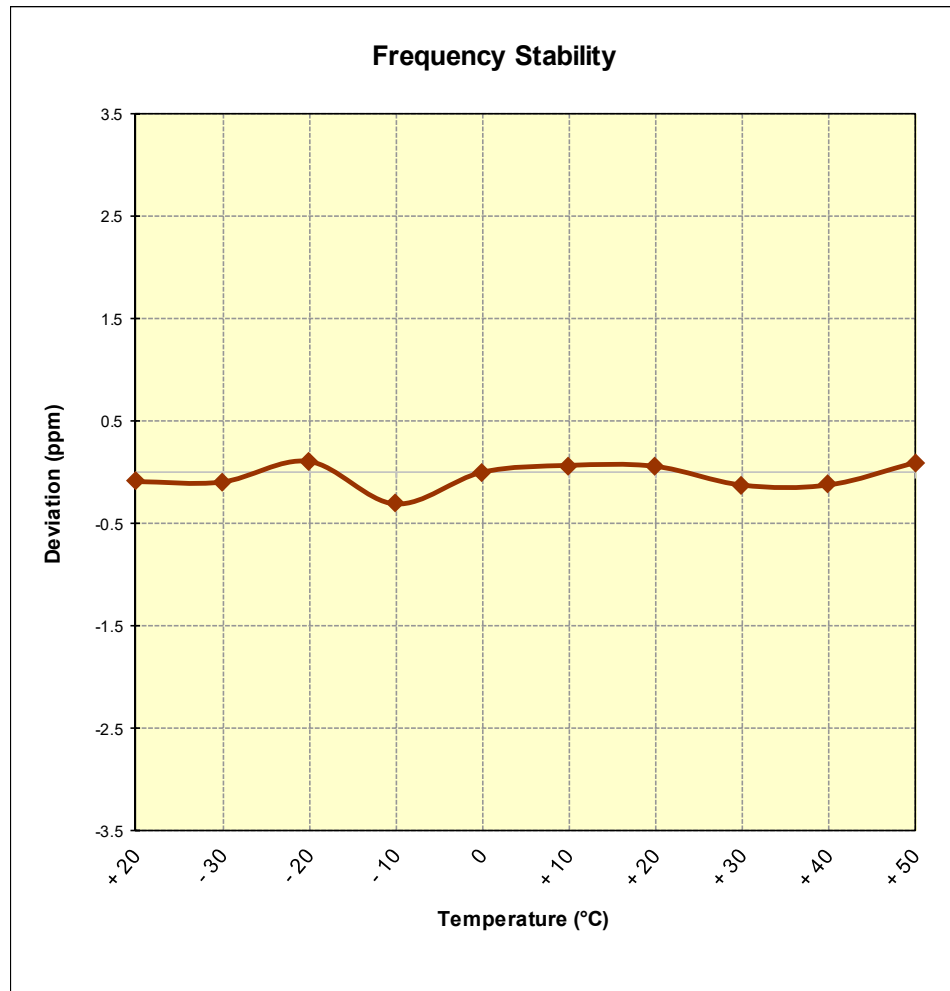


Figure 7-9. Frequency Stability Graph (Band 12)

FCC ID: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1805030091-03.ZNF	Test Dates: 5/8/2018 - 5/25/2018	EUT Type: Portable Handset	Page 154 of 163

Band 13 Frequency Stability Measurements

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)	782,000,017	17	0.0000022
100 %		- 30	782,000,098	98	0.0000125
100 %		- 20	782,000,227	227	0.0000290
100 %		- 10	781,999,864	-136	-0.0000174
100 %		0	781,999,751	-249	-0.0000318
100 %		+ 10	782,000,085	85	0.0000109
100 %		+ 20	782,000,132	132	0.0000169
100 %		+ 30	781,999,823	-177	-0.0000226
100 %		+ 40	782,000,216	216	0.0000276
100 %		+ 50	782,000,122	122	0.0000156
BATT. ENDPOINT	3.45	+ 20	781,999,899	-101	-0.0000129

Table 7-30. 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: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 13 Frequency Stability Measurements

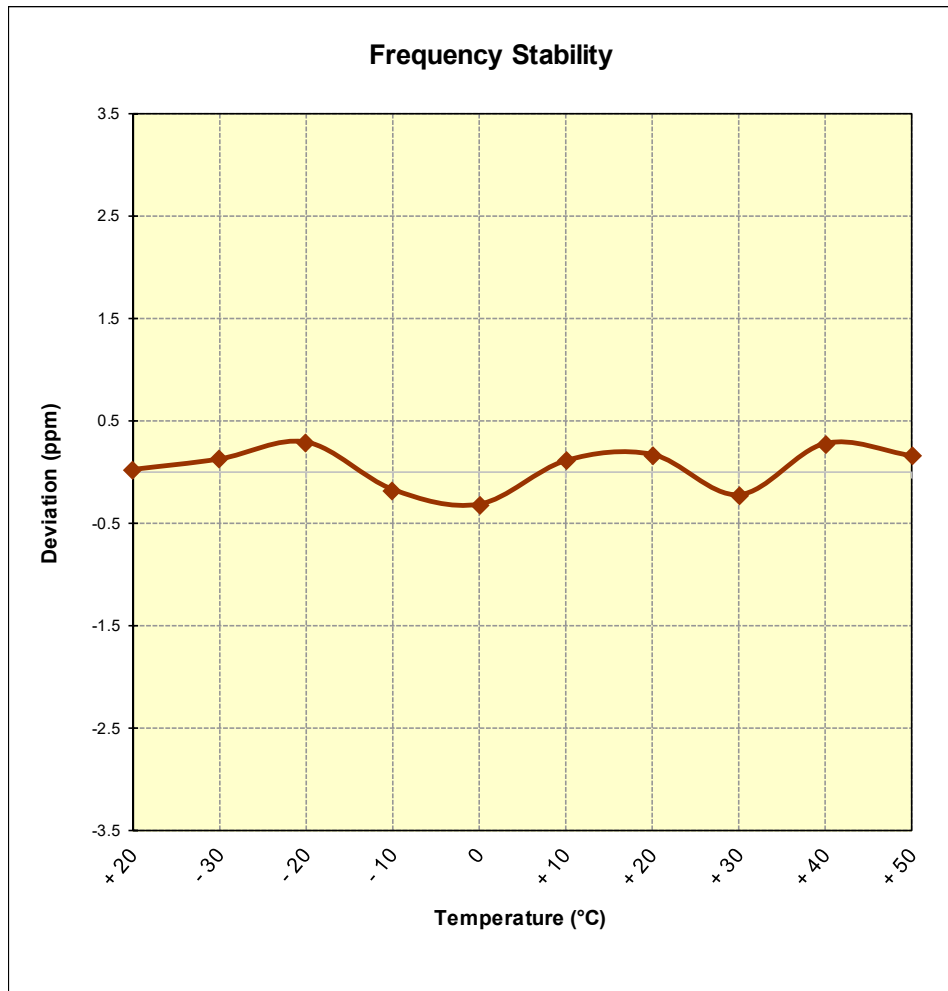


Figure 7-10. Frequency Stability Graph (Band 13)

FCC ID: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 5 Frequency Stability Measurements

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)	836,499,982	-18	-0.0000022
100 %		- 30	836,500,088	88	0.0000105
100 %		- 20	836,500,002	2	0.0000002
100 %		- 10	836,499,704	-296	-0.0000354
100 %		0	836,499,836	-164	-0.0000196
100 %		+ 10	836,500,063	63	0.0000075
100 %		+ 20	836,500,114	114	0.0000136
100 %		+ 30	836,500,026	26	0.0000031
100 %		+ 40	836,500,319	319	0.0000381
100 %		+ 50	836,500,111	111	0.0000133
BATT. ENDPOINT	3.45	+ 20	836,500,012	12	0.0000014

Table 7-31. Frequency Stability Data (Band 5)

FCC ID: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 5 Frequency Stability Measurements

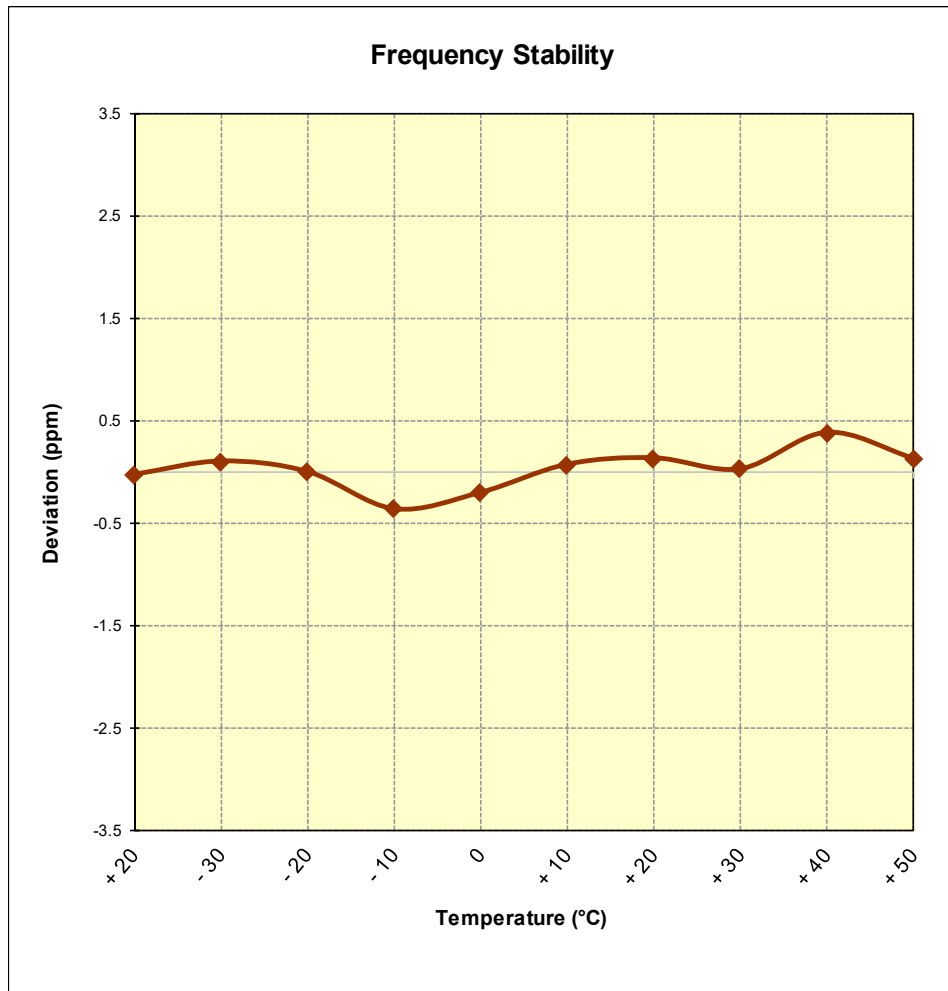


Figure 7-11. Frequency Stability Graph (Band 5)

FCC ID: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1805030091-03.ZNF	Test Dates: 5/8/2018 - 5/25/2018	EUT Type: Portable Handset	Page 158 of 163

Band 66/4 Frequency Stability Measurements

OPERATING FREQUENCY: 1,745,000,000 Hz
 CHANNEL: 132322
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,744,999,788	-212	-0.0000121
100 %		- 30	1,744,999,683	-317	-0.0000182
100 %		- 20	1,745,000,085	85	0.0000049
100 %		- 10	1,745,000,271	271	0.0000155
100 %		0	1,744,999,743	-257	-0.0000147
100 %		+ 10	1,745,000,046	46	0.0000026
100 %		+ 20	1,745,000,460	460	0.0000264
100 %		+ 30	1,745,000,072	72	0.0000041
100 %		+ 40	1,745,000,069	69	0.0000040
100 %		+ 50	1,744,999,992	-8	-0.0000005
BATT. ENDPOINT	3.45	+ 20	1,744,999,975	-25	-0.0000014

Table 7-32. 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: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 66/4 Frequency Stability Measurements

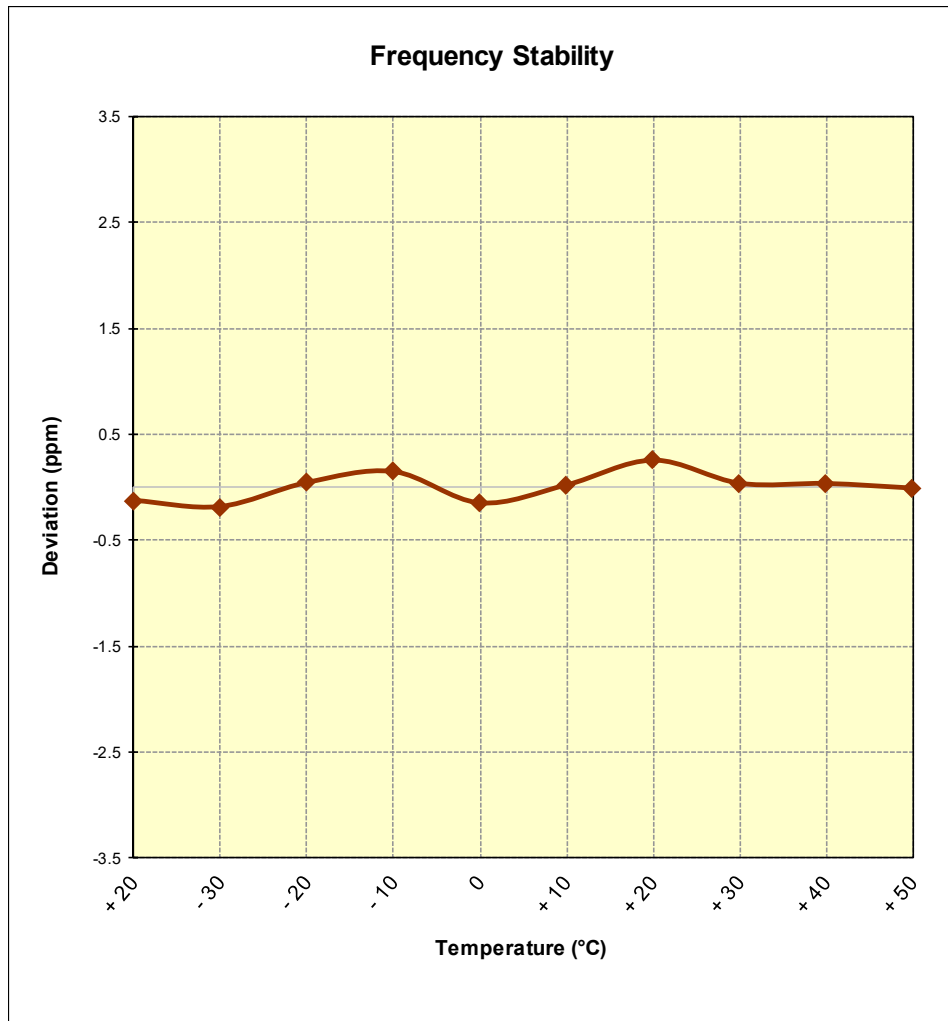


Figure 7-12. Frequency Stability Graph (Band 66/4)

FCC ID: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1805030091-03.ZNF	Test Dates: 5/8/2018 - 5/25/2018	EUT Type: Portable Handset	Page 160 of 163

Band 2 Frequency Stability Measurements

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)	1,879,999,915	-85	-0.0000045
100 %		- 30	1,879,999,768	-232	-0.0000123
100 %		- 20	1,880,000,058	58	0.0000031
100 %		- 10	1,880,000,045	45	0.0000024
100 %		0	1,880,000,380	380	0.0000202
100 %		+ 10	1,879,999,695	-305	-0.0000162
100 %		+ 20	1,879,999,887	-113	-0.0000060
100 %		+ 30	1,880,000,038	38	0.0000020
100 %		+ 40	1,880,000,086	86	0.0000046
100 %		+ 50	1,880,000,084	84	0.0000045
BATT. ENDPOINT	3.45	+ 20	1,880,000,265	265	0.0000141

Table 7-33. Frequency Stability Data (Band 2)

Note:

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

FCC ID: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1805030091-03.ZNF	Test Dates: 5/8/2018 - 5/25/2018	EUT Type: Portable Handset	Page 161 of 163

Band 2 Frequency Stability Measurements

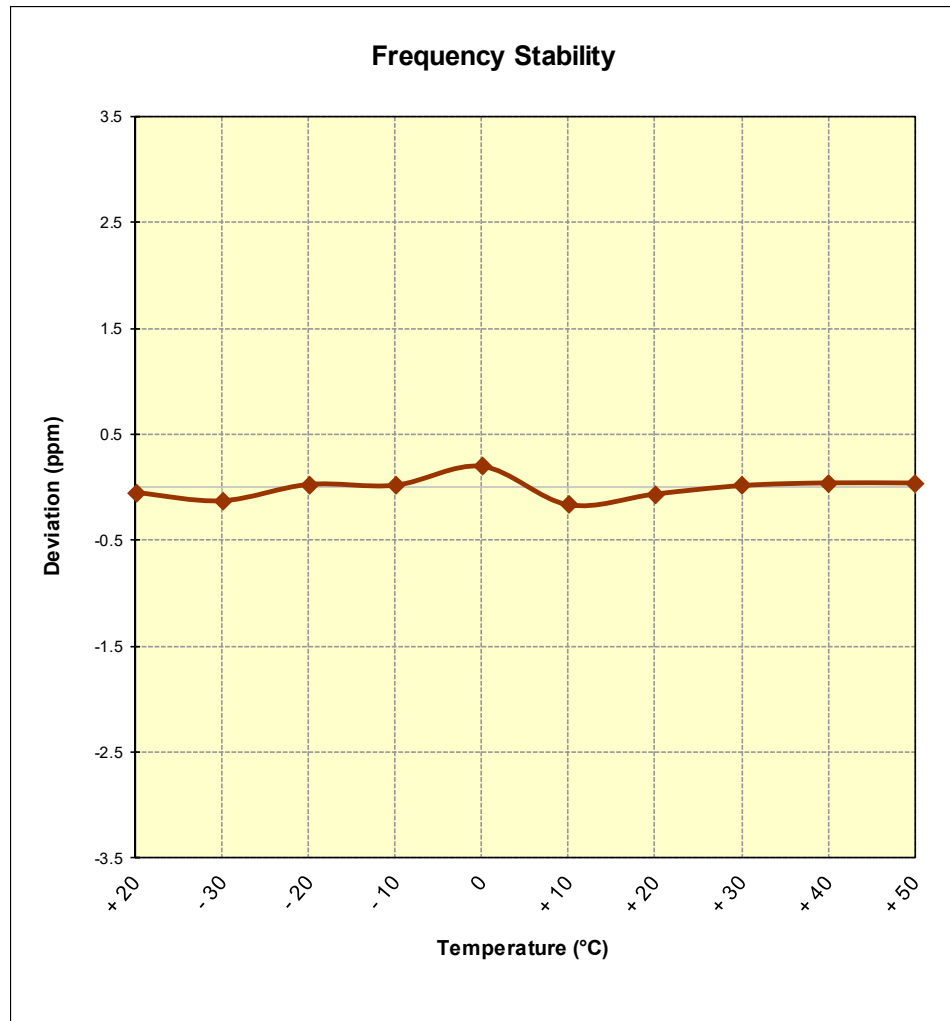


Figure 7-13. Frequency Stability Graph (Band 2)

FCC ID: ZNFL414DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1805030091-03.ZNF	Test Dates: 5/8/2018 - 5/25/2018	EUT Type: Portable Handset	Page 162 of 163

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFL414DL** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFL414DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1805030091-03.ZNF	Test Dates: 5/8/2018 - 5/25/2018	EUT Type: Portable Handset		Page 163 of 163