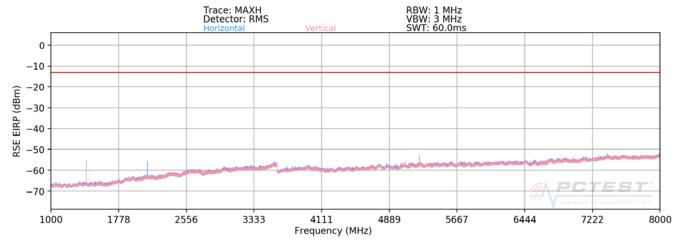


### Band 12/17



Plot 7-210. Radiated Spurious Plot above 1GHz (Band 12/17)

OPERATING FREQUENCY: 701.50 MHz

MODULATION SIGNAL: **QPSK** 

> **BANDWIDTH:** 5.0 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]
1403.00	V	152	120	-55.26	8.12	-47.13	-34.1
2104.50	V	152	232	-43.24	9.62	-33.62	-20.6
2806.00	V	-	-	-66.00	9.09	-56.91	-43.9

Table 7-7. Radiated Spurious Data (Band 12/17 - Low Channel)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST HADMAINS LABORATORS, IMC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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OPERATING FREQUENCY: 707.50 MHz

MODULATION SIGNAL: **QPSK** 

> BANDWIDTH: 5.0 MHzDISTANCE: 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	V	140	118	-55.05	8.22	-46.83	-33.8
2122.50	V	140	267	-40.82	9.59	-31.23	-18.2
2830.00	V	398	19	-66.97	9.10	-57.87	-44.9
3537.50	V	-	-	-62.03	7.26	-54.78	-41.8

Table 7-8. Radiated Spurious Data (Band 12/17 - Mid Channel)

OPERATING FREQUENCY: 713.50 MHz

MODULATION SIGNAL: **QPSK** 

> BANDWIDTH: 5.0 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]
1427.00	V	138	124	-53.35	8.31	-45.04	-32.0
2140.50	V	141	299	-43.49	9.56	-33.94	-20.9
2854.00	V	-	-	-65.47	9.12	-56.35	-43.3

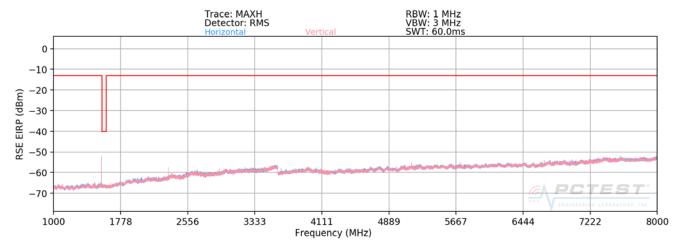
Table 7-9. Radiated Spurious Data (Band 12/17 - High Channel)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST HADMAINS LABORATORS, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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#### Band 13



Plot 7-211. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY: 782.00 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 10.0 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]
2346.00	٧	140	286	-43.05	10.31	-32.74	-19.7
3128.00	V	-	-	-62.98	8.60	-54.38	-41.4

Table 7-10. Radiated Spurious Data (Band 13)

MODULATION SIGNAL: QPSK

BANDWIDTH: 10.00 MHz

DISTANCE: 3 meters

NARROWBAND EMISSION LIMIT: -50 dBm

WIDEBAND EMISSION LIMIT: -40 dBm/MHz

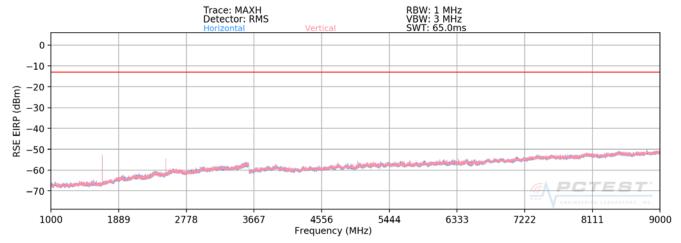
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	V	382	81	-57.86	9.44	-48.42	-8.4

Table 7-11. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST INC. INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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#### Band 5



Plot 7-212. Radiated Spurious Plot above 1GHz (Band 5)

OPERATING FREQUENCY: 826.50 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 5.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Ant. **Antenna Turntable** Substitute **Spurious** Level at Antenna Frequency Margin Pol. Height **Azimuth Antenna Gain Emission Level** [MHz] Terminals [dBm] [dB] [H/V] [cm] [degree] [dBi] [dBm] 1653.00 ٧ -72.73 309 10 9.56 -63.17 -50.2 2479.50 ٧ 119 315 -71.04 9.46 -61.58 -48.6 ٧ 3306.00 -73.32 7.49 -65.83 -52.8

Table 7-12. Radiated Spurious Data (Band 5 – Low Channel)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST HADMAINS LABORATORS, IMC.	MEASUREMENT REPORT (CERTIFICATION)	i	Approved by: Quality Manager
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OPERATING FREQUENCY: 836.50 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 5.0 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	272	266	-65.20	9.54	-55.67	-42.7
2509.50	V	142	314	-72.69	9.42	-63.26	-50.3
3346.00	V	-	-	-73.32	7.32	-66.00	-53.0

Table 7-13. Radiated Spurious Data (Band 5 – Mid Channel)

OPERATING FREQUENCY: 846.50 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 5.0 MHz

DISTANCE: 3 meters

LIMIT: \_\_\_\_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]
1693.00	V	149	341	-72.63	9.52	-63.11	-50.1
2539.50	V	111	313	-67.54	9.39	-58.15	-45.2
3386.00	V	-	-	-73.36	7.31	-66.05	-53.0

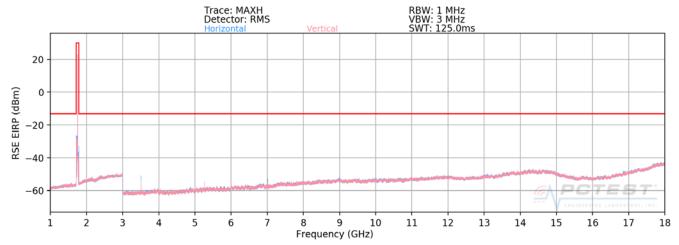
Table 7-14. Radiated Spurious Data (Band 5 – High Channel)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST HADMAINS LABORATORS, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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### **Band 66/4**



Plot 7-213. Radiated Spurious Plot above 1GHz (Band 66/4)

OPERATING FREQUENCY: 1711.50 MHz

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]
3423.00	Η	150	184	-53.31	7.43	-45.89	-32.9
5134.50	Н	118	24	-65.11	11.04	-54.07	-41.1
6846.00	Н	113	166	-67.89	11.71	-56.18	-43.2
8557.50	Н	-	-	-64.67	8.89	-55.78	-42.8

Table 7-15. Radiated Spurious Data (Band 66/4 – Low Channel)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST INCIDENCE LABORATORS, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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OPERATING FREQUENCY: 1745.00 MHz

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]
3490.00	Н	112	248	-60.83	7.50	-53.33	-40.3
5235.00	Н	114	324	-69.75	11.26	-58.49	-45.5
6980.00	Н	112	231	-65.81	11.85	-53.96	-41.0
8725.00	Н	-	-	-67.09	8.41	-58.68	-45.7

Table 7-16. Radiated Spurious Data (Band 66/4 - Mid Channel)

OPERATING FREQUENCY: 1778.50 MHz

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]
3557.00	Н	116	246	-61.32	7.15	-54.17	-41.2
5335.50	Н	113	333	-65.23	11.50	-53.73	-40.7
7114.00	Н	111	237	-66.31	11.93	-54.38	-41.4
8892.50	Н	-	-	-62.07	7.44	-54.63	-41.6

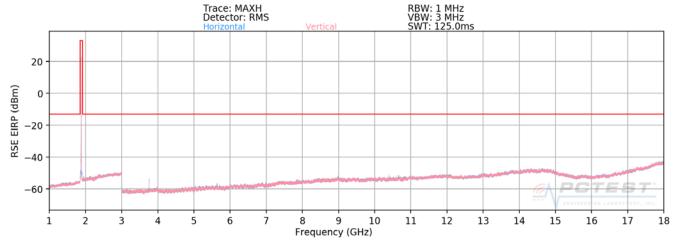
Table 7-17. Radiated Spurious Data (Band 66/4 – High Channel)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	G	Approved by: Quality Manager
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### Band 2



Plot 7-214. Radiated Spurious Plot above 1GHz (Band 2)

OPERATING FREQUENCY: 1850.70 MHz MODULATION SIGNAL: **QPSK** BANDWIDTH: 1.4 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]
3701.40	Н	124	123	-63.33	6.13	-57.19	-44.2
5552.10	Н	136	130	-72.39	12.01	-60.38	-47.4
7402.80	Н	126	359	-70.50	12.44	-58.06	-45.1
9253.50	Н	-	-	-69.00	8.74	-60.26	-47.3

Table 7-18. Radiated Spurious Data (Band 2 – Low Channel)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST HADMAINS LABORATORS, IMC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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OPERATING FREQUENCY: 1880.00 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 1.4 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	Н	189	14	-62.30	5.90	-56.40	-43.4
5640.00	Н	117	16	-73.00	12.27	-60.73	-47.7
7520.00	Н	111	356	-71.71	12.56	-59.15	-46.2
9400.00	Н	-	-	-67.74	9.05	-58.69	-45.7

Table 7-19. Radiated Spurious Data (Band 2 - Mid Channel)

OPERATING FREQUENCY: 1909.30 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 1.4 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]
3818.60	Н	144	126	-61.56	5.82	-55.75	-42.7
5727.90	Η	134	117	-69.67	12.44	-57.23	-44.2
7637.20	Н	113	106	-71.13	12.38	-58.74	-45.7
9546.50	Н	-	-	-67.69	9.34	-58.35	-45.4

Table 7-20. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST INCIDENCE LABORATORS, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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### 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  $\pm 0.00025\%$  ( $\pm 2.5$  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).
- 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: ZNFX120WM IC: 2703C-X120WM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	G	Approved by: Quality Manager
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### **Band 12/17 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	- 30	707,499,932	-68	-0.0000096
100 %		- 20	707,499,748	-252	-0.0000356
100 %		- 10	707,499,857	-143	-0.0000202
100 %		0	707,499,825	-175	-0.0000247
100 %		+ 10	707,500,012	12	0.000017
100 %		+ 20	707,499,990	-10	-0.0000014
100 %		+ 30	707,500,019	19	0.0000027
100 %		+ 40	707,500,038	38	0.000054
100 %		+ 50	707,500,059	59	0.000083
BATT. ENDPOINT	3.21	+ 20	707,500,107	107	0.0000151

Table 7-21. Frequency Stability Data (Band 12/17)

### Note:

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

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST'	MEASUREMENT REPORT (CERTIFICATION)	<b>⊕</b> LG	Approved by: Quality Manager
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# **Band 12/17 Frequency Stability Measurements**

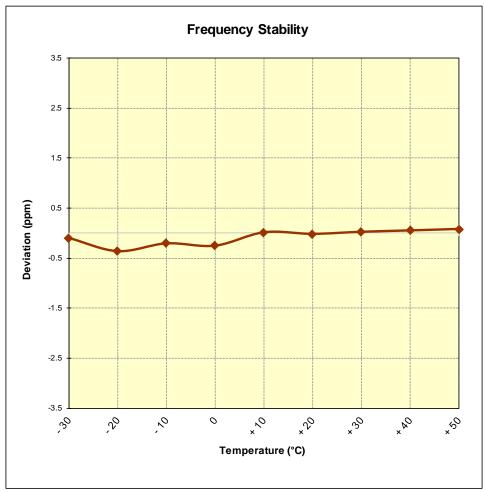


Figure 7-8. Frequency Stability Graph (Band 12/17)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST INC.	MEASUREMENT REPORT (CERTIFICATION)  LG	Approved by: Quality Manager
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### **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	- 30	782,000,210	210	0.0000269
100 %		- 20	781,999,778	-222	-0.0000284
100 %		- 10	782,000,293	293	0.0000375
100 %		0	782,000,119	119	0.0000152
100 %		+ 10	782,000,335	335	0.0000428
100 %		+ 20	782,000,044	44	0.0000056
100 %		+ 30	782,000,057	57	0.0000073
100 %		+ 40	781,999,932	-68	-0.0000087
100 %		+ 50	781,999,944	-56	-0.0000072
BATT. ENDPOINT	3.21	+ 20	782,000,028	28	0.000036

Table 7-22. 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: ZNFX120WM IC: 2703C-X120WM	PETEST'	MEASUREMENT REPORT (CERTIFICATION)	1 LG	Approved by: Quality Manager
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# **Band 13 Frequency Stability Measurements**

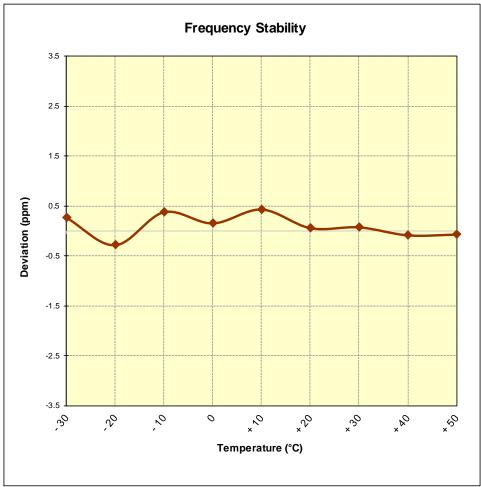


Figure 7-9. Frequency Stability Graph (Band 13)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST INC.	MEASUREMENT REPORT (CERTIFICATION)  LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 147 of 154
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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	- 30	836,500,135	135	0.0000161
100 %		- 20	836,500,115	115	0.0000137
100 %		- 10	836,499,613	-387	-0.0000463
100 %		0	836,499,835	-165	-0.0000197
100 %		+ 10	836,500,363	363	0.0000434
100 %		+ 20	836,500,287	287	0.0000343
100 %		+ 30	836,500,152	152	0.0000182
100 %		+ 40	836,500,245	245	0.0000293
100 %		+ 50	836,499,928	-72	-0.0000086
BATT. ENDPOINT	3.21	+ 20	836,500,134	134	0.0000160

Table 7-23. Frequency Stability Data (Band 5)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST INCIDENCE LABORATORS, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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# **Band 5 Frequency Stability Measurements**

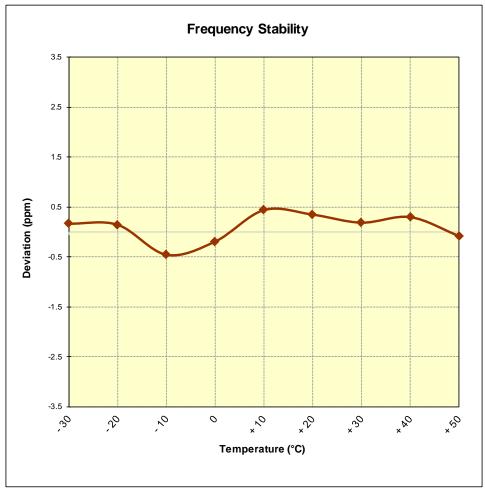


Figure 7-10. Frequency Stability Graph (Band 5)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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### **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	- 30	1,745,000,022	22	0.000013
100 %		- 20	1,745,000,183	183	0.0000105
100 %		- 10	1,745,000,063	63	0.0000036
100 %		0	1,745,000,220	220	0.0000126
100 %		+ 10	1,745,000,028	28	0.000016
100 %		+ 20	1,745,000,303	303	0.0000174
100 %		+ 30	1,744,999,925	-75	-0.0000043
100 %		+ 40	1,745,000,314	314	0.0000180
100 %		+ 50	1,745,000,211	211	0.0000121
BATT. ENDPOINT	3.21	+ 20	1,744,999,955	-45	-0.0000026

Table 7-24. 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: ZNFX120WM IC: 2703C-X120WM	PETEST'	MEASUREMENT REPORT (CERTIFICATION)	<b>⊕</b> LG	Approved by: Quality Manager
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# **Band 66/4 Frequency Stability Measurements**

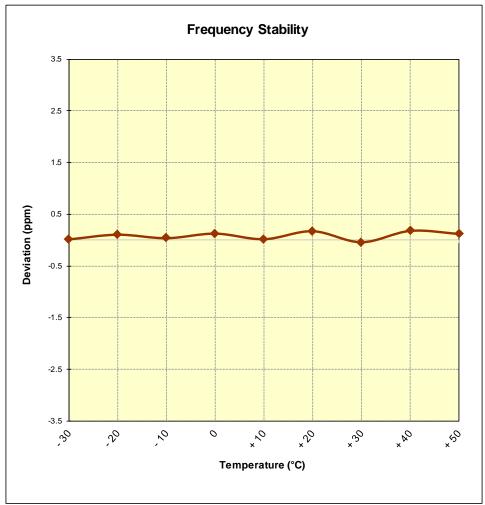


Figure 7-11. Frequency Stability Graph (Band 66/4)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 151 of 154
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# **Band 2 Frequency Stability Measurements**

OPERATING FREQUENCY: 1,880,000,000 Hz

> CHANNEL: 18900

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	- 30	1,879,999,952	-48	-0.0000026
100 %		- 20	1,880,000,015	15	0.0000008
100 %		- 10	1,879,999,843	-157	-0.0000084
100 %		0	1,880,000,204	204	0.0000109
100 %		+ 10	1,879,999,886	-114	-0.0000061
100 %		+ 20	1,879,999,993	-7	-0.0000004
100 %		+ 30	1,880,000,003	3	0.0000002
100 %		+ 40	1,880,000,070	70	0.0000037
100 %		+ 50	1,880,000,031	31	0.0000016
BATT. ENDPOINT	3.21	+ 20	1,879,999,590	-410	-0.0000218

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

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST INCIDENCE LABORATORS, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 152 of 154
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# **Band 2 Frequency Stability Measurements**

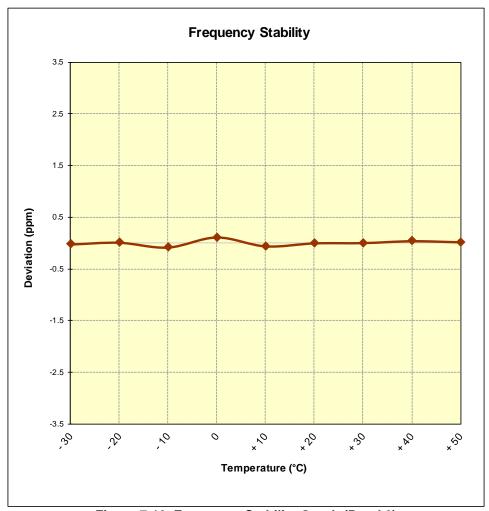


Figure 7-12. Frequency Stability Graph (Band 2)

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 152 of 154
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#### CONCLUSION 8.0

The data collected relate only to the item(s) tested and show that the LG Portable Handset FCC ID: ZNFX120WM complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFX120WM IC: 2703C-X120WM	PETEST HOMELENG LASGRATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 154 of 154
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