

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 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

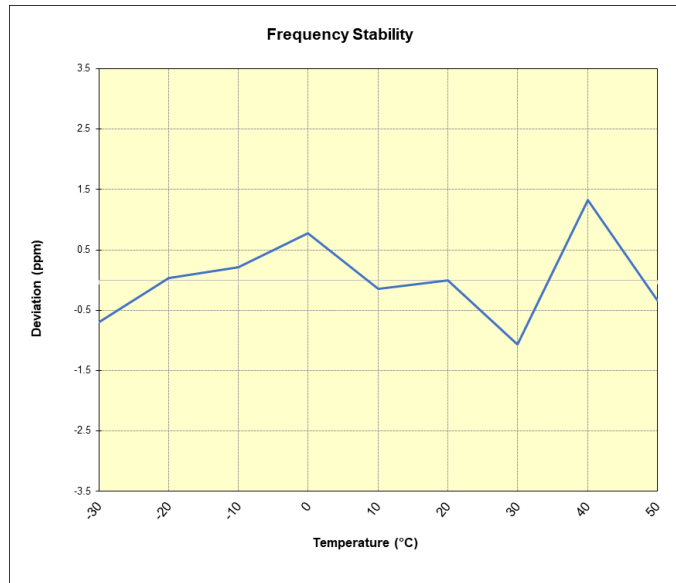
None

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LTE Band 71

LTE Band 71					
Operating Frequency (Hz):		680,500,000			
Ref. Voltage (VDC):		4.31			
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	680,499,375	-475	-0.0000698
		- 20	680,499,875	25	0.0000037
		- 10	680,500,000	150	0.0000220
		0	680,500,375	525	0.0000771
		+ 10	680,499,750	-100	-0.0000147
		+ 20 (Ref)	680,499,850	0	0.0000000
		+ 30	680,499,125	-725	-0.0001065
		+ 40	680,500,750	900	0.0001323
Battery Endpoint	3.58	+ 20	680,500,375	525	0.0000771

Table 7-29. LTE Band 71 Frequency Stability Data



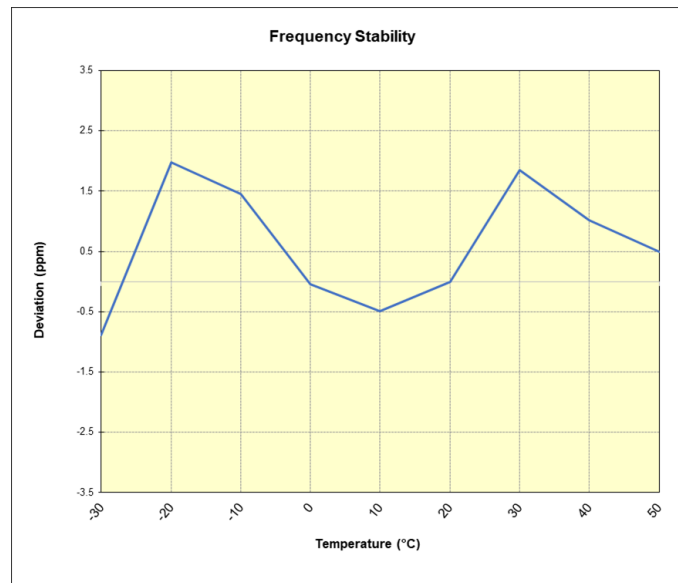
Plot 7-160. LTE Band 71 Frequency Stability Chart

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LTE Band 12

LTE Band 12					
Operating Frequency (Hz):		707,500,000			
Ref. Voltage (VDC):		4.31			
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	707,499,100	-625	-0.0000883
		- 20	707,501,125	1,400	0.0001979
		- 10	707,500,750	1,025	0.0001449
		0	707,499,700	-25	-0.0000035
		+ 10	707,499,375	-350	-0.0000495
		+ 20 (Ref)	707,499,725	0	0.0000000
		+ 30	707,501,035	1,310	0.0001852
		+ 40	707,500,450	725	0.0001025
Battery Endpoint	3.58	+ 20	707,499,550	-175	-0.0000247

Table 7-30. LTE Band 12 Frequency Stability Data



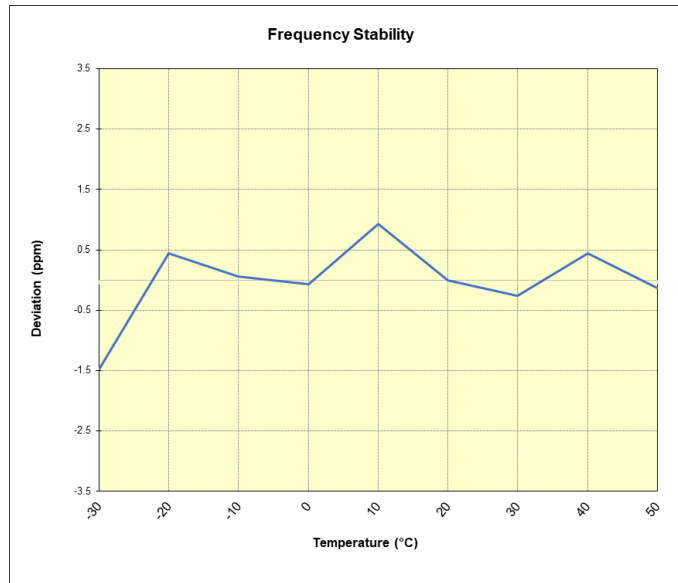
Plot 7-161. LTE Band 12 Frequency Stability Chart

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LTE Band 13

LTE Band 13					
Operating Frequency (Hz):		782,000,000			
Ref. Voltage (VDC):		4.31			
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	781,999,025	-1,150	-0.0001471
		- 20	782,000,525	350	0.0000448
		- 10	782,000,225	50	0.0000064
		0	782,000,125	-50	-0.0000064
		+ 10	782,000,900	725	0.0000927
		+ 20 (Ref)	782,000,175	0	0.0000000
		+ 30	781,999,970	-205	-0.0000262
		+ 40	782,000,525	350	0.0000448
Battery Endpoint	3.58	+ 20	781,999,700	-475	-0.0000607

Table 7-31. LTE Band 13 Frequency Stability Data



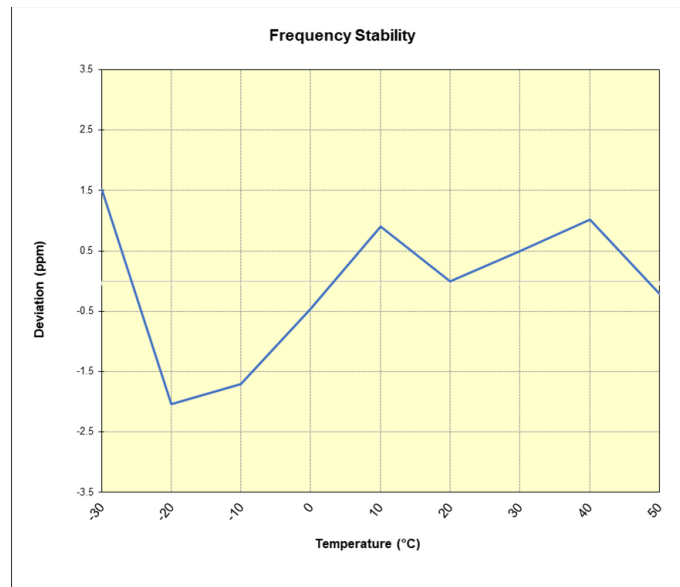
Plot 7-162. LTE Band 13 Frequency Stability Chart

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WCDMA AWS

WCDMA AWS					
Operating Frequency (Hz):		1,732,600,000			
Ref. Voltage (VDC):		4.31			
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	1,732,603,320	2,640	0.0001524
		- 20	1,732,597,160	-3,520	-0.0002032
		- 10	1,732,597,720	-2,960	-0.0001708
		0	1,732,599,880	-800	-0.0000462
		+ 10	1,732,602,240	1,560	0.0000900
		+ 20 (Ref)	1,732,600,680	0	0.0000000
		+ 30	1,732,601,540	860	0.0000496
		+ 40	1,732,602,440	1,760	0.0001016
Battery Endpoint	3.58	+ 20	1,732,599,160	-1,520	-0.0000877

Table 7-32. WCDMA AWS Frequency Stability Data



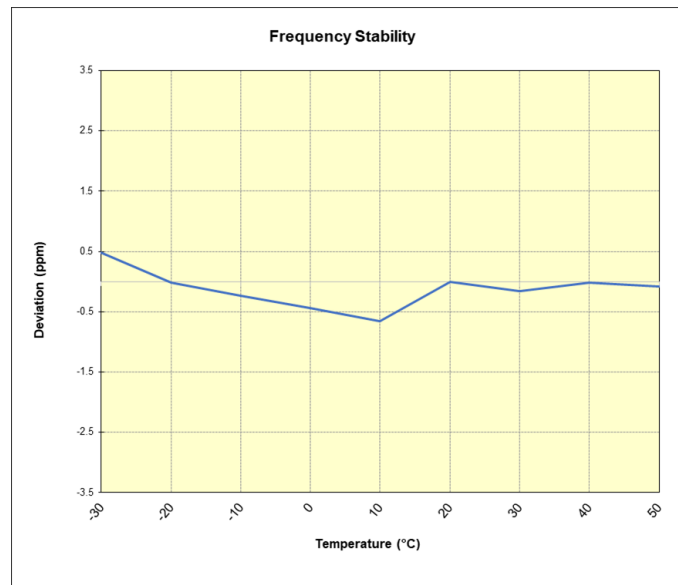
Plot 7-163. WCDMA AWS Frequency Stability Chart

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LTE Band 66/4

LTE Band 66/4					
		Operating Frequency (Hz):		1,745,000,000	
		Ref. Voltage (VDC):		4.31	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	1,745,001,000	850	0.0000487
		- 20	1,745,000,125	-25	-0.0000014
		- 10	1,744,999,750	-400	-0.0000229
		0	1,744,999,375	-775	-0.0000444
		+ 10	1,744,999,000	-1,150	-0.0000659
		+ 20 (Ref)	1,745,000,150	0	0.0000000
		+ 30	1,744,999,875	-275	-0.0000158
		+ 40	1,745,000,125	-25	-0.0000014
		+ 50	1,745,000,000	-150	-0.0000086
Battery Endpoint	3.58	+ 20	1,745,000,375	225	0.0000129

Table 7-33. LTE Band 66/4 Frequency Stability Data





Plot 7-164. LTE Band 66/4 Frequency Stability Chart

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMA135U** complies with all the requirements of Part 27 of the FCC rules.

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