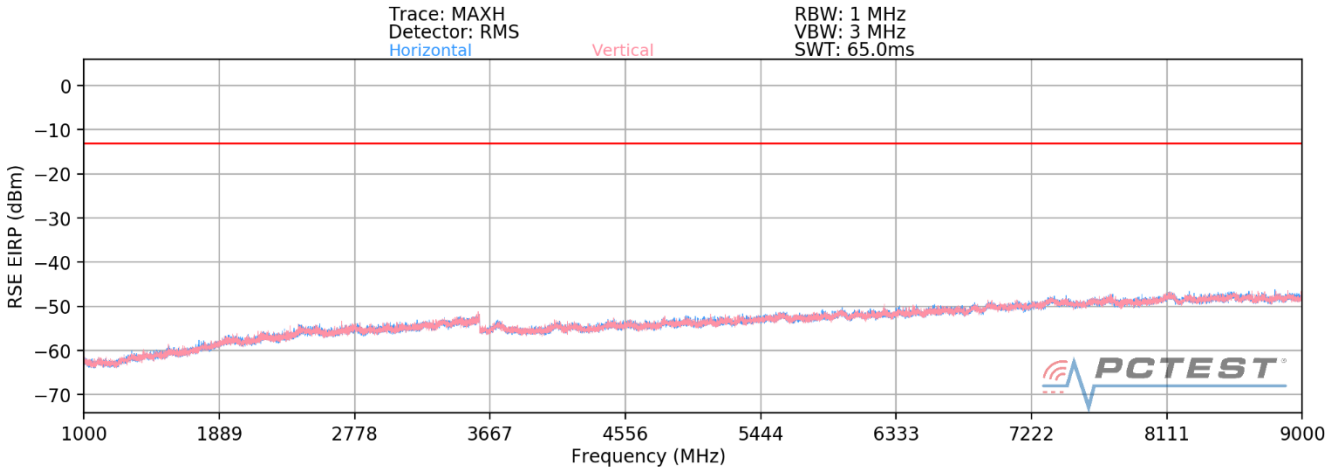
Band 5



Plot 7-176. Radiated Spurious Plot above 1GHz (Band 5)

OPERATING FREQUENCY:	829.00	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]
1658.00	V	-	-	-62.06	3.61	-58.44	-45.4
2487.00	V	-	-	-57.72	4.25	-53.47	-40.5

Table 7-15. Radiated Spurious Data (Band 5 – Low Channel)

OPERATING FREQUENCY:	836.50	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]
1673.00	V	-	-	-62.08	3.62	-58.46	-45.5
2509.50	V	-	-	-57.67	4.33	-53.34	-40.3

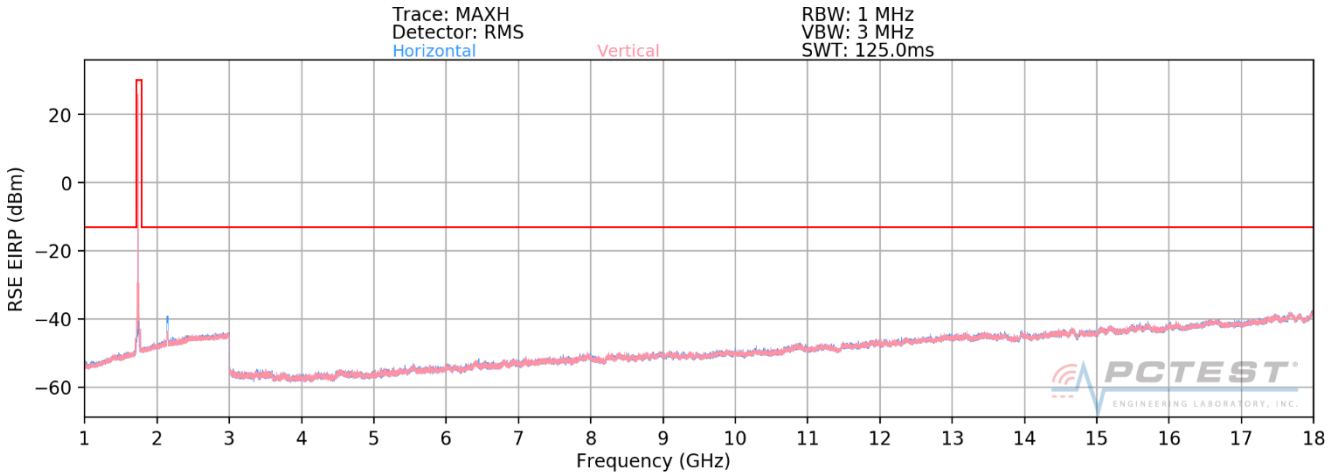
Table 7-16. Radiated Spurious Data (Band 5 – Mid Channel)

OPERATING FREQUENCY:	844.00	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]
1688.00	V	-	-	-61.82	3.63	-58.20	-45.2
2532.00	V	-	-	-58.07	4.47	-53.60	-40.6

Table 7-17. Radiated Spurious Data (Band 5 – High Channel)

Band 4



Plot 7-177. Radiated Spurious Plot above 1GHz (Band 4)

OPERATING FREQUENCY:	1720.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	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]
3440.00	H	-	-	-57.35	6.22	-51.13	-38.1
5160.00	H	-	-	-64.08	8.68	-55.41	-42.4
6880.00	H	-	-	-60.93	8.76	-52.17	-39.2

Table 7-18. Radiated Spurious Data (Band 4 – Low Channel)

OPERATING FREQUENCY:	1732.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	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]
3465.00	H	-	-	-56.72	6.27	-50.45	-37.5
5197.50	H	-	-	-63.92	8.71	-55.21	-42.2
6930.00	H	-	-	-60.67	8.72	-51.95	-39.0

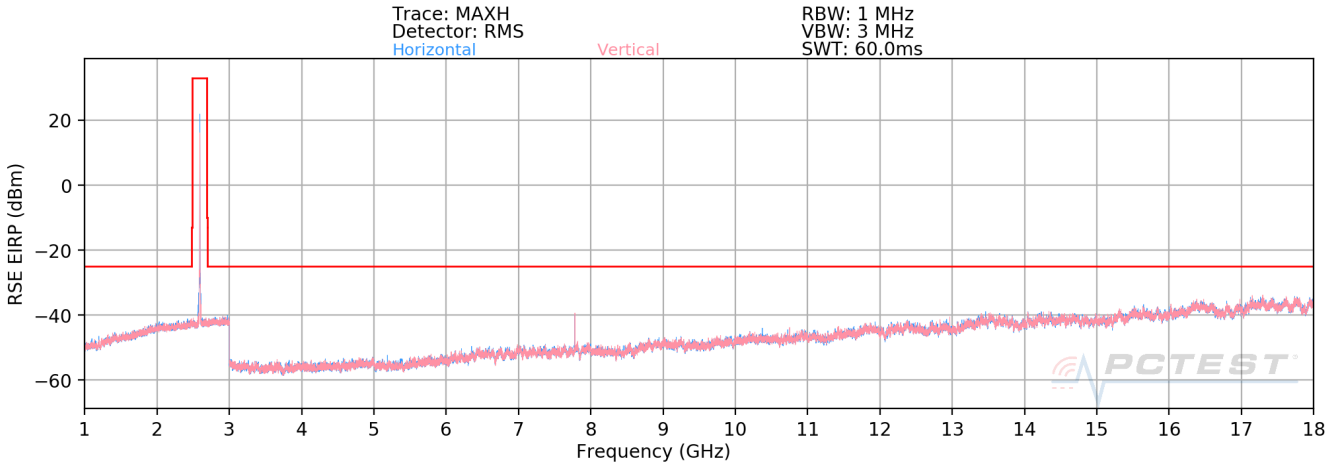
Table 7-19. Radiated Spurious Data (Band 4 – Mid Channel)

OPERATING FREQUENCY:	1745.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

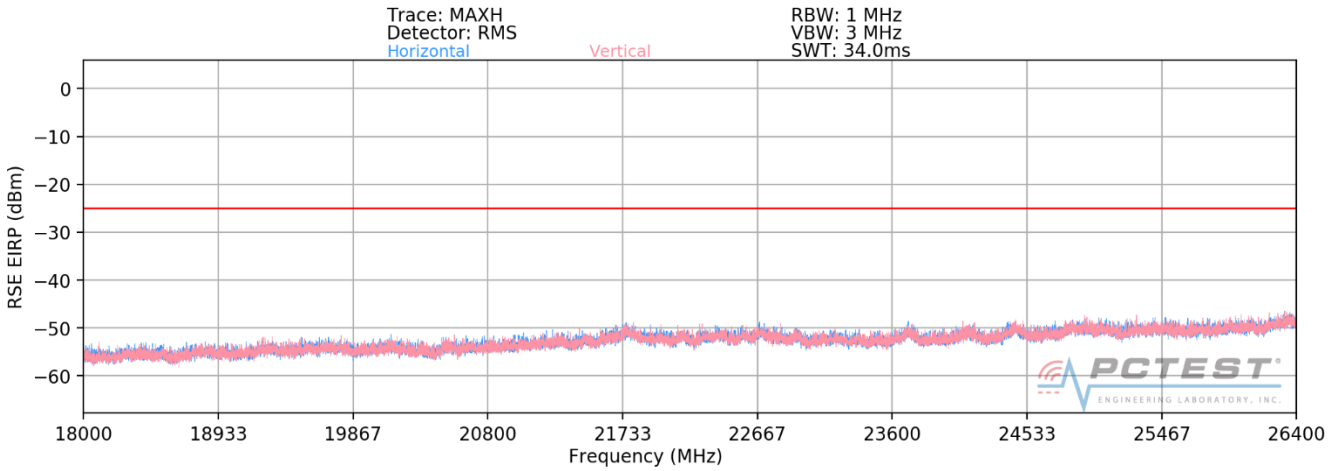
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	H	-	-	-57.37	6.32	-51.05	-38.0
5235.00	H	-	-	-64.35	8.71	-55.64	-42.6
6980.00	H	-	-	-61.38	8.74	-52.65	-39.6

Table 7-20. Radiated Spurious Data (Band 4 – High Channel)

Band 41



Plot 7-178. Radiated Spurious Plot 1GHz - 18GHz (Band 41)



Plot 7-179. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41)

OPERATING FREQUENCY:	2506.00	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	V	-	-	-57.83	8.75	-49.08	-24.1
7518.00	V	-	-	-57.64	9.32	-48.33	-23.3
10024.00	V	-	-	-56.85	9.80	-47.05	-22.0
12530.00	V	-	-	-46.37	8.87	-37.50	-12.5

Table 7-21. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY:	2593.00	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	V	354	323	-58.42	9.03	-49.40	-24.4
7696.00	V	111	13	-47.89	9.26	-38.62	-13.6
10206.00	V	-	-	-51.68	9.69	-41.98	-17.0
12716.00	V	-	-	-46.73	8.92	-37.81	-12.8

Table 7-22. Radiated Spurious Data (Band 41 – Mid Channel)

OPERATING FREQUENCY:	2680.00	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	V	-	-	-58.60	8.99	-49.61	-24.6
8040.00	V	-	-	-54.46	9.35	-45.10	-20.1
10720.00	V	-	-	-53.01	9.39	-43.62	-18.6
13400.00	V	-	-	-44.73	8.67	-36.06	-11.1

Table 7-23. Radiated Spurious Data (Band 41 – High Channel)

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 ±0.00025% (±2.5 ppm) of the center frequency. 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

Band 12 Frequency Stability Measurements

OPERATING FREQUENCY:	707,500,000	Hz
CHANNEL:	23790	
REFERENCE VOLTAGE:	4.19	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.19	- 30	707,499,846	-154	-0.0000218
100 %		- 20	707,500,002	2	0.0000003
100 %		- 10	707,500,293	293	0.0000414
100 %		0	707,499,679	-321	-0.0000454
100 %		+ 10	707,499,715	-285	-0.0000403
100 %		+ 20	707,499,906	-94	-0.0000133
100 %		+ 30	707,500,371	371	0.0000524
100 %		+ 40	707,499,917	-83	-0.0000117
100 %		+ 50	707,499,875	-125	-0.0000177
BATT. ENDPOINT	3.79	+ 20	707,500,325	325	0.0000459

Table 7-24. 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.

Band 12 Frequency Stability Measurements

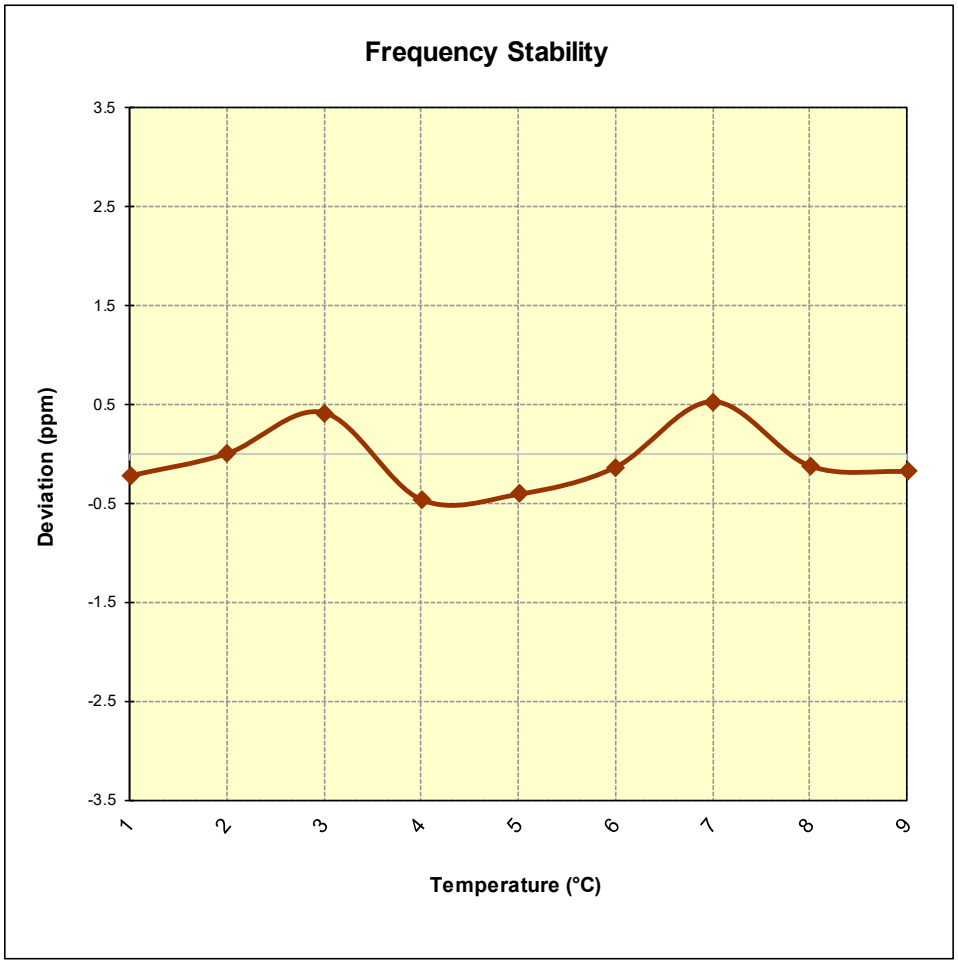


Figure 7-8. Frequency Stability Graph (Band 12)

Band 13 Frequency Stability Measurements

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	
REFERENCE VOLTAGE:	4.19	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.19	- 30	782,000,026	26	0.0000033
100 %		- 20	782,000,382	382	0.0000488
100 %		- 10	781,999,797	-203	-0.0000260
100 %		0	782,000,363	363	0.0000464
100 %		+ 10	782,000,028	28	0.0000036
100 %		+ 20	781,999,753	-247	-0.0000316
100 %		+ 30	782,000,119	119	0.0000152
100 %		+ 40	782,000,067	67	0.0000086
100 %		+ 50	782,000,028	28	0.0000036
BATT. ENDPOINT	3.79	+ 20	781,999,999	-1	-0.0000001

Table 7-25. 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.

Band 13 Frequency Stability Measurements

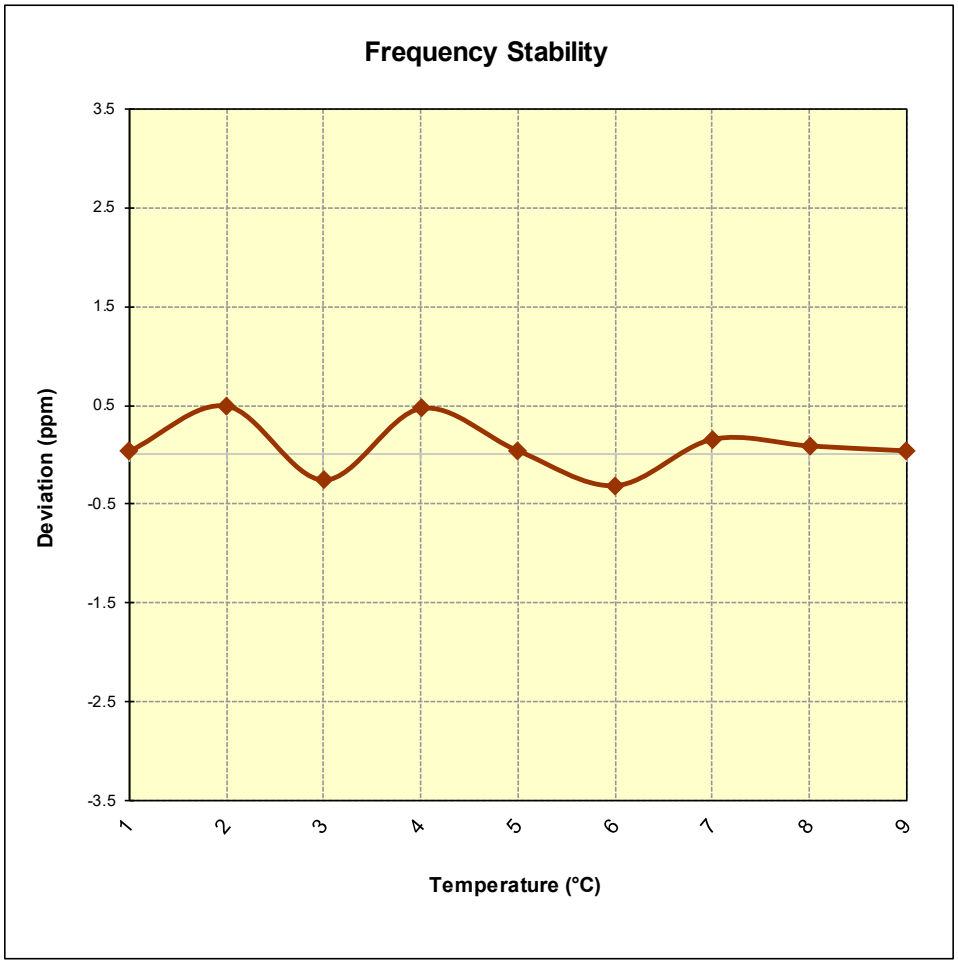


Figure 7-9. Frequency Stability Graph (Band 13)

Band 5 Frequency Stability Measurements

OPERATING FREQUENCY:	836,500,000	Hz
CHANNEL:	20525	
REFERENCE VOLTAGE:	4.19	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.19	- 30	836,500,153	153	0.0000183
100 %		- 20	836,500,023	23	0.0000027
100 %		- 10	836,500,319	319	0.0000381
100 %		0	836,500,125	125	0.0000149
100 %		+ 10	836,500,016	16	0.0000019
100 %		+ 20	836,500,384	384	0.0000459
100 %		+ 30	836,499,853	-147	-0.0000176
100 %		+ 40	836,500,017	17	0.0000020
100 %		+ 50	836,500,006	6	0.0000007
BATT. ENDPOINT	3.79	+ 20	836,500,411	411	0.0000491

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

Band 5 Frequency Stability Measurements

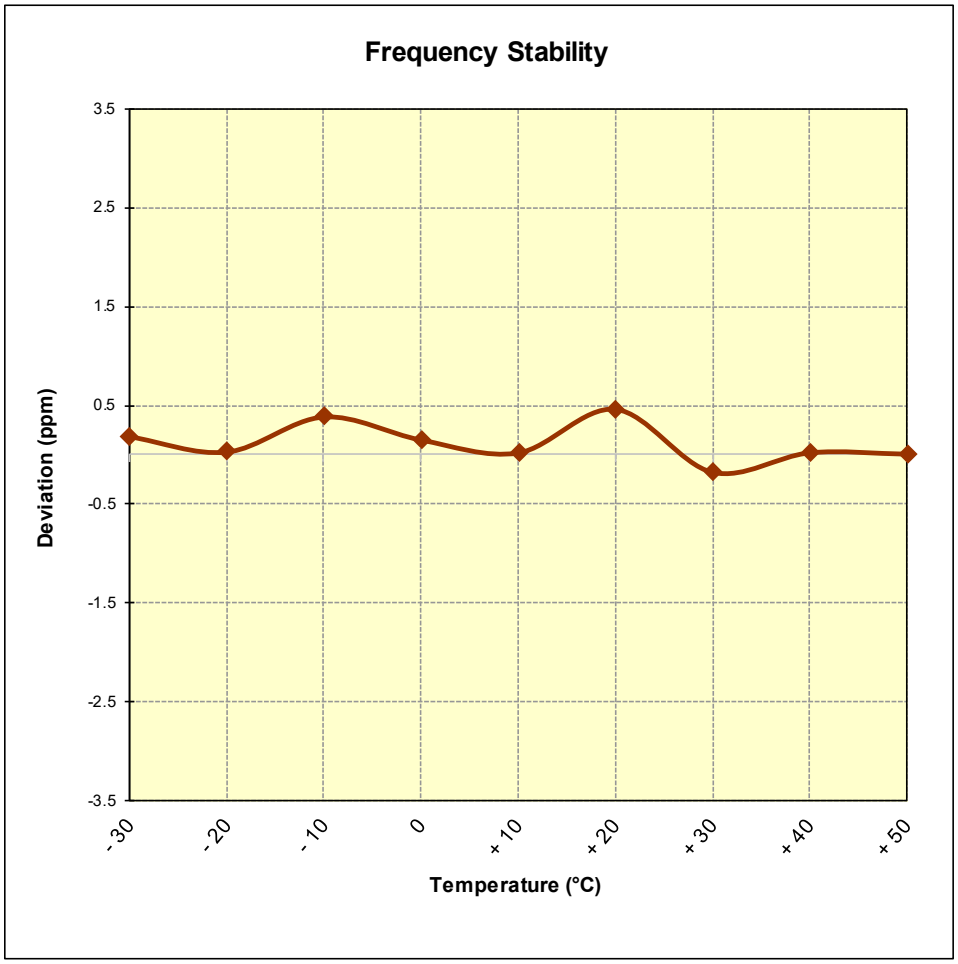


Figure 7-10. Frequency Stability Graph (Band 5)

Band 4 Frequency Stability Measurements

OPERATING FREQUENCY:	1,732,500,000	Hz
CHANNEL:	20175	
REFERENCE VOLTAGE:	4.19	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.19	- 30	1,732,499,928	-72	-0.0000042
100 %		- 20	1,732,500,214	214	0.0000124
100 %		- 10	1,732,499,713	-287	-0.0000166
100 %		0	1,732,499,978	-22	-0.0000013
100 %		+ 10	1,732,499,959	-41	-0.0000024
100 %		+ 20	1,732,500,227	227	0.0000131
100 %		+ 30	1,732,500,105	105	0.0000061
100 %		+ 40	1,732,499,946	-54	-0.0000031
100 %		+ 50	1,732,500,201	201	0.0000116
BATT. ENDPOINT	3.79	+ 20	1,732,500,380	380	0.0000219

Table 7-27. 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.

Band 4 Frequency Stability Measurements

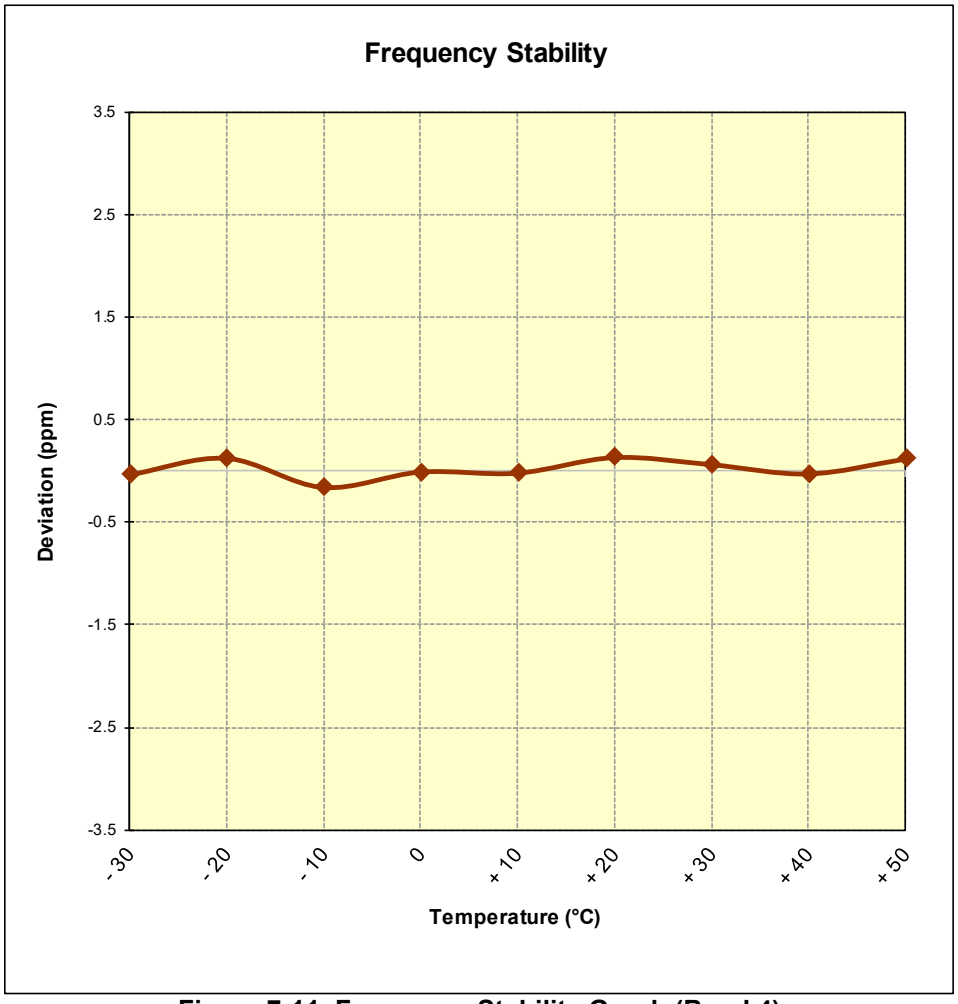


Figure 7-11. Frequency Stability Graph (Band 4)

Band 41 Frequency Stability Measurements

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	4.19	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.19	- 30	2,592,999,814	-186	-0.0000072
100 %		- 20	2,593,000,027	27	0.0000010
100 %		- 10	2,593,000,094	94	0.0000036
100 %		0	2,593,000,009	9	0.0000003
100 %		+ 10	2,593,000,059	59	0.0000023
100 %		+ 20	2,593,000,093	93	0.0000036
100 %		+ 30	2,593,000,202	202	0.0000078
100 %		+ 40	2,593,000,271	271	0.0000105
100 %		+ 50	2,593,000,080	80	0.0000031
BATT. ENDPOINT	3.79	+ 20	2,593,000,163	163	0.0000063

Table 7-28. 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.

Band 41 Frequency Stability Measurements

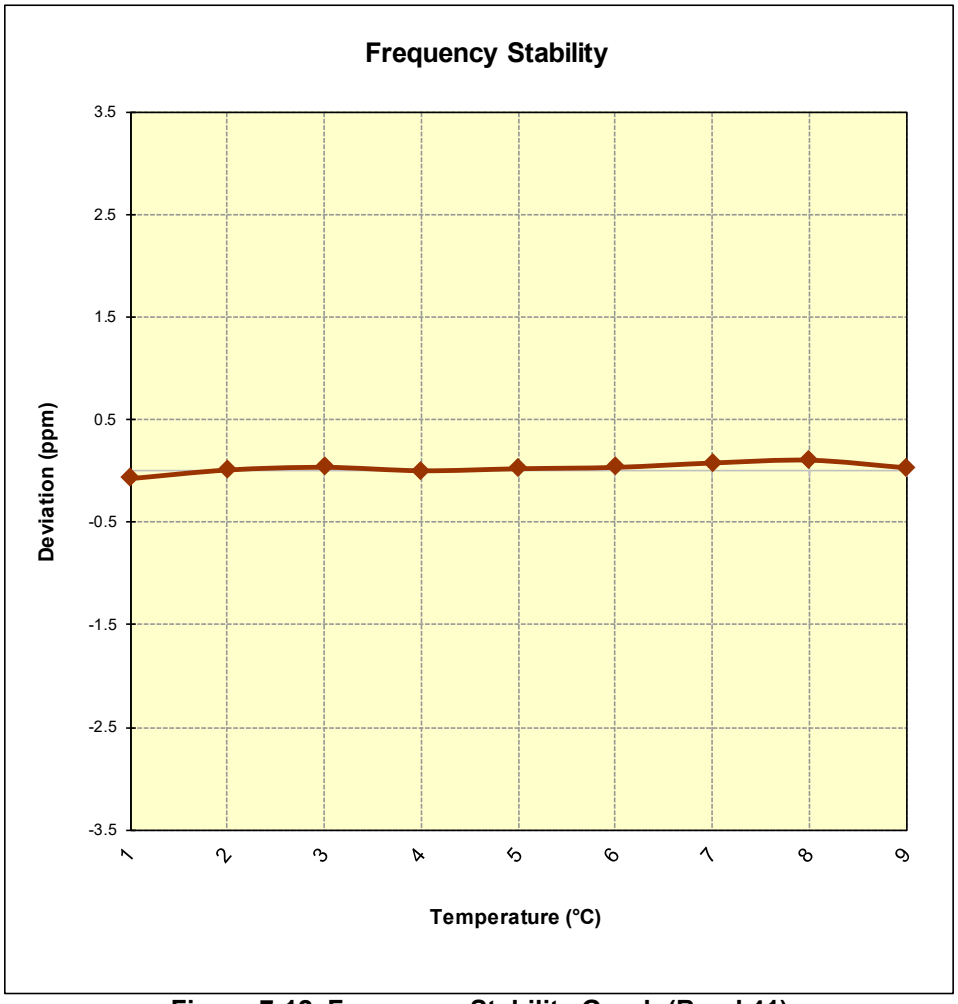


Figure 7-12. Frequency Stability Graph (Band 41)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG986JPN** complies with all the requirements of Part 22 & 27 of the FCC Rules for LTE operation only.