ACLRResults

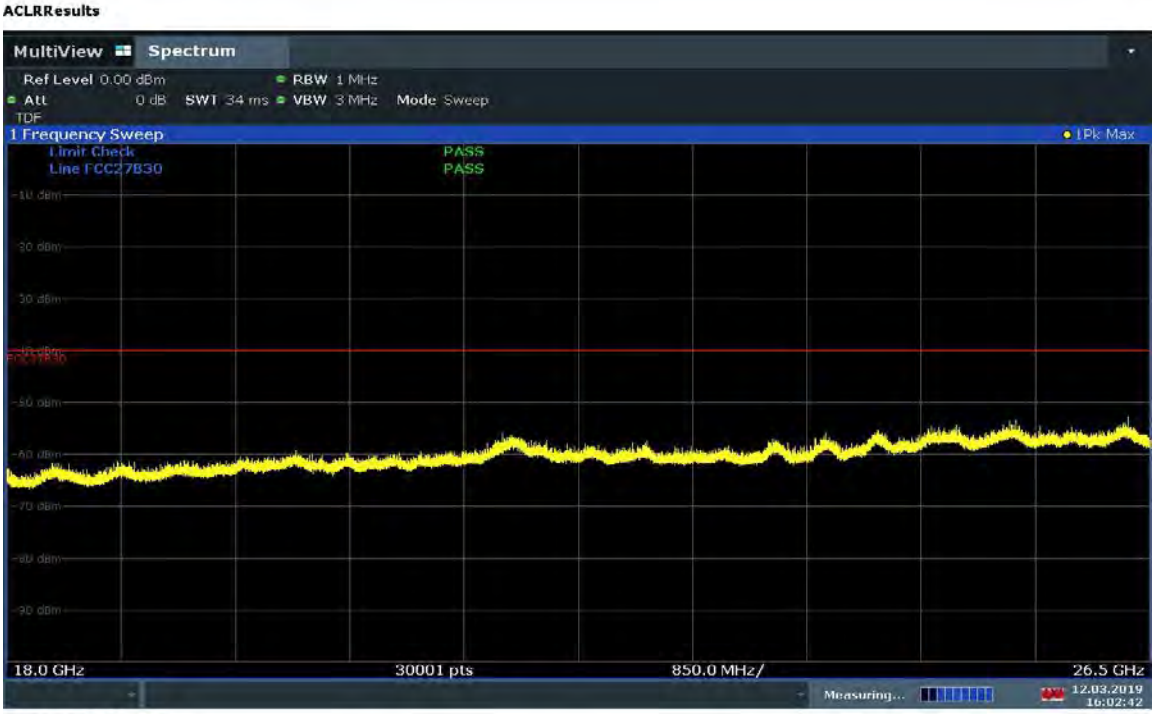
18:21:30 12.03.2019

Plot 7-415. Radiated Spurious Plot 18GHz – 26.5GHz (Band 30 – H – CLOSED)

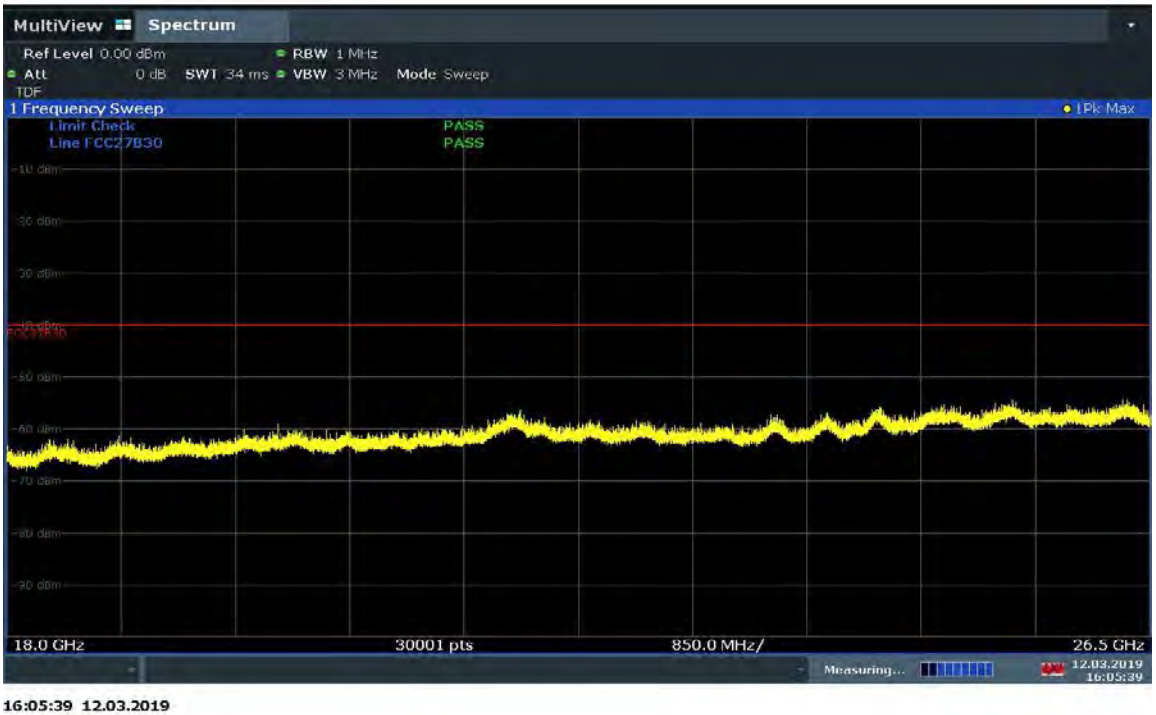
ACLRResults

18:23:34 12.03.2019

Plot 7-416. Radiated Spurious Plot 18GHz – 26.5GHz (Band 30 – V - CLOSED)



Plot 7-417. Radiated Spurious Plot 18GHz – 26.5GHz (Band 30 – H - OPEN)



Plot 7-418. Radiated Spurious Plot 18GHz – 26.5GHz (Band 30 – V - OPEN)

OPERATING FREQUENCY:	2312.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-40	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]
4625.00	V	117	298	-73.79	10.92	-62.87	-22.9
6937.50	V	390	132	-63.40	11.75	-51.65	-11.7
9250.00	V	-	-	-68.08	11.63	-56.45	-16.4

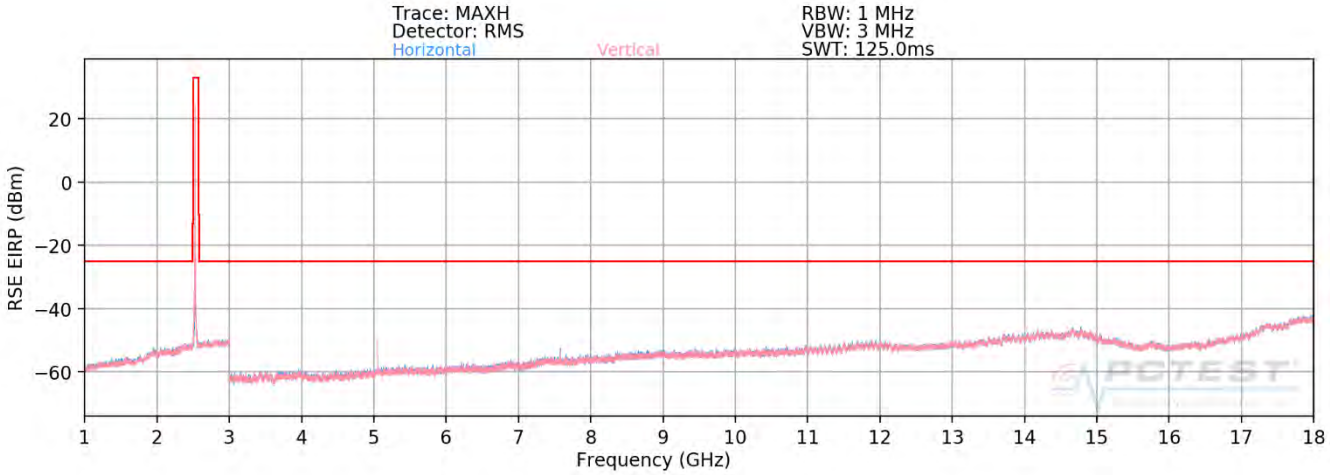
Table 7-45. Radiated Spurious Data (Band 30 – Mid Channel - CLOSED)

OPERATING FREQUENCY:	2312.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-40	dBm

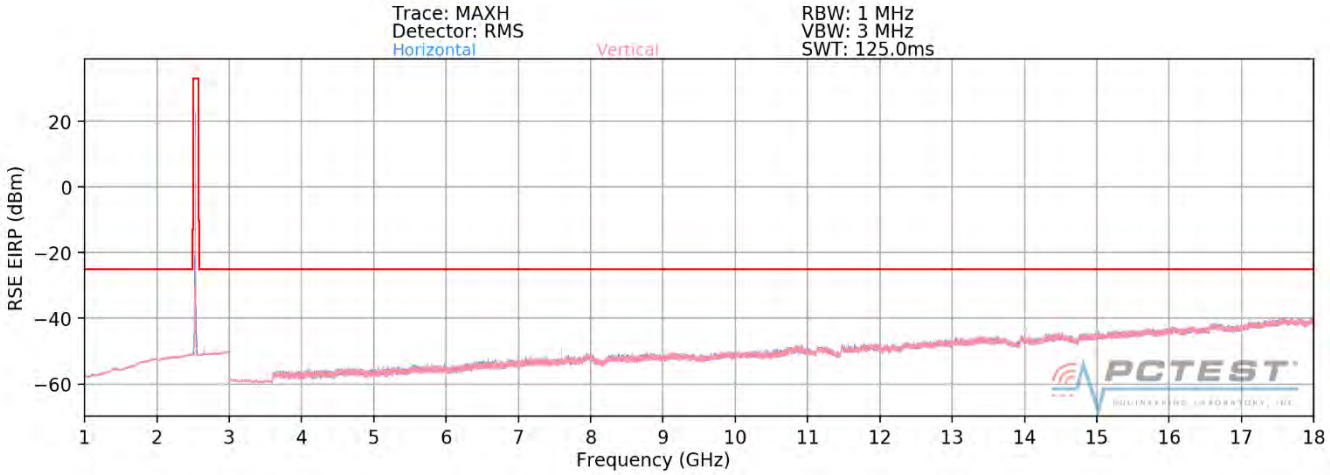
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4625.00	V	116	0	-72.66	10.92	-61.74	-21.7
6937.50	V	126	325	-70.81	11.75	-59.06	-19.1
9250.00	V	399	368	-68.15	11.63	-56.52	-16.5
11562.50	V	-	-	-67.31	12.71	-54.60	-14.6

Table 7-46. Radiated Spurious Data with WCP (Band 30 –Mid Channel - CLOSED)

Band 7



Plot 7-419. Radiated Spurious Plot 1GHz - 18GHz (Band 7 - CLOSED)



Plot 7-420. Radiated Spurious Plot 1GHz - 18GHz (Band 7 - OPEN)

ACLRResults

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Plot 7-421. Radiated Spurious Plot 18GHz – 26.5GHz (Band 7 – H - CLOSED)

ACLRResults

18:26:48 12.03.2019

Plot 7-422. Radiated Spurious Plot 18GHz – 26.5GHz (Band 7 – V - CLOSED)

ACLRResults

16:23:23 12.03.2019

Plot 7-423. Radiated Spurious Plot 18GHz – 26.5GHz (Band 7 – H - OPEN)

ACLRResults

16:13:12 12.03.2019

Plot 7-424. Radiated Spurious Plot 18GHz – 26.5GHz (Band 7 – V - OPEN)

OPERATING FREQUENCY:	2510.00	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]
5020.00	H	229	358	-60.50	10.88	-49.62	-24.6
7530.00	H	325	336	-63.12	11.13	-51.99	-27.0
10040.00	H	-	-	-68.99	11.99	-57.00	-32.0

Table 7-47. Radiated Spurious Data (Band 7 – Low Channel - CLOSED)

OPERATING FREQUENCY:	2535.00	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]
5070.00	H	159	5	-58.92	10.75	-48.17	-23.2
7605.00	H	344	16	-64.44	11.25	-53.19	-28.2
10140.00	H	-	-	-69.22	12.07	-57.15	-32.2

Table 7-48. Radiated Spurious Data (Band 7 – Mid Channel - CLOSED)

OPERATING FREQUENCY:	2560.00	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]
5120.00	H	241	1	-61.05	10.68	-50.37	-25.4
7680.00	H	310	318	-64.05	11.39	-52.66	-27.7
10240.00	H	-	-	-68.90	12.18	-56.71	-31.7

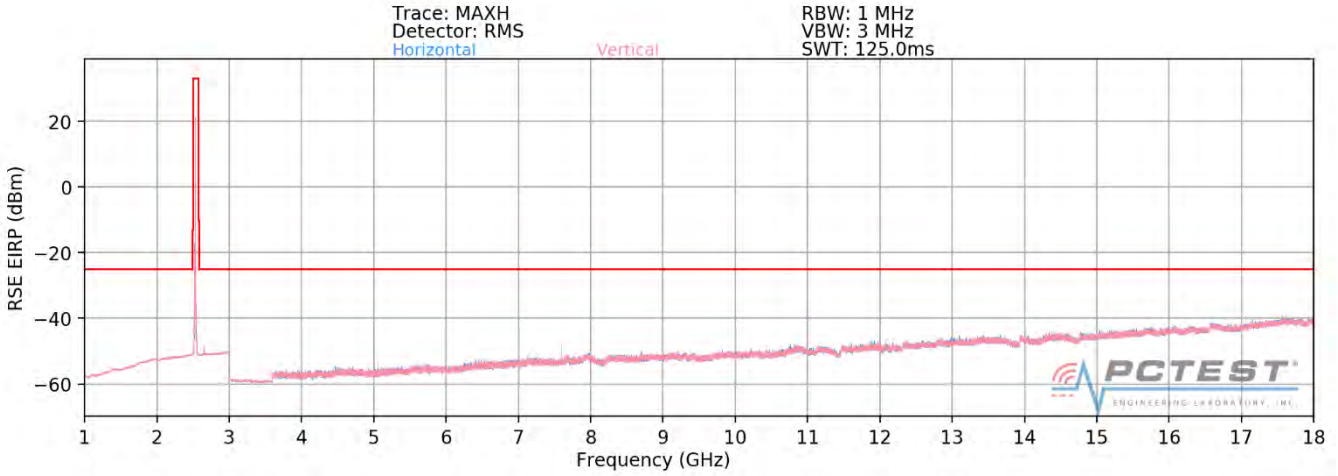
Table 7-49. Radiated Spurious Data (Band 7 – High Channel - CLOSED)

OPERATING FREQUENCY:	2535.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

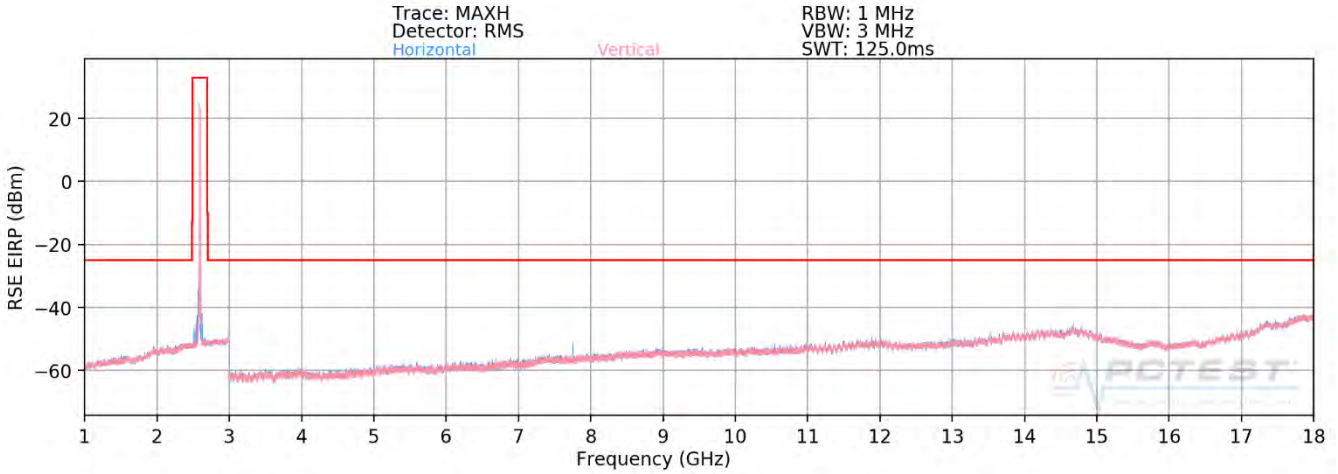
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5070.00	H	114	29	-61.57	10.75	-50.82	-25.8
7605.00	H	138	311	-64.21	11.25	-52.96	-28.0
10140.00	H	-	-	-69.46	12.07	-57.39	-32.4

Table 7-50. Radiated Spurious Data with WCP (Band 7 – Mid Channel - CLOSED)

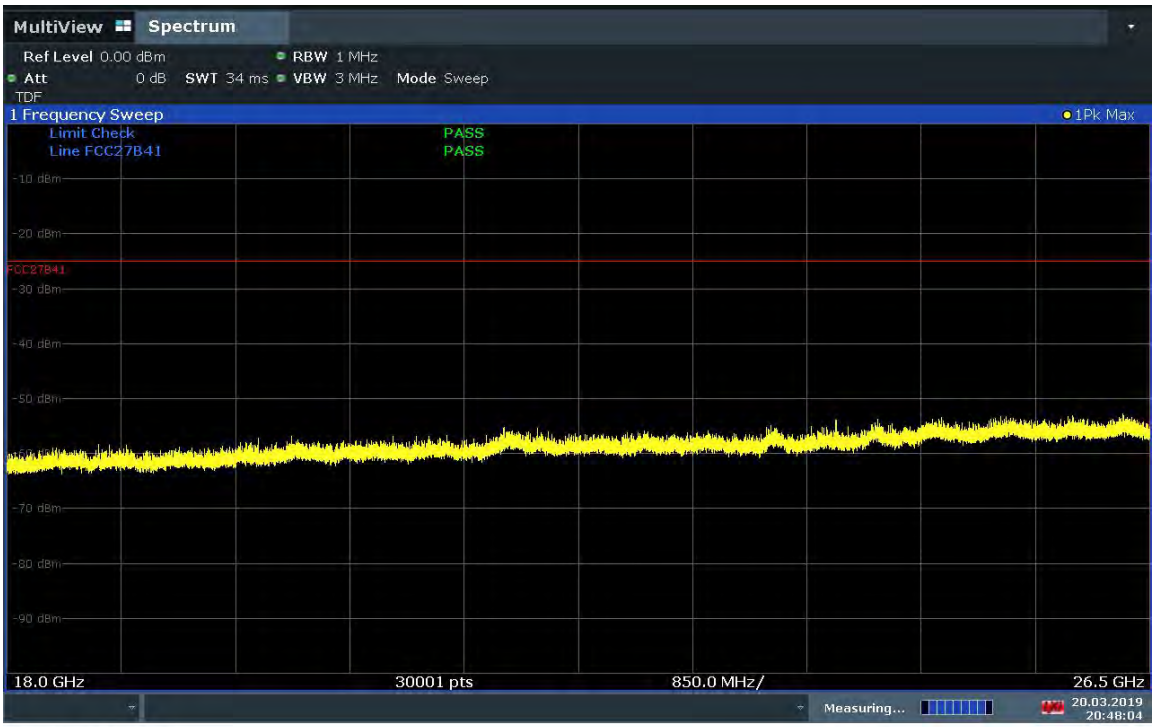
Band 41 PC3



Plot 7-425. Radiated Spurious Plot 1GHz - 18GHz (Band 41 PC3 - CLOSED)



Plot 7-426. Radiated Spurious Plot 1GHz - 18GHz (Band 41 PC3 - OPEN)



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Plot 7-427. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41 PC3 – H - CLOSED)

20:49:45 20.03.2019

Plot 7-428. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41 PC3 – V - CLOSED)

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Plot 7-429. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41 PC3 – H - OPEN)

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5. 18:34:54 12.03.2019

Plot 7-430. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41 PC3 – V - OPEN)

OPERATING FREQUENCY:	2510.00	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]
5020.00	H	352	38	-68.96	10.88	-58.08	-33.1
7530.00	H	345	338	-60.16	11.13	-49.03	-24.0
10040.00	H	-	-	-67.11	11.99	-55.13	-30.1

Table 7-51. Radiated Spurious Data (Band 41 PC3 – Low Channel - OPEN)

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	H	113	309	-69.61	10.74	-58.87	-33.9
7779.00	H	287	299	-56.76	11.44	-45.32	-20.3
10372.00	H	-	-	-67.44	12.42	-55.01	-30.0

Table 7-52. Radiated Spurious Data (Band 41 PC3 – Mid Channel - OPEN)

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	H	328	303	-67.47	10.70	-56.77	-31.8
8040.00	H	325	296	-53.63	11.16	-42.47	-17.5
10720.00	H	-	-	-67.50	12.59	-54.90	-29.9

Table 7-53. Radiated Spurious Data (Band 41 PC3 – High Channel - OPEN)

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	H	112	343	-68.87	10.70	-58.17	-33.2
8040.00	H	117	297	-56.09	11.16	-44.93	-19.9
10720.00	H	-	-	-67.09	12.59	-54.49	-29.5

Table 7-54. Radiated Spurious Data with WCP (Band 41 PC3 – High Channel - OPEN)

7.9 Uplink Carrier Aggregation Radiated Measurements

§2.1053, §27.53(m)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. No. of sweep points ≥ 2 x span / RBW
4. Detector = RMS
5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
6. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

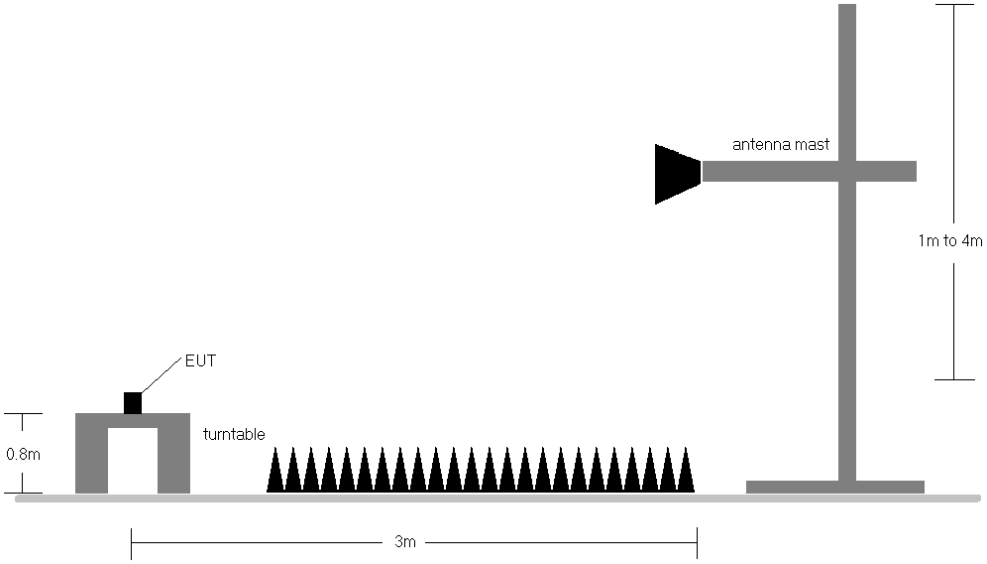


Figure 7-9. Test Instrument & Measurement Setup

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2) This unit was tested with its standard battery.

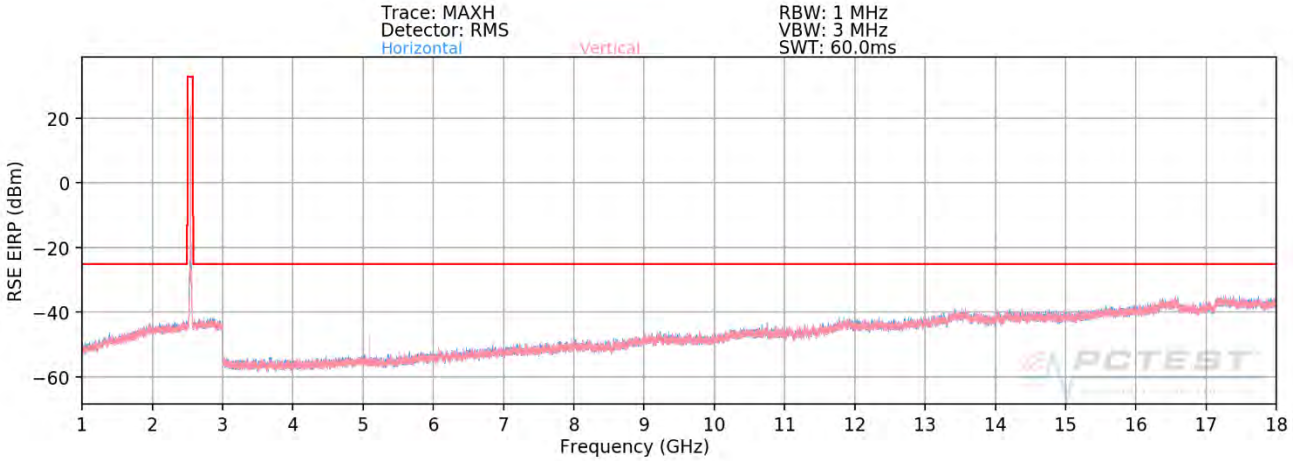
3) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.

4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

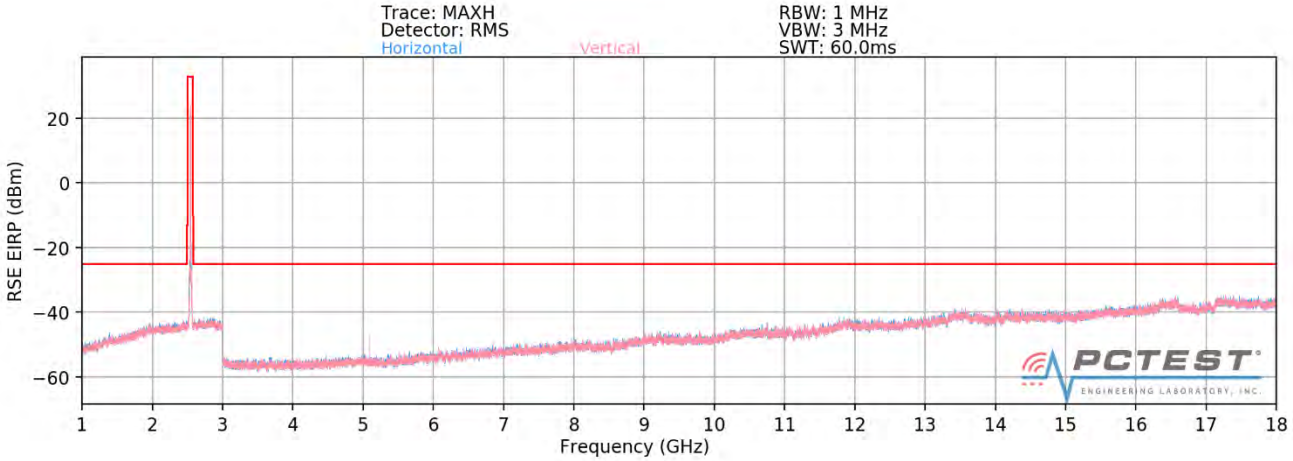
5) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

6) No significant emissions were found as a result of two uplink carriers operating contiguously.

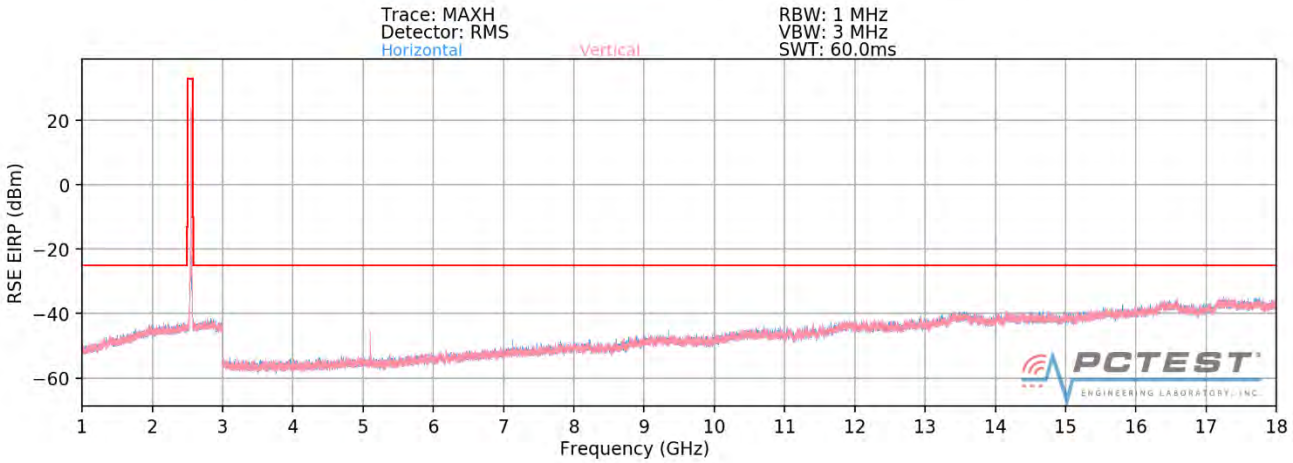
Uplink CA Configuration 7C



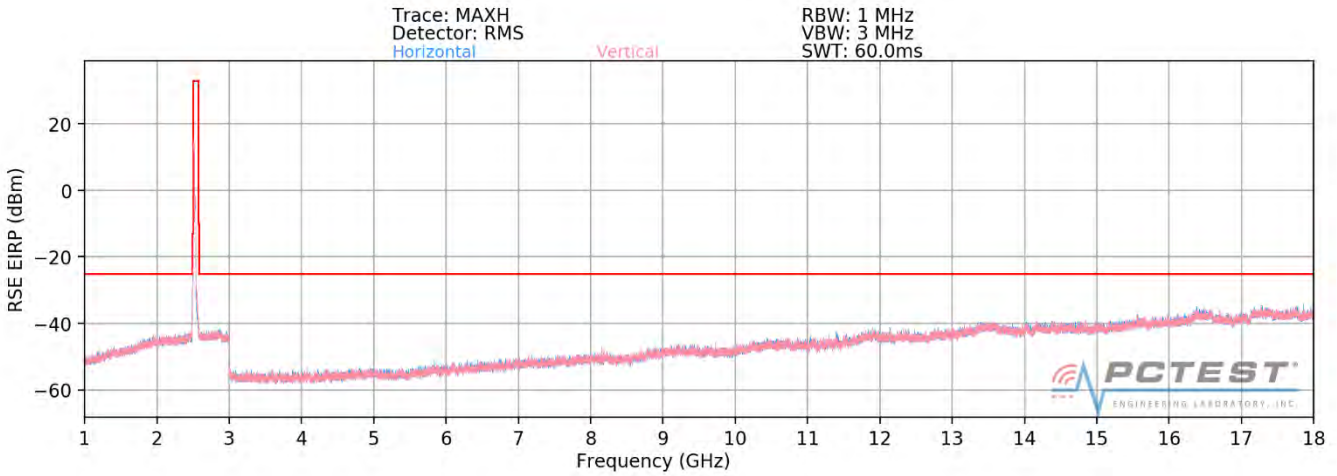
Plot 7-431. Radiated Spurious Plot (ULCA 7C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel - CLOSED)



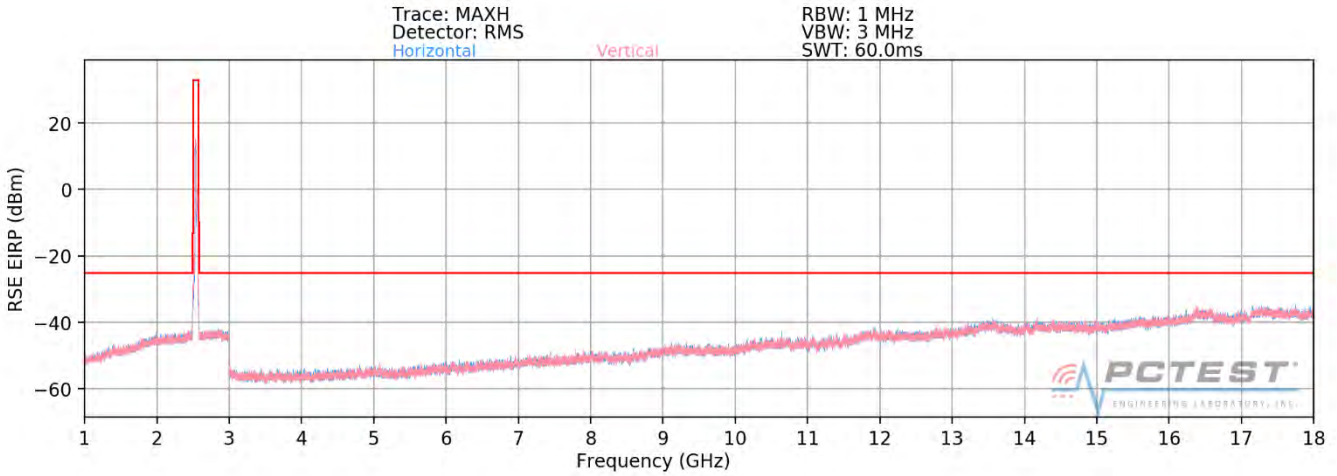
Plot 7-432. Radiated Spurious Plot (ULCA 7C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel - CLOSED)



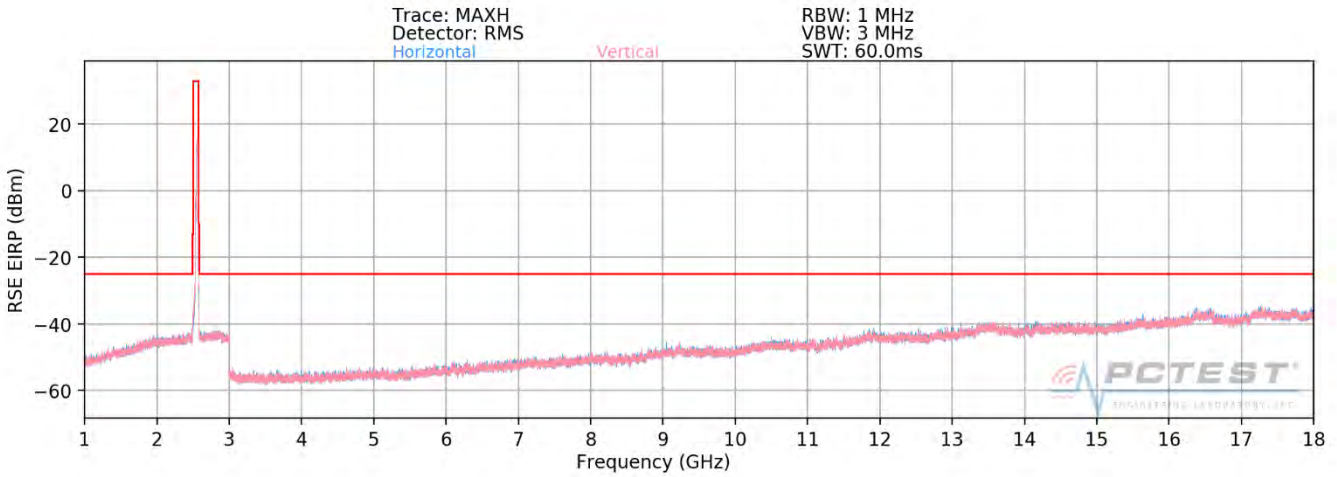
Plot 7-433. Radiated Spurious Plot (ULCA 7C PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel - CLOSED)



Plot 7-434. Radiated Spurious Plot (ULCA 7C PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – Low Channel - CLOSED)



Plot 7-435. Radiated Spurious Plot (ULCA 7C PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – Mid Channel - CLOSED)



Plot 7-436. Radiated Spurious Plot (ULCA 7C PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – High Channel - CLOSED)

OPERATING FREQUENCY:	2510.00	MHz
OPERATING FREQUENCY:	2529.80	MHz
CHANNEL:	20850	
CHANNEL:	21048	
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]
5059.60	V	101	257	-68.62	10.88	-57.74	-32.7
7589.40	V	102	147	-66.68	11.13	-55.55	-30.6
10119.20	V	-	-	-65.25	11.99	-53.27	-28.3
12649.00	V	-	-	-63.24	13.56	-49.68	-24.7
15178.80	V	-	-	-60.64	13.58	-47.06	-22.1

Table 7-55. Radiated Spurious Data (ULCA 7C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel - CLOSED)

OPERATING FREQUENCY:	2535.00	MHz
OPERATING FREQUENCY:	2554.80	MHz
CHANNEL:	21100	
CHANNEL:	21298	
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]
5070.00	V	100	254	-64.44	10.75	-53.69	-28.7
7605.00	V	100	54	-65.27	11.25	-54.02	-29.0
10140.00	V	-	-	-65.21	12.07	-53.14	-28.1
12675.00	V	-	-	-63.57	13.66	-49.90	-24.9
15210.00	V	-	-	-61.62	14.71	-46.91	-21.9

Table 7-56. Radiated Spurious Data (ULCA 7C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel - CLOSED)

OPERATING FREQUENCY:	2560.00	MHz
OPERATING FREQUENCY:	2540.20	MHz
CHANNEL:	21350	
CHANNEL:	21152	
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]
5120.00	V	111	254	-66.07	10.68	-55.39	-30.4
7680.00	V	106	107	-65.97	11.39	-54.58	-29.6
10240.00	V	-	-	-64.47	12.18	-52.29	-27.3
12800.00	V	-	-	-62.55	13.50	-49.05	-24.0
15360.00	V	-	-	-61.78	15.29	-46.49	-21.5

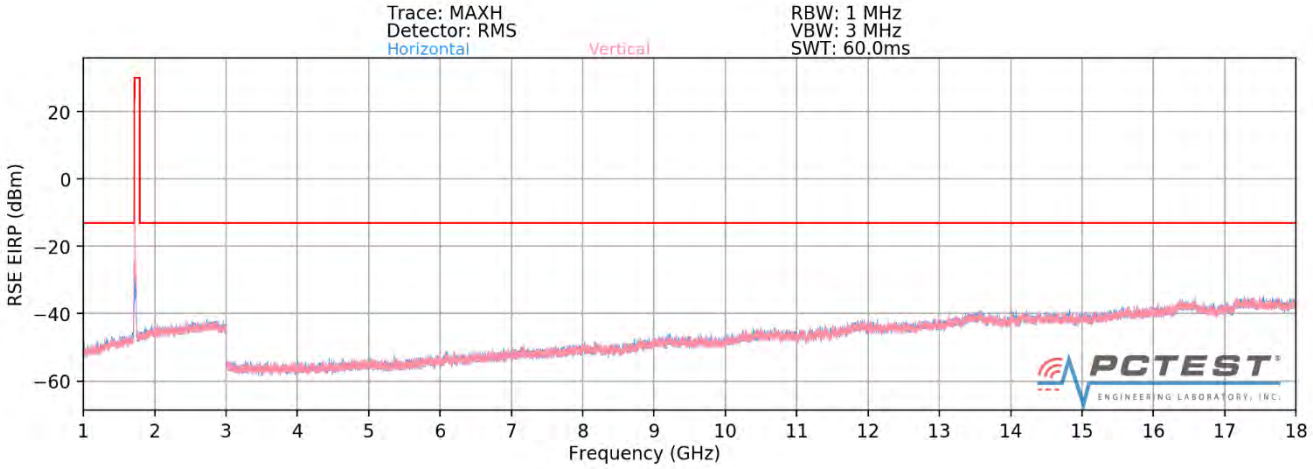
Table 7-57. Radiated Spurious Data (ULCA 7C PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel - CLOSED)

OPERATING FREQUENCY:	2535.00	MHz
OPERATING FREQUENCY:	2554.80	MHz
CHANNEL:	21100	
CHANNEL:	21298	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

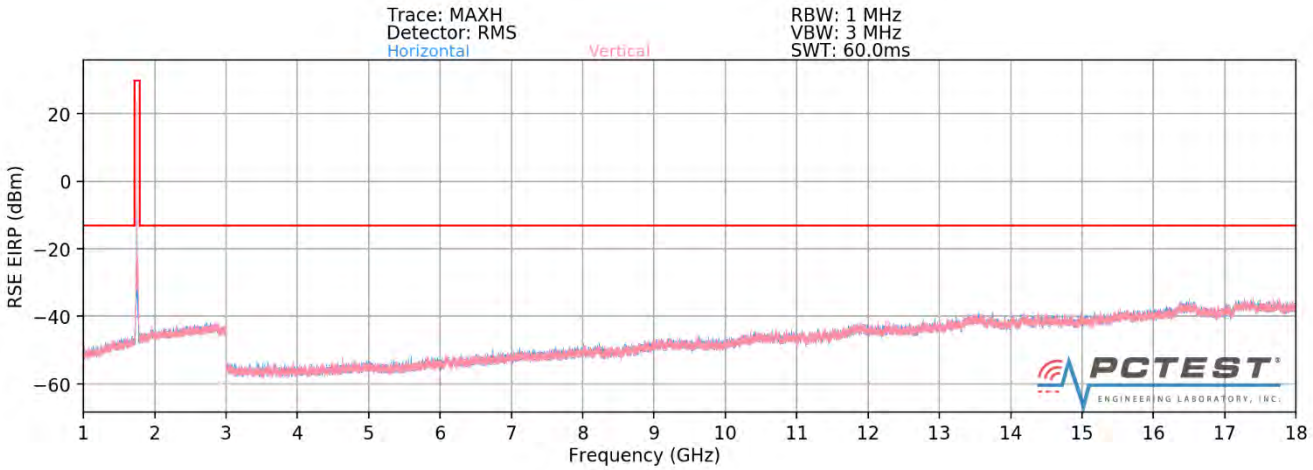
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5070.00	V	104	295	-67.45	10.75	-56.70	-31.7
7605.00	V	-	-	-67.27	11.25	-56.02	-31.0
10140.00	V	-	-	-65.42	12.07	-53.35	-28.3
12675.00	V	-	-	-63.87	13.66	-50.20	-25.2

Table 7-58. Radiated Spurious Data with WCP (ULCA 7C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel - CLOSED)

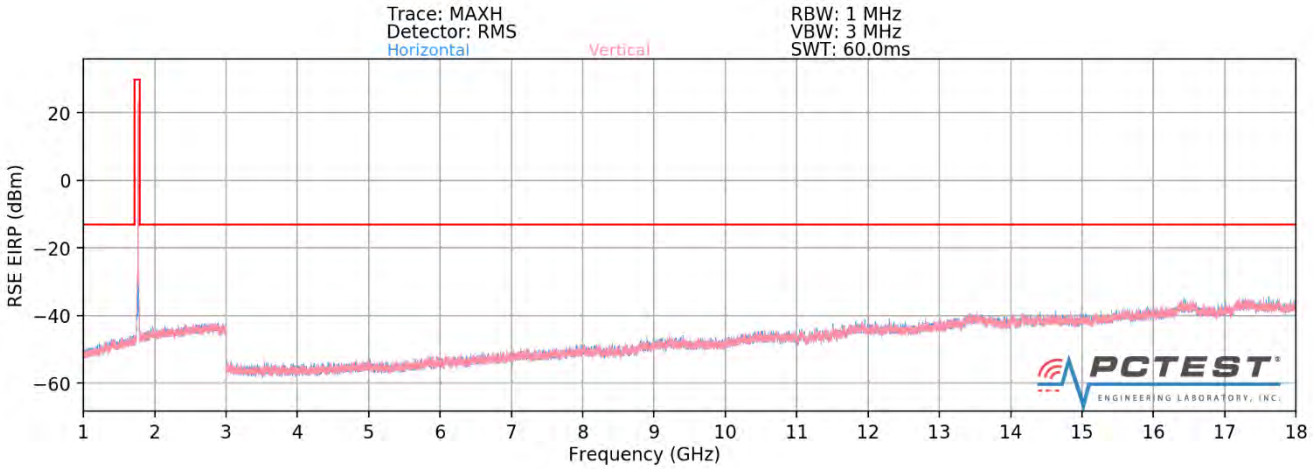
Uplink CA Configuration 66B



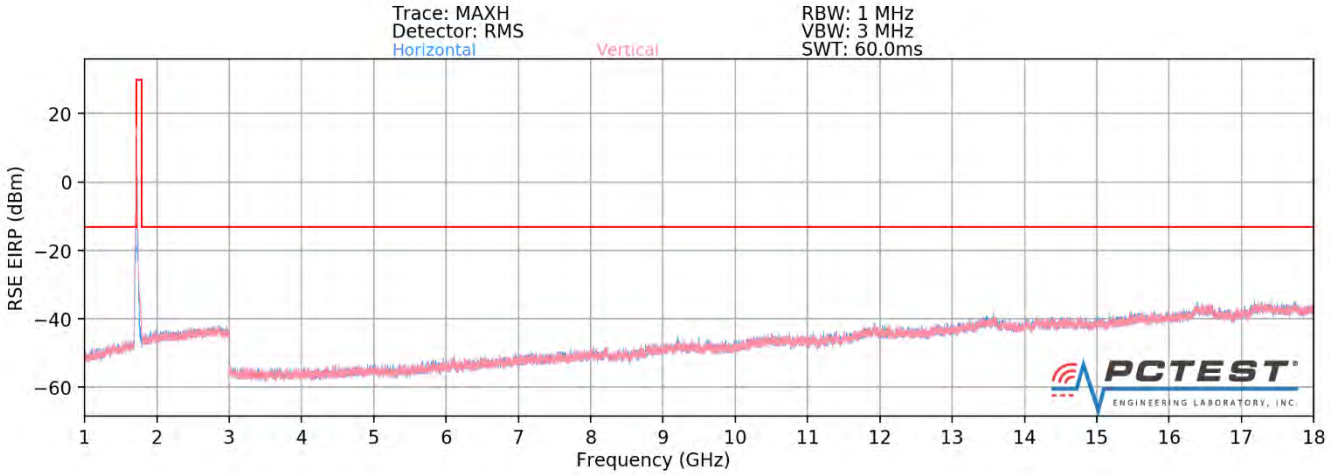
Plot 7-437. Radiated Spurious Plot (ULCA 66B PCC: RB 1 Offset 74, SCC: RB 1 Offset 0 – Low Channel – OPEN)



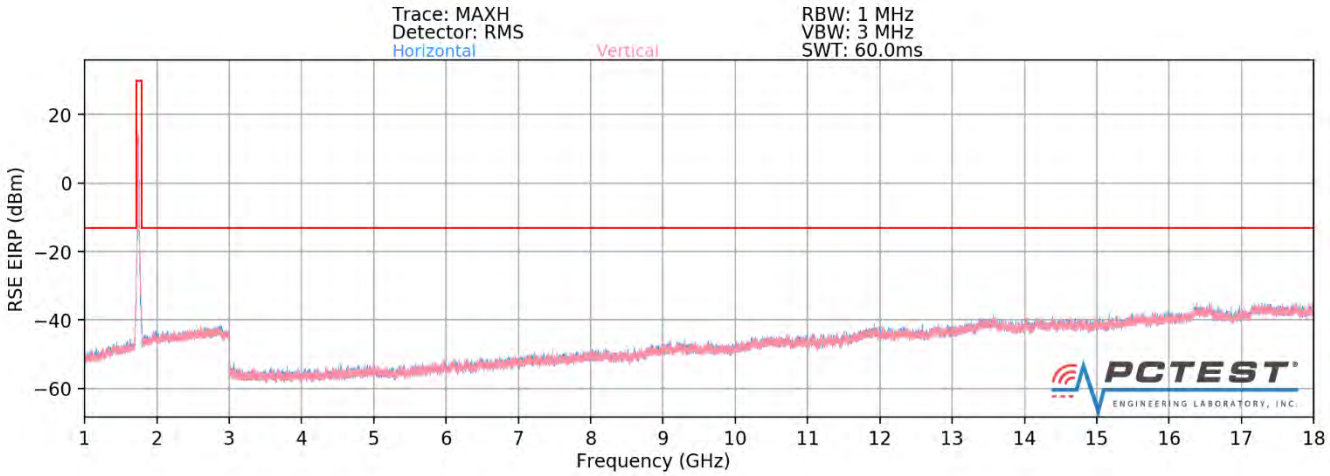
Plot 7-438. Radiated Spurious Plot (ULCA 66B PCC: RB 1 Offset 74, SCC: RB 1 Offset 0 – Mid Channel - OPEN)



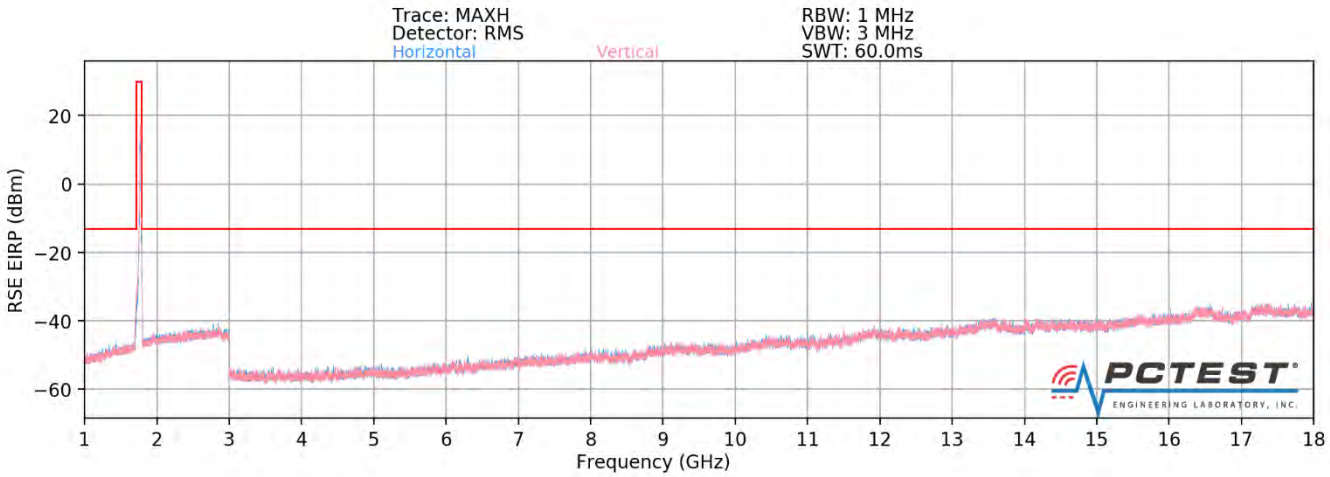
Plot 7-439. Radiated Spurious Plot (ULCA 66B PCC: RB 1 Offset 0, SCC: RB 1 Offset 24 – High Channel - OPEN)



Plot 7-440. Radiated Spurious Plot (ULCA 66B PCC: RB 75 Offset 0, SCC: RB 25 Offset 0 – Low Channel - OPEN)



Plot 7-441. Radiated Spurious Plot (ULCA 66B PCC: RB 75 Offset 0, SCC: RB 25 Offset 0 – Mid Channel - OPEN)



Plot 7-442. Radiated Spurious Plot (ULCA 66B PCC: RB 75 Offset 0, SCC: RB 25 Offset 0 – High Channel - OPEN)

OPERATING FREQUENCY:	1717.50	MHz
OPERATING FREQUENCY:	1726.80	MHz
CHANNEL:	132047	
CHANNEL:	132140	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15 + 5	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]
3453.60	H	-	-	-71.11	9.84	-61.27	-48.3
5180.40	H	-	-	-70.64	10.70	-59.94	-46.9
6907.20	H	-	-	-69.21	11.67	-57.55	-44.5
8634.00	H	-	-	-66.40	11.10	-55.30	-42.3

Table 7-59. Radiated Spurious Data (ULCA 66B PCC: RB 1 Offset 74, SCC: RB 1 Offset 0 – Low Channel - OPEN)

OPERATING FREQUENCY:	1745.00	MHz
OPERATING FREQUENCY:	1754.30	MHz
CHANNEL:	132322	
CHANNEL:	132415	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15 + 5	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	-	-	-73.73	9.91	-63.82	-50.8
5235.00	H	207	344	-67.55	10.73	-56.82	-43.8
6980.00	H	-	-	-69.91	11.82	-58.08	-45.1
8725.00	H	-	-	-66.56	11.00	-55.56	-42.6

Table 7-60. Radiated Spurious Data (ULCA 66B PCC: RB 1 Offset 74, SCC: RB 1 Offset 0 – Mid Channel - OPEN)

OPERATING FREQUENCY:	1772.50	MHz
OPERATING FREQUENCY:	1763.20	MHz
CHANNEL:	132597	
CHANNEL:	132504	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15 + 5	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	106	10	-69.83	9.89	-59.94	-46.9
5317.50	H	-	-	-71.11	10.69	-60.42	-47.4
7090.00	H	-	-	-68.94	11.77	-57.17	-44.2
8862.50	H	-	-	-66.06	11.01	-55.05	-42.1

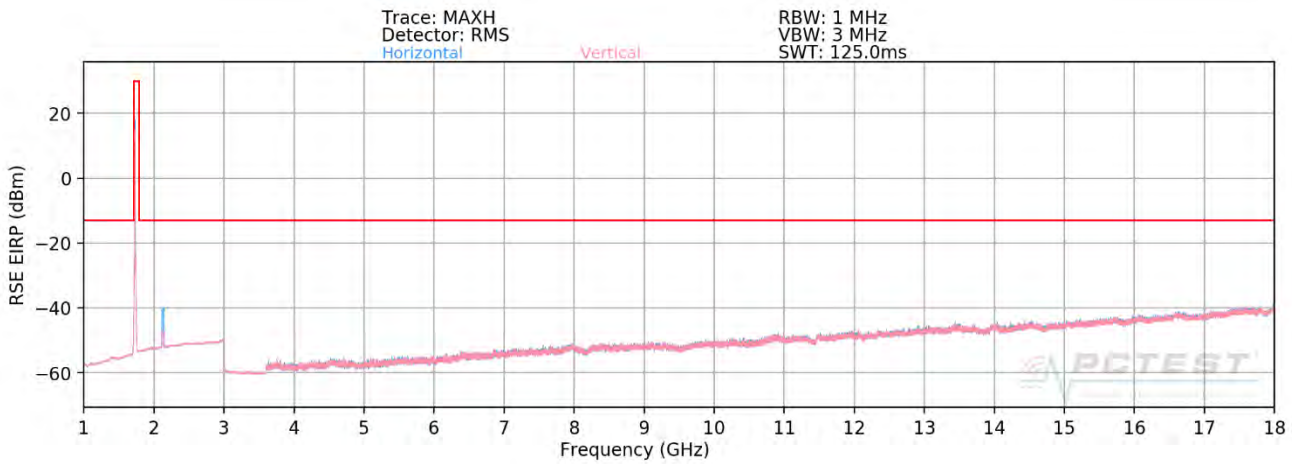
Table 7-61. Radiated Spurious Data (ULCA 66B PCC: RB 1 Offset 0, SCC: RB 1 Offset 74 – High Channel - OPEN)

OPERATING FREQUENCY:	1745.00	MHz
OPERATING FREQUENCY:	1754.30	MHz
CHANNEL:	132322	
CHANNEL:	132415	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15 + 5	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

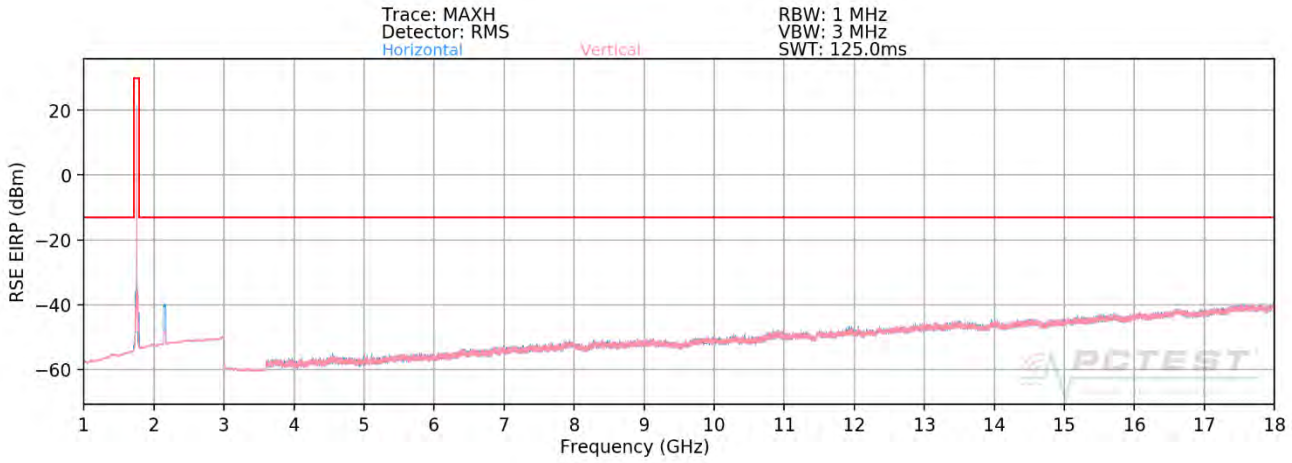
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	H	-	-	-71.49	9.91	-61.58	-48.6
5235.00	H	-	-	-71.26	10.73	-60.53	-47.5
6980.00	H	-	-	-69.64	11.82	-57.81	-44.8

Table 7-62. Radiated Spurious Data with WCP (ULCA 66B PCC: RB 1 Offset 74, SCC: RB 1 Offset 0 – Mid Channel - OPEN)

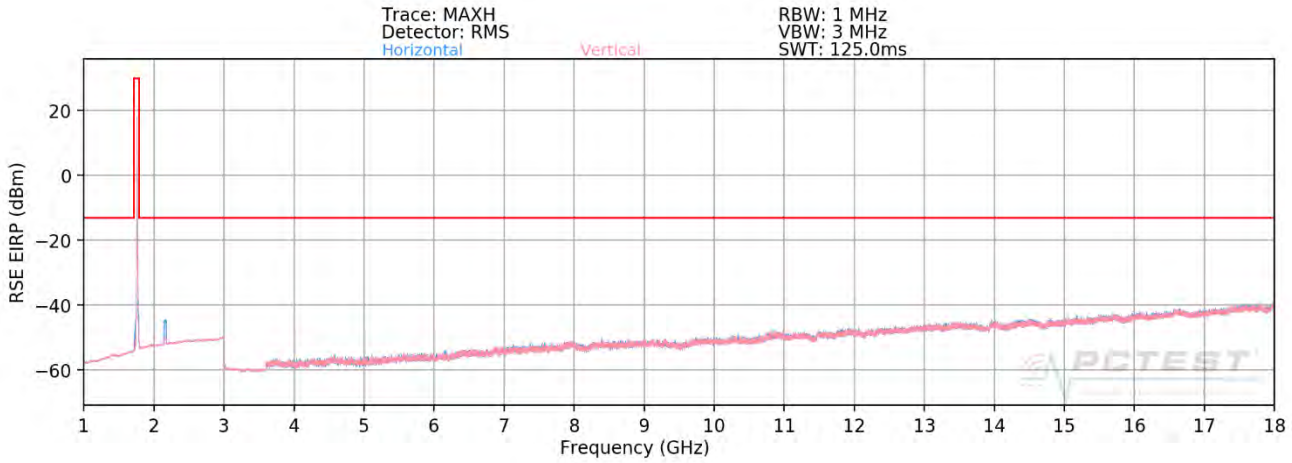
Uplink CA Configuration 66C



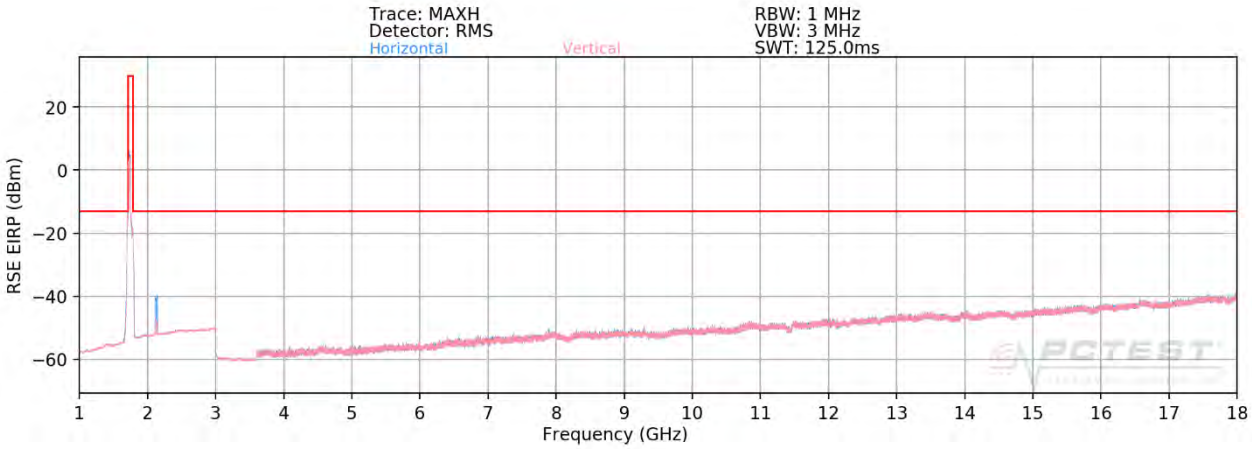
Plot 7-443. Radiated Spurious Plot (ULCA 66C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel - OPEN)



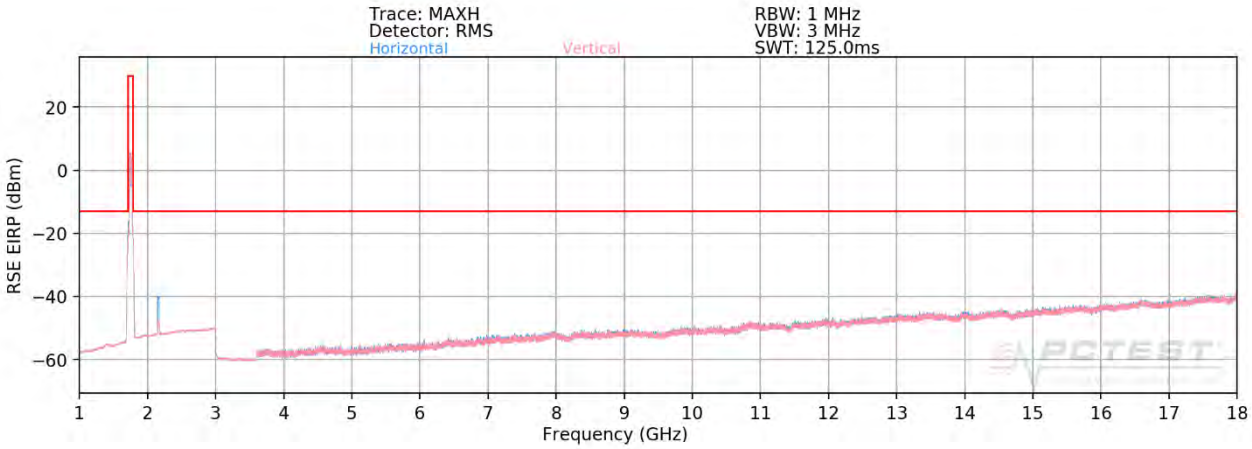
Plot 7-444. Radiated Spurious Plot (ULCA 66C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel - OPEN)



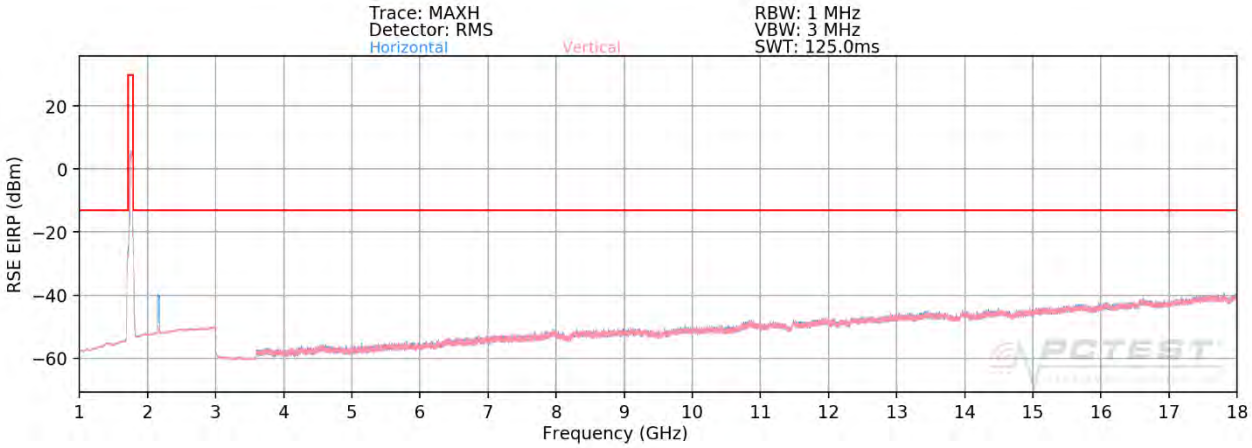
Plot 7-445. Radiated Spurious Plot (ULCA 66C PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel - OPEN)



Plot 7-446. Radiated Spurious Plot (ULCA 66C PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – Low Channel - OPEN)



Plot 7-447. Radiated Spurious Plot (ULCA 66C PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – Mid Channel – OPEN)



Plot 7-448. Radiated Spurious Plot (ULCA 66C PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – High Channel - OPEN)

OPERATING FREQUENCY:	1720.00	MHz
OPERATING FREQUENCY:	1739.80	MHz
CHANNEL:	132072	
CHANNEL:	132520	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15-5	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]
3479.60	H	-	-	-71.11	9.84	-61.27	-48.3
5219.40	H	-	-	-70.64	10.70	-59.94	-46.9
6959.20	H	-	-	-69.21	11.67	-57.55	-44.5
8699.00	H	-	-	-66.40	11.10	-55.30	-42.3

Table 7-63. Radiated Spurious Data (ULCA 66C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel - OPEN)

OPERATING FREQUENCY:	1745.00	MHz
OPERATING FREQUENCY:	1764.80	MHz
CHANNEL:	132322	
CHANNEL:	132250	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15-5	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	-	-	-73.73	9.91	-63.82	-50.8
5235.00	H	207	344	-67.55	10.73	-56.82	-43.8
6980.00	H	-	-	-69.91	11.82	-58.08	-45.1
8725.00	H	-	-	-66.56	11.00	-55.56	-42.6

Table 7-64. Radiated Spurious Data (ULCA 66C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel - OPEN)

OPERATING FREQUENCY:	1770.00	MHz
OPERATING FREQUENCY:	1750.20	MHz
CHANNEL:	132572	
CHANNEL:	132374	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15-5	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]
3540.00	H	106	10	-69.83	9.89	-59.94	-46.9
5310.00	H	-	-	-71.11	10.69	-60.42	-47.4
7080.00	H	-	-	-68.94	11.77	-57.17	-44.2
8850.00	H	-	-	-66.06	11.01	-55.05	-42.1

Table 7-65. Radiated Spurious Data (ULCA 66C PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel - OPEN)

OPERATING FREQUENCY:	1745.00	MHz
OPERATING FREQUENCY:	1764.80	MHz
CHANNEL:	132322	
CHANNEL:	132250	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15-5	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	-	-	-71.49	9.91	-61.58	-48.6
5235.00	H	-	-	-71.26	10.73	-60.53	-47.5
6980.00	H	-	-	-69.64	11.82	-57.81	-44.8

Table 7-66. Radiated Spurious Data with WCP (ULCA 66C PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel - OPEN)

7.10 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 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

Band 71 Frequency Stability Measurements

OPERATING FREQUENCY:	680,500,000	Hz
CHANNEL:	133297	
REFERENCE VOLTAGE:	4.27	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	680,500,375	375	0.0000551
100 %		- 20	680,499,682	-318	-0.0000467
100 %		- 10	680,499,747	-253	-0.0000372
100 %		0	680,500,128	128	0.0000188
100 %		+ 10	680,499,623	-377	-0.0000554
100 %		+ 20	680,499,876	-124	-0.0000182
100 %		+ 30	680,500,134	134	0.0000197
100 %		+ 40	680,499,742	-258	-0.0000379
100 %		+ 50	680,500,249	249	0.0000366
BATT. ENDPOINT	3.45	+ 20	680,499,640	-360	-0.0000529

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.

Band 71 Frequency Stability Measurements

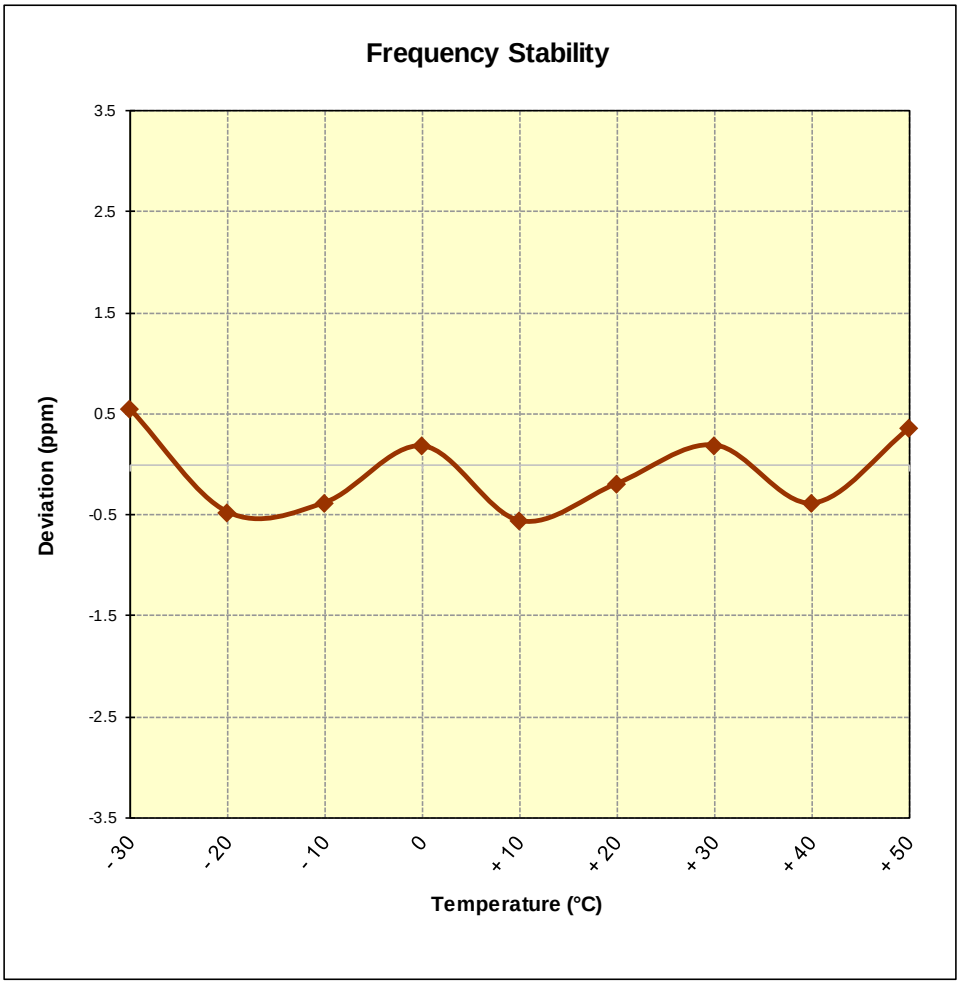


Figure 7-10. Frequency Stability Graph (Band 71)

Band 12 Frequency Stability Measurements

OPERATING FREQUENCY:	707,500,000	Hz
CHANNEL:	23790	
REFERENCE VOLTAGE:	4.27	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	707,500,282	282	0.0000399
100 %		- 20	707,500,246	246	0.0000348
100 %		- 10	707,500,014	14	0.0000020
100 %		0	707,499,940	-60	-0.0000085
100 %		+ 10	707,499,988	-12	-0.0000017
100 %		+ 20	707,499,918	-82	-0.0000116
100 %		+ 30	707,500,007	7	0.0000010
100 %		+ 40	707,499,769	-231	-0.0000327
100 %		+ 50	707,499,863	-137	-0.0000194
BATT. ENDPOINT	3.45	+ 20	707,500,196	196	0.0000277

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.

Band 12 Frequency Stability Measurements

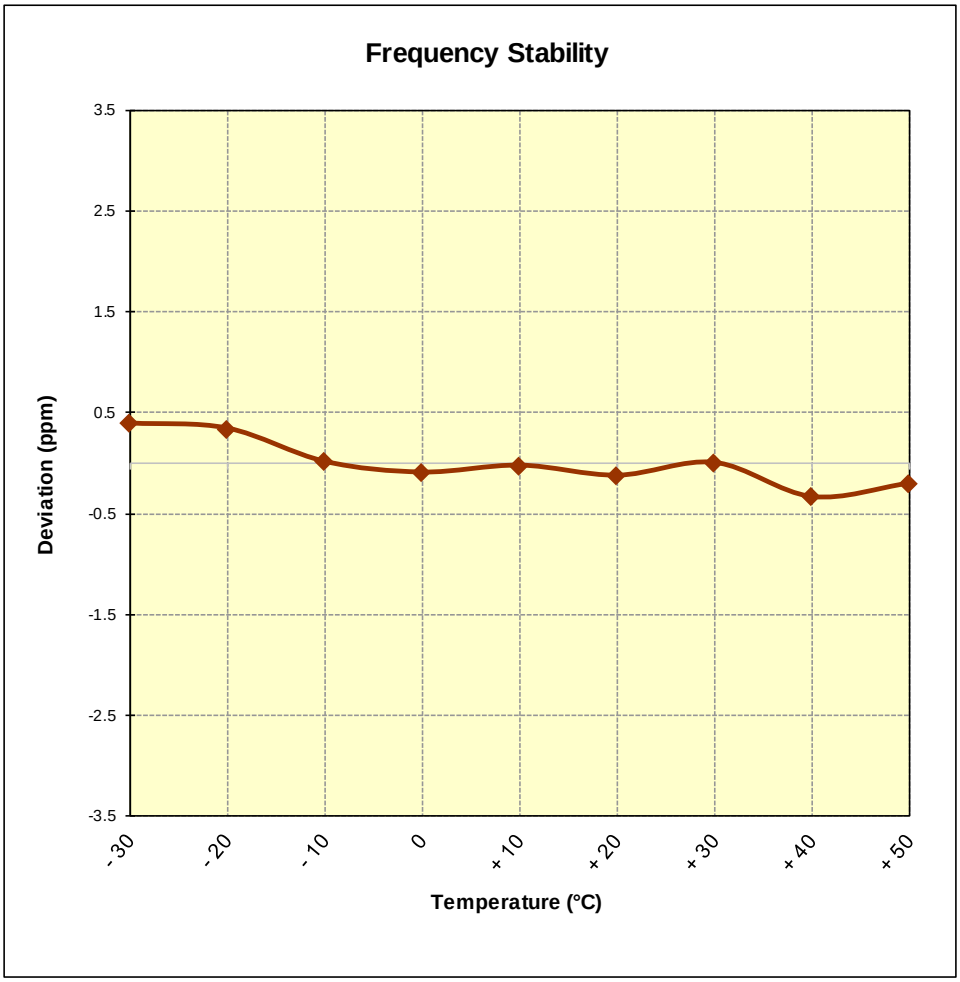


Figure 7-11. Frequency Stability Graph (Band 12)

Band 13 Frequency Stability Measurements

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	
REFERENCE VOLTAGE:	4.27	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	781,999,848	-152	-0.0000194
100 %		- 20	782,000,201	201	0.0000257
100 %		- 10	782,000,136	136	0.0000174
100 %		0	781,999,833	-167	-0.0000214
100 %		+ 10	782,000,106	106	0.0000136
100 %		+ 20	781,999,981	-19	-0.0000024
100 %		+ 30	781,999,817	-183	-0.0000234
100 %		+ 40	781,999,727	-273	-0.0000349
100 %		+ 50	781,999,587	-413	-0.0000528
BATT. ENDPOINT	3.45	+ 20	781,999,970	-30	-0.0000038

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.

Band 13 Frequency Stability Measurements

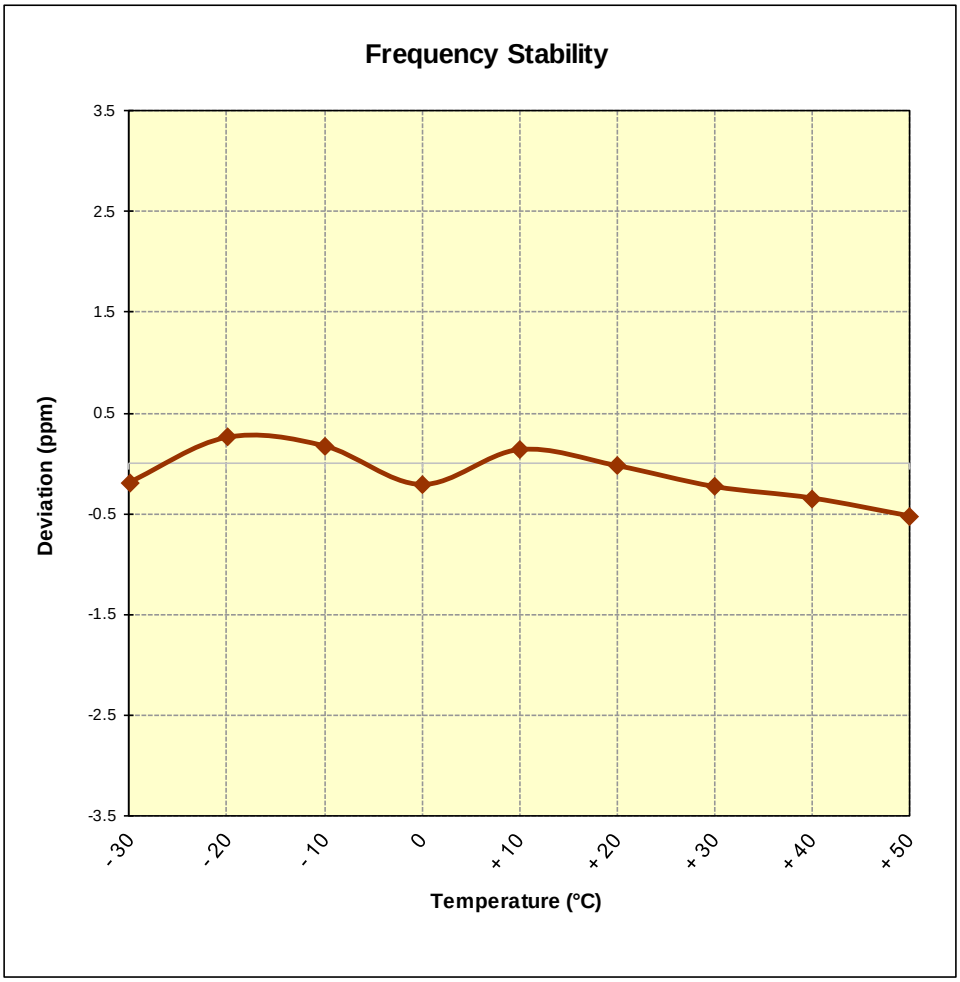


Figure 7-12. Frequency Stability Graph (Band 13)

Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	4.27	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	831,500,270	270	0.0000325
100 %		- 20	831,500,222	222	0.0000267
100 %		- 10	831,499,864	-136	-0.0000164
100 %		0	831,500,015	15	0.0000018
100 %		+ 10	831,499,857	-143	-0.0000172
100 %		+ 20	831,499,852	-148	-0.0000178
100 %		+ 30	831,500,042	42	0.0000051
100 %		+ 40	831,499,903	-97	-0.0000117
100 %		+ 50	831,499,991	-9	-0.0000011
BATT. ENDPOINT	3.45	+ 20	831,500,053	53	0.0000064

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

Band 26/5 Frequency Stability Measurements

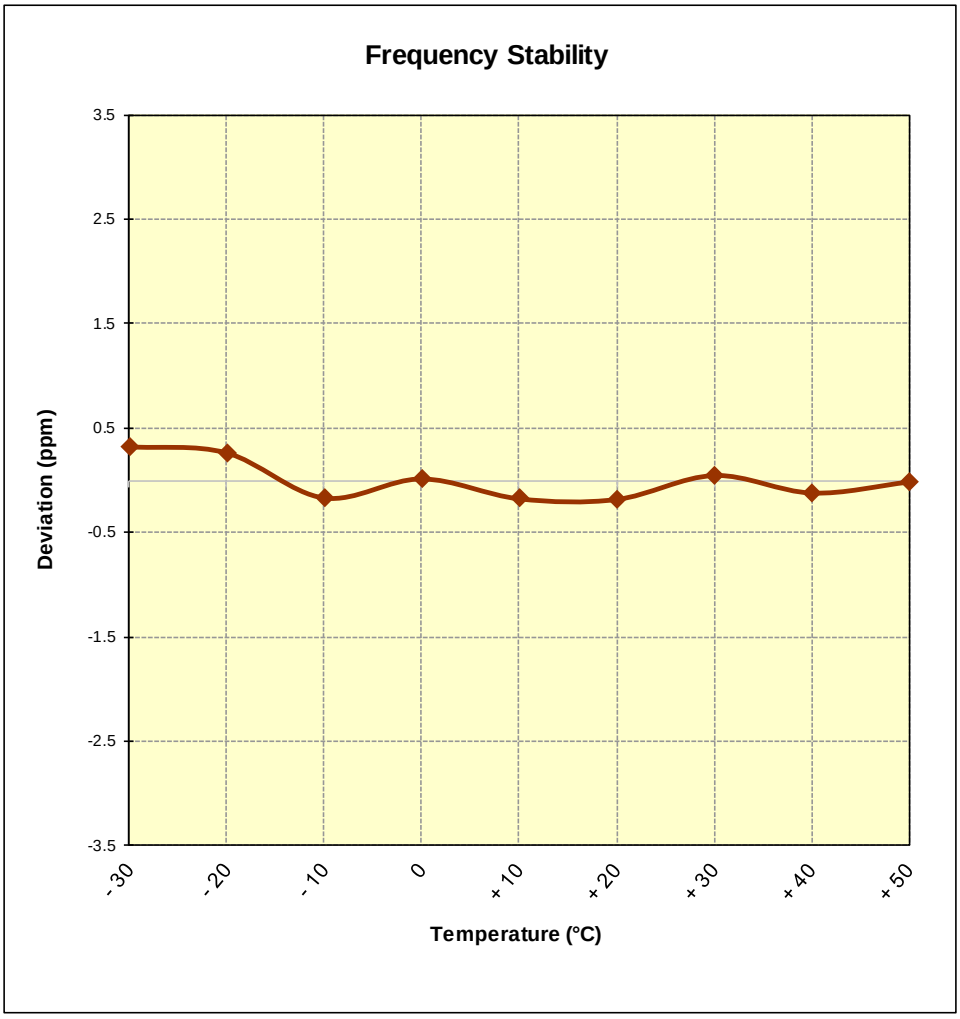


Figure 7-13. Frequency Stability Graph (Band 26/5)

Band 66/4 Frequency Stability Measurements

OPERATING FREQUENCY:	1,745,000,000	Hz
CHANNEL:	132322	
REFERENCE VOLTAGE:	4.27	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	1,745,000,067	67	0.0000038
100 %		- 20	1,745,000,097	97	0.0000056
100 %		- 10	1,744,999,983	-17	-0.0000010
100 %		0	1,744,999,979	-21	-0.0000012
100 %		+ 10	1,745,000,347	347	0.0000199
100 %		+ 20	1,745,000,162	162	0.0000093
100 %		+ 30	1,744,999,932	-68	-0.0000039
100 %		+ 40	1,745,000,038	38	0.0000022
100 %		+ 50	1,744,999,786	-214	-0.0000123
BATT. ENDPOINT	3.45	+ 20	1,744,999,569	-431	-0.0000247

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.

Band 66/4 Frequency Stability Measurements

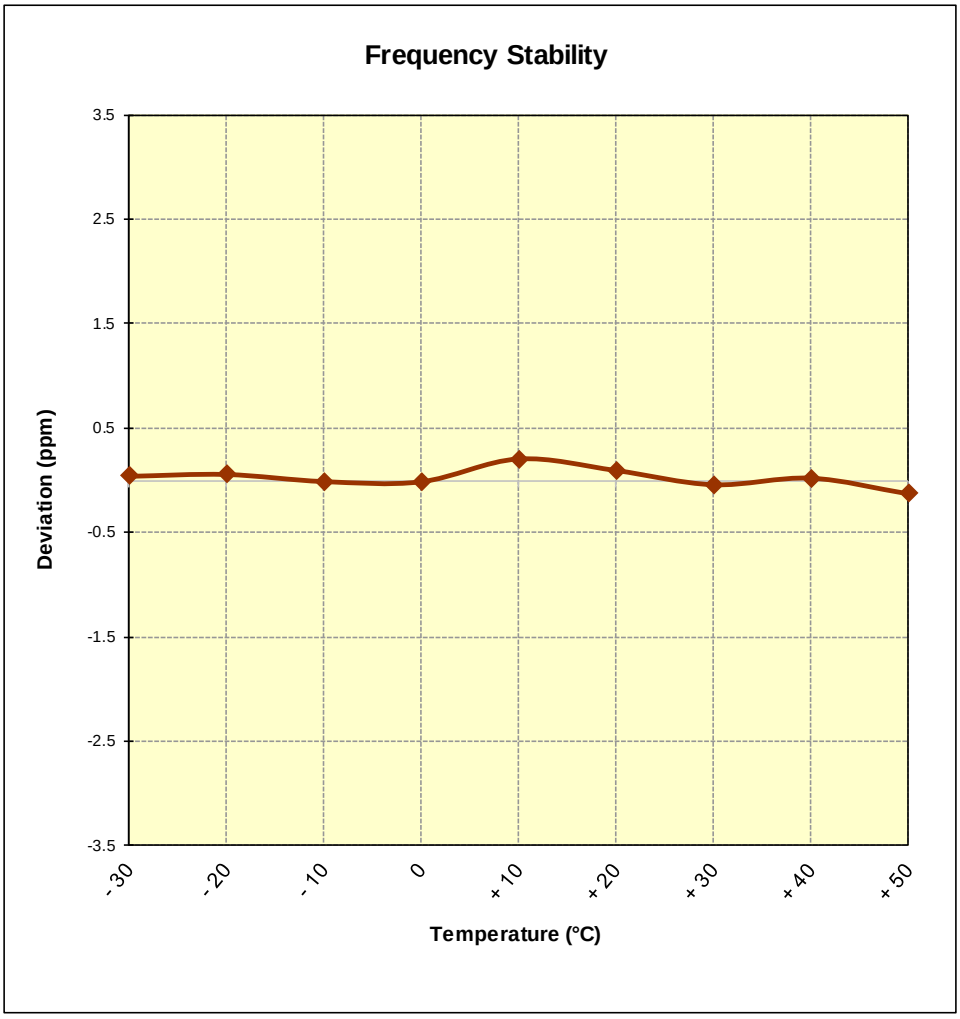


Figure 7-14. Frequency Stability Graph (Band 66/4)

Band 25/2 Frequency Stability Measurements

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	
REFERENCE VOLTAGE:	4.27	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	1,882,499,839	-161	-0.0000086
100 %		- 20	1,882,499,897	-103	-0.0000055
100 %		- 10	1,882,500,056	56	0.0000030
100 %		0	1,882,500,181	181	0.0000096
100 %		+ 10	1,882,500,192	192	0.0000102
100 %		+ 20	1,882,499,955	-45	-0.0000024
100 %		+ 30	1,882,500,051	51	0.0000027
100 %		+ 40	1,882,500,067	67	0.0000036
100 %		+ 50	1,882,500,057	57	0.0000030
BATT. ENDPOINT	3.45	+ 20	1,882,499,962	-38	-0.0000020

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

Band 25/2 Frequency Stability Measurements

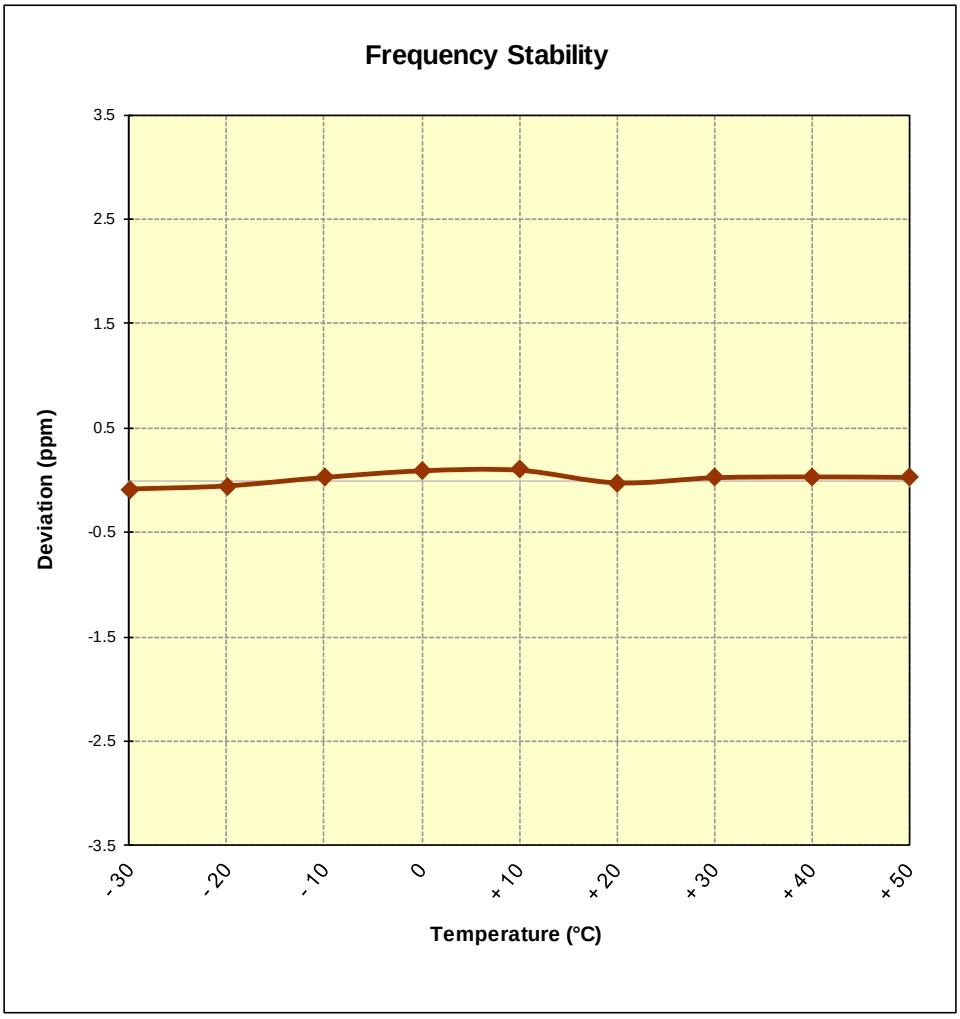


Figure 7-15. Frequency Stability Graph (Band 25/2)

Band 30 Frequency Stability Measurements

OPERATING FREQUENCY:	2,310,000,000	Hz
CHANNEL:	27710	
REFERENCE VOLTAGE:	4.27	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	2,309,999,780	-220	-0.0000095
100 %		- 20	2,309,999,889	-111	-0.0000048
100 %		- 10	2,310,000,090	90	0.0000039
100 %		0	2,310,000,326	326	0.0000141
100 %		+ 10	2,309,999,893	-107	-0.0000046
100 %		+ 20	2,309,999,826	-174	-0.0000075
100 %		+ 30	2,310,000,177	177	0.0000077
100 %		+ 40	2,309,999,848	-152	-0.0000066
100 %		+ 50	2,309,999,974	-26	-0.0000011
BATT. ENDPOINT	3.45	+ 20	2,310,000,181	181	0.0000078

Table 7-73. Frequency Stability Data (Band 30)

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 30 Frequency Stability Measurements

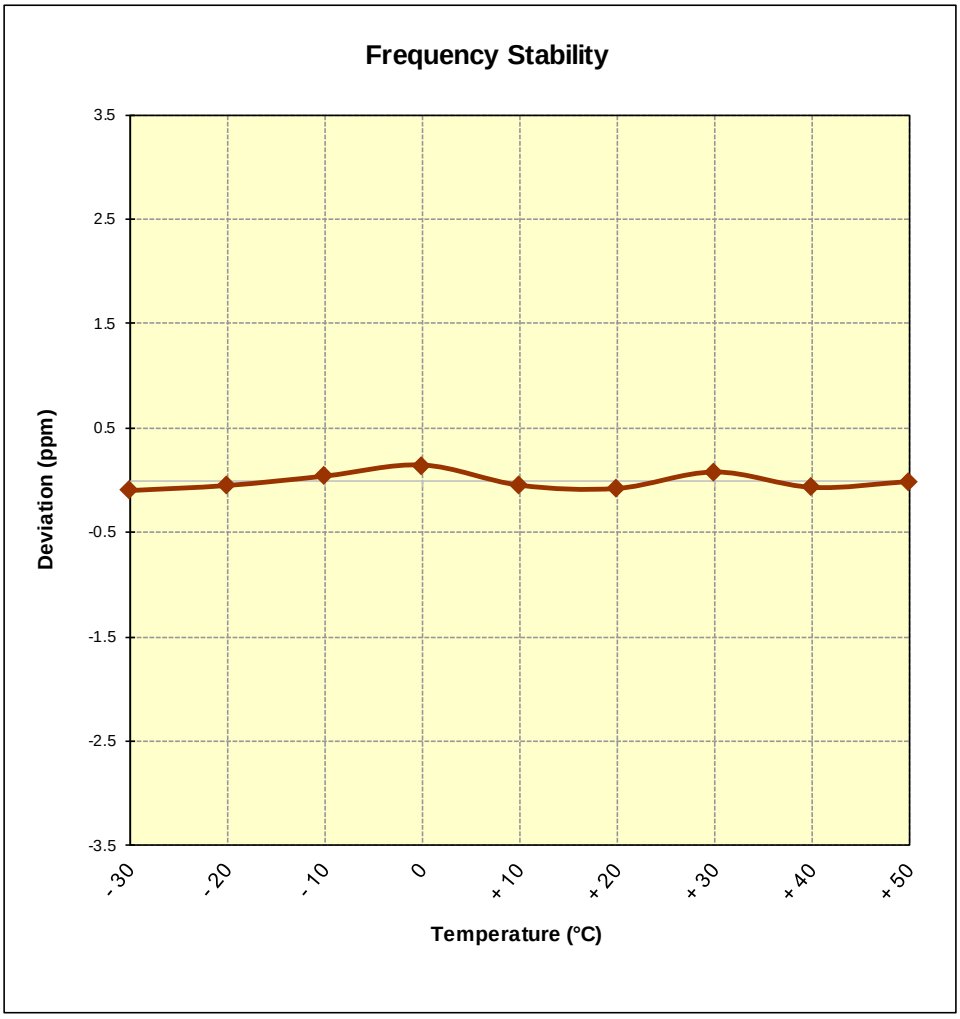


Figure 7-16. Frequency Stability Graph (Band 30)

Band 7 Frequency Stability Measurements

OPERATING FREQUENCY:	2,535,000,000	Hz
CHANNEL:	21100	
REFERENCE VOLTAGE:	4.27	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	2,534,999,979	-21	-0.0000008
100 %		- 20	2,535,000,285	285	0.0000112
100 %		- 10	2,535,000,028	28	0.0000011
100 %		0	2,535,000,149	149	0.0000059
100 %		+ 10	2,534,999,835	-165	-0.0000065
100 %		+ 20	2,535,000,329	329	0.0000130
100 %		+ 30	2,535,000,118	118	0.0000047
100 %		+ 40	2,534,999,813	-187	-0.0000074
100 %		+ 50	2,535,000,113	113	0.0000045
BATT. ENDPOINT	3.45	+ 20	2,535,000,147	147	0.0000058

Table 7-74. Frequency Stability Data (Band 7)

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 7 Frequency Stability Measurements

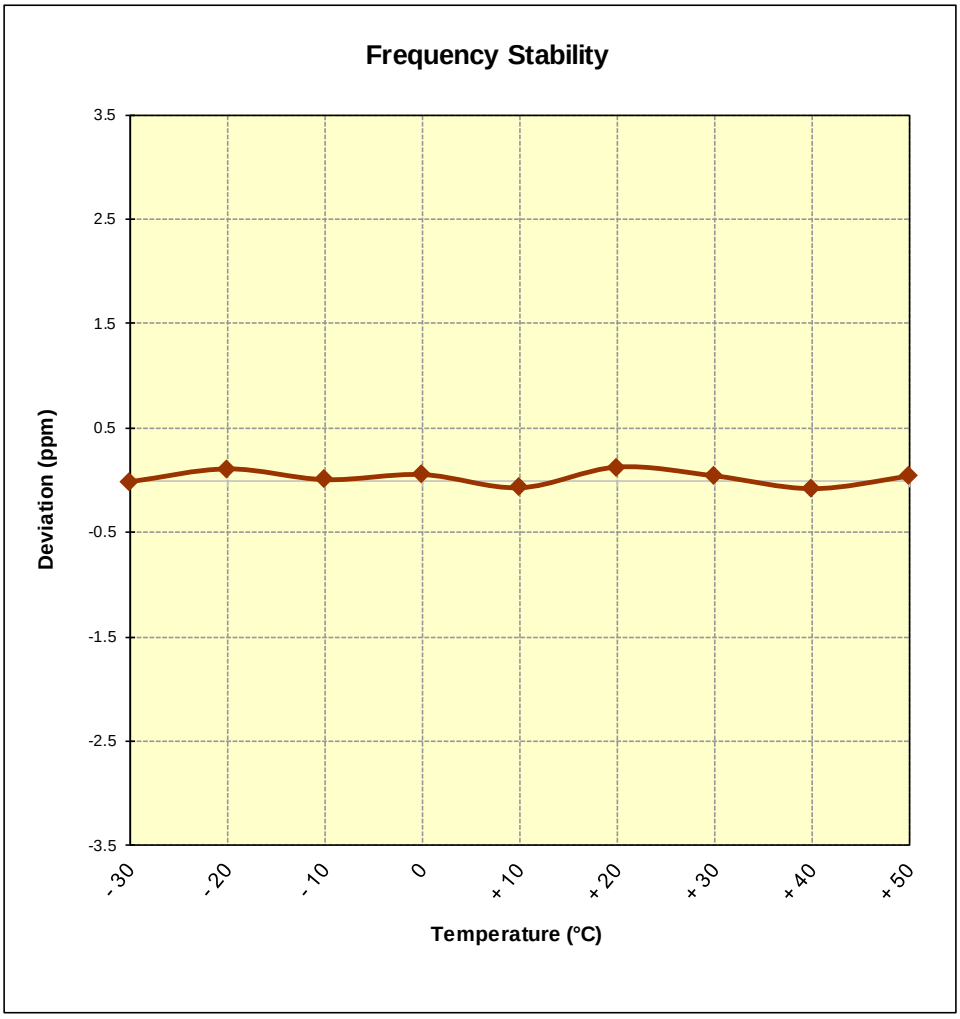


Figure 7-17. Frequency Stability Graph (Band 7)

Band 41/38 Frequency Stability Measurements

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	4.27	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	2,593,000,166	166	0.0000064
100 %		- 20	2,593,000,280	280	0.0000108
100 %		- 10	2,592,999,853	-147	-0.0000057
100 %		0	2,593,000,123	123	0.0000047
100 %		+ 10	2,592,999,808	-192	-0.0000074
100 %		+ 20	2,593,000,020	20	0.0000008
100 %		+ 30	2,593,000,086	86	0.0000033
100 %		+ 40	2,592,999,929	-71	-0.0000027
100 %		+ 50	2,593,000,420	420	0.0000162
BATT. ENDPOINT	3.45	+ 20	2,592,999,779	-221	-0.0000085

Table 7-75. Frequency Stability Data (Band 41/38)

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 41/38 Frequency Stability Measurements

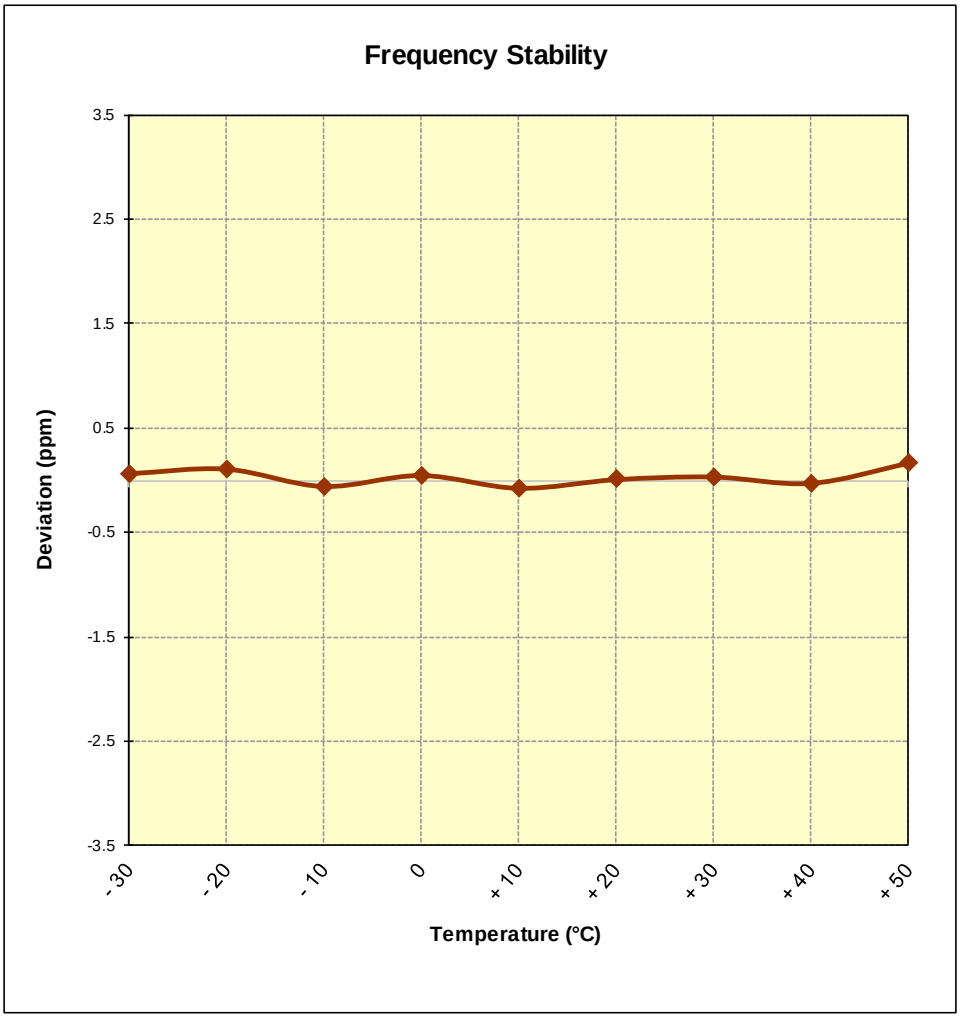


Figure 7-18. Frequency Stability Graph (Band 41/38)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMF900F** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.