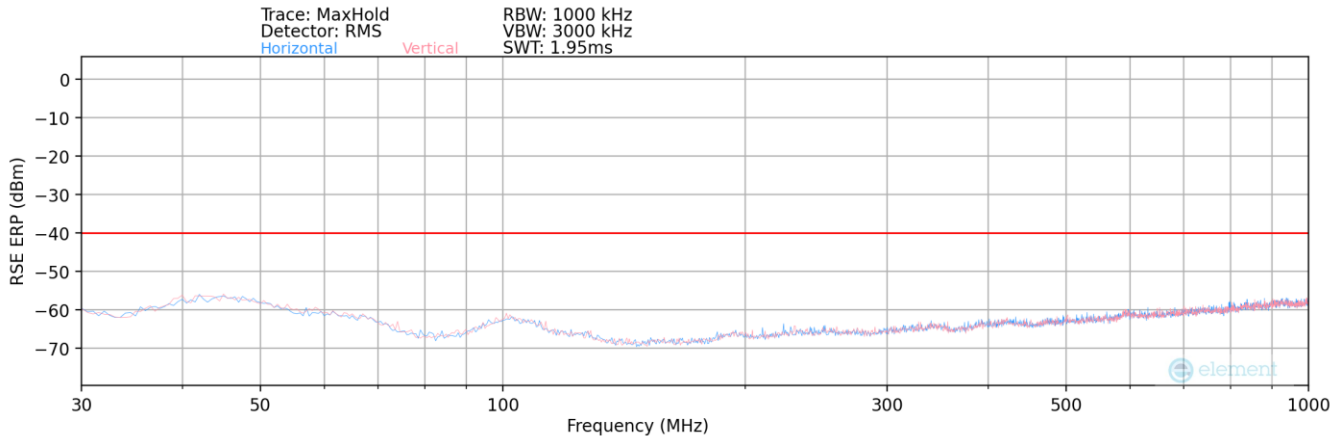
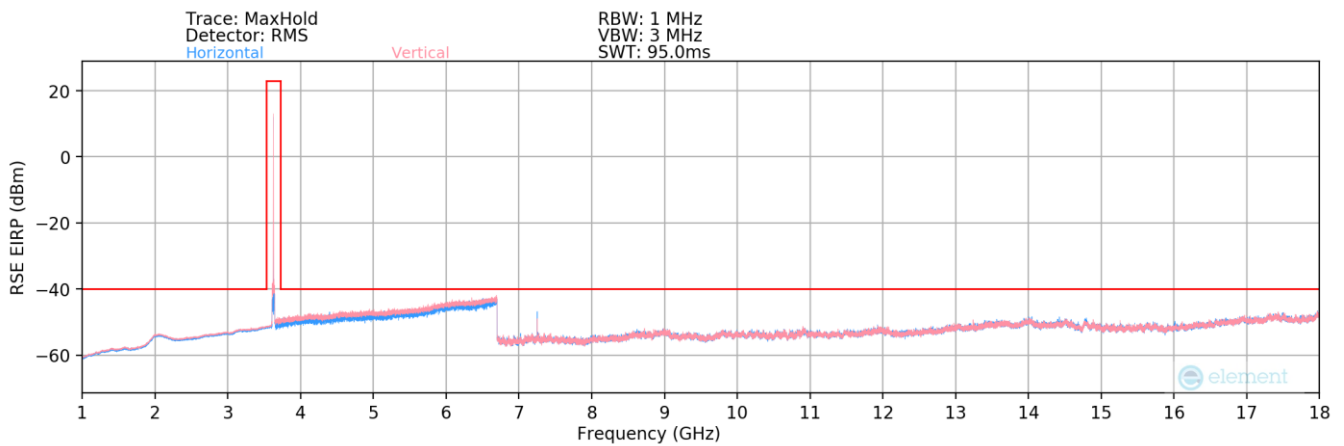


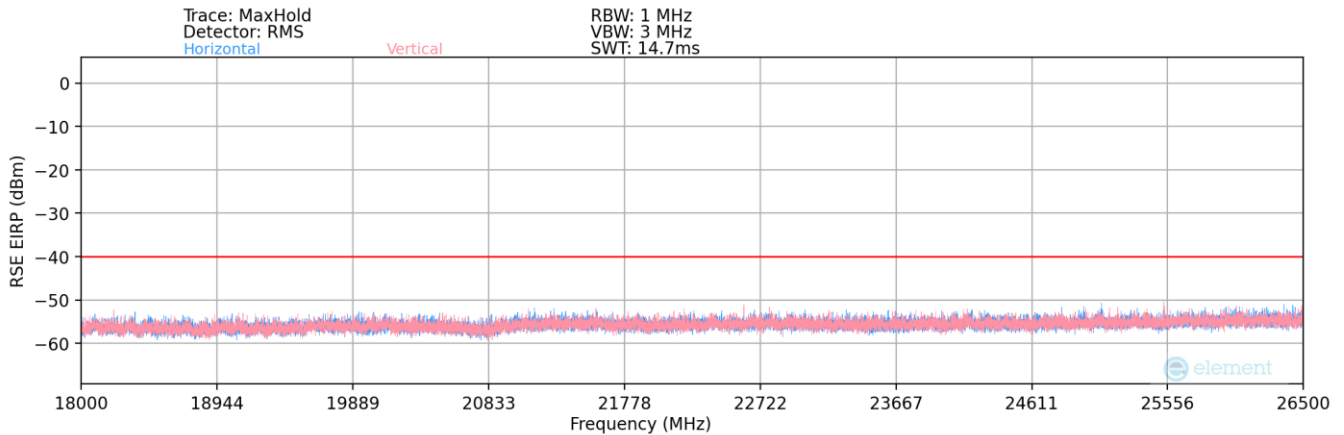
NR Band n48



Plot 7-67. Radiated Spurious Plot (NR Band n48 – Below 1GHz)

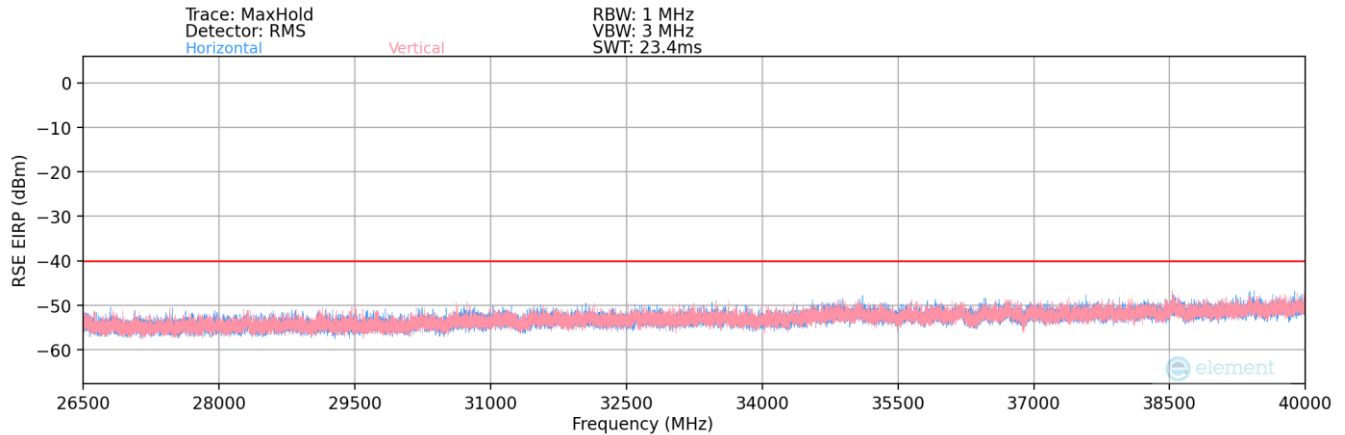


Plot 7-68. Radiated Spurious Plot (NR Band n48– 1GHz -18GHz)



Plot 7-69. Radiated Spurious Plot (NR Band n48 – 18GHz -26.5GHz)

| | | | |
|--|--|--------------------------------------|--|
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Plot 7-70. Radiated Spurious Plot (NR Band n48 – 26.5GHz-40GHz– Ant1)

| | |
|----------------------------|--------|
| Bandwidth (MHz): | 40 |
| Frequency (MHz): | 3570.0 |
| Modulation Signal: | QPSK |
| RB Config (Size / Offset): | 1 / 53 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBμV/m] | ERP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|-----------------------------------|-------------|-------------|
| 213.00 | H | - | - | -62.59 | -11.33 | 33.08 | -64.33 | -40.00 | -24.33 |

Table 7-25. Radiated Spurious Data (NR Band n48 – Below 1GHz - Ant1)

| | |
|----------------------------|--------|
| Bandwidth (MHz): | 40 |
| Frequency (MHz): | 3570.0 |
| Modulation Signal: | QPSK |
| RB Config (Size / Offset): | 1 / 53 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBμV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|------------------------------------|-------------|-------------|
| 7140.00 | H | 173 | 308 | -65.46 | 9.62 | 51.16 | -44.10 | -40.00 | -4.10 |
| 10710.00 | H | - | - | -79.57 | 12.33 | 39.76 | -55.49 | -40.00 | -15.49 |
| 14280.00 | H | - | - | -80.18 | 15.60 | 42.42 | -52.84 | -40.00 | -12.84 |
| 17850.00 | H | - | - | -80.36 | 17.64 | 44.28 | -50.98 | -40.00 | -10.98 |

Table 7-26. Radiated Spurious Data (NR Band n48 – Low Channel - Ant1)

| | |
|----------------------------|--------|
| Bandwidth (MHz): | 40 |
| Frequency (MHz): | 3625.0 |
| Modulation Signal: | QPSK |
| RB Config (Size / Offset): | 1 / 53 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBμV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|------------------------------------|-------------|-------------|
| 7250.00 | H | 276 | 311 | -65.94 | 9.18 | 50.24 | -45.02 | -40.00 | -5.02 |
| 10875.00 | H | 213 | 42 | -77.67 | 11.95 | 41.28 | -53.98 | -40.00 | -13.98 |
| 14500.00 | H | - | - | -79.96 | 15.94 | 42.98 | -52.27 | -40.00 | -12.27 |
| 18125.00 | H | - | - | -58.84 | 1.60 | 49.75 | -55.05 | -40.00 | -15.05 |
| 21750.00 | H | - | - | -59.99 | 3.86 | 50.87 | -53.93 | -40.00 | -13.93 |

Table 7-27. Radiated Spurious Data (NR Band n48 – Mid Channel - Ant1)

| | | | |
|---|-------------------------------------|-------------------------------|-----------------------------------|
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| | |
|----------------------------|--------|
| Bandwidth (MHz): | 40 |
| Frequency (MHz): | 3680.0 |
| Modulation Signal: | QPSK |
| RB Config (Size / Offset): | 1 / 53 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBμV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|------------------------------------|-------------|-------------|
| 7360.00 | H | 271 | 314 | -69.66 | 9.60 | 46.94 | -48.32 | -40.00 | -8.32 |
| 11040.00 | H | 194 | 30 | -74.07 | 12.06 | 44.99 | -50.27 | -40.00 | -10.27 |
| 14720.00 | H | - | - | -80.50 | 15.48 | 41.98 | -53.27 | -40.00 | -13.27 |
| 18400.00 | H | - | - | -59.55 | 1.45 | 48.91 | -55.89 | -40.00 | -15.89 |
| 22080.00 | H | - | - | -59.49 | 3.74 | 51.25 | -53.55 | -40.00 | -13.55 |

Table 7-28. Radiated Spurious Data (NR Band n48 – High Channel - Ant1)

| | |
|----------------------------|--------------------------|
| Case: | w/ Wireless Charging Pad |
| Bandwidth (MHz): | 40 |
| Frequency (MHz): | 3570.0 |
| Modulation Signal: | QPSK |
| RB Config (Size / Offset): | 1 / 53 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBμV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|------------------------------------|-------------|-------------|
| 7140.00 | H | 163 | 317 | -67.79 | 9.62 | 48.83 | -46.43 | -40.00 | -6.43 |
| 10710.00 | H | - | - | -79.59 | 12.33 | 39.74 | -55.51 | -40.00 | -15.51 |
| 14280.00 | H | - | - | -80.16 | 15.60 | 42.44 | -52.82 | -40.00 | -12.82 |
| 17850.00 | H | - | - | -80.70 | 17.64 | 43.94 | -51.32 | -40.00 | -11.32 |

Table 7-29. Radiated Spurious Data with WCP (NR Band n48)

| | | | |
|---|-------------------------------------|-------------------------------|-----------------------------------|
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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 C63.26-2015. 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 96, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI C63.26-2015 – Section 5.6

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

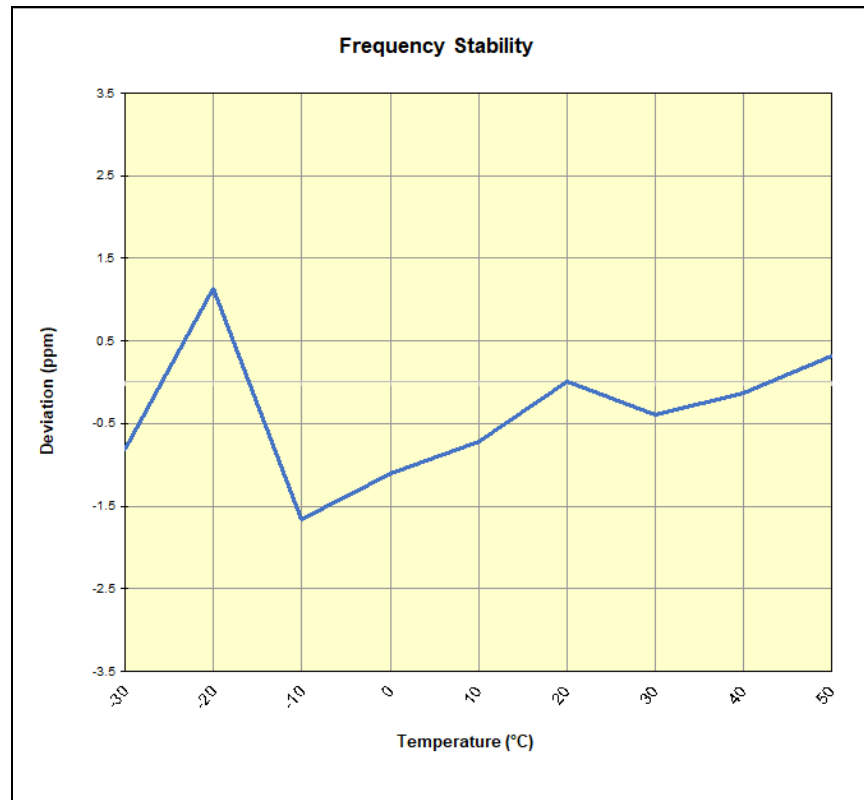
None

| | | | |
|--|--|--------------------------------------|--|
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Frequency Stability / Temperature Variation

| LTE Band 48 | | | | | |
|---------------------------|-------------|---------------|----------------|-----------------|---------------|
| Operating Frequency (Hz): | | 3,625,000,000 | | | |
| Ref. Voltage (VDC): | | 4.43 | | | |
| Voltage (%) | Power (VDC) | Temp (°C) | Frequency (Hz) | Freq. Dev. (Hz) | Deviation (%) |
| 100 % | 4.43 | - 30 | 3,620,698,076 | -2,950 | -0.0000815 |
| | | - 20 | 3,620,705,113 | 4,087 | 0.0001129 |
| | | - 10 | 3,620,695,015 | -6,010 | -0.0001660 |
| | | 0 | 3,620,696,997 | -4,028 | -0.0001112 |
| | | + 10 | 3,620,698,429 | -2,597 | -0.0000717 |
| | | + 20 (Ref) | 3,620,701,025 | 0 | 0.0000000 |
| | | + 30 | 3,620,699,624 | -1,402 | -0.0000387 |
| | | + 40 | 3,620,700,569 | -457 | -0.0000126 |
| | | + 50 | 3,620,702,198 | 1,173 | 0.0000324 |
| Battery Endpoint | 3.27 | + 20 | 3,620,701,000 | -25 | -0.0000007 |

Table 7-30. LTE Band 48 Frequency Stability Data



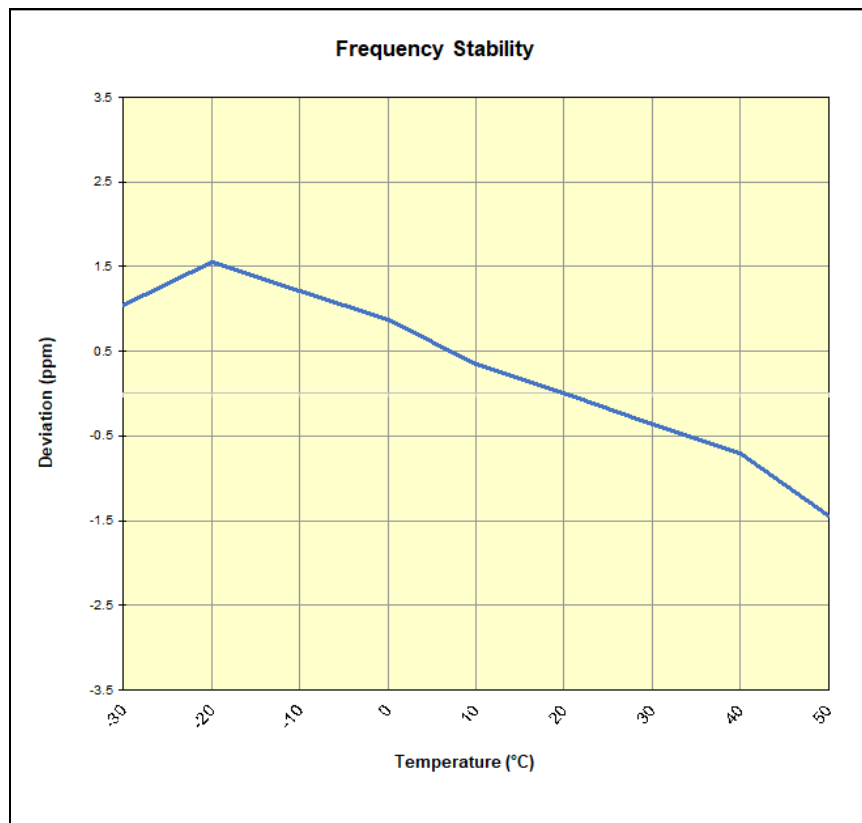
Plot 7-71. LTE Band 48 Frequency Stability Chart

| | | | |
|---|-------------------------------------|-------------------------------|-----------------------------------|
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Frequency Stability / Temperature Variation

| NR Band n48 | | | | | |
|---------------------------|-------------|---------------|----------------|-----------------|---------------|
| Operating Frequency (Hz): | | 3,625,000,000 | | | |
| Ref. Voltage (VDC): | | 4.43 | | | |
| Voltage (%) | Power (VDC) | Temp (°C) | Frequency (Hz) | Freq. Dev. (Hz) | Deviation (%) |
| 100 % | 4.43 | - 30 | 3,625,310,711 | 3,794 | 0.0001047 |
| | | - 20 | 3,625,312,533 | 5,617 | 0.0001549 |
| | | - 10 | 3,625,311,287 | 4,371 | 0.0001206 |
| | | 0 | 3,625,310,066 | 3,150 | 0.0000869 |
| | | + 10 | 3,625,308,197 | 1,281 | 0.0000353 |
| | | + 20 (Ref) | 3,625,306,916 | 0 | 0.0000000 |
| | | + 30 | 3,625,305,588 | -1,328 | -0.0000366 |
| | | + 40 | 3,625,304,379 | -2,537 | -0.0000700 |
| Battery Endpoint | 3.27 | + 20 | 3,625,306,900 | -16 | -0.0000004 |

Table 7-31. NR Band n48 Frequency Stability Data



Plot 7-72. NR Band n48 Frequency Stability Chart

| | | | |
|---|-------------------------------------|-------------------------------|-----------------------------------|
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7.9 End User Device Additional Requirement (CBSD Protocol)

Test Overview and Limit

End user device additional requirements are tested per the test procedures listed below. During testing, the EUT is connected to a certified LTE CBSD (Ruckus FCC ID: S9GQ910US00) and an NR CBSD (Airspan FCC ID: PIDAV2700) as a companion device to show compliance with Part 96.47.

End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.

An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.

Test Procedure Used

KDB 940660 D01 v03, WINNF-18-IN-00178 v1.0.0.00

Test Setup/Method

The EUT was connected via an RF cable to a certified CBSD and spectrum analyzer. The following procedure is performed by applying WINNF-TS-0122 CBRS CBSD Test Specification.

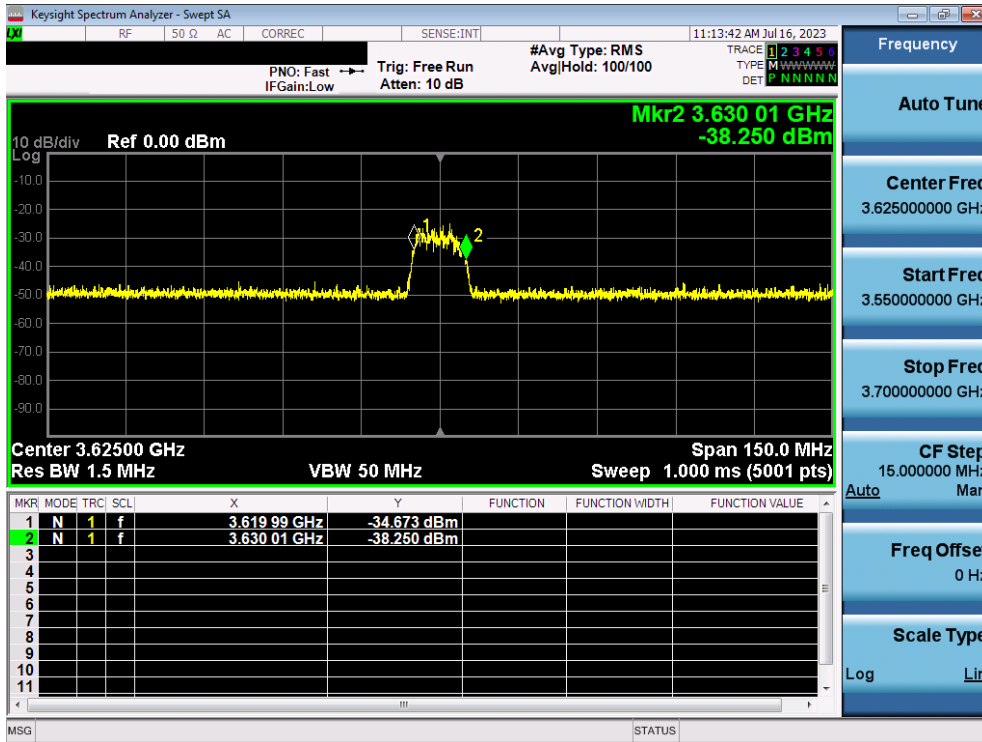
1. Run#1:
 - a. Setup WINNF.PT.C.HBT.1 with 3615MHz – 3635MHz.
 - b. Enable AP service from Ruckus Cloud management.
 - c. Check EUT Tx frequency.
 - d. Disable AP service from Ruckus Cloud management and check EUT stop transmission within 10s.
2. Run#2:
 - a. Setup WINNF.PT.C.HBT.1 with 3660MHz – 3680MHz.
 - b. Enable AP service from Ruckus Cloud management.
 - c. Check EUT Tx frequency.
 - d. Disable AP service from Ruckus Cloud management and check EUT stop transmission within 10s.

Test Notes

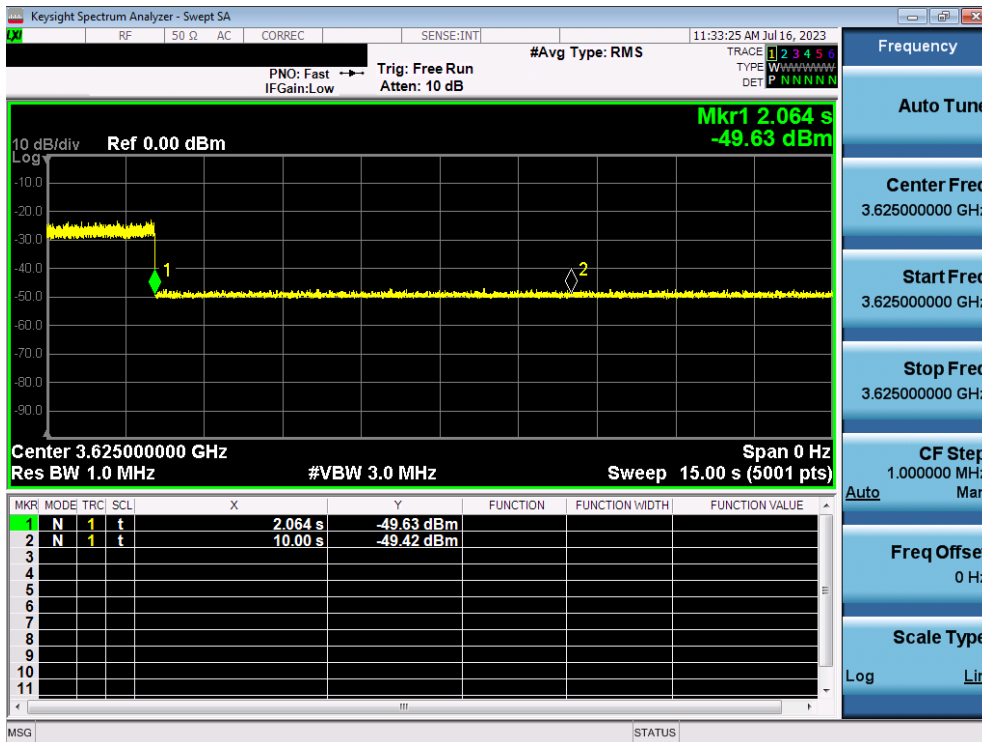
The EUT is an End User Device.

| | | | |
|---|-------------------------------------|-------------------------------|-----------------------------------|
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Run#1 – LTE Band 48:



Plot 7-73. Run#1 End User Device Frequency of Operations



Plot 7-74. Run#1 End User Device Discontinues Operations within 10s

| | | | |
|---|-------------------------------------|-------------------------------|-----------------------------------|
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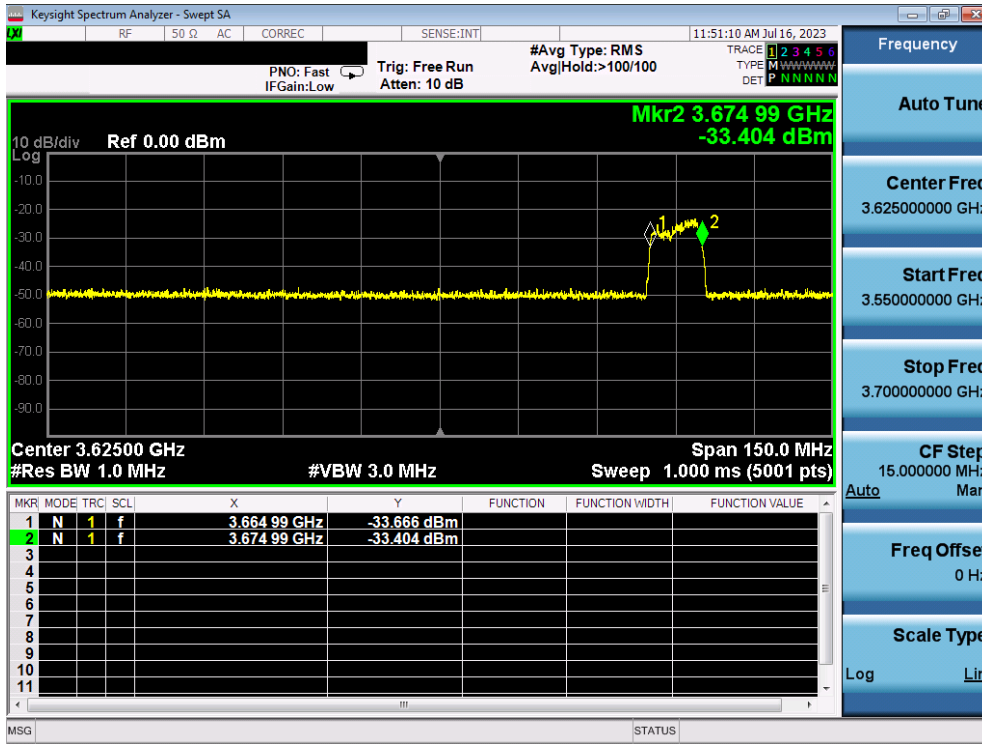


Note:

Marker 1: CBSD sends instructions to discontinue LTE operations.
Marker 2: EUT discontinues operation.
Marker 3: 10 seconds elapsed time from CBSD sending instructions to EUT.

| | | | |
|--|--|--------------------------------------|--|
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Run#2 – LTE Band 48:



Plot 7-75. Run#2 End User Device Frequency of Operations



Plot 7-76. Run#2 End User Device Discontinues Operations within 10s

| | | | |
|---|-------------------------------------|-------------------------------|-----------------------------------|
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Note:

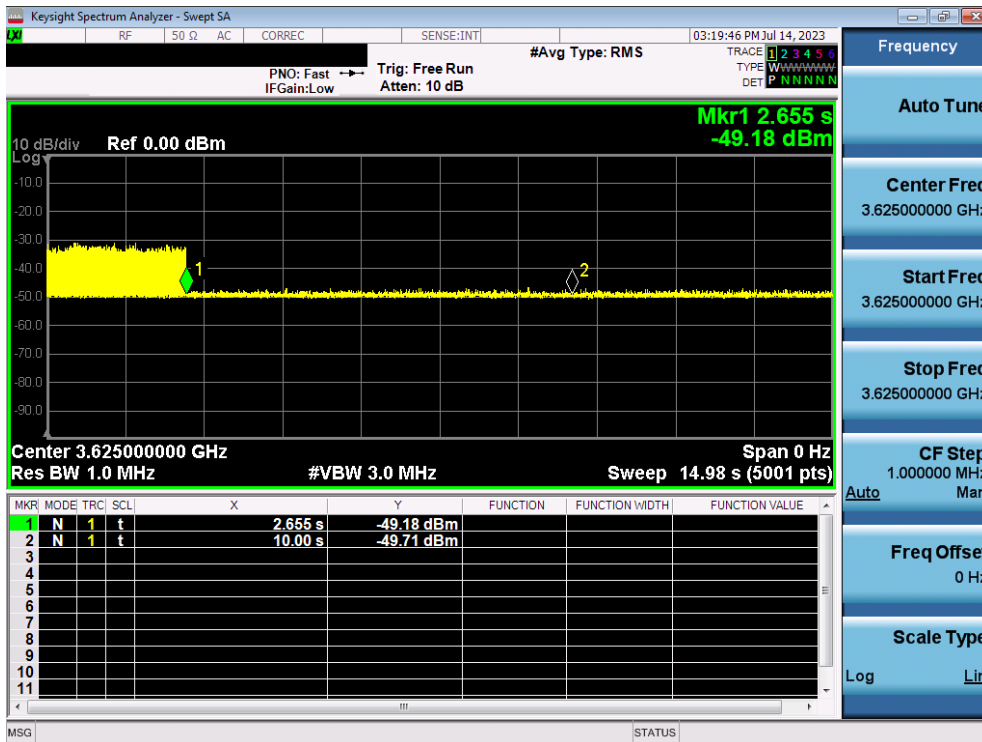
Marker 1: CBSD sends instructions to discontinue LTE operations.
Marker 2: EUT discontinues operation.
Marker 3: 10 seconds elapsed time from CBSD sending instructions to EUT.

| | | | |
|--|--|--------------------------------------|--|
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Run#1 – NR Band n48:



Plot 7-77. Run#1 End User Device Frequency of Operations



Plot 7-78. Run#1 End User Device Discontinues Operations within 10s

| | | | |
|---|-------------------------------------|-------------------------------|-----------------------------------|
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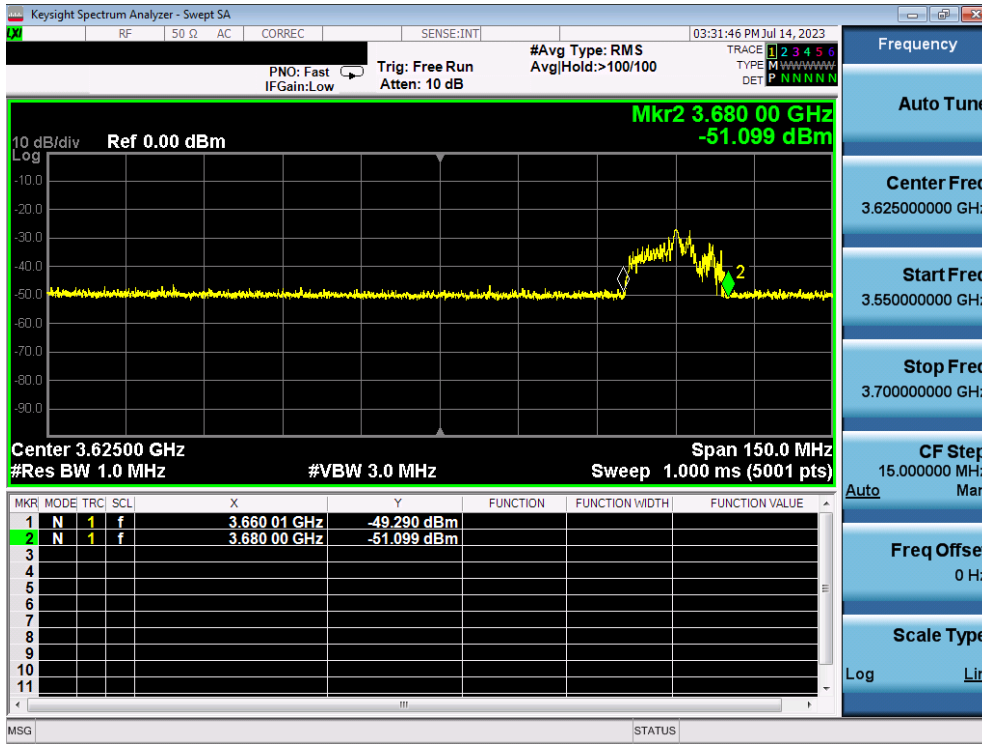


Note:

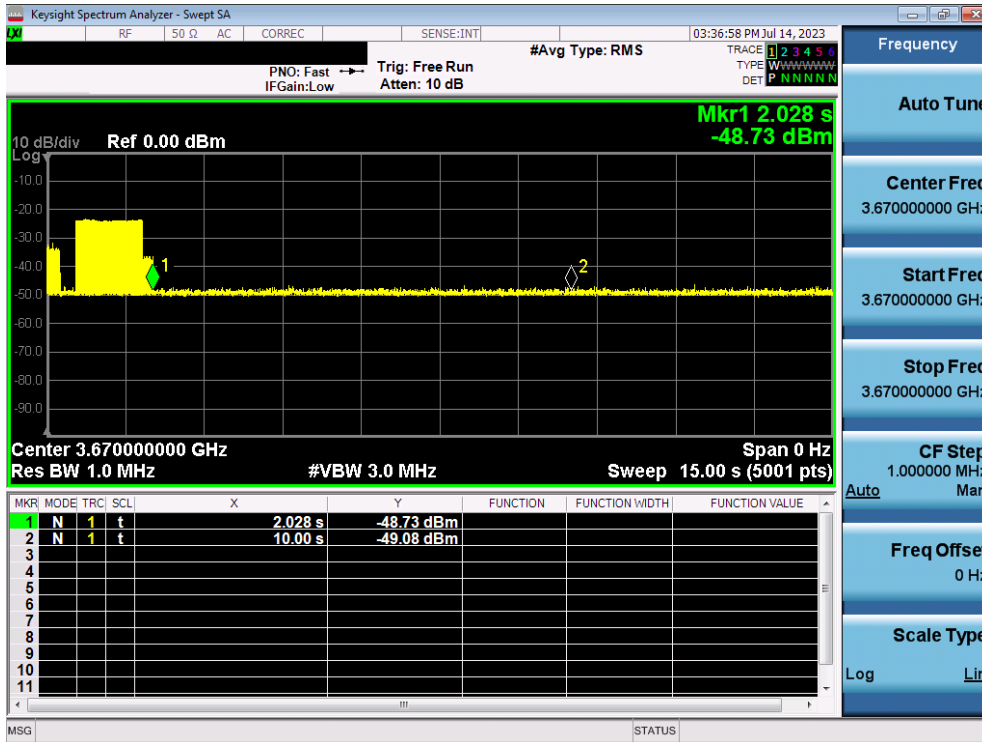
Marker 1: CBSD sends instructions to discontinue NR operations.
Marker 2: EUT discontinues operation.
Marker 3: 10 seconds elapsed time from CBSD sending instructions to EUT.

| | | | |
|--|--|--------------------------------------|--|
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Run#2 – NR Band n48:



Plot 7-79. Run#2 End User Device Frequency of Operations



Plot 7-80. Run#2 End User Device Discontinues Operations within 10s

| | | | |
|---|-------------------------------------|-------------------------------|-----------------------------------|
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Note:

Marker 1: CBSD sends instructions to discontinue NR operations.
Marker 2: EUT discontinues operation.
Marker 3: 10 seconds elapsed time from CBSD sending instructions to EUT.

| | | | |
|--|--|--------------------------------------|--|
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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: A3LSMS711U** complies with all of the End User Device requirements of Part 96 of the FCC Rules for LTE operation only.

| | | | |
|--|--|--------------------------------------|--|
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