

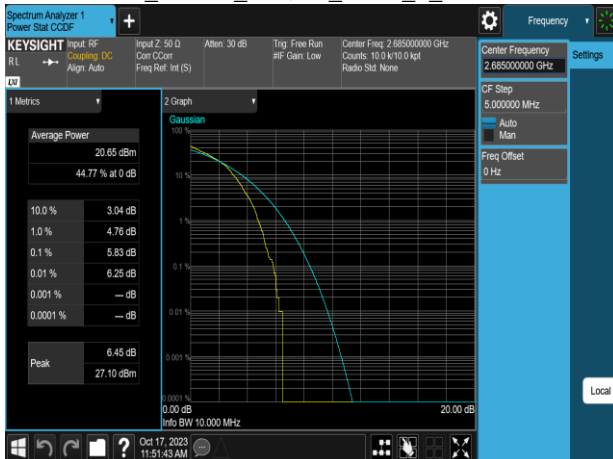
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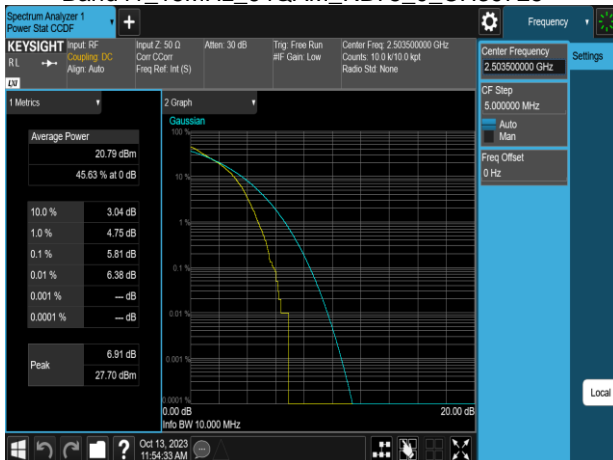
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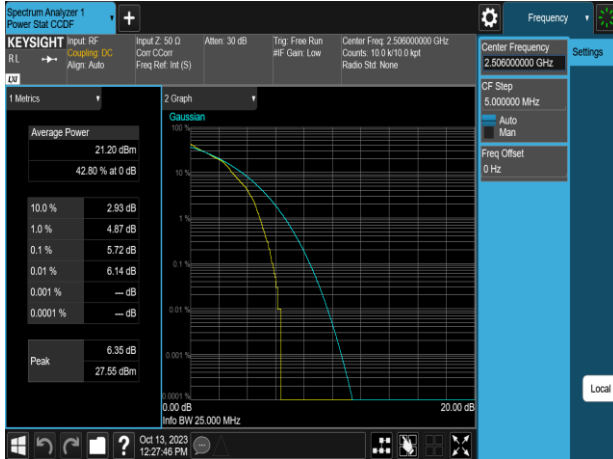
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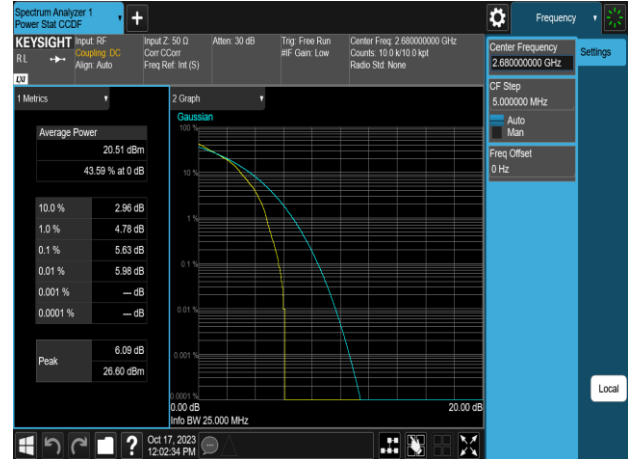
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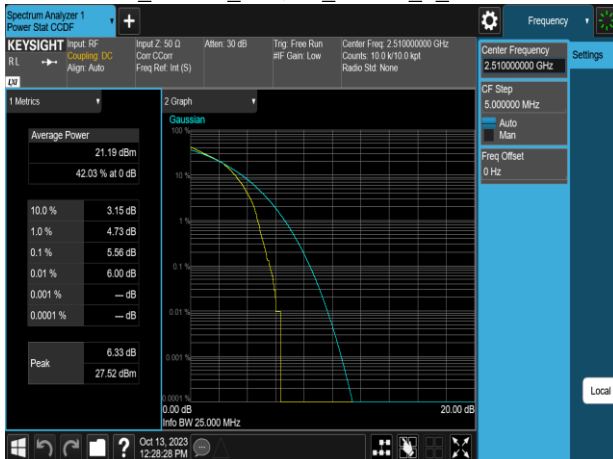
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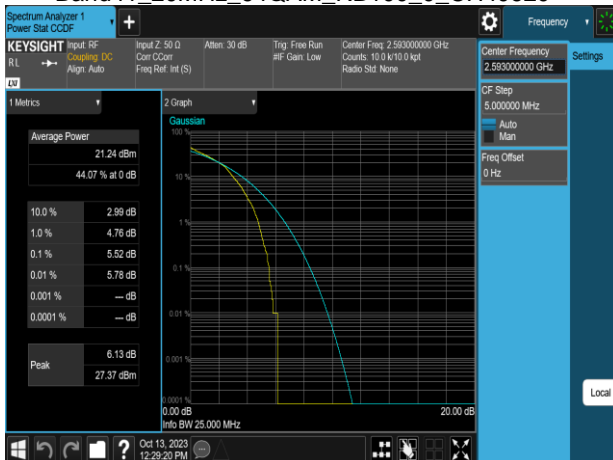
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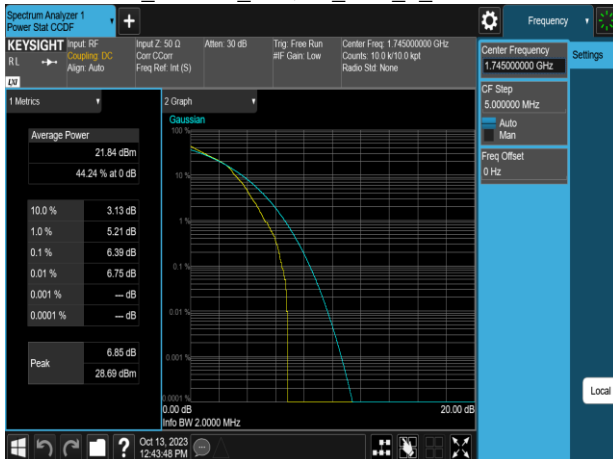
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Band66_3MHz_64QAM_RB15_0_CH131987



Band66_1.4MHz_64QAM_RB6_0_CH132322



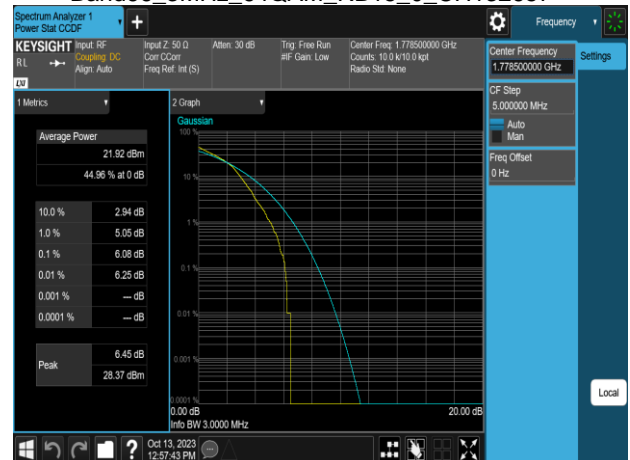
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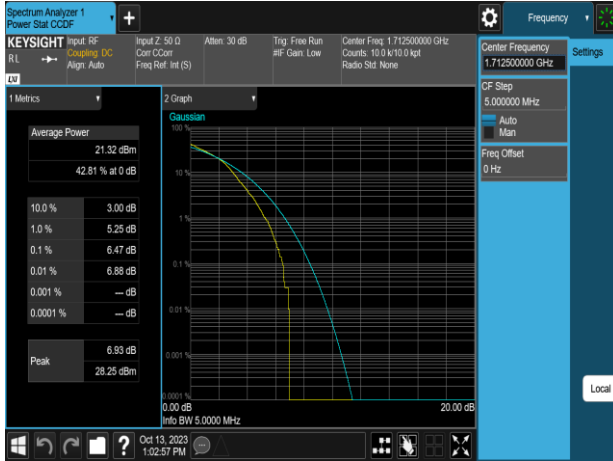
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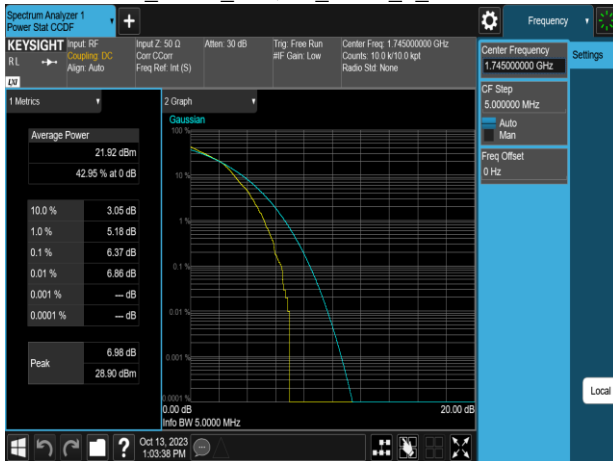
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Band66_10MHz_64QAM_RB50_0_CH132022



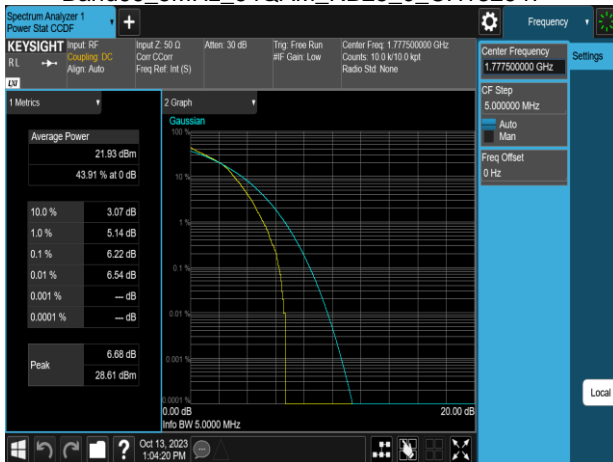
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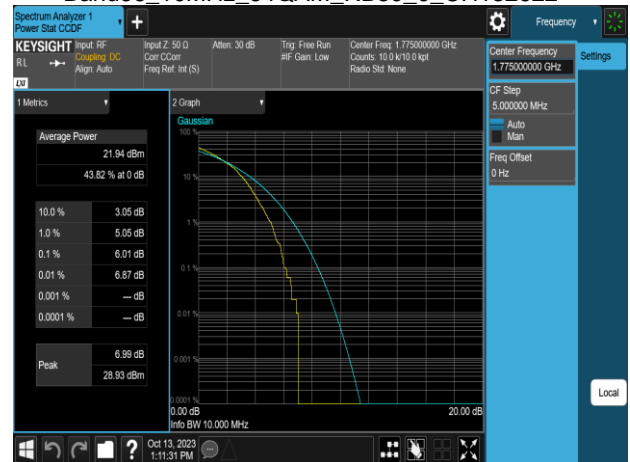
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Band66_10MHz_64QAM_RB50_0_CH132622



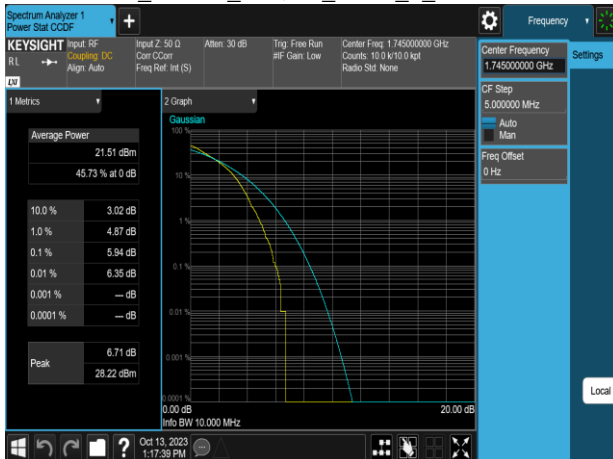
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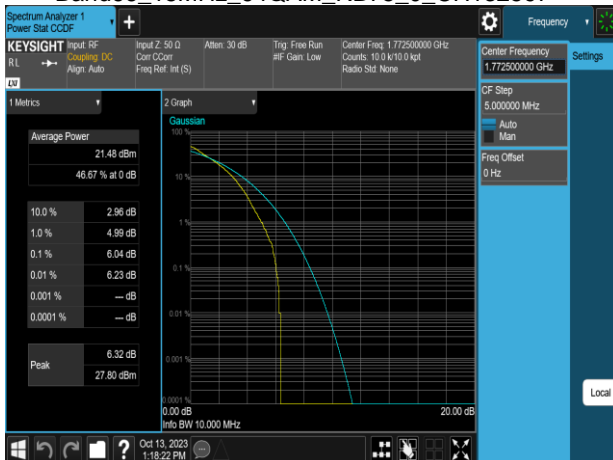
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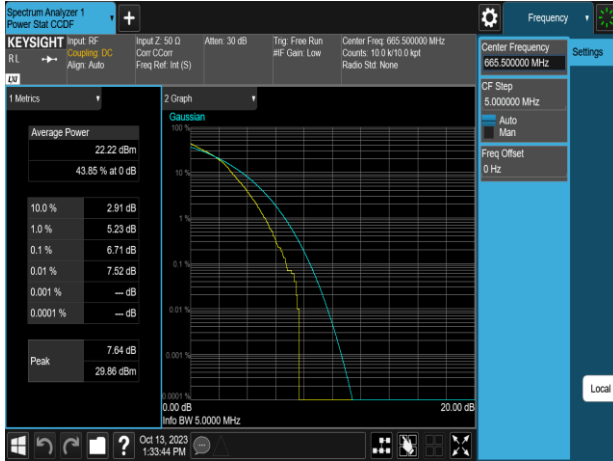
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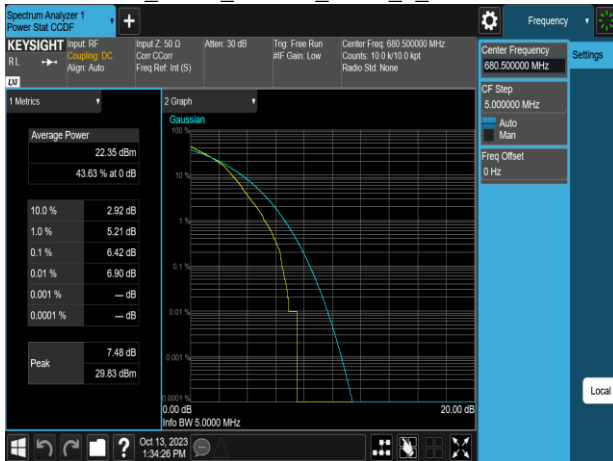
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Band71_10MHz_64QAM_RB50_0_CH133297



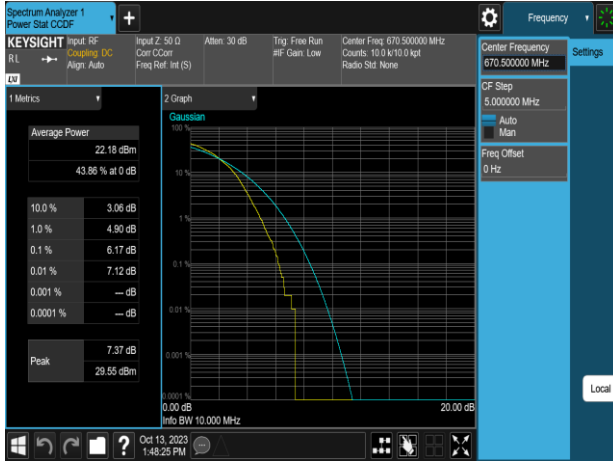
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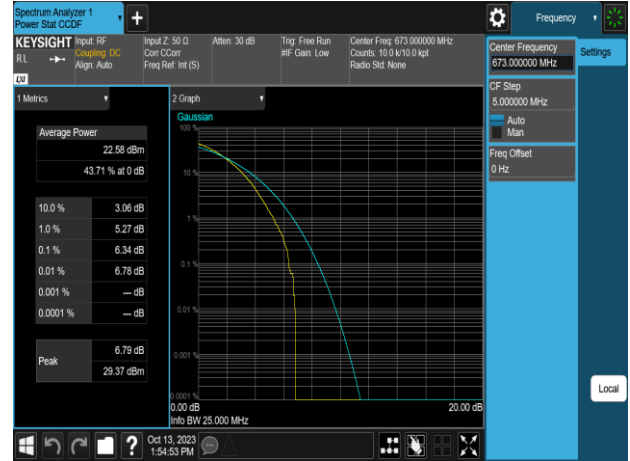
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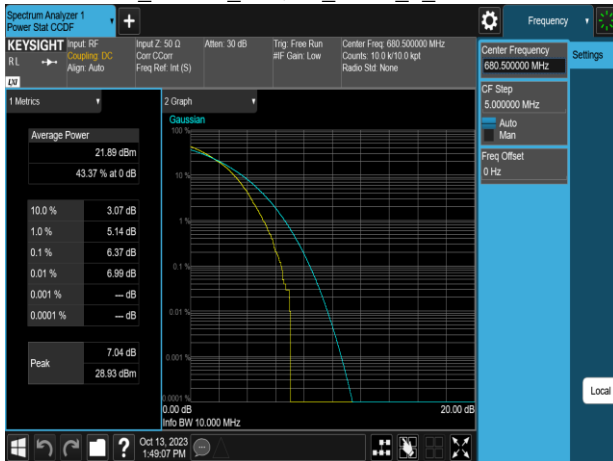
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Band71_20MHz_64QAM_RB100_0_CH133222



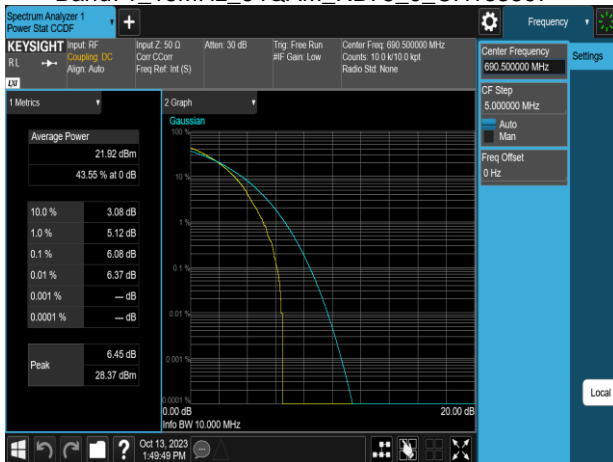
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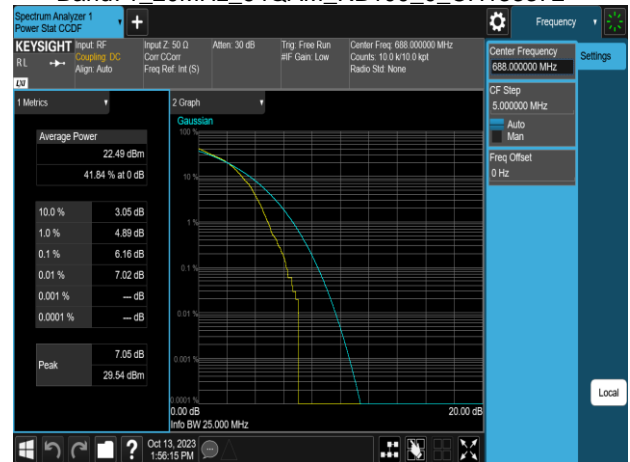
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Band71_15MHz_64QAM_RB75_0_CH133397



Band71_20MHz_64QAM_RB100_0_CH133372



8.5 OUT OF BAND EMISSION AT ANTENNA TERMINALS

LIMIT

FCC §22.917(a), §24.238(a), §27.53(h), §90.543(e)(3)

RSS-130 §4.7, RSS-132 §5.5, RSS-133 §6.5.1, RSS-139 §5.6, RSS-140 §4.4, RSS-199 §5.6

Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

FCC §22.917(a), LTE Band 5, 26

For operations in the 824-849 MHz band, Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

FCC §24.238(a), LTE Band 2, 25

For operations in the 1850-1910 and 1930-1950 MHz band, Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

FCC §27.53(c), LTE Band 13

For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (2) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB (-13dBm)
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log(P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

FCC §27.53(g), LTE Band 12, 17, 71

Compliance for operations in the 600 MHz, 698-746 MHz, 746-758 MHz and the 776-788 MHz band with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log(P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log(P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

FCC §27.53(m) (4) (6), LTE Band 7, 41

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

FCC §27.53(h)(1), LTE Band 4

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

FCC Part 27.53(m) (4), LTE Band 66

Specifies that “for BRS and EBS stations. For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section. In addition, the attenuation factor shall not be less that $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

FCC §90.543 (e), LTE Band 14

For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations.
- (2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations.
- (3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log (P)$ dB.

FCC §90.691 Emission mask requirements for EA-based systems, LTE Band 26

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

- (1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \text{Log}_{10}(f/6.1)$ decibels or $50 + 10 \text{Log}_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
- (2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \text{Log}_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

ISED RSS-130 §4.7.1, LTE Band 12, 13, 17, 71

Compliance for operations in the 617-652 MHz, 663-698 MHz, 698-756 MHz and the 777-787 MHz band, the unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

ISED RSS-130 §4.7.2, LTE Band 13

In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions: the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:

$76 + 10 \log_{10} p$ (watts), dB, for base and fixed equipment and
 $65 + 10 \log_{10} p$ (watts), dB, for mobile and portable equipment

the e.i.r.p. in the band 1559-1610 MHz shall not exceed -70 dBW/MHz for wideband signal and -80 dBW for discrete emission with bandwidth less than 700 Hz.

ISED RSS-132 §5.5, LTE Band 5, 26

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

- i. In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).
- ii. After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

ISED RSS-133 §6.5.1, LTE Band 2, 25

Equipment shall comply with the limits in (i) and (ii) below.

- i. In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).
- ii. After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

ISED RSS-139 §5.6 for LTE Band 4, 66

In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, Footnote 2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} p$ (watts) dB. After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} p$ (watts) dB.

ISED RSS-140 §4.4 for LTE Band 14

- a. For any frequency between 769-775 MHz and 799-806 MHz:
 - i. $76 + 10 \log(p)$, dB in a 6.25 kHz band for fixed and base station equipment
 - ii. $65 + 10 \log(p)$, dB in a 6.25 kHz band for mobile and portable/hand-held equipment
- b. For any frequency between 775-788 MHz, above 806 MHz, and below 758 MHz: $43 + 10 \log(p)$, dB in a bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency bands 758-768 MHz and 788-798 MHz, a resolution bandwidth of 30 kHz may be employed.

ISED RSS-199 §5.6 for LTE Band 7, 41

In the 1 MHz band immediately outside and adjacent to the channel edge, the unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth for base station and fixed subscriber equipment, and 2% for mobile subscriber equipment. Beyond the 1 MHz band, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% or 2% of the occupied bandwidth, as applicable.

Equipment shall comply with the following unwanted emission limits:

for base station and fixed subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:

- $40 + 10 \log_{10} p$ from the channel edges to 5 MHz away
- $43 + 10 \log_{10} p$ between 5 MHz and X MHz from the channel edges, and
- $55 + 10 \log_{10} p$ at X MHz and beyond from the channel edges

In addition, the attenuation shall not be less than $43 + 10 \log_{10} p$ on all frequencies between 2490.5 MHz and 2496 MHz, and $55 + 10 \log_{10} p$ at or below 2490.5 MHz.

In (a) and (b), p is the transmitter power measured in watts and X is 6 MHz or the equipment occupied bandwidth, whichever is greater.

TEST PROCEDURES

a) Conducted Emission

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 1MHz & VBW = 1MHz on Spectrum.
3. Allow trace to fully stabilize
4. Repeat above procedures until all default test channel measured were complete.

b) Band Edge

1. To connect Antenna Port of EUT to Spectrum.
2. The band edge of low and high channels for the highest RF powers was measured. Setting RBW \geq 1% EBW.
3. Allow trace to fully stabilize
4. Repeat above procedures until all default test channel measured were complete.

TEST RESULTS

Compliance

Temperature: 21.6~25.6°C

Test date:

October 13~December
15, 2023

Humidity: 50~62% RH

Tested by:

Allen Shen

Test Data: Band Edge

Band Edge_Band2_1.4MHz_QPSK_RB1_0_CH18607



Band Edge_Band2_1.4MHz_QPSK_RB6_0_CH19193



Band Edge_Band2_1.4MHz_QPSK_RB1_5_CH19193



Band Edge_Band2_3MHz_QPSK_RB1_0_CH18615



Band Edge_Band2_1.4MHz_QPSK_RB6_0_CH18607



Band Edge_Band2_3MHz_QPSK_RB1_14_CH19185



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Band Edge_Band2_5MHz_QPSK_RB25_0_CH18625



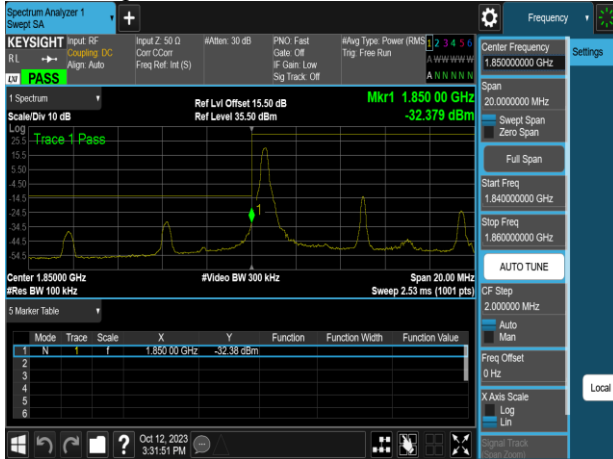
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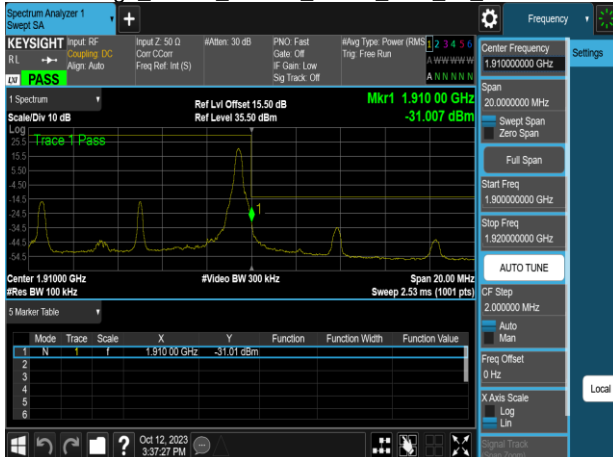
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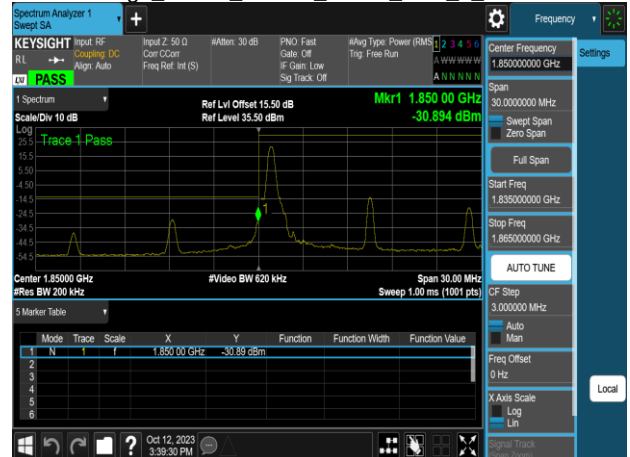
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Band Edge_Band2_10MHz_QPSK_RB50_0_CH18650



Band Edge_Band2_15MHz_QPSK_RB1_74_CH19125



Band Edge_Band2_15MHz_QPSK_RB75_0_CH18675



Band Edge_Band2_20MHz_QPSK_RB1_99_CH19100



Band Edge_Band2_15MHz_QPSK_RB75_0_CH19125



Band Edge_Band2_20MHz_QPSK_RB100_0_CH18700



Band Edge_Band2_20MHz_QPSK_RB1_0_CH18700



Band Edge_Band2_20MHz_QPSK_RB100_0_CH19100



Band Edge_Band4_1.4MHz_QPSK_RB1_0_CH19957



Band Edge_Band4_1.4MHz_QPSK_RB6_0_CH20393



Band Edge_Band4_1.4MHz_QPSK_RB1_5_CH20393



Band Edge_Band4_3MHz_QPSK_RB1_0_CH19965



Band Edge_Band4_1.4MHz_QPSK_RB6_0_CH19957



Band Edge_Band4_3MHz_QPSK_RB1_14_CH20385



Band Edge_Band4_3MHz_QPSK_RB15_0_CH19965



Band Edge_Band4_5MHz_QPSK_RB1_24_CH20375



Band Edge_Band4_3MHz_QPSK_RB15_0_CH20385



Band Edge_Band4_5MHz_QPSK_RB25_0_CH19975



Band Edge_Band4_5MHz_QPSK_RB1_0_CH19975



Band Edge_Band4_5MHz_QPSK_RB25_0_CH20375

