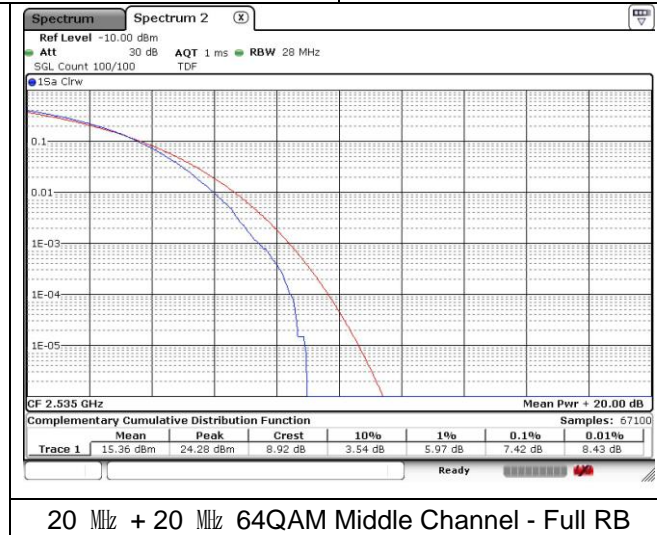
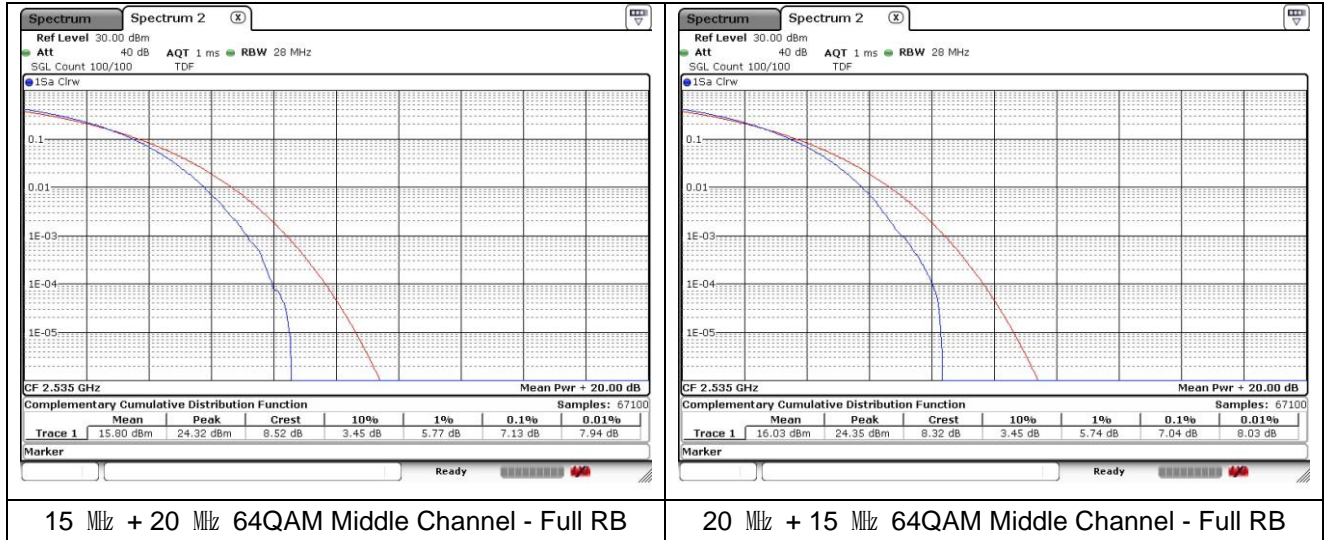
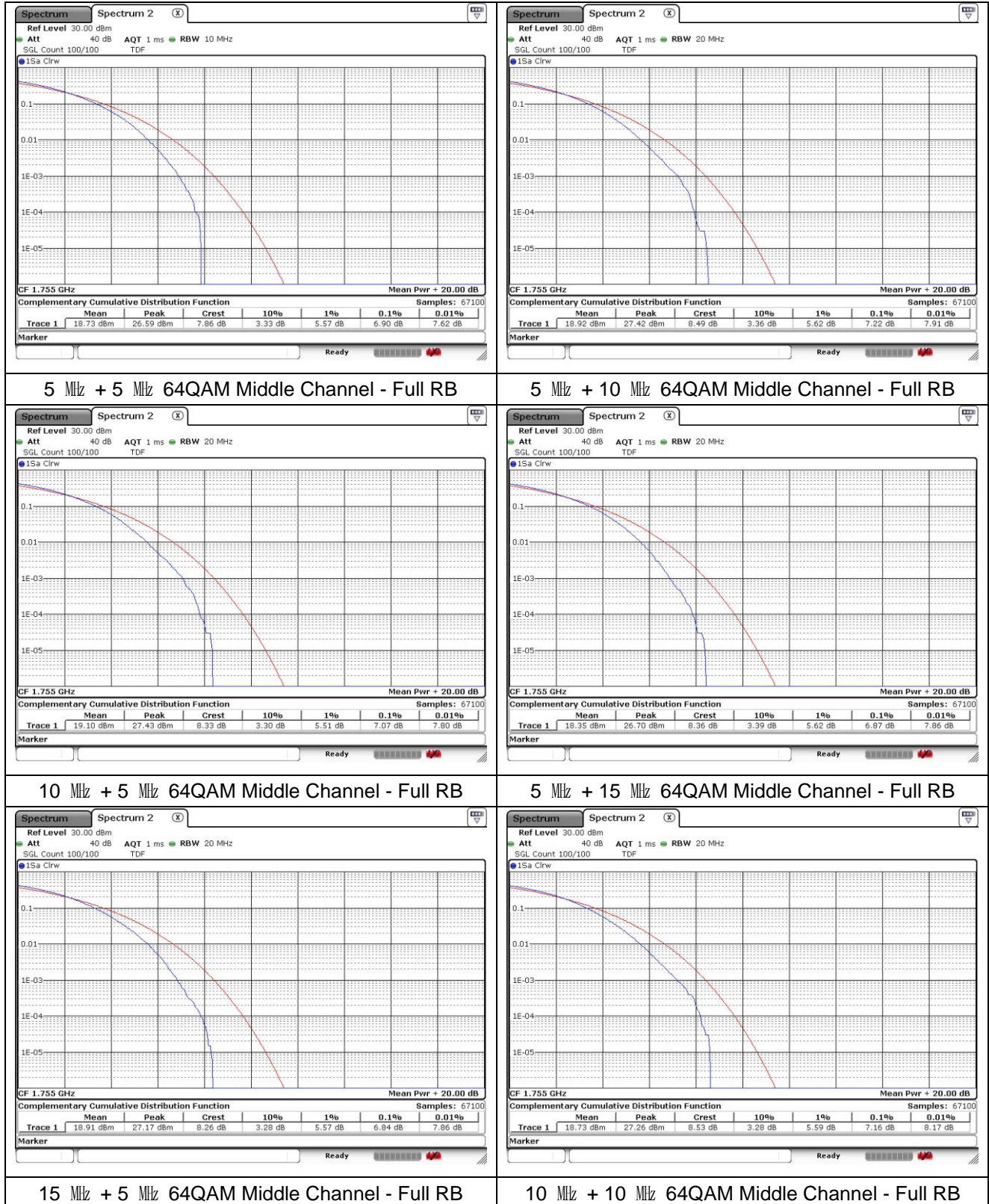


ULCA 7C

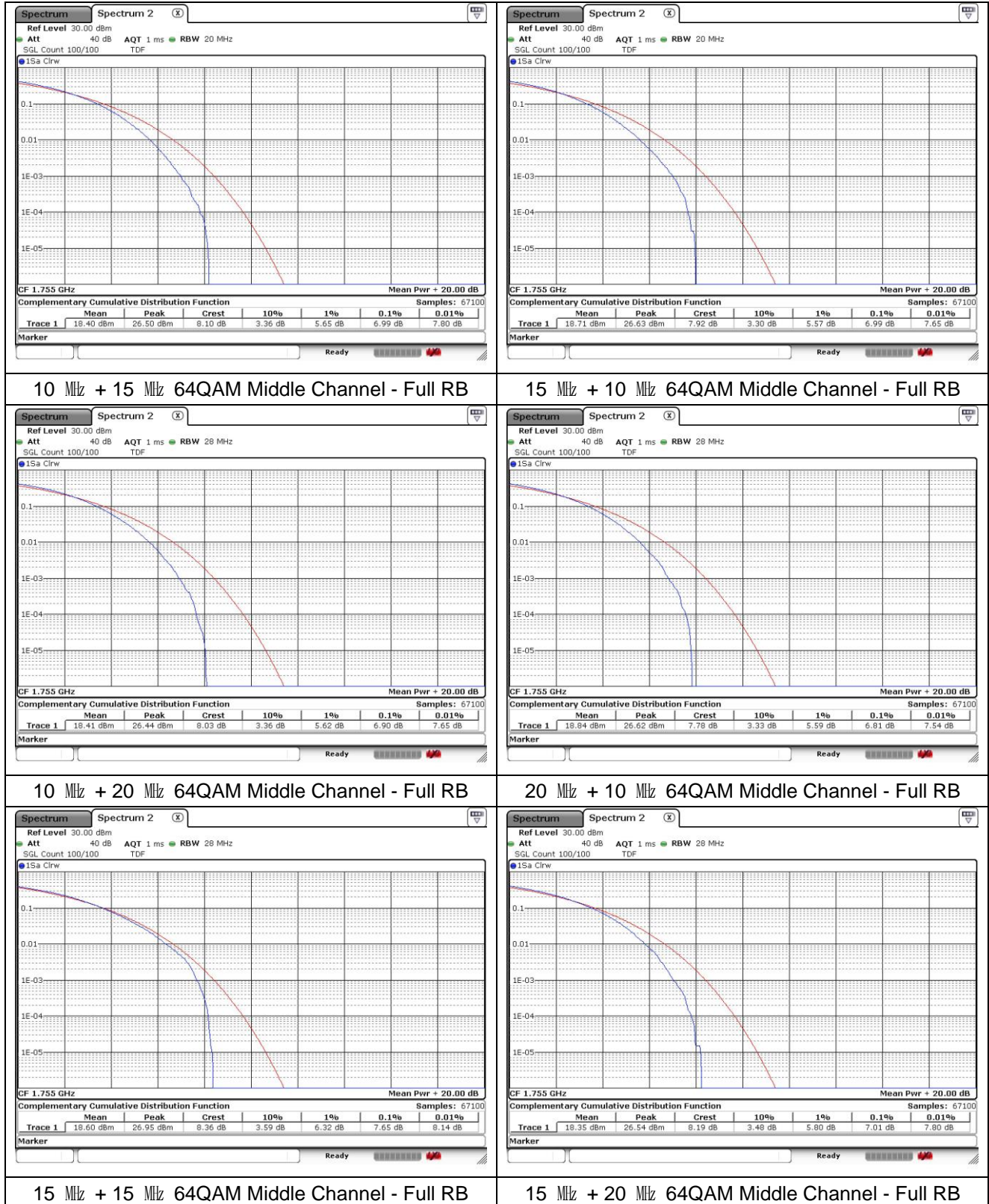


20 MHz + 20 MHz 64QAM Middle Channel - Full RB

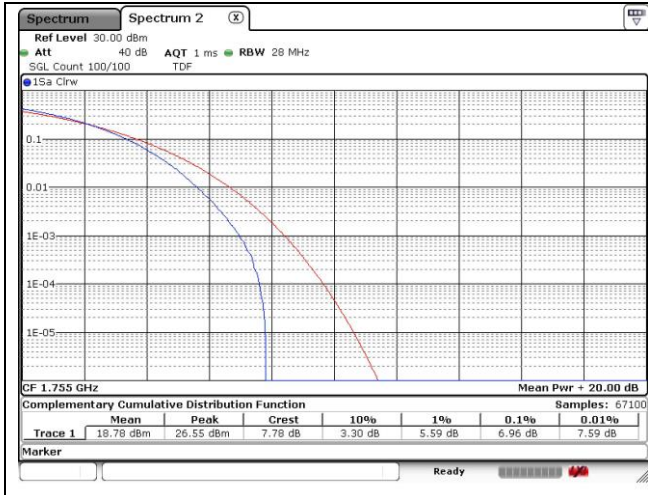
ULCA 66B



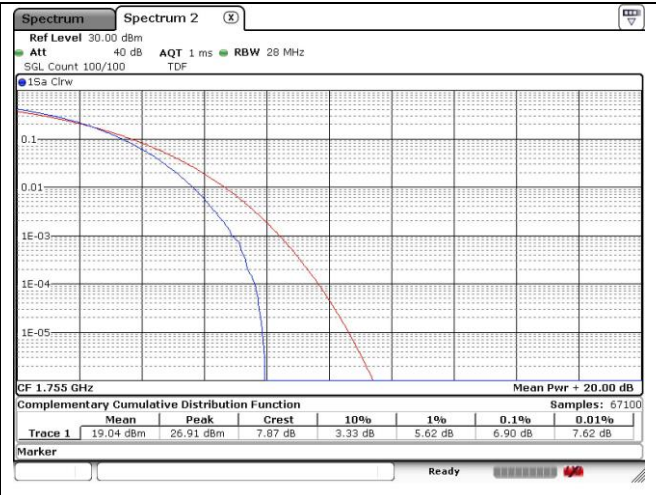
ULCA 66C



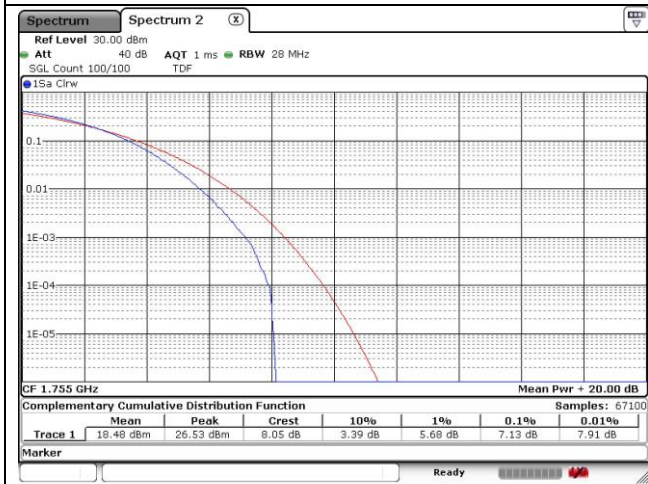
ULCA 66C



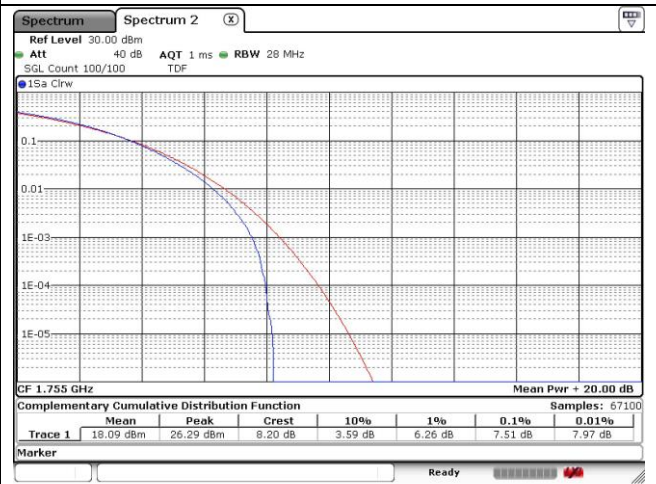
20 MHz + 15 MHz 64QAM Middle Channel - Full RB



20 MHz + 5 MHz 64QAM Middle Channel - Full RB



5 MHz + 20 MHz 64QAM Middle Channel - Full RB



20 MHz + 20 MHz 64QAM Middle Channel - Full RB

6. Spurious Emissions at Antenna Terminal

6.1. Limit

FCC

- §22.917(a), 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.

- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 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.

- §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than $40 + 10\log_{10}(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10\log_{10}(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10\log_{10}(P)$ 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 $43 + 10\log_{10}(P)$ dB on all frequencies between 2 490.5 MHz and 2 496 MHz and $55 + 10\log_{10}(P)$ dB at or below 2 490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2 495 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.

IC

- RSS-132 Issue 3

5.5, 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 (dB W) 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 (dB W) 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.

- RSS-139 Issue 3

6.6, (i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, 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 dB W) by at least $43 + 10\log_{10} p$ (watts) dB.

(ii) 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 dB W) by at least $43 + 10\log_{10} p$ (watts) dB.

- RSS-199 Issue 3

4.5, 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 (dB W), 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 (dB W), by at least:

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

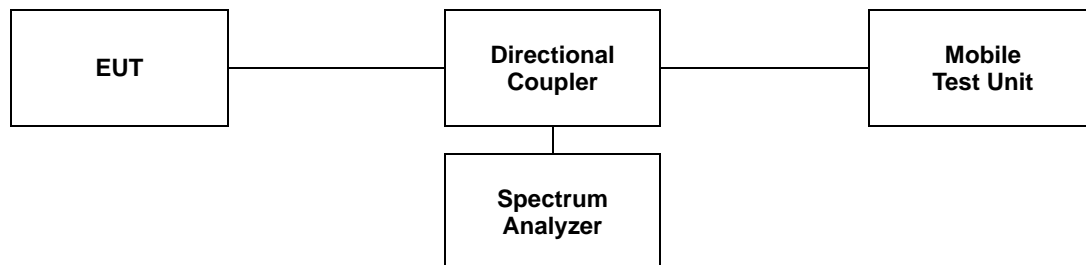
In addition, the attenuation shall not be less than $43 + 10 \log_{10} p$ on all frequencies between 2 490.5 MHz and 2 496 MHz, and $55 + 10 \log_{10} p$ at or below 2 490.5 MHz.

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.

6.2. Test Procedure

The test follows section 5.7 of ANSI C63.26-2015.

1. Start frequency was set to 9 kHz and stop frequency was set to at least 10* the fundamental frequency.
2. Detector = RMS.
3. Trace mode = Max hold.
4. Sweep time = Auto couple.
5. The trace was allowed to stabilize.
6. Please see notes below for RBW and VBW settings.
7. For plots showing conducted spurious emissions from 9 kHz to 28 GHz, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as TDF function.



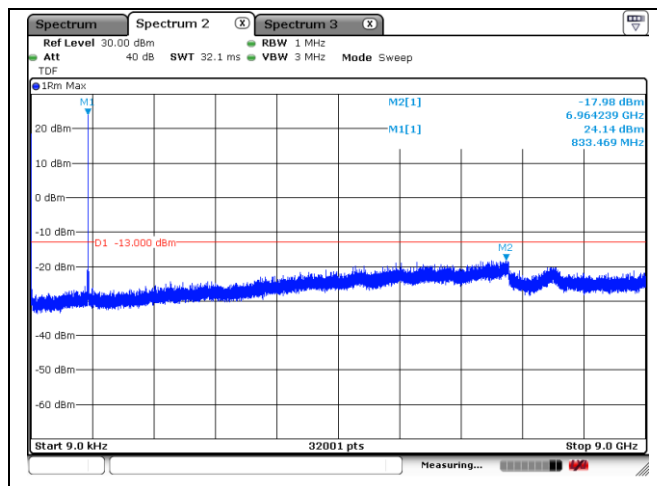
Note;

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and frequencies greater than 1 GHz. 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. The emission bandwidth is defined as the width of the signal between two point, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

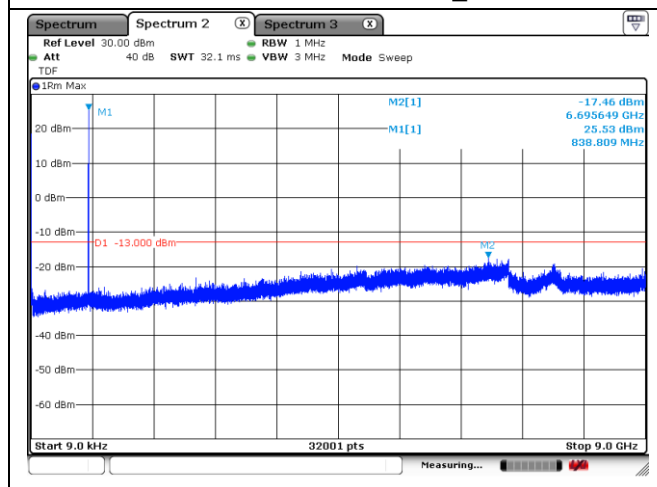
6.3. Test Results

Ambient temperature : $(23 \pm 1) ^\circ\text{C}$
 Relative humidity : 47 % R.H.

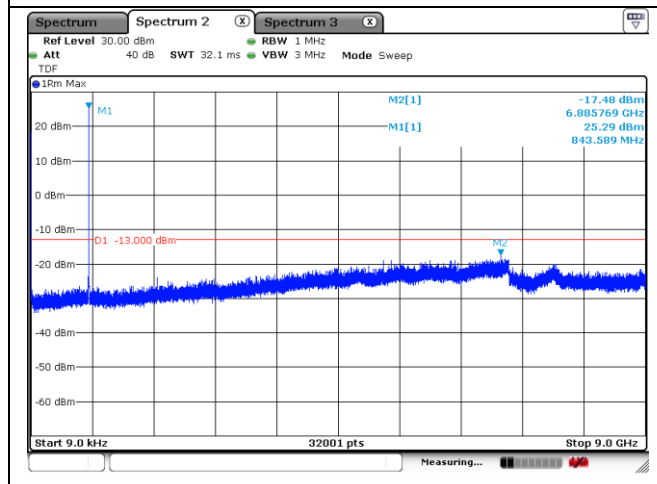
- Test plots ULCA 5B



PCC 10 MHz RB1 + SCC 5 MHz RB1_Low Channel

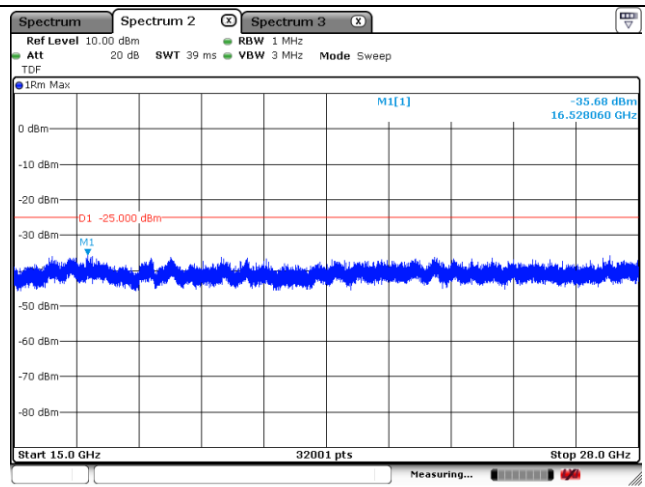
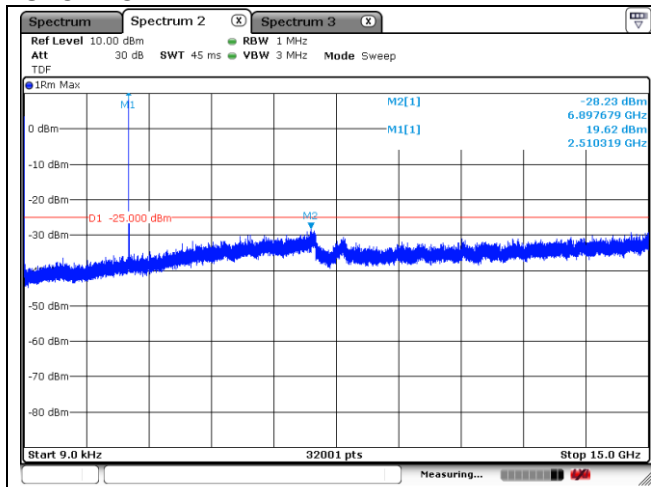


PCC 10 MHz RB1 + SCC 5 MHz RB1_Middle Channel

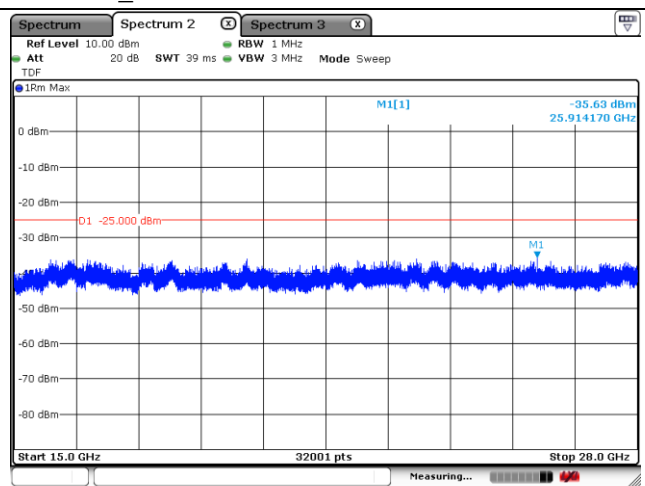
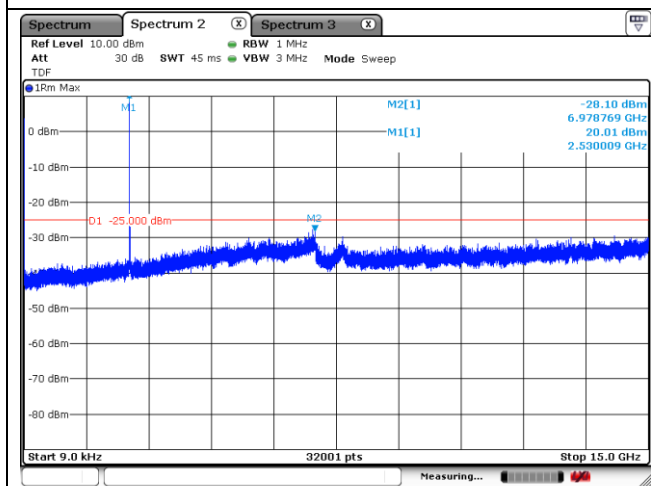


PCC 10 MHz RB1 + SCC 5 MHz RB1_High Channel

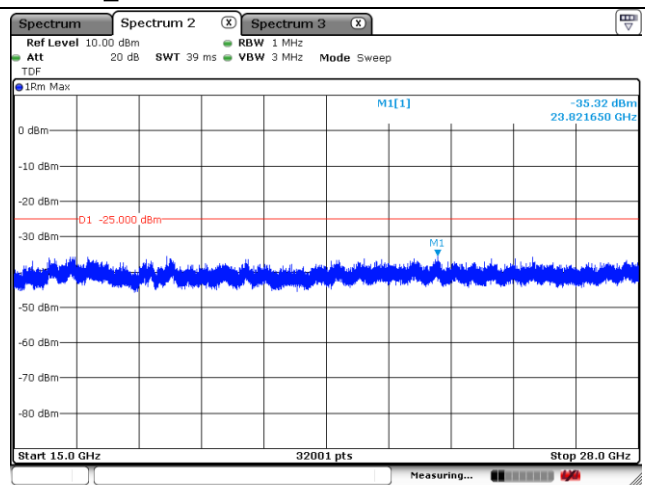
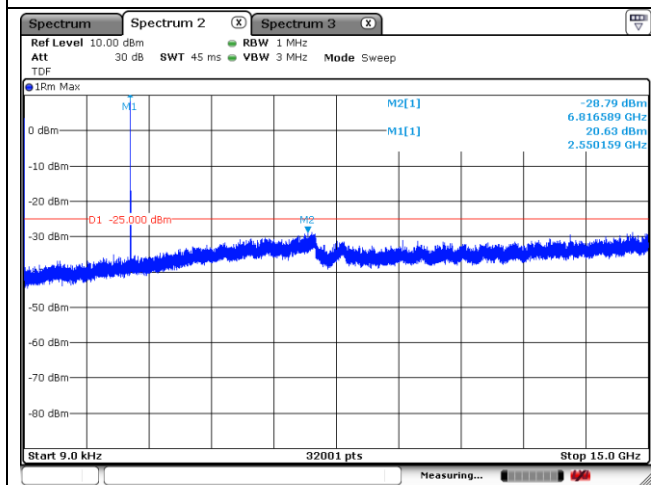
ULCA 7C



PCC 10 MHz RB1 + SCC 20 MHz RB1_Low Channel

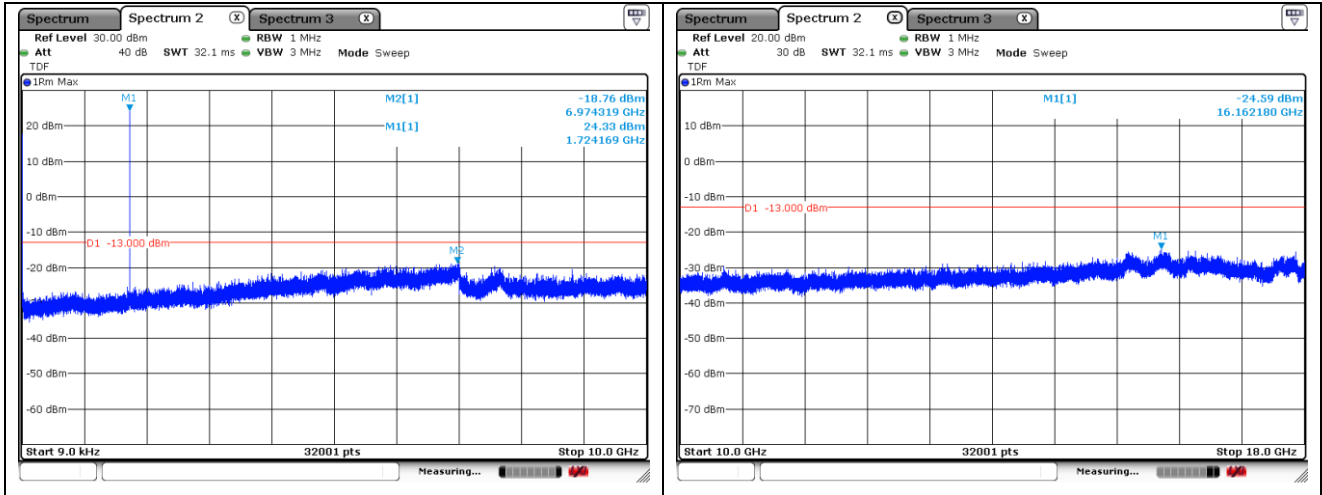


PCC 10 MHz RB1 + SCC 20 MHz RB1_Middle Channel

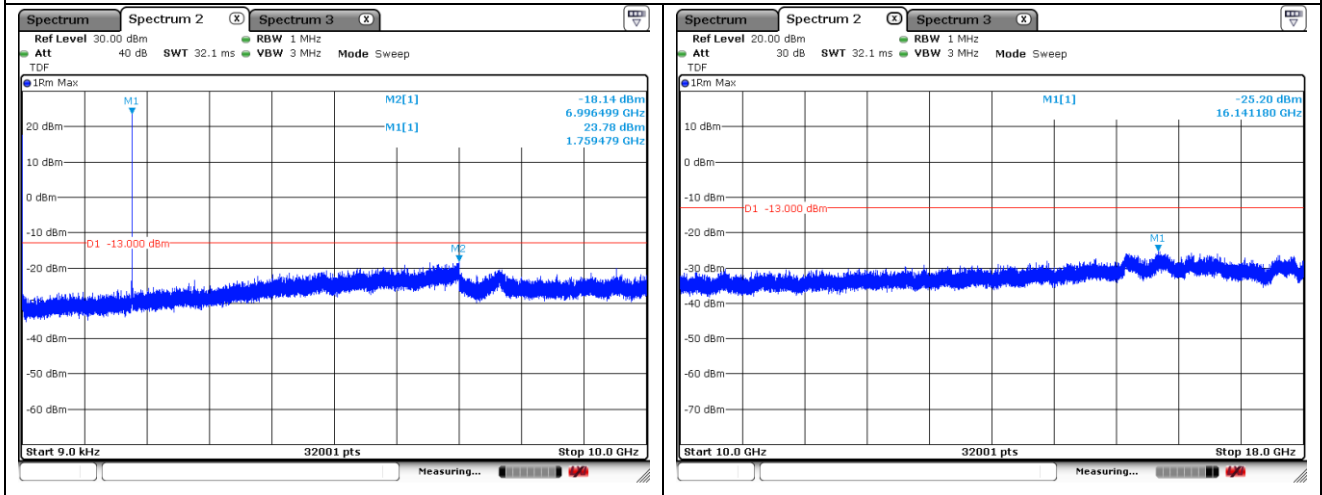


PCC 10 MHz RB1 + SCC 20 MHz RB1_High Channel

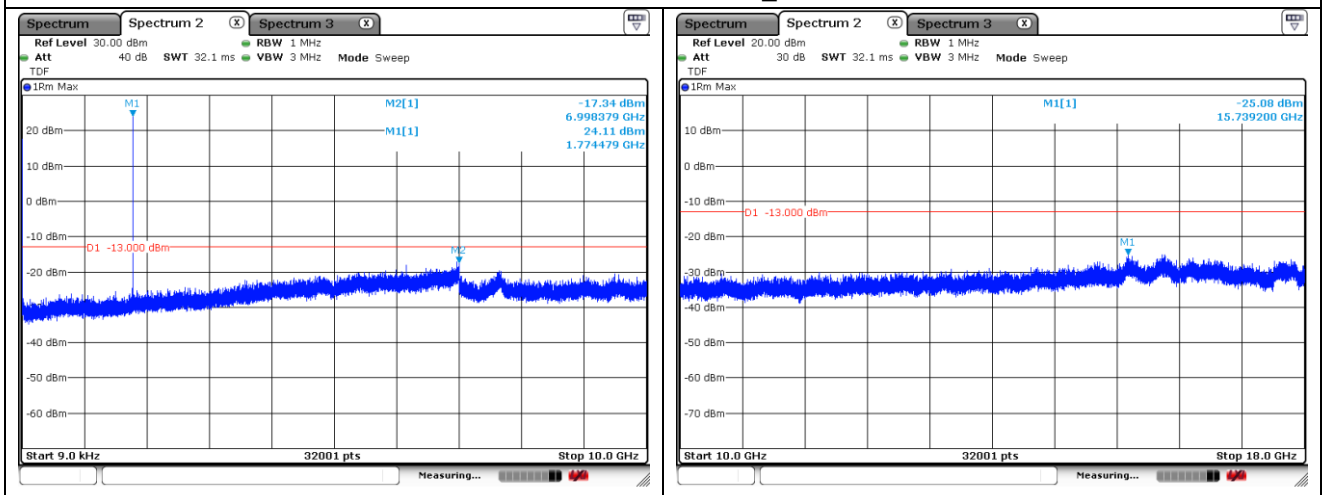
ULCA 66B



PCC 15 MHz RB1 + SCC 5 MHz RB1_Low Channel

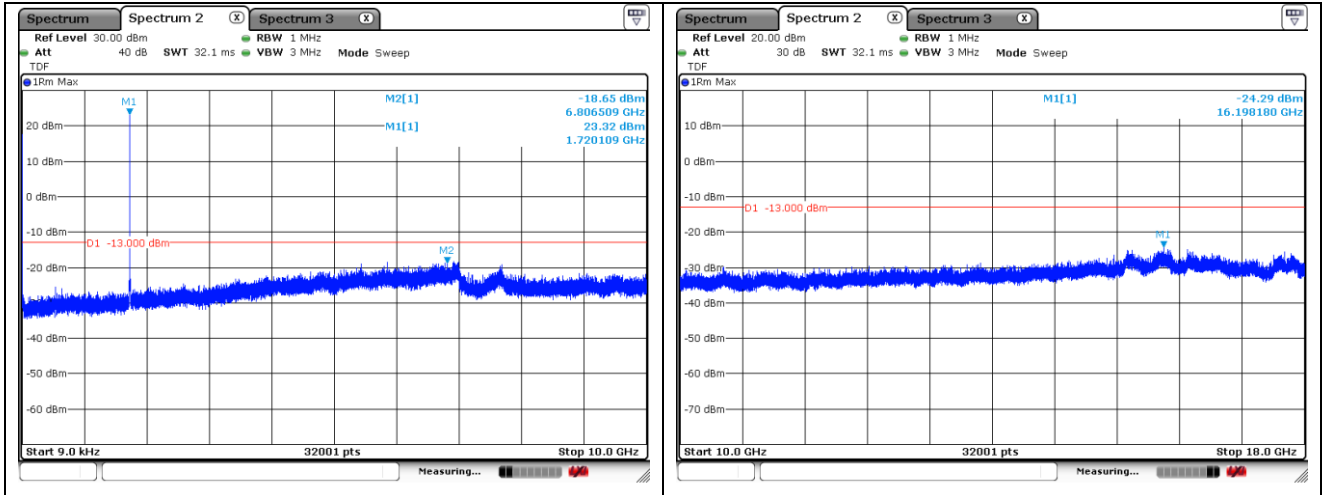


PCC 15 MHz RB1 + SCC 5 MHz RB1_Middle Channel

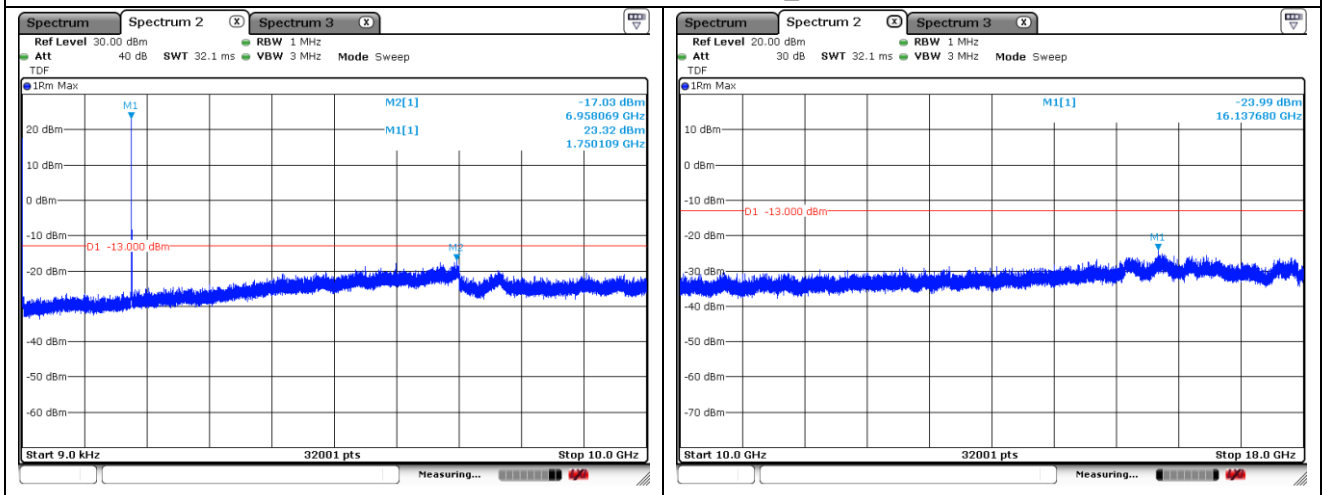


PCC 15 MHz RB1 + SCC 5 MHz RB1_High Channel

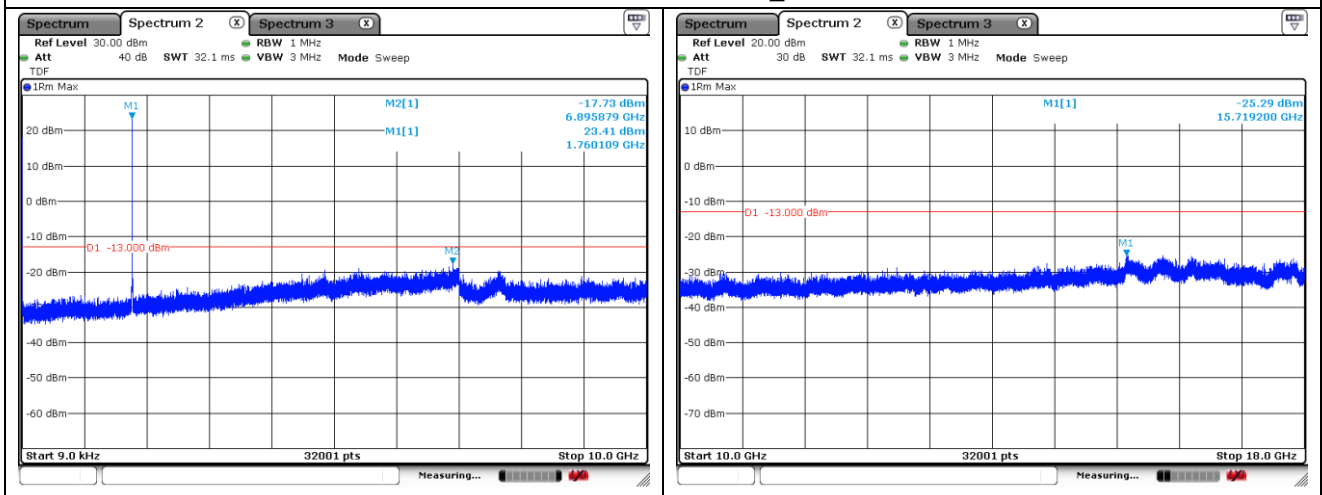
ULCA 66C



PCC 10 MHz RB1 + SCC 20 MHz RB1_Low Channel



PCC 10 MHz RB1 + SCC 20 MHz RB1_Middle Channel



PCC 10 MHz RB1 + SCC 20 MHz RB1_High Channel

7. Band Edge and Emission Mask

7.1. Limit

FCC

- §22.917(a), 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.

- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 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.

- §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log_{10}(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log_{10}(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log_{10}(P)$ 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 $43 + 10 \log_{10}(P)$ dB on all frequencies between 2 490.5 MHz and 2 496 MHz and $55 + 10 \log_{10}(P)$ dB at or below 2 490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2 495 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.

IC

- RSS-132 Issue 3

5.5, 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 (dB W) 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 (dB W) 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.

- RSS-139 Issue 3

6.6, (i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, 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 dB W) by at least $43 + 10 \log_{10} p$ (watts) dB.

(ii) 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 dB W) by at least $43 + 10 \log_{10} p$ (watts) dB.

- RSS-199 Issue 3

4.5, 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 (dB W), 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 (dB W), by at least:

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

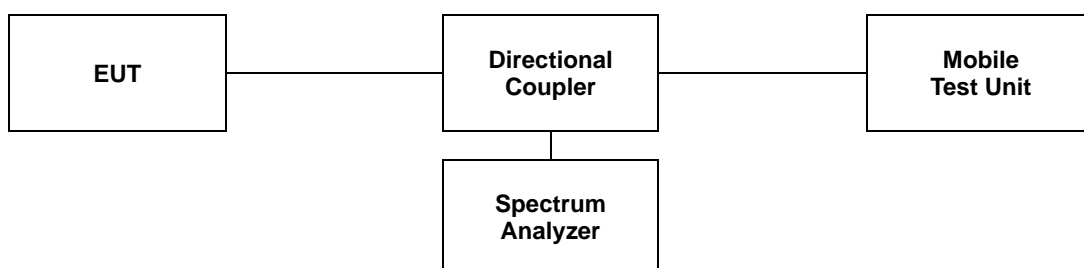
In addition, the attenuation shall not be less than $43 + 10 \log_{10} p$ on all frequencies between 2 490.5 MHz and 2 496 MHz, and $55 + 10 \log_{10} p$ at or below 2 490.5 MHz.

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.

7.2. Test Procedure

The test follows section 5.7 of ANSI C63.26-2015.

- a. Span was set large enough so as to capture all out of band emissions near the band edge.
- b. RBW ≥ 1 % of OBW
- c. VBW $\geq 3 \times$ RBW.
- d. Detector = RMS.
- e. Trace mode = Average.
- f. Sweep time = Auto.
- g. The trace was allowed to stabilize.
- h. All path loss of frequency range was investigated and compensated to spectrum analyzer as TDF function.

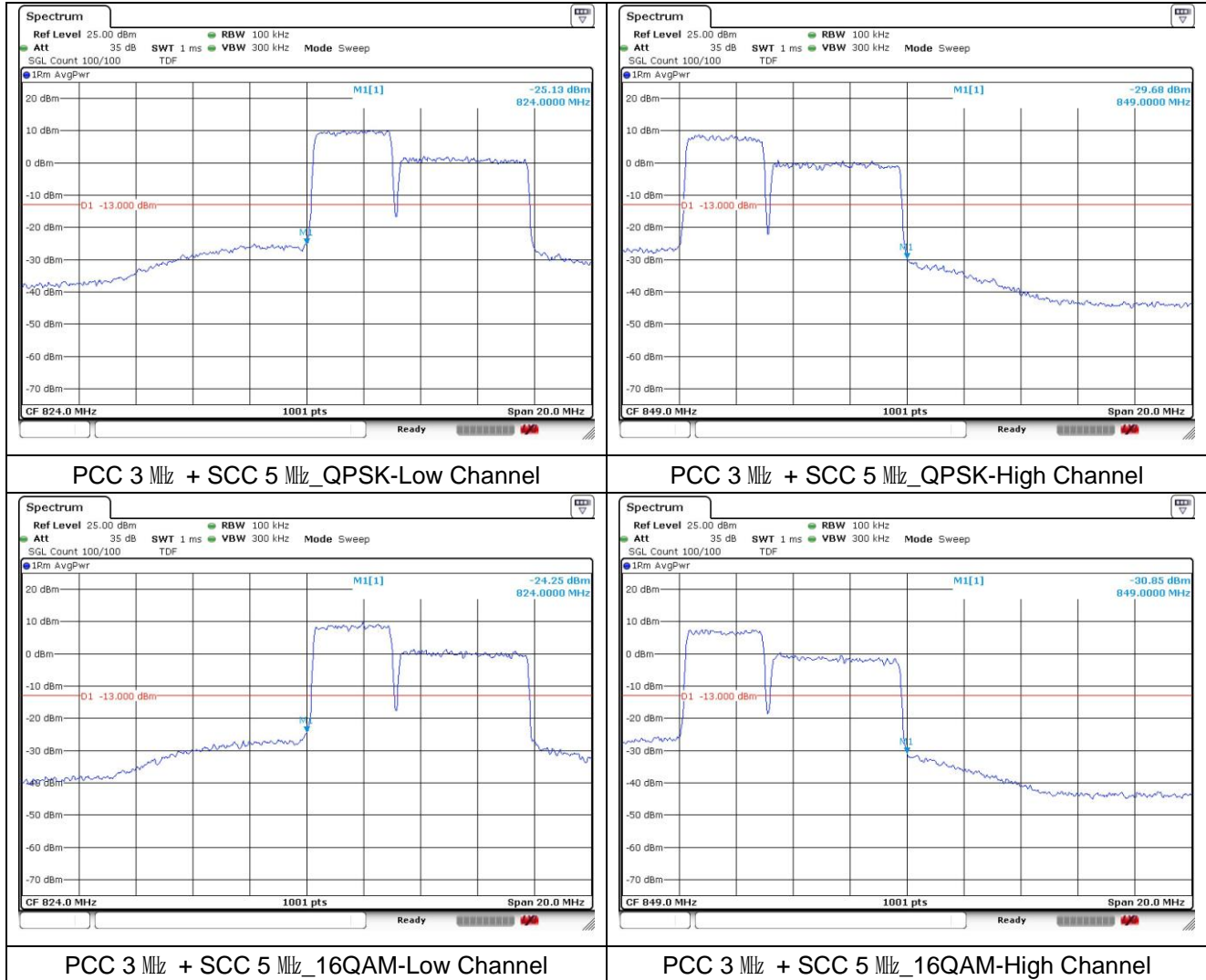


7.3. Test Results

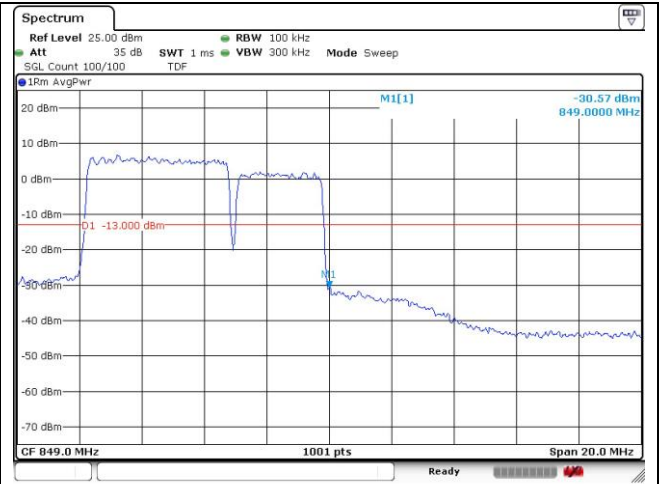
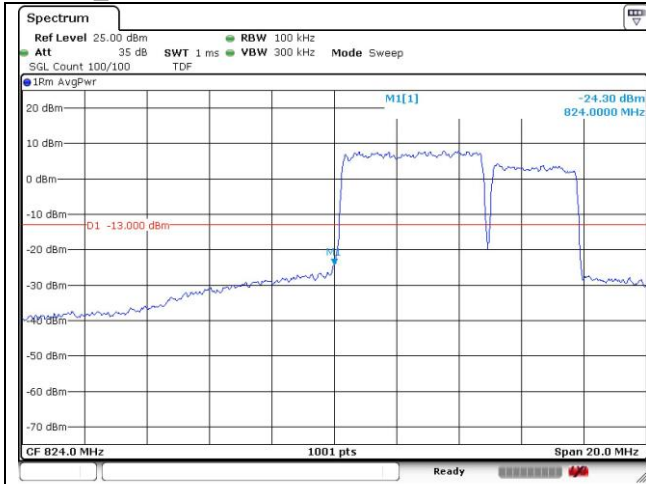
Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 % R.H.

- Test plots

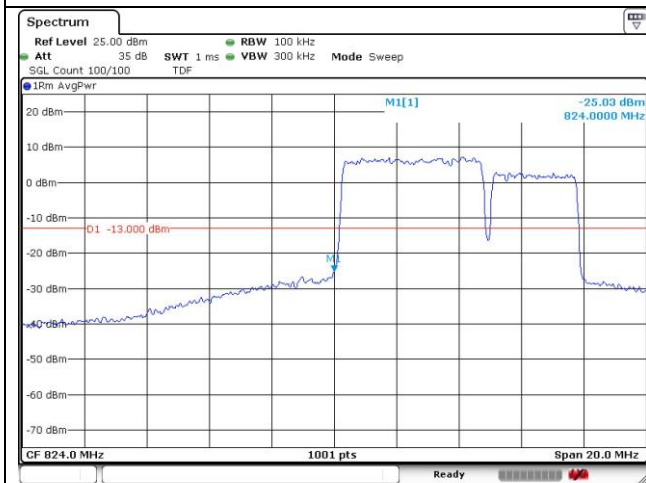
ULCA_5B



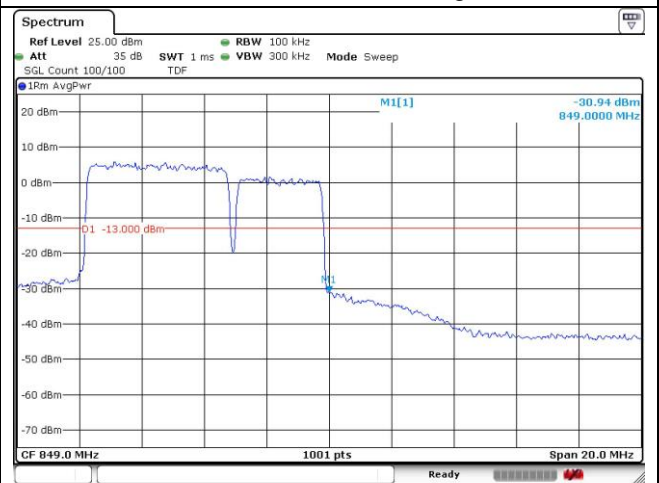
ULCA 5B



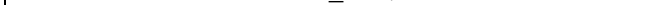
PCC 5 MHz + SCC 3 MHz_QPSK-Low Channel



PCC 5 MHz + SCC 3 MHz_QPSK-High Channel



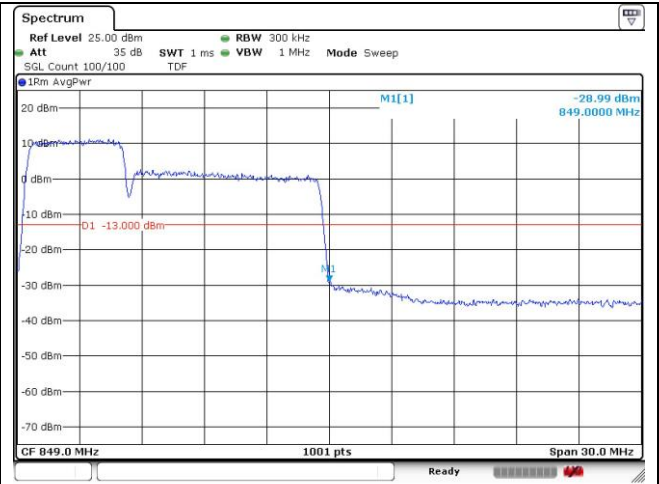
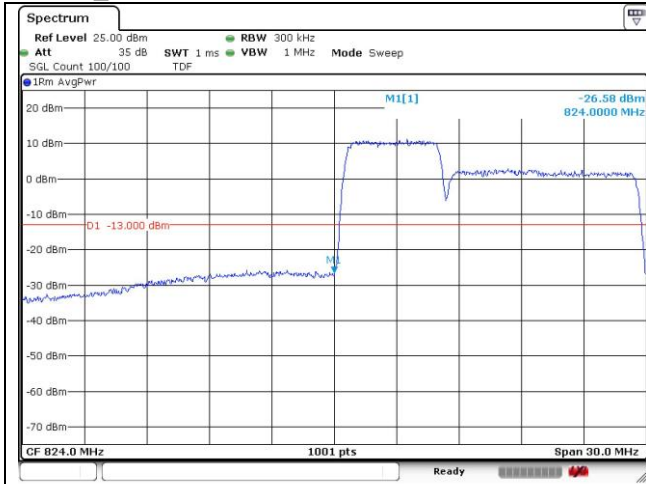
PCC 5 MHz + SCC 3 MHz_16QAM-Low Channel



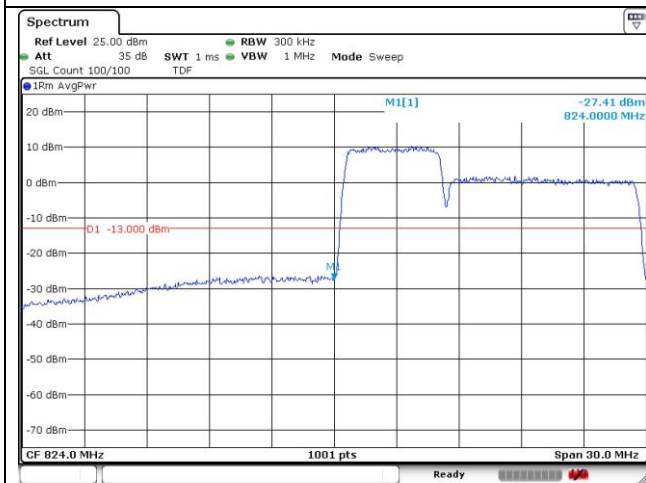
PCC 5 MHz + SCC 3 MHz_16QAM-High Channel



ULCA_5B



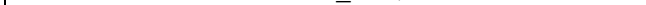
PCC 5 MHz + SCC 10 MHz_QPSK-Low Channel



PCC 5 MHz + SCC 10 MHz_QPSK-High Channel



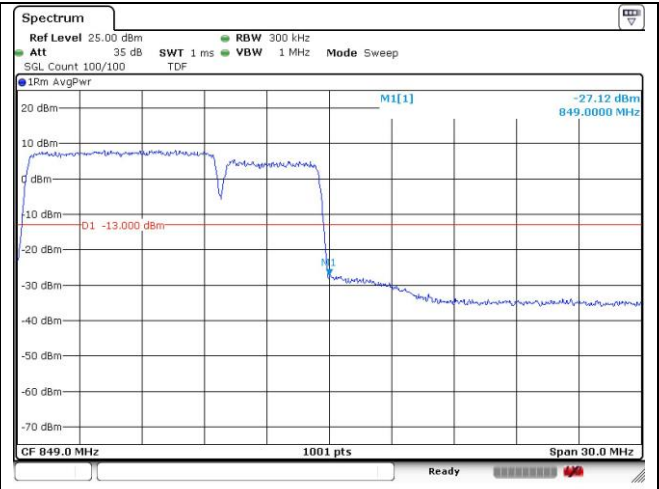
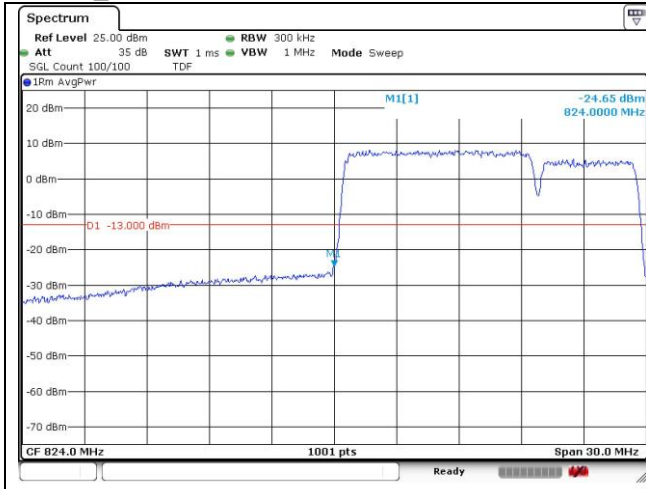
PCC 5 MHz + SCC 10 MHz_16QAM-Low Channel



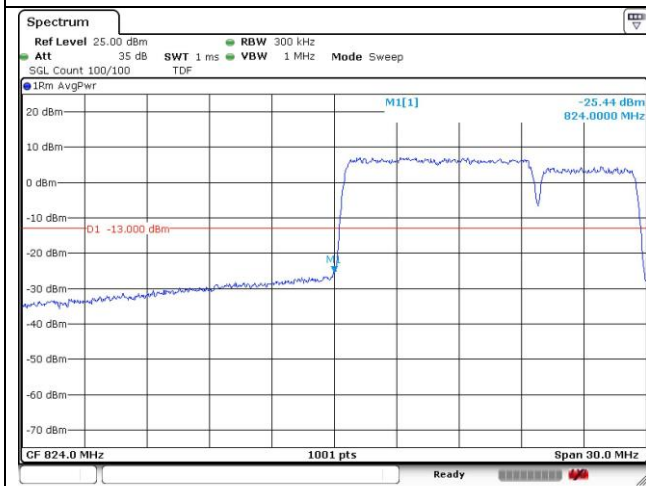
PCC 5 MHz + SCC 10 MHz_16QAM-High Channel



ULCA_5B



PCC 10 MHz + SCC 5 MHz_QPSK-Low Channel



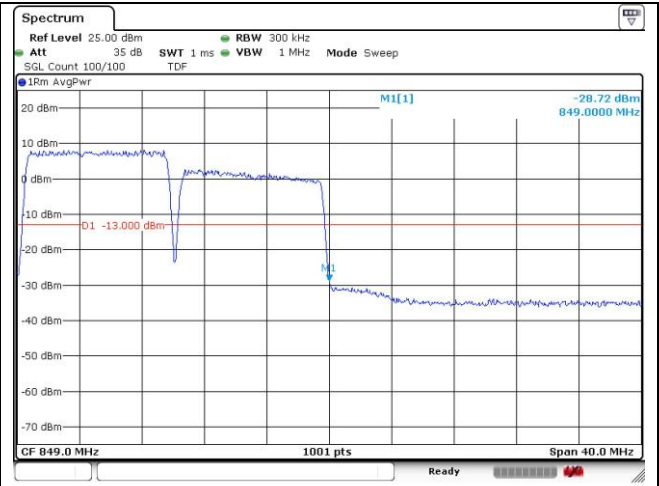
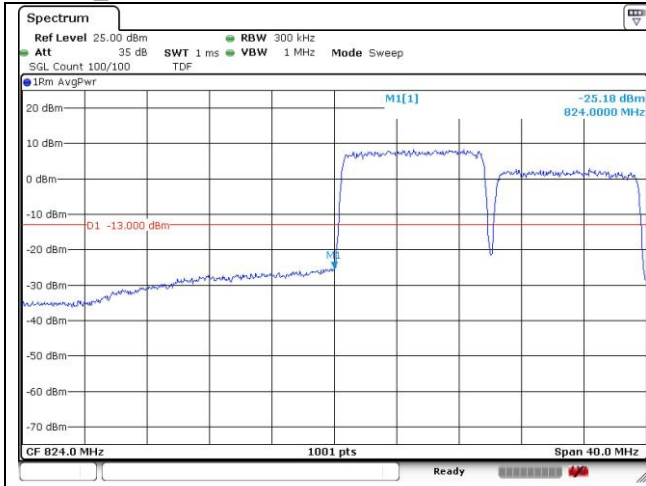
PCC 10 MHz + SCC 5 MHz_QPSK-High Channel



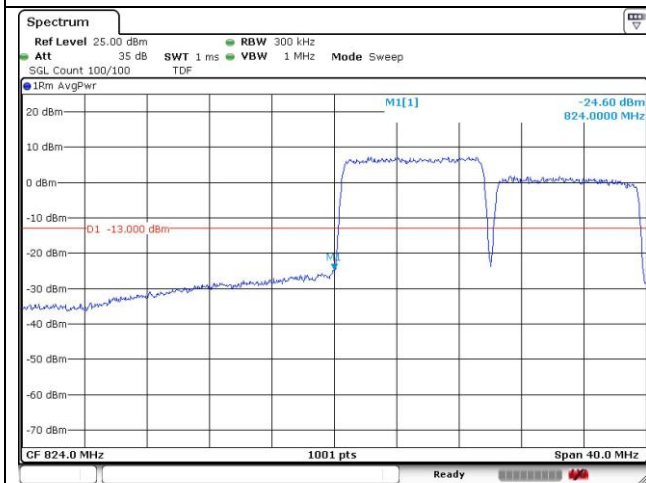
PCC 10 MHz + SCC 5 MHz_16QAM-Low Channel

PCC 10 MHz + SCC 5 MHz_16QAM-High Channel

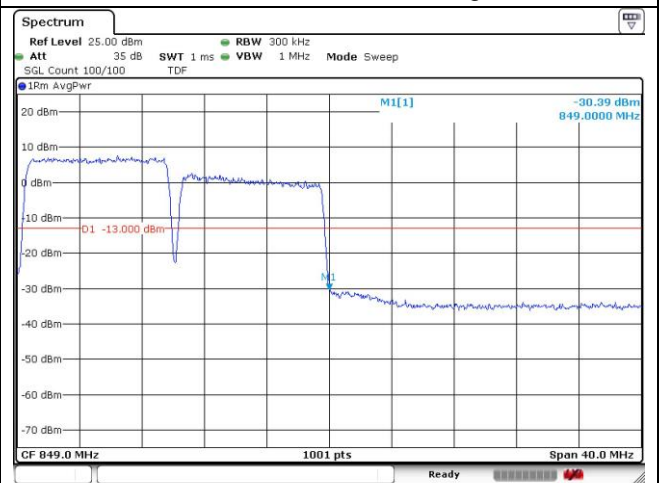
ULCA_5B



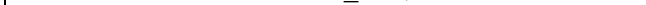
PCC 10 MHz + SCC 10 MHz_QPSK-Low Channel



PCC 10 MHz + SCC 10 MHz_QPSK-High Channel



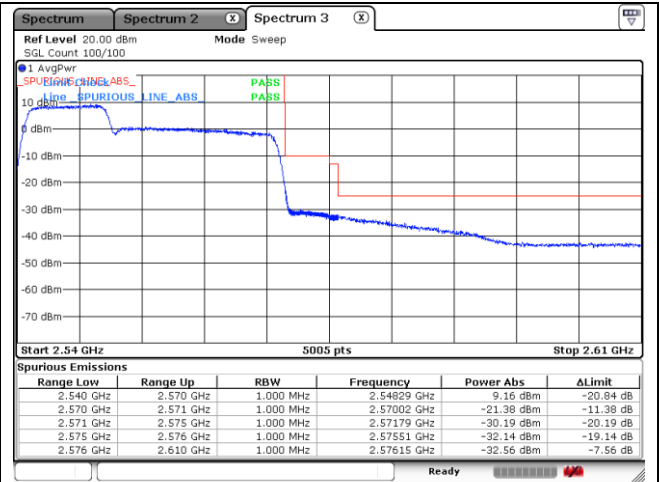
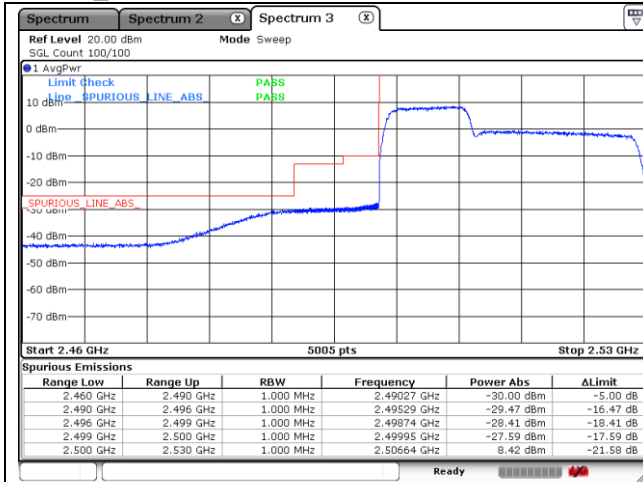
PCC 10 MHz + SCC 10 MHz_16QAM-Low Channel



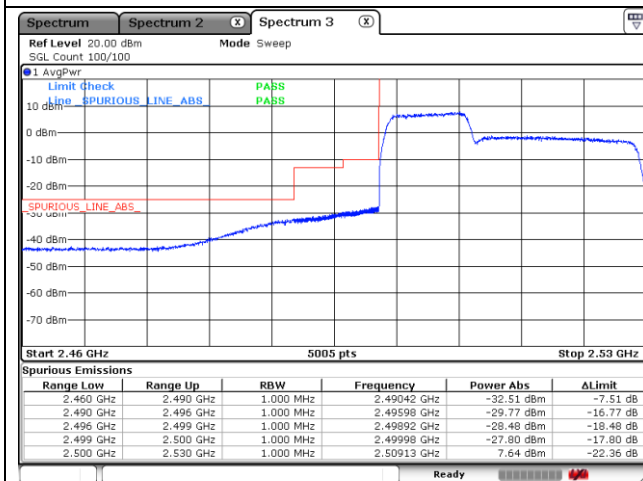
PCC 10 MHz + SCC 10 MHz_16QAM-High Channel



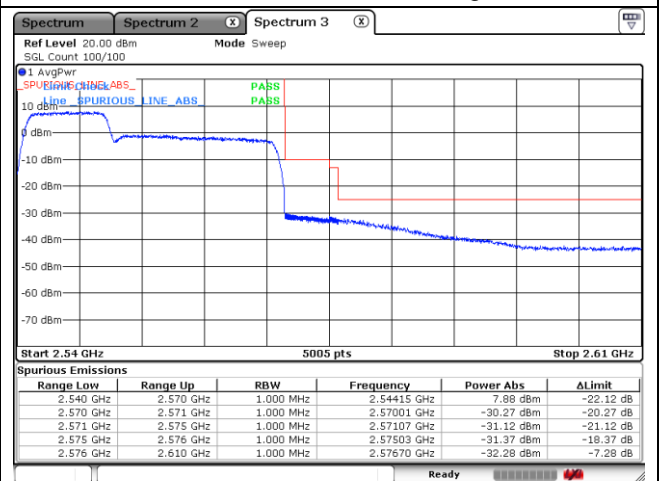
ULCA_7C



PCC 10 MHz + SCC 20 MHz_QPSK-Low Channel



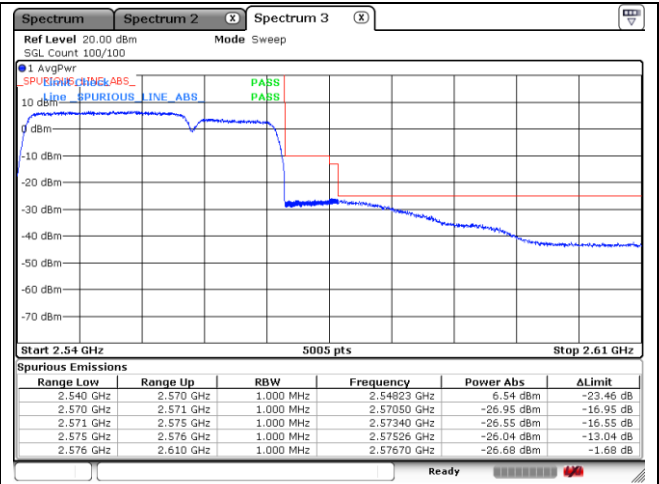
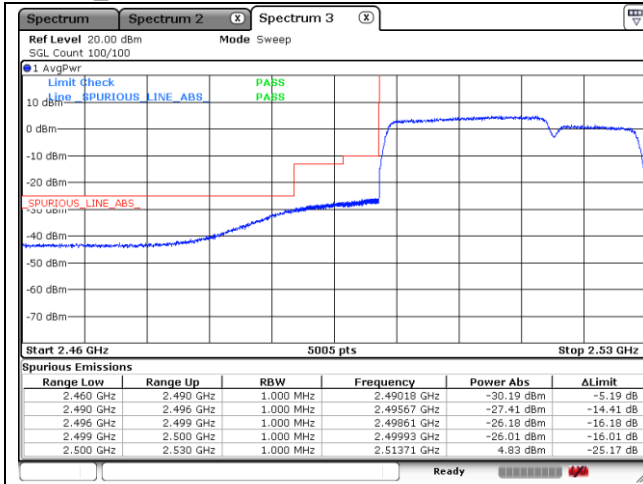
PCC 10 MHz + SCC 20 MHz_QPSK-High Channel



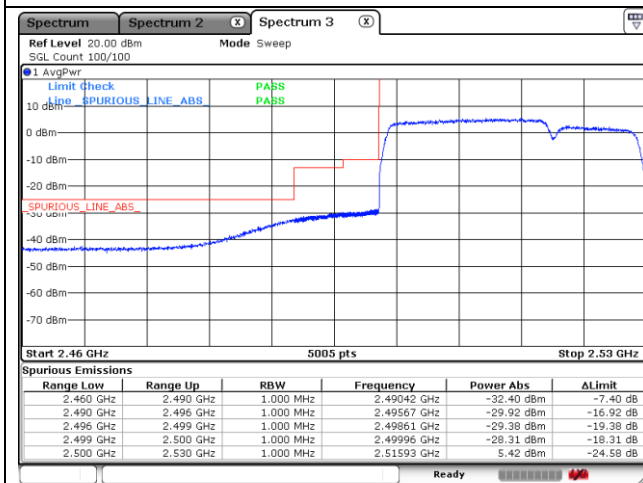
PCC 10 MHz + SCC 20 MHz_16QAM-Low Channel

PCC 10 MHz + SCC 20 MHz_16QAM-High Channel

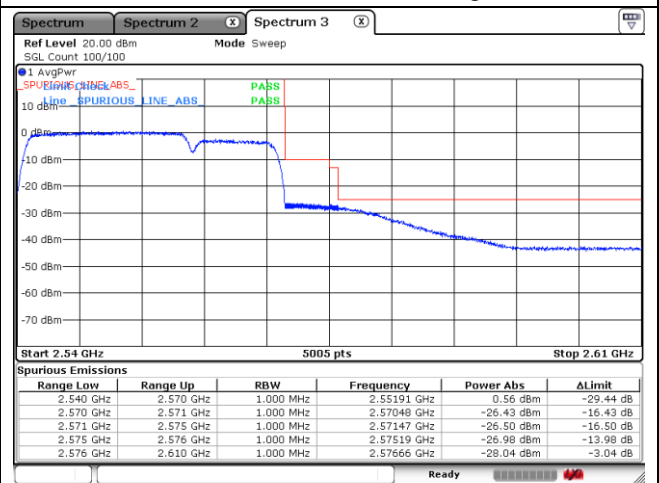
ULCA_7C



PCC 20 MHz + SCC 10 MHz_QPSK-Low Channel



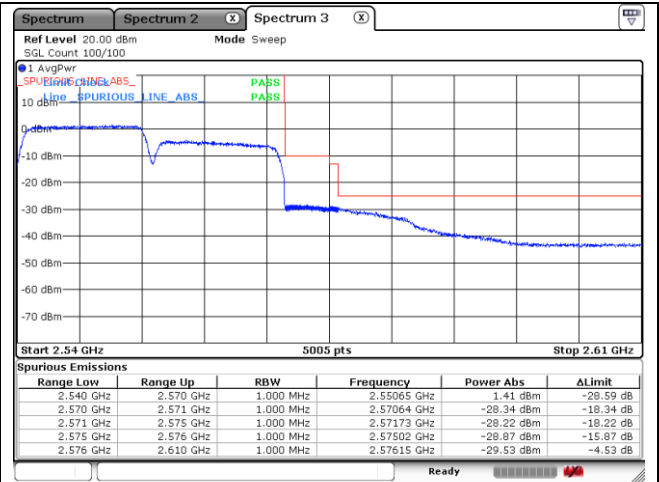
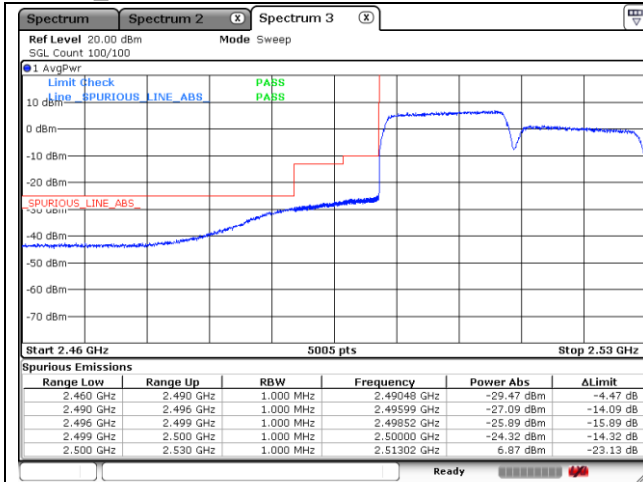
PCC 20 MHz + SCC 10 MHz_QPSK-High Channel



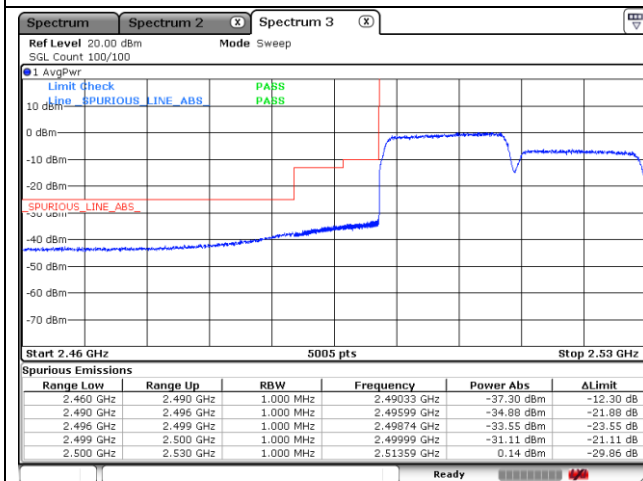
PCC 20 MHz + SCC 10 MHz_16QAM-Low Channel

PCC 20 MHz + SCC 10 MHz_16QAM-High Channel

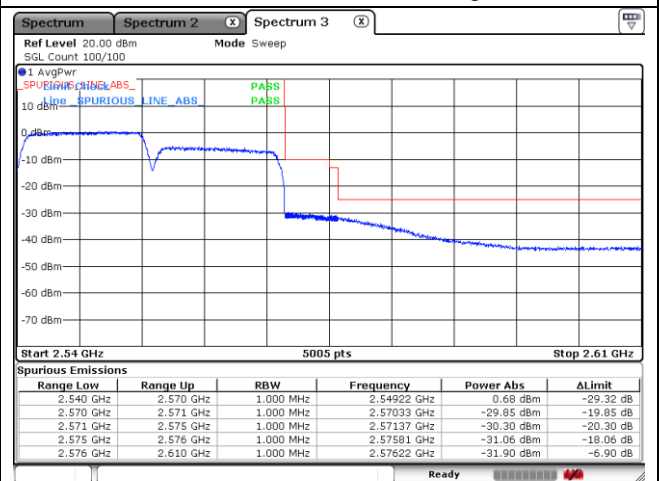
ULCA_7C



PCC 15 MHz + SCC 15 MHz_QPSK-Low Channel



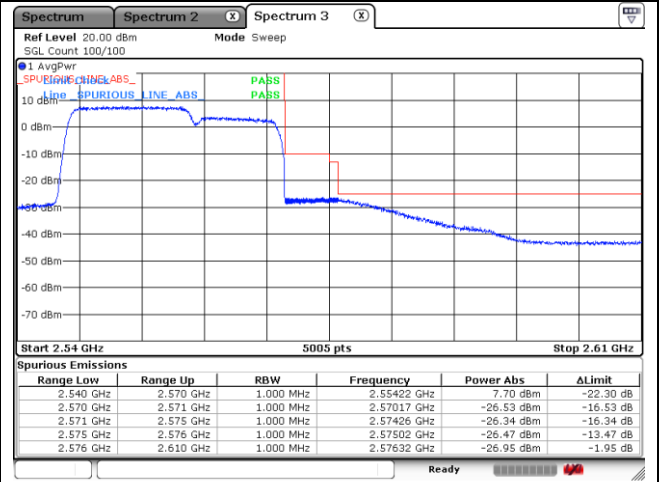
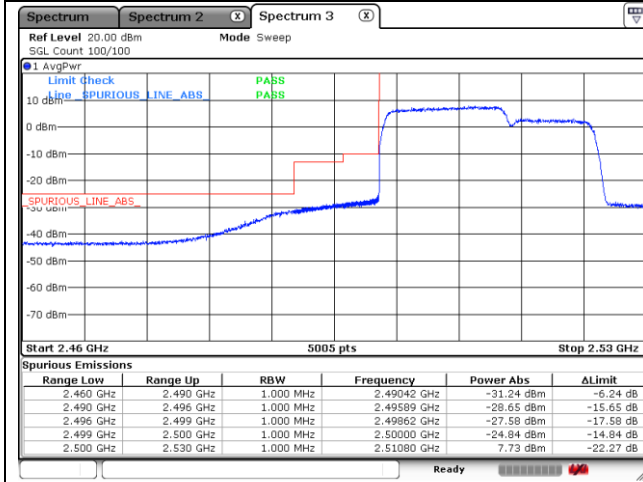
PCC 15 MHz + SCC 15 MHz_QPSK-High Channel



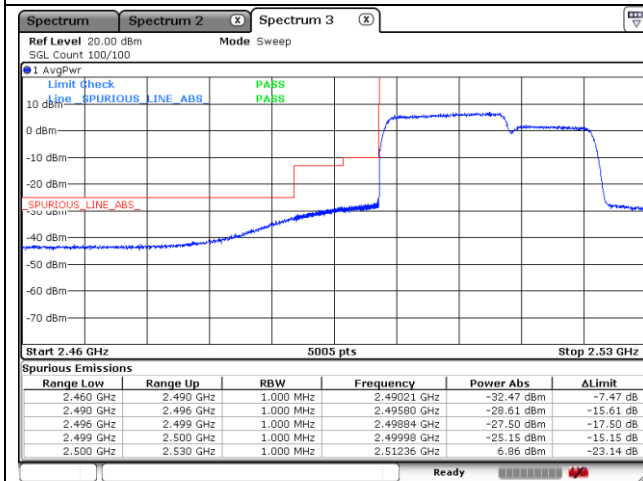
PCC 15 MHz + SCC 15 MHz_16QAM-Low Channel

PCC 15 MHz + SCC 15 MHz_16QAM-High Channel

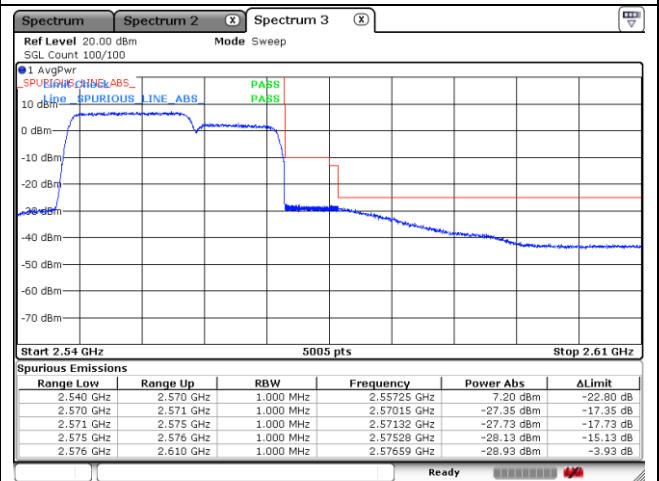
ULCA_7C



PCC 15 MHz + SCC 10 MHz_QPSK-Low Channel



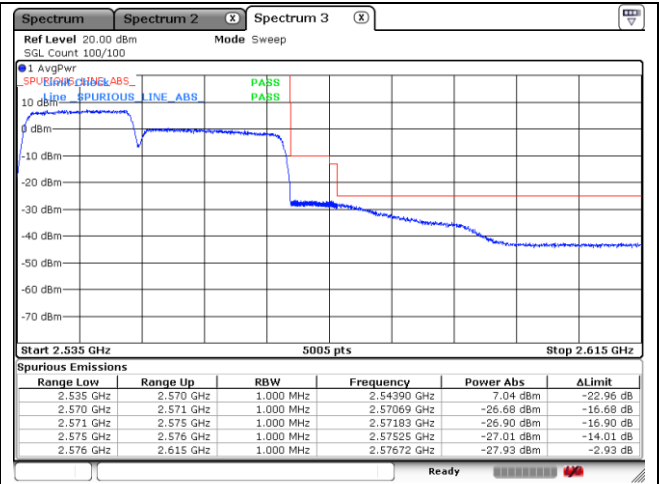
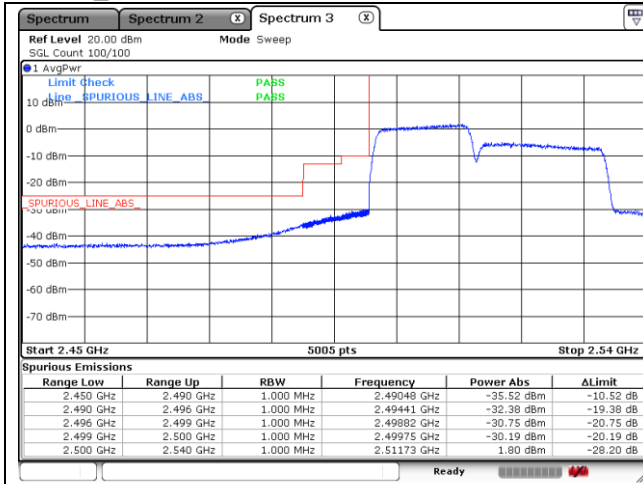
PCC 15 MHz + SCC 10 MHz_QPSK-High Channel



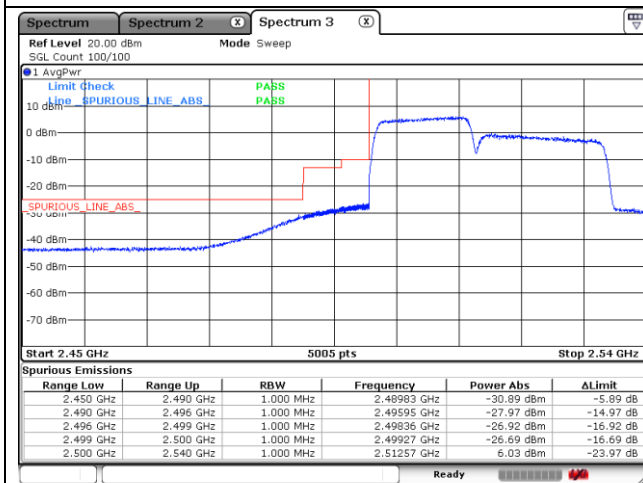
PCC 15 MHz + SCC 10 MHz_16QAM-Low Channel

PCC 15 MHz + SCC 10 MHz_16QAM-High Channel

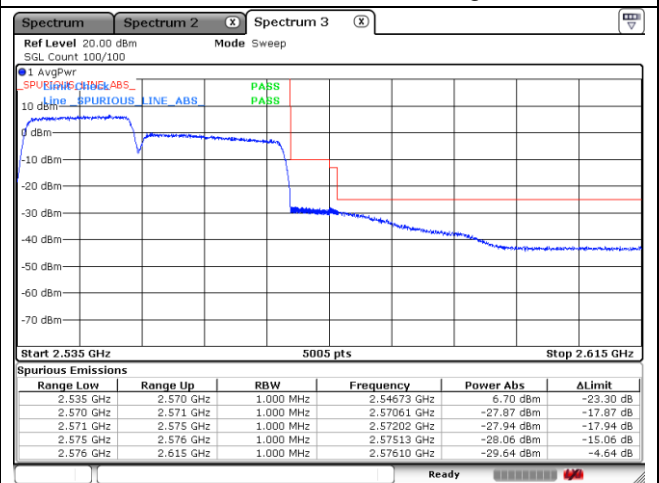
ULCA_7C



PCC 15 MHz + SCC 20 MHz_QPSK-Low Channel



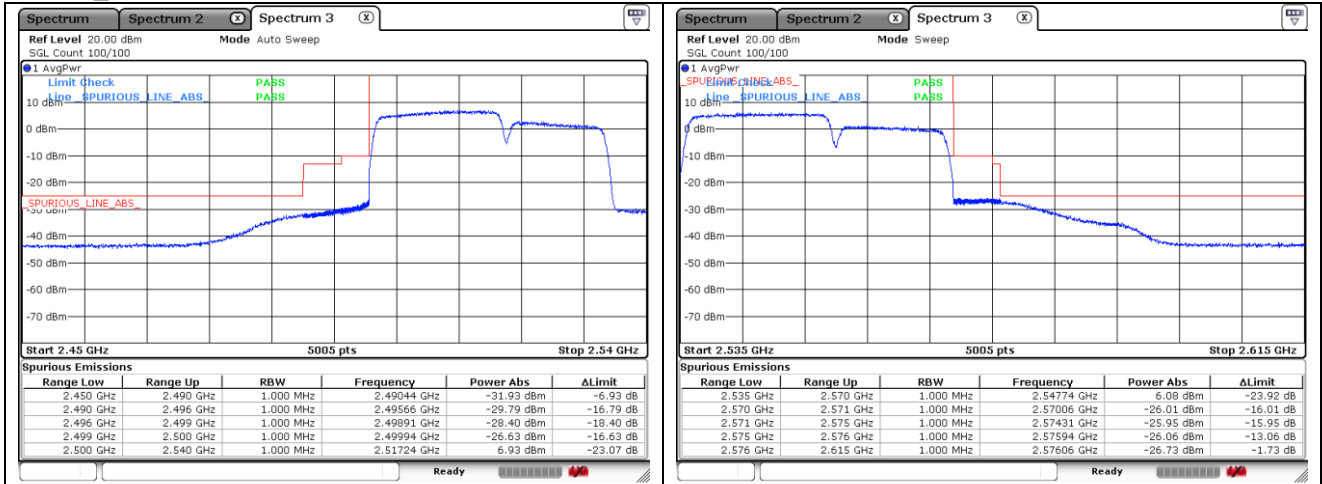
PCC 15 MHz + SCC 20 MHz_QPSK-High Channel



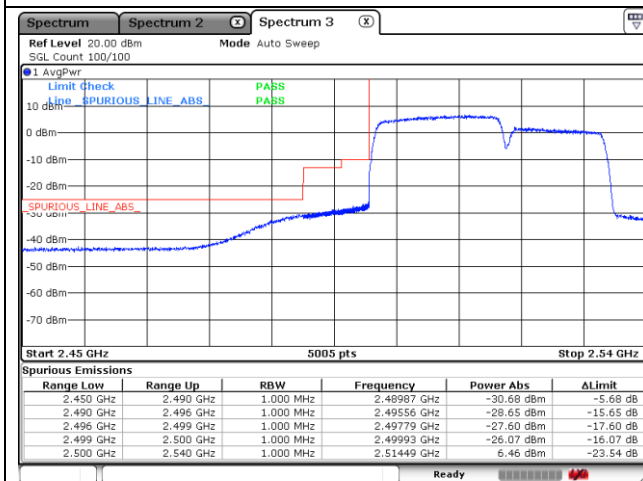
PCC 15 MHz + SCC 20 MHz_16QAM-Low Channel

PCC 15 MHz + SCC 20 MHz_16QAM-High Channel

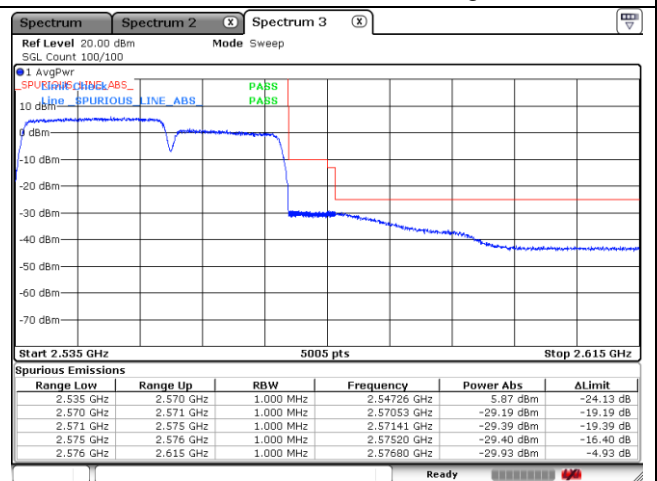
ULCA_7C



PCC 20 MHz + SCC 15 MHz_QPSK-Low Channel



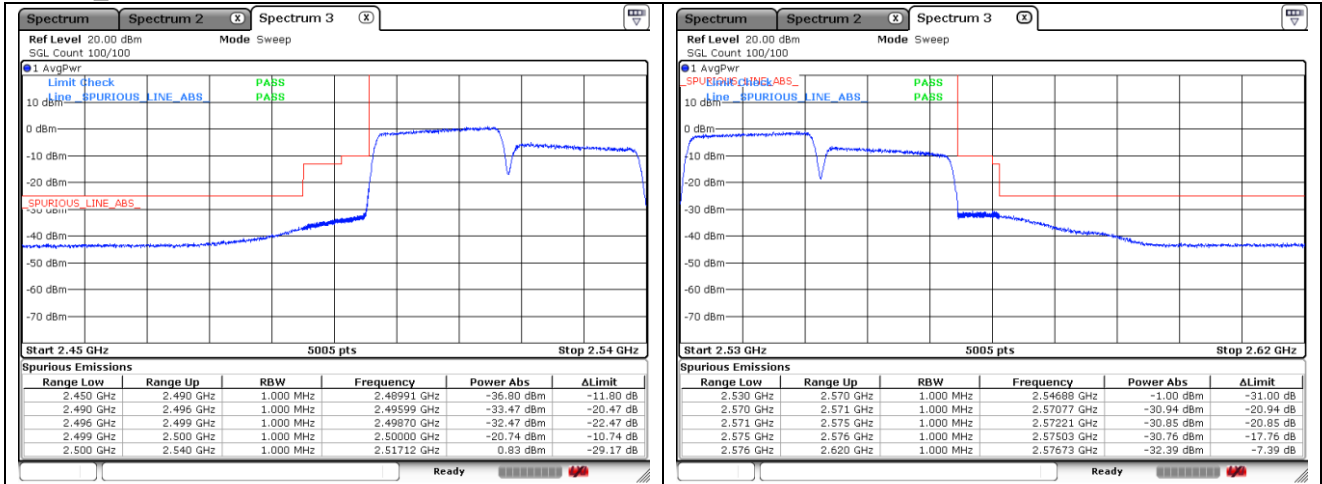
PCC 20 MHz + SCC 15 MHz_QPSK-High Channel



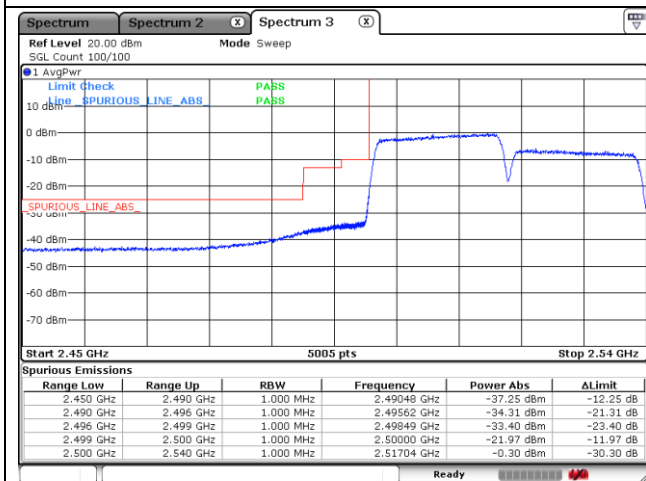
PCC 20 MHz + SCC 15 MHz_16QAM-Low Channel

PCC 20 MHz + SCC 15 MHz_16QAM-High Channel

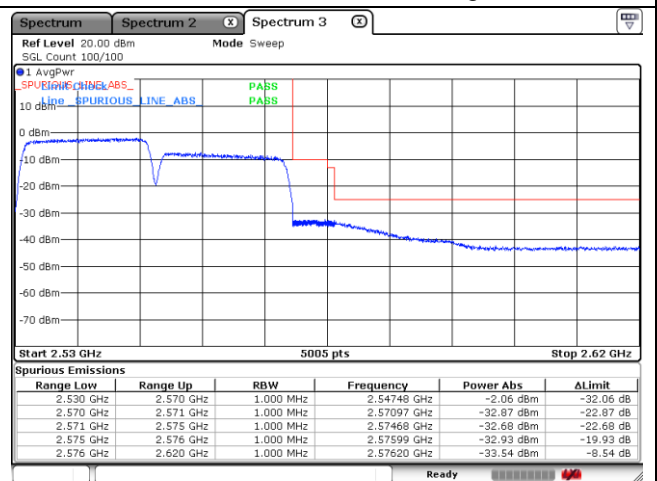
ULCA_7C



PCC 20 MHz + SCC 20 MHz_QPSK-Low Channel



PCC 20 MHz + SCC 20 MHz_QPSK-High Channel



PCC 20 MHz + SCC 20 MHz_16QAM-Low Channel

PCC 20 MHz + SCC 20 MHz_16QAM-High Channel

ULCA_66B

