





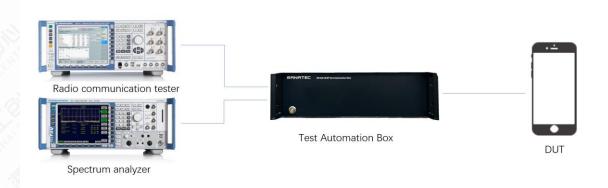
Report No: 24T04I300217-051-V2

6.5 Emission Bandwidth

6.5.1 Method of Measurement

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. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the followinag pages.

6.5.2 Test Setup



6.5.3 Measurement results

| Band | Range | BandWidth | Frequency(MHz) | QPSK(MHz) | 16QAM(MHz) | 64QAM(MHz) |
|-------|----------|-----------|----------------|-----------|------------|------------|
| FDD02 | MidRange | 1.4 | 1880 | 1.27 | 1.25 | 1.27 |
| FDD02 | MidRange | 3 | 1880 | 2.90 | 2.90 | 2.92 |
| FDD02 | MidRange | 5 | 1880 | 4.69 | 4.69 | 4.66 |
| FDD02 | MidRange | 10 | 1880 | 9.33 | 9.33 | 9.33 |
| FDD02 | MidRange | 15 | 1880 | 14.21 | 14.21 | 14.21 |
| FDD02 | MidRange | 20 | 1880 | 18.75 | 18.75 | 18.75 |
| FDD04 | MidRange | 1.4 | 1732.5 | 1.23 | 1.25 | 1.25 |
| FDD04 | MidRange | 3 | 1732.5 | 2.90 | 2.87 | 2.87 |
| FDD04 | MidRange | 5 | 1732.5 | 4.66 | 4.66 | 4.71 |
| FDD04 | MidRange | 10 | 1732.5 | 9.33 | 9.33 | 9.33 |
| FDD04 | MidRange | 15 | 1732.5 | 14.21 | 14.21 | 14.21 |
| FDD04 | MidRange | 20 | 1732.5 | 18.75 | 18.75 | 18.75 |
| FDD05 | MidRange | 1.4 | 836.5 | 1.25 | 1.26 | 1.24 |
| FDD05 | MidRange | 3 | 836.5 | 2.87 | 2.87 | 2.87 |



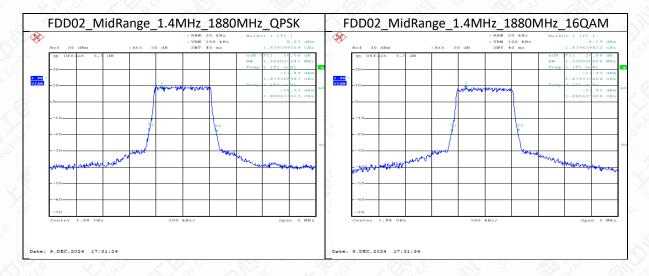
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|--------------------|----------|-------|----------|-----------------------------|-------|-------|--|
| FDD05 | MidRange | 5 | 836.5 | 4.64 | 4.71 | 4.66 | |
| FDD05 | MidRange | 10 | 836.5 | 9.33 | 9.33 | 9.33 | |
| FDD07 | MidRange | 5 | 2535 | 4.81 | 4.74 | 4.74 | |
| FDD07 | MidRange | 10 | 2535 | 9.33 | 9.33 | 9.33 | |
| FDD07 | MidRange | 15 | 2535 | 14.21 | 14.21 | 14.28 | |
| FDD07 | MidRange | 20 | 2535 | 18.75 | 18.65 | 18.75 | |
| FDD12 | MidRange | 1.4 | 707.5 | 1.26 | 1.24 | 1.26 | |
| FDD12 | MidRange | 3 | 707.5 | 2.88 | 2.87 | 2.92 | |
| FDD12 | MidRange | 5 | 707.5 | 4.81 | 4.66 | 4.66 | |
| FDD12 | MidRange | 10 | 707.5 | 9.28 | 9.28 | 9.28 | |
| FDD13 | MidRange | 5 | 782 | 4.66 | 4.66 | 4.66 | |
| FDD13 | MidRange | 10 | 782 | 9.23 | 9.28 | 9.28 | |
| FDD17 | MidRange | 5 | 710 | 4.66 | 4.66 | 4.74 | |
| FDD17 | MidRange | 10 | 710 | 9.33 | 9.33 | 9.33 | |
| FDD25 | MidRange | 1.4 | 1882.5 | 1.25 | 1.23 | 1.25 | |
| FDD25 | MidRange | 3 | 1882.5 | 2.87 | 2.87 | 2.85 | |
| FDD25 | MidRange | 5 | 1882.5 | 4.66 | 4.66 | 4.74 | |
| FDD25 | MidRange | 10 | 1882.5 | 9.28 | 9.33 | 9.33 | |
| FDD25 | MidRange | 15 | 1882.5 | 14.21 | 14.21 | 14.21 | |
| FDD25 | MidRange | 20 | 1882.5 | 18.75 | 18.75 | 18.75 | |
| FDD26 (PART 22) | MidRange | 1.4 | 836.5 | 1.27 | 1.25 | 1.26 | |
| FDD26 (PART 22) | MidRange | 3 | 836.5 | 2.85 | 2.88 | 2.84 | |
| FDD26 (PART 22) | MidRange | 5 | 836.5 | 4.69 | 4.66 | 4.66 | |
| FDD26 (PART 22) | MidRange | 10 | 836.5 | 9.33 | 9.33 | 9.33 | |
| FDD26 (PART 22) | MidRange | 15 | 836.5 | 14.06 | 14.06 | 14.21 | |
| TDD38 | MidRange | 5 | 2595 | 4.88 | 4.83 | 4.81 | |
| TDD38 | MidRange | 10 | 2595 | 9.62 | 9.52 | 9.62 | |
| TDD38 | MidRange | 15 | 2595 | 14.42 | 14.35 | 14.35 | |
| TDD38 | MidRange | 20 | 2595 | 19.04 | 19.04 | 19.13 | |

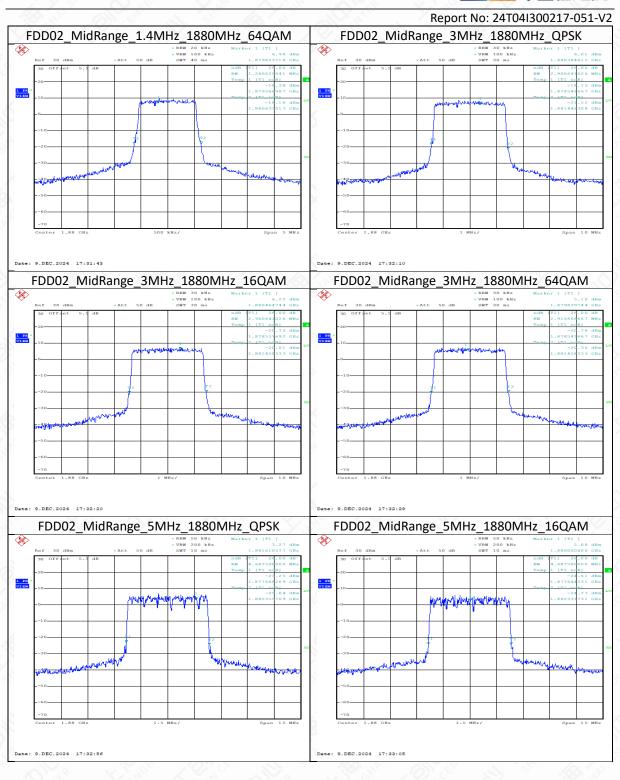


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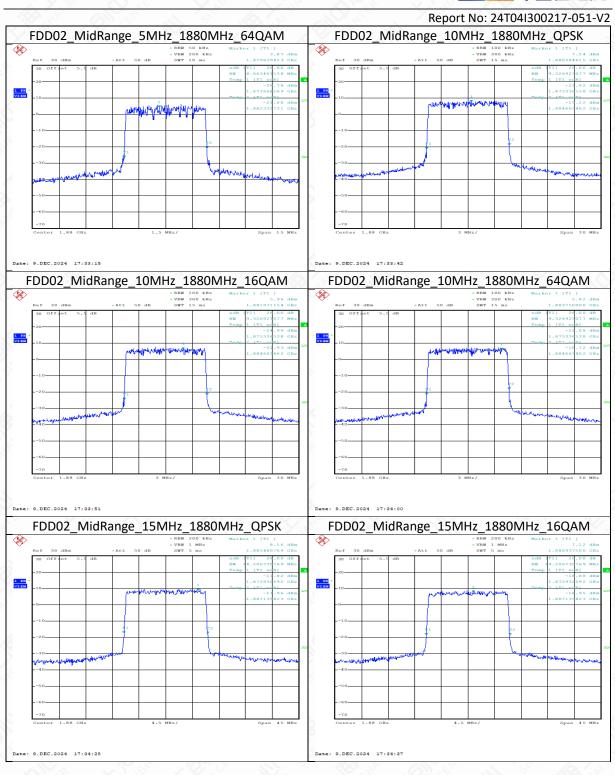
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|-------|----------|------|-------|-------------------------------|-------|-------|--|
| TDD41 | MidRange | 5 | 2593 | 4.86 | 4.81 | 4.83 | |
| TDD41 | MidRange | 10 | 2593 | 9.52 | 9.52 | 9.62 | |
| TDD41 | MidRange | 15 | 2593 | 14.42 | 14.50 | 14.42 | |
| TDD41 | MidRange | 20 | 2593 | 19.23 | 18.94 | 19.04 | |
| FDD66 | MidRange | 1.4 | 1745 | 1.23 | 1.27 | 1.25 | |
| FDD66 | MidRange | 3 | 1745 | 2.85 | 2.88 | 2.87 | |
| FDD66 | MidRange | 5 | 1745 | 4.71 | 4.71 | 4.69 | |
| FDD66 | MidRange | 10 | 1745 | 9.33 | 9.33 | 9.33 | |
| FDD66 | MidRange | 15 | 1745 | 14.21 | 14.21 | 14.21 | |
| FDD66 | MidRange | 20 | 1745 | 18.75 | 18.75 | 18.75 | |
| FDD71 | MidRange | 5 | 680.5 | 4.66 | 4.64 | 4.66 | |
| FDD71 | MidRange | 10 | 680.5 | 9.33 | 9.33 | 9.33 | |
| FDD71 | MidRange | 15 | 680.5 | 14.21 | 14.21 | 14.21 | |
| FDD71 | MidRange | 20 | 683 | 18.65 | 18.65 | 18.65 | |



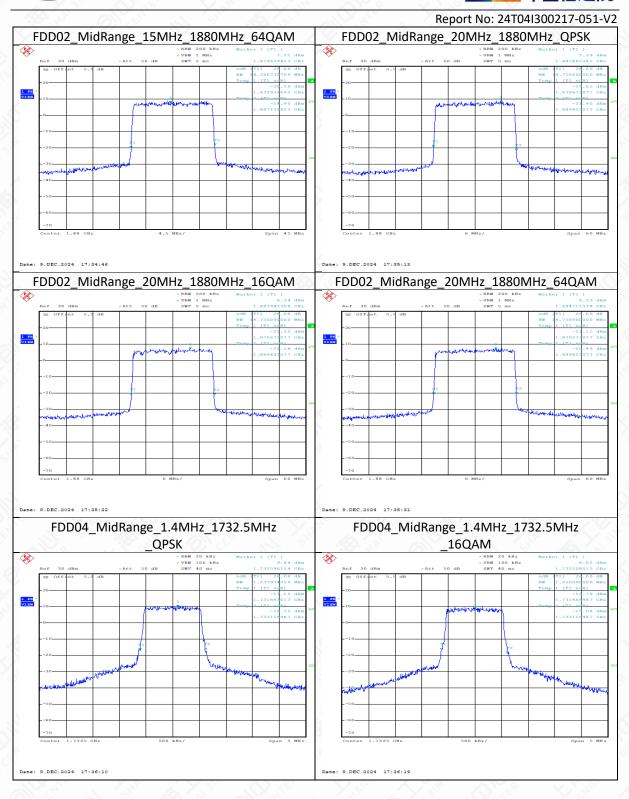




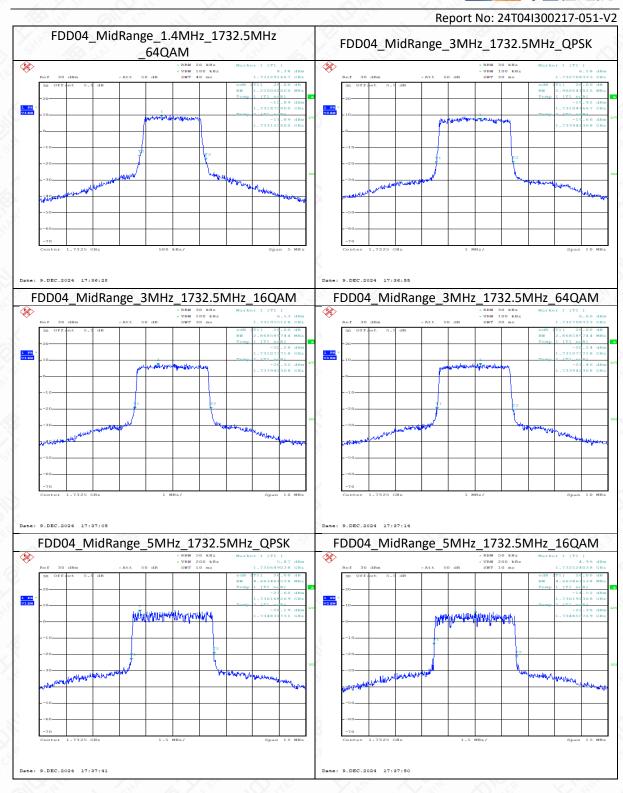




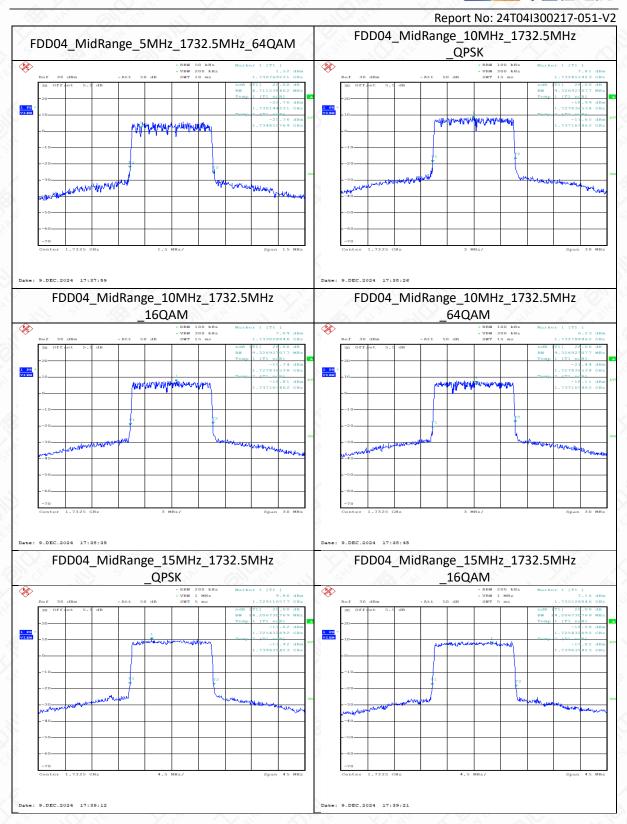




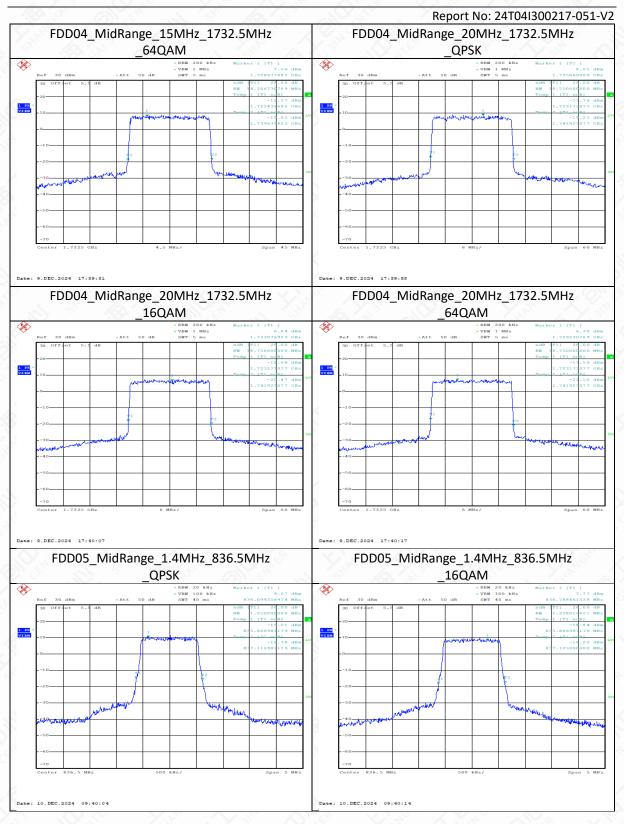




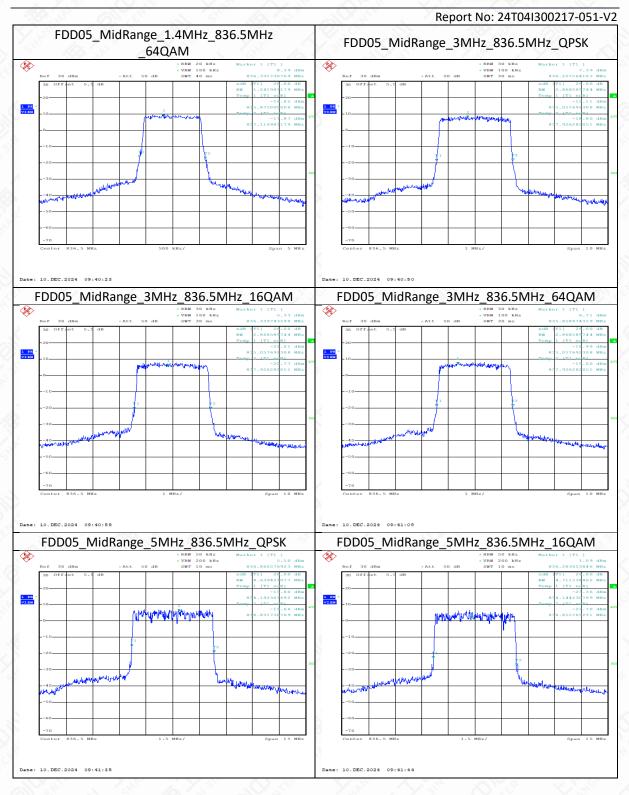




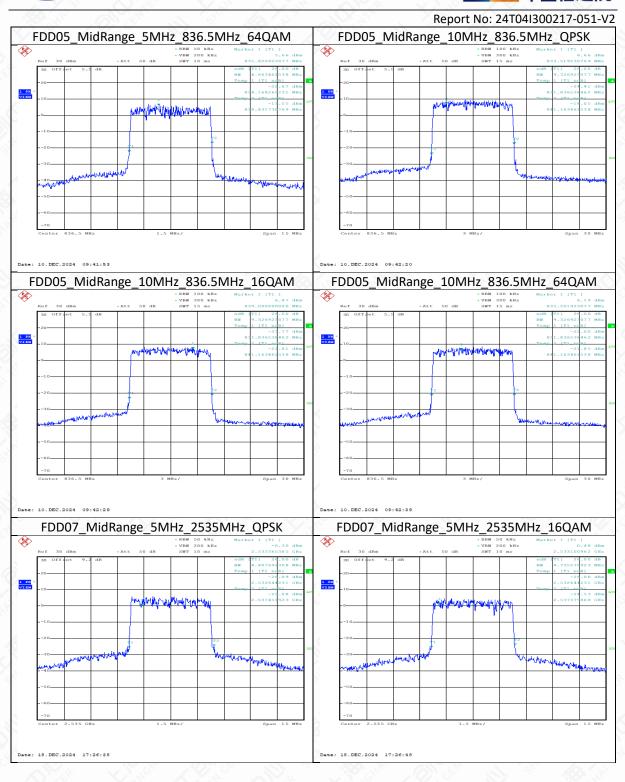




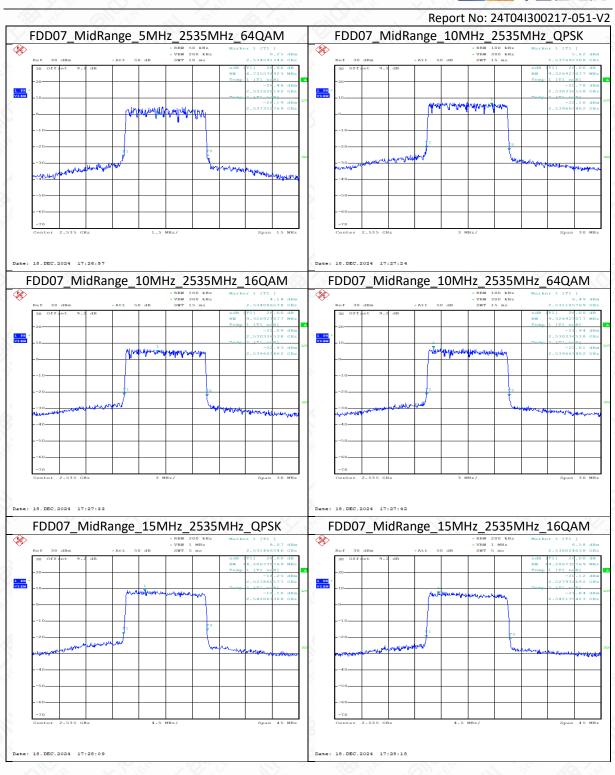




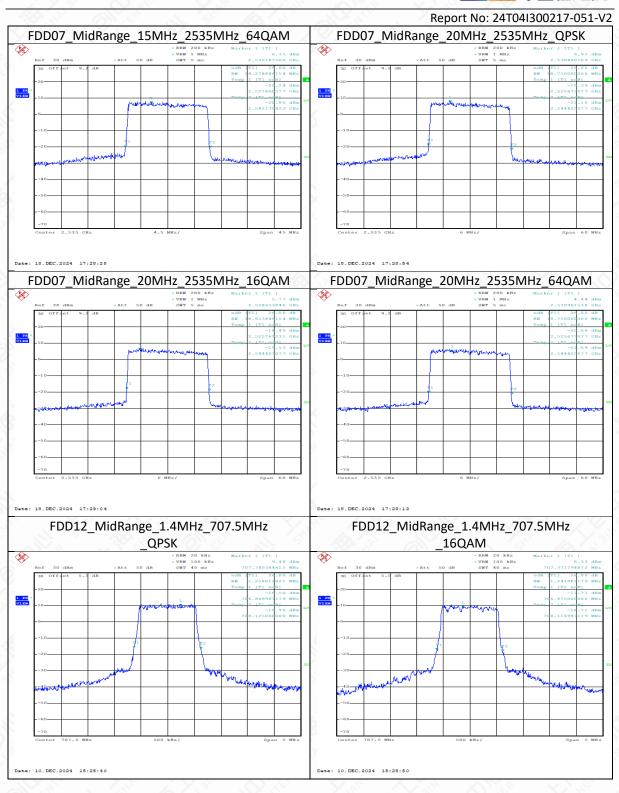




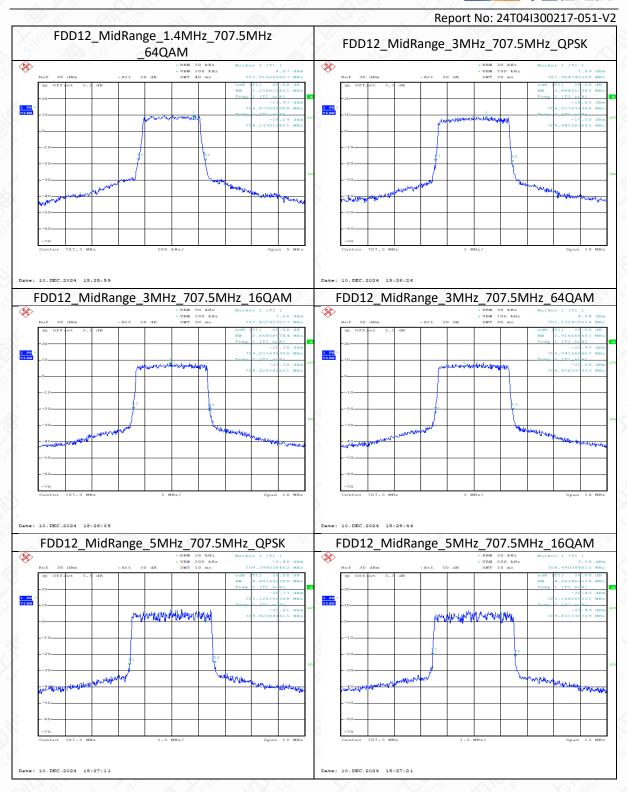




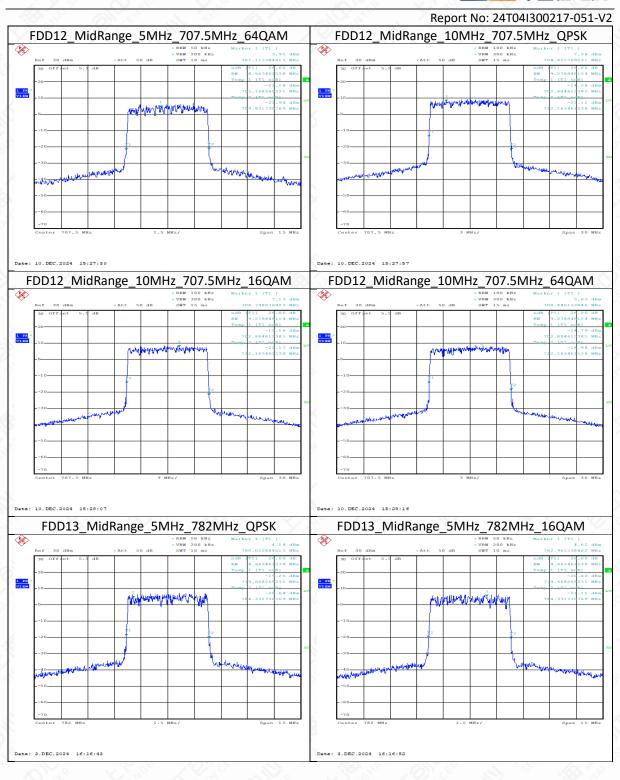




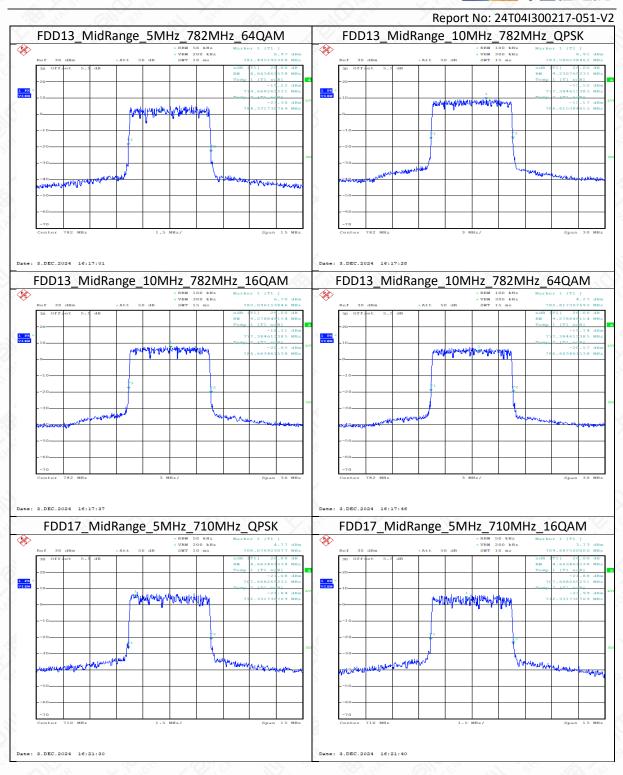




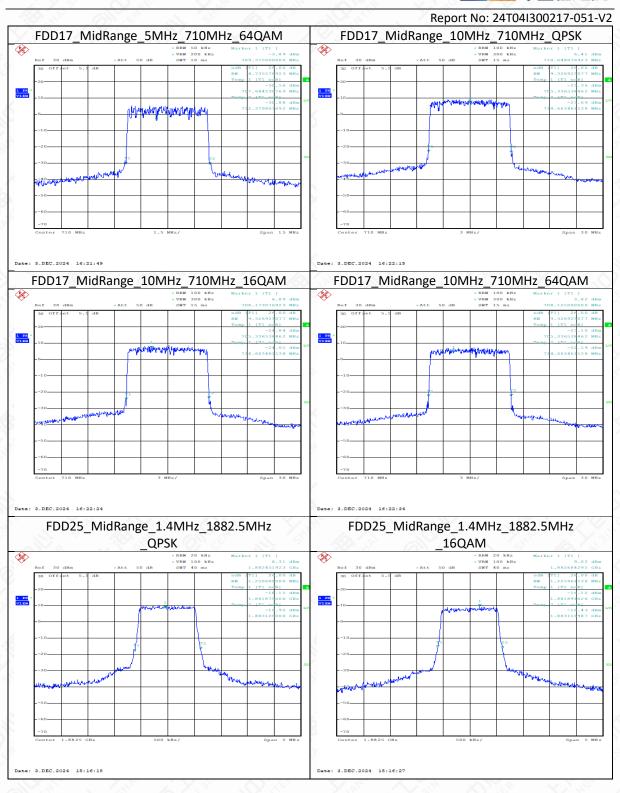




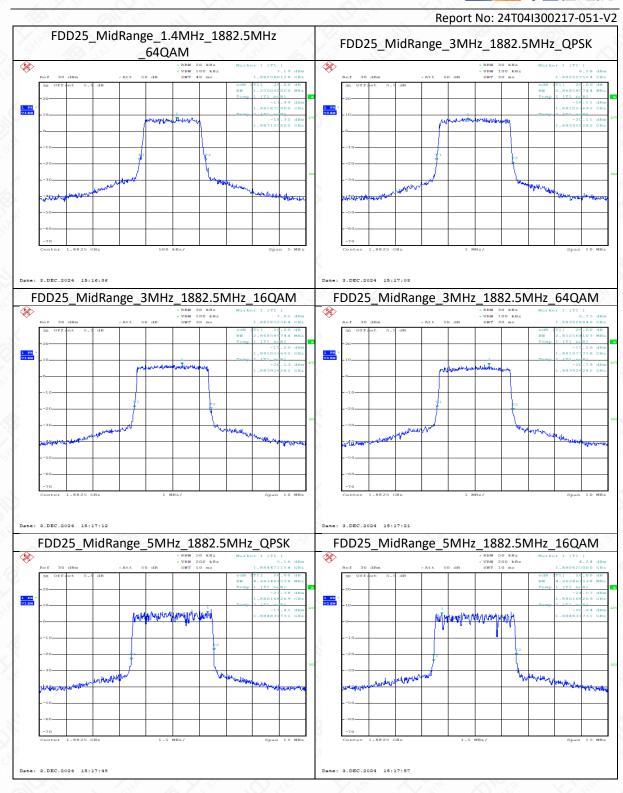




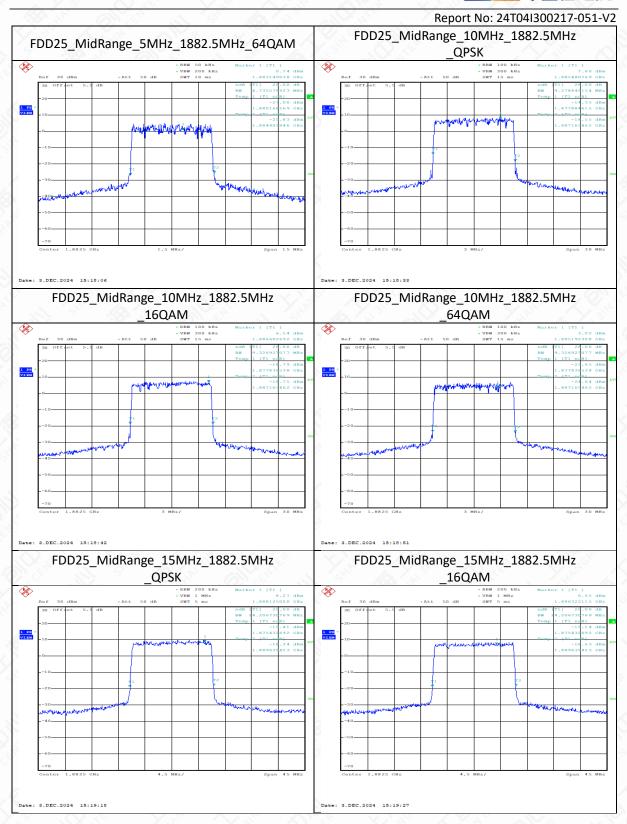




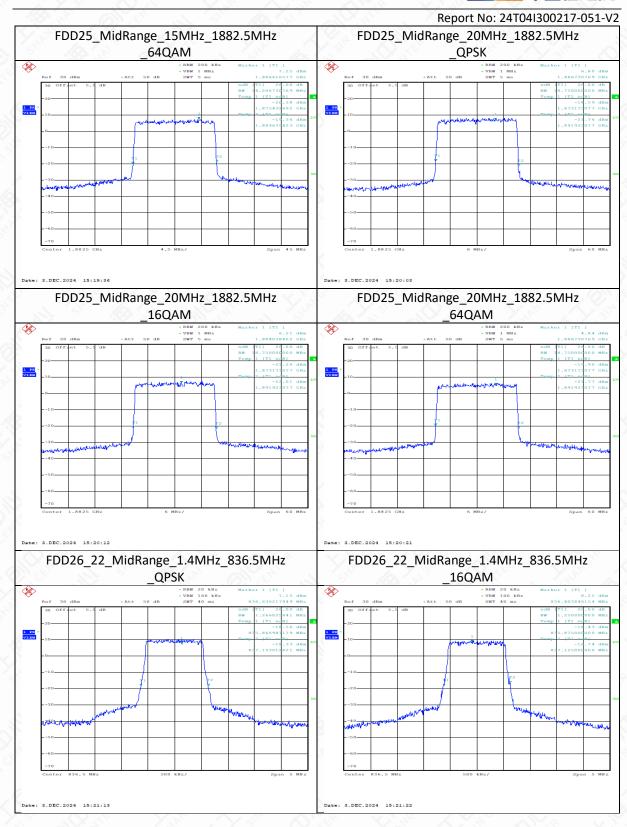




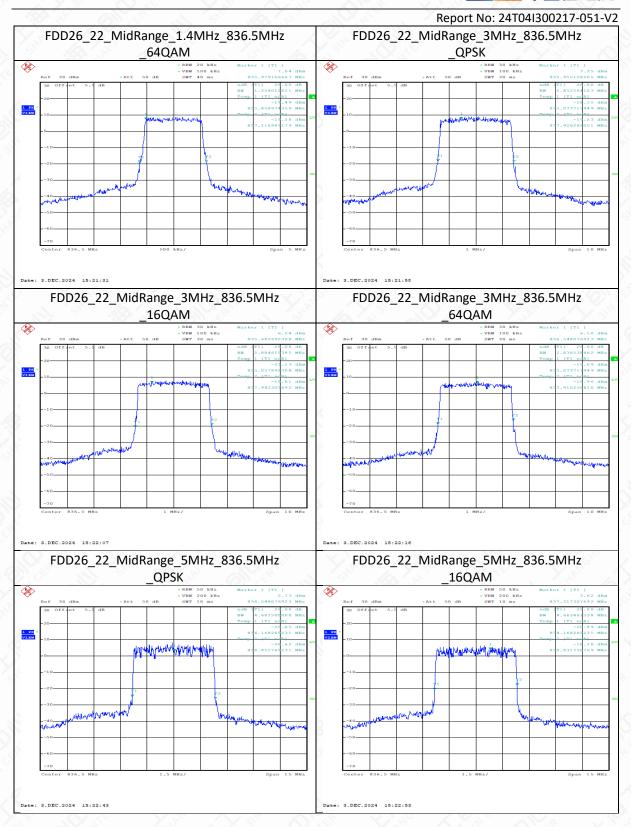




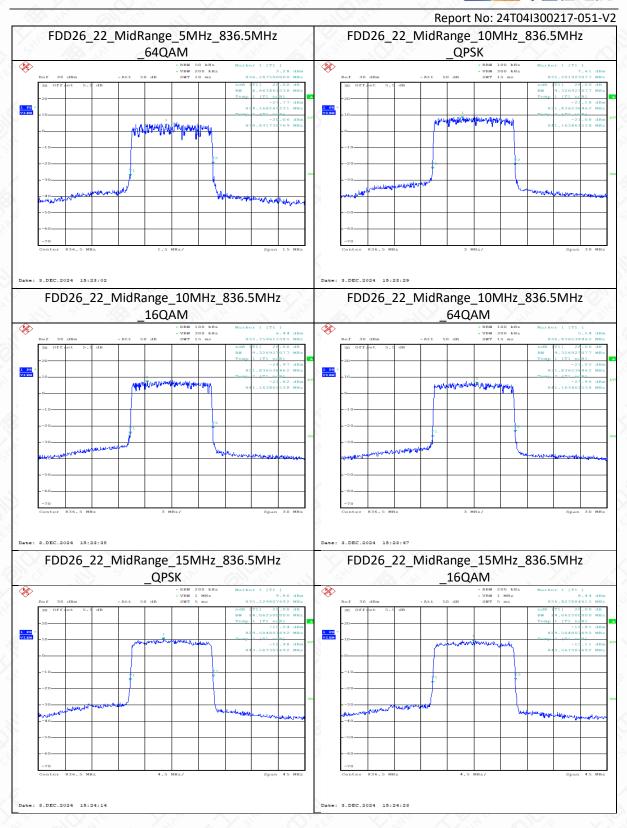




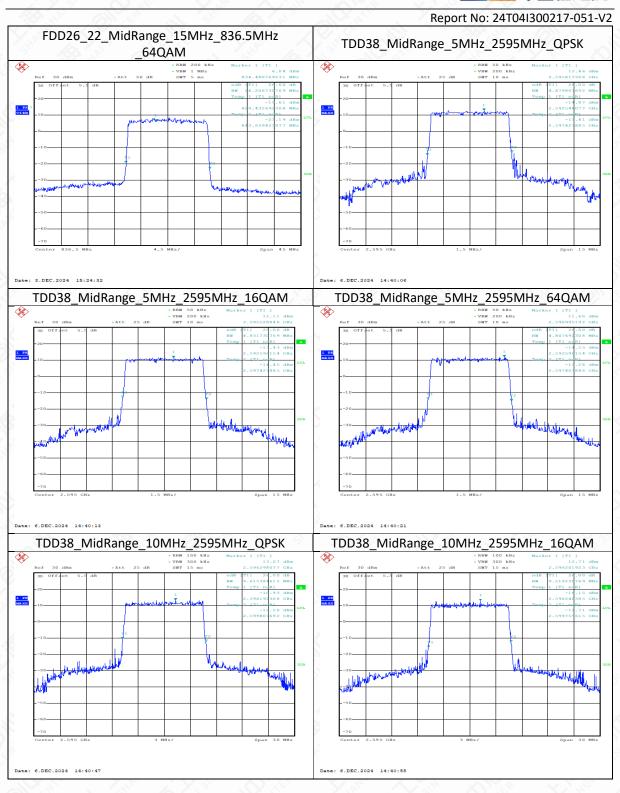




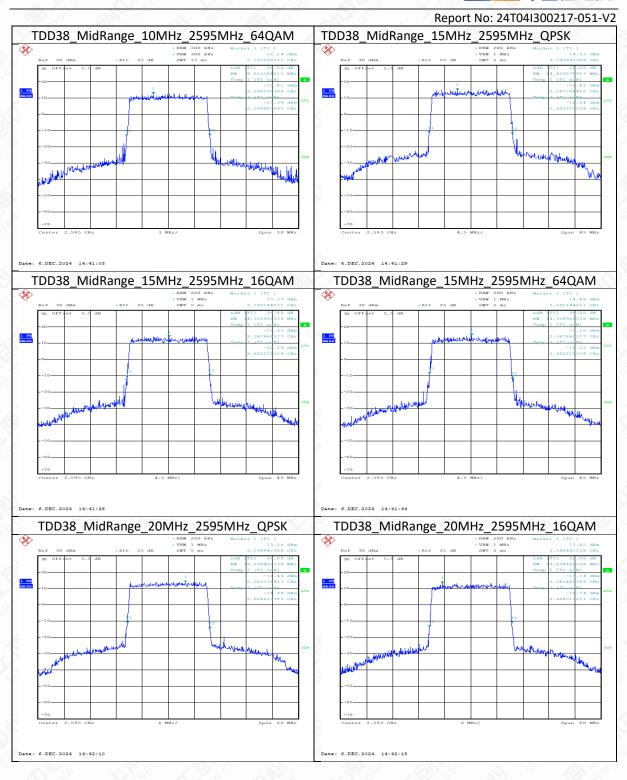




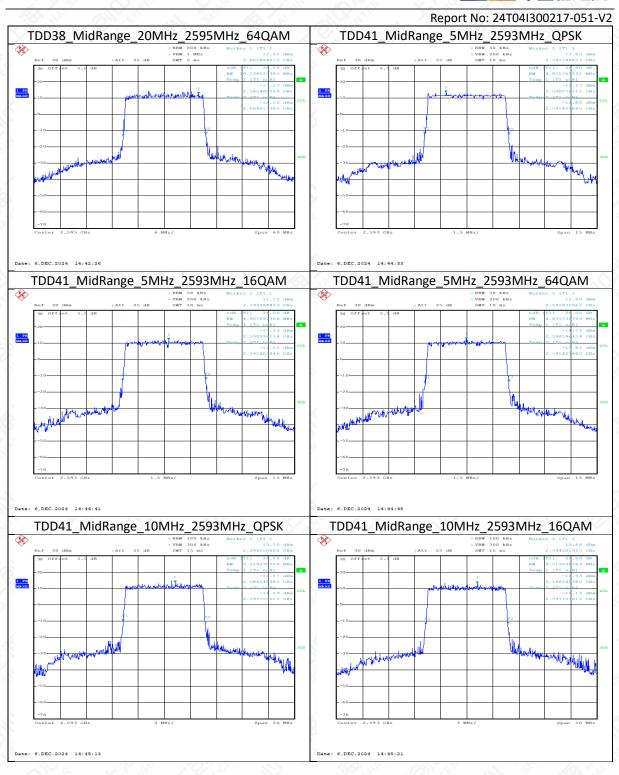




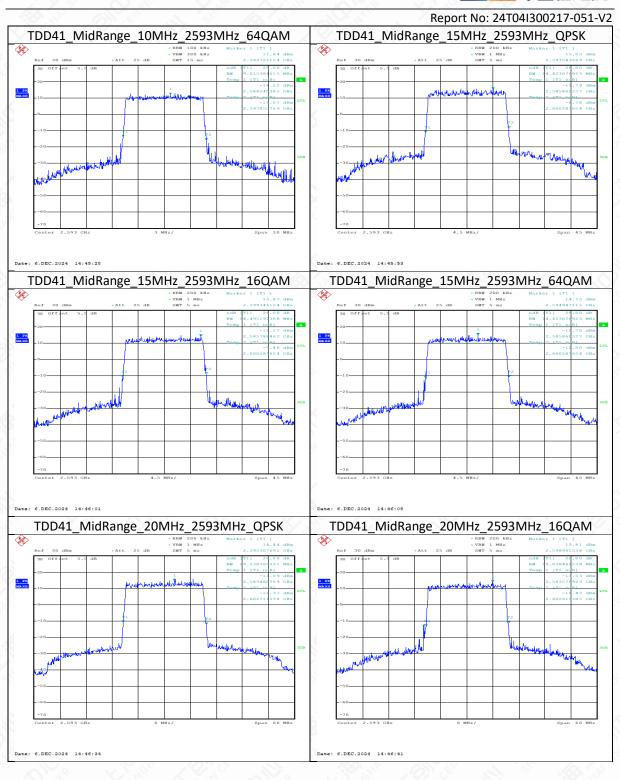




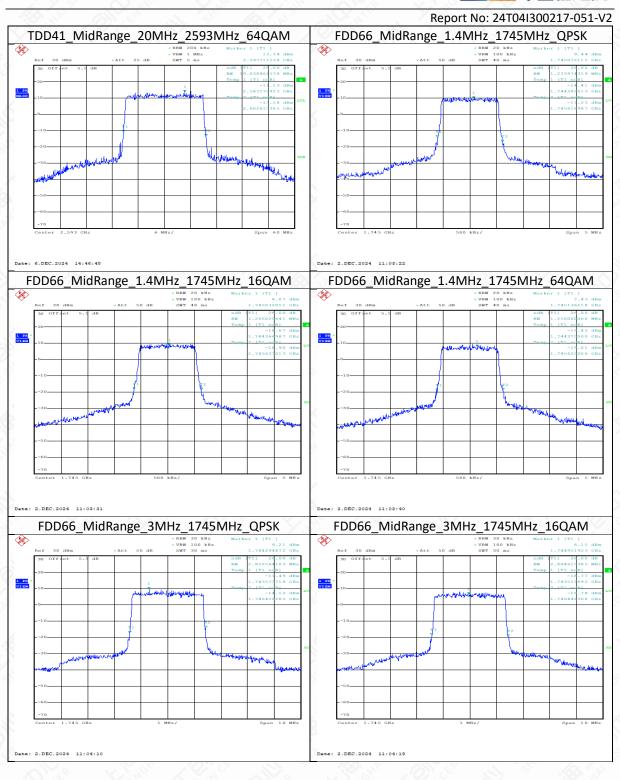




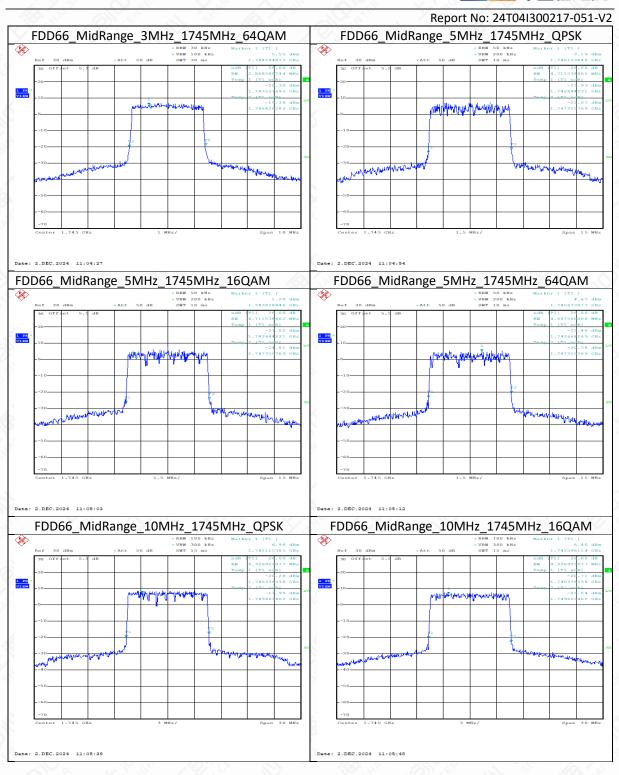




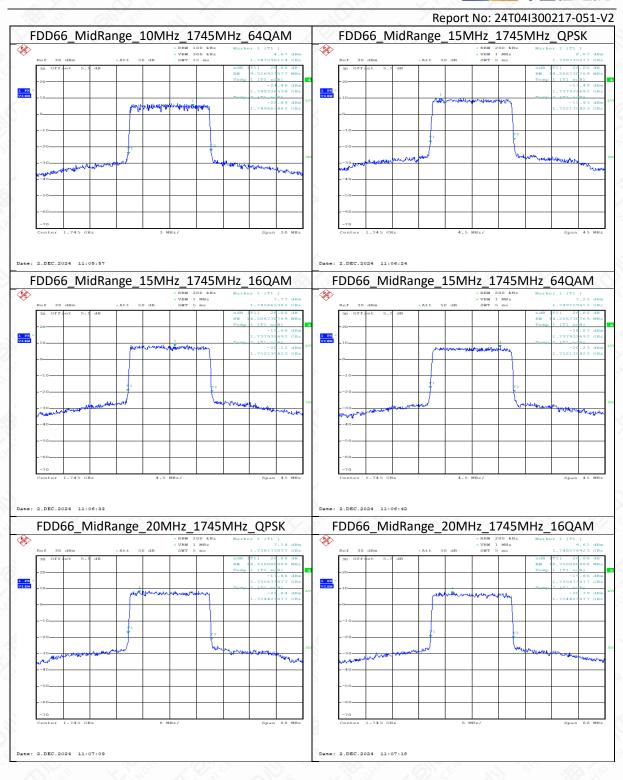




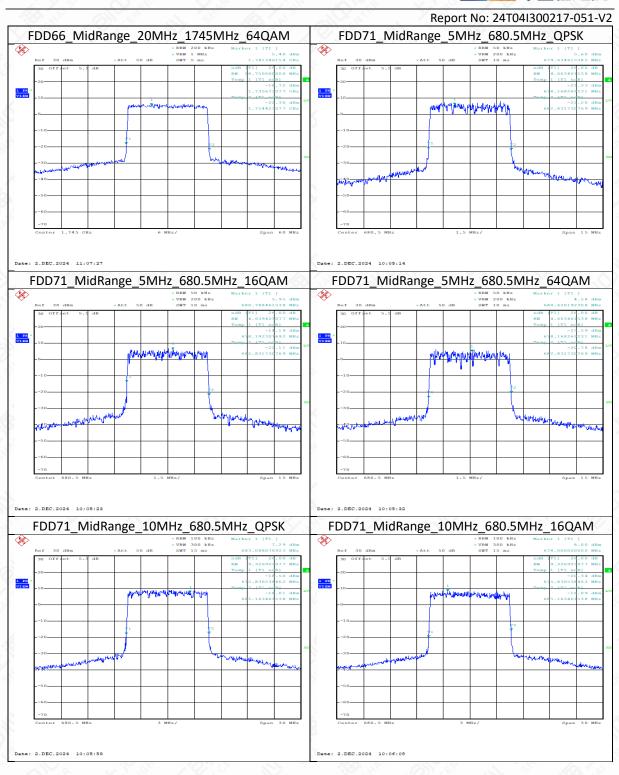




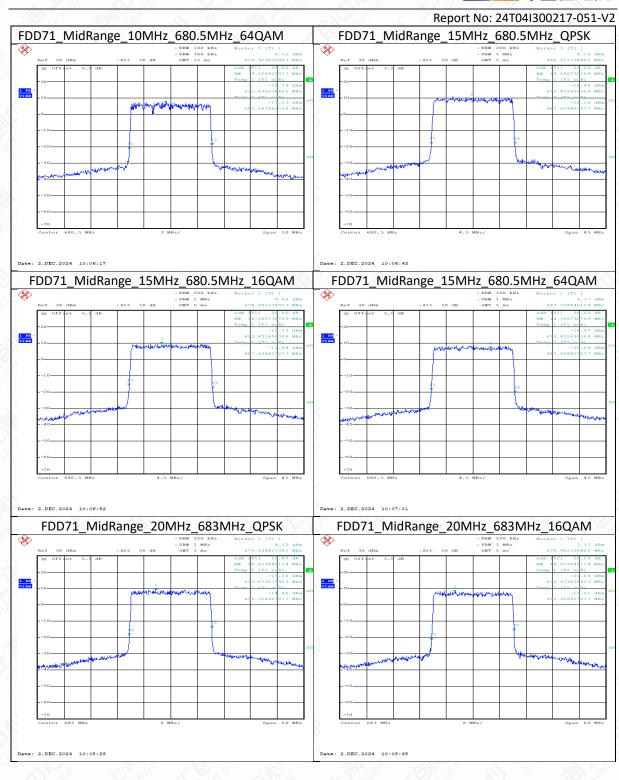




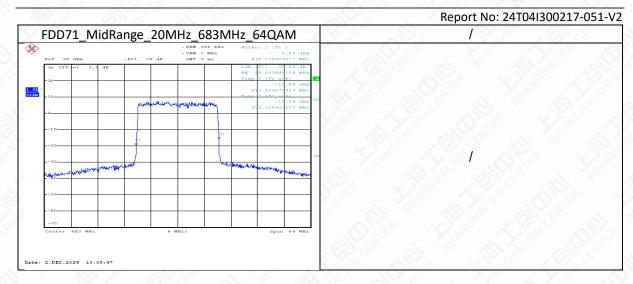
















6.6 Band Edge Compliance

6.6.1 Measurement Limit

FCC §22.917(a) 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 $\S24.238(a)$ 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(a) For mobile and portable stations operating in the 2305–2315 MHz and 2350–2360 MHz bands:

- (i) By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;
- (ii) By a factor of not less than $43 + 10 \log (P) dB$ on all frequencies between 2300 and 2305 MHz, $55 + 10 \log (P) dB$ on all frequencies between 2296 and 2300 MHz, $61 + 10 \log (P) dB$ on all frequencies between 2292 and 2296 MHz, $67 + 10 \log (P) dB$ on all frequencies between 2288 and 2292 MHz, and $70 + 10 \log (P) dB$ below 2288 MHz;
- (iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.

FCC §27.53(c)

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:

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P) dB$;
- (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;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;
- (6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

FCC §27.53(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for





wideband signals, and –80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

FCC §27.53(m)(4) 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 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 §27.53(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 log10 (P) dB.
- (2) Additional protection levels. Notwithstanding the foregoing paragraph (h)(1) of this section:
- (i) Operations in the 2180–2200 MHz band are subject to the out-of-band emission requirements set forth in § 27.1134 for the protection of federal government operations operating in the 2200–2290 MHz band.
- (ii) For operations in the 2000–2020 MHz band, the power of any emissions below 2000 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 log10(P) dB.
- (iii) For operations in the 1915–1920 MHz band, the power of any emission between 1930–1995 MHz shall be attenuated below the transmitter power (P) in watts by at least $70 + 10 \log 10$ (P) dB.
- (iv) For operations in the 1995–2000 MHz band, the power of any emission between 2005–2020 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 log10(P) dB.

FCC §27.50(c)(10) Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

FCC §27.53(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a 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, by at least 43 + 10 log (P) dB. Compliance 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. RSS-133 5.6,RSS-199 5.6:

Unwanted emissions shall be measured in terms of average values while the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, specified in table 3, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment's operating frequency range. For the unwanted emission limits, in the 1 MHz bands immediately outside and adjacent to the frequency





block group, the power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth (OBW). Beyond these 1 MHz bands, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth may be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% of the OBW, as applicable.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors), where applicable, of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in the table.

| Offset frequency from the edge of the frequency block group (MHz) | Unwanted emission limit | | |
|---|-------------------------|--|--|
| ≤1 | -13 dBm/(1% of OBW) | | |
| >1 | -13 dBm/MHz | | |

RSS-139 5.6

Unwanted emissions shall be measured in terms of average values.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors) of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in table.

| Offset frequency from the edge of the frequency block group (MHz) | Unwanted emission limit -13 dBm/(1% of OB*) | |
|---|---|--|
| 1 MHz | | |
| >1 MHz | -13 dBm/MHz | |

RSS-132 5.5

Equipment shall meet the unwanted emission limits specified 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 below the transmitter output power P (dBW) by at least 43 + 10 log(p) dB.
- 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 below the transmitter output power P (dBW) by at least 43 + 10 log(p) dB. If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

p is the output power specified in watts.

RSS 130 4.7:

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 log10 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. 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:

- a. 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:
 - i. $76 + 10 \log_{10} p$ (watts), dB, for base and fixed equipment and
 - ii. $65 + 10 \log_{10} p$ (watts), dB, for mobile and portable equipment
- b. 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.



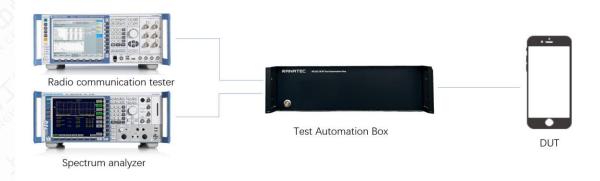


6.6.2 Method of Measurement

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 6.0

The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyzer. the other end of which was connected to a Base Station Simulator, The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at two frequencies (low channel and high channel).in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of 100kHz or 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed. The EUT emission bandwidth is measured as the width of the signal between two points. Outside of which all emission are attenuated at east 26dB below the transmitter power. The video bandwidth of the spectrum analyzer was set at thrice the resolution bandwidth. Detector Mode was set to RMS.

6.6.3 Test Setup



6.6.4 Measurement result

Band 2 (Only the worst mode data is provided)

| Band | Range | BandWidth(MHz) | Modulation | RbMode |
|-------|-----------|----------------|------------|------------------|
| FDD02 | LowRange | 20 | QPSK | 1RB_LowRange |
| FDD02 | LowRange | 20 | QPSK | FullRB_LowRange |
| FDD02 | LowRange | 1.4 | QPSK | 1RB_LowRange |
| FDD02 | LowRange | 1.4 | QPSK | FullRB_LowRange |
| FDD02 | HighRange | 20 | QPSK | 1RB_HighRange |
| FDD02 | HighRange | 20 | QPSK | FullRB_HighRange |
| FDD02 | HighRange | 1.4 | QPSK | 1RB_HighRange |
| FDD02 | HighRange | 1.4 | QPSK | FullRB_HighRange |