



6.4 Occupied Bandwidth

6.4.1 Summary

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated.

6.4.2 Method of Measurement

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from KDB 9711684:

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
- c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.
- d) Set the detection mode to peak, and the trace mode to max hold.
- e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

6.4.3 Test Setup







6.4.4 Measurement Results

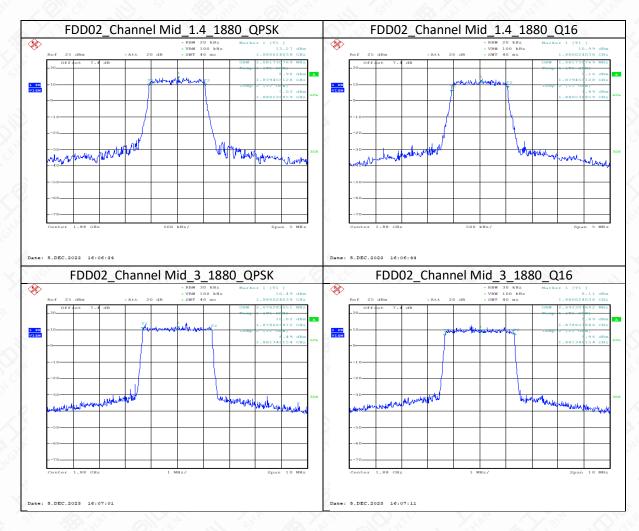
Band	Channel	BandWidth	Frequency(MHz)	QPSK(MHz)	Q16(MHz)
FDD02	Mid	1.4	1880	1.08	1.08
FDD02	Mid	3	1880	2.68	2.69
FDD02	Mid	5	1880	4.47	4.47
FDD02	Mid	10	1880	8.94	8.94
FDD02	Mid	15	1880	13.49	13.49
FDD02	Mid	20	1880	17.89	17.98
FDD04	Mid	1.4	1732.5	1.09	1.09
FDD04	Mid	3	1732.5	2.69	2.69
FDD04	Mid	5	1732.5	4.47	4.47
FDD04	Mid	10	1732.5	8.94	8.94
FDD04	Mid	15	1732.5	13.49	13.49
FDD04	Mid	20	1732.5	17.89	17.89
FDD05	Mid	1.4	836.5	1.09	1.09
FDD05	Mid	3	836.5	2.69	2.69
FDD05	Mid	5	836.5	4.50	4.47
FDD05	Mid	10	836.5	8.94	8.94
FDD07	Mid	5	2535	4.47	4.47
FDD07	Mid	10	2535	8.94	8.94
FDD07	Mid	15	2535	13.49	13.49
FDD07	Mid	20	2535	17.98	17.98
FDD26(PART 22)	Mid	1.4	836.5	1.09	1.09
FDD26(PART 22)	Mid	3	836.5	2.69	2.66
FDD26(PART 22)	Mid	5	836.5	4.47	4.47
FDD26(PART 22)	Mid	10	836.5	8.94	8.94
FDD26(PART 22)	Mid	15	836.5	13.49	13.41
TDD38	Mid	5	2595	4.47	4.50
TDD38	Mid	10	2595	8.99	8.94



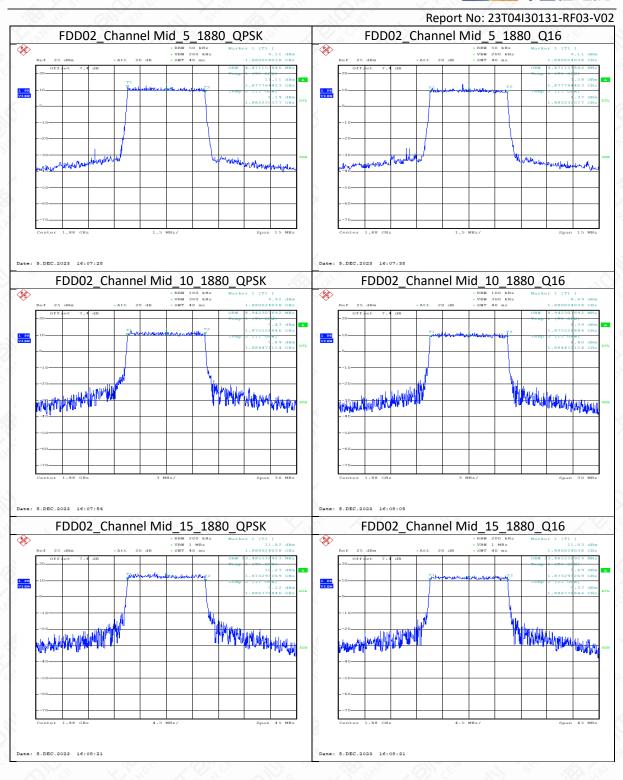
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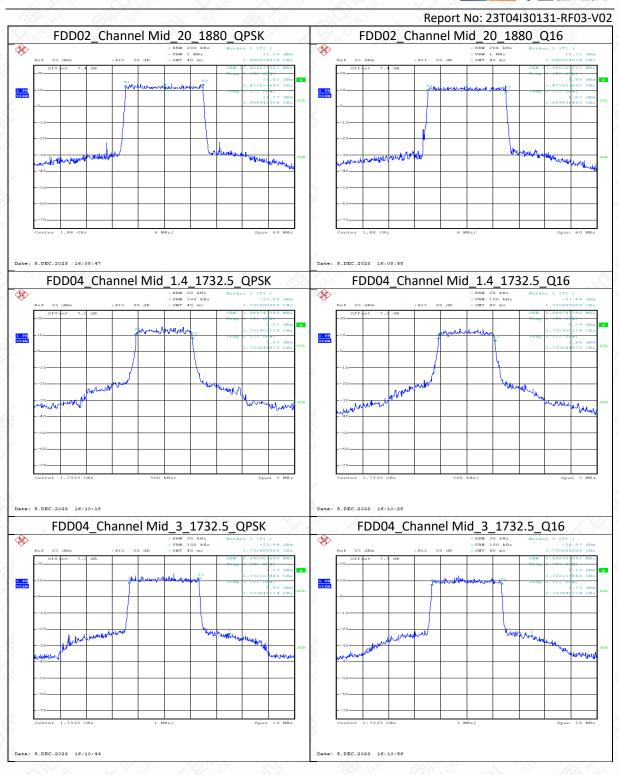
Band	Channel	BandWidth	Frequency(MHz)	QPSK(MHz)	Q16(MHz)
TDD38	Mid	15	2595	13.56	13.49
TDD38	Mid	20	2595	17.89	17.98
TDD40(2305- 2315MHz)	Mid	5	2310	4.50	4.47
TDD40(2305- 2315MHz)	Mid	10	2310	8.94	8.94
TDD40(2350- 2360MHz)	Mid	5	2355	4.50	4.50
TDD40(2350- 2360MHz)	Mid	10	2355	8.99	8.94
TDD41	Mid	5	2593	4.47	4.50
TDD41	Mid	10	2593	8.94	8.99
TDD41	Mid	15	2593	13.49	13.49
TDD41	Mid	20	2593	17.98	17.98



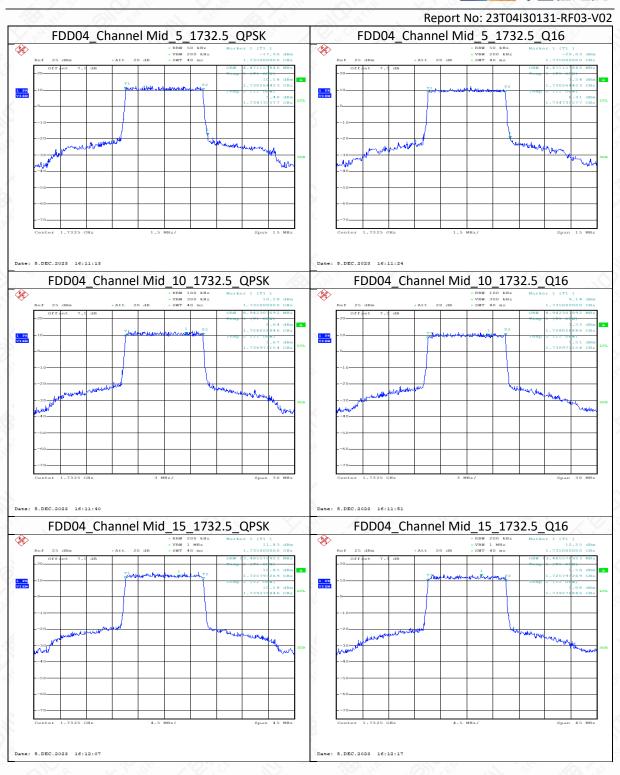




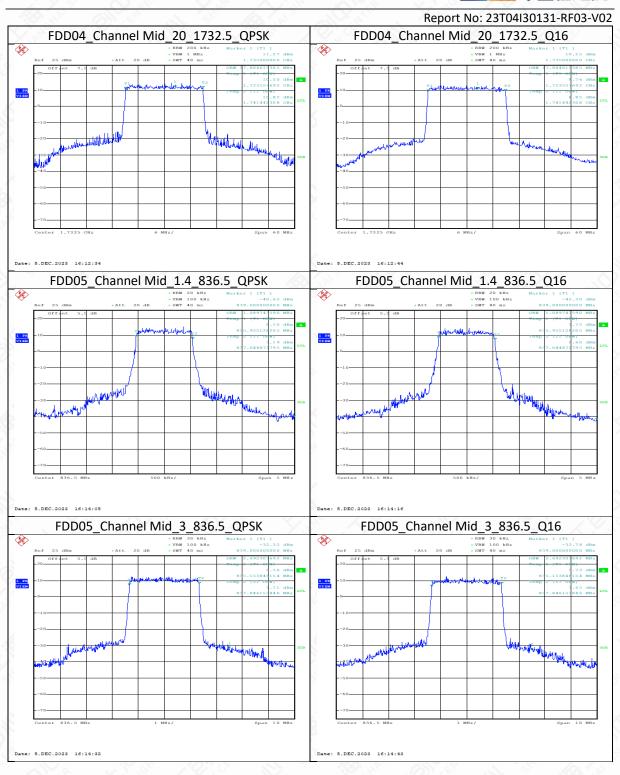




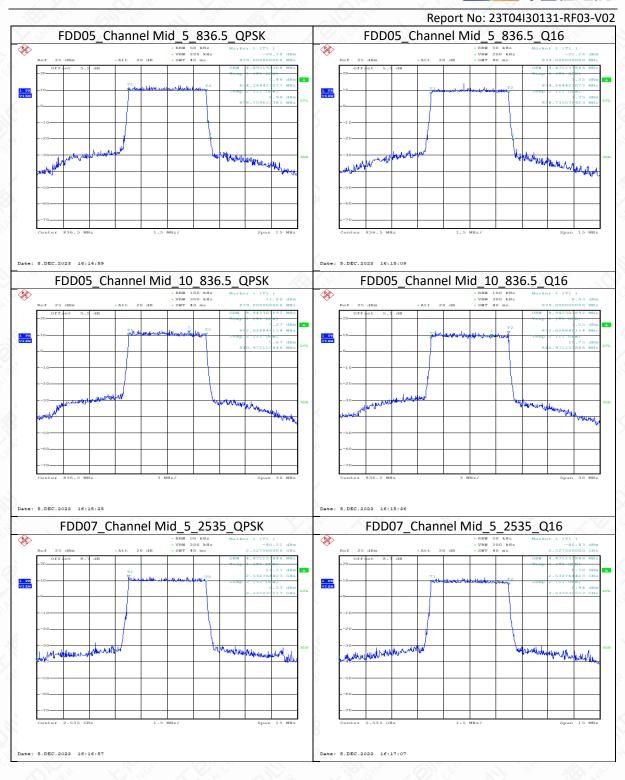




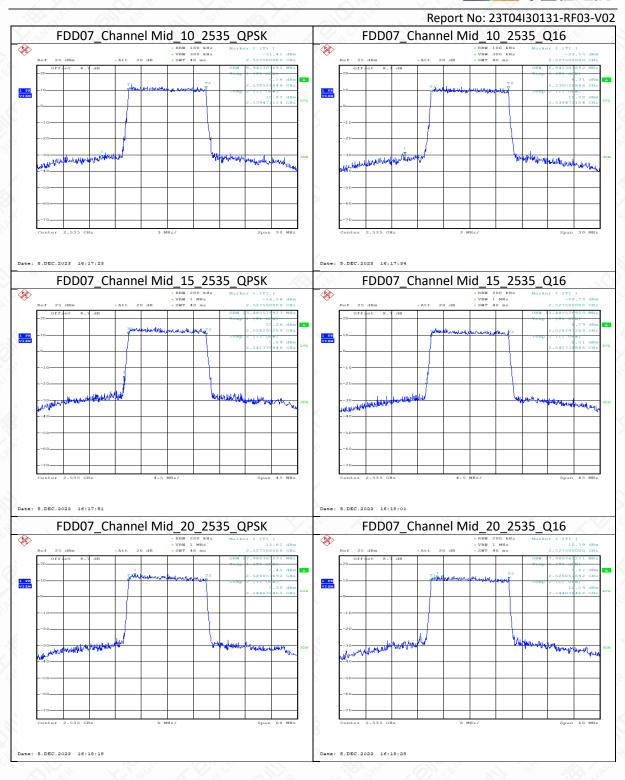




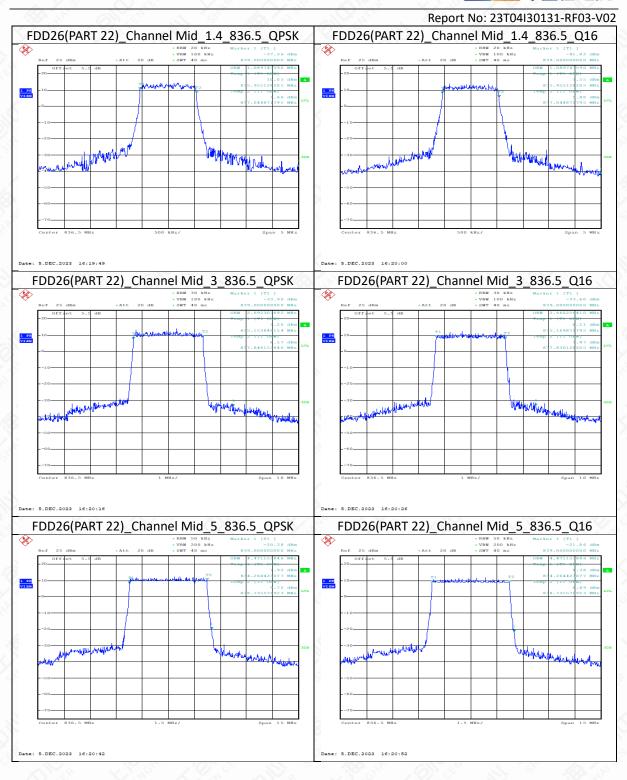




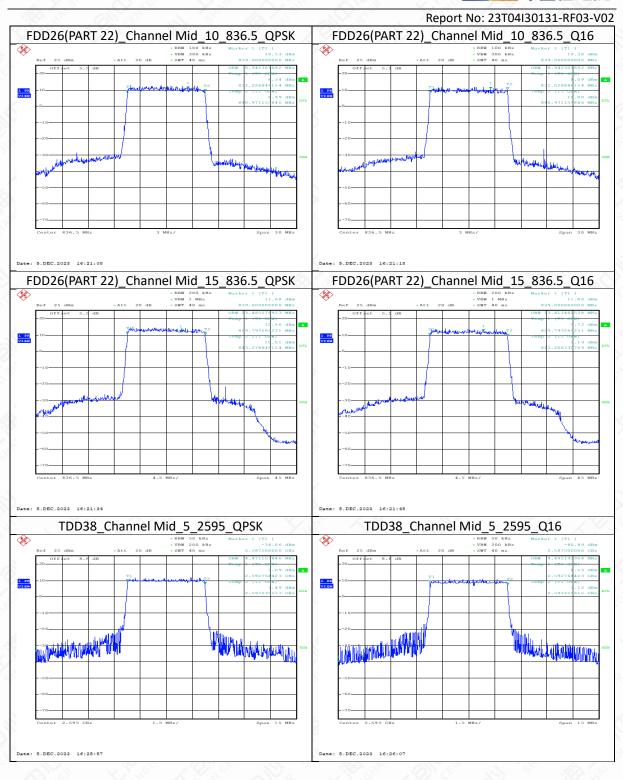




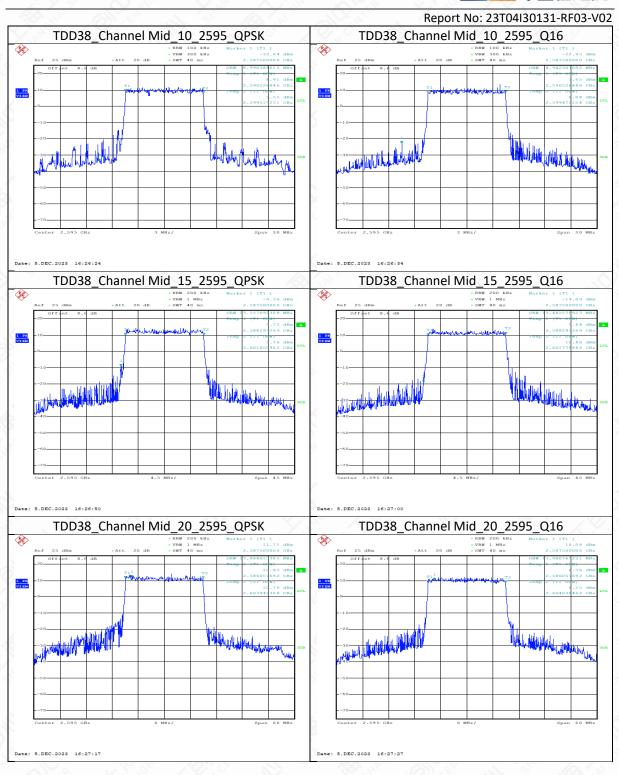




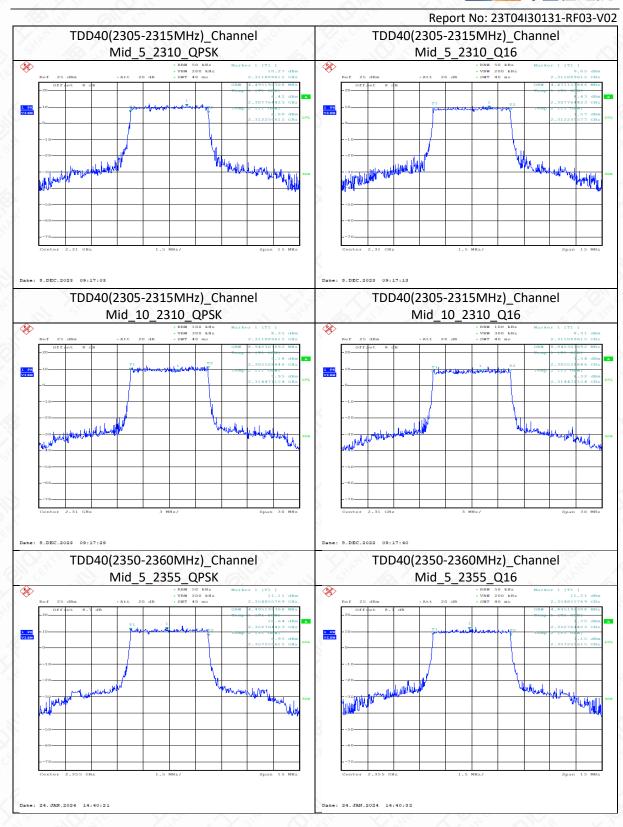




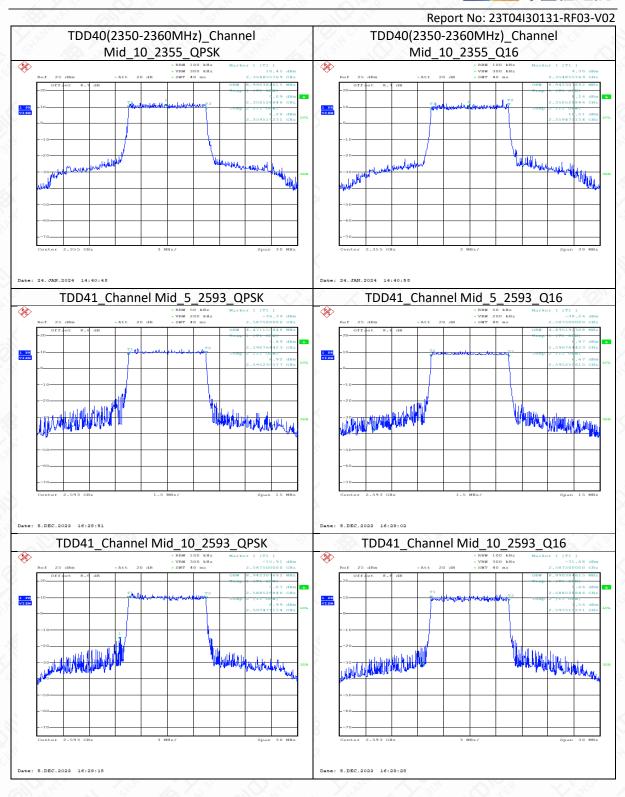




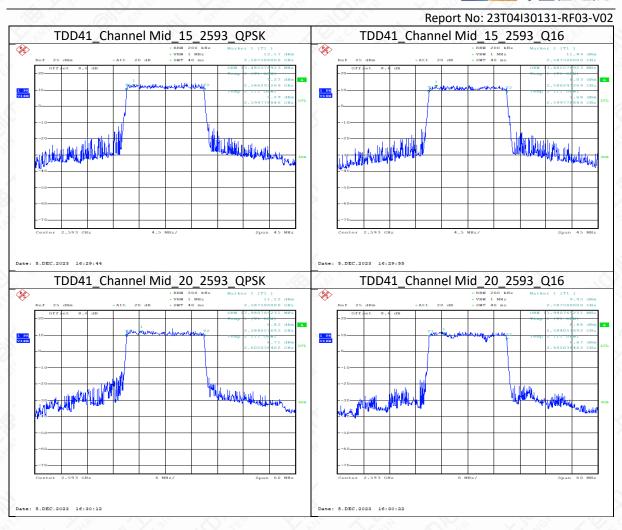














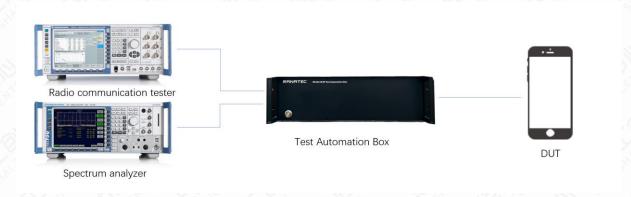


6.5 Emission Bandwidth

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	Channel	BandWidth	Frequency(MHz)	QPSK(MHz)	Q16(MHz)
FDD02	Mid	1.4	1880	1.27	1.28
FDD02	Mid	3	1880	2.88	2.87
FDD02	Mid	5	1880	4.88	4.83
FDD02	Mid	10	1880	9.66	9.62
FDD02	Mid	15	1880	14.50	14.50
FDD02	Mid	20	1880	19.13	19.04
FDD04	Mid	1.4	1732.5	1.26	1.30
FDD04	Mid	3	1732.5	2.88	2.87
FDD04	Mid	5	1732.5	4.81	4.86
FDD04	Mid	10	1732.5	9.62	9.52
FDD04	Mid	15	1732.5	14.50	14.42
FDD04	Mid	20	1732.5	19.04	19.04
FDD05	Mid	1.4	836.5	1.27	1.27
FDD05	Mid	3	836.5	2.85	2.88
FDD05	Mid	5	836.5	4.83	4.78

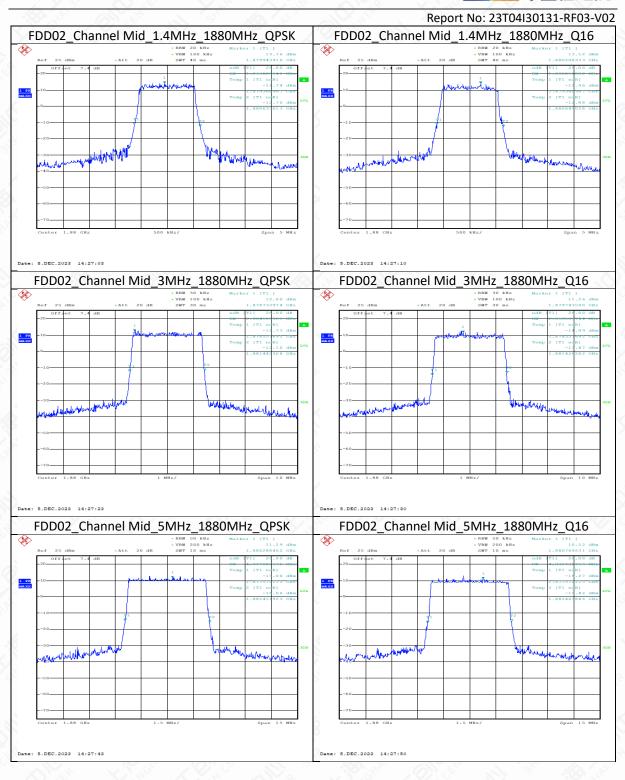


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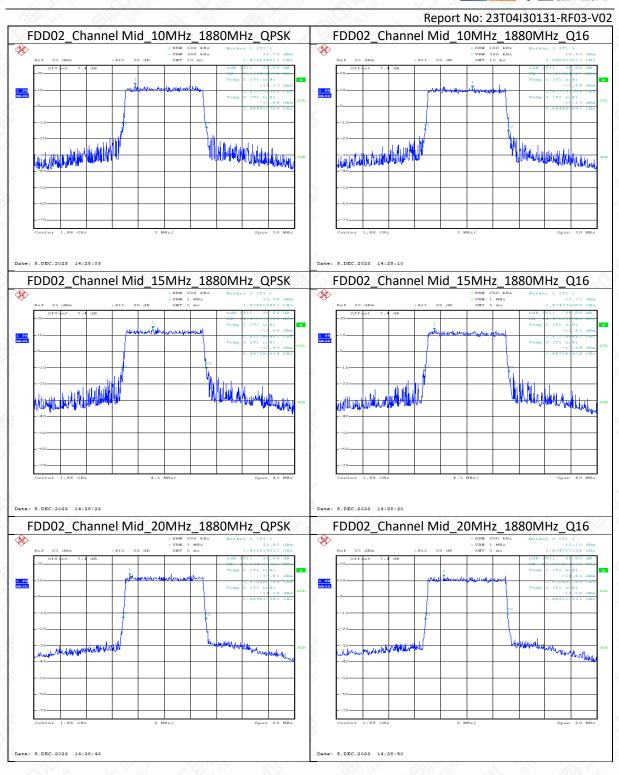
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Band	Channel	BandWidth	Frequency(MHz)	QPSK(MHz)	Q16(MHz)
FDD05	Mid	10	836.5	9.62	9.52
FDD07	Mid	5	2535	4.83	4.74
FDD07	Mid	10	2535	9.62	9.52
FDD07	Mid	15	2535	14.42	14.35
FDD07	Mid	20	2535	18.94	19.13
FDD26(PART 22)	Mid	1.4	836.5	1.27	1.28
FDD26(PART 22)	Mid	3	836.5	2.85	2.87
FDD26(PART 22)	Mid	5	836.5	4.78	4.78
FDD26(PART 22)	Mid	10	836.5	9.57	9.57
FDD26(PART 22)	Mid	15	836.5	14.35	14.50
TDD38	Mid	5	2595	4.88	4.83
TDD38	Mid	10	2595	9.62	9.57
TDD38	Mid	15	2595	14.21	14.28
TDD38	Mid	20	2595	19.04	19.04
TDD40(2305- 2315MHz)	Mid	5	2310	4.83	4.93
TDD40(2305- 2315MHz)	Mid	10	2310	9.62	9.71
TDD40(2350- 2360MHz)	Mid	5	2355	5.07	4.98
TDD40(2350- 2360MHz)	Mid	10	2355	9.71	9.86
TDD41	Mid	5	2593	4.74	4.83
TDD41	Mid	10	2593	9.52	9.57
TDD41	Mid	15	2593	14.57	14.42
TDD41	Mid	20	2593	19.23	19.13

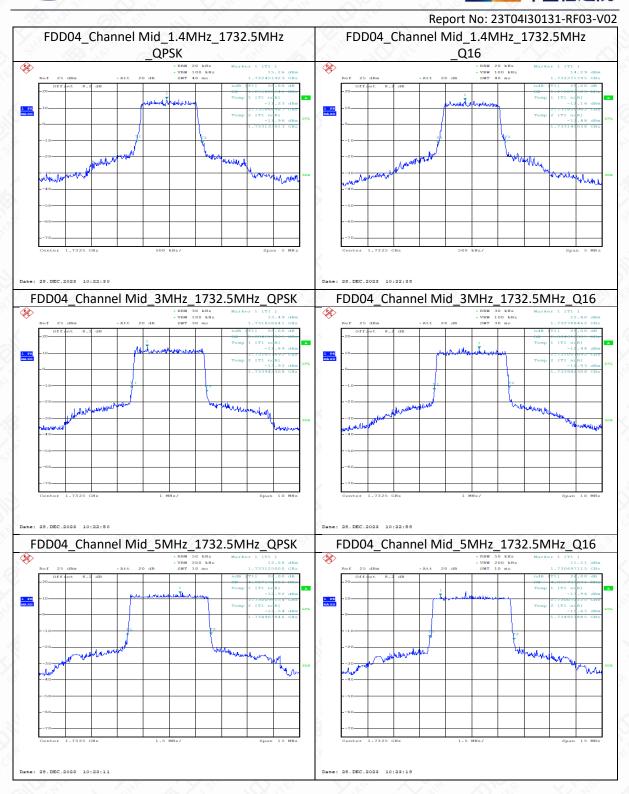




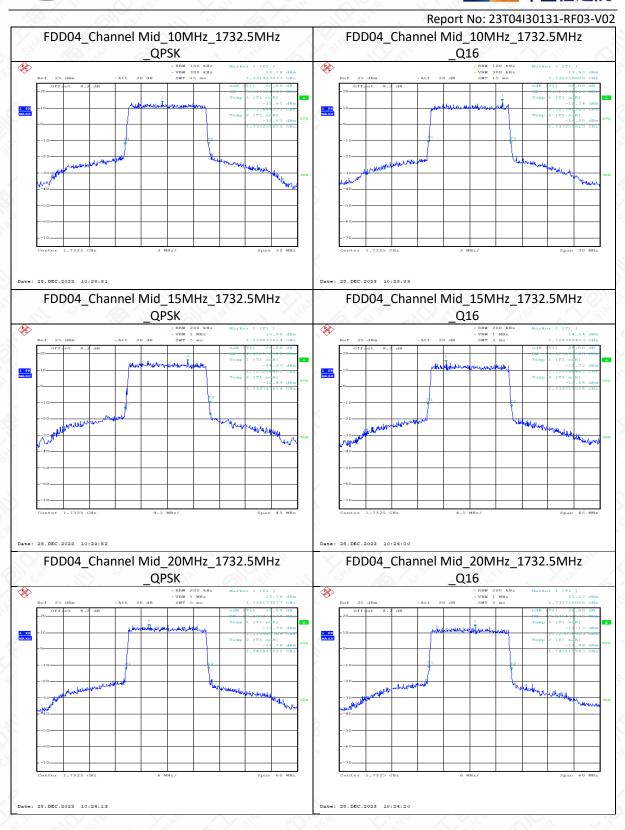




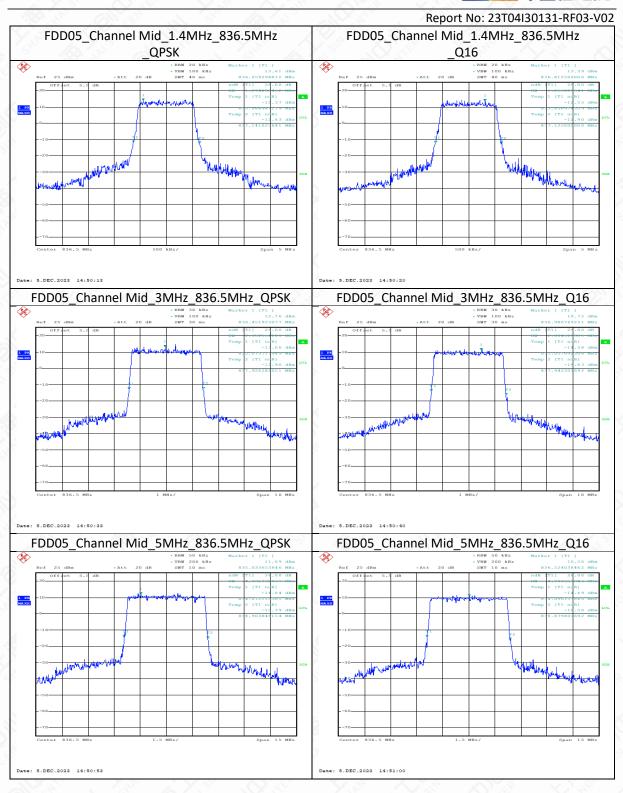




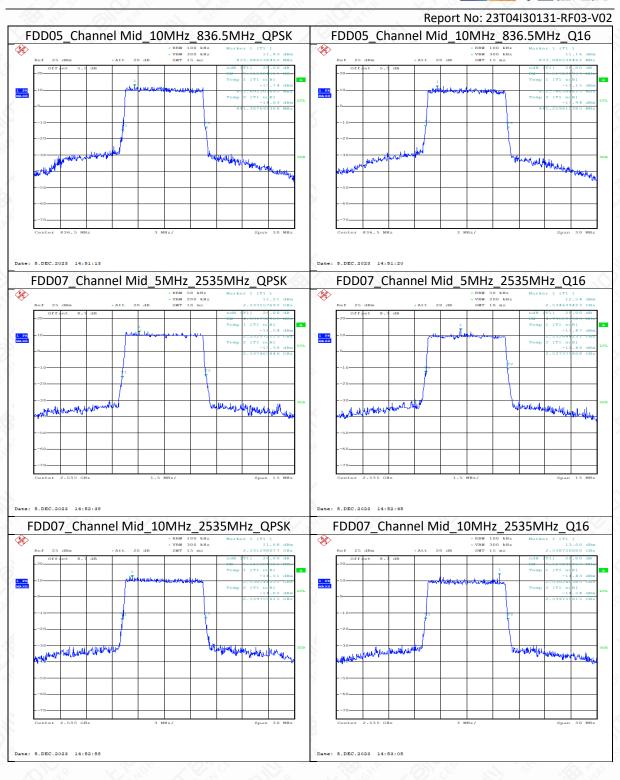




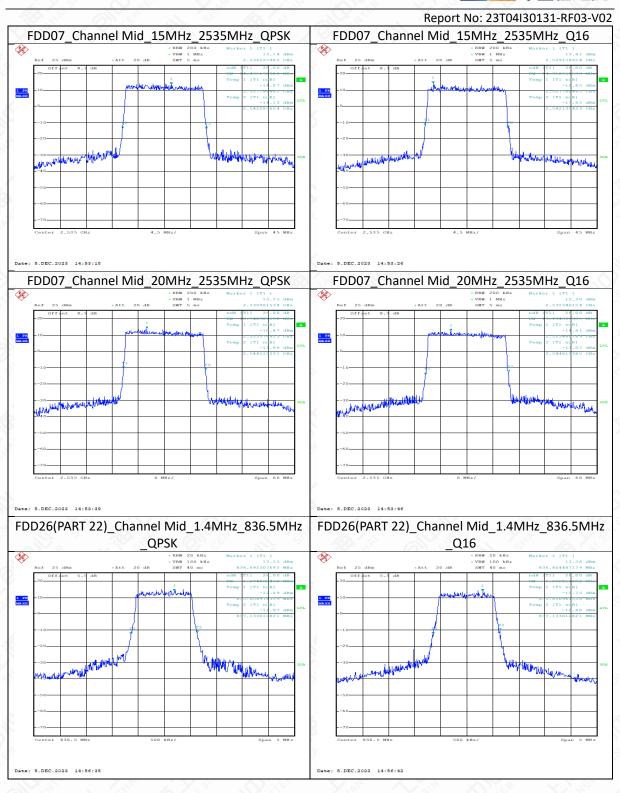




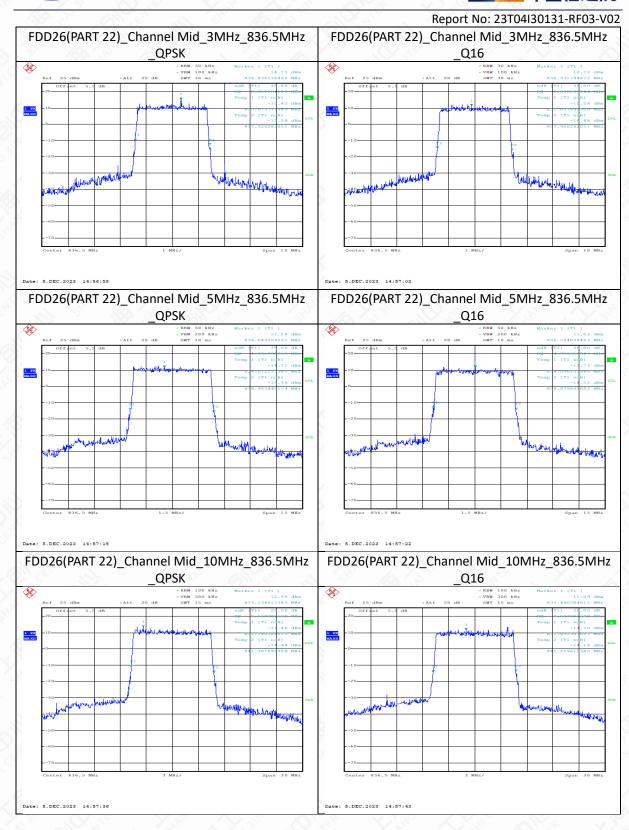




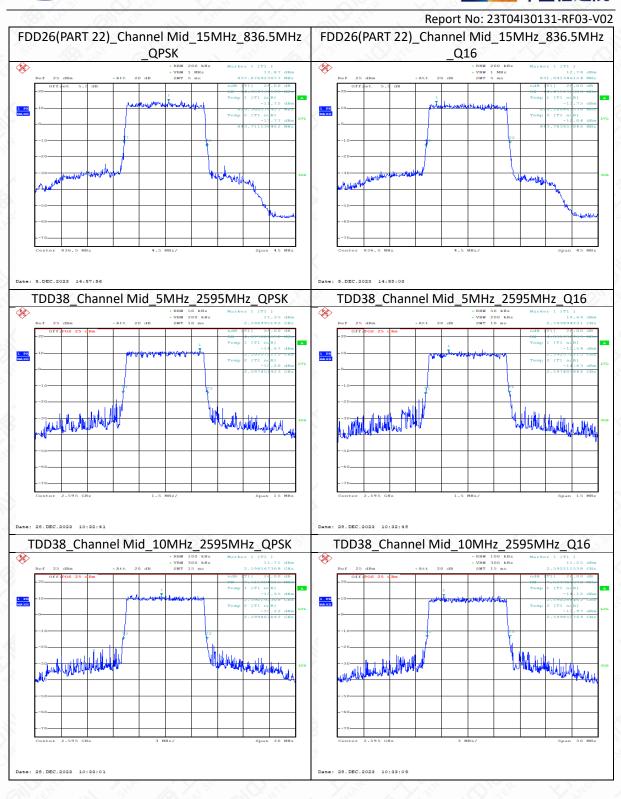




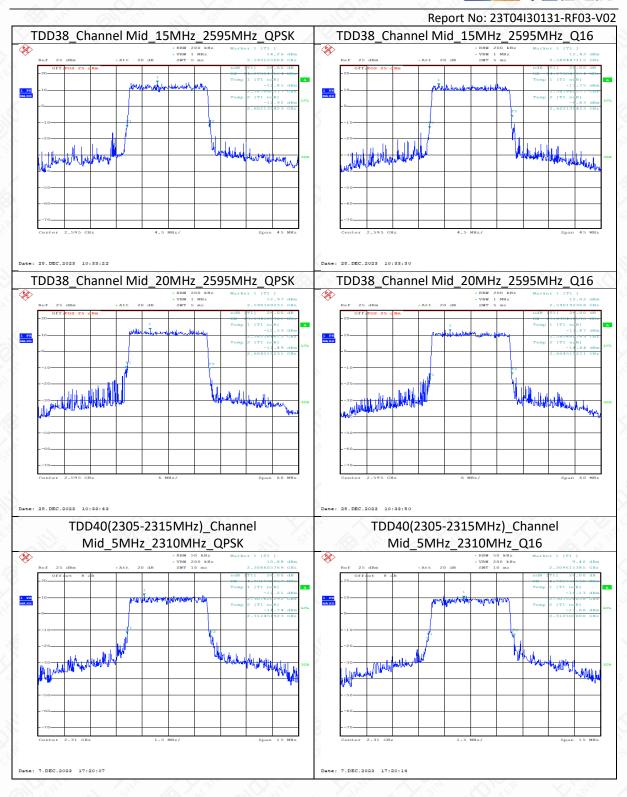




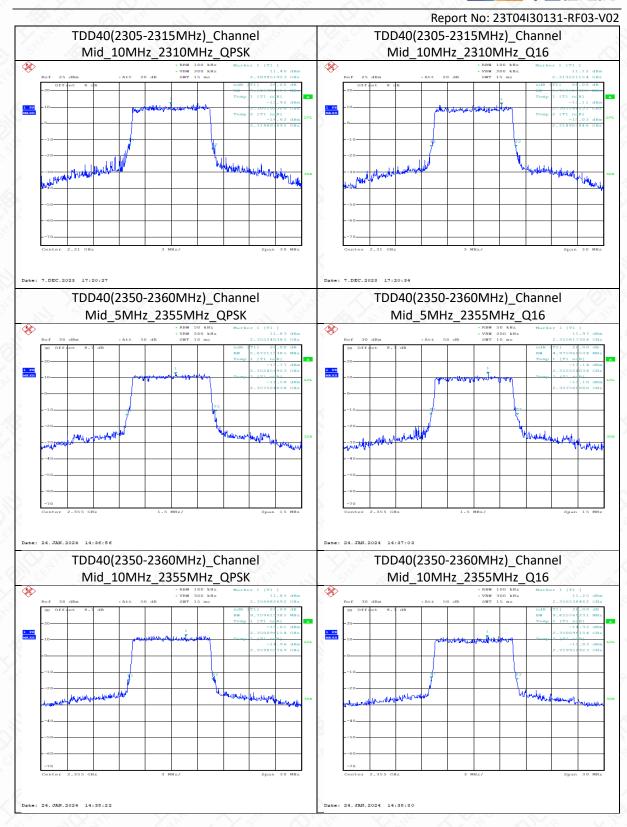




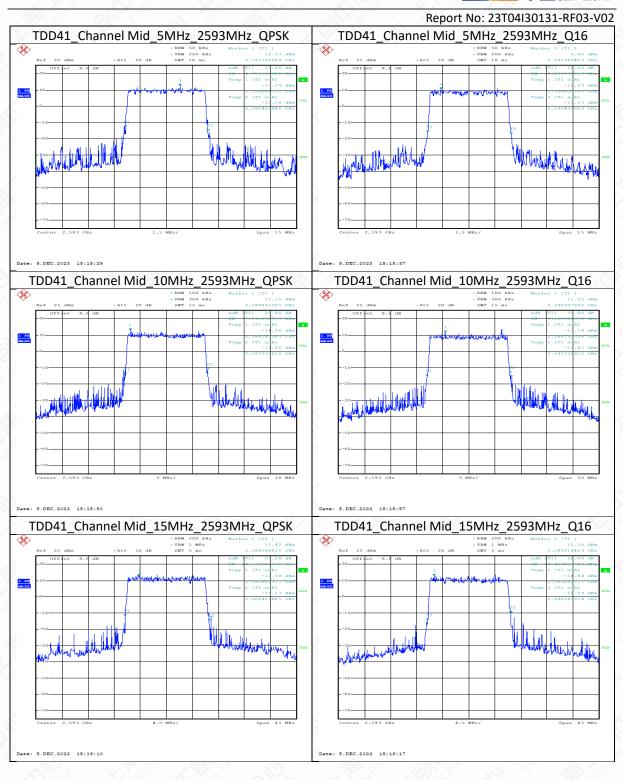




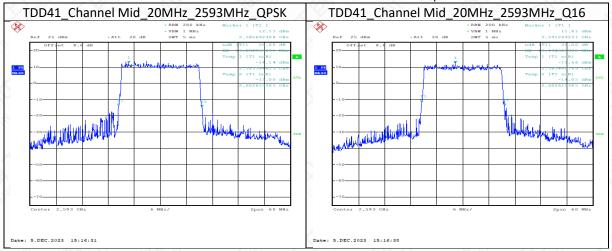
















6.6 Band Edge Compliance

6.6.1 Measurement Limit

FCC $\S 22.917(a)$ 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(h) (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.

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.





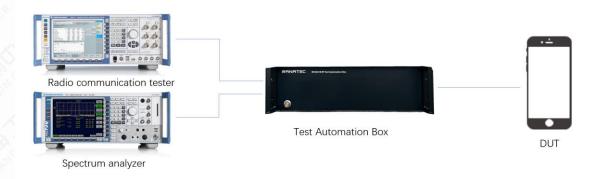
- (2) Additional protection levels. Notwithstanding the foregoing paragraph (h)(1) of this section:
- (i) Operations in the 2180–2200 MHz band are subject to the out-of-band emission requirements set forth in § 27.1134 for the protection of federal government operations operating in the 2200–2290 MHz 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 log10(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.

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

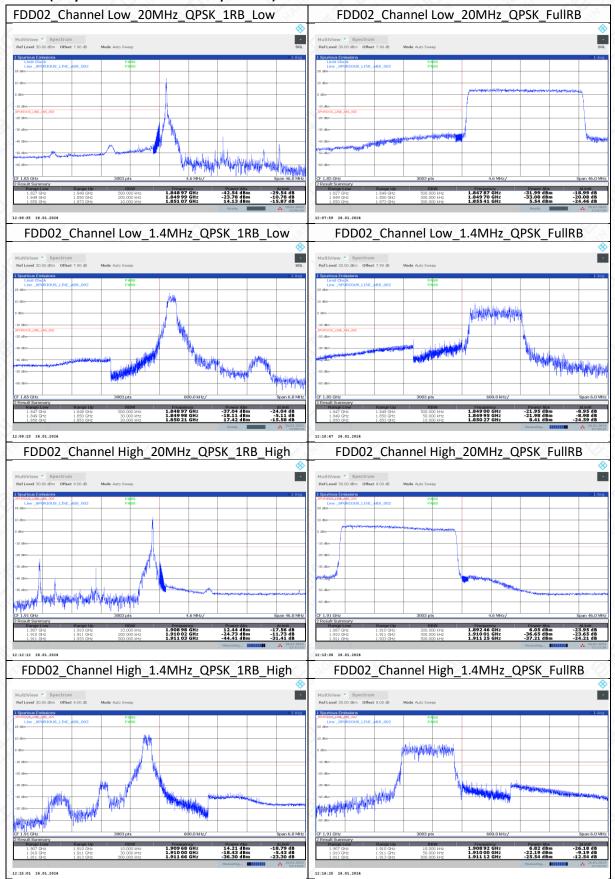






6.6.4 Measurement result

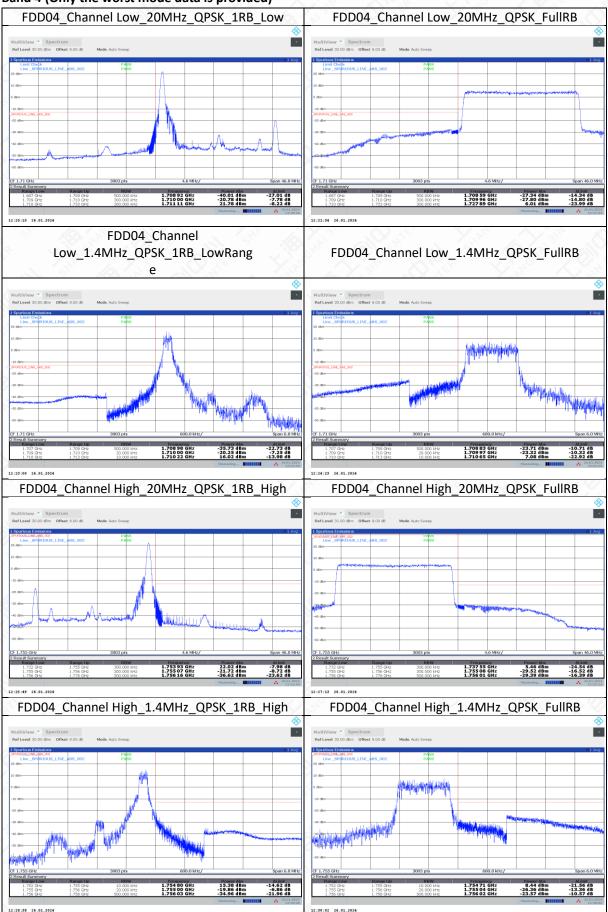
Band 2 (Only the worst mode data is provided)





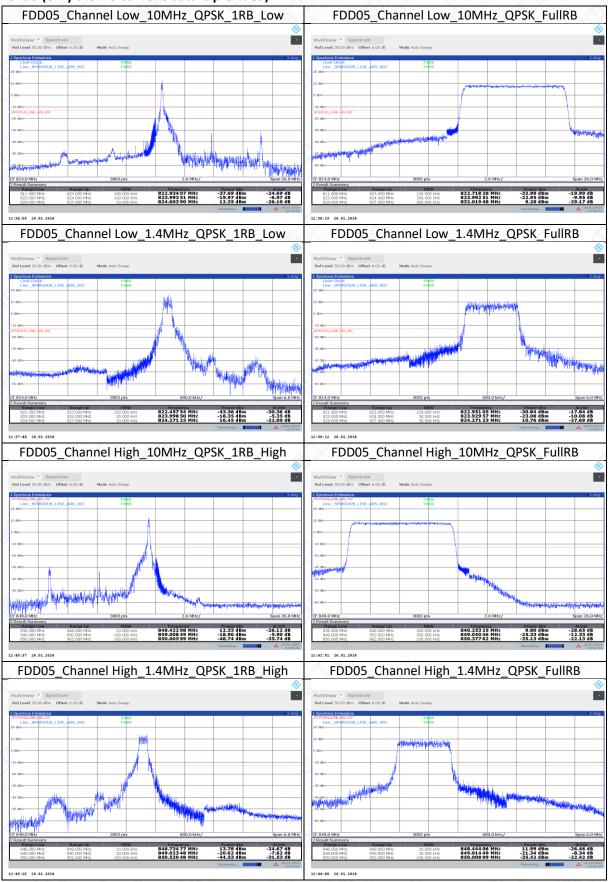


Band 4 (Only the worst mode data is provided)





Band5 (Only the worst mode data is provided)







Band 7

