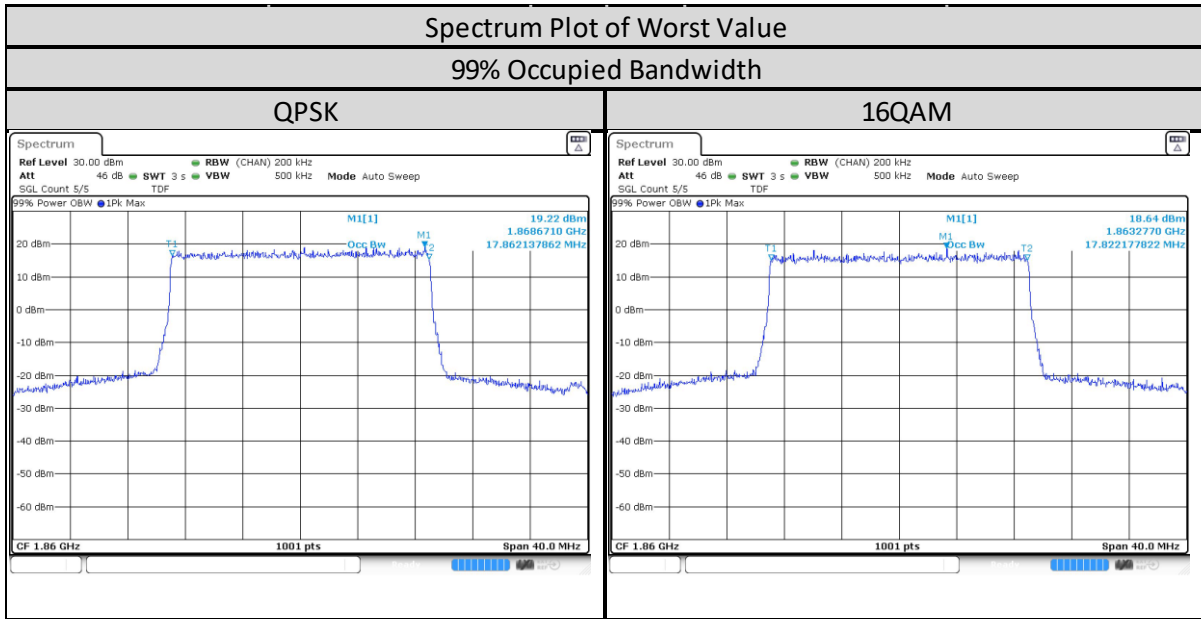
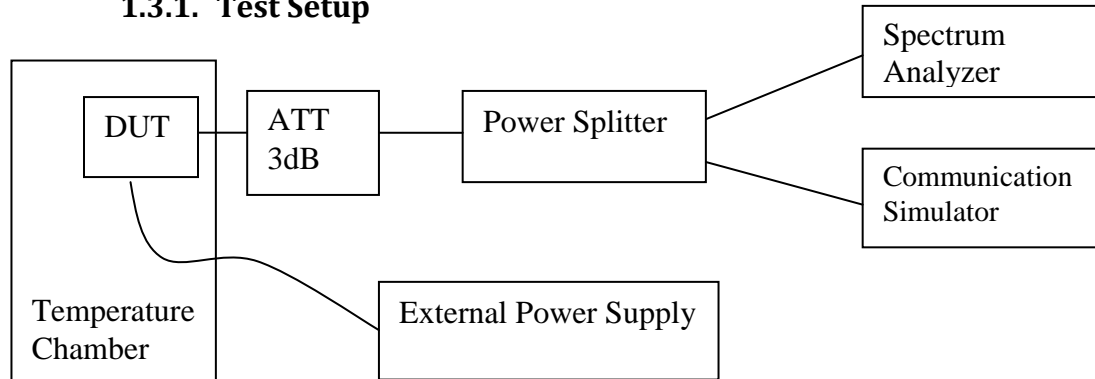


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/20MHz/100/0	Low CH 18700	1860 MHz	17.862	17.822
	Mid CH 18900	1880 MHz	17.822	17.822
	High CH 19100	1900 MHz	17.822	17.822



1.3. Frequency Stability

1.3.1. Test Setup



- 1) The DUT is placed in the temperature chamber and DUT is power up by external power supply to control the DC input voltage.
- 2) The temperature chamber could control the temperature and humidity and external power supply could control the test voltage range from minimum to maximum operating voltage.
- 3) Measured frequency error from the communication simulator by vary below step :
 - i. Vary temperature of the temperature chamber from -30 ~ 60 deg C (10 deg C / Step) and set external supply voltage constant at nominal voltage.
 - ii. Vary external supply voltage from minimum to maximum operation voltage support by DUT and set temperature chamber constant at room temp.
- 4) All the measurement was done at mid channel for each band.

1.3.2. Test Limit

As per manufacturer declared product operating at -30 to 60 deg C with spec of +/- 0.1ppm.

1.3.3. Frequency Stability - LTE Band 2 (1850 -1910 MHz)

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 1.4 MHz			
		Low Channel		High Channel	
		1850.7MHz		1909.3MHz	
LTE Band 2		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	60	1850.699991	-0.004692	1909.299994	-0.003312
	50	1850.700015	0.007946	1909.300027	0.014123
	40	1850.700008	0.004421	1909.299991	-0.004675
	30	1850.700009	0.004901	1909.29999	-0.005155
	20	1850.700012	0.006501	1909.29999	-0.005379
	10	1850.700014	0.007737	1909.299994	-0.003244
	0	1850.700014	0.007498	1909.300007	0.003664
	-10	1850.700012	0.006632	1909.300008	0.004053
	-20	1850.699987	-0.006926	1909.300007	0.003431
-30	1850.69999	-0.005426	1909.299991	-0.004698	

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 1.4 MHz			
		Low Channel		High Channel	
		1850.7MHz		1909.3MHz	
LTE Band 2		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	9	1850.700007	0.004043	1909.300006	0.003162
	7.5	1850.700012	0.006323	1909.299974	-0.013539
	6	1850.699994	-0.003494	1909.299989	-0.005837

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 3 MHz			
		Low Channel		High Channel	
		1851.5MHz		1908.5MHz	
LTE Band 2		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	60	1851.500008	0.004504	1908.500008	0.004108
	50	1851.500007	0.003693	1908.500008	0.004167
	40	1851.500009	0.004636	1908.500008	0.004355
	30	1851.500007	0.003778	1908.500008	0.004123
	20	1851.500011	0.00605	1908.500008	0.004407
	10	1851.500009	0.004953	1908.500008	0.004407
	0	1851.500009	0.004875	1908.500009	0.004767
	-10	1851.500009	0.004875	1908.500009	0.004602
	-20	1851.50001	0.005594	1908.500011	0.005577
-30	1851.50001	0.005347	1908.500009	0.004715	

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 3 MHz			
		Low Channel		High Channel	
		1851.5MHz		1908.5MHz	
LTE Band 2		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	9	1851.500009	0.005038	1908.500008	0.00428
	7.5	1851.50001	0.005161	1908.500008	0.004272
	6	1851.500069	0.037356	1908.500009	0.004857

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 5 MHz			
		Low Channel		High Channel	
		1852.5MHz		1907.5MHz	
LTE Band 2		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	60	1852.500008	0.004448	1907.499992	-0.0042
	50	1852.500012	0.006734	1907.499993	-0.003502
	40	1852.50001	0.005135	1907.499991	-0.004522
	30	1852.50001	0.00566	1907.499993	-0.003427
	20	1852.500011	0.005784	1907.499992	-0.004117
	10	1852.500009	0.005081	1907.499994	-0.003405
	0	1852.500012	0.006664	1907.499993	-0.00369
	-10	1852.500012	0.006587	1907.499994	-0.003322
	-20	1852.500011	0.006139	1907.499994	-0.003367
-30	1852.50001	0.005212	1907.499993	-0.003697	

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 5 MHz			
		Low Channel		High Channel	
		1852.5MHz		1907.5MHz	
LTE Band 2		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	9	1852.50001	0.005182	1907.499994	-0.003127
	7.5	1852.500011	0.0061	1907.499993	-0.003637
	6	1852.500072	0.038881	1907.499992	-0.004147

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 10 MHz			
		Low Channel		High Channel	
		1855MHz		1905MHz	
LTE Band 2		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	60	1854.999992	-0.004133	1905.000009	0.004686
	50	1854.999993	-0.004018	1905.000009	0.004738
	40	1854.999993	-0.003918	1905.000009	0.004513
	30	1854.999992	-0.004126	1905.000001	0.005189
	20	1854.999993	-0.003709	1905.000009	0.004506
	10	1854.999993	-0.003833	1905.000001	0.005294
	0	1854.999993	-0.004002	1905.000009	0.004768
	-10	1854.999994	-0.00337	1905.000001	0.005159
	-20	1854.999993	-0.003717	1905.000011	0.005835
-30	1854.999993	-0.004002	1905.000009	0.004971	

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 10 MHz			
		Low Channel		High Channel	
		1855MHz		1905MHz	
LTE Band 2		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	9	1854.999993	-0.003987	1905.000009	0.004806
	7.5	1855.000009	0.00472	1905.000008	0.00437
	6	1854.999991	-0.004959	1905.000018	0.009342

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 15 MHz			
		Low Channel		High Channel	
		1857.5MHz		1902.5MHz	
LTE Band 2		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	60	1857.500006	0.003365	1902.500006	0.003346
	50	1857.500006	0.003188	1902.499994	-0.003
	40	1857.500007	0.003881	1902.500006	0.003248
	30	1857.500007	0.003828	1902.500006	0.003308
	20	1857.500008	0.004436	1902.500008	0.003985
	10	1857.500008	0.004143	1902.500008	0.00403
	0	1857.500008	0.004174	1902.500008	0.004316
	-10	1857.500008	0.00429	1902.500007	0.003699
	-20	1857.500008	0.004159	1902.500008	0.004181
-30	1857.500008	0.004197	1902.500008	0.004053	

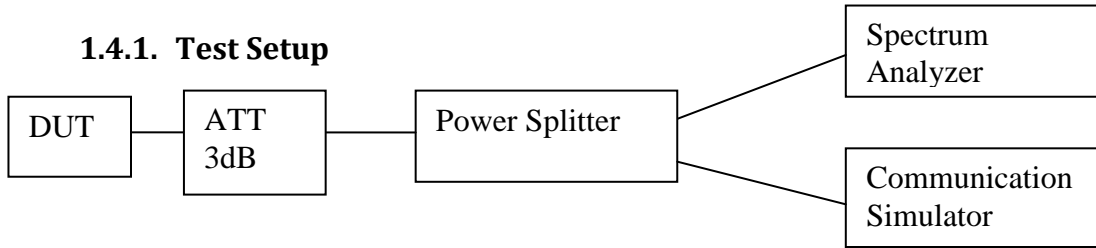
Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 15 MHz			
		Low Channel		High Channel	
		1857.5MHz		1902.5MHz	
LTE Band 2		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	9	1857.500007	0.00372	1902.500007	0.003895
	7.5	1857.500006	0.003496	1902.500007	0.003932
	6	1857.500007	0.003504	1902.500009	0.00479

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 20 MHz			
		Low Channel		High Channel	
		1860MHz		1900MHz	
		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
LTE Band 2	60	1860.000009	0.004599	1899.999993	-0.003877
	50	1860.000009	0.004715	1899.999991	-0.004894
	40	1860.000008	0.004307	1899.999992	-0.004442
	30	1860.000007	0.003769	1899.999992	-0.00402
	20	1860.000009	0.004599	1899.999992	-0.004111
	10	1860.000009	0.004938	1899.999993	-0.003915
	0	1860.000009	0.004761	1899.999993	-0.003825
	-10	1860.000009	0.004822	1899.999991	-0.004525
	-20	1860.000009	0.004891	1899.999993	-0.003253
	-30	1860.000009	0.005184	1899.999993	-0.003757

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 20 MHz			
		Low Channel		High Channel	
		1860MHz		1900MHz	
		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
LTE Band 2	9	1860.000008	0.004284	1899.99999	-0.005376
	7.5	1860.000008	0.004345	1899.999992	-0.004231
	6	1860.000011	0.006122	1899.999992	-0.004194

1.4. Band Edge Conducted Spurious Emission

1.4.1. Test Setup

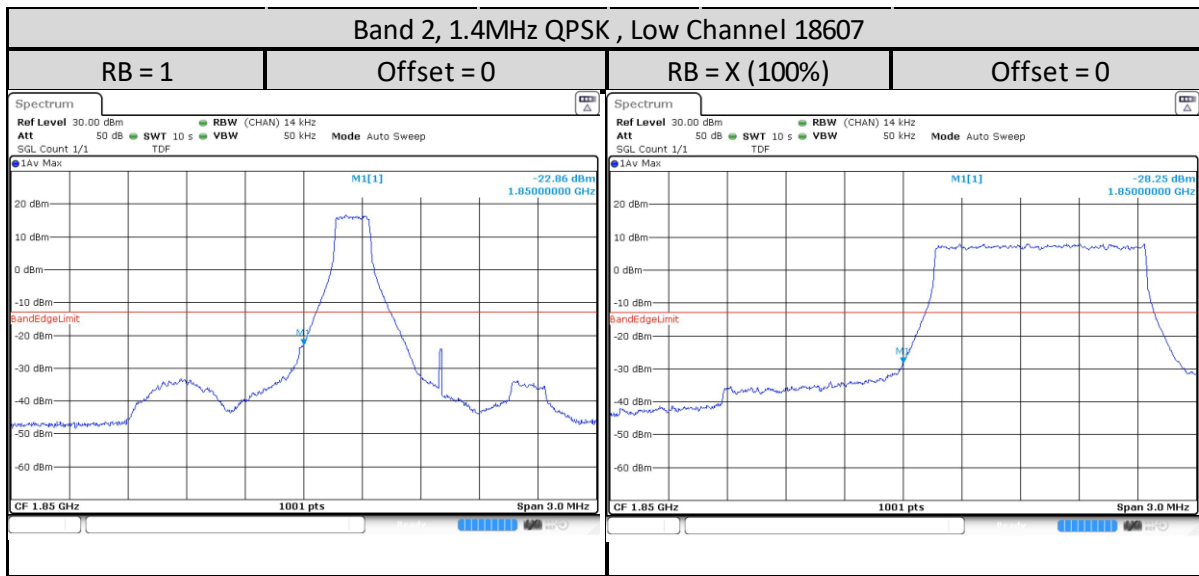


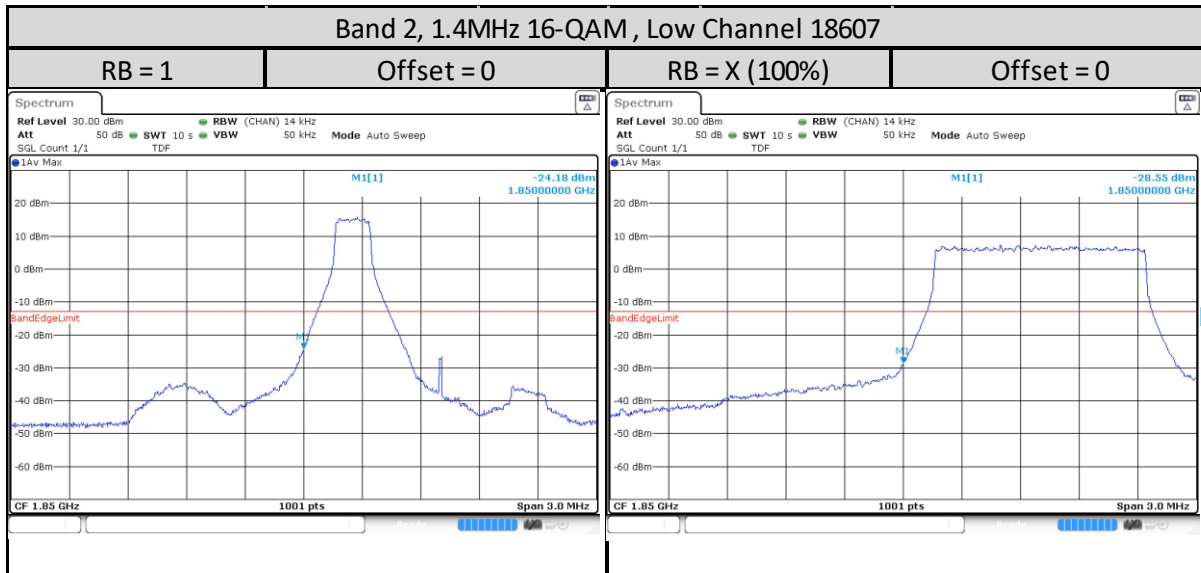
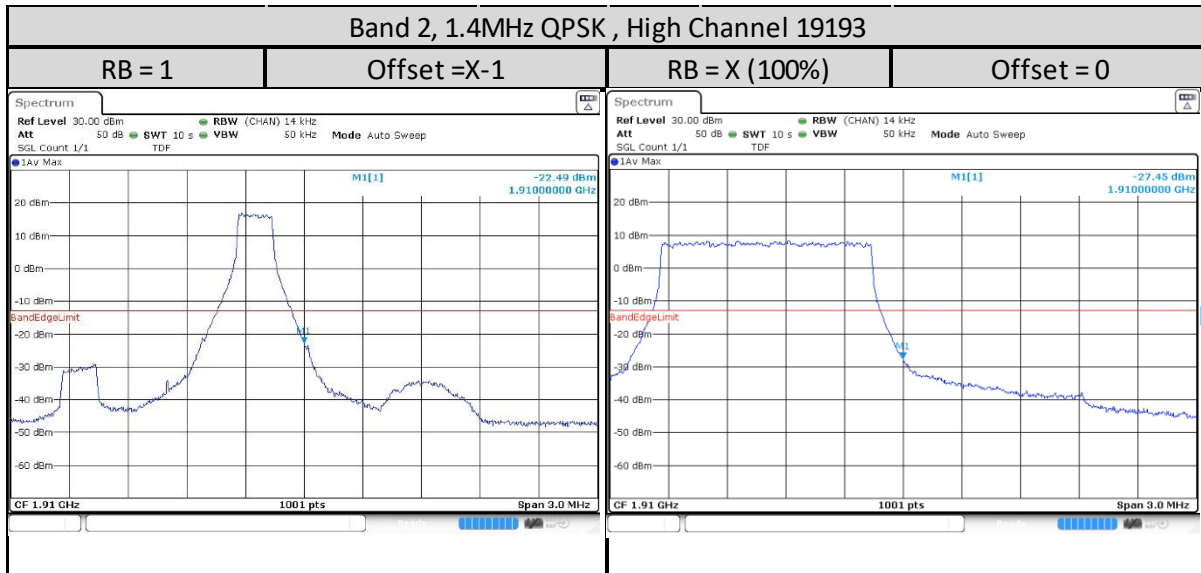
- 1) The DUT transmitter output port was connected to communication simulator with above setup.
- 2) Path loss for the measurement included.
- 3) Set DUT to transmit maximum power through communication simulator.
- 4) The band edges of lowest and highest channels with the highest RF powers were measured.
- 5) The center frequency of spectrum is the band edge frequency, span is 3MHz, RBW is 1~3% of EBW and VBW is at least 3 times of RBW.
- 6) Record the maximum trace plot into the test report.

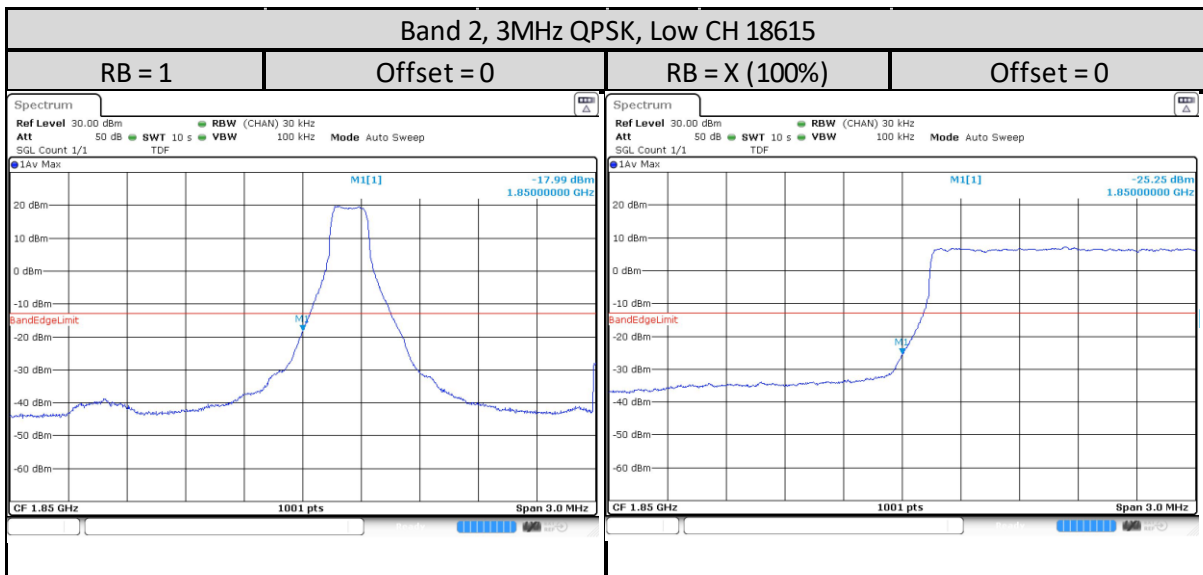
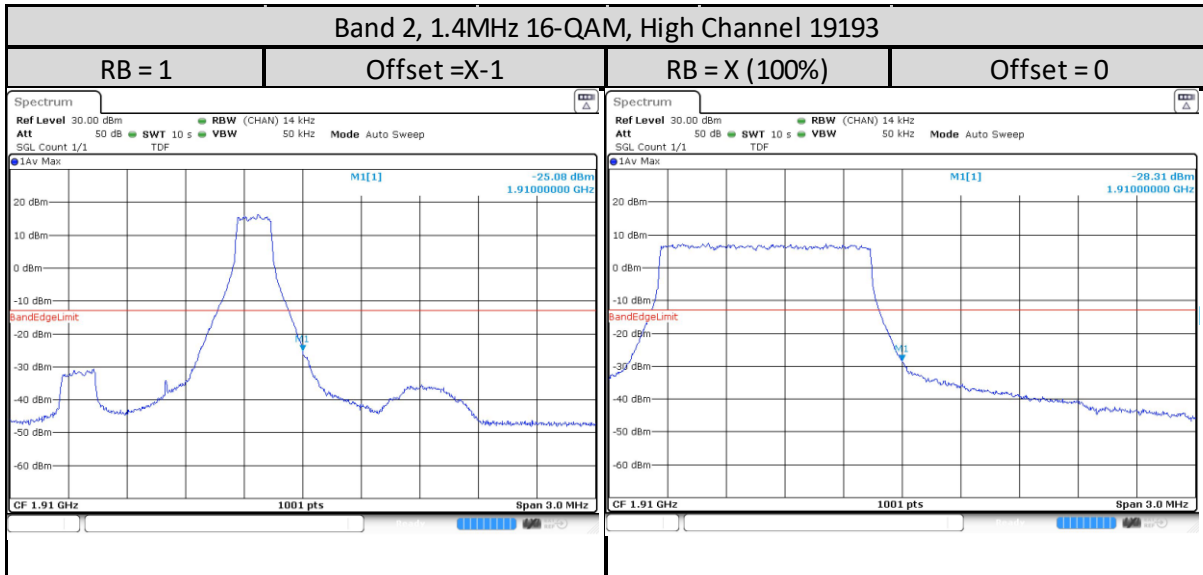
1.4.2. Test Limit

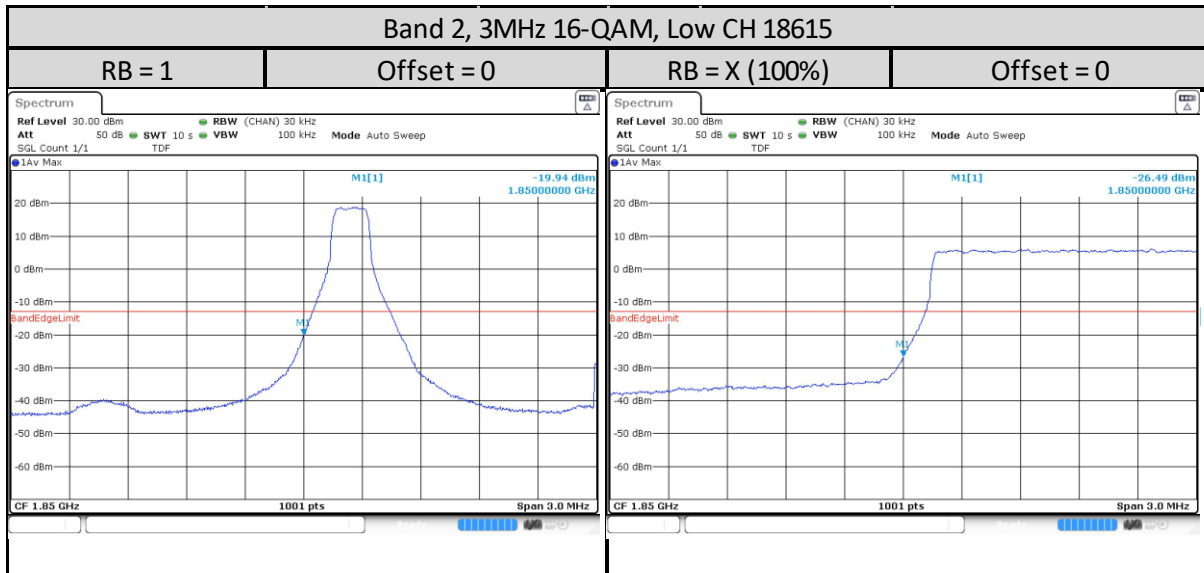
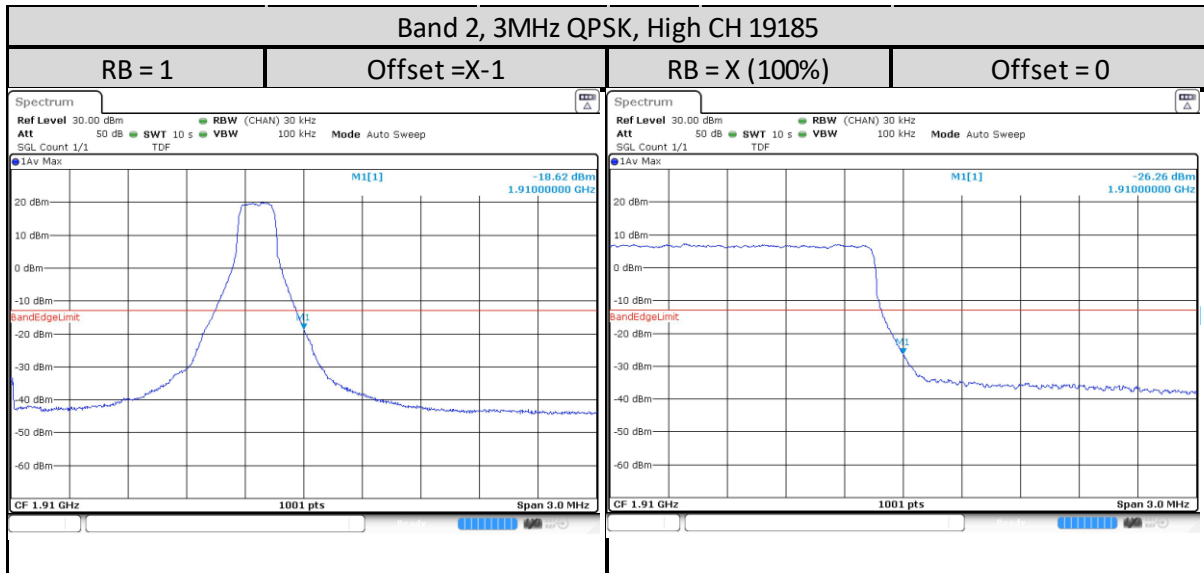
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB. In the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

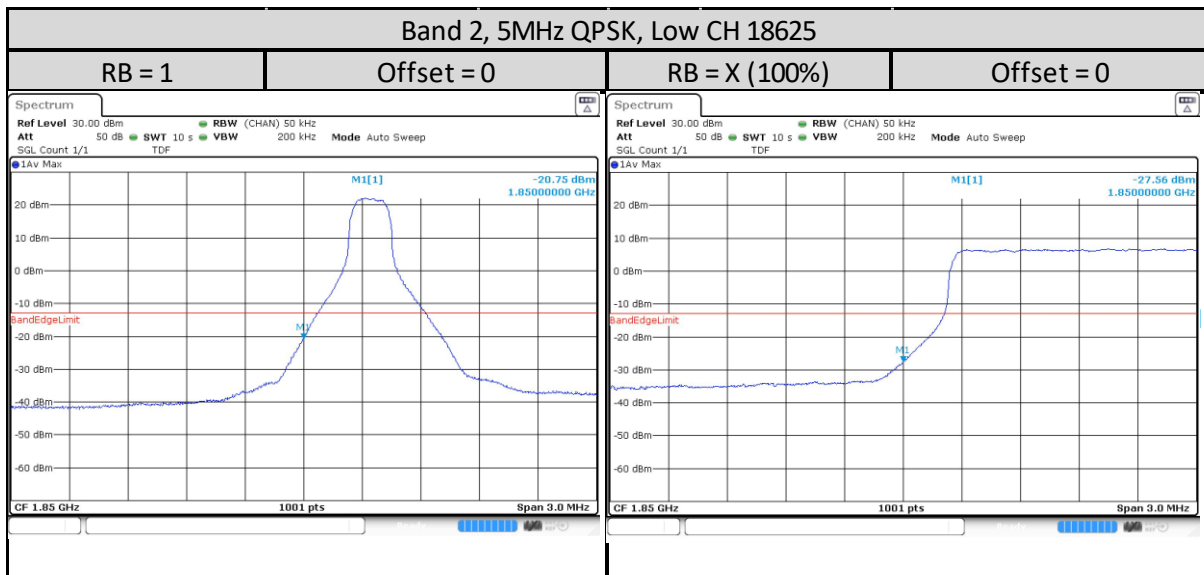
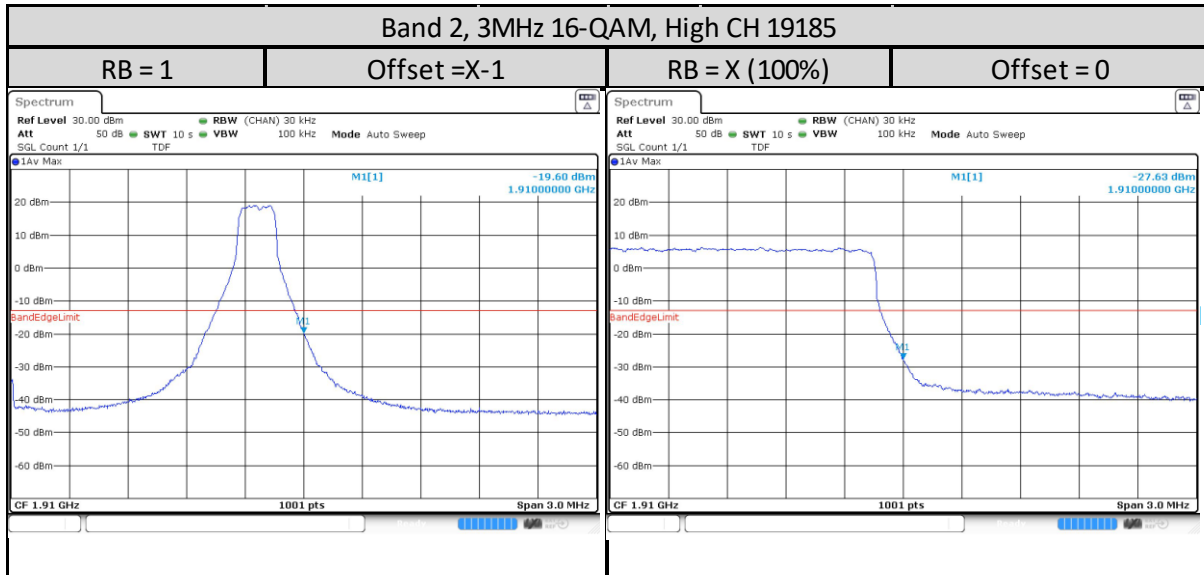
1.4.3. Band Edge Conducted Spurious Emission – LTE Band 2 (1850 -1910 MHz)

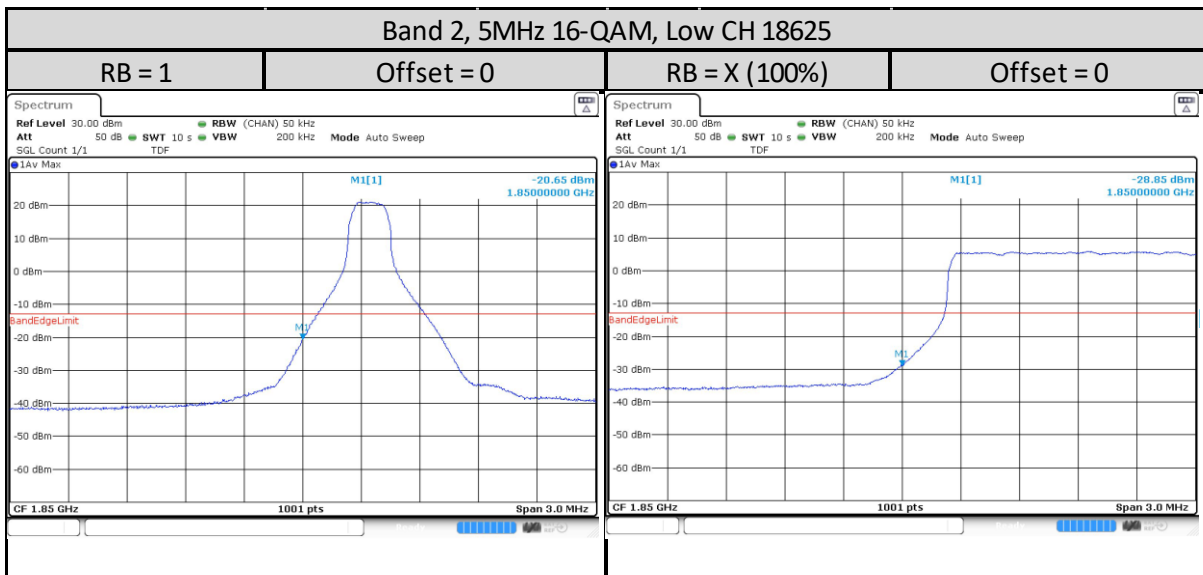
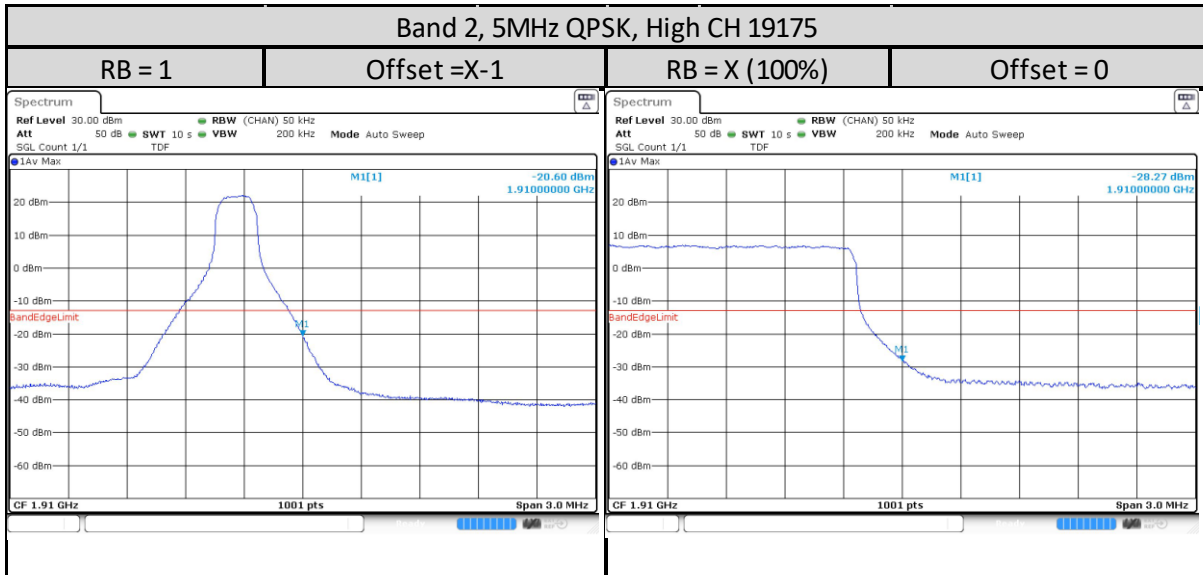


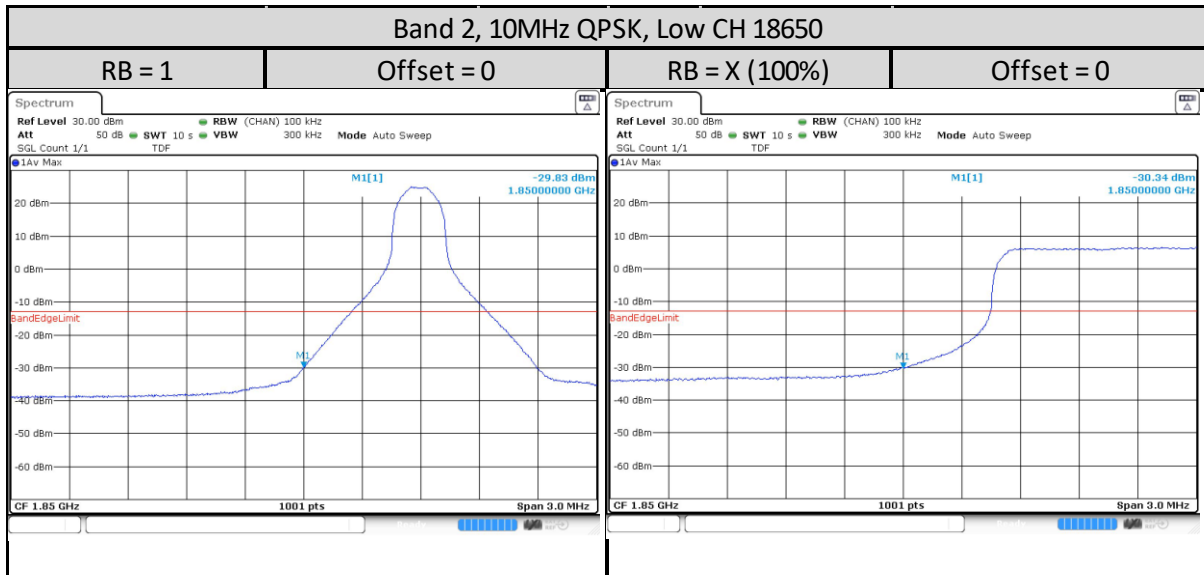
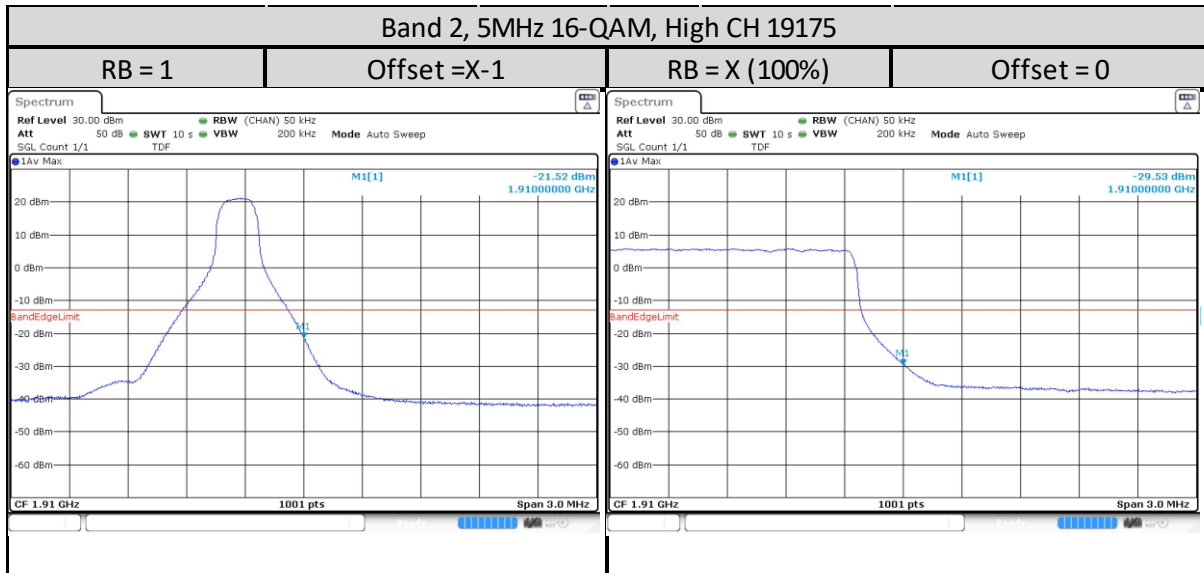


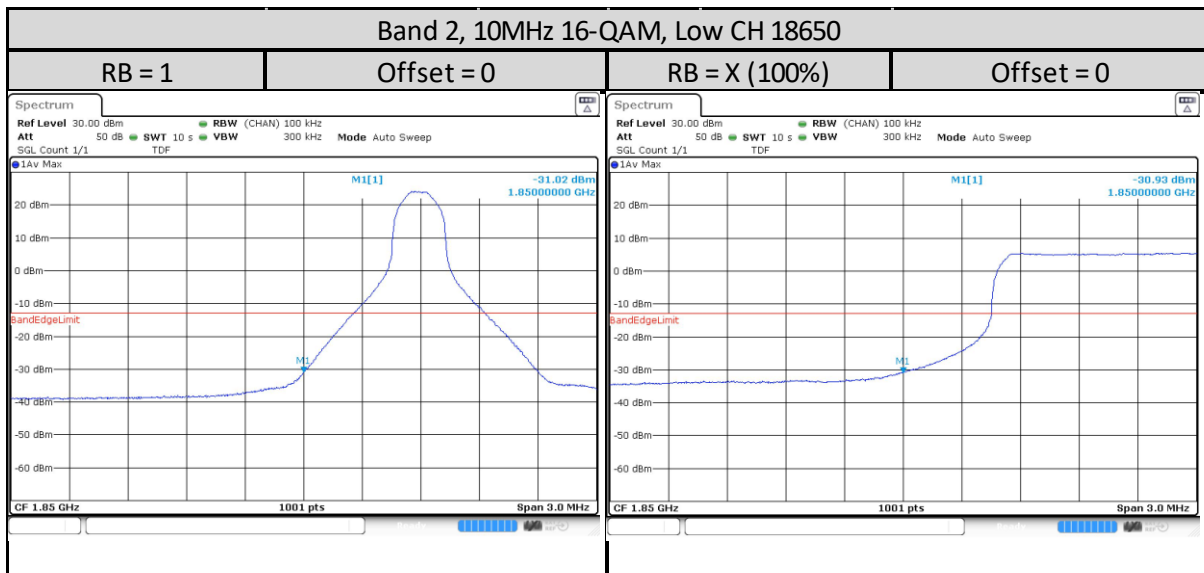
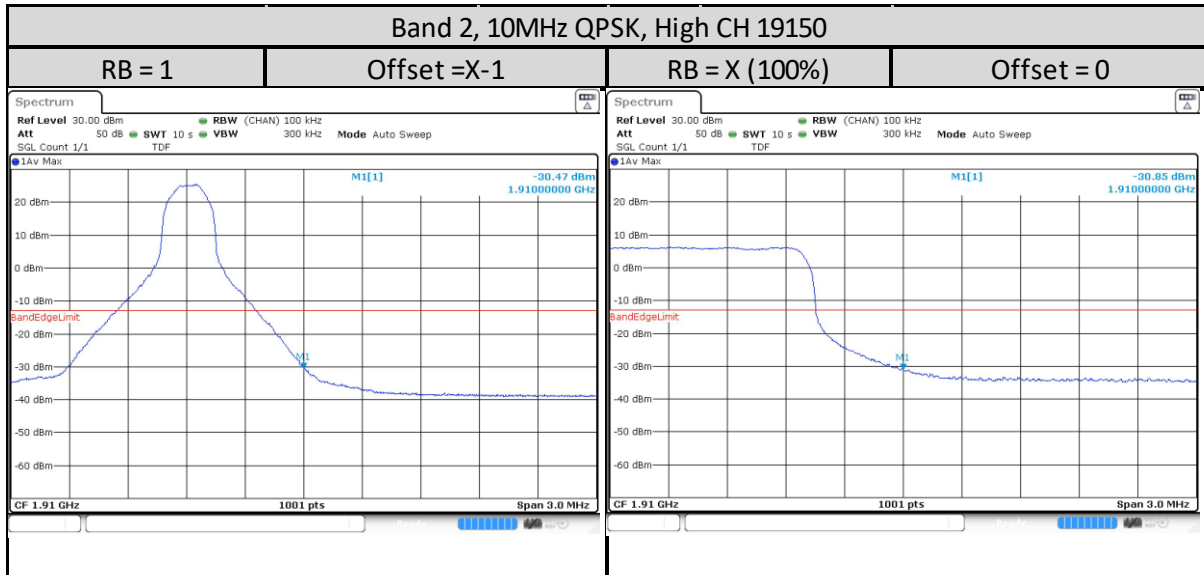


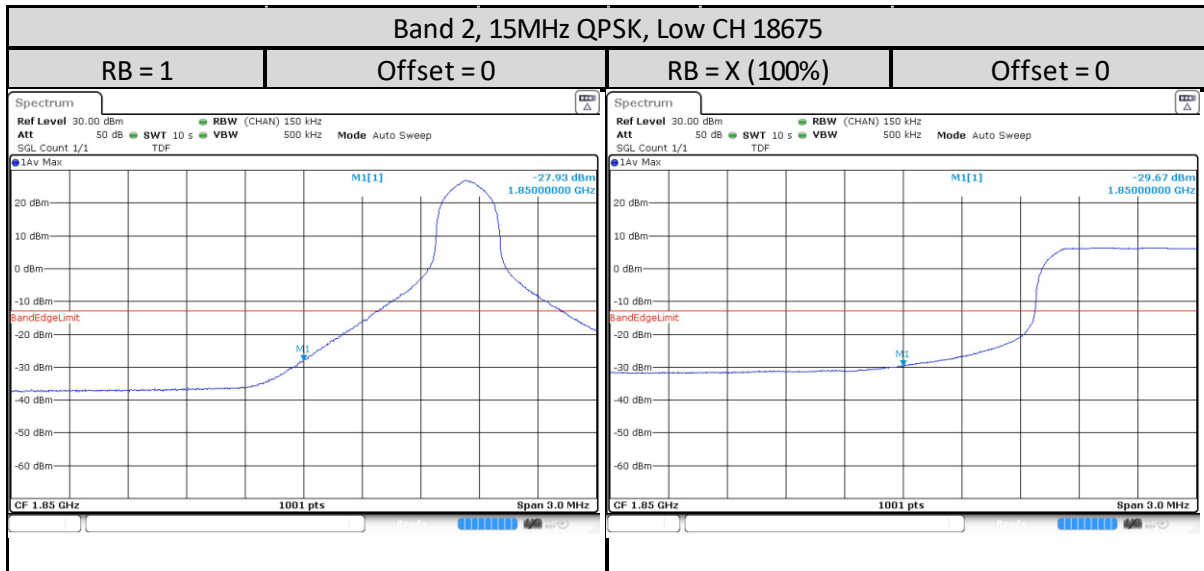
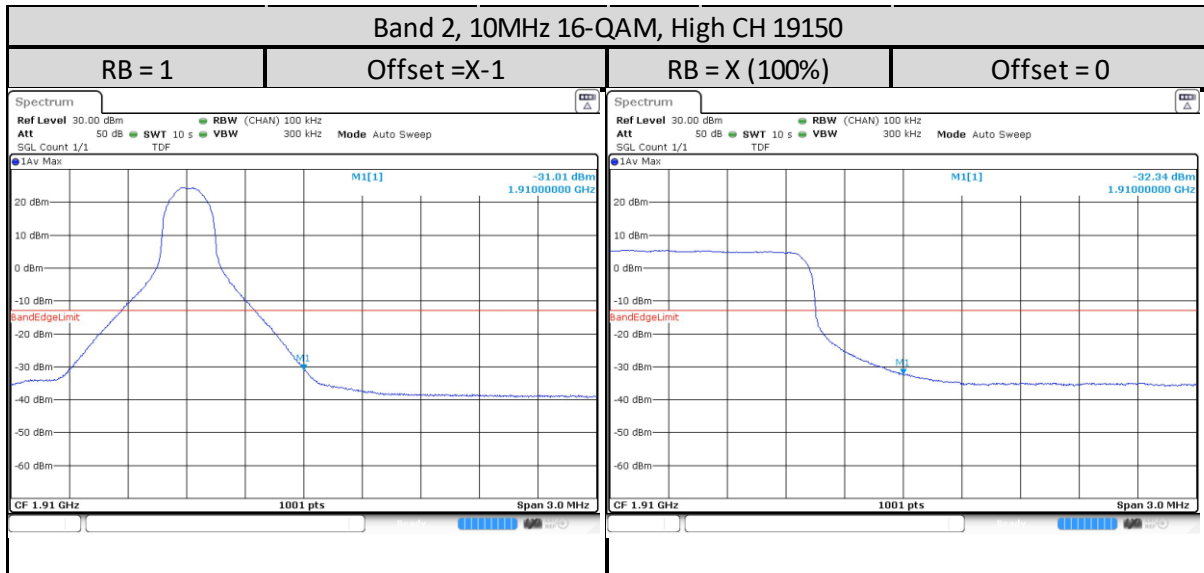


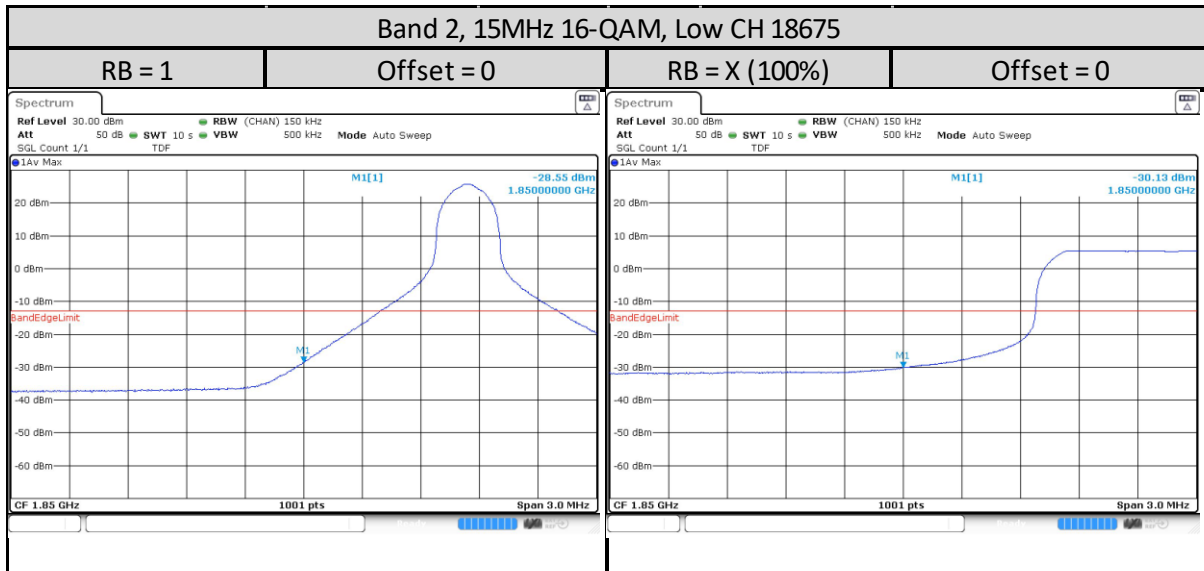
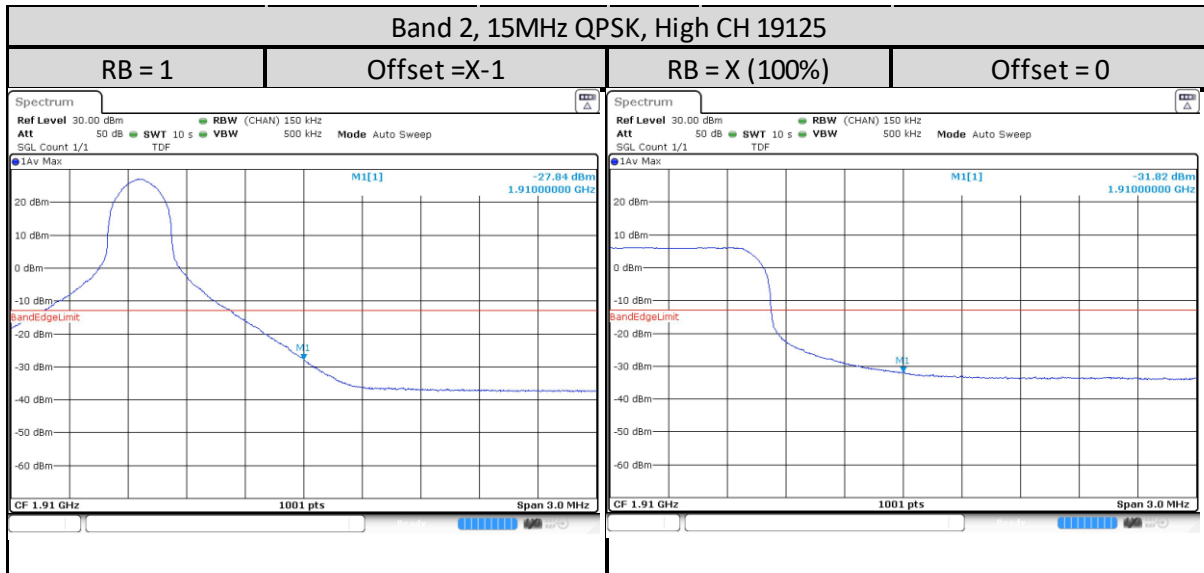


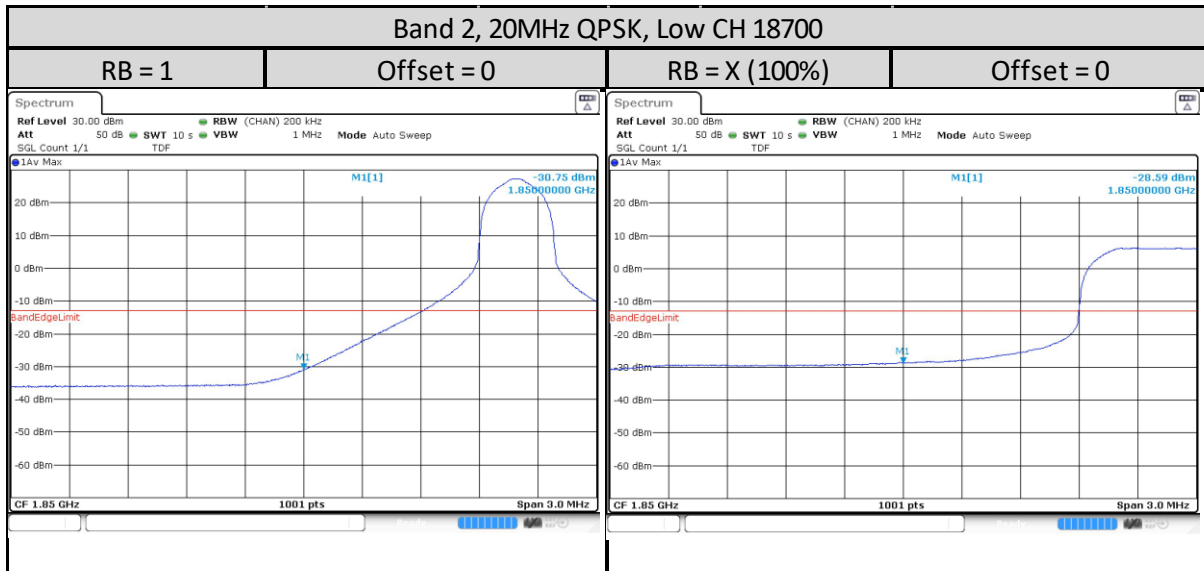
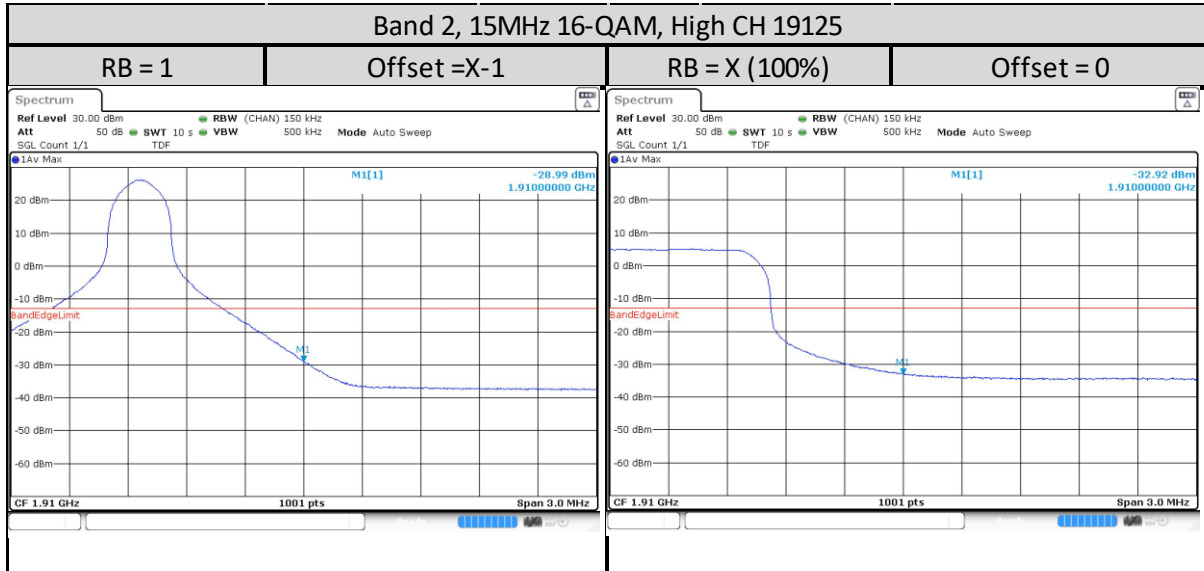


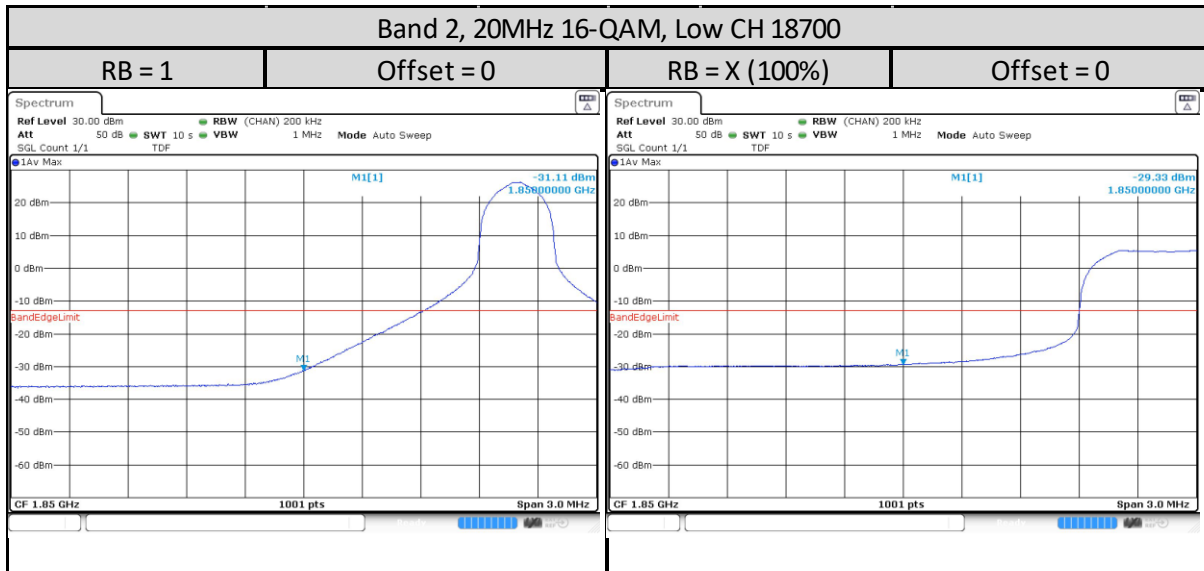
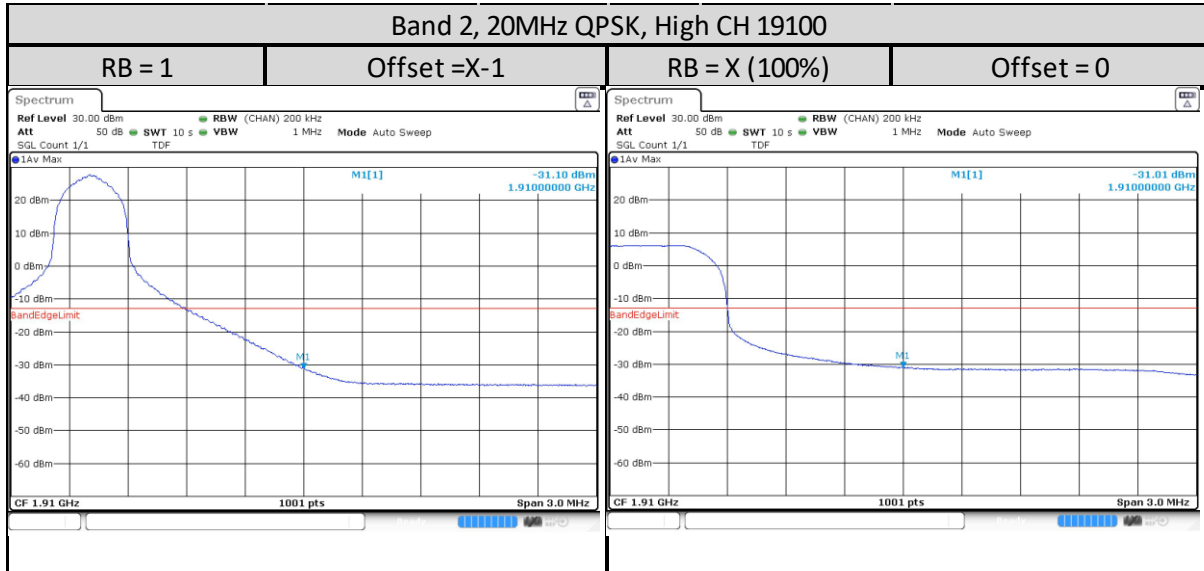


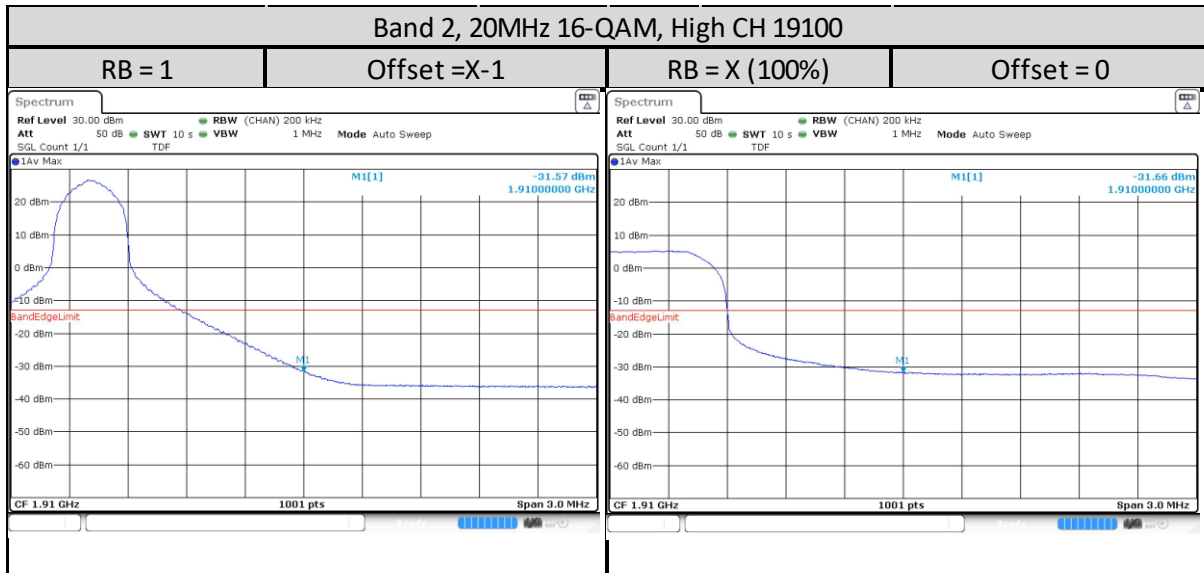






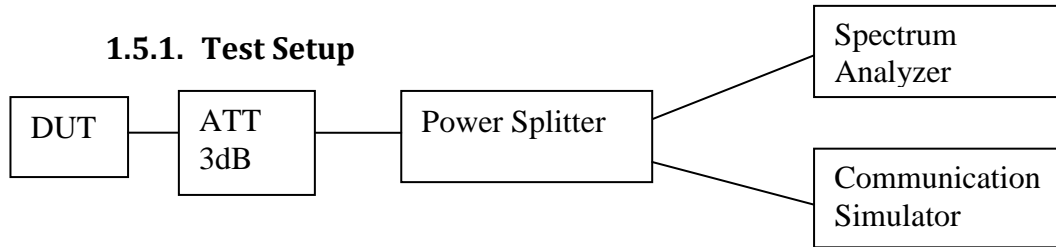






1.5. Conducted Spurious Emission

1.5.1. Test Setup



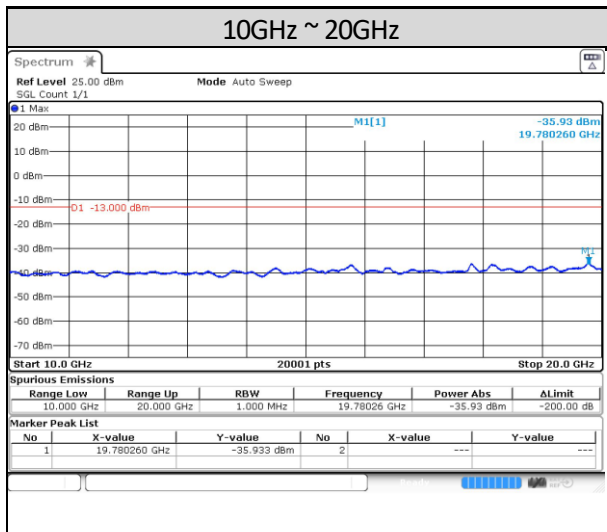
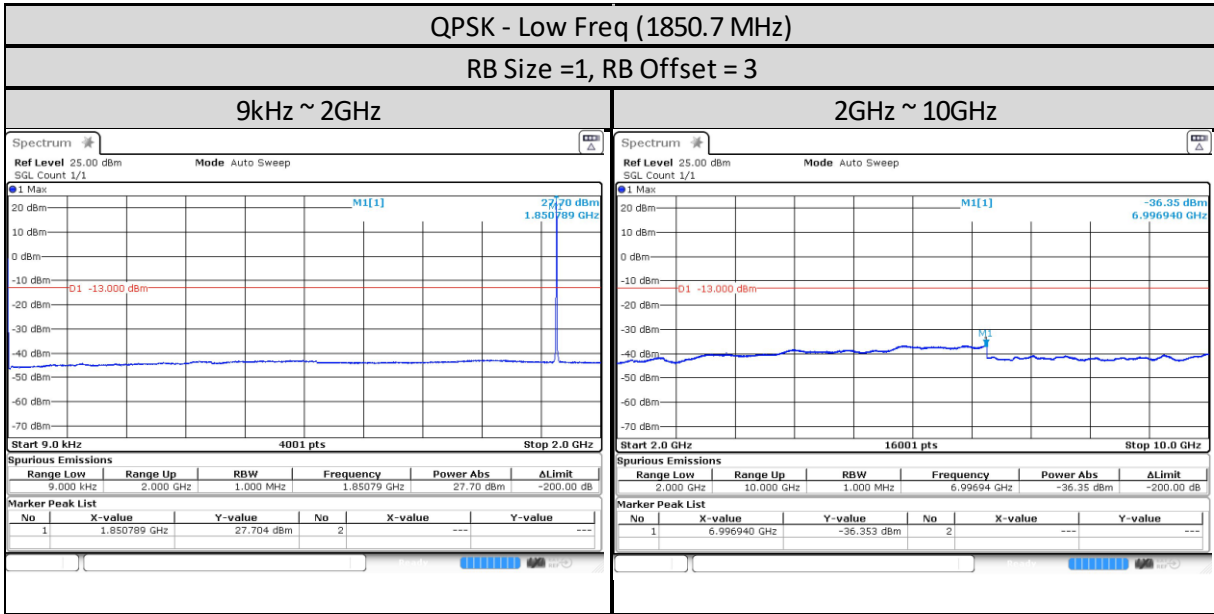
- 1) The DUT transmitter output port was connected to communication simulator with above setup.
- 2) Path loss for the measurement included.
- 3) Set DUT to transmit maximum power through communication simulator.
- 4) Spectrum Analyzer setting, RBW = 1 MHz, VBW = 3 MHz.
- 5) The spurious emission of lowest, middle and highest channels with the highest RF powers were measured.
- 6) Record the maximum trace plot into the test report.

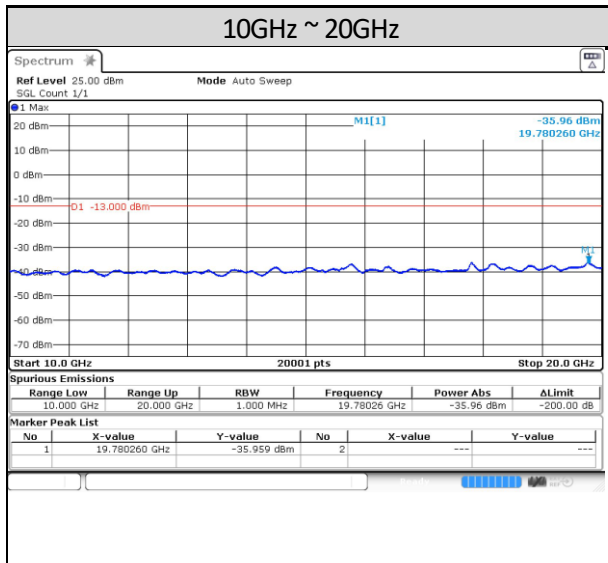
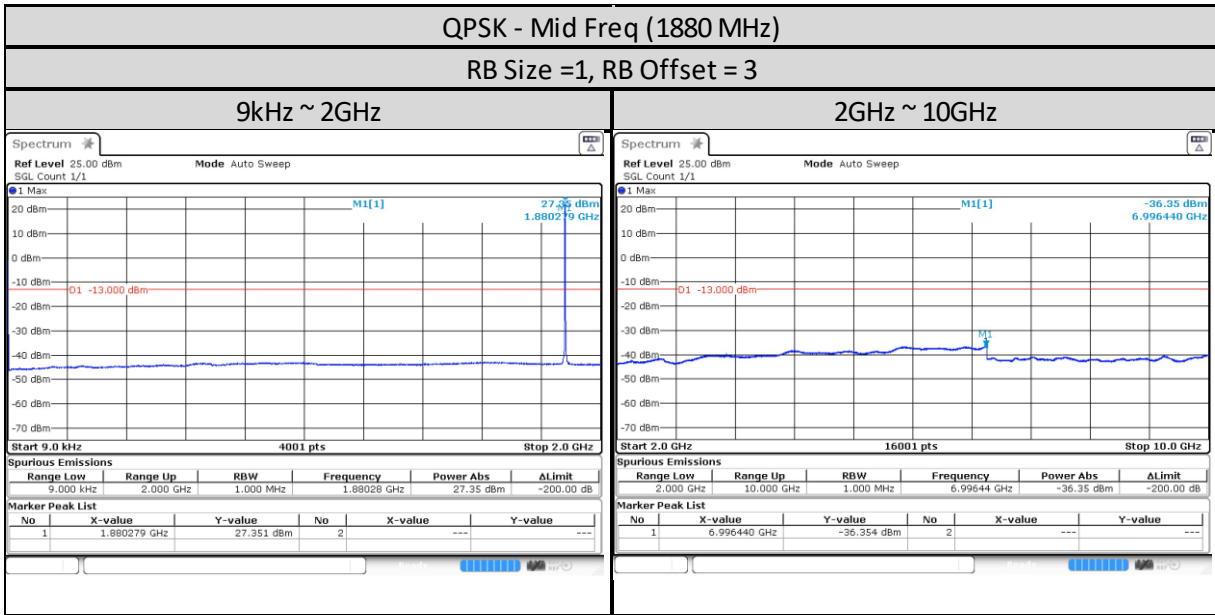
1.5.2. Test Limit

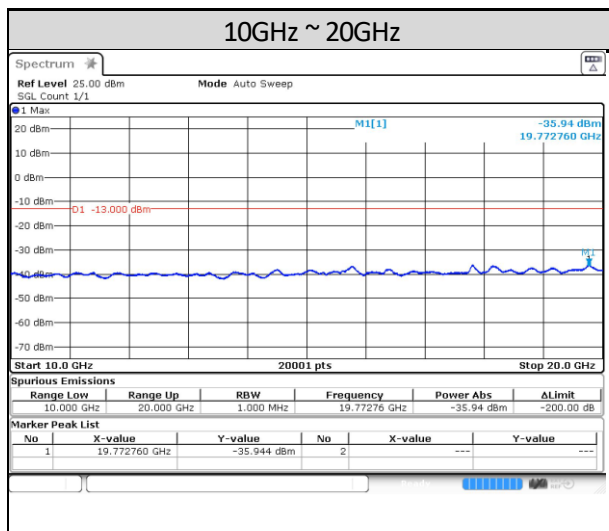
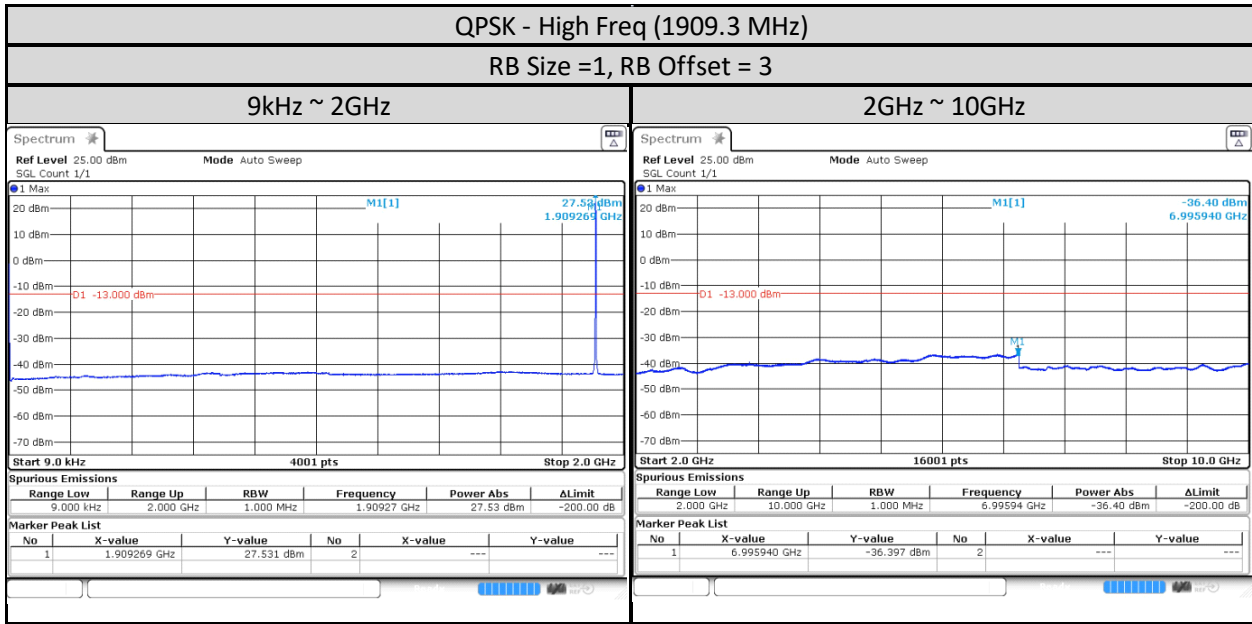
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB. The measurement instrumentation is employing a resolution bandwidth of 1 megahertz or greater.

1.5.3. Conducted Spurious Emissions - LTE Band 2 (1850 -1910 MHz)

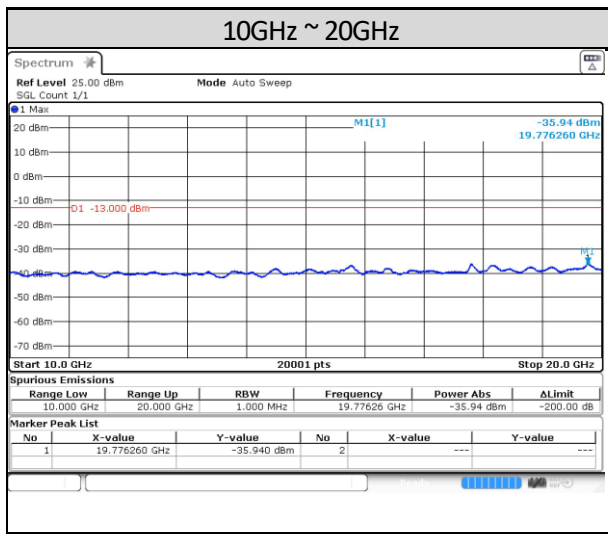
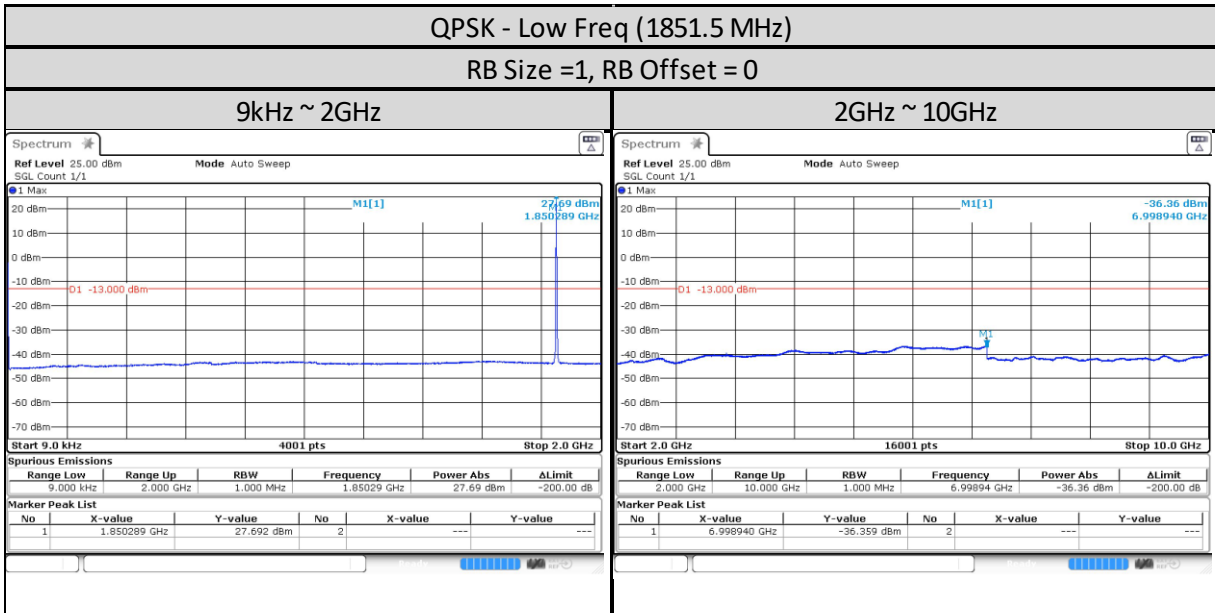
1.4MHz

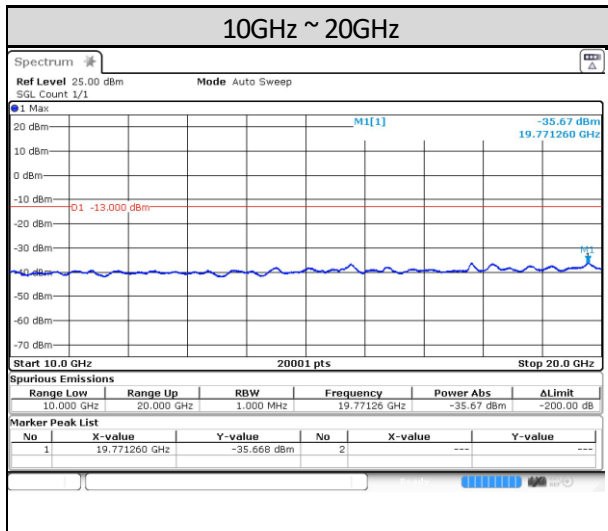
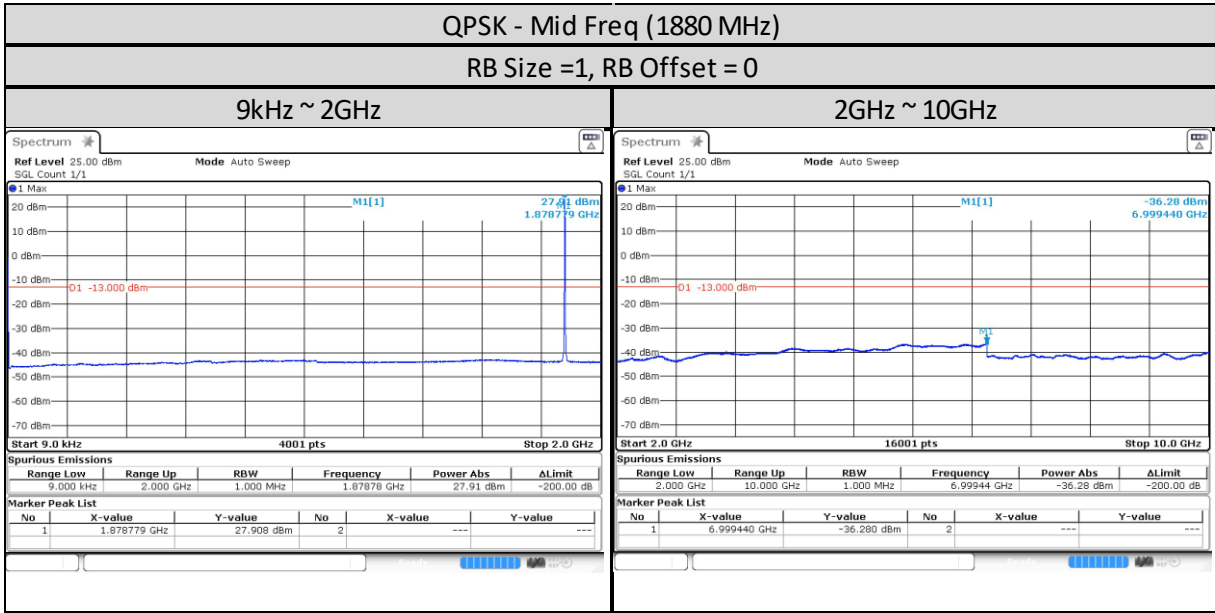


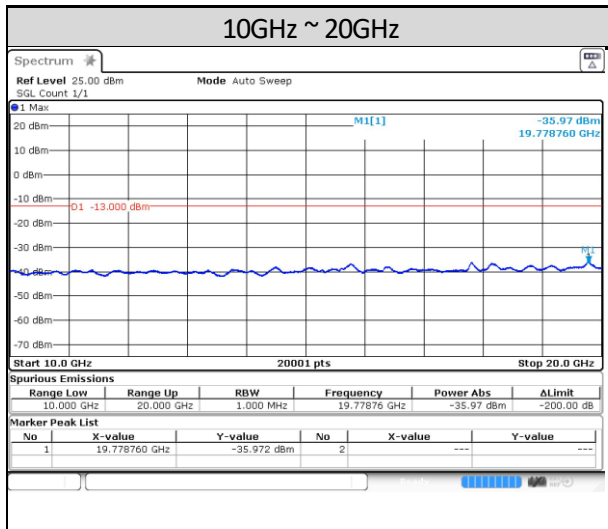
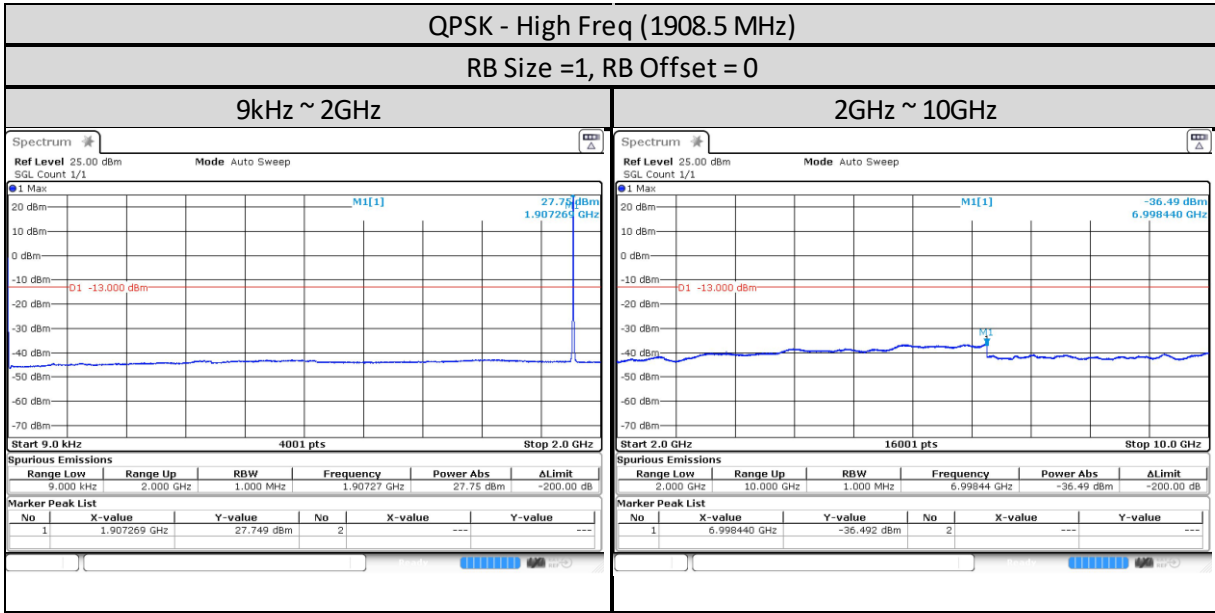




3MHz







5MHz

