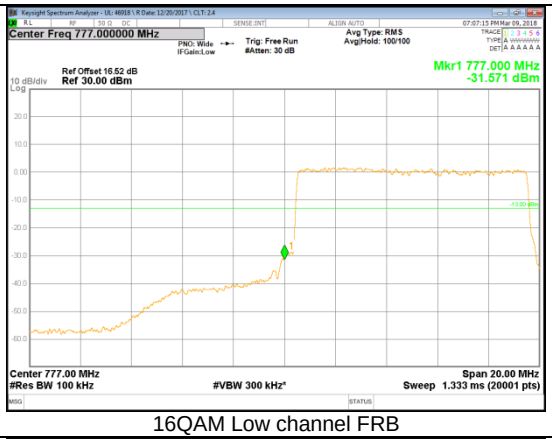
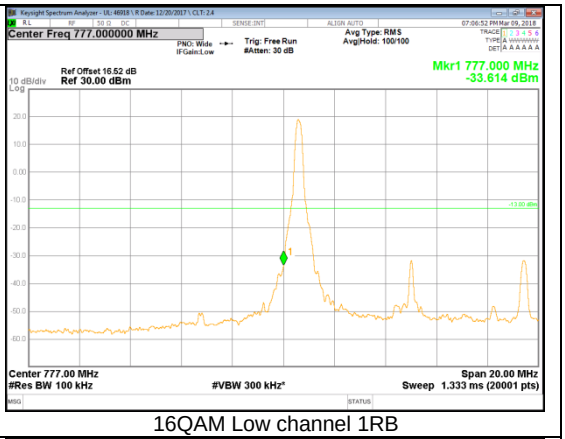
Band 13

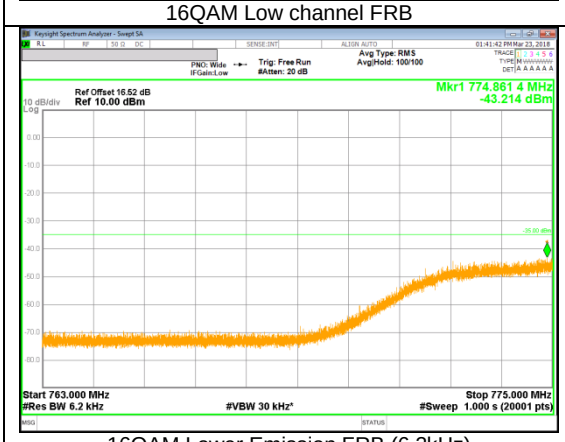
10MHz



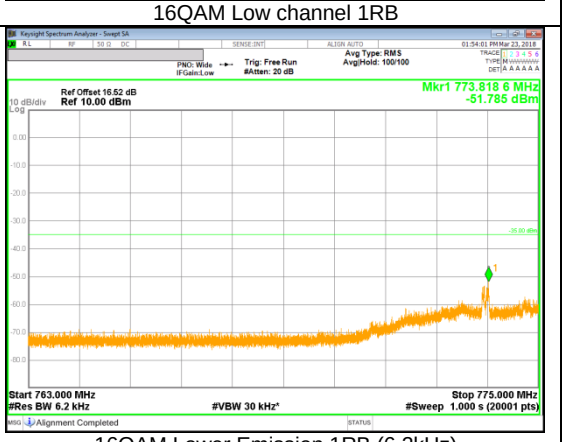
16QAM Low channel FRB



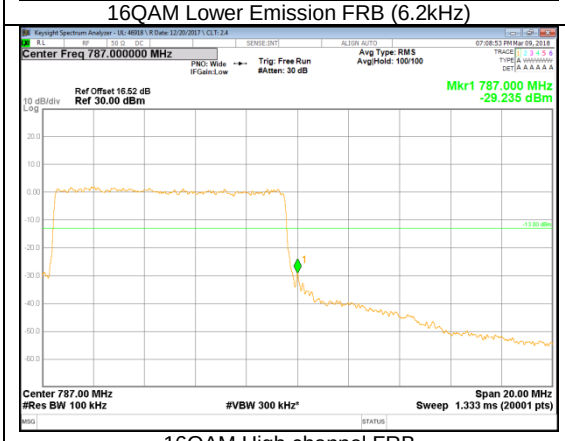
16QAM Low channel 1RB



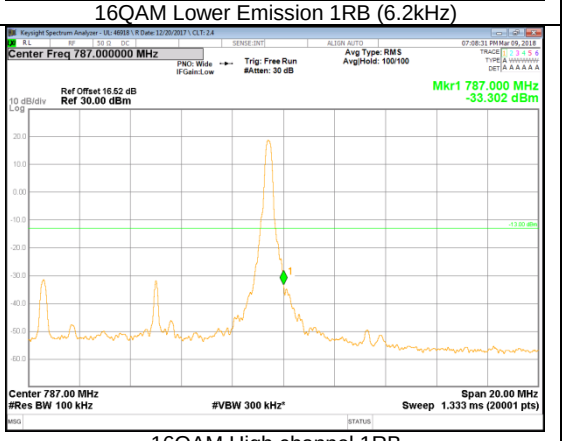
16QAM Lower Emission FRB (6.2kHz)



16QAM Lower Emission 1RB (6.2kHz)



16QAM High channel FRB



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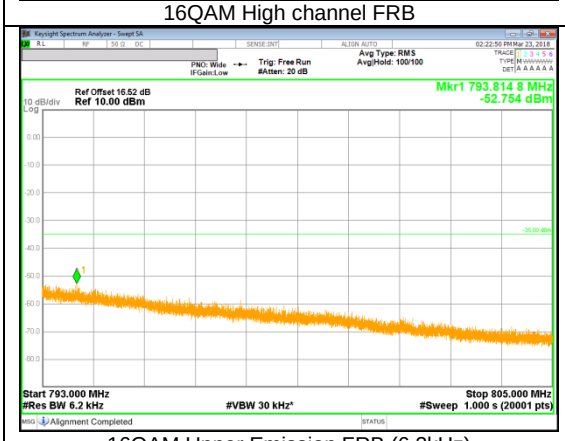
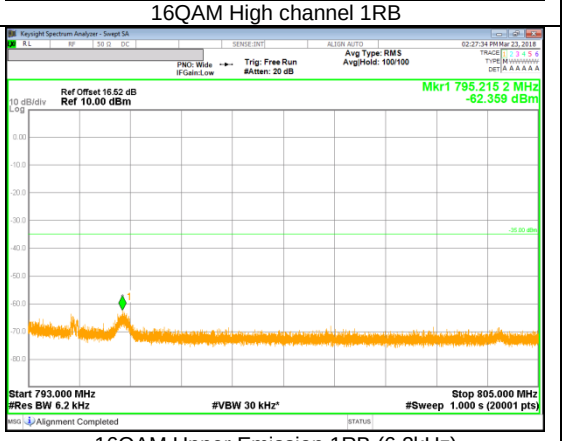


16QAM Upper Emission FRB (6.2kHz)



16QAM Upper Emission 1RB (6.2kHz)

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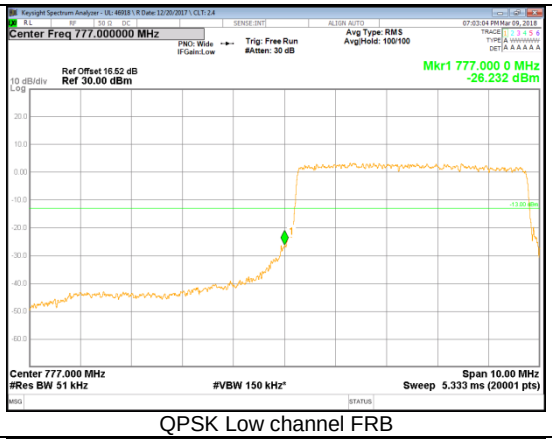
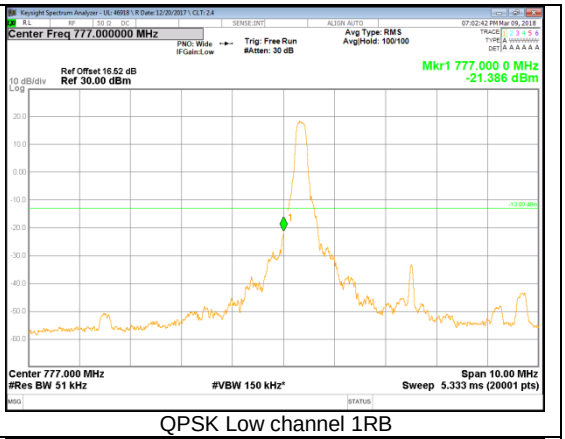
Band 13

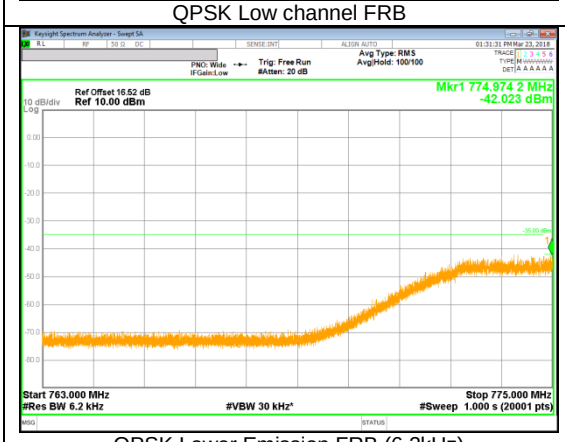
5MHz



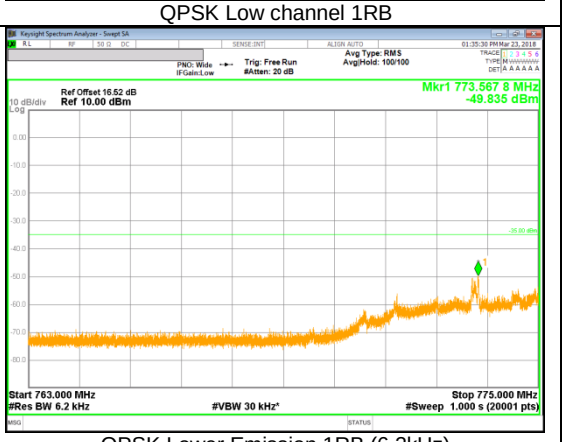
QPSK Low channel FRB



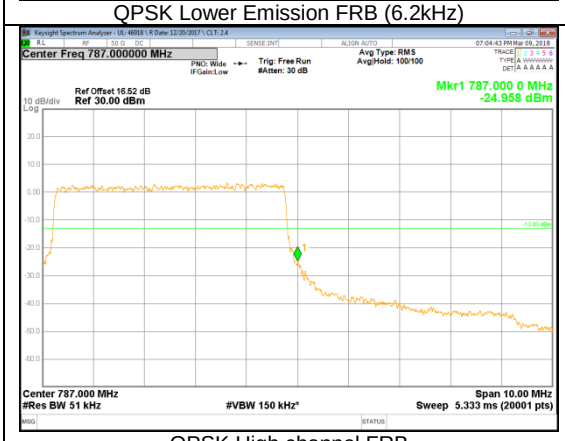
QPSK Low channel 1RB



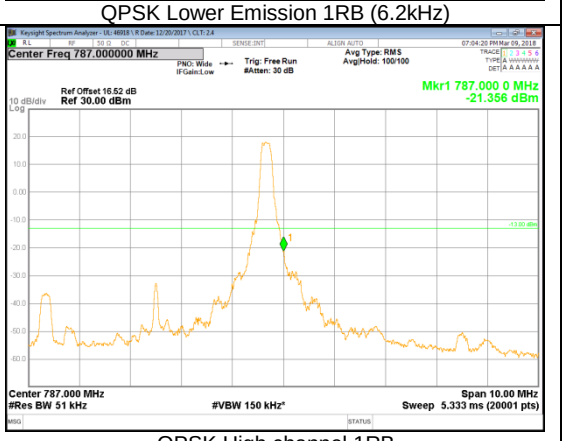
QPSK Lower Emission FRB (6.2kHz)



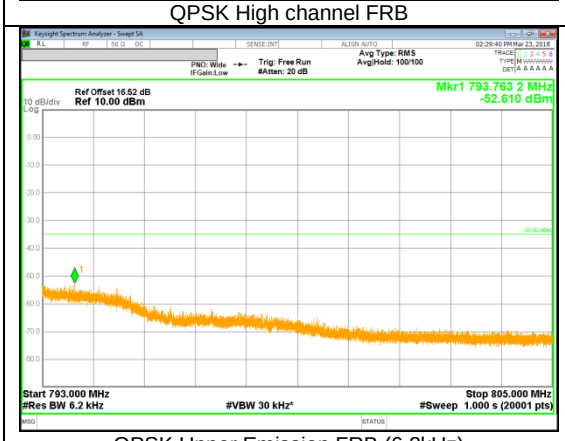
QPSK Lower Emission 1RB (6.2kHz)



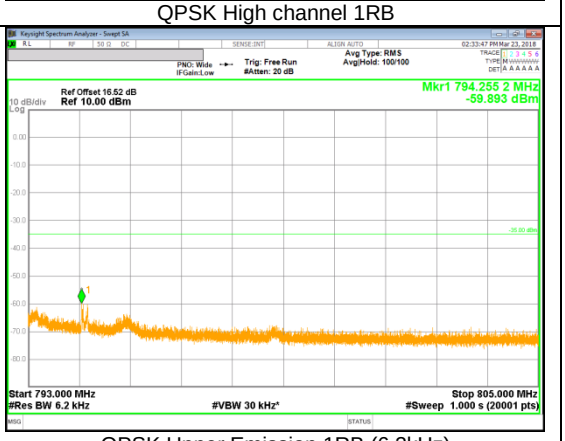
QPSK High channel FRB



QPSK High channel 1RB



QPSK Upper Emission FRB (6.2kHz)



QPSK Upper Emission 1RB (6.2kHz)

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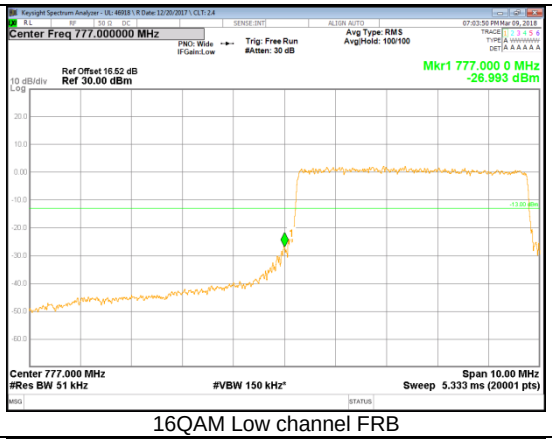
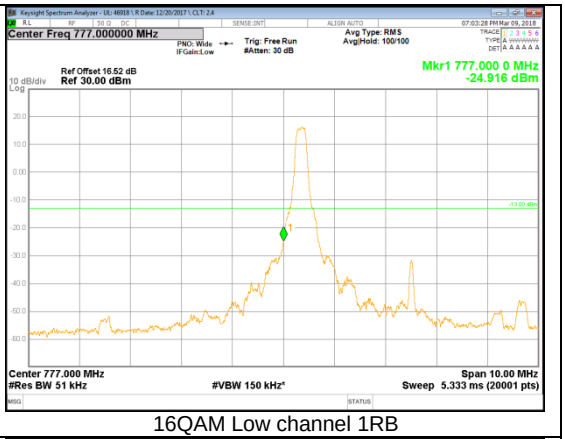
Band 13

5MHz



16QAM Low channel FRB



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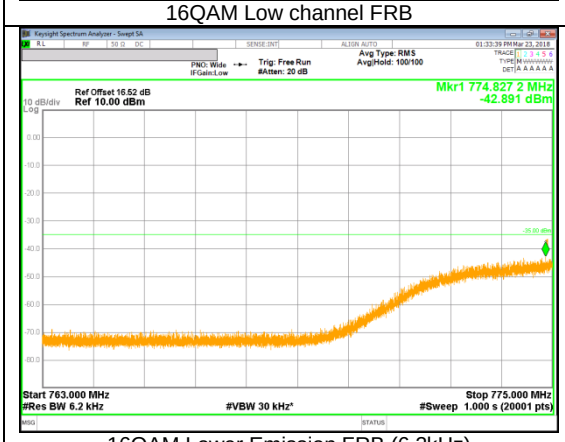
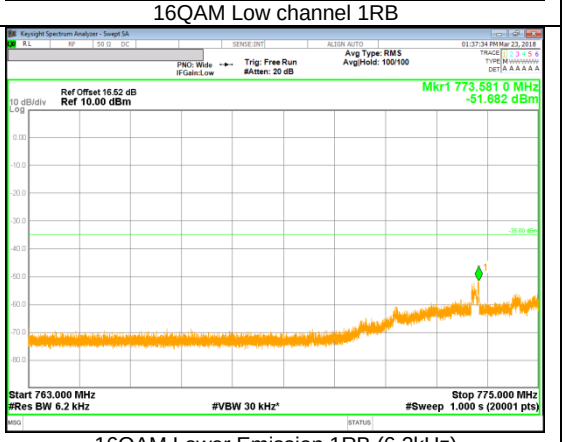
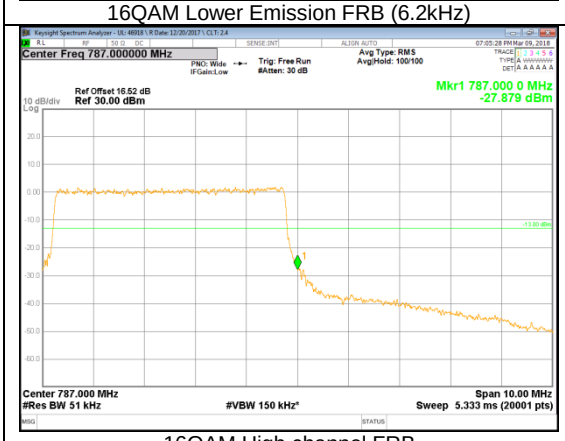


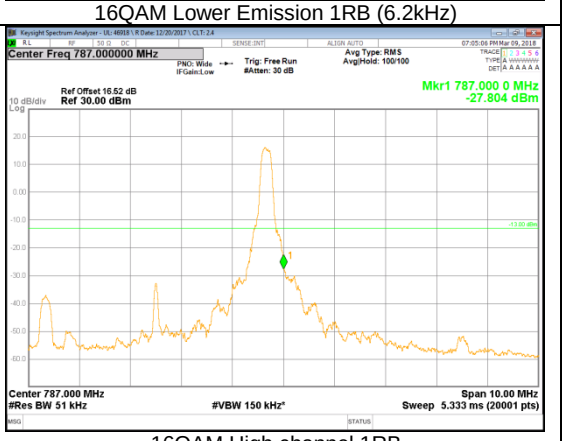
16QAM Lower Emission FRB (6.2kHz)



16QAM Lower Emission 1RB (6.2kHz)



16QAM High channel FRB



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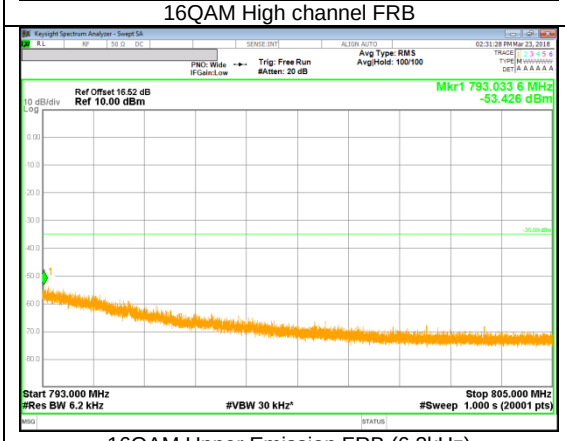
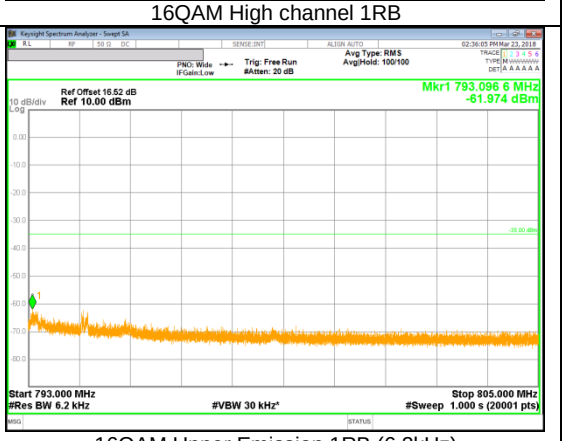


16QAM Upper Emission FRB (6.2kHz)



16QAM Upper Emission 1RB (6.2kHz)

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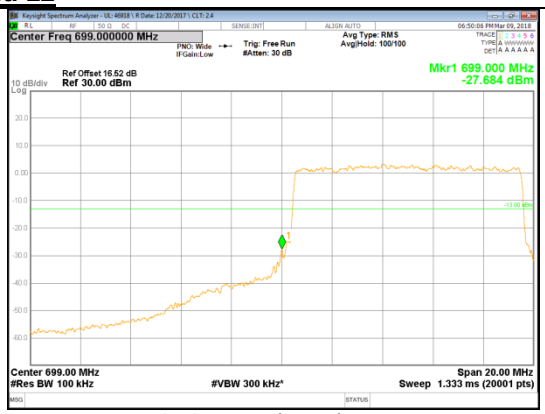
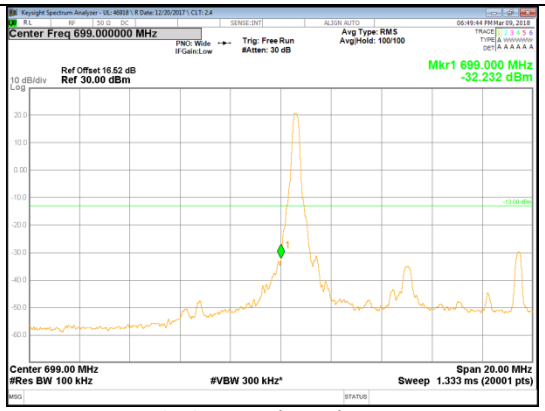
LTE Band 12

Band 12

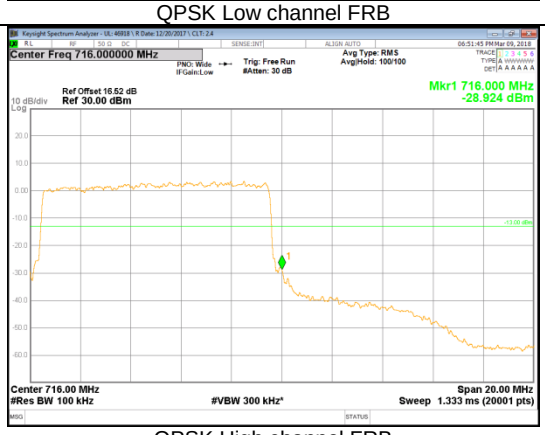
10MHz



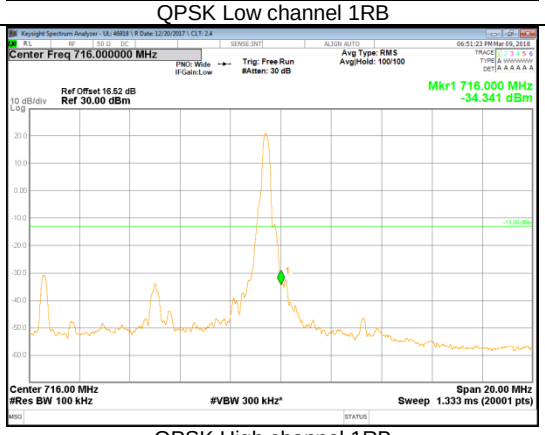
QPSK Low channel FRB



QPSK Low channel 1RB



QPSK High channel FRB



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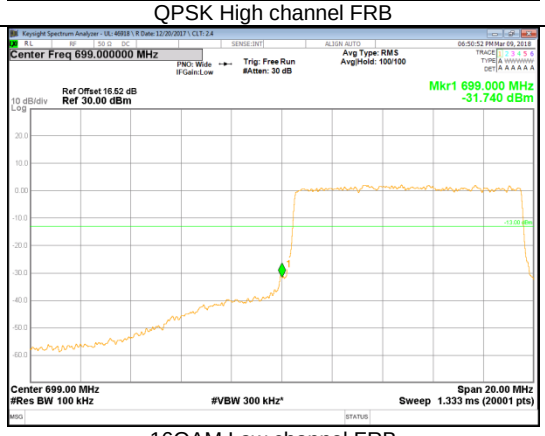

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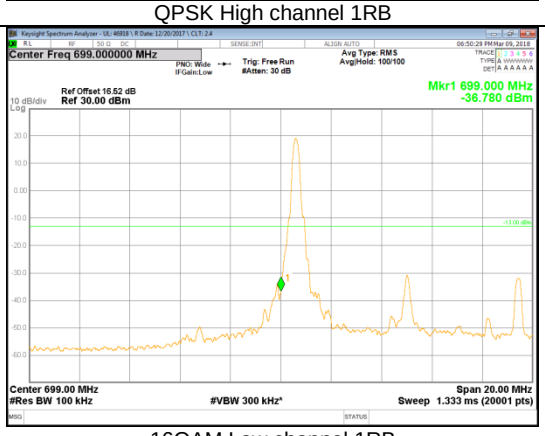

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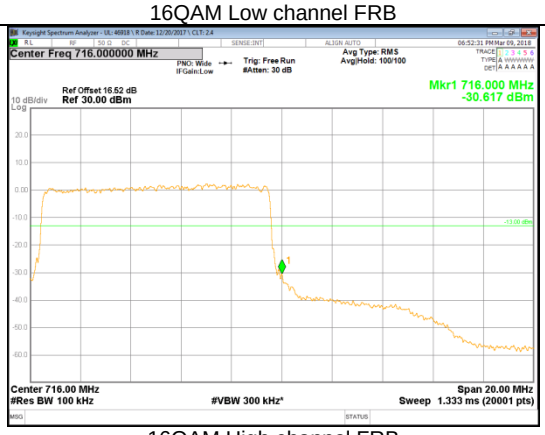

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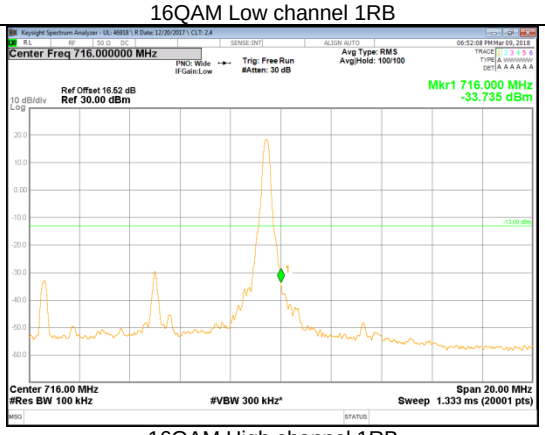

16QAM High channel 1RB

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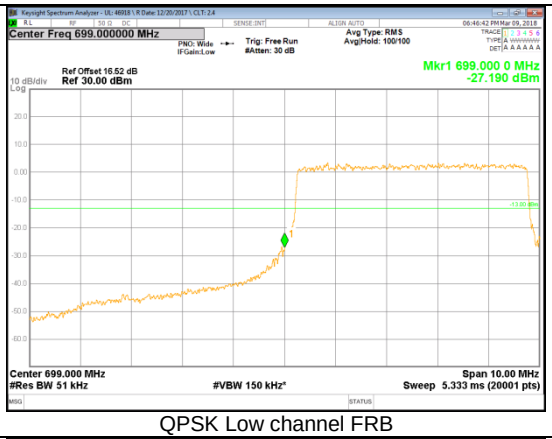
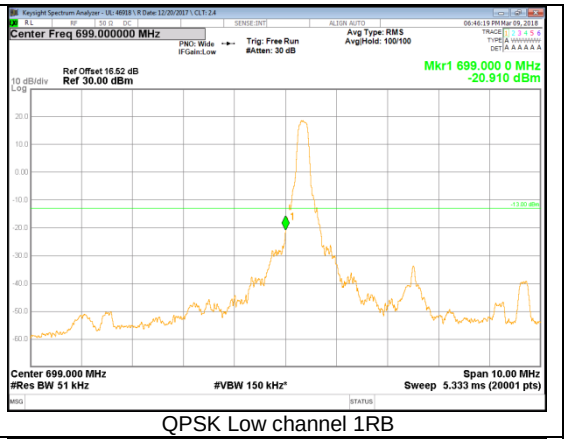
Band 12

5MHz



QPSK Low channel FRB



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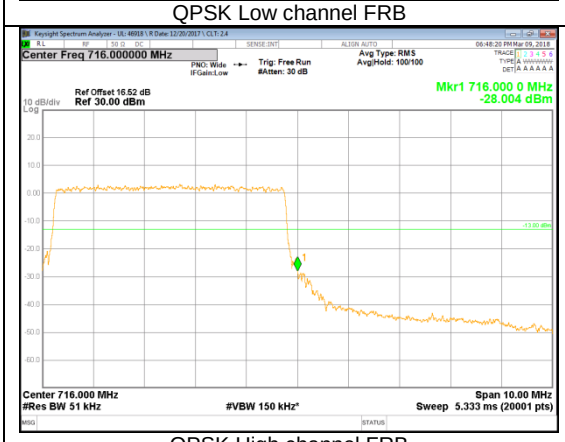

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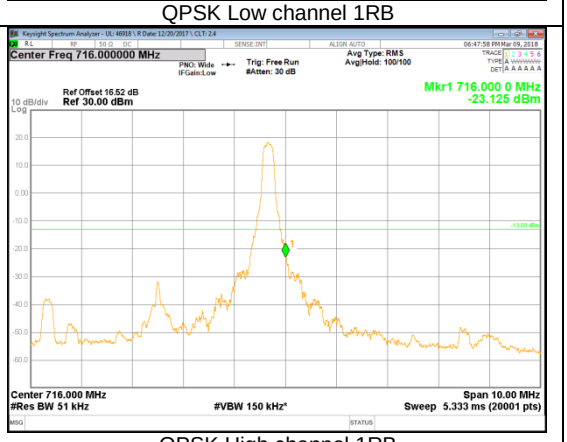

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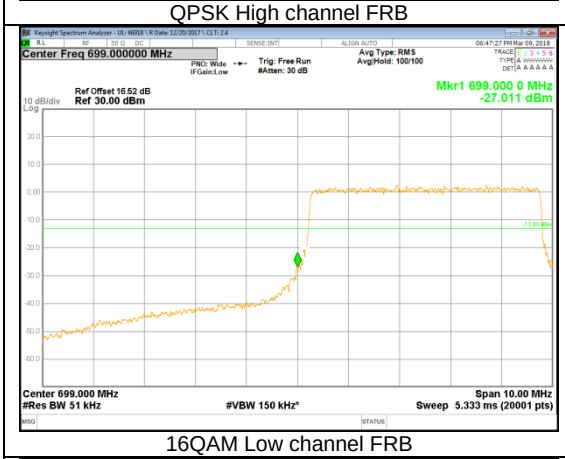

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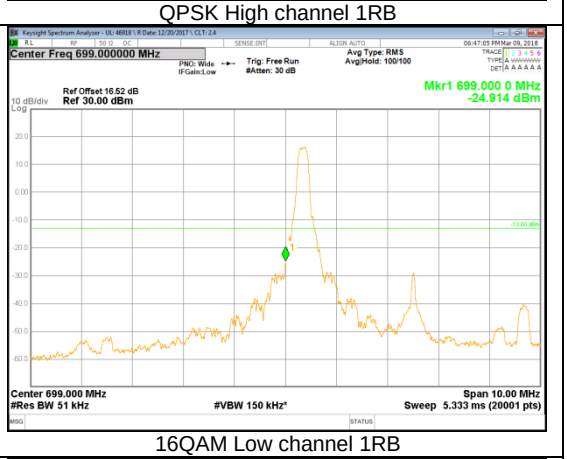

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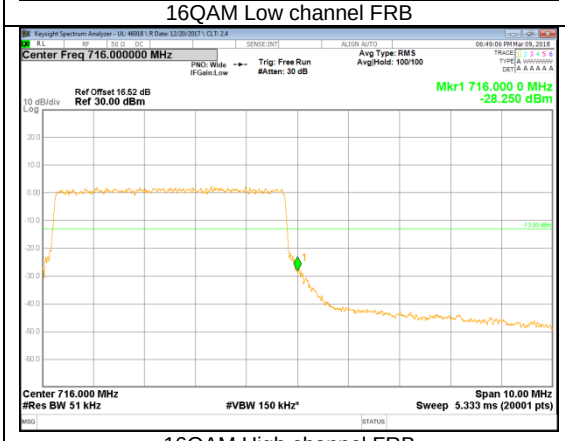
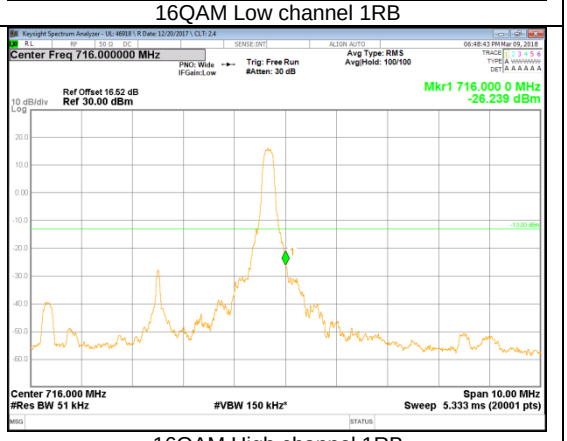


16QAM High channel FRB



16QAM High channel 1RB

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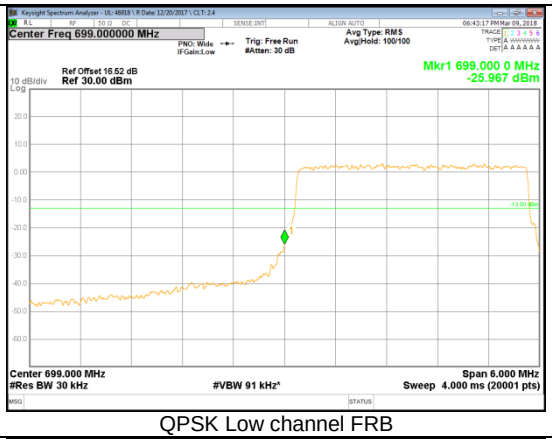
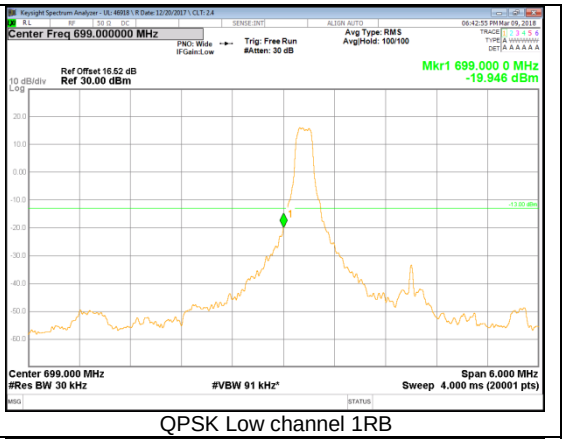
Band 12

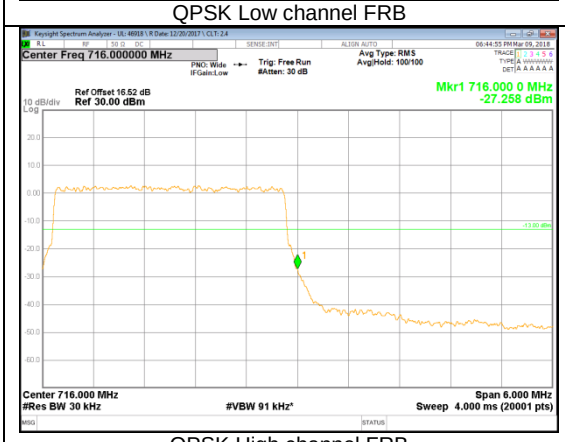
3MHz



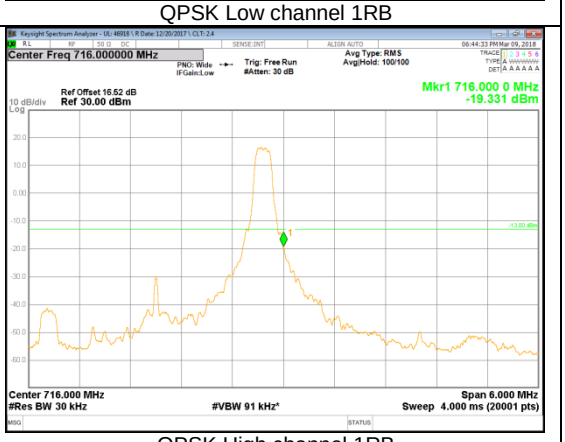
QPSK Low channel FRB



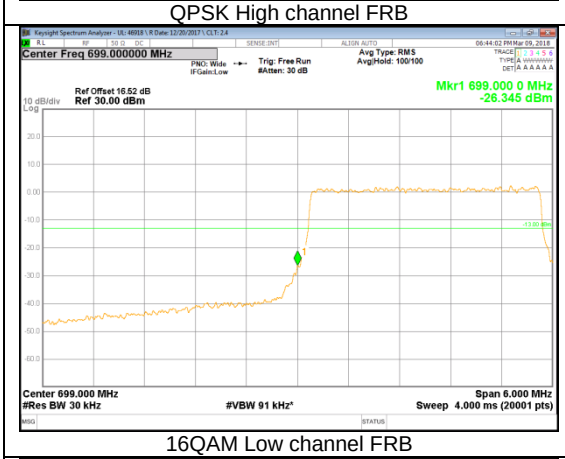
QPSK Low channel 1RB



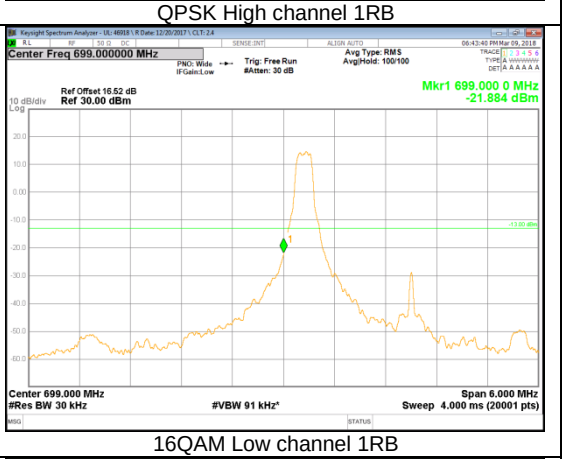
QPSK High channel FRB



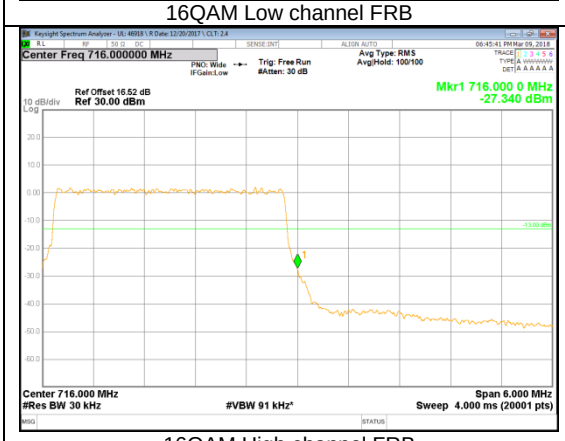
QPSK High channel 1RB



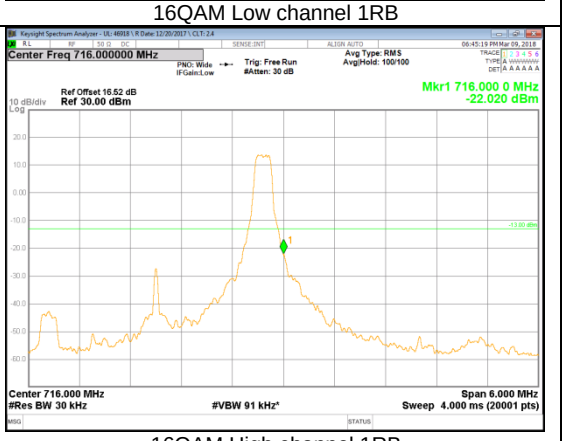
16QAM Low channel FRB



16QAM Low channel 1RB



16QAM High channel FRB



16QAM High channel 1RB

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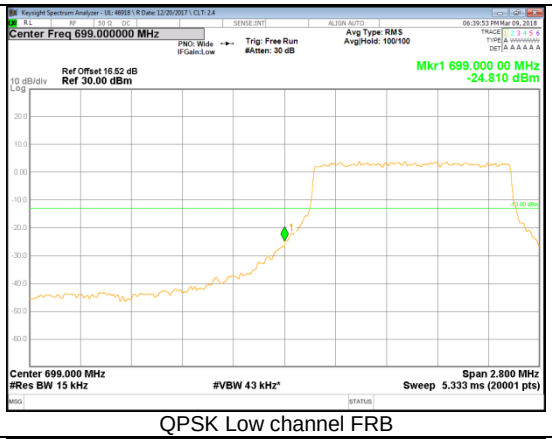
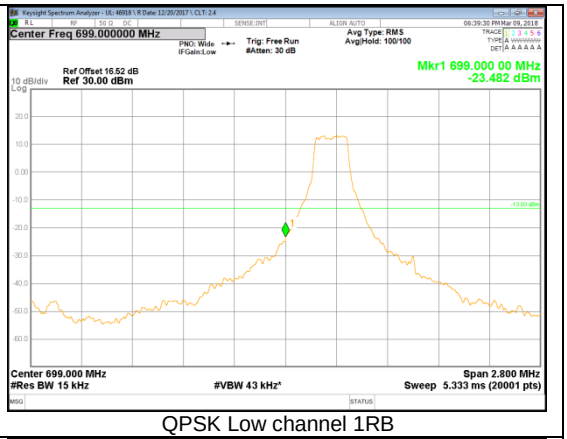
Band 12

1.4MHz



QPSK Low channel FRB



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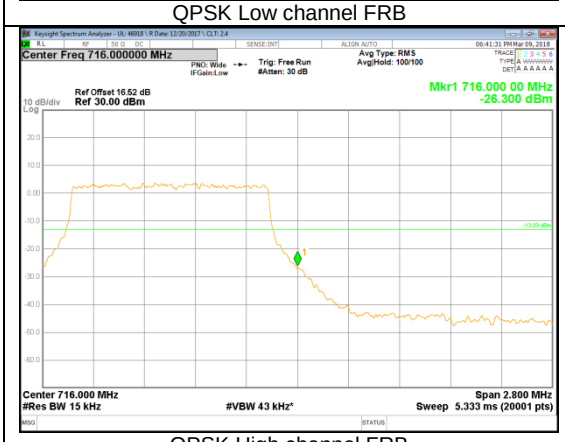

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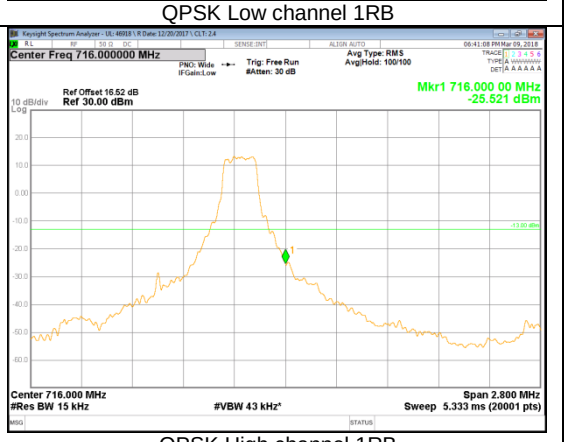

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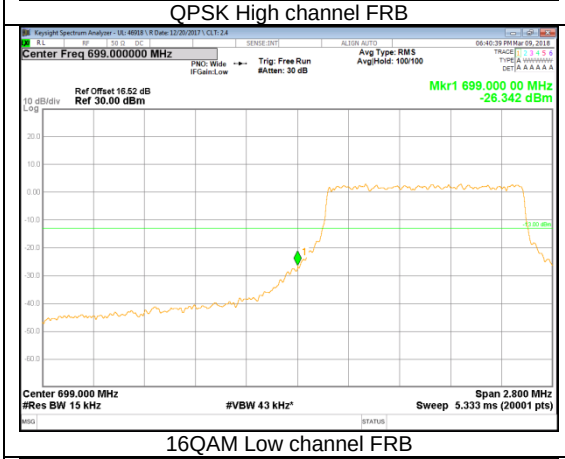

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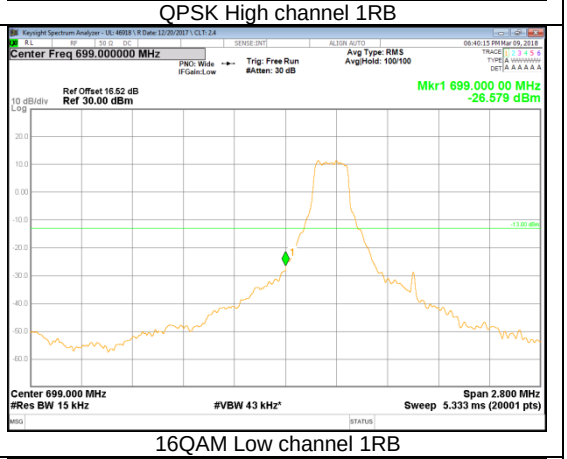

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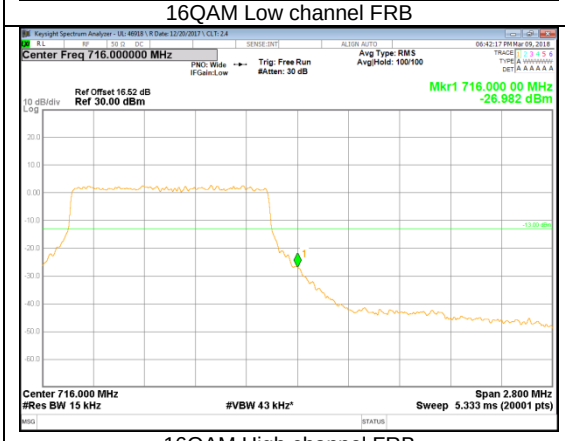

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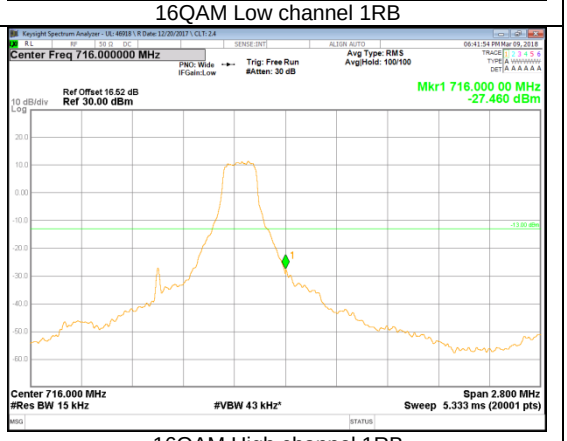

16QAM High channel 1RB

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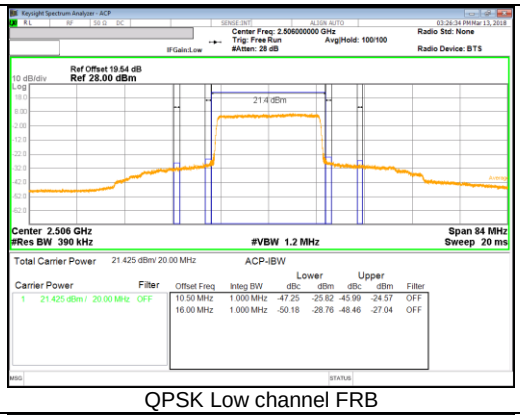
9.2.1. EMISSION MASK PLOTS

LTE Band 41

Band 41

20MHz



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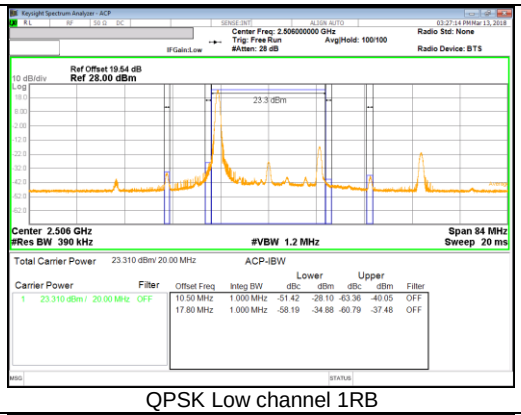

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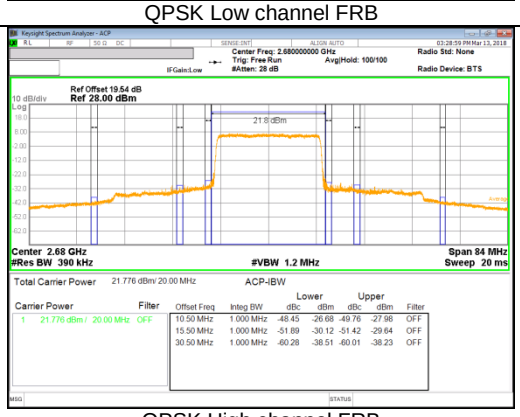

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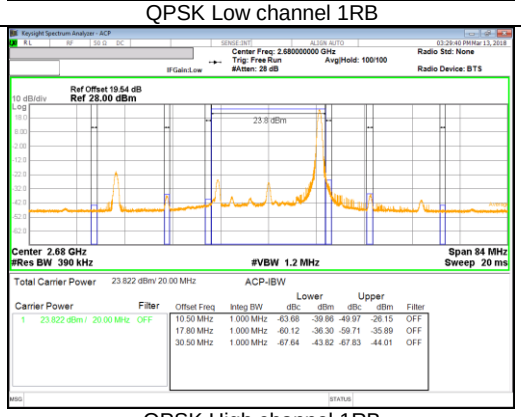

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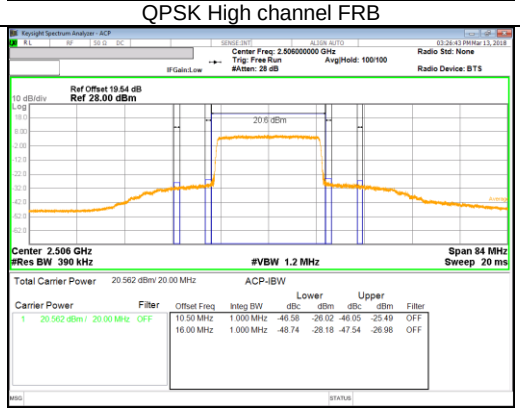

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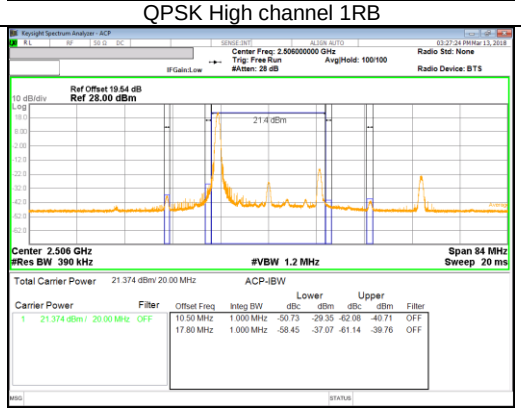

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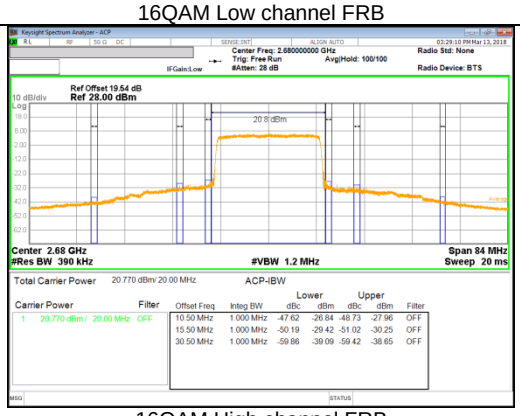
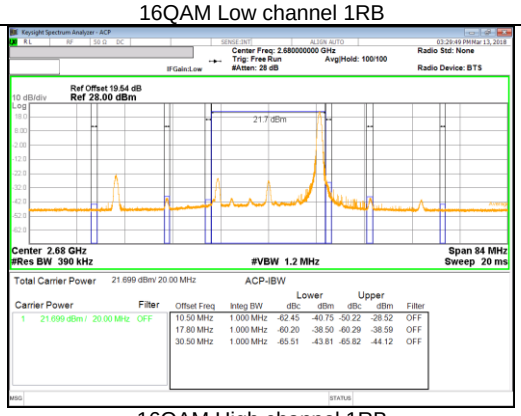


16QAM High channel FRB



16QAM High channel 1RB

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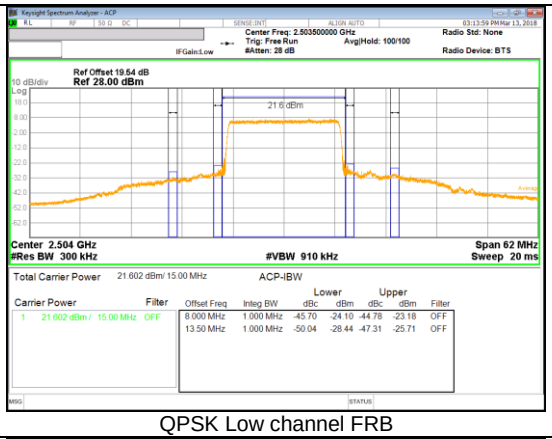
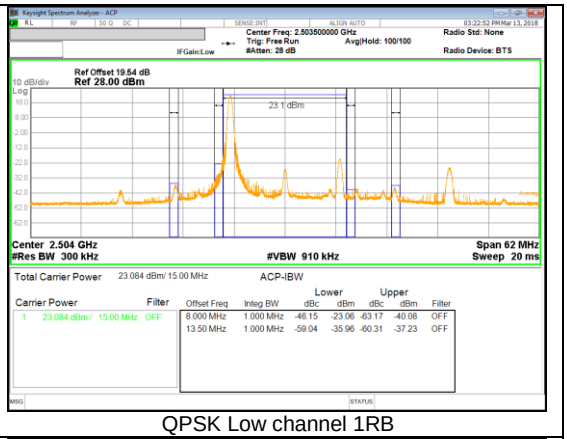
Band 41

15MHz



QPSK Low channel FRB



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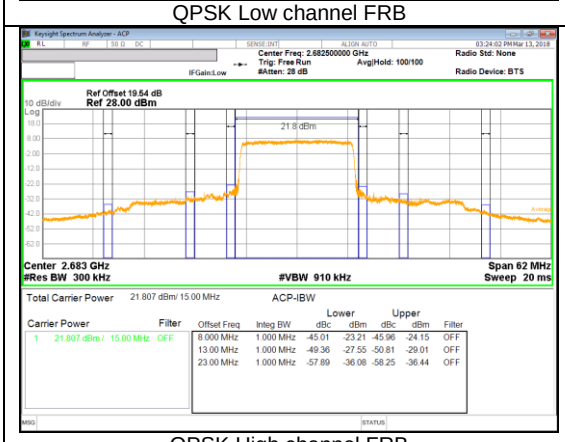

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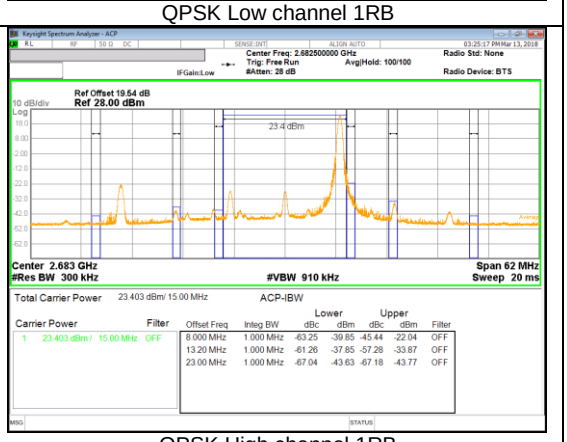

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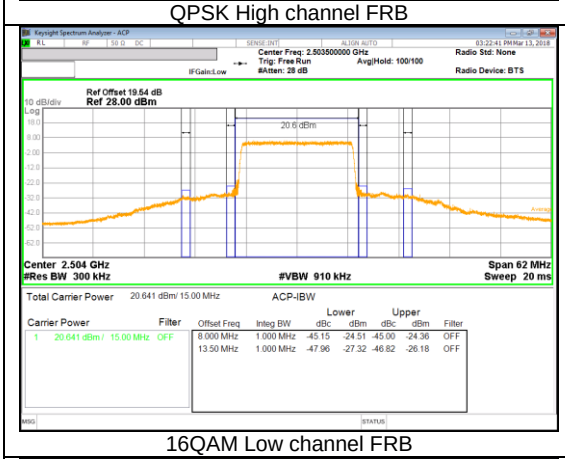

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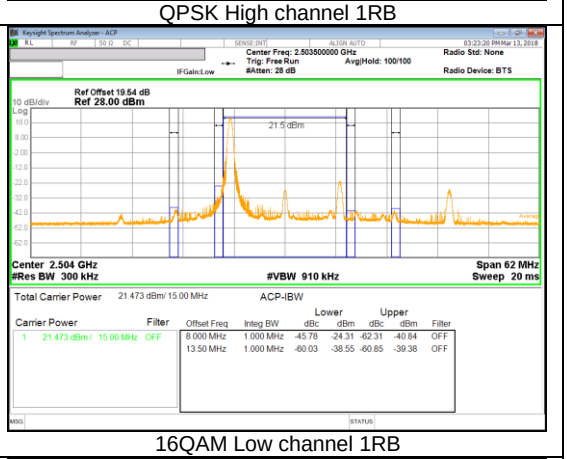

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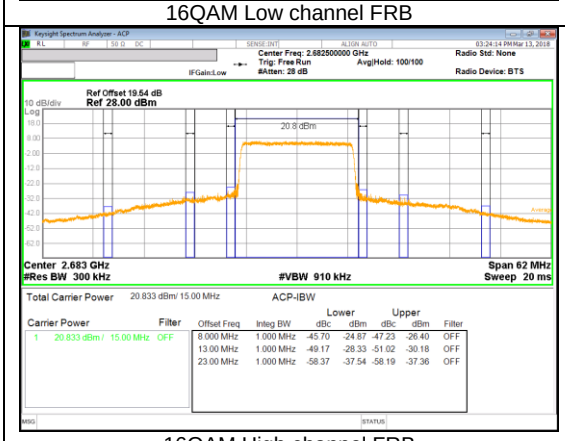

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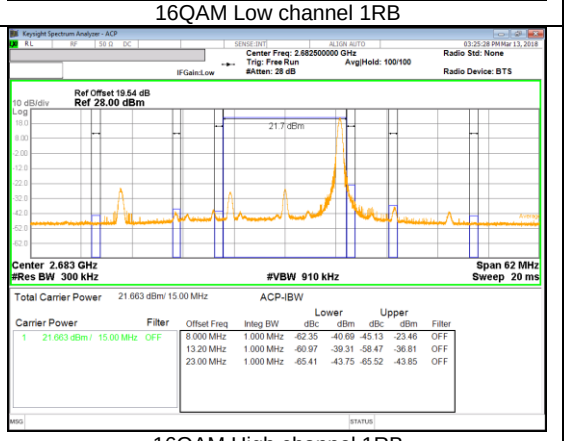

16QAM High channel 1RB

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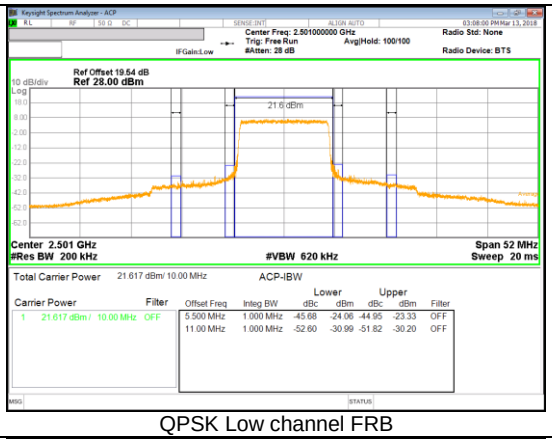
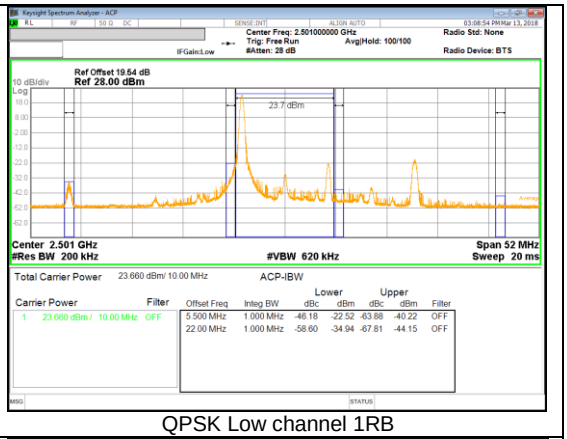
Band 41

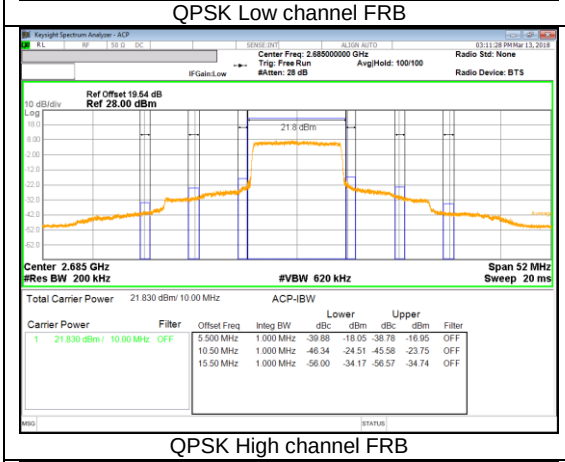
10MHz



QPSK Low channel FRB



QPSK Low channel 1RB



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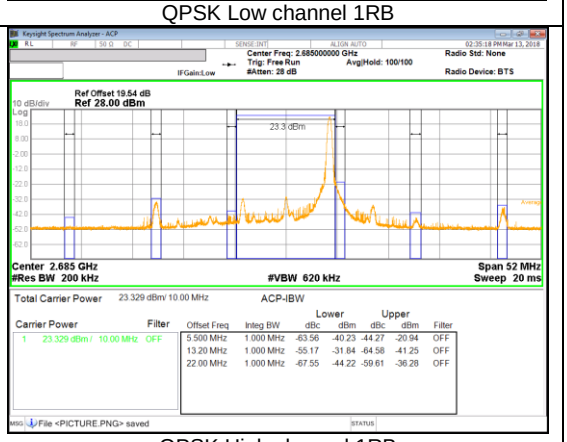

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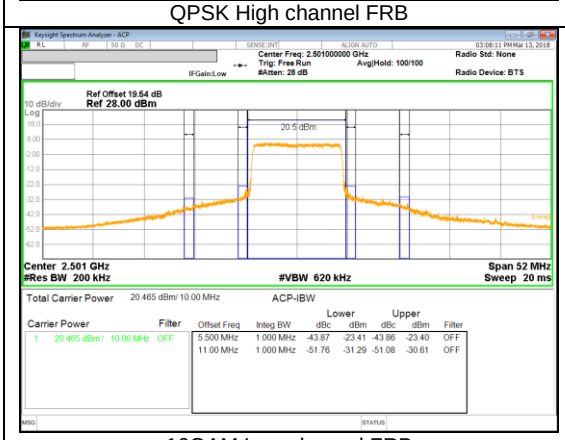

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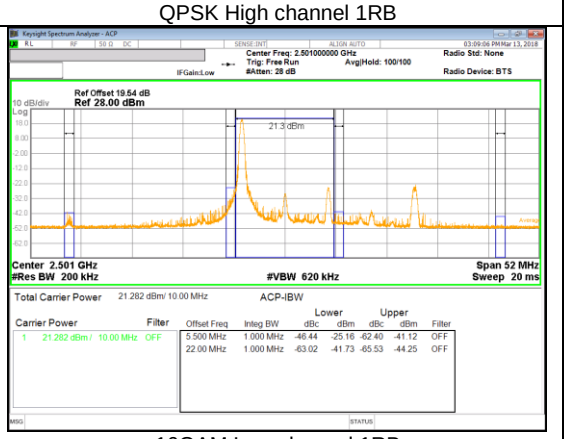

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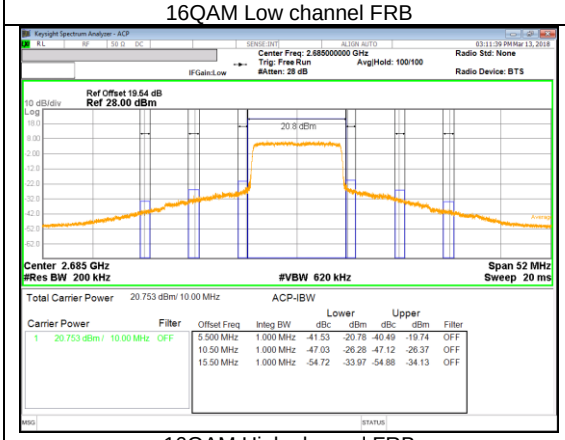
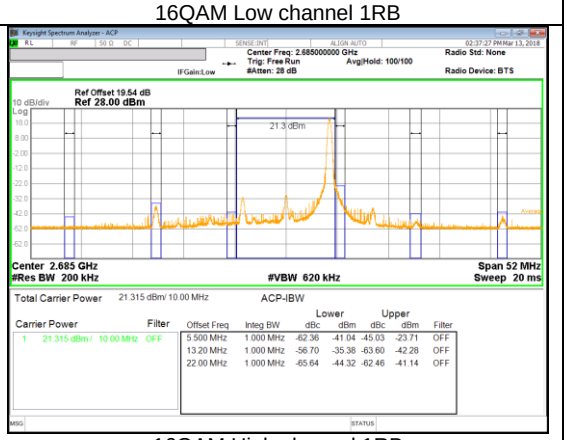


16QAM High channel FRB



16QAM High channel 1RB

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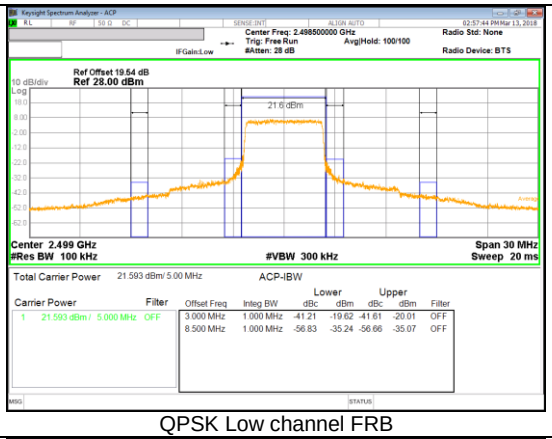
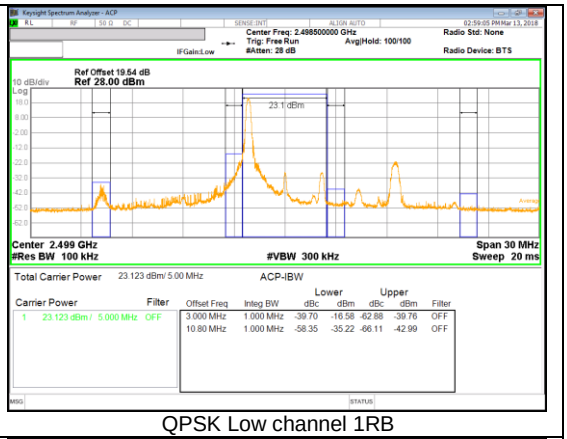
Band 41

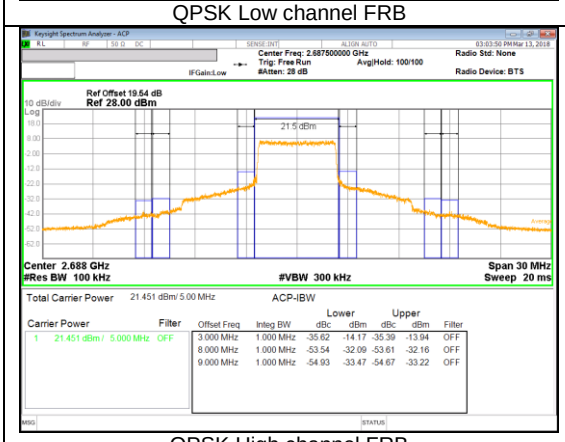
5MHz



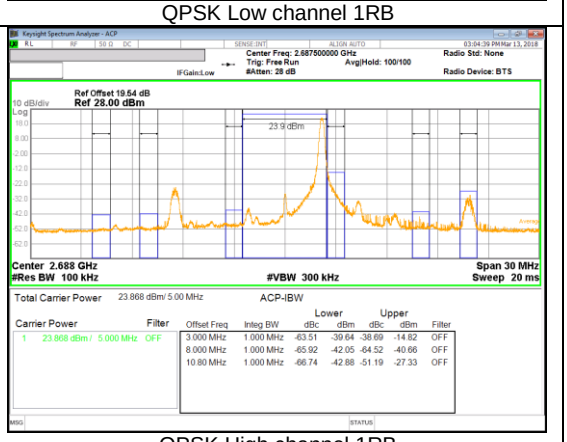
QPSK Low channel FRB



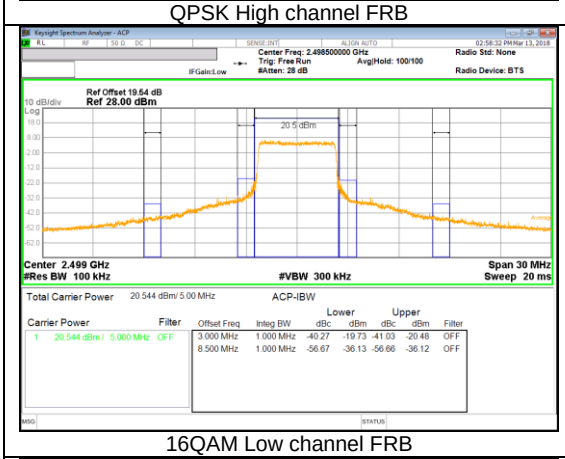
QPSK Low channel 1RB



QPSK High channel FRB



QPSK High channel 1RB



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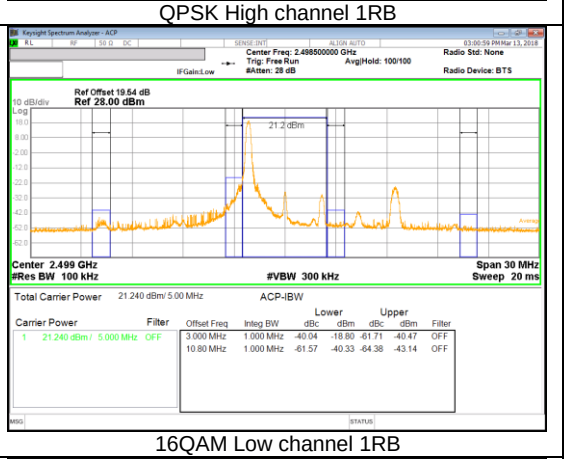

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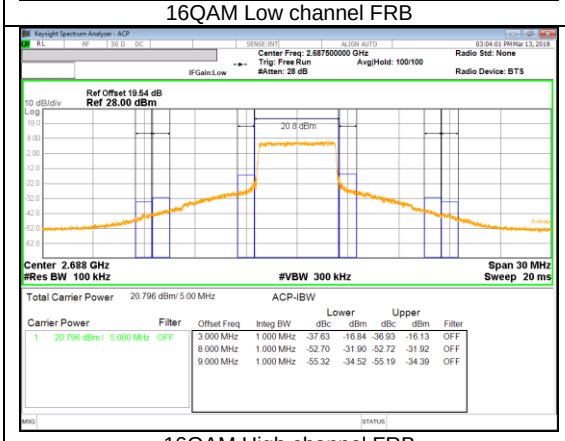

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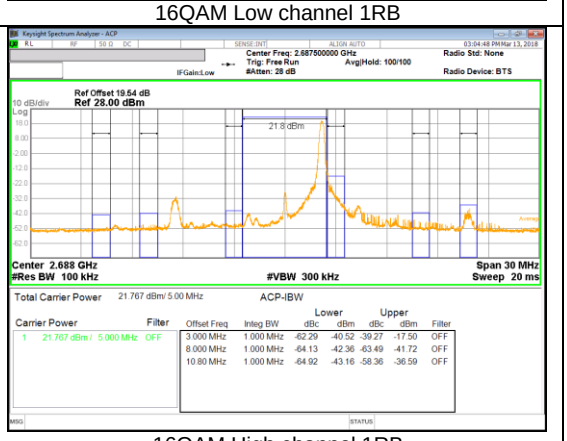

16QAM High channel 1RB

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9.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238 and §27. 53

LIMITS

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.

Part 27: (m)(4) For mobile station, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge and (55 + 10 log (P)dB) at the 5.5 MHz from the channel edges.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03
The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

a) Set the RBW = 100KHz for emission below 1GHz and 1MHz for emissions above 1GHz (Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)

b) Set VBW ≥ 3 × RBW;

c) Set span ≥ 1.5 times the OBW;

d) Sweep time = auto couple;

e) Detector = peak(GSM), rms(WCDMA, LTE);

f) Ensure that the number of measurement points = Max (40001);

g) Trace mode = max hold(GSM), average(WCDMA, LTE);

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RESULTS

GSM

Band	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]
GSM850	GPRS	824.2	-23.03	-13.00
		836.6	-22.42	
		848.8	-22.28	
	EGPRS	824.2	-22.47	
		836.6	-21.97	
		848.8	-22.24	
GSM1900	GPRS	1850.2	-21.59	
		1880.0	-22.21	
		1909.8	-21.94	
	EGPRS	1850.2	-21.75	
		1880.0	-21.17	
		1909.8	-22.08	

WCDMA

Band	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]
Band 5	REL99	826.4	-27.870	-13.00
		836.6	-28.862	
		846.6	-27.183	
	HSDPA	826.4	-30.975	
		836.6	-32.682	
		846.6	-30.948	
Band 4	REL99	1712.4	-30.999	
		1732.6	-30.798	
		1752.6	-30.956	
	HSDPA	1712.4	-31.040	
		1732.6	-30.975	
		1752.6	-30.972	
Band 2	REL99	1852.4	-31.362	
		1880.0	-31.330	
		1907.6	-31.360	
	HSDPA	1852.4	-31.279	
		1880.0	-31.209	
		1907.6	-31.148	

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LTE 5

Bandwidth	Mode	f [MHz]	Spurious [dBm]	5th Harmonic 5MHz Span Spurious [dBm]	Limit [dBm]
10 MHz	QPSK	829.0	-19.224		-13.00
		836.5	-19.610		
		844.0	-17.097	-16.234	
	16QAM	829.0	-23.522		
		836.5	-23.385		
		844.0	-22.593		
5 MHz	QPSK	826.5	-17.987		
		836.5	-19.921		
		846.5	-17.430	-16.079	
	16QAM	826.5	-22.574		
		836.5	-24.424		
		846.5	-22.078		
3 MHz	QPSK	825.5	-19.735		
		836.5	-20.450		
		847.5	-17.310	-16.278	
	16QAM	825.5	-23.277		
		836.5	-23.941		
		847.5	-22.108		
1.4 MHz	QPSK	824.7	-20.377		
		836.5	-20.923		
		848.3	-17.691	-16.528	
	16QAM	824.7	-23.094		
		836.5	-24.347		
		848.3	-21.262		

- NOTE : Highest Ch. and QPSK condition were worst case results for each bandwidth. So re-test were performed on the condition of narrow span(5MHz).

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LTE 41

Bandwidth	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]
20 MHz	QPSK	2506.0	-30.606	-25.00
		2593.0	-30.852	
		2680.0	-30.909	
	16QAM	2506.0	-30.682	
		2593.0	-30.683	
		2680.0	-30.972	
15 MHz	QPSK	2503.5	-30.884	
		2593.0	-30.804	
		2682.5	-30.785	
	16QAM	2503.5	-30.798	
		2593.0	-30.916	
		2682.5	-30.933	
10 MHz	QPSK	2501.0	-30.681	
		2593.0	-30.729	
		2685.0	-30.634	
	16QAM	2501.0	-30.702	
		2593.0	-30.869	
		2685.0	-30.922	
5 MHz	QPSK	2498.5	-30.683	
		2593.0	-30.775	
		2687.5	-30.657	
	16QAM	2498.5	-30.826	
		2593.0	-30.868	
		2687.5	-30.886	

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LTE 66

Bandwidth	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]
20 MHz	QPSK	1720.0	-31.273	-13.00
		1745.0	-31.083	
		1770.0	-31.139	
	16QAM	1720.0	-31.086	
		1745.0	-31.243	
		1770.0	-31.030	
15 MHz	QPSK	1717.5	-31.079	
		1745.0	-31.098	
		1772.5	-31.266	
	16QAM	1717.5	-31.075	
		1745.0	-31.008	
		1772.5	-30.919	
10 MHz	QPSK	1715.0	-30.734	
		1745.0	-31.038	
		1775.0	-31.136	
	16QAM	1715.0	-30.907	
		1745.0	-31.261	
		1775.0	-30.876	
5 MHz	QPSK	1712.5	-31.173	
		1745.0	-31.156	
		1777.5	-31.017	
	16QAM	1712.5	-30.897	
		1745.0	-31.148	
		1777.5	-31.186	
3 MHz	QPSK	1711.5	-31.238	
		1745.0	-31.187	
		1778.5	-30.612	
	16QAM	1711.5	-31.101	
		1745.0	-31.262	
		1778.5	-30.994	
1.4 MHz	QPSK	1710.7	-31.302	
		1745.0	-31.218	
		1779.3	-31.157	
	16QAM	1710.7	-31.287	
		1745.0	-31.127	
		1779.3	-31.068	

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LTE 2

Bandwidth	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]
20 MHz	QPSK	1860.0	-30.978	-13.00
		1880.0	-30.879	
		1900.0	-31.126	
	16QAM	1860.0	-31.101	
		1880.0	-31.085	
		1900.0	-31.187	
15 MHz	QPSK	1857.5	-31.228	
		1880.0	-31.114	
		1902.5	-31.108	
	16QAM	1857.5	-31.263	
		1880.0	-30.951	
		1902.5	-31.086	
10 MHz	QPSK	1855.0	-30.790	
		1880.0	-31.110	
		1905.0	-31.105	
	16QAM	1855.0	-31.145	
		1880.0	-31.057	
		1905.0	-30.924	
5 MHz	QPSK	1852.5	-31.097	
		1880.0	-30.979	
		1907.5	-31.223	
	16QAM	1852.5	-31.401	
		1880.0	-31.032	
		1907.5	-31.266	
3 MHz	QPSK	1851.5	-31.007	
		1880.0	-30.882	
		1908.5	-30.997	
	16QAM	1851.5	-31.073	
		1880.0	-31.116	
		1908.5	-31.195	
1.4 MHz	QPSK	1850.7	-31.026	
		1880.0	-31.051	
		1909.3	-31.119	
	16QAM	1850.7	-31.214	
		1880.0	-30.980	
		1909.3	-31.083	

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LTE 13

Bandwidth	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]
10 MHz	QPSK	782.0	-34.737	-13.00
	16QAM	782.0	-34.711	
5 MHz	QPSK	779.5	-34.741	
		782.0	-34.809	
		784.5	-34.616	
	16QAM	779.5	-34.742	
		782.0	-34.374	
		784.5	-34.631	

LTE Band 4

Due to frequency range and same output power setting, test was carried in LTE Band 66 to cover both LTE Band 66 and LTE Band 4.

LTE Band 17

Due to frequency range and same output power setting, test was carried in LTE Band 12 to cover both LTE Band 12 and LTE Band 17.

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LTE 12

Bandwidth	Mode	f [MHz]	Spurious [dBm]	5th Harmonic 5MHz Span Spurious [dBm]	Limit [dBm]
10 MHz	QPSK	704.0	-20.176		-13.00
		707.5	-20.663		
		711.0	-18.932	-17.751	
	16QAM	704.0	-23.875		
		707.5	-23.047		
		711.0	-21.485		
5 MHz	QPSK	701.5	-19.768	-18.231	
		707.5	-20.001		
		713.5	-20.600		
	16QAM	701.5	-22.687		
		707.5	-23.326		
		713.5	-23.281		
3 MHz	QPSK	700.5	-20.004		
		707.5	-19.868	-17.914	
		714.5	-21.099		
	16QAM	700.5	-22.416		
		707.5	-21.275		
		714.5	-24.255		
1.4 MHz	QPSK	699.7	-19.158		
		707.5	-18.911	-17.992	
		715.3	-20.343		
	16QAM	699.7	-22.297		
		707.5	-21.801		
		715.3	-23.447		

- NOTE : Re-test were performed with narrow span(5MHz) at the worst result for each bandwidth.

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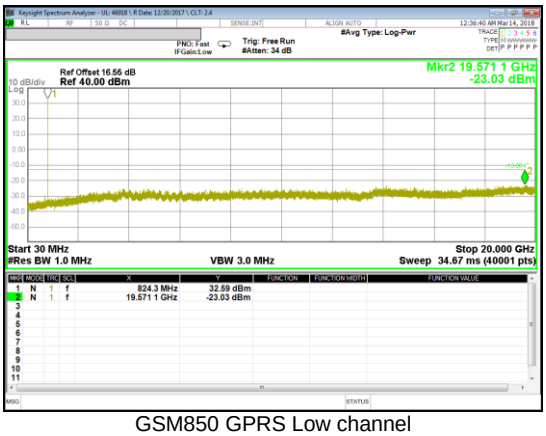
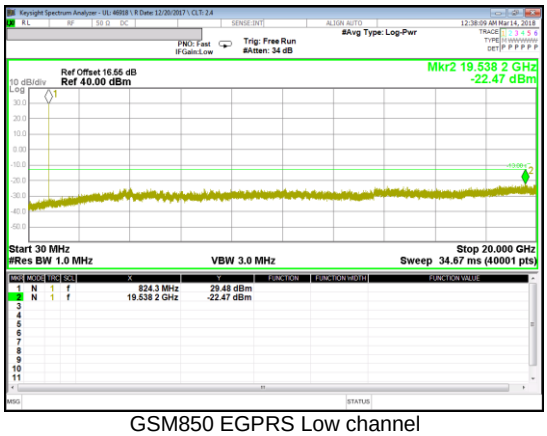
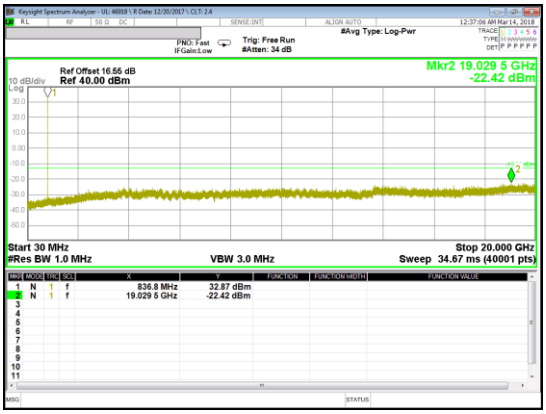
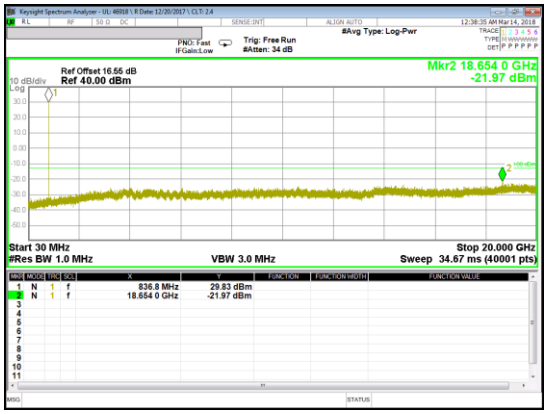
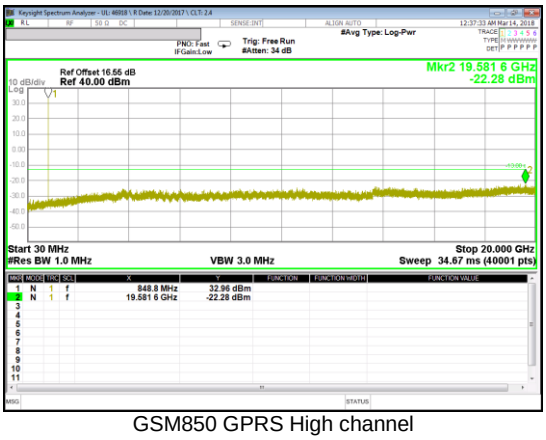
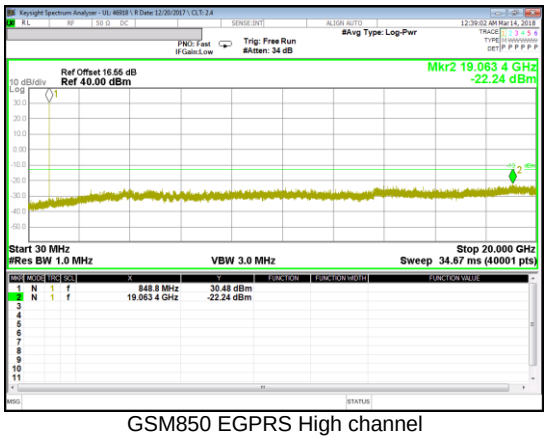
9.3.1. OUT OF BAND EMISSIONS PLOTS

GSM 850	 GSM850 GPRS Low channel	 GSM850 EGPRS Low channel
	 GSM850 GPRS Mid channel	 GSM850 EGPRS Mid channel
	 GSM850 GPRS High channel	 GSM850 EGPRS High channel

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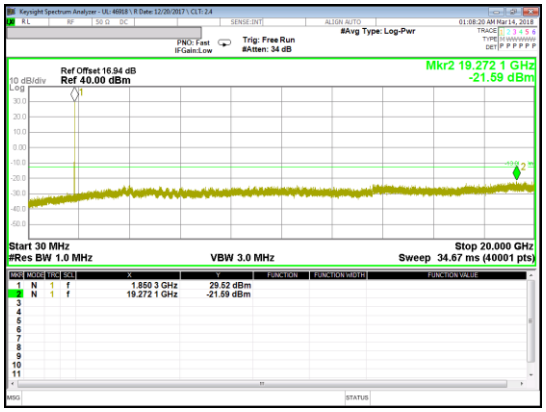
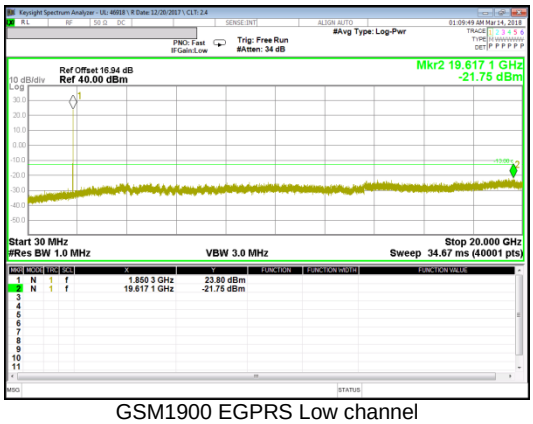
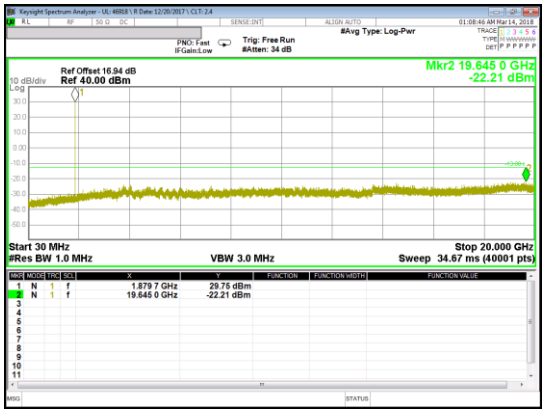
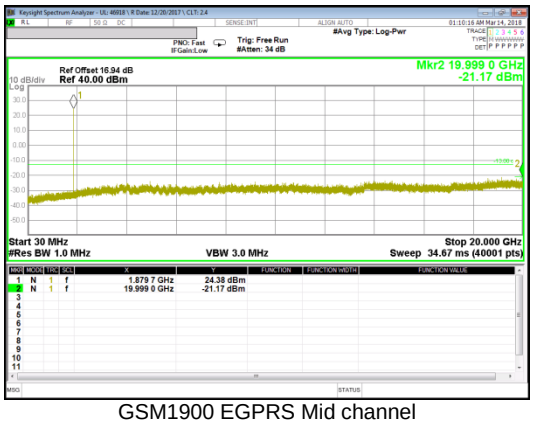
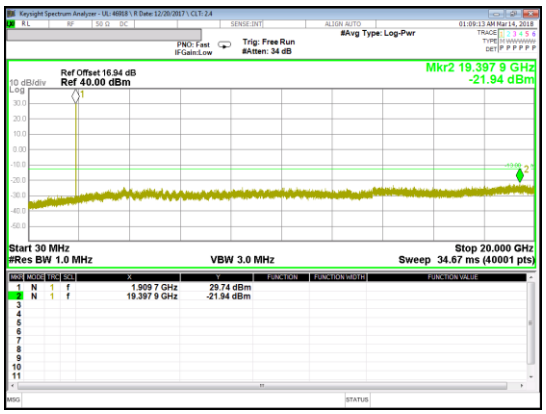
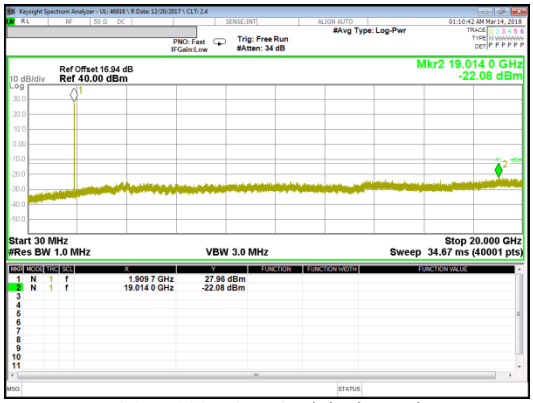
GSM 1900	 GSM1900 GPRS Low channel	 GSM1900 EGPRS Low channel
	 GSM1900 GPRS Mid channel	 GSM1900 EGPRS Mid channel
	 GSM1900 GPRS High channel	 GSM1900 EGPRS High channel

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