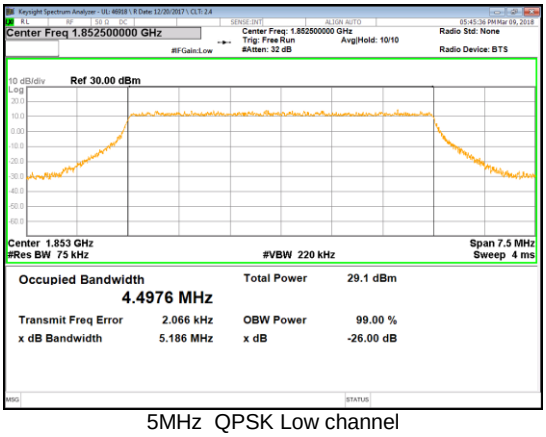
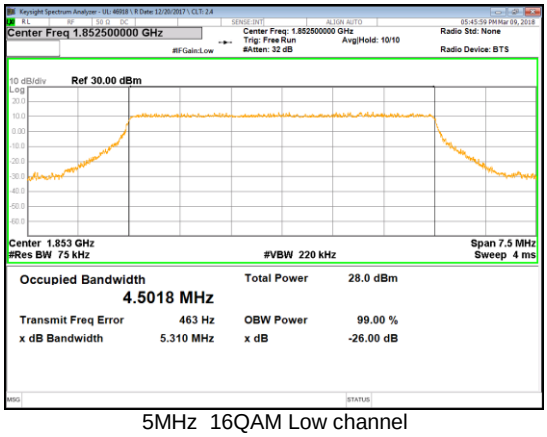
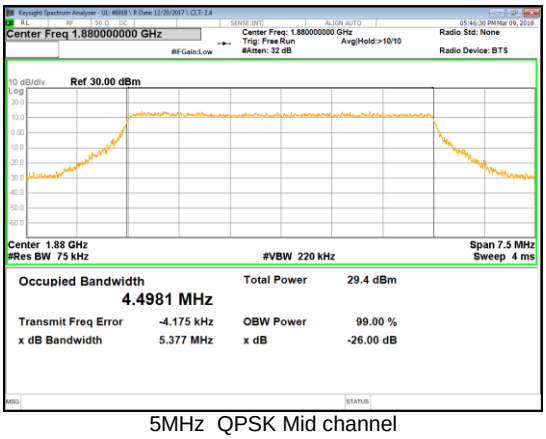
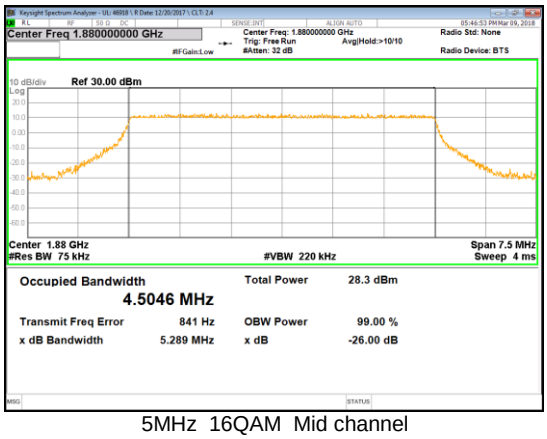
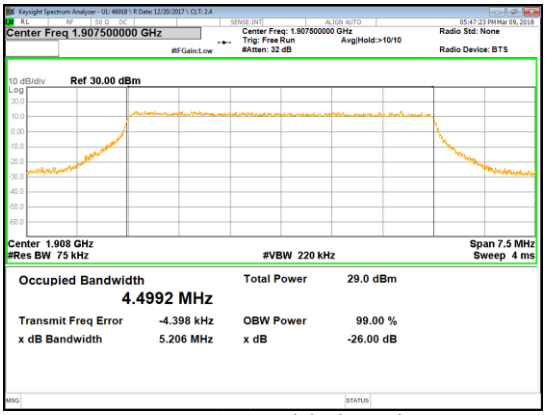
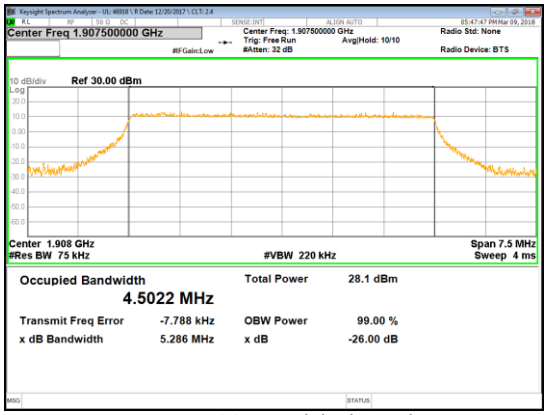
Band 2 5MHz	 5MHz QPSK Low channel	 5MHz 16QAM Low channel
	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel
	 5MHz QPSK High channel	 5MHz 16QAM High channel

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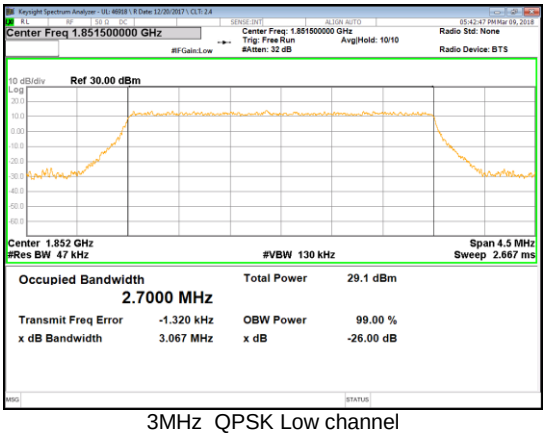
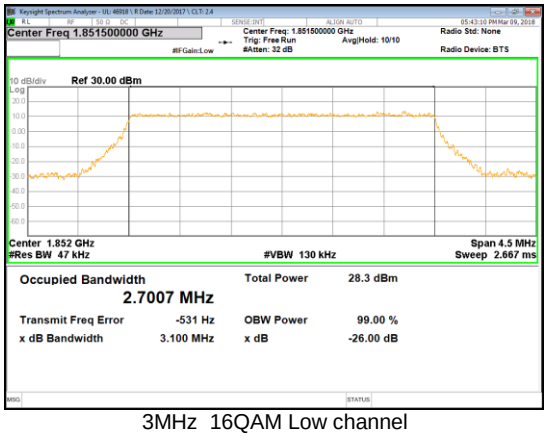
Band 2

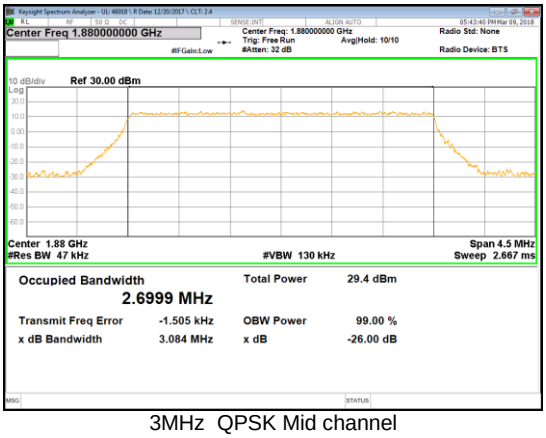
3MHz



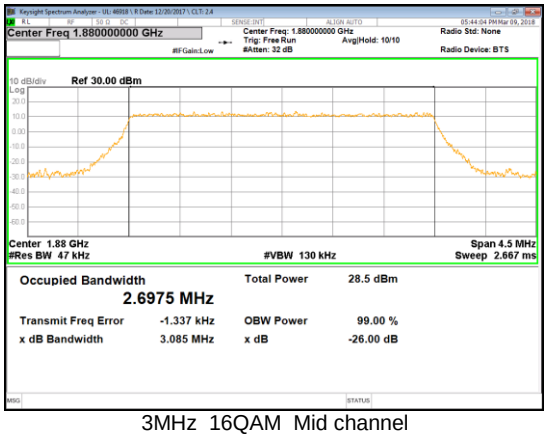
3MHz QPSK Low channel



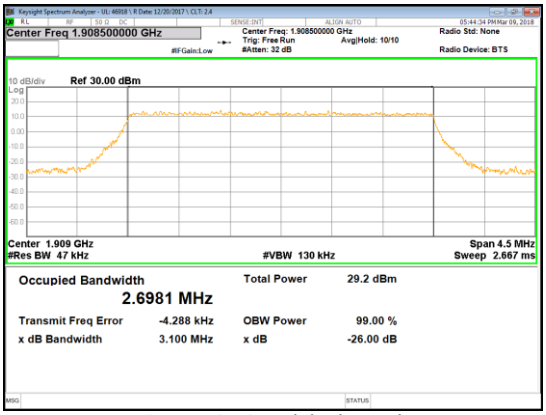
3MHz 16QAM Low channel



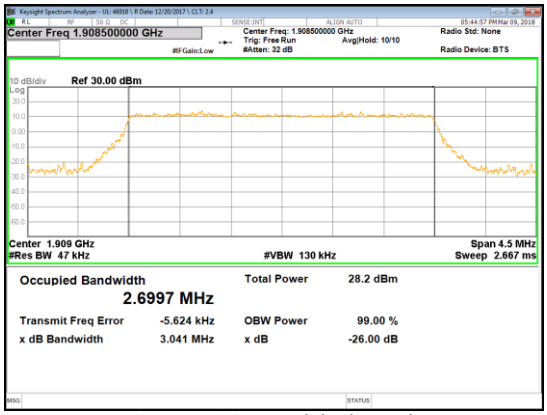
3MHz QPSK Mid channel



3MHz 16QAM Mid channel



3MHz QPSK High channel



3MHz 16QAM High channel

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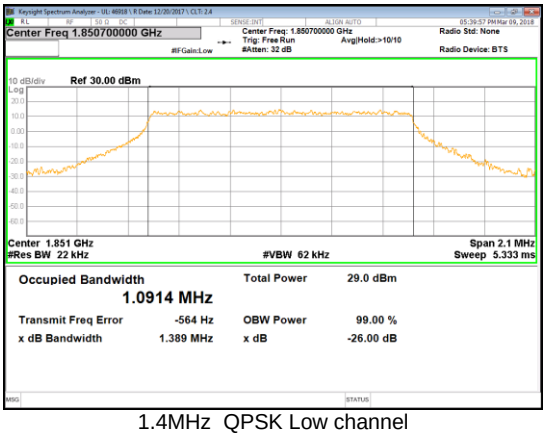
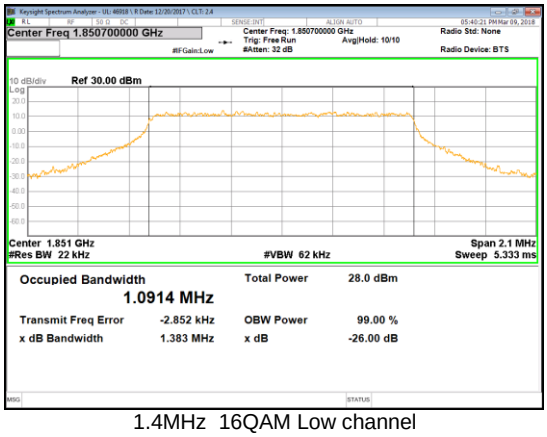
Band 2

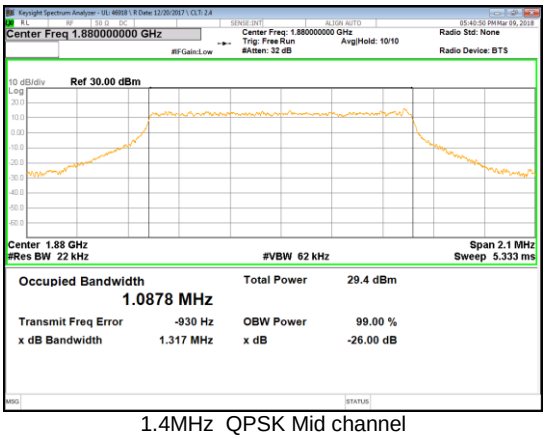
1.4MHz



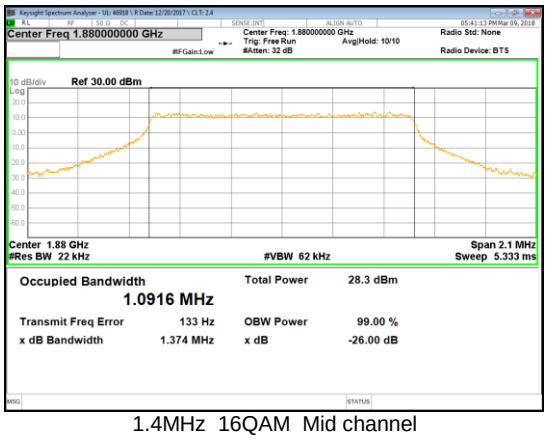
1.4MHz QPSK Low channel



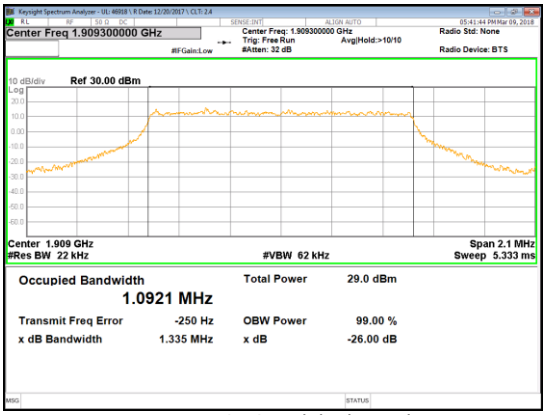
1.4MHz 16QAM Low channel



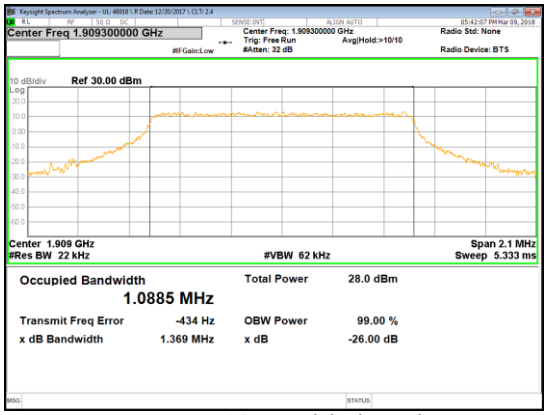
1.4MHz QPSK Mid channel



1.4MHz 16QAM Mid channel



1.4MHz QPSK High channel



1.4MHz 16QAM High channel

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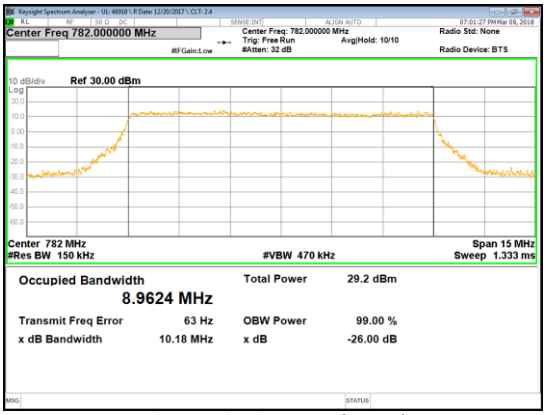
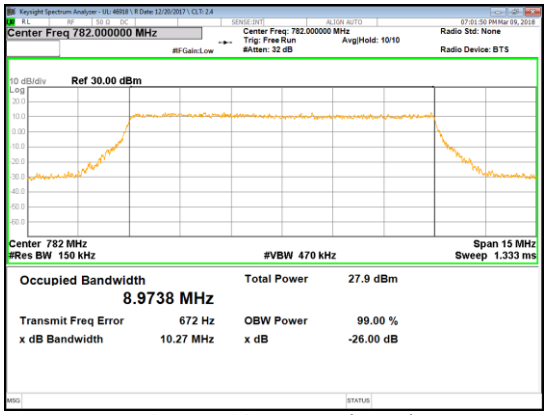
LTE Band 13

Band 13 10MHz	 10MHz QPSK Low channel	 10MHz 16QAM Low channel

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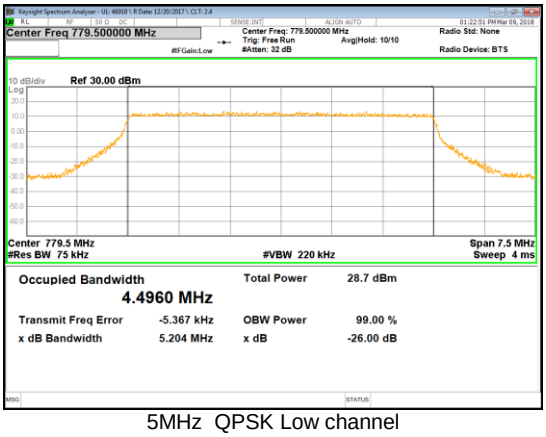
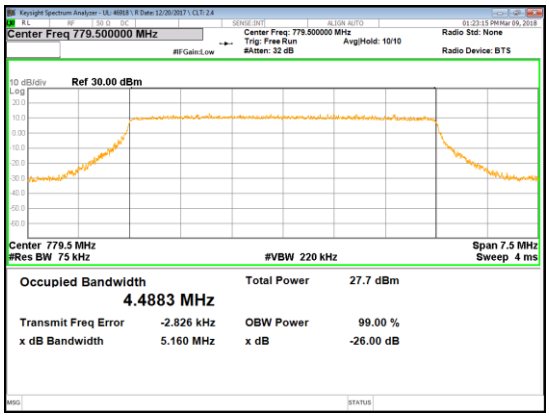
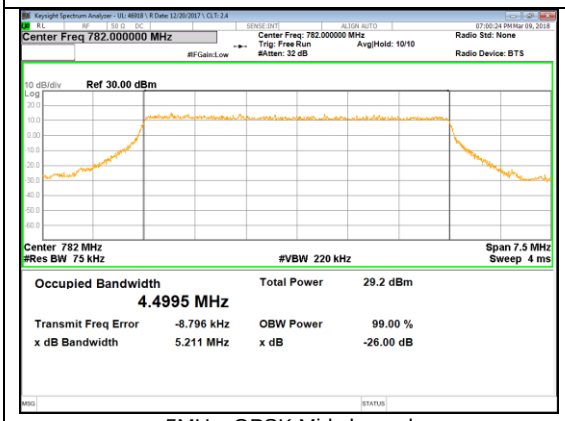
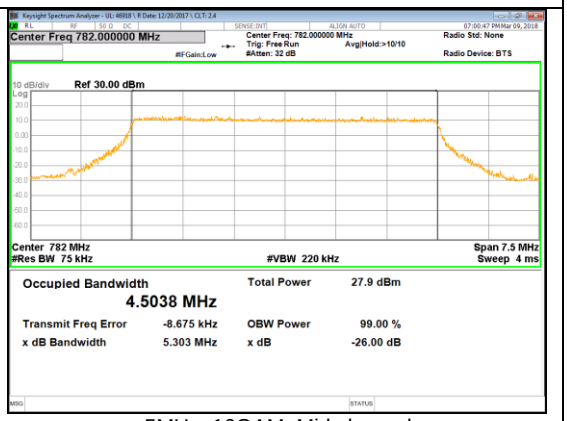
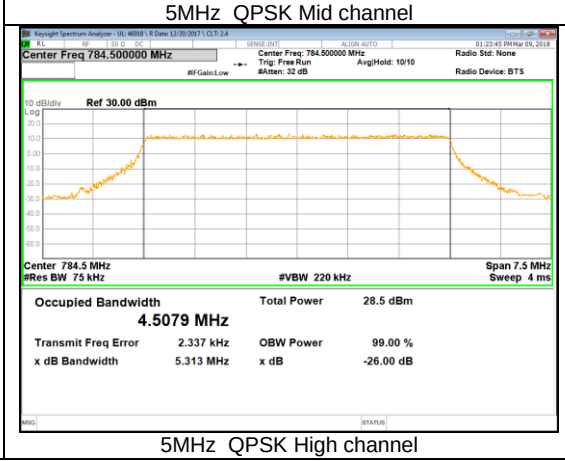
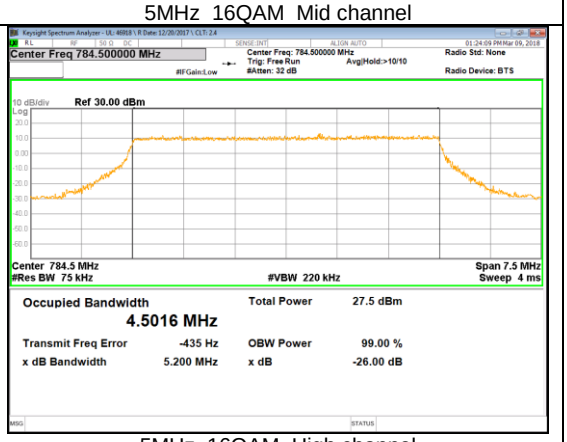
Band 13 5MHz	 5MHz QPSK Low channel	 5MHz 16QAM Low channel
	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel
	 5MHz QPSK High channel	 5MHz 16QAM High channel

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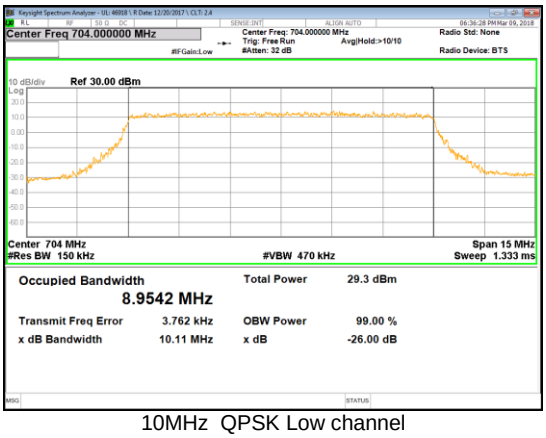
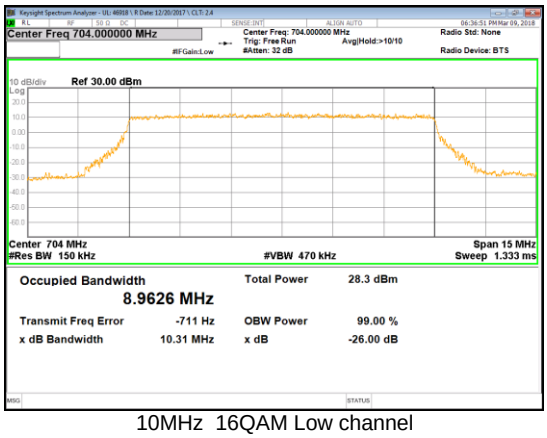
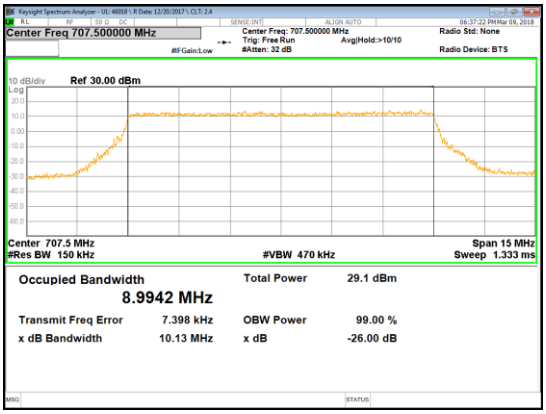
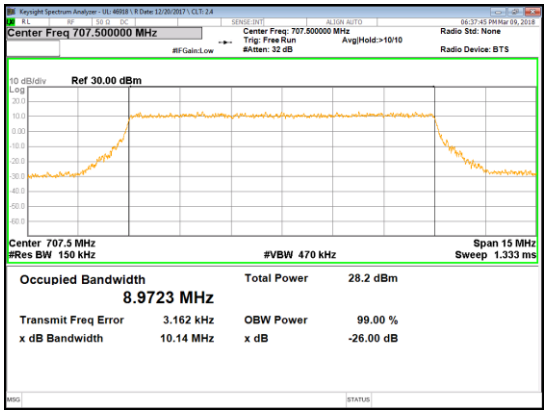
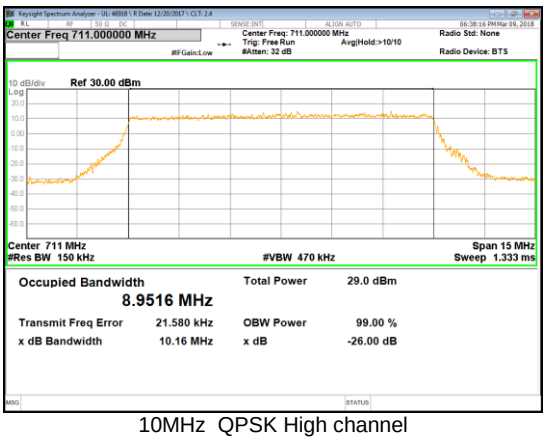
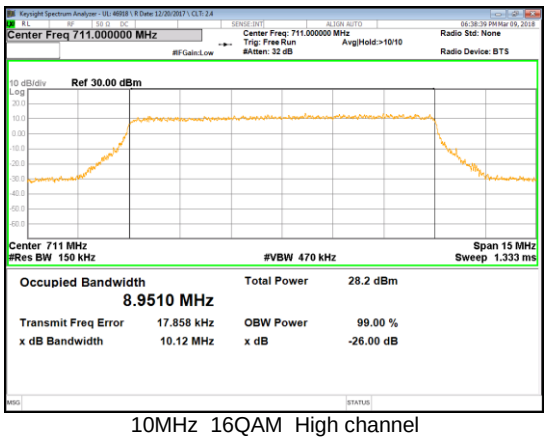
LTE Band 12

Band 12 10MHz	 10MHz QPSK Low channel	 10MHz 16QAM Low channel
	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel
	 10MHz QPSK High channel	 10MHz 16QAM High channel

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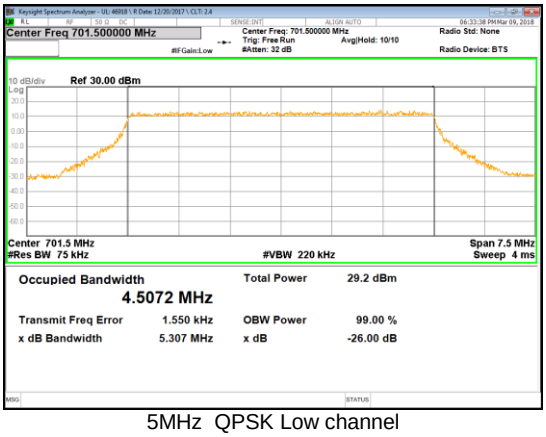
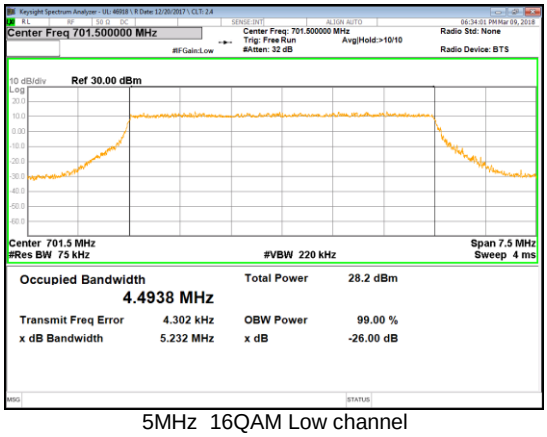
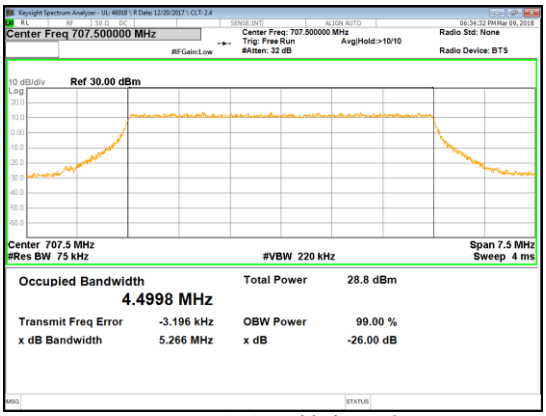
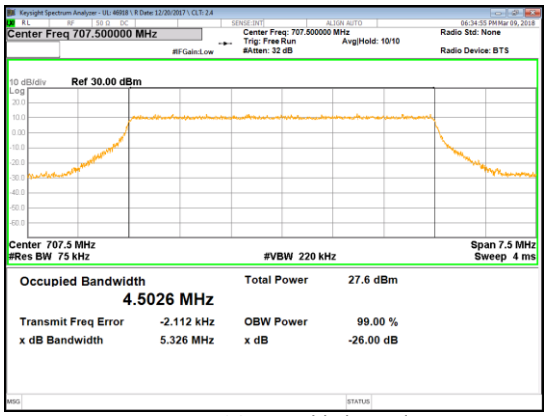
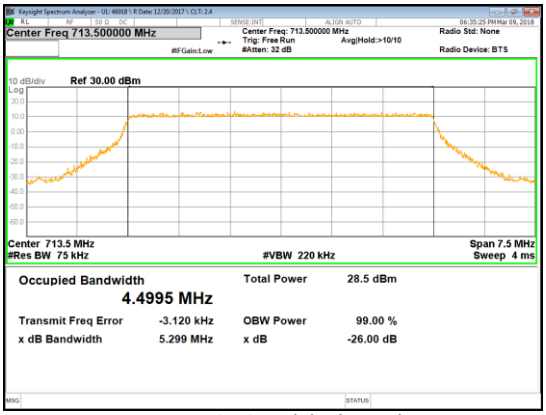
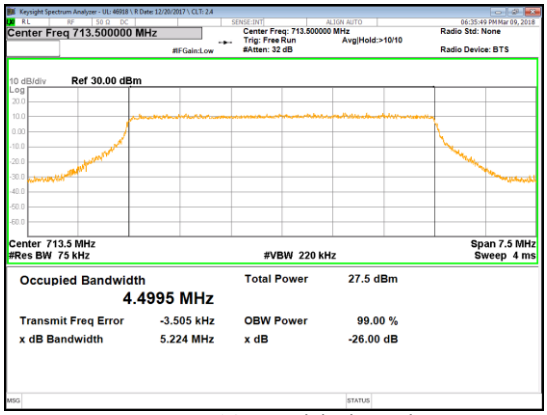
Band 12 5MHz	 5MHz QPSK Low channel	 5MHz 16QAM Low channel
	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel
	 5MHz QPSK High channel	 5MHz 16QAM High channel

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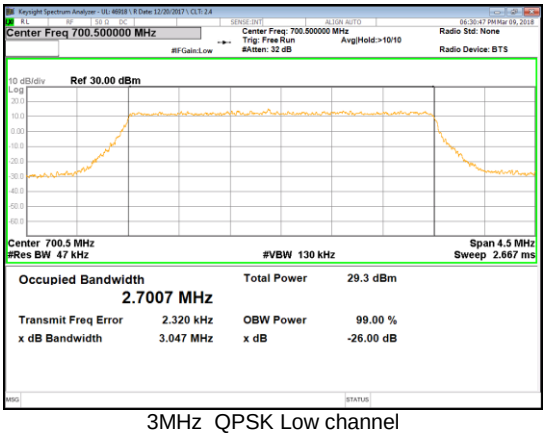
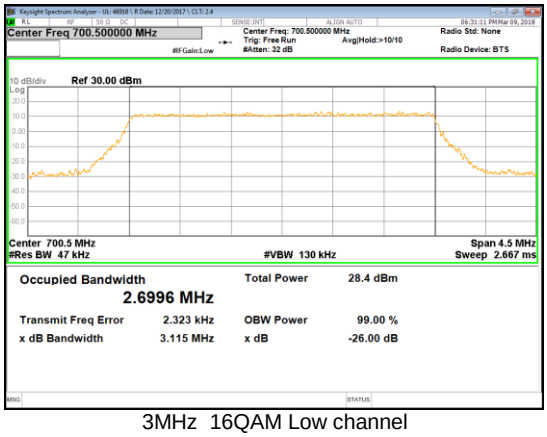
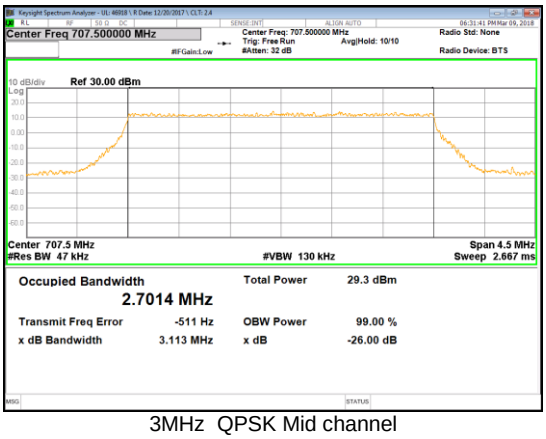
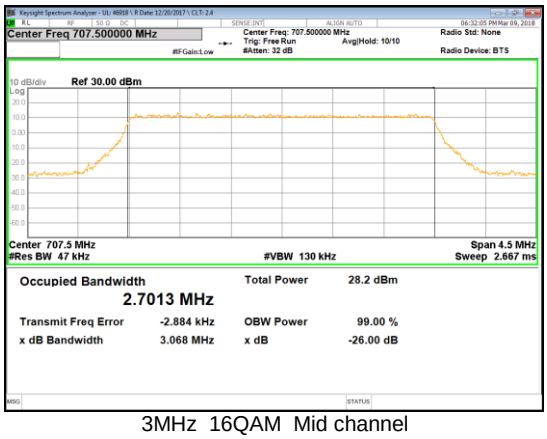
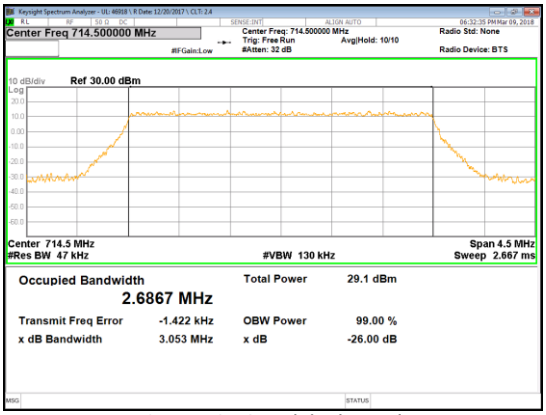
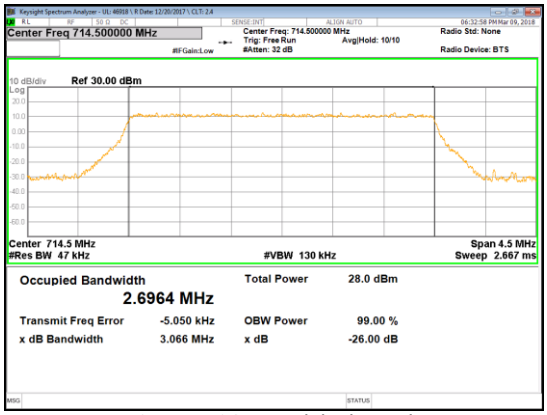
Band 12 3MHz	 3MHz QPSK Low channel	 3MHz 16QAM Low channel
	 3MHz QPSK Mid channel	 3MHz 16QAM Mid channel
	 3MHz QPSK High channel	 3MHz 16QAM High channel

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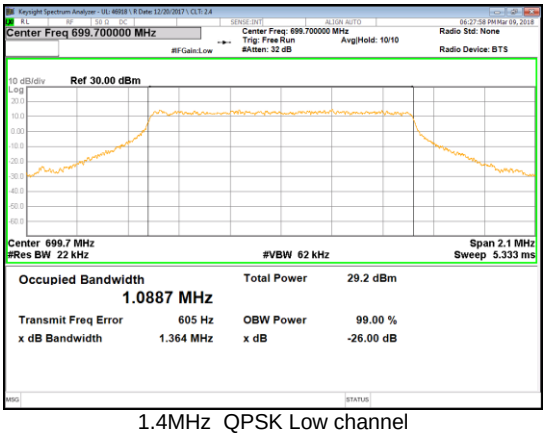
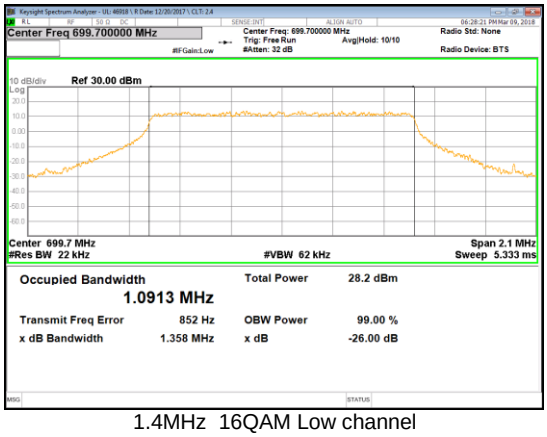
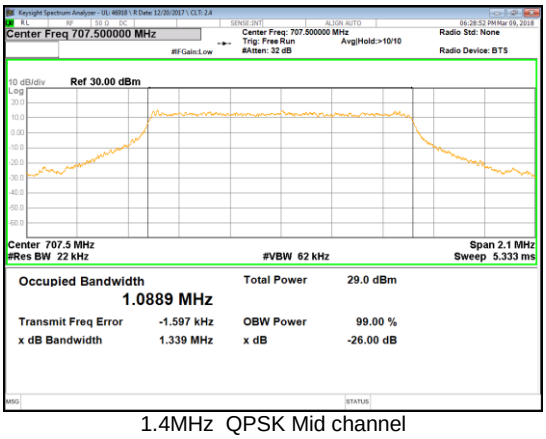
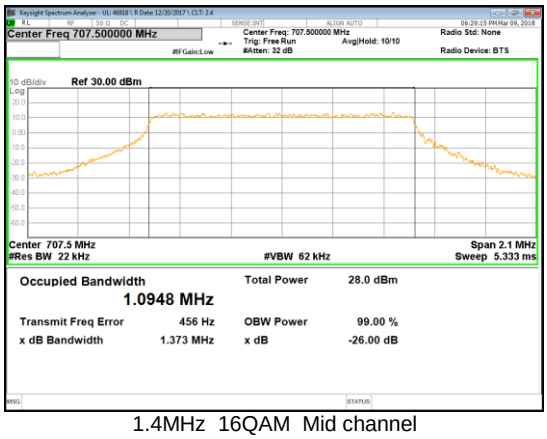
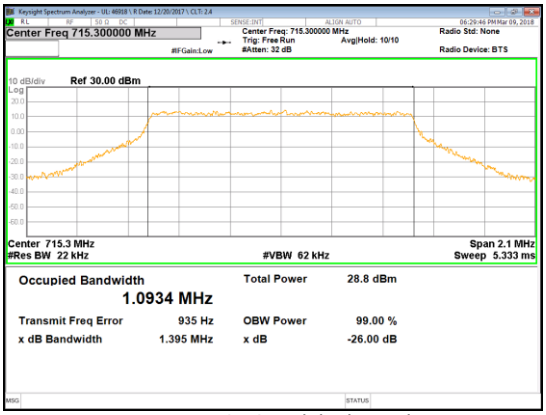
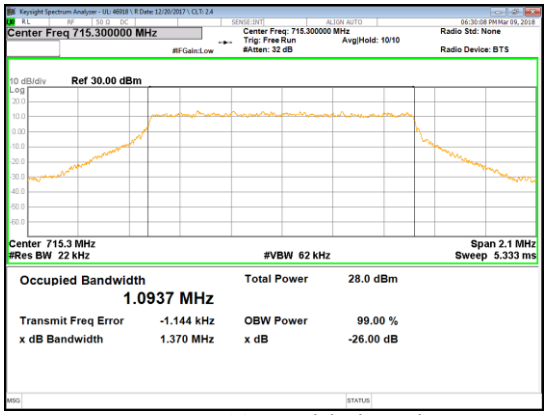
Band 12 1.4MHz	 1.4MHz QPSK Low channel	 1.4MHz 16QAM Low channel
	 1.4MHz QPSK Mid channel	 1.4MHz 16QAM Mid channel
	 1.4MHz QPSK High channel	 1.4MHz 16QAM High channel

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9.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238, §27. 53(m) and §27. 53(c)(2),(4)/ (g), (h)

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 27.53(m) 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.

(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:
(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;
(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;

(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.

(h) 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.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03
The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

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GSM

a) Set the RBW = 1 ~ 5% of OBW(GSM850 – 8.2KHz, GSM1900 – 9.1KHz)

b) Set VBW ≥ 3 × RBW;

c) Set span ≥ 1.5 times the OBW;

d) Sweep time = 1S ;

e) Detector = RMS;

f) Ensure that the number of measurement points ≥ 2*Span/RBW;

g) Trace mode = Average(100);

h) Add duty cycle correction factor (9dB)

WCDMA/LTE

b) Set the RBW = 1 ~ 1.5 % of OBW(Typically limited to a minimum RBW of 1% of the OBW)

b) Set VBW ≥ 3 × RBW;

c) Set span ≥ 1.5 times the OBW;

d) Sweep time = Auto;

e) Detector = RMS;

f) Ensure that the number of measurement points ≥ 2*Span/RBW;

g) Trace mode = Average (100);

NOTE1
LTE Band 41 - Duty cycle correction factor(2.25dB) already applied on the plot.

NOTE2: For frequency range of 763-775 MHz and 793-805 MHz,

a) Set the RBW = 6.2kHz

b) Set VBW ≥ 3 × RBW;

c) Sweep time = 1 second ;

d) Detector = RMS;

e) Ensure that the number of measurement points ≥ 2*Span/RBW;

f) Trace mode = Maxhold;

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RESULTS

GSM

Band	Mode	Side	f [MHz]	Level [dBm]	Limit [dBm]
GSM850	GPRS	Lower	823.982	-15.634	-13.00
		Upper	849.018	-15.341	
	EGPRS	Lower	823.982	-23.866	
		Upper	849.018	-24.148	
GSM1900	GPRS	Lower	1849.982	-16.647	
		Upper	1910.018	-15.235	
	EGPRS	Lower	1849.987	-22.679	
		Upper	1910.018	-23.934	

WCDMA

Band	Mode	Side	f [MHz]	Level [dBm]	Limit [dBm]
Band 5	REL99	Lower	824.000	-26.510	-13.00
		Upper	849.000	-24.237	
	HSDPA	Lower	824.000	-29.222	
		Upper	849.000	-30.551	
Band 4	REL99	Lower	1710.000	-24.626	
		Upper	1755.000	-26.961	
	HSDPA	Lower	1710.000	-30.309	
		Upper	1755.000	-29.492	
Band 2	REL99	Lower	1850.000	-26.705	
		Upper	1910.000	-25.112	
	HSDPA	Lower	1850.000	-27.864	
		Upper	1910.000	-28.141	

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LTE 5

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	824.000	-31.326	-13.00
			FRB	824.000	-26.671	
		Upper	1RB	849.000	-26.926	
			FRB	849.000	-28.675	
	16QAM	Lower	1RB	824.000	-35.936	
			FRB	824.000	-29.216	
		Upper	1RB	849.000	-32.805	
			FRB	849.000	-31.765	
5 MHz	QPSK	Lower	1RB	824.000	-20.635	
			FRB	824.000	-24.696	
		Upper	1RB	849.000	-18.809	
			FRB	849.000	-24.399	
	16QAM	Lower	1RB	824.000	-24.401	
			FRB	824.000	-26.964	
		Upper	1RB	849.000	-24.867	
			FRB	849.000	-26.230	
3 MHz	QPSK	Lower	1RB	824.000	-19.398	
			FRB	824.000	-25.123	
		Upper	1RB	849.000	-15.461	
			FRB	849.000	-24.590	
	16QAM	Lower	1RB	824.000	-22.847	
			FRB	824.000	-25.938	
		Upper	1RB	849.000	-20.024	
			FRB	849.000	-26.834	
1.4 MHz	QPSK	Lower	1RB	824.000	-23.499	
			FRB	824.000	-24.526	
		Upper	1RB	849.000	-21.172	
			FRB	849.000	-25.074	
	16QAM	Lower	1RB	824.000	-27.163	
			FRB	824.000	-25.671	
		Upper	1RB	849.000	-24.854	
			FRB	849.000	-25.847	

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LTE 41

Bandwidth	Mode	f [MHz]	RB Status	Side Trace	Level [dBm]	Limit [dBm]
20 MHz	QPSK	2506.0	1RB	Lower Trace 1	-28.10	-13.00
				Lower Trace 2	-34.88	-25.00
			FRB	Lower Trace 1	-25.82	-13.00
				Lower Trace 2	-28.76	-25.00
		2680.0	1RB	Upper Trace 1	-26.15	-10.00
				Upper Trace 2	-35.89	-13.00
				Upper Trace 3	-44.01	-25.00
			FRB	Upper Trace 1	-27.98	-10.00
				Upper Trace 2	-29.64	-13.00
				Upper Trace 3	-38.23	-25.00
	16QAM	2506.0	1RB	Lower Trace 1	-29.35	-13.00
				Lower Trace 2	-37.07	-25.00
			FRB	Lower Trace 1	-26.02	-13.00
				Lower Trace 2	-28.18	-25.00
		2680.0	1RB	Upper Trace 1	-28.52	-10.00
				Upper Trace 2	-38.59	-13.00
				Upper Trace 3	-44.12	-25.00
			FRB	Upper Trace 1	-27.96	-10.00
				Upper Trace 2	-30.25	-13.00
				Upper Trace 3	-38.65	-25.00
15 MHz	QPSK	2503.5	1RB	Lower Trace 1	-23.06	-13.00
				Lower Trace 2	-35.96	-25.00
			FRB	Lower Trace 1	-24.10	-13.00
				Lower Trace 2	-28.44	-25.00
		2682.5	1RB	Upper Trace 1	-22.04	-10.00
				Upper Trace 2	-33.87	-13.00
				Upper Trace 3	-43.77	-25.00
			FRB	Upper Trace 1	-24.15	-10.00
				Upper Trace 2	-29.01	-13.00
				Upper Trace 3	-36.44	-25.00
	16QAM	2503.5	1RB	Lower Trace 1	-24.31	-13.00
				Lower Trace 2	-38.55	-25.00
			FRB	Lower Trace 1	-24.51	-13.00
				Lower Trace 2	-27.32	-25.00
		2682.5	1RB	Upper Trace 1	-23.46	-10.00
				Upper Trace 2	-36.81	-13.00
				Upper Trace 3	-43.85	-25.00
			FRB	Upper Trace 1	-26.40	-10.00
				Upper Trace 2	-30.18	-13.00
				Upper Trace 3	-37.36	-25.00

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LTE 41 (continued)

Bandwidth	Mode	f [MHz]	RB Status	Side Trace	Level [dBm]	Limit [dBm]
10 MHz	QPSK	2501.0	1RB	Lower Trace 1	-22.52	-13.00
				Lower Trace 2	-34.94	-25.00
			FRB	Lower Trace 1	-24.06	-13.00
				Lower Trace 2	-30.99	-25.00
		2685.0	1RB	Upper Trace 1	-20.94	-10.00
				Upper Trace 2	-41.25	-13.00
				Upper Trace 3	-36.28	-25.00
			FRB	Upper Trace 1	-16.95	-10.00
				Upper Trace 2	-23.75	-13.00
				Upper Trace 3	-34.74	-25.00
	16QAM	2501.0	1RB	Lower Trace 1	-25.16	-13.00
				Lower Trace 2	-41.73	-25.00
			FRB	Lower Trace 1	-23.41	-13.00
				Lower Trace 2	-31.29	-25.00
		2685.0	1RB	Upper Trace 1	-22.84	-10.00
				Upper Trace 2	-42.24	-13.00
				Upper Trace 3	-35.40	-25.00
			FRB	Upper Trace 1	-19.74	-10.00
				Upper Trace 2	-26.37	-13.00
				Upper Trace 3	-34.13	-25.00
5 MHz	QPSK	2498.5	1RB	Lower Trace 1	-16.58	-13.00
				Lower Trace 2	-35.22	-25.00
			FRB	Lower Trace 1	-19.62	-13.00
				Lower Trace 2	-35.24	-25.00
		2687.5	1RB	Upper Trace 1	-14.82	-10.00
				Upper Trace 2	-40.66	-13.00
				Upper Trace 3	-27.33	-25.00
			FRB	Upper Trace 1	-13.94	-10.00
				Upper Trace 2	-32.16	-13.00
				Upper Trace 3	-33.22	-25.00
	16QAM	2498.5	1RB	Lower Trace 1	-18.80	-13.00
				Lower Trace 2	-40.33	-25.00
			FRB	Lower Trace 1	-19.73	-13.00
				Lower Trace 2	-36.13	-25.00
		2687.5	1RB	Upper Trace 1	-17.50	-10.00
				Upper Trace 2	-41.72	-13.00
				Upper Trace 3	-36.59	-25.00
			FRB	Upper Trace 1	-16.13	-10.00
				Upper Trace 2	-31.92	-13.00
				Upper Trace 3	-34.39	-25.00

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LTE 66

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
20 MHz	QPSK	Lower	1RB	1710.000	-36.420	-13.00
			FRB	1710.000	-33.348	
		Upper	1RB	1780.000	-36.956	
			FRB	1780.000	-32.665	
	16QAM	Lower	1RB	1710.000	-38.460	
			FRB	1710.000	-34.030	
		Upper	1RB	1780.000	-37.233	
			FRB	1780.000	-36.290	
15 MHz	QPSK	Lower	1RB	1710.000	-27.934	
			FRB	1710.000	-30.585	
		Upper	1RB	1780.000	-23.701	
			FRB	1780.000	-32.921	
	16QAM	Lower	1RB	1710.000	-27.425	
			FRB	1710.000	-29.885	
		Upper	1RB	1780.000	-27.952	
			FRB	1780.000	-33.596	
10 MHz	QPSK	Lower	1RB	1710.000	-31.443	
			FRB	1710.000	-30.582	
		Upper	1RB	1780.000	-28.502	
			FRB	1780.000	-28.756	
	16QAM	Lower	1RB	1710.000	-36.052	
			FRB	1710.000	-30.835	
		Upper	1RB	1780.000	-33.996	
			FRB	1780.000	-31.696	
5 MHz	QPSK	Lower	1RB	1710.000	-18.342	
			FRB	1710.000	-27.490	
		Upper	1RB	1780.000	-21.147	
			FRB	1780.000	-26.350	
	16QAM	Lower	1RB	1710.000	-24.359	
			FRB	1710.000	-25.143	
		Upper	1RB	1780.000	-25.967	
			FRB	1780.000	-27.466	

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Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
3 MHz	QPSK	Lower	1RB	1710.000	-19.787	-13.00
			FRB	1710.000	-25.314	
		Upper	1RB	1780.000	-18.254	
			FRB	1780.000	-26.897	
	16QAM	Lower	1RB	1710.000	-21.624	
			FRB	1710.000	-26.708	
		Upper	1RB	1780.000	-21.267	
			FRB	1780.000	-28.002	
1.4 MHz	QPSK	Lower	1RB	1710.000	-23.175	
			FRB	1710.000	-24.857	
		Upper	1RB	1780.000	-24.708	
			FRB	1780.000	-26.586	
	16QAM	Lower	1RB	1710.000	-26.695	
			FRB	1710.000	-25.337	
		Upper	1RB	1780.000	-27.326	
			FRB	1780.000	-27.584	

LTE 2

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
20 MHz	QPSK	Lower	1RB	1850.000	-37.564	-13.00
			FRB	1850.000	-37.600	
		Upper	1RB	1910.000	-34.613	
			FRB	1910.000	-38.199	
	16QAM	Lower	1RB	1850.000	-39.328	
			FRB	1850.000	-36.662	
		Upper	1RB	1910.000	-42.246	
			FRB	1910.000	-36.199	
15 MHz	QPSK	Lower	1RB	1850.000	-27.718	
			FRB	1850.000	-35.158	
		Upper	1RB	1910.000	-25.036	
			FRB	1910.000	-32.283	
	16QAM	Lower	1RB	1850.000	-25.477	
			FRB	1850.000	-33.437	
		Upper	1RB	1910.000	-27.471	
			FRB	1910.000	-32.807	

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Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	1850.000	-31.912	-13.00
			FRB	1850.000	-31.279	
		Upper	1RB	1910.000	-30.847	
			FRB	1910.000	-32.527	
	16QAM	Lower	1RB	1850.000	-34.844	
			FRB	1850.000	-33.976	
		Upper	1RB	1910.000	-33.652	
			FRB	1910.000	-32.581	
5 MHz	QPSK	Lower	1RB	1850.000	-20.811	
			FRB	1850.000	-25.869	
		Upper	1RB	1910.000	-21.670	
			FRB	1910.000	-29.925	
	16QAM	Lower	1RB	1850.000	-24.641	
			FRB	1850.000	-28.923	
		Upper	1RB	1910.000	-25.039	
			FRB	1910.000	-30.284	
3 MHz	QPSK	Lower	1RB	1850.000	-19.903	
			FRB	1850.000	-25.789	
		Upper	1RB	1910.000	-17.963	
			FRB	1910.000	-26.925	
	16QAM	Lower	1RB	1850.000	-22.734	
			FRB	1850.000	-27.046	
		Upper	1RB	1910.000	-20.226	
			FRB	1910.000	-28.068	
1.4 MHz	QPSK	Lower	1RB	1850.000	-24.404	
			FRB	1850.000	-25.665	
		Upper	1RB	1910.000	-24.035	
			FRB	1910.000	-27.750	
	16QAM	Lower	1RB	1850.000	-27.763	
			FRB	1850.000	-27.045	
		Upper	1RB	1910.000	-26.960	
			FRB	1910.000	-27.459	

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LTE 13

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	777.000	-32.728	-13.00
			FRB	777.000	-29.199	
		Upper	1RB	787.000	-29.588	
			FRB	787.000	-28.919	
	16QAM	Lower	1RB	777.000	-33.614	
			FRB	777.000	-31.571	
		Upper	1RB	787.000	-33.302	
			FRB	787.000	-29.235	
5 MHz	QPSK	Lower	1RB	777.000	-21.386	
			FRB	777.000	-26.232	
		Upper	1RB	787.000	-21.356	
			FRB	787.000	-24.958	
	16QAM	Lower	1RB	777.000	-24.916	
			FRB	777.000	-26.993	
		Upper	1RB	787.000	-27.804	
			FRB	787.000	-27.879	

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	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	699.000	-32.232	-13.00
			FRB	699.000	-27.684	
		Upper	1RB	716.000	-34.341	
			FRB	716.000	-28.924	
	16QAM	Lower	1RB	699.000	-36.780	
			FRB	699.000	-31.740	
		Upper	1RB	716.000	-33.735	
			FRB	716.000	-30.617	
5 MHz	QPSK	Lower	1RB	699.000	-20.910	
			FRB	699.000	-27.190	
		Upper	1RB	716.000	-23.125	
			FRB	716.000	-28.004	
	16QAM	Lower	1RB	699.000	-24.914	
			FRB	699.000	-27.011	
		Upper	1RB	716.000	-26.239	
			FRB	716.000	-28.250	
3 MHz	QPSK	Lower	1RB	699.000	-19.946	
			FRB	699.000	-25.967	
		Upper	1RB	716.000	-19.331	
			FRB	716.000	-27.258	
	16QAM	Lower	1RB	699.000	-21.884	
			FRB	699.000	-26.345	
		Upper	1RB	716.000	-22.020	
			FRB	716.000	-27.340	
1.4 MHz	QPSK	Lower	1RB	699.000	-23.482	
			FRB	699.000	-24.810	
		Upper	1RB	716.000	-25.521	
			FRB	716.000	-26.300	
	16QAM	Lower	1RB	699.000	-26.579	
			FRB	699.000	-26.342	
		Upper	1RB	716.000	-27.460	
			FRB	716.000	-26.982	

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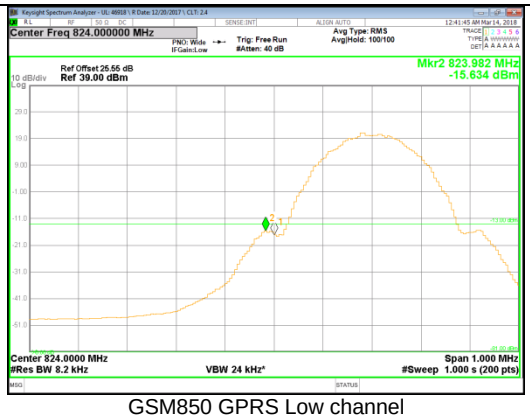
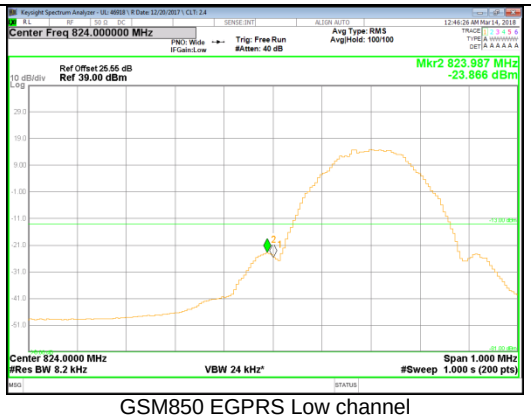
9.2.1. BAND EDGE PLOTS

GSM

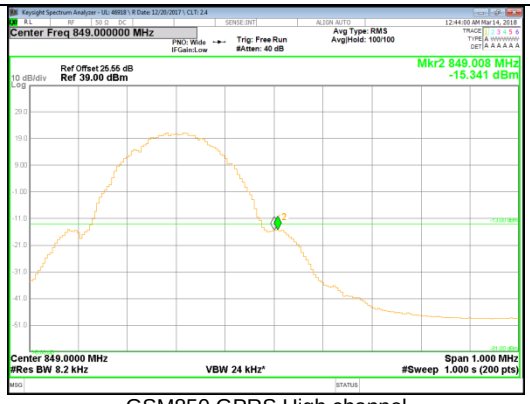
GSM 850



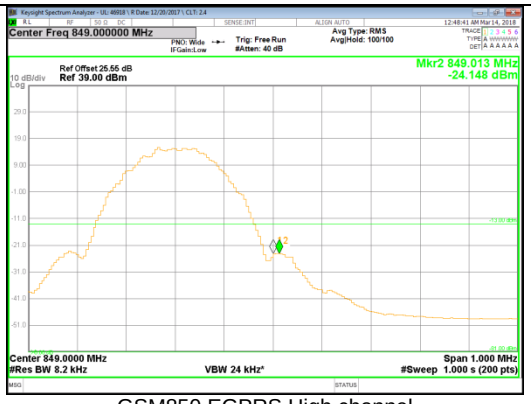
GSM850 GPRS Low channel



GSM850 EGPRS Low channel

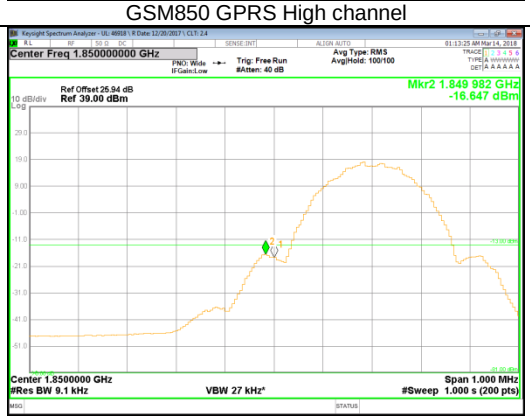


GSM850 GPRS High channel



GSM850 EGPRS High channel

GSM 1900



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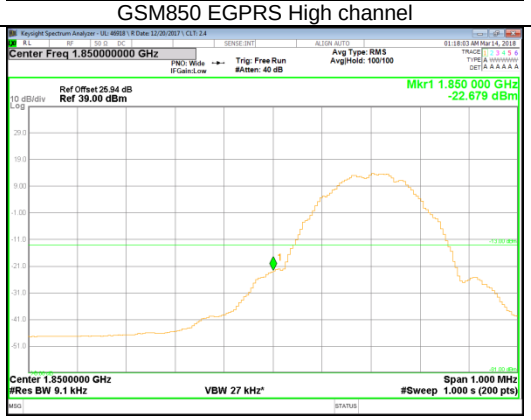

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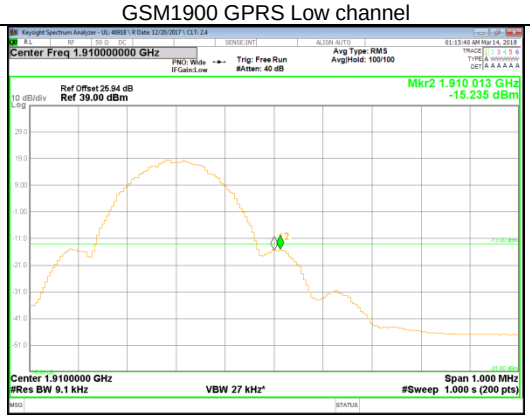
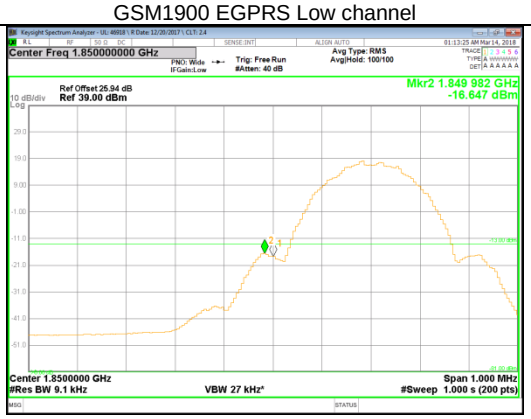


GSM1900 GPRS High channel



GSM1900 EGPRS High channel

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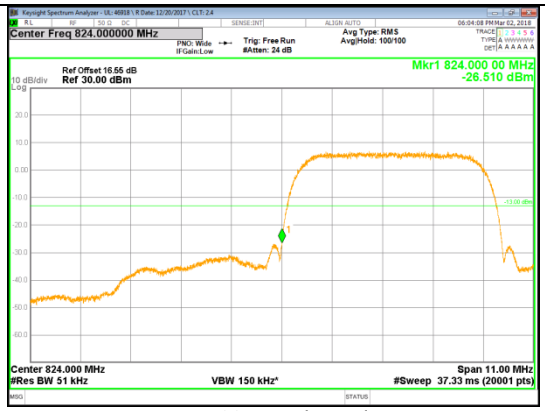
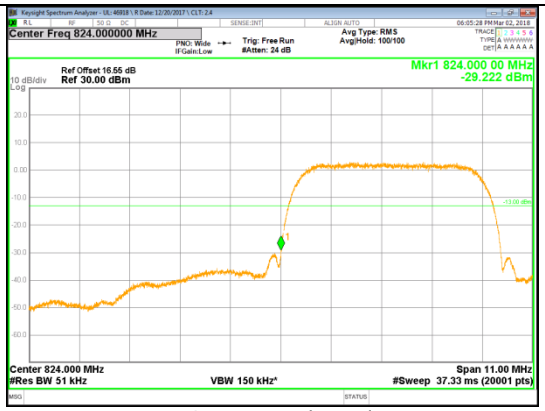
WCDMA

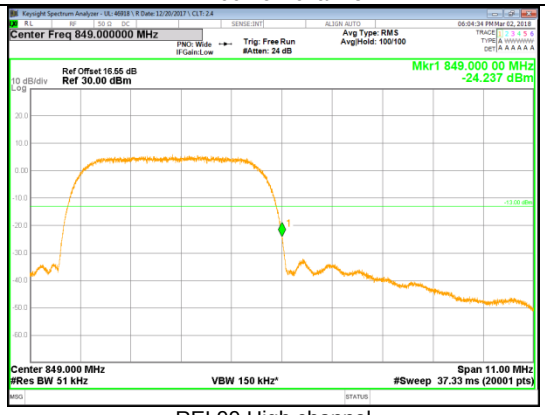
Band 5



REL99 Low channel



HSDPA Low channel



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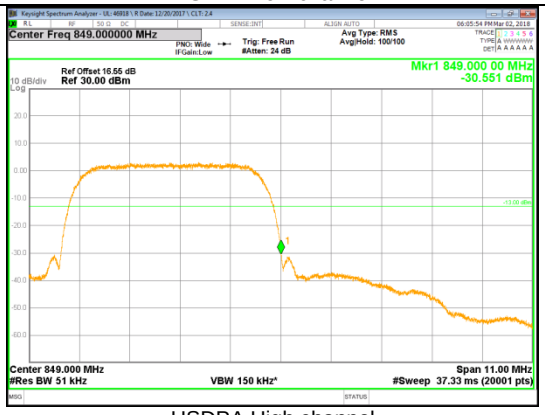
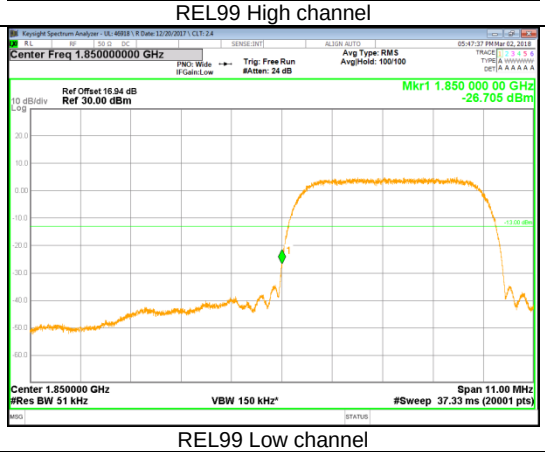


HSDPA High channel

Band 2



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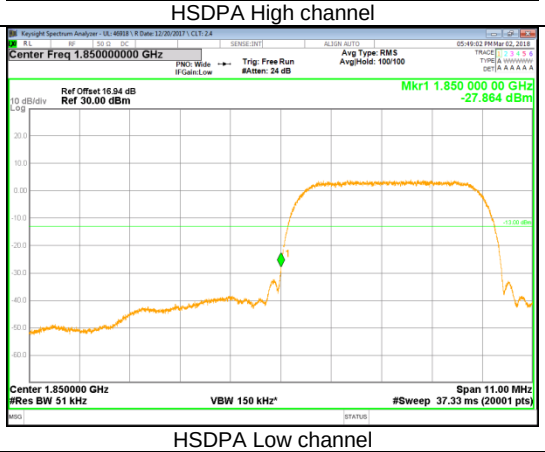

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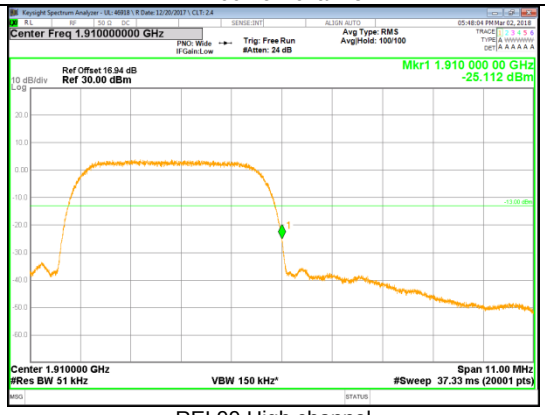

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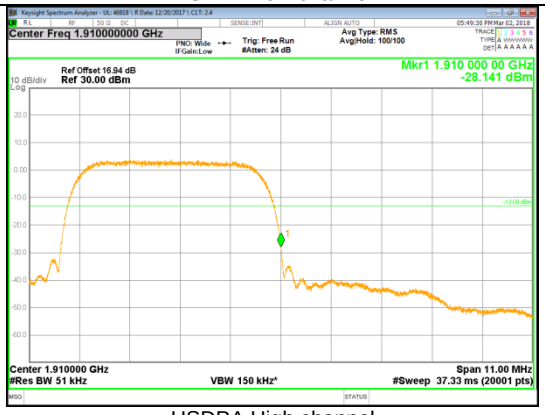

HSDPA High channel

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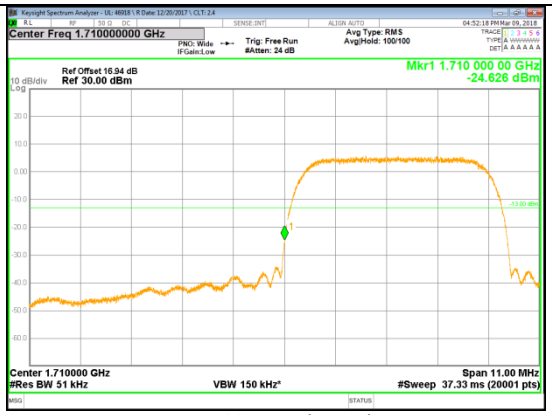
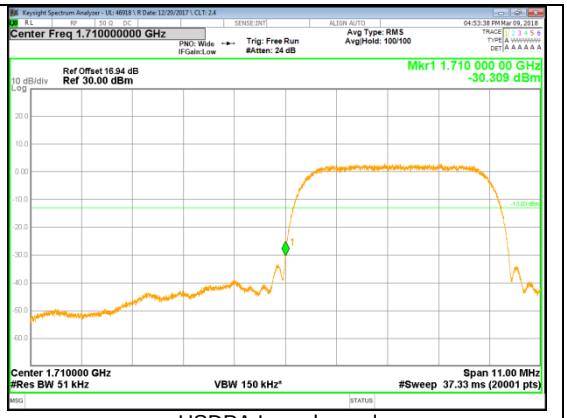
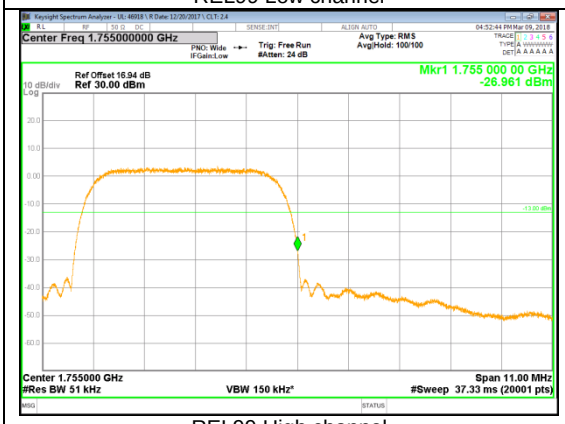
WCDMA

Band 4	 REL99 Low channel	 HSDPA Low channel
	 REL99 High channel	 HSDPA High channel

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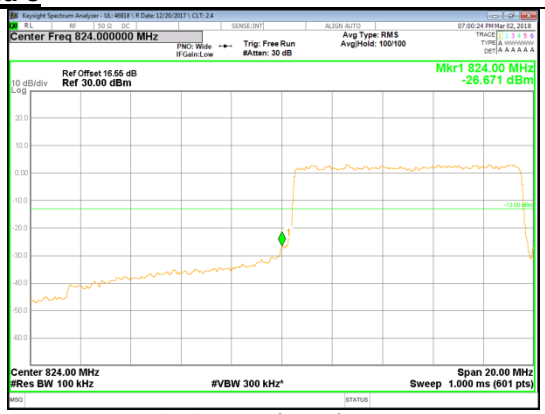
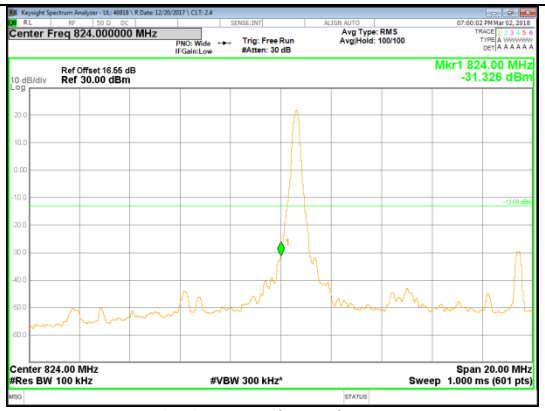
LTE Band 5

Band 5

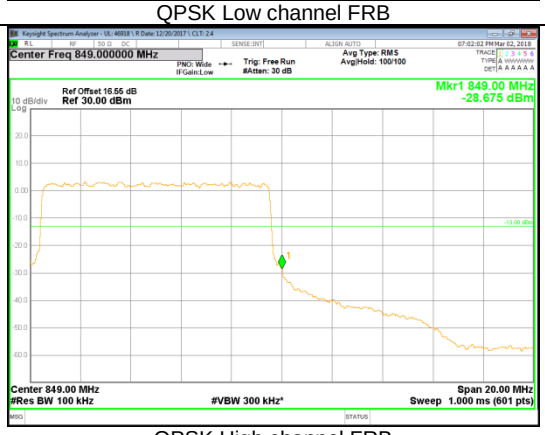
10MHz



QPSK Low channel FRB



QPSK Low channel 1RB



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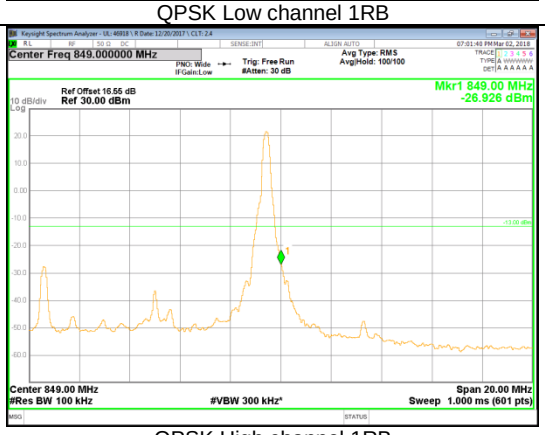

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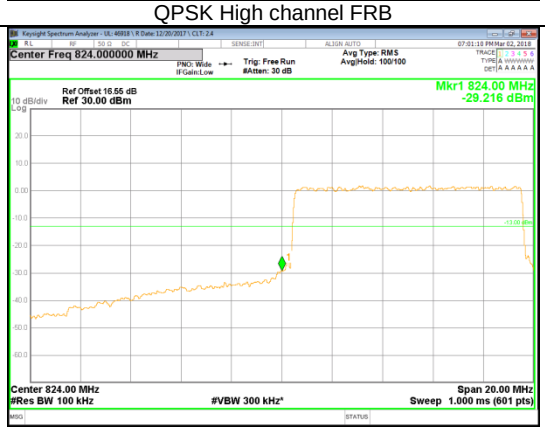
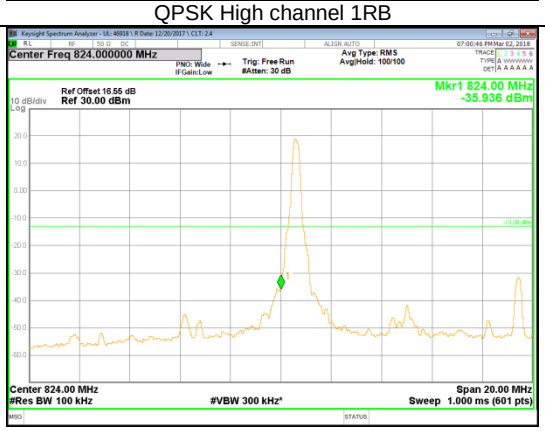


16QAM Low channel FRB



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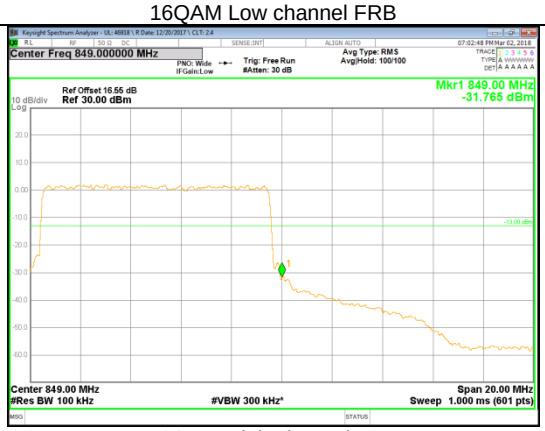

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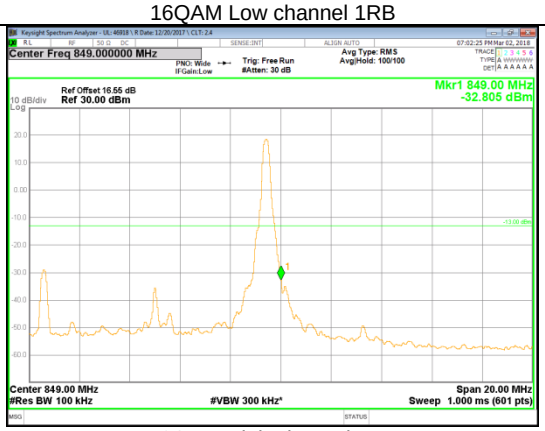

16QAM High channel 1RB

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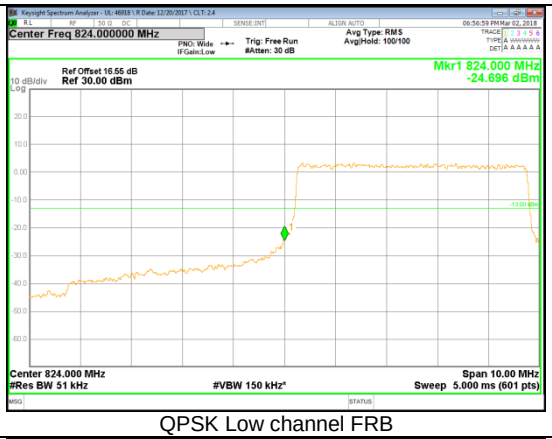
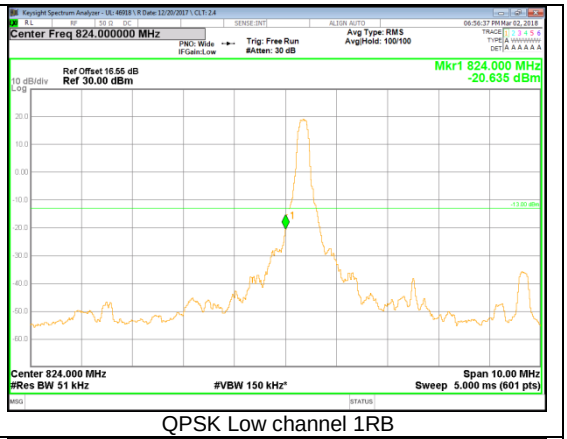
Band 5

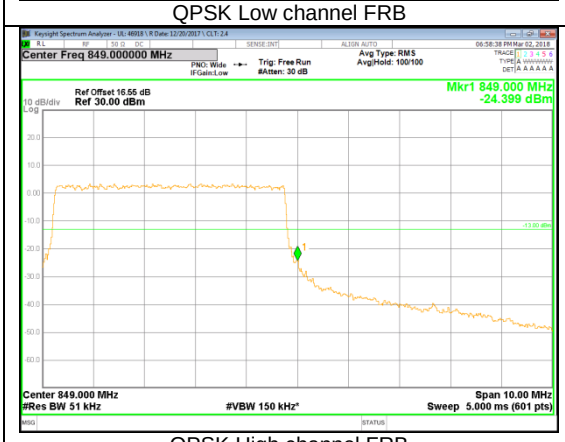
5MHz



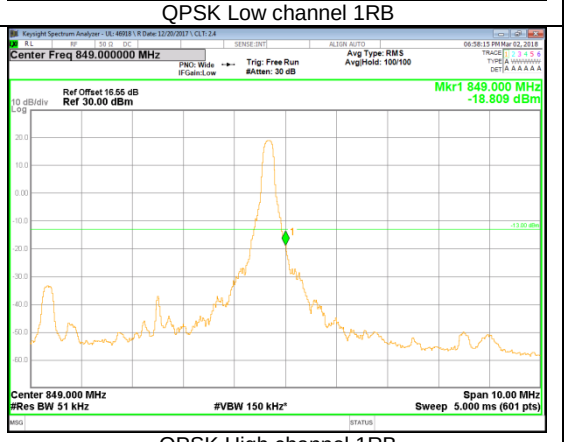
QPSK Low channel FRB



QPSK Low channel 1RB



QPSK High channel FRB



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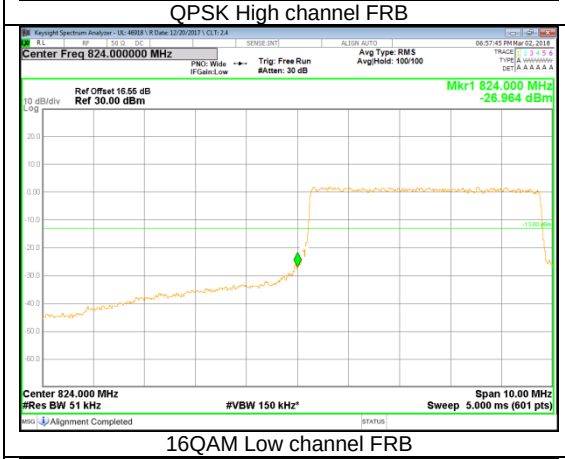

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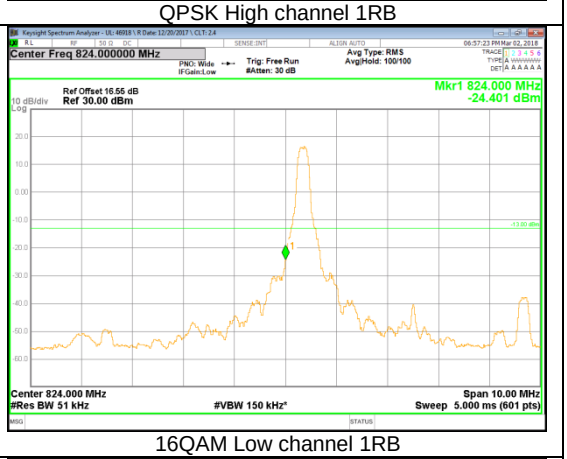

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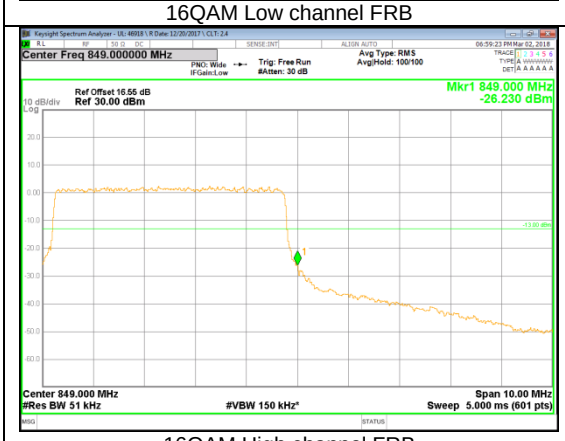

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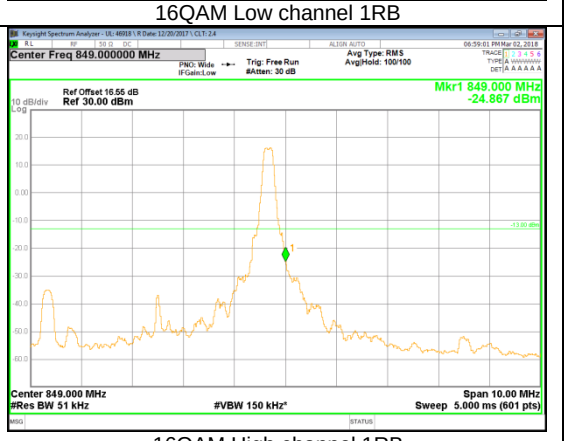

16QAM High channel 1RB

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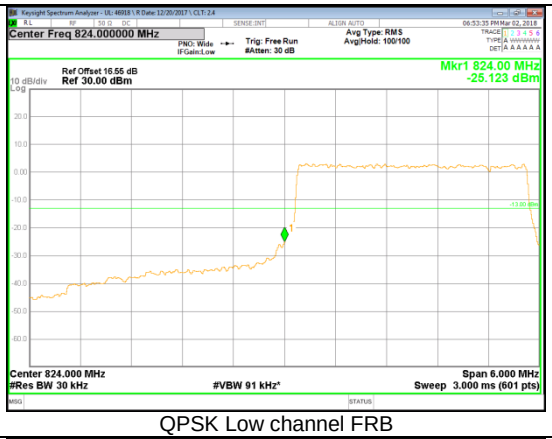
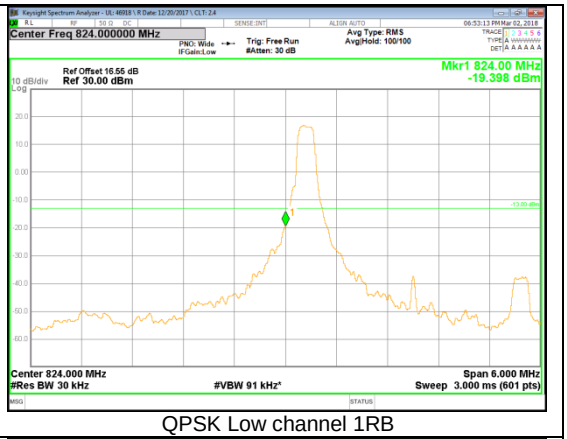
Band 5

3MHz



QPSK Low channel FRB



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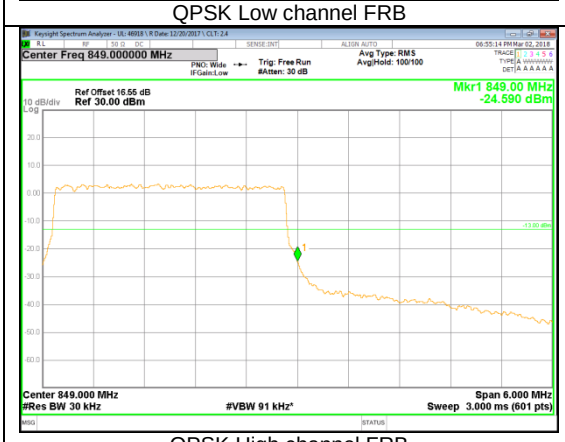

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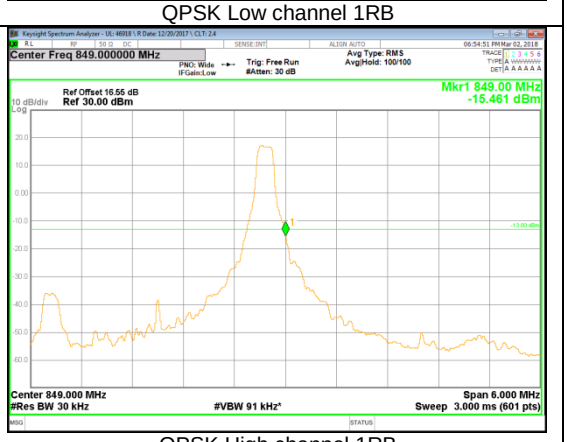

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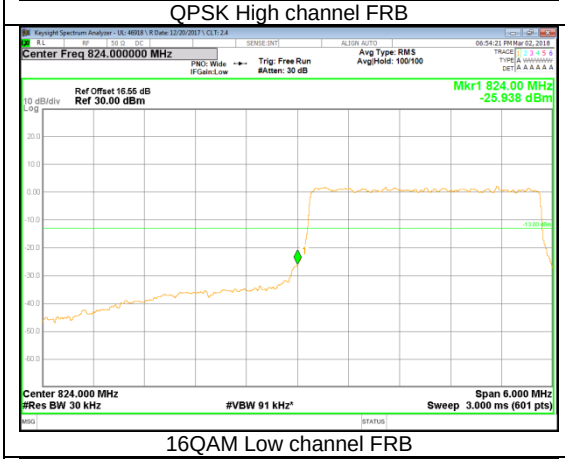

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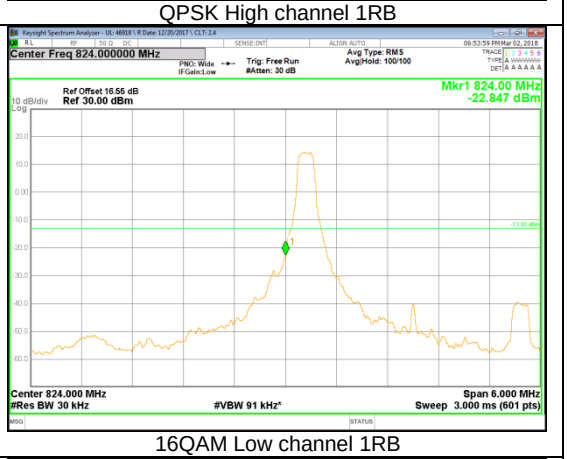

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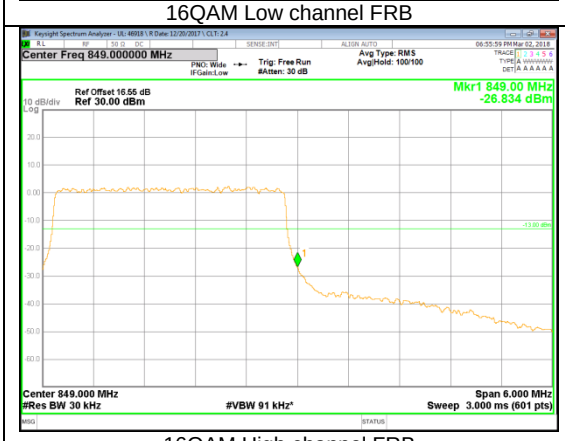

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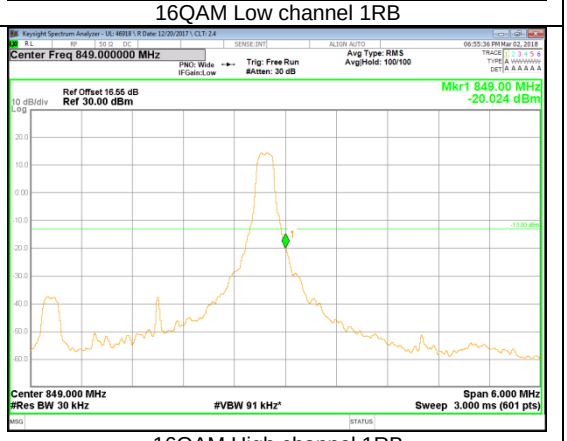

16QAM High channel 1RB

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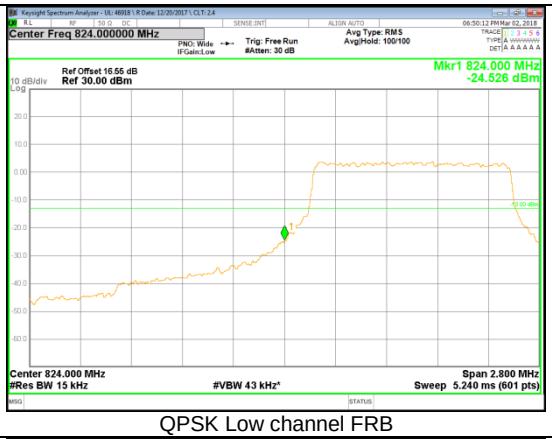
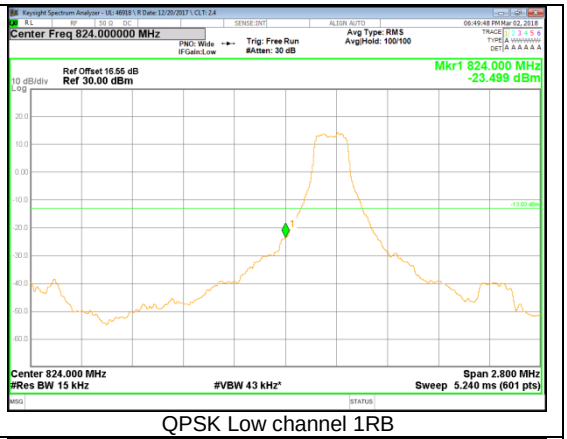
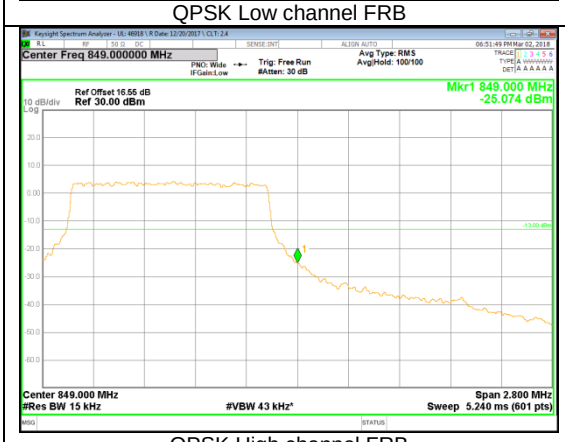
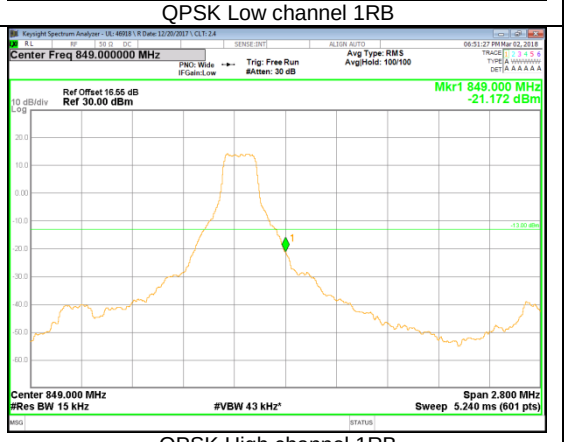
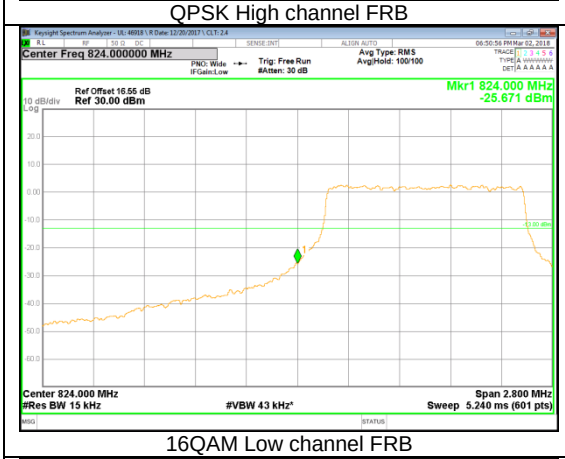
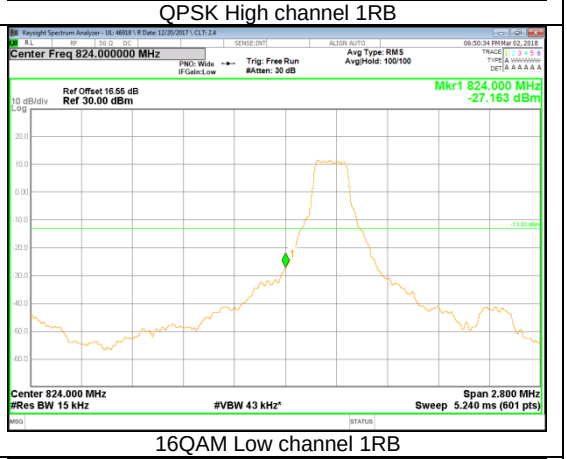
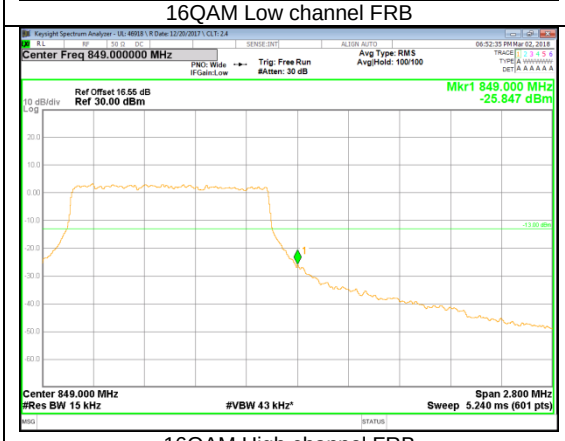
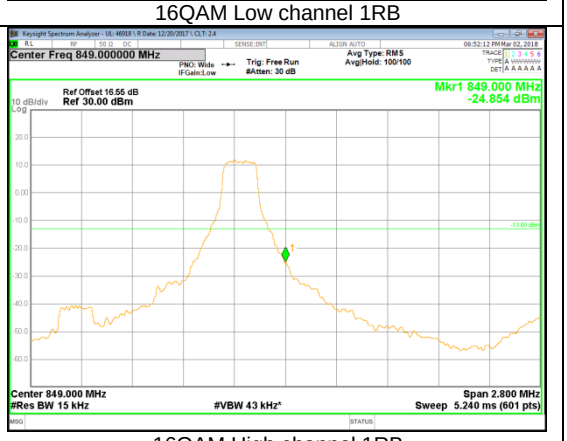
Band 5 1.4MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB
	 QPSK High channel FRB	 QPSK High channel 1RB
	 16QAM Low channel FRB	 16QAM Low channel 1RB
	 16QAM High channel FRB	 16QAM High channel 1RB

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

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