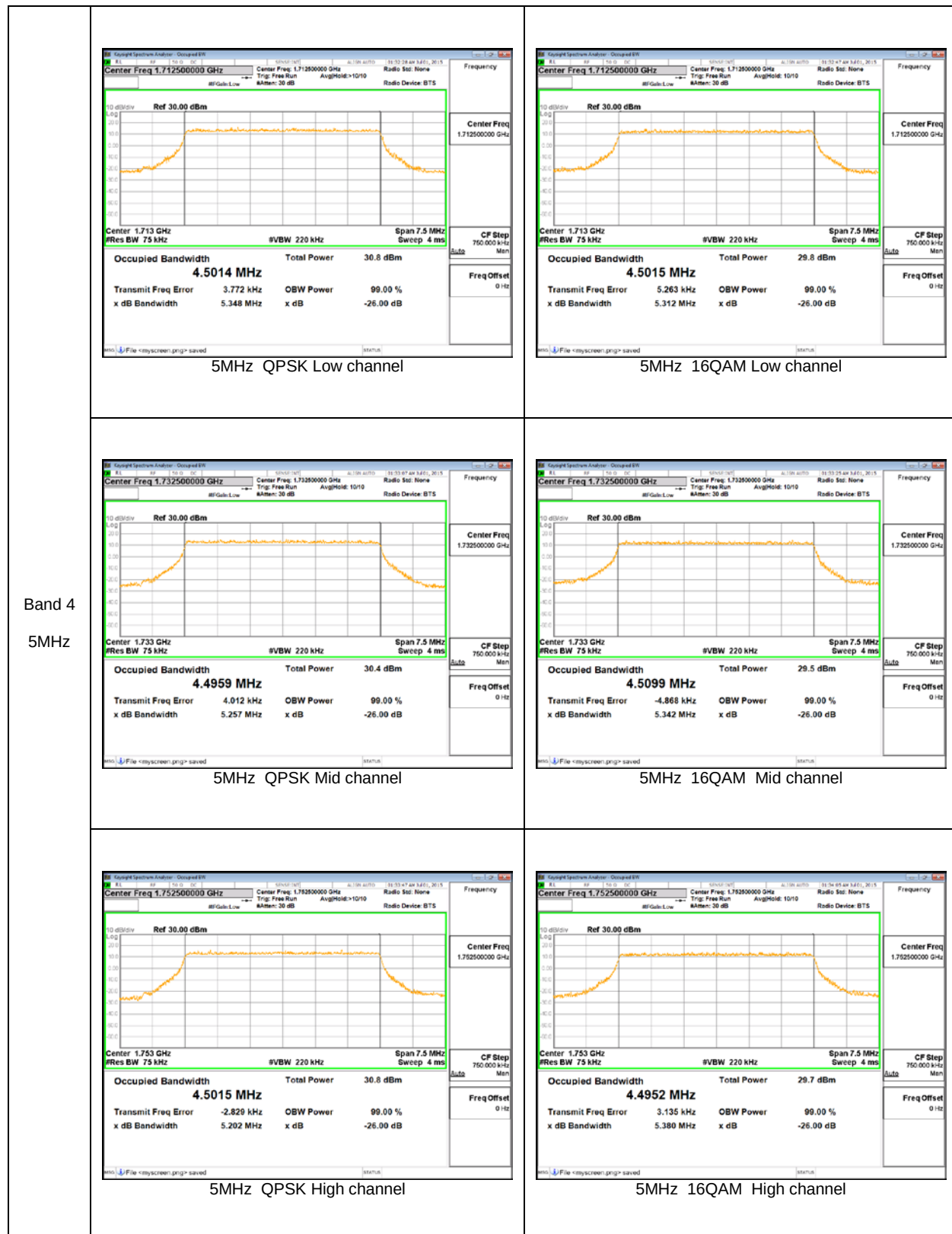
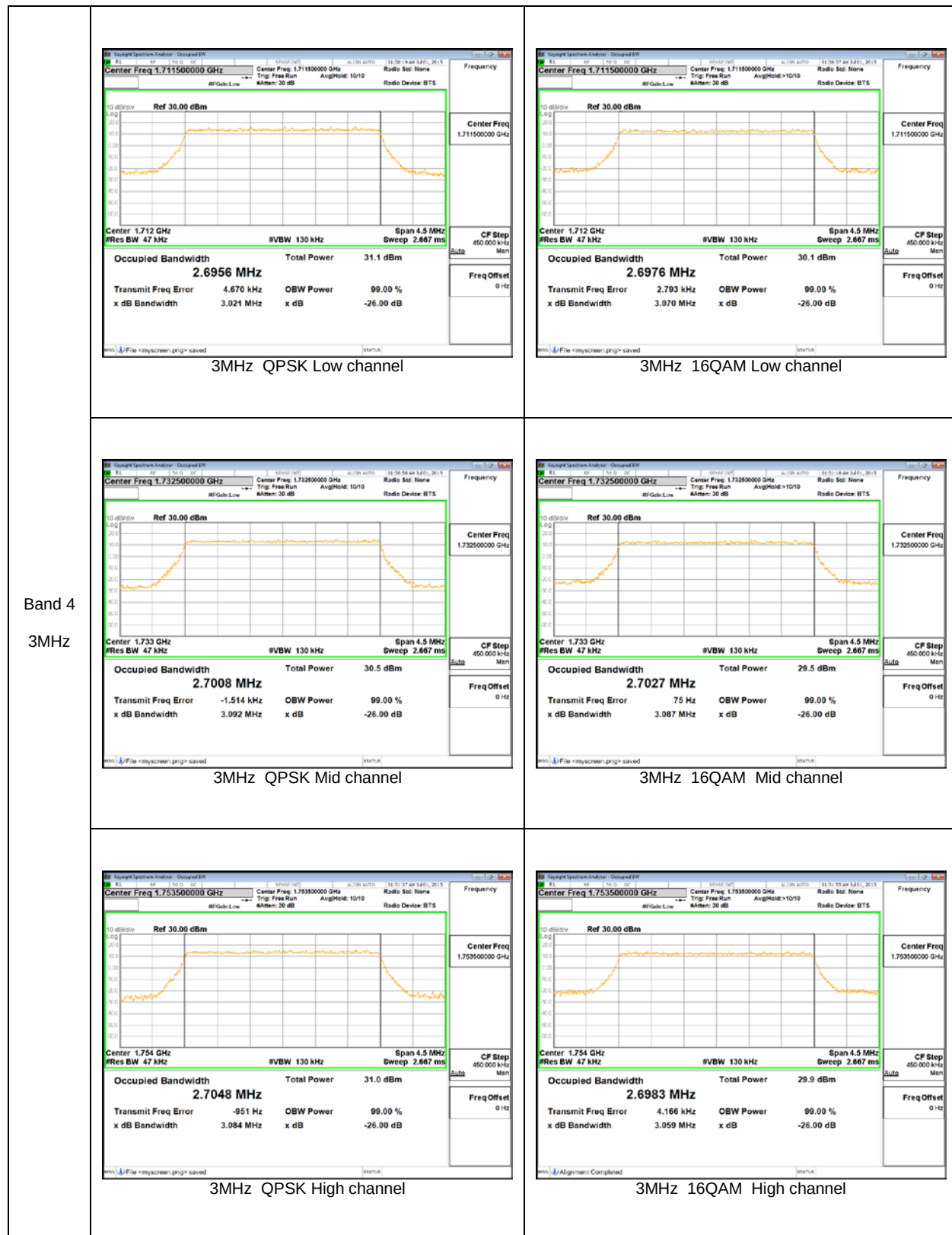
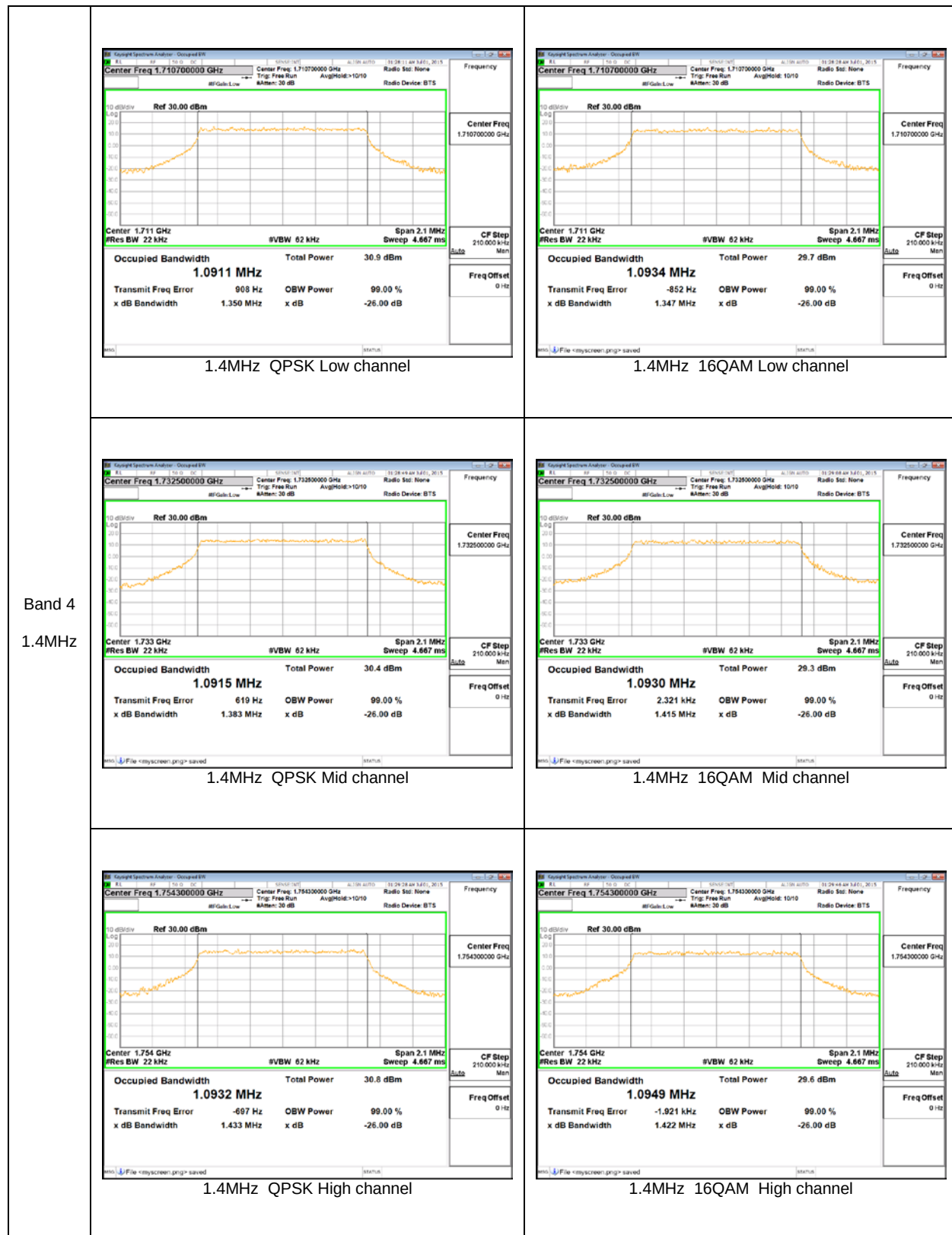








10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238, §27.53 and §90.691

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 than $43 + 10 \log (P)$ 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.

Part 90:

(a) (1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(a) (2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz. (NOTE : Use 100kHz reference bandwidth)

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

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.

RESULTS

LTE 41

Bandwidth	Mode	f [MHz]	RB Status	Side Trace	Level [dBm]	Limit [dBm]
20 MHz	QPSK	2506.0	1RB	Lower Trace 1	-31.00	-13.00
				Lower Trace 2	-34.69	-25.00
			FRB	Lower Trace 1	-26.98	-13.00
				Lower Trace 2	-31.94	-25.00
		2680.0	1RB	Upper Trace 1	-29.17	-10.00
				Upper Trace 2	-36.91	-13.00
				Upper Trace 3	-44.75	-25.00
			FRB	Upper Trace 1	-29.87	-10.00
				Upper Trace 2	-34.79	-13.00
				Upper Trace 3	-43.92	-25.00
	16QAM	2506.0	1RB	Lower Trace 1	-31.64	-13.00
				Lower Trace 2	-35.85	-25.00
			FRB	Lower Trace 1	-28.42	-13.00
				Lower Trace 2	-31.51	-25.00
		2680.0	1RB	Upper Trace 1	-29.81	-10.00
				Upper Trace 2	-37.81	-13.00
				Upper Trace 3	-44.96	-25.00
			FRB	Upper Trace 1	-30.31	-10.00
				Upper Trace 2	-34.58	-13.00
				Upper Trace 3	-43.89	-25.00
15 MHz	QPSK	2503.5	1RB	Lower Trace 1	-25.26	-13.00
				Lower Trace 2	-35.54	-25.00
			FRB	Lower Trace 1	-25.88	-13.00
				Lower Trace 2	-30.25	-25.00
		2682.5	1RB	Upper Trace 1	-26.03	-10.00
				Upper Trace 2	-34.82	-13.00
				Upper Trace 3	-44.91	-25.00
			FRB	Upper Trace 1	-27.26	-10.00
				Upper Trace 2	-34.18	-13.00
				Upper Trace 3	-41.88	-25.00
	16QAM	2503.5	1RB	Lower Trace 1	-25.80	-13.00
				Lower Trace 2	-37.17	-25.00
			FRB	Lower Trace 1	-27.42	-13.00
				Lower Trace 2	-30.90	-25.00
		2682.5	1RB	Upper Trace 1	-26.10	-10.00
				Upper Trace 2	-34.89	-13.00
				Upper Trace 3	-44.86	-25.00
			FRB	Upper Trace 1	-27.75	-10.00
				Upper Trace 2	-34.13	-13.00
				Upper Trace 3	-42.66	-25.00

LTE 41 (continued)

Bandwidth	Mode	f [MHz]	RB Status	Side Trace	Level [dBm]	Limit [dBm]
10 MHz	QPSK	2501.0	1RB	Lower Trace 1	-25.34	-13.00
				Lower Trace 2	-41.53	-25.00
			FRB	Lower Trace 1	-23.75	-13.00
				Lower Trace 2	-32.33	-25.00
		2685.0	1RB	Upper Trace 1	-26.12	-10.00
				Upper Trace 2	-34.40	-13.00
				Upper Trace 3	-44.55	-25.00
			FRB	Upper Trace 1	-26.56	-10.00
				Upper Trace 2	-33.84	-13.00
				Upper Trace 3	-41.73	-25.00
	16QAM	2501.0	1RB	Lower Trace 1	-26.37	-13.00
				Lower Trace 2	-42.23	-25.00
			FRB	Lower Trace 1	-25.15	-13.00
				Lower Trace 2	-33.27	-25.00
		2685.0	1RB	Upper Trace 1	-26.16	-10.00
				Upper Trace 2	-35.27	-13.00
				Upper Trace 3	-44.33	-25.00
			FRB	Upper Trace 1	-27.10	-10.00
				Upper Trace 2	-34.04	-13.00
				Upper Trace 3	-42.06	-25.00
5 MHz	QPSK	2498.5	1RB	Lower Trace 1	-20.52	-13.00
				Lower Trace 2	-41.87	-25.00
			FRB	Lower Trace 1	-20.31	-13.00
				Lower Trace 2	-41.18	-25.00
		2687.5	1RB	Upper Trace 1	-20.47	-10.00
				Upper Trace 2	-42.10	-13.00
				Upper Trace 3	-41.37	-25.00
			FRB	Upper Trace 1	-20.28	-10.00
				Upper Trace 2	-38.38	-13.00
				Upper Trace 3	-39.75	-25.00
	16QAM	2498.5	1RB	Lower Trace 1	-21.66	-13.00
				Lower Trace 2	-42.96	-25.00
			FRB	Lower Trace 1	-21.76	-13.00
				Lower Trace 2	-42.16	-25.00
		2687.5	1RB	Upper Trace 1	-19.91	-10.00
				Upper Trace 2	-41.74	-13.00
				Upper Trace 3	-41.62	-25.00
			FRB	Upper Trace 1	-22.75	-10.00
				Upper Trace 2	-38.71	-13.00
				Upper Trace 3	-41.25	-25.00

LTE 26

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
15 MHz	QPSK	Lower	1RB	824.000	-22.069	-13.00
			FRB	824.000	-27.826	
		Upper	1RB	849.000	-20.746	
			FRB	849.000	-29.016	
	16QAM	Lower	1RB	824.000	-23.687	
			FRB	824.000	-28.358	
		Upper	1RB	849.000	-24.242	
			FRB	849.000	-30.362	
10 MHz	QPSK	Lower (Part90)	1RB	814.000	-26.062	-13.00
			FRB	814.000	-24.133	
		Lower (Part22)	1RB	824.000	-30.667	
			FRB	824.000	-27.037	
		Upper	1RB	849.000	-25.035	
			FRB	849.000	-24.229	
	16QAM	Lower (Part90)	1RB	814.000	-26.655	
			FRB	814.000	-25.497	
		Lower (Part22)	1RB	824.000	-30.002	
			FRB	824.000	-26.611	
		Upper	1RB	849.000	-27.162	
			FRB	849.000	-27.827	

LTE 26 (continued)

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
5 MHz	QPSK	Lower (Part90)	1RB	814.000	-17.899	-13.00
			FRB	814.000	-23.979	
		Lower (Part22)	1RB	824.000	-21.195	
			FRB	824.000	-22.558	
		Upper	1RB	849.000	-17.760	
			FRB	849.000	-24.121	
	16QAM	Lower (Part90)	1RB	814.000	-19.564	
			FRB	814.000	-23.809	
		Lower (Part22)	1RB	824.000	-18.543	
			FRB	824.000	-23.226	
		Upper	1RB	849.000	-19.237	
			FRB	849.000	-26.202	
3 MHz	QPSK	Lower (Part90)	1RB	814.000	-17.286	-13.00
			FRB	814.000	-22.253	
		Lower (Part22)	1RB	824.000	-16.682	
			FRB	824.000	-22.974	
		Upper	1RB	849.000	-16.333	
			FRB	849.000	-22.893	
	16QAM	Lower (Part90)	1RB	814.000	-16.936	
			FRB	814.000	-24.457	
		Lower (Part22)	1RB	824.000	-23.126	
			FRB	824.000	-22.176	
		Upper	1RB	849.000	-16.801	
			FRB	849.000	-23.599	

LTE 26 (continued)

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
1.4 MHz	QPSK	Lower (Part90)	1RB	814.000	-21.272	
			FRB	814.000	-22.927	
		Lower (Part22)	1RB	824.000	-22.468	
			FRB	824.000	-23.873	
		Upper	1RB	849.000	-20.275	
			FRB	849.000	-22.256	
	16QAM	Lower (Part90)	1RB	814.000	-23.309	
			FRB	814.000	-23.944	
		Lower (Part22)	1RB	824.000	-24.132	
			FRB	824.000	-24.150	
		Upper	1RB	849.000	-21.832	
			FRB	849.000	-24.192	

LTE 25

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
20 MHz	QPSK	Lower	1RB	1850.000	-29.280	
			FRB	1850.000	-27.619	
		Upper	1RB	1915.000	-28.756	
			FRB	1915.000	-25.382	
	16QAM	Lower	1RB	1850.000	-29.093	
			FRB	1850.000	-28.297	
		Upper	1RB	1915.000	-30.814	
			FRB	1915.000	-26.813	
15 MHz	QPSK	Lower	1RB	1850.000	-19.862	-13.00
			FRB	1850.000	-29.382	
		Upper	1RB	1915.000	-24.335	
			FRB	1915.000	-27.033	
	16QAM	Lower	1RB	1850.000	-21.067	
			FRB	1850.000	-26.866	
		Upper	1RB	1915.000	-20.996	
			FRB	1915.000	-29.757	

LTE 25 (continued)

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	1850.000	-24.411	-13.00
			FRB	1850.000	-28.580	
		Upper	1RB	1915.000	-23.089	
			FRB	1915.000	-25.704	
	16QAM	Lower	1RB	1850.000	-25.709	
			FRB	1850.000	-25.239	
		Upper	1RB	1915.000	-25.706	
			FRB	1915.000	-30.112	
5 MHz	QPSK	Lower	1RB	1850.000	-21.411	
			FRB	1850.000	-24.264	
		Upper	1RB	1915.000	-18.757	
			FRB	1915.000	-26.608	
	16QAM	Lower	1RB	1850.000	-21.108	
			FRB	1850.000	-25.063	
		Upper	1RB	1915.000	-21.700	
			FRB	1915.000	-24.060	
3 MHz	QPSK	Lower	1RB	1850.000	-18.570	
			FRB	1850.000	-22.292	
		Upper	1RB	1915.000	-18.682	
			FRB	1915.000	-23.156	
	16QAM	Lower	1RB	1850.000	-18.668	
			FRB	1850.000	-24.845	
		Upper	1RB	1915.000	-16.618	
			FRB	1915.000	-22.941	
1.4 MHz	QPSK	Lower	1RB	1850.000	-23.875	
			FRB	1850.000	-23.621	
		Upper	1RB	1915.000	-23.355	
			FRB	1915.000	-23.465	
	16QAM	Lower	1RB	1850.000	-23.777	
			FRB	1850.000	-23.315	
		Upper	1RB	1915.000	-24.509	
			FRB	1915.000	-23.257	

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

LTE 12

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	699.000	-26.476	-13.00
			FRB	699.000	-23.428	
		Upper	1RB	716.000	-25.028	
			FRB	716.000	-29.222	
	16QAM	Lower	1RB	699.000	-25.468	
			FRB	699.000	-25.558	
		Upper	1RB	716.000	-26.097	
			FRB	716.000	-26.896	
5 MHz	QPSK	Lower	1RB	699.000	-17.091	
			FRB	699.000	-23.442	
		Upper	1RB	716.000	-17.437	
			FRB	716.000	-23.217	
	16QAM	Lower	1RB	699.000	-19.503	
			FRB	699.000	-22.544	
		Upper	1RB	716.000	-18.226	
			FRB	716.000	-24.101	
3 MHz	QPSK	Lower	1RB	699.000	-15.735	
			FRB	699.000	-20.862	
		Upper	1RB	716.000	-15.889	
			FRB	716.000	-22.869	
	16QAM	Lower	1RB	699.000	-17.786	
			FRB	699.000	-24.438	
		Upper	1RB	716.000	-15.839	
			FRB	716.000	-23.577	
1.4 MHz	QPSK	Lower	1RB	699.000	-18.637	
			FRB	699.000	-22.605	
		Upper	1RB	716.000	-19.484	
			FRB	716.000	-22.804	
	16QAM	Lower	1RB	699.000	-20.612	
			FRB	699.000	-22.704	
		Upper	1RB	716.000	-20.753	
			FRB	716.000	-24.400	

LTE Band 5

Due to frequency range and same output power setting, test was carried in LTE Band 26 to cover both LTE Band 26 and LTE Band 5.

LTE 4

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
20 MHz	QPSK	Lower	1RB	1710.000	-28.595	-13.00
			FRB	1710.000	-25.953	
		Upper	1RB	1755.000	-29.018	
			FRB	1755.000	-23.710	
	16QAM	Lower	1RB	1710.000	-31.726	
			FRB	1710.000	-27.278	
		Upper	1RB	1755.000	-28.779	
			FRB	1755.000	-25.810	
15 MHz	QPSK	Lower	1RB	1710.000	-22.616	
			FRB	1710.000	-26.999	
		Upper	1RB	1755.000	-18.743	
			FRB	1755.000	-25.833	
	16QAM	Lower	1RB	1710.000	-20.856	
			FRB	1710.000	-27.330	
		Upper	1RB	1755.000	-24.946	
			FRB	1755.000	-26.211	
10 MHz	QPSK	Lower	1RB	1710.000	-25.941	
			FRB	1710.000	-25.642	
		Upper	1RB	1755.000	-24.366	
			FRB	1755.000	-25.270	
	16QAM	Lower	1RB	1710.000	-28.902	
			FRB	1710.000	-24.452	
		Upper	1RB	1755.000	-24.282	
			FRB	1755.000	-27.276	
5 MHz	QPSK	Lower	1RB	1710.000	-19.395	
			FRB	1710.000	-23.621	
		Upper	1RB	1755.000	-18.185	
			FRB	1755.000	-23.627	
	16QAM	Lower	1RB	1710.000	-19.003	
			FRB	1710.000	-27.287	
		Upper	1RB	1755.000	-20.235	
			FRB	1755.000	-22.490	

LTE 4 (continued)

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
3 MHz	QPSK	Lower	1RB	1710.000	-16.513	-13.00
			FRB	1710.000	-24.800	
		Upper	1RB	1755.000	-15.393	
			FRB	1755.000	-21.902	
	16QAM	Lower	1RB	1710.000	-17.346	
			FRB	1710.000	-23.600	
		Upper	1RB	1755.000	-17.761	
			FRB	1755.000	-26.098	
1.4 MHz	QPSK	Lower	1RB	1710.000	-22.534	-13.00
			FRB	1710.000	-22.238	
		Upper	1RB	1755.000	-21.595	
			FRB	1755.000	-22.554	
	16QAM	Lower	1RB	1710.000	-21.612	
			FRB	1710.000	-25.151	
		Upper	1RB	1755.000	-22.063	
			FRB	1755.000	-23.119	

LTE Band 2

Due to frequency range and same output power setting, test was carried in LTE Band 25 to cover both LTE Band 25 and LTE Band 2.

10.2.1. BAND EDGE PLOTS

LTE Band 26

