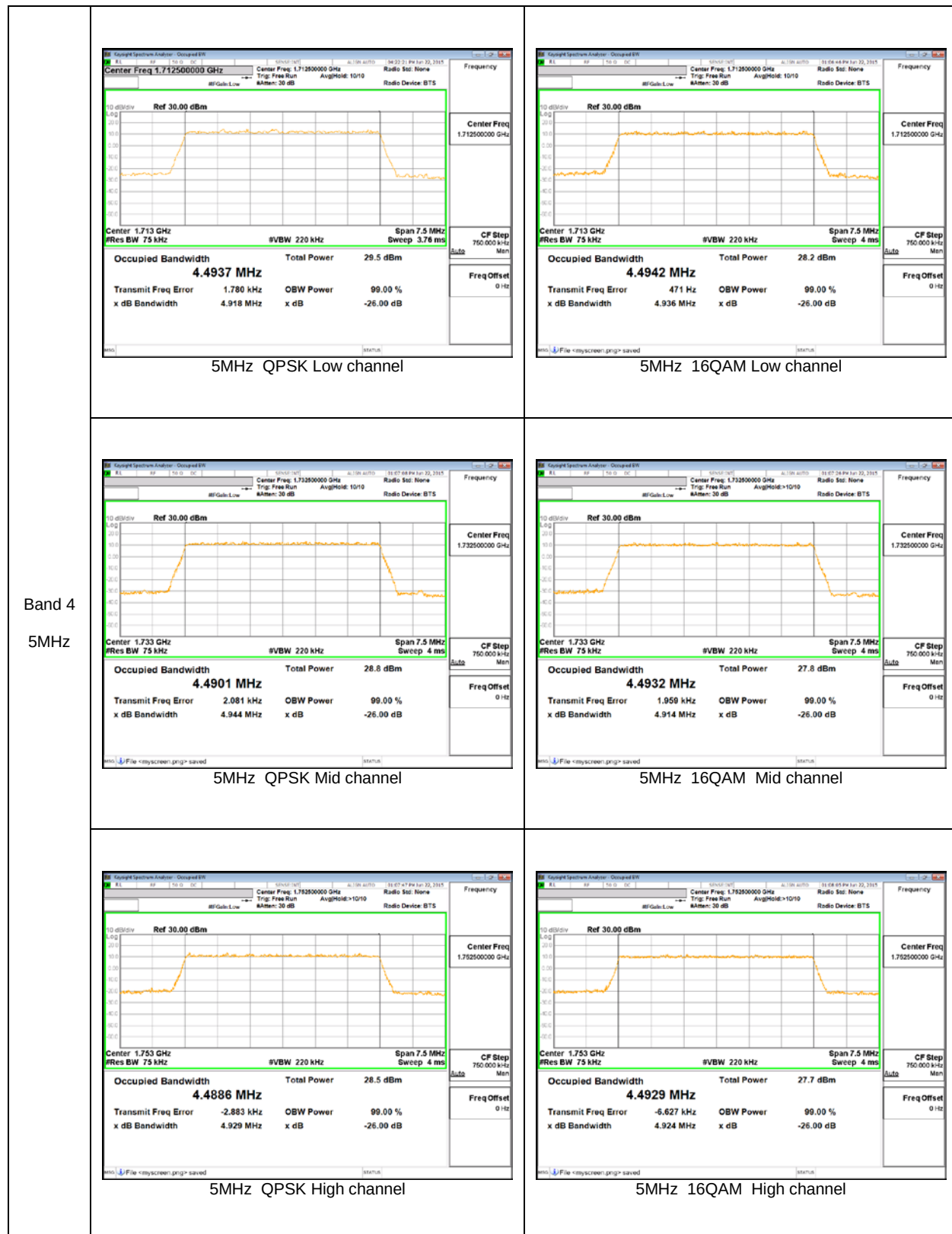








10.2. BAND EDGE EMISSIONS

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	-28.20	-13.00
				Lower Trace 2	-41.42	-25.00
			FRB	Lower Trace 1	-28.93	-13.00
				Lower Trace 2	-33.96	-25.00
		2680.0	1RB	Upper Trace 1	-31.78	-10.00
				Upper Trace 2	-41.88	-13.00
				Upper Trace 3	-44.82	-25.00
			FRB	Upper Trace 1	-30.55	-10.00
				Upper Trace 2	-34.28	-13.00
				Upper Trace 3	-41.77	-25.00
	16QAM	2506.0	1RB	Lower Trace 1	-29.28	-13.00
				Lower Trace 2	-41.31	-25.00
			FRB	Lower Trace 1	-29.03	-13.00
				Lower Trace 2	-33.92	-25.00
		2680.0	1RB	Upper Trace 1	-31.70	-10.00
				Upper Trace 2	-41.28	-13.00
				Upper Trace 3	-44.76	-25.00
			FRB	Upper Trace 1	-30.95	-10.00
				Upper Trace 2	-34.40	-13.00
				Upper Trace 3	-41.57	-25.00
15 MHz	QPSK	2503.5	1RB	Lower Trace 1	-29.74	-13.00
				Lower Trace 2	-39.34	-25.00
			FRB	Lower Trace 1	-29.11	-13.00
				Lower Trace 2	-32.97	-25.00
		2682.5	1RB	Upper Trace 1	-29.92	-10.00
				Upper Trace 2	-41.03	-13.00
				Upper Trace 3	-44.80	-25.00
			FRB	Upper Trace 1	-27.13	-10.00
				Upper Trace 2	-31.69	-13.00
				Upper Trace 3	-40.17	-25.00
	16QAM	2503.5	1RB	Lower Trace 1	-28.91	-13.00
				Lower Trace 2	-39.95	-25.00
			FRB	Lower Trace 1	-28.29	-13.00
				Lower Trace 2	-32.82	-25.00
		2682.5	1RB	Upper Trace 1	-31.01	-10.00
				Upper Trace 2	-41.96	-13.00
				Upper Trace 3	-44.87	-25.00
			FRB	Upper Trace 1	-27.82	-10.00
				Upper Trace 2	-32.28	-13.00
				Upper Trace 3	-39.53	-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	-27.03	-13.00
				Lower Trace 2	-43.55	-25.00
			FRB	Lower Trace 1	-26.50	-13.00
				Lower Trace 2	-31.91	-25.00
		2685.0	1RB	Upper Trace 1	-27.86	-10.00
				Upper Trace 2	-43.46	-13.00
				Upper Trace 3	-44.79	-25.00
			FRB	Upper Trace 1	-27.10	-10.00
				Upper Trace 2	-32.11	-13.00
				Upper Trace 3	-39.70	-25.00
	16QAM	2501.0	1RB	Lower Trace 1	-30.06	-13.00
				Lower Trace 2	-43.69	-25.00
			FRB	Lower Trace 1	-25.79	-13.00
				Lower Trace 2	-33.01	-25.00
		2685.0	1RB	Upper Trace 1	-28.85	-10.00
				Upper Trace 2	-43.39	-13.00
				Upper Trace 3	-44.80	-25.00
			FRB	Upper Trace 1	-27.21	-10.00
				Upper Trace 2	-32.47	-13.00
				Upper Trace 3	-39.04	-25.00
5 MHz	QPSK	2498.5	1RB	Lower Trace 1	-20.62	-13.00
				Lower Trace 2	-43.65	-25.00
			FRB	Lower Trace 1	-24.20	-13.00
				Lower Trace 2	-38.33	-25.00
		2687.5	1RB	Upper Trace 1	-20.92	-10.00
				Upper Trace 2	-43.71	-13.00
				Upper Trace 3	-42.93	-25.00
			FRB	Upper Trace 1	-24.37	-10.00
				Upper Trace 2	-36.02	-13.00
				Upper Trace 3	-37.99	-25.00
	16QAM	2498.5	1RB	Lower Trace 1	-21.26	-13.00
				Lower Trace 2	-44.30	-25.00
			FRB	Lower Trace 1	-23.13	-13.00
				Lower Trace 2	-39.67	-25.00
		2687.5	1RB	Upper Trace 1	-23.04	-10.00
				Upper Trace 2	-44.23	-13.00
				Upper Trace 3	-43.33	-25.00
			FRB	Upper Trace 1	-23.84	-10.00
				Upper Trace 2	-37.43	-13.00
				Upper Trace 3	-39.91	-25.00

LTE 26

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
15MHz	QPSK	Lower	1RB	824.000	-27.465	
			FRB	824.000	-27.266	
		Upper	1RB	849.000	-25.199	
			FRB	849.000	-25.191	
	16QAM	Lower	1RB	824.000	-29.317	
			FRB	824.000	-29.444	
		Upper	1RB	849.000	-32.609	
			FRB	849.000	-28.560	
10 MHz	QPSK	Lower (Part90)	1RB	814.000	-27.374	
			FRB	814.000	-32.629	
		Lower (Part22)	1RB	824.000	-33.703	
			FRB	824.000	-30.705	
		Upper	1RB	849.000	-27.826	
			FRB	849.000	-28.173	
	16QAM	Lower (Part90)	1RB	814.000	-27.636	
			FRB	814.000	-34.294	
		Lower (Part22)	1RB	824.000	-35.161	
			FRB	824.000	-32.433	
		Upper	1RB	849.000	-30.392	
			FRB	849.000	-29.272	

LTE 26 (continued)

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
5 MHz	QPSK	Lower (Part90)	1RB	814.000	-20.666	-13.00
			FRB	814.000	-31.129	
		Lower (Part22)	1RB	824.000	-23.723	
			FRB	824.000	-28.144	
		Upper	1RB	849.000	-20.613	
			FRB	849.000	-28.830	
	16QAM	Lower (Part90)	1RB	814.000	-20.783	
			FRB	814.000	-31.771	
		Lower (Part22)	1RB	824.000	-20.341	
			FRB	824.000	-29.324	
		Upper	1RB	849.000	-23.344	
			FRB	849.000	-29.032	
3 MHz	QPSK	Lower (Part90)	1RB	814.000	-16.455	-13.00
			FRB	814.000	-26.882	
		Lower (Part22)	1RB	824.000	-18.897	
			FRB	824.000	-26.232	
		Upper	1RB	849.000	-17.001	
			FRB	849.000	-25.921	
	16QAM	Lower (Part90)	1RB	814.000	-18.581	
			FRB	814.000	-28.734	
		Lower (Part22)	1RB	824.000	-19.814	
			FRB	824.000	-27.106	
		Upper	1RB	849.000	-18.124	
			FRB	849.000	-26.707	

LTE 26 (continued)

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
1.4 MHz	QPSK	Lower (Part90)	1RB	814.000	-24.787	-13.00
			FRB	814.000	-34.592	
		Lower (Part22)	1RB	824.000	-31.079	
			FRB	824.000	-31.964	
		Upper	1RB	849.000	-24.726	
			FRB	849.000	-34.968	
	16QAM	Lower (Part90)	1RB	814.000	-25.570	
			FRB	814.000	-34.667	
		Lower (Part22)	1RB	824.000	-33.841	
			FRB	824.000	-33.770	
		Upper	1RB	849.000	-27.101	
			FRB	849.000	-35.981	

LTE 25

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
20 MHz	QPSK	Lower	1RB	1850.000	-34.336	-13.00
			FRB	1850.000	-30.227	
		Upper	1RB	1915.000	-24.827	
			FRB	1915.000	-24.255	
	16QAM	Lower	1RB	1850.000	-34.963	
			FRB	1850.000	-31.815	
		Upper	1RB	1915.000	-26.015	
			FRB	1915.000	-25.761	
15 MHz	QPSK	Lower	1RB	1850.000	-28.242	-13.00
			FRB	1850.000	-32.782	
		Upper	1RB	1915.000	-27.112	
			FRB	1915.000	-25.940	
	16QAM	Lower	1RB	1850.000	-30.971	
			FRB	1850.000	-32.619	
		Upper	1RB	1915.000	-28.688	
			FRB	1915.000	-26.510	

LTE 25 (continued)

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	1850.000	-28.303	-13.00
			FRB	1850.000	-32.337	
		Upper	1RB	1915.000	-27.952	
			FRB	1915.000	-27.720	
	16QAM	Lower	1RB	1850.000	-29.760	
			FRB	1850.000	-32.280	
		Upper	1RB	1915.000	-27.952	
			FRB	1915.000	-29.128	
5 MHz	QPSK	Lower	1RB	1850.000	-22.646	
			FRB	1850.000	-28.030	
		Upper	1RB	1915.000	-21.312	
			FRB	1915.000	-27.564	
	16QAM	Lower	1RB	1850.000	-23.601	
			FRB	1850.000	-29.110	
		Upper	1RB	1915.000	-19.595	
			FRB	1915.000	-28.802	
3 MHz	QPSK	Lower	1RB	1850.000	-20.300	
			FRB	1850.000	-27.595	
		Upper	1RB	1915.000	-17.143	
			FRB	1915.000	-25.896	
	16QAM	Lower	1RB	1850.000	-19.428	
			FRB	1850.000	-27.170	
		Upper	1RB	1915.000	-16.774	
			FRB	1915.000	-27.445	
1.4 MHz	QPSK	Lower	1RB	1850.000	-32.234	
			FRB	1850.000	-33.689	
		Upper	1RB	1915.000	-28.032	
			FRB	1915.000	-34.985	
	16QAM	Lower	1RB	1850.000	-32.544	
			FRB	1850.000	-33.565	
		Upper	1RB	1915.000	-27.591	
			FRB	1915.000	-35.273	

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	-31.667	-13.00
			FRB	699.000	-28.852	
		Upper	1RB	716.000	-29.717	
			FRB	716.000	-30.987	
	16QAM	Lower	1RB	699.000	-30.629	
			FRB	699.000	-27.872	
		Upper	1RB	716.000	-30.672	
			FRB	716.000	-33.333	
5 MHz	QPSK	Lower	1RB	699.000	-21.772	
			FRB	699.000	-27.631	
		Upper	1RB	716.000	-22.463	
			FRB	716.000	-27.861	
	16QAM	Lower	1RB	699.000	-21.528	
			FRB	699.000	-27.118	
		Upper	1RB	716.000	-20.581	
			FRB	716.000	-28.747	
3 MHz	QPSK	Lower	1RB	699.000	-21.090	
			FRB	699.000	-25.800	
		Upper	1RB	716.000	-17.162	
			FRB	716.000	-26.293	
	16QAM	Lower	1RB	699.000	-19.628	
			FRB	699.000	-24.211	
		Upper	1RB	716.000	-19.509	
			FRB	716.000	-27.041	
1.4 MHz	QPSK	Lower	1RB	699.000	-26.277	
			FRB	699.000	-31.224	
		Upper	1RB	716.000	-27.938	
			FRB	716.000	-40.574	
	16QAM	Lower	1RB	699.000	-29.487	
			FRB	699.000	-31.206	
		Upper	1RB	716.000	-31.410	
			FRB	716.000	-41.197	

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	-32.157	-13.00
			FRB	1710.000	-30.919	
		Upper	1RB	1755.000	-33.945	
			FRB	1755.000	-27.089	
	16QAM	Lower	1RB	1710.000	-34.927	
			FRB	1710.000	-31.958	
		Upper	1RB	1755.000	-35.464	
			FRB	1755.000	-28.460	
15 MHz	QPSK	Lower	1RB	1710.000	-30.450	
			FRB	1710.000	-33.397	
		Upper	1RB	1755.000	-29.914	
			FRB	1755.000	-29.379	
	16QAM	Lower	1RB	1710.000	-32.514	
			FRB	1710.000	-33.366	
		Upper	1RB	1755.000	-34.394	
			FRB	1755.000	-31.082	
10 MHz	QPSK	Lower	1RB	1710.000	-34.890	
			FRB	1710.000	-32.691	
		Upper	1RB	1755.000	-31.268	
			FRB	1755.000	-30.191	
	16QAM	Lower	1RB	1710.000	-32.487	
			FRB	1710.000	-33.333	
		Upper	1RB	1755.000	-30.501	
			FRB	1755.000	-29.561	

LTE 4 (continued)

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
5 MHz	QPSK	Lower	1RB	1710.000	-21.173	-13.00
			FRB	1710.000	-29.076	
		Upper	1RB	1755.000	-22.042	
			FRB	1755.000	-26.904	
	16QAM	Lower	1RB	1710.000	-24.524	
			FRB	1710.000	-29.671	
		Upper	1RB	1755.000	-21.977	
			FRB	1755.000	-28.676	
3 MHz	QPSK	Lower	1RB	1710.000	-20.974	
			FRB	1710.000	-26.075	
		Upper	1RB	1755.000	-17.591	
			FRB	1755.000	-26.448	
	16QAM	Lower	1RB	1710.000	-19.889	
			FRB	1710.000	-27.399	
		Upper	1RB	1755.000	-18.650	
			FRB	1755.000	-26.506	
1.4 MHz	QPSK	Lower	1RB	1710.000	-29.720	
			FRB	1710.000	-31.063	
		Upper	1RB	1755.000	-25.488	
			FRB	1755.000	-27.416	
	16QAM	Lower	1RB	1710.000	-31.214	
			FRB	1710.000	-32.758	
		Upper	1RB	1755.000	-27.954	
			FRB	1755.000	-27.495	

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

