

9.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238, and §27.53(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.

(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.

GSM

- a) Set the RBW = 1 ~ 5% of OBW(GSM850 – 8.2KHz, GSM1900 – 9.1KHz)
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = 1S ;
- e) Detector = RMS;
- f) Ensure that the number of measurement points $\geq 2 \times$ Span/RBW;
- g) Trace mode = Average(100);
- h) Add duty cycle correction factor (9dB)

WCDMA/LTE

- a) Set the RBW = 1 ~ 1.5 % of OBW(Typically limited to a minimum RBW of 1% of the OBW)
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = Auto;
- e) Detector = RMS;
- f) Ensure that the number of measurement points $\geq 2 \times$ Span/RBW;
- g) Trace mode = Average (100);

RESULTS

GSM

Band	Mode	Side	f [MHz]	Level [dBm]	Limit [dBm]
GSM850	GPRS	Lower	823.982	-15.528	-13.00
		Upper	849.018	-15.027	
	EGPRS	Lower	823.992	-24.077	
		Upper	849.018	-22.913	
GSM1900	GPRS	Lower	1849.982	-17.427	
		Upper	1910.018	-15.747	
	EGPRS	Lower	1849.987	-27.142	
		Upper	1910.013	-25.170	

WCDMA

Band	Mode	Side	f [MHz]	Level [dBm]	Limit [dBm]
Band 5	REL99	Lower	824.000	-26.673	-13.00
		Upper	849.000	-28.096	
	HSDPA	Lower	824.000	-29.645	
		Upper	849.000	-28.966	
Band 4	REL99	Lower	1710.000	-26.156	
		Upper	1755.000	-29.775	
	HSDPA	Lower	1710.000	-29.442	
		Upper	1755.000	-29.073	
Band 2	REL99	Lower	1850.000	-27.266	
		Upper	1910.000	-29.464	
	HSDPA	Lower	1850.000	-31.608	
		Upper	1910.000	-31.205	

LTE 5

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	824.000	-32.842	-13.00
			FRB	824.000	-28.174	
		Upper	1RB	849.000	-31.510	
			FRB	849.000	-27.282	
	16QAM	Lower	1RB	824.000	-32.160	
			FRB	824.000	-31.178	
		Upper	1RB	849.000	-30.972	
			FRB	849.000	-32.277	
5 MHz	QPSK	Lower	1RB	824.000	-21.915	
			FRB	824.000	-28.498	
		Upper	1RB	849.000	-24.213	
			FRB	849.000	-25.009	
	16QAM	Lower	1RB	824.000	-26.042	
			FRB	824.000	-26.253	
		Upper	1RB	849.000	-25.118	
			FRB	849.000	-25.511	
3 MHz	QPSK	Lower	1RB	824.000	-21.617	
			FRB	824.000	-25.127	
		Upper	1RB	849.000	-18.976	
			FRB	849.000	-24.964	
	16QAM	Lower	1RB	824.000	-21.574	
			FRB	824.000	-24.411	
		Upper	1RB	849.000	-19.875	
			FRB	849.000	-26.931	
1.4 MHz	QPSK	Lower	1RB	824.000	-24.977	
			FRB	824.000	-24.047	
		Upper	1RB	849.000	-22.889	
			FRB	849.000	-22.818	
	16QAM	Lower	1RB	824.000	-26.079	
			FRB	824.000	-23.683	
		Upper	1RB	849.000	-25.806	
			FRB	849.000	-25.342	

LTE 66

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
20 MHz	QPSK	Lower	1RB	1710.000	-28.928	-13.00
			FRB	1710.000	-29.977	
		Upper	1RB	1780.000	-24.883	
			FRB	1780.000	-28.547	
	16QAM	Lower	1RB	1710.000	-30.664	
			FRB	1710.000	-32.073	
		Upper	1RB	1780.000	-24.543	
			FRB	1780.000	-31.485	
15 MHz	QPSK	Lower	1RB	1710.000	-24.883	
			FRB	1710.000	-28.547	
		Upper	1RB	1780.000	-30.664	
			FRB	1780.000	-32.073	
	16QAM	Lower	1RB	1710.000	-30.664	
			FRB	1710.000	-30.073	
		Upper	1RB	1780.000	-24.543	
			FRB	1780.000	-31.485	
10 MHz	QPSK	Lower	1RB	1710.000	-33.167	
			FRB	1710.000	-30.272	
		Upper	1RB	1780.000	-33.239	
			FRB	1780.000	-28.761	
	16QAM	Lower	1RB	1710.000	-33.732	
			FRB	1710.000	-29.517	
		Upper	1RB	1780.000	-33.133	
			FRB	1780.000	-31.196	
5 MHz	QPSK	Lower	1RB	1710.000	-20.461	
			FRB	1710.000	-24.820	
		Upper	1RB	1780.000	-22.593	
			FRB	1780.000	-24.632	
	16QAM	Lower	1RB	1710.000	-21.553	
			FRB	1710.000	-25.557	
		Upper	1RB	1780.000	-24.597	
			FRB	1780.000	-24.280	

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
3 MHz	QPSK	Lower	1RB	1710.000	-21.307	-13.00
			FRB	1710.000	-22.255	
		Upper	1RB	1780.000	-20.208	
			FRB	1780.000	-23.654	
	16QAM	Lower	1RB	1710.000	-21.536	
			FRB	1710.000	-24.842	
		Upper	1RB	1780.000	-20.612	
			FRB	1780.000	-26.801	
1.4 MHz	QPSK	Lower	1RB	1710.000	-25.755	-13.00
			FRB	1710.000	-24.555	
		Upper	1RB	1780.000	-23.909	
			FRB	1780.000	-24.400	
	16QAM	Lower	1RB	1710.000	-25.095	
			FRB	1710.000	-24.510	
		Upper	1RB	1780.000	-25.498	
			FRB	1780.000	-25.589	

LTE 2

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
20 MHz	QPSK	Lower	1RB	1850.000	-38.317	-13.00
			FRB	1850.000	-32.104	
		Upper	1RB	1910.000	-39.858	
			FRB	1910.000	-30.113	
	16QAM	Lower	1RB	1850.000	-38.726	
			FRB	1850.000	-33.080	
		Upper	1RB	1910.000	-36.884	
			FRB	1910.000	-32.584	
15 MHz	QPSK	Lower	1RB	1850.000	-26.614	-13.00
			FRB	1850.000	-30.159	
		Upper	1RB	1910.000	-27.961	
			FRB	1910.000	-28.084	
	16QAM	Lower	1RB	1850.000	-28.536	
			FRB	1850.000	-29.497	
		Upper	1RB	1910.000	-26.487	
			FRB	1910.000	-31.545	

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	1850.000	-32.820	-13.00
			FRB	1850.000	-30.170	
		Upper	1RB	1910.000	-31.756	
			FRB	1910.000	-30.213	
	16QAM	Lower	1RB	1850.000	-32.583	
			FRB	1850.000	-32.106	
		Upper	1RB	1910.000	-34.306	
			FRB	1910.000	-32.437	
5 MHz	QPSK	Lower	1RB	1850.000	-24.037	-13.00
			FRB	1850.000	-26.340	
		Upper	1RB	1910.000	-22.145	
			FRB	1910.000	-24.266	
	16QAM	Lower	1RB	1850.000	-23.327	
			FRB	1850.000	-25.632	
		Upper	1RB	1910.000	-23.912	
			FRB	1910.000	-27.250	
3 MHz	QPSK	Lower	1RB	1850.000	-20.829	-13.00
			FRB	1850.000	-24.446	
		Upper	1RB	1910.000	-18.693	
			FRB	1910.000	-24.754	
	16QAM	Lower	1RB	1850.000	-21.460	
			FRB	1850.000	-27.574	
		Upper	1RB	1910.000	-19.653	
			FRB	1910.000	-26.193	
1.4 MHz	QPSK	Lower	1RB	1850.000	-25.666	-13.00
			FRB	1850.000	-26.278	
		Upper	1RB	1910.000	-23.092	
			FRB	1910.000	-25.235	
	16QAM	Lower	1RB	1850.000	-25.565	
			FRB	1850.000	-25.246	
		Upper	1RB	1910.000	-23.519	
			FRB	1910.000	-26.556	

LTE 12

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	699.000	-34.460	-13.00
			FRB	699.000	-29.108	
		Upper	1RB	716.000	-32.470	
			FRB	716.000	-26.735	
	16QAM	Lower	1RB	699.000	-33.536	
			FRB	699.000	-32.101	
		Upper	1RB	716.000	-34.658	
			FRB	716.000	-33.738	
5 MHz	QPSK	Lower	1RB	699.000	-19.803	-13.00
			FRB	699.000	-23.445	
		Upper	1RB	716.000	-23.723	
			FRB	716.000	-24.769	
	16QAM	Lower	1RB	699.000	-26.331	
			FRB	699.000	-25.276	
		Upper	1RB	716.000	-24.713	
			FRB	716.000	-27.642	
3 MHz	QPSK	Lower	1RB	699.000	-20.980	-13.00
			FRB	699.000	-22.413	
		Upper	1RB	716.000	-20.895	
			FRB	716.000	-25.732	
	16QAM	Lower	1RB	699.000	-21.186	
			FRB	699.000	-22.874	
		Upper	1RB	716.000	-25.522	
			FRB	716.000	-24.388	
1.4 MHz	QPSK	Lower	1RB	699.000	-25.367	-13.00
			FRB	699.000	-24.602	
		Upper	1RB	716.000	-25.512	
			FRB	716.000	-24.860	
	16QAM	Lower	1RB	699.000	-25.929	
			FRB	699.000	-25.344	
		Upper	1RB	716.000	-28.007	
			FRB	716.000	-25.822	

LTE Band 4

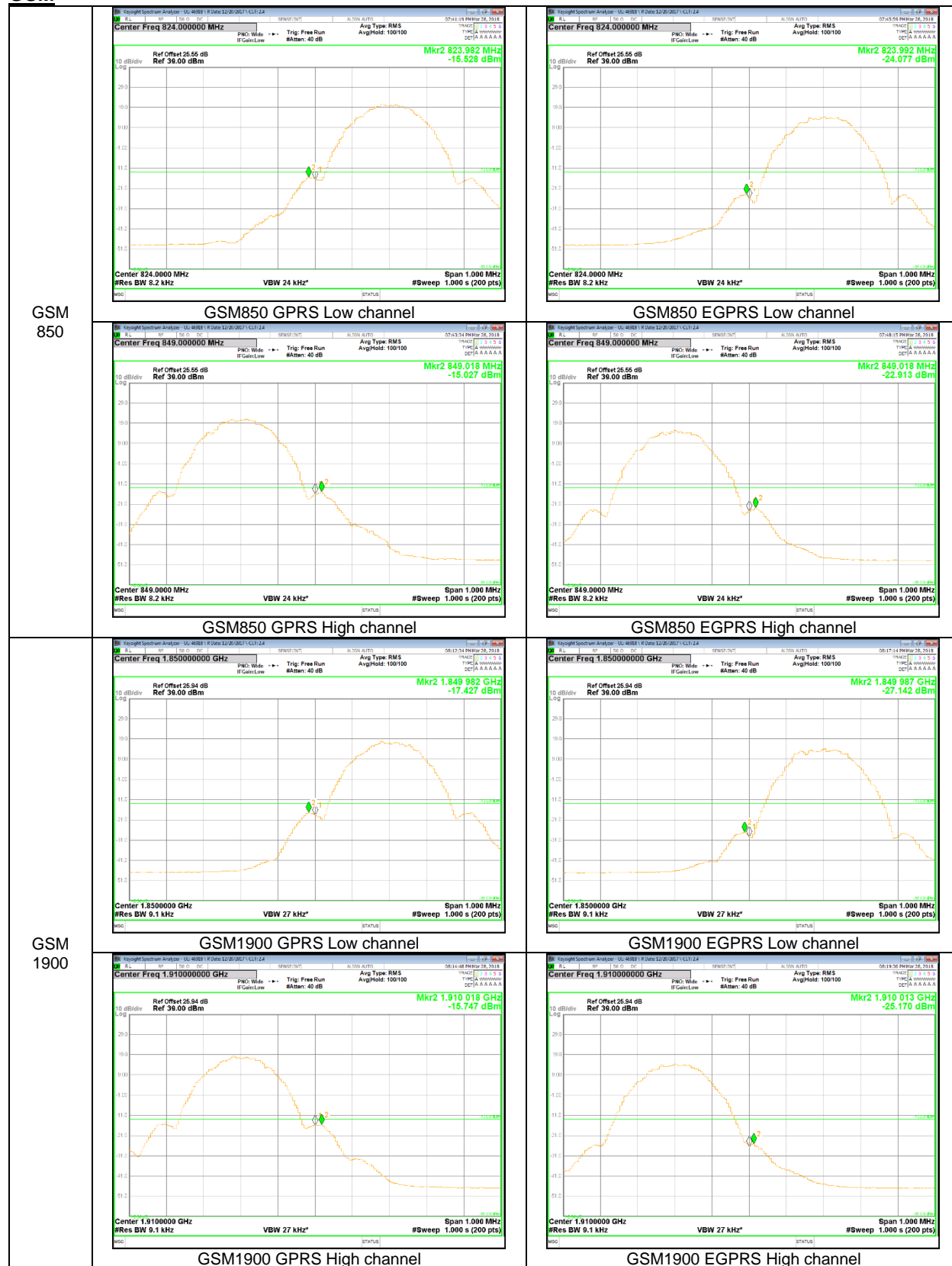
LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

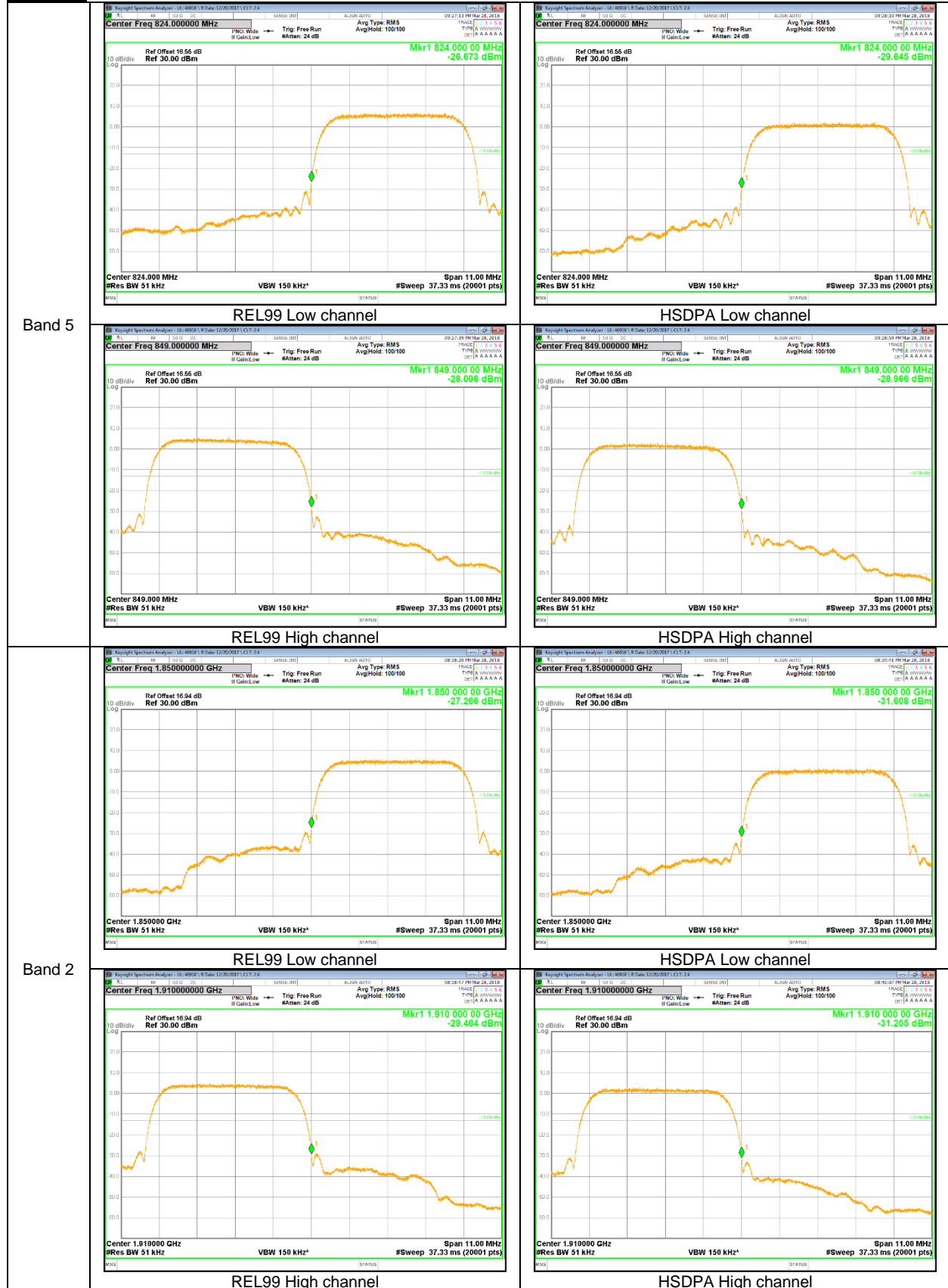
LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

9.2.1. BAND EDGE PLOTS

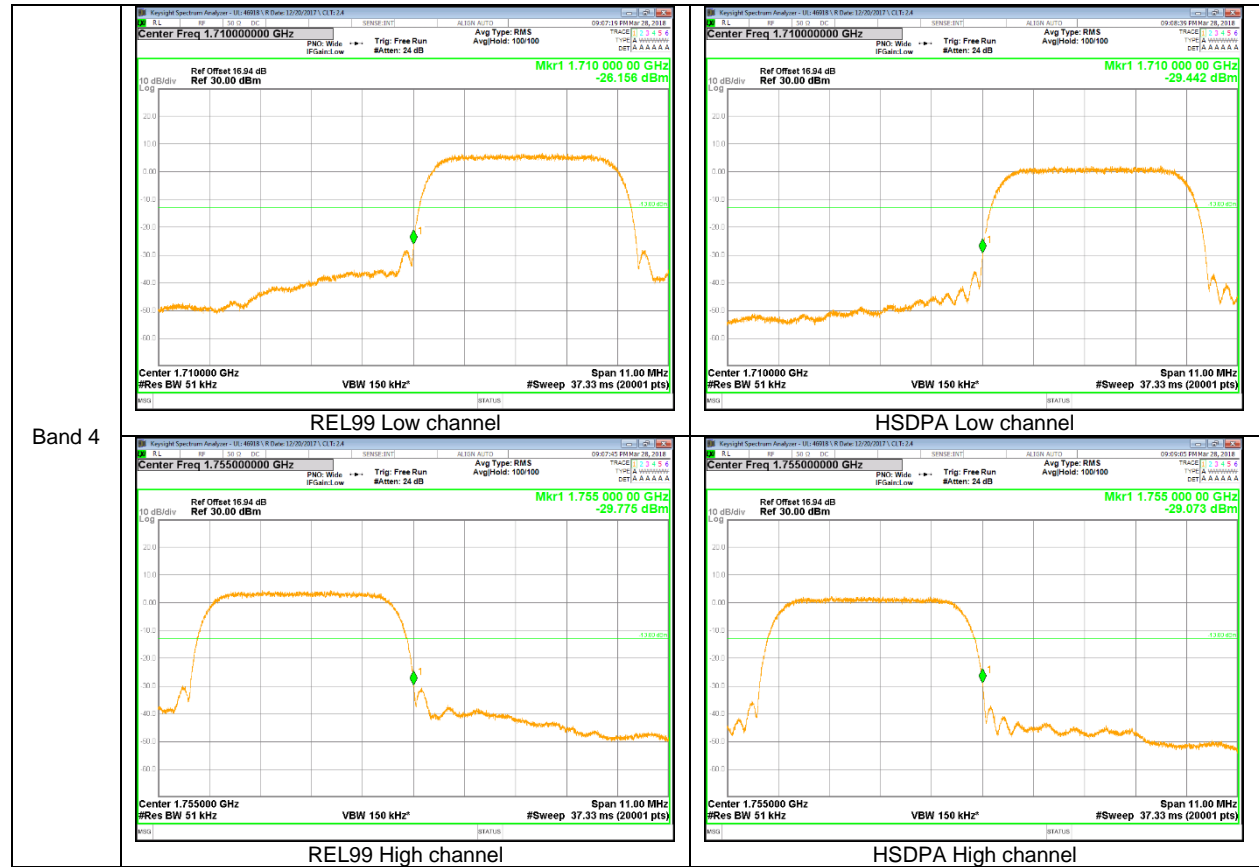
GSM



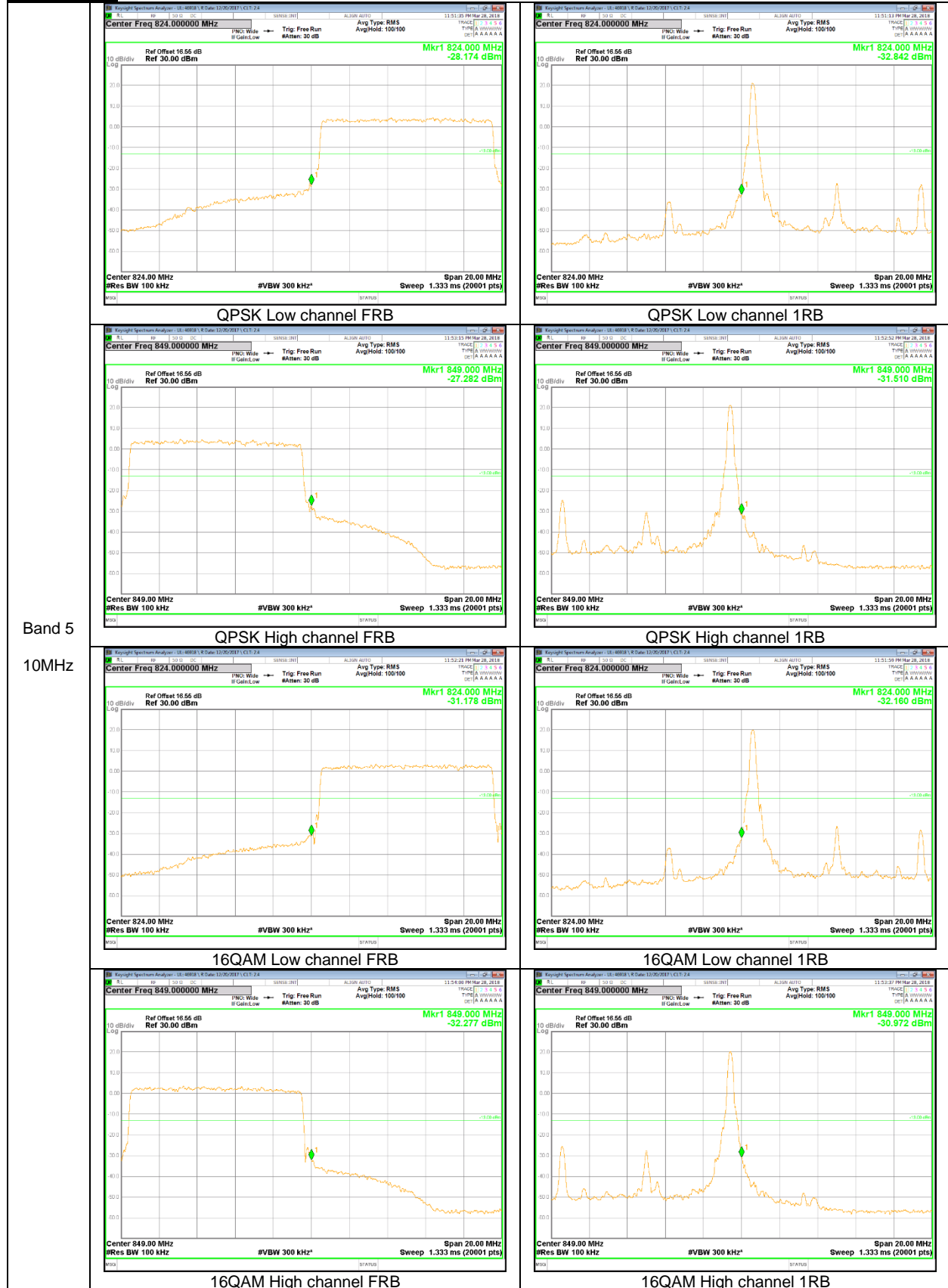
WCDMA



WCDMA



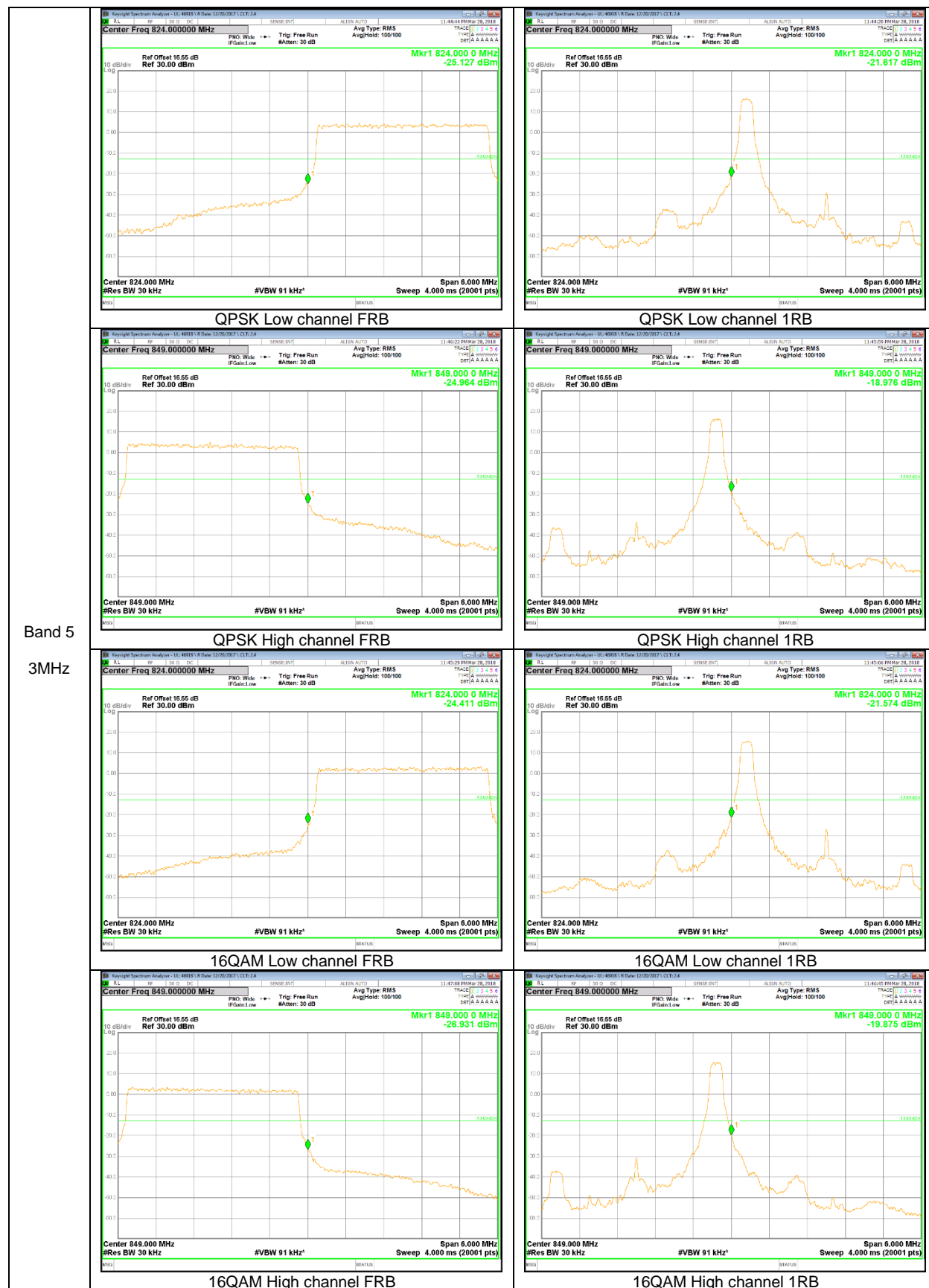
LTE Band 5



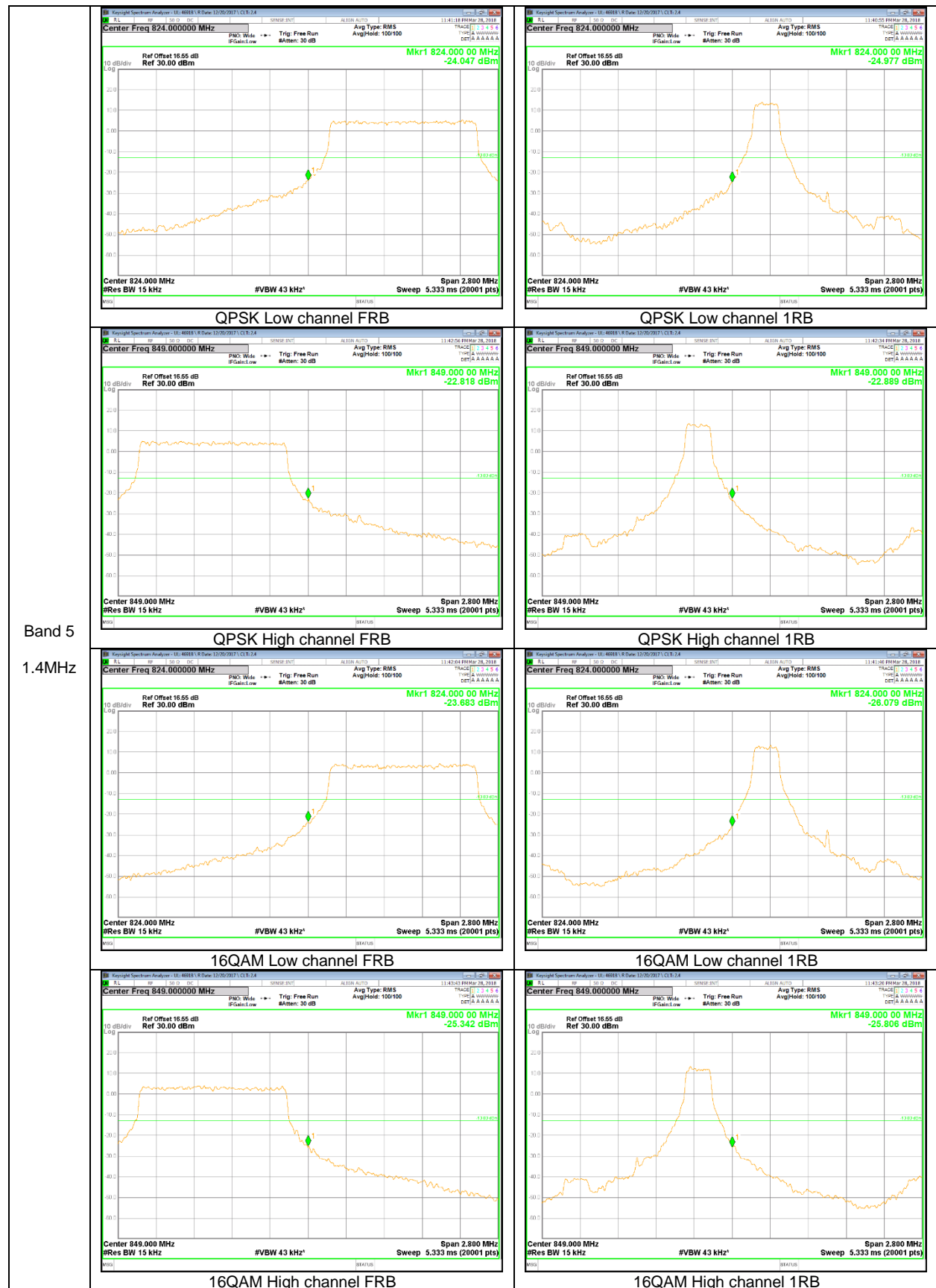
Band 5
10MHz



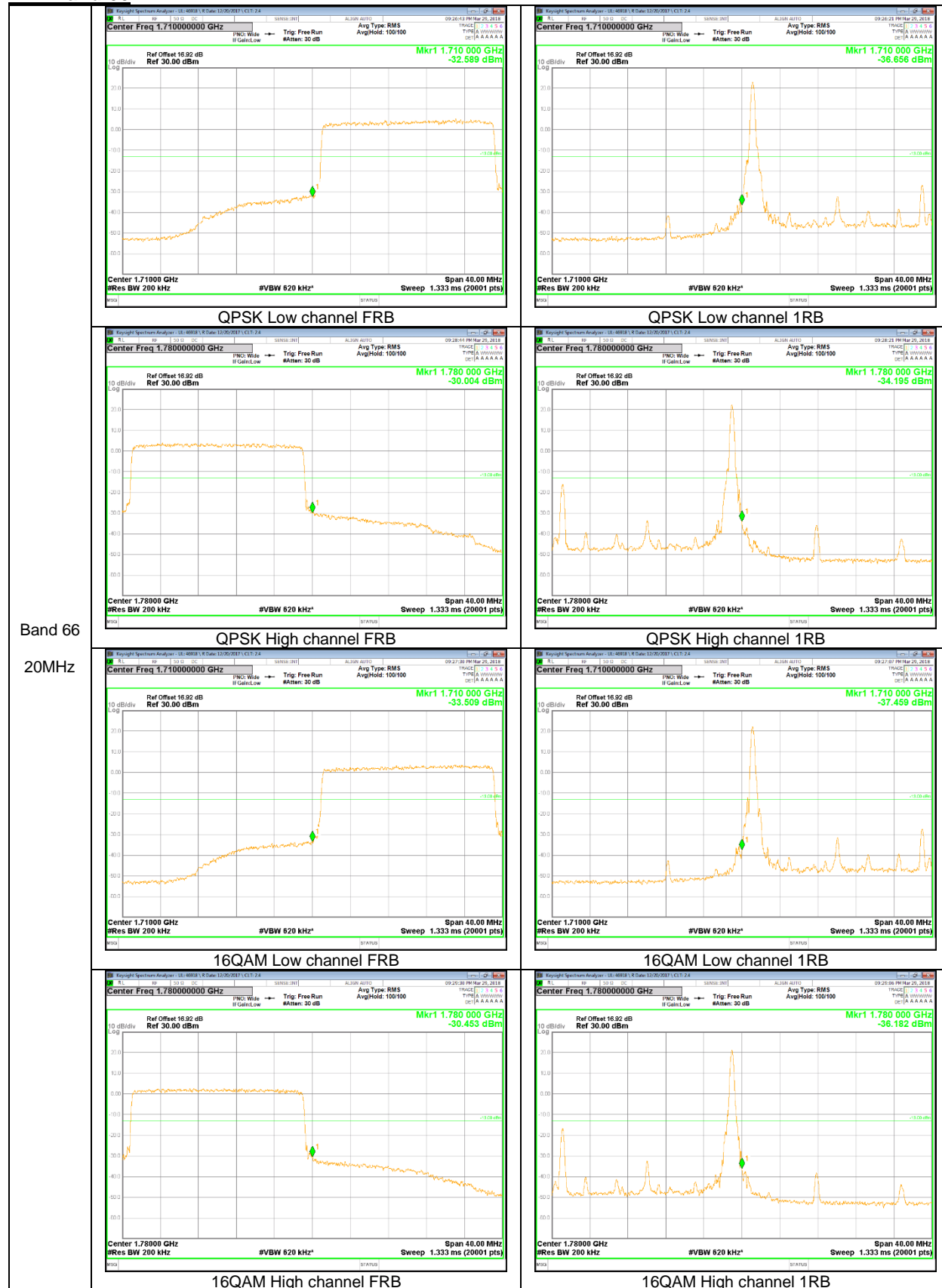
Band 5
 5MHz



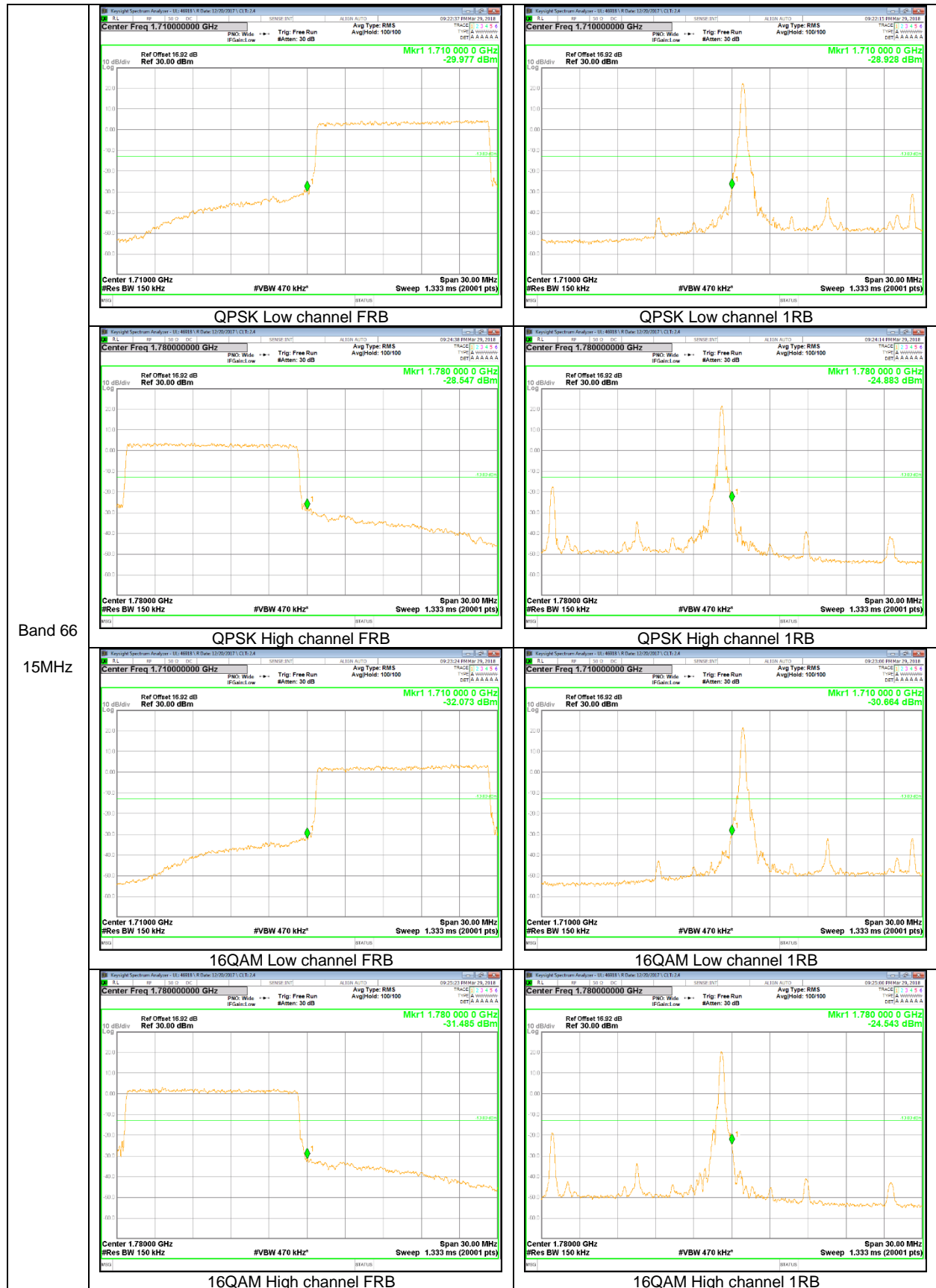
Band 5
3MHz



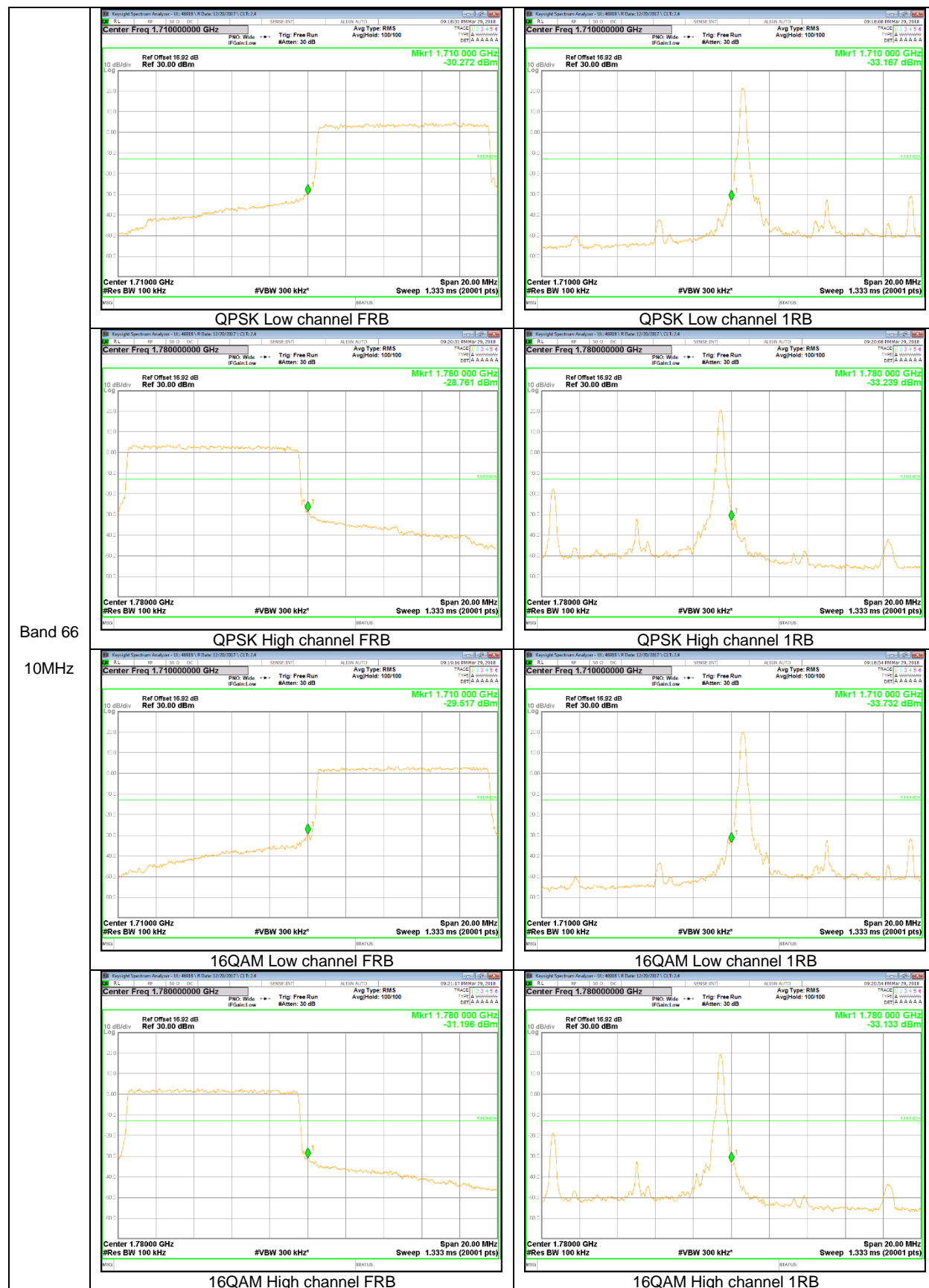
LTE Band 66



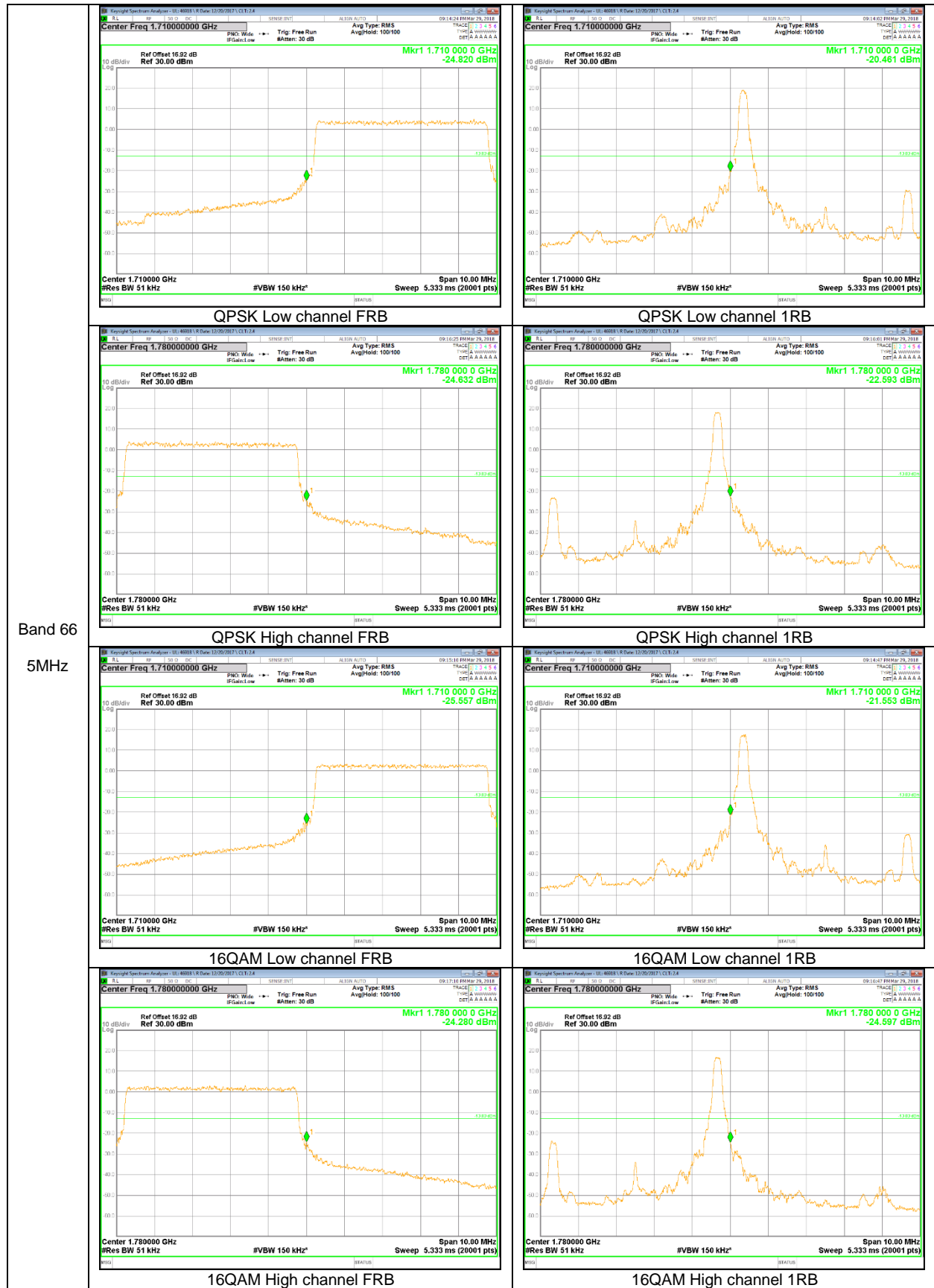
Band 66
20MHz



Band 66
15MHz



Band 66
10MHz



Band 66
5MHz

