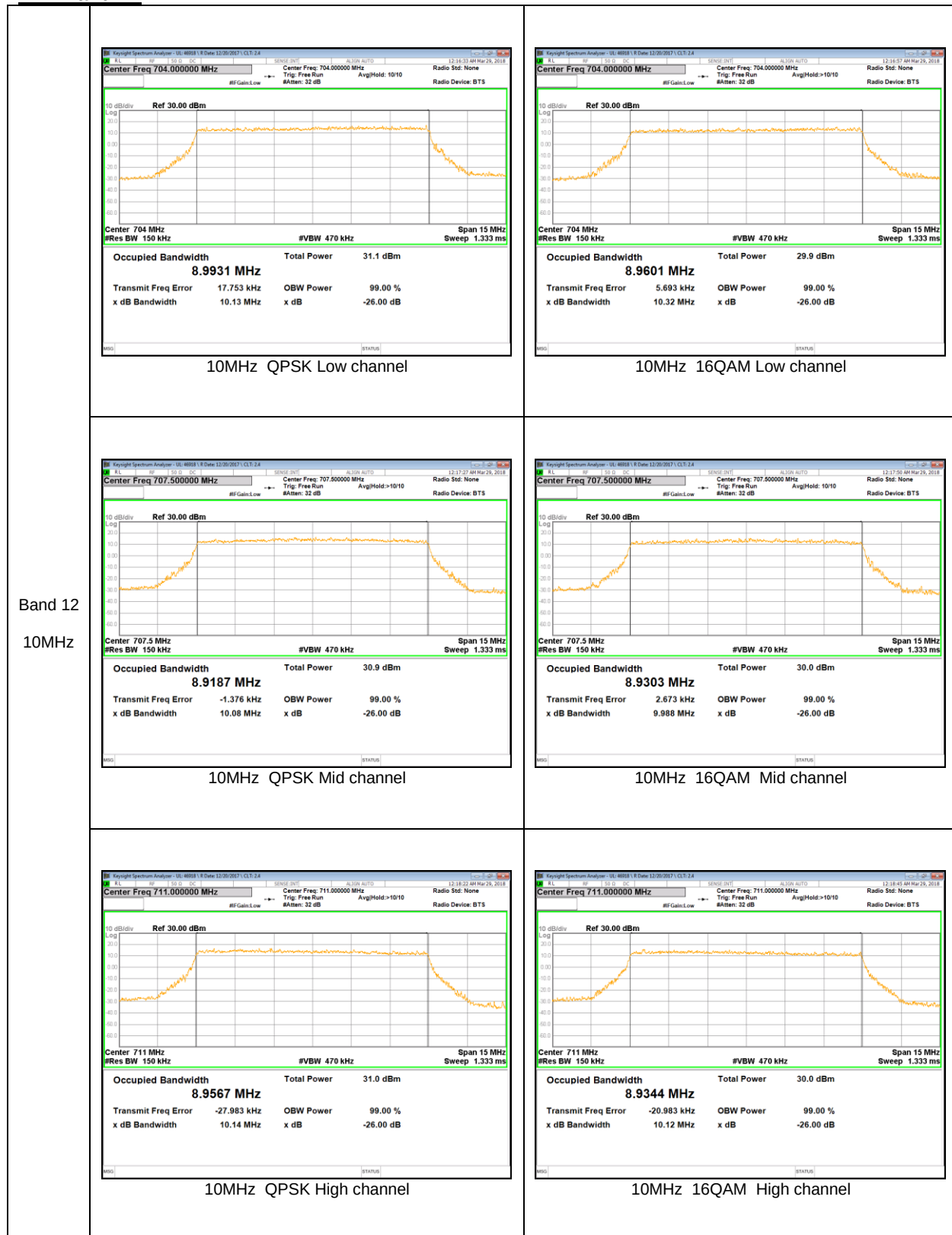
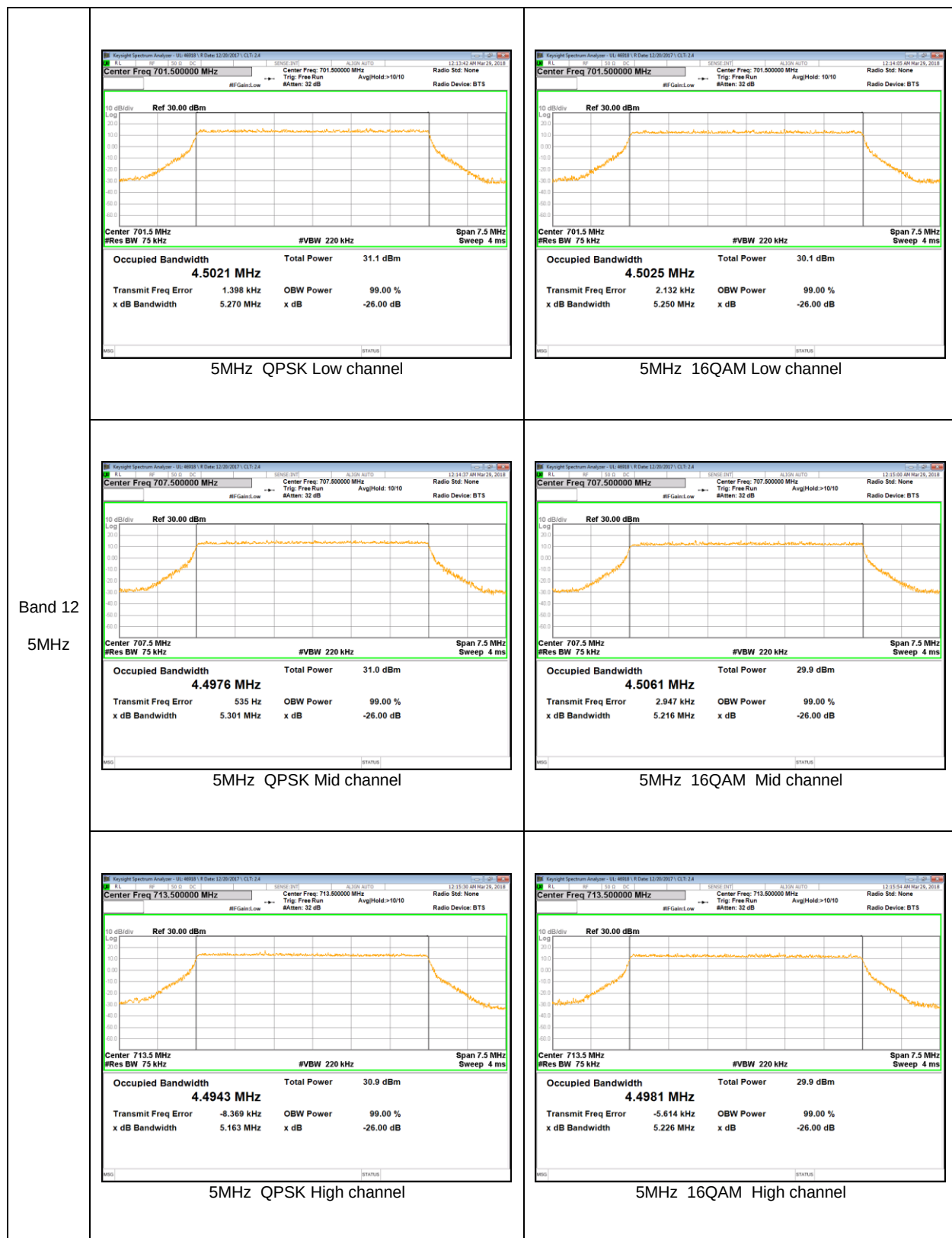
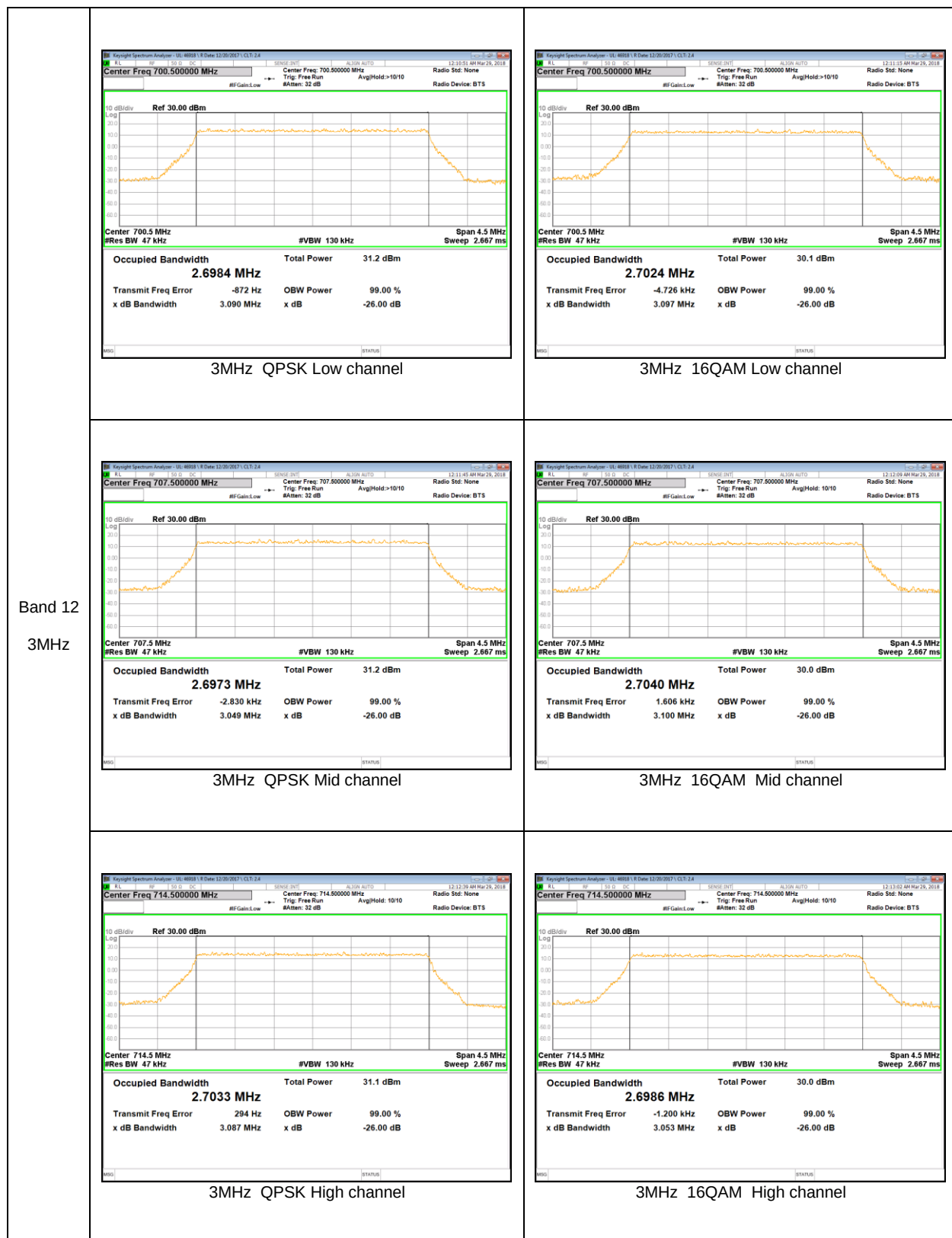
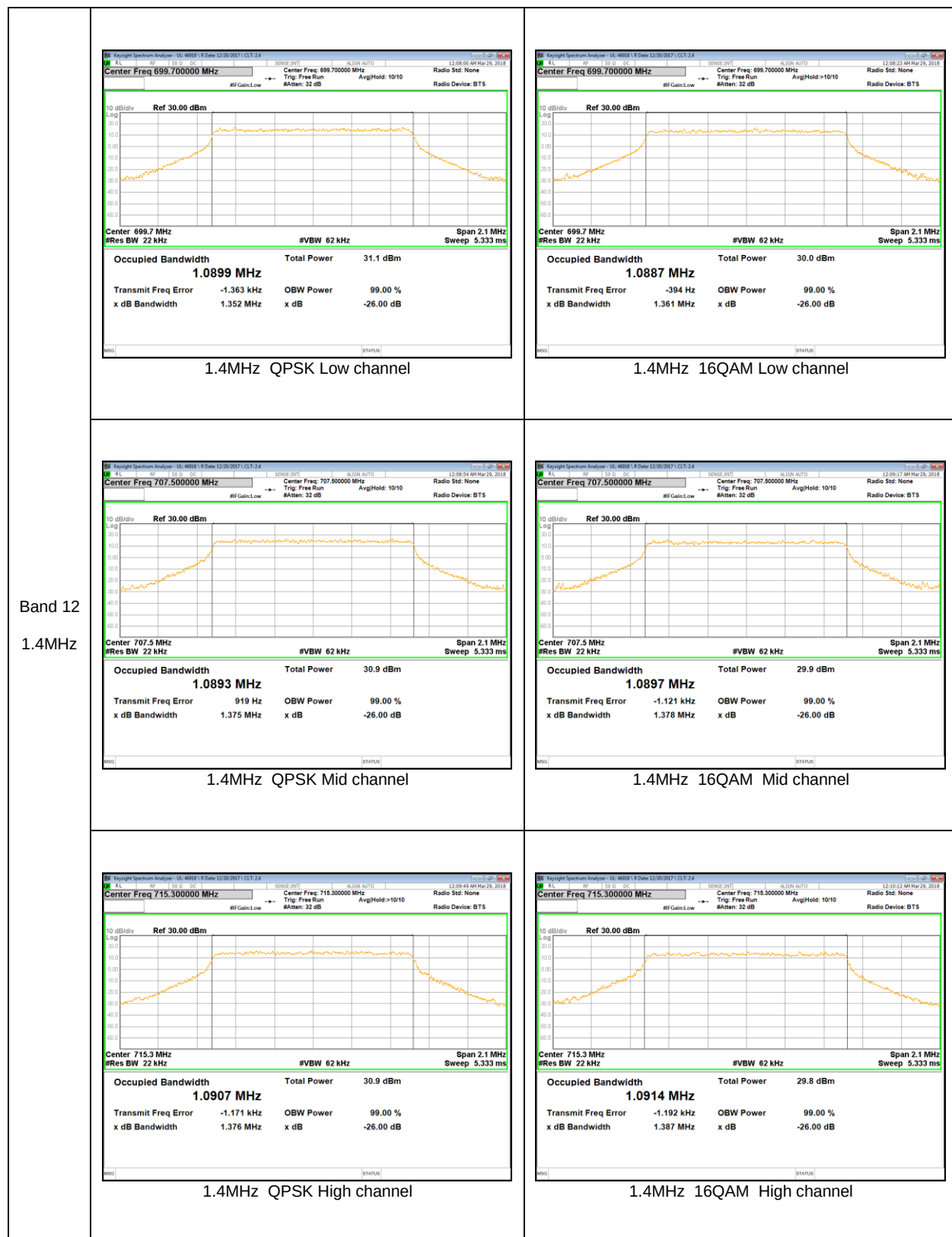


LTE Band 12

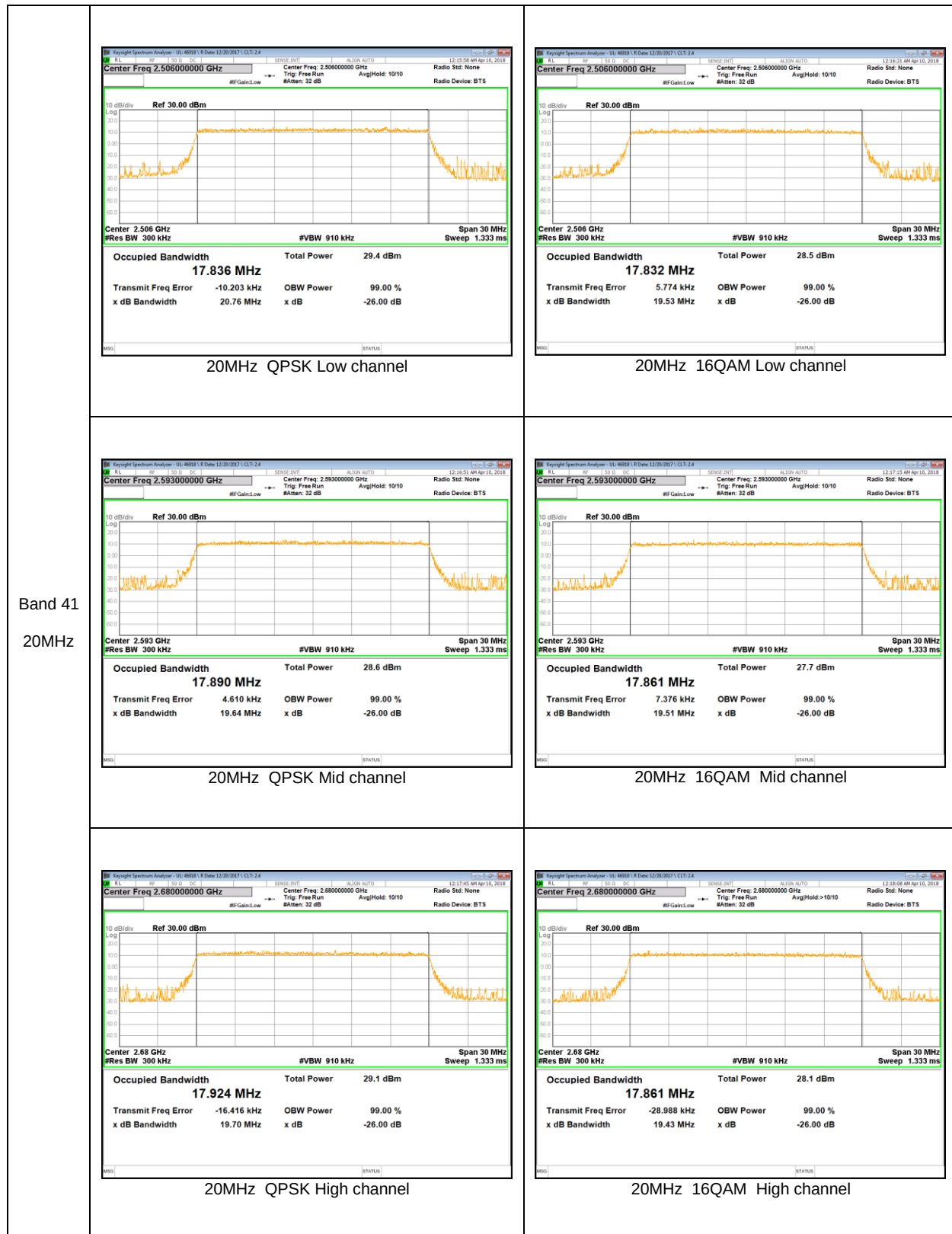


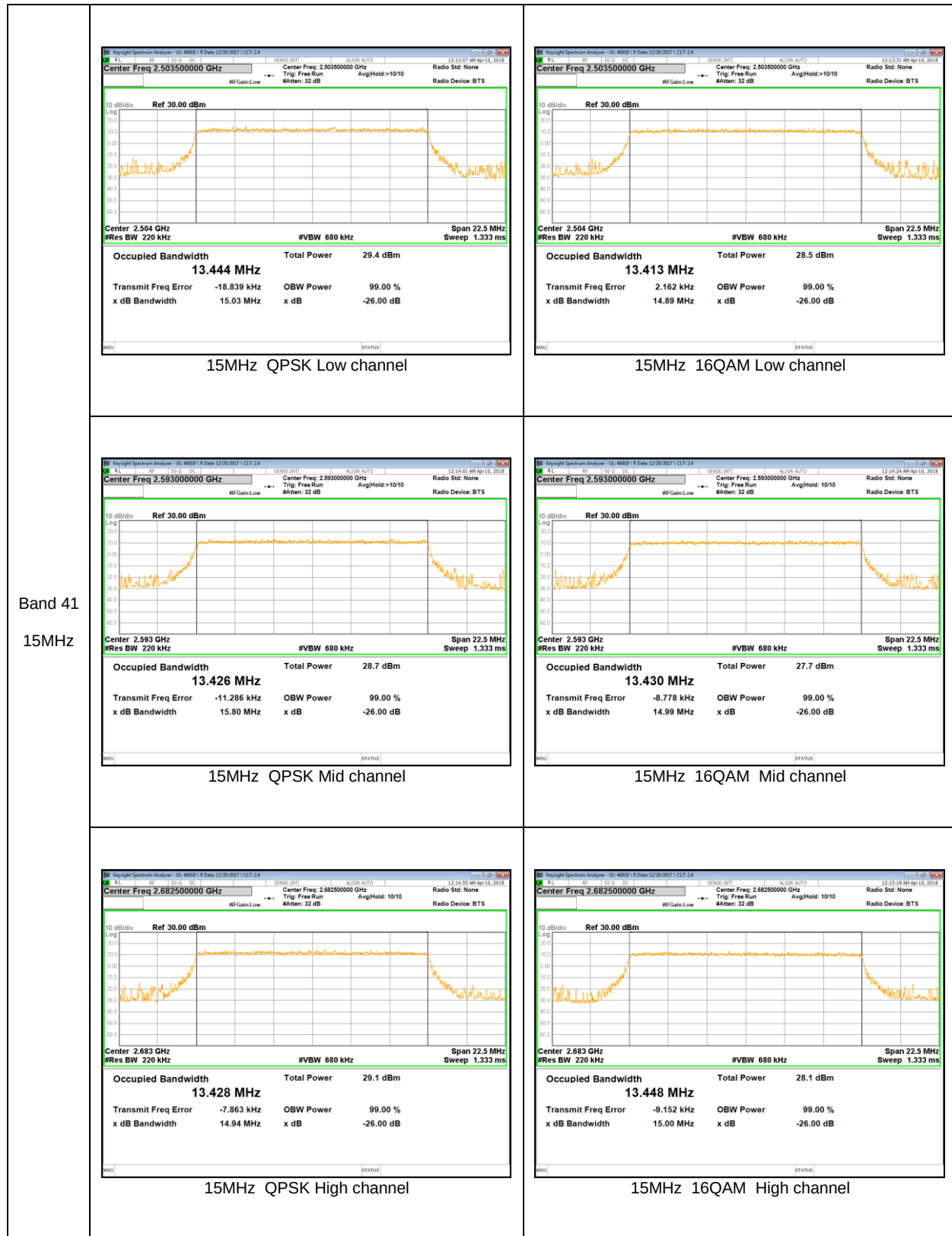


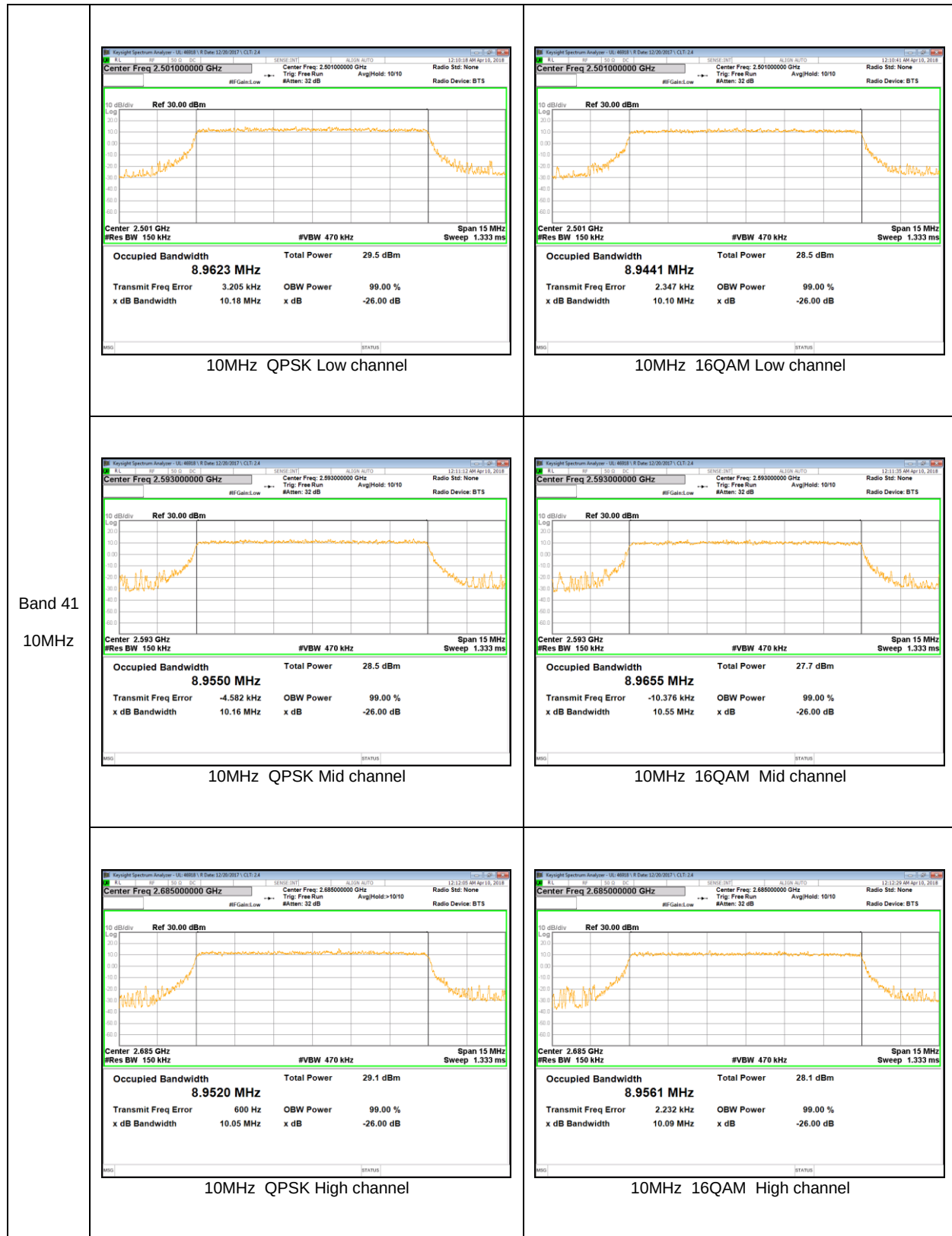


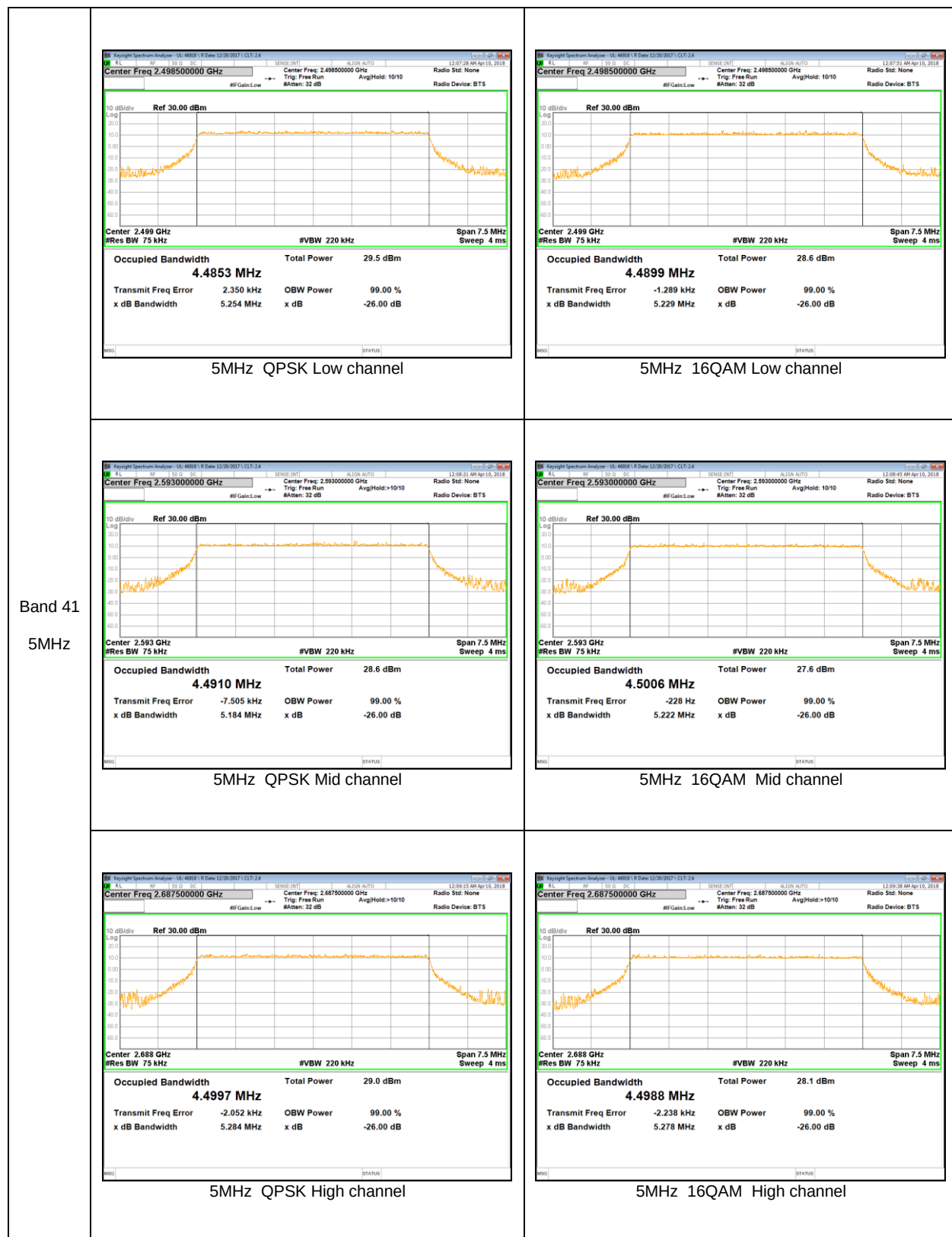


LTE Band 41

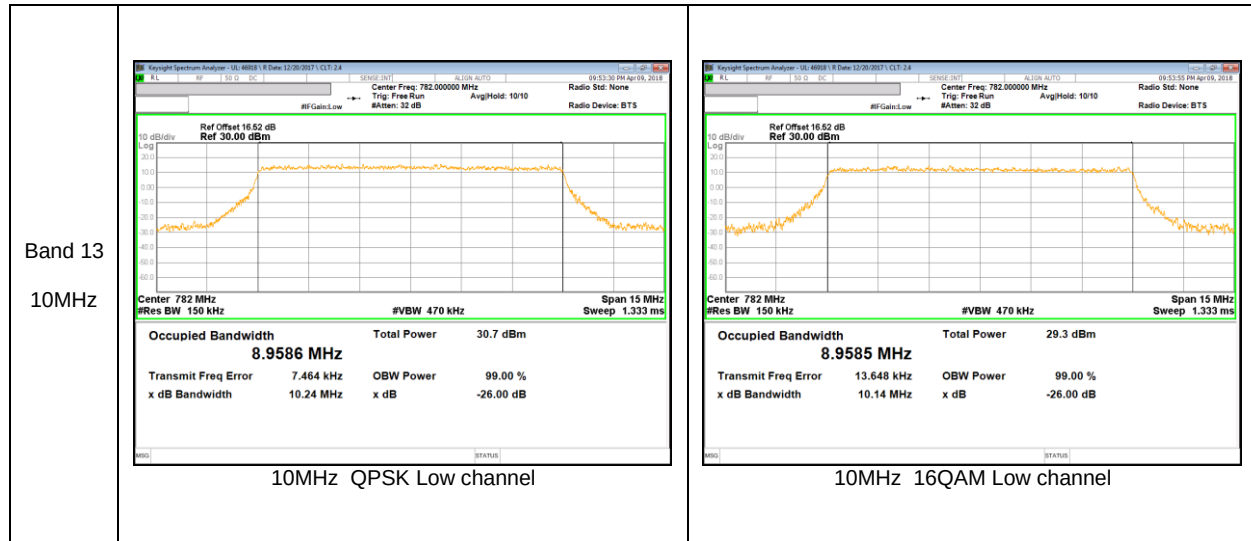


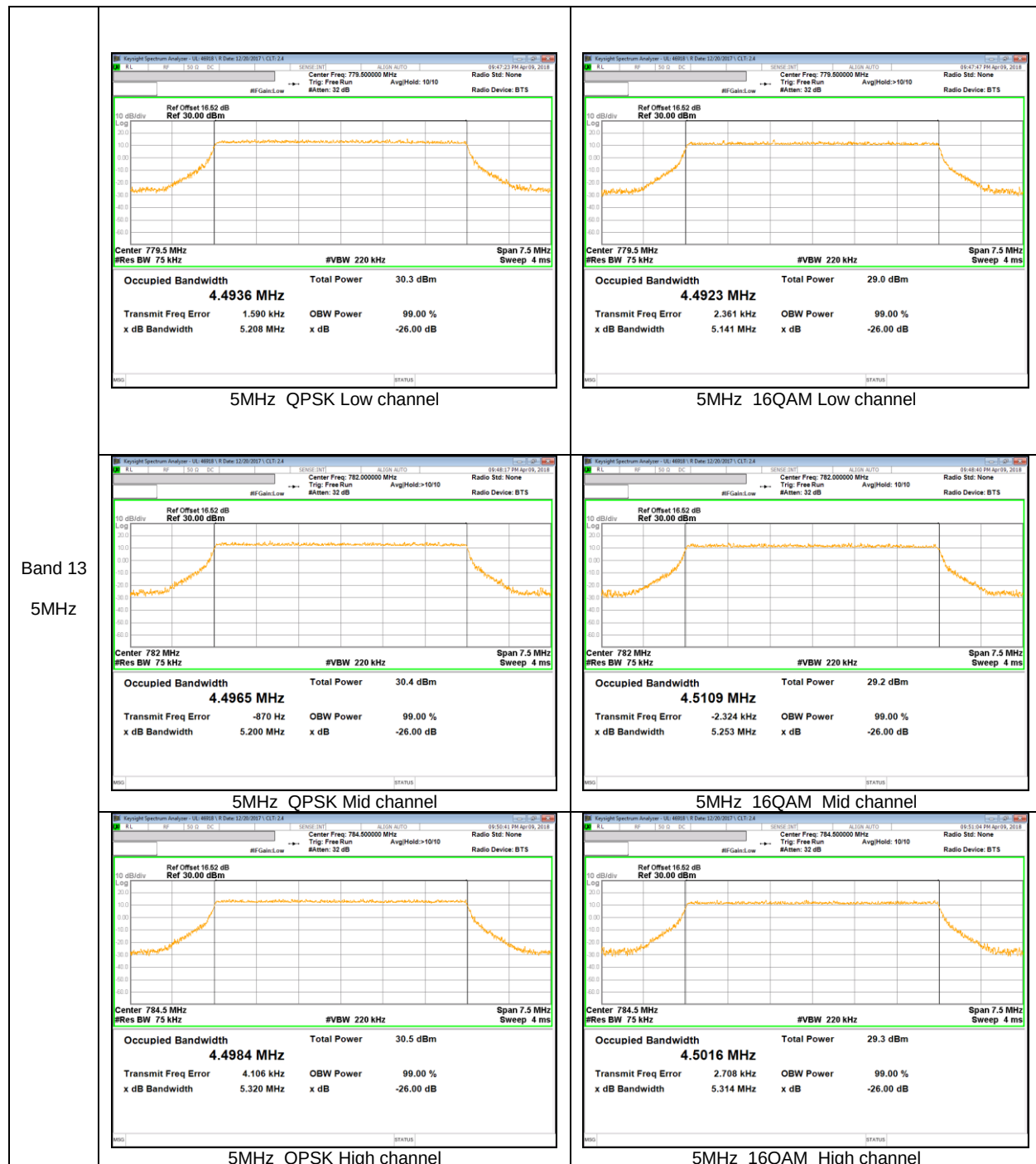






LTE Band 13





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 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.

(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.

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 $\geq 2 \times \text{Span} / \text{RBW}$;
- 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 $\geq 2 \times \text{Span} / \text{RBW}$;
- 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 $\geq 3 \times$ RBW;
- c) Sweep time = 1 second ;
- d) Detector = RMS;
- e) Ensure that the number of measurement points $\geq 2 \times \text{Span} / \text{RBW}$;
- f) Trace mode = Maxhold;

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	
			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	
			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	
			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	
			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	
			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	
			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 13

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	777.000	-32.971	-13.00
			FRB	777.000	-30.891	
		Upper	1RB	787.000	-31.307	
			FRB	787.000	-30.993	
	16QAM	Lower	1RB	777.000	-33.953	
			FRB	777.000	-30.434	
		Upper	1RB	787.000	-30.821	
			FRB	787.000	-33.877	
5 MHz	QPSK	Lower	1RB	777.000	-22.603	-13.00
			FRB	777.000	-25.629	
		Upper	1RB	787.000	-22.438	
			FRB	787.000	-23.672	
	16QAM	Lower	1RB	777.000	-23.581	
			FRB	777.000	-26.599	
		Upper	1RB	787.000	-22.993	
			FRB	787.000	-24.761	

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.

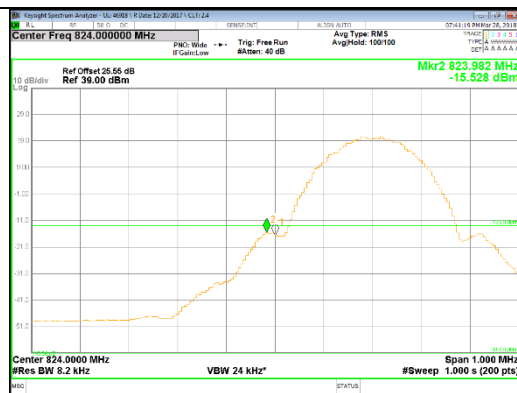
LTE 41

Please refer to Emission Mask Plots.

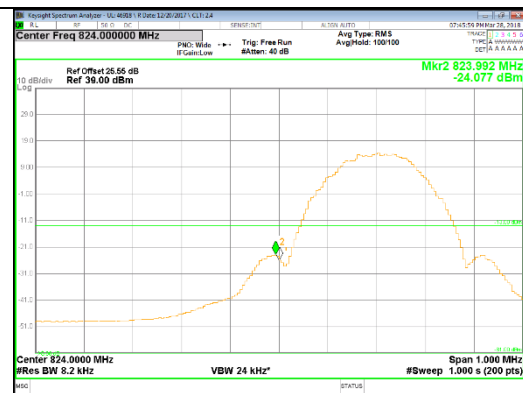
9.2.1. BAND EDGE PLOTS

GSM

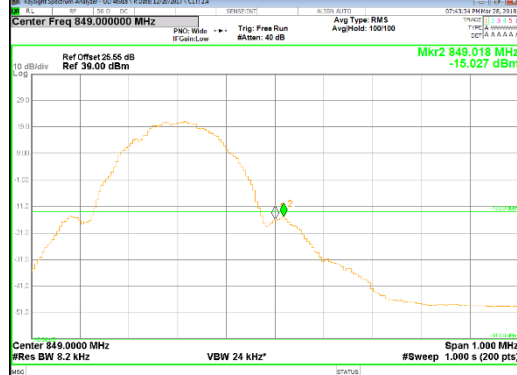
GSM
850



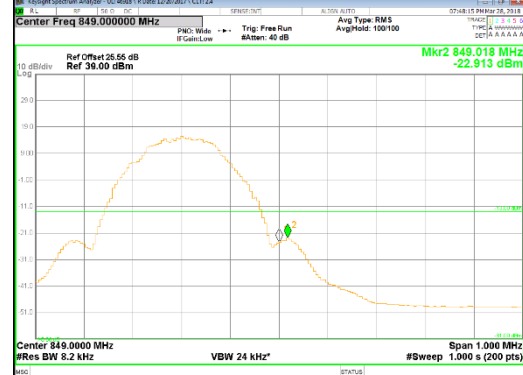
GSM850 GPRS Low channel



GSM850 EGPRS Low channel

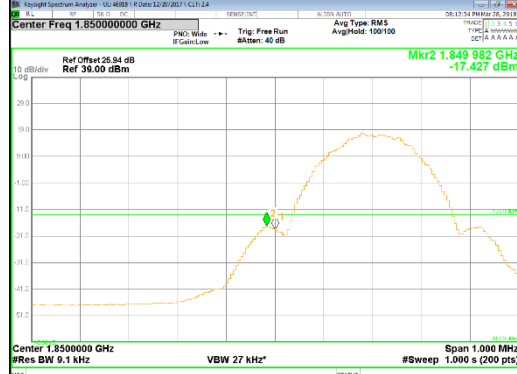


GSM850 GPRS High channel

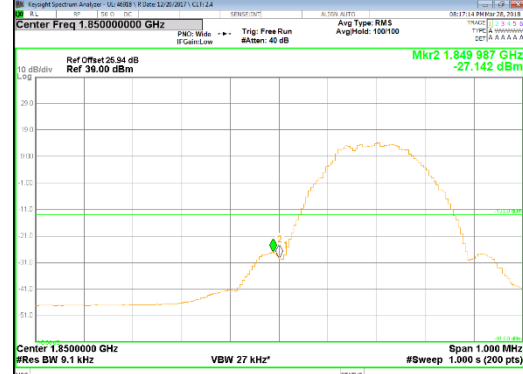


GSM850 EGPRS High channel

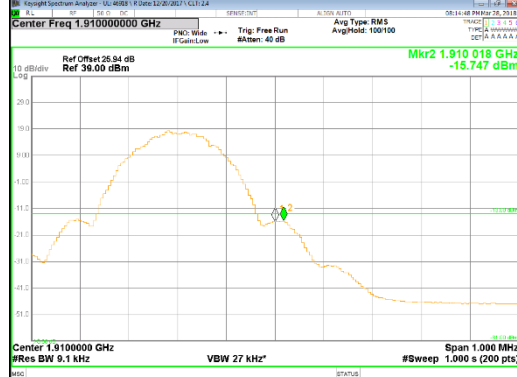
GSM
1900



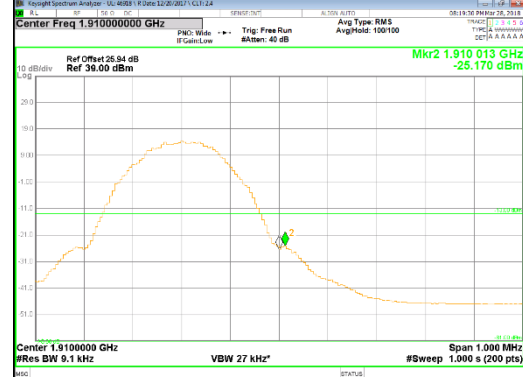
GSM1900 GPRS Low channel



GSM1900 EGPRS Low channel

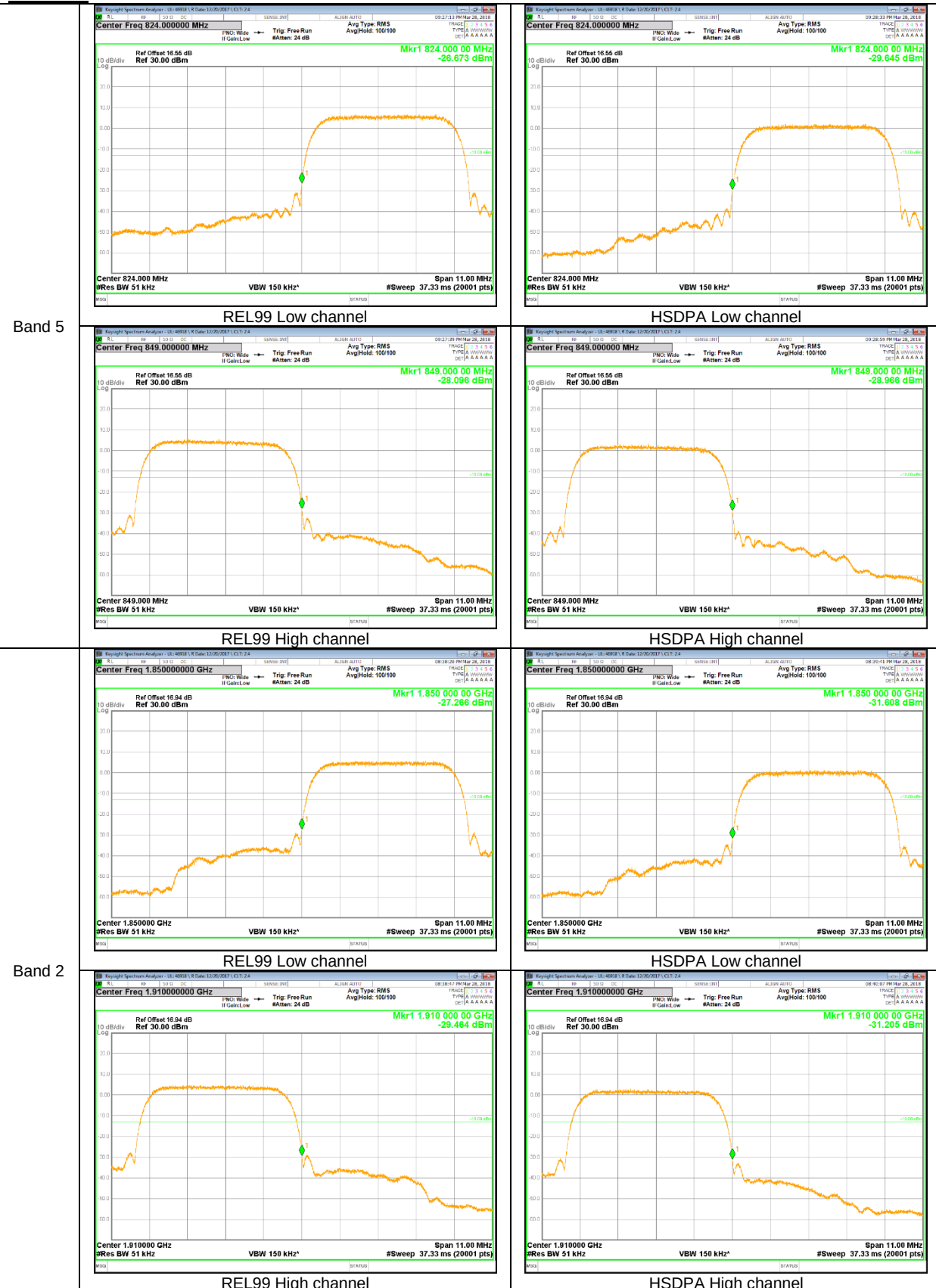


GSM1900 GPRS High channel

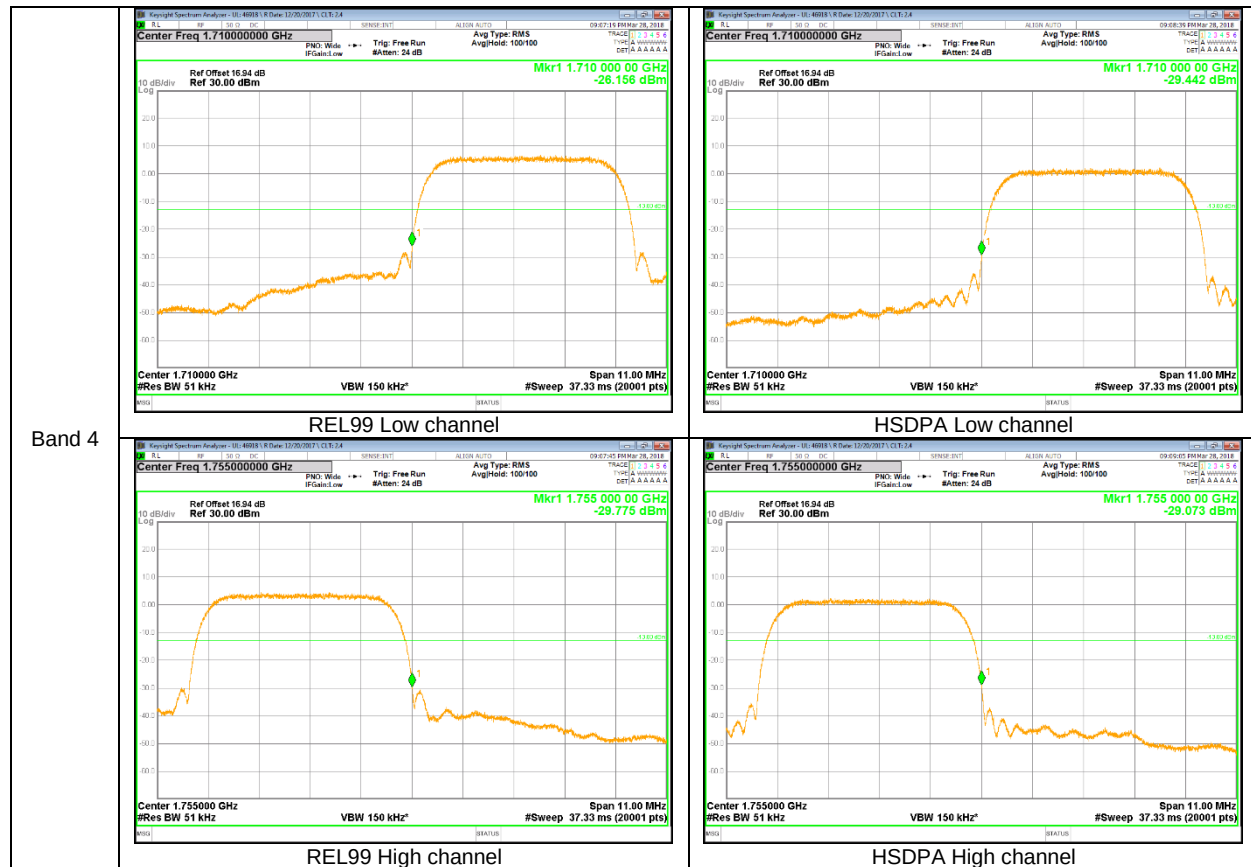


GSM1900 EGPRS High channel

WCDMA



WCDMA



LTE Band 5

