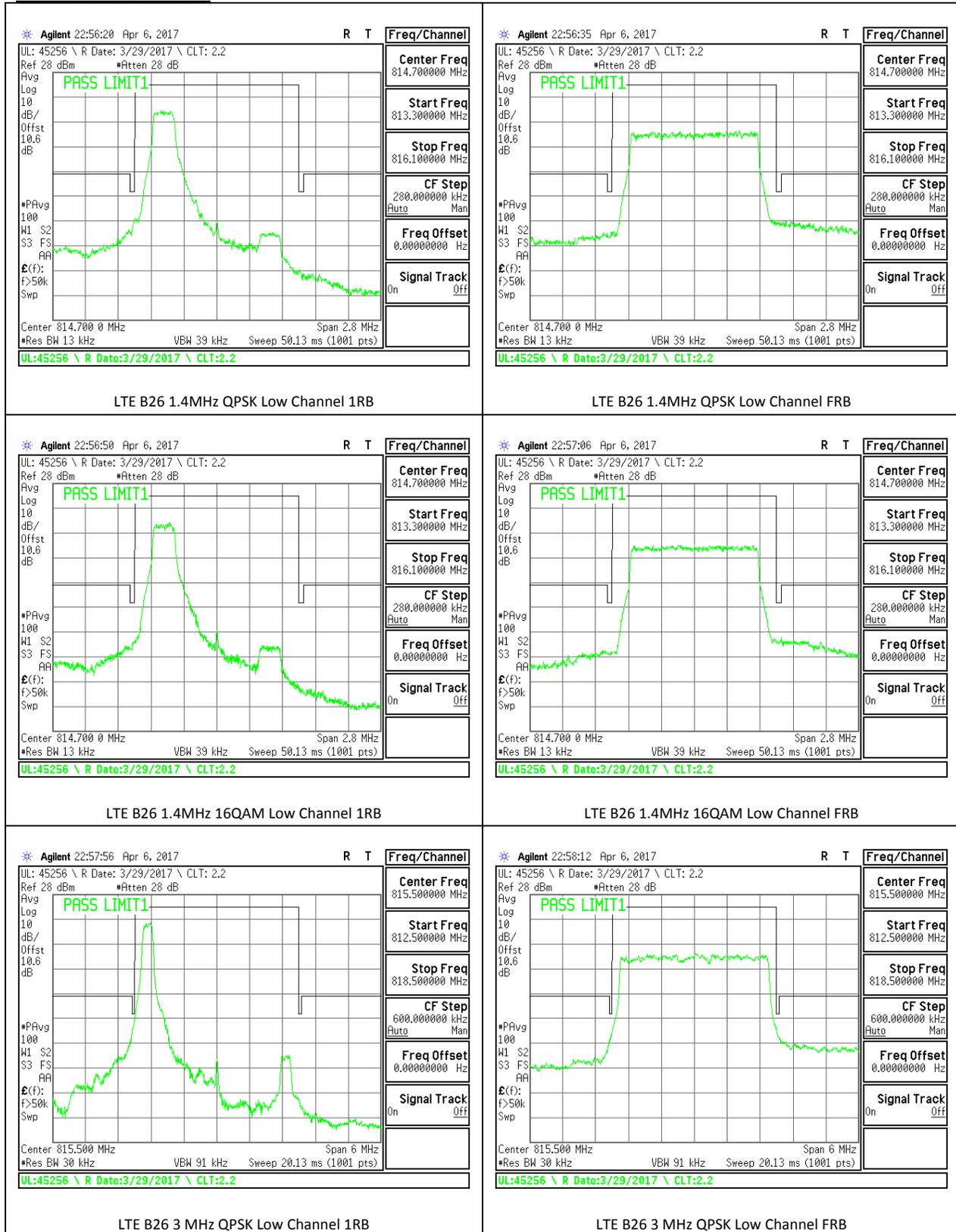
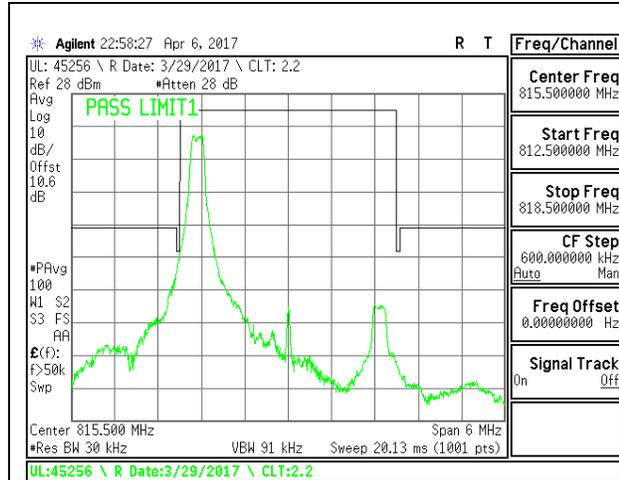
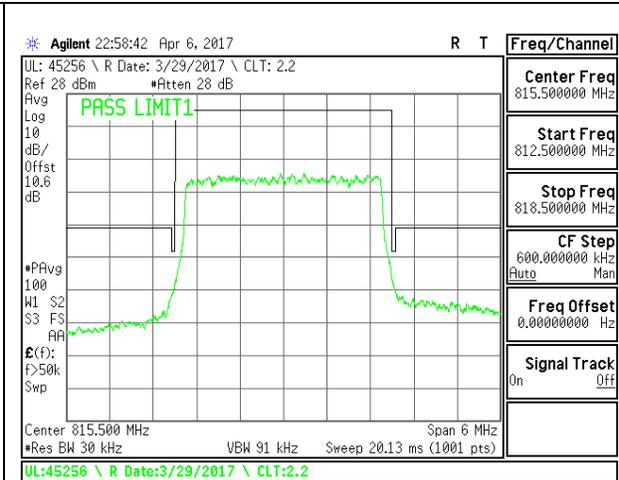


LTE Band 26 Part 90

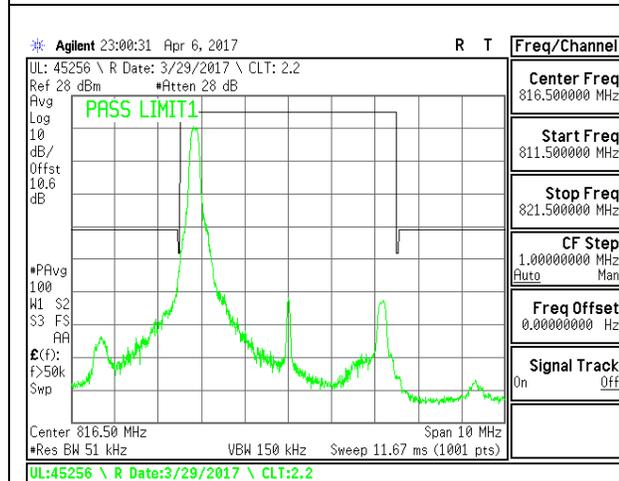




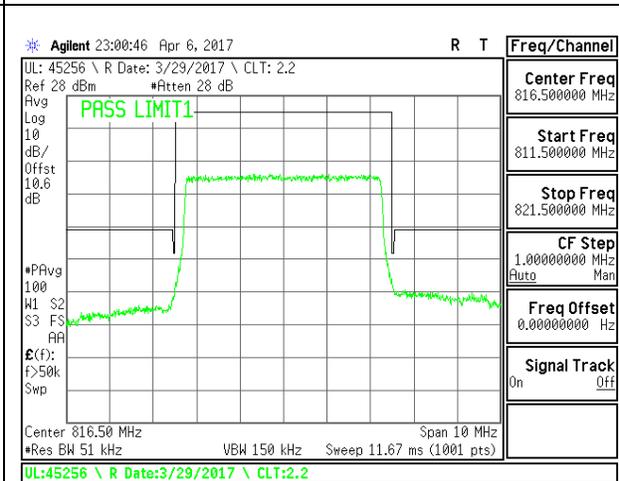
LTE B26 3 MHz 16QAM Low Channel 1RB



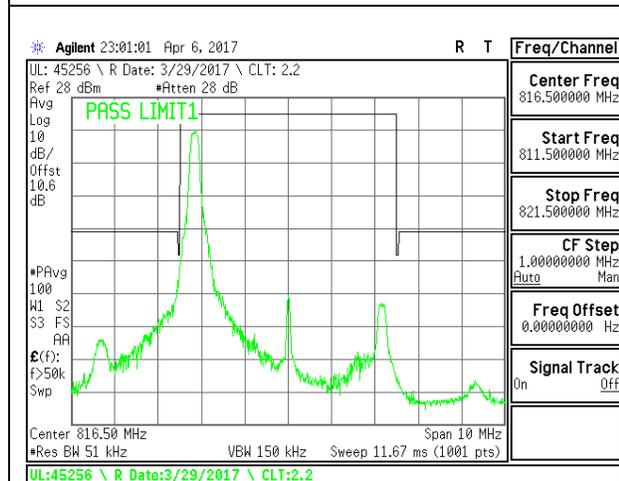
LTE B26 3 MHz 16QAM Low Channel FRB



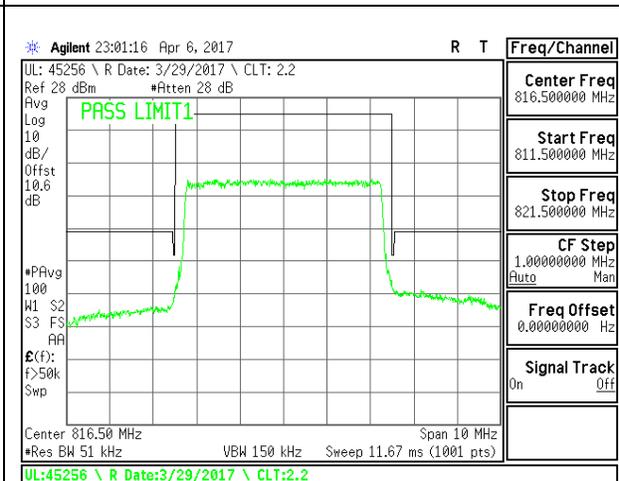
LTE B26 5 MHz QPSK Low Channel 1RB



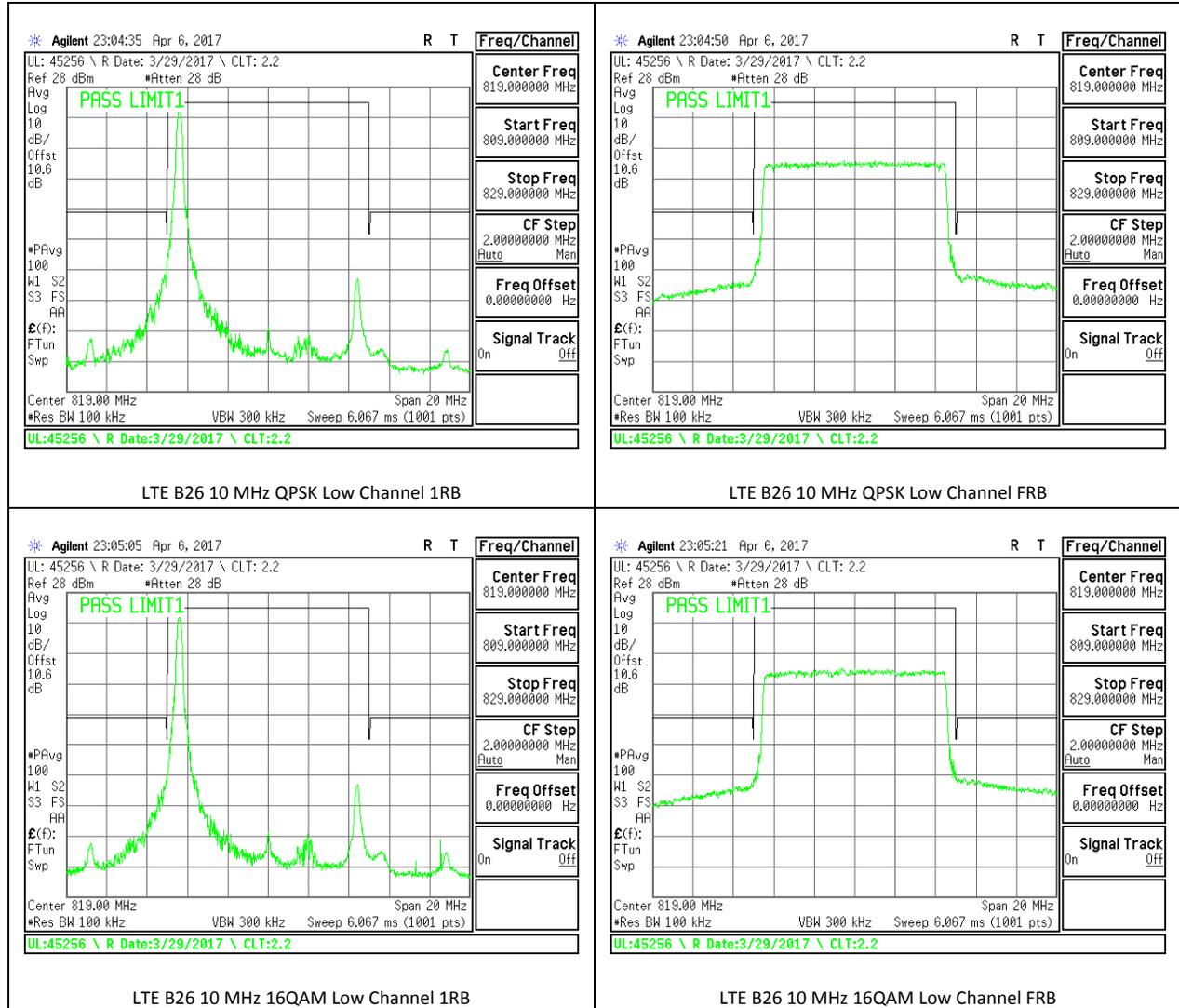
LTE B26 5 MHz QPSK Low Channel FRB



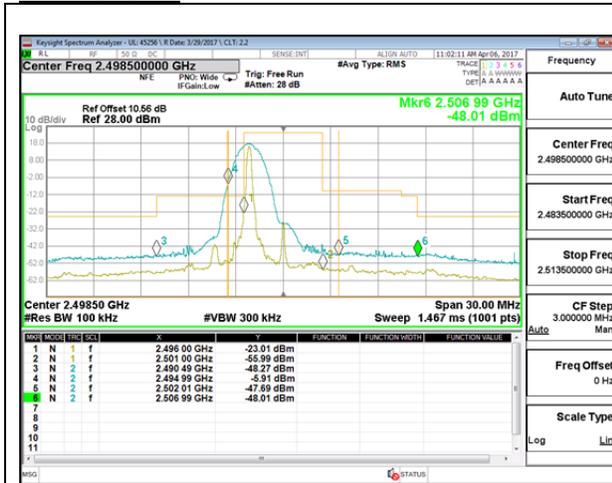
LTE B26 5 MHz 16QAM Low Channel 1RB



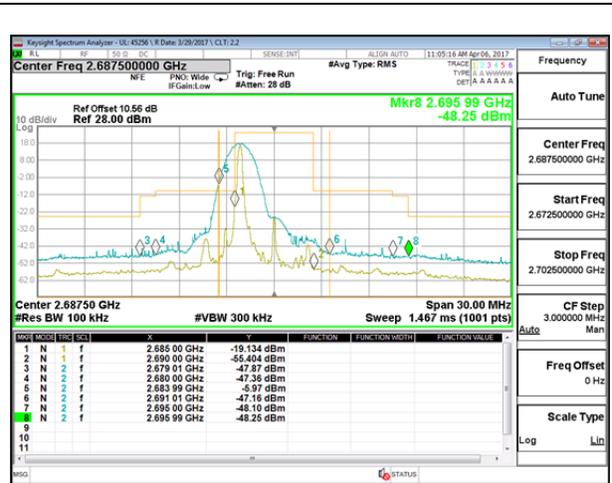
LTE B26 5 MHz 16QAM Low Channel FRB



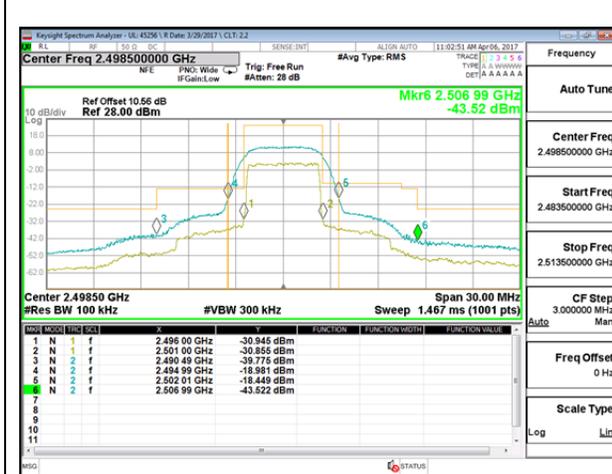
LTE Band 41



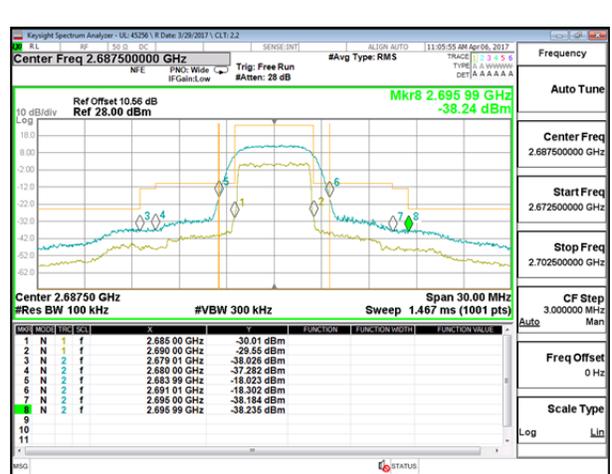
LTE B41 5MHz QPSK Low Channel 1RB



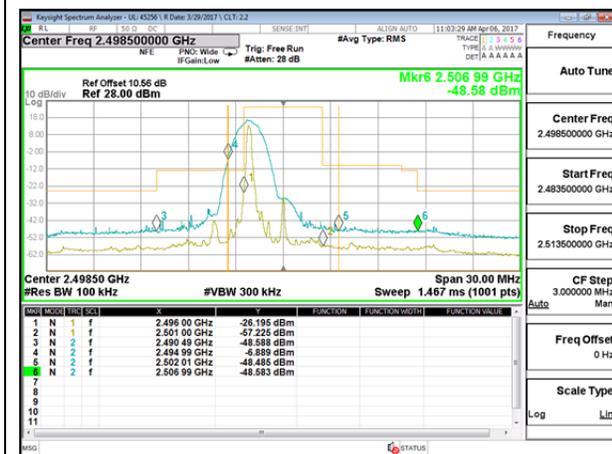
LTE B41 5MHz QPSK High Channel 1RB



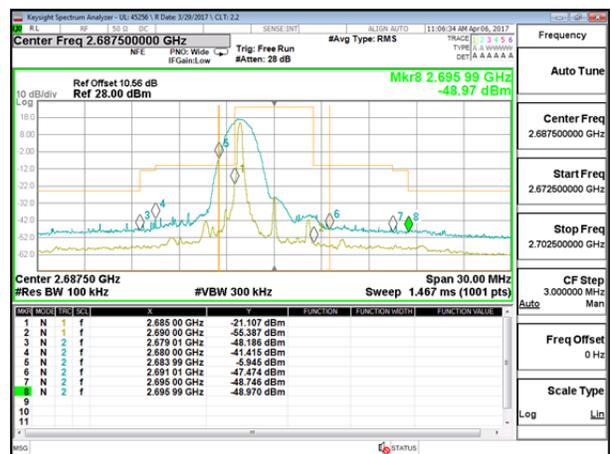
LTE B41 5MHz QPSK Low Channel FRB



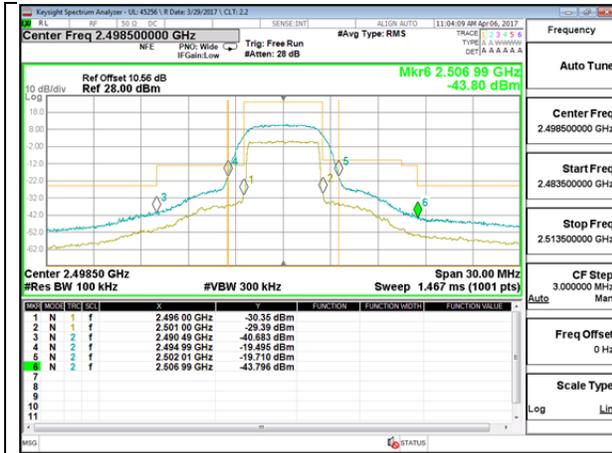
LTE B41 5MHz QPSK High Channel FRB



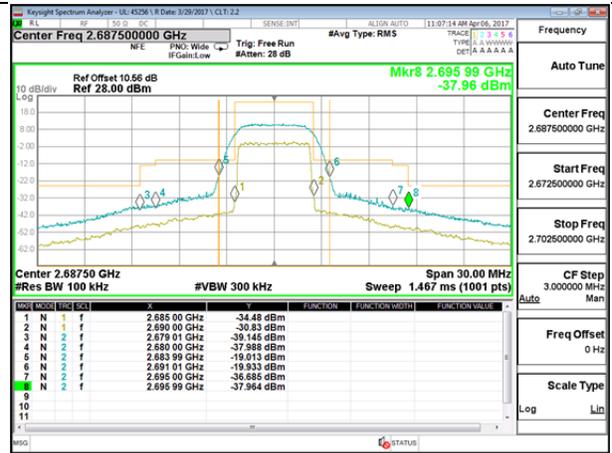
LTE B41 5MHz 16QAM Low Channel 1RB



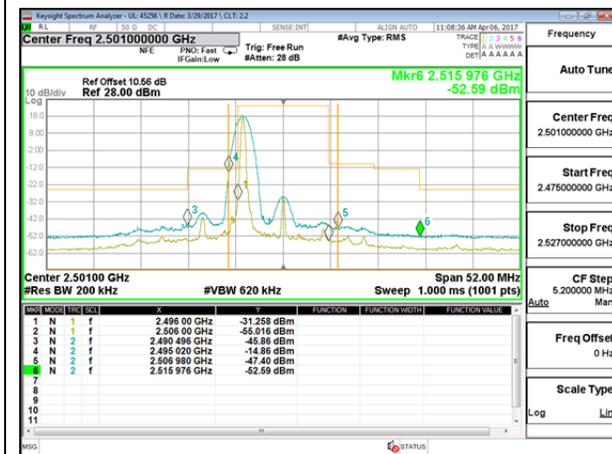
LTE B41 5MHz 16QAM High Channel 1RB



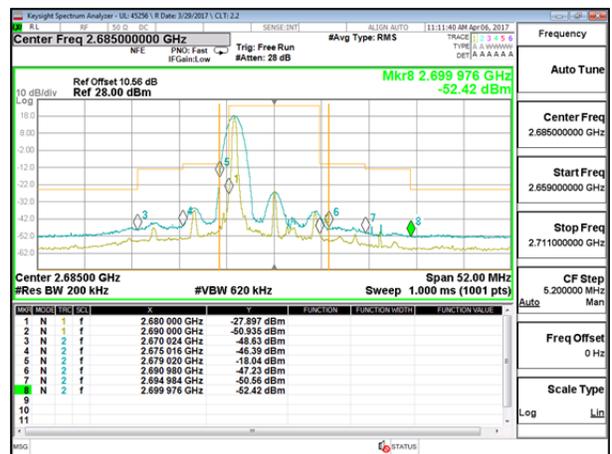
LTE B41 5MHz 16QAM Low Channel FRB



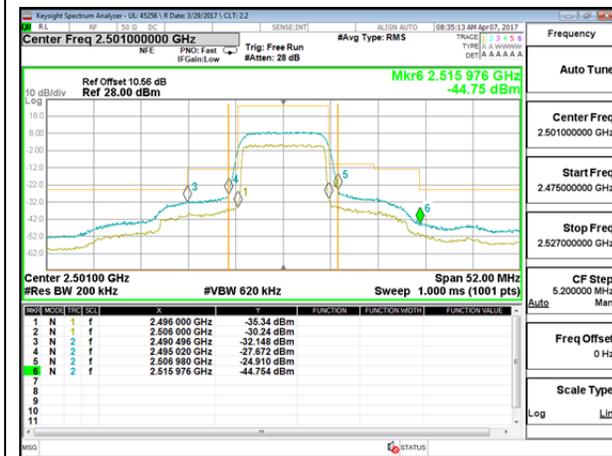
LTE B41 5MHz 16QAM High Channel FRB



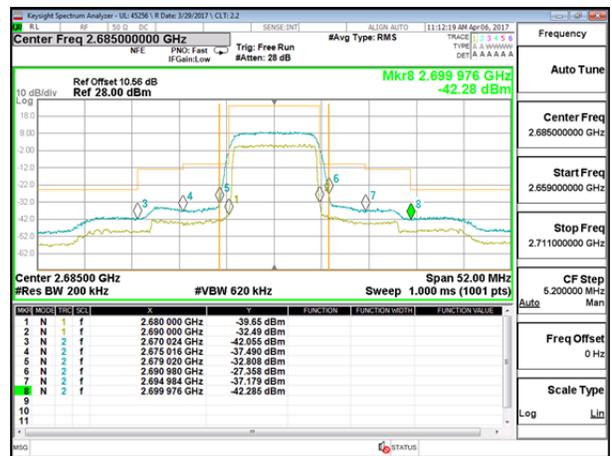
LTE B41 10MHz QPSK Low Channel 1RB



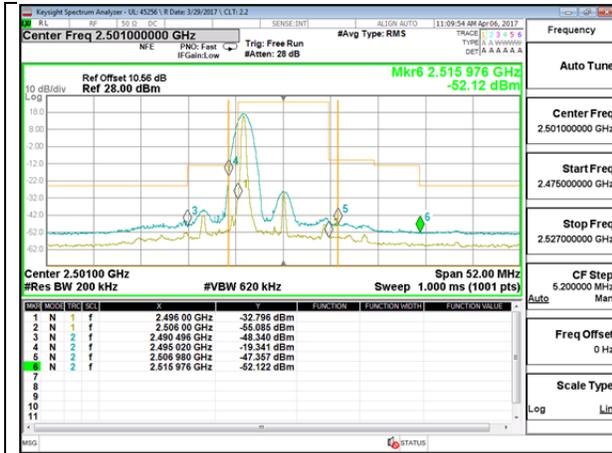
LTE B41 10MHz QPSK High Channel 1RB



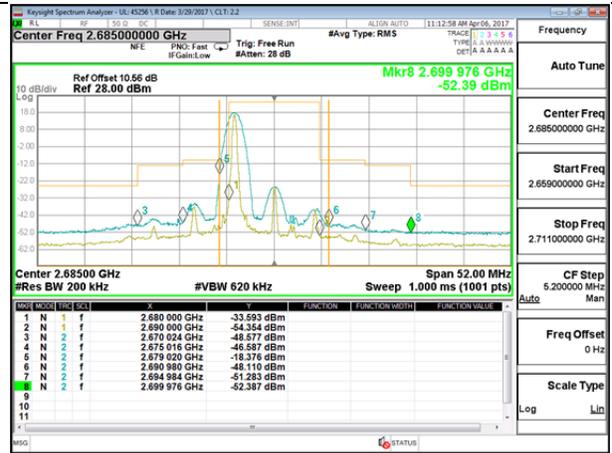
LTE B41 10MHz QPSK Low Channel FRB



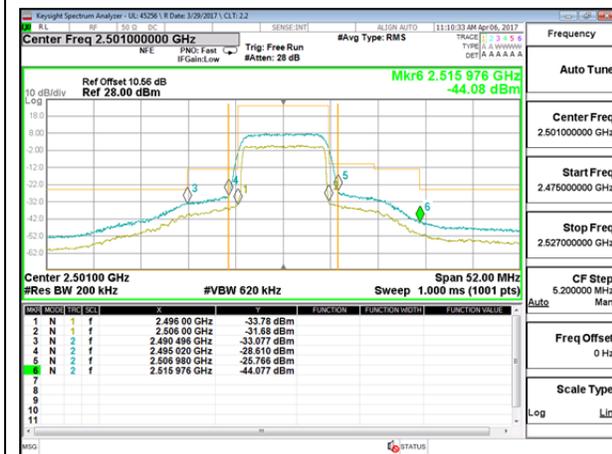
LTE B41 10MHz QPSK High Channel FRB



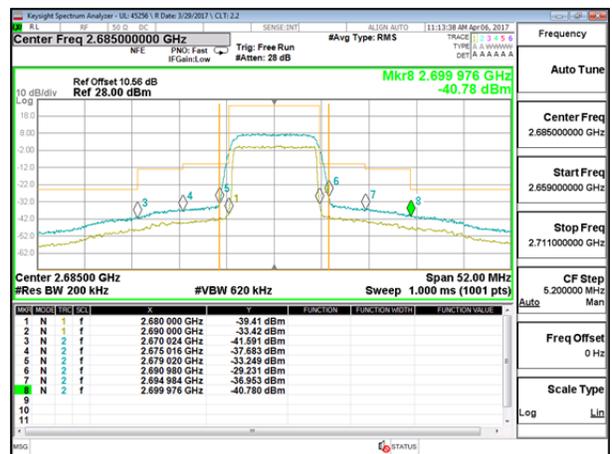
LTE B41 10MHz 16QAM Low Channel 1RB



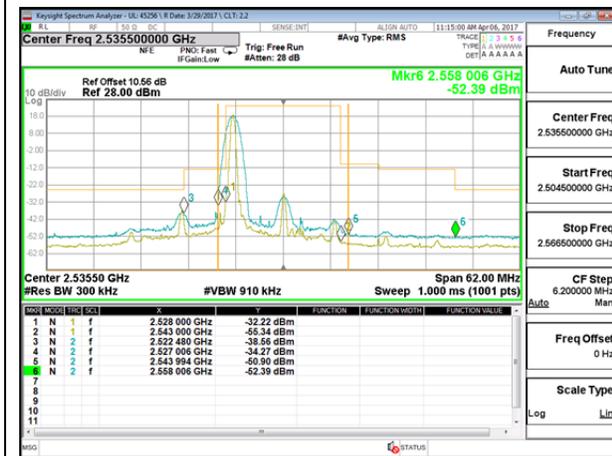
LTE B41 10MHz 16QAM High Channel 1RB



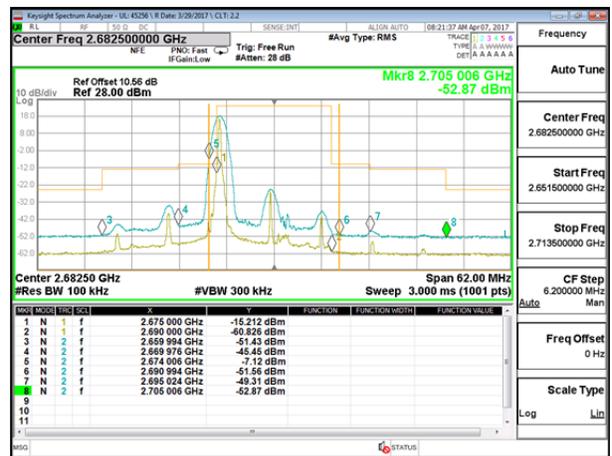
LTE B41 10MHz 16QAM Low Channel FRB



LTE B41 10MHz 16QAM High Channel FRB



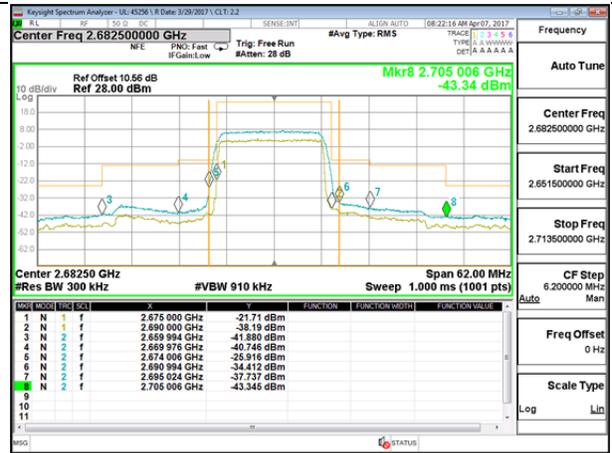
LTE B41 15MHz QPSK Low Channel 1RB



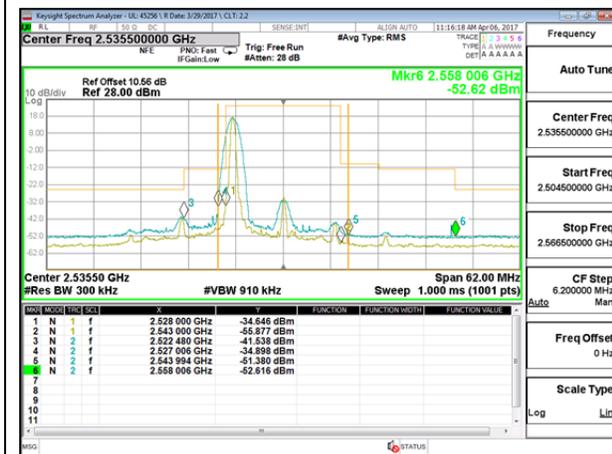
LTE B41 15MHz QPSK High Channel 1RB



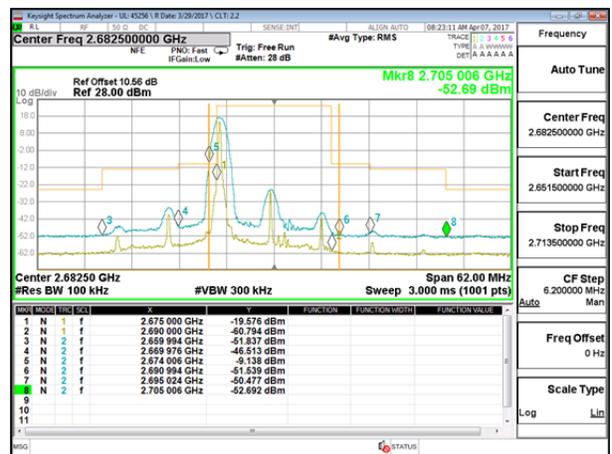
LTE B41 15MHz QPSK Low Channel FRB



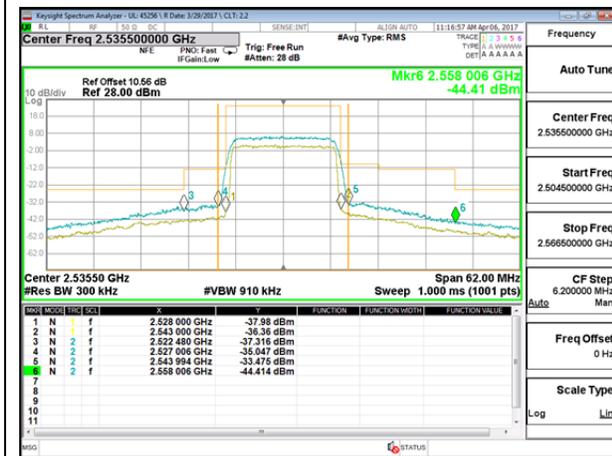
LTE B41 15MHz QPSK High Channel FRB



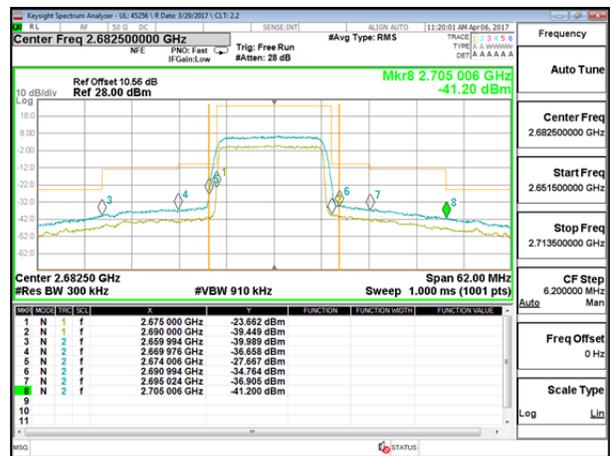
LTE B41 15MHz 16QAM Low Channel 1RB



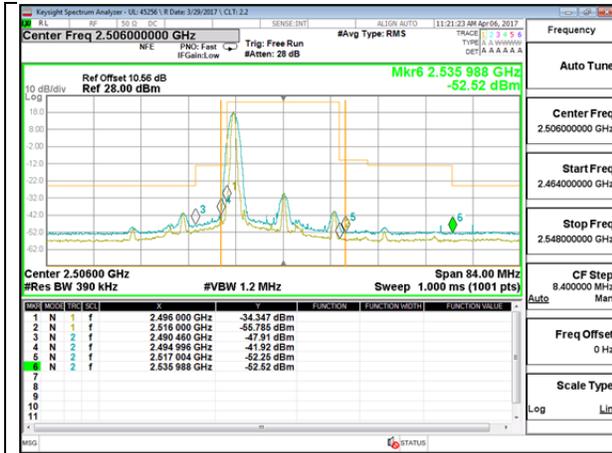
LTE B41 15MHz 16QAM High Channel 1RB



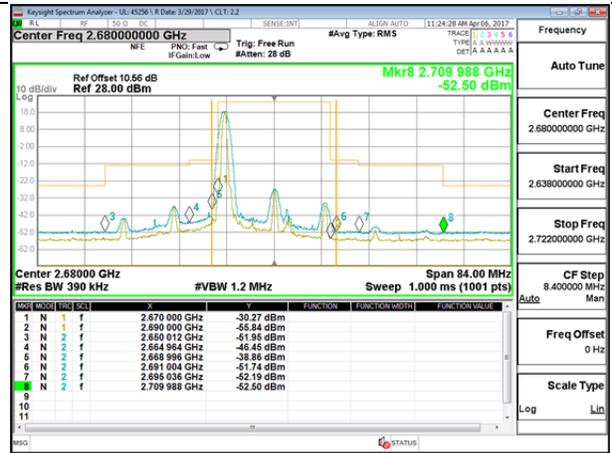
LTE B41 15MHz 16QAM Low Channel FRB



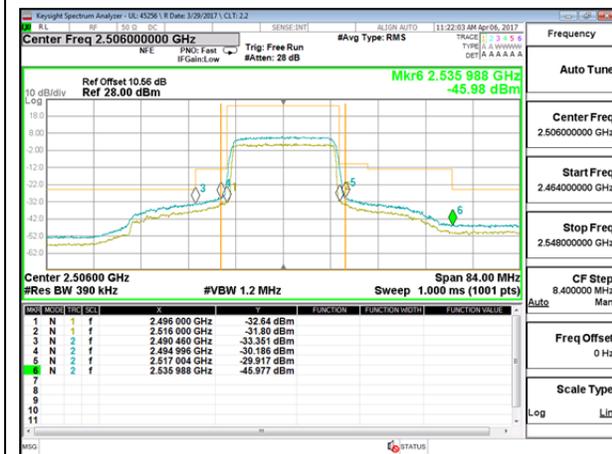
LTE B41 15MHz 16QAM High Channel FRB



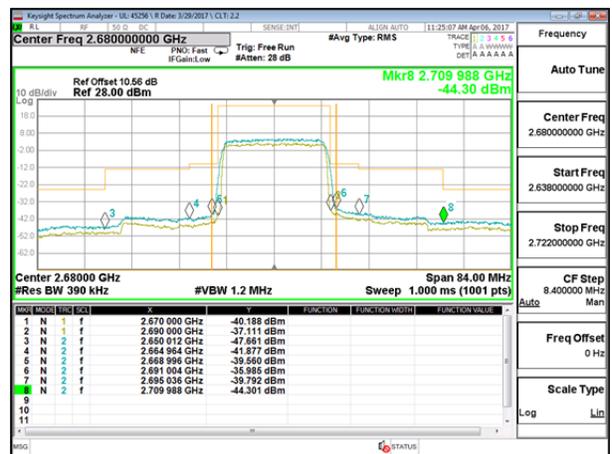
LTE B41 20MHz QPSK Low Channel 1RB



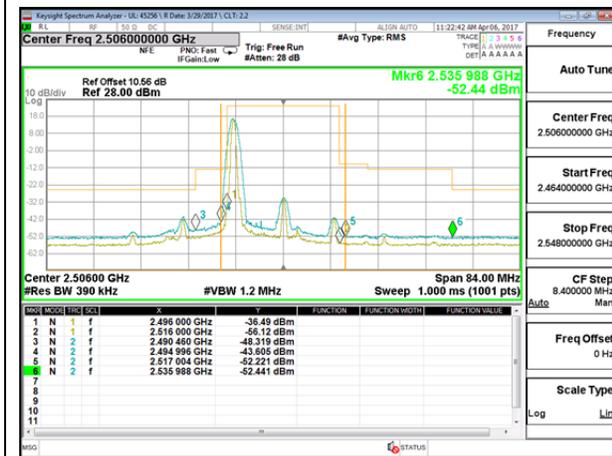
LTE B41 20MHz QPSK High Channel 1RB



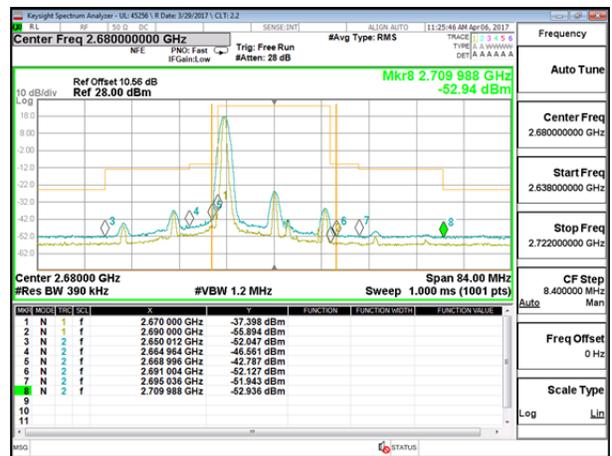
LTE B41 20MHz QPSK Low Channel FRB



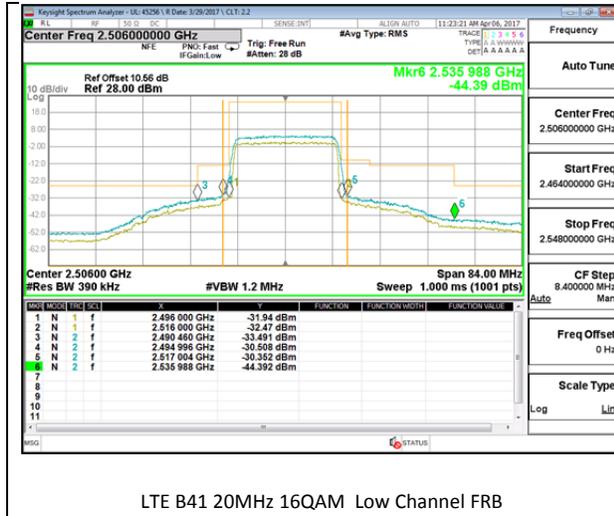
LTE B41 20MHz QPSK High Channel FRB



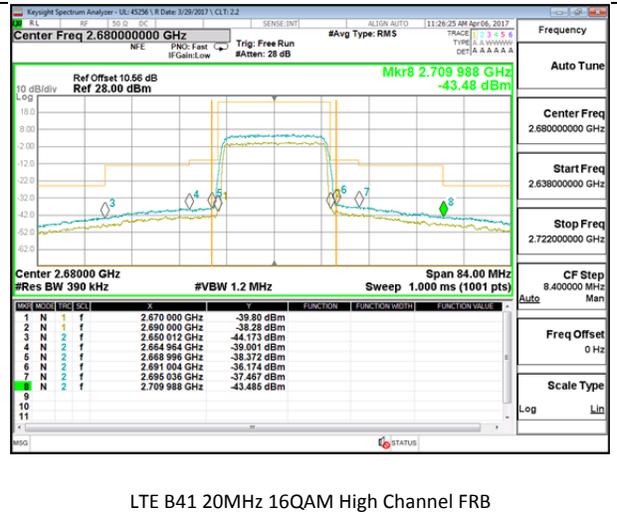
LTE B41 20MHz 16QAM Low Channel 1RB



LTE B41 20MHz 16QAM High Channel 1RB



LTE B41 20MHz 16QAM Low Channel FRB



LTE B41 20MHz 16QAM High Channel FRB

15. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53 and §90.691

FCC 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: (m)(4) (4) 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.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

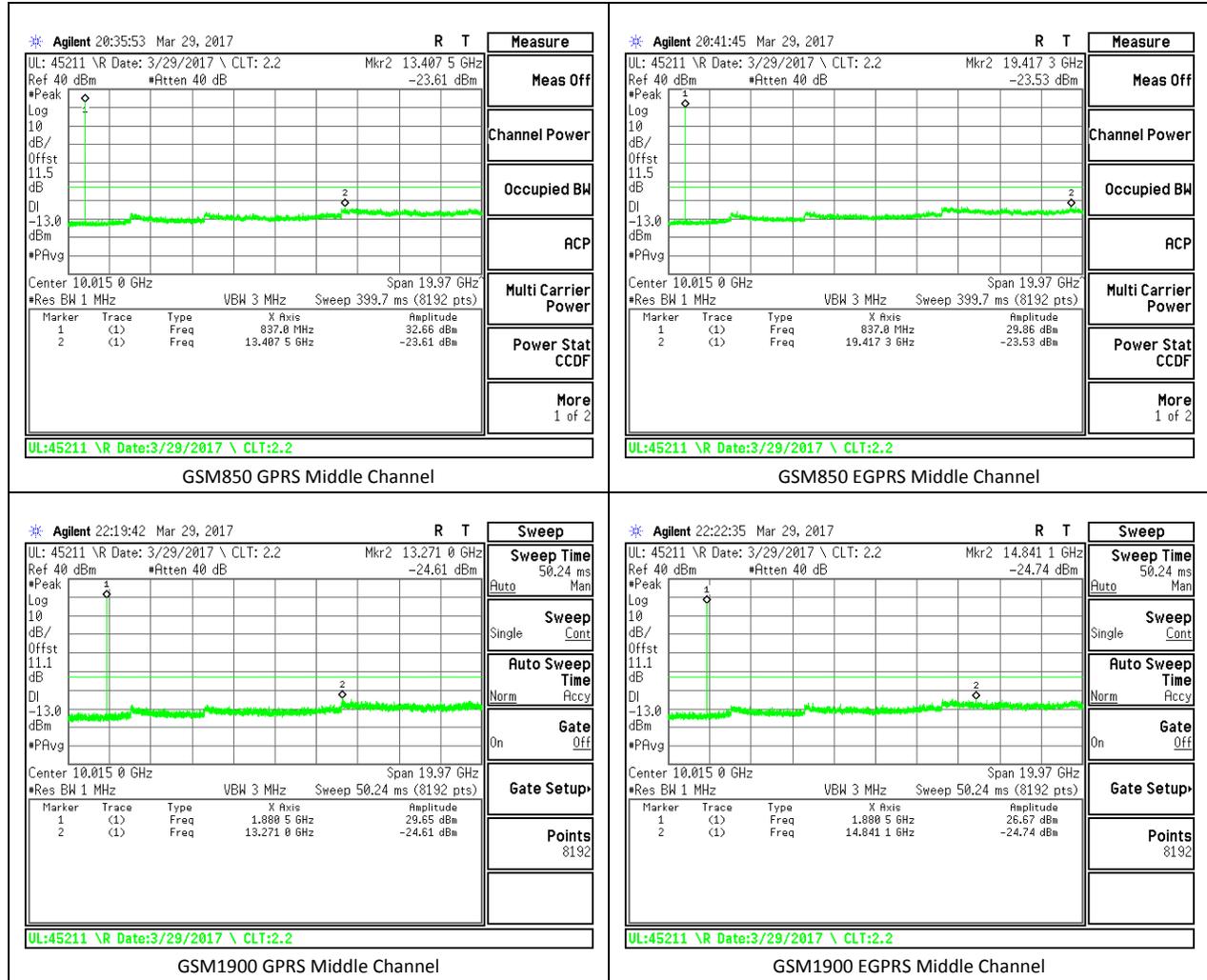
The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in a maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

RESULTS

15.1. OUT OF BAND EMISSIONS RESULT AND PLOTS

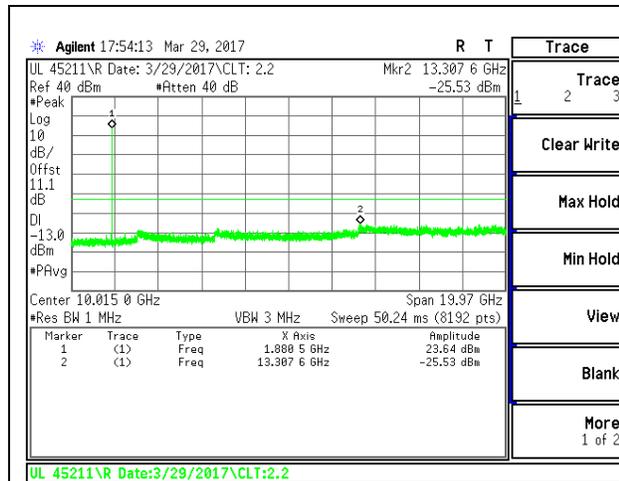
GSM

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM 850	GPRS	824.2	-23.88	-13	-10.88
		836.6	-23.61	-13	-10.61
		848.8	-23.48	-13	-10.48
	EGPRS	824.2	-23.62	-13	-10.62
		836.6	-23.53	-13	-10.53
		848.8	-23.44	-13	-10.44
GSM 1900	GPRS	1850.2	-24.63	-13	-11.63
		1880	-24.61	-13	-11.61
		1909.8	-24.58	-13	-11.58
	EGPRS	1850.2	-24.51	-13	-11.51
		1880	-24.74	-13	-11.74
		1909.8	-25.15	-13	-12.15

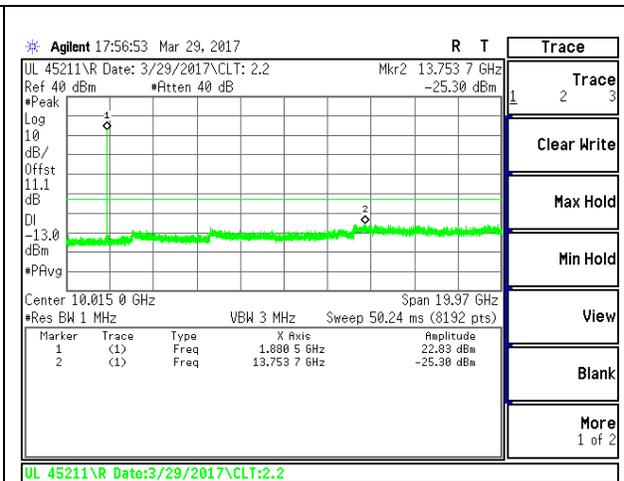


WCDMA

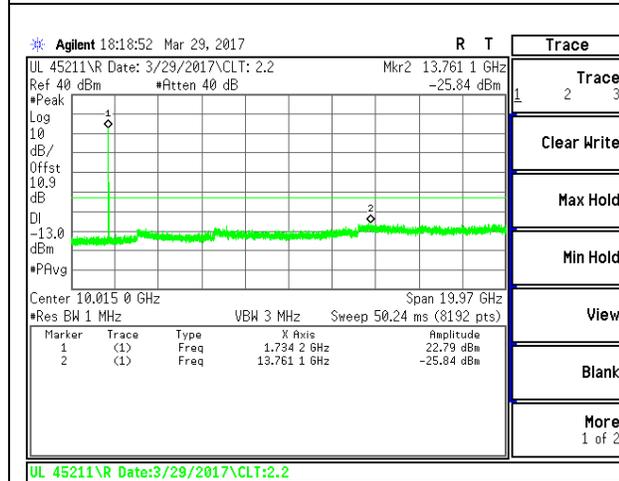
Band	Mode	f (MHz)	Spur (dBm)	99% BW (MHz)	Delta (dB)
Band 2	REL99	1852.4	-24.1	-13	-11.1
		1880	-25.53	-13	-12.53
		1907.6	-24.4	-13	-11.4
	HSDPA	1852.4	-24.85	-13	-11.85
		1880	-25.3	-13	-12.3
		1907.6	-25.73	-13	-12.73
Band 4	REL99	1712.4	-25.19	-13	-12.19
		1732.6	-25.84	-13	-12.84
		1752.6	-26.48	-13	-13.48
	HSDPA	1712.4	-25	-13	-12
		1732.6	-25.73	-13	-12.73
		1752.6	-24.65	-13	-11.65
Band 5	REL99	826.4	-30.82	-13	-17.82
		836.6	-31.95	-13	-18.95
		846.6	-30.76	-13	-17.76
	HSDPA	826.4	-31.36	-13	-18.36
		836.6	-31.3	-13	-18.3
		846.6	-31.31	-13	-18.31



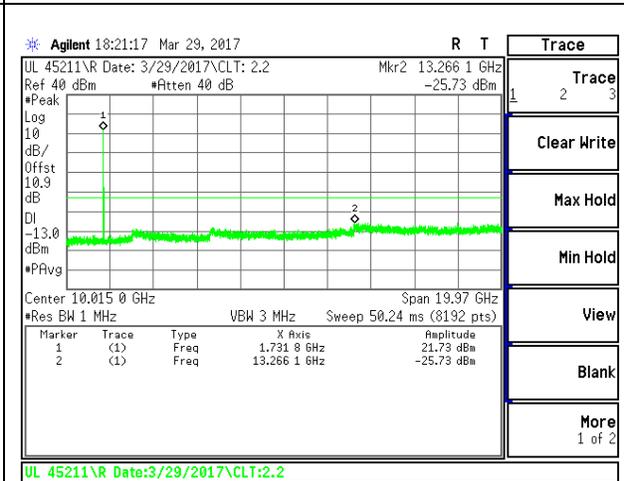
B2 REL99 Middle Channel



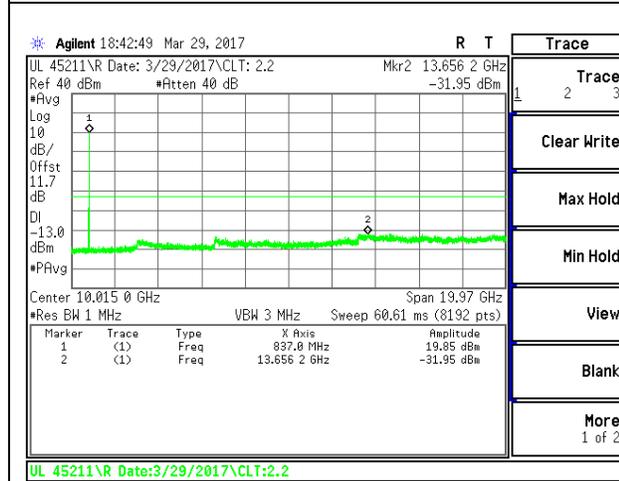
B2 HSDPA Middle Channel



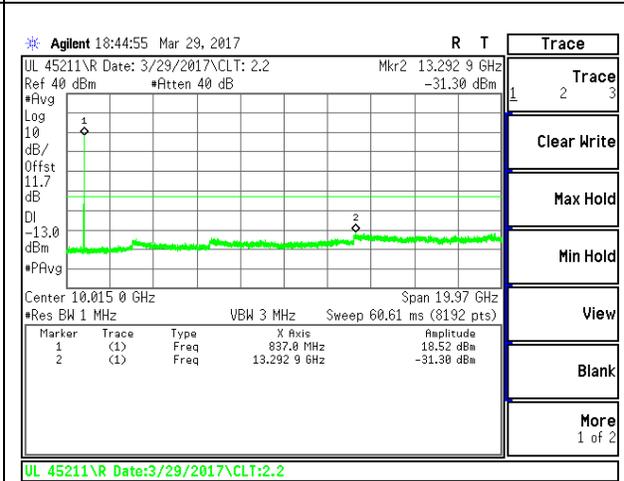
B4 REL99 Middle Channel



B4 HSDPA Middle Channel



B5 REL99 Middle Channel

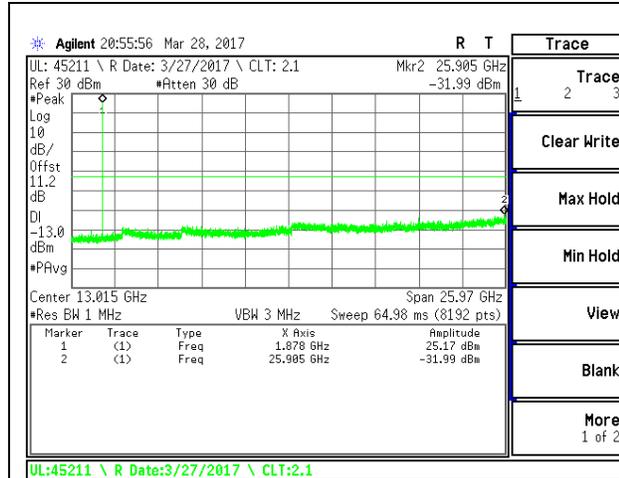


B5 HSDPA Middle Channel

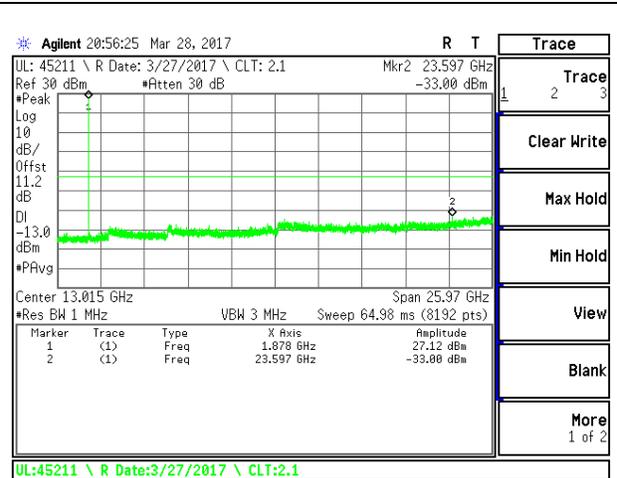
LTE Band 2

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	20	16QAM	1860	-32.9	-13	-19.9
			1880	-32.03	-13	-19.03
			1900	-32.42	-13	-19.42
		QPSK	1860	-33.13	-13	-20.13
			1880	-32.44	-13	-19.44
			1900	-32.37	-13	-19.37
	15	16QAM	1857.5	-33.36	-13	-20.36
			1880	-32.66	-13	-19.66
			1902.5	-32.08	-13	-19.08
		QPSK	1857.5	-31.93	-13	-18.93
			1880	-33.02	-13	-20.02
			1902.5	-33.09	-13	-20.09
	10	16QAM	1855	-31.95	-13	-18.95
			1880	-32.1	-13	-19.1
			1905	-33.38	-13	-20.38
		QPSK	1855	-32.52	-13	-19.52
			1880	-32.42	-13	-19.42
			1905	-33.47	-13	-20.47
	5	16QAM	1852.5	-32.64	-13	-19.64
			1880	-33.17	-13	-20.17
			1907.5	-33.58	-13	-20.58
		QPSK	1852.5	-32.5	-13	-19.5
			1880	-32.39	-13	-19.39
			1907.5	-32.97	-13	-19.97

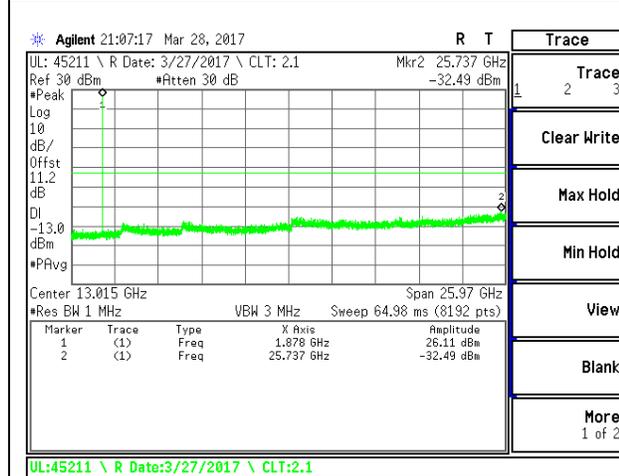
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	3	16QAM	1851.5	-32.94	-13	-19.94
			1880	-32.68	-13	-19.68
			1908.5	-32.49	-13	-19.49
		QPSK	1851.5	-32.48	-13	-19.48
			1880	-32.49	-13	-19.49
			1908.5	-32.66	-13	-19.66
	1.4	16QAM	1850.7	-32.38	-13	-19.38
			1880	-33	-13	-20
			1909.3	-33.32	-13	-20.32
		QPSK	1850.7	-32.35	-13	-19.35
			1880	-31.99	-13	-18.99
			1909.3	-33.02	-13	-20.02



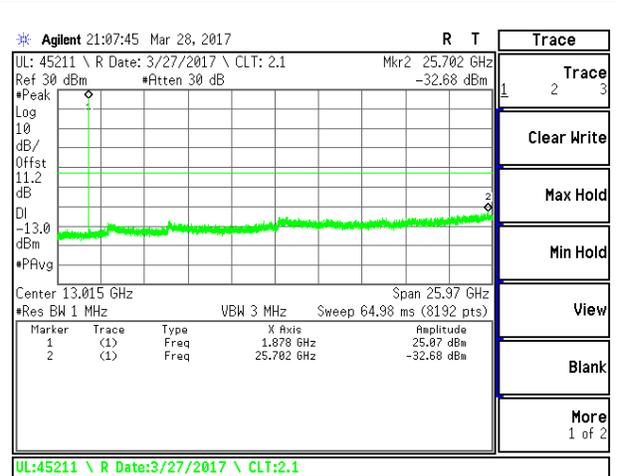
LTE B2 1.4MHz QPSK Middle Channel



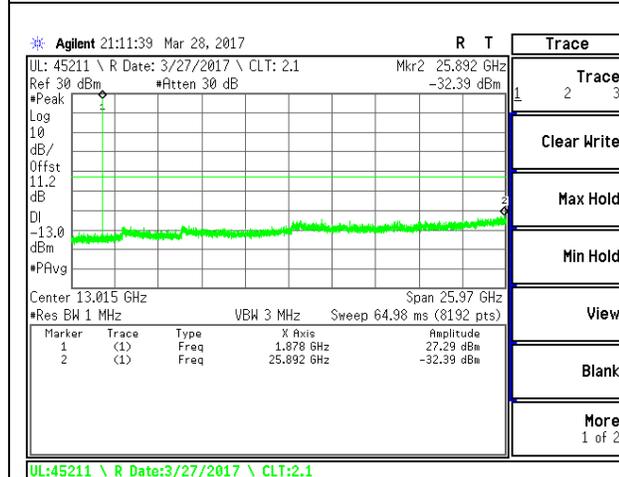
LTE B2 1.4MHz 16QAM Middle Channel



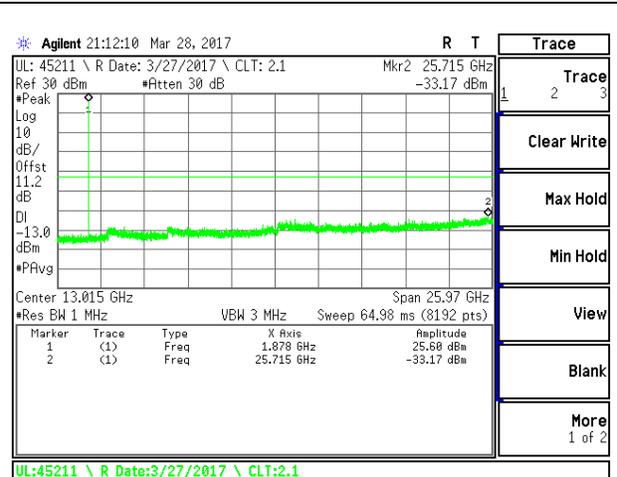
LTE B2 3MHz QPSK Middle Channel



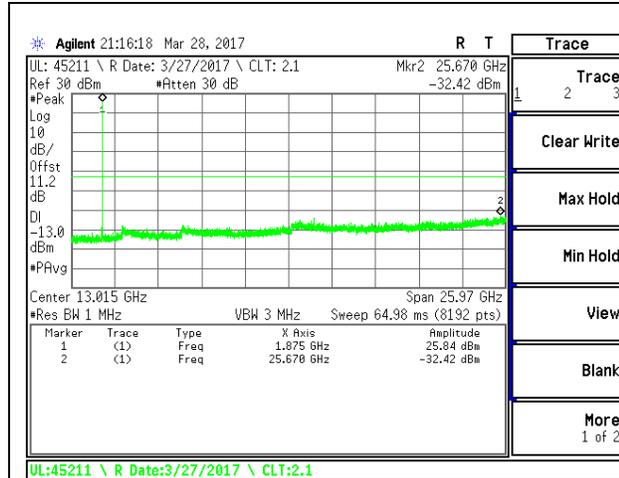
LTE B2 3MHz 16QAM Middle Channel



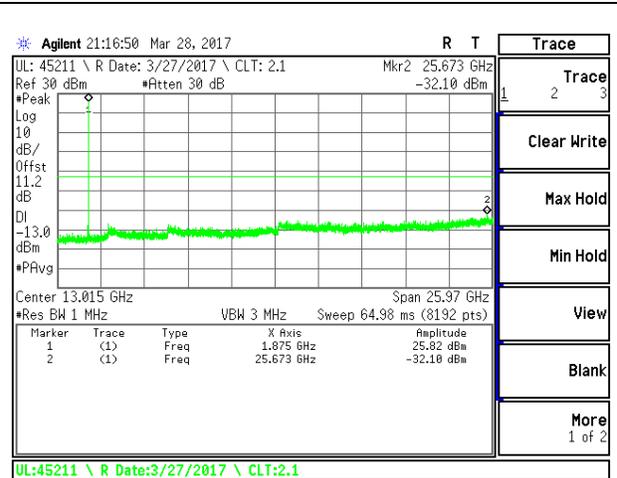
LTE B2 5MHz QPSK Middle Channel



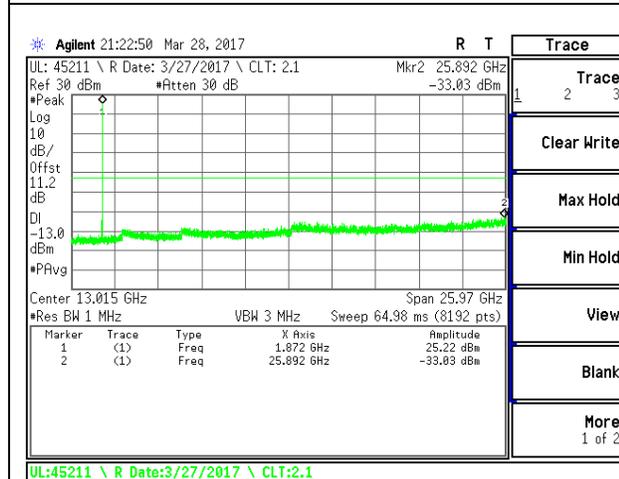
LTE B2 5MHz 16QAM Middle Channel



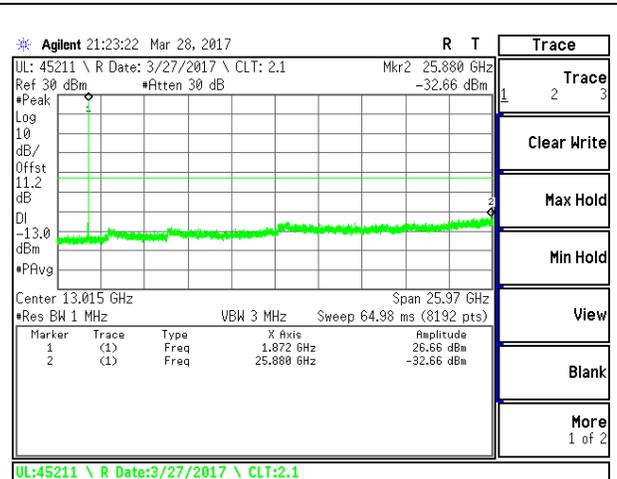
LTE B2 10MHz QPSK Middle Channel



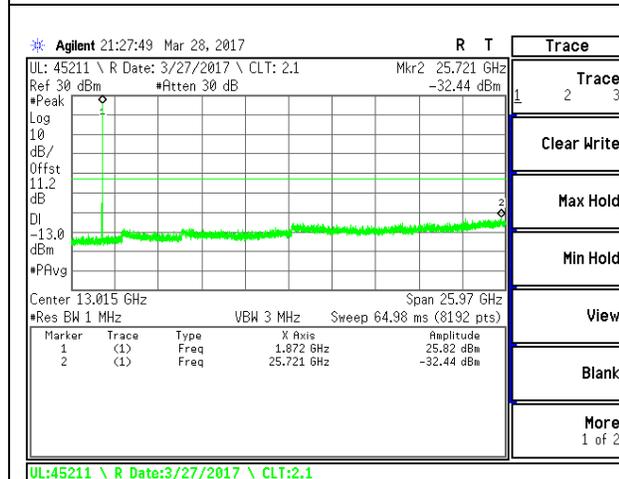
LTE B2 10MHz 16QAM Middle Channel



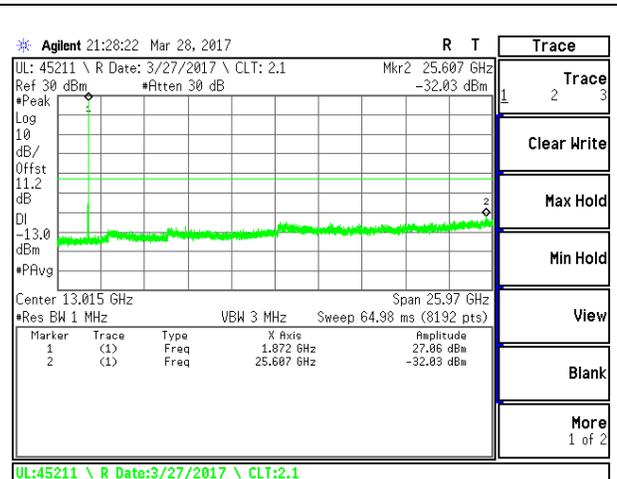
LTE B2 15MHz QPSK Middle Channel



LTE B2 15MHz 16QAM Middle Channel



LTE B2 20MHz QPSK Middle Channel

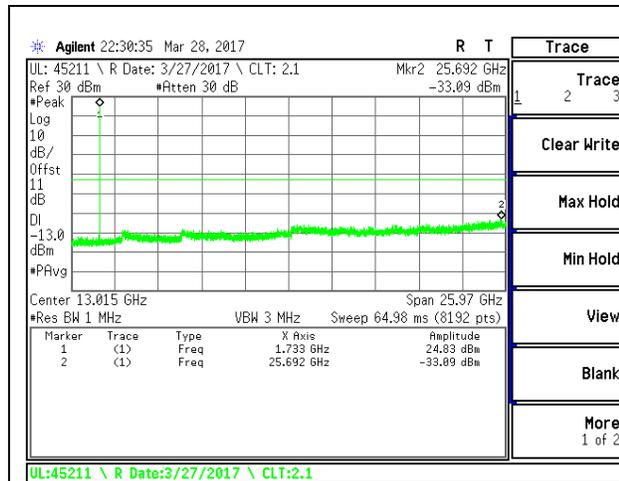


LTE B2 20MHz 16QAM Middle Channel

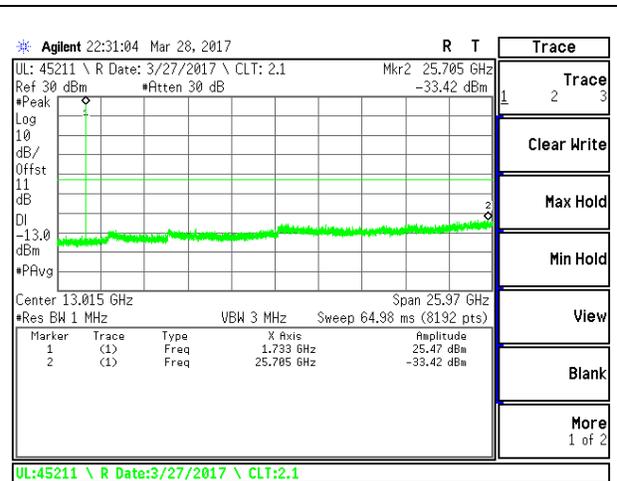
LTE Band 4

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	20	16QAM	1720	-32.32	-13	-19.32
			1732.5	-32.54	-13	-19.54
			1745	-32.53	-13	-19.53
		QPSK	1720	-32.58	-13	-19.58
			1732.5	-32.51	-13	-19.51
			1745	-32.27	-13	-19.27
	15	16QAM	1717.5	-33.68	-13	-20.68
			1732.5	-32.93	-13	-19.93
			1747.5	-33.28	-13	-20.28
		QPSK	1717.5	-32.85	-13	-19.85
			1732.5	-32.54	-13	-19.54
			1747.5	-32.66	-13	-19.66
	10	16QAM	1715	-33.03	-13	-20.03
			1732.5	-33.15	-13	-20.15
			1750	-33.49	-13	-20.49
		QPSK	1715	-32.32	-13	-19.32
			1732.5	-32.47	-13	-19.47
			1750	-33.22	-13	-20.22
	5	16QAM	1712.5	-33.46	-13	-20.46
			1732.5	-33.21	-13	-20.21
			1752.5	-33.1	-13	-20.1
		QPSK	1712.5	-31.91	-13	-18.91
			1732.5	-33.47	-13	-20.47
			1752.5	-33.62	-13	-20.62

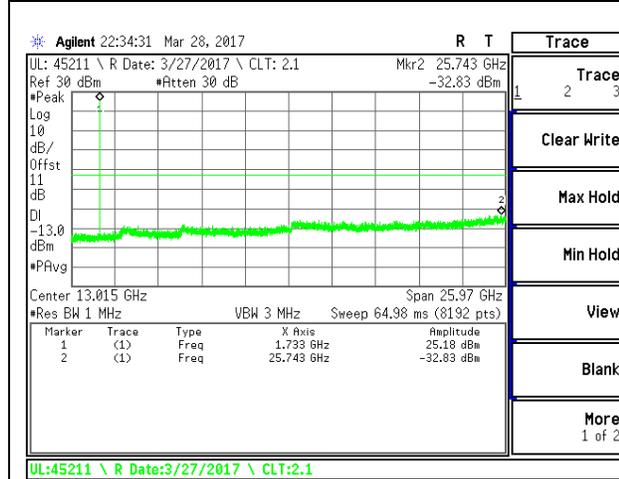
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	3	16QAM	1711.5	-33.04	-13	-20.04
			1732.5	-33.39	-13	-20.39
			1753.5	-32.46	-13	-19.46
		QPSK	1711.5	-32.83	-13	-19.83
			1732.5	-32.83	-13	-19.83
			1753.5	-33.66	-13	-20.66
	1.4	16QAM	1710.7	-33.5	-13	-20.5
			1732.5	-33.42	-13	-20.42
			1754.3	-32.83	-13	-19.83
		QPSK	1710.7	-33.01	-13	-20.01
			1732.5	-33.09	-13	-20.09
			1754.3	-33.05	-13	-20.05



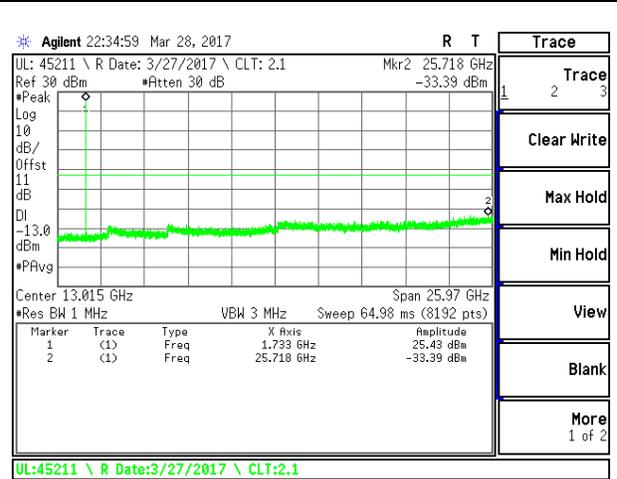
LTE B4 1.4MHz QPSK Middle Channel



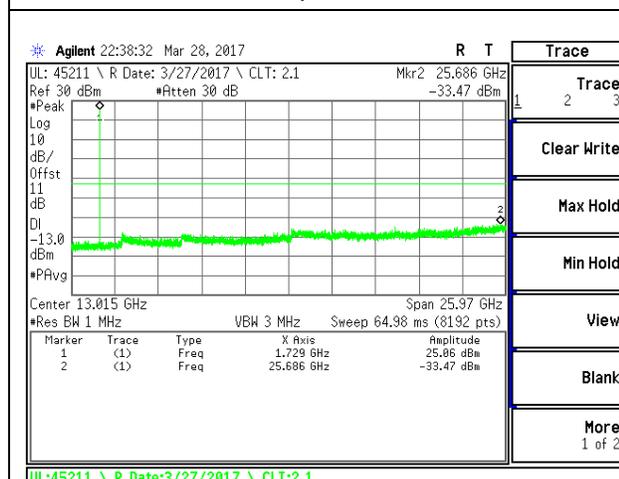
LTE B4 1.4MHz 16QAM Middle Channel



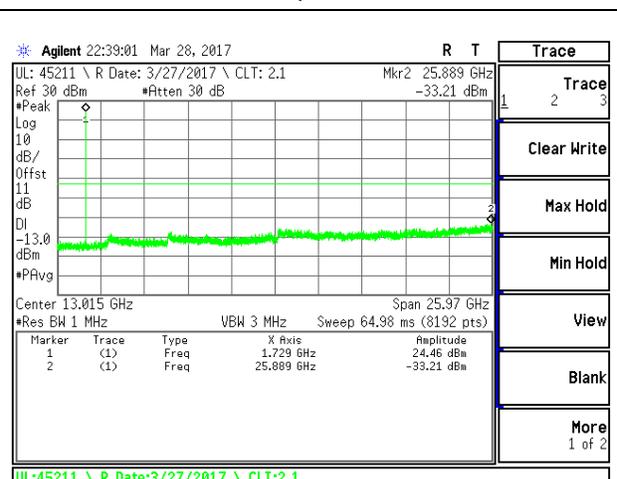
LTE B4 3MHz QPSK Middle Channel



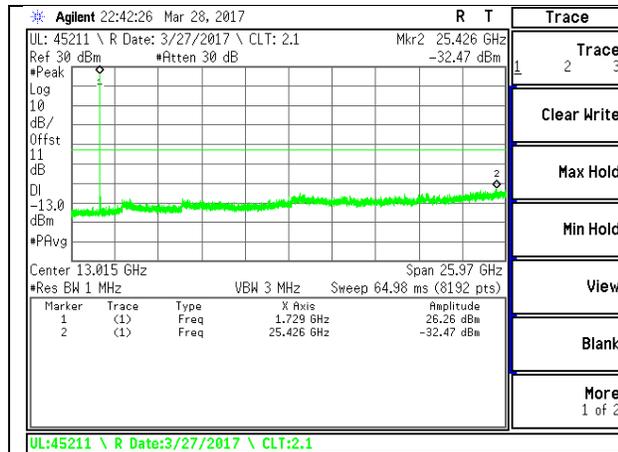
LTE B4 3MHz 16QAM Middle Channel



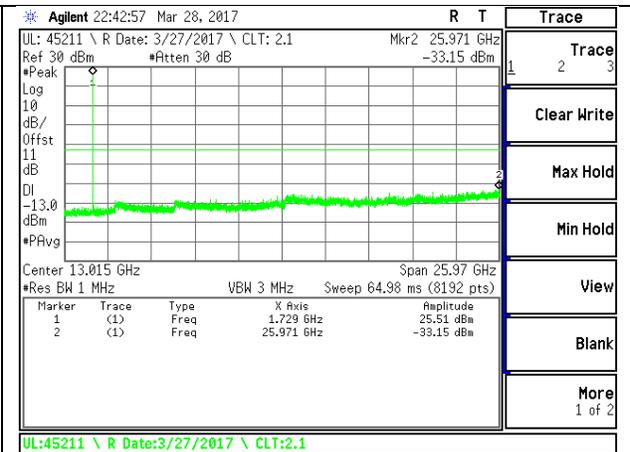
LTE B4 5MHz QPSK Middle Channel



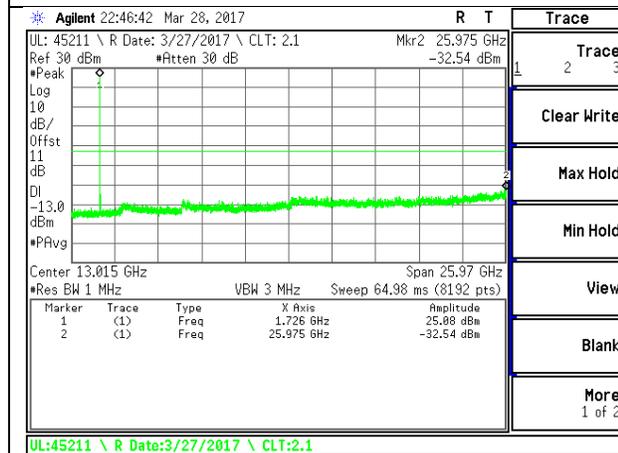
LTE B4 5MHz 16QAM Middle Channel



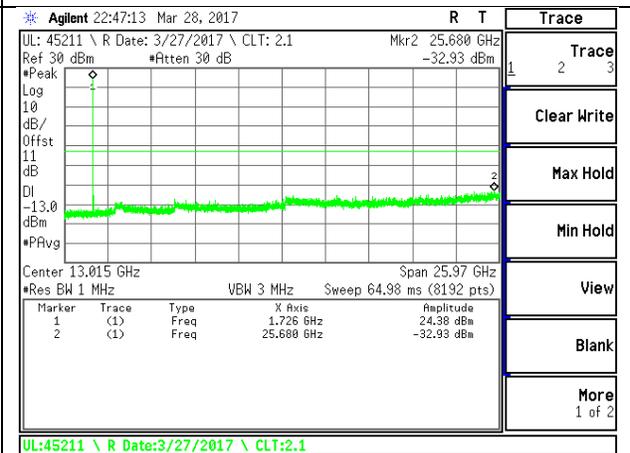
LTE B4 10MHz QPSK Middle Channel



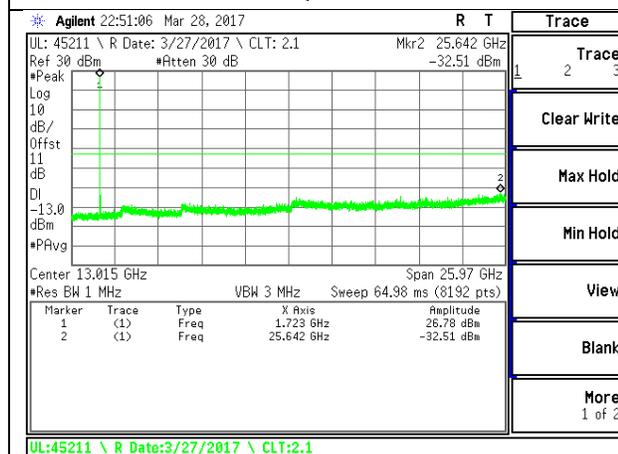
LTE B4 10MHz 16QAM Middle Channel



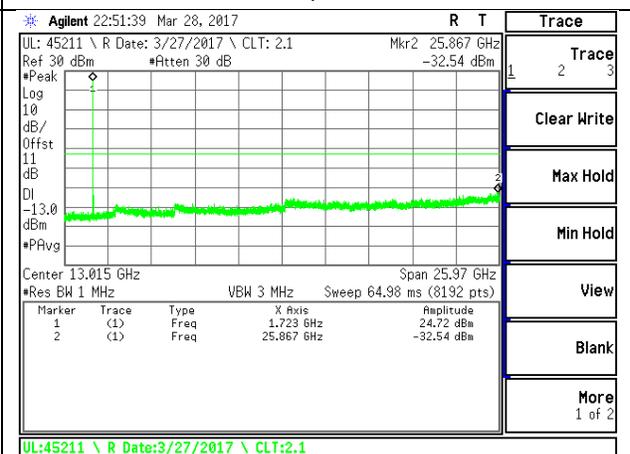
LTE B4 15MHz QPSK Middle Channel



LTE B4 15MHz 16QAM Middle Channel



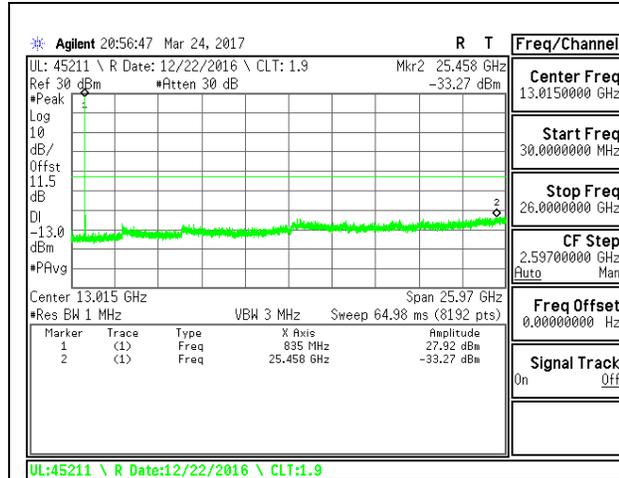
LTE B4 20MHz QPSK Middle Channel



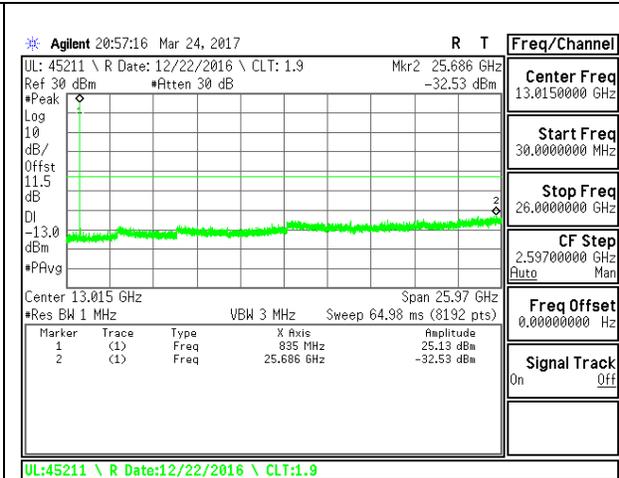
LTE B4 20MHz 16QAM Middle Channel

LTE Band 5

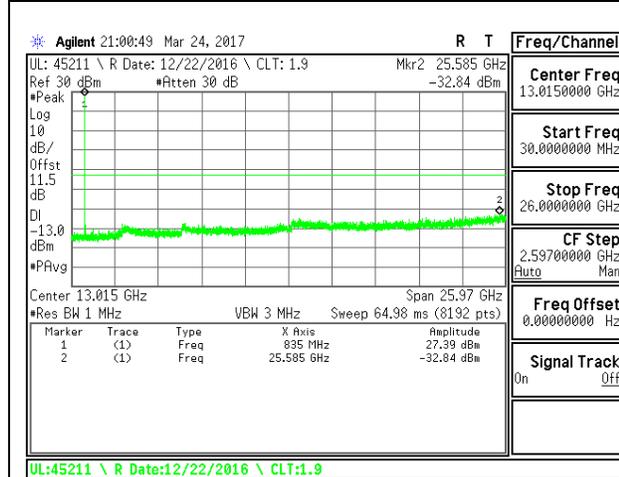
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE5	10	16QAM	829	-32.56	-13	-19.56
			836.5	-32.47	-13	-19.47
			844	-32.03	-13	-19.03
		QPSK	829	-32.33	-13	-19.33
			836.5	-32.01	-13	-19.01
			844	-32.99	-13	-19.99
	5	16QAM	826.5	-32.64	-13	-19.64
			836.5	-32.23	-13	-19.23
			846.5	-32.87	-13	-19.87
		QPSK	826.5	-32.08	-13	-19.08
			836.5	-33.02	-13	-20.02
			846.5	-32.76	-13	-19.76
	3	16QAM	825.5	-32.08	-13	-19.08
			836.5	-32.93	-13	-19.93
			847.5	-32.59	-13	-19.59
		QPSK	825.5	-32.51	-13	-19.51
			836.5	-32.84	-13	-19.84
			847.5	-32.34	-13	-19.34
	1.4	16QAM	824.7	-32.47	-13	-19.47
			836.5	-32.53	-13	-19.53
			848.3	-33.16	-13	-20.16
		QPSK	824.7	-32.94	-13	-19.94
			836.5	-33.27	-13	-20.27
			848.3	-32.96	-13	-19.96



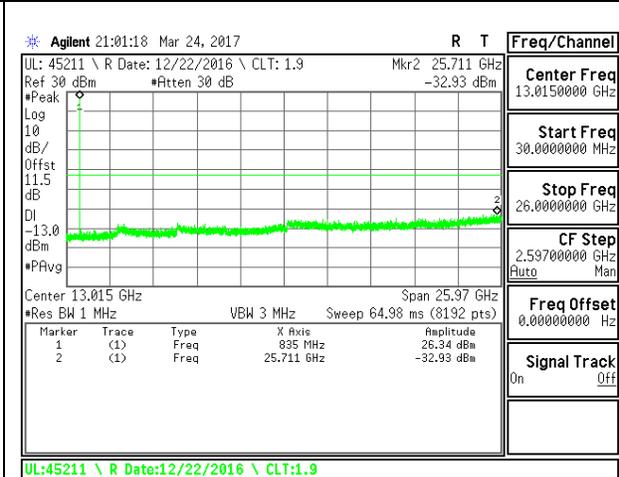
LTE B5 1.4MHz QPSK Middle Channel



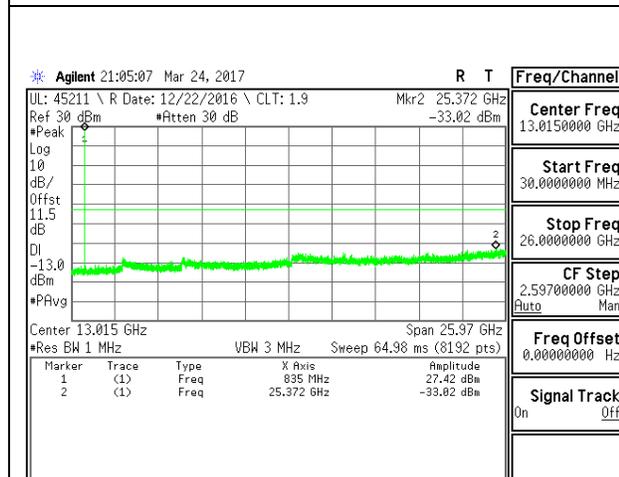
LTE B5 1.4MHz 16QAM Middle Channel



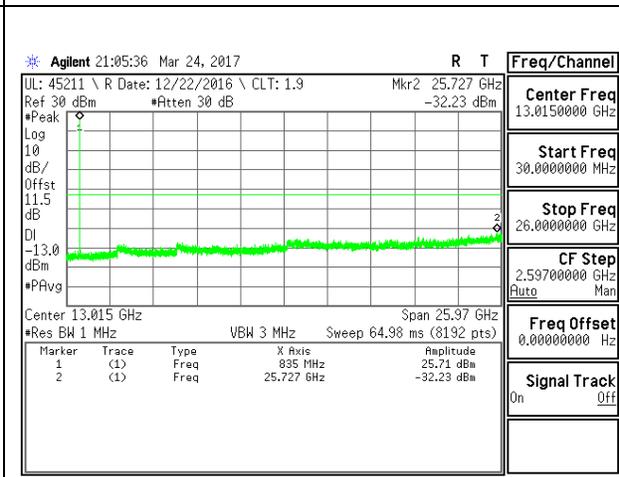
LTE B5 3MHz QPSK Middle Channel



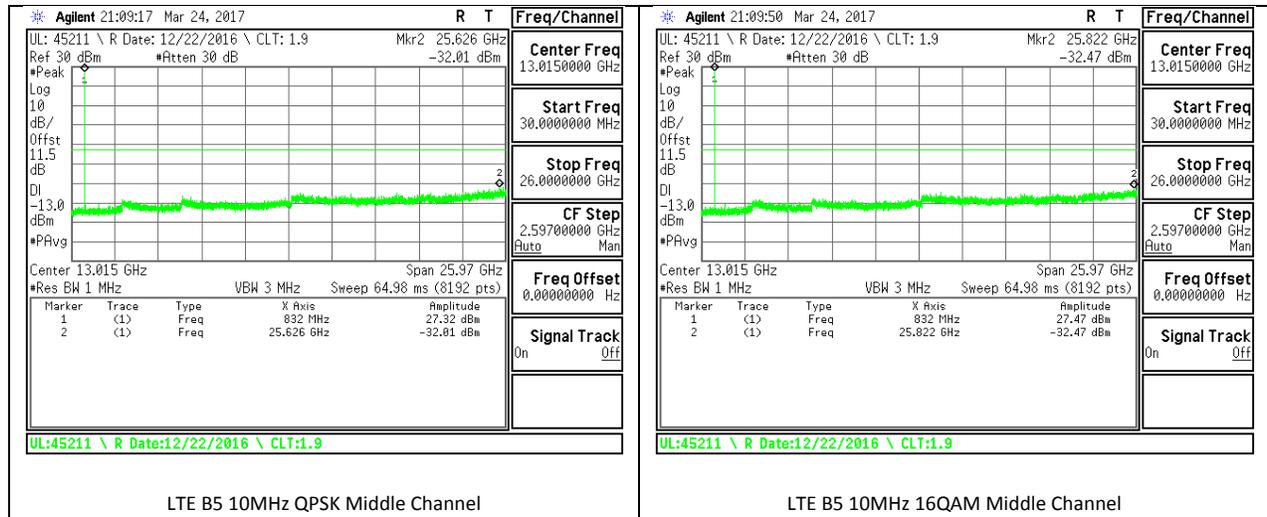
LTE B5 3MHz 16QAM Middle Channel



LTE B5 5MHz QPSK Middle Channel

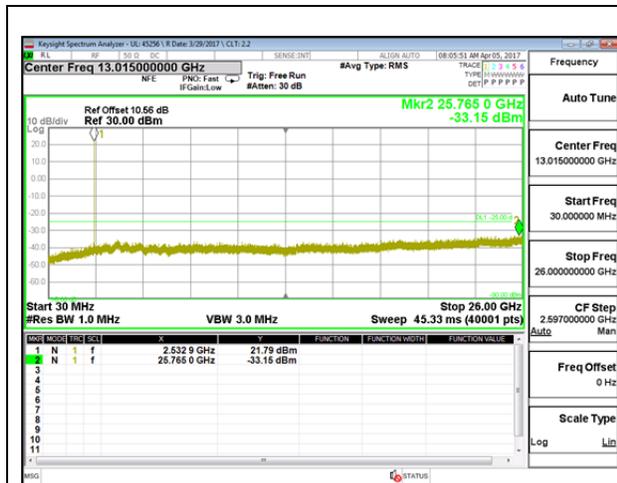


LTE B5 5MHz 16QAM Middle Channel

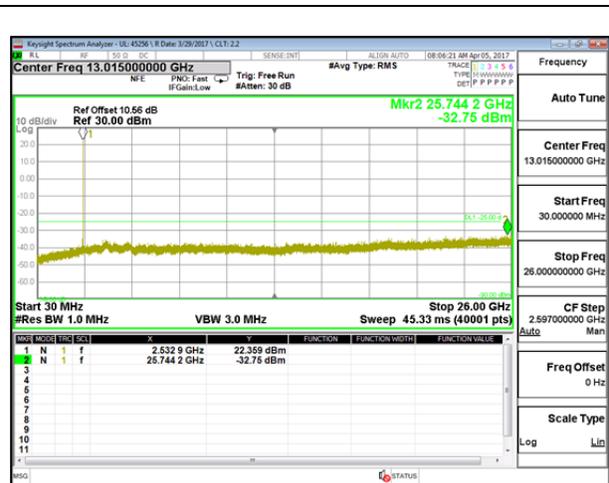


LTE Band 7

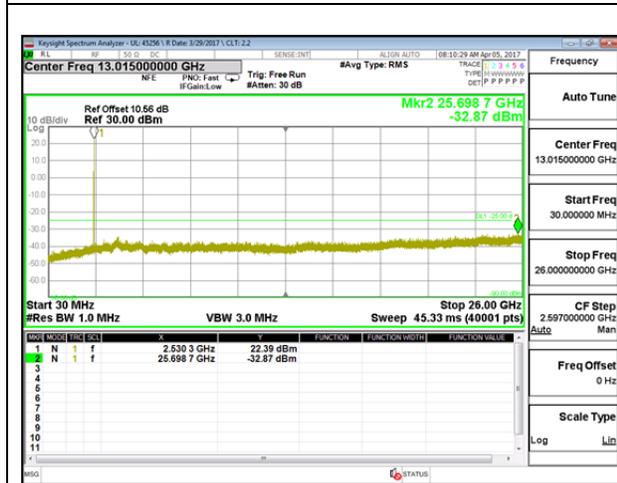
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE7	20	16QAM	2510	-32.66	-25	-7.66
			2535	-32.69	-25	-7.69
			2560	-31.58	-25	-6.58
		QPSK	2510	-32.98	-25	-7.98
			2535	-31.79	-25	-6.79
			2560	-32.72	-25	-7.72
	15	16QAM	2507.5	-32.36	-25	-7.36
			2535	-32.78	-25	-7.78
			2562.5	-32.18	-25	-7.18
		QPSK	2507.5	-31.87	-25	-6.87
			2535	-32.98	-25	-7.98
			2562.5	-32.98	-25	-7.98
	10	16QAM	2505	-33.01	-25	-8.01
			2535	-32.82	-25	-7.82
			2565	-32.5	-25	-7.5
		QPSK	2505	-32.75	-25	-7.75
			2535	-32.87	-25	-7.87
			2565	-33.03	-25	-8.03
	5	16QAM	2502.5	-32.19	-25	-7.19
			2535	-32.75	-25	-7.75
			2567.5	-31.8	-25	-6.8
		QPSK	2502.5	-32.53	-25	-7.53
			2535	-33.15	-25	-8.15
			2567.5	-32.7	-25	-7.7



LTE B7 5MHz QPSK Middle Channel



LTE B7 5MHz 16QAM Middle Channel



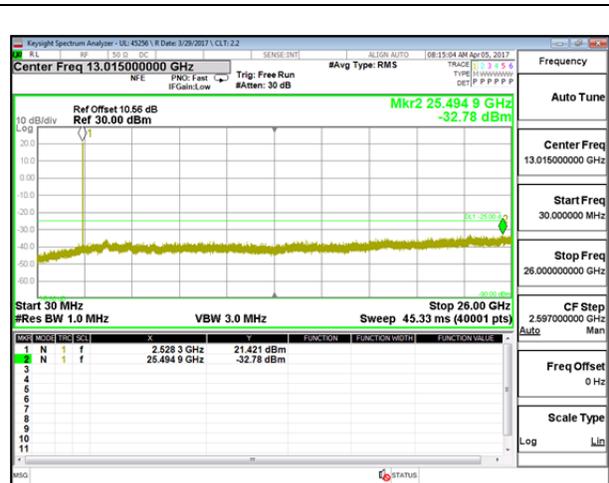
LTE B7 10MHz QPSK Middle Channel



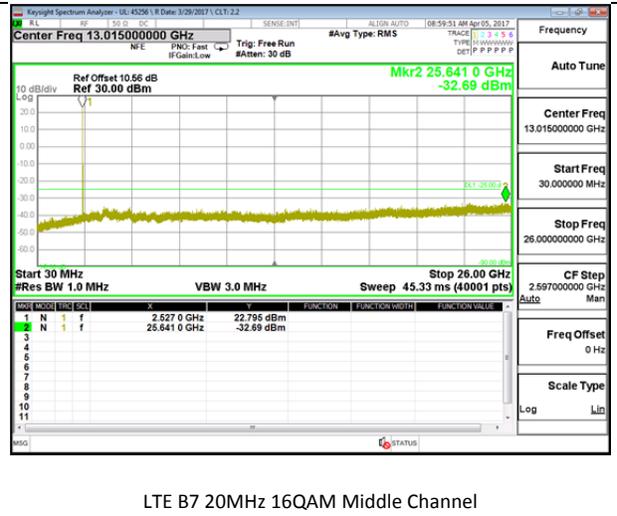
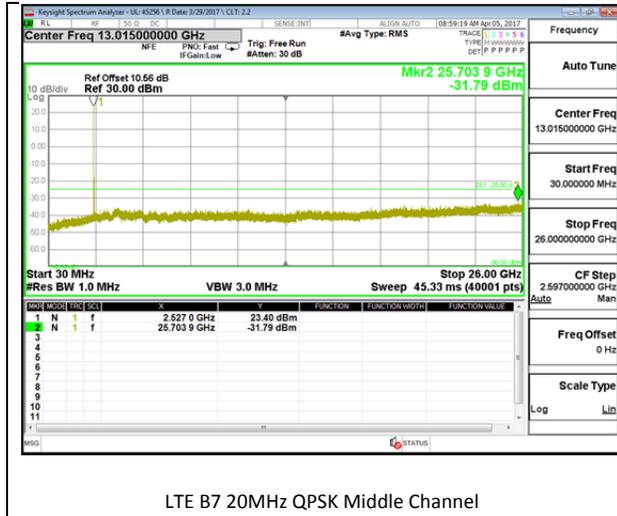
LTE B7 10MHz 16QAM Middle Channel



LTE B7 15MHz QPSK Middle Channel

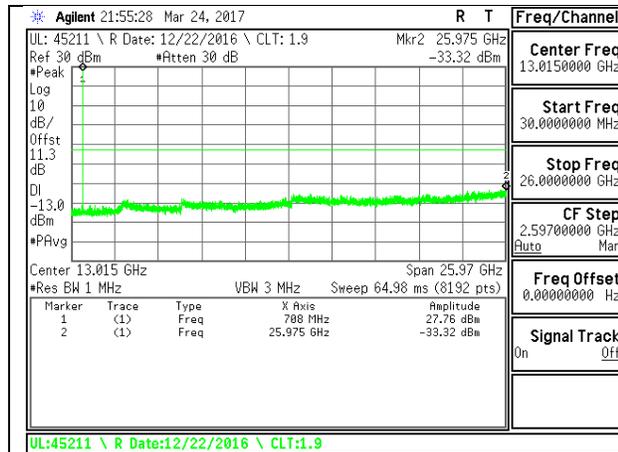


LTE B7 15MHz 16QAM Middle Channel

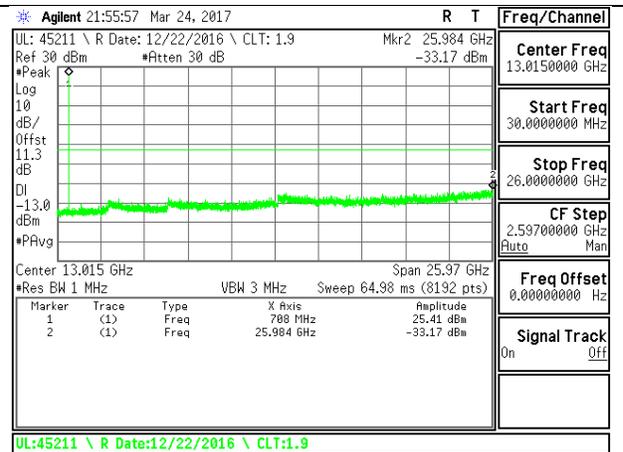


LTE Band 12

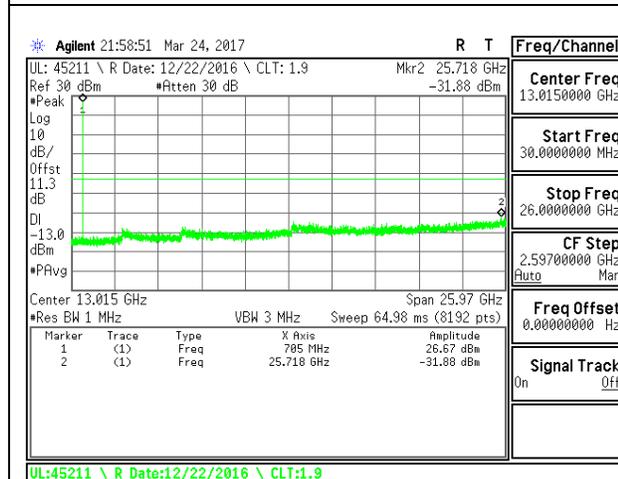
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE12	10	16QAM	704	-31.92	-13	-18.92
			707.5	-32.53	-13	-19.53
			711	-31.99	-13	-18.99
		QPSK	704	-32.07	-13	-19.07
			707.5	-32.83	-13	-19.83
			711	-32.93	-13	-19.93
	5	16QAM	701.5	-32.51	-13	-19.51
			707.5	-32.42	-13	-19.42
			713.5	-33.37	-13	-20.37
		QPSK	701.5	-32.84	-13	-19.84
			707.5	-32.27	-13	-19.27
			713.5	-32.21	-13	-19.21
	3	16QAM	700.5	-32.67	-13	-19.67
			707.5	-32.09	-13	-19.09
			714.5	-32.12	-13	-19.12
		QPSK	700.5	-32.93	-13	-19.93
			707.5	-31.88	-13	-18.88
			714.5	-33.35	-13	-20.35
	1.4	16QAM	699.7	-32.64	-13	-19.64
			707.5	-33.17	-13	-20.17
			715.3	-33.45	-13	-20.45
		QPSK	699.7	-33.07	-13	-20.07
			707.5	-33.32	-13	-20.32
			715.3	-32.78	-13	-19.78



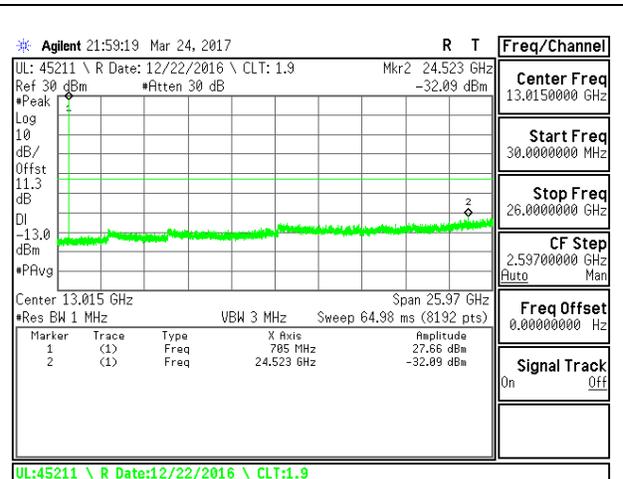
LTE B12 1.4MHz QPSK Middle Channel



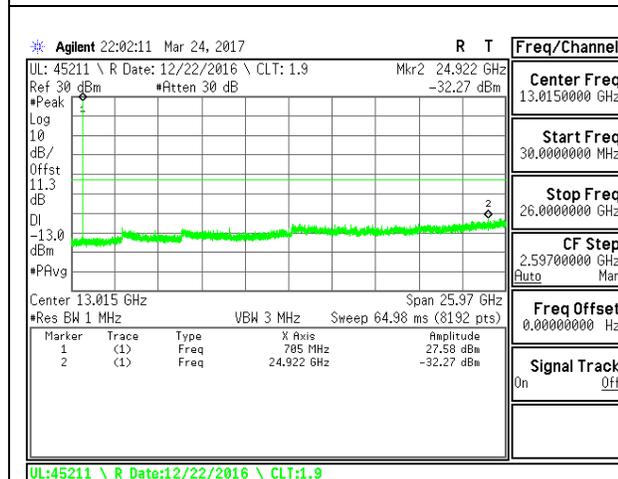
LTE B12 1.4MHz 16QAM Middle Channel



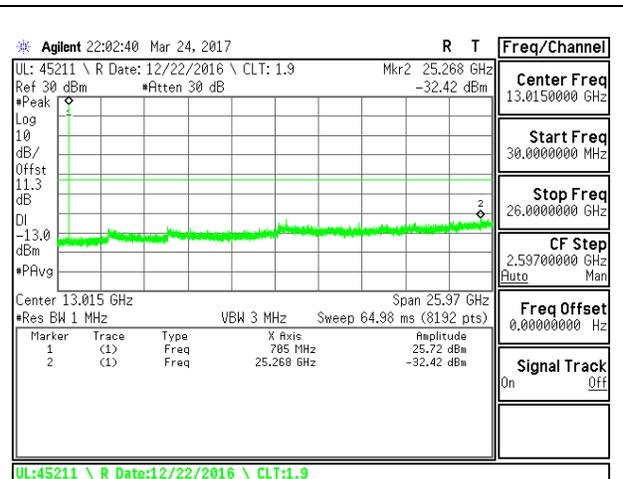
LTE B12 3MHz QPSK Middle Channel



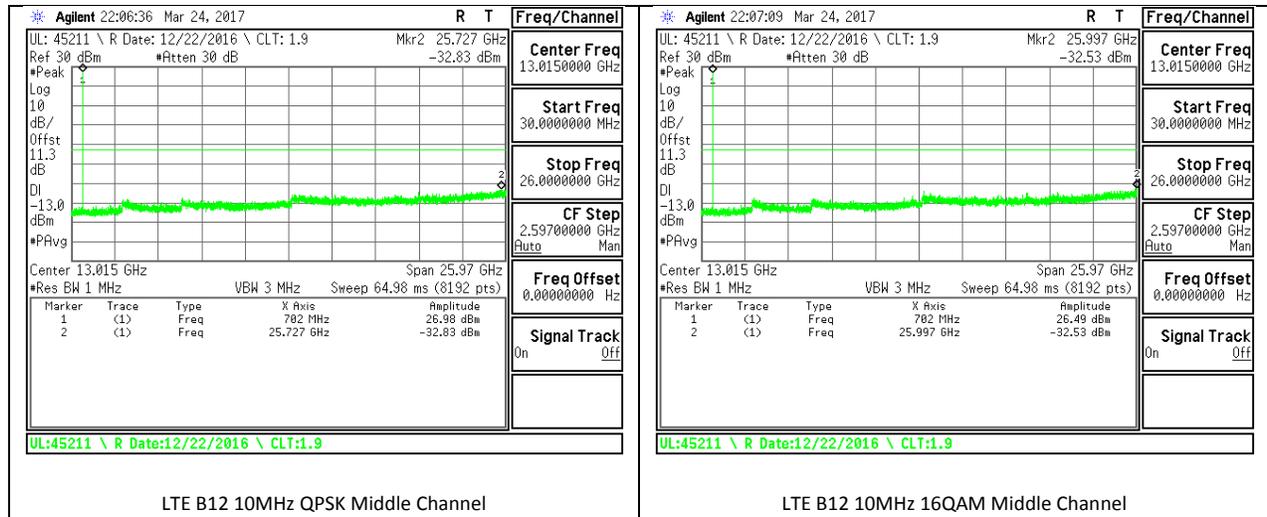
LTE B12 3MHz 16QAM Middle Channel



LTE B12 5MHz QPSK Middle Channel

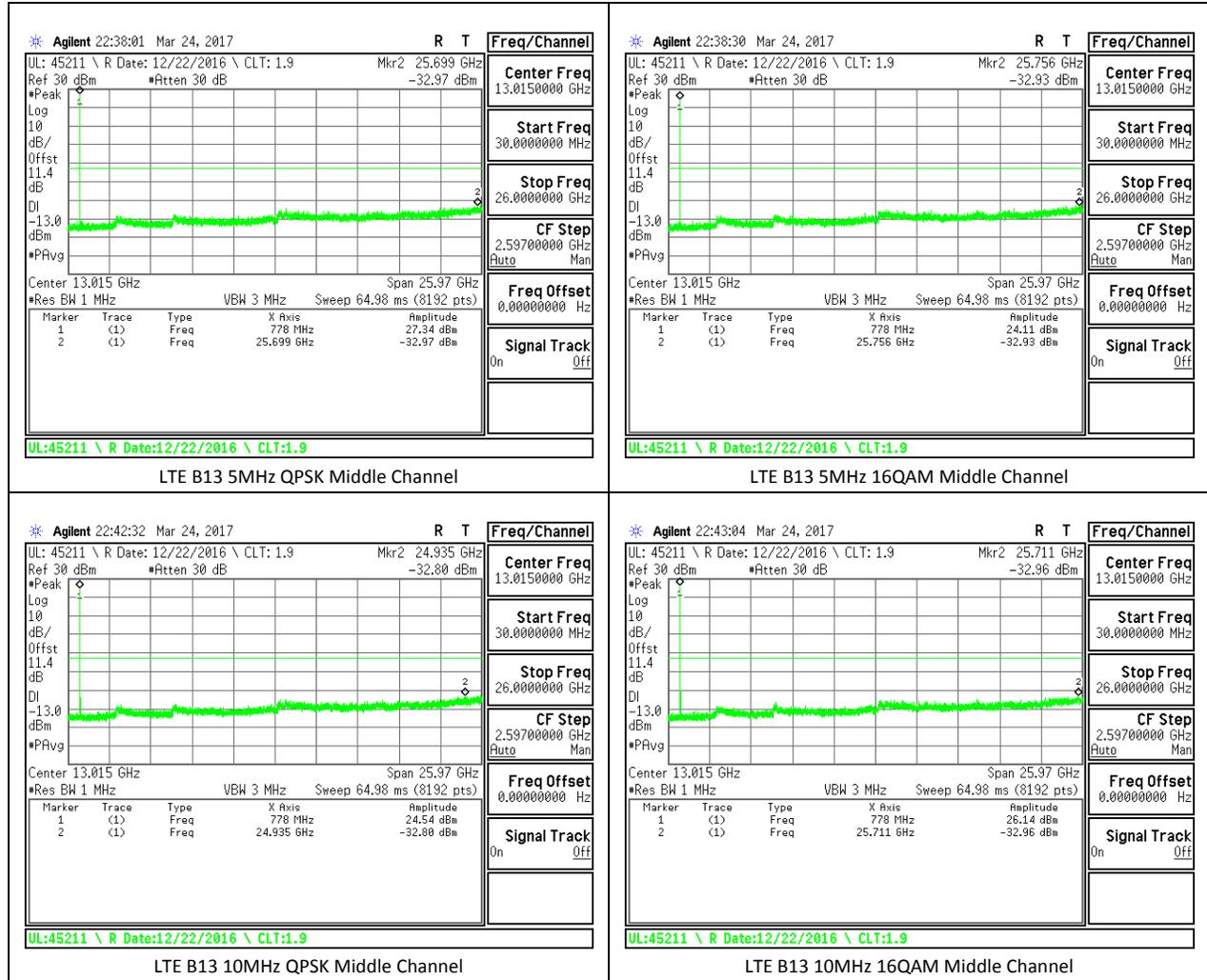


LTE B12 5MHz 16QAM Middle Channel



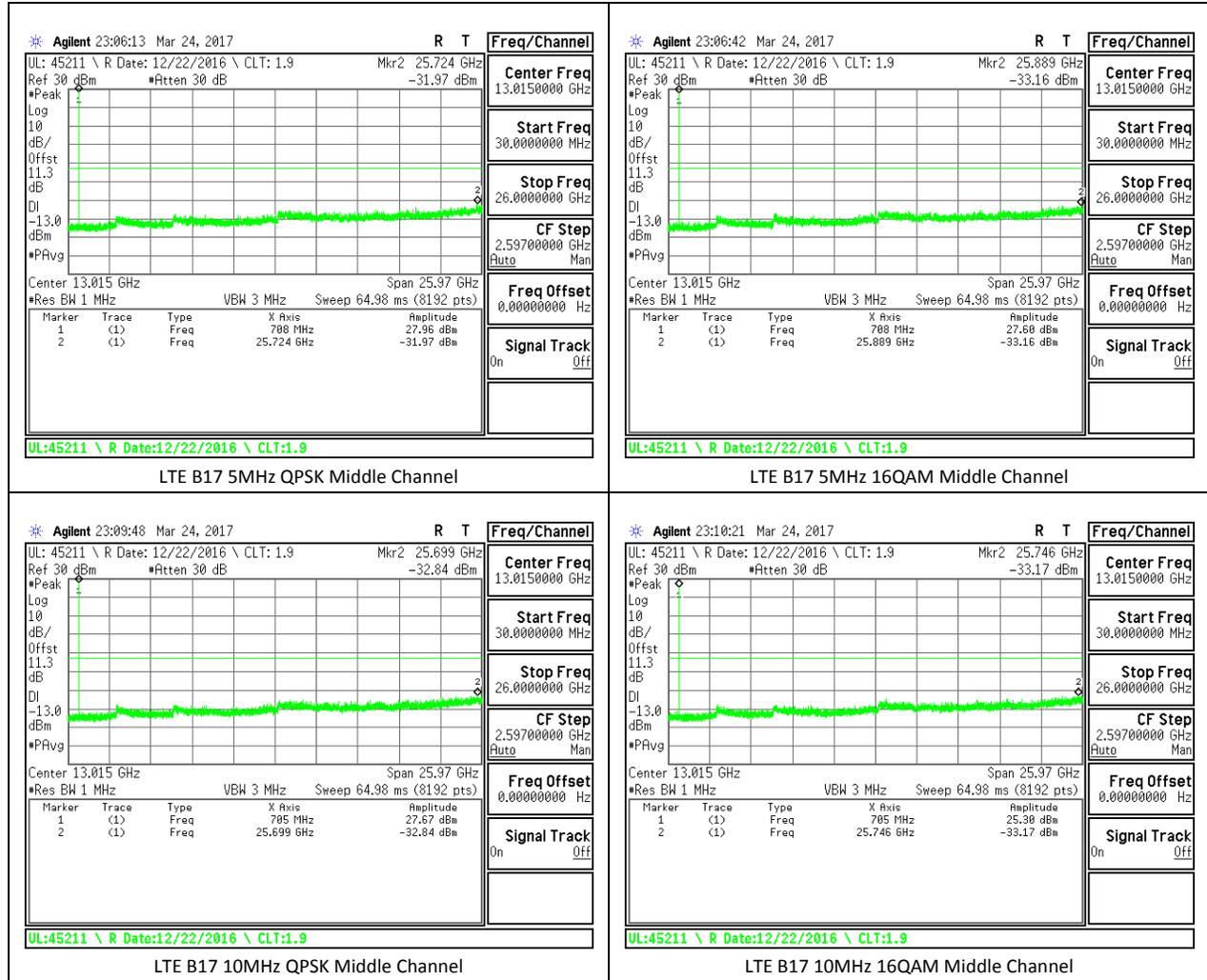
LTE Band 13

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE13	10	16QAM	782	-32.59	-13	-19.59
			782	-32.96	-13	-19.96
			782	-32.96	-13	-19.96
		QPSK	782	-32.88	-13	-19.88
			782	-32.80	-13	-19.80
			782	-32.8	-13	-19.8
	5	16QAM	779.5	-32.81	-13	-19.81
			782	-32.93	-13	-19.93
			784.5	-33.16	-13	-20.16
		QPSK	779.5	-32.89	-13	-19.89
			782	-32.97	-13	-19.97
			784.5	-32.23	-13	-19.23



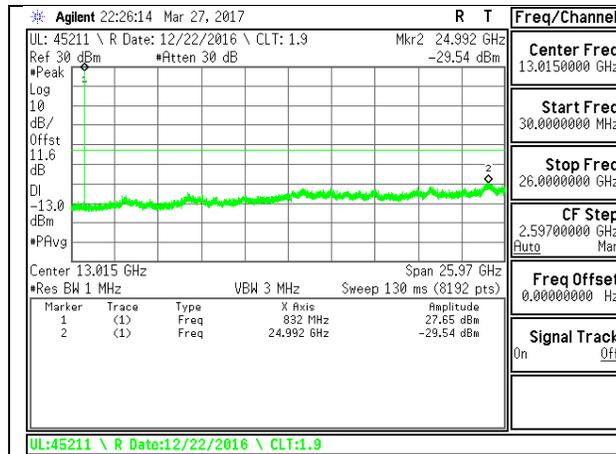
LTE Band 17

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE17	10	16QAM	709	-32.13	-13	-19.13
			710	-33.17	-13	-20.17
			711	-32.53	-13	-19.53
		QPSK	709	-32.53	-13	-19.53
			710	-32.84	-13	-19.84
			711	-32.94	-13	-19.94
	5	16QAM	706.5	-32.13	-13	-19.13
			710	-33.16	-13	-20.16
			713.5	-32.24	-13	-19.24
		QPSK	706.5	-32.54	-13	-19.54
			710	-31.97	-13	-18.97
			713.5	-32.12	-13	-19.12

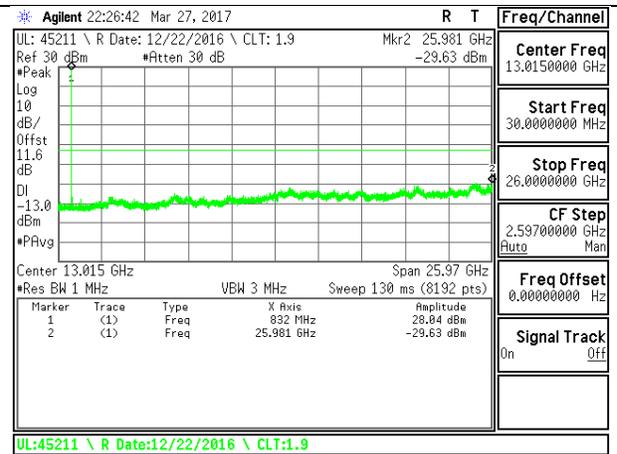


LTE Band 26

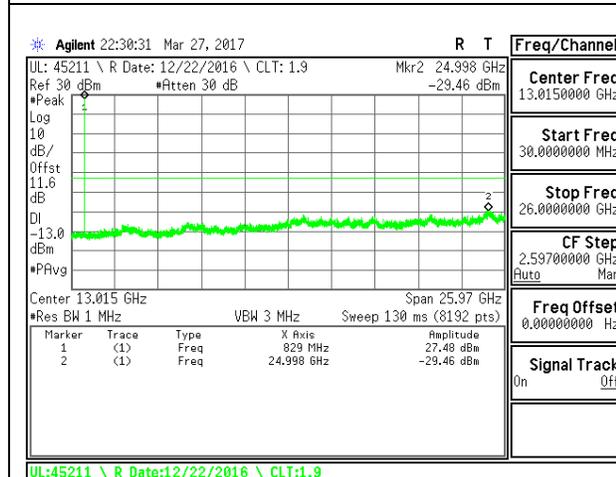
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE26	15	16QAM	831.5	-29.63	-13	-16.63
			836.5	-28.54	-13	-15.54
			841.5	-29.07	-13	-16.07
		QPSK	831.5	-29.1	-13	-16.1
			836.5	-29.43	-13	-16.43
			841.5	-30.14	-13	-17.14
	10	16QAM	819	-29.38	-13	-16.38
			831.5	-28.75	-13	-15.75
			844	-28.19	-13	-15.19
		QPSK	819	-29.18	-13	-16.18
			831.5	-29.03	-13	-16.03
			844	-29.46	-13	-16.46
	5	16QAM	816.5	-29.72	-13	-16.72
			831.5	-29.15	-13	-16.15
			846.5	-28.7	-13	-15.7
		QPSK	816.5	-29.42	-13	-16.42
			831.5	-29.44	-13	-16.44
			846.5	-29.51	-13	-16.51
	3	16QAM	815.5	-29.32	-13	-16.32
			831.5	-28.91	-13	-15.91
			847.5	-29.98	-13	-16.98
		QPSK	815.5	-27.86	-13	-14.86
			831.5	-29.46	-13	-16.46
			847.5	-29.69	-13	-16.69
	1.4	16QAM	814.7	-28.97	-13	-15.97
			831.5	-29.63	-13	-16.63
			848.3	-28.3	-13	-15.3
		QPSK	814.7	-28.72	-13	-15.72
			831.5	-29.54	-13	-16.54
			848.3	-28.34	-13	-15.34



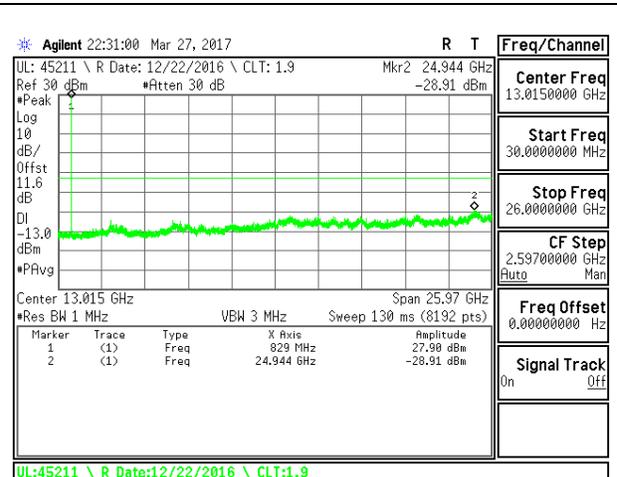
LTE B26 1.4MHz QPSK Middle Channel



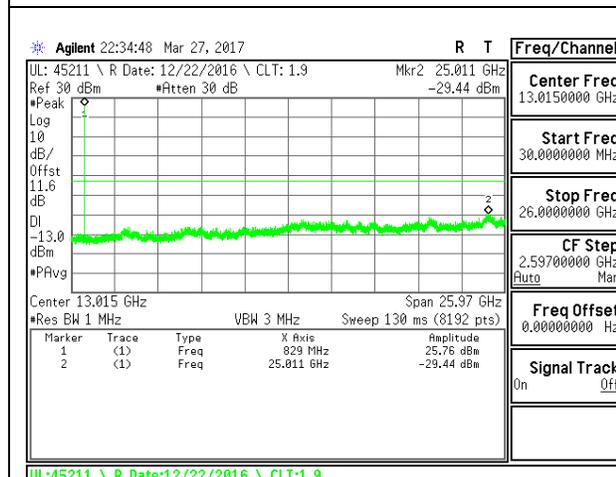
LTE B26 1.4MHz 16QAM Middle Channel



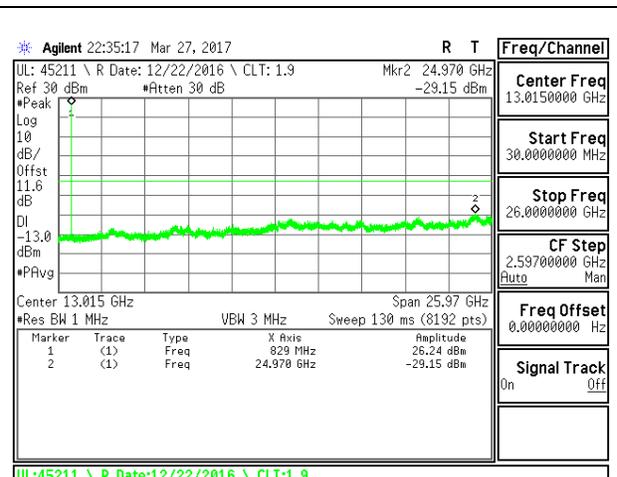
LTE B26 3MHz QPSK Middle Channel



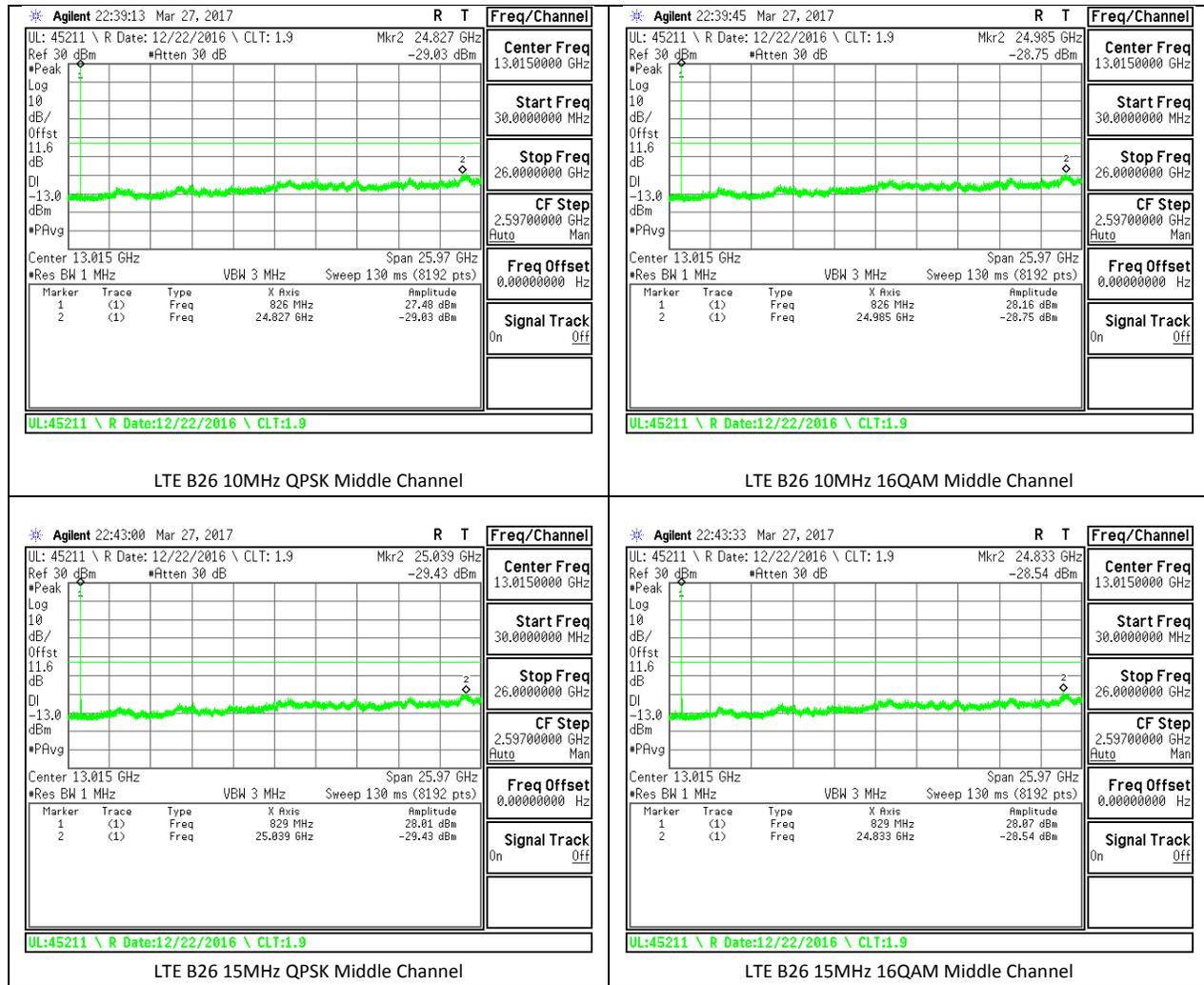
LTE B26 3MHz 16QAM Middle Channel



LTE B26 5MHz QPSK Middle Channel

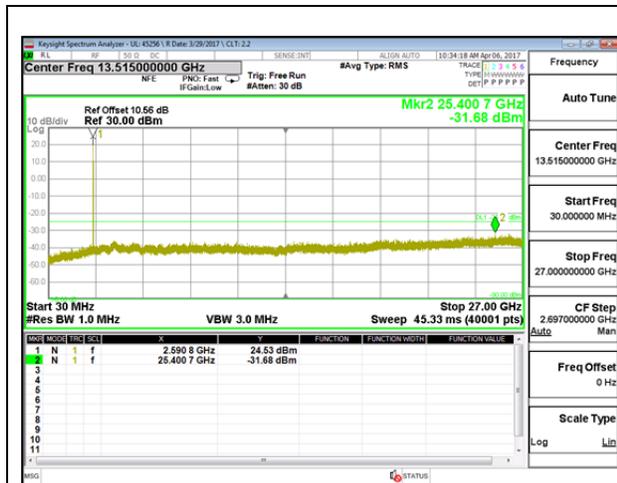


LTE B26 5MHz 16QAM Middle Channel

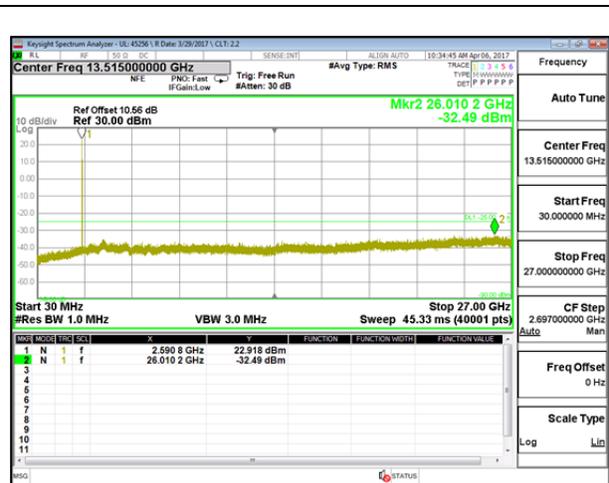


LTE Band 41

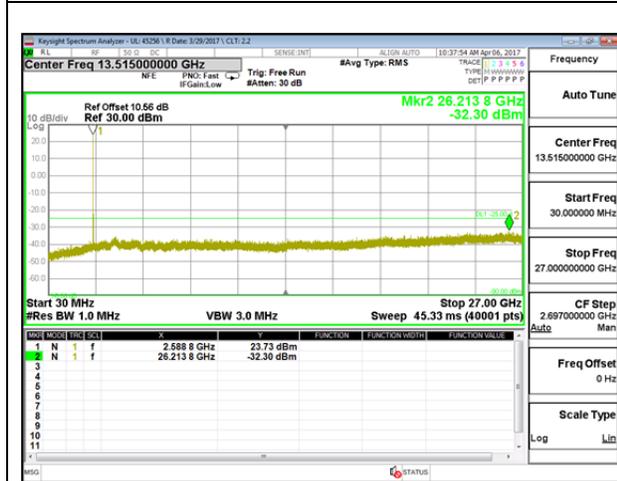
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE41	20	16QAM	2506	-32.45	-25	-7.45
			2593	-32.63	-25	-7.63
			2680	-32.34	-25	-7.34
		QPSK	2506	-32.64	-25	-7.64
			2593	-32.45	-25	-7.45
			2680	-32.62	-25	-7.62
	15	16QAM	2503.5	-32.55	-25	-7.55
			2593	-32.34	-25	-7.34
			2682.5	-32.69	-25	-7.69
		QPSK	2503.5	-32.12	-25	-7.12
			2593	-32.93	-25	-7.93
			2682.5	-31.58	-25	-6.58
	10	16QAM	2501	-32.56	-25	-7.56
			2593	-31.57	-25	-6.57
			2685	-32.65	-25	-7.65
		QPSK	2501	-32.13	-25	-7.13
			2593	-32.30	-25	-7.30
			2685	-32.72	-25	-7.72
	5	16QAM	2498.5	-32.79	-25	-7.79
			2593	-32.49	-25	-7.49
			2687.5	-32.94	-25	-7.94
		QPSK	2498.5	-32.68	-25	-7.68
			2593	-31.68	-25	-6.68
			2687.5	-32.45	-25	-7.45



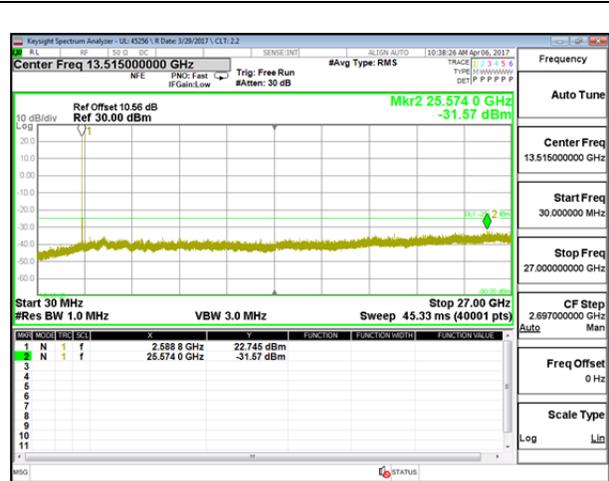
LTE B41 5MHz QPSK Middle Channel



LTE B41 5MHz 16QAM Middle Channel



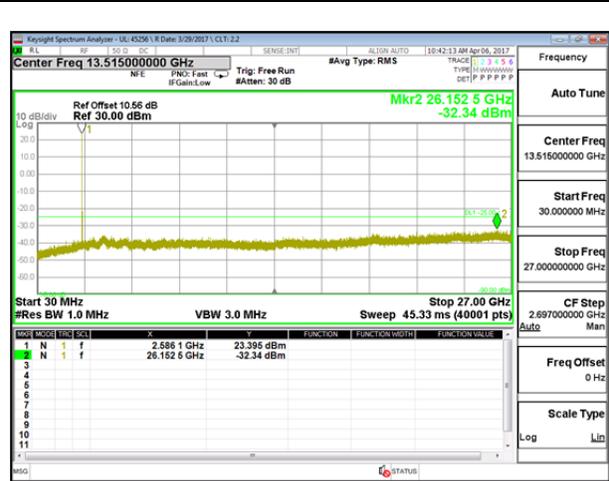
LTE B41 10MHz QPSK Middle Channel



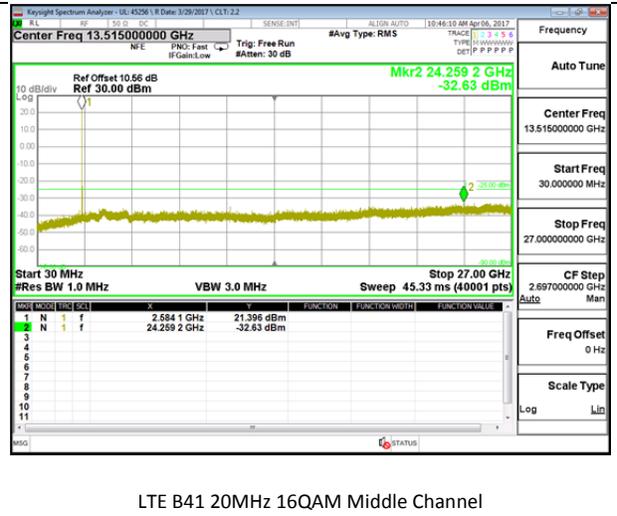
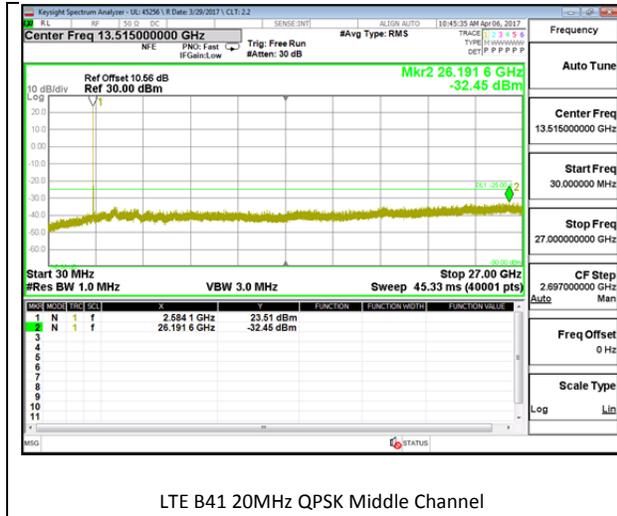
LTE B41 10MHz 16QAM Middle Channel



LTE B41 15MHz QPSK Middle Channel



LTE B41 15MHz 16QAM Middle Channel



16. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54 and §90.213

FCC LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

§24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

§27.54 - The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

Results

Tested By	Lionel Lara-Mendoza
Date	4/10/2017

16.1. FREQUENCY STABILITY RESULTS

LTE Band 2

QPSK

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	1850.8000	1909.1300		
Extreme (55C)		1850.8000	1909.1300	14.0	0.007
Extreme (40C)		1850.8000	1909.1300	20.8	0.011
Extreme (30C)		1850.8000	1909.1300	14.8	0.008
Extreme (10C)		1850.8000	1909.1300	21.2	0.011
Extreme (0C)		1850.8000	1909.1300	15.1	0.008
Extreme (-10C)		1850.8000	1909.1300	17.0	0.009
Extreme (-20C)		1850.8000	1909.1300	21.2	0.011
Extreme (-30C)		1850.8000	1909.1300	20.1	0.011
25C	3.8 Vdc	1850.8000	1909.1300	10.9	0.006
	4.2 Vdc	1850.8000	1909.1300	9.1	0.005
	3.6 Vdc	1850.8000	1909.1300	9.8	0.005

LTE Band 4

QPSK

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	1710.8000	1754.1300		
Extreme (55C)		1710.8000	1754.1300	12.4	0.007
Extreme (40C)		1710.8000	1754.1300	14.5	0.008
Extreme (30C)		1710.8000	1754.1300	19.7	0.011
Extreme (10C)		1710.8000	1754.1300	17.3	0.010
Extreme (0C)		1710.8000	1754.1300	13.5	0.008
Extreme (-10C)		1710.8000	1754.1300	12.5	0.007
Extreme (-20C)		1710.8000	1754.1300	13.1	0.008
Extreme (-30C)		1710.8000	1754.1300	8.3	0.005
25C	3.8 Vdc	1710.8000	1754.1300	14.8	0.009
	4.2 Vdc	1710.8000	1754.1300	13.8	0.008
	3.6 Vdc	1710.8000	1754.1300	16.1	0.009

LTE Band 5

Reference Frequency: Mid Channel		836.5	MHz @ 20°C	
Limit: to stay +/- 2.5 ppm =		2091.250	Hz	
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	55	836.500011	-0.030	2.5
3.80	40	836.499985	0.001	2.5
3.80	30	836.499985	0.001	2.5
3.80	20	836.499986	0	2.5
3.80	10	836.499985	0.002	2.5
3.80	0	836.500012	-0.030	2.5
3.80	-10	836.500011	-0.029	2.5
3.80	-20	836.499987	-0.001	2.5
3.80	-30	836.499987	0.000	2.5

Reference Frequency: Cellular Mid Channel		836.5	MHz @ 20°C	
Limit: to stay +/- 2.5 ppm =		2091.250	Hz	
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.8	20	836.499986	0.000	2.5
4.2	20	836.499985	0.002	2.5
3.6	20	836.499987	0.000	2.5

LTE Band 7

QPSK

Limit		2500	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (25C)	3.8 Vdc	2500.6700	2569.3300		
Extreme (55C)		2500.6700	2569.3300	21.1	0.008
Extreme (40C)		2500.6700	2569.3300	-15.2	-0.006
Extreme (30C)		2500.6700	2569.3300	-16.2	-0.006
Extreme (10C)		2500.6700	2569.3300	-18.7	-0.007
Extreme (0C)		2500.6700	2569.3300	19.0	0.007
Extreme (-10C)		2500.6700	2569.3300	19.2	0.007
Extreme (-20C)		2500.6700	2569.3300	19.1	0.007
Extreme (-30C)		2500.6700	2569.3300	-17.9	-0.007
25C		3.8 Vdc	2500.6700	2569.3300	-10.1
	4.2 Vdc	2500.6700	2569.3300	-3.3	-0.001
	3.6 Vdc	2500.6700	2569.3300	-9.0	-0.003

LTE Band 12

QPSK

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	699.4000	715.5700		
Extreme (55C)		699.4000	715.5700	-15.3	-0.022
Extreme (40C)		699.4000	715.5700	11.6	0.016
Extreme (30C)		699.4000	715.5700	-18.5	-0.026
Extreme (10C)		699.4000	715.5700	11.1	0.016
Extreme (0C)		699.4000	715.5700	-17.2	-0.024
Extreme (-10C)		699.4000	715.5700	-13.1	-0.019
Extreme (-20C)		699.4000	715.5700	12.0	0.017
Extreme (-30C)		699.4000	715.5700	-14.0	-0.020
25C	3.8 Vdc	699.4000	715.5700	-14.9	-0.021
	4.2 Vdc	699.4000	715.5700	-12.1	-0.017
	3.6 Vdc	699.4000	715.5700	-14.1	-0.020

LTE Band 13

QPSK

Limit		777	787	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	777.4000	786.5700		
Extreme (55C)		777.4000	786.5700	-17.1	-0.022
Extreme (40C)		777.4000	786.5700	-16.4	-0.021
Extreme (30C)		777.4000	786.5700	13.4	0.017
Extreme (10C)		777.4000	786.5700	-10.3	-0.013
Extreme (0C)		777.4000	786.5700	-14.1	-0.018
Extreme (-10C)		777.4000	786.5700	-17.8	-0.023
Extreme (-20C)		777.4000	786.5700	-15.2	-0.019
Extreme (-30C)		777.4000	786.5700	-18.0	-0.023
25C	3.8 Vdc	777.4000	786.5700	10.6	0.014
	4.2 Vdc	777.4000	786.5700	13.1	0.017
	3.6 Vdc	777.4000	786.5700	12.1	0.015

17. RADIATED TEST RESULTS

17.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2. 1046, §22. 913, §24. 232, §27 and § 90.635.

FCC LIMITS

22.913 (a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232 (c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

27.50 (b) - (10) Portable stations (handheld devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP. (LTE B13)

27.50 (c) - (10) Portable stations (handheld devices) are limited to 3 watts ERP; (LTE B17)

27.50 (d) - (4) Fixed, mobile, and portable (handheld) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.(Band 4)

27.50 (h) - (2) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power. (LTE B41 & 7)

90.635 (b) - The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw). (LTE B26)

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

TEST PROCEDURE

ANSI / TIA / EIA 603D Clause 2.2.17; PSA setting reference to 971168 D01 v02r02

For peak power measurement with a PSA:

a) Set the RBW \geq OBW; b) Set VBW $\geq 3 \times$ RBW; c) Set span $\geq 2 \times$ RBW; d) Sweep time = auto couple; e) Detector = peak; f) Ensure that the number of measurement points \geq span/RBW; g) Trace mode = max hold;

For average power measurement with a PSA:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW $\geq 3 \times$ RBW; d) Set number of points in sweep $\geq 2 \times$ span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle ≥ 98 ; h) Use trigger to capture bursts If burst duty cycle < 98 ; i) Trace average at least 100 traces in power averaging (*i.e.*, RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.

17.1.1. ERP/EIRP RESULTS AND TABLE

GSM

Band	Mode	Channel	f(MHz)	ERP/EIRP	
				dBm	mW
GSM850	GPRS	128	824.2	25.93	391.74
		190	836.6	26.49	445.66
		251	848.8	25.89	388.15
	EGPRS	128	824.2	21.45	139.64
		190	836.6	21.24	133.05
		251	848.8	21.80	151.36
GSM1900	GPRS	512	1850.2	27.97	626.61
		661	1880	29.46	883.08
		810	1909.8	29.03	799.83
	EGPRS	512	1850.2	26.10	407.38
		661	1880	27.36	544.50
		810	1909.8	26.74	472.06