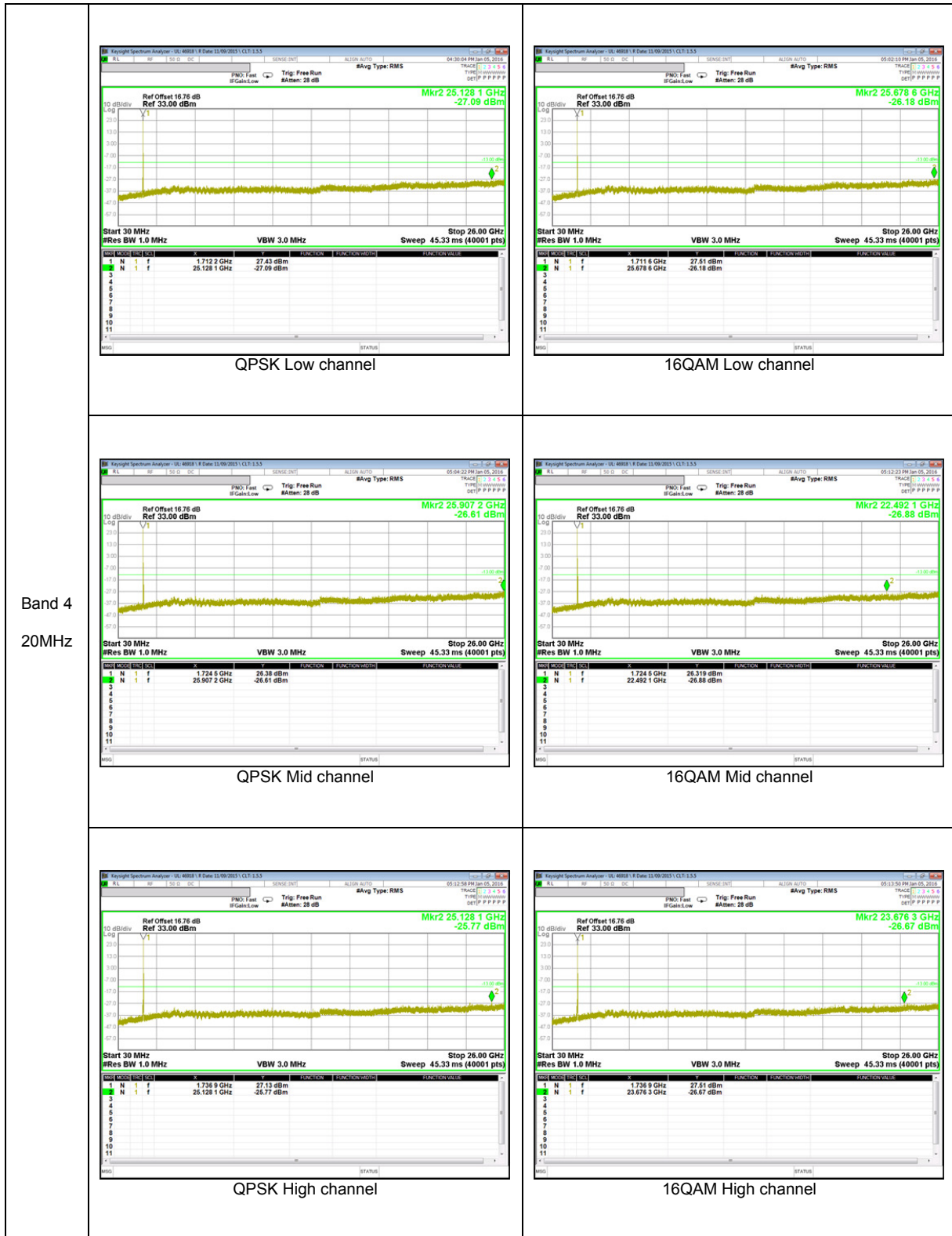
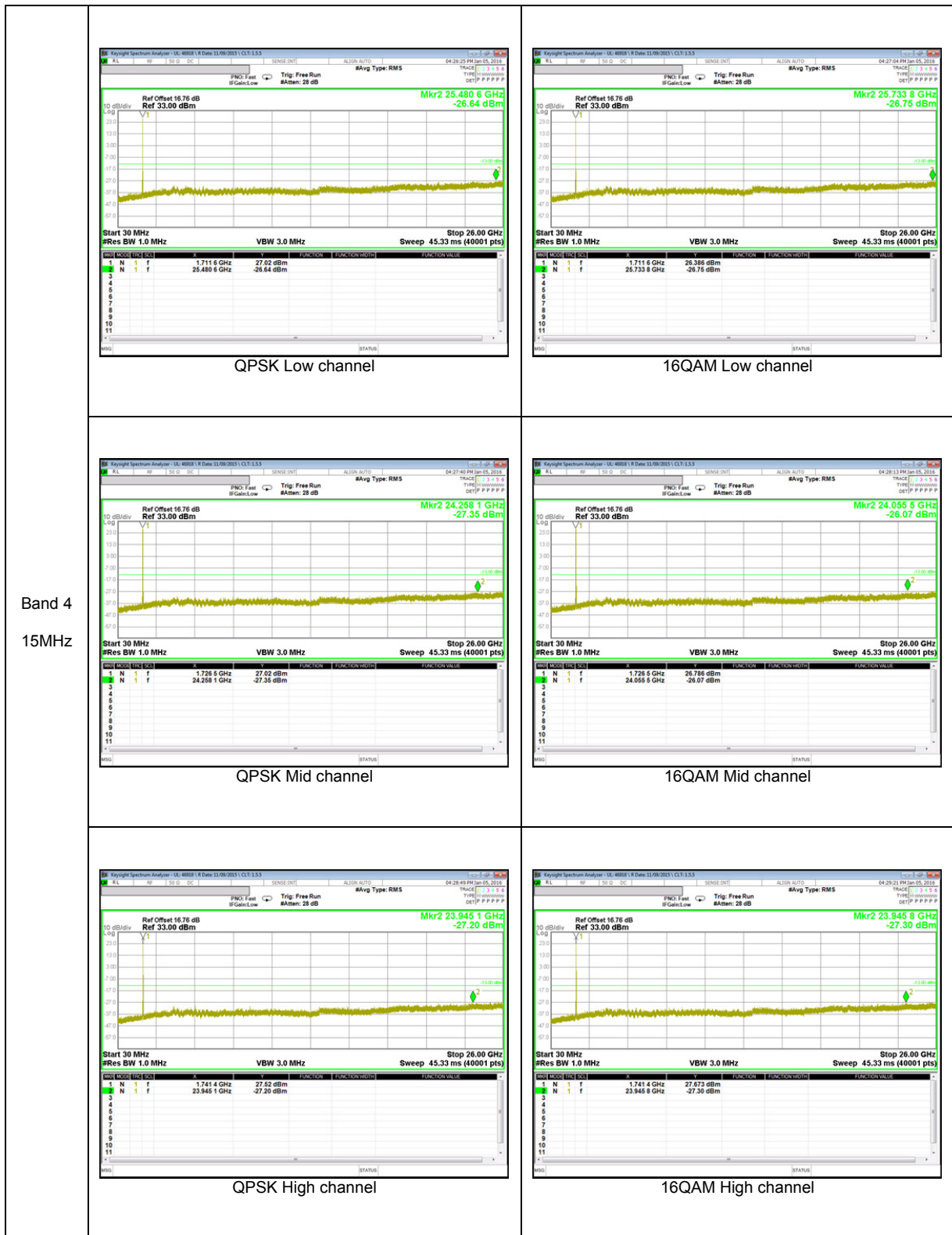
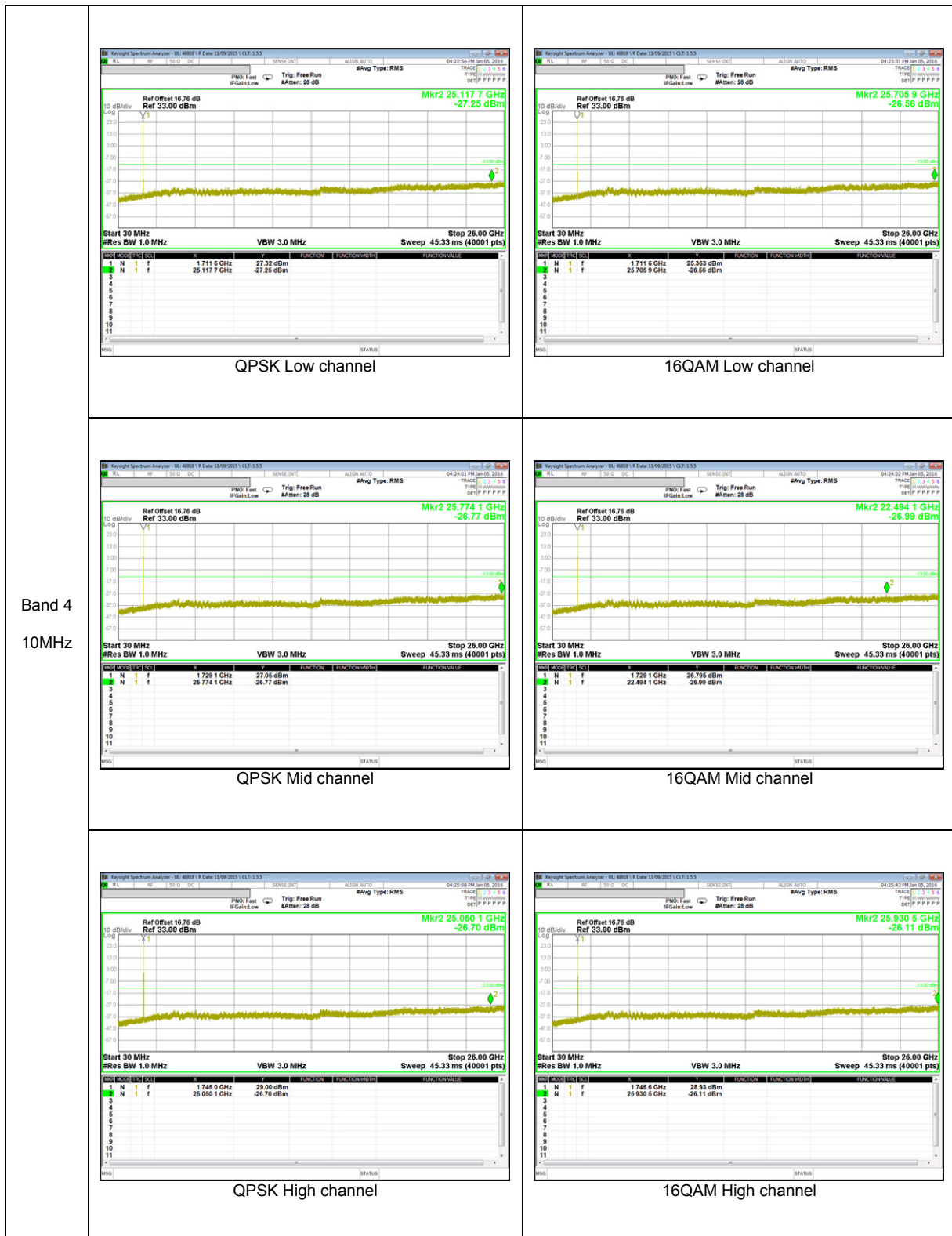
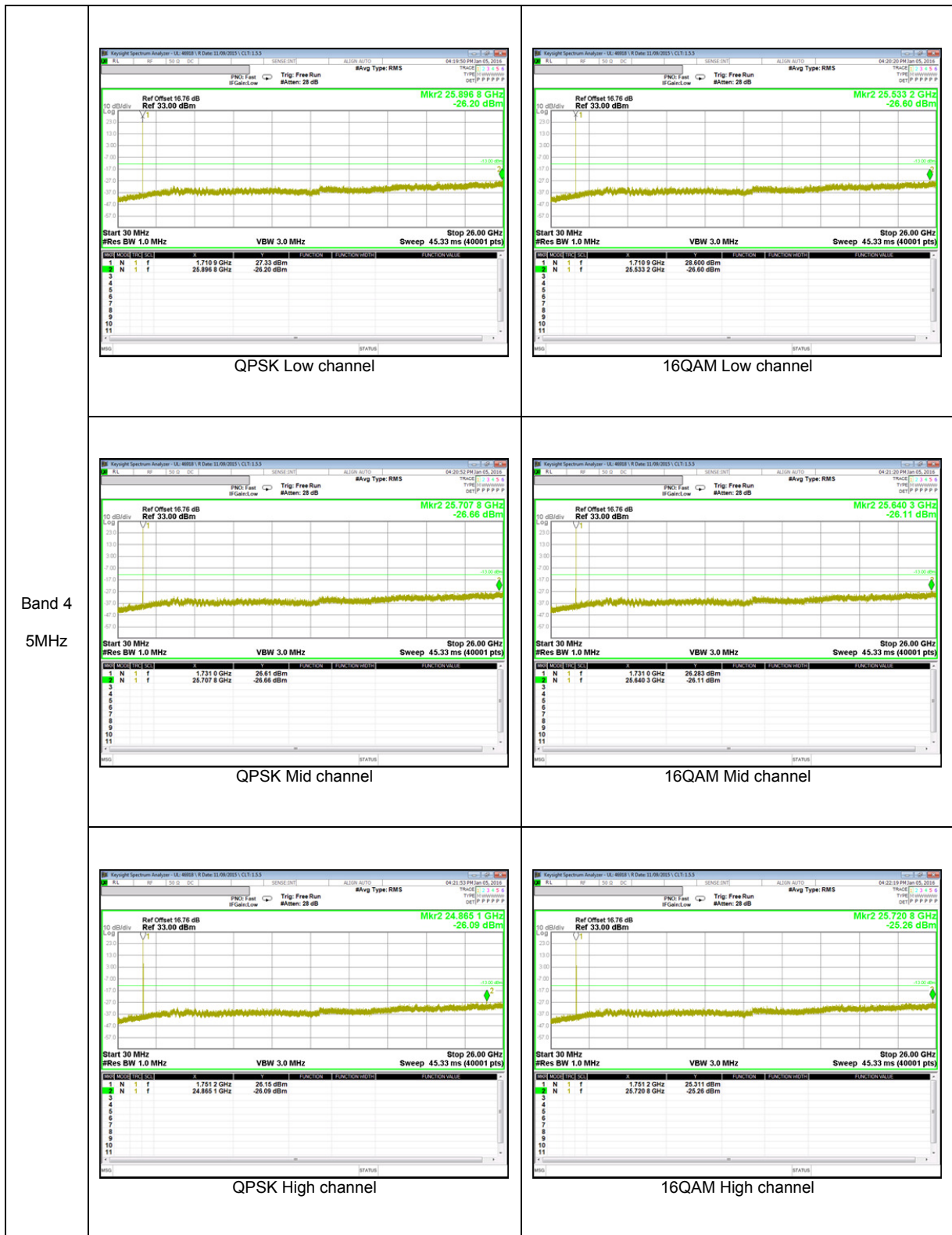


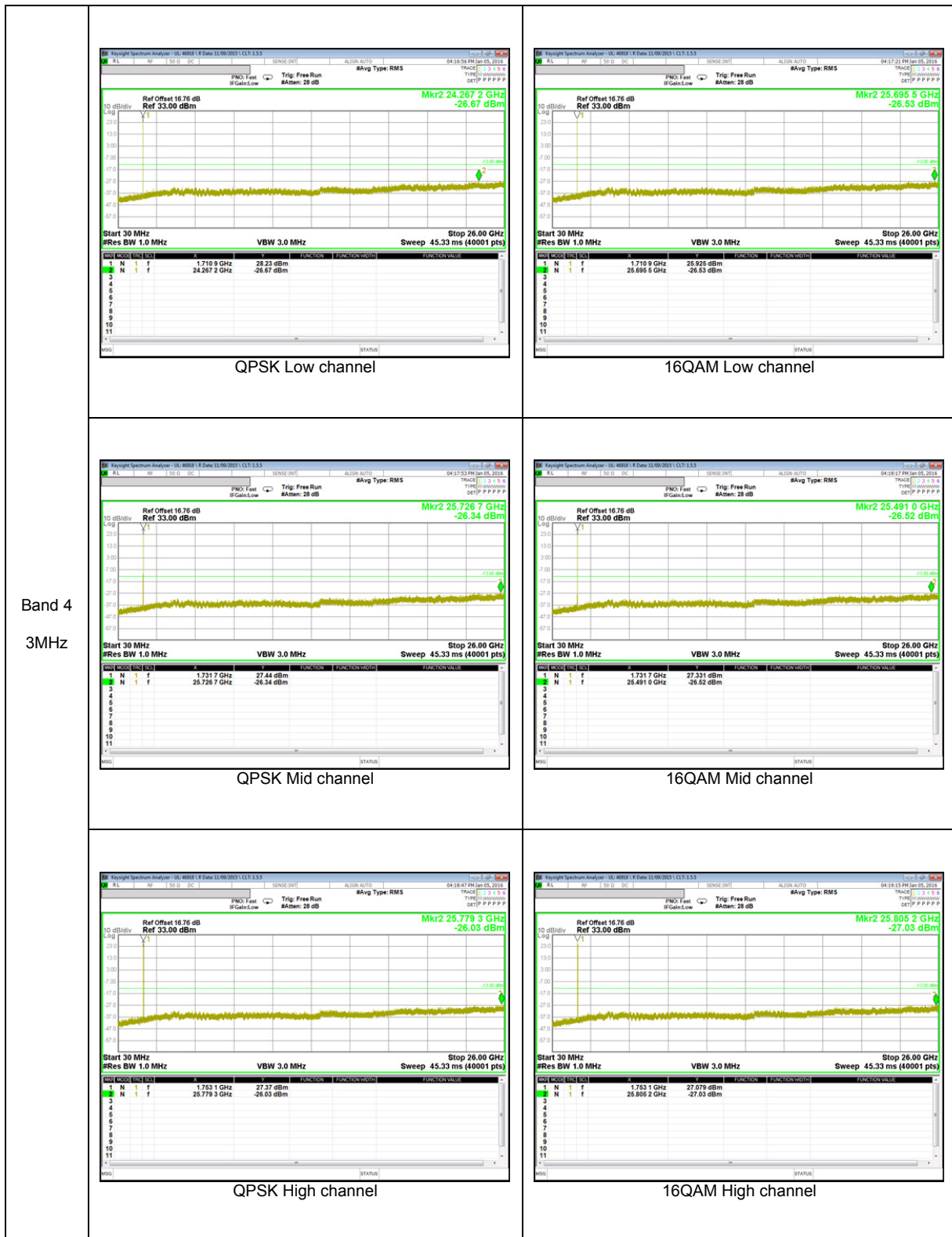
LTE Band 4

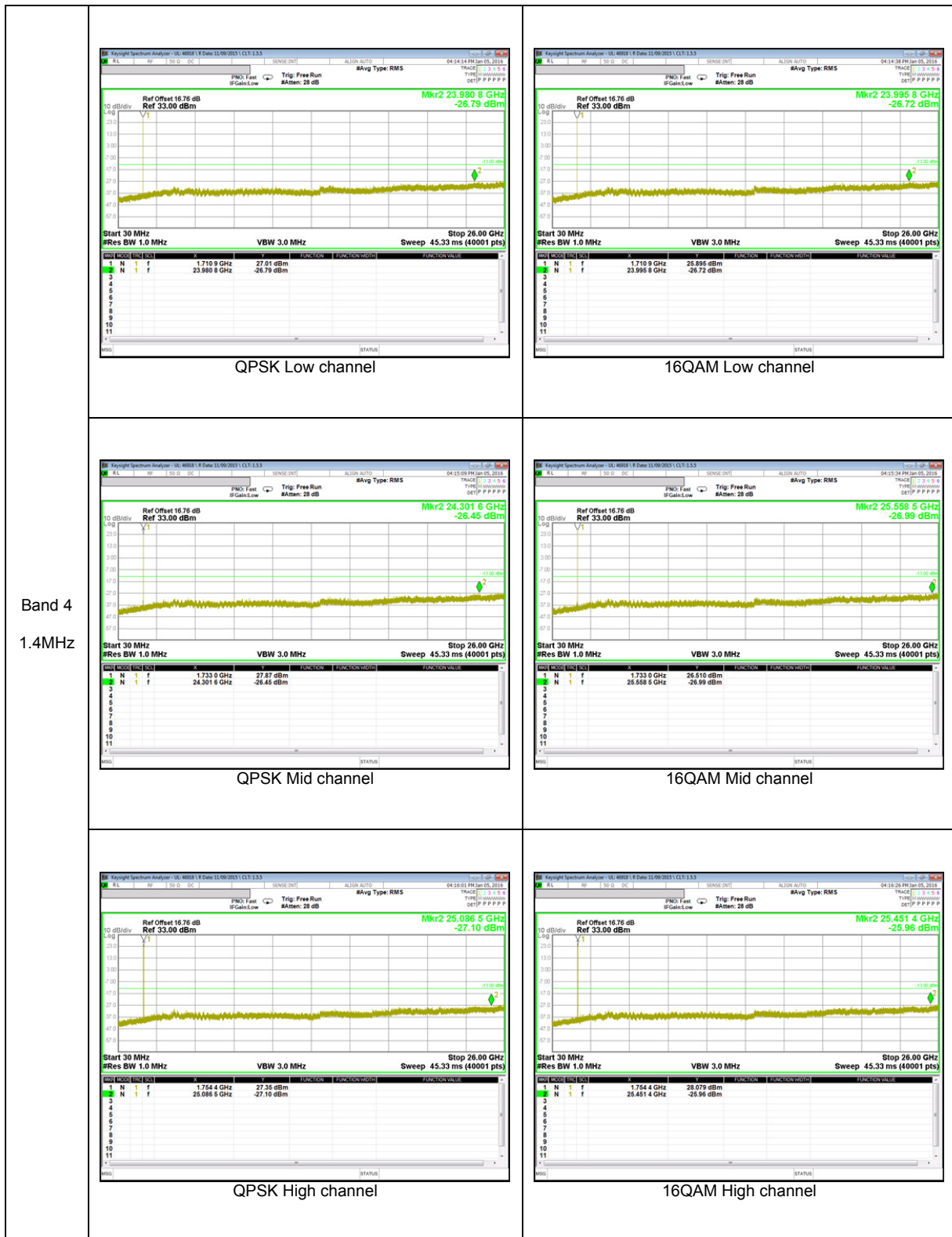




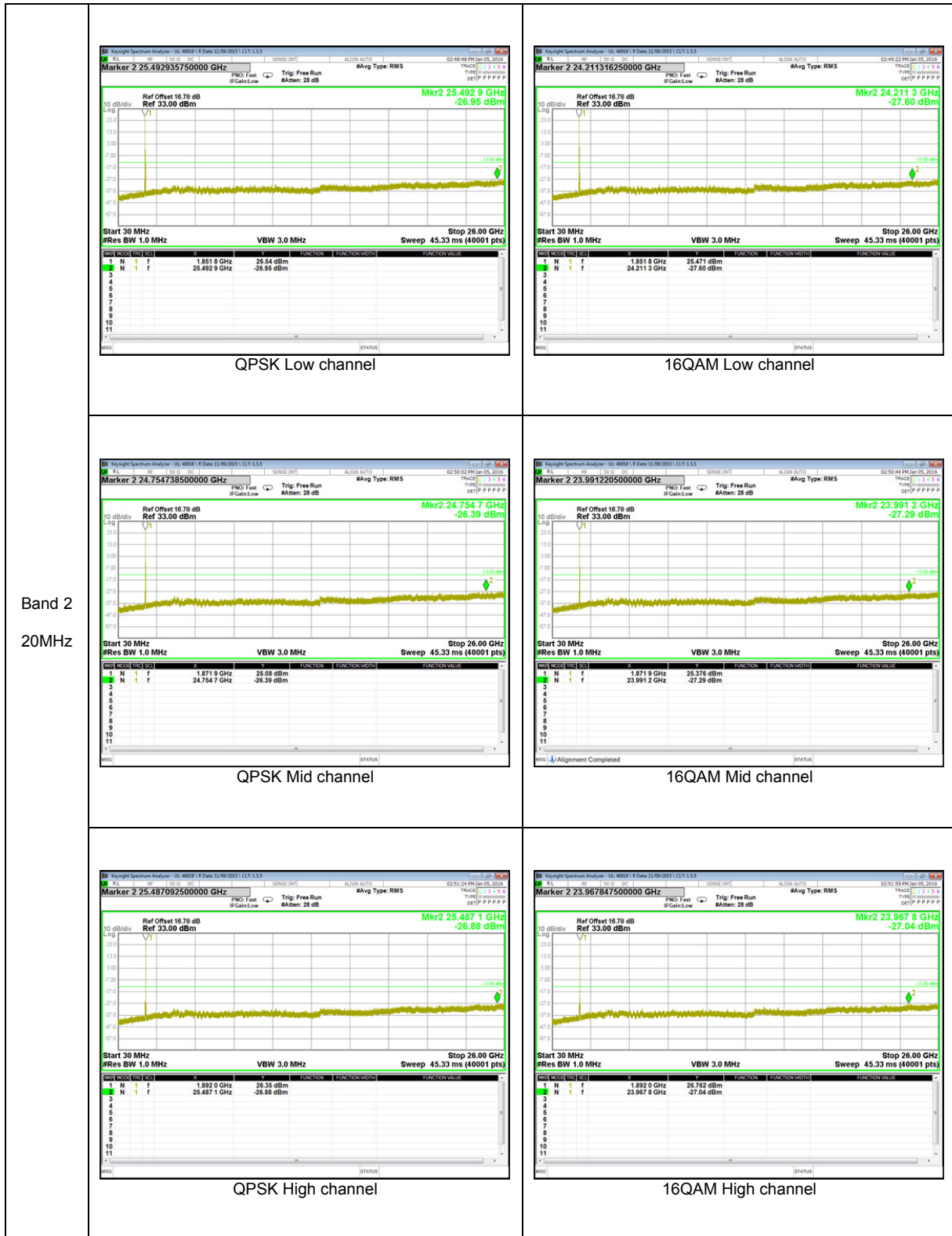


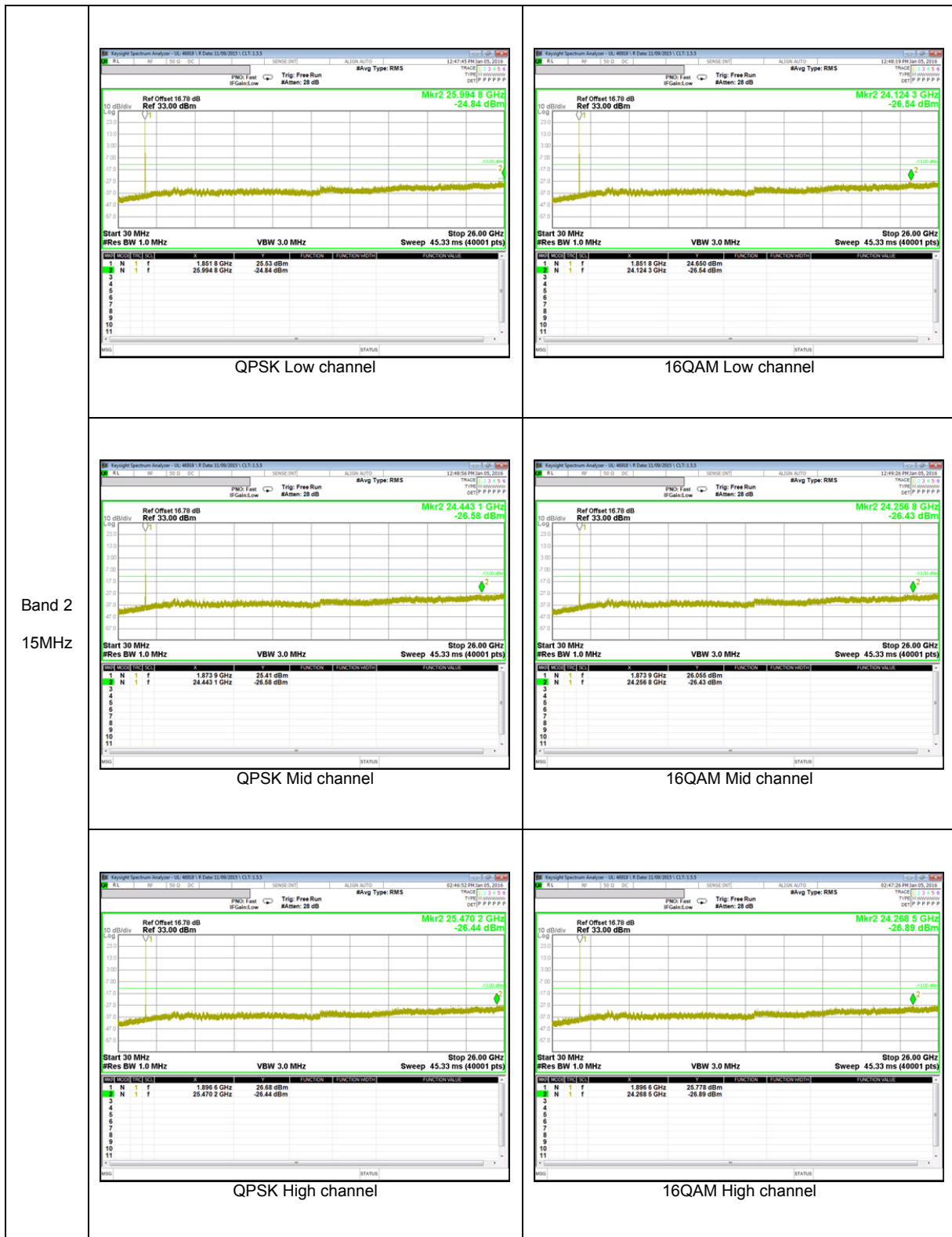


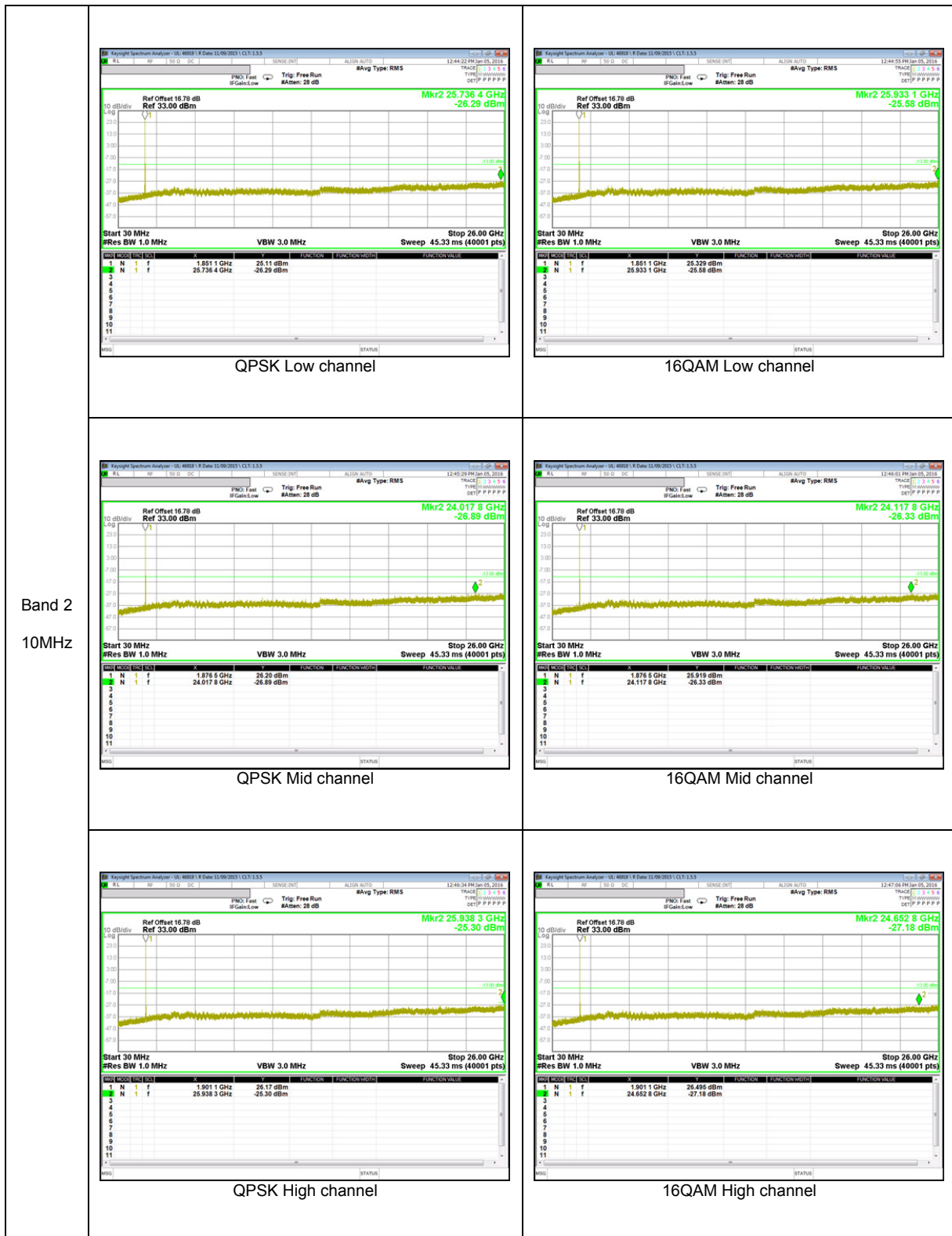


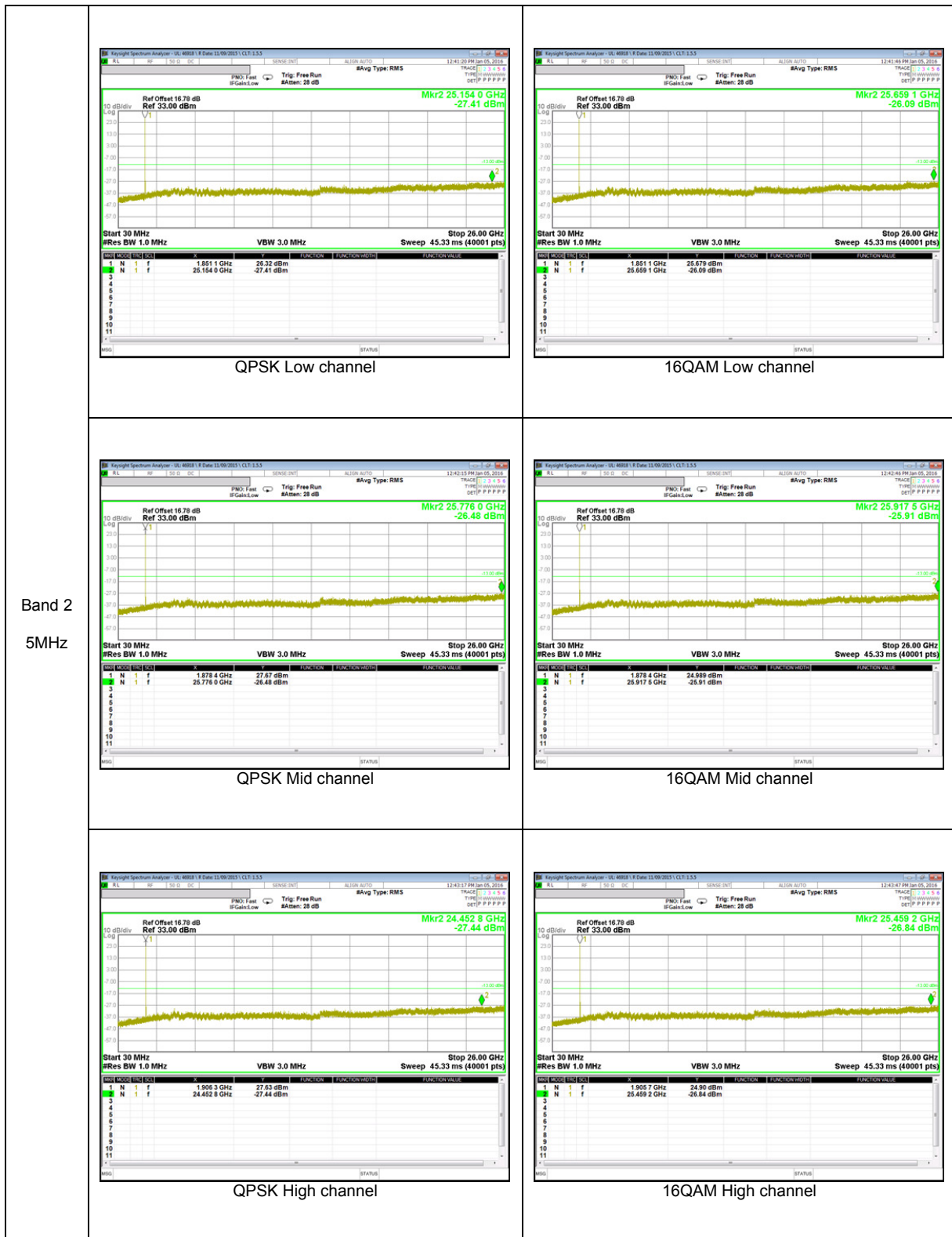


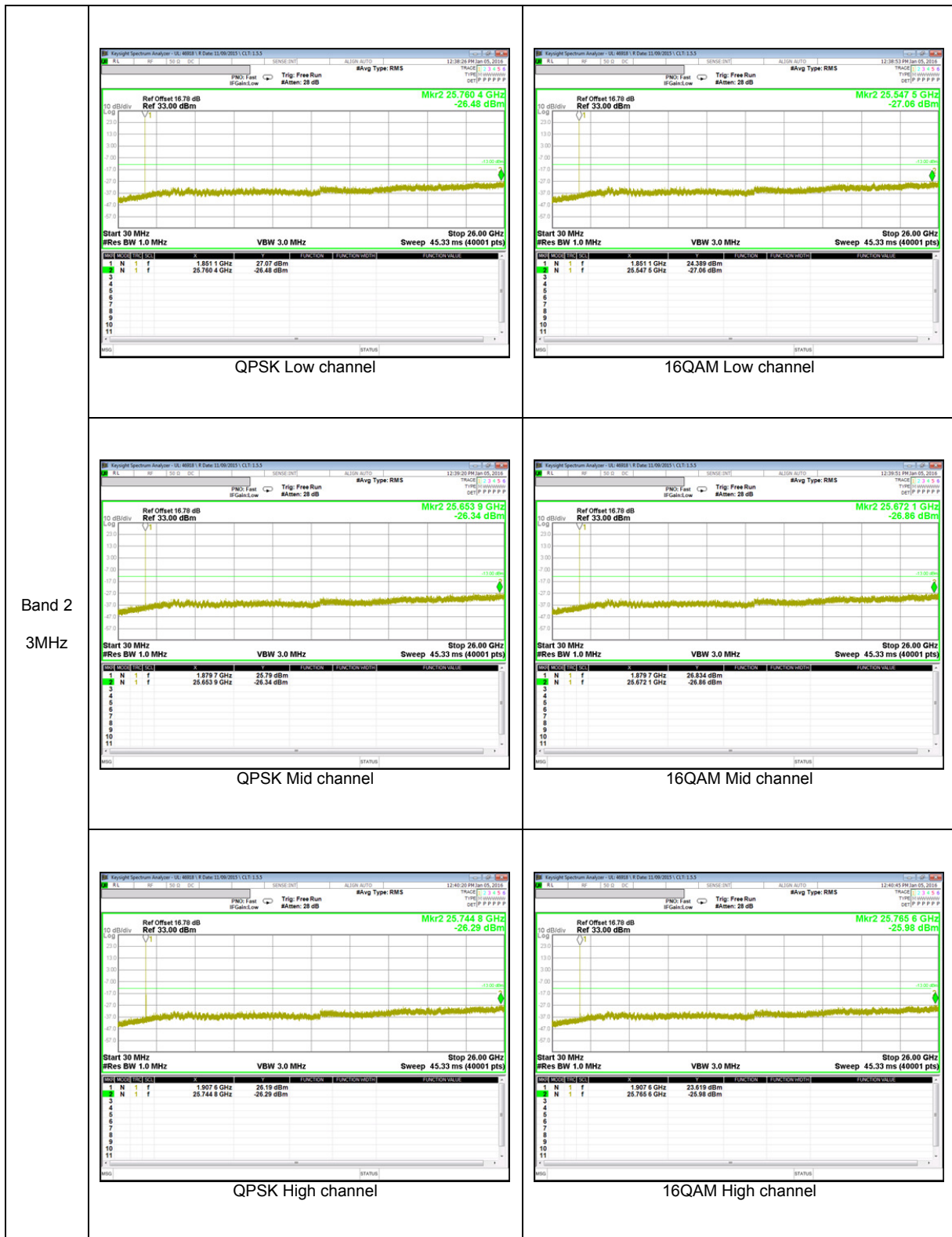
LTE Band 2

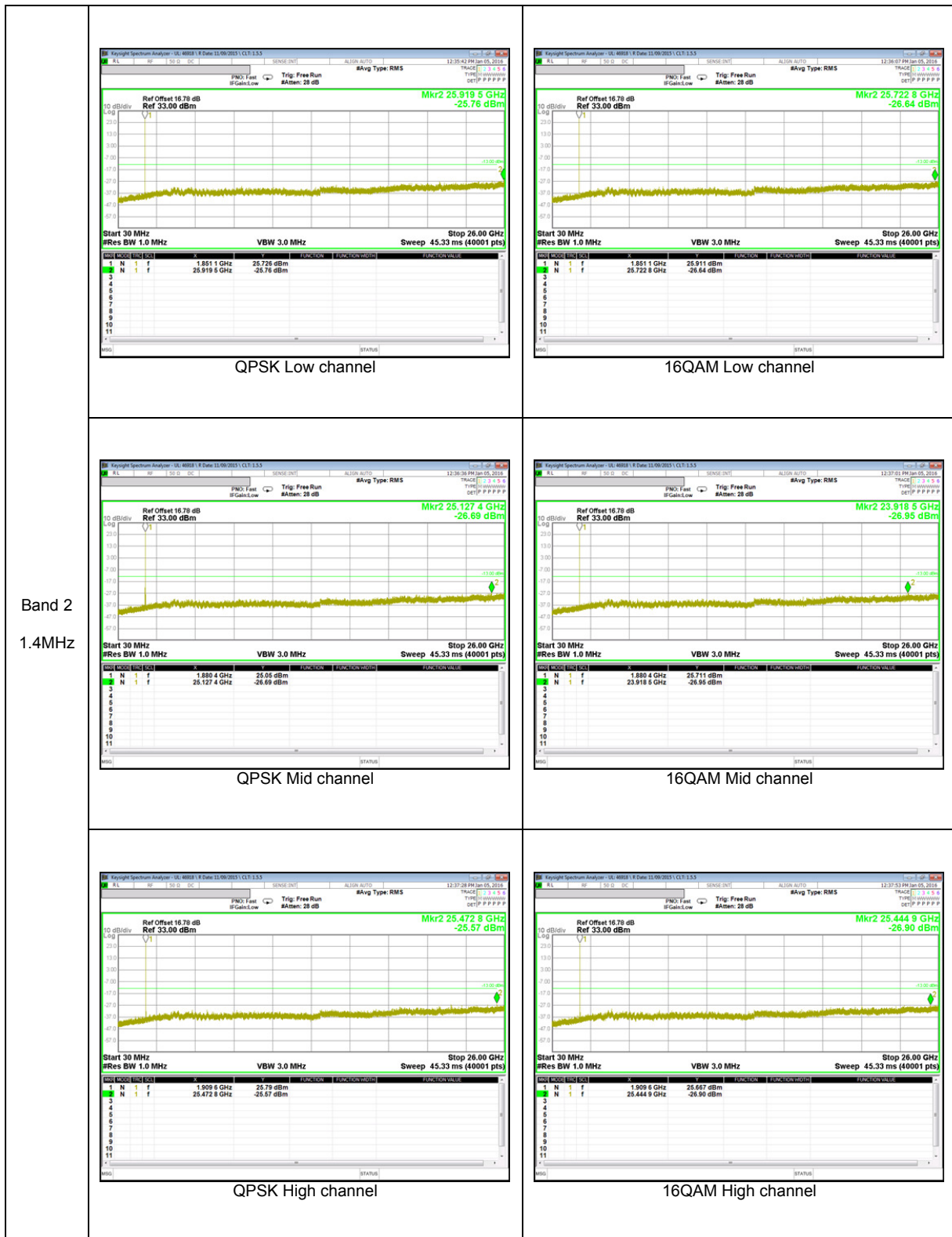












10.4. FREQUENCY STABILITY

RULE PART(S)

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

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

See the following pages.

10.4.1. FREQUENCY STABILITY RESULTS

LTE Band 17, Channel 23790, Frequency 710.0 MHz

Reference Frequency: LTE Band 17 Mid Channel 710.0 MHz @ 20°C				
Limit: +/- 2.5 ppm = 1775.000 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.80	50	710.00000448	0.001	2.5
3.80	40	710.00000439	0.001	2.5
3.80	30	710.00000534	0.000	2.5
3.80	20	710.00000518	0	2.5
3.80	10	710.00000379	0.002	2.5
3.80	0	710.00000595	-0.001	2.5
3.80	-10	710.00000581	-0.001	2.5
3.80	-20	710.00000504	0.000	2.5
3.80	-30	710.00000481	0.001	2.5

Reference Frequency: LTE Band 17 Mid Channel 710.0 MHz @ 20°C				
Limit: +/- 2.5 ppm = 1775.000 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.80	20	710.00000518	0	2.5
4.20	20	710.00000346	0.002	2.5
3.40	20	710.00000443	0.001	2.5

LTE Band 5, Channel 20524, Frequency 836.5 MHz

WCDMA Band 5, Channel 4183, Frequency 836.6 MHz

GSM 850, Channel 190, Frequency 836.6 MHz

Reference Frequency: LTE Band 5 Mid Channel 836.5 MHz @ 20°C				
Limit: +/- 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	50	836.5000748	-0.002	2.5
3.80	40	836.5000459	0.001	2.5
3.80	30	836.5000594	-0.001	2.5
3.80	20	836.5000545	0	2.5
3.80	10	836.5000468	0.001	2.5
3.80	0	836.5000741	-0.002	2.5
3.80	-10	836.5000539	0.000	2.5
3.80	-20	836.5000554	0.000	2.5
3.80	-30	836.5000409	0.002	2.5

Reference Frequency: LTE Band 5 Mid Channel 836.5 MHz @ 20°C				
Limit: +/- 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	20	836.5000545	0	2.5
4.20	20	836.5000485	0.001	2.5
3.40	20	836.5000581	0.000	2.5

LTE Band 4, Channel 20174, Frequency 1732.5 MHz

WCDMA Band 4, Channel 1413, Frequency 1732.6 MHz

Reference Frequency: LTE Band 4 Mid Channel 1732.5 MHz @ 20°C				
Limit: +/- 2.5 ppm = 4331.250 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.80	50	1732.49999396	-0.003	2.5
3.80	40	1732.49999292	-0.002	2.5
3.80	30	1732.49999084	-0.001	2.5
3.80	20	1732.49998867	0	2.5
3.80	10	1732.49999160	-0.002	2.5
3.80	0	1732.49999037	-0.001	2.5
3.80	-10	1732.49999212	-0.002	2.5
3.80	-20	1732.49999063	-0.001	2.5
3.80	-30	1732.49999137	-0.002	2.5

Reference Frequency: LTE Band 4 Mid Channel 1732.5 MHz @ 20°C				
Limit: +/- 2.5 ppm = 4331.250 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.80	20	1732.49998867	0	2.5
4.20	20	1732.49999060	-0.001	2.5
3.40	20	1732.49998952	0.000	2.5

LTE Band 2, Channel 18900, Frequency 1880.0 MHz

WCDMA Band 2, Channel 9400, Frequency 1880.0 MHz

GSM 1900, Channel 661, Frequency 1880.0 MHz

Reference Frequency: LTE Band 2 Mid Channel 1880.0 MHz @ 20°C				
Limit: +/- 2.5 ppm = 4700.000 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.80	50	1880.00001163	0.000	2.5
3.80	40	1880.00000956	0.002	2.5
3.80	30	1880.00001039	0.001	2.5
3.80	20	1880.00001253	0	2.5
3.80	10	1880.00001099	0.001	2.5
3.80	0	1880.00001114	0.001	2.5
3.80	-10	1880.00001307	0.000	2.5
3.80	-20	1880.00001176	0.000	2.5
3.80	-30	1880.00001182	0.000	2.5

Reference Frequency: LTE Band 2 Mid Channel 1880.0 MHz @ 20°C				
Limit: +/- 2.5 ppm = 4700.000 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.80	20	1880.00001253	0	2.5
4.20	20	1880.00001014	0.001	2.5
3.40	20	1880.00001355	-0.001	2.5

11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232 and §27.50

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

27.50(d) - (4) Fixed, mobile, and portable (hand-held) 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)

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; MXA setting reference to 971168 D01 v02r02

For peak power measurement with a MXA:

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 MXA:

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.

TEST RESULTS

11.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	512	824.2	29.68	928.97
		661	836.6	28.94	783.43
		810	848.8	28.51	709.58
	EGPRS	512	824.2	22.79	190.11
		661	836.6	22.69	185.78
		810	848.8	23.63	230.67
GSM1900	GPRS	512	1850.2	29.41	872.97
		661	1880.0	29.68	928.97
		810	1909.8	28.86	769.13
	EGPRS	512	1850.2	26.10	407.38
		661	1880.0	27.58	572.80
		810	1909.8	26.18	414.95

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	18.53	71.29
		4183	836.6	17.74	59.43
		4233	846.6	17.60	57.54
	HSDPA	4132	826.4	17.47	55.85
		4183	836.6	15.98	39.63
		4233	846.6	17.62	57.81
Band 4	REL99	1312	1712.4	22.26	168.27
		1413	1732.6	21.68	147.23
		1513	1752.6	21.44	139.32
	HSDPA	1312	1712.4	22.01	158.85
		1413	1732.6	20.45	110.92
		1513	1752.6	21.48	140.60
Band 2	REL99	9262	1852.4	21.94	156.31
		9400	1880.0	22.24	167.49
		9538	1907.6	21.71	148.25
	HSDPA	9262	1852.4	19.86	96.83
		9400	1880.0	21.14	130.02
		9538	1907.6	20.33	107.89

LTE Band 17

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 17	10	QPSK	50/0	709.0	11.68	14.72
			50/0	710.0	11.59	14.42
			50/0	711.0	11.55	14.29
		16QAM	50/0	709.0	10.74	11.86
			50/0	710.0	10.66	11.64
			50/0	711.0	10.66	11.64
	5	QPSK	25/0	706.5	11.25	13.34
			25/0	710.0	11.18	13.12
			25/0	713.5	11.38	13.74
		16QAM	25/0	706.5	10.42	11.02
			25/0	710.0	10.33	10.79
			25/0	713.5	10.44	11.07

LTE Band 5

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 5	10	QPSK	50/0	829.0	15.47	35.24
			50/0	836.5	15.48	35.32
			50/0	844.0	15.56	35.97
		16QAM	50/0	829.0	15.21	33.19
			50/0	836.5	14.79	30.13
			50/0	844.0	14.06	25.47
	5	QPSK	25/0	826.5	15.61	36.39
			25/0	836.5	15.69	37.07
			25/0	846.5	14.90	30.90
		16QAM	25/0	826.5	15.17	32.89
			25/0	836.5	14.72	29.65
			25/0	846.5	13.99	25.06
	3	QPSK	15/0	825.5	15.74	37.50
			15/0	836.5	15.41	34.75
			15/0	847.5	14.52	28.31
		16QAM	15/0	825.5	15.03	31.84
			15/0	836.5	14.56	28.58
			15/0	847.5	14.26	26.67
	1.4	QPSK	6/0	824.7	13.70	23.44
			6/0	836.5	13.35	21.63
			6/0	848.3	12.58	18.11
		16QAM	6/0	824.7	12.79	19.01
			6/0	836.5	12.40	17.38
			6/0	848.3	12.17	16.48

LTE Band 4

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 4	20	QPSK	100/0	1720.0	17.79	60.12
			100/0	1732.5	18.95	78.52
			100/0	1745.0	17.91	61.80
		16QAM	100/0	1720.0	17.45	55.59
			100/0	1732.5	18.58	72.11
			100/0	1745.0	17.56	57.02
	15	QPSK	75/0	1717.5	16.99	50.00
			75/0	1732.5	18.61	72.61
			75/0	1747.5	17.97	62.66
		16QAM	75/0	1717.5	16.66	46.34
			75/0	1732.5	18.33	68.08
			75/0	1747.5	17.62	57.81
	10	QPSK	50/0	1715.0	17.56	57.02
			50/0	1732.5	16.49	44.57
			50/0	1750.0	17.81	60.39
		16QAM	50/0	1715.0	17.32	53.95
			50/0	1732.5	16.06	40.36
			50/0	1750.0	17.45	55.59
	5	QPSK	25/0	1712.5	17.43	55.34
			25/0	1732.5	18.76	75.16
			25/0	1752.5	17.85	60.95
		16QAM	25/0	1712.5	17.13	51.64
			25/0	1732.5	18.32	67.92
			25/0	1752.5	17.41	55.08
	3	QPSK	15/0	1711.5	16.36	43.25
			15/0	1732.5	19.35	86.10
			15/0	1753.5	17.32	53.95
		16QAM	15/0	1711.5	16.01	39.90
			15/0	1732.5	18.88	77.27
			15/0	1753.5	17.04	50.58
1.4	QPSK	6/0	1710.7	15.71	37.24	
		6/0	1732.5	15.72	37.33	
		6/0	1754.3	14.58	28.71	
	16QAM	6/0	1710.7	15.28	33.73	
		6/0	1732.5	15.25	33.50	
		6/0	1754.3	14.12	25.82	

LTE Band 2

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 2	20	QPSK	100/0	1860.0	19.70	93.33
			100/0	1880.0	16.36	43.25
			100/0	1900.0	17.51	56.36
		16QAM	100/0	1860.0	16.79	47.75
			100/0	1880.0	15.11	32.43
			100/0	1900.0	14.77	29.99
	15	QPSK	75/0	1857.5	18.89	77.45
			75/0	1880.0	20.76	119.12
			75/0	1902.5	19.08	80.91
		16QAM	75/0	1857.5	15.77	37.76
			75/0	1880.0	18.45	69.98
			75/0	1902.5	16.69	46.67
	10	QPSK	50/0	1955.0	19.62	91.62
			50/0	1880.0	17.25	53.09
			50/0	1905.0	18.24	66.68
		16QAM	50/0	1955.0	15.94	39.26
			50/0	1880.0	15.47	35.24
			50/0	1905.0	16.58	45.50
	5	QPSK	25/0	1852.5	17.05	50.70
			25/0	1880.0	17.75	59.57
			25/0	1907.5	18.96	78.70
		16QAM	25/0	1852.5	15.62	36.48
			25/0	1880.0	15.99	39.72
			25/0	1907.5	17.07	50.93
	3	QPSK	15/0	1815.5	17.82	60.53
			15/0	1880.0	17.83	60.67
			15/0	1908.5	17.61	57.68
		16QAM	15/0	1815.5	14.81	30.27
			15/0	1880.0	16.27	42.36
			15/0	1908.5	15.24	33.42
1.4	QPSK	6/0	1850.7	16.68	46.56	
		6/0	1880.0	15.63	36.56	
		6/0	1909.3	16.34	43.05	
	16QAM	6/0	1850.7	14.40	27.54	
		6/0	1880.0	14.36	27.29	
		6/0	1909.3	14.13	25.88	

11.1.2. ERP/EIRP DATA

GSM 850

		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
		Company: Samsung		Project #: 15K22555		Date: 12-30-15		Test Engineer: Steven Kim		
GSM GSM850 GPRS		Configuration: EUT ONLY, Z Position		Mode: GPRS 850 MHz						
		Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.								
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
		Low Ch								
		824.20	32.30	V	1.1	-1.6	29.68	38.5	-8.8	
		824.20	18.31	H	1.1	-1.6	15.69	38.5	-22.8	
		Mid Ch								
		836.60	31.43	V	1.1	-1.4	28.94	38.5	-9.5	
		836.60	20.00	H	1.1	-1.4	17.51	38.5	-20.9	
		High Ch								
		848.80	30.87	V	1.1	-1.3	28.51	38.5	-9.9	
		848.80	23.45	H	1.1	-1.3	21.09	38.5	-17.4	
		Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								
		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
		Company: Samsung		Project #: 15K22555		Date: 12-30-15		Test Engineer: Steven Kim		
GSM GSM850 EGPRS		Configuration: EUT ONLY, Z Position		Mode: EGPRS 850 MHz						
		Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.								
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
		Low Ch								
		824.20	25.41	V	1.1	-1.6	22.79	38.5	-15.7	
		824.20	11.37	H	1.1	-1.6	8.75	38.5	-29.7	
		Mid Ch								
		836.60	25.18	V	1.1	-1.4	22.69	38.5	-15.8	
		836.60	14.38	H	1.1	-1.4	11.89	38.5	-26.6	
		High Ch								
		848.80	25.99	V	1.1	-1.3	23.63	38.5	-14.8	
		848.80	18.44	H	1.1	-1.3	16.08	38.5	-22.4	
		Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								