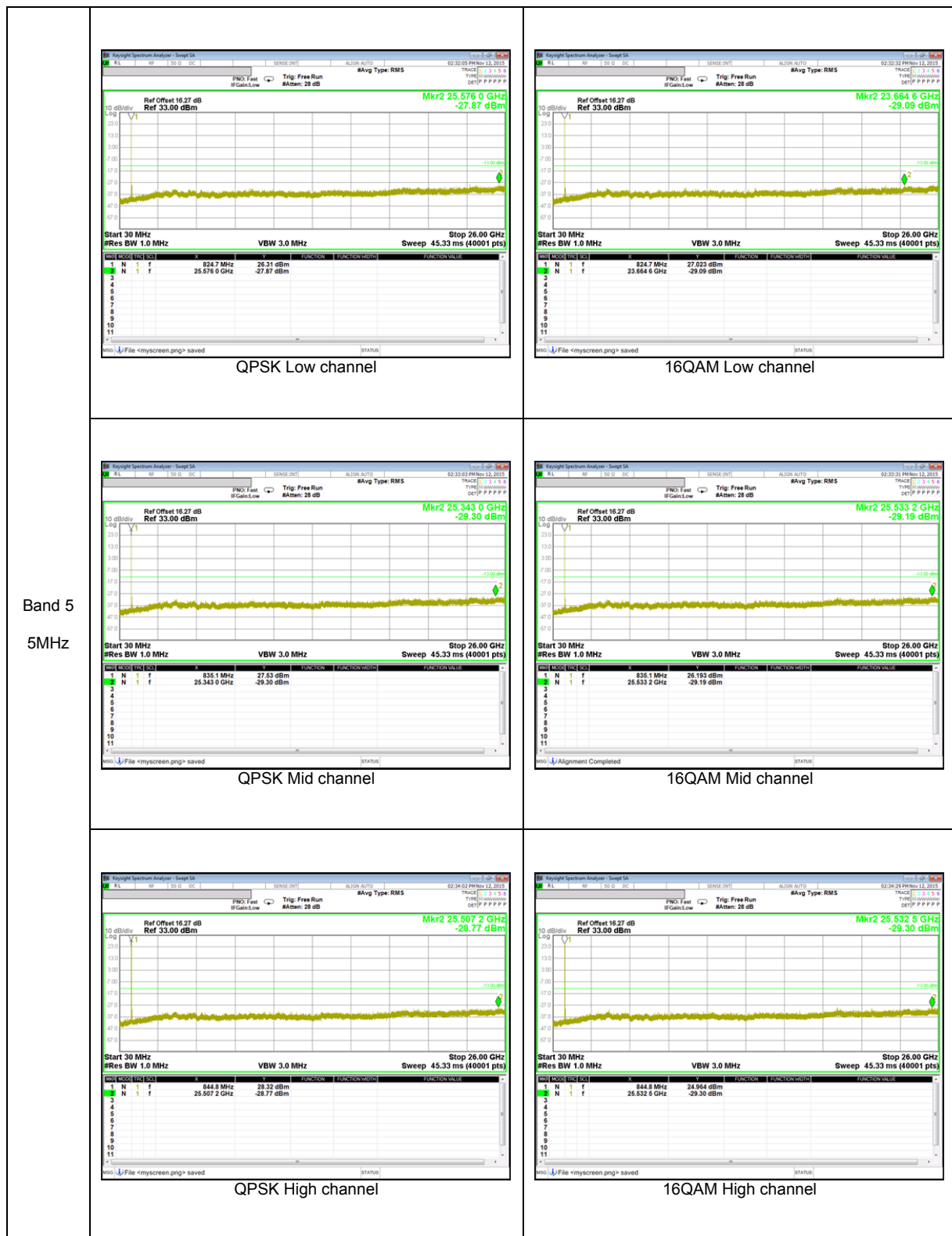
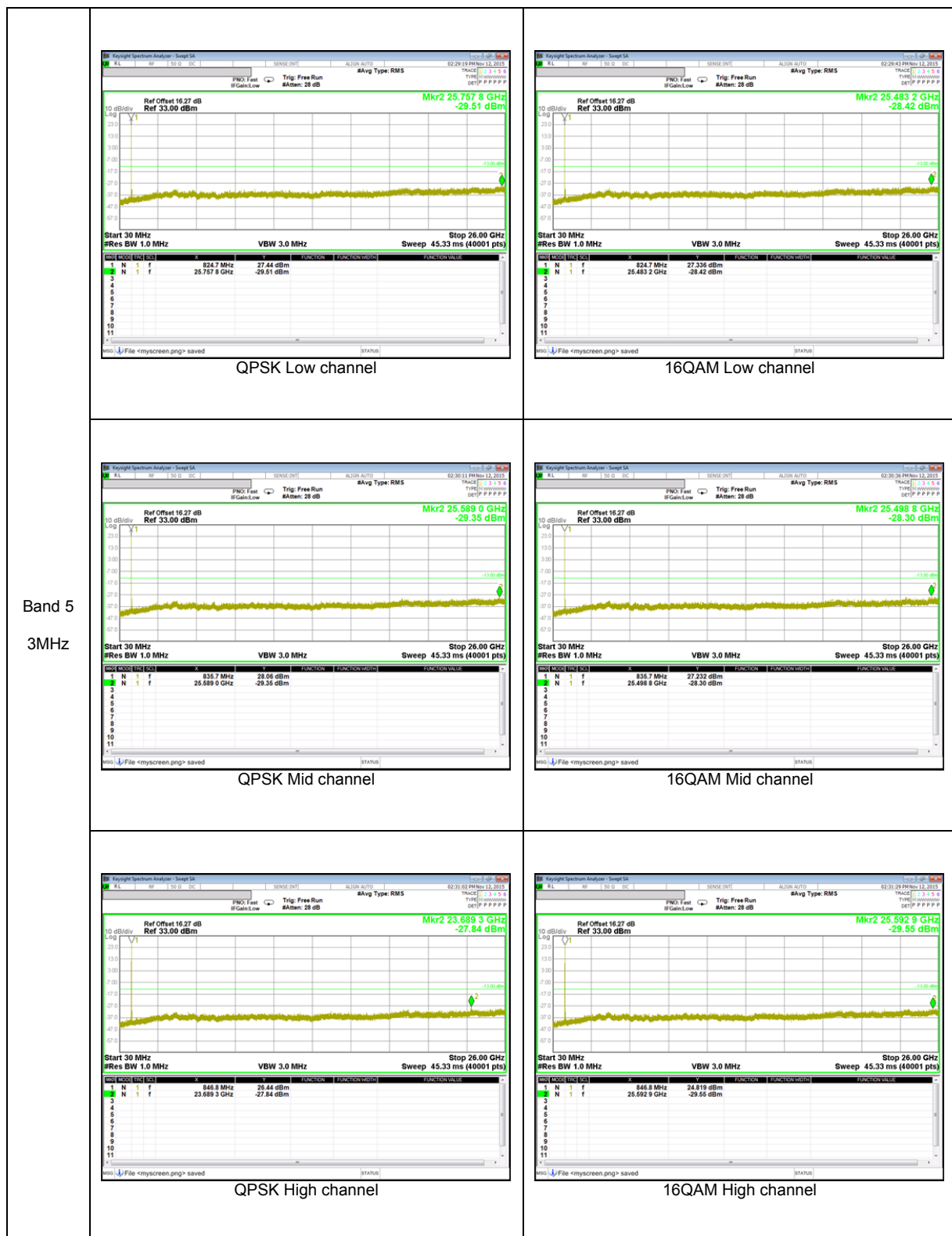
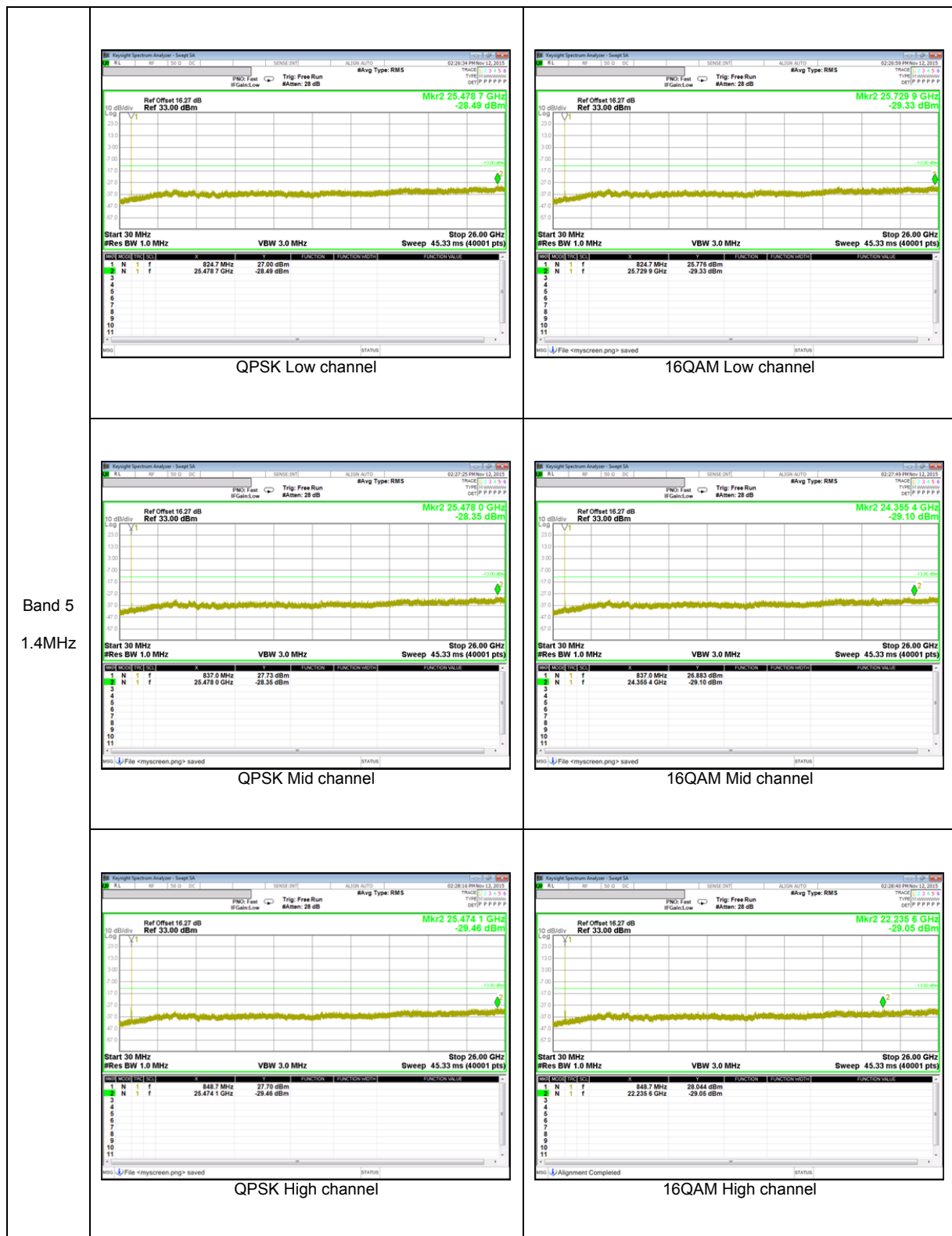
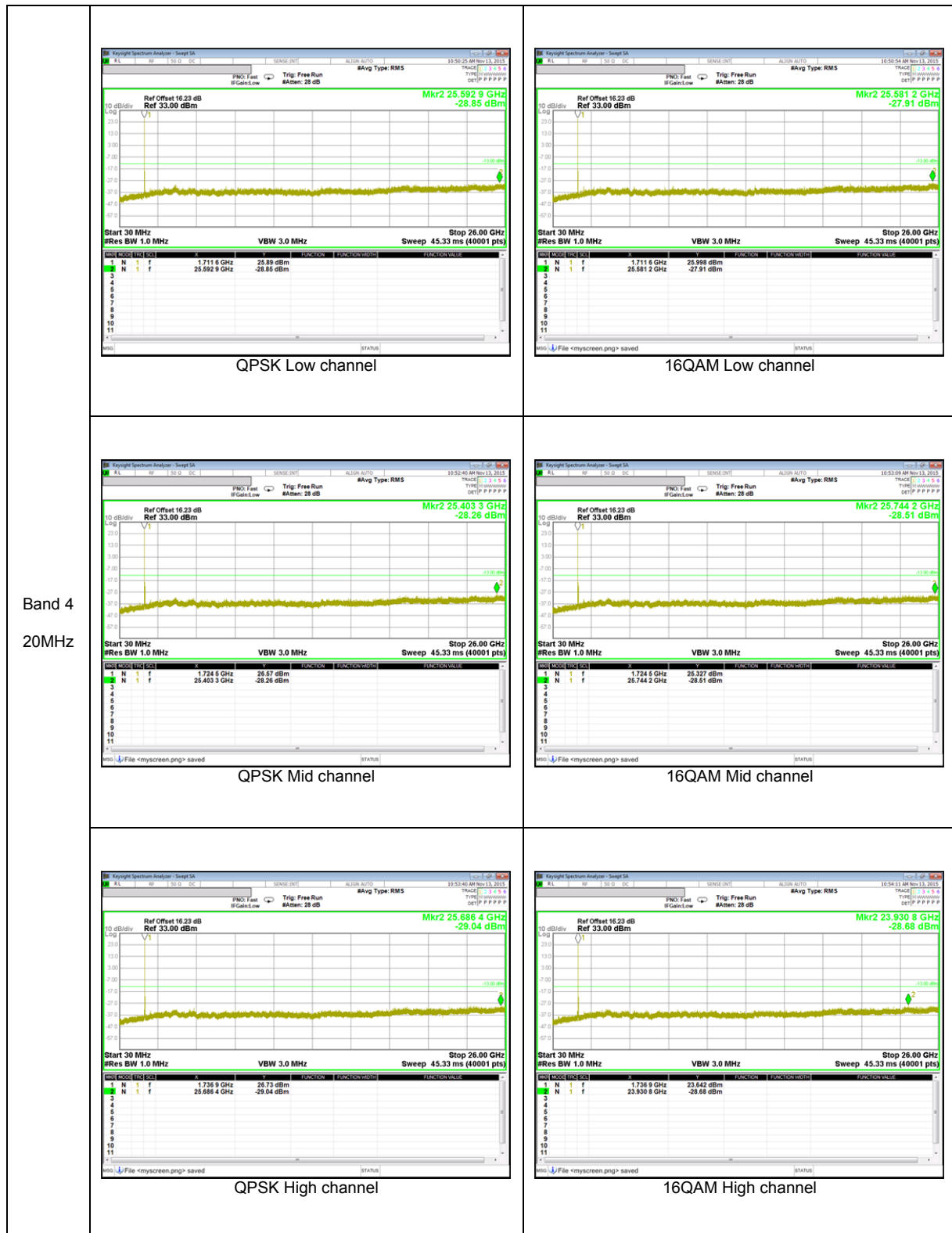


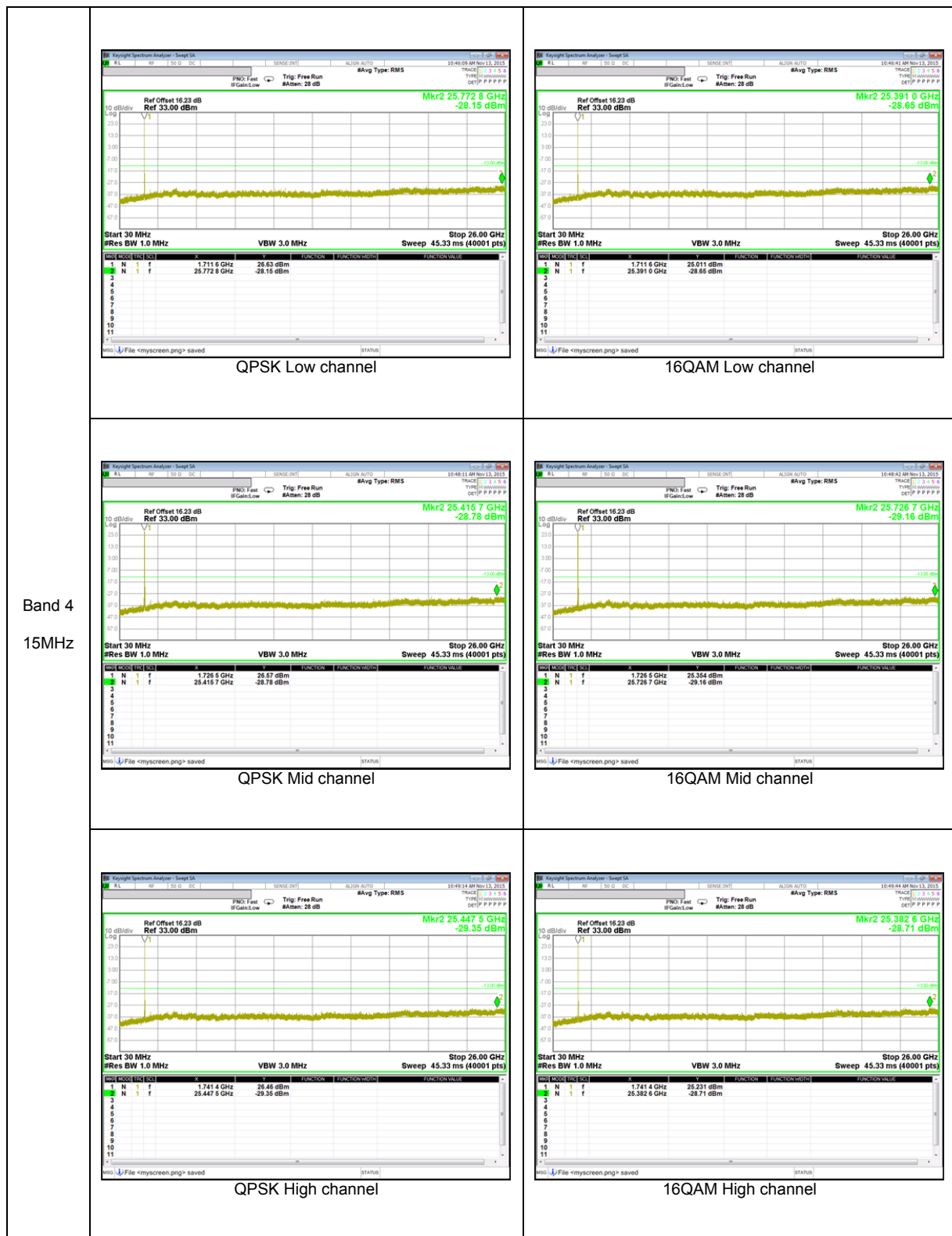


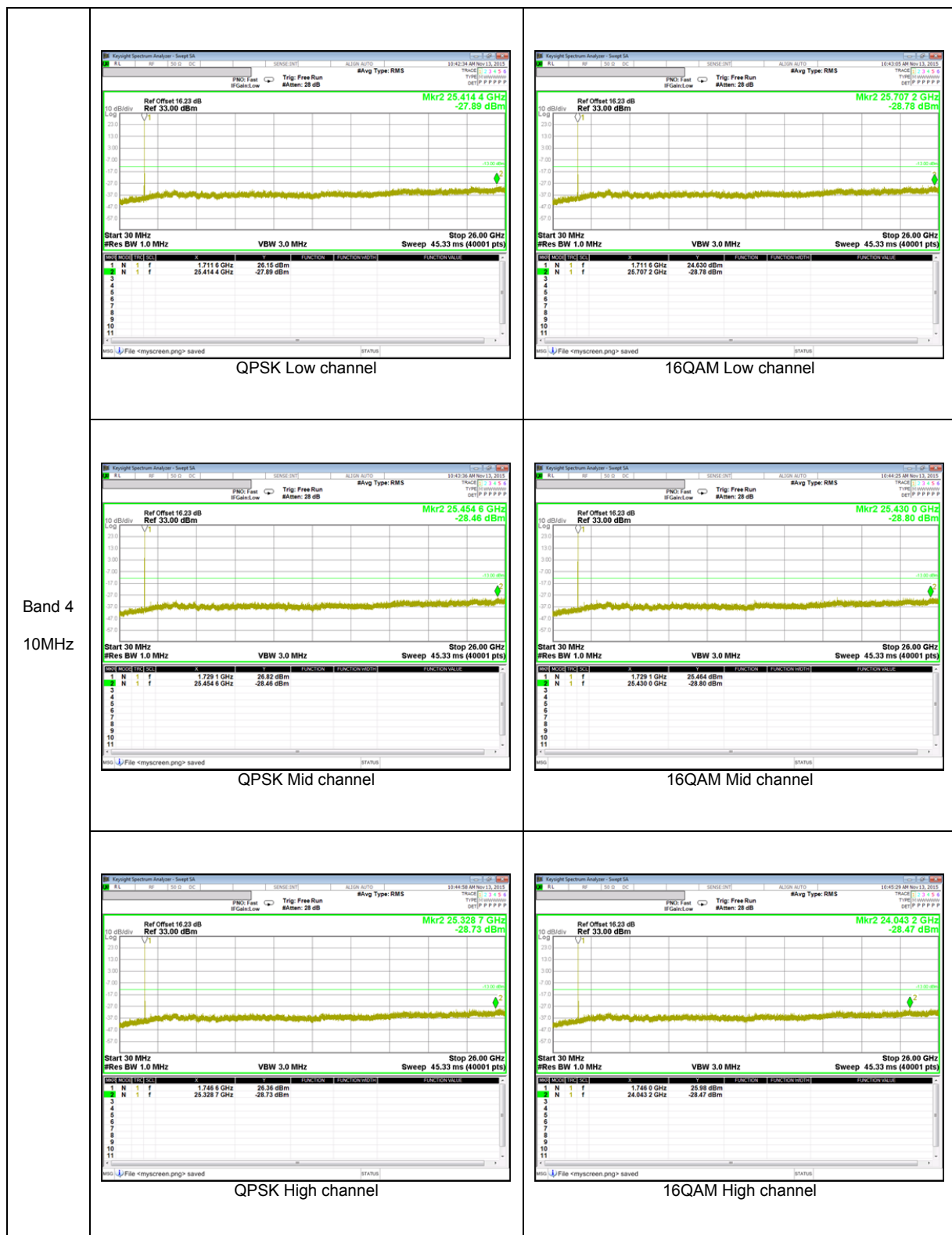


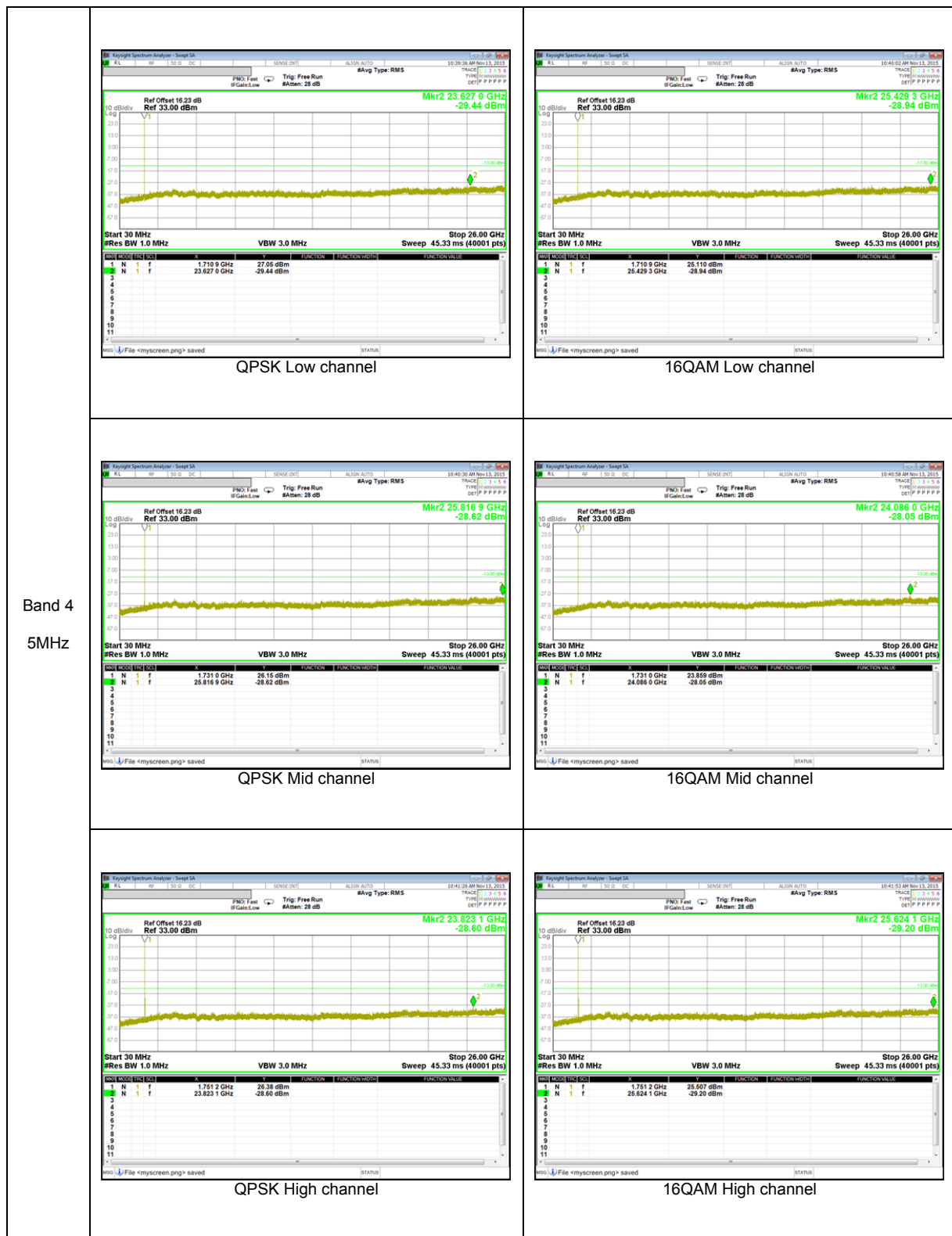


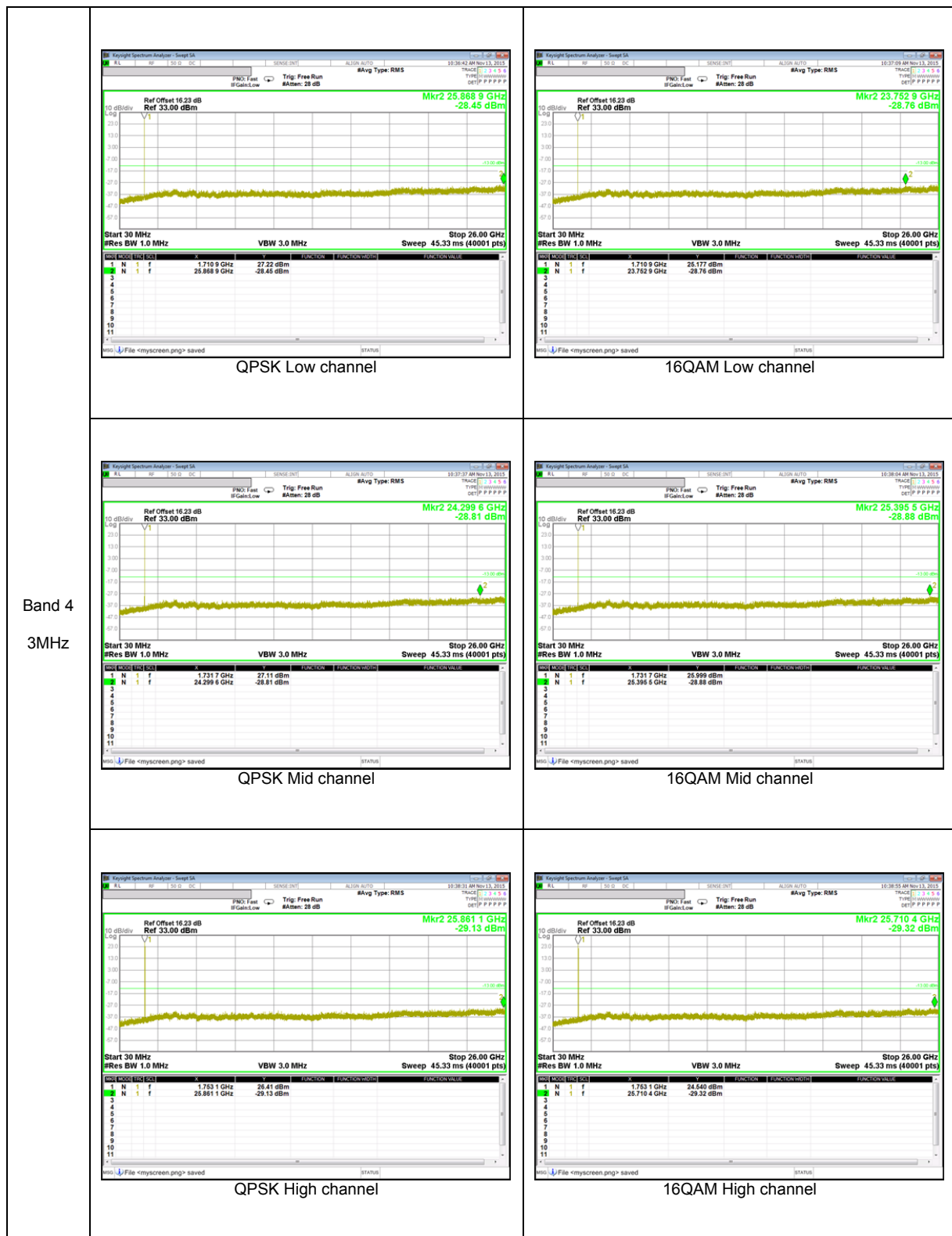
LTE Band 4

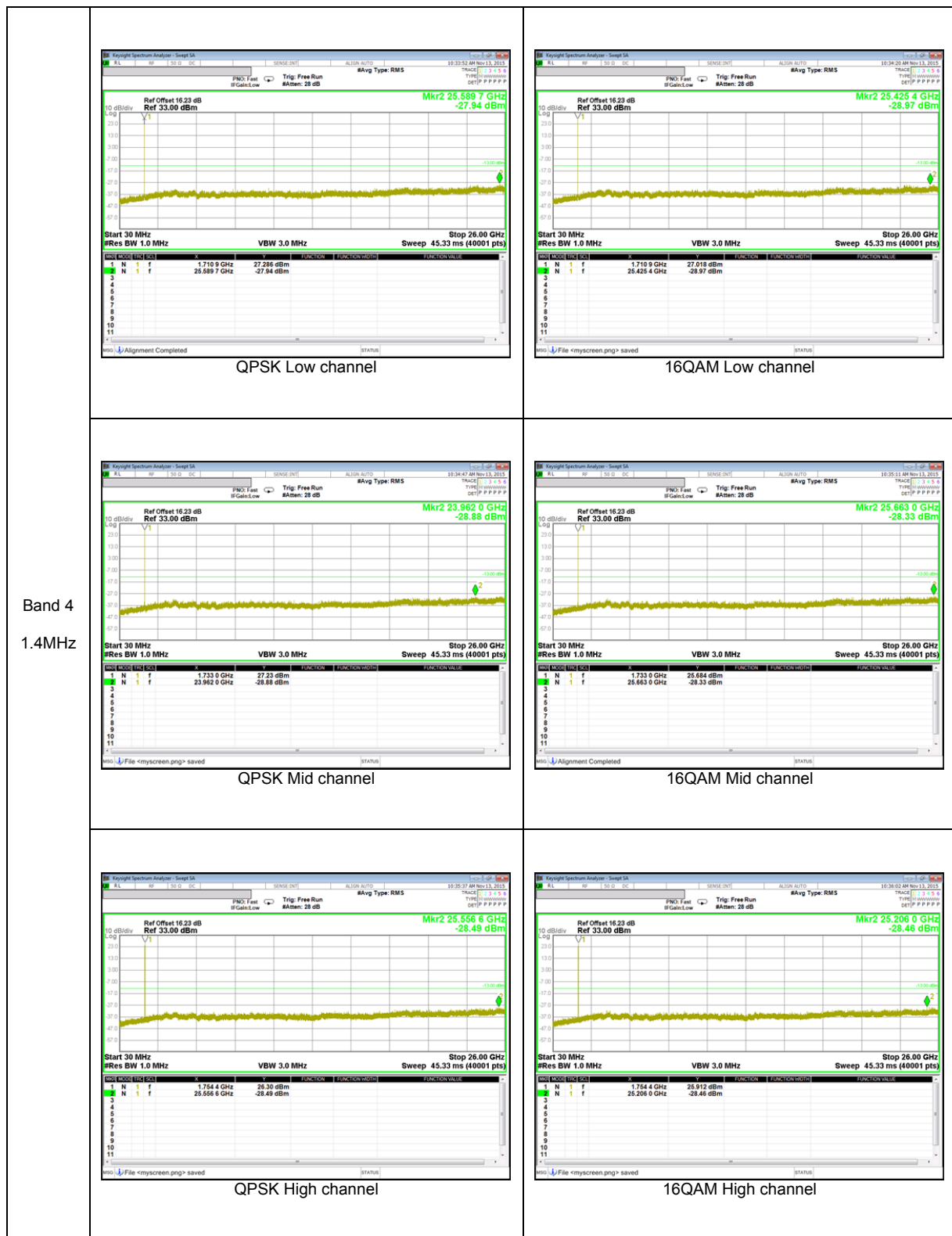




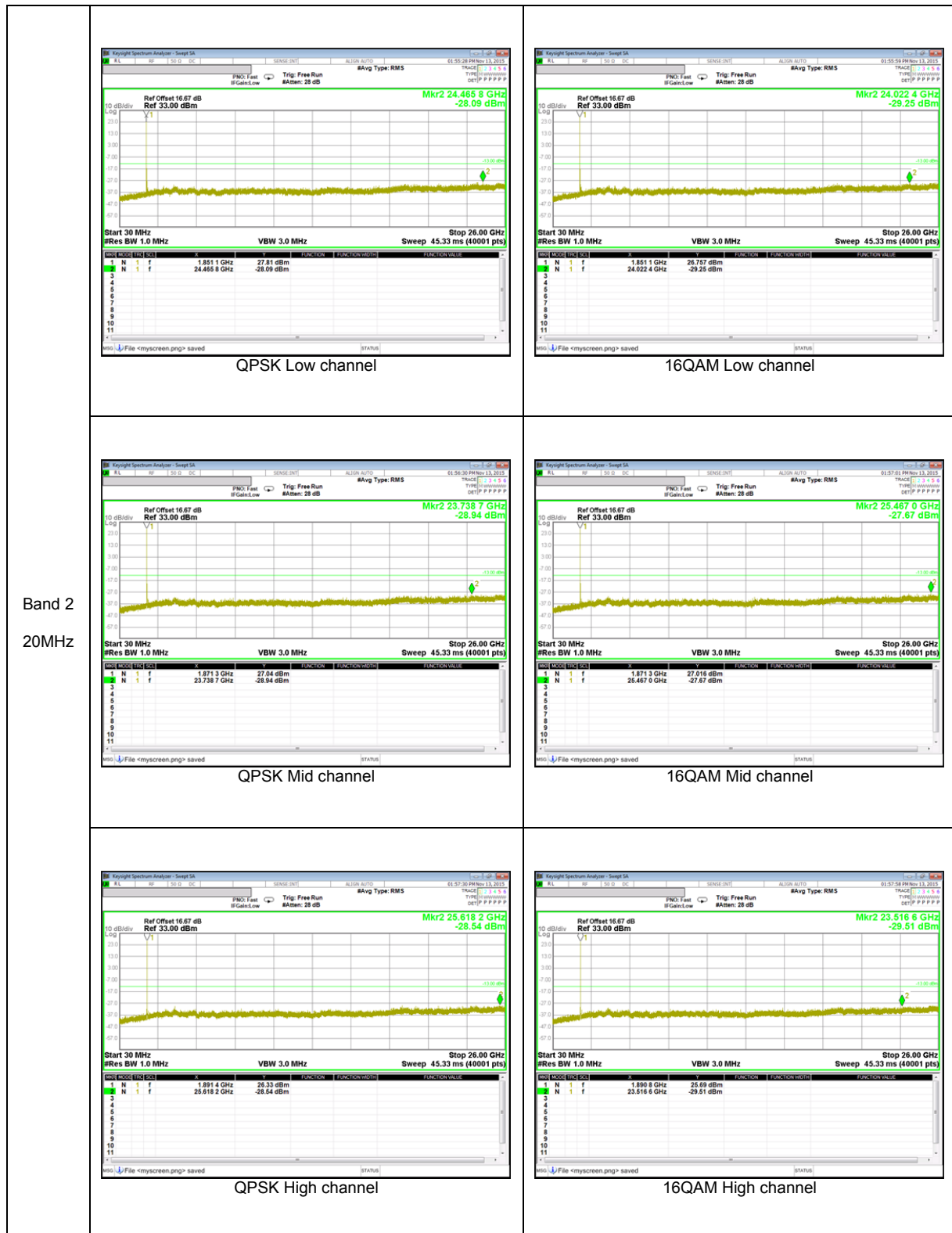


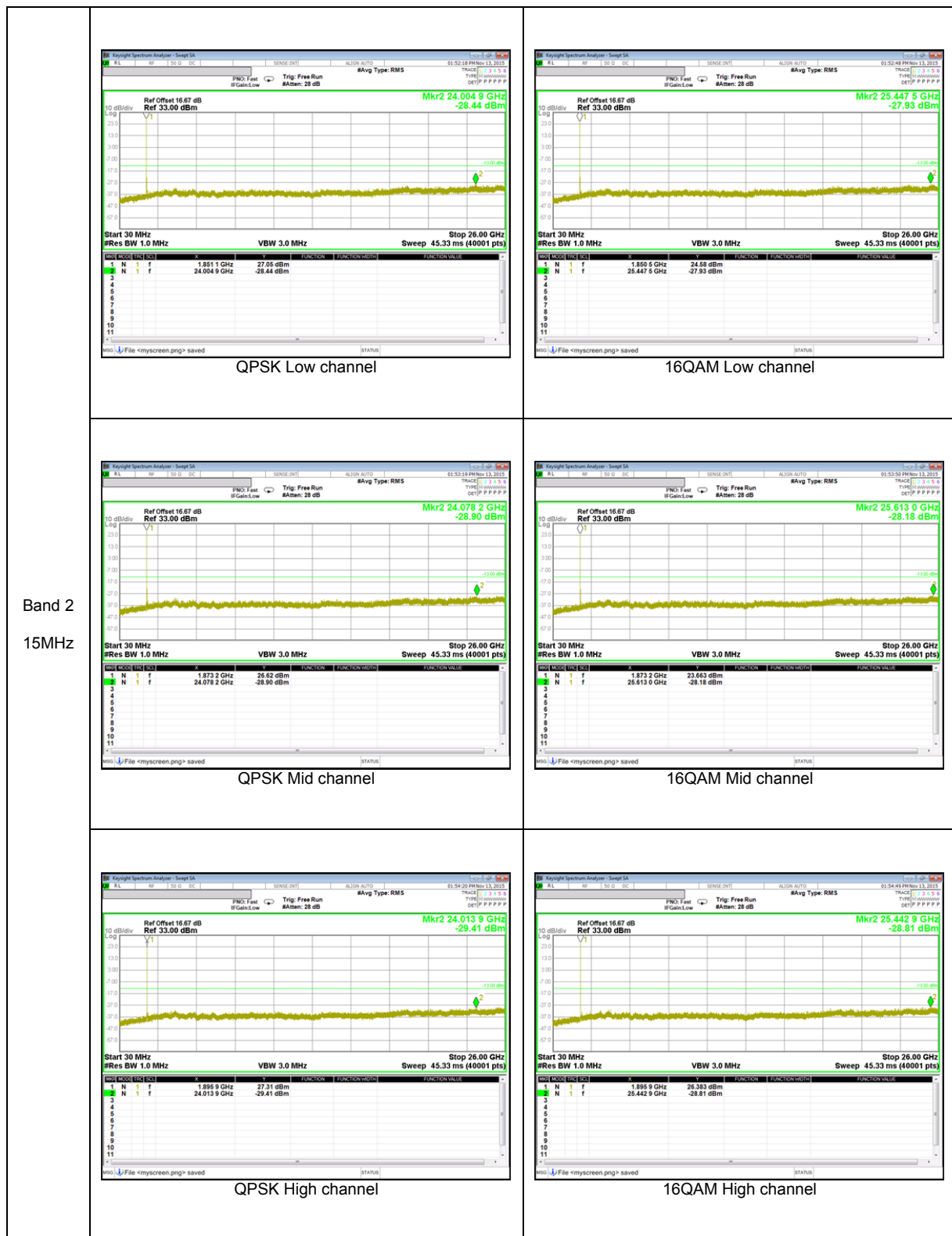


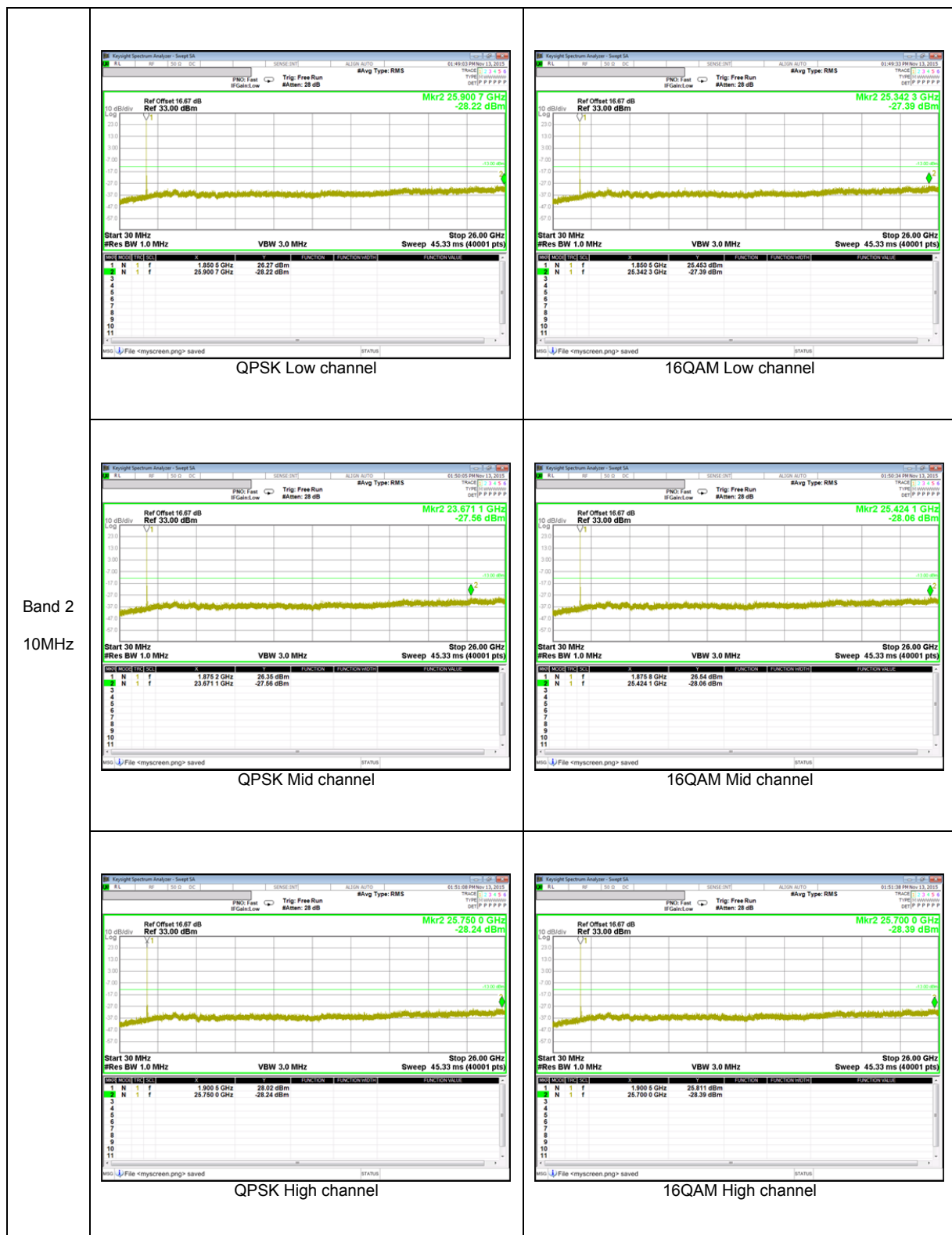


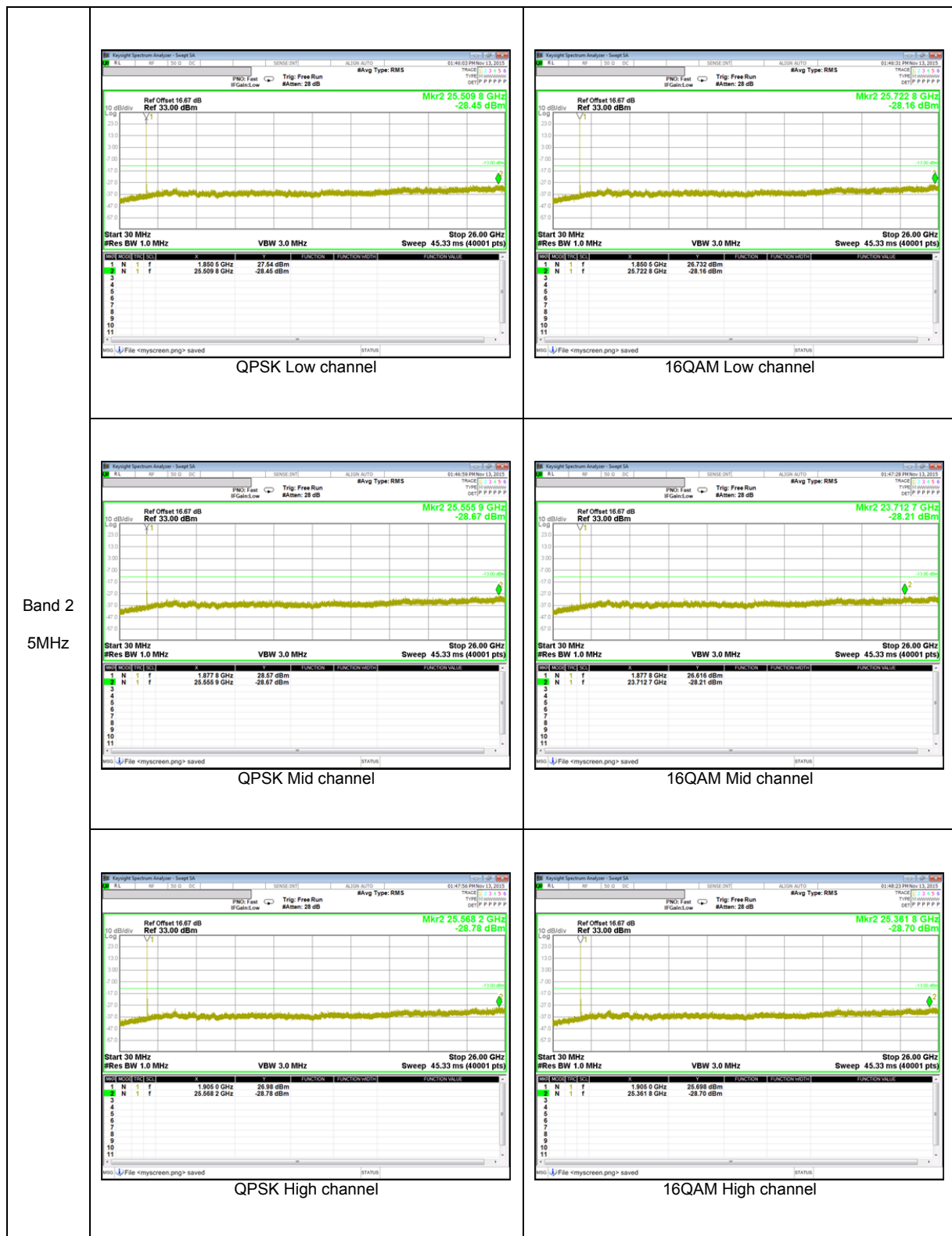


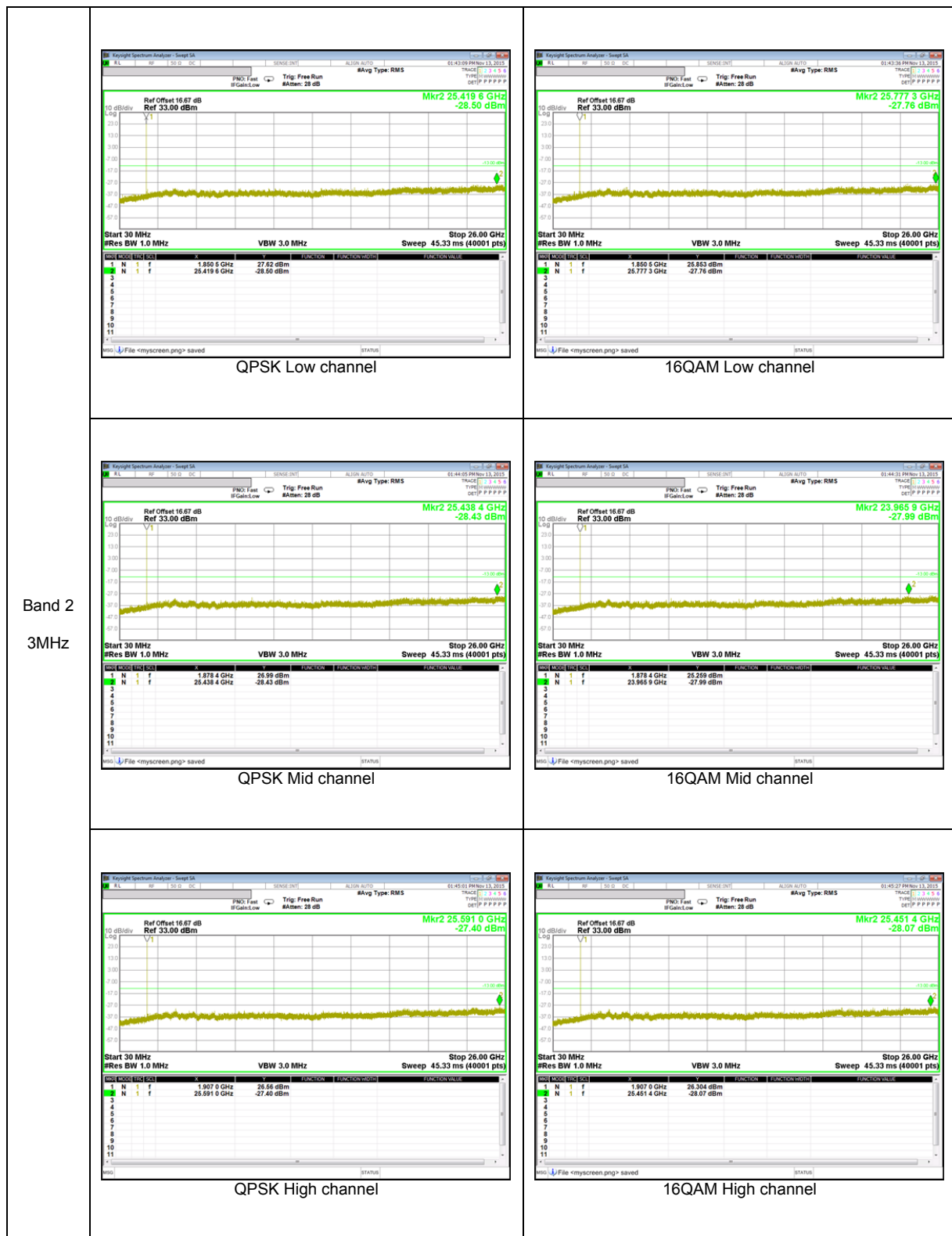
LTE Band 2

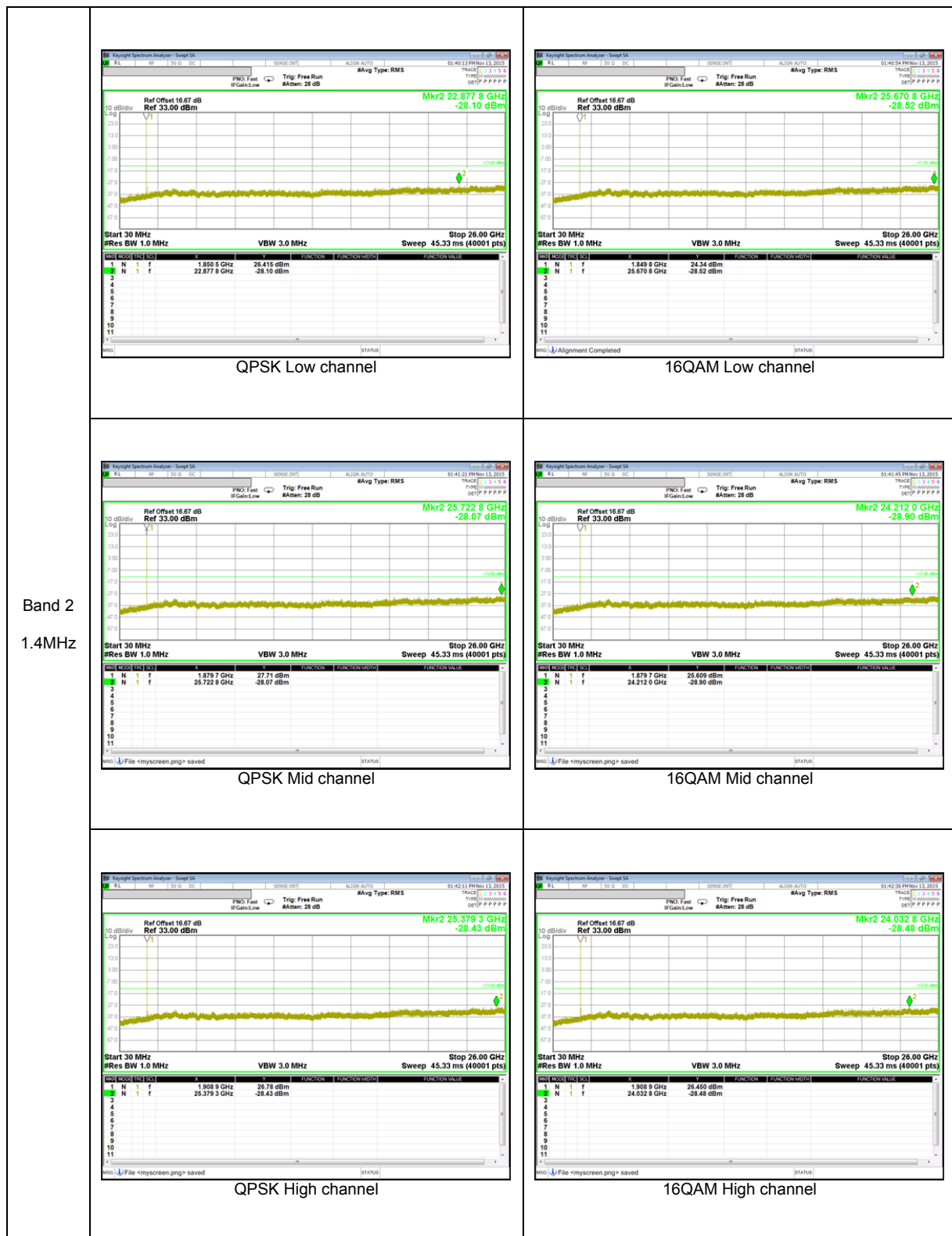












10.4. FREQUENCY STABILITY

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	709.99998445	-0.004	2.5
3.80	40	709.99998368	-0.003	2.5
3.80	30	709.99997884	0.004	2.5
3.80	20	709.99998161	0	2.5
3.80	10	709.99998693	-0.007	2.5
3.80	0	709.99998388	-0.003	2.5
3.80	-10	709.99998462	-0.004	2.5
3.80	-20	709.99998036	0.002	2.5
3.80	-30	709.99998453	-0.004	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	709.99998161	0	2.5
4.20	20	709.99997994	0.002	2.5
3.50	20	709.99998317	-0.002	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	836.49996586	0.016	2.5
3.80	40	836.49998314	-0.004	2.5
3.80	30	836.49997618	0.004	2.5
3.80	20	836.49997939	0	2.5
3.80	10	836.49998254	-0.004	2.5
3.80	0	836.49998403	-0.006	2.5
3.80	-10	836.49997501	0.005	2.5
3.80	-20	836.49997325	0.007	2.5
3.80	-30	836.49997561	0.005	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	836.49997939	0	2.5
4.20	20	836.49998244	-0.004	2.5
3.50	20	836.49998312	-0.004	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	1732.49996831	0.002	2.5
3.80	40	1732.49997362	-0.001	2.5
3.80	30	1732.49997591	-0.002	2.5
3.80	20	1732.49997235	0	2.5
3.80	10	1732.49997643	-0.002	2.5
3.80	0	1732.49998574	-0.008	2.5
3.80	-10	1732.49997671	-0.003	2.5
3.80	-20	1732.49997205	0.000	2.5
3.80	-30	1732.49997391	-0.001	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	1732.49997235	0	2.5
4.20	20	1732.49997250	0.000	2.5
3.50	20	1732.49997468	-0.001	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	1879.99997764	0.001	2.5
3.80	40	1879.99998116	0.000	2.5
3.80	30	1879.99998028	0.000	2.5
3.80	20	1879.99998044	0	2.5
3.80	10	1879.99997193	0.005	2.5
3.80	0	1879.99997754	0.002	2.5
3.80	-10	1879.99997647	0.002	2.5
3.80	-20	1879.99995669	0.013	2.5
3.80	-30	1879.99997245	0.004	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	1879.99998044	0	2.5
4.20	20	1879.99997215	0.004	2.5
3.50	20	1879.99997643	0.002	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	28.77	753.36
		661	836.6	27.89	615.18
		810	848.8	26.73	470.98
	EGPRS	512	824.2	21.29	134.59
		661	836.6	21.29	134.59
		810	848.8	19.64	92.04
GSM1900	GPRS	512	1850.2	28.51	709.58
		661	1880.0	28.56	717.79
		810	1909.8	30.84	1213.39
	EGPRS	512	1850.2	25.75	375.84
		661	1880.0	25.57	360.58
		810	1909.8	27.84	608.14

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	17.81	60.39
		4183	836.6	16.96	49.66
		4233	846.6	16.63	46.03
	HSDPA	4132	826.4	17.91	61.80
		4183	836.6	17.21	52.60
		4233	846.6	16.74	47.21
Band 4	REL99	1312	1712.4	21.54	142.56
		1413	1732.6	22.79	190.11
		1513	1752.6	23.16	207.01
	HSDPA	1312	1712.4	21.90	154.88
		1413	1732.6	22.82	191.43
		1513	1752.6	23.13	205.59
Band 2	REL99	9262	1852.4	23.72	235.50
		9400	1880.0	22.64	183.65
		9538	1907.6	26.31	427.56
	HSDPA	9262	1852.4	23.43	220.29
		9400	1880.0	23.60	229.09
		9538	1907.6	25.99	397.19

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	10.16	10.38
			50/0	710.0	10.03	10.07
			50/0	711.0	9.91	9.79
		16QAM	50/0	709.0	9.15	8.22
			50/0	710.0	9.06	8.05
			50/0	711.0	8.96	7.87
	5	QPSK	25/0	706.5	10.18	10.42
			25/0	710.0	10.13	10.30
			25/0	713.5	9.88	9.73
		16QAM	25/0	706.5	9.22	8.36
			25/0	710.0	9.16	8.24
			25/0	713.5	8.91	7.78

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	15.38	34.51
			50/0	836.5	14.74	29.79
			50/0	844.0	13.95	24.83
		16QAM	50/0	829.0	14.25	26.61
			50/0	836.5	13.73	23.60
			50/0	844.0	12.94	19.68
	5	QPSK	25/0	826.5	15.21	33.19
			25/0	836.5	14.64	29.11
			25/0	846.5	13.09	20.37
		16QAM	25/0	826.5	14.25	26.61
			25/0	836.5	13.57	22.75
			25/0	846.5	12.48	17.70
	3	QPSK	15/0	825.5	15.31	33.96
			15/0	836.5	14.59	28.77
			15/0	847.5	12.91	19.54
		16QAM	15/0	825.5	14.27	26.73
			15/0	836.5	13.57	22.75
			15/0	847.5	12.45	17.58
	1.4	QPSK	6/0	824.7	13.25	21.13
			6/0	836.5	12.66	18.45
			6/0	848.3	11.11	12.91
		16QAM	6/0	824.7	12.25	16.79
			6/0	836.5	11.67	14.69
			6/0	848.3	10.48	11.17

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	18.46	70.15
			100/0	1732.5	19.27	84.53
			100/0	1745.0	19.71	93.54
		16QAM	100/0	1720.0	17.50	56.23
			100/0	1732.5	18.27	67.14
			100/0	1745.0	18.68	73.79
	15	QPSK	75/0	1717.5	18.38	68.87
			75/0	1732.5	19.42	87.50
			75/0	1747.5	19.79	95.28
		16QAM	75/0	1717.5	17.24	52.97
			75/0	1732.5	18.37	68.71
			75/0	1747.5	18.82	76.21
	10	QPSK	50/0	1715.0	18.33	68.08
			50/0	1732.5	19.31	85.31
			50/0	1750.0	19.81	95.72
		16QAM	50/0	1715.0	17.36	54.45
			50/0	1732.5	18.27	67.14
			50/0	1750.0	18.84	76.56
	5	QPSK	25/0	1712.5	18.18	65.77
			25/0	1732.5	19.28	84.72
			25/0	1752.5	19.67	92.68
		16QAM	25/0	1712.5	17.17	52.12
			25/0	1732.5	18.27	67.14
			25/0	1752.5	18.69	73.96
	3	QPSK	15/0	1711.5	18.32	67.92
			15/0	1732.5	19.32	85.51
			15/0	1753.5	19.70	93.33
		16QAM	15/0	1711.5	17.27	53.33
			15/0	1732.5	18.27	67.14
			15/0	1753.5	18.68	73.79
	1.4	QPSK	6/0	1710.7	16.25	42.17
			6/0	1732.5	17.29	53.58
			6/0	1754.3	17.60	57.54
		16QAM	6/0	1710.7	15.20	33.11
			6/0	1732.5	16.27	42.36
			6/0	1754.3	16.60	45.71

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	19.55	90.16
			100/0	1880.0	20.22	105.20
			100/0	1900.0	19.79	95.28
		16QAM	100/0	1860.0	18.53	71.29
			100/0	1880.0	19.21	83.37
			100/0	1900.0	18.73	74.64
	15	QPSK	75/0	1857.5	19.40	87.10
			75/0	1880.0	20.04	100.93
			75/0	1902.5	19.76	94.62
		16QAM	75/0	1857.5	18.40	69.18
			75/0	1880.0	18.97	78.89
			75/0	1902.5	18.72	74.47
	10	QPSK	50/0	1955.0	19.36	86.30
			50/0	1880.0	20.13	103.04
			50/0	1905.0	19.63	91.83
		16QAM	50/0	1955.0	18.25	66.83
			50/0	1880.0	19.11	81.47
			50/0	1905.0	18.66	73.45
	5	QPSK	25/0	1852.5	19.18	82.79
			25/0	1880.0	19.89	97.50
			25/0	1907.5	19.52	89.54
		16QAM	25/0	1852.5	18.13	65.01
			25/0	1880.0	19.03	79.98
			25/0	1907.5	18.61	72.61
	3	QPSK	15/0	1815.5	19.08	80.91
			15/0	1880.0	19.83	96.16
			15/0	1908.5	19.50	89.13
		16QAM	15/0	1815.5	18.04	63.68
			15/0	1880.0	18.81	76.03
			15/0	1908.5	18.47	70.31
	1.4	QPSK	6/0	1850.7	17.26	53.21
			6/0	1880.0	18.07	64.12
			6/0	1909.3	17.43	55.34
		16QAM	6/0	1850.7	16.28	42.46
			6/0	1880.0	17.02	50.35
			6/0	1909.3	16.45	44.16

11.1.2. ERP/EIRP DATA

GSM 850

GSM GSM850 GPRS	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company: Samsung Project #: 15K22210 Date: 11-13-15 Test Engineer: Steven.Kim 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	31.39	V	1.1	-1.6	28.77	38.5	-9.7	
	824.20	18.81	H	1.1	-1.6	16.19	38.5	-22.3	
	Mid Ch								
	836.60	30.38	V	1.1	-1.4	27.89	38.5	-10.6	
	836.60	20.42	H	1.1	-1.4	17.93	38.5	-20.5	
	High Ch								
	848.80	29.09	V	1.1	-1.3	26.73	38.5	-11.7	
	848.80	21.59	H	1.1	-1.3	19.23	38.5	-19.2	
	Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								
GSM GSM850 EGPRS	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company: Samsung Project #: 15K22210 Date: 11-13-15 Test Engineer: Steven.Kim 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	23.91	V	1.1	-1.6	21.29	38.5	-17.2	
	824.20	13.19	H	1.1	-1.6	10.57	38.5	-27.9	
	Mid Ch								
	836.60	23.78	V	1.1	-1.4	21.29	38.5	-17.2	
	836.60	13.60	H	1.1	-1.4	11.11	38.5	-27.3	
	High Ch								
	848.80	22.00	V	1.1	-1.3	19.64	38.5	-18.8	
	848.80	14.09	H	1.1	-1.3	11.73	38.5	-26.7	
	Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								

GSM 1900

GSM

GSM1900

GPRS

High Frequency Substitution Measurement

UL Korea, Ltd. Suwon Laboratory Chamber 2

Company:

Samsung

Project #:

15K22210

Date:

11-22-15

Test Engineer:

Steven Kim

Configuration:

EUT ONLY, X Position

Mode:

GPRS 1900MHz

Test Equipment:

Receiving: 3117[00168724] and Chamber 1 SMA Cables

Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
GHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
Low Ch								
1850.20	7.0	V	1.60	8.80	14.21	33.0	-18.8	
1850.20	21.3	H	1.60	8.80	28.51	33.0	-4.5	
Mid Ch								
1880.00	14.0	V	1.62	8.62	20.98	33.0	-12.0	
1880.00	21.6	H	1.62	8.62	28.56	33.0	-4.4	
High Ch								
1909.80	15.0	V	1.63	8.44	21.76	33.0	-11.2	
1909.80	24.0	H	1.63	8.44	30.84	33.0	-2.2	

Rev. 3.17.11

GSM

GSM1900

EGPRS

High Frequency Substitution Measurement

UL Korea, Ltd. Suwon Laboratory Chamber 2

Company:

Samsung

Project #:

15K22210

Date:

11-22-15

Test Engineer:

Steven Kim

Configuration:

EUT ONLY, X Position

Mode:

EGPRS 1900MHz

Test Equipment:

Receiving: 3117[00168724] and Chamber 1 SMA Cables

Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
GHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
Low Ch								
1850.20	4.2	V	1.60	8.80	11.37	33.0	-21.6	
1850.20	18.6	H	1.60	8.80	25.75	33.0	-7.3	
Mid Ch								
1880.00	12.3	V	1.62	8.62	19.28	33.0	-13.7	
1880.00	18.6	H	1.62	8.62	25.57	33.0	-7.4	
High Ch								
1909.80	12.2	V	1.63	8.44	18.97	33.0	-14.0	
1909.80	21.0	H	1.63	8.44	27.84	33.0	-5.2	

Rev. 3.17.11

WCDMA Band 5

WCDMA Band 5 REL99	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2 Company: Samsung Project #: 15K22210 Date: 11-13-15 Test Engineer: Steven.Kim Configuration: EUT ONLY, Z Position Mode: Rel 99_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. <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBd)</th><th>ERP (dBm)</th><th>Limit (dBm)</th><th>Margin (dB)</th><th>Notes</th></tr><tr><td>Low Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>826.40</td><td>20.42</td><td>V</td><td>1.1</td><td>-1.5</td><td>17.81</td><td>38.5</td><td>-20.6</td></tr><tr><td>826.40</td><td>9.48</td><td>H</td><td>1.1</td><td>-1.5</td><td>6.87</td><td>38.5</td><td>-31.6</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>836.60</td><td>19.45</td><td>V</td><td>1.1</td><td>-1.4</td><td>16.96</td><td>38.5</td><td>-21.5</td></tr><tr><td>836.60</td><td>11.09</td><td>H</td><td>1.1</td><td>-1.4</td><td>8.60</td><td>38.5</td><td>-29.9</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>846.60</td><td>19.01</td><td>V</td><td>1.1</td><td>-1.3</td><td>16.63</td><td>38.5</td><td>-21.8</td></tr><tr><td>846.60</td><td>12.55</td><td>H</td><td>1.1</td><td>-1.3</td><td>10.17</td><td>38.5</td><td>-28.3</td></tr></table> Rev. 3.17.11									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch								826.40	20.42	V	1.1	-1.5	17.81	38.5	-20.6	826.40	9.48	H	1.1	-1.5	6.87	38.5	-31.6	Mid Ch								836.60	19.45	V	1.1	-1.4	16.96	38.5	-21.5	836.60	11.09	H	1.1	-1.4	8.60	38.5	-29.9	High Ch								846.60	19.01	V	1.1	-1.3	16.63	38.5	-21.8	846.60	12.55	H	1.1	-1.3	10.17	38.5	-28.3
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																	
	Low Ch																																																																																									
	826.40	20.42	V	1.1	-1.5	17.81	38.5	-20.6																																																																																		
	826.40	9.48	H	1.1	-1.5	6.87	38.5	-31.6																																																																																		
	Mid Ch																																																																																									
	836.60	19.45	V	1.1	-1.4	16.96	38.5	-21.5																																																																																		
	836.60	11.09	H	1.1	-1.4	8.60	38.5	-29.9																																																																																		
	High Ch																																																																																									
	846.60	19.01	V	1.1	-1.3	16.63	38.5	-21.8																																																																																		
846.60	12.55	H	1.1	-1.3	10.17	38.5	-28.3																																																																																			
WCDMA Band 5 HSDPA	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2 Company: Samsung Project #: 15K22210 Date: 11-13-15 Test Engineer: Steven.Kim Configuration: EUT ONLY, Z Position Mode: HSDPA_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. <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBd)</th><th>ERP (dBm)</th><th>Limit (dBm)</th><th>Margin (dB)</th><th>Notes</th></tr><tr><td>Low Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>826.40</td><td>20.52</td><td>V</td><td>1.1</td><td>-1.5</td><td>17.91</td><td>38.5</td><td>-20.5</td></tr><tr><td>826.40</td><td>9.26</td><td>H</td><td>1.1</td><td>-1.5</td><td>6.65</td><td>38.5</td><td>-31.8</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>836.60</td><td>19.70</td><td>V</td><td>1.1</td><td>-1.4</td><td>17.21</td><td>38.5</td><td>-21.2</td></tr><tr><td>836.60</td><td>11.15</td><td>H</td><td>1.1</td><td>-1.4</td><td>8.66</td><td>38.5</td><td>-29.8</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>846.60</td><td>19.12</td><td>V</td><td>1.1</td><td>-1.3</td><td>16.74</td><td>38.5</td><td>-21.7</td></tr><tr><td>846.60</td><td>12.56</td><td>H</td><td>1.1</td><td>-1.3</td><td>10.18</td><td>38.5</td><td>-28.3</td></tr></table> Rev. 3.17.11									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch								826.40	20.52	V	1.1	-1.5	17.91	38.5	-20.5	826.40	9.26	H	1.1	-1.5	6.65	38.5	-31.8	Mid Ch								836.60	19.70	V	1.1	-1.4	17.21	38.5	-21.2	836.60	11.15	H	1.1	-1.4	8.66	38.5	-29.8	High Ch								846.60	19.12	V	1.1	-1.3	16.74	38.5	-21.7	846.60	12.56	H	1.1	-1.3	10.18	38.5	-28.3
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																	
	Low Ch																																																																																									
	826.40	20.52	V	1.1	-1.5	17.91	38.5	-20.5																																																																																		
	826.40	9.26	H	1.1	-1.5	6.65	38.5	-31.8																																																																																		
	Mid Ch																																																																																									
	836.60	19.70	V	1.1	-1.4	17.21	38.5	-21.2																																																																																		
	836.60	11.15	H	1.1	-1.4	8.66	38.5	-29.8																																																																																		
	High Ch																																																																																									
	846.60	19.12	V	1.1	-1.3	16.74	38.5	-21.7																																																																																		
846.60	12.56	H	1.1	-1.3	10.18	38.5	-28.3																																																																																			

WCDMA Band 4

WCDMA Band 4 REL99	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company:		Samsung						
	Project #:		15K22210						
	Date:		11-13-15						
	Test Engineer:		Steven.Kim						
	Configuration:		EUT ONLY, X Position						
	Mode:		Rel 99_1700 MHz						
	Test Equipment:								
	Receiving: 3117[00168724] and Chamber 1 SMA Cables								
	Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	1712.40	4.59	V	1.54	9.20	12.25	33.0	-20.8	
	1712.40	13.88	H	1.54	9.20	21.54	33.0	-11.5	
	Mid Ch								
1732.60	4.44	V	1.55	9.31	12.20	33.0	-20.8		
1732.60	15.03	H	1.55	9.31	22.79	33.0	-10.2		
High Ch									
1752.60	4.29	V	1.56	9.38	12.11	33.0	-20.9		
1752.60	15.34	H	1.56	9.38	23.16	33.0	-9.8		
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm									

WCDMA Band 4 HSDPA	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company:		Samsung						
	Project #:		15K22210						
	Date:		11-13-15						
	Test Engineer:		Steven.Kim						
	Configuration:		EUT ONLY, X Position						
	Mode:		HSDPA_1700 MHz						
	Test Equipment:								
	Receiving: 3117[00168724] and Chamber 1 SMA Cables								
	Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	1712.40	4.67	V	1.54	9.20	12.33	33.0	-20.7	
	1712.40	14.24	H	1.54	9.20	21.90	33.0	-11.1	
	Mid Ch								
1732.60	4.38	V	1.55	9.31	12.14	33.0	-20.9		
1732.60	15.06	H	1.55	9.31	22.82	33.0	-10.2		
High Ch									
1752.60	3.93	V	1.56	9.38	11.75	33.0	-21.3		
1752.60	15.31	H	1.56	9.38	23.13	33.0	-9.9		
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm									

WCDMA Band 2

WCDMA Band 2 REL99	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company:		Samsung						
	Project #:		15K22210						
	Date:		11-22-15						
	Test Engineer:		Steven.Kim						
	Configuration:		EUT ONLY, X Position						
	Mode:		REL99_1900 MHz						
	Test Equipment:								
	Receiving: 3117[00168724] and Chamber 1 SMA Cables								
	Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	1852.40	14.61	V	1.60	8.79	21.80	33.0	-11.2	
	1852.40	16.53	H	1.60	8.79	23.72	33.0	-9.3	
	Mid Ch								
	1880.00	16.35	V	1.62	8.62	23.35	33.0	-9.6	
	1880.00	15.64	H	1.62	8.62	22.64	33.0	-10.4	
	High Ch								
	1907.60	16.26	V	1.63	8.45	23.08	33.0	-9.9	
	1907.60	19.49	H	1.63	8.45	26.31	33.0	-6.7	
	Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								
WCDMA Band 2 HSDPA	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company:		Samsung						
	Project #:		15K22210						
	Date:		11-22-15						
	Test Engineer:		Steven.Kim						
	Configuration:		EUT ONLY, X Position						
	Mode:		HSDPA_1900 MHz						
	Test Equipment:								
	Receiving: 3117[00168724] and Chamber 1 SMA Cables								
	Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	1852.40	14.40	V	1.60	8.79	21.59	33.0	-11.4	
	1852.40	16.24	H	1.60	8.79	23.43	33.0	-9.6	
	Mid Ch								
	1880.00	16.60	V	1.62	8.62	23.60	33.0	-9.4	
	1880.00	15.65	H	1.62	8.62	22.65	33.0	-10.3	
	High Ch								
	1907.60	16.01	V	1.63	8.45	22.83	33.0	-10.2	
	1907.60	19.17	H	1.63	8.45	25.99	33.0	-7.0	
	Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								

LTE Band 17

LTE Band 17 10MHz QPSK	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company: Samsung Project #: 15K22210 Date: 11-13-15 Test Engineer: Steven.Kim Configuration: EUT ONLY, Z Position Mode: LTE Band 17, QPSK, 10MHz								
	Test Equipment: Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	709.00	12.76	V	1.0	-1.6	10.16	34.8	-24.6	
	709.00	-2.73	H	1.0	-1.6	-5.33	34.8	-40.1	
	Mid Ch								
	710.00	12.63	V	1.0	-1.6	10.03	34.8	-24.7	
	710.00	-2.58	H	1.0	-1.6	-5.18	34.8	-40.0	
	High Ch								
	711.00	12.51	V	1.0	-1.6	9.91	34.8	-24.9	
	711.00	-2.81	H	1.0	-1.6	-5.41	34.8	-40.2	
	Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								
LTE Band 17 10MHz 16QAM	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company: Samsung Project #: 15K22210 Date: 11-13-15 Test Engineer: Steven.Kim Configuration: EUT ONLY, Z Position Mode: LTE Band 17 16QAM, 10MHz								
	Test Equipment: Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	709.00	11.75	V	1.0	-1.6	9.15	34.8	-25.6	
	709.00	-3.50	H	1.0	-1.6	-6.10	34.8	-40.9	
	Mid Ch								
	710.00	11.66	V	1.0	-1.6	9.06	34.8	-25.7	
	710.00	-3.56	H	1.0	-1.6	-6.16	34.8	-40.9	
	High Ch								
	711.00	11.56	V	1.0	-1.6	8.96	34.8	-25.8	
	711.00	-3.53	H	1.0	-1.6	-6.13	34.8	-40.9	
	Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								

LTE Band 17 5MHz QPSK	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company:		Samsung						
	Project #:		15K22210						
	Date:		11-13-15						
	Test Engineer:		Steven.Kim						
	Configuration:		EUT ONLY, Z Position						
	Mode:		LTE Band 17, QPSK , 5MHz						
	Test Equipment:								
	Receiving: VULB9163-750, 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)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	706.50	12.78	V	1.0	-1.6	10.18	34.8	-24.6	
	706.50	-2.39	H	1.0	-1.6	-4.99	34.8	-39.8	
	Mid Ch								
	710.00	12.73	V	1.0	-1.6	10.13	34.8	-24.6	
710.00	-3.40	H	1.0	-1.6	-6.00	34.8	-40.8		
High Ch									
713.50	12.48	V	1.0	-1.6	9.88	34.8	-24.9		
713.50	-2.95	H	1.0	-1.6	-5.55	34.8	-40.3		
Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE Band 17 5MHz 16QAM	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company:		Samsung						
	Project #:		15K22210						
	Date:		11-13-15						
	Test Engineer:		Steven.Kim						
	Configuration:		EUT ONLY, Z Position						
	Mode:		LTE Band 17 16QAM, 5MHz						
	Test Equipment:								
	Receiving: VULB9163-750, 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)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	706.50	11.82	V	1.0	-1.6	9.22	34.8	-25.6	
	706.50	-3.54	H	1.0	-1.6	-6.14	34.8	-40.9	
	Mid Ch								
	710.00	11.76	V	1.0	-1.6	9.16	34.8	-25.6	
710.00	-4.43	H	1.0	-1.6	-7.03	34.8	-41.8		
High Ch									
713.50	11.51	V	1.0	-1.6	8.91	34.8	-25.9		
713.50	-4.08	H	1.0	-1.6	-6.68	34.8	-41.5		
Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE Band 5

LTE Band 5 10MHz QPSK	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company:		Samsung						
	Project #:		15K22210						
	Date:		11-13-15						
	Test Engineer:		Steven.Kim						
	Configuration:		EUT ONLY, Z Position						
	Mode:		TX, LTE BAND 5, 10MHz BW,QPSK						
	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								
	829.00	17.96	V	1.1	-1.5	15.38	38.5	-23.1	
	829.00	6.81	H	1.1	-1.5	4.23	38.5	-34.2	
	Mid Ch								
836.50	17.23	V	1.1	-1.4	14.74	38.5	-23.7		
836.50	7.93	H	1.1	-1.4	5.44	38.5	-33.0		
High Ch									
844.00	16.34	V	1.1	-1.3	13.95	38.5	-24.5		
844.00	8.64	H	1.1	-1.3	6.22	38.5	-32.2		
Rev. 3.17.11									
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									
LTE Band 5 10MHz 16QAM	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company:		Samsung						
	Project #:		15K22210						
	Date:		11-13-15						
	Test Engineer:		Steven.Kim						
	Configuration:		EUT ONLY, Z Position						
	Mode:		LTE5 10MHz FUND 16QAM						
	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								
	829.00	16.83	V	1.1	-1.5	14.25	38.5	-24.2	
	829.00	5.79	H	1.1	-1.5	3.21	38.5	-35.2	
	Mid Ch								
836.50	16.24	V	1.1	-1.4	13.73	38.5	-24.7		
836.50	6.83	H	1.1	-1.4	4.32	38.5	-34.1		
High Ch									
844.00	15.36	V	1.1	-1.3	12.94	38.5	-25.5		
844.00	7.54	H	1.1	-1.3	5.12	38.5	-33.3		
Rev. 3.17.11									
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE Band 5 5MHz QPSK	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company: Samsung Project #: 15K22210 Date: 11-13-15 Test Engineer: Steven.Kim Configuration: EUT ONLY, Z Position Mode: LTE5 5MHz FUND QPSK								
	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	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	826.50	17.81	V	1.1	-1.5	15.21	38.5	-23.2	
	826.50	6.20	H	1.1	-1.5	3.60	38.5	-34.9	
	Mid Ch								
	836.50	17.13	V	1.1	-1.4	14.64	38.5	-23.8	
	836.50	7.70	H	1.1	-1.4	5.21	38.5	-33.2	
	High Ch								
	846.50	15.97	V	1.6	-1.3	13.09	38.5	-25.4	
	846.50	8.81	H	1.6	-1.3	5.93	38.5	-32.5	
	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 #: 15K22210 Date: 11-13-15 Test Engineer: Steven.Kim Configuration: EUT ONLY, Z Position Mode: LTE5 5MHz FUND 16QAM								
	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	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	826.50	16.85	V	1.1	-1.5	14.25	38.5	-24.2	
	826.50	5.07	H	1.1	-1.5	2.47	38.5	-36.0	
	Mid Ch								
	836.50	16.06	V	1.1	-1.4	13.57	38.5	-24.9	
	836.50	6.63	H	1.1	-1.4	4.14	38.5	-34.3	
	High Ch								
	846.50	14.86	V	1.1	-1.3	12.48	38.5	-26.0	
	846.50	7.73	H	1.1	-1.3	5.35	38.5	-33.1	
	Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								

LTE Band 5 3MHz QPSK	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company: Samsung Project #: 15K22210 Date: 11-13-15 Test Engineer: Steven.Kim Configuration: EUT ONLY, Z Position Mode: LTE5 3MHz FUND QPSK								
	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	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	825.50	17.91	V	1.1	-1.5	15.31	38.5	-23.1	
	825.50	6.24	H	1.1	-1.5	3.64	38.5	-34.8	
	Mid Ch								
	836.50	17.08	V	1.1	-1.4	14.59	38.5	-23.9	
	836.50	7.87	H	1.1	-1.4	5.38	38.5	-33.1	
	High Ch								
	847.50	15.79	V	1.6	-1.3	12.91	38.5	-25.5	
	847.50	8.80	H	1.6	-1.3	5.92	38.5	-32.5	
	Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								
LTE Band 5 3MHz 16QAM	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
	Company: Samsung Project #: 15K22210 Date: 11-13-15 Test Engineer: Steven.Kim Configuration: EUT ONLY, Z Position Mode: LTE5 3MHz FUND 16QAM								
	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	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	825.50	16.87	V	1.1	-1.5	14.27	38.5	-24.2	
	825.50	5.26	H	1.1	-1.5	2.66	38.5	-35.8	
	Mid Ch								
	836.50	16.06	V	1.1	-1.4	13.57	38.5	-24.9	
	836.50	6.83	H	1.1	-1.4	4.34	38.5	-34.1	
	High Ch								
	847.50	14.83	V	1.1	-1.3	12.45	38.5	-26.0	
	847.50	7.80	H	1.1	-1.3	5.42	38.5	-33.0	
	Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								