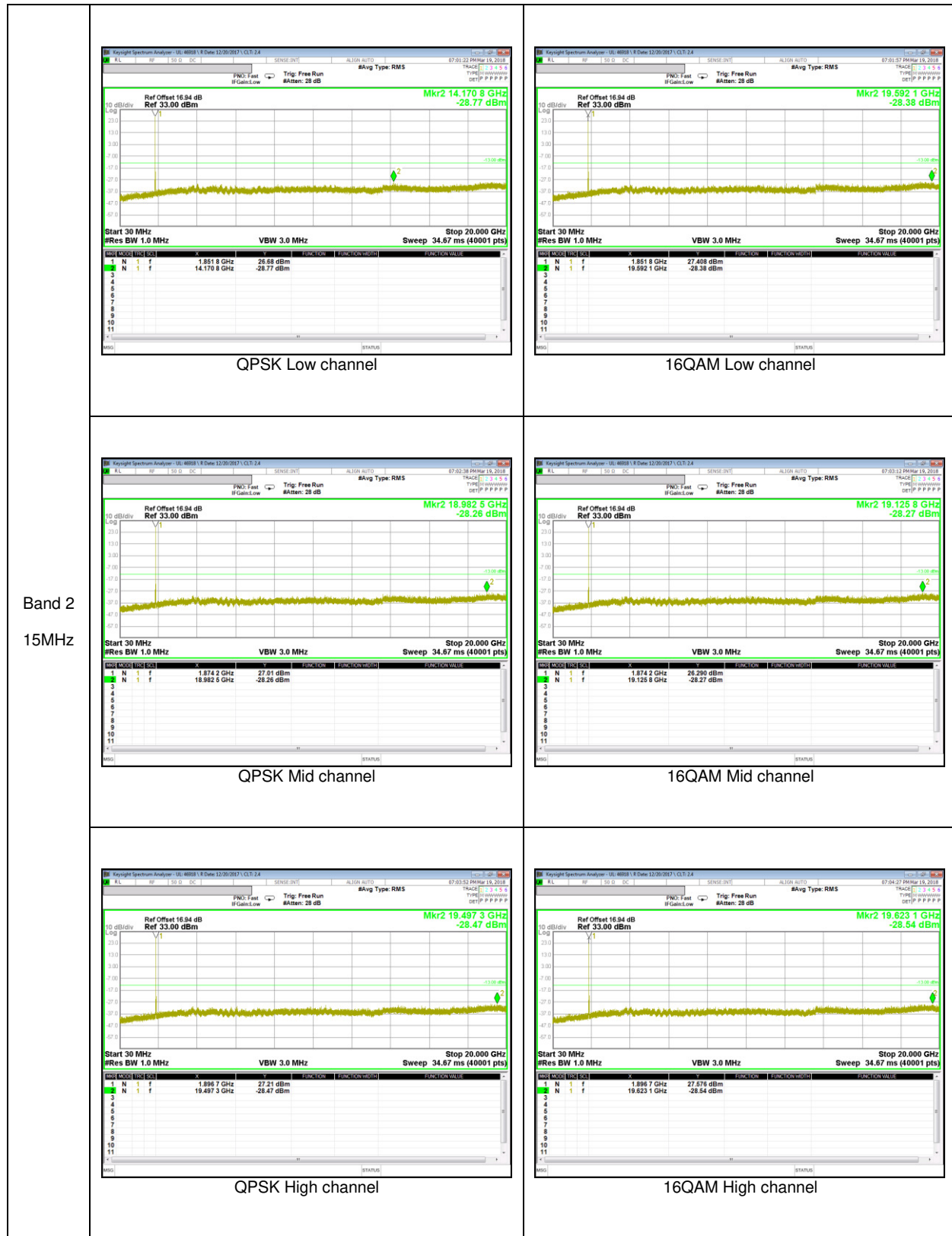
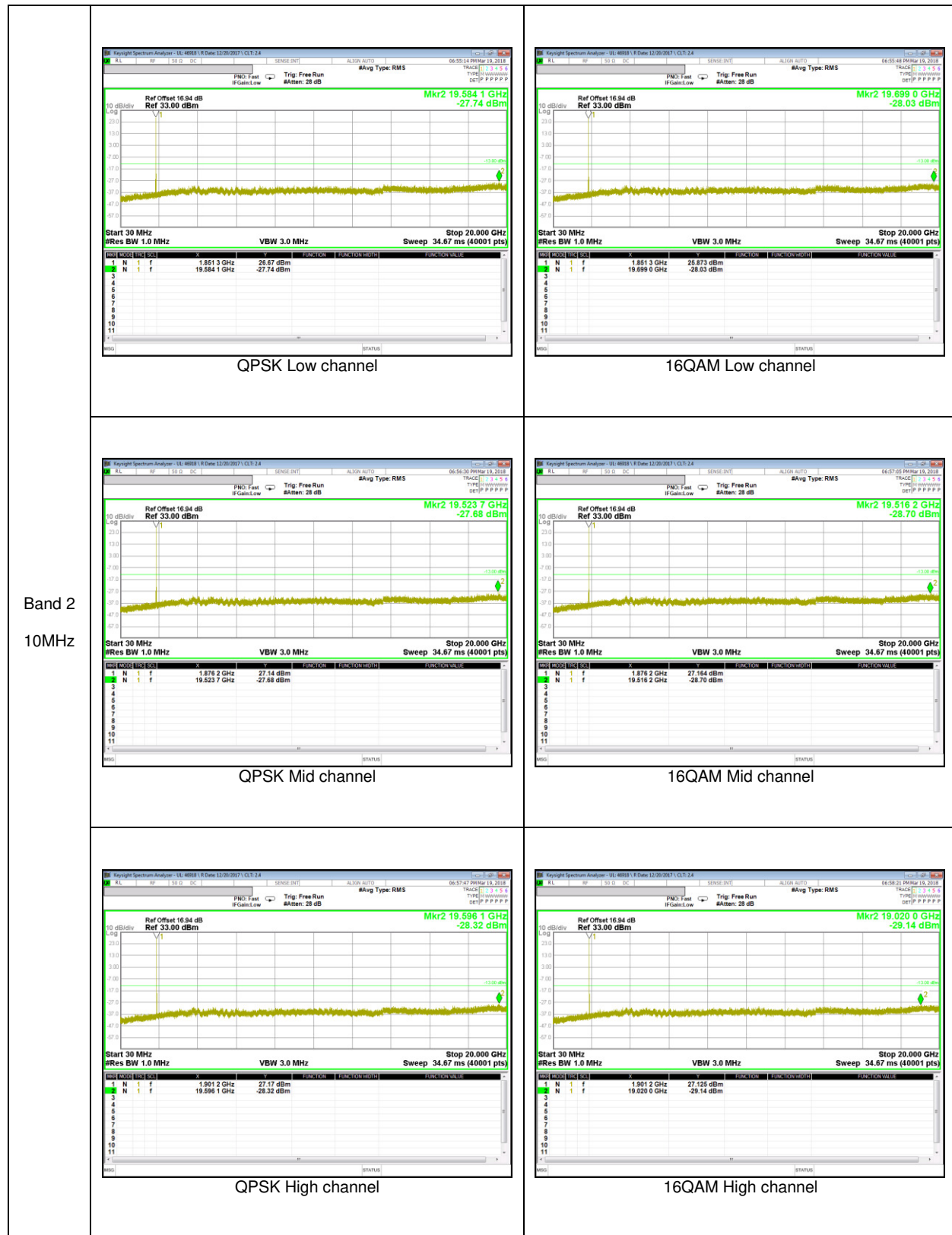
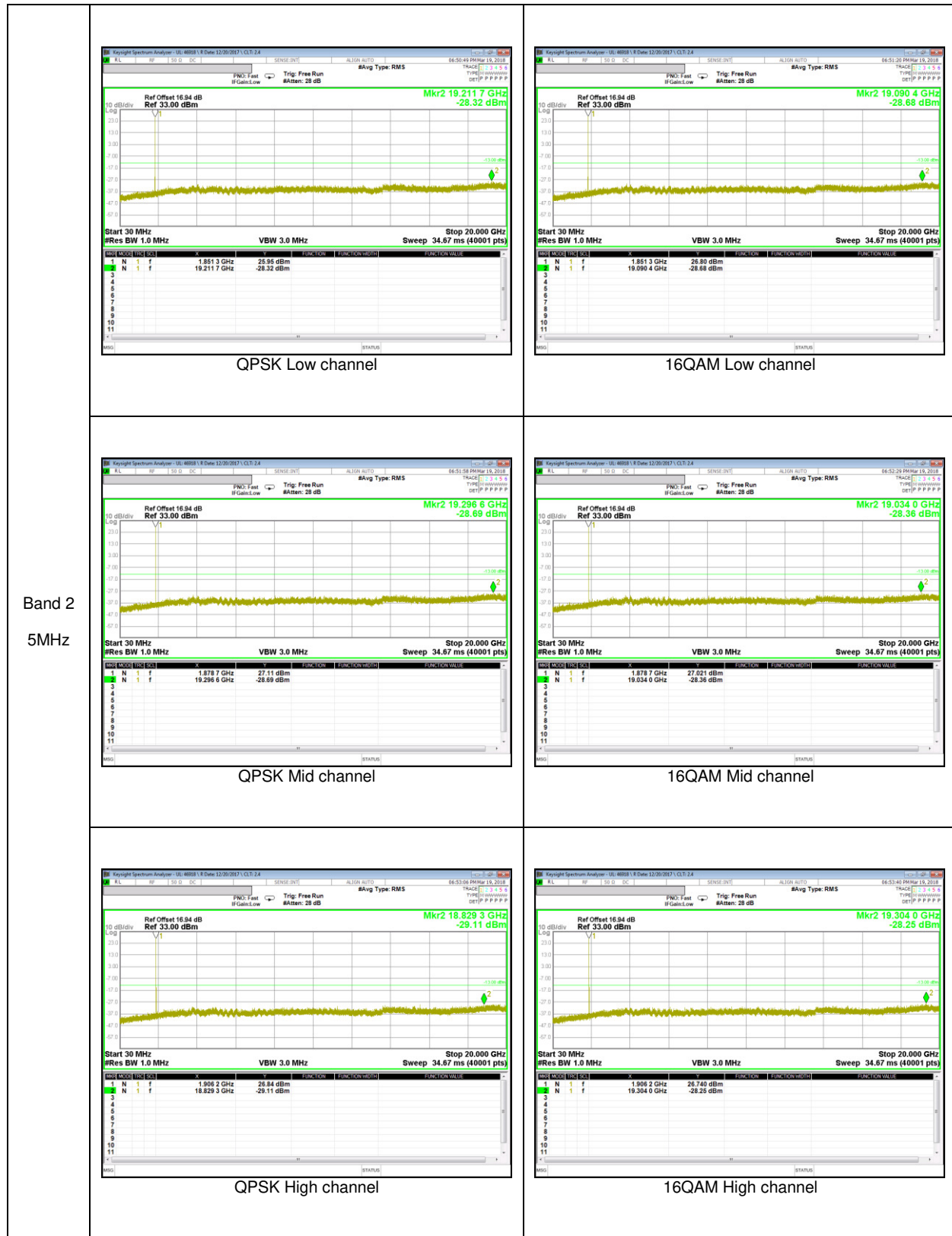
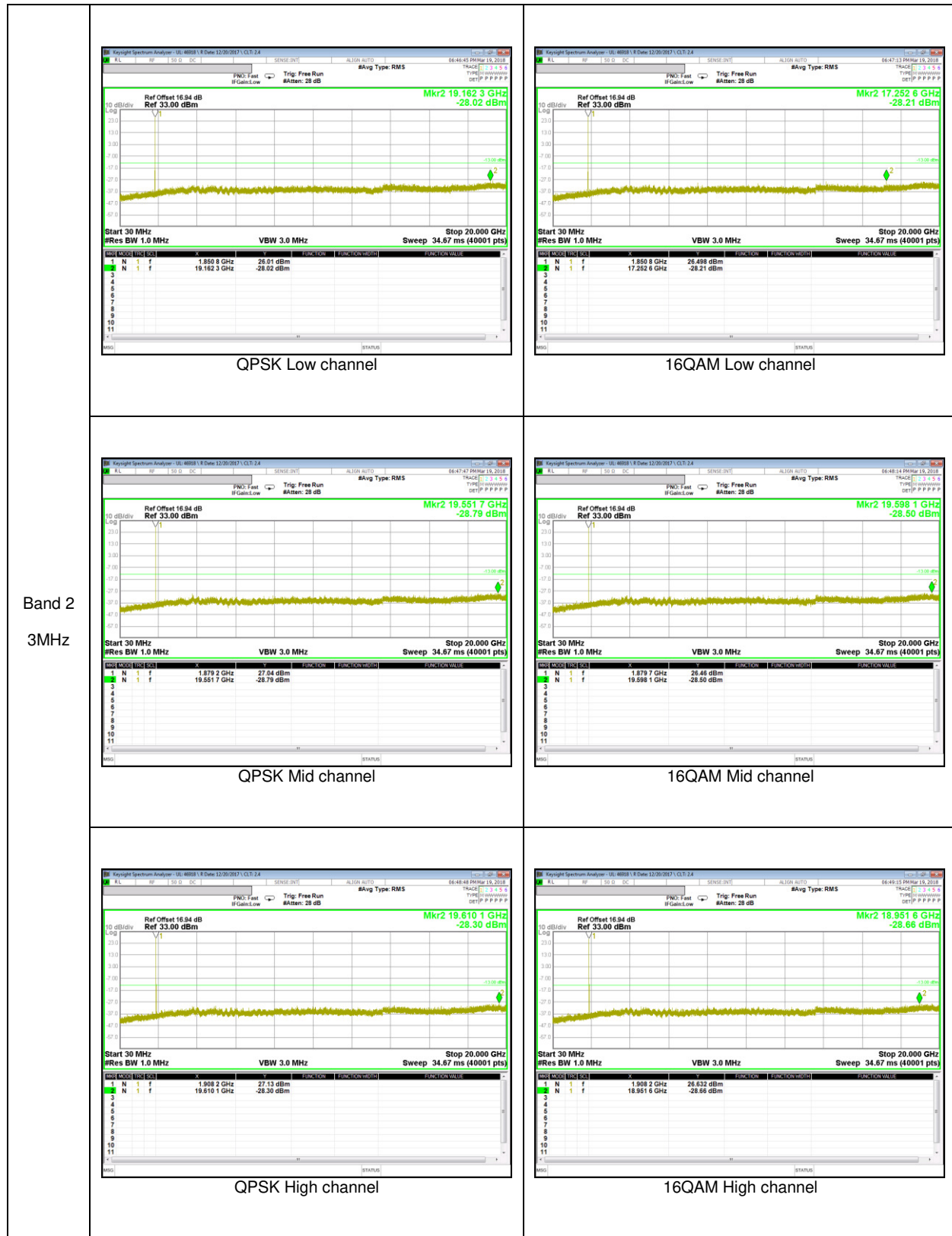
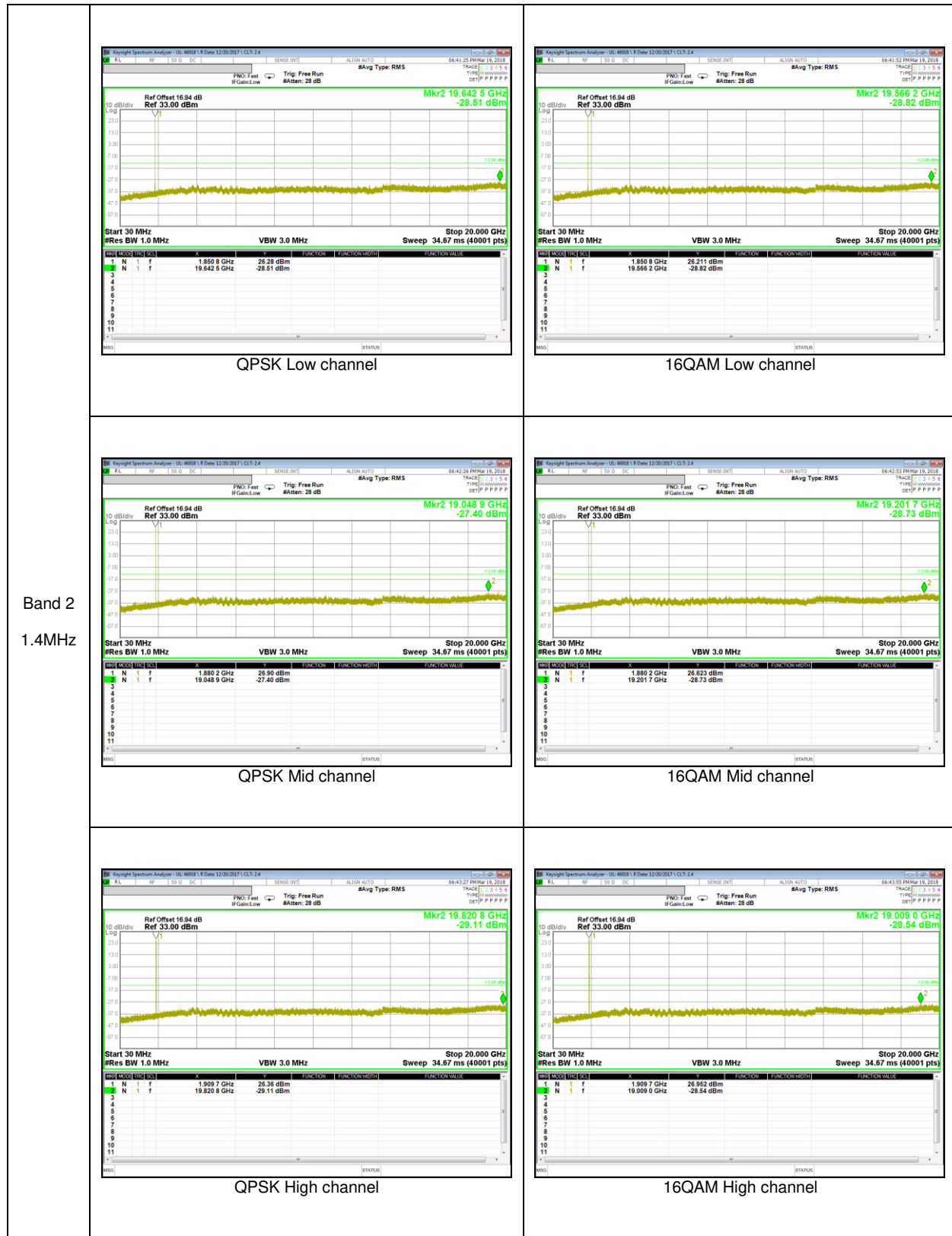




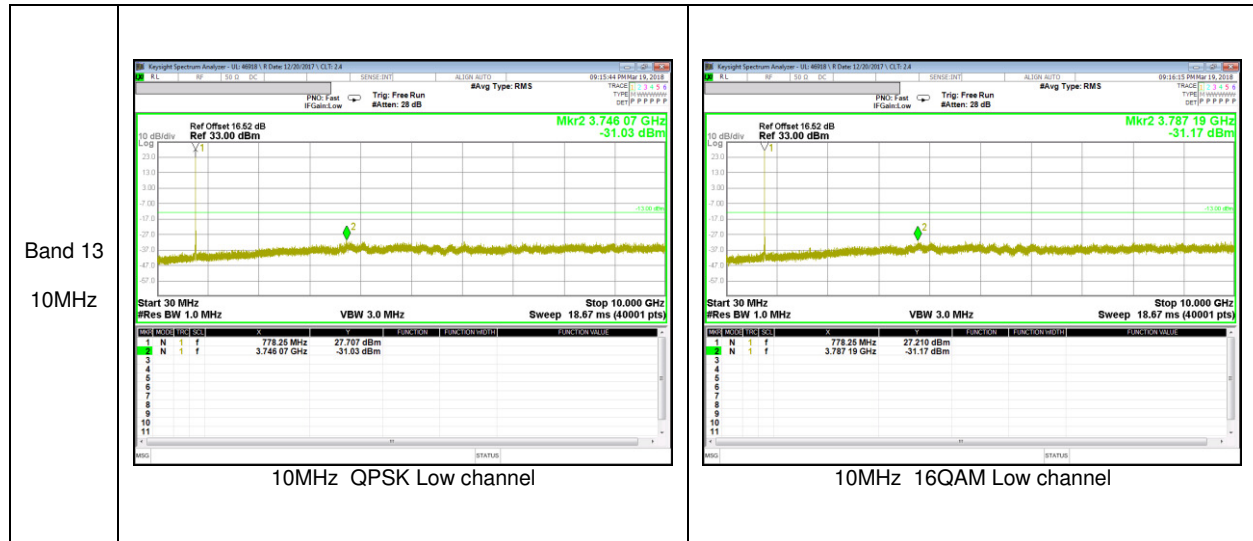




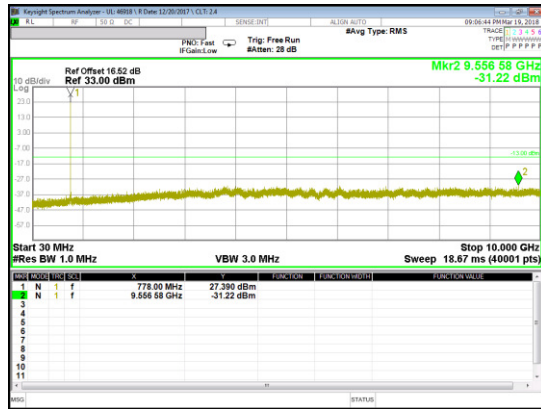




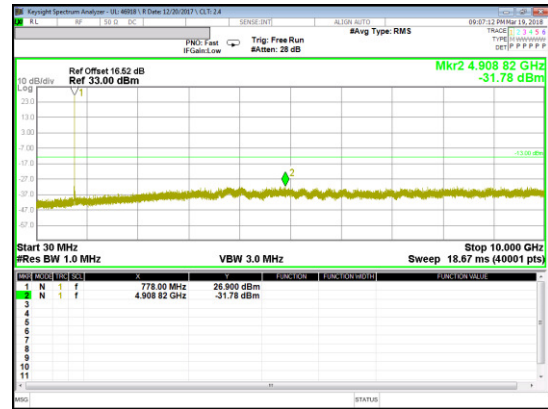
LTE Band 13



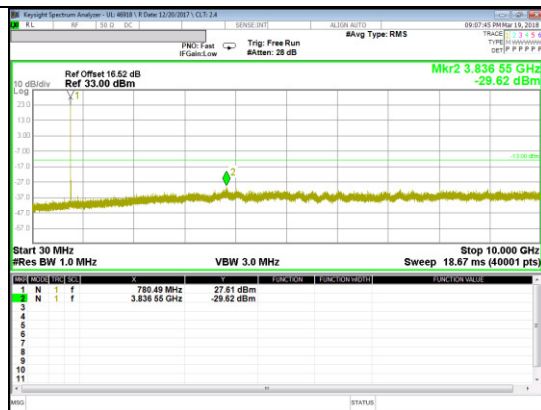
Band 13
5MHz



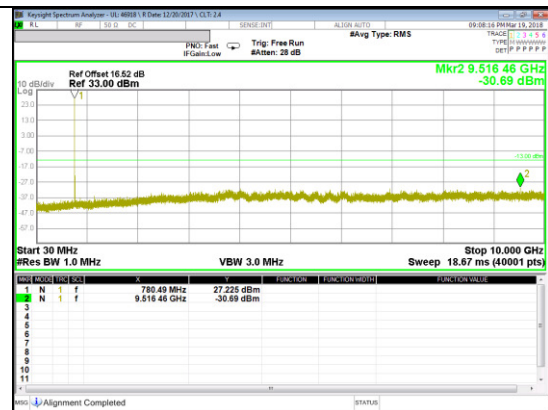
5MHz QPSK Low channel



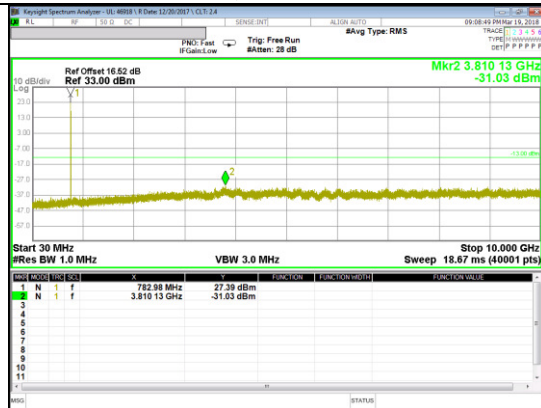
5MHz 16QAM Low channel



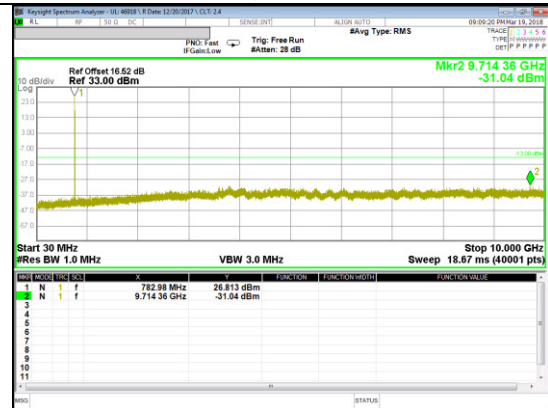
5MHz QPSK Mid channel



5MHz 16QAM Mid channel

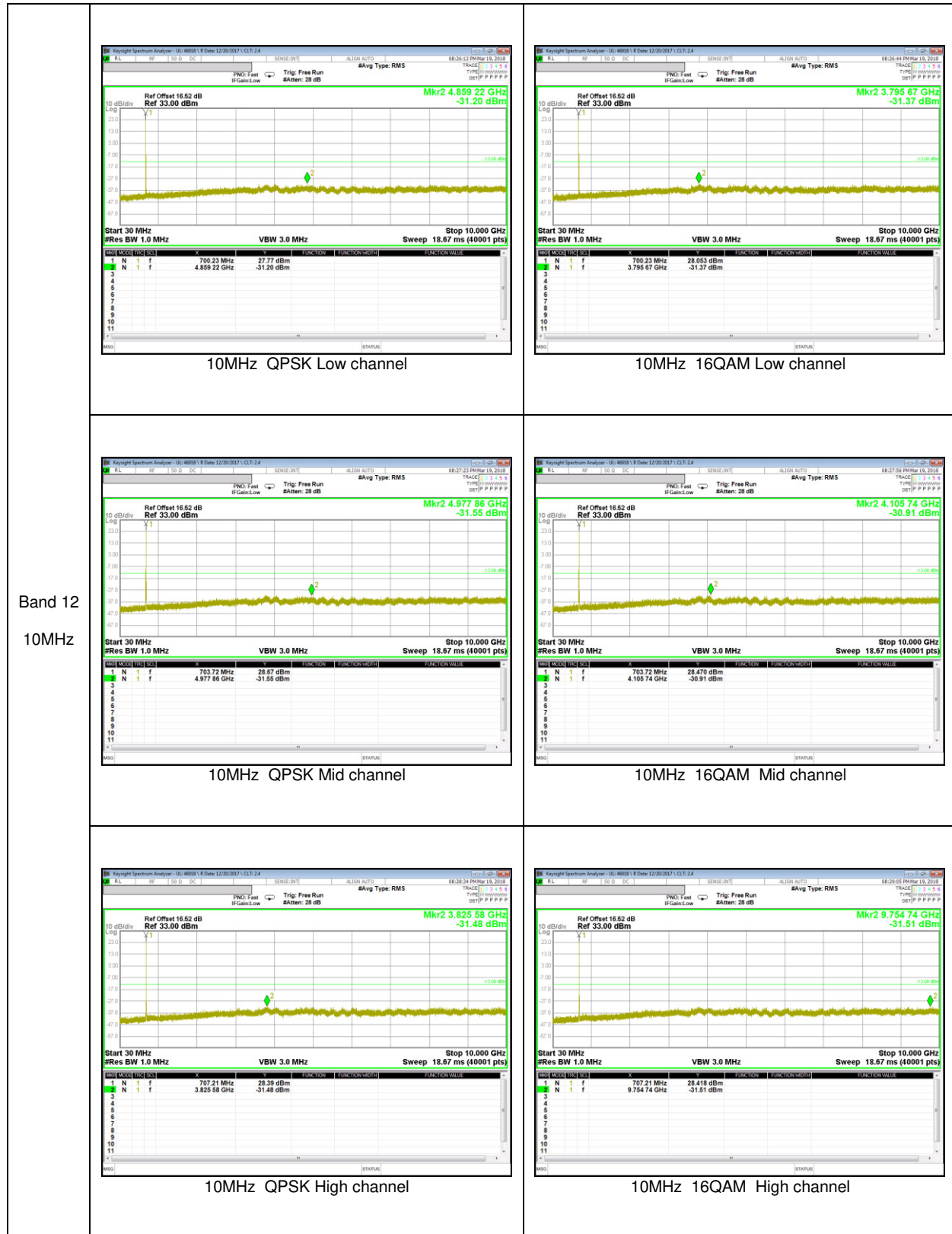


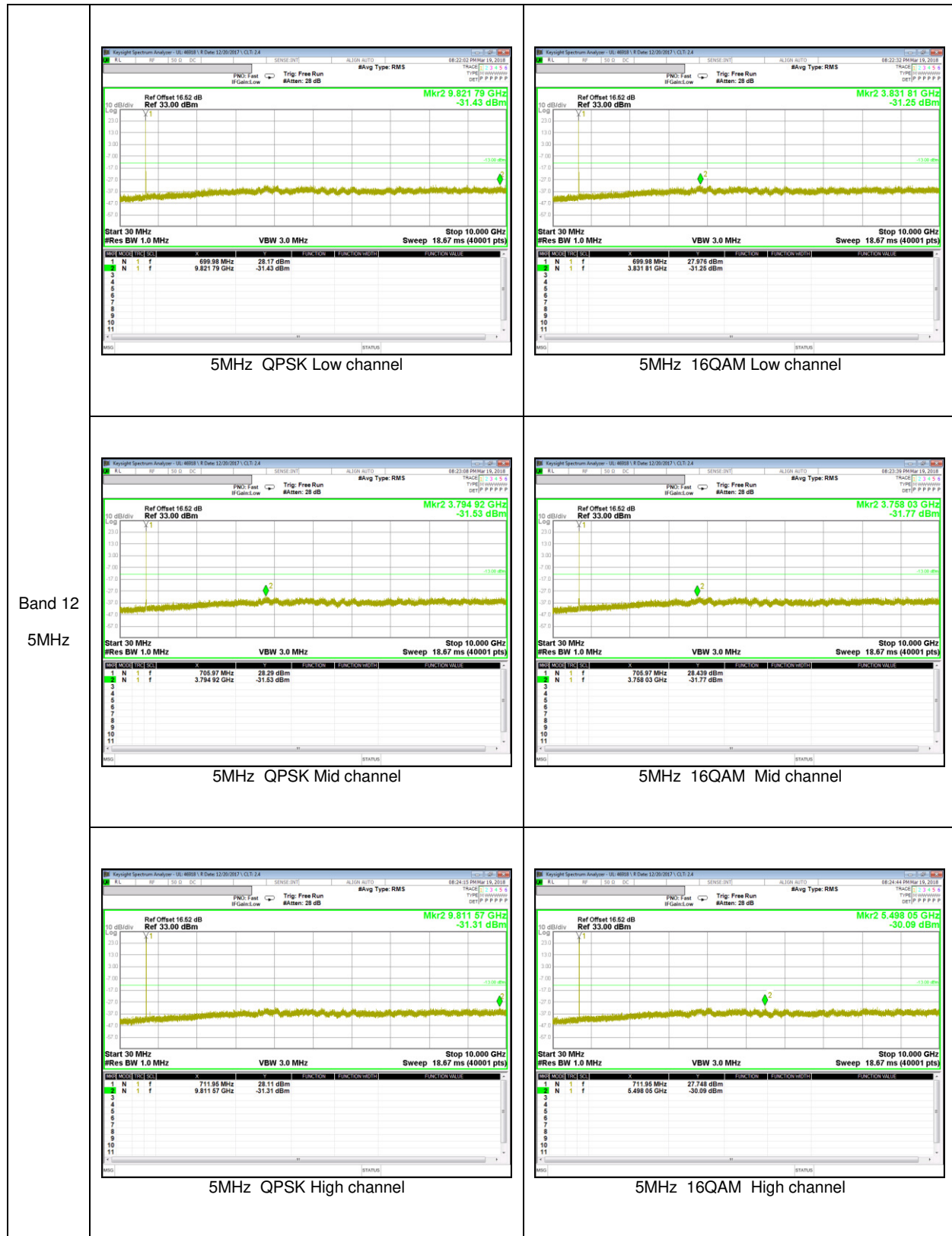
5MHz QPSK High channel

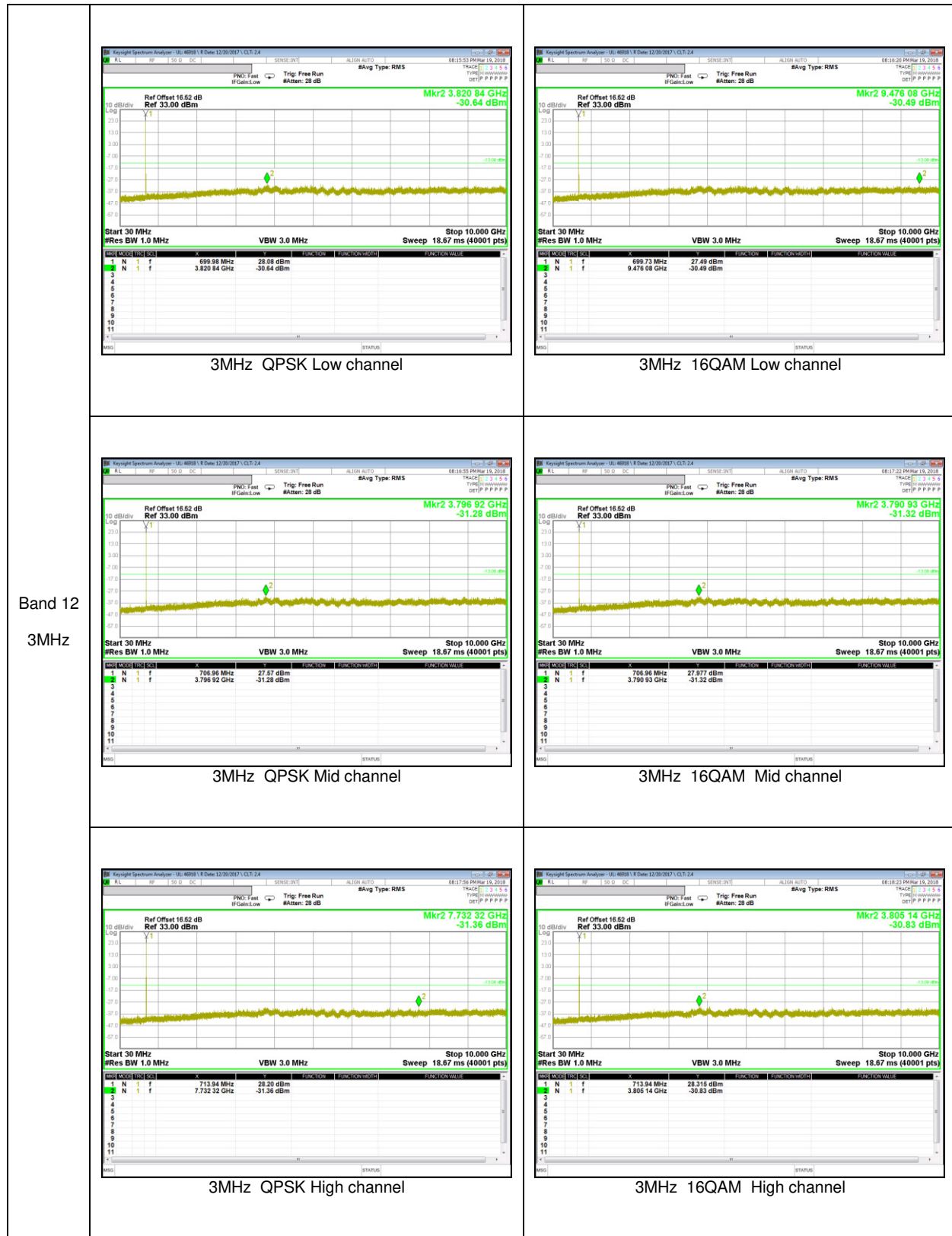


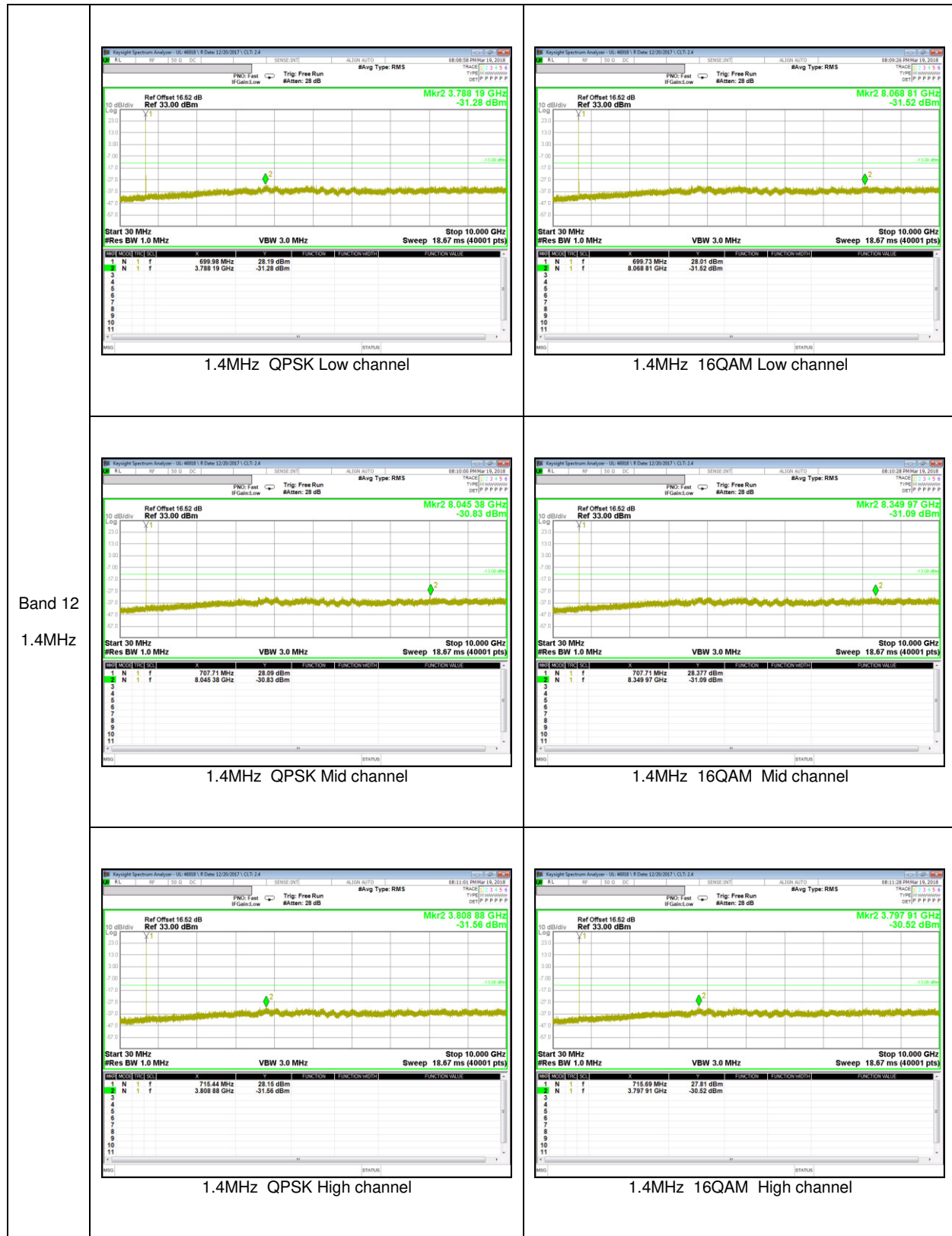
5MHz 16QAM High channel

LTE Band 12









9.4. 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 v03

RESULTS

See the following pages.

9.4.1. FREQUENCY STABILITY RESULTS

GSM 850, Channel 190, Frequency 836.6 MHz

Reference Frequency : GSM850 Mid Channel 836.6 MHz @ 20°C Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	50	836.60004136	-0.001	2.5
3.85	40	836.60003925	0.001	2.5
3.85	30	836.60004888	-0.010	2.5
3.85	20	836.60004033	0	2.5
3.85	10	836.60004642	-0.007	2.5
3.85	0	836.60004678	-0.008	2.5
3.85	-10	836.60004510	-0.006	2.5
3.85	-20	836.60004891	-0.010	2.5
3.85	-30	836.60004155	-0.001	2.5

Reference Frequency : GSM850 Mid Channel 836.6 MHz @ 20°C Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	20	836.60004033	0	2.5
4.40	20	836.60004628	-0.007	2.5
3.60	20	836.60004502	-0.006	2.5

GSM 1900, Channel 661, Frequency 1880.0 MHz

Reference Frequency: GSM1900 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]
3.85	50	1880.00005530	0.003	2.5
3.85	40	1880.00006105	0.000	2.5
3.85	30	1880.00006001	0.000	2.5
3.85	20	1880.00006080	0	2.5
3.85	10	1880.00005942	0.001	2.5
3.85	0	1880.00005630	0.002	2.5
3.85	-10	1880.00006087	0.000	2.5
3.85	-20	1880.00006284	-0.001	2.5
3.85	-30	1880.00006174	-0.001	2.5

Reference Frequency: GSM1900 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]
3.85	20	1880.00006080	0	2.5
4.40	20	1880.00005441	0.003	2.5
3.60	20	1880.00006231	-0.001	2.5

WCDMA Band 5 , Channel 4183, Frequency 836.6 MHz

Reference Frequency: WCDMA Band 5 Mid Channel 836.6 MHz @ 20°C				
Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	50	836.60001509	0.001	2.5
3.85	40	836.60001702	-0.002	2.5
3.85	30	836.60001061	0.006	2.5
3.85	20	836.60001558	0	2.5
3.85	10	836.60001471	0.001	2.5
3.85	0	836.60000956	0.007	2.5
3.85	-10	836.60001194	0.004	2.5
3.85	-20	836.60001620	-0.001	2.5
3.85	-30	836.60001574	0.000	2.5

Reference Frequency: WCDMA Band 5 Mid Channel 836.6 MHz @ 20°C				
Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	20	836.60001558	0	2.5
4.40	20	836.60001907	-0.004	2.5
3.60	20	836.60001322	0.003	2.5

WCDMA Band 2 , Channel 9400, Frequency 1880.0 MHz

Reference Frequency: WCDMA 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]
3.85	50	1879.99997194	-0.002	2.5
3.85	40	1879.99996782	0.000	2.5
3.85	30	1879.99997467	-0.004	2.5
3.85	20	1879.99996772	0	2.5
3.85	10	1879.99997184	-0.002	2.5
3.85	0	1879.99997203	-0.002	2.5
3.85	-10	1879.99996391	0.002	2.5
3.85	-20	1879.99996398	0.002	2.5
3.85	-30	1879.99997464	-0.004	2.5

Reference Frequency: WCDMA 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]
3.85	20	1879.99996772	0	2.5
4.40	20	1879.99996981	-0.001	2.5
3.60	20	1879.99997019	-0.001	2.5

WCDMA Band 4, Channel 1413, Frequency 1732.6 MHz

Reference Frequency: WCDMA Band 4 Mid Channel 1732.6 MHz @ 20°C				
Limit: +- 2.5 ppm = 4331.500 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	50	1732.59998463	-0.002	2.5
3.85	40	1732.59997716	0.002	2.5
3.85	30	1732.59997922	0.001	2.5
3.85	20	1732.59998084	0	2.5
3.85	10	1732.59998307	-0.001	2.5
3.85	0	1732.59998618	-0.003	2.5
3.85	-10	1732.59998281	-0.001	2.5
3.85	-20	1732.59998694	-0.004	2.5
3.85	-30	1732.59998656	-0.003	2.5

Reference Frequency: WCDMA Band 4 Mid Channel 1732.6 MHz @ 20°C				
Limit: +- 2.5 ppm = 4331.500 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	20	1732.59998084	0	2.5
4.40	20	1732.59997770	0.002	2.5
3.60	20	1732.59997898	0.001	2.5

LTE Band 66, Channel 132322, Frequency 1745.0 MHz

Reference Frequency: LTE Band 66 Mid Channel 1745 MHz @ 20°C				
Limit: +- 2.5 ppm = 4362.500 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	50	1744.99997742	-0.001	2.5
3.85	40	1744.99997821	-0.001	2.5
3.85	30	1744.99997592	0.000	2.5
3.85	20	1744.99997582	0	2.5
3.85	10	1744.99997647	0.000	2.5
3.85	0	1744.99997994	-0.002	2.5
3.85	-10	1744.99997165	0.002	2.5
3.85	-20	1744.99997938	-0.002	2.5
3.85	-30	1744.99998060	-0.003	2.5

Reference Frequency: LTE Band 66 Mid Channel 1745 MHz @ 20°C				
Limit: +- 2.5 ppm = 4362.500 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	20	1744.99997582	0	2.5
4.40	20	1744.99997536	0.000	2.5
3.60	20	1744.99997176	0.002	2.5

LTE Band 2, Channel 18900, Frequency 1880.0 MHz

Reference Frequency: LTE Band 2 Mid Channel 1880 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]
3.85	50	1880.00002660	-0.003	2.5
3.85	40	1880.00002361	-0.002	2.5
3.85	30	1880.00001658	0.002	2.5
3.85	20	1880.00002020	0	2.5
3.85	10	1880.00002113	0.000	2.5
3.85	0	1880.00002174	-0.001	2.5
3.85	-10	1880.00001660	0.002	2.5
3.85	-20	1880.00002587	-0.003	2.5
3.85	-30	1880.00002064	0.000	2.5

Reference Frequency: LTE Band 2 Mid Channel 1880 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]
3.85	20	1880.00002020	0	2.5
4.40	20	1880.00002723	-0.004	2.5
3.60	20	1880.00001855	0.001	2.5

LTE Band 13, Channel 23230, Frequency 782.0 MHz

Reference Frequency: LTE Band 13 Mid Channel 782 MHz @ 20°C				
Limit: +- 2.5 ppm = 1955.000 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	50	781.99997980	0.000	2.5
3.85	40	781.99998398	-0.005	2.5
3.85	30	781.99997816	0.002	2.5
3.85	20	781.99998011	0	2.5
3.85	10	781.99997645	0.005	2.5
3.85	0	781.99997857	0.002	2.5
3.85	-10	781.99997331	0.009	2.5
3.85	-20	781.99997535	0.006	2.5
3.85	-30	781.99997773	0.003	2.5

Reference Frequency: LTE Band 13 Mid Channel 782 MHz @ 20°C				
Limit: +- 2.5 ppm = 1955.000 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	20	781.99998011	0	2.5
4.40	20	781.99998028	0.000	2.5
3.60	20	781.99998377	-0.005	2.5

LTE Band 12, Channel 23095, Frequency 707.5 MHz

Reference Frequency: LTE Band 12 Mid Channel 707.5 MHz @ 20°C				
Limit: +- 2.5 ppm = 1768.750 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	50	707.50001353	-0.001	2.5
3.85	40	707.50002046	-0.011	2.5
3.85	30	707.50001709	-0.007	2.5
3.85	20	707.50001247	0	2.5
3.85	10	707.50001742	-0.007	2.5
3.85	0	707.50001933	-0.010	2.5
3.85	-10	707.50001811	-0.008	2.5
3.85	-20	707.50001087	0.002	2.5
3.85	-30	707.50001823	-0.008	2.5

Reference Frequency: LTE Band 12 Mid Channel 707.5 MHz @ 20°C				
Limit: +- 2.5 ppm = 1768.750 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	20	707.50001247	0	2.5
4.40	20	707.50001645	-0.006	2.5
3.60	20	707.50001929	-0.010	2.5

LTE Band 41 , Channel 40620, Frequency 2593.0 MHz

Reference Frequency: LTE Band 41 Mid Channel 2593 MHz @ 20°C				
Limit: +- 2.5 ppm = 6482.500 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	50	2593.00003509	0.002	2.5
3.85	40	2593.00004030	0.000	2.5
3.85	30	2593.00003408	0.003	2.5
3.85	20	2593.00004082	0	2.5
3.85	10	2593.00004432	-0.001	2.5
3.85	0	2593.00003808	0.001	2.5
3.85	-10	2593.00003914	0.001	2.5
3.85	-20	2593.00003933	0.001	2.5
3.85	-30	2593.00003662	0.002	2.5

Reference Frequency: LTE Band 41 Mid Channel 2593 MHz @ 20°C				
Limit: +- 2.5 ppm = 6482.500 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	20	2593.00004082	0	2.5
4.40	20	2593.00004390	-0.001	2.5
3.60	20	2593.00003949	0.001	2.5

LTE Band 5 , Channel 20524, Frequency 836.5 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]
3.85	50	836.49997515	-0.001	2.5
3.85	40	836.49997189	0.003	2.5
3.85	30	836.49996726	0.009	2.5
3.85	20	836.49997463	0	2.5
3.85	10	836.49997574	-0.001	2.5
3.85	0	836.49996854	0.007	2.5
3.85	-10	836.49997573	-0.001	2.5
3.85	-20	836.49996624	0.010	2.5
3.85	-30	836.49996737	0.009	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]
3.85	20	836.49997463	0	2.5
4.40	20	836.49997578	-0.001	2.5
3.60	20	836.49996556	0.011	2.5

LTE Band 4

Due to frequency range and same output power setting, test was carried in LTE Band 66 to cover both LTE Band 66 and LTE Band 4.

LTE Band 17

Due to frequency range and same output power setting, test was carried in LTE Band 12 to cover both LTE Band 12 and LTE Band 17.

10. RADIATED TEST RESULTS

10.1. 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(h) - (2) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

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

27.50(c) (10) - Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

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 603 E Clause 2.2.17; ESU40 setting reference to 971168 D01 v03

For peak power measurement with a ESU40:

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 ESU40:

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. (RBW/VBW are automatically set for LTE B41)

TEST RESULTS

10.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	512	824.2	25.53	357.27
		661	836.6	27.04	505.82
		810	848.8	25.38	345.14
	EGPRS	512	824.2	18.66	73.45
		661	836.6	20.78	119.67
		810	848.8	18.60	72.44
GSM1900	GPRS	512	1850.2	29.54	899.50
		661	1880.0	29.66	924.70
		810	1909.8	28.92	779.83
	EGPRS	512	1850.2	26.06	403.65
		661	1880.0	26.30	426.58
		810	1909.8	25.26	335.74

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	17.93	62.09
		4183	836.6	17.48	55.98
		4233	846.6	16.64	46.13
	HSDPA	4132	826.4	17.43	55.34
		4183	836.6	17.09	51.17
		4233	846.6	16.35	43.15
Band 2	REL99	9262	1852.4	21.40	138.04
		9400	1880.0	21.31	135.21
		9538	1907.6	20.99	125.60
	HSDPA	9262	1852.4	19.88	97.27
		9400	1880.0	20.43	110.41
		9538	1907.6	19.87	97.05

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 4	REL99	1312	1712.4	25.19	330.37
		1413	1732.6	24.54	284.45
		1513	1752.6	23.44	220.80
	HSDPA	1312	1712.4	24.11	257.63
		1413	1732.6	23.56	226.99
		1513	1752.6	22.43	174.98

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	16.32	42.85
			50/0	836.5	16.02	39.99
			50/0	844.0	15.57	36.06
		16QAM	50/0	829.0	15.50	35.48
			50/0	836.5	15.05	31.99
			50/0	844.0	14.39	27.48
	5	QPSK	25/0	826.5	16.08	40.55
			25/0	836.5	15.69	37.07
			25/0	846.5	14.76	29.92
		16QAM	25/0	826.5	15.07	32.14
			25/0	836.5	14.77	29.99
			25/0	846.5	13.83	24.15
	3	QPSK	15/0	825.5	16.45	44.16
			15/0	836.5	15.57	36.06
			15/0	847.5	14.48	28.05
		16QAM	15/0	825.5	15.42	34.83
			15/0	836.5	14.59	28.77
			15/0	847.5	13.51	22.44
	1.4	QPSK	6/0	824.7	13.98	25.00
			6/0	836.5	12.45	17.58
			6/0	848.3	12.33	17.10
		16QAM	6/0	824.7	13.14	20.61
			6/0	836.5	11.51	14.16
			6/0	848.3	11.40	13.80

LTE Band 41

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 41	20	QPSK	100/0	2506.0	17.99	62.95
			100/0	2593.0	18.79	75.68
			100/0	2680.0	21.17	130.92
		16QAM	100/0	2506.0	17.00	50.12
			100/0	2593.0	17.89	61.52
			100/0	2680.0	20.24	105.68
	15	QPSK	75/0	2503.5	17.20	52.48
			75/0	2593.0	18.40	69.18
			75/0	2682.5	21.11	129.12
		16QAM	75/0	2503.5	16.46	44.26
			75/0	2593.0	17.45	55.59
			75/0	2682.5	20.66	116.41
	10	QPSK	50/0	2501.0	17.97	62.66
			50/0	2593.0	16.51	44.77
			50/0	2685.0	20.11	102.57
		16QAM	50/0	2501.0	17.00	50.12
			50/0	2593.0	15.67	36.90
			50/0	2685.0	18.85	76.74
	5	QPSK	25/0	2498.5	17.84	60.81
			25/0	2593.0	18.79	75.68
			25/0	2687.5	20.28	106.66
		16QAM	25/0	2498.5	17.23	52.84
			25/0	2593.0	17.67	58.48
			25/0	2687.5	19.29	84.92

LTE Band 4

Due to frequency range and same output power setting, test was carried in LTE Band 66 to cover both LTE Band 66 and LTE Band 4.

LTE Band 17

Due to frequency range and same output power setting, test was carried in LTE Band 12 to cover both LTE Band 12 and LTE Band 17.

LTE Band 66

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 66	20	QPSK	100/0	1720.0	22.96	197.70
			100/0	1745.0	22.86	193.20
			100/0	1770.0	21.59	144.21
		16QAM	100/0	1720.0	21.96	157.04
			100/0	1745.0	22.15	164.06
			100/0	1770.0	20.59	114.55
	15	QPSK	75/0	1717.5	23.23	210.38
			75/0	1745.0	22.13	163.31
			75/0	1772.5	22.13	163.31
		16QAM	75/0	1717.5	22.29	169.43
			75/0	1745.0	21.37	137.09
			75/0	1772.5	21.19	131.52
	10	QPSK	50/0	1715.0	22.21	166.34
			50/0	1745.0	22.65	184.08
			50/0	1775.0	21.45	139.64
		16QAM	50/0	1715.0	21.22	132.43
			50/0	1745.0	21.61	144.88
			50/0	1775.0	20.57	114.02
	5	QPSK	25/0	1712.5	23.23	210.38
			25/0	1745.0	23.79	239.33
			25/0	1777.5	23.68	233.35
		16QAM	25/0	1712.5	22.20	165.96
			25/0	1745.0	22.75	188.36
			25/0	1777.5	22.50	177.83
	3	QPSK	15/0	1711.5	23.36	216.77
			15/0	1745.0	23.75	237.14
			15/0	1778.5	21.38	137.40
		16QAM	15/0	1711.5	22.38	172.98
			15/0	1745.0	22.74	187.93
			15/0	1778.5	20.36	108.64
	1.4	QPSK	6/0	1710.7	19.58	90.78
			6/0	1745.0	21.31	135.21
			6/0	1779.3	19.25	84.14
		16QAM	6/0	1710.7	18.62	72.78
			6/0	1745.0	20.22	105.20
			6/0	1779.3	18.28	67.30

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	19.48	88.72
			100/0	1880.0	19.47	88.51
			100/0	1900.0	19.55	90.16
		16QAM	100/0	1860.0	18.49	70.63
			100/0	1880.0	18.40	69.18
			100/0	1900.0	18.54	71.45
	15	QPSK	75/0	1857.5	18.35	68.39
			75/0	1880.0	19.80	95.50
			75/0	1902.5	18.88	77.27
		16QAM	75/0	1857.5	17.47	55.85
			75/0	1880.0	18.82	76.21
			75/0	1902.5	17.88	61.38
	10	QPSK	50/0	1855.0	20.20	104.71
			50/0	1880.0	19.71	93.54
			50/0	1905.0	19.26	84.33
		16QAM	50/0	1855.0	19.16	82.41
			50/0	1880.0	18.67	73.62
			50/0	1905.0	18.21	66.22
	5	QPSK	25/0	1852.5	19.77	94.84
			25/0	1880.0	20.18	104.23
			25/0	1907.5	18.96	78.70
		16QAM	25/0	1852.5	18.80	75.86
			25/0	1880.0	19.17	82.60
			25/0	1907.5	17.97	62.66
	3	QPSK	15/0	1851.5	20.11	102.57
			15/0	1880.0	18.08	64.27
			15/0	1908.5	19.29	84.92
		16QAM	15/0	1851.5	19.06	80.54
			15/0	1880.0	17.06	50.82
			15/0	1908.5	18.26	66.99
	1.4	QPSK	6/0	1850.7	17.26	53.21
			6/0	1880.0	18.38	68.87
			6/0	1909.3	16.56	45.29
		16QAM	6/0	1850.7	16.23	41.98
			6/0	1880.0	17.41	55.08
			6/0	1909.3	15.59	36.22

LTE Band 13

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 13	10	QPSK	50/0	782.0	13.13	20.56
		16QAM	50/0	782.0	12.22	16.67
	5	QPSK	25/0	779.5	14.22	26.42
			25/0	782.0	14.12	25.82
			25/0	784.5	14.27	26.73
		16QAM	25/0	779.5	13.13	20.56
			25/0	782.0	13.06	20.23
			25/0	784.5	14.07	25.53
			25/0	784.5	14.07	25.53

LTE Band 12

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 12	10	QPSK	50/0	704.0	15.79	37.93
			50/0	707.5	15.86	38.55
			50/0	711.0	16.08	40.55
		16QAM	50/0	704.0	14.80	30.20
			50/0	707.5	14.82	30.34
			50/0	711.0	14.99	31.55
	5	QPSK	25/0	701.5	15.34	34.20
			25/0	707.5	15.44	34.99
			25/0	713.5	15.00	31.62
		16QAM	25/0	701.5	14.30	26.92
			25/0	707.5	14.54	28.44
			25/0	713.5	14.11	25.76
	3	QPSK	15/0	700.5	15.21	33.19
			15/0	707.5	15.45	35.08
			15/0	714.5	15.61	36.39
		16QAM	15/0	700.5	14.16	26.06
			15/0	707.5	14.41	27.61
			15/0	714.5	14.92	31.05
	1.4	QPSK	6/0	699.7	12.73	18.75
			6/0	707.5	13.15	20.65
			6/0	715.3	13.03	20.09
		16QAM	6/0	699.7	11.78	15.07
			6/0	707.5	12.09	16.18
			6/0	715.3	11.91	15.52

10.1.2. ERP/EIRP DATA

GSM 850

GSM GSM850 GPRS	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company:		Samsung						
	Project #:		4788372835						
	Date:		2018-03-19						
	Test Engineer:		47989						
	Configuration:		EUT / X-Position						
	Location:		Chamber 1						
	Mode:		GPRS 850 MHz Fundamentals						
	Test Equipment:								
	Receiving: VULB9163-845, and Chamber 2 SMA Cables								
	Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.20	21.21	V	1.0	-1.5	18.78	38.5	-19.7	
824.20	27.96	H	1.0	-1.5	25.53	38.5	-13.0		
Mid Ch									
836.60	22.14	V	1.0	-1.4	19.76	38.5	-18.7		
836.60	29.42	H	1.0	-1.4	27.04	38.5	-11.5		
High Ch									
848.80	20.65	V	1.0	-1.4	18.31	38.5	-20.2		
848.80	27.72	H	1.0	-1.4	25.38	38.5	-13.1		

GSM GSM850 EGPRS	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company:		Samsung						
	Project #:		4788372835						
	Date:		2018-03-19						
	Test Engineer:		47989						
	Configuration:		EUT / X-Position						
	Location:		Chamber 1						
	Mode:		EGPRS 850 MHz Fundamentals						
	Test Equipment:								
	Receiving: VULB9163-845, and Chamber 2 SMA Cables								
	Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.20	15.29	V	1.0	-1.5	12.86	38.5	-25.6	
824.20	21.09	H	1.0	-1.5	18.66	38.5	-19.8		
Mid Ch									
836.60	15.83	V	1.0	-1.4	13.45	38.5	-25.1		
836.60	23.16	H	1.0	-1.4	20.78	38.5	-17.7		
High Ch									
848.80	14.08	V	1.0	-1.4	11.74	38.5	-26.8		
848.80	20.94	H	1.0	-1.4	18.60	38.5	-19.9		

GSM 1900

GSM GSM1900 GPRS	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788372835 Date: 2018-02-25 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: GPRS 1900 MHz Fundamentals Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>1850.20</td><td>17.10</td><td>V</td><td>4.5</td><td>9.5</td><td>22.11</td><td>33.0</td><td>-10.9</td></tr><tr><td>1850.20</td><td>24.53</td><td>H</td><td>4.5</td><td>9.5</td><td>29.54</td><td>33.0</td><td>-3.5</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1880.00</td><td>18.02</td><td>V</td><td>4.5</td><td>9.2</td><td>22.70</td><td>33.0</td><td>-10.3</td></tr><tr><td>1880.00</td><td>24.98</td><td>H</td><td>4.5</td><td>9.2</td><td>29.66</td><td>33.0</td><td>-3.3</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1909.80</td><td>19.01</td><td>V</td><td>4.6</td><td>8.9</td><td>23.31</td><td>33.0</td><td>-9.7</td></tr><tr><td>1909.80</td><td>24.62</td><td>H</td><td>4.6</td><td>8.9</td><td>28.92</td><td>33.0</td><td>-4.1</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								1850.20	17.10	V	4.5	9.5	22.11	33.0	-10.9	1850.20	24.53	H	4.5	9.5	29.54	33.0	-3.5	Mid Ch								1880.00	18.02	V	4.5	9.2	22.70	33.0	-10.3	1880.00	24.98	H	4.5	9.2	29.66	33.0	-3.3	High Ch								1909.80	19.01	V	4.6	8.9	23.31	33.0	-9.7	1909.80	24.62	H	4.6	8.9	28.92	33.0	-4.1
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
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	1850.20	17.10	V	4.5	9.5	22.11	33.0	-10.9																																																																																		
	1850.20	24.53	H	4.5	9.5	29.54	33.0	-3.5																																																																																		
	Mid Ch																																																																																									
	1880.00	18.02	V	4.5	9.2	22.70	33.0	-10.3																																																																																		
	1880.00	24.98	H	4.5	9.2	29.66	33.0	-3.3																																																																																		
	High Ch																																																																																									
	1909.80	19.01	V	4.6	8.9	23.31	33.0	-9.7																																																																																		
1909.80	24.62	H	4.6	8.9	28.92	33.0	-4.1																																																																																			
GSM GSM1900 EGPRS	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788372835 Date: 2018-02-25 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: EGPRS 1900 MHz Fundamentals Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>1850.20</td><td>13.32</td><td>V</td><td>4.5</td><td>9.5</td><td>18.33</td><td>33.0</td><td>-14.7</td></tr><tr><td>1850.20</td><td>21.05</td><td>H</td><td>4.5</td><td>9.5</td><td>26.06</td><td>33.0</td><td>-6.9</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1880.00</td><td>14.57</td><td>V</td><td>4.5</td><td>9.2</td><td>19.25</td><td>33.0</td><td>-13.8</td></tr><tr><td>1880.00</td><td>21.62</td><td>H</td><td>4.5</td><td>9.2</td><td>26.30</td><td>33.0</td><td>-6.7</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1909.80</td><td>15.23</td><td>V</td><td>4.6</td><td>8.9</td><td>19.53</td><td>33.0</td><td>-13.5</td></tr><tr><td>1909.80</td><td>20.96</td><td>H</td><td>4.6</td><td>8.9</td><td>25.26</td><td>33.0</td><td>-7.7</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								1850.20	13.32	V	4.5	9.5	18.33	33.0	-14.7	1850.20	21.05	H	4.5	9.5	26.06	33.0	-6.9	Mid Ch								1880.00	14.57	V	4.5	9.2	19.25	33.0	-13.8	1880.00	21.62	H	4.5	9.2	26.30	33.0	-6.7	High Ch								1909.80	15.23	V	4.6	8.9	19.53	33.0	-13.5	1909.80	20.96	H	4.6	8.9	25.26	33.0	-7.7
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	1850.20	13.32	V	4.5	9.5	18.33	33.0	-14.7																																																																																		
	1850.20	21.05	H	4.5	9.5	26.06	33.0	-6.9																																																																																		
	Mid Ch																																																																																									
	1880.00	14.57	V	4.5	9.2	19.25	33.0	-13.8																																																																																		
	1880.00	21.62	H	4.5	9.2	26.30	33.0	-6.7																																																																																		
	High Ch																																																																																									
	1909.80	15.23	V	4.6	8.9	19.53	33.0	-13.5																																																																																		
1909.80	20.96	H	4.6	8.9	25.26	33.0	-7.7																																																																																			

WCDMA Band 5

WCDMA Band 5 REL99	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788372835 Date: 2018-02-25 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: Rel99 Band 5 Fundamentals Test Equipment: Receiving: VULB9163-845, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable <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>Delta (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>10.30</td><td>V</td><td>1.0</td><td>-1.5</td><td>7.88</td><td>38.5</td><td>-30.6</td></tr><tr><td>826.40</td><td>20.35</td><td>H</td><td>1.0</td><td>-1.5</td><td>17.93</td><td>38.5</td><td>-20.6</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>10.34</td><td>V</td><td>1.0</td><td>-1.4</td><td>7.96</td><td>38.5</td><td>-30.5</td></tr><tr><td>836.60</td><td>19.86</td><td>H</td><td>1.0</td><td>-1.4</td><td>17.48</td><td>38.5</td><td>-21.0</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>9.87</td><td>V</td><td>1.0</td><td>-1.4</td><td>7.52</td><td>38.5</td><td>-31.0</td></tr><tr><td>846.60</td><td>18.99</td><td>H</td><td>1.0</td><td>-1.4</td><td>16.64</td><td>38.5</td><td>-21.9</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								826.40	10.30	V	1.0	-1.5	7.88	38.5	-30.6	826.40	20.35	H	1.0	-1.5	17.93	38.5	-20.6	Mid Ch								836.60	10.34	V	1.0	-1.4	7.96	38.5	-30.5	836.60	19.86	H	1.0	-1.4	17.48	38.5	-21.0	High Ch								846.60	9.87	V	1.0	-1.4	7.52	38.5	-31.0	846.60	18.99	H	1.0	-1.4	16.64	38.5	-21.9
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
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	826.40	10.30	V	1.0	-1.5	7.88	38.5	-30.6																																																																																		
	826.40	20.35	H	1.0	-1.5	17.93	38.5	-20.6																																																																																		
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	836.60	10.34	V	1.0	-1.4	7.96	38.5	-30.5																																																																																		
	836.60	19.86	H	1.0	-1.4	17.48	38.5	-21.0																																																																																		
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846.60	18.99	H	1.0	-1.4	16.64	38.5	-21.9																																																																																			
WCDMA Band 5 HSDPA	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788372835 Date: 2018-02-25 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: HSDPA Band 5 Fundamentals Test Equipment: Receiving: VULB9163-845, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable <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>Delta (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>10.10</td><td>V</td><td>1.0</td><td>-1.5</td><td>7.68</td><td>38.5</td><td>-30.8</td></tr><tr><td>826.40</td><td>19.85</td><td>H</td><td>1.0</td><td>-1.5</td><td>17.43</td><td>38.5</td><td>-21.1</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>9.78</td><td>V</td><td>1.0</td><td>-1.4</td><td>7.40</td><td>38.5</td><td>-31.1</td></tr><tr><td>836.60</td><td>19.47</td><td>H</td><td>1.0</td><td>-1.4</td><td>17.09</td><td>38.5</td><td>-21.4</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>9.28</td><td>V</td><td>1.0</td><td>-1.4</td><td>6.93</td><td>38.5</td><td>-31.6</td></tr><tr><td>846.60</td><td>18.70</td><td>H</td><td>1.0</td><td>-1.4</td><td>16.35</td><td>38.5</td><td>-22.1</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								826.40	10.10	V	1.0	-1.5	7.68	38.5	-30.8	826.40	19.85	H	1.0	-1.5	17.43	38.5	-21.1	Mid Ch								836.60	9.78	V	1.0	-1.4	7.40	38.5	-31.1	836.60	19.47	H	1.0	-1.4	17.09	38.5	-21.4	High Ch								846.60	9.28	V	1.0	-1.4	6.93	38.5	-31.6	846.60	18.70	H	1.0	-1.4	16.35	38.5	-22.1
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
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	826.40	19.85	H	1.0	-1.5	17.43	38.5	-21.1																																																																																		
	Mid Ch																																																																																									
	836.60	9.78	V	1.0	-1.4	7.40	38.5	-31.1																																																																																		
	836.60	19.47	H	1.0	-1.4	17.09	38.5	-21.4																																																																																		
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	846.60	9.28	V	1.0	-1.4	6.93	38.5	-31.6																																																																																		
846.60	18.70	H	1.0	-1.4	16.35	38.5	-22.1																																																																																			

WCDMA Band 4

WCDMA
Band 4
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788388893
Date: 2018-03-24
Test Engineer: 51072
Configuration: EUT / X-Postition
Location: Chamber 2
Mode: Rel99 Band 4 Fundamentals

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.40	13.48	V	4.3	9.5	18.63	30.0	-11.4	
1712.40	20.04	H	4.3	9.5	25.19	30.0	-4.8	
Mid Ch								
1732.60	17.25	V	4.3	9.5	22.45	30.0	-7.6	
1732.60	19.35	H	4.3	9.5	24.54	30.0	-5.5	
High Ch								
1752.60	13.12	V	4.4	9.6	18.36	30.0	-11.6	
1752.60	18.20	H	4.4	9.6	23.44	30.0	-6.6	

WCDMA
Band 4
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788388893
Date: 2018-03-24
Test Engineer: 51072
Configuration: EUT / X-Postition
Location: Chamber 2
Mode: HSDPA Band 4 Fundamentals

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.40	12.48	V	4.3	9.5	17.63	30.0	-12.4	
1712.40	18.96	H	4.3	9.5	24.11	30.0	-5.9	
Mid Ch								
1732.60	16.15	V	4.3	9.5	21.35	30.0	-8.7	
1732.60	18.37	H	4.3	9.5	23.56	30.0	-6.4	
High Ch								
1752.60	12.05	V	4.4	9.6	17.29	30.0	-12.7	
1752.60	17.19	H	4.4	9.6	22.43	30.0	-7.6	

WCDMA Band 2

WCDMA

Band 2

REL99

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4788372835

Date:

2018-02-25

Test Engineer:

45585

Configuration:

EUT / Z-Position

Location:

Chamber 1

Mode:

Rel99 Band 2 Fundamentals

Test Equipment:

Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables

Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	9.39	V	4.5	9.5	14.38	33.0	-18.6	
1852.40	16.41	H	4.5	9.5	21.40	33.0	-11.6	
Mid Ch								
1880.00	10.72	V	4.5	9.2	15.40	33.0	-17.6	
1880.00	16.63	H	4.5	9.2	21.31	33.0	-11.7	
High Ch								
1907.60	10.09	V	4.6	8.9	14.43	33.0	-18.6	
1907.60	16.65	H	4.6	8.9	20.99	33.0	-12.0	

WCDMA

Band 2

HSDPA

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4788372835

Date:

2018-02-25

Test Engineer:

45585

Configuration:

EUT / Z-Position

Location:

Chamber 1

Mode:

HSDPA Band 2 Fundamentals

Test Equipment:

Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables

Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	8.28	V	4.5	9.5	13.27	33.0	-19.7	
1852.40	14.89	H	4.5	9.5	19.88	33.0	-13.1	
Mid Ch								
1880.00	9.69	V	4.5	9.2	14.37	33.0	-18.6	
1880.00	15.75	H	4.5	9.2	20.43	33.0	-12.6	
High Ch								
1907.60	9.46	V	4.6	8.9	13.80	33.0	-19.2	
1907.60	15.53	H	4.6	8.9	19.87	33.0	-13.1	

LTE Band 5

LTE

Band 5

10MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4788372835

Date:

2018-03-19

Test Engineer:

47989

Configuration:

EUT / X-Position

Location:

Chamber 1

Mode:

LTE_QPSK Band 5 Fundamentals, 10MHz Bandwidth

Test Equipment:

Receiving: VULB9163-845, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	12.21	V	1.0	-1.5	9.80	38.5	-28.7	
829.00	18.73	H	1.0	-1.5	16.32	38.5	-22.2	
Mid Ch								
836.50	11.17	V	1.0	-1.4	8.79	38.5	-29.7	
836.50	18.40	H	1.0	-1.4	16.02	38.5	-22.5	
High Ch								
844.00	10.75	V	1.0	-1.4	8.39	38.5	-30.1	
844.00	17.92	H	1.0	-1.4	15.57	38.5	-22.9	

LTE

Band 5

10MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4788372835

Date:

2018-03-19

Test Engineer:

47989

Configuration:

EUT / X-Position

Location:

Chamber 1

Mode:

LTE_16QAM Band 5 Fundamentals, 10MHz Bandwidth

Test Equipment:

Receiving: VULB9163-845, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	11.24	V	1.0	-1.5	8.83	38.5	-29.7	
829.00	17.91	H	1.0	-1.5	15.50	38.5	-23.0	
Mid Ch								
836.50	10.19	V	1.0	-1.4	7.81	38.5	-30.7	
836.50	17.43	H	1.0	-1.4	15.05	38.5	-23.5	
High Ch								
844.00	9.66	V	1.0	-1.4	7.30	38.5	-31.2	
844.00	16.74	H	1.0	-1.4	14.39	38.5	-24.1	

LTE Band 5 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788372835 Date: 2018-03-19 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Fundamentals, 5MHz Bandwidth Test Equipment: Receiving: VULB9163-845, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	826.50	12.27	V	1.0	-1.5	9.85	38.5	-28.6	
	826.50	18.50	H	1.0	-1.5	16.08	38.5	-22.4	
	Mid Ch								
	836.50	11.23	V	1.0	-1.4	8.85	38.5	-29.6	
	836.50	18.07	H	1.0	-1.4	15.69	38.5	-22.8	
	High Ch								
	846.50	9.34	V	1.0	-1.4	6.99	38.5	-31.5	
	846.50	17.11	H	1.0	-1.4	14.76	38.5	-23.7	
LTE Band 5 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788372835 Date: 2018-03-19 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 5MHz Bandwidth Test Equipment: Receiving: VULB9163-845, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	826.50	11.26	V	1.0	-1.5	8.84	38.5	-29.7	
	826.50	17.49	H	1.0	-1.5	15.07	38.5	-23.4	
	Mid Ch								
	836.50	9.94	V	1.0	-1.4	7.56	38.5	-30.9	
	836.50	17.15	H	1.0	-1.4	14.77	38.5	-23.7	
	High Ch								
	846.50	8.34	V	1.0	-1.4	5.99	38.5	-32.5	
	846.50	16.18	H	1.0	-1.4	13.83	38.5	-24.7	

LTE Band 5 3MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788372835 Date: 2018-03-19 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth Test Equipment: Receiving: VULB9163-845, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable <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>Delta (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>825.50</td><td>12.48</td><td>V</td><td>1.0</td><td>-1.5</td><td>10.05</td><td>38.5</td><td>-28.4</td></tr><tr><td>825.50</td><td>18.87</td><td>H</td><td>1.0</td><td>-1.5</td><td>16.45</td><td>38.5</td><td>-22.0</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>836.50</td><td>11.26</td><td>V</td><td>1.0</td><td>-1.4</td><td>8.88</td><td>38.5</td><td>-29.6</td></tr><tr><td>836.50</td><td>17.95</td><td>H</td><td>1.0</td><td>-1.4</td><td>15.57</td><td>38.5</td><td>-22.9</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>847.50</td><td>9.79</td><td>V</td><td>1.0</td><td>-1.4</td><td>7.45</td><td>38.5</td><td>-31.1</td></tr><tr><td>847.50</td><td>16.82</td><td>H</td><td>1.0</td><td>-1.4</td><td>14.48</td><td>38.5</td><td>-24.0</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								825.50	12.48	V	1.0	-1.5	10.05	38.5	-28.4	825.50	18.87	H	1.0	-1.5	16.45	38.5	-22.0	Mid Ch								836.50	11.26	V	1.0	-1.4	8.88	38.5	-29.6	836.50	17.95	H	1.0	-1.4	15.57	38.5	-22.9	High Ch								847.50	9.79	V	1.0	-1.4	7.45	38.5	-31.1	847.50	16.82	H	1.0	-1.4	14.48	38.5	-24.0
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
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	825.50	18.87	H	1.0	-1.5	16.45	38.5	-22.0																																																																																		
	Mid Ch																																																																																									
	836.50	11.26	V	1.0	-1.4	8.88	38.5	-29.6																																																																																		
	836.50	17.95	H	1.0	-1.4	15.57	38.5	-22.9																																																																																		
	High Ch																																																																																									
	847.50	9.79	V	1.0	-1.4	7.45	38.5	-31.1																																																																																		
847.50	16.82	H	1.0	-1.4	14.48	38.5	-24.0																																																																																			
LTE Band 5 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788372835 Date: 2018-03-19 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth Test Equipment: Receiving: VULB9163-845, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable <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>Delta (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>825.50</td><td>11.38</td><td>V</td><td>1.0</td><td>-1.5</td><td>8.95</td><td>38.5</td><td>-29.5</td></tr><tr><td>825.50</td><td>17.84</td><td>H</td><td>1.0</td><td>-1.5</td><td>15.42</td><td>38.5</td><td>-23.1</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>836.50</td><td>10.35</td><td>V</td><td>1.0</td><td>-1.4</td><td>7.97</td><td>38.5</td><td>-30.5</td></tr><tr><td>836.50</td><td>16.97</td><td>H</td><td>1.0</td><td>-1.4</td><td>14.59</td><td>38.5</td><td>-23.9</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>847.50</td><td>8.91</td><td>V</td><td>1.0</td><td>-1.4</td><td>6.57</td><td>38.5</td><td>-31.9</td></tr><tr><td>847.50</td><td>15.85</td><td>H</td><td>1.0</td><td>-1.4</td><td>13.51</td><td>38.5</td><td>-25.0</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								825.50	11.38	V	1.0	-1.5	8.95	38.5	-29.5	825.50	17.84	H	1.0	-1.5	15.42	38.5	-23.1	Mid Ch								836.50	10.35	V	1.0	-1.4	7.97	38.5	-30.5	836.50	16.97	H	1.0	-1.4	14.59	38.5	-23.9	High Ch								847.50	8.91	V	1.0	-1.4	6.57	38.5	-31.9	847.50	15.85	H	1.0	-1.4	13.51	38.5	-25.0
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	825.50	11.38	V	1.0	-1.5	8.95	38.5	-29.5																																																																																		
	825.50	17.84	H	1.0	-1.5	15.42	38.5	-23.1																																																																																		
	Mid Ch																																																																																									
	836.50	10.35	V	1.0	-1.4	7.97	38.5	-30.5																																																																																		
	836.50	16.97	H	1.0	-1.4	14.59	38.5	-23.9																																																																																		
	High Ch																																																																																									
	847.50	8.91	V	1.0	-1.4	6.57	38.5	-31.9																																																																																		
847.50	15.85	H	1.0	-1.4	13.51	38.5	-25.0																																																																																			

LTE Band 5 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788372835 Date: 2018-03-19 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-845, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	10.61	V	1.0	-1.5	8.19	38.5	-30.3	
	824.70	16.40	H	1.0	-1.5	13.98	38.5	-24.5	
	Mid Ch								
	836.50	8.96	V	1.0	-1.4	6.58	38.5	-31.9	
	836.50	14.83	H	1.0	-1.4	12.45	38.5	-26.1	
LTE Band 5 1.4MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788372835 Date: 2018-03-19 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-845, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	9.64	V	1.0	-1.5	7.22	38.5	-31.3	
	824.70	15.56	H	1.0	-1.5	13.14	38.5	-25.4	
	Mid Ch								
	836.50	7.98	V	1.0	-1.4	5.60	38.5	-32.9	
	836.50	13.89	H	1.0	-1.4	11.51	38.5	-27.0	
	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788372835 Date: 2018-03-19 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-845, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	9.64	V	1.0	-1.5	7.22	38.5	-31.3	
	824.70	15.56	H	1.0	-1.5	13.14	38.5	-25.4	
	Mid Ch								
	836.50	7.98	V	1.0	-1.4	5.60	38.5	-32.9	
	836.50	13.89	H	1.0	-1.4	11.51	38.5	-27.0	

LTE Band 41

LTE

Band 41

20MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788371689

2018-03-20

47989

EUT / X-Position

Chamber 2

LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables

Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2506.00	11.37	V	5.3	10.3	16.31	33.0	-16.7	
2506.00	13.06	H	5.3	10.3	17.99	33.0	-15.0	
Mid Ch								
2593.00	11.57	V	5.4	10.1	16.24	33.0	-16.8	
2593.00	14.12	H	5.4	10.1	18.79	33.0	-14.2	
High Ch								
2680.00	14.24	V	5.5	10.2	18.87	33.0	-14.1	
2680.00	16.54	H	5.5	10.2	21.17	33.0	-11.8	

LTE

Band 41

20MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788371689

2018-03-20

47989

EUT / X-Position

Chamber 2

LTE_16QAM Band 41 Fundamentals, 20MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables

Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2506.00	10.36	V	5.3	10.3	15.30	33.0	-17.7	
2506.00	12.07	H	5.3	10.3	17.00	33.0	-16.0	
Mid Ch								
2593.00	10.67	V	5.4	10.1	15.34	33.0	-17.7	
2593.00	13.22	H	5.4	10.1	17.89	33.0	-15.1	
High Ch								
2680.00	13.78	V	5.5	10.2	18.41	33.0	-14.6	
2680.00	15.61	H	5.5	10.2	20.24	33.0	-12.8	

LTE Band 41 15MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788371689 Date: 2018-03-20 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_QPSK Band 41 Fundamentals, 15MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>2503.50</td><td>10.84</td><td>V</td><td>5.3</td><td>10.3</td><td>15.80</td><td>33.0</td><td>-17.2</td></tr><tr><td>2503.50</td><td>12.25</td><td>H</td><td>5.3</td><td>10.3</td><td>17.20</td><td>33.0</td><td>-15.8</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2593.00</td><td>11.81</td><td>V</td><td>5.4</td><td>10.1</td><td>16.48</td><td>33.0</td><td>-16.5</td></tr><tr><td>2593.00</td><td>13.73</td><td>H</td><td>5.4</td><td>10.1</td><td>18.40</td><td>33.0</td><td>-14.6</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2682.50</td><td>12.44</td><td>V</td><td>5.5</td><td>10.2</td><td>17.07</td><td>33.0</td><td>-15.9</td></tr><tr><td>2682.50</td><td>16.48</td><td>H</td><td>5.5</td><td>10.2</td><td>21.11</td><td>33.0</td><td>-11.9</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								2503.50	10.84	V	5.3	10.3	15.80	33.0	-17.2	2503.50	12.25	H	5.3	10.3	17.20	33.0	-15.8	Mid Ch								2593.00	11.81	V	5.4	10.1	16.48	33.0	-16.5	2593.00	13.73	H	5.4	10.1	18.40	33.0	-14.6	High Ch								2682.50	12.44	V	5.5	10.2	17.07	33.0	-15.9	2682.50	16.48	H	5.5	10.2	21.11	33.0	-11.9
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	2503.50	10.84	V	5.3	10.3	15.80	33.0	-17.2																																																																																		
	2503.50	12.25	H	5.3	10.3	17.20	33.0	-15.8																																																																																		
	Mid Ch																																																																																									
	2593.00	11.81	V	5.4	10.1	16.48	33.0	-16.5																																																																																		
	2593.00	13.73	H	5.4	10.1	18.40	33.0	-14.6																																																																																		
	High Ch																																																																																									
	2682.50	12.44	V	5.5	10.2	17.07	33.0	-15.9																																																																																		
2682.50	16.48	H	5.5	10.2	21.11	33.0	-11.9																																																																																			
LTE Band 41 15MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788371689 Date: 2018-03-20 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_16QAM Band 41 Fundamentals, 15MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>2503.50</td><td>9.93</td><td>V</td><td>5.3</td><td>10.3</td><td>14.89</td><td>33.0</td><td>-18.1</td></tr><tr><td>2503.50</td><td>11.51</td><td>H</td><td>5.3</td><td>10.3</td><td>16.46</td><td>33.0</td><td>-16.5</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2593.00</td><td>10.72</td><td>V</td><td>5.4</td><td>10.1</td><td>15.39</td><td>33.0</td><td>-17.6</td></tr><tr><td>2593.00</td><td>12.78</td><td>H</td><td>5.4</td><td>10.1</td><td>17.45</td><td>33.0</td><td>-15.6</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2682.50</td><td>13.17</td><td>V</td><td>5.5</td><td>10.2</td><td>17.80</td><td>33.0</td><td>-15.2</td></tr><tr><td>2682.50</td><td>16.03</td><td>H</td><td>5.5</td><td>10.2</td><td>20.66</td><td>33.0</td><td>-12.3</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								2503.50	9.93	V	5.3	10.3	14.89	33.0	-18.1	2503.50	11.51	H	5.3	10.3	16.46	33.0	-16.5	Mid Ch								2593.00	10.72	V	5.4	10.1	15.39	33.0	-17.6	2593.00	12.78	H	5.4	10.1	17.45	33.0	-15.6	High Ch								2682.50	13.17	V	5.5	10.2	17.80	33.0	-15.2	2682.50	16.03	H	5.5	10.2	20.66	33.0	-12.3
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	2503.50	9.93	V	5.3	10.3	14.89	33.0	-18.1																																																																																		
	2503.50	11.51	H	5.3	10.3	16.46	33.0	-16.5																																																																																		
	Mid Ch																																																																																									
	2593.00	10.72	V	5.4	10.1	15.39	33.0	-17.6																																																																																		
	2593.00	12.78	H	5.4	10.1	17.45	33.0	-15.6																																																																																		
	High Ch																																																																																									
	2682.50	13.17	V	5.5	10.2	17.80	33.0	-15.2																																																																																		
2682.50	16.03	H	5.5	10.2	20.66	33.0	-12.3																																																																																			

LTE Band 41 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788371689 Date: 2018-03-20 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_QPSK Band 41 Fundamentals, 10MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>2501.00</td><td>11.16</td><td>V</td><td>5.3</td><td>10.3</td><td>16.12</td><td>33.0</td><td>-16.9</td></tr><tr><td>2501.00</td><td>13.00</td><td>H</td><td>5.3</td><td>10.3</td><td>17.97</td><td>33.0</td><td>-15.0</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2593.00</td><td>10.70</td><td>V</td><td>5.4</td><td>10.1</td><td>15.37</td><td>33.0</td><td>-17.6</td></tr><tr><td>2593.00</td><td>11.84</td><td>H</td><td>5.4</td><td>10.1</td><td>16.51</td><td>33.0</td><td>-16.5</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2685.00</td><td>13.38</td><td>V</td><td>5.5</td><td>10.2</td><td>18.01</td><td>33.0</td><td>-15.0</td></tr><tr><td>2685.00</td><td>15.48</td><td>H</td><td>5.5</td><td>10.2</td><td>20.11</td><td>33.0</td><td>-12.9</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								2501.00	11.16	V	5.3	10.3	16.12	33.0	-16.9	2501.00	13.00	H	5.3	10.3	17.97	33.0	-15.0	Mid Ch								2593.00	10.70	V	5.4	10.1	15.37	33.0	-17.6	2593.00	11.84	H	5.4	10.1	16.51	33.0	-16.5	High Ch								2685.00	13.38	V	5.5	10.2	18.01	33.0	-15.0	2685.00	15.48	H	5.5	10.2	20.11	33.0	-12.9
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	2501.00	11.16	V	5.3	10.3	16.12	33.0	-16.9																																																																																		
	2501.00	13.00	H	5.3	10.3	17.97	33.0	-15.0																																																																																		
	Mid Ch																																																																																									
	2593.00	10.70	V	5.4	10.1	15.37	33.0	-17.6																																																																																		
	2593.00	11.84	H	5.4	10.1	16.51	33.0	-16.5																																																																																		
	High Ch																																																																																									
	2685.00	13.38	V	5.5	10.2	18.01	33.0	-15.0																																																																																		
2685.00	15.48	H	5.5	10.2	20.11	33.0	-12.9																																																																																			
LTE Band 41 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788371689 Date: 2018-03-20 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_16QAM Band 41 Fundamentals, 10MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>2501.00</td><td>10.22</td><td>V</td><td>5.3</td><td>10.3</td><td>15.18</td><td>33.0</td><td>-17.8</td></tr><tr><td>2501.00</td><td>12.03</td><td>H</td><td>5.3</td><td>10.3</td><td>17.00</td><td>33.0</td><td>-16.0</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2593.00</td><td>9.92</td><td>V</td><td>5.4</td><td>10.1</td><td>14.59</td><td>33.0</td><td>-18.4</td></tr><tr><td>2593.00</td><td>11.00</td><td>H</td><td>5.4</td><td>10.1</td><td>15.67</td><td>33.0</td><td>-17.3</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2685.00</td><td>12.35</td><td>V</td><td>5.5</td><td>10.2</td><td>16.98</td><td>33.0</td><td>-16.0</td></tr><tr><td>2685.00</td><td>14.22</td><td>H</td><td>5.5</td><td>10.2</td><td>18.85</td><td>33.0</td><td>-14.2</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								2501.00	10.22	V	5.3	10.3	15.18	33.0	-17.8	2501.00	12.03	H	5.3	10.3	17.00	33.0	-16.0	Mid Ch								2593.00	9.92	V	5.4	10.1	14.59	33.0	-18.4	2593.00	11.00	H	5.4	10.1	15.67	33.0	-17.3	High Ch								2685.00	12.35	V	5.5	10.2	16.98	33.0	-16.0	2685.00	14.22	H	5.5	10.2	18.85	33.0	-14.2
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	2501.00	10.22	V	5.3	10.3	15.18	33.0	-17.8																																																																																		
	2501.00	12.03	H	5.3	10.3	17.00	33.0	-16.0																																																																																		
	Mid Ch																																																																																									
	2593.00	9.92	V	5.4	10.1	14.59	33.0	-18.4																																																																																		
	2593.00	11.00	H	5.4	10.1	15.67	33.0	-17.3																																																																																		
	High Ch																																																																																									
	2685.00	12.35	V	5.5	10.2	16.98	33.0	-16.0																																																																																		
2685.00	14.22	H	5.5	10.2	18.85	33.0	-14.2																																																																																			

LTE
Band 41
5MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788371689
Date: 2018-03-20
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 41 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	10.89	V	5.3	10.3	15.89	33.0	-17.1	
2498.50	12.84	H	5.3	10.3	17.84	33.0	-15.2	
Mid Ch								
2593.00	11.21	V	5.4	10.1	15.88	33.0	-17.1	
2593.00	14.12	H	5.4	10.1	18.79	33.0	-14.2	
High Ch								
2687.50	13.90	V	5.5	10.2	18.52	33.0	-14.5	
2687.50	15.66	H	5.5	10.2	20.28	33.0	-12.7	

LTE
Band 41
5MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788371689
Date: 2018-03-20
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 41 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	9.21	V	5.3	10.3	14.21	33.0	-18.8	
2498.50	12.23	H	5.3	10.3	17.23	33.0	-15.8	
Mid Ch								
2593.00	10.15	V	5.4	10.1	14.82	33.0	-18.2	
2593.00	13.00	H	5.4	10.1	17.67	33.0	-15.3	
High Ch								
2687.50	13.14	V	5.5	10.2	17.76	33.0	-15.2	
2687.50	14.67	H	5.5	10.2	19.29	33.0	-13.7	

LTE Band 66

LTE Band 66 20MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788371689 Date: 2018-03-25 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_QPSK Band 66 Fundamentals, 20MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	1720.00	12.16	V	4.3	9.5	17.33	30.0	-12.7	
	1720.00	17.79	H	4.3	9.5	22.96	30.0	-7.0	
	Mid Ch								
	1745.00	12.46	V	4.4	9.6	17.68	30.0	-12.3	
	1745.00	17.64	H	4.4	9.6	22.86	30.0	-7.1	
	High Ch								
	1770.00	12.93	V	4.4	9.6	18.16	30.0	-11.8	
	1770.00	16.36	H	4.4	9.6	21.59	30.0	-8.4	
LTE Band 66 20MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788371689 Date: 2018-03-25 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_16QAM Band 66 Fundamentals, 20MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	1720.00	11.24	V	4.3	9.5	16.41	30.0	-13.6	
	1720.00	16.79	H	4.3	9.5	21.96	30.0	-8.0	
	Mid Ch								
	1745.00	11.43	V	4.4	9.6	16.65	30.0	-13.4	
	1745.00	16.93	H	4.4	9.6	22.15	30.0	-7.9	
	High Ch								
	1770.00	11.96	V	4.4	9.6	17.19	30.0	-12.8	
	1770.00	15.36	H	4.4	9.6	20.59	30.0	-9.4	

LTE
Band 66
15MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788371689
Date: 2018-03-25
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 15MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	12.13	V	4.3	9.5	17.30	30.0	-12.7	
1717.50	18.07	H	4.3	9.5	23.23	30.0	-6.8	
Mid Ch								
1745.00	12.40	V	4.4	9.6	17.62	30.0	-12.4	
1745.00	16.91	H	4.4	9.6	22.13	30.0	-7.9	
High Ch								
1772.50	13.43	V	4.4	9.6	18.67	30.0	-11.3	
1772.50	16.89	H	4.4	9.6	22.13	30.0	-7.9	

LTE
Band 66
15MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788371689
Date: 2018-03-25
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 15MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	11.15	V	4.3	9.5	16.32	30.0	-13.7	
1717.50	17.13	H	4.3	9.5	22.29	30.0	-7.7	
Mid Ch								
1745.00	11.51	V	4.4	9.6	16.73	30.0	-13.3	
1745.00	16.15	H	4.4	9.6	21.37	30.0	-8.6	
High Ch								
1772.50	12.43	V	4.4	9.6	17.67	30.0	-12.3	
1772.50	15.95	H	4.4	9.6	21.19	30.0	-8.8	

LTE Band 66 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsnug Project #: 4788371689 Date: 2018-03-25 Test Engineer: 51072 Configuration: EUT / X-Postion Location: Chamber 2 Mode: LTE_QPSK Band 66 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	1715.00	11.39	V	4.3	9.5	16.55	30.0	-13.4	
	1715.00	17.05	H	4.3	9.5	22.21	30.0	-7.8	
	Mid Ch								
	1745.00	12.85	V	4.4	9.6	18.07	30.0	-11.9	
LTE Band 66 10MHz 16QAM	1745.00	17.43	H	4.4	9.6	22.65	30.0	-7.4	
	High Ch								
	1775.00	13.51	V	4.4	9.6	18.75	30.0	-11.2	
	1775.00	16.21	H	4.4	9.6	21.45	30.0	-8.6	
LTE Band 66 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsnug Project #: 4788371689 Date: 2018-03-25 Test Engineer: 51072 Configuration: EUT / X-Postion Location: Chamber 2 Mode: LTE_16QAM Band 66 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	1715.00	10.41	V	4.3	9.5	15.57	30.0	-14.4	
	1715.00	16.06	H	4.3	9.5	21.22	30.0	-8.8	
	Mid Ch								
	1745.00	11.86	V	4.4	9.6	17.08	30.0	-12.9	
	1745.00	16.39	H	4.4	9.6	21.61	30.0	-8.4	
LTE Band 66 10MHz 16QAM	High Ch								
	1775.00	12.37	V	4.4	9.6	17.61	30.0	-12.4	
	1775.00	15.33	H	4.4	9.6	20.57	30.0	-9.4	

LTE Band 66 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788371689 Date: 2018-03-24 Test Engineer: 51072 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_QPSK Band 66 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1712.50	11.61	V	4.3	9.5	16.77	30.0	-13.2	
	1712.50	18.08	H	4.3	9.5	23.23	30.0	-6.8	
	Mid Ch								
	1745.00	11.44	V	4.4	9.6	16.66	30.0	-13.3	
	1745.00	18.57	H	4.4	9.6	23.79	30.0	-6.2	
LTE Band 66 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788371689 Date: 2018-03-24 Test Engineer: 51072 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_16QAM Band 66 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1712.50	10.55	V	4.3	9.5	15.71	30.0	-14.3	
	1712.50	17.05	H	4.3	9.5	22.20	30.0	-7.8	
	Mid Ch								
	1745.00	10.50	V	4.4	9.6	15.72	30.0	-14.3	
	1745.00	17.53	H	4.4	9.6	22.75	30.0	-7.3	
	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788371689 Date: 2018-03-24 Test Engineer: 51072 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_16QAM Band 66 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1712.50	10.55	V	4.3	9.5	15.71	30.0	-14.3	
	1712.50	17.05	H	4.3	9.5	22.20	30.0	-7.8	
	Mid Ch								
	1745.00	10.50	V	4.4	9.6	15.72	30.0	-14.3	
	1745.00	17.53	H	4.4	9.6	22.75	30.0	-7.3	

LTE
Band 66
3MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsnug
Project #: 4788371689
Date: 2018-03-23
Test Engineer: 51072
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 3MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	11.37	V	4.3	9.5	16.52	30.0	-13.5	
1711.50	18.21	H	4.3	9.5	23.36	30.0	-6.6	
Mid Ch								
1745.00	11.55	V	4.4	9.6	16.77	30.0	-13.2	
1745.00	18.53	H	4.4	9.6	23.75	30.0	-6.3	
High Ch								
1778.50	11.78	V	4.4	9.6	17.02	30.0	-13.0	
1778.50	16.15	H	4.4	9.6	21.38	30.0	-8.6	

LTE
Band 66
3MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsnug
Project #: 4788371689
Date: 2018-03-23
Test Engineer: 51072
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 3MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	10.34	V	4.3	9.5	15.49	30.0	-14.5	
1711.50	17.23	H	4.3	9.5	22.38	30.0	-7.6	
Mid Ch								
1745.00	10.53	V	4.4	9.6	15.75	30.0	-14.3	
1745.00	17.52	H	4.4	9.6	22.74	30.0	-7.3	
High Ch								
1778.50	10.25	V	4.4	9.6	15.49	30.0	-14.5	
1778.50	15.13	H	4.4	9.6	20.36	30.0	-9.6	

LTE Band 66 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788371689 Date: 2018-03-23 Test Engineer: 51072 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_QPSK Band 66 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	1710.70	9.05	V	4.3	9.5	14.19	30.0	-15.8	
	1710.70	14.44	H	4.3	9.5	19.58	30.0	-10.4	
	Mid Ch								
	1745.00	9.97	V	4.4	9.6	15.20	30.0	-14.8	
LTE Band 66 1.4MHz 16QAM	1745.00	16.09	H	4.4	9.6	21.31	30.0	-8.7	
	High Ch								
	1779.30	9.55	V	4.4	9.6	14.79	30.0	-15.2	
	1779.30	14.01	H	4.4	9.6	19.25	30.0	-10.7	
LTE Band 66 1.4MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788371689 Date: 2018-03-23 Test Engineer: 51072 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_16QAM Band 66 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	1710.70	8.09	V	4.3	9.5	13.23	30.0	-16.8	
	1710.70	13.48	H	4.3	9.5	18.62	30.0	-11.4	
	Mid Ch								
	1745.00	8.91	V	4.4	9.6	14.14	30.0	-15.9	
	1745.00	15.00	H	4.4	9.6	20.22	30.0	-9.8	
LTE Band 66 1.4MHz 16QAM	High Ch								
	1779.30	8.58	V	4.4	9.6	13.82	30.0	-16.2	
	1779.30	13.04	H	4.4	9.6	18.28	30.0	-11.7	

LTE Band 2

LTE Band 2 20MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788371689 Date: 2018-03-20 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 2 Fundamentals, 20MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>1860.00</td><td>12.24</td><td>V</td><td>4.5</td><td>9.4</td><td>17.14</td><td>33.0</td><td>-15.9</td></tr><tr><td>1860.00</td><td>14.58</td><td>H</td><td>4.5</td><td>9.4</td><td>19.48</td><td>33.0</td><td>-13.5</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1880.00</td><td>13.81</td><td>V</td><td>4.5</td><td>9.2</td><td>18.49</td><td>33.0</td><td>-14.5</td></tr><tr><td>1880.00</td><td>14.79</td><td>H</td><td>4.5</td><td>9.2</td><td>19.47</td><td>33.0</td><td>-13.5</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1900.00</td><td>12.94</td><td>V</td><td>4.6</td><td>9.0</td><td>17.40</td><td>33.0</td><td>-15.6</td></tr><tr><td>1900.00</td><td>15.09</td><td>H</td><td>4.6</td><td>9.0</td><td>19.55</td><td>33.0</td><td>-13.5</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								1860.00	12.24	V	4.5	9.4	17.14	33.0	-15.9	1860.00	14.58	H	4.5	9.4	19.48	33.0	-13.5	Mid Ch								1880.00	13.81	V	4.5	9.2	18.49	33.0	-14.5	1880.00	14.79	H	4.5	9.2	19.47	33.0	-13.5	High Ch								1900.00	12.94	V	4.6	9.0	17.40	33.0	-15.6	1900.00	15.09	H	4.6	9.0	19.55	33.0	-13.5
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	1860.00	12.24	V	4.5	9.4	17.14	33.0	-15.9																																																																																		
	1860.00	14.58	H	4.5	9.4	19.48	33.0	-13.5																																																																																		
	Mid Ch																																																																																									
	1880.00	13.81	V	4.5	9.2	18.49	33.0	-14.5																																																																																		
	1880.00	14.79	H	4.5	9.2	19.47	33.0	-13.5																																																																																		
	High Ch																																																																																									
	1900.00	12.94	V	4.6	9.0	17.40	33.0	-15.6																																																																																		
1900.00	15.09	H	4.6	9.0	19.55	33.0	-13.5																																																																																			
LTE Band 2 20MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788371689 Date: 2018-03-20 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 2 Fundamentals, 20MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>1860.00</td><td>11.29</td><td>V</td><td>4.5</td><td>9.4</td><td>16.19</td><td>33.0</td><td>-16.8</td></tr><tr><td>1860.00</td><td>13.59</td><td>H</td><td>4.5</td><td>9.4</td><td>18.49</td><td>33.0</td><td>-14.5</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1880.00</td><td>13.00</td><td>V</td><td>4.5</td><td>9.2</td><td>17.68</td><td>33.0</td><td>-15.3</td></tr><tr><td>1880.00</td><td>13.72</td><td>H</td><td>4.5</td><td>9.2</td><td>18.40</td><td>33.0</td><td>-14.6</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1900.00</td><td>11.92</td><td>V</td><td>4.6</td><td>9.0</td><td>16.38</td><td>33.0</td><td>-16.6</td></tr><tr><td>1900.00</td><td>14.08</td><td>H</td><td>4.6</td><td>9.0</td><td>18.54</td><td>33.0</td><td>-14.5</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								1860.00	11.29	V	4.5	9.4	16.19	33.0	-16.8	1860.00	13.59	H	4.5	9.4	18.49	33.0	-14.5	Mid Ch								1880.00	13.00	V	4.5	9.2	17.68	33.0	-15.3	1880.00	13.72	H	4.5	9.2	18.40	33.0	-14.6	High Ch								1900.00	11.92	V	4.6	9.0	16.38	33.0	-16.6	1900.00	14.08	H	4.6	9.0	18.54	33.0	-14.5
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	1860.00	11.29	V	4.5	9.4	16.19	33.0	-16.8																																																																																		
	1860.00	13.59	H	4.5	9.4	18.49	33.0	-14.5																																																																																		
	Mid Ch																																																																																									
	1880.00	13.00	V	4.5	9.2	17.68	33.0	-15.3																																																																																		
	1880.00	13.72	H	4.5	9.2	18.40	33.0	-14.6																																																																																		
	High Ch																																																																																									
	1900.00	11.92	V	4.6	9.0	16.38	33.0	-16.6																																																																																		
1900.00	14.08	H	4.6	9.0	18.54	33.0	-14.5																																																																																			

LTE Band 2 15MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788371689 Date: 2018-03-17 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 2 Fundamentals, 15MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>1857.50</td><td>12.01</td><td>V</td><td>4.5</td><td>9.4</td><td>16.94</td><td>33.0</td><td>-16.1</td></tr><tr><td>1857.50</td><td>13.42</td><td>H</td><td>4.5</td><td>9.4</td><td>18.35</td><td>33.0</td><td>-14.7</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1880.00</td><td>12.26</td><td>V</td><td>4.5</td><td>9.2</td><td>16.94</td><td>33.0</td><td>-16.1</td></tr><tr><td>1880.00</td><td>15.12</td><td>H</td><td>4.5</td><td>9.2</td><td>19.80</td><td>33.0</td><td>-13.2</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1902.50</td><td>12.65</td><td>V</td><td>4.6</td><td>9.0</td><td>17.07</td><td>33.0</td><td>-15.9</td></tr><tr><td>1902.50</td><td>14.46</td><td>H</td><td>4.6</td><td>9.0</td><td>18.88</td><td>33.0</td><td>-14.1</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								1857.50	12.01	V	4.5	9.4	16.94	33.0	-16.1	1857.50	13.42	H	4.5	9.4	18.35	33.0	-14.7	Mid Ch								1880.00	12.26	V	4.5	9.2	16.94	33.0	-16.1	1880.00	15.12	H	4.5	9.2	19.80	33.0	-13.2	High Ch								1902.50	12.65	V	4.6	9.0	17.07	33.0	-15.9	1902.50	14.46	H	4.6	9.0	18.88	33.0	-14.1
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	1857.50	12.01	V	4.5	9.4	16.94	33.0	-16.1																																																																																		
	1857.50	13.42	H	4.5	9.4	18.35	33.0	-14.7																																																																																		
	Mid Ch																																																																																									
	1880.00	12.26	V	4.5	9.2	16.94	33.0	-16.1																																																																																		
	1880.00	15.12	H	4.5	9.2	19.80	33.0	-13.2																																																																																		
	High Ch																																																																																									
	1902.50	12.65	V	4.6	9.0	17.07	33.0	-15.9																																																																																		
1902.50	14.46	H	4.6	9.0	18.88	33.0	-14.1																																																																																			
LTE Band 2 15MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788371689 Date: 2018-03-17 Test Engineer: 45585 Configuration: EUT / Z- Position Location: Chamber 2 Mode: LTE_16QAM Band 2 Fundamentals, 15MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <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 (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (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>1857.50</td><td>11.06</td><td>V</td><td>4.5</td><td>9.4</td><td>15.99</td><td>33.0</td><td>-17.0</td></tr><tr><td>1857.50</td><td>12.54</td><td>H</td><td>4.5</td><td>9.4</td><td>17.47</td><td>33.0</td><td>-15.5</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1880.00</td><td>11.36</td><td>V</td><td>4.5</td><td>9.2</td><td>16.04</td><td>33.0</td><td>-17.0</td></tr><tr><td>1880.00</td><td>14.14</td><td>H</td><td>4.5</td><td>9.2</td><td>18.82</td><td>33.0</td><td>-14.2</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1902.50</td><td>11.65</td><td>V</td><td>4.6</td><td>9.0</td><td>16.07</td><td>33.0</td><td>-16.9</td></tr><tr><td>1902.50</td><td>13.46</td><td>H</td><td>4.6</td><td>9.0</td><td>17.88</td><td>33.0</td><td>-15.1</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								1857.50	11.06	V	4.5	9.4	15.99	33.0	-17.0	1857.50	12.54	H	4.5	9.4	17.47	33.0	-15.5	Mid Ch								1880.00	11.36	V	4.5	9.2	16.04	33.0	-17.0	1880.00	14.14	H	4.5	9.2	18.82	33.0	-14.2	High Ch								1902.50	11.65	V	4.6	9.0	16.07	33.0	-16.9	1902.50	13.46	H	4.6	9.0	17.88	33.0	-15.1
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
	Low Ch																																																																																									
	1857.50	11.06	V	4.5	9.4	15.99	33.0	-17.0																																																																																		
	1857.50	12.54	H	4.5	9.4	17.47	33.0	-15.5																																																																																		
	Mid Ch																																																																																									
	1880.00	11.36	V	4.5	9.2	16.04	33.0	-17.0																																																																																		
	1880.00	14.14	H	4.5	9.2	18.82	33.0	-14.2																																																																																		
	High Ch																																																																																									
	1902.50	11.65	V	4.6	9.0	16.07	33.0	-16.9																																																																																		
1902.50	13.46	H	4.6	9.0	17.88	33.0	-15.1																																																																																			

LTE

Band 2

10MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4788371689

Date:

2018-03-17

Test Engineer:

45585

Configuration:

EUT / Z-Position

Location:

Chamber 2

Mode:

LTE_QPSK Band 2 Fundamentals, 10MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables

Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	11.57	V	4.5	9.5	16.53	33.0	-16.5	
1855.00	15.25	H	4.5	9.5	20.20	33.0	-12.8	
Mid Ch								
1880.00	13.76	V	4.5	9.2	18.44	33.0	-14.6	
1880.00	15.03	H	4.5	9.2	19.71	33.0	-13.3	
High Ch								
1905.00	12.73	V	4.6	8.9	17.11	33.0	-15.9	
1905.00	14.88	H	4.6	8.9	19.26	33.0	-13.7	

LTE

Band 2

10MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4788371689

Date:

2018-03-17

Test Engineer:

45585

Configuration:

EUT / Z- Position

Location:

Chamber 2

Mode:

LTE_16QAM Band 2 Fundamentals, 10MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables

Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	10.54	V	4.5	9.5	15.50	33.0	-17.5	
1855.00	14.21	H	4.5	9.5	19.16	33.0	-13.8	
Mid Ch								
1880.00	12.64	V	4.5	9.2	17.32	33.0	-15.7	
1880.00	13.99	H	4.5	9.2	18.67	33.0	-14.3	
High Ch								
1905.00	11.67	V	4.6	8.9	16.05	33.0	-16.9	
1905.00	13.83	H	4.6	8.9	18.21	33.0	-14.8	