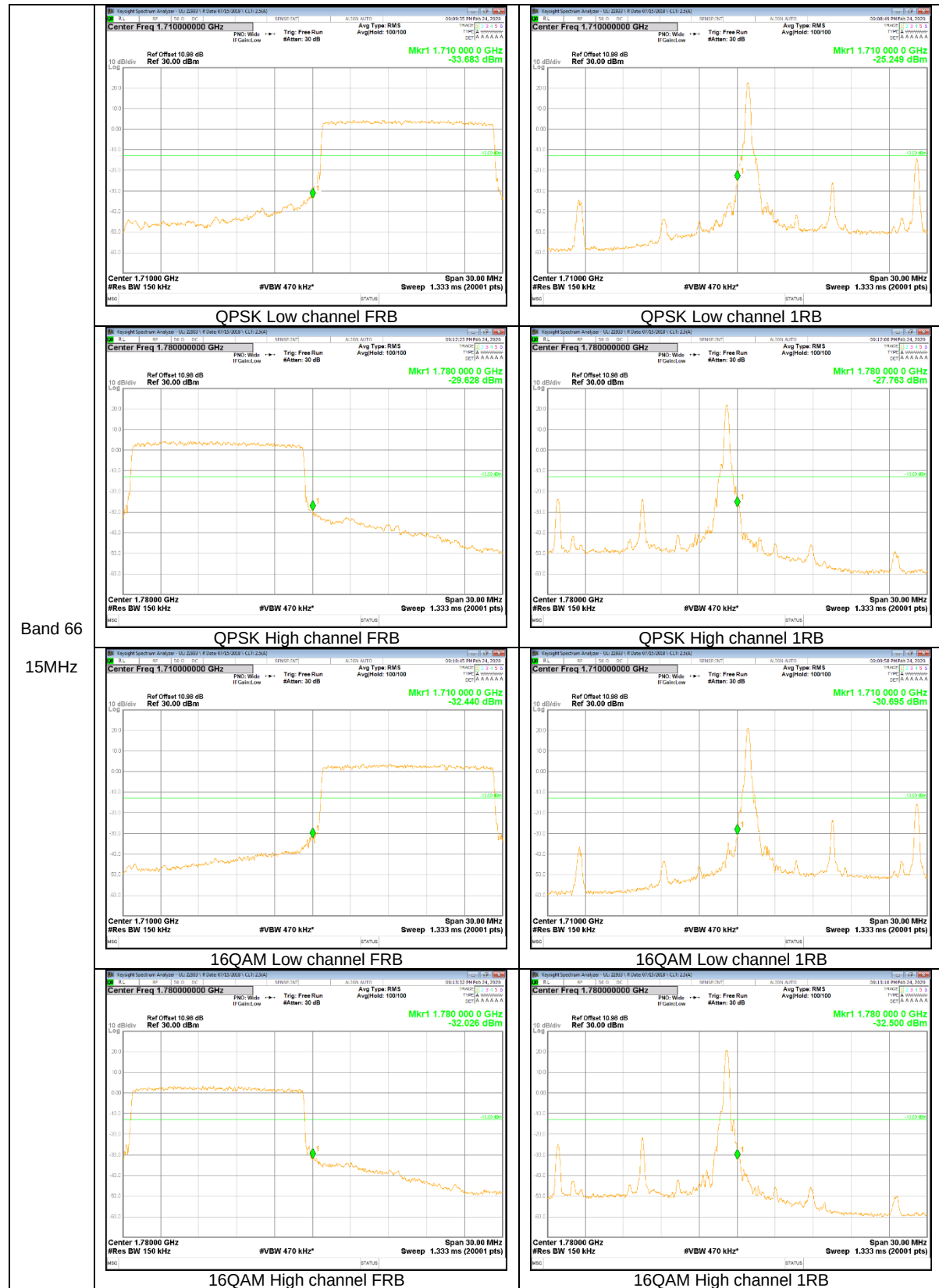
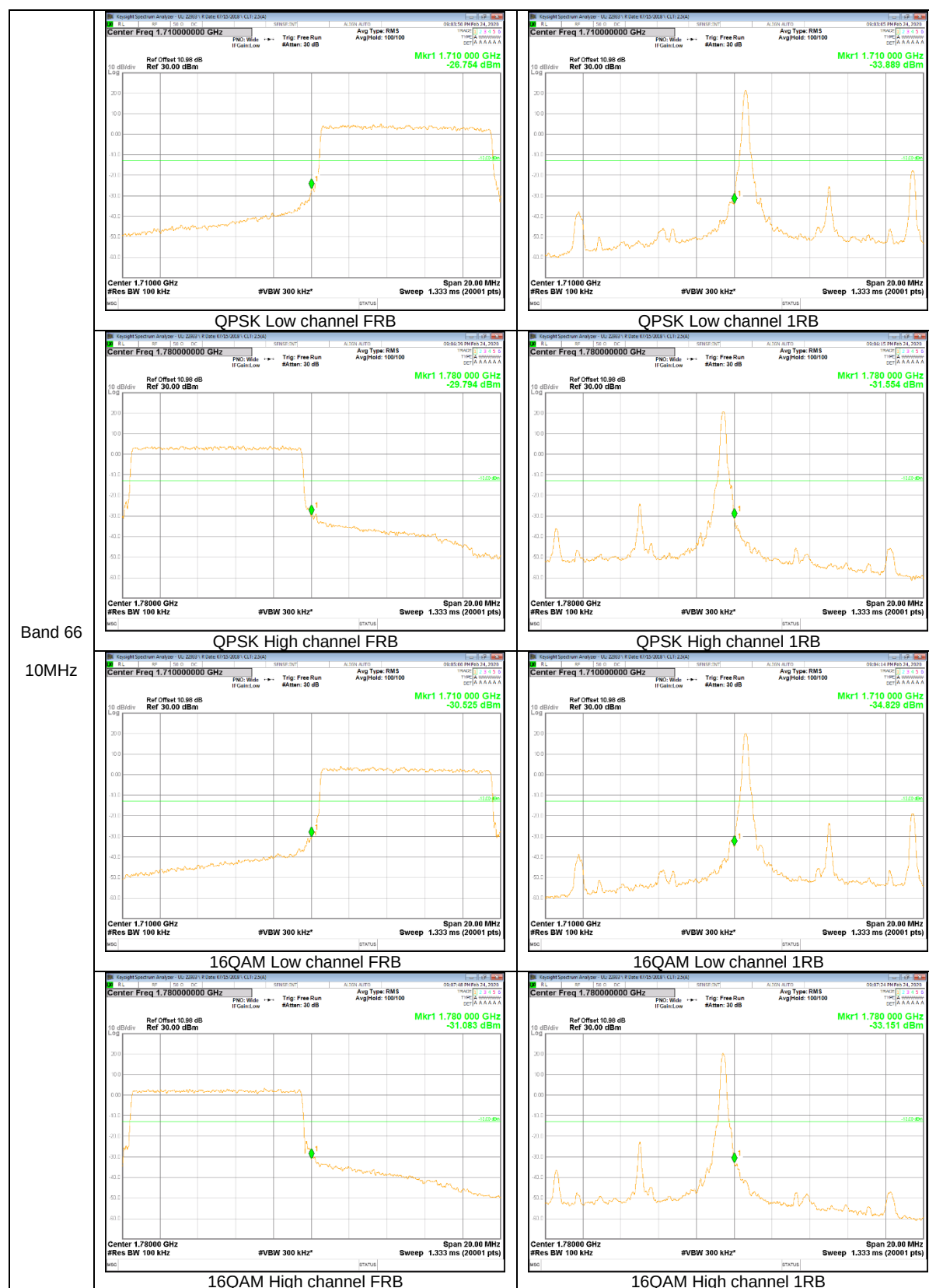
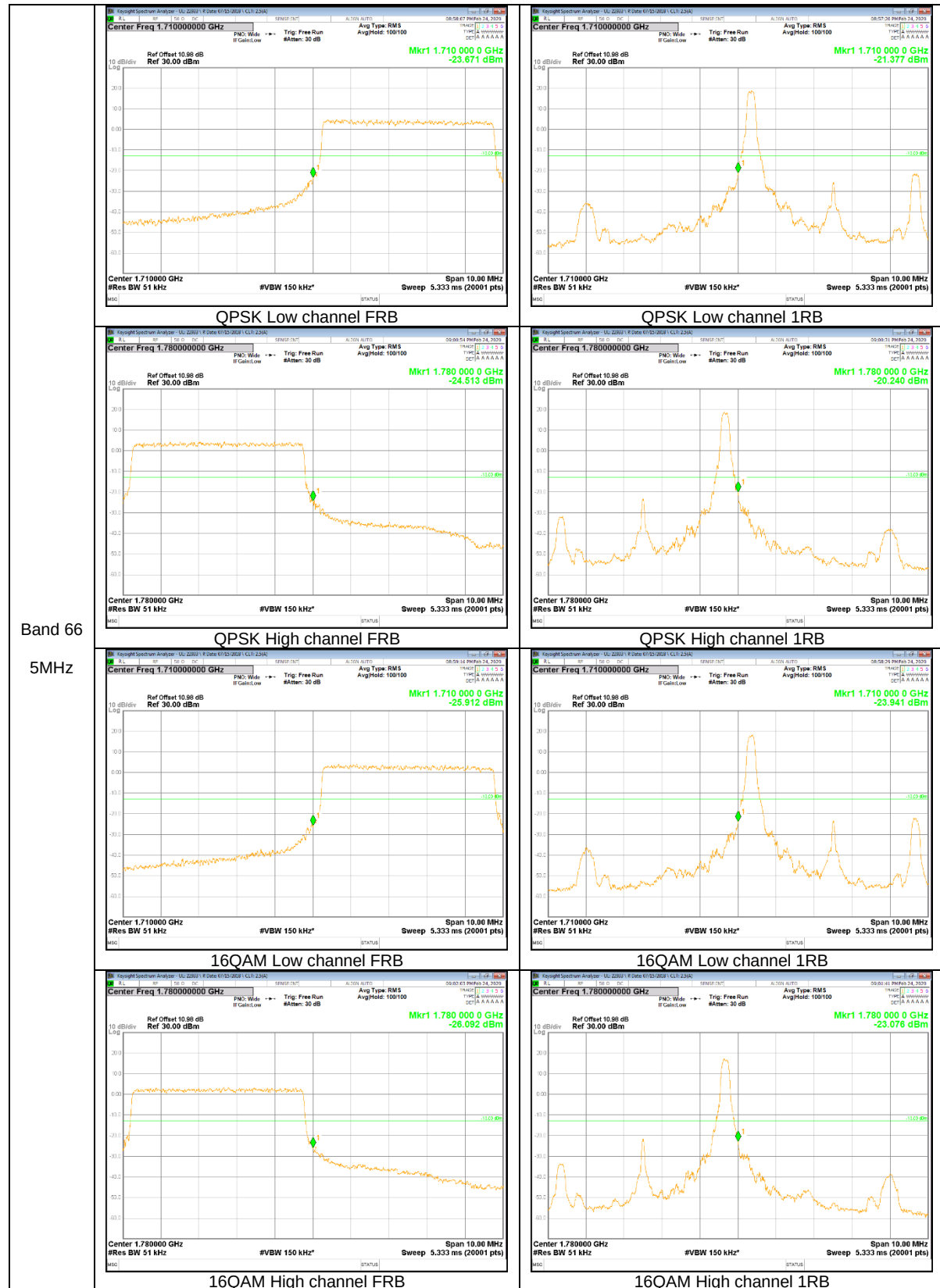
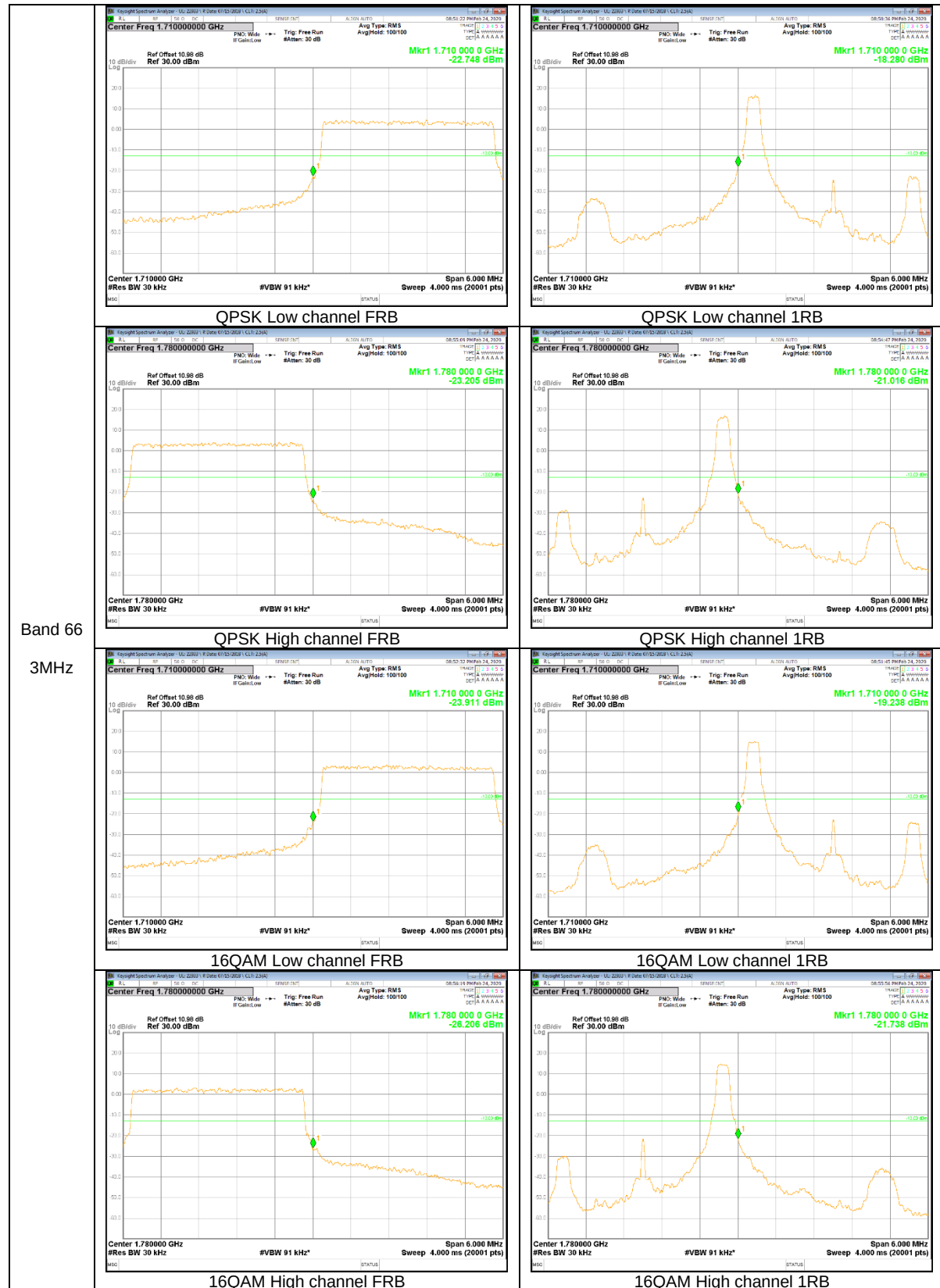
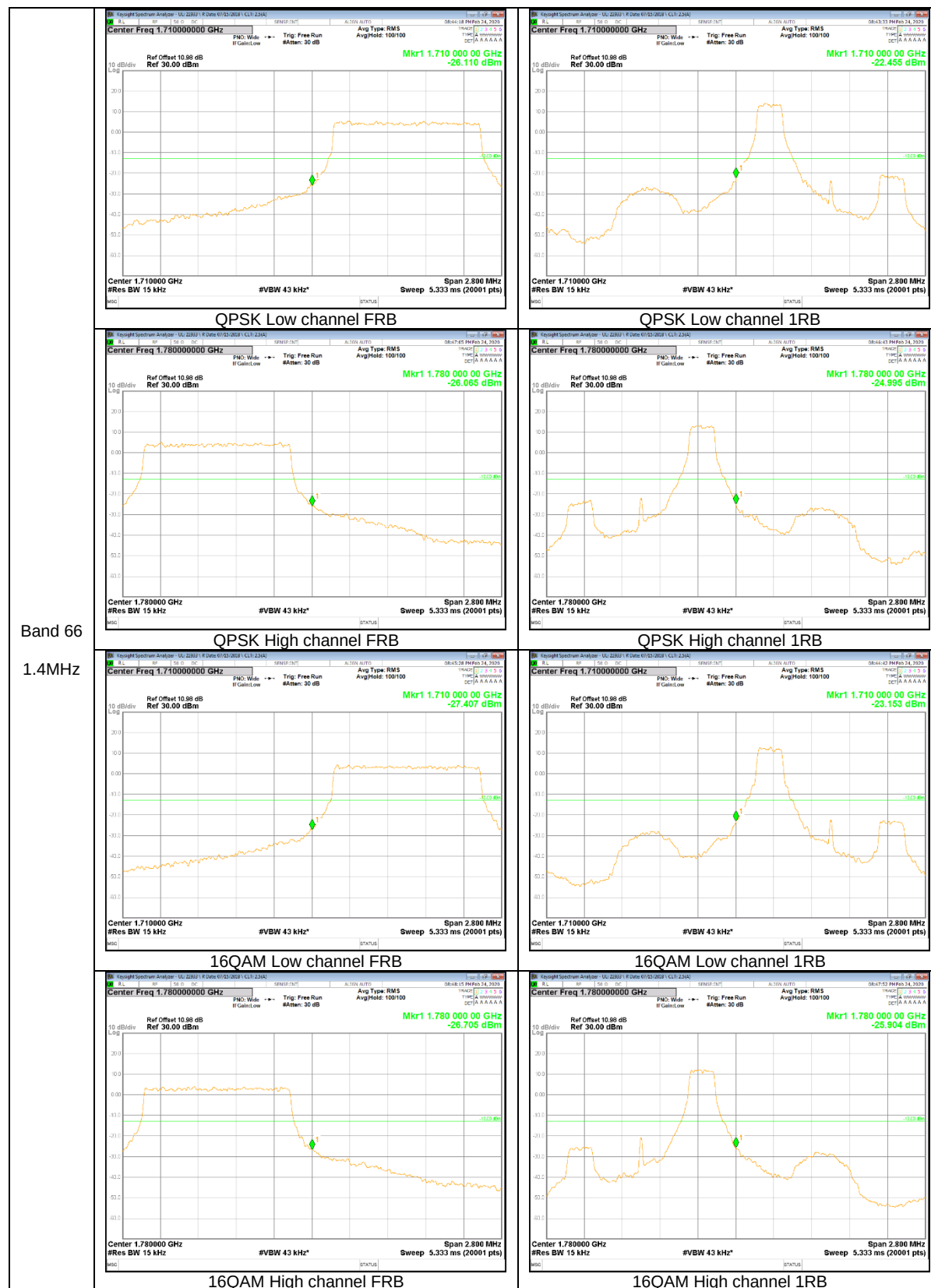












LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

9.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238 and §27. 53

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

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

- a) Set the RBW = 100KHz for emission below 1GHz and 1MHz for emissions above 1GHz
(Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points = Max (40001);
- g) Trace mode = average(WCDMA, LTE), Maxhold(GSM, LTE Band41);

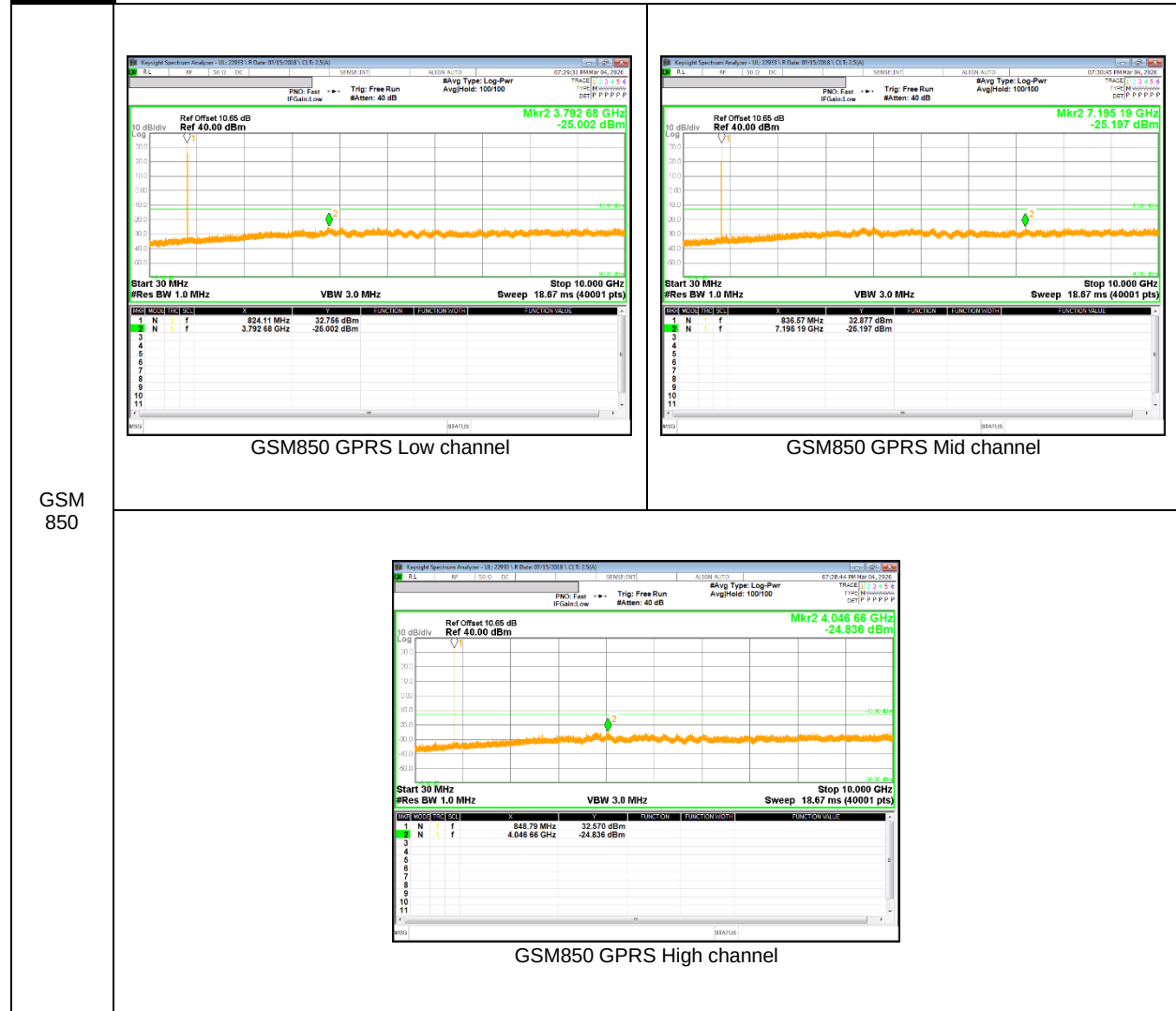
RESULTS

See the following pages.

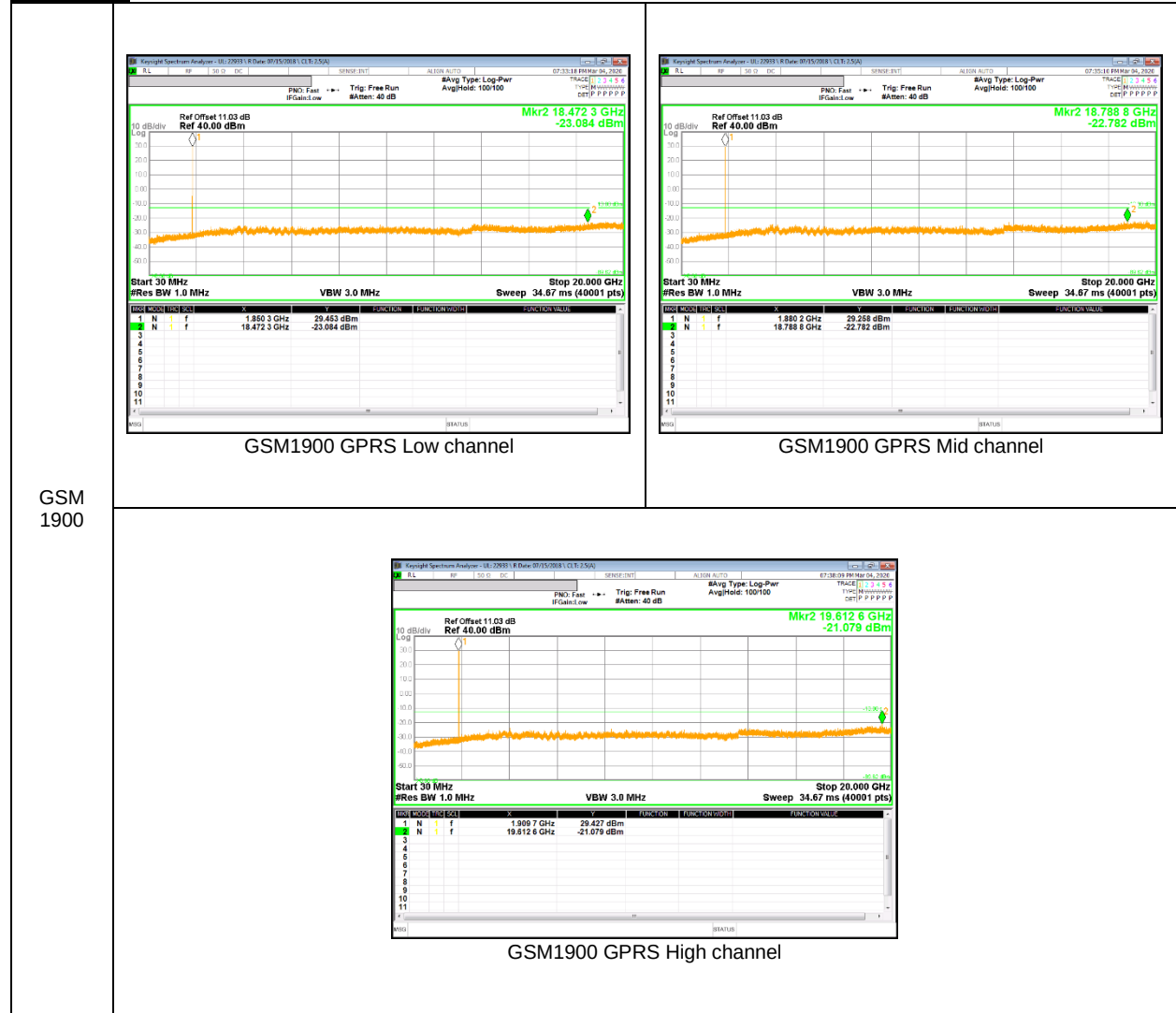
NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

9.3.1. OUT OF BAND EMISSIONS RESULT

GSM 850



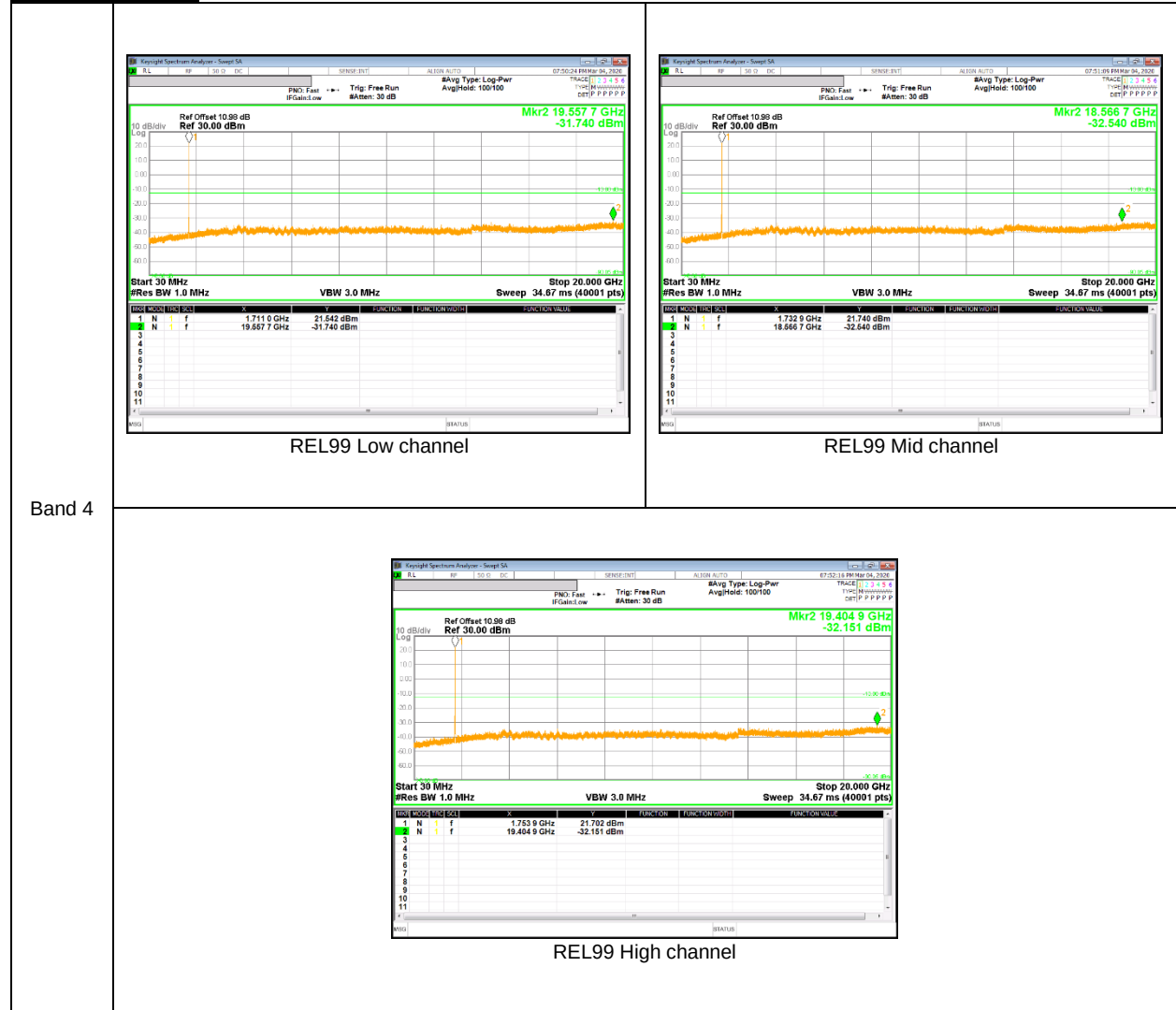
GSM 1900



WCDMA Band 5



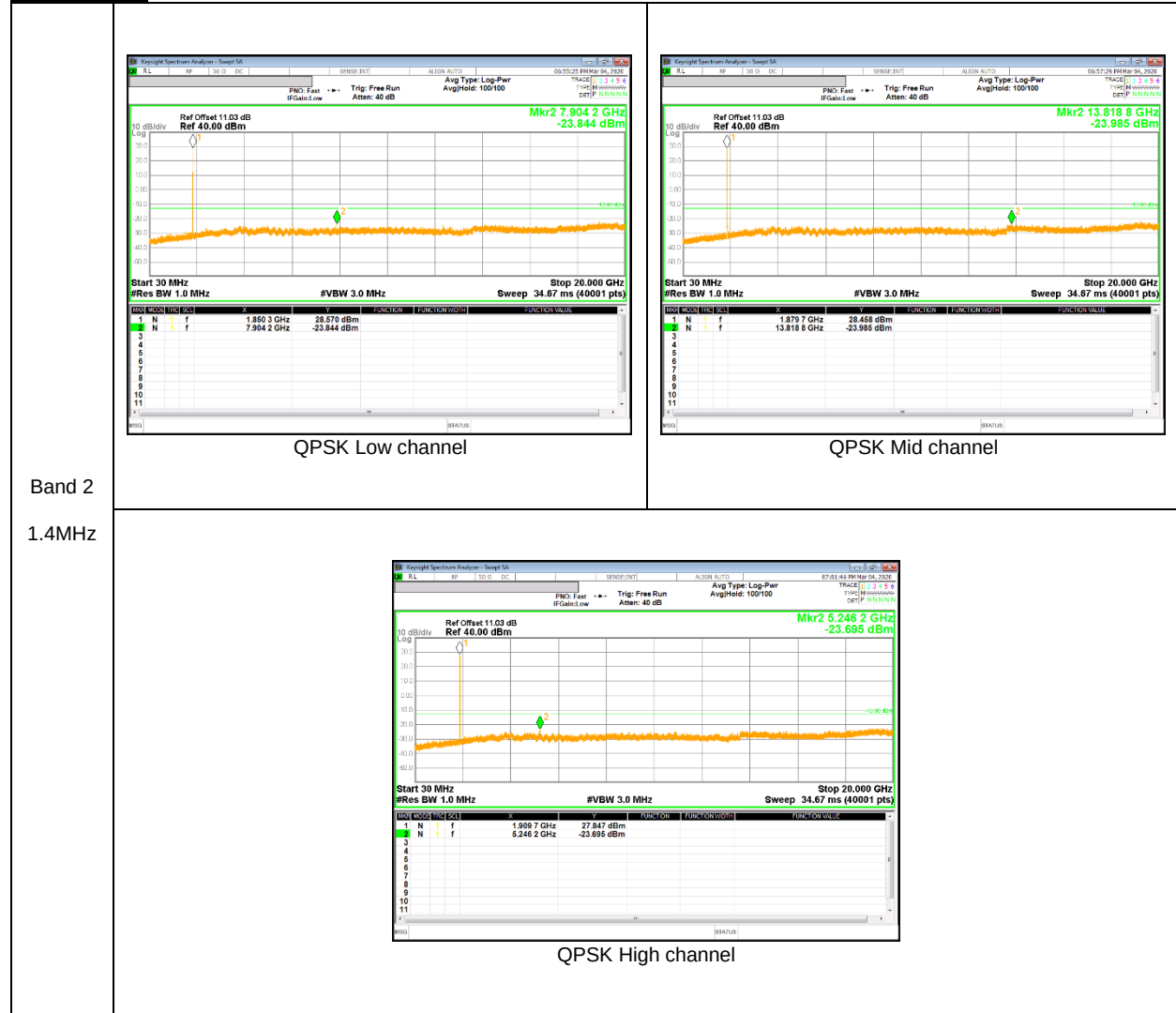
WCDMA Band 4



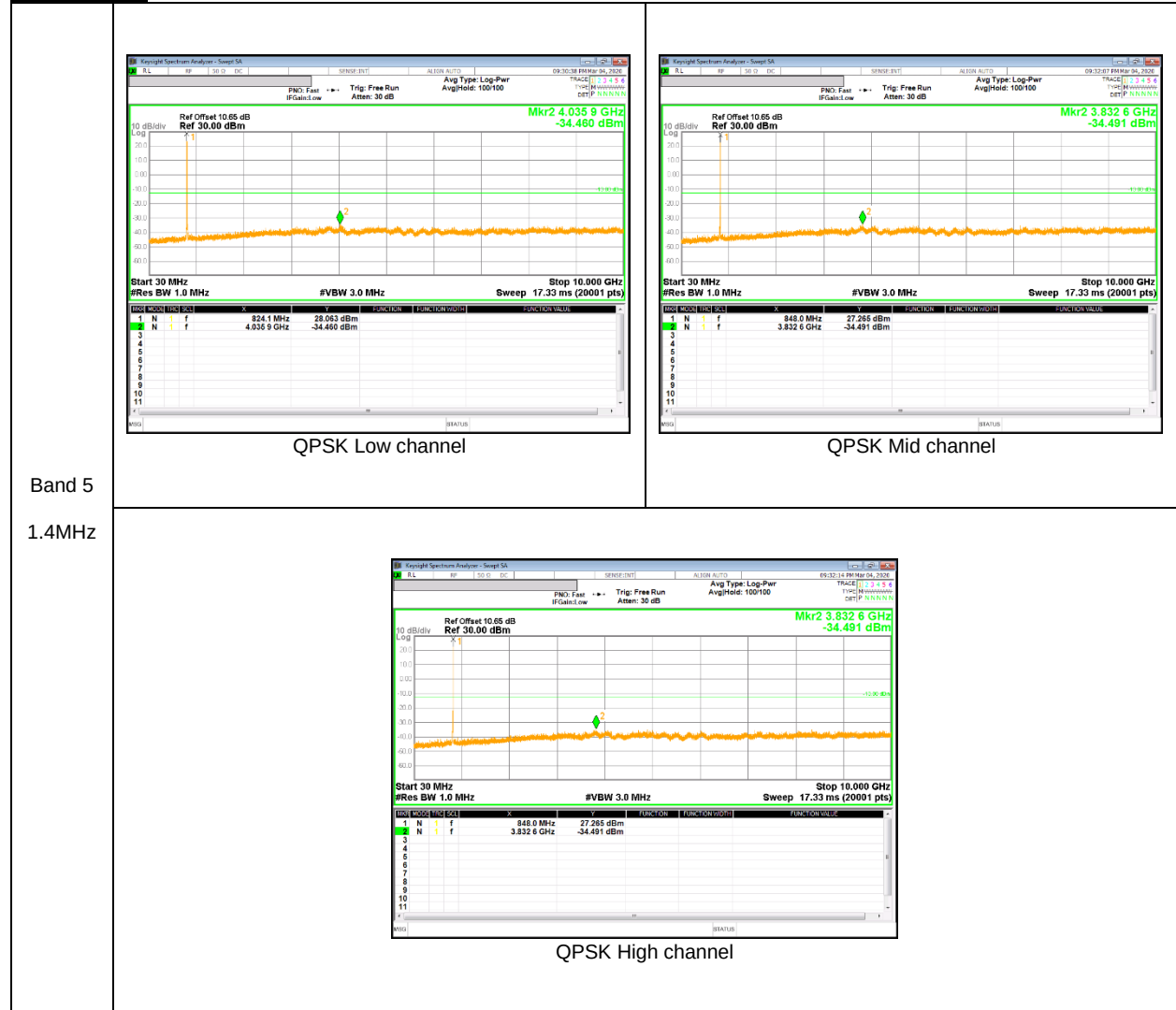
WCDMA Band 2



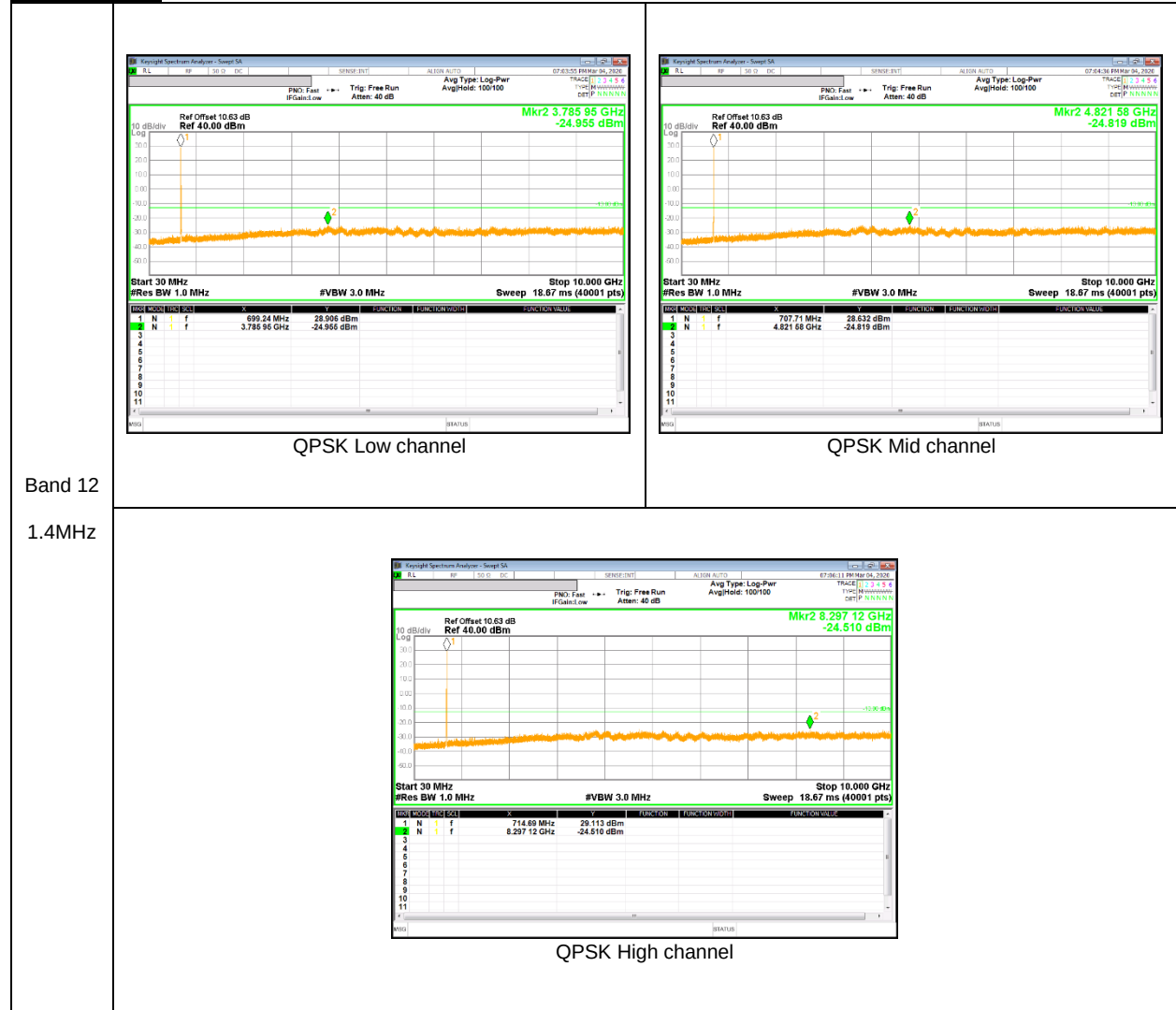
LTE Band 2



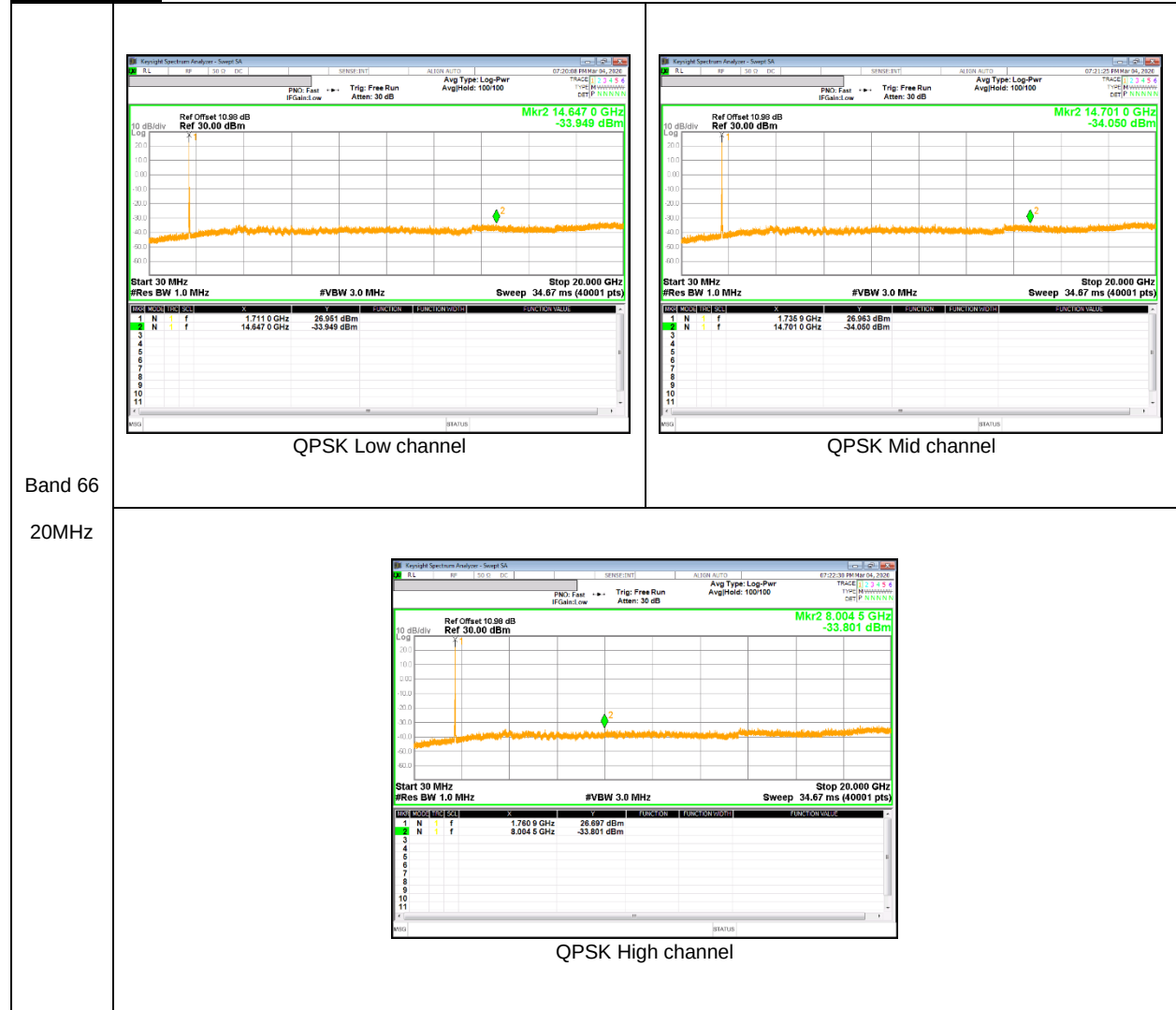
LTE Band 5



LTE Band 12



LTE Band 66



LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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 v03r01

RESULTS

See the following pages.

NOTE : Test were performed each lowest or highest frequency on the modulation condition of more wide bandwidth.(Please refer to section 9.1.1 OBW results)

9.4.1. FREQUENCY STABILITY RESULTS

GSM 850, Channel 128/251, Frequency 824.2/848.8 MHz

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2060.500	Hz	High Channel	2122.000
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	824.19998750	0.002	848.79999236	-0.008	2.5
3.85	40	824.19998830	0.001	848.79999164	-0.007	2.5
3.85	30	824.19998635	0.003	848.79998788	-0.002	2.5
3.85	20	824.19998875	0.000	848.79998596	0.000	2.5
3.85	10	824.19999417	-0.007	848.79999460	-0.010	2.5
3.85	0	824.19999029	-0.002	848.79999345	-0.009	2.5
3.85	-10	824.19999447	-0.007	848.79999573	-0.012	2.5
3.85	-20	824.19998328	0.007	848.79999161	-0.007	2.5
3.85	-30	824.19998732	0.002	848.79999689	-0.013	2.5

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2060.500	Hz	High Channel	2122.000
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	20	824.19998875	0	848.79998596	0	2.5
4.35	20	824.19999113	-0.003	848.79998876	-0.003	2.5
3.75	20	824.19998631	0.003	848.79998946	-0.004	2.5

GSM 1900, Channel 512/810, Frequency 1850.0/1910.0 MHz (Lowest Frequency:EGPRS / Highest Frequency: EGPRS)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0778	1909.9230		
Extreme (50C)		1850.0778	1909.9230	-18.8	-0.010
Extreme (40C)		1850.0778	1909.9230	-19.3	-0.010
Extreme (30C)		1850.0778	1909.9230	-11.5	-0.006
Extreme (10C)		1850.0778	1909.9230	-15.9	-0.008
Extreme (0C)		1850.0778	1909.9230	-16.9	-0.009
Extreme (-10C)		1850.0778	1909.9230	-13.5	-0.007
Extreme (-20C)		1850.0778	1909.9230	-16.7	-0.009
Extreme (-30C)		1850.0778	1909.9230	-15.6	-0.008
20C	15%	1850.0778	1909.9230	-20.5	-0.011
	-15%	1850.0778	1909.9230	-17.4	-0.009
	End Point	1850.0778	1909.9230	-18.6	-0.010

WCDMA Band 5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	826.39999342	-0.012	846.59998951	-0.006	2.5
3.85	40	826.39998826	-0.006	846.59998752	-0.004	2.5
3.85	30	826.39998117	0.003	846.59998336	0.001	2.5
3.85	20	826.39998343	0.000	846.59998445	0.000	2.5
3.85	10	826.39998158	0.002	846.59998260	0.002	2.5
3.85	0	826.39998007	0.004	846.59998004	0.005	2.5
3.85	-10	826.39998445	-0.001	846.59998878	-0.005	2.5
3.85	-20	826.39998851	-0.006	846.59998460	0.000	2.5
3.85	-30	826.39998313	0.000	846.59998365	0.001	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	20	826.39998343	0	846.59998445	0	2.5
4.35	20	826.39998764	-0.005	846.59998111	0.004	2.5
3.75	20	826.39998635	-0.004	846.59998223	0.003	2.5

WCDMA Band 4 (Lowest Frequency:HSDPA / Highest Frequency: Rel99)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1712.3979	1752.6021		
Extreme (50C)		1712.3979	1752.6020	-16.6	-0.010
Extreme (40C)		1712.3979	1752.6021	-10.5	-0.006
Extreme (30C)		1712.3979	1752.6020	-16.7	-0.010
Extreme (10C)		1712.3979	1752.6020	-17.9	-0.010
Extreme (0C)		1712.3979	1752.6020	-20.3	-0.012
Extreme (-10C)		1712.3979	1752.6021	-11.5	-0.007
Extreme (-20C)		1712.3979	1752.6020	-16.9	-0.010
Extreme (-30C)		1712.3979	1752.6020	-17.8	-0.010

20C	15%	1712.3979	1752.6021	-13.6	-0.008
	-15%	1712.3979	1752.6020	-16.7	-0.010
	End Point	1712.3979	1752.6020	-15.0	-0.009

WCDMA Band 2 (Lowest Frequency: Rel99 / Highest Frequency: HSDPA)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1852.3979	1907.6021		
Extreme (50C)		1852.3979	1907.6020	-23.7	-0.013
Extreme (40C)		1852.3979	1907.6020	-20.5	-0.011
Extreme (30C)		1852.3979	1907.6020	-16.4	-0.009
Extreme (10C)		1852.3979	1907.6020	-20.0	-0.011
Extreme (0C)		1852.3979	1907.6020	-20.5	-0.011
Extreme (-10C)		1852.3979	1907.6020	-15.4	-0.008
Extreme (-20C)		1852.3979	1907.6020	-17.8	-0.009
Extreme (-30C)		1852.3979	1907.6020	-18.3	-0.010
20C	15%	1852.3979	1907.6020	-14.6	-0.008
	-15%	1852.3979	1907.6020	-20.2	-0.011
	End Point	1852.3979	1907.6020	-21.2	-0.011

LTE Band 2 (Lowest Frequency: 16QAM / Highest Frequency: 16QAM)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.6995	1909.3005		
Extreme (50C)		1850.6994	1909.3005	-20.5	-0.011
Extreme (40C)		1850.6994	1909.3005	-22.3	-0.012
Extreme (30C)		1850.6994	1909.3005	-21.4	-0.011
Extreme (10C)		1850.6994	1909.3005	-26.6	-0.014
Extreme (0C)		1850.6994	1909.3005	-19.9	-0.011
Extreme (-10C)		1850.6994	1909.3005	-18.8	-0.010
Extreme (-20C)		1850.6994	1909.3005	-16.5	-0.009
Extreme (-30C)		1850.6994	1909.3005	-15.6	-0.008
20C	15%	1850.6994	1909.3005	-18.8	-0.010
	-15%	1850.6994	1909.3005	-16.9	-0.009
	End Point	1850.6994	1909.3005	-20.5	-0.011

LTE Band 5 (Lowest Frequency: 16QAM / Highest Frequency: QPSK)

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2061.750	Hz	High Channel	2120.750
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	50	824.69999026	0.006	848.29998955	-0.006	2.5
3.80	40	824.69999009	0.006	848.29998643	-0.002	2.5
3.80	30	824.69998646	0.011	848.29998556	-0.001	2.5
3.80	20	824.69999515	0.000	848.29998472	0.000	2.5
3.80	10	824.69998933	0.007	848.29998860	-0.005	2.5
3.80	0	824.69998858	0.008	848.29998334	0.002	2.5
3.80	-10	824.69998867	0.008	848.29998128	0.004	2.5
3.80	-20	824.69998716	0.010	848.29998661	-0.002	2.5
3.80	-30	824.69999248	0.003	848.29998443	0.000	2.5

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2061.750	Hz	High Channel	2120.750
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	20	824.69999515	0	848.29998472	0	2.5
4.30	20	824.69999332	0.002	848.29999182	-0.008	2.5
3.60	20	824.69999064	0.005	848.29999471	-0.012	2.5

LTE Band 12 (Lowest Frequency:16QAM / Highest Frequency: QPSK)

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	699.6995	715.3005		
Extreme (50C)		699.6994	715.3005	-6.5	-0.009
Extreme (40C)		699.6994	715.3005	-11.7	-0.017
Extreme (30C)		699.6994	715.3005	-5.9	-0.008
Extreme (10C)		699.6994	715.3005	-8.3	-0.012
Extreme (0C)		699.6994	715.3005	-7.2	-0.010
Extreme (-10C)		699.6994	715.3005	-6.0	-0.009
Extreme (-20C)		699.6994	715.3005	-6.5	-0.009
Extreme (-30C)		699.6994	715.3005	-8.6	-0.012

20C	15%	699.6994	715.3005	-8.6	-0.012
	-15%	699.6994	715.3005	-9.9	-0.014
	End Point	699.6994	715.3005	-9.1	-0.013

LTE Band 66 (Lowest Frequency:16QAM / Highest Frequency: QPSK)

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.6995	1779.3005		
Extreme (50C)		1710.6994	1779.3005	-18.8	-0.011
Extreme (40C)		1710.6994	1779.3005	-16.0	-0.009
Extreme (30C)		1710.6994	1779.3005	-15.4	-0.009
Extreme (10C)		1710.6994	1779.3005	-20.8	-0.012
Extreme (0C)		1710.6994	1779.3005	-26.5	-0.015
Extreme (-10C)		1710.6994	1779.3005	-24.1	-0.014
Extreme (-20C)		1710.6994	1779.3005	-24.6	-0.014
Extreme (-30C)		1710.6994	1779.3005	-19.6	-0.011
20C	15%	1710.6994	1779.3005	-17.8	-0.010
	-15%	1710.6994	1779.3005	-18.6	-0.011
	End Point	1710.6994	1779.3005	-16.3	-0.009

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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(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 v03r01

For radiated output 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 = rms; f) Ensure that the number of measurement points $\geq$ span/RBW; g) Trace mode = max hold(GSM, WCDMA), average(LTE);

TEST RESULTS

10.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	128	824.2	31.96	1570.36
		190	836.6	33.46	2218.20
		251	848.8	32.66	1845.02
	EGPRS	128	824.2	26.17	414.00
		190	836.6	28.36	685.49
		251	848.8	26.83	481.95
GSM1900	GPRS	512	1850.2	30.02	1004.62
		661	1880	30.34	1081.43
		810	1909.8	30.62	1153.45
	EGPRS	512	1850.2	27.98	628.06
		661	1880	28.16	654.64
		810	1909.8	28.90	776.25

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	22.93	196.34
		4183	836.6	23.73	236.05
		4233	846.6	23.75	237.14
	HSDPA	4132	826.4	22.80	190.55
		4183	836.6	23.73	236.05
		4233	846.6	23.68	233.35
Band 4	REL99	1312	1712.4	24.86	306.20
		1413	1732.6	24.91	309.74
		1513	1752.6	24.54	284.45
	HSDPA	1312	1712.4	24.85	305.49
		1413	1732.6	24.93	311.17
		1513	1752.6	24.56	285.76
Band 2	REL99	9262	1852.4	24.30	269.15
		9400	1880.0	24.28	267.92
		9538	1907.6	25.98	396.28
	HSDPA	9262	1852.4	24.16	260.62
		9400	1880.0	24.43	277.33
		9538	1907.6	26.13	410.20

LTE Band 2

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 2	20	QPSK	1 / 0	1860.0	25.12	325.09
			1 / 0	1880.0	24.28	267.92
			1 / 0	1900.0	24.49	281.19
		16QAM	1 / 49	1860.0	23.55	226.46
			1 / 0	1880.0	23.06	202.30
			1 / 0	1900.0	23.37	217.27
	15	QPSK	1 / 0	1857.5	24.67	293.09
			1 / 0	1880.0	24.53	283.79
			1 / 0	1902.5	25.09	322.85
		16QAM	1 / 0	1857.5	23.30	213.80
			1 / 0	1880.0	23.23	210.38
			1 / 0	1902.5	23.72	235.50
	10	QPSK	1 / 0	1855.0	25.40	346.74
			1 / 0	1880.0	24.57	286.42
			1 / 0	1905.0	25.01	316.96
		16QAM	1 / 0	1855.0	23.87	243.78
			1 / 0	1880.0	23.38	217.77
			1 / 0	1905.0	23.54	225.94
	5	QPSK	1 / 12	1852.5	25.21	331.89
			1 / 0	1880.0	24.77	299.92
			1 / 0	1907.5	24.34	271.64
		16QAM	1 / 0	1852.5	23.97	249.46
			1 / 0	1880.0	23.33	215.28
			1 / 0	1907.5	23.07	202.77
	3	QPSK	1 / 8	1851.5	25.48	353.18
			1 / 8	1880.0	25.20	331.13
			1 / 0	1908.5	24.20	263.03
		16QAM	1 / 0	1851.5	24.00	251.19
			1 / 0	1880.0	23.45	221.31
			1 / 8	1908.5	22.91	195.43
	1.4	QPSK	1 / 0	1850.7	25.02	317.69
			1 / 0	1880.0	25.14	326.59
			1 / 5	1909.3	24.19	262.42
		16QAM	1 / 3	1850.7	23.78	238.78
			1 / 5	1880.0	24.03	252.93
			1 / 0	1909.3	23.06	202.30

LTE Band 4

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 4	20	QPSK	1 / 0	1720.0	25.00	316.23
			1 / 49	1732.5	25.17	328.85
			1 / 0	1745.0	24.68	293.76
		16QAM	1 / 0	1720.0	23.97	249.46
			1 / 49	1732.5	23.53	225.42
			1 / 49	1745.0	23.95	248.31
	15	QPSK	1 / 0	1717.5	25.18	329.61
			1 / 0	1732.5	25.60	363.08
			1 / 0	1747.5	25.32	340.41
		16QAM	1 / 0	1717.5	24.13	258.82
			1 / 37	1732.5	24.11	257.63
			1 / 0	1747.5	24.35	272.27
	10	QPSK	1 / 0	1715.0	25.34	341.98
			1 / 0	1732.5	25.02	317.69
			1 / 0	1750.0	25.31	339.63
		16QAM	1 / 0	1715.0	24.04	253.51
			1 / 0	1732.5	24.04	253.51
			1 / 0	1750.0	24.00	251.19
	5	QPSK	1 / 0	1712.5	25.00	316.23
			1 / 12	1732.5	25.21	331.89
			1 / 0	1752.5	25.16	328.10
		16QAM	1 / 0	1712.5	23.84	242.10
			1 / 12	1732.5	23.91	246.04
			1 / 0	1752.5	23.80	239.88
	3	QPSK	1 / 8	1711.5	25.49	354.00
			1 / 0	1732.5	25.14	326.59
			1 / 0	1753.5	24.94	311.89
		16QAM	1 / 8	1711.5	24.24	265.46
			1 / 14	1732.5	24.11	257.63
			1 / 8	1753.5	23.77	238.23
	1.4	QPSK	1 / 5	1710.7	24.95	312.61
			1 / 0	1732.5	23.74	236.59
			1 / 3	1754.3	24.41	276.06
		16QAM	1 / 5	1710.7	23.78	238.78
			1 / 3	1732.5	22.38	172.98
			1 / 3	1754.3	23.39	218.27

LTE Band 5

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 5	10	QPSK	1 / 0	829.0	23.35	216.27
			1 / 0	836.5	23.85	242.66
			1 / 0	844.0	24.21	263.63
		16QAM	1 / 0	829.0	21.82	152.05
			1 / 0	836.5	22.56	180.30
			1 / 0	844.0	23.10	204.17
	5	QPSK	1 / 0	826.5	23.20	208.93
			1 / 12	836.5	23.88	244.34
			1 / 0	846.5	23.98	250.03
		16QAM	1 / 12	826.5	21.85	153.11
			1 / 12	836.5	22.59	181.55
			1 / 12	846.5	22.47	176.60
	3	QPSK	1 / 8	825.5	23.32	214.78
			1 / 0	836.5	23.97	249.46
			1 / 0	847.5	24.04	253.51
		16QAM	1 / 8	825.5	22.16	164.44
			1 / 8	836.5	22.78	189.67
			1 / 8	847.5	23.18	207.97
	1.4	QPSK	1 / 0	824.7	23.37	217.27
			1 / 0	836.5	23.78	238.78
			1 / 0	848.3	23.81	240.44
		16QAM	1 / 0	824.7	21.84	152.76
			1 / 0	836.5	22.63	183.23
			1 / 5	848.3	22.59	181.55

LTE Band 12

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 12	10	QPSK	1 / 0	704.0	17.31	53.83
			1 / 0	707.5	17.23	52.84
			1 / 0	711.0	17.91	61.80
		16QAM	1 / 0	704.0	16.07	40.46
			1 / 0	707.5	16.27	42.36
			1 / 25	711.0	16.19	41.59
	5	QPSK	1 / 0	701.5	17.20	52.48
			1 / 0	707.5	17.76	59.70
			1 / 0	713.5	17.71	59.02
		16QAM	1 / 0	701.5	15.98	39.63
			1 / 0	707.5	16.58	45.50
			1 / 0	713.5	16.64	46.13
	3	QPSK	1 / 0	700.5	17.05	50.70
			1 / 8	707.5	17.47	55.85
			1 / 0	714.5	17.60	57.54
		16QAM	1 / 0	700.5	15.77	37.76
			1 / 14	707.5	16.44	44.06
			1 / 8	714.5	16.48	44.46
	1.4	QPSK	1 / 0	699.7	16.67	46.45
			1 / 5	707.5	17.32	53.95
			1 / 0	715.3	17.42	55.21
		16QAM	1 / 0	699.7	15.33	34.12
			1 / 0	707.5	16.38	43.45
			1 / 5	715.3	16.27	42.36

LTE Band 66

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 66	20	QPSK	1 / 0	1720.0	25.52	356.45
			1 / 0	1745.0	25.69	370.68
			1 / 0	1770.0	24.63	290.40
		16QAM	1 / 0	1720.0	24.37	273.53
			1 / 0	1745.0	24.12	258.23
			1 / 0	1770.0	23.63	230.67
	15	QPSK	1 / 0	1717.5	25.42	348.34
			1 / 0	1747.5	25.50	354.81
			1 / 0	1772.5	25.06	320.63
		16QAM	1 / 0	1717.5	24.22	264.24
			1 / 0	1747.5	24.18	261.82
			1 / 0	1772.5	23.79	239.33
	10	QPSK	1 / 0	1715.0	25.36	343.56
			1 / 0	1745.0	25.62	364.75
			1 / 0	1775.0	24.99	315.50
		16QAM	1 / 0	1715.0	24.20	263.03
			1 / 0	1745.0	24.11	257.63
			1 / 0	1775.0	23.73	236.05
	5	QPSK	1 / 0	1712.5	24.54	284.45
			1 / 12	1745.0	25.20	331.13
			1 / 0	1777.5	24.29	268.53
		16QAM	1 / 0	1712.5	23.20	208.93
			1 / 24	1745.0	23.76	237.68
			1 / 0	1777.5	23.45	221.31
	3	QPSK	1 / 8	1711.5	25.18	329.61
			1 / 8	1745.0	24.87	306.90
			1 / 0	1778.5	24.76	299.23
		16QAM	1 / 8	1711.5	24.05	254.10
			1 / 0	1745.0	23.72	235.50
			1 / 0	1778.5	23.64	231.21
	1.4	QPSK	1 / 0	1710.7	25.18	329.61
			1 / 5	1745.0	24.50	281.84
			1 / 3	1779.3	24.42	276.69
		16QAM	1 / 0	1710.7	24.08	255.86
			1 / 0	1745.0	23.53	225.42
			1 / 0	1779.3	23.08	203.24

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

10.1.2. ERP/EIRP DATA

GSM850

GSM850 GPRS	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-12 Test Engineer: 20881 Configuration: EUT, Y-Position Location: Chamber 1 Mode: GPRS 850 MHz Fundamentals Test Equipment: Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-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 colspan="9">Low Ch</td></tr><tr><td>824.20</td><td>35.93</td><td>V</td><td>3.0</td><td>-1.0</td><td>31.96</td><td>38.5</td><td>-6.5</td><td></td></tr><tr><td>824.20</td><td>26.00</td><td>H</td><td>3.0</td><td>-1.0</td><td>22.03</td><td>38.5</td><td>-16.5</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>836.60</td><td>37.40</td><td>V</td><td>3.0</td><td>-0.9</td><td>33.46</td><td>38.5</td><td>-5.0</td><td></td></tr><tr><td>836.60</td><td>27.58</td><td>H</td><td>3.0</td><td>-0.9</td><td>23.64</td><td>38.5</td><td>-14.9</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>848.80</td><td>36.57</td><td>V</td><td>3.1</td><td>-0.9</td><td>32.66</td><td>38.5</td><td>-5.8</td><td></td></tr><tr><td>848.80</td><td>26.69</td><td>H</td><td>3.1</td><td>-0.9</td><td>22.78</td><td>38.5</td><td>-15.7</td><td></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									824.20	35.93	V	3.0	-1.0	31.96	38.5	-6.5		824.20	26.00	H	3.0	-1.0	22.03	38.5	-16.5		Mid Ch									836.60	37.40	V	3.0	-0.9	33.46	38.5	-5.0		836.60	27.58	H	3.0	-0.9	23.64	38.5	-14.9		High Ch									848.80	36.57	V	3.1	-0.9	32.66	38.5	-5.8		848.80	26.69	H	3.1	-0.9	22.78	38.5	-15.7	
	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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GSM850 EGPRS	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-12 Test Engineer: 20881 Configuration: EUT, Y-Position Location: Chamber 1 Mode: EGPRS 850 MHz Fundamentals Test Equipment: Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-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 colspan="9">Low Ch</td></tr><tr><td>824.20</td><td>30.14</td><td>V</td><td>3.0</td><td>-1.0</td><td>26.17</td><td>38.5</td><td>-12.3</td><td></td></tr><tr><td>824.20</td><td>20.37</td><td>H</td><td>3.0</td><td>-1.0</td><td>16.40</td><td>38.5</td><td>-22.1</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>836.60</td><td>32.30</td><td>V</td><td>3.0</td><td>-0.9</td><td>28.36</td><td>38.5</td><td>-10.1</td><td></td></tr><tr><td>836.60</td><td>22.71</td><td>H</td><td>3.0</td><td>-0.9</td><td>18.77</td><td>38.5</td><td>-19.7</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>848.80</td><td>30.74</td><td>V</td><td>3.1</td><td>-0.9</td><td>26.83</td><td>38.5</td><td>-11.7</td><td></td></tr><tr><td>848.80</td><td>21.33</td><td>H</td><td>3.1</td><td>-0.9</td><td>17.42</td><td>38.5</td><td>-21.1</td><td></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									824.20	30.14	V	3.0	-1.0	26.17	38.5	-12.3		824.20	20.37	H	3.0	-1.0	16.40	38.5	-22.1		Mid Ch									836.60	32.30	V	3.0	-0.9	28.36	38.5	-10.1		836.60	22.71	H	3.0	-0.9	18.77	38.5	-19.7		High Ch									848.80	30.74	V	3.1	-0.9	26.83	38.5	-11.7		848.80	21.33	H	3.1	-0.9	17.42	38.5	-21.1	
	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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	Mid Ch																																																																																																		
	836.60	32.30	V	3.0	-0.9	28.36	38.5	-10.1																																																																																											
	836.60	22.71	H	3.0	-0.9	18.77	38.5	-19.7																																																																																											
	High Ch																																																																																																		
	848.80	30.74	V	3.1	-0.9	26.83	38.5	-11.7																																																																																											
848.80	21.33	H	3.1	-0.9	17.42	38.5	-21.1																																																																																												

GSM1900

GSM1900

GPRS

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4789354096

Date:

2020-03-03

Test Engineer:

20881

Configuration:

EUT, X-Position

Location:

Chamber 1

Mode:

GPRS 1900 MHz Fundamentals

Test Equipment:

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

Substitution: Horn 3115[00167211], 8.5m SMA-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								
1850.20	20.64	V	4.5	9.5	25.65	33.0	-7.4	
1850.20	25.01	H	4.5	9.5	30.02	33.0	-3.0	
Mid Ch								
1880.00	20.91	V	4.5	9.3	25.68	33.0	-7.3	
1880.00	25.57	H	4.5	9.3	30.34	33.0	-2.7	
High Ch								
1909.80	18.31	V	4.6	9.1	22.80	33.0	-10.2	
1909.80	26.14	H	4.6	9.1	30.62	33.0	-2.4	

GSM1900

EGPRS

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4789354096

Date:

2020-03-04

Test Engineer:

20881

Configuration:

EUT, X-Position

Location:

Chamber 1

Mode:

EGPRS 1900 MHz Fundamentals

Test Equipment:

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

Substitution: Horn 3115[00167211], 8.5m SMA-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								
1850.20	18.40	V	4.5	9.5	23.41	33.0	-9.6	
1850.20	22.97	H	4.5	9.5	27.98	33.0	-5.0	
Mid Ch								
1880.00	18.42	V	4.5	9.3	23.19	33.0	-9.8	
1880.00	23.39	H	4.5	9.3	28.16	33.0	-4.8	
High Ch								
1909.80	17.41	V	4.6	9.1	21.90	33.0	-11.1	
1909.80	24.42	H	4.6	9.1	28.90	33.0	-4.1	

WCDMA Band 5

WCDMA
Band 5
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung

Project #: 4789354096

Date: 2020-02-12

Test Engineer: 20881

Configuration: EUT, Y-Position

Location: Chamber 1

Mode: Rel99 Band 5 Fundamentals

Test Equipment:

Receiving: VULB9163-750, and Chamber 1 SMA Cables

Substitution: Dipole 3121_DB4, 8.5m SMA-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								
826.40	26.89	V	3.0	-0.9	22.93	38.5	-15.6	
826.40	16.37	H	3.0	-0.9	12.41	38.5	-26.1	
Mid Ch								
836.60	27.67	V	3.0	-0.9	23.73	38.5	-14.8	
836.60	18.33	H	3.0	-0.9	14.39	38.5	-24.1	
High Ch								
846.60	27.67	V	3.1	-0.9	23.75	38.5	-14.7	
846.60	17.77	H	3.1	-0.9	13.86	38.5	-24.6	

WCDMA
Band 5
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung

Project #: 4789354096

Date: 2020-02-12

Test Engineer: 20881

Configuration: EUT, Y-Position

Location: Chamber 1

Mode: HSDPA Band 5 Fundamentals

Test Equipment:

Receiving: VULB9163-750, and Chamber 1 SMA Cables

Substitution: Dipole 3121_DB4, 8.5m SMA-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								
826.40	26.76	V	3.0	-0.9	22.80	38.5	-15.7	
826.40	16.57	H	3.0	-0.9	12.61	38.5	-25.9	
Mid Ch								
836.60	27.67	V	3.0	-0.9	23.73	38.5	-14.8	
836.60	17.88	H	3.0	-0.9	13.94	38.5	-24.6	
High Ch								
846.60	27.60	V	3.1	-0.9	23.68	38.5	-14.8	
846.60	17.91	H	3.1	-0.9	14.00	38.5	-24.5	

WCDMA Band 4

WCDMA

Band 4

REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20882
Configuration: EUT, X-Position
Location: Chamber 1
Mode: Rel99 Band 4 Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-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	12.33	V	4.3	9.4	17.41	30.0	-12.6	
1712.40	19.78	H	4.3	9.4	24.86	30.0	-5.1	
Mid Ch								
1732.60	13.07	V	4.3	9.5	18.20	30.0	-11.8	
1732.60	19.78	H	4.3	9.5	24.91	30.0	-5.1	
High Ch								
1752.60	12.70	V	4.4	9.5	17.88	30.0	-12.1	
1752.60	19.36	H	4.4	9.5	24.54	30.0	-5.5	

WCDMA

Band 4

HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20882
Configuration: EUT, X-Position
Location: Chamber 1
Mode: HSDPA Band 4 Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-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	12.27	V	4.3	9.4	17.35	30.0	-12.6	
1712.40	19.77	H	4.3	9.4	24.85	30.0	-5.1	
Mid Ch								
1732.60	13.01	V	4.3	9.5	18.14	30.0	-11.9	
1732.60	19.80	H	4.3	9.5	24.93	30.0	-5.1	
High Ch								
1752.60	12.82	V	4.4	9.5	18.00	30.0	-12.0	
1752.60	19.38	H	4.4	9.5	24.56	30.0	-5.4	

WCDMA Band 2

WCDMA Band 2 REL99	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-12 Test Engineer: 20882 Configuration: EUT, X-Position Location: Chamber 1 Mode: Rel99 Band 2 Fundamentals Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-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><td></td></tr> <tr><td>1852.40</td><td>14.81</td><td>V</td><td>4.5</td><td>9.5</td><td>19.80</td><td>33.0</td><td>-13.2</td><td></td></tr> <tr><td>1852.40</td><td>19.32</td><td>H</td><td>4.5</td><td>9.5</td><td>24.30</td><td>33.0</td><td>-8.7</td><td></td></tr> <tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1880.00</td><td>14.37</td><td>V</td><td>4.5</td><td>9.3</td><td>19.14</td><td>33.0</td><td>-13.9</td><td></td></tr> <tr><td>1880.00</td><td>19.51</td><td>H</td><td>4.5</td><td>9.3</td><td>24.28</td><td>33.0</td><td>-8.7</td><td></td></tr> <tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1907.60</td><td>14.71</td><td>V</td><td>4.6</td><td>9.1</td><td>19.23</td><td>33.0</td><td>-13.8</td><td></td></tr> <tr><td>1907.60</td><td>21.46</td><td>H</td><td>4.6</td><td>9.1</td><td>25.98</td><td>33.0</td><td>-7.0</td><td></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									1852.40	14.81	V	4.5	9.5	19.80	33.0	-13.2		1852.40	19.32	H	4.5	9.5	24.30	33.0	-8.7		Mid Ch									1880.00	14.37	V	4.5	9.3	19.14	33.0	-13.9		1880.00	19.51	H	4.5	9.3	24.28	33.0	-8.7		High Ch									1907.60	14.71	V	4.6	9.1	19.23	33.0	-13.8		1907.60	21.46	H	4.6	9.1	25.98	33.0	-7.0	
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	14.81	V	4.5	9.5	19.80	33.0	-13.2																																																																																											
1852.40	19.32	H	4.5	9.5	24.30	33.0	-8.7																																																																																											
Mid Ch																																																																																																		
1880.00	14.37	V	4.5	9.3	19.14	33.0	-13.9																																																																																											
1880.00	19.51	H	4.5	9.3	24.28	33.0	-8.7																																																																																											
High Ch																																																																																																		
1907.60	14.71	V	4.6	9.1	19.23	33.0	-13.8																																																																																											
1907.60	21.46	H	4.6	9.1	25.98	33.0	-7.0																																																																																											
WCDMA Band 2 HSDPA	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-12 Test Engineer: 20882 Configuration: EUT, X-Position Location: Chamber 1 Mode: HSDPA Band 2 Fundamentals Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-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><td></td></tr> <tr><td>1852.40</td><td>14.80</td><td>V</td><td>4.5</td><td>9.5</td><td>19.79</td><td>33.0</td><td>-13.2</td><td></td></tr> <tr><td>1852.40</td><td>19.18</td><td>H</td><td>4.5</td><td>9.5</td><td>24.16</td><td>33.0</td><td>-8.8</td><td></td></tr> <tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1880.00</td><td>14.10</td><td>V</td><td>4.5</td><td>9.3</td><td>18.87</td><td>33.0</td><td>-14.1</td><td></td></tr> <tr><td>1880.00</td><td>19.66</td><td>H</td><td>4.5</td><td>9.3</td><td>24.43</td><td>33.0</td><td>-8.6</td><td></td></tr> <tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1907.60</td><td>14.77</td><td>V</td><td>4.6</td><td>9.1</td><td>19.29</td><td>33.0</td><td>-13.7</td><td></td></tr> <tr><td>1907.60</td><td>21.61</td><td>H</td><td>4.6</td><td>9.1</td><td>26.13</td><td>33.0</td><td>-6.9</td><td></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									1852.40	14.80	V	4.5	9.5	19.79	33.0	-13.2		1852.40	19.18	H	4.5	9.5	24.16	33.0	-8.8		Mid Ch									1880.00	14.10	V	4.5	9.3	18.87	33.0	-14.1		1880.00	19.66	H	4.5	9.3	24.43	33.0	-8.6		High Ch									1907.60	14.77	V	4.6	9.1	19.29	33.0	-13.7		1907.60	21.61	H	4.6	9.1	26.13	33.0	-6.9	
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
Low Ch																																																																																																		
1852.40	14.80	V	4.5	9.5	19.79	33.0	-13.2																																																																																											
1852.40	19.18	H	4.5	9.5	24.16	33.0	-8.8																																																																																											
Mid Ch																																																																																																		
1880.00	14.10	V	4.5	9.3	18.87	33.0	-14.1																																																																																											
1880.00	19.66	H	4.5	9.3	24.43	33.0	-8.6																																																																																											
High Ch																																																																																																		
1907.60	14.77	V	4.6	9.1	19.29	33.0	-13.7																																																																																											
1907.60	21.61	H	4.6	9.1	26.13	33.0	-6.9																																																																																											

LTE Band 2

LTE Band 2 20MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-04 Test Engineer: 20890 Configuration: EUT / X-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[00167451], 8.5m SMA-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 colspan="9">Low Ch</td></tr><tr><td>1860.00</td><td>15.21</td><td>V</td><td>4.5</td><td>9.3</td><td>20.04</td><td>33.0</td><td>-13.0</td><td></td></tr><tr><td>1860.00</td><td>20.29</td><td>H</td><td>4.5</td><td>9.3</td><td>25.12</td><td>33.0</td><td>-7.9</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>1880.00</td><td>13.76</td><td>V</td><td>4.5</td><td>9.2</td><td>18.42</td><td>33.0</td><td>-14.6</td><td></td></tr><tr><td>1880.00</td><td>19.62</td><td>H</td><td>4.5</td><td>9.2</td><td>24.28</td><td>33.0</td><td>-8.7</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>1900.00</td><td>13.66</td><td>V</td><td>4.6</td><td>9.0</td><td>18.15</td><td>33.0</td><td>-14.8</td><td></td></tr><tr><td>1900.00</td><td>20.00</td><td>H</td><td>4.6</td><td>9.0</td><td>24.49</td><td>33.0</td><td>-8.5</td><td></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	15.21	V	4.5	9.3	20.04	33.0	-13.0		1860.00	20.29	H	4.5	9.3	25.12	33.0	-7.9		Mid Ch									1880.00	13.76	V	4.5	9.2	18.42	33.0	-14.6		1880.00	19.62	H	4.5	9.2	24.28	33.0	-8.7		High Ch									1900.00	13.66	V	4.6	9.0	18.15	33.0	-14.8		1900.00	20.00	H	4.6	9.0	24.49	33.0	-8.5	
	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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	1860.00	15.21	V	4.5	9.3	20.04	33.0	-13.0																																																																																											
	1860.00	20.29	H	4.5	9.3	25.12	33.0	-7.9																																																																																											
	Mid Ch																																																																																																		
	1880.00	13.76	V	4.5	9.2	18.42	33.0	-14.6																																																																																											
	1880.00	19.62	H	4.5	9.2	24.28	33.0	-8.7																																																																																											
	High Ch																																																																																																		
	1900.00	13.66	V	4.6	9.0	18.15	33.0	-14.8																																																																																											
1900.00	20.00	H	4.6	9.0	24.49	33.0	-8.5																																																																																												
LTE Band 2 20MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-04 Test Engineer: 20890 Configuration: EUT / X-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[00167451], 8.5m SMA-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 colspan="9">Low Ch</td></tr><tr><td>1860.00</td><td>13.38</td><td>V</td><td>4.5</td><td>9.3</td><td>18.21</td><td>33.0</td><td>-14.8</td><td></td></tr><tr><td>1860.00</td><td>18.72</td><td>H</td><td>4.5</td><td>9.3</td><td>23.55</td><td>33.0</td><td>-9.5</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>1880.00</td><td>12.43</td><td>V</td><td>4.5</td><td>9.2</td><td>17.09</td><td>33.0</td><td>-15.9</td><td></td></tr><tr><td>1880.00</td><td>18.40</td><td>H</td><td>4.5</td><td>9.2</td><td>23.06</td><td>33.0</td><td>-9.9</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>1900.00</td><td>12.46</td><td>V</td><td>4.6</td><td>9.0</td><td>16.95</td><td>33.0</td><td>-16.0</td><td></td></tr><tr><td>1900.00</td><td>18.88</td><td>H</td><td>4.6</td><td>9.0</td><td>23.37</td><td>33.0</td><td>-9.6</td><td></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	13.38	V	4.5	9.3	18.21	33.0	-14.8		1860.00	18.72	H	4.5	9.3	23.55	33.0	-9.5		Mid Ch									1880.00	12.43	V	4.5	9.2	17.09	33.0	-15.9		1880.00	18.40	H	4.5	9.2	23.06	33.0	-9.9		High Ch									1900.00	12.46	V	4.6	9.0	16.95	33.0	-16.0		1900.00	18.88	H	4.6	9.0	23.37	33.0	-9.6	
	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	13.38	V	4.5	9.3	18.21	33.0	-14.8																																																																																											
	1860.00	18.72	H	4.5	9.3	23.55	33.0	-9.5																																																																																											
	Mid Ch																																																																																																		
	1880.00	12.43	V	4.5	9.2	17.09	33.0	-15.9																																																																																											
	1880.00	18.40	H	4.5	9.2	23.06	33.0	-9.9																																																																																											
	High Ch																																																																																																		
	1900.00	12.46	V	4.6	9.0	16.95	33.0	-16.0																																																																																											
1900.00	18.88	H	4.6	9.0	23.37	33.0	-9.6																																																																																												

LTE

Band 2

15MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Equipment:

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

Substitution: Horn 3115[00167451], 8.5m SMA-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								
1857.50	15.13	V	4.5	9.4	19.98	33.0	-13.0	
1857.50	19.82	H	4.5	9.4	24.67	33.0	-8.3	
Mid Ch								
1880.00	13.86	V	4.5	9.2	18.52	33.0	-14.5	
1880.00	19.87	H	4.5	9.2	24.53	33.0	-8.5	
High Ch								
1902.50	13.73	V	4.6	9.0	18.19	33.0	-14.8	
1902.50	20.63	H	4.6	9.0	25.09	33.0	-7.9	

LTE

Band 2

15MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Equipment:

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

Substitution: Horn 3115[00167451], 8.5m SMA-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								
1857.50	13.81	V	4.5	9.4	18.66	33.0	-14.3	
1857.50	18.45	H	4.5	9.4	23.30	33.0	-9.7	
Mid Ch								
1880.00	12.71	V	4.5	9.2	17.37	33.0	-15.6	
1880.00	18.57	H	4.5	9.2	23.23	33.0	-9.8	
High Ch								
1902.50	12.28	V	4.6	9.0	16.74	33.0	-16.3	
1902.50	19.26	H	4.6	9.0	23.72	33.0	-9.3	

LTE Band 2 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-04 Test Engineer: 20890 Configuration: EUT / X-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[00167451], 8.5m SMA-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 colspan="9">Low Ch</td></tr><tr><td>1855.00</td><td>15.48</td><td>V</td><td>4.5</td><td>9.4</td><td>20.35</td><td>33.0</td><td>-12.6</td><td></td></tr><tr><td>1855.00</td><td>20.52</td><td>H</td><td>4.5</td><td>9.4</td><td>25.40</td><td>33.0</td><td>-7.6</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>1880.00</td><td>14.43</td><td>V</td><td>4.5</td><td>9.2</td><td>19.09</td><td>33.0</td><td>-13.9</td><td></td></tr><tr><td>1880.00</td><td>19.91</td><td>H</td><td>4.5</td><td>9.2</td><td>24.57</td><td>33.0</td><td>-8.4</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>1905.00</td><td>13.42</td><td>V</td><td>4.6</td><td>9.0</td><td>17.85</td><td>33.0</td><td>-15.2</td><td></td></tr><tr><td>1905.00</td><td>20.58</td><td>H</td><td>4.6</td><td>9.0</td><td>25.01</td><td>33.0</td><td>-8.0</td><td></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									1855.00	15.48	V	4.5	9.4	20.35	33.0	-12.6		1855.00	20.52	H	4.5	9.4	25.40	33.0	-7.6		Mid Ch									1880.00	14.43	V	4.5	9.2	19.09	33.0	-13.9		1880.00	19.91	H	4.5	9.2	24.57	33.0	-8.4		High Ch									1905.00	13.42	V	4.6	9.0	17.85	33.0	-15.2		1905.00	20.58	H	4.6	9.0	25.01	33.0	-8.0	
	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	15.48	V	4.5	9.4	20.35	33.0	-12.6																																																																																											
1855.00	20.52	H	4.5	9.4	25.40	33.0	-7.6																																																																																												
Mid Ch																																																																																																			
1880.00	14.43	V	4.5	9.2	19.09	33.0	-13.9																																																																																												
1880.00	19.91	H	4.5	9.2	24.57	33.0	-8.4																																																																																												
High Ch																																																																																																			
1905.00	13.42	V	4.6	9.0	17.85	33.0	-15.2																																																																																												
1905.00	20.58	H	4.6	9.0	25.01	33.0	-8.0																																																																																												
LTE Band 2 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-04 Test Engineer: 20890 Configuration: EUT / X-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[00167451], 8.5m SMA-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 colspan="9">Low Ch</td></tr><tr><td>1855.00</td><td>13.96</td><td>V</td><td>4.5</td><td>9.4</td><td>18.83</td><td>33.0</td><td>-14.2</td><td></td></tr><tr><td>1855.00</td><td>18.99</td><td>H</td><td>4.5</td><td>9.4</td><td>23.87</td><td>33.0</td><td>-9.1</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>1880.00</td><td>13.10</td><td>V</td><td>4.5</td><td>9.2</td><td>17.76</td><td>33.0</td><td>-15.2</td><td></td></tr><tr><td>1880.00</td><td>18.72</td><td>H</td><td>4.5</td><td>9.2</td><td>23.38</td><td>33.0</td><td>-9.6</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>1905.00</td><td>12.00</td><td>V</td><td>4.6</td><td>9.0</td><td>16.43</td><td>33.0</td><td>-16.6</td><td></td></tr><tr><td>1905.00</td><td>19.11</td><td>H</td><td>4.6</td><td>9.0</td><td>23.54</td><td>33.0</td><td>-9.5</td><td></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									1855.00	13.96	V	4.5	9.4	18.83	33.0	-14.2		1855.00	18.99	H	4.5	9.4	23.87	33.0	-9.1		Mid Ch									1880.00	13.10	V	4.5	9.2	17.76	33.0	-15.2		1880.00	18.72	H	4.5	9.2	23.38	33.0	-9.6		High Ch									1905.00	12.00	V	4.6	9.0	16.43	33.0	-16.6		1905.00	19.11	H	4.6	9.0	23.54	33.0	-9.5	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	1855.00	13.96	V	4.5	9.4	18.83	33.0	-14.2																																																																																											
1855.00	18.99	H	4.5	9.4	23.87	33.0	-9.1																																																																																												
Mid Ch																																																																																																			
1880.00	13.10	V	4.5	9.2	17.76	33.0	-15.2																																																																																												
1880.00	18.72	H	4.5	9.2	23.38	33.0	-9.6																																																																																												
High Ch																																																																																																			
1905.00	12.00	V	4.6	9.0	16.43	33.0	-16.6																																																																																												
1905.00	19.11	H	4.6	9.0	23.54	33.0	-9.5																																																																																												

LTE Band 2 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-04 Test Engineer: 20890 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_QPSK Band 2 Fundamentals, 5MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-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><td></td></tr><tr><td>1852.50</td><td>14.63</td><td>V</td><td>4.5</td><td>9.4</td><td>19.53</td><td>33.0</td><td>-13.5</td><td></td></tr><tr><td>1852.50</td><td>20.31</td><td>H</td><td>4.5</td><td>9.4</td><td>25.21</td><td>33.0</td><td>-7.8</td><td></td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1880.00</td><td>14.46</td><td>V</td><td>4.5</td><td>9.2</td><td>19.12</td><td>33.0</td><td>-13.9</td><td></td></tr><tr><td>1880.00</td><td>20.11</td><td>H</td><td>4.5</td><td>9.2</td><td>24.77</td><td>33.0</td><td>-8.2</td><td></td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1907.50</td><td>13.24</td><td>V</td><td>4.6</td><td>9.0</td><td>17.63</td><td>33.0</td><td>-15.4</td><td></td></tr><tr><td>1907.50</td><td>19.95</td><td>H</td><td>4.6</td><td>9.0</td><td>24.34</td><td>33.0</td><td>-8.7</td><td></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									1852.50	14.63	V	4.5	9.4	19.53	33.0	-13.5		1852.50	20.31	H	4.5	9.4	25.21	33.0	-7.8		Mid Ch									1880.00	14.46	V	4.5	9.2	19.12	33.0	-13.9		1880.00	20.11	H	4.5	9.2	24.77	33.0	-8.2		High Ch									1907.50	13.24	V	4.6	9.0	17.63	33.0	-15.4		1907.50	19.95	H	4.6	9.0	24.34	33.0	-8.7	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	1852.50	14.63	V	4.5	9.4	19.53	33.0	-13.5																																																																																											
1852.50	20.31	H	4.5	9.4	25.21	33.0	-7.8																																																																																												
Mid Ch																																																																																																			
1880.00	14.46	V	4.5	9.2	19.12	33.0	-13.9																																																																																												
1880.00	20.11	H	4.5	9.2	24.77	33.0	-8.2																																																																																												
High Ch																																																																																																			
1907.50	13.24	V	4.6	9.0	17.63	33.0	-15.4																																																																																												
1907.50	19.95	H	4.6	9.0	24.34	33.0	-8.7																																																																																												
LTE Band 2 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-04 Test Engineer: 20890 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_16QAM Band 2 Fundamentals, 5MHz Bandwidth Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-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><td></td></tr><tr><td>1852.50</td><td>13.56</td><td>V</td><td>4.5</td><td>9.4</td><td>18.46</td><td>33.0</td><td>-14.5</td><td></td></tr><tr><td>1852.50</td><td>19.07</td><td>H</td><td>4.5</td><td>9.4</td><td>23.97</td><td>33.0</td><td>-9.0</td><td></td></tr><tr><td>Mid Ch</td><td></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>17.66</td><td>33.0</td><td>-15.3</td><td></td></tr><tr><td>1880.00</td><td>18.67</td><td>H</td><td>4.5</td><td>9.2</td><td>23.33</td><td>33.0</td><td>-9.7</td><td></td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1907.50</td><td>11.97</td><td>V</td><td>4.6</td><td>9.0</td><td>16.36</td><td>33.0</td><td>-16.6</td><td></td></tr><tr><td>1907.50</td><td>18.68</td><td>H</td><td>4.6</td><td>9.0</td><td>23.07</td><td>33.0</td><td>-9.9</td><td></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									1852.50	13.56	V	4.5	9.4	18.46	33.0	-14.5		1852.50	19.07	H	4.5	9.4	23.97	33.0	-9.0		Mid Ch									1880.00	13.00	V	4.5	9.2	17.66	33.0	-15.3		1880.00	18.67	H	4.5	9.2	23.33	33.0	-9.7		High Ch									1907.50	11.97	V	4.6	9.0	16.36	33.0	-16.6		1907.50	18.68	H	4.6	9.0	23.07	33.0	-9.9	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	1852.50	13.56	V	4.5	9.4	18.46	33.0	-14.5																																																																																											
1852.50	19.07	H	4.5	9.4	23.97	33.0	-9.0																																																																																												
Mid Ch																																																																																																			
1880.00	13.00	V	4.5	9.2	17.66	33.0	-15.3																																																																																												
1880.00	18.67	H	4.5	9.2	23.33	33.0	-9.7																																																																																												
High Ch																																																																																																			
1907.50	11.97	V	4.6	9.0	16.36	33.0	-16.6																																																																																												
1907.50	18.68	H	4.6	9.0	23.07	33.0	-9.9																																																																																												

LTE

Band 2

3MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Equipment:

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

Substitution: Horn 3115[00167451], 8.5m SMA-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								
1851.50	15.37	V	4.5	9.4	20.28	33.0	-12.7	
1851.50	20.58	H	4.5	9.4	25.48	33.0	-7.5	
Mid Ch								
1880.00	14.13	V	4.5	9.2	18.79	33.0	-14.2	
1880.00	20.54	H	4.5	9.2	25.20	33.0	-7.8	
High Ch								
1908.50	13.54	V	4.6	8.9	17.91	33.0	-15.1	
1908.50	19.83	H	4.6	8.9	24.20	33.0	-8.8	

LTE

Band 2

3MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Equipment:

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

Substitution: Horn 3115[00167451], 8.5m SMA-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								
1851.50	14.29	V	4.5	9.4	19.20	33.0	-13.8	
1851.50	19.10	H	4.5	9.4	24.00	33.0	-9.0	
Mid Ch								
1880.00	12.90	V	4.5	9.2	17.56	33.0	-15.4	
1880.00	18.79	H	4.5	9.2	23.45	33.0	-9.6	
High Ch								
1908.50	11.88	V	4.6	8.9	16.25	33.0	-16.7	
1908.50	18.54	H	4.6	8.9	22.91	33.0	-10.1	

LTE

Band 2

1.4MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4789354096

2020-02-03

20896

EUT, X-Position

Chamber 2

LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equipment:

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

Substitution: Horn 3115[00167451], 8.5m SMA-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								
1850.70	15.42	V	4.5	9.4	20.34	33.0	-12.7	
1850.70	20.10	H	4.5	9.4	25.02	33.0	-8.0	
Mid Ch								
1880.00	14.68	V	4.5	9.2	19.34	33.0	-13.7	
1880.00	20.48	H	4.5	9.2	25.14	33.0	-7.9	
High Ch								
1909.30	9.25	V	4.6	8.9	13.62	33.0	-19.4	
1909.30	19.82	H	4.6	8.9	24.19	33.0	-8.8	

LTE

Band 2

1.4MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4789354096

2020-02-03

20896

EUT, X-Position

Chamber 2

LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equipment:

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

Substitution: Horn 3115[00167451], 8.5m SMA-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								
1850.70	14.06	V	4.5	9.4	18.98	33.0	-14.0	
1850.70	18.86	H	4.5	9.4	23.78	33.0	-9.2	
Mid Ch								
1880.00	13.03	V	4.5	9.2	17.69	33.0	-15.3	
1880.00	19.37	H	4.5	9.2	24.03	33.0	-9.0	
High Ch								
1909.30	7.54	V	4.6	8.9	11.91	33.0	-21.1	
1909.30	18.69	H	4.6	8.9	23.06	33.0	-9.9	

LTE Band 5

LTE Band 5 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-03 Test Engineer: 20896 Configuration: EUT, Y-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Fundamentals, 10MHz Bandwidth Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-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>829.00</td><td>27.31</td><td>V</td><td>3.0</td><td>-0.9</td><td>23.35</td><td>38.5</td><td>-15.1</td></tr><tr><td>829.00</td><td>18.02</td><td>H</td><td>3.0</td><td>-0.9</td><td>14.07</td><td>38.5</td><td>-24.4</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>27.78</td><td>V</td><td>3.0</td><td>-0.9</td><td>23.85</td><td>38.5</td><td>-14.7</td></tr><tr><td>836.50</td><td>18.27</td><td>H</td><td>3.0</td><td>-0.9</td><td>14.33</td><td>38.5</td><td>-24.2</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>844.00</td><td>28.13</td><td>V</td><td>3.0</td><td>-0.9</td><td>24.21</td><td>38.5</td><td>-14.3</td></tr><tr><td>844.00</td><td>18.49</td><td>H</td><td>3.0</td><td>-0.9</td><td>14.57</td><td>38.5</td><td>-23.9</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								829.00	27.31	V	3.0	-0.9	23.35	38.5	-15.1	829.00	18.02	H	3.0	-0.9	14.07	38.5	-24.4	Mid Ch								836.50	27.78	V	3.0	-0.9	23.85	38.5	-14.7	836.50	18.27	H	3.0	-0.9	14.33	38.5	-24.2	High Ch								844.00	28.13	V	3.0	-0.9	24.21	38.5	-14.3	844.00	18.49	H	3.0	-0.9	14.57	38.5	-23.9
	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	27.31	V	3.0	-0.9	23.35	38.5	-15.1																																																																																		
	829.00	18.02	H	3.0	-0.9	14.07	38.5	-24.4																																																																																		
	Mid Ch																																																																																									
	836.50	27.78	V	3.0	-0.9	23.85	38.5	-14.7																																																																																		
	836.50	18.27	H	3.0	-0.9	14.33	38.5	-24.2																																																																																		
	High Ch																																																																																									
	844.00	28.13	V	3.0	-0.9	24.21	38.5	-14.3																																																																																		
844.00	18.49	H	3.0	-0.9	14.57	38.5	-23.9																																																																																			
LTE Band 5 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-03 Test Engineer: 20896 Configuration: EUT, Y-Position Location: Chamber 2 Mode: LTE_16QAM Band 5 Fundamentals, 10MHz Bandwidth Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-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>829.00</td><td>25.78</td><td>V</td><td>3.0</td><td>-0.9</td><td>21.82</td><td>38.5</td><td>-16.7</td></tr><tr><td>829.00</td><td>16.73</td><td>H</td><td>3.0</td><td>-0.9</td><td>12.78</td><td>38.5</td><td>-25.7</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>836.50</td><td>26.49</td><td>V</td><td>3.0</td><td>-0.9</td><td>22.56</td><td>38.5</td><td>-15.9</td></tr><tr><td>836.50</td><td>16.96</td><td>H</td><td>3.0</td><td>-0.9</td><td>13.02</td><td>38.5</td><td>-25.5</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>844.00</td><td>27.02</td><td>V</td><td>3.0</td><td>-0.9</td><td>23.10</td><td>38.5</td><td>-15.4</td></tr><tr><td>844.00</td><td>17.39</td><td>H</td><td>3.0</td><td>-0.9</td><td>13.47</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								829.00	25.78	V	3.0	-0.9	21.82	38.5	-16.7	829.00	16.73	H	3.0	-0.9	12.78	38.5	-25.7	Mid Ch								836.50	26.49	V	3.0	-0.9	22.56	38.5	-15.9	836.50	16.96	H	3.0	-0.9	13.02	38.5	-25.5	High Ch								844.00	27.02	V	3.0	-0.9	23.10	38.5	-15.4	844.00	17.39	H	3.0	-0.9	13.47	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																																																																																									
	829.00	25.78	V	3.0	-0.9	21.82	38.5	-16.7																																																																																		
	829.00	16.73	H	3.0	-0.9	12.78	38.5	-25.7																																																																																		
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	836.50	26.49	V	3.0	-0.9	22.56	38.5	-15.9																																																																																		
	836.50	16.96	H	3.0	-0.9	13.02	38.5	-25.5																																																																																		
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	844.00	27.02	V	3.0	-0.9	23.10	38.5	-15.4																																																																																		
844.00	17.39	H	3.0	-0.9	13.47	38.5	-25.0																																																																																			

LTE

Band 5

5MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4789354096

2020-02-03

20896

EUT, Y-Position

Chamber 2

LTE_QPSK Band 5 Fundamentals, 5MHz Bandwidth

Test Equipment:

Receiving: VULB9163-749, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 8.5m SMA-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								
826.50	27.16	V	3.0	-0.9	23.20	38.5	-15.3	
826.50	17.72	H	3.0	-0.9	13.76	38.5	-24.7	
Mid Ch								
836.50	27.81	V	3.0	-0.9	23.88	38.5	-14.6	
836.50	18.13	H	3.0	-0.9	14.19	38.5	-24.3	
High Ch								
846.50	27.89	V	3.0	-0.9	23.98	38.5	-14.5	
846.50	18.59	H	3.0	-0.9	14.67	38.5	-23.8	

LTE

Band 5

5MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4789354096

2020-02-03

20890

EUT, Y-Position

Chamber 2

LTE_16QAM Band 5 Fundamentals, 5MHz Bandwidth

Test Equipment:

Receiving: VULB9163-749, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 8.5m SMA-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								
826.50	25.81	V	3.0	-0.9	21.85	38.5	-16.6	
826.50	16.30	H	3.0	-0.9	12.34	38.5	-26.2	
Mid Ch								
836.50	26.52	V	3.0	-0.9	22.59	38.5	-15.9	
836.50	17.07	H	3.0	-0.9	13.13	38.5	-25.4	
High Ch								
846.50	26.38	V	3.0	-0.9	22.47	38.5	-16.0	
846.50	17.75	H	3.0	-0.9	13.83	38.5	-24.7	

LTE

Band 5

3MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4789354096

Date:

2020-02-03

Test Engineer:

20890

Configuration:

EUT

Location:

Chamber 2

Mode:

LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth

Test Equipment:

Receiving: VULB9163-749, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 8.5m SMA-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								
825.50	27.28	V	3.0	-0.9	23.32	38.5	-15.2	
825.50	17.89	H	3.0	-0.9	13.93	38.5	-24.6	
Mid Ch								
836.50	27.90	V	3.0	-0.9	23.97	38.5	-14.5	
836.50	18.22	H	3.0	-0.9	14.28	38.5	-24.2	
High Ch								
847.50	27.96	V	3.1	-0.9	24.04	38.5	-14.5	
847.50	18.57	H	3.1	-0.9	14.65	38.5	-23.8	

LTE

Band 5

3MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4789354096

Date:

2020-02-03

Test Engineer:

20890

Configuration:

EUT, Y-Postion

Location:

Chamber 2

Mode:

LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth

Test Equipment:

Receiving: VULB9163-749, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 8.5m SMA-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								
825.50	26.12	V	3.0	-0.9	22.16	38.5	-16.3	
825.50	17.03	H	3.0	-0.9	13.07	38.5	-25.4	
Mid Ch								
836.50	26.71	V	3.0	-0.9	22.78	38.5	-15.7	
836.50	16.93	H	3.0	-0.9	12.99	38.5	-25.5	
High Ch								
847.50	27.10	V	3.1	-0.9	23.18	38.5	-15.3	
847.50	17.47	H	3.1	-0.9	13.55	38.5	-24.9	

LTE

Band 5

1.4MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Equipment:

Receiving: VULB9163-749, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 8.5m SMA-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	27.33	V	3.0	-1.0	23.37	38.5	-15.1	
824.70	17.89	H	3.0	-1.0	13.92	38.5	-24.6	
Mid Ch								
836.50	27.71	V	3.0	-0.9	23.78	38.5	-14.7	
836.50	18.00	H	3.0	-0.9	14.06	38.5	-24.4	
High Ch								
848.30	27.72	V	3.0	-0.9	23.81	38.5	-14.7	
848.30	18.51	H	3.0	-0.9	14.60	38.5	-23.9	

LTE

Band 5

1.4MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Equipment:

Receiving: VULB9163-749, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 8.5m SMA-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	25.80	V	3.0	-1.0	21.84	38.5	-16.7	
824.70	16.57	H	3.0	-1.0	12.60	38.5	-25.9	
Mid Ch								
836.50	26.56	V	3.0	-0.9	22.63	38.5	-15.9	
836.50	16.88	H	3.0	-0.9	12.94	38.5	-25.6	
High Ch								
848.30	26.50	V	3.0	-0.9	22.59	38.5	-15.9	
848.30	17.02	H	3.0	-0.9	13.11	38.5	-25.4	

LTE Band 12

LTE

Band 12

10MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4789354096

2020-02-03

20896

EUT/ X-Position

Chamber 1

LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth

Test Equipment:

Receiving: VULB9163-750, and Chamber 1 SMA Cables

Substitution: Dipole 3121_DB4, 8.5m SMA-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								
704.00	15.69	V	2.8	-1.1	11.85	34.8	-22.9	
704.00	21.15	H	2.8	-1.1	17.31	34.8	-17.5	
Mid Ch								
707.50	16.01	V	2.8	-1.1	12.17	34.8	-22.6	
707.50	21.08	H	2.8	-1.1	17.23	34.8	-17.6	
High Ch								
711.00	15.61	V	2.8	-1.1	11.75	34.8	-23.0	
711.00	21.77	H	2.8	-1.1	17.91	34.8	-16.9	

LTE

Band 12

10MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4789354096

2020-02-03

20896

EUT / X-Position

Chamber 1

LTE_16QAM Band 12 Fundamentals, 10MHz Bandwidth

Test Equipment:

Receiving: VULB9163-750, and Chamber 1 SMA Cables

Substitution: Dipole 3121_DB4, 8.5m SMA-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								
704.00	14.40	V	2.8	-1.1	10.56	34.8	-24.2	
704.00	19.91	H	2.8	-1.1	16.07	34.8	-18.7	
Mid Ch								
707.50	14.85	V	2.8	-1.1	11.01	34.8	-23.8	
707.50	20.12	H	2.8	-1.1	16.27	34.8	-18.5	
High Ch								
711.00	13.58	V	2.8	-1.1	9.72	34.8	-25.1	
711.00	20.05	H	2.8	-1.1	16.19	34.8	-18.6	

LTE Band 12 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-03 Test Engineer: 20896 Configuration: EUT/ X-Position Location: Chamber 1 Mode: LTE_QPSK Band 12 Fundamentals, 5MHz Bandwidth Test Equipment: Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-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 colspan="9">Low Ch</td></tr><tr><td>701.50</td><td>15.97</td><td>V</td><td>2.8</td><td>-1.1</td><td>12.14</td><td>34.8</td><td>-22.7</td><td></td></tr><tr><td>701.50</td><td>21.04</td><td>H</td><td>2.8</td><td>-1.1</td><td>17.20</td><td>34.8</td><td>-17.6</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>707.50</td><td>15.70</td><td>V</td><td>2.8</td><td>-1.1</td><td>11.86</td><td>34.8</td><td>-22.9</td><td></td></tr><tr><td>707.50</td><td>21.61</td><td>H</td><td>2.8</td><td>-1.1</td><td>17.76</td><td>34.8</td><td>-17.0</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>713.50</td><td>15.27</td><td>V</td><td>2.8</td><td>-1.1</td><td>11.40</td><td>34.8</td><td>-23.4</td><td></td></tr><tr><td>713.50</td><td>21.57</td><td>H</td><td>2.8</td><td>-1.1</td><td>17.71</td><td>34.8</td><td>-17.1</td><td></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									701.50	15.97	V	2.8	-1.1	12.14	34.8	-22.7		701.50	21.04	H	2.8	-1.1	17.20	34.8	-17.6		Mid Ch									707.50	15.70	V	2.8	-1.1	11.86	34.8	-22.9		707.50	21.61	H	2.8	-1.1	17.76	34.8	-17.0		High Ch									713.50	15.27	V	2.8	-1.1	11.40	34.8	-23.4		713.50	21.57	H	2.8	-1.1	17.71	34.8	-17.1	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	701.50	15.97	V	2.8	-1.1	12.14	34.8	-22.7																																																																																											
	701.50	21.04	H	2.8	-1.1	17.20	34.8	-17.6																																																																																											
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	707.50	15.70	V	2.8	-1.1	11.86	34.8	-22.9																																																																																											
	707.50	21.61	H	2.8	-1.1	17.76	34.8	-17.0																																																																																											
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	713.50	15.27	V	2.8	-1.1	11.40	34.8	-23.4																																																																																											
713.50	21.57	H	2.8	-1.1	17.71	34.8	-17.1																																																																																												
LTE Band 12 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-03 Test Engineer: 20896 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 12 Fundamentals, 5MHz Bandwidth Test Equipment: Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-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 colspan="9">Low Ch</td></tr><tr><td>701.50</td><td>14.83</td><td>V</td><td>2.8</td><td>-1.1</td><td>11.00</td><td>34.8</td><td>-23.8</td><td></td></tr><tr><td>701.50</td><td>19.82</td><td>H</td><td>2.8</td><td>-1.1</td><td>15.98</td><td>34.8</td><td>-18.8</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>707.50</td><td>14.20</td><td>V</td><td>2.8</td><td>-1.1</td><td>10.36</td><td>34.8</td><td>-24.4</td><td></td></tr><tr><td>707.50</td><td>20.43</td><td>H</td><td>2.8</td><td>-1.1</td><td>16.58</td><td>34.8</td><td>-18.2</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>713.50</td><td>14.08</td><td>V</td><td>2.8</td><td>-1.1</td><td>10.21</td><td>34.8</td><td>-24.6</td><td></td></tr><tr><td>713.50</td><td>20.50</td><td>H</td><td>2.8</td><td>-1.1</td><td>16.64</td><td>34.8</td><td>-18.2</td><td></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									701.50	14.83	V	2.8	-1.1	11.00	34.8	-23.8		701.50	19.82	H	2.8	-1.1	15.98	34.8	-18.8		Mid Ch									707.50	14.20	V	2.8	-1.1	10.36	34.8	-24.4		707.50	20.43	H	2.8	-1.1	16.58	34.8	-18.2		High Ch									713.50	14.08	V	2.8	-1.1	10.21	34.8	-24.6		713.50	20.50	H	2.8	-1.1	16.64	34.8	-18.2	
	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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	701.50	19.82	H	2.8	-1.1	15.98	34.8	-18.8																																																																																											
	Mid Ch																																																																																																		
	707.50	14.20	V	2.8	-1.1	10.36	34.8	-24.4																																																																																											
	707.50	20.43	H	2.8	-1.1	16.58	34.8	-18.2																																																																																											
	High Ch																																																																																																		
	713.50	14.08	V	2.8	-1.1	10.21	34.8	-24.6																																																																																											
713.50	20.50	H	2.8	-1.1	16.64	34.8	-18.2																																																																																												

LTE

Band 12

3MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4789354096

2020-02-03

20896

EUT/ X-Position

Chamber 1

LTE_QPSK Band 12 Fundamentals, 3MHz Bandwidth

Test Equipment:

Receiving: VULB9163-750, and Chamber 1 SMA Cables

Substitution: Dipole 3121_DB4, 8.5m SMA-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								
700.50	15.79	V	2.8	-1.1	11.96	34.8	-22.8	
700.50	20.88	H	2.8	-1.1	17.05	34.8	-17.7	
Mid Ch								
707.50	15.44	V	2.8	-1.1	11.60	34.8	-23.2	
707.50	21.32	H	2.8	-1.1	17.47	34.8	-17.3	
High Ch								
714.50	15.04	V	2.8	-1.1	11.18	34.8	-23.6	
714.50	21.46	H	2.8	-1.1	17.60	34.8	-17.2	

LTE

Band 12

3MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4789354096

2020-02-03

20890

EUT / X-Position

Chamber 1

LTE_16QAM Band 12 Fundamentals, 3MHz Bandwidth

Test Equipment:

Receiving: VULB9163-750, and Chamber 1 SMA Cables

Substitution: Dipole 3121_DB4, 8.5m SMA-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								
700.50	14.62	V	2.8	-1.1	10.79	34.8	-24.0	
700.50	19.60	H	2.8	-1.1	15.77	34.8	-19.0	
Mid Ch								
707.50	14.11	V	2.8	-1.1	10.27	34.8	-24.5	
707.50	20.29	H	2.8	-1.1	16.44	34.8	-18.4	
High Ch								
714.50	14.03	V	2.8	-1.1	10.17	34.8	-24.6	
714.50	20.34	H	2.8	-1.1	16.48	34.8	-18.3	

LTE Band 12 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-03 Test Engineer: 20890 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 12 Fundamentals, 1.4MHz Bandwidth Test Equipment: Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-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 colspan="9">Low Ch</td></tr><tr><td>699.70</td><td>15.41</td><td>V</td><td>2.8</td><td>-1.1</td><td>11.58</td><td>34.8</td><td>-23.2</td><td></td></tr><tr><td>699.70</td><td>20.51</td><td>H</td><td>2.8</td><td>-1.1</td><td>16.67</td><td>34.8</td><td>-18.1</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>707.50</td><td>15.36</td><td>V</td><td>2.8</td><td>-1.1</td><td>11.52</td><td>34.8</td><td>-23.3</td><td></td></tr><tr><td>707.50</td><td>21.17</td><td>H</td><td>2.8</td><td>-1.1</td><td>17.32</td><td>34.8</td><td>-17.5</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>715.30</td><td>14.95</td><td>V</td><td>2.8</td><td>-1.1</td><td>11.09</td><td>34.8</td><td>-23.7</td><td></td></tr><tr><td>715.30</td><td>21.28</td><td>H</td><td>2.8</td><td>-1.1</td><td>17.42</td><td>34.8</td><td>-17.4</td><td></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									699.70	15.41	V	2.8	-1.1	11.58	34.8	-23.2		699.70	20.51	H	2.8	-1.1	16.67	34.8	-18.1		Mid Ch									707.50	15.36	V	2.8	-1.1	11.52	34.8	-23.3		707.50	21.17	H	2.8	-1.1	17.32	34.8	-17.5		High Ch									715.30	14.95	V	2.8	-1.1	11.09	34.8	-23.7		715.30	21.28	H	2.8	-1.1	17.42	34.8	-17.4	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	699.70	15.41	V	2.8	-1.1	11.58	34.8	-23.2																																																																																											
	699.70	20.51	H	2.8	-1.1	16.67	34.8	-18.1																																																																																											
	Mid Ch																																																																																																		
	707.50	15.36	V	2.8	-1.1	11.52	34.8	-23.3																																																																																											
	707.50	21.17	H	2.8	-1.1	17.32	34.8	-17.5																																																																																											
	High Ch																																																																																																		
	715.30	14.95	V	2.8	-1.1	11.09	34.8	-23.7																																																																																											
715.30	21.28	H	2.8	-1.1	17.42	34.8	-17.4																																																																																												
LTE Band 12 1.4MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-03 Test Engineer: 20890 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 12 Fundamentals, 1.4MHz Bandwidth Test Equipment: Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-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 colspan="9">Low Ch</td></tr><tr><td>699.70</td><td>14.17</td><td>V</td><td>2.8</td><td>-1.1</td><td>10.34</td><td>34.8</td><td>-24.5</td><td></td></tr><tr><td>699.70</td><td>19.17</td><td>H</td><td>2.8</td><td>-1.1</td><td>15.33</td><td>34.8</td><td>-19.5</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>707.50</td><td>13.73</td><td>V</td><td>2.8</td><td>-1.1</td><td>9.89</td><td>34.8</td><td>-24.9</td><td></td></tr><tr><td>707.50</td><td>20.23</td><td>H</td><td>2.8</td><td>-1.1</td><td>16.38</td><td>34.8</td><td>-18.4</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>715.30</td><td>13.73</td><td>V</td><td>2.8</td><td>-1.1</td><td>9.87</td><td>34.8</td><td>-24.9</td><td></td></tr><tr><td>715.30</td><td>20.13</td><td>H</td><td>2.8</td><td>-1.1</td><td>16.27</td><td>34.8</td><td>-18.5</td><td></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									699.70	14.17	V	2.8	-1.1	10.34	34.8	-24.5		699.70	19.17	H	2.8	-1.1	15.33	34.8	-19.5		Mid Ch									707.50	13.73	V	2.8	-1.1	9.89	34.8	-24.9		707.50	20.23	H	2.8	-1.1	16.38	34.8	-18.4		High Ch									715.30	13.73	V	2.8	-1.1	9.87	34.8	-24.9		715.30	20.13	H	2.8	-1.1	16.27	34.8	-18.5	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
	Low Ch																																																																																																		
	699.70	14.17	V	2.8	-1.1	10.34	34.8	-24.5																																																																																											
	699.70	19.17	H	2.8	-1.1	15.33	34.8	-19.5																																																																																											
	Mid Ch																																																																																																		
	707.50	13.73	V	2.8	-1.1	9.89	34.8	-24.9																																																																																											
	707.50	20.23	H	2.8	-1.1	16.38	34.8	-18.4																																																																																											
	High Ch																																																																																																		
	715.30	13.73	V	2.8	-1.1	9.87	34.8	-24.9																																																																																											
715.30	20.13	H	2.8	-1.1	16.27	34.8	-18.5																																																																																												

LTE Band 66

LTE
Band 66
20MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-05
Test Engineer: 20896
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[00167451], 8.5m SMA-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								
1720.00	13.37	V	4.3	9.4	18.39	30.0	-11.6	
1720.00	20.50	H	4.3	9.4	25.52	30.0	-4.5	
Mid Ch								
1745.00	14.45	V	4.4	9.4	19.54	30.0	-10.5	
1745.00	20.60	H	4.4	9.4	25.69	30.0	-4.3	
High Ch								
1770.00	13.31	V	4.4	9.5	18.41	30.0	-11.6	
1770.00	19.53	H	4.4	9.5	24.63	30.0	-5.4	

LTE
Band 66
20MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-05
Test Engineer: 20896
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[00167451], 8.5m SMA-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								
1720.00	12.06	V	4.3	9.4	17.08	30.0	-12.9	
1720.00	19.35	H	4.3	9.4	24.37	30.0	-5.6	
Mid Ch								
1745.00	12.67	V	4.4	9.4	17.76	30.0	-12.2	
1745.00	19.03	H	4.4	9.4	24.12	30.0	-5.9	
High Ch								
1770.00	12.17	V	4.4	9.5	17.27	30.0	-12.7	
1770.00	18.53	H	4.4	9.5	23.63	30.0	-6.4	

LTE

Band 66

15MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4789354096

2020-02-05

20896

EUT, X-Position

Chamber 2

LTE_QPSK Band 66 Fundamentals, 15MHz Bandwidth

Test Equipment:

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

Substitution: Horn 3115[00167451], 8.5m SMA-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	13.46	V	4.3	9.3	18.48	30.0	-11.5	
1717.50	20.40	H	4.3	9.3	25.42	30.0	-4.6	
Mid Ch								
1745.00	13.35	V	4.4	9.4	18.44	30.0	-11.6	
1745.00	20.41	H	4.4	9.4	25.50	30.0	-4.5	
High Ch								
1772.50	13.11	V	4.4	9.5	18.20	30.0	-11.8	
1772.50	19.97	H	4.4	9.5	25.06	30.0	-4.9	

LTE

Band 66

15MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4789354096

2020-02-05

20896

EUT, X-Position

Chamber 2

LTE_16QAM Band 66 Fundamentals, 15MHz Bandwidth

Test Equipment:

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

Substitution: Horn 3115[00167451], 8.5m SMA-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	12.45	V	4.3	9.3	17.47	30.0	-12.5	
1717.50	19.20	H	4.3	9.3	24.22	30.0	-5.8	
Mid Ch								
1745.00	12.09	V	4.4	9.4	17.18	30.0	-12.8	
1745.00	19.09	H	4.4	9.4	24.18	30.0	-5.8	
High Ch								
1772.50	11.79	V	4.4	9.5	16.88	30.0	-13.1	
1772.50	18.70	H	4.4	9.5	23.79	30.0	-6.2	

LTE

Band 66

10MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4789354096

2020-02-05

20896

EUT, X-Position

Chamber 2

LTE_QPSK Band 66 Fundamentals, 10MHz Bandwidth

Test Equipment:

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

Substitution: Horn 3115[00167451], 8.5m SMA-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								
1715.00	13.27	V	4.3	9.3	18.28	30.0	-11.7	
1715.00	20.35	H	4.3	9.3	25.36	30.0	-4.6	
Mid Ch								
1745.00	13.09	V	4.4	9.4	18.18	30.0	-11.8	
1745.00	20.53	H	4.4	9.4	25.62	30.0	-4.4	
High Ch								
1775.00	12.65	V	4.4	9.5	17.75	30.0	-12.3	
1775.00	19.89	H	4.4	9.5	24.99	30.0	-5.0	

LTE

Band 66

10MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4789354096

2020-02-05

20896

EUT, X-Position

Chamber 2

LTE_16QAM Band 66 Fundamentals, 10MHz Bandwidth

Test Equipment:

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

Substitution: Horn 3115[00167451], 8.5m SMA-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								
1715.00	12.30	V	4.3	9.3	17.31	30.0	-12.7	
1715.00	19.19	H	4.3	9.3	24.20	30.0	-5.8	
Mid Ch								
1745.00	11.80	V	4.4	9.4	16.89	30.0	-13.1	
1745.00	19.02	H	4.4	9.4	24.11	30.0	-5.9	
High Ch								
1775.00	11.51	V	4.4	9.5	16.61	30.0	-13.4	
1775.00	18.63	H	4.4	9.5	23.73	30.0	-6.3	

LTE

Band 66

5MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4789354096

Date:

2020-02-07

Test Engineer:

20890

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[00167451], 8.5m SMA-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	12.80	V	4.3	9.3	17.80	30.0	-12.2	
1712.50	19.54	H	4.3	9.3	24.54	30.0	-5.5	
Mid Ch								
1745.00	13.92	V	4.4	9.4	19.01	30.0	-11.0	
1745.00	20.11	H	4.4	9.4	25.20	30.0	-4.8	
High Ch								
1777.50	12.72	V	4.4	9.5	17.82	30.0	-12.2	
1777.50	19.19	H	4.4	9.5	24.29	30.0	-5.7	

LTE

Band 66

5MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4789354096

Date:

2020-02-07

Test Engineer:

20890

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[00167451], 8.5m SMA-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	11.25	V	4.3	9.3	16.25	30.0	-13.7	
1712.50	18.20	H	4.3	9.3	23.20	30.0	-6.8	
Mid Ch								
1745.00	12.99	V	4.4	9.4	18.08	30.0	-11.9	
1745.00	18.67	H	4.4	9.4	23.76	30.0	-6.2	
High Ch								
1777.50	11.64	V	4.4	9.5	16.74	30.0	-13.3	
1777.50	18.35	H	4.4	9.5	23.45	30.0	-6.5	

LTE

Band 66

3MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Equipment:

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

Substitution: Horn 3115[00167451], 8.5m SMA-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	11.70	V	4.3	9.3	16.71	30.0	-13.3	
1711.50	20.17	H	4.3	9.3	25.18	30.0	-4.8	
Mid Ch								
1745.00	13.06	V	4.4	9.4	18.15	30.0	-11.9	
1745.00	19.78	H	4.4	9.4	24.87	30.0	-5.1	
High Ch								
1778.50	12.78	V	4.4	9.5	17.88	30.0	-12.1	
1778.50	19.66	H	4.4	9.5	24.76	30.0	-5.2	

LTE

Band 66

3MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Equipment:

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

Substitution: Horn 3115[00167451], 8.5m SMA-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	10.56	V	4.3	9.3	15.57	30.0	-14.4	
1711.50	19.04	H	4.3	9.3	24.05	30.0	-6.0	
Mid Ch								
1745.00	12.12	V	4.4	9.4	17.21	30.0	-12.8	
1745.00	18.63	H	4.4	9.4	23.72	30.0	-6.3	
High Ch								
1778.50	11.58	V	4.4	9.5	16.68	30.0	-13.3	
1778.50	18.54	H	4.4	9.5	23.64	30.0	-6.4	

LTE

Band 66

1.4MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsung

Project #: 4789354096

Date: 2020-02-07

Test Engineer: 20890

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[00167451], 8.5m SMA-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								
1710.70	11.22	V	4.3	9.3	16.22	30.0	-13.8	
1710.70	20.18	H	4.3	9.3	25.18	30.0	-4.8	
Mid Ch								
1745.00	12.61	V	4.4	9.4	17.70	30.0	-12.3	
1745.00	19.41	H	4.4	9.4	24.50	30.0	-5.5	
High Ch								
1779.30	11.40	V	4.4	9.5	16.50	30.0	-13.5	
1779.30	19.32	H	4.4	9.5	24.42	30.0	-5.6	

LTE

Band 66

1.4MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsung

Project #: 4789354096

Date: 2020-02-07

Test Engineer: 20890

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[00167451], 8.5m SMA-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								
1710.70	9.83	V	4.3	9.3	14.83	30.0	-15.2	
1710.70	19.08	H	4.3	9.3	24.08	30.0	-5.9	
Mid Ch								
1745.00	11.33	V	4.4	9.4	16.42	30.0	-13.6	
1745.00	18.44	H	4.4	9.4	23.53	30.0	-6.5	
High Ch								
1779.30	10.26	V	4.4	9.5	15.36	30.0	-14.6	
1779.30	17.98	H	4.4	9.5	23.08	30.0	-6.9	

10.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238 and §27. 53

LIMIT

Part 22.917(a) & Part 24.238(a) & Part 27.53(h) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB.

Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

Part 27.53 (h) AWS emission limits—the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.12; ESU40 setting reference to 971168 D01 v03r01

For peak power measurement with a ESU40:

- a) Set the RBW = 100 KHz for emission below 1GHz and 1MHz for emissions above 1GHz
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points $\geq$ span/RBW;
- g) Trace mode = average(WCDMA, LTE), Maxhold(GSM, LTE Band41);;

RESULTS

See the following pages.

NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

10.2.1. SPURIOUS RADIATION PLOTS

GSM850

GSM850 GPRS	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4789354096									
	Date: 2020-02-13									
	Test Engineer: 20881									
	Configuration: EUT / AC Adapter / Earphone, Y-Position									
	Location: Chamber 1									
	Mode: GPRS 850 MHz Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 824.2MHz									
	1648.40	-14.0	V	3.0	45.2	1.0	-58.2	-13.0	-45.2	
	2472.60	-10.6	V	3.0	45.0	1.0	-54.6	-13.0	-41.6	
	3296.80	-8.1	V	3.0	45.3	1.0	-52.4	-13.0	-39.4	
	1648.40	-13.1	H	3.0	45.2	1.0	-57.3	-13.0	-44.3	
	2472.60	-9.9	H	3.0	45.0	1.0	-53.9	-13.0	-40.9	
	3296.80	-8.1	H	3.0	45.3	1.0	-52.4	-13.0	-39.4	
	Mid Ch, 836.6MHz									
	1673.20	-13.8	V	3.0	45.2	1.0	-58.0	-13.0	-45.0	
	2509.80	-10.9	V	3.0	45.0	1.0	-54.9	-13.0	-41.9	
3346.40	-8.3	V	3.0	45.3	1.0	-52.6	-13.0	-39.6		
1673.20	-12.9	H	3.0	45.2	1.0	-57.1	-13.0	-44.1		
2509.80	-10.1	H	3.0	45.0	1.0	-54.2	-13.0	-41.2		
3346.40	-8.3	H	3.0	45.3	1.0	-52.6	-13.0	-39.6		
High Ch, 848.8MHz										
1697.60	-13.1	V	3.0	45.2	1.0	-57.3	-13.0	-44.3		
2546.40	-10.6	V	3.0	45.1	1.0	-54.7	-13.0	-41.7		
3395.20	-8.1	V	3.0	45.3	1.0	-52.4	-13.0	-39.4		
1697.60	-12.7	H	3.0	45.2	1.0	-56.9	-13.0	-43.9		
2546.40	-10.2	H	3.0	45.1	1.0	-54.2	-13.0	-41.2		
3395.20	-8.2	H	3.0	45.3	1.0	-52.5	-13.0	-39.5		
GSM850 EGPRS	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4789354096									
	Date: 2020-02-13									
	Test Engineer: 20881									
	Configuration: EUT / AC Adapter / Earphone, Y-Position									
	Location: Chamber 1									
	Mode: EGPRS 850 MHz Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 824.2MHz									
	1648.40	-13.9	V	3.0	45.2	1.0	-58.1	-13.0	-45.1	
	2472.60	-10.6	V	3.0	45.0	1.0	-54.6	-13.0	-41.6	
	3296.80	-8.2	V	3.0	45.3	1.0	-52.4	-13.0	-39.4	
	1648.40	-13.1	H	3.0	45.2	1.0	-57.3	-13.0	-44.3	
	2472.60	-9.8	H	3.0	45.0	1.0	-53.9	-13.0	-40.9	
	3296.80	-8.5	H	3.0	45.3	1.0	-52.7	-13.0	-39.7	
	Mid Ch, 836.6MHz									
	1673.20	-13.9	V	3.0	45.2	1.0	-58.1	-13.0	-45.1	
	2509.80	-10.7	V	3.0	45.0	1.0	-54.7	-13.0	-41.7	
3346.40	-8.3	V	3.0	45.3	1.0	-52.6	-13.0	-39.6		
1673.20	-12.8	H	3.0	45.2	1.0	-57.0	-13.0	-44.0		
2509.80	-10.2	H	3.0	45.0	1.0	-54.2	-13.0	-41.2		
3346.40	-8.5	H	3.0	45.3	1.0	-52.8	-13.0	-39.8		
High Ch, 848.8MHz										
1697.60	-13.6	V	3.0	45.2	1.0	-57.8	-13.0	-44.8		
2546.40	-10.7	V	3.0	45.1	1.0	-54.7	-13.0	-41.7		
3395.20	-8.2	V	3.0	45.3	1.0	-52.5	-13.0	-39.5		
1697.60	-12.7	H	3.0	45.2	1.0	-56.9	-13.0	-43.9		
2546.40	-10.1	H	3.0	45.1	1.0	-54.2	-13.0	-41.2		
3395.20	-8.2	H	3.0	45.3	1.0	-52.5	-13.0	-39.5		

GSM1900

GSM1900 GPRS	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-03-04 Test Engineer: 20881 Configuration: EUT / AC Adapter / Earphone, X-Position Location: Chamber 1 Mode: GPRS 1900 MHz Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
GSM1900 EGPRS	Low Ch, 1850.2MHz									
	3700.40	-8.0	V	3.0	45.4	1.0	-52.4	-13.0	-39.4	
	5550.60	-5.4	V	3.0	45.3	1.0	-49.6	-13.0	-36.6	
	7400.80	-3.0	V	3.0	44.1	1.0	-46.2	-13.0	-33.2	
	3700.40	-8.5	H	3.0	45.4	1.0	-52.9	-13.0	-39.9	
	5550.60	-5.5	H	3.0	45.3	1.0	-49.7	-13.0	-36.7	
	7400.80	-2.4	H	3.0	44.1	1.0	-45.5	-13.0	-32.5	
	Mid Ch, 1880MHz									
	3760.00	-8.1	V	3.0	45.4	1.0	-52.5	-13.0	-39.5	
	5640.00	-5.2	V	3.0	45.3	1.0	-49.5	-13.0	-36.5	
	7520.00	-3.0	V	3.0	44.1	1.0	-46.1	-13.0	-33.1	
	3760.00	-7.9	H	3.0	45.4	1.0	-52.3	-13.0	-39.3	
	5640.00	-5.6	H	3.0	45.3	1.0	-49.9	-13.0	-36.9	
	7520.00	-2.6	H	3.0	44.1	1.0	-45.7	-13.0	-32.7	
	High Ch, 1909.8MHz									
	3819.60	-8.2	V	3.0	45.4	1.0	-52.6	-13.0	-39.6	
	5729.40	-5.3	V	3.0	45.3	1.0	-49.6	-13.0	-36.6	
	7639.20	-2.8	V	3.0	44.0	1.0	-45.8	-13.0	-32.8	
	3819.60	-8.7	H	3.0	45.4	1.0	-53.1	-13.0	-40.1	
	5729.40	-5.3	H	3.0	45.3	1.0	-49.6	-13.0	-36.6	
	7639.20	-2.8	H	3.0	44.0	1.0	-45.8	-13.0	-32.8	
GSM1900 EGPRS	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-03-04 Test Engineer: 20881 Configuration: EUT / AC Adapter / Earphone, X-Position Location: Chamber 1 Mode: EGPRS 1900 MHz Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1850.2MHz									
	3700.40	-8.3	V	3.0	45.4	1.0	-52.7	-13.0	-39.7	
	5550.60	-5.2	V	3.0	45.3	1.0	-49.5	-13.0	-36.5	
	7400.80	-2.8	V	3.0	44.1	1.0	-46.0	-13.0	-33.0	
	3700.40	-8.6	H	3.0	45.4	1.0	-53.0	-13.0	-40.0	
	5550.60	-5.4	H	3.0	45.3	1.0	-49.7	-13.0	-36.7	
	7400.80	-3.1	H	3.0	44.1	1.0	-46.2	-13.0	-33.2	
	Mid Ch, 1880MHz									
	3760.00	-8.0	V	3.0	45.4	1.0	-52.4	-13.0	-39.4	
	5640.00	-5.0	V	3.0	45.3	1.0	-49.2	-13.0	-36.2	
	7520.00	-2.9	V	3.0	44.1	1.0	-45.9	-13.0	-32.9	
	3760.00	-8.6	H	3.0	45.4	1.0	-53.0	-13.0	-40.0	
	5640.00	-5.4	H	3.0	45.3	1.0	-49.7	-13.0	-36.7	
	7520.00	-2.7	H	3.0	44.1	1.0	-45.8	-13.0	-32.8	
	High Ch, 1909.8MHz									
	3819.60	-8.1	V	3.0	45.4	1.0	-52.6	-13.0	-39.6	
	5729.40	-5.5	V	3.0	45.3	1.0	-49.8	-13.0	-36.8	
	7639.20	-2.9	V	3.0	44.0	1.0	-45.9	-13.0	-32.9	
	3819.60	-8.5	H	3.0	45.4	1.0	-52.9	-13.0	-39.9	
	5729.40	-5.3	H	3.0	45.3	1.0	-49.6	-13.0	-36.6	
	7639.20	-2.7	H	3.0	44.0	1.0	-45.7	-13.0	-32.7	

WCDMA Band 5

WCDMA Band 5 REL99	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-13 Test Engineer: 20881 Configuration: EUT / AC Adapter / Earphone, Y-Position Location: Chamber 1 Mode: Rel99 Band 5 Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
WCDMA Band 5 HSDPA	Low Ch, 826.4MHz									
	1652.80	-15.0	V	3.0	45.2	1.0	-59.2	-13.0	-46.2	
	2479.20	-11.6	V	3.0	45.0	1.0	-55.6	-13.0	-42.6	
	3305.60	-9.3	V	3.0	45.3	1.0	-53.5	-13.0	-40.5	
	1652.80	-14.1	H	3.0	45.2	1.0	-58.3	-13.0	-45.3	
	2479.20	-11.0	H	3.0	45.0	1.0	-55.1	-13.0	-42.1	
	3305.60	-9.5	H	3.0	45.3	1.0	-53.7	-13.0	-40.7	
	Mid Ch, 836.6MHz									
	1673.20	-14.9	V	3.0	45.2	1.0	-59.1	-13.0	-46.1	
	2509.80	-11.7	V	3.0	45.0	1.0	-55.8	-13.0	-42.8	
	3346.40	-9.2	V	3.0	45.3	1.0	-53.5	-13.0	-40.5	
	1673.20	-14.0	H	3.0	45.2	1.0	-58.1	-13.0	-45.1	
	2509.80	-11.1	H	3.0	45.0	1.0	-55.2	-13.0	-42.2	
	3346.40	-9.2	H	3.0	45.3	1.0	-53.5	-13.0	-40.5	
	High Ch, 846.6MHz									
	1693.20	-14.7	V	3.0	45.2	1.0	-58.9	-13.0	-45.9	
	2539.80	-11.6	V	3.0	45.0	1.0	-55.6	-13.0	-42.6	
	3386.40	-9.1	V	3.0	45.3	1.0	-53.4	-13.0	-40.4	
	1693.20	-13.8	H	3.0	45.2	1.0	-58.0	-13.0	-45.0	
	2539.80	-11.2	H	3.0	45.0	1.0	-55.2	-13.0	-42.2	
	3386.40	-9.3	H	3.0	45.3	1.0	-53.6	-13.0	-40.6	
WCDMA Band 5 HSDPA	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-13 Test Engineer: 20881 Configuration: EUT / AC Adapter / Earphone, Y-Position Location: Chamber 1 Mode: HSDPA Band 5 Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 826.4MHz									
	1652.80	-15.0	V	3.0	45.2	1.0	-59.2	-13.0	-46.2	
	2479.20	-11.5	V	3.0	45.0	1.0	-55.6	-13.0	-42.6	
	3305.60	-9.2	V	3.0	45.3	1.0	-53.4	-13.0	-40.4	
	1652.80	-14.0	H	3.0	45.2	1.0	-58.2	-13.0	-45.2	
	2479.20	-11.0	H	3.0	45.0	1.0	-55.1	-13.0	-42.1	
	3305.60	-9.5	H	3.0	45.3	1.0	-53.8	-13.0	-40.8	
	Mid Ch, 836.6MHz									
	1673.20	-14.8	V	3.0	45.2	1.0	-59.0	-13.0	-46.0	
	2509.80	-11.6	V	3.0	45.0	1.0	-55.7	-13.0	-42.7	
	3346.40	-9.2	V	3.0	45.3	1.0	-53.5	-13.0	-40.5	
	1673.20	-13.9	H	3.0	45.2	1.0	-58.1	-13.0	-45.1	
	2509.80	-11.1	H	3.0	45.0	1.0	-55.1	-13.0	-42.1	
	3346.40	-9.4	H	3.0	45.3	1.0	-53.7	-13.0	-40.7	
	High Ch, 846.6MHz									
	1693.20	-14.7	V	3.0	45.2	1.0	-58.8	-13.0	-45.8	
	2539.80	-11.6	V	3.0	45.0	1.0	-55.7	-13.0	-42.7	
	3386.40	-8.9	V	3.0	45.3	1.0	-53.2	-13.0	-40.2	
	1693.20	-13.8	H	3.0	45.2	1.0	-57.9	-13.0	-44.9	
	2539.80	-11.1	H	3.0	45.0	1.0	-55.2	-13.0	-42.2	
	3386.40	-9.3	H	3.0	45.3	1.0	-53.6	-13.0	-40.6	

WCDMA Band 4

WCDMA Band 4 REL99	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-12 Test Engineer: 20882 Configuration: EUT / AC Adapter / Earphone, X-Position Location: Chamber 1 Mode: Rel99 Band 4 Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1712.4MHz 3424.80 -8.0 V 3.0 45.3 1.0 -52.3 -13.0 -39.3 5137.20 -8.3 V 3.0 45.3 1.0 -52.6 -13.0 -39.6 6849.60 -5.7 V 3.0 44.5 1.0 -49.2 -13.0 -36.2 3424.80 -8.2 H 3.0 45.3 1.0 -52.5 -13.0 -39.5 5137.20 -8.3 H 3.0 45.3 1.0 -52.6 -13.0 -39.6 6849.60 -5.4 H 3.0 44.5 1.0 -48.8 -13.0 -35.8 Mid Ch, 1732.6MHz 3465.20 -7.5 V 3.0 45.3 1.0 -51.9 -13.0 -38.9 5197.80 -7.3 V 3.0 45.3 1.0 -51.6 -13.0 -38.6 6930.40 -5.7 V 3.0 44.4 1.0 -49.1 -13.0 -36.1 3465.20 -7.7 H 3.0 45.3 1.0 -52.0 -13.0 -39.0 5197.80 -7.9 H 3.0 45.3 1.0 -52.2 -13.0 -39.2 6930.40 -5.7 H 3.0 44.4 1.0 -49.1 -13.0 -36.1 High Ch, 1752.6MHz 3505.20 -7.5 V 3.0 45.3 1.0 -51.8 -13.0 -38.8 5257.80 -7.7 V 3.0 45.3 1.0 -52.0 -13.0 -39.0 7010.40 -5.7 V 3.0 44.4 1.0 -49.1 -13.0 -36.1 3505.20 -7.8 H 3.0 45.3 1.0 -52.1 -13.0 -39.1 5257.80 -7.7 H 3.0 45.3 1.0 -52.0 -13.0 -39.0 7010.40 -5.4 H 3.0 44.4 1.0 -48.8 -13.0 -35.8									
WCDMA Band 4 HSDPA	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-12 Test Engineer: 20882 Configuration: EUT / AC Adapter / Earphone, X-Position Location: Chamber 1 Mode: HSDPA Band 4 Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1712.4MHz 3424.80 -7.4 V 3.0 45.3 1.0 -51.7 -13.0 -38.7 5137.20 -8.4 V 3.0 45.3 1.0 -52.6 -13.0 -39.6 6849.60 -5.6 V 3.0 44.5 1.0 -49.1 -13.0 -36.1 3424.80 -7.8 H 3.0 45.3 1.0 -52.1 -13.0 -39.1 5137.20 -8.5 H 3.0 45.3 1.0 -52.7 -13.0 -39.7 6849.60 -5.6 H 3.0 44.5 1.0 -49.1 -13.0 -36.1 Mid Ch, 1732.6MHz 3465.20 -7.5 V 3.0 45.3 1.0 -51.8 -13.0 -38.8 5197.80 -7.7 V 3.0 45.3 1.0 -52.0 -13.0 -39.0 6930.40 -5.4 V 3.0 44.4 1.0 -48.8 -13.0 -35.8 3465.20 -7.6 H 3.0 45.3 1.0 -51.9 -13.0 -38.9 5197.80 -7.6 H 3.0 45.3 1.0 -51.9 -13.0 -38.9 6930.40 -5.7 H 3.0 44.4 1.0 -49.1 -13.0 -36.1 High Ch, 1752.6MHz 3505.20 -7.4 V 3.0 45.3 1.0 -51.8 -13.0 -38.8 5257.80 -7.7 V 3.0 45.3 1.0 -52.0 -13.0 -39.0 7010.40 -5.4 V 3.0 44.4 1.0 -48.7 -13.0 -35.7 3505.20 -7.7 H 3.0 45.3 1.0 -52.0 -13.0 -39.0 5257.80 -7.8 H 3.0 45.3 1.0 -52.1 -13.0 -39.1 7010.40 -5.1 H 3.0 44.4 1.0 -48.5 -13.0 -35.5									

WCDMA Band 2

WCDMA Band 2 REL99	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-12 Test Engineer: 20882 Configuration: EUT / AC Adapter / Earphone, X-Position Location: Chamber 1 Mode: Rel99 Band 2 Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
WCDMA Band 2 HSDPA	Low Ch, 1852.4MHz									
	3704.80	-10.8	V	3.0	45.4	1.0	-55.2	-13.0	-42.2	
	5557.20	-7.7	V	3.0	45.3	1.0	-52.0	-13.0	-39.0	
	7409.60	-5.5	V	3.0	44.1	1.0	-48.7	-13.0	-35.7	
	3704.80	-11.0	H	3.0	45.4	1.0	-55.4	-13.0	-42.4	
	5557.20	-8.1	H	3.0	45.3	1.0	-52.4	-13.0	-39.4	
	7409.60	-5.1	H	3.0	44.1	1.0	-48.3	-13.0	-35.3	
	Mid Ch, 1880MHz									
	3760.00	-11.3	V	3.0	45.4	1.0	-55.7	-13.0	-42.7	
	5640.00	-7.6	V	3.0	45.3	1.0	-51.9	-13.0	-38.9	
	7520.00	-5.4	V	3.0	44.1	1.0	-48.5	-13.0	-35.5	
	3760.00	-11.0	H	3.0	45.4	1.0	-55.4	-13.0	-42.4	
	5640.00	-7.9	H	3.0	45.3	1.0	-52.2	-13.0	-39.2	
	7520.00	-5.2	H	3.0	44.1	1.0	-48.3	-13.0	-35.3	
	High Ch, 1907.6MHz									
	3815.20	-10.4	V	3.0	45.4	1.0	-54.8	-13.0	-41.8	
	5722.80	-7.8	V	3.0	45.3	1.0	-52.1	-13.0	-39.1	
	7630.40	-5.1	V	3.0	44.0	1.0	-48.1	-13.0	-35.1	
	3815.20	-10.9	H	3.0	45.4	1.0	-55.3	-13.0	-42.3	
	5722.80	-7.7	H	3.0	45.3	1.0	-52.0	-13.0	-39.0	
	7630.40	-5.1	H	3.0	44.0	1.0	-48.1	-13.0	-35.1	
WCDMA Band 2 HSDPA	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4789354096 Date: 2020-02-12 Test Engineer: 20882 Configuration: EUT / AC Adapter / Earphone, X-Position Location: Chamber 1 Mode: HSDPA Band 2 Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1852.4MHz									
	3704.80	-10.4	V	3.0	45.4	1.0	-54.8	-13.0	-41.8	
	5557.20	-7.4	V	3.0	45.3	1.0	-51.7	-13.0	-38.7	
	7409.60	-5.1	V	3.0	44.1	1.0	-48.2	-13.0	-35.2	
	3704.80	-11.0	H	3.0	45.4	1.0	-55.4	-13.0	-42.4	
	5557.20	-8.0	H	3.0	45.3	1.0	-52.3	-13.0	-39.3	
	7409.60	-5.1	H	3.0	44.1	1.0	-48.3	-13.0	-35.3	
	Mid Ch, 1880MHz									
	3760.00	-10.1	V	3.0	45.4	1.0	-54.5	-13.0	-41.5	
	5640.00	-7.2	V	3.0	45.3	1.0	-51.5	-13.0	-38.5	
	7520.00	-5.2	V	3.0	44.1	1.0	-48.3	-13.0	-35.3	
	3760.00	-10.3	H	3.0	45.4	1.0	-54.7	-13.0	-41.7	
	5640.00	-7.4	H	3.0	45.3	1.0	-51.7	-13.0	-38.7	
	7520.00	-4.7	H	3.0	44.1	1.0	-47.8	-13.0	-34.8	
	High Ch, 1907.6MHz									
	3815.20	-10.4	V	3.0	45.4	1.0	-54.9	-13.0	-41.9	
	5722.80	-7.5	V	3.0	45.3	1.0	-51.8	-13.0	-38.8	
	7630.40	-5.3	V	3.0	44.0	1.0	-48.3	-13.0	-35.3	
	3815.20	-11.1	H	3.0	45.4	1.0	-55.6	-13.0	-42.6	
	5722.80	-7.5	H	3.0	45.3	1.0	-51.8	-13.0	-38.8	
	7630.40	-5.0	H	3.0	44.0	1.0	-48.0	-13.0	-35.0	

LTE Band 2

LTE Band 2 1.4MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4789354096 Date: 2020-02-04 Test Engineer: 20890 Configuration: EUT / AC Adapter / Earphone, X-Position Location: Chamber 2 Mode: LTE_QPSK Band 2 Harmonics, 1.4MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1850.7MHz									
	3701.40	-11.5	V	3.0	42.0	1.0	-52.5	-13.0	-39.5	
	5552.10	-7.8	V	3.0	42.9	1.0	-49.6	-13.0	-36.6	
	7402.80	-6.3	V	3.0	42.5	1.0	-47.8	-13.0	-34.8	
	3701.40	-11.3	H	3.0	42.0	1.0	-52.4	-13.0	-39.4	
	5552.10	-7.7	H	3.0	42.9	1.0	-49.6	-13.0	-36.6	
	7402.80	-6.4	H	3.0	42.5	1.0	-47.9	-13.0	-34.9	
	Mid Ch, 1880MHz									
	3760.00	-10.5	V	3.0	42.1	1.0	-51.6	-13.0	-38.6	
	5640.00	-7.2	V	3.0	42.9	1.0	-49.1	-13.0	-36.1	
	7520.00	-6.3	V	3.0	42.4	1.0	-47.7	-13.0	-34.7	
	3760.00	-10.9	H	3.0	42.1	1.0	-52.0	-13.0	-39.0	
	5640.00	-7.2	H	3.0	42.9	1.0	-49.1	-13.0	-36.1	
	7520.00	-5.1	H	3.0	42.4	1.0	-46.5	-13.0	-33.5	
	High Ch, 1909.3MHz									
	3818.60	-11.4	V	3.0	42.1	1.0	-52.4	-13.0	-39.4	
	5727.90	-7.7	V	3.0	42.9	1.0	-49.6	-13.0	-36.6	
	7637.20	-6.6	V	3.0	42.3	1.0	-48.0	-13.0	-35.0	
	3818.60	-11.4	H	3.0	42.1	1.0	-52.4	-13.0	-39.4	
	5727.90	-7.7	H	3.0	42.9	1.0	-49.6	-13.0	-36.6	
	7637.20	-5.5	H	3.0	42.3	1.0	-46.9	-13.0	-33.9	

LTE Band 5

LTE Band 5 1.4MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4789354096 Date: 2020-02-03 Test Engineer: 20896 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 5 Harmonics, 1.4MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 824.7MHz									
	1649.40	-11.7	V	3.0	40.7	1.0	-51.4	-13.0	-38.4	
	2474.10	-12.7	V	3.0	41.3	1.0	-53.0	-13.0	-40.0	
	3298.80	-10.3	V	3.0	42.0	1.0	-51.3	-13.0	-38.3	
	1649.40	-10.7	H	3.0	40.7	1.0	-50.3	-13.0	-37.3	
	2474.10	-12.6	H	3.0	41.3	1.0	-52.9	-13.0	-39.9	
	3298.80	-10.0	H	3.0	42.0	1.0	-51.1	-13.0	-38.1	
	Mid Ch, 836.5MHz									
	1673.00	-12.7	V	3.0	40.7	1.0	-52.3	-13.0	-39.3	
	2509.50	-12.9	V	3.0	41.3	1.0	-53.2	-13.0	-40.2	
	3346.00	-10.2	V	3.0	42.0	1.0	-51.2	-13.0	-38.2	
	1673.00	-11.5	H	3.0	40.7	1.0	-51.1	-13.0	-38.1	
	2509.50	-12.7	H	3.0	41.3	1.0	-53.0	-13.0	-40.0	
	3346.00	-9.8	H	3.0	42.0	1.0	-50.8	-13.0	-37.8	
	High Ch, 848.3MHz									
	1696.60	-13.2	V	3.0	40.7	1.0	-52.9	-13.0	-39.9	
	2544.90	-12.5	V	3.0	41.4	1.0	-52.9	-13.0	-39.9	
	3393.20	-9.8	V	3.0	42.0	1.0	-50.8	-13.0	-37.8	
	1696.60	-12.4	H	3.0	40.7	1.0	-52.1	-13.0	-39.1	
	2544.90	-12.3	H	3.0	41.4	1.0	-52.7	-13.0	-39.7	
	3393.20	-9.3	H	3.0	42.0	1.0	-50.4	-13.0	-37.4	

LTE Band 12

LTE Band 12 1.4MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4789354096 Date: 2020-02-03 Test Engineer: 20896 Configuration: EUT / AC Adapter / Earphone, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 12 Harmonics, 1.4MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 699.7MHz									
	1399.40	-14.0	V	3.0	45.4	1.0	-58.4	-13.0	-45.4	
	2099.10	-12.9	V	3.0	45.0	1.0	-56.8	-13.0	-43.8	
	2798.80	-10.8	V	3.0	45.1	1.0	-54.9	-13.0	-41.9	
	1399.40	-11.1	H	3.0	45.4	1.0	-55.5	-13.0	-42.5	
	2099.10	-11.8	H	3.0	45.0	1.0	-55.7	-13.0	-42.7	
	2798.80	-10.6	H	3.0	45.1	1.0	-54.7	-13.0	-41.7	
	Mid Ch, 707.5MHz									
	1415.00	-14.7	V	3.0	45.4	1.0	-59.1	-13.0	-46.1	
	2122.50	-12.7	V	3.0	45.0	1.0	-56.7	-13.0	-43.7	
	2830.00	-10.8	V	3.0	45.1	1.0	-55.0	-13.0	-42.0	
	1415.00	-8.4	H	3.0	45.4	1.0	-52.8	-13.0	-39.8	
	2122.50	-11.0	H	3.0	45.0	1.0	-55.0	-13.0	-42.0	
	2830.00	-10.6	H	3.0	45.1	1.0	-54.7	-13.0	-41.7	
	High Ch, 715.3MHz									
	1430.60	-11.8	V	3.0	45.4	1.0	-56.2	-13.0	-43.2	
	2145.90	-12.7	V	3.0	45.0	1.0	-56.7	-13.0	-43.7	
	2861.20	-10.7	V	3.0	45.1	1.0	-54.8	-13.0	-41.8	
	1430.60	-8.2	H	3.0	45.4	1.0	-52.6	-13.0	-39.6	
	2145.90	-11.7	H	3.0	45.0	1.0	-55.6	-13.0	-42.6	
	2861.20	-10.8	H	3.0	45.1	1.0	-55.0	-13.0	-42.0	

LTE Band 66

LTE Band 66 20MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung Project #: 4789354096 Date: 2020-02-07 Test Engineer: 20890 Configuration: EUT / AC Adapter / Earphone, X-Position Location: Chamber 2 Mode: LTE_QPSK Band 66 Harmonics, 20MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1720MHz									
	3440.00	-9.0	V	3.0	42.0	1.0	-50.0	-13.0	-37.0	
	5160.00	-7.5	V	3.0	42.8	1.0	-49.3	-13.0	-36.3	
	6880.00	-5.2	V	3.0	42.7	1.0	-46.9	-13.0	-33.9	
	3440.00	-8.8	H	3.0	42.0	1.0	-49.8	-13.0	-36.8	
	5160.00	-8.4	H	3.0	42.8	1.0	-50.2	-13.0	-37.2	
	6880.00	-5.4	H	3.0	42.7	1.0	-47.1	-13.0	-34.1	
	Mid Ch, 1745MHz									
	3490.00	-8.4	V	3.0	42.0	1.0	-49.4	-13.0	-36.4	
	5235.00	-7.7	V	3.0	42.8	1.0	-49.5	-13.0	-36.5	
	6980.00	-5.9	V	3.0	42.7	1.0	-47.5	-13.0	-34.5	
	3490.00	-8.2	H	3.0	42.0	1.0	-49.2	-13.0	-36.2	
	5235.00	-7.8	H	3.0	42.8	1.0	-49.6	-13.0	-36.6	
	6980.00	-6.5	H	3.0	42.7	1.0	-48.2	-13.0	-35.2	
	High Ch, 1770MHz									
	3540.00	-7.8	V	3.0	42.0	1.0	-48.9	-13.0	-35.9	
	5310.00	-8.0	V	3.0	42.8	1.0	-49.8	-13.0	-36.8	
	7080.00	-6.0	V	3.0	42.6	1.0	-47.6	-13.0	-34.6	
	3540.00	-7.8	H	3.0	42.0	1.0	-48.9	-13.0	-35.9	
	5310.00	-8.0	H	3.0	42.8	1.0	-49.8	-13.0	-36.8	
	7080.00	-5.8	H	3.0	42.6	1.0	-47.4	-13.0	-34.4	

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

END OF REPORT