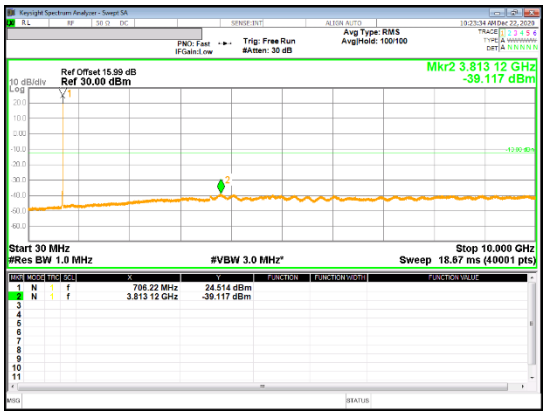
LTE Band 2

Band 2 15MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

LTE Band 12

Band 12 3MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

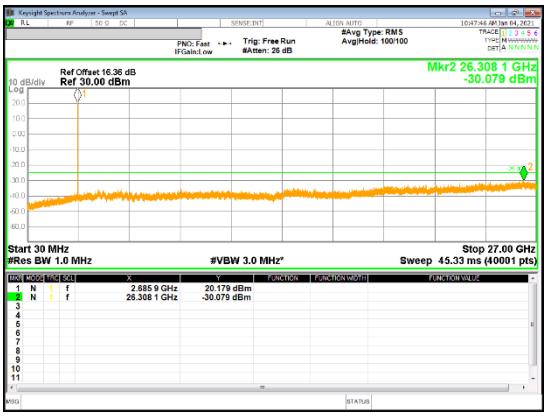
LTE Band 26 (Part 90)

Band 26 3MHz	 QPSK Low channel	 QPSK High channel

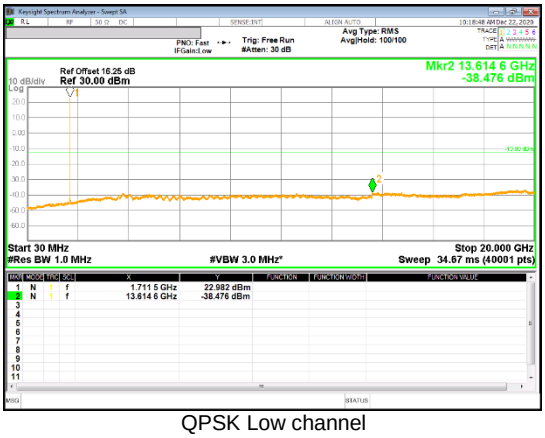
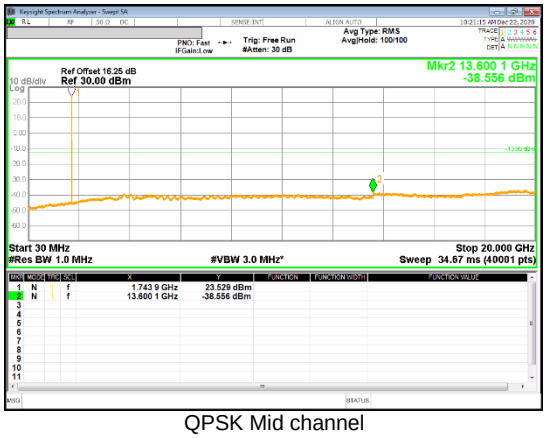
LTE Band 26 (Part 22)

Band 26 5MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

LTE Band 41

Band 41 5MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

LTE Band 66

Band 66 3MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 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.

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9.4. FREQUENCY STABILITY

RULE PART(S)

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

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.

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

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)

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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 @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2060.500 Hz		High Channel	2122.000 Hz	
Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.86	50	824.20004972	-0.004	848.80003610	0.006	2.5
3.86	40	824.20003384	0.015	848.80002257	0.022	2.5
3.86	30	824.20003267	0.017	848.80002602	0.017	2.5
3.86	***20***	***824.20004643***	***0.000***	***848.80004084***	***0.000***	***2.5***
3.86	10	824.20003939	0.009	848.80003264	0.010	2.5
3.86	0	824.20005740	-0.013	848.80007103	-0.036	2.5
3.86	-10	824.20006658	-0.024	848.80007613	-0.042	2.5
3.86	-20	824.20005627	-0.012	848.80007342	-0.038	2.5
3.86	-30	824.20005989	-0.016	#VALUE!	#VALUE!	2.5

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2060.500 Hz		High Channel	2122.000 Hz	
Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.86	***20***	**824.20004643**	***0***	**848.80004084**	***0***	***2.5***
4.43	20	824.20001314	0.040	848.80001333	0.032	2.5
3.65	20	824.20002728	0.023	848.80002804	0.015	2.5

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

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	1850.0808	1909.9183		
Extreme (50C)		1850.0809	1909.9184	76.0	0.040
Extreme (40C)		1850.0809	1909.9184	72.7	0.039
Extreme (30C)		1850.0809	1909.9184	60.6	0.032
Extreme (10C)		1850.0809	1909.9184	40.4	0.021
Extreme (0C)		1850.0809	1909.9184	45.1	0.024
Extreme (-10C)		1850.0809	1909.9184	56.0	0.030
Extreme (-20C)		1850.0809	1909.9184	75.4	0.040
Extreme (-30C)		1850.0809	1909.9184	55.0	0.029
20C	15%	1850.0809	1909.9183	17.6	0.009
	-15%	1850.0809	1909.9183	16.7	0.009
	End Point	1850.0809	1909.9183	14.7	0.008

WCDMA Band 5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz

Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.86	50	826.40001187	0.001	846.60001038	-0.001	2.5
3.86	40	826.40001013	0.003	846.60001232	-0.003	2.5
3.86	30	826.40001139	0.002	846.60001107	-0.002	2.5
3.86	***20***	***826.40001297***	***0.000***	***846.60000963***	***0.000***	***2.5***
3.86	10	826.40001591	-0.004	846.60001103	-0.002	2.5
3.86	0	826.40004448	-0.038	846.60005295	-0.051	2.5
3.86	-10	826.40004592	-0.040	846.60004111	-0.037	2.5
3.86	-20	826.40004509	-0.039	846.60004153	-0.038	2.5
3.86	-30	826.40004857	-0.043	846.60004721	-0.044	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz

Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.86	***20***	**826.40001297**	***0***	**846.60000963**	***0***	***2.5***
4.43	20	826.40000378	0.011	846.60000304	0.008	2.5
3.65	20	826.40000437	0.010	846.60000301	0.008	2.5

WCDMA Band 4 (Lowest Frequency:Rel99 / 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	1710.3028	1754.6946		
Extreme (50C)		1710.3029	1754.6946	63.4	0.037
Extreme (40C)		1710.3029	1754.6946	57.2	0.033
Extreme (30C)		1710.3028	1754.6946	22.8	0.013
Extreme (10C)		1710.3028	1754.6946	20.9	0.012
Extreme (0C)		1710.3029	1754.6946	53.8	0.031
Extreme (-10C)		1710.3029	1754.6946	52.1	0.030
Extreme (-20C)		1710.3029	1754.6946	54.3	0.031
Extreme (-30C)		1710.3028	1754.6946	46.9	0.027
20C	15%	1710.3029	1754.6946	7.8	0.004
	-15%	1710.3029	1754.6946	7.9	0.005
	End Point	1710.3028	1754.6946	8.2	0.005

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	1850.3100	1909.6954		
Extreme (50C)		1850.3100	1909.6954	37.5	0.020
Extreme (40C)		1850.3100	1909.6954	39.1	0.021
Extreme (30C)		1850.3100	1909.6954	25.7	0.014
Extreme (10C)		1850.3100	1909.6954	28.5	0.015
Extreme (0C)		1850.3100	1909.6954	29.2	0.016
Extreme (-10C)		1850.3100	1909.6954	40.6	0.022
Extreme (-20C)		1850.3100	1909.6954	39.3	0.021
Extreme (-30C)		1850.3100	1909.6954	35.6	0.019
20C	15%	1850.3100	1909.6954	8.1	0.004
	-15%	1850.3100	1909.6954	8.7	0.005
	End Point	1850.3100	1909.6954	7.1	0.004

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	1850.1541	1909.8443		
Extreme (50C)		1850.1541	1909.8443	71.6	0.038
Extreme (40C)		1850.1541	1909.8443	73.4	0.039
Extreme (30C)		1850.1541	1909.8443	68.8	0.037
Extreme (10C)		1850.1541	1909.8443	49.9	0.027
Extreme (0C)		1850.1541	1909.8443	57.0	0.030
Extreme (-10C)		1850.1541	1909.8443	51.5	0.027
Extreme (-20C)		1850.1541	1909.8443	55.0	0.029
Extreme (-30C)		1850.1541	1909.8443	79.1	0.042
20C	15%	1850.1541	1909.8443	15.2	0.008
	-15%	1850.1541	1909.8443	15.3	0.008
	End Point	1850.1541	1909.8443	17.6	0.009

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

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	699.1550	715.8457		
Extreme (50C)		699.1550	715.8457	10.8	0.015
Extreme (40C)		699.1550	715.8457	18.3	0.026
Extreme (30C)		699.1550	715.8457	4.4	0.006
Extreme (10C)		699.1550	715.8457	8.3	0.012
Extreme (0C)		699.1550	715.8457	7.4	0.010
Extreme (-10C)		699.1550	715.8457	5.8	0.008
Extreme (-20C)		699.1550	715.8457	5.2	0.007
Extreme (-30C)		699.1550	715.8457	18.9	0.027
20C	15%	699.1550	715.8457	6.4	0.009
	-15%	699.1550	715.8457	5.8	0.008
	End Point	699.1550	715.8457	6.1	0.009

LTE Band 26

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20ºC

Limit: +- 2.5 ppm = Low Channel 2036.750 Hz High Channel 2120.750 Hz

Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	814.70004540	0.014	848.30001252	-0.003	2.5
3.85	40	814.70005702	0.000	848.30001243	-0.002	2.5
3.85	30	814.70006848	-0.014	848.30000964	0.001	2.5
3.85	***20***	***814.70005671***	***0.000***	***848.30001037***	***0.000***	***2.5***
3.85	10	814.70007097	-0.018	848.30001566	-0.006	2.5
3.85	0	814.70008057	-0.029	848.30001455	-0.005	2.5
3.85	-10	814.70003904	0.022	848.30005410	-0.052	2.5
3.85	-20	814.70005756	-0.001	848.30006311	-0.062	2.5
3.85	-30	814.70006047	-0.005	848.30005815	-0.056	2.5

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20ºC

Limit: +- 2.5 ppm = Low Channel 2036.750 Hz High Channel 2120.750 Hz

Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.86	***20***	**814.70005671**	***0***	**848.30001037**	***0***	***2.5***
4.43	20	814.70000734	0.061	848.30000867	0.002	2.5
3.65	20	814.70000775	0.060	848.30000805	0.003	2.5

LTE Band 41 (Lowest Frequency: 16QAM / Highest Frequency: QPSK)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2493.9980	2692.0055		
Extreme (50C)		2493.9981	2692.0056	83.7	0.032
Extreme (40C)		2493.9981	2692.0056	66.2	0.026
Extreme (30C)		2493.9981	2692.0056	62.0	0.024
Extreme (10C)		2493.9981	2692.0056	51.7	0.020
Extreme (0C)		2493.9981	2692.0056	50.6	0.019
Extreme (-10C)		2493.9981	2692.0056	52.1	0.020
Extreme (-20C)		2493.9980	2692.0055	42.5	0.016
Extreme (-30C)		2493.9980	2692.0055	47.8	0.018
20C	15%	2493.9981	2692.0055	18.7	0.007
	-15%	2493.9981	2692.0055	17.9	0.007
	End Point	2493.9981	2692.0055	19.5	0.008

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

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)		1710.6995	1779.3006	61.3	0.035
Extreme (40C)		1710.6995	1779.3006	61.8	0.035
Extreme (30C)		1710.6995	1779.3006	35.2	0.020
Extreme (10C)		1710.6995	1779.3006	23.3	0.013
Extreme (0C)		1710.6995	1779.3006	22.6	0.013
Extreme (-10C)		1710.6995	1779.3006	72.7	0.042
Extreme (-20C)		1710.6995	1779.3006	92.6	0.053
Extreme (-30C)		1710.6995	1779.3006	94.6	0.054
20C	15%	1710.6995	1779.3006	12.1	0.007
	-15%	1710.6995	1779.3006	11.8	0.007
	End Point	1710.6995	1779.3006	11.9	0.007

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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 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 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.

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9.5. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50, §27.53 and §90.635

LIMITS

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

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

27.50:

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

(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.

(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.

(h) The following power limits shall apply in the BRS and EBS:

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

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

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 ≥ OBW;

b) Set VBW ≥ 3 × RBW;

c) Set span ≥ 2 x RBW;

d) Sweep time = auto couple;

e) Detector = rms;

f) Ensure that the number of measurement points ≥ span/RBW;

g) Trace mode = max hold (GSM, WCDMA), average(LTE);

TEST RESULTS

9.5.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	128	824.2	27.85	609.54
		190	836.6	28.56	717.79
		251	848.8	**30.52**	**1127.20**
	EGPRS	128	824.2	21.93	155.96
		190	836.6	22.30	169.82
		251	848.8	**24.29**	**268.53**
GSM1900	GPRS	512	1850.2	**31.24**	**1330.45**
		661	1880	29.11	814.70
		810	1909.8	30.39	1093.96
	EGPRS	512	1850.2	27.32	539.51
		661	1880	23.61	229.61
		810	1909.8	**28.19**	**659.17**

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	18.19	65.92
		4183	836.6	19.63	91.83
		4233	846.6	**21.22**	**132.43**
	HSDPA	4132	826.4	17.82	60.53
		4183	836.6	19.93	98.40
		4233	846.6	**21.36**	**136.77**
Band 4	REL99	1312	1712.4	21.81	151.71
		1413	1732.6	**23.22**	**209.89**
		1513	1752.6	22.72	187.07
	HSDPA	1312	1712.4	22.01	158.85
		1413	1732.6	**23.20**	**208.93**
		1513	1752.6	22.74	187.93
Band 2	REL99	9262	1852.4	**24.97**	**314.05**
		9400	1880.0	24.13	258.82
		9538	1907.6	23.62	230.14
	HSDPA	9262	1852.4	**24.96**	**313.33**
		9400	1880.0	23.95	248.31
		9538	1907.6	23.61	229.61

LTE Band 2

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 2	20	QPSK	1/0	1860.0	**26.16**	**413.05**
			1/0	1880.0	25.13	325.84
			1/0	1900.0	25.34	341.98
		16QAM	1/0	1860.0	**25.09**	**322.85**
			1/0	1880.0	23.93	247.17
			1/0	1900.0	24.40	275.42
	15	QPSK	1/0	1857.5	**26.31**	**427.56**
			1/0	1880.0	25.41	347.54
			1/37	1902.5	24.80	302.00
		16QAM	1/37	1857.5	**24.86**	**306.20**
			1/37	1880.0	23.62	230.14
			1/37	1902.5	23.59	228.56
	10	QPSK	1/0	1855.0	**25.32**	**340.41**
			1/0	1880.0	25.10	323.59
			1/0	1905.0	25.07	321.37
		16QAM	1/49	1855.0	**24.90**	**309.03**
			1/49	1880.0	24.09	256.45
			1/0	1905.0	24.08	255.86
	5	QPSK	1/24	1852.5	**25.27**	**336.51**
			1/24	1880.0	24.35	272.27
			1/12	1907.5	25.24	334.20
		16QAM	1/12	1852.5	23.93	247.17
			1/24	1880.0	23.07	202.77
			1/24	1907.5	**24.28**	**267.92**
	3	QPSK	1/8	1851.5	**25.41**	**347.54**
			1/0	1880.0	25.01	316.96
			1/8	1908.5	24.95	312.61
		16QAM	1/8	1851.5	24.22	264.24
			1/0	1880.0	24.01	251.77
			1/8	1908.5	**24.26**	**266.69**
	1.4	QPSK	1/0	1850.7	**25.66**	**368.13**
			1/0	1880.0	25.17	328.85
			1/0	1909.3	25.57	360.58
		16QAM	1/3	1850.7	**24.52**	**283.14**
			1/0	1880.0	23.99	250.61
			1/0	1909.3	24.36	272.90

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LTE Band 12

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 12	10	QPSK	1/0	704.0	19.51	89.33
			1/0	707.5	**19.71**	**93.54**
			1/0	711.0	19.35	86.10
		16QAM	1/0	704.0	18.38	68.87
			1/0	707.5	**18.42**	**69.50**
			1/0	711.0	18.20	66.07
	5	QPSK	1/24	701.5	**19.63**	**91.83**
			1/12	707.5	19.42	87.50
			1/12	713.5	19.40	87.10
		16QAM	1/12	701.5	18.29	67.45
			1/12	707.5	18.18	65.77
			1/0	713.5	**18.37**	**68.71**
	3	QPSK	1/8	700.5	19.45	88.10
			1/0	707.5	**19.68**	**92.90**
			1/8	714.5	19.51	89.33
		16QAM	1/8	700.5	**18.32**	**67.92**
			1/8	707.5	18.22	66.37
			1/8	714.5	18.29	67.45
	1.4	QPSK	1/0	699.7	19.43	87.70
			1/0	707.5	**19.50**	**89.13**
			1/0	715.3	19.38	86.70
		16QAM	1/0	699.7	**18.25**	**66.83**
			1/0	707.5	18.24	66.68
			1/0	715.3	18.24	66.68

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LTE Band 26

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP/EIRP [dBm]	ERP/EIRP [mW]
Band 26	15	QPSK	1/37	821.5	18.63	72.95
			1/0	831.5	19.60	91.20
			1/37	841.5	**21.95**	**156.68**
		16QAM	1/37	821.5	17.43	55.34
			1/37	831.5	18.63	72.95
			1/37	841.5	**20.97**	**125.03**
	10	QPSK	1/0	819.0	18.53	71.29
			1/0	829.0	19.23	83.75
			1/0	831.5	19.64	92.04
			1/0	844.0	**21.96**	**157.04**
		16QAM	1/49	819.0	16.86	48.53
			1/25	829.0	17.99	62.95
			1/0	831.5	18.33	68.08
			1/0	844.0	**20.95**	**124.45**
	5	QPSK	1/24	816.5	18.72	74.47
			1/24	821.5	18.54	71.45
			1/12	826.5	18.99	79.25
			1/24	831.5	20.14	103.28
			1/12	846.5	**22.62**	**182.81**
		16QAM	1/12	816.5	17.44	55.46
			1/0	821.5	17.81	60.39
			1/24	826.5	18.03	63.53
			1/12	831.5	18.66	73.45
			1/24	846.5	**21.62**	**145.21**
	3	QPSK	1/8	815.5	18.60	72.44
			1/14	822.5	18.77	75.34
			1/14	825.5	19.08	80.91
			1/8	831.5	19.83	96.16
			1/0	847.5	**22.67**	**184.93**
		16QAM	1/14	815.5	17.48	55.98
			1/14	822.5	17.85	60.95
			1/14	825.5	18.10	64.57
			1/8	831.5	18.57	71.94
			1/0	847.5	**21.46**	**139.96**
	1.4	QPSK	1/0	814.7	18.70	74.13
			1/0	823.3	18.80	75.86
			1/0	824.7	18.95	78.52
			1/0	831.5	19.97	99.31
			1/0	848.3	**22.65**	**184.08**
		16QAM	1/0	814.7	17.38	54.70
			1/0	823.3	17.58	57.28
			1/0	824.7	18.00	63.10
			1/0	831.5	18.77	75.34
			1/0	848.3	**21.53**	**142.23**

LTE Band 41

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 41	20	QPSK	1/0	2506.0	21.23	132.74
			1/0	2593.0	**23.34**	**215.77**
			1/0	2680.0	20.99	125.60
		16QAM	1/49	2506.0	20.38	109.14
			1/0	2593.0	**22.73**	**187.50**
			1/0	2680.0	20.57	114.02
	15	QPSK	1/0	2503.5	21.35	136.46
			1/0	2593.0	**22.50**	**177.83**
			1/0	2682.5	19.85	96.61
		16QAM	1/0	2503.5	21.00	125.89
			1/0	2593.0	**22.02**	**159.22**
			1/0	2682.5	19.25	84.14
	10	QPSK	1/0	2501.0	21.48	140.60
			1/0	2593.0	**23.12**	**205.12**
			1/0	2685.0	19.88	97.27
		16QAM	1/0	2501.0	21.90	154.88
			1/0	2593.0	**22.50**	**177.83**
			1/25	2685.0	19.15	82.22
	5	QPSK	1/0	2498.5	22.42	174.58
			1/0	2593.0	**22.95**	**197.24**
			1/0	2687.5	20.16	103.75
		16QAM	1/0	2498.5	21.79	151.01
			1/0	2593.0	**22.77**	**189.23**
			1/24	2687.5	18.91	77.80

LTE Band 66

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 66	20	QPSK	1/0	1720.0	22.70	186.21
			1/0	1745.0	**24.28**	**267.92**
			1/0	1770.0	23.71	234.96
		16QAM	1/0	1720.0	21.54	142.56
			1/99	1745.0	**22.80**	**190.55**
			1/0	1770.0	22.59	181.55
	15	QPSK	1/0	1717.5	22.46	176.20
			1/37	1747.5	24.38	274.16
			1/0	1772.5	**25.32**	**340.41**
		16QAM	1/0	1717.5	21.32	135.52
			1/0	1747.5	23.30	213.80
			1/37	1772.5	**23.58**	**228.03**
	10	QPSK	1/0	1715.0	22.98	198.61
			1/0	1745.0	24.71	295.80
			1/0	1775.0	**25.02**	**317.69**
		16QAM	1/49	1715.0	22.09	161.81
			1/49	1745.0	23.25	211.35
			1/0	1775.0	**23.89**	**244.91**
	5	QPSK	1/12	1712.5	22.00	158.49
			1/24	1745.0	**24.40**	**275.42**
			1/12	1777.5	23.22	209.89
		16QAM	1/24	1712.5	20.96	124.74
			1/12	1745.0	23.26	211.84
			1/24	1777.5	**23.54**	**225.94**
	3	QPSK	1/8	1711.5	22.06	160.69
			1/0	1745.0	**24.81**	**302.69**
			1/8	1778.5	24.79	301.30
		16QAM	1/8	1711.5	20.96	124.74
			1/8	1745.0	23.56	226.99
			1/8	1778.5	**24.04**	**253.51**
	1.4	QPSK	1/0	1710.7	22.05	160.32
			1/0	1745.0	**24.57**	**286.42**
			1/0	1779.3	23.94	247.74
		16QAM	1/3	1710.7	21.19	131.52
			1/3	1745.0	**23.30**	**213.80**
			1/0	1779.3	23.14	206.06

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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 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 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.

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9.5.2. ERP/EIRP DATA

GSM850

GSM850

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-16
Test Engineer: 22943
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: GPRS 850 MHz Fundamentals

Test Equpment:
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								
824.20	31.85	V	3.0	-1.0	27.85	38.5	-10.6	
824.20	15.58	H	3.0	-1.0	11.59	38.5	-26.9	
Mid Ch								
836.60	32.52	V	3.1	-0.9	28.56	38.5	-9.9	
836.60	16.34	H	3.1	-0.9	12.38	38.5	-26.1	
High Ch								
848.80	34.46	V	3.1	-0.9	30.52	38.5	-8.0	
848.80	17.57	H	3.1	-0.9	13.63	38.5	-24.9	

GSM850

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-16
Test Engineer: 22943
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: EGPRS 850 MHz Fundamentals

Test Equpment:
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								
824.20	25.93	V	3.0	-1.0	21.93	38.5	-16.6	
824.20	9.54	H	3.0	-1.0	5.55	38.5	-33.0	
Mid Ch								
836.60	26.26	V	3.1	-0.9	22.30	38.5	-16.2	
836.60	10.69	H	3.1	-0.9	6.73	38.5	-31.8	
High Ch								
848.80	28.23	V	3.1	-0.9	24.29	38.5	-14.2	
848.80	11.40	H	3.1	-0.9	7.46	38.5	-31.0	

GSM1900

GSM1900

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-16
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: GPRS 1900 MHz Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	19.18	V	4.5	9.6	24.29	33.0	-8.7	
1850.20	26.13	H	4.5	9.6	31.24	33.0	-1.8	
Mid Ch								
1880.00	22.38	V	4.6	9.4	27.17	33.0	-5.8	
1880.00	24.32	H	4.6	9.4	29.11	33.0	-3.9	
High Ch								
1909.80	22.86	V	4.6	9.1	27.32	33.0	-5.7	
1909.80	25.93	H	4.6	9.1	30.39	33.0	-2.6	

GSM1900

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-16
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: EGPRS 1900 MHz Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	14.82	V	4.5	9.6	19.93	33.0	-13.1	
1850.20	22.21	H	4.5	9.6	27.32	33.0	-5.7	
Mid Ch								
1880.00	18.31	V	4.6	9.4	23.10	33.0	-9.9	
1880.00	18.82	H	4.6	9.4	23.61	33.0	-9.4	
High Ch								
1909.80	20.11	V	4.6	9.1	24.57	33.0	-8.4	
1909.80	23.73	H	4.6	9.1	28.19	33.0	-4.8	

WCDMA Band 5

WCDMA

Band 5
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 22943
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: Rel99 Band 5 Fundamentals

Test Equpment:
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								
826.40	22.18	V	3.0	-0.9	18.19	38.5	-20.3	
826.40	6.59	H	3.0	-0.9	2.60	38.5	-35.9	
Mid Ch								
836.60	23.59	V	3.1	-0.9	19.63	38.5	-18.9	
836.60	7.40	H	3.1	-0.9	3.44	38.5	-35.1	
High Ch								
846.60	25.17	V	3.1	-0.9	21.22	38.5	-17.3	
846.60	5.34	H	3.1	-0.9	1.39	38.5	-37.1	

WCDMA

Band 5
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 22943
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: HSDPA Band 5 Fundamentals

Test Equpment:
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								
826.40	21.81	V	3.0	-0.9	17.82	38.5	-20.7	
826.40	5.83	H	3.0	-0.9	1.84	38.5	-36.7	
Mid Ch								
836.60	23.89	V	3.1	-0.9	19.93	38.5	-18.6	
836.60	7.19	H	3.1	-0.9	3.23	38.5	-35.3	
High Ch								
846.60	25.31	V	3.1	-0.9	21.36	38.5	-17.1	
846.60	6.85	H	3.1	-0.9	2.90	38.5	-35.6	

WCDMA Band 4

WCDMA

Band 4
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: Rel99 Band 4 Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	13.11	V	4.4	9.6	18.33	30.0	-11.7	
1712.40	16.59	H	4.4	9.6	21.81	30.0	-8.2	
Mid Ch								
1732.60	13.82	V	4.4	9.6	19.07	30.0	-10.9	
1732.60	17.97	H	4.4	9.6	23.22	30.0	-6.8	
High Ch								
1752.60	13.18	V	4.4	9.7	18.47	30.0	-11.5	
1752.60	17.43	H	4.4	9.7	22.72	30.0	-7.3	

WCDMA

Band 4
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: HSDPA Band 4 Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	13.04	V	4.4	9.6	18.26	30.0	-11.7	
1712.40	16.79	H	4.4	9.6	22.01	30.0	-8.0	
Mid Ch								
1732.60	13.67	V	4.4	9.6	18.92	30.0	-11.1	
1732.60	17.95	H	4.4	9.6	23.20	30.0	-6.8	
High Ch								
1752.60	13.56	V	4.4	9.7	18.85	30.0	-11.2	
1752.60	17.45	H	4.4	9.7	22.74	30.0	-7.3	

WCDMA Band 2

WCDMA

Band 2
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: Rel99 Band 2 Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
1852.40	19.89	V	4.5	9.6	24.97	33.0	-8.0	
1852.40	16.87	H	4.5	9.6	21.95	33.0	-11.1	
Mid Ch								
1880.00	19.34	V	4.6	9.4	24.13	33.0	-8.9	
1880.00	16.97	H	4.6	9.4	21.76	33.0	-11.2	
High Ch								
1907.60	19.13	V	4.6	9.1	23.62	33.0	-9.4	
1907.60	16.68	H	4.6	9.1	21.17	33.0	-11.8	

WCDMA

Band 2
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: HSDPA Band 2 Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
1852.40	19.88	V	4.5	9.6	24.96	33.0	-8.0	
1852.40	16.84	H	4.5	9.6	21.92	33.0	-11.1	
Mid Ch								
1880.00	19.16	V	4.6	9.4	23.95	33.0	-9.0	
1880.00	16.71	H	4.6	9.4	21.50	33.0	-11.5	
High Ch								
1907.60	19.12	V	4.6	9.1	23.61	33.0	-9.4	
1907.60	16.61	H	4.6	9.1	21.10	33.0	-11.9	

LTE Band 2

LTE Band 2 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
1860.00	18.45	V	4.6	9.6	23.45	33.0	-9.5	
1860.00	21.16	H	4.6	9.6	26.16	33.0	-6.8	
Mid Ch								
1880.00	17.34	V	4.6	9.4	22.13	33.0	-10.9	
1880.00	20.34	H	4.6	9.4	25.13	33.0	-7.9	
High Ch								
1900.00	17.51	V	4.6	9.2	22.11	33.0	-10.9	
1900.00	20.75	H	4.6	9.2	25.34	33.0	-7.7	

LTE Band 12 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
1860.00	17.43	V	4.6	9.6	22.43	33.0	-10.6	
1860.00	20.09	H	4.6	9.6	25.09	33.0	-7.9	
Mid Ch								
1880.00	16.19	V	4.6	9.4	20.98	33.0	-12.0	
1880.00	19.14	H	4.6	9.4	23.93	33.0	-9.1	
High Ch								
1900.00	16.40	V	4.6	9.2	21.00	33.0	-12.0	
1900.00	19.81	H	4.6	9.2	24.40	33.0	-8.6	

LTE
Band 2
15MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	18.45	V	4.5	9.6	23.48	33.0	-9.5	
1857.50	21.28	H	4.5	9.6	26.31	33.0	-6.7	
Mid Ch								
1880.00	17.60	V	4.6	9.4	22.39	33.0	-10.6	
1880.00	20.62	H	4.6	9.4	25.41	33.0	-7.6	
High Ch								
1902.50	17.15	V	4.6	9.2	21.71	33.0	-11.3	
1902.50	20.24	H	4.6	9.2	24.80	33.0	-8.2	

LTE
Band 2
15MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	12.93	V	4.5	9.6	17.96	33.0	-15.0	
1857.50	19.83	H	4.5	9.6	24.86	33.0	-8.1	
Mid Ch								
1880.00	16.18	V	4.6	9.4	20.97	33.0	-12.0	
1880.00	18.83	H	4.6	9.4	23.62	33.0	-9.4	
High Ch								
1902.50	16.03	V	4.6	9.2	20.59	33.0	-12.4	
1902.50	19.03	H	4.6	9.2	23.59	33.0	-9.4	

LTE
Band 2
10MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
1855.00	18.30	V	4.5	9.6	23.35	33.0	-9.7	
1855.00	20.27	H	4.5	9.6	25.32	33.0	-7.7	
Mid Ch								
1880.00	16.38	V	4.6	9.4	21.17	33.0	-11.8	
1880.00	20.31	H	4.6	9.4	25.10	33.0	-7.9	
High Ch								
1905.00	17.33	V	4.6	9.1	21.85	33.0	-11.1	
1905.00	20.54	H	4.6	9.1	25.07	33.0	-7.9	

LTE
Band 2
10MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20881
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
1855.00	16.69	V	4.5	9.6	21.74	33.0	-11.3	
1855.00	19.85	H	4.5	9.6	24.90	33.0	-8.1	
Mid Ch								
1880.00	16.18	V	4.6	9.4	20.97	33.0	-12.0	
1880.00	19.30	H	4.6	9.4	24.09	33.0	-8.9	
High Ch								
1905.00	16.09	V	4.6	9.1	20.61	33.0	-12.4	
1905.00	19.55	H	4.6	9.1	24.08	33.0	-8.9	

LTE Band 2 5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
1852.50	18.09	V	4.5	9.6	23.17	33.0	-9.8	
1852.50	20.19	H	4.5	9.6	25.27	33.0	-7.7	
Mid Ch								
1880.00	15.69	V	4.6	9.4	20.48	33.0	-12.5	
1880.00	19.56	H	4.6	9.4	24.35	33.0	-8.6	
High Ch								
1907.50	17.37	V	4.6	9.1	21.86	33.0	-11.1	
1907.50	20.75	H	4.6	9.1	25.24	33.0	-7.8	

LTE Band 2 5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20881
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
1852.50	15.84	V	4.5	9.6	20.92	33.0	-12.1	
1852.50	18.85	H	4.5	9.6	23.93	33.0	-9.1	
Mid Ch								
1880.00	14.51	V	4.6	9.4	19.30	33.0	-13.7	
1880.00	18.28	H	4.6	9.4	23.07	33.0	-9.9	
High Ch								
1907.50	15.86	V	4.6	9.1	20.35	33.0	-12.6	
1907.50	19.79	H	4.6	9.1	24.28	33.0	-8.7	

LTE Band 2 3MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	18.04	V	4.5	9.6	23.14	33.0	-9.9	
1851.50	20.31	H	4.5	9.6	25.41	33.0	-7.6	
Mid Ch								
1880.00	15.74	V	4.6	9.4	20.53	33.0	-12.5	
1880.00	20.22	H	4.6	9.4	25.01	33.0	-8.0	
High Ch								
1908.50	17.20	V	4.6	9.1	21.67	33.0	-11.3	
1908.50	20.47	H	4.6	9.1	24.95	33.0	-8.1	

LTE Band 2 3MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20881
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	16.79	V	4.5	9.6	21.89	33.0	-11.1	
1851.50	19.12	H	4.5	9.6	24.22	33.0	-8.8	
Mid Ch								
1880.00	14.33	V	4.6	9.4	19.12	33.0	-13.9	
1880.00	19.22	H	4.6	9.4	24.01	33.0	-9.0	
High Ch								
1908.50	16.15	V	4.6	9.1	20.62	33.0	-12.4	
1908.50	19.78	H	4.6	9.1	24.26	33.0	-8.7	

LTE Band 2 1.4MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	18.19	V	4.5	9.6	23.29	33.0	-9.7	
1850.70	20.55	H	4.5	9.6	25.66	33.0	-7.3	
Mid Ch								
1880.00	15.69	V	4.6	9.4	20.48	33.0	-12.5	
1880.00	20.38	H	4.6	9.4	25.17	33.0	-7.8	
High Ch								
1909.30	17.00	V	4.6	9.1	21.46	33.0	-11.5	
1909.30	21.11	H	4.6	9.1	25.57	33.0	-7.4	

LTE Band 2 1.4MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20881
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	16.37	V	4.5	9.6	21.47	33.0	-11.5	
1850.70	19.41	H	4.5	9.6	24.52	33.0	-8.5	
Mid Ch								
1880.00	14.43	V	4.6	9.4	19.22	33.0	-13.8	
1880.00	19.20	H	4.6	9.4	23.99	33.0	-9.0	
High Ch								
1909.30	15.89	V	4.6	9.1	20.35	33.0	-12.6	
1909.30	19.90	H	4.6	9.1	24.36	33.0	-8.6	

LTE Band 12

LTE Band 12 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 20890
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth

Test Equpment:
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								
704.00	23.38	V	2.8	-1.1	19.51	34.8	-15.3	
704.00	4.97	H	2.8	-1.1	1.10	34.8	-33.7	
Mid Ch								
707.50	23.58	V	2.8	-1.1	19.71	34.8	-15.1	
707.50	6.16	H	2.8	-1.1	2.29	34.8	-32.5	
High Ch								
711.00	23.23	V	2.8	-1.1	19.35	34.8	-15.4	
711.00	6.48	H	2.8	-1.1	2.60	34.8	-32.2	

LTE Band 12 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 20890
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 12 Fundamentals, 10MHz Bandwidth

Test Equpment:
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								
704.00	22.25	V	2.8	-1.1	18.38	34.8	-16.4	
704.00	3.84	H	2.8	-1.1	-0.03	34.8	-34.8	
Mid Ch								
707.50	22.29	V	2.8	-1.1	18.42	34.8	-16.4	
707.50	4.88	H	2.8	-1.1	1.01	34.8	-33.8	
High Ch								
711.00	22.08	V	2.8	-1.1	18.20	34.8	-16.6	
711.00	5.27	H	2.8	-1.1	1.39	34.8	-33.4	

LTE Band 12 5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 20890
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 12 Fundamentals, 5MHz Bandwidth

Test Equpment:
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								
701.50	23.49	V	2.8	-1.1	19.63	34.8	-15.1	
701.50	5.53	H	2.8	-1.1	1.67	34.8	-33.1	
Mid Ch								
707.50	23.29	V	2.8	-1.1	19.42	34.8	-15.4	
707.50	6.24	H	2.8	-1.1	2.37	34.8	-32.4	
High Ch								
713.50	23.28	V	2.8	-1.1	19.40	34.8	-15.4	
713.50	7.04	H	2.8	-1.1	3.15	34.8	-31.6	

LTE Band 12 5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 20890
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 12 Fundamentals, 5MHz Bandwidth

Test Equpment:
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								
701.50	22.15	V	2.8	-1.1	18.29	34.8	-16.5	
701.50	3.90	H	2.8	-1.1	0.04	34.8	-34.7	
Mid Ch								
707.50	22.05	V	2.8	-1.1	18.18	34.8	-16.6	
707.50	4.97	H	2.8	-1.1	1.10	34.8	-33.7	
High Ch								
713.50	22.25	V	2.8	-1.1	18.37	34.8	-16.4	
713.50	5.98	H	2.8	-1.1	2.09	34.8	-32.7	

LTE
Band 12
3MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 20890
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 12 Fundamentals, 3MHz Bandwidth

Test Equpment:
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								
700.50	23.30	V	2.8	-1.1	19.45	34.8	-15.3	
700.50	7.27	H	2.8	-1.1	3.41	34.8	-31.4	
Mid Ch								
707.50	23.55	V	2.8	-1.1	19.68	34.8	-15.1	
707.50	7.48	H	2.8	-1.1	3.61	34.8	-31.2	
High Ch								
714.50	23.39	V	2.8	-1.1	19.51	34.8	-15.3	
714.50	8.07	H	2.8	-1.1	4.18	34.8	-30.6	

LTE
Band 12
3MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 20890
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 12 Fundamentals, 3MHz Bandwidth

Test Equpment:
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								
700.50	22.17	V	2.8	-1.1	18.32	34.8	-16.5	
700.50	5.87	H	2.8	-1.1	2.01	34.8	-32.8	
Mid Ch								
707.50	22.09	V	2.8	-1.1	18.22	34.8	-16.6	
707.50	6.28	H	2.8	-1.1	2.41	34.8	-32.4	
High Ch								
714.50	22.17	V	2.8	-1.1	18.29	34.8	-16.5	
714.50	6.87	H	2.8	-1.1	2.98	34.8	-31.8	

LTE
Band 12
1.4MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 20890
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
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								
699.70	23.29	V	2.8	-1.1	19.43	34.8	-15.3	
699.70	7.21	H	2.8	-1.1	3.35	34.8	-31.4	
Mid Ch								
707.50	23.37	V	2.8	-1.1	19.50	34.8	-15.3	
707.50	7.45	H	2.8	-1.1	3.58	34.8	-31.2	
High Ch								
715.30	23.27	V	2.8	-1.1	19.38	34.8	-15.4	
715.30	8.15	H	2.8	-1.1	4.26	34.8	-30.5	

LTE
Band 12
1.4MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 20890
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
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								
699.70	22.11	V	2.8	-1.1	18.25	34.8	-16.5	
699.70	5.98	H	2.8	-1.1	2.12	34.8	-32.7	
Mid Ch								
707.50	22.11	V	2.8	-1.1	18.24	34.8	-16.5	
707.50	6.27	H	2.8	-1.1	2.40	34.8	-32.4	
High Ch								
715.30	22.13	V	2.8	-1.1	18.24	34.8	-16.5	
715.30	7.35	H	2.8	-1.1	3.46	34.8	-31.3	

LTE Band 26 (Part 90)

LTE Band 26 15MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 15MHz Bandwidth

Test Equpment:
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								
821.50	22.64	V	3.0	-1.0	18.63	50.0	-31.4	Part 90
821.50	7.72	H	3.0	-1.0	3.71	50.0	-46.3	Part 90

LTE Band 26 15MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 15MHz Bandwidth

Test Equpment:
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								
821.50	21.44	V	3.0	-1.0	17.43	50.0	-32.6	Part 90
821.50	6.56	H	3.0	-1.0	2.55	50.0	-47.4	Part 90

LTE
Band 26
10MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
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								
819.00	22.54	V	3.0	-1.0	18.53	50.0	-31.5	Part 90
819.00	6.88	H	3.0	-1.0	2.88	50.0	-47.1	Part 90

LTE
Band 26
10MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
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								
819.00	20.87	V	3.0	-1.0	16.86	50.0	-33.1	Part 90
819.00	5.58	H	3.0	-1.0	1.58	50.0	-48.4	Part 90

LTE

Band 26

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
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								
816.50	22.74	V	3.0	-1.0	18.72	50.0	-31.3	Part 90
816.50	7.39	H	3.0	-1.0	3.37	50.0	-46.6	Part 90
Mid Ch								
821.50	22.55	V	3.0	-1.0	18.54	50.0	-31.5	Part 90
821.50	7.69	H	3.0	-1.0	3.68	50.0	-46.3	Part 90

LTE

Band 26

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
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								
816.50	21.46	V	3.0	-1.0	17.44	50.0	-32.6	Part 90
816.50	6.46	H	3.0	-1.0	2.44	50.0	-47.6	Part 90
Mid Ch								
821.50	21.82	V	3.0	-1.0	17.81	50.0	-32.2	Part 90
821.50	6.65	H	3.0	-1.0	2.64	50.0	-47.4	Part 90

LTE Band 26 3MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
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								
815.50	22.62	V	3.0	-1.0	18.60	50.0	-31.4	Part 90
815.50	7.97	H	3.0	-1.0	3.95	50.0	-46.1	Part 90
Mid Ch								
822.50	22.77	V	3.0	-1.0	18.77	50.0	-31.2	Part 90
822.50	7.93	H	3.0	-1.0	3.93	50.0	-46.1	Part 90

LTE Band 26 3MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
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								
815.50	21.50	V	3.0	-1.0	17.48	50.0	-32.5	Part 90
815.50	6.72	H	3.0	-1.0	2.70	50.0	-47.3	Part 90
Mid Ch								
822.50	21.85	V	3.0	-1.0	17.85	50.0	-32.2	Part 90
822.50	6.95	H	3.0	-1.0	2.95	50.0	-47.1	Part 90

LTE Band 26 1.4MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
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								
814.70	22.72	V	3.0	-1.0	18.70	50.0	-31.3	Part 90
814.70	7.60	H	3.0	-1.0	3.58	50.0	-46.4	Part 90
Mid Ch								
823.30	22.80	V	3.0	-1.0	18.80	50.0	-31.2	Part 90
823.30	7.89	H	3.0	-1.0	3.89	50.0	-46.1	Part 90

LTE Band 26 1.4MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
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								
814.70	21.40	V	3.0	-1.0	17.38	50.0	-32.6	Part 90
814.70	6.47	H	3.0	-1.0	2.45	50.0	-47.5	Part 90
Mid Ch								
823.30	21.58	V	3.0	-1.0	17.58	50.0	-32.4	Part 90
823.30	6.50	H	3.0	-1.0	2.50	50.0	-47.5	Part 90

LTE Band 26 (Part 22)

LTE Band 26 15MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 15MHz Bandwidth

Test Equpment:
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
Mid Ch								
831.50	23.58	V	3.1	-0.9	19.60	38.5	-18.9	
831.50	8.10	H	3.1	-0.9	4.12	38.5	-34.4	
High Ch								
841.50	25.91	V	3.1	-0.9	21.95	38.5	-16.5	
841.50	7.12	H	3.1	-0.9	3.17	38.5	-35.3	

LTE Band 26 15MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 15MHz Bandwidth

Test Equpment:
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
Mid Ch								
831.50	22.61	V	3.1	-0.9	18.63	38.5	-19.9	
831.50	4.78	H	3.1	-0.9	0.80	38.5	-37.7	
High Ch								
841.50	24.93	V	3.1	-0.9	20.97	38.5	-17.5	
841.50	6.01	H	3.1	-0.9	2.06	38.5	-36.4	

LTE Band 26 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
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								
829.00	23.22	V	3.1	-0.9	19.23	38.5	-19.3	
829.00	8.11	H	3.1	-0.9	4.12	38.5	-34.4	
Mid Ch								
831.50	23.62	V	3.1	-0.9	19.64	38.5	-18.9	
831.50	7.83	H	3.1	-0.9	3.85	38.5	-34.7	
High Ch								
844.00	25.91	V	3.1	-0.9	21.96	38.5	-16.5	
844.00	6.98	H	3.1	-0.9	3.03	38.5	-35.5	

LTE Band 26 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
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								
829.00	21.98	V	3.1	-0.9	17.99	38.5	-20.5	
829.00	7.11	H	3.1	-0.9	3.12	38.5	-35.4	
Mid Ch								
831.50	22.31	V	3.1	-0.9	18.33	38.5	-20.2	
831.50	6.70	H	3.1	-0.9	2.72	38.5	-35.8	
High Ch								
844.00	24.90	V	3.1	-0.9	20.95	38.5	-17.6	
844.00	5.82	H	3.1	-0.9	1.87	38.5	-36.6	

LTE

Band 26

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20881
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
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	22.99	V	3.0	-0.9	18.99	38.5	-19.5	
826.50	7.77	H	3.0	-0.9	3.78	38.5	-34.7	
Mid Ch								
831.50	24.12	V	3.1	-0.9	20.14	38.5	-18.4	
831.50	6.56	H	3.1	-0.9	2.58	38.5	-35.9	
High Ch								
846.50	26.57	V	3.1	-0.9	22.62	38.5	-15.9	
846.50	9.34	H	3.1	-0.9	5.40	38.5	-33.1	

LTE

Band 26

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20881
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
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	22.03	V	3.0	-0.9	18.03	38.5	-20.5	
826.50	5.20	H	3.0	-0.9	1.21	38.5	-37.3	
Mid Ch								
831.50	22.64	V	3.1	-0.9	18.66	38.5	-19.8	
831.50	5.45	H	3.1	-0.9	1.47	38.5	-37.0	
High Ch								
846.50	25.57	V	3.1	-0.9	21.62	38.5	-16.9	
846.50	8.53	H	3.1	-0.9	4.59	38.5	-33.9	

LTE

Band 26

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
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	23.07	V	3.0	-0.9	19.08	38.5	-19.4	
825.50	5.75	H	3.0	-0.9	1.76	38.5	-36.7	
Mid Ch								
831.50	23.81	V	3.1	-0.9	19.83	38.5	-18.7	
831.50	6.02	H	3.1	-0.9	2.04	38.5	-36.5	
High Ch								
847.50	26.61	V	3.1	-0.9	22.67	38.5	-15.8	
847.50	9.25	H	3.1	-0.9	5.31	38.5	-33.2	

LTE

Band 26

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
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	22.09	V	3.0	-0.9	18.10	38.5	-20.4	
825.50	4.99	H	3.0	-0.9	1.00	38.5	-37.5	
Mid Ch								
831.50	22.55	V	3.1	-0.9	18.57	38.5	-19.9	
831.50	5.05	H	3.1	-0.9	1.07	38.5	-37.4	
High Ch								
847.50	25.40	V	3.1	-0.9	21.46	38.5	-17.0	
847.50	7.94	H	3.1	-0.9	4.00	38.5	-34.5	

LTE

Band 26

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
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	22.95	V	3.0	-1.0	18.95	38.5	-19.5	
824.70	7.96	H	3.0	-1.0	3.96	38.5	-34.5	
Mid Ch								
831.50	23.95	V	3.1	-0.9	19.97	38.5	-18.5	
831.50	6.19	H	3.1	-0.9	2.21	38.5	-36.3	
High Ch								
848.30	26.59	V	3.1	-0.9	22.65	38.5	-15.9	
848.30	9.08	H	3.1	-0.9	5.14	38.5	-33.4	

LTE

Band 26

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
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	22.00	V	3.0	-1.0	18.00	38.5	-20.5	
824.70	6.82	H	3.0	-1.0	2.82	38.5	-35.7	
Mid Ch								
831.50	22.75	V	3.1	-0.9	18.77	38.5	-19.7	
831.50	5.17	H	3.1	-0.9	1.19	38.5	-37.3	
High Ch								
848.30	25.47	V	3.1	-0.9	21.53	38.5	-17.0	
848.30	7.96	H	3.1	-0.9	4.02	38.5	-34.5	

LTE Band 41

LTE Band 41 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-18
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
2506.00	14.02	V	5.3	10.2	18.92	33.0	-14.1	
2506.00	16.32	H	5.3	10.2	21.23	33.0	-11.8	
Mid Ch								
2593.00	16.54	V	5.4	10.1	21.28	33.0	-11.7	
2593.00	18.60	H	5.4	10.1	23.34	33.0	-9.7	
High Ch								
2680.00	14.25	V	5.5	10.2	18.95	33.0	-14.0	
2680.00	16.28	H	5.5	10.2	20.99	33.0	-12.0	

LTE Band 41 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-18
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 41 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
2506.00	13.13	V	5.3	10.2	18.03	33.0	-15.0	
2506.00	15.47	H	5.3	10.2	20.38	33.0	-12.6	
Mid Ch								
2593.00	16.01	V	5.4	10.1	20.75	33.0	-12.3	
2593.00	17.99	H	5.4	10.1	22.73	33.0	-10.3	
High Ch								
2680.00	13.81	V	5.5	10.2	18.51	33.0	-14.5	
2680.00	15.86	H	5.5	10.2	20.57	33.0	-12.4	

LTE
Band 41
15MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-18
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 41 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
2503.50	14.18	V	5.3	10.2	19.09	33.0	-13.9	
2503.50	16.43	H	5.3	10.2	21.35	33.0	-11.7	
Mid Ch								
2593.00	16.02	V	5.4	10.1	20.76	33.0	-12.2	
2593.00	17.76	H	5.4	10.1	22.50	33.0	-10.5	
High Ch								
2682.50	13.16	V	5.5	10.2	17.86	33.0	-15.1	
2682.50	15.14	H	5.5	10.2	19.85	33.0	-13.2	

LTE
Band 41
15MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-18
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 41 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
2503.50	13.95	V	5.3	10.2	18.86	33.0	-14.1	
2503.50	16.08	H	5.3	10.2	21.00	33.0	-12.0	
Mid Ch								
2593.00	15.59	V	5.4	10.1	20.33	33.0	-12.7	
2593.00	17.28	H	5.4	10.1	22.02	33.0	-11.0	
High Ch								
2682.50	12.58	V	5.5	10.2	17.28	33.0	-15.7	
2682.50	14.54	H	5.5	10.2	19.25	33.0	-13.8	

LTE
Band 41
10MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-18
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 41 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
2501.00	15.11	V	5.3	10.2	20.03	33.0	-13.0	
2501.00	16.56	H	5.3	10.2	21.48	33.0	-11.5	
Mid Ch								
2593.00	17.35	V	5.4	10.1	22.09	33.0	-10.9	
2593.00	18.38	H	5.4	10.1	23.12	33.0	-9.9	
High Ch								
2685.00	14.22	V	5.5	10.2	18.93	33.0	-14.1	
2685.00	15.18	H	5.5	10.2	19.88	33.0	-13.1	

LTE
Band 41
10MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-18
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 41 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
2501.00	14.67	V	5.3	10.2	19.59	33.0	-13.4	
2501.00	16.98	H	5.3	10.2	21.90	33.0	-11.1	
Mid Ch								
2593.00	16.75	V	5.4	10.1	21.49	33.0	-11.5	
2593.00	17.76	H	5.4	10.1	22.50	33.0	-10.5	
High Ch								
2685.00	12.25	V	5.5	10.2	16.96	33.0	-16.0	
2685.00	14.45	H	5.5	10.2	19.15	33.0	-13.8	

LTE
Band 41
5MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-18
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 41 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
2498.50	15.48	V	5.3	10.2	20.42	33.0	-12.6	
2498.50	17.49	H	5.3	10.2	22.42	33.0	-10.6	
Mid Ch								
2593.00	16.60	V	5.4	10.1	21.34	33.0	-11.7	
2593.00	18.21	H	5.4	10.1	22.95	33.0	-10.1	
High Ch								
2687.50	14.02	V	5.5	10.2	18.74	33.0	-14.3	
2687.50	15.44	H	5.5	10.2	20.16	33.0	-12.8	

LTE
Band 41
5MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-18
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 41 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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								
2498.50	14.55	V	5.3	10.2	19.49	33.0	-13.5	
2498.50	16.86	H	5.3	10.2	21.79	33.0	-11.2	
Mid Ch								
2593.00	16.57	V	5.4	10.1	21.31	33.0	-11.7	
2593.00	18.03	H	5.4	10.1	22.77	33.0	-10.2	
High Ch								
2687.50	12.45	V	5.5	10.2	17.17	33.0	-15.8	
2687.50	14.19	H	5.5	10.2	18.91	33.0	-14.1	

LTE Band 66

LTE Band 66 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	14.46	V	4.4	9.6	19.70	30.0	-10.3	
1720.00	17.47	H	4.4	9.6	22.70	30.0	-7.3	
Mid Ch								
1745.00	16.17	V	4.4	9.7	21.45	30.0	-8.6	
1745.00	19.00	H	4.4	9.7	24.28	30.0	-5.7	
High Ch								
1770.00	16.97	V	4.4	9.7	22.24	30.0	-7.8	
1770.00	18.43	H	4.4	9.7	23.71	30.0	-6.3	

LTE Band 66 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	13.28	V	4.4	9.6	18.52	30.0	-11.5	
1720.00	16.31	H	4.4	9.6	21.54	30.0	-8.5	
Mid Ch								
1745.00	14.59	V	4.4	9.7	19.87	30.0	-10.1	
1745.00	17.52	H	4.4	9.7	22.80	30.0	-7.2	
High Ch								
1770.00	15.68	V	4.4	9.7	20.95	30.0	-9.0	
1770.00	17.31	H	4.4	9.7	22.59	30.0	-7.4	

LTE
Band 66
15MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	14.63	V	4.4	9.6	19.86	30.0	-10.1	
1717.50	17.23	H	4.4	9.6	22.46	30.0	-7.5	
Mid Ch								
1745.00	16.07	V	4.4	9.7	21.35	30.0	-8.7	
1745.00	19.10	H	4.4	9.7	24.38	30.0	-5.6	
High Ch								
1772.50	17.06	V	4.4	9.7	22.33	30.0	-7.7	
1772.50	20.05	H	4.4	9.7	25.32	30.0	-4.7	

LTE
Band 66
15MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	4.4	9.6	18.69	30.0	-11.3	
1717.50	16.09	H	4.4	9.6	21.32	30.0	-8.7	
Mid Ch								
1745.00	14.90	V	4.4	9.7	20.18	30.0	-9.8	
1745.00	18.02	H	4.4	9.7	23.30	30.0	-6.7	
High Ch								
1772.50	15.69	V	4.4	9.7	20.96	30.0	-9.0	
1772.50	18.31	H	4.4	9.7	23.58	30.0	-6.4	

LTE

Band 66

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	14.71	V	4.4	9.6	19.94	30.0	-10.1	
1715.00	17.76	H	4.4	9.6	22.98	30.0	-7.0	
Mid Ch								
1745.00	16.11	V	4.4	9.7	21.39	30.0	-8.6	
1745.00	19.43	H	4.4	9.7	24.71	30.0	-5.3	
High Ch								
1775.00	17.20	V	4.4	9.7	22.47	30.0	-7.5	
1775.00	19.75	H	4.4	9.7	25.02	30.0	-5.0	

LTE

Band 66

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	13.63	V	4.4	9.6	18.86	30.0	-11.1	
1715.00	16.87	H	4.4	9.6	22.09	30.0	-7.9	
Mid Ch								
1745.00	14.69	V	4.4	9.7	19.97	30.0	-10.0	
1745.00	17.97	H	4.4	9.7	23.25	30.0	-6.7	
High Ch								
1775.00	16.06	V	4.4	9.7	21.33	30.0	-8.7	
1775.00	18.62	H	4.4	9.7	23.89	30.0	-6.1	

LTE

Band 66

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	12.84	V	4.4	9.6	18.06	30.0	-11.9	
1712.50	16.78	H	4.4	9.6	22.00	30.0	-8.0	
Mid Ch								
1745.00	14.75	V	4.4	9.7	20.03	30.0	-10.0	
1745.00	19.12	H	4.4	9.7	24.40	30.0	-5.6	
High Ch								
1777.50	16.16	V	4.4	9.7	21.43	30.0	-8.6	
1777.50	17.96	H	4.4	9.7	23.22	30.0	-6.8	

LTE

Band 66

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	11.62	V	4.4	9.6	16.84	30.0	-13.2	
1712.50	15.74	H	4.4	9.6	20.96	30.0	-9.0	
Mid Ch								
1745.00	13.86	V	4.4	9.7	19.14	30.0	-10.9	
1745.00	17.98	H	4.4	9.7	23.26	30.0	-6.7	
High Ch								
1777.50	14.89	V	4.4	9.7	20.16	30.0	-9.8	
1777.50	18.28	H	4.4	9.7	23.54	30.0	-6.5	

LTE
Band 66
3MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	13.57	V	4.4	9.6	18.78	30.0	-11.2	
1711.50	16.84	H	4.4	9.6	22.06	30.0	-7.9	
Mid Ch								
1745.00	16.01	V	4.4	9.7	21.29	30.0	-8.7	
1745.00	19.53	H	4.4	9.7	24.81	30.0	-5.2	
High Ch								
1778.50	16.49	V	4.4	9.7	21.75	30.0	-8.2	
1778.50	19.53	H	4.4	9.7	24.79	30.0	-5.2	

LTE
Band 66
3MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	12.37	V	4.4	9.6	17.58	30.0	-12.4	
1711.50	15.74	H	4.4	9.6	20.96	30.0	-9.0	
Mid Ch								
1745.00	14.58	V	4.4	9.7	19.86	30.0	-10.1	
1745.00	18.28	H	4.4	9.7	23.56	30.0	-6.4	
High Ch								
1778.50	15.55	V	4.4	9.7	20.81	30.0	-9.2	
1778.50	18.78	H	4.4	9.7	24.04	30.0	-6.0	

LTE

Band 66

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	13.00	V	4.4	9.6	18.21	30.0	-11.8	
1710.70	16.83	H	4.4	9.6	22.05	30.0	-8.0	
Mid Ch								
1745.00	15.26	V	4.4	9.7	20.54	30.0	-9.5	
1745.00	19.29	H	4.4	9.7	24.57	30.0	-5.4	
High Ch								
1779.30	15.72	V	4.4	9.7	20.98	30.0	-9.0	
1779.30	18.67	H	4.4	9.7	23.94	30.0	-6.1	

LTE

Band 66

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 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	12.18	V	4.4	9.6	17.39	30.0	-12.6	
1710.70	15.97	H	4.4	9.6	21.19	30.0	-8.8	
Mid Ch								
1745.00	14.16	V	4.4	9.7	19.44	30.0	-10.6	
1745.00	18.02	H	4.4	9.7	23.30	30.0	-6.7	
High Ch								
1779.30	14.79	V	4.4	9.7	20.05	30.0	-9.9	
1779.30	17.87	H	4.4	9.7	23.14	30.0	-6.9	

9.6. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27. 53 and §90.691

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:
(c)(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB.

(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

(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.

(h) 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.

(m) (4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Part 90.691(a):

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log_{10}(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.(NOTE : Use 100kHz reference bandwidth)

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

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 ≥ 3 × 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 ≥ span/RBW;
g) Trace mode = average(WCDMA, LTE), Max hold(GSM, LTE Band41)

RESULTS

See the following pages.
NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE.

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27(04)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

9.6.1. SPURIOUS RADIATION PLOTS

GSM850

GSM850 GPRS

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-16
Test Engineer: 22943
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 2
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	-12.8	V	3.0	40.7	1.0	-52.5	-13.0	-39.5	
2472.60	-8.7	V	3.0	41.3	1.0	-49.0	-13.0	-36.0	
3296.80	-9.0	V	3.0	42.1	1.0	-50.1	-13.0	-37.1	
1648.40	-12.0	H	3.0	40.7	1.0	-51.7	-13.0	-38.7	
2472.60	-8.0	H	3.0	41.3	1.0	-48.3	-13.0	-35.3	
3296.80	-9.1	H	3.0	42.1	1.0	-50.1	-13.0	-37.1	
Mid Ch, 836.6MHz									
1673.20	-12.3	V	3.0	40.7	1.0	-52.0	-13.0	-39.0	
2509.80	-9.1	V	3.0	41.4	1.0	-49.4	-13.0	-36.4	
3346.40	-9.0	V	3.0	42.1	1.0	-50.1	-13.0	-37.1	
1673.20	-10.7	H	3.0	40.7	1.0	-50.4	-13.0	-37.4	
2509.80	-8.3	H	3.0	41.4	1.0	-48.6	-13.0	-35.6	
3346.40	-8.8	H	3.0	42.1	1.0	-49.9	-13.0	-36.9	
High Ch, 848.8MHz									
1697.60	-10.7	V	3.0	40.7	1.0	-50.4	-13.0	-37.4	
2546.40	-8.2	V	3.0	41.4	1.0	-48.6	-13.0	-35.6	
3395.20	-8.9	V	3.0	42.1	1.0	-49.9	-13.0	-36.9	
1697.60	-8.4	H	3.0	40.7	1.0	-48.1	-13.0	-35.1	
2546.40	-7.2	H	3.0	41.4	1.0	-47.6	-13.0	-34.6	
3395.20	-8.8	H	3.0	42.1	1.0	-49.9	-13.0	-36.9	

GSM850 EGPRS

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-16
Test Engineer: 22943
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 2
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	-14.6	V	3.0	40.7	1.0	-54.3	-13.0	-41.3	
2472.60	-11.5	V	3.0	41.3	1.0	-51.8	-13.0	-38.8	
3296.80	-8.9	V	3.0	42.1	1.0	-50.0	-13.0	-37.0	
1648.40	-14.5	H	3.0	40.7	1.0	-54.2	-13.0	-41.2	
2472.60	-11.4	H	3.0	41.3	1.0	-51.7	-13.0	-38.7	
3296.80	-9.0	H	3.0	42.1	1.0	-50.0	-13.0	-37.0	
Mid Ch, 836.6MHz									
1673.20	-14.6	V	3.0	40.7	1.0	-54.3	-13.0	-41.3	
2509.80	-11.5	V	3.0	41.4	1.0	-51.9	-13.0	-38.9	
3346.40	-8.6	V	3.0	42.1	1.0	-49.6	-13.0	-36.6	
1673.20	-14.5	H	3.0	40.7	1.0	-54.2	-13.0	-41.2	
2509.80	-11.1	H	3.0	41.4	1.0	-51.5	-13.0	-38.5	
3346.40	-8.8	H	3.0	42.1	1.0	-49.8	-13.0	-36.8	
High Ch, 848.8MHz									
1697.60	-14.5	V	3.0	40.7	1.0	-54.2	-13.0	-41.2	
2546.40	-11.3	V	3.0	41.4	1.0	-51.7	-13.0	-38.7	
3395.20	-8.8	V	3.0	42.1	1.0	-49.9	-13.0	-36.9	
1697.60	-13.6	H	3.0	40.7	1.0	-53.3	-13.0	-40.3	
2546.40	-10.9	H	3.0	41.4	1.0	-51.3	-13.0	-38.3	
3395.20	-9.0	H	3.0	42.1	1.0	-50.1	-13.0	-37.1	

GSM1900

GSM1900

GPRS

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-16
Test Engineer: 22943
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 2
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
Low Ch, 1850.2MHz									
3700.40	-11.5	V	3.0	42.1	1.0	-52.6	-13.0	-39.6	
5550.60	-4.8	V	3.0	42.9	1.0	-46.7	-13.0	-33.7	
7400.80	-6.2	V	3.0	42.5	1.0	-47.7	-13.0	-34.7	
3700.40	-11.4	H	3.0	42.1	1.0	-52.5	-13.0	-39.5	
5550.60	-6.3	H	3.0	42.9	1.0	-48.2	-13.0	-35.2	
7400.80	-6.4	H	3.0	42.5	1.0	-47.9	-13.0	-34.9	
Mid Ch, 1880MHz									
3760.00	-11.3	V	3.0	42.1	1.0	-52.4	-13.0	-39.4	
5640.00	-7.7	V	3.0	42.9	1.0	-49.6	-13.0	-36.6	
7520.00	-6.2	V	3.0	42.4	1.0	-47.7	-13.0	-34.7	
3760.00	-11.3	H	3.0	42.1	1.0	-52.3	-13.0	-39.3	
5640.00	-7.6	H	3.0	42.9	1.0	-49.5	-13.0	-36.5	
7520.00	-6.3	H	3.0	42.4	1.0	-47.8	-13.0	-34.8	
High Ch, 1909.8MHz									
3819.60	-11.1	V	3.0	42.1	1.0	-52.2	-13.0	-39.2	
5729.40	-7.8	V	3.0	43.0	1.0	-49.8	-13.0	-36.8	
7639.20	-7.0	V	3.0	42.4	1.0	-48.4	-13.0	-35.4	
3819.60	-11.3	H	3.0	42.1	1.0	-52.3	-13.0	-39.3	
5729.40	-7.7	H	3.0	43.0	1.0	-49.6	-13.0	-36.6	
7639.20	-6.4	H	3.0	42.4	1.0	-47.8	-13.0	-34.8	

GSM1900

EGPRS

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-16
Test Engineer: 22943
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 2
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	-11.5	V	3.0	42.1	1.0	-52.5	-13.0	-39.5	
5550.60	-8.1	V	3.0	42.9	1.0	-50.0	-13.0	-37.0	
7400.80	-6.2	V	3.0	42.5	1.0	-47.7	-13.0	-34.7	
3700.40	-11.5	H	3.0	42.1	1.0	-52.6	-13.0	-39.6	
5550.60	-7.8	H	3.0	42.9	1.0	-49.7	-13.0	-36.7	
7400.80	-6.4	H	3.0	42.5	1.0	-47.9	-13.0	-34.9	
Mid Ch, 1880MHz									
3760.00	-11.2	V	3.0	42.1	1.0	-52.3	-13.0	-39.3	
5640.00	-7.7	V	3.0	42.9	1.0	-49.7	-13.0	-36.7	
7520.00	-6.2	V	3.0	42.4	1.0	-47.6	-13.0	-34.6	
3760.00	-11.2	H	3.0	42.1	1.0	-52.3	-13.0	-39.3	
5640.00	-7.6	H	3.0	42.9	1.0	-49.5	-13.0	-36.5	
7520.00	-6.3	H	3.0	42.4	1.0	-47.7	-13.0	-34.7	
High Ch, 1909.8MHz									
3819.60	-11.2	V	3.0	42.1	1.0	-52.3	-13.0	-39.3	
5729.40	-7.8	V	3.0	43.0	1.0	-49.8	-13.0	-36.8	
7639.20	-6.1	V	3.0	42.4	1.0	-47.4	-13.0	-34.4	
3819.60	-11.3	H	3.0	42.1	1.0	-52.4	-13.0	-39.4	
5729.40	-7.6	H	3.0	43.0	1.0	-49.5	-13.0	-36.5	
7639.20	-6.2	H	3.0	42.4	1.0	-47.6	-13.0	-34.6	

WCDMA Band 5

WCDMA

Band 5
REL99

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 20881
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 2
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
Low Ch, 826.4MHz									
1652.80	-6.6	V	3.0	40.7	1.0	-46.3	-13.0	-33.3	
2479.20	-1.6	V	3.0	41.3	1.0	-41.9	-13.0	-28.9	
3305.60	0.5	V	3.0	42.1	1.0	-40.6	-13.0	-27.6	
1652.80	-6.7	H	3.0	40.7	1.0	-46.4	-13.0	-33.4	
2479.20	-1.2	H	3.0	41.3	1.0	-41.6	-13.0	-28.6	
3305.60	0.7	H	3.0	42.1	1.0	-40.3	-13.0	-27.3	
Mid Ch, 836.6MHz									
1673.20	-6.4	V	3.0	40.7	1.0	-46.1	-13.0	-33.1	
2509.80	-2.0	V	3.0	41.4	1.0	-42.4	-13.0	-29.4	
3346.40	0.4	V	3.0	42.1	1.0	-40.6	-13.0	-27.6	
1673.20	-6.4	H	3.0	40.7	1.0	-46.1	-13.0	-33.1	
2509.80	-1.7	H	3.0	41.4	1.0	-42.0	-13.0	-29.0	
3346.40	0.5	H	3.0	42.1	1.0	-40.6	-13.0	-27.6	
High Ch, 846.6MHz									
1693.20	-6.3	V	3.0	40.7	1.0	-46.0	-13.0	-33.0	
2539.80	-2.0	V	3.0	41.4	1.0	-42.4	-13.0	-29.4	
3386.40	-0.3	V	3.0	42.1	1.0	-41.3	-13.0	-28.3	
1693.20	-6.2	H	3.0	40.7	1.0	-45.9	-13.0	-32.9	
2539.80	-1.8	H	3.0	41.4	1.0	-42.2	-13.0	-29.2	
3386.40	-0.2	H	3.0	42.1	1.0	-41.3	-13.0	-28.3	

WCDMA

Band 5
HSDPA

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 20881
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 2
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	-6.6	V	3.0	40.7	1.0	-46.3	-13.0	-33.3	
2479.20	-1.6	V	3.0	41.3	1.0	-42.0	-13.0	-29.0	
3305.60	0.5	V	3.0	42.1	1.0	-40.5	-13.0	-27.5	
1652.80	-6.6	H	3.0	40.7	1.0	-46.3	-13.0	-33.3	
2479.20	-1.4	H	3.0	41.3	1.0	-41.7	-13.0	-28.7	
3305.60	0.6	H	3.0	42.1	1.0	-40.5	-13.0	-27.5	
Mid Ch, 836.6MHz									
1673.20	-6.4	V	3.0	40.7	1.0	-46.1	-13.0	-33.1	
2509.80	-1.8	V	3.0	41.4	1.0	-42.2	-13.0	-29.2	
3346.40	0.4	V	3.0	42.1	1.0	-40.7	-13.0	-27.7	
1673.20	-6.4	H	3.0	40.7	1.0	-46.1	-13.0	-33.1	
2509.80	-1.6	H	3.0	41.4	1.0	-42.0	-13.0	-29.0	
3346.40	0.4	H	3.0	42.1	1.0	-40.7	-13.0	-27.7	
High Ch, 846.6MHz									
1693.20	-6.2	V	3.0	40.7	1.0	-45.9	-13.0	-32.9	
2539.80	-2.0	V	3.0	41.4	1.0	-42.4	-13.0	-29.4	
3386.40	-0.2	V	3.0	42.1	1.0	-41.3	-13.0	-28.3	
1693.20	-6.1	H	3.0	40.7	1.0	-45.8	-13.0	-32.8	
2539.80	-1.8	H	3.0	41.4	1.0	-42.2	-13.0	-29.2	
3386.40	-0.1	H	3.0	42.1	1.0	-41.2	-13.0	-28.2	

WCDMA Band 4

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 22943
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 2
Mode: Rel99 Band 4 Harmonics

WCDMA

Band 4
REL99

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	-9.8	V	3.0	42.1	1.0	-50.8	-13.0	-37.8	
5137.20	-8.9	V	3.0	42.8	1.0	-50.8	-13.0	-37.8	
6849.60	-6.6	V	3.0	42.7	1.0	-48.3	-13.0	-35.3	
3424.80	-9.3	H	3.0	42.1	1.0	-50.4	-13.0	-37.4	
5137.20	-8.6	H	3.0	42.8	1.0	-50.4	-13.0	-37.4	
6849.60	-6.6	H	3.0	42.7	1.0	-48.4	-13.0	-35.4	
Mid Ch, 1732.6MHz									
3465.20	-9.4	V	3.0	42.1	1.0	-50.4	-13.0	-37.4	
5197.80	-8.8	V	3.0	42.8	1.0	-50.6	-13.0	-37.6	
6930.40	-6.4	V	3.0	42.7	1.0	-48.2	-13.0	-35.2	
3465.20	-9.3	H	3.0	42.1	1.0	-50.4	-13.0	-37.4	
5197.80	-8.4	H	3.0	42.8	1.0	-50.3	-13.0	-37.3	
6930.40	-6.5	H	3.0	42.7	1.0	-48.2	-13.0	-35.2	
High Ch, 1752.6MHz									
3505.20	-8.7	V	3.0	42.1	1.0	-49.7	-13.0	-36.7	
5257.80	-8.8	V	3.0	42.8	1.0	-50.6	-13.0	-37.6	
7010.40	-6.2	V	3.0	42.7	1.0	-47.9	-13.0	-34.9	
3505.20	-8.6	H	3.0	42.1	1.0	-49.7	-13.0	-36.7	
5257.80	-8.4	H	3.0	42.8	1.0	-50.3	-13.0	-37.3	
7010.40	-6.3	H	3.0	42.7	1.0	-48.0	-13.0	-35.0	

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 22943
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 2
Mode: HSDPA Band 4 Harmonics

WCDMA

Band 4
HSDPA

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	-9.4	V	3.0	42.1	1.0	-50.4	-13.0	-37.4	
5137.20	-9.0	V	3.0	42.8	1.0	-50.8	-13.0	-37.8	
6849.60	-6.6	V	3.0	42.7	1.0	-48.3	-13.0	-35.3	
3424.80	-9.3	H	3.0	42.1	1.0	-50.4	-13.0	-37.4	
5137.20	-8.6	H	3.0	42.8	1.0	-50.4	-13.0	-37.4	
6849.60	-6.6	H	3.0	42.7	1.0	-48.3	-13.0	-35.3	
Mid Ch, 1732.6MHz									
3465.20	-9.4	V	3.0	42.1	1.0	-50.4	-13.0	-37.4	
5197.80	-8.8	V	3.0	42.8	1.0	-50.6	-13.0	-37.6	
6930.40	-6.4	V	3.0	42.7	1.0	-48.1	-13.0	-35.1	
3465.20	-9.3	H	3.0	42.1	1.0	-50.3	-13.0	-37.3	
5197.80	-8.4	H	3.0	42.8	1.0	-50.2	-13.0	-37.2	
6930.40	-6.5	H	3.0	42.7	1.0	-48.2	-13.0	-35.2	
High Ch, 1752.6MHz									
3505.20	-8.6	V	3.0	42.1	1.0	-49.7	-13.0	-36.7	
5257.80	-8.8	V	3.0	42.8	1.0	-50.6	-13.0	-37.6	
7010.40	-6.2	V	3.0	42.7	1.0	-47.9	-13.0	-34.9	
3505.20	-8.6	H	3.0	42.1	1.0	-49.6	-13.0	-36.6	
5257.80	-8.4	H	3.0	42.8	1.0	-50.3	-13.0	-37.3	
7010.40	-6.3	H	3.0	42.7	1.0	-48.0	-13.0	-35.0	

WCDMA Band 2

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 22943
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 2
Mode: Rel99 Band 2 Harmonics

WCDMA

Band 2
REL99

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	-11.5	V	3.0	42.1	1.0	-52.6	-13.0	-39.6	
5557.20	-8.0	V	3.0	42.9	1.0	-50.0	-13.0	-37.0	
7409.60	-6.4	V	3.0	42.5	1.0	-47.8	-13.0	-34.8	
3704.80	-11.5	H	3.0	42.1	1.0	-52.6	-13.0	-39.6	
5557.20	-7.9	H	3.0	42.9	1.0	-49.8	-13.0	-36.8	
7409.60	-6.5	H	3.0	42.5	1.0	-48.0	-13.0	-35.0	
Mid Ch, 1880MHz									
3760.00	-11.3	V	3.0	42.1	1.0	-52.4	-13.0	-39.4	
5640.00	-7.8	V	3.0	42.9	1.0	-49.7	-13.0	-36.7	
7520.00	-6.4	V	3.0	42.4	1.0	-47.8	-13.0	-34.8	
3760.00	-11.4	H	3.0	42.1	1.0	-52.5	-13.0	-39.5	
5640.00	-7.7	H	3.0	42.9	1.0	-49.6	-13.0	-36.6	
7520.00	-6.5	H	3.0	42.4	1.0	-47.9	-13.0	-34.9	
High Ch, 1907.6MHz									
3815.20	-11.4	V	3.0	42.1	1.0	-52.4	-13.0	-39.4	
5722.80	-8.0	V	3.0	42.9	1.0	-50.0	-13.0	-37.0	
7630.40	-6.3	V	3.0	42.4	1.0	-47.7	-13.0	-34.7	
3815.20	-11.4	H	3.0	42.1	1.0	-52.4	-13.0	-39.4	
5722.80	-7.9	H	3.0	42.9	1.0	-49.8	-13.0	-36.8	
7630.40	-6.4	H	3.0	42.4	1.0	-47.8	-13.0	-34.8	

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-15
Test Engineer: 22943
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 2
Mode: HSDPA Band 2 Harmonics

WCDMA

Band 2
HSDPA

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	-11.6	V	3.0	42.1	1.0	-52.6	-13.0	-39.6	
5557.20	-8.1	V	3.0	42.9	1.0	-50.0	-13.0	-37.0	
7409.60	-6.3	V	3.0	42.5	1.0	-47.8	-13.0	-34.8	
3704.80	-11.6	H	3.0	42.1	1.0	-52.7	-13.0	-39.7	
5557.20	-7.9	H	3.0	42.9	1.0	-49.8	-13.0	-36.8	
7409.60	-6.5	H	3.0	42.5	1.0	-48.0	-13.0	-35.0	
Mid Ch, 1880MHz									
3760.00	-11.3	V	3.0	42.1	1.0	-52.4	-13.0	-39.4	
5640.00	-7.8	V	3.0	42.9	1.0	-49.7	-13.0	-36.7	
7520.00	-6.3	V	3.0	42.4	1.0	-47.8	-13.0	-34.8	
3760.00	-11.4	H	3.0	42.1	1.0	-52.5	-13.0	-39.5	
5640.00	-7.7	H	3.0	42.9	1.0	-49.6	-13.0	-36.6	
7520.00	-6.4	H	3.0	42.4	1.0	-47.9	-13.0	-34.9	
High Ch, 1907.6MHz									
3815.20	-11.3	V	3.0	42.1	1.0	-52.4	-13.0	-39.4	
5722.80	-8.0	V	3.0	42.9	1.0	-50.0	-13.0	-37.0	
7630.40	-6.2	V	3.0	42.4	1.0	-47.6	-13.0	-34.6	
3815.20	-11.4	H	3.0	42.1	1.0	-52.5	-13.0	-39.5	
5722.80	-7.9	H	3.0	42.9	1.0	-49.9	-13.0	-36.9	
7630.40	-6.5	H	3.0	42.4	1.0	-47.9	-13.0	-34.9	

LTE Band 2

LTE

Band 2

15MHz

QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-09
Test Engineer: 20896
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Harmonics, 15MHz 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, 1857.5MHz									
3715.00	-11.7	V	3.0	42.1	1.0	-52.8	-13.0	-39.8	
5572.50	-8.2	V	3.0	42.9	1.0	-50.1	-13.0	-37.1	
7430.00	-6.4	V	3.0	42.5	1.0	-47.9	-13.0	-34.9	
3715.00	-11.7	H	3.0	42.1	1.0	-52.8	-13.0	-39.8	
5572.50	-7.9	H	3.0	42.9	1.0	-49.8	-13.0	-36.8	
7430.00	-6.5	H	3.0	42.5	1.0	-48.0	-13.0	-35.0	
Mid Ch, 1880MHz									
3760.00	-11.6	V	3.0	42.1	1.0	-52.7	-13.0	-39.7	
5640.00	-7.9	V	3.0	42.9	1.0	-49.9	-13.0	-36.9	
7520.00	-6.4	V	3.0	42.4	1.0	-47.9	-13.0	-34.9	
3760.00	-11.6	H	3.0	42.1	1.0	-52.7	-13.0	-39.7	
5640.00	-7.8	H	3.0	42.9	1.0	-49.7	-13.0	-36.7	
7520.00	-6.5	H	3.0	42.4	1.0	-48.0	-13.0	-35.0	
High Ch, 1902.5MHz									
3805.00	-11.6	V	3.0	42.1	1.0	-52.7	-13.0	-39.7	
5707.50	-8.2	V	3.0	42.9	1.0	-50.1	-13.0	-37.1	
7610.00	-6.4	V	3.0	42.4	1.0	-47.8	-13.0	-34.8	
3805.00	-11.6	H	3.0	42.1	1.0	-52.7	-13.0	-39.7	
5707.50	-7.9	H	3.0	42.9	1.0	-49.9	-13.0	-36.9	
7610.00	-6.5	H	3.0	42.4	1.0	-47.9	-13.0	-34.9	

LTE Band 12

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company:	Samsung
Project #:	4789739083
Date:	2020-12-15
Test Engineer:	20890
Configuration:	EUT / AC Adapter / Earphone, Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 12 Harmonics, 3MHz Bandwidth

LTE

Band 12

3MHz

QPSK

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 700.5MHz									
1401.00	-16.4	V	3.0	40.7	1.0	-56.1	-13.0	-43.1	
2101.50	-13.5	V	3.0	40.8	1.0	-53.3	-13.0	-40.3	
2802.00	-10.7	V	3.0	41.8	1.0	-51.4	-13.0	-38.4	
1401.00	-16.3	H	3.0	40.7	1.0	-56.0	-13.0	-43.0	
2101.50	-13.2	H	3.0	40.8	1.0	-53.0	-13.0	-40.0	
2802.00	-10.3	H	3.0	41.8	1.0	-51.1	-13.0	-38.1	
Mid Ch, 707.5MHz									
1415.00	-16.2	V	3.0	40.7	1.0	-56.0	-13.0	-43.0	
2122.50	-13.2	V	3.0	40.8	1.0	-53.0	-13.0	-40.0	
2830.00	-10.7	V	3.0	41.8	1.0	-51.5	-13.0	-38.5	
1415.00	-16.3	H	3.0	40.7	1.0	-56.0	-13.0	-43.0	
2122.50	-13.2	H	3.0	40.8	1.0	-53.0	-13.0	-40.0	
2830.00	-10.4	H	3.0	41.8	1.0	-51.2	-13.0	-38.2	
High Ch, 714.5MHz									
1429.00	-16.2	V	3.0	40.7	1.0	-55.9	-13.0	-42.9	
2143.50	-13.3	V	3.0	40.8	1.0	-53.1	-13.0	-40.1	
2858.00	-10.6	V	3.0	41.8	1.0	-51.4	-13.0	-38.4	
1429.00	-16.3	H	3.0	40.7	1.0	-56.1	-13.0	-43.1	
2143.50	-13.0	H	3.0	40.8	1.0	-52.8	-13.0	-39.8	
2858.00	-10.0	H	3.0	41.8	1.0	-50.8	-13.0	-37.8	

LTE Band 26 (Part 90)

LTE Band 26 3MHz QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Harmonics, 3MHz 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, 815.5MHz									
1631.00	-15.6	V	3.0	40.7	1.0	-55.3	-13.0	-42.3	
2446.50	-12.7	V	3.0	41.3	1.0	-53.0	-13.0	-40.0	
3262.00	-9.9	V	3.0	42.1	1.0	-51.0	-13.0	-38.0	
1631.00	-15.7	H	3.0	40.7	1.0	-55.4	-13.0	-42.4	
2446.50	-12.3	H	3.0	41.3	1.0	-52.6	-13.0	-39.6	
3262.00	-9.9	H	3.0	42.1	1.0	-51.0	-13.0	-38.0	
Mid Ch, 822.5MHz									
1645.00	-15.6	V	3.0	40.7	1.0	-55.3	-13.0	-42.3	
2467.50	-12.6	V	3.0	41.3	1.0	-52.9	-13.0	-39.9	
3290.00	-10.0	V	3.0	42.1	1.0	-51.0	-13.0	-38.0	
1645.00	-15.6	H	3.0	40.7	1.0	-55.3	-13.0	-42.3	
2467.50	-12.3	H	3.0	41.3	1.0	-52.6	-13.0	-39.6	
3290.00	-9.9	H	3.0	42.1	1.0	-51.0	-13.0	-38.0	

LTE Band 26 (Part 22)

LTE Band 26 5MHz QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 20896
Configuration: EUT /AC Adapter / Earphone, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Harmonics, 5MHz 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, 826.5MHz									
1653.00	-15.5	V	3.0	40.7	1.0	-55.2	-13.0	-42.2	
2479.50	-12.5	V	3.0	41.3	1.0	-52.8	-13.0	-39.8	
3306.00	-10.0	V	3.0	42.1	1.0	-51.0	-13.0	-38.0	
1653.00	-15.6	H	3.0	40.7	1.0	-55.3	-13.0	-42.3	
2479.50	-12.2	H	3.0	41.3	1.0	-52.5	-13.0	-39.5	
3306.00	-9.9	H	3.0	42.1	1.0	-51.0	-13.0	-38.0	
Mid Ch, 831.5MHz									
1663.00	-15.5	V	3.0	40.7	1.0	-55.2	-13.0	-42.2	
2494.50	-12.5	V	3.0	41.3	1.0	-52.9	-13.0	-39.9	
3326.00	-9.8	V	3.0	42.1	1.0	-50.8	-13.0	-37.8	
1663.00	-15.5	H	3.0	40.7	1.0	-55.2	-13.0	-42.2	
2494.50	-12.3	H	3.0	41.3	1.0	-52.6	-13.0	-39.6	
3326.00	-9.7	H	3.0	42.1	1.0	-50.8	-13.0	-37.8	
High Ch, 846.5MHz									
1693.00	-15.5	V	3.0	40.7	1.0	-55.2	-13.0	-42.2	
2539.50	-12.3	V	3.0	41.4	1.0	-52.7	-13.0	-39.7	
3386.00	-9.9	V	3.0	42.1	1.0	-51.0	-13.0	-38.0	
1693.00	-15.3	H	3.0	40.7	1.0	-55.0	-13.0	-42.0	
2539.50	-12.2	H	3.0	41.4	1.0	-52.6	-13.0	-39.6	
3386.00	-9.8	H	3.0	42.1	1.0	-50.8	-13.0	-37.8	

LTE Band 41

LTE

Band 41

5MHz

QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company:	Samsung
Project #:	4789739083
Date:	2020-12-18
Test Engineer:	22943
Configuration:	EUT/ AC Adapter / Earphone, Y-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 41 Harmonics, 5MHz 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, 2498.5MHz									
4997.00	-15.7	V	3.0	42.8	1.0	-57.5	-25.0	-32.5	
7495.50	-18.7	V	3.0	42.5	1.0	-60.1	-25.0	-35.1	
9994.00	-15.3	V	3.0	40.9	1.0	-55.2	-25.0	-30.2	
12492.50	-7.2	V	3.0	42.1	1.0	-48.3	-25.0	-23.3	
4997.00	-19.0	H	3.0	42.8	1.0	-60.8	-25.0	-35.8	
7495.50	-19.3	H	3.0	42.5	1.0	-60.7	-25.0	-35.7	
9994.00	-16.1	H	3.0	40.9	1.0	-56.0	-25.0	-31.0	
12492.50	-11.7	H	3.0	42.1	1.0	-52.8	-25.0	-27.8	
Mid Ch, 2593MHz									
5186.00	-14.4	V	3.0	42.8	1.0	-56.3	-25.0	-31.3	
7779.00	-16.0	V	3.0	42.3	1.0	-57.3	-25.0	-32.3	
10372.00	-7.8	V	3.0	41.0	1.0	-47.8	-25.0	-22.8	
12965.00	-8.5	V	3.0	42.4	1.0	-49.9	-25.0	-24.9	
5186.00	-15.0	H	3.0	42.8	1.0	-56.8	-25.0	-31.8	
7779.00	-14.2	H	3.0	42.3	1.0	-55.5	-25.0	-30.5	
10372.00	-7.1	H	3.0	41.0	1.0	-47.1	-25.0	-22.1	
12965.00	-11.0	H	3.0	42.4	1.0	-52.4	-25.0	-27.4	
High Ch, 2687.5MHz									
5375.00	-13.1	V	3.0	42.9	1.0	-55.0	-25.0	-30.0	
8062.50	-9.5	V	3.0	42.2	1.0	-50.6	-25.0	-25.6	
10750.00	-9.8	V	3.0	41.2	1.0	-50.0	-25.0	-25.0	
13437.50	-8.6	V	3.0	42.7	1.0	-50.3	-25.0	-25.3	
5375.00	-15.4	H	3.0	42.9	1.0	-57.3	-25.0	-32.3	
8062.50	-12.3	H	3.0	42.2	1.0	-53.5	-25.0	-28.5	
10750.00	-8.8	H	3.0	41.2	1.0	-49.0	-25.0	-24.0	
13437.50	-7.5	H	3.0	42.7	1.0	-49.2	-25.0	-24.2	

LTE Band 66

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789739083
Date: 2020-12-17
Test Engineer: 22943
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Harmonics, 3MHz Bandwidth

LTE Band 66 3MHz QPSK

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1711.5MHz									
3423.00	-8.8	V	3.0	42.1	1.0	-49.9	-13.0	-36.9	
5134.50	-8.7	V	3.0	42.8	1.0	-50.5	-13.0	-37.5	
6846.00	-6.2	V	3.0	42.7	1.0	-47.9	-13.0	-34.9	
3423.00	-8.8	H	3.0	42.1	1.0	-49.9	-13.0	-36.9	
5134.50	-8.3	H	3.0	42.8	1.0	-50.1	-13.0	-37.1	
6846.00	-6.3	H	3.0	42.7	1.0	-48.1	-13.0	-35.1	
Mid Ch, 1745MHz									
3490.00	-8.3	V	3.0	42.1	1.0	-49.4	-13.0	-36.4	
5235.00	-8.6	V	3.0	42.8	1.0	-50.4	-13.0	-37.4	
6980.00	-5.9	V	3.0	42.7	1.0	-47.6	-13.0	-34.6	
3490.00	-8.5	H	3.0	42.1	1.0	-49.6	-13.0	-36.6	
5235.00	-8.3	H	3.0	42.8	1.0	-50.1	-13.0	-37.1	
6980.00	-6.0	H	3.0	42.7	1.0	-47.7	-13.0	-34.7	
High Ch, 1778.5MHz									
3557.00	-7.5	V	3.0	42.1	1.0	-48.6	-13.0	-35.6	
5335.50	-8.2	V	3.0	42.9	1.0	-50.0	-13.0	-37.0	
7114.00	-5.8	V	3.0	42.6	1.0	-47.4	-13.0	-34.4	
3557.00	-7.3	H	3.0	42.1	1.0	-48.3	-13.0	-35.3	
5335.50	-7.8	H	3.0	42.9	1.0	-49.6	-13.0	-36.6	
7114.00	-5.9	H	3.0	42.6	1.0	-47.6	-13.0	-34.6	

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27(04)
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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 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 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 TEST REPORT

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27(04)
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