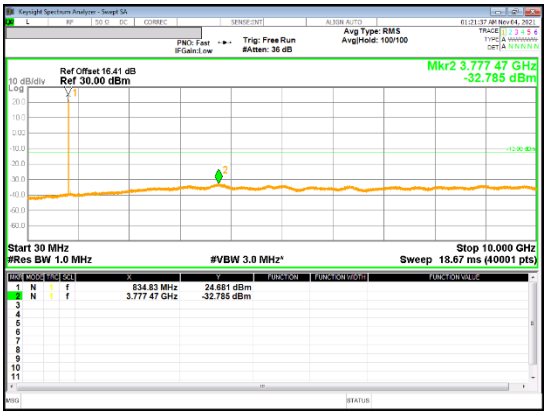
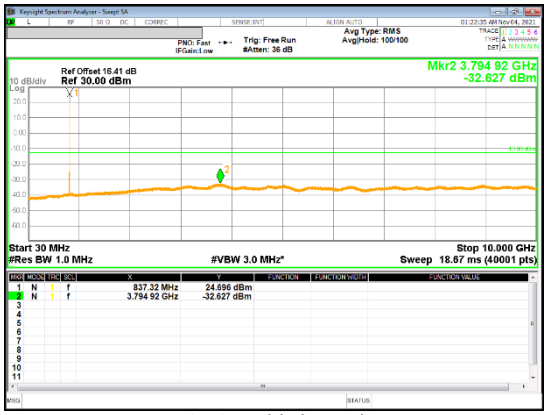
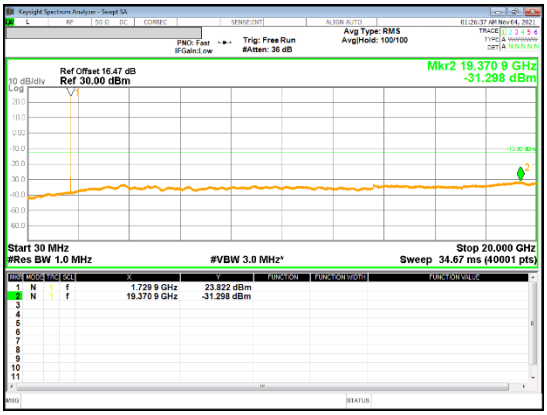
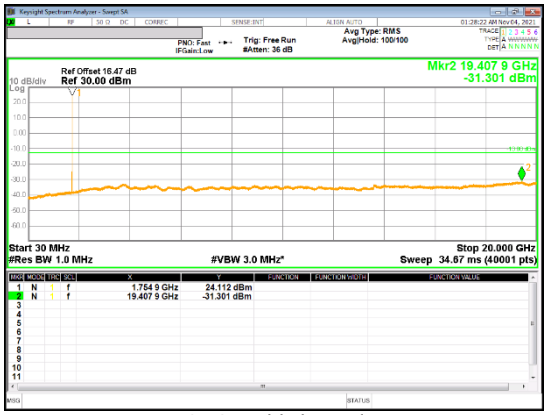
LTE Band 66

LTE Band 66 20MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

NR Band 5

NR Band 5 20MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

NR Band 66

NR Band 66 20MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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)

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				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	50	824.20003358	-0.002	848.80003391	-0.004	2.5
3.88	40	824.20003420	-0.003	848.80003580	-0.006	2.5
3.88	30	824.20003096	0.001	848.80003150	-0.001	2.5
3.88	***20***	***824.20003180***	***0.000***	***848.80003050***	***0.000***	***2.5***
3.88	10	824.20003435	-0.003	848.80003503	-0.005	2.5
3.88	0	824.20003737	-0.007	848.80003933	-0.010	2.5
3.88	-10	824.20003807	-0.008	848.80003897	-0.010	2.5
3.88	-20	824.20003844	-0.008	848.80003820	-0.009	2.5
3.88	-30	824.20003428	-0.003	848.80003705	-0.008	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				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	***20***	**824.20003180**	***0***	**848.80003050**	***0***	***2.5***
4.40	20	824.20003873	-0.008	848.80003976	-0.011	2.5
3.70	20	824.20003692	-0.006	848.80004022	-0.011	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	1850.0790	1909.9235		
Extreme (50C)		1850.0790	1909.9236	44.6	0.024
Extreme (40C)		1850.0790	1909.9236	43.9	0.023
Extreme (30C)		1850.0790	1909.9236	44.6	0.024
Extreme (10C)		1850.0790	1909.9236	42.9	0.023
Extreme (0C)		1850.0790	1909.9236	45.2	0.024
Extreme (-10C)		1850.0790	1909.9236	44.9	0.024
Extreme (-20C)		1850.0790	1909.9236	62.8	0.033
Extreme (-30C)		1850.0790	1909.9236	36.3	0.019
20C	15%	1850.0790	1909.9236	52.3	0.028
	-15%	1850.0790	1909.9236	53.8	0.029
	End Point	1850.0790	1909.9236	48.1	0.026

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]	
3.88	50	826.40001358	0.000	846.60001190	0.003	2.5
3.88	40	826.40001406	-0.001	846.60001268	0.002	2.5
3.88	30	826.40001268	0.001	846.60001308	0.002	2.5
3.88	***20***	***826.40001350***	***0.000***	***846.60001450***	***0.000***	***2.5***
3.88	10	826.40001240	0.001	846.60001367	0.001	2.5
3.88	0	826.40001191	0.002	846.60001293	0.002	2.5
3.88	-10	826.40001310	0.000	846.60001219	0.003	2.5
3.88	-20	826.40001373	0.000	846.60001094	0.004	2.5
3.88	-30	826.40001106	0.003	846.60001135	0.004	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]	
3.88	***20***	**826.40001350**	***0***	**846.60001450**	***0***	***2.5***
4.40	20	826.40002827	-0.018	846.60001327	0.001	2.5
3.70	20	826.40001246	0.001	846.60001377	0.001	2.5

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

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	1710.3192	1754.6746		
Extreme (50C)		1710.3192	1754.6746	40.7	0.023
Extreme (40C)		1710.3192	1754.6746	41.7	0.024
Extreme (30C)		1710.3192	1754.6746	42.3	0.024
Extreme (10C)		1710.3192	1754.6746	41.3	0.024
Extreme (0C)		1710.3192	1754.6746	30.3	0.017
Extreme (-10C)		1710.3192	1754.6746	40.5	0.023
Extreme (-20C)		1710.3192	1754.6746	40.8	0.024
Extreme (-30C)		1710.3192	1754.6746	29.3	0.017
20C	15%	1710.3192	1754.6746	25.8	0.015
	-15%	1710.3192	1754.6746	26.2	0.015
	End Point	1710.3192	1754.6746	26.8	0.015

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	1850.3219	1909.6802		
Extreme (50C)		1850.3219	1909.6802	66.8	0.036
Extreme (40C)		1850.3219	1909.6802	25.6	0.014
Extreme (30C)		1850.3219	1909.6802	25.9	0.014
Extreme (10C)		1850.3219	1909.6802	66.1	0.035
Extreme (0C)		1850.3219	1909.6802	68.1	0.036
Extreme (-10C)		1850.3219	1909.6802	68.0	0.036
Extreme (-20C)		1850.3219	1909.6802	25.6	0.014
Extreme (-30C)		1850.3219	1909.6802	24.6	0.013
20C	15%	1850.3219	1909.6802	22.8	0.012
	-15%	1850.3219	1909.6802	24.2	0.013
	End Point	1850.3219	1909.6802	21.7	0.012

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

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	699.1536	715.8457		
Extreme (50C)		699.1536	715.8457	33.3	0.047
Extreme (40C)		699.1536	715.8457	32.8	0.046
Extreme (30C)		699.1536	715.8457	32.0	0.045
Extreme (10C)		699.1536	715.8457	34.6	0.049
Extreme (0C)		699.1536	715.8457	32.5	0.046
Extreme (-10C)		699.1536	715.8457	33.2	0.047
Extreme (-20C)		699.1536	715.8457	31.7	0.045
Extreme (-30C)		699.1536	715.8457	33.3	0.047
20C	15%	699.1536	715.8457	37.4	0.053
	-15%	699.1536	715.8457	25.3	0.036
	End Point	699.1536	715.8457	25.2	0.036

LTE Band 13 (Lowest Frequency:QPSK / Highest Frequency: QPSK)

Limit		777	787	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	777.2546	786.7556		
Extreme (50C)		777.2546	786.7556	38.9	0.050
Extreme (40C)		777.2546	786.7556	40.6	0.052
Extreme (30C)		777.2546	786.7556	39.7	0.051
Extreme (10C)		777.2546	786.7556	41.4	0.053
Extreme (0C)		777.2546	786.7556	37.7	0.048
Extreme (-10C)		777.2546	786.7556	45.0	0.058
Extreme (-20C)		777.2546	786.7556	42.6	0.055
Extreme (-30C)		777.2546	786.7556	34.2	0.044
20C	15%	777.2546	786.7556	32.9	0.042
	-15%	777.2546	786.7556	29.4	0.038
	End Point	777.2546	786.7556	30.2	0.039

LTE Band 25 (Lowest Frequency:16QAM / Highest Frequency: QPSK)

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.1533	1914.8448		
Extreme (50C)		1850.1533	1914.8448	20.7	0.011
Extreme (40C)		1850.1533	1914.8448	22.0	0.012
Extreme (30C)		1850.1533	1914.8448	22.6	0.012
Extreme (10C)		1850.1533	1914.8448	24.6	0.013
Extreme (0C)		1850.1533	1914.8448	20.7	0.011
Extreme (-10C)		1850.1533	1914.8448	22.4	0.012
Extreme (-20C)		1850.1533	1914.8448	27.7	0.015
Extreme (-30C)		1850.1533	1914.8448	20.7	0.011
20C	15%	1850.1533	1914.8449	66.8	0.035
	-15%	1850.1533	1914.8449	58.8	0.031
	End Point	1850.1533	1914.8449	60.3	0.032

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	814.70002405	0.012	848.30003280	0.000	2.5
3.85	40	814.70002268	0.013	848.30002090	0.014	2.5
3.85	30	814.70002584	0.010	848.30002670	0.008	2.5
3.85	***20***	***814.70003360***	***0.000***	***848.30003315***	***0.000***	***2.5***
3.85	10	814.70004007	-0.008	848.30004144	-0.010	2.5
3.85	0	814.70003780	-0.005	848.30003129	0.002	2.5
3.85	-10	814.70003871	-0.006	848.30003757	-0.005	2.5
3.85	-20	814.70003307	0.001	848.30003603	-0.003	2.5
3.85	-30	814.70001250	0.026	848.30002208	0.013	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]	
3.88	***20***	**814.70003360**	***0***	**848.30003315**	***0***	***2.5***
4.40	20	814.70003141	0.003	848.30003211	0.001	2.5
3.70	20	814.70003117	0.003	848.30003017	0.004	2.5

LTE Band 41 PC2 (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	2496.2475	2689.7507		
Extreme (50C)		2496.2475	2689.7507	40.3	0.016
Extreme (40C)		2496.2475	2689.7507	39.6	0.015
Extreme (30C)		2496.2475	2689.7507	38.1	0.015
Extreme (10C)		2496.2475	2689.7507	35.6	0.014
Extreme (0C)		2496.2475	2689.7507	34.7	0.013
Extreme (-10C)		2496.2475	2689.7507	34.6	0.013
Extreme (-20C)		2496.2475	2689.7507	32.5	0.013
Extreme (-30C)		2496.2475	2689.7507	33.0	0.013
20C	15%	2496.2475	2689.7507	40.6	0.016
	-15%	2496.2475	2689.7507	32.5	0.013
	End Point	2496.2475	2689.7507	36.3	0.014

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	31.2	0.018
Extreme (40C)		1710.6995	1779.3006	32.4	0.019
Extreme (30C)		1710.6995	1779.3006	33.1	0.019
Extreme (10C)		1710.6995	1779.3006	17.3	0.010
Extreme (0C)		1710.6995	1779.3006	30.8	0.018
Extreme (-10C)		1710.6995	1779.3006	24.5	0.014
Extreme (-20C)		1710.6995	1779.3006	18.3	0.010
Extreme (-30C)		1710.6995	1779.3006	25.9	0.015
20C	15%	1710.6995	1779.3006	61.6	0.035
	-15%	1710.6995	1779.3006	55.9	0.032
	End Point	1710.6995	1779.3006	60.9	0.035

NR Band 5

Reference Frequency : NR Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2061.750 Hz		High Channel	2120.750 Hz	
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	50	824.70002615	0.004	848.30003008	0.005	2.5
3.88	40	824.70003420	-0.006	848.30002297	0.013	2.5
3.88	30	824.70002418	0.007	848.30003335	0.001	2.5
3.88	***20***	***824.70002955***	***0.000***	***848.30003428***	***0.000***	***2.5***
3.88	10	824.70002613	0.004	848.30003070	0.004	2.5
3.88	0	824.70002838	0.001	848.30002934	0.006	2.5
3.88	-10	824.70003128	-0.002	848.30003050	0.004	2.5
3.88	-20	824.70002927	0.000	848.30002385	0.012	2.5
3.88	-30	824.70002580	0.005	848.30002614	0.010	2.5

Reference Frequency : NR Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2061.750 Hz		High Channel	2120.750 Hz	
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	***20***	**824.70002955**	***0***	**848.30003428**	***0***	***2.5***
4.40	20	824.70001928	0.012	848.30002153	0.015	2.5
3.70	20	824.70002438	0.006	848.30002526	0.011	2.5

NR Band 66 (Lowest Frequency: QPSK / Highest Frequency: QPSK)

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.6995	1779.3005		
Extreme (50C)		1710.6995	1779.3006	52.8	0.030
Extreme (40C)		1710.6995	1779.3006	53.6	0.031
Extreme (30C)		1710.6995	1779.3006	60.7	0.035
Extreme (10C)		1710.6995	1779.3006	61.3	0.035
Extreme (0C)		1710.6995	1779.3006	54.8	0.031
Extreme (-10C)		1710.6995	1779.3006	50.6	0.029
Extreme (-20C)		1710.6995	1779.3006	51.3	0.029
Extreme (-30C)		1710.6995	1779.3006	55.2	0.032
20C	15%	1710.6995	1779.3006	39.5	0.023
	-15%	1710.6995	1779.3006	37.2	0.021
	End Point	1710.6995	1779.3006	35.8	0.021

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,NR);

TEST RESULTS

9.5.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	128	824.2	31.90	1548.82
		190	836.6	**33.56**	**2269.86**
		251	848.8	32.60	1819.70
	EGPRS	128	824.2	26.95	495.45
		190	836.6	**27.80**	**602.56**
		251	848.8	27.42	552.08
GSM1900	GPRS	512	1850.2	29.09	810.96
		661	1880	29.25	841.40
		810	1909.8	**29.81**	**957.19**
	EGPRS	512	1850.2	26.46	442.59
		661	1880	26.68	465.59
		810	1909.8	**27.02**	**503.50**

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	23.59	228.56
		4183	836.6	**24.47**	**279.90**
		4233	846.6	23.76	237.68
	HSDPA	4132	826.4	22.55	179.89
		4183	836.6	**23.54**	**225.94**
		4233	846.6	22.88	194.09
Band 4	REL99	1312	1712.4	23.62	230.14
		1413	1732.6	23.55	226.46
		1513	1752.6	**23.97**	**249.46**
	HSDPA	1312	1712.4	**23.21**	**209.41**
		1413	1732.6	23.00	199.53
		1513	1752.6	22.92	195.88
Band 2	REL99	9262	1852.4	23.84	242.10
		9400	1880.0	23.85	242.66
		9538	1907.6	**24.06**	**254.68**
	HSDPA	9262	1852.4	22.67	184.93
		9400	1880.0	22.21	166.34
		9538	1907.6	**23.02**	**200.45**

LTE Band 2 (Sub Antenna)

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 2	20	QPSK	1/49	1860.0	**21.34**	**136.14**
			1/49	1880.0	21.25	133.35
			1/49	1900.0	21.22	132.43
		16QAM	1/49	1860.0	**21.21**	**132.13**
			1/49	1880.0	21.10	128.82
			1/99	1900.0	21.10	128.82
	15	QPSK	1/74	1857.5	21.40	138.04
			1/37	1880.0	**21.62**	**145.21**
			1/37	1902.5	21.45	139.64
		16QAM	1/74	1857.5	**21.62**	**145.21**
			1/74	1880.0	21.39	137.72
			1/37	1902.5	21.34	136.14
	10	QPSK	1/25	1855.0	**21.85**	**153.11**
			1/0	1880.0	21.70	147.91
			1/49	1905.0	21.18	131.22
		16QAM	1/25	1855.0	21.64	145.88
			1/49	1880.0	**21.80**	**151.36**
			1/25	1905.0	21.02	126.47
	5	QPSK	1/12	1852.5	20.36	108.64
			1/24	1880.0	21.18	131.22
			1/12	1907.5	**21.33**	**135.83**
		16QAM	1/0	1852.5	22.21	166.34
			1/24	1880.0	**22.39**	**173.38**
			1/12	1907.5	21.55	142.89
	3	QPSK	1/0	1851.5	20.20	104.71
			1/8	1880.0	**22.18**	**165.20**
			1/0	1908.5	19.55	90.16
		16QAM	1/0	1851.5	19.95	98.86
			1/14	1880.0	**20.99**	**125.60**
			1/14	1908.5	20.23	105.44
	1.4	QPSK	1/5	1850.7	19.94	98.63
			1/5	1880.0	19.45	88.10
			1/5	1909.3	**20.61**	**115.08**
		16QAM	1/5	1850.7	19.82	95.94
			1/5	1880.0	19.56	90.36
			1/5	1909.3	**20.56**	**113.76**

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	21.34	136.14
			1/0	707.5	21.55	142.89
			1/0	711.0	**21.78**	**150.66**
		16QAM	1/0	704.0	20.07	101.62
			1/0	707.5	20.42	110.15
			1/0	711.0	**20.69**	**117.22**
	5	QPSK	1/12	701.5	21.34	136.14
			1/12	707.5	21.60	144.54
			1/12	713.5	**22.08**	**161.44**
		16QAM	1/0	701.5	19.91	97.95
			1/12	707.5	20.61	115.08
			1/0	713.5	**20.93**	**123.88**
	3	QPSK	1/8	700.5	20.75	118.85
			1/0	707.5	**21.82**	**152.05**
			1/8	714.5	21.78	150.66
		16QAM	1/8	700.5	19.55	90.16
			1/8	707.5	**20.67**	**116.68**
			1/0	714.5	20.54	113.24
	1.4	QPSK	1/5	699.7	20.96	124.74
			1/3	707.5	21.61	144.88
			1/3	715.3	**21.74**	**149.28**
		16QAM	1/0	699.7	19.77	94.84
			1/3	707.5	**20.50**	**112.20**
			1/3	715.3	20.27	106.41

LTE Band 13

Band	BW [MHz]	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 13	10	QPSK	1/25	782.0	**22.71**	**186.64**
		16QAM	1/25	782.0	21.65	146.22
	5	QPSK	1/12	779.5	**22.53**	**179.06**
			1/12	782.0	22.03	159.59
			1/12	784.5	22.00	158.49
		16QAM	1/12	779.5	21.27	133.97
			1/12	782.0	20.87	122.18
			1/0	784.5	**21.39**	**137.72**

LTE Band 25

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 25	20	QPSK	1/49	1860.0	24.48	280.54
			1/49	1882.5	**24.74**	**297.85**
			1/49	1905.0	24.63	290.40
		16QAM	1/49	1860.0	23.67	232.81
			1/49	1882.5	**23.83**	**241.55**
			1/49	1905.0	23.63	230.67
	15	QPSK	1/37	1857.5	**25.44**	**349.95**
			1/37	1882.5	25.06	320.63
			1/37	1907.5	23.49	223.36
		16QAM	1/37	1857.5	**24.35**	**272.27**
			1/74	1882.5	23.92	246.60
			1/37	1907.5	22.41	174.18
	10	QPSK	1/25	1855.0	**25.09**	**322.85**
			1/25	1882.5	24.89	308.32
			1/25	1910.0	24.81	302.69
		16QAM	1/25	1855.0	23.91	246.04
			1/25	1882.5	**24.34**	**271.64**
			1/25	1910.0	23.84	242.10
	5	QPSK	1/12	1852.5	24.99	315.50
			1/12	1882.5	23.81	240.44
			1/12	1912.5	**25.23**	**333.43**
		16QAM	1/24	1852.5	**24.13**	**258.82**
			1/12	1882.5	22.69	185.78
			1/12	1912.5	23.67	232.81
	3	QPSK	1/8	1851.5	25.41	347.54
			1/8	1882.5	**25.47**	**352.37**
			1/8	1913.5	24.91	309.74
		16QAM	1/8	1851.5	24.04	253.51
			1/8	1882.5	**24.42**	**276.69**
			1/8	1913.5	23.95	248.31
	1.4	QPSK	1/3	1850.7	25.08	322.11
			1/5	1882.5	**25.36**	**343.56**
			1/3	1914.3	24.73	297.17
		16QAM	1/5	1850.7	**24.33**	**271.02**
			1/3	1882.5	24.15	260.02
			1/3	1914.3	23.77	238.23

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	24.97	314.05
			1/37	831.5	**25.88**	**387.26**
			1/37	841.5	25.05	319.89
		16QAM	1/37	821.5	23.66	232.27
			1/37	831.5	**25.11**	**324.34**
			1/37	841.5	23.97	249.46
	10	QPSK	1/25	819.0	25.35	342.77
			1/25	829.0	24.33	271.02
			1/25	831.5	**25.06**	**320.63**
			1/25	844.0	24.91	309.74
		16QAM	1/0	819.0	23.90	245.47
			1/25	829.0	23.19	208.45
			1/0	831.5	**25.14**	**326.59**
			1/25	844.0	23.88	244.34
	5	QPSK	1/12	816.5	25.02	317.69
			1/12	821.5	24.91	309.74
			1/12	826.5	25.10	323.59
			1/12	831.5	**25.22**	**332.66**
			1/12	846.5	23.97	249.46
		16QAM	1/12	816.5	**23.99**	**250.61**
			1/12	821.5	23.77	238.23
			1/12	826.5	23.82	240.99
			1/12	831.5	23.70	234.42
			1/12	846.5	22.80	190.55
	3	QPSK	1/8	815.5	**25.17**	**328.85**
			1/8	822.5	24.88	307.61
			1/8	825.5	24.92	310.46
			1/8	831.5	25.01	316.96
			1/8	847.5	23.71	234.96
		16QAM	1/8	815.5	23.86	243.22
			1/8	822.5	23.97	249.46
			1/8	825.5	23.65	231.74
			1/8	831.5	**24.05**	**254.10**
			1/8	847.5	22.53	179.06
	1.4	QPSK	1/3	814.7	25.08	322.11
			1/3	823.3	**25.32**	**340.41**
			1/3	824.7	24.66	292.42
			1/3	831.5	24.84	304.79
			1/3	848.3	23.35	216.27
		16QAM	1/3	814.7	**24.05**	**254.10**
			1/3	823.3	24.04	253.51
			1/0	824.7	23.56	226.99
			1/3	831.5	23.77	238.23
			1/5	848.3	21.97	157.40

LTE Band 26(Straddle)

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP/EIRP [dBm]	ERP/EIRP [mW]
Band 26	15	QPSK	1/37	824	24.51	282.49
		16QAM	1/37		23.47	222.33
	10	QPSK	1/25	824	24.79	301.30
		16QAM	1/25		23.58	228.03
	5	QPSK	1/12	824	24.75	298.54
		16QAM	1/12		23.50	223.87
	3	QPSK	1/8	824	24.61	289.07
		16QAM	1/8		23.28	212.81
	1.4	QPSK	1/3	824	24.52	283.14
		16QAM	1/3		23.45	221.31

LTE Band 41 (PC2)

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 41	20	QPSK	1/0	2506.0	**26.03**	**400.87**
			1/49	2593.0	25.68	369.83
			1/49	2680.0	25.13	325.84
		16QAM	1/49	2506.0	23.82	240.99
			1/49	2593.0	**25.04**	**319.15**
			1/49	2680.0	24.45	278.61
	15	QPSK	1/37	2503.5	24.18	261.82
			1/37	2593.0	**26.02**	**399.94**
			1/37	2682.5	25.63	365.59
		16QAM	1/0	2503.5	23.64	231.21
			1/37	2593.0	**25.57**	**360.58**
			1/37	2682.5	25.15	327.34
	10	QPSK	1/25	2501.0	24.63	290.40
			1/25	2593.0	**25.95**	**393.55**
			1/25	2685.0	25.36	343.56
		16QAM	1/25	2501.0	24.01	251.77
			1/25	2593.0	**25.74**	**374.97**
			1/25	2685.0	24.98	314.77
	5	QPSK	1/12	2498.5	26.33	429.54
			1/12	2593.0	**27.44**	**554.63**
			1/12	2687.5	27.08	510.50
		16QAM	1/12	2498.5	25.51	355.63
			1/12	2593.0	**27.01**	**502.34**
			1/12	2687.5	26.50	446.68

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(04)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

LTE Band 66

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 66	20	QPSK	1/49	1720.0	24.28	267.92
			1/49	1745.0	24.28	267.92
			1/0	1770.0	**24.81**	**302.69**
		16QAM	1/49	1720.0	23.22	209.89
			1/49	1745.0	23.19	208.45
			1/0	1770.0	**23.47**	**222.33**
	15	QPSK	1/37	1717.5	24.08	255.86
			1/37	1747.5	**24.52**	**283.14**
			1/37	1772.5	24.42	276.69
		16QAM	1/37	1717.5	23.14	206.06
			1/37	1747.5	**23.52**	**224.91**
			1/0	1772.5	23.32	214.78
	10	QPSK	1/25	1715.0	24.04	253.51
			1/25	1745.0	**24.90**	**309.03**
			1/25	1775.0	23.96	248.89
		16QAM	1/25	1715.0	22.94	196.79
			1/25	1745.0	**23.85**	**242.66**
			1/25	1775.0	22.70	186.21
	5	QPSK	1/12	1712.5	**24.22**	**264.24**
			1/12	1745.0	24.13	258.82
			1/12	1777.5	23.83	241.55
		16QAM	1/12	1712.5	**23.09**	**203.70**
			1/12	1745.0	22.96	197.70
			1/12	1777.5	22.97	198.15
	3	QPSK	1/8	1711.5	24.14	259.42
			1/8	1745.0	**24.63**	**290.40**
			1/8	1778.5	23.86	243.22
		16QAM	1/8	1711.5	22.86	193.20
			1/8	1745.0	**23.73**	**236.05**
			1/0	1778.5	23.30	213.80
	1.4	QPSK	1/3	1710.7	24.16	260.62
			1/3	1745.0	**24.82**	**303.39**
			1/0	1779.3	23.92	246.60
		16QAM	1/3	1710.7	23.09	203.70
			1/0	1745.0	**23.50**	**223.87**
			1/5	1779.3	22.80	190.55

NR Band 5

Band	BW [MHz]	Modulation	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
n5	20	DFT-s OFDM	QPSK	1/53	834.0	**22.46**	**176.20**
				1/53	836.5	22.00	158.49
				1/53	839.0	21.70	147.91
			16QAM	1/53	834.0	**21.14**	**130.02**
				1/53	836.5	20.42	110.15
				1/53	839.0	20.43	110.41
	15	DFT-s OFDM	QPSK	1/40	831.5	**22.44**	**175.39**
				1/40	836.5	21.92	155.60
				1/40	841.5	21.22	132.43
			16QAM	1/40	831.5	**21.32**	**135.52**
				1/40	836.5	20.72	118.03
				1/40	841.5	20.42	110.15
	10	DFT-s OFDM	QPSK	1/26	829.0	**22.50**	**177.83**
				1/26	836.5	21.61	**144.88**
				1/26	844.0	21.20	131.83
			16QAM	1/26	829.0	**21.45**	139.64
				1/26	836.5	20.78	**119.67**
				1/26	844.0	20.03	100.69
	5	DFT-s OFDM	QPSK	1/1	826.5	**22.03**	**159.59**
				1/23	836.5	21.86	153.46
				1/1	846.5	21.66	146.55
			16QAM	1/1	826.5	**21.88**	**154.17**
				1/23	836.5	20.47	111.43
				1/1	846.5	20.56	113.76

NR Band 66

Band	BW [MHz]	Modulation	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
n66	20	DFT-s OFDM	QPSK	1/104	1720.0	**20.88**	**122.46**
				1/104	1745.0	20.70	117.49
				1/104	1770.0	19.29	84.92
			16QAM	1/104	1720.0	**20.75**	**118.85**
				1/104	1745.0	20.48	111.69
				1/104	1770.0	19.06	80.54
	15	DFT-s OFDM	QPSK	1/77	1717.5	**20.51**	**112.46**
				1/1	1745.0	20.18	104.23
				1/1	1772.5	20.17	103.99
			16QAM	1/77	1717.5	**20.49**	**111.94**
				1/1	1745.0	20.25	105.93
				1/1	1772.5	20.07	101.62
	10	DFT-s OFDM	QPSK	1/50	1715.0	19.80	**95.50**
				1/1	1745.0	**20.52**	**112.72**
				1/26	1775.0	19.91	97.95
			16QAM	1/50	1715.0	19.61	91.41
				1/1	1745.0	**20.41**	**109.90**
				1/26	1775.0	19.75	94.41
	5	DFT-s OFDM	QPSK	1/13	1712.5	20.52	112.72
				1/13	1745.0	**20.84**	**121.34**
				1/13	1777.5	20.50	112.20
			16QAM	1/13	1712.5	19.83	96.16
				1/13	1745.0	**20.61**	**115.08**
				1/13	1777.5	20.14	103.28

9.5.2. ERP/EIRP DATA

GSM850

GSM850

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Y-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	36.25	V	3.0	-1.3	31.90	38.5	-6.6	
824.20	26.02	H	3.0	-1.3	21.67	38.5	-16.8	
Mid Ch								
836.60	37.81	V	3.0	-1.2	33.56	38.5	-4.9	
836.60	26.99	H	3.0	-1.2	22.74	38.5	-15.8	
High Ch								
848.80	36.76	V	3.1	-1.1	32.60	38.5	-5.9	
848.80	28.13	H	3.1	-1.1	23.96	38.5	-14.5	

GSM850

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Y-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	31.30	V	3.0	-1.3	26.95	38.5	-11.5	
824.20	20.26	H	3.0	-1.3	15.91	38.5	-22.6	
Mid Ch								
836.60	32.05	V	3.0	-1.2	27.80	38.5	-10.7	
836.60	21.89	H	3.0	-1.2	17.64	38.5	-20.9	
High Ch								
848.80	31.58	V	3.1	-1.1	27.42	38.5	-11.1	
848.80	22.26	H	3.1	-1.1	18.09	38.5	-20.4	

GSM1900

GSM1900

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 22943
Configuration: EUT, Z-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	21.60	V	4.5	9.6	26.78	33.0	-6.2	
1850.20	23.91	H	4.5	9.6	29.09	33.0	-3.9	
Mid Ch								
1880.00	22.39	V	4.5	9.4	27.26	33.0	-5.7	
1880.00	24.38	H	4.5	9.4	29.25	33.0	-3.8	
High Ch								
1909.80	22.73	V	4.5	9.1	27.25	33.0	-5.7	
1909.80	25.28	H	4.5	9.1	29.81	33.0	-3.2	

GSM1900

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 22943
Configuration: EUT, Z-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	18.63	V	4.5	9.6	23.81	33.0	-9.2	
1850.20	21.28	H	4.5	9.6	26.46	33.0	-6.5	
Mid Ch								
1880.00	18.90	V	4.5	9.4	23.77	33.0	-9.2	
1880.00	21.81	H	4.5	9.4	26.68	33.0	-6.3	
High Ch								
1909.80	18.53	V	4.5	9.1	23.05	33.0	-9.9	
1909.80	22.49	H	4.5	9.1	27.02	33.0	-6.0	

WCDMA Band 5

Band 5 REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 22943
Configuration: EUT, Y-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	27.92	V	3.0	-1.3	23.59	38.5	-14.9	
826.40	17.38	H	3.0	-1.3	13.05	38.5	-25.4	
Mid Ch								
836.60	28.72	V	3.0	-1.2	24.47	38.5	-14.0	
836.60	18.45	H	3.0	-1.2	14.20	38.5	-24.3	
High Ch								
846.60	27.94	V	3.0	-1.1	23.76	38.5	-14.7	
846.60	18.46	H	3.0	-1.1	14.28	38.5	-24.2	

Band 5 HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 22943
Configuration: EUT, Y-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	26.88	V	3.0	-1.3	22.55	38.5	-15.9	
826.40	15.89	H	3.0	-1.3	11.56	38.5	-26.9	
Mid Ch								
836.60	27.79	V	3.0	-1.2	23.54	38.5	-15.0	
836.60	17.10	H	3.0	-1.2	12.85	38.5	-25.6	
High Ch								
846.60	27.06	V	3.0	-1.1	22.88	38.5	-15.6	
846.60	17.33	H	3.0	-1.1	13.15	38.5	-25.3	

WCDMA Band 4

Band 4 REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 22943
Configuration: EUT, Z-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	15.26	V	4.3	9.6	20.55	30.0	-9.5	
1712.40	18.34	H	4.3	9.6	23.62	30.0	-6.4	
Mid Ch								
1732.60	14.42	V	4.3	9.6	19.75	30.0	-10.3	
1732.60	18.23	H	4.3	9.6	23.55	30.0	-6.4	
High Ch								
1752.60	15.18	V	4.3	9.7	20.54	30.0	-9.5	
1752.60	18.62	H	4.3	9.7	23.97	30.0	-6.0	

Band 4 HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 22943
Configuration: EUT, Z-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	14.62	V	4.3	9.6	19.91	30.0	-10.1	
1712.40	17.93	H	4.3	9.6	23.21	30.0	-6.8	
Mid Ch								
1732.60	13.35	V	4.3	9.6	18.68	30.0	-11.3	
1732.60	17.68	H	4.3	9.6	23.00	30.0	-7.0	
High Ch								
1752.60	14.05	V	4.3	9.7	19.41	30.0	-10.6	
1752.60	17.57	H	4.3	9.7	22.92	30.0	-7.1	

WCDMA Band 2

Band 2 REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 22943
Configuration: EUT, X-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	18.13	V	4.5	9.6	23.28	33.0	-9.7	
1852.40	18.68	H	4.5	9.6	23.84	33.0	-9.2	
Mid Ch								
1880.00	18.18	V	4.5	9.4	23.05	33.0	-9.9	
1880.00	18.98	H	4.5	9.4	23.85	33.0	-9.2	
High Ch								
1907.60	19.50	V	4.5	9.1	24.06	33.0	-8.9	
1907.60	18.81	H	4.5	9.1	23.37	33.0	-9.6	

Band 2 HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 22943
Configuration: EUT, X-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	17.12	V	4.5	9.6	22.27	33.0	-10.7	
1852.40	17.51	H	4.5	9.6	22.67	33.0	-10.3	
Mid Ch								
1880.00	17.08	V	4.5	9.4	21.95	33.0	-11.0	
1880.00	17.34	H	4.5	9.4	22.21	33.0	-10.8	
High Ch								
1907.60	18.46	V	4.5	9.1	23.02	33.0	-10.0	
1907.60	17.55	H	4.5	9.1	22.11	33.0	-10.9	

LTE Band 2(Sub Antenna)

LTE Band 2

20MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 12/9/2021
Test Engineer: 19568
Configuration: EUT / AC Adpater, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	8.66	V	4.5	9.5	13.70	33.0	-19.3	
1860.00	16.29	H	4.5	9.5	21.34	33.0	-11.7	
Mid Ch								
1880.00	9.33	V	4.5	9.4	14.21	33.0	-18.8	
1880.00	16.37	H	4.5	9.4	21.25	33.0	-11.8	
High Ch								
1900.00	9.84	V	4.5	9.2	14.55	33.0	-18.4	
1900.00	16.51	H	4.5	9.2	21.22	33.0	-11.8	

LTE Band 2

20MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 12/9/2021
Test Engineer: 19568
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	8.51	V	4.5	9.5	13.55	33.0	-19.4	
1860.00	16.16	H	4.5	9.5	21.21	33.0	-11.8	
Mid Ch								
1880.00	9.21	V	4.5	9.4	14.09	33.0	-18.9	
1880.00	16.22	H	4.5	9.4	21.10	33.0	-11.9	
High Ch								
1900.00	9.77	V	4.5	9.2	14.48	33.0	-18.5	
1900.00	16.39	H	4.5	9.2	21.10	33.0	-11.9	

LTE Band 2

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 12/9/2021
Test Engineer: 19568
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	9.48	V	4.5	9.5	14.55	33.0	-18.4	
1857.50	16.33	H	4.5	9.5	21.40	33.0	-11.6	
Mid Ch								
1880.00	10.70	V	4.5	9.4	15.58	33.0	-17.4	
1880.00	16.74	H	4.5	9.4	21.62	33.0	-11.4	
High Ch								
1902.50	11.13	V	4.5	9.2	15.81	33.0	-17.2	
1902.50	16.77	H	4.5	9.2	21.45	33.0	-11.6	

LTE Band 2

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 12/9/2021
Test Engineer: 19568
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	9.58	V	4.5	9.5	14.65	33.0	-18.3	
1857.50	16.55	H	4.5	9.5	21.62	33.0	-11.4	
Mid Ch								
1880.00	10.76	V	4.5	9.4	15.64	33.0	-17.4	
1880.00	16.51	H	4.5	9.4	21.39	33.0	-11.6	
High Ch								
1902.50	11.06	V	4.5	9.2	15.74	33.0	-17.3	
1902.50	16.66	H	4.5	9.2	21.34	33.0	-11.7	

LTE Band 2

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 12/9/2021
Test Engineer: 19568
Configuration: EUT/ AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	9.33	V	4.5	9.6	14.42	33.0	-18.6	
1855.00	16.76	H	4.5	9.6	21.85	33.0	-11.1	
Mid Ch								
1880.00	10.10	V	4.5	9.4	14.98	33.0	-18.0	
1880.00	16.82	H	4.5	9.4	21.70	33.0	-11.3	
High Ch								
1905.00	9.70	V	4.5	9.2	14.35	33.0	-18.7	
1905.00	16.53	H	4.5	9.2	21.18	33.0	-11.8	

LTE Band 2

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 12/9/2021
Test Engineer: 19568
Configuration: EUT/ AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	9.68	V	4.5	9.6	14.77	33.0	-18.2	
1855.00	16.55	H	4.5	9.6	21.64	33.0	-11.4	
Mid Ch								
1880.00	10.03	V	4.5	9.4	14.91	33.0	-18.1	
1880.00	16.92	H	4.5	9.4	21.80	33.0	-11.2	
High Ch								
1905.00	9.43	V	4.5	9.2	14.08	33.0	-18.9	
1905.00	16.37	H	4.5	9.2	21.02	33.0	-12.0	

LTE Band 2

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 12/9/2021
Test Engineer: 19568
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	9.43	V	4.5	9.6	14.54	33.0	-18.5	
1852.50	15.25	H	4.5	9.6	20.36	33.0	-12.6	
Mid Ch								
1880.00	9.96	V	4.5	9.4	14.84	33.0	-18.2	
1880.00	16.30	H	4.5	9.4	21.18	33.0	-11.8	
High Ch								
1907.50	10.18	V	4.5	9.2	14.80	33.0	-18.2	
1907.50	16.72	H	4.5	9.2	21.33	33.0	-11.7	

LTE Band 2

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 12/9/2021
Test Engineer: 19568
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 2 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	9.71	V	4.5	9.6	14.82	33.0	-18.2	
1852.50	17.10	H	4.5	9.6	22.21	33.0	-10.8	
Mid Ch								
1880.00	10.38	V	4.5	9.4	15.26	33.0	-17.7	
1880.00	17.51	H	4.5	9.4	22.39	33.0	-10.6	
High Ch								
1907.50	10.16	V	4.5	9.2	14.78	33.0	-18.2	
1907.50	16.94	H	4.5	9.2	21.55	33.0	-11.4	

LTE Band 2 3MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 12/8/2021
Test Engineer: 19568
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	11.32	V	4.5	9.6	16.44	33.0	-16.6	
1851.50	15.07	H	4.5	9.6	20.20	33.0	-12.8	
Mid Ch								
1880.00	12.23	V	4.5	9.4	17.11	33.0	-15.9	
1880.00	17.30	H	4.5	9.4	22.18	33.0	-10.8	
High Ch								
1908.50	11.38	V	4.5	9.1	15.98	33.0	-17.0	
1908.50	14.95	H	4.5	9.1	19.55	33.0	-13.5	

LTE Band 2 3MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 12/8/2021
Test Engineer: 19568
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	11.25	V	4.5	9.6	16.37	33.0	-16.6	
1851.50	14.82	H	4.5	9.6	19.95	33.0	-13.1	
Mid Ch								
1880.00	8.27	V	4.5	9.4	13.15	33.0	-19.9	
1880.00	16.11	H	4.5	9.4	20.99	33.0	-12.0	
High Ch								
1908.50	12.47	V	4.5	9.1	17.07	33.0	-15.9	
1908.50	15.63	H	4.5	9.1	20.23	33.0	-12.8	

LTE Band 2

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 12/8/2021
Test Engineer: 19568
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	11.52	V	4.5	9.6	16.65	33.0	-16.4	
1850.70	14.81	H	4.5	9.6	19.94	33.0	-13.1	
Mid Ch								
1880.00	10.94	V	4.5	9.4	15.82	33.0	-17.2	
1880.00	14.57	H	4.5	9.4	19.45	33.0	-13.6	
High Ch								
1909.30	10.56	V	4.5	9.1	15.15	33.0	-17.8	
1909.30	16.02	H	4.5	9.1	20.61	33.0	-12.4	

LTE Band 2

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 12/8/2021
Test Engineer: 19568
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	11.47	V	4.5	9.6	16.60	33.0	-16.4	
1850.70	14.69	H	4.5	9.6	19.82	33.0	-13.2	
Mid Ch								
1880.00	10.76	V	4.5	9.4	15.64	33.0	-17.4	
1880.00	14.68	H	4.5	9.4	19.56	33.0	-13.4	
High Ch								
1909.30	10.44	V	4.5	9.1	15.03	33.0	-18.0	
1909.30	15.97	H	4.5	9.1	20.56	33.0	-12.4	

LTE Band 12

LTE Band 12

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 22943
Configuration: EUT, X-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	16.21	V	2.8	-1.4	12.06	34.8	-22.7	
704.00	25.49	H	2.8	-1.4	21.34	34.8	-13.4	
Mid Ch								
707.50	16.12	V	2.8	-1.4	11.95	34.8	-22.8	
707.50	25.71	H	2.8	-1.4	21.55	34.8	-13.2	
High Ch								
711.00	16.84	V	2.8	-1.4	12.67	34.8	-22.1	
711.00	25.95	H	2.8	-1.4	21.78	34.8	-13.0	

LTE Band 12

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 22943
Configuration: EUT, X-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	15.04	V	2.8	-1.4	10.89	34.8	-23.9	
704.00	24.22	H	2.8	-1.4	20.07	34.8	-14.7	
Mid Ch								
707.50	14.74	V	2.8	-1.4	10.57	34.8	-24.2	
707.50	24.58	H	2.8	-1.4	20.42	34.8	-14.4	
High Ch								
711.00	15.54	V	2.8	-1.4	11.37	34.8	-23.4	
711.00	24.86	H	2.8	-1.4	20.69	34.8	-14.1	

LTE Band 12 5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 22943
Configuration: EUT, X-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	16.32	V	2.8	-1.4	12.19	34.8	-22.6	
701.50	25.47	H	2.8	-1.4	21.34	34.8	-13.4	
Mid Ch								
707.50	17.06	V	2.8	-1.4	12.89	34.8	-21.9	
707.50	25.76	H	2.8	-1.4	21.60	34.8	-13.2	
High Ch								
713.50	17.47	V	2.8	-1.4	13.29	34.8	-21.5	
713.50	26.26	H	2.8	-1.4	22.08	34.8	-12.7	

LTE Band 12 5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 22943
Configuration: EUT, X-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	15.16	V	2.8	-1.4	11.03	34.8	-23.7	
701.50	24.04	H	2.8	-1.4	19.91	34.8	-14.9	
Mid Ch								
707.50	15.82	V	2.8	-1.4	11.65	34.8	-23.1	
707.50	24.77	H	2.8	-1.4	20.61	34.8	-14.2	
High Ch								
713.50	16.40	V	2.8	-1.4	12.22	34.8	-22.5	
713.50	25.11	H	2.8	-1.4	20.93	34.8	-13.8	

LTE Band 12

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 22943
Configuration: EUT, X-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	16.21	V	2.8	-1.4	12.08	34.8	-22.7	
700.50	24.89	H	2.8	-1.4	20.75	34.8	-14.0	
Mid Ch								
707.50	16.68	V	2.8	-1.4	12.51	34.8	-22.3	
707.50	25.98	H	2.8	-1.4	21.82	34.8	-13.0	
High Ch								
714.50	17.65	V	2.8	-1.4	13.46	34.8	-21.3	
714.50	25.97	H	2.8	-1.4	21.78	34.8	-13.0	

LTE Band 12

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 22943
Configuration: EUT, X-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	15.07	V	2.8	-1.4	10.94	34.8	-23.8	
700.50	23.69	H	2.8	-1.4	19.55	34.8	-15.2	
Mid Ch								
707.50	15.86	V	2.8	-1.4	11.69	34.8	-23.1	
707.50	24.83	H	2.8	-1.4	20.67	34.8	-14.1	
High Ch								
714.50	16.19	V	2.8	-1.4	12.00	34.8	-22.8	
714.50	24.73	H	2.8	-1.4	20.54	34.8	-14.2	

LTE Band 12

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 22943
Configuration: EUT, X-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	16.28	V	2.8	-1.4	12.15	34.8	-22.6	
699.70	25.09	H	2.8	-1.4	20.96	34.8	-13.8	
Mid Ch								
707.50	16.92	V	2.8	-1.4	12.75	34.8	-22.0	
707.50	25.77	H	2.8	-1.4	21.61	34.8	-13.2	
High Ch								
715.30	17.21	V	2.8	-1.4	13.02	34.8	-21.7	
715.30	25.93	H	2.8	-1.4	21.74	34.8	-13.0	

LTE Band 12

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 22943
Configuration: EUT, X-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	15.01	V	2.8	-1.4	10.88	34.8	-23.9	
699.70	23.90	H	2.8	-1.4	19.77	34.8	-15.0	
Mid Ch								
707.50	15.55	V	2.8	-1.4	11.38	34.8	-23.4	
707.50	24.66	H	2.8	-1.4	20.50	34.8	-14.3	
High Ch								
715.30	16.17	V	2.8	-1.4	11.98	34.8	-22.8	
715.30	24.46	H	2.8	-1.4	20.27	34.8	-14.5	

LTE Band 13

LTE Band 13

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 13 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
Mid Ch								
782.00	27.16	V	2.9	-1.5	22.71	34.8	-12.1	
782.00	18.00	H	2.9	-1.5	13.55	34.8	-21.2	

LTE Band 13

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 13 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
Mid Ch								
782.00	26.10	V	2.9	-1.5	21.65	34.8	-13.1	
782.00	16.88	H	2.9	-1.5	12.43	34.8	-22.3	

LTE Band 13 5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 13 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								
779.50	26.97	V	2.9	-1.5	22.53	34.8	-12.2	
779.50	18.19	H	2.9	-1.5	13.75	34.8	-21.0	
Mid Ch								
782.00	26.48	V	2.9	-1.5	22.03	34.8	-12.7	
782.00	17.52	H	2.9	-1.5	13.07	34.8	-21.7	
High Ch								
784.50	26.46	V	2.9	-1.5	22.00	34.8	-12.8	
784.50	16.92	H	2.9	-1.5	12.46	34.8	-22.3	

LTE Band 13 5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 22943
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 13 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								
779.50	25.71	V	2.9	-1.5	21.27	34.8	-13.5	
779.50	17.10	H	2.9	-1.5	12.66	34.8	-22.1	
Mid Ch								
782.00	25.32	V	2.9	-1.5	20.87	34.8	-13.9	
782.00	16.21	H	2.9	-1.5	11.76	34.8	-23.0	
High Ch								
784.50	25.85	V	2.9	-1.5	21.39	34.8	-13.4	
784.50	16.07	H	2.9	-1.5	11.61	34.8	-23.2	

LTE Band 25

LTE Band 25

20MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 25 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	15.62	V	4.5	9.6	20.70	33.0	-12.3	
1860.00	19.41	H	4.5	9.6	24.48	33.0	-8.5	
Mid Ch								
1882.50	16.10	V	4.5	9.3	20.94	33.0	-12.1	
1882.50	19.89	H	4.5	9.3	24.74	33.0	-8.3	
High Ch								
1905.00	16.27	V	4.5	9.1	20.87	33.0	-12.1	
1905.00	20.04	H	4.5	9.1	24.63	33.0	-8.4	

LTE Band 25

20MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 25 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	14.89	V	4.5	9.6	19.97	33.0	-13.0	
1860.00	18.60	H	4.5	9.6	23.67	33.0	-9.3	
Mid Ch								
1882.50	14.86	V	4.5	9.3	19.70	33.0	-13.3	
1882.50	18.98	H	4.5	9.3	23.83	33.0	-9.2	
High Ch								
1905.00	15.28	V	4.5	9.1	19.88	33.0	-13.1	
1905.00	19.04	H	4.5	9.1	23.63	33.0	-9.4	

LTE Band 25

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 20882
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 25 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	15.90	V	4.5	9.5	20.97	33.0	-12.0	
1857.50	20.37	H	4.5	9.5	25.44	33.0	-7.6	
Mid Ch								
1882.50	16.77	V	4.5	9.4	21.63	33.0	-11.4	
1882.50	20.20	H	4.5	9.4	25.06	33.0	-7.9	
High Ch								
1907.50	15.84	V	4.5	9.2	20.46	33.0	-12.5	
1907.50	18.88	H	4.5	9.2	23.49	33.0	-9.5	

LTE Band 25

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 20882
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 25 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	14.80	V	4.5	9.5	19.87	33.0	-13.1	
1857.50	19.28	H	4.5	9.5	24.35	33.0	-8.6	
Mid Ch								
1882.50	15.37	V	4.5	9.4	20.23	33.0	-12.8	
1882.50	19.06	H	4.5	9.4	23.92	33.0	-9.1	
High Ch								
1907.50	14.52	V	4.5	9.2	19.14	33.0	-13.9	
1907.50	17.80	H	4.5	9.2	22.41	33.0	-10.6	

LTE Band 25

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 20882
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 25 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	15.62	V	4.5	9.6	20.71	33.0	-12.3	
1855.00	20.00	H	4.5	9.6	25.09	33.0	-7.9	
Mid Ch								
1882.50	16.85	V	4.5	9.4	21.71	33.0	-11.3	
1882.50	20.03	H	4.5	9.4	24.89	33.0	-8.1	
High Ch								
1910.00	16.05	V	4.5	9.1	20.63	33.0	-12.4	
1910.00	20.23	H	4.5	9.1	24.81	33.0	-8.2	

LTE Band 25

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 20882
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 25 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	14.52	V	4.5	9.6	19.61	33.0	-13.4	
1855.00	18.82	H	4.5	9.6	23.91	33.0	-9.1	
Mid Ch								
1882.50	15.64	V	4.5	9.4	20.50	33.0	-12.5	
1882.50	19.48	H	4.5	9.4	24.34	33.0	-8.7	
High Ch								
1910.00	15.06	V	4.5	9.1	19.64	33.0	-13.4	
1910.00	19.26	H	4.5	9.1	23.84	33.0	-9.2	

LTE Band 25

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 20882
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 25 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	15.64	V	4.5	9.6	20.75	33.0	-12.2	
1852.50	19.88	H	4.5	9.6	24.99	33.0	-8.0	
Mid Ch								
1882.50	16.89	V	4.5	9.4	21.75	33.0	-11.2	
1882.50	18.95	H	4.5	9.4	23.81	33.0	-9.2	
High Ch								
1912.50	16.33	V	4.5	9.1	20.88	33.0	-12.1	
1912.50	20.68	H	4.5	9.1	25.23	33.0	-7.8	

LTE Band 25

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 20882
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 25 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	14.41	V	4.5	9.6	19.52	33.0	-13.5	
1852.50	19.02	H	4.5	9.6	24.13	33.0	-8.9	
Mid Ch								
1882.50	15.61	V	4.5	9.4	20.47	33.0	-12.5	
1882.50	17.83	H	4.5	9.4	22.69	33.0	-10.3	
High Ch								
1912.50	15.39	V	4.5	9.1	19.94	33.0	-13.1	
1912.50	19.12	H	4.5	9.1	23.67	33.0	-9.3	

LTE Band 25

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 20882
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 25 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	16.79	V	4.5	9.6	21.91	33.0	-11.1	
1851.50	20.28	H	4.5	9.6	25.41	33.0	-7.6	
Mid Ch								
1882.50	16.53	V	4.5	9.4	21.39	33.0	-11.6	
1882.50	20.61	H	4.5	9.4	25.47	33.0	-7.5	
High Ch								
1913.50	16.38	V	4.5	9.1	20.92	33.0	-12.1	
1913.50	20.37	H	4.5	9.1	24.91	33.0	-8.1	

LTE Band 25

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 20882
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 25 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	15.79	V	4.5	9.6	20.91	33.0	-12.1	
1851.50	18.91	H	4.5	9.6	24.04	33.0	-9.0	
Mid Ch								
1882.50	15.49	V	4.5	9.4	20.35	33.0	-12.6	
1882.50	19.56	H	4.5	9.4	24.42	33.0	-8.6	
High Ch								
1913.50	15.05	V	4.5	9.1	19.59	33.0	-13.4	
1913.50	19.41	H	4.5	9.1	23.95	33.0	-9.1	

LTE Band 25

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 20882
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 25 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	15.36	V	4.5	9.6	20.49	33.0	-12.5	
1850.70	19.95	H	4.5	9.6	25.08	33.0	-7.9	
Mid Ch								
1882.50	16.48	V	4.5	9.4	21.34	33.0	-11.7	
1882.50	20.50	H	4.5	9.4	25.36	33.0	-7.6	
High Ch								
1914.30	16.29	V	4.5	9.1	20.81	33.0	-12.2	
1914.30	20.20	H	4.5	9.1	24.73	33.0	-8.3	

LTE Band 25

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/5/2021
Test Engineer: 20882
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 25 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	15.34	V	4.5	9.6	20.47	33.0	-12.5	
1850.70	19.20	H	4.5	9.6	24.33	33.0	-8.7	
Mid Ch								
1882.50	15.46	V	4.5	9.4	20.32	33.0	-12.7	
1882.50	19.29	H	4.5	9.4	24.15	33.0	-8.8	
High Ch								
1914.30	15.15	V	4.5	9.1	19.67	33.0	-13.3	
1914.30	19.24	H	4.5	9.1	23.77	33.0	-9.2	

LTE Band 26 (Part 90)

LTE Band 26

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 20882
Configuration: EUT, Y-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	29.34	V	3.0	-1.4	24.97	50.0	-25.0	Part 90
821.50	18.05	H	3.0	-1.4	13.69	50.0	-36.3	Part 90

LTE Band 26

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 20882
Configuration: EUT, Y-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	28.03	V	3.0	-1.4	23.66	50.0	-26.3	Part 90
821.50	16.92	H	3.0	-1.4	12.56	50.0	-37.4	Part 90

LTE Band 26

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 20882
Configuration: EUT, Y-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	29.73	V	3.0	-1.4	25.35	50.0	-24.7	Part 90
819.00	18.46	H	3.0	-1.4	14.08	50.0	-35.9	Part 90

LTE Band 26

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 20882
Configuration: EUT, Y-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	28.28	V	3.0	-1.4	23.90	50.0	-26.1	Part 90
819.00	17.27	H	3.0	-1.4	12.89	50.0	-37.1	Part 90

LTE Band 26

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 20882
Configuration: EUT, Y-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	29.41	V	3.0	-1.4	25.02	50.0	-25.0	Part 90
816.50	18.48	H	3.0	-1.4	14.08	50.0	-35.9	Part 90
Mid Ch								
821.50	29.28	V	3.0	-1.4	24.91	50.0	-25.1	Part 90
821.50	18.27	H	3.0	-1.4	13.91	50.0	-36.1	Part 90

LTE Band 26

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 20882
Configuration: EUT, Y-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	28.38	V	3.0	-1.4	23.99	50.0	-26.0	Part 90
816.50	17.40	H	3.0	-1.4	13.00	50.0	-37.0	Part 90
Mid Ch								
821.50	28.14	V	3.0	-1.4	23.77	50.0	-26.2	Part 90
821.50	17.16	H	3.0	-1.4	12.80	50.0	-37.2	Part 90

LTE Band 26

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 20882
Configuration: EUT, Y-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	29.58	V	3.0	-1.4	25.17	50.0	-24.8	Part 90
815.50	18.14	H	3.0	-1.4	13.74	50.0	-36.3	Part 90
Mid Ch								
822.50	29.23	V	3.0	-1.3	24.88	50.0	-25.1	Part 90
822.50	18.63	H	3.0	-1.3	14.28	50.0	-35.7	Part 90

LTE Band 26

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 20882
Configuration: EUT, Y-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	28.27	V	3.0	-1.4	23.86	50.0	-26.1	Part 90
815.50	17.00	H	3.0	-1.4	12.60	50.0	-37.4	Part 90
Mid Ch								
822.50	28.32	V	3.0	-1.3	23.97	50.0	-26.0	Part 90
822.50	17.22	H	3.0	-1.3	12.87	50.0	-37.1	Part 90

LTE Band 26

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 20882
Configuration: EUT, Y-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	29.49	V	3.0	-1.4	25.08	50.0	-24.9	Part 90
814.70	18.17	H	3.0	-1.4	13.76	50.0	-36.2	Part 90
Mid Ch								
823.30	29.66	V	3.0	-1.3	25.32	50.0	-24.7	Part 90
823.30	18.66	H	3.0	-1.3	14.32	50.0	-35.7	Part 90

LTE Band 26

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 20882
Configuration: EUT, Y-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	28.46	V	3.0	-1.4	24.05	50.0	-26.0	Part 90
814.70	17.07	H	3.0	-1.4	12.66	50.0	-37.3	Part 90
Mid Ch								
823.30	28.38	V	3.0	-1.3	24.04	50.0	-26.0	Part 90
823.30	17.66	H	3.0	-1.3	13.32	50.0	-36.7	Part 90

LTE Band 26 (Part 22)

LTE Band 26

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Y-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
Straddle Ch								
824.00	28.85	V	3.0	-1.3	24.51	38.5	-14.0	
824.00	18.76	H	3.0	-1.3	14.42	38.5	-24.1	
Mid Ch								
831.50	30.17	V	3.0	-1.3	25.88	38.5	-12.6	
831.50	18.78	H	3.0	-1.3	14.49	38.5	-24.0	
High Ch								
841.50	29.27	V	3.0	-1.2	25.05	38.5	-13.4	
841.50	18.57	H	3.0	-1.2	14.36	38.5	-24.1	

LTE Band 26

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Y-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
Straddle Ch								
824.00	27.81	V	3.0	-1.3	23.47	38.5	-15.0	
824.00	17.86	H	3.0	-1.3	13.52	38.5	-25.0	
Mid Ch								
831.50	29.40	V	3.0	-1.3	25.11	38.5	-13.4	
831.50	17.63	H	3.0	-1.3	13.34	38.5	-25.2	
High Ch								
841.50	28.19	V	3.0	-1.2	23.97	38.5	-14.5	
841.50	17.27	H	3.0	-1.2	13.06	38.5	-25.4	

LTE Band 26

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Y-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
Straddle Ch								
824.00	29.13	V	3.0	-1.3	24.79	38.5	-13.7	
824.00	18.71	H	3.0	-1.3	14.37	38.5	-24.1	
Low Ch								
829.00	28.64	V	3.0	-1.3	24.33	38.5	-14.2	
829.00	19.31	H	3.0	-1.3	15.01	38.5	-23.5	
Mid Ch								
831.50	29.35	V	3.0	-1.3	25.06	38.5	-13.4	
831.50	19.14	H	3.0	-1.3	14.85	38.5	-23.6	
High Ch								
844.00	29.11	V	3.0	-1.2	24.91	38.5	-13.6	
844.00	18.65	H	3.0	-1.2	14.46	38.5	-24.0	

LTE Band 26

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Y-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
Straddle Ch								
824.00	27.92	V	3.0	-1.3	23.58	38.5	-14.9	
824.00	17.77	H	3.0	-1.3	13.43	38.5	-25.1	
Low Ch								
829.00	27.50	V	3.0	-1.3	23.19	38.5	-15.3	
829.00	18.04	H	3.0	-1.3	13.74	38.5	-24.8	
Mid Ch								
831.50	29.43	V	3.0	-1.3	25.14	38.5	-13.4	
831.50	18.07	H	3.0	-1.3	13.78	38.5	-24.7	
High Ch								
844.00	28.08	V	3.0	-1.2	23.88	38.5	-14.6	
844.00	17.65	H	3.0	-1.2	13.46	38.5	-25.0	

LTE Band 26

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Y-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
Straddle Ch								
824.00	29.09	V	3.0	-1.3	24.75	38.5	-13.8	
824.00	18.77	H	3.0	-1.3	14.43	38.5	-24.1	
Low Ch								
826.50	29.43	V	3.0	-1.3	25.10	38.5	-13.4	
826.50	19.48	H	3.0	-1.3	15.15	38.5	-23.3	
Mid Ch								
831.50	29.51	V	3.0	-1.3	25.22	38.5	-13.3	
831.50	19.56	H	3.0	-1.3	15.27	38.5	-23.2	
High Ch								
846.50	28.15	V	3.0	-1.1	23.97	38.5	-14.5	
846.50	19.19	H	3.0	-1.1	15.01	38.5	-23.5	

LTE Band 26

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Y-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
Straddle Ch								
824.00	27.84	V	3.0	-1.3	23.50	38.5	-15.0	
824.00	17.38	H	3.0	-1.3	13.04	38.5	-25.5	
Low Ch								
826.50	28.15	V	3.0	-1.3	23.82	38.5	-14.7	
826.50	18.39	H	3.0	-1.3	14.06	38.5	-24.4	
Mid Ch								
831.50	27.99	V	3.0	-1.3	23.70	38.5	-14.8	
831.50	18.28	H	3.0	-1.3	13.99	38.5	-24.5	
High Ch								
846.50	26.98	V	3.0	-1.1	22.80	38.5	-15.7	
846.50	18.02	H	3.0	-1.1	13.84	38.5	-24.7	

LTE Band 26

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Y-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
Straddle Ch								
824.00	28.95	V	3.0	-1.3	24.61	38.5	-13.9	
824.00	19.07	H	3.0	-1.3	14.73	38.5	-23.8	
Low Ch								
825.50	29.25	V	3.0	-1.3	24.92	38.5	-13.6	
825.50	18.74	H	3.0	-1.3	14.41	38.5	-24.1	
Mid Ch								
831.50	29.30	V	3.0	-1.3	25.01	38.5	-13.5	
831.50	19.51	H	3.0	-1.3	15.22	38.5	-23.3	
High Ch								
847.50	27.88	V	3.0	-1.1	23.71	38.5	-14.8	
847.50	19.15	H	3.0	-1.1	14.98	38.5	-23.5	

LTE Band 26

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Y-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
Straddle Ch								
824.00	27.62	V	3.0	-1.3	23.28	38.5	-15.2	
824.00	17.93	H	3.0	-1.3	13.59	38.5	-24.9	
Low Ch								
825.50	27.98	V	3.0	-1.3	23.65	38.5	-14.8	
825.50	17.65	H	3.0	-1.3	13.32	38.5	-25.2	
Mid Ch								
831.50	28.34	V	3.0	-1.3	24.05	38.5	-14.5	
831.50	18.23	H	3.0	-1.3	13.94	38.5	-24.6	
High Ch								
847.50	26.70	V	3.0	-1.1	22.53	38.5	-16.0	
847.50	18.29	H	3.0	-1.1	14.12	38.5	-24.4	

LTE Band 26

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Y-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
Straddle Ch								
824.00	28.86	V	3.0	-1.3	24.52	38.5	-14.0	
824.00	18.66	H	3.0	-1.3	14.32	38.5	-24.2	
Low Ch								
824.70	29.00	V	3.0	-1.3	24.66	38.5	-13.8	
824.70	18.61	H	3.0	-1.3	14.27	38.5	-24.2	
Mid Ch								
831.50	29.13	V	3.0	-1.3	24.84	38.5	-13.7	
831.50	19.51	H	3.0	-1.3	15.22	38.5	-23.3	
High Ch								
848.30	27.52	V	3.1	-1.1	23.35	38.5	-15.1	
848.30	19.35	H	3.1	-1.1	15.18	38.5	-23.3	

LTE Band 26

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Y-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
Straddle Ch								
824.00	27.79	V	3.0	-1.3	23.45	38.5	-15.1	
824.00	17.36	H	3.0	-1.3	13.02	38.5	-25.5	
Low Ch								
824.70	27.90	V	3.0	-1.3	23.56	38.5	-14.9	
824.70	17.32	H	3.0	-1.3	12.98	38.5	-25.5	
Mid Ch								
831.50	28.06	V	3.0	-1.3	23.77	38.5	-14.7	
831.50	18.41	H	3.0	-1.3	14.12	38.5	-24.4	
High Ch								
848.30	26.14	V	3.1	-1.1	21.97	38.5	-16.5	
848.30	18.05	H	3.1	-1.1	13.88	38.5	-24.6	

LTE Band 41 (PC2)

LTE Band 41

20MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 20882
Configuration: EUT, X-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	16.95	V	5.2	10.2	21.90	33.0	-11.1	
2506.00	21.07	H	5.2	10.2	26.03	33.0	-7.0	
Mid Ch								
2593.00	16.81	V	5.3	10.1	21.59	33.0	-11.4	
2593.00	20.90	H	5.3	10.1	25.68	33.0	-7.3	
High Ch								
2680.00	19.54	V	5.4	10.2	24.30	33.0	-8.7	
2680.00	20.37	H	5.4	10.2	25.13	33.0	-7.9	

LTE Band 41

20MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 20882
Configuration: EUT, X-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	14.91	V	5.2	10.2	19.86	33.0	-13.1	
2506.00	18.86	H	5.2	10.2	23.82	33.0	-9.2	
Mid Ch								
2593.00	16.25	V	5.3	10.1	21.03	33.0	-12.0	
2593.00	20.26	H	5.3	10.1	25.04	33.0	-8.0	
High Ch								
2680.00	18.81	V	5.4	10.2	23.57	33.0	-9.4	
2680.00	19.69	H	5.4	10.2	24.45	33.0	-8.6	

LTE Band 41

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 20882
Configuration: EUT, X-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	16.17	V	5.2	10.2	21.13	33.0	-11.9	
2503.50	19.22	H	5.2	10.2	24.18	33.0	-8.8	
Mid Ch								
2593.00	17.15	V	5.3	10.1	21.93	33.0	-11.1	
2593.00	21.24	H	5.3	10.1	26.02	33.0	-7.0	
High Ch								
2682.50	19.60	V	5.4	10.2	24.36	33.0	-8.6	
2682.50	20.87	H	5.4	10.2	25.63	33.0	-7.4	

LTE Band 41

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 20882
Configuration: EUT, X-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	16.35	V	5.2	10.2	21.31	33.0	-11.7	
2503.50	18.68	H	5.2	10.2	23.64	33.0	-9.4	
Mid Ch								
2593.00	16.62	V	5.3	10.1	21.40	33.0	-11.6	
2593.00	20.79	H	5.3	10.1	25.57	33.0	-7.4	
High Ch								
2682.50	19.23	V	5.4	10.2	23.99	33.0	-9.0	
2682.50	20.39	H	5.4	10.2	25.15	33.0	-7.8	

LTE Band 41

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 20882
Configuration: EUT, X-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	16.88	V	5.2	10.2	21.85	33.0	-11.2	
2501.00	19.66	H	5.2	10.2	24.63	33.0	-8.4	
Mid Ch								
2593.00	17.73	V	5.3	10.1	22.51	33.0	-10.5	
2593.00	21.17	H	5.3	10.1	25.95	33.0	-7.0	
High Ch								
2685.00	19.63	V	5.4	10.2	24.39	33.0	-8.6	
2685.00	20.60	H	5.4	10.2	25.36	33.0	-7.6	

LTE Band 41

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 20882
Configuration: EUT, X-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	16.60	V	5.2	10.2	21.57	33.0	-11.4	
2501.00	19.04	H	5.2	10.2	24.01	33.0	-9.0	
Mid Ch								
2593.00	17.23	V	5.3	10.1	22.01	33.0	-11.0	
2593.00	20.96	H	5.3	10.1	25.74	33.0	-7.3	
High Ch								
2685.00	19.05	V	5.4	10.2	23.81	33.0	-9.2	
2685.00	20.22	H	5.4	10.2	24.98	33.0	-8.0	

LTE Band 41

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 20882
Configuration: EUT, X-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	19.18	V	5.2	10.2	24.15	33.0	-8.9	
2498.50	21.36	H	5.2	10.2	26.33	33.0	-6.7	
Mid Ch								
2593.00	19.45	V	5.3	10.1	24.23	33.0	-8.8	
2593.00	22.66	H	5.3	10.1	27.44	33.0	-5.6	
High Ch								
2687.50	20.92	V	5.4	10.2	25.69	33.0	-7.3	
2687.50	22.32	H	5.4	10.2	27.08	33.0	-5.9	

LTE Band 41

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 20882
Configuration: EUT, X-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	18.12	V	5.2	10.2	23.09	33.0	-9.9	
2498.50	20.54	H	5.2	10.2	25.51	33.0	-7.5	
Mid Ch								
2593.00	18.92	V	5.3	10.1	23.70	33.0	-9.3	
2593.00	22.23	H	5.3	10.1	27.01	33.0	-6.0	
High Ch								
2687.50	19.72	V	5.4	10.2	24.49	33.0	-8.5	
2687.50	21.74	H	5.4	10.2	26.50	33.0	-6.5	

LTE Band 66

LTE Band 66

20MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-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	16.50	V	4.3	9.6	21.80	30.0	-8.2	
1720.00	18.98	H	4.3	9.6	24.28	30.0	-5.7	
Mid Ch								
1745.00	15.46	V	4.3	9.7	20.81	30.0	-9.2	
1745.00	18.93	H	4.3	9.7	24.28	30.0	-5.7	
High Ch								
1770.00	15.06	V	4.4	9.7	20.40	30.0	-9.6	
1770.00	19.47	H	4.4	9.7	24.81	30.0	-5.2	

LTE Band 66

20MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-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	15.64	V	4.3	9.6	20.94	30.0	-9.1	
1720.00	17.92	H	4.3	9.6	23.22	30.0	-6.8	
Mid Ch								
1745.00	14.52	V	4.3	9.7	19.87	30.0	-10.1	
1745.00	17.84	H	4.3	9.7	23.19	30.0	-6.8	
High Ch								
1770.00	13.62	V	4.4	9.7	18.96	30.0	-11.0	
1770.00	18.13	H	4.4	9.7	23.47	30.0	-6.5	

LTE Band 66

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-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	16.64	V	4.3	9.6	21.94	30.0	-8.1	
1717.50	18.79	H	4.3	9.6	24.08	30.0	-5.9	
Mid Ch								
1745.00	16.57	V	4.3	9.7	21.92	30.0	-8.1	
1745.00	19.17	H	4.3	9.7	24.52	30.0	-5.5	
High Ch								
1772.50	14.80	V	4.4	9.7	20.14	30.0	-9.9	
1772.50	19.08	H	4.4	9.7	24.42	30.0	-5.6	

LTE Band 66

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-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	15.47	V	4.3	9.6	20.77	30.0	-9.2	
1717.50	17.85	H	4.3	9.6	23.14	30.0	-6.9	
Mid Ch								
1745.00	15.52	V	4.3	9.7	20.87	30.0	-9.1	
1745.00	18.17	H	4.3	9.7	23.52	30.0	-6.5	
High Ch								
1772.50	14.41	V	4.4	9.7	19.75	30.0	-10.3	
1772.50	17.98	H	4.4	9.7	23.32	30.0	-6.7	

LTE Band 66

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-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	16.95	V	4.3	9.6	22.24	30.0	-7.8	
1715.00	18.75	H	4.3	9.6	24.04	30.0	-6.0	
Mid Ch								
1745.00	15.42	V	4.3	9.7	20.77	30.0	-9.2	
1745.00	19.55	H	4.3	9.7	24.90	30.0	-5.1	
High Ch								
1775.00	15.13	V	4.4	9.7	20.46	30.0	-9.5	
1775.00	18.62	H	4.4	9.7	23.96	30.0	-6.0	

LTE Band 66

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-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	15.89	V	4.3	9.6	21.18	30.0	-8.8	
1715.00	17.65	H	4.3	9.6	22.94	30.0	-7.1	
Mid Ch								
1745.00	14.25	V	4.3	9.7	19.60	30.0	-10.4	
1745.00	18.50	H	4.3	9.7	23.85	30.0	-6.2	
High Ch								
1775.00	14.01	V	4.4	9.7	19.34	30.0	-10.7	
1775.00	17.36	H	4.4	9.7	22.70	30.0	-7.3	

LTE Band 66

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-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	17.00	V	4.3	9.6	22.29	30.0	-7.7	
1712.50	18.93	H	4.3	9.6	24.22	30.0	-5.8	
Mid Ch								
1745.00	15.62	V	4.3	9.7	20.97	30.0	-9.0	
1745.00	18.78	H	4.3	9.7	24.13	30.0	-5.9	
High Ch								
1777.50	17.87	V	4.4	9.7	23.21	30.0	-6.8	
1777.50	18.49	H	4.4	9.7	23.83	30.0	-6.2	

LTE Band 66

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-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	15.85	V	4.3	9.6	21.14	30.0	-8.9	
1712.50	17.80	H	4.3	9.6	23.09	30.0	-6.9	
Mid Ch								
1745.00	14.41	V	4.3	9.7	19.76	30.0	-10.2	
1745.00	17.61	H	4.3	9.7	22.96	30.0	-7.0	
High Ch								
1777.50	14.23	V	4.4	9.7	19.57	30.0	-10.4	
1777.50	17.63	H	4.4	9.7	22.97	30.0	-7.0	

LTE Band 66

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-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	17.16	V	4.3	9.6	22.45	30.0	-7.6	
1711.50	18.86	H	4.3	9.6	24.14	30.0	-5.9	
Mid Ch								
1745.00	15.58	V	4.3	9.7	20.93	30.0	-9.1	
1745.00	19.28	H	4.3	9.7	24.63	30.0	-5.4	
High Ch								
1778.50	15.11	V	4.4	9.7	20.45	30.0	-9.6	
1778.50	18.53	H	4.4	9.7	23.86	30.0	-6.1	

LTE Band 66

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-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	16.03	V	4.3	9.6	21.32	30.0	-8.7	
1711.50	17.58	H	4.3	9.6	22.86	30.0	-7.1	
Mid Ch								
1745.00	14.57	V	4.3	9.7	19.92	30.0	-10.1	
1745.00	18.38	H	4.3	9.7	23.73	30.0	-6.3	
High Ch								
1778.50	14.26	V	4.4	9.7	19.60	30.0	-10.4	
1778.50	17.97	H	4.4	9.7	23.30	30.0	-6.7	

LTE Band 66

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/8/2021
Test Engineer: 19568
Configuration: EUT, Z-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	17.00	V	4.3	9.6	22.28	30.0	-7.7	
1710.70	18.88	H	4.3	9.6	24.16	30.0	-5.8	
Mid Ch								
1745.00	16.17	V	4.3	9.7	21.52	30.0	-8.5	
1745.00	19.47	H	4.3	9.7	24.82	30.0	-5.2	
High Ch								
1779.30	15.09	V	4.4	9.7	20.43	30.0	-9.6	
1779.30	18.58	H	4.4	9.7	23.92	30.0	-6.1	

LTE Band 66

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 22943
Configuration: EUT, Z-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	15.73	V	4.3	9.6	21.01	30.0	-9.0	
1710.70	17.81	H	4.3	9.6	23.09	30.0	-6.9	
Mid Ch								
1745.00	15.39	V	4.3	9.7	20.74	30.0	-9.3	
1745.00	18.15	H	4.3	9.7	23.50	30.0	-6.5	
High Ch								
1779.30	13.56	V	4.4	9.7	18.90	30.0	-11.1	
1779.30	17.46	H	4.4	9.7	22.80	30.0	-7.2	

NR Band 5

NR Band 5 20MHz DFT-s QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 25546
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: LTE_QPSK NR n5 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
834.00	26.73	V	3.0	-1.2	22.46	38.5	-16.0	
834.00	16.08	H	3.0	-1.2	11.81	38.5	-26.7	
Mid Ch								
836.50	26.25	V	3.0	-1.2	22.00	38.5	-16.5	
836.50	15.96	H	3.0	-1.2	11.71	38.5	-26.8	
High Ch								
839.00	25.93	V	3.0	-1.2	21.70	38.5	-16.8	
839.00	16.07	H	3.0	-1.2	11.84	38.5	-26.7	

NR Band 5 20MHz DFT-s 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 25546
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: LTE_16QAM NR n5 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
834.00	25.41	V	3.0	-1.2	21.14	38.5	-17.4	
834.00	15.14	H	3.0	-1.2	10.87	38.5	-27.6	
Mid Ch								
836.50	24.67	V	3.0	-1.2	20.42	38.5	-18.1	
836.50	14.70	H	3.0	-1.2	10.45	38.5	-28.1	
High Ch								
839.00	24.66	V	3.0	-1.2	20.43	38.5	-18.1	
839.00	14.97	H	3.0	-1.2	10.74	38.5	-27.8	

NR Band 5 15MHz DFT-s QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 25546
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: LTE_QPSK NR n5 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
831.50	26.73	V	3.0	-1.3	22.44	38.5	-16.1	
831.50	15.46	H	3.0	-1.3	11.17	38.5	-27.3	
Mid Ch								
836.50	26.17	V	3.0	-1.2	21.92	38.5	-16.6	
836.50	16.03	H	3.0	-1.2	11.78	38.5	-26.7	
High Ch								
841.50	25.43	V	3.0	-1.2	21.22	38.5	-17.3	
841.50	16.17	H	3.0	-1.2	11.96	38.5	-26.5	

NR Band 5 15MHz DFT-s 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 25546
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: LTE_16QAM NR n5 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
831.50	25.61	V	3.0	-1.3	21.32	38.5	-17.2	
831.50	14.55	H	3.0	-1.3	10.26	38.5	-28.2	
Mid Ch								
836.50	24.97	V	3.0	-1.2	20.72	38.5	-17.8	
836.50	14.77	H	3.0	-1.2	10.52	38.5	-28.0	
High Ch								
841.50	24.63	V	3.0	-1.2	20.42	38.5	-18.1	
841.50	15.19	H	3.0	-1.2	10.98	38.5	-27.5	

NR Band 5 10MHz DFT-s QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 25546
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: LTE_QPSK NR n5 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	26.81	V	3.0	-1.3	22.50	38.5	-16.0	
829.00	15.66	H	3.0	-1.3	11.35	38.5	-27.2	
Mid Ch								
836.50	25.86	V	3.0	-1.2	21.61	38.5	-16.9	
836.50	15.63	H	3.0	-1.2	11.38	38.5	-27.1	
High Ch								
844.00	25.40	V	3.0	-1.2	21.20	38.5	-17.3	
844.00	16.01	H	3.0	-1.2	11.81	38.5	-26.7	

NR Band 5 10MHz DFT-s 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 25546
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: LTE_16QAM NR n5 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	25.76	V	3.0	-1.3	21.45	38.5	-17.0	
829.00	14.56	H	3.0	-1.3	10.25	38.5	-28.3	
Mid Ch								
836.50	25.03	V	3.0	-1.2	20.78	38.5	-17.7	
836.50	14.34	H	3.0	-1.2	10.09	38.5	-28.4	
High Ch								
844.00	24.23	V	3.0	-1.2	20.03	38.5	-18.5	
844.00	15.34	H	3.0	-1.2	11.14	38.5	-27.4	

NR Band 5

5MHz

DFT-s

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 25546
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: LTE_QPSK NR n5 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	26.35	V	3.0	-1.3	22.03	38.5	-16.5	
826.50	15.12	H	3.0	-1.3	10.79	38.5	-27.7	
Mid Ch								
836.50	26.11	V	3.0	-1.2	21.86	38.5	-16.6	
836.50	15.76	H	3.0	-1.2	11.51	38.5	-27.0	
High Ch								
846.50	25.84	V	3.0	-1.1	21.66	38.5	-16.8	
846.50	16.24	H	3.0	-1.1	12.06	38.5	-26.4	

NR Band 5

5MHz

DFT-s

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 25546
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: LTE_16QAM NR n5 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	26.20	V	3.0	-1.3	21.88	38.5	-16.6	
826.50	14.63	H	3.0	-1.3	10.30	38.5	-28.2	
Mid Ch								
836.50	24.72	V	3.0	-1.2	20.47	38.5	-18.0	
836.50	14.78	H	3.0	-1.2	10.53	38.5	-28.0	
High Ch								
846.50	24.74	V	3.0	-1.1	20.56	38.5	-17.9	
846.50	15.35	H	3.0	-1.1	11.17	38.5	-27.3	

NR Band 66

NR Band 66 20MHz DFT-s QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 19568
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_QPSK NR n66 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	13.90	V	4.3	9.6	19.19	30.0	-10.8	
1720.00	15.59	H	4.3	9.6	20.88	30.0	-9.1	
Mid Ch								
1745.00	15.35	V	4.3	9.7	20.70	30.0	-9.3	
1745.00	14.37	H	4.3	9.7	19.72	30.0	-10.3	
High Ch								
1770.00	13.12	V	4.4	9.7	18.45	30.0	-11.5	
1770.00	13.95	H	4.4	9.7	19.29	30.0	-10.7	

NR Band 66 20MHz DFT-s 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 19568
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_16QAM NR n66 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	13.83	V	4.3	9.6	19.12	30.0	-10.9	
1720.00	15.46	H	4.3	9.6	20.75	30.0	-9.2	
Mid Ch								
1745.00	15.13	V	4.3	9.7	20.48	30.0	-9.5	
1745.00	14.31	H	4.3	9.7	19.66	30.0	-10.3	
High Ch								
1770.00	12.53	V	4.4	9.7	17.86	30.0	-12.1	
1770.00	13.72	H	4.4	9.7	19.06	30.0	-10.9	

NR Band 66

15MHz

DFT-s

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 19568
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_QPSK NR n66 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	12.71	V	4.3	9.6	18.00	30.0	-12.0	
1717.50	15.22	H	4.3	9.6	20.51	30.0	-9.5	
Mid Ch								
1745.00	14.65	V	4.3	9.7	20.00	30.0	-10.0	
1745.00	14.83	H	4.3	9.7	20.18	30.0	-9.8	
High Ch								
1772.50	12.17	V	4.4	9.7	17.50	30.0	-12.5	
1772.50	14.84	H	4.4	9.7	20.17	30.0	-9.8	

NR Band 66

15MHz

DFT-s

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 19568
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_16QAM NR n66 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	12.59	V	4.3	9.6	17.88	30.0	-12.1	
1717.50	15.20	H	4.3	9.6	20.49	30.0	-9.5	
Mid Ch								
1745.00	14.90	V	4.3	9.7	20.25	30.0	-9.8	
1745.00	14.66	H	4.3	9.7	20.01	30.0	-10.0	
High Ch								
1772.50	11.74	V	4.4	9.7	17.07	30.0	-12.9	
1772.50	14.74	H	4.4	9.7	20.07	30.0	-9.9	

NR Band 66

10MHz

DFT-s

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 19568
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_QPSK NR n66 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	13.10	V	4.3	9.6	18.38	30.0	-11.6	
1715.00	14.52	H	4.3	9.6	19.80	30.0	-10.2	
Mid Ch								
1745.00	15.17	V	4.3	9.7	20.52	30.0	-9.5	
1745.00	15.14	H	4.3	9.7	20.49	30.0	-9.5	
High Ch								
1775.00	13.65	V	4.4	9.7	18.98	30.0	-11.0	
1775.00	14.58	H	4.4	9.7	19.91	30.0	-10.1	

NR Band 66

10MHz

DFT-s

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 19568
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM NR n66 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	12.90	V	4.3	9.6	18.18	30.0	-11.8	
1715.00	14.33	H	4.3	9.6	19.61	30.0	-10.4	
Mid Ch								
1745.00	15.06	V	4.3	9.7	20.41	30.0	-9.6	
1745.00	14.93	H	4.3	9.7	20.28	30.0	-9.7	
High Ch								
1775.00	13.47	V	4.4	9.7	18.80	30.0	-11.2	
1775.00	14.42	H	4.4	9.7	19.75	30.0	-10.3	

NR Band 66

5MHz

DFT-s

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 19568
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_QPSK NR n66 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	13.72	V	4.3	9.6	19.00	30.0	-11.0	
1712.50	15.24	H	4.3	9.6	20.52	30.0	-9.5	
Mid Ch								
1745.00	15.49	V	4.3	9.7	20.84	30.0	-9.2	
1745.00	15.25	H	4.3	9.7	20.60	30.0	-9.4	
High Ch								
1777.50	14.11	V	4.4	9.7	19.44	30.0	-10.6	
1777.50	15.17	H	4.4	9.7	20.50	30.0	-9.5	

NR Band 66

5MHz

DFT-s

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 19568
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_16QAM NR n66 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	13.35	V	4.3	9.6	18.63	30.0	-11.4	
1712.50	14.55	H	4.3	9.6	19.83	30.0	-10.2	
Mid Ch								
1745.00	15.26	V	4.3	9.7	20.61	30.0	-9.4	
1745.00	15.08	H	4.3	9.7	20.43	30.0	-9.6	
High Ch								
1777.50	13.62	V	4.4	9.7	18.95	30.0	-11.0	
1777.50	14.81	H	4.4	9.7	20.14	30.0	-9.9	

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 FDD, NR), Maxhold(GSM, LTE TDD);

NOTE

5G NR: All Waveforms (CP-OFDM vs DFT-s OFDM) and modulations (π /2 BPSK, QPSK QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

RESULTS

See the following pages.

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

9.6.1. SPURIOUS RADIATION PLOTS

GSM850

GSM850

GPRS

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

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 20882
Configuration: EUT / AC Adapter, Y-Position
Location: Chamber 2
Mode: GPRS 850 MHz Harmonics
Test Votage: AC 120 V, 60 Hz

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	-7.1	V	3.0	40.9	1.0	-47.0	-13.0	-34.0	
2472.60	-7.1	V	3.0	41.5	1.0	-47.7	-13.0	-34.7	
3296.80	-9.0	V	3.0	42.3	1.0	-50.3	-13.0	-37.3	
1648.40	-4.8	H	3.0	40.9	1.0	-44.8	-13.0	-31.8	
2472.60	-6.8	H	3.0	41.5	1.0	-47.3	-13.0	-34.3	
3296.80	-8.7	H	3.0	42.3	1.0	-50.0	-13.0	-37.0	
Mid Ch, 836.6MHz									
1673.20	-11.8	V	3.0	40.9	1.0	-51.7	-13.0	-38.7	
2509.80	-6.2	V	3.0	41.6	1.0	-46.8	-13.0	-33.8	
3346.40	-8.7	V	3.0	42.3	1.0	-50.0	-13.0	-37.0	
1673.20	-8.5	H	3.0	40.9	1.0	-48.4	-13.0	-35.4	
2509.80	-7.6	H	3.0	41.6	1.0	-48.2	-13.0	-35.2	
3346.40	-8.9	H	3.0	42.3	1.0	-50.2	-13.0	-37.2	
High Ch, 848.8MHz									
1697.60	-11.7	V	3.0	40.9	1.0	-51.6	-13.0	-38.6	
2546.40	-8.0	V	3.0	41.6	1.0	-48.7	-13.0	-35.7	
3395.20	-8.7	V	3.0	42.3	1.0	-50.0	-13.0	-37.0	
1697.60	-13.9	H	3.0	40.9	1.0	-53.8	-13.0	-40.8	
2546.40	-1.8	H	3.0	41.6	1.0	-42.5	-13.0	-29.5	
3395.20	-8.8	H	3.0	42.3	1.0	-50.1	-13.0	-37.1	

GSM850

EGPRS

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

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 20882
Configuration: EUT / AC Adapter, Y-Position
Location: Chamber 2
Mode: EGPRS 850 MHz Harmonics
Test Votage: AC 120 V, 60 Hz

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	-14.8	V	3.0	40.9	1.0	-54.7	-13.0	-41.7	
2472.60	-12.1	V	3.0	41.5	1.0	-52.7	-13.0	-39.7	
3296.80	-9.4	V	3.0	42.3	1.0	-50.7	-13.0	-37.7	
1648.40	-15.8	H	3.0	40.9	1.0	-55.7	-13.0	-42.7	
2472.60	-12.2	H	3.0	41.5	1.0	-52.7	-13.0	-39.7	
3296.80	-9.5	H	3.0	42.3	1.0	-50.8	-13.0	-37.8	
Mid Ch, 836.6MHz									
1673.20	-14.9	V	3.0	40.9	1.0	-54.8	-13.0	-41.8	
2509.80	-12.0	V	3.0	41.6	1.0	-52.6	-13.0	-39.6	
3346.40	-8.8	V	3.0	42.3	1.0	-50.1	-13.0	-37.1	
1673.20	-14.6	H	3.0	40.9	1.0	-54.6	-13.0	-41.6	
2509.80	-11.8	H	3.0	41.6	1.0	-52.4	-13.0	-39.4	
3346.40	-9.1	H	3.0	42.3	1.0	-50.4	-13.0	-37.4	
High Ch, 848.8MHz									
1697.60	-14.8	V	3.0	40.9	1.0	-54.7	-13.0	-41.7	
2546.40	-12.0	V	3.0	41.6	1.0	-52.7	-13.0	-39.7	
3395.20	-8.7	V	3.0	42.3	1.0	-50.0	-13.0	-37.0	
1697.60	-15.8	H	3.0	40.9	1.0	-55.7	-13.0	-42.7	
2546.40	-11.3	H	3.0	41.6	1.0	-52.0	-13.0	-39.0	
3395.20	-8.9	H	3.0	42.3	1.0	-50.2	-13.0	-37.2	

GSM1900

GSM1900
GPRS

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

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 22943
Configuration: EUT / AC Adapter, Y-Position
Location: Chamber 2
Mode: GPRS 1900 MHz Harmonics
Test Votage: AC 120 V, 60 Hz

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	-10.4	V	3.0	42.3	1.0	-51.8	-13.0	-38.8	
5550.60	-7.2	V	3.0	43.1	1.0	-49.4	-13.0	-36.4	
7400.80	-4.2	V	3.0	42.7	1.0	-46.0	-13.0	-33.0	
3700.40	-10.3	H	3.0	42.3	1.0	-51.6	-13.0	-38.6	
5550.60	-7.1	H	3.0	43.1	1.0	-49.3	-13.0	-36.3	
7400.80	-3.5	H	3.0	42.7	1.0	-45.3	-13.0	-32.3	
Mid Ch, 1880MHz									
3760.00	-10.2	V	3.0	42.3	1.0	-51.6	-13.0	-38.6	
5640.00	-6.8	V	3.0	43.2	1.0	-49.0	-13.0	-36.0	
7520.00	-2.9	V	3.0	42.7	1.0	-44.6	-13.0	-31.6	
3760.00	-10.1	H	3.0	42.3	1.0	-51.4	-13.0	-38.4	
5640.00	-6.1	H	3.0	43.2	1.0	-48.2	-13.0	-35.2	
7520.00	-2.4	H	3.0	42.7	1.0	-44.1	-13.0	-31.1	
High Ch, 1909.8MHz									
3819.60	-10.2	V	3.0	42.3	1.0	-51.6	-13.0	-38.6	
5729.40	-7.1	V	3.0	43.2	1.0	-49.3	-13.0	-36.3	
7639.20	-3.0	V	3.0	42.6	1.0	-44.6	-13.0	-31.6	
3819.60	-10.1	H	3.0	42.3	1.0	-51.5	-13.0	-38.5	
5729.40	-7.4	H	3.0	43.2	1.0	-49.6	-13.0	-36.6	
7639.20	-2.3	H	3.0	42.6	1.0	-43.9	-13.0	-30.9	

GSM1900
EGPRS

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

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 22943
Configuration: EUT / AC Adapter, Y-Position
Location: Chamber 2
Mode: EGPRS 1900 MHz Harmonics
Test Votage: AC 120 V, 60 Hz

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	-10.6	V	3.0	42.3	1.0	-51.9	-13.0	-38.9	
5550.60	-7.2	V	3.0	43.1	1.0	-49.4	-13.0	-36.4	
7400.80	-4.9	V	3.0	42.7	1.0	-46.6	-13.0	-33.6	
3700.40	-10.4	H	3.0	42.3	1.0	-51.7	-13.0	-38.7	
5550.60	-7.1	H	3.0	43.1	1.0	-49.2	-13.0	-36.2	
7400.80	-4.6	H	3.0	42.7	1.0	-46.4	-13.0	-33.4	
Mid Ch, 1880MHz									
3760.00	-10.3	V	3.0	42.3	1.0	-51.6	-13.0	-38.6	
5640.00	-6.9	V	3.0	43.2	1.0	-49.1	-13.0	-36.1	
7520.00	-3.9	V	3.0	42.7	1.0	-45.6	-13.0	-32.6	
3760.00	-9.9	H	3.0	42.3	1.0	-51.3	-13.0	-38.3	
5640.00	-6.8	H	3.0	43.2	1.0	-49.0	-13.0	-36.0	
7520.00	-3.9	H	3.0	42.7	1.0	-45.6	-13.0	-32.6	
High Ch, 1909.8MHz									
3819.60	-10.1	V	3.0	42.3	1.0	-51.4	-13.0	-38.4	
5729.40	-7.2	V	3.0	43.2	1.0	-49.4	-13.0	-36.4	
7639.20	-3.5	V	3.0	42.6	1.0	-45.1	-13.0	-32.1	
3819.60	-10.1	H	3.0	42.3	1.0	-51.4	-13.0	-38.4	
5729.40	-7.2	H	3.0	43.2	1.0	-49.4	-13.0	-36.4	
7639.20	-2.8	H	3.0	42.6	1.0	-44.4	-13.0	-31.4	

WCDMA Band 5

Band 5 REL99

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

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 20882
Configuration: EUT / AC Adapter, Y-Position
Location: Chamber 2
Mode: Rel99 Band 5 Harmonics
Test Votage: AC 120 V, 60 Hz

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1652.80	-15.8	V	3.0	40.9	1.0	-55.8	-13.0	-42.8	
2479.20	-12.8	V	3.0	41.6	1.0	-53.4	-13.0	-40.4	
3305.60	-10.1	V	3.0	42.3	1.0	-51.4	-13.0	-38.4	
1652.80	-16.6	H	3.0	40.9	1.0	-56.5	-13.0	-43.5	
2479.20	-13.3	H	3.0	41.6	1.0	-53.9	-13.0	-40.9	
3305.60	-10.1	H	3.0	42.3	1.0	-51.4	-13.0	-38.4	
Mid Ch, 836.6MHz									
1673.20	-15.9	V	3.0	40.9	1.0	-55.9	-13.0	-42.9	
2509.80	-12.9	V	3.0	41.6	1.0	-53.5	-13.0	-40.5	
3346.40	-9.7	V	3.0	42.3	1.0	-51.0	-13.0	-38.0	
1673.20	-16.3	H	3.0	40.9	1.0	-56.2	-13.0	-43.2	
2509.80	-13.2	H	3.0	41.6	1.0	-53.8	-13.0	-40.8	
3346.40	-9.7	H	3.0	42.3	1.0	-51.0	-13.0	-38.0	
High Ch, 846.6MHz									
1693.20	-15.5	V	3.0	40.9	1.0	-55.4	-13.0	-42.4	
2539.80	-12.3	V	3.0	41.6	1.0	-53.0	-13.0	-40.0	
3386.40	-9.8	V	3.0	42.3	1.0	-51.1	-13.0	-38.1	
1693.20	-16.3	H	3.0	40.9	1.0	-56.2	-13.0	-43.2	
2539.80	-12.9	H	3.0	41.6	1.0	-53.5	-13.0	-40.5	
3386.40	-9.6	H	3.0	42.3	1.0	-50.9	-13.0	-37.9	

Band 5 HSDPA

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

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 20882
Configuration: EUT / AC Adapter, Y-Position
Location: Chamber 2
Mode: HSDPA Band 5 Harmonics
Test Votage: AC 120 V, 60 Hz

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	-16.0	V	3.0	40.9	1.0	-55.9	-13.0	-42.9	
2479.20	-12.8	V	3.0	41.6	1.0	-53.4	-13.0	-40.4	
3305.60	-9.9	V	3.0	42.3	1.0	-51.2	-13.0	-38.2	
1652.80	-16.5	H	3.0	40.9	1.0	-56.4	-13.0	-43.4	
2479.20	-12.3	H	3.0	41.6	1.0	-52.8	-13.0	-39.8	
3305.60	-9.9	H	3.0	42.3	1.0	-51.2	-13.0	-38.2	
Mid Ch, 836.6MHz									
1673.20	-15.7	V	3.0	40.9	1.0	-55.6	-13.0	-42.6	
2509.80	-12.8	V	3.0	41.6	1.0	-53.4	-13.0	-40.4	
3346.40	-9.5	V	3.0	42.3	1.0	-50.8	-13.0	-37.8	
1673.20	-16.5	H	3.0	40.9	1.0	-56.4	-13.0	-43.4	
2509.80	-13.3	H	3.0	41.6	1.0	-53.9	-13.0	-40.9	
3346.40	-9.6	H	3.0	42.3	1.0	-50.9	-13.0	-37.9	
High Ch, 846.6MHz									
1693.20	-15.7	V	3.0	40.9	1.0	-55.6	-13.0	-42.6	
2539.80	-12.5	V	3.0	41.6	1.0	-53.2	-13.0	-40.2	
3386.40	-9.7	V	3.0	42.3	1.0	-51.0	-13.0	-38.0	
1693.20	-16.2	H	3.0	40.9	1.0	-56.1	-13.0	-43.1	
2539.80	-13.2	H	3.0	41.6	1.0	-53.8	-13.0	-40.8	
3386.40	-9.5	H	3.0	42.3	1.0	-50.8	-13.0	-37.8	

WCDMA Band 4

Band 4 REL99

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

Company: Samsung
Project #: 4790101660
Date: 11/12/2021
Test Engineer: 22943
Configuration: EUT / AC Adapter, Z-Position
Location: Chamber 2
Mode: Rel99 Band 4 Harmonics
Test Votage: AC 120 V, 60 Hz

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	-9.2	V	3.0	42.3	1.0	-50.5	-13.0	-37.5	
5137.20	-9.2	V	3.0	43.1	1.0	-51.2	-13.0	-38.2	
6849.60	-6.3	V	3.0	43.0	1.0	-48.2	-13.0	-35.2	
3424.80	-9.2	H	3.0	42.3	1.0	-50.5	-13.0	-37.5	
5137.20	-8.9	H	3.0	43.1	1.0	-51.0	-13.0	-38.0	
6849.60	-6.2	H	3.0	43.0	1.0	-48.2	-13.0	-35.2	
Mid Ch, 1732.6MHz									
3465.20	-8.8	V	3.0	42.3	1.0	-50.1	-13.0	-37.1	
5197.80	-9.1	V	3.0	43.1	1.0	-51.1	-13.0	-38.1	
6930.40	-6.6	V	3.0	43.0	1.0	-48.5	-13.0	-35.5	
3465.20	-8.7	H	3.0	42.3	1.0	-50.0	-13.0	-37.0	
5197.80	-8.8	H	3.0	43.1	1.0	-50.8	-13.0	-37.8	
6930.40	-6.3	H	3.0	43.0	1.0	-48.2	-13.0	-35.2	
High Ch, 1752.6MHz									
3505.20	-8.7	V	3.0	42.3	1.0	-50.0	-13.0	-37.0	
5257.80	-9.1	V	3.0	43.1	1.0	-51.1	-13.0	-38.1	
7010.40	-6.3	V	3.0	42.9	1.0	-48.2	-13.0	-35.2	
3505.20	-8.7	H	3.0	42.3	1.0	-50.0	-13.0	-37.0	
5257.80	-8.9	H	3.0	43.1	1.0	-51.0	-13.0	-38.0	
7010.40	-6.1	H	3.0	42.9	1.0	-48.0	-13.0	-35.0	

Band 4 HSDPA

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

Company: Samsung
Project #: 4790101660
Date: 11/12/2021
Test Engineer: 22943
Configuration: EUT / AC Adapter, Z-Position
Location: Chamber 2
Mode: HSDPA Band 4 Harmonics
Test Votage: AC 120 V, 60 Hz

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	-9.3	V	3.0	42.3	1.0	-50.6	-13.0	-37.6	
5137.20	-9.0	V	3.0	43.1	1.0	-51.1	-13.0	-38.1	
6849.60	-6.2	V	3.0	43.0	1.0	-48.2	-13.0	-35.2	
3424.80	-9.2	H	3.0	42.3	1.0	-50.6	-13.0	-37.6	
5137.20	-8.9	H	3.0	43.1	1.0	-50.9	-13.0	-37.9	
6849.60	-6.3	H	3.0	43.0	1.0	-48.3	-13.0	-35.3	
Mid Ch, 1732.6MHz									
3465.20	-8.7	V	3.0	42.3	1.0	-50.0	-13.0	-37.0	
5197.80	-8.6	V	3.0	43.1	1.0	-50.7	-13.0	-37.7	
6930.40	-6.3	V	3.0	43.0	1.0	-48.3	-13.0	-35.3	
3465.20	-8.8	H	3.0	42.3	1.0	-50.1	-13.0	-37.1	
5197.80	-8.8	H	3.0	43.1	1.0	-50.9	-13.0	-37.9	
6930.40	-6.1	H	3.0	43.0	1.0	-48.1	-13.0	-35.1	
High Ch, 1752.6MHz									
3505.20	-8.7	V	3.0	42.3	1.0	-50.0	-13.0	-37.0	
5257.80	-8.9	V	3.0	43.1	1.0	-51.0	-13.0	-38.0	
7010.40	-6.3	V	3.0	42.9	1.0	-48.2	-13.0	-35.2	
3505.20	-8.6	H	3.0	42.3	1.0	-49.9	-13.0	-36.9	
5257.80	-8.8	H	3.0	43.1	1.0	-50.9	-13.0	-37.9	
7010.40	-6.2	H	3.0	42.9	1.0	-48.1	-13.0	-35.1	

WCDMA Band 2

Band 2 REL99

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

Company: Samsung
Project #: 4790101660
Date: 11/12/2021
Test Engineer: 22943
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 2
Mode: Rel99 Band 2 Harmonics
Test Votage: AC 120 V, 60 Hz

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	-11.0	V	3.0	42.3	1.0	-52.4	-13.0	-39.4	
5557.20	-8.3	V	3.0	43.1	1.0	-50.5	-13.0	-37.5	
7409.60	-6.3	V	3.0	42.7	1.0	-48.0	-13.0	-35.0	
3704.80	-11.1	H	3.0	42.3	1.0	-52.4	-13.0	-39.4	
5557.20	-8.2	H	3.0	43.1	1.0	-50.4	-13.0	-37.4	
7409.60	-6.3	H	3.0	42.7	1.0	-48.0	-13.0	-35.0	
Mid Ch, 1880MHz									
3760.00	-11.1	V	3.0	42.3	1.0	-52.4	-13.0	-39.4	
5640.00	-7.9	V	3.0	43.2	1.0	-50.0	-13.0	-37.0	
7520.00	-6.4	V	3.0	42.7	1.0	-48.1	-13.0	-35.1	
3760.00	-11.0	H	3.0	42.3	1.0	-52.3	-13.0	-39.3	
5640.00	-8.1	H	3.0	43.2	1.0	-50.2	-13.0	-37.2	
7520.00	-6.4	H	3.0	42.7	1.0	-48.1	-13.0	-35.1	
High Ch, 1907.6MHz									
3815.20	-11.2	V	3.0	42.3	1.0	-52.5	-13.0	-39.5	
5722.80	-7.9	V	3.0	43.2	1.0	-50.1	-13.0	-37.1	
7630.40	-6.1	V	3.0	42.6	1.0	-47.7	-13.0	-34.7	
3815.20	-11.2	H	3.0	42.3	1.0	-52.5	-13.0	-39.5	
5722.80	-8.0	H	3.0	43.2	1.0	-50.2	-13.0	-37.2	
7630.40	-6.0	H	3.0	42.6	1.0	-47.6	-13.0	-34.6	

Band 2 HSDPA

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

Company: Samsung
Project #: 4790101660
Date: 11/12/2021
Test Engineer: 22943
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 2
Mode: HSDPA Band 2 Harmonics
Test Votage: AC 120 V, 60 Hz

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	-11.2	V	3.0	42.3	1.0	-52.6	-13.0	-39.6	
5557.20	-8.2	V	3.0	43.1	1.0	-50.4	-13.0	-37.4	
7409.60	-6.3	V	3.0	42.7	1.0	-48.0	-13.0	-35.0	
3704.80	-11.2	H	3.0	42.3	1.0	-52.5	-13.0	-39.5	
5557.20	-8.3	H	3.0	43.1	1.0	-50.5	-13.0	-37.5	
7409.60	-6.4	H	3.0	42.7	1.0	-48.1	-13.0	-35.1	
Mid Ch, 1880MHz									
3760.00	-11.2	V	3.0	42.3	1.0	-52.5	-13.0	-39.5	
5640.00	-7.9	V	3.0	43.2	1.0	-50.1	-13.0	-37.1	
7520.00	-6.3	V	3.0	42.7	1.0	-48.0	-13.0	-35.0	
3760.00	-10.9	H	3.0	42.3	1.0	-52.2	-13.0	-39.2	
5640.00	-7.8	H	3.0	43.2	1.0	-50.0	-13.0	-37.0	
7520.00	-6.4	H	3.0	42.7	1.0	-48.1	-13.0	-35.1	
High Ch, 1907.6MHz									
3815.20	-11.2	V	3.0	42.3	1.0	-52.5	-13.0	-39.5	
5722.80	-8.1	V	3.0	43.2	1.0	-50.2	-13.0	-37.2	
7630.40	-6.2	V	3.0	42.6	1.0	-47.9	-13.0	-34.9	
3815.20	-11.2	H	3.0	42.3	1.0	-52.5	-13.0	-39.5	
5722.80	-8.0	H	3.0	43.2	1.0	-50.1	-13.0	-37.1	
7630.40	-6.2	H	3.0	42.6	1.0	-47.8	-13.0	-34.8	

LTE Band 2 (Sub Antenna)

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

Company:	Samsung
Project #:	4790101660
Date:	12/9/2021
Test Engineer:	19568
Configuration:	EUT / AC Adpater, X-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 2 Harmonics, 5MHz Bandwidth
Test Votage:	AC 120 V, 60 Hz

LTE Band 2

5MHz

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, 1852.5MHz									
3705.00	-10.7	V	3.0	45.8	1.0	-55.5	-13.0	-42.5	
5557.50	-8.3	V	3.0	45.7	1.0	-53.1	-13.0	-40.1	
7410.00	-5.4	V	3.0	44.6	1.0	-48.9	-13.0	-35.9	
3705.00	-10.7	H	3.0	45.8	1.0	-55.5	-13.0	-42.5	
5557.50	-8.4	H	3.0	45.7	1.0	-53.1	-13.0	-40.1	
7410.00	-5.6	H	3.0	44.6	1.0	-49.1	-13.0	-36.1	
Mid Ch, 1880MHz									
3760.00	-10.5	V	3.0	45.8	1.0	-55.3	-13.0	-42.3	
5640.00	-8.2	V	3.0	45.7	1.0	-53.0	-13.0	-40.0	
7520.00	-5.5	V	3.0	44.5	1.0	-49.0	-13.0	-36.0	
3760.00	-11.3	H	3.0	45.8	1.0	-56.1	-13.0	-43.1	
5640.00	-8.2	H	3.0	45.7	1.0	-52.9	-13.0	-39.9	
7520.00	-5.0	H	3.0	44.5	1.0	-48.5	-13.0	-35.5	
High Ch, 1907.5MHz									
3815.00	-10.1	V	3.0	45.8	1.0	-54.9	-13.0	-41.9	
5722.50	-7.9	V	3.0	45.7	1.0	-52.7	-13.0	-39.7	
7630.00	-5.5	V	3.0	44.4	1.0	-48.9	-13.0	-35.9	
3815.00	-10.3	H	3.0	45.8	1.0	-55.2	-13.0	-42.2	
5722.50	-8.1	H	3.0	45.7	1.0	-52.9	-13.0	-39.9	
7630.00	-5.5	H	3.0	44.4	1.0	-48.9	-13.0	-35.9	

LTE Band 12

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

Company: Samsung
Project #: 4790101660
Date: 11/10/2021
Test Engineer: 20882
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 12 Harmonics, 3MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

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	-17.1	V	3.0	41.0	1.0	-57.1	-13.0	-44.1	
2101.50	-14.1	V	3.0	41.0	1.0	-54.1	-13.0	-41.1	
2802.00	-11.6	V	3.0	42.0	1.0	-52.6	-13.0	-39.6	
1401.00	-17.8	H	3.0	41.0	1.0	-57.8	-13.0	-44.8	
2101.50	-14.6	H	3.0	41.0	1.0	-54.6	-13.0	-41.6	
2802.00	-11.8	H	3.0	42.0	1.0	-52.8	-13.0	-39.8	
Mid Ch, 707.5MHz									
1415.00	-16.7	V	3.0	41.0	1.0	-56.7	-13.0	-43.7	
2122.50	-14.0	V	3.0	41.0	1.0	-54.1	-13.0	-41.1	
2830.00	-11.6	V	3.0	42.0	1.0	-52.7	-13.0	-39.7	
1415.00	-17.3	H	3.0	41.0	1.0	-57.2	-13.0	-44.2	
2122.50	-14.7	H	3.0	41.0	1.0	-54.7	-13.0	-41.7	
2830.00	-11.9	H	3.0	42.0	1.0	-52.9	-13.0	-39.9	
High Ch, 714.5MHz									
1429.00	-16.6	V	3.0	41.0	1.0	-56.5	-13.0	-43.5	
2143.50	-13.8	V	3.0	41.1	1.0	-53.9	-13.0	-40.9	
2858.00	-11.4	V	3.0	42.1	1.0	-52.5	-13.0	-39.5	
1429.00	-17.4	H	3.0	41.0	1.0	-57.4	-13.0	-44.4	
2143.50	-14.5	H	3.0	41.1	1.0	-54.6	-13.0	-41.6	
2858.00	-11.8	H	3.0	42.1	1.0	-52.8	-13.0	-39.8	

LTE Band 13

LTE Band 13

10MHz

QPSK

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

Company:	Samsung
Project #:	4790101660
Date:	11/10/2021
Test Engineer:	20882
Configuration:	EUT / AC Adapter, Y-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 13 Harmonics, 10MHz Bandwidth
Test Votage:	AC 120 V, 60 Hz

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch, 782MHz									
1564.00	-30.2	V	3.0	40.9	1.0	-70.1	-40.0	-30.1	
2346.00	-13.3	V	3.0	41.4	1.0	-53.6	-13.0	-40.6	
3128.00	-9.8	V	3.0	42.3	1.0	-51.1	-13.0	-38.1	
1564.00	-30.4	H	3.0	40.9	1.0	-70.4	-40.0	-30.4	
2346.00	-13.2	H	3.0	41.4	1.0	-53.6	-13.0	-40.6	
3128.00	-10.3	H	3.0	42.3	1.0	-51.6	-13.0	-38.6	

Note : No narrowband emissions so only applied the -70dBW/MHz (-40dBm/MHz) wideband emission limit for the 1559-1610 MHz band

LTE Band 25

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

Company:	Samsung
Project #:	4790101660
Date:	11/8/2021
Test Engineer:	19568
Configuration:	EUT / AC Adpater, Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 25 Harmonics, 3MHz Bandwidth
Test Votage:	AC 120 V, 60 Hz

LTE Band 25

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, 1851.5MHz									
3703.00	-7.9	V	3.0	42.3	1.0	-49.2	-13.0	-36.2	
5554.50	-8.4	V	3.0	43.1	1.0	-50.5	-13.0	-37.5	
7406.00	-6.3	V	3.0	42.7	1.0	-48.0	-13.0	-35.0	
3703.00	-8.2	H	3.0	42.3	1.0	-49.5	-13.0	-36.5	
5554.50	-8.3	H	3.0	43.1	1.0	-50.4	-13.0	-37.4	
7406.00	-6.3	H	3.0	42.7	1.0	-48.0	-13.0	-35.0	
Mid Ch, 1882.5MHz									
3765.00	-8.9	V	3.0	42.3	1.0	-50.2	-13.0	-37.2	
5647.50	-7.9	V	3.0	43.2	1.0	-50.1	-13.0	-37.1	
7530.00	-6.4	V	3.0	42.7	1.0	-48.1	-13.0	-35.1	
3765.00	-9.1	H	3.0	42.3	1.0	-50.4	-13.0	-37.4	
5647.50	-8.0	H	3.0	43.2	1.0	-50.2	-13.0	-37.2	
7530.00	-6.3	H	3.0	42.7	1.0	-48.0	-13.0	-35.0	
High Ch, 1913.5MHz									
3827.00	-10.7	V	3.0	42.3	1.0	-52.0	-13.0	-39.0	
5740.50	-8.2	V	3.0	43.2	1.0	-50.4	-13.0	-37.4	
7654.00	-6.4	V	3.0	42.6	1.0	-48.0	-13.0	-35.0	
3827.00	-9.7	H	3.0	42.3	1.0	-51.1	-13.0	-38.1	
5740.50	-8.2	H	3.0	43.2	1.0	-50.4	-13.0	-37.4	
7654.00	-6.5	H	3.0	42.6	1.0	-48.1	-13.0	-35.1	

LTE Band 26 (Part 90)

LTE Band 26

5MHz

QPSK

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

Company:	Samsung
Project #:	4790101660
Date:	11/10/2021
Test Engineer:	20882
Configuration:	EUT / AC Adapter, Y-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 26 Harmonics, 5MHz Bandwidth
Test Votage:	AC 120 V, 60 Hz

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	-15.8	V	3.0	40.9	1.0	-55.7	-13.0	-42.7	
2479.50	-12.3	V	3.0	41.6	1.0	-52.8	-13.0	-39.8	
3306.00	-9.5	V	3.0	42.3	1.0	-50.8	-13.0	-37.8	
1653.00	-16.1	H	3.0	40.9	1.0	-56.0	-13.0	-43.0	
2479.50	-12.9	H	3.0	41.6	1.0	-53.4	-13.0	-40.4	
3306.00	-9.7	H	3.0	42.3	1.0	-51.0	-13.0	-38.0	
Mid Ch, 831.5MHz									
1663.00	-15.6	V	3.0	40.9	1.0	-55.5	-13.0	-42.5	
2494.50	-12.5	V	3.0	41.6	1.0	-53.1	-13.0	-40.1	
3326.00	-9.6	V	3.0	42.3	1.0	-50.9	-13.0	-37.9	
1663.00	-16.1	H	3.0	40.9	1.0	-56.1	-13.0	-43.1	
2494.50	-12.8	H	3.0	41.6	1.0	-53.4	-13.0	-40.4	
3326.00	-9.8	H	3.0	42.3	1.0	-51.1	-13.0	-38.1	
High Ch, 846.5MHz									
1693.00	-15.3	V	3.0	40.9	1.0	-55.2	-13.0	-42.2	
2539.50	-12.4	V	3.0	41.6	1.0	-53.0	-13.0	-40.0	
3386.00	-8.9	V	3.0	42.3	1.0	-50.2	-13.0	-37.2	
1693.00	-16.0	H	3.0	40.9	1.0	-55.9	-13.0	-42.9	
2539.50	-12.6	H	3.0	41.6	1.0	-53.3	-13.0	-40.3	
3386.00	-8.8	H	3.0	42.3	1.0	-50.1	-13.0	-37.1	

LTE Band 26 (Straddle)

LTE Band 26

5MHz

QPSK

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

Company:	Samsung
Project #:	4790101660
Date:	11/10/2021
Test Engineer:	20882
Configuration:	EUT / AC Adapter, Y-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 26 Harmonics, 5MHz Bandwidth
Test Votage:	AC 120 V, 60 Hz

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Straddle Ch, 824MHz									
1648.00	-15.6	V	3.0	40.9	1.0	-55.5	-13.0	-42.5	
2472.00	-12.5	V	3.0	41.5	1.0	-53.0	-13.0	-40.0	
3296.00	-9.6	V	3.0	42.3	1.0	-50.9	-13.0	-37.9	
1648.00	-16.1	H	3.0	40.9	1.0	-56.1	-13.0	-43.1	
2472.00	-13.1	H	3.0	41.5	1.0	-53.6	-13.0	-40.6	
3296.00	-9.4	H	3.0	42.3	1.0	-50.7	-13.0	-37.7	

LTE Band 26 (Part 22)

LTE Band 26

5MHz

QPSK

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

Company:	Samsung
Project #:	4790101660
Date:	11/10/2021
Test Engineer:	20882
Configuration:	EUT / AC Adapter, Y-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 26 Harmonics, 5MHz Bandwidth
Test Votage:	AC 120 V, 60 Hz

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 816.5MHz									
1653.00	-15.6	V	3.0	40.9	1.0	-55.5	-13.0	-42.5	
2479.50	-12.6	V	3.0	41.6	1.0	-53.2	-13.0	-40.2	
3306.00	-9.7	V	3.0	42.3	1.0	-51.0	-13.0	-38.0	
1653.00	-16.2	H	3.0	40.9	1.0	-56.1	-13.0	-43.1	
2479.50	-12.9	H	3.0	41.6	1.0	-53.5	-13.0	-40.5	
3306.00	-9.7	H	3.0	42.3	1.0	-51.0	-13.0	-38.0	
Mid Ch, 821.5MHz									
1643.00	-15.2	V	3.0	40.9	1.0	-55.1	-13.0	-42.1	
2464.50	-12.8	V	3.0	41.5	1.0	-53.3	-13.0	-40.3	
3286.00	-9.8	V	3.0	42.3	1.0	-51.1	-13.0	-38.1	
1643.00	-16.0	H	3.0	40.9	1.0	-55.9	-13.0	-42.9	
2464.50	-13.0	H	3.0	41.5	1.0	-53.5	-13.0	-40.5	
3286.00	-9.8	H	3.0	42.3	1.0	-51.1	-13.0	-38.1	

LTE Band 41 (PC2)

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

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 22943
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 41 Harmonics, 10MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

LTE Band 41 (PC2)

10MHz

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, 2501MHz									
5002.00	-15.2	V	3.0	43.0	1.0	-57.2	-25.0	-32.2	
7503.00	-10.6	V	3.0	42.7	1.0	-52.2	-25.0	-27.2	
10004.00	-13.4	V	3.0	41.1	1.0	-53.5	-25.0	-28.5	
5002.00	-17.8	H	3.0	43.0	1.0	-59.8	-25.0	-34.8	
7503.00	-13.8	H	3.0	42.7	1.0	-55.5	-25.0	-30.5	
10004.00	-13.5	H	3.0	41.1	1.0	-53.6	-25.0	-28.6	
Mid Ch, 2593MHz									
5186.00	-13.7	V	3.0	43.1	1.0	-55.8	-25.0	-30.8	
7779.00	-14.7	V	3.0	42.5	1.0	-56.2	-25.0	-31.2	
10372.00	-13.1	V	3.0	41.3	1.0	-53.3	-25.0	-28.3	
5186.00	-17.0	H	3.0	43.1	1.0	-59.0	-25.0	-34.0	
7779.00	-16.6	H	3.0	42.5	1.0	-58.2	-25.0	-33.2	
10372.00	-13.2	H	3.0	41.3	1.0	-53.5	-25.0	-28.5	
High Ch, 2685MHz									
5370.00	-10.5	V	3.0	43.1	1.0	-52.6	-25.0	-27.6	
8055.00	-14.7	V	3.0	42.4	1.0	-56.1	-25.0	-31.1	
10740.00	-12.3	V	3.0	41.4	1.0	-52.8	-25.0	-27.8	
5370.00	-14.7	H	3.0	43.1	1.0	-56.8	-25.0	-31.8	
8055.00	-16.8	H	3.0	42.4	1.0	-58.2	-25.0	-33.2	
10740.00	-12.5	H	3.0	41.4	1.0	-52.9	-25.0	-27.9	

LTE Band 66

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

Company: Samsung
Project #: 4790101660
Date: 11/12/2021
Test Engineer: 20882
Configuration: EUT/ AC Adapter, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Harmonics, 20MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

LTE Band 66

20MHz

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, 1720MHz									
3440.00	-9.5	V	3.0	42.3	1.0	-50.8	-13.0	-37.8	
5160.00	-9.2	V	3.0	43.1	1.0	-51.3	-13.0	-38.3	
6880.00	-6.4	V	3.0	43.0	1.0	-48.3	-13.0	-35.3	
3440.00	-9.3	H	3.0	42.3	1.0	-50.6	-13.0	-37.6	
5160.00	-8.9	H	3.0	43.1	1.0	-51.0	-13.0	-38.0	
6880.00	-6.3	H	3.0	43.0	1.0	-48.3	-13.0	-35.3	
Mid Ch, 1745MHz									
3490.00	-9.0	V	3.0	42.3	1.0	-50.3	-13.0	-37.3	
5235.00	-9.0	V	3.0	43.1	1.0	-51.1	-13.0	-38.1	
6980.00	-6.4	V	3.0	42.9	1.0	-48.4	-13.0	-35.4	
3490.00	-8.9	H	3.0	42.3	1.0	-50.2	-13.0	-37.2	
5235.00	-8.9	H	3.0	43.1	1.0	-51.0	-13.0	-38.0	
6980.00	-6.3	H	3.0	42.9	1.0	-48.2	-13.0	-35.2	
High Ch, 1770MHz									
3540.00	-8.3	V	3.0	42.3	1.0	-49.6	-13.0	-36.6	
5310.00	-8.2	V	3.0	43.1	1.0	-50.3	-13.0	-37.3	
7080.00	-6.3	V	3.0	42.9	1.0	-48.2	-13.0	-35.2	
3540.00	-8.1	H	3.0	42.3	1.0	-49.4	-13.0	-36.4	
5310.00	-8.6	H	3.0	43.1	1.0	-50.7	-13.0	-37.7	
7080.00	-6.1	H	3.0	42.9	1.0	-47.9	-13.0	-34.9	

NR Band 5

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

Company: Samsung
Project #: 4790101660
Date: 11/11/2021
Test Engineer: 25546
Configuration: EUT / AC Adapter, Y-Position
Location: Chamber 1
Mode: LTE_QPSK NR n5 Harmonics, 20MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

NR Band 5

20MHz

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, 834MHz									
1668.00	-15.2	V	3.0	45.6	1.0	-59.8	-13.0	-46.8	
2502.00	-11.8	V	3.0	45.5	1.0	-56.3	-13.0	-43.3	
3336.00	-9.7	V	3.0	45.7	1.0	-54.4	-13.0	-41.4	
1668.00	-16.1	H	3.0	45.6	1.0	-60.7	-13.0	-47.7	
2502.00	-12.3	H	3.0	45.5	1.0	-56.7	-13.0	-43.7	
3336.00	-9.4	H	3.0	45.7	1.0	-54.1	-13.0	-41.1	
Mid Ch, 836.5MHz									
1673.00	-14.3	V	3.0	45.6	1.0	-58.9	-13.0	-45.9	
2509.50	-11.8	V	3.0	45.5	1.0	-56.3	-13.0	-43.3	
3346.00	-9.3	V	3.0	45.7	1.0	-54.0	-13.0	-41.0	
1673.00	-16.1	H	3.0	45.6	1.0	-60.7	-13.0	-47.7	
2509.50	-12.4	H	3.0	45.5	1.0	-56.8	-13.0	-43.8	
3346.00	-9.3	H	3.0	45.7	1.0	-54.0	-13.0	-41.0	
High Ch, 839MHz									
1678.00	-15.1	V	3.0	45.6	1.0	-59.7	-13.0	-46.7	
2517.00	-11.7	V	3.0	45.5	1.0	-56.2	-13.0	-43.2	
3356.00	-9.2	V	3.0	45.7	1.0	-53.9	-13.0	-40.9	
1678.00	-16.1	H	3.0	45.6	1.0	-60.7	-13.0	-47.7	
2517.00	-12.3	H	3.0	45.5	1.0	-56.7	-13.0	-43.7	
3356.00	-9.2	H	3.0	45.7	1.0	-53.9	-13.0	-40.9	

NR Band 66

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

Company: Samsung
Project #: 4790101660
Date: 11/9/2021
Test Engineer: 19568
Configuration: EUT / AC Adapter, Y-Position
Location: Chamber 1
Mode: LTE_QPSK NR n66 Harmonics, 20MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

NR Band 66

20MHz

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, 1720MHz									
3440.00	-6.4	V	3.0	45.7	1.0	-51.1	-13.0	-38.1	
5160.00	-9.5	V	3.0	45.8	1.0	-54.3	-13.0	-41.3	
6880.00	-6.2	V	3.0	44.9	1.0	-50.1	-13.0	-37.1	
3440.00	-8.5	H	3.0	45.7	1.0	-53.2	-13.0	-40.2	
5160.00	-9.4	H	3.0	45.8	1.0	-54.2	-13.0	-41.2	
6880.00	-6.4	H	3.0	44.9	1.0	-50.2	-13.0	-37.2	
Mid Ch, 1745MHz									
3490.00	-6.6	V	3.0	45.7	1.0	-51.3	-13.0	-38.3	
5235.00	-9.2	V	3.0	45.8	1.0	-54.0	-13.0	-41.0	
6980.00	-5.9	V	3.0	44.8	1.0	-49.7	-13.0	-36.7	
3490.00	-7.8	H	3.0	45.7	1.0	-52.5	-13.0	-39.5	
5235.00	-9.0	H	3.0	45.8	1.0	-53.8	-13.0	-40.8	
6980.00	-6.0	H	3.0	44.8	1.0	-49.8	-13.0	-36.8	
High Ch, 1770MHz									
3540.00	-6.2	V	3.0	45.8	1.0	-51.0	-13.0	-38.0	
5310.00	-9.0	V	3.0	45.8	1.0	-53.8	-13.0	-40.8	
7080.00	-5.8	V	3.0	44.7	1.0	-49.5	-13.0	-36.5	
3540.00	-8.0	H	3.0	45.8	1.0	-52.8	-13.0	-39.8	
5310.00	-9.0	H	3.0	45.8	1.0	-53.8	-13.0	-40.8	
7080.00	-6.0	H	3.0	44.7	1.0	-49.7	-13.0	-36.7	

END OF REPORT

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