NR Band 66 (Lowest Frequency: QPSK / 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	1708.4498	1781.5455		
Extreme (50C)		1708.4498	1781.5455	9.5	0.005
Extreme (40C)		1708.4498	1781.5455	9.2	0.005
Extreme (30C)		1708.4498	1781.5455	8.1	0.005
Extreme (10C)		1708.4498	1781.5455	7.7	0.004
Extreme (0C)		1708.4498	1781.5455	7.6	0.004
Extreme (-10C)		1708.4498	1781.5455	8.1	0.005
Extreme (-20C)		1708.4498	1781.5455	4.7	0.003
Extreme (-30C)		1708.4498	1781.5455	6.0	0.003
20C	15%	1708.4498	1781.5455	7.9	0.004
	-15%	1708.4498	1781.5455	6.8	0.004
	End Point	1708.4498	1781.5455	7.6	0.004

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	29.83	961.61
		190	836.6	30.91	1233.10
		251	848.8	**31.03**	**1267.65**
	EGPRS	128	824.2	25.91	389.94
		190	836.6	**26.72**	**469.89**
		251	848.8	25.84	383.71
GSM1900	GPRS	512	1850.2	27.87	612.35
		661	1880	**28.62**	**727.78**
		810	1909.8	27.51	563.64
	EGPRS	512	1850.2	25.82	381.94
		661	1880	**26.58**	**454.99**
		810	1909.8	25.26	335.74

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	20.55	113.50
		4183	836.6	**21.21**	**132.13**
		4233	846.6	20.05	101.16
	HSDPA	4132	826.4	19.48	88.72
		4183	836.6	**20.02**	**100.46**
		4233	846.6	19.55	90.16
Band 4	REL99	1312	1712.4	21.88	154.17
		1413	1732.6	21.98	157.76
		1513	1752.6	**22.74**	**187.93**
	HSDPA	1312	1712.4	21.72	148.59
		1413	1732.6	21.95	156.68
		1513	1752.6	**22.73**	**187.50**
Band 2	REL99	9262	1852.4	**21.22**	**132.43**
		9400	1880.0	**21.22**	**132.43**
		9538	1907.6	19.51	89.33
	HSDPA	9262	1852.4	21.24	133.05
		9400	1880.0	**21.30**	**134.90**
		9538	1907.6	20.38	109.14

LTE Band 2 (Main ANT)

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 2	20	QPSK	1/49	1860.0	**21.78**	**150.66**
			1/49	1880.0	21.34	136.14
			1/99	1900.0	20.13	103.04
		16QAM	1/49	1860.0	19.59	90.99
			1/49	1880.0	19.11	81.47
			1/49	1900.0	**19.83**	**96.16**
	15	QPSK	1/74	1857.5	21.03	126.77
			1/74	1880.0	21.72	148.59
			1/74	1902.5	**21.90**	**154.88**
		16QAM	1/74	1857.5	19.18	82.79
			1/0	1880.0	19.47	88.51
			1/74	1902.5	**19.56**	**90.36**
	10	QPSK	1/49	1855.0	21.32	135.52
			1/25	1880.0	**21.63**	**145.55**
			1/49	1905.0	20.38	109.14
		16QAM	1/25	1855.0	18.51	70.96
			1/25	1880.0	**19.59**	**90.99**
			1/0	1905.0	19.50	89.13
	5	QPSK	1/24	1852.5	20.44	110.66
			1/24	1880.0	**21.00**	**125.89**
			1/24	1907.5	20.92	123.59
		16QAM	1/24	1852.5	18.57	71.94
			1/0	1880.0	19.65	92.26
			1/24	1907.5	**19.66**	**92.47**
	3	QPSK	1/14	1851.5	20.80	120.23
			1/0	1880.0	**21.56**	**143.22**
			1/14	1908.5	21.15	130.32
		16QAM	1/0	1851.5	18.66	73.45
			1/0	1880.0	**19.80**	**95.50**
			1/14	1908.5	19.53	89.74
	1.4	QPSK	1/5	1850.7	20.60	114.82
			1/0	1880.0	21.84	152.76
			1/0	1909.3	**22.40**	**173.78**
		16QAM	1/5	1850.7	18.55	71.61
			1/3	1880.0	19.62	91.62
			1/3	1909.3	**19.63**	**91.83**

LTE Band 2 (Sub ANT) – Spot Check

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 2	20	QPSK	1/0	1860.0	**21.55**	**142.89**
			1/0	1880.0	18.72	74.47
			1/0	1900.0	20.42	110.15
		16QAM	1/0	1860.0	**20.31**	**107.40**
			1/0	1880.0	18.40	69.18
			1/0	1900.0	19.78	95.06
	15	QPSK				
		16QAM				
	10	QPSK				
		16QAM				
	5	QPSK				
		16QAM				
	3	QPSK				
		16QAM				
	1.4	QPSK				
		16QAM				

LTE Band 12

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 12	10	QPSK	1/0	704.0	19.02	79.80
			1/0	707.5	**19.19**	**82.99**
			1/0	711.0	**19.19**	**82.99**
		16QAM	1/25	704.0	**16.95**	**49.55**
			1/0	707.5	16.61	45.81
			1/0	711.0	16.91	49.09
	5	QPSK	1/24	701.5	**19.29**	**84.92**
			1/24	707.5	18.96	78.70
			1/24	713.5	18.37	68.71
		16QAM	1/0	701.5	**17.09**	**51.17**
			1/0	707.5	16.88	48.75
			1/0	713.5	16.69	46.67
	3	QPSK	1/14	700.5	**19.12**	**81.66**
			1/14	707.5	18.80	75.86
			1/0	714.5	18.88	77.27
		16QAM	1/0	700.5	16.50	44.67
			1/0	707.5	**17.01**	**50.23**
			1/14	714.5	16.16	41.30
	1.4	QPSK	1/5	699.7	19.06	80.54
			1/0	707.5	**19.28**	**84.72**
			1/0	715.3	18.49	70.63
		16QAM	1/3	699.7	**16.61**	**45.81**
			1/3	707.5	16.60	45.71
			1/3	715.3	16.47	44.36

LTE Band 13

Band	BW [MHz]	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 13	10	QPSK	1/0	782.0	**20.73**	**118.30**
		16QAM	1/25	782.0	18.12	64.86
	5	QPSK	1/0	779.5	**20.62**	**115.35**
			1/24	782.0	20.41	109.90
			1/24	784.5	20.46	111.17
		16QAM	1/0	779.5	**18.45**	**69.98**
			1/0	782.0	18.36	68.55
			1/0	784.5	18.12	64.86

LTE Band 26

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP/EIRP [dBm]	ERP/EIRP [mW]
Band 26	15	QPSK	1/0	821.5	22.26	168.27
			1/0	831.5	**20.81**	**120.50**
			1/0	841.5	19.54	89.95
		16QAM	1/0	821.5	20.20	104.71
			1/0	831.5	**18.87**	**77.09**
			1/0	841.5	17.21	52.60
	10	QPSK	1/49	819.0	21.67	146.89
			1/0	829.0	**20.62**	**115.35**
			1/0	831.5	20.55	113.50
			1/49	844.0	19.31	85.31
		16QAM	1/0	819.0	20.30	107.15
			1/0	829.0	18.71	74.30
			1/0	831.5	**18.74**	**74.82**
			1/25	844.0	17.38	54.70
	5	QPSK	1/0	816.5	21.70	147.91
			1/24	821.5	**21.92**	**155.60**
			1/24	826.5	20.46	111.17
			1/24	831.5	20.60	114.82
			1/24	846.5	19.43	87.70
		16QAM	1/24	816.5	19.68	92.90
			1/24	821.5	**19.98**	**99.54**
			1/0	826.5	18.51	70.96
			1/0	831.5	18.20	66.07
			1/0	846.5	17.41	55.08
	3	QPSK	1/0	815.5	21.54	142.56
			1/14	822.5	**22.07**	**161.06**
			1/0	825.5	20.53	112.98
			1/14	831.5	20.75	118.85
			1/14	847.5	19.17	82.60
		16QAM	1/14	815.5	19.48	88.72
			1/0	822.5	**20.23**	**105.44**
			1/0	825.5	18.54	71.45
			1/0	831.5	18.63	72.95
			1/0	847.5	17.37	54.58
	1.4	QPSK	1/0	814.7	20.26	106.17
			1/0	823.3	**20.82**	**120.78**
			1/0	824.7	20.49	111.94
			1/0	831.5	20.78	119.67
			1/0	848.3	19.53	89.74
		16QAM	1/3	814.7	18.03	63.53
			1/5	823.3	18.60	72.44
			1/5	824.7	18.27	67.14
			1/3	831.5	18.34	68.23
			1/3	848.3	**19.61**	**91.41**

LTE Band 26(Straddle)

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP/EIRP [dBm]	ERP/EIRP [mW]
Band 26	15	QPSK	1/0	824	20.50	112.20
		16QAM	1/0		18.65	73.28
	10	QPSK	1/0	824	20.43	110.41
		16QAM	1/25		18.27	67.14
	5	QPSK	1/24	824	20.43	110.41
		16QAM	1/0		18.30	67.61
	3	QPSK	1/14	824	20.29	106.91
		16QAM	1/0		18.17	65.61
	1.4	QPSK	1/0	824	20.25	105.93
		16QAM	1/5		18.33	68.08

LTE Band 41

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 41	20	QPSK	1/0	2506.0	21.48	140.60
			1/99	2593.0	21.21	132.13
			1/0	2680.0	**22.29**	**169.43**
		16QAM	1/99	2506.0	19.36	86.30
			1/99	2593.0	20.15	103.51
			1/49	2680.0	**20.60**	**114.82**
	15	QPSK	1/0	2503.5	20.53	112.98
			1/0	2593.0	22.28	169.04
			1/0	2682.5	**23.10**	**204.17**
		16QAM	1/74	2503.5	19.34	85.90
			1/74	2593.0	20.17	103.99
			1/37	2682.5	**21.29**	**134.59**
	10	QPSK	1/0	2501.0	21.71	148.25
			1/25	2593.0	22.62	182.81
			1/25	2685.0	**22.79**	**190.11**
		16QAM	1/49	2501.0	20.00	100.00
			1/49	2593.0	20.95	124.45
			1/0	2685.0	**21.37**	**137.09**
	5	QPSK	1/0	2498.5	22.08	161.44
			1/0	2593.0	22.49	177.42
			1/0	2687.5	**22.66**	**184.50**
		16QAM	1/24	2498.5	19.90	97.72
			1/0	2593.0	20.73	118.30
			1/24	2687.5	**20.91**	**123.31**

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LTE Band 66 (Main ANT)

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 66	20	QPSK	1/99	1720.0	20.55	113.50
			1/49	1745.0	**22.23**	**167.11**
			1/49	1770.0	21.59	144.21
		16QAM	1/49	1720.0	20.00	100.00
			1/49	1745.0	19.86	96.83
			1/49	1770.0	**20.05**	**101.16**
	15	QPSK	1/74	1717.5	22.30	169.82
			1/74	1747.5	**22.37**	**172.58**
			1/74	1772.5	22.18	165.20
		16QAM	1/74	1717.5	19.90	97.72
			1/0	1747.5	**20.42**	**110.15**
			1/74	1772.5	20.03	100.69
	10	QPSK	1/49	1715.0	**22.52**	**178.65**
			1/49	1745.0	22.39	173.38
			1/49	1775.0	22.15	164.06
		16QAM	1/25	1715.0	20.09	102.09
			1/25	1745.0	20.04	100.93
			1/25	1775.0	**20.41**	**109.90**
	5	QPSK	1/24	1712.5	22.21	166.34
			1/24	1745.0	21.97	157.40
			1/24	1777.5	**22.56**	**180.30**
		16QAM	1/24	1712.5	20.46	111.17
			1/0	1745.0	**20.73**	**118.30**
			1/0	1777.5	20.04	100.93
	3	QPSK	1/14	1711.5	21.60	144.54
			1/14	1745.0	**22.06**	**160.69**
			1/14	1778.5	21.87	153.82
		16QAM	1/8	1711.5	19.52	89.54
			1/14	1745.0	**19.68**	**92.90**
			1/0	1778.5	19.62	91.62
	1.4	QPSK	1/5	1710.7	20.62	115.35
			1/5	1745.0	**22.49**	**177.42**
			1/5	1779.3	20.81	120.50
		16QAM	1/0	1710.7	20.13	103.04
			1/0	1745.0	**21.08**	**128.23**
			1/0	1779.3	20.00	100.00

LTE Band 66 (Sub ANT) – Spot Check

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 66	20	QPSK	1/0	1720.0	20.64	115.88
			1/0	1745.0	**22.09**	**161.81**
			1/0	1770.0	20.43	110.41
		16QAM	1/49	1720.0	19.75	94.41
			1/49	1745.0	**21.47**	**140.28**
			1/49	1770.0	19.29	84.92
	15	QPSK				
		16QAM				
	10	QPSK				
		16QAM				
	5	QPSK				
		16QAM				
	3	QPSK				
		16QAM				
	1.4	QPSK				
		16QAM				

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	1/104	834.0	18.40	69.18
				1/104	836.5	**21.25**	**133.35**
				1/104	839.0	20.20	104.71
			16QAM	1/104	834.0	18.40	69.18
				1/104	836.5	**19.05**	**80.35**
				1/104	839.0	18.80	75.86
	15	DFT-s OFDM	QPSK	1/77	831.5	**19.47**	**88.51**
				1/77	836.5	18.45	69.98
				1/77	841.5	17.76	59.70
			16QAM	1/77	831.5	**19.17**	**82.60**
				1/77	836.5	18.25	66.83
				1/77	841.5	17.36	54.45
	10	DFT-s OFDM	QPSK	1/50	829.0	17.12	**51.52**
				1/50	836.5	**17.13**	**51.64**
				1/1	844.0	16.52	44.87
			16QAM	1/50	829.0	**16.03**	40.09
				1/50	836.5	15.05	31.99
				1/1	844.0	15.18	**32.96**
	5	DFT-s OFDM	QPSK	1/23	826.5	**18.85**	**76.74**
				1/23	836.5	18.25	66.83
				1/23	846.5	18.12	64.86
			16QAM	1/23	826.5	17.85	60.95
				1/23	836.5	**17.95**	**62.37**
				1/23	846.5	17.72	59.16

NR Band 66 (Main ANT)

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	22.09	161.81
				1/53	1745.0	**22.31**	**170.22**
				1/53	1770.0	21.86	153.46
			16QAM	1/104	1720.0	19.92	98.17
				1/53	1745.0	20.65	116.14
				1/53	1770.0	**21.66**	**146.55**
	15	DFT-s OFDM	QPSK	1/40	1717.5	**23.72**	**235.50**
				1/40	1745.0	23.22	209.89
				1/40	1772.5	22.82	191.43
			16QAM	1/40	1717.5	**23.50**	**223.87**
				1/40	1745.0	23.15	206.54
				1/40	1772.5	22.75	188.36
	10	DFT-s OFDM	QPSK	1/50	1715.0	22.94	**196.79**
				1/50	1745.0	**23.16**	**207.01**
				1/1	1775.0	22.85	192.75
			16QAM	1/50	1715.0	22.77	189.23
				1/50	1745.0	**22.98**	**198.61**
				1/1	1775.0	21.92	155.60
	5	DFT-s OFDM	QPSK	1/23	1712.5	21.89	154.53
				1/1	1745.0	**22.62**	**182.81**
				1/1	1777.5	21.90	154.88
			16QAM	1/23	1712.5	21.87	153.82
				1/1	1745.0	**22.51**	**178.24**
				1/1	1777.5	21.76	149.97

NR Band 66 (Sub ANT) – Spot Check

Band	BW [MHz]	Modulation	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
n66	20	DFT-s OFDM	QPSK				
			16QAM				
	15	DFT-s OFDM	QPSK	1/40	1717.5	18.20	66.07
				1/77	1745.0	**18.57**	**71.94**
				1/77	1772.5	18.09	64.42
			16QAM	1/40	1717.5	17.76	59.70
				1/77	1745.0	**18.02**	**63.39**
				1/77	1772.5	17.91	61.80
	10	DFT-s OFDM	QPSK				
			16QAM				
	5	DFT-s OFDM	QPSK				
			16QAM				

9.5.2. ERP/EIRP DATA

GSM850

GSM850

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/17/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: GPRS 850 MHz Fundamentals

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.20	34.18	V	3.0	-1.3	29.83	38.5	-8.7	
824.20	20.94	H	3.0	-1.3	16.59	38.5	-21.9	
Mid Ch								
836.60	35.16	V	3.0	-1.2	30.91	38.5	-7.6	
836.60	21.27	H	3.0	-1.2	17.02	38.5	-21.5	
High Ch								
848.80	35.19	V	3.1	-1.1	31.03	38.5	-7.5	
848.80	21.90	H	3.1	-1.1	17.73	38.5	-20.8	

GSM850

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/17/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: EGPRS 850 MHz Fundamentals

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.20	30.26	V	3.0	-1.3	25.91	38.5	-12.6	
824.20	16.45	H	3.0	-1.3	12.10	38.5	-26.4	
Mid Ch								
836.60	30.97	V	3.0	-1.2	26.72	38.5	-11.8	
836.60	17.29	H	3.0	-1.2	13.04	38.5	-25.5	
High Ch								
848.80	30.00	V	3.1	-1.1	25.84	38.5	-12.7	
848.80	17.37	H	3.1	-1.1	13.20	38.5	-25.3	

GSM1900

GSM1900

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/17/2021
Test Engineer: 19568
Configuration: EUT, X-Position
Location: Chamber 2
Mode: GPRS 1900 MHz Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	17.86	V	4.5	9.6	23.04	33.0	-10.0	
1850.20	22.69	H	4.5	9.6	27.87	33.0	-5.1	
Mid Ch								
1880.00	18.88	V	4.5	9.4	23.75	33.0	-9.2	
1880.00	23.75	H	4.5	9.4	28.62	33.0	-4.4	
High Ch								
1909.80	18.12	V	4.5	9.1	22.64	33.0	-10.4	
1909.80	22.98	H	4.5	9.1	27.51	33.0	-5.5	

GSM1900

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/17/2021
Test Engineer: 19568
Configuration: EUT, X-Position
Location: Chamber 2
Mode: EGPRS 1900 MHz Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	14.64	V	4.5	9.6	19.82	33.0	-13.2	
1850.20	20.64	H	4.5	9.6	25.82	33.0	-7.2	
Mid Ch								
1880.00	17.11	V	4.5	9.4	21.98	33.0	-11.0	
1880.00	21.71	H	4.5	9.4	26.58	33.0	-6.4	
High Ch								
1909.80	15.56	V	4.5	9.1	20.08	33.0	-12.9	
1909.80	20.73	H	4.5	9.1	25.26	33.0	-7.7	

WCDMA Band 5

Band 5 REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19227
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: Rel99 Band 5 Fundamentals

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	24.88	V	3.0	-1.3	20.55	38.5	-17.9	
826.40	11.82	H	3.0	-1.3	7.49	38.5	-31.0	
Mid Ch								
836.60	25.46	V	3.0	-1.2	21.21	38.5	-17.3	
836.60	12.91	H	3.0	-1.2	8.66	38.5	-29.8	
High Ch								
846.60	24.23	V	3.0	-1.1	20.05	38.5	-18.4	
846.60	11.97	H	3.0	-1.1	7.79	38.5	-30.7	

Band 5 HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19227
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: HSDPA Band 5 Fundamentals

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	23.81	V	3.0	-1.3	19.48	38.5	-19.0	
826.40	10.46	H	3.0	-1.3	6.13	38.5	-32.4	
Mid Ch								
836.60	24.27	V	3.0	-1.2	20.02	38.5	-18.5	
836.60	11.63	H	3.0	-1.2	7.38	38.5	-31.1	
High Ch								
846.60	23.73	V	3.0	-1.1	19.55	38.5	-18.9	
846.60	11.40	H	3.0	-1.1	7.22	38.5	-31.3	

WCDMA Band 4

Band 4 REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/22/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: Rel99 Band 4 Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.40	8.79	V	4.3	9.6	14.08	30.0	-15.9	
1712.40	16.60	H	4.3	9.6	21.88	30.0	-8.1	
Mid Ch								
1732.60	10.81	V	4.3	9.6	16.14	30.0	-13.9	
1732.60	16.66	H	4.3	9.6	21.98	30.0	-8.0	
High Ch								
1752.60	10.75	V	4.3	9.7	16.11	30.0	-13.9	
1752.60	17.39	H	4.3	9.7	22.74	30.0	-7.3	

Band 4 HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/22/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: HSDPA Band 4 Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.40	8.78	V	4.3	9.6	14.07	30.0	-15.9	
1712.40	16.44	H	4.3	9.6	21.72	30.0	-8.3	
Mid Ch								
1732.60	10.74	V	4.3	9.6	16.07	30.0	-13.9	
1732.60	16.63	H	4.3	9.6	21.95	30.0	-8.0	
High Ch								
1752.60	10.61	V	4.3	9.7	15.97	30.0	-14.0	
1752.60	17.38	H	4.3	9.7	22.73	30.0	-7.3	

WCDMA Band 2

Band 2 REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 25546
Configuration: EUT / Z-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	11.59	V	4.5	9.6	16.74	33.0	-16.3	
1852.40	16.06	H	4.5	9.6	21.22	33.0	-11.8	
Mid Ch								
1880.00	11.31	V	4.5	9.4	16.18	33.0	-16.8	
1880.00	16.35	H	4.5	9.4	21.22	33.0	-11.8	
High Ch								
1907.60	10.82	V	4.5	9.1	15.38	33.0	-17.6	
1907.60	14.95	H	4.5	9.1	19.51	33.0	-13.5	

Band 2 HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 25546
Configuration: EUT / Z-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	12.20	V	4.5	9.6	17.35	33.0	-15.7	
1852.40	16.08	H	4.5	9.6	21.24	33.0	-11.8	
Mid Ch								
1880.00	11.71	V	4.5	9.4	16.58	33.0	-16.4	
1880.00	16.43	H	4.5	9.4	21.30	33.0	-11.7	
High Ch								
1907.60	11.59	V	4.5	9.1	16.15	33.0	-16.9	
1907.60	15.82	H	4.5	9.1	20.38	33.0	-12.6	

LTE Band 2 (Main ANT)

LTE Band 2

20MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/2/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	10.59	V	4.5	9.6	15.67	33.0	-17.3	
1860.00	16.71	H	4.5	9.6	21.78	33.0	-11.2	
Mid Ch								
1880.00	12.90	V	4.5	9.4	17.77	33.0	-15.2	
1880.00	16.47	H	4.5	9.4	21.34	33.0	-11.7	
High Ch								
1900.00	11.85	V	4.5	9.2	16.51	33.0	-16.5	
1900.00	15.47	H	4.5	9.2	20.13	33.0	-12.9	

LTE Band 2

20MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/2/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	8.29	V	4.5	9.6	13.37	33.0	-19.6	
1860.00	14.52	H	4.5	9.6	19.59	33.0	-13.4	
Mid Ch								
1880.00	10.42	V	4.5	9.4	15.29	33.0	-17.7	
1880.00	14.24	H	4.5	9.4	19.11	33.0	-13.9	
High Ch								
1900.00	10.86	V	4.5	9.2	15.52	33.0	-17.5	
1900.00	15.17	H	4.5	9.2	19.83	33.0	-13.2	

LTE Band 2

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/1/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	13.37	V	4.5	9.6	18.47	33.0	-14.5	
1857.50	15.93	H	4.5	9.6	21.03	33.0	-12.0	
Mid Ch								
1880.00	11.97	V	4.5	9.4	16.84	33.0	-16.2	
1880.00	16.85	H	4.5	9.4	21.72	33.0	-11.3	
High Ch								
1902.50	13.37	V	4.5	9.2	18.00	33.0	-15.0	
1902.50	17.27	H	4.5	9.2	21.90	33.0	-11.1	

LTE Band 2

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/2/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	7.95	V	4.5	9.6	13.05	33.0	-20.0	
1857.50	14.08	H	4.5	9.6	19.18	33.0	-13.8	
Mid Ch								
1880.00	8.42	V	4.5	9.4	13.29	33.0	-19.7	
1880.00	14.60	H	4.5	9.4	19.47	33.0	-13.5	
High Ch								
1902.50	10.99	V	4.5	9.2	15.62	33.0	-17.4	
1902.50	14.93	H	4.5	9.2	19.56	33.0	-13.4	

LTE Band 2

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/1/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	12.13	V	4.5	9.6	17.25	33.0	-15.7	
1855.00	16.20	H	4.5	9.6	21.32	33.0	-11.7	
Mid Ch								
1880.00	12.07	V	4.5	9.4	16.94	33.0	-16.1	
1880.00	16.76	H	4.5	9.4	21.63	33.0	-11.4	
High Ch								
1905.00	12.11	V	4.5	9.1	16.71	33.0	-16.3	
1905.00	15.79	H	4.5	9.1	20.38	33.0	-12.6	

LTE Band 2

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/1/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	8.05	V	4.5	9.6	13.17	33.0	-19.8	
1855.00	13.39	H	4.5	9.6	18.51	33.0	-14.5	
Mid Ch								
1880.00	10.20	V	4.5	9.4	15.07	33.0	-17.9	
1880.00	14.72	H	4.5	9.4	19.59	33.0	-13.4	
High Ch								
1905.00	11.79	V	4.5	9.1	16.39	33.0	-16.6	
1905.00	14.91	H	4.5	9.1	19.50	33.0	-13.5	

LTE Band 2

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/1/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	13.05	V	4.5	9.6	18.20	33.0	-14.8	
1852.50	15.29	H	4.5	9.6	20.44	33.0	-12.6	
Mid Ch								
1880.00	11.88	V	4.5	9.4	16.75	33.0	-16.2	
1880.00	16.13	H	4.5	9.4	21.00	33.0	-12.0	
High Ch								
1907.50	12.32	V	4.5	9.1	16.88	33.0	-16.1	
1907.50	16.36	H	4.5	9.1	20.92	33.0	-12.1	

LTE Band 2

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/1/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	10.87	V	4.5	9.6	16.02	33.0	-17.0	
1852.50	13.42	H	4.5	9.6	18.57	33.0	-14.4	
Mid Ch								
1880.00	10.90	V	4.5	9.4	15.77	33.0	-17.2	
1880.00	14.78	H	4.5	9.4	19.65	33.0	-13.4	
High Ch								
1907.50	10.87	V	4.5	9.1	15.43	33.0	-17.6	
1907.50	15.10	H	4.5	9.1	19.66	33.0	-13.3	

LTE Band 2

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/1/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	12.69	V	4.5	9.6	17.85	33.0	-15.1	
1851.50	15.63	H	4.5	9.6	20.80	33.0	-12.2	
Mid Ch								
1880.00	12.40	V	4.5	9.4	17.27	33.0	-15.7	
1880.00	16.69	H	4.5	9.4	21.56	33.0	-11.4	
High Ch								
1908.50	11.96	V	4.5	9.1	16.50	33.0	-16.5	
1908.50	16.61	H	4.5	9.1	21.15	33.0	-11.8	

LTE Band 2

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/1/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	10.58	V	4.5	9.6	15.74	33.0	-17.3	
1851.50	13.49	H	4.5	9.6	18.66	33.0	-14.3	
Mid Ch								
1880.00	10.32	V	4.5	9.4	15.19	33.0	-17.8	
1880.00	14.93	H	4.5	9.4	19.80	33.0	-13.2	
High Ch								
1908.50	10.56	V	4.5	9.1	15.10	33.0	-17.9	
1908.50	14.99	H	4.5	9.1	19.53	33.0	-13.5	

LTE Band 2

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 11/30/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	12.46	V	4.5	9.6	17.63	33.0	-15.4	
1850.70	15.43	H	4.5	9.6	20.60	33.0	-12.4	
Mid Ch								
1880.00	12.89	V	4.5	9.4	17.76	33.0	-15.2	
1880.00	16.97	H	4.5	9.4	21.84	33.0	-11.2	
High Ch								
1909.30	13.36	V	4.5	9.1	17.89	33.0	-15.1	
1909.30	17.86	H	4.5	9.1	22.40	33.0	-10.6	

LTE Band 2

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 11/30/2021
Test Engineer: 19227
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00161451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	10.31	V	4.5	9.6	15.48	33.0	-17.5	
1850.70	13.38	H	4.5	9.6	18.55	33.0	-14.4	
Mid Ch								
1880.00	10.57	V	4.5	9.4	15.44	33.0	-17.6	
1880.00	14.75	H	4.5	9.4	19.62	33.0	-13.4	
High Ch								
1909.30	11.25	V	4.5	9.1	15.78	33.0	-17.2	
1909.30	15.09	H	4.5	9.1	19.63	33.0	-13.4	

LTE Band 2 (Sub ANT) – Spot Check

LTE Band 2

20MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/17/2021
Test Engineer: 25546
Configuration: EUT / Z-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	13.51	V	4.5	9.5	18.55	33.0	-14.4	
1860.00	16.50	H	4.5	9.5	21.55	33.0	-11.5	
Mid Ch								
1880.00	10.81	V	4.5	9.4	15.69	33.0	-17.3	
1880.00	13.84	H	4.5	9.4	18.72	33.0	-14.3	
High Ch								
1900.00	13.08	V	4.5	9.2	17.79	33.0	-15.2	
1900.00	15.71	H	4.5	9.2	20.42	33.0	-12.6	

LTE Band 2

20MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/17/2021
Test Engineer: 25546
Configuration: EUT / Z-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	12.43	V	4.5	9.5	17.47	33.0	-15.5	
1860.00	15.26	H	4.5	9.5	20.31	33.0	-12.7	
Mid Ch								
1880.00	9.66	V	4.5	9.4	14.54	33.0	-18.5	
1880.00	13.52	H	4.5	9.4	18.40	33.0	-14.6	
High Ch								
1900.00	12.53	V	4.5	9.2	17.24	33.0	-15.8	
1900.00	15.07	H	4.5	9.2	19.78	33.0	-13.2	

LTE Band 12

LTE Band 12

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 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								
704.00	23.17	V	2.8	-1.4	19.02	34.8	-15.7	
704.00	11.18	H	2.8	-1.4	7.04	34.8	-27.7	
Mid Ch								
707.50	23.35	V	2.8	-1.4	19.19	34.8	-15.6	
707.50	11.25	H	2.8	-1.4	7.08	34.8	-27.7	
High Ch								
711.00	23.36	V	2.8	-1.4	19.19	34.8	-15.6	
711.00	11.07	H	2.8	-1.4	6.90	34.8	-27.9	

LTE Band 12

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 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								
704.00	21.10	V	2.8	-1.4	16.95	34.8	-17.8	
704.00	8.96	H	2.8	-1.4	4.82	34.8	-30.0	
Mid Ch								
707.50	20.77	V	2.8	-1.4	16.61	34.8	-18.2	
707.50	8.96	H	2.8	-1.4	4.79	34.8	-30.0	
High Ch								
711.00	21.08	V	2.8	-1.4	16.91	34.8	-17.9	
711.00	8.77	H	2.8	-1.4	4.60	34.8	-30.2	

LTE Band 12

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 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								
701.50	23.42	V	2.8	-1.4	19.29	34.8	-15.5	
701.50	11.09	H	2.8	-1.4	6.96	34.8	-27.8	
Mid Ch								
707.50	23.12	V	2.8	-1.4	18.96	34.8	-15.8	
707.50	10.67	H	2.8	-1.4	6.50	34.8	-28.3	
High Ch								
713.50	22.56	V	2.8	-1.4	18.37	34.8	-16.4	
713.50	10.26	H	2.8	-1.4	6.08	34.8	-28.7	

LTE Band 12

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 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								
701.50	21.22	V	2.8	-1.4	17.09	34.8	-17.7	
701.50	8.44	H	2.8	-1.4	4.31	34.8	-30.5	
Mid Ch								
707.50	21.04	V	2.8	-1.4	16.88	34.8	-17.9	
707.50	8.82	H	2.8	-1.4	4.65	34.8	-30.1	
High Ch								
713.50	20.88	V	2.8	-1.4	16.69	34.8	-18.1	
713.50	8.67	H	2.8	-1.4	4.49	34.8	-30.3	

LTE Band 12

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 Fundamentals, 3MHz 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								
700.50	23.26	V	2.8	-1.4	19.12	34.8	-15.6	
700.50	10.75	H	2.8	-1.4	6.61	34.8	-28.2	
Mid Ch								
707.50	22.96	V	2.8	-1.4	18.80	34.8	-16.0	
707.50	10.77	H	2.8	-1.4	6.60	34.8	-28.2	
High Ch								
714.50	23.07	V	2.8	-1.4	18.88	34.8	-15.9	
714.50	10.45	H	2.8	-1.4	6.26	34.8	-28.5	

LTE Band 12

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 Fundamentals, 3MHz 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								
700.50	20.64	V	2.8	-1.4	16.50	34.8	-18.3	
700.50	8.03	H	2.8	-1.4	3.89	34.8	-30.9	
Mid Ch								
707.50	21.17	V	2.8	-1.4	17.01	34.8	-17.8	
707.50	8.90	H	2.8	-1.4	4.73	34.8	-30.0	
High Ch								
714.50	20.35	V	2.8	-1.4	16.16	34.8	-18.6	
714.50	8.29	H	2.8	-1.4	4.10	34.8	-30.7	

LTE Band 12

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/12/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 Fundamentals, 1.4MHz 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								
699.70	23.19	V	2.8	-1.4	19.06	34.8	-15.7	
699.70	11.29	H	2.8	-1.4	7.16	34.8	-27.6	
Mid Ch								
707.50	23.44	V	2.8	-1.4	19.28	34.8	-15.5	
707.50	12.15	H	2.8	-1.4	7.98	34.8	-26.8	
High Ch								
715.30	22.68	V	2.8	-1.4	18.49	34.8	-16.3	
715.30	11.06	H	2.8	-1.4	6.87	34.8	-27.9	

LTE Band 12

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/12/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 Fundamentals, 1.4MHz 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								
699.70	20.74	V	2.8	-1.4	16.61	34.8	-18.2	
699.70	9.22	H	2.8	-1.4	5.09	34.8	-29.7	
Mid Ch								
707.50	20.76	V	2.8	-1.4	16.60	34.8	-18.2	
707.50	9.38	H	2.8	-1.4	5.21	34.8	-29.6	
High Ch								
715.30	20.66	V	2.8	-1.4	16.47	34.8	-18.3	
715.30	9.12	H	2.8	-1.4	4.93	34.8	-29.8	

LTE Band 13

LTE Band 13

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 13 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
Mid Ch								
782.00	25.18	V	2.9	-1.5	20.73	34.8	-14.0	
782.00	12.28	H	2.9	-1.5	7.83	34.8	-26.9	

LTE Band 13

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 13 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
Mid Ch								
782.00	22.57	V	2.9	-1.5	18.12	34.8	-16.6	
782.00	9.92	H	2.9	-1.5	5.47	34.8	-29.3	

LTE Band 13

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 13 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								
779.50	25.06	V	2.9	-1.5	20.62	34.8	-14.2	
779.50	12.18	H	2.9	-1.5	7.75	34.8	-27.0	
Mid Ch								
782.00	24.86	V	2.9	-1.5	20.41	34.8	-14.4	
782.00	11.95	H	2.9	-1.5	7.50	34.8	-27.3	
High Ch								
784.50	24.92	V	2.9	-1.5	20.46	34.8	-14.3	
784.50	11.76	H	2.9	-1.5	7.30	34.8	-27.5	

LTE Band 13

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 13 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								
779.50	22.89	V	2.9	-1.5	18.45	34.8	-16.3	
779.50	9.90	H	2.9	-1.5	5.47	34.8	-29.3	
Mid Ch								
782.00	22.81	V	2.9	-1.5	18.36	34.8	-16.4	
782.00	10.11	H	2.9	-1.5	5.66	34.8	-29.1	
High Ch								
784.50	22.58	V	2.9	-1.5	18.12	34.8	-16.6	
784.50	9.59	H	2.9	-1.5	5.13	34.8	-29.6	

LTE Band 26 (Part 90)

LTE Band 26

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 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								
821.50	26.63	V	3.0	-1.4	22.26	50.0	-27.7	Part 90
821.50	13.87	H	3.0	-1.4	9.50	50.0	-40.5	Part 90

LTE Band 26

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 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								
821.50	24.57	V	3.0	-1.4	20.20	50.0	-29.8	Part 90
821.50	11.92	H	3.0	-1.4	7.55	50.0	-42.4	Part 90

LTE Band 26

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 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								
819.00	26.05	V	3.0	-1.4	21.67	50.0	-28.3	Part 90
819.00	14.26	H	3.0	-1.4	9.88	50.0	-40.1	Part 90

LTE Band 26

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 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								
819.00	24.68	V	3.0	-1.4	20.30	50.0	-29.7	Part 90
819.00	12.29	H	3.0	-1.4	7.91	50.0	-42.1	Part 90

LTE Band 26

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 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								
816.50	26.10	V	3.0	-1.4	21.70	50.0	-28.3	Part 90
816.50	13.91	H	3.0	-1.4	9.51	50.0	-40.5	Part 90
Mid Ch								
821.50	26.29	V	3.0	-1.4	21.92	50.0	-28.1	Part 90
821.50	14.21	H	3.0	-1.4	9.84	50.0	-40.2	Part 90

LTE Band 26

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 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								
816.50	24.08	V	3.0	-1.4	19.68	50.0	-30.3	Part 90
816.50	12.40	H	3.0	-1.4	8.00	50.0	-42.0	Part 90
Mid Ch								
821.50	24.35	V	3.0	-1.4	19.98	50.0	-30.0	Part 90
821.50	12.22	H	3.0	-1.4	7.85	50.0	-42.1	Part 90

LTE Band 26

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 Fundamentals, 3MHz 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								
815.50	25.95	V	3.0	-1.4	21.54	50.0	-28.5	Part 90
815.50	14.14	H	3.0	-1.4	9.74	50.0	-40.3	Part 90
Mid Ch								
822.50	26.42	V	3.0	-1.3	22.07	50.0	-27.9	Part 90
822.50	14.18	H	3.0	-1.3	9.82	50.0	-40.2	Part 90

LTE Band 26

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 Fundamentals, 3MHz 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								
815.50	23.89	V	3.0	-1.4	19.48	50.0	-30.5	Part 90
815.50	12.32	H	3.0	-1.4	7.92	50.0	-42.1	Part 90
Mid Ch								
822.50	24.58	V	3.0	-1.3	20.23	50.0	-29.8	Part 90
822.50	12.42	H	3.0	-1.3	8.06	50.0	-41.9	Part 90

LTE Band 26

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/14/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 Fundamentals, 1.4MHz 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								
814.70	24.67	V	3.0	-1.4	20.26	50.0	-29.7	
814.70	12.94	H	3.0	-1.4	8.53	50.0	-41.5	
Mid Ch								
823.30	25.17	V	3.0	-1.3	20.82	50.0	-29.2	
823.30	12.44	H	3.0	-1.3	8.09	50.0	-41.9	

LTE Band 26

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/14/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 Fundamentals, 1.4MHz 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								
814.70	22.44	V	3.0	-1.4	18.03	50.0	-32.0	
814.70	10.82	H	3.0	-1.4	6.41	50.0	-43.6	
Mid Ch								
823.30	22.95	V	3.0	-1.3	18.60	50.0	-31.4	
823.30	10.02	H	3.0	-1.3	5.67	50.0	-44.3	

LTE Band 26 (Part 22)

LTE Band 26

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 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
Straddle Ch								
824.00	24.84	V	3.0	-1.3	20.50	38.5	-18.0	
824.00	12.22	H	3.0	-1.3	7.88	38.5	-30.6	
Mid Ch								
831.50	25.10	V	3.0	-1.3	20.81	38.5	-17.7	
831.50	12.30	H	3.0	-1.3	8.01	38.5	-30.5	
High Ch								
841.50	23.75	V	3.0	-1.2	19.54	38.5	-19.0	
841.50	12.68	H	3.0	-1.2	8.47	38.5	-30.0	

LTE Band 26

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 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
Straddle Ch								
824.00	22.99	V	3.0	-1.3	18.65	38.5	-19.8	
824.00	10.42	H	3.0	-1.3	6.08	38.5	-32.4	
Mid Ch								
831.50	23.16	V	3.0	-1.3	18.87	38.5	-19.6	
831.50	10.40	H	3.0	-1.3	6.11	38.5	-32.4	
High Ch								
841.50	21.42	V	3.0	-1.2	17.21	38.5	-21.3	
841.50	10.48	H	3.0	-1.2	6.27	38.5	-32.2	

LTE Band 26

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 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
Straddle Cha								
824.00	24.77	V	3.0	-1.3	20.43	38.5	-18.1	
824.00	13.03	H	3.0	-1.3	8.69	38.5	-29.8	
Low Ch								
829.00	24.93	V	3.0	-1.3	20.62	38.5	-17.9	
829.00	12.21	H	3.0	-1.3	7.90	38.5	-30.6	
Mid Ch								
831.50	24.84	V	3.0	-1.3	20.55	38.5	-18.0	
831.50	12.31	H	3.0	-1.3	8.02	38.5	-30.5	
High Ch								
844.00	23.51	V	3.0	-1.2	19.31	38.5	-19.2	
844.00	13.61	H	3.0	-1.2	9.41	38.5	-29.1	

LTE Band 26

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 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
Straddle Ch								
824.00	22.61	V	3.0	-1.3	18.27	38.5	-20.2	
824.00	9.75	H	3.0	-1.3	5.41	38.5	-33.1	
Low Ch								
829.00	23.02	V	3.0	-1.3	18.71	38.5	-19.8	
829.00	10.01	H	3.0	-1.3	5.70	38.5	-32.8	
Mid Ch								
831.50	23.03	V	3.0	-1.3	18.74	38.5	-19.8	
831.50	10.50	H	3.0	-1.3	6.21	38.5	-32.3	
High Ch								
844.00	21.58	V	3.0	-1.2	17.38	38.5	-21.1	
844.00	10.90	H	3.0	-1.2	6.70	38.5	-31.8	

LTE Band 26

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 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
Straddle Ch								
824.00	24.77	V	3.0	-1.3	20.43	38.5	-18.1	
824.00	12.30	H	3.0	-1.3	7.96	38.5	-30.5	
Low Ch								
826.50	24.78	V	3.0	-1.3	20.46	38.5	-18.0	
826.50	12.32	H	3.0	-1.3	7.99	38.5	-30.5	
Mid Ch								
831.50	24.89	V	3.0	-1.3	20.60	38.5	-17.9	
831.50	12.48	H	3.0	-1.3	8.19	38.5	-30.3	
High Ch								
846.50	23.61	V	3.0	-1.1	19.43	38.5	-19.1	
846.50	13.23	H	3.0	-1.1	9.05	38.5	-29.4	

LTE Band 26

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 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								
824.00	22.64	V	3.0	-1.3	18.30	38.5	-20.2	
824.00	9.90	H	3.0	-1.3	5.56	38.5	-32.9	
Low Ch								
826.50	22.83	V	3.0	-1.3	18.51	38.5	-20.0	
826.50	9.85	H	3.0	-1.3	5.52	38.5	-33.0	
Mid Ch								
831.50	22.49	V	3.0	-1.3	18.20	38.5	-20.3	
831.50	10.44	H	3.0	-1.3	6.15	38.5	-32.3	
High Ch								
846.50	21.59	V	3.0	-1.1	17.41	38.5	-21.1	
846.50	11.02	H	3.0	-1.1	6.84	38.5	-31.7	

LTE Band 26

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 Fundamentals, 3MHz 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
Straddle Ch								
824.00	24.63	V	3.0	-1.3	20.29	38.5	-18.2	
824.00	12.56	H	3.0	-1.3	8.22	38.5	-30.3	
Low Ch								
825.50	24.86	V	3.0	-1.3	20.53	38.5	-18.0	
825.50	12.60	H	3.0	-1.3	8.27	38.5	-30.2	
Mid Ch								
831.50	25.04	V	3.0	-1.3	20.75	38.5	-17.8	
831.50	13.04	H	3.0	-1.3	8.75	38.5	-29.7	
High Ch								
847.50	23.34	V	3.0	-1.1	19.17	38.5	-19.3	
847.50	13.60	H	3.0	-1.1	9.43	38.5	-29.1	

LTE Band 26

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 Fundamentals, 3MHz 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
Straddle Ch								
824.00	22.51	V	3.0	-1.3	18.17	38.5	-20.3	
824.00	10.52	H	3.0	-1.3	6.18	38.5	-32.3	
Low Ch								
825.50	22.87	V	3.0	-1.3	18.54	38.5	-20.0	
825.50	11.15	H	3.0	-1.3	6.82	38.5	-31.7	
Mid Ch								
831.50	22.92	V	3.0	-1.3	18.63	38.5	-19.9	
831.50	10.76	H	3.0	-1.3	6.47	38.5	-32.0	
High Ch								
847.50	21.54	V	3.0	-1.1	17.37	38.5	-21.1	
847.50	11.62	H	3.0	-1.1	7.45	38.5	-31.0	

LTE Band 26

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 Fundamentals, 1.4MHz 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
Straddle Ch								
824.00	24.59	V	3.0	-1.3	20.25	38.5	-18.2	
824.00	12.61	H	3.0	-1.3	8.27	38.5	-30.2	
Low Ch								
824.70	24.83	V	3.0	-1.3	20.49	38.5	-18.0	
824.70	12.55	H	3.0	-1.3	8.22	38.5	-30.3	
Mid Ch								
831.50	25.07	V	3.0	-1.3	20.78	38.5	-17.7	
831.50	12.89	H	3.0	-1.3	8.60	38.5	-29.9	
High Ch								
848.30	23.70	V	3.1	-1.1	19.53	38.5	-19.0	
848.30	13.90	H	3.1	-1.1	9.73	38.5	-28.8	

LTE Band 26

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/13/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 Fundamentals, 1.4MHz 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
Straddle Ch								
824.00	22.67	V	3.0	-1.3	18.33	38.5	-20.2	
824.00	10.65	H	3.0	-1.3	6.31	38.5	-32.2	
Low Ch								
824.70	22.61	V	3.0	-1.3	18.27	38.5	-20.2	
824.70	10.31	H	3.0	-1.3	5.98	38.5	-32.5	
Mid Ch								
831.50	22.63	V	3.0	-1.3	18.34	38.5	-20.2	
831.50	10.75	H	3.0	-1.3	6.46	38.5	-32.0	
High Ch								
848.30	23.78	V	3.1	-1.1	19.61	38.5	-18.9	
848.30	10.51	H	3.1	-1.1	6.34	38.5	-32.2	

LTE Band 41

LTE Band 41

20MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/14/2021
Test Engineer: 25546
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	15.67	V	5.2	10.2	20.62	33.0	-12.4	
2506.00	16.52	H	5.2	10.2	21.48	33.0	-11.5	
Mid Ch								
2593.00	16.43	V	5.3	10.1	21.21	33.0	-11.8	
2593.00	16.04	H	5.3	10.1	20.82	33.0	-12.2	
High Ch								
2680.00	15.42	V	5.4	10.2	20.18	33.0	-12.8	
2680.00	17.53	H	5.4	10.2	22.29	33.0	-10.7	

LTE Band 41

20MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/14/2021
Test Engineer: 25546
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	14.41	V	5.2	10.2	19.36	33.0	-13.6	
2506.00	14.32	H	5.2	10.2	19.28	33.0	-13.7	
Mid Ch								
2593.00	15.37	V	5.3	10.1	20.15	33.0	-12.8	
2593.00	14.94	H	5.3	10.1	19.72	33.0	-13.3	
High Ch								
2680.00	13.93	V	5.4	10.2	18.69	33.0	-14.3	
2680.00	15.84	H	5.4	10.2	20.60	33.0	-12.4	

LTE Band 41

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/20/2021
Test Engineer: 19227
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	14.83	V	5.2	10.2	19.79	33.0	-13.2	
2503.50	15.57	H	5.2	10.2	20.53	33.0	-12.5	
Mid Ch								
2593.00	15.65	V	5.3	10.1	20.43	33.0	-12.6	
2593.00	17.50	H	5.3	10.1	22.28	33.0	-10.7	
High Ch								
2682.50	16.77	V	5.4	10.2	21.53	33.0	-11.5	
2682.50	18.34	H	5.4	10.2	23.10	33.0	-9.9	

LTE Band 41

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/14/2021
Test Engineer: 25546
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	14.38	V	5.2	10.2	19.34	33.0	-13.7	
2503.50	13.97	H	5.2	10.2	18.93	33.0	-14.1	
Mid Ch								
2593.00	14.54	V	5.3	10.1	19.32	33.0	-13.7	
2593.00	15.39	H	5.3	10.1	20.17	33.0	-12.8	
High Ch								
2682.50	14.60	V	5.4	10.2	19.36	33.0	-13.6	
2682.50	16.53	H	5.4	10.2	21.29	33.0	-11.7	

LTE Band 41

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/8/2021
Test Engineer: 25546
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	15.59	V	5.2	10.2	20.56	33.0	-12.4	
2501.00	16.74	H	5.2	10.2	21.71	33.0	-11.3	
Mid Ch								
2593.00	16.36	V	5.3	10.1	21.14	33.0	-11.9	
2593.00	17.84	H	5.3	10.1	22.62	33.0	-10.4	
High Ch								
2685.00	16.60	V	5.4	10.2	21.36	33.0	-11.6	
2685.00	18.03	H	5.4	10.2	22.79	33.0	-10.2	

LTE Band 41

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19227
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	13.83	V	5.2	10.2	18.80	33.0	-14.2	
2501.00	15.03	H	5.2	10.2	20.00	33.0	-13.0	
Mid Ch								
2593.00	15.27	V	5.3	10.1	20.05	33.0	-12.9	
2593.00	16.17	H	5.3	10.1	20.95	33.0	-12.0	
High Ch								
2685.00	15.44	V	5.4	10.2	20.20	33.0	-12.8	
2685.00	16.61	H	5.4	10.2	21.37	33.0	-11.6	

LTE Band 41

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/8/2021
Test Engineer: 25546
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	15.97	V	5.2	10.2	20.94	33.0	-12.1	
2498.50	17.11	H	5.2	10.2	22.08	33.0	-10.9	
Mid Ch								
2593.00	15.70	V	5.3	10.1	20.48	33.0	-12.5	
2593.00	17.71	H	5.3	10.1	22.49	33.0	-10.5	
High Ch								
2687.50	16.30	V	5.4	10.2	21.07	33.0	-11.9	
2687.50	17.90	H	5.4	10.2	22.66	33.0	-10.3	

LTE Band 41

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/8/2021
Test Engineer: 25546
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	14.73	V	5.2	10.2	19.70	33.0	-13.3	
2498.50	14.93	H	5.2	10.2	19.90	33.0	-13.1	
Mid Ch								
2593.00	13.95	V	5.3	10.1	18.73	33.0	-14.3	
2593.00	15.95	H	5.3	10.1	20.73	33.0	-12.3	
High Ch								
2687.50	14.36	V	5.4	10.2	19.13	33.0	-13.9	
2687.50	16.15	H	5.4	10.2	20.91	33.0	-12.1	

LTE Band 66 (Main ANT)

LTE Band 66

20MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/8/2021
Test Engineer: 25546
Configuration: EUT / Y-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	15.25	V	4.3	9.6	20.55	30.0	-9.5	
1720.00	10.67	H	4.3	9.6	15.97	30.0	-14.0	
Mid Ch								
1745.00	16.88	V	4.3	9.7	22.23	30.0	-7.8	
1745.00	11.09	H	4.3	9.7	16.44	30.0	-13.6	
High Ch								
1770.00	16.25	V	4.4	9.7	21.59	30.0	-8.4	
1770.00	10.65	H	4.4	9.7	15.99	30.0	-14.0	

LTE Band 66

20MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/8/2021
Test Engineer: 25546
Configuration: EUT / Y-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	14.70	V	4.3	9.6	20.00	30.0	-10.0	
1720.00	9.62	H	4.3	9.6	14.92	30.0	-15.1	
Mid Ch								
1745.00	14.51	V	4.3	9.7	19.86	30.0	-10.1	
1745.00	9.24	H	4.3	9.7	14.59	30.0	-15.4	
High Ch								
1770.00	14.71	V	4.4	9.7	20.05	30.0	-10.0	
1770.00	8.71	H	4.4	9.7	14.05	30.0	-16.0	

LTE Band 66

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/7/2021
Test Engineer: 25546
Configuration: EUT / Y-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	17.00	V	4.3	9.6	22.30	30.0	-7.7	
1717.50	11.35	H	4.3	9.6	16.64	30.0	-13.4	
Mid Ch								
1745.00	17.02	V	4.3	9.7	22.37	30.0	-7.6	
1745.00	10.42	H	4.3	9.7	15.77	30.0	-14.2	
High Ch								
1772.50	16.84	V	4.4	9.7	22.18	30.0	-7.8	
1772.50	10.11	H	4.4	9.7	15.45	30.0	-14.6	

LTE Band 66

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/7/2021
Test Engineer: 25546
Configuration: EUT / Y-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	14.60	V	4.3	9.6	19.90	30.0	-10.1	
1717.50	8.75	H	4.3	9.6	14.04	30.0	-16.0	
Mid Ch								
1745.00	15.07	V	4.3	9.7	20.42	30.0	-9.6	
1745.00	8.60	H	4.3	9.7	13.95	30.0	-16.1	
High Ch								
1772.50	14.69	V	4.4	9.7	20.03	30.0	-10.0	
1772.50	8.29	H	4.4	9.7	13.63	30.0	-16.4	

LTE Band 66

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/7/2021
Test Engineer: 25546
Configuration: EUT / Y-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	17.23	V	4.3	9.6	22.52	30.0	-7.5	
1715.00	11.25	H	4.3	9.6	16.54	30.0	-13.5	
Mid Ch								
1745.00	17.04	V	4.3	9.7	22.39	30.0	-7.6	
1745.00	10.62	H	4.3	9.7	15.97	30.0	-14.0	
High Ch								
1775.00	16.82	V	4.4	9.7	22.15	30.0	-7.8	
1775.00	9.30	H	4.4	9.7	14.64	30.0	-15.4	

LTE Band 66

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/7/2021
Test Engineer: 25546
Configuration: EUT / Y-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	14.80	V	4.3	9.6	20.09	30.0	-9.9	
1715.00	8.30	H	4.3	9.6	13.59	30.0	-16.4	
Mid Ch								
1745.00	14.69	V	4.3	9.7	20.04	30.0	-10.0	
1745.00	8.34	H	4.3	9.7	13.69	30.0	-16.3	
High Ch								
1775.00	15.08	V	4.4	9.7	20.41	30.0	-9.6	
1775.00	8.30	H	4.4	9.7	13.64	30.0	-16.4	

LTE Band 66

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/6/2021
Test Engineer: 25546
Configuration: EUT / Y-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	16.92	V	4.3	9.6	22.21	30.0	-7.8	
1712.50	9.17	H	4.3	9.6	14.46	30.0	-15.5	
Mid Ch								
1745.00	16.62	V	4.3	9.7	21.97	30.0	-8.0	
1745.00	10.57	H	4.3	9.7	15.92	30.0	-14.1	
High Ch								
1777.50	17.22	V	4.4	9.7	22.56	30.0	-7.4	
1777.50	8.82	H	4.4	9.7	14.16	30.0	-15.8	

LTE Band 66

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/6/2021
Test Engineer: 25546
Configuration: EUT / Y-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	15.17	V	4.3	9.6	20.46	30.0	-9.5	
1712.50	9.18	H	4.3	9.6	14.47	30.0	-15.5	
Mid Ch								
1745.00	15.38	V	4.3	9.7	20.73	30.0	-9.3	
1745.00	7.81	H	4.3	9.7	13.16	30.0	-16.8	
High Ch								
1777.50	14.70	V	4.4	9.7	20.04	30.0	-10.0	
1777.50	7.46	H	4.4	9.7	12.80	30.0	-17.2	

LTE Band 66

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/6/2021
Test Engineer: 25546
Configuration: EUT / Y-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	16.31	V	4.3	9.6	21.60	30.0	-8.4	
1711.50	9.17	H	4.3	9.6	14.45	30.0	-15.5	
Mid Ch								
1745.00	16.71	V	4.3	9.7	22.06	30.0	-7.9	
1745.00	10.70	H	4.3	9.7	16.05	30.0	-14.0	
High Ch								
1778.50	16.53	V	4.4	9.7	21.87	30.0	-8.1	
1778.50	9.00	H	4.4	9.7	14.33	30.0	-15.7	

LTE Band 66

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/17/2021
Test Engineer: 25546
Configuration: EUT / Y-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	14.23	V	4.3	9.6	19.52	30.0	-10.5	
1711.50	7.22	H	4.3	9.6	12.50	30.0	-17.5	
Mid Ch								
1745.00	14.33	V	4.3	9.7	19.68	30.0	-10.3	
1745.00	8.46	H	4.3	9.7	13.81	30.0	-16.2	
High Ch								
1778.50	14.28	V	4.4	9.7	19.62	30.0	-10.4	
1778.50	6.76	H	4.4	9.7	12.09	30.0	-17.9	

LTE Band 66

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/3/2021
Test Engineer: 25546
Configuration: EUT / Y-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	15.34	V	4.3	9.6	20.62	30.0	-9.4	
1710.70	9.18	H	4.3	9.6	14.46	30.0	-15.5	
Mid Ch								
1745.00	17.14	V	4.3	9.7	22.49	30.0	-7.5	
1745.00	11.05	H	4.3	9.7	16.40	30.0	-13.6	
High Ch								
1779.30	15.47	V	4.4	9.7	20.81	30.0	-9.2	
1779.30	9.54	H	4.4	9.7	14.88	30.0	-15.1	

LTE Band 66

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/3/2021
Test Engineer: 25546
Configuration: EUT / Y-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	14.84	V	4.3	9.6	20.13	30.0	-9.9	
1710.70	8.43	H	4.3	9.6	13.74	30.0	-16.3	
Mid Ch								
1745.00	15.73	V	4.3	9.7	21.08	30.0	-8.9	
1745.00	7.01	H	4.3	9.7	12.36	30.0	-17.6	
High Ch								
1779.30	14.66	V	4.4	9.7	20.00	30.0	-10.0	
1779.30	7.71	H	4.4	9.7	13.05	30.0	-17.0	

LTE Band 66 (Sub ANT) – Spot Check

LTE Band 66 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/22/2021
Test Engineer: 19568
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 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	10.80	V	4.3	9.6	16.09	30.0	-13.9	
1720.00	15.35	H	4.3	9.6	20.64	30.0	-9.4	
Mid Ch								
1745.00	13.88	V	4.3	9.7	19.23	30.0	-10.8	
1745.00	16.74	H	4.3	9.7	22.09	30.0	-7.9	
High Ch								
1770.00	12.14	V	4.4	9.7	17.47	30.0	-12.5	
1770.00	15.09	H	4.4	9.7	20.43	30.0	-9.6	

LTE Band 66 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/22/2021
Test Engineer: 19568
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 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	9.81	V	4.3	9.6	15.10	30.0	-14.9	
1720.00	14.46	H	4.3	9.6	19.75	30.0	-10.2	
Mid Ch								
1745.00	13.03	V	4.3	9.7	18.38	30.0	-11.6	
1745.00	16.12	H	4.3	9.7	21.47	30.0	-8.5	
High Ch								
1770.00	11.25	V	4.4	9.7	16.58	30.0	-13.4	
1770.00	13.95	H	4.4	9.7	19.29	30.0	-10.7	

NR Band 5

NR Band 5 20MHz DFT-s QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19568
Configuration: EUT, Z- 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	22.67	V	3.0	-1.2	18.40	38.5	-20.1	
834.00	10.00	H	3.0	-1.2	5.73	38.5	-32.8	
Mid Ch								
836.50	25.50	V	3.0	-1.2	21.25	38.5	-17.2	
836.50	9.92	H	3.0	-1.2	5.67	38.5	-32.8	
High Ch								
839.00	24.43	V	3.0	-1.2	20.20	38.5	-18.3	
839.00	10.39	H	3.0	-1.2	6.16	38.5	-32.3	

NR Band 5 20MHz DFT-s 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19568
Configuration: EUT, Z-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	22.67	V	3.0	-1.2	18.40	38.5	-20.1	
834.00	9.70	H	3.0	-1.2	5.43	38.5	-33.1	
Mid Ch								
836.50	23.30	V	3.0	-1.2	19.05	38.5	-19.4	
836.50	10.02	H	3.0	-1.2	5.77	38.5	-32.7	
High Ch								
839.00	23.03	V	3.0	-1.2	18.80	38.5	-19.7	
839.00	10.19	H	3.0	-1.2	5.96	38.5	-32.5	

NR Band 5

15MHz

DFT-s

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19568
Configuration: EUT, Z- 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	23.76	V	3.0	-1.3	19.47	38.5	-19.0	
831.50	9.58	H	3.0	-1.3	5.29	38.5	-33.2	
Mid Ch								
836.50	22.70	V	3.0	-1.2	18.45	38.5	-20.0	
836.50	10.22	H	3.0	-1.2	5.97	38.5	-32.5	
High Ch								
841.50	21.97	V	3.0	-1.2	17.76	38.5	-20.7	
841.50	10.69	H	3.0	-1.2	6.48	38.5	-32.0	

NR Band 5

15MHz

DFT-s

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19568
Configuration: EUT, Z-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	23.46	V	3.0	-1.3	19.17	38.5	-19.3	
831.50	9.48	H	3.0	-1.3	5.19	38.5	-33.3	
Mid Ch								
836.50	22.50	V	3.0	-1.2	18.25	38.5	-20.2	
836.50	9.92	H	3.0	-1.2	5.67	38.5	-32.8	
High Ch								
841.50	21.57	V	3.0	-1.2	17.36	38.5	-21.1	
841.50	10.49	H	3.0	-1.2	6.28	38.5	-32.2	

NR Band 5 10MHz DFT-s QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19568
Configuration: EUT, Z- 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	21.43	V	3.0	-1.3	17.12	38.5	-21.4	
829.00	9.64	H	3.0	-1.3	5.33	38.5	-33.2	
Mid Ch								
836.50	21.38	V	3.0	-1.2	17.13	38.5	-21.4	
836.50	10.07	H	3.0	-1.2	5.82	38.5	-32.7	
High Ch								
844.00	20.72	V	3.0	-1.2	16.52	38.5	-22.0	
844.00	11.15	H	3.0	-1.2	6.95	38.5	-31.6	

NR Band 5 10MHz DFT-s 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19568
Configuration: EUT, Z-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	20.34	V	3.0	-1.3	16.03	38.5	-22.5	
829.00	8.49	H	3.0	-1.3	4.18	38.5	-34.3	
Mid Ch								
836.50	19.30	V	3.0	-1.2	15.05	38.5	-23.4	
836.50	8.90	H	3.0	-1.2	4.65	38.5	-33.9	
High Ch								
844.00	19.38	V	3.0	-1.2	15.18	38.5	-23.3	
844.00	9.88	H	3.0	-1.2	5.68	38.5	-32.8	

NR Band 5 5MHz DFT-s QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19568
Configuration: EUT, Z- 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	23.17	V	3.0	-1.3	18.85	38.5	-19.7	
826.50	9.23	H	3.0	-1.3	4.90	38.5	-33.6	
Mid Ch								
836.50	22.50	V	3.0	-1.2	18.25	38.5	-20.2	
836.50	9.52	H	3.0	-1.2	5.27	38.5	-33.2	
High Ch								
846.50	22.30	V	3.0	-1.1	18.12	38.5	-20.4	
846.50	10.69	H	3.0	-1.1	6.51	38.5	-32.0	

NR Band 5 5MHz DFT-s 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19568
Configuration: EUT, Z-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	22.17	V	3.0	-1.3	17.85	38.5	-20.7	
826.50	9.13	H	3.0	-1.3	4.80	38.5	-33.7	
Mid Ch								
836.50	22.20	V	3.0	-1.2	17.95	38.5	-20.5	
836.50	9.32	H	3.0	-1.2	5.07	38.5	-33.4	
High Ch								
846.50	21.90	V	3.0	-1.1	17.72	38.5	-20.8	
846.50	10.59	H	3.0	-1.1	6.41	38.5	-32.1	

NR Band 66 (Main ANT)

NR Band 66 20MHz DFT-s QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/27/2021
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	8.76	V	4.3	9.6	14.05	30.0	-15.9	
1720.00	16.80	H	4.3	9.6	22.09	30.0	-7.9	
Mid Ch								
1745.00	11.27	V	4.3	9.7	16.62	30.0	-13.4	
1745.00	16.96	H	4.3	9.7	22.31	30.0	-7.7	
High Ch								
1770.00	9.34	V	4.4	9.7	14.67	30.0	-15.3	
1770.00	16.52	H	4.4	9.7	21.86	30.0	-8.1	

NR Band 66 20MHz DFT-s 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/27/2021
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	8.28	V	4.3	9.6	13.57	30.0	-16.4	
1720.00	14.63	H	4.3	9.6	19.92	30.0	-10.1	
Mid Ch								
1745.00	10.56	V	4.3	9.7	15.91	30.0	-14.1	
1745.00	15.30	H	4.3	9.7	20.65	30.0	-9.4	
High Ch								
1770.00	8.58	V	4.4	9.7	13.91	30.0	-16.1	
1770.00	16.32	H	4.4	9.7	21.66	30.0	-8.3	

NR Band 66

15MHz

DFT-s

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/28/2021
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	11.37	V	4.3	9.6	16.66	30.0	-13.3	
1717.50	18.43	H	4.3	9.6	23.72	30.0	-6.3	
Mid Ch								
1745.00	13.15	V	4.3	9.7	18.50	30.0	-11.5	
1745.00	17.87	H	4.3	9.7	23.22	30.0	-6.8	
High Ch								
1772.50	12.66	V	4.4	9.7	17.99	30.0	-12.0	
1772.50	17.49	H	4.4	9.7	22.82	30.0	-7.2	

NR Band 66

15MHz

DFT-s

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/28/2021
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	10.30	V	4.3	9.6	15.59	30.0	-14.4	
1717.50	18.21	H	4.3	9.6	23.50	30.0	-6.5	
Mid Ch								
1745.00	13.03	V	4.3	9.7	18.38	30.0	-11.6	
1745.00	17.80	H	4.3	9.7	23.15	30.0	-6.9	
High Ch								
1772.50	12.57	V	4.4	9.7	17.90	30.0	-12.1	
1772.50	17.42	H	4.4	9.7	22.75	30.0	-7.2	

NR Band 66

10MHz

DFT-s

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/28/2021
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	10.14	V	4.3	9.6	15.42	30.0	-14.6	
1715.00	17.66	H	4.3	9.6	22.94	30.0	-7.1	
Mid Ch								
1745.00	13.17	V	4.3	9.7	18.52	30.0	-11.5	
1745.00	17.81	H	4.3	9.7	23.16	30.0	-6.8	
High Ch								
1775.00	12.21	V	4.4	9.7	17.54	30.0	-12.5	
1775.00	17.52	H	4.4	9.7	22.85	30.0	-7.2	

NR Band 66

10MHz

DFT-s

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/28/2021
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	10.08	V	4.3	9.6	15.36	30.0	-14.6	
1715.00	17.49	H	4.3	9.6	22.77	30.0	-7.2	
Mid Ch								
1745.00	12.09	V	4.3	9.7	17.44	30.0	-12.6	
1745.00	17.63	H	4.3	9.7	22.98	30.0	-7.0	
High Ch								
1775.00	12.08	V	4.4	9.7	17.41	30.0	-12.6	
1775.00	16.59	H	4.4	9.7	21.92	30.0	-8.1	

NR Band 66

5MHz

DFT-s

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/28/2021
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	8.94	V	4.3	9.6	14.22	30.0	-15.8	
1712.50	16.61	H	4.3	9.6	21.89	30.0	-8.1	
Mid Ch								
1745.00	13.00	V	4.3	9.7	18.35	30.0	-11.7	
1745.00	17.27	H	4.3	9.7	22.62	30.0	-7.4	
High Ch								
1777.50	11.41	V	4.4	9.7	16.74	30.0	-13.3	
1777.50	16.57	H	4.4	9.7	21.90	30.0	-8.1	

NR Band 66

5MHz

DFT-s

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4790160849
Date: 12/28/2021
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	8.88	V	4.3	9.6	14.16	30.0	-15.8	
1712.50	16.59	H	4.3	9.6	21.87	30.0	-8.1	
Mid Ch								
1745.00	11.85	V	4.3	9.7	17.20	30.0	-12.8	
1745.00	17.16	H	4.3	9.7	22.51	30.0	-7.5	
High Ch								
1777.50	11.25	V	4.4	9.7	16.58	30.0	-13.4	
1777.50	16.43	H	4.4	9.7	21.76	30.0	-8.2	

NR Band 66 (Sub ANT) – Spot Check

NR Band 66

15MHz

DFT-s

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 47901060849
Date: 12/24/2021
Test Engineer: 25546
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	9.83	V	4.3	9.6	15.12	30.0	-14.9	
1717.50	12.91	H	4.3	9.6	18.20	30.0	-11.8	
Mid Ch								
1745.00	9.88	V	4.3	9.7	15.23	30.0	-14.8	
1745.00	13.22	H	4.3	9.7	18.57	30.0	-11.4	
High Ch								
1772.50	9.38	V	4.4	9.7	14.71	30.0	-15.3	
1772.50	12.76	H	4.4	9.7	18.09	30.0	-11.9	

NR Band 66

15MHz

DFT-s

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 47901060849
Date: 12/24/2021
Test Engineer: 25546
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	9.57	V	4.3	9.6	14.86	30.0	-15.1	
1717.50	12.47	H	4.3	9.6	17.76	30.0	-12.2	
Mid Ch								
1745.00	9.68	V	4.3	9.7	15.03	30.0	-15.0	
1745.00	12.67	H	4.3	9.7	18.02	30.0	-12.0	
High Ch								
1772.50	9.00	V	4.4	9.7	14.33	30.0	-15.7	
1772.50	12.58	H	4.4	9.7	17.91	30.0	-12.1	

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, 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 #: 4790160849
Date: 12/17/2021
Test Engineer: 19568
Configuration: EUT, 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	-13.2	V	3.0	40.9	1.0	-53.1	-13.0	-40.1	
2472.60	-5.2	V	3.0	41.5	1.0	-45.7	-13.0	-32.7	
3296.80	-2.6	V	3.0	42.3	1.0	-43.9	-13.0	-30.9	
4121.00	-9.1	V	3.0	42.4	1.0	-50.5	-13.0	-37.5	
4945.20	-8.0	V	3.0	43.0	1.0	-50.0	-13.0	-37.0	
1648.40	-10.8	H	3.0	40.9	1.0	-50.7	-13.0	-37.7	
2472.60	-0.9	H	3.0	41.5	1.0	-41.5	-13.0	-28.5	
3296.80	-6.4	H	3.0	42.3	1.0	-47.7	-13.0	-34.7	
4121.00	-8.4	H	3.0	42.4	1.0	-49.8	-13.0	-36.8	
4945.20	-7.7	H	3.0	43.0	1.0	-49.7	-13.0	-36.7	
Mid Ch, 836.6MHz									
1673.20	3.9	V	3.0	40.9	1.0	-36.0	-13.0	-23.0	
2509.80	6.9	V	3.0	41.6	1.0	-33.7	-13.0	-20.7	
3346.40	13.1	V	3.0	42.3	1.0	-28.2	-13.0	-15.2	
4183.00	4.5	V	3.0	42.5	1.0	-36.9	-13.0	-23.9	
5019.60	6.2	V	3.0	43.0	1.0	-35.8	-13.0	-22.8	
1673.20	2.4	H	3.0	40.9	1.0	-37.5	-13.0	-24.5	
2509.80	5.9	H	3.0	41.6	1.0	-34.7	-13.0	-21.7	
3346.40	9.6	H	3.0	42.3	1.0	-31.7	-13.0	-18.7	
4183.00	6.6	H	3.0	42.5	1.0	-34.8	-13.0	-21.8	
5019.60	9.4	H	3.0	43.0	1.0	-32.7	-13.0	-19.7	
High Ch, 848.8MHz									
1697.60	-13.0	V	3.0	40.9	1.0	-52.9	-13.0	-39.9	
2546.40	0.0	V	3.0	41.6	1.0	-40.6	-13.0	-27.6	
3395.20	-7.5	V	3.0	42.3	1.0	-48.8	-13.0	-35.8	
4244.00	-9.2	V	3.0	42.5	1.0	-50.7	-13.0	-37.7	
5092.80	-7.8	V	3.0	43.0	1.0	-49.8	-13.0	-36.8	
1697.60	-11.8	H	3.0	40.9	1.0	-51.7	-13.0	-38.7	
2546.40	0.0	H	3.0	41.6	1.0	-40.6	-13.0	-27.6	
3395.20	-8.3	H	3.0	42.3	1.0	-49.6	-13.0	-36.6	
4244.00	-8.6	H	3.0	42.5	1.0	-50.1	-13.0	-37.1	
5092.80	-7.8	H	3.0	43.0	1.0	-49.8	-13.0	-36.8	

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

Company: Samsung
Project #: 4790160849
Date: 12/20/2021
Test Engineer: 19568
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: EGPRS 850 MHz Harmonics
Test Votage: AC 120 V, 60 Hz

GSM850

EGPRS

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1648.40	-14.6	V	3.0	40.9	1.0	-54.6	-13.0	-41.6	
2472.60	-11.6	V	3.0	41.5	1.0	-52.2	-13.0	-39.2	
3296.80	-8.3	V	3.0	42.3	1.0	-49.6	-13.0	-36.6	
4121.00	-9.5	V	3.0	42.4	1.0	-50.9	-13.0	-37.9	
4945.20	-8.1	V	3.0	43.0	1.0	-50.1	-13.0	-37.1	
1648.40	-12.3	H	3.0	40.9	1.0	-52.2	-13.0	-39.2	
2472.60	-11.0	H	3.0	41.5	1.0	-51.6	-13.0	-38.6	
3296.80	-8.6	H	3.0	42.3	1.0	-49.9	-13.0	-36.9	
4121.00	-9.2	H	3.0	42.4	1.0	-50.6	-13.0	-37.6	
4945.20	-7.7	H	3.0	43.0	1.0	-49.7	-13.0	-36.7	
Mid Ch, 836.6MHz									
1673.20	-10.8	V	3.0	40.9	1.0	-50.7	-13.0	-37.7	
2509.80	-5.5	V	3.0	41.6	1.0	-46.1	-13.0	-33.1	
3346.40	-5.3	V	3.0	42.3	1.0	-46.6	-13.0	-33.6	
4183.00	-9.3	V	3.0	42.5	1.0	-50.8	-13.0	-37.8	
5019.60	-7.8	V	3.0	43.0	1.0	-49.8	-13.0	-36.8	
1673.20	-12.0	H	3.0	40.9	1.0	-51.9	-13.0	-38.9	
2509.80	-11.8	H	3.0	41.6	1.0	-52.4	-13.0	-39.4	
3346.40	-7.2	H	3.0	42.3	1.0	-48.5	-13.0	-35.5	
4183.00	-8.9	H	3.0	42.5	1.0	-50.3	-13.0	-37.3	
5019.60	-7.5	H	3.0	43.0	1.0	-49.5	-13.0	-36.5	
High Ch, 848.8MHz									
1697.60	-14.6	V	3.0	40.9	1.0	-54.5	-13.0	-41.5	
2546.40	-10.1	V	3.0	41.6	1.0	-50.8	-13.0	-37.8	
3395.20	-8.4	V	3.0	42.3	1.0	-49.7	-13.0	-36.7	
4244.00	-9.2	V	3.0	42.5	1.0	-50.7	-13.0	-37.7	
5092.80	-7.9	V	3.0	43.0	1.0	-49.9	-13.0	-36.9	
1697.60	-13.3	H	3.0	40.9	1.0	-53.2	-13.0	-40.2	
2546.40	-10.4	H	3.0	41.6	1.0	-51.0	-13.0	-38.0	
3395.20	-8.4	H	3.0	42.3	1.0	-49.7	-13.0	-36.7	
4244.00	-9.0	H	3.0	42.5	1.0	-50.5	-13.0	-37.5	
5092.80	-7.7	H	3.0	43.0	1.0	-49.7	-13.0	-36.7	

GSM1900

GSM1900

GPRS

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

Company:	Samsung
Project #:	4790160849
Date:	12/23/2021
Test Engineer:	25546
Configuration:	EUT, X-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	7.4	V	3.0	42.3	1.0	-33.9	-13.0	-20.9	
5550.60	14.4	V	3.0	43.1	1.0	-27.8	-13.0	-14.8	
7400.80	12.9	V	3.0	42.7	1.0	-28.8	-13.0	-15.8	
9251.00	4.1	V	3.0	41.8	1.0	-36.7	-13.0	-23.7	
11101.20	1.3	V	3.0	41.6	1.0	-39.3	-13.0	-26.3	
3700.40	6.9	H	3.0	42.3	1.0	-34.4	-13.0	-21.4	
5550.60	16.1	H	3.0	43.1	1.0	-26.1	-13.0	-13.1	
7400.80	13.3	H	3.0	42.7	1.0	-28.4	-13.0	-15.4	
9251.00	1.1	H	3.0	41.8	1.0	-39.7	-13.0	-26.7	
11101.20	1.1	H	3.0	41.6	1.0	-39.5	-13.0	-26.5	
Mid Ch, 1880MHz									
3760.00	11.3	V	3.0	42.3	1.0	-30.0	-13.0	-17.0	
5640.00	17.3	V	3.0	43.2	1.0	-24.8	-13.0	-11.8	
7520.00	15.8	V	3.0	42.7	1.0	-25.9	-13.0	-12.9	
9400.00	8.9	V	3.0	41.7	1.0	-31.7	-13.0	-18.7	
11280.00	2.1	V	3.0	41.7	1.0	-38.5	-13.0	-25.5	
3760.00	10.5	H	3.0	42.3	1.0	-30.8	-13.0	-17.8	
5640.00	18.5	H	3.0	43.2	1.0	-23.6	-13.0	-10.6	
7520.00	16.5	H	3.0	42.7	1.0	-25.2	-13.0	-12.2	
9400.00	5.8	H	3.0	41.7	1.0	-34.8	-13.0	-21.8	
11280.00	1.7	H	3.0	41.7	1.0	-38.9	-13.0	-25.9	
High Ch, 1909.8MHz									
3819.60	13.0	V	3.0	42.3	1.0	-28.4	-13.0	-15.4	
5729.40	15.1	V	3.0	43.2	1.0	-27.0	-13.0	-14.0	
7639.20	16.5	V	3.0	42.6	1.0	-25.1	-13.0	-12.1	
9549.00	11.3	V	3.0	41.5	1.0	-29.2	-13.0	-16.2	
11458.80	4.5	V	3.0	41.7	1.0	-36.2	-13.0	-23.2	
3819.60	12.0	H	3.0	42.3	1.0	-29.3	-13.0	-16.3	
5729.40	14.5	H	3.0	43.2	1.0	-27.7	-13.0	-14.7	
7639.20	18.1	H	3.0	42.6	1.0	-23.6	-13.0	-10.6	
9549.00	7.6	H	3.0	41.5	1.0	-33.0	-13.0	-20.0	
11458.80	2.3	H	3.0	41.7	1.0	-38.4	-13.0	-25.4	

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

Company: Samsung
Project #: 4790160849
Date: 12/23/2021
Test Engineer: 25546
Configuration: EUT, X-Position
Location: Chamber 2
Mode: EGPRS 1900 MHz Harmonics
Test Votage: AC 120 V, 60 Hz

GSM1900

EGPRS

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	0.6	V	3.0	42.3	1.0	-40.7	-13.0	-27.7	
5550.60	-0.9	V	3.0	43.1	1.0	-43.1	-13.0	-30.1	
7400.80	4.3	V	3.0	42.7	1.0	-37.4	-13.0	-24.4	
9251.00	-1.3	V	3.0	41.8	1.0	-42.1	-13.0	-29.1	
11101.20	1.0	V	3.0	41.6	1.0	-39.6	-13.0	-26.6	
3700.40	-3.2	H	3.0	42.3	1.0	-44.6	-13.0	-31.6	
5550.60	7.7	H	3.0	43.1	1.0	-34.5	-13.0	-21.5	
7400.80	4.6	H	3.0	42.7	1.0	-37.2	-13.0	-24.2	
9251.00	-2.8	H	3.0	41.8	1.0	-43.6	-13.0	-30.6	
11101.20	1.1	H	3.0	41.6	1.0	-39.5	-13.0	-26.5	
Mid Ch, 1880MHz									
3760.00	4.3	V	3.0	42.3	1.0	-37.0	-13.0	-24.0	
5640.00	8.5	V	3.0	43.2	1.0	-33.7	-13.0	-20.7	
7520.00	7.6	V	3.0	42.7	1.0	-34.1	-13.0	-21.1	
9400.00	0.6	V	3.0	41.7	1.0	-40.0	-13.0	-27.0	
11280.00	1.1	V	3.0	41.7	1.0	-39.6	-13.0	-26.6	
3760.00	3.7	H	3.0	42.3	1.0	-37.6	-13.0	-24.6	
5640.00	10.3	H	3.0	43.2	1.0	-31.9	-13.0	-18.9	
7520.00	8.4	H	3.0	42.7	1.0	-33.3	-13.0	-20.3	
9400.00	-1.5	H	3.0	41.7	1.0	-42.1	-13.0	-29.1	
11280.00	1.2	H	3.0	41.7	1.0	-39.4	-13.0	-26.4	
High Ch, 1909.8MHz									
3819.60	5.4	V	3.0	42.3	1.0	-35.9	-13.0	-22.9	
5729.40	7.3	V	3.0	43.2	1.0	-34.9	-13.0	-21.9	
7639.20	8.0	V	3.0	42.6	1.0	-33.6	-13.0	-20.6	
9549.00	1.8	V	3.0	41.5	1.0	-38.7	-13.0	-25.7	
11458.80	1.5	V	3.0	41.7	1.0	-39.2	-13.0	-26.2	
3819.60	5.2	H	3.0	42.3	1.0	-36.1	-13.0	-23.1	
5729.40	6.4	H	3.0	43.2	1.0	-35.8	-13.0	-22.8	
7639.20	9.8	H	3.0	42.6	1.0	-31.8	-13.0	-18.8	
9549.00	-0.3	H	3.0	41.5	1.0	-40.8	-13.0	-27.8	
11458.80	1.4	H	3.0	41.7	1.0	-39.3	-13.0	-26.3	

WCDMA Band 5

Band 5 REL99

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

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19227
Configuration: EUT / AC Adatper, Z-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	-16.0	V	3.0	40.9	1.0	-55.9	-13.0	-42.9	
2479.20	-13.1	V	3.0	41.6	1.0	-53.7	-13.0	-40.7	
3305.60	-10.2	V	3.0	42.3	1.0	-51.5	-13.0	-38.5	
1652.80	-16.7	H	3.0	40.9	1.0	-56.6	-13.0	-43.6	
2479.20	-13.4	H	3.0	41.6	1.0	-54.0	-13.0	-41.0	
3305.60	-10.2	H	3.0	42.3	1.0	-51.5	-13.0	-38.5	
Mid Ch, 836.6MHz									
1673.20	-15.9	V	3.0	40.9	1.0	-55.8	-13.0	-42.8	
2509.80	-13.0	V	3.0	41.6	1.0	-53.6	-13.0	-40.6	
3346.40	-9.9	V	3.0	42.3	1.0	-51.2	-13.0	-38.2	
1673.20	-16.6	H	3.0	40.9	1.0	-56.5	-13.0	-43.5	
2509.80	-13.3	H	3.0	41.6	1.0	-53.9	-13.0	-40.9	
3346.40	-9.8	H	3.0	42.3	1.0	-51.1	-13.0	-38.1	
High Ch, 846.6MHz									
1693.20	-15.9	V	3.0	40.9	1.0	-55.8	-13.0	-42.8	
2539.80	-12.9	V	3.0	41.6	1.0	-53.6	-13.0	-40.6	
3386.40	-9.8	V	3.0	42.3	1.0	-51.1	-13.0	-38.1	
1693.20	-16.5	H	3.0	40.9	1.0	-56.5	-13.0	-43.5	
2539.80	-13.2	H	3.0	41.6	1.0	-53.9	-13.0	-40.9	
3386.40	-9.8	H	3.0	42.3	1.0	-51.1	-13.0	-38.1	

Band 5 HSDPA

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

Company: Samsung
Project #: 4790160849
Date: 12/21/2021
Test Engineer: 19227
Configuration: EUT / AC Adatper, Z-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	-7.6	V	3.0	40.9	1.0	-47.6	-13.0	-34.6	
2479.20	-4.8	V	3.0	41.6	1.0	-45.4	-13.0	-32.4	
3305.60	-1.8	V	3.0	42.3	1.0	-43.1	-13.0	-30.1	
1652.80	-8.3	H	3.0	40.9	1.0	-48.3	-13.0	-35.3	
2479.20	-5.1	H	3.0	41.6	1.0	-45.7	-13.0	-32.7	
3305.60	-1.9	H	3.0	42.3	1.0	-43.2	-13.0	-30.2	
Mid Ch, 836.6MHz									
1673.20	-7.7	V	3.0	40.9	1.0	-47.6	-13.0	-34.6	
2509.80	-4.7	V	3.0	41.6	1.0	-45.3	-13.0	-32.3	
3346.40	-1.7	V	3.0	42.3	1.0	-43.0	-13.0	-30.0	
1673.20	-8.3	H	3.0	40.9	1.0	-48.2	-13.0	-35.2	
2509.80	-5.0	H	3.0	41.6	1.0	-45.6	-13.0	-32.6	
3346.40	-1.6	H	3.0	42.3	1.0	-42.9	-13.0	-29.9	
High Ch, 846.6MHz									
1693.20	-7.5	V	3.0	40.9	1.0	-47.4	-13.0	-34.4	
2539.80	-4.6	V	3.0	41.6	1.0	-45.3	-13.0	-32.3	
3386.40	-1.5	V	3.0	42.3	1.0	-42.8	-13.0	-29.8	
1693.20	-8.2	H	3.0	40.9	1.0	-48.2	-13.0	-35.2	
2539.80	-4.9	H	3.0	41.6	1.0	-45.6	-13.0	-32.6	
3386.40	-1.5	H	3.0	42.3	1.0	-42.8	-13.0	-29.8	

WCDMA Band 4

Band 4 REL99

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

Company: Samsung
Project #: 4790160849
Date: 12/22/2021
Test Engineer: 19227
Configuration: EUT / AC Adapter, Y-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	-9.0	V	3.0	42.3	1.0	-50.3	-13.0	-37.3	
5137.20	-9.3	V	3.0	43.1	1.0	-51.4	-13.0	-38.4	
6849.60	-6.7	V	3.0	43.0	1.0	-48.6	-13.0	-35.6	
3424.80	-8.9	H	3.0	42.3	1.0	-50.2	-13.0	-37.2	
5137.20	-9.1	H	3.0	43.1	1.0	-51.2	-13.0	-38.2	
6849.60	-6.5	H	3.0	43.0	1.0	-48.5	-13.0	-35.5	
Mid Ch, 1732.6MHz									
3465.20	-6.3	V	3.0	42.3	1.0	-47.6	-13.0	-34.6	
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	-48.6	-13.0	-35.6	
3465.20	-7.3	H	3.0	42.3	1.0	-48.6	-13.0	-35.6	
5197.80	-8.9	H	3.0	43.1	1.0	-51.0	-13.0	-38.0	
6930.40	-6.5	H	3.0	43.0	1.0	-48.4	-13.0	-35.4	
High Ch, 1752.6MHz									
3505.20	-6.5	V	3.0	42.3	1.0	-47.8	-13.0	-34.8	
5257.80	-9.1	V	3.0	43.1	1.0	-51.1	-13.0	-38.1	
7010.40	-6.4	V	3.0	42.9	1.0	-48.3	-13.0	-35.3	
3505.20	-7.2	H	3.0	42.3	1.0	-48.5	-13.0	-35.5	
5257.80	-8.9	H	3.0	43.1	1.0	-51.0	-13.0	-38.0	
7010.40	-6.2	H	3.0	42.9	1.0	-48.1	-13.0	-35.1	

Band 4 HSDPA

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

Company: Samsung
Project #: 4790160849
Date: 12/22/2021
Test Engineer: 19227
Configuration: EUT / AC Adapter,Y-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	-9.0	V	3.0	42.3	1.0	-50.3	-13.0	-37.3	
5137.20	-9.3	V	3.0	43.1	1.0	-51.4	-13.0	-38.4	
6849.60	-6.7	V	3.0	43.0	1.0	-48.6	-13.0	-35.6	
3424.80	-8.9	H	3.0	42.3	1.0	-50.2	-13.0	-37.2	
5137.20	-9.2	H	3.0	43.1	1.0	-51.2	-13.0	-38.2	
6849.60	-6.5	H	3.0	43.0	1.0	-48.5	-13.0	-35.5	
Mid Ch, 1732.6MHz									
3465.20	-8.3	V	3.0	42.3	1.0	-49.6	-13.0	-36.6	
5197.80	-9.0	V	3.0	43.1	1.0	-51.1	-13.0	-38.1	
6930.40	-6.6	V	3.0	43.0	1.0	-48.6	-13.0	-35.6	
3465.20	-8.4	H	3.0	42.3	1.0	-49.7	-13.0	-36.7	
5197.80	-8.9	H	3.0	43.1	1.0	-51.0	-13.0	-38.0	
6930.40	-6.5	H	3.0	43.0	1.0	-48.4	-13.0	-35.4	
High Ch, 1752.6MHz									
3505.20	-6.6	V	3.0	42.3	1.0	-47.9	-13.0	-34.9	
5257.80	-9.0	V	3.0	43.1	1.0	-51.1	-13.0	-38.1	
7010.40	-6.4	V	3.0	42.9	1.0	-48.3	-13.0	-35.3	
3505.20	-7.3	H	3.0	42.3	1.0	-48.6	-13.0	-35.6	
5257.80	-8.4	H	3.0	43.1	1.0	-50.5	-13.0	-37.5	
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 #: 4790160849
Date: 12/21/2021
Test Engineer: 25546
Configuration: EUT, Z-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	-10.7	V	3.0	42.3	1.0	-52.0	-13.0	-39.0	
5557.20	-8.4	V	3.0	43.1	1.0	-50.6	-13.0	-37.6	
7409.60	-6.5	V	3.0	42.7	1.0	-48.2	-13.0	-35.2	
3704.80	-9.1	H	3.0	42.3	1.0	-50.4	-13.0	-37.4	
5557.20	-8.4	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	-10.2	V	3.0	42.3	1.0	-51.5	-13.0	-38.5	
5640.00	-8.1	V	3.0	43.2	1.0	-50.2	-13.0	-37.2	
7520.00	-6.5	V	3.0	42.7	1.0	-48.2	-13.0	-35.2	
3760.00	-8.0	H	3.0	42.3	1.0	-49.3	-13.0	-36.3	
5640.00	-8.1	H	3.0	43.2	1.0	-50.2	-13.0	-37.2	
7520.00	-6.5	H	3.0	42.7	1.0	-48.2	-13.0	-35.2	
High Ch, 1907.6MHz									
3815.20	-8.7	V	3.0	42.3	1.0	-50.0	-13.0	-37.0	
5722.80	-8.3	V	3.0	43.2	1.0	-50.4	-13.0	-37.4	
7630.40	-6.5	V	3.0	42.6	1.0	-48.1	-13.0	-35.1	
3815.20	-6.3	H	3.0	42.3	1.0	-47.6	-13.0	-34.6	
5722.80	-8.3	H	3.0	43.2	1.0	-50.4	-13.0	-37.4	
7630.40	-6.5	H	3.0	42.6	1.0	-48.1	-13.0	-35.1	

Band 2 HSDPA

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

Company: Samsung
Project #: 4790160849
Date: 12/22/2021
Test Engineer: 19227
Configuration: EUT, Z-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	-10.4	V	3.0	42.3	1.0	-51.8	-13.0	-38.8	
5557.20	-8.4	V	3.0	43.1	1.0	-50.6	-13.0	-37.6	
7409.60	-6.5	V	3.0	42.7	1.0	-48.2	-13.0	-35.2	
3704.80	-8.8	H	3.0	42.3	1.0	-50.1	-13.0	-37.1	
5557.20	-8.4	H	3.0	43.1	1.0	-50.6	-13.0	-37.6	
7409.60	-6.4	H	3.0	42.7	1.0	-48.2	-13.0	-35.2	
Mid Ch, 1880MHz									
3760.00	-10.4	V	3.0	42.3	1.0	-51.7	-13.0	-38.7	
5640.00	-8.1	V	3.0	43.2	1.0	-50.2	-13.0	-37.2	
7520.00	-6.6	V	3.0	42.7	1.0	-48.3	-13.0	-35.3	
3760.00	-8.3	H	3.0	42.3	1.0	-49.6	-13.0	-36.6	
5640.00	-8.1	H	3.0	43.2	1.0	-50.2	-13.0	-37.2	
7520.00	-6.6	H	3.0	42.7	1.0	-48.2	-13.0	-35.2	
High Ch, 1907.6MHz									
3815.20	-9.4	V	3.0	42.3	1.0	-50.7	-13.0	-37.7	
5722.80	-8.3	V	3.0	43.2	1.0	-50.5	-13.0	-37.5	
7630.40	-6.5	V	3.0	42.6	1.0	-48.1	-13.0	-35.1	
3815.20	-6.9	H	3.0	42.3	1.0	-48.3	-13.0	-35.3	
5722.80	-8.3	H	3.0	43.2	1.0	-50.5	-13.0	-37.5	
7630.40	-6.5	H	3.0	42.6	1.0	-48.1	-13.0	-35.1	

LTE Band 2 (Main ANT)

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

Company: Samsung
Project #: 4790160849
Date: 12/15/2021
Test Engineer: 25546
Configuration: EUT / Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Harmonics, 1.4MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

LTE Band 2

1.4MHz

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, 1850.7MHz									
3701.40	-6.6	V	3.0	45.8	1.0	-51.4	-13.0	-38.4	
5552.10	-8.0	V	3.0	45.7	1.0	-52.7	-13.0	-39.7	
7402.80	-6.4	V	3.0	44.6	1.0	-50.0	-13.0	-37.0	
3701.40	-4.4	H	3.0	45.8	1.0	-49.2	-13.0	-36.2	
5552.10	-7.7	H	3.0	45.7	1.0	-52.5	-13.0	-39.5	
7402.80	-6.5	H	3.0	44.6	1.0	-50.0	-13.0	-37.0	
Mid Ch, 1880MHz									
3760.00	-3.7	V	3.0	45.8	1.0	-48.5	-13.0	-35.5	
5640.00	-7.3	V	3.0	45.7	1.0	-52.0	-13.0	-39.0	
7520.00	-6.3	V	3.0	44.5	1.0	-49.8	-13.0	-36.8	
3760.00	-0.6	H	3.0	45.8	1.0	-45.5	-13.0	-32.5	
5640.00	-7.5	H	3.0	45.7	1.0	-52.2	-13.0	-39.2	
7520.00	-6.3	H	3.0	44.5	1.0	-49.8	-13.0	-36.8	
High Ch, 1909.3MHz									
3818.60	-0.1	V	3.0	45.8	1.0	-45.0	-13.0	-32.0	
5727.90	-6.1	V	3.0	45.7	1.0	-50.9	-13.0	-37.9	
7637.20	-6.2	V	3.0	44.4	1.0	-49.7	-13.0	-36.7	
3818.60	1.9	H	3.0	45.8	1.0	-42.9	-13.0	-29.9	
5727.90	-5.2	H	3.0	45.7	1.0	-49.9	-13.0	-36.9	
7637.20	-6.2	H	3.0	44.4	1.0	-49.7	-13.0	-36.7	

LTE Band 2 (Sub ANT)

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

Company:	Samsung
Project #:	2021-12-17
Date:	12/17/2021
Test Engineer:	25546
Configuration:	EUT / AC Adapter, Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 2 Harmonics, 20MHz Bandwidth
Test Votage:	AC 120 V, 60 Hz

LTE Band 2

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, 1860MHz									
3720.00	-5.3	V	3.0	42.3	1.0	-46.6	-13.0	-33.6	
5580.00	-7.1	V	3.0	43.1	1.0	-49.2	-13.0	-36.2	
7440.00	-5.4	V	3.0	42.7	1.0	-47.1	-13.0	-34.1	
9300.00	-3.8	V	3.0	41.7	1.0	-44.5	-13.0	-31.5	
11160.00	0.4	V	3.0	41.6	1.0	-40.2	-13.0	-27.2	
3720.00	-1.3	H	3.0	42.3	1.0	-42.6	-13.0	-29.6	
5580.00	-6.7	H	3.0	43.1	1.0	-48.8	-13.0	-35.8	
7440.00	-5.4	H	3.0	42.7	1.0	-47.1	-13.0	-34.1	
9300.00	-4.0	H	3.0	41.7	1.0	-44.8	-13.0	-31.8	
11160.00	0.6	H	3.0	41.6	1.0	-40.0	-13.0	-27.0	
Mid Ch, 1880MHz									
3760.00	-5.1	V	3.0	42.3	1.0	-46.4	-13.0	-33.4	
5640.00	-6.2	V	3.0	43.2	1.0	-48.4	-13.0	-35.4	
7520.00	-5.8	V	3.0	42.7	1.0	-47.5	-13.0	-34.5	
9400.00	-3.1	V	3.0	41.7	1.0	-43.8	-13.0	-30.8	
11280.00	0.1	V	3.0	41.7	1.0	-40.5	-13.0	-27.5	
3760.00	-1.0	H	3.0	42.3	1.0	-42.3	-13.0	-29.3	
5640.00	-4.5	H	3.0	43.2	1.0	-46.7	-13.0	-33.7	
7520.00	-5.7	H	3.0	42.7	1.0	-47.4	-13.0	-34.4	
9400.00	-2.4	H	3.0	41.7	1.0	-43.1	-13.0	-30.1	
11280.00	1.2	H	3.0	41.7	1.0	-39.5	-13.0	-26.5	
High Ch, 1900MHz									
3800.00	-4.7	V	3.0	42.3	1.0	-46.0	-13.0	-33.0	
5700.00	-4.5	V	3.0	43.2	1.0	-46.7	-13.0	-33.7	
7600.00	-5.6	V	3.0	42.6	1.0	-47.3	-13.0	-34.3	
9500.00	-3.2	V	3.0	41.6	1.0	-43.8	-13.0	-30.8	
11400.00	1.0	V	3.0	41.7	1.0	-39.7	-13.0	-26.7	
3800.00	-10.2	H	3.0	42.3	1.0	-51.5	-13.0	-38.5	
5700.00	-3.4	H	3.0	43.2	1.0	-45.6	-13.0	-32.6	
7600.00	-4.6	H	3.0	42.6	1.0	-46.2	-13.0	-33.2	
9500.00	-3.2	H	3.0	41.6	1.0	-43.7	-13.0	-30.7	
11400.00	0.7	H	3.0	41.7	1.0	-40.0	-13.0	-27.0	

LTE Band 12

LTE Band 12

1.4MHz

QPSK

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

Company: Samsung
Project #: 4790160849
Date: 12/15/2021
Test Engineer: 19568
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 Harmonics, 1.4MHz 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, 699.7MHz									
1399.40	-17.0	V	3.0	45.8	1.0	-61.8	-13.0	-48.8	
2099.10	-5.5	V	3.0	45.4	1.0	-49.8	-13.0	-36.8	
2798.80	-10.6	V	3.0	45.5	1.0	-55.1	-13.0	-42.1	
3498.50	-7.9	V	3.0	45.7	1.0	-52.7	-13.0	-39.7	
4198.20	-9.0	V	3.0	45.9	1.0	-53.9	-13.0	-40.9	
1399.40	-18.2	H	3.0	45.8	1.0	-63.0	-13.0	-50.0	
2099.10	-2.8	H	3.0	45.4	1.0	-47.2	-13.0	-34.2	
2798.80	-10.8	H	3.0	45.5	1.0	-55.3	-13.0	-42.3	
3498.50	-7.8	H	3.0	45.7	1.0	-52.5	-13.0	-39.5	
4198.20	-9.3	H	3.0	45.9	1.0	-54.2	-13.0	-41.2	
Mid Ch, 707.5MHz									
1415.00	-16.9	V	3.0	45.8	1.0	-61.7	-13.0	-48.7	
2122.50	-10.8	V	3.0	45.4	1.0	-55.2	-13.0	-42.2	
2830.00	0.0	V	3.0	45.5	1.0	-44.5	-13.0	-31.5	
3537.50	0.0	V	3.0	45.8	1.0	-44.8	-13.0	-31.8	
4245.00	0.0	V	3.0	45.9	1.0	-44.9	-13.0	-31.9	
1415.00	0.0	H	3.0	45.8	1.0	-44.8	-13.0	-31.8	
2122.50	-11.9	H	3.0	45.4	1.0	-56.3	-13.0	-43.3	
2830.00	-10.6	H	3.0	45.5	1.0	-55.2	-13.0	-42.2	
3537.50	-7.5	H	3.0	45.8	1.0	-52.3	-13.0	-39.3	
4245.00	-9.1	H	3.0	45.9	1.0	-54.0	-13.0	-41.0	
High Ch, 715.3MHz									
1430.60	-16.3	V	3.0	45.8	1.0	-61.1	-13.0	-48.1	
2145.90	-10.6	V	3.0	45.4	1.0	-55.0	-13.0	-42.0	
2861.20	-10.5	V	3.0	45.5	1.0	-55.0	-13.0	-42.0	
3576.50	-7.0	V	3.0	45.8	1.0	-51.7	-13.0	-38.7	
4291.80	-8.9	V	3.0	45.9	1.0	-53.8	-13.0	-40.8	
1430.60	-16.4	H	3.0	45.8	1.0	-61.2	-13.0	-48.2	
2145.90	-10.7	H	3.0	45.4	1.0	-55.1	-13.0	-42.1	
2861.20	-10.5	H	3.0	45.5	1.0	-55.0	-13.0	-42.0	
3576.50	-6.8	H	3.0	45.8	1.0	-51.6	-13.0	-38.6	
4291.80	-9.0	H	3.0	45.9	1.0	-53.9	-13.0	-40.9	

LTE Band 13

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

Company: Samsung
Project #: 4790160849
Date: 12/14/2021
Test Engineer: 19568
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 13 Harmonics, 5MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

LTE Band 13

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, 779.5MHz									
1559.00	-16.1	V	3.0	45.7	1.0	-60.8	-40.0	-20.8	
2338.50	-11.7	V	3.0	45.4	1.0	-56.1	-13.0	-43.1	
3118.00	-9.5	V	3.0	45.6	1.0	-54.1	-13.0	-41.1	
1559.00	-16.1	H	3.0	45.7	1.0	-60.8	-40.0	-20.8	
2338.50	-12.1	H	3.0	45.4	1.0	-56.5	-13.0	-43.5	
3118.00	-9.3	H	3.0	45.6	1.0	-53.9	-13.0	-40.9	
Mid Ch, 782MHz									
1564.00	-15.1	V	3.0	45.7	1.0	-59.8	-40.0	-19.8	
2346.00	-11.6	V	3.0	45.4	1.0	-56.1	-13.0	-43.1	
3128.00	-9.7	V	3.0	45.6	1.0	-54.3	-13.0	-41.3	
1564.00	-15.7	H	3.0	45.7	1.0	-60.4	-40.0	-20.4	
2346.00	-12.3	H	3.0	45.4	1.0	-56.7	-13.0	-43.7	
3128.00	-9.0	H	3.0	45.6	1.0	-53.6	-13.0	-40.6	
High Ch, 784.5MHz									
1569.00	-15.2	V	3.0	45.7	1.0	-59.9	-40.0	-19.9	
2353.50	-11.3	V	3.0	45.4	1.0	-55.7	-13.0	-42.7	
3138.00	-9.9	V	3.0	45.6	1.0	-54.5	-13.0	-41.5	
1569.00	-15.6	H	3.0	45.7	1.0	-60.3	-40.0	-20.3	
2353.50	-12.3	H	3.0	45.4	1.0	-56.8	-13.0	-43.8	
3138.00	-9.6	H	3.0	45.6	1.0	-54.3	-13.0	-41.3	

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

LTE Band 26 (Part 90)

LTE Band 26

1.4MHz

QPSK

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

Company:	Samsung
Project #:	4790160849
Date:	12/22/2021
Test Engineer:	19227
Configuration:	EUT / AC Adapter, Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 26 Harmonics, 1.4MHz 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, 814.7MHz									
1629.40	-16.1	V	3.0	40.9	1.0	-56.0	-13.0	-43.0	
2444.10	-13.2	V	3.0	41.5	1.0	-53.7	-13.0	-40.7	
3258.80	-10.5	V	3.0	42.3	1.0	-51.8	-13.0	-38.8	
1629.40	-16.8	H	3.0	40.9	1.0	-56.7	-13.0	-43.7	
2444.10	-13.5	H	3.0	41.5	1.0	-54.0	-13.0	-41.0	
3258.80	-10.4	H	3.0	42.3	1.0	-51.7	-13.0	-38.7	
Mid Ch, 823.3Mhz									
1646.60	-16.0	V	3.0	40.9	1.0	-55.9	-13.0	-42.9	
2469.90	-13.0	V	3.0	41.5	1.0	-53.6	-13.0	-40.6	
3293.20	-10.2	V	3.0	42.3	1.0	-51.5	-13.0	-38.5	
1646.60	-16.2	H	3.0	40.9	1.0	-56.1	-13.0	-43.1	
2469.90	-13.4	H	3.0	41.5	1.0	-54.0	-13.0	-41.0	
3293.20	-10.3	H	3.0	42.3	1.0	-51.6	-13.0	-38.6	

LTE Band 26 (Straddle)

LTE Band 26

1.4MHz

QPSK

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

Company:	Samsung
Project #:	4790160849
Date:	12/21/2021
Test Engineer:	19227
Configuration:	EUT / AC Adapter, Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 26 Harmonics, 1.4MHz 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, 824Mhz									
1648.00	-16.1	V	3.0	40.9	1.0	-56.0	-13.0	-43.0	
2472.00	-13.1	V	3.0	41.5	1.0	-53.7	-13.0	-40.7	
3296.00	-10.3	V	3.0	42.3	1.0	-51.6	-13.0	-38.6	
1648.00	-16.8	H	3.0	40.9	1.0	-56.8	-13.0	-43.8	
2472.00	-13.5	H	3.0	41.5	1.0	-54.1	-13.0	-41.1	
3296.00	-10.3	H	3.0	42.3	1.0	-51.6	-13.0	-38.6	

LTE Band 26 (Part 22)

LTE Band 26

15MHz

QPSK

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

Company:	Samsung
Project #:	4790160849
Date:	12/22/2021
Test Engineer:	19227
Configuration:	EUT / AC Adapter, Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 26 Harmonics, 15MHz 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, 831.5Mhz									
1663.00	-15.9	V	3.0	40.9	1.0	-55.8	-13.0	-42.8	
2494.50	-13.1	V	3.0	41.6	1.0	-53.7	-13.0	-40.7	
3326.00	-10.1	V	3.0	42.3	1.0	-51.4	-13.0	-38.4	
1663.00	-16.7	H	3.0	40.9	1.0	-56.6	-13.0	-43.6	
2494.50	-13.4	H	3.0	41.6	1.0	-54.0	-13.0	-41.0	
3326.00	-10.1	H	3.0	42.3	1.0	-51.4	-13.0	-38.4	
High Ch, 841.5MHz									
1683.00	-15.9	V	3.0	40.9	1.0	-55.9	-13.0	-42.9	
2524.50	-12.9	V	3.0	41.6	1.0	-53.5	-13.0	-40.5	
3366.00	-9.8	V	3.0	42.3	1.0	-51.1	-13.0	-38.1	
1683.00	-16.5	H	3.0	40.9	1.0	-56.4	-13.0	-43.4	
2524.50	-13.3	H	3.0	41.6	1.0	-53.9	-13.0	-40.9	
3366.00	-9.3	H	3.0	42.3	1.0	-50.6	-13.0	-37.6	

LTE Band 41

LTE Band 41

15MHz

QPSK

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

Company: Samsung
Project #: 4790160849
Date: 12/22/2021
Test Engineer: 25546
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 41 Harmonics, 15MHz 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, 2503.5MHz									
5007.00	-4.4	V	3.0	43.0	1.0	-46.4	-25.0	-21.4	
7510.50	-5.1	V	3.0	42.7	1.0	-46.8	-25.0	-21.8	
10014.00	-8.4	V	3.0	41.1	1.0	-48.5	-25.0	-23.5	
12517.50	-6.4	V	3.0	42.3	1.0	-47.8	-25.0	-22.8	
15021.00	-8.2	V	3.0	43.9	1.0	-51.1	-25.0	-26.1	
5007.00	-3.1	H	3.0	43.0	1.0	-45.1	-25.0	-20.1	
7510.50	-5.7	H	3.0	42.7	1.0	-47.4	-25.0	-22.4	
10014.00	-2.6	H	3.0	41.1	1.0	-42.8	-25.0	-17.8	
12517.50	-6.6	H	3.0	42.3	1.0	-47.9	-25.0	-22.9	
15021.00	-7.9	H	3.0	43.9	1.0	-50.8	-25.0	-25.8	
Mid Ch, 2593MHz									
5186.00	7.0	V	3.0	43.1	1.0	-35.0	-25.0	-10.0	
7779.00	0.2	V	3.0	42.5	1.0	-41.4	-25.0	-16.4	
10372.00	-4.0	V	3.0	41.3	1.0	-44.3	-25.0	-19.3	
12965.00	-8.6	V	3.0	42.6	1.0	-50.2	-25.0	-25.2	
15558.00	-8.0	V	3.0	43.8	1.0	-50.7	-25.0	-25.7	
5186.00	4.9	H	3.0	43.1	1.0	-37.1	-25.0	-12.1	
7779.00	4.5	H	3.0	42.5	1.0	-37.0	-25.0	-12.0	
10372.00	-2.7	H	3.0	41.3	1.0	-43.0	-25.0	-18.0	
12965.00	-8.0	H	3.0	42.6	1.0	-49.6	-25.0	-24.6	
15558.00	-7.6	H	3.0	43.8	1.0	-50.3	-25.0	-25.3	
High Ch, 2682.5MHz									
5365.00	7.1	V	3.0	43.1	1.0	-35.0	-25.0	-10.0	
8047.50	0.0	V	3.0	42.4	1.0	-41.4	-25.0	-16.4	
10730.00	-4.4	V	3.0	41.4	1.0	-44.8	-25.0	-19.8	
13412.50	-8.0	V	3.0	42.9	1.0	-49.9	-25.0	-24.9	
16095.00	-7.0	V	3.0	43.6	1.0	-49.6	-25.0	-24.6	
5365.00	9.6	H	3.0	43.1	1.0	-32.5	-25.0	-7.5	
8047.50	0.6	H	3.0	42.4	1.0	-40.8	-25.0	-15.8	
10730.00	0.2	H	3.0	41.4	1.0	-40.3	-25.0	-15.3	
13412.50	-4.0	H	3.0	42.9	1.0	-45.9	-25.0	-20.9	
16095.00	-6.9	H	3.0	43.6	1.0	-49.5	-25.0	-24.5	

LTE Band 66 (Main ANT)

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

Company: Samsung
Project #: 4790160849
Date: 12/22/2021
Test Engineer: 25546
Configuration: EUT / AC Adapter. X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Harmonics, 5MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

LTE Band 66

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, 1712.5MHz									
3425.00	-7.4	V	3.0	42.3	1.0	-48.7	-13.0	-35.7	
5137.50	-8.7	V	3.0	43.1	1.0	-50.8	-13.0	-37.8	
6850.00	-6.5	V	3.0	43.0	1.0	-48.5	-13.0	-35.5	
3425.00	-5.7	H	3.0	42.3	1.0	-47.0	-13.0	-34.0	
5137.50	-8.8	H	3.0	43.1	1.0	-50.9	-13.0	-37.9	
6850.00	-6.4	H	3.0	43.0	1.0	-48.4	-13.0	-35.4	
Mid Ch, 1745MHz									
3490.00	-0.5	V	3.0	42.3	1.0	-41.8	-13.0	-28.8	
5235.00	-8.9	V	3.0	43.1	1.0	-51.0	-13.0	-38.0	
6980.00	-6.1	V	3.0	42.9	1.0	-48.1	-13.0	-35.1	
3490.00	1.9	H	3.0	42.3	1.0	-39.4	-13.0	-26.4	
5235.00	-8.6	H	3.0	43.1	1.0	-50.7	-13.0	-37.7	
6980.00	-6.2	H	3.0	42.9	1.0	-48.1	-13.0	-35.1	
High Ch, 1777.5MHz									
3555.00	-3.6	V	3.0	42.3	1.0	-44.9	-13.0	-31.9	
5332.50	-8.2	V	3.0	43.1	1.0	-50.3	-13.0	-37.3	
7110.00	-6.3	V	3.0	42.9	1.0	-48.2	-13.0	-35.2	
3555.00	-0.1	H	3.0	42.3	1.0	-41.4	-13.0	-28.4	
5332.50	-7.8	H	3.0	43.1	1.0	-49.9	-13.0	-36.9	
7110.00	-6.5	H	3.0	42.9	1.0	-48.4	-13.0	-35.4	

LTE Band 66 (Sub ANT)

LTE Band 66

20MHz

QPSK

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

Company:	Samsung
Project #:	4790160849
Date:	12/21/2021
Test Engineer:	25546
Configuration:	EUT, Y-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 66 Harmonics, 20MHz 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, 1720MHz									
3440.00	-0.7	V	3.0	45.7	1.0	-45.5	-13.0	-32.5	
5160.00	-9.1	V	3.0	45.8	1.0	-53.9	-13.0	-40.9	
6880.00	-5.7	V	3.0	44.9	1.0	-49.6	-13.0	-36.6	
8600.00	-4.8	V	3.0	43.8	1.0	-47.6	-13.0	-34.6	
10320.00	-1.2	V	3.0	42.7	1.0	-42.8	-13.0	-29.8	
3440.00	7.2	H	3.0	45.7	1.0	-37.5	-13.0	-24.5	
5160.00	-0.3	H	3.0	45.8	1.0	-45.1	-13.0	-32.1	
6880.00	2.4	H	3.0	44.9	1.0	-41.4	-13.0	-28.4	
8600.00	3.5	H	3.0	43.8	1.0	-39.3	-13.0	-26.3	
10320.00	-1.4	H	3.0	42.7	1.0	-43.1	-13.0	-30.1	
Mid Ch, 1745MHz									
3490.00	3.8	V	3.0	45.7	1.0	-40.9	-13.0	-27.9	
5235.00	0.4	V	3.0	45.8	1.0	-44.3	-13.0	-31.3	
6980.00	2.3	V	3.0	44.8	1.0	-41.5	-13.0	-28.5	
8725.00	4.4	V	3.0	43.7	1.0	-38.3	-13.0	-25.3	
10470.00	-1.1	V	3.0	42.7	1.0	-42.9	-13.0	-29.9	
3490.00	5.1	H	3.0	45.7	1.0	-39.6	-13.0	-26.6	
5235.00	1.7	H	3.0	45.8	1.0	-43.1	-13.0	-30.1	
6980.00	2.7	H	3.0	44.8	1.0	-41.1	-13.0	-28.1	
8725.00	3.6	H	3.0	43.7	1.0	-39.1	-13.0	-26.1	
10470.00	-1.3	H	3.0	42.7	1.0	-43.1	-13.0	-30.1	
High Ch, 1770MHz									
3540.00	1.7	V	3.0	45.8	1.0	-43.0	-13.0	-30.0	
5310.00	-7.3	V	3.0	45.8	1.0	-52.0	-13.0	-39.0	
7080.00	-5.7	V	3.0	44.7	1.0	-49.5	-13.0	-36.5	
8850.00	-4.8	V	3.0	43.6	1.0	-47.4	-13.0	-34.4	
10620.00	-0.9	V	3.0	42.8	1.0	-42.6	-13.0	-29.6	
3540.00	3.9	H	3.0	45.8	1.0	-40.9	-13.0	-27.9	
5310.00	-6.4	H	3.0	45.8	1.0	-51.2	-13.0	-38.2	
7080.00	-5.8	H	3.0	44.7	1.0	-49.5	-13.0	-36.5	
8850.00	-4.6	H	3.0	43.6	1.0	-47.2	-13.0	-34.2	
10620.00	-1.0	H	3.0	42.8	1.0	-42.8	-13.0	-29.8	

NR Band 5

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

Company: Samsung
Project #: 4790160849
Date: 12/6/2021
Test Engineer: 19568
Configuration: EUT/ AC Adapter, Z-Position
Location: Chamber 1
Mode: LTE_QPSK NR n5 Harmonics, 10MHz Bandwidth
Test Votage: AC 120 V, 60 Hz

NR Band 5

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, 829MHz									
1658.00	-10.1	V	3.0	45.6	1.0	-54.7	-13.0	-41.7	
2487.00	-7.0	V	3.0	45.5	1.0	-51.4	-13.0	-38.4	
3316.00	-4.9	V	3.0	45.7	1.0	-49.6	-13.0	-36.6	
1658.00	-11.4	H	3.0	45.6	1.0	-56.0	-13.0	-43.0	
2487.00	-7.6	H	3.0	45.5	1.0	-52.0	-13.0	-39.0	
3316.00	-4.8	H	3.0	45.7	1.0	-49.5	-13.0	-36.5	
Mid Ch, 836.5MHz									
1673.00	-10.4	V	3.0	45.6	1.0	-55.0	-13.0	-42.0	
2509.50	-7.0	V	3.0	45.5	1.0	-51.5	-13.0	-38.5	
3346.00	-4.6	V	3.0	45.7	1.0	-49.2	-13.0	-36.2	
1673.00	-11.2	H	3.0	45.6	1.0	-55.8	-13.0	-42.8	
2509.50	-7.7	H	3.0	45.5	1.0	-52.2	-13.0	-39.2	
3346.00	-4.0	H	3.0	45.7	1.0	-48.6	-13.0	-35.6	
High Ch, 844MHz									
1688.00	-9.9	V	3.0	45.6	1.0	-54.5	-13.0	-41.5	
2532.00	-7.3	V	3.0	45.5	1.0	-51.8	-13.0	-38.8	
3376.00	-4.2	V	3.0	45.7	1.0	-48.9	-13.0	-35.9	
1688.00	-11.5	H	3.0	45.6	1.0	-56.1	-13.0	-43.1	
2532.00	-7.9	H	3.0	45.5	1.0	-52.4	-13.0	-39.4	
3376.00	-4.6	H	3.0	45.7	1.0	-49.3	-13.0	-36.3	

NR Band 66 (Main ANT)

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

Company:	Samsung
Project #:	4790160849
Date:	12/28/2021
Test Engineer:	19568
Configuration:	EUT, X-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	0.0	V	3.0	45.7	1.0	-44.7	-13.0	-31.7	
5160.00	0.0	V	3.0	45.8	1.0	-44.8	-13.0	-31.8	
6880.00	0.0	V	3.0	44.9	1.0	-43.9	-13.0	-30.9	
8600.00	0.0	V	3.0	43.8	1.0	-42.8	-13.0	-29.8	
10320.00	0.0	V	3.0	42.7	1.0	-41.7	-13.0	-28.7	
3440.00	0.0	H	3.0	45.7	1.0	-44.7	-13.0	-31.7	
5160.00	0.0	H	3.0	45.8	1.0	-44.8	-13.0	-31.8	
6880.00	0.0	H	3.0	44.9	1.0	-43.9	-13.0	-30.9	
8600.00	0.0	H	3.0	43.8	1.0	-42.8	-13.0	-29.8	
10320.00	0.0	H	3.0	42.7	1.0	-41.7	-13.0	-28.7	
Mid Ch, 1745MHz									
3490.00	1.2	V	3.0	45.7	1.0	-43.5	-13.0	-30.5	
5235.00	0.0	V	3.0	45.8	1.0	-44.8	-13.0	-31.8	
6980.00	0.0	V	3.0	44.8	1.0	-43.8	-13.0	-30.8	
8725.00	0.0	V	3.0	43.7	1.0	-42.7	-13.0	-29.7	
10470.00	0.0	V	3.0	42.7	1.0	-41.7	-13.0	-28.7	
3490.00	3.3	H	3.0	45.7	1.0	-41.4	-13.0	-28.4	
5235.00	-8.8	H	3.0	45.8	1.0	-53.6	-13.0	-40.6	
6980.00	0.0	H	3.0	44.8	1.0	-43.8	-13.0	-30.8	
8725.00	0.0	H	3.0	43.7	1.0	-42.7	-13.0	-29.7	
10470.00	0.0	H	3.0	42.7	1.0	-41.7	-13.0	-28.7	
High Ch, 1770MHz									
3540.00	0.0	V	3.0	45.8	1.0	-44.8	-13.0	-31.8	
5310.00	0.0	V	3.0	45.8	1.0	-44.8	-13.0	-31.8	
7080.00	0.0	V	3.0	44.7	1.0	-43.7	-13.0	-30.7	
8850.00	0.0	V	3.0	43.6	1.0	-42.6	-13.0	-29.6	
10620.00	0.0	V	3.0	42.8	1.0	-41.8	-13.0	-28.8	
3540.00	0.0	H	3.0	45.8	1.0	-44.8	-13.0	-31.8	
5310.00	0.0	H	3.0	45.8	1.0	-44.8	-13.0	-31.8	
7080.00	0.0	H	3.0	44.7	1.0	-43.7	-13.0	-30.7	
8850.00	0.0	H	3.0	43.6	1.0	-42.6	-13.0	-29.6	
10620.00	0.0	H	3.0	42.8	1.0	-41.8	-13.0	-28.8	

NR Band 66 (Sub ANT)

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

Company:	Samsung
Project #:	479010680849
Date:	12/24/2021
Test Engineer:	25546
Configuration:	EUT
Location:	Chamber 1
Mode:	LTE_QPSK NR n66 Harmonics, 15MHz Bandwidth
Test Votage:	AC 120 V, 60 Hz

NR Band 66

15MHz

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, 1717.5MHz									
3435.00	-1.2	V	3.0	45.7	1.0	-45.9	-13.0	-32.9	
5152.50	-9.0	V	3.0	45.8	1.0	-53.8	-13.0	-40.8	
6870.00	-5.8	V	3.0	44.9	1.0	-49.7	-13.0	-36.7	
3435.00	-0.3	H	3.0	45.7	1.0	-45.0	-13.0	-32.0	
5152.50	-9.1	H	3.0	45.8	1.0	-53.9	-13.0	-40.9	
6870.00	-5.9	H	3.0	44.9	1.0	-49.8	-13.0	-36.8	
Mid Ch, 1745MHz									
3490.00	3.1	V	3.0	45.7	1.0	-41.7	-13.0	-28.7	
5235.00	-8.4	V	3.0	45.8	1.0	-53.2	-13.0	-40.2	
6980.00	-5.6	V	3.0	44.8	1.0	-49.4	-13.0	-36.4	
3490.00	2.4	H	3.0	45.7	1.0	-42.4	-13.0	-29.4	
5235.00	-8.7	H	3.0	45.8	1.0	-53.5	-13.0	-40.5	
6980.00	-5.8	H	3.0	44.8	1.0	-49.6	-13.0	-36.6	
High Ch, 1772.5MHz									
3545.00	1.5	V	3.0	45.8	1.0	-43.3	-13.0	-30.3	
5317.50	-8.6	V	3.0	45.8	1.0	-53.4	-13.0	-40.4	
7090.00	-5.6	V	3.0	44.7	1.0	-49.3	-13.0	-36.3	
3545.00	3.0	H	3.0	45.8	1.0	-41.8	-13.0	-28.8	
5317.50	-8.3	H	3.0	45.8	1.0	-53.1	-13.0	-40.1	
7090.00	-5.6	H	3.0	44.7	1.0	-49.3	-13.0	-36.3	

END OF REPORT