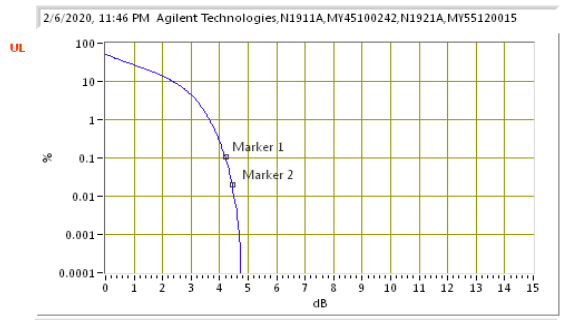
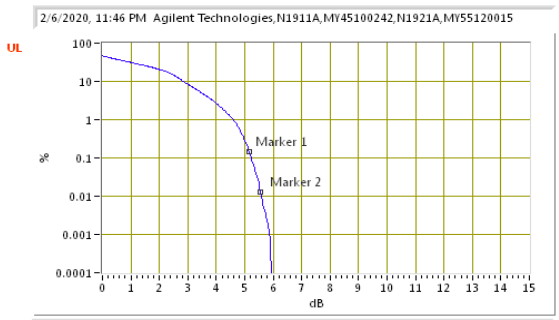
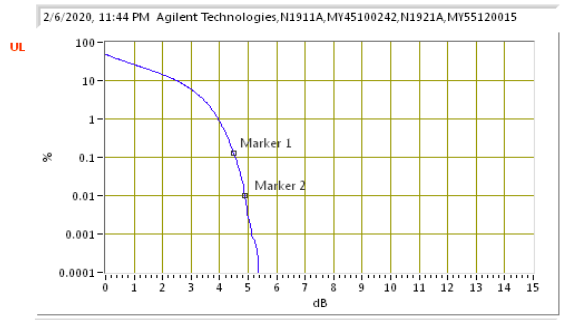
8.5.7. LTE BAND 13



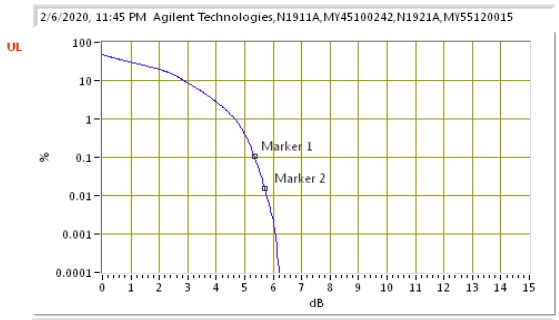
LTE B13 5MHz QPSK Middle Channel



LTE B13 5MHz 16QAM Middle Channel

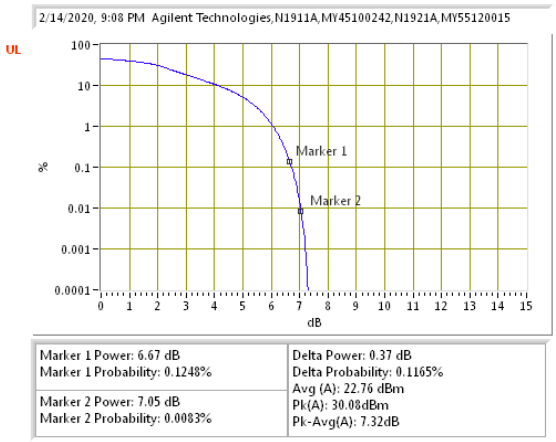


LTE B13 10MHz QPSK Middle Channel

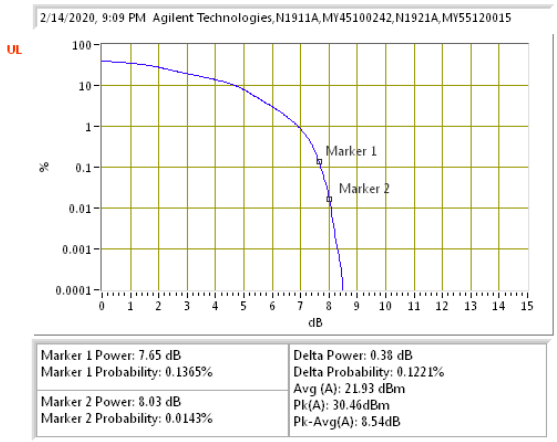


LTE B13 10MHz 16QAM Middle Channel

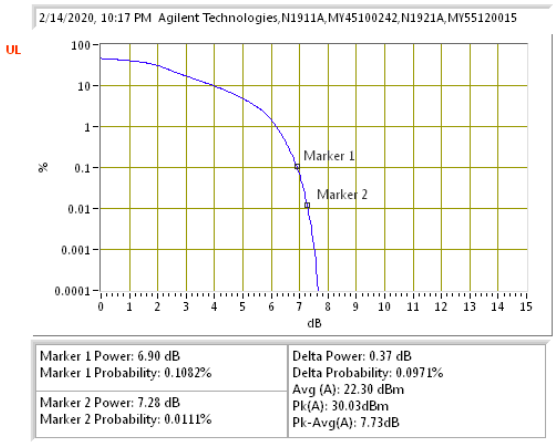
8.5.8. LTE BAND 41 (FCC)



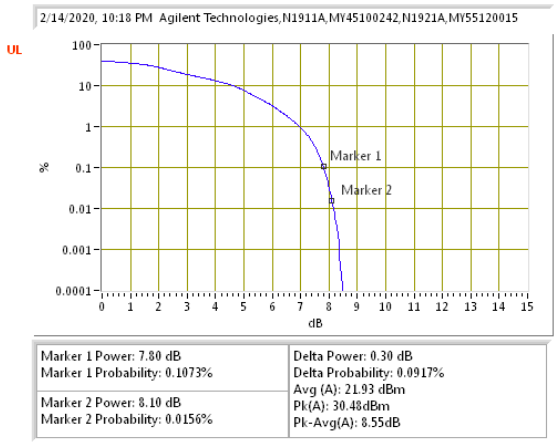
LTE B41 5MHz QPSK Middle Channel



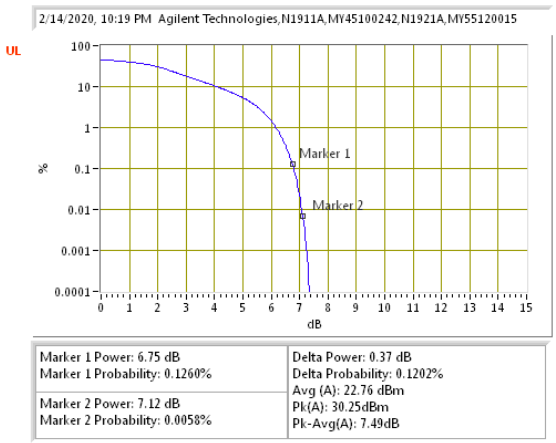
LTE B41 5MHz 16QAM Middle Channel



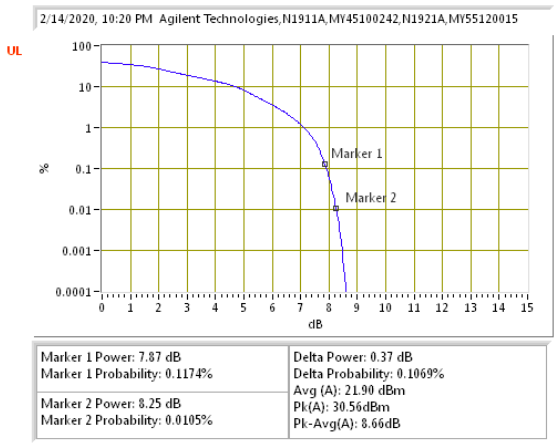
LTE B41 10MHz QPSK Middle Channel



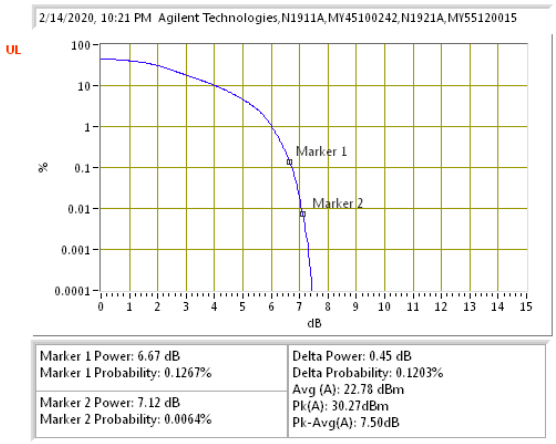
LTE B41 10MHz 16QAM Middle Channel



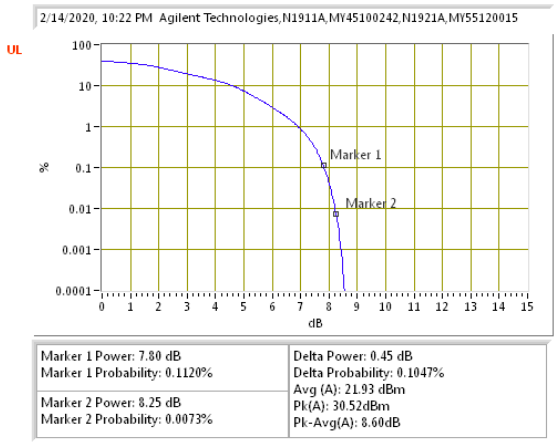
LTE B41 15MHz QPSK Middle Channel



LTE B41 15MHz 16QAM Middle Channel

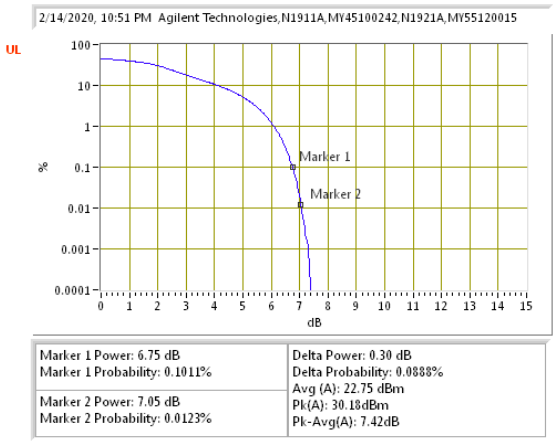


LTE B41 20MHz QPSK Middle Channel

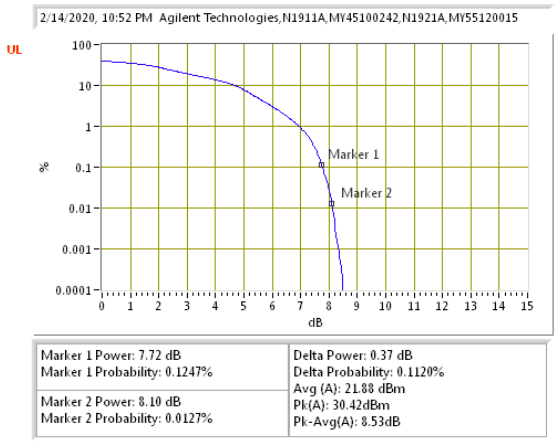


LTE B41 20MHz 16QAM Middle Channel

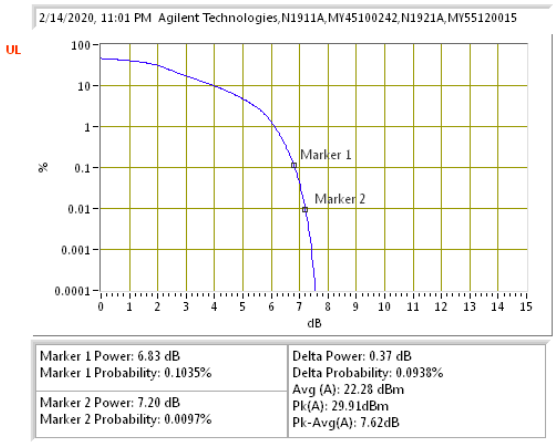
8.5.9. LTE BAND 41 (IC)



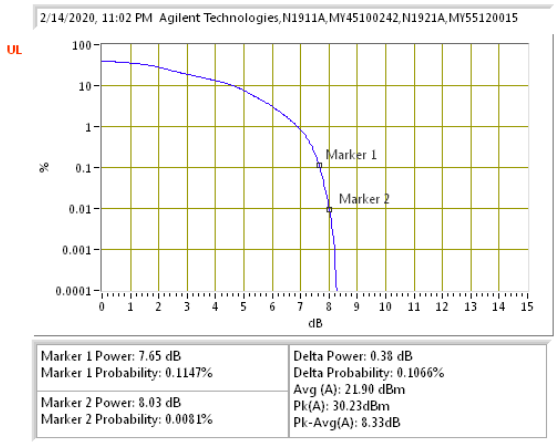
LTE B41 5MHz QPSK Middle Channel



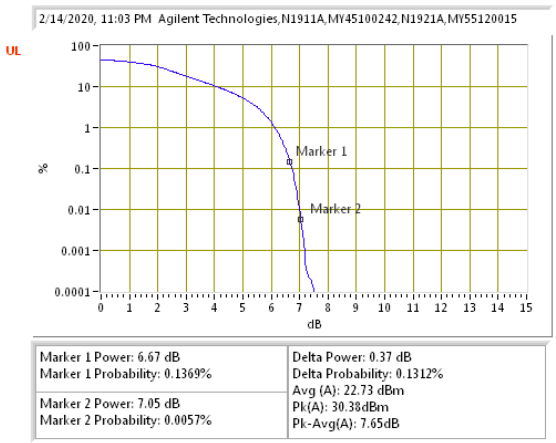
LTE B41 5MHz 16QAM Middle Channel



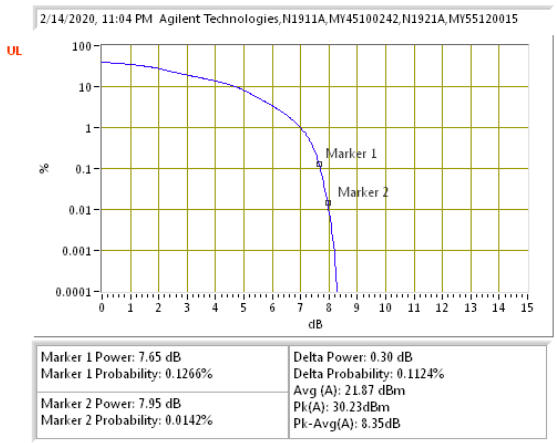
LTE B41 10MHz QPSK Middle Channel



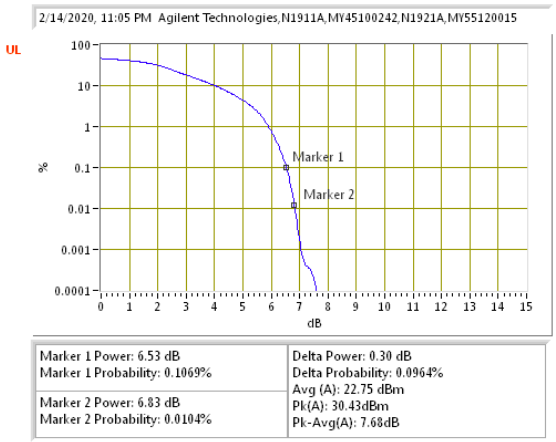
LTE B41 10MHz 16QAM Middle Channel



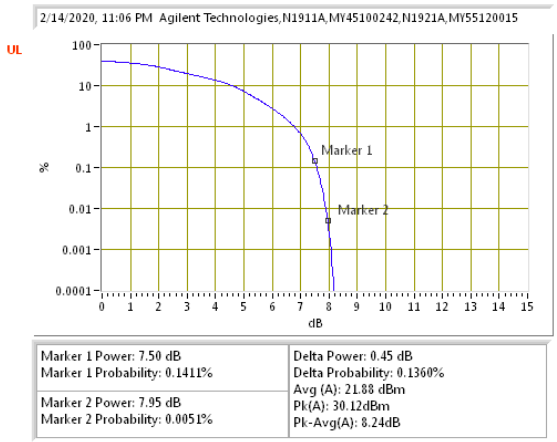
LTE B41 15MHz QPSK Middle Channel



LTE B41 15MHz 16QAM Middle Channel

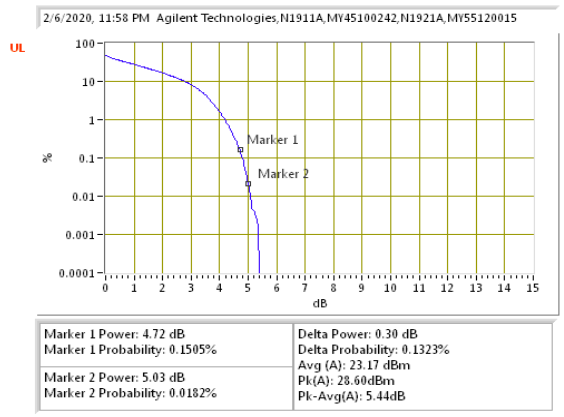


LTE B41 20MHz QPSK Middle Channel

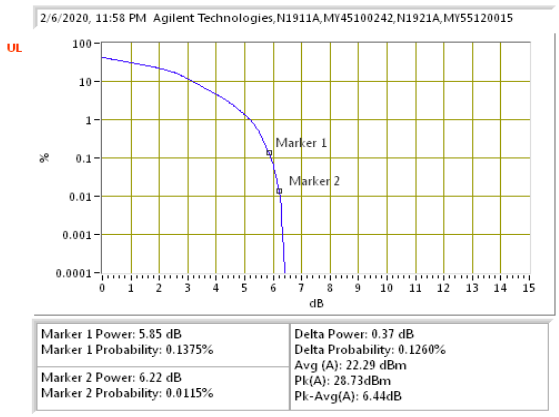


LTE B41 20MHz 16QAM Middle Channel

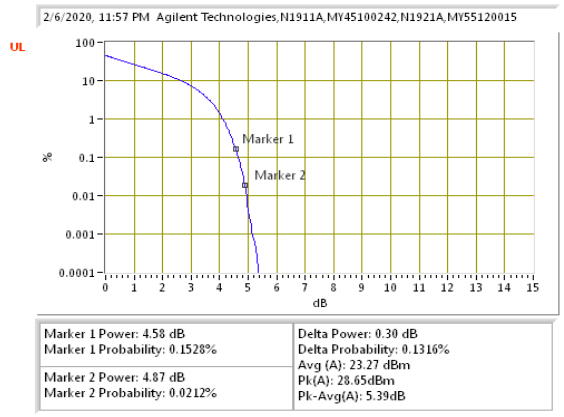
8.5.10. LTE BAND 66



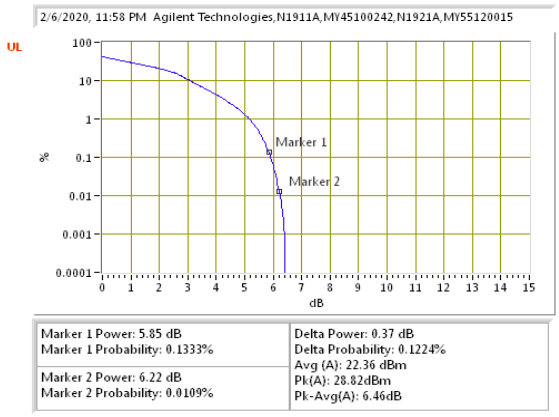
LTE B66 1.4MHz QPSK Middle Channel



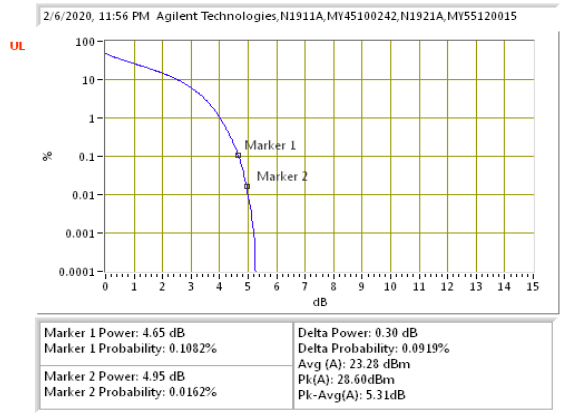
LTE B66 1.4MHz 16QAM Middle Channel



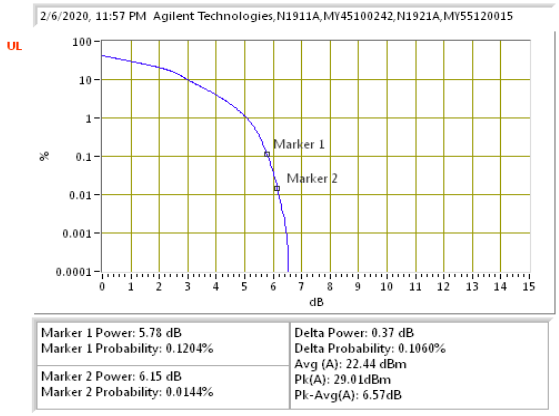
LTE B66 3MHz QPSK Middle Channel



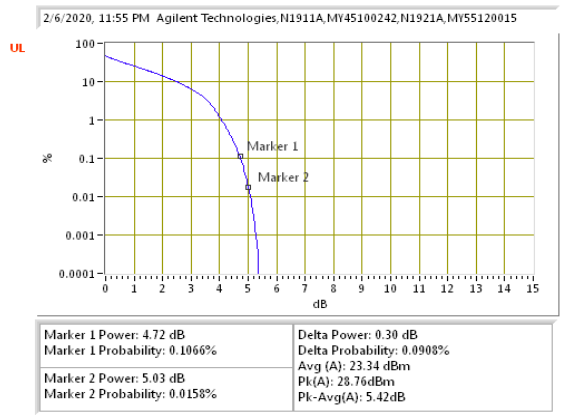
LTE B66 3MHz 16QAM Middle Channel



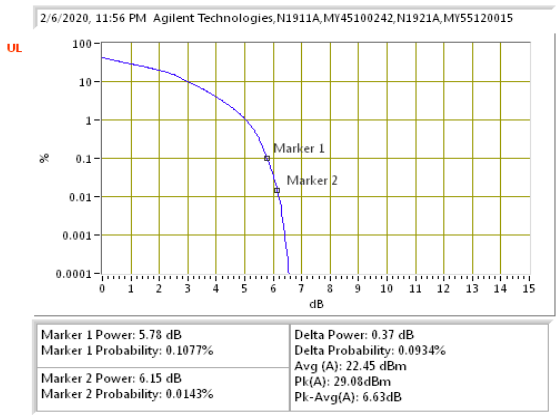
LTE B66 5MHz QPSK Middle Channel



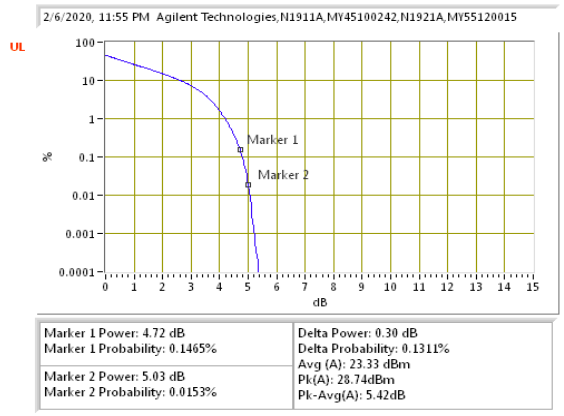
LTE B66 5MHz 16QAM Middle Channel



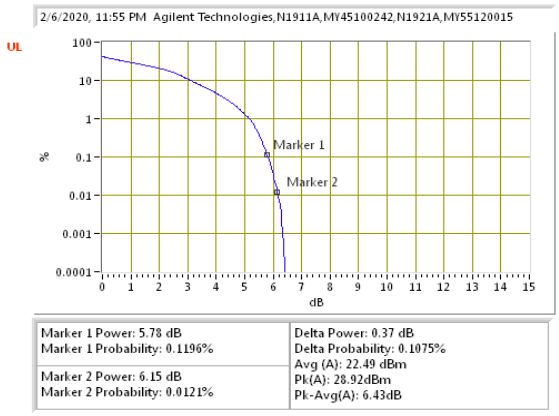
LTE B66 10MHz QPSK Middle Channel



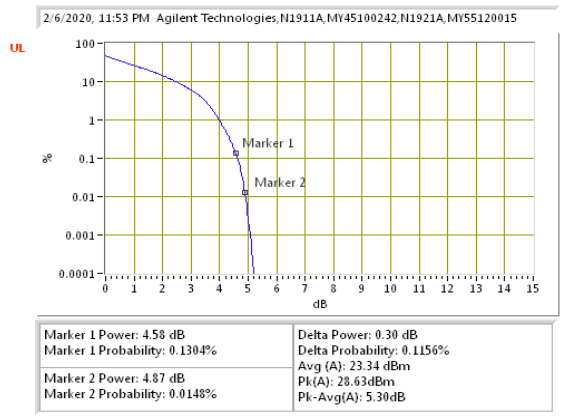
LTE B66 10MHz 16QAM Middle Channel



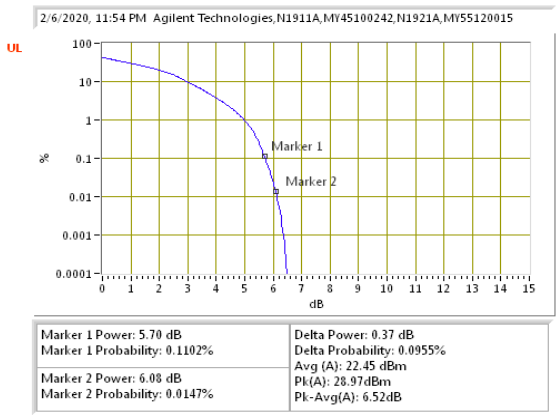
LTE B66 15MHz QPSK Middle Channel



LTE B66 15MHz 16QAM Middle Channel

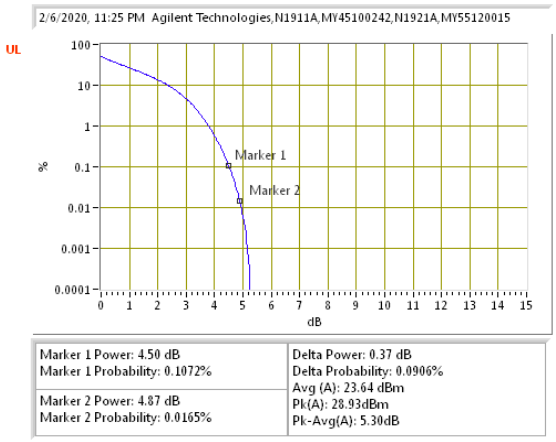


LTE B66 20MHz QPSK Middle Channel

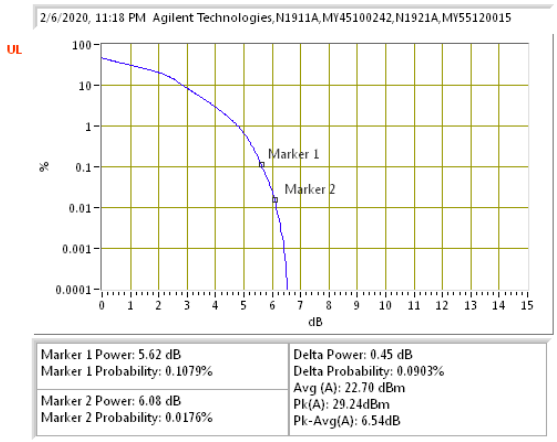


LTE B66 20MHz 16QAM Middle Channel

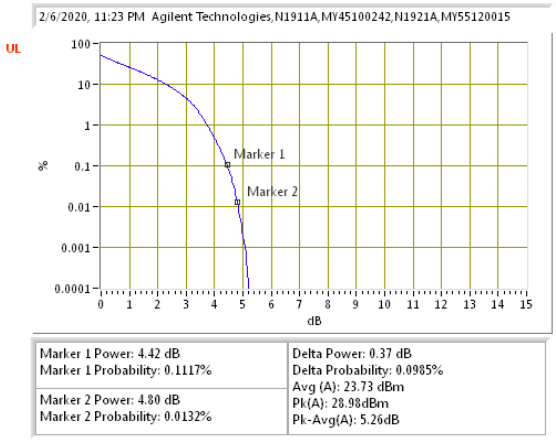
8.5.11. LTE BAND 71



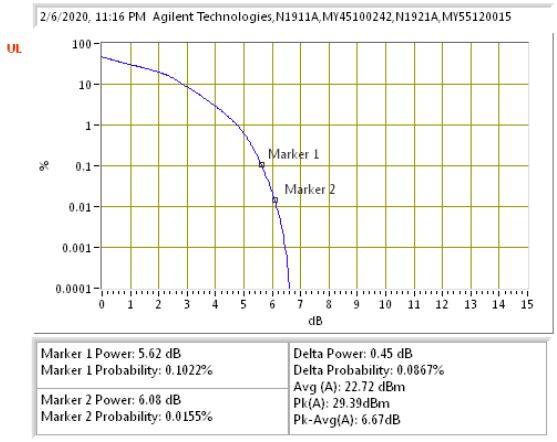
LTE B71 5MHz QPSK Middle Channel



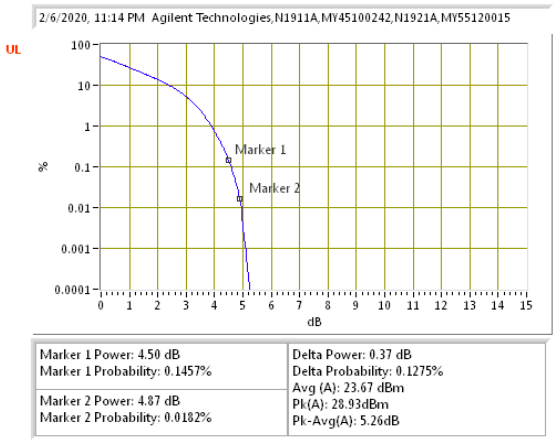
LTE B71 5MHz 16QAM Middle Channel



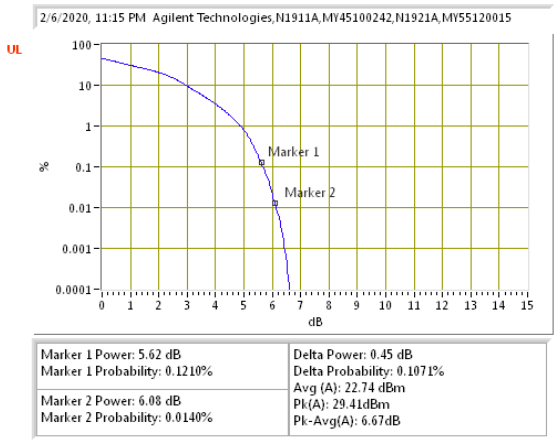
LTE B71 10MHz QPSK Middle Channel



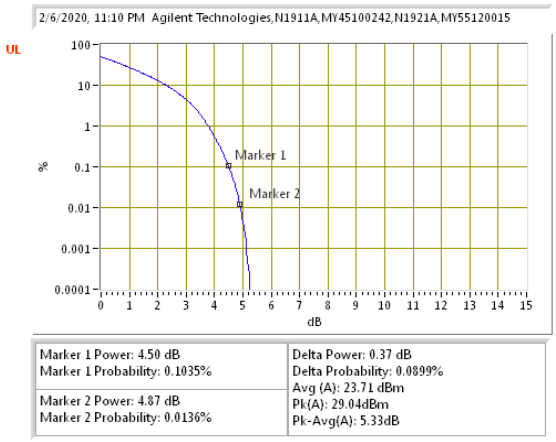
LTE B71 10MHz 16QAM Middle Channel



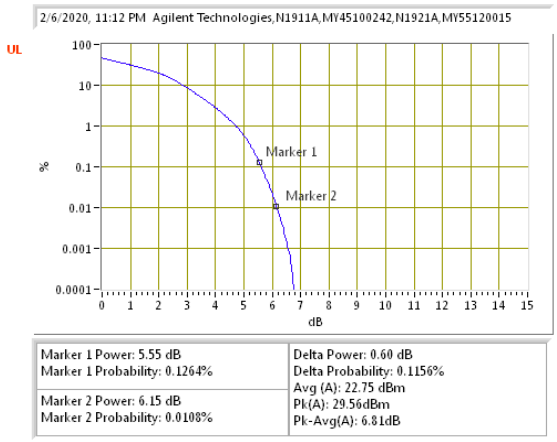
LTE B71 15MHz QPSK Middle Channel



LTE B71 15MHz 16QAM Middle Channel



LTE B71 20MHz QPSK Middle Channel



LTE B71 20MHz 16QAM Middle Channel

9. RADIATED TEST RESULTS

9.1. EFFECTIVE RADIATED POWER ERP/EIRP

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, and §27.50
RSS130§4.4, RSS132§5.4; RSS133§6.4, RSS139§6.5, RSS199§4.4

LIMITS

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

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

27.50(c) - (10) Portable stations (hand-held devices) are limited to 3 watts ERP; (LTE B12)

27.50(d) - (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.(Band 66)

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 (2016), Clause 2.2.17; PSA setting reference to 971168 D01 v03r01

For peak power measurement with a PSA:

a) Set the RBW ≥ OBW; b) Set VBW ≥ 3 × RBW; c) Set span ≥ 2 x RBW; d) Sweep time = auto couple; e) Detector = peak; f) Ensure that the number of measurement points ≥ span/RBW; g) Trace mode = max hold;

For average power measurement with a PSA:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW ≥ 3 x RBW; d) Set number of points in sweep ≥ 2 × span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle ≥ 98; h) Use trigger to capture bursts If burst duty cycle < 98; i) Trace average at least 100 traces in power averaging (*i.e.*, RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.

MODES TESTED

GSM, WCMDA, and LTE

TEST RESULTS

GSM

Band	Mode	Channel	f(MHz)	ERP/EIRP	
				dBm	W
GSM 850	GPRS	128	824.2	29.64	0.9204
		190	836.6	28.96	0.7870
		251	848.8	29.14	0.8204
	EGPRS	128	824.2	22.50	0.1778
		190	836.6	21.35	0.1365
		251	848.8	22.18	0.1652
GSM 1900	GPRS	512	1850.2	29.42	0.8750
		661	1880.0	29.80	0.9550
		810	1909.8	29.70	0.9333
	EGPRS	512	1850.2	24.14	0.2594
		661	1880.0	24.88	0.3076
		810	1909.8	24.48	0.2805

WCDMA

Band	Mode	Channel	f(MHz)	ERP/EIRP	
				dBm	W
Band 5	REL99	4132	826.4	19.04	0.0802
		4183	836.6	18.81	0.0760
		4233	846.6	18.61	0.0726
	HSDPA	4132	826.4	18.03	0.0635
		4183	836.6	17.76	0.0597
		4233	846.6	17.65	0.0582
Band 2	REL99	9262	1852.4	21.43	0.1390
		9400	1880	21.93	0.1560
		9538	1907.6	20.55	0.1135
	HSDPA	9262	1852.4	20.48	0.1117
		9400	1880.0	20.91	0.1233
		9538	1907.6	19.57	0.0906
Band 4	REL99	1312	1712.4	21.12	0.1294
		1413	1732.6	21.45	0.1396
		1513	1752.6	22.27	0.1687
	HSDPA	1312	1712.4	20.38	0.1091
		1413	1732.6	20.59	0.1146
		1513	1752.6	21.20	0.1318

LTE Band 2

BW (MHz)	Mode	RB/RB Size	f(MHz)	EIRP	
				dBm	W
20	QPSK	1/0	1860	22.82	0.1914
		1/0	1880	23.21	0.2094
		1/0	1900	22.70	0.1862
	16QAM	1/0	1860	22.00	0.1585
		1/0	1880	22.57	0.1807
		1/0	1900	22.24	0.1675
15	QPSK	1/0	1857.5	22.24	0.1675
		1/0	1880	22.74	0.1879
		1/0	1902.5	23.31	0.2143
	16QAM	1/0	1857.5	21.36	0.1368
		1/0	1880	22.13	0.1633
		1/0	1902.5	22.63	0.1832
10	QPSK	1/0	1855	21.23	0.1327
		1/0	1880	22.77	0.1892
		1/0	1905	22.88	0.1941
	16QAM	1/0	1855	20.40	0.1096
		1/0	1880	21.94	0.1563
		1/0	1905	22.12	0.1629
5	QPSK	1/0	1852.5	21.86	0.1535
		1/0	1880	22.78	0.1897
		1/0	1907.5	22.89	0.1945
	16QAM	1/0	1852.5	21.32	0.1355
		1/0	1880	21.96	0.1570
		1/0	1907.5	22.05	0.1603
3	QPSK	1/0	1851.5	22.08	0.1614
		1/0	1880	22.94	0.1968
		1/0	1908.5	22.77	0.1892
	16QAM	1/0	1851.5	21.25	0.1334
		1/0	1880	22.18	0.1652
		1/0	1908.5	21.90	0.1549
1.4	QPSK	1/0	1850.7	21.71	0.1483
		1/0	1880	22.56	0.1803
		1/0	1909.3	22.69	0.1858
	16QAM	1/0	1850.7	20.95	0.1245
		1/0	1880	21.84	0.1528
		1/0	1909.3	21.85	0.1531

LTE Band 5

BW (MHz)	Mode	RB/RB Size	f(MHz)	ERP	
				dBm	W
10	QPSK	1/0	829	20.58	0.1143
		1/0	836.5	20.54	0.1132
		1/0	844	19.91	0.0979
	16QAM	1/0	829	20.21	0.1050
		1/0	836.5	20.17	0.1040
		1/0	844	19.47	0.0885
5	QPSK	1/0	826.5	20.34	0.1081
		1/0	836.5	20.40	0.1096
		1/0	846.5	19.65	0.0923
	16QAM	1/0	826.5	20.02	0.1005
		1/0	836.5	20.18	0.1042
		1/0	846.5	19.35	0.0861
3	QPSK	1/0	825.5	20.42	0.1102
		1/0	836.5	20.29	0.1069
		1/0	847.5	19.44	0.0879
	16QAM	1/0	825.5	19.98	0.0995
		1/0	836.5	19.96	0.0991
		1/0	847.5	19.06	0.0805
1.4	QPSK	1/0	824.7	20.18	0.1042
		1/0	836.5	19.96	0.0991
		1/0	848.3	19.04	0.0802
	16QAM	1/0	824.7	19.76	0.0946
		1/0	836.5	19.55	0.0902
		1/0	848.3	18.66	0.0735

LTE Band 7

BW (MHz)	Mode	RB/RB Size	f(MHz)	EIRP	
				dBm	W
20	QPSK	1/0	2510	21.31	0.1352
		1/0	2535	21.60	0.1445
		1/0	2560	21.37	0.1371
	16QAM	1/0	2510	20.54	0.1132
		1/0	2535	20.97	0.1250
		1/0	2560	20.70	0.1175
15	QPSK	1/0	2507.5	21.23	0.1327
		1/0	2535	21.66	0.1466
		1/0	2562.5	21.32	0.1355
	16QAM	1/0	2507.5	20.51	0.1125
		1/0	2535	20.82	0.1208
		1/0	2562.5	20.56	0.1138
10	QPSK	1/0	2505.0	20.92	0.1236
		1/0	2535.0	21.77	0.1503
		1/0	2565.0	21.34	0.1361
	16QAM	1/0	2505.0	20.06	0.1014
		1/0	2535.0	20.97	0.1250
		1/0	2565.0	20.58	0.1143
5	QPSK	1/0	2502.5	21.04	0.1271
		1/0	2535.0	22.07	0.1611
		1/0	2567.5	21.15	0.1303
	16QAM	1/0	2502.5	20.22	0.1052
		1/0	2535.0	21.35	0.1365
		1/0	2567.5	20.29	0.1069

LTE Band 12

BW (MHz)	Mode	RB/RB Size	f(MHz)	ERP	
				dBm	W
10	QPSK	1/0	704	19.92	0.0982
		1/0	707.5	19.80	0.0955
		1/0	711	20.02	0.1005
	16QAM	1/0	704	19.09	0.0811
		1/0	707.5	18.99	0.0793
		1/0	711	19.10	0.0813
5	QPSK	1/0	701.5	19.83	0.0962
		1/0	707.5	19.89	0.0975
		1/0	713.5	20.16	0.1038
	16QAM	1/0	701.5	19.01	0.0796
		1/0	707.5	19.03	0.0800
		1/0	713.5	19.42	0.0875
3	QPSK	1/0	700.5	19.64	0.0920
		1/0	707.5	19.94	0.0986
		1/0	714.5	19.93	0.0984
	16QAM	1/0	700.5	18.80	0.0759
		1/0	707.5	19.09	0.0811
		1/0	714.5	19.13	0.0818
1.4	QPSK	1/0	699.7	19.72	0.0938
		1/0	707.5	19.45	0.0881
		1/0	715.3	19.69	0.0931
	16QAM	1/0	699.7	18.80	0.0759
		1/0	707.5	18.56	0.0718
		1/0	715.3	18.84	0.0766

LTE Band 13

BW (MHz)	Mode	RB/RB Size	f(MHz)	ERP	
				dBm	W
10	QPSK				
		1/0	782	20.71	0.1178
	16QAM				
		1/0	782	19.86	0.0968
5	QPSK	1/0	779.5	20.50	0.1122
		1/0	782	20.65	0.1161
		1/0	784.5	20.38	0.1091
	16QAM	1/0	779.5	19.73	0.0940
		1/0	782	19.75	0.0944
		1/0	784.5	19.52	0.0895

LTE Band 41 (FCC)

BW (MHz)	Mode	RB/RB Size	f(MHz)	EIRP	
				dBm	W
20	QPSK	1/0	2506	22.25	0.1679
		1/0	2593	22.65	0.1841
		1/0	2680	20.96	0.1247
	16QAM	1/0	2506	21.58	0.1439
		1/0	2593	21.98	0.1578
		1/0	2680	20.12	0.1028
15	QPSK	1/0	2503.5	21.36	0.1368
		1/0	2593	21.86	0.1535
		1/0	2682.5	21.19	0.1315
	16QAM	1/0	2503.5	20.67	0.1167
		1/0	2593	20.94	0.1242
		1/0	2682.5	20.33	0.1079
10	QPSK	1/0	2501	21.15	0.1303
		1/0	2593	22.06	0.1607
		1/0	2685	21.43	0.1390
	16QAM	1/0	2501	20.14	0.1033
		1/0	2593	21.02	0.1265
		1/0	2685	20.28	0.1067
5	QPSK	1/0	2498.5	20.90	0.1230
		1/0	2593	21.94	0.1563
		1/0	2687.5	21.55	0.1429
	16QAM	1/0	2498.5	20.02	0.1005
		1/0	2593	20.87	0.1222
		1/0	2687.5	20.44	0.1107

LTE Band 41 (IC)

BW (MHz)	Mode	RB/RB Size	f(MHz)	EIRP	
				dBm	W
20	QPSK	1/0	2510	22.41	0.1742
		1/0	2595	22.74	0.1879
		1/0	2680	20.96	0.1247
	16QAM	1/0	2510	21.58	0.1439
		1/0	2595	21.83	0.1524
		1/0	2680	20.12	0.1028
15	QPSK	1/0	2507.5	21.70	0.1479
		1/0	2595	21.47	0.1403
		1/0	2682.5	21.19	0.1315
	16QAM	1/0	2507.5	20.73	0.1183
		1/0	2595	20.64	0.1159
		1/0	2682.5	20.33	0.1079
10	QPSK	1/0	2505	21.72	0.1486
		1/0	2595	21.88	0.1542
		1/0	2685	21.43	0.1390
	16QAM	1/0	2505	20.56	0.1138
		1/0	2595	20.98	0.1253
		1/0	2685	20.28	0.1067
5	QPSK	1/0	2592.5	21.62	0.1452
		1/0	2595	21.96	0.1570
		1/0	2687.5	21.55	0.1429
	16QAM	1/0	2592.5	20.59	0.1146
		1/0	2595	20.70	0.1175
		1/0	2687.5	20.44	0.1107

LTE Band 66

BW (MHz)	Mode	RB/RB Size	f(MHz)	EIRP	
				dBm	W
20	QPSK	1/0	1720	23.11	0.2046
		1/0	1745	22.55	0.1799
		1/0	1770	22.28	0.1690
	16QAM	1/0	1720	21.93	0.1560
		1/0	1745	21.85	0.1531
		1/0	1770	21.21	0.1321
15	QPSK	1/0	1717.5	23.07	0.2028
		1/0	1745	22.78	0.1897
		1/0	1772.5	22.20	0.1660
	16QAM	1/0	1717.5	21.95	0.1567
		1/0	1745	22.06	0.1607
		1/0	1772.5	21.01	0.1262
10	QPSK	1/0	1715	23.06	0.2023
		1/0	1745	23.05	0.2018
		1/0	1775	22.48	0.1770
	16QAM	1/0	1715	21.94	0.1563
		1/0	1745	22.19	0.1656
		1/0	1775	21.33	0.1358
5	QPSK	1/0	1712.5	23.06	0.2023
		1/0	1745	23.48	0.2228
		1/0	1777.5	22.38	0.1730
	16QAM	1/0	1712.5	22.19	0.1656
		1/0	1745	22.61	0.1824
		1/0	1777.5	21.48	0.1406
3	QPSK	1/0	1711.5	23.00	0.1995
		1/0	1745	23.52	0.2249
		1/0	1778.5	22.10	0.1622
	16QAM	1/0	1711.5	21.95	0.1567
		1/0	1745	22.59	0.1816
		1/0	1778.5	21.20	0.1318
1.4	QPSK	1/0	1710.7	22.91	0.1954
		1/0	1745	23.25	0.2113
		1/0	1779.3	21.79	0.1510
	16QAM	1/0	1710.7	21.97	0.1574
		1/0	1745	22.30	0.1698
		1/0	1779.3	20.89	0.1227

LTE Band 71

BW (MHz)	Mode	RB/RB Size	f(MHz)	ERP	
				dBm	W
20	QPSK	1/0	673	19.22	0.0836
		1/0	680.5	19.55	0.0902
		1/0	688	19.77	0.0948
	16QAM	1/0	673	18.64	0.0731
		1/0	680.5	18.80	0.0759
		1/0	688	18.94	0.0783
15	QPSK	1/0	670.5	18.81	0.0760
		1/0	680.5	19.47	0.0885
		1/0	690.5	19.74	0.0942
	16QAM	1/0	670.5	18.21	0.0662
		1/0	680.5	18.59	0.0723
		1/0	690.5	18.91	0.0778
10	QPSK	1/0	668	18.70	0.0741
		1/0	680.5	19.31	0.0853
		1/0	693	19.81	0.0957
	16QAM	1/0	668	18.09	0.0644
		1/0	680.5	18.43	0.0697
		1/0	693	18.96	0.0787
5	QPSK	1/0	665.5	18.76	0.0752
		1/0	680.5	19.15	0.0822
		1/0	695.5	19.44	0.0879
	16QAM	1/0	665.5	18.16	0.0655
		1/0	680.5	18.30	0.0676
		1/0	695.5	18.63	0.0729

9.1.1. GSM

GPRS 850

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/11/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: GPRS 850 MHz Fundamentals

Test Equpment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.20	25.91	V	4.1	0.5	22.36	38.5	-16.1	
824.20	33.39	H	4.1	0.3	29.64	38.5	-8.9	
Mid Ch								
836.60	25.73	V	4.1	0.5	22.15	38.5	-16.3	
836.60	32.74	H	4.1	0.3	28.96	38.5	-9.5	
High Ch								
848.80	25.08	V	4.1	0.5	21.48	38.5	-17.0	
848.80	32.94	H	4.1	0.3	29.14	38.5	-9.4	

EGPRS 850

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/11/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: EGPRS 850 MHz Fundamentals

Test Equpment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	18.71	V	4.1	0.5	15.16	38.5	-23.3	
824.20	26.25	H	4.1	0.3	22.50	38.5	-16.0	
Mid Ch								
836.60	17.93	V	4.1	0.5	14.35	38.5	-24.1	
836.60	25.13	H	4.1	0.3	21.35	38.5	-17.1	
High Ch								
848.80	18.05	V	4.1	0.5	14.45	38.5	-24.0	
848.80	25.98	H	4.1	0.3	22.18	38.5	-16.3	

GPRS 1900

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: GPRS 1900 MHz Fundamentals

Test Equpment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	30.37	V	6.1	4.5	28.78	33.0	-4.2	
1850.20	31.01	H	6.1	4.5	29.42	33.0	-3.6	
Mid Ch								
1880.00	29.99	V	6.2	4.6	28.33	33.0	-4.7	
1880.00	31.46	H	6.2	4.6	29.80	33.0	-3.2	
High Ch								
1909.80	30.03	V	6.3	4.6	28.32	33.0	-4.7	
1909.80	31.41	H	6.3	4.6	29.70	33.0	-3.3	

EGPRS 1900

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: EGPRS 1900 MHz Fundamentals

Test Equpment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	24.91	V	6.1	4.5	23.32	33.0	-9.7	
1850.20	25.73	H	6.1	4.5	24.14	33.0	-8.9	
Mid Ch								
1880.00	24.99	V	6.2	4.6	23.33	33.0	-9.7	
1880.00	26.54	H	6.2	4.6	24.88	33.0	-8.1	
High Ch								
1909.80	25.35	V	6.3	4.6	23.64	33.0	-9.4	
1909.80	26.19	H	6.3	4.6	24.48	33.0	-8.5	

9.1.2. WCDMA

B5 REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/11/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: Rel99 Band 5 Fundamentals

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	14.79	V	4.1	0.5	11.23	38.5	-27.3	
826.40	22.80	H	4.1	0.3	19.04	38.5	-19.5	
Mid Ch								
836.60	14.43	V	4.1	0.5	10.85	38.5	-27.6	
836.60	22.59	H	4.1	0.3	18.81	38.5	-19.7	
High Ch								
846.60	14.21	V	4.1	0.5	10.62	38.5	-27.9	
846.60	22.40	H	4.1	0.3	18.61	38.5	-19.9	

B5 HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/11/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: HSDPA Band 5 Fundamentals

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	13.89	V	4.1	0.5	10.33	38.5	-28.2	
826.40	21.79	H	4.1	0.3	18.03	38.5	-20.5	
Mid Ch								
836.60	13.48	V	4.1	0.5	9.90	38.5	-28.6	
836.60	21.54	H	4.1	0.3	17.76	38.5	-20.7	
High Ch								
846.60	13.23	V	4.1	0.5	9.64	38.5	-28.9	
846.60	21.44	H	4.1	0.3	17.65	38.5	-20.9	

B2 REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: Rel99 Band 2 Fundamentals

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	21.34	V	6.1	4.5	19.70	33.0	-13.3	
1852.40	23.07	H	6.1	4.5	21.43	33.0	-11.6	
Mid Ch								
1880.00	21.34	V	6.2	4.6	19.68	33.0	-13.3	
1880.00	23.59	H	6.2	4.6	21.93	33.0	-11.1	
High Ch								
1907.60	21.55	V	6.3	4.5	19.78	33.0	-13.2	
1907.60	22.32	H	6.3	4.5	20.55	33.0	-12.5	

B2 HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: HSDPA Band 2 Fundamentals

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	20.26	V	6.1	4.5	18.62	33.0	-14.4	
1852.40	22.12	H	6.1	4.5	20.48	33.0	-12.5	
Mid Ch								
1880.00	20.17	V	6.2	4.6	18.51	33.0	-14.5	
1880.00	22.57	H	6.2	4.6	20.91	33.0	-12.1	
High Ch								
1907.60	20.70	V	6.3	4.5	18.93	33.0	-14.1	
1907.60	21.34	H	6.3	4.5	19.57	33.0	-13.4	

B4 REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: Rel99 Band 4 Fundamentals

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	18.18	V	5.8	5.7	18.06	30.0	-11.9	
1712.40	21.24	H	5.8	5.7	21.12	30.0	-8.9	
Mid Ch								
1732.60	18.93	V	5.9	5.5	18.55	30.0	-11.5	
1732.60	21.83	H	5.9	5.5	21.45	30.0	-8.6	
High Ch								
1752.60	20.16	V	5.9	5.3	19.57	30.0	-10.4	
1752.60	22.86	H	5.9	5.3	22.27	30.0	-7.7	

B4 HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: HSDPA Band 4 Fundamentals

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	17.18	V	5.8	5.7	17.06	30.0	-12.9	
1712.40	20.50	H	5.8	5.7	20.38	30.0	-9.6	
Mid Ch								
1732.60	17.85	V	5.9	5.5	17.47	30.0	-12.5	
1732.60	20.97	H	5.9	5.5	20.59	30.0	-9.4	
High Ch								
1752.60	19.00	V	5.9	5.3	18.41	30.0	-11.6	
1752.60	21.79	H	5.9	5.3	21.20	30.0	-8.8	

9.1.3. LTE Band 2

20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	22.76	V	6.1	4.6	21.23	33.0	-11.8	
1860.00	24.35	H	6.1	4.6	22.82	33.0	-10.2	
Mid Ch								
1880.00	22.91	V	6.2	4.6	21.25	33.0	-11.8	
1880.00	24.87	H	6.2	4.6	23.21	33.0	-9.8	
High Ch	0.00							
1900.00	21.70	V	6.3	4.6	20.00	33.0	-13.0	
1900.00	24.40	H	6.3	4.6	22.70	33.0	-10.3	

20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	22.04	V	6.1	4.6	20.51	33.0	-12.5	
1860.00	23.53	H	6.1	4.6	22.00	33.0	-11.0	
Mid Ch								
1880.00	22.28	V	6.2	4.6	20.62	33.0	-12.4	
1880.00	24.23	H	6.2	4.6	22.57	33.0	-10.4	
High Ch								
1900.00	21.04	V	6.3	4.6	19.34	33.0	-13.7	
1900.00	23.94	H	6.3	4.6	22.24	33.0	-10.8	

15MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	22.84	V	6.1	4.5	21.25	33.0	-11.8	
1857.50	23.83	H	6.1	4.5	22.24	33.0	-10.8	
Mid Ch								
1880.00	22.35	V	6.2	4.6	20.69	33.0	-12.3	
1880.00	24.40	H	6.2	4.6	22.74	33.0	-10.3	
High Ch								
1902.50	22.06	V	6.3	4.6	20.32	33.0	-12.7	
1902.50	25.05	H	6.3	4.6	23.31	33.0	-9.7	

15MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	21.88	V	6.1	4.5	20.29	33.0	-12.7	
1857.50	22.95	H	6.1	4.5	21.36	33.0	-11.6	
Mid Ch								
1880.00	21.59	V	6.2	4.6	19.93	33.0	-13.1	
1880.00	23.79	H	6.2	4.6	22.13	33.0	-10.9	
High Ch								
1902.50	21.32	V	6.3	4.6	19.58	33.0	-13.4	
1902.50	24.37	H	6.3	4.6	22.63	33.0	-10.4	

10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	22.67	V	6.1	4.5	21.01	33.0	-12.0	
1855.00	22.89	H	6.1	4.5	21.23	33.0	-11.8	
Mid Ch								
1880.00	22.26	V	6.2	4.6	20.60	33.0	-12.4	
1880.00	24.43	H	6.2	4.6	22.77	33.0	-10.2	
High Ch								
1905.00	22.47	V	6.3	4.5	20.70	33.0	-12.3	
1905.00	24.65	H	6.3	4.5	22.88	33.0	-10.1	

10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	21.81	V	6.1	4.5	20.15	33.0	-12.8	
1855.00	22.06	H	6.1	4.5	20.40	33.0	-12.6	
Mid Ch								
1880.00	21.42	V	6.2	4.6	19.76	33.0	-13.2	
1880.00	23.60	H	6.2	4.6	21.94	33.0	-11.1	
High Ch								
1905.00	21.85	V	6.3	4.5	20.08	33.0	-12.9	
1905.00	23.89	H	6.3	4.5	22.12	33.0	-10.9	

5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 2 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	22.83	V	6.1	4.5	21.18	33.0	-11.8	
1852.50	23.51	H	6.1	4.5	21.86	33.0	-11.1	
Mid Ch								
1880.00	22.43	V	6.2	4.6	20.77	33.0	-12.2	
1880.00	24.44	H	6.2	4.6	22.78	33.0	-10.2	
High Ch								
1907.50	22.96	V	6.3	4.5	21.18	33.0	-11.8	
1907.50	24.67	H	6.3	4.5	22.89	33.0	-10.1	

5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 2 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	22.09	V	6.1	4.5	20.44	33.0	-12.6	
1852.50	22.97	H	6.1	4.5	21.32	33.0	-11.7	
Mid Ch								
1880.00	21.70	V	6.2	4.6	20.04	33.0	-13.0	
1880.00	23.62	H	6.2	4.6	21.96	33.0	-11.0	
High Ch								
1907.50	22.24	V	6.3	4.5	20.46	33.0	-12.5	
1907.50	23.83	H	6.3	4.5	22.05	33.0	-10.9	

3MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 2 Fundamentals, 3MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	22.43	V	6.1	4.5	20.81	33.0	-12.2	
1851.50	23.70	H	6.1	4.5	22.08	33.0	-10.9	
Mid Ch								
1880.00	22.07	V	6.2	4.6	20.41	33.0	-12.6	
1880.00	24.60	H	6.2	4.6	22.94	33.0	-10.1	
High Ch								
1908.50	22.69	V	6.3	4.5	20.94	33.0	-12.1	
1908.50	24.52	H	6.3	4.5	22.77	33.0	-10.2	

3MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 2 Fundamentals, 3MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	21.60	V	6.1	4.5	19.98	33.0	-13.0	
1851.50	22.87	H	6.1	4.5	21.25	33.0	-11.8	
Mid Ch								
1880.00	21.40	V	6.2	4.6	19.74	33.0	-13.3	
1880.00	23.84	H	6.2	4.6	22.18	33.0	-10.8	
High Ch								
1908.50	22.02	V	6.3	4.5	20.27	33.0	-12.7	
1908.50	23.65	H	6.3	4.5	21.90	33.0	-11.1	

1.4MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	22.28	V	6.1	4.5	20.68	33.0	-12.3	
1850.70	23.31	H	6.1	4.5	21.71	33.0	-11.3	
Mid Ch								
1880.00	21.75	V	6.2	4.6	20.09	33.0	-12.9	
1880.00	24.22	H	6.2	4.6	22.56	33.0	-10.4	
High Ch								
1909.30	22.70	V	6.3	4.6	20.97	33.0	-12.0	
1909.30	24.42	H	6.3	4.6	22.69	33.0	-10.3	

1.4Hz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	21.46	V	6.1	4.5	19.86	33.0	-13.1	
1850.70	22.55	H	6.1	4.5	20.95	33.0	-12.1	
Mid Ch								
1880.00	20.93	V	6.2	4.6	19.27	33.0	-13.7	
1880.00	23.50	H	6.2	4.6	21.84	33.0	-11.2	
High Ch								
1909.30	21.87	V	6.3	4.6	20.14	33.0	-12.9	
1909.30	23.58	H	6.3	4.6	21.85	33.0	-11.1	

9.1.4. LTE Band 5

10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 5 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	16.69	V	4.1	0.5	13.13	38.5	-25.4	
829.00	24.34	H	4.1	0.3	20.58	38.5	-17.9	
Mid Ch								
836.50	16.79	V	4.1	0.5	13.21	38.5	-25.3	
836.50	24.32	H	4.1	0.3	20.54	38.5	-18.0	
High Ch								
844.00	16.37	V	4.1	0.5	12.78	38.5	-25.7	
844.00	23.70	H	4.1	0.3	19.91	38.5	-18.6	

10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 5 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	16.29	V	4.1	0.5	12.73	38.5	-25.8	
829.00	23.97	H	4.1	0.3	20.21	38.5	-18.3	
Mid Ch								
836.50	16.42	V	4.1	0.5	12.84	38.5	-25.7	
836.50	23.95	H	4.1	0.3	20.17	38.5	-18.3	
High Ch								
844.00	16.01	V	4.1	0.5	12.42	38.5	-26.1	
844.00	23.26	H	4.1	0.3	19.47	38.5	-19.0	

5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 5 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	16.67	V	4.1	0.5	13.11	38.5	-25.4	
826.50	24.10	H	4.1	0.3	20.34	38.5	-18.2	
Mid Ch								
836.50	16.61	V	4.1	0.5	13.03	38.5	-25.5	
836.50	24.18	H	4.1	0.3	20.40	38.5	-18.1	
High Ch								
846.50	15.89	V	4.1	0.5	12.30	38.5	-26.2	
846.50	23.44	H	4.1	0.3	19.65	38.5	-18.9	

5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 5 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	16.34	V	4.1	0.5	12.78	38.5	-25.7	
826.50	23.78	H	4.1	0.3	20.02	38.5	-18.5	
Mid Ch								
836.50	16.36	V	4.1	0.5	12.78	38.5	-25.7	
836.50	23.96	H	4.1	0.3	20.18	38.5	-18.3	
High Ch								
846.50	15.55	V	4.1	0.5	11.96	38.5	-26.5	
846.50	23.14	H	4.1	0.3	19.35	38.5	-19.2	

3MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
825.50	16.65	V	4.1	0.5	13.09	38.5	-25.4	
825.50	24.18	H	4.1	0.3	20.42	38.5	-18.1	
Mid Ch								
836.50	16.64	V	4.1	0.5	13.06	38.5	-25.4	
836.50	24.07	H	4.1	0.3	20.29	38.5	-18.2	
High Ch								
847.50	15.70	V	4.1	0.5	12.10	38.5	-26.4	
847.50	23.24	H	4.1	0.3	19.44	38.5	-19.1	

3MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
825.50	16.27	V	4.1	0.5	12.71	38.5	-25.8	
825.50	23.74	H	4.1	0.3	19.98	38.5	-18.5	
Mid Ch								
836.50	16.31	V	4.1	0.5	12.73	38.5	-25.8	
836.50	23.74	H	4.1	0.3	19.96	38.5	-18.5	
High Ch								
847.50	15.29	V	4.1	0.5	11.69	38.5	-26.8	
847.50	22.86	H	4.1	0.3	19.06	38.5	-19.4	

1.4MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	15.99	V	4.1	0.5	12.44	38.5	-26.1	
824.70	23.93	H	4.1	0.3	20.18	38.5	-18.3	
Mid Ch								
836.50	16.05	V	4.1	0.5	12.47	38.5	-26.0	
836.50	23.74	H	4.1	0.3	19.96	38.5	-18.5	
High Ch								
848.30	15.03	V	4.1	0.5	11.43	38.5	-27.1	
848.30	22.84	H	4.1	0.3	19.04	38.5	-19.5	

1.4MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/12/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	15.56	V	4.1	0.5	12.01	38.5	-26.5	
824.70	23.51	H	4.1	0.3	19.76	38.5	-18.7	
Mid Ch								
836.50	15.63	V	4.1	0.5	12.05	38.5	-26.4	
836.50	23.33	H	4.1	0.3	19.55	38.5	-18.9	
High Ch								
848.30	14.66	V	4.1	0.5	11.06	38.5	-27.4	
848.30	22.46	H	4.1	0.3	18.66	38.5	-19.8	

9.1.5. LTE Band 7

20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/17/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 7 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2510.00	21.06	V	7.3	5.8	19.57	33.0	-13.4	
2510.00	22.80	H	7.3	5.8	21.31	33.0	-11.7	
Mid Ch								
2535.00	18.76	V	7.3	5.8	17.30	33.0	-15.7	
2535.00	23.06	H	7.3	5.8	21.60	33.0	-11.4	
High Ch								
2560.00	19.20	V	7.3	5.9	17.79	33.0	-15.2	
2560.00	22.78	H	7.3	5.9	21.37	33.0	-11.6	

20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/17/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 7 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2510.00	20.33	V	7.3	5.8	18.84	33.0	-14.2	
2510.00	22.03	H	7.3	5.8	20.54	33.0	-12.5	
Mid Ch								
2535.00	18.17	V	7.3	5.8	16.71	33.0	-16.3	
2535.00	22.43	H	7.3	5.8	20.97	33.0	-12.0	
High Ch								
2560.00	18.51	V	7.3	5.9	17.10	33.0	-15.9	
2560.00	22.11	H	7.3	5.9	20.70	33.0	-12.3	

15MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/17/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 7 Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2507.50	20.48	V	7.3	5.7	18.97	33.0	-14.0	
2507.50	22.74	H	7.3	5.7	21.23	33.0	-11.8	
Mid Ch								
2535.00	19.76	V	7.3	5.8	18.30	33.0	-14.7	
2535.00	23.12	H	7.3	5.8	21.66	33.0	-11.3	
High Ch								
2562.50	21.08	V	7.3	5.9	19.69	33.0	-13.3	
2562.50	22.71	H	7.3	5.9	21.32	33.0	-11.7	

15MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/17/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 7 Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2507.50	19.79	V	7.3	5.7	18.28	33.0	-14.7	
2507.50	22.02	H	7.3	5.7	20.51	33.0	-12.5	
Mid Ch								
2535.00	18.93	V	7.3	5.8	17.47	33.0	-15.5	
2535.00	22.28	H	7.3	5.8	20.82	33.0	-12.2	
High Ch								
2562.50	20.30	V	7.3	5.9	18.91	33.0	-14.1	
2562.50	21.95	H	7.3	5.9	20.56	33.0	-12.4	

10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/17/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 7 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2505.00	18.60	V	7.3	5.7	17.08	33.0	-15.9	
2505.00	22.44	H	7.3	5.7	20.92	33.0	-12.1	
Mid Ch								
2535.00	18.69	V	7.3	5.8	17.23	33.0	-15.8	
2535.00	23.23	H	7.3	5.8	21.77	33.0	-11.2	
High Ch								
2565.00	18.61	V	7.3	5.9	17.25	33.0	-15.8	
2565.00	22.70	H	7.3	5.9	21.34	33.0	-11.7	

10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/17/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 7 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2505.00	17.80	V	7.3	5.7	16.28	33.0	-16.7	
2505.00	21.58	H	7.3	5.7	20.06	33.0	-12.9	
Mid Ch								
2535.00	18.01	V	7.3	5.8	16.55	33.0	-16.4	
2535.00	22.43	H	7.3	5.8	20.97	33.0	-12.0	
High Ch								
2565.00	17.83	V	7.3	5.9	16.47	33.0	-16.5	
2565.00	21.94	H	7.3	5.9	20.58	33.0	-12.4	

5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/17/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 7 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2502.50	20.62	V	7.3	5.7	19.09	33.0	-13.9	
2502.50	22.57	H	7.3	5.7	21.04	33.0	-12.0	
Mid Ch								
2535.00	19.93	V	7.3	5.8	18.47	33.0	-14.5	
2535.00	23.53	H	7.3	5.8	22.07	33.0	-10.9	
High Ch								
2567.50	20.75	V	7.3	5.9	19.38	33.0	-13.6	
2567.50	22.52	H	7.3	5.9	21.15	33.0	-11.8	

5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/17/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 7 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2502.50	19.98	V	7.3	5.7	18.45	33.0	-14.6	
2502.50	21.75	H	7.3	5.7	20.22	33.0	-12.8	
Mid Ch								
2535.00	19.06	V	7.3	5.8	17.60	33.0	-15.4	
2535.00	22.81	H	7.3	5.8	21.35	33.0	-11.6	
High Ch								
2567.50	19.94	V	7.3	5.9	18.57	33.0	-14.4	
2567.50	21.66	H	7.3	5.9	20.29	33.0	-12.7	

9.1.6. LTE Band 12

10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	13.20	V	3.7	1.3	10.74	34.8	-24.1	
704.00	22.30	H	3.7	1.4	19.92	34.8	-14.9	
Mid Ch								
707.50	12.93	V	3.7	1.2	10.43	34.8	-24.4	
707.50	22.23	H	3.7	1.3	19.80	34.8	-15.0	
High Ch								
711.00	13.09	V	3.8	1.2	10.55	34.8	-24.2	
711.00	22.50	H	3.8	1.3	20.02	34.8	-14.8	

10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 12 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	12.40	V	3.7	1.3	9.94	34.8	-24.9	
704.00	21.47	H	3.7	1.4	19.09	34.8	-15.7	
Mid Ch								
707.50	12.10	V	3.7	1.2	9.60	34.8	-25.2	
707.50	21.42	H	3.7	1.3	18.99	34.8	-15.8	
High Ch								
711.00	12.23	V	3.8	1.2	9.69	34.8	-25.1	
711.00	21.58	H	3.8	1.3	19.10	34.8	-15.7	

5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 12 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	13.13	V	3.7	1.3	10.69	34.8	-24.1	
701.50	22.17	H	3.7	1.4	19.83	34.8	-15.0	
Mid Ch								
707.50	13.02	V	3.7	1.2	10.52	34.8	-24.3	
707.50	22.32	H	3.7	1.3	19.89	34.8	-14.9	
High Ch								
713.50	13.28	V	3.8	1.2	10.71	34.8	-24.1	
713.50	22.68	H	3.8	1.2	20.16	34.8	-14.6	

5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 12 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	12.31	V	3.7	1.3	9.87	34.8	-24.9	
701.50	21.35	H	3.7	1.4	19.01	34.8	-15.8	
Mid Ch								
707.50	12.18	V	3.7	1.2	9.68	34.8	-25.1	
707.50	21.46	H	3.7	1.3	19.03	34.8	-15.8	
High Ch								
713.50	12.57	V	3.8	1.2	10.00	34.8	-24.8	
713.50	21.94	H	3.8	1.2	19.42	34.8	-15.4	

3MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 12 Fundamentals, 3MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	12.93	V	3.7	1.3	10.50	34.8	-24.3	
700.50	21.97	H	3.7	1.4	19.64	34.8	-15.2	
Mid Ch								
707.50	13.10	V	3.7	1.2	10.60	34.8	-24.2	
707.50	22.37	H	3.7	1.3	19.94	34.8	-14.9	
High Ch								
714.50	13.10	V	3.8	1.2	10.52	34.8	-24.3	
714.50	22.47	H	3.8	1.2	19.93	34.8	-14.9	

3MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 12 Fundamentals, 3MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	12.09	V	3.7	1.3	9.66	34.8	-25.1	
700.50	21.13	H	3.7	1.4	18.80	34.8	-16.0	
Mid Ch								
707.50	12.29	V	3.7	1.2	9.79	34.8	-25.0	
707.50	21.52	H	3.7	1.3	19.09	34.8	-15.7	
High Ch								
714.50	12.27	V	3.8	1.2	9.69	34.8	-25.1	
714.50	21.67	H	3.8	1.2	19.13	34.8	-15.7	

1.4MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	12.50	V	3.7	1.3	10.08	34.8	-24.7	
699.70	22.04	H	3.7	1.4	19.72	34.8	-15.1	
Mid Ch								
707.50	12.80	V	3.7	1.2	10.30	34.8	-24.5	
707.50	21.88	H	3.7	1.3	19.45	34.8	-15.4	
High Ch								
715.30	12.64	V	3.8	1.2	10.05	34.8	-24.7	
715.30	22.24	H	3.8	1.2	19.69	34.8	-15.1	

1.4MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	11.56	V	3.7	1.3	9.14	34.8	-25.7	
699.70	21.12	H	3.7	1.4	18.80	34.8	-16.0	
Mid Ch								
707.50	11.93	V	3.7	1.2	9.43	34.8	-25.4	
707.50	20.99	H	3.7	1.3	18.56	34.8	-16.2	
High Ch								
715.30	11.79	V	3.8	1.2	9.20	34.8	-25.6	
715.30	21.39	H	3.8	1.2	18.84	34.8	-16.0	

9.1.7. LTE Band 13

10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	13211873
Date:	2/10/2020
Test Engineer:	19480 BS
Configuration:	EUT Only
Location:	Chamber K
Mode:	LTE_QPSK Band 13 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	16.11	V	4.0	0.7	12.90	34.8	-21.9	
782.00	24.15	H	4.0	0.5	20.71	34.8	-14.1	

10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	13211873
Date:	2/10/2020
Test Engineer:	19480 BS
Configuration:	EUT Only
Location:	Chamber K
Mode:	LTE_16QAM Band 13 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	15.22	V	4.0	0.7	12.01	34.8	-22.8	
782.00	23.30	H	4.0	0.5	19.86	34.8	-14.9	

5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	13211873
Date:	2/10/2020
Test Engineer:	19480 BS
Configuration:	EUT Only
Location:	Chamber K
Mode:	LTE_QPSK Band 13 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	16.12	V	4.0	0.8	12.93	34.8	-21.8	
779.50	23.90	H	4.0	0.5	20.50	34.8	-14.3	
Mid Ch								
782.00	16.05	V	4.0	0.7	12.84	34.8	-21.9	
782.00	24.09	H	4.0	0.5	20.65	34.8	-14.1	
High Ch								
784.50	15.73	V	4.0	0.7	12.49	34.8	-22.3	
784.50	23.86	H	4.0	0.5	20.38	34.8	-14.4	

5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	13211873
Date:	2/10/2020
Test Engineer:	19480 BS
Configuration:	EUT Only
Location:	Chamber K
Mode:	LTE_16QAM Band 13 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

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	15.35	V	4.0	0.8	12.16	34.8	-22.6	
779.50	23.13	H	4.0	0.5	19.73	34.8	-15.0	
Mid Ch								
782.00	15.19	V	4.0	0.7	11.98	34.8	-22.8	
782.00	23.19	H	4.0	0.5	19.75	34.8	-15.0	
High Ch								
784.50	14.86	V	4.0	0.7	11.62	34.8	-23.2	
784.50	23.00	H	4.0	0.5	19.52	34.8	-15.2	

9.1.8. LTE Band 41 (FCC)

20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 41(FCC) Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	20.50	V	7.3	5.7	18.98	33.0	-14.0	
2506.00	23.77	H	7.3	5.7	22.25	33.0	-10.7	
Mid Ch								
2593.00	19.22	V	7.3	5.8	17.76	33.0	-15.2	
2593.00	24.11	H	7.3	5.8	22.65	33.0	-10.4	
High Ch								
2680.00	18.57	V	7.7	6.0	16.88	33.0	-16.1	
2680.00	22.65	H	7.7	6.0	20.96	33.0	-12.0	

20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 41(FCC) Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	19.54	V	7.3	5.7	18.02	33.0	-15.0	
2506.00	23.10	H	7.3	5.7	21.58	33.0	-11.4	
Mid Ch								
2593.00	18.42	V	7.3	5.8	16.96	33.0	-16.0	
2593.00	23.44	H	7.3	5.8	21.98	33.0	-11.0	
High Ch								
2680.00	17.78	V	7.7	6.0	16.09	33.0	-16.9	
2680.00	21.81	H	7.7	6.0	20.12	33.0	-12.9	

15MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 41(FCC) Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	21.08	V	7.3	5.7	19.55	33.0	-13.4	
2503.50	22.89	H	7.3	5.7	21.36	33.0	-11.6	
Mid Ch								
2593.00	19.91	V	7.3	5.8	18.45	33.0	-14.6	
2593.00	23.32	H	7.3	5.8	21.86	33.0	-11.1	
High Ch								
2682.50	18.12	V	7.7	6.0	16.41	33.0	-16.6	
2682.50	22.90	H	7.7	6.0	21.19	33.0	-11.8	

15MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 41(FCC) Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	20.19	V	7.3	5.7	18.66	33.0	-14.3	
2503.50	22.20	H	7.3	5.7	20.67	33.0	-12.3	
Mid Ch								
2593.00	19.14	V	7.3	5.8	17.68	33.0	-15.3	
2593.00	22.40	H	7.3	5.8	20.94	33.0	-12.1	
High Ch								
2682.50	17.39	V	7.7	6.0	15.68	33.0	-17.3	
2682.50	22.04	H	7.7	6.0	20.33	33.0	-12.7	

10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 41(FCC) Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	20.54	V	7.3	5.7	19.01	33.0	-14.0	
2501.00	22.68	H	7.3	5.7	21.15	33.0	-11.9	
Mid Ch								
2593.00	19.41	V	7.3	5.8	17.95	33.0	-15.1	
2593.00	23.52	H	7.3	5.8	22.06	33.0	-10.9	
High Ch								
2685.00	18.65	V	7.7	6.0	16.92	33.0	-16.1	
2685.00	23.16	H	7.7	6.0	21.43	33.0	-11.6	

10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 41(FCC) Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	19.44	V	7.3	5.7	17.91	33.0	-15.1	
2501.00	21.67	H	7.3	5.7	20.14	33.0	-12.9	
Mid Ch								
2593.00	18.36	V	7.3	5.8	16.90	33.0	-16.1	
2593.00	22.48	H	7.3	5.8	21.02	33.0	-12.0	
High Ch								
2685.00	17.81	V	7.7	6.0	16.08	33.0	-16.9	
2685.00	22.01	H	7.7	6.0	20.28	33.0	-12.7	

5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 41(FCC) Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	20.41	V	7.2	5.7	18.85	33.0	-14.1	
2498.50	22.46	H	7.2	5.7	20.90	33.0	-12.1	
Mid Ch								
2593.00	22.01	V	7.3	5.8	20.55	33.0	-12.5	
2593.00	23.40	H	7.3	5.8	21.94	33.0	-11.1	
High Ch								
2687.50	19.72	V	7.7	6.0	17.97	33.0	-15.0	
2687.50	23.30	H	7.7	6.0	21.55	33.0	-11.5	

5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 41(FCC) Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	19.58	V	7.2	5.7	18.02	33.0	-15.0	
2498.50	21.58	H	7.2	5.7	20.02	33.0	-13.0	
Mid Ch								
2593.00	20.90	V	7.3	5.8	19.44	33.0	-13.6	
2593.00	22.33	H	7.3	5.8	20.87	33.0	-12.1	
High Ch								
2687.50	18.68	V	7.7	6.0	16.93	33.0	-16.1	
2687.50	22.19	H	7.7	6.0	20.44	33.0	-12.6	

9.1.9. LTE Band 41 (IC)

20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 41 (IC) Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2510.00	20.98	V	7.3	5.8	19.49	33.0	-13.5	
2510.00	23.90	H	7.3	5.8	22.41	33.0	-10.6	
Mid Ch								
2595.00	18.99	V	7.3	5.8	17.52	33.0	-15.5	
2595.00	24.21	H	7.3	5.8	22.74	33.0	-10.3	
High Ch								
2680.00	18.57	V	7.7	6.0	16.88	33.0	-16.1	
2680.00	22.65	H	7.7	6.0	20.96	33.0	-12.0	

20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 41 (IC) Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2510.00	20.00	V	7.3	5.8	18.51	33.0	-14.5	
2510.00	23.07	H	7.3	5.8	21.58	33.0	-11.4	
Mid Ch								
2595.00	18.00	V	7.3	5.8	16.53	33.0	-16.5	
2595.00	23.30	H	7.3	5.8	21.83	33.0	-11.2	
High Ch								
2680.00	17.78	V	7.7	6.0	16.09	33.0	-16.9	
2680.00	21.81	H	7.7	6.0	20.12	33.0	-12.9	

15MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 41 (IC) Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2507.50	22.16	V	7.3	5.7	20.65	33.0	-12.3	
2507.50	23.21	H	7.3	5.7	21.70	33.0	-11.3	
Mid Ch								
2595.00	19.17	V	7.3	5.8	17.70	33.0	-15.3	
2595.00	22.94	H	7.3	5.8	21.47	33.0	-11.5	
High Ch								
2682.50	18.12	V	7.7	6.0	16.41	33.0	-16.6	
2682.50	22.90	H	7.7	6.0	21.19	33.0	-11.8	

15MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 41 (IC) Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2507.50	21.10	V	7.3	5.7	19.59	33.0	-13.4	
2507.50	22.24	H	7.3	5.7	20.73	33.0	-12.3	
Mid Ch								
2595.00	18.21	V	7.3	5.8	16.74	33.0	-16.3	
2595.00	22.11	H	7.3	5.8	20.64	33.0	-12.4	
High Ch								
2682.50	17.39	V	7.7	6.0	15.68	33.0	-17.3	
2682.50	22.04	H	7.7	6.0	20.33	33.0	-12.7	

10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 41 (IC) Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2505.00	21.80	V	7.3	5.7	20.28	33.0	-12.7	
2505.00	23.24	H	7.3	5.7	21.72	33.0	-11.3	
Mid Ch								
2595.00	18.93	V	7.3	5.8	17.46	33.0	-15.5	
2595.00	23.35	H	7.3	5.8	21.88	33.0	-11.1	
High Ch								
2685.00	18.65	V	7.7	6.0	16.92	33.0	-16.1	
2685.00	23.16	H	7.7	6.0	21.43	33.0	-11.6	

10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 41 (IC) Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2505.00	21.20	V	7.3	5.7	19.68	33.0	-13.3	
2505.00	22.08	H	7.3	5.7	20.56	33.0	-12.4	
Mid Ch								
2595.00	17.90	V	7.3	5.8	16.43	33.0	-16.6	
2595.00	22.45	H	7.3	5.8	20.98	33.0	-12.0	
High Ch								
2685.00	17.81	V	7.7	6.0	16.08	33.0	-16.9	
2685.00	22.01	H	7.7	6.0	20.28	33.0	-12.7	

5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 41 (IC) Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2502.50	21.63	V	7.3	5.7	20.10	33.0	-12.9	
2502.50	23.15	H	7.3	5.7	21.62	33.0	-11.4	
Mid Ch								
2595.00	21.59	V	7.3	5.8	20.12	33.0	-12.9	
2595.00	23.43	H	7.3	5.8	21.96	33.0	-11.0	
High Ch								
2687.50	19.72	V	7.7	6.0	17.97	33.0	-15.0	
2687.50	23.30	H	7.7	6.0	21.55	33.0	-11.5	

5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/14/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 41 (IC) Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2502.50	20.80	V	7.3	5.7	19.27	33.0	-13.7	
2502.50	22.12	H	7.3	5.7	20.59	33.0	-12.4	
Mid Ch								
2595.00	20.94	V	7.3	5.8	19.47	33.0	-13.5	
2595.00	22.17	H	7.3	5.8	20.70	33.0	-12.3	
High Ch								
2687.50	18.68	V	7.7	6.0	16.93	33.0	-16.1	
2687.50	22.19	H	7.7	6.0	20.44	33.0	-12.6	

9.1.10. LTE Band 66

20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 66 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	20.42	V	5.9	5.6	20.12	30.0	-9.9	
1720.00	23.41	H	5.9	5.6	23.11	30.0	-6.9	
Mid Ch								
1745.00	20.57	V	5.9	5.4	20.10	30.0	-9.9	
1745.00	23.02	H	5.9	5.4	22.55	30.0	-7.5	
High Ch								
1770.00	20.84	V	5.9	5.3	20.21	30.0	-9.8	
1770.00	22.91	H	5.9	5.3	22.28	30.0	-7.7	

20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 66 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	19.47	V	5.9	5.6	19.17	30.0	-10.8	
1720.00	22.23	H	5.9	5.6	21.93	30.0	-8.1	
Mid Ch								
1745.00	19.76	V	5.9	5.4	19.29	30.0	-10.7	
1745.00	22.32	H	5.9	5.4	21.85	30.0	-8.2	
High Ch								
1770.00	19.79	V	5.9	5.3	19.16	30.0	-10.8	
1770.00	21.84	H	5.9	5.3	21.21	30.0	-8.8	

15MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 66 Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	20.38	V	5.9	5.6	20.10	30.0	-9.9	
1717.50	23.35	H	5.9	5.6	23.07	30.0	-6.9	
Mid Ch								
1745.00	20.38	V	5.9	5.4	19.91	30.0	-10.1	
1745.00	23.25	H	5.9	5.4	22.78	30.0	-7.2	
High Ch								
1772.50	20.24	V	5.9	5.3	19.59	30.0	-10.4	
1772.50	22.85	H	5.9	5.3	22.20	30.0	-7.8	

15MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 66 Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	19.27	V	5.9	5.6	18.99	30.0	-11.0	
1717.50	22.23	H	5.9	5.6	21.95	30.0	-8.1	
Mid Ch								
1745.00	19.51	V	5.9	5.4	19.04	30.0	-11.0	
1745.00	22.53	H	5.9	5.4	22.06	30.0	-7.9	
High Ch								
1772.50	19.28	V	5.9	5.3	18.63	30.0	-11.4	
1772.50	21.66	H	5.9	5.3	21.01	30.0	-9.0	

10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 66 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	20.28	V	5.9	5.6	20.07	30.0	-9.9	
1715.00	23.27	H	5.9	5.6	23.06	30.0	-6.9	
Mid Ch								
1745.00	20.58	V	5.9	5.4	20.11	30.0	-9.9	
1745.00	23.52	H	5.9	5.4	23.05	30.0	-7.0	
High Ch								
1775.00	20.47	V	5.9	5.2	19.77	30.0	-10.2	
1775.00	23.18	H	5.9	5.2	22.48	30.0	-7.5	

10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 66 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	19.22	V	5.9	5.6	19.01	30.0	-11.0	
1715.00	22.15	H	5.9	5.6	21.94	30.0	-8.1	
Mid Ch								
1745.00	19.69	V	5.9	5.4	19.22	30.0	-10.8	
1745.00	22.66	H	5.9	5.4	22.19	30.0	-7.8	
High Ch								
1775.00	19.59	V	5.9	5.2	18.89	30.0	-11.1	
1775.00	22.03	H	5.9	5.2	21.33	30.0	-8.7	

5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 66 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	19.87	V	5.9	5.7	19.75	30.0	-10.3	
1712.50	23.18	H	5.9	5.7	23.06	30.0	-6.9	
Mid Ch								
1745.00	20.85	V	5.9	5.4	20.38	30.0	-9.6	
1745.00	23.95	H	5.9	5.4	23.48	30.0	-6.5	
High Ch								
1777.50	20.95	V	5.9	5.1	20.17	30.0	-9.8	
1777.50	23.16	H	5.9	5.1	22.38	30.0	-7.6	

5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 66 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	18.96	V	5.9	5.7	18.84	30.0	-11.2	
1712.50	22.31	H	5.9	5.7	22.19	30.0	-7.8	
Mid Ch								
1745.00	19.95	V	5.9	5.4	19.48	30.0	-10.5	
1745.00	23.08	H	5.9	5.4	22.61	30.0	-7.4	
High Ch								
1777.50	20.14	V	5.9	5.1	19.36	30.0	-10.6	
1777.50	22.26	H	5.9	5.1	21.48	30.0	-8.5	

3MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 66 Fundamentals, 3MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	19.81	V	5.8	5.8	19.71	30.0	-10.3	
1711.50	23.10	H	5.8	5.8	23.00	30.0	-7.0	
Mid Ch								
1745.00	20.69	V	5.9	5.4	20.22	30.0	-9.8	
1745.00	23.99	H	5.9	5.4	23.52	30.0	-6.5	
High Ch								
1778.50	20.87	V	5.9	5.1	20.06	30.0	-9.9	
1778.50	22.91	H	5.9	5.1	22.10	30.0	-7.9	

3MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 66 Fundamentals, 3MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	18.65	V	5.8	5.8	18.55	30.0	-11.4	
1711.50	22.05	H	5.8	5.8	21.95	30.0	-8.0	
Mid Ch								
1745.00	19.74	V	5.9	5.4	19.27	30.0	-10.7	
1745.00	23.06	H	5.9	5.4	22.59	30.0	-7.4	
High Ch								
1778.50	20.18	V	5.9	5.1	19.37	30.0	-10.6	
1778.50	22.01	H	5.9	5.1	21.20	30.0	-8.8	

1.4MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	19.74	V	5.8	5.8	19.65	30.0	-10.3	
1710.70	23.00	H	5.8	5.8	22.91	30.0	-7.1	
Mid Ch								
1745.00	20.26	V	5.9	5.4	19.79	30.0	-10.2	
1745.00	23.72	H	5.9	5.4	23.25	30.0	-6.8	
High Ch								
1779.30	20.16	V	5.9	5.1	19.32	30.0	-10.7	
1779.30	22.63	H	5.9	5.1	21.79	30.0	-8.2	

1.4Hz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/13/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: Horn T344, and Chamber K SMA Cables
Substitution: T120, Chamber K Passthrough Cables

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	18.63	V	5.8	5.8	18.54	30.0	-11.5	
1710.70	22.06	H	5.8	5.8	21.97	30.0	-8.0	
Mid Ch								
1745.00	19.34	V	5.9	5.4	18.87	30.0	-11.1	
1745.00	22.77	H	5.9	5.4	22.30	30.0	-7.7	
High Ch								
1779.30	19.37	V	5.9	5.1	18.53	30.0	-11.5	
1779.30	21.73	H	5.9	5.1	20.89	30.0	-9.1	

9.1.11. LTE Band 71

20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 71 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
673.00	12.35	V	3.7	1.1	9.78	34.8	-25.0	
673.00	21.58	H	3.7	1.3	19.22	34.8	-15.5	
Mid Ch								
680.50	12.64	V	3.7	1.1	10.11	34.8	-24.7	
680.50	21.90	H	3.7	1.3	19.55	34.8	-15.2	
High Ch								
688.00	12.46	V	3.7	1.2	9.97	34.8	-24.8	
688.00	22.11	H	3.7	1.4	19.77	34.8	-15.0	

20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 71 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
673.00	11.76	V	3.7	1.1	9.19	34.8	-25.6	
673.00	21.00	H	3.7	1.3	18.64	34.8	-16.1	
Mid Ch								
680.50	11.92	V	3.7	1.1	9.39	34.8	-25.4	
680.50	21.15	H	3.7	1.3	18.80	34.8	-16.0	
High Ch								
688.00	11.67	V	3.7	1.2	9.18	34.8	-25.6	
688.00	21.28	H	3.7	1.4	18.94	34.8	-15.8	

15MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 71 Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
670.50	12.32	V	3.7	1.1	9.75	34.8	-25.0	
670.50	21.16	H	3.7	1.3	18.81	34.8	-16.0	
Mid Ch								
680.50	12.43	V	3.7	1.1	9.90	34.8	-24.9	
680.50	21.82	H	3.7	1.3	19.47	34.8	-15.3	
High Ch								
690.50	12.92	V	3.7	1.2	10.45	34.8	-24.3	
690.50	22.08	H	3.7	1.4	19.74	34.8	-15.0	

15MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 71 Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
670.50	11.69	V	3.7	1.1	9.12	34.8	-25.7	
670.50	20.56	H	3.7	1.3	18.21	34.8	-16.6	
Mid Ch								
680.50	11.61	V	3.7	1.1	9.08	34.8	-25.7	
680.50	20.94	H	3.7	1.3	18.59	34.8	-16.2	
High Ch								
690.50	12.09	V	3.7	1.2	9.62	34.8	-25.2	
690.50	21.25	H	3.7	1.4	18.91	34.8	-15.9	

10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 71 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
668.00	12.31	V	3.6	1.1	9.74	34.8	-25.0	
668.00	21.05	H	3.6	1.3	18.70	34.8	-16.1	
Mid Ch								
680.50	12.07	V	3.7	1.1	9.54	34.8	-25.2	
680.50	21.66	H	3.7	1.3	19.31	34.8	-15.5	
High Ch								
693.00	13.40	V	3.7	1.2	10.94	34.8	-23.8	
693.00	22.14	H	3.7	1.4	19.81	34.8	-15.0	

10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 71 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
668.00	11.63	V	3.6	1.1	9.06	34.8	-25.7	
668.00	20.44	H	3.6	1.3	18.09	34.8	-16.7	
Mid Ch								
680.50	11.18	V	3.7	1.1	8.65	34.8	-26.1	
680.50	20.78	H	3.7	1.3	18.43	34.8	-16.3	
High Ch								
693.00	12.61	V	3.7	1.2	10.15	34.8	-24.6	
693.00	21.29	H	3.7	1.4	18.96	34.8	-15.8	

5MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_QPSK Band 71 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
665.50	12.38	V	3.6	1.1	9.80	34.8	-25.0	
665.50	21.10	H	3.6	1.3	18.76	34.8	-16.0	
Mid Ch								
680.50	11.55	V	3.7	1.1	9.02	34.8	-25.8	
680.50	21.50	H	3.7	1.3	19.15	34.8	-15.6	
High Ch								
695.50	12.40	V	3.7	1.3	9.95	34.8	-24.8	
695.50	21.77	H	3.7	1.4	19.44	34.8	-15.3	

5MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 13211873
Date: 2/10/2020
Test Engineer: 19480 BS
Configuration: EUT Only
Location: Chamber K
Mode: LTE_16QAM Band 71 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Hybrid PRE0181574, and Chamber K SMA Cables
Substitution: Dipole T416, Chamber K Passthrough Cables

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
665.50	11.77	V	3.6	1.1	9.19	34.8	-25.6	
665.50	20.50	H	3.6	1.3	18.16	34.8	-16.6	
Mid Ch								
680.50	10.73	V	3.7	1.1	8.20	34.8	-26.6	
680.50	20.65	H	3.7	1.3	18.30	34.8	-16.5	
High Ch								
695.50	11.64	V	3.7	1.3	9.19	34.8	-25.6	
695.50	20.96	H	3.7	1.4	18.63	34.8	-16.1	

9.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53
ISED: RSS130§4.7, RSS132§5.5; RSS133§6.5, RSS139§6.6, RSS199§4.5.

LIMITS

FCC: §22.917(a), §24.238(a), §27.53 (g), (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.

FCC: §27.53 (Band 13)
(c) 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.

(f) 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.

FCC: §27.53 (m) (Band 7, 41)
At least 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.

RSS130§4.7
4.7.1 General unwanted emissions limits
The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 $\log_{10}$ p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

4.7.2 Additional unwanted emissions limits
In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:

(a) the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:
    i. 76 + 10 $\log_{10}$ p (watts), dB, for base and fixed equipment and
    ii. 65 + 10 $\log_{10}$ p (watts), dB, for mobile and portable equipment
(b) the e.i.r.p. in the band 1559-1610 MHz shall not exceed −70 dBW/MHz for wideband signal and −80 dBW for discrete emission with bandwidth less than 700 Hz.

RSS132§5.5

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

(iii) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p (watts).
(iv) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

RSS133§6.5

Equipment shall comply with the limits in (i) and (ii) below.

(iii) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts).

(iv) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

RSS139§6.6

(iii) (i)In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,Footnote2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least43 + 10 log10 p (watts) dB.

(iv) (ii)After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.

RSS199§4.5
Equipment shall comply with the following unwanted emission limits:

a. for base station and fixed subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least 43 + 10 $\log_{10}$ p
b. for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:
   i. 40 + 10 $\log_{10}$ p from the channel edges to 5 MHz away
   ii. 43 + 10 $\log_{10}$ p between 5 MHz and X MHz from the channel edges, and
   iii. 55 + 10 $\log_{10}$ p at X MHz and beyond from the channel edges

   In addition, the attenuation shall not be less than 43 + 10 $\log_{10}$ p on all frequencies between 2490.5 MHz and 2496 MHz, and 55 + 10 $\log_{10}$ p at or below 2490.5 MHz.

In (a) and (b), **p** is the transmitter power measured in watts and **X** is 6 MHz or the equipment occupied bandwidth, whichever is greater.

TEST PROCEDURE

KDB 971168 D01 v03r01/D02 v02/r01

All tests above 1GHz were done with a Resolution Bandwidth of 1MHz, and a Video Bandwidth of 3MHz.

RESULTS

No spurious emissions were detected above system noise floor from 18-26GHz.

9.2.1. GSM 850

GPRS MODE

Company:	Samsung
Project #:	13211873
Date:	2/4/2020
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode:	GPRS 850
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	824.2 MHz											
1	1.63431	-66.8	Pk	28.4	-34.7	11.4	-61.7	-13	-48.7	0-360	149	H
2	2.47209	-66.53	Pk	32.3	-34.4	11	-57.63	-13	-44.63	0-360	149	H
3	3.28809	-68.07	Pk	32.8	-32.4	10.9	-56.77	-13	-43.77	0-360	149	H
4	1.6375	-66.73	Pk	28.5	-34.7	11.8	-61.13	-13	-48.13	0-360	149	V
5	2.48431	-65.36	Pk	32.5	-34.4	10.2	-57.06	-13	-44.06	0-360	149	V
6	3.29766	-67.94	Pk	32.8	-32.2	10.8	-56.54	-13	-43.54	0-360	149	V
	836.6 MHz											
1	1.72197	-65.54	Pk	29.5	-34.6	11.7	-58.94	-13	-45.94	0-360	149	H
2	2.51459	-65.61	Pk	32.4	-34.3	10.3	-57.21	-13	-44.21	0-360	149	H
3	3.3715	-67.53	Pk	32.9	-32.2	10.8	-56.03	-13	-43.03	0-360	149	H
4	1.69222	-66.32	Pk	29	-34.7	12	-60.02	-13	-47.02	0-360	149	V
5	2.50397	-66.35	Pk	32.4	-34.3	11.2	-57.05	-13	-44.05	0-360	149	V
6	3.37256	-68.37	Pk	32.9	-32.2	11.1	-56.57	-13	-43.57	0-360	149	V
	848.8 MHz											
1	1.72356	-66.75	Pk	29.4	-34.6	11.9	-60.05	-13	-47.05	0-360	149	H
2	2.56931	-66.11	Pk	32.4	-34.2	10.8	-57.11	-13	-44.11	0-360	149	H
3	3.40125	-68.49	Pk	32.9	-32.3	10.8	-57.09	-13	-44.09	0-360	149	H
4	1.7055	-66.26	Pk	29.3	-34.7	12	-59.66	-13	-46.66	0-360	149	V
5	2.53505	-64.97	Pk	32.4	-34.3	10.6	-56.27	-13	-43.27	0-360	149	V
6	3.39488	-67.75	Pk	32.9	-32.3	11.2	-55.95	-13	-42.95	0-360	149	V

EGPRS MODE

Company:	Samsung
Project #:	13211873
Date:	2/4/2020
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode:	EGPRS 850
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	824.2 MHz											
1	1.63272	-66.63	Pk	28.5	-34.7	11.4	-61.43	-13	-48.43	0-360	149	H
2	2.47316	-65.58	Pk	32.3	-34.4	10.9	-56.78	-13	-43.78	0-360	149	H
3	3.27481	-67.21	Pk	32.8	-32.6	10.7	-56.31	-13	-43.31	0-360	149	H
4	1.63591	-67.41	Pk	28.4	-34.7	12	-61.71	-13	-48.71	0-360	149	V
5	2.47475	-65.74	Pk	32.4	-34.4	11	-56.74	-13	-43.74	0-360	149	V
6	3.30244	-67.97	Pk	32.8	-32.3	11.1	-56.37	-13	-43.37	0-360	149	V
	836.6 MHz											
1	1.68903	-65.67	Pk	29	-34.6	10.7	-60.57	-13	-47.57	0-360	149	H
2	2.52097	-65.59	Pk	32.4	-34.4	10.5	-57.09	-13	-44.09	0-360	149	H
3	3.34441	-68	Pk	32.9	-32.3	10.6	-56.8	-13	-43.8	0-360	149	H
4	1.68	-66.19	Pk	28.8	-34.7	11.2	-60.89	-13	-47.89	0-360	149	V
5	2.51194	-66.61	Pk	32.4	-34.3	11.4	-57.11	-13	-44.11	0-360	149	V
6	3.33325	-66.67	Pk	32.9	-32.4	11	-55.17	-13	-42.17	0-360	149	V
	848.8 MHz											
1	1.71294	-65.5	Pk	29.3	-34.6	11.3	-59.5	-13	-46.5	0-360	149	H
2	2.56825	-66.39	Pk	32.4	-34.3	10.7	-57.59	-13	-44.59	0-360	149	H
3	3.37522	-68.09	Pk	32.9	-32.2	10.9	-56.49	-13	-43.49	0-360	149	H
4	1.69116	-65.22	Pk	29	-34.7	11.9	-59.02	-13	-46.02	0-360	149	V
5	2.53531	-65.68	Pk	32.4	-34.3	10.6	-56.98	-13	-43.98	0-360	149	V
6	3.40497	-68.14	Pk	33	-32.3	11.1	-56.34	-13	-43.34	0-360	149	V

9.2.2. GSM 1900

GPRS MODE

Company:	Samsung
Project #:	13211873
Date:	2/4/2020
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode:	GPRS 1900
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1850.2 MHz											
1	3.78641	-68.74	Pk	33.3	-31.3	10.8	-55.94	-13	-42.94	0-360	150	H
2	5.46569	-70.56	Pk	34.4	-28.7	11.1	-53.76	-13	-40.76	0-360	150	H
3	7.46	-72.75	Pk	35.6	-25.7	10.5	-52.35	-13	-39.35	0-360	150	H
4	3.65944	-68.29	Pk	32.9	-31.5	11.3	-55.59	-13	-42.59	0-360	150	H
5	5.56716	-71.14	Pk	34.6	-28.5	10.9	-54.14	-13	-41.14	0-360	150	H
6	7.47381	-72.56	Pk	35.7	-25.7	10.5	-52.06	-13	-39.06	0-360	150	H
	1880 MHz											
1	3.82838	-68.06	Pk	33.4	-31	10.4	-55.26	-13	-42.26	0-360	149	H
2	5.73078	-71.34	Pk	34.9	-27.9	10.4	-53.94	-13	-40.94	0-360	149	H
3	7.48975	-72.32	Pk	35.7	-25.7	10.4	-51.92	-13	-38.92	0-360	149	H
4	3.77472	-68.33	Pk	33.3	-31.3	10.6	-55.73	-13	-42.73	0-360	149	V
5	5.6155	-70.8	Pk	34.8	-28.4	10.8	-53.6	-13	-40.6	0-360	149	V
6	7.60291	-71.9	Pk	35.7	-25.5	10.5	-51.2	-13	-38.2	0-360	149	V
	1909.8 MHz											
1	3.79013	-68.33	Pk	33.3	-31.3	10.8	-55.53	-13	-42.53	0-360	149	H
2	5.845	-70.95	Pk	35.1	-27.8	10.6	-53.05	-13	-40.05	0-360	149	H
3	7.78778	-73.31	Pk	35.8	-25	10.5	-52.01	-13	-39.01	0-360	149	H
4	3.79384	-68.02	Pk	33.4	-31.3	10.5	-55.42	-13	-42.42	0-360	149	V
5	5.65322	-70.41	Pk	34.7	-28.2	10.5	-53.41	-13	-40.41	0-360	149	V
6	7.71872	-72.19	Pk	35.9	-25.3	10.5	-51.09	-13	-38.09	0-360	149	V

EGPRS MODE

Company:	Samsung
Project #:	13211873
Date:	2/4/2020
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode:	EGPRS 1900
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1850.2 MHz											
1	3.79331	-67.93	Pk	33.4	-31.3	10.7	-55.13	-13	-42.13	0-360	149	H
2	5.50394	-70.57	Pk	34.6	-28.7	10.9	-53.77	-13	-40.77	0-360	149	H
3	7.31709	-72.39	Pk	35.6	-25.8	10.3	-52.29	-13	-39.29	0-360	149	H
4	3.73434	-67.27	Pk	33.1	-31.4	10.6	-54.97	-13	-41.97	0-360	149	V
5	5.51031	-70.28	Pk	34.6	-28.6	11.2	-53.08	-13	-40.08	0-360	149	V
6	7.56784	-73.24	Pk	35.7	-25.4	10.7	-52.24	-13	-39.24	0-360	149	V
	1880 MHz											
1	3.669	-68.28	Pk	32.9	-31.4	11	-55.78	-13	-42.78	0-360	149	H
2	5.56503	-70.3	Pk	34.6	-28.6	10.6	-53.7	-13	-40.7	0-360	149	H
3	7.61513	-72.72	Pk	35.7	-25.5	10.4	-52.12	-13	-39.12	0-360	149	H
4	3.79066	-68.36	Pk	33.3	-31.3	10.5	-55.86	-13	-42.86	0-360	149	V
5	5.62294	-70.7	Pk	34.8	-28.4	10.7	-53.6	-13	-40.6	0-360	149	V
6	7.49772	-73.05	Pk	35.6	-25.7	10.8	-52.35	-13	-39.35	0-360	149	V
	1909.8 MHz											
1	3.77844	-68.38	Pk	33.3	-31.4	10.8	-55.68	-13	-42.68	0-360	149	H
2	5.83916	-70.95	Pk	35	-27.8	10.4	-53.35	-13	-40.35	0-360	149	H
3	7.68897	-72.83	Pk	35.8	-25.4	10.4	-52.03	-13	-39.03	0-360	149	H
4	3.85334	-68.46	Pk	33.4	-30.9	10.8	-55.16	-13	-42.16	0-360	149	V
5	5.66863	-70.29	Pk	34.8	-28.2	10.7	-52.99	-13	-39.99	0-360	149	V
6	7.60078	-72.9	Pk	35.7	-25.5	10.6	-52.1	-13	-39.1	0-360	149	V

9.2.3. WCDMA BAND 5

REL 99 MODE

Company:	Samsung
Project #:	13211873
Date:	2/4/2020
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode:	REL 99 Band 5
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	826.4 MHz											
1	1.65078	-61.39	Pk	28.6	-34.7	10.1	-57.39	-13	-44.39	0-360	149	H
2	2.479	-65.64	Pk	32.4	-34.4	10.5	-57.14	-13	-44.14	0-360	149	H
3	3.32263	-67.88	Pk	32.8	-32.3	10.9	-56.48	-13	-43.48	0-360	149	H
4	1.65025	-55.68	Pk	28.6	-34.7	10.9	-50.88	-13	-37.88	0-360	149	V
5	2.46784	-66.09	Pk	32.4	-34.4	11.1	-56.99	-13	-43.99	0-360	149	V
6	3.30509	-68.25	Pk	32.8	-32.3	11.3	-56.45	-13	-43.45	0-360	149	V
	836.6 MHz											
1	1.6715	-63.97	Pk	28.8	-34.7	9.9	-59.97	-13	-46.97	0-360	149	H
2	2.50663	-65.88	Pk	32.4	-34.3	10	-57.78	-13	-44.78	0-360	149	H
3	3.36884	-67.33	Pk	32.9	-32.2	10.8	-55.83	-13	-42.83	0-360	149	H
4	1.6715	-57.46	Pk	28.8	-34.7	11.3	-52.06	-13	-39.06	0-360	149	V
5	2.50928	-66.74	Pk	32.3	-34.3	11.5	-57.24	-13	-44.24	0-360	149	V
6	3.346	-68.02	Pk	32.9	-32.3	10.8	-56.62	-13	-43.62	0-360	149	V
	846.6 MHz											
1	1.69116	-65.05	Pk	29	-34.7	11	-59.75	-13	-46.75	0-360	149	H
2	2.55922	-66.64	Pk	32.5	-34.3	10.5	-57.94	-13	-44.94	0-360	149	H
3	3.38531	-68.14	Pk	33	-32.2	11	-56.34	-13	-43.34	0-360	149	H
4	1.69009	-60.58	Pk	29	-34.7	11.9	-54.38	-13	-41.38	0-360	149	V
5	2.53053	-66.83	Pk	32.4	-34.3	10.8	-57.93	-13	-44.93	0-360	149	V
6	3.38531	-67.02	Pk	33	-32.2	11.1	-55.12	-13	-42.12	0-360	149	V

HSDPA MODE

Company:	Samsung
Project #:	13211873
Date:	2/4/2020
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode:	HSDPA Band 5
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	826.4 MHz											
1	1.65078	-62.14	Pk	28.6	-34.7	10.1	-58.14	-13	-45.14	0-360	149	H
2	2.47634	-66.19	Pk	32.4	-34.4	10.8	-57.39	-13	-44.39	0-360	149	H
3	3.31466	-67.29	Pk	32.8	-32.3	10.9	-55.89	-13	-42.89	0-360	149	H
4	1.65025	-56.47	Pk	28.6	-34.7	10.9	-51.67	-13	-38.67	0-360	149	V
5	2.47528	-66.58	Pk	32.4	-34.4	10.9	-57.68	-13	-44.68	0-360	149	V
6	3.30616	-67.81	Pk	32.8	-32.3	11.3	-56.01	-13	-43.01	0-360	149	V
	836.6 MHz											
1	1.66991	-65.17	Pk	28.7	-34.6	10	-61.07	-13	-48.07	0-360	149	H
2	2.50291	-65.68	Pk	32.4	-34.2	10	-57.48	-13	-44.48	0-360	149	H
3	3.34334	-67.01	Pk	32.9	-32.3	10.6	-55.81	-13	-42.81	0-360	149	H
4	1.67097	-59.32	Pk	28.8	-34.7	11.3	-53.92	-13	-40.92	0-360	149	V
5	2.51406	-66.26	Pk	32.4	-34.3	11.3	-56.86	-13	-43.86	0-360	149	V
6	3.34866	-67.84	Pk	32.9	-32.3	10.7	-56.54	-13	-43.54	0-360	149	V
	846.6 MHz											
1	1.69381	-66.78	Pk	29	-34.7	11.4	-61.08	-13	-48.08	0-360	149	H
2	2.54169	-65.44	Pk	32.4	-34.3	9.9	-57.44	-13	-44.44	0-360	149	H
3	3.36247	-67.95	Pk	32.9	-32.2	10.8	-56.45	-13	-43.45	0-360	149	H
4	1.69116	-63.81	Pk	29	-34.7	11.9	-57.61	-13	-44.61	0-360	149	V
5	2.54381	-66.64	Pk	32.4	-34.3	10.7	-57.84	-13	-44.84	0-360	149	V
6	3.37788	-68.36	Pk	32.9	-32.2	11.2	-56.46	-13	-43.46	0-360	149	V

9.2.4. WCDMA BAND 2

REL 99 MODE

Company:	Samsung
Project #:	13211873
Date:	2/4/2020
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode:	REL 99 Band 2
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1852.4 MHz											
1	3.669	-68.14	Pk	32.9	-31.4	11	-55.64	-13	-42.64	0-360	148	H
2	5.50713	-71.32	Pk	34.6	-28.6	11	-54.32	-13	-41.32	0-360	148	H
3	7.49241	-72.44	Pk	35.7	-25.7	10.4	-52.04	-13	-39.04	0-360	148	H
4	3.68813	-68.03	Pk	32.9	-31.4	11.2	-55.33	-13	-42.33	0-360	148	V
5	5.57991	-70.51	Pk	34.7	-28.3	10.5	-53.61	-13	-40.61	0-360	148	V
6	7.37766	-73.17	Pk	35.6	-25.7	10.7	-52.57	-13	-39.57	0-360	148	V
	1880 MHz											
1	3.78853	-67.54	Pk	33.3	-31.3	10.8	-54.74	-13	-41.74	0-360	149	H
2	5.57088	-70.4	Pk	34.6	-28.5	10.5	-53.8	-13	-40.8	0-360	149	H
3	7.5025	-71.6	Pk	35.5	-25.6	10.6	-51.1	-13	-38.1	0-360	149	H
4	3.77844	-69.72	Pk	33.3	-31.4	10.5	-57.32	-13	-44.32	0-360	149	V
5	5.6155	-72.2	Pk	34.8	-28.4	10.8	-55	-13	-42	0-360	149	V
6	7.55509	-72.98	Pk	35.7	-25.5	10.5	-52.28	-13	-39.28	0-360	149	V
	1907.6 MHz											
1	3.8135	-67.14	Pk	33.4	-31.3	10.2	-54.84	-13	-41.84	0-360	149	H
2	5.72281	-71.07	Pk	34.9	-27.9	10.3	-53.77	-13	-40.77	0-360	149	H
3	7.60822	-72.77	Pk	35.8	-25.5	10.4	-52.07	-13	-39.07	0-360	149	H
4	3.79491	-68.42	Pk	33.4	-31.3	10.5	-55.82	-13	-42.82	0-360	149	V
5	5.69253	-70.87	Pk	34.8	-28	10.5	-53.57	-13	-40.57	0-360	149	V
6	7.63691	-72.96	Pk	35.8	-25.5	10.6	-52.06	-13	-39.06	0-360	149	V

HSDPA MODE

Company:	Samsung
Project #:	13211873
Date:	2/4/2020
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode:	HSDPA Band 2
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1852.4 MHz											
1	3.65731	-68.39	Pk	32.9	-31.4	11	-55.89	-13	-42.89	0-360	149	H
2	5.5815	-70.61	Pk	34.7	-28.3	10.1	-54.11	-13	-41.11	0-360	149	H
3	7.45203	-72.58	Pk	35.6	-25.7	10.6	-52.08	-13	-39.08	0-360	149	H
4	3.68334	-69.1	Pk	32.9	-31.4	11.1	-56.5	-13	-43.5	0-360	149	V
5	5.56503	-69.92	Pk	34.6	-28.6	10.9	-53.02	-13	-40.02	0-360	149	V
6	7.45416	-73.78	Pk	35.7	-25.7	10.8	-52.98	-13	-39.98	0-360	149	V
	1880 MHz											
1	3.79119	-68.03	Pk	33.3	-31.3	10.8	-55.23	-13	-42.23	0-360	149	H
2	5.62453	-69.96	Pk	34.8	-28.4	10.5	-53.06	-13	-40.06	0-360	149	H
3	7.47434	-72.58	Pk	35.7	-25.6	10.4	-52.08	-13	-39.08	0-360	149	H
4	3.77419	-68.8	Pk	33.3	-31.3	10.6	-56.2	-13	-43.2	0-360	149	V
5	5.61072	-71.03	Pk	34.8	-28.4	10.8	-53.83	-13	-40.83	0-360	149	V
6	7.53066	-73.55	Pk	35.7	-25.5	10.6	-52.75	-13	-39.75	0-360	149	V
	1907.6 MHz											
1	3.85866	-67.97	Pk	33.4	-31	10.3	-55.27	-13	-42.27	0-360	149	H
2	5.67766	-71.22	Pk	34.8	-28.2	10.2	-54.42	-13	-41.42	0-360	149	H
3	7.71553	-72.99	Pk	35.8	-25.3	10.3	-52.19	-13	-39.19	0-360	149	H
4	3.83581	-69.17	Pk	33.4	-31.2	10.7	-56.27	-13	-43.27	0-360	149	V
5	5.74088	-71.49	Pk	34.9	-28.1	10.6	-54.09	-13	-41.09	0-360	149	V
6	7.61778	-72.35	Pk	35.7	-25.5	10.5	-51.65	-13	-38.65	0-360	149	V

9.2.5. WCDMA BAND 4

REL 99 MODE

Company:	Samsung
Project #:	13211873
Date:	2/4/2020
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode:	REL 99 Band 4
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1712.4 MHz											
1	3.46447	-67.66	Pk	33.1	-32.3	11	-55.86	-13	-42.86	0-360	149	H
2	5.16606	-70.24	Pk	34.2	-29.1	10.6	-54.54	-13	-41.54	0-360	149	H
3	6.84109	-72.2	Pk	35.8	-26.1	10.3	-52.2	-13	-39.2	0-360	149	H
4	3.41984	-68.19	Pk	33	-32.2	11.2	-56.19	-13	-43.19	0-360	149	V
5	5.11931	-69.97	Pk	34.3	-29.4	10.5	-54.57	-13	-41.57	0-360	149	V
6	6.80178	-72.04	Pk	35.7	-26.3	10.4	-52.24	-13	-39.24	0-360	149	V
	1732.6 MHz											
1	3.46606	-66.81	Pk	33.1	-32.2	11	-54.91	-13	-41.91	0-360	149	H
2	5.22291	-69.79	Pk	34.3	-29	10.8	-53.69	-13	-40.69	0-360	149	H
3	6.90431	-72.23	Pk	35.6	-26.2	10.2	-52.63	-13	-39.63	0-360	149	H
4	3.45544	-67.69	Pk	33.1	-32.2	11.2	-55.59	-13	-42.59	0-360	149	V
5	5.22875	-70.63	Pk	34.3	-29	10.8	-54.53	-13	-41.53	0-360	149	V
6	6.96328	-71.68	Pk	35.7	-26.2	10.3	-51.88	-13	-38.88	0-360	149	V
	1752.6 MHz											
1	3.45491	-68.23	Pk	33.1	-32.2	11.2	-56.13	-13	-43.13	0-360	149	H
2	5.23034	-69.92	Pk	34.3	-28.9	10.5	-54.02	-13	-41.02	0-360	149	H
3	6.94894	-72.01	Pk	35.8	-26.2	10.1	-52.31	-13	-39.31	0-360	149	H
4	3.49475	-66.62	Pk	33	-32.1	11	-54.72	-13	-41.72	0-360	149	V
5	5.27763	-71.09	Pk	34.4	-28.8	11.3	-54.19	-13	-41.19	0-360	149	V
6	7.035	-72.7	Pk	35.7	-26	10.6	-52.4	-13	-39.4	0-360	149	V

HSDPA MODE

Company:	Samsung
Project #:	13211873
Date:	2/4/2020
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode:	HSDPA Band 4
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1712.4 MHz											
1	3.44269	-68.02	Pk	33.1	-32.2	10.8	-56.32	-13	-43.32	0-360	149	H
2	5.10763	-70.08	Pk	34.2	-29.4	10.6	-54.68	-13	-41.68	0-360	149	H
3	6.76247	-71.84	Pk	35.8	-26.5	10.4	-52.14	-13	-39.14	0-360	149	H
4	3.43206	-67.47	Pk	33.1	-32.2	11.1	-55.47	-13	-42.47	0-360	149	V
5	5.15969	-70.45	Pk	34.2	-29.1	10.7	-54.65	-13	-41.65	0-360	149	V
6	6.82622	-73.69	Pk	35.8	-26.1	10.6	-53.39	-13	-40.39	0-360	149	V
	1732.6 MHz											
1	3.50431	-67.92	Pk	33.1	-32.1	11.1	-55.82	-13	-42.82	0-360	149	H
2	5.16341	-69.58	Pk	34.2	-29.1	10.6	-53.88	-13	-40.88	0-360	149	H
3	6.86713	-72.44	Pk	35.7	-26.1	10.6	-52.24	-13	-39.24	0-360	149	H
4	3.44588	-67.8	Pk	33.1	-32.2	11.2	-55.7	-13	-42.7	0-360	149	V
5	5.22981	-69.1	Pk	34.3	-29	10.7	-53.1	-13	-40.1	0-360	149	V
6	6.96116	-72.39	Pk	35.7	-26.2	10.3	-52.59	-13	-39.59	0-360	149	V
	1752.6 MHz											
1	3.50538	-67.29	Pk	33.1	-32.1	11	-55.29	-13	-42.29	0-360	152	H
2	5.20803	-70.73	Pk	34.2	-29	10.9	-54.63	-13	-41.63	0-360	152	H
3	7.10592	-72.4	Pk	35.7	-26	10.4	-52.3	-13	-39.3	0-360	152	H
4	3.49103	-67.78	Pk	33	-32.1	11	-55.88	-13	-42.88	0-360	152	V
5	5.28188	-70.59	Pk	34.3	-28.8	11.2	-53.89	-13	-40.89	0-360	152	V
6	7.06209	-72.49	Pk	35.7	-25.9	10.5	-52.19	-13	-39.19	0-360	152	V

9.2.6. LTE BAND 2

LIMITS

FCC: §24.238(a)
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.

RSS133§6.5

Equipment shall comply with the limits in (i) and (ii) below.

(i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts).

(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

QPSK LTE BAND 2 (20.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/10/20
Test Engineer:	20756
Configuration:	EUT + Support Equipment
Mode	LTE 5 QPSK 20MHz
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1860 MHz											
1	3.66103	-68.07	Pk	32.9	-31.5	10.9	-55.77	-13	-42.77	0-360	149	H
2	5.51191	-70.03	Pk	34.6	-28.6	10.9	-53.13	-13	-40.13	0-360	149	H
3	7.49984	-73.14	Pk	35.5	-25.7	10.5	-52.84	-13	-39.84	0-360	149	H
4	3.68813	-69.05	Pk	32.9	-31.4	11.2	-56.35	-13	-43.35	0-360	149	V
5	5.55972	-70.15	Pk	34.6	-28.6	11	-53.15	-13	-40.15	0-360	149	V
6	7.35853	-73.57	Pk	35.6	-25.8	10.5	-53.27	-13	-40.27	0-360	149	V
	1880 MHz											
1	3.70194	-67.98	Pk	33	-31.4	10.7	-55.68	-13	-42.68	0-360	149	H
2	5.56503	-71.21	Pk	34.6	-28.6	10.6	-54.61	-13	-41.61	0-360	149	H
3	7.53172	-72.38	Pk	35.7	-25.5	10.2	-51.98	-13	-38.98	0-360	149	H
4	3.75772	-68.78	Pk	33.2	-31.4	10.7	-56.28	-13	-43.28	0-360	149	V
5	5.5985	-71.21	Pk	34.7	-28.4	10.5	-54.41	-13	-41.41	0-360	149	V
6	7.46956	-72.9	Pk	35.6	-25.7	10.7	-52.3	-13	-39.3	0-360	149	V
	1900 MHz											
1	3.78163	-68.55	Pk	33.4	-31.4	10.8	-55.75	-13	-42.75	0-360	149	H
2	5.66331	-71.17	Pk	34.8	-28.2	10.6	-53.97	-13	-40.97	0-360	149	H
3	7.48709	-72.33	Pk	35.6	-25.7	10.5	-51.93	-13	-38.93	0-360	149	H
4	3.78163	-67.76	Pk	33.4	-31.4	10.5	-55.26	-13	-42.26	0-360	149	V
5	5.71113	-70.94	Pk	34.8	-27.9	10.3	-53.74	-13	-40.74	0-360	149	V
6	7.60716	-72.5	Pk	35.8	-25.5	10.5	-51.7	-13	-38.7	0-360	149	V

16QAM LTE BAND 2 (20.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/10/20
Test Engineer:	20756
Configuration:	EUT + Support Equipment
Mode	LTE 5 16QAM 20MHz
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1860 MHz											
1	3.686	-69.07	Pk	32.9	-31.4	11.2	-56.37	-13	-43.37	0-360	149	H
2	5.55813	-70.9	Pk	34.6	-28.5	10.9	-53.9	-13	-40.9	0-360	149	H
3	7.40741	-72.65	Pk	35.6	-25.6	10.4	-52.25	-13	-39.25	0-360	149	H
4	3.686	-67.86	Pk	32.9	-31.4	11.1	-55.26	-13	-42.26	0-360	149	V
5	5.54538	-70.6	Pk	34.5	-28.5	10.9	-53.7	-13	-40.7	0-360	149	V
6	7.41059	-73.36	Pk	35.6	-25.6	10.6	-52.76	-13	-39.76	0-360	149	V
	1880 MHz											
1	3.79119	-67	Pk	33.3	-31.3	10.8	-54.2	-13	-41.2	0-360	149	H
2	5.66225	-71.07	Pk	34.8	-28.2	10.5	-53.97	-13	-40.97	0-360	149	H
3	7.45309	-73.26	Pk	35.6	-25.7	10.6	-52.76	-13	-39.76	0-360	149	H
4	3.74869	-69.32	Pk	33.2	-31.4	10.7	-56.82	-13	-43.82	0-360	149	V
5	5.58522	-71.12	Pk	34.7	-28.3	10.4	-54.32	-13	-41.32	0-360	149	V
6	7.53384	-72.82	Pk	35.7	-25.5	10.6	-52.02	-13	-39.02	0-360	149	V
	1900 MHz											
1	3.78216	-65.6	Pk	33.4	-31.4	10.8	-52.8	-13	-39.8	0-360	149	H
2	5.61444	-70.68	Pk	34.8	-28.4	10.5	-53.78	-13	-40.78	0-360	149	H
3	7.54181	-72.68	Pk	35.6	-25.5	10.2	-52.38	-13	-39.38	0-360	149	H
4	3.78163	-68.25	Pk	33.4	-31.4	10.5	-55.75	-13	-42.75	0-360	149	V
5	5.63781	-70.74	Pk	34.7	-28.3	10.6	-53.74	-13	-40.74	0-360	149	V
6	7.60184	-72.39	Pk	35.7	-25.5	10.6	-51.59	-13	-38.59	0-360	149	V

9.2.7. LTE BAND 5

LIMITS

FCC: §22.917(a)
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.

RSS132§5.5

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

(i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p (watts).

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

QPSK LTE BAND 5 (10.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/05/20
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode	LTE 5 QPSK 10MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	829 MHz											
1	1.65769	-56.65	Pk	28.6	-35.8	12.3	-51.55	-13	-38.55	0-360	149	H
2	2.48697	-64.49	Pk	32.3	-35.4	11.6	-55.99	-13	-42.99	0-360	149	H
3	3.28969	-66.36	Pk	32.9	-34.5	12.1	-55.86	-13	-42.86	0-360	149	H
4	1.65663	-63.84	Pk	28.6	-35.8	11.3	-59.74	-13	-46.74	0-360	149	V
5	2.49016	-65.66	Pk	32.3	-35.4	10.9	-57.86	-13	-44.86	0-360	149	V
6	3.32263	-65.7	Pk	32.8	-34.5	11.6	-55.8	-13	-42.8	0-360	149	V
	836.5 MHz											
1	1.67309	-58.74	Pk	28.7	-35.8	12.1	-53.74	-13	-40.74	0-360	149	H
2	2.50928	-64.06	Pk	32.4	-35.5	12.1	-55.06	-13	-42.06	0-360	149	H
3	3.35397	-66.6	Pk	32.8	-34.4	11.9	-56.3	-13	-43.3	0-360	149	H
4	1.67309	-57.43	Pk	28.7	-35.8	11.8	-52.73	-13	-39.73	0-360	149	V
5	2.50875	-64.15	Pk	32.4	-35.4	11.7	-55.45	-13	-42.45	0-360	149	V
6	3.33909	-66.98	Pk	32.8	-34.5	11.9	-56.78	-13	-43.78	0-360	149	V
	844 MHz											
1	1.68744	-61.86	Pk	28.7	-35.8	11.6	-57.36	-13	-44.36	0-360	149	H
2	2.53159	-63.06	Pk	32.3	-35.4	12.4	-53.76	-13	-40.76	0-360	149	H
3	3.36513	-66	Pk	32.8	-34.5	11.6	-56.1	-13	-43.1	0-360	149	H
4	1.68744	-59.57	Pk	28.7	-35.8	12.1	-54.57	-13	-41.57	0-360	149	V
5	2.53691	-65.46	Pk	32.3	-35.4	11.5	-57.06	-13	-44.06	0-360	149	V
6	3.36513	-66.09	Pk	32.8	-34.5	11.7	-56.09	-13	-43.09	0-360	149	V

16QAM LTE BAND 5 (10.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/05/20
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode	LTE 5 16QAM 10MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	829 MHz											
1	1.65769	-57.44	Pk	28.6	-35.8	12.3	-52.34	-13	-39.34	0-360	149	H
2	2.47794	-64.66	Pk	32.3	-35.5	11.7	-56.16	-13	-43.16	0-360	149	H
3	3.32581	-65.67	Pk	32.8	-34.5	11.7	-55.67	-13	-42.67	0-360	149	H
4	1.65769	-61.57	Pk	28.6	-35.8	11.3	-57.47	-13	-44.47	0-360	149	V
5	2.48644	-63.05	Pk	32.3	-35.5	11	-55.25	-13	-42.25	0-360	149	V
6	3.31838	-66	Pk	32.8	-34.5	11.4	-56.3	-13	-43.3	0-360	149	V
	836.5 MHz											
1	1.67256	-57.58	Pk	28.7	-35.8	12.2	-52.48	-13	-39.48	0-360	149	H
2	2.50928	-60.17	Pk	32.4	-35.5	12.1	-51.17	-13	-38.17	0-360	149	H
3	3.33644	-65.98	Pk	32.8	-34.5	11.6	-56.08	-13	-43.08	0-360	149	H
4	1.67256	-59.96	Pk	28.7	-35.8	11.8	-55.26	-13	-42.26	0-360	149	V
5	2.50928	-61.97	Pk	32.4	-35.5	11.7	-53.37	-13	-40.37	0-360	149	V
6	3.33856	-66.11	Pk	32.8	-34.5	11.9	-55.91	-13	-42.91	0-360	149	V
	844 MHz											
1	1.68744	-59.79	Pk	28.7	-35.8	11.6	-55.29	-13	-42.29	0-360	149	H
2	2.53213	-61.95	Pk	32.3	-35.4	12.4	-52.65	-13	-39.65	0-360	149	H
3	3.36406	-66.03	Pk	32.8	-34.5	11.6	-56.13	-13	-43.13	0-360	149	H
4	1.68744	-58.3	Pk	28.7	-35.8	12.1	-53.3	-13	-40.3	0-360	149	V
5	2.52575	-65	Pk	32.4	-35.4	11.9	-56.1	-13	-43.1	0-360	149	V
6	3.35981	-65.61	Pk	32.8	-34.4	11.7	-55.51	-13	-42.51	0-360	149	V

9.2.8. LTE BAND 7

LIMITS

FCC: §27.53 (m)
At least 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.

RSS199§4.5
Equipment shall comply with the following unwanted emission limits:

a. for base station and fixed subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least 43 + 10 $\log_{10}$ p
b. for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:
   i. 40 + 10 $\log_{10}$ p from the channel edges to 5 MHz away
   ii. 43 + 10 $\log_{10}$ p between 5 MHz and X MHz from the channel edges, and
   iii. 55 + 10 $\log_{10}$ p at X MHz and beyond from the channel edges

In addition, the attenuation shall not be less than 43 + 10 $\log_{10}$ p on all frequencies between 2490.5 MHz and 2496 MHz, and 55 + 10 $\log_{10}$ p at or below 2490.5 MHz.

In (a) and (b), **p** is the transmitter power measured in watts and **X** is 6 MHz or the equipment occupied bandwidth, whichever is greater.

QPSK LTE BAND 7 (20.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/06/20
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode	LTE 7 QPSK 20MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	2510 MHz											
1	4.98544	-68.47	Pk	34.1	-31.2	12	-53.57	-25	-28.57	0-360	149	H
2	7.53013	-67.91	Pk	35.7	-27.9	11.8	-48.31	-25	-23.31	0-360	149	H
3	10.00522	-72.41	Pk	37	-25.1	12.4	-48.11	-25	-23.11	0-360	149	H
4	5.01997	-67.44	Pk	34.2	-31.3	11.5	-53.04	-25	-28.04	0-360	149	V
5	7.53013	-68.53	Pk	35.7	-27.9	11.8	-48.93	-25	-23.93	0-360	149	V
6	10.03975	-69.46	Pk	37.1	-25.1	12.1	-45.36	-25	-20.36	0-360	149	V
	2535 MHz											
1	5.06938	-68.16	Pk	34.2	-31.2	11.9	-53.26	-25	-28.26	0-360	149	H
2	7.60503	-68.72	Pk	35.7	-27.7	12.2	-48.52	-25	-23.52	0-360	149	H
3	10.03869	-73.18	Pk	37.1	-25.1	12.3	-48.88	-25	-23.88	0-360	149	H
4	5.05556	-68.18	Pk	34.2	-31.1	12	-53.08	-25	-28.08	0-360	149	V
5	7.60503	-69.19	Pk	35.7	-27.7	11.9	-49.29	-25	-24.29	0-360	149	V
6	10.13963	-72.29	Pk	37.2	-25.4	12.3	-48.19	-25	-23.19	0-360	149	V
	2560 MHz											
1	5.11931	-66.95	Pk	34.3	-31	12.1	-51.55	-25	-26.55	0-360	149	H
2	7.67994	-66.3	Pk	35.7	-27.6	12.3	-45.9	-25	-20.9	0-360	149	H
3	10.18319	-72.89	Pk	37.2	-25.1	12.6	-48.19	-25	-23.19	0-360	149	H
4	5.09434	-68.53	Pk	34.2	-31.1	12	-53.43	-25	-28.43	0-360	149	V
5	7.67941	-67.55	Pk	35.7	-27.6	12.3	-47.15	-25	-22.15	0-360	149	V
6	10.2395	-70.18	Pk	37.3	-25.1	12.1	-45.88	-25	-20.88	0-360	149	V

16QAM LTE BAND 7 (20.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/06/20
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode	LTE 7 16QAM 20MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	2510 MHz											
1	5.01997	-67.57	Pk	34.2	-31.3	11.7	-52.97	-25	-27.97	0-360	149	H
2	7.53013	-67.36	Pk	35.7	-27.9	11.8	-47.76	-25	-22.76	0-360	149	H
3	9.95316	-72.59	Pk	37	-25.3	12.7	-48.19	-25	-23.19	0-360	149	H
4	5.01944	-67.89	Pk	34.2	-31.3	11.5	-53.49	-25	-28.49	0-360	149	V
5	7.52959	-67.73	Pk	35.7	-27.9	11.8	-48.13	-25	-23.13	0-360	149	V
6	10.03975	-71.4	Pk	37.1	-25.1	12.1	-47.3	-25	-22.3	0-360	149	V
	2535 MHz											
1	5.05131	-67.84	Pk	34.2	-31.1	12	-52.74	-25	-27.74	0-360	149	H
2	7.60503	-69.01	Pk	35.7	-27.7	12.2	-48.81	-25	-23.81	0-360	149	H
3	10.11625	-72.83	Pk	37.2	-25.4	12.3	-48.73	-25	-23.73	0-360	149	H
4	5.09434	-69.5	Pk	34.2	-31.1	12	-54.4	-25	-29.4	0-360	149	V
5	7.60503	-69.38	Pk	35.7	-27.7	11.9	-49.48	-25	-24.48	0-360	149	V
6	10.17575	-71.99	Pk	37.2	-25.2	12.3	-47.69	-25	-22.69	0-360	149	V
	2560 MHz											
1	5.11984	-67.09	Pk	34.3	-31.1	12.1	-51.79	-25	-26.79	0-360	149	H
2	7.67941	-67.2	Pk	35.7	-27.6	12.3	-46.8	-25	-21.8	0-360	149	H
3	10.30272	-73.33	Pk	37.4	-25.3	12.3	-48.93	-25	-23.93	0-360	149	H
4	5.10869	-66.83	Pk	34.2	-31	12.3	-51.33	-25	-26.33	0-360	149	V
5	7.67994	-66.98	Pk	35.7	-27.6	12.3	-46.58	-25	-21.58	0-360	149	V
6	10.24003	-69.8	Pk	37.3	-25.1	12.1	-45.5	-25	-20.5	0-360	149	V

9.2.9. LTE BAND 12

LIMITS

FCC: §27.53 (g)
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.

RSS130§4.7
4.7.1 General unwanted emissions limits
The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 $\log_{10}$ p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

4.7.2 Additional unwanted emissions limits
In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:

a. the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:
   iii. 76 + 10 $\log_{10}$ p (watts), dB, for base and fixed equipment and
   iv. 65 + 10 $\log_{10}$ p (watts), dB, for mobile and portable equipment
b. the e.i.r.p. in the band 1559-1610 MHz shall not exceed −70 dBW/MHz for wideband signal and −80 dBW for discrete emission with bandwidth less than 700 Hz.

QPSK LTE BAND 12 (10.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/10/20
Test Engineer:	20756
Configuration:	EUT + Support Equipment
Mode	LTE 12 QPSK 10MHz
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	704 MHz											
1	1.3995	-65.61	Pk	28.9	-34.7	10.6	-60.81	-13	-47.81	0-360	149	H
2	2.09863	-56.68	Pk	31.4	-34.5	10.2	-49.58	-13	-36.58	0-360	149	H
3	2.80625	-66.61	Pk	32.4	-33.9	10.4	-57.71	-13	-44.71	0-360	149	H
4	1.41331	-67.25	Pk	28.7	-34.7	12	-61.25	-13	-48.25	0-360	149	V
5	2.09863	-64.58	Pk	31.4	-34.5	11.4	-56.28	-13	-43.28	0-360	149	V
6	2.81103	-66.53	Pk	32.4	-33.9	10.9	-57.13	-13	-44.13	0-360	149	V
	707.5 MHz											
1	1.40641	-65.51	Pk	28.8	-34.6	10.8	-60.51	-13	-47.51	0-360	149	H
2	2.10925	-55.65	Pk	31.3	-34.5	10	-48.85	-13	-35.85	0-360	149	H
3	2.87584	-66.85	Pk	32.4	-33.8	11.2	-57.05	-13	-44.05	0-360	149	H
4	1.41544	-67.28	Pk	28.7	-34.6	12.1	-61.08	-13	-48.08	0-360	149	V
5	2.10872	-61.21	Pk	31.3	-34.5	10.7	-53.71	-13	-40.71	0-360	149	V
6	2.87797	-66.4	Pk	32.4	-33.8	11	-56.8	-13	-43.8	0-360	149	V
	711 MHz											
1	1.43084	-66.11	Pk	28.6	-34.7	10.7	-61.51	-13	-48.51	0-360	149	H
2	2.11934	-56.09	Pk	31.3	-34.5	10.3	-48.99	-13	-35.99	0-360	149	H
3	2.83441	-66.4	Pk	32.3	-33.9	10.9	-57.1	-13	-44.1	0-360	149	H
4	1.41384	-66.53	Pk	28.7	-34.6	12	-60.43	-13	-47.43	0-360	149	V
5	2.11934	-62.77	Pk	31.3	-34.5	11	-54.97	-13	-41.97	0-360	149	V
6	* 2.853	-67.35	Pk	32.3	-33.9	11.4	-57.55	-13	-44.55	0-360	149	V

16QAM LTE BAND 12 (10.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/10/20
Test Engineer:	20756
Configuration:	EUT + Support Equipment
Mode	LTE 12 16QAM 10MHz
Chamber #:	Chamber K

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	704 MHz											
1	* 1.39897	-65.25	Pk	28.9	-34.7	10.6	-60.45	-13	-47.45	0-360	149	H
2	2.09863	-56.91	Pk	31.4	-34.5	10.2	-49.81	-13	-36.81	0-360	149	H
3	* 2.81369	-65.85	Pk	32.3	-33.9	10.6	-56.85	-13	-43.85	0-360	149	H
4	* 1.41225	-66.74	Pk	28.8	-34.7	11.9	-60.74	-13	-47.74	0-360	149	V
5	2.09809	-61.61	Pk	31.4	-34.5	11.5	-53.21	-13	-40.21	0-360	149	V
6	* 2.80891	-65.97	Pk	32.4	-33.9	10.9	-56.57	-13	-43.57	0-360	149	V
	707.5 MHz											
1	* 1.40588	-66.25	Pk	28.8	-34.6	10.8	-61.25	-13	-48.25	0-360	149	H
2	2.10925	-56.57	Pk	31.3	-34.5	10	-49.77	-13	-36.77	0-360	149	H
3	* 2.84875	-66.76	Pk	32.3	-33.9	11.2	-57.16	-13	-44.16	0-360	149	H
4	* 1.41278	-66.72	Pk	28.7	-34.7	11.9	-60.82	-13	-47.82	0-360	149	V
5	2.10872	-61.44	Pk	31.3	-34.5	10.7	-53.94	-13	-40.94	0-360	149	V
6	* 2.83228	-65.78	Pk	32.3	-33.9	11.2	-56.18	-13	-43.18	0-360	149	V
	711 MHz											
1	* 1.41384	-65.92	Pk	28.7	-34.6	11	-60.82	-13	-47.82	0-360	149	H
2	2.11934	-54.3	Pk	31.3	-34.5	10.3	-47.2	-13	-34.2	0-360	149	H
3	* 2.87	-66.73	Pk	32.4	-33.8	11.2	-56.93	-13	-43.93	0-360	149	H
4	* 1.41278	-66.16	Pk	28.7	-34.7	11.9	-60.26	-13	-47.26	0-360	149	V
5	2.11934	-63.4	Pk	31.3	-34.5	11	-55.6	-13	-42.6	0-360	149	V
6	* 2.85938	-66.08	Pk	32.3	-33.8	11.2	-56.38	-13	-43.38	0-360	149	V

9.2.10. LTE BAND 13

LIMITS

FCC: §27.53
(c) 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.
(f) 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.

RSS130§4.7
4.7.1 General unwanted emissions limits
The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 $\log_{10}$ p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

4.7.2 Additional unwanted emissions limits
In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:

a. the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:
   i. 76 + 10 $\log_{10}$ p (watts), dB, for base and fixed equipment and
   ii. 65 + 10 $\log_{10}$ p (watts), dB, for mobile and portable equipment
b. the e.i.r.p. in the band 1559-1610 MHz shall not exceed −70 dBW/MHz for wideband signal and −80 dBW for discrete emission with bandwidth less than 700 Hz.

QPSK LTE BAND 13 (10.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/05/20
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode	LTE 13 QPSK 10MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	782MHz											
1	1.56313	-63.9	Pk	28	-35.9	11.1	-60.7	-40	-20.7	0-360	149	H
2	2.34566	-60.83	Pk	31.6	-35.6	13.1	-51.73	-13	-38.73	0-360	149	H
3	3.10906	-64.97	Pk	33	-34.8	11.6	-55.17	-13	-42.17	0-360	149	H
4	1.57322	-65.14	Pk	28	-35.8	12.1	-60.84	-40	-20.84	0-360	149	V
5	2.34566	-62.05	Pk	31.6	-35.6	12.1	-53.95	-13	-40.95	0-360	149	V
6	3.1165	-65.68	Pk	33.1	-34.8	11.6	-55.78	-13	-42.78	0-360	149	V

16QAM LTE BAND 13 (10.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/05/20
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode	LTE 13 16QAM 10MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	782MHz											
1	1.56366	-63.56	Pk	28	-35.9	11.1	-60.36	-40	-20.36	0-360	149	H
2	2.34566	-63.28	Pk	31.6	-35.6	13.1	-54.18	-13	-41.18	0-360	149	H
3	3.14359	-65.96	Pk	32.9	-34.7	11.6	-56.16	-13	-43.16	0-360	149	H
4	1.54984	-65.66	Pk	28.1	-35.9	12.7	-60.76	-40	-20.76	0-360	149	V
5	2.34566	-62.08	Pk	31.6	-35.6	12.1	-53.98	-13	-40.98	0-360	149	V
6	3.12978	-66.14	Pk	33.1	-34.8	11.3	-56.54	-13	-43.54	0-360	149	V

9.2.12. LTE BAND 41 (FCC)

LIMITS

FCC: §27.53 (m)
At least 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.

QPSK LTE BAND 41 (20.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/17/20
Test Engineer:	20756
Configuration:	EUT + Support Equipment
Mode	LTE 41 QPSK 20MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	2506 MHz											
1	4.99394	-67.89	Pk	34.1	-31.2	12.3	-52.69	-25	-27.69	0-360	149	H
2	7.49134	-68.28	Pk	35.7	-27.9	12	-48.48	-25	-23.48	0-360	149	H
3	10.00256	-72.72	Pk	37	-25.2	12.3	-48.62	-25	-23.62	0-360	149	H
4	4.99394	-67.07	Pk	34.1	-31.2	11.7	-52.47	-25	-27.47	0-360	149	V
5	7.49134	-69.29	Pk	35.7	-27.9	11.8	-49.69	-25	-24.69	0-360	149	V
6	10.00734	-71.54	Pk	37	-25.1	12.2	-47.44	-25	-22.44	0-360	149	V
	2593 MHz											
1	5.21494	-68.45	Pk	34.3	-31	12.3	-52.85	-25	-27.85	0-360	149	H
2	7.75219	-69.73	Pk	35.8	-27.6	12.2	-49.33	-25	-24.33	0-360	149	H
3	10.41216	-72.24	Pk	37.6	-25.3	12.3	-47.64	-25	-22.64	0-360	149	H
4	5.17297	-68.73	Pk	34.2	-31	12.2	-53.33	-25	-28.33	0-360	149	V
5	7.75219	-69.83	Pk	35.8	-27.6	12	-49.63	-25	-24.63	0-360	149	V
6	10.33619	-72.04	Pk	37.4	-25.4	12.2	-47.84	-25	-22.84	0-360	149	V
	2680 MHz											
1	5.3435	-68.71	Pk	34.4	-31	12.3	-53.01	-25	-28.01	0-360	149	H
2	8.01356	-65.16	Pk	35.7	-27.4	12	-44.86	-25	-19.86	0-360	149	H
3	10.71072	-73.01	Pk	37.9	-24.9	12.5	-47.51	-25	-22.51	0-360	149	H
4	5.34191	-69.67	Pk	34.5	-31	12.2	-53.97	-25	-28.97	0-360	149	V
5	8.01303	-59.99	Pk	35.7	-27.4	11.9	-39.79	-25	-14.79	0-360	149	V
6	10.68469	-72.35	Pk	37.9	-24.7	12.4	-46.75	-25	-21.75	0-360	149	V

16QAM LTE BAND 41 (20.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/17/20
Test Engineer:	20756
Configuration:	EUT + Support Equipment
Mode	LTE 41 16QAM 20MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	2506 MHz											
1	5.00297	-68.54	Pk	34.1	-31.3	12.1	-53.64	-25	-28.64	0-360	149	H
2	7.49134	-68.92	Pk	35.7	-27.9	12	-49.12	-25	-24.12	0-360	149	H
3	10.04294	-73.37	Pk	37.2	-25.1	12.3	-48.97	-25	-23.97	0-360	149	H
4	4.99288	-68.34	Pk	34.1	-31.2	11.7	-53.74	-25	-28.74	0-360	149	V
5	7.49134	-68.28	Pk	35.7	-27.9	11.8	-48.68	-25	-23.68	0-360	149	V
6	9.98769	-71.55	Pk	37	-25.3	12	-47.85	-25	-22.85	0-360	149	V
	2593 MHz											
1	5.16766	-68.21	Pk	34.3	-31	12.2	-52.71	-25	-27.71	0-360	149	H
2	7.75166	-66.68	Pk	35.8	-27.6	12.2	-46.28	-25	-21.28	0-360	149	H
3	10.37444	-72.55	Pk	37.5	-25.3	12.3	-48.05	-25	-23.05	0-360	149	H
4	5.16075	-69.42	Pk	34.3	-31	12	-54.12	-25	-29.12	0-360	149	V
5	7.75219	-68.76	Pk	35.8	-27.6	12	-48.56	-25	-23.56	0-360	149	V
6	10.33619	-70.7	Pk	37.4	-25.4	12.2	-46.5	-25	-21.5	0-360	149	V
	2680 MHz											
1	5.34191	-66.52	Pk	34.5	-31	12.3	-50.72	-25	-25.72	0-360	149	H
2	8.01303	-59.88	Pk	35.7	-27.4	12	-39.58	-25	-14.58	0-360	149	H
3	10.61669	-72.89	Pk	37.8	-24.9	12.4	-47.59	-25	-22.59	0-360	149	H
4	5.34775	-68.03	Pk	34.5	-30.9	12.2	-52.23	-25	-27.23	0-360	149	V
5	8.01303	-56.25	Pk	35.7	-27.4	11.9	-36.05	-25	-11.05	0-360	149	V
6	10.68469	-71.41	Pk	37.9	-24.7	12.4	-45.81	-25	-20.81	0-360	149	V

9.2.13. LTE BAND 41 (IC)

LIMITS

RSS199§4.5
Equipment shall comply with the following unwanted emission limits:

a. for base station and fixed subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least 43 + 10 $\log_{10}$ p
b. for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:
   i. 40 + 10 $\log_{10}$ p from the channel edges to 5 MHz away
   ii. 43 + 10 $\log_{10}$ p between 5 MHz and X MHz from the channel edges, and
   iii. 55 + 10 $\log_{10}$ p at X MHz and beyond from the channel edges

In addition, the attenuation shall not be less than 43 + 10 $\log_{10}$ p on all frequencies between 2490.5 MHz and 2496 MHz, and 55 + 10 $\log_{10}$ p at or below 2490.5 MHz.

In (a) and (b), **p** is the transmitter power measured in watts and **X** is 6 MHz or the equipment occupied bandwidth, whichever is greater.

QPSK LTE BAND 41 (20.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/21/20
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode	LTE 41 QPSK 20MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	2510 MHz											
1	5.04281	-68.37	Pk	34.2	-31.1	12.2	-53.07	-25	-28.07	0-360	149	H
2	7.53013	-66.83	Pk	35.7	-27.9	11.8	-47.23	-25	-22.23	0-360	149	H
3	10.04028	-72.16	Pk	37.1	-25.1	12.3	-47.86	-25	-22.86	0-360	149	H
4	5.01997	-65.9	Pk	34.2	-31.3	11.5	-51.5	-25	-26.5	0-360	149	V
5	7.52959	-68.25	Pk	35.7	-27.9	11.8	-48.65	-25	-23.65	0-360	149	V
6	10.03922	-71.99	Pk	37.1	-25.1	12.1	-47.89	-25	-22.89	0-360	149	V
	2595 MHz											
1	5.22397	-68.72	Pk	34.3	-30.9	12.4	-52.92	-25	-27.92	0-360	149	H
2	7.78459	-63.99	Pk	35.8	-27.5	12.1	-43.59	-25	-18.59	0-360	149	H
3	10.37975	-73.46	Pk	37.6	-25.3	12.4	-48.76	-25	-23.76	0-360	149	H
4	5.17403	-69.19	Pk	34.2	-31	12.2	-53.79	-25	-28.79	0-360	149	V
5	7.78459	-61.89	Pk	35.8	-27.5	11.9	-41.69	-25	-16.69	0-360	149	V
6	10.37975	-70.9	Pk	37.6	-25.3	12.3	-46.3	-25	-21.3	0-360	149	V
	2680 MHz											
1	5.3435	-68.71	Pk	34.4	-31	12.3	-53.01	-25	-28.01	0-360	149	H
2	8.01356	-65.16	Pk	35.7	-27.4	12	-44.86	-25	-19.86	0-360	149	H
3	10.71072	-73.01	Pk	37.9	-24.9	12.5	-47.51	-25	-22.51	0-360	149	H
4	5.34191	-69.67	Pk	34.5	-31	12.2	-53.97	-25	-28.97	0-360	149	V
5	8.01303	-59.99	Pk	35.7	-27.4	11.9	-39.79	-25	-14.79	0-360	149	V
6	10.68469	-72.35	Pk	37.9	-24.7	12.4	-46.75	-25	-21.75	0-360	149	V

16QAM LTE BAND 41 (20.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/21/20
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode	LTE 41 16QAM 20MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	2510 MHz											
1	5.07044	-68.52	Pk	34.2	-31.2	11.8	-53.72	-25	-28.72	0-360	149	H
2	7.52959	-65.79	Pk	35.7	-27.9	11.9	-46.09	-25	-21.09	0-360	149	H
3	10.02541	-73.01	Pk	37.1	-25	12.5	-48.41	-25	-23.41	0-360	149	H
4	5.01997	-67.83	Pk	34.2	-31.3	11.5	-53.43	-25	-28.43	0-360	149	V
5	7.53013	-67.04	Pk	35.7	-27.9	11.8	-47.44	-25	-22.44	0-360	149	V
6	10.04028	-70.59	Pk	37.1	-25.1	12	-46.59	-25	-21.59	0-360	149	V
	2595 MHz											
1	5.16659	-68.99	Pk	34.3	-31	12.2	-53.49	-25	-28.49	0-360	149	H
2	7.78459	-65.21	Pk	35.8	-27.5	12.1	-44.81	-25	-19.81	0-360	149	H
3	10.31813	-72.34	Pk	37.4	-25.3	12.6	-47.64	-25	-22.64	0-360	149	H
4	5.16925	-68.89	Pk	34.3	-31	12.1	-53.49	-25	-28.49	0-360	149	V
5	7.78513	-65.04	Pk	35.8	-27.5	11.9	-44.84	-25	-19.84	0-360	149	V
6	10.37975	-68.35	Pk	37.6	-25.3	12.3	-43.75	-25	-18.75	0-360	149	V
	2680 MHz											
1	5.34191	-66.52	Pk	34.5	-31	12.3	-50.72	-25	-25.72	0-360	149	H
2	8.01303	-59.88	Pk	35.7	-27.4	12	-39.58	-25	-14.58	0-360	149	H
3	10.61669	-72.89	Pk	37.8	-24.9	12.4	-47.59	-25	-22.59	0-360	149	H
4	5.34775	-68.03	Pk	34.5	-30.9	12.2	-52.23	-25	-27.23	0-360	149	V
5	8.01303	-56.25	Pk	35.7	-27.4	11.9	-36.05	-25	-11.05	0-360	149	V
6	10.68469	-71.41	Pk	37.9	-24.7	12.4	-45.81	-25	-20.81	0-360	149	V

9.2.14. LTE BAND 66

LIMITS

FCC: §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.

RSS139§6.6

(i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,Footnote2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least43 + 10 log10 p (watts) dB.

(ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.

QPSK LTE BAND 66 (20.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/14/20
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode	LTE 66 QPSK 20MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1720 MHz											
1	3.44003	-62.55	Pk	32.6	-34.3	12	-52.25	-13	-39.25	0-360	149	H
2	5.22291	-69.35	Pk	34.3	-30.9	12.4	-53.55	-13	-40.55	0-360	149	H
3	6.79859	-70.93	Pk	35.6	-28.1	12.4	-51.03	-13	-38.03	0-360	149	H
4	3.44003	-65.98	Pk	32.6	-34.3	11.9	-55.78	-13	-42.78	0-360	149	V
5	5.19263	-68.83	Pk	34.2	-31.1	11.8	-53.93	-13	-40.93	0-360	149	V
6	6.87722	-71.08	Pk	35.7	-28.2	12	-51.58	-13	-38.58	0-360	149	V
	1745 MHz											
1	3.47191	-67.44	Pk	33.1	-32.2	11	-55.54	-13	-42.54	0-360	149	H
2	5.22291	-70.23	Pk	34.3	-29	10.8	-54.13	-13	-41.13	0-360	149	H
3	6.85597	-72.65	Pk	35.8	-26.1	10.4	-52.55	-13	-39.55	0-360	149	H
4	3.50378	-67.03	Pk	33.1	-32.1	10.8	-55.23	-13	-42.23	0-360	149	V
5	5.17138	-70.38	Pk	34.2	-29.1	10.6	-54.68	-13	-41.68	0-360	149	V
6	6.93672	-72.8	Pk	35.8	-26.2	10.6	-52.6	-13	-39.6	0-360	149	V
7	12.15253	-70.87	Pk	39	-19.9	10	-41.77	-13	-28.77	0-360	149	V
	1770 MHz											
1	3.52184	-66.27	Pk	33	-32.1	10.6	-54.77	-13	-41.77	0-360	149	H
2	5.34616	-70.43	Pk	34.4	-28.8	10.9	-53.93	-13	-40.93	0-360	149	H
3	7.08228	-72.49	Pk	35.7	-26	10.1	-52.69	-13	-39.69	0-360	149	H
4	3.50591	-67.57	Pk	33.1	-32.1	10.7	-55.87	-13	-42.87	0-360	149	V
5	5.27922	-71.36	Pk	34.4	-28.8	11.3	-54.46	-13	-41.46	0-360	149	V
6	7.04509	-73.35	Pk	35.8	-26	10.4	-53.15	-13	-40.15	0-360	149	V
7	12.32784	-72.31	Pk	39	-20.1	9.9	-43.51	-13	-30.51	0-360	149	V

16QAM LTE BAND 66 (20.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/14/20
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode	LTE 66 16QAM 20MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1720 MHz											
1	3.44003	-63.47	Pk	32.6	-34.3	12	-53.17	-13	-40.17	0-360	149	H
2	5.23194	-69.45	Pk	34.3	-30.8	12.4	-53.55	-13	-40.55	0-360	149	H
3	6.86925	-71.69	Pk	35.5	-28.1	12.4	-51.89	-13	-38.89	0-360	149	H
4	3.44694	-64.99	Pk	32.6	-34.3	12	-54.69	-13	-41.69	0-360	149	V
5	5.12675	-69.01	Pk	34.3	-31.2	12	-53.91	-13	-40.91	0-360	149	V
6	6.86659	-71.17	Pk	35.6	-28.1	12.3	-51.37	-13	-38.37	0-360	149	V
	1745 MHz											
1	3.47191	-67.51	Pk	33.1	-32.2	11	-55.61	-13	-42.61	0-360	149	H
2	5.21706	-70.88	Pk	34.2	-29.1	11	-54.78	-13	-41.78	0-360	149	H
3	6.84906	-73.28	Pk	35.7	-26.1	10.5	-53.18	-13	-40.18	0-360	149	H
4	3.43684	-67.03	Pk	33.1	-32.3	11	-55.23	-13	-42.23	0-360	149	V
5	5.15969	-70.02	Pk	34.2	-29.1	10.7	-54.22	-13	-41.22	0-360	149	V
6	6.85066	-72.83	Pk	35.7	-26.1	10.4	-52.83	-13	-39.83	0-360	149	V
7	12.15253	-69.71	Pk	39	-19.9	10	-40.61	-13	-27.61	0-360	149	V
	1770 MHz											
1	3.52184	-66.38	Pk	33	-32.1	10.6	-54.88	-13	-41.88	0-360	149	H
2	5.20909	-70.35	Pk	34.2	-29.1	10.9	-54.35	-13	-41.35	0-360	149	H
3	7.13009	-73.2	Pk	35.6	-25.9	10.2	-53.3	-13	-40.3	0-360	149	H
4	3.55956	-67.79	Pk	33.2	-32	10.1	-56.49	-13	-43.49	0-360	149	V
5	5.34775	-71.02	Pk	34.4	-28.8	11	-54.42	-13	-41.42	0-360	149	V
6	7.00578	-72.94	Pk	35.8	-26.1	10.6	-52.64	-13	-39.64	0-360	149	V
7	12.32731	-69.6	Pk	39	-20.1	9.9	-40.8	-13	-27.8	0-360	149	V

9.2.15. LTE BAND 71

LIMITS

FCC: §27.53 (g)
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.
RSS130§4.7
4.7.1 General unwanted emissions limits
The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 $\log_{10}$ p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

4.7.2 Additional unwanted emissions limits
In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:

a. the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:
   i. 76 + 10 $\log_{10}$ p (watts), dB, for base and fixed equipment and
   ii. 65 + 10 $\log_{10}$ p (watts), dB, for mobile and portable equipment
b. the e.i.r.p. in the band 1559-1610 MHz shall not exceed −70 dBW/MHz for wideband signal and −80 dBW for discrete emission with bandwidth less than 700 Hz.

QPSK LTE BAND 71 (20.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/10/20
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode	LTE 71 QPSK 20MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	673 MHz											
1	1.36975	-64.98	Pk	29.4	-35.9	11	-60.48	-13	-47.48	0-360	149	H
2	2.04338	-64.44	Pk	30.9	-35.6	11.6	-57.54	-13	-44.54	0-360	149	H
3	2.6915	-65.35	Pk	32.3	-35.2	11.5	-56.75	-13	-43.75	0-360	149	H
4	1.34531	-65.39	Pk	29	-35.8	11.1	-61.09	-13	-48.09	0-360	149	V
5	2.01841	-65.77	Pk	30.9	-35.6	11.8	-58.67	-13	-45.67	0-360	149	V
6	2.68353	-66	Pk	32.3	-35.2	11.8	-57.1	-13	-44.1	0-360	149	V
	680.5 MHz											
1	1.36072	-62.01	Pk	29.3	-35.9	11.2	-57.41	-13	-44.41	0-360	149	H
2	2.04178	-62.7	Pk	30.9	-35.7	11.5	-56	-13	-43	0-360	149	H
3	2.72231	-65.86	Pk	32.2	-35.2	11.2	-57.66	-13	-44.66	0-360	149	H
4	1.36444	-65.34	Pk	29.4	-35.8	10.8	-60.94	-13	-47.94	0-360	149	V
5	2.04975	-65.98	Pk	30.9	-35.7	10.7	-60.08	-13	-47.08	0-360	149	V
6	2.73294	-65.95	Pk	32.2	-35.2	11.4	-57.55	-13	-44.55	0-360	149	V
	688 MHz											
1	1.39313	-65.64	Pk	28.8	-35.8	12.4	-60.24	-13	-47.24	0-360	149	H
2	2.06356	-61.07	Pk	31	-35.6	11.2	-54.47	-13	-41.47	0-360	149	H
3	2.76056	-65.43	Pk	32.1	-35.2	12.3	-56.23	-13	-43.23	0-360	149	H
4	1.36816	-64.44	Pk	29.4	-35.8	10.8	-60.04	-13	-47.04	0-360	149	V
5	2.06356	-62.66	Pk	31	-35.6	10.8	-56.46	-13	-43.46	0-360	149	V
6	2.7425	-65.7	Pk	32.2	-35.2	11.7	-57	-13	-44	0-360	149	V

16QAM LTE BAND 71 (20.0MHZ BANDWIDTH)

Company:	Samsung
Project #:	13211873
Date:	2/10/20
Test Engineer:	43575
Configuration:	EUT + Support Equipment
Mode	LTE 71 16QAM 20MHz
Chamber #:	Chamber J

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	673 MHz											
1	1.34053	-64.99	Pk	29	-35.9	11.6	-60.29	-13	-47.29	0-360	149	H
2	2.01894	-64.61	Pk	30.9	-35.7	11.2	-58.21	-13	-45.21	0-360	149	H
3	2.71488	-65.06	Pk	32.2	-35.2	11.2	-56.86	-13	-43.86	0-360	149	H
4	1.34584	-65.15	Pk	29	-35.8	11.1	-60.85	-13	-47.85	0-360	149	V
5	2.01894	-65.55	Pk	30.9	-35.7	11.8	-58.55	-13	-45.55	0-360	149	V
6	2.69177	-65.46	Pk	32.3	-35.2	11.9	-56.46	-13	-43.46	0-360	149	V
	680.5 MHz											
1	1.36019	-63.66	Pk	29.3	-35.9	11.3	-58.96	-13	-45.96	0-360	149	H
2	2.04072	-63.98	Pk	30.9	-35.7	11.4	-57.38	-13	-44.38	0-360	149	H
3	2.73081	-66.01	Pk	32.2	-35.2	11.4	-57.61	-13	-44.61	0-360	149	H
4	1.36391	-66.11	Pk	29.4	-35.8	10.8	-61.71	-13	-48.71	0-360	149	V
5	2.04125	-64.57	Pk	30.9	-35.7	10.9	-58.47	-13	-45.47	0-360	149	V
6	2.72178	-66.09	Pk	32.2	-35.2	11.3	-57.79	-13	-44.79	0-360	149	V
	688 MHz											
1	1.35009	-65.29	Pk	29.2	-35.9	11.5	-60.49	-13	-47.49	0-360	149	H
2	2.06356	-59.69	Pk	31	-35.6	11.2	-53.09	-13	-40.09	0-360	149	H
3	2.74409	-64.37	Pk	32.1	-35.2	11.8	-55.67	-13	-42.67	0-360	149	H
4	1.36231	-64.81	Pk	29.3	-35.9	10.9	-60.51	-13	-47.51	0-360	149	V
5	2.06409	-63.19	Pk	31	-35.6	10.8	-56.99	-13	-43.99	0-360	149	V
6	2.73931	-64.64	Pk	32.2	-35.2	11.7	-55.94	-13	-42.94	0-360	149	V