

WCDMA Band 5 (Rel 99)

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	826.39999027	-0.008	846.59998511	0.006	2.5
3.85	40	826.39998972	-0.007	846.59998289	0.008	2.5
3.85	30	826.39999034	-0.008	846.59998197	0.009	2.5
3.85	20	826.39998353	0.000	846.59998998	0.000	2.5
3.85	10	826.39998938	-0.007	846.59998067	0.011	2.5
3.85	0	826.39998682	-0.004	846.59998939	0.001	2.5
3.85	-10	826.39998651	-0.004	846.59998592	0.005	2.5
3.85	-20	826.39998176	0.002	846.59998329	0.008	2.5
3.85	-30	826.39998358	0.000	846.59998432	0.007	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	20	826.39998353	0	846.59998998	0	2.5
4.40	20	826.39998634	-0.003	846.59998567	0.005	2.5
3.60	20	826.39998855	-0.006	846.59999052	-0.001	2.5

WCDMA Band 2 (Lowest Frequency : Rel 99 / Highest Frequency : HSDPA)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1852.3979	1907.6021		
Extreme (50C)		1852.3979	1907.6020	-27.0	-0.014
Extreme (40C)		1852.3979	1907.6020	-27.6	-0.015
Extreme (30C)		1852.3979	1907.6020	-26.8	-0.014
Extreme (10C)		1852.3979	1907.6020	-28.2	-0.015
Extreme (0C)		1852.3979	1907.6020	-29.7	-0.016
Extreme (-10C)		1852.3979	1907.6020	-21.4	-0.011
Extreme (-20C)		1852.3979	1907.6020	-24.9	-0.013
Extreme (-30C)		1852.3979	1907.6020	-24.5	-0.013
20C	15%	1852.3979	1907.6020	-23.5	-0.013
	-15%	1852.3979	1907.6020	-25.2	-0.013
	End Point	1852.3979	1907.6020	-23.0	-0.012

LTE Band 5 (Rel 99)

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2061.750	Hz	High Channel	2120.750
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	824.69998654	-0.007	848.29998430	0.004	2.5
3.85	40	824.69998522	-0.005	848.29998934	-0.002	2.5
3.85	30	824.69998712	-0.008	848.29999047	-0.003	2.5
3.85	20	824.69998083	0.000	848.29998792	0.000	2.5
3.85	10	824.69998040	0.001	848.29999031	-0.003	2.5
3.85	0	824.69998205	-0.001	848.29999094	-0.004	2.5
3.85	-10	824.69998073	0.000	848.29998492	0.004	2.5
3.85	-20	824.69998199	-0.001	848.29998936	-0.002	2.5
3.85	-30	824.69998454	-0.004	848.29998842	-0.001	2.5

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C						
Limit: +/- 2.5 ppm =		Low Channel	2061.750	Hz	High Channel	2120.750
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	20	824.69998083	0	848.29998792	0	2.5
4.40	20	824.69999099	-0.012	848.29998009	0.009	2.5
3.60	20	824.69998897	-0.010	848.29998478	0.004	2.5

LTE Band 17 (Lowest Frequency : 16QAM & 5MHz / Highest Frequency : QPSK & 5MHz)

Limit		704	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	706.4978	713.5023		
Extreme (50C)		706.4977	713.5022	-17.7	-0.025
Extreme (40C)		706.4977	713.5022	-12.1	-0.017
Extreme (30C)		706.4977	713.5022	-11.2	-0.016
Extreme (10C)		706.4977	713.5022	-15.4	-0.022
Extreme (0C)		706.4977	713.5022	-17.0	-0.024
Extreme (-10C)		706.4977	713.5022	-14.3	-0.020
Extreme (-20C)		706.4977	713.5022	-15.9	-0.022
Extreme (-30C)		706.4977	713.5022	-14.7	-0.021
20C	15%	706.4977	713.5022	-16.0	-0.023
	-15%	706.4977	713.5022	-17.8	-0.025
	End Point	706.4977	713.5022	-15.3	-0.022

LTE Band 41 (Lowest Frequency : QPSK & 5MHz / Highest Frequency : 16QAM & 5MHz)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2498.4978	2687.5022		
Extreme (50C)		2498.4977	2687.5022	-27.9	-0.011
Extreme (40C)		2498.4977	2687.5022	-31.2	-0.012
Extreme (30C)		2498.4977	2687.5022	-30.2	-0.012
Extreme (10C)		2498.4977	2687.5022	-31.5	-0.012
Extreme (0C)		2498.4977	2687.5022	-24.5	-0.009
Extreme (-10C)		2498.4977	2687.5022	-31.4	-0.012
Extreme (-20C)		2498.4977	2687.5022	-30.1	-0.012
Extreme (-30C)		2498.4977	2687.5022	-32.7	-0.013
20C	15%	2498.4977	2687.5022	-29.8	-0.012
	-15%	2498.4977	2687.5022	-33.8	-0.013
	End Point	2498.4977	2687.5022	-30.9	-0.012

10. RADIATED TEST RESULTS

10.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

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

LIMITS

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

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

27.50(c) (10) - Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

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

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.17; ESU40 setting reference to 971168 D01 v03r01

For power measurement with a ESU40:

For radiated output power measurement with a ESU40:

a) Set the RBW $\geq$ OBW; b) Set VBW $\geq 3 \times$ RBW; c) Set span $\geq 2 \times$ RBW; d) Sweep time = auto couple; e) Detector = rms; f) Ensure that the number of measurement points $\geq$ span/RBW; g) Trace mode = max hold(GSM, LTE Band41), average(WCDMA, LTE);

TEST RESULTS

10.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM1900	GPRS	512	1850.2	27.45	555.90
		661	1880.0	25.60	363.08
		810	1909.8	28.88	772.68
	EGPRS	512	1850.2	25.82	381.94
		661	1880.0	23.36	216.77
		810	1909.8	27.23	528.45

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	18.34	68.23
		4183	836.6	18.16	65.46
		4233	846.6	17.84	60.81
	HSDPA	4132	826.4	17.05	50.70
		4183	836.6	16.87	48.64
		4233	846.6	16.90	48.98
Band 2	REL99	9262	1852.4	21.45	139.64
		9400	1880.0	20.24	105.68
		9538	1907.6	19.98	99.54
	HSDPA	9262	1852.4	21.51	141.58
		9400	1880.0	20.13	103.04
		9538	1907.6	20.38	109.14

LTE Band 5

Band	BW [MHz]	Mode	RB/RB Offset	f [MHz]	ERP / EIRP	
			1 RB		[dBm]	[mW]
Band 5	10	QPSK	1 / 49	829.0	17.12	51.52
			1 / 0	836.5	17.21	52.60
			1 / 0	844.0	17.98	62.81
		16QAM	1 / 0	829.0	15.99	39.72
			1 / 0	836.5	15.74	37.50
			1 / 0	844.0	17.33	54.08
	5	QPSK	1 / 0	826.5	18.25	66.83
			1 / 0	836.5	17.83	60.67
			1 / 0	846.5	18.60	72.44
		16QAM	1 / 0	826.5	17.11	51.40
			1 / 0	836.5	15.93	39.17
			1 / 24	846.5	15.93	39.17
	3	QPSK	1 / 0	825.5	18.44	69.82
			1 / 0	836.5	17.24	52.97
			1 / 14	847.5	19.17	82.60
		16QAM	1 / 0	825.5	17.28	53.46
			1 / 8	836.5	16.03	40.09
			1 / 14	847.5	16.58	45.50
	1.4	QPSK	1 / 5	824.7	17.83	60.67
			1 / 0	836.5	18.18	65.77
			1 / 0	848.3	18.16	65.46
		16QAM	1 / 3	824.7	17.28	53.46
			1 / 5	836.5	17.28	53.46
			1 / 5	848.3	17.45	55.59

LTE Band 17

Band	BW [MHz]	Mode	RB/RB Offset	f [MHz]	ERP / EIRP	
			1 RB		[dBm]	[mW]
Band 17	10	QPSK	1 / 49	709.0	14.93	31.12
			1 / 0	710.0	15.40	34.67
			1 / 49	711.0	15.73	37.41
		16QAM	1 / 0	709.0	13.26	21.18
			1 / 0	710.0	13.52	22.49
			1 / 49	711.0	13.98	25.00
	5	QPSK	1 / 0	706.5	14.88	30.76
			1 / 0	710.0	16.45	44.16
			1 / 24	713.5	16.80	47.86
		16QAM	1 / 12	706.5	12.75	18.84
			1 / 12	710.0	13.95	24.83
			1 / 24	713.5	13.82	24.10

LTE Band 41

Band	BW [MHz]	Mode	RB/RB Offset	f [MHz]	ERP / EIRP	
			1 RB		[dBm]	[mW]
Band 41	20	QPSK	1 / 49	2506.0	24.49	281.19
			1 / 0	2593.0	24.03	252.93
			1 / 0	2680.0	23.53	225.42
		16QAM	1 / 99	2506.0	24.35	272.27
			1 / 0	2593.0	23.84	242.10
			1 / 0	2680.0	24.22	264.24
	15	QPSK	1 / 74	2503.5	24.41	276.06
			1 / 0	2593.0	24.42	276.69
			1 / 74	2682.5	25.08	322.11
		16QAM	1 / 74	2503.5	23.38	217.77
			1 / 74	2593.0	23.11	204.64
			1 / 74	2682.5	23.21	209.41
	10	QPSK	1 / 49	2501.0	23.78	238.78
			1 / 0	2593.0	23.79	239.33
			1 / 49	2685.0	24.10	257.04
		16QAM	1 / 49	2501.0	23.37	217.27
			1 / 0	2593.0	25.93	391.74
			1 / 49	2685.0	23.71	234.96
	5	QPSK	1 / 0	2498.5	22.22	166.72
			1 / 0	2593.0	22.27	168.66
			1 / 12	2687.5	22.11	162.55
		16QAM	1 / 24	2498.5	21.48	140.60
			1 / 24	2593.0	21.82	152.05
			1 / 24	2687.5	21.12	129.42

10.1.2. ERP/EIRP DATA

GSM 1900

GSM GSM1900 GPRS	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788429415 Date: 2018-04-21 Test Engineer: 51072 Configuration: EUT / X-Position Location: Chamber 2 Mode: GPRS 1900 MHz Fundamentals Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (dB)</th><th>Notes</th></tr><tr><td>Low Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1850.20</td><td>22.44</td><td>V</td><td>4.5</td><td>9.5</td><td>27.45</td><td>33.0</td><td>-5.5</td></tr><tr><td>1850.20</td><td>22.28</td><td>H</td><td>4.5</td><td>9.5</td><td>27.29</td><td>33.0</td><td>-5.7</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1880.00</td><td>20.92</td><td>V</td><td>4.5</td><td>9.2</td><td>25.60</td><td>33.0</td><td>-7.4</td></tr><tr><td>1880.00</td><td>20.91</td><td>H</td><td>4.5</td><td>9.2</td><td>25.59</td><td>33.0</td><td>-7.4</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1909.80</td><td>24.40</td><td>V</td><td>4.6</td><td>8.9</td><td>28.71</td><td>33.0</td><td>-4.3</td></tr><tr><td>1909.80</td><td>24.57</td><td>H</td><td>4.6</td><td>8.9</td><td>28.88</td><td>33.0</td><td>-4.1</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								1850.20	22.44	V	4.5	9.5	27.45	33.0	-5.5	1850.20	22.28	H	4.5	9.5	27.29	33.0	-5.7	Mid Ch								1880.00	20.92	V	4.5	9.2	25.60	33.0	-7.4	1880.00	20.91	H	4.5	9.2	25.59	33.0	-7.4	High Ch								1909.80	24.40	V	4.6	8.9	28.71	33.0	-4.3	1909.80	24.57	H	4.6	8.9	28.88	33.0	-4.1
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	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
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WCDMA Band 5

WCDMA

Band 5
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788452485
Date: 2018-04-24
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 1
Mode: Rel99 Band 5 Fundamentals

Test Equipment:
Receiving: VULB9163-750, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	20.76	V	1.0	-1.5	18.34	38.5	-20.2	
826.40	7.80	H	1.0	-1.5	5.38	38.5	-33.1	
Mid Ch								
836.60	20.54	V	1.0	-1.4	18.16	38.5	-20.3	
836.60	8.04	H	1.0	-1.4	5.66	38.5	-32.8	
High Ch								
846.60	20.19	V	1.0	-1.4	17.84	38.5	-20.7	
846.60	7.27	H	1.0	-1.4	4.92	38.5	-33.6	

WCDMA

Band 5
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788452485
Date: 2018-04-24
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 1
Mode: HSDPA Band 5 Fundamentals

Test Equipment:
Receiving: VULB9163-750, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	19.47	V	1.0	-1.5	17.05	38.5	-21.4	
826.40	6.74	H	1.0	-1.5	4.32	38.5	-34.2	
Mid Ch								
836.60	19.25	V	1.0	-1.4	16.87	38.5	-21.6	
836.60	6.80	H	1.0	-1.4	4.42	38.5	-34.1	
High Ch								
846.60	19.25	V	1.0	-1.4	16.90	38.5	-21.6	
846.60	5.22	H	1.0	-1.4	2.87	38.5	-35.6	

WCDMA Band 2

WCDMA

Band 2

REL99

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4788452485

Date:

2018-04-21

Test Engineer:

45585

Configuration:

EUT / X-Position

Location:

Chamber 2

Mode:

Rel99 Band 2 Fundamentals

Test Equipment:

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

Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	14.75	V	4.5	9.5	19.74	33.0	-13.3	
1852.40	16.46	H	4.5	9.5	21.45	33.0	-11.6	
Mid Ch								
1880.00	13.98	V	4.5	9.2	18.66	33.0	-14.3	
1880.00	15.56	H	4.5	9.2	20.24	33.0	-12.8	
High Ch								
1907.60	13.91	V	4.6	8.9	18.25	33.0	-14.8	
1907.60	15.64	H	4.6	8.9	19.98	33.0	-13.0	

WCDMA

Band 2

HSDPA

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4788452485

Date:

2018-04-21

Test Engineer:

45585

Configuration:

EUT / X-Position

Location:

Chamber 2

Mode:

HSDPA Band 2 Fundamentals

Test Equipment:

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

Substitution: Horn 3115[00161451], 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	15.01	V	4.5	9.5	20.00	33.0	-13.0	
1852.40	16.52	H	4.5	9.5	21.51	33.0	-11.5	
Mid Ch								
1880.00	13.90	V	4.5	9.2	18.58	33.0	-14.4	
1880.00	15.45	H	4.5	9.2	20.13	33.0	-12.9	
High Ch								
1907.60	13.91	V	4.6	8.9	18.25	33.0	-14.8	
1907.60	16.04	H	4.6	8.9	20.38	33.0	-12.6	

LTE Band 5

LTE

Band 5

10MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Equipment:

Receiving: VULB9163-750, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	19.53	V	1.0	-1.5	17.12	38.5	-21.4	
829.00	6.90	H	1.0	-1.5	4.49	38.5	-34.0	
Mid Ch								
836.50	19.59	V	1.0	-1.4	17.21	38.5	-21.3	
836.50	6.28	H	1.0	-1.4	3.90	38.5	-34.6	
High Ch								
844.00	20.34	V	1.0	-1.4	17.98	38.5	-20.5	
844.00	6.18	H	1.0	-1.4	3.83	38.5	-34.7	

LTE

Band 5

10MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Equipment:

Receiving: VULB9163-750, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	18.40	V	1.0	-1.5	15.99	38.5	-22.5	
829.00	5.64	H	1.0	-1.5	3.23	38.5	-35.3	
Mid Ch								
836.50	18.12	V	1.0	-1.4	15.74	38.5	-22.8	
836.50	4.79	H	1.0	-1.4	2.41	38.5	-36.1	
High Ch								
844.00	19.69	V	1.0	-1.4	17.33	38.5	-21.2	
844.00	5.18	H	1.0	-1.4	2.83	38.5	-35.7	

LTE Band 5 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	826.50	20.67	V	1.0	-1.5	18.25	38.5	-20.2	
	826.50	7.39	H	1.0	-1.5	4.97	38.5	-33.5	
	Mid Ch								
	836.50	20.21	V	1.0	-1.4	17.83	38.5	-20.7	
	836.50	6.29	H	1.0	-1.4	3.91	38.5	-34.6	
LTE Band 5 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	826.50	19.53	V	1.0	-1.5	17.11	38.5	-21.4	
	826.50	6.42	H	1.0	-1.5	4.00	38.5	-34.5	
	Mid Ch								
	836.50	18.31	V	1.0	-1.4	15.93	38.5	-22.6	
	836.50	5.17	H	1.0	-1.4	2.79	38.5	-35.7	
LTE Band 5 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	826.50	19.53	V	1.0	-1.5	17.11	38.5	-21.4	
	826.50	6.42	H	1.0	-1.5	4.00	38.5	-34.5	
	Mid Ch								
	836.50	18.31	V	1.0	-1.4	15.93	38.5	-22.6	
	836.50	5.17	H	1.0	-1.4	2.79	38.5	-35.7	

LTE Band 5 3MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	825.50	20.87	V	1.0	-1.5	18.44	38.5	-20.1	
	825.50	6.96	H	1.0	-1.5	4.54	38.5	-34.0	
	Mid Ch								
	836.50	19.62	V	1.0	-1.4	17.24	38.5	-21.3	
	836.50	7.48	H	1.0	-1.4	5.10	38.5	-33.4	
LTE Band 5 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	825.50	19.71	V	1.0	-1.5	17.28	38.5	-21.2	
	825.50	5.99	H	1.0	-1.5	3.57	38.5	-34.9	
	Mid Ch								
	836.50	18.41	V	1.0	-1.4	16.03	38.5	-22.5	
	836.50	6.39	H	1.0	-1.4	4.01	38.5	-34.5	
LTE Band 5 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	825.50	19.71	V	1.0	-1.5	17.28	38.5	-21.2	
	825.50	5.99	H	1.0	-1.5	3.57	38.5	-34.9	
	Mid Ch								
	836.50	18.41	V	1.0	-1.4	16.03	38.5	-22.5	
	836.50	6.39	H	1.0	-1.4	4.01	38.5	-34.5	
LTE Band 5 3MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	825.50	19.71	V	1.0	-1.5	17.28	38.5	-21.2	
	825.50	5.99	H	1.0	-1.5	3.57	38.5	-34.9	
	Mid Ch								
	836.50	18.41	V	1.0	-1.4	16.03	38.5	-22.5	
	836.50	6.39	H	1.0	-1.4	4.01	38.5	-34.5	

LTE Band 5 1.4MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	20.25	V	1.0	-1.5	17.83	38.5	-20.7	
	824.70	8.32	H	1.0	-1.5	5.90	38.5	-32.6	
	Mid Ch								
	836.50	20.56	V	1.0	-1.4	18.18	38.5	-20.3	
	836.50	9.11	H	1.0	-1.4	6.73	38.5	-31.8	
LTE Band 5 1.4MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	19.70	V	1.0	-1.5	17.28	38.5	-21.2	
	824.70	7.84	H	1.0	-1.5	5.42	38.5	-33.1	
	Mid Ch								
	836.50	19.66	V	1.0	-1.4	17.28	38.5	-21.2	
	836.50	7.68	H	1.0	-1.4	5.30	38.5	-33.2	
	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	19.70	V	1.0	-1.5	17.28	38.5	-21.2	
	824.70	7.84	H	1.0	-1.5	5.42	38.5	-33.1	
	Mid Ch								
	836.50	19.66	V	1.0	-1.4	17.28	38.5	-21.2	
	836.50	7.68	H	1.0	-1.4	5.30	38.5	-33.2	
	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth								
	Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	19.70	V	1.0	-1.5	17.28	38.5	-21.2	
	824.70	7.84	H	1.0	-1.5	5.42	38.5	-33.1	
	Mid Ch								
	836.50	19.66	V	1.0	-1.4	17.28	38.5	-21.2	
	836.50	7.68	H	1.0	-1.4	5.30	38.5	-33.2	

LTE Band 17

LTE

Band 17

10MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4788452485

Date:

2018-04-24

Test Engineer:

45585

Configuration:

EUT / Z-Position

Location:

Chamber 1

Mode:

LTE_QPSK Band 17 Fundamentals, 10MHz Bandwidth

Test Equipment:

Receiving: VULB9163-750, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
709.00	17.39	V	0.9	-1.6	14.93	34.8	-19.8	
709.00	1.65	H	0.9	-1.6	-0.82	34.8	-35.6	
Mid Ch								
710.00	17.87	V	0.9	-1.6	15.40	34.8	-19.4	
710.00	0.47	H	0.9	-1.6	-2.00	34.8	-36.8	
High Ch								
711.00	18.20	V	0.9	-1.6	15.73	34.8	-19.0	
711.00	1.60	H	0.9	-1.6	-0.88	34.8	-35.6	

LTE

Band 17

10MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Samsung

Project #:

4788452485

Date:

2018-04-24

Test Engineer:

45585

Configuration:

EUT / Z-Position

Location:

Chamber 1

Mode:

LTE_16QAM Band 17 Fundamentals, 10MHz Bandwidth

Test Equipment:

Receiving: VULB9163-750, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 3m N-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
709.00	15.72	V	0.9	-1.6	13.26	34.8	-21.5	
709.00	-1.27	H	0.9	-1.6	-3.74	34.8	-38.5	
Mid Ch								
710.00	15.99	V	0.9	-1.6	13.52	34.8	-21.3	
710.00	-1.45	H	0.9	-1.6	-3.92	34.8	-38.7	
High Ch								
711.00	16.45	V	0.9	-1.6	13.98	34.8	-20.8	
711.00	-0.09	H	0.9	-1.6	-2.57	34.8	-37.3	

LTE Band 17 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 17 Fundamentals, 5MHz Bandwidth Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	706.50	17.35	V	0.9	-1.6	14.88	34.8	-19.9	
	706.50	0.42	H	0.9	-1.6	-2.04	34.8	-36.8	
	Mid Ch								
	710.00	18.92	V	0.9	-1.6	16.45	34.8	-18.3	
	710.00	1.55	H	0.9	-1.6	-0.92	34.8	-35.7	
	High Ch								
LTE Band 17 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 17 Fundamentals, 5MHz Bandwidth Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	706.50	15.22	V	0.9	-1.6	12.75	34.8	-22.0	
	706.50	-1.64	H	0.9	-1.6	-4.10	34.8	-38.9	
	Mid Ch								
	710.00	16.42	V	0.9	-1.6	13.95	34.8	-20.8	
	710.00	0.51	H	0.9	-1.6	-1.96	34.8	-36.7	
	High Ch								
LTE Band 17 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 17 Fundamentals, 5MHz Bandwidth Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	706.50	15.22	V	0.9	-1.6	12.75	34.8	-22.0	
	706.50	-1.64	H	0.9	-1.6	-4.10	34.8	-38.9	
	Mid Ch								
	710.00	16.42	V	0.9	-1.6	13.95	34.8	-20.8	
	710.00	0.51	H	0.9	-1.6	-1.96	34.8	-36.7	
	High Ch								
LTE Band 17 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement Company: Samsung Project #: 4788452485 Date: 2018-04-24 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 1 Mode: LTE_16QAM Band 17 Fundamentals, 5MHz Bandwidth Test Equipment: Receiving: VULB9163-750, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
	Low Ch								
	706.50	15.22	V	0.9	-1.6	12.75	34.8	-22.0	
	706.50	-1.64	H	0.9	-1.6	-4.10	34.8	-38.9	
	Mid Ch								
	710.00	16.42	V	0.9	-1.6	13.95	34.8	-20.8	
	710.00	0.51	H	0.9	-1.6	-1.96	34.8	-36.7	
	High Ch								

LTE Band 41

LTE Band 41 20MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-28 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	2506.00	16.60	V	5.3	10.3	21.54	33.0	-11.5	
	2506.00	19.55	H	5.3	10.3	24.49	33.0	-8.5	
	Mid Ch								
	2593.00	15.03	V	5.4	10.1	19.70	33.0	-13.3	
	2593.00	19.36	H	5.4	10.1	24.03	33.0	-9.0	
	High Ch								
	2680.00	15.76	V	5.5	10.2	20.40	33.0	-12.6	
	2680.00	18.90	H	5.5	10.2	23.53	33.0	-9.5	
LTE Band 41 20MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-27 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 20MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	2506.00	16.25	V	5.3	10.3	21.19	33.0	-11.8	
	2506.00	19.41	H	5.3	10.3	24.35	33.0	-8.6	
	Mid Ch								
	2593.00	14.02	V	5.4	10.1	18.69	33.0	-14.3	
	2593.00	19.17	H	5.4	10.1	23.84	33.0	-9.2	
	High Ch								
	2680.00	16.87	V	5.5	10.2	21.51	33.0	-11.5	
	2680.00	19.59	H	5.5	10.2	24.22	33.0	-8.8	

LTE Band 41 15MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-28 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 15MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	2503.50	16.11	V	5.3	10.3	21.06	33.0	-11.9	
	2503.50	19.46	H	5.3	10.3	24.41	33.0	-8.6	
	Mid Ch								
	2593.00	17.15	V	5.4	10.1	21.82	33.0	-11.2	
LTE Band 41 15MHz 16QAM	2593.00	19.75	H	5.4	10.1	24.42	33.0	-8.6	
	High Ch								
	2682.50	17.20	V	5.5	10.2	21.83	33.0	-11.2	
	2682.50	20.44	H	5.5	10.2	25.08	33.0	-7.9	
LTE Band 41 15MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-27 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 15MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	2503.50	16.98	V	5.3	10.3	21.93	33.0	-11.1	
	2503.50	18.43	H	5.3	10.3	23.38	33.0	-9.6	
	Mid Ch								
	2593.00	16.13	V	5.4	10.1	20.80	33.0	-12.2	
	2593.00	18.44	H	5.4	10.1	23.11	33.0	-9.9	
LTE Band 41 15MHz 16QAM	High Ch								
	2682.50	15.35	V	5.5	10.2	19.98	33.0	-13.0	
	2682.50	18.57	H	5.5	10.2	23.21	33.0	-9.8	

LTE Band 41 10MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-28 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	2501.00	16.68	V	5.3	10.3	21.64	33.0	-11.4	
	2501.00	18.81	H	5.3	10.3	23.78	33.0	-9.2	
	Mid Ch								
	2593.00	15.29	V	5.4	10.1	19.96	33.0	-13.0	
LTE Band 41 10MHz 16QAM	2593.00	19.12	H	5.4	10.1	23.79	33.0	-9.2	
	High Ch								
	2685.00	16.44	V	5.5	10.2	21.07	33.0	-11.9	
	2685.00	19.47	H	5.5	10.2	24.10	33.0	-8.9	
LTE Band 41 10MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-27 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 10MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	2501.00	16.31	V	5.3	10.3	21.27	33.0	-11.7	
	2501.00	18.40	H	5.3	10.3	23.37	33.0	-9.6	
	Mid Ch								
	2593.00	17.38	V	5.4	10.1	22.05	33.0	-11.0	
LTE Band 41 10MHz 16QAM	2593.00	21.26	H	5.4	10.1	25.93	33.0	-7.1	
	High Ch								
	2685.00	16.01	V	5.5	10.2	20.64	33.0	-12.4	
	2685.00	19.08	H	5.5	10.2	23.71	33.0	-9.3	

LTE Band 41 5MHz QPSK	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-25 Test Engineer: 51072 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	2498.50	13.07	V	5.3	10.3	18.07	33.0	-14.9	
	2498.50	17.22	H	5.3	10.3	22.22	33.0	-10.8	
	Mid Ch								
	2593.00	15.56	V	5.4	10.1	20.23	33.0	-12.8	
LTE Band 41 5MHz 16QAM	2593.00	17.60	H	5.4	10.1	22.27	33.0	-10.7	
	High Ch								
	2687.50	15.21	V	5.5	10.2	19.84	33.0	-13.2	
	2687.50	17.48	H	5.5	10.2	22.11	33.0	-10.9	
LTE Band 41 5MHz 16QAM	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788452485 Date: 2018-04-25 Test Engineer: 51072 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 5MHz Bandwidth								
	Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00161451], 3m N-type Cable								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	2498.50	12.59	V	5.3	10.3	17.59	33.0	-15.4	
	2498.50	16.48	H	5.3	10.3	21.48	33.0	-11.5	
	Mid Ch								
	2593.00	15.13	V	5.4	10.1	19.80	33.0	-13.2	
	2593.00	17.15	H	5.4	10.1	21.82	33.0	-11.2	
LTE Band 41 5MHz 16QAM	High Ch								
	2687.50	14.16	V	5.5	10.2	18.79	33.0	-14.2	
	2687.50	16.49	H	5.5	10.2	21.12	33.0	-11.9	

10.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

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

LIMIT

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

Part 27: (m)(4) For mobile station, the attenuation factor shall be not less than $43 + 10 \log (P)$ dB at the channel edge and $(55 + 10 \log (P))$ dB at the 5.5 MHz from the channel edges.

TEST PROCEDURE

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

For peak power measurement with a ESU40:

- a) Set the RBW = 100 KHz for emission below 1GHz and 1MHz for emissions above 1GHz
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points $\geq$ span/RBW;
- g) Trace mode = max hold(GSM, LTE B41), average(WCDMA, LTE);

NOTE : Radiated spurious emissions were investigated below 30MHz, 30MHz – 1GHz and above 1GHz. There were no emissions found on below 30MHz and 30MHz – 1GHz.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site.

Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

RESULTS

10.2.1. SPURIOUS RADIATION PLOTS

GSM 1900

GSM GSM1900 GPRS	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4788452485									
	Date: 2018-05-02									
	Test Engineer: 45585									
	Configuration: EUT / Adapter / Earphone, X-Position									
	Location: Chamber 1									
	Mode: GPRS 1900 MHz Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1850.2MHz									
	3700.40	-15.2	V	3.0	43.8	1.0	-58.0	-13.0	-45.0	
	5550.60	-12.4	V	3.0	43.7	1.0	-55.1	-13.0	-42.1	
	7400.80	-17.0	V	3.0	42.5	1.0	-58.5	-13.0	-45.5	
	3700.40	-13.3	H	3.0	43.8	1.0	-56.1	-13.0	-43.1	
	5550.60	-15.5	H	3.0	43.7	1.0	-58.2	-13.0	-45.2	
	7400.80	-16.5	H	3.0	42.5	1.0	-58.1	-13.0	-45.1	
	Mid Ch, 1880MHz									
	3760.00	-16.8	V	3.0	43.8	1.0	-59.6	-13.0	-46.6	
	5640.00	-18.5	V	3.0	43.7	1.0	-61.2	-13.0	-48.2	
7520.00	-16.3	V	3.0	42.5	1.0	-57.8	-13.0	-44.8		
3760.00	-9.7	H	3.0	43.8	1.0	-52.5	-13.0	-39.5		
5640.00	-15.8	H	3.0	43.7	1.0	-58.5	-13.0	-45.5		
7520.00	-15.8	H	3.0	42.5	1.0	-57.3	-13.0	-44.3		
High Ch, 1909.8MHz										
3819.60	-14.6	V	3.0	43.8	1.0	-57.5	-13.0	-44.5		
5729.40	-12.4	V	3.0	43.7	1.0	-55.1	-13.0	-42.1		
7639.20	-16.6	V	3.0	42.4	1.0	-58.0	-13.0	-45.0		
3819.60	-13.0	H	3.0	43.8	1.0	-55.8	-13.0	-42.8		
5729.40	-12.8	H	3.0	43.7	1.0	-55.5	-13.0	-42.5		
7639.20	-16.5	H	3.0	42.4	1.0	-57.9	-13.0	-44.9		
GSM GSM1900 EGPRS	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4788452485									
	Date: 2018-05-02									
	Test Engineer: 45585									
	Configuration: EUT / Adapter / Earphone, X-Position									
	Location: Chamber 1									
	Mode: EGPRS 1900 MHz Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1850.2MHz									
	3700.40	-17.5	V	3.0	43.8	1.0	-60.3	-13.0	-47.3	
	5550.60	-15.8	V	3.0	43.7	1.0	-58.5	-13.0	-45.5	
	7400.80	-16.2	V	3.0	42.5	1.0	-57.7	-13.0	-44.7	
	3700.40	-15.5	H	3.0	43.8	1.0	-58.3	-13.0	-45.3	
	5550.60	-17.1	H	3.0	43.7	1.0	-59.8	-13.0	-46.8	
	7400.80	-16.3	H	3.0	42.5	1.0	-57.8	-13.0	-44.8	
	Mid Ch, 1880MHz									
	3760.00	-18.3	V	3.0	43.8	1.0	-61.1	-13.0	-48.1	
	5640.00	-19.3	V	3.0	43.7	1.0	-62.0	-13.0	-49.0	
7520.00	-16.2	V	3.0	42.5	1.0	-57.6	-13.0	-44.6		
3760.00	-12.2	H	3.0	43.8	1.0	-55.0	-13.0	-42.0		
5640.00	-17.1	H	3.0	43.7	1.0	-59.8	-13.0	-46.8		
7520.00	-15.7	H	3.0	42.5	1.0	-57.2	-13.0	-44.2		
High Ch, 1909.8MHz										
3819.60	-17.6	V	3.0	43.8	1.0	-60.4	-13.0	-47.4		
5729.40	-14.8	V	3.0	43.7	1.0	-57.5	-13.0	-44.5		
7639.20	-16.9	V	3.0	42.4	1.0	-58.2	-13.0	-45.2		
3819.60	-15.0	H	3.0	43.8	1.0	-57.8	-13.0	-44.8		
5729.40	-15.2	H	3.0	43.7	1.0	-57.9	-13.0	-44.9		
7639.20	-16.5	H	3.0	42.4	1.0	-57.8	-13.0	-44.8		

WCDMA Band 5

WCDMA

Band 5

REL99

UL Verification Services, Inc.

Above 1GHz High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788452485

2018-05-02

45585

EUT / Adapter / Earphone, Z-Position

Chamber 1

Rel99 Band 5 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1652.80	-16.7	V	3.0	43.6	1.0	-59.3	-13.0	-46.3	
2479.20	-9.2	V	3.0	43.4	1.0	-51.6	-13.0	-38.6	
3305.60	-20.0	V	3.0	43.6	1.0	-62.6	-13.0	-49.6	
1652.80	-16.1	H	3.0	43.6	1.0	-58.7	-13.0	-45.7	
2479.20	-6.4	H	3.0	43.4	1.0	-48.8	-13.0	-35.8	
3305.60	-19.6	H	3.0	43.6	1.0	-62.2	-13.0	-49.2	
Mid Ch, 836.6MHz									
1673.20	-15.0	V	3.0	43.6	1.0	-57.6	-13.0	-44.6	
2509.80	-11.4	V	3.0	43.4	1.0	-53.8	-13.0	-40.8	
3346.40	-20.1	V	3.0	43.6	1.0	-62.7	-13.0	-49.7	
1673.20	-14.3	H	3.0	43.6	1.0	-56.9	-13.0	-43.9	
2509.80	-4.1	H	3.0	43.4	1.0	-46.6	-13.0	-33.6	
3346.40	-19.1	H	3.0	43.6	1.0	-61.8	-13.0	-48.8	
High Ch, 846.6MHz									
1693.20	-15.5	V	3.0	43.6	1.0	-58.0	-13.0	-45.0	
2539.80	-9.2	V	3.0	43.4	1.0	-51.7	-13.0	-38.7	
3386.40	-20.4	V	3.0	43.7	1.0	-63.1	-13.0	-50.1	
1693.20	-14.7	H	3.0	43.6	1.0	-57.3	-13.0	-44.3	
2539.80	-5.0	H	3.0	43.4	1.0	-47.5	-13.0	-34.5	
3386.40	-20.1	H	3.0	43.7	1.0	-62.7	-13.0	-49.7	

WCDMA

Band 5

HSDPA

UL Verification Services, Inc.

Above 1GHz High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788452485

2018-05-02

45585

EUT / Adapter / Earphone, Z-Position

Chamber 1

HSDPA Band 5 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1652.80	-18.2	V	3.0	43.6	1.0	-60.8	-13.0	-47.8	
2479.20	-21.2	V	3.0	43.4	1.0	-63.6	-13.0	-50.6	
3305.60	-20.1	V	3.0	43.6	1.0	-62.7	-13.0	-49.7	
1652.80	-17.9	H	3.0	43.6	1.0	-60.5	-13.0	-47.5	
2479.20	-19.9	H	3.0	43.4	1.0	-62.3	-13.0	-49.3	
3305.60	-19.4	H	3.0	43.6	1.0	-62.1	-13.0	-49.1	
Mid Ch, 836.6MHz									
1673.20	-17.2	V	3.0	43.6	1.0	-59.7	-13.0	-46.7	
2509.80	-21.5	V	3.0	43.4	1.0	-63.9	-13.0	-50.9	
3346.40	-19.9	V	3.0	43.6	1.0	-62.6	-13.0	-49.6	
1673.20	-17.2	H	3.0	43.6	1.0	-59.7	-13.0	-46.7	
2509.80	-21.5	H	3.0	43.4	1.0	-63.9	-13.0	-50.9	
3346.40	-19.6	H	3.0	43.6	1.0	-62.3	-13.0	-49.3	
High Ch, 846.6MHz									
1693.20	-17.4	V	3.0	43.6	1.0	-60.0	-13.0	-47.0	
2539.80	-21.3	V	3.0	43.4	1.0	-63.7	-13.0	-50.7	
3386.40	-20.5	V	3.0	43.7	1.0	-63.2	-13.0	-50.2	
1693.20	-17.8	H	3.0	43.6	1.0	-60.3	-13.0	-47.3	
2539.80	-21.4	H	3.0	43.4	1.0	-63.8	-13.0	-50.8	
3386.40	-20.0	H	3.0	43.7	1.0	-62.7	-13.0	-49.7	

WCDMA
Band 2
REL99

UL Verification Services, Inc.									
Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4788452485							
Date:		2018-05-02							
Test Engineer:		45585							
Configuration:		EUT / Adapter / Earphone, X-Position							
Location:		Chamber 1							
Mode:		Ref99 Band 2 Harmonics							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	-17.2	V	3.0	43.8	1.0	-60.0	-13.0	-47.0	
5557.20	-12.5	V	3.0	43.7	1.0	-55.2	-13.0	-42.2	
7409.60	-16.6	V	3.0	42.5	1.0	-58.1	-13.0	-45.1	
3704.80	-12.7	H	3.0	43.8	1.0	-55.5	-13.0	-42.5	
5557.20	-13.9	H	3.0	43.7	1.0	-56.7	-13.0	-43.7	
7409.60	-16.6	H	3.0	42.5	1.0	-58.1	-13.0	-45.1	
Mid Ch, 1880MHz									
3760.00	-16.5	V	3.0	43.8	1.0	-59.3	-13.0	-46.3	
5640.00	-15.1	V	3.0	43.7	1.0	-57.8	-13.0	-44.8	
7520.00	-15.9	V	3.0	42.5	1.0	-57.4	-13.0	-44.4	
3760.00	-14.2	H	3.0	43.8	1.0	-57.0	-13.0	-44.0	
5640.00	-15.2	H	3.0	43.7	1.0	-57.9	-13.0	-44.9	
7520.00	-15.8	H	3.0	42.5	1.0	-57.3	-13.0	-44.3	
High Ch, 1907.6MHz									
3815.20	-15.5	V	3.0	43.8	1.0	-58.3	-13.0	-45.3	
5722.80	-14.5	V	3.0	43.7	1.0	-57.2	-13.0	-44.2	
7630.40	-16.8	V	3.0	42.4	1.0	-58.2	-13.0	-45.2	
3815.20	-14.7	H	3.0	43.8	1.0	-57.5	-13.0	-44.5	
5722.80	-14.5	H	3.0	43.7	1.0	-57.2	-13.0	-44.2	
7630.40	-16.0	H	3.0	42.4	1.0	-57.4	-13.0	-44.4	

UL Verification Services, Inc.									
Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4788452485							
Date:		2018-05-02							
Test Engineer:		45585							
Configuration:		EUT / Adapter / Earphone, X-Position							
Location:		Chamber 1							
Mode:		HSDPA Band 2 Harmonics							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	-16.6	V	3.0	43.8	1.0	-59.4	-13.0	-46.4	
5557.20	-13.2	V	3.0	43.7	1.0	-55.9	-13.0	-42.9	
7409.60	-16.6	V	3.0	42.5	1.0	-58.1	-13.0	-45.1	
3704.80	-12.4	H	3.0	43.8	1.0	-55.1	-13.0	-42.1	
5557.20	-14.4	H	3.0	43.7	1.0	-57.1	-13.0	-44.1	
7409.60	-16.5	H	3.0	42.5	1.0	-58.0	-13.0	-45.0	
Mid Ch, 1880MHz									
3760.00	-15.9	V	3.0	43.8	1.0	-58.7	-13.0	-45.7	
5640.00	-15.4	V	3.0	43.7	1.0	-58.1	-13.0	-45.1	
7520.00	-16.1	V	3.0	42.5	1.0	-57.6	-13.0	-44.6	
3760.00	-13.3	H	3.0	43.8	1.0	-56.1	-13.0	-43.1	
5640.00	-15.7	H	3.0	43.7	1.0	-58.4	-13.0	-45.4	
7520.00	-15.8	H	3.0	42.5	1.0	-57.2	-13.0	-44.2	
High Ch, 1907.6MHz									
3815.20	-14.3	V	3.0	43.8	1.0	-57.1	-13.0	-44.1	
5722.80	-14.9	V	3.0	43.7	1.0	-57.6	-13.0	-44.6	
7630.40	-16.7	V	3.0	42.4	1.0	-58.1	-13.0	-45.1	
3815.20	-13.6	H	3.0	43.8	1.0	-56.4	-13.0	-43.4	
5722.80	-15.0	H	3.0	43.7	1.0	-57.7	-13.0	-44.7	
7630.40	-16.5	H	3.0	42.4	1.0	-57.9	-13.0	-44.9	

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
LTE Band 5 5MHz QPSK		Company: Samsung Project #: 4788452485 Date: 2018-04-25 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, Z-Position Location: Chamber 3 Mode: LTE_QPSK Band 5 Harmonics, 5MHz Bandwidth									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Ch, 826.5MHz									
		1653.00	-26.4	V	3.0	41.8	1.0	-67.3	-13.0	-54.3	
		2479.50	-29.5	V	3.0	41.7	1.0	-70.2	-13.0	-57.2	
		3306.00	-29.3	V	3.0	41.1	1.0	-69.4	-13.0	-56.4	
		1653.00	-31.9	H	3.0	41.8	1.0	-72.7	-13.0	-59.7	
		2479.50	-29.5	H	3.0	41.7	1.0	-70.2	-13.0	-57.2	
		3306.00	-29.7	H	3.0	41.1	1.0	-69.8	-13.0	-56.8	
		Mid Ch, 836.5MHz									
		1673.00	-26.4	V	3.0	41.8	1.0	-67.2	-13.0	-54.2	
		2509.50	-30.6	V	3.0	41.7	1.0	-71.3	-13.0	-58.3	
		3346.00	-29.5	V	3.0	41.1	1.0	-69.5	-13.0	-56.5	
		1673.00	-26.5	H	3.0	41.8	1.0	-67.3	-13.0	-54.3	
		2509.50	-30.7	H	3.0	41.7	1.0	-71.4	-13.0	-58.4	
		3346.00	-29.6	H	3.0	41.1	1.0	-69.7	-13.0	-56.7	
		High Ch, 846.5MHz									
		1693.00	-27.7	V	3.0	41.8	1.0	-68.5	-13.0	-55.5	
		2539.50	-29.1	V	3.0	41.6	1.0	-69.8	-13.0	-56.8	
		3386.00	-29.4	V	3.0	41.1	1.0	-69.4	-13.0	-56.4	
		1693.00	-29.0	H	3.0	41.8	1.0	-69.9	-13.0	-56.9	
		2539.50	-30.1	H	3.0	41.6	1.0	-70.8	-13.0	-57.8	
		3386.00	-29.6	H	3.0	41.1	1.0	-69.7	-13.0	-56.7	
LTE Band 5 5MHz 16QAM		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
		Company: Samsung Project #: 4788452485 Date: 2018-04-25 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, Z-Position Location: Chamber 3 Mode: LTE_16QAM Band 5 Harmonics, 5MHz Bandwidth									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Ch, 826.5MHz									
		1653.00	-29.1	V	3.0	41.8	1.0	-69.9	-13.0	-56.9	
		2479.50	-30.1	V	3.0	41.7	1.0	-70.8	-13.0	-57.8	
		3306.00	-29.3	V	3.0	41.1	1.0	-69.4	-13.0	-56.4	
		1653.00	-32.4	H	3.0	41.8	1.0	-73.2	-13.0	-60.2	
		2479.50	-30.2	H	3.0	41.7	1.0	-70.9	-13.0	-57.9	
		3306.00	-29.6	H	3.0	41.1	1.0	-69.7	-13.0	-56.7	
		Mid Ch, 836.5MHz									
		1673.00	-28.4	V	3.0	41.8	1.0	-69.2	-13.0	-56.2	
		2509.50	-30.6	V	3.0	41.7	1.0	-71.3	-13.0	-58.3	
		3346.00	-29.6	V	3.0	41.1	1.0	-69.7	-13.0	-56.7	
		1673.00	-28.2	H	3.0	41.8	1.0	-69.1	-13.0	-56.1	
		2509.50	-30.9	H	3.0	41.7	1.0	-71.5	-13.0	-58.5	
		3346.00	-29.8	H	3.0	41.1	1.0	-69.9	-13.0	-56.9	
		High Ch, 846.5MHz									
		1693.00	-26.7	V	3.0	41.8	1.0	-67.6	-13.0	-54.6	
		2539.50	-28.8	V	3.0	41.6	1.0	-69.5	-13.0	-56.5	
		3386.00	-29.4	V	3.0	41.1	1.0	-69.5	-13.0	-56.5	
		1693.00	-30.4	H	3.0	41.8	1.0	-71.3	-13.0	-58.3	
		2539.50	-28.4	H	3.0	41.6	1.0	-69.0	-13.0	-56.0	
		3386.00	-29.7	H	3.0	41.1	1.0	-69.8	-13.0	-56.8	

LTE Band 5 3MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4788452485									
	Date: 2018-04-25									
	Test Engineer: 45585									
	Configuration: EUT / Adapter / Earphone, Z-Position									
	Location: Chamber 3									
	Mode: LTE_QPSK Band 5 Harmonics, 3MHz Bandwidth									

LTE Band 5 1.4MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788452485 Date: 2018-04-25 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, Z-Position Location: Chamber 3 Mode: LTE_QPSK Band 5 Harmonics, 1.4MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 824.7MHz									
	1649.40	-30.7	V	3.0	41.8	1.0	-71.5	-13.0	-58.5	
	2474.10	-29.4	V	3.0	41.7	1.0	-70.1	-13.0	-57.1	
	3298.80	-29.3	V	3.0	41.1	1.0	-69.4	-13.0	-56.4	
	1649.40	-32.4	H	3.0	41.8	1.0	-73.2	-13.0	-60.2	
	2474.10	-31.1	H	3.0	41.7	1.0	-71.8	-13.0	-58.8	
	3298.80	-29.7	H	3.0	41.1	1.0	-69.8	-13.0	-56.8	
	Mid Ch, 836.5MHz									
	1673.00	-31.4	V	3.0	41.8	1.0	-72.3	-13.0	-59.3	
	2509.50	-29.6	V	3.0	41.7	1.0	-70.3	-13.0	-57.3	
	3346.00	-29.5	V	3.0	41.1	1.0	-69.6	-13.0	-56.6	
	1673.00	-32.1	H	3.0	41.8	1.0	-72.9	-13.0	-59.9	
	2509.50	-30.9	H	3.0	41.7	1.0	-71.5	-13.0	-58.5	
	3346.00	-29.9	H	3.0	41.1	1.0	-70.0	-13.0	-57.0	
	High Ch, 848.3MHz									
	1696.60	-29.7	V	3.0	41.8	1.0	-70.6	-13.0	-57.6	
	2544.90	-29.5	V	3.0	41.6	1.0	-70.1	-13.0	-57.1	
	3393.20	-29.3	V	3.0	41.1	1.0	-69.3	-13.0	-56.3	
1696.60	-30.8	H	3.0	41.8	1.0	-71.6	-13.0	-58.6		
2544.90	-30.2	H	3.0	41.6	1.0	-70.8	-13.0	-57.8		
3393.20	-29.8	H	3.0	41.1	1.0	-69.8	-13.0	-56.8		
LTE Band 5 1.4MHz 16QAM	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788452485 Date: 2018-04-27 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, Z-Position Location: Chamber 3 Mode: LTE_16QAM Band 5 Harmonics, 1.4MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 824.7MHz									
	1649.40	-31.4	V	3.0	41.8	1.0	-72.2	-13.0	-59.2	
	2474.10	-29.9	V	3.0	41.7	1.0	-70.6	-13.0	-57.6	
	3298.80	-29.2	V	3.0	41.1	1.0	-69.3	-13.0	-56.3	
	1649.40	-32.8	H	3.0	41.8	1.0	-73.6	-13.0	-60.6	
	2474.10	-30.9	H	3.0	41.7	1.0	-71.6	-13.0	-58.6	
	3298.80	-29.7	H	3.0	41.1	1.0	-69.8	-13.0	-56.8	
	Mid Ch, 836.5MHz									
	1673.00	-31.3	V	3.0	41.8	1.0	-72.2	-13.0	-59.2	
	2509.50	-30.7	V	3.0	41.7	1.0	-71.3	-13.0	-58.3	
	3346.00	-29.6	V	3.0	41.1	1.0	-69.7	-13.0	-56.7	
	1673.00	-27.9	H	3.0	41.8	1.0	-68.7	-13.0	-55.7	
	2509.50	-30.9	H	3.0	41.7	1.0	-71.5	-13.0	-58.5	
	3346.00	-29.8	H	3.0	41.1	1.0	-69.9	-13.0	-56.9	
	High Ch, 848.3MHz									
	1696.60	-30.8	V	3.0	41.8	1.0	-71.7	-13.0	-58.7	
	2544.90	-30.2	V	3.0	41.6	1.0	-70.8	-13.0	-57.8	
	3393.20	-29.2	V	3.0	41.1	1.0	-69.2	-13.0	-56.2	
1696.60	-13.8	H	3.0	41.8	1.0	-54.6	-13.0	-41.6		
2544.90	-30.2	H	3.0	41.6	1.0	-70.9	-13.0	-57.9		
3393.20	-29.6	H	3.0	41.1	1.0	-69.7	-13.0	-56.7		

LTE Band 17

LTE Band 17 10MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788452485 Date: 2018-04-27 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, X-Position Location: Chamber 3 Mode: LTE_QPSK Band 17 Harmonics, 10MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 709MHz									
	1418.00	-29.4	V	3.0	41.7	1.0	-70.1	-13.0	-57.1	
	2127.00	-26.7	V	3.0	41.9	1.0	-67.6	-13.0	-54.6	
	2836.00	-29.5	V	3.0	41.4	1.0	-70.0	-13.0	-57.0	
	1418.00	-19.3	H	3.0	41.7	1.0	-60.0	-13.0	-47.0	
	2127.00	-23.5	H	3.0	41.9	1.0	-64.4	-13.0	-51.4	
	2836.00	-29.9	H	3.0	41.4	1.0	-70.4	-13.0	-57.4	
	Mid Ch, 710MHz									
	1420.00	-30.0	V	3.0	41.7	1.0	-70.7	-13.0	-57.7	
	2130.00	-28.1	V	3.0	41.9	1.0	-69.1	-13.0	-56.1	
	2840.00	-30.1	V	3.0	41.4	1.0	-70.5	-13.0	-57.5	
	1420.00	-22.7	H	3.0	41.7	1.0	-63.4	-13.0	-50.4	
	2130.00	-28.8	H	3.0	41.9	1.0	-69.8	-13.0	-56.8	
	2840.00	-30.5	H	3.0	41.4	1.0	-70.9	-13.0	-57.9	
	High Ch, 711MHz									
	1422.00	-31.6	V	3.0	41.7	1.0	-72.2	-13.0	-59.2	
	2133.00	-25.3	V	3.0	41.9	1.0	-66.2	-13.0	-53.2	
	2844.00	-29.5	V	3.0	41.4	1.0	-69.9	-13.0	-56.9	
1422.00	-25.9	H	3.0	41.7	1.0	-66.5	-13.0	-53.5		
2133.00	-26.3	H	3.0	41.9	1.0	-67.2	-13.0	-54.2		
2844.00	-30.1	H	3.0	41.4	1.0	-70.5	-13.0	-57.5		
LTE Band 17 10MHz 16QAM	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788452485 Date: 2018-04-27 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, X-Position Location: Chamber 3 Mode: LTE_16QAM Band 17 Harmonics, 10MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 709MHz									
	1418.00	-29.7	V	3.0	41.7	1.0	-70.4	-13.0	-57.4	
	2127.00	-27.7	V	3.0	41.9	1.0	-68.6	-13.0	-55.6	
	2836.00	-29.9	V	3.0	41.4	1.0	-70.3	-13.0	-57.3	
	1418.00	-31.3	H	3.0	41.7	1.0	-72.0	-13.0	-59.0	
	2127.00	-27.4	H	3.0	41.9	1.0	-68.4	-13.0	-55.4	
	2836.00	-30.3	H	3.0	41.4	1.0	-70.7	-13.0	-57.7	
	Mid Ch, 710MHz									
	1420.00	-31.6	V	3.0	41.7	1.0	-72.3	-13.0	-59.3	
	2130.00	-29.1	V	3.0	41.9	1.0	-70.1	-13.0	-57.1	
	2840.00	-29.7	V	3.0	41.4	1.0	-70.1	-13.0	-57.1	
	1420.00	-28.0	H	3.0	41.7	1.0	-68.7	-13.0	-55.7	
	2130.00	-27.9	H	3.0	41.9	1.0	-68.8	-13.0	-55.8	
	2840.00	-30.1	H	3.0	41.4	1.0	-70.6	-13.0	-57.6	
	High Ch, 711MHz									
	1422.00	-31.3	V	3.0	41.7	1.0	-71.9	-13.0	-58.9	
	2133.00	-27.6	V	3.0	41.9	1.0	-68.6	-13.0	-55.6	
	2844.00	-29.8	V	3.0	41.4	1.0	-70.2	-13.0	-57.2	
1422.00	-26.6	H	3.0	41.7	1.0	-67.2	-13.0	-54.2		
2133.00	-28.1	H	3.0	41.9	1.0	-69.1	-13.0	-56.1		
2844.00	-30.4	H	3.0	41.4	1.0	-70.9	-13.0	-57.9		

LTE Band 17 5MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788452485 Date: 2018-04-27 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, X-Position Location: Chamber 3 Mode: LTE_QPSK Band 17 Harmonics, 5MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 706.5MHz									
	1413.00	-27.9	V	3.0	41.7	1.0	-68.5	-13.0	-55.5	
	2119.50	-26.8	V	3.0	41.9	1.0	-67.7	-13.0	-54.7	
	2826.00	-30.0	V	3.0	41.4	1.0	-70.4	-13.0	-57.4	
	1413.00	-20.4	H	3.0	41.7	1.0	-61.1	-13.0	-48.1	
	2119.50	-27.3	H	3.0	41.9	1.0	-68.3	-13.0	-55.3	
	2826.00	-30.4	H	3.0	41.4	1.0	-70.9	-13.0	-57.9	
	Mid Ch, 710MHz									
	1420.00	-31.7	V	3.0	41.7	1.0	-72.4	-13.0	-59.4	
	2130.00	-27.4	V	3.0	41.9	1.0	-68.3	-13.0	-55.3	
	2840.00	-30.0	V	3.0	41.4	1.0	-70.4	-13.0	-57.4	
	1420.00	-26.1	H	3.0	41.7	1.0	-66.8	-13.0	-53.8	
	2130.00	-28.4	H	3.0	41.9	1.0	-69.3	-13.0	-56.3	
	2840.00	-30.3	H	3.0	41.4	1.0	-70.8	-13.0	-57.8	
	High Ch, 713.5MHz									
	1427.00	-29.8	V	3.0	41.7	1.0	-70.5	-13.0	-57.5	
	2140.50	-25.4	V	3.0	41.9	1.0	-66.3	-13.0	-53.3	
	2854.00	-29.7	V	3.0	41.4	1.0	-70.1	-13.0	-57.1	
1427.00	-20.7	H	3.0	41.7	1.0	-61.3	-13.0	-48.3		
2140.50	-23.7	H	3.0	41.9	1.0	-64.6	-13.0	-51.6		
2854.00	-30.3	H	3.0	41.4	1.0	-70.7	-13.0	-57.7		
LTE Band 17 5MHz 16QAM	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: Samsung Project #: 4788452485 Date: 2018-04-27 Test Engineer: 45585 Configuration: EUT / Adapter / Earphone, X-Position Location: Chamber 3 Mode: LTE_16QAM Band 17 Harmonics, 5MHz Bandwidth									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 706.5MHz									
	1413.00	-33.3	V	3.0	41.7	1.0	-74.0	-13.0	-61.0	
	2119.50	-29.1	V	3.0	41.9	1.0	-70.0	-13.0	-57.0	
	2826.00	-30.0	V	3.0	41.4	1.0	-70.4	-13.0	-57.4	
	1413.00	-31.5	H	3.0	41.7	1.0	-72.1	-13.0	-59.1	
	2119.50	-27.3	H	3.0	41.9	1.0	-68.3	-13.0	-55.3	
	2826.00	-30.5	H	3.0	41.4	1.0	-70.9	-13.0	-57.9	
	Mid Ch, 710MHz									
	1420.00	-29.6	V	3.0	41.7	1.0	-70.3	-13.0	-57.3	
	2130.00	-27.2	V	3.0	41.9	1.0	-68.1	-13.0	-55.1	
	2840.00	-30.0	V	3.0	41.4	1.0	-70.4	-13.0	-57.4	
	1420.00	-23.0	H	3.0	41.7	1.0	-63.7	-13.0	-50.7	
	2130.00	-27.4	H	3.0	41.9	1.0	-68.3	-13.0	-55.3	
	2840.00	-30.4	H	3.0	41.4	1.0	-70.8	-13.0	-57.8	
	High Ch, 713.5MHz									
	1427.00	-32.5	V	3.0	41.7	1.0	-73.2	-13.0	-60.2	
	2140.50	-26.7	V	3.0	41.9	1.0	-67.7	-13.0	-54.7	
	2854.00	-30.0	V	3.0	41.4	1.0	-70.4	-13.0	-57.4	
1427.00	-29.7	H	3.0	41.7	1.0	-70.4	-13.0	-57.4		
2140.50	-28.0	H	3.0	41.9	1.0	-68.9	-13.0	-55.9		
2854.00	-30.4	H	3.0	41.4	1.0	-70.8	-13.0	-57.8		