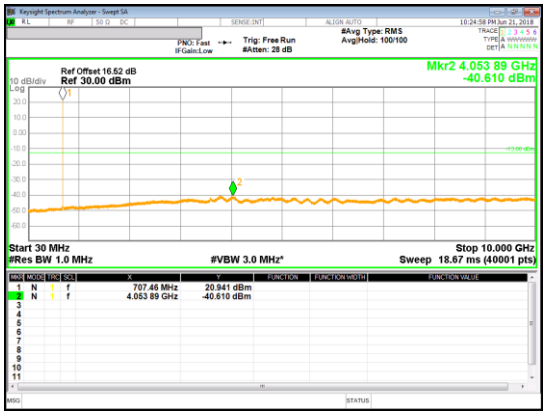
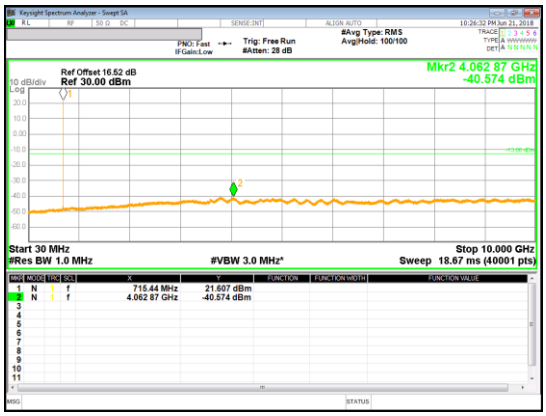
Band 12 1.4MHz	 1.4MHz QPSK Low channel	 1.4MHz 16QAM Low channel
	  1.4MHz QPSK Mid channel	 1.4MHz 16QAM Mid channel
	  1.4MHz QPSK High channel	 1.4MHz 16QAM High channel

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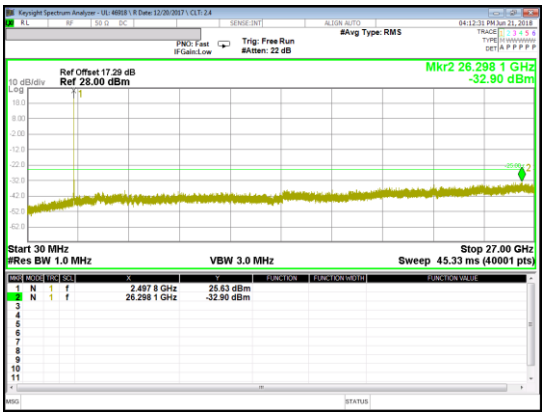
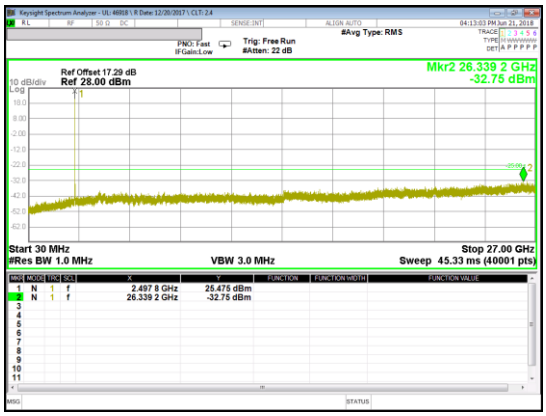
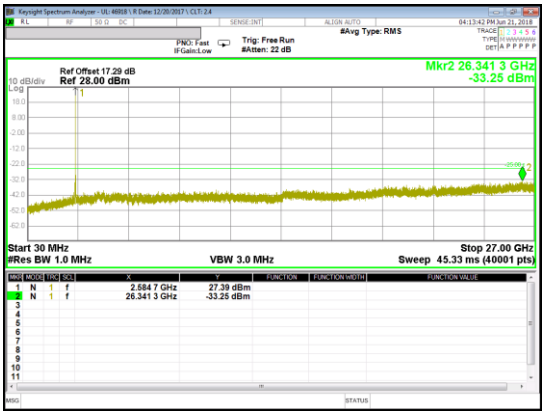
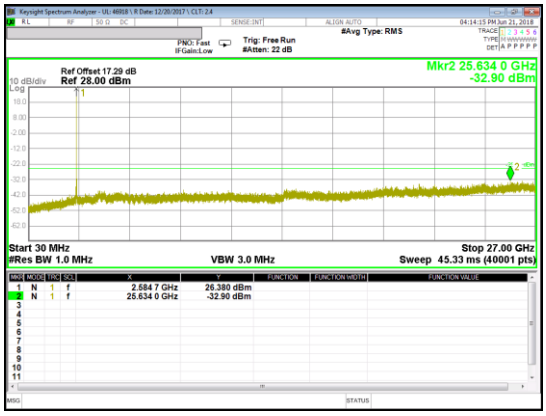
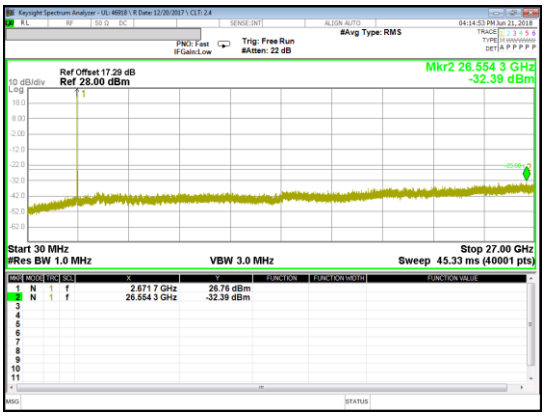
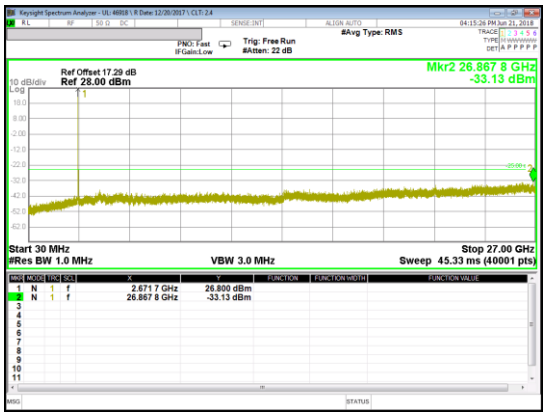
LTE Band 41

Band 41 20MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

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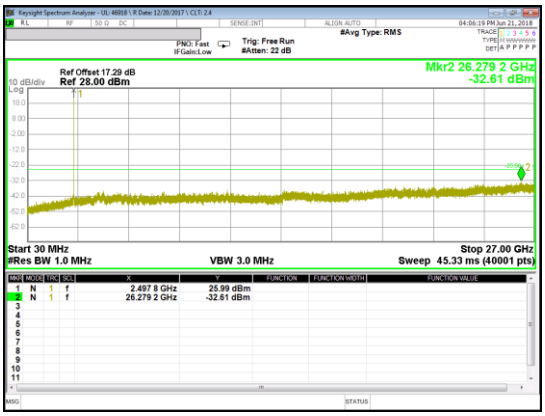
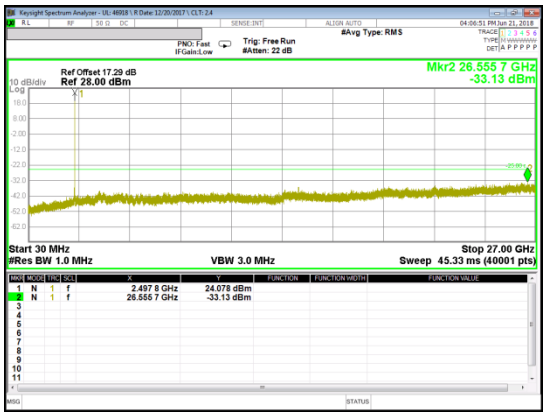
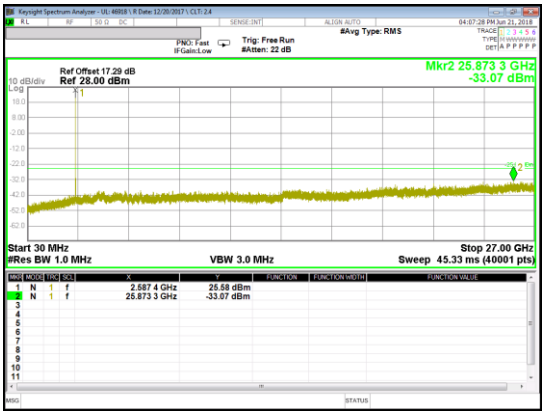
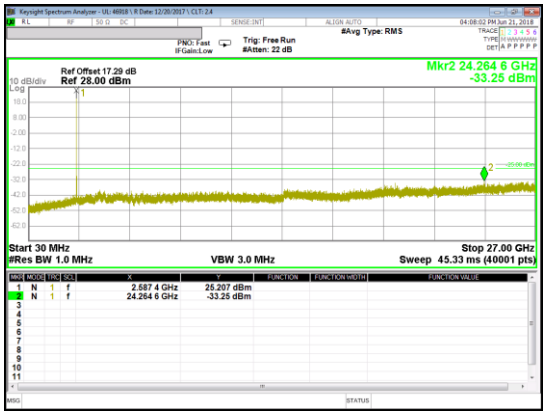
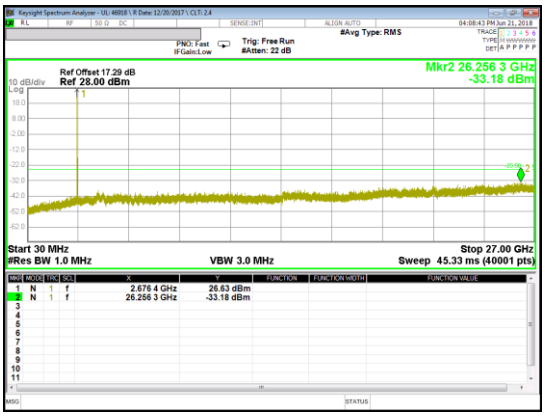
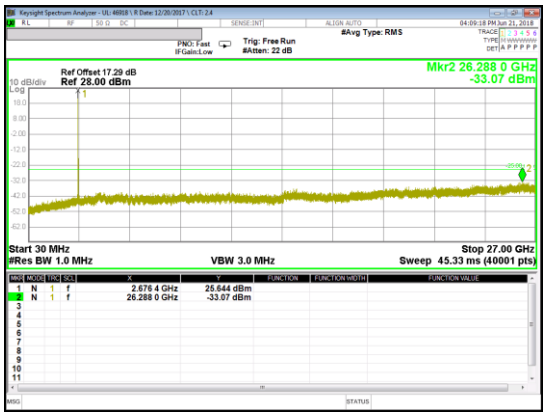
Band 41 15MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

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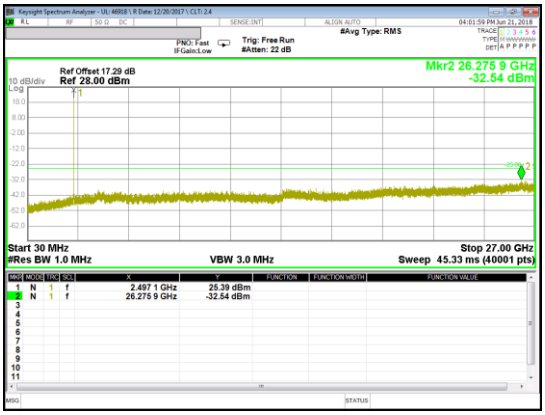
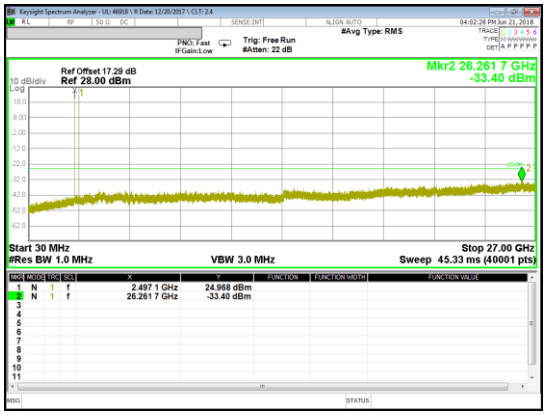
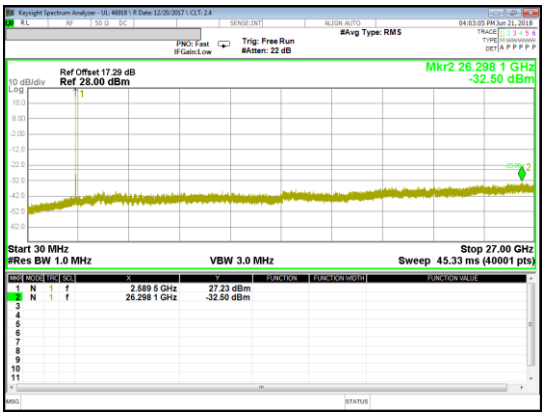
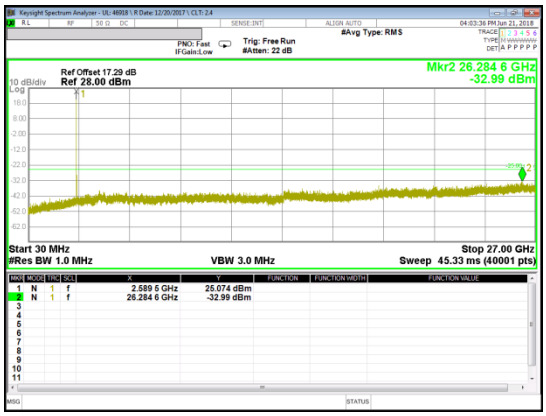
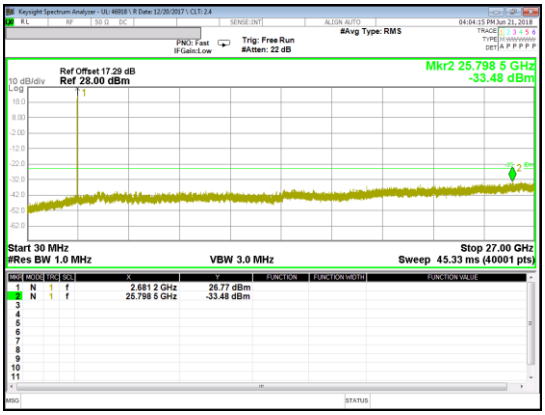
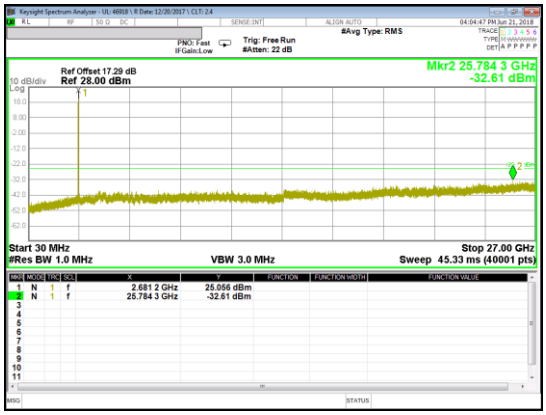
Band 41 10MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

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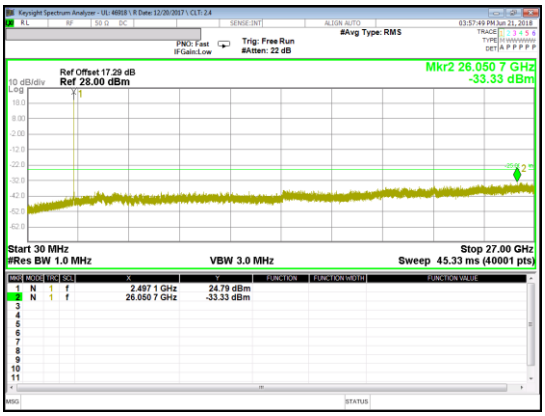
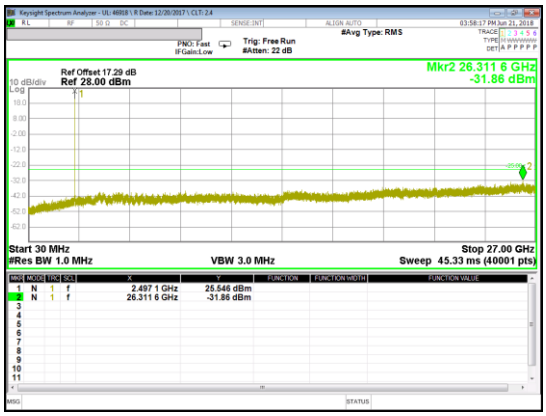
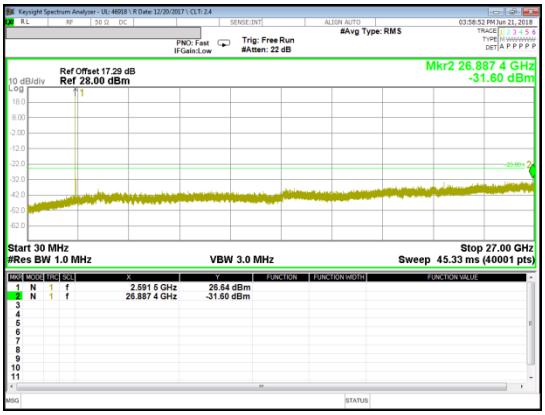
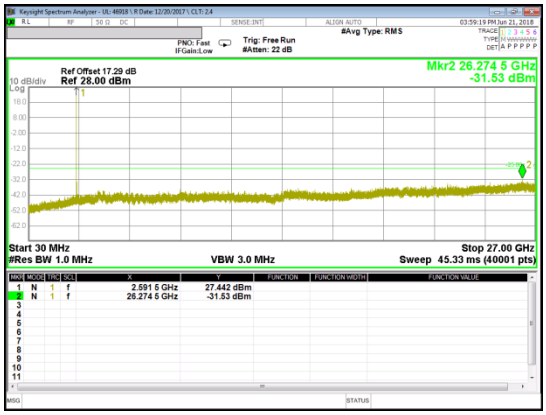
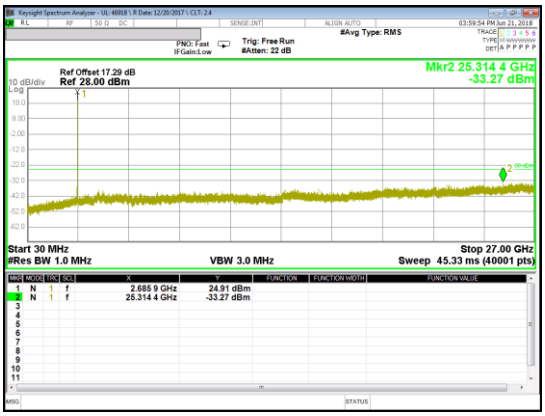
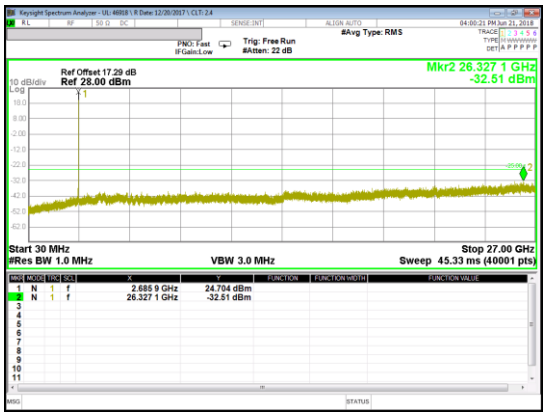
Band 41 5MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

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9.4. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

§24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

§27.54 - The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

RESULTS

See the following pages.

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9.4.1. FREQUENCY STABILITY RESULTS

GSM 850

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	824.19998618	0.005	848.79998792	0.000	2.5
3.85	40	824.19998043	0.012	848.79998452	0.004	2.5
3.85	30	824.19998398	0.007	848.79998766	0.001	2.5
3.85	***20***	***824.19999010***	***0.000***	***848.79998813***	***0.000***	***2.5***
3.85	10	824.19998239	0.009	848.79998781	0.000	2.5
3.85	0	824.19998624	0.005	848.79998856	-0.001	2.5
3.85	-10	824.19998532	0.006	848.79998656	0.002	2.5
3.85	-20	824.19998847	0.002	848.79998178	0.007	2.5
3.85	-30	824.19998687	0.004	848.79998126	0.008	2.5

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	***20***	**824.19999010**	***0***	**848.79998813**	***0***	***2.5***
4.35	20	824.19998922	0.001	848.79998705	0.001	2.5
3.65	20	824.19998679	0.004	848.79998220	0.007	2.5

GSM 1900

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0778	1909.9233		
Extreme (50C)		1850.0777	1909.9233	-22.2	-0.012
Extreme (40C)		1850.0777	1909.9233	-14.4	-0.008
Extreme (30C)		1850.0777	1909.9233	-17.6	-0.009
Extreme (10C)		1850.0777	1909.9233	-22.8	-0.012
Extreme (0C)		1850.0777	1909.9233	-23.0	-0.012
Extreme (-10C)		1850.0777	1909.9233	-19.6	-0.010
Extreme (-20C)		1850.0777	1909.9233	-22.3	-0.012
Extreme (-30C)		1850.0777	1909.9233	-24.0	-0.013
20C	15%	1850.0777	1909.9233	-20.8	-0.011
	-15%	1850.0777	1909.9233	-15.8	-0.008
	End Point	1850.0777	1909.9233	-15.3	-0.008

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WCDMA Band 5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	826.39998342	-0.003	846.59998137	0.011	2.5
3.85	40	826.39998453	-0.005	846.59998004	0.012	2.5
3.85	30	826.39998736	-0.008	846.59998032	0.012	2.5
3.85	***20***	***826.39998056***	***0.000***	***846.59999039***	***0.000***	***2.5***
3.85	10	826.39998119	-0.001	846.59998459	0.007	2.5
3.85	0	826.39998461	-0.005	846.59998858	0.002	2.5
3.85	-10	826.39998622	-0.007	846.59998253	0.009	2.5
3.85	-20	826.39998111	-0.001	846.59998537	0.006	2.5
3.85	-30	826.39998379	-0.004	846.59998191	0.010	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	***20***	**826.39998056**	***0***	**846.59999039**	***0***	***2.5***
4.35	20	826.39998409	-0.004	846.59998225	0.010	2.5
3.65	20	826.39998180	-0.002	846.59998986	0.001	2.5

WCDMA Band 2

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	-21.9	-0.012
Extreme (40C)		1852.3979	1907.6020	-18.0	-0.010
Extreme (30C)		1852.3979	1907.6020	-19.0	-0.010
Extreme (10C)		1852.3979	1907.6020	-24.9	-0.013
Extreme (0C)		1852.3979	1907.6020	-16.9	-0.009
Extreme (-10C)		1852.3979	1907.6020	-21.8	-0.012
Extreme (-20C)		1852.3979	1907.6020	-18.2	-0.010
Extreme (-30C)		1852.3979	1907.6020	-18.0	-0.010
20C	15%	1852.3979	1907.6020	-16.3	-0.009
	-15%	1852.3979	1907.6020	-24.5	-0.013
	End Point	1852.3979	1907.6020	-19.7	-0.010

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LTE Band 5

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2061.750	Hz	High Channel	2120.750	Hz
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	824.69998964	-0.007	848.29998837	0.000	2.5
3.85	40	824.69998503	-0.001	848.29998750	0.001	2.5
3.85	30	824.69998719	-0.004	848.29999086	-0.003	2.5
3.85	***20***	***824.69998407***	***0.000***	***848.29998825***	***0.000***	***2.5***
3.85	10	824.69998365	0.001	848.29998599	0.003	2.5
3.85	0	824.69998143	0.003	848.29998049	0.009	2.5
3.85	-10	824.69998051	0.004	848.29998563	0.003	2.5
3.85	-20	824.69998166	0.003	848.29998808	0.000	2.5
3.85	-30	824.69998876	-0.006	848.29998677	0.002	2.5

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2061.750	Hz	High Channel	2120.750	Hz
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	***20***	***824.69998407***	***0***	***848.29998825***	***0***	***2.5***
4.35	20	824.69998084	0.004	848.29998750	0.001	2.5
3.65	20	824.69998914	-0.006	848.29998541	0.003	2.5

LTE Band 12

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	699.6995	715.3005		
Extreme (50C)		699.6994	715.3005	-5.6	-0.008
Extreme (40C)		699.6994	715.3005	-7.6	-0.011
Extreme (30C)		699.6994	715.3005	-6.5	-0.009
Extreme (10C)		699.6994	715.3005	-8.9	-0.013
Extreme (0C)		699.6994	715.3005	-4.6	-0.006
Extreme (-10C)		699.6994	715.3005	-8.3	-0.012
Extreme (-20C)		699.6994	715.3005	-14.2	-0.020
Extreme (-30C)		699.6994	715.3005	-14.7	-0.021
20C	15%	699.6994	715.3005	-13.3	-0.019
	-15%	699.6994	715.3005	-8.7	-0.012
	End Point	699.6994	715.3005	-14.5	-0.021

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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LTE Band 41

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	-19.8	-0.008
Extreme (40C)		2498.4977	2687.5022	-26.6	-0.010
Extreme (30C)		2498.4977	2687.5022	-24.9	-0.010
Extreme (10C)		2498.4977	2687.5022	-23.6	-0.009
Extreme (0C)		2498.4977	2687.5022	-27.2	-0.010
Extreme (-10C)		2498.4977	2687.5022	-20.6	-0.008
Extreme (-20C)		2498.4977	2687.5022	-25.4	-0.010
Extreme (-30C)		2498.4977	2687.5022	-26.6	-0.010
20C	15%	2498.4977	2687.5022	-29.8	-0.012
	-15%	2498.4977	2687.5022	-21.6	-0.008
	End Point	2498.4977	2687.5022	-22.2	-0.009

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

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.

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

TEST PROCEDURE

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

For radiated output power measurement with a ESU40:

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

TEST RESULTS

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10.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	512	824.2	30.63	1156.11
		661	836.6	30.40	1096.48
		810	848.8	30.71	1177.61
	EGPRS	512	824.2	24.61	289.07
		661	836.6	24.01	251.77
		810	848.8	24.95	312.61
GSM1900	GPRS	512	1850.2	30.24	1056.82
		661	1880.0	30.25	1059.25
		810	1909.8	28.84	765.60
	EGPRS	512	1850.2	26.11	408.32
		661	1880.0	25.27	336.51
		810	1909.8	25.57	360.58

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WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	21.39	137.72
		4183	836.6	20.31	107.40
		4233	846.6	20.16	103.75
	HSDPA	4132	826.4	20.56	113.76
		4183	836.6	19.54	89.95
		4233	846.6	19.08	80.91
Band 2	REL99	9262	1852.4	21.91	155.24
		9400	1880.0	21.64	145.88
		9538	1907.6	20.85	121.62
	HSDPA	9262	1852.4	21.30	134.90
		9400	1880.0	21.29	134.59
		9538	1907.6	20.24	105.68

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LTE Band 5

Band	BW [MHz]	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 5	10	QPSK	1/0	829.0	23.34	215.77
			1/0	836.5	22.88	194.09
			1/0	844.0	22.88	194.09
		16QAM	1/0	829.0	22.23	167.11
			1/0	836.5	21.95	156.68
			1/0	844.0	21.70	147.91
	5	QPSK	1/0	826.5	23.32	214.78
			1/0	836.5	23.13	205.59
			1/0	846.5	22.73	187.50
		16QAM	1/0	826.5	22.46	176.20
			1/0	836.5	21.80	151.36
			1/0	846.5	21.76	149.97
	3	QPSK	1/8	825.5	23.55	226.46
			1/8	836.5	22.83	191.87
			1/8	847.5	21.86	153.46
		16QAM	1/8	825.5	22.18	165.20
			1/8	836.5	21.76	149.97
			1/8	847.5	20.74	118.58
	1.4	QPSK	1/3	824.7	23.37	217.27
			1/3	836.5	22.69	185.78
			1/3	848.3	21.37	137.09
		16QAM	1/3	824.7	22.31	170.22
			1/3	836.5	21.61	144.88
			1/3	848.3	20.19	104.47

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LTE Band 12

Band	BW [MHz]	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 12	10	QPSK	1/0	704.0	16.80	47.86
			1/0	707.5	17.03	50.47
			1/0	711.0	17.16	52.00
		16QAM	1/0	704.0	15.62	36.48
			1/0	707.5	16.01	39.90
			1/0	711.0	15.97	39.54
	5	QPSK	1/0	701.5	16.70	46.77
			1/0	707.5	17.07	50.93
			1/0	713.5	16.57	45.39
		16QAM	1/0	701.5	15.40	34.67
			1/0	707.5	16.10	40.74
			1/0	713.5	15.80	38.02
	3	QPSK	1/8	700.5	16.72	46.99
			1/8	707.5	16.60	45.71
			1/8	714.5	16.59	45.60
		16QAM	1/8	700.5	15.59	36.22
			1/0	707.5	15.41	34.75
			1/8	714.5	15.49	35.40
	1.4	QPSK	1/3	699.7	16.53	44.98
			1/3	707.5	16.95	49.55
			1/3	715.3	16.31	42.76
		16QAM	1/3	699.7	15.48	35.32
			1/3	707.5	15.68	36.98
			1/3	715.3	15.28	33.73

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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LTE Band 41

Band	BW [MHz]	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 41	20	QPSK	1/0	2506.0	23.56	226.99
			1/0	2593.0	24.84	304.79
			1/0	2680.0	22.20	165.96
		16QAM	1/0	2506.0	22.41	174.18
			1/0	2593.0	25.26	335.74
			1/0	2680.0	21.76	149.97
	15	QPSK	1/0	2503.5	21.86	153.46
			1/0	2593.0	23.24	210.86
			1/0	2682.5	21.94	156.31
		16QAM	1/0	2503.5	22.23	167.11
			1/0	2593.0	23.56	226.99
			1/0	2682.5	21.28	134.28
	10	QPSK	1/0	2501.0	23.31	214.29
			1/0	2593.0	22.83	191.87
			1/0	2685.0	21.61	144.88
		16QAM	1/0	2501.0	23.51	224.39
			1/0	2593.0	22.69	185.78
			1/0	2685.0	22.03	159.59
	5	QPSK	1/0	2498.5	19.97	99.31
			1/0	2593.0	22.60	181.97
			1/0	2687.5	22.15	164.06
		16QAM	1/0	2498.5	20.02	100.46
			1/0	2593.0	21.98	157.76
			1/0	2687.5	22.65	184.08

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10.1.2.ERP/EIRP DATA

GSM 850

GSM

GSM850
GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: GPRS 850 MHz 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								
824.20	33.06	V	1.0	-1.5	30.63	38.5	-7.9	
824.20	24.48	H	1.0	-1.5	22.05	38.5	-16.4	
Mid Ch								
836.60	32.78	V	1.0	-1.4	30.40	38.5	-8.1	
836.60	23.40	H	1.0	-1.4	21.02	38.5	-17.5	
High Ch								
848.80	33.05	V	1.0	-1.4	30.71	38.5	-7.8	
848.80	22.81	H	1.0	-1.4	20.47	38.5	-18.0	

GSM

GSM850
EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: EGPRS 850 MHz 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								
824.20	27.04	V	1.0	-1.5	24.61	38.5	-13.9	
824.20	18.33	H	1.0	-1.5	15.90	38.5	-22.6	
Mid Ch								
836.60	26.39	V	1.0	-1.4	24.01	38.5	-14.5	
836.60	17.47	H	1.0	-1.4	15.09	38.5	-23.4	
High Ch								
848.80	27.29	V	1.0	-1.4	24.95	38.5	-13.6	
848.80	16.44	H	1.0	-1.4	14.10	38.5	-24.4	

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GSM 1900

GSM

GSM1900
GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-21
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: GPRS 1900 MHz Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 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								
1850.20	25.18	V	4.5	9.5	30.19	33.0	-2.8	
1850.20	25.23	H	4.5	9.5	30.24	33.0	-2.8	
Mid Ch								
1880.00	24.66	V	4.5	9.2	29.34	33.0	-3.7	
1880.00	25.57	H	4.5	9.2	30.25	33.0	-2.8	
High Ch								
1909.80	24.51	V	4.6	8.9	28.81	33.0	-4.2	
1909.80	24.54	H	4.6	8.9	28.84	33.0	-4.2	

GSM

GSM1900
EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-21
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: EGPRS 1900 MHz Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 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								
1850.20	20.42	V	4.5	9.5	25.43	33.0	-7.6	
1850.20	21.10	H	4.5	9.5	26.11	33.0	-6.9	
Mid Ch								
1880.00	20.55	V	4.5	9.2	25.23	33.0	-7.8	
1880.00	20.59	H	4.5	9.2	25.27	33.0	-7.7	
High Ch								
1909.80	20.37	V	4.6	8.9	24.67	33.0	-8.3	
1909.80	21.27	H	4.6	8.9	25.57	33.0	-7.4	

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WCDMA Band 5

WCDMA

Band 5
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 45585
Configuration: EUT / Y-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	23.81	V	1.0	-1.5	21.39	38.5	-17.1	
826.40	14.80	H	1.0	-1.5	12.38	38.5	-26.1	
Mid Ch								
836.60	22.69	V	1.0	-1.4	20.31	38.5	-18.2	
836.60	14.02	H	1.0	-1.4	11.64	38.5	-26.9	
High Ch								
846.60	22.51	V	1.0	-1.4	20.16	38.5	-18.3	
846.60	12.85	H	1.0	-1.4	10.50	38.5	-28.0	

WCDMA

Band 5
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 45585
Configuration: EUT / Y-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	22.98	V	1.0	-1.5	20.56	38.5	-17.9	
826.40	13.60	H	1.0	-1.5	11.18	38.5	-27.3	
Mid Ch								
836.60	21.92	V	1.0	-1.4	19.54	38.5	-19.0	
836.60	13.17	H	1.0	-1.4	10.79	38.5	-27.7	
High Ch								
846.60	21.43	V	1.0	-1.4	19.08	38.5	-19.4	
846.60	11.69	H	1.0	-1.4	9.34	38.5	-29.2	

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WCDMA Band 2

WCDMA

Band 2
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-21
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: Rel99 Band 2 Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 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	16.40	V	4.5	9.5	21.39	33.0	-11.6	
1852.40	16.92	H	4.5	9.5	21.91	33.0	-11.1	
Mid Ch								
1880.00	16.35	V	4.5	9.2	21.03	33.0	-12.0	
1880.00	16.96	H	4.5	9.2	21.64	33.0	-11.4	
High Ch								
1907.60	16.37	V	4.6	8.9	20.71	33.0	-12.3	
1907.60	16.51	H	4.6	8.9	20.85	33.0	-12.1	

WCDMA

Band 2
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-21
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: HSDPA Band 2 Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 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	14.57	V	4.5	9.5	19.56	33.0	-13.4	
1852.40	16.31	H	4.5	9.5	21.30	33.0	-11.7	
Mid Ch								
1880.00	15.59	V	4.5	9.2	20.27	33.0	-12.7	
1880.00	16.61	H	4.5	9.2	21.29	33.0	-11.7	
High Ch								
1907.60	15.62	V	4.6	8.9	19.96	33.0	-13.0	
1907.60	15.90	H	4.6	8.9	20.24	33.0	-12.8	

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LTE Band 5

LTE
Band 5
10MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 5 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								
829.00	25.75	V	1.0	-1.5	23.34	38.5	-15.2	
829.00	16.60	H	1.0	-1.5	14.19	38.5	-24.3	
Mid Ch								
836.50	25.26	V	1.0	-1.4	22.88	38.5	-15.6	
836.50	15.60	H	1.0	-1.4	13.22	38.5	-25.3	
High Ch								
844.00	25.24	V	1.0	-1.4	22.88	38.5	-15.6	
844.00	15.58	H	1.0	-1.4	13.23	38.5	-25.3	

LTE
Band 5
10MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 5 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								
829.00	24.64	V	1.0	-1.5	22.23	38.5	-16.3	
829.00	15.28	H	1.0	-1.5	12.87	38.5	-25.6	
Mid Ch								
836.50	24.33	V	1.0	-1.4	21.95	38.5	-16.5	
836.50	14.92	H	1.0	-1.4	12.54	38.5	-26.0	
High Ch								
844.00	24.06	V	1.0	-1.4	21.70	38.5	-16.8	
844.00	14.34	H	1.0	-1.4	11.99	38.5	-26.5	

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LTE
Band 5
5MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 45585
Configuration: EUT / Y-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	25.74	V	1.0	-1.5	23.32	38.5	-15.2	
826.50	16.72	H	1.0	-1.5	14.30	38.5	-24.2	
Mid Ch								
836.50	25.50	V	1.0	-1.4	23.12	38.5	-15.4	
836.50	15.70	H	1.0	-1.4	13.32	38.5	-25.2	
High Ch								
846.50	25.08	V	1.0	-1.4	22.73	38.5	-15.8	
846.50	14.88	H	1.0	-1.4	12.53	38.5	-26.0	

LTE
Band 5
5MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 45585
Configuration: EUT / Y-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	24.88	V	1.0	-1.5	22.46	38.5	-16.0	
826.50	15.68	H	1.0	-1.5	13.26	38.5	-25.2	
Mid Ch								
836.50	24.18	V	1.0	-1.4	21.80	38.5	-16.7	
836.50	14.81	H	1.0	-1.4	12.43	38.5	-26.1	
High Ch								
846.50	24.11	V	1.0	-1.4	21.76	38.5	-16.7	
846.50	13.94	H	1.0	-1.4	11.59	38.5	-26.9	

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LTE
Band 5
3MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 45585
Configuration: EUT / Y-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	25.98	V	1.0	-1.5	23.55	38.5	-14.9	
825.50	16.64	H	1.0	-1.5	14.22	38.5	-24.3	
Mid Ch								
836.50	25.21	V	1.0	-1.4	22.83	38.5	-15.7	
836.50	15.58	H	1.0	-1.4	13.20	38.5	-25.3	
High Ch								
847.50	24.21	V	1.0	-1.4	21.86	38.5	-16.6	
847.50	20.49	H	1.0	-1.4	18.15	38.5	-20.4	

LTE
Band 5
3MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 45585
Configuration: EUT / Y-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	24.61	V	1.0	-1.5	22.18	38.5	-16.3	
825.50	15.43	H	1.0	-1.5	13.01	38.5	-25.5	
Mid Ch								
836.50	24.14	V	1.0	-1.4	21.76	38.5	-16.7	
836.50	14.63	H	1.0	-1.4	12.25	38.5	-26.3	
High Ch								
847.50	23.09	V	1.0	-1.4	20.74	38.5	-17.8	
847.50	19.76	H	1.0	-1.4	17.42	38.5	-21.1	

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LTE
Band 5
1.4MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 45585
Configuration: EUT / Y-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	25.79	V	1.0	-1.5	23.37	38.5	-15.1	
824.70	16.62	H	1.0	-1.5	14.20	38.5	-24.3	
Mid Ch								
836.50	25.07	V	1.0	-1.4	22.69	38.5	-15.8	
836.50	15.57	H	1.0	-1.4	13.19	38.5	-25.3	
High Ch								
848.30	23.71	V	1.0	-1.4	21.37	38.5	-17.1	
848.30	13.44	H	1.0	-1.4	11.10	38.5	-27.4	

LTE
Band 5
1.4MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 45585
Configuration: EUT / Y-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	24.73	V	1.0	-1.5	22.31	38.5	-16.2	
824.70	15.44	H	1.0	-1.5	13.02	38.5	-25.5	
Mid Ch								
836.50	23.99	V	1.0	-1.4	21.61	38.5	-16.9	
836.50	14.40	H	1.0	-1.4	12.02	38.5	-26.5	
High Ch								
848.30	22.53	V	1.0	-1.4	20.19	38.5	-18.3	
848.30	12.50	H	1.0	-1.4	10.16	38.5	-28.3	

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LTE Band 12

LTE Band 12 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 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								
704.00	19.27	V	0.9	-1.6	16.80	34.8	-18.0	
704.00	10.31	H	0.9	-1.6	7.84	34.8	-27.0	
Mid Ch								
707.50	19.50	V	0.9	-1.6	17.03	34.8	-17.8	
707.50	10.50	H	0.9	-1.6	8.03	34.8	-26.8	
High Ch								
711.00	19.63	V	0.9	-1.6	17.16	34.8	-17.6	
711.00	11.02	H	0.9	-1.6	8.54	34.8	-26.3	

LTE Band 12 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 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								
704.00	18.09	V	0.9	-1.6	15.62	34.8	-19.2	
704.00	9.31	H	0.9	-1.6	6.84	34.8	-28.0	
Mid Ch								
707.50	18.48	V	0.9	-1.6	16.01	34.8	-18.8	
707.50	9.65	H	0.9	-1.6	7.18	34.8	-27.6	
High Ch								
711.00	18.44	V	0.9	-1.6	15.97	34.8	-18.8	
711.00	9.93	H	0.9	-1.6	7.45	34.8	-27.3	

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LTE
Band 12
5MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 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								
701.50	19.17	V	0.9	-1.6	16.70	34.8	-18.1	
701.50	10.12	H	0.9	-1.6	7.66	34.8	-27.1	
Mid Ch								
707.50	19.54	V	0.9	-1.6	17.07	34.8	-17.7	
707.50	10.48	H	0.9	-1.6	8.01	34.8	-26.8	
High Ch								
713.50	19.05	V	0.9	-1.6	16.57	34.8	-18.2	
713.50	10.80	H	0.9	-1.6	8.32	34.8	-26.5	

LTE
Band 12
5MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 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								
701.50	17.87	V	0.9	-1.6	15.40	34.8	-19.4	
701.50	9.55	H	0.9	-1.6	7.09	34.8	-27.7	
Mid Ch								
707.50	18.57	V	0.9	-1.6	16.10	34.8	-18.7	
707.50	9.13	H	0.9	-1.6	6.66	34.8	-28.1	
High Ch								
713.50	18.28	V	0.9	-1.6	15.80	34.8	-19.0	
713.50	10.06	H	0.9	-1.6	7.58	34.8	-27.2	

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LTE
Band 12
3MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 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								
700.50	19.19	V	0.9	-1.6	16.72	34.8	-18.1	
700.50	10.29	H	0.9	-1.6	7.83	34.8	-27.0	
Mid Ch								
707.50	19.07	V	0.9	-1.6	16.60	34.8	-18.2	
707.50	10.77	H	0.9	-1.6	8.30	34.8	-26.5	
High Ch								
714.50	19.06	V	0.9	-1.6	16.59	34.8	-18.2	
714.50	11.34	H	0.9	-1.6	8.86	34.8	-25.9	

LTE
Band 12
3MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 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								
700.50	18.06	V	0.9	-1.6	15.59	34.8	-19.2	
700.50	8.83	H	0.9	-1.6	6.37	34.8	-28.4	
Mid Ch								
707.50	17.88	V	0.9	-1.6	15.41	34.8	-19.4	
707.50	9.44	H	0.9	-1.6	6.97	34.8	-27.8	
High Ch								
714.50	17.96	V	0.9	-1.6	15.49	34.8	-19.3	
714.50	10.23	H	0.9	-1.6	7.75	34.8	-27.0	

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LTE
Band 12
1.4MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 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								
699.70	19.00	V	0.9	-1.6	16.53	34.8	-18.3	
699.70	10.17	H	0.9	-1.6	7.70	34.8	-27.1	
Mid Ch								
707.50	19.42	V	0.9	-1.6	16.95	34.8	-17.9	
707.50	10.89	H	0.9	-1.6	8.42	34.8	-26.4	
High Ch								
715.30	18.79	V	0.9	-1.6	16.31	34.8	-18.5	
715.30	10.23	H	0.9	-1.6	7.76	34.8	-27.0	

LTE
Band 12
1.4MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 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								
699.70	17.95	V	0.9	-1.6	15.48	34.8	-19.3	
699.70	9.02	H	0.9	-1.6	6.55	34.8	-28.2	
Mid Ch								
707.50	18.15	V	0.9	-1.6	15.68	34.8	-19.1	
707.50	9.47	H	0.9	-1.6	7.00	34.8	-27.8	
High Ch								
715.30	17.76	V	0.9	-1.6	15.28	34.8	-19.5	
715.30	9.29	H	0.9	-1.6	6.82	34.8	-28.0	

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LTE Band 41

LTE Band 41 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 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								
2506.00	15.40	V	5.3	10.3	20.34	33.0	-12.7	
2506.00	18.62	H	5.3	10.3	23.56	33.0	-9.4	
Mid Ch								
2593.00	14.87	V	5.4	10.1	19.54	33.0	-13.5	
2593.00	20.17	H	5.4	10.1	24.84	33.0	-8.2	
High Ch								
2680.00	13.08	V	5.5	10.2	17.72	33.0	-15.3	
2680.00	17.57	H	5.5	10.2	22.20	33.0	-10.8	

LTE Band 41 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 41 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 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								
2506.00	15.12	V	5.3	10.3	20.06	33.0	-12.9	
2506.00	17.47	H	5.3	10.3	22.41	33.0	-10.6	
Mid Ch								
2593.00	15.33	V	5.4	10.1	20.00	33.0	-13.0	
2593.00	20.59	H	5.4	10.1	25.26	33.0	-7.7	
High Ch								
2680.00	12.10	V	5.5	10.2	16.74	33.0	-16.3	
2680.00	17.13	H	5.5	10.2	21.76	33.0	-11.2	

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LTE

Band 41

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-22
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 41 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 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								
2503.50	14.13	V	5.3	10.3	19.08	33.0	-13.9	
2503.50	16.91	H	5.3	10.3	21.86	33.0	-11.1	
Mid Ch								
2593.00	14.29	V	5.4	10.1	18.96	33.0	-14.0	
2593.00	18.57	H	5.4	10.1	23.24	33.0	-9.8	
High Ch								
2682.50	15.33	V	5.5	10.2	19.96	33.0	-13.0	
2682.50	17.30	H	5.5	10.2	21.94	33.0	-11.1	

LTE

Band 41

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-22
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 41 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 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								
2503.50	14.53	V	5.3	10.3	19.48	33.0	-13.5	
2503.50	17.28	H	5.3	10.3	22.23	33.0	-10.8	
Mid Ch								
2593.00	14.15	V	5.4	10.1	18.82	33.0	-14.2	
2593.00	18.89	H	5.4	10.1	23.56	33.0	-9.4	
High Ch								
2682.50	14.83	V	5.5	10.2	19.46	33.0	-13.5	
2682.50	16.64	H	5.5	10.2	21.28	33.0	-11.7	

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LTE
Band 41
10MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-22
Test Engineer: 45585
Configuration: EUT / Z-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 MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2501.00	15.47	V	5.3	10.3	20.43	33.0	-12.6	
2501.00	18.34	H	5.3	10.3	23.31	33.0	-9.7	
Mid Ch								
2593.00	15.07	V	5.4	10.1	19.74	33.0	-13.3	
2593.00	18.16	H	5.4	10.1	22.83	33.0	-10.2	
High Ch								
2685.00	14.34	V	5.5	10.2	18.97	33.0	-14.0	
2685.00	16.98	H	5.5	10.2	21.61	33.0	-11.4	

LTE
Band 41
10MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-22
Test Engineer: 45585
Configuration: EUT / Z-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 MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2501.00	15.68	V	5.3	10.3	20.64	33.0	-12.4	
2501.00	18.54	H	5.3	10.3	23.51	33.0	-9.5	
Mid Ch								
2593.00	14.91	V	5.4	10.1	19.58	33.0	-13.4	
2593.00	18.02	H	5.4	10.1	22.69	33.0	-10.3	
High Ch								
2685.00	14.78	V	5.5	10.2	19.41	33.0	-13.6	
2685.00	17.40	H	5.5	10.2	22.03	33.0	-11.0	

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LTE
Band 41
5MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-22
Test Engineer: 45585
Configuration: EUT / Z-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 MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	14.30	V	5.3	10.3	19.30	33.0	-13.7	
2498.50	14.97	H	5.3	10.3	19.97	33.0	-13.0	
Mid Ch								
2593.00	15.92	V	5.4	10.1	20.59	33.0	-12.4	
2593.00	17.93	H	5.4	10.1	22.60	33.0	-10.4	
High Ch								
2687.50	14.34	V	5.5	10.2	18.97	33.0	-14.0	
2687.50	17.52	H	5.5	10.2	22.15	33.0	-10.8	

LTE
Band 41
5MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788506351
Date: 2018-06-22
Test Engineer: 45585
Configuration: EUT / Z-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 MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	14.28	V	5.3	10.3	19.28	33.0	-13.7	
2498.50	15.02	H	5.3	10.3	20.02	33.0	-13.0	
Mid Ch								
2593.00	15.29	V	5.4	10.1	19.96	33.0	-13.0	
2593.00	17.31	H	5.4	10.1	21.98	33.0	-11.0	
High Ch								
2687.50	14.39	V	5.5	10.2	19.02	33.0	-14.0	
2687.50	18.02	H	5.5	10.2	22.65	33.0	-10.3	

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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.

Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.12; ESU40 setting reference to 971168 D01 v03

For peak power measurement with a ESU40:
a) Set the RBW = 100 KHz for emission below 1GHz and 1MHz for emissions above 1GHz
b) Set VBW ≥ 3 × RBW;
c) Set span ≥ 1.5 times the OBW;
d) Sweep time = auto couple;
e) Detector = rms;
f) Ensure that the number of measurement points ≥ span/RBW;
g) Trace mode = 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.

RESULTS

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10.2.1. SPURIOUS RADIATION PLOTS

GSM 850

GSM

GSM850
GPRS

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 47989
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: GPRS 850 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1648.40	4.3	V	3.0	43.6	1.0	-38.2	-13.0	-25.2	
2472.60	0.6	V	3.0	43.4	1.0	-41.8	-13.0	-28.8	
3296.80	-15.4	V	3.0	43.6	1.0	-58.0	-13.0	-45.0	
4121.00	-18.3	V	3.0	43.9	1.0	-61.2	-13.0	-48.2	
4945.20	-14.4	V	3.0	43.8	1.0	-57.2	-13.0	-44.2	
1648.40	3.0	H	3.0	43.6	1.0	-39.6	-13.0	-26.6	
2472.60	1.0	H	3.0	43.4	1.0	-41.5	-13.0	-28.5	
3296.80	-13.7	H	3.0	43.6	1.0	-56.3	-13.0	-43.3	
4121.00	-19.2	H	3.0	43.9	1.0	-62.0	-13.0	-49.0	
4945.20	-17.9	H	3.0	43.8	1.0	-60.7	-13.0	-47.7	
Mid Ch, 836.6MHz									
1673.20	7.0	V	3.0	43.6	1.0	-35.6	-13.0	-22.6	
2509.80	3.8	V	3.0	43.4	1.0	-38.6	-13.0	-25.6	
3346.40	-19.1	V	3.0	43.6	1.0	-61.7	-13.0	-48.7	
4183.00	-16.4	V	3.0	43.9	1.0	-59.2	-13.0	-46.2	
5019.60	-13.8	V	3.0	43.8	1.0	-56.6	-13.0	-43.6	
1673.20	3.9	H	3.0	43.6	1.0	-38.7	-13.0	-25.7	
2509.80	3.8	H	3.0	43.4	1.0	-38.7	-13.0	-25.7	
3346.40	-16.1	H	3.0	43.6	1.0	-58.8	-13.0	-45.8	
4183.00	-19.3	H	3.0	43.9	1.0	-62.2	-13.0	-49.2	
5019.60	-18.4	H	3.0	43.8	1.0	-61.2	-13.0	-48.2	
High Ch, 848.8MHz									
1697.60	9.5	V	3.0	43.6	1.0	-33.0	-13.0	-20.0	
2546.40	1.5	V	3.0	43.4	1.0	-40.9	-13.0	-27.9	
3395.20	-15.1	V	3.0	43.7	1.0	-57.8	-13.0	-44.8	
4244.00	-15.0	V	3.0	43.9	1.0	-57.8	-13.0	-44.8	
5092.80	-14.8	V	3.0	43.8	1.0	-57.5	-13.0	-44.5	
1697.60	7.9	H	3.0	43.6	1.0	-34.7	-13.0	-21.7	
2546.40	1.1	H	3.0	43.4	1.0	-41.3	-13.0	-28.3	
3395.20	-16.1	H	3.0	43.7	1.0	-58.8	-13.0	-45.8	
4244.00	-19.0	H	3.0	43.9	1.0	-61.8	-13.0	-48.8	
5092.80	-17.6	H	3.0	43.8	1.0	-60.4	-13.0	-47.4	

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GSM

GSM850
EGPRS

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 47989
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: EGPRS 850 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1648.40	-0.6	V	3.0	43.6	1.0	-43.2	-13.0	-30.2	
2472.60	-10.0	V	3.0	43.4	1.0	-52.4	-13.0	-39.4	
3296.80	-19.2	V	3.0	43.6	1.0	-61.9	-13.0	-48.9	
4121.00	-19.4	V	3.0	43.9	1.0	-62.3	-13.0	-49.3	
4945.20	-17.6	V	3.0	43.8	1.0	-60.4	-13.0	-47.4	
1648.40	-2.0	H	3.0	43.6	1.0	-44.6	-13.0	-31.6	
2472.60	-8.8	H	3.0	43.4	1.0	-51.2	-13.0	-38.2	
3296.80	-19.6	H	3.0	43.6	1.0	-62.2	-13.0	-49.2	
4121.00	-19.3	H	3.0	43.9	1.0	-62.2	-13.0	-49.2	
4945.20	-18.2	H	3.0	43.8	1.0	-61.0	-13.0	-48.0	
Mid Ch, 836.6MHz									
1673.20	0.7	V	3.0	43.6	1.0	-41.9	-13.0	-28.9	
2509.80	-7.4	V	3.0	43.4	1.0	-49.8	-13.0	-36.8	
3346.40	-20.4	V	3.0	43.6	1.0	-63.0	-13.0	-50.0	
4183.00	-19.4	V	3.0	43.9	1.0	-62.3	-13.0	-49.3	
5019.60	-17.9	V	3.0	43.8	1.0	-60.7	-13.0	-47.7	
1673.20	-3.3	H	3.0	43.6	1.0	-45.8	-13.0	-32.8	
2509.80	-8.1	H	3.0	43.4	1.0	-50.5	-13.0	-37.5	
3346.40	-20.0	H	3.0	43.6	1.0	-62.7	-13.0	-49.7	
4183.00	-19.2	H	3.0	43.9	1.0	-62.1	-13.0	-49.1	
5019.60	-18.6	H	3.0	43.8	1.0	-61.3	-13.0	-48.3	
High Ch, 848.8MHz									
1697.60	1.7	V	3.0	43.6	1.0	-40.9	-13.0	-27.9	
2546.40	-9.2	V	3.0	43.4	1.0	-51.6	-13.0	-38.6	
3395.20	-19.7	V	3.0	43.7	1.0	-62.4	-13.0	-49.4	
4244.00	-19.2	V	3.0	43.9	1.0	-62.1	-13.0	-49.1	
5092.80	-17.7	V	3.0	43.8	1.0	-60.4	-13.0	-47.4	
1697.60	-0.3	H	3.0	43.6	1.0	-42.8	-13.0	-29.8	
2546.40	-8.6	H	3.0	43.4	1.0	-51.1	-13.0	-38.1	
3395.20	-19.9	H	3.0	43.7	1.0	-62.5	-13.0	-49.5	
4244.00	-19.1	H	3.0	43.9	1.0	-62.0	-13.0	-49.0	
5092.80	-18.2	H	3.0	43.8	1.0	-61.0	-13.0	-48.0	

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GSM 1900

GSM

GSM1900
GPRS

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-21
Test Engineer: 47989
Configuration: EUT / AC 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	2.6	V	3.0	43.8	1.0	-40.2	-13.0	-27.2	
5550.60	12.0	V	3.0	43.7	1.0	-30.7	-13.0	-17.7	
7400.80	-10.0	V	3.0	42.5	1.0	-51.5	-13.0	-38.5	
9251.00	-8.3	V	3.0	41.3	1.0	-48.5	-13.0	-35.5	
11101.20	-12.7	V	3.0	40.9	1.0	-52.6	-13.0	-39.6	
3700.40	-0.6	H	3.0	43.8	1.0	-43.4	-13.0	-30.4	
5550.60	4.5	H	3.0	43.7	1.0	-38.2	-13.0	-25.2	
7400.80	-13.4	H	3.0	42.5	1.0	-54.9	-13.0	-41.9	
9251.00	-12.4	H	3.0	41.3	1.0	-52.7	-13.0	-39.7	
11101.20	-15.8	H	3.0	40.9	1.0	-55.7	-13.0	-42.7	
Mid Ch, 1880MHz									
3760.00	5.1	V	3.0	43.8	1.0	-37.7	-13.0	-24.7	
5640.00	9.3	V	3.0	43.7	1.0	-33.4	-13.0	-20.4	
7520.00	-10.1	V	3.0	42.5	1.0	-51.6	-13.0	-38.6	
9400.00	-3.5	V	3.0	41.1	1.0	-43.6	-13.0	-30.6	
11280.00	-7.0	V	3.0	41.0	1.0	-46.9	-13.0	-33.9	
3760.00	1.8	H	3.0	43.8	1.0	-41.0	-13.0	-28.0	
5640.00	2.8	H	3.0	43.7	1.0	-39.9	-13.0	-26.9	
7520.00	-13.0	H	3.0	42.5	1.0	-54.4	-13.0	-41.4	
9400.00	-8.8	H	3.0	41.1	1.0	-49.0	-13.0	-36.0	
11280.00	-10.4	H	3.0	41.0	1.0	-50.4	-13.0	-37.4	
High Ch, 1909.8MHz									
3819.60	4.1	V	3.0	43.8	1.0	-38.8	-13.0	-25.8	
5729.40	5.9	V	3.0	43.7	1.0	-36.8	-13.0	-23.8	
7639.20	-12.5	V	3.0	42.4	1.0	-53.9	-13.0	-40.9	
9549.00	-7.0	V	3.0	41.0	1.0	-47.0	-13.0	-34.0	
11458.80	-1.7	V	3.0	41.0	1.0	-41.8	-13.0	-28.8	
3819.60	1.4	H	3.0	43.8	1.0	-41.4	-13.0	-28.4	
5729.40	-2.5	H	3.0	43.7	1.0	-45.2	-13.0	-32.2	
7639.20	-14.0	H	3.0	42.4	1.0	-55.4	-13.0	-42.4	
9549.00	-9.6	H	3.0	41.0	1.0	-49.6	-13.0	-36.6	
11458.80	-5.0	H	3.0	41.0	1.0	-45.0	-13.0	-32.0	

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GSM

GSM1900
EGPRS

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-21
Test Engineer: 47989
Configuration: EUT / AC 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	-5.6	V	3.0	43.8	1.0	-48.3	-13.0	-35.3	
5550.60	-0.6	V	3.0	43.7	1.0	-43.3	-13.0	-30.3	
7400.80	-16.6	V	3.0	42.5	1.0	-58.1	-13.0	-45.1	
9251.00	-15.3	V	3.0	41.3	1.0	-55.5	-13.0	-42.5	
11101.20	-16.7	V	3.0	40.9	1.0	-56.6	-13.0	-43.6	
3700.40	-8.0	H	3.0	43.8	1.0	-50.8	-13.0	-37.8	
5550.60	-7.8	H	3.0	43.7	1.0	-50.5	-13.0	-37.5	
7400.80	-16.5	H	3.0	42.5	1.0	-58.0	-13.0	-45.0	
9251.00	-17.9	H	3.0	41.3	1.0	-58.2	-13.0	-45.2	
11101.20	-14.9	H	3.0	40.9	1.0	-54.8	-13.0	-41.8	
Mid Ch, 1880MHz									
3760.00	-4.2	V	3.0	43.8	1.0	-47.0	-13.0	-34.0	
5640.00	-2.8	V	3.0	43.7	1.0	-45.5	-13.0	-32.5	
7520.00	-16.6	V	3.0	42.5	1.0	-58.1	-13.0	-45.1	
9400.00	-15.9	V	3.0	41.1	1.0	-56.1	-13.0	-43.1	
11280.00	-15.9	V	3.0	41.0	1.0	-55.9	-13.0	-42.9	
3760.00	-7.0	H	3.0	43.8	1.0	-49.8	-13.0	-36.8	
5640.00	-10.5	H	3.0	43.7	1.0	-53.2	-13.0	-40.2	
7520.00	-16.2	H	3.0	42.5	1.0	-57.6	-13.0	-44.6	
9400.00	-17.0	H	3.0	41.1	1.0	-57.1	-13.0	-44.1	
11280.00	-14.6	H	3.0	41.0	1.0	-54.6	-13.0	-41.6	
High Ch, 1909.8MHz									
3819.60	-4.1	V	3.0	43.8	1.0	-46.9	-13.0	-33.9	
5729.40	-6.8	V	3.0	43.7	1.0	-49.5	-13.0	-36.5	
7639.20	-17.3	V	3.0	42.4	1.0	-58.7	-13.0	-45.7	
9549.00	-18.0	V	3.0	41.0	1.0	-58.0	-13.0	-45.0	
11458.80	-16.1	V	3.0	41.0	1.0	-56.1	-13.0	-43.1	
3819.60	-7.3	H	3.0	43.8	1.0	-50.1	-13.0	-37.1	
5729.40	-14.0	H	3.0	43.7	1.0	-56.7	-13.0	-43.7	
7639.20	-16.7	H	3.0	42.4	1.0	-58.1	-13.0	-45.1	
9549.00	-17.4	H	3.0	41.0	1.0	-57.4	-13.0	-44.4	
11458.80	-14.6	H	3.0	41.0	1.0	-54.6	-13.0	-41.6	

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WCDMA Band 5

WCDMA

Band 5
REL99

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 47989
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: Rel99 Band 5 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1652.80	-16.1	V	3.0	43.6	1.0	-58.6	-13.0	-45.6	
2479.20	-21.3	V	3.0	43.4	1.0	-63.7	-13.0	-50.7	
3305.60	-15.4	V	3.0	43.6	1.0	-58.0	-13.0	-45.0	
4132.00	-19.7	V	3.0	43.9	1.0	-62.6	-13.0	-49.6	
1652.80	-18.8	H	3.0	43.6	1.0	-61.4	-13.0	-48.4	
2479.20	-22.0	H	3.0	43.4	1.0	-64.4	-13.0	-51.4	
3305.60	-20.2	H	3.0	43.6	1.0	-62.8	-13.0	-49.8	
4132.00	-19.8	H	3.0	43.9	1.0	-62.7	-13.0	-49.7	
Mid Ch, 836.6MHz									
1673.20	-12.5	V	3.0	43.6	1.0	-55.1	-13.0	-42.1	
2509.80	-22.1	V	3.0	43.4	1.0	-64.5	-13.0	-51.5	
3346.40	-19.9	V	3.0	43.6	1.0	-62.5	-13.0	-49.5	
4183.00	-19.2	V	3.0	43.9	1.0	-62.1	-13.0	-49.1	
1673.20	-18.6	H	3.0	43.6	1.0	-61.1	-13.0	-48.1	
2509.80	-22.8	H	3.0	43.4	1.0	-65.2	-13.0	-52.2	
3346.40	-20.9	H	3.0	43.6	1.0	-63.5	-13.0	-50.5	
4183.00	-20.1	H	3.0	43.9	1.0	-62.9	-13.0	-49.9	
High Ch, 846.6MHz									
1693.20	-14.5	V	3.0	43.6	1.0	-57.0	-13.0	-44.0	
2539.80	-13.3	V	3.0	43.4	1.0	-55.7	-13.0	-42.7	
3386.40	-16.0	V	3.0	43.7	1.0	-58.7	-13.0	-45.7	
4233.00	-15.8	V	3.0	43.9	1.0	-58.7	-13.0	-45.7	
1693.20	-16.4	H	3.0	43.6	1.0	-58.9	-13.0	-45.9	
2539.80	-17.6	H	3.0	43.4	1.0	-60.1	-13.0	-47.1	
3386.40	-15.5	H	3.0	43.7	1.0	-58.1	-13.0	-45.1	
4233.00	-18.4	H	3.0	43.9	1.0	-61.3	-13.0	-48.3	

WCDMA

Band 5
HSDPA

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 47989
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: HSDPA Band 5 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1652.80	-17.1	V	3.0	43.6	1.0	-59.6	-13.0	-46.6	
2479.20	-21.3	V	3.0	43.4	1.0	-63.8	-13.0	-50.8	
3305.60	-16.4	V	3.0	43.6	1.0	-59.0	-13.0	-46.0	
4132.00	-20.0	V	3.0	43.9	1.0	-62.9	-13.0	-49.9	
1652.80	-20.2	H	3.0	43.6	1.0	-62.8	-13.0	-49.8	
2479.20	-22.0	H	3.0	43.4	1.0	-64.4	-13.0	-51.4	
3305.60	-20.3	H	3.0	43.6	1.0	-63.0	-13.0	-50.0	
4132.00	-19.7	H	3.0	43.9	1.0	-62.6	-13.0	-49.6	
Mid Ch, 836.6MHz									
1673.20	-14.8	V	3.0	43.6	1.0	-57.4	-13.0	-44.4	
2509.80	-22.7	V	3.0	43.4	1.0	-65.1	-13.0	-52.1	
3346.40	-19.0	V	3.0	43.6	1.0	-61.7	-13.0	-48.7	
4183.00	-19.3	V	3.0	43.9	1.0	-62.2	-13.0	-49.2	
1673.20	-20.0	H	3.0	43.6	1.0	-62.5	-13.0	-49.5	
2509.80	-22.5	H	3.0	43.4	1.0	-65.0	-13.0	-52.0	
3346.40	-20.7	H	3.0	43.6	1.0	-63.3	-13.0	-50.3	
4183.00	-19.8	H	3.0	43.9	1.0	-62.6	-13.0	-49.6	
High Ch, 846.6MHz									
1693.20	-16.4	V	3.0	43.6	1.0	-59.0	-13.0	-46.0	
2539.80	-16.1	V	3.0	43.4	1.0	-58.5	-13.0	-45.5	
3386.40	-17.1	V	3.0	43.7	1.0	-59.7	-13.0	-46.7	
4233.00	-16.2	V	3.0	43.9	1.0	-59.0	-13.0	-46.0	
1693.20	-18.9	H	3.0	43.6	1.0	-61.5	-13.0	-48.5	
2539.80	-21.1	H	3.0	43.4	1.0	-63.5	-13.0	-50.5	
3386.40	-18.2	H	3.0	43.7	1.0	-60.9	-13.0	-47.9	
4233.00	-18.8	H	3.0	43.9	1.0	-61.7	-13.0	-48.7	

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WCDMA Band 2

WCDMA

Band 2
REL99

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

Company:	Samsung
Project #:	4788506351
Date:	2018-06-21
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, X-Position
Location:	Chamber 1
Mode:	Rel99 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	-7.1	V	3.0	43.8	1.0	-49.8	-13.0	-36.8	
5557.20	4.3	V	3.0	43.7	1.0	-38.5	-13.0	-25.5	
7409.60	-9.6	V	3.0	42.5	1.0	-51.1	-13.0	-38.1	
9262.00	-6.7	V	3.0	41.3	1.0	-46.9	-13.0	-33.9	
11114.40	-9.1	V	3.0	40.9	1.0	-49.0	-13.0	-36.0	
3704.80	-9.8	H	3.0	43.8	1.0	-52.5	-13.0	-39.5	
5557.20	-4.7	H	3.0	43.7	1.0	-47.4	-13.0	-34.4	
7409.60	-12.0	H	3.0	42.5	1.0	-53.5	-13.0	-40.5	
9262.00	-11.4	H	3.0	41.3	1.0	-51.6	-13.0	-38.6	
11114.40	-12.1	H	3.0	40.9	1.0	-52.0	-13.0	-39.0	
Mid Ch, 1880MHz									
3760.00	-5.5	V	3.0	43.8	1.0	-48.3	-13.0	-35.3	
5640.00	3.2	V	3.0	43.7	1.0	-39.5	-13.0	-26.5	
7520.00	-9.4	V	3.0	42.5	1.0	-50.9	-13.0	-37.9	
9400.00	-4.2	V	3.0	41.1	1.0	-44.3	-13.0	-31.3	
11280.00	-7.4	V	3.0	41.0	1.0	-47.3	-13.0	-34.3	
3760.00	-9.6	H	3.0	43.8	1.0	-52.4	-13.0	-39.4	
5640.00	-5.5	H	3.0	43.7	1.0	-48.2	-13.0	-35.2	
7520.00	-10.2	H	3.0	42.5	1.0	-51.6	-13.0	-38.6	
9400.00	-9.5	H	3.0	41.1	1.0	-49.6	-13.0	-36.6	
11280.00	-10.1	H	3.0	41.0	1.0	-50.1	-13.0	-37.1	
High Ch, 1907.6MHz									
3815.20	-6.0	V	3.0	43.8	1.0	-48.8	-13.0	-35.8	
5722.80	1.2	V	3.0	43.7	1.0	-41.5	-13.0	-28.5	
7630.40	-6.8	V	3.0	42.4	1.0	-48.2	-13.0	-35.2	
9538.00	-5.6	V	3.0	41.0	1.0	-45.6	-13.0	-32.6	
11445.60	-8.2	V	3.0	41.0	1.0	-48.2	-13.0	-35.2	
3815.20	-10.1	H	3.0	43.8	1.0	-52.9	-13.0	-39.9	
5722.80	-4.0	H	3.0	43.7	1.0	-46.7	-13.0	-33.7	
7630.40	-9.7	H	3.0	42.4	1.0	-51.1	-13.0	-38.1	
9538.00	-11.0	H	3.0	41.0	1.0	-51.0	-13.0	-38.0	
11445.60	-7.2	H	3.0	41.0	1.0	-47.2	-13.0	-34.2	

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WCDMA

Band 2
HSDPA

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-21
Test Engineer: 47989
Configuration: EUT / AC 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	-7.7	V	3.0	43.8	1.0	-50.4	-13.0	-37.4	
5557.20	4.3	V	3.0	43.7	1.0	-38.4	-13.0	-25.4	
7409.60	-9.2	V	3.0	42.5	1.0	-50.8	-13.0	-37.8	
9262.00	-6.7	V	3.0	41.3	1.0	-46.9	-13.0	-33.9	
11114.40	-0.6	V	3.0	40.9	1.0	-40.5	-13.0	-27.5	
3704.80	-10.2	H	3.0	43.8	1.0	-53.0	-13.0	-40.0	
5557.20	-4.7	H	3.0	43.7	1.0	-47.4	-13.0	-34.4	
7409.60	-11.4	H	3.0	42.5	1.0	-53.0	-13.0	-40.0	
9262.00	-10.5	H	3.0	41.3	1.0	-50.7	-13.0	-37.7	
11114.40	-12.3	H	3.0	40.9	1.0	-52.2	-13.0	-39.2	
Mid Ch, 1880MHz									
3760.00	-5.0	V	3.0	43.8	1.0	-47.8	-13.0	-34.8	
5640.00	2.3	V	3.0	43.7	1.0	-40.4	-13.0	-27.4	
7520.00	-7.5	V	3.0	42.5	1.0	-49.0	-13.0	-36.0	
9400.00	-2.6	V	3.0	41.1	1.0	-42.8	-13.0	-29.8	
11280.00	-5.2	V	3.0	41.0	1.0	-45.1	-13.0	-32.1	
3760.00	-8.4	H	3.0	43.8	1.0	-51.2	-13.0	-38.2	
5640.00	-6.2	H	3.0	43.7	1.0	-48.9	-13.0	-35.9	
7520.00	-9.6	H	3.0	42.5	1.0	-51.0	-13.0	-38.0	
9400.00	-8.5	H	3.0	41.1	1.0	-48.7	-13.0	-35.7	
11280.00	-11.2	H	3.0	41.0	1.0	-51.2	-13.0	-38.2	
High Ch, 1907.6MHz									
3815.20	-6.7	V	3.0	43.8	1.0	-49.5	-13.0	-36.5	
5722.80	1.9	V	3.0	43.7	1.0	-40.7	-13.0	-27.7	
7630.40	-6.6	V	3.0	42.4	1.0	-48.0	-13.0	-35.0	
9538.00	-6.2	V	3.0	41.0	1.0	-46.2	-13.0	-33.2	
11445.60	-9.2	V	3.0	41.0	1.0	-49.2	-13.0	-36.2	
3815.20	-10.5	H	3.0	43.8	1.0	-53.3	-13.0	-40.3	
5722.80	-4.9	H	3.0	43.7	1.0	-47.6	-13.0	-34.6	
7630.40	-9.9	H	3.0	42.4	1.0	-51.3	-13.0	-38.3	
9538.00	-11.0	H	3.0	41.0	1.0	-51.0	-13.0	-38.0	
11445.60	-7.2	H	3.0	41.0	1.0	-47.2	-13.0	-34.2	

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LTE Band 5

LTE

Band 5

10MHz

QPSK

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 45585
Configuration: EUT / Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 5 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, 829MHz									
1658.00	-10.9	V	3.0	43.6	1.0	-53.4	-13.0	-40.4	
2487.00	-18.2	V	3.0	43.4	1.0	-60.6	-13.0	-47.6	
3316.00	-11.2	V	3.0	43.6	1.0	-53.8	-13.0	-40.8	
4145.00	-13.2	V	3.0	43.9	1.0	-56.0	-13.0	-43.0	
4974.00	-17.4	V	3.0	43.8	1.0	-60.2	-13.0	-47.2	
1658.00	-11.9	H	3.0	43.6	1.0	-54.5	-13.0	-41.5	
2487.00	-21.1	H	3.0	43.4	1.0	-63.5	-13.0	-50.5	
3316.00	-20.7	H	3.0	43.6	1.0	-63.4	-13.0	-50.4	
4145.00	-20.2	H	3.0	43.9	1.0	-63.1	-13.0	-50.1	
4974.00	-19.6	H	3.0	43.8	1.0	-62.4	-13.0	-49.4	
Mid Ch, 836.5MHz									
1673.00	-7.5	V	3.0	43.6	1.0	-50.1	-13.0	-37.1	
2509.50	-16.0	V	3.0	43.4	1.0	-58.4	-13.0	-45.4	
3346.00	-13.6	V	3.0	43.6	1.0	-56.2	-13.0	-43.2	
4182.50	-12.6	V	3.0	43.9	1.0	-55.5	-13.0	-42.5	
5019.00	-15.7	V	3.0	43.8	1.0	-58.5	-13.0	-45.5	
1673.00	-13.8	H	3.0	43.6	1.0	-56.3	-13.0	-43.3	
2509.50	-20.2	H	3.0	43.4	1.0	-62.7	-13.0	-49.7	
3346.00	-18.8	H	3.0	43.6	1.0	-61.5	-13.0	-48.5	
4182.50	-20.7	H	3.0	43.9	1.0	-63.5	-13.0	-50.5	
5019.00	-19.8	H	3.0	43.8	1.0	-62.6	-13.0	-49.6	
High Ch, 844MHz									
1688.00	-5.4	V	3.0	43.6	1.0	-47.9	-13.0	-34.9	
2532.00	-19.0	V	3.0	43.4	1.0	-61.5	-13.0	-48.5	
3376.00	-13.5	V	3.0	43.7	1.0	-56.2	-13.0	-43.2	
4220.00	-19.3	V	3.0	43.9	1.0	-62.1	-13.0	-49.1	
5064.00	-18.6	V	3.0	43.8	1.0	-61.4	-13.0	-48.4	
1688.00	-12.9	H	3.0	43.6	1.0	-55.5	-13.0	-42.5	
2532.00	-20.8	H	3.0	43.4	1.0	-63.3	-13.0	-50.3	
3376.00	-20.9	H	3.0	43.7	1.0	-63.6	-13.0	-50.6	
4220.00	-19.6	H	3.0	43.9	1.0	-62.4	-13.0	-49.4	
5064.00	-19.8	H	3.0	43.8	1.0	-62.6	-13.0	-49.6	

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LTE

Band 5

10MHz

16QAM

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 45585
Configuration: EUT / Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 5 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, 829MHz									
1658.00	-12.7	V	3.0	43.6	1.0	-55.3	-13.0	-42.3	
2487.00	-19.6	V	3.0	43.4	1.0	-62.0	-13.0	-49.0	
3316.00	-11.8	V	3.0	43.6	1.0	-54.4	-13.0	-41.4	
4145.00	-14.1	V	3.0	43.9	1.0	-57.0	-13.0	-44.0	
4974.00	-17.7	V	3.0	43.8	1.0	-60.5	-13.0	-47.5	
1658.00	-14.3	H	3.0	43.6	1.0	-56.9	-13.0	-43.9	
2487.00	-21.4	H	3.0	43.4	1.0	-63.8	-13.0	-50.8	
3316.00	-20.8	H	3.0	43.6	1.0	-63.4	-13.0	-50.4	
4145.00	-20.2	H	3.0	43.9	1.0	-63.1	-13.0	-50.1	
4974.00	-19.6	H	3.0	43.8	1.0	-62.4	-13.0	-49.4	
Mid Ch, 836.5MHz									
1673.00	-9.7	V	3.0	43.6	1.0	-52.3	-13.0	-39.3	
2509.50	-17.2	V	3.0	43.4	1.0	-59.7	-13.0	-46.7	
3346.00	-14.7	V	3.0	43.6	1.0	-57.3	-13.0	-44.3	
4182.50	-13.5	V	3.0	43.9	1.0	-56.3	-13.0	-43.3	
5019.00	-16.4	V	3.0	43.8	1.0	-59.2	-13.0	-46.2	
1673.00	-14.9	H	3.0	43.6	1.0	-57.5	-13.0	-44.5	
2509.50	-21.0	H	3.0	43.4	1.0	-63.4	-13.0	-50.4	
3346.00	-19.4	H	3.0	43.6	1.0	-62.0	-13.0	-49.0	
4182.50	-20.7	H	3.0	43.9	1.0	-63.6	-13.0	-50.6	
5019.00	-19.8	H	3.0	43.8	1.0	-62.6	-13.0	-49.6	
High Ch, 844MHz									
1688.00	-6.7	V	3.0	43.6	1.0	-49.3	-13.0	-36.3	
2532.00	-19.9	V	3.0	43.4	1.0	-62.3	-13.0	-49.3	
3376.00	-12.9	V	3.0	43.7	1.0	-55.6	-13.0	-42.6	
4220.00	-19.5	V	3.0	43.9	1.0	-62.4	-13.0	-49.4	
5064.00	-18.9	V	3.0	43.8	1.0	-61.7	-13.0	-48.7	
1688.00	-14.4	H	3.0	43.6	1.0	-56.9	-13.0	-43.9	
2532.00	-21.3	H	3.0	43.4	1.0	-63.8	-13.0	-50.8	
3376.00	-21.0	H	3.0	43.7	1.0	-63.6	-13.0	-50.6	
4220.00	-19.6	H	3.0	43.9	1.0	-62.5	-13.0	-49.5	
5064.00	-19.8	H	3.0	43.8	1.0	-62.6	-13.0	-49.6	

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LTE

Band 5

5MHz

QPSK

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 45585
Configuration: EUT / Adapter / Earphone, Y-Position
Location: Chamber 1
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	-4.8	V	3.0	43.6	1.0	-47.4	-13.0	-34.4	
2479.50	-17.9	V	3.0	43.4	1.0	-60.3	-13.0	-47.3	
3306.00	-12.1	V	3.0	43.6	1.0	-54.8	-13.0	-41.8	
4132.50	-15.0	V	3.0	43.9	1.0	-57.9	-13.0	-44.9	
4959.00	-17.5	V	3.0	43.8	1.0	-60.3	-13.0	-47.3	
1653.00	-13.2	H	3.0	43.6	1.0	-55.8	-13.0	-42.8	
2479.50	-20.5	H	3.0	43.4	1.0	-62.9	-13.0	-49.9	
3306.00	-20.5	H	3.0	43.6	1.0	-63.1	-13.0	-50.1	
4132.50	-20.2	H	3.0	43.9	1.0	-63.1	-13.0	-50.1	
4959.00	-19.5	H	3.0	43.8	1.0	-62.3	-13.0	-49.3	
Mid Ch, 836.5MHz									
1673.00	-9.2	V	3.0	43.6	1.0	-51.8	-13.0	-38.8	
2509.50	-17.3	V	3.0	43.4	1.0	-59.7	-13.0	-46.7	
3346.00	-14.3	V	3.0	43.6	1.0	-57.0	-13.0	-44.0	
4182.50	-20.7	V	3.0	43.9	1.0	-63.6	-13.0	-50.6	
5019.00	-18.3	V	3.0	43.8	1.0	-61.1	-13.0	-48.1	
1673.00	-12.8	H	3.0	43.6	1.0	-55.3	-13.0	-42.3	
2509.50	-21.4	H	3.0	43.4	1.0	-63.8	-13.0	-50.8	
3346.00	-21.5	H	3.0	43.6	1.0	-64.1	-13.0	-51.1	
4182.50	-20.7	H	3.0	43.9	1.0	-63.5	-13.0	-50.5	
5019.00	-19.6	H	3.0	43.8	1.0	-62.3	-13.0	-49.3	
High Ch, 846.5MHz									
1693.00	-4.9	V	3.0	43.6	1.0	-47.5	-13.0	-34.5	
2539.50	-13.8	V	3.0	43.4	1.0	-56.3	-13.0	-43.3	
3386.00	-10.9	V	3.0	43.7	1.0	-53.5	-13.0	-40.5	
4232.50	-7.9	V	3.0	43.9	1.0	-50.8	-13.0	-37.8	
5079.00	-11.4	V	3.0	43.8	1.0	-54.2	-13.0	-41.2	
1693.00	-14.3	H	3.0	43.6	1.0	-56.9	-13.0	-43.9	
2539.50	-15.5	H	3.0	43.4	1.0	-57.9	-13.0	-44.9	
3386.00	-15.3	H	3.0	43.7	1.0	-57.9	-13.0	-44.9	
4232.50	-17.3	H	3.0	43.9	1.0	-60.1	-13.0	-47.1	
5079.00	-19.1	H	3.0	43.8	1.0	-61.9	-13.0	-48.9	

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LTE

Band 5

5MHz

16QAM

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 45585
Configuration: EUT / Adapter / Earphone, Y-Position
Location: Chamber 1
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	-6.3	V	3.0	43.6	1.0	-48.9	-13.0	-35.9	
2479.50	-18.9	V	3.0	43.4	1.0	-61.3	-13.0	-48.3	
3306.00	-12.6	V	3.0	43.6	1.0	-55.3	-13.0	-42.3	
4132.50	-15.8	V	3.0	43.9	1.0	-58.7	-13.0	-45.7	
4959.00	-17.8	V	3.0	43.8	1.0	-60.6	-13.0	-47.6	
1653.00	-14.9	H	3.0	43.6	1.0	-57.5	-13.0	-44.5	
2479.50	-21.0	H	3.0	43.4	1.0	-63.4	-13.0	-50.4	
3306.00	-20.6	H	3.0	43.6	1.0	-63.3	-13.0	-50.3	
4132.50	-20.3	H	3.0	43.9	1.0	-63.2	-13.0	-50.2	
4959.00	-19.5	H	3.0	43.8	1.0	-62.3	-13.0	-49.3	
Mid Ch, 836.5MHz									
1673.00	-10.9	V	3.0	43.6	1.0	-53.5	-13.0	-40.5	
2509.50	-18.7	V	3.0	43.4	1.0	-61.1	-13.0	-48.1	
3346.00	-15.2	V	3.0	43.6	1.0	-57.8	-13.0	-44.8	
4182.50	-20.7	V	3.0	43.9	1.0	-63.5	-13.0	-50.5	
5019.00	-18.5	V	3.0	43.8	1.0	-61.3	-13.0	-48.3	
1673.00	-14.4	H	3.0	43.6	1.0	-57.0	-13.0	-44.0	
2509.50	-21.8	H	3.0	43.4	1.0	-64.3	-13.0	-51.3	
3346.00	-21.4	H	3.0	43.6	1.0	-64.1	-13.0	-51.1	
4182.50	-20.6	H	3.0	43.9	1.0	-63.5	-13.0	-50.5	
5019.00	-19.5	H	3.0	43.8	1.0	-62.3	-13.0	-49.3	
High Ch, 846.5MHz									
1693.00	-6.1	V	3.0	43.6	1.0	-48.7	-13.0	-35.7	
2539.50	-15.2	V	3.0	43.4	1.0	-57.6	-13.0	-44.6	
3386.00	-11.9	V	3.0	43.7	1.0	-54.5	-13.0	-41.5	
4232.50	-8.9	V	3.0	43.9	1.0	-51.7	-13.0	-38.7	
5079.00	-12.4	V	3.0	43.8	1.0	-55.2	-13.0	-42.2	
1693.00	-15.5	H	3.0	43.6	1.0	-58.0	-13.0	-45.0	
2539.50	-16.5	H	3.0	43.4	1.0	-59.0	-13.0	-46.0	
3386.00	-15.9	H	3.0	43.7	1.0	-58.6	-13.0	-45.6	
4232.50	-17.7	H	3.0	43.9	1.0	-60.5	-13.0	-47.5	
5079.00	-19.2	H	3.0	43.8	1.0	-61.9	-13.0	-48.9	

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LTE

Band 5

3MHz

QPSK

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 45585
Configuration: EUT / Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 5 Harmonics, 3MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 825.5MHz									
1651.00	-6.2	V	3.0	43.6	1.0	-48.7	-13.0	-35.7	
2476.50	-18.8	V	3.0	43.4	1.0	-61.2	-13.0	-48.2	
3302.00	-11.0	V	3.0	43.6	1.0	-53.6	-13.0	-40.6	
4127.50	-14.4	V	3.0	43.9	1.0	-57.2	-13.0	-44.2	
4953.00	-16.6	V	3.0	43.8	1.0	-59.4	-13.0	-46.4	
1651.00	-9.1	H	3.0	43.6	1.0	-51.7	-13.0	-38.7	
2476.50	-21.1	H	3.0	43.4	1.0	-63.5	-13.0	-50.5	
3302.00	-20.7	H	3.0	43.6	1.0	-63.3	-13.0	-50.3	
4127.50	-18.1	H	3.0	43.9	1.0	-61.0	-13.0	-48.0	
4953.00	-19.6	H	3.0	43.8	1.0	-62.4	-13.0	-49.4	
Mid Ch, 836.5MHz									
1673.00	-8.6	V	3.0	43.6	1.0	-51.1	-13.0	-38.1	
2509.50	-18.4	V	3.0	43.4	1.0	-60.8	-13.0	-47.8	
3346.00	-21.5	V	3.0	43.6	1.0	-64.2	-13.0	-51.2	
4182.50	-20.3	V	3.0	43.9	1.0	-63.2	-13.0	-50.2	
5019.00	-19.2	V	3.0	43.8	1.0	-62.0	-13.0	-49.0	
1673.00	-14.2	H	3.0	43.6	1.0	-56.7	-13.0	-43.7	
2509.50	-21.4	H	3.0	43.4	1.0	-63.8	-13.0	-50.8	
3346.00	-20.8	H	3.0	43.6	1.0	-63.5	-13.0	-50.5	
4182.50	-20.1	H	3.0	43.9	1.0	-63.0	-13.0	-50.0	
5019.00	-19.7	H	3.0	43.8	1.0	-62.4	-13.0	-49.4	
High Ch, 847.5MHz									
1695.00	-11.0	V	3.0	43.6	1.0	-53.6	-13.0	-40.6	
2542.50	-16.1	V	3.0	43.4	1.0	-58.6	-13.0	-45.6	
3390.00	-11.8	V	3.0	43.7	1.0	-54.5	-13.0	-41.5	
4237.50	-13.4	V	3.0	43.9	1.0	-56.3	-13.0	-43.3	
5085.00	-15.3	V	3.0	43.8	1.0	-58.0	-13.0	-45.0	
1695.00	-13.0	H	3.0	43.6	1.0	-55.6	-13.0	-42.6	
2542.50	-16.2	H	3.0	43.4	1.0	-58.6	-13.0	-45.6	
3390.00	-18.4	H	3.0	43.7	1.0	-61.0	-13.0	-48.0	
4237.50	-17.3	H	3.0	43.9	1.0	-60.1	-13.0	-47.1	
5085.00	-19.5	H	3.0	43.8	1.0	-62.3	-13.0	-49.3	

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LTE

Band 5

3MHz

16QAM

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 45585
Configuration: EUT / Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 5 Harmonics, 3MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 825.5MHz									
1651.00	-7.7	V	3.0	43.6	1.0	-50.3	-13.0	-37.3	
2476.50	-19.9	V	3.0	43.4	1.0	-62.3	-13.0	-49.3	
3302.00	-11.5	V	3.0	43.6	1.0	-54.1	-13.0	-41.1	
4127.50	-15.4	V	3.0	43.9	1.0	-58.2	-13.0	-45.2	
4953.00	-17.1	V	3.0	43.8	1.0	-59.9	-13.0	-46.9	
1651.00	-11.3	H	3.0	43.6	1.0	-53.9	-13.0	-40.9	
2476.50	-21.7	H	3.0	43.4	1.0	-64.1	-13.0	-51.1	
3302.00	-20.6	H	3.0	43.6	1.0	-63.2	-13.0	-50.2	
4127.50	-18.4	H	3.0	43.9	1.0	-61.3	-13.0	-48.3	
4953.00	-19.5	H	3.0	43.8	1.0	-62.3	-13.0	-49.3	
Mid Ch, 836.5MHz									
1673.00	-11.8	V	3.0	43.6	1.0	-54.4	-13.0	-41.4	
2509.50	-19.6	V	3.0	43.4	1.0	-62.0	-13.0	-49.0	
3346.00	-16.5	V	3.0	43.6	1.0	-59.1	-13.0	-46.1	
4182.50	-20.2	V	3.0	43.9	1.0	-63.1	-13.0	-50.1	
5019.00	-18.2	V	3.0	43.8	1.0	-61.0	-13.0	-48.0	
1673.00	-14.7	H	3.0	43.6	1.0	-57.3	-13.0	-44.3	
2509.50	-19.9	H	3.0	43.4	1.0	-62.3	-13.0	-49.3	
3346.00	-21.0	H	3.0	43.6	1.0	-63.7	-13.0	-50.7	
4182.50	-19.7	H	3.0	43.9	1.0	-62.6	-13.0	-49.6	
5019.00	-19.3	H	3.0	43.8	1.0	-62.1	-13.0	-49.1	
High Ch, 847.5MHz									
1695.00	-12.5	V	3.0	43.6	1.0	-55.1	-13.0	-42.1	
2542.50	-17.1	V	3.0	43.4	1.0	-59.5	-13.0	-46.5	
3390.00	-13.0	V	3.0	43.7	1.0	-55.7	-13.0	-42.7	
4237.50	-13.8	V	3.0	43.9	1.0	-56.7	-13.0	-43.7	
5085.00	-16.0	V	3.0	43.8	1.0	-58.8	-13.0	-45.8	
1695.00	-14.8	H	3.0	43.6	1.0	-57.4	-13.0	-44.4	
2542.50	-17.6	H	3.0	43.4	1.0	-60.0	-13.0	-47.0	
3390.00	-18.8	H	3.0	43.7	1.0	-61.5	-13.0	-48.5	
4237.50	-17.8	H	3.0	43.9	1.0	-60.6	-13.0	-47.6	
5085.00	-19.3	H	3.0	43.8	1.0	-62.1	-13.0	-49.1	

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LTE

Band 5

1.4MHz

QPSK

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-21
Test Engineer: 51072
Configuration: EUT / Adapter / Earphone , Y-position
Location: Chamber 1
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	-7.7	V	3.0	43.6	1.0	-50.3	-13.0	-37.3	
2474.10	-17.9	V	3.0	43.4	1.0	-60.3	-13.0	-47.3	
3298.80	-11.9	V	3.0	43.6	1.0	-54.5	-13.0	-41.5	
4123.50	-14.0	V	3.0	43.9	1.0	-56.8	-13.0	-43.8	
4948.20	-16.4	V	3.0	43.8	1.0	-59.2	-13.0	-46.2	
1649.40	-11.3	H	3.0	43.6	1.0	-53.9	-13.0	-40.9	
2474.10	-18.1	H	3.0	43.4	1.0	-60.5	-13.0	-47.5	
3298.80	-17.2	H	3.0	43.6	1.0	-59.9	-13.0	-46.9	
4123.50	-16.6	H	3.0	43.9	1.0	-59.5	-13.0	-46.5	
4948.20	-19.0	H	3.0	43.8	1.0	-61.8	-13.0	-48.8	
Mid Ch, 836.5MHz									
1673.00	-8.9	V	3.0	43.6	1.0	-51.5	-13.0	-38.5	
2509.50	-18.2	V	3.0	43.4	1.0	-60.6	-13.0	-47.6	
3346.00	-18.7	V	3.0	43.6	1.0	-61.4	-13.0	-48.4	
4182.50	-16.2	V	3.0	43.9	1.0	-59.0	-13.0	-46.0	
5019.00	-19.4	V	3.0	43.8	1.0	-62.2	-13.0	-49.2	
1673.00	-11.3	H	3.0	43.6	1.0	-53.9	-13.0	-40.9	
2509.50	-18.2	H	3.0	43.4	1.0	-60.7	-13.0	-47.7	
3346.00	-21.0	H	3.0	43.6	1.0	-63.7	-13.0	-50.7	
4182.50	-19.7	H	3.0	43.9	1.0	-62.6	-13.0	-49.6	
5019.00	-19.7	H	3.0	43.8	1.0	-62.5	-13.0	-49.5	
High Ch, 848.3MHz									
1696.60	-8.9	V	3.0	43.6	1.0	-51.4	-13.0	-38.4	
2544.90	-16.4	V	3.0	43.4	1.0	-58.8	-13.0	-45.8	
3393.20	-17.3	V	3.0	43.7	1.0	-59.9	-13.0	-46.9	
4241.50	-12.8	V	3.0	43.9	1.0	-55.6	-13.0	-42.6	
5089.80	-18.9	V	3.0	43.8	1.0	-61.6	-13.0	-48.6	
1696.60	-16.1	H	3.0	43.6	1.0	-58.6	-13.0	-45.6	
2544.90	-17.9	H	3.0	43.4	1.0	-60.3	-13.0	-47.3	
3393.20	-19.2	H	3.0	43.7	1.0	-61.9	-13.0	-48.9	
4241.50	-18.7	H	3.0	43.9	1.0	-61.5	-13.0	-48.5	
5089.80	-19.3	H	3.0	43.8	1.0	-62.1	-13.0	-49.1	

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LTE

Band 5

1.4MHz

16QAM

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-21
Test Engineer: 51072
Configuration: EUT / Adapter / Earphone , Y-position
Location: Chamber 1
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	-8.4	V	3.0	43.6	1.0	-51.0	-13.0	-38.0	
2474.10	-19.6	V	3.0	43.4	1.0	-62.0	-13.0	-49.0	
3298.80	-12.2	V	3.0	43.6	1.0	-54.9	-13.0	-41.9	
4123.50	-14.9	V	3.0	43.9	1.0	-57.7	-13.0	-44.7	
4948.20	-17.0	V	3.0	43.8	1.0	-59.8	-13.0	-46.8	
1649.40	-13.1	H	3.0	43.6	1.0	-55.7	-13.0	-42.7	
2474.10	-19.6	H	3.0	43.4	1.0	-62.0	-13.0	-49.0	
3298.80	-17.5	H	3.0	43.6	1.0	-60.1	-13.0	-47.1	
4123.50	-17.3	H	3.0	43.9	1.0	-60.2	-13.0	-47.2	
4948.20	-19.2	H	3.0	43.8	1.0	-62.0	-13.0	-49.0	
Mid Ch, 836.5MHz									
1673.00	-10.4	V	3.0	43.6	1.0	-53.0	-13.0	-40.0	
2509.50	-19.0	V	3.0	43.4	1.0	-61.4	-13.0	-48.4	
3346.00	-19.0	V	3.0	43.6	1.0	-61.7	-13.0	-48.7	
4182.50	-16.9	V	3.0	43.9	1.0	-59.8	-13.0	-46.8	
5019.00	-19.4	V	3.0	43.8	1.0	-62.2	-13.0	-49.2	
1673.00	-13.1	H	3.0	43.6	1.0	-55.7	-13.0	-42.7	
2509.50	-19.3	H	3.0	43.4	1.0	-61.7	-13.0	-48.7	
3346.00	-20.9	H	3.0	43.6	1.0	-63.5	-13.0	-50.5	
4182.50	-19.9	H	3.0	43.9	1.0	-62.7	-13.0	-49.7	
5019.00	-19.8	H	3.0	43.8	1.0	-62.6	-13.0	-49.6	
High Ch, 848.3MHz									
1696.60	-10.8	V	3.0	43.6	1.0	-53.4	-13.0	-40.4	
2544.90	-17.6	V	3.0	43.4	1.0	-60.0	-13.0	-47.0	
3393.20	-17.8	V	3.0	43.7	1.0	-60.4	-13.0	-47.4	
4241.50	-13.4	V	3.0	43.9	1.0	-56.3	-13.0	-43.3	
5089.80	-18.8	V	3.0	43.8	1.0	-61.6	-13.0	-48.6	
1696.60	-17.6	H	3.0	43.6	1.0	-60.2	-13.0	-47.2	
2544.90	-19.2	H	3.0	43.4	1.0	-61.6	-13.0	-48.6	
3393.20	-19.3	H	3.0	43.7	1.0	-61.9	-13.0	-48.9	
4241.50	-19.0	H	3.0	43.9	1.0	-61.9	-13.0	-48.9	
5089.80	-19.2	H	3.0	43.8	1.0	-62.0	-13.0	-49.0	

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LTE Band 12

LTE

Band 12

10MHz

QPSK

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 45585
Configuration: EUT / Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 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, 704MHz									
1408.00	-11.6	V	3.0	43.8	1.0	-54.4	-13.0	-41.4	
2112.00	-21.5	V	3.0	43.3	1.0	-63.8	-13.0	-50.8	
2816.00	-12.2	V	3.0	43.5	1.0	-54.7	-13.0	-41.7	
3520.00	-11.1	V	3.0	43.7	1.0	-53.8	-13.0	-40.8	
4224.00	-17.3	V	3.0	43.9	1.0	-60.1	-13.0	-47.1	
1408.00	-13.5	H	3.0	43.8	1.0	-56.3	-13.0	-43.3	
2112.00	-15.8	H	3.0	43.3	1.0	-58.1	-13.0	-45.1	
2816.00	-19.0	H	3.0	43.5	1.0	-61.5	-13.0	-48.5	
3520.00	-19.6	H	3.0	43.7	1.0	-62.3	-13.0	-49.3	
4224.00	-19.8	H	3.0	43.9	1.0	-62.6	-13.0	-49.6	
Mid Ch, 707.5MHz									
1415.00	-11.6	V	3.0	43.8	1.0	-54.3	-13.0	-41.3	
2122.50	-21.3	V	3.0	43.3	1.0	-63.7	-13.0	-50.7	
2830.00	-12.6	V	3.0	43.5	1.0	-55.1	-13.0	-42.1	
3537.50	-13.0	V	3.0	43.7	1.0	-55.7	-13.0	-42.7	
4245.00	-20.6	V	3.0	43.9	1.0	-63.5	-13.0	-50.5	
1415.00	-17.4	H	3.0	43.8	1.0	-60.2	-13.0	-47.2	
2122.50	-22.3	H	3.0	43.3	1.0	-64.6	-13.0	-51.6	
2830.00	-19.9	H	3.0	43.5	1.0	-62.4	-13.0	-49.4	
3537.50	-17.8	H	3.0	43.7	1.0	-60.5	-13.0	-47.5	
4245.00	-20.6	H	3.0	43.9	1.0	-63.4	-13.0	-50.4	
High Ch, 711MHz									
1422.00	-15.7	V	3.0	43.8	1.0	-58.5	-13.0	-45.5	
2133.00	-20.1	V	3.0	43.3	1.0	-62.4	-13.0	-49.4	
2844.00	-15.1	V	3.0	43.5	1.0	-57.6	-13.0	-44.6	
3555.00	-14.8	V	3.0	43.7	1.0	-57.5	-13.0	-44.5	
4266.00	-18.4	V	3.0	43.8	1.0	-61.2	-13.0	-48.2	
1422.00	-19.7	H	3.0	43.8	1.0	-62.5	-13.0	-49.5	
2133.00	-22.4	H	3.0	43.3	1.0	-64.7	-13.0	-51.7	
2844.00	-20.1	H	3.0	43.5	1.0	-62.6	-13.0	-49.6	
3555.00	-20.4	H	3.0	43.7	1.0	-63.1	-13.0	-50.1	
4266.00	-20.3	H	3.0	43.8	1.0	-63.2	-13.0	-50.2	

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LTE

Band 12

10MHz

16QAM

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-20
Test Engineer: 45585
Configuration: EUT / Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 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, 704MHz									
1408.00	-12.4	V	3.0	43.8	1.0	-55.2	-13.0	-42.2	
2112.00	-21.8	V	3.0	43.3	1.0	-64.1	-13.0	-51.1	
2816.00	-13.2	V	3.0	43.5	1.0	-55.7	-13.0	-42.7	
3520.00	-12.0	V	3.0	43.7	1.0	-54.7	-13.0	-41.7	
4224.00	-17.9	V	3.0	43.9	1.0	-60.7	-13.0	-47.7	
1408.00	-14.6	H	3.0	43.8	1.0	-57.4	-13.0	-44.4	
2112.00	-17.3	H	3.0	43.3	1.0	-59.7	-13.0	-46.7	
2816.00	-19.7	H	3.0	43.5	1.0	-62.2	-13.0	-49.2	
3520.00	-19.6	H	3.0	43.7	1.0	-62.3	-13.0	-49.3	
4224.00	-19.8	H	3.0	43.9	1.0	-62.7	-13.0	-49.7	
Mid Ch, 707.5MHz									
1415.00	-12.4	V	3.0	43.8	1.0	-55.1	-13.0	-42.1	
2122.50	-21.3	V	3.0	43.3	1.0	-63.6	-13.0	-50.6	
2830.00	-13.4	V	3.0	43.5	1.0	-55.9	-13.0	-42.9	
3537.50	-14.1	V	3.0	43.7	1.0	-56.8	-13.0	-43.8	
4245.00	-20.6	V	3.0	43.9	1.0	-63.5	-13.0	-50.5	
1415.00	-18.2	H	3.0	43.8	1.0	-61.0	-13.0	-48.0	
2122.50	-22.6	H	3.0	43.3	1.0	-64.9	-13.0	-51.9	
2830.00	-20.4	H	3.0	43.5	1.0	-62.8	-13.0	-49.8	
3537.50	-18.3	H	3.0	43.7	1.0	-61.0	-13.0	-48.0	
4245.00	-20.6	H	3.0	43.9	1.0	-63.4	-13.0	-50.4	
High Ch, 711MHz									
1422.00	-16.8	V	3.0	43.8	1.0	-59.5	-13.0	-46.5	
2133.00	-21.3	V	3.0	43.3	1.0	-63.6	-13.0	-50.6	
2844.00	-16.4	V	3.0	43.5	1.0	-58.9	-13.0	-45.9	
3555.00	-16.0	V	3.0	43.7	1.0	-58.7	-13.0	-45.7	
4266.00	-19.0	V	3.0	43.8	1.0	-61.8	-13.0	-48.8	
1422.00	-20.8	H	3.0	43.8	1.0	-63.6	-13.0	-50.6	
2133.00	-23.0	H	3.0	43.3	1.0	-65.3	-13.0	-52.3	
2844.00	-20.1	H	3.0	43.5	1.0	-62.6	-13.0	-49.6	
3555.00	-20.3	H	3.0	43.7	1.0	-63.0	-13.0	-50.0	
4266.00	-20.4	H	3.0	43.8	1.0	-63.3	-13.0	-50.3	

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LTE

Band 12

5MHz

QPSK

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 47989
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 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, 701.5MHz									
1403.00	-7.5	V	3.0	43.8	1.0	-50.3	-13.0	-37.3	
2104.50	-11.7	V	3.0	43.3	1.0	-54.0	-13.0	-41.0	
2806.00	-12.2	V	3.0	43.5	1.0	-54.7	-13.0	-41.7	
3507.50	-8.5	V	3.0	43.7	1.0	-51.2	-13.0	-38.2	
4209.00	-15.8	V	3.0	43.9	1.0	-58.7	-13.0	-45.7	
1403.00	-13.2	H	3.0	43.8	1.0	-56.0	-13.0	-43.0	
2104.50	-13.5	H	3.0	43.3	1.0	-55.9	-13.0	-42.9	
2806.00	-19.6	H	3.0	43.5	1.0	-62.1	-13.0	-49.1	
3507.50	-17.7	H	3.0	43.7	1.0	-60.5	-13.0	-47.5	
4209.00	-19.6	H	3.0	43.9	1.0	-62.4	-13.0	-49.4	
Mid Ch, 707.5MHz									
1415.00	-14.8	V	3.0	43.8	1.0	-57.6	-13.0	-44.6	
2122.50	-20.7	V	3.0	43.3	1.0	-63.0	-13.0	-50.0	
2830.00	-12.6	V	3.0	43.5	1.0	-55.1	-13.0	-42.1	
3537.50	-12.5	V	3.0	43.7	1.0	-55.2	-13.0	-42.2	
4245.00	-16.5	V	3.0	43.9	1.0	-59.4	-13.0	-46.4	
1415.00	-19.7	H	3.0	43.8	1.0	-62.4	-13.0	-49.4	
2122.50	-23.0	H	3.0	43.3	1.0	-65.4	-13.0	-52.4	
2830.00	-18.4	H	3.0	43.5	1.0	-60.9	-13.0	-47.9	
3537.50	-18.0	H	3.0	43.7	1.0	-60.7	-13.0	-47.7	
4245.00	-20.0	H	3.0	43.9	1.0	-62.8	-13.0	-49.8	
High Ch, 713.5MHz									
1427.00	-6.2	V	3.0	43.8	1.0	-49.0	-13.0	-36.0	
2140.50	-14.2	V	3.0	43.3	1.0	-56.6	-13.0	-43.6	
2854.00	-13.6	V	3.0	43.5	1.0	-56.1	-13.0	-43.1	
3567.50	-10.9	V	3.0	43.7	1.0	-53.7	-13.0	-40.7	
4281.00	-14.4	V	3.0	43.8	1.0	-57.3	-13.0	-44.3	
1427.00	-14.1	H	3.0	43.8	1.0	-56.8	-13.0	-43.8	
2140.50	-16.7	H	3.0	43.3	1.0	-59.1	-13.0	-46.1	
2854.00	-19.7	H	3.0	43.5	1.0	-62.2	-13.0	-49.2	
3567.50	-19.2	H	3.0	43.7	1.0	-61.9	-13.0	-48.9	
4281.00	-19.4	H	3.0	43.8	1.0	-62.3	-13.0	-49.3	

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LTE

Band 12

5MHz

16QAM

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

Company: Samsung
Project #: 4788506351
Date: 2018-06-19
Test Engineer: 47989
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 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, 701.5MHz									
1403.00	-8.9	V	3.0	43.8	1.0	-51.7	-13.0	-38.7	
2104.50	-13.0	V	3.0	43.3	1.0	-55.3	-13.0	-42.3	
2806.00	-13.3	V	3.0	43.5	1.0	-55.8	-13.0	-42.8	
3507.50	-10.0	V	3.0	43.7	1.0	-52.7	-13.0	-39.7	
4209.00	-16.3	V	3.0	43.9	1.0	-59.2	-13.0	-46.2	
1403.00	-14.4	H	3.0	43.8	1.0	-57.2	-13.0	-44.2	
2104.50	-14.5	H	3.0	43.3	1.0	-56.9	-13.0	-43.9	
2806.00	-19.6	H	3.0	43.5	1.0	-62.1	-13.0	-49.1	
3507.50	-18.5	H	3.0	43.7	1.0	-61.2	-13.0	-48.2	
4209.00	-19.9	H	3.0	43.9	1.0	-62.7	-13.0	-49.7	
Mid Ch, 707.5MHz									
1415.00	-15.6	V	3.0	43.8	1.0	-58.3	-13.0	-45.3	
2122.50	-21.4	V	3.0	43.3	1.0	-63.8	-13.0	-50.8	
2830.00	-13.9	V	3.0	43.5	1.0	-56.4	-13.0	-43.4	
3537.50	-14.1	V	3.0	43.7	1.0	-56.8	-13.0	-43.8	
4245.00	-17.3	V	3.0	43.9	1.0	-60.2	-13.0	-47.2	
1415.00	-20.4	H	3.0	43.8	1.0	-63.1	-13.0	-50.1	
2122.50	-23.5	H	3.0	43.3	1.0	-65.9	-13.0	-52.9	
2830.00	-19.1	H	3.0	43.5	1.0	-61.6	-13.0	-48.6	
3537.50	-18.6	H	3.0	43.7	1.0	-61.3	-13.0	-48.3	
4245.00	-20.4	H	3.0	43.9	1.0	-63.2	-13.0	-50.2	
High Ch, 713.5MHz									
1427.00	-7.6	V	3.0	43.8	1.0	-50.3	-13.0	-37.3	
2140.50	-15.1	V	3.0	43.3	1.0	-57.5	-13.0	-44.5	
2854.00	-14.5	V	3.0	43.5	1.0	-57.0	-13.0	-44.0	
3567.50	-12.1	V	3.0	43.7	1.0	-54.9	-13.0	-41.9	
4281.00	-15.5	V	3.0	43.8	1.0	-58.3	-13.0	-45.3	
1427.00	-14.9	H	3.0	43.8	1.0	-57.7	-13.0	-44.7	
2140.50	-18.0	H	3.0	43.3	1.0	-60.3	-13.0	-47.3	
2854.00	-20.1	H	3.0	43.5	1.0	-62.6	-13.0	-49.6	
3567.50	-19.2	H	3.0	43.7	1.0	-61.9	-13.0	-48.9	
4281.00	-19.3	H	3.0	43.8	1.0	-62.1	-13.0	-49.1	

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