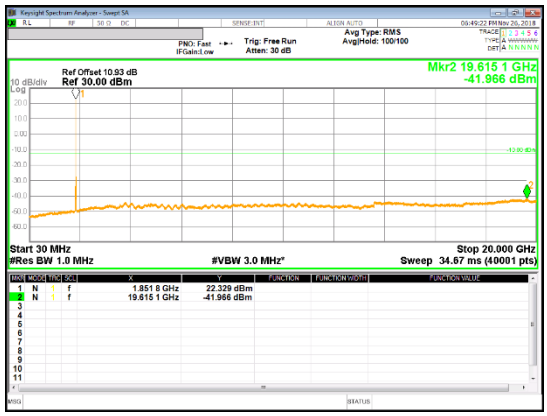
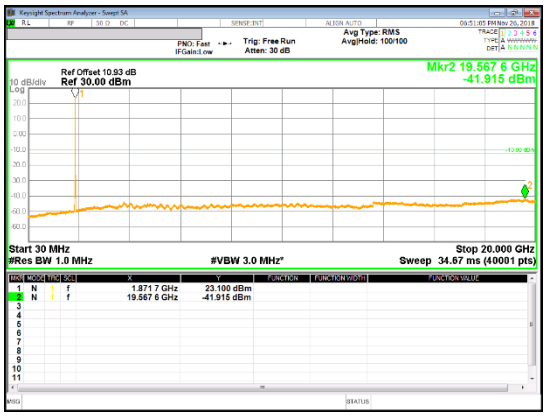
LTE Band 2

Band 2 20MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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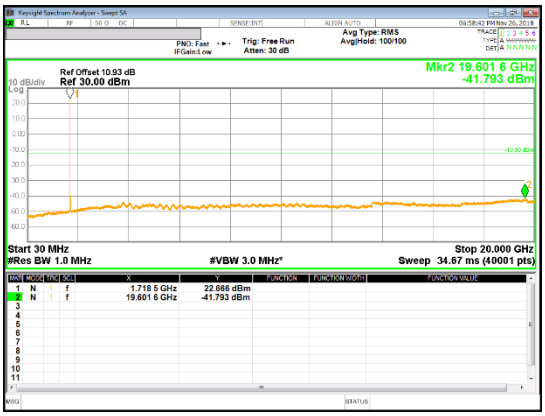
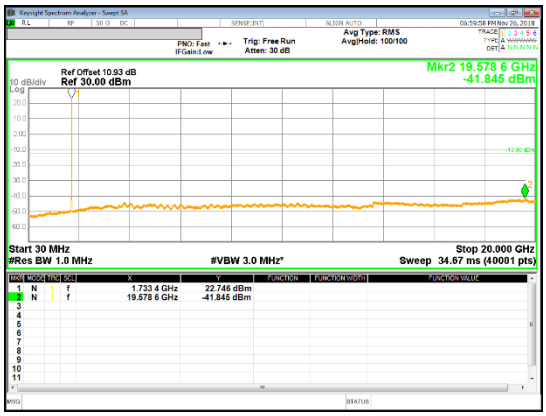
LTE Band 4

Band 4 15 MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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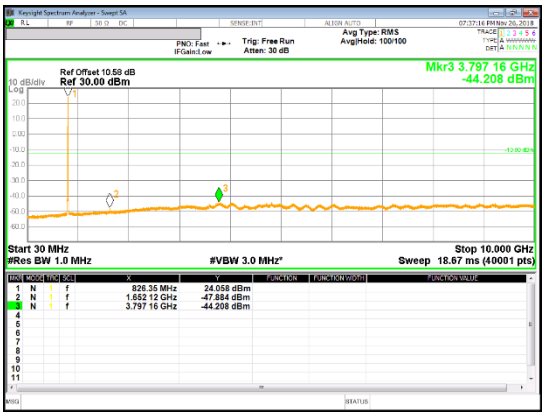
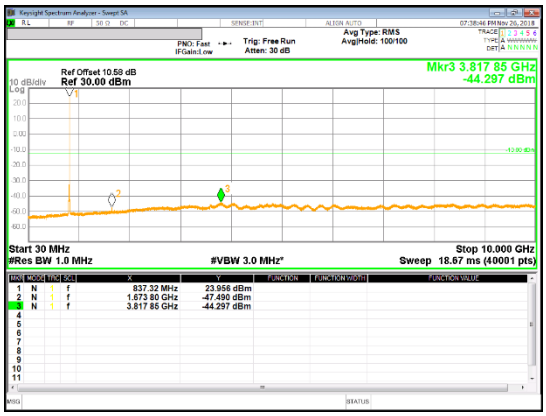
LTE Band 5

Band 5 3MHz	 QPSK Low channel	 QPSK Mid channel
	  QPSK High channel	

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LTE Band 7

Band 7 5MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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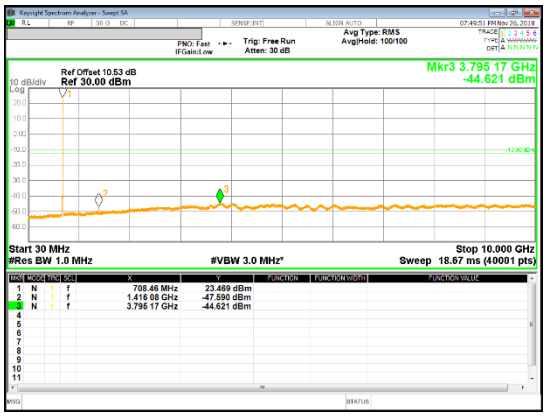
LTE Band 12

Band 12 3MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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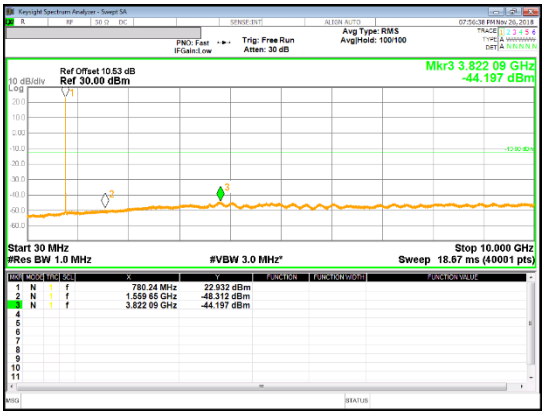
LTE Band 13

Band 13 10MHz	 QPSK Mid channel
Band 13 5MHz	 QPSK Low channel QPSK Mid channel QPSK High channel

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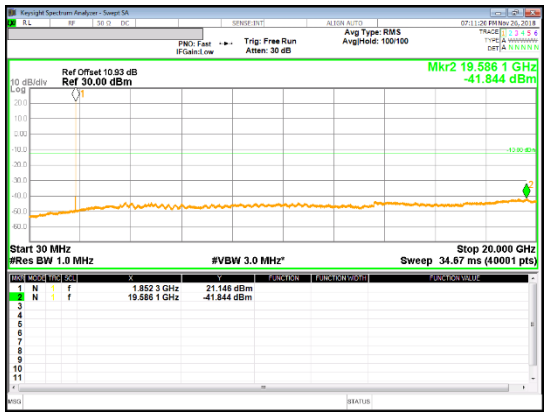
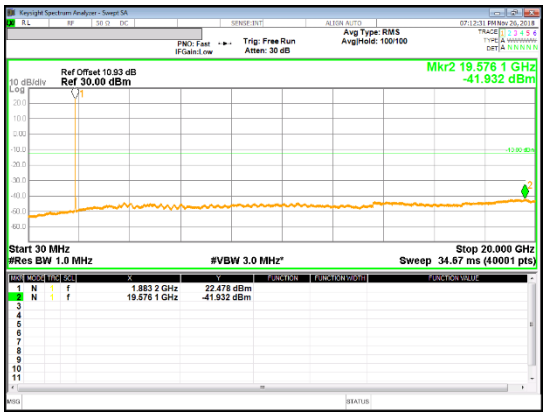
LTE Band 25

Band 25 20MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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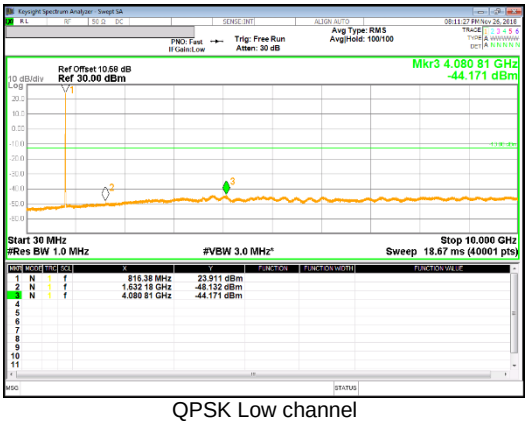
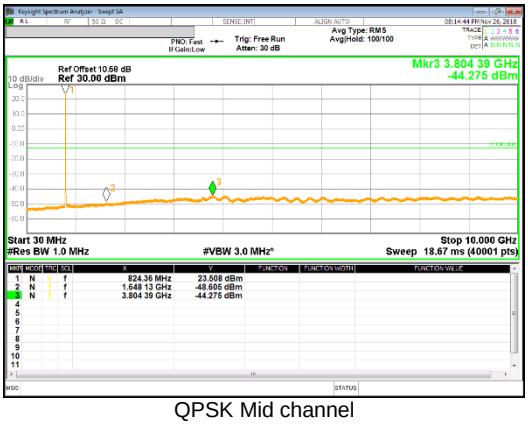
LTE Band 26

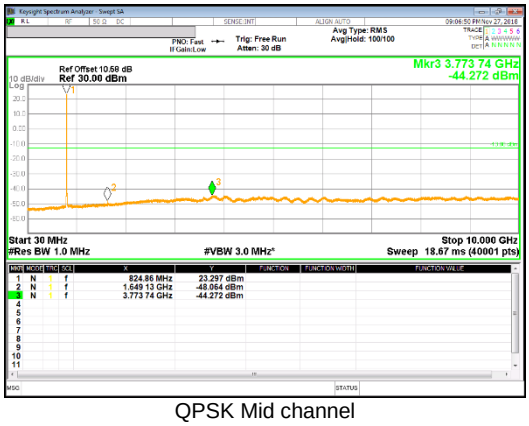
Band 26
3MHz



QPSK Low channel



QPSK Mid channel



QPSK Mid channel

QPSK Mid channel

QPSK High channel

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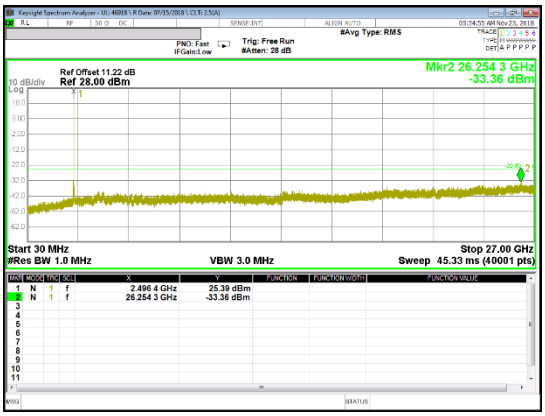
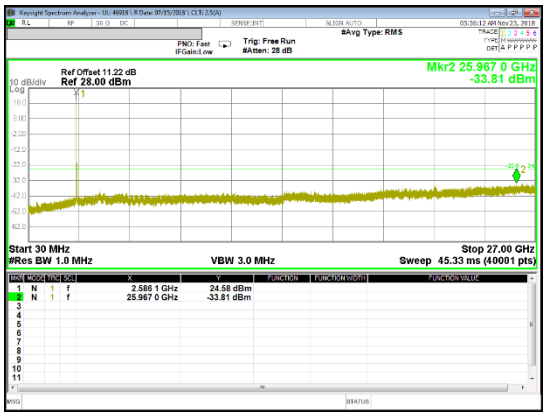
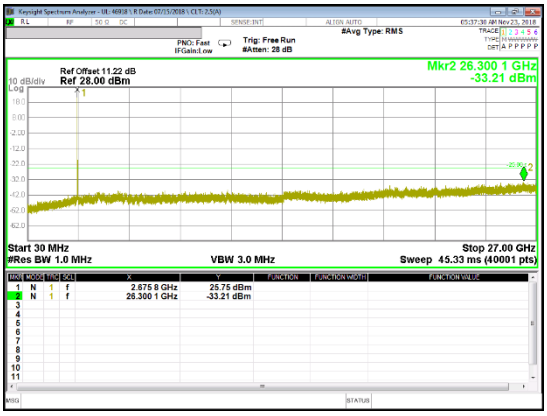
LTE Band 41

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

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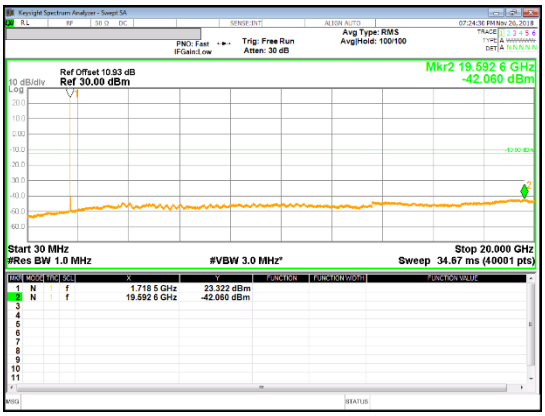
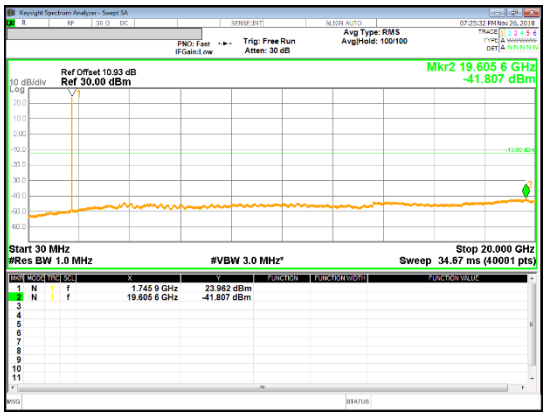
LTE Band 66

Band 66 15MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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9.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235,§27.54 and §90.213

LIMITS

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

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

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

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

RESULTS

See the following pages.

NOTE : Test were performed each lowest or highest frequency on the modulation condition of more wide bandwidth.(Please refer to section 9.1.1 OBW results)

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9.4.1. FREQUENCY STABILITY RESULTS

GSM 850, Channel 190, Frequency 836.6 MHz

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	50	824.19997790	0.000	848.79997841	-0.001	2.5
3.80	40	824.19998177	-0.004	848.79997986	-0.003	2.5
3.80	30	824.19997576	0.003	848.79997952	-0.003	2.5
3.80	***20***	***824.19997819***	***0.000***	***848.79997717***	***0.000***	***2.5***
3.80	10	824.19998259	-0.005	848.79998177	-0.005	2.5
3.80	0	824.19998249	-0.005	848.79997662	0.001	2.5
3.80	-10	824.19997925	-0.001	848.79997813	-0.001	2.5
3.80	-20	824.19997606	0.003	848.79997985	-0.003	2.5
3.80	-30	824.19998162	-0.004	848.79998165	-0.005	2.5

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	***20***	***824.19997819***	***0***	***848.79997717***	***0***	***2.5***
4.30	20	824.19997971	-0.002	848.79997567	0.002	2.5
3.60	20	824.19997644	0.002	848.79998228	-0.006	2.5

GSM 1900, Channel 661, Frequency 1880.0 MHz

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	1850.0783	1909.9226		
Extreme (50C)		1850.0783	1909.9227	25.6	0.014
Extreme (40C)		1850.0783	1909.9227	30.7	0.016
Extreme (30C)		1850.0783	1909.9227	30.5	0.016
Extreme (10C)		1850.0783	1909.9227	24.4	0.013
Extreme (0C)		1850.0783	1909.9227	22.8	0.012
Extreme (-10C)		1850.0783	1909.9227	30.2	0.016
Extreme (-20C)		1850.0783	1909.9227	25.9	0.014
Extreme (-30C)		1850.0783	1909.9227	27.9	0.015
20C	15%	1850.0783	1909.9227	24.2	0.013
	-15%	1850.0783	1909.9227	30.1	0.016
	End Point	1850.0783	1909.9227	26.5	0.014

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WCDMA Band 5 (HSDPA)

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	50	826.40000610	0.008	846.60001072	-0.006	2.5
3.80	40	826.40001409	-0.001	846.60000641	-0.001	2.5
3.80	30	826.40001522	-0.003	846.60000623	0.000	2.5
3.80	***20***	***826.40001301***	***0.000***	***846.60000586***	***0.000***	***2.5***
3.80	10	826.40001094	0.003	846.60000726	-0.002	2.5
3.80	0	826.40000582	0.009	846.60000519	0.001	2.5
3.80	-10	826.40000686	0.007	846.60001384	-0.009	2.5
3.80	-20	826.40001552	-0.003	846.60000567	0.000	2.5
3.80	-30	826.40000761	0.007	846.60001284	-0.008	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	***20***	**826.40001301**	***0***	**846.60000586**	***0***	***2.5***
4.30	20	826.40001550	-0.003	846.60000648	-0.001	2.5
3.60	20	826.40000951	0.004	846.60000665	-0.001	2.5

WCDMA Band 4 (HSDPA)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1712.3979	1752.6021		
Extreme (50C)		1712.3979	1752.6021	27.4	0.016
Extreme (40C)		1712.3979	1752.6021	30.8	0.018
Extreme (30C)		1712.3979	1752.6021	29.5	0.017
Extreme (10C)		1712.3979	1752.6021	24.3	0.014
Extreme (0C)		1712.3979	1752.6021	24.4	0.014
Extreme (-10C)		1712.3979	1752.6021	27.9	0.016
Extreme (-20C)		1712.3979	1752.6021	21.6	0.012
Extreme (-30C)		1712.3979	1752.6021	20.2	0.012
20C	15%	1712.3979	1752.6021	20.4	0.012
	-15%	1712.3979	1752.6021	28.5	0.016
	End Point	1712.3979	1752.6021	24.2	0.014

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WCDMA Band 2 (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	1907.6021	23.6	0.013
Extreme (40C)		1852.3979	1907.6021	28.7	0.015
Extreme (30C)		1852.3979	1907.6021	27.6	0.015
Extreme (10C)		1852.3979	1907.6021	24.9	0.013
Extreme (0C)		1852.3979	1907.6021	29.2	0.016
Extreme (-10C)		1852.3979	1907.6021	20.7	0.011
Extreme (-20C)		1852.3979	1907.6021	21.3	0.011
Extreme (-30C)		1852.3979	1907.6021	20.8	0.011
20C	15%	1852.3979	1907.6021	22.2	0.012
	-15%	1852.3979	1907.6021	27.2	0.014
	End Point	1852.3979	1907.6021	23.4	0.012

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LTE Band 2 (Lowest Frequency: 16QAM / Highest Frequency: QPSK)

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	1850.6995	1909.3005		
Extreme (50C)		1850.6994	1909.3005	-32.4	-0.017
Extreme (40C)		1850.6994	1909.3005	-33.4	-0.018
Extreme (30C)		1850.6994	1909.3005	-29.1	-0.016
Extreme (10C)		1850.6994	1909.3005	-30.9	-0.016
Extreme (0C)		1850.6994	1909.3005	-37.2	-0.020
Extreme (-10C)		1850.6994	1909.3005	-32.9	-0.018
Extreme (-20C)		1850.6994	1909.3005	-33.2	-0.018
Extreme (-30C)		1850.6994	1909.3005	-38.0	-0.020
20C	15%	1850.6994	1909.3005	-30.4	-0.016
	-15%	1850.6994	1909.3005	-38.8	-0.021
	End Point	1850.6994	1909.3005	-33.0	-0.018

LTE Band 4 (Lowest Frequency: 16QAM / Highest Frequency: QPSK)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1852.3995	1907.6005		
Extreme (50C)		1852.3994	1907.6005	-27.0	-0.016
Extreme (40C)		1852.3994	1907.6005	-27.6	-0.016
Extreme (30C)		1852.3994	1907.6005	-26.8	-0.015
Extreme (10C)		1852.3994	1907.6005	-28.2	-0.016
Extreme (0C)		1852.3994	1907.6005	-29.7	-0.017
Extreme (-10C)		1852.3994	1907.6005	-21.4	-0.012
Extreme (-20C)		1852.3994	1907.6005	-24.9	-0.014
Extreme (-30C)		1852.3994	1907.6005	-24.5	-0.014
20C	15%	1852.3994	1907.6005	-23.5	-0.014
	-15%	1852.3994	1907.6005	-25.2	-0.015
	End Point	1852.3994	1907.6005	-23.0	-0.013

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

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	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]	
3.80	50	824.69998496	-0.013	848.29998115	0.004	2.5
3.80	40	824.69998460	-0.013	848.29997531	0.011	2.5
3.80	30	824.69997413	0.000	848.29998381	0.001	2.5
3.80	***20***	***824.69997429***	***0.000***	***848.29998462***	***0.000***	***2.5***
3.80	10	824.69997792	-0.004	848.29997496	0.011	2.5
3.80	0	824.69998010	-0.007	848.29997578	0.010	2.5
3.80	-10	824.69997549	-0.001	848.29998040	0.005	2.5
3.80	-20	824.69997999	-0.007	848.29997579	0.010	2.5
3.80	-30	824.69998019	-0.007	848.29998101	0.004	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	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]	
3.80	***20***	***824.69997429***	***0***	***848.29998462***	***0***	***2.5***
4.30	20	824.69998246	-0.010	848.29998254	0.002	2.5
3.60	20	824.69998466	-0.013	848.29997692	0.009	2.5

LTE Band 7 (QPSK)

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2502.4977	2567.5022		
Extreme (50C)		2502.4977	2567.5022	-24.6	-0.010
Extreme (40C)		2502.4977	2567.5022	-17.8	-0.007
Extreme (30C)		2502.4977	2567.5022	-28.6	-0.011
Extreme (10C)		2502.4977	2567.5022	-20.4	-0.008
Extreme (0C)		2502.4977	2567.5022	-21.6	-0.009
Extreme (-10C)		2502.4977	2567.5022	-20.3	-0.008
Extreme (-20C)		2502.4977	2567.5022	-18.6	-0.007
Extreme (-30C)		2502.4977	2567.5022	-28.3	-0.011
20C	15%	2502.4977	2567.5022	-22.0	-0.009
	-15%	2502.4977	2567.5022	-19.1	-0.008
	End Point	2502.4977	2567.5022	-19.1	-0.008

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LTE Band 12 (16QAM)

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	-10.8	-0.015
Extreme (40C)		699.6994	715.3005	-10.0	-0.014
Extreme (30C)		699.6994	715.3005	-18.5	-0.026
Extreme (10C)		699.6994	715.3005	-15.9	-0.022
Extreme (0C)		699.6994	715.3005	-13.0	-0.018
Extreme (-10C)		699.6994	715.3005	-12.4	-0.018
Extreme (-20C)		699.6994	715.3005	-9.2	-0.013
Extreme (-30C)		699.6994	715.3005	-18.9	-0.027
20C	15%	699.6994	715.3005	-18.0	-0.025
	-15%	699.6994	715.3005	-17.8	-0.025
	End Point	699.6994	715.3005	-11.5	-0.016

LTE Band 13 (Lowest Frequency: QPSK / Highest Frequency: 16QAM)

Limit		777	787	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	779.4977	784.5023		
Extreme (50C)		779.4978	784.5023	17.4	0.022
Extreme (40C)		779.4978	784.5023	20.1	0.026
Extreme (30C)		779.4978	784.5023	11.4	0.015
Extreme (10C)		779.4978	784.5023	17.2	0.022
Extreme (0C)		779.4978	784.5023	10.4	0.013
Extreme (-10C)		779.4978	784.5023	16.4	0.021
Extreme (-20C)		779.4978	784.5023	15.5	0.020
Extreme (-30C)		779.4978	784.5023	20.3	0.026
20C	15%	779.4978	784.5023	16.8	0.021
	-15%	779.4978	784.5023	12.9	0.017
	End Point	779.4978	784.5023	16.1	0.021

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

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.6995	1914.3005		
Extreme (50C)		1850.6994	1914.3005	-10.5	-0.006
Extreme (40C)		1850.6994	1914.3005	-12.6	-0.007
Extreme (30C)		1850.6994	1914.3005	-16.7	-0.009
Extreme (10C)		1850.6994	1914.3005	-12.4	-0.007
Extreme (0C)		1850.6994	1914.3005	-18.1	-0.010
Extreme (-10C)		1850.6994	1914.3005	-19.5	-0.010
Extreme (-20C)		1850.6994	1914.3005	-19.2	-0.010
Extreme (-30C)		1850.6994	1914.3005	-10.3	-0.005
20C	15%	1850.6994	1914.3005	-14.8	-0.008
	-15%	1850.6994	1914.3005	-14.9	-0.008
	End Point	1850.6994	1914.3005	-12.8	-0.007

LTE Band 26 (QPSK)

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20°C

Low Channel 2036.750 Hz High Channel 2120.750 Hz

Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
	Low Channel		High Channel		
	[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
50	814.70001507	0.000	848.30002363	-0.008	2.5
40	814.70001698	-0.003	848.30001962	-0.003	2.5
30	814.70001835	-0.004	848.30002266	-0.007	2.5
20	***814.70001477***	***0.000***	***848.30001709***	***0.000***	***2.5***
10	814.70001989	-0.006	848.30002323	-0.007	2.5
0	814.70001628	-0.002	848.30001388	0.004	2.5
-10	814.70001385	0.001	848.30001782	-0.001	2.5
-20	814.70001936	-0.006	848.30002110	-0.005	2.5
-30	814.70001495	0.000	848.30002013	-0.004	2.5

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20°C

Low Channel 2036.750 Hz High Channel 2120.750 Hz

Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
	Low Channel		High Channel		
	[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
20	**814.70001477**	***0***	**848.30001709**	***0***	***2.5***
20	814.70001499	0.000	848.30002119	-0.005	2.5
20	814.70001360	0.001	848.30002240	-0.006	2.5

LTE Band 38[Single carrier]

LTE Band 38[Single carrier] (Frequency range: 2570-2620 MHz) is covered by LTE Band 41 (Frequency range: 2496-2690 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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LTE Band 41 (16QAM)

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	-31.5	-0.012
Extreme (40C)		2498.4977	2687.5022	-33.8	-0.013
Extreme (30C)		2498.4977	2687.5022	-31.8	-0.012
Extreme (10C)		2498.4977	2687.5022	-35.0	-0.013
Extreme (0C)		2498.4977	2687.5022	-31.1	-0.012
Extreme (-10C)		2498.4977	2687.5022	-30.3	-0.012
Extreme (-20C)		2498.4977	2687.5022	-27.5	-0.011
Extreme (-30C)		2498.4977	2687.5022	-27.7	-0.011
20C	15%	2498.4977	2687.5022	-28.4	-0.011
	-15%	2498.4977	2687.5022	-33.8	-0.013
	End Point	2498.4977	2687.5022	-28.2	-0.011

LTE Band 66 (16QAM)

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.6995	1779.3005		
Extreme (50C)		1710.6995	1779.3006	19.8	0.011
Extreme (40C)		1710.6995	1779.3006	10.9	0.006
Extreme (30C)		1710.6995	1779.3006	14.2	0.008
Extreme (10C)		1710.6995	1779.3006	13.6	0.008
Extreme (0C)		1710.6995	1779.3006	20.0	0.011
Extreme (-10C)		1710.6995	1779.3006	12.7	0.007
Extreme (-20C)		1710.6995	1779.3006	10.1	0.006
Extreme (-30C)		1710.6995	1779.3006	18.0	0.010
20C	15%	1710.6995	1779.3006	18.4	0.011
	-15%	1710.6995	1779.3006	10.2	0.006
	End Point	1710.6995	1779.3006	16.6	0.009

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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10. RADIATED TEST RESULTS

10.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50 and §27.53

LIMITS

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

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

27.50:

(b)(10) Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

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

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

(h) The following power limits shall apply in the BRS and EBS:

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

Part 90.635(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

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	26.63	460.26
		661	836.6	**28.02**	**633.87**
		810	848.8	26.35	431.52
	EGPRS	512	824.2	**23.81**	**240.44**
		661	836.6	23.63	230.67
		810	848.8	22.91	195.43
GSM1900	GPRS	512	1850.2	26.85	484.17
		661	1880.0	**28.62**	**727.78**
		810	1909.8	27.76	597.04
	EGPRS	512	1850.2	24.78	300.61
		661	1880.0	**27.22**	**527.23**
		810	1909.8	25.74	374.97

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WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	18.12	64.86
		4183	836.6	**19.07**	**80.72**
		4233	846.6	18.35	68.39
	HSDPA	4132	826.4	17.19	52.36
		4183	836.6	**18.28**	**67.30**
		4233	846.6	17.66	58.34
Band 4	REL99	1312	1712.4	23.96	248.89
		1413	1732.6	**24.32**	**270.40**
		1513	1752.6	23.78	238.78
	HSDPA	1312	1712.4	**23.95**	**248.31**
		1413	1732.6	23.56	226.99
		1513	1752.6	23.66	232.27
Band 2	REL99	9262	1852.4	19.45	88.10
		9400	1880.0	**22.22**	**166.72**
		9538	1907.6	21.23	132.74
	HSDPA	9262	1852.4	19.17	82.60
		9400	1880.0	**21.42**	**138.68**
		9538	1907.6	20.62	115.35

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LTE Band 2

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 2	20	QPSK	1 / 0	1860.0	23.34	215.77
			1 / 0	1880.0	22.78	189.67
			1 / 0	1900.0	**23.41**	**219.28**
		16QAM	1 / 0	1860.0	21.40	138.04
			1 / 0	1880.0	21.34	136.14
			1 / 0	1900.0	**21.96**	157.04
	15	QPSK	1 / 37	1857.5	22.44	175.39
			1 / 0	1880.0	22.69	185.78
			1 / 37	1902.5	22.98	198.61
		16QAM	1 / 37	1857.5	21.10	128.82
			1 / 0	1880.0	21.40	138.04
			1 / 37	1902.5	21.38	137.40
	10	QPSK	1 / 0	1855.0	23.08	203.24
			1 / 0	1880.0	22.70	186.21
			1 / 0	1905.0	22.80	190.55
		16QAM	1 / 0	1855.0	21.74	149.28
			1 / 0	1880.0	21.09	128.53
			1 / 0	1905.0	21.10	128.82
	5	QPSK	1 / 12	1852.5	22.94	196.79
			1 / 24	1880.0	22.83	191.87
			1 / 0	1907.5	22.72	187.07
		16QAM	1 / 0	1852.5	21.48	140.60
			1 / 12	1880.0	21.04	127.06
			1 / 12	1907.5	21.34	136.14
	3	QPSK	1 / 8	1851.5	22.87	193.64
			1 / 0	1880.0	22.80	190.55
			1 / 8	1908.5	22.54	179.47
		16QAM	1 / 8	1851.5	21.13	129.72
			1 / 0	1880.0	21.40	138.04
			1 / 8	1908.5	21.01	126.18
	1.4	QPSK	1 / 0	1850.7	23.16	207.01
			1 / 0	1880.0	22.98	198.61
			1 / 0	1909.3	22.76	188.80
		16QAM	1 / 0	1850.7	21.67	146.89
			1 / 0	1880.0	21.54	142.56
			1 / 3	1909.3	20.54	113.24

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LTE Band 4

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 4	20	QPSK	1 / 0	1720.0	20.96	124.74
			1 / 0	1732.5	21.63	145.55
			1 / 0	1745.0	22.28	169.04
		16QAM	1 / 0	1720.0	19.41	87.30
			1 / 0	1732.5	19.86	96.83
			1 / 0	1745.0	**20.81**	120.50
	15	QPSK	1 / 37	1717.5	21.26	133.66
			1 / 37	1732.5	22.24	167.49
			1 / 37	1747.5	21.97	157.40
		16QAM	1 / 37	1717.5	19.63	91.83
			1 / 0	1732.5	20.59	114.55
			1 / 0	1747.5	20.26	106.17
	10	QPSK	1 / 25	1715.0	21.03	126.77
			1 / 49	1732.5	21.96	157.04
			1 / 0	1750.0	21.84	152.76
		16QAM	1 / 49	1715.0	19.72	93.76
			1 / 49	1732.5	20.26	106.17
			1 / 0	1750.0	20.07	101.62
	5	QPSK	1 / 24	1712.5	21.82	152.05
			1 / 24	1732.5	**22.43**	**174.98**
			1 / 24	1752.5	21.25	133.35
		16QAM	1 / 12	1712.5	20.17	103.99
			1 / 12	1732.5	20.50	112.20
			1 / 12	1752.5	19.90	97.72
	3	QPSK	1 / 8	1711.5	21.87	153.82
			1 / 0	1732.5	22.39	173.38
			1 / 0	1753.5	21.33	135.83
		16QAM	1 / 8	1711.5	20.37	108.89
			1 / 14	1732.5	20.58	114.29
			1 / 14	1753.5	19.80	95.50
	1.4	QPSK	1 / 0	1710.7	21.38	137.40
			1 / 0	1732.5	22.32	170.61
			1 / 0	1754.3	21.39	137.72
		16QAM	1 / 3	1710.7	20.05	101.16
			1 / 0	1732.5	20.72	118.03
			1 / 0	1754.3	19.93	98.40

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LTE Band 5

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 5	10	QPSK	1 / 0	829.0	19.14	82.04
			1 / 0	836.5	19.66	92.47
			1 / 0	844.0	18.52	71.12
		16QAM	1 / 0	829.0	16.45	44.16
			1 / 0	836.5	17.21	52.60
			1 / 0	844.0	16.32	42.85
	5	QPSK	1 / 0	826.5	19.26	84.33
			1 / 12	836.5	19.95	98.86
			1 / 0	846.5	20.08	101.86
		16QAM	1 / 12	826.5	16.48	44.46
			1 / 24	836.5	17.22	52.72
			1 / 12	846.5	17.45	55.59
	3	QPSK	1 / 8	825.5	18.76	75.16
			1 / 8	836.5	19.91	97.95
			1 / 0	847.5	19.27	84.53
		16QAM	1 / 14	825.5	16.36	43.25
			1 / 8	836.5	17.27	53.33
			1 / 8	847.5	16.71	46.88
	1.4	QPSK	1 / 0	824.7	19.33	85.70
			1 / 0	836.5	20.22	105.20
			1 / 0	848.3	18.98	79.07
		16QAM	1 / 0	824.7	16.14	41.11
			1 / 0	836.5	17.47	55.85
			1 / 0	848.3	16.38	43.45

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LTE Band 7

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 7	20	QPSK	1 / 0	2510.0	**23.12**	**205.12**
			1 / 0	2535.0	22.45	175.79
			1 / 0	2560.0	22.78	189.67
		16QAM	1 / 0	2510.0	**21.11**	129.12
			1 / 0	2535.0	20.78	119.67
			1 / 0	2560.0	20.41	109.90
	15	QPSK	1 / 37	2507.5	**22.77**	189.23
			1 / 0	2535.0	22.55	179.89
			1 / 37	2562.5	22.32	170.61
		16QAM	1 / 37	2507.5	**20.68**	116.95
			1 / 0	2535.0	20.60	114.82
			1 / 37	2562.5	20.17	103.99
	10	QPSK	1 / 0	2505.0	**23.05**	201.84
			1 / 0	2535.0	22.67	184.93
			1 / 0	2565.0	22.46	176.20
		16QAM	1 / 0	2505.0	**21.09**	128.53
			1 / 0	2535.0	20.88	122.46
			1 / 0	2565.0	20.50	112.20
	5	QPSK	1 / 12	2502.5	**22.85**	192.75
			1 / 24	2535.0	22.58	181.13
			1 / 12	2567.5	22.23	167.11
		16QAM	1 / 12	2502.5	**20.71**	117.76
			1 / 12	2535.0	20.23	105.44
			1 / 24	2567.5	20.22	105.20

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LTE Band 12

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 12	10	QPSK	1 / 0	704.0	15.33	34.12
			1 / 0	707.5	**16.23**	**41.98**
			1 / 0	711.0	15.87	38.64
		16QAM	1 / 0	704.0	13.30	21.38
			1 / 0	707.5	**13.72**	23.55
			1 / 0	711.0	13.63	23.07
	5	QPSK	1 / 24	701.5	15.27	33.65
			1 / 0	707.5	15.95	39.36
			1 / 0	713.5	**16.01**	39.90
		16QAM	1 / 12	701.5	13.59	22.86
			1 / 12	707.5	13.51	22.44
			1 / 12	713.5	**14.03**	25.29
	3	QPSK	1 / 8	700.5	15.35	34.28
			1 / 8	707.5	15.86	38.55
			1 / 0	714.5	**16.09**	40.64
		16QAM	1 / 8	700.5	12.88	19.41
			1 / 8	707.5	**14.02**	25.23
			1 / 0	714.5	13.94	24.77
	1.4	QPSK	1 / 0	699.7	15.15	32.73
			1 / 0	707.5	15.80	38.02
			1 / 0	715.3	**16.23**	**41.98**
		16QAM	1 / 0	699.7	12.80	19.05
			1 / 0	707.5	13.63	23.07
			1 / 0	715.3	**13.94**	24.77

LTE Band 13

Band	BW [MHz]	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 13	10	QPSK	1 / 0	782.0	18.71	74.30
		16QAM	1 / 0	782.0	16.50	44.67
	5	QPSK	1 / 12	779.5	**19.61**	**91.41**
			1 / 24	782.0	18.84	76.56
			1 / 12	784.5	10.47	11.14
		16QAM	1 / 12	779.5	**17.63**	57.94
			1 / 12	782.0	16.55	45.19
			1 / 12	784.5	17.06	50.82

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LTE Band 25

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 25	20	QPSK	1 / 0	1860.0	19.84	96.38
			1 / 0	1882.5	**21.87**	153.82
			1 / 0	1905.0	21.62	145.21
		16QAM	1 / 0	1860.0	18.62	72.78
			1 / 0	1882.5	**20.87**	122.18
			1 / 0	1905.0	20.55	113.50
	15	QPSK	1 / 37	1857.5	19.52	89.54
			1 / 37	1882.5	**21.99**	158.12
			1 / 37	1907.5	20.99	125.60
		16QAM	1 / 0	1857.5	18.92	77.98
			1 / 37	1882.5	**20.90**	123.03
			1 / 37	1907.5	19.90	97.72
	10	QPSK	1 / 0	1855.0	19.42	87.50
			1 / 0	1882.5	**21.94**	156.31
			1 / 0	1910.0	20.79	119.95
		16QAM	1 / 0	1855.0	18.65	73.28
			1 / 0	1882.5	**20.93**	123.88
			1 / 0	1910.0	19.57	90.57
	5	QPSK	1 / 0	1852.5	19.36	86.30
			1 / 24	1882.5	**21.72**	148.59
			1 / 24	1912.5	20.38	109.14
		16QAM	1 / 12	1852.5	17.85	60.95
			1 / 12	1882.5	**20.68**	116.95
			1 / 12	1912.5	19.28	84.72
	3	QPSK	1 / 8	1851.5	19.12	81.66
			1 / 8	1882.5	**22.07**	**161.06**
			1 / 8	1913.5	20.61	115.08
		16QAM	1 / 0	1851.5	18.43	69.66
			1 / 8	1882.5	**20.89**	122.74
			1 / 0	1913.5	19.48	88.72
	1.4	QPSK	1 / 0	1850.7	19.12	81.66
			1 / 0	1882.5	**21.85**	153.11
			1 / 0	1914.3	20.55	113.50
		16QAM	1 / 0	1850.7	18.08	64.27
			1 / 5	1882.5	**20.27**	106.41
			1 / 3	1914.3	19.37	86.50

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LTE Band 26

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP/EIRP [dBm]	ERP/EIRP [mW]
Band 26	15	QPSK	1 / 37	821.5	17.92	61.94
			1 / 37	831.5	20.12	102.80
			1 / 37	841.5	**20.75**	**118.85**
		16QAM	1 / 37	821.5	16.53	44.98
			1 / 37	831.5	18.95	78.52
			1 / 0	841.5	**19.28**	**84.72**
	10	QPSK	1 / 0	819.0	16.89	48.87
			1 / 0	829.0	18.52	71.12
			1 / 0	831.5	**18.86**	**76.91**
			1 / 0	844.0	18.82	76.21
		16QAM	1 / 0	819.0	15.28	33.73
			1 / 0	829.0	16.97	49.77
			1 / 0	831.5	**17.14**	**51.76**
			1 / 0	844.0	17.03	50.47
	5	QPSK	1 / 24	816.5	17.13	51.64
			1 / 12	821.5	**17.18**	**52.24**
			1 / 12	826.5	18.30	67.61
			1 / 0	831.5	**19.01**	**79.62**
			1 / 12	846.5	18.37	68.71
		16QAM	1 / 12	816.5	15.10	32.36
			1 / 0	821.5	**15.75**	**37.58**
			1 / 24	826.5	14.39	27.48
			1 / 0	831.5	**17.17**	**52.12**
			1 / 12	846.5	16.86	48.53
	3	QPSK	1 / 8	815.5	16.64	46.13
			1 / 14	822.5	**17.74**	**59.43**
			1 / 0	825.5	18.12	64.86
			1 / 8	831.5	**19.07**	**80.72**
			1 / 8	847.5	18.53	71.29
		16QAM	1 / 14	815.5	15.47	35.24
			1 / 14	822.5	**16.01**	**39.90**
			1 / 0	825.5	16.80	47.86
			1 / 8	831.5	**17.31**	**53.83**
			1 / 8	847.5	16.56	45.29
	1.4	QPSK	1 / 0	814.7	16.46	44.26
			1 / 0	823.3	**17.84**	**60.81**
			1 / 0	824.7	17.92	61.94
			1 / 0	831.5	**18.89**	**77.45**
			1 / 0	848.3	18.29	67.45
		16QAM	1 / 0	814.7	14.72	29.65
			1 / 3	823.3	**15.91**	**38.99**
			1 / 3	824.7	16.25	42.17
			1 / 0	831.5	**17.20**	**52.48**
			1 / 0	848.3	16.99	50.00

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LTE Band 41

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 41	20	QPSK	1 / 0	2506.0	**23.19**	**208.45**
			1 / 0	2593.0	22.13	163.31
			1 / 0	2680.0	22.39	173.38
		16QAM	1 / 49	2506.0	**22.20**	**165.96**
			1 / 49	2593.0	20.50	112.20
			1 / 0	2680.0	21.76	149.97
	15	QPSK	1 / 0	2503.5	**24.13**	**258.82**
			1 / 0	2593.0	21.64	145.88
			1 / 0	2682.5	22.14	163.68
		16QAM	1 / 0	2503.5	**22.00**	**158.49**
			1 / 0	2593.0	20.13	103.04
			1 / 0	2682.5	21.96	157.04
	10	QPSK	1 / 0	2501.0	19.81	95.72
			1 / 0	2593.0	19.05	80.35
			1 / 0	2685.0	**22.65**	**184.08**
		16QAM	1 / 0	2501.0	17.57	57.15
			1 / 0	2593.0	17.17	52.12
			1 / 0	2685.0	**21.49**	**140.93**
	5	QPSK	1 / 0	2498.5	**22.96**	**197.70**
			1 / 0	2593.0	22.35	171.79
			1 / 0	2687.5	22.34	171.40
		16QAM	1 / 0	2498.5	**21.83**	**152.41**
			1 / 0	2593.0	20.69	117.22
			1 / 0	2687.5	21.38	137.40

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.

LTE Band 38[Single carrier]

LTE Band 38[Single carrier] (Frequency range: 2570-2620 MHz) is covered by LTE Band 41 (Frequency range: 2496-2690 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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LTE Band 66

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 66	20	QPSK	1 / 0	1720.0	**24.82**	**303.39**
			1 / 0	1745.0	23.74	236.59
			1 / 0	1770.0	24.30	269.15
		16QAM	1 / 0	1720.0	**22.88**	**194.09**
			1 / 0	1745.0	21.90	154.88
			1 / 0	1770.0	22.19	165.58
	15	QPSK	1 / 37	1717.5	24.28	267.92
			1 / 37	1747.5	**24.36**	**272.90**
			1 / 37	1772.5	22.50	177.83
		16QAM	1 / 37	1717.5	22.06	160.69
			1 / 0	1747.5	22.84	192.31
			1 / 37	1772.5	**24.02**	**252.35**
	10	QPSK	1 / 0	1715.0	24.65	291.74
			1 / 0	1745.0	**24.78**	**300.61**
			1 / 0	1775.0	24.28	267.92
		16QAM	1 / 49	1715.0	**22.80**	**190.55**
			1 / 0	1745.0	22.57	180.72
			1 / 0	1775.0	21.63	145.55
	5	QPSK	1 / 24	1712.5	24.73	297.17
			1 / 24	1745.0	**25.34**	**341.98**
			1 / 24	1777.5	23.65	231.74
		16QAM	1 / 12	1712.5	22.75	188.36
			1 / 0	1745.0	**22.87**	**193.64**
			1 / 12	1777.5	21.44	139.32
	3	QPSK	1 / 8	1711.5	24.70	295.12
			1 / 0	1745.0	**24.82**	**303.39**
			1 / 0	1778.5	24.05	254.10
		16QAM	1 / 0	1711.5	**23.46**	**221.82**
			1 / 8	1745.0	23.25	211.35
			1 / 14	1778.5	21.76	149.97
	1.4	QPSK	1 / 0	1710.7	24.44	277.97
			1 / 0	1745.0	**24.54**	**284.45**
			1 / 0	1779.3	23.49	223.36
		16QAM	1 / 0	1710.7	**22.62**	**182.81**
			1 / 0	1745.0	22.57	180.72
			1 / 0	1779.3	21.45	139.64

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10.1.2. ERP/EIRP DATA

GSM850

GSM850

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-15
Test Engineer: 45585
Configuration: EUT
Location: Chamber 2
Mode: GPRS 850 MHz Fundamentals

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.20	23.61	V	3.0	-1.5	19.12	38.5	-19.4	
824.20	31.12	H	3.0	-1.5	26.63	38.5	-11.9	
Mid Ch								
836.60	24.80	V	3.0	-1.4	20.34	38.5	-18.2	
836.60	32.48	H	3.0	-1.4	28.02	38.5	-10.5	
High Ch								
848.80	23.54	V	3.1	-1.4	19.10	38.5	-19.4	
848.80	30.79	H	3.1	-1.4	26.35	38.5	-12.2	

GSM850

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-16
Test Engineer: 45585
Configuration: EUT
Location: Chamber 2
Mode: EGPRS 850 MHz Fundamentals

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.20	20.73	V	3.0	-1.5	16.24	38.5	-22.3	
824.20	28.30	H	3.0	-1.5	23.81	38.5	-14.7	
Mid Ch								
836.60	24.80	V	3.0	-1.4	20.34	38.5	-18.2	
836.60	28.09	H	3.0	-1.4	23.63	38.5	-14.9	
High Ch								
848.80	19.98	V	3.1	-1.4	15.54	38.5	-23.0	
848.80	27.35	H	3.1	-1.4	22.91	38.5	-15.6	

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GSM1900

GSM1900

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-15
Test Engineer: 45585
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: GPRS 1900 MHz Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	21.93	V	4.5	9.4	26.85	33.0	-6.1	
1850.20	15.29	H	4.5	9.4	20.21	33.0	-12.8	
Mid Ch								
1880.00	23.96	V	4.5	9.2	28.62	33.0	-4.4	
1880.00	14.92	H	4.5	9.2	19.59	33.0	-13.4	
High Ch								
1909.80	23.40	V	4.6	8.9	27.76	33.0	-5.2	
1909.80	16.59	H	4.6	8.9	20.95	33.0	-12.1	

GSM1900

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-15
Test Engineer: 45585
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: EGPRS 1900 MHz Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	19.86	V	4.5	9.4	24.78	33.0	-8.2	
1850.20	9.21	H	4.5	9.4	14.13	33.0	-18.9	
Mid Ch								
1880.00	22.56	V	4.5	9.2	27.22	33.0	-5.8	
1880.00	12.62	H	4.5	9.2	17.29	33.0	-15.7	
High Ch								
1909.80	21.38	V	4.6	8.9	25.74	33.0	-7.3	
1909.80	14.63	H	4.6	8.9	18.99	33.0	-14.0	

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WCDMA Band 5

WCDMA

Band 5
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-15
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 1
Mode: Rel99 Band 5 Fundamentals

Test Equipment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	22.60	V	3.0	-1.5	18.12	38.5	-20.4	
826.40	14.12	H	3.0	-1.5	9.64	38.5	-28.9	
Mid Ch								
836.60	23.53	V	3.0	-1.4	19.07	38.5	-19.4	
836.60	15.61	H	3.0	-1.4	11.14	38.5	-27.4	
High Ch								
846.60	22.80	V	3.1	-1.4	18.35	38.5	-20.1	
846.60	15.40	H	3.1	-1.4	10.95	38.5	-27.5	

WCDMA

Band 5
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-15
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 1
Mode: HSDPA Band 5 Fundamentals

Test Equipment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	21.67	V	3.0	-1.5	17.19	38.5	-21.3	
826.40	12.59	H	3.0	-1.5	8.11	38.5	-30.4	
Mid Ch								
836.60	22.74	V	3.0	-1.4	18.28	38.5	-20.2	
836.60	14.22	H	3.0	-1.4	9.75	38.5	-28.7	
High Ch								
846.60	22.11	V	3.1	-1.4	17.66	38.5	-20.8	
846.60	14.10	H	3.1	-1.4	9.65	38.5	-28.8	

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WCDMA Band 4

WCDMA

Band 4
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-15
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: Rel99 Band 4 Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.40	10.62	V	4.3	9.4	15.71	30.0	-14.3	
1712.40	18.88	H	4.3	9.4	23.96	30.0	-6.0	
Mid Ch								
1732.60	13.16	V	4.3	9.5	18.30	30.0	-11.7	
1732.60	19.19	H	4.3	9.5	24.32	30.0	-5.7	
High Ch								
1752.60	12.89	V	4.4	9.5	18.06	30.0	-11.9	
1752.60	18.61	H	4.4	9.5	23.78	30.0	-6.2	

WCDMA

Band 4
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-15
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: HSDPA Band 4 Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.40	11.09	V	4.3	9.4	16.18	30.0	-13.8	
1712.40	18.87	H	4.3	9.4	23.95	30.0	-6.0	
Mid Ch								
1732.60	11.52	V	4.3	9.5	16.66	30.0	-13.3	
1732.60	18.43	H	4.3	9.5	23.56	30.0	-6.4	
High Ch								
1752.60	13.09	V	4.4	9.5	18.26	30.0	-11.7	
1752.60	18.49	H	4.4	9.5	23.66	30.0	-6.3	

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WCDMA Band 2

WCDMA

Band 2
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-14
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: Rel99 Band 2 Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	14.55	V	4.5	9.4	19.45	33.0	-13.5	
1852.40	7.39	H	4.5	9.4	12.29	33.0	-20.7	
Mid Ch								
1880.00	17.56	V	4.5	9.2	22.22	33.0	-10.8	
1880.00	9.65	H	4.5	9.2	14.32	33.0	-18.7	
High Ch								
1907.60	16.84	V	4.6	9.0	21.23	33.0	-11.8	
1907.60	10.37	H	4.6	9.0	14.76	33.0	-18.2	

WCDMA

Band 2
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-14
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: HSDPA Band 2 Fundamentals

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	14.27	V	4.5	9.4	19.17	33.0	-13.8	
1852.40	7.14	H	4.5	9.4	12.04	33.0	-21.0	
Mid Ch								
1880.00	16.76	V	4.5	9.2	21.42	33.0	-11.6	
1880.00	9.20	H	4.5	9.2	13.87	33.0	-19.1	
High Ch								
1907.60	16.23	V	4.6	9.0	20.62	33.0	-12.4	
1907.60	9.80	H	4.6	9.0	14.19	33.0	-18.8	

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LTE Band 2

LTE Band 2 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	18.40	V	4.5	9.4	23.34	33.0	-9.7	
1860.00	4.60	H	4.5	9.4	9.53	33.0	-23.5	
Mid Ch								
1880.00	18.00	V	4.5	9.3	22.78	33.0	-10.2	
1880.00	13.13	H	4.5	9.3	17.90	33.0	-15.1	
High Ch								
1900.00	18.80	V	4.6	9.2	23.41	33.0	-9.6	
1900.00	13.78	H	4.6	9.2	18.40	33.0	-14.6	

LTE Band 2 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	16.46	V	4.5	9.4	21.40	33.0	-11.6	
1860.00	3.02	H	4.5	9.4	7.95	33.0	-25.0	
Mid Ch								
1880.00	16.56	V	4.5	9.3	21.34	33.0	-11.7	
1880.00	11.43	H	4.5	9.3	16.20	33.0	-16.8	
High Ch								
1900.00	17.35	V	4.6	9.2	21.96	33.0	-11.0	
1900.00	12.21	H	4.6	9.2	16.83	33.0	-16.2	

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Band 2

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	17.49	V	4.5	9.5	22.44	33.0	-10.6	
1857.50	12.07	H	4.5	9.5	17.02	33.0	-16.0	
Mid Ch								
1880.00	17.91	V	4.5	9.3	22.69	33.0	-10.3	
1880.00	13.05	H	4.5	9.3	17.82	33.0	-15.2	
High Ch								
1902.50	18.39	V	4.6	9.1	22.98	33.0	-10.0	
1902.50	13.15	H	4.6	9.1	17.73	33.0	-15.3	

LTE

Band 2

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	16.15	V	4.5	9.5	21.10	33.0	-11.9	
1857.50	10.30	H	4.5	9.5	15.25	33.0	-17.7	
Mid Ch								
1880.00	16.62	V	4.5	9.3	21.40	33.0	-11.6	
1880.00	11.74	H	4.5	9.3	16.51	33.0	-16.5	
High Ch								
1902.50	16.79	V	4.6	9.1	21.38	33.0	-11.6	
1902.50	11.39	H	4.6	9.1	15.97	33.0	-17.0	

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Band 2

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	18.11	V	4.5	9.5	23.08	33.0	-9.9	
1855.00	12.52	H	4.5	9.5	17.49	33.0	-15.5	
Mid Ch								
1880.00	17.92	V	4.5	9.3	22.70	33.0	-10.3	
1880.00	11.30	H	4.5	9.3	16.07	33.0	-16.9	
High Ch								
1905.00	18.25	V	4.6	9.1	22.80	33.0	-10.2	
1905.00	13.24	H	4.6	9.1	17.79	33.0	-15.2	

LTE

Band 2

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	16.77	V	4.5	9.5	21.74	33.0	-11.3	
1855.00	11.18	H	4.5	9.5	16.15	33.0	-16.8	
Mid Ch								
1880.00	16.31	V	4.5	9.3	21.09	33.0	-11.9	
1880.00	9.93	H	4.5	9.3	14.70	33.0	-18.3	
High Ch								
1905.00	16.55	V	4.6	9.1	21.10	33.0	-11.9	
1905.00	11.65	H	4.6	9.1	16.20	33.0	-16.8	

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Band 2

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	17.94	V	4.5	9.5	22.94	33.0	-10.1	
1852.50	8.75	H	4.5	9.5	13.75	33.0	-19.3	
Mid Ch								
1880.00	18.05	V	4.5	9.3	22.83	33.0	-10.2	
1880.00	13.24	H	4.5	9.3	18.01	33.0	-15.0	
High Ch								
1907.50	18.20	V	4.6	9.1	22.72	33.0	-10.3	
1907.50	12.57	H	4.6	9.1	17.09	33.0	-15.9	

LTE

Band 2

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 2 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	16.48	V	4.5	9.5	21.48	33.0	-11.5	
1852.50	3.50	H	4.5	9.5	8.50	33.0	-24.5	
Mid Ch								
1880.00	16.26	V	4.5	9.3	21.04	33.0	-12.0	
1880.00	11.24	H	4.5	9.3	16.01	33.0	-17.0	
High Ch								
1907.50	16.82	V	4.6	9.1	21.34	33.0	-11.7	
1907.50	10.91	H	4.6	9.1	15.43	33.0	-17.6	

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Band 2

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	17.86	V	4.5	9.5	22.87	33.0	-10.1	
1851.50	12.01	H	4.5	9.5	17.01	33.0	-16.0	
Mid Ch								
1880.00	18.02	V	4.5	9.3	22.80	33.0	-10.2	
1880.00	13.30	H	4.5	9.3	18.07	33.0	-14.9	
High Ch								
1908.50	18.03	V	4.6	9.1	22.54	33.0	-10.5	
1908.50	11.34	H	4.6	9.1	15.84	33.0	-17.2	

LTE

Band 2

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	16.12	V	4.5	9.5	21.13	33.0	-11.9	
1851.50	10.28	H	4.5	9.5	15.28	33.0	-17.7	
Mid Ch								
1880.00	16.62	V	4.5	9.3	21.40	33.0	-11.6	
1880.00	11.68	H	4.5	9.3	16.45	33.0	-16.5	
High Ch								
1908.50	16.50	V	4.6	9.1	21.01	33.0	-12.0	
1908.50	9.82	H	4.6	9.1	14.32	33.0	-18.7	

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Band 2

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	18.15	V	4.5	9.5	23.16	33.0	-9.8	
1850.70	12.37	H	4.5	9.5	17.38	33.0	-15.6	
Mid Ch								
1880.00	18.20	V	4.5	9.3	22.98	33.0	-10.0	
1880.00	13.46	H	4.5	9.3	18.23	33.0	-14.8	
High Ch								
1909.30	18.27	V	4.6	9.1	22.76	33.0	-10.2	
1909.30	11.65	H	4.6	9.1	16.14	33.0	-16.9	

LTE

Band 2

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 47989
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	16.66	V	4.5	9.5	21.67	33.0	-11.3	
1850.70	10.48	H	4.5	9.5	15.49	33.0	-17.5	
Mid Ch								
1880.00	16.76	V	4.5	9.3	21.54	33.0	-11.5	
1880.00	11.67	H	4.5	9.3	16.44	33.0	-16.6	
High Ch								
1909.30	16.05	V	4.6	9.1	20.54	33.0	-12.5	
1909.30	10.08	H	4.6	9.1	14.57	33.0	-18.4	

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LTE Band 4

LTE Band 4 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 4 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	12.47	V	4.3	9.4	17.49	30.0	-12.5	
1720.00	15.93	H	4.3	9.4	20.96	30.0	-9.0	
Mid Ch								
1732.50	13.62	V	4.3	9.4	18.68	30.0	-11.3	
1732.50	16.57	H	4.3	9.4	21.63	30.0	-8.4	
High Ch								
1745.00	13.41	V	4.4	9.4	18.50	30.0	-11.5	
1745.00	17.20	H	4.4	9.4	22.28	30.0	-7.7	

LTE Band 4 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 4 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	10.87	V	4.3	9.4	15.89	30.0	-14.1	
1720.00	14.38	H	4.3	9.4	19.41	30.0	-10.6	
Mid Ch								
1732.50	11.90	V	4.3	9.4	16.96	30.0	-13.0	
1732.50	14.80	H	4.3	9.4	19.86	30.0	-10.1	
High Ch								
1745.00	12.02	V	4.4	9.4	17.11	30.0	-12.9	
1745.00	15.73	H	4.4	9.4	20.81	30.0	-9.2	

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LTE

Band 4

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 4 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	12.99	V	4.3	9.3	18.02	30.0	-12.0	
1717.50	16.24	H	4.3	9.3	21.26	30.0	-8.7	
Mid Ch								
1732.50	13.85	V	4.3	9.4	18.91	30.0	-11.1	
1732.50	17.18	H	4.3	9.4	22.24	30.0	-7.8	
High Ch								
1747.50	11.41	V	4.4	9.5	16.51	30.0	-13.5	
1747.50	16.88	H	4.4	9.5	21.97	30.0	-8.0	

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Band 4

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 4 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	11.35	V	4.3	9.3	16.38	30.0	-13.6	
1717.50	14.61	H	4.3	9.3	19.63	30.0	-10.4	
Mid Ch								
1732.50	12.13	V	4.3	9.4	17.19	30.0	-12.8	
1732.50	15.53	H	4.3	9.4	20.59	30.0	-9.4	
High Ch								
1747.50	9.81	V	4.4	9.5	14.91	30.0	-15.1	
1747.50	15.17	H	4.4	9.5	20.26	30.0	-9.7	

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Band 4

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 4 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	12.68	V	4.3	9.3	17.70	30.0	-12.3	
1715.00	16.01	H	4.3	9.3	21.03	30.0	-9.0	
Mid Ch								
1732.50	13.80	V	4.3	9.4	18.86	30.0	-11.1	
1732.50	16.90	H	4.3	9.4	21.96	30.0	-8.0	
High Ch								
1750.00	11.85	V	4.4	9.5	16.95	30.0	-13.0	
1750.00	16.74	H	4.4	9.5	21.84	30.0	-8.2	

LTE

Band 4

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 4 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	11.22	V	4.3	9.3	16.24	30.0	-13.8	
1715.00	14.70	H	4.3	9.3	19.72	30.0	-10.3	
Mid Ch								
1732.50	11.87	V	4.3	9.4	16.93	30.0	-13.1	
1732.50	15.20	H	4.3	9.4	20.26	30.0	-9.7	
High Ch								
1750.00	10.19	V	4.4	9.5	15.29	30.0	-14.7	
1750.00	14.97	H	4.4	9.5	20.07	30.0	-9.9	

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Band 4

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 4 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	12.62	V	4.3	9.3	17.64	30.0	-12.4	
1712.50	16.80	H	4.3	9.3	21.82	30.0	-8.2	
Mid Ch								
1732.50	13.47	V	4.3	9.4	18.53	30.0	-11.5	
1732.50	17.37	H	4.3	9.4	22.43	30.0	-7.6	
High Ch								
1752.50	11.21	V	4.4	9.5	16.31	30.0	-13.7	
1752.50	16.15	H	4.4	9.5	21.25	30.0	-8.7	

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Band 4

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 4 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	10.47	V	4.3	9.3	15.49	30.0	-14.5	
1712.50	15.15	H	4.3	9.3	20.17	30.0	-9.8	
Mid Ch								
1732.50	11.76	V	4.3	9.4	16.82	30.0	-13.2	
1732.50	15.44	H	4.3	9.4	20.50	30.0	-9.5	
High Ch								
1752.50	10.13	V	4.4	9.5	15.23	30.0	-14.8	
1752.50	14.80	H	4.4	9.5	19.90	30.0	-10.1	

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Band 4

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 4 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	12.26	V	4.3	9.3	17.27	30.0	-12.7	
1711.50	16.86	H	4.3	9.3	21.87	30.0	-8.1	
Mid Ch								
1732.50	13.80	V	4.3	9.4	18.86	30.0	-11.1	
1732.50	17.33	H	4.3	9.4	22.39	30.0	-7.6	
High Ch								
1753.50	12.12	V	4.4	9.5	17.22	30.0	-12.8	
1753.50	16.23	H	4.4	9.5	21.33	30.0	-8.7	

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Band 4

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 4 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	10.95	V	4.3	9.3	15.96	30.0	-14.0	
1711.50	15.36	H	4.3	9.3	20.37	30.0	-9.6	
Mid Ch								
1732.50	12.20	V	4.3	9.4	17.26	30.0	-12.7	
1732.50	15.52	H	4.3	9.4	20.58	30.0	-9.4	
High Ch								
1753.50	10.55	V	4.4	9.5	15.65	30.0	-14.4	
1753.50	14.70	H	4.4	9.5	19.80	30.0	-10.2	

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Band 4

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 4 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1710.70	12.38	V	4.3	9.3	17.39	30.0	-12.6	
1710.70	16.37	H	4.3	9.3	21.38	30.0	-8.6	
Mid Ch								
1732.50	13.96	V	4.3	9.4	19.02	30.0	-11.0	
1732.50	17.26	H	4.3	9.4	22.32	30.0	-7.7	
High Ch								
1754.30	12.24	V	4.4	9.5	17.34	30.0	-12.7	
1754.30	16.29	H	4.4	9.5	21.39	30.0	-8.6	

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Band 4

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 4 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1710.70	10.95	V	4.3	9.3	15.96	30.0	-14.0	
1710.70	15.04	H	4.3	9.3	20.05	30.0	-10.0	
Mid Ch								
1732.50	12.38	V	4.3	9.4	17.44	30.0	-12.6	
1732.50	15.66	H	4.3	9.4	20.72	30.0	-9.3	
High Ch								
1754.30	10.43	V	4.4	9.5	15.53	30.0	-14.5	
1754.30	14.83	H	4.4	9.5	19.93	30.0	-10.1	

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LTE Band 5

LTE Band 5 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-16
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 5 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	23.62	V	3.0	-1.5	19.14	38.5	-19.4	
829.00	13.48	H	3.0	-1.5	9.00	38.5	-29.5	
Mid Ch								
836.50	24.12	V	3.0	-1.4	19.66	38.5	-18.8	
836.50	14.33	H	3.0	-1.4	9.86	38.5	-28.6	
High Ch								
844.00	22.97	V	3.1	-1.4	18.52	38.5	-20.0	
844.00	13.74	H	3.1	-1.4	9.29	38.5	-29.2	

LTE Band 5 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-16
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 5 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	20.93	V	3.0	-1.5	16.45	38.5	-22.0	
829.00	11.92	H	3.0	-1.5	7.44	38.5	-31.1	
Mid Ch								
836.50	21.67	V	3.0	-1.4	17.21	38.5	-21.3	
836.50	12.09	H	3.0	-1.4	7.62	38.5	-30.9	
High Ch								
844.00	20.77	V	3.1	-1.4	16.32	38.5	-22.2	
844.00	11.49	H	3.1	-1.4	7.04	38.5	-31.5	

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Band 5

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-16
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 5 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	23.75	V	3.0	-1.5	19.26	38.5	-19.2	
826.50	13.53	H	3.0	-1.5	9.05	38.5	-29.5	
Mid Ch								
836.50	24.41	V	3.0	-1.4	19.95	38.5	-18.6	
836.50	14.80	H	3.0	-1.4	10.33	38.5	-28.2	
High Ch								
846.50	24.53	V	3.1	-1.4	20.08	38.5	-18.4	
846.50	14.70	H	3.1	-1.4	10.25	38.5	-28.2	

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Band 5

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-16
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 5 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	20.97	V	3.0	-1.5	16.48	38.5	-22.0	
826.50	10.81	H	3.0	-1.5	6.33	38.5	-32.2	
Mid Ch								
836.50	21.68	V	3.0	-1.4	17.22	38.5	-21.3	
836.50	12.77	H	3.0	-1.4	8.30	38.5	-30.2	
High Ch								
846.50	21.90	V	3.1	-1.4	17.45	38.5	-21.0	
846.50	12.60	H	3.1	-1.4	8.15	38.5	-30.3	

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Band 5

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-16
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
825.50	23.24	V	3.0	-1.5	18.76	38.5	-19.7	
825.50	13.91	H	3.0	-1.5	9.42	38.5	-29.1	
Mid Ch								
836.50	24.37	V	3.0	-1.4	19.91	38.5	-18.6	
836.50	14.34	H	3.0	-1.4	9.87	38.5	-28.6	
High Ch								
847.50	23.71	V	3.1	-1.4	19.27	38.5	-19.2	
847.50	14.60	H	3.1	-1.4	10.16	38.5	-28.3	

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Band 5

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-16
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
825.50	20.84	V	3.0	-1.5	16.36	38.5	-22.1	
825.50	11.58	H	3.0	-1.5	7.09	38.5	-31.4	
Mid Ch								
836.50	21.73	V	3.0	-1.4	17.27	38.5	-21.2	
836.50	13.50	H	3.0	-1.4	9.03	38.5	-29.5	
High Ch								
847.50	21.15	V	3.1	-1.4	16.71	38.5	-21.8	
847.50	11.82	H	3.1	-1.4	7.38	38.5	-31.1	

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Band 5

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-16
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	23.81	V	3.0	-1.5	19.33	38.5	-19.2	
824.70	13.28	H	3.0	-1.5	8.79	38.5	-29.7	
Mid Ch								
836.50	24.68	V	3.0	-1.4	20.22	38.5	-18.3	
836.50	15.40	H	3.0	-1.4	10.93	38.5	-27.6	
High Ch								
848.30	23.42	V	3.1	-1.4	18.98	38.5	-19.5	
848.30	14.87	H	3.1	-1.4	10.43	38.5	-28.1	

LTE

Band 5

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-16
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	20.62	V	3.0	-1.5	16.14	38.5	-22.4	
824.70	10.89	H	3.0	-1.5	6.40	38.5	-32.1	
Mid Ch								
836.50	21.93	V	3.0	-1.4	17.47	38.5	-21.0	
836.50	11.98	H	3.0	-1.4	7.51	38.5	-31.0	
High Ch								
848.30	20.82	V	3.1	-1.4	16.38	38.5	-22.1	
848.30	11.83	H	3.1	-1.4	7.39	38.5	-31.1	

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LTE Band 7

LTE Band 7 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-14
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 7 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2510.00	15.32	V	5.3	10.1	20.14	33.0	-12.9	
2510.00	18.30	H	5.3	10.1	23.12	33.0	-9.9	
Mid Ch								
2535.00	15.07	V	5.3	10.0	19.83	33.0	-13.2	
2535.00	17.68	H	5.3	10.0	22.45	33.0	-10.6	
High Ch								
2560.00	14.85	V	5.3	10.0	19.56	33.0	-13.4	
2560.00	18.08	H	5.3	10.0	22.78	33.0	-10.2	

LTE Band 7 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-14
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 7 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2510.00	13.25	V	5.3	10.1	18.07	33.0	-14.9	
2510.00	16.29	H	5.3	10.1	21.11	33.0	-11.9	
Mid Ch								
2535.00	12.83	V	5.3	10.0	17.59	33.0	-15.4	
2535.00	16.01	H	5.3	10.0	20.78	33.0	-12.2	
High Ch								
2560.00	12.83	V	5.3	10.0	17.54	33.0	-15.5	
2560.00	15.71	H	5.3	10.0	20.41	33.0	-12.6	

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LTE

Band 7

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-14
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 7 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2507.50	14.83	V	5.3	10.1	19.66	33.0	-13.3	
2507.50	17.94	H	5.3	10.1	22.77	33.0	-10.2	
Mid Ch								
2535.00	14.79	V	5.3	10.0	19.55	33.0	-13.4	
2535.00	17.78	H	5.3	10.0	22.55	33.0	-10.5	
High Ch								
2562.50	14.22	V	5.3	10.0	18.92	33.0	-14.1	
2562.50	17.61	H	5.3	10.0	22.32	33.0	-10.7	

LTE

Band 7

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-14
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 7 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2507.50	12.57	V	5.3	10.1	17.40	33.0	-15.6	
2507.50	15.85	H	5.3	10.1	20.68	33.0	-12.3	
Mid Ch								
2535.00	12.82	V	5.3	10.0	17.58	33.0	-15.4	
2535.00	15.83	H	5.3	10.0	20.60	33.0	-12.4	
High Ch								
2562.50	11.94	V	5.3	10.0	16.64	33.0	-16.4	
2562.50	15.46	H	5.3	10.0	20.17	33.0	-12.8	

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Band 7

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-14
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 7 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2505.00	15.15	V	5.2	10.1	19.98	33.0	-13.0	
2505.00	18.22	H	5.2	10.1	23.05	33.0	-9.9	
Mid Ch								
2535.00	14.63	V	5.3	10.0	19.39	33.0	-13.6	
2535.00	17.90	H	5.3	10.0	22.67	33.0	-10.3	
High Ch								
2565.00	14.55	V	5.3	10.0	19.25	33.0	-13.7	
2565.00	17.76	H	5.3	10.0	22.46	33.0	-10.5	

LTE

Band 7

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-14
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 7 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2505.00	13.25	V	5.2	10.1	18.08	33.0	-14.9	
2505.00	16.26	H	5.2	10.1	21.09	33.0	-11.9	
Mid Ch								
2535.00	12.66	V	5.3	10.0	17.42	33.0	-15.6	
2535.00	16.11	H	5.3	10.0	20.88	33.0	-12.1	
High Ch								
2565.00	12.50	V	5.3	10.0	17.20	33.0	-15.8	
2565.00	15.80	H	5.3	10.0	20.50	33.0	-12.5	

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Band 7

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-14
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 7 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2502.50	15.25	V	5.2	10.1	20.09	33.0	-12.9	
2502.50	18.01	H	5.2	10.1	22.85	33.0	-10.2	
Mid Ch								
2535.00	14.59	V	5.3	10.0	19.35	33.0	-13.6	
2535.00	17.81	H	5.3	10.0	22.58	33.0	-10.4	
High Ch								
2567.50	14.15	V	5.3	10.0	18.84	33.0	-14.2	
2567.50	17.54	H	5.3	10.0	22.23	33.0	-10.8	

LTE

Band 7

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-14
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 7 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2502.50	12.94	V	5.2	10.1	17.78	33.0	-15.2	
2502.50	15.87	H	5.2	10.1	20.71	33.0	-12.3	
Mid Ch								
2535.00	12.29	V	5.3	10.0	17.05	33.0	-15.9	
2535.00	15.46	H	5.3	10.0	20.23	33.0	-12.8	
High Ch								
2567.50	12.11	V	5.3	10.0	16.80	33.0	-16.2	
2567.50	15.53	H	5.3	10.0	20.22	33.0	-12.8	

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LTE Band 12

LTE Band 12 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-17
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
704.00	11.77	V	2.8	-1.6	7.39	34.8	-27.4	
704.00	19.72	H	2.8	-1.6	15.33	34.8	-19.5	
Mid Ch								
707.50	12.04	V	2.8	-1.6	7.66	34.8	-27.1	
707.50	20.61	H	2.8	-1.6	16.23	34.8	-18.6	
High Ch								
711.00	12.44	V	2.8	-1.6	8.04	34.8	-26.8	
711.00	20.27	H	2.8	-1.6	15.87	34.8	-18.9	

LTE Band 12 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-17
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 12 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
704.00	9.19	V	2.8	-1.6	4.81	34.8	-30.0	
704.00	17.69	H	2.8	-1.6	13.30	34.8	-21.5	
Mid Ch								
707.50	11.24	V	2.8	-1.6	6.86	34.8	-27.9	
707.50	18.10	H	2.8	-1.6	13.72	34.8	-21.1	
High Ch								
711.00	10.07	V	2.8	-1.6	5.67	34.8	-29.1	
711.00	18.03	H	2.8	-1.6	13.63	34.8	-21.2	

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Band 12

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-17
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 12 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
701.50	11.40	V	2.8	-1.6	7.02	34.8	-27.8	
701.50	19.65	H	2.8	-1.6	15.27	34.8	-19.5	
Mid Ch								
707.50	12.23	V	2.8	-1.6	7.85	34.8	-27.0	
707.50	20.33	H	2.8	-1.6	15.95	34.8	-18.9	
High Ch								
713.50	12.86	V	2.8	-1.6	8.46	34.8	-26.3	
713.50	20.40	H	2.8	-1.6	16.01	34.8	-18.8	

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Band 12

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-17
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 12 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
701.50	9.24	V	2.8	-1.6	4.86	34.8	-29.9	
701.50	17.97	H	2.8	-1.6	13.59	34.8	-21.2	
Mid Ch								
707.50	10.06	V	2.8	-1.6	5.68	34.8	-29.1	
707.50	17.89	H	2.8	-1.6	13.51	34.8	-21.3	
High Ch								
713.50	9.92	V	2.8	-1.6	5.52	34.8	-29.3	
713.50	18.42	H	2.8	-1.6	14.03	34.8	-20.8	

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Band 12

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-17
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 12 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
700.50	10.85	V	2.8	-1.6	6.47	34.8	-28.3	
700.50	19.73	H	2.8	-1.6	15.35	34.8	-19.5	
Mid Ch								
707.50	11.62	V	2.8	-1.6	7.24	34.8	-27.6	
707.50	20.24	H	2.8	-1.6	15.86	34.8	-18.9	
High Ch								
714.50	12.30	V	2.8	-1.6	7.90	34.8	-26.9	
714.50	20.49	H	2.8	-1.6	16.09	34.8	-18.7	

LTE

Band 12

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-17
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 12 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
700.50	8.76	V	2.8	-1.6	4.38	34.8	-30.4	
700.50	17.26	H	2.8	-1.6	12.88	34.8	-21.9	
Mid Ch								
707.50	10.24	V	2.8	-1.6	5.86	34.8	-28.9	
707.50	18.40	H	2.8	-1.6	14.02	34.8	-20.8	
High Ch								
714.50	10.08	V	2.8	-1.6	5.68	34.8	-29.1	
714.50	18.34	H	2.8	-1.6	13.94	34.8	-20.9	

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Band 12

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-17
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
699.70	11.63	V	2.8	-1.6	7.25	34.8	-27.6	
699.70	19.52	H	2.8	-1.6	15.15	34.8	-19.7	
Mid Ch								
707.50	11.99	V	2.8	-1.6	7.61	34.8	-27.2	
707.50	20.18	H	2.8	-1.6	15.80	34.8	-19.0	
High Ch								
715.30	13.08	V	2.8	-1.6	8.68	34.8	-26.1	
715.30	20.63	H	2.8	-1.6	16.23	34.8	-18.6	

LTE

Band 12

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-17
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
699.70	9.46	V	2.8	-1.6	5.08	34.8	-29.7	
699.70	17.17	H	2.8	-1.6	12.80	34.8	-22.0	
Mid Ch								
707.50	10.10	V	2.8	-1.6	5.72	34.8	-29.1	
707.50	18.01	H	2.8	-1.6	13.63	34.8	-21.2	
High Ch								
715.30	10.28	V	2.8	-1.6	5.88	34.8	-28.9	
715.30	18.34	H	2.8	-1.6	13.94	34.8	-20.9	

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LTE Band 13

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Band 13

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-20
Test Engineer: 45585
Configuration: EUT
Location: Chamber 2
Mode: LTE_QPSK Band 13 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
782.00	23.21	V	2.9	-1.6	18.71	34.8	-16.1	
782.00	10.30	H	2.9	-1.6	5.80	34.8	-29.0	

LTE

Band 13

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-20
Test Engineer: 45585
Configuration: EUT
Location: Chamber 2
Mode: LTE_16QAM Band 13 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
782.00	21.00	V	2.9	-1.6	16.50	34.8	-18.3	
782.00	8.40	H	2.9	-1.6	3.90	34.8	-30.9	

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LTE

Band 13

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-20
Test Engineer: 45585
Configuration: EUT
Location: Chamber 2
Mode: LTE_QPSK Band 13 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
779.50	24.11	V	2.9	-1.6	19.61	34.8	-15.2	
779.50	10.49	H	2.9	-1.6	5.99	34.8	-28.8	
Mid Ch								
782.00	23.34	V	2.9	-1.6	18.84	34.8	-15.9	
782.00	10.36	H	2.9	-1.6	5.86	34.8	-28.9	
High Ch								
784.50	14.97	V	2.9	-1.6	10.47	34.8	-24.3	
784.50	10.50	H	2.9	-1.6	5.99	34.8	-28.8	

LTE

Band 13

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-20
Test Engineer: 45585
Configuration: EUT
Location: Chamber 2
Mode: LTE_16QAM Band 13 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
779.50	22.13	V	2.9	-1.6	17.63	34.8	-17.1	
779.50	8.70	H	2.9	-1.6	4.20	34.8	-30.6	
Mid Ch								
782.00	21.05	V	2.9	-1.6	16.55	34.8	-18.2	
782.00	8.75	H	2.9	-1.6	4.25	34.8	-30.5	
High Ch								
784.50	21.56	V	2.9	-1.6	17.06	34.8	-17.7	
784.50	8.94	H	2.9	-1.6	4.43	34.8	-30.3	

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LTE Band 25

LTE Band 25 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 25 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	15.00	V	4.5	9.3	19.84	33.0	-13.2	
1860.00	8.45	H	4.5	9.3	13.29	33.0	-19.7	
Mid Ch								
1882.50	17.22	V	4.5	9.2	21.87	33.0	-11.1	
1882.50	10.27	H	4.5	9.2	14.91	33.0	-18.1	
High Ch								
1905.00	17.20	V	4.6	9.0	21.62	33.0	-11.4	
1905.00	10.44	H	4.6	9.0	14.87	33.0	-18.1	

LTE Band 25 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 25 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	13.78	V	4.5	9.3	18.62	33.0	-14.4	
1860.00	7.24	H	4.5	9.3	12.08	33.0	-20.9	
Mid Ch								
1882.50	16.22	V	4.5	9.2	20.87	33.0	-12.1	
1882.50	9.12	H	4.5	9.2	13.76	33.0	-19.2	
High Ch								
1905.00	16.13	V	4.6	9.0	20.55	33.0	-12.4	
1905.00	9.45	H	4.6	9.0	13.88	33.0	-19.1	

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Band 25

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 25 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	14.66	V	4.5	9.4	19.52	33.0	-13.5	
1857.50	8.46	H	4.5	9.4	13.32	33.0	-19.7	
Mid Ch								
1882.50	17.34	V	4.5	9.2	21.99	33.0	-11.0	
1882.50	9.38	H	4.5	9.2	14.02	33.0	-19.0	
High Ch								
1907.50	16.60	V	4.6	9.0	20.99	33.0	-12.0	
1907.50	9.08	H	4.6	9.0	13.47	33.0	-19.5	

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Band 25

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 25 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	14.06	V	4.5	9.4	18.92	33.0	-14.1	
1857.50	6.88	H	4.5	9.4	11.74	33.0	-21.3	
Mid Ch								
1882.50	16.25	V	4.5	9.2	20.90	33.0	-12.1	
1882.50	8.52	H	4.5	9.2	13.16	33.0	-19.8	
High Ch								
1907.50	15.51	V	4.6	9.0	19.90	33.0	-13.1	
1907.50	8.81	H	4.6	9.0	13.20	33.0	-19.8	

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Band 25

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 25 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	14.54	V	4.5	9.4	19.42	33.0	-13.6	
1855.00	7.54	H	4.5	9.4	12.42	33.0	-20.6	
Mid Ch								
1882.50	17.29	V	4.5	9.2	21.94	33.0	-11.1	
1882.50	9.45	H	4.5	9.2	14.09	33.0	-18.9	
High Ch								
1910.00	16.44	V	4.6	8.9	20.79	33.0	-12.2	
1910.00	9.19	H	4.6	8.9	13.54	33.0	-19.5	

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Band 25

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 25 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	13.77	V	4.5	9.4	18.65	33.0	-14.4	
1855.00	6.42	H	4.5	9.4	11.30	33.0	-21.7	
Mid Ch								
1882.50	16.28	V	4.5	9.2	20.93	33.0	-12.1	
1882.50	8.41	H	4.5	9.2	13.05	33.0	-19.9	
High Ch								
1910.00	15.22	V	4.6	8.9	19.57	33.0	-13.4	
1910.00	7.89	H	4.6	8.9	12.24	33.0	-20.8	

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Band 25

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 25 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	14.46	V	4.5	9.4	19.36	33.0	-13.6	
1852.50	8.41	H	4.5	9.4	13.31	33.0	-19.7	
Mid Ch								
1882.50	17.07	V	4.5	9.2	21.72	33.0	-11.3	
1882.50	9.92	H	4.5	9.2	14.56	33.0	-18.4	
High Ch								
1912.50	16.06	V	4.6	8.9	20.38	33.0	-12.6	
1912.50	8.77	H	4.6	8.9	13.09	33.0	-19.9	

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Band 25

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 25 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	12.95	V	4.5	9.4	17.85	33.0	-15.2	
1852.50	6.11	H	4.5	9.4	11.01	33.0	-22.0	
Mid Ch								
1882.50	16.03	V	4.5	9.2	20.68	33.0	-12.3	
1882.50	8.72	H	4.5	9.2	13.36	33.0	-19.6	
High Ch								
1912.50	14.96	V	4.6	8.9	19.28	33.0	-13.7	
1912.50	8.25	H	4.6	8.9	12.57	33.0	-20.4	

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Band 25

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 25 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	14.21	V	4.5	9.4	19.12	33.0	-13.9	
1851.50	7.78	H	4.5	9.4	12.69	33.0	-20.3	
Mid Ch								
1882.50	17.42	V	4.5	9.2	22.07	33.0	-10.9	
1882.50	9.57	H	4.5	9.2	14.21	33.0	-18.8	
High Ch								
1913.50	16.30	V	4.6	8.9	20.61	33.0	-12.4	
1913.50	8.72	H	4.6	8.9	13.03	33.0	-20.0	

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Band 25

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 25 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	13.52	V	4.5	9.4	18.43	33.0	-14.6	
1851.50	7.21	H	4.5	9.4	12.12	33.0	-20.9	
Mid Ch								
1882.50	16.24	V	4.5	9.2	20.89	33.0	-12.1	
1882.50	8.47	H	4.5	9.2	13.11	33.0	-19.9	
High Ch								
1913.50	15.17	V	4.6	8.9	19.48	33.0	-13.5	
1913.50	7.73	H	4.6	8.9	12.04	33.0	-21.0	

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Band 25

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 25 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	14.21	V	4.5	9.4	19.13	33.0	-13.9	
1850.70	7.92	H	4.5	9.4	12.84	33.0	-20.2	
Mid Ch								
1882.50	17.20	V	4.5	9.2	21.85	33.0	-11.2	
1882.50	8.66	H	4.5	9.2	13.30	33.0	-19.7	
High Ch								
1914.30	16.25	V	4.6	8.9	20.55	33.0	-12.5	
1914.30	9.44	H	4.6	8.9	13.74	33.0	-19.3	

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Band 25

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788725460
Date: 2018-11-13
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 25 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	13.16	V	4.5	9.4	18.08	33.0	-14.9	
1850.70	6.48	H	4.5	9.4	11.40	33.0	-21.6	
Mid Ch								
1882.50	15.62	V	4.5	9.2	20.27	33.0	-12.7	
1882.50	8.73	H	4.5	9.2	13.37	33.0	-19.6	
High Ch								
1914.30	15.07	V	4.6	8.9	19.37	33.0	-13.6	
1914.30	8.27	H	4.6	8.9	12.57	33.0	-20.4	

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