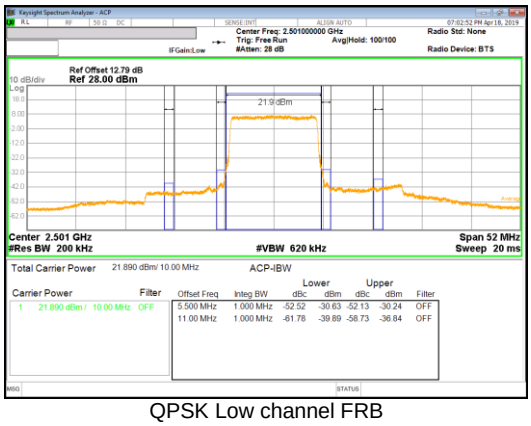
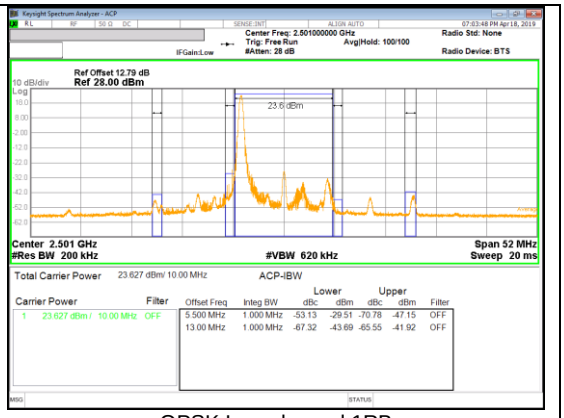
Band 41

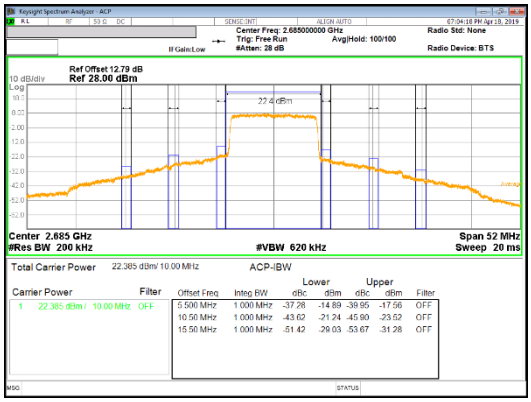
10MHz



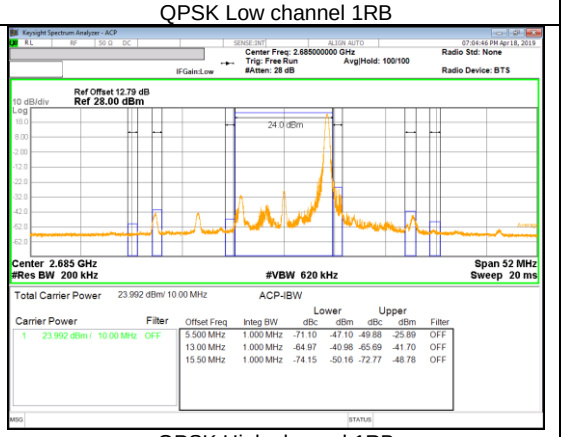
QPSK Low channel FRB



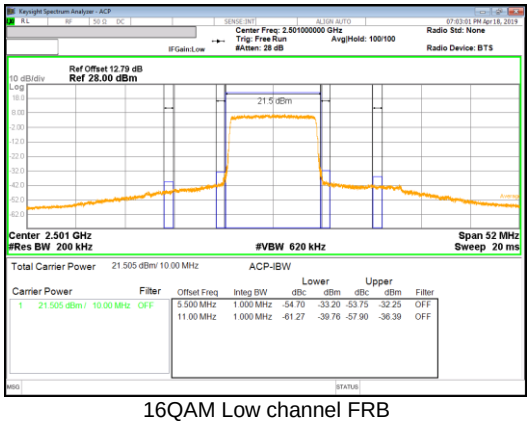
QPSK Low channel 1RB



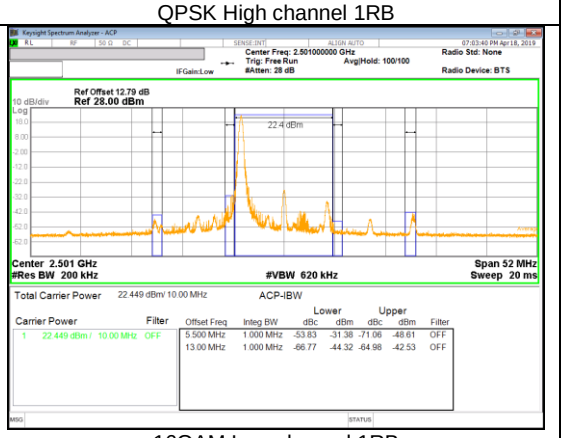
QPSK High channel FRB



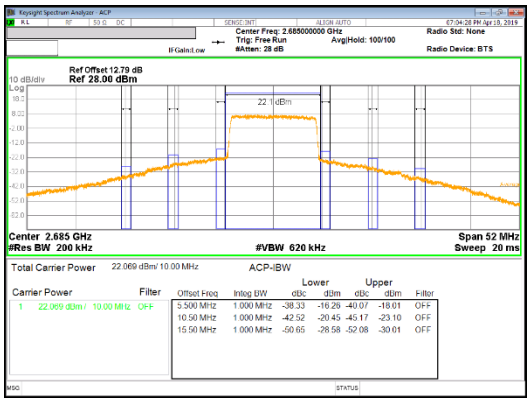
QPSK High channel 1RB



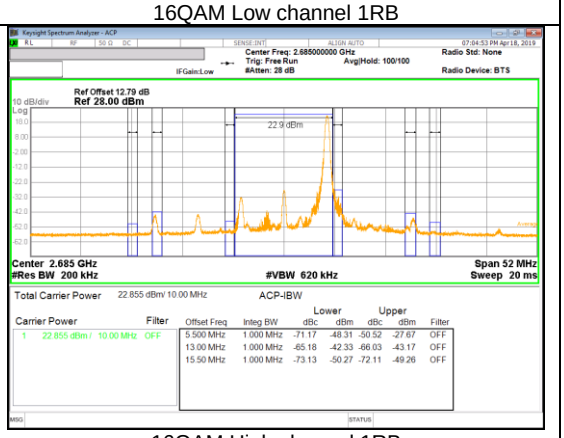
16QAM Low channel FRB



16QAM Low channel 1RB



16QAM High channel FRB



16QAM High channel 1RB

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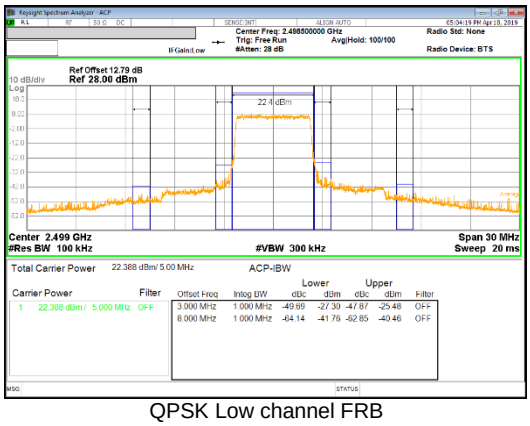
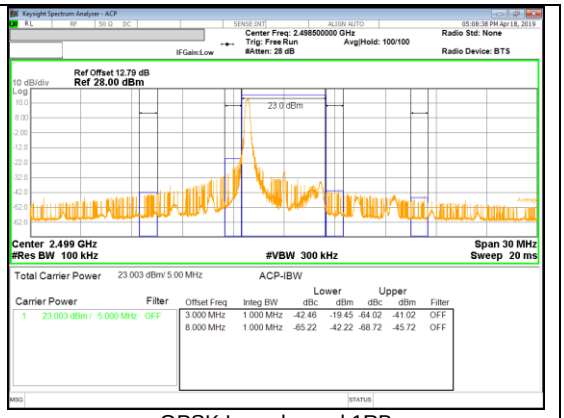
Band 41

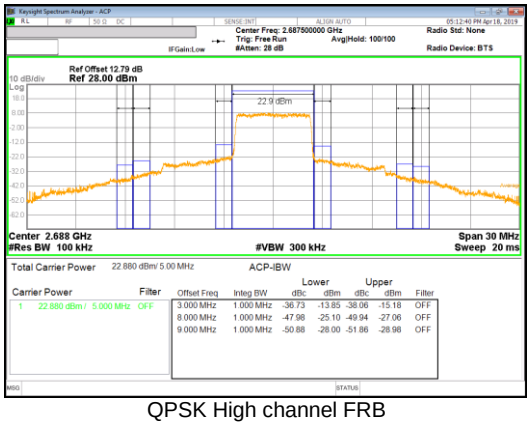
5MHz



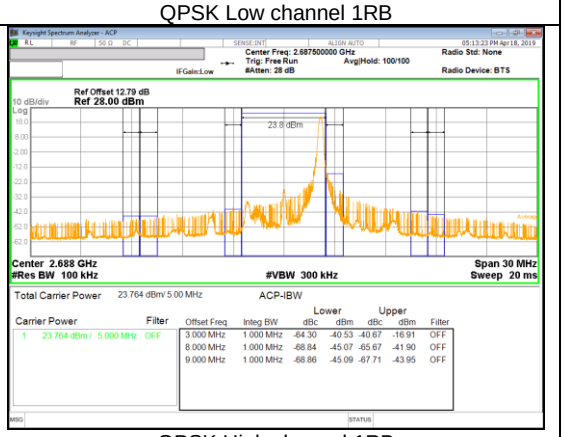
QPSK Low channel FRB



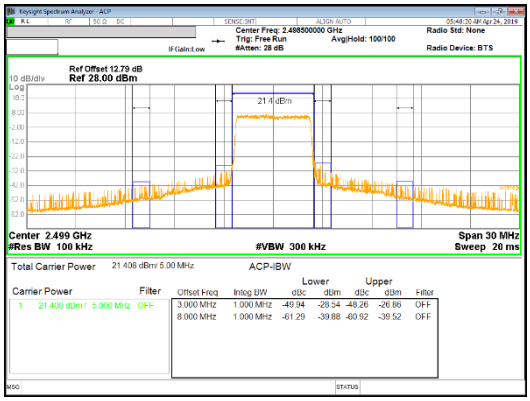
QPSK Low channel 1RB



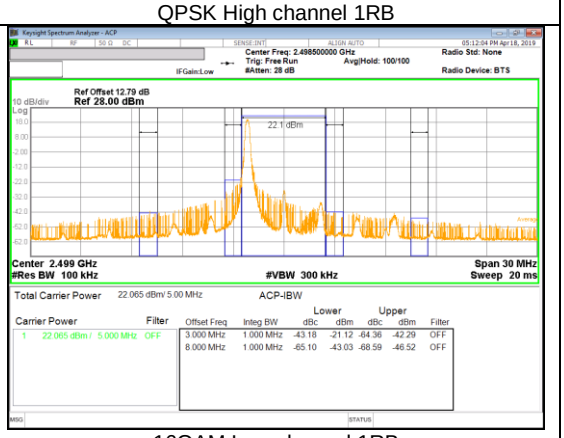
QPSK High channel FRB



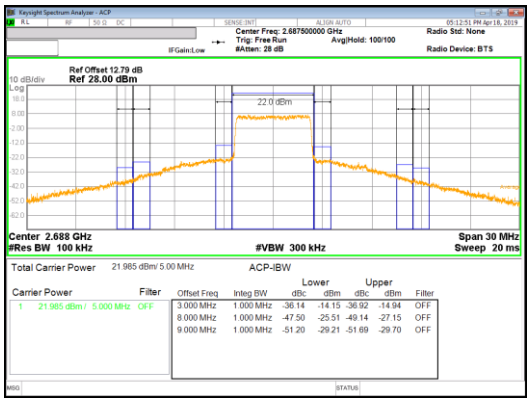
QPSK High channel 1RB



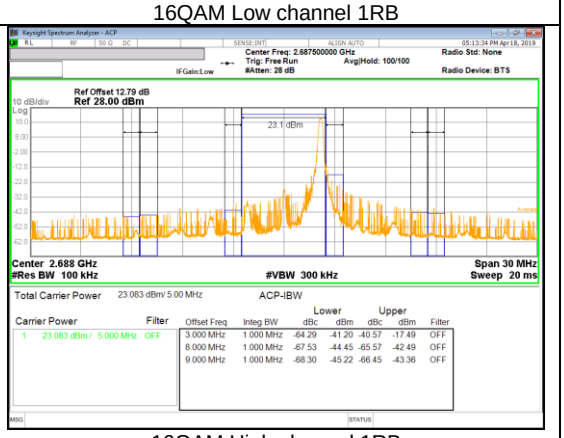
16QAM Low channel FRB



16QAM Low channel 1RB



16QAM High channel FRB



16QAM High channel 1RB

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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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10.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917 and §27.53

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

Part 27.53:
(c)(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB.

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

(h) The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB.

(m) (4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01
The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

a) Set the RBW = 100KHz for emission below 1GHz and 1MHz for emissions above 1GHz (Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)

b) Set VBW ≥ 3 × RBW;

c) Set span ≥ 1.5 times the OBW;

d) Sweep time = auto couple;

e) Detector = rms;

f) Ensure that the number of measurement points = Max (40001);

g) Trace mode = average(WCDMA, LTE), Maxhold(GSM, LTE Band41);

RESULTS

See the following pages.

NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

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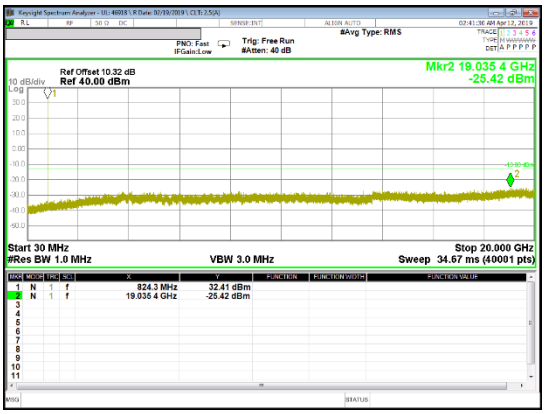
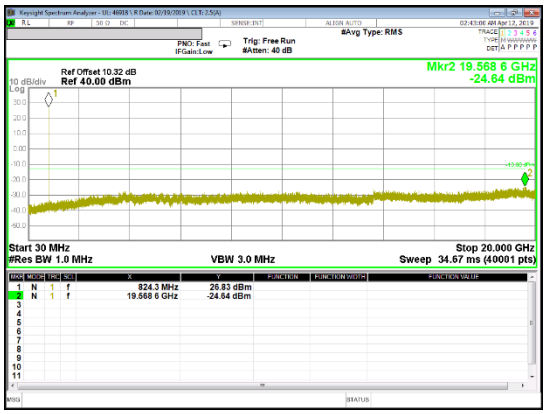
10.3.1.OUT OF BAND EMISSIONS RESULT

GSM 850

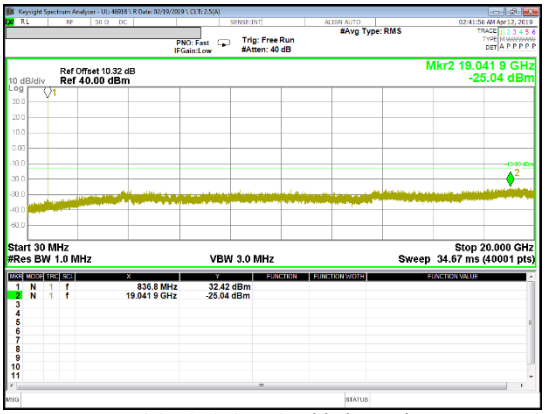
GSM 850



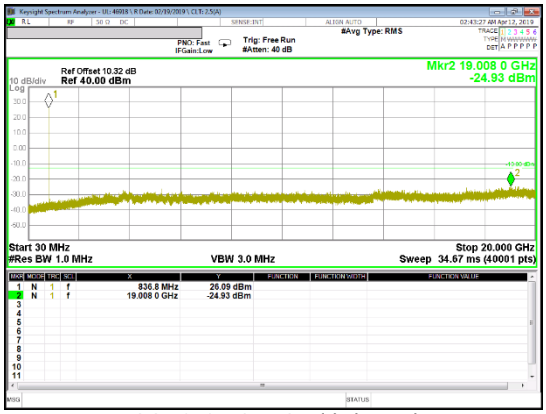
GSM850 GPRS Low channel



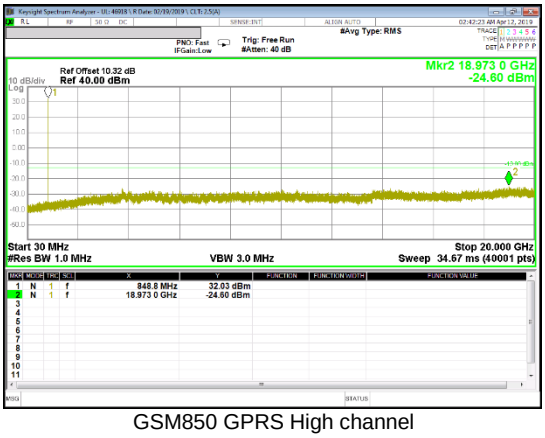
GSM850 EGPRS Low channel



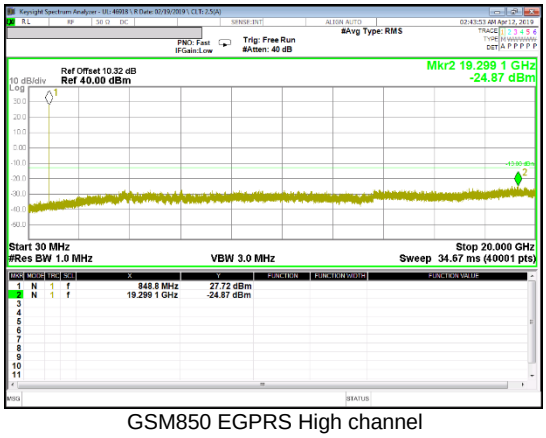
GSM850 GPRS Mid channel



GSM850 EGPRS Mid channel



GSM850 GPRS High channel



GSM850 EGPRS High channel

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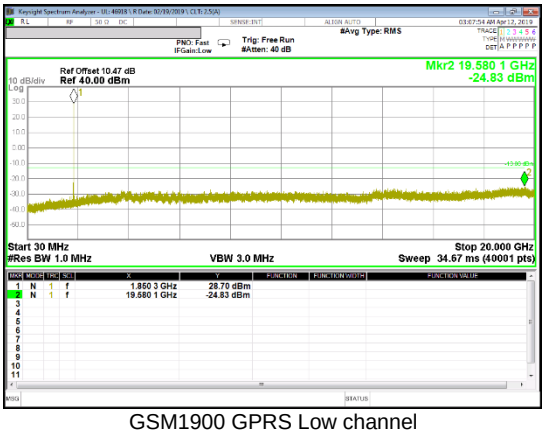
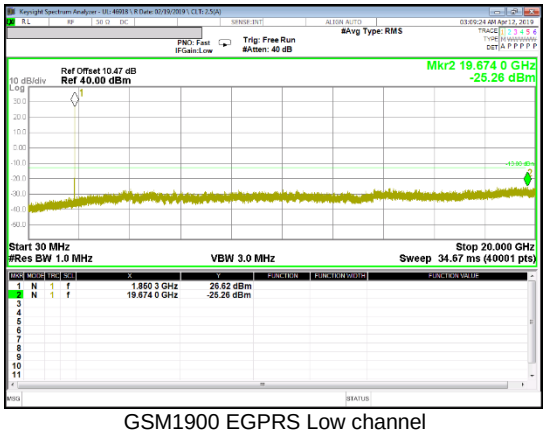
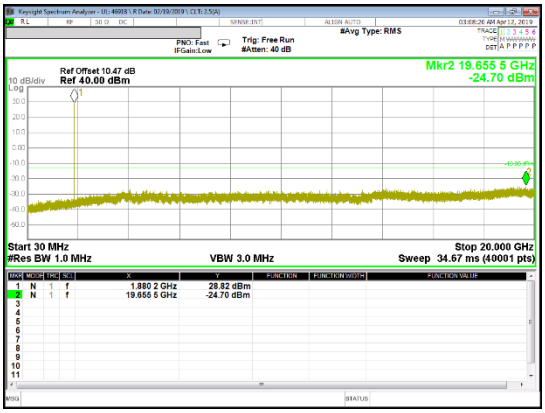
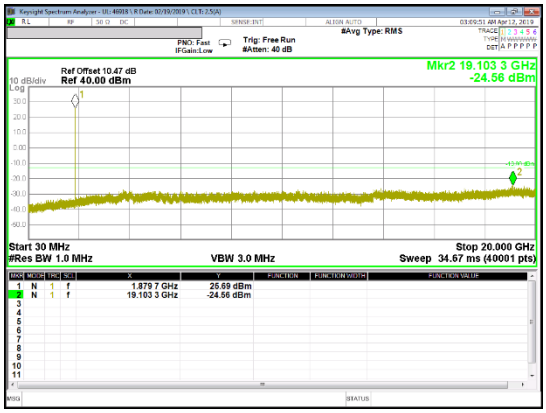
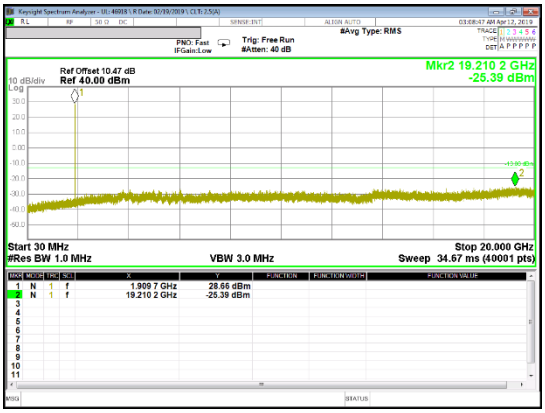
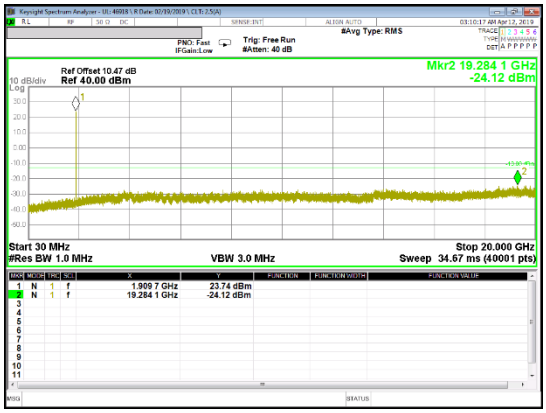
GSM 1900

GSM 1900	 GSM1900 GPRS Low channel	 GSM1900 EGPRS Low channel
	 GSM1900 GPRS Mid channel	 GSM1900 EGPRS Mid channel
	 GSM1900 GPRS High channel	 GSM1900 EGPRS High channel

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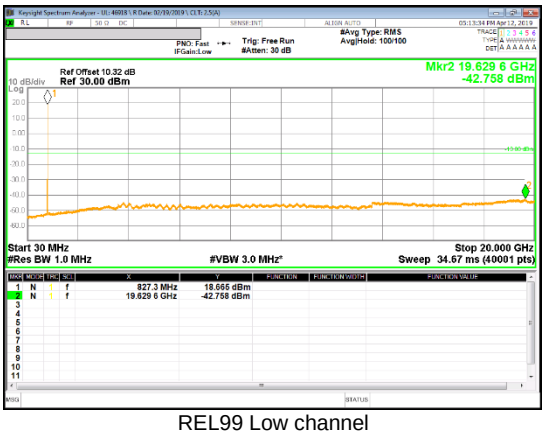
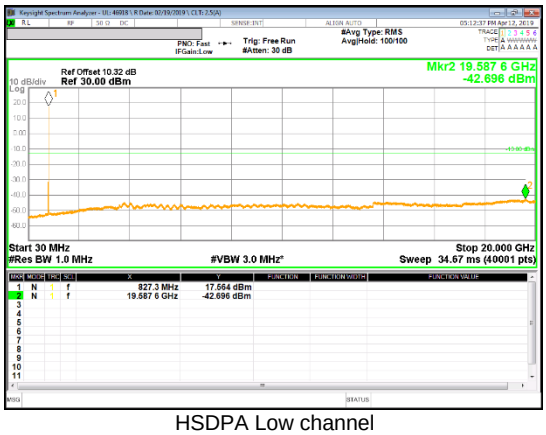
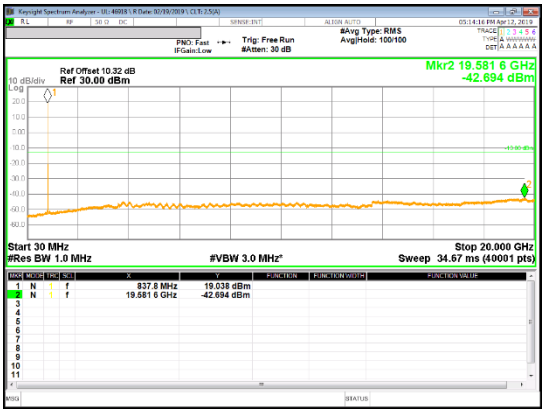
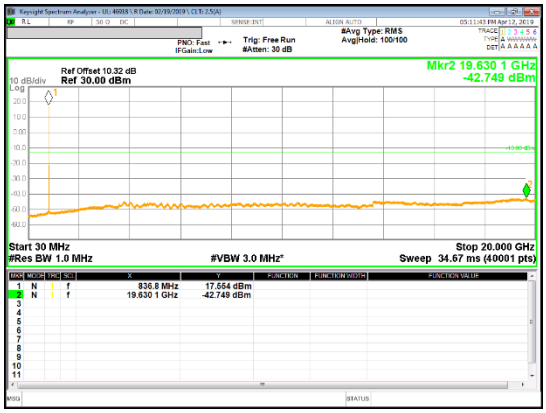
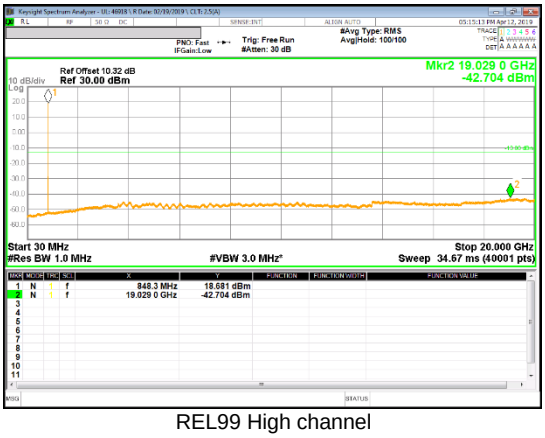
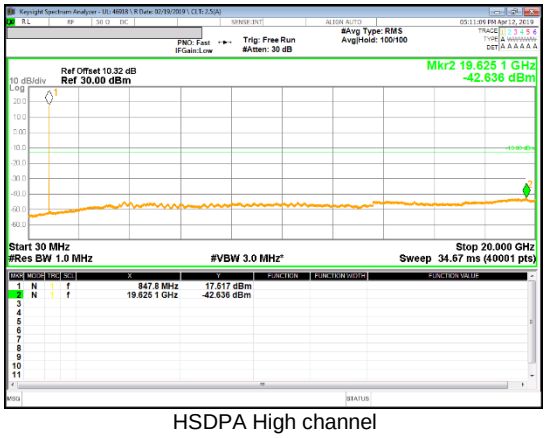
WCDMA Band 5

Band 5	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

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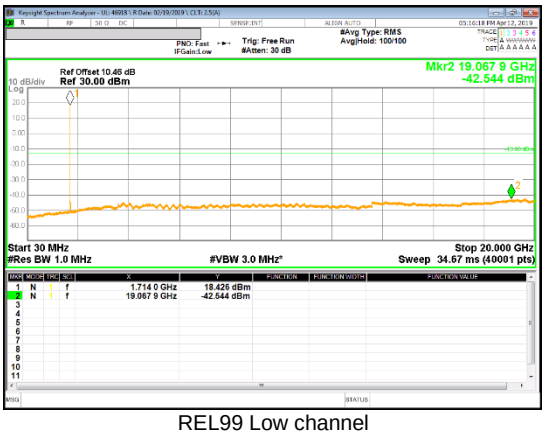
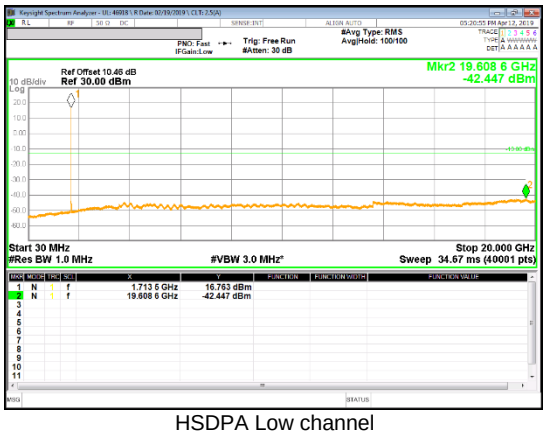
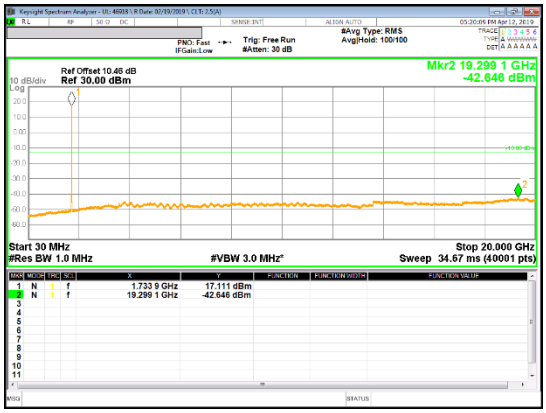
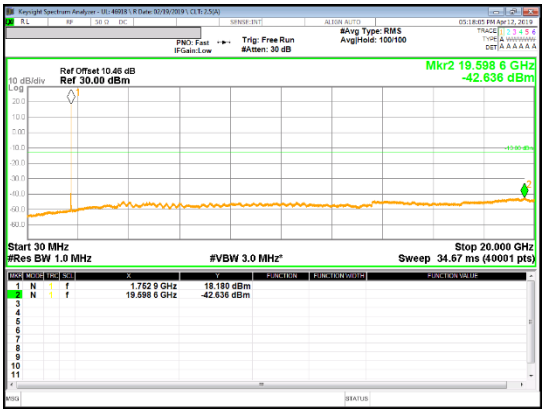
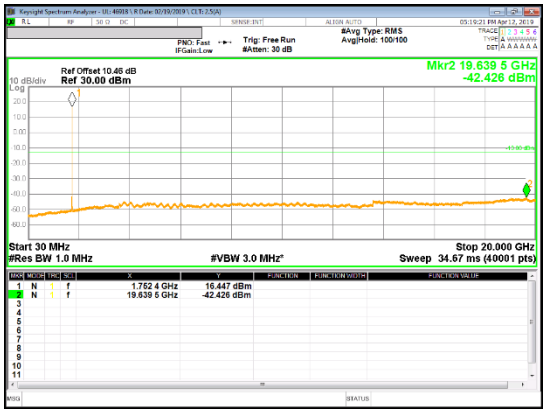
WCDMA Band 4

Band 4	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

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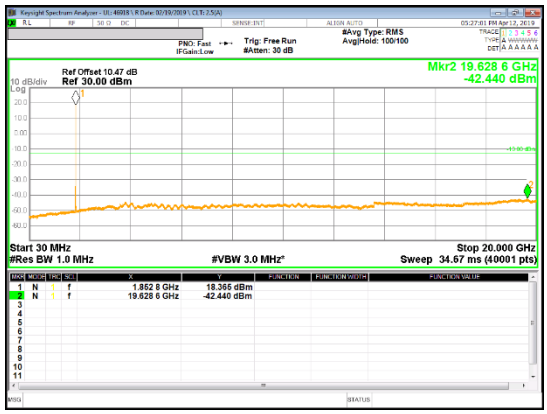
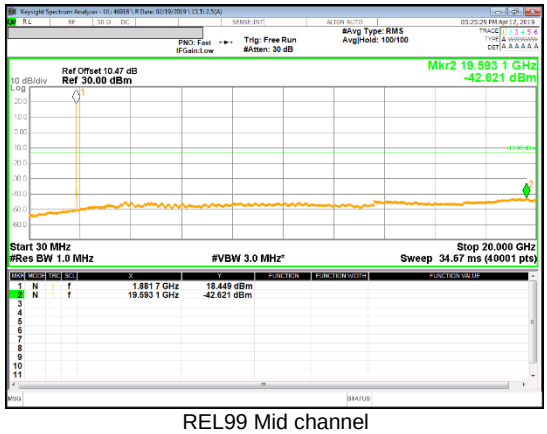
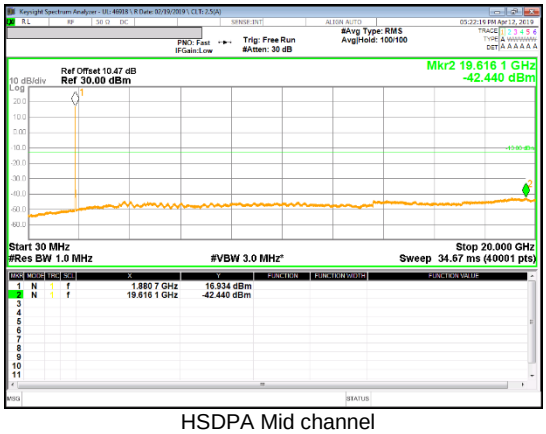
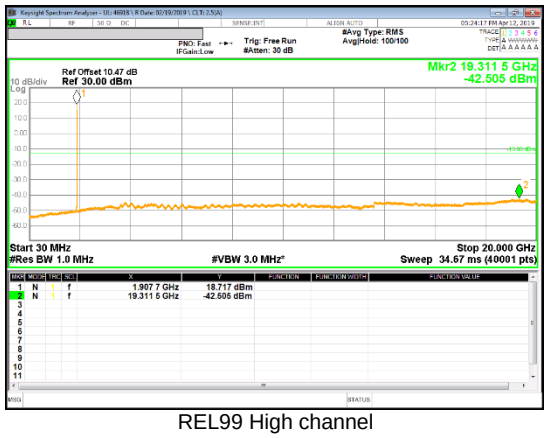
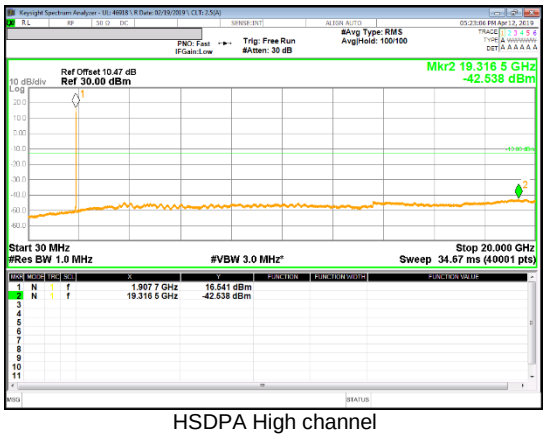
WCDMA Band 2

Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

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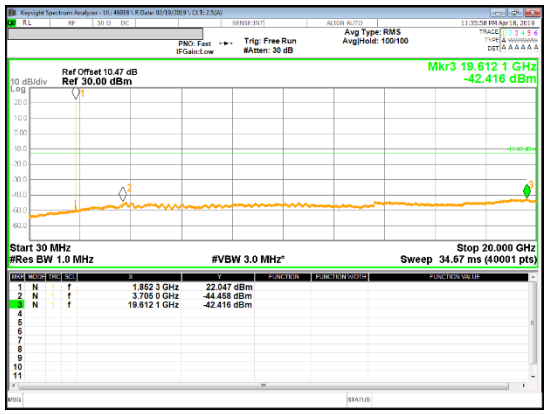
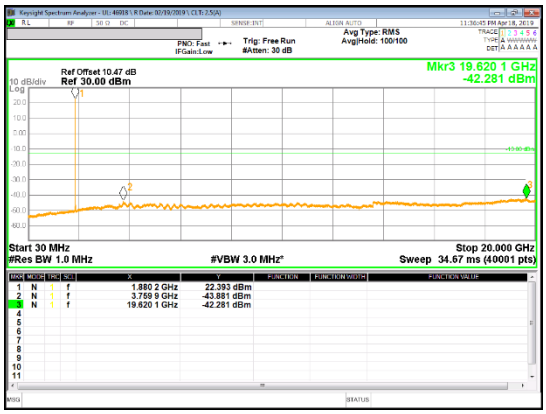
LTE Band 2

Band 2 5Hz	 QPSK Low channel	 QPSK Mid channel
	  QPSK High channel	

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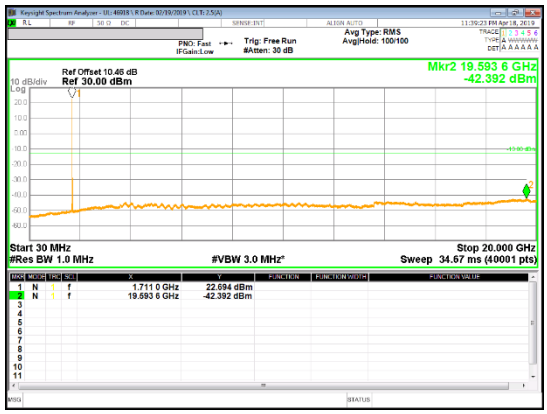
LTE Band 4

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

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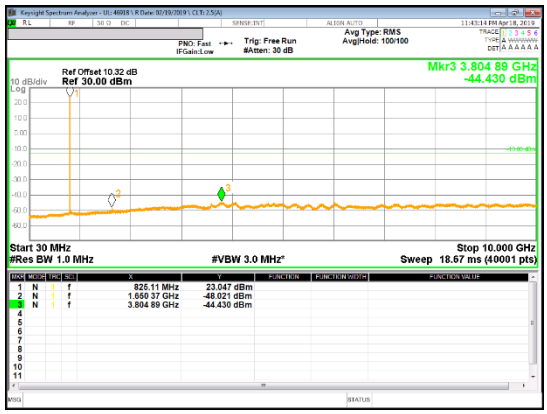
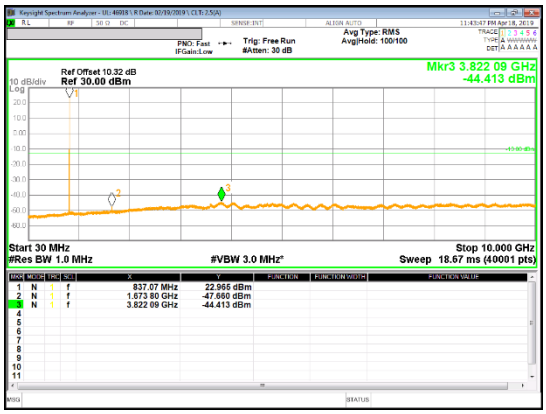
LTE Band 5

Band 5 1.4MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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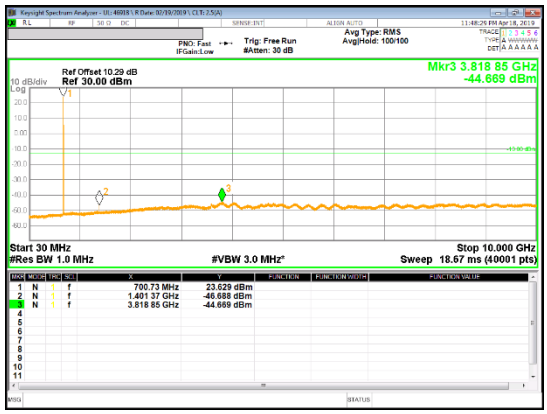
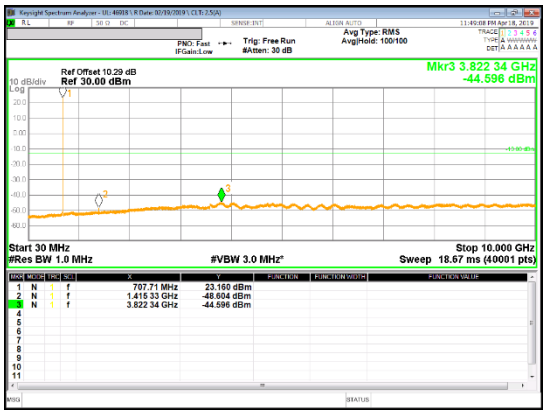
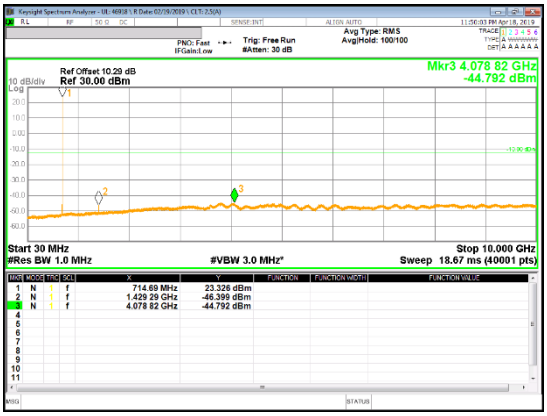
LTE Band 12

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

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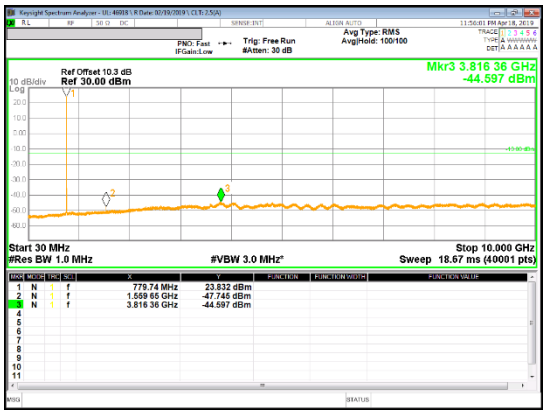
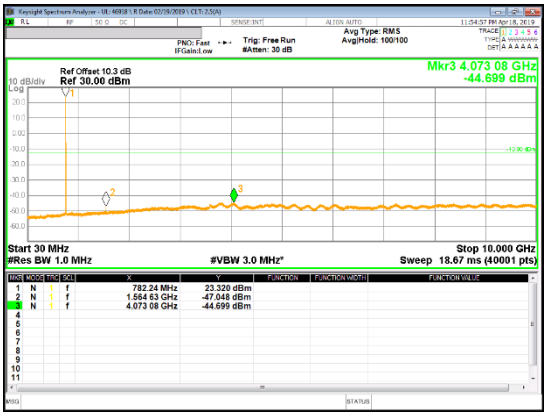
LTE Band 13

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

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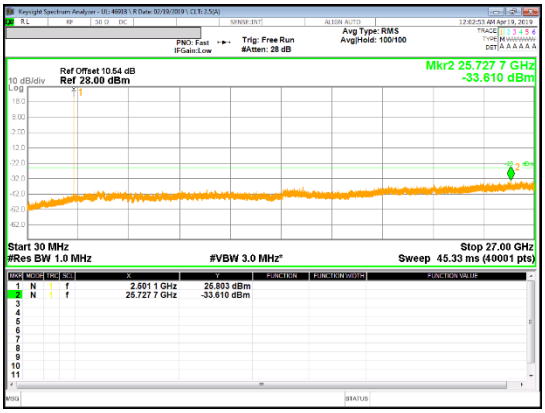
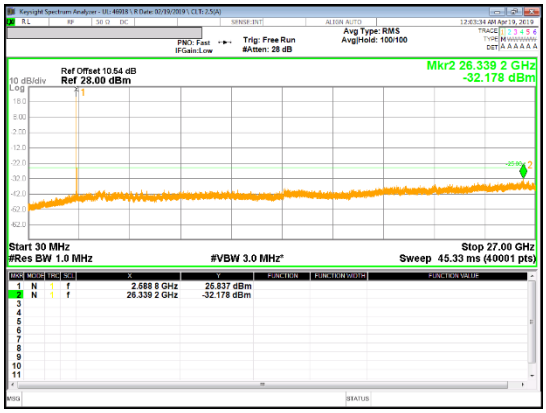
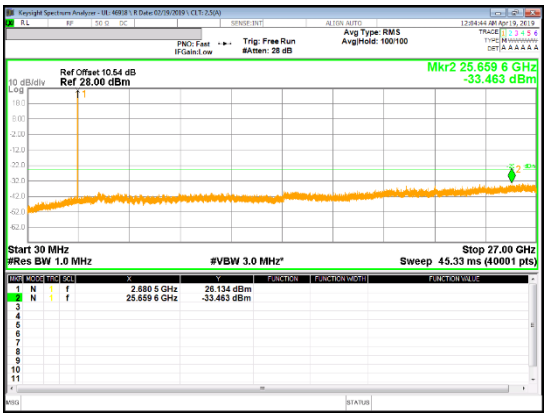
LTE Band 41

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

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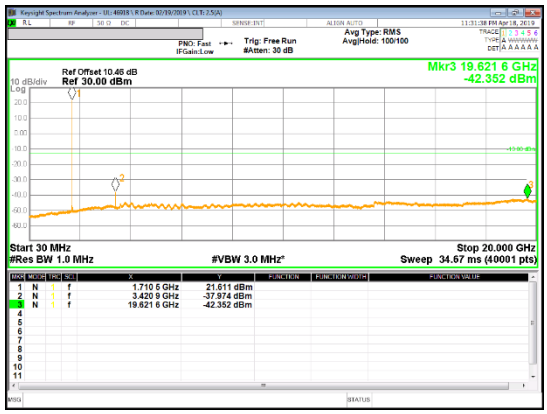
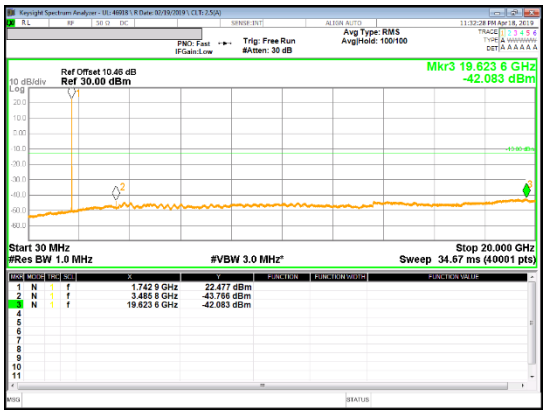
LTE Band 66

Band 66 5MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

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10.4. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

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

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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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10.4.1. FREQUENCY STABILITY RESULTS

GSM 850, Channel 128/251, Frequency 824.2/848.8 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				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	824.19998041	0.010	848.79998930	-0.006	2.5
3.85	40	824.19998603	0.004	848.79998519	-0.002	2.5
3.85	30	824.19998656	0.003	848.79998267	0.001	2.5
3.85	***20***	***824.19998895***	***0.000***	***848.79998385***	***0.000***	***2.5***
3.85	10	824.19999095	-0.002	848.79999073	-0.008	2.5
3.85	0	824.19998714	0.002	848.79998865	-0.006	2.5
3.85	-10	824.19998837	0.001	848.79999100	-0.008	2.5
3.85	-20	824.19998708	0.002	848.79998733	-0.004	2.5
3.85	-30	824.19999068	-0.002	848.79998900	-0.006	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				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	***20***	***824.19998895***	***0***	***848.79998385***	***0***	***2.5***
4.40	20	824.19998169	0.009	848.79999006	-0.007	2.5
3.60	20	824.19998676	0.003	848.79998397	0.000	2.5

GSM 1900, Channel 512/810, Frequency 1850.0/1910.0 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	1850.0781	1909.9244		
Extreme (50C)		1850.0780	1909.9244	-27.5	-0.015
Extreme (40C)		1850.0780	1909.9244	-19.7	-0.011
Extreme (30C)		1850.0780	1909.9244	-27.2	-0.014
Extreme (10C)		1850.0780	1909.9244	-23.8	-0.013
Extreme (0C)		1850.0780	1909.9244	-28.7	-0.015
Extreme (-10C)		1850.0780	1909.9244	-23.2	-0.012
Extreme (-20C)		1850.0780	1909.9244	-29.8	-0.016
Extreme (-30C)		1850.0780	1909.9244	-19.4	-0.010
20C	15%	1850.0780	1909.9244	-20.9	-0.011
	-15%	1850.0780	1909.9244	-21.8	-0.012
	End Point	1850.0780	1909.9244	-25.8	-0.014

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WCDMA Band 5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	826.39998516	0.002	846.59998877	-0.009	2.5
3.85	40	826.39998588	0.001	846.59998918	-0.009	2.5
3.85	30	826.39998897	-0.003	846.59998807	-0.008	2.5
3.85	***20***	***826.39998660***	***0.000***	***846.59998156***	***0.000***	***2.5***
3.85	10	826.39998982	-0.004	846.59998432	-0.003	2.5
3.85	0	826.39998774	-0.001	846.59998012	0.002	2.5
3.85	-10	826.39998201	0.006	846.59998586	-0.005	2.5
3.85	-20	826.39998989	-0.004	846.59998073	0.001	2.5
3.85	-30	826.39998539	0.001	846.59998471	-0.004	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]	
3.85	***20***	**826.39998660**	***0***	**846.59998156**	***0***	***2.5***
4.40	20	826.39998568	0.001	846.59998361	-0.002	2.5
3.60	20	826.39998092	0.007	846.59999079	-0.011	2.5

WCDMA Band 4 (Rel. 99)

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	1752.6020	-24.2	-0.014
Extreme (40C)		1712.3979	1752.6020	-22.8	-0.013
Extreme (30C)		1712.3979	1752.6020	-21.9	-0.013
Extreme (10C)		1712.3979	1752.6020	-21.3	-0.012
Extreme (0C)		1712.3979	1752.6020	-24.9	-0.014
Extreme (-10C)		1712.3979	1752.6020	-25.9	-0.015
Extreme (-20C)		1712.3979	1752.6020	-21.2	-0.012
Extreme (-30C)		1712.3979	1752.6020	-28.9	-0.017
20C	15%	1712.3979	1752.6020	-22.6	-0.013
	-15%	1712.3979	1752.6020	-28.6	-0.016
	End Point	1712.3979	1752.6020	-21.5	-0.012

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WCDMA Band 2 (Rel. 99)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1852.3979	1907.6021		
Extreme (50C)		1852.3979	1907.6020	-28.3	-0.015
Extreme (40C)		1852.3979	1907.6020	-21.9	-0.012
Extreme (30C)		1852.3979	1907.6020	-25.6	-0.014
Extreme (10C)		1852.3979	1907.6020	-26.6	-0.014
Extreme (0C)		1852.3979	1907.6020	-26.2	-0.014
Extreme (-10C)		1852.3979	1907.6020	-26.9	-0.014
Extreme (-20C)		1852.3979	1907.6020	-20.0	-0.011
Extreme (-30C)		1852.3979	1907.6020	-21.4	-0.011
20C	15%	1852.3979	1907.6020	-19.6	-0.010
	-15%	1852.3979	1907.6020	-22.7	-0.012
	End Point	1852.3979	1907.6020	-23.6	-0.013

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LTE Band 2 (16QAM)

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	-19.9	-0.011
Extreme (40C)		1850.6994	1909.3005	-21.8	-0.012
Extreme (30C)		1850.6994	1909.3005	-19.5	-0.010
Extreme (10C)		1850.6994	1909.3005	-27.0	-0.014
Extreme (0C)		1850.6994	1909.3005	-22.8	-0.012
Extreme (-10C)		1850.6994	1909.3005	-28.9	-0.015
Extreme (-20C)		1850.6994	1909.3005	-21.4	-0.011
Extreme (-30C)		1850.6994	1909.3005	-19.1	-0.010
20C	15%	1850.6994	1909.3005	-24.0	-0.013
	-15%	1850.6994	1909.3005	-21.5	-0.011
	End Point	1850.6994	1909.3005	-27.4	-0.015

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

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	-22.9	-0.013
Extreme (40C)		1852.3994	1907.6005	-22.1	-0.013
Extreme (30C)		1852.3994	1907.6005	-28.1	-0.016
Extreme (10C)		1852.3994	1907.6005	-27.2	-0.016
Extreme (0C)		1852.3994	1907.6005	-27.5	-0.016
Extreme (-10C)		1852.3994	1907.6005	-27.8	-0.016
Extreme (-20C)		1852.3994	1907.6005	-21.4	-0.012
Extreme (-30C)		1852.3994	1907.6005	-19.0	-0.011
20C	15%	1852.3994	1907.6005	-22.2	-0.013
	-15%	1852.3994	1907.6005	-22.2	-0.013
	End Point	1852.3994	1907.6005	-25.9	-0.015

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LTE Band 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]	
3.85	50	824.69998171	0.006	848.29998796	0.000	2.5
3.85	40	824.69998159	0.006	848.29998231	0.006	2.5
3.85	30	824.69998954	-0.003	848.29998760	0.000	2.5
3.85	***20***	***824.69998692***	***0.000***	***848.29998782***	***0.000***	***2.5***
3.85	10	824.69998579	0.001	848.29998561	0.003	2.5
3.85	0	824.69998033	0.008	848.29998657	0.001	2.5
3.85	-10	824.69998787	-0.001	848.29998105	0.008	2.5
3.85	-20	824.69998982	-0.004	848.29998599	0.002	2.5
3.85	-30	824.69998483	0.003	848.29998175	0.007	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]	
3.85	***20***	***824.69998692***	***0***	***848.29998782***	***0***	***2.5***
4.40	20	824.69998022	0.008	848.29998568	0.003	2.5
3.60	20	824.69998051	0.008	848.29998459	0.004	2.5

LTE Band 12 (Lowest Frequency: QPSK / Highest Frequency: 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	-9.2	-0.013
Extreme (40C)		699.6994	715.3005	-13.0	-0.018
Extreme (30C)		699.6994	715.3005	-12.7	-0.018
Extreme (10C)		699.6994	715.3005	-8.8	-0.012
Extreme (0C)		699.6994	715.3005	-13.9	-0.020
Extreme (-10C)		699.6994	715.3005	-11.1	-0.016
Extreme (-20C)		699.6994	715.3005	-14.0	-0.020
Extreme (-30C)		699.6994	715.3005	-10.9	-0.015
20C	15%	699.6994	715.3005	-12.1	-0.017
	-15%	699.6994	715.3005	-10.7	-0.015
	End Point	699.6994	715.3005	-7.3	-0.010

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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	784.5022		
Extreme (50C)		779.4977	784.5022	-11.9	-0.015
Extreme (40C)		779.4977	784.5022	-4.7	-0.006
Extreme (30C)		779.4977	784.5022	-14.2	-0.018
Extreme (10C)		779.4977	784.5022	-11.8	-0.015
Extreme (0C)		779.4977	784.5022	-14.7	-0.019
Extreme (-10C)		779.4977	784.5022	-10.0	-0.013
Extreme (-20C)		779.4977	784.5022	-10.1	-0.013
Extreme (-30C)		779.4977	784.5022	-12.0	-0.015
20C	15%	779.4977	784.5022	-8.6	-0.011
	-15%	779.4977	784.5022	-10.9	-0.014
	End Point	779.4977	784.5022	-11.6	-0.015

LTE Band 41 (QPSK)

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	-30.9	-0.012
Extreme (40C)		2498.4977	2687.5022	-34.6	-0.013
Extreme (30C)		2498.4977	2687.5022	-27.6	-0.011
Extreme (10C)		2498.4977	2687.5022	-33.2	-0.013
Extreme (0C)		2498.4977	2687.5022	-32.3	-0.012
Extreme (-10C)		2498.4977	2687.5022	-27.1	-0.010
Extreme (-20C)		2498.4977	2687.5022	-27.9	-0.011
Extreme (-30C)		2498.4977	2687.5022	-31.4	-0.012
20C	15%	2498.4977	2687.5022	-32.9	-0.013
	-15%	2498.4977	2687.5022	-27.9	-0.011
	End Point	2498.4977	2687.5022	-32.1	-0.012

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LTE Band 66 (Lowest Frequency: 16QAM / Highest Frequency: QPSK)

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)		1710.6994	1779.3005	-27.4	-0.016
Extreme (40C)		1710.6994	1779.3005	-25.0	-0.014
Extreme (30C)		1710.6994	1779.3005	-22.4	-0.013
Extreme (10C)		1710.6994	1779.3005	-20.4	-0.012
Extreme (0C)		1710.6994	1779.3005	-19.0	-0.011
Extreme (-10C)		1710.6994	1779.3005	-26.0	-0.015
Extreme (-20C)		1710.6994	1779.3005	-27.6	-0.016
Extreme (-30C)		1710.6994	1779.3005	-24.1	-0.014
20C	15%	1710.6994	1779.3005	-26.8	-0.015
	-15%	1710.6994	1779.3005	-29.8	-0.017
	End Point	1710.6994	1779.3005	-21.6	-0.012

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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11. RADIATED TEST RESULTS

11.1. 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.

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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11.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	512	824.2	20.28	106.66
		661	836.6	**26.30**	**426.58**
		810	848.8	19.36	86.30
	EGPRS	512	824.2	**20.16**	**103.75**
		661	836.6	19.96	99.08
		810	848.8	19.40	87.10
GSM1900	GPRS	512	1850.2	28.94	783.43
		661	1880	**29.71**	**935.41**
		810	1909.8	27.82	605.34
	EGPRS	512	1850.2	26.14	411.15
		661	1880	**26.97**	**497.74**
		810	1909.8	24.44	277.97

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	**17.97**	**62.66**
		4183	836.6	17.44	55.46
		4233	846.6	17.12	51.52
	HSDPA	4132	826.4	**16.77**	**47.53**
		4183	836.6	16.51	44.77
		4233	846.6	15.93	39.17
Band 4	REL99	1312	1712.4	**20.78**	**119.67**
		1413	1732.6	20.66	116.41
		1513	1752.6	20.50	112.20
	HSDPA	1312	1712.4	19.01	79.62
		1413	1732.6	**19.10**	**81.28**
		1513	1752.6	18.88	77.27
Band 2	REL99	9262	1852.4	21.18	131.22
		9400	1880.0	**22.88**	**194.09**
		9538	1907.6	22.36	172.19
	HSDPA	9262	1852.4	19.53	89.74
		9400	1880.0	**21.06**	**127.64**
		9538	1907.6	20.60	114.82

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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 / 99	1860.0	19.51	89.33
			1 / 49	1880.0	21.09	128.53
			1 / 0	1900.0	20.63	115.61
		16QAM	1 / 99	1860.0	18.53	71.29
			1 / 49	1880.0	19.87	97.05
			1 / 0	1900.0	19.47	88.51
	15	QPSK	1 / 74	1857.5	19.40	87.10
			1 / 37	1880.0	20.96	124.74
			1 / 37	1902.5	20.78	119.67
		16QAM	1 / 74	1857.5	18.43	69.66
			1 / 37	1880.0	19.92	98.17
			1 / 0	1902.5	19.46	88.31
	10	QPSK	1 / 0	1855.0	19.09	81.10
			1 / 49	1880.0	21.07	127.94
			1 / 0	1905.0	20.68	116.95
		16QAM	1 / 0	1855.0	17.97	62.66
			1 / 0	1880.0	20.22	105.20
			1 / 0	1905.0	19.59	90.99
	5	QPSK	1 / 12	1852.5	18.73	74.64
			1 / 12	1880.0	**21.39**	**137.72**
			1 / 0	1907.5	20.57	114.02
		16QAM	1 / 12	1852.5	17.94	62.23
			1 / 12	1880.0	20.31	107.40
			1 / 12	1907.5	19.68	92.90
	3	QPSK	1 / 8	1851.5	18.73	74.64
			1 / 8	1880.0	21.27	133.97
			1 / 8	1908.5	20.38	109.14
		16QAM	1 / 8	1851.5	17.61	57.68
			1 / 8	1880.0	**20.34**	**108.14**
			1 / 8	1908.5	19.32	85.51
	1.4	QPSK	1 / 3	1850.7	18.80	75.86
			1 / 3	1880.0	20.99	125.60
			1 / 0	1909.3	20.46	111.17
		16QAM	1 / 3	1850.7	17.52	56.49
			1 / 3	1880.0	19.75	94.41
			1 / 3	1909.3	19.37	86.50

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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	20.92	123.59
			1 / 0	1732.5	21.15	130.32
			1 / 0	1745.0	20.90	123.03
		16QAM	1 / 0	1720.0	20.00	100.00
			1 / 0	1732.5	19.98	99.54
			1 / 0	1745.0	19.78	95.06
	15	QPSK	1 / 0	1717.5	21.13	129.72
			1 / 0	1732.5	20.98	125.31
			1 / 0	1747.5	21.05	127.35
		16QAM	1 / 74	1717.5	19.81	95.72
			1 / 0	1732.5	19.74	94.19
			1 / 0	1747.5	20.17	103.99
	10	QPSK	1 / 0	1715.0	20.82	120.78
			1 / 0	1732.5	20.74	118.58
			1 / 49	1750.0	20.45	110.92
		16QAM	1 / 0	1715.0	19.96	99.08
			1 / 0	1732.5	19.78	95.06
			1 / 0	1750.0	19.90	97.72
	5	QPSK	1 / 24	1712.5	20.76	119.12
			1 / 0	1732.5	20.73	118.30
			1 / 24	1752.5	20.87	122.18
		16QAM	1 / 0	1712.5	19.75	94.41
			1 / 0	1732.5	19.63	91.83
			1 / 24	1752.5	19.73	93.97
	3	QPSK	1 / 8	1711.5	20.97	125.03
			1 / 8	1732.5	20.70	117.49
			1 / 8	1753.5	21.14	130.02
		16QAM	1 / 8	1711.5	19.95	98.86
			1 / 8	1732.5	19.59	90.99
			1 / 8	1753.5	20.06	101.39
	1.4	QPSK	1 / 3	1710.7	21.85	153.11
			1 / 3	1732.5	21.73	148.94
			1 / 3	1754.3	**21.95**	**156.68**
		16QAM	1 / 3	1710.7	20.82	120.78
			1 / 3	1732.5	20.35	108.39
			1 / 3	1754.3	**21.09**	**128.53**

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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 / 49	829.0	16.03	40.09
			1 / 0	836.5	16.55	45.19
			1 / 0	844.0	16.57	45.39
		16QAM	1 / 49	829.0	15.57	36.06
			1 / 25	836.5	15.41	34.75
			1 / 0	844.0	15.75	37.58
	5	QPSK	1 / 24	826.5	16.68	46.56
			1 / 0	836.5	16.31	42.76
			1 / 0	846.5	16.59	45.60
		16QAM	1 / 24	826.5	15.46	35.16
			1 / 12	836.5	15.60	36.31
			1 / 0	846.5	15.70	37.15
	3	QPSK	1 / 8	825.5	**17.08**	**51.05**
			1 / 8	836.5	16.53	44.98
			1 / 8	847.5	16.48	44.46
		16QAM	1 / 8	825.5	**15.81**	**38.11**
			1 / 8	836.5	15.51	35.56
			1 / 0	847.5	15.52	35.65
	1.4	QPSK	1 / 5	824.7	16.65	46.24
			1 / 5	836.5	16.56	45.29
			1 / 5	848.3	16.48	44.46
		16QAM	1 / 5	824.7	15.52	35.65
			1 / 5	836.5	15.45	35.08
			1 / 5	848.3	15.38	34.51

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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	16.94	49.43
			1 / 0	707.5	17.19	52.36
			1 / 0	711.0	**17.39**	**54.83**
		16QAM	1 / 0	704.0	**16.22**	**41.88**
			1 / 0	707.5	16.16	41.30
			1 / 0	711.0	16.03	40.09
	5	QPSK	1 / 0	701.5	16.73	47.10
			1 / 12	707.5	17.24	52.97
			1 / 12	713.5	17.15	51.88
		16QAM	1 / 0	701.5	15.92	39.08
			1 / 0	707.5	16.18	41.50
			1 / 0	713.5	16.10	40.74
	3	QPSK	1 / 8	700.5	16.83	48.19
			1 / 8	707.5	17.21	52.60
			1 / 8	714.5	17.09	51.17
		16QAM	1 / 8	700.5	15.68	36.98
			1 / 8	707.5	15.93	39.17
			1 / 8	714.5	15.95	39.36
	1.4	QPSK	1 / 3	699.7	16.22	41.88
			1 / 3	707.5	16.99	50.00
			1 / 0	715.3	16.78	47.64
		16QAM	1 / 3	699.7	15.09	32.28
			1 / 3	707.5	15.82	38.19
			1 / 3	715.3	15.72	37.33

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	12.43	17.50
		16QAM	1 / 49	782.0	11.41	13.84
	5	QPSK	1 / 0	779.5	12.09	16.18
			1 / 0	782.0	12.16	16.44
			1 / 0	784.5	**12.55**	**17.99**
		16QAM	1 / 24	779.5	11.25	13.34
			1 / 0	782.0	11.27	13.40
			1 / 24	784.5	**11.50**	**14.13**

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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	22.19	165.58
			1 / 0	2593.0	**22.98**	**198.61**
			1 / 49	2680.0	21.94	156.31
		16QAM	1 / 0	2506.0	22.45	175.79
			1 / 0	2593.0	23.00	199.53
			1 / 49	2680.0	22.06	160.69
	15	QPSK	1 / 0	2503.5	22.89	194.54
			1 / 0	2593.0	22.69	185.78
			1 / 37	2682.5	21.71	148.25
		16QAM	1 / 0	2503.5	22.33	171.00
			1 / 0	2593.0	23.58	228.03
			1 / 37	2682.5	21.98	157.76
	10	QPSK	1 / 25	2501.0	22.01	158.85
			1 / 0	2593.0	22.65	184.08
			1 / 0	2685.0	22.67	184.93
		16QAM	1 / 0	2501.0	21.73	148.94
			1 / 0	2593.0	**23.88**	**244.34**
			1 / 0	2685.0	22.35	171.79
	5	QPSK	1 / 0	2498.5	22.32	170.61
			1 / 0	2593.0	22.44	175.39
			1 / 12	2687.5	22.05	160.32
		16QAM	1 / 12	2498.5	21.93	155.96
			1 / 0	2593.0	23.75	237.14
			1 / 12	2687.5	21.07	127.94

LTE Band 17

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

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LTE Band 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	**22.19**	**165.58**
			1 / 0	1745.0	21.84	152.76
			1 / 0	1770.0	21.31	135.21
		16QAM	1 / 0	1720.0	20.98	125.31
			1 / 0	1745.0	20.67	116.68
			1 / 0	1770.0	20.50	112.20
	15	QPSK	1 / 0	1717.5	21.85	153.11
			1 / 0	1747.5	21.85	153.11
			1 / 0	1772.5	21.69	147.57
		16QAM	1 / 0	1717.5	20.59	114.55
			1 / 0	1747.5	20.91	123.31
			1 / 0	1772.5	20.69	117.22
	10	QPSK	1 / 49	1715.0	20.90	123.03
			1 / 0	1745.0	21.54	142.56
			1 / 0	1775.0	21.21	132.13
		16QAM	1 / 0	1715.0	20.61	115.08
			1 / 0	1745.0	20.70	117.49
			1 / 49	1775.0	19.44	87.90
	5	QPSK	1 / 0	1712.5	21.21	132.13
			1 / 0	1745.0	22.15	164.06
			1 / 0	1777.5	19.71	93.54
		16QAM	1 / 0	1712.5	20.57	114.02
			1 / 0	1745.0	**21.28**	**134.28**
			1 / 24	1777.5	19.62	91.62
	3	QPSK	1 / 8	1711.5	21.05	127.35
			1 / 8	1745.0	21.86	153.46
			1 / 8	1778.5	20.54	113.24
		16QAM	1 / 8	1711.5	19.87	97.05
			1 / 8	1745.0	20.65	116.14
			1 / 8	1778.5	19.44	87.90
	1.4	QPSK	1 / 3	1710.7	21.13	129.72
			1 / 3	1745.0	21.93	155.96
			1 / 3	1779.3	20.49	111.94
		16QAM	1 / 3	1710.7	20.14	103.28
			1 / 3	1745.0	20.99	125.60
			1 / 3	1779.3	19.35	86.10

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11.1.2. ERP/EIRP DATA

GSM850

GSM850

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-18
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: GPRS 850 MHz Fundamentals

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.20	24.77	V	3.0	-1.5	20.28	38.5	-18.2	
824.20	8.66	H	3.0	-1.5	4.17	38.5	-34.3	
Mid Ch								
836.60	30.76	V	3.0	-1.4	26.30	38.5	-12.2	
836.60	14.34	H	3.0	-1.4	9.88	38.5	-28.6	
High Ch								
848.80	23.80	V	3.1	-1.4	19.36	38.5	-19.1	
848.80	9.62	H	3.1	-1.4	5.18	38.5	-33.3	

GSM850

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-18
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: EGPRS 850 MHz Fundamentals

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.20	24.65	V	3.0	-1.5	20.16	38.5	-18.3	
824.20	8.73	H	3.0	-1.5	4.24	38.5	-34.3	
Mid Ch								
836.60	24.42	V	3.0	-1.4	19.96	38.5	-18.5	
836.60	9.35	H	3.0	-1.4	4.89	38.5	-33.6	
High Ch								
848.80	23.84	V	3.1	-1.4	19.40	38.5	-19.1	
848.80	9.59	H	3.1	-1.4	5.15	38.5	-33.4	

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GSM1900

GSM1900

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / X-Position ConfigurationTextBox
Location: Chamber 1
Mode: GPRS 1900 MHz Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	20.00	V	4.5	9.5	25.02	33.0	-8.0	
1850.20	23.92	H	4.5	9.5	28.94	33.0	-4.1	
Mid Ch								
1880.00	16.14	V	4.5	9.3	20.92	33.0	-12.1	
1880.00	24.94	H	4.5	9.3	29.71	33.0	-3.3	
High Ch								
1909.80	18.98	V	4.6	9.1	23.47	33.0	-9.5	
1909.80	23.33	H	4.6	9.1	27.82	33.0	-5.2	

GSM1900

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: EGPRS 1900 MHz Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	17.81	V	4.5	9.5	22.83	33.0	-10.2	
1850.20	21.12	H	4.5	9.5	26.14	33.0	-6.9	
Mid Ch								
1880.00	13.42	V	4.5	9.3	18.20	33.0	-14.8	
1880.00	22.20	H	4.5	9.3	26.97	33.0	-6.0	
High Ch								
1909.80	15.47	V	4.6	9.1	19.96	33.0	-13.0	
1909.80	19.95	H	4.6	9.1	24.44	33.0	-8.6	

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WCDMA Band 5

WCDMA

Band 5
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-18
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: Rel99 Band 5 Fundamentals

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	22.45	V	3.0	-1.5	17.97	38.5	-20.5	
826.40	5.56	H	3.0	-1.5	1.08	38.5	-37.4	
Mid Ch								
836.60	21.90	V	3.0	-1.4	17.44	38.5	-21.1	
836.60	4.91	H	3.0	-1.4	0.45	38.5	-38.1	
High Ch								
846.60	21.56	V	3.1	-1.4	17.12	38.5	-21.4	
846.60	6.05	H	3.1	-1.4	1.61	38.5	-36.9	

WCDMA

Band 5
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-18
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: HSDPA Band 5 Fundamentals

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	21.25	V	3.0	-1.5	16.77	38.5	-21.7	
826.40	4.79	H	3.0	-1.5	0.31	38.5	-38.2	
Mid Ch								
836.60	20.97	V	3.0	-1.4	16.51	38.5	-22.0	
836.60	4.42	H	3.0	-1.4	-0.04	38.5	-38.5	
High Ch								
846.60	20.37	V	3.1	-1.4	15.93	38.5	-22.6	
846.60	5.28	H	3.1	-1.4	0.84	38.5	-37.7	

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WCDMA Band 4

WCDMA

Band 4
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: Rel99 Band 4 Fundamentals

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.40	10.89	V	4.3	9.4	15.98	30.0	-14.0	
1712.40	15.70	H	4.3	9.4	20.78	30.0	-9.2	
Mid Ch								
1732.60	10.15	V	4.3	9.5	15.29	30.0	-14.7	
1732.60	15.53	H	4.3	9.5	20.66	30.0	-9.3	
High Ch								
1752.60	2.84	V	4.4	9.5	8.01	30.0	-22.0	
1752.60	15.33	H	4.4	9.5	20.50	30.0	-9.5	

WCDMA

Band 4
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: HSDPA Band 4 Fundamentals

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.40	9.30	V	4.3	9.4	14.39	30.0	-15.6	
1712.40	13.93	H	4.3	9.4	19.01	30.0	-11.0	
Mid Ch								
1732.60	8.81	V	4.3	9.5	13.95	30.0	-16.1	
1732.60	13.97	H	4.3	9.5	19.10	30.0	-10.9	
High Ch								
1752.60	1.36	V	4.4	9.5	6.53	30.0	-23.5	
1752.60	13.71	H	4.4	9.5	18.88	30.0	-11.1	

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WCDMA Band 2

WCDMA

Band 2
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: Rel99 Band 2 Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	13.33	V	4.5	9.5	18.33	33.0	-14.7	
1852.40	16.18	H	4.5	9.5	21.18	33.0	-11.8	
Mid Ch								
1880.00	7.84	V	4.5	9.3	12.62	33.0	-20.4	
1880.00	18.11	H	4.5	9.3	22.88	33.0	-10.1	
High Ch								
1907.60	7.82	V	4.6	9.1	12.33	33.0	-20.7	
1907.60	17.84	H	4.6	9.1	22.36	33.0	-10.6	

WCDMA

Band 2
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: HSDPA Band 2 Fundamentals

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	11.93	V	4.5	9.5	16.93	33.0	-16.1	
1852.40	14.53	H	4.5	9.5	19.53	33.0	-13.5	
Mid Ch								
1880.00	5.85	V	4.5	9.3	10.63	33.0	-22.4	
1880.00	16.29	H	4.5	9.3	21.06	33.0	-11.9	
High Ch								
1907.60	6.37	V	4.6	9.1	10.88	33.0	-22.1	
1907.60	16.08	H	4.6	9.1	20.60	33.0	-12.4	

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LTE Band 2

LTE Band 2 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	14.67	V	4.5	9.3	19.51	33.0	-13.5	
1860.00	11.46	H	4.5	9.3	16.30	33.0	-16.7	
Mid Ch								
1880.00	16.43	V	4.5	9.2	21.09	33.0	-11.9	
1880.00	11.80	H	4.5	9.2	16.47	33.0	-16.5	
High Ch								
1900.00	16.13	V	4.6	9.0	20.63	33.0	-12.4	
1900.00	11.56	H	4.6	9.0	16.06	33.0	-16.9	

LTE Band 2 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	13.69	V	4.5	9.3	18.53	33.0	-14.5	
1860.00	10.51	H	4.5	9.3	15.35	33.0	-17.6	
Mid Ch								
1880.00	15.21	V	4.5	9.2	19.87	33.0	-13.1	
1880.00	10.83	H	4.5	9.2	15.50	33.0	-17.5	
High Ch								
1900.00	14.97	V	4.6	9.0	19.47	33.0	-13.5	
1900.00	10.48	H	4.6	9.0	14.98	33.0	-18.0	

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LTE

Band 2

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	14.54	V	4.5	9.4	19.40	33.0	-13.6	
1857.50	11.15	H	4.5	9.4	16.01	33.0	-17.0	
Mid Ch								
1880.00	16.30	V	4.5	9.2	20.96	33.0	-12.0	
1880.00	11.91	H	4.5	9.2	16.58	33.0	-16.4	
High Ch								
1902.50	16.32	V	4.6	9.0	20.78	33.0	-12.2	
1902.50	12.29	H	4.6	9.0	16.74	33.0	-16.3	

LTE

Band 2

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	13.57	V	4.5	9.4	18.43	33.0	-14.6	
1857.50	10.06	H	4.5	9.4	14.92	33.0	-18.1	
Mid Ch								
1880.00	15.26	V	4.5	9.2	19.92	33.0	-13.1	
1880.00	10.75	H	4.5	9.2	15.42	33.0	-17.6	
High Ch								
1902.50	15.00	V	4.6	9.0	19.46	33.0	-13.5	
1902.50	10.56	H	4.6	9.0	15.01	33.0	-18.0	

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LTE

Band 2

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	14.21	V	4.5	9.4	19.09	33.0	-13.9	
1855.00	10.27	H	4.5	9.4	15.15	33.0	-17.8	
Mid Ch								
1880.00	16.41	V	4.5	9.2	21.07	33.0	-11.9	
1880.00	11.47	H	4.5	9.2	16.14	33.0	-16.9	
High Ch								
1905.00	16.26	V	4.6	9.0	20.68	33.0	-12.3	
1905.00	12.37	H	4.6	9.0	16.80	33.0	-16.2	

LTE

Band 2

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	13.09	V	4.5	9.4	17.97	33.0	-15.0	
1855.00	9.13	H	4.5	9.4	14.01	33.0	-19.0	
Mid Ch								
1880.00	15.56	V	4.5	9.2	20.22	33.0	-12.8	
1880.00	11.02	H	4.5	9.2	15.69	33.0	-17.3	
High Ch								
1905.00	15.17	V	4.6	9.0	19.59	33.0	-13.4	
1905.00	11.24	H	4.6	9.0	15.67	33.0	-17.3	

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LTE

Band 2

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	13.83	V	4.5	9.4	18.73	33.0	-14.3	
1852.50	10.07	H	4.5	9.4	14.97	33.0	-18.0	
Mid Ch								
1880.00	16.73	V	4.5	9.2	21.39	33.0	-11.6	
1880.00	12.04	H	4.5	9.2	16.71	33.0	-16.3	
High Ch								
1907.50	16.18	V	4.6	9.0	20.57	33.0	-12.4	
1907.50	12.69	H	4.6	9.0	17.08	33.0	-15.9	

LTE

Band 2

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	13.04	V	4.5	9.4	17.94	33.0	-15.1	
1852.50	9.23	H	4.5	9.4	14.13	33.0	-18.9	
Mid Ch								
1880.00	15.65	V	4.5	9.2	20.31	33.0	-12.7	
1880.00	10.91	H	4.5	9.2	15.58	33.0	-17.4	
High Ch								
1907.50	15.29	V	4.6	9.0	19.68	33.0	-13.3	
1907.50	11.56	H	4.6	9.0	15.95	33.0	-17.0	

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LTE

Band 2

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	13.82	V	4.5	9.4	18.73	33.0	-14.3	
1851.50	10.01	H	4.5	9.4	14.92	33.0	-18.1	
Mid Ch								
1880.00	16.61	V	4.5	9.2	21.27	33.0	-11.7	
1880.00	11.58	H	4.5	9.2	16.25	33.0	-16.8	
High Ch								
1908.50	16.01	V	4.6	8.9	20.38	33.0	-12.6	
1908.50	12.43	H	4.6	8.9	16.81	33.0	-16.2	

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Band 2

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	12.70	V	4.5	9.4	17.61	33.0	-15.4	
1851.50	8.84	H	4.5	9.4	13.75	33.0	-19.2	
Mid Ch								
1880.00	15.68	V	4.5	9.2	20.34	33.0	-12.7	
1880.00	10.64	H	4.5	9.2	15.31	33.0	-17.7	
High Ch								
1908.50	14.95	V	4.6	8.9	19.32	33.0	-13.7	
1908.50	11.29	H	4.6	8.9	15.67	33.0	-17.3	

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Band 2

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	13.88	V	4.5	9.4	18.80	33.0	-14.2	
1850.70	9.80	H	4.5	9.4	14.72	33.0	-18.3	
Mid Ch								
1880.00	16.33	V	4.5	9.2	20.99	33.0	-12.0	
1880.00	12.19	H	4.5	9.2	16.86	33.0	-16.1	
High Ch								
1909.30	16.09	V	4.6	8.9	20.46	33.0	-12.5	
1909.30	12.25	H	4.6	8.9	16.62	33.0	-16.4	

LTE

Band 2

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-11
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables
Substitution: Horn 3115[00167451], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	12.60	V	4.5	9.4	17.52	33.0	-15.5	
1850.70	8.88	H	4.5	9.4	13.80	33.0	-19.2	
Mid Ch								
1880.00	15.09	V	4.5	9.2	19.75	33.0	-13.3	
1880.00	11.03	H	4.5	9.2	15.70	33.0	-17.3	
High Ch								
1909.30	15.00	V	4.6	8.9	19.37	33.0	-13.6	
1909.30	11.09	H	4.6	8.9	15.46	33.0	-17.5	

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LTE Band 4

LTE Band 4 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 4 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	4.35	V	4.3	9.4	9.45	30.0	-20.5	
1720.00	15.81	H	4.3	9.4	20.92	30.0	-9.1	
Mid Ch								
1732.50	9.92	V	4.3	9.5	15.06	30.0	-14.9	
1732.50	16.02	H	4.3	9.5	21.15	30.0	-8.8	
High Ch								
1745.00	3.98	V	4.4	9.5	9.14	30.0	-20.9	
1745.00	15.73	H	4.4	9.5	20.90	30.0	-9.1	

LTE Band 4 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 4 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	3.49	V	4.3	9.4	8.59	30.0	-21.4	
1720.00	14.89	H	4.3	9.4	20.00	30.0	-10.0	
Mid Ch								
1732.50	8.77	V	4.3	9.5	13.91	30.0	-16.1	
1732.50	14.85	H	4.3	9.5	19.98	30.0	-10.0	
High Ch								
1745.00	3.05	V	4.4	9.5	8.21	30.0	-21.8	
1745.00	14.61	H	4.4	9.5	19.78	30.0	-10.2	

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Band 4

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 4 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	4.48	V	4.3	9.4	9.58	30.0	-20.4	
1717.50	16.03	H	4.3	9.4	21.13	30.0	-8.9	
Mid Ch								
1732.50	10.20	V	4.3	9.5	15.34	30.0	-14.7	
1732.50	15.85	H	4.3	9.5	20.98	30.0	-9.0	
High Ch								
1747.50	8.93	V	4.4	9.5	14.10	30.0	-15.9	
1747.50	15.88	H	4.4	9.5	21.05	30.0	-8.9	

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Band 4

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 4 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	-1.04	V	4.3	9.4	4.06	30.0	-25.9	
1717.50	14.71	H	4.3	9.4	19.81	30.0	-10.2	
Mid Ch								
1732.50	9.13	V	4.3	9.5	14.27	30.0	-15.7	
1732.50	14.61	H	4.3	9.5	19.74	30.0	-10.3	
High Ch								
1747.50	7.70	V	4.4	9.5	12.87	30.0	-17.1	
1747.50	15.00	H	4.4	9.5	20.17	30.0	-9.8	

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Band 4

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 4 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	8.68	V	4.3	9.4	13.77	30.0	-16.2	
1715.00	15.72	H	4.3	9.4	20.82	30.0	-9.2	
Mid Ch								
1732.50	10.30	V	4.3	9.5	15.44	30.0	-14.6	
1732.50	15.61	H	4.3	9.5	20.74	30.0	-9.3	
High Ch								
1750.00	11.08	V	4.4	9.5	16.26	30.0	-13.7	
1750.00	15.27	H	4.4	9.5	20.45	30.0	-9.6	

LTE

Band 4

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 4 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	7.53	V	4.3	9.4	12.62	30.0	-17.4	
1715.00	14.86	H	4.3	9.4	19.96	30.0	-10.0	
Mid Ch								
1732.50	9.71	V	4.3	9.5	14.85	30.0	-15.2	
1732.50	14.65	H	4.3	9.5	19.78	30.0	-10.2	
High Ch								
1750.00	2.02	V	4.4	9.5	7.20	30.0	-22.8	
1750.00	14.72	H	4.4	9.5	19.90	30.0	-10.1	

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LTE

Band 4

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 4 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	7.02	V	4.3	9.4	12.11	30.0	-17.9	
1712.50	15.67	H	4.3	9.4	20.76	30.0	-9.2	
Mid Ch								
1732.50	9.36	V	4.3	9.5	14.50	30.0	-15.5	
1732.50	15.60	H	4.3	9.5	20.73	30.0	-9.3	
High Ch								
1752.50	2.58	V	4.4	9.5	7.75	30.0	-22.2	
1752.50	15.70	H	4.4	9.5	20.87	30.0	-9.1	

LTE

Band 4

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 4 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	7.70	V	4.3	9.4	12.79	30.0	-17.2	
1712.50	14.66	H	4.3	9.4	19.75	30.0	-10.3	
Mid Ch								
1732.50	8.57	V	4.3	9.5	13.71	30.0	-16.3	
1732.50	14.50	H	4.3	9.5	19.63	30.0	-10.4	
High Ch								
1752.50	1.61	V	4.4	9.5	6.78	30.0	-23.2	
1752.50	14.56	H	4.4	9.5	19.73	30.0	-10.3	

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LTE

Band 4

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 4 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	3.91	V	4.3	9.4	9.00	30.0	-21.0	
1711.50	15.88	H	4.3	9.4	20.97	30.0	-9.0	
Mid Ch								
1732.50	9.03	V	4.3	9.5	14.17	30.0	-15.8	
1732.50	15.57	H	4.3	9.5	20.70	30.0	-9.3	
High Ch								
1753.50	10.90	V	4.4	9.5	16.08	30.0	-13.9	
1753.50	15.96	H	4.4	9.5	21.14	30.0	-8.9	

LTE

Band 4

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 4 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	2.92	V	4.3	9.4	8.01	30.0	-22.0	
1711.50	14.86	H	4.3	9.4	19.95	30.0	-10.1	
Mid Ch								
1732.50	7.84	V	4.3	9.5	12.98	30.0	-17.0	
1732.50	14.46	H	4.3	9.5	19.59	30.0	-10.4	
High Ch								
1753.50	9.78	V	4.4	9.5	14.96	30.0	-15.0	
1753.50	14.88	H	4.4	9.5	20.06	30.0	-9.9	

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Band 4

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 4 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1710.70	3.29	V	4.3	9.4	8.37	30.0	-21.6	
1710.70	16.77	H	4.3	9.4	21.85	30.0	-8.1	
Mid Ch								
1732.50	11.28	V	4.3	9.5	16.42	30.0	-13.6	
1732.50	16.60	H	4.3	9.5	21.73	30.0	-8.3	
High Ch								
1754.30	13.63	V	4.4	9.5	18.81	30.0	-11.2	
1754.30	16.77	H	4.4	9.5	21.95	30.0	-8.1	

LTE

Band 4

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 4 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1710.70	2.19	V	4.3	9.4	7.27	30.0	-22.7	
1710.70	15.74	H	4.3	9.4	20.82	30.0	-9.2	
Mid Ch								
1732.50	10.28	V	4.3	9.5	15.42	30.0	-14.6	
1732.50	15.22	H	4.3	9.5	20.35	30.0	-9.6	
High Ch								
1754.30	12.50	V	4.4	9.5	17.68	30.0	-12.3	
1754.30	15.91	H	4.4	9.5	21.09	30.0	-8.9	

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LTE Band 5

LTE Band 5 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
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, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	20.51	V	3.0	-1.5	16.03	38.5	-22.5	
829.00	7.34	H	3.0	-1.5	2.86	38.5	-35.6	
Mid Ch								
836.50	21.01	V	3.0	-1.4	16.55	38.5	-22.0	
836.50	7.32	H	3.0	-1.4	2.85	38.5	-35.6	
High Ch								
844.00	21.02	V	3.1	-1.4	16.57	38.5	-21.9	
844.00	6.63	H	3.1	-1.4	2.18	38.5	-36.3	

LTE Band 5 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
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, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	20.05	V	3.0	-1.5	15.57	38.5	-22.9	
829.00	4.97	H	3.0	-1.5	0.49	38.5	-38.0	
Mid Ch								
836.50	19.87	V	3.0	-1.4	15.41	38.5	-23.1	
836.50	6.17	H	3.0	-1.4	1.70	38.5	-36.8	
High Ch								
844.00	20.20	V	3.1	-1.4	15.75	38.5	-22.8	
844.00	5.75	H	3.1	-1.4	1.30	38.5	-37.2	

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Band 5

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
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, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	21.17	V	3.0	-1.5	16.68	38.5	-21.8	
826.50	5.20	H	3.0	-1.5	0.72	38.5	-37.8	
Mid Ch								
836.50	20.77	V	3.0	-1.4	16.31	38.5	-22.2	
836.50	5.27	H	3.0	-1.4	0.80	38.5	-37.7	
High Ch								
846.50	21.04	V	3.1	-1.4	16.59	38.5	-21.9	
846.50	6.80	H	3.1	-1.4	2.35	38.5	-36.1	

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Band 5

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
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, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	19.95	V	3.0	-1.5	15.46	38.5	-23.0	
826.50	4.13	H	3.0	-1.5	-0.35	38.5	-38.9	
Mid Ch								
836.50	20.06	V	3.0	-1.4	15.60	38.5	-22.9	
836.50	4.34	H	3.0	-1.4	-0.13	38.5	-38.6	
High Ch								
846.50	20.15	V	3.1	-1.4	15.70	38.5	-22.8	
846.50	6.07	H	3.1	-1.4	1.62	38.5	-36.9	

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Band 5

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
825.50	21.56	V	3.0	-1.5	17.08	38.5	-21.4	
825.50	5.13	H	3.0	-1.5	0.64	38.5	-37.9	
Mid Ch								
836.50	20.99	V	3.0	-1.4	16.53	38.5	-22.0	
836.50	5.24	H	3.0	-1.4	0.77	38.5	-37.7	
High Ch								
847.50	20.92	V	3.1	-1.4	16.48	38.5	-22.0	
847.50	7.18	H	3.1	-1.4	2.74	38.5	-35.8	

LTE

Band 5

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
825.50	20.29	V	3.0	-1.5	15.81	38.5	-22.7	
825.50	3.90	H	3.0	-1.5	-0.59	38.5	-39.1	
Mid Ch								
836.50	19.97	V	3.0	-1.4	15.51	38.5	-23.0	
836.50	4.34	H	3.0	-1.4	-0.13	38.5	-38.6	
High Ch								
847.50	19.96	V	3.1	-1.4	15.52	38.5	-23.0	
847.50	6.21	H	3.1	-1.4	1.77	38.5	-36.7	

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Band 5

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	21.13	V	3.0	-1.5	16.65	38.5	-21.9	
824.70	5.08	H	3.0	-1.5	0.59	38.5	-37.9	
Mid Ch								
836.50	21.02	V	3.0	-1.4	16.56	38.5	-21.9	
836.50	5.19	H	3.0	-1.4	0.72	38.5	-37.8	
High Ch								
848.30	20.92	V	3.1	-1.4	16.48	38.5	-22.0	
848.30	6.96	H	3.1	-1.4	2.52	38.5	-36.0	

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Band 5

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	20.00	V	3.0	-1.5	15.52	38.5	-23.0	
824.70	4.01	H	3.0	-1.5	-0.48	38.5	-39.0	
Mid Ch								
836.50	19.91	V	3.0	-1.4	15.45	38.5	-23.1	
836.50	3.95	H	3.0	-1.4	-0.52	38.5	-39.0	
High Ch								
848.30	19.82	V	3.1	-1.4	15.38	38.5	-23.1	
848.30	5.93	H	3.1	-1.4	1.49	38.5	-37.0	

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LTE Band 12

LTE Band 12 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-23
Test Engineer: 45585
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, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
704.00	11.22	V	2.8	-1.6	6.84	34.8	-28.0	
704.00	21.33	H	2.8	-1.6	16.94	34.8	-17.9	
Mid Ch								
707.50	13.45	V	2.8	-1.6	9.07	34.8	-25.7	
707.50	21.57	H	2.8	-1.6	17.19	34.8	-17.6	
High Ch								
711.00	14.22	V	2.8	-1.6	9.82	34.8	-25.0	
711.00	21.79	H	2.8	-1.6	17.39	34.8	-17.4	

LTE Band 12 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-23
Test Engineer: 45585
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, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
704.00	10.12	V	2.8	-1.6	5.74	34.8	-29.1	
704.00	20.61	H	2.8	-1.6	16.22	34.8	-18.6	
Mid Ch								
707.50	12.31	V	2.8	-1.6	7.93	34.8	-26.9	
707.50	20.54	H	2.8	-1.6	16.16	34.8	-18.6	
High Ch								
711.00	12.99	V	2.8	-1.6	8.59	34.8	-26.2	
711.00	20.43	H	2.8	-1.6	16.03	34.8	-18.8	

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Band 12

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-23
Test Engineer: 45585
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, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
701.50	11.26	V	2.8	-1.6	6.88	34.8	-27.9	
701.50	21.11	H	2.8	-1.6	16.73	34.8	-18.1	
Mid Ch								
707.50	13.94	V	2.8	-1.6	9.56	34.8	-25.2	
707.50	21.62	H	2.8	-1.6	17.24	34.8	-17.6	
High Ch								
713.50	14.45	V	2.8	-1.6	10.05	34.8	-24.8	
713.50	21.54	H	2.8	-1.6	17.15	34.8	-17.7	

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Band 12

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-23
Test Engineer: 45585
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, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
701.50	10.10	V	2.8	-1.6	5.72	34.8	-29.1	
701.50	20.30	H	2.8	-1.6	15.92	34.8	-18.9	
Mid Ch								
707.50	12.69	V	2.8	-1.6	8.31	34.8	-26.5	
707.50	20.56	H	2.8	-1.6	16.18	34.8	-18.6	
High Ch								
713.50	13.44	V	2.8	-1.6	9.04	34.8	-25.8	
713.50	20.49	H	2.8	-1.6	16.10	34.8	-18.7	

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Band 12

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-16
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 12 Fundamentals, 3MHz Bandwidth

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
700.50	11.13	V	2.8	-1.6	6.75	34.8	-28.0	
700.50	21.21	H	2.8	-1.6	16.83	34.8	-18.0	
Mid Ch								
707.50	13.19	V	2.8	-1.6	8.81	34.8	-26.0	
707.50	21.59	H	2.8	-1.6	17.21	34.8	-17.6	
High Ch								
714.50	14.28	V	2.8	-1.6	9.88	34.8	-24.9	
714.50	21.49	H	2.8	-1.6	17.09	34.8	-17.7	

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Band 12

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-16
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 12 Fundamentals, 3MHz Bandwidth

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
700.50	10.05	V	2.8	-1.6	5.67	34.8	-29.1	
700.50	20.06	H	2.8	-1.6	15.68	34.8	-19.1	
Mid Ch								
707.50	12.37	V	2.8	-1.6	7.99	34.8	-26.8	
707.50	20.31	H	2.8	-1.6	15.93	34.8	-18.9	
High Ch								
714.50	13.34	V	2.8	-1.6	8.94	34.8	-25.9	
714.50	20.35	H	2.8	-1.6	15.95	34.8	-18.8	

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Band 12

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-16
Test Engineer: 45585
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, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
699.70	13.20	V	2.8	-1.6	8.82	34.8	-26.0	
699.70	20.59	H	2.8	-1.6	16.22	34.8	-18.6	
Mid Ch								
707.50	13.47	V	2.8	-1.6	9.09	34.8	-25.7	
707.50	21.37	H	2.8	-1.6	16.99	34.8	-17.8	
High Ch								
715.30	12.14	V	2.8	-1.6	7.74	34.8	-27.1	
715.30	21.18	H	2.8	-1.6	16.78	34.8	-18.0	

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Band 12

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-16
Test Engineer: 45585
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, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
699.70	11.92	V	2.8	-1.6	7.54	34.8	-27.3	
699.70	19.46	H	2.8	-1.6	15.09	34.8	-19.7	
Mid Ch								
707.50	12.15	V	2.8	-1.6	7.77	34.8	-27.0	
707.50	20.20	H	2.8	-1.6	15.82	34.8	-19.0	
High Ch								
715.30	10.63	V	2.8	-1.6	6.23	34.8	-28.6	
715.30	20.12	H	2.8	-1.6	15.72	34.8	-19.1	

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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 #: 12810836
Date: 2109-04-19
Test Engineer: 45585
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 13 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
782.00	16.94	V	2.9	-1.6	12.43	34.8	-22.3	
782.00	-0.12	H	2.9	-1.6	-4.62	34.8	-39.4	

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Band 13

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2109-04-19
Test Engineer: 45585
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 13 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
782.00	15.92	V	2.9	-1.6	11.41	34.8	-23.4	
782.00	-1.42	H	2.9	-1.6	-5.92	34.8	-40.7	

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Band 13

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2109-04-19
Test Engineer: 45585
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 13 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
779.50	16.59	V	2.9	-1.6	12.09	34.8	-22.7	
779.50	-0.35	H	2.9	-1.6	-4.85	34.8	-39.6	
Mid Ch								
782.00	16.67	V	2.9	-1.6	12.16	34.8	-22.6	
782.00	-0.57	H	2.9	-1.6	-5.07	34.8	-39.8	
High Ch								
784.50	17.06	V	2.9	-1.6	12.55	34.8	-22.2	
784.50	-0.97	H	2.9	-1.6	-5.48	34.8	-40.2	

LTE

Band 13

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2109-04-19
Test Engineer: 45585
Configuration: EUT, Z-Position
Location: Chamber 1
Mode: LTE_16QAM Band 13 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
779.50	15.75	V	2.9	-1.6	11.25	34.8	-23.5	
779.50	-1.62	H	2.9	-1.6	-6.12	34.8	-40.9	
Mid Ch								
782.00	15.78	V	2.9	-1.6	11.27	34.8	-23.5	
782.00	-1.83	H	2.9	-1.6	-6.33	34.8	-41.1	
High Ch								
784.50	16.01	V	2.9	-1.6	11.50	34.8	-23.3	
784.50	-1.04	H	2.9	-1.6	-5.55	34.8	-40.3	

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LTE Band 41

LTE Band 41 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2506.00	13.96	V	5.2	9.9	18.63	33.0	-14.4	
2506.00	17.52	H	5.2	9.9	22.19	33.0	-10.8	
Mid Ch								
2593.00	15.59	V	5.3	9.8	20.05	33.0	-12.9	
2593.00	18.51	H	5.3	9.8	22.98	33.0	-10.0	
High Ch								
2680.00	16.78	V	5.4	9.8	21.15	33.0	-11.8	
2680.00	17.57	H	5.4	9.8	21.94	33.0	-11.1	

LTE Band 41 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_16QAM Band 41 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2506.00	14.17	V	5.2	9.9	18.84	33.0	-14.2	
2506.00	17.78	H	5.2	9.9	22.45	33.0	-10.5	
Mid Ch								
2593.00	15.63	V	5.3	9.8	20.09	33.0	-12.9	
2593.00	18.53	H	5.3	9.8	23.00	33.0	-10.0	
High Ch								
2680.00	16.90	V	5.4	9.8	21.27	33.0	-11.7	
2680.00	17.69	H	5.4	9.8	22.06	33.0	-10.9	

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LTE

Band 41

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 41 Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2503.50	15.75	V	5.2	9.9	20.43	33.0	-12.6	
2503.50	18.22	H	5.2	9.9	22.89	33.0	-10.1	
Mid Ch								
2593.00	16.05	V	5.3	9.8	20.51	33.0	-12.5	
2593.00	18.22	H	5.3	9.8	22.69	33.0	-10.3	
High Ch								
2682.50	15.90	V	5.4	9.8	20.28	33.0	-12.7	
2682.50	17.34	H	5.4	9.8	21.71	33.0	-11.3	

LTE

Band 41

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT
Location: Chamber 1
Mode: LTE_16QAM Band 41 Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2503.50	15.18	V	5.2	9.9	19.86	33.0	-13.1	
2503.50	17.66	H	5.2	9.9	22.33	33.0	-10.7	
Mid Ch								
2593.00	16.95	V	5.3	9.8	21.41	33.0	-11.6	
2593.00	19.11	H	5.3	9.8	23.58	33.0	-9.4	
High Ch								
2682.50	17.36	V	5.4	9.8	21.74	33.0	-11.3	
2682.50	17.61	H	5.4	9.8	21.98	33.0	-11.0	

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LTE

Band 41

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 41 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2501.00	15.04	V	5.2	9.9	19.73	33.0	-13.3	
2501.00	17.33	H	5.2	9.9	22.01	33.0	-11.0	
Mid Ch								
2593.00	16.39	V	5.3	9.8	20.85	33.0	-12.1	
2593.00	18.18	H	5.3	9.8	22.65	33.0	-10.4	
High Ch								
2685.00	16.85	V	5.4	9.8	21.22	33.0	-11.8	
2685.00	18.31	H	5.4	9.8	22.67	33.0	-10.3	

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Band 41

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT
Location: Chamber 1
Mode: LTE_16QAM Band 41 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2501.00	13.75	V	5.2	9.9	18.44	33.0	-14.6	
2501.00	17.05	H	5.2	9.9	21.73	33.0	-11.3	
Mid Ch								
2593.00	17.60	V	5.3	9.8	22.06	33.0	-10.9	
2593.00	19.41	H	5.3	9.8	23.88	33.0	-9.1	
High Ch								
2685.00	16.54	V	5.4	9.8	20.91	33.0	-12.1	
2685.00	17.99	H	5.4	9.8	22.35	33.0	-10.6	

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Band 41

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 41 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	15.34	V	5.2	9.9	20.03	33.0	-13.0	
2498.50	17.63	H	5.2	9.9	22.32	33.0	-10.7	
Mid Ch								
2593.00	16.35	V	5.3	9.8	20.81	33.0	-12.2	
2593.00	17.97	H	5.3	9.8	22.44	33.0	-10.6	
High Ch								
2687.50	17.17	V	5.4	9.8	21.54	33.0	-11.5	
2687.50	17.68	H	5.4	9.8	22.05	33.0	-11.0	

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Band 41

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT
Location: Chamber 1
Mode: LTE_16QAM Band 41 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	14.97	V	5.2	9.9	19.66	33.0	-13.3	
2498.50	17.24	H	5.2	9.9	21.93	33.0	-11.1	
Mid Ch								
2593.00	17.64	V	5.3	9.8	22.10	33.0	-10.9	
2593.00	19.28	H	5.3	9.8	23.75	33.0	-9.3	
High Ch								
2687.50	16.17	V	5.4	9.8	20.54	33.0	-12.5	
2687.50	16.70	H	5.4	9.8	21.07	33.0	-11.9	

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LTE Band 66

LTE

Band 66

20MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-22
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	12.93	V	4.3	9.4	18.03	30.0	-12.0	
1720.00	17.08	H	4.3	9.4	22.19	30.0	-7.8	
Mid Ch								
1745.00	12.89	V	4.4	9.5	18.05	30.0	-11.9	
1745.00	16.67	H	4.4	9.5	21.84	30.0	-8.2	
High Ch								
1770.00	13.04	V	4.4	9.6	18.21	30.0	-11.8	
1770.00	16.14	H	4.4	9.6	21.31	30.0	-8.7	

LTE

Band 66

20MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-22
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	11.71	V	4.3	9.4	16.81	30.0	-13.2	
1720.00	15.87	H	4.3	9.4	20.98	30.0	-9.0	
Mid Ch								
1745.00	11.88	V	4.4	9.5	17.04	30.0	-13.0	
1745.00	15.50	H	4.4	9.5	20.67	30.0	-9.3	
High Ch								
1770.00	12.03	V	4.4	9.6	17.20	30.0	-12.8	
1770.00	15.33	H	4.4	9.6	20.50	30.0	-9.5	

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Band 66

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-22
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	6.75	V	4.3	9.4	11.85	30.0	-18.1	
1717.50	16.75	H	4.3	9.4	21.85	30.0	-8.2	
Mid Ch								
1745.00	14.29	V	4.4	9.5	19.45	30.0	-10.5	
1745.00	16.68	H	4.4	9.5	21.85	30.0	-8.2	
High Ch								
1772.50	13.54	V	4.4	9.6	18.71	30.0	-11.3	
1772.50	16.52	H	4.4	9.6	21.69	30.0	-8.3	

LTE

Band 66

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-22
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 Fundamentals, 15MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	5.63	V	4.3	9.4	10.73	30.0	-19.3	
1717.50	15.49	H	4.3	9.4	20.59	30.0	-9.4	
Mid Ch								
1745.00	13.21	V	4.4	9.5	18.37	30.0	-11.6	
1745.00	15.74	H	4.4	9.5	20.91	30.0	-9.1	
High Ch								
1772.50	12.49	V	4.4	9.6	17.66	30.0	-12.3	
1772.50	15.52	H	4.4	9.6	20.69	30.0	-9.3	

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Band 66

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-20
Test Engineer: 45585
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	12.64	V	4.3	9.4	17.73	30.0	-12.3	
1715.00	15.80	H	4.3	9.4	20.90	30.0	-9.1	
Mid Ch								
1745.00	12.68	V	4.4	9.5	17.84	30.0	-12.2	
1745.00	16.37	H	4.4	9.5	21.54	30.0	-8.5	
High Ch								
1775.00	12.38	V	4.4	9.6	17.55	30.0	-12.5	
1775.00	16.04	H	4.4	9.6	21.21	30.0	-8.8	

LTE

Band 66

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-20
Test Engineer: 45585
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	10.08	V	4.3	9.4	15.17	30.0	-14.8	
1715.00	15.51	H	4.3	9.4	20.61	30.0	-9.4	
Mid Ch								
1745.00	11.48	V	4.4	9.5	16.64	30.0	-13.4	
1745.00	15.53	H	4.4	9.5	20.70	30.0	-9.3	
High Ch								
1775.00	11.42	V	4.4	9.6	16.59	30.0	-13.4	
1775.00	14.27	H	4.4	9.6	19.44	30.0	-10.6	

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Band 66

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-17
Test Engineer: 45585
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	12.58	V	4.3	9.4	17.67	30.0	-12.3	
1712.50	16.12	H	4.3	9.4	21.21	30.0	-8.8	
Mid Ch								
1745.00	6.29	V	4.4	9.5	11.45	30.0	-18.5	
1745.00	16.98	H	4.4	9.5	22.15	30.0	-7.9	
High Ch								
1777.50	13.03	V	4.4	9.6	18.20	30.0	-11.8	
1777.50	14.54	H	4.4	9.6	19.71	30.0	-10.3	

LTE

Band 66

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-17
Test Engineer: 45585
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	11.69	V	4.3	9.4	16.78	30.0	-13.2	
1712.50	15.48	H	4.3	9.4	20.57	30.0	-9.4	
Mid Ch								
1745.00	6.27	V	4.4	9.5	11.43	30.0	-18.6	
1745.00	16.11	H	4.4	9.5	21.28	30.0	-8.7	
High Ch								
1777.50	11.36	V	4.4	9.6	16.53	30.0	-13.5	
1777.50	14.45	H	4.4	9.6	19.62	30.0	-10.4	

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Band 66

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-19
Test Engineer: 45585
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	12.94	V	4.3	9.4	18.03	30.0	-12.0	
1711.50	15.96	H	4.3	9.4	21.05	30.0	-9.0	
Mid Ch								
1745.00	6.63	V	4.4	9.5	11.79	30.0	-18.2	
1745.00	16.69	H	4.4	9.5	21.86	30.0	-8.1	
High Ch								
1778.50	12.31	V	4.4	9.6	17.48	30.0	-12.5	
1778.50	15.37	H	4.4	9.6	20.54	30.0	-9.5	

LTE

Band 66

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-19
Test Engineer: 45585
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	12.29	V	4.3	9.4	17.38	30.0	-12.6	
1711.50	14.78	H	4.3	9.4	19.87	30.0	-10.1	
Mid Ch								
1745.00	5.43	V	4.4	9.5	10.59	30.0	-19.4	
1745.00	15.48	H	4.4	9.5	20.65	30.0	-9.4	
High Ch								
1778.50	11.22	V	4.4	9.6	16.39	30.0	-13.6	
1778.50	14.27	H	4.4	9.6	19.44	30.0	-10.6	

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LTE

Band 66

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-19
Test Engineer: 45585
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1710.70	4.82	V	4.3	9.4	9.90	30.0	-20.1	
1710.70	16.05	H	4.3	9.4	21.13	30.0	-8.9	
Mid Ch								
1745.00	6.65	V	4.4	9.5	11.81	30.0	-18.2	
1745.00	16.76	H	4.4	9.5	21.93	30.0	-8.1	
High Ch								
1779.30	11.91	V	4.4	9.6	17.08	30.0	-12.9	
1779.30	15.32	H	4.4	9.6	20.49	30.0	-9.5	

LTE

Band 66

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 12810836
Date: 2019-04-19
Test Engineer: 45585
Configuration: EUT, X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1710.70	3.66	V	4.3	9.4	8.74	30.0	-21.3	
1710.70	15.06	H	4.3	9.4	20.14	30.0	-9.9	
Mid Ch								
1745.00	5.34	V	4.4	9.5	10.50	30.0	-19.5	
1745.00	15.82	H	4.4	9.5	20.99	30.0	-9.0	
High Ch								
1779.30	10.92	V	4.4	9.6	16.09	30.0	-13.9	
1779.30	14.18	H	4.4	9.6	19.35	30.0	-10.7	

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11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

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

LIMIT

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

Part 27.53:
(c)(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB.

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

(h) The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB.

(m) (4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

TEST PROCEDURE

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

For peak power measurement with a ESU40:
a) Set the RBW = 100 KHz for emission below 1GHz and 1MHz for emissions above 1GHz
b) Set VBW ≥ 3 × RBW;
c) Set span ≥ 1.5 times the OBW;
d) Sweep time = auto couple;
e) Detector = rms;
f) Ensure that the number of measurement points ≥ span/RBW;
g) Trace mode = average(WCDMA, LTE), Maxhold(GSM, LTE Band41);;

RESULTS

See the following pages.

NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

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11.2.1. SPURIOUS RADIATION PLOTS

GSM850

GSM850

GPRS

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

Company: Samsung
Project #: 12810836
Date: 2019-04-19
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 2
Mode: GPRS 850 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1648.40	11.4	V	3.0	38.2	1.0	-25.8	-13.0	-12.8	
2472.60	15.0	V	3.0	38.8	1.0	-22.8	-13.0	-9.8	
3296.80	4.5	V	3.0	39.4	1.0	-33.9	-13.0	-20.9	
4121.00	10.3	V	3.0	39.8	1.0	-28.5	-13.0	-15.5	
4945.20	10.3	V	3.0	39.8	1.0	-28.5	-13.0	-15.5	
5796.40	-6.7	V	3.0	40.0	1.0	-45.8	-13.0	-32.8	
1648.40	10.4	H	3.0	38.2	1.0	-26.8	-13.0	-13.8	
2472.60	13.9	H	3.0	38.8	1.0	-23.9	-13.0	-10.9	
3296.80	1.5	H	3.0	39.4	1.0	-37.0	-13.0	-24.0	
4121.00	11.4	H	3.0	39.8	1.0	-27.4	-13.0	-14.4	
4945.20	10.3	H	3.0	39.8	1.0	-28.5	-13.0	-15.5	
5796.40	-6.9	H	3.0	40.0	1.0	-45.9	-13.0	-32.9	
Mid Ch, 836.6MHz									
1673.20	14.7	V	3.0	38.2	1.0	-22.5	-13.0	-9.5	
2509.80	13.1	V	3.0	38.8	1.0	-24.7	-13.0	-11.7	
3346.40	6.0	V	3.0	39.5	1.0	-32.4	-13.0	-19.4	
4183.00	9.1	V	3.0	39.8	1.0	-29.7	-13.0	-16.7	
5019.60	5.5	V	3.0	39.8	1.0	-33.3	-13.0	-20.3	
5856.20	11.4	V	3.0	40.0	1.0	-27.6	-13.0	-14.6	
1673.20	12.1	H	3.0	38.2	1.0	-25.2	-13.0	-12.2	
2509.80	7.2	H	3.0	38.8	1.0	-30.6	-13.0	-17.6	
3346.40	1.5	H	3.0	39.5	1.0	-37.0	-13.0	-24.0	
4183.00	9.1	H	3.0	39.8	1.0	-29.7	-13.0	-16.7	
5019.60	5.7	H	3.0	39.8	1.0	-33.1	-13.0	-20.1	
5856.20	9.3	H	3.0	40.0	1.0	-29.7	-13.0	-16.7	
High Ch, 848.8MHz									
1697.60	18.8	V	3.0	38.2	1.0	-18.5	-13.0	-5.5	
2546.40	12.1	V	3.0	38.9	1.0	-25.8	-13.0	-12.8	
3395.20	2.9	V	3.0	39.5	1.0	-35.6	-13.0	-22.6	
4244.00	9.5	V	3.0	39.8	1.0	-29.3	-13.0	-16.3	
5092.80	3.4	V	3.0	39.8	1.0	-35.4	-13.0	-22.4	
5941.60	11.5	V	4.0	40.1	2.0	-24.0	-13.0	-11.0	
1697.60	14.5	H	3.0	38.2	1.0	-22.8	-13.0	-9.8	
2546.40	12.1	H	3.0	38.9	1.0	-25.7	-13.0	-12.7	
3395.20	-1.2	H	3.0	39.5	1.0	-39.7	-13.0	-26.7	
4244.00	9.0	H	3.0	39.8	1.0	-29.8	-13.0	-16.8	
5092.80	1.5	H	3.0	39.8	1.0	-37.3	-13.0	-24.3	
5941.60	12.5	H	3.0	40.1	1.0	-26.6	-13.0	-13.6	

GSM850

EGPRS

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

Company: Samsung
Project #: 12810836
Date: 2019-04-19
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 2
Mode: EGPRS 850 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1648.40	10.2	V	3.0	38.2	1.0	-27.0	-13.0	-14.0	
2472.60	14.3	V	3.0	38.8	1.0	-23.5	-13.0	-10.5	
3296.80	3.9	V	3.0	39.4	1.0	-34.5	-13.0	-21.5	
4121.00	10.1	V	3.0	39.8	1.0	-28.7	-13.0	-15.7	
4945.20	9.3	V	3.0	39.8	1.0	-29.5	-13.0	-16.5	
5796.40	-6.6	V	3.0	40.0	1.0	-45.6	-13.0	-32.6	
1648.40	8.5	H	3.0	38.2	1.0	-28.7	-13.0	-15.7	
2472.60	13.7	H	3.0	38.8	1.0	-24.1	-13.0	-11.1	
3296.80	0.6	H	3.0	39.4	1.0	-37.8	-13.0	-24.8	
4121.00	7.6	H	3.0	39.8	1.0	-31.2	-13.0	-18.2	
4945.20	8.9	H	3.0	39.8	1.0	-29.9	-13.0	-16.9	
5796.00	-6.9	H	3.0	40.0	1.0	-45.9	-13.0	-32.9	
Mid Ch, 836.6MHz									
1673.20	16.8	V	3.0	38.2	1.0	-20.4	-13.0	-7.4	
2509.80	13.1	V	3.0	38.8	1.0	-24.8	-13.0	-11.8	
3346.40	5.4	V	3.0	39.5	1.0	-33.1	-13.0	-20.1	
4183.00	8.7	V	3.0	39.8	1.0	-30.1	-13.0	-17.1	
5019.60	5.9	V	3.0	39.8	1.0	-32.8	-13.0	-19.8	
5856.20	12.0	V	3.0	40.0	1.0	-27.0	-13.0	-14.0	
1673.20	2.4	H	3.0	38.2	1.0	-34.9	-13.0	-21.9	
2509.80	11.4	H	3.0	38.8	1.0	-26.4	-13.0	-13.4	
3346.40	0.7	H	3.0	39.5	1.0	-37.8	-13.0	-24.8	
4183.00	7.9	H	3.0	39.8	1.0	-30.9	-13.0	-17.9	
5019.60	4.1	H	3.0	39.8	1.0	-34.7	-13.0	-21.7	
5856.20	7.8	H	3.0	40.0	1.0	-31.3	-13.0	-18.3	
High Ch, 848.8MHz									
1697.60	18.8	V	3.0	38.2	1.0	-18.5	-13.0	-5.5	
2546.40	12.2	V	3.0	38.9	1.0	-25.7	-13.0	-12.7	
3395.20	3.1	V	3.0	39.5	1.0	-35.4	-13.0	-22.4	
4244.00	9.6	V	3.0	39.8	1.0	-29.2	-13.0	-16.2	
5092.80	3.8	V	3.0	39.8	1.0	-35.0	-13.0	-22.0	
5941.60	11.6	V	3.0	40.1	1.0	-27.5	-13.0	-14.5	
1697.60	14.5	H	3.0	38.2	1.0	-22.7	-13.0	-9.7	
2546.40	12.2	H	3.0	38.9	1.0	-25.7	-13.0	-12.7	
3395.20	-1.2	H	3.0	39.5	1.0	-39.7	-13.0	-26.7	
4244.00	9.0	H	3.0	39.8	1.0	-29.8	-13.0	-16.8	
5092.80	1.9	H	3.0	39.8	1.0	-36.9	-13.0	-23.9	
5941.60	12.5	H	3.0	40.1	1.0	-26.5	-13.0	-13.5	

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GSM1900

GSM1900

GPRS

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

Company: Samsung
Project #: 12810836
Date: 2019-04-22
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 1
Mode: GPRS 1900 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3700.40	7.1	V	3.0	43.8	1.0	-35.7	-13.0	-22.7	
5550.60	4.9	V	3.0	43.7	1.0	-37.8	-13.0	-24.8	
7400.80	-0.4	V	3.0	42.5	1.0	-41.9	-13.0	-28.9	
3700.40	10.5	H	3.0	43.8	1.0	-32.3	-13.0	-19.3	
5550.60	11.8	H	3.0	43.7	1.0	-30.9	-13.0	-17.9	
7400.80	2.6	H	3.0	42.5	1.0	-39.0	-13.0	-26.0	
Mid Ch, 1880MHz									
3760.00	-2.6	V	3.0	43.8	1.0	-45.4	-13.0	-32.4	
5640.00	3.3	V	3.0	43.7	1.0	-39.4	-13.0	-26.4	
7520.00	-2.7	V	3.0	42.5	1.0	-44.2	-13.0	-31.2	
3760.00	-1.9	H	3.0	43.8	1.0	-44.7	-13.0	-31.7	
5640.00	4.7	H	3.0	43.7	1.0	-38.0	-13.0	-25.0	
7520.00	-2.8	H	3.0	42.5	1.0	-44.3	-13.0	-31.3	
High Ch, 1909.8MHz									
3819.60	-6.7	V	3.0	43.8	1.0	-49.5	-13.0	-36.5	
5729.40	2.8	V	3.0	43.7	1.0	-39.9	-13.0	-26.9	
7639.20	-2.7	V	3.0	42.4	1.0	-44.1	-13.0	-31.1	
3819.60	-2.4	H	3.0	43.8	1.0	-45.3	-13.0	-32.3	
5729.40	3.5	H	3.0	43.7	1.0	-39.2	-13.0	-26.2	
7639.20	-2.8	H	3.0	42.4	1.0	-44.2	-13.0	-31.2	

GSM1900

EGPRS

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

Company: Samsung
Project #: 12810836
Date: 2019-04-22
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 1
Mode: EGPRS 1900 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3700.40	0.7	V	3.0	43.8	1.0	-42.1	-13.0	-29.1	
5550.60	-1.9	V	3.0	43.7	1.0	-44.6	-13.0	-31.6	
7400.80	-2.6	V	3.0	42.5	1.0	-44.1	-13.0	-31.1	
3700.40	4.0	H	3.0	43.8	1.0	-38.8	-13.0	-25.8	
5550.60	4.2	H	3.0	43.7	1.0	-38.5	-13.0	-25.5	
7400.80	-2.2	H	3.0	42.5	1.0	-43.8	-13.0	-30.8	
Mid Ch, 1880MHz									
3760.00	-5.6	V	3.0	43.8	1.0	-48.4	-13.0	-35.4	
5640.00	-0.7	V	3.0	43.7	1.0	-43.4	-13.0	-30.4	
7520.00	-3.2	V	3.0	42.5	1.0	-44.6	-13.0	-31.6	
3760.00	-3.4	H	3.0	43.8	1.0	-46.2	-13.0	-33.2	
5640.00	1.8	H	3.0	43.7	1.0	-40.9	-13.0	-27.9	
7520.00	-3.2	H	3.0	42.5	1.0	-44.7	-13.0	-31.7	
High Ch, 1909.8MHz									
3819.60	-7.4	V	3.0	43.8	1.0	-50.2	-13.0	-37.2	
5729.40	-3.5	V	3.0	43.7	1.0	-46.2	-13.0	-33.2	
7639.20	-2.9	V	3.0	42.4	1.0	-44.3	-13.0	-31.3	
3819.60	-3.6	H	3.0	43.8	1.0	-46.4	-13.0	-33.4	
5729.40	-1.0	H	3.0	43.7	1.0	-43.7	-13.0	-30.7	
7639.20	-2.9	H	3.0	42.4	1.0	-44.3	-13.0	-31.3	

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WCDMA Band 5

WCDMA

Band 5
REL99

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

Company: Samsung
Project #: 12810836
Date: 2019-04-18
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 2
Mode: Rel99 Band 5 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1652.80	-10.7	V	3.0	38.2	1.0	-47.9	-13.0	-34.9	
2479.20	-11.9	V	3.0	38.8	1.0	-49.7	-13.0	-36.7	
3305.60	-10.2	V	3.0	39.4	1.0	-48.7	-13.0	-35.7	
1652.80	-15.7	H	3.0	38.2	1.0	-52.9	-13.0	-39.9	
2479.20	-12.3	H	3.0	38.8	1.0	-50.1	-13.0	-37.1	
3305.60	-10.5	H	3.0	39.4	1.0	-48.9	-13.0	-35.9	
Mid Ch, 836.6MHz									
1673.20	-12.4	V	3.0	38.2	1.0	-49.6	-13.0	-36.6	
2509.80	-12.0	V	3.0	38.8	1.0	-49.8	-13.0	-36.8	
3346.40	-9.4	V	3.0	39.5	1.0	-47.9	-13.0	-34.9	
1673.20	-13.7	H	3.0	38.2	1.0	-50.9	-13.0	-37.9	
2509.80	-12.7	H	3.0	38.8	1.0	-50.5	-13.0	-37.5	
3346.40	-10.0	H	3.0	39.5	1.0	-48.4	-13.0	-35.4	
High Ch, 846.6MHz									
1693.20	-1.4	V	3.0	38.2	1.0	-38.7	-13.0	-25.7	
2539.80	-12.2	V	3.0	38.9	1.0	-50.0	-13.0	-37.0	
3386.40	-9.4	V	3.0	39.5	1.0	-47.9	-13.0	-34.9	
1693.20	-0.1	H	3.0	38.2	1.0	-37.3	-13.0	-24.3	
2539.80	-12.4	H	3.0	38.9	1.0	-50.3	-13.0	-37.3	
3386.40	-9.8	H	3.0	39.5	1.0	-48.2	-13.0	-35.2	

WCDMA

Band 5
HSDPA

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

Company: Samsung
Project #: 12810836
Date: 2019-04-18
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 2
Mode: HSDPA Band 5 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1652.80	-12.4	V	3.0	38.2	1.0	-49.6	-13.0	-36.6	
2479.20	-12.1	V	3.0	38.8	1.0	-49.9	-13.0	-36.9	
3305.60	-10.2	V	3.0	39.4	1.0	-48.7	-13.0	-35.7	
1652.80	-15.7	H	3.0	38.2	1.0	-52.9	-13.0	-39.9	
2479.20	-12.4	H	3.0	38.8	1.0	-50.2	-13.0	-37.2	
3305.60	-10.5	H	3.0	39.4	1.0	-48.9	-13.0	-35.9	
Mid Ch, 836.6MHz									
1673.20	-12.8	V	3.0	38.2	1.0	-50.0	-13.0	-37.0	
2509.80	-12.0	V	3.0	38.8	1.0	-49.8	-13.0	-36.8	
3346.40	-9.5	V	3.0	39.5	1.0	-47.9	-13.0	-34.9	
1673.20	-15.2	H	3.0	38.2	1.0	-52.5	-13.0	-39.5	
2509.80	-12.7	H	3.0	38.8	1.0	-50.6	-13.0	-37.6	
3346.40	-10.0	H	3.0	39.5	1.0	-48.5	-13.0	-35.5	
High Ch, 846.6MHz									
1693.20	-3.7	V	3.0	38.2	1.0	-40.9	-13.0	-27.9	
2539.80	-11.6	V	3.0	38.9	1.0	-49.5	-13.0	-36.5	
3386.40	-9.3	V	3.0	39.5	1.0	-47.8	-13.0	-34.8	
1693.20	-3.2	H	3.0	38.2	1.0	-40.4	-13.0	-27.4	
2539.80	-12.5	H	3.0	38.9	1.0	-50.4	-13.0	-37.4	
3386.40	-9.3	H	3.0	39.5	1.0	-47.8	-13.0	-34.8	

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WCDMA Band 4

WCDMA

Band 4
REL99

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

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: Rel99 Band 4 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.4MHz									
3424.80	-8.8	V	3.0	43.7	1.0	-51.5	-13.0	-38.5	
5137.20	9.5	V	3.0	43.8	1.0	-33.3	-13.0	-20.3	
6849.60	-5.4	V	3.0	42.9	1.0	-47.3	-13.0	-34.3	
3424.80	-8.7	H	3.0	43.7	1.0	-51.4	-13.0	-38.4	
5137.20	14.3	H	3.0	43.8	1.0	-28.5	-13.0	-15.5	
6849.60	-5.0	H	3.0	42.9	1.0	-46.9	-13.0	-33.9	
Mid Ch, 1732.6MHz									
3465.20	-8.9	V	3.0	43.7	1.0	-51.5	-13.0	-38.5	
5197.80	13.2	V	3.0	43.8	1.0	-29.6	-13.0	-16.6	
6930.40	-5.5	V	3.0	42.8	1.0	-47.2	-13.0	-34.2	
3465.20	-8.6	H	3.0	43.7	1.0	-51.3	-13.0	-38.3	
5197.80	15.2	H	3.0	43.8	1.0	-27.5	-13.0	-14.5	
6930.40	-5.2	H	3.0	42.8	1.0	-47.0	-13.0	-34.0	
High Ch, 1752.6MHz									
3505.20	-8.4	V	3.0	43.7	1.0	-51.1	-13.0	-38.1	
5257.80	12.5	V	3.0	43.8	1.0	-30.2	-13.0	-17.2	
7010.40	-5.2	V	3.0	42.7	1.0	-46.9	-13.0	-33.9	
3505.20	-8.4	H	3.0	43.7	1.0	-51.1	-13.0	-38.1	
5257.80	16.6	H	3.0	43.8	1.0	-26.2	-13.0	-13.2	
7010.40	-5.3	H	3.0	42.7	1.0	-47.0	-13.0	-34.0	

WCDMA

Band 4
HSDPA

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

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: HSDPA Band 4 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.4MHz									
3424.80	-9.4	V	3.0	43.7	1.0	-52.1	-13.0	-39.1	
5137.20	2.5	V	3.0	43.8	1.0	-40.3	-13.0	-27.3	
6849.60	-5.0	V	3.0	42.9	1.0	-46.9	-13.0	-33.9	
3424.80	-8.1	H	3.0	43.7	1.0	-50.8	-13.0	-37.8	
5137.20	8.9	H	3.0	43.8	1.0	-33.9	-13.0	-20.9	
6849.60	-5.4	H	3.0	42.9	1.0	-47.3	-13.0	-34.3	
Mid Ch, 1732.6MHz									
3465.20	-8.6	V	3.0	43.7	1.0	-51.3	-13.0	-38.3	
5197.80	8.4	V	3.0	43.8	1.0	-34.3	-13.0	-21.3	
6930.40	-5.3	V	3.0	42.8	1.0	-47.0	-13.0	-34.0	
3465.20	-8.8	H	3.0	43.7	1.0	-51.5	-13.0	-38.5	
5197.80	7.5	H	3.0	43.8	1.0	-35.2	-13.0	-22.2	
6930.40	-5.0	H	3.0	42.8	1.0	-46.8	-13.0	-33.8	
High Ch, 1752.6MHz									
3505.20	-8.3	V	3.0	43.7	1.0	-51.0	-13.0	-38.0	
5257.80	9.5	V	3.0	43.8	1.0	-33.2	-13.0	-20.2	
7010.40	-5.3	V	3.0	42.7	1.0	-47.0	-13.0	-34.0	
3505.20	-8.7	H	3.0	43.7	1.0	-51.4	-13.0	-38.4	
5257.80	14.5	H	3.0	43.8	1.0	-28.3	-13.0	-15.3	
7010.40	-5.2	H	3.0	42.7	1.0	-46.9	-13.0	-33.9	

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WCDMA Band 2

WCDMA

Band 2
REL99

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

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: Rel99 Band 2 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	-8.2	V	3.0	43.8	1.0	-51.0	-13.0	-38.0	
5557.20	12.0	V	3.0	43.7	1.0	-30.7	-13.0	-17.7	
7409.60	-5.5	V	3.0	42.5	1.0	-47.0	-13.0	-34.0	
3704.80	-9.0	H	3.0	43.8	1.0	-51.8	-13.0	-38.8	
5557.20	15.5	H	3.0	43.7	1.0	-27.2	-13.0	-14.2	
7409.60	-5.6	H	3.0	42.5	1.0	-47.2	-13.0	-34.2	
Mid Ch, 1880MHz									
3760.00	-5.6	V	3.0	43.8	1.0	-48.3	-13.0	-35.3	
5640.00	13.2	V	3.0	43.7	1.0	-29.5	-13.0	-16.5	
7520.00	-5.5	V	3.0	42.5	1.0	-47.0	-13.0	-34.0	
3760.00	-7.1	H	3.0	43.8	1.0	-49.9	-13.0	-36.9	
5640.00	18.4	H	3.0	43.7	1.0	-24.3	-13.0	-11.3	
7520.00	-5.5	H	3.0	42.5	1.0	-47.0	-13.0	-34.0	
High Ch, 1907.6MHz									
3815.20	-2.1	V	3.0	43.8	1.0	-44.9	-13.0	-31.9	
5722.80	14.0	V	3.0	43.7	1.0	-28.7	-13.0	-15.7	
7630.40	-5.3	V	3.0	42.4	1.0	-46.7	-13.0	-33.7	
3815.20	-4.1	H	3.0	43.8	1.0	-47.0	-13.0	-34.0	
5722.80	16.8	H	3.0	43.7	1.0	-25.9	-13.0	-12.9	
7630.40	-5.1	H	3.0	42.4	1.0	-46.5	-13.0	-33.5	

WCDMA

Band 2
HSDPA

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

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: HSDPA Band 2 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	1.4	V	3.0	43.8	1.0	-41.4	-13.0	-28.4	
5557.20	9.8	V	3.0	43.7	1.0	-32.9	-13.0	-19.9	
7409.60	-5.6	V	3.0	42.5	1.0	-47.1	-13.0	-34.1	
3704.80	-9.6	H	3.0	43.8	1.0	-52.4	-13.0	-39.4	
5557.20	12.7	H	3.0	43.7	1.0	-30.1	-13.0	-17.1	
7409.60	-5.2	H	3.0	42.5	1.0	-46.7	-13.0	-33.7	
Mid Ch, 1880MHz									
3760.00	-6.8	V	3.0	43.8	1.0	-49.6	-13.0	-36.6	
5640.00	11.1	V	3.0	43.7	1.0	-31.6	-13.0	-18.6	
7520.00	-5.3	V	3.0	42.5	1.0	-46.8	-13.0	-33.8	
3760.00	-7.6	H	3.0	43.8	1.0	-50.4	-13.0	-37.4	
5640.00	15.1	H	3.0	43.7	1.0	-27.6	-13.0	-14.6	
7520.00	-4.8	H	3.0	42.5	1.0	-46.3	-13.0	-33.3	
High Ch, 1907.6MHz									
3815.20	-3.5	V	3.0	43.8	1.0	-46.3	-13.0	-33.3	
5722.80	11.3	V	3.0	43.7	1.0	-31.4	-13.0	-18.4	
7630.40	-5.2	V	3.0	42.4	1.0	-46.6	-13.0	-33.6	
3815.20	-5.2	H	3.0	43.8	1.0	-48.0	-13.0	-35.0	
5722.80	14.2	H	3.0	43.7	1.0	-28.5	-13.0	-15.5	
7630.40	-5.0	H	3.0	42.4	1.0	-46.4	-13.0	-33.4	

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LTE Band 2

LTE

Band 2

5MHz

QPSK

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

Company:	Samsung
Project #:	12810836
Date:	2019-04-12
Test Engineer:	45585
Configuration:	EUT / AC Adapter/ Earphone, Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 2 Harmonics, 5MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.5MHz									
3705.00	-9.7	V	3.0	39.7	1.0	-48.3	-13.0	-35.3	
5557.50	-8.2	V	3.0	39.9	1.0	-47.1	-13.0	-34.1	
7410.00	-6.0	V	3.0	39.4	1.0	-44.5	-13.0	-31.5	
3705.00	-8.8	H	3.0	39.7	1.0	-47.5	-13.0	-34.5	
5557.50	-8.4	H	3.0	39.9	1.0	-47.3	-13.0	-34.3	
7410.00	-6.9	H	3.0	39.4	1.0	-45.4	-13.0	-32.4	
Mid Ch, 1880MHz									
3760.00	-7.0	V	3.0	39.7	1.0	-45.7	-13.0	-32.7	
5640.00	-5.4	V	3.0	40.0	1.0	-44.4	-13.0	-31.4	
7520.00	-6.2	V	3.0	39.4	1.0	-44.6	-13.0	-31.6	
3760.00	-2.8	H	3.0	39.7	1.0	-41.5	-13.0	-28.5	
5640.00	-6.4	H	3.0	40.0	1.0	-45.3	-13.0	-32.3	
7520.00	-6.9	H	3.0	39.4	1.0	-45.2	-13.0	-32.2	
High Ch, 1907.5MHz									
3815.00	-3.7	V	3.0	39.7	1.0	-42.4	-13.0	-29.4	
5722.50	-3.5	V	3.0	40.0	1.0	-42.5	-13.0	-29.5	
7630.00	-6.1	V	3.0	39.3	1.0	-44.5	-13.0	-31.5	
3815.00	2.2	H	3.0	39.7	1.0	-36.6	-13.0	-23.6	
5722.50	-5.0	H	3.0	40.0	1.0	-44.0	-13.0	-31.0	
7630.00	-6.9	H	3.0	39.3	1.0	-45.2	-13.0	-32.2	

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LTE Band 4

LTE

Band 4

15MHz

QPSK

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

Company: Samsung
Project #: 12810836
Date: 2019-04-13
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 4 Harmonics, 15MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1717.5MHz									
3435.00	-0.5	V	3.0	43.7	1.0	-43.1	-13.0	-30.1	
5152.50	-2.1	V	3.0	43.8	1.0	-44.9	-13.0	-31.9	
6870.00	-2.3	V	3.0	42.8	1.0	-44.1	-13.0	-31.1	
8587.50	-2.5	V	3.0	41.8	1.0	-43.3	-13.0	-30.3	
10305.00	0.6	V	3.0	40.6	1.0	-39.0	-13.0	-26.0	
3435.00	-0.2	H	3.0	43.7	1.0	-42.9	-13.0	-29.9	
5152.50	-3.1	H	3.0	43.8	1.0	-45.8	-13.0	-32.8	
6870.00	-2.7	H	3.0	42.8	1.0	-44.6	-13.0	-31.6	
8587.50	-2.5	H	3.0	41.8	1.0	-43.2	-13.0	-30.2	
10305.00	0.8	H	3.0	40.6	1.0	-38.9	-13.0	-25.9	
Mid Ch, 1732.5MHz									
3465.00	4.4	V	3.0	43.7	1.0	-38.3	-13.0	-25.3	
5197.50	-0.3	V	3.0	43.8	1.0	-43.0	-13.0	-30.0	
6930.00	0.4	V	3.0	42.8	1.0	-41.4	-13.0	-28.4	
8662.50	-2.5	V	3.0	41.7	1.0	-43.3	-13.0	-30.3	
10395.00	1.1	V	3.0	40.7	1.0	-38.6	-13.0	-25.6	
3465.00	3.0	H	3.0	43.7	1.0	-39.6	-13.0	-26.6	
5197.50	-0.9	H	3.0	43.8	1.0	-43.7	-13.0	-30.7	
6930.00	1.7	H	3.0	42.8	1.0	-40.1	-13.0	-27.1	
8662.50	-2.0	H	3.0	41.7	1.0	-42.8	-13.0	-29.8	
10395.00	0.8	H	3.0	40.7	1.0	-38.9	-13.0	-25.9	
High Ch, 1747.5MHz									
3495.00	1.5	V	3.0	43.7	1.0	-41.2	-13.0	-28.2	
5242.50	-1.4	V	3.0	43.8	1.0	-44.1	-13.0	-31.1	
6990.00	0.8	V	3.0	42.7	1.0	-41.0	-13.0	-28.0	
8737.50	-2.3	V	3.0	41.7	1.0	-43.0	-13.0	-30.0	
10485.00	1.3	V	3.0	40.7	1.0	-38.4	-13.0	-25.4	
3495.00	1.6	H	3.0	43.7	1.0	-41.1	-13.0	-28.1	
5242.50	-3.7	H	3.0	43.8	1.0	-46.4	-13.0	-33.4	
6990.00	0.6	H	3.0	42.7	1.0	-41.1	-13.0	-28.1	
8737.50	-2.3	H	3.0	41.7	1.0	-43.0	-13.0	-30.0	
10485.00	1.2	H	3.0	40.7	1.0	-38.5	-13.0	-25.5	

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LTE Band 5

LTE

Band 5

1.4MHz

QPSK

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

Company:	Samsung
Project #:	12810836
Date:	2019-04-18
Test Engineer:	45585
Configuration:	EUT / AC Adapter / Earphone, Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 5 Harmonics, 1.4MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.7MHz									
1649.40	-13.8	V	3.0	38.2	1.0	-51.1	-13.0	-38.1	
2474.10	-12.7	V	3.0	38.8	1.0	-50.5	-13.0	-37.5	
3298.80	-10.2	V	3.0	39.4	1.0	-48.6	-13.0	-35.6	
1649.40	-14.1	H	3.0	38.2	1.0	-51.3	-13.0	-38.3	
2474.10	-13.3	H	3.0	38.8	1.0	-51.1	-13.0	-38.1	
3298.80	-10.6	H	3.0	39.4	1.0	-49.0	-13.0	-36.0	
Mid Ch, 836.5MHz									
1673.00	-14.0	V	3.0	38.2	1.0	-51.2	-13.0	-38.2	
2509.50	-12.5	V	3.0	38.8	1.0	-50.3	-13.0	-37.3	
3346.00	-10.3	V	3.0	39.5	1.0	-48.7	-13.0	-35.7	
1673.00	-15.0	H	3.0	38.2	1.0	-52.3	-13.0	-39.3	
2509.50	-13.0	H	3.0	38.8	1.0	-50.8	-13.0	-37.8	
3346.00	-10.4	H	3.0	39.5	1.0	-48.9	-13.0	-35.9	
High Ch, 848.3MHz									
1696.60	0.3	V	3.0	38.2	1.0	-36.9	-13.0	-23.9	
2544.90	-12.4	V	3.0	38.9	1.0	-50.2	-13.0	-37.2	
3393.20	-10.0	V	3.0	39.5	1.0	-48.4	-13.0	-35.4	
1696.60	-1.7	H	3.0	38.2	1.0	-38.9	-13.0	-25.9	
2544.90	-12.8	H	3.0	38.9	1.0	-50.7	-13.0	-37.7	
3393.20	-10.2	H	3.0	39.5	1.0	-48.7	-13.0	-35.7	

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LTE Band 12

LTE

Band 12

3MHz

QPSK

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

Company:	Samsung
Project #:	12810836
Date:	2019-04-23
Test Engineer:	45585
Configuration:	ETU / AC Adapter /Earphone
Location:	Chamber 1
Mode:	LTE_QPSK Band 12 Harmonics, 3MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 700.5MHz									
1401.00	0.5	V	3.0	43.8	1.0	-42.3	-13.0	-29.3	
2101.50	7.1	V	3.0	43.3	1.0	-35.2	-13.0	-22.2	
2802.00	-1.2	V	3.0	43.5	1.0	-43.6	-13.0	-30.6	
3502.50	4.7	V	3.0	43.7	1.0	-38.0	-13.0	-25.0	
4203.00	3.0	V	3.0	43.9	1.0	-39.8	-13.0	-26.8	
4903.50	4.5	V	3.0	43.8	1.0	-38.3	-13.0	-25.3	
1401.00	2.0	H	3.0	43.8	1.0	-40.8	-13.0	-27.8	
2101.50	8.8	H	3.0	43.3	1.0	-33.5	-13.0	-20.5	
2802.00	-2.0	H	3.0	43.5	1.0	-44.5	-13.0	-31.5	
3502.50	5.3	H	3.0	43.7	1.0	-37.4	-13.0	-24.4	
4203.00	6.4	H	3.0	43.9	1.0	-36.5	-13.0	-23.5	
4903.50	6.7	H	3.0	43.8	1.0	-36.1	-13.0	-23.1	
Mid Ch, 707.5MHz									
1415.00	-1.6	V	3.0	43.8	1.0	-44.4	-13.0	-31.4	
2122.50	4.1	V	3.0	43.3	1.0	-38.3	-13.0	-25.3	
2830.00	-2.9	V	3.0	43.5	1.0	-45.4	-13.0	-32.4	
3537.50	4.0	V	3.0	43.7	1.0	-38.7	-13.0	-25.7	
4245.00	2.3	V	3.0	43.9	1.0	-40.6	-13.0	-27.6	
4952.50	1.3	V	3.0	43.8	1.0	-41.5	-13.0	-28.5	
1415.00	2.0	H	3.0	43.8	1.0	-40.8	-13.0	-27.8	
2122.50	4.8	H	3.0	43.3	1.0	-37.5	-13.0	-24.5	
2830.00	-1.6	H	3.0	43.5	1.0	-44.1	-13.0	-31.1	
3537.50	4.4	H	3.0	43.7	1.0	-38.4	-13.0	-25.4	
4245.00	3.8	H	3.0	43.9	1.0	-39.1	-13.0	-26.1	
4952.50	3.7	H	3.0	43.8	1.0	-39.1	-13.0	-26.1	
High Ch, 714.5MHz									
1429.00	-5.7	V	3.0	43.8	1.0	-48.5	-13.0	-35.5	
2143.50	-2.1	V	3.0	43.3	1.0	-44.4	-13.0	-31.4	
2858.00	-5.4	V	3.0	43.5	1.0	-47.9	-13.0	-34.9	
3572.50	0.8	V	3.0	43.7	1.0	-41.9	-13.0	-28.9	
4287.00	-1.1	V	3.0	43.8	1.0	-44.0	-13.0	-31.0	
5001.50	-5.5	V	3.0	43.8	1.0	-48.3	-13.0	-35.3	
1429.00	-3.1	H	3.0	43.8	1.0	-45.9	-13.0	-32.9	
2143.50	-1.1	H	3.0	43.3	1.0	-43.4	-13.0	-30.4	
2858.00	-5.2	H	3.0	43.5	1.0	-47.7	-13.0	-34.7	
3572.50	2.7	H	3.0	43.7	1.0	-40.0	-13.0	-27.0	
4287.00	0.1	H	3.0	43.8	1.0	-42.8	-13.0	-29.8	
5001.50	-3.6	H	3.0	43.8	1.0	-46.4	-13.0	-33.4	

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LTE Band 13

LTE

Band 13

5MHz

QPSK

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

Company:	Samsung
Project #:	12810836
Date:	2019-04-20
Test Engineer:	45585
Configuration:	EUT / AC Adapter / Earphone, Y-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 13 Harmonics, 5MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 779.5MHz									
1559.00	-10.0	V	3.0	43.7	1.0	-52.7	-40.0	-12.7	
2338.50	-10.8	V	3.0	43.4	1.0	-53.2	-13.0	-40.2	
3118.00	-10.3	V	3.0	43.6	1.0	-52.9	-13.0	-39.9	
1559.00	-14.6	H	3.0	43.7	1.0	-57.2	-40.0	-17.2	
2338.50	-12.0	H	3.0	43.4	1.0	-54.4	-13.0	-41.4	
3118.00	-11.0	H	3.0	43.6	1.0	-53.5	-13.0	-40.5	
Mid Ch, 782MHz									
1564.00	-4.5	V	3.0	43.7	1.0	-47.1	-40.0	-7.1	
2346.00	-11.5	V	3.0	43.4	1.0	-53.9	-13.0	-40.9	
3128.00	-10.8	V	3.0	43.6	1.0	-53.4	-13.0	-40.4	
1564.00	-8.9	H	3.0	43.7	1.0	-51.5	-40.0	-11.5	
2346.00	-12.4	H	3.0	43.4	1.0	-54.8	-13.0	-41.8	
3128.00	-10.7	H	3.0	43.6	1.0	-53.3	-13.0	-40.3	
High Ch, 784.5MHz									
1569.00	-11.7	V	3.0	43.7	1.0	-54.4	-40.0	-14.4	
2353.50	-11.8	V	3.0	43.4	1.0	-54.2	-13.0	-41.2	
3138.00	-10.7	V	3.0	43.6	1.0	-53.2	-13.0	-40.2	
1569.00	-12.7	H	3.0	43.7	1.0	-55.4	-40.0	-15.4	
2353.50	-12.8	H	3.0	43.4	1.0	-55.2	-13.0	-42.2	
3138.00	-10.8	H	3.0	43.6	1.0	-53.3	-13.0	-40.3	

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LTE Band 41

LTE

Band 41

10MHz

QPSK

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

Company: Samsung
Project #: 12810836
Date: 2019-04-12
Test Engineer: 45585
Configuration: EUT / AC Adpater / Earphone, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 41 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 2501MHz									
5002.00	-8.7	V	3.0	43.8	1.0	-51.5	-25.0	-26.5	
7503.00	-6.5	V	3.0	42.5	1.0	-47.9	-25.0	-22.9	
10004.00	-0.6	V	3.0	40.6	1.0	-40.2	-25.0	-15.2	
12505.00	-2.6	V	3.0	41.6	1.0	-43.3	-25.0	-18.3	
15006.00	-6.3	V	3.0	43.7	1.0	-49.0	-25.0	-24.0	
5002.00	-8.2	H	3.0	43.8	1.0	-51.0	-25.0	-26.0	
7503.00	-8.6	H	3.0	42.5	1.0	-50.1	-25.0	-25.1	
10004.00	-3.9	H	3.0	40.6	1.0	-43.5	-25.0	-18.5	
12505.00	-7.1	H	3.0	41.6	1.0	-47.7	-25.0	-22.7	
15006.00	-7.8	H	3.0	43.7	1.0	-50.5	-25.0	-25.5	
Mid Ch, 2593MHz									
5186.00	-11.3	V	3.0	43.8	1.0	-54.0	-25.0	-29.0	
7779.00	-7.1	V	3.0	42.3	1.0	-48.4	-25.0	-23.4	
10372.00	-2.5	V	3.0	40.7	1.0	-42.2	-25.0	-17.2	
12965.00	-4.4	V	3.0	42.0	1.0	-45.4	-25.0	-20.4	
15558.00	-6.9	V	3.0	43.0	1.0	-49.0	-25.0	-24.0	
5186.00	-12.3	H	3.0	43.8	1.0	-55.1	-25.0	-30.1	
7779.00	-7.8	H	3.0	42.3	1.0	-49.1	-25.0	-24.1	
10372.00	-6.1	H	3.0	40.7	1.0	-45.8	-25.0	-20.8	
12965.00	-7.7	H	3.0	42.0	1.0	-48.7	-25.0	-23.7	
15558.00	-7.3	H	3.0	43.0	1.0	-49.3	-25.0	-24.3	
High Ch, 2685MHz									
5370.00	-2.5	V	3.0	43.7	1.0	-45.3	-25.0	-20.3	
8055.00	4.9	V	3.0	42.2	1.0	-36.3	-25.0	-11.3	
10740.00	3.3	V	3.0	40.8	1.0	-36.4	-25.0	-11.4	
13425.00	0.7	V	3.0	42.4	1.0	-40.7	-25.0	-15.7	
16110.00	-6.9	V	3.0	42.4	1.0	-48.3	-25.0	-23.3	
5370.00	-3.0	H	3.0	43.7	1.0	-45.8	-25.0	-20.8	
8055.00	1.9	H	3.0	42.2	1.0	-39.2	-25.0	-14.2	
10740.00	-1.1	H	3.0	40.8	1.0	-40.9	-25.0	-15.9	
13425.00	-4.4	H	3.0	42.4	1.0	-45.7	-25.0	-20.7	
16110.00	-7.0	H	3.0	42.4	1.0	-48.4	-25.0	-23.4	

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LTE Band 66

LTE

Band 66

5MHz
QPSK

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

Company: Samsung
Project #: 12810836
Date: 2019-04-22
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 Harmonics, 5MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.5MHz									
3425.00	-7.3	V	3.0	43.7	1.0	-50.0	-13.0	-37.0	
5137.50	-6.4	V	3.0	43.8	1.0	-49.2	-13.0	-36.2	
6850.00	-6.1	V	3.0	42.9	1.0	-48.0	-13.0	-35.0	
3425.00	-4.4	H	3.0	43.7	1.0	-47.1	-13.0	-34.1	
5137.50	-5.8	H	3.0	43.8	1.0	-48.6	-13.0	-35.6	
6850.00	-6.1	H	3.0	42.9	1.0	-47.9	-13.0	-34.9	
Mid Ch, 1745MHz									
3490.00	-8.9	V	3.0	43.7	1.0	-51.6	-13.0	-38.6	
5235.00	-8.0	V	3.0	43.8	1.0	-50.8	-13.0	-37.8	
6980.00	-5.9	V	3.0	42.7	1.0	-47.7	-13.0	-34.7	
3490.00	-8.3	H	3.0	43.7	1.0	-51.0	-13.0	-38.0	
5235.00	-8.0	H	3.0	43.8	1.0	-50.7	-13.0	-37.7	
6980.00	-5.9	H	3.0	42.7	1.0	-47.7	-13.0	-34.7	
High Ch, 1777.5MHz									
3555.00	-7.5	V	3.0	43.7	1.0	-50.2	-13.0	-37.2	
5332.50	-7.0	V	3.0	43.7	1.0	-49.7	-13.0	-36.7	
7110.00	-5.8	V	3.0	42.7	1.0	-47.5	-13.0	-34.5	
3555.00	-7.7	H	3.0	43.7	1.0	-50.4	-13.0	-37.4	
5332.50	-6.6	H	3.0	43.7	1.0	-49.3	-13.0	-36.3	
7110.00	-5.7	H	3.0	42.7	1.0	-47.4	-13.0	-34.4	

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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