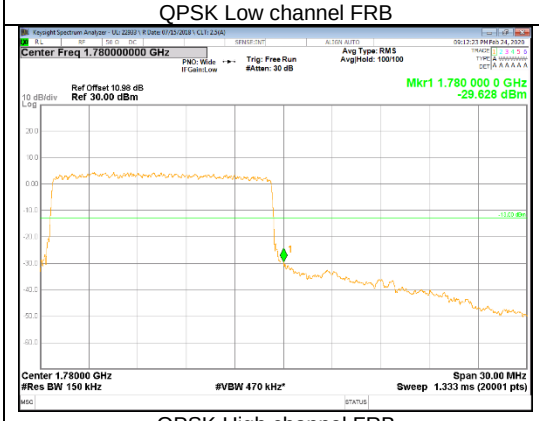
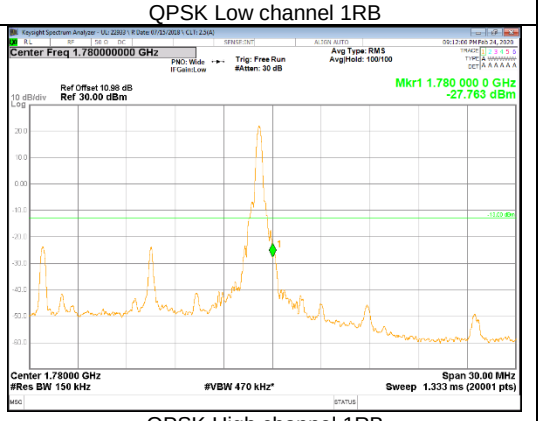
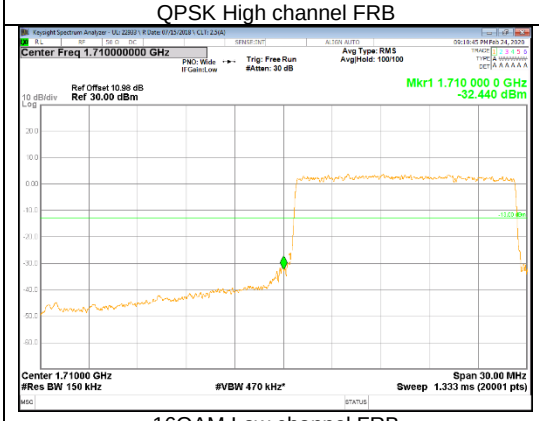
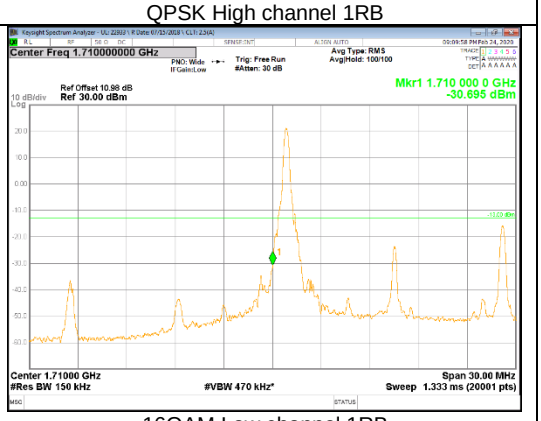
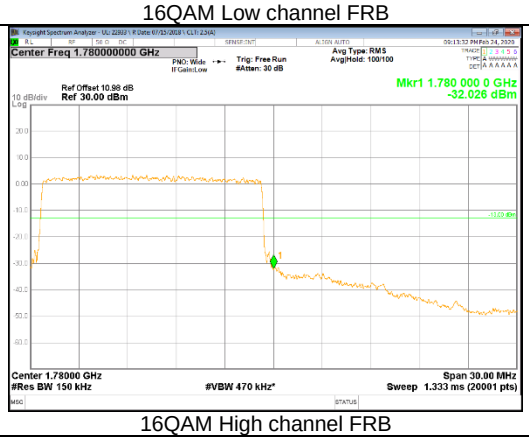
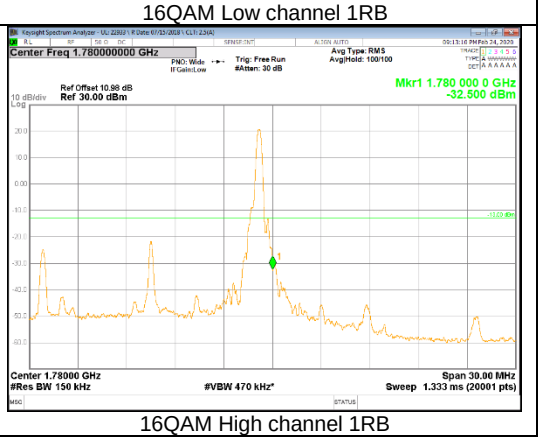
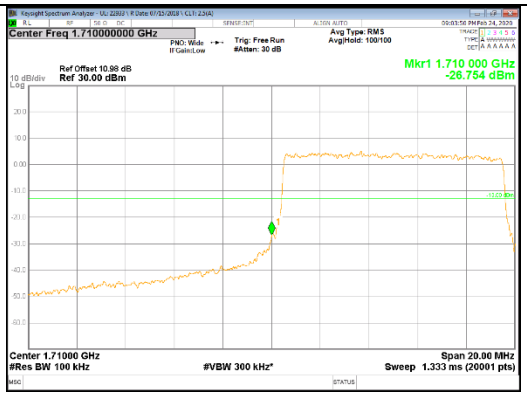
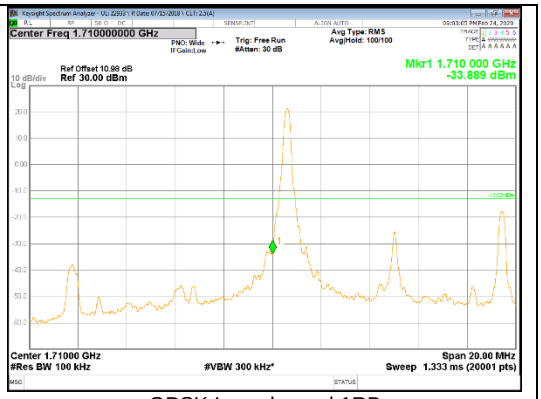
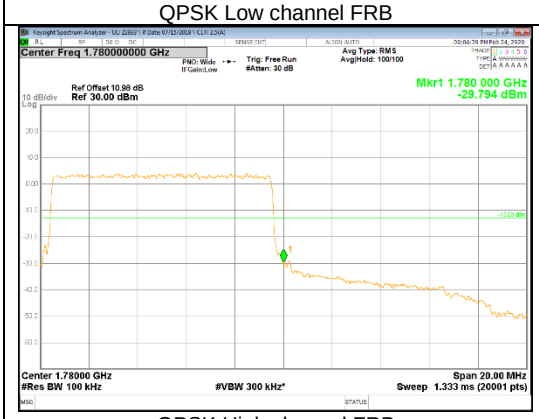
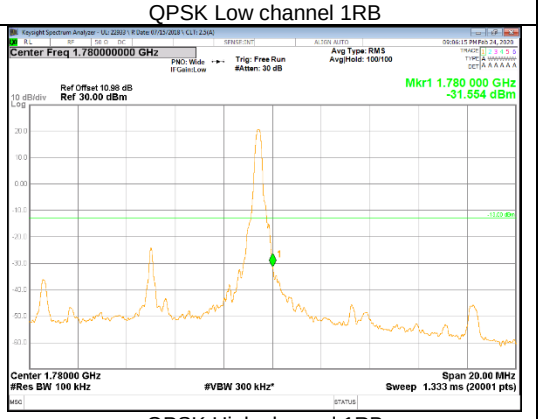
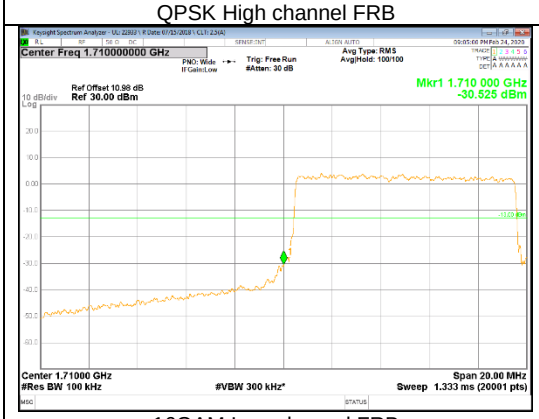
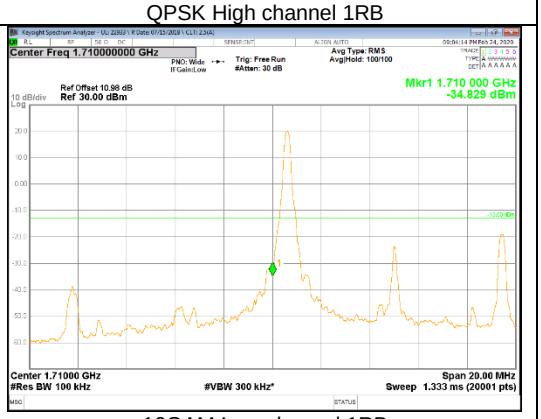
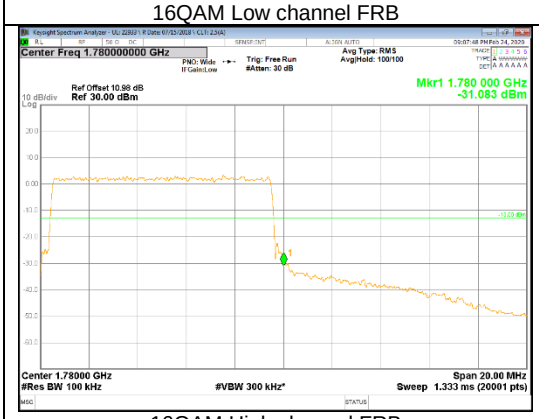
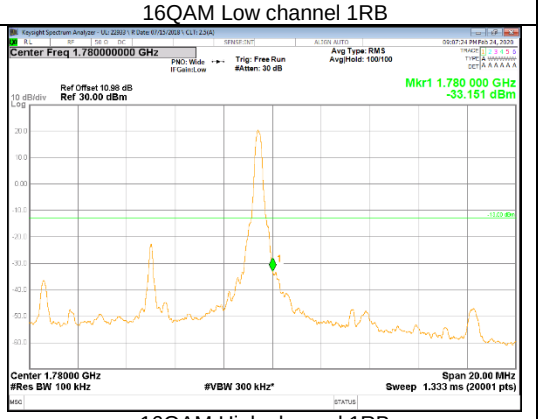
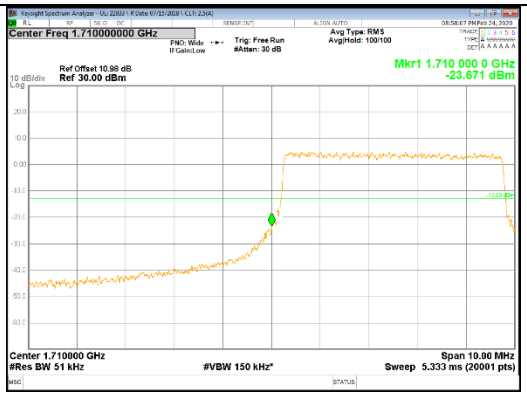
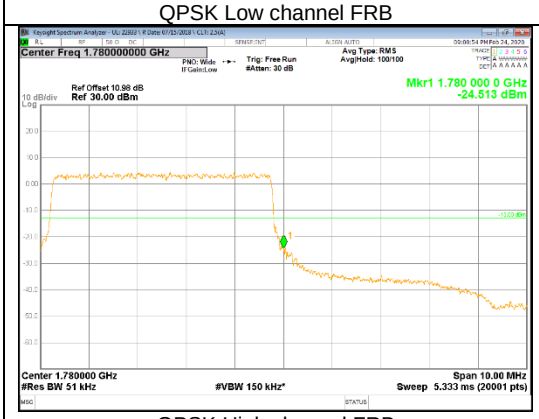
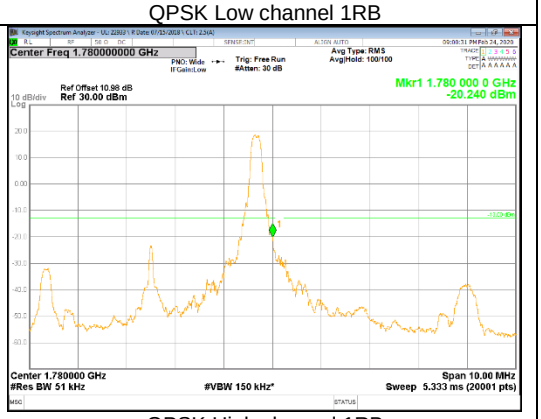
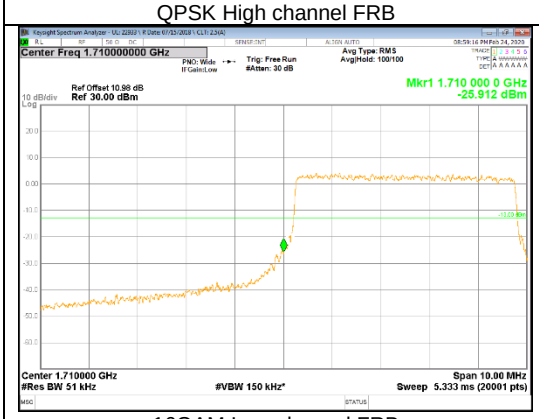
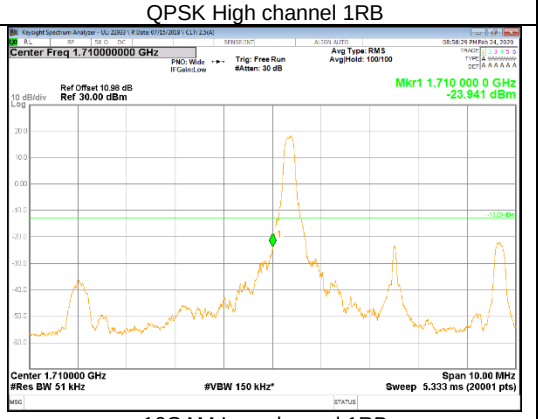
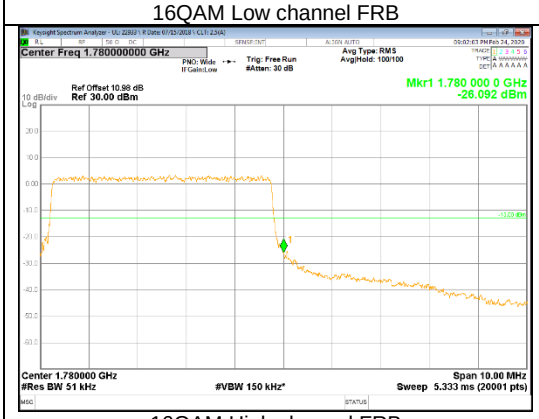
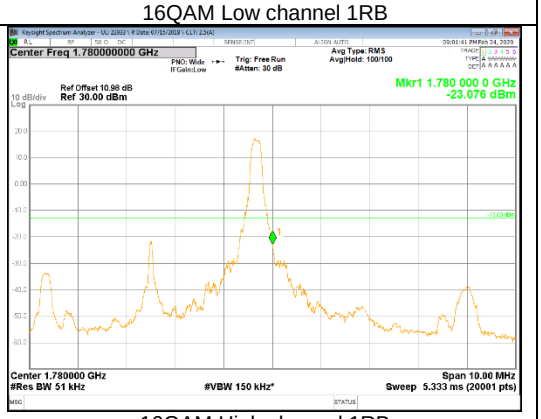
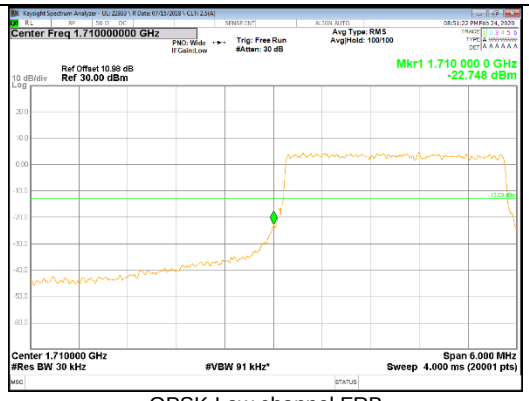
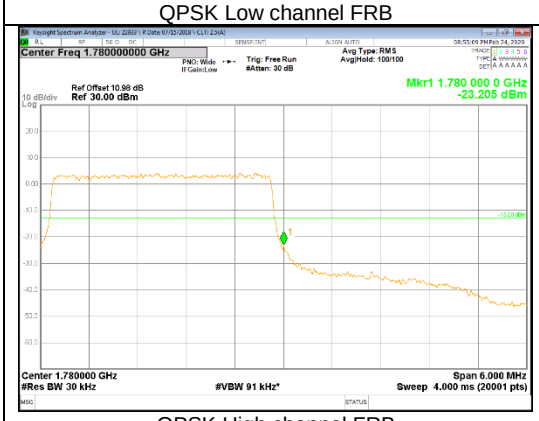
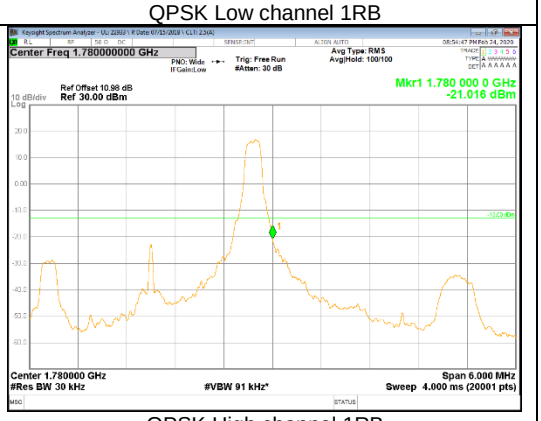
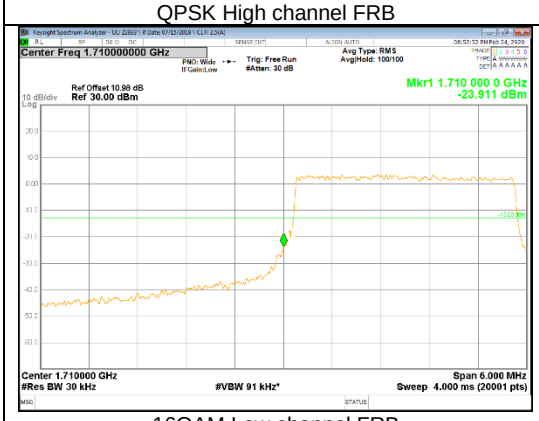
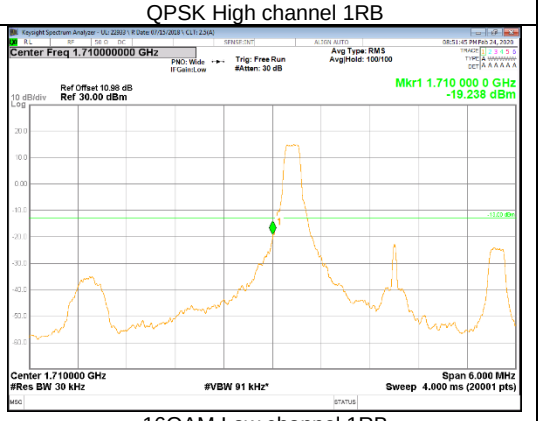
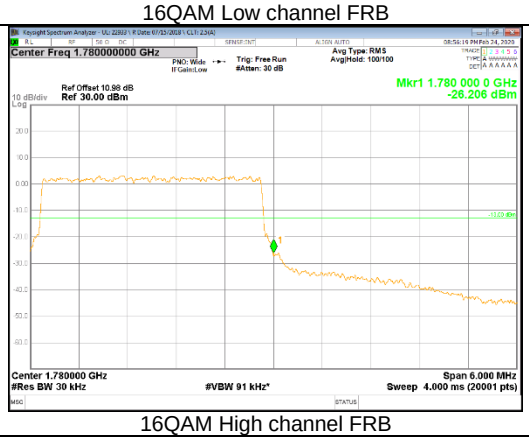
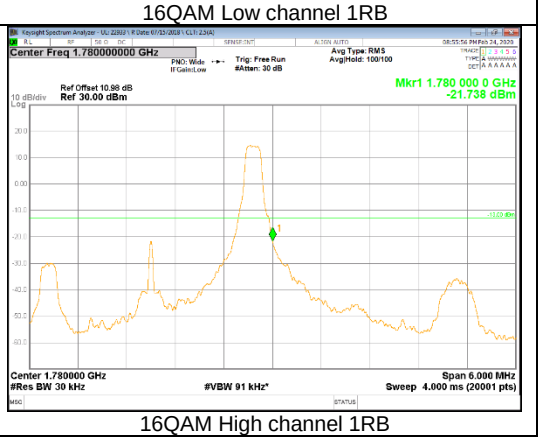
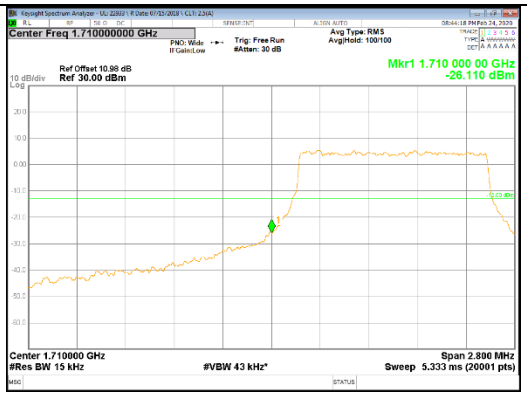
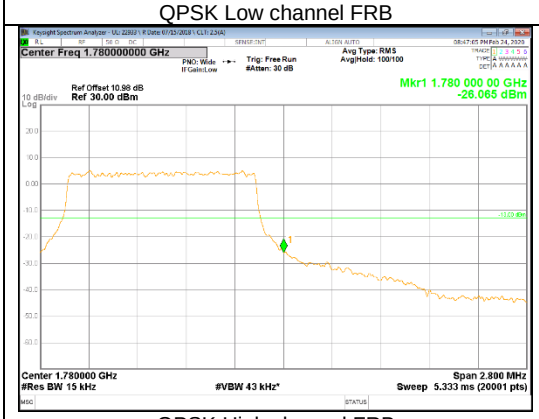
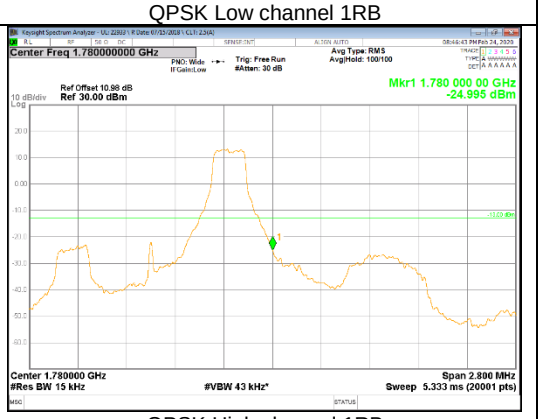
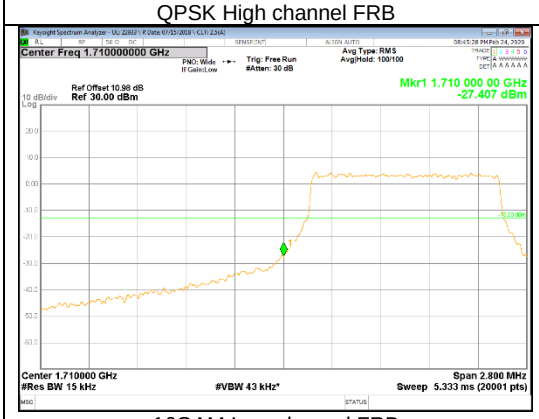
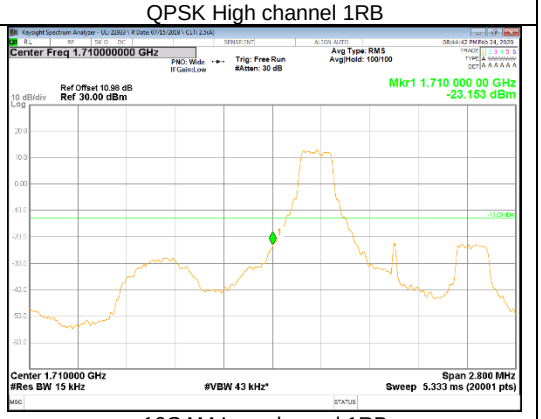
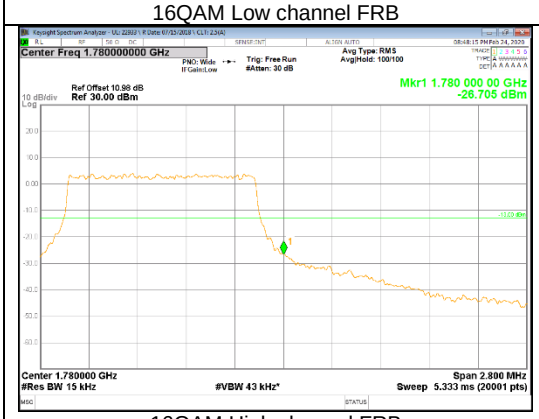
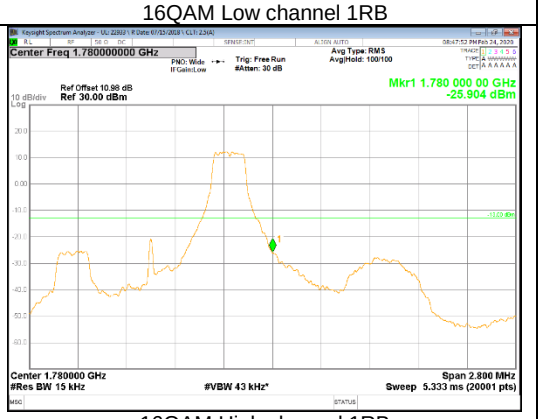
Band 66 15MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB
	 QPSK High channel FRB	 QPSK High channel 1RB
	 16QAM Low channel FRB	 16QAM Low channel 1RB
	 16QAM High channel FRB	 16QAM High channel 1RB

Band 66 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

Band 66 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

Band 66 3MHz	 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

Band 66 1.4MHz	 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

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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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9.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238 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.

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.

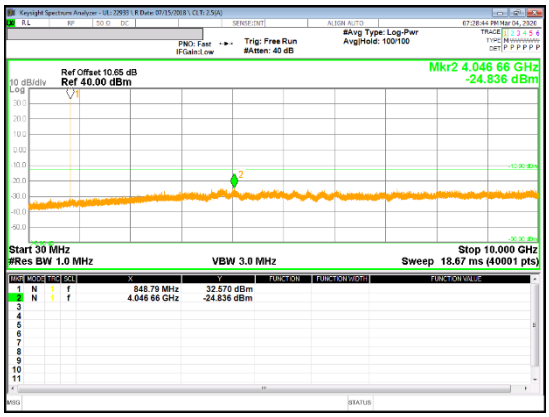
9.3.1. OUT OF BAND EMISSIONS RESULT

GSM 850

GSM 850

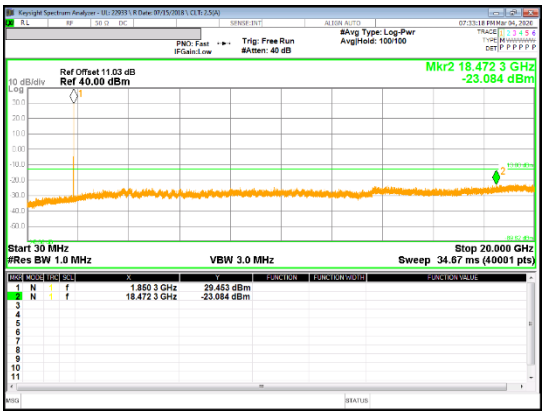
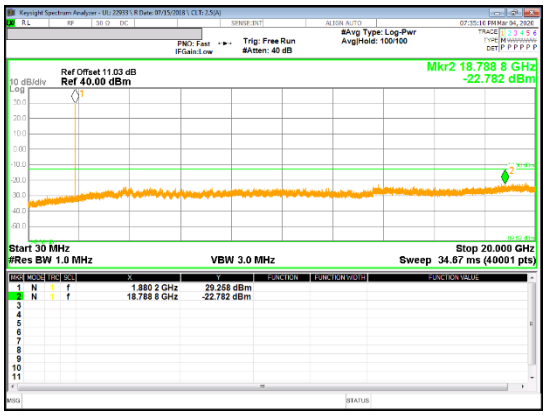
GSM850 GPRS Low channel

GSM850 GPRS Mid channel

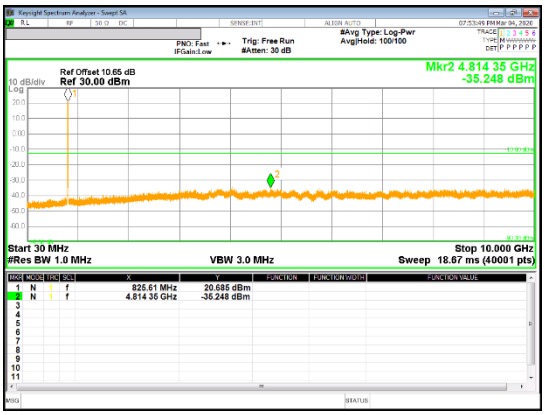
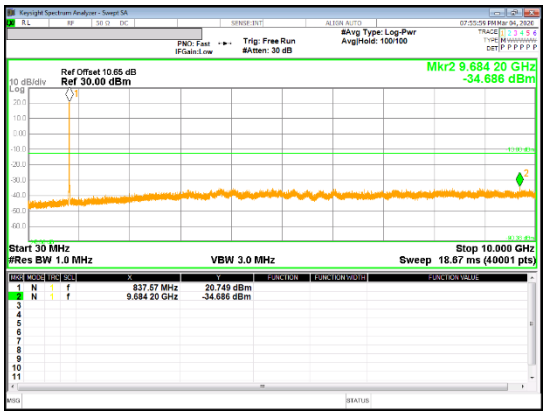


GSM850 GPRS High channel

GSM 1900

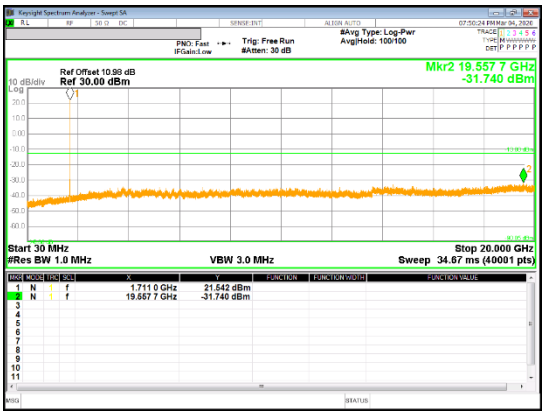
GSM 1900	 GSM1900 GPRS Low channel	 GSM1900 GPRS Mid channel
	 GSM1900 GPRS High channel	

WCDMA Band 5

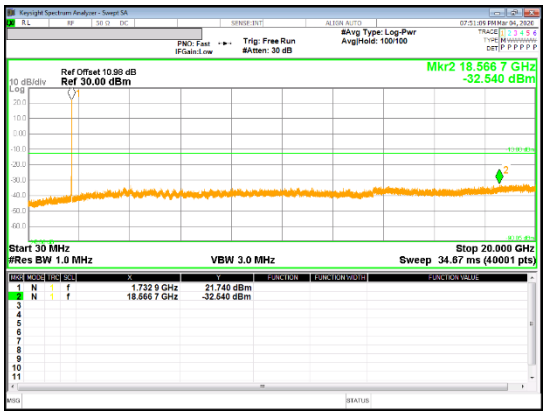
Band 5	 REL99 Low channel	 REL99 Mid channel
	 REL99 High channel	

WCDMA Band 4

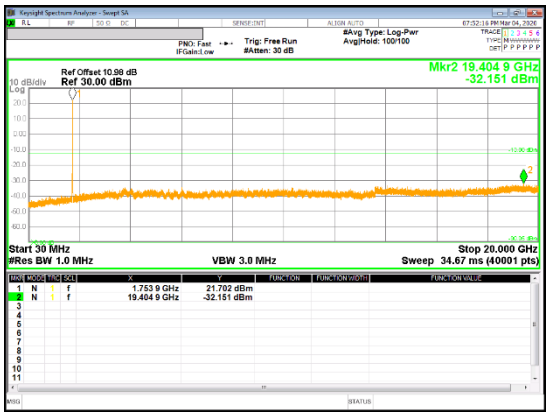
Band 4



REL99 Low channel



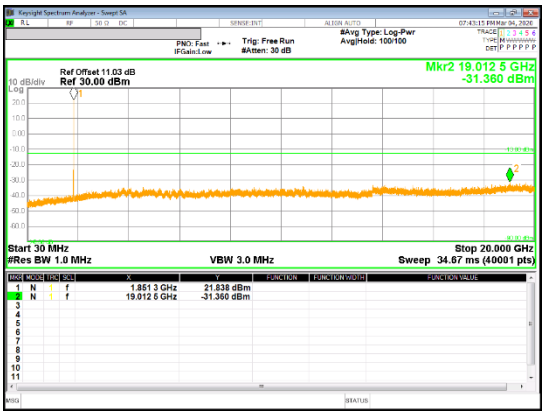
REL99 Mid channel



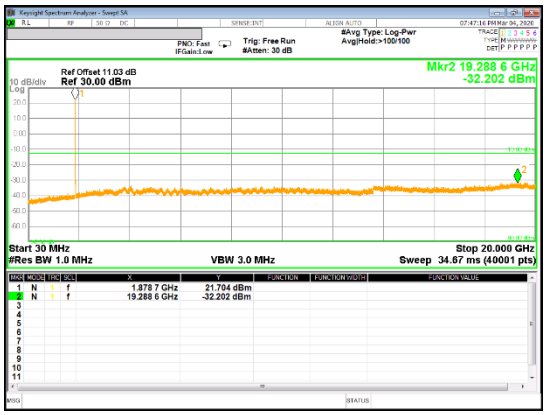
REL99 High channel

WCDMA Band 2

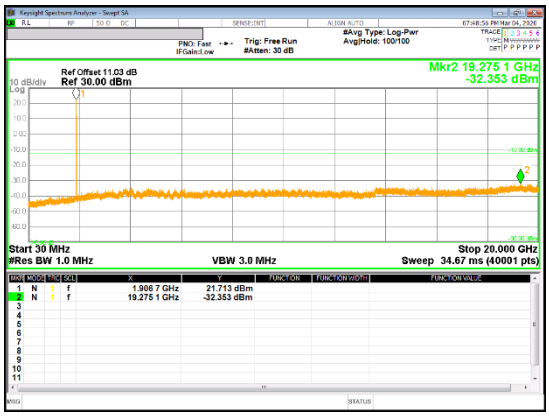
Band 2



REL99 Low channel



REL99 Mid channel

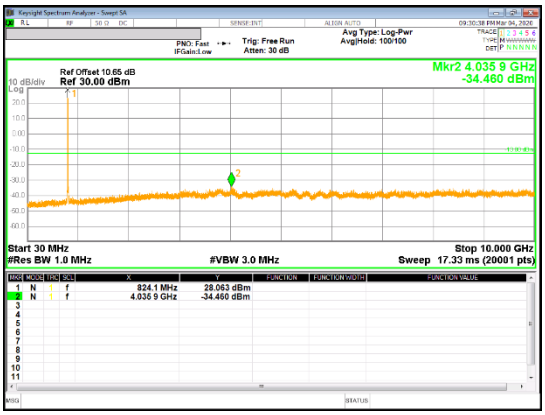
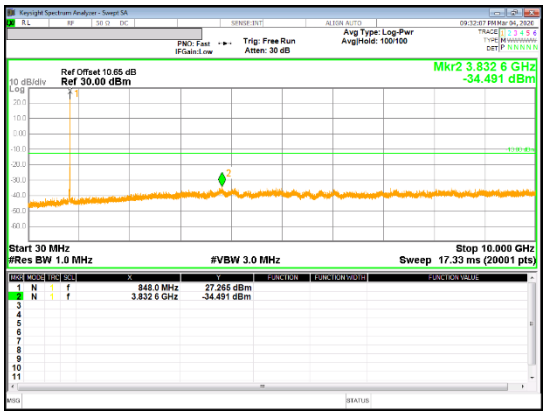


REL99 High channel

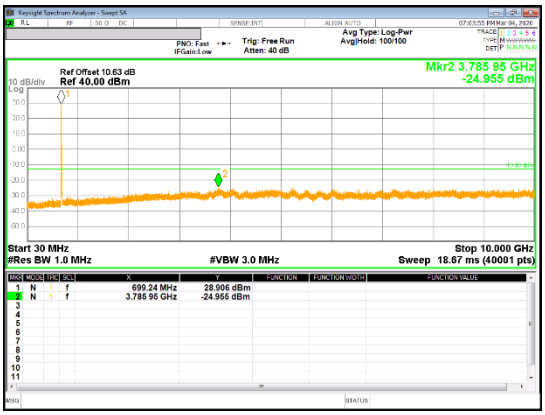
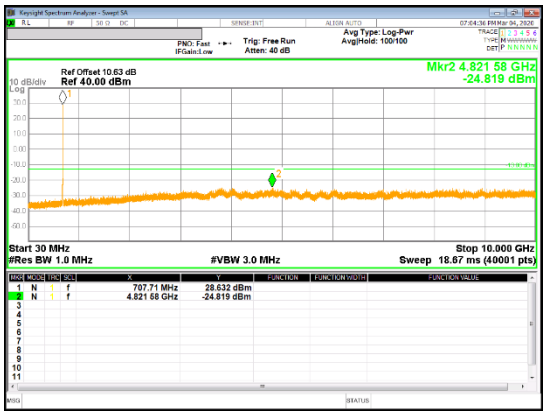
LTE Band 2

Band 2 1.4MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

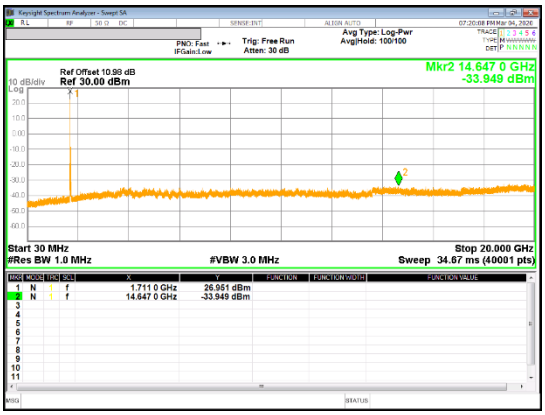
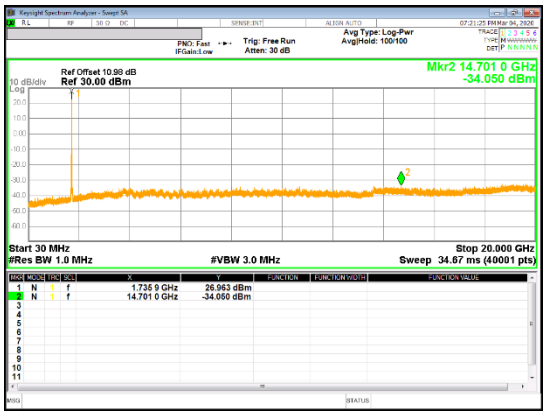
LTE Band 5

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

LTE Band 12

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

LTE Band 66

Band 66 20MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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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9.4. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

RESULTS

See the following pages.

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)

9.4.1. 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 [*C]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	824.19998750	0.002	848.79999236	-0.008	2.5
3.85	40	824.19998830	0.001	848.79999164	-0.007	2.5
3.85	30	824.19998635	0.003	848.79998788	-0.002	2.5
3.85	***20***	***824.19998875***	***0.000***	***848.79998596***	***0.000***	***2.5***
3.85	10	824.19999417	-0.007	848.79999460	-0.010	2.5
3.85	0	824.19999029	-0.002	848.79999345	-0.009	2.5
3.85	-10	824.19999447	-0.007	848.79999573	-0.012	2.5
3.85	-20	824.19998328	0.007	848.79999161	-0.007	2.5
3.85	-30	824.19998732	0.002	848.79999689	-0.013	2.5

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2060.500 Hz		High Channel	2122.000 Hz	
Power Supply [Vdc]	Environment Temperature [*C]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	***20***	***824.19998875***	***0***	***848.79998596***	***0***	***2.5***
4.35	20	824.19999113	-0.003	848.79998876	-0.003	2.5
3.75	20	824.19998631	0.003	848.79998946	-0.004	2.5

GSM 1900, Channel 512/810, Frequency 1850.0/1910.0 MHz (Lowest Frequency:EGPRS / Highest Frequency: EGPRS)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0778	1909.9230		
Extreme (50C)		1850.0778	1909.9230	-18.8	-0.010
Extreme (40C)		1850.0778	1909.9230	-19.3	-0.010
Extreme (30C)		1850.0778	1909.9230	-11.5	-0.006
Extreme (10C)		1850.0778	1909.9230	-15.9	-0.008
Extreme (0C)		1850.0778	1909.9230	-16.9	-0.009
Extreme (-10C)		1850.0778	1909.9230	-13.5	-0.007
Extreme (-20C)		1850.0778	1909.9230	-16.7	-0.009
Extreme (-30C)		1850.0778	1909.9230	-15.6	-0.008
20C	15%	1850.0778	1909.9230	-20.5	-0.011
	-15%	1850.0778	1909.9230	-17.4	-0.009
	End Point	1850.0778	1909.9230	-18.6	-0.010

WCDMA Band 5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz

Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	826.39999342	-0.012	846.59998951	-0.006	2.5
3.85	40	826.39998826	-0.006	846.59998752	-0.004	2.5
3.85	30	826.39998117	0.003	846.59998336	0.001	2.5
3.85	***20***	***826.39998343***	***0.000***	***846.59998445***	***0.000***	***2.5***
3.85	10	826.39998158	0.002	846.59998260	0.002	2.5
3.85	0	826.39998007	0.004	846.59998004	0.005	2.5
3.85	-10	826.39998445	-0.001	846.59998878	-0.005	2.5
3.85	-20	826.39998851	-0.006	846.59998460	0.000	2.5
3.85	-30	826.39998313	0.000	846.59998365	0.001	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2066.000	Hz	High Channel	2116.500	Hz

Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	***20***	**826.39998343**	***0***	**846.59998445**	***0***	***2.5***
4.35	20	826.39998764	-0.005	846.59998111	0.004	2.5
3.75	20	826.39998635	-0.004	846.59998223	0.003	2.5

WCDMA Band 4 (Lowest Frequency:HSDPA / Highest Frequency: Rel99)

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	-16.6	-0.010
Extreme (40C)		1712.3979	1752.6021	-10.5	-0.006
Extreme (30C)		1712.3979	1752.6020	-16.7	-0.010
Extreme (10C)		1712.3979	1752.6020	-17.9	-0.010
Extreme (0C)		1712.3979	1752.6020	-20.3	-0.012
Extreme (-10C)		1712.3979	1752.6021	-11.5	-0.007
Extreme (-20C)		1712.3979	1752.6020	-16.9	-0.010
Extreme (-30C)		1712.3979	1752.6020	-17.8	-0.010
20C	15%	1712.3979	1752.6021	-13.6	-0.008
	-15%	1712.3979	1752.6020	-16.7	-0.010
	End Point	1712.3979	1752.6020	-15.0	-0.009

WCDMA Band 2 (Lowest Frequency:Rel99 / Highest Frequency: HSDPA)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1852.3979	1907.6021		
Extreme (50C)		1852.3979	1907.6020	-23.7	-0.013
Extreme (40C)		1852.3979	1907.6020	-20.5	-0.011
Extreme (30C)		1852.3979	1907.6020	-16.4	-0.009
Extreme (10C)		1852.3979	1907.6020	-20.0	-0.011
Extreme (0C)		1852.3979	1907.6020	-20.5	-0.011
Extreme (-10C)		1852.3979	1907.6020	-15.4	-0.008
Extreme (-20C)		1852.3979	1907.6020	-17.8	-0.009
Extreme (-30C)		1852.3979	1907.6020	-18.3	-0.010
20C	15%	1852.3979	1907.6020	-14.6	-0.008
	-15%	1852.3979	1907.6020	-20.2	-0.011
	End Point	1852.3979	1907.6020	-21.2	-0.011

LTE Band 2 (Lowest Frequency: 16QAM / Highest Frequency: 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	-20.5	-0.011
Extreme (40C)		1850.6994	1909.3005	-22.3	-0.012
Extreme (30C)		1850.6994	1909.3005	-21.4	-0.011
Extreme (10C)		1850.6994	1909.3005	-26.6	-0.014
Extreme (0C)		1850.6994	1909.3005	-19.9	-0.011
Extreme (-10C)		1850.6994	1909.3005	-18.8	-0.010
Extreme (-20C)		1850.6994	1909.3005	-16.5	-0.009
Extreme (-30C)		1850.6994	1909.3005	-15.6	-0.008
20C	15%	1850.6994	1909.3005	-18.8	-0.010
	-15%	1850.6994	1909.3005	-16.9	-0.009
	End Point	1850.6994	1909.3005	-20.5	-0.011

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

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2061.750	Hz	High Channel	2120.750	Hz

Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	50	824.69999026	0.006	848.29998955	-0.006	2.5
3.80	40	824.69999009	0.006	848.29998643	-0.002	2.5
3.80	30	824.69998646	0.011	848.29998556	-0.001	2.5
3.80	***20***	***824.69999515***	***0.000***	***848.29998472***	***0.000***	***2.5***
3.80	10	824.69998933	0.007	848.29998860	-0.005	2.5
3.80	0	824.69998858	0.008	848.29998334	0.002	2.5
3.80	-10	824.69998867	0.008	848.29998128	0.004	2.5
3.80	-20	824.69998716	0.010	848.29998661	-0.002	2.5
3.80	-30	824.69999248	0.003	848.29998443	0.000	2.5

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2061.750	Hz	High Channel	2120.750	Hz

Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	***20***	**824.69999515**	***0***	**848.29998472**	***0***	***2.5***
4.30	20	824.69999332	0.002	848.29999182	-0.008	2.5
3.60	20	824.69999064	0.005	848.29999471	-0.012	2.5

LTE Band 12 (Lowest Frequency:16QAM / Highest Frequency: QPSK)

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	-6.5	-0.009
Extreme (40C)		699.6994	715.3005	-11.7	-0.017
Extreme (30C)		699.6994	715.3005	-5.9	-0.008
Extreme (10C)		699.6994	715.3005	-8.3	-0.012
Extreme (0C)		699.6994	715.3005	-7.2	-0.010
Extreme (-10C)		699.6994	715.3005	-6.0	-0.009
Extreme (-20C)		699.6994	715.3005	-6.5	-0.009
Extreme (-30C)		699.6994	715.3005	-8.6	-0.012
20C	15%	699.6994	715.3005	-8.6	-0.012
	-15%	699.6994	715.3005	-9.9	-0.014
	End Point	699.6994	715.3005	-9.1	-0.013

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	-18.8	-0.011
Extreme (40C)		1710.6994	1779.3005	-16.0	-0.009
Extreme (30C)		1710.6994	1779.3005	-15.4	-0.009
Extreme (10C)		1710.6994	1779.3005	-20.8	-0.012
Extreme (0C)		1710.6994	1779.3005	-26.5	-0.015
Extreme (-10C)		1710.6994	1779.3005	-24.1	-0.014
Extreme (-20C)		1710.6994	1779.3005	-24.6	-0.014
Extreme (-30C)		1710.6994	1779.3005	-19.6	-0.011
20C	15%	1710.6994	1779.3005	-17.8	-0.010
	-15%	1710.6994	1779.3005	-18.6	-0.011
	End Point	1710.6994	1779.3005	-16.3	-0.009

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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.

10. RADIATED TEST RESULTS

10.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

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

LIMITS

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

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

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

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

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

10.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	128	824.2	31.96	1570.36
		190	836.6	**33.46**	**2218.20**
		251	848.8	32.66	1845.02
	EGPRS	128	824.2	26.17	414.00
		190	836.6	**28.36**	**685.49**
		251	848.8	26.83	481.95
GSM1900	GPRS	512	1850.2	30.02	1004.62
		661	1880	30.34	1081.43
		810	1909.8	**30.62**	**1153.45**
	EGPRS	512	1850.2	27.98	628.06
		661	1880	28.16	654.64
		810	1909.8	**28.90**	**776.25**

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	22.93	196.34
		4183	836.6	23.73	236.05
		4233	846.6	**23.75**	**237.14**
	HSDPA	4132	826.4	22.80	190.55
		4183	836.6	**23.73**	**236.05**
		4233	846.6	23.68	233.35
Band 4	REL99	1312	1712.4	24.86	306.20
		1413	1732.6	**24.91**	**309.74**
		1513	1752.6	24.54	284.45
	HSDPA	1312	1712.4	24.85	305.49
		1413	1732.6	**24.93**	**311.17**
		1513	1752.6	24.56	285.76
Band 2	REL99	9262	1852.4	24.30	269.15
		9400	1880.0	24.28	267.92
		9538	1907.6	**25.98**	**396.28**
	HSDPA	9262	1852.4	24.16	260.62
		9400	1880.0	24.43	277.33
		9538	1907.6	**26.13**	**410.20**

LTE Band 2

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 2	20	QPSK	1 / 0	1860.0	**25.12**	**325.09**
			1 / 0	1880.0	24.28	267.92
			1 / 0	1900.0	24.49	281.19
		16QAM	1 / 49	1860.0	**23.55**	**226.46**
			1 / 0	1880.0	23.06	202.30
			1 / 0	1900.0	23.37	217.27
	15	QPSK	1 / 0	1857.5	24.67	293.09
			1 / 0	1880.0	24.53	283.79
			1 / 0	1902.5	**25.09**	**322.85**
		16QAM	1 / 0	1857.5	23.30	213.80
			1 / 0	1880.0	23.23	210.38
			1 / 0	1902.5	**23.72**	**235.50**
	10	QPSK	1 / 0	1855.0	**25.40**	**346.74**
			1 / 0	1880.0	24.57	286.42
			1 / 0	1905.0	25.01	316.96
		16QAM	1 / 0	1855.0	**23.87**	**243.78**
			1 / 0	1880.0	23.38	217.77
			1 / 0	1905.0	23.54	225.94
	5	QPSK	1 / 12	1852.5	**25.21**	**331.89**
			1 / 0	1880.0	24.77	299.92
			1 / 0	1907.5	24.34	271.64
		16QAM	1 / 0	1852.5	**23.97**	**249.46**
			1 / 0	1880.0	23.33	215.28
			1 / 0	1907.5	23.07	202.77
	3	QPSK	1 / 8	1851.5	**25.48**	**353.18**
			1 / 8	1880.0	25.20	331.13
			1 / 0	1908.5	24.20	263.03
		16QAM	1 / 0	1851.5	**24.00**	**251.19**
			1 / 0	1880.0	23.45	221.31
			1 / 8	1908.5	22.91	195.43
	1.4	QPSK	1 / 0	1850.7	25.02	317.69
			1 / 0	1880.0	**25.14**	**326.59**
			1 / 5	1909.3	24.19	262.42
		16QAM	1 / 3	1850.7	23.78	238.78
			1 / 5	1880.0	**24.03**	**252.93**
			1 / 0	1909.3	23.06	202.30

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	25.00	316.23
			1 / 49	1732.5	**25.17**	**328.85**
			1 / 0	1745.0	24.68	293.76
		16QAM	1 / 0	1720.0	**23.97**	**249.46**
			1 / 49	1732.5	23.53	225.42
			1 / 49	1745.0	23.95	248.31
	15	QPSK	1 / 0	1717.5	25.18	329.61
			1 / 0	1732.5	**25.60**	**363.08**
			1 / 0	1747.5	25.32	340.41
		16QAM	1 / 0	1717.5	24.13	258.82
			1 / 37	1732.5	24.11	257.63
			1 / 0	1747.5	**24.35**	**272.27**
	10	QPSK	1 / 0	1715.0	**25.34**	**341.98**
			1 / 0	1732.5	25.02	317.69
			1 / 0	1750.0	25.31	339.63
		16QAM	1 / 0	1715.0	**24.04**	**253.51**
			1 / 0	1732.5	**24.04**	**253.51**
			1 / 0	1750.0	24.00	251.19
	5	QPSK	1 / 0	1712.5	25.00	316.23
			1 / 12	1732.5	**25.21**	**331.89**
			1 / 0	1752.5	25.16	328.10
		16QAM	1 / 0	1712.5	23.84	242.10
			1 / 12	1732.5	**23.91**	**246.04**
			1 / 0	1752.5	23.80	239.88
	3	QPSK	1 / 8	1711.5	**25.49**	**354.00**
			1 / 0	1732.5	25.14	326.59
			1 / 0	1753.5	24.94	311.89
		16QAM	1 / 8	1711.5	**24.24**	**265.46**
			1 / 14	1732.5	24.11	257.63
			1 / 8	1753.5	23.77	238.23
	1.4	QPSK	1 / 5	1710.7	**24.95**	**312.61**
			1 / 0	1732.5	23.74	236.59
			1 / 3	1754.3	24.41	276.06
		16QAM	1 / 5	1710.7	**23.78**	**238.78**
			1 / 3	1732.5	22.38	172.98
			1 / 3	1754.3	23.39	218.27

LTE Band 5

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 5	10	QPSK	1 / 0	829.0	23.35	216.27
			1 / 0	836.5	23.85	242.66
			1 / 0	844.0	**24.21**	**263.63**
		16QAM	1 / 0	829.0	21.82	152.05
			1 / 0	836.5	22.56	180.30
			1 / 0	844.0	**23.10**	**204.17**
	5	QPSK	1 / 0	826.5	23.20	208.93
			1 / 12	836.5	23.88	244.34
			1 / 0	846.5	**23.98**	**250.03**
		16QAM	1 / 12	826.5	21.85	153.11
			1 / 12	836.5	**22.59**	**181.55**
			1 / 12	846.5	22.47	176.60
	3	QPSK	1 / 8	825.5	23.32	214.78
			1 / 0	836.5	23.97	249.46
			1 / 0	847.5	**24.04**	**253.51**
		16QAM	1 / 8	825.5	22.16	164.44
			1 / 8	836.5	22.78	189.67
			1 / 8	847.5	**23.18**	**207.97**
	1.4	QPSK	1 / 0	824.7	23.37	217.27
			1 / 0	836.5	23.78	238.78
			1 / 0	848.3	**23.81**	**240.44**
		16QAM	1 / 0	824.7	21.84	152.76
			1 / 0	836.5	**22.63**	**183.23**
			1 / 5	848.3	22.59	181.55

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	17.31	53.83
			1 / 0	707.5	17.23	52.84
			1 / 0	711.0	**17.91**	**61.80**
		16QAM	1 / 0	704.0	16.07	40.46
			1 / 0	707.5	**16.27**	**42.36**
			1 / 25	711.0	16.19	41.59
	5	QPSK	1 / 0	701.5	17.20	52.48
			1 / 0	707.5	**17.76**	**59.70**
			1 / 0	713.5	17.71	59.02
		16QAM	1 / 0	701.5	15.98	39.63
			1 / 0	707.5	16.58	45.50
			1 / 0	713.5	**16.64**	**46.13**
	3	QPSK	1 / 0	700.5	17.05	50.70
			1 / 8	707.5	17.47	55.85
			1 / 0	714.5	**17.60**	**57.54**
		16QAM	1 / 0	700.5	15.77	37.76
			1 / 14	707.5	16.44	44.06
			1 / 8	714.5	**16.48**	**44.46**
	1.4	QPSK	1 / 0	699.7	16.67	46.45
			1 / 5	707.5	17.32	53.95
			1 / 0	715.3	**17.42**	**55.21**
		16QAM	1 / 0	699.7	15.33	34.12
			1 / 0	707.5	**16.38**	**43.45**
			1 / 5	715.3	16.27	42.36

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	25.52	356.45
			1 / 0	1745.0	**25.69**	**370.68**
			1 / 0	1770.0	24.63	290.40
		16QAM	1 / 0	1720.0	**24.37**	**273.53**
			1 / 0	1745.0	24.12	258.23
			1 / 0	1770.0	23.63	230.67
	15	QPSK	1 / 0	1717.5	25.42	348.34
			1 / 0	1747.5	**25.50**	**354.81**
			1 / 0	1772.5	25.06	320.63
		16QAM	1 / 0	1717.5	**24.22**	**264.24**
			1 / 0	1747.5	24.18	261.82
			1 / 0	1772.5	23.79	239.33
	10	QPSK	1 / 0	1715.0	25.36	343.56
			1 / 0	1745.0	**25.62**	**364.75**
			1 / 0	1775.0	24.99	315.50
		16QAM	1 / 0	1715.0	**24.20**	**263.03**
			1 / 0	1745.0	24.11	257.63
			1 / 0	1775.0	23.73	236.05
	5	QPSK	1 / 0	1712.5	24.54	284.45
			1 / 12	1745.0	**25.20**	**331.13**
			1 / 0	1777.5	24.29	268.53
		16QAM	1 / 0	1712.5	23.20	208.93
			1 / 24	1745.0	**23.76**	**237.68**
			1 / 0	1777.5	23.45	221.31
	3	QPSK	1 / 8	1711.5	**25.18**	**329.61**
			1 / 8	1745.0	24.87	306.90
			1 / 0	1778.5	24.76	299.23
		16QAM	1 / 8	1711.5	**24.05**	**254.10**
			1 / 0	1745.0	23.72	235.50
			1 / 0	1778.5	23.64	231.21
	1.4	QPSK	1 / 0	1710.7	**25.18**	**329.61**
			1 / 5	1745.0	24.50	281.84
			1 / 3	1779.3	24.42	276.69
		16QAM	1 / 0	1710.7	**24.08**	**255.86**
			1 / 0	1745.0	23.53	225.42
			1 / 0	1779.3	23.08	203.24

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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.

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

10.1.2. ERP/EIRP DATA

GSM850

GSM850

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20881
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: GPRS 850 MHz Fundamentals

Test Equpment:
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								
824.20	35.93	V	3.0	-1.0	31.96	38.5	-6.5	
824.20	26.00	H	3.0	-1.0	22.03	38.5	-16.5	
Mid Ch								
836.60	37.40	V	3.0	-0.9	33.46	38.5	-5.0	
836.60	27.58	H	3.0	-0.9	23.64	38.5	-14.9	
High Ch								
848.80	36.57	V	3.1	-0.9	32.66	38.5	-5.8	
848.80	26.69	H	3.1	-0.9	22.78	38.5	-15.7	

GSM850

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20881
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: EGPRS 850 MHz Fundamentals

Test Equpment:
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								
824.20	30.14	V	3.0	-1.0	26.17	38.5	-12.3	
824.20	20.37	H	3.0	-1.0	16.40	38.5	-22.1	
Mid Ch								
836.60	32.30	V	3.0	-0.9	28.36	38.5	-10.1	
836.60	22.71	H	3.0	-0.9	18.77	38.5	-19.7	
High Ch								
848.80	30.74	V	3.1	-0.9	26.83	38.5	-11.7	
848.80	21.33	H	3.1	-0.9	17.42	38.5	-21.1	

GSM1900

GSM1900

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-03-03
Test Engineer: 20881
Configuration: EUT, X-Position
Location: Chamber 1
Mode: GPRS 1900 MHz 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								
1850.20	20.64	V	4.5	9.5	25.65	33.0	-7.4	
1850.20	25.01	H	4.5	9.5	30.02	33.0	-3.0	
Mid Ch								
1880.00	20.91	V	4.5	9.3	25.68	33.0	-7.3	
1880.00	25.57	H	4.5	9.3	30.34	33.0	-2.7	
High Ch								
1909.80	18.31	V	4.6	9.1	22.80	33.0	-10.2	
1909.80	26.14	H	4.6	9.1	30.62	33.0	-2.4	

GSM1900

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-03-04
Test Engineer: 20881
Configuration: EUT, X-Position
Location: Chamber 1
Mode: EGPRS 1900 MHz 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								
1850.20	18.40	V	4.5	9.5	23.41	33.0	-9.6	
1850.20	22.97	H	4.5	9.5	27.98	33.0	-5.0	
Mid Ch								
1880.00	18.42	V	4.5	9.3	23.19	33.0	-9.8	
1880.00	23.39	H	4.5	9.3	28.16	33.0	-4.8	
High Ch								
1909.80	17.41	V	4.6	9.1	21.90	33.0	-11.1	
1909.80	24.42	H	4.6	9.1	28.90	33.0	-4.1	

WCDMA Band 5

WCDMA

Band 5
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20881
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: Rel99 Band 5 Fundamentals

Test Equpment:
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								
826.40	26.89	V	3.0	-0.9	22.93	38.5	-15.6	
826.40	16.37	H	3.0	-0.9	12.41	38.5	-26.1	
Mid Ch								
836.60	27.67	V	3.0	-0.9	23.73	38.5	-14.8	
836.60	18.33	H	3.0	-0.9	14.39	38.5	-24.1	
High Ch								
846.60	27.67	V	3.1	-0.9	23.75	38.5	-14.7	
846.60	17.77	H	3.1	-0.9	13.86	38.5	-24.6	

WCDMA

Band 5
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20881
Configuration: EUT, Y-Position
Location: Chamber 1
Mode: HSDPA Band 5 Fundamentals

Test Equpment:
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								
826.40	26.76	V	3.0	-0.9	22.80	38.5	-15.7	
826.40	16.57	H	3.0	-0.9	12.61	38.5	-25.9	
Mid Ch								
836.60	27.67	V	3.0	-0.9	23.73	38.5	-14.8	
836.60	17.88	H	3.0	-0.9	13.94	38.5	-24.6	
High Ch								
846.60	27.60	V	3.1	-0.9	23.68	38.5	-14.8	
846.60	17.91	H	3.1	-0.9	14.00	38.5	-24.5	

WCDMA Band 4

WCDMA

Band 4
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20882
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	12.33	V	4.3	9.4	17.41	30.0	-12.6	
1712.40	19.78	H	4.3	9.4	24.86	30.0	-5.1	
Mid Ch								
1732.60	13.07	V	4.3	9.5	18.20	30.0	-11.8	
1732.60	19.78	H	4.3	9.5	24.91	30.0	-5.1	
High Ch								
1752.60	12.70	V	4.4	9.5	17.88	30.0	-12.1	
1752.60	19.36	H	4.4	9.5	24.54	30.0	-5.5	

WCDMA

Band 4
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20882
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	12.27	V	4.3	9.4	17.35	30.0	-12.6	
1712.40	19.77	H	4.3	9.4	24.85	30.0	-5.1	
Mid Ch								
1732.60	13.01	V	4.3	9.5	18.14	30.0	-11.9	
1732.60	19.80	H	4.3	9.5	24.93	30.0	-5.1	
High Ch								
1752.60	12.82	V	4.4	9.5	18.00	30.0	-12.0	
1752.60	19.38	H	4.4	9.5	24.56	30.0	-5.4	

WCDMA Band 2

WCDMA

Band 2
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20882
Configuration: EUT, X-Position
Location: Chamber 1
Mode: Rel99 Band 2 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								
1852.40	14.81	V	4.5	9.5	19.80	33.0	-13.2	
1852.40	19.32	H	4.5	9.5	24.30	33.0	-8.7	
Mid Ch								
1880.00	14.37	V	4.5	9.3	19.14	33.0	-13.9	
1880.00	19.51	H	4.5	9.3	24.28	33.0	-8.7	
High Ch								
1907.60	14.71	V	4.6	9.1	19.23	33.0	-13.8	
1907.60	21.46	H	4.6	9.1	25.98	33.0	-7.0	

WCDMA

Band 2
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20882
Configuration: EUT, X-Position
Location: Chamber 1
Mode: HSDPA Band 2 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								
1852.40	14.80	V	4.5	9.5	19.79	33.0	-13.2	
1852.40	19.18	H	4.5	9.5	24.16	33.0	-8.8	
Mid Ch								
1880.00	14.10	V	4.5	9.3	18.87	33.0	-14.1	
1880.00	19.66	H	4.5	9.3	24.43	33.0	-8.6	
High Ch								
1907.60	14.77	V	4.6	9.1	19.29	33.0	-13.7	
1907.60	21.61	H	4.6	9.1	26.13	33.0	-6.9	

LTE Band 2

LTE Band 2 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-04
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 20MHz 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								
1860.00	15.21	V	4.5	9.3	20.04	33.0	-13.0	
1860.00	20.29	H	4.5	9.3	25.12	33.0	-7.9	
Mid Ch								
1880.00	13.76	V	4.5	9.2	18.42	33.0	-14.6	
1880.00	19.62	H	4.5	9.2	24.28	33.0	-8.7	
High Ch								
1900.00	13.66	V	4.6	9.0	18.15	33.0	-14.8	
1900.00	20.00	H	4.6	9.0	24.49	33.0	-8.5	

LTE Band 2 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-04
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 20MHz 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								
1860.00	13.38	V	4.5	9.3	18.21	33.0	-14.8	
1860.00	18.72	H	4.5	9.3	23.55	33.0	-9.5	
Mid Ch								
1880.00	12.43	V	4.5	9.2	17.09	33.0	-15.9	
1880.00	18.40	H	4.5	9.2	23.06	33.0	-9.9	
High Ch								
1900.00	12.46	V	4.6	9.0	16.95	33.0	-16.0	
1900.00	18.88	H	4.6	9.0	23.37	33.0	-9.6	

LTE

Band 2

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-04
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 15MHz 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								
1857.50	15.13	V	4.5	9.4	19.98	33.0	-13.0	
1857.50	19.82	H	4.5	9.4	24.67	33.0	-8.3	
Mid Ch								
1880.00	13.86	V	4.5	9.2	18.52	33.0	-14.5	
1880.00	19.87	H	4.5	9.2	24.53	33.0	-8.5	
High Ch								
1902.50	13.73	V	4.6	9.0	18.19	33.0	-14.8	
1902.50	20.63	H	4.6	9.0	25.09	33.0	-7.9	

LTE

Band 2

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-04
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 15MHz 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								
1857.50	13.81	V	4.5	9.4	18.66	33.0	-14.3	
1857.50	18.45	H	4.5	9.4	23.30	33.0	-9.7	
Mid Ch								
1880.00	12.71	V	4.5	9.2	17.37	33.0	-15.6	
1880.00	18.57	H	4.5	9.2	23.23	33.0	-9.8	
High Ch								
1902.50	12.28	V	4.6	9.0	16.74	33.0	-16.3	
1902.50	19.26	H	4.6	9.0	23.72	33.0	-9.3	

LTE

Band 2

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-04
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 10MHz 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								
1855.00	15.48	V	4.5	9.4	20.35	33.0	-12.6	
1855.00	20.52	H	4.5	9.4	25.40	33.0	-7.6	
Mid Ch								
1880.00	14.43	V	4.5	9.2	19.09	33.0	-13.9	
1880.00	19.91	H	4.5	9.2	24.57	33.0	-8.4	
High Ch								
1905.00	13.42	V	4.6	9.0	17.85	33.0	-15.2	
1905.00	20.58	H	4.6	9.0	25.01	33.0	-8.0	

LTE

Band 2

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-04
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 10MHz 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								
1855.00	13.96	V	4.5	9.4	18.83	33.0	-14.2	
1855.00	18.99	H	4.5	9.4	23.87	33.0	-9.1	
Mid Ch								
1880.00	13.10	V	4.5	9.2	17.76	33.0	-15.2	
1880.00	18.72	H	4.5	9.2	23.38	33.0	-9.6	
High Ch								
1905.00	12.00	V	4.6	9.0	16.43	33.0	-16.6	
1905.00	19.11	H	4.6	9.0	23.54	33.0	-9.5	

LTE

Band 2

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-04
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 5MHz 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								
1852.50	14.63	V	4.5	9.4	19.53	33.0	-13.5	
1852.50	20.31	H	4.5	9.4	25.21	33.0	-7.8	
Mid Ch								
1880.00	14.46	V	4.5	9.2	19.12	33.0	-13.9	
1880.00	20.11	H	4.5	9.2	24.77	33.0	-8.2	
High Ch								
1907.50	13.24	V	4.6	9.0	17.63	33.0	-15.4	
1907.50	19.95	H	4.6	9.0	24.34	33.0	-8.7	

LTE

Band 2

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-04
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 2 Fundamentals, 5MHz 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								
1852.50	13.56	V	4.5	9.4	18.46	33.0	-14.5	
1852.50	19.07	H	4.5	9.4	23.97	33.0	-9.0	
Mid Ch								
1880.00	13.00	V	4.5	9.2	17.66	33.0	-15.3	
1880.00	18.67	H	4.5	9.2	23.33	33.0	-9.7	
High Ch								
1907.50	11.97	V	4.6	9.0	16.36	33.0	-16.6	
1907.50	18.68	H	4.6	9.0	23.07	33.0	-9.9	

LTE

Band 2

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-04
Test Engineer: 20890
Configuration: EUT / X-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	15.37	V	4.5	9.4	20.28	33.0	-12.7	
1851.50	20.58	H	4.5	9.4	25.48	33.0	-7.5	
Mid Ch								
1880.00	14.13	V	4.5	9.2	18.79	33.0	-14.2	
1880.00	20.54	H	4.5	9.2	25.20	33.0	-7.8	
High Ch								
1908.50	13.54	V	4.6	8.9	17.91	33.0	-15.1	
1908.50	19.83	H	4.6	8.9	24.20	33.0	-8.8	

LTE

Band 2

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-04
Test Engineer: 20890
Configuration: EUT / X-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	14.29	V	4.5	9.4	19.20	33.0	-13.8	
1851.50	19.10	H	4.5	9.4	24.00	33.0	-9.0	
Mid Ch								
1880.00	12.90	V	4.5	9.2	17.56	33.0	-15.4	
1880.00	18.79	H	4.5	9.2	23.45	33.0	-9.6	
High Ch								
1908.50	11.88	V	4.6	8.9	16.25	33.0	-16.7	
1908.50	18.54	H	4.6	8.9	22.91	33.0	-10.1	

LTE

Band 2

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz 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								
1850.70	15.42	V	4.5	9.4	20.34	33.0	-12.7	
1850.70	20.10	H	4.5	9.4	25.02	33.0	-8.0	
Mid Ch								
1880.00	14.68	V	4.5	9.2	19.34	33.0	-13.7	
1880.00	20.48	H	4.5	9.2	25.14	33.0	-7.9	
High Ch								
1909.30	9.25	V	4.6	8.9	13.62	33.0	-19.4	
1909.30	19.82	H	4.6	8.9	24.19	33.0	-8.8	

LTE

Band 2

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz 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								
1850.70	14.06	V	4.5	9.4	18.98	33.0	-14.0	
1850.70	18.86	H	4.5	9.4	23.78	33.0	-9.2	
Mid Ch								
1880.00	13.03	V	4.5	9.2	17.69	33.0	-15.3	
1880.00	19.37	H	4.5	9.2	24.03	33.0	-9.0	
High Ch								
1909.30	7.54	V	4.6	8.9	11.91	33.0	-21.1	
1909.30	18.69	H	4.6	8.9	23.06	33.0	-9.9	

LTE Band 5

LTE Band 5 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20896
Configuration: EUT, Y-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	27.31	V	3.0	-0.9	23.35	38.5	-15.1	
829.00	18.02	H	3.0	-0.9	14.07	38.5	-24.4	
Mid Ch								
836.50	27.78	V	3.0	-0.9	23.85	38.5	-14.7	
836.50	18.27	H	3.0	-0.9	14.33	38.5	-24.2	
High Ch								
844.00	28.13	V	3.0	-0.9	24.21	38.5	-14.3	
844.00	18.49	H	3.0	-0.9	14.57	38.5	-23.9	

LTE Band 5 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20896
Configuration: EUT, Y-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	25.78	V	3.0	-0.9	21.82	38.5	-16.7	
829.00	16.73	H	3.0	-0.9	12.78	38.5	-25.7	
Mid Ch								
836.50	26.49	V	3.0	-0.9	22.56	38.5	-15.9	
836.50	16.96	H	3.0	-0.9	13.02	38.5	-25.5	
High Ch								
844.00	27.02	V	3.0	-0.9	23.10	38.5	-15.4	
844.00	17.39	H	3.0	-0.9	13.47	38.5	-25.0	

LTE

Band 5

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20896
Configuration: EUT, Y-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	27.16	V	3.0	-0.9	23.20	38.5	-15.3	
826.50	17.72	H	3.0	-0.9	13.76	38.5	-24.7	
Mid Ch								
836.50	27.81	V	3.0	-0.9	23.88	38.5	-14.6	
836.50	18.13	H	3.0	-0.9	14.19	38.5	-24.3	
High Ch								
846.50	27.89	V	3.0	-0.9	23.98	38.5	-14.5	
846.50	18.59	H	3.0	-0.9	14.67	38.5	-23.8	

LTE

Band 5

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20890
Configuration: EUT, Y-Postion
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	25.81	V	3.0	-0.9	21.85	38.5	-16.6	
826.50	16.30	H	3.0	-0.9	12.34	38.5	-26.2	
Mid Ch								
836.50	26.52	V	3.0	-0.9	22.59	38.5	-15.9	
836.50	17.07	H	3.0	-0.9	13.13	38.5	-25.4	
High Ch								
846.50	26.38	V	3.0	-0.9	22.47	38.5	-16.0	
846.50	17.75	H	3.0	-0.9	13.83	38.5	-24.7	

LTE

Band 5

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20890
Configuration: EUT
Location: Chamber 2
Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 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	27.28	V	3.0	-0.9	23.32	38.5	-15.2	
825.50	17.89	H	3.0	-0.9	13.93	38.5	-24.6	
Mid Ch								
836.50	27.90	V	3.0	-0.9	23.97	38.5	-14.5	
836.50	18.22	H	3.0	-0.9	14.28	38.5	-24.2	
High Ch								
847.50	27.96	V	3.1	-0.9	24.04	38.5	-14.5	
847.50	18.57	H	3.1	-0.9	14.65	38.5	-23.8	

LTE

Band 5

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20890
Configuration: EUT, Y-Postion
Location: Chamber 2
Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 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	26.12	V	3.0	-0.9	22.16	38.5	-16.3	
825.50	17.03	H	3.0	-0.9	13.07	38.5	-25.4	
Mid Ch								
836.50	26.71	V	3.0	-0.9	22.78	38.5	-15.7	
836.50	16.93	H	3.0	-0.9	12.99	38.5	-25.5	
High Ch								
847.50	27.10	V	3.1	-0.9	23.18	38.5	-15.3	
847.50	17.47	H	3.1	-0.9	13.55	38.5	-24.9	

LTE

Band 5

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20890
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 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	27.33	V	3.0	-1.0	23.37	38.5	-15.1	
824.70	17.89	H	3.0	-1.0	13.92	38.5	-24.6	
Mid Ch								
836.50	27.71	V	3.0	-0.9	23.78	38.5	-14.7	
836.50	18.00	H	3.0	-0.9	14.06	38.5	-24.4	
High Ch								
848.30	27.72	V	3.0	-0.9	23.81	38.5	-14.7	
848.30	18.51	H	3.0	-0.9	14.60	38.5	-23.9	

LTE

Band 5

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20890
Configuration: EUT, Y-Postion
Location: Chamber 2
Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 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	25.80	V	3.0	-1.0	21.84	38.5	-16.7	
824.70	16.57	H	3.0	-1.0	12.60	38.5	-25.9	
Mid Ch								
836.50	26.56	V	3.0	-0.9	22.63	38.5	-15.9	
836.50	16.88	H	3.0	-0.9	12.94	38.5	-25.6	
High Ch								
848.30	26.50	V	3.0	-0.9	22.59	38.5	-15.9	
848.30	17.02	H	3.0	-0.9	13.11	38.5	-25.4	

LTE Band 12

LTE Band 12 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20896
Configuration: EUT/ X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth

Test Equpment:
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								
704.00	15.69	V	2.8	-1.1	11.85	34.8	-22.9	
704.00	21.15	H	2.8	-1.1	17.31	34.8	-17.5	
Mid Ch								
707.50	16.01	V	2.8	-1.1	12.17	34.8	-22.6	
707.50	21.08	H	2.8	-1.1	17.23	34.8	-17.6	
High Ch								
711.00	15.61	V	2.8	-1.1	11.75	34.8	-23.0	
711.00	21.77	H	2.8	-1.1	17.91	34.8	-16.9	

LTE Band 12 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20896
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 Fundamentals, 10MHz Bandwidth

Test Equpment:
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								
704.00	14.40	V	2.8	-1.1	10.56	34.8	-24.2	
704.00	19.91	H	2.8	-1.1	16.07	34.8	-18.7	
Mid Ch								
707.50	14.85	V	2.8	-1.1	11.01	34.8	-23.8	
707.50	20.12	H	2.8	-1.1	16.27	34.8	-18.5	
High Ch								
711.00	13.58	V	2.8	-1.1	9.72	34.8	-25.1	
711.00	20.05	H	2.8	-1.1	16.19	34.8	-18.6	

LTE

Band 12

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20896
Configuration: EUT/ X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 Fundamentals, 5MHz Bandwidth

Test Equpment:
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								
701.50	15.97	V	2.8	-1.1	12.14	34.8	-22.7	
701.50	21.04	H	2.8	-1.1	17.20	34.8	-17.6	
Mid Ch								
707.50	15.70	V	2.8	-1.1	11.86	34.8	-22.9	
707.50	21.61	H	2.8	-1.1	17.76	34.8	-17.0	
High Ch								
713.50	15.27	V	2.8	-1.1	11.40	34.8	-23.4	
713.50	21.57	H	2.8	-1.1	17.71	34.8	-17.1	

LTE

Band 12

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20896
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 Fundamentals, 5MHz Bandwidth

Test Equpment:
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								
701.50	14.83	V	2.8	-1.1	11.00	34.8	-23.8	
701.50	19.82	H	2.8	-1.1	15.98	34.8	-18.8	
Mid Ch								
707.50	14.20	V	2.8	-1.1	10.36	34.8	-24.4	
707.50	20.43	H	2.8	-1.1	16.58	34.8	-18.2	
High Ch								
713.50	14.08	V	2.8	-1.1	10.21	34.8	-24.6	
713.50	20.50	H	2.8	-1.1	16.64	34.8	-18.2	

LTE

Band 12

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20896
Configuration: EUT/ X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 Fundamentals, 3MHz Bandwidth

Test Equpment:
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								
700.50	15.79	V	2.8	-1.1	11.96	34.8	-22.8	
700.50	20.88	H	2.8	-1.1	17.05	34.8	-17.7	
Mid Ch								
707.50	15.44	V	2.8	-1.1	11.60	34.8	-23.2	
707.50	21.32	H	2.8	-1.1	17.47	34.8	-17.3	
High Ch								
714.50	15.04	V	2.8	-1.1	11.18	34.8	-23.6	
714.50	21.46	H	2.8	-1.1	17.60	34.8	-17.2	

LTE

Band 12

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 Fundamentals, 3MHz Bandwidth

Test Equpment:
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								
700.50	14.62	V	2.8	-1.1	10.79	34.8	-24.0	
700.50	19.60	H	2.8	-1.1	15.77	34.8	-19.0	
Mid Ch								
707.50	14.11	V	2.8	-1.1	10.27	34.8	-24.5	
707.50	20.29	H	2.8	-1.1	16.44	34.8	-18.4	
High Ch								
714.50	14.03	V	2.8	-1.1	10.17	34.8	-24.6	
714.50	20.34	H	2.8	-1.1	16.48	34.8	-18.3	

LTE

Band 12

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
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								
699.70	15.41	V	2.8	-1.1	11.58	34.8	-23.2	
699.70	20.51	H	2.8	-1.1	16.67	34.8	-18.1	
Mid Ch								
707.50	15.36	V	2.8	-1.1	11.52	34.8	-23.3	
707.50	21.17	H	2.8	-1.1	17.32	34.8	-17.5	
High Ch								
715.30	14.95	V	2.8	-1.1	11.09	34.8	-23.7	
715.30	21.28	H	2.8	-1.1	17.42	34.8	-17.4	

LTE

Band 12

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
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								
699.70	14.17	V	2.8	-1.1	10.34	34.8	-24.5	
699.70	19.17	H	2.8	-1.1	15.33	34.8	-19.5	
Mid Ch								
707.50	13.73	V	2.8	-1.1	9.89	34.8	-24.9	
707.50	20.23	H	2.8	-1.1	16.38	34.8	-18.4	
High Ch								
715.30	13.73	V	2.8	-1.1	9.87	34.8	-24.9	
715.30	20.13	H	2.8	-1.1	16.27	34.8	-18.5	

LTE Band 66

LTE Band 66 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-05
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 20MHz 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								
1720.00	13.37	V	4.3	9.4	18.39	30.0	-11.6	
1720.00	20.50	H	4.3	9.4	25.52	30.0	-4.5	
Mid Ch								
1745.00	14.45	V	4.4	9.4	19.54	30.0	-10.5	
1745.00	20.60	H	4.4	9.4	25.69	30.0	-4.3	
High Ch								
1770.00	13.31	V	4.4	9.5	18.41	30.0	-11.6	
1770.00	19.53	H	4.4	9.5	24.63	30.0	-5.4	

LTE Band 66 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-05
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 20MHz 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								
1720.00	12.06	V	4.3	9.4	17.08	30.0	-12.9	
1720.00	19.35	H	4.3	9.4	24.37	30.0	-5.6	
Mid Ch								
1745.00	12.67	V	4.4	9.4	17.76	30.0	-12.2	
1745.00	19.03	H	4.4	9.4	24.12	30.0	-5.9	
High Ch								
1770.00	12.17	V	4.4	9.5	17.27	30.0	-12.7	
1770.00	18.53	H	4.4	9.5	23.63	30.0	-6.4	

LTE

Band 66

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-05
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 15MHz 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								
1717.50	13.46	V	4.3	9.3	18.48	30.0	-11.5	
1717.50	20.40	H	4.3	9.3	25.42	30.0	-4.6	
Mid Ch								
1745.00	13.35	V	4.4	9.4	18.44	30.0	-11.6	
1745.00	20.41	H	4.4	9.4	25.50	30.0	-4.5	
High Ch								
1772.50	13.11	V	4.4	9.5	18.20	30.0	-11.8	
1772.50	19.97	H	4.4	9.5	25.06	30.0	-4.9	

LTE

Band 66

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-05
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 15MHz 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								
1717.50	12.45	V	4.3	9.3	17.47	30.0	-12.5	
1717.50	19.20	H	4.3	9.3	24.22	30.0	-5.8	
Mid Ch								
1745.00	12.09	V	4.4	9.4	17.18	30.0	-12.8	
1745.00	19.09	H	4.4	9.4	24.18	30.0	-5.8	
High Ch								
1772.50	11.79	V	4.4	9.5	16.88	30.0	-13.1	
1772.50	18.70	H	4.4	9.5	23.79	30.0	-6.2	

LTE

Band 66

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-05
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 10MHz 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								
1715.00	13.27	V	4.3	9.3	18.28	30.0	-11.7	
1715.00	20.35	H	4.3	9.3	25.36	30.0	-4.6	
Mid Ch								
1745.00	13.09	V	4.4	9.4	18.18	30.0	-11.8	
1745.00	20.53	H	4.4	9.4	25.62	30.0	-4.4	
High Ch								
1775.00	12.65	V	4.4	9.5	17.75	30.0	-12.3	
1775.00	19.89	H	4.4	9.5	24.99	30.0	-5.0	

LTE

Band 66

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-05
Test Engineer: 20896
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 10MHz 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								
1715.00	12.30	V	4.3	9.3	17.31	30.0	-12.7	
1715.00	19.19	H	4.3	9.3	24.20	30.0	-5.8	
Mid Ch								
1745.00	11.80	V	4.4	9.4	16.89	30.0	-13.1	
1745.00	19.02	H	4.4	9.4	24.11	30.0	-5.9	
High Ch								
1775.00	11.51	V	4.4	9.5	16.61	30.0	-13.4	
1775.00	18.63	H	4.4	9.5	23.73	30.0	-6.3	

LTE

Band 66

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-07
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 5MHz 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								
1712.50	12.80	V	4.3	9.3	17.80	30.0	-12.2	
1712.50	19.54	H	4.3	9.3	24.54	30.0	-5.5	
Mid Ch								
1745.00	13.92	V	4.4	9.4	19.01	30.0	-11.0	
1745.00	20.11	H	4.4	9.4	25.20	30.0	-4.8	
High Ch								
1777.50	12.72	V	4.4	9.5	17.82	30.0	-12.2	
1777.50	19.19	H	4.4	9.5	24.29	30.0	-5.7	

LTE

Band 66

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-07
Test Engineer: 20890
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 5MHz 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								
1712.50	11.25	V	4.3	9.3	16.25	30.0	-13.7	
1712.50	18.20	H	4.3	9.3	23.20	30.0	-6.8	
Mid Ch								
1745.00	12.99	V	4.4	9.4	18.08	30.0	-11.9	
1745.00	18.67	H	4.4	9.4	23.76	30.0	-6.2	
High Ch								
1777.50	11.64	V	4.4	9.5	16.74	30.0	-13.3	
1777.50	18.35	H	4.4	9.5	23.45	30.0	-6.5	

LTE

Band 66

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-07
Test Engineer: 20890
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 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								
1711.50	11.70	V	4.3	9.3	16.71	30.0	-13.3	
1711.50	20.17	H	4.3	9.3	25.18	30.0	-4.8	
Mid Ch								
1745.00	13.06	V	4.4	9.4	18.15	30.0	-11.9	
1745.00	19.78	H	4.4	9.4	24.87	30.0	-5.1	
High Ch								
1778.50	12.78	V	4.4	9.5	17.88	30.0	-12.1	
1778.50	19.66	H	4.4	9.5	24.76	30.0	-5.2	

LTE

Band 66

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-07
Test Engineer: 20890
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 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								
1711.50	10.56	V	4.3	9.3	15.57	30.0	-14.4	
1711.50	19.04	H	4.3	9.3	24.05	30.0	-6.0	
Mid Ch								
1745.00	12.12	V	4.4	9.4	17.21	30.0	-12.8	
1745.00	18.63	H	4.4	9.4	23.72	30.0	-6.3	
High Ch								
1778.50	11.58	V	4.4	9.5	16.68	30.0	-13.3	
1778.50	18.54	H	4.4	9.5	23.64	30.0	-6.4	

LTE

Band 66

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-07
Test Engineer: 20890
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 1.4MHz 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								
1710.70	11.22	V	4.3	9.3	16.22	30.0	-13.8	
1710.70	20.18	H	4.3	9.3	25.18	30.0	-4.8	
Mid Ch								
1745.00	12.61	V	4.4	9.4	17.70	30.0	-12.3	
1745.00	19.41	H	4.4	9.4	24.50	30.0	-5.5	
High Ch								
1779.30	11.40	V	4.4	9.5	16.50	30.0	-13.5	
1779.30	19.32	H	4.4	9.5	24.42	30.0	-5.6	

LTE

Band 66

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789354096
Date: 2020-02-07
Test Engineer: 20890
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 1.4MHz 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								
1710.70	9.83	V	4.3	9.3	14.83	30.0	-15.2	
1710.70	19.08	H	4.3	9.3	24.08	30.0	-5.9	
Mid Ch								
1745.00	11.33	V	4.4	9.4	16.42	30.0	-13.6	
1745.00	18.44	H	4.4	9.4	23.53	30.0	-6.5	
High Ch								
1779.30	10.26	V	4.4	9.5	15.36	30.0	-14.6	
1779.30	17.98	H	4.4	9.5	23.08	30.0	-6.9	

10.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

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

LIMIT

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

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

Part 27.53 (h) AWS emission limits—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 log10 (P) dB.

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.

10.2.1. SPURIOUS RADIATION PLOTS

GSM850

GSM850 GPRS

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

Company: Samsung
Project #: 4789354096
Date: 2020-02-13
Test Engineer: 20881
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: GPRS 850 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1648.40	-14.0	V	3.0	45.2	1.0	-58.2	-13.0	-45.2	
2472.60	-10.6	V	3.0	45.0	1.0	-54.6	-13.0	-41.6	
3296.80	-8.1	V	3.0	45.3	1.0	-52.4	-13.0	-39.4	
1648.40	-13.1	H	3.0	45.2	1.0	-57.3	-13.0	-44.3	
2472.60	-9.9	H	3.0	45.0	1.0	-53.9	-13.0	-40.9	
3296.80	-8.1	H	3.0	45.3	1.0	-52.4	-13.0	-39.4	
Mid Ch, 836.6MHz									
1673.20	-13.8	V	3.0	45.2	1.0	-58.0	-13.0	-45.0	
2509.80	-10.9	V	3.0	45.0	1.0	-54.9	-13.0	-41.9	
3346.40	-8.3	V	3.0	45.3	1.0	-52.6	-13.0	-39.6	
1673.20	-12.9	H	3.0	45.2	1.0	-57.1	-13.0	-44.1	
2509.80	-10.1	H	3.0	45.0	1.0	-54.2	-13.0	-41.2	
3346.40	-8.3	H	3.0	45.3	1.0	-52.6	-13.0	-39.6	
High Ch, 848.8MHz									
1697.60	-13.1	V	3.0	45.2	1.0	-57.3	-13.0	-44.3	
2546.40	-10.6	V	3.0	45.1	1.0	-54.7	-13.0	-41.7	
3395.20	-8.1	V	3.0	45.3	1.0	-52.4	-13.0	-39.4	
1697.60	-12.7	H	3.0	45.2	1.0	-56.9	-13.0	-43.9	
2546.40	-10.2	H	3.0	45.1	1.0	-54.2	-13.0	-41.2	
3395.20	-8.2	H	3.0	45.3	1.0	-52.5	-13.0	-39.5	

GSM850 EGPRS

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

Company: Samsung
Project #: 4789354096
Date: 2020-02-13
Test Engineer: 20881
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: EGPRS 850 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1648.40	-13.9	V	3.0	45.2	1.0	-58.1	-13.0	-45.1	
2472.60	-10.6	V	3.0	45.0	1.0	-54.6	-13.0	-41.6	
3296.80	-8.2	V	3.0	45.3	1.0	-52.4	-13.0	-39.4	
1648.40	-13.1	H	3.0	45.2	1.0	-57.3	-13.0	-44.3	
2472.60	-9.8	H	3.0	45.0	1.0	-53.9	-13.0	-40.9	
3296.80	-8.5	H	3.0	45.3	1.0	-52.7	-13.0	-39.7	
Mid Ch, 836.6MHz									
1673.20	-13.9	V	3.0	45.2	1.0	-58.1	-13.0	-45.1	
2509.80	-10.7	V	3.0	45.0	1.0	-54.7	-13.0	-41.7	
3346.40	-8.3	V	3.0	45.3	1.0	-52.6	-13.0	-39.6	
1673.20	-12.8	H	3.0	45.2	1.0	-57.0	-13.0	-44.0	
2509.80	-10.2	H	3.0	45.0	1.0	-54.2	-13.0	-41.2	
3346.40	-8.5	H	3.0	45.3	1.0	-52.8	-13.0	-39.8	
High Ch, 848.8MHz									
1697.60	-13.6	V	3.0	45.2	1.0	-57.8	-13.0	-44.8	
2546.40	-10.7	V	3.0	45.1	1.0	-54.7	-13.0	-41.7	
3395.20	-8.2	V	3.0	45.3	1.0	-52.5	-13.0	-39.5	
1697.60	-12.7	H	3.0	45.2	1.0	-56.9	-13.0	-43.9	
2546.40	-10.1	H	3.0	45.1	1.0	-54.2	-13.0	-41.2	
3395.20	-8.2	H	3.0	45.3	1.0	-52.5	-13.0	-39.5	

GSM1900

GSM1900
GPRS

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

Company: Samsung
Project #: 4789354096
Date: 2020-03-04
Test Engineer: 20881
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 1
Mode: GPRS 1900 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3700.40	-8.0	V	3.0	45.4	1.0	-52.4	-13.0	-39.4	
5550.60	-5.4	V	3.0	45.3	1.0	-49.6	-13.0	-36.6	
7400.80	-3.0	V	3.0	44.1	1.0	-46.2	-13.0	-33.2	
3700.40	-8.5	H	3.0	45.4	1.0	-52.9	-13.0	-39.9	
5550.60	-5.5	H	3.0	45.3	1.0	-49.7	-13.0	-36.7	
7400.80	-2.4	H	3.0	44.1	1.0	-45.5	-13.0	-32.5	
Mid Ch, 1880MHz									
3760.00	-8.1	V	3.0	45.4	1.0	-52.5	-13.0	-39.5	
5640.00	-5.2	V	3.0	45.3	1.0	-49.5	-13.0	-36.5	
7520.00	-3.0	V	3.0	44.1	1.0	-46.1	-13.0	-33.1	
3760.00	-7.9	H	3.0	45.4	1.0	-52.3	-13.0	-39.3	
5640.00	-5.6	H	3.0	45.3	1.0	-49.9	-13.0	-36.9	
7520.00	-2.6	H	3.0	44.1	1.0	-45.7	-13.0	-32.7	
High Ch, 1909.8MHz									
3819.60	-8.2	V	3.0	45.4	1.0	-52.6	-13.0	-39.6	
5729.40	-5.3	V	3.0	45.3	1.0	-49.6	-13.0	-36.6	
7639.20	-2.8	V	3.0	44.0	1.0	-45.8	-13.0	-32.8	
3819.60	-8.7	H	3.0	45.4	1.0	-53.1	-13.0	-40.1	
5729.40	-5.3	H	3.0	45.3	1.0	-49.6	-13.0	-36.6	
7639.20	-2.8	H	3.0	44.0	1.0	-45.8	-13.0	-32.8	

GSM1900
EGPRS

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

Company: Samsung
Project #: 4789354096
Date: 2020-03-04
Test Engineer: 20881
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 1
Mode: EGPRS 1900 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3700.40	-8.3	V	3.0	45.4	1.0	-52.7	-13.0	-39.7	
5550.60	-5.2	V	3.0	45.3	1.0	-49.5	-13.0	-36.5	
7400.80	-2.8	V	3.0	44.1	1.0	-46.0	-13.0	-33.0	
3700.40	-8.6	H	3.0	45.4	1.0	-53.0	-13.0	-40.0	
5550.60	-5.4	H	3.0	45.3	1.0	-49.7	-13.0	-36.7	
7400.80	-3.1	H	3.0	44.1	1.0	-46.2	-13.0	-33.2	
Mid Ch, 1880MHz									
3760.00	-8.0	V	3.0	45.4	1.0	-52.4	-13.0	-39.4	
5640.00	-5.0	V	3.0	45.3	1.0	-49.2	-13.0	-36.2	
7520.00	-2.9	V	3.0	44.1	1.0	-45.9	-13.0	-32.9	
3760.00	-8.6	H	3.0	45.4	1.0	-53.0	-13.0	-40.0	
5640.00	-5.4	H	3.0	45.3	1.0	-49.7	-13.0	-36.7	
7520.00	-2.7	H	3.0	44.1	1.0	-45.8	-13.0	-32.8	
High Ch, 1909.8MHz									
3819.60	-8.1	V	3.0	45.4	1.0	-52.6	-13.0	-39.6	
5729.40	-5.5	V	3.0	45.3	1.0	-49.8	-13.0	-36.8	
7639.20	-2.9	V	3.0	44.0	1.0	-45.9	-13.0	-32.9	
3819.60	-8.5	H	3.0	45.4	1.0	-52.9	-13.0	-39.9	
5729.40	-5.3	H	3.0	45.3	1.0	-49.6	-13.0	-36.6	
7639.20	-2.7	H	3.0	44.0	1.0	-45.7	-13.0	-32.7	

WCDMA Band 5

WCDMA

Band 5
REL99

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

Company: Samsung
Project #: 4789354096
Date: 2020-02-13
Test Engineer: 20881
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: Rel99 Band 5 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1652.80	-15.0	V	3.0	45.2	1.0	-59.2	-13.0	-46.2	
2479.20	-11.6	V	3.0	45.0	1.0	-55.6	-13.0	-42.6	
3305.60	-9.3	V	3.0	45.3	1.0	-53.5	-13.0	-40.5	
1652.80	-14.1	H	3.0	45.2	1.0	-58.3	-13.0	-45.3	
2479.20	-11.0	H	3.0	45.0	1.0	-55.1	-13.0	-42.1	
3305.60	-9.5	H	3.0	45.3	1.0	-53.7	-13.0	-40.7	
Mid Ch, 836.6MHz									
1673.20	-14.9	V	3.0	45.2	1.0	-59.1	-13.0	-46.1	
2509.80	-11.7	V	3.0	45.0	1.0	-55.8	-13.0	-42.8	
3346.40	-9.2	V	3.0	45.3	1.0	-53.5	-13.0	-40.5	
1673.20	-14.0	H	3.0	45.2	1.0	-58.1	-13.0	-45.1	
2509.80	-11.1	H	3.0	45.0	1.0	-55.2	-13.0	-42.2	
3346.40	-9.2	H	3.0	45.3	1.0	-53.5	-13.0	-40.5	
High Ch, 846.6MHz									
1693.20	-14.7	V	3.0	45.2	1.0	-58.9	-13.0	-45.9	
2539.80	-11.6	V	3.0	45.0	1.0	-55.6	-13.0	-42.6	
3386.40	-9.1	V	3.0	45.3	1.0	-53.4	-13.0	-40.4	
1693.20	-13.8	H	3.0	45.2	1.0	-58.0	-13.0	-45.0	
2539.80	-11.2	H	3.0	45.0	1.0	-55.2	-13.0	-42.2	
3386.40	-9.3	H	3.0	45.3	1.0	-53.6	-13.0	-40.6	

WCDMA

Band 5
HSDPA

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

Company: Samsung
Project #: 4789354096
Date: 2020-02-13
Test Engineer: 20881
Configuration: EUT / AC Adapter / Earphone, Y-Position
Location: Chamber 1
Mode: HSDPA Band 5 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1652.80	-15.0	V	3.0	45.2	1.0	-59.2	-13.0	-46.2	
2479.20	-11.5	V	3.0	45.0	1.0	-55.6	-13.0	-42.6	
3305.60	-9.2	V	3.0	45.3	1.0	-53.4	-13.0	-40.4	
1652.80	-14.0	H	3.0	45.2	1.0	-58.2	-13.0	-45.2	
2479.20	-11.0	H	3.0	45.0	1.0	-55.1	-13.0	-42.1	
3305.60	-9.5	H	3.0	45.3	1.0	-53.8	-13.0	-40.8	
Mid Ch, 836.6MHz									
1673.20	-14.8	V	3.0	45.2	1.0	-59.0	-13.0	-46.0	
2509.80	-11.6	V	3.0	45.0	1.0	-55.7	-13.0	-42.7	
3346.40	-9.2	V	3.0	45.3	1.0	-53.5	-13.0	-40.5	
1673.20	-13.9	H	3.0	45.2	1.0	-58.1	-13.0	-45.1	
2509.80	-11.1	H	3.0	45.0	1.0	-55.1	-13.0	-42.1	
3346.40	-9.4	H	3.0	45.3	1.0	-53.7	-13.0	-40.7	
High Ch, 846.6MHz									
1693.20	-14.7	V	3.0	45.2	1.0	-58.8	-13.0	-45.8	
2539.80	-11.6	V	3.0	45.0	1.0	-55.7	-13.0	-42.7	
3386.40	-8.9	V	3.0	45.3	1.0	-53.2	-13.0	-40.2	
1693.20	-13.8	H	3.0	45.2	1.0	-57.9	-13.0	-44.9	
2539.80	-11.1	H	3.0	45.0	1.0	-55.2	-13.0	-42.2	
3386.40	-9.3	H	3.0	45.3	1.0	-53.6	-13.0	-40.6	

WCDMA Band 4

WCDMA Band 4 REL99

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

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20882
Configuration: EUT / AC Adapter / Earphone, X-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	-8.0	V	3.0	45.3	1.0	-52.3	-13.0	-39.3	
5137.20	-8.3	V	3.0	45.3	1.0	-52.6	-13.0	-39.6	
6849.60	-5.7	V	3.0	44.5	1.0	-49.2	-13.0	-36.2	
3424.80	-8.2	H	3.0	45.3	1.0	-52.5	-13.0	-39.5	
5137.20	-8.3	H	3.0	45.3	1.0	-52.6	-13.0	-39.6	
6849.60	-5.4	H	3.0	44.5	1.0	-48.8	-13.0	-35.8	
Mid Ch, 1732.6MHz									
3465.20	-7.5	V	3.0	45.3	1.0	-51.9	-13.0	-38.9	
5197.80	-7.3	V	3.0	45.3	1.0	-51.6	-13.0	-38.6	
6930.40	-5.7	V	3.0	44.4	1.0	-49.1	-13.0	-36.1	
3465.20	-7.7	H	3.0	45.3	1.0	-52.0	-13.0	-39.0	
5197.80	-7.9	H	3.0	45.3	1.0	-52.2	-13.0	-39.2	
6930.40	-5.7	H	3.0	44.4	1.0	-49.1	-13.0	-36.1	
High Ch, 1752.6MHz									
3505.20	-7.5	V	3.0	45.3	1.0	-51.8	-13.0	-38.8	
5257.80	-7.7	V	3.0	45.3	1.0	-52.0	-13.0	-39.0	
7010.40	-5.7	V	3.0	44.4	1.0	-49.1	-13.0	-36.1	
3505.20	-7.8	H	3.0	45.3	1.0	-52.1	-13.0	-39.1	
5257.80	-7.7	H	3.0	45.3	1.0	-52.0	-13.0	-39.0	
7010.40	-5.4	H	3.0	44.4	1.0	-48.8	-13.0	-35.8	

WCDMA Band 4 HSDPA

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

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20882
Configuration: EUT / AC Adapter / Earphone, X-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	-7.4	V	3.0	45.3	1.0	-51.7	-13.0	-38.7	
5137.20	-8.4	V	3.0	45.3	1.0	-52.6	-13.0	-39.6	
6849.60	-5.6	V	3.0	44.5	1.0	-49.1	-13.0	-36.1	
3424.80	-7.8	H	3.0	45.3	1.0	-52.1	-13.0	-39.1	
5137.20	-8.5	H	3.0	45.3	1.0	-52.7	-13.0	-39.7	
6849.60	-5.6	H	3.0	44.5	1.0	-49.1	-13.0	-36.1	
Mid Ch, 1732.6MHz									
3465.20	-7.5	V	3.0	45.3	1.0	-51.8	-13.0	-38.8	
5197.80	-7.7	V	3.0	45.3	1.0	-52.0	-13.0	-39.0	
6930.40	-5.4	V	3.0	44.4	1.0	-48.8	-13.0	-35.8	
3465.20	-7.6	H	3.0	45.3	1.0	-51.9	-13.0	-38.9	
5197.80	-7.6	H	3.0	45.3	1.0	-51.9	-13.0	-38.9	
6930.40	-5.7	H	3.0	44.4	1.0	-49.1	-13.0	-36.1	
High Ch, 1752.6MHz									
3505.20	-7.4	V	3.0	45.3	1.0	-51.8	-13.0	-38.8	
5257.80	-7.7	V	3.0	45.3	1.0	-52.0	-13.0	-39.0	
7010.40	-5.4	V	3.0	44.4	1.0	-48.7	-13.0	-35.7	
3505.20	-7.7	H	3.0	45.3	1.0	-52.0	-13.0	-39.0	
5257.80	-7.8	H	3.0	45.3	1.0	-52.1	-13.0	-39.1	
7010.40	-5.1	H	3.0	44.4	1.0	-48.5	-13.0	-35.5	

WCDMA Band 2

WCDMA

Band 2
REL99

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

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20882
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 1
Mode: Rel99 Band 2 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	-10.8	V	3.0	45.4	1.0	-55.2	-13.0	-42.2	
5557.20	-7.7	V	3.0	45.3	1.0	-52.0	-13.0	-39.0	
7409.60	-5.5	V	3.0	44.1	1.0	-48.7	-13.0	-35.7	
3704.80	-11.0	H	3.0	45.4	1.0	-55.4	-13.0	-42.4	
5557.20	-8.1	H	3.0	45.3	1.0	-52.4	-13.0	-39.4	
7409.60	-5.1	H	3.0	44.1	1.0	-48.3	-13.0	-35.3	
Mid Ch, 1880MHz									
3760.00	-11.3	V	3.0	45.4	1.0	-55.7	-13.0	-42.7	
5640.00	-7.6	V	3.0	45.3	1.0	-51.9	-13.0	-38.9	
7520.00	-5.4	V	3.0	44.1	1.0	-48.5	-13.0	-35.5	
3760.00	-11.0	H	3.0	45.4	1.0	-55.4	-13.0	-42.4	
5640.00	-7.9	H	3.0	45.3	1.0	-52.2	-13.0	-39.2	
7520.00	-5.2	H	3.0	44.1	1.0	-48.3	-13.0	-35.3	
High Ch, 1907.6MHz									
3815.20	-10.4	V	3.0	45.4	1.0	-54.8	-13.0	-41.8	
5722.80	-7.8	V	3.0	45.3	1.0	-52.1	-13.0	-39.1	
7630.40	-5.1	V	3.0	44.0	1.0	-48.1	-13.0	-35.1	
3815.20	-10.9	H	3.0	45.4	1.0	-55.3	-13.0	-42.3	
5722.80	-7.7	H	3.0	45.3	1.0	-52.0	-13.0	-39.0	
7630.40	-5.1	H	3.0	44.0	1.0	-48.1	-13.0	-35.1	

WCDMA

Band 2
HSDPA

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

Company: Samsung
Project #: 4789354096
Date: 2020-02-12
Test Engineer: 20882
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 1
Mode: HSDPA Band 2 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	-10.4	V	3.0	45.4	1.0	-54.8	-13.0	-41.8	
5557.20	-7.4	V	3.0	45.3	1.0	-51.7	-13.0	-38.7	
7409.60	-5.1	V	3.0	44.1	1.0	-48.2	-13.0	-35.2	
3704.80	-11.0	H	3.0	45.4	1.0	-55.4	-13.0	-42.4	
5557.20	-8.0	H	3.0	45.3	1.0	-52.3	-13.0	-39.3	
7409.60	-5.1	H	3.0	44.1	1.0	-48.3	-13.0	-35.3	
Mid Ch, 1880MHz									
3760.00	-10.1	V	3.0	45.4	1.0	-54.5	-13.0	-41.5	
5640.00	-7.2	V	3.0	45.3	1.0	-51.5	-13.0	-38.5	
7520.00	-5.2	V	3.0	44.1	1.0	-48.3	-13.0	-35.3	
3760.00	-10.3	H	3.0	45.4	1.0	-54.7	-13.0	-41.7	
5640.00	-7.4	H	3.0	45.3	1.0	-51.7	-13.0	-38.7	
7520.00	-4.7	H	3.0	44.1	1.0	-47.8	-13.0	-34.8	
High Ch, 1907.6MHz									
3815.20	-10.4	V	3.0	45.4	1.0	-54.9	-13.0	-41.9	
5722.80	-7.5	V	3.0	45.3	1.0	-51.8	-13.0	-38.8	
7630.40	-5.3	V	3.0	44.0	1.0	-48.3	-13.0	-35.3	
3815.20	-11.1	H	3.0	45.4	1.0	-55.6	-13.0	-42.6	
5722.80	-7.5	H	3.0	45.3	1.0	-51.8	-13.0	-38.8	
7630.40	-5.0	H	3.0	44.0	1.0	-48.0	-13.0	-35.0	

LTE Band 2

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

Company: Samsung
Project #: 4789354096
Date: 2020-02-04
Test Engineer: 20890
Configuration: EUT / AC Adpater / Earphone, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Harmonics, 1.4MHz Bandwidth

LTE Band 2 1.4MHz QPSK

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.7MHz									
3701.40	-11.5	V	3.0	42.0	1.0	-52.5	-13.0	-39.5	
5552.10	-7.8	V	3.0	42.9	1.0	-49.6	-13.0	-36.6	
7402.80	-6.3	V	3.0	42.5	1.0	-47.8	-13.0	-34.8	
3701.40	-11.3	H	3.0	42.0	1.0	-52.4	-13.0	-39.4	
5552.10	-7.7	H	3.0	42.9	1.0	-49.6	-13.0	-36.6	
7402.80	-6.4	H	3.0	42.5	1.0	-47.9	-13.0	-34.9	
Mid Ch, 1880MHz									
3760.00	-10.5	V	3.0	42.1	1.0	-51.6	-13.0	-38.6	
5640.00	-7.2	V	3.0	42.9	1.0	-49.1	-13.0	-36.1	
7520.00	-6.3	V	3.0	42.4	1.0	-47.7	-13.0	-34.7	
3760.00	-10.9	H	3.0	42.1	1.0	-52.0	-13.0	-39.0	
5640.00	-7.2	H	3.0	42.9	1.0	-49.1	-13.0	-36.1	
7520.00	-5.1	H	3.0	42.4	1.0	-46.5	-13.0	-33.5	
High Ch, 1909.3MHz									
3818.60	-11.4	V	3.0	42.1	1.0	-52.4	-13.0	-39.4	
5727.90	-7.7	V	3.0	42.9	1.0	-49.6	-13.0	-36.6	
7637.20	-6.6	V	3.0	42.3	1.0	-48.0	-13.0	-35.0	
3818.60	-11.4	H	3.0	42.1	1.0	-52.4	-13.0	-39.4	
5727.90	-7.7	H	3.0	42.9	1.0	-49.6	-13.0	-36.6	
7637.20	-5.5	H	3.0	42.3	1.0	-46.9	-13.0	-33.9	

LTE Band 5

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

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20896
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 5 Harmonics, 1.4MHz Bandwidth

LTE Band 5 1.4MHz QPSK

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	-11.7	V	3.0	40.7	1.0	-51.4	-13.0	-38.4	
2474.10	-12.7	V	3.0	41.3	1.0	-53.0	-13.0	-40.0	
3298.80	-10.3	V	3.0	42.0	1.0	-51.3	-13.0	-38.3	
1649.40	-10.7	H	3.0	40.7	1.0	-50.3	-13.0	-37.3	
2474.10	-12.6	H	3.0	41.3	1.0	-52.9	-13.0	-39.9	
3298.80	-10.0	H	3.0	42.0	1.0	-51.1	-13.0	-38.1	
Mid Ch, 836.5MHz									
1673.00	-12.7	V	3.0	40.7	1.0	-52.3	-13.0	-39.3	
2509.50	-12.9	V	3.0	41.3	1.0	-53.2	-13.0	-40.2	
3346.00	-10.2	V	3.0	42.0	1.0	-51.2	-13.0	-38.2	
1673.00	-11.5	H	3.0	40.7	1.0	-51.1	-13.0	-38.1	
2509.50	-12.7	H	3.0	41.3	1.0	-53.0	-13.0	-40.0	
3346.00	-9.8	H	3.0	42.0	1.0	-50.8	-13.0	-37.8	
High Ch, 848.3MHz									
1696.60	-13.2	V	3.0	40.7	1.0	-52.9	-13.0	-39.9	
2544.90	-12.5	V	3.0	41.4	1.0	-52.9	-13.0	-39.9	
3393.20	-9.8	V	3.0	42.0	1.0	-50.8	-13.0	-37.8	
1696.60	-12.4	H	3.0	40.7	1.0	-52.1	-13.0	-39.1	
2544.90	-12.3	H	3.0	41.4	1.0	-52.7	-13.0	-39.7	
3393.20	-9.3	H	3.0	42.0	1.0	-50.4	-13.0	-37.4	

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LTE Band 12

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

Company: Samsung
Project #: 4789354096
Date: 2020-02-03
Test Engineer: 20896
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 12 Harmonics, 1.4MHz Bandwidth

LTE Band 12 1.4MHz QPSK

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 699.7MHz									
1399.40	-14.0	V	3.0	45.4	1.0	-58.4	-13.0	-45.4	
2099.10	-12.9	V	3.0	45.0	1.0	-56.8	-13.0	-43.8	
2798.80	-10.8	V	3.0	45.1	1.0	-54.9	-13.0	-41.9	
1399.40	-11.1	H	3.0	45.4	1.0	-55.5	-13.0	-42.5	
2099.10	-11.8	H	3.0	45.0	1.0	-55.7	-13.0	-42.7	
2798.80	-10.6	H	3.0	45.1	1.0	-54.7	-13.0	-41.7	
Mid Ch, 707.5MHz									
1415.00	-14.7	V	3.0	45.4	1.0	-59.1	-13.0	-46.1	
2122.50	-12.7	V	3.0	45.0	1.0	-56.7	-13.0	-43.7	
2830.00	-10.8	V	3.0	45.1	1.0	-55.0	-13.0	-42.0	
1415.00	-8.4	H	3.0	45.4	1.0	-52.8	-13.0	-39.8	
2122.50	-11.0	H	3.0	45.0	1.0	-55.0	-13.0	-42.0	
2830.00	-10.6	H	3.0	45.1	1.0	-54.7	-13.0	-41.7	
High Ch, 715.3MHz									
1430.60	-11.8	V	3.0	45.4	1.0	-56.2	-13.0	-43.2	
2145.90	-12.7	V	3.0	45.0	1.0	-56.7	-13.0	-43.7	
2861.20	-10.7	V	3.0	45.1	1.0	-54.8	-13.0	-41.8	
1430.60	-8.2	H	3.0	45.4	1.0	-52.6	-13.0	-39.6	
2145.90	-11.7	H	3.0	45.0	1.0	-55.6	-13.0	-42.6	
2861.20	-10.8	H	3.0	45.1	1.0	-55.0	-13.0	-42.0	

LTE Band 66

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

Company: Samsung
Project #: 4789354096
Date: 2020-02-07
Test Engineer: 20890
Configuration: EUT / AC Adapter / Earphone, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Harmonics, 20MHz Bandwidth

LTE Band 66 20MHz QPSK

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1720MHz									
3440.00	-9.0	V	3.0	42.0	1.0	-50.0	-13.0	-37.0	
5160.00	-7.5	V	3.0	42.8	1.0	-49.3	-13.0	-36.3	
6880.00	-5.2	V	3.0	42.7	1.0	-46.9	-13.0	-33.9	
3440.00	-8.8	H	3.0	42.0	1.0	-49.8	-13.0	-36.8	
5160.00	-8.4	H	3.0	42.8	1.0	-50.2	-13.0	-37.2	
6880.00	-5.4	H	3.0	42.7	1.0	-47.1	-13.0	-34.1	
Mid Ch, 1745MHz									
3490.00	-8.4	V	3.0	42.0	1.0	-49.4	-13.0	-36.4	
5235.00	-7.7	V	3.0	42.8	1.0	-49.5	-13.0	-36.5	
6980.00	-5.9	V	3.0	42.7	1.0	-47.5	-13.0	-34.5	
3490.00	-8.2	H	3.0	42.0	1.0	-49.2	-13.0	-36.2	
5235.00	-7.8	H	3.0	42.8	1.0	-49.6	-13.0	-36.6	
6980.00	-6.5	H	3.0	42.7	1.0	-48.2	-13.0	-35.2	
High Ch, 1770MHz									
3540.00	-7.8	V	3.0	42.0	1.0	-48.9	-13.0	-35.9	
5310.00	-8.0	V	3.0	42.8	1.0	-49.8	-13.0	-36.8	
7080.00	-6.0	V	3.0	42.6	1.0	-47.6	-13.0	-34.6	
3540.00	-7.8	H	3.0	42.0	1.0	-48.9	-13.0	-35.9	
5310.00	-8.0	H	3.0	42.8	1.0	-49.8	-13.0	-36.8	
7080.00	-5.8	H	3.0	42.6	1.0	-47.4	-13.0	-34.4	

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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.

END OF REPORT

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