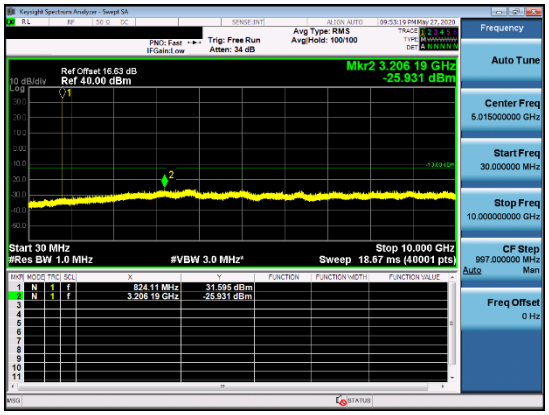
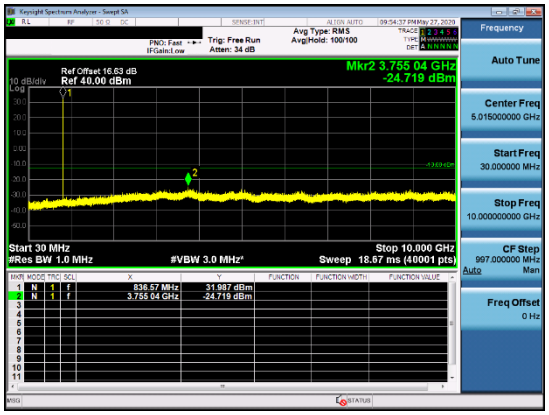
9.3.1. OUT OF BAND EMISSIONS RESULT

GSM 850

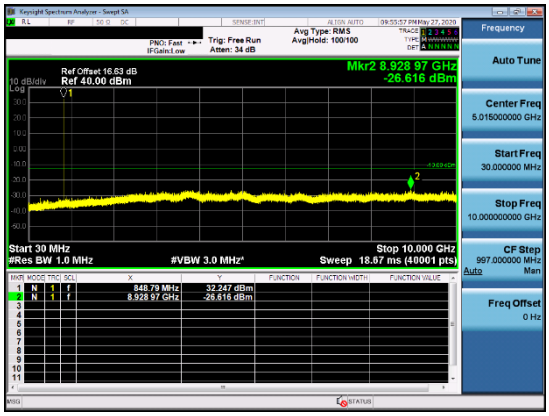
GSM 850



GSM850 GPRS Low channel

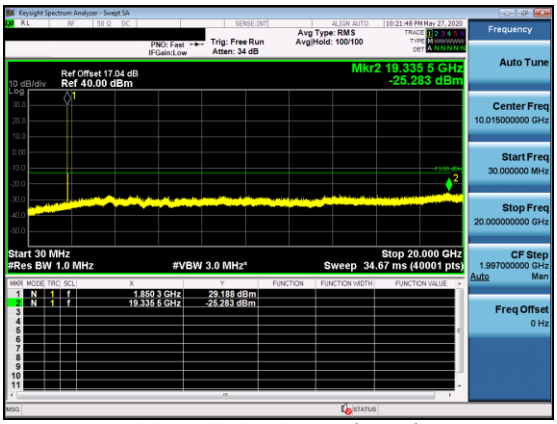
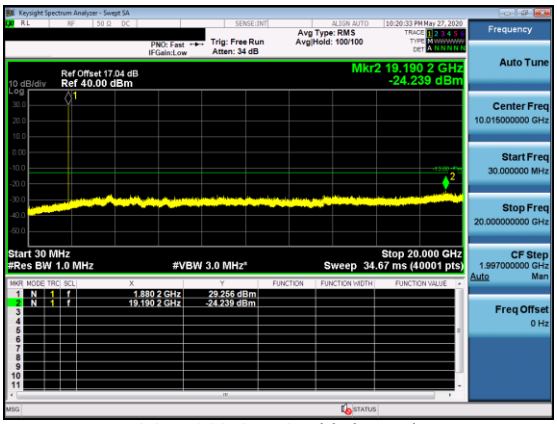
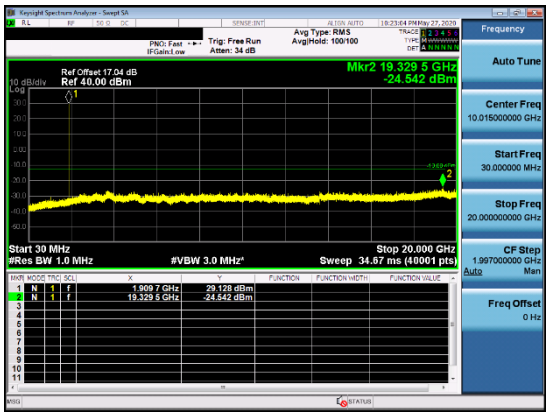


GSM850 GPRS Mid channel

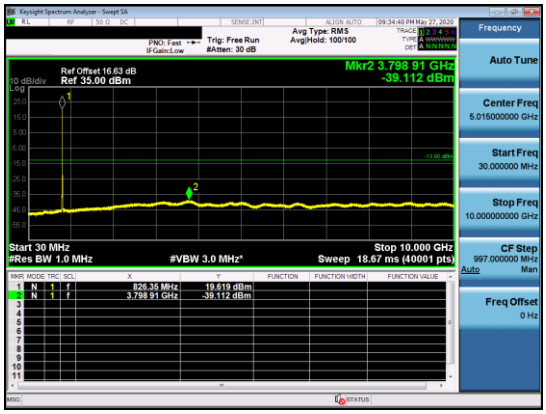
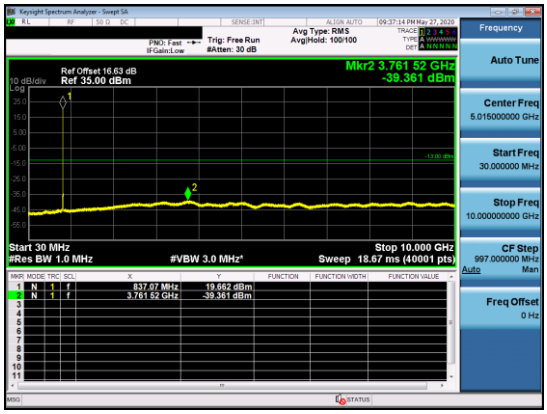
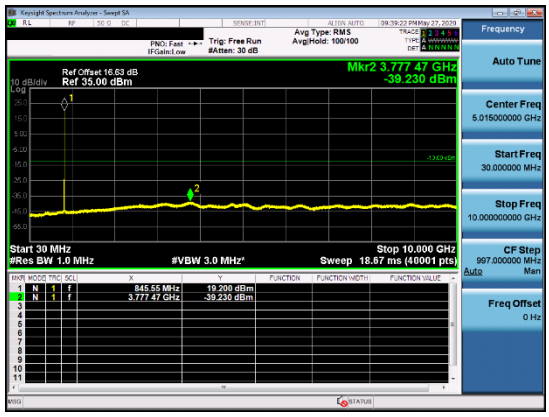


GSM850 GPRS High channel

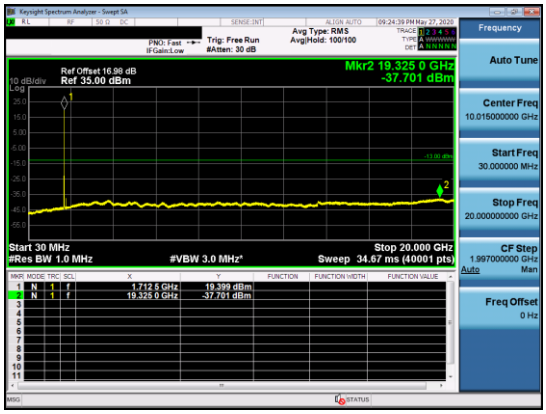
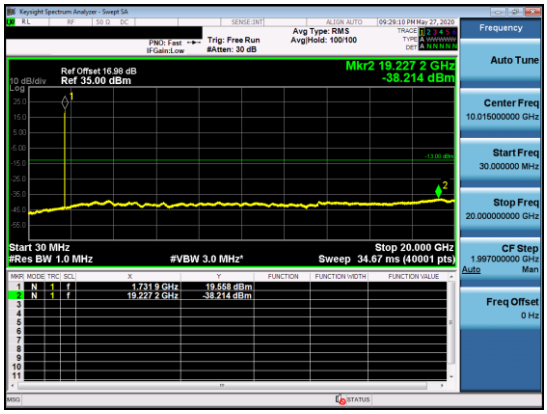
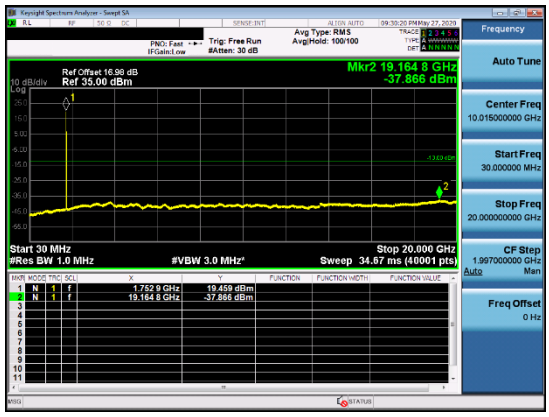
GSM 1900

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

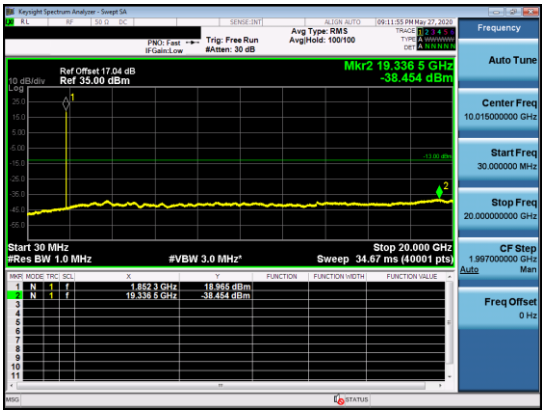
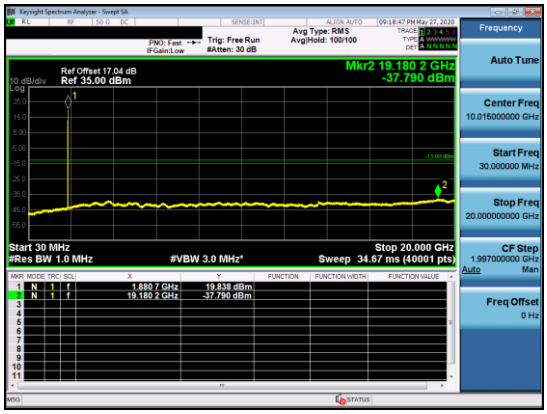
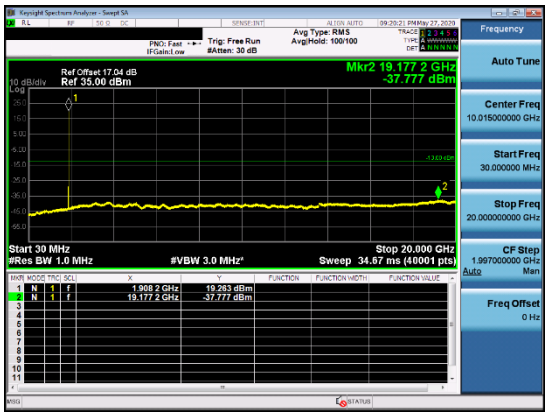
WCDMA Band 5

Band 5	 REL99 Low channel	 REL99 Mid channel
	 REL99 High channel	

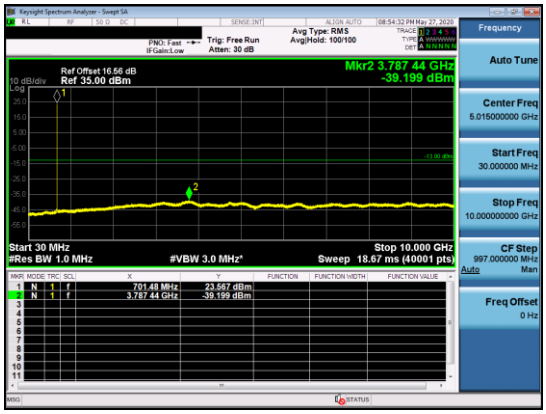
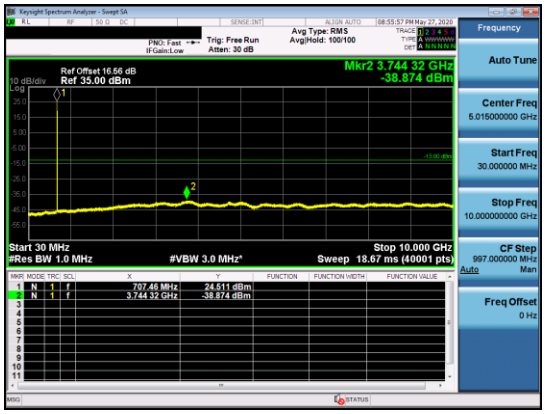
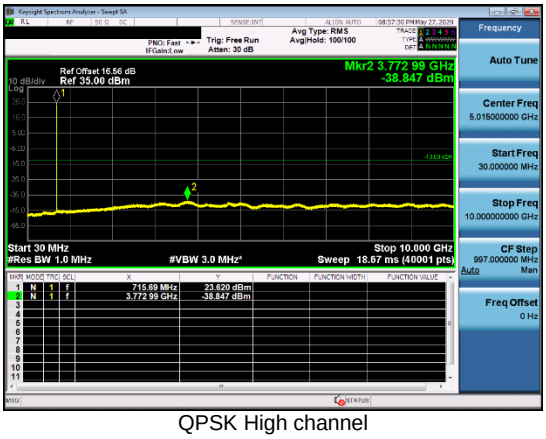
WCDMA Band 4

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 12

Band 12 5MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

LTE Band 13

<table>
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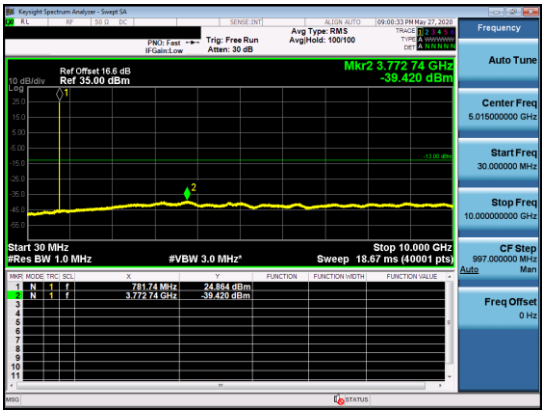
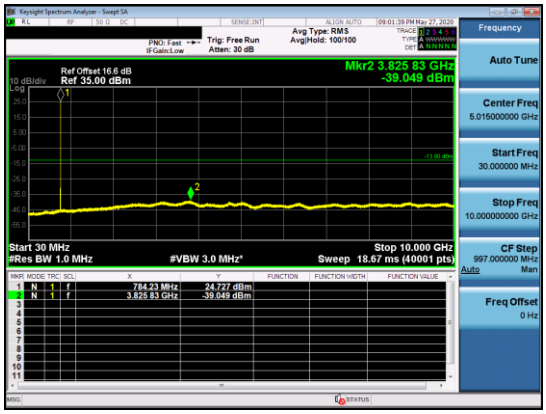
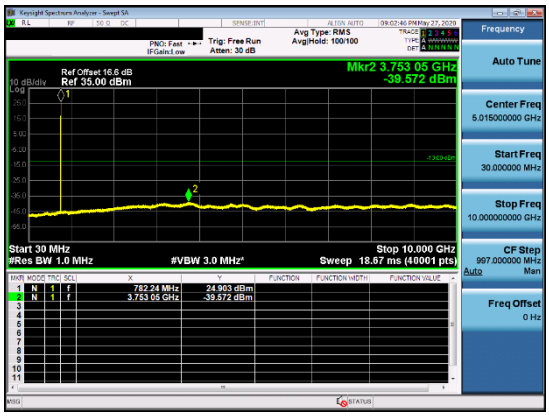
5MHz</td><td> 

QPSK Low channel</td><td> 

QPSK Mid channel</td></tr>
<tr><td colspan="2"> 

QPSK High channel</td></tr>
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LTE Band 25

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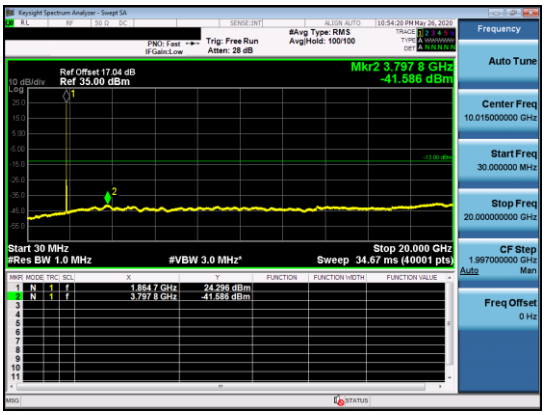
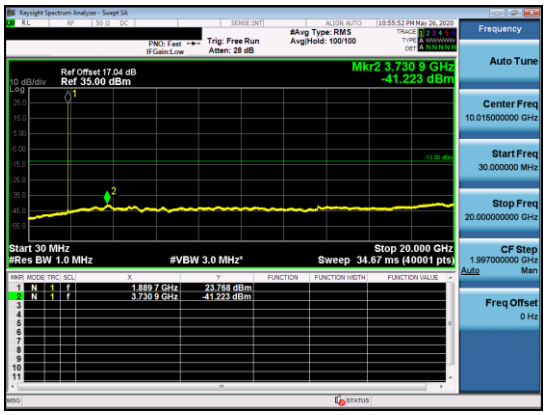
15MHz</td>
<td> 

QPSK Low channel</td>
<td> 

QPSK Mid channel</td>
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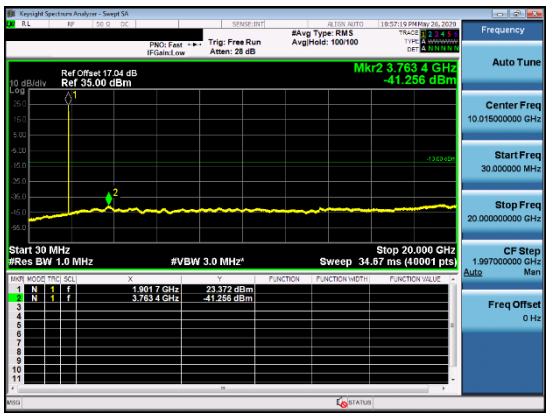
<tr>
<td colspan="2"> 

QPSK High channel</td>
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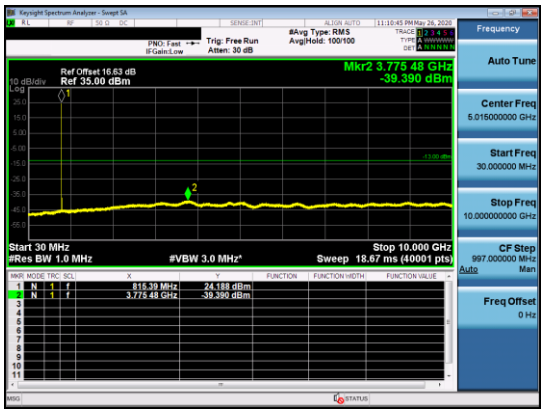
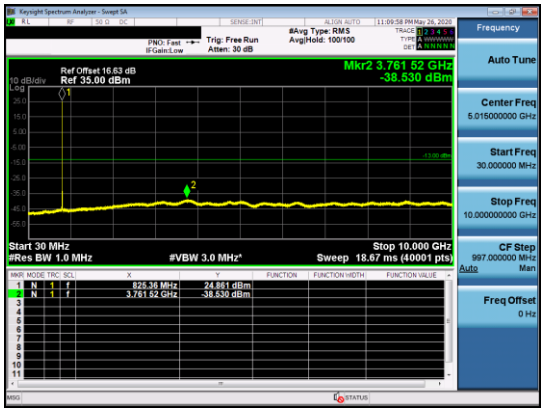
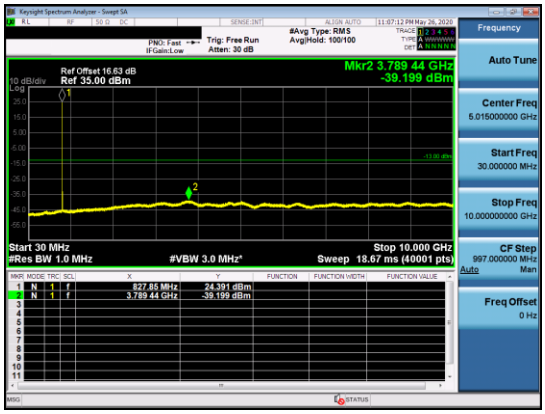
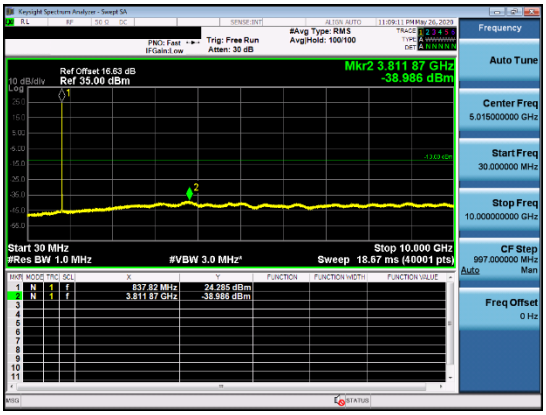
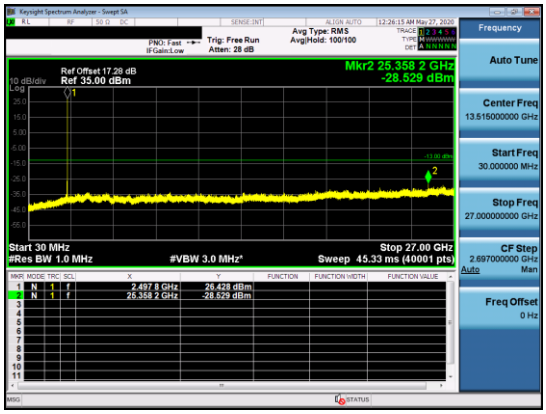
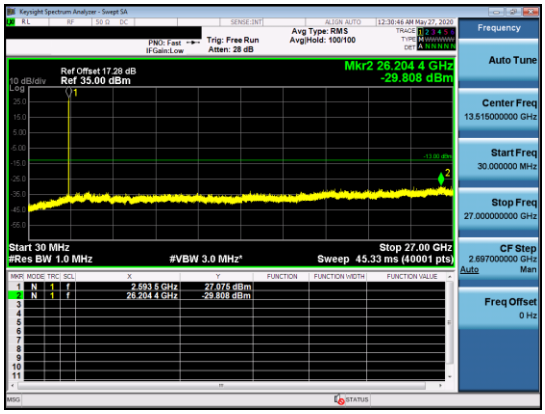
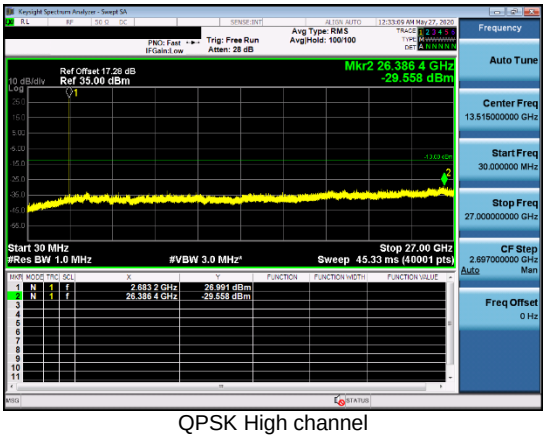
LTE Band 26(Part 90)

Band 26 (Part90) 10MHz	 QPSK Mid channel

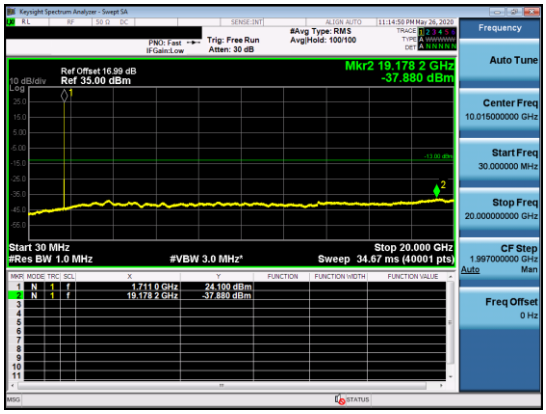
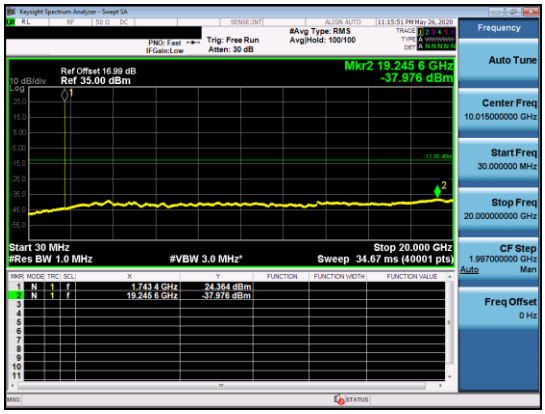
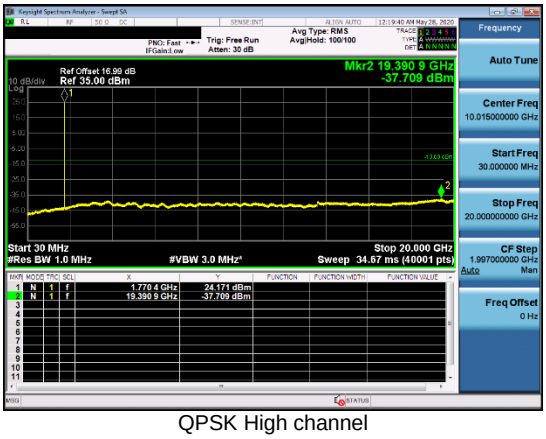
LTE Band 26(Part 22)

Band 26 (Part 22) 10MHz	 QPSK Low channel	 QPSK Mid channel
	 QPSK High channel	

LTE Band 41(PC3)

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

LTE Band 66

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

LTE Band 2

LTE Band 2(Frequency range: 1850-1910 MHz) is covered by LTE Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 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,§27.54 and §90.213

LIMITS

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

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

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

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

RESULTS

See the following pages.

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

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 [ºC]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	50	824.20002990	-0.001	848.80002508	-0.004	2.5
3.88	40	824.20002055	0.011	848.80002338	-0.002	2.5
3.88	30	824.20002487	0.006	848.80002345	-0.002	2.5
3.88	***20***	***824.20002944***	***0.000***	***848.80002146***	***0.000***	***2.5***
3.88	10	824.20002560	0.005	848.80002249	-0.001	2.5
3.88	0	824.20002494	0.005	848.80002730	-0.007	2.5
3.88	-10	824.20002835	0.001	848.80002255	-0.001	2.5
3.88	-20	824.20002688	0.003	848.80002783	-0.008	2.5
3.88	-30	824.20002400	0.007	848.80002081	0.001	2.5

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2060.500 Hz		High Channel	2122.000 Hz	
Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				
		Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	***20***	***824.20002944***	***0***	***848.80002146***	***0***	***2.5***
4.47	20	824.20002732	0.003	848.80002417	-0.003	2.5
3.60	20	824.20002081	0.010	848.80002968	-0.010	2.5

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

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	1850.0767	1909.9233		
Extreme (50C)		1850.0767	1909.9233	-20.3	-0.011
Extreme (40C)		1850.0767	1909.9233	-23.3	-0.012
Extreme (30C)		1850.0767	1909.9233	-17.0	-0.009
Extreme (10C)		1850.0767	1909.9233	-16.7	-0.009
Extreme (0C)		1850.0767	1909.9233	-22.7	-0.012
Extreme (-10C)		1850.0767	1909.9233	-19.0	-0.010
Extreme (-20C)		1850.0767	1909.9233	-23.0	-0.012
Extreme (-30C)		1850.0767	1909.9233	-19.0	-0.010
20C	15%	1850.0767	1909.9233	-18.5	-0.010
	-15%	1850.0767	1909.9233	-18.2	-0.010
	End Point	1850.0767	1909.9233	-18.7	-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 [ºC]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	50	826.40000571	-0.001	846.59999851	0.006	2.5
3.88	40	826.40000565	-0.001	846.59999930	0.005	2.5
3.88	30	826.40000065	0.005	846.60000424	0.000	2.5
3.88	***20***	***826.40000506***	***0.000***	***846.60000386***	***0.000***	***2.5***
3.88	10	826.39999827	0.008	846.60000337	0.001	2.5
3.88	0	826.40000229	0.003	846.59999913	0.006	2.5
3.88	-10	826.40000204	0.004	846.59999987	0.005	2.5
3.88	-20	826.39999881	0.008	846.60000519	-0.002	2.5
3.88	-30	826.39999634	0.011	846.60000156	0.003	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2066.000 Hz		High Channel	2116.500 Hz	
Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	***20***	**826.40000506**	***0***	**846.60000386**	***0***	***2.5***
4.47	20	826.40000174	0.004	846.60000156	0.003	2.5
3.60	20	826.39999982	0.006	846.60000451	-0.001	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	1710.3231	1754.6770		
Extreme (50C)		1710.3231	1754.6770	5.1	0.003
Extreme (40C)		1710.3231	1754.6770	3.0	0.002
Extreme (30C)		1710.3231	1754.6770	0.2	0.000
Extreme (10C)		1710.3231	1754.6770	8.5	0.005
Extreme (0C)		1710.3231	1754.6770	8.5	0.005
Extreme (-10C)		1710.3231	1754.6770	9.9	0.006
Extreme (-20C)		1710.3231	1754.6770	3.3	0.002
Extreme (-30C)		1710.3231	1754.6770	9.7	0.006
20C	15%	1710.3231	1754.6770	1.8	0.001
	-15%	1710.3231	1754.6770	0.0	0.000
	End Point	1710.3231	1754.6770	5.7	0.003

WCDMA Band 2 (HSDPA)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.3233	1909.6767		
Extreme (50C)		1850.3233	1909.6767	-0.9	0.000
Extreme (40C)		1850.3233	1909.6767	7.2	0.004
Extreme (30C)		1850.3233	1909.6767	1.1	0.001
Extreme (10C)		1850.3233	1909.6767	0.9	0.000
Extreme (0C)		1850.3233	1909.6767	3.5	0.002
Extreme (-10C)		1850.3233	1909.6767	4.5	0.002
Extreme (-20C)		1850.3233	1909.6767	0.8	0.000
Extreme (-30C)		1850.3233	1909.6767	-0.7	0.000
20C	15%	1850.3233	1909.6767	4.9	0.003
	-15%	1850.3233	1909.6767	1.4	0.001
	End Point	1850.3233	1909.6767	1.8	0.001

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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	699.1544	715.8457		
Extreme (50C)		699.1543	715.8456	-6.5	-0.009
Extreme (40C)		699.1544	715.8457	1.7	0.002
Extreme (30C)		699.1544	715.8457	2.9	0.004
Extreme (10C)		699.1544	715.8457	3.9	0.006
Extreme (0C)		699.1544	715.8457	1.5	0.002
Extreme (-10C)		699.1544	715.8457	0.2	0.000
Extreme (-20C)		699.1543	715.8456	-5.6	-0.008
Extreme (-30C)		699.1543	715.8456	-1.9	-0.003
20C	15%	699.1543	715.8457	3.1	0.004
	-15%	699.1544	715.8457	2.7	0.004
	End Point	699.1544	715.8456	-5.2	-0.007

LTE Band 13 (QPSK)

Limit		777	787	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	777.2424	786.7577		
Extreme (50C)		777.2423	786.7576	-2.1	-0.003
Extreme (40C)		777.2423	786.7576	-0.4	0.000
Extreme (30C)		777.2423	786.7576	-1.4	-0.002
Extreme (10C)		777.2423	786.7576	-1.3	-0.002
Extreme (0C)		777.2423	786.7576	-0.8	-0.001
Extreme (-10C)		777.2424	786.7577	1.4	0.002
Extreme (-20C)		777.2423	786.7576	-1.2	-0.002
Extreme (-30C)		777.2424	786.7577	0.7	0.001
20C	15%	777.2423	786.7577	0.9	0.001
	-15%	777.2423	786.7576	-0.4	0.000
	End Point	777.2423	786.7577	1.8	0.002

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

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.1578	1914.8422		
Extreme (50C)		1850.1578	1914.8422	8.6	0.005
Extreme (40C)		1850.1578	1914.8422	1.8	0.001
Extreme (30C)		1850.1578	1914.8422	2.7	0.001
Extreme (10C)		1850.1578	1914.8422	7.8	0.004
Extreme (0C)		1850.1578	1914.8422	11.5	0.006
Extreme (-10C)		1850.1578	1914.8422	10.9	0.006
Extreme (-20C)		1850.1578	1914.8422	8.7	0.005
Extreme (-30C)		1850.1578	1914.8422	4.2	0.002
20C	15%	1850.1578	1914.8422	8.7	0.005
	-15%	1850.1578	1914.8422	7.6	0.004
	End Point	1850.1578	1914.8422	4.8	0.003

LTE Band 26

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2036.750 Hz		High Channel	2120.750 Hz	
Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	814.69999678	-0.021	848.29999884	-0.026	2.5
3.85	40	814.69998475	-0.006	848.29999469	-0.021	2.5
3.85	30	814.69998206	-0.003	848.29997943	-0.003	2.5
3.85	***20***	***814.69997983***	***0.000***	***848.29997661***	***0.000***	***2.5***
3.85	10	814.69998248	-0.003	848.29999614	-0.023	2.5
3.85	0	814.70000468	-0.031	848.30000270	-0.031	2.5
3.85	-10	814.69999426	-0.018	848.29999847	-0.026	2.5
3.85	-20	814.70001003	-0.037	848.30000455	-0.033	2.5
3.85	-30	814.70000299	-0.028	848.30000986	-0.039	2.5

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20ºC						
Limit: +- 2.5 ppm =	Low Channel	2036.750 Hz		High Channel	2120.750 Hz	
Power Supply [Vdc]	Environment Temperature [ºC]	Frequency Deviation Measureed with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.88	***20***	**814.69997983**	***0***	**848.29997661**	***0***	***2.5***
4.47	20	814.69998367	-0.005	848.29998037	-0.004	2.5
3.60	20	814.69997986	0.000	848.29998572	-0.011	2.5

LTE Band 41 PC3 (QPSK)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2494.0025	2691.9975		
Extreme (50C)		2494.0025	2691.9975	27.1	0.010
Extreme (40C)		2494.0025	2691.9975	27.1	0.010
Extreme (30C)		2494.0025	2691.9975	27.2	0.010
Extreme (10C)		2494.0025	2691.9975	22.0	0.008
Extreme (0C)		2494.0025	2691.9975	24.3	0.009
Extreme (-10C)		2494.0025	2691.9975	25.2	0.010
Extreme (-20C)		2494.0025	2691.9975	20.2	0.008
Extreme (-30C)		2494.0025	2691.9975	28.7	0.011
20C	15%	2494.0025	2691.9975	21.2	0.008
	-15%	2494.0025	2691.9975	25.5	0.010
	End Point	2494.0025	2691.9975	23.4	0.009

LTE Band 66 (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	-15.1	-0.009
Extreme (40C)		1710.6994	1779.3005	-4.4	-0.003
Extreme (30C)		1710.6994	1779.3005	-5.7	-0.003
Extreme (10C)		1710.6994	1779.3005	-19.0	-0.011
Extreme (0C)		1710.6994	1779.3005	-12.5	-0.007
Extreme (-10C)		1710.6995	1779.3005	-2.5	-0.001
Extreme (-20C)		1710.6994	1779.3005	-3.8	-0.002
Extreme (-30C)		1710.6994	1779.3005	-17.3	-0.010
20C	15%	1710.6994	1779.3005	-13.2	-0.008
	-15%	1710.6994	1779.3005	-2.6	-0.002
	End Point	1710.6994	1779.3005	-3.8	-0.002

LTE Band 2

LTE Band 2(Frequency range: 1850-1910 MHz) is covered by LTE Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 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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9.5. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50, §27.53 and §90.635

LIMITS

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

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

27.50:

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

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

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

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

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

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

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

9.5.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	512	824.2	**27.07**	**508.82**
		661	836.6	26.99	499.76
		810	848.8	27.06	507.73
	EGPRS	512	824.2	**22.66**	**184.32**
		661	836.6	21.72	148.51
		810	848.8	22.12	162.79
GSM1900	GPRS	512	1850.2	27.10	513.38
		661	1880	**29.84**	**963.00**
		810	1909.8	28.61	726.30
	EGPRS	512	1850.2	26.99	500.54
		661	1880	**29.78**	**949.79**
		810	1909.8	28.37	687.25

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	**20.07**	**101.52**
		4183	836.6	19.27	84.48
		4233	846.6	19.71	93.49
	HSDPA	4132	826.4	17.81	60.33
		4183	836.6	17.26	53.18
		4233	846.6	**18.05**	**63.79**
Band 4	REL99	1312	1712.4	26.44	440.55
		1413	1732.6	**26.60**	**456.58**
		1513	1752.6	26.27	423.52
	HSDPA	1312	1712.4	**26.30**	**426.57**
		1413	1732.6	26.24	420.26
		1513	1752.6	24.85	305.40
Band 2	REL99	9262	1852.4	26.05	402.27
		9400	1880.0	**27.26**	**532.59**
		9538	1907.6	25.96	394.21
	HSDPA	9262	1852.4	24.73	296.83
		9400	1880.0	**25.75**	**376.18**
		9538	1907.6	25.53	357.05

LTE Band 12

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 12	10	QPSK	1/25	704.0	15.49	35.41
			1/0	707.5	15.82	38.24
			1/49	711.0	**16.43**	**43.94**
		16QAM	1/49	704.0	15.23	33.35
			1/0	707.5	14.50	28.22
			1/49	711.0	**15.50**	**35.47**
	5	QPSK	1/12	701.5	15.13	32.60
			1/12	707.5	16.02	40.04
			1/24	713.5	**16.14**	**41.12**
		16QAM	1/12	701.5	14.38	27.43
			1/24	707.5	15.33	34.16
			1/12	713.5	**15.64**	**36.63**
	3	QPSK	1/14	700.5	14.75	29.87
			1/8	707.5	15.13	32.62
			1/14	714.5	**15.84**	**38.40**
		16QAM	1/14	700.5	13.59	22.87
			1/0	707.5	**14.38**	**27.45**
			1/14	714.5	14.33	27.12
	1.4	QPSK	1/3	699.7	14.49	28.14
			1/5	707.5	15.49	35.44
			1/5	715.3	**15.74**	**37.50**
		16QAM	1/3	699.7	13.48	22.30
			1/3	707.5	14.48	28.09
			1/0	715.3	**15.57**	**36.06**

LTE Band 13

Band	BW [MHz]	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 13	10	QPSK	1/0	782.0	**17.52**	**56.49**
		16QAM	1/49	782.0	16.17	41.40
	5	QPSK	1/24	779.5	**17.44**	**55.51**
			1/24	782.0	17.33	54.08
			1/0	784.5	17.30	53.75
		16QAM	1/12	779.5	16.29	42.60
			1/24	782.0	**16.36**	**43.25**
			1/12	784.5	16.28	42.50

LTE Band 25

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 25	20	QPSK	1/49	1860.0	25.57	360.23
			1/99	1882.5	24.16	260.35
			1/0	1905.0	**25.74**	**374.59**
		16QAM	1/99	1860.0	24.36	272.64
			1/99	1882.5	23.33	215.06
			1/0	1905.0	**24.71**	**295.50**
	15	QPSK	1/74	1857.5	23.91	246.28
			1/74	1882.5	24.33	270.75
			1/0	1907.5	**25.43**	**348.79**
		16QAM	1/37	1857.5	23.47	222.55
			1/74	1882.5	22.82	191.23
			1/0	1907.5	**24.54**	**284.16**
	10	QPSK	1/49	1855.0	24.09	256.43
			1/49	1882.5	24.97	313.73
			1/0	1910.0	**25.06**	**320.90**
		16QAM	1/49	1855.0	23.75	237.12
			1/49	1882.5	23.97	249.21
			1/0	1910.0	**24.25**	**266.30**
	5	QPSK	1/24	1852.5	23.84	242.08
			1/24	1882.5	**24.88**	**307.30**
			1/0	1912.5	22.80	190.59
		16QAM	1/24	1852.5	23.34	215.76
			1/24	1882.5	**23.90**	**245.22**
			1/0	1912.5	22.52	178.69
	3	QPSK	1/14	1851.5	23.81	240.57
			1/14	1882.5	**24.94**	**311.57**
			1/0	1913.5	24.56	285.99
		16QAM	1/14	1851.5	23.66	232.40
			1/14	1882.5	**24.66**	**292.12**
			1/0	1913.5	24.16	260.83
	1.4	QPSK	1/0	1850.7	23.76	237.45
			1/3	1882.5	**24.66**	**292.12**
			1/3	1914.3	22.50	177.92
		16QAM	1/3	1850.7	23.15	206.33
			1/3	1882.5	**23.39**	**218.05**
			1/0	1914.3	22.03	159.67

LTE Band 26

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP/EIRP	
					[dBm]	[mW]
Band 26	15	QPSK	1/0	821.5	18.28	67.22
			1/0	831.5	18.71	74.26
			1/0	841.5	**18.77**	**75.32**
		16QAM	1/0	821.5	16.88	48.70
			1/0	831.5	17.67	58.44
			1/0	841.5	**17.72**	**59.14**
	10	QPSK	1/0	819.0	18.16	65.51
			1/0	829.0	18.65	73.34
			1/0	831.5	18.66	73.41
			1/0	844.0	**19.55**	**90.24**
		16QAM	1/0	819.0	16.99	50.04
			1/0	829.0	17.53	56.67
			1/0	831.5	16.69	46.64
			1/0	844.0	**17.90**	**61.71**
	5	QPSK	1/0	816.5	18.80	75.83
			1/0	821.5	**19.09**	**81.04**
			1/0	826.5	18.94	78.33
			1/0	831.5	18.12	64.82
			1/0	846.5	18.39	68.95
		16QAM	1/0	816.5	**18.46**	**70.12**
			1/0	821.5	18.46	70.10
			1/0	826.5	17.85	60.94
			1/0	831.5	17.36	54.42
			1/0	846.5	17.56	56.96
	3	QPSK	1/0	815.5	18.45	70.02
			1/0	822.5	18.70	74.09
			1/14	825.5	**18.82**	**76.25**
			1/0	831.5	18.31	67.72
			1/14	847.5	18.22	66.40
		16QAM	1/0	815.5	16.87	48.67
			1/0	822.5	**17.66**	**58.31**
			1/0	825.5	17.57	57.18
			1/0	831.5	17.19	52.33
			1/14	847.5	17.13	51.66
	1.4	QPSK	1/3	814.7	18.61	72.61
			1/3	823.3	**18.80**	**75.80**
			1/3	824.7	18.60	72.38
			1/3	831.5	18.37	68.66
			1/3	848.3	18.49	70.71
		16QAM	1/3	814.7	16.80	47.86
			1/3	823.3	17.88	61.33
			1/3	824.7	**17.89**	**61.46**
			1/3	831.5	17.34	54.17
			1/3	848.3	17.32	54.01

LTE Band 41(PC3)

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 41	20	QPSK	1/0	2506.0	23.86	242.97
			1/49	2593.0	24.45	278.45
			1/49	2680.0	**27.52**	**565.15**
		16QAM	1/0	2506.0	22.62	182.62
			1/49	2593.0	24.18	261.67
			1/49	2680.0	**26.97**	**497.92**
	15	QPSK	1/0	2503.5	24.19	262.41
			1/37	2593.0	**28.00**	**630.59**
			1/74	2682.5	26.33	429.28
		16QAM	1/37	2503.5	23.00	199.52
			1/37	2593.0	24.41	275.90
			1/49	2682.5	**26.31**	**427.31**
	10	QPSK	1/25	2501.0	24.47	279.60
			1/25	2593.0	26.86	485.01
			1/25	2685.0	**26.86**	**485.23**
		16QAM	1/0	2501.0	23.74	236.34
			1/25	2593.0	25.57	360.37
			1/25	2685.0	**25.98**	**396.23**
	5	QPSK	1/0	2498.5	24.56	285.71
			1/12	2593.0	**26.60**	**456.82**
			1/0	2687.5	26.46	442.43
		16QAM	1/24	2498.5	24.53	283.74
			1/12	2593.0	**26.26**	**422.42**
			1/0	2687.5	25.28	337.17

LTE Band 66

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP [dBm]	ERP / EIRP [mW]
Band 66	20	QPSK	1/99	1720.0	25.32	340.14
			1/49	1745.0	**27.10**	**512.27**
			1/49	1770.0	24.35	272.21
		16QAM	1/99	1720.0	23.94	247.55
			1/49	1745.0	**26.48**	**444.12**
			1/49	1770.0	23.38	217.73
	15	QPSK	1/0	1717.5	24.42	276.90
			1/0	1747.5	**26.76**	**473.70**
			1/37	1772.5	24.89	308.13
		16QAM	1/74	1717.5	22.87	193.78
			1/0	1747.5	**25.75**	**375.41**
			1/37	1772.5	23.80	239.74
	10	QPSK	1/0	1715.0	24.24	265.65
			1/25	1745.0	**25.39**	**345.54**
			1/0	1775.0	24.89	308.12
		16QAM	1/0	1715.0	23.25	211.50
			1/0	1745.0	**24.24**	**265.16**
			1/25	1775.0	23.96	248.72
	5	QPSK	1/0	1712.5	23.90	245.71
			1/0	1745.0	**26.89**	**488.09**
			1/0	1777.5	24.67	293.34
		16QAM	1/0	1712.5	22.52	178.83
			1/12	1745.0	**25.62**	**364.34**
			1/0	1777.5	23.64	231.41
	3	QPSK	1/0	1711.5	23.31	214.06
			1/0	1745.0	**26.65**	**461.85**
			1/0	1778.5	23.89	244.73
		16QAM	1/0	1711.5	22.86	192.99
			1/0	1745.0	**24.28**	**267.61**
			1/0	1778.5	23.04	201.23
	1.4	QPSK	1/3	1710.7	23.00	199.72
			1/3	1745.0	**26.97**	**497.17**
			1/3	1779.3	23.65	232.00
		16QAM	1/3	1710.7	20.96	124.86
			1/5	1745.0	**25.15**	**326.96**
			1/3	1779.3	21.92	155.77

LTE Band 2

LTE Band 2(Frequency range: 1850-1910 MHz) is covered by LTE Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 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(04)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

9.5.2. ERP/EIRP DATA

GSM850

GSM850

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT_X position_Open
Location: 10m Chamber
Mode: GPRS 850 MHz Fundamentals

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.20	25.33	V	2.0	-1.0	22.42	38.5	-16.1	
824.20	29.98	H	2.0	-1.0	27.07	38.5	-11.4	
Mid Ch								
836.60	25.31	V	2.0	-0.9	22.43	38.5	-16.1	
836.60	29.86	H	2.0	-0.9	26.99	38.5	-11.5	
High Ch								
848.80	25.45	V	2.0	-0.9	22.61	38.5	-15.9	
848.80	29.90	H	2.0	-0.9	27.06	38.5	-11.4	

GSM850

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT_X position_Open
Location: 10m Chamber
Mode: EGPRS 850 MHz Fundamentals

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.20	20.80	V	2.0	-1.0	17.89	38.5	-20.6	
824.20	25.57	H	2.0	-1.0	22.66	38.5	-15.8	
Mid Ch								
836.60	19.65	V	2.0	-0.9	16.77	38.5	-21.7	
836.60	24.59	H	2.0	-0.9	21.72	38.5	-16.8	
High Ch								
848.80	19.92	V	2.0	-0.9	17.08	38.5	-21.4	
848.80	24.96	H	2.0	-0.9	22.12	38.5	-16.4	

GSM1900

GSM1900

GPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: EUT / Y-position / Half folded
Location: 10m Chamber
Mode: GPRS 1900 MHz Fundamentals

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	20.66	V	3.1	9.5	27.10	33.0	-5.9	
1850.20	17.55	H	3.1	9.5	24.00	33.0	-9.0	
Mid Ch								
1880.00	23.67	V	3.1	9.3	29.84	33.0	-3.2	
1880.00	16.53	H	3.1	9.3	22.69	33.0	-10.3	
High Ch								
1909.80	22.71	V	3.2	9.1	28.61	33.0	-4.4	
1909.80	12.73	H	3.2	9.1	18.62	33.0	-14.4	

GSM1900

EGPRS

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: EUT / Y-position / Half folded
Location: 10m Chamber
Mode: EGPRS 1900 MHz Fundamentals

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	20.55	V	3.1	9.5	26.99	33.0	-6.0	
1850.20	14.59	H	3.1	9.5	21.04	33.0	-12.0	
Mid Ch								
1880.00	23.61	V	3.1	9.3	29.78	33.0	-3.2	
1880.00	16.19	H	3.1	9.3	22.35	33.0	-10.6	
High Ch								
1909.80	22.47	V	3.2	9.1	28.37	33.0	-4.6	
1909.80	12.35	H	3.2	9.1	18.24	33.0	-14.8	

WCDMA Band 5

WCDMA

Band 5
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / X-Position / Open
Location: 10m Chamber
Mode: Rel99 Band 5 Fundamentals

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	14.88	V	2.0	-0.9	11.98	38.5	-26.5	
826.40	22.97	H	2.0	-0.9	20.07	38.5	-18.4	
Mid Ch								
836.60	15.89	V	2.0	-0.9	13.01	38.5	-25.5	
836.60	22.14	H	2.0	-0.9	19.27	38.5	-19.2	
High Ch								
846.60	16.32	V	2.0	-0.9	13.48	38.5	-25.0	
846.60	22.55	H	2.0	-0.9	19.71	38.5	-18.8	

WCDMA

Band 5
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-02
Test Engineer: 22944
Configuration: EUT / X-Position / Open
Location: 10m Chamber
Mode: HSDPA Band 5 Fundamentals

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	16.08	V	2.0	-0.9	13.18	38.5	-25.3	
826.40	20.71	H	2.0	-0.9	17.81	38.5	-20.7	
Mid Ch								
836.60	14.84	V	2.0	-0.9	11.96	38.5	-26.5	
836.60	20.13	H	2.0	-0.9	17.26	38.5	-21.2	
High Ch								
846.60	15.35	V	2.0	-0.9	12.51	38.5	-26.0	
846.60	20.89	H	2.0	-0.9	18.05	38.5	-20.5	

WCDMA Band 4

WCDMA

Band 4
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-15
Test Engineer: 22944
Configuration: EUT / X-position / Half folded
Location: 10m Chamber
Mode: Rel99 Band 4 Fundamentals

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.40	13.76	V	3.0	9.4	20.21	30.0	-9.8	
1712.40	19.99	H	3.0	9.4	26.44	30.0	-3.6	
Mid Ch								
1732.60	11.16	V	3.0	9.5	17.65	30.0	-12.3	
1732.60	20.10	H	3.0	9.5	26.60	30.0	-3.4	
High Ch								
1752.60	12.35	V	3.0	9.5	18.90	30.0	-11.1	
1752.60	19.72	H	3.0	9.5	26.27	30.0	-3.7	

WCDMA

Band 4
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-15
Test Engineer: 22944
Configuration: EUT / X-position / Half folded
Location: 10m Chamber
Mode: HSDPA Band 4 Fundamentals

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.40	12.86	V	3.0	9.4	19.31	30.0	-10.7	
1712.40	19.85	H	3.0	9.4	26.30	30.0	-3.7	
Mid Ch								
1732.60	10.98	V	3.0	9.5	17.47	30.0	-12.5	
1732.60	19.74	H	3.0	9.5	26.24	30.0	-3.8	
High Ch								
1752.60	11.16	V	3.0	9.5	17.71	30.0	-12.3	
1752.60	18.30	H	3.0	9.5	24.85	30.0	-5.2	

WCDMA Band 2

WCDMA

Band 2
REL99

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-15
Test Engineer: 22944
Configuration: EUT / X-Position / Half folded
Location: 10m Chamber
Mode: Rel99 Band 2 Fundamentals

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	11.04	V	3.1	9.5	17.47	33.0	-15.5	
1852.40	19.62	H	3.1	9.5	26.05	33.0	-7.0	
Mid Ch								
1880.00	11.17	V	3.1	9.3	17.34	33.0	-15.7	
1880.00	21.10	H	3.1	9.3	27.26	33.0	-5.7	
High Ch								
1907.60	11.68	V	3.1	9.1	17.61	33.0	-15.4	
1907.60	20.02	H	3.1	9.1	25.96	33.0	-7.0	

WCDMA

Band 2
HSDPA

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-15
Test Engineer: 22944
Configuration: EUT / X-Position / Half folded
Location: 10m Chamber
Mode: HSDPA Band 2 Fundamentals

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	10.42	V	3.1	9.5	16.85	33.0	-16.2	
1852.40	18.30	H	3.1	9.5	24.73	33.0	-8.3	
Mid Ch								
1880.00	10.46	V	3.1	9.3	16.63	33.0	-16.4	
1880.00	19.59	H	3.1	9.3	25.75	33.0	-7.2	
High Ch								
1907.60	10.66	V	3.1	9.1	16.59	33.0	-16.4	
1907.60	19.59	H	3.1	9.1	25.53	33.0	-7.5	

LTE Band 12

LTE Band 12 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / Y-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
704.00	13.12	V	1.8	-1.1	10.25	34.8	-24.6	
704.00	18.36	H	1.8	-1.1	15.49	34.8	-19.3	
Mid Ch								
707.50	14.03	V	1.8	-1.1	11.15	34.8	-23.6	
707.50	18.70	H	1.8	-1.1	15.82	34.8	-19.0	
High Ch								
711.00	15.35	V	1.8	-1.1	12.48	34.8	-22.3	
711.00	19.30	H	1.8	-1.1	16.43	34.8	-18.4	

LTE Band 12 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / Y-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 12 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
704.00	13.00	V	1.8	-1.1	10.13	34.8	-24.7	
704.00	18.10	H	1.8	-1.1	15.23	34.8	-19.6	
Mid Ch								
707.50	12.45	V	1.8	-1.1	9.57	34.8	-25.2	
707.50	17.38	H	1.8	-1.1	14.50	34.8	-20.3	
High Ch								
711.00	13.80	V	1.8	-1.1	10.93	34.8	-23.9	
711.00	18.37	H	1.8	-1.1	15.50	34.8	-19.3	

LTE

Band 12

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / Y-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 12 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
701.50	13.90	V	1.8	-1.1	11.04	34.8	-23.8	
701.50	17.99	H	1.8	-1.1	15.13	34.8	-19.7	
Mid Ch								
707.50	14.40	V	1.8	-1.1	11.52	34.8	-23.3	
707.50	18.90	H	1.8	-1.1	16.02	34.8	-18.8	
High Ch								
713.50	14.91	V	1.8	-1.1	12.04	34.8	-22.8	
713.50	19.01	H	1.8	-1.1	16.14	34.8	-18.7	

LTE

Band 12

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / Y-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 12 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
704.00	13.23	V	1.8	-1.1	10.36	34.8	-24.4	
704.00	17.25	H	1.8	-1.1	14.38	34.8	-20.4	
Mid Ch								
707.50	14.00	V	1.8	-1.1	11.12	34.8	-23.7	
707.50	18.21	H	1.8	-1.1	15.33	34.8	-19.5	
High Ch								
711.00	14.07	V	1.8	-1.1	11.20	34.8	-23.6	
711.00	18.51	H	1.8	-1.1	15.64	34.8	-19.2	

LTE

Band 12

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / Y-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 12 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
700.50	11.90	V	1.8	-1.1	9.04	34.8	-25.8	
700.50	17.61	H	1.8	-1.1	14.75	34.8	-20.0	
Mid Ch								
707.50	13.45	V	1.8	-1.1	10.57	34.8	-24.2	
707.50	18.01	H	1.8	-1.1	15.13	34.8	-19.7	
High Ch								
714.50	14.18	V	1.8	-1.1	11.30	34.8	-23.5	
714.50	18.72	H	1.8	-1.1	15.84	34.8	-19.0	

LTE

Band 12

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / Y-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 12 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
700.50	10.88	V	1.8	-1.1	8.02	34.8	-26.8	
700.50	16.45	H	1.8	-1.1	13.59	34.8	-21.2	
Mid Ch								
707.50	11.95	V	1.8	-1.1	9.07	34.8	-25.7	
707.50	17.26	H	1.8	-1.1	14.38	34.8	-20.4	
High Ch								
714.50	13.34	V	1.8	-1.1	10.46	34.8	-24.3	
714.50	17.21	H	1.8	-1.1	14.33	34.8	-20.5	

LTE

Band 12

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / Y-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
699.70	12.96	V	1.8	-1.1	10.10	34.8	-24.7	
699.70	17.35	H	1.8	-1.1	14.49	34.8	-20.3	
Mid Ch								
707.50	14.10	V	1.8	-1.1	11.22	34.8	-23.6	
707.50	18.37	H	1.8	-1.1	15.49	34.8	-19.3	
High Ch								
715.30	14.91	V	1.8	-1.1	12.03	34.8	-22.8	
715.30	18.62	H	1.8	-1.1	15.74	34.8	-19.1	

LTE

Band 12

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / Y-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
699.70	11.87	V	1.8	-1.1	9.01	34.8	-25.8	
699.70	16.34	H	1.8	-1.1	13.48	34.8	-21.3	
Mid Ch								
707.50	12.95	V	1.8	-1.1	10.07	34.8	-24.7	
707.50	17.36	H	1.8	-1.1	14.48	34.8	-20.3	
High Ch								
715.30	14.71	V	1.8	-1.1	11.83	34.8	-23.0	
715.30	18.45	H	1.8	-1.1	15.57	34.8	-19.2	

LTE Band 13

LTE Band 13 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / X-Position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 13 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
782.00	18.67	V	1.9	-1.1	15.70	34.8	-19.1	
782.00	20.49	H	1.9	-1.1	17.52	34.8	-17.2	

LTE Band 13 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / X-Position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 13 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
782.00	17.64	V	1.9	-1.1	14.67	34.8	-20.1	
782.00	19.14	H	1.9	-1.1	16.17	34.8	-18.6	

LTE

Band 13

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / X-Position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 13 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
779.50	18.87	V	1.9	-1.1	15.90	34.8	-18.9	
779.50	20.41	H	1.9	-1.1	17.44	34.8	-17.3	
Mid Ch								
782.00	18.81	V	1.9	-1.1	15.84	34.8	-18.9	
782.00	20.30	H	1.9	-1.1	17.33	34.8	-17.4	
High Ch								
784.50	18.70	V	1.9	-1.1	15.74	34.8	-19.0	
784.50	20.27	H	1.9	-1.1	17.30	34.8	-17.5	

LTE

Band 13

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / X-Position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 13 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
779.50	17.75	V	1.9	-1.1	14.78	34.8	-20.0	
779.50	19.26	H	1.9	-1.1	16.29	34.8	-18.5	
Mid Ch								
782.00	17.91	V	1.9	-1.1	14.94	34.8	-19.8	
782.00	19.33	H	1.9	-1.1	16.36	34.8	-18.4	
High Ch								
784.50	17.81	V	1.9	-1.1	14.85	34.8	-19.9	
784.50	19.25	H	1.9	-1.1	16.28	34.8	-18.5	

LTE Band 25

LTE Band 25 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 25 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	9.79	V	3.1	9.4	16.15	33.0	-16.8	
1860.00	19.21	H	3.1	9.4	25.57	33.0	-7.4	
Mid Ch								
1882.50	11.47	V	3.1	9.3	17.63	33.0	-15.4	
1882.50	18.00	H	3.1	9.3	24.16	33.0	-8.8	
High Ch								
1905.00	9.87	V	3.1	9.1	15.84	33.0	-17.2	
1905.00	19.77	H	3.1	9.1	25.74	33.0	-7.3	

LTE Band 25 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 25 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	8.34	V	3.1	9.4	14.70	33.0	-18.3	
1860.00	18.00	H	3.1	9.4	24.36	33.0	-8.6	
Mid Ch								
1882.50	7.43	V	3.1	9.3	13.59	33.0	-19.4	
1882.50	17.17	H	3.1	9.3	23.33	33.0	-9.7	
High Ch								
1905.00	9.79	V	3.1	9.1	15.76	33.0	-17.2	
1905.00	18.74	H	3.1	9.1	24.71	33.0	-8.3	

LTE

Band 25

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 25 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	11.49	V	3.1	9.5	17.88	33.0	-15.1	
1857.50	17.53	H	3.1	9.5	23.91	33.0	-9.1	
Mid Ch								
1882.50	6.03	V	3.1	9.3	12.19	33.0	-20.8	
1882.50	18.17	H	3.1	9.3	24.33	33.0	-8.7	
High Ch								
1907.50	14.23	V	3.1	9.1	20.17	33.0	-12.8	
1907.50	19.49	H	3.1	9.1	25.43	33.0	-7.6	

LTE

Band 25

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 25 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	9.18	V	3.1	9.5	15.57	33.0	-17.4	
1857.50	17.09	H	3.1	9.5	23.47	33.0	-9.5	
Mid Ch								
1882.50	5.47	V	3.1	9.3	11.63	33.0	-21.4	
1882.50	16.66	H	3.1	9.3	22.82	33.0	-10.2	
High Ch								
1907.50	12.38	V	3.1	9.1	18.32	33.0	-14.7	
1907.50	18.60	H	3.1	9.1	24.54	33.0	-8.5	

LTE

Band 25

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 25 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	10.56	V	3.1	9.5	16.96	33.0	-16.0	
1855.00	17.69	H	3.1	9.5	24.09	33.0	-8.9	
Mid Ch								
1882.50	11.16	V	3.1	9.3	17.32	33.0	-15.7	
1882.50	18.81	H	3.1	9.3	24.97	33.0	-8.0	
High Ch								
1910.00	10.47	V	3.2	9.1	16.36	33.0	-16.6	
1910.00	19.17	H	3.2	9.1	25.06	33.0	-7.9	

LTE

Band 25

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 25 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	8.61	V	3.1	9.5	15.01	33.0	-18.0	
1855.00	17.35	H	3.1	9.5	23.75	33.0	-9.3	
Mid Ch								
1882.50	10.28	V	3.1	9.3	16.44	33.0	-16.6	
1882.50	17.81	H	3.1	9.3	23.97	33.0	-9.0	
High Ch								
1910.00	10.44	V	3.2	9.1	16.33	33.0	-16.7	
1910.00	18.36	H	3.2	9.1	24.25	33.0	-8.7	

LTE

Band 25

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 25 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	12.06	V	3.1	9.5	18.49	33.0	-14.5	
1852.50	17.41	H	3.1	9.5	23.84	33.0	-9.2	
Mid Ch								
1882.50	10.76	V	3.1	9.3	16.92	33.0	-16.1	
1882.50	18.72	H	3.1	9.3	24.88	33.0	-8.1	
High Ch								
1912.50	11.85	V	3.2	9.0	17.71	33.0	-15.3	
1912.50	16.95	H	3.2	9.0	22.80	33.0	-10.2	

LTE

Band 25

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 25 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	10.40	V	3.1	9.5	16.83	33.0	-16.2	
1852.50	16.91	H	3.1	9.5	23.34	33.0	-9.7	
Mid Ch								
1882.50	9.36	V	3.1	9.3	15.52	33.0	-17.5	
1882.50	17.74	H	3.1	9.3	23.90	33.0	-9.1	
High Ch								
1912.50	10.63	V	3.2	9.0	16.49	33.0	-16.5	
1912.50	16.67	H	3.2	9.0	22.52	33.0	-10.5	

LTE

Band 25

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 25 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	11.14	V	3.1	9.5	17.58	33.0	-15.4	
1851.50	17.38	H	3.1	9.5	23.81	33.0	-9.2	
Mid Ch								
1882.50	8.75	V	3.1	9.3	14.91	33.0	-18.1	
1882.50	18.78	H	3.1	9.3	24.94	33.0	-8.1	
High Ch								
1913.50	10.72	V	3.2	9.0	16.55	33.0	-16.4	
1913.50	18.73	H	3.2	9.0	24.56	33.0	-8.4	

LTE

Band 25

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 25 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	11.28	V	3.1	9.5	17.72	33.0	-15.3	
1851.50	17.23	H	3.1	9.5	23.66	33.0	-9.3	
Mid Ch								
1882.50	8.18	V	3.1	9.3	14.34	33.0	-18.7	
1882.50	18.50	H	3.1	9.3	24.66	33.0	-8.3	
High Ch								
1913.50	10.60	V	3.2	9.0	16.43	33.0	-16.6	
1913.50	18.33	H	3.2	9.0	24.16	33.0	-8.8	

LTE

Band 25

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-17
Test Engineer: 22944
Configuration: EUT / X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 25 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	11.61	V	3.1	9.5	18.05	33.0	-15.0	
1850.70	17.31	H	3.1	9.5	23.76	33.0	-9.2	
Mid Ch								
1882.50	9.48	V	3.1	9.3	15.64	33.0	-17.4	
1882.50	18.50	H	3.1	9.3	24.66	33.0	-8.3	
High Ch								
1914.30	9.05	V	3.2	9.0	14.87	33.0	-18.1	
1914.30	16.68	H	3.2	9.0	22.50	33.0	-10.5	

LTE

Band 25

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: EUT / X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 25 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	10.06	V	3.1	9.5	16.50	33.0	-16.5	
1850.70	16.70	H	3.1	9.5	23.15	33.0	-9.9	
Mid Ch								
1882.50	7.80	V	3.1	9.3	13.96	33.0	-19.0	
1882.50	17.23	H	3.1	9.3	23.39	33.0	-9.6	
High Ch								
1914.30	6.38	V	3.2	9.0	12.20	33.0	-20.8	
1914.30	16.21	H	3.2	9.0	22.03	33.0	-11.0	

LTE Band 26

LTE

Band 26

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_QPSK Band 26 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
821.50	16.03	V	2.0	-1.0	13.12	50.0	-36.9	Part 90
821.50	21.19	H	2.0	-1.0	18.28	50.0	-31.7	Part 90

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_QPSK Band 26 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
831.50	17.04	V	2.0	-0.9	14.16	38.5	-24.3	
831.50	21.59	H	2.0	-0.9	18.71	38.5	-19.8	
High Ch								
841.50	15.09	V	2.0	-0.9	12.22	38.5	-26.3	
841.50	21.63	H	2.0	-0.9	18.77	38.5	-19.7	

LTE

Band 26

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_16QAM Band 26 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
821.50	14.86	V	2.0	-1.0	11.95	50.0	-38.1	Part 90
821.50	19.79	H	2.0	-1.0	16.88	50.0	-33.1	Part 90

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_16QAM Band 26 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
831.50	15.62	V	2.0	-0.9	12.74	38.5	-25.8	
831.50	20.55	H	2.0	-0.9	17.67	38.5	-20.8	
High Ch								
841.50	14.12	V	2.0	-0.9	11.25	38.5	-27.2	
841.50	20.58	H	2.0	-0.9	17.72	38.5	-20.8	

LTE

Band 26

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_QPSK Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
819.00	15.46	V	2.0	-1.0	12.54	50.0	-37.5	Part 90
819.00	21.09	H	2.0	-1.0	18.16	50.0	-31.8	Part 90

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_QPSK Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	16.68	V	2.0	-0.9	13.79	38.5	-24.7	
829.00	21.55	H	2.0	-0.9	18.65	38.5	-19.8	
Mid Ch								
831.50	16.67	V	2.0	-0.9	13.79	38.5	-24.7	
831.50	21.54	H	2.0	-0.9	18.66	38.5	-19.8	
High Ch								
844.00	15.49	V	2.0	-0.9	12.64	38.5	-25.9	
844.00	22.41	H	2.0	-0.9	19.55	38.5	-18.9	

LTE

Band 26

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_16QAM Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
819.00	14.27	V	2.0	-1.0	11.35	50.0	-38.7	Part 90
819.00	19.92	H	2.0	-1.0	16.99	50.0	-33.0	Part 90

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_16QAM Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	15.72	V	2.0	-0.9	12.83	38.5	-25.7	
829.00	20.43	H	2.0	-0.9	17.53	38.5	-21.0	
Mid Ch								
831.50	15.49	V	2.0	-0.9	12.61	38.5	-25.9	
831.50	19.57	H	2.0	-0.9	16.69	38.5	-21.8	
High Ch								
844.00	14.42	V	2.0	-0.9	11.57	38.5	-26.9	
844.00	20.76	H	2.0	-0.9	17.90	38.5	-20.6	

LTE

Band 26

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_QPSK Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
816.50	15.74	V	1.9	-1.0	12.81	50.0	-37.2	Part 90
816.50	21.73	H	1.9	-1.0	18.80	50.0	-31.2	Part 90
Mid Ch								
821.50	16.32	V	2.0	-1.0	13.40	50.0	-36.6	Part 90
821.50	22.01	H	2.0	-1.0	19.09	50.0	-30.9	Part 90

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_QPSK Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	16.33	V	2.0	-0.9	13.42	38.5	-25.1	
826.50	21.84	H	2.0	-0.9	18.94	38.5	-19.6	
Mid Ch								
831.50	16.17	V	2.0	-0.9	13.29	38.5	-25.2	
831.50	21.00	H	2.0	-0.9	18.12	38.5	-20.4	
High Ch								
846.50	15.61	V	2.0	-0.9	12.76	38.5	-25.7	
846.50	21.23	H	2.0	-0.9	18.39	38.5	-20.1	

LTE

Band 26

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_16QAM Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
816.50	15.24	V	1.9	-1.0	12.31	50.0	-37.7	Part 90
816.50	21.39	H	1.9	-1.0	18.46	50.0	-31.5	Part 90
Mid Ch								
821.50	16.25	V	2.0	-1.0	13.33	50.0	-36.7	Part 90
821.50	21.38	H	2.0	-1.0	18.46	50.0	-31.5	Part 90

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_16QAM Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	15.13	V	2.0	-0.9	12.22	38.5	-26.3	
826.50	20.75	H	2.0	-0.9	17.85	38.5	-20.7	
Mid Ch								
831.50	14.74	V	2.0	-0.9	11.86	38.5	-26.6	
831.50	20.24	H	2.0	-0.9	17.36	38.5	-21.1	
High Ch								
846.50	14.65	V	2.0	-0.9	11.80	38.5	-26.7	
846.50	20.40	H	2.0	-0.9	17.56	38.5	-20.9	

LTE

Band 26

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_QPSK Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
815.50	15.50	V	1.9	-1.0	12.56	50.0	-37.4	Part 90
815.50	21.39	H	1.9	-1.0	18.45	50.0	-31.5	Part 90
Mid Ch								
822.50	16.29	V	2.0	-1.0	13.38	50.0	-36.6	Part 90
822.50	21.61	H	2.0	-1.0	18.70	50.0	-31.3	Part 90

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_QPSK Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
825.50	16.26	V	2.0	-0.9	13.35	38.5	-25.1	
825.50	21.73	H	2.0	-0.9	18.82	38.5	-19.7	
Mid Ch								
831.50	15.96	V	2.0	-0.9	13.08	38.5	-25.4	
831.50	21.19	H	2.0	-0.9	18.31	38.5	-20.2	
High Ch								
847.50	16.16	V	2.0	-0.9	13.32	38.5	-25.2	
847.50	21.06	H	2.0	-0.9	18.22	38.5	-20.3	

LTE

Band 26

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_16QAM Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
815.50	14.30	V	1.9	-1.0	11.36	50.0	-38.6	Part 90
815.50	19.81	H	1.9	-1.0	16.87	50.0	-33.1	Part 90
Mid Ch								
822.50	15.21	V	2.0	-1.0	12.30	50.0	-37.7	Part 90
822.50	20.57	H	2.0	-1.0	17.66	50.0	-32.3	Part 90

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_16QAM Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
825.50	15.28	V	2.0	-0.9	12.37	38.5	-26.1	
825.50	20.48	H	2.0	-0.9	17.57	38.5	-20.9	
Mid Ch								
831.50	14.47	V	2.0	-0.9	11.59	38.5	-26.9	
831.50	20.07	H	2.0	-0.9	17.19	38.5	-21.3	
High Ch								
847.50	14.84	V	2.0	-0.9	12.00	38.5	-26.5	
847.50	19.97	H	2.0	-0.9	17.13	38.5	-21.4	

LTE

Band 26

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_QPSK Band 26 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
814.70	15.29	V	1.9	-1.0	12.35	50.0	-37.6	Part 90
814.70	21.55	H	1.9	-1.0	18.61	50.0	-31.4	Part 90
Mid Ch								
823.30	16.75	V	2.0	-1.0	13.83	50.0	-36.2	Part 90
823.30	21.71	H	2.0	-1.0	18.80	50.0	-31.2	Part 90

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_QPSK Band 26 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	16.40	V	2.0	-1.0	13.49	38.5	-25.0	
824.70	21.51	H	2.0	-1.0	18.60	38.5	-19.9	
Mid Ch								
831.50	15.73	V	2.0	-0.9	12.85	38.5	-25.7	
831.50	21.25	H	2.0	-0.9	18.37	38.5	-20.1	
High Ch								
848.30	16.23	V	2.0	-0.9	13.39	38.5	-25.1	
848.30	21.34	H	2.0	-0.9	18.49	38.5	-20.0	

LTE

Band 26

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_16QAM Band 26 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
814.70	13.98	V	1.9	-1.0	11.04	50.0	-39.0	Part 90
814.70	19.74	H	1.9	-1.0	16.80	50.0	-33.2	Part 90
Mid Ch								
823.30	15.70	V	2.0	-1.0	12.78	50.0	-37.2	Part 90
823.30	20.79	H	2.0	-1.0	17.88	50.0	-32.1	Part 90

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-21
Test Engineer: 22944
Configuration: EUT / X-position / Open
Location: 10m Chamber
Mode: LTE_16QAM Band 26 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB 9163[1241], and W13.05-CP2_X1-W11.09-OSP-ESW44
Substitution: Dipole 3121_DB4, W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	15.51	V	2.0	-1.0	12.60	38.5	-25.9	
824.70	20.80	H	2.0	-1.0	17.89	38.5	-20.6	
Mid Ch								
831.50	14.90	V	2.0	-0.9	12.02	38.5	-26.5	
831.50	20.22	H	2.0	-0.9	17.34	38.5	-21.2	
High Ch								
848.30	14.85	V	2.0	-0.9	12.01	38.5	-26.5	
848.30	20.17	H	2.0	-0.9	17.32	38.5	-21.2	

LTE Band 41(PC3)

LTE Band 41 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: EUT / X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2506.00	15.80	V	3.6	9.9	22.13	33.0	-10.9	
2506.00	17.53	H	3.6	9.9	23.86	33.0	-9.1	
Mid Ch								
2593.00	17.11	V	3.7	9.8	23.24	33.0	-9.8	
2593.00	18.32	H	3.7	9.8	24.45	33.0	-8.6	
High Ch								
2680.00	19.25	V	3.7	9.8	25.36	33.0	-7.6	
2680.00	21.41	H	3.7	9.8	27.52	33.0	-5.5	

LTE Band 41 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: EUT / X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 41 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2506.00	15.02	V	3.6	9.9	21.35	33.0	-11.7	
2506.00	16.29	H	3.6	9.9	22.62	33.0	-10.4	
Mid Ch								
2593.00	17.05	V	3.7	9.8	23.18	33.0	-9.8	
2593.00	18.05	H	3.7	9.8	24.18	33.0	-8.8	
High Ch								
2680.00	19.21	V	3.7	9.8	25.32	33.0	-7.7	
2680.00	20.86	H	3.7	9.8	26.97	33.0	-6.0	

LTE

Band 41

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: EUT / X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 41 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2503.50	17.72	V	3.6	9.9	24.04	33.0	-9.0	
2503.50	17.86	H	3.6	9.9	24.19	33.0	-8.8	
Mid Ch								
2593.00	17.54	V	3.7	9.8	23.67	33.0	-9.3	
2593.00	21.87	H	3.7	9.8	28.00	33.0	-5.0	
High Ch								
2682.50	19.78	V	3.7	9.8	25.88	33.0	-7.1	
2682.50	20.23	H	3.7	9.8	26.33	33.0	-6.7	

LTE

Band 41

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: EUT / X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 41 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2503.50	12.76	V	3.6	9.9	19.08	33.0	-13.9	
2503.50	16.67	H	3.6	9.9	23.00	33.0	-10.0	
Mid Ch								
2593.00	17.49	V	3.7	9.8	23.62	33.0	-9.4	
2593.00	18.28	H	3.7	9.8	24.41	33.0	-8.6	
High Ch								
2682.50	19.54	V	3.7	9.8	25.64	33.0	-7.4	
2682.50	20.21	H	3.7	9.8	26.31	33.0	-6.7	

LTE

Band 41

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: EUT / X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 41 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2501.00	11.22	V	3.6	9.9	17.55	33.0	-15.4	
2501.00	18.13	H	3.6	9.9	24.47	33.0	-8.5	
Mid Ch								
2593.00	17.30	V	3.7	9.8	23.43	33.0	-9.6	
2593.00	20.73	H	3.7	9.8	26.86	33.0	-6.1	
High Ch								
2685.00	16.71	V	3.8	9.8	22.76	33.0	-10.2	
2685.00	20.81	H	3.8	9.8	26.86	33.0	-6.1	

LTE

Band 41

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: EUT / X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 41 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2501.00	16.16	V	3.6	9.9	22.49	33.0	-10.5	
2501.00	17.40	H	3.6	9.9	23.74	33.0	-9.3	
Mid Ch								
2593.00	16.98	V	3.7	9.8	23.11	33.0	-9.9	
2593.00	19.44	H	3.7	9.8	25.57	33.0	-7.4	
High Ch								
2685.00	15.67	V	3.8	9.8	21.72	33.0	-11.3	
2685.00	19.93	H	3.8	9.8	25.98	33.0	-7.0	

LTE

Band 41

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: EUT / X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 41 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	16.32	V	3.6	9.9	22.59	33.0	-10.4	
2498.50	18.28	H	3.6	9.9	24.56	33.0	-8.4	
Mid Ch								
2593.00	16.62	V	3.7	9.8	22.75	33.0	-10.3	
2593.00	20.47	H	3.7	9.8	26.60	33.0	-6.4	
High Ch								
2687.50	18.81	V	3.8	9.8	24.84	33.0	-8.2	
2687.50	20.42	H	3.8	9.8	26.46	33.0	-6.5	

LTE

Band 41

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-18
Test Engineer: 22944
Configuration: EUT / X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 41 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	15.70	V	3.6	9.9	21.97	33.0	-11.0	
2498.50	18.25	H	3.6	9.9	24.53	33.0	-8.5	
Mid Ch								
2593.00	16.44	V	3.7	9.8	22.57	33.0	-10.4	
2593.00	20.13	H	3.7	9.8	26.26	33.0	-6.7	
High Ch								
2687.50	17.94	V	3.8	9.8	23.97	33.0	-9.0	
2687.50	19.24	H	3.8	9.8	25.28	33.0	-7.7	

LTE Band 66

LTE Band 66 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 66 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	8.70	V	3.0	9.4	15.19	30.0	-14.8	
1720.00	18.84	H	3.0	9.4	25.32	30.0	-4.7	
Mid Ch								
1745.00	9.61	V	3.0	9.5	16.14	30.0	-13.9	
1745.00	20.56	H	3.0	9.5	27.10	30.0	-2.9	
High Ch								
1770.00	7.68	V	3.0	9.6	14.22	30.0	-15.8	
1770.00	17.80	H	3.0	9.6	24.35	30.0	-5.7	

LTE Band 66 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 66 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	7.60	V	3.0	9.4	14.09	30.0	-15.9	
1720.00	17.46	H	3.0	9.4	23.94	30.0	-6.1	
Mid Ch								
1745.00	8.03	V	3.0	9.5	14.56	30.0	-15.4	
1745.00	19.94	H	3.0	9.5	26.48	30.0	-3.5	
High Ch								
1770.00	6.97	V	3.0	9.6	13.51	30.0	-16.5	
1770.00	16.83	H	3.0	9.6	23.38	30.0	-6.6	

LTE

Band 66

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 66 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	9.58	V	3.0	9.4	16.05	30.0	-13.9	
1717.50	17.95	H	3.0	9.4	24.42	30.0	-5.6	
Mid Ch								
1745.00	10.28	V	3.0	9.5	16.81	30.0	-13.2	
1745.00	20.22	H	3.0	9.5	26.76	30.0	-3.2	
High Ch								
1772.50	11.56	V	3.0	9.6	18.08	30.0	-11.9	
1772.50	18.36	H	3.0	9.6	24.89	30.0	-5.1	

LTE

Band 66

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 66 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	6.86	V	3.0	9.4	13.33	30.0	-16.7	
1717.50	16.40	H	3.0	9.4	22.87	30.0	-7.1	
Mid Ch								
1745.00	9.46	V	3.0	9.5	15.99	30.0	-14.0	
1745.00	19.21	H	3.0	9.5	25.75	30.0	-4.3	
High Ch								
1772.50	10.50	V	3.0	9.6	17.02	30.0	-13.0	
1772.50	17.27	H	3.0	9.6	23.80	30.0	-6.2	

LTE

Band 66

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2019-05-19
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 66 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	8.49	V	3.0	9.4	14.95	30.0	-15.1	
1715.00	17.79	H	3.0	9.4	24.24	30.0	-5.8	
Mid Ch								
1745.00	9.95	V	3.0	9.5	16.48	30.0	-13.5	
1745.00	18.85	H	3.0	9.5	25.39	30.0	-4.6	
High Ch								
1775.00	9.30	V	3.0	9.6	15.82	30.0	-14.2	
1775.00	18.37	H	3.0	9.6	24.89	30.0	-5.1	

LTE

Band 66

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2019-05-19
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 66 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	6.82	V	3.0	9.4	13.28	30.0	-16.7	
1715.00	16.80	H	3.0	9.4	23.25	30.0	-6.7	
Mid Ch								
1745.00	8.04	V	3.0	9.5	14.57	30.0	-15.4	
1745.00	17.70	H	3.0	9.5	24.24	30.0	-5.8	
High Ch								
1775.00	6.35	V	3.0	9.6	12.87	30.0	-17.1	
1775.00	17.44	H	3.0	9.6	23.96	30.0	-6.0	

LTE

Band 66

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 66 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	11.37	V	3.0	9.4	17.83	30.0	-12.2	
1712.50	17.45	H	3.0	9.4	23.90	30.0	-6.1	
Mid Ch								
1745.00	11.95	V	3.0	9.5	18.48	30.0	-11.5	
1745.00	20.35	H	3.0	9.5	26.89	30.0	-3.1	
High Ch								
1777.50	12.10	V	3.0	9.6	18.63	30.0	-11.4	
1777.50	18.14	H	3.0	9.6	24.67	30.0	-5.3	

LTE

Band 66

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 66 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	9.38	V	3.0	9.4	15.84	30.0	-14.2	
1712.50	16.07	H	3.0	9.4	22.52	30.0	-7.5	
Mid Ch								
1745.00	11.80	V	3.0	9.5	18.33	30.0	-11.7	
1745.00	19.08	H	3.0	9.5	25.62	30.0	-4.4	
High Ch								
1777.50	10.95	V	3.0	9.6	17.48	30.0	-12.5	
1777.50	17.11	H	3.0	9.6	23.64	30.0	-6.4	

LTE

Band 66

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 66 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	10.75	V	3.0	9.4	17.20	30.0	-12.8	
1711.50	16.86	H	3.0	9.4	23.31	30.0	-6.7	
Mid Ch								
1745.00	8.25	V	3.0	9.5	14.78	30.0	-15.2	
1745.00	20.11	H	3.0	9.5	26.65	30.0	-3.4	
High Ch								
1778.50	9.32	V	3.0	9.6	15.85	30.0	-14.1	
1778.50	17.36	H	3.0	9.6	23.89	30.0	-6.1	

LTE

Band 66

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 66 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	9.79	V	3.0	9.4	16.24	30.0	-13.8	
1711.50	16.41	H	3.0	9.4	22.86	30.0	-7.1	
Mid Ch								
1745.00	8.08	V	3.0	9.5	14.61	30.0	-15.4	
1745.00	17.74	H	3.0	9.5	24.28	30.0	-5.7	
High Ch								
1778.50	8.39	V	3.0	9.6	14.92	30.0	-15.1	
1778.50	16.51	H	3.0	9.6	23.04	30.0	-7.0	

LTE

Band 66

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1710.70	11.49	V	3.0	9.4	17.93	30.0	-12.1	
1710.70	16.56	H	3.0	9.4	23.00	30.0	-7.0	
Mid Ch								
1745.00	8.09	V	3.0	9.5	14.62	30.0	-15.4	
1745.00	20.43	H	3.0	9.5	26.97	30.0	-3.0	
High Ch								
1779.30	8.27	V	3.0	9.6	14.80	30.0	-15.2	
1779.30	17.12	H	3.0	9.6	23.65	30.0	-6.3	

LTE

Band 66

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789467590
Date: 2020-05-19
Test Engineer: 22944
Configuration: X-position / Half folded
Location: 10m Chamber
Mode: LTE_16QAM Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00227048], and 10m CP2 Cables
Substitution: Horn 3115[00167211], W13.02_N type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1710.70	9.60	V	3.0	9.4	16.04	30.0	-14.0	
1710.70	14.52	H	3.0	9.4	20.96	30.0	-9.0	
Mid Ch								
1745.00	7.35	V	3.0	9.5	13.88	30.0	-16.1	
1745.00	18.61	H	3.0	9.5	25.15	30.0	-4.9	
High Ch								
1779.30	6.82	V	3.0	9.6	13.35	30.0	-16.6	
1779.30	15.39	H	3.0	9.6	21.92	30.0	-8.1	

9.6. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27. 53 and §90.691

LIMIT

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

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

(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

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

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

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

Part 90.691(a):
(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log_{10}(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.(NOTE : Use 100kHz reference bandwidth)

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

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.

9.6.1. SPURIOUS RADIATION PLOTS

GSM850

GSM850

GPRS

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-25
Test Engineer: 22944
Configuration: EUT / AC adapter, X-position / Open
Location: 10m Chamber
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	-2.5	V	3.0	42.5	1.0	-43.9	-13.0	-30.9	
2472.60	3.1	V	3.0	42.3	1.0	-38.2	-13.0	-25.2	
3296.80	3.4	V	3.0	42.1	1.0	-37.7	-13.0	-24.7	
1648.40	-1.8	H	3.0	42.5	1.0	-43.3	-13.0	-30.3	
2472.60	1.4	H	3.0	42.3	1.0	-39.9	-13.0	-26.9	
3296.80	3.3	H	3.0	42.1	1.0	-37.9	-13.0	-24.9	
Mid Ch, 836.6MHz									
1673.20	-2.3	V	3.0	42.5	1.0	-43.8	-13.0	-30.8	
2509.80	3.5	V	3.0	42.3	1.0	-37.8	-13.0	-24.8	
3346.40	3.9	V	3.0	42.1	1.0	-37.2	-13.0	-24.2	
1673.20	-2.0	H	3.0	42.5	1.0	-43.5	-13.0	-30.5	
2509.80	3.5	H	3.0	42.3	1.0	-37.8	-13.0	-24.8	
3346.40	4.0	H	3.0	42.1	1.0	-37.1	-13.0	-24.1	
High Ch, 848.8MHz									
1697.60	-1.2	V	3.0	42.5	1.0	-42.7	-13.0	-29.7	
2546.40	2.6	V	3.0	42.3	1.0	-38.6	-13.0	-25.6	
3395.20	3.8	V	3.0	42.1	1.0	-37.3	-13.0	-24.3	
1697.60	-2.1	H	3.0	42.5	1.0	-43.6	-13.0	-30.6	
2546.40	2.5	H	3.0	42.3	1.0	-38.8	-13.0	-25.8	
3395.20	3.5	H	3.0	42.1	1.0	-37.6	-13.0	-24.6	

GSM850

EGPRS

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-25
Test Engineer: 22944
Configuration: EUT / AC adapter, X-position / Open
Location: 10m Chamber
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	-3.0	V	3.0	42.5	1.0	-44.5	-13.0	-31.5	
2472.60	2.1	V	3.0	42.3	1.0	-39.2	-13.0	-26.2	
3296.80	4.2	V	3.0	42.1	1.0	-37.0	-13.0	-24.0	
1648.40	-1.9	H	3.0	42.5	1.0	-43.4	-13.0	-30.4	
2472.60	1.7	H	3.0	42.3	1.0	-39.6	-13.0	-26.6	
3296.80	3.8	H	3.0	42.1	1.0	-37.3	-13.0	-24.3	
Mid Ch, 836.6MHz									
1673.20	-2.6	V	3.0	42.5	1.0	-44.1	-13.0	-31.1	
2509.80	2.8	V	3.0	42.3	1.0	-38.5	-13.0	-25.5	
3346.40	4.1	V	3.0	42.1	1.0	-37.0	-13.0	-24.0	
1673.20	-2.2	H	3.0	42.5	1.0	-43.7	-13.0	-30.7	
2509.80	1.9	H	3.0	42.3	1.0	-39.3	-13.0	-26.3	
3346.40	3.2	H	3.0	42.1	1.0	-37.9	-13.0	-24.9	
High Ch, 848.8MHz									
1697.60	-1.8	V	3.0	42.5	1.0	-43.3	-13.0	-30.3	
2546.40	2.8	V	3.0	42.3	1.0	-38.5	-13.0	-25.5	
3395.20	4.0	V	3.0	42.1	1.0	-37.1	-13.0	-24.1	
1697.60	-1.5	H	3.0	42.5	1.0	-43.0	-13.0	-30.0	
2546.40	2.4	H	3.0	42.3	1.0	-38.8	-13.0	-25.8	
3395.20	4.3	H	3.0	42.1	1.0	-36.8	-13.0	-23.8	

GSM1900

GSM1900
GPRS

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-22
Test Engineer: 22944
Configuration: EUT / AC adapter, Y-position / Half folded
Location: 10m Chamber
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	6.2	V	3.0	42.1	1.0	-34.9	-13.0	-21.9	
5550.60	10.5	V	3.0	40.4	1.0	-28.9	-13.0	-15.9	
7400.80	12.5	V	3.0	40.5	1.0	-27.0	-13.0	-14.0	
3700.40	5.8	H	3.0	42.1	1.0	-35.3	-13.0	-22.3	
5550.60	10.3	H	3.0	40.4	1.0	-29.2	-13.0	-16.2	
7400.80	13.1	H	3.0	40.5	1.0	-26.4	-13.0	-13.4	
Mid Ch, 1880MHz									
3760.00	5.7	V	3.0	42.0	1.0	-35.3	-13.0	-22.3	
5640.00	9.9	V	3.0	40.3	1.0	-29.5	-13.0	-16.5	
7520.00	12.8	V	3.0	40.5	1.0	-26.7	-13.0	-13.7	
3760.00	5.5	H	3.0	42.0	1.0	-35.5	-13.0	-22.5	
5640.00	10.1	H	3.0	40.3	1.0	-29.3	-13.0	-16.3	
7520.00	12.8	H	3.0	40.5	1.0	-26.7	-13.0	-13.7	
High Ch, 1909.8MHz									
3819.60	5.6	V	3.0	42.0	1.0	-35.4	-13.0	-22.4	
5729.40	10.9	V	3.0	40.2	1.0	-28.3	-13.0	-15.3	
7639.20	13.6	V	3.0	40.5	1.0	-25.9	-13.0	-12.9	
3819.60	6.1	H	3.0	42.0	1.0	-34.9	-13.0	-21.9	
5729.40	11.2	H	3.0	40.2	1.0	-28.0	-13.0	-15.0	
7639.20	13.7	H	3.0	40.5	1.0	-25.8	-13.0	-12.8	

GSM1900
EGPRS

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-22
Test Engineer: 22944
Configuration: EUT / AC adapter, Y-position / Half folded
Location: 10m Chamber
Mode: EGPRS 1900 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3700.40	5.1	V	3.0	42.1	1.0	-35.9	-13.0	-22.9	
5550.60	9.7	V	3.0	40.4	1.0	-29.7	-13.0	-16.7	
7400.80	11.5	V	3.0	40.5	1.0	-28.0	-13.0	-15.0	
3700.40	4.5	H	3.0	42.1	1.0	-36.5	-13.0	-23.5	
5550.60	9.5	H	3.0	40.4	1.0	-29.9	-13.0	-16.9	
7400.80	12.4	H	3.0	40.5	1.0	-27.1	-13.0	-14.1	
Mid Ch, 1880MHz									
3760.00	5.1	V	3.0	42.0	1.0	-35.9	-13.0	-22.9	
5640.00	9.6	V	3.0	40.3	1.0	-29.7	-13.0	-16.7	
7520.00	12.2	V	3.0	40.5	1.0	-27.2	-13.0	-14.2	
3760.00	4.6	H	3.0	42.0	1.0	-36.4	-13.0	-23.4	
5640.00	10.0	H	3.0	40.3	1.0	-29.3	-13.0	-16.3	
7520.00	12.3	H	3.0	40.5	1.0	-27.2	-13.0	-14.2	
High Ch, 1909.8MHz									
3819.60	5.2	V	3.0	42.0	1.0	-35.9	-13.0	-22.9	
5729.40	10.9	V	3.0	40.2	1.0	-28.4	-13.0	-15.4	
7639.20	13.2	V	3.0	40.5	1.0	-26.3	-13.0	-13.3	
3819.60	5.0	H	3.0	42.0	1.0	-36.1	-13.0	-23.1	
5729.40	11.3	H	3.0	40.2	1.0	-27.9	-13.0	-14.9	
7639.20	13.0	H	3.0	40.5	1.0	-26.5	-13.0	-13.5	

WCDMA Band 5

WCDMA

Band 5
REL99

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-25
Test Engineer: 22944
Configuration: EUT / AC adapter, X-position / Open
Location: 10m Chamber
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	-11.6	V	3.0	42.5	1.0	-53.1	-13.0	-40.1	
2479.20	-6.8	V	3.0	42.3	1.0	-48.1	-13.0	-35.1	
3305.60	-5.1	V	3.0	42.1	1.0	-46.2	-13.0	-33.2	
1652.80	-11.4	H	3.0	42.5	1.0	-52.9	-13.0	-39.9	
2479.20	-6.9	H	3.0	42.3	1.0	-48.2	-13.0	-35.2	
3305.60	-5.5	H	3.0	42.1	1.0	-46.7	-13.0	-33.7	
Mid Ch, 836.6MHz									
1673.20	-11.6	V	3.0	42.5	1.0	-53.1	-13.0	-40.1	
2509.80	-6.5	V	3.0	42.3	1.0	-47.8	-13.0	-34.8	
3346.40	-5.2	V	3.0	42.1	1.0	-46.3	-13.0	-33.3	
1673.20	-11.4	H	3.0	42.5	1.0	-52.9	-13.0	-39.9	
2509.80	-6.7	H	3.0	42.3	1.0	-48.0	-13.0	-35.0	
3346.40	-5.5	H	3.0	42.1	1.0	-46.6	-13.0	-33.6	
High Ch, 846.6MHz									
1693.20	-11.4	V	3.0	42.5	1.0	-52.9	-13.0	-39.9	
2539.80	-6.4	V	3.0	42.3	1.0	-47.7	-13.0	-34.7	
3386.40	-5.2	V	3.0	42.1	1.0	-46.3	-13.0	-33.3	
1693.20	-11.3	H	3.0	42.5	1.0	-52.8	-13.0	-39.8	
2539.80	-6.7	H	3.0	42.3	1.0	-48.0	-13.0	-35.0	
3386.40	-5.4	H	3.0	42.1	1.0	-46.5	-13.0	-33.5	

WCDMA

Band 5
HSDPA

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-25
Test Engineer: 22944
Configuration: EUT / AC adapter, X-position / Open
Location: 10m Chamber
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	-11.8	V	3.0	42.5	1.0	-53.3	-13.0	-40.3	
2479.20	-7.2	V	3.0	42.3	1.0	-48.4	-13.0	-35.4	
3305.60	-5.4	V	3.0	42.1	1.0	-46.5	-13.0	-33.5	
1652.80	-11.8	H	3.0	42.5	1.0	-53.3	-13.0	-40.3	
2479.20	-7.4	H	3.0	42.3	1.0	-48.6	-13.0	-35.6	
3305.60	-6.0	H	3.0	42.1	1.0	-47.1	-13.0	-34.1	
Mid Ch, 836.6MHz									
1673.20	-11.8	V	3.0	42.5	1.0	-53.3	-13.0	-40.3	
2509.80	-7.1	V	3.0	42.3	1.0	-48.4	-13.0	-35.4	
3346.40	-5.4	V	3.0	42.1	1.0	-46.5	-13.0	-33.5	
1673.20	-11.7	H	3.0	42.5	1.0	-53.1	-13.0	-40.1	
2509.80	-7.1	H	3.0	42.3	1.0	-48.4	-13.0	-35.4	
3346.40	-6.1	H	3.0	42.1	1.0	-47.2	-13.0	-34.2	
High Ch, 846.6MHz									
1693.20	-12.0	V	3.0	42.5	1.0	-53.5	-13.0	-40.5	
2539.80	-6.7	V	3.0	42.3	1.0	-48.0	-13.0	-35.0	
3386.40	-5.5	V	3.0	42.1	1.0	-46.6	-13.0	-33.6	
1693.20	-11.7	H	3.0	42.5	1.0	-53.2	-13.0	-40.2	
2539.80	-7.2	H	3.0	42.3	1.0	-48.5	-13.0	-35.5	
3386.40	-5.8	H	3.0	42.1	1.0	-46.9	-13.0	-33.9	

WCDMA Band 4

WCDMA

Band 4
REL99

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-22
Test Engineer: 22944
Configuration: EUT / AC adapter, X-position / Half folded
Location: 10m Chamber
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	-5.6	V	3.0	42.1	1.0	-46.7	-13.0	-33.7	
5137.20	-0.8	V	3.0	40.9	1.0	-40.7	-13.0	-27.7	
6849.60	3.8	V	3.0	40.5	1.0	-35.7	-13.0	-22.7	
3424.80	-5.9	H	3.0	42.1	1.0	-47.0	-13.0	-34.0	
5137.20	-0.9	H	3.0	40.9	1.0	-40.8	-13.0	-27.8	
6849.60	4.0	H	3.0	40.5	1.0	-35.5	-13.0	-22.5	
Mid Ch, 1732.6MHz									
3465.20	-5.6	V	3.0	42.1	1.0	-46.7	-13.0	-33.7	
5197.80	-0.7	V	3.0	40.8	1.0	-40.6	-13.0	-27.6	
6930.40	3.5	V	3.0	40.6	1.0	-36.1	-13.0	-23.1	
3465.20	-6.0	H	3.0	42.1	1.0	-47.1	-13.0	-34.1	
5197.80	-0.5	H	3.0	40.8	1.0	-40.3	-13.0	-27.3	
6930.40	3.8	H	3.0	40.6	1.0	-35.7	-13.0	-22.7	
High Ch, 1752.6MHz									
3505.20	-5.8	V	3.0	42.1	1.0	-46.9	-13.0	-33.9	
5257.80	-0.6	V	3.0	40.8	1.0	-40.4	-13.0	-27.4	
7010.40	3.4	V	3.0	40.6	1.0	-36.2	-13.0	-23.2	
3505.20	-6.0	H	3.0	42.1	1.0	-47.1	-13.0	-34.1	
5257.80	-0.5	H	3.0	40.8	1.0	-40.3	-13.0	-27.3	
7010.40	3.7	H	3.0	40.6	1.0	-35.9	-13.0	-22.9	

WCDMA

Band 4
HSDPA

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-22
Test Engineer: 22944
Configuration: EUT / AC adapter, X-position / Half folded
Location: 10m Chamber
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	-5.5	V	3.0	42.1	1.0	-46.6	-13.0	-33.6	
5137.20	-1.0	V	3.0	40.9	1.0	-40.9	-13.0	-27.9	
6849.60	3.6	V	3.0	40.5	1.0	-35.9	-13.0	-22.9	
3424.80	-5.9	H	3.0	42.1	1.0	-47.0	-13.0	-34.0	
5137.20	-0.9	H	3.0	40.9	1.0	-40.8	-13.0	-27.8	
6849.60	4.0	H	3.0	40.5	1.0	-35.5	-13.0	-22.5	
Mid Ch, 1732.6MHz									
3465.20	-5.7	V	3.0	42.1	1.0	-46.8	-13.0	-33.8	
5197.80	-0.6	V	3.0	40.8	1.0	-40.5	-13.0	-27.5	
6930.40	3.7	V	3.0	40.6	1.0	-35.9	-13.0	-22.9	
3465.20	-5.8	H	3.0	42.1	1.0	-46.9	-13.0	-33.9	
5197.80	-0.7	H	3.0	40.8	1.0	-40.5	-13.0	-27.5	
6930.40	3.9	H	3.0	40.6	1.0	-35.7	-13.0	-22.7	
High Ch, 1752.6MHz									
3505.20	-5.7	V	3.0	42.1	1.0	-46.8	-13.0	-33.8	
5257.80	-0.4	V	3.0	40.8	1.0	-40.2	-13.0	-27.2	
7010.40	3.3	V	3.0	40.6	1.0	-36.3	-13.0	-23.3	
3505.20	-6.1	H	3.0	42.1	1.0	-47.2	-13.0	-34.2	
5257.80	-0.5	H	3.0	40.8	1.0	-40.3	-13.0	-27.3	
7010.40	3.5	H	3.0	40.6	1.0	-36.1	-13.0	-23.1	

WCDMA Band 2

WCDMA

Band 2
REL99

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-22
Test Engineer: 22944
Configuration: EUT / AC adapter, X-position / Half folded
Location: 10m Chamber
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	-4.9	V	3.0	42.1	1.0	-45.9	-13.0	-32.9	
5557.20	-0.3	V	3.0	40.4	1.0	-39.7	-13.0	-26.7	
7409.60	2.3	V	3.0	40.5	1.0	-37.2	-13.0	-24.2	
3704.80	-4.9	H	3.0	42.1	1.0	-45.9	-13.0	-32.9	
5557.20	-0.1	H	3.0	40.4	1.0	-39.5	-13.0	-26.5	
7409.60	2.6	H	3.0	40.5	1.0	-37.0	-13.0	-24.0	
Mid Ch, 1880MHz									
3760.00	-4.8	V	3.0	42.0	1.0	-45.8	-13.0	-32.8	
5640.00	-0.3	V	3.0	40.3	1.0	-39.7	-13.0	-26.7	
7520.00	2.6	V	3.0	40.5	1.0	-36.9	-13.0	-23.9	
3760.00	-4.9	H	3.0	42.0	1.0	-46.0	-13.0	-33.0	
5640.00	-0.2	H	3.0	40.3	1.0	-39.5	-13.0	-26.5	
7520.00	2.9	H	3.0	40.5	1.0	-36.6	-13.0	-23.6	
High Ch, 1907.6MHz									
3815.20	-4.6	V	3.0	42.0	1.0	-45.7	-13.0	-32.7	
5722.80	0.9	V	3.0	40.2	1.0	-38.4	-13.0	-25.4	
7630.40	2.9	V	3.0	40.5	1.0	-36.5	-13.0	-23.5	
3815.20	-4.8	H	3.0	42.0	1.0	-45.8	-13.0	-32.8	
5722.80	1.0	H	3.0	40.2	1.0	-38.3	-13.0	-25.3	
7630.40	3.0	H	3.0	40.5	1.0	-36.5	-13.0	-23.5	

WCDMA

Band 2
HSDPA

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-22
Test Engineer: 22944
Configuration: EUT / AC adapter, X-position / Half folded
Location: 10m Chamber
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	-4.7	V	3.0	42.1	1.0	-45.7	-13.0	-32.7	
5557.20	-0.1	V	3.0	40.4	1.0	-39.5	-13.0	-26.5	
7409.60	2.3	V	3.0	40.5	1.0	-37.2	-13.0	-24.2	
3704.80	-4.9	H	3.0	42.1	1.0	-46.0	-13.0	-33.0	
5557.20	-0.2	H	3.0	40.4	1.0	-39.7	-13.0	-26.7	
7409.60	2.7	H	3.0	40.5	1.0	-36.8	-13.0	-23.8	
Mid Ch, 1880MHz									
3760.00	-4.8	V	3.0	42.0	1.0	-45.9	-13.0	-32.9	
5640.00	-0.5	V	3.0	40.3	1.0	-39.8	-13.0	-26.8	
7520.00	2.6	V	3.0	40.5	1.0	-36.9	-13.0	-23.9	
3760.00	-4.9	H	3.0	42.0	1.0	-46.0	-13.0	-33.0	
5640.00	-0.1	H	3.0	40.3	1.0	-39.5	-13.0	-26.5	
7520.00	2.7	H	3.0	40.5	1.0	-36.8	-13.0	-23.8	
High Ch, 1907.6MHz									
3815.20	-4.4	V	3.0	42.0	1.0	-45.5	-13.0	-32.5	
5722.80	0.8	V	3.0	40.2	1.0	-38.4	-13.0	-25.4	
7630.40	3.1	V	3.0	40.5	1.0	-36.3	-13.0	-23.3	
3815.20	-4.8	H	3.0	42.0	1.0	-45.8	-13.0	-32.8	
5722.80	0.8	H	3.0	40.2	1.0	-38.4	-13.0	-25.4	
7630.40	3.0	H	3.0	40.5	1.0	-36.4	-13.0	-23.4	

LTE Band 12

LTE

Band 12

5MHz

QPSK

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-25
Test Engineer: 22944
Configuration: EUT / AC adapter, Y-position / Full folded
Location: 10m Chamber
Mode: LTE_QPSK Band 12 Harmonics, 5MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 701.5MHz									
1403.00	-10.4	V	3.0	42.6	1.0	-52.0	-13.0	-39.0	
2104.50	-8.9	V	3.0	42.4	1.0	-50.3	-13.0	-37.3	
2806.00	-6.1	V	3.0	42.2	1.0	-47.4	-13.0	-34.4	
3507.50	-5.6	V	3.0	42.1	1.0	-46.7	-13.0	-33.7	
4209.00	-2.8	V	3.0	41.8	1.0	-43.6	-13.0	-30.6	
1403.00	-7.0	H	3.0	42.6	1.0	-48.5	-13.0	-35.5	
2104.50	-9.3	H	3.0	42.4	1.0	-50.6	-13.0	-37.6	
2806.00	-6.3	H	3.0	42.2	1.0	-47.6	-13.0	-34.6	
3507.50	-5.9	H	3.0	42.1	1.0	-47.0	-13.0	-34.0	
4209.00	-2.9	H	3.0	41.8	1.0	-43.7	-13.0	-30.7	
Mid Ch, 707.5MHz									
1415.00	-7.0	V	3.0	42.6	1.0	-48.5	-13.0	-35.5	
2122.50	-9.0	V	3.0	42.4	1.0	-50.4	-13.0	-37.4	
2830.00	-6.0	V	3.0	42.2	1.0	-47.2	-13.0	-34.2	
3537.50	-5.7	V	3.0	42.1	1.0	-46.8	-13.0	-33.8	
4245.00	-2.7	V	3.0	41.8	1.0	-43.4	-13.0	-30.4	
1415.00	-1.3	H	3.0	42.6	1.0	-42.9	-13.0	-29.9	
2122.50	-8.9	H	3.0	42.4	1.0	-50.3	-13.0	-37.3	
2830.00	-6.2	H	3.0	42.2	1.0	-47.4	-13.0	-34.4	
3537.50	-5.8	H	3.0	42.1	1.0	-46.9	-13.0	-33.9	
4245.00	-2.7	H	3.0	41.8	1.0	-43.4	-13.0	-30.4	
High Ch, 713.5MHz									
1427.00	-7.2	V	3.0	42.6	1.0	-48.7	-13.0	-35.7	
2140.50	-9.0	V	3.0	42.4	1.0	-50.4	-13.0	-37.4	
2854.00	-5.4	V	3.0	42.2	1.0	-46.7	-13.0	-33.7	
3567.50	-5.3	V	3.0	42.1	1.0	-46.4	-13.0	-33.4	
4281.00	-4.2	V	3.0	41.7	1.0	-44.9	-13.0	-31.9	
1427.00	-4.9	H	3.0	42.6	1.0	-46.5	-13.0	-33.5	
2140.50	-8.9	H	3.0	42.4	1.0	-50.3	-13.0	-37.3	
2854.00	-5.8	H	3.0	42.2	1.0	-47.0	-13.0	-34.0	
3567.50	-5.6	H	3.0	42.1	1.0	-46.7	-13.0	-33.7	
4281.00	-2.6	H	3.0	41.7	1.0	-43.3	-13.0	-30.3	

LTE Band 13

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-20
Test Engineer: 22944
Configuration: EUT / AC Adapter, Y-Position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 13 Harmonics, 5MHz Bandwidth

LTE
Band 13
5MHz
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, 779.5MHz									
1559.00	-18.1	V	3.0	42.5	1.0	-59.6	-40.0	-19.6	
2338.50	-14.4	V	3.0	42.3	1.0	-55.7	-13.0	-42.7	
3118.00	-11.2	V	3.0	42.2	1.0	-52.4	-13.0	-39.4	
3897.50	-10.2	V	3.0	42.0	1.0	-51.2	-13.0	-38.2	
4677.00	-7.0	V	3.0	41.4	1.0	-47.4	-13.0	-34.4	
1559.00	-15.5	H	3.0	42.5	1.0	-57.0	-40.0	-17.0	
2338.50	-14.4	H	3.0	42.3	1.0	-55.7	-13.0	-42.7	
3118.00	-11.7	H	3.0	42.2	1.0	-52.8	-13.0	-39.8	
3897.50	-10.2	H	3.0	42.0	1.0	-51.2	-13.0	-38.2	
3897.50	-10.1	H	3.0	42.0	1.0	-51.2	-13.0	-38.2	
Mid Ch, 782MHz									
1564.00	-13.7	V	3.0	42.5	1.0	-55.2	-40.0	-15.2	
2346.00	-14.4	V	3.0	42.3	1.0	-55.8	-13.0	-42.8	
3128.00	-11.0	V	3.0	42.2	1.0	-52.2	-13.0	-39.2	
3910.00	-10.0	V	3.0	42.0	1.0	-51.1	-13.0	-38.1	
4692.00	-7.4	V	3.0	41.4	1.0	-47.8	-13.0	-34.8	
1564.00	-10.4	H	3.0	42.5	1.0	-51.9	-40.0	-11.9	
2346.00	-14.2	H	3.0	42.3	1.0	-55.5	-13.0	-42.5	
3128.00	-11.5	H	3.0	42.2	1.0	-52.6	-13.0	-39.6	
3910.00	-10.1	H	3.0	42.0	1.0	-51.1	-13.0	-38.1	
4692.00	-7.3	H	3.0	41.4	1.0	-47.7	-13.0	-34.7	
High Ch, 784.5MHz									
1569.00	-19.0	V	3.0	42.5	1.0	-60.6	-40.0	-20.6	
2353.50	-14.2	V	3.0	42.3	1.0	-55.6	-13.0	-42.6	
3138.00	-11.0	V	3.0	42.2	1.0	-52.1	-13.0	-39.1	
3922.50	-9.9	V	3.0	42.0	1.0	-50.9	-13.0	-37.9	
4707.00	-7.4	V	3.0	41.3	1.0	-47.7	-13.0	-34.7	
1569.00	-16.2	H	3.0	42.5	1.0	-57.8	-40.0	-17.8	
2353.50	-14.5	H	3.0	42.3	1.0	-55.8	-13.0	-42.8	
3138.00	-11.3	H	3.0	42.2	1.0	-52.5	-13.0	-39.5	
3922.50	-10.2	H	3.0	42.0	1.0	-51.2	-13.0	-38.2	
4707.00	-7.4	H	3.0	41.3	1.0	-47.8	-13.0	-34.8	

Note : No narrowband emissions so only applied the -70dBW/MHz (-40dBm/MHz) wideband emission limit for the 1559-1610 MHz band

LTE Band 25

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-22
Test Engineer: 22944
Configuration: EUT / AC adapter, X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 25 Harmonics, 15MHz Bandwidth

LTE
Band 25
15MHz
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, 1857.5MHz									
3715.00	-4.7	V	3.0	42.1	1.0	-45.8	-13.0	-32.8	
5572.50	-0.4	V	3.0	40.4	1.0	-39.8	-13.0	-26.8	
7430.00	2.2	V	3.0	40.5	1.0	-37.3	-13.0	-24.3	
3715.00	-5.0	H	3.0	42.1	1.0	-46.0	-13.0	-33.0	
5572.50	-0.2	H	3.0	40.4	1.0	-39.6	-13.0	-26.6	
7430.00	2.5	H	3.0	40.5	1.0	-37.0	-13.0	-24.0	
Mid Ch, 1882.5MHz									
3765.00	-4.8	V	3.0	42.0	1.0	-45.9	-13.0	-32.9	
5647.50	-0.5	V	3.0	40.3	1.0	-39.8	-13.0	-26.8	
7530.00	2.5	V	3.0	40.5	1.0	-36.9	-13.0	-23.9	
3765.00	-5.1	H	3.0	42.0	1.0	-46.1	-13.0	-33.1	
5647.50	-0.2	H	3.0	40.3	1.0	-39.6	-13.0	-26.6	
7530.00	2.6	H	3.0	40.5	1.0	-36.9	-13.0	-23.9	
High Ch, 1907.5MHz									
3815.00	-4.6	V	3.0	42.0	1.0	-45.6	-13.0	-32.6	
5722.50	0.6	V	3.0	40.2	1.0	-38.6	-13.0	-25.6	
7630.00	2.8	V	3.0	40.5	1.0	-36.6	-13.0	-23.6	
3815.00	-4.7	H	3.0	42.0	1.0	-45.7	-13.0	-32.7	
5722.50	0.7	H	3.0	40.2	1.0	-38.5	-13.0	-25.5	
7630.00	3.0	H	3.0	40.5	1.0	-36.5	-13.0	-23.5	

LTE Band 26

LTE
Band 26
10MHz
QPSK

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

Company: Samsung
Project #: 478967590
Date: 2020-05-29
Test Engineer: 22944
Configuration: EUT / AC adapter / Half folded / Y-position
Location: 10m Chamber
Mode: LTE_QPSK Band 26 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 819MHz									
1638.00	-9.3	V	3.0	42.5	1.0	-50.8	-13.0	-37.8	
2457.00	-7.8	V	3.0	42.3	1.0	-49.1	-13.0	-36.1	
3276.00	-5.4	V	3.0	42.1	1.0	-46.6	-13.0	-33.6	
1638.00	-6.3	H	3.0	42.5	1.0	-47.8	-13.0	-34.8	
2457.00	-7.7	H	3.0	42.3	1.0	-49.0	-13.0	-36.0	
3276.00	-5.9	H	3.0	42.1	1.0	-47.0	-13.0	-34.0	

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

Company: Samsung
Project #: 478967590
Date: 2020-05-29
Test Engineer: 22944
Configuration: EUT / AC adapter / Half folded / Y-position
Location: 10m Chamber
Mode: LTE_QPSK Band 26 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 829MHz									
1653.00	-10.4	V	3.0	42.5	1.0	-51.9	-13.0	-38.9	
2479.50	-7.2	V	3.0	42.3	1.0	-48.5	-13.0	-35.5	
3306.00	-5.7	V	3.0	42.1	1.0	-46.8	-13.0	-33.8	
1653.00	-10.8	H	3.0	42.5	1.0	-52.3	-13.0	-39.3	
2479.50	-7.2	H	3.0	42.3	1.0	-48.5	-13.0	-35.5	
3306.00	-6.0	H	3.0	42.1	1.0	-47.1	-13.0	-34.1	
Mid Ch, 831.5MHz									
1663.00	-10.1	V	3.0	42.5	1.0	-51.6	-13.0	-38.6	
2494.50	-6.9	V	3.0	42.3	1.0	-48.2	-13.0	-35.2	
3326.00	-5.6	V	3.0	42.1	1.0	-46.7	-13.0	-33.7	
1663.00	-10.2	H	3.0	42.5	1.0	-51.7	-13.0	-38.7	
2494.50	-7.2	H	3.0	42.3	1.0	-48.5	-13.0	-35.5	
3326.00	-5.4	H	3.0	42.1	1.0	-46.5	-13.0	-33.5	
High Ch, 844MHz									
1688.00	-10.6	V	3.0	42.5	1.0	-52.1	-13.0	-39.1	
2532.00	-6.7	V	3.0	42.3	1.0	-48.0	-13.0	-35.0	
3376.00	-5.4	V	3.0	42.1	1.0	-46.5	-13.0	-33.5	
1688.00	-10.4	H	3.0	42.5	1.0	-51.9	-13.0	-38.9	
2532.00	-7.2	H	3.0	42.3	1.0	-48.5	-13.0	-35.5	
3376.00	-5.9	H	3.0	42.1	1.0	-47.0	-13.0	-34.0	

LTE Band 41(PC3)

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

Company:	Samsung
Project #:	4789467590
Date:	2020-05-22
Test Engineer:	22944
Configuration:	EUT / AC adapter, X-position / Half folded
Location:	10m Chamber
Mode:	LTE_QPSK Band 41 Harmonics, 15MHz Bandwidth

LTE

Band 41 (PC3)

15MHz

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, 2503.5MHz									
5007.00	-5.1	V	3.0	41.1	1.0	-45.2	-25.0	-20.2	
7510.50	-1.7	V	3.0	40.5	1.0	-41.2	-25.0	-16.2	
10014.00	3.9	V	3.0	41.5	1.0	-36.6	-25.0	-11.6	
5007.00	-4.9	H	3.0	41.1	1.0	-45.0	-25.0	-20.0	
7510.50	-1.6	H	3.0	40.5	1.0	-41.1	-25.0	-16.1	
10014.00	3.7	H	3.0	41.5	1.0	-36.8	-25.0	-11.8	
Mid Ch, 2593MHz									
5186.00	-4.3	V	3.0	40.9	1.0	-44.1	-25.0	-19.1	
7779.00	-1.1	V	3.0	40.4	1.0	-40.5	-25.0	-15.5	
10372.00	4.5	V	3.0	41.6	1.0	-36.0	-25.0	-11.0	
5186.00	-4.7	H	3.0	40.9	1.0	-44.6	-25.0	-19.6	
7779.00	-0.9	H	3.0	40.4	1.0	-40.3	-25.0	-15.3	
10372.00	4.9	H	3.0	41.6	1.0	-35.7	-25.0	-10.7	
High Ch, 2682.5MHz									
5365.00	-4.8	V	3.0	40.7	1.0	-44.5	-25.0	-19.5	
8047.50	-1.2	V	3.0	40.4	1.0	-40.6	-25.0	-15.6	
10730.00	4.9	V	3.0	41.6	1.0	-35.7	-25.0	-10.7	
5365.00	-4.5	H	3.0	40.7	1.0	-44.1	-25.0	-19.1	
8047.50	-1.2	H	3.0	40.4	1.0	-40.6	-25.0	-15.6	
10730.00	4.7	H	3.0	41.6	1.0	-36.0	-25.0	-11.0	

LTE Band 66

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

Company: Samsung
Project #: 4789467590
Date: 2020-05-22
Test Engineer: 22944
Configuration: EUT / AC adapter, X-position / Half folded
Location: 10m Chamber
Mode: LTE_QPSK Band 66 Harmonics, 5MHz Bandwidth

LTE
Band 66
5MHz
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, 1712.5MHz									
3425.00	-8.8	V	3.0	42.1	1.0	-49.9	-13.0	-36.9	
5137.50	-4.1	V	3.0	40.9	1.0	-44.0	-13.0	-31.0	
6850.00	-0.1	V	3.0	40.5	1.0	-39.6	-13.0	-26.6	
3425.00	-9.0	H	3.0	42.1	1.0	-50.1	-13.0	-37.1	
5137.50	-4.6	H	3.0	40.9	1.0	-44.6	-13.0	-31.6	
6850.00	0.2	H	3.0	40.5	1.0	-39.3	-13.0	-26.3	
Mid Ch, 1745MHz									
3490.00	-8.4	V	3.0	42.1	1.0	-49.5	-13.0	-36.5	
5235.00	-4.7	V	3.0	40.8	1.0	-44.5	-13.0	-31.5	
6980.00	-0.4	V	3.0	40.6	1.0	-40.0	-13.0	-27.0	
3490.00	-8.9	H	3.0	42.1	1.0	-50.0	-13.0	-37.0	
5235.00	-4.6	H	3.0	40.8	1.0	-44.4	-13.0	-31.4	
6980.00	-0.3	H	3.0	40.6	1.0	-39.9	-13.0	-26.9	
High Ch, 1777.5MHz									
3555.00	-8.7	V	3.0	42.1	1.0	-49.8	-13.0	-36.8	
5332.50	-4.7	V	3.0	40.7	1.0	-44.3	-13.0	-31.3	
7110.00	-1.3	V	3.0	40.6	1.0	-40.9	-13.0	-27.9	
3555.00	-9.2	H	3.0	42.1	1.0	-50.3	-13.0	-37.3	
5332.50	-4.3	H	3.0	40.7	1.0	-44.0	-13.0	-31.0	
7110.00	-0.9	H	3.0	40.6	1.0	-40.5	-13.0	-27.5	

LTE Band 2

LTE Band 2(Frequency range: 1850-1910 MHz) is covered by LTE Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 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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