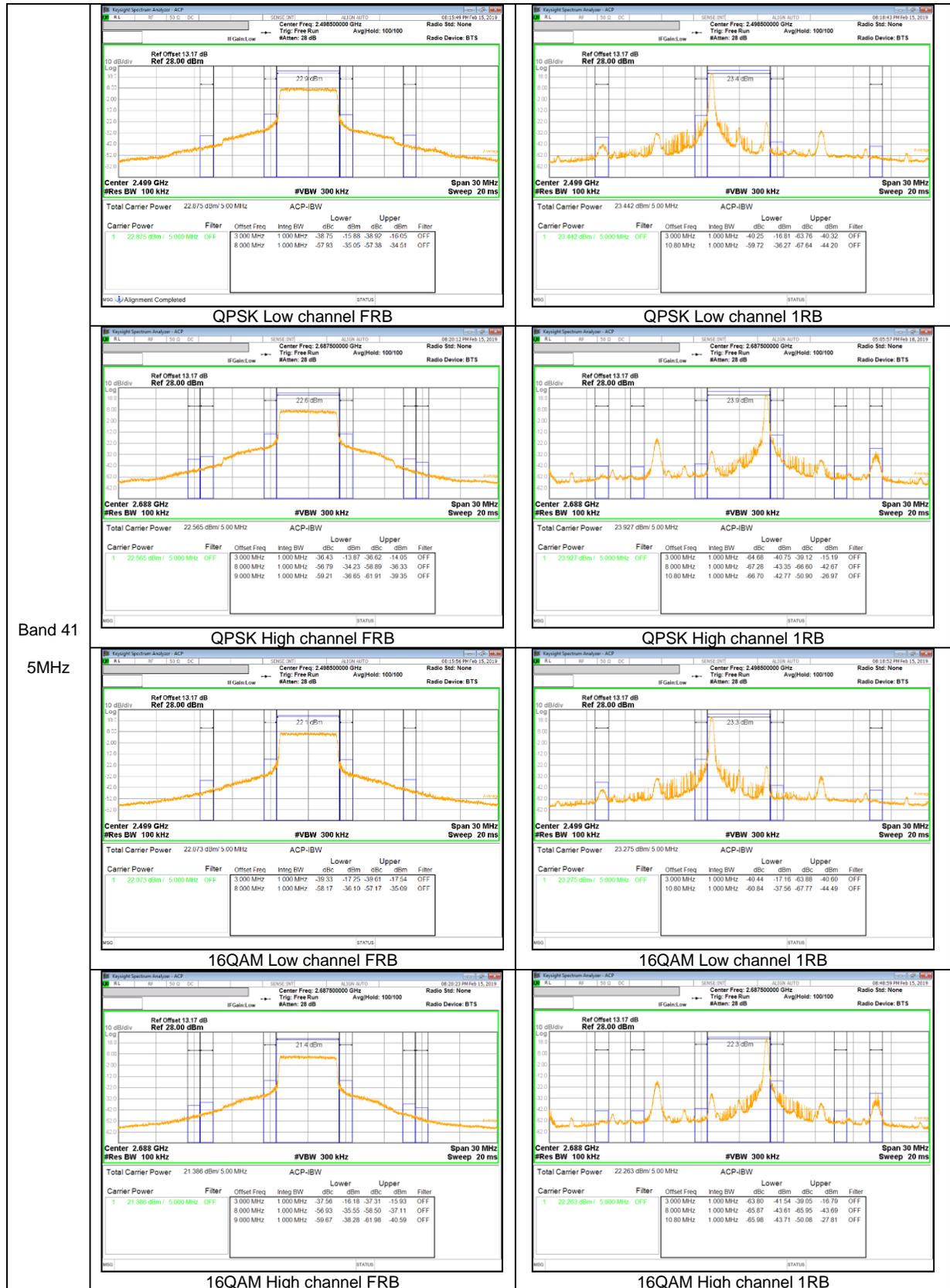


Band 41  
 10MHz



Band 41  
 5MHz

**LTE Band 17**

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

**LTE Band 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.

### 9.3. OUT OF BAND EMISSIONS

#### RULE PART(S)

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

#### LIMITS

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

Part 27.53:

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

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

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

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

## **TEST PROCEDURE**

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

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

- a) Set the RBW = 100KHz for emission below 1GHz and 1MHz for emissions above 1GHz  
(Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points = Max (40001);
- g) Trace mode = average(WCDMA, LTE), Maxhold(GSM, LTE Band41);

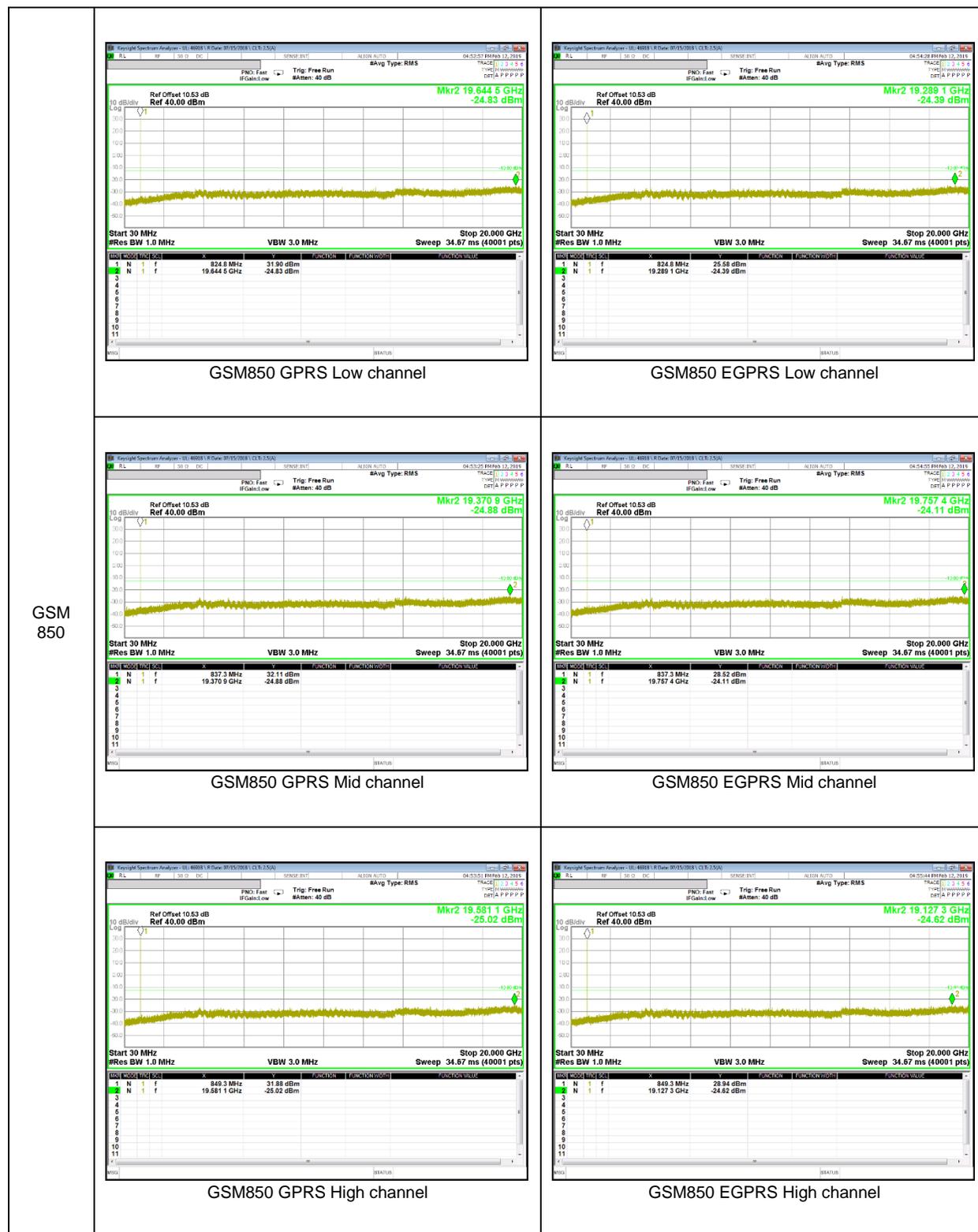
## **RESULTS**

See the following pages.

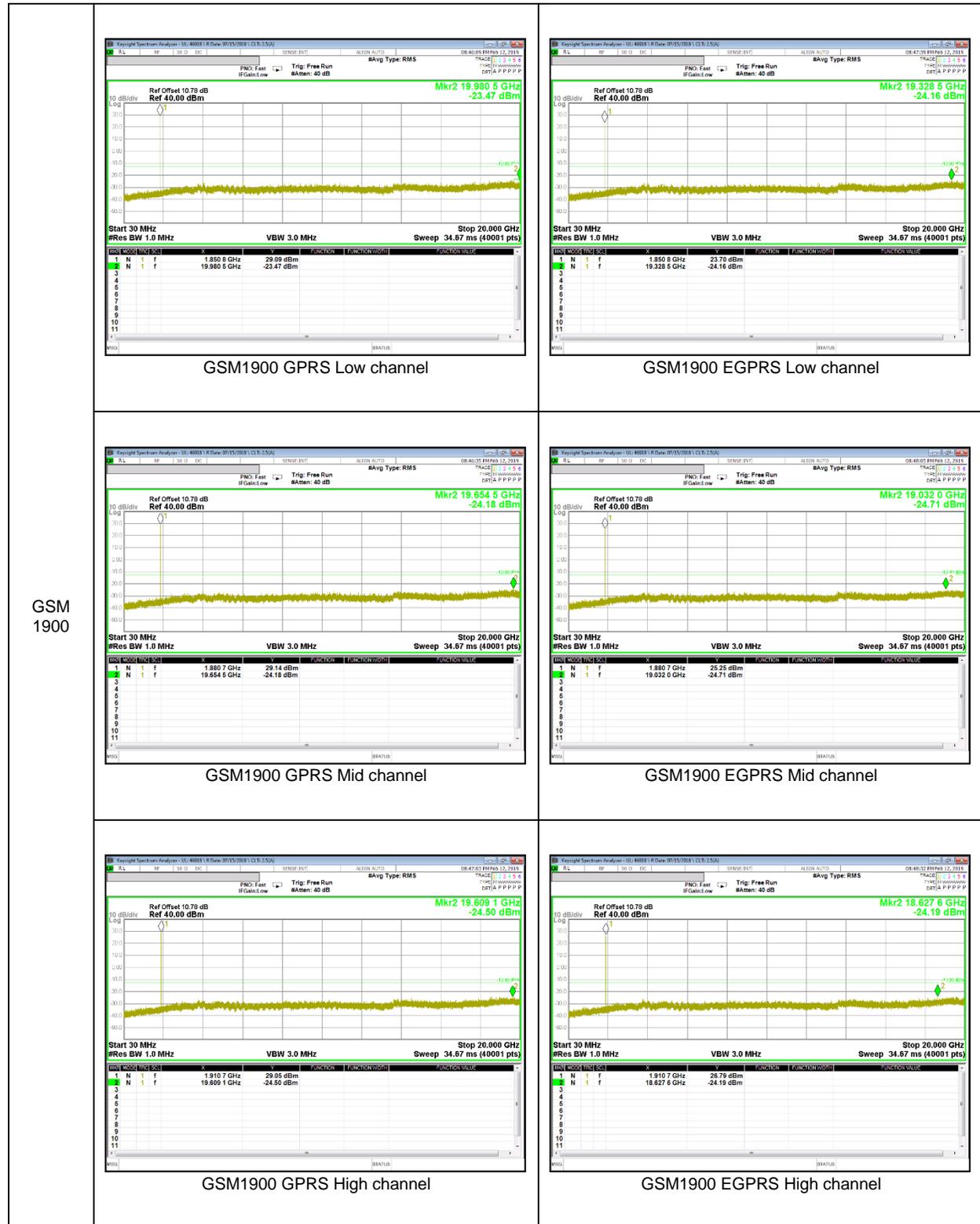
NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

### 9.3.1. OUT OF BAND EMISSIONS RESULT

#### GSM 850



**GSM 1900**



WCDMA Band 5



WCDMA Band 4



**WCDMA Band 2**



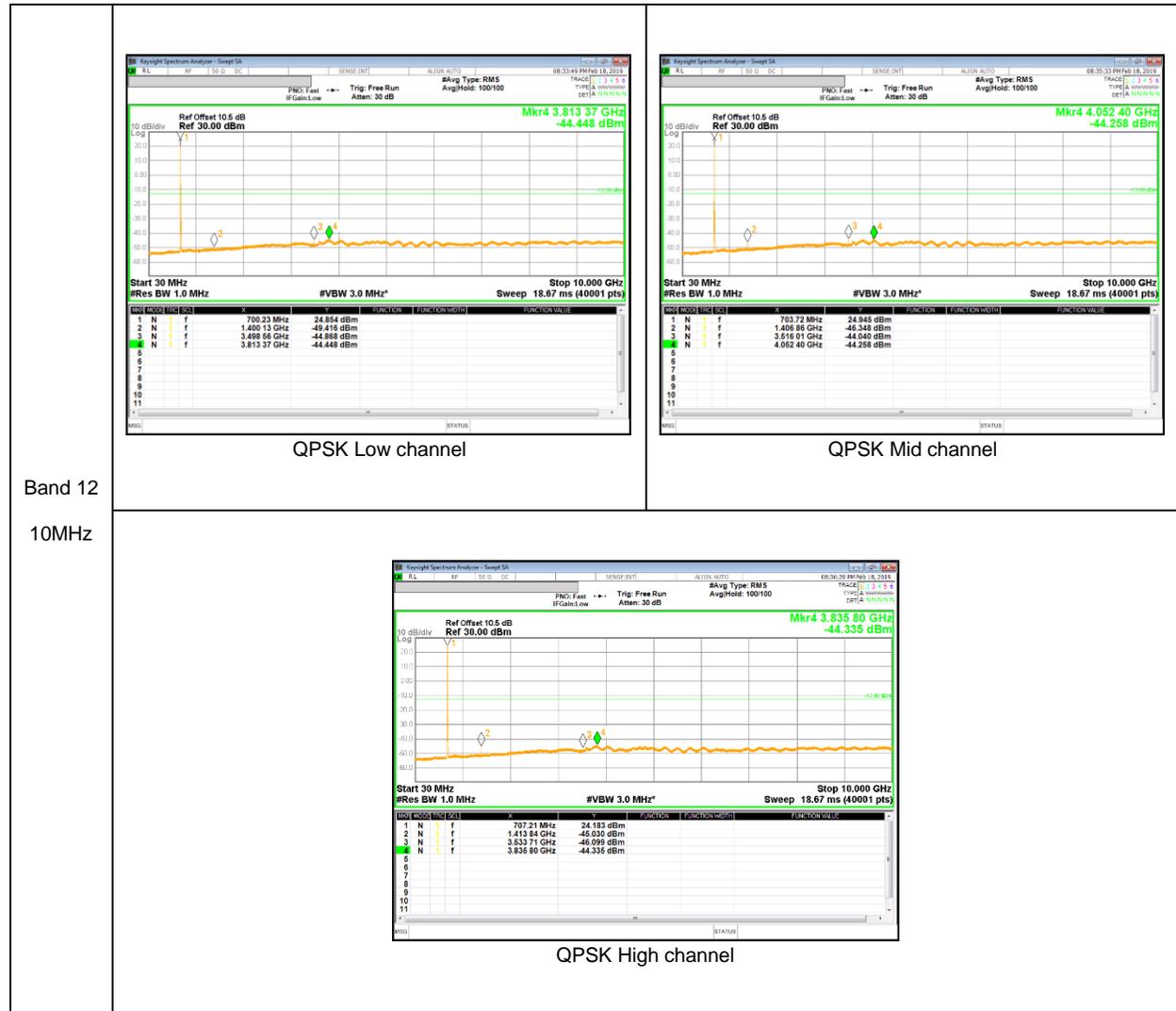
**LTE Band 2**



**LTE Band 5**



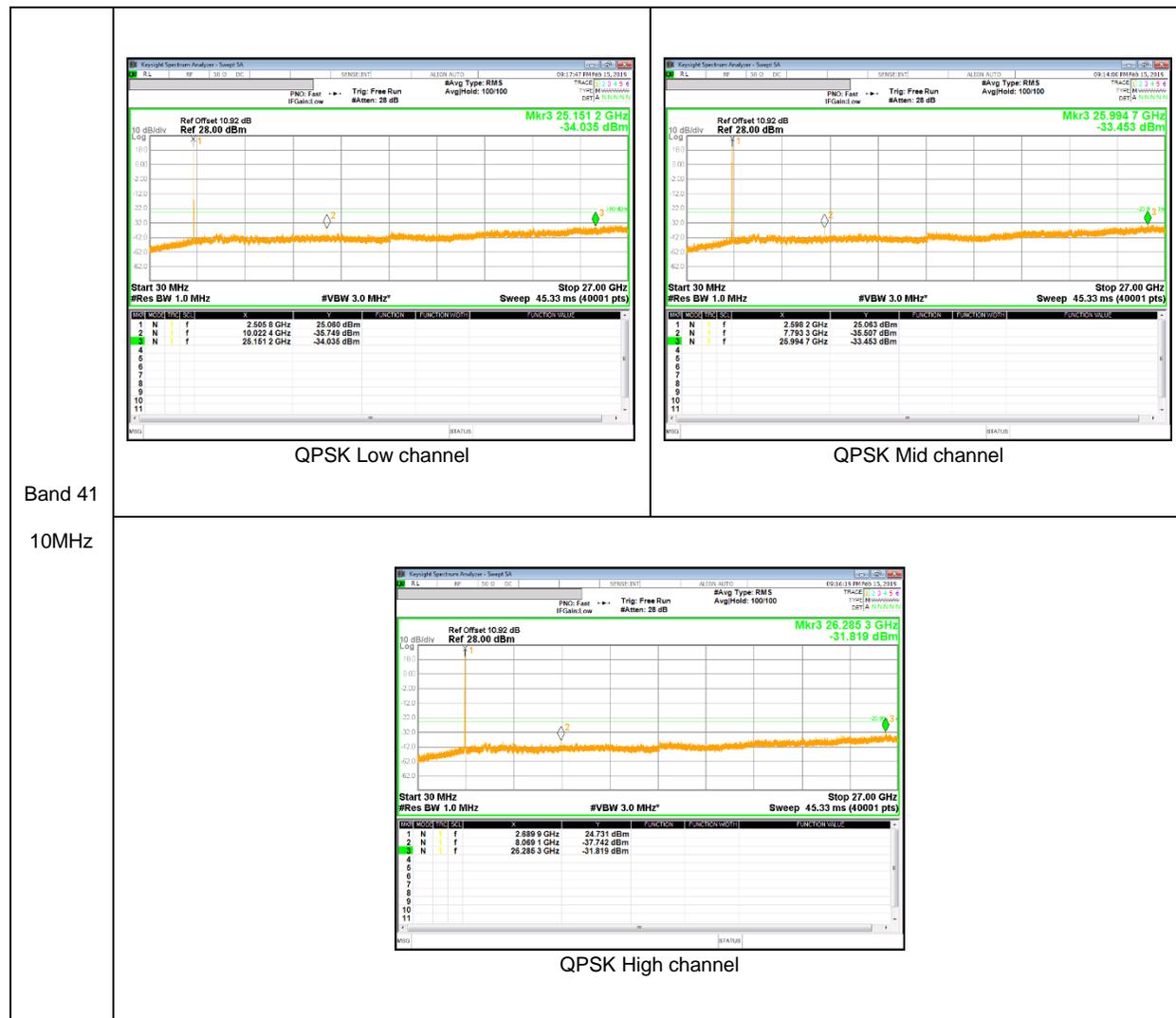
**LTE Band 12**



**LTE Band 13**



**LTE Band 41**



**LTE Band 66**



## 9.4. FREQUENCY STABILITY

### RULE PART(S)

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

### LIMITS

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

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

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

### TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

### RESULTS

See the following pages.

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

### 9.4.1. FREQUENCY STABILITY RESULTS

#### GSM 850, Channel 128/251, Frequency 824.2/848.8 MHz

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.85	50	824.19998776	0.002	848.79998511	-0.005	2.5	
3.85	40	824.19998314	0.007	848.79998099	-0.001	2.5	
3.85	30	824.19998013	0.011	848.79998062	0.000	2.5	
<b>3.85</b>	<b>20</b>	<b>824.19998927</b>	<b>0.000</b>	<b>848.79998045</b>	<b>0.000</b>	<b>2.5</b>	
3.85	10	824.19998602	0.004	848.79998685	-0.008	2.5	
3.85	0	824.19999066	-0.002	848.79998475	-0.005	2.5	
3.85	-10	824.19998459	0.006	848.79998841	-0.009	2.5	
3.85	-20	824.19999065	-0.002	848.79998459	-0.005	2.5	
3.85	-30	824.19998925	0.000	848.79998195	-0.002	2.5	

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.85	20	824.19998927	0	848.79998045	0	2.5	
4.40	20	824.19998236	0.008	848.79998038	0.000	2.5	
3.60	20	824.19998773	0.002	848.79998036	0.000	2.5	

#### GSM 1900, Channel 512/810, Frequency 1850.0/1910.0 MHz

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0764	1909.9237		
Extreme (50C)		1850.0764	1909.9236	-24.8	-0.013
Extreme (40C)		1850.0764	1909.9236	-28.1	-0.015
Extreme (30C)		1850.0764	1909.9236	-19.3	-0.010
Extreme (10C)		1850.0764	1909.9236	-19.7	-0.010
Extreme (0C)		1850.0764	1909.9236	-20.0	-0.011
Extreme (-10C)		1850.0764	1909.9236	-26.9	-0.014
Extreme (-20C)		1850.0764	1909.9236	-28.1	-0.015
Extreme (-30C)		1850.0764	1909.9236	-27.8	-0.015
20C		15%	1850.0764	1909.9236	-23.8
	-15%	1850.0764	1909.9236	-21.0	-0.011
	End Point	1850.0764	1909.9236	-29.3	-0.016

**WCDMA Band 5 Lowest Frequency: HSDPA / Highest Frequency: Rel. 99)**

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.85	50	826.39998406	-0.009	846.59997547	0.001	2.5	
3.85	40	826.39998452	-0.009	846.59998132	-0.005	2.5	
3.85	30	826.39997564	0.001	846.59997754	-0.001	2.5	
<b>3.85</b>	<b>20</b>	<b>826.39997678</b>	<b>0.000</b>	<b>846.59997667</b>	<b>0.000</b>	<b>2.5</b>	
3.85	10	826.39998413	-0.009	846.59998432	-0.009	2.5	
3.85	0	826.39998567	-0.011	846.59997657	0.000	2.5	
3.85	-10	826.39997611	0.001	846.59997916	-0.003	2.5	
3.85	-20	826.39998271	-0.007	846.59998451	-0.009	2.5	
3.85	-30	826.39998246	-0.007	846.59998123	-0.005	2.5	

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.85	20	826.39997678	0	846.59997667	0	2.5	
4.40	20	826.39997890	-0.003	846.59998468	-0.009	2.5	
3.60	20	826.39997859	-0.002	846.59997949	-0.003	2.5	

**WCDMA Band 2 (Lowest Frequency: Rel. 99 / Highest Frequency: HSDPA)**

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1852.3979	1907.6021		
Extreme (50C)		1852.3979	1907.6021	-21.8	-0.012
Extreme (40C)		1852.3979	1907.6021	-21.4	-0.011
Extreme (30C)		1852.3979	1907.6021	-26.3	-0.014
Extreme (10C)		1852.3979	1907.6021	-28.4	-0.015
Extreme (0C)		1852.3979	1907.6021	-23.7	-0.013
Extreme (-10C)		1852.3979	1907.6021	-19.7	-0.010
Extreme (-20C)		1852.3979	1907.6021	-23.4	-0.012
Extreme (-30C)		1852.3979	1907.6021	-29.3	-0.016
20C	15%	1852.3979	1907.6021	-20.5	-0.011
	-15%	1852.3979	1907.6021	-29.2	-0.016
	End Point	1852.3979	1907.6021	-19.3	-0.010

**WCDMA Band 4 (HSDPA)**

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1712.3979	1752.6021		
Extreme (50C)		1712.3979	1752.6021	-19.7	-0.011
Extreme (40C)		1712.3979	1752.6021	-20.7	-0.012
Extreme (30C)		1712.3979	1752.6021	-27.1	-0.016
Extreme (10C)		1712.3979	1752.6021	-24.1	-0.014
Extreme (0C)		1712.3979	1752.6021	-27.8	-0.016
Extreme (-10C)		1712.3979	1752.6021	-19.6	-0.011
Extreme (-20C)		1712.3979	1752.6021	-25.1	-0.014
Extreme (-30C)		1712.3979	1752.6021	-25.9	-0.015
20C		15%	1712.3979	1752.6021	-22.1
	-15%	1712.3979	1752.6021	-26.4	-0.015
	End Point	1712.3979	1752.6021	-28.6	-0.017

**LTE Band 2 (QPSK)**

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.6995	1909.3005		
Extreme (50C)		1850.6994	1909.3005	-26.8	-0.014
Extreme (40C)		1850.6994	1909.3005	-24.9	-0.013
Extreme (30C)		1850.6994	1909.3005	-20.5	-0.011
Extreme (10C)		1850.6994	1909.3005	-19.9	-0.011
Extreme (0C)		1850.6994	1909.3005	-24.8	-0.013
Extreme (-10C)		1850.6994	1909.3005	-24.1	-0.013
Extreme (-20C)		1850.6994	1909.3005	-26.7	-0.014
Extreme (-30C)		1850.6994	1909.3005	-25.1	-0.013
20C		15%	1850.6994	1909.3005	-23.7
	-15%	1850.6994	1909.3005	-21.8	-0.012
	End Point	1850.6994	1909.3005	-23.5	-0.012

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

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C						
Limit: +- 2.5 ppm =		Low Channel	2061.750 Hz	High Channel	2120.750 Hz	
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	50	824.69997705	0.008	848.29998056	0.005	2.5
3.85	40	824.69997965	0.005	848.29998552	-0.001	2.5
3.85	30	824.69998387	0.000	848.29997759	0.009	2.5
<b>3.85</b>	<b>20</b>	<b>824.69998366</b>	<b>0.000</b>	<b>848.29998491</b>	<b>0.000</b>	<b>2.5</b>
3.85	10	824.69998217	0.002	848.29998551	-0.001	2.5
3.85	0	824.69997663	0.009	848.29998356	0.002	2.5
3.85	-10	824.69997968	0.005	848.29998435	0.001	2.5
3.85	-20	824.69997860	0.006	848.29998438	0.001	2.5
3.85	-30	824.69998208	0.002	848.29997684	0.010	2.5

Reference Frequency : LTE Band 5 Low Channel 824.7 MHz / High Channel 848.3 MHz @ 20°C						
Limit: +- 2.5 ppm =		Low Channel	2061.750 Hz	High Channel	2120.750 Hz	
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.85	20	824.69998366	0	848.29998491	0	2.5
4.40	20	824.69997734	0.008	848.29997631	0.010	2.5
3.60	20	824.69997739	0.008	848.29997778	0.008	2.5

**LTE Band 12 (QPSK)**

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	699.6995	715.3005		
Extreme (50C)		699.6994	715.3005	-10.1	-0.014
Extreme (40C)		699.6994	715.3005	-16.8	-0.024
Extreme (30C)		699.6994	715.3005	-14.6	-0.021
Extreme (10C)		699.6994	715.3005	-13.2	-0.019
Extreme (0C)		699.6994	715.3005	-12.0	-0.017
Extreme (-10C)		699.6994	715.3005	-14.6	-0.021
Extreme (-20C)		699.6994	715.3005	-19.6	-0.028
Extreme (-30C)		699.6994	715.3005	-15.4	-0.022
20C		15%	699.6994	715.3005	-9.3
	-15%	699.6994	715.3005	-18.5	-0.026
	End Point	699.6994	715.3005	-10.9	-0.015

**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	779.4978	784.5023		
Extreme (50C)		779.4977	784.5022	-10.0	-0.013
Extreme (40C)		779.4977	784.5022	-9.3	-0.012
Extreme (30C)		779.4977	784.5022	-17.7	-0.023
Extreme (10C)		779.4977	784.5022	-9.7	-0.012
Extreme (0C)		779.4977	784.5022	-13.4	-0.017
Extreme (-10C)		779.4977	784.5022	-15.4	-0.020
Extreme (-20C)		779.4977	784.5022	-14.5	-0.019
Extreme (-30C)		779.4977	784.5022	-9.3	-0.012
20C		15%	779.4977	784.5022	-9.3
	-15%	779.4977	784.5022	-16.7	-0.021
	End Point	779.4977	784.5022	-15.4	-0.020

**LTE Band 41 (QPSK)**

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2498.4977	2687.5022		
Extreme (50C)		2498.4977	2687.5022	-24.8	-0.010
Extreme (40C)		2498.4977	2687.5022	-30.9	-0.012
Extreme (30C)		2498.4977	2687.5022	-24.7	-0.010
Extreme (10C)		2498.4977	2687.5022	-28.5	-0.011
Extreme (0C)		2498.4977	2687.5022	-33.3	-0.013
Extreme (-10C)		2498.4977	2687.5022	-25.0	-0.010
Extreme (-20C)		2498.4977	2687.5022	-29.2	-0.011
Extreme (-30C)		2498.4977	2687.5022	-29.9	-0.012
20C		15%	2498.4977	2687.5022	-27.2
	-15%	2498.4977	2687.5022	-26.5	-0.010
	End Point	2498.4977	2687.5022	-32.2	-0.012

**LTE Band 66 (16QAM)**

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.6995	1779.3005		
Extreme (50C)		1710.6994	1779.3005	-22.7	-0.013
Extreme (40C)		1710.6994	1779.3005	-20.5	-0.012
Extreme (30C)		1710.6994	1779.3005	-23.4	-0.013
Extreme (10C)		1710.6994	1779.3005	-27.8	-0.016
Extreme (0C)		1710.6994	1779.3005	-25.1	-0.014
Extreme (-10C)		1710.6994	1779.3005	-28.8	-0.016
Extreme (-20C)		1710.6994	1779.3005	-28.0	-0.016
Extreme (-30C)		1710.6994	1779.3005	-21.1	-0.012
20C		15%	1710.6994	1779.3005	-26.5
	-15%	1710.6994	1779.3005	-20.1	-0.012
	End Point	1710.6994	1779.3005	-26.0	-0.015

**LTE Band 17**

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

**LTE Band 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.

## 10. RADIATED TEST RESULTS

### 10.1. RADIATED POWER (ERP & EIRP)

#### RULE PART(S)

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

#### LIMITS

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

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

27.50:

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

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

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

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

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

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

#### TEST RESULTS

### 10.1.1. ERP/EIRP Results

#### GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	512	824.2	26.38	434.51
		661	836.6	25.9	389.05
		810	848.8	26.18	414.95
	EGPRS	512	824.2	21.16	130.62
		661	836.6	20.75	118.85
		810	848.8	21.09	128.53
GSM1900	GPRS	512	1850.2	26.21	417.83
		661	1880	26.82	480.84
		810	1909.8	27.5	562.34
	EGPRS	512	1850.2	25.12	325.09
		661	1880	24.81	302.69
		810	1909.8	25.24	334.20

#### WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	17.32	53.95
		4183	836.6	<b>17.71</b>	<b>59.02</b>
		4233	846.6	16.68	46.56
	HSDPA	4132	826.4	16.43	43.95
		4183	836.6	<b>16.57</b>	<b>45.39</b>
		4233	846.6	14.42	27.67
Band 4	REL99	1312	1712.4	21.74	149.28
		1413	1732.6	<b>21.88</b>	154.17
		1513	1752.6	21.69	147.57
	HSDPA	1312	1712.4	21.32	<b>135.52</b>
		1413	1732.6	<b>21.93</b>	155.96
		1513	1752.6	21.77	150.31
Band 2	REL99	9262	1852.4	20.64	115.88
		9400	1880.0	<b>22.11</b>	<b>162.55</b>
		9538	1907.6	21.15	130.32
	HSDPA	9262	1852.4	20.34	108.14
		9400	1880.0	<b>22.11</b>	<b>162.55</b>
		9538	1907.6	20.96	124.74

**LTE Band 2**

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 2	20	QPSK	1 / 99	1860.0	21.74	149.28
			1 / 0	1880.0	22.96	197.70
			1 / 0	1900.0	22.50	177.83
		16QAM	1 / 49	1860.0	20.06	101.39
			1 / 49	1880.0	<b>22.58</b>	181.13
			1 / 0	1900.0	21.68	147.23
	15	QPSK	1 / 0	1857.5	20.49	111.94
			1 / 0	1880.0	23.31	214.29
			1 / 0	1902.5	22.60	181.97
		16QAM	1 / 37	1857.5	20.00	100.00
			1 / 0	1880.0	22.19	165.58
			1 / 0	1902.5	21.51	141.58
	10	QPSK	1 / 0	1855.0	20.58	114.29
			1 / 49	1880.0	22.36	172.19
			1 / 0	1905.0	22.79	190.11
		16QAM	1 / 0	1855.0	19.66	92.47
			1 / 0	1880.0	21.36	136.77
			1 / 0	1905.0	21.71	148.25
	5	QPSK	1 / 24	1852.5	21.48	140.60
			1 / 0	1880.0	23.40	218.78
			1 / 24	1907.5	22.16	164.44
		16QAM	1 / 24	1852.5	20.52	112.72
			1 / 0	1880.0	22.41	174.18
			1 / 0	1907.5	21.22	132.43
	3	QPSK	1 / 0	1851.5	21.35	136.46
			1 / 14	1880.0	<b>23.61</b>	<b>229.61</b>
			1 / 0	1908.5	23.33	215.28
		16QAM	1 / 14	1851.5	20.36	108.64
			1 / 14	1880.0	<b>22.58</b>	181.13
			1 / 14	1908.5	20.70	117.49
1.4	QPSK	1 / 5	1850.7	21.03	126.77	
		1 / 5	1880.0	23.55	226.46	
		1 / 5	1909.3	22.51	178.24	
	16QAM	1 / 3	1850.7	20.00	100.00	
		1 / 3	1880.0	22.57	180.72	
		1 / 3	1909.3	21.73	148.94	

**LTE Band 5**

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 5	10	QPSK	1 / 0	829.0	<b>19.52</b>	<b>89.54</b>
			1 / 0	836.5	18.11	64.71
			1 / 0	844.0	18.17	65.61
		16QAM	1 / 0	829.0	<b>18.11</b>	<b>64.71</b>
			1 / 0	836.5	17.15	51.88
			1 / 25	844.0	<b>18.11</b>	<b>64.71</b>
	5	QPSK	1 / 0	826.5	19.31	85.31
			1 / 0	836.5	<b>19.61</b>	<b>91.41</b>
			1 / 12	846.5	15.40	34.67
		16QAM	1 / 0	826.5	18.01	63.24
			1 / 0	836.5	<b>18.35</b>	<b>68.39</b>
			1 / 12	846.5	14.67	29.31
	3	QPSK	1 / 8	825.5	<b>18.71</b>	<b>74.30</b>
			1 / 14	836.5	18.54	71.45
			1 / 8	847.5	17.78	59.98
		16QAM	1 / 14	825.5	<b>17.19</b>	<b>52.36</b>
			1 / 14	836.5	17.12	51.52
			1 / 0	847.5	16.65	46.24
	1.4	QPSK	1 / 3	824.7	18.84	76.56
			1 / 3	836.5	<b>18.88</b>	<b>77.27</b>
			1 / 0	848.3	17.86	61.09
		16QAM	1 / 0	824.7	<b>17.65</b>	<b>58.21</b>
			1 / 0	836.5	17.37	54.58
			1 / 0	848.3	16.84	48.31

**LTE Band 12**

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 12	10	QPSK	1 / 0	704.0	16.94	49.43
			1 / 0	707.5	<b>17.26</b>	<b>53.21</b>
			1 / 0	711.0	17.10	51.29
		16QAM	1 / 0	704.0	15.49	35.40
			1 / 0	707.5	<b>16.11</b>	40.83
			1 / 0	711.0	15.96	39.45
	5	QPSK	1 / 0	701.5	16.67	46.45
			1 / 0	707.5	<b>17.17</b>	52.12
			1 / 0	713.5	16.99	50.00
		16QAM	1 / 0	701.5	15.37	34.43
			1 / 0	707.5	<b>15.87</b>	38.64
			1 / 12	713.5	15.81	38.11
	3	QPSK	1 / 0	700.5	15.93	39.17
			1 / 0	707.5	16.45	44.16
			1 / 0	714.5	<b>16.58</b>	45.50
		16QAM	1 / 14	700.5	14.77	29.99
			1 / 8	707.5	15.52	35.65
			1 / 14	714.5	<b>15.81</b>	38.11
	1.4	QPSK	1 / 0	699.7	15.87	38.64
			1 / 5	707.5	16.46	44.26
			1 / 0	715.3	<b>16.77</b>	47.53
		16QAM	1 / 3	699.7	14.64	29.11
			1 / 5	707.5	15.31	33.96
			1 / 5	715.3	<b>15.70</b>	37.15

**LTE Band 13**

Band	BW	Mode	RB size /	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 13	10	QPSK	1 / 0	782.0	<b>14.69</b>	<b>29.44</b>
		16QAM	1 / 0	782.0	13.20	20.89
	5	QPSK	1 / 0	779.5	14.35	27.23
			1 / 0	782.0	14.36	27.29
			1 / 0	784.5	14.51	28.25
	16QAM	1 / 12	779.5	<b>13.89</b>	24.49	
		1 / 0	782.0	12.98	19.86	
		1 / 0	784.5	13.19	20.84	

**LTE Band 41**

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 41	20	QPSK	1 / 99	2506.0	<b>22.08</b>	161.44
			1 / 99	2593.0	21.92	155.60
			1 / 99	2680.0	20.02	100.46
		16QAM	1 / 99	2506.0	21.18	131.22
			1 / 99	2593.0	<b>21.42</b>	138.68
			1 / 49	2680.0	19.37	86.50
	15	QPSK	1 / 74	2503.5	21.82	152.05
			1 / 37	2593.0	<b>22.18</b>	165.20
			1 / 0	2682.5	20.57	114.02
		16QAM	1 / 74	2503.5	21.03	126.77
			1 / 37	2593.0	<b>22.30</b>	169.82
			1 / 0	2682.5	20.39	109.40
	10	QPSK	1 / 49	2501.0	<b>22.39</b>	<b>173.38</b>
			1 / 49	2593.0	21.87	153.82
			1 / 49	2685.0	20.30	107.15
		16QAM	1 / 49	2501.0	21.42	138.68
			1 / 25	2593.0	<b>21.68</b>	147.23
			1 / 49	2685.0	20.57	114.02
	5	QPSK	1 / 24	2498.5	21.99	158.12
			1 / 24	2593.0	<b>22.00</b>	158.49
			1 / 24	2687.5	20.51	112.46
		16QAM	1 / 24	2498.5	20.67	116.68
			1 / 24	2593.0	<b>21.25</b>	133.35
			1 / 24	2687.5	19.60	91.20

**LTE Band 17**

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

**LTE Band 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 66**

Band	BW	Mode	RB Size/	f [MHz]	ERP / EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 66	20	QPSK	1 / 0	1720.0	<b>23.94</b>	247.74
			1 / 0	1745.0	23.25	211.35
			1 / 0	1770.0	23.41	219.28
		16QAM	1 / 0	1720.0	<b>22.69</b>	185.78
			1 / 0	1745.0	22.18	165.20
			1 / 0	1770.0	21.96	157.04
	15	QPSK	1 / 0	1717.5	<b>23.96</b>	248.89
			1 / 0	1747.5	23.38	217.77
			1 / 0	1772.5	23.22	209.89
		16QAM	1 / 0	1717.5	<b>22.68</b>	185.35
			1 / 0	1747.5	22.25	167.88
			1 / 0	1772.5	21.70	147.91
	10	QPSK	1 / 25	1715.0	<b>24.02</b>	252.35
			1 / 0	1745.0	22.98	198.61
			1 / 0	1775.0	22.88	194.09
		16QAM	1 / 0	1715.0	<b>22.71</b>	186.64
			1 / 0	1745.0	21.90	154.88
			1 / 0	1775.0	21.55	142.89
	5	QPSK	1 / 24	1712.5	<b>24.18</b>	<b>261.82</b>
			1 / 12	1745.0	23.30	213.80
			1 / 0	1777.5	23.38	217.77
		16QAM	1 / 12	1712.5	<b>22.51</b>	178.24
			1 / 0	1745.0	22.20	165.96
			1 / 0	1777.5	22.19	165.58
	3	QPSK	1 / 14	1711.5	<b>23.88</b>	244.34
			1 / 14	1745.0	22.93	196.34
			1 / 8	1778.5	23.23	210.38
		16QAM	1 / 14	1711.5	<b>22.56</b>	180.30
			1 / 0	1745.0	21.72	148.59
			1 / 14	1778.5	20.70	117.49
1.4	QPSK	1 / 5	1710.7	<b>23.98</b>	250.03	
		1 / 5	1745.0	22.57	180.72	
		1 / 0	1779.3	21.44	139.32	
	16QAM	1 / 5	1710.7	22.87	193.64	
		1 / 0	1745.0	<b>23.59</b>	228.56	
		1 / 0	1779.3	21.29	134.59	

### 10.1.2. ERP/EIRP DATA

#### GSM850

GSM850  GPRS	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>							
	<p>Company: Samsung                  Project #: 4788869685                  Date: 2019-02-13                  Test Engineer: 47989                  Configuration: EUT / X-Position                  Location: Chamber 1                  Mode: GPRS 850 MHz Fundamentals</p> <p><u>Test Equipment:</u>                  Receiving: VULB9163-750, and Chamber 1 SMA Cables                  Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable</p>							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.20	23.96	V	3.0	-1.5	19.47	38.5	-19.0	
824.20	30.87	H	3.0	-1.5	26.38	38.5	-12.1	
Mid Ch								
836.60	24.06	V	3.0	-1.4	19.60	38.5	-18.9	
836.60	30.37	H	3.0	-1.4	25.90	38.5	-12.6	
High Ch								
848.80	24.03	V	3.1	-1.4	19.59	38.5	-18.9	
848.80	30.62	H	3.1	-1.4	26.18	38.5	-12.3	

GSM850  EGPRS	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>							
	<p>Company: Samsung                  Project #: 4788869685                  Date: 2019-02-13                  Test Engineer: 47989                  Configuration: EUT / X-Position                  Location: Chamber 1                  Mode: EGPRS 850 MHz Fundamentals</p> <p><u>Test Equipment:</u>                  Receiving: VULB9163-750, and Chamber 1 SMA Cables                  Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable</p>							
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	18.67	V	3.0	-1.5	14.18	38.5	-24.3	
824.20	25.65	H	3.0	-1.5	21.16	38.5	-17.3	
Mid Ch								
836.60	18.55	V	3.0	-1.4	14.09	38.5	-24.4	
836.60	25.22	H	3.0	-1.4	20.75	38.5	-17.7	
High Ch								
848.80	18.75	V	3.1	-1.4	14.31	38.5	-24.2	
848.80	25.53	H	3.1	-1.4	21.09	38.5	-17.4	

**GSM1900**

GSM1900 GPRS	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788869685 Date: 2019-02-12 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 2 Mode: GPRS 1900 MHz Fundamentals  Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1850.20	14.74	V	4.5	9.4	19.66	33.0	-13.3	
	1850.20	21.29	H	4.5	9.4	26.21	33.0	-6.8	
	Mid Ch								
	1880.00	14.14	V	4.5	9.2	18.80	33.0	-14.2	
	1880.00	22.15	H	4.5	9.2	26.82	33.0	-6.2	
	High Ch								
	1909.80	13.34	V	4.6	8.9	17.70	33.0	-15.3	
	1909.80	23.14	H	4.6	8.9	27.50	33.0	-5.5	
GSM1900 EGPRS	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4788869685 Date: 2019-02-12 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 2 Mode: EGPRS 1900 MHz Fundamentals  Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1850.20	13.55	V	4.5	9.4	18.47	33.0	-14.5	
	1850.20	20.20	H	4.5	9.4	25.12	33.0	-7.9	
	Mid Ch								
	1880.00	12.85	V	4.5	9.2	17.51	33.0	-15.5	
	1880.00	20.14	H	4.5	9.2	24.81	33.0	-8.2	
	High Ch								
	1909.80	11.98	V	4.6	8.9	16.34	33.0	-16.7	
	1909.80	20.88	H	4.6	8.9	25.24	33.0	-7.8	

**WCDMA Band 5**

WCDMA  Band 5 REL99	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																										
	Company: Samsung Project #: 4788869685 Date: 2019-02-12 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 2 Mode: Rel99 Band 5 Fundamentals  Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable																																																																																										
	<table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>826.40</td> <td>21.80</td> <td>V</td> <td>3.0</td> <td>-1.5</td> <td>17.32</td> <td>38.5</td> <td>-21.2</td> <td></td> </tr> <tr> <td>826.40</td> <td>8.68</td> <td>H</td> <td>3.0</td> <td>-1.5</td> <td>4.20</td> <td>38.5</td> <td>-34.3</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>836.60</td> <td>22.17</td> <td>V</td> <td>3.0</td> <td>-1.4</td> <td>17.71</td> <td>38.5</td> <td>-20.8</td> <td></td> </tr> <tr> <td>836.60</td> <td>8.61</td> <td>H</td> <td>3.0</td> <td>-1.4</td> <td>4.15</td> <td>38.5</td> <td>-34.4</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>846.60</td> <td>21.12</td> <td>V</td> <td>3.1</td> <td>-1.4</td> <td>16.68</td> <td>38.5</td> <td>-21.8</td> <td></td> </tr> <tr> <td>846.60</td> <td>7.97</td> <td>H</td> <td>3.1</td> <td>-1.4</td> <td>3.53</td> <td>38.5</td> <td>-35.0</td> <td></td> </tr> </tbody> </table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									826.40	21.80	V	3.0	-1.5	17.32	38.5	-21.2		826.40	8.68	H	3.0	-1.5	4.20	38.5	-34.3		Mid Ch									836.60	22.17	V	3.0	-1.4	17.71	38.5	-20.8		836.60	8.61	H	3.0	-1.4	4.15	38.5	-34.4		High Ch									846.60	21.12	V	3.1	-1.4	16.68	38.5	-21.8		846.60	7.97	H	3.1	-1.4	3.53	38.5	-35.0	
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																			
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WCDMA  Band 5 HSDPA	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																										
	Company: Samsung Project #: 4788869685 Date: 2019-02-13 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 2 Mode: HSDPA Band 5 Fundamentals  Test Equipment: Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable																																																																																										
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**WCDMA Band 4**

WCDMA Band 4 REL99	<p style="text-align: center;"><b>UL Verification Services, Inc.</b>  <b>High Frequency Substitution Measurement</b></p> <p>Company: Samsung                  Project #: 4788869685                  Date: 2019-02-08                  Test Engineer: 45585                  Configuration: EUT, X-Position                  Location: Chamber 2                  Mode: Rel99 Band 4 Fundamentals</p> <p><u>Test Equipment:</u>                  Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables                  Substitution: Horn 3115[00167451], 2.5m SMA-type Cable</p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBi)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>1712.40</td> <td>10.48</td> <td>V</td> <td>4.3</td> <td>9.3</td> <td>15.50</td> <td>30.0</td> <td>-14.5</td> <td></td> </tr> <tr> <td>1712.40</td> <td>16.72</td> <td>H</td> <td>4.3</td> <td>9.3</td> <td>21.74</td> <td>30.0</td> <td>-8.3</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1732.60</td> <td>4.06</td> <td>V</td> <td>4.3</td> <td>9.4</td> <td>9.12</td> <td>30.0</td> <td>-20.9</td> <td></td> </tr> <tr> <td>1732.60</td> <td>16.82</td> <td>H</td> <td>4.3</td> <td>9.4</td> <td>21.88</td> <td>30.0</td> <td>-8.1</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1752.60</td> <td>12.54</td> <td>V</td> <td>4.4</td> <td>9.5</td> <td>17.65</td> <td>30.0</td> <td>-12.4</td> <td></td> </tr> <tr> <td>1752.60</td> <td>16.58</td> <td>H</td> <td>4.4</td> <td>9.5</td> <td>21.69</td> <td>30.0</td> <td>-8.3</td> <td></td> </tr> </tbody> </table>								f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									1712.40	10.48	V	4.3	9.3	15.50	30.0	-14.5		1712.40	16.72	H	4.3	9.3	21.74	30.0	-8.3		Mid Ch									1732.60	4.06	V	4.3	9.4	9.12	30.0	-20.9		1732.60	16.82	H	4.3	9.4	21.88	30.0	-8.1		High Ch									1752.60	12.54	V	4.4	9.5	17.65	30.0	-12.4		1752.60	16.58	H	4.4	9.5	21.69	30.0	-8.3	
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WCDMA Band 4 HSDPA	<p style="text-align: center;"><b>UL Verification Services, Inc.</b>  <b>High Frequency Substitution Measurement</b></p> <p>Company: Samsung                  Project #: 4788869685                  Date: 2019-02-12                  Test Engineer: 45585                  Configuration: EUT, X-Position                  Location: Chamber 2                  Mode: HSDPA Band 4 Fundamentals</p> <p><u>Test Equipment:</u>                  Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables                  Substitution: Horn 3115[00167451], 2.5m SMA-type Cable</p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBi)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>1712.40</td> <td>10.83</td> <td>V</td> <td>4.3</td> <td>9.3</td> <td>15.85</td> <td>30.0</td> <td>-14.2</td> <td></td> </tr> <tr> <td>1712.40</td> <td>16.30</td> <td>H</td> <td>4.3</td> <td>9.3</td> <td>21.32</td> <td>30.0</td> <td>-8.7</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1732.60</td> <td>3.92</td> <td>V</td> <td>4.3</td> <td>9.4</td> <td>8.98</td> <td>30.0</td> <td>-21.0</td> <td></td> </tr> <tr> <td>1732.60</td> <td>16.87</td> <td>H</td> <td>4.3</td> <td>9.4</td> <td>21.93</td> <td>30.0</td> <td>-8.1</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1752.60</td> <td>12.32</td> <td>V</td> <td>4.4</td> <td>9.5</td> <td>17.43</td> <td>30.0</td> <td>-12.6</td> <td></td> </tr> <tr> <td>1752.60</td> <td>16.66</td> <td>H</td> <td>4.4</td> <td>9.5</td> <td>21.77</td> <td>30.0</td> <td>-8.2</td> <td></td> </tr> </tbody> </table>								f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									1712.40	10.83	V	4.3	9.3	15.85	30.0	-14.2		1712.40	16.30	H	4.3	9.3	21.32	30.0	-8.7		Mid Ch									1732.60	3.92	V	4.3	9.4	8.98	30.0	-21.0		1732.60	16.87	H	4.3	9.4	21.93	30.0	-8.1		High Ch									1752.60	12.32	V	4.4	9.5	17.43	30.0	-12.6		1752.60	16.66	H	4.4	9.5	21.77	30.0	-8.2	
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**WCDMA Band 2**

WCDMA Band 2 REL99	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-02-08 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 2 Mode: Rel99 Band 2 Fundamentals  <u>Test Equipment:</u> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1852.40	7.11	V	4.5	9.4	12.01	33.0	-21.0	
	1852.40	15.74	H	4.5	9.4	20.64	33.0	-12.4	
	Mid Ch								
	1880.00	6.56	V	4.5	9.2	11.22	33.0	-21.8	
	1880.00	17.44	H	4.5	9.2	22.11	33.0	-10.9	
	High Ch								
	1907.60	5.52	V	4.6	9.0	9.91	33.0	-23.1	
	1907.60	16.76	H	4.6	9.0	21.15	33.0	-11.8	
WCDMA Band 2 HSDPA	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-02-08 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 2 Mode: HSDPA Band 2 Fundamentals  <u>Test Equipment:</u> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1852.40	6.77	V	4.5	9.4	11.67	33.0	-21.3	
	1852.40	15.44	H	4.5	9.4	20.34	33.0	-12.7	
	Mid Ch								
	1880.00	7.98	V	4.5	9.2	12.64	33.0	-20.4	
	1880.00	17.44	H	4.5	9.2	22.11	33.0	-10.9	
	High Ch								
	1907.60	5.28	V	4.6	9.0	9.67	33.0	-23.3	
	1907.60	16.57	H	4.6	9.0	20.96	33.0	-12.0	

**LTE Band 2**

LTE Band 2 20MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-01-28 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 20MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1860.00	13.71	V	4.5	9.4	18.65	33.0	-14.4	
	1860.00	16.81	H	4.5	9.4	21.74	33.0	-11.3	
	Mid Ch								
	1880.00	14.61	V	4.5	9.3	19.39	33.0	-13.6	
	1880.00	18.19	H	4.5	9.3	22.96	33.0	-10.0	
High Ch									
1900.00	13.02	V	4.6	9.2	17.63	33.0	-15.4		
1900.00	17.88	H	4.6	9.2	22.50	33.0	-10.5		
LTE Band 2 20MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-01-28 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 2 Fundamentals, 20MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1860.00	11.48	V	4.5	9.4	16.42	33.0	-16.6	
	1860.00	15.13	H	4.5	9.4	20.06	33.0	-12.9	
	Mid Ch								
	1880.00	7.22	V	4.5	9.3	12.00	33.0	-21.0	
	1880.00	17.81	H	4.5	9.3	22.58	33.0	-10.4	
High Ch									
1900.00	11.93	V	4.6	9.2	16.54	33.0	-16.5		
1900.00	17.06	H	4.6	9.2	21.68	33.0	-11.3		

LTE Band 2 15MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-01-28 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1857.50	8.93	V	4.5	9.5	13.88	33.0	-19.1	
	1857.50	15.54	H	4.5	9.5	20.49	33.0	-12.5	
	Mid Ch								
	1880.00	14.44	V	4.5	9.3	19.22	33.0	-13.8	
	1880.00	18.54	H	4.5	9.3	23.31	33.0	-9.7	
High Ch									
1902.50	12.49	V	4.6	9.1	17.08	33.0	-15.9		
1902.50	18.02	H	4.6	9.1	22.60	33.0	-10.4		
LTE Band 2 15MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-01-28 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 2 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1857.50	9.61	V	4.5	9.5	14.56	33.0	-18.4	
	1857.50	15.05	H	4.5	9.5	20.00	33.0	-13.0	
	Mid Ch								
	1880.00	13.59	V	4.5	9.3	18.37	33.0	-14.6	
	1880.00	17.42	H	4.5	9.3	22.19	33.0	-10.8	
High Ch									
1902.50	11.54	V	4.6	9.1	16.13	33.0	-16.9		
1902.50	16.93	H	4.6	9.1	21.51	33.0	-11.5		

LTE Band 2 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-01-28 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1855.00	9.20	V	4.5	9.5	14.17	33.0	-18.8	
	1855.00	15.61	H	4.5	9.5	20.58	33.0	-12.4	
	Mid Ch								
	1880.00	12.90	V	4.5	9.3	17.68	33.0	-15.3	
	1880.00	17.59	H	4.5	9.3	22.36	33.0	-10.6	
High Ch									
1905.00	13.27	V	4.6	9.1	17.82	33.0	-15.2		
1905.00	18.24	H	4.6	9.1	22.79	33.0	-10.2		
LTE Band 2 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-01-28 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 2 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1855.00	8.46	V	4.5	9.5	13.43	33.0	-19.6	
	1855.00	14.69	H	4.5	9.5	19.66	33.0	-13.3	
	Mid Ch								
	1880.00	12.10	V	4.5	9.3	16.88	33.0	-16.1	
	1880.00	16.59	H	4.5	9.3	21.36	33.0	-11.6	
High Ch									
1905.00	12.39	V	4.6	9.1	16.94	33.0	-16.1		
1905.00	17.16	H	4.6	9.1	21.71	33.0	-11.3		

LTE Band 2 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-01-29 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1852.50	13.09	V	4.5	9.5	18.09	33.0	-14.9	
	1852.50	16.48	H	4.5	9.5	21.48	33.0	-11.5	
	Mid Ch								
	1880.00	14.34	V	4.5	9.3	19.12	33.0	-13.9	
	1880.00	18.63	H	4.5	9.3	23.40	33.0	-9.6	
High Ch									
1907.50	13.97	V	4.6	9.1	18.49	33.0	-14.5		
1907.50	17.64	H	4.6	9.1	22.16	33.0	-10.8		
LTE Band 2 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-01-29 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 2 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1852.50	11.92	V	4.5	9.5	16.92	33.0	-16.1	
	1852.50	15.52	H	4.5	9.5	20.52	33.0	-12.5	
	Mid Ch								
	1880.00	13.27	V	4.5	9.3	18.05	33.0	-15.0	
	1880.00	17.64	H	4.5	9.3	22.41	33.0	-10.6	
High Ch									
1907.50	13.19	V	4.6	9.1	17.71	33.0	-15.3		
1907.50	16.70	H	4.6	9.1	21.22	33.0	-11.8		

LTE Band 2 3MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-01-29 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1851.50	10.09	V	4.5	9.5	15.10	33.0	-17.9	
	1851.50	16.35	H	4.5	9.5	21.35	33.0	-11.6	
	Mid Ch								
	1880.00	16.31	V	4.5	9.3	21.09	33.0	-11.9	
	1880.00	18.84	H	4.5	9.3	23.61	33.0	-9.4	
High Ch									
1908.50	14.37	V	4.6	9.1	18.88	33.0	-14.1		
1908.50	18.83	H	4.6	9.1	23.33	33.0	-9.7		
LTE Band 2 3MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-01-29 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 2 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1851.50	9.74	V	4.5	9.5	14.75	33.0	-18.3	
	1851.50	15.36	H	4.5	9.5	20.36	33.0	-12.6	
	Mid Ch								
	1880.00	15.26	V	4.5	9.3	20.04	33.0	-13.0	
	1880.00	17.81	H	4.5	9.3	22.58	33.0	-10.4	
High Ch									
1908.50	11.41	V	4.6	9.1	15.92	33.0	-17.1		
1908.50	16.20	H	4.6	9.1	20.70	33.0	-12.3		

LTE Band 2 1.4MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-01-29 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1850.70	10.63	V	4.5	9.5	15.64	33.0	-17.4	
	1850.70	16.02	H	4.5	9.5	21.03	33.0	-12.0	
	Mid Ch								
	1880.00	16.09	V	4.5	9.3	20.87	33.0	-12.1	
	1880.00	18.78	H	4.5	9.3	23.55	33.0	-9.4	
High Ch									
1909.30	14.70	V	4.6	9.1	19.19	33.0	-13.8		
1909.30	18.02	H	4.6	9.1	22.51	33.0	-10.5		
LTE Band 2 1.4MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-01-29 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 2 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1850.70	9.91	V	4.5	9.5	14.92	33.0	-18.1	
	1850.70	14.99	H	4.5	9.5	20.00	33.0	-13.0	
	Mid Ch								
	1880.00	15.01	V	4.5	9.3	19.79	33.0	-13.2	
	1880.00	17.80	H	4.5	9.3	22.57	33.0	-10.4	
High Ch									
1909.30	13.88	V	4.6	9.1	18.37	33.0	-14.6		
1909.30	17.24	H	4.6	9.1	21.73	33.0	-11.3		

**LTE Band 5**

LTE Band 5 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	829.00	17.29	V	3.0	-1.5	12.81	38.5	-25.7	
	829.00	24.00	H	3.0	-1.5	19.52	38.5	-19.0	
	Mid Ch								
	836.50	14.78	V	3.0	-1.4	10.32	38.5	-28.2	
	836.50	22.57	H	3.0	-1.4	18.11	38.5	-20.4	
	High Ch								
	844.00	13.85	V	3.1	-1.4	9.40	38.5	-29.1	
844.00	22.62	H	3.1	-1.4	18.17	38.5	-20.3		
LTE Band 5 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	829.00	15.86	V	3.0	-1.5	11.38	38.5	-27.1	
	829.00	22.59	H	3.0	-1.5	18.11	38.5	-20.4	
	Mid Ch								
	836.50	13.45	V	3.0	-1.4	8.99	38.5	-29.5	
	836.50	21.61	H	3.0	-1.4	17.15	38.5	-21.4	
	High Ch								
	844.00	12.27	V	3.1	-1.4	7.82	38.5	-30.7	
844.00	22.56	H	3.1	-1.4	18.11	38.5	-20.4		

LTE Band 5 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>									
	Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Fundamentals, 5MHz Bandwidth									
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	826.50	14.59	V	3.0	-1.5	10.11	38.5	-28.4		
	826.50	23.79	H	3.0	-1.5	19.31	38.5	-19.2		
	Mid Ch									
	836.50	14.71	V	3.0	-1.4	10.25	38.5	-28.3		
	836.50	24.07	H	3.0	-1.4	19.61	38.5	-18.9		
High Ch										
846.50	13.53	V	3.1	-1.4	9.08	38.5	-29.4			
846.50	19.85	H	3.1	-1.4	15.40	38.5	-23.1			
LTE Band 5 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>									
	Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 5MHz Bandwidth									
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	826.50	13.42	V	3.0	-1.5	8.94	38.5	-29.6		
	826.50	22.49	H	3.0	-1.5	18.01	38.5	-20.5		
	Mid Ch									
	836.50	13.45	V	3.0	-1.4	8.99	38.5	-29.5		
	836.50	22.81	H	3.0	-1.4	18.35	38.5	-20.2		
High Ch										
846.50	12.16	V	3.1	-1.4	7.71	38.5	-30.8			
846.50	19.12	H	3.1	-1.4	14.67	38.5	-23.8			

LTE Band 5 3MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																										
	Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth																																																																																										
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f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																			
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825.50	12.89	V	3.0	-1.5	8.41	38.5	-30.1																																																																																				
825.50	21.67	H	3.0	-1.5	17.19	38.5	-21.3																																																																																				
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LTE Band 5 1.4MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	14.28	V	3.0	-1.5	9.79	38.5	-28.7	
	824.70	23.33	H	3.0	-1.5	18.84	38.5	-19.7	
	Mid Ch								
	836.50	14.47	V	3.0	-1.4	10.01	38.5	-28.5	
	836.50	23.34	H	3.0	-1.4	18.88	38.5	-19.6	
High Ch									
848.30	12.25	V	3.1	-1.4	7.81	38.5	-30.7		
848.30	22.30	H	3.1	-1.4	17.86	38.5	-20.6		
LTE Band 5 1.4MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	13.00	V	3.0	-1.5	8.51	38.5	-30.0	
	824.70	22.14	H	3.0	-1.5	17.65	38.5	-20.8	
	Mid Ch								
	836.50	13.01	V	3.0	-1.4	8.55	38.5	-30.0	
	836.50	21.83	H	3.0	-1.4	17.37	38.5	-21.1	
High Ch									
848.30	10.83	V	3.1	-1.4	6.39	38.5	-32.1		
848.30	21.28	H	3.1	-1.4	16.84	38.5	-21.7		

**LTE Band 12**

LTE Band 12 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	704.00	13.91	V	2.8	-1.6	9.53	34.8	-25.3	
	704.00	21.32	H	2.8	-1.6	16.94	34.8	-17.9	
	Mid Ch								
	707.50	13.69	V	2.8	-1.6	9.30	34.8	-25.5	
	707.50	21.64	H	2.8	-1.6	17.26	34.8	-17.5	
High Ch									
711.00	13.37	V	2.8	-1.6	8.97	34.8	-25.8		
711.00	21.49	H	2.8	-1.6	17.10	34.8	-17.7		
LTE Band 12 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 12 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	704.00	12.54	V	2.8	-1.6	8.16	34.8	-26.6	
	704.00	19.87	H	2.8	-1.6	15.49	34.8	-19.3	
	Mid Ch								
	707.50	12.69	V	2.8	-1.6	8.30	34.8	-26.5	
	707.50	20.49	H	2.8	-1.6	16.11	34.8	-18.7	
High Ch									
711.00	12.30	V	2.8	-1.6	7.90	34.8	-26.9		
711.00	20.35	H	2.8	-1.6	15.96	34.8	-18.8		

LTE Band 12 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 12 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	701.50	13.57	V	2.8	-1.6	9.19	34.8	-25.6	
	701.50	21.05	H	2.8	-1.6	16.67	34.8	-18.1	
	Mid Ch								
	707.50	13.61	V	2.8	-1.6	9.22	34.8	-25.6	
	707.50	21.55	H	2.8	-1.6	17.17	34.8	-17.6	
High Ch									
713.50	13.16	V	2.8	-1.6	8.76	34.8	-26.0		
713.50	21.39	H	2.8	-1.6	16.99	34.8	-17.8		
LTE Band 12 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 12 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	701.50	12.38	V	2.8	-1.6	8.00	34.8	-26.8	
	701.50	19.75	H	2.8	-1.6	15.37	34.8	-19.4	
	Mid Ch								
	707.50	12.40	V	2.8	-1.6	8.01	34.8	-26.8	
	707.50	20.25	H	2.8	-1.6	15.87	34.8	-18.9	
High Ch									
713.50	11.30	V	2.8	-1.6	6.90	34.8	-27.9		
713.50	20.21	H	2.8	-1.6	15.81	34.8	-19.0		