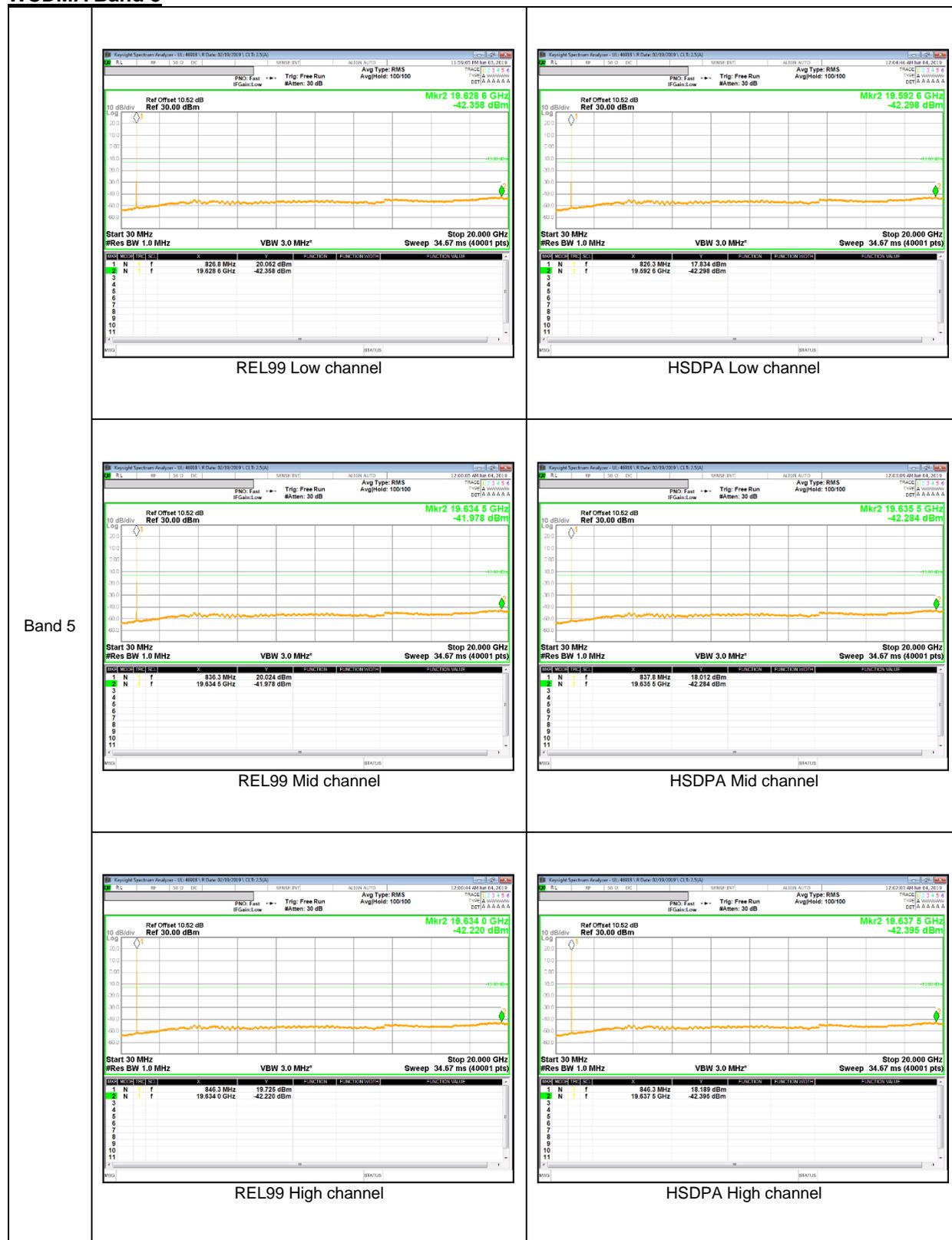




WCDMA Band 5



WCDMA Band 4



**WCDMA Band 2**



Band 2

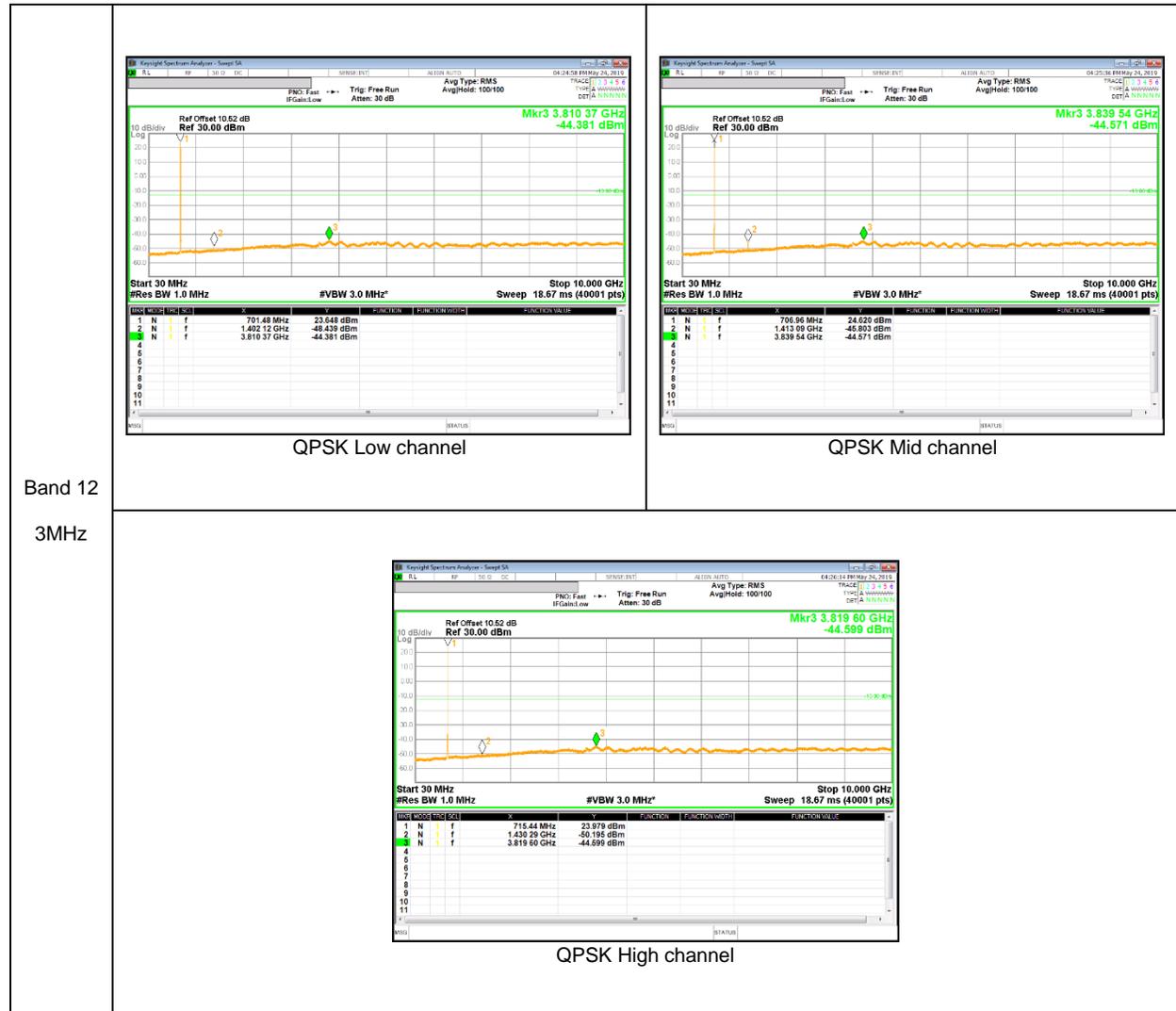
**LTE Band 5**



**LTE Band 7**



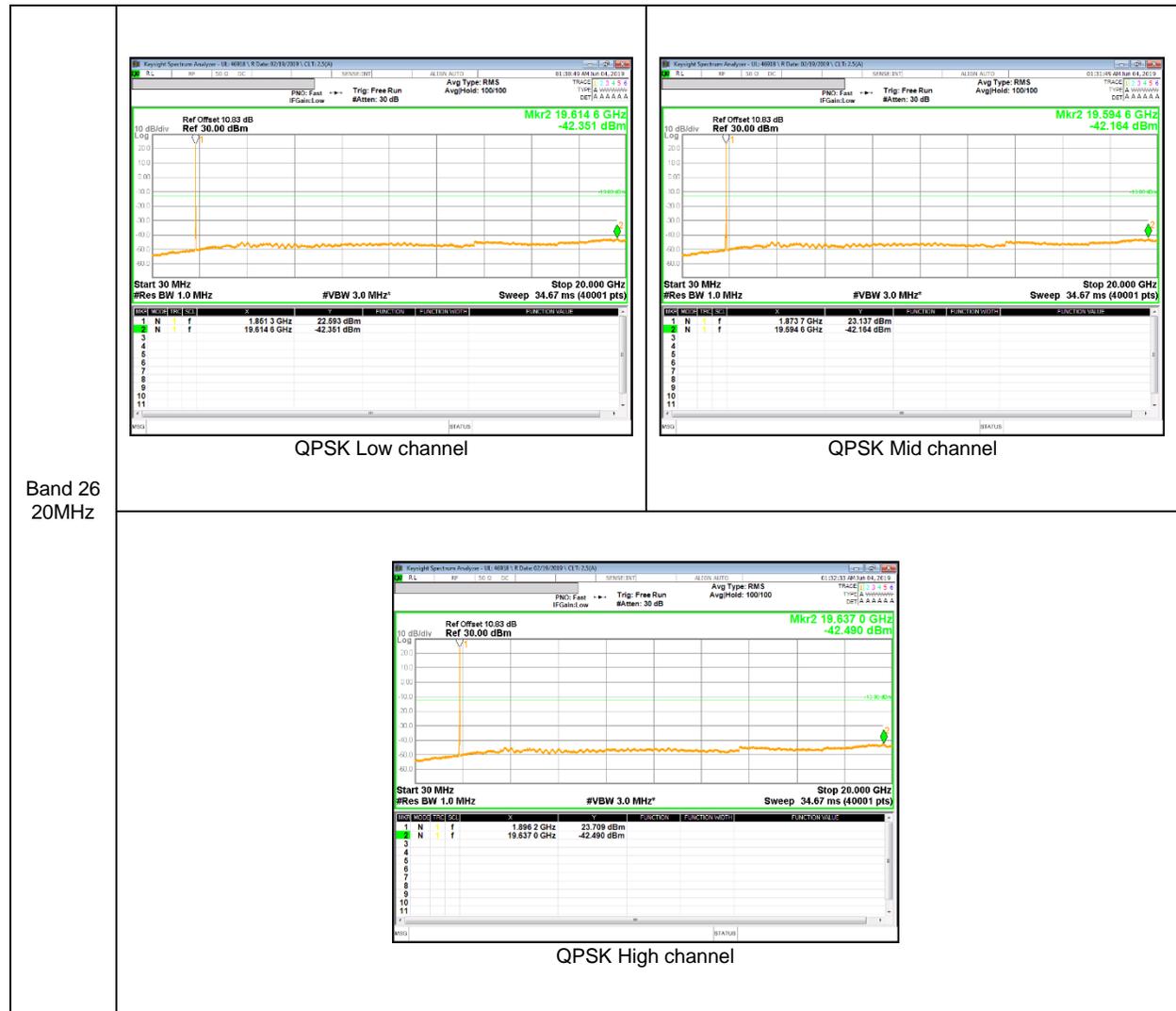
**LTE Band 12**



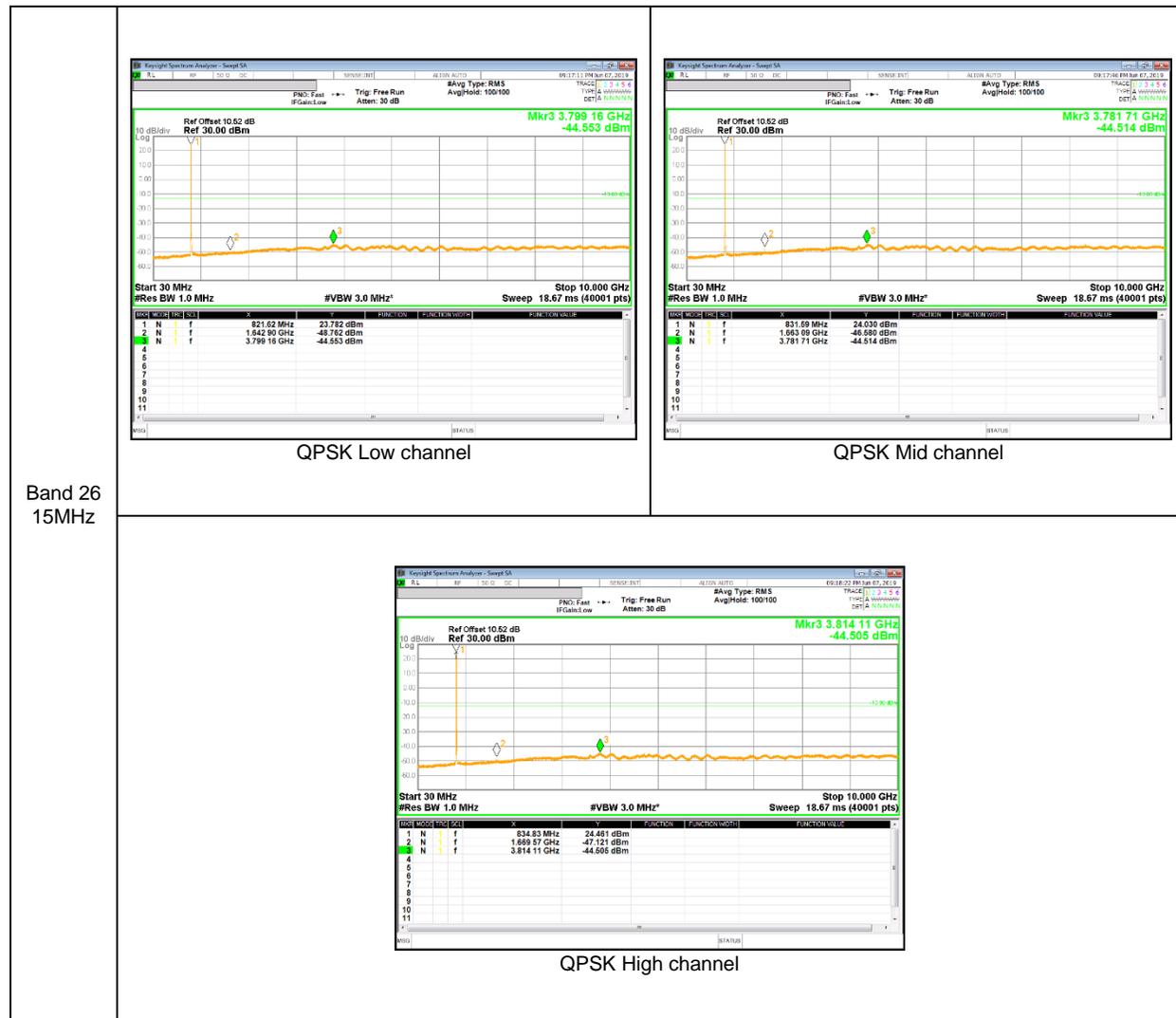
**LTE Band 13**



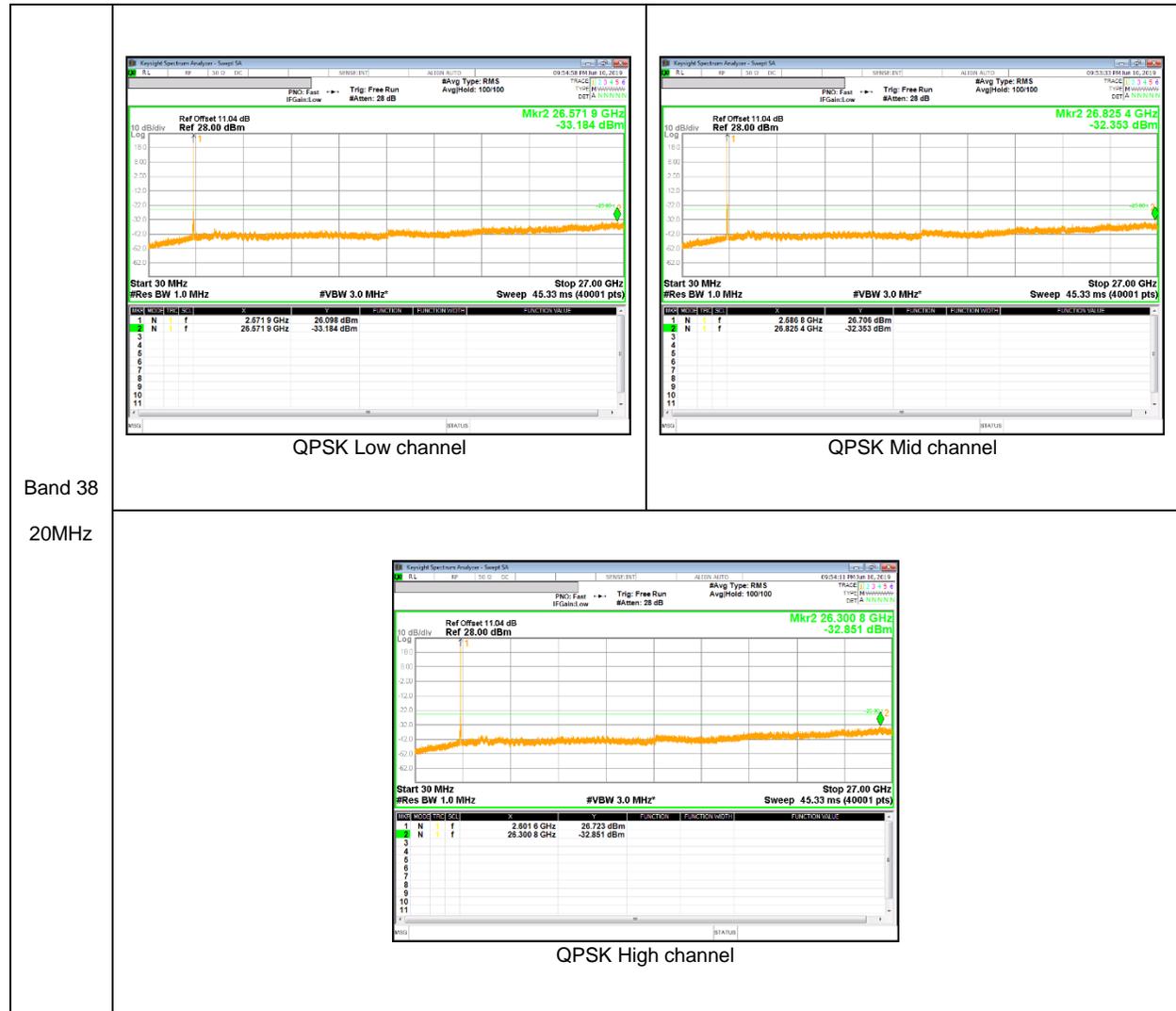
**LTE Band 25**



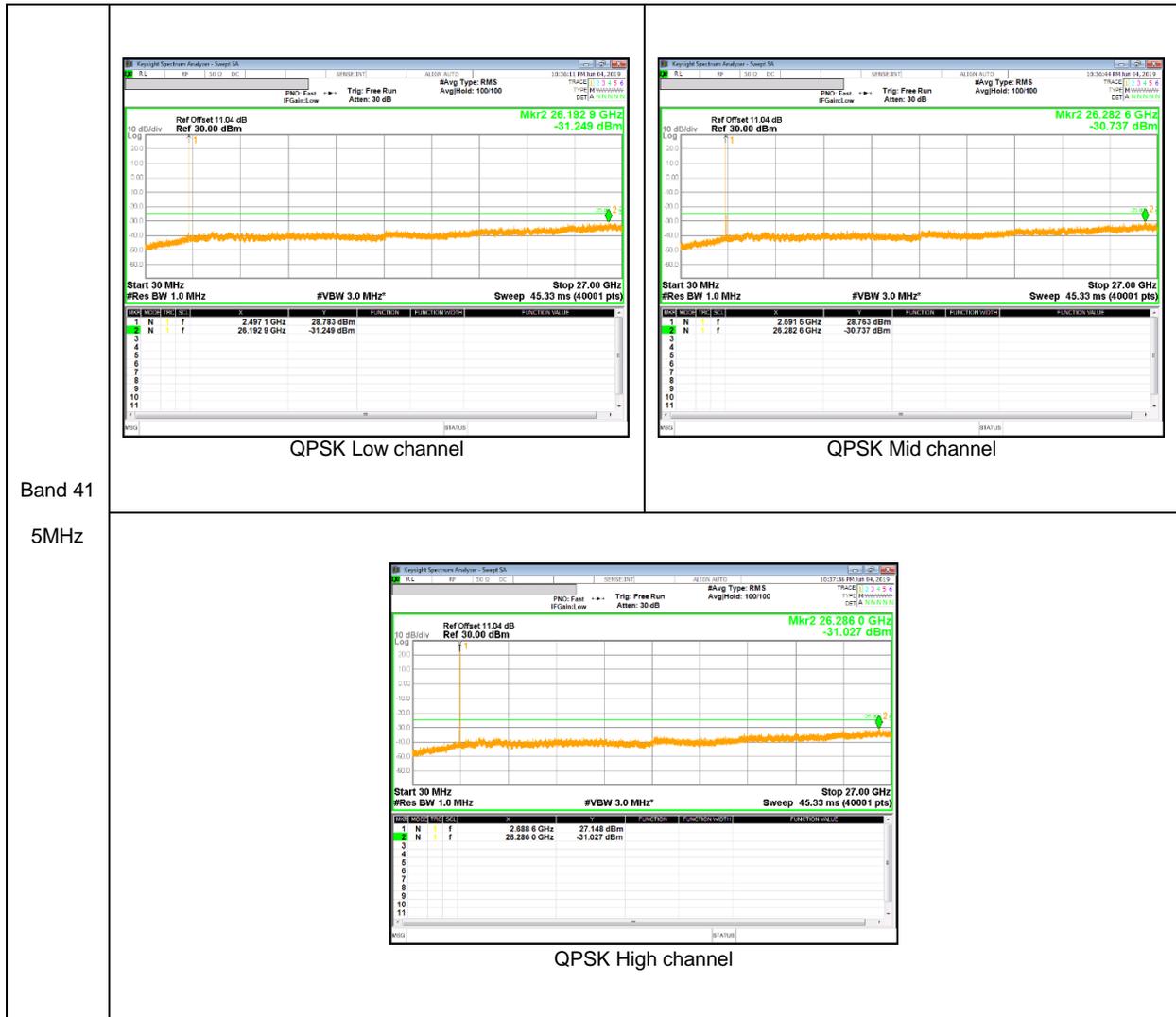
**LTE Band 26**



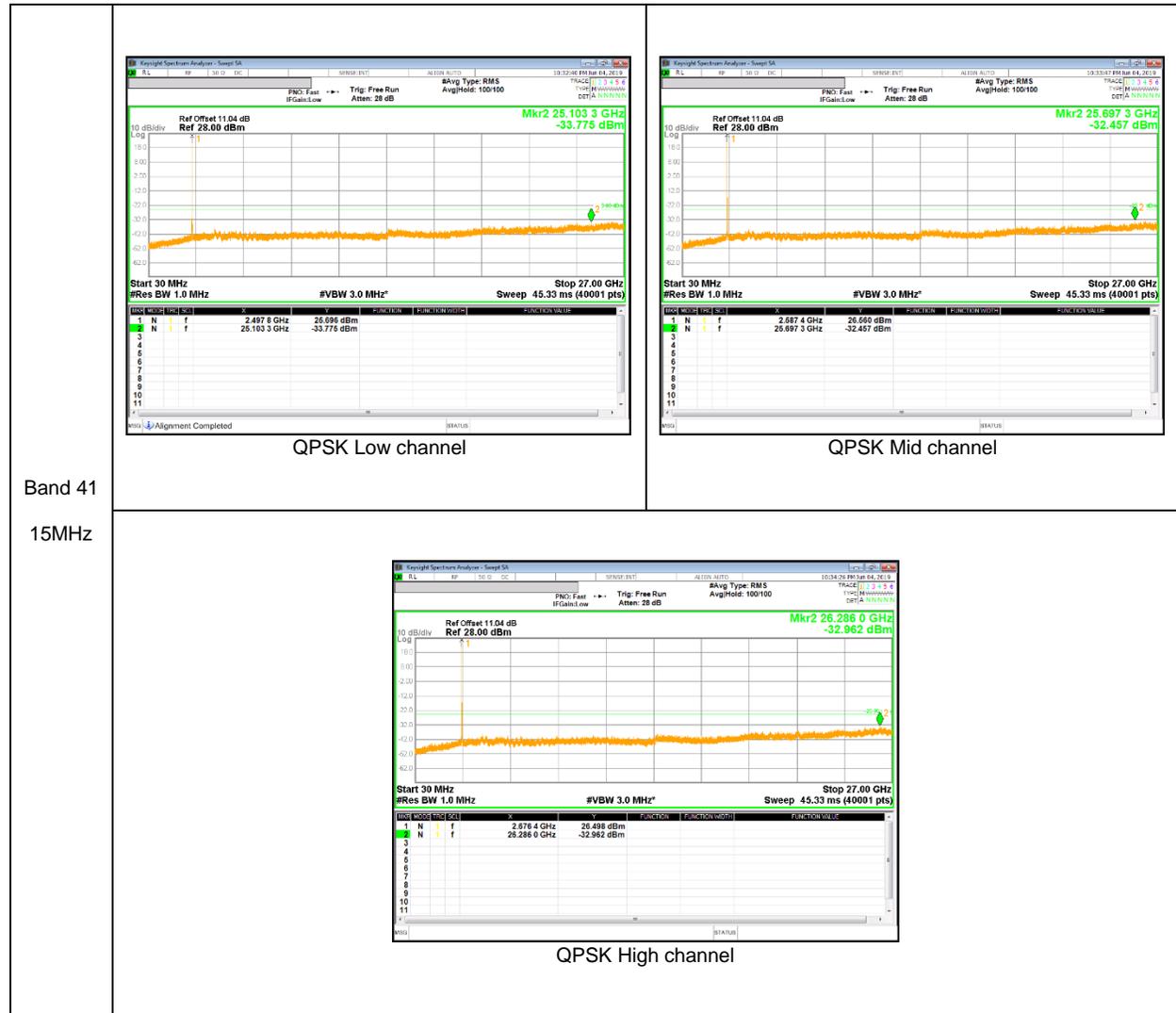
**LTE Band 38**



**LTE Band 41(PC2)**



**LTE Band 41(PC3)**



**LTE Band 66**



Band 66  
 20MHz

**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 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, maximum tune-up limit of LTE Band 25 is higher than LTE Band 2 and both LTE Band 25 and LTE Band 2 channel bandwidth are same.

## 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  $\pm 2.5$  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.

§90.213 - The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  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 @ 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]		
3.80	50	824.19998525	0.001	848.79998713	0.004	2.5	
3.80	40	824.19998932	-0.004	848.79998609	0.005	2.5	
3.80	30	824.19999100	-0.006	848.79998656	0.004	2.5	
<b>3.80</b>	<b>20</b>	<b>824.19998594</b>	<b>0.000</b>	<b>848.79999021</b>	<b>0.000</b>	<b>2.5</b>	
3.80	10	824.19998279	0.004	848.79998187	0.010	2.5	
3.80	0	824.19998012	0.007	848.79998332	0.008	2.5	
3.80	-10	824.19998981	-0.005	848.79998097	0.011	2.5	
3.80	-20	824.19998467	0.002	848.79998150	0.010	2.5	
3.80	-30	824.19998761	-0.002	848.79998543	0.006	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]		
<b>3.80</b>	<b>20</b>	<b>824.19998594</b>	<b>0</b>	<b>848.79999021</b>	<b>0</b>	<b>2.5</b>	
4.30	20	824.19998299	0.004	848.79998809	0.002	2.5	
3.60	20	824.19998866	-0.003	848.79999071	-0.001	2.5	

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

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0805	1909.9209		
Extreme (50C)		1850.0805	1909.9209	-28.6	-0.015
Extreme (40C)		1850.0805	1909.9209	-26.5	-0.014
Extreme (30C)		1850.0805	1909.9209	-21.7	-0.012
Extreme (10C)		1850.0805	1909.9209	-28.8	-0.015
Extreme (0C)		1850.0805	1909.9209	-22.1	-0.012
Extreme (-10C)		1850.0805	1909.9209	-19.6	-0.010
Extreme (-20C)		1850.0805	1909.9209	-19.3	-0.010
Extreme (-30C)		1850.0805	1909.9209	-27.2	-0.014
20C	15%	1850.0805	1909.9209	-28.6	-0.015
	-15%	1850.0805	1909.9209	-28.2	-0.015
	End Point	1850.0805	1909.9209	-23.6	-0.013

**WCDMA Band 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		Limit [ppm]	
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.80	50	826.39998962	-0.007	846.59998999	-0.008	2.5	
3.80	40	826.39998256	0.002	846.59998498	-0.002	2.5	
3.80	30	826.39998747	-0.004	846.59998559	-0.003	2.5	
<b>3.80</b>	<b>20</b>	<b>826.39998399</b>	<b>0.000</b>	<b>846.59998287</b>	<b>0.000</b>	<b>2.5</b>	
3.80	10	826.39998853	-0.005	846.59998544	-0.003	2.5	
3.80	0	826.39998361	0.000	846.59998366	-0.001	2.5	
3.80	-10	826.39998119	0.003	846.59998544	-0.003	2.5	
3.80	-20	826.39999058	-0.008	846.59998808	-0.006	2.5	
3.80	-30	826.39998425	0.000	846.59998545	-0.003	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		Limit [ppm]	
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.80	20	826.39998399	0	846.59998287	0	2.5	
4.30	20	826.39999018	-0.007	846.59999034	-0.009	2.5	
3.60	20	826.39998441	-0.001	846.59998601	-0.004	2.5	

**WCDMA Band 2 (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	1850.3177	1909.6874		
Extreme (50C)		1850.3177	1909.6874	-24.1	-0.013
Extreme (40C)		1850.3177	1909.6874	-19.1	-0.010
Extreme (30C)		1850.3177	1909.6874	-24.3	-0.013
Extreme (10C)		1850.3177	1909.6874	-21.0	-0.011
Extreme (0C)		1850.3177	1909.6874	-23.0	-0.012
Extreme (-10C)		1850.3177	1909.6874	-24.5	-0.013
Extreme (-20C)		1850.3177	1909.6874	-23.8	-0.013
Extreme (-30C)		1850.3177	1909.6874	-24.6	-0.013
20C		15%	1850.3177	1909.6874	-20.2
	-15%	1850.3177	1909.6874	-25.0	-0.013
	End Point	1850.3177	1909.6874	-27.0	-0.014

**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	1710.3113	1754.6881		
Extreme (50C)		1710.3113	1754.6880	-26.9	-0.016
Extreme (40C)		1710.3113	1754.6880	-28.4	-0.016
Extreme (30C)		1710.3113	1754.6880	-21.1	-0.012
Extreme (10C)		1710.3113	1754.6880	-26.4	-0.015
Extreme (0C)		1710.3113	1754.6880	-23.2	-0.013
Extreme (-10C)		1710.3113	1754.6880	-22.1	-0.013
Extreme (-20C)		1710.3113	1754.6880	-25.4	-0.015
Extreme (-30C)		1710.3113	1754.6880	-25.6	-0.015
20C		15%	1710.3113	1754.6880	-29.6
	-15%	1710.3113	1754.6880	-29.9	-0.017
	End Point	1710.3113	1754.6880	-21.8	-0.013

**LTE Band 5 (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]	
3.80	50	824.69998661	-0.006	848.29998331	-0.004	2.5
3.80	40	824.69998300	-0.001	848.29999083	-0.013	2.5
3.80	30	824.69998544	-0.004	848.29998678	-0.008	2.5
<b>3.80</b>	<b>20</b>	<b>824.69998185</b>	<b>0.000</b>	<b>848.29998020</b>	<b>0.000</b>	<b>2.5</b>
3.80	10	824.69998693	-0.006	848.29998479	-0.005	2.5
3.80	0	824.69998029	0.002	848.29998003	0.000	2.5
3.80	-10	824.69998387	-0.002	848.29999048	-0.012	2.5
3.80	-20	824.69998977	-0.010	848.29998886	-0.010	2.5
3.80	-30	824.69998937	-0.009	848.29998548	-0.006	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]	
3.80	20	824.69998185	0	848.29998020	0	2.5
4.30	20	824.69998073	0.001	848.29998711	-0.008	2.5
3.60	20	824.69998776	-0.007	848.29998057	0.000	2.5

**LTE Band 7 (16QAM)**

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2500.2504	2569.7523		
Extreme (50C)		2500.2504	2569.7523	-32.5	-0.013
Extreme (40C)		2500.2504	2569.7523	-28.4	-0.011
Extreme (30C)		2500.2504	2569.7523	-24.9	-0.010
Extreme (10C)		2500.2504	2569.7523	-25.0	-0.010
Extreme (0C)		2500.2504	2569.7523	-34.3	-0.014
Extreme (-10C)		2500.2504	2569.7523	-28.5	-0.011
Extreme (-20C)		2500.2504	2569.7523	-32.1	-0.013
Extreme (-30C)		2500.2504	2569.7523	-32.3	-0.013
20C		15%	2500.2504	2569.7523	-32.1
	-15%	2500.2504	2569.7523	-31.4	-0.012
	End Point	2500.2504	2569.7523	-27.1	-0.011

**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	699.1545	715.8442		
Extreme (50C)		699.1545	715.8441	-13.5	-0.019
Extreme (40C)		699.1545	715.8441	-11.1	-0.016
Extreme (30C)		699.1545	715.8441	-11.9	-0.017
Extreme (10C)		699.1545	715.8441	-18.8	-0.027
Extreme (0C)		699.1545	715.8441	-16.1	-0.023
Extreme (-10C)		699.1545	715.8441	-16.9	-0.024
Extreme (-20C)		699.1545	715.8441	-16.3	-0.023
Extreme (-30C)		699.1545	715.8441	-17.9	-0.025
20C		15%	699.1545	715.8441	-14.0
	-15%	699.1545	715.8441	-16.0	-0.023
	End Point	699.1545	715.8441	-9.5	-0.013

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

Limit		777	787	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	777.2486	786.7534		
Extreme (50C)		777.2485	786.7533	-9.3	-0.012
Extreme (40C)		777.2485	786.7533	-14.8	-0.019
Extreme (30C)		777.2485	786.7533	-13.0	-0.017
Extreme (10C)		777.2485	786.7533	-16.6	-0.021
Extreme (0C)		777.2485	786.7533	-17.4	-0.022
Extreme (-10C)		777.2485	786.7533	-19.1	-0.024
Extreme (-20C)		777.2485	786.7533	-15.8	-0.020
Extreme (-30C)		777.2485	786.7533	-18.5	-0.024
20C		15%	777.2485	786.7533	-19.9
	-15%	777.2485	786.7533	-19.7	-0.025
	End Point	777.2485	786.7533	-10.5	-0.013

**LTE Band 25 (16QAM)**

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.1535	1914.8436		
Extreme (50C)		1850.1534	1914.8435	-20.5	-0.011
Extreme (40C)		1850.1534	1914.8435	-19.6	-0.010
Extreme (30C)		1850.1534	1914.8435	-20.1	-0.011
Extreme (10C)		1850.1534	1914.8435	-25.8	-0.014
Extreme (0C)		1850.1534	1914.8435	-26.9	-0.014
Extreme (-10C)		1850.1534	1914.8435	-19.1	-0.010
Extreme (-20C)		1850.1534	1914.8435	-22.5	-0.012
Extreme (-30C)		1850.1534	1914.8435	-25.1	-0.013
20C		15%	1850.1534	1914.8435	-28.9
	-15%	1850.1534	1914.8435	-25.0	-0.013
	End Point	1850.1534	1914.8435	-25.1	-0.013

**LTE Band 26**

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2036.750	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]		
3.80	50	814.69998257	0.007	848.29998762	-0.004	2.5	
3.80	40	814.69998235	0.007	848.29999072	-0.008	2.5	
3.80	30	814.69999027	-0.003	848.29998530	-0.002	2.5	
<b>3.80</b>	<b>20</b>	<b>814.69998804</b>	<b>0.000</b>	<b>848.29998387</b>	<b>0.000</b>	<b>2.5</b>	
3.80	10	814.69998513	0.004	848.29998998	-0.007	2.5	
3.80	0	814.69998109	0.009	848.29998757	-0.004	2.5	
3.80	-10	814.69998159	0.008	848.29998868	-0.006	2.5	
3.80	-20	814.69998315	0.006	848.29998601	-0.003	2.5	
3.80	-30	814.69998489	0.004	848.29998049	0.004	2.5	

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2036.750	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]		
3.80	20	814.69998804	0	848.29998387	0	2.5	
4.30	20	814.69998084	0.009	848.29999063	-0.008	2.5	
3.60	20	814.69998113	0.008	848.29998162	0.003	2.5	

**LTE Band 38(Lowest Frequency:16QAM / Highest Frequency: QPSK)**

Limit		2570	2620	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2570.2466	2619.7471		
Extreme (50C)		2570.2466	2619.7471	-25.5	-0.010
Extreme (40C)		2570.2466	2619.7471	-27.5	-0.011
Extreme (30C)		2570.2466	2619.7471	-34.7	-0.013
Extreme (10C)		2570.2466	2619.7471	-28.4	-0.011
Extreme (0C)		2570.2466	2619.7471	-33.3	-0.013
Extreme (-10C)		2570.2466	2619.7471	-30.4	-0.012
Extreme (-20C)		2570.2466	2619.7471	-33.4	-0.013
Extreme (-30C)		2570.2466	2619.7471	-29.3	-0.011
20C	15%	2570.2466	2619.7471	-25.6	-0.010
	-15%	2570.2466	2619.7471	-28.1	-0.011
	End Point	2570.2466	2619.7471	-28.7	-0.011

**LTE Band 41 PC2 (16QAM)**

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2496.2524	2689.7491		
Extreme (50C)		2496.2523	2689.7490	-28.6	-0.011
Extreme (40C)		2496.2523	2689.7490	-32.1	-0.012
Extreme (30C)		2496.2523	2689.7490	-29.2	-0.011
Extreme (10C)		2496.2523	2689.7490	-32.2	-0.012
Extreme (0C)		2496.2523	2689.7490	-31.1	-0.012
Extreme (-10C)		2496.2523	2689.7490	-25.1	-0.010
Extreme (-20C)		2496.2523	2689.7490	-26.6	-0.010
Extreme (-30C)		2496.2523	2689.7490	-33.8	-0.013
20C		15%	2496.2523	2689.7490	-29.1
	-15%	2496.2523	2689.7490	-31.4	-0.012
	End Point	2496.2523	2689.7490	-34.5	-0.013

**LTE Band 41 PC3 (Lowest Frequency:16QAM / Highest Frequency: 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	2496.2509	2689.7489		
Extreme (50C)		2496.2509	2689.7488	-32.3	-0.012
Extreme (40C)		2496.2509	2689.7488	-27.2	-0.010
Extreme (30C)		2496.2509	2689.7488	-29.6	-0.011
Extreme (10C)		2496.2509	2689.7488	-26.1	-0.010
Extreme (0C)		2496.2509	2689.7488	-24.2	-0.009
Extreme (-10C)		2496.2509	2689.7488	-28.0	-0.011
Extreme (-20C)		2496.2509	2689.7488	-26.3	-0.010
Extreme (-30C)		2496.2509	2689.7488	-30.5	-0.012
20C		15%	2496.2509	2689.7488	-33.7
	-15%	2496.2509	2689.7488	-25.6	-0.010
	End Point	2496.2509	2689.7488	-30.0	-0.012

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

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.1551	1779.8444		
Extreme (50C)		1710.1550	1779.8443	-23.6	-0.014
Extreme (40C)		1710.1550	1779.8443	-25.5	-0.015
Extreme (30C)		1710.1550	1779.8443	-29.0	-0.017
Extreme (10C)		1710.1550	1779.8443	-23.4	-0.013
Extreme (0C)		1710.1550	1779.8443	-27.3	-0.016
Extreme (-10C)		1710.1550	1779.8443	-24.8	-0.014
Extreme (-20C)		1710.1550	1779.8443	-28.8	-0.016
Extreme (-30C)		1710.1550	1779.8443	-23.9	-0.014
20C		15%	1710.1550	1779.8443	-26.3
	-15%	1710.1550	1779.8443	-23.4	-0.013
	End Point	1710.1550	1779.8443	-25.7	-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.

**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, maximum tune-up limit of LTE Band 25 is higher than LTE Band 2 and both LTE Band 25 and LTE Band 2 channel bandwidth are same.

## 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	26.50	446.68
		661	836.6	27.18	522.40
		810	848.8	28.20	660.69
	EGPRS	512	824.2	19.47	88.51
		661	836.6	20.49	111.94
		810	848.8	21.53	142.23
GSM1900	GPRS	512	1850.2	28.32	679.20
		661	1880	31.88	1541.70
		810	1909.8	29.30	851.14
	EGPRS	512	1850.2	23.54	225.94
		661	1880	27.70	588.84
		810	1909.8	25.13	325.84

#### WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	<b>17.88</b>	61.38
		4183	836.6	17.74	<b>59.43</b>
		4233	846.6	17.46	55.72
	HSDPA	4132	826.4	15.25	33.50
		4183	836.6	15.37	<b>34.43</b>
		4233	846.6	<b>15.41</b>	34.75
Band 4	REL99	1312	1712.4	<b>23.54</b>	225.94
		1413	1732.6	22.03	159.59
		1513	1752.6	22.15	164.06
	HSDPA	1312	1712.4	<b>23.57</b>	<b>227.51</b>
		1413	1732.6	22.25	167.88
		1513	1752.6	22.31	170.22
Band 2	REL99	9262	1852.4	20.15	103.51
		9400	1880.0	<b>21.61</b>	<b>144.88</b>
		9538	1907.6	20.51	112.46
	HSDPA	9262	1852.4	19.45	88.10
		9400	1880.0	<b>21.05</b>	<b>127.35</b>
		9538	1907.6	19.93	98.40

**LTE Band 5**

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 5	10	QPSK	1 / 0	829.0	<b>17.42</b>	<b>55.21</b>
			1 / 0	836.5	17.13	51.64
			1 / 0	844.0	17.24	52.97
		16QAM	1 / 0	829.0	<b>14.79</b>	<b>30.13</b>
			1 / 0	836.5	14.42	27.67
			1 / 0	844.0	14.40	27.54
	5	QPSK	1 / 12	826.5	17.03	50.47
			1 / 12	836.5	16.94	49.43
			1 / 0	846.5	<b>17.26</b>	<b>53.21</b>
		16QAM	1 / 24	826.5	<b>14.57</b>	<b>28.64</b>
			1 / 12	836.5	14.22	26.42
			1 / 0	846.5	14.39	27.48
	3	QPSK	1 / 8	825.5	17.15	51.88
			1 / 0	836.5	<b>17.19</b>	<b>52.36</b>
			1 / 0	847.5	17.15	51.88
		16QAM	1 / 8	825.5	14.55	28.51
			1 / 0	836.5	14.68	29.38
			1 / 8	847.5	<b>14.74</b>	<b>29.79</b>
	1.4	QPSK	1 / 3	824.7	16.82	48.08
			1 / 0	836.5	<b>17.40</b>	<b>54.95</b>
			1 / 3	848.3	17.29	53.58
		16QAM	1 / 3	824.7	14.29	26.85
			1 / 0	836.5	<b>14.59</b>	<b>28.77</b>
			1 / 0	848.3	<b>14.59</b>	<b>28.77</b>

**LTE Band 7**

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 7	20	QPSK	1 / 0	2510.0	21.92	155.60
			1 / 0	2535.0	21.84	152.76
			1 / 99	2560.0	<b>22.09</b>	161.81
		16QAM	1 / 0	2510.0	19.30	85.11
			1 / 0	2535.0	19.28	84.72
			1 / 0	2560.0	<b>20.66</b>	116.41
	15	QPSK	1 / 0	2507.5	21.49	140.93
			1 / 0	2535.0	22.06	160.69
			1 / 0	2562.5	<b>22.16</b>	<b>164.44</b>
		16QAM	1 / 37	2507.5	19.08	80.91
			1 / 0	2535.0	19.71	93.54
			1 / 37	2562.5	<b>19.97</b>	99.31
	10	QPSK	1 / 0	2505.0	21.76	149.97
			1 / 0	2535.0	21.98	157.76
			1 / 49	2565.0	<b>22.09</b>	161.81
		16QAM	1 / 0	2505.0	19.13	81.85
			1 / 0	2535.0	19.52	89.54
			1 / 0	2565.0	<b>19.92</b>	98.17
	5	QPSK	1 / 12	2502.5	21.79	151.01
			1 / 24	2535.0	21.70	147.91
			1 / 24	2567.5	<b>21.92</b>	155.60
		16QAM	1 / 24	2502.5	19.04	80.17
			1 / 0	2535.0	19.39	86.90
			1 / 0	2567.5	<b>19.61</b>	91.41

**LTE Band 12**

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 12	10	QPSK	1 / 0	704.0	16.43	43.95
			1 / 0	707.5	<b>16.47</b>	44.36
			1 / 0	711.0	15.79	37.93
		16QAM	1 / 0	704.0	14.17	26.12
			1 / 0	707.5	<b>14.18</b>	26.18
			1 / 0	711.0	13.13	20.56
	5	QPSK	1 / 12	701.5	16.16	41.30
			1 / 24	707.5	<b>16.23</b>	41.98
			1 / 12	713.5	15.83	38.28
		16QAM	1 / 24	701.5	<b>13.90</b>	24.55
			1 / 0	707.5	13.89	24.49
			1 / 0	713.5	13.48	22.28
	3	QPSK	1 / 8	700.5	16.12	40.93
			1 / 0	707.5	<b>16.49</b>	<b>44.57</b>
			1 / 8	714.5	15.81	38.11
		16QAM	1 / 8	700.5	13.63	23.07
			1 / 8	707.5	<b>13.98</b>	25.00
			1 / 8	714.5	12.99	19.91
	1.4	QPSK	1 / 5	699.7	16.18	41.50
			1 / 3	707.5	<b>16.42</b>	43.85
			1 / 0	715.3	16.09	40.64
		16QAM	1 / 5	699.7	13.41	21.93
			1 / 5	707.5	<b>13.43</b>	22.03
			1 / 0	715.3	13.27	21.23

**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	16.88	48.75
		16QAM	1 / 0	782.0	14.23	26.49
	QPSK	1 / 12	779.5	<b>17.15</b>	<b>51.88</b>	
		1 / 24	782.0	16.84	48.31	
		1 / 0	784.5	16.48	44.46	
	5	16QAM	1 / 24	779.5	14.37	27.35
			1 / 12	782.0	<b>14.38</b>	27.42
		1 / 12	784.5	13.90	24.55	

**LTE Band 25**

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 25	20	QPSK	1 / 0	1860.0	19.38	86.70
			1 / 0	1882.5	20.43	110.41
			1 / 0	1905.0	19.95	98.86
		16QAM	1 / 0	1860.0	17.70	58.88
			1 / 0	1882.5	19.06	80.54
			1 / 0	1905.0	18.79	75.68
	15	QPSK	1 / 37	1857.5	18.91	77.80
			1 / 0	1882.5	20.38	109.14
			1 / 0	1907.5	18.91	77.80
		16QAM	1 / 37	1857.5	17.53	56.62
			1 / 0	1882.5	19.22	83.56
			1 / 37	1907.5	17.31	53.83
	10	QPSK	1 / 0	1855.0	19.49	88.92
			1 / 0	1882.5	20.59	114.55
			1 / 0	1910.0	18.75	74.99
		16QAM	1 / 0	1855.0	18.06	63.97
			1 / 0	1882.5	19.03	79.98
			1 / 0	1910.0	17.19	52.36
	5	QPSK	1 / 12	1852.5	19.14	82.04
			1 / 24	1882.5	21.09	128.53
			1 / 24	1912.5	18.74	74.82
		16QAM	1 / 24	1852.5	17.63	57.94
			1 / 12	1882.5	19.05	80.35
			1 / 12	1912.5	16.83	48.19
	3	QPSK	1 / 8	1851.5	19.15	82.22
			1 / 0	1882.5	20.85	121.62
			1 / 8	1913.5	18.61	72.61
		16QAM	1 / 8	1851.5	17.76	59.70
			1 / 0	1882.5	19.13	81.85
			1 / 8	1913.5	17.19	52.36
1.4	QPSK	1 / 0	1850.7	19.61	91.41	
		1 / 0	1882.5	<b>21.14</b>	<b>130.02</b>	
		1 / 0	1914.3	19.15	82.22	
	16QAM	1 / 0	1850.7	17.90	61.66	
		1 / 3	1882.5	<b>19.85</b>	96.61	
		1 / 5	1914.3	17.38	54.70	

**LTE Band 26**

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP/EIRP	
					[dBm]	[mW]
Band 26	15	QPSK	1 / 37	821.5	16.11	40.83
			1 / 37	831.5	<b>16.05</b>	40.27
			1 / 0	841.5	15.48	35.32
		16QAM	1 / 0	821.5	14.29	26.85
			1 / 37	831.5	13.68	23.33
			1 / 37	841.5	<b>13.88</b>	24.43
	10	QPSK	1 / 0	819.0	16.04	40.18
			1 / 25	829.0	<b>16.15</b>	41.21
			1 / 0	831.5	15.84	38.37
		16QAM	1 / 0	844.0	15.57	36.06
			1 / 0	819.0	14.09	25.64
			1 / 25	829.0	<b>14.22</b>	26.42
			1 / 0	831.5	13.54	22.59
			1 / 0	844.0	13.47	22.23
			1 / 0	844.0	13.47	22.23
	5	QPSK	1 / 24	816.5	16.06	40.36
			1 / 12	821.5	<b>16.27</b>	42.36
			1 / 12	826.5	<b>15.44</b>	34.99
			1 / 24	831.5	15.24	33.42
		16QAM	1 / 12	846.5	15.18	32.96
			1 / 0	816.5	<b>13.96</b>	24.89
			1 / 12	821.5	13.86	24.32
			1 / 24	826.5	<b>13.51</b>	22.44
			1 / 0	831.5	13.04	20.14
			1 / 0	846.5	13.38	21.78
	3	QPSK	1 / 0	815.5	15.92	39.08
			1 / 0	822.5	<b>16.11</b>	40.83
			1 / 0	825.5	<b>15.66</b>	36.81
			1 / 0	831.5	15.44	34.99
			1 / 8	847.5	15.40	34.67
		16QAM	1 / 14	815.5	13.92	24.66
			1 / 0	822.5	<b>14.18</b>	26.18
			1 / 14	825.5	<b>13.52</b>	22.49
			1 / 14	831.5	13.24	21.09
			1 / 0	847.5	13.30	21.38
	1.4	QPSK	1 / 5	814.7	<b>16.19</b>	41.59
			1 / 3	823.3	16.18	41.50
			1 / 0	824.7	15.57	36.06
			1 / 0	831.5	<b>15.64</b>	36.64
			1 / 3	848.3	15.63	36.56
		16QAM	1 / 5	814.7	<b>14.29</b>	26.85
			1 / 3	823.3	13.98	25.00
			1 / 0	824.7	<b>13.98</b>	25.00
			1 / 3	831.5	13.44	22.08
			1 / 3	831.5	13.44	22.08
			1 / 5	848.3	13.33	21.53

**LTE Band 38**

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 38	20	QPSK	1 / 0	2580.0	25.66	367.96
			1 / 0	2595.0	25.65	367.28
			1 / 0	2610.0	<b>25.77</b>	377.57
		16QAM	1 / 49	2580.0	24.69	294.44
			1 / 0	2595.0	<b>25.12</b>	325.09
			1 / 99	2610.0	24.83	304.09
	15	QPSK	1 / 0	2577.5	25.60	363.08
			1 / 0	2595.0	<b>26.23</b>	<b>419.76</b>
			1 / 0	2612.5	26.11	408.32
		16QAM	1 / 0	2577.5	24.59	287.74
			1 / 0	2595.0	<b>25.24</b>	334.20
			1 / 37	2612.5	25.15	327.34
	10	QPSK	1 / 0	2575.0	24.99	315.50
			1 / 0	2595.0	<b>25.32</b>	340.41
			1 / 0	2615.0	24.59	287.74
		16QAM	1 / 0	2575.0	23.96	248.89
			1 / 0	2595.0	<b>24.24</b>	265.46
			1 / 0	2615.0	23.58	228.03
	5	QPSK	1 / 0	2572.5	24.30	269.15
			1 / 0	2595.0	<b>25.59</b>	362.24
			1 / 0	2617.5	25.23	333.43
		16QAM	1 / 0	2572.5	23.38	217.77
			1 / 0	2595.0	<b>24.54</b>	284.45
			1 / 0	2617.5	24.53	283.79

**LTE Band 41(PC2)**

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 41	20	QPSK	1 / 99	2506.0	23.94	247.74
			1 / 0	2593.0	<b>26.39</b>	435.51
			1 / 0	2680.0	26.27	423.64
		16QAM	1 / 0	2506.0	23.73	236.05
			1 / 0	2593.0	<b>26.91</b>	490.91
			1 / 0	2680.0	25.94	392.64
	15	QPSK	1 / 0	2503.5	24.13	258.82
			1 / 0	2593.0	<b>27.16</b>	<b>520.00</b>
			1 / 37	2682.5	25.73	374.11
		16QAM	1 / 0	2503.5	23.97	249.46
			1 / 0	2593.0	<b>26.68</b>	465.59
			1 / 37	2682.5	25.61	363.92
	10	QPSK	1 / 25	2501.0	24.59	287.74
			1 / 0	2593.0	<b>26.59</b>	456.04
			1 / 0	2685.0	24.87	306.90
		16QAM	1 / 25	2501.0	24.82	303.39
			1 / 0	2593.0	<b>26.76</b>	474.24
			1 / 0	2685.0	24.79	301.30
	5	QPSK	1 / 0	2498.5	25.04	319.15
			1 / 0	2593.0	<b>27.01</b>	502.34
			1 / 12	2687.5	25.90	389.05
		16QAM	1 / 0	2498.5	24.04	253.51
			1 / 0	2593.0	<b>25.70</b>	371.54
			1 / 24	2687.5	24.75	298.54

**LTE Band 41(PC3)**

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 41	20	QPSK	1 / 99	2506.0	22.69	185.78
			1 / 0	2593.0	<b>24.85</b>	305.49
			1 / 0	2680.0	23.84	242.10
		16QAM	1 / 0	2506.0	22.10	162.18
			1 / 49	2593.0	<b>25.04</b>	319.15
			1 / 0	2680.0	24.54	284.45
	15	QPSK	1 / 0	2503.5	21.71	148.25
			1 / 0	2593.0	<b>24.83</b>	304.09
			1 / 0	2682.5	22.34	171.40
		16QAM	1 / 74	2503.5	21.59	144.21
			1 / 0	2593.0	<b>24.80</b>	302.00
			1 / 0	2682.5	22.34	171.40
	10	QPSK	1 / 0	2501.0	21.88	154.17
			1 / 0	2593.0	<b>25.25</b>	<b>334.97</b>
			1 / 0	2685.0	23.47	222.33
		16QAM	1 / 0	2501.0	21.97	157.40
			1 / 0	2593.0	<b>25.14</b>	326.59
			1 / 0	2685.0	23.50	223.87
	5	QPSK	1 / 0	2498.5	22.09	161.81
			1 / 0	2593.0	<b>25.05</b>	319.89
			1 / 0	2687.5	23.43	220.29
		16QAM	1 / 24	2498.5	21.87	153.82
			1 / 0	2593.0	<b>24.98</b>	314.77
			1 / 0	2687.5	23.40	218.78

**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 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, maximum tune-up limit of LTE Band 25 is higher than LTE Band 2 and both LTE Band 25 and LTE Band 2 channel bandwidth are same.

**LTE Band 66**

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 66	20	QPSK	1 / 0	1720.0	22.02	159.22
			1 / 0	1745.0	<b>22.92</b>	<b>195.88</b>
			1 / 0	1770.0	21.63	145.55
		16QAM	1 / 0	1720.0	19.48	88.72
			1 / 0	1745.0	<b>20.52</b>	112.72
			1 / 0	1770.0	19.62	91.62
	15	QPSK	1 / 37	1717.5	21.72	148.59
			1 / 0	1747.5	<b>22.42</b>	174.58
			1 / 37	1772.5	21.46	139.96
		16QAM	1 / 0	1717.5	19.59	90.99
			1 / 37	1747.5	<b>20.52</b>	112.72
			1 / 37	1772.5	19.03	79.98
	10	QPSK	1 / 0	1715.0	21.93	155.96
			1 / 0	1745.0	<b>22.23</b>	167.11
			1 / 0	1775.0	21.50	141.25
		16QAM	1 / 25	1715.0	19.91	97.95
			1 / 25	1745.0	<b>20.24</b>	105.68
			1 / 25	1775.0	19.56	90.36
	5	QPSK	1 / 12	1712.5	21.38	137.40
			1 / 24	1745.0	<b>22.16</b>	164.44
			1 / 12	1777.5	21.48	140.60
		16QAM	1 / 0	1712.5	19.68	92.90
			1 / 24	1745.0	<b>20.13</b>	103.04
			1 / 24	1777.5	19.61	91.41
	3	QPSK	1 / 8	1711.5	21.83	152.41
			1 / 0	1745.0	<b>22.52</b>	178.65
			1 / 8	1778.5	21.84	152.76
		16QAM	1 / 8	1711.5	19.71	93.54
			1 / 0	1745.0	<b>20.40</b>	109.65
			1 / 8	1778.5	19.84	96.38
	1.4	QPSK	1 / 0	1710.7	21.89	154.53
			1 / 0	1745.0	<b>22.54</b>	179.47
			1 / 0	1779.3	21.94	156.31
		16QAM	1 / 5	1710.7	19.71	93.54
			1 / 0	1745.0	<b>20.23</b>	105.44
			1 / 0	1779.3	19.81	95.72

### 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 #: 4789009800                  Date: 2019-05-31                  Test Engineer: 45585                  Configuration: EUT, Z-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, 8.5m 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 (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>824.20</td> <td>30.99</td> <td>V</td> <td>3.0</td> <td>-1.5</td> <td>26.50</td> <td>38.5</td> <td>-12.0</td> <td></td> </tr> <tr> <td>824.20</td> <td>23.79</td> <td>H</td> <td>3.0</td> <td>-1.5</td> <td>19.30</td> <td>38.5</td> <td>-19.2</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>836.60</td> <td>31.64</td> <td>V</td> <td>3.0</td> <td>-1.4</td> <td>27.18</td> <td>38.5</td> <td>-11.3</td> <td></td> </tr> <tr> <td>836.60</td> <td>23.47</td> <td>H</td> <td>3.0</td> <td>-1.4</td> <td>19.00</td> <td>38.5</td> <td>-19.5</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>848.80</td> <td>32.64</td> <td>V</td> <td>3.1</td> <td>-1.4</td> <td>28.20</td> <td>38.5</td> <td>-10.3</td> <td></td> </tr> <tr> <td>848.80</td> <td>24.01</td> <td>H</td> <td>3.1</td> <td>-1.4</td> <td>19.57</td> <td>38.5</td> <td>-18.9</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									824.20	30.99	V	3.0	-1.5	26.50	38.5	-12.0		824.20	23.79	H	3.0	-1.5	19.30	38.5	-19.2		Mid Ch									836.60	31.64	V	3.0	-1.4	27.18	38.5	-11.3		836.60	23.47	H	3.0	-1.4	19.00	38.5	-19.5		High Ch									848.80	32.64	V	3.1	-1.4	28.20	38.5	-10.3		848.80	24.01	H	3.1	-1.4	19.57	38.5	-18.9
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GSM850  EGPRS	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
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**GSM1900**

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**WCDMA Band 5**

WCDMA  Band 5 REL99	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																										
	Company: Samsung Project #: 4789009800 Date: 2019-05-31 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: Rel99 Band 5 Fundamentals  <u>Test Equipment:</u> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable																																																																																										
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**WCDMA Band 4**

WCDMA  Band 4 REL99	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4789009800 Date: 2019-06-03 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 1 Mode: Rel99 Band 4 Fundamentals  Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	<b>f</b>	<b>SG reading</b>	<b>Ant. Pol.</b>	<b>Cable Loss</b>	<b>Antenna Gain</b>	<b>EIRP</b>	<b>Limit</b>	<b>Delta</b>	<b>Notes</b>
	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1712.40	14.68	V	4.3	9.4	19.77	30.0	-10.2	
	1712.40	18.46	H	4.3	9.4	23.54	30.0	-6.5	
	Mid Ch								
	1732.60	14.41	V	4.3	9.5	19.55	30.0	-10.5	
	1732.60	16.90	H	4.3	9.5	22.03	30.0	-8.0	
	High Ch								
	1752.60	14.36	V	4.4	9.5	19.53	30.0	-10.5	
	1752.60	16.98	H	4.4	9.5	22.15	30.0	-7.8	
WCDMA  Band 4 HSDPA	UL Verification Services, Inc. High Frequency Substitution Measurement								
	Company: Samsung Project #: 4789009800 Date: 2019-06-03 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 1 Mode: HSDPA Band 4 Fundamentals  Test Equipment: Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	<b>f</b>	<b>SG reading</b>	<b>Ant. Pol.</b>	<b>Cable Loss</b>	<b>Antenna Gain</b>	<b>EIRP</b>	<b>Limit</b>	<b>Delta</b>	<b>Notes</b>
	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1712.40	14.76	V	4.3	9.4	19.85	30.0	-10.2	
	1712.40	18.49	H	4.3	9.4	23.57	30.0	-6.4	
	Mid Ch								
	1732.60	14.61	V	4.3	9.5	19.75	30.0	-10.3	
	1732.60	17.12	H	4.3	9.5	22.25	30.0	-7.7	
	High Ch								
	1752.60	14.42	V	4.4	9.5	19.59	30.0	-10.4	
	1752.60	17.14	H	4.4	9.5	22.31	30.0	-7.7	

**WCDMA Band 2**

WCDMA  Band 2 REL99	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																										
	Company: Samsung Project #: 4789009800 Date: 2019-06-14 Test Engineer: 45585 Configuration: EUT, Z-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], 8.5m SMA-type Cable																																																																																										
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**LTE Band 5**

LTE Band 5 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
	<b>Company:</b> Samsung																																																																																																	
	<b>Project #:</b> 4789009800																																																																																																	
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LTE Band 5 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
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836.50	11.32	V	3.0	-1.4	6.86	38.5	-31.6																																																																																											
836.50	18.88	H	3.0	-1.4	14.42	38.5	-24.1																																																																																											
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844.00	11.86	V	3.1	-1.4	7.41	38.5	-31.1																																																																																											
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LTE Band 5 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-06-14 Test Engineer: 45585 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, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	826.50	13.46	V	3.0	-1.5	8.98	38.5	-29.5	
	826.50	21.51	H	3.0	-1.5	17.03	38.5	-21.5	
	Mid Ch								
	836.50	14.05	V	3.0	-1.4	9.59	38.5	-28.9	
	836.50	21.40	H	3.0	-1.4	16.94	38.5	-21.6	
High Ch									
846.50	14.20	V	3.1	-1.4	9.75	38.5	-28.7		
846.50	21.71	H	3.1	-1.4	17.26	38.5	-21.2		
LTE Band 5 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-06-14 Test Engineer: 45585 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, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	826.50	10.97	V	3.0	-1.5	6.49	38.5	-32.0	
	826.50	19.05	H	3.0	-1.5	14.57	38.5	-23.9	
	Mid Ch								
	836.50	11.55	V	3.0	-1.4	7.09	38.5	-31.4	
	836.50	18.68	H	3.0	-1.4	14.22	38.5	-24.3	
High Ch									
846.50	11.49	V	3.1	-1.4	7.04	38.5	-31.5		
846.50	18.84	H	3.1	-1.4	14.39	38.5	-24.1		

LTE Band 5 3MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-06-14 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT / X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	825.50	13.38	V	3.0	-1.5	8.90	38.5	-29.6	
	825.50	21.63	H	3.0	-1.5	17.15	38.5	-21.4	
	Mid Ch								
	836.50	14.19	V	3.0	-1.4	9.73	38.5	-28.8	
	836.50	21.65	H	3.0	-1.4	17.19	38.5	-21.3	
High Ch									
847.50	14.19	V	3.1	-1.4	9.75	38.5	-28.8		
847.50	21.60	H	3.1	-1.4	17.15	38.5	-21.3		
LTE Band 5 3MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-06-14 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT / X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	825.50	10.80	V	3.0	-1.5	6.32	38.5	-32.2	
	825.50	19.03	H	3.0	-1.5	14.55	38.5	-24.0	
	Mid Ch								
	836.50	11.53	V	3.0	-1.4	7.07	38.5	-31.4	
	836.50	19.14	H	3.0	-1.4	14.68	38.5	-23.8	
High Ch									
847.50	11.82	V	3.1	-1.4	7.38	38.5	-31.1		
847.50	19.19	H	3.1	-1.4	14.74	38.5	-23.8		

LTE Band 5 1.4MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-06-14 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT / X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	13.35	V	3.0	-1.5	8.86	38.5	-29.6	
	824.70	21.31	H	3.0	-1.5	16.82	38.5	-21.7	
	Mid Ch								
	836.50	14.32	V	3.0	-1.4	9.86	38.5	-28.6	
	836.50	21.86	H	3.0	-1.4	17.40	38.5	-21.1	
High Ch									
848.30	14.48	V	3.1	-1.4	10.04	38.5	-28.5		
848.30	21.73	H	3.1	-1.4	17.29	38.5	-21.2		
LTE Band 5 1.4MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-06-14 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT / X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	824.70	10.83	V	3.0	-1.5	6.34	38.5	-32.2	
	824.70	18.78	H	3.0	-1.5	14.29	38.5	-24.2	
	Mid Ch								
	836.50	11.76	V	3.0	-1.4	7.30	38.5	-31.2	
	836.50	19.05	H	3.0	-1.4	14.59	38.5	-23.9	
High Ch									
848.30	11.87	V	3.1	-1.4	7.43	38.5	-31.1		
848.30	19.03	H	3.1	-1.4	14.59	38.5	-23.9		

**LTE Band 7**

LTE Band 7 20MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
	<b>Company:</b> Samsung																																																																																																	
	<b>Project #:</b> 4789009800																																																																																																	
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	<b>Mode:</b> LTE_QPSK Band 7 Fundamentals, 20MHz Bandwidth																																																																																																	
	<b>Test Equipment:</b>																																																																																																	
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	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-06-14 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_QPSK Band 7 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	<b>f</b>	<b>SG reading</b>	<b>Ant. Pol.</b>	<b>Cable Loss</b>	<b>Antenna Gain</b>	<b>EIRP</b>	<b>Limit</b>	<b>Delta</b>	<b>Notes</b>
	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	2502.50	12.72	V	5.2	10.1	17.56	33.0	-15.4	
	2502.50	16.95	H	5.2	10.1	21.79	33.0	-11.2	
	Mid Ch								
	2535.00	14.75	V	5.3	10.0	19.51	33.0	-13.5	
2535.00	16.93	H	5.3	10.0	21.70	33.0	-11.3		
High Ch									
2567.50	14.74	V	5.3	10.0	19.43	33.0	-13.6		
2567.50	17.23	H	5.3	10.0	21.92	33.0	-11.1		
LTE Band 7 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-06-14 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 7 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	<b>f</b>	<b>SG reading</b>	<b>Ant. Pol.</b>	<b>Cable Loss</b>	<b>Antenna Gain</b>	<b>EIRP</b>	<b>Limit</b>	<b>Delta</b>	<b>Notes</b>
	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	2502.50	10.55	V	5.2	10.1	15.39	33.0	-17.6	
	2502.50	14.20	H	5.2	10.1	19.04	33.0	-14.0	
	Mid Ch								
	2535.00	12.95	V	5.3	10.0	17.71	33.0	-15.3	
2535.00	14.62	H	5.3	10.0	19.39	33.0	-13.6		
High Ch									
2567.50	12.53	V	5.3	10.0	17.22	33.0	-15.8		
2567.50	14.92	H	5.3	10.0	19.61	33.0	-13.4		

**LTE Band 12**

LTE Band 12 10MHz QPSK	<p style="text-align: center;"><b>UL Verification Services, Inc.</b>  <b>High Frequency Substitution Measurement</b></p> <p>Company: Samsung                  Project #: 4789009800                  Date: 2019-05-21                  Test Engineer: 45585                  Configuration: EUT / X-Position                  Location: Chamber 1                  Mode: LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth</p> <p><u>Test Equipment:</u>                  Receiving: VULB9163-750, and Chamber 1 SMA Cables                  Substitution: Dipole 3121_DB4, 8.5m 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 (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>704.00</td> <td>13.95</td> <td>V</td> <td>2.8</td> <td>-1.6</td> <td>9.57</td> <td>34.8</td> <td>-25.2</td> <td></td> </tr> <tr> <td>704.00</td> <td>20.81</td> <td>H</td> <td>2.8</td> <td>-1.6</td> <td>16.43</td> <td>34.8</td> <td>-18.4</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>707.50</td> <td>13.77</td> <td>V</td> <td>2.8</td> <td>-1.6</td> <td>9.38</td> <td>34.8</td> <td>-25.4</td> <td></td> </tr> <tr> <td>707.50</td> <td>20.85</td> <td>H</td> <td>2.8</td> <td>-1.6</td> <td>16.47</td> <td>34.8</td> <td>-18.3</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>711.00</td> <td>12.72</td> <td>V</td> <td>2.8</td> <td>-1.6</td> <td>8.32</td> <td>34.8</td> <td>-26.5</td> <td></td> </tr> <tr> <td>711.00</td> <td>20.18</td> <td>H</td> <td>2.8</td> <td>-1.6</td> <td>15.79</td> <td>34.8</td> <td>-19.0</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									704.00	13.95	V	2.8	-1.6	9.57	34.8	-25.2		704.00	20.81	H	2.8	-1.6	16.43	34.8	-18.4		Mid Ch									707.50	13.77	V	2.8	-1.6	9.38	34.8	-25.4		707.50	20.85	H	2.8	-1.6	16.47	34.8	-18.3		High Ch									711.00	12.72	V	2.8	-1.6	8.32	34.8	-26.5		711.00	20.18	H	2.8	-1.6	15.79	34.8	-19.0	
	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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LTE Band 12 10MHz 16QAM	<p style="text-align: center;"><b>UL Verification Services, Inc.</b>  <b>High Frequency Substitution Measurement</b></p> <p>Company: Samsung                  Project #: 4789009800                  Date: 2019-05-21                  Test Engineer: 45585                  Configuration: EUT / X-Position                  Location: Chamber 1                  Mode: LTE_16QAM Band 12 Fundamentals, 10MHz Bandwidth</p> <p><u>Test Equipment:</u>                  Receiving: VULB9163-750, and Chamber 1 SMA Cables                  Substitution: Dipole 3121_DB4, 8.5m 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 (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>704.00</td> <td>11.76</td> <td>V</td> <td>2.8</td> <td>-1.6</td> <td>7.38</td> <td>34.8</td> <td>-27.4</td> <td></td> </tr> <tr> <td>704.00</td> <td>18.55</td> <td>H</td> <td>2.8</td> <td>-1.6</td> <td>14.17</td> <td>34.8</td> <td>-20.6</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>707.50</td> <td>11.03</td> <td>V</td> <td>2.8</td> <td>-1.6</td> <td>6.64</td> <td>34.8</td> <td>-28.2</td> <td></td> </tr> <tr> <td>707.50</td> <td>18.56</td> <td>H</td> <td>2.8</td> <td>-1.6</td> <td>14.18</td> <td>34.8</td> <td>-20.6</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>711.00</td> <td>10.04</td> <td>V</td> <td>2.8</td> <td>-1.6</td> <td>5.64</td> <td>34.8</td> <td>-29.2</td> <td></td> </tr> <tr> <td>711.00</td> <td>17.52</td> <td>H</td> <td>2.8</td> <td>-1.6</td> <td>13.13</td> <td>34.8</td> <td>-21.7</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									704.00	11.76	V	2.8	-1.6	7.38	34.8	-27.4		704.00	18.55	H	2.8	-1.6	14.17	34.8	-20.6		Mid Ch									707.50	11.03	V	2.8	-1.6	6.64	34.8	-28.2		707.50	18.56	H	2.8	-1.6	14.18	34.8	-20.6		High Ch									711.00	10.04	V	2.8	-1.6	5.64	34.8	-29.2		711.00	17.52	H	2.8	-1.6	13.13	34.8	-21.7	
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LTE Band 12 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 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, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	701.50	13.90	V	2.8	-1.6	9.52	34.8	-25.3	
	701.50	20.54	H	2.8	-1.6	16.16	34.8	-18.6	
	Mid Ch								
	707.50	13.09	V	2.8	-1.6	8.70	34.8	-26.1	
	707.50	20.61	H	2.8	-1.6	16.23	34.8	-18.6	
High Ch									
713.50	12.04	V	2.8	-1.6	7.64	34.8	-27.2		
713.50	20.23	H	2.8	-1.6	15.83	34.8	-19.0		
LTE Band 12 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 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, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	701.50	11.28	V	2.8	-1.6	6.90	34.8	-27.9	
	701.50	18.28	H	2.8	-1.6	13.90	34.8	-20.9	
	Mid Ch								
	707.50	11.17	V	2.8	-1.6	6.78	34.8	-28.0	
	707.50	18.27	H	2.8	-1.6	13.89	34.8	-20.9	
High Ch									
713.50	9.79	V	2.8	-1.6	5.39	34.8	-29.4		
713.50	17.88	H	2.8	-1.6	13.48	34.8	-21.3		

LTE Band 12 3MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-05-21 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT / X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 12 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	700.50	14.02	V	2.8	-1.6	9.64	34.8	-25.2	
	700.50	20.50	H	2.8	-1.6	16.12	34.8	-18.7	
	Mid Ch								
	707.50	13.46	V	2.8	-1.6	9.07	34.8	-25.7	
	707.50	20.87	H	2.8	-1.6	16.49	34.8	-18.3	
High Ch									
714.50	11.99	V	2.8	-1.6	7.60	34.8	-27.2		
714.50	20.21	H	2.8	-1.6	15.81	34.8	-19.0		
LTE Band 12 3MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-05-21 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT / X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 12 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	700.50	11.56	V	2.8	-1.6	7.18	34.8	-27.6	
	700.50	18.01	H	2.8	-1.6	13.63	34.8	-21.2	
	Mid Ch								
	707.50	10.75	V	2.8	-1.6	6.36	34.8	-28.4	
	707.50	18.36	H	2.8	-1.6	13.98	34.8	-20.8	
High Ch									
714.50	9.75	V	2.8	-1.6	5.36	34.8	-29.4		
714.50	17.39	H	2.8	-1.6	12.99	34.8	-21.8		

LTE Band 12 1.4MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 12 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	699.70	14.35	V	2.8	-1.6	9.97	34.8	-24.8	
	699.70	20.56	H	2.8	-1.6	16.18	34.8	-18.6	
	Mid Ch								
	707.50	13.68	V	2.8	-1.6	9.29	34.8	-25.5	
	707.50	20.80	H	2.8	-1.6	16.42	34.8	-18.4	
High Ch									
715.30	12.28	V	2.8	-1.6	7.88	34.8	-26.9		
715.30	20.49	H	2.8	-1.6	16.09	34.8	-18.7		
LTE Band 12 1.4MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 12 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	699.70	11.73	V	2.8	-1.6	7.35	34.8	-27.4	
	699.70	17.79	H	2.8	-1.6	13.41	34.8	-21.4	
	Mid Ch								
	707.50	10.46	V	2.8	-1.6	6.07	34.8	-28.7	
	707.50	17.81	H	2.8	-1.6	13.43	34.8	-21.4	
High Ch									
715.30	9.71	V	2.8	-1.6	5.31	34.8	-29.5		
715.30	17.67	H	2.8	-1.6	13.27	34.8	-21.5		

**LTE Band 13**

LTE Band 13 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-06-06 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 13 Fundamentals, 10MHz Bandwidth  <u>Test Equipment:</u> Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Mid Ch								
	782.00	21.38	V	2.9	-1.6	16.88	34.8	-17.9	
	782.00	7.90	H	2.9	-1.6	3.40	34.8	-31.4	
LTE Band 13 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-06-06 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 13 Fundamentals, 10MHz Bandwidth  <u>Test Equipment:</u> Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Mid Ch								
	782.00	18.73	V	2.9	-1.6	14.23	34.8	-20.5	
	782.00	5.72	H	2.9	-1.6	1.22	34.8	-33.6	

LTE Band 13 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-06-06 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 13 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	779.50	21.65	V	2.9	-1.6	17.15	34.8	-17.6	
	779.50	7.96	H	2.9	-1.6	3.46	34.8	-31.3	
	Mid Ch								
	782.00	21.34	V	2.9	-1.6	16.84	34.8	-17.9	
	782.00	8.36	H	2.9	-1.6	3.86	34.8	-30.9	
High Ch									
784.50	20.98	V	2.9	-1.6	16.48	34.8	-18.3		
784.50	8.37	H	2.9	-1.6	3.86	34.8	-30.9		
LTE Band 13 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-06-06 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 13 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	779.50	18.87	V	2.9	-1.6	14.37	34.8	-20.4	
	779.50	5.55	H	2.9	-1.6	1.05	34.8	-33.7	
	Mid Ch								
	782.00	18.88	V	2.9	-1.6	14.38	34.8	-20.4	
	782.00	5.61	H	2.9	-1.6	1.11	34.8	-33.7	
High Ch									
784.50	18.40	V	2.9	-1.6	13.90	34.8	-20.9		
784.50	5.60	H	2.9	-1.6	1.09	34.8	-33.7		

**LTE Band 25**

LTE Band 25 20MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
	<b>Company:</b> Samsung																																																																																																	
	<b>Project #:</b> 4789009800																																																																																																	
	<b>Date:</b> 2019-05-31																																																																																																	
	<b>Test Engineer:</b> 45585																																																																																																	
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1882.50	12.45	V	4.5	9.2	17.10	33.0	-15.9																																																																																											
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1905.00	11.69	V	4.6	9.0	16.11	33.0	-16.9																																																																																											
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f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
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1860.00	9.89	V	4.5	9.3	14.73	33.0	-18.3																																																																																											
1860.00	12.86	H	4.5	9.3	17.70	33.0	-15.3																																																																																											
Mid Ch																																																																																																		
1882.50	10.73	V	4.5	9.2	15.38	33.0	-17.6																																																																																											
1882.50	14.42	H	4.5	9.2	19.06	33.0	-13.9																																																																																											
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1905.00	9.95	V	4.6	9.0	14.37	33.0	-18.6																																																																																											
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LTE Band 25 15MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-31 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 25 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1857.50	10.61	V	4.5	9.4	15.47	33.0	-17.5	
	1857.50	14.05	H	4.5	9.4	18.91	33.0	-14.1	
	Mid Ch								
	1882.50	12.12	V	4.5	9.2	16.77	33.0	-16.2	
	1882.50	15.74	H	4.5	9.2	20.38	33.0	-12.6	
High Ch									
1907.50	12.30	V	4.6	9.0	16.69	33.0	-16.3		
1907.50	14.52	H	4.6	9.0	18.91	33.0	-14.1		
LTE Band 25 15MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-31 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 25 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1857.50	8.92	V	4.5	9.4	13.78	33.0	-19.2	
	1857.50	12.67	H	4.5	9.4	17.53	33.0	-15.5	
	Mid Ch								
	1882.50	10.70	V	4.5	9.2	15.35	33.0	-17.7	
	1882.50	14.58	H	4.5	9.2	19.22	33.0	-13.8	
High Ch									
1907.50	10.73	V	4.6	9.0	15.12	33.0	-17.9		
1907.50	12.92	H	4.6	9.0	17.31	33.0	-15.7		

LTE Band 25 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-31 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 25 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1855.00	8.62	V	4.5	9.4	13.50	33.0	-19.5	
	1855.00	14.61	H	4.5	9.4	19.49	33.0	-13.5	
	Mid Ch								
	1882.50	12.77	V	4.5	9.2	17.42	33.0	-15.6	
	1882.50	15.95	H	4.5	9.2	20.59	33.0	-12.4	
High Ch									
1910.00	12.17	V	4.6	8.9	16.52	33.0	-16.5		
1910.00	14.40	H	4.6	8.9	18.75	33.0	-14.2		
LTE Band 25 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-31 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 25 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1855.00	7.08	V	4.5	9.4	11.96	33.0	-21.0	
	1855.00	13.18	H	4.5	9.4	18.06	33.0	-14.9	
	Mid Ch								
	1882.50	11.04	V	4.5	9.2	15.69	33.0	-17.3	
	1882.50	14.39	H	4.5	9.2	19.03	33.0	-14.0	
High Ch									
1910.00	10.56	V	4.6	8.9	14.91	33.0	-18.1		
1910.00	12.84	H	4.6	8.9	17.19	33.0	-15.8		

LTE Band 25 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-31 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 25 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1852.50	8.86	V	4.5	9.4	13.76	33.0	-19.2	
	1852.50	14.24	H	4.5	9.4	19.14	33.0	-13.9	
	Mid Ch								
	1882.50	11.30	V	4.5	9.2	15.95	33.0	-17.1	
	1882.50	16.45	H	4.5	9.2	21.09	33.0	-11.9	
High Ch									
1912.50	10.80	V	4.6	8.9	15.12	33.0	-17.9		
1912.50	14.42	H	4.6	8.9	18.74	33.0	-14.3		
LTE Band 25 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-31 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 25 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1852.50	7.20	V	4.5	9.4	12.10	33.0	-20.9	
	1852.50	12.73	H	4.5	9.4	17.63	33.0	-15.4	
	Mid Ch								
	1882.50	9.52	V	4.5	9.2	14.17	33.0	-18.8	
	1882.50	14.41	H	4.5	9.2	19.05	33.0	-13.9	
High Ch									
1912.50	9.26	V	4.6	8.9	13.58	33.0	-19.4		
1912.50	12.51	H	4.6	8.9	16.83	33.0	-16.2		

LTE Band 25 3MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-31 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 25 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1851.50	8.26	V	4.5	9.4	13.17	33.0	-19.8	
	1851.50	14.24	H	4.5	9.4	19.15	33.0	-13.8	
	Mid Ch								
	1882.50	11.32	V	4.5	9.2	15.97	33.0	-17.0	
	1882.50	16.21	H	4.5	9.2	20.85	33.0	-12.1	
High Ch									
1913.50	12.34	V	4.6	8.9	16.65	33.0	-16.3		
1913.50	14.30	H	4.6	8.9	18.61	33.0	-14.4		
LTE Band 25 3MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-31 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 25 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1851.50	6.95	V	4.5	9.4	11.86	33.0	-21.1	
	1851.50	12.85	H	4.5	9.4	17.76	33.0	-15.2	
	Mid Ch								
	1882.50	9.89	V	4.5	9.2	14.54	33.0	-18.5	
	1882.50	14.49	H	4.5	9.2	19.13	33.0	-13.9	
High Ch									
1913.50	10.93	V	4.6	8.9	15.24	33.0	-17.8		
1913.50	12.88	H	4.6	8.9	17.19	33.0	-15.8		

LTE Band 25 1.4MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-31 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 25 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1850.70	9.04	V	4.5	9.4	13.96	33.0	-19.0	
	1850.70	14.69	H	4.5	9.4	19.61	33.0	-13.4	
	Mid Ch								
	1882.50	11.25	V	4.5	9.2	15.90	33.0	-17.1	
	1882.50	16.50	H	4.5	9.2	21.14	33.0	-11.9	
High Ch									
1914.30	10.79	V	4.6	8.9	15.09	33.0	-17.9		
1914.30	14.85	H	4.6	8.9	19.15	33.0	-13.9		
LTE Band 25 1.4MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-31 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 25 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1850.70	7.69	V	4.5	9.4	12.61	33.0	-20.4	
	1850.70	12.98	H	4.5	9.4	17.90	33.0	-15.1	
	Mid Ch								
	1882.50	9.37	V	4.5	9.2	14.02	33.0	-19.0	
	1882.50	15.21	H	4.5	9.2	19.85	33.0	-13.1	
High Ch									
1914.30	9.27	V	4.6	8.9	13.57	33.0	-19.4		
1914.30	13.08	H	4.6	8.9	17.38	33.0	-15.6		

**LTE Band 26**

LTE Band 26 15MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>									
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 Fundamentals, 15MHz Bandwidth									
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Mid Ch									
	831.50	13.79	V	3.0	-1.4	9.32	38.5	-29.2		
	831.50	20.52	H	3.0	-1.4	16.05	38.5	-22.5		
	High Ch									
	841.50	13.73	V	3.0	-1.4	9.27	38.5	-29.2		
	841.50	19.93	H	3.0	-1.4	15.48	38.5	-23.0		
<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>										
Company: Samsung Project #: 4789009800 Date: 2019-05-22 Test Engineer: 45585 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 Fundamentals, 15MHz Bandwidth										
<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable										
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		
Low Ch										
821.50	13.35	V	3.0	-1.5	8.85	50.0	-41.1	Part 90		
821.50	20.60	H	3.0	-1.5	16.11	50.0	-33.9	Part 90		

LTE Band 26 15MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-05-21 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 26 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Mid Ch								
	831.50	11.52	V	3.0	-1.4	7.05	38.5	-31.5	
	831.50	18.15	H	3.0	-1.4	13.68	38.5	-24.8	
	High Ch								
	841.50	11.54	V	3.0	-1.4	7.08	38.5	-31.4	
	841.50	18.33	H	3.0	-1.4	13.88	38.5	-24.6	
<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>									
<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-05-22 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 26 Fundamentals, 15MHz Bandwidth									
<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch									
821.50	11.28	V	3.0	-1.5	6.78	50.0	-43.2	Part 90	
821.50	18.78	H	3.0	-1.5	14.29	50.0	-35.7	Part 90	

UL Verification Services, Inc. High Frequency Substitution Measurement										
LTE Band 26 10MHz QPSK	Company:		Samsung							
	Project #:		4789009800							
	Date:		2019-05-21							
	Test Engineer:		45585							
	Configuration:		EUT / X-Position							
	Location:		Chamber 1							
	Mode:		LTE_QPSK Band 26 Fundamentals, 10MHz Bandwidth							
	<u>Test Equipment:</u>									
	Receiving: VULB9163-750, and Chamber 1 SMA Cables									
	Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		
Low Ch										
829.00	12.49	V	3.0	-1.5	8.01	38.5	-30.5			
829.00	20.63	H	3.0	-1.5	16.15	38.5	-22.4			
Mid Ch										
831.50	13.95	V	3.0	-1.4	9.48	38.5	-29.0			
831.50	20.31	H	3.0	-1.4	15.84	38.5	-22.7			
High Ch										
844.00	13.99	V	3.1	-1.4	9.54	38.5	-29.0			
844.00	20.02	H	3.1	-1.4	15.57	38.5	-22.9			
UL Verification Services, Inc. High Frequency Substitution Measurement										
Company:		Samsung								
Project #:		4789009800								
Date:		2019-05-22								
Test Engineer:		45585								
Configuration:		EUT, X-Position								
Location:		Chamber 1								
Mode:		LTE_QPSK Band 26 Fundamentals, 10MHz Bandwidth								
<u>Test Equipment:</u>										
Receiving: VULB9163-750, and Chamber 1 SMA Cables										
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable										
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		
Low Ch										
819.00	13.27	V	3.0	-1.5	8.77	50.0	-41.2	Part 90		
819.00	20.54	H	3.0	-1.5	16.04	50.0	-34.0	Part 90		