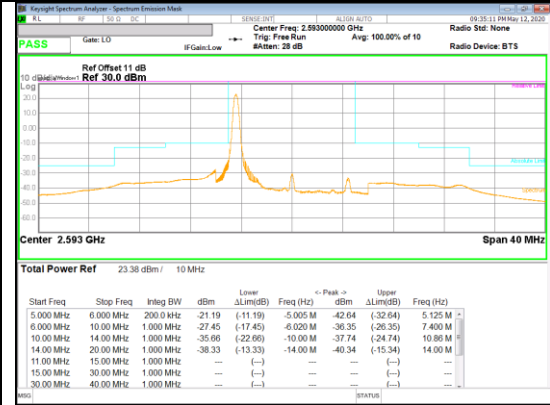


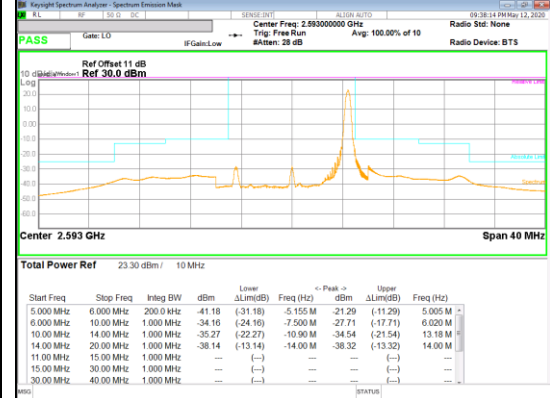
Band 41  
 10MHz  
 16QAM



16QAM Mid channel FRB



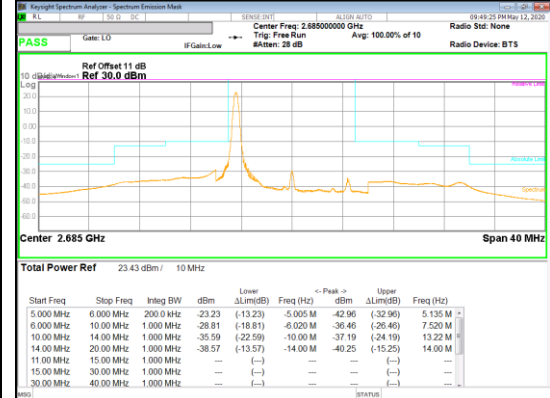
16QAM Mid channel 1RB\_Offset Low



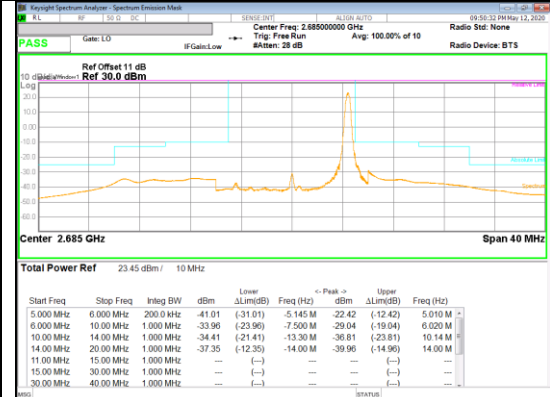
16QAM Mid channel 1RB\_Offset High



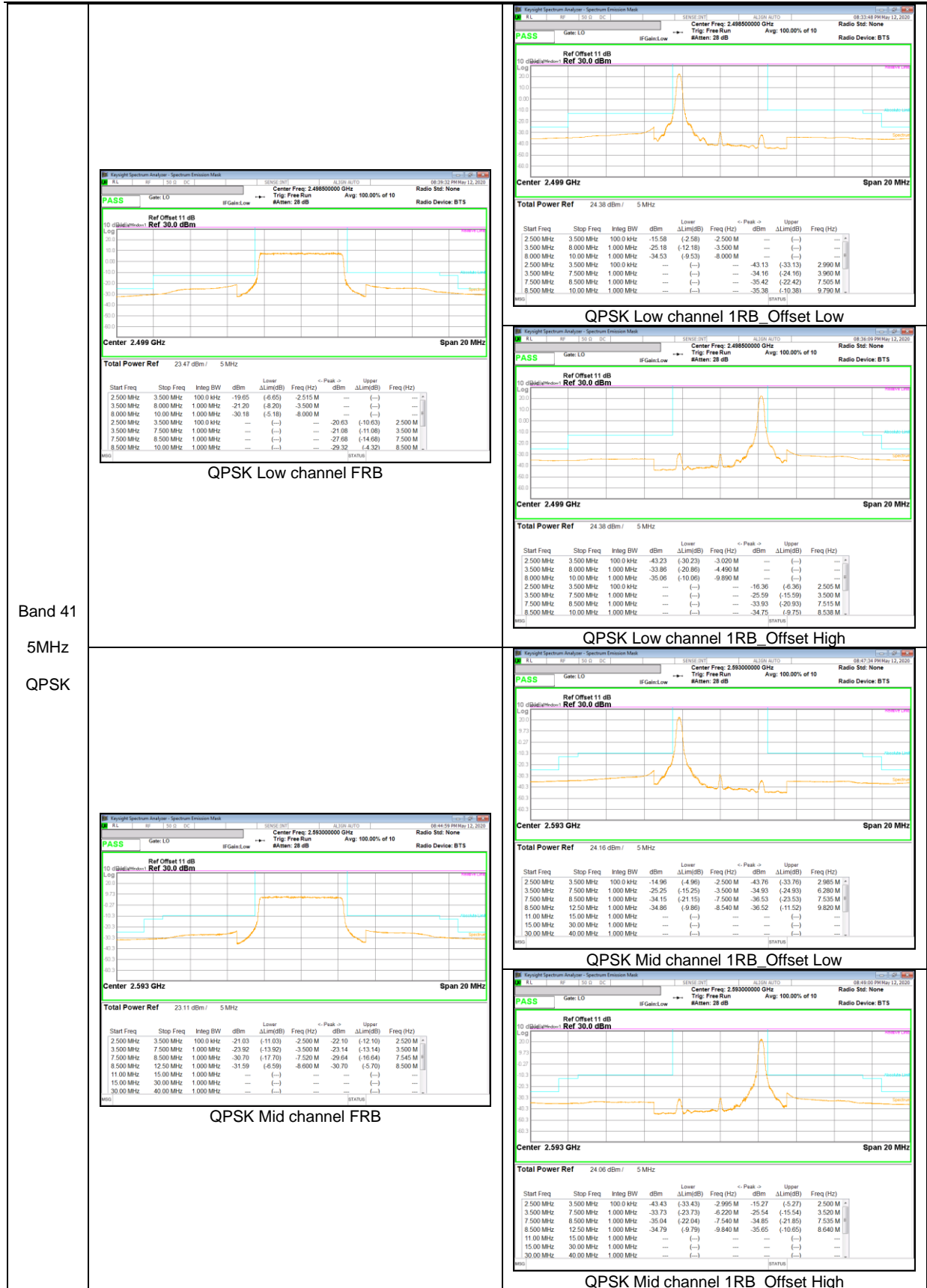
16QAM High channel FRB



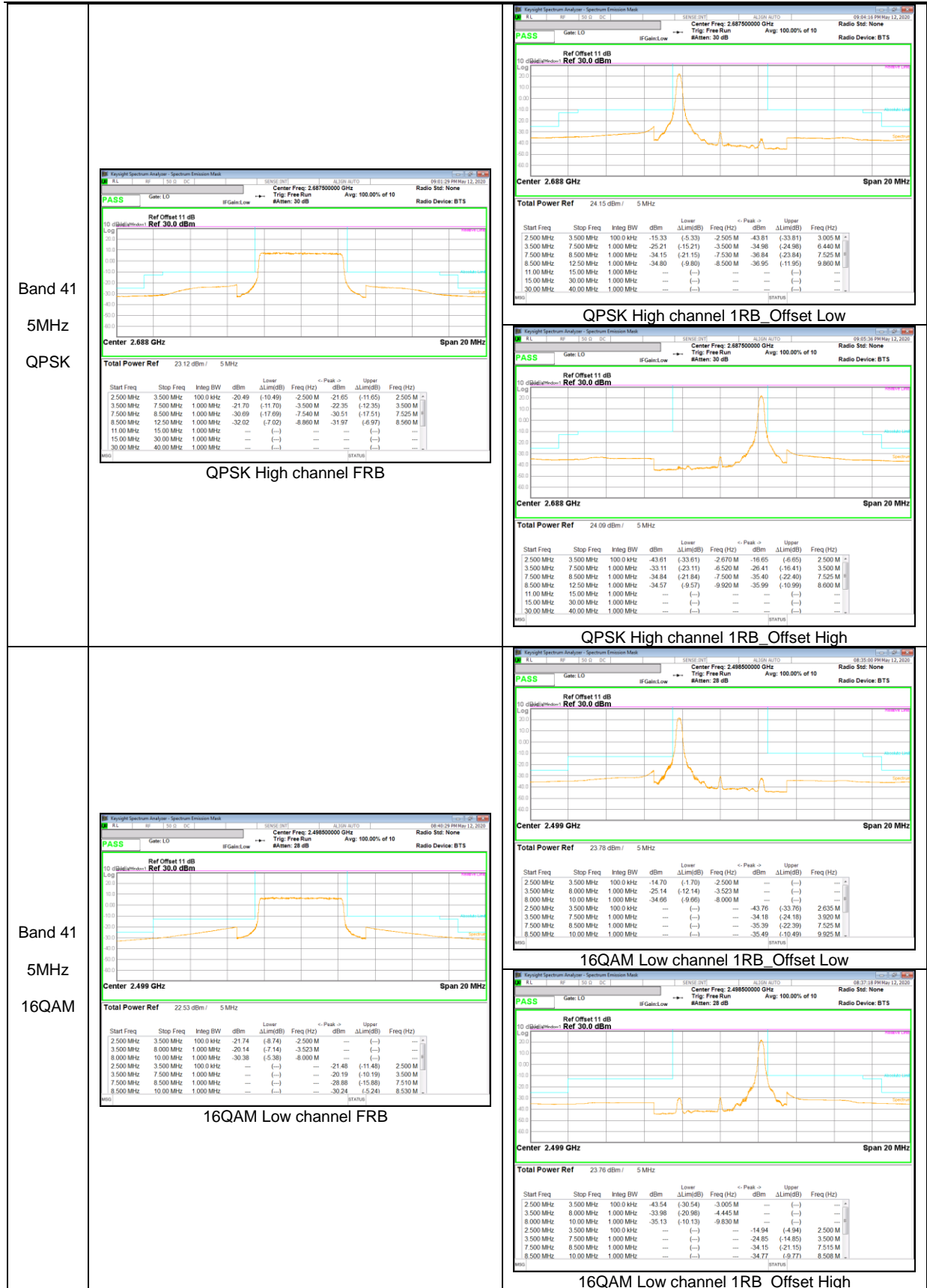
16QAM High channel 1RB\_Offset Low

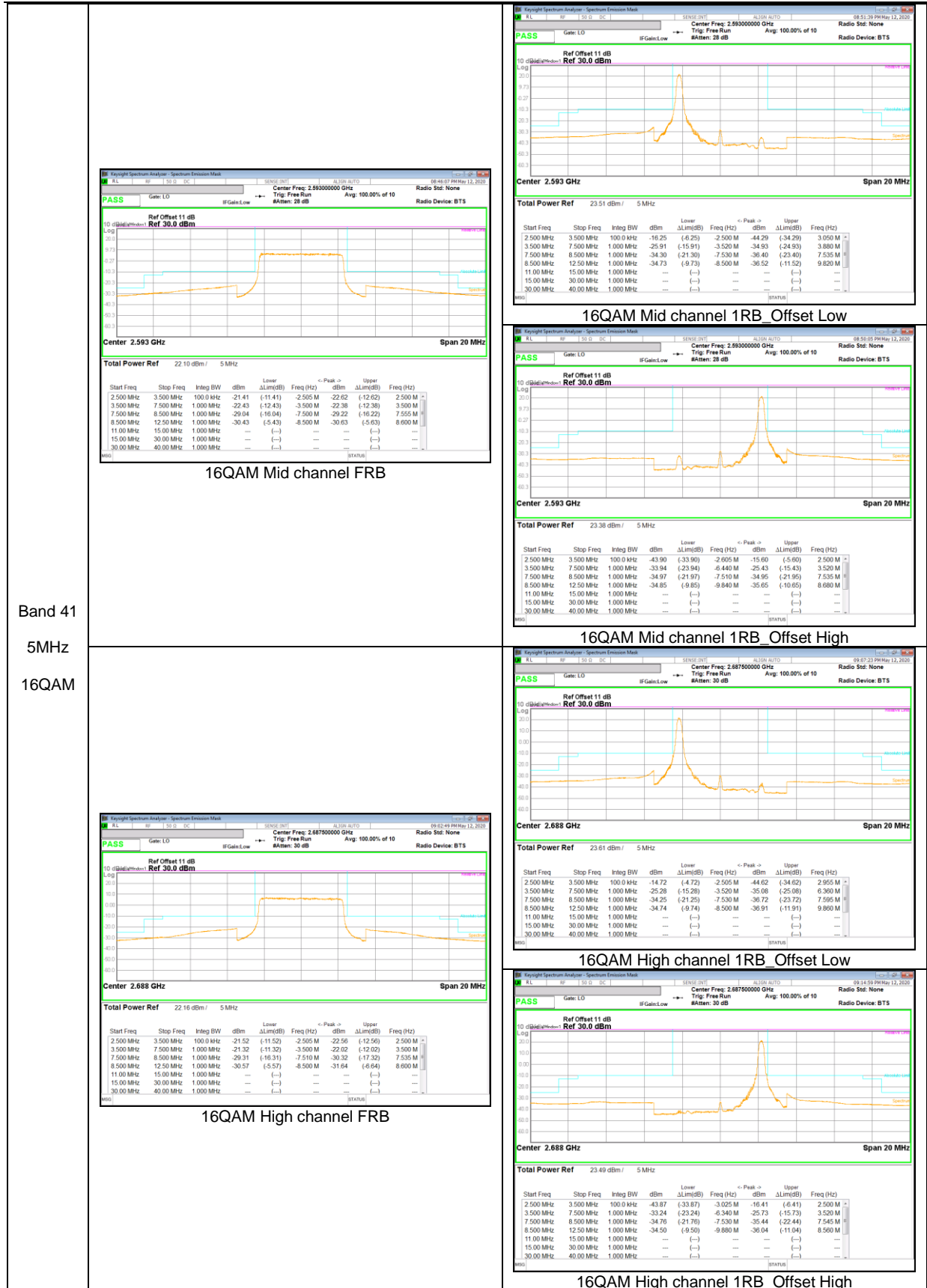


16QAM High channel 1RB\_Offset High



Band 41  
 5MHz  
 QPSK





Band 41  
 5MHz  
 16QAM

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**LTE Band 2**

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

**LTE Band 4**

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

**LTE Band 5**

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

**LTE Band 17**

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

**LTE Band41(PC3)**

LTE Band 41(PC3, Frequency range : 2496-2690 MHz) is covered by LTE Band 41(PC2) (Frequency range: 2496-2690 MHz) due to same frequency range, same channel bandwidth and maximum tune-up limit is higher than LTE Band41(PC3).

### 9.3. OUT OF BAND EMISSIONS

#### RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §27.53 and 90.691

#### 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.

Part 90.691(a):

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

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

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

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**TEST PROCEDURE**

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

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

- a) Set the RBW = 100kHz for emission below 1GHz and 1MHz for emissions above 1GHz  
(Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
- b) Set VBW  $\geq 3 \times$  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), Max hold(GSM, LTE Band41);

**RESULTS**

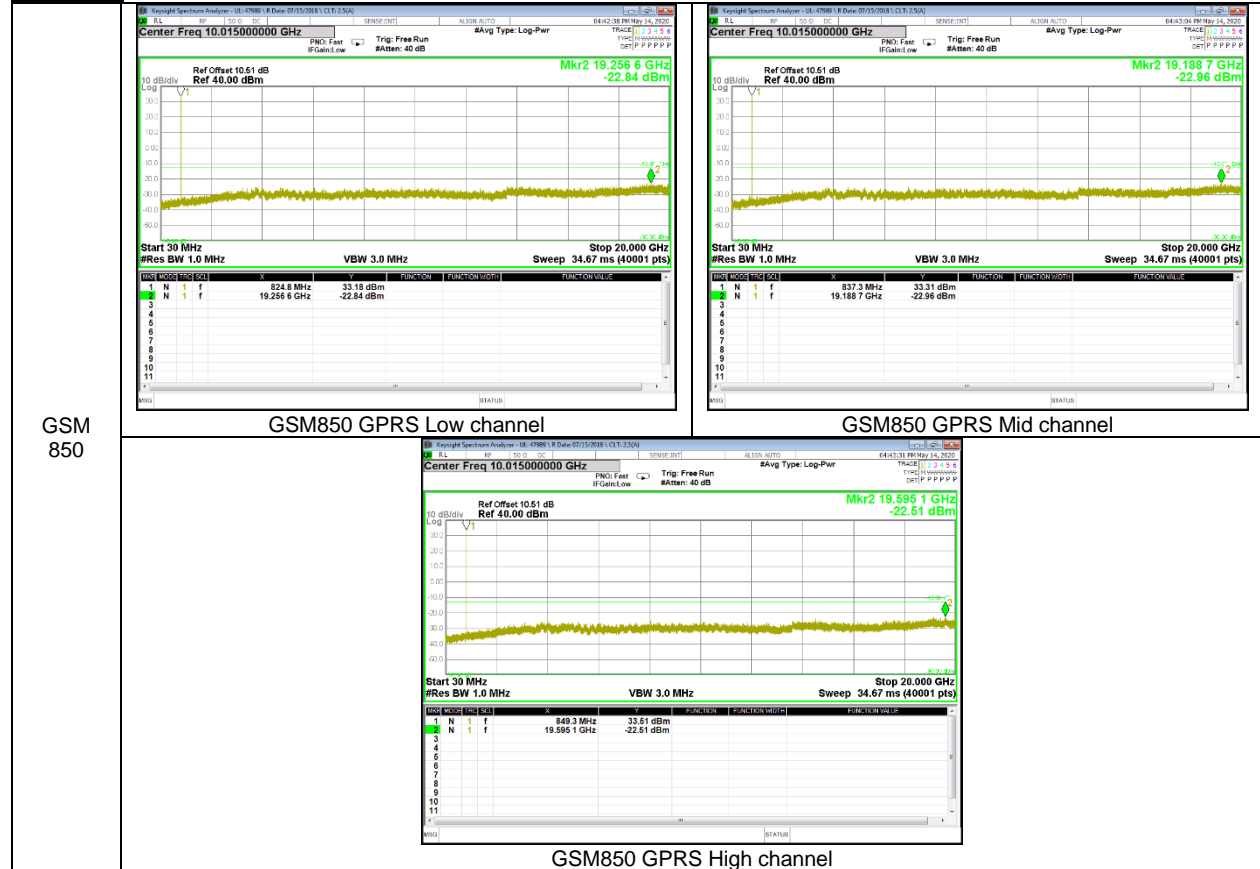
See the following pages.

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



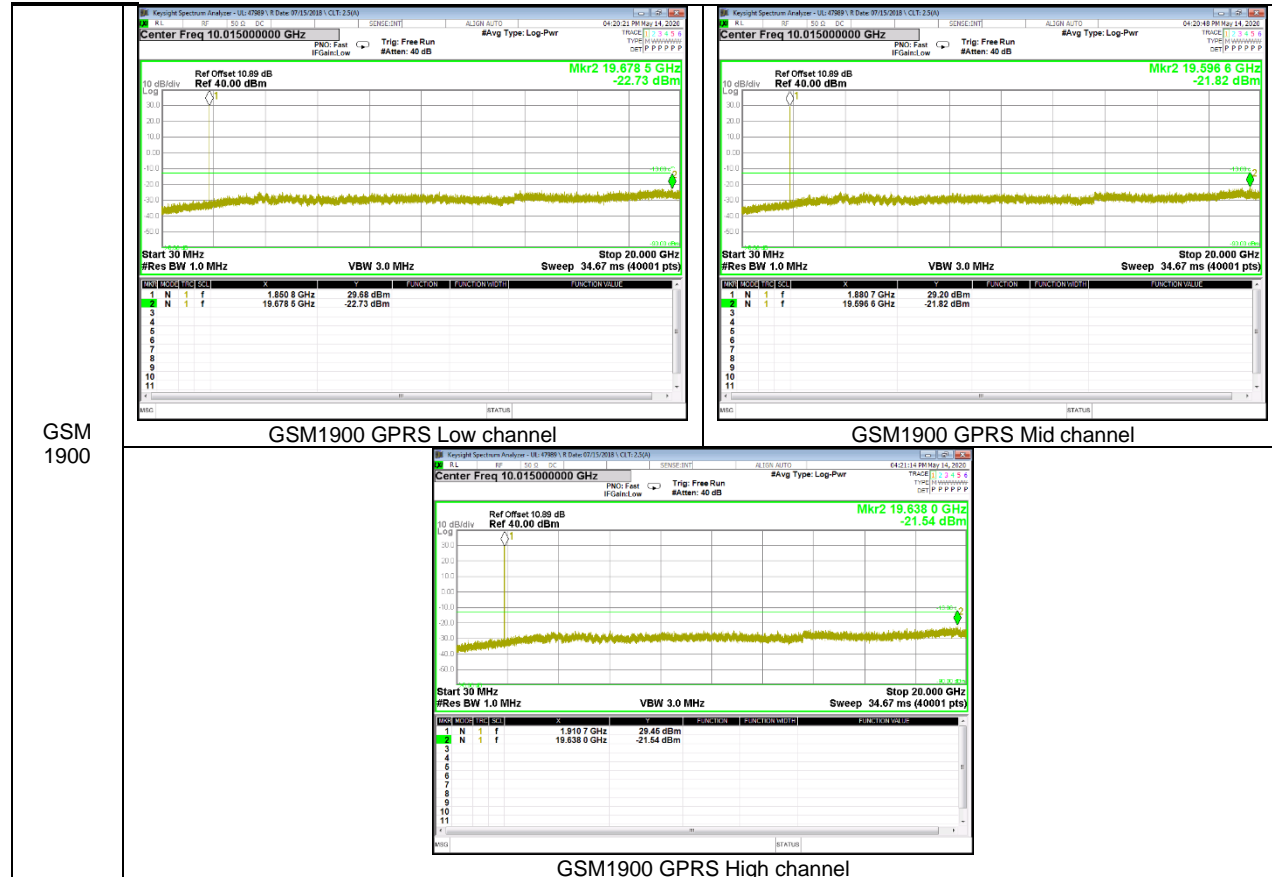
### 9.3.1. OUT OF BAND EMISSIONS RESULT

#### GSM 850



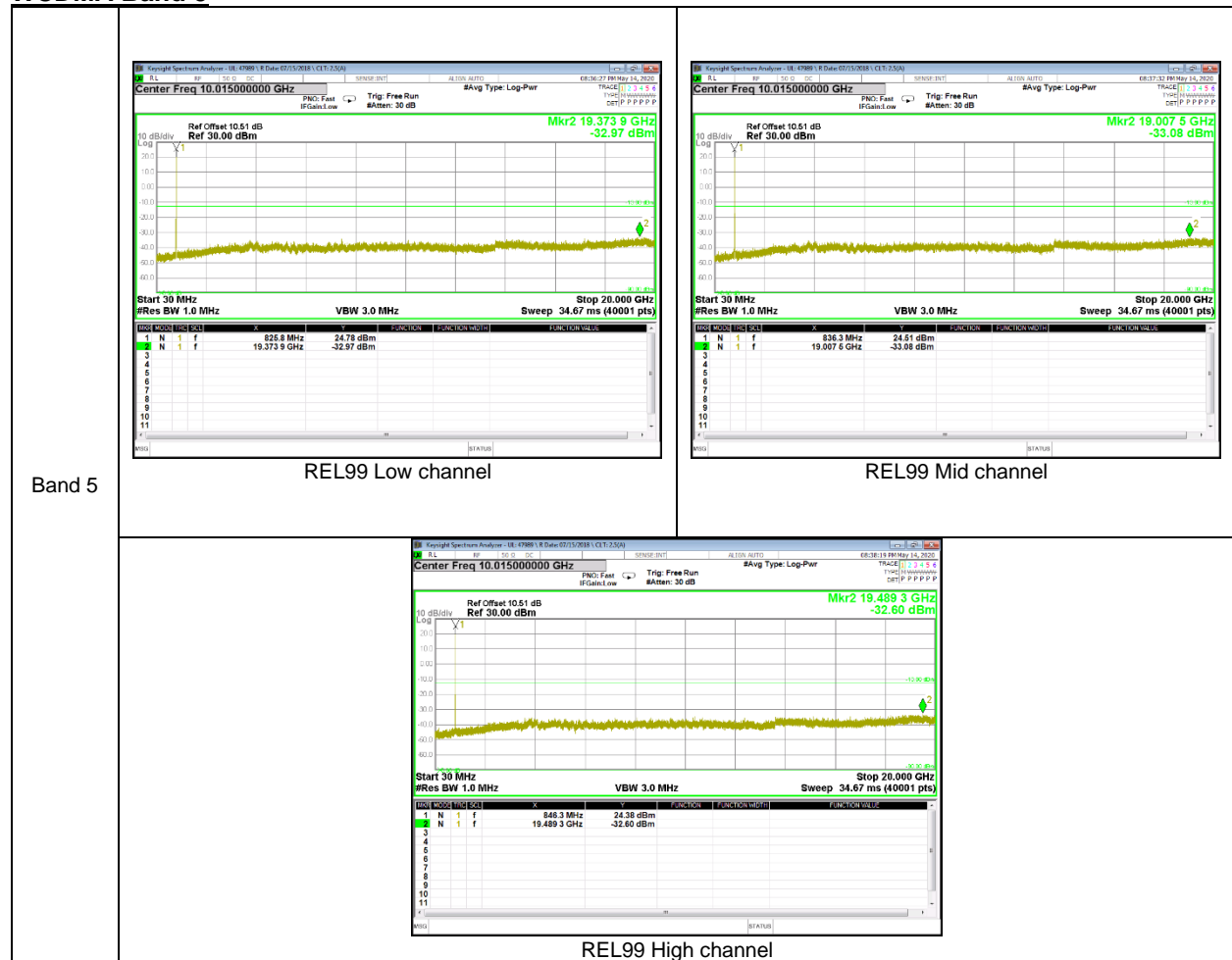
GSM  
850

**GSM 1900**



GSM  
1900

**WCDMA Band 5**



Band 5

REL99 Low channel

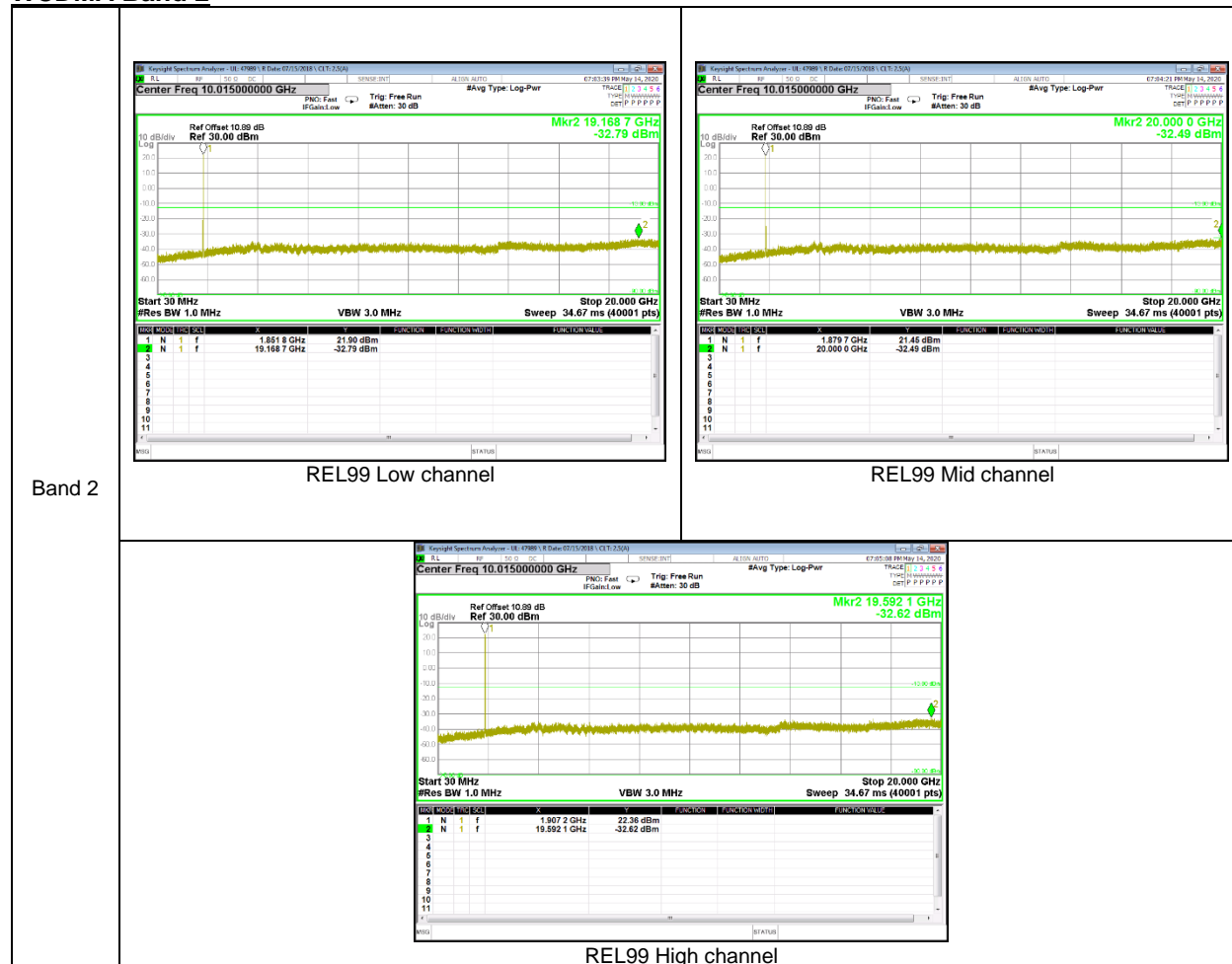
REL99 Mid channel

REL99 High channel

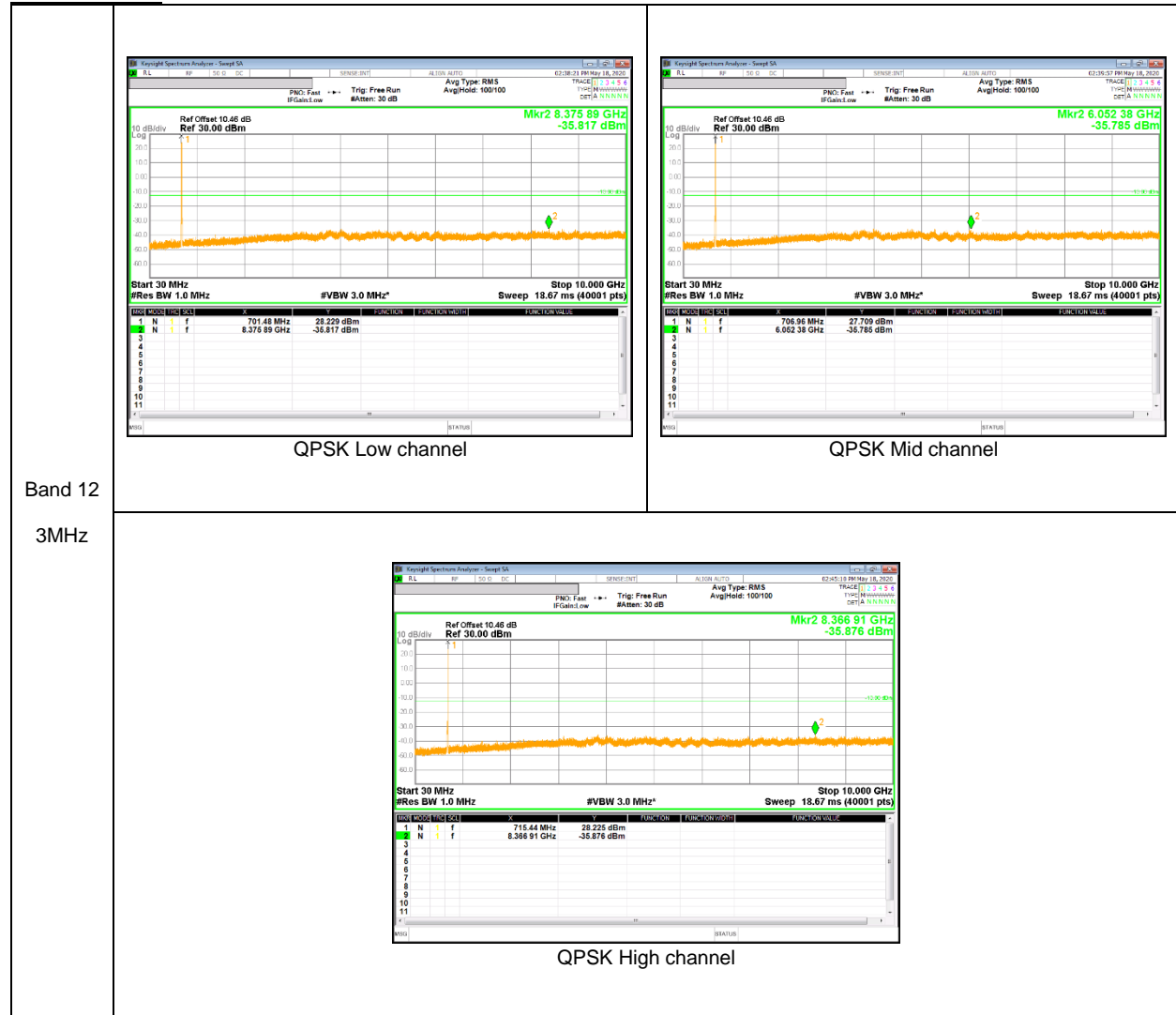
**WCDMA Band 4**



**WCDMA Band 2**

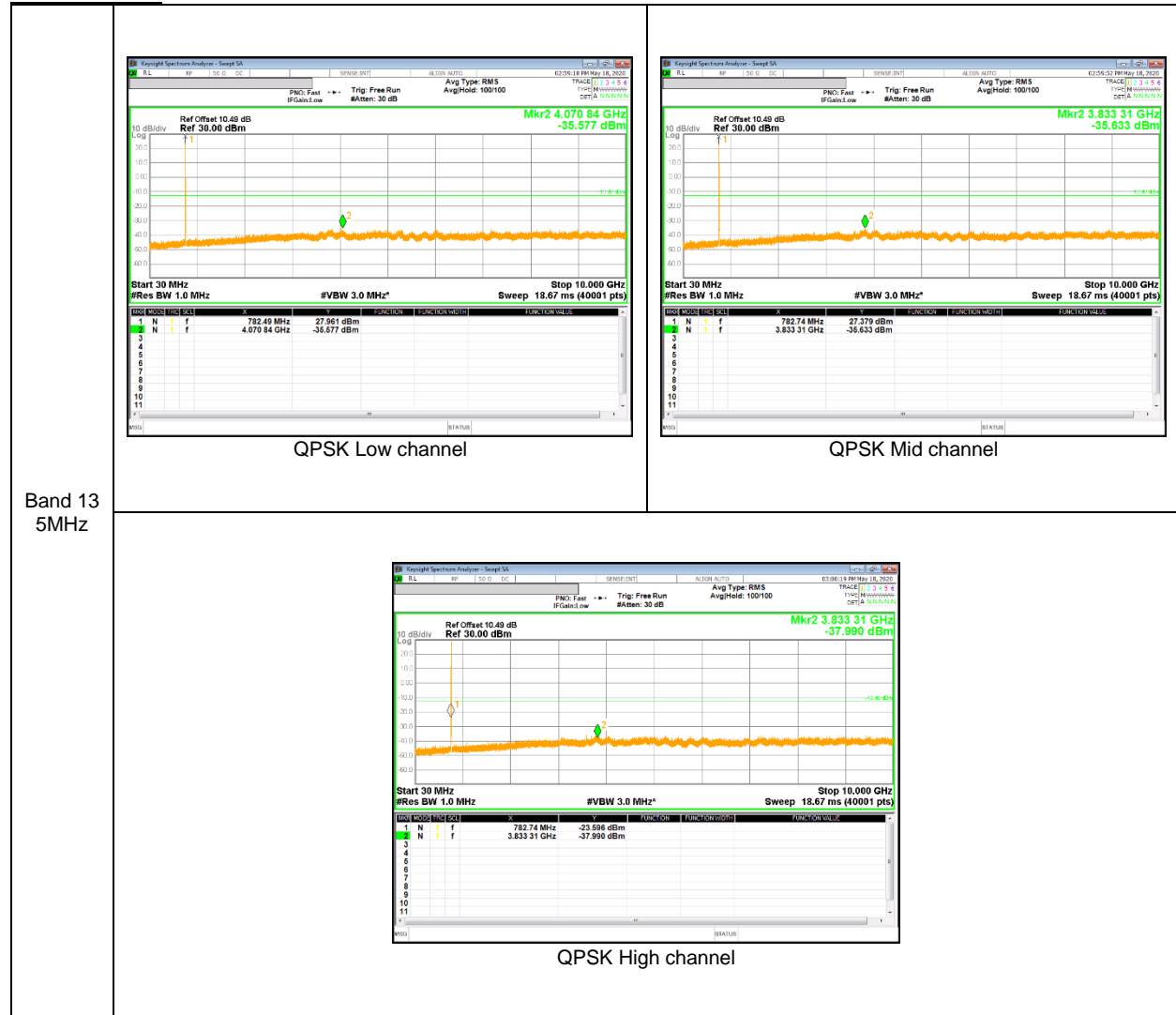


**LTE Band 12**

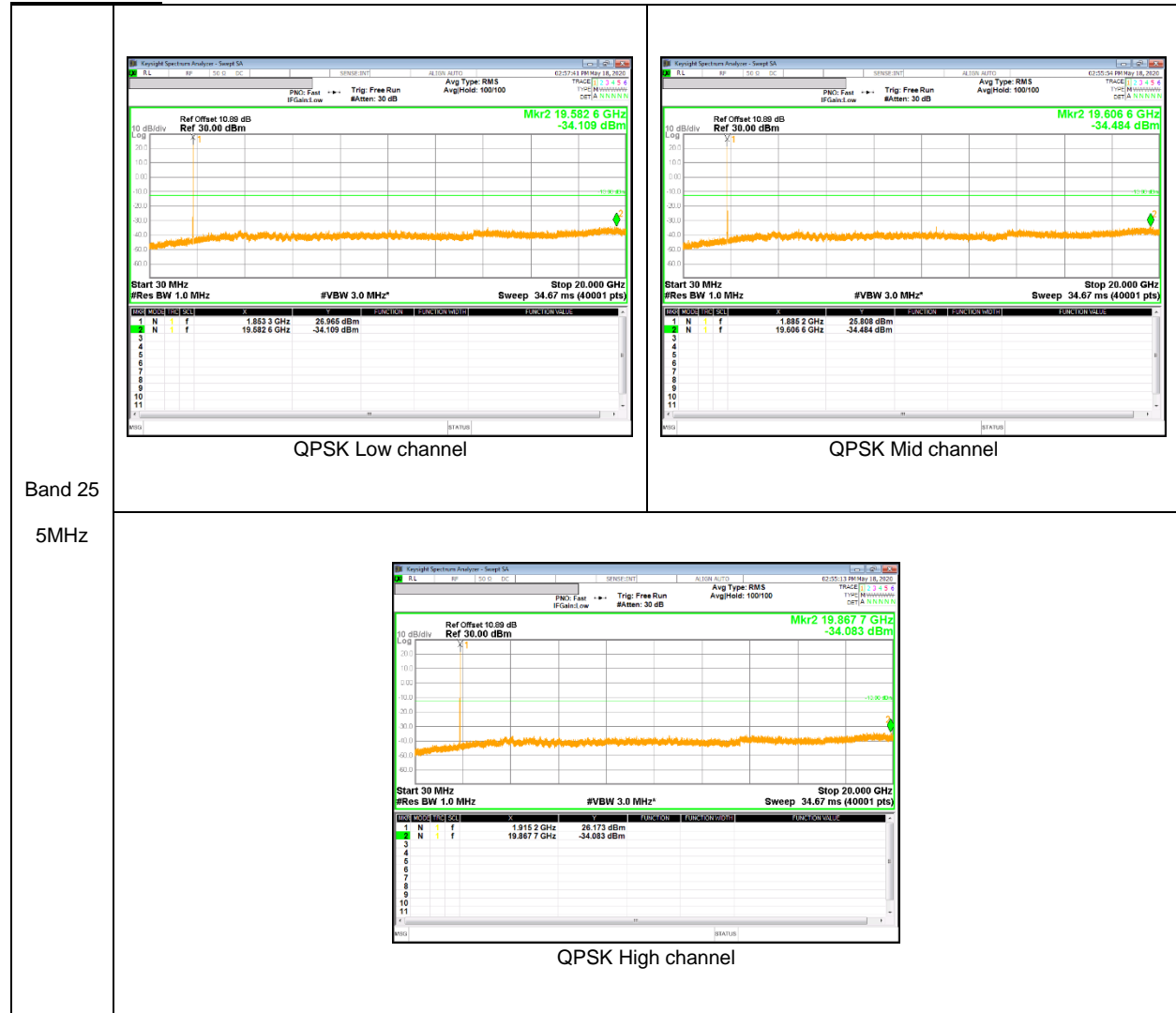


Band 12  
3MHz

**LTE Band 13**



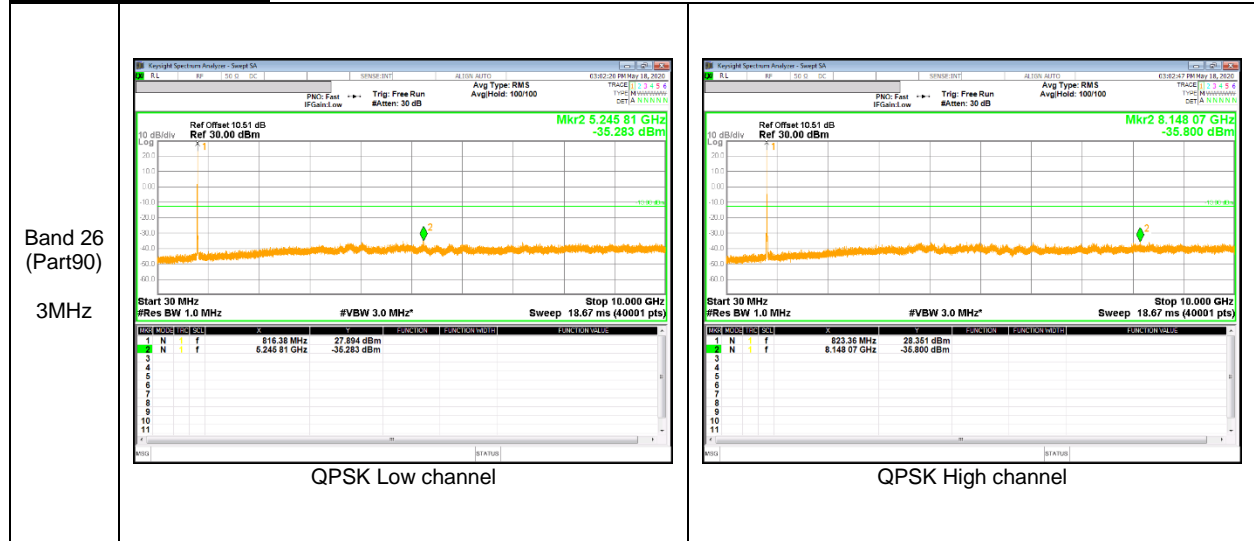
**LTE Band 25**



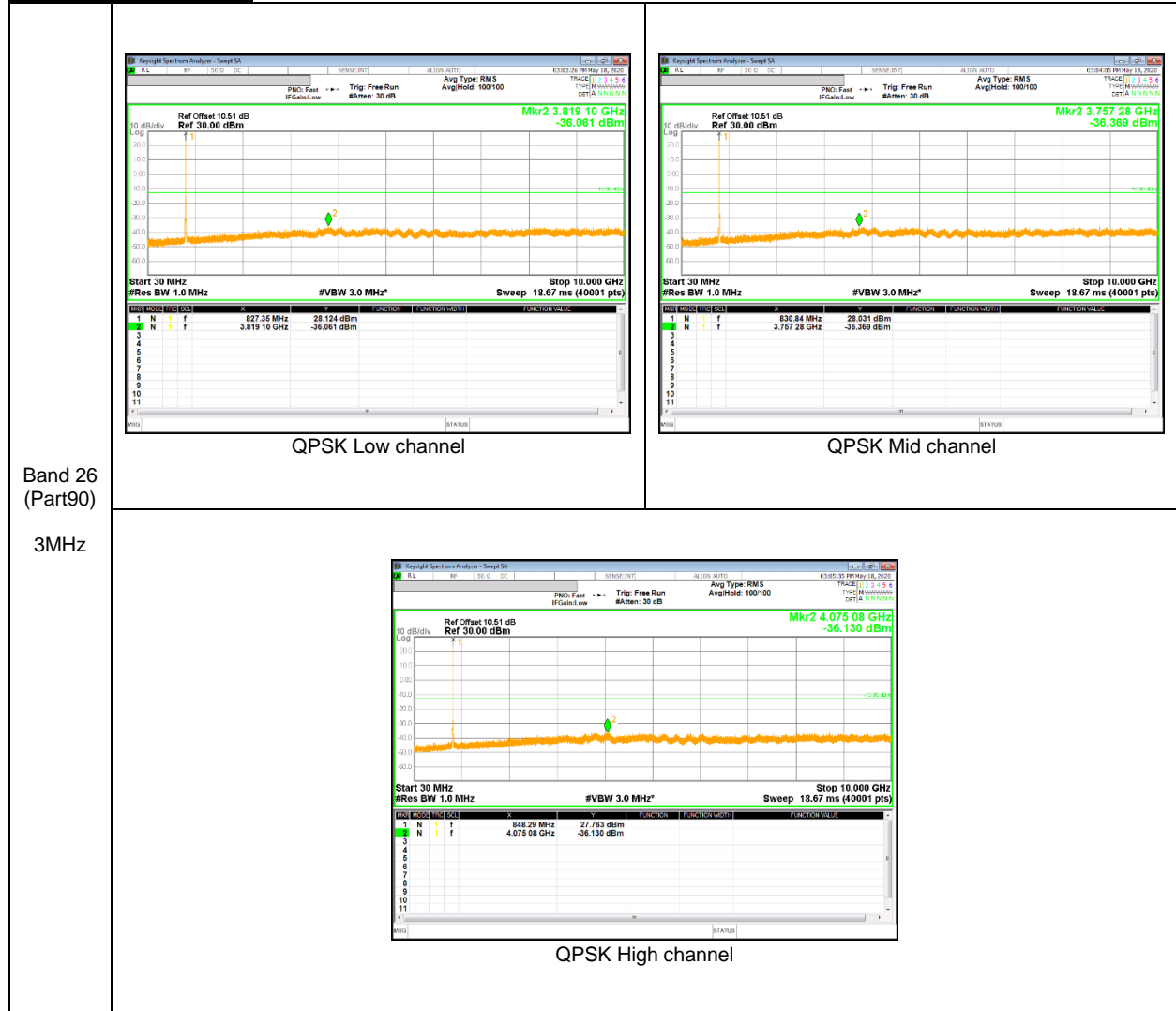
Band 25  
5MHz



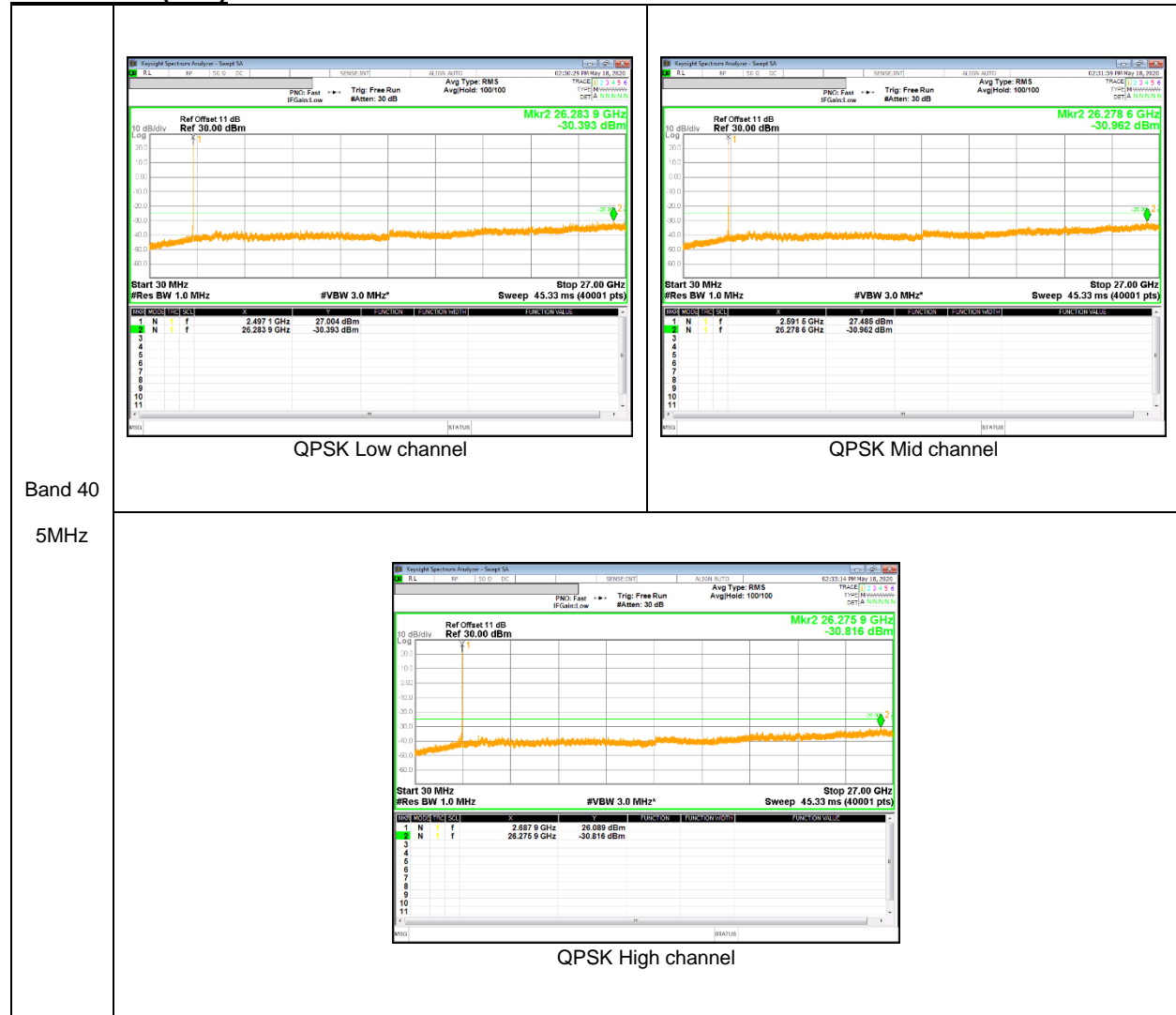
**LTE Band 26(Part90)**



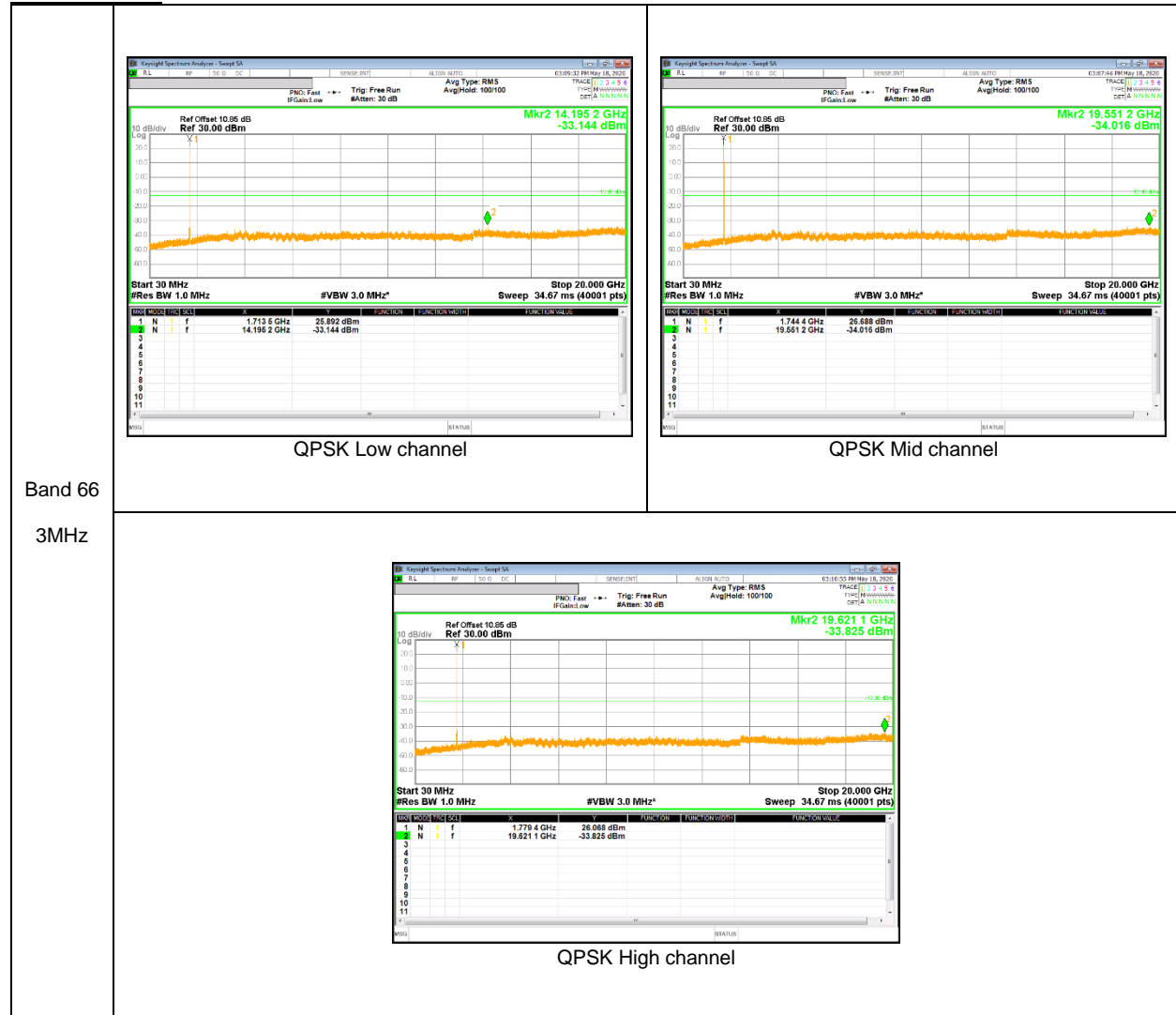
**LTE Band 26(Part22)**



**LTE Band 41(PC2)**



**LTE Band 66**



Band 66  
 3MHz

**LTE Band 2**

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

**LTE Band 4**

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

**LTE Band 5**

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

**LTE Band 17**

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

**LTE Band41(PC3)**

LTE Band 41(PC3, Frequency range : 2496-2690 MHz) is covered by LTE Band 41(PC2) (Frequency range: 2496-2690 MHz) due to same frequency range, same channel bandwidth and maximum tune-up limit is higher than LTE Band41(PC3).

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## 9.4. FREQUENCY STABILITY

### RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54 and §90.213

### LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  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]		
3.88	50	824.20017063	0.010	848.80018340	-0.006	2.5	
3.88	40	824.20015497	0.029	848.80017705	0.001	2.5	
3.88	30	824.20016844	0.012	848.80019614	-0.021	2.5	
<b>3.88</b>	<b>20</b>	<b>824.20017854</b>	<b>0.000</b>	<b>848.80017799</b>	<b>0.000</b>	<b>2.5</b>	
3.88	10	824.20014609	0.039	848.80015665	0.025	2.5	
3.88	0	824.20014403	0.042	848.80015571	0.026	2.5	
3.88	-10	824.20013415	0.054	848.80013479	0.051	2.5	
3.88	-20	824.20018687	-0.010	848.80014596	0.038	2.5	
3.88	-30	824.20015646	0.027	848.80014580	0.038	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>3.88</b>	<b>20</b>	<b>824.20017854</b>	<b>0</b>	<b>848.80017799</b>	<b>0</b>	<b>2.5</b>	
4.47	20	824.20018726	-0.011	848.80019633	-0.022	2.5	
3.60	20	824.20018991	-0.014	848.80017996	-0.002	2.5	

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

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0758	1909.9227		
Extreme (50C)		1850.0759	1909.9228	101.5	0.054
Extreme (40C)		1850.0759	1909.9228	112.3	0.060
Extreme (30C)		1850.0759	1909.9229	134.2	0.071
Extreme (10C)		1850.0759	1909.9228	90.6	0.048
Extreme (0C)		1850.0759	1909.9228	100.5	0.053
Extreme (-10C)		1850.0759	1909.9228	114.2	0.061
Extreme (-20C)		1850.0759	1909.9228	98.5	0.052
Extreme (-30C)		1850.0758	1909.9228	84.2	0.045
20C		15%	1850.0759	1909.9228	90.2
	-15%	1850.0759	1909.9229	117.0	0.062
	End Point	1850.0759	1909.9228	96.1	0.051

**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			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.88	50	826.40000526	-0.002	846.60000592	-0.001	2.5	
3.88	40	826.40000335	0.000	846.60000445	0.000	2.5	
3.88	30	826.40000409	-0.001	846.60000502	0.000	2.5	
<b>3.88</b>	<b>20</b>	<b>826.40000365</b>	<b>0.000</b>	<b>846.60000484</b>	<b>0.000</b>	<b>2.5</b>	
3.88	10	826.40000433	-0.001	846.60000460	0.000	2.5	
3.88	0	826.40000419	-0.001	846.60000499	0.000	2.5	
3.88	-10	826.40000515	-0.002	846.60000378	0.001	2.5	
3.88	-20	826.40000632	-0.003	846.60000461	0.000	2.5	
3.88	-30	826.40000539	-0.002	846.60000406	0.001	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]		
<b>3.88</b>	<b>20</b>	<b>826.40000365</b>	<b>0</b>	<b>846.60000484</b>	<b>0</b>	<b>2.5</b>	
4.47	20	826.40000270	0.001	846.60000534	-0.001	2.5	
3.60	20	826.40000303	0.001	846.60000583	-0.001	2.5	

**WCDMA Band 4**

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	1710.3157	1754.6838	5.3	0.003
Extreme (50C)		1710.3157	1754.6838		
Extreme (40C)		1710.3157	1754.6838		
Extreme (30C)		1710.3157	1754.6838		
Extreme (10C)		1710.3157	1754.6838		
Extreme (0C)		1710.3157	1754.6838		
Extreme (-10C)		1710.3157	1754.6838		
Extreme (-20C)		1710.3157	1754.6838		
Extreme (-30C)		1710.3157	1754.6838		
20C	15%	1710.3157	1754.6838	4.3	0.003
	-15%	1710.3157	1754.6838	5.3	0.003
	End Point	1710.3157	1754.6838	4.3	0.002

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

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.3123	1909.6945	5.9	0.003
Extreme (50C)		1850.3123	1909.6945		
Extreme (40C)		1850.3123	1909.6945		
Extreme (30C)		1850.3123	1909.6945		
Extreme (10C)		1850.3123	1909.6945		
Extreme (0C)		1850.3123	1909.6945		
Extreme (-10C)		1850.3123	1909.6945		
Extreme (-20C)		1850.3123	1909.6945		
Extreme (-30C)		1850.3123	1909.6945		
20C	15%	1850.3123	1909.6945	4.5	0.002
	-15%	1850.3123	1909.6945	5.0	0.003
	End Point	1850.3123	1909.6945	4.5	0.002

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

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	699.1557	715.8451	26.3	0.037
Extreme (50C)		699.1557	715.8451		
Extreme (40C)		699.1557	715.8451		
Extreme (30C)		699.1557	715.8451		
Extreme (10C)		699.1557	715.8451		
Extreme (0C)		699.1557	715.8451		
Extreme (-10C)		699.1557	715.8451		
Extreme (-20C)		699.1557	715.8451		
Extreme (-30C)		699.1557	715.8451		
20C	15%	699.1557	715.8451	10.5	0.015
	-15%	699.1557	715.8451	10.6	0.015
	End Point	699.1557	715.8451	8.9	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	777.2561	786.7536	27.9	0.036
Extreme (50C)		777.2561	786.7536		
Extreme (40C)		777.2561	786.7536		
Extreme (30C)		777.2561	786.7536		
Extreme (10C)		777.2561	786.7536		
Extreme (0C)		777.2561	786.7536		
Extreme (-10C)		777.2561	786.7536		
Extreme (-20C)		777.2561	786.7536		
Extreme (-30C)		777.2561	786.7536		
20C	15%	777.2561	786.7536	9.5	0.012
	-15%	777.2561	786.7536	9.8	0.012
	End Point	777.2561	786.7536	10.0	0.013

**LTE Band 25 (Lowest Frequency:16QAM / Highest Frequency: 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	1850.1556	1914.8432	31.0	0.016
Extreme (50C)		1850.1556	1914.8432		
Extreme (40C)		1850.1556	1914.8432		
Extreme (30C)		1850.1556	1914.8432		
Extreme (10C)		1850.1556	1914.8432		
Extreme (0C)		1850.1556	1914.8432		
Extreme (-10C)		1850.1556	1914.8432		
Extreme (-20C)		1850.1556	1914.8432		
Extreme (-30C)		1850.1556	1914.8432		
20C	15%	1850.1556	1914.8432	11.0	0.006
	-15%	1850.1556	1914.8432	11.7	0.006
	End Point	1850.1556	1914.8432	11.6	0.006

**LTE Band 26 (Lowest Frequency:QPSK / Highest Frequency: 16QAM)**

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]		
3.85	50	814.70003656	-0.022	848.30003232	-0.009	2.5	
3.85	40	814.70002745	-0.010	848.30002432	0.000	2.5	
3.85	30	814.70001935	-0.001	848.30002612	-0.002	2.5	
<b>3.85</b>	<b>20</b>	<b>814.70001891</b>	<b>0.000</b>	<b>848.30002446</b>	<b>0.000</b>	<b>2.5</b>	
3.85	10	814.70002872	-0.012	848.30004765	-0.027	2.5	
3.85	0	814.70003098	-0.015	848.30003180	-0.009	2.5	
3.85	-10	814.70002335	-0.005	848.30002485	0.000	2.5	
3.85	-20	814.70002751	-0.011	848.30002880	-0.005	2.5	
3.85	-30	814.70002496	-0.007	848.30002670	-0.003	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]		
<b>3.88</b>	<b>20</b>	<b>814.70001891</b>	<b>0</b>	<b>848.30002446</b>	<b>0</b>	<b>2.5</b>	
4.47	20	814.70000823	0.013	848.30000960	0.018	2.5	
3.60	20	814.70001034	0.011	848.30001039	0.017	2.5	

**LTE Band 41 (Lowest Frequency: 16QAM / Highest Frequency: 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	2494.0001	2692.0046		
Extreme (50C)		2494.0001	2692.0046	44.8	0.017
Extreme (40C)		2494.0001	2692.0046	42.7	0.016
Extreme (30C)		2494.0001	2692.0046	41.8	0.016
Extreme (10C)		2494.0001	2692.0046	26.4	0.010
Extreme (0C)		2494.0001	2692.0046	28.9	0.011
Extreme (-10C)		2494.0001	2692.0046	33.1	0.013
Extreme (-20C)		2494.0001	2692.0046	38.3	0.015
Extreme (-30C)		2494.0001	2692.0046	42.7	0.016
20C	15%	2494.0001	2692.0046	11.7	0.005
	-15%	2494.0001	2692.0046	11.0	0.004
	End Point	2494.0001	2692.0046	12.2	0.005

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

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.6995	1779.3005	26.0	0.015
Extreme (50C)		1710.6995	1779.3006		
Extreme (40C)		1710.6995	1779.3006		
Extreme (30C)		1710.6995	1779.3006		
Extreme (10C)		1710.6995	1779.3006		
Extreme (0C)		1710.6995	1779.3006		
Extreme (-10C)		1710.6995	1779.3006		
Extreme (-20C)		1710.6995	1779.3006		
Extreme (-30C)		1710.6995	1779.3006		
20C	15%	1710.6995	1779.3006	10.5	0.006
	-15%	1710.6995	1779.3006	11.8	0.007
	End Point	1710.6995	1779.3006	11.3	0.006

**LTE Band 2**

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

**LTE Band 4**

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

**LTE Band 5**

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

**LTE Band 17**

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

**LTE Band41(PC3)**

LTE Band 41(PC3, Frequency range : 2496-2690 MHz) is covered by LTE Band 41(PC2) (Frequency range: 2496-2690 MHz) due to same frequency range, same channel bandwidth and maximum tune-up limit is higher than LTE Band41(PC3).

## **9.5. RADIATED POWER (ERP & EIRP)**

### **RULE PART(S)**

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

### **LIMITS**

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

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

27.50:

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

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

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

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

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

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

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

### **TEST PROCEDURE**

ANSI / TIA / EIA 603 E Clause 2.2.17; ESU40 setting reference to 971168 D01 v03r01

For radiated output power measurement with a ESU40:

- a) Set the RBW  $\geq$  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**

**9.5.1. ERP/EIRP Results**

**GSM**

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	128	824.2	28.74	748.17
		190	836.6	29.48	887.16
		251	848.8	<b>29.86</b>	<b>968.28</b>
	EGPRS	128	824.2	23.22	209.89
		190	836.6	24.13	258.82
		251	848.8	<b>24.28</b>	<b>267.92</b>
GSM1900	GPRS	512	1850.2	29.25	841.40
		661	1880	27.50	562.34
		810	1909.8	<b>29.72</b>	<b>937.56</b>
	EGPRS	512	1850.2	25.32	340.41
		661	1880	24.99	315.50
		810	1909.8	<b>26.02</b>	<b>399.94</b>

**WCDMA**

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	18.22	66.37
		4183	836.6	<b>19.61</b>	<b>91.41</b>
		4233	846.6	18.86	76.91
	HSDPA	4132	826.4	16.83	48.19
		4183	836.6	<b>18.20</b>	<b>66.07</b>
		4233	846.6	17.40	54.95
Band 4	REL99	1312	1712.4	23.86	243.22
		1413	1732.6	<b>24.10</b>	<b>257.04</b>
		1513	1752.6	23.24	210.86
	HSDPA	1312	1712.4	22.79	190.11
		1413	1732.6	<b>22.97</b>	<b>198.15</b>
		1513	1752.6	22.33	171.00
Band 2	REL99	9262	1852.4	21.48	140.60
		9400	1880.0	21.52	141.91
		9538	1907.6	<b>23.14</b>	<b>206.06</b>
	HSDPA	9262	1852.4	21.52	141.91
		9400	1880.0	21.69	147.57
		9538	1907.6	<b>23.20</b>	<b>208.93</b>

**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	17.84	60.81
			1/0	707.5	<b>17.99</b>	<b>62.95</b>
			1/0	711.0	17.95	62.37
		16QAM	1/0	704.0	16.79	47.75
			1/49	707.5	16.68	46.56
			1/0	711.0	<b>16.88</b>	<b>48.75</b>
	5	QPSK	1/24	701.5	17.74	59.43
			1/12	707.5	17.78	59.98
			1/12	713.5	<b>17.82</b>	<b>60.53</b>
		16QAM	1/12	701.5	16.59	45.60
			1/24	707.5	16.59	45.60
			1/24	713.5	<b>16.74</b>	<b>47.21</b>
	3	QPSK	1/8	700.5	18.36	68.55
			1/0	707.5	<b>18.43</b>	<b>69.66</b>
			1/8	714.5	18.32	67.92
		16QAM	1/8	700.5	<b>17.52</b>	<b>56.49</b>
			1/0	707.5	17.37	54.58
			1/14	714.5	17.36	54.45
	1.4	QPSK	1/0	699.7	17.47	55.85
			1/5	707.5	17.72	59.16
			1/5	715.3	<b>18.05</b>	<b>63.83</b>
		16QAM	1/5	699.7	16.18	41.50
			1/5	707.5	16.65	46.24
			1/0	715.3	<b>16.98</b>	<b>49.89</b>

**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	<b>21.63</b>	<b>145.55</b>
		16QAM	1/0	782.0	20.37	108.89
	5	QPSK	1/24	779.5	<b>21.99</b>	<b>158.12</b>
			1/12	782.0	21.72	148.59
			1/12	784.5	21.77	150.31
		16QAM	1/12	779.5	20.38	109.14
	1/24		782.0	20.46	111.17	
				1/24	784.5	<b>20.65</b>

**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	23.12	205.12
			1/0	1882.5	22.27	168.66
			1/0	1905.0	<b>24.84</b>	<b>304.79</b>
		16QAM	1/0	1860.0	22.13	163.31
			1/0	1882.5	21.26	133.66
			1/0	1905.0	<b>23.50</b>	<b>223.87</b>
	15	QPSK	1/0	1857.5	22.49	177.42
			1/0	1882.5	22.22	166.72
			1/37	1907.5	<b>24.90</b>	<b>309.03</b>
		16QAM	1/0	1857.5	21.24	133.05
			1/37	1882.5	21.14	130.02
			1/0	1907.5	<b>23.77</b>	<b>238.23</b>
	10	QPSK	1/49	1855.0	22.02	159.22
			1/0	1882.5	22.12	162.93
			1/0	1910.0	<b>23.92</b>	<b>246.60</b>
		16QAM	1/49	1855.0	20.94	124.17
			1/0	1882.5	21.20	131.83
			1/49	1910.0	<b>22.08</b>	<b>161.44</b>
	5	QPSK	1/24	1852.5	21.99	158.12
			1/12	1882.5	21.90	154.88
			1/24	1912.5	<b>23.60</b>	<b>229.09</b>
		16QAM	1/12	1852.5	20.77	119.40
			1/12	1882.5	20.79	119.95
			1/12	1912.5	<b>22.51</b>	<b>178.24</b>
	3	QPSK	1/14	1851.5	21.90	154.88
			1/0	1882.5	22.64	183.65
			1/8	1913.5	<b>23.57</b>	<b>227.51</b>
		16QAM	1/14	1851.5	20.76	119.12
			1/0	1882.5	21.25	133.35
			1/8	1913.5	<b>22.42</b>	<b>174.58</b>
1.4	QPSK	1/0	1850.7	22.17	164.82	
		1/5	1882.5	21.87	153.82	
		1/5	1914.3	<b>23.51</b>	<b>224.39</b>	
	16QAM	1/5	1850.7	20.78	119.67	
		1/3	1882.5	20.90	123.03	
		1/0	1914.3	<b>22.43</b>	<b>174.98</b>	

**LTE Band 26**

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP/EIRP	
			RB Offset		[dBm]	[mW]
Band 26	15	QPSK	1/37	821.5	19.07	80.72
			1/0	831.5	<b>20.85</b>	<b>121.62</b>
			1/37	841.5	19.46	88.31
		16QAM	1/37	821.5	18.02	63.39
			1/0	831.5	<b>19.89</b>	<b>97.50</b>
			1/37	841.5	18.04	63.68
	10	QPSK	1/49	819.0	18.95	78.52
			1/0	829.0	20.71	117.76
			1/0	831.5	<b>20.83</b>	<b>121.06</b>
			1/49	844.0	19.00	79.43
		16QAM	1/49	819.0	18.08	64.27
			1/49	829.0	18.60	72.44
			1/0	831.5	<b>19.83</b>	<b>96.16</b>
			1/49	844.0	17.83	60.67
	5	QPSK	1/24	816.5	19.38	86.70
			1/24	821.5	18.89	77.45
			1/12	826.5	<b>20.47</b>	<b>111.43</b>
			1/12	831.5	20.13	103.04
		16QAM	1/12	846.5	18.90	77.62
			1/12	816.5	18.36	68.55
			1/12	821.5	17.83	60.67
			1/0	826.5	<b>19.39</b>	<b>86.90</b>
			1/24	831.5	19.09	81.10
			1/24	846.5	17.80	60.26
	3	QPSK	1/8	815.5	19.88	97.27
			1/8	822.5	19.09	81.10
			1/14	825.5	18.73	74.64
			1/0	831.5	<b>20.38</b>	<b>109.14</b>
		16QAM	1/8	847.5	19.06	80.54
			1/14	815.5	18.41	69.34
			1/14	822.5	17.96	62.52
			1/0	825.5	17.94	62.23
	1.4	QPSK	1/0	814.7	19.82	95.94
			1/5	823.3	18.76	75.16
			1/5	824.7	18.73	74.64
			1/5	831.5	<b>19.97</b>	<b>99.31</b>
			1/0	848.3	18.89	77.45
		16QAM	1/3	814.7	18.78	75.51
			1/0	823.3	18.01	63.24
			1/3	824.7	17.74	59.43
			1/0	831.5	<b>18.88</b>	<b>77.27</b>
			1/5	848.3	17.84	60.81



**LTE Band 41(PC2)**

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 41	20	QPSK	1/0	2506.0	26.16	413.05
			1/99	2593.0	<b>26.75</b>	<b>473.15</b>
			1/0	2680.0	24.86	306.20
		16QAM	1/0	2506.0	25.57	360.58
			1/0	2593.0	<b>26.39</b>	<b>435.51</b>
			1/0	2680.0	24.30	269.15
	15	QPSK	1/0	2503.5	26.28	424.62
			1/0	2593.0	<b>26.88</b>	<b>487.53</b>
			1/0	2682.5	25.43	349.14
		16QAM	1/0	2503.5	25.56	359.75
			1/0	2593.0	<b>26.28</b>	<b>424.62</b>
			1/0	2682.5	24.04	253.51
	10	QPSK	1/25	2501.0	26.41	437.52
			1/0	2593.0	<b>27.18</b>	<b>522.40</b>
			1/25	2685.0	25.21	331.89
		16QAM	1/25	2501.0	26.64	461.32
			1/0	2593.0	<b>27.66</b>	<b>583.45</b>
			1/0	2685.0	24.22	264.24
	5	QPSK	1/0	2498.5	25.88	387.26
			1/0	2593.0	<b>27.85</b>	<b>609.54</b>
			1/12	2687.5	24.03	252.93
		16QAM	1/0	2498.5	26.36	432.51
			1/0	2593.0	<b>27.52</b>	<b>564.94</b>
			1/24	2687.5	23.89	244.91

**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	24.32	270.40
			1/0	1745.0	<b>24.44</b>	<b>277.97</b>
			1/0	1770.0	23.84	242.10
		16QAM	1/99	1720.0	23.37	217.27
			1/0	1745.0	<b>23.59</b>	<b>228.56</b>
			1/99	1770.0	22.49	177.42
	15	QPSK	1/0	1717.5	<b>24.45</b>	<b>278.61</b>
			1/0	1747.5	23.84	242.10
			1/37	1772.5	22.13	163.31
		16QAM	1/74	1717.5	<b>22.75</b>	<b>188.36</b>
			1/74	1747.5	21.98	157.76
			1/0	1772.5	21.13	129.72
	10	QPSK	1/49	1715.0	<b>24.35</b>	<b>272.27</b>
			1/0	1745.0	24.22	264.24
			1/0	1775.0	21.84	152.76
		16QAM	1/49	1715.0	<b>23.23</b>	<b>210.38</b>
			1/0	1745.0	23.10	204.17
			1/49	1775.0	20.86	121.90
	5	QPSK	1/24	1712.5	11.61	14.49
			1/12	1745.0	<b>24.00</b>	<b>251.19</b>
			1/24	1777.5	22.97	198.15
		16QAM	1/12	1712.5	11.74	14.93
			1/24	1745.0	<b>22.97</b>	<b>198.15</b>
			1/24	1777.5	22.07	161.06
	3	QPSK	1/14	1711.5	22.91	195.43
			1/0	1745.0	24.04	253.51
			1/14	1778.5	<b>24.18</b>	<b>261.82</b>
		16QAM	1/8	1711.5	22.69	185.78
			1/8	1745.0	<b>23.00</b>	<b>199.53</b>
			1/8	1778.5	22.20	165.96
1.4	QPSK	1/5	1710.7	23.50	223.87	
		1/5	1745.0	<b>23.64</b>	<b>231.21</b>	
		1/5	1779.3	23.01	199.99	
	16QAM	1/5	1710.7	22.35	171.79	
		1/5	1745.0	<b>22.41</b>	<b>174.18</b>	
		1/3	1779.3	22.13	163.31	

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**LTE Band 2**

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

**LTE Band 4**

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

**LTE Band 5**

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

**LTE Band 17**

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

**LTE Band41(PC3)**

LTE Band 41(PC3, Frequency range : 2496-2690 MHz) is covered by LTE Band 41(PC2) (Frequency range: 2496-2690 MHz) due to same frequency range, same channel bandwidth and maximum tune-up limit is higher than LTE Band41(PC3).

**9.5.2. ERP/EIRP DATA**

**GSM850**

GSM850  GPRS	<p style="text-align: center;"><b>UL Verification Services, Inc.</b>  <b>High Frequency Substitution Measurement</b></p> <p><b>Company:</b> Samsung  <b>Project #:</b> 4789468331  <b>Date:</b> 2020-05-11  <b>Test Engineer:</b> 20881  <b>Configuration:</b> EUT, Z-Position  <b>Location:</b> Chamber 1  <b>Mode:</b> GPRS 850 MHz Fundamentals</p> <p><b>Test Equipment:</b>                  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"><b>Low Ch</b></td> </tr> <tr> <td>824.20</td> <td>32.71</td> <td>V</td> <td>3.0</td> <td>-1.0</td> <td>28.74</td> <td>38.5</td> <td>-9.8</td> <td></td> </tr> <tr> <td>824.20</td> <td>24.26</td> <td>H</td> <td>3.0</td> <td>-1.0</td> <td>20.29</td> <td>38.5</td> <td>-18.2</td> <td></td> </tr> <tr> <td colspan="9"><b>Mid Ch</b></td> </tr> <tr> <td>836.60</td> <td>33.42</td> <td>V</td> <td>3.0</td> <td>-0.9</td> <td>29.48</td> <td>38.5</td> <td>-9.0</td> <td></td> </tr> <tr> <td>836.60</td> <td>24.69</td> <td>H</td> <td>3.0</td> <td>-0.9</td> <td>20.75</td> <td>38.5</td> <td>-17.7</td> <td></td> </tr> <tr> <td colspan="9"><b>High Ch</b></td> </tr> <tr> <td>848.80</td> <td>33.77</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>29.86</td> <td>38.5</td> <td>-8.6</td> <td></td> </tr> <tr> <td>848.80</td> <td>26.00</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>22.09</td> <td>38.5</td> <td>-16.4</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	<b>Low Ch</b>									824.20	32.71	V	3.0	-1.0	28.74	38.5	-9.8		824.20	24.26	H	3.0	-1.0	20.29	38.5	-18.2		<b>Mid Ch</b>									836.60	33.42	V	3.0	-0.9	29.48	38.5	-9.0		836.60	24.69	H	3.0	-0.9	20.75	38.5	-17.7		<b>High Ch</b>									848.80	33.77	V	3.1	-0.9	29.86	38.5	-8.6		848.80	26.00	H	3.1	-0.9	22.09	38.5	-16.4	
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**GSM1900**

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	17.34	V	4.5	9.4	22.26	33.0	-10.7	
1850.20	24.33	H	4.5	9.4	29.25	33.0	-3.8	
Mid Ch								
1880.00	18.62	V	4.5	9.2	23.28	33.0	-9.7	
1880.00	22.84	H	4.5	9.2	27.50	33.0	-5.5	
High Ch								
1909.80	19.26	V	4.6	8.9	23.62	33.0	-9.4	
1909.80	25.36	H	4.6	8.9	29.72	33.0	-3.3	

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	14.97	V	4.5	9.4	19.89	33.0	-13.1	
1850.20	20.40	H	4.5	9.4	25.32	33.0	-7.7	
Mid Ch								
1880.00	16.54	V	4.5	9.2	21.20	33.0	-11.8	
1880.00	20.33	H	4.5	9.2	24.99	33.0	-8.0	
High Ch								
1909.80	15.76	V	4.6	8.9	20.12	33.0	-12.9	
1909.80	21.66	H	4.6	8.9	26.02	33.0	-7.0	

**WCDMA Band 5**

WCDMA  Band 5 REL99	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
	<p> <b>Company:</b> Samsung  <b>Project #:</b> 4789468331  <b>Date:</b> 2020-05-11  <b>Test Engineer:</b> 20881  <b>Configuration:</b> EUT, X-Position  <b>Location:</b> Chamber 1  <b>Mode:</b> Rel99 Band 5 Fundamentals                 </p> <p> <b>Test Equipment:</b>                      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"><b>Low Ch</b></td> </tr> <tr> <td>826.40</td> <td>15.36</td> <td>V</td> <td>3.0</td> <td>-0.9</td> <td>11.40</td> <td>38.5</td> <td>-27.1</td> <td></td> </tr> <tr> <td>826.40</td> <td>22.18</td> <td>H</td> <td>3.0</td> <td>-0.9</td> <td>18.22</td> <td>38.5</td> <td>-20.3</td> <td></td> </tr> <tr> <td colspan="9"><b>Mid Ch</b></td> </tr> <tr> <td>836.60</td> <td>17.04</td> <td>V</td> <td>3.0</td> <td>-0.9</td> <td>13.10</td> <td>38.5</td> <td>-25.4</td> <td></td> </tr> <tr> <td>836.60</td> <td>23.55</td> <td>H</td> <td>3.0</td> <td>-0.9</td> <td>19.61</td> <td>38.5</td> <td>-18.9</td> <td></td> </tr> <tr> <td colspan="9"><b>High Ch</b></td> </tr> <tr> <td>846.60</td> <td>16.03</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>12.11</td> <td>38.5</td> <td>-26.4</td> <td></td> </tr> <tr> <td>846.60</td> <td>22.77</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>18.86</td> <td>38.5</td> <td>-19.6</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	<b>Low Ch</b>									826.40	15.36	V	3.0	-0.9	11.40	38.5	-27.1		826.40	22.18	H	3.0	-0.9	18.22	38.5	-20.3		<b>Mid Ch</b>									836.60	17.04	V	3.0	-0.9	13.10	38.5	-25.4		836.60	23.55	H	3.0	-0.9	19.61	38.5	-18.9		<b>High Ch</b>									846.60	16.03	V	3.1	-0.9	12.11	38.5	-26.4		846.60	22.77	H	3.1	-0.9	18.86	38.5	-19.6
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WCDMA  Band 5 HSDPA	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
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**WCDMA Band 4**

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1712.40	13.78	V	4.3	9.4	18.86	30.0	-11.1	
1712.40	18.78	H	4.3	9.4	23.86	30.0	-6.1	
1732.60	15.04	V	4.3	9.5	20.17	30.0	-9.8	
1732.60	18.97	H	4.3	9.5	24.10	30.0	-5.9	
1752.60	13.52	V	4.4	9.5	18.70	30.0	-11.3	
1752.60	18.06	H	4.4	9.5	23.24	30.0	-6.8	

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1712.40	12.84	V	4.3	9.4	17.92	30.0	-12.1	
1712.40	17.71	H	4.3	9.4	22.79	30.0	-7.2	
1732.60	14.08	V	4.3	9.5	19.21	30.0	-10.8	
1732.60	17.84	H	4.3	9.5	22.97	30.0	-7.0	
1752.60	12.53	V	4.4	9.5	17.71	30.0	-12.3	
1752.60	17.15	H	4.4	9.5	22.33	30.0	-7.7	

**WCDMA Band 2**

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1852.40	13.06	V	4.5	9.5	18.05	33.0	-14.9	
1852.40	16.50	H	4.5	9.5	21.48	33.0	-11.5	
1880.00	12.46	V	4.5	9.3	17.23	33.0	-15.8	
1880.00	16.75	H	4.5	9.3	21.52	33.0	-11.5	
1907.60	12.56	V	4.6	9.1	17.08	33.0	-15.9	
1907.60	18.62	H	4.6	9.1	23.14	33.0	-9.9	

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1852.40	13.00	V	4.5	9.5	17.99	33.0	-15.0	
1852.40	16.54	H	4.5	9.5	21.52	33.0	-11.5	
1880.00	12.66	V	4.5	9.3	17.43	33.0	-15.6	
1880.00	16.92	H	4.5	9.3	21.69	33.0	-11.3	
1907.60	12.54	V	4.6	9.1	17.06	33.0	-15.9	
1907.60	18.68	H	4.6	9.1	23.20	33.0	-9.8	



**LTE Band 12**

LTE Band 12 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b>		Samsung						
	<b>Project #:</b>		4789468331						
	<b>Date:</b>		2020-05-11						
	<b>Test Engineer:</b>		20881						
	<b>Configuration:</b>		EUT, Z-Position						
	<b>Location:</b>		Chamber 2						
	<b>Mode:</b>		LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth						
	<b>Test Equipment:</b>								
	Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	<b>f MHz</b>	<b>SG reading (dBm)</b>	<b>Ant. Pol. (H/V)</b>	<b>Cable Loss (dB)</b>	<b>Antenna Gain (dBd)</b>	<b>ERP (dBm)</b>	<b>Limit (dBm)</b>	<b>Delta (dB)</b>	<b>Notes</b>
	Low Ch								
	704.00	21.68	V	2.8	-1.1	17.84	34.8	-17.0	
	704.00	7.56	H	2.8	-1.1	3.72	34.8	-31.1	
	Mid Ch								
	707.50	21.83	V	2.8	-1.1	17.99	34.8	-16.8	
	707.50	7.84	H	2.8	-1.1	4.00	34.8	-30.8	
	High Ch								
	711.00	21.80	V	2.8	-1.1	17.95	34.8	-16.9	
	711.00	8.09	H	2.8	-1.1	4.24	34.8	-30.6	

LTE Band 12 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b>		Samsung						
	<b>Project #:</b>		4789468331						
	<b>Date:</b>		2020-05-11						
	<b>Test Engineer:</b>		20881						
	<b>Configuration:</b>		EUT, Z-Position						
	<b>Location:</b>		Chamber 2						
	<b>Mode:</b>		LTE_16QAM Band 12 Fundamentals, 10MHz Bandwidth						
	<b>Test Equipment:</b>								
	Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable								
	<b>f MHz</b>	<b>SG reading (dBm)</b>	<b>Ant. Pol. (H/V)</b>	<b>Cable Loss (dB)</b>	<b>Antenna Gain (dBd)</b>	<b>ERP (dBm)</b>	<b>Limit (dBm)</b>	<b>Delta (dB)</b>	<b>Notes</b>
	Low Ch								
	704.00	20.63	V	2.8	-1.1	16.79	34.8	-18.0	
	704.00	6.24	H	2.8	-1.1	2.40	34.8	-32.4	
	Mid Ch								
	707.50	20.52	V	2.8	-1.1	16.68	34.8	-18.1	
	707.50	6.96	H	2.8	-1.1	3.12	34.8	-31.7	
	High Ch								
	711.00	20.73	V	2.8	-1.1	16.88	34.8	-17.9	
	711.00	6.96	H	2.8	-1.1	3.11	34.8	-31.7	

LTE Band 12 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, Z-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_QPSK Band 12 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								
	701.50	21.58	V	2.8	-1.1	17.74	34.8	-17.1	
	701.50	7.76	H	2.8	-1.1	3.93	34.8	-30.9	
	Mid Ch								
	707.50	21.62	V	2.8	-1.1	17.78	34.8	-17.0	
	707.50	7.73	H	2.8	-1.1	3.89	34.8	-30.9	
High Ch									
713.50	21.68	V	2.8	-1.1	17.82	34.8	-17.0		
713.50	7.93	H	2.8	-1.1	4.07	34.8	-30.7		
LTE Band 12 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, Z-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 12 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								
	701.50	20.43	V	2.8	-1.1	16.59	34.8	-18.2	
	701.50	6.48	H	2.8	-1.1	2.65	34.8	-32.2	
	Mid Ch								
	707.50	20.43	V	2.8	-1.1	16.59	34.8	-18.2	
	707.50	6.79	H	2.8	-1.1	2.95	34.8	-31.9	
High Ch									
713.50	20.60	V	2.8	-1.1	16.74	34.8	-18.1		
713.50	6.85	H	2.8	-1.1	2.99	34.8	-31.8		

LTE Band 12 3MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789468331 Date: 2020-05-11 Test Engineer: 20881 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 12 Fundamentals, 3MHz 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								
	700.50	22.19	V	2.8	-1.1	18.36	34.8	-16.4	
	700.50	7.58	H	2.8	-1.1	3.75	34.8	-31.1	
	Mid Ch								
	707.50	22.27	V	2.8	-1.1	18.43	34.8	-16.4	
	707.50	7.06	H	2.8	-1.1	3.22	34.8	-31.6	
High Ch									
714.50	22.18	V	2.8	-1.1	18.32	34.8	-16.5		
714.50	7.93	H	2.8	-1.1	4.07	34.8	-30.7		
LTE Band 12 3MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789468331 Date: 2020-05-11 Test Engineer: 20881 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 12 Fundamentals, 3MHz 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								
	700.50	21.35	V	2.8	-1.1	17.52	34.8	-17.3	
	700.50	6.76	H	2.8	-1.1	2.93	34.8	-31.9	
	Mid Ch								
	707.50	21.21	V	2.8	-1.1	17.37	34.8	-17.4	
	707.50	6.10	H	2.8	-1.1	2.26	34.8	-32.5	
High Ch									
714.50	21.22	V	2.8	-1.1	17.36	34.8	-17.4		
714.50	7.19	H	2.8	-1.1	3.33	34.8	-31.5		

LTE Band 12 1.4MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, Z-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_QPSK Band 12 Fundamentals, 1.4MHz 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								
	699.70	21.31	V	2.8	-1.1	17.47	34.8	-17.3	
	699.70	7.02	H	2.8	-1.1	3.19	34.8	-31.6	
	Mid Ch								
	707.50	21.56	V	2.8	-1.1	17.72	34.8	-17.1	
	707.50	7.91	H	2.8	-1.1	4.07	34.8	-30.7	
High Ch									
715.30	21.92	V	2.8	-1.1	18.05	34.8	-16.7		
715.30	7.90	H	2.8	-1.1	4.03	34.8	-30.8		
LTE Band 12 1.4MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, Z-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 12 Fundamentals, 1.4MHz 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								
	699.70	20.02	V	2.8	-1.1	16.18	34.8	-18.6	
	699.70	6.27	H	2.8	-1.1	2.44	34.8	-32.4	
	Mid Ch								
	707.50	20.49	V	2.8	-1.1	16.65	34.8	-18.2	
	707.50	6.82	H	2.8	-1.1	2.98	34.8	-31.8	
High Ch									
715.30	20.85	V	2.8	-1.1	16.98	34.8	-17.8		
715.30	6.89	H	2.8	-1.1	3.02	34.8	-31.8		

**LTE Band 13**

LTE Band 13 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																				
	<p> <b>Company:</b> Samsung  <b>Project #:</b> 4789468331  <b>Date:</b> 2020-05-11  <b>Test Engineer:</b> 20881  <b>Configuration:</b> EUT, Z-Position  <b>Location:</b> Chamber 1  <b>Mode:</b> LTE_QPSK Band 13 Fundamentals, 10MHz Bandwidth                 </p> <p> <b>Test Equipment:</b>                      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>Mid Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>782.00</td> <td>25.62</td> <td>V</td> <td>2.9</td> <td>-1.1</td> <td>21.63</td> <td>34.8</td> <td>-13.1</td> <td></td> </tr> <tr> <td>782.00</td> <td>15.42</td> <td>H</td> <td>2.9</td> <td>-1.1</td> <td>11.43</td> <td>34.8</td> <td>-23.3</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	Mid Ch									782.00	25.62	V	2.9	-1.1	21.63	34.8	-13.1		782.00	15.42	H	2.9	-1.1	11.43	34.8	-23.3	
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																													
Mid Ch																																					
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782.00	15.42	H	2.9	-1.1	11.43	34.8	-23.3																														
LTE Band 13 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																				
	<p> <b>Company:</b> Samsung  <b>Project #:</b> 4789468331  <b>Date:</b> 2020-05-11  <b>Test Engineer:</b> 20881  <b>Configuration:</b> EUT, Z-Position  <b>Location:</b> Chamber 1  <b>Mode:</b> LTE_16QAM Band 13 Fundamentals, 10MHz Bandwidth                 </p> <p> <b>Test Equipment:</b>                      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>Mid Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>782.00</td> <td>24.36</td> <td>V</td> <td>2.9</td> <td>-1.1</td> <td>20.37</td> <td>34.8</td> <td>-14.4</td> <td></td> </tr> <tr> <td>782.00</td> <td>14.38</td> <td>H</td> <td>2.9</td> <td>-1.1</td> <td>10.39</td> <td>34.8</td> <td>-24.4</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	Mid Ch									782.00	24.36	V	2.9	-1.1	20.37	34.8	-14.4		782.00	14.38	H	2.9	-1.1	10.39	34.8	-24.4	
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	24.36	V	2.9	-1.1	20.37	34.8	-14.4																														
782.00	14.38	H	2.9	-1.1	10.39	34.8	-24.4																														

LTE Band 13 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, Z-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 13 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								
	779.50	25.97	V	2.9	-1.1	21.99	34.8	-12.8	
	779.50	15.46	H	2.9	-1.1	11.48	34.8	-23.3	
	Mid Ch								
	782.00	25.71	V	2.9	-1.1	21.72	34.8	-13.0	
	782.00	15.36	H	2.9	-1.1	11.37	34.8	-23.4	
High Ch									
784.50	25.76	V	2.9	-1.1	21.77	34.8	-13.0		
784.50	15.64	H	2.9	-1.1	11.65	34.8	-23.1		
LTE Band 13 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, Z-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 13 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								
	779.50	24.36	V	2.9	-1.1	20.38	34.8	-14.4	
	779.50	13.62	H	2.9	-1.1	9.64	34.8	-25.1	
	Mid Ch								
	782.00	24.45	V	2.9	-1.1	20.46	34.8	-14.3	
	782.00	14.32	H	2.9	-1.1	10.33	34.8	-24.4	
High Ch									
784.50	24.64	V	2.9	-1.1	20.65	34.8	-14.1		
784.50	14.46	H	2.9	-1.1	10.47	34.8	-24.3		

**LTE Band 25**

		UL Verification Services, Inc. High Frequency Substitution Measurement								
		Company: Samsung Project #: 4789468331 Date: 2020-05-21 Test Engineer: 20881 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 25 Fundamentals, 20MHz Bandwidth								
		<u>Test Equipment:</u> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
LTE Band 25 20MHz QPSK	Low Ch									
		1860.00	10.18	V	4.5	9.4	15.11	33.0	-17.9	
		1860.00	18.20	H	4.5	9.4	23.12	33.0	-9.9	
		Mid Ch								
		1882.50	13.61	V	4.5	9.3	18.36	33.0	-14.6	
		1882.50	17.52	H	4.5	9.3	22.27	33.0	-10.7	
		High Ch								
		1905.00	13.96	V	4.6	9.1	18.51	33.0	-14.5	
		1905.00	20.29	H	4.6	9.1	24.84	33.0	-8.2	

		UL Verification Services, Inc. High Frequency Substitution Measurement								
		Company: Samsung Project #: 4789468331 Date: 2020-05-21 Test Engineer: 20881 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_16QAM Band 25 Fundamentals, 20MHz Bandwidth								
		<u>Test Equipment:</u> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
LTE Band 25 20MHz 16QAM	Low Ch									
		1860.00	9.04	V	4.5	9.4	13.97	33.0	-19.0	
		1860.00	17.21	H	4.5	9.4	22.13	33.0	-10.9	
		Mid Ch								
		1882.50	12.76	V	4.5	9.3	17.51	33.0	-15.5	
		1882.50	16.51	H	4.5	9.3	21.26	33.0	-11.7	
		High Ch								
		1905.00	12.96	V	4.6	9.1	17.51	33.0	-15.5	
		1905.00	18.95	H	4.6	9.1	23.50	33.0	-9.5	

LTE Band 25 15MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789468331 Date: 2020-05-21 Test Engineer: 20881 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 25 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1857.50	11.19	V	4.5	9.5	16.14	33.0	-16.9	
	1857.50	17.54	H	4.5	9.5	22.49	33.0	-10.5	
	Mid Ch								
	1882.50	13.84	V	4.5	9.3	18.59	33.0	-14.4	
	1882.50	17.47	H	4.5	9.3	22.22	33.0	-10.8	
High Ch									
1907.50	14.28	V	4.6	9.1	18.80	33.0	-14.2		
1907.50	20.38	H	4.6	9.1	24.90	33.0	-8.1		
LTE Band 25 15MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789468331 Date: 2020-05-21 Test Engineer: 20881 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_16QAM Band 25 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1857.50	9.96	V	4.5	9.5	14.91	33.0	-18.1	
	1857.50	16.29	H	4.5	9.5	21.24	33.0	-11.8	
	Mid Ch								
	1882.50	12.73	V	4.5	9.3	17.48	33.0	-15.5	
	1882.50	16.39	H	4.5	9.3	21.14	33.0	-11.9	
High Ch									
1907.50	13.19	V	4.6	9.1	17.71	33.0	-15.3		
1907.50	19.25	H	4.6	9.1	23.77	33.0	-9.2		



LTE Band 25 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789468331 Date: 2020-05-20 Test Engineer: 20881 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 25 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1855.00	12.67	V	4.5	9.5	17.64	33.0	-15.4	
	1855.00	17.05	H	4.5	9.5	22.02	33.0	-11.0	
	Mid Ch								
	1882.50	13.43	V	4.5	9.3	18.18	33.0	-14.8	
	1882.50	17.37	H	4.5	9.3	22.12	33.0	-10.9	
High Ch									
1910.00	14.39	V	4.6	9.1	18.87	33.0	-14.1		
1910.00	19.43	H	4.6	9.1	23.92	33.0	-9.1		
LTE Band 25 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789468331 Date: 2020-05-20 Test Engineer: 20881 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_16QAM Band 25 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1855.00	11.63	V	4.5	9.5	16.60	33.0	-16.4	
	1855.00	15.97	H	4.5	9.5	20.94	33.0	-12.1	
	Mid Ch								
	1882.50	12.35	V	4.5	9.3	17.10	33.0	-15.9	
	1882.50	16.45	H	4.5	9.3	21.20	33.0	-11.8	
High Ch									
1910.00	13.20	V	4.6	9.1	17.68	33.0	-15.3		
1910.00	17.59	H	4.6	9.1	22.08	33.0	-10.9		

LTE Band 25 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 25 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1852.50	13.39	V	4.5	9.5	18.38	33.0	-14.6	
	1852.50	17.00	H	4.5	9.5	21.99	33.0	-11.0	
	Mid Ch								
	1882.50	13.36	V	4.5	9.3	18.11	33.0	-14.9	
	1882.50	17.15	H	4.5	9.3	21.90	33.0	-11.1	
High Ch									
1912.50	12.79	V	4.6	9.0	17.25	33.0	-15.8		
1912.50	19.14	H	4.6	9.0	23.60	33.0	-9.4		
LTE Band 25 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 25 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1852.50	12.42	V	4.5	9.5	17.41	33.0	-15.6	
	1852.50	15.78	H	4.5	9.5	20.77	33.0	-12.2	
	Mid Ch								
	1882.50	12.32	V	4.5	9.3	17.07	33.0	-15.9	
	1882.50	16.04	H	4.5	9.3	20.79	33.0	-12.2	
High Ch									
1912.50	11.98	V	4.6	9.0	16.44	33.0	-16.6		
1912.50	18.05	H	4.6	9.0	22.51	33.0	-10.5		

LTE Band 25 3MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 25 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1851.50	13.38	V	4.5	9.5	18.38	33.0	-14.6	
	1851.50	16.90	H	4.5	9.5	21.90	33.0	-11.1	
	Mid Ch								
	1882.50	13.12	V	4.5	9.3	17.87	33.0	-15.1	
	1882.50	17.89	H	4.5	9.3	22.64	33.0	-10.4	
High Ch									
1913.50	14.64	V	4.6	9.0	19.08	33.0	-13.9		
1913.50	19.13	H	4.6	9.0	23.57	33.0	-9.4		
LTE Band 25 3MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 25 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1851.50	11.94	V	4.5	9.5	16.94	33.0	-16.1	
	1851.50	15.76	H	4.5	9.5	20.76	33.0	-12.2	
	Mid Ch								
	1882.50	12.35	V	4.5	9.3	17.10	33.0	-15.9	
	1882.50	16.50	H	4.5	9.3	21.25	33.0	-11.8	
High Ch									
1913.50	13.51	V	4.6	9.0	17.95	33.0	-15.0		
1913.50	17.98	H	4.6	9.0	22.42	33.0	-10.6		

LTE Band 25 1.4MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 25 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1850.70	13.54	V	4.5	9.5	18.54	33.0	-14.5	
	1850.70	17.17	H	4.5	9.5	22.17	33.0	-10.8	
	Mid Ch								
	1882.50	13.34	V	4.5	9.3	18.09	33.0	-14.9	
	1882.50	17.12	H	4.5	9.3	21.87	33.0	-11.1	
High Ch									
1914.30	12.87	V	4.6	9.0	17.30	33.0	-15.7		
1914.30	19.08	H	4.6	9.0	23.51	33.0	-9.5		
LTE Band 25 1.4MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 25 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1850.70	12.22	V	4.5	9.5	17.22	33.0	-15.8	
	1850.70	15.78	H	4.5	9.5	20.78	33.0	-12.2	
	Mid Ch								
	1882.50	12.16	V	4.5	9.3	16.91	33.0	-16.1	
	1882.50	16.15	H	4.5	9.3	20.90	33.0	-12.1	
High Ch									
1914.30	11.72	V	4.6	9.0	16.15	33.0	-16.9		
1914.30	18.00	H	4.6	9.0	22.43	33.0	-10.6		

**LTE Band 26**

		UL Verification Services, Inc. High Frequency Substitution Measurement																																																																				
LTE  Band 26 (Part 90) 15MHz  QPSK	Company: Samsung Project #: 4789468331 Date: 2020-05-11 Test Engineer: 20882 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 Fundamentals, 15MHz Bandwidth  <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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821.50	23.04	H	3.0	-1.0	19.07	50.0	-30.9	Part 90																																																														
LTE  Band 26 (Part 22) 15MHz  QPSK	Company: Samsung Project #: 4789468331 Date: 2020-05-11 Test Engineer: 20882 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 Fundamentals, 15MHz Bandwidth  <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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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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831.50	18.08	V	3.0	-0.9	14.14	38.5	-24.4																																																															
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High Ch																																																																						
841.50	16.53	V	3.0	-0.9	12.61	38.5	-25.9																																																															
841.50	23.38	H	3.0	-0.9	19.46	38.5	-19.0																																																															

		UL Verification Services, Inc. High Frequency Substitution Measurement							
LTE  Band 26 (Part 90) 15MHz  16QAM	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <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	14.95	V	3.0	-1.0	10.98	50.0	-39.0	Part 90
821.50	21.99	H	3.0	-1.0	18.02	50.0	-32.0	Part 90	
LTE  Band 26 (Part 22) 15MHz  16QAM	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <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	17.07	V	3.0	-0.9	13.13	38.5	-25.4	
	831.50	23.84	H	3.0	-0.9	19.89	38.5	-18.6	
	High Ch								
	841.50	15.12	V	3.0	-0.9	11.20	38.5	-27.3	
	841.50	21.96	H	3.0	-0.9	18.04	38.5	-20.5	

LTE  Band 26 (Part 90) 10MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>									
	Company: Samsung Project #: 4789468331 Date: 2020-05-11 Test Engineer: 20882 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 Fundamentals, 10MHz 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									
	819.00	15.47	V	3.0	-1.0	11.49	50.0	-38.5	Part 90	
	819.00	22.93	H	3.0	-1.0	18.95	50.0	-31.1	Part 90	
LTE  Band 26 (Part 22) 10MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>									
	Company: Samsung Project #: 4789468331 Date: 2020-05-11 Test Engineer: 20882 Configuration: EUT, X-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 Fundamentals, 10MHz 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								
		829.00	17.93	V	3.0	-0.9	13.97	50.0	-36.0	
		829.00	24.66	H	3.0	-0.9	20.71	50.0	-29.3	
		Mid Ch								
		831.50	18.03	V	3.0	-0.9	14.09	38.5	-24.4	
		831.50	24.78	H	3.0	-0.9	20.83	38.5	-17.7	
		High Ch								
		844.00	15.87	V	3.0	-0.9	11.95	38.5	-26.6	
		844.00	22.92	H	3.0	-0.9	19.00	38.5	-19.5	

		UL Verification Services, Inc. High Frequency Substitution Measurement								
LTE  Band 26 (Part 90) 10MHz  16QAM	Company:	Samsung								
	Project #:	4789468331								
	Date:	2020-05-11								
	Test Engineer:	20882								
	Configuration:	EUT, X-Position								
	Location:	Chamber 1								
	Mode:	LTE_16QAM Band 26 Fundamentals, 10MHz 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									
		819.00	14.43	V	3.0	-1.0	10.45	50.0	-39.5	Part 90
		819.00	22.06	H	3.0	-1.0	18.08	50.0	-31.9	Part 90
		UL Verification Services, Inc. High Frequency Substitution Measurement								
LTE  Band 26 (Part 22) 10MHz  16QAM	Company:	Samsung								
	Project #:	4789468331								
	Date:	2020-05-11								
	Test Engineer:	20882								
	Configuration:	EUT, X-Position								
	Location:	Chamber 1								
	Mode:	LTE_16QAM Band 26 Fundamentals, 10MHz 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									
		829.00	15.25	V	3.0	-0.9	11.29	50.0	-38.7	
		829.00	22.55	H	3.0	-0.9	18.60	50.0	-31.4	
	Mid Ch									
		831.50	16.88	V	3.0	-0.9	12.94	38.5	-25.6	
		831.50	23.78	H	3.0	-0.9	19.83	38.5	-18.7	
	High Ch									
		844.00	14.91	V	3.0	-0.9	10.99	38.5	-27.5	
		844.00	21.75	H	3.0	-0.9	17.83	38.5	-20.7	



		UL Verification Services, Inc. High Frequency Substitution Measurement							
LTE  Band 26 (Part 90) 5MHz  QPSK	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 26 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								
	816.50	16.52	V	3.0	-1.0	12.54	50.0	-37.5	Part 90
	816.50	23.36	H	3.0	-1.0	19.38	50.0	-30.6	Part 90
	Mid Ch								
	821.50	18.02	V	3.0	-1.0	14.05	38.5	-24.4	Part 90
	821.50	22.86	H	3.0	-1.0	18.89	38.5	-19.6	Part 90
LTE  Band 26 (Part 22) 5MHz  QPSK	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 26 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	17.40	V	3.0	-0.9	13.44	50.0	-36.6	
	826.50	24.43	H	3.0	-0.9	20.47	50.0	-29.5	
	Mid Ch								
	831.50	17.20	V	3.0	-0.9	13.26	38.5	-25.2	
	831.50	24.08	H	3.0	-0.9	20.13	38.5	-18.4	
	High Ch								
	846.50	15.81	V	3.0	-0.9	11.89	38.5	-26.6	
846.50	22.82	H	3.0	-0.9	18.90	38.5	-19.6		

		UL Verification Services, Inc. High Frequency Substitution Measurement								
LTE  Band 26 (Part 90) 5MHz  16QAM	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 26 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									
	816.50	15.74	V	3.0	-1.0	11.76	50.0	-38.2	Part 90	
	816.50	22.34	H	3.0	-1.0	18.36	50.0	-31.6	Part 90	
	Mid Ch									
	821.50	14.81	V	3.0	-1.0	10.84	38.5	-27.7	Part 90	
	821.50	21.80	H	3.0	-1.0	17.83	38.5	-20.7	Part 90	
LTE  Band 26 (Part 22) 5MHz  16QAM	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 26 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	16.41	V	3.0	-0.9	12.45	50.0	-37.5		
	826.50	23.35	H	3.0	-0.9	19.39	50.0	-30.6		
	Mid Ch									
	831.50	15.93	V	3.0	-0.9	11.99	38.5	-26.5		
	831.50	23.04	H	3.0	-0.9	19.09	38.5	-19.4		
	High Ch									
846.50	14.46	V	3.0	-0.9	10.54	38.5	-28.0			
846.50	21.72	H	3.0	-0.9	17.80	38.5	-20.7			

		UL Verification Services, Inc. High Frequency Substitution Measurement							
LTE  Band 26 (Part 90) 3MHz  QPSK	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 26 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								
	815.50	16.84	V	3.0	-1.0	12.85	50.0	-37.1	Part 90
	815.50	23.86	H	3.0	-1.0	19.88	50.0	-30.1	Part 90
	Mid Ch								
	822.50	16.10	V	3.0	-1.0	12.13	38.5	-26.4	Part 90
	822.50	23.05	H	3.0	-1.0	19.09	38.5	-19.4	Part 90
LTE  Band 26 (Part 22) 3MHz  QPSK	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 26 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	15.67	V	3.0	-0.9	11.71	50.0	-38.3	
	825.50	22.69	H	3.0	-0.9	18.73	50.0	-31.3	
	Mid Ch								
	831.50	17.67	V	3.0	-0.9	13.73	38.5	-24.8	
	831.50	24.33	H	3.0	-0.9	20.38	38.5	-18.1	
	High Ch								
847.50	16.06	V	3.1	-0.9	12.15	38.5	-26.3		
847.50	22.97	H	3.1	-0.9	19.06	38.5	-19.4		

		UL Verification Services, Inc. High Frequency Substitution Measurement							
LTE  Band 26 (Part 90) 3MHz  16QAM	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 26 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								
	815.50	15.81	V	3.0	-1.0	11.82	50.0	-38.2	Part 90
	815.50	22.39	H	3.0	-1.0	18.41	50.0	-31.6	Part 90
	Mid Ch								
	822.50	14.47	V	3.0	-1.0	10.50	38.5	-28.0	Part 90
	822.50	21.92	H	3.0	-1.0	17.96	38.5	-20.5	Part 90
LTE  Band 26 (Part 22) 3MHz  16QAM	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 26 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	14.78	V	3.0	-0.9	10.82	50.0	-39.2	
	825.50	21.90	H	3.0	-0.9	17.94	50.0	-32.1	
	Mid Ch								
	831.50	16.45	V	3.0	-0.9	12.51	38.5	-26.0	
	831.50	23.22	H	3.0	-0.9	19.27	38.5	-19.2	
	High Ch								
847.50	14.87	V	3.1	-0.9	10.96	38.5	-27.5		
847.50	21.93	H	3.1	-0.9	18.02	38.5	-20.5		

		UL Verification Services, Inc. High Frequency Substitution Measurement							
LTE  Band 26 (Part 90) 1.4MHz  QPSK	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 26 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								
	814.70	16.97	V	3.0	-1.0	12.99	50.0	-37.0	Part 90
	814.70	23.81	H	3.0	-1.0	19.82	50.0	-30.2	Part 90
	Mid Ch								
	823.30	15.74	V	3.0	-1.0	11.77	38.5	-26.7	Part 90
	823.30	22.73	H	3.0	-1.0	18.76	38.5	-19.7	Part 90
LTE  Band 26 (Part 22) 1.4MHz  QPSK	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 26 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	15.57	V	3.0	-1.0	11.60	50.0	-38.4	
	824.70	22.69	H	3.0	-1.0	18.73	50.0	-31.3	
	Mid Ch								
	831.50	17.00	V	3.0	-0.9	13.06	38.5	-25.4	
	831.50	23.92	H	3.0	-0.9	19.97	38.5	-18.5	
	High Ch								
	848.30	15.60	V	3.0	-0.9	11.69	38.5	-26.8	
848.30	22.80	H	3.0	-0.9	18.89	38.5	-19.6		

		UL Verification Services, Inc. High Frequency Substitution Measurement							
LTE  Band 26 (Part 90) 1.4MHz  16QAM	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 26 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								
	814.70	15.92	V	3.0	-1.0	11.94	50.0	-38.1	Part 90
	814.70	22.77	H	3.0	-1.0	18.78	50.0	-31.2	Part 90
	Mid Ch								
	823.30	14.56	V	3.0	-1.0	10.59	38.5	-27.9	Part 90
	823.30	21.98	H	3.0	-1.0	18.01	38.5	-20.5	Part 90
LTE  Band 26 (Part 22) 1.4MHz  16QAM	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-11 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 26 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	14.56	V	3.0	-1.0	10.59	38.5	-27.9	
	824.70	21.70	H	3.0	-1.0	17.74	38.5	-20.8	
	Mid Ch								
	831.50	16.00	V	3.0	-0.9	12.06	38.5	-26.4	
	831.50	22.83	H	3.0	-0.9	18.88	38.5	-19.6	
	High Ch								
848.30	13.39	V	3.0	-0.9	9.48	38.5	-29.0		
848.30	21.75	H	3.0	-0.9	17.84	38.5	-20.7		

**LTE Band 41**

LTE Band 41 20MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
	<p> <b>Company:</b> Samsung  <b>Project #:</b> 4789468331  <b>Date:</b> 2020-05-12  <b>Test Engineer:</b> 20881  <b>Configuration:</b> EUT, X-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth                 </p> <p> <b>Test Equipment:</b>                      Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables                      Substitution: Horn 3115[00167451], 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 (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>2506.00</td> <td>19.02</td> <td>V</td> <td>5.2</td> <td>10.1</td> <td>23.85</td> <td>33.0</td> <td>-9.2</td> <td></td> </tr> <tr> <td>2506.00</td> <td>21.33</td> <td>H</td> <td>5.2</td> <td>10.1</td> <td>26.16</td> <td>33.0</td> <td>-6.8</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>2593.00</td> <td>18.47</td> <td>V</td> <td>5.3</td> <td>10.0</td> <td>23.10</td> <td>33.0</td> <td>-9.9</td> <td></td> </tr> <tr> <td>2593.00</td> <td>22.12</td> <td>H</td> <td>5.3</td> <td>10.0</td> <td>26.75</td> <td>33.0</td> <td>-6.2</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>2680.00</td> <td>14.80</td> <td>V</td> <td>5.4</td> <td>10.0</td> <td>19.38</td> <td>33.0</td> <td>-13.6</td> <td></td> </tr> <tr> <td>2680.00</td> <td>20.28</td> <td>H</td> <td>5.4</td> <td>10.0</td> <td>24.86</td> <td>33.0</td> <td>-8.1</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									2506.00	19.02	V	5.2	10.1	23.85	33.0	-9.2		2506.00	21.33	H	5.2	10.1	26.16	33.0	-6.8		Mid Ch									2593.00	18.47	V	5.3	10.0	23.10	33.0	-9.9		2593.00	22.12	H	5.3	10.0	26.75	33.0	-6.2		High Ch									2680.00	14.80	V	5.4	10.0	19.38	33.0	-13.6		2680.00	20.28	H	5.4	10.0	24.86	33.0	-8.1
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LTE Band 41 20MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
	<p> <b>Company:</b> Samsung  <b>Project #:</b> 4789468331  <b>Date:</b> 2020-05-12  <b>Test Engineer:</b> 20881  <b>Configuration:</b> EUT, X-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_16QAM Band 41 Fundamentals, 20MHz Bandwidth                 </p> <p> <b>Test Equipment:</b>                      Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables                      Substitution: Horn 3115[00167451], 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 (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>2506.00</td> <td>18.66</td> <td>V</td> <td>5.2</td> <td>10.1</td> <td>23.49</td> <td>33.0</td> <td>-9.5</td> <td></td> </tr> <tr> <td>2506.00</td> <td>20.74</td> <td>H</td> <td>5.2</td> <td>10.1</td> <td>25.57</td> <td>33.0</td> <td>-7.4</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>2593.00</td> <td>19.29</td> <td>V</td> <td>5.3</td> <td>10.0</td> <td>23.92</td> <td>33.0</td> <td>-9.1</td> <td></td> </tr> <tr> <td>2593.00</td> <td>21.76</td> <td>H</td> <td>5.3</td> <td>10.0</td> <td>26.39</td> <td>33.0</td> <td>-6.6</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>2680.00</td> <td>14.85</td> <td>V</td> <td>5.4</td> <td>10.0</td> <td>19.43</td> <td>33.0</td> <td>-13.6</td> <td></td> </tr> <tr> <td>2680.00</td> <td>19.72</td> <td>H</td> <td>5.4</td> <td>10.0</td> <td>24.30</td> <td>33.0</td> <td>-8.7</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									2506.00	18.66	V	5.2	10.1	23.49	33.0	-9.5		2506.00	20.74	H	5.2	10.1	25.57	33.0	-7.4		Mid Ch									2593.00	19.29	V	5.3	10.0	23.92	33.0	-9.1		2593.00	21.76	H	5.3	10.0	26.39	33.0	-6.6		High Ch									2680.00	14.85	V	5.4	10.0	19.43	33.0	-13.6		2680.00	19.72	H	5.4	10.0	24.30	33.0	-8.7
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LTE Band 41 15MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-12 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_QPSK Band 41 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								
	2503.50	18.99	V	5.2	10.1	23.82	33.0	-9.2	
	2503.50	21.45	H	5.2	10.1	26.28	33.0	-6.7	
	Mid Ch								
	2593.00	20.19	V	5.3	10.0	24.82	33.0	-8.2	
	2593.00	22.25	H	5.3	10.0	26.88	33.0	-6.1	
High Ch									
2682.50	15.43	V	5.4	10.0	20.01	33.0	-13.0		
2682.50	20.84	H	5.4	10.0	25.43	33.0	-7.6		
LTE Band 41 15MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-12 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 41 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								
	2503.50	18.61	V	5.2	10.1	23.44	33.0	-9.6	
	2503.50	20.73	H	5.2	10.1	25.56	33.0	-7.4	
	Mid Ch								
	2593.00	19.56	V	5.3	10.0	24.19	33.0	-8.8	
	2593.00	21.65	H	5.3	10.0	26.28	33.0	-6.7	
High Ch									
2682.50	14.90	V	5.4	10.0	19.48	33.0	-13.5		
2682.50	19.45	H	5.4	10.0	24.04	33.0	-9.0		



LTE Band 41 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-12 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_QPSK Band 41 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								
	2501.00	19.61	V	5.2	10.1	24.45	33.0	-8.5	
	2501.00	21.57	H	5.2	10.1	26.41	33.0	-6.6	
	Mid Ch								
	2593.00	19.95	V	5.3	10.0	24.58	33.0	-8.4	
	2593.00	22.55	H	5.3	10.0	27.18	33.0	-5.8	
High Ch									
2685.00	15.61	V	5.5	10.0	20.19	33.0	-12.8		
2685.00	20.63	H	5.5	10.0	25.21	33.0	-7.8		
LTE Band 41 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-12 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 41 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								
	2501.00	19.43	V	5.2	10.1	24.27	33.0	-8.7	
	2501.00	21.80	H	5.2	10.1	26.64	33.0	-6.4	
	Mid Ch								
	2593.00	20.01	V	5.3	10.0	24.64	33.0	-8.4	
	2593.00	23.03	H	5.3	10.0	27.66	33.0	-5.3	
High Ch									
2685.00	15.25	V	5.5	10.0	19.83	33.0	-13.2		
2685.00	19.64	H	5.5	10.0	24.22	33.0	-8.8		

LTE Band 41 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-12 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_QPSK Band 41 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								
	2498.50	18.31	V	5.2	10.1	23.15	33.0	-9.8	
	2498.50	21.04	H	5.2	10.1	25.88	33.0	-7.1	
	Mid Ch								
	2593.00	19.33	V	5.3	10.0	23.96	33.0	-9.0	
	2593.00	23.22	H	5.3	10.0	27.85	33.0	-5.1	
High Ch									
2687.50	16.25	V	5.5	10.0	20.84	33.0	-12.2		
2687.50	19.45	H	5.5	10.0	24.03	33.0	-9.0		
LTE Band 41 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-12 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 41 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								
	2498.50	17.96	V	5.2	10.1	22.80	33.0	-10.2	
	2498.50	21.52	H	5.2	10.1	26.36	33.0	-6.6	
	Mid Ch								
	2593.00	19.10	V	5.3	10.0	23.73	33.0	-9.3	
	2593.00	22.89	H	5.3	10.0	27.52	33.0	-5.5	
High Ch									
2687.50	15.69	V	5.5	10.0	20.28	33.0	-12.7		
2687.50	19.31	H	5.5	10.0	23.89	33.0	-9.1		

**LTE Band 66**

LTE Band 66 20MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, Y-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 66 Fundamentals, 20MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1720.00	19.23	V	4.3	9.4	24.32	30.0	-5.7	
	1720.00	14.26	H	4.3	9.4	19.36	30.0	-10.6	
	Mid Ch								
	1745.00	19.27	V	4.4	9.5	24.44	30.0	-5.6	
	1745.00	13.39	H	4.4	9.5	18.55	30.0	-11.4	
High Ch									
1770.00	18.67	V	4.4	9.6	23.84	30.0	-6.2		
1770.00	12.18	H	4.4	9.6	17.35	30.0	-12.7		

LTE Band 66 20MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, Y-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 66 Fundamentals, 20MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1720.00	18.28	V	4.3	9.4	23.37	30.0	-6.6	
	1720.00	13.26	H	4.3	9.4	18.36	30.0	-11.6	
	Mid Ch								
	1745.00	18.42	V	4.4	9.5	23.59	30.0	-6.4	
	1745.00	12.41	H	4.4	9.5	17.57	30.0	-12.4	
High Ch									
1770.00	17.32	V	4.4	9.6	22.49	30.0	-7.5		
1770.00	11.15	H	4.4	9.6	16.32	30.0	-13.7		

LTE Band 66 15MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, Y-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 66 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1717.50	19.35	V	4.3	9.4	24.45	30.0	-5.6	
	1717.50	12.11	H	4.3	9.4	17.20	30.0	-12.8	
	Mid Ch								
	1745.00	18.67	V	4.4	9.5	23.84	30.0	-6.2	
	1745.00	14.53	H	4.4	9.5	19.69	30.0	-10.3	
High Ch									
1772.50	16.95	V	4.4	9.6	22.13	30.0	-7.9		
1772.50	11.53	H	4.4	9.6	16.70	30.0	-13.3		
LTE Band 66 15MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, Y-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 66 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1717.50	17.65	V	4.3	9.4	22.75	30.0	-7.3	
	1717.50	11.71	H	4.3	9.4	16.80	30.0	-13.2	
	Mid Ch								
	1745.00	16.81	V	4.4	9.5	21.98	30.0	-8.0	
	1745.00	12.04	H	4.4	9.5	17.20	30.0	-12.8	
High Ch									
1772.50	15.95	V	4.4	9.6	21.13	30.0	-8.9		
1772.50	10.41	H	4.4	9.6	15.58	30.0	-14.4		

LTE Band 66 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, Y-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 66 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1715.00	19.26	V	4.3	9.4	24.35	30.0	-5.7	
	1715.00	14.34	H	4.3	9.4	19.43	30.0	-10.6	
	Mid Ch								
	1745.00	19.05	V	4.4	9.5	24.22	30.0	-5.8	
	1745.00	13.85	H	4.4	9.5	19.01	30.0	-11.0	
High Ch									
1775.00	16.66	V	4.4	9.6	21.84	30.0	-8.2		
1775.00	12.90	H	4.4	9.6	18.08	30.0	-11.9		
LTE Band 66 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, Y-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 66 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1715.00	18.14	V	4.3	9.4	23.23	30.0	-6.8	
	1715.00	13.35	H	4.3	9.4	18.44	30.0	-11.6	
	Mid Ch								
	1745.00	17.93	V	4.4	9.5	23.10	30.0	-6.9	
	1745.00	12.50	H	4.4	9.5	17.66	30.0	-12.3	
High Ch									
1775.00	15.68	V	4.4	9.6	20.86	30.0	-9.1		
1775.00	11.16	H	4.4	9.6	16.34	30.0	-13.7		

LTE Band 66 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, Y-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 66 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1712.50	6.53	V	4.3	9.4	11.61	30.0	-18.4	
	1712.50	4.69	H	4.3	9.4	9.77	30.0	-20.2	
	Mid Ch								
	1745.00	18.83	V	4.4	9.5	24.00	30.0	-6.0	
	1745.00	13.31	H	4.4	9.5	18.47	30.0	-11.5	
High Ch									
1777.50	17.80	V	4.4	9.6	22.97	30.0	-7.0		
1777.50	12.70	H	4.4	9.6	17.87	30.0	-12.1		
LTE Band 66 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, Y-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 66 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1712.50	6.66	V	4.3	9.4	11.74	30.0	-18.3	
	1712.50	5.07	H	4.3	9.4	10.15	30.0	-19.9	
	Mid Ch								
	1745.00	17.80	V	4.4	9.5	22.97	30.0	-7.0	
	1745.00	12.01	H	4.4	9.5	17.17	30.0	-12.8	
High Ch									
1777.50	16.90	V	4.4	9.6	22.07	30.0	-7.9		
1777.50	11.67	H	4.4	9.6	16.84	30.0	-13.2		

LTE Band 66 3MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, Y-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 66 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1711.50	17.83	V	4.3	9.4	22.91	30.0	-7.1	
	1711.50	12.84	H	4.3	9.4	17.92	30.0	-12.1	
	Mid Ch								
	1745.00	18.87	V	4.4	9.5	24.04	30.0	-6.0	
	1745.00	13.74	H	4.4	9.5	18.90	30.0	-11.1	
High Ch									
1778.50	19.00	V	4.4	9.6	24.18	30.0	-5.8		
1778.50	13.80	H	4.4	9.6	18.98	30.0	-11.0		
LTE Band 66 3MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, Y-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 66 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1711.50	17.61	V	4.3	9.4	22.69	30.0	-7.3	
	1711.50	12.36	H	4.3	9.4	17.44	30.0	-12.6	
	Mid Ch								
	1745.00	17.83	V	4.4	9.5	23.00	30.0	-7.0	
	1745.00	12.43	H	4.4	9.5	17.59	30.0	-12.4	
High Ch									
1778.50	17.02	V	4.4	9.6	22.20	30.0	-7.8		
1778.50	11.21	H	4.4	9.6	16.39	30.0	-13.6		

LTE Band 66 1.4MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, Y-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 66 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1710.70	18.43	V	4.3	9.4	23.50	30.0	-6.5	
	1710.70	13.23	H	4.3	9.4	18.31	30.0	-11.7	
	Mid Ch								
	1745.00	18.47	V	4.4	9.5	23.64	30.0	-6.4	
	1745.00	13.29	H	4.4	9.5	18.45	30.0	-11.5	
High Ch									
1779.30	17.84	V	4.4	9.6	23.01	30.0	-7.0		
1779.30	12.86	H	4.4	9.6	18.04	30.0	-12.0		
LTE Band 66 1.4MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789468331 <b>Date:</b> 2020-05-20 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, Y-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 66 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1710.70	17.28	V	4.3	9.4	22.35	30.0	-7.6	
	1710.70	12.31	H	4.3	9.4	17.39	30.0	-12.6	
	Mid Ch								
	1745.00	17.24	V	4.4	9.5	22.41	30.0	-7.6	
	1745.00	12.10	H	4.4	9.5	17.26	30.0	-12.7	
High Ch									
1779.30	16.96	V	4.4	9.6	22.13	30.0	-7.9		
1779.30	11.58	H	4.4	9.6	16.76	30.0	-13.2		



## 9.6. FIELD STRENGTH OF SPURIOUS RADIATION

### RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53

### LIMIT

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

Part 27.53:

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

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

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

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

(m) (4) For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less 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

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

For peak power measurement with a ESU40:

- a) Set the RBW = 100 kHz for emission below 1GHz and 1MHz for emissions above 1GHz
- b) Set VBW  $\geq 3 \times$  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  $\geq$  span/RBW;
- g) Trace mode = average(WCDMA, LTE), Max hold(GSM, LTE Band41);;

### RESULTS

See the following pages.

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

**9.6.1. SPURIOUS RADIATION PLOTS**

**GSM850**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
		Company:	Samsung									
		Project #:	4789468331									
		Date:	2020-05-11									
		Test Engineer:	20881									
		Configuration:	EUT / AC Adapter, X-Position									
		Location:	Chamber 1									
		Mode:	GPRS 850 MHz Harmonics									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes			
Low Ch, 824.2MHz												
1648.40	-14.0	V	3.0	45.2	1.0	-58.2	-13.0	-45.2				
2472.60	-7.6	V	3.0	45.0	1.0	-51.6	-13.0	-38.6				
3296.80	-8.6	V	3.0	45.3	1.0	-52.9	-13.0	-39.9				
1648.40	-12.9	H	3.0	45.2	1.0	-57.1	-13.0	-44.1				
2472.60	-6.3	H	3.0	45.0	1.0	-50.3	-13.0	-37.3				
3296.80	-8.8	H	3.0	45.3	1.0	-53.1	-13.0	-40.1				
Mid Ch, 836.6MHz												
1673.20	-13.4	V	3.0	45.2	1.0	-57.6	-13.0	-44.6				
2509.80	-7.0	V	3.0	45.0	1.0	-51.0	-13.0	-38.0				
3346.40	-7.9	V	3.0	45.3	1.0	-52.2	-13.0	-39.2				
1673.20	-12.7	H	3.0	45.2	1.0	-56.9	-13.0	-43.9				
2509.80	-3.1	H	3.0	45.0	1.0	-47.2	-13.0	-34.2				
3346.40	-9.0	H	3.0	45.3	1.0	-53.2	-13.0	-40.2				
High Ch, 848.8MHz												
1697.60	-13.7	V	3.0	45.2	1.0	-57.9	-13.0	-44.9				
2546.40	-6.7	V	3.0	45.1	1.0	-50.7	-13.0	-37.7				
3395.20	-8.2	V	3.0	45.3	1.0	-52.5	-13.0	-39.5				
1697.60	-13.1	H	3.0	45.2	1.0	-57.2	-13.0	-44.2				
2546.40	-2.9	H	3.0	45.1	1.0	-47.0	-13.0	-34.0				
3395.20	-8.1	H	3.0	45.3	1.0	-52.4	-13.0	-39.4				
GSM850		GPRS										
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
		Company:	Samsung									
		Project #:	4789468331									
		Date:	2020-05-11									
		Test Engineer:	20881									
		Configuration:	EUT / AC Adapter, X-Position									
		Location:	Chamber 1									
		Mode:	EGPRS 850 MHz Harmonics									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes			
Low Ch, 824.2MHz												
1648.40	-14.1	V	3.0	45.2	1.0	-58.3	-13.0	-45.3				
2472.60	-10.6	V	3.0	45.0	1.0	-54.7	-13.0	-41.7				
3296.80	-8.7	V	3.0	45.3	1.0	-53.0	-13.0	-40.0				
1648.40	-13.2	H	3.0	45.2	1.0	-57.4	-13.0	-44.4				
2472.60	-10.0	H	3.0	45.0	1.0	-54.1	-13.0	-41.1				
3296.80	-8.9	H	3.0	45.3	1.0	-53.2	-13.0	-40.2				
Mid Ch, 836.6MHz												
1673.20	-14.1	V	3.0	45.2	1.0	-58.3	-13.0	-45.3				
2509.80	-10.8	V	3.0	45.0	1.0	-54.8	-13.0	-41.8				
3346.40	-8.2	V	3.0	45.3	1.0	-52.4	-13.0	-39.4				
1673.20	-13.2	H	3.0	45.2	1.0	-57.4	-13.0	-44.4				
2509.80	-9.1	H	3.0	45.0	1.0	-53.1	-13.0	-40.1				
3346.40	-8.3	H	3.0	45.3	1.0	-52.5	-13.0	-39.5				
High Ch, 848.8MHz												
1697.60	-13.9	V	3.0	45.2	1.0	-58.0	-13.0	-45.0				
2546.40	-10.7	V	3.0	45.1	1.0	-54.8	-13.0	-41.8				
3395.20	-8.2	V	3.0	45.3	1.0	-52.4	-13.0	-39.4				
1697.60	-13.0	H	3.0	45.2	1.0	-57.1	-13.0	-44.1				
2546.40	-9.5	H	3.0	45.1	1.0	-53.5	-13.0	-40.5				
3395.20	-8.2	H	3.0	45.3	1.0	-52.5	-13.0	-39.5				
GSM850		EGPRS										

**GSM1900**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
<b>Company:</b>		Samsung								
<b>Project #:</b>		4789468331								
<b>Date:</b>		2020-05-19								
<b>Test Engineer:</b>		20881								
<b>Configuration:</b>		EUT / AC Adapter, X-Position								
<b>Location:</b>		Chamber 2								
<b>Mode:</b>		GPRS 1900 MHz Harmonics								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch, 1850.2MHz										
3700.40	-10.6	V	3.0	42.0	1.0	-51.6	-13.0	-38.6		
5550.60	-6.9	V	3.0	42.9	1.0	-48.8	-13.0	-35.8		
7400.80	-5.4	V	3.0	42.5	1.0	-46.9	-13.0	-33.9		
3700.40	-11.4	H	3.0	42.0	1.0	-52.4	-13.0	-39.4		
5550.60	-6.9	H	3.0	42.9	1.0	-48.8	-13.0	-35.8		
7400.80	-5.3	H	3.0	42.5	1.0	-46.7	-13.0	-33.7		
Mid Ch, 1880MHz										
3760.00	-10.2	V	3.0	42.1	1.0	-51.3	-13.0	-38.3		
5640.00	-6.7	V	3.0	42.9	1.0	-48.6	-13.0	-35.6		
7520.00	-5.6	V	3.0	42.4	1.0	-47.0	-13.0	-34.0		
3760.00	-10.5	H	3.0	42.1	1.0	-51.6	-13.0	-38.6		
5640.00	-6.8	H	3.0	42.9	1.0	-48.7	-13.0	-35.7		
7520.00	-5.7	H	3.0	42.4	1.0	-47.1	-13.0	-34.1		
High Ch, 1909.8MHz										
3819.60	-10.3	V	3.0	42.1	1.0	-51.4	-13.0	-38.4		
5729.40	-6.6	V	3.0	42.9	1.0	-48.5	-13.0	-35.5		
7639.20	-5.2	V	3.0	42.3	1.0	-46.6	-13.0	-33.6		
3819.60	-11.2	H	3.0	42.1	1.0	-52.3	-13.0	-39.3		
5729.40	-7.0	H	3.0	42.9	1.0	-48.9	-13.0	-35.9		
7639.20	-5.6	H	3.0	42.3	1.0	-47.0	-13.0	-34.0		

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
<b>Company:</b>		Samsung								
<b>Project #:</b>		4789468331								
<b>Date:</b>		2020-05-19								
<b>Test Engineer:</b>		20881								
<b>Configuration:</b>		EUT / AC Adapter, X-Position								
<b>Location:</b>		Chamber 2								
<b>Mode:</b>		EGPRS 1900 MHz Harmonics								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch, 1850.2MHz										
3700.40	-10.5	V	3.0	42.0	1.0	-51.5	-13.0	-38.5		
5550.60	-7.0	V	3.0	42.9	1.0	-48.9	-13.0	-35.9		
7400.80	-5.5	V	3.0	42.5	1.0	-47.0	-13.0	-34.0		
3700.40	-10.6	H	3.0	42.0	1.0	-51.6	-13.0	-38.6		
5550.60	-6.8	H	3.0	42.9	1.0	-48.6	-13.0	-35.6		
7400.80	-5.3	H	3.0	42.5	1.0	-46.8	-13.0	-33.8		
Mid Ch, 1880MHz										
3760.00	-10.1	V	3.0	42.1	1.0	-51.2	-13.0	-38.2		
5640.00	-6.8	V	3.0	42.9	1.0	-48.6	-13.0	-35.6		
7520.00	-5.4	V	3.0	42.4	1.0	-46.8	-13.0	-33.8		
3760.00	-10.1	H	3.0	42.1	1.0	-51.2	-13.0	-38.2		
5640.00	-6.8	H	3.0	42.9	1.0	-48.7	-13.0	-35.7		
7520.00	-5.6	H	3.0	42.4	1.0	-47.0	-13.0	-34.0		
High Ch, 1909.8MHz										
3819.60	-10.3	V	3.0	42.1	1.0	-51.4	-13.0	-38.4		
5729.40	-6.9	V	3.0	42.9	1.0	-48.8	-13.0	-35.8		
7639.20	-5.5	V	3.0	42.3	1.0	-46.8	-13.0	-33.8		
3819.60	-10.1	H	3.0	42.1	1.0	-51.2	-13.0	-38.2		
5729.40	-7.2	H	3.0	42.9	1.0	-49.1	-13.0	-36.1		
7639.20	-5.5	H	3.0	42.3	1.0	-46.9	-13.0	-33.9		

**WCDMA Band 5**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		Company: Samsung Project #: 4789468331 Date: 2020-05-11 Test Engineer: 20881 Configuration: EUT / AC Adapter, X-Position Location: Chamber 1 Mode: Rel99 Band 5 Harmonics								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
<b>Low Ch, 826.4MHz</b>										
1652.80	-14.9	V	3.0	45.2	1.0	-59.1	-13.0	-46.1		
2479.20	-11.6	V	3.0	45.0	1.0	-55.6	-13.0	-42.6		
3305.60	-9.5	V	3.0	45.3	1.0	-53.8	-13.0	-40.8		
1652.80	-13.7	H	3.0	45.2	1.0	-57.9	-13.0	-44.9		
2479.20	-11.0	H	3.0	45.0	1.0	-55.1	-13.0	-42.1		
3305.60	-9.6	H	3.0	45.3	1.0	-53.9	-13.0	-40.9		
<b>Mid Ch, 836.6MHz</b>										
1673.20	-14.8	V	3.0	45.2	1.0	-59.0	-13.0	-46.0		
2509.80	-11.7	V	3.0	45.0	1.0	-55.7	-13.0	-42.7		
3346.40	-9.0	V	3.0	45.3	1.0	-53.3	-13.0	-40.3		
1673.20	-14.0	H	3.0	45.2	1.0	-58.2	-13.0	-45.2		
2509.80	-10.9	H	3.0	45.0	1.0	-55.0	-13.0	-42.0		
3346.40	-9.1	H	3.0	45.3	1.0	-53.4	-13.0	-40.4		
<b>High Ch, 846.6MHz</b>										
1693.20	-14.7	V	3.0	45.2	1.0	-58.9	-13.0	-45.9		
2539.80	-11.4	V	3.0	45.0	1.0	-55.5	-13.0	-42.5		
3386.40	-8.9	V	3.0	45.3	1.0	-53.2	-13.0	-40.2		
1693.20	-13.8	H	3.0	45.2	1.0	-57.9	-13.0	-44.9		
2539.80	-11.1	H	3.0	45.0	1.0	-55.1	-13.0	-42.1		
3386.40	-9.1	H	3.0	45.3	1.0	-53.4	-13.0	-40.4		
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		Company: Samsung Project #: 4789468331 Date: 2020-05-11 Test Engineer: 20881 Configuration: EUT / AC Adapter, X-Position Location: Chamber 1 Mode: HSDPA Band 5 Harmonics								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
<b>Low Ch, 826.4MHz</b>										
1652.80	-14.9	V	3.0	45.2	1.0	-59.1	-13.0	-46.1		
2479.20	-11.5	V	3.0	45.0	1.0	-55.5	-13.0	-42.5		
3305.60	-9.5	V	3.0	45.3	1.0	-53.8	-13.0	-40.8		
1652.80	-13.9	H	3.0	45.2	1.0	-58.1	-13.0	-45.1		
2479.20	-10.9	H	3.0	45.0	1.0	-55.0	-13.0	-42.0		
3305.60	-9.6	H	3.0	45.3	1.0	-53.8	-13.0	-40.8		
<b>Mid Ch, 836.6MHz</b>										
1673.20	-14.8	V	3.0	45.2	1.0	-59.0	-13.0	-46.0		
2509.80	-11.6	V	3.0	45.0	1.0	-55.7	-13.0	-42.7		
3346.40	-9.0	V	3.0	45.3	1.0	-53.2	-13.0	-40.2		
1673.20	-14.0	H	3.0	45.2	1.0	-58.2	-13.0	-45.2		
2509.80	-11.0	H	3.0	45.0	1.0	-55.1	-13.0	-42.1		
3346.40	-9.0	H	3.0	45.3	1.0	-53.3	-13.0	-40.3		
<b>High Ch, 846.6MHz</b>										
1693.20	-14.7	V	3.0	45.2	1.0	-58.9	-13.0	-45.9		
2539.80	-11.5	V	3.0	45.0	1.0	-55.5	-13.0	-42.5		
3386.40	-8.9	V	3.0	45.3	1.0	-53.2	-13.0	-40.2		
1693.20	-13.8	H	3.0	45.2	1.0	-58.0	-13.0	-45.0		
2539.80	-11.0	H	3.0	45.0	1.0	-55.0	-13.0	-42.0		
3386.40	-9.1	H	3.0	45.3	1.0	-53.4	-13.0	-40.4		

**WCDMA Band 4**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
<b>Company:</b>		Samsung								
<b>Project #:</b>		4789468331								
<b>Date:</b>		2020-05-14								
<b>Test Engineer:</b>		20881								
<b>Configuration:</b>		EUT / AC Adapter, Z-Position								
<b>Location:</b>		Chamber 1								
<b>Mode:</b>		Rel99 Band 4 Harmonics								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
<b>Low Ch, 1712.4MHz</b>										
3424.80	-12.0	V	3.0	45.3	1.0	-56.3	-13.0	-43.3		
5137.20	-6.8	V	3.0	45.3	1.0	-51.1	-13.0	-38.1		
6849.60	-5.5	V	3.0	44.5	1.0	-49.0	-13.0	-36.0		
3424.80	-8.8	H	3.0	45.3	1.0	-53.1	-13.0	-40.1		
5137.20	-8.1	H	3.0	45.3	1.0	-52.4	-13.0	-39.4		
6849.60	-5.6	H	3.0	44.5	1.0	-49.1	-13.0	-36.1		
<b>Mid Ch, 1732.6MHz</b>										
3465.20	-7.9	V	3.0	45.3	1.0	-52.3	-13.0	-39.3		
5197.80	-7.5	V	3.0	45.3	1.0	-51.8	-13.0	-38.8		
6930.40	-5.5	V	3.0	44.4	1.0	-48.9	-13.0	-35.9		
3465.20	-8.1	H	3.0	45.3	1.0	-52.4	-13.0	-39.4		
5197.80	-7.9	H	3.0	45.3	1.0	-52.2	-13.0	-39.2		
6930.40	-5.6	H	3.0	44.4	1.0	-49.0	-13.0	-36.0		
<b>High Ch, 1752.6MHz</b>										
3505.20	-7.6	V	3.0	45.3	1.0	-51.9	-13.0	-38.9		
5257.80	-7.6	V	3.0	45.3	1.0	-51.8	-13.0	-38.8		
7010.40	-5.2	V	3.0	44.4	1.0	-48.6	-13.0	-35.6		
3505.20	-7.8	H	3.0	45.3	1.0	-52.1	-13.0	-39.1		
5257.80	-7.9	H	3.0	45.3	1.0	-52.2	-13.0	-39.2		
7010.40	-5.2	H	3.0	44.4	1.0	-48.5	-13.0	-35.5		

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
<b>Company:</b>		Samsung								
<b>Project #:</b>		4789468331								
<b>Date:</b>		2020-05-14								
<b>Test Engineer:</b>		20881								
<b>Configuration:</b>		EUT / AC Adapter, Z-Position								
<b>Location:</b>		Chamber 1								
<b>Mode:</b>		HSDPA Band 4 Harmonics								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
<b>Low Ch, 1712.4MHz</b>										
3424.80	-11.7	V	3.0	45.3	1.0	-56.0	-13.0	-43.0		
5137.20	-7.8	V	3.0	45.3	1.0	-52.1	-13.0	-39.1		
6849.60	-5.4	V	3.0	44.5	1.0	-48.9	-13.0	-35.9		
3424.80	-8.7	H	3.0	45.3	1.0	-53.0	-13.0	-40.0		
5137.20	-8.2	H	3.0	45.3	1.0	-52.5	-13.0	-39.5		
6849.60	-5.5	H	3.0	44.5	1.0	-49.0	-13.0	-36.0		
<b>Mid Ch, 1732.6MHz</b>										
3465.20	-7.9	V	3.0	45.3	1.0	-52.2	-13.0	-39.2		
5197.80	-7.5	V	3.0	45.3	1.0	-51.8	-13.0	-38.8		
6930.40	-5.4	V	3.0	44.4	1.0	-48.9	-13.0	-35.9		
3465.20	-8.1	H	3.0	45.3	1.0	-52.4	-13.0	-39.4		
5197.80	-7.8	H	3.0	45.3	1.0	-52.1	-13.0	-39.1		
6930.40	-5.5	H	3.0	44.4	1.0	-49.0	-13.0	-36.0		
<b>High Ch, 1752.6MHz</b>										
3505.20	-7.5	V	3.0	45.3	1.0	-51.9	-13.0	-38.9		
5257.80	-7.5	V	3.0	45.3	1.0	-51.8	-13.0	-38.8		
7010.40	-5.1	V	3.0	44.4	1.0	-48.5	-13.0	-35.5		
3505.20	-7.7	H	3.0	45.3	1.0	-52.1	-13.0	-39.1		
5257.80	-7.9	H	3.0	45.3	1.0	-52.2	-13.0	-39.2		
7010.40	-5.2	H	3.0	44.4	1.0	-48.5	-13.0	-35.5		

**WCDMA Band 2**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		Company: Samsung Project #: 4789468331 Date: 2020-05-14 Test Engineer: 20881 Configuration: EUT / AC Adapter, X-Position Location: Chamber 1 Mode: Rel99 Band 2 Harmonics								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch, 1852.4MHz										
3704.80	-10.5	V	3.0	45.4	1.0	-54.9	-13.0	-41.9		
5557.20	-7.7	V	3.0	45.3	1.0	-52.0	-13.0	-39.0		
7409.60	-5.1	V	3.0	44.1	1.0	-48.3	-13.0	-35.3		
3704.80	-10.8	H	3.0	45.4	1.0	-55.2	-13.0	-42.2		
5557.20	-7.9	H	3.0	45.3	1.0	-52.2	-13.0	-39.2		
7409.60	-5.1	H	3.0	44.1	1.0	-48.3	-13.0	-35.3		
Mid Ch, 1880MHz										
3760.00	-10.4	V	3.0	45.4	1.0	-54.8	-13.0	-41.8		
5640.00	-7.5	V	3.0	45.3	1.0	-51.8	-13.0	-38.8		
7520.00	-5.2	V	3.0	44.1	1.0	-48.3	-13.0	-35.3		
3760.00	-10.7	H	3.0	45.4	1.0	-55.1	-13.0	-42.1		
5640.00	-7.6	H	3.0	45.3	1.0	-51.9	-13.0	-38.9		
7520.00	-5.1	H	3.0	44.1	1.0	-48.2	-13.0	-35.2		
High Ch, 1907.6MHz										
3815.20	-10.5	V	3.0	45.4	1.0	-54.9	-13.0	-41.9		
5722.80	-7.6	V	3.0	45.3	1.0	-51.9	-13.0	-38.9		
7630.40	-5.1	V	3.0	44.0	1.0	-48.1	-13.0	-35.1		
3815.20	-10.8	H	3.0	45.4	1.0	-55.2	-13.0	-42.2		
5722.80	-7.8	H	3.0	45.3	1.0	-52.1	-13.0	-39.1		
7630.40	-5.0	H	3.0	44.0	1.0	-48.0	-13.0	-35.0		
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		Company: Samsung Project #: 4789468331 Date: 2020-05-14 Test Engineer: 20881 Configuration: EUT / AC Adapter Location: Chamber 1 Mode: HSDPA Band 2 Harmonics								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch, 1852.4MHz										
3704.80	-10.6	V	3.0	45.4	1.0	-55.0	-13.0	-42.0		
5557.20	-7.7	V	3.0	45.3	1.0	-52.0	-13.0	-39.0		
7409.60	-5.3	V	3.0	44.1	1.0	-48.4	-13.0	-35.4		
3704.80	-10.8	H	3.0	45.4	1.0	-55.2	-13.0	-42.2		
5557.20	-7.9	H	3.0	45.3	1.0	-52.2	-13.0	-39.2		
7409.60	-5.1	H	3.0	44.1	1.0	-48.2	-13.0	-35.2		
Mid Ch, 1880MHz										
3760.00	-10.4	V	3.0	45.4	1.0	-54.8	-13.0	-41.8		
5640.00	-7.5	V	3.0	45.3	1.0	-51.8	-13.0	-38.8		
7520.00	-5.3	V	3.0	44.1	1.0	-48.4	-13.0	-35.4		
3760.00	-10.7	H	3.0	45.4	1.0	-55.1	-13.0	-42.1		
5640.00	-7.6	H	3.0	45.3	1.0	-51.9	-13.0	-38.9		
7520.00	-5.1	H	3.0	44.1	1.0	-48.2	-13.0	-35.2		
High Ch, 1907.6MHz										
3815.20	-10.4	V	3.0	45.4	1.0	-54.8	-13.0	-41.8		
5722.80	-7.6	V	3.0	45.3	1.0	-51.8	-13.0	-38.8		
7630.40	-5.0	V	3.0	44.0	1.0	-48.1	-13.0	-35.1		
3815.20	-10.9	H	3.0	45.4	1.0	-55.3	-13.0	-42.3		
5722.80	-7.8	H	3.0	45.3	1.0	-52.1	-13.0	-39.1		
7630.40	-4.9	H	3.0	44.0	1.0	-47.9	-13.0	-34.9		

**LTE Band 12**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789468331							
<b>Date:</b>		2020-05-11							
<b>Test Engineer:</b>		20881							
<b>Configuration:</b>		EUT / AC Adapter							
<b>Location:</b>		Chamber 2							
<b>Mode:</b>		LTE_QPSK Band 12 Harmonics, 3MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 700.5MHz</b>									
1401.00	-15.8	V	3.0	40.7	1.0	-55.5	-13.0	-42.5	
2101.50	-13.4	V	3.0	40.7	1.0	-53.2	-13.0	-40.2	
2802.00	-11.1	V	3.0	41.7	1.0	-51.9	-13.0	-38.9	
1401.00	-17.0	H	3.0	40.7	1.0	-56.8	-13.0	-43.8	
<b>3MHz</b>									
2101.50	-13.6	H	3.0	40.7	1.0	-53.3	-13.0	-40.3	
2802.00	-10.9	H	3.0	41.7	1.0	-51.7	-13.0	-38.7	
<b>QPSK</b>									
<b>Mid Ch, 707.5MHz</b>									
1415.00	-15.3	V	3.0	40.7	1.0	-55.0	-13.0	-42.0	
2122.50	-13.5	V	3.0	40.8	1.0	-53.3	-13.0	-40.3	
2830.00	-11.0	V	3.0	41.8	1.0	-51.8	-13.0	-38.8	
1415.00	-16.5	H	3.0	40.7	1.0	-56.2	-13.0	-43.2	
2122.50	-12.7	H	3.0	40.8	1.0	-52.5	-13.0	-39.5	
2830.00	-10.6	H	3.0	41.8	1.0	-51.4	-13.0	-38.4	
<b>High Ch, 714.5MHz</b>									
1429.00	-15.7	V	3.0	40.7	1.0	-55.4	-13.0	-42.4	
2143.50	-13.3	V	3.0	40.8	1.0	-53.1	-13.0	-40.1	
2858.00	-10.5	V	3.0	41.8	1.0	-51.4	-13.0	-38.4	
1429.00	-16.6	H	3.0	40.7	1.0	-56.3	-13.0	-43.3	
2143.50	-13.3	H	3.0	40.8	1.0	-53.1	-13.0	-40.1	
2858.00	-10.0	H	3.0	41.8	1.0	-50.8	-13.0	-37.8	

**LTE Band 13**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
		<b>Company:</b>	Samsung							
		<b>Project #:</b>	4789468331							
		<b>Date:</b>	2020-05-11							
		<b>Test Engineer:</b>	20881							
		<b>Configuration:</b>	EUT / AC Adapter, Z-Position							
		<b>Location:</b>	Chamber 1							
		<b>Mode:</b>	LTE_QPSK Band 13 Harmonics, 5MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
<b>LTE</b>										
<b>Band 13</b>										
<b>5MHz</b>										
<b>QPSK</b>										
<b>Low Ch, 779.5MHz</b>										
1559.00	-24.8	V	3.0	45.3	1.0	-69.1	-40.0	-29.1		
2338.50	-12.2	V	3.0	45.0	1.0	-56.2	-13.0	-43.2		
3118.00	-10.0	V	3.0	45.2	1.0	-54.2	-13.0	-41.2		
1559.00	-23.8	H	3.0	45.3	1.0	-68.0	-40.0	-28.0		
2338.50	-11.5	H	3.0	45.0	1.0	-55.5	-13.0	-42.5		
3118.00	-10.2	H	3.0	45.2	1.0	-54.4	-13.0	-41.4		
<b>Mid Ch, 782MHz</b>										
1564.00	-24.7	V	3.0	45.3	1.0	-69.0	-40.0	-29.0		
2346.00	-12.3	V	3.0	45.0	1.0	-56.3	-13.0	-43.3		
3128.00	-9.9	V	3.0	45.2	1.0	-54.1	-13.0	-41.1		
1564.00	-24.0	H	3.0	45.3	1.0	-68.3	-40.0	-28.3		
2346.00	-11.6	H	3.0	45.0	1.0	-55.6	-13.0	-42.6		
3128.00	-10.1	H	3.0	45.2	1.0	-54.3	-13.0	-41.3		
<b>High Ch, 784.5MHz</b>										
1569.00	-24.8	V	3.0	45.3	1.0	-69.1	-40.0	-29.1		
2353.50	-12.2	V	3.0	45.0	1.0	-56.2	-13.0	-43.2		
3138.00	-10.0	V	3.0	45.2	1.0	-54.2	-13.0	-41.2		
1569.00	-24.0	H	3.0	45.3	1.0	-68.3	-40.0	-28.3		
2353.50	-11.5	H	3.0	45.0	1.0	-55.5	-13.0	-42.5		
3138.00	-10.0	H	3.0	45.2	1.0	-54.2	-13.0	-41.2		

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



**LTE Band 25**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4789468331							
Date:		2020-05-21							
Test Engineer:		20881							
Configuration:		EUT / AC Adapter, X-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 25 Harmonics, 3MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 1851.5MHz</b>									
3703.00	-10.7	V	3.0	45.4	1.0	-55.0	-13.0	-42.0	
5554.50	-7.7	V	3.0	45.3	1.0	-52.0	-13.0	-39.0	
7406.00	-5.3	V	3.0	44.1	1.0	-48.4	-13.0	-35.4	
3703.00	-10.9	H	3.0	45.4	1.0	-55.3	-13.0	-42.3	
5554.50	-8.0	H	3.0	45.3	1.0	-52.3	-13.0	-39.3	
7406.00	-5.2	H	3.0	44.1	1.0	-48.3	-13.0	-35.3	
<b>Mid Ch, 1882.5MHz</b>									
3765.00	-10.4	V	3.0	45.4	1.0	-54.8	-13.0	-41.8	
5647.50	-7.5	V	3.0	45.3	1.0	-51.7	-13.0	-38.7	
7530.00	-5.2	V	3.0	44.1	1.0	-48.3	-13.0	-35.3	
3765.00	-10.7	H	3.0	45.4	1.0	-55.2	-13.0	-42.2	
5647.50	-7.8	H	3.0	45.3	1.0	-52.1	-13.0	-39.1	
7530.00	-5.2	H	3.0	44.1	1.0	-48.3	-13.0	-35.3	
<b>High Ch, 1913.5MHz</b>									
3827.00	-10.6	V	3.0	45.4	1.0	-55.1	-13.0	-42.1	
5740.50	-7.7	V	3.0	45.3	1.0	-51.9	-13.0	-38.9	
7654.00	-5.2	V	3.0	44.0	1.0	-48.2	-13.0	-35.2	
3827.00	-10.9	H	3.0	45.4	1.0	-55.3	-13.0	-42.3	
5740.50	-7.8	H	3.0	45.3	1.0	-52.1	-13.0	-39.1	
7654.00	-5.0	H	3.0	44.0	1.0	-48.0	-13.0	-35.0	

LTE  
 Band 25  
 3MHz  
 QPSK

**LTE Band 26**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4789468331							
Date:		2020-05-11							
Test Engineer:		20882							
Configuration:		EUT / AC Adapter, X-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 26 Harmonics, 3MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 815.5MHz</b>									
1651.00	-14.6	V	3.0	45.2	1.0	-58.8	-13.0	-45.8	
2476.50	-11.4	V	3.0	45.0	1.0	-55.4	-13.0	-42.4	
3302.00	-9.8	V	3.0	45.3	1.0	-54.1	-13.0	-41.1	
1651.00	-14.1	H	3.0	45.2	1.0	-58.3	-13.0	-45.3	
2476.50	-11.0	H	3.0	45.0	1.0	-55.1	-13.0	-42.1	
3302.00	-9.7	H	3.0	45.3	1.0	-54.0	-13.0	-41.0	
<b>Mid CH, 822.5MHz</b>									
1645.00	-15.0	V	3.0	45.2	1.0	-59.2	-13.0	-46.2	
2467.50	-11.7	V	3.0	45.0	1.0	-55.8	-13.0	-42.8	
3290.00	-9.7	V	3.0	45.3	1.0	-53.9	-13.0	-40.9	
1645.00	-14.2	H	3.0	45.2	1.0	-58.4	-13.0	-45.4	
2467.50	-10.7	H	3.0	45.0	1.0	-54.8	-13.0	-41.8	
3290.00	-9.9	H	3.0	45.3	1.0	-54.1	-13.0	-41.1	

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4789468331							
Date:		2020-05-11							
Test Engineer:		20882							
Configuration:		EUT / AC Adapter, X-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 26 Harmonics, 3MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low CH, 825.5MHz</b>									
1651.00	-15.2	V	3.0	45.2	1.0	-59.4	-13.0	-46.4	
2476.50	-12.0	V	3.0	45.0	1.0	-56.0	-13.0	-43.0	
3302.00	-9.4	V	3.0	45.3	1.0	-53.7	-13.0	-40.7	
1651.00	-14.4	H	3.0	45.2	1.0	-58.6	-13.0	-45.6	
2476.50	-11.1	H	3.0	45.0	1.0	-55.1	-13.0	-42.1	
3302.00	-9.8	H	3.0	45.3	1.0	-54.1	-13.0	-41.1	
<b>Mid Ch, 831.5MHz</b>									
1663.00	-15.4	V	3.0	45.2	1.0	-59.6	-13.0	-46.6	
2494.50	-11.7	V	3.0	45.0	1.0	-55.7	-13.0	-42.7	
3326.00	-9.5	V	3.0	45.3	1.0	-53.7	-13.0	-40.7	
1663.00	-14.5	H	3.0	45.2	1.0	-58.7	-13.0	-45.7	
2494.50	-10.3	H	3.0	45.0	1.0	-54.4	-13.0	-41.4	
3326.00	-9.6	H	3.0	45.3	1.0	-53.9	-13.0	-40.9	
<b>High Ch, 847.5MHz</b>									
1695.00	-15.1	V	3.0	45.2	1.0	-59.2	-13.0	-46.2	
2542.50	-11.8	V	3.0	45.0	1.0	-55.8	-13.0	-42.8	
3390.00	-8.8	V	3.0	45.3	1.0	-53.1	-13.0	-40.1	
1695.00	-14.3	H	3.0	45.2	1.0	-58.5	-13.0	-45.5	
2542.50	-11.4	H	3.0	45.0	1.0	-55.5	-13.0	-42.5	
3390.00	-9.3	H	3.0	45.3	1.0	-53.5	-13.0	-40.5	

**LTE Band 41 (PC2)**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
LTE Band 41  5MHz QPSK	Company: Samsung										
	Project #: 4789468331										
	Date: 2020-05-12										
	Test Engineer: 20881										
	Configuration: EUT/ AC Adapter, X-Position										
	Location: Chamber 2										
	Mode: LTE_QPSK Band 41 Harmonics, 5MHz Bandwidth										
	<b>Low Ch, 2498.5MHz</b>										
		4997.00	-18.0	V	3.0	42.7	1.0	-59.8	-25.0	-34.8	
		7495.50	-17.1	V	3.0	42.4	1.0	-58.5	-25.0	-33.5	
		9994.00	-14.2	V	3.0	40.8	1.0	-54.0	-25.0	-29.0	
		4997.00	-18.1	H	3.0	42.7	1.0	-59.8	-25.0	-34.8	
		7495.50	-17.2	H	3.0	42.4	1.0	-58.6	-25.0	-33.6	
		9994.00	-14.4	H	3.0	40.8	1.0	-54.2	-25.0	-29.2	
	<b>Mid Ch, 2593MHz</b>										
		5186.00	-17.1	V	3.0	42.8	1.0	-58.9	-25.0	-33.9	
		7779.00	-17.4	V	3.0	42.3	1.0	-58.7	-25.0	-33.7	
		10372.00	-13.3	V	3.0	41.0	1.0	-53.3	-25.0	-28.3	
		5186.00	-16.6	H	3.0	42.8	1.0	-58.4	-25.0	-33.4	
		7779.00	-17.2	H	3.0	42.3	1.0	-58.5	-25.0	-33.5	
		10372.00	-14.5	H	3.0	41.0	1.0	-54.5	-25.0	-29.5	
	<b>High Ch, 2687.5MHz</b>										
		5375.00	-17.7	V	3.0	42.8	1.0	-59.5	-25.0	-34.5	
		8062.50	-16.7	V	3.0	42.1	1.0	-57.8	-25.0	-32.8	
		10750.00	-12.8	V	3.0	41.2	1.0	-53.0	-25.0	-28.0	
		5375.00	-17.5	H	3.0	42.8	1.0	-59.3	-25.0	-34.3	
		8062.50	-17.4	H	3.0	42.1	1.0	-58.6	-25.0	-33.6	
		10750.00	-13.1	H	3.0	41.2	1.0	-53.3	-25.0	-28.3	

**LTE Band 66**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement											
LTE Band 66  3MHz QPSK		Company: Samsung Project #: 4789468331 Date: 2020-05-20 Test Engineer: 20881 Configuration: EUT / AC Adapter, Y-Position Location: Chamber 1 Mode: LTE_QPSK Band 66 Harmonics, 3MHz Bandwidth									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Ch, 1711.5MHz									
		3423.00	-8.7	V	3.0	45.3	1.0	-53.0	-13.0	-40.0	
		5134.50	-7.8	V	3.0	45.3	1.0	-52.1	-13.0	-39.1	
		6846.00	-5.5	V	3.0	44.5	1.0	-49.0	-13.0	-36.0	
		3423.00	-9.0	H	3.0	45.3	1.0	-53.3	-13.0	-40.3	
		5134.50	-8.2	H	3.0	45.3	1.0	-52.5	-13.0	-39.5	
		6846.00	-5.6	H	3.0	44.5	1.0	-49.1	-13.0	-36.1	
		Mid Ch, 1745MHz									
3490.00	-8.1	V	3.0	45.3	1.0	-52.5	-13.0	-39.5			
5235.00	-7.6	V	3.0	45.3	1.0	-51.8	-13.0	-38.8			
6980.00	-5.4	V	3.0	44.4	1.0	-48.7	-13.0	-35.7			
3490.00	-8.3	H	3.0	45.3	1.0	-52.6	-13.0	-39.6			
5235.00	-7.8	H	3.0	45.3	1.0	-52.1	-13.0	-39.1			
6980.00	-5.2	H	3.0	44.4	1.0	-48.6	-13.0	-35.6			
High Ch, 1778.5MHz											
3557.00	-7.1	V	3.0	45.3	1.0	-51.4	-13.0	-38.4			
5335.50	-7.2	V	3.0	45.3	1.0	-51.5	-13.0	-38.5			
7114.00	-5.1	V	3.0	44.3	1.0	-48.4	-13.0	-35.4			
3557.00	-7.4	H	3.0	45.3	1.0	-51.8	-13.0	-38.8			
5335.50	-7.5	H	3.0	45.3	1.0	-51.8	-13.0	-38.8			
7114.00	-5.2	H	3.0	44.3	1.0	-48.5	-13.0	-35.5			

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**LTE Band 2**

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

**LTE Band 4**

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

**LTE Band 5**

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

**LTE Band 17**

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

**LTE Band41(PC3)**

LTE Band 41(PC3, Frequency range : 2496-2690 MHz) is covered by LTE Band 41(PC2) (Frequency range: 2496-2690 MHz) due to same frequency range, same channel bandwidth and maximum tune-up limit is higher than LTE Band41(PC3).

## **END OF TEST REPORT**