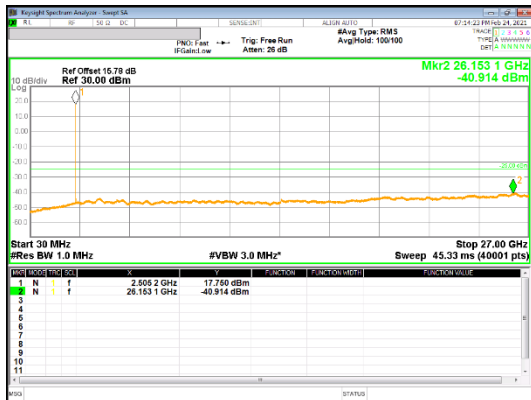
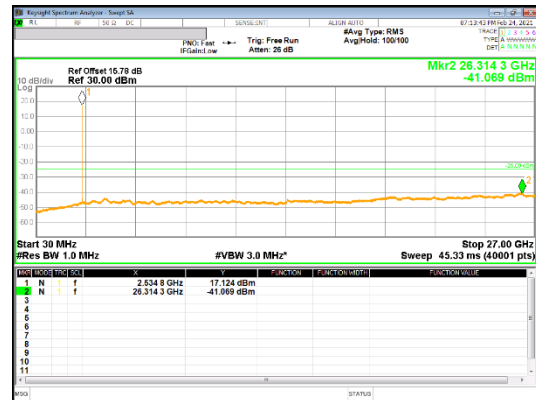


**LTE Band 7**

10 MHz QPSK



Low channel



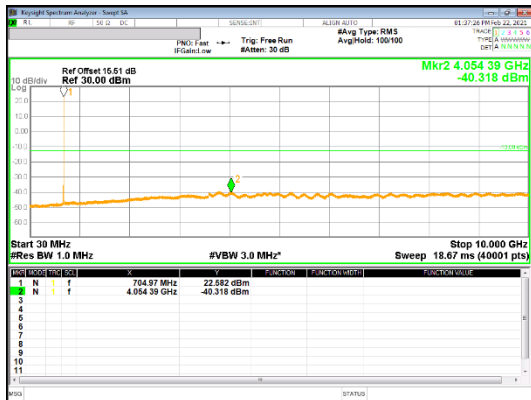
Mid channel



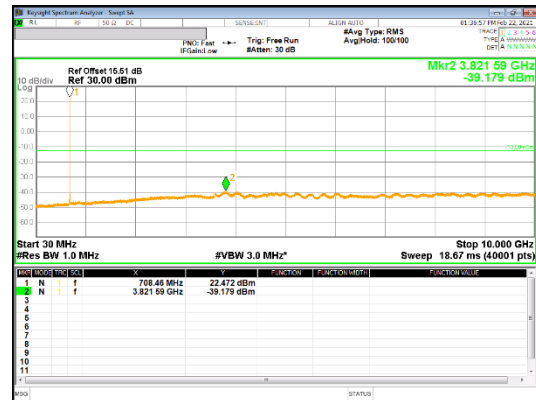
High channel

**LTE Band 12**

5 MHz QPSK



Low channel



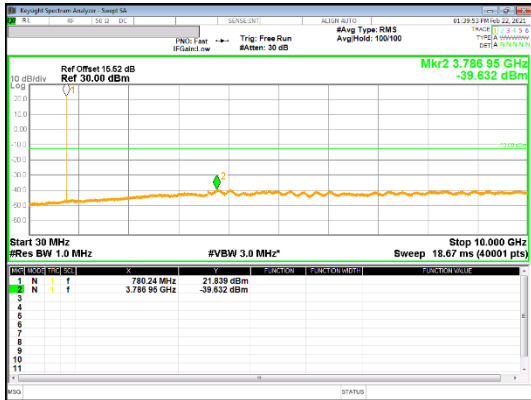
Mid channel



High channel

**LTE Band 13**

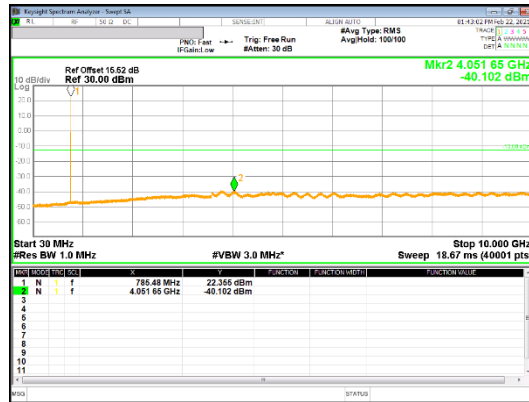
5 MHz QPSK



Low channel



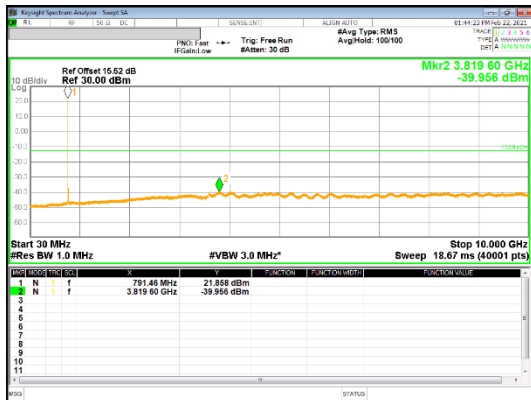
Mid channel



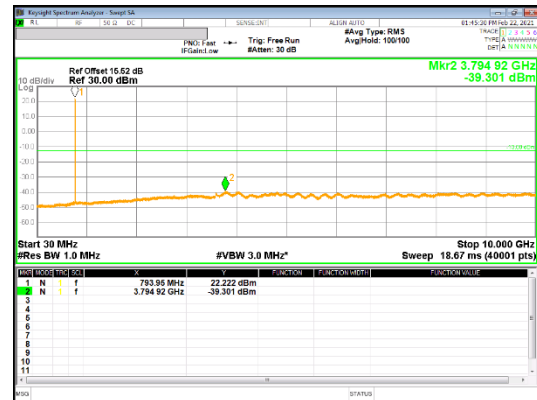
High channel

**LTE Band 14**

5 MHz QPSK



Low channel



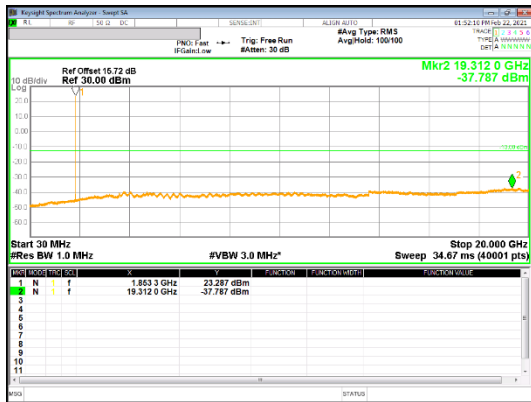
Mid channel



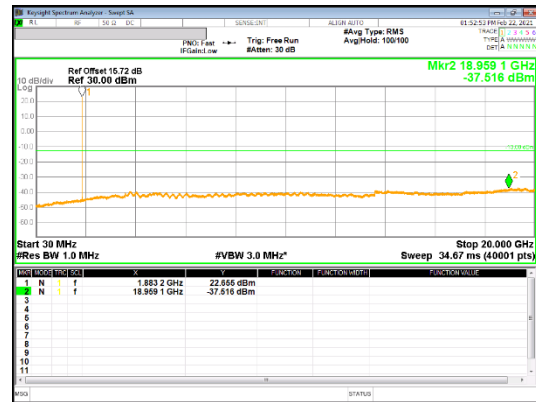
High channel

**LTE Band 25**

5 MHz QPSK



Low channel

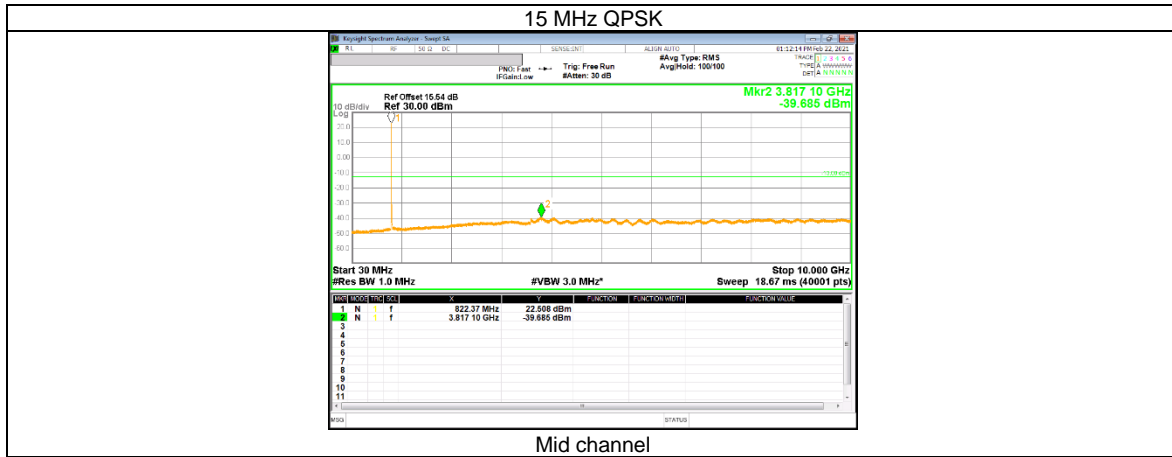


Mid channel

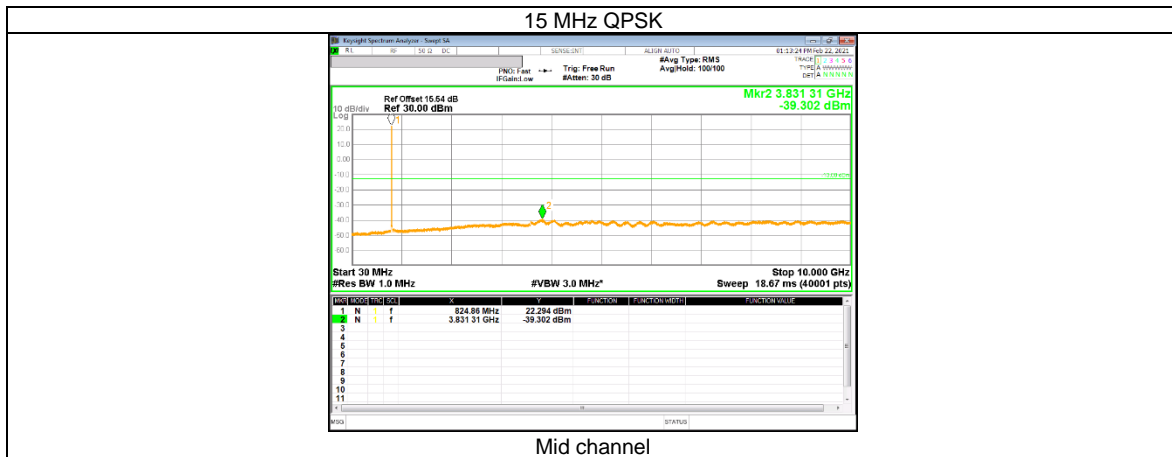


High channel

**LTE Band 26 (Part 90)**

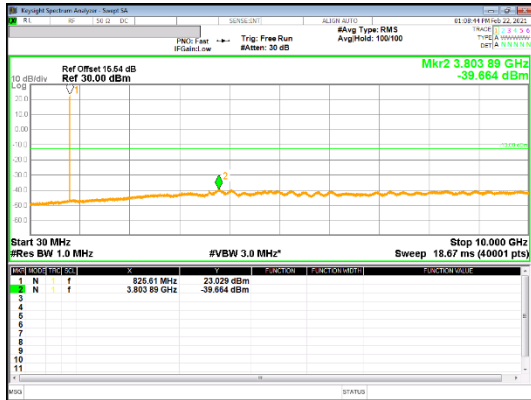


**LTE Band 26 (Straddle)**



**LTE Band 26 (Part 22)**

1.4 MHz QPSK



Low channel



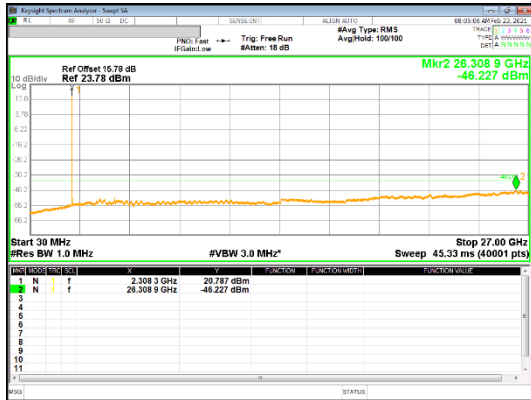
Mid channel



High channel

**LTE Band 30**

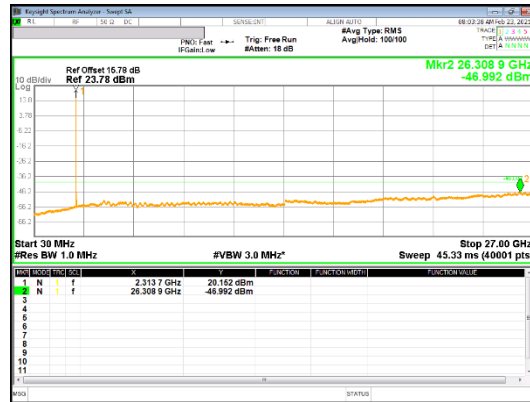
5 MHz QPSK



Low channel



Mid channel

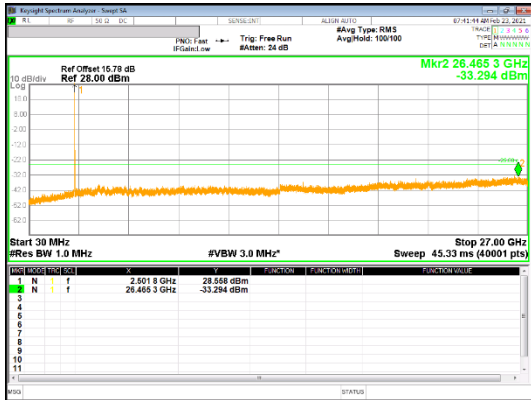


High channel

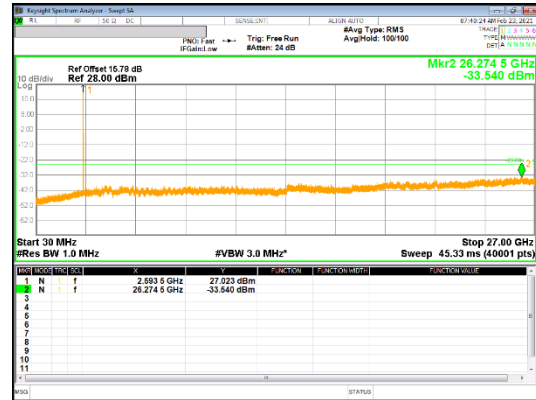


**LTE Band 41 (PC2)**

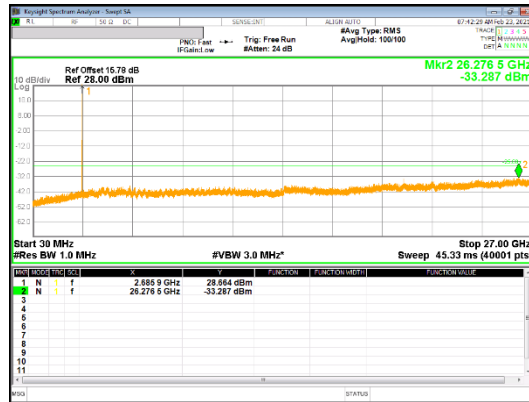
10 MHz QPSK



Low channel



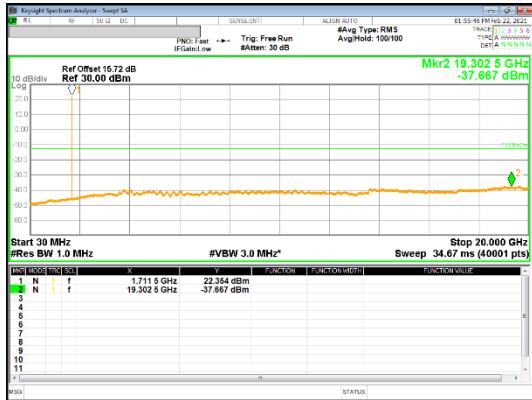
Mid channel



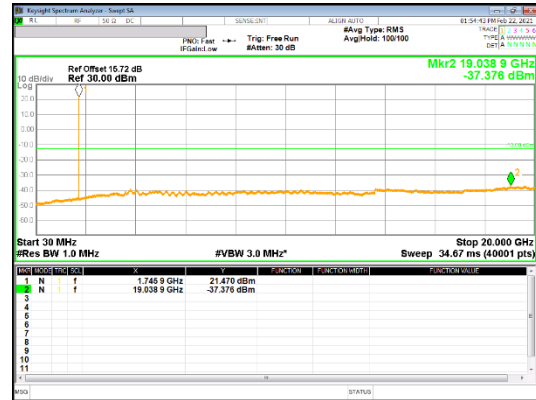
High channel

**LTE Band 66**

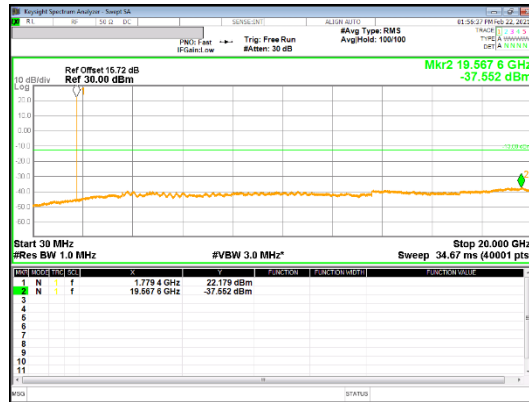
1.4 MHz QPSK



Low channel



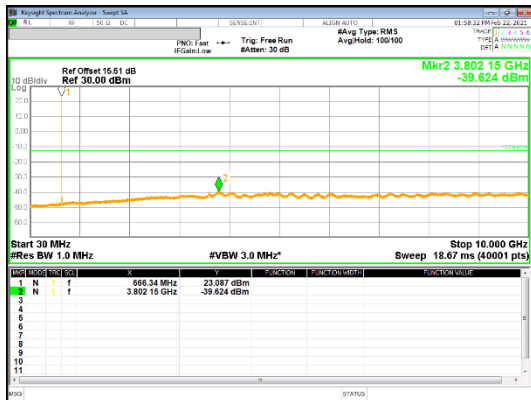
Mid channel



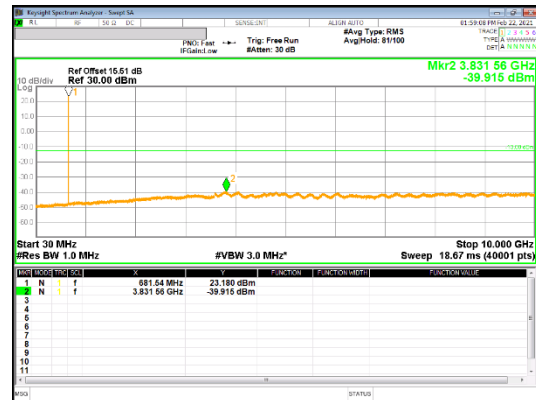
High channel

**LTE Band 71**

5 MHz QPSK



Low channel



Mid channel



High channel

**LTE Band 2**

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

**LTE Band 4**

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

**LTE Band 5**

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

**LTE Band 38**

LTE Band 38 (Frequency range: 2570-2620 MHz) is covered by LTE Band 41 (Frequency range: 2496-2690 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, §90.213 and §90.539(e)

### 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.

§90.539 - The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be  $\pm 1.25$  ppm or better when AFC is locked to a base station, and  $\pm 5$  ppm or better when AFC is not locked.

### 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]		
3.86	50	824.20002041	-0.001	848.80001958	-0.001	2.5	
3.86	40	824.20002115	-0.002	848.80001867	0.000	2.5	
3.86	30	824.20002209	-0.003	848.80001924	0.000	2.5	
<b>3.86</b>	<b>20</b>	<b>824.20001937</b>	<b>0.000</b>	<b>848.80001907</b>	<b>0.000</b>	<b>2.5</b>	
3.86	10	824.20002308	-0.005	848.80002162	-0.003	2.5	
3.86	0	824.20002506	-0.007	848.80002304	-0.005	2.5	
3.86	-10	824.20002370	-0.005	848.80002084	-0.002	2.5	
3.86	-20	824.20002268	-0.004	848.80002191	-0.003	2.5	
3.86	-30	824.20002168	-0.003	848.80002058	-0.002	2.5	

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20°C							
Limit: +/- 2.5 ppm =		Low Channel	2060.500	Hz	High Channel	2122.000	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
<b>3.60</b>	<b>20</b>	<b>824.20001937</b>	<b>0</b>	<b>848.80001907</b>	<b>0</b>	<b>2.5</b>	
4.35	20	824.20002547	-0.007	848.80002286	-0.004	2.5	
3.25	20	824.20001950	0.000	848.80001608	0.004	2.5	

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

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0736	1909.9258		
Extreme (50C)		1850.0736	1909.9258	30.6	0.016
Extreme (40C)		1850.0736	1909.9258	31.6	0.017
Extreme (30C)		1850.0736	1909.9258	33.1	0.018
Extreme (10C)		1850.0736	1909.9258	35.8	0.019
Extreme (0C)		1850.0736	1909.9258	32.6	0.017
Extreme (-10C)		1850.0736	1909.9258	31.1	0.017
Extreme (-20C)		1850.0736	1909.9258	30.9	0.016
Extreme (-30C)		1850.0736	1909.9258	30.6	0.016
20C	15%	1850.0736	1909.9258	33.8	0.018
	-15%	1850.0736	1909.9258	23.3	0.012
	End Point	1850.0736	1909.9258	23.1	0.012

**CDMA BC 10**

Reference Frequency : CDMA BC10 Low Channel 817.9 MHz / High Channel 823.1 MHz @ 20°C							
Limit: +- 2.5 ppm =		Low Channel	2044.750	Hz	High Channel	2057.750	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]		
3.86	50	817.90000665	-0.002	823.10000838	0.000	2.5	
3.86	40	817.90000816	-0.004	823.10001113	-0.003	2.5	
3.86	30	817.90000571	-0.001	823.10000625	0.003	2.5	
<b>3.86</b>	<b>20</b>	<b>817.90000485</b>	<b>0.000</b>	<b>823.10000868</b>	<b>0.000</b>	<b>2.5</b>	
3.86	10	817.90000582	-0.001	823.10000847	0.000	2.5	
3.86	0	817.90001361	-0.011	823.10000763	0.001	2.5	
3.86	-10	817.90000731	-0.003	823.10000778	0.001	2.5	
3.86	-20	817.90000542	-0.001	823.10000657	0.003	2.5	
3.86	-30	817.90000854	-0.005	823.10001020	-0.002	2.5	

Reference Frequency : CDMA BC10 Low Channel 817.9 MHz / High Channel 823.1 MHz @ 20°C							
Limit: +- 2.5 ppm =		Low Channel	2044.750	Hz	High Channel	2057.750	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>3.60</b>	<b>20</b>	<b>817.90000485</b>	<b>0</b>	<b>823.10000868</b>	<b>0</b>	<b>2.5</b>	
4.35	20	817.90002045	-0.019	823.10002303	-0.017	2.5	
3.25	20	817.90002150	-0.020	823.10002268	-0.017	2.5	

**CDMA BC 0**

Reference Frequency : CDMA BC 0 Low Channel 824.7 MHz / High Channel 848.31 MHz @ 20°C							
Limit: +- 2.5 ppm =		Low Channel	2061.750	Hz	High Channel	2120.775	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]		
3.86	50	824.70000657	0.000	848.31000420	0.003	2.5	
3.86	40	824.70000720	-0.001	848.31000693	0.000	2.5	
3.86	30	824.70000541	0.001	848.31000693	0.000	2.5	
<b>3.86</b>	<b>20</b>	<b>824.70000619</b>	<b>0.000</b>	<b>848.31000715</b>	<b>0.000</b>	<b>2.5</b>	
3.86	10	824.70000569	0.001	848.31000468	0.003	2.5	
3.86	0	824.70000627	0.000	848.31000655	0.001	2.5	
3.86	-10	824.70000621	0.000	848.31000660	0.001	2.5	
3.86	-20	824.70000568	0.001	848.31000614	0.001	2.5	
3.86	-30	824.70000665	-0.001	848.31000663	0.001	2.5	

Reference Frequency : CDMA BC 0 Low Channel 824.7 MHz / High Channel 848.31 MHz @ 20°C							
Limit: +- 2.5 ppm =		Low Channel	2061.750	Hz	High Channel	2120.775	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>3.60</b>	<b>20</b>	<b>824.70000619</b>	<b>0</b>	<b>848.31000715</b>	<b>0</b>	<b>2.5</b>	
4.35	20	824.70002043	-0.017	848.31002168	-0.017	2.5	
3.25	20	824.70001925	-0.016	848.31001848	-0.013	2.5	

**CDMA BC 1 (Lowest Frequency: EV-DO / Highest Frequency: EV-DO)**

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	1850.6147	1909.3895	6.2	0.003
Extreme (50C)		1850.6147	1909.3895		
Extreme (40C)		1850.6147	1909.3895		
Extreme (30C)		1850.6147	1909.3895		
Extreme (10C)		1850.6147	1909.3895		
Extreme (0C)		1850.6147	1909.3895		
Extreme (-10C)		1850.6147	1909.3895		
Extreme (-20C)		1850.6147	1909.3895		
Extreme (-30C)		1850.6147	1909.3895		
20C		15%	1850.6147		
	-15%	1850.6147	1909.3895	14.1	0.008
	End Point	1850.6147	1909.3895	13.8	0.007

**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]	
3.86	50	826.40001680	0.003	846.60001807	-0.003	2.5
3.86	40	826.40001628	0.003	846.60001762	-0.002	2.5
3.86	30	826.40001725	0.002	846.60001694	-0.001	2.5
<b>3.86</b>	<b>20</b>	<b>826.40001908</b>	<b>0.000</b>	<b>846.60001588</b>	<b>0.000</b>	<b>2.5</b>
3.86	10	826.40001625	0.003	846.60001592	0.000	2.5
3.86	0	826.40001580	0.004	846.60001631	-0.001	2.5
3.86	-10	826.40001460	0.005	846.60001722	-0.002	2.5
3.86	-20	826.40001627	0.003	846.60001803	-0.003	2.5
3.86	-30	826.40001705	0.002	846.60001625	0.000	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20°C						
Limit: +- 2.5 ppm =		Low Channel	2066.000 Hz	High Channel	2116.500 Hz	
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]
		Low Channel		High Channel		
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.60	20	826.40001908	0	846.60001588	0	2.5
4.35	20	826.40001501	0.005	846.60001472	0.001	2.5
3.25	20	826.40001541	0.004	846.60001360	0.003	2.5



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

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1712.4000	1754.6862		
Extreme (50C)		1712.4000	1754.6862	25.6	0.015
Extreme (40C)		1712.4000	1754.6862	24.9	0.014
Extreme (30C)		1712.4000	1754.6862	24.0	0.014
Extreme (10C)		1712.4000	1754.6862	27.2	0.016
Extreme (0C)		1712.4000	1754.6862	26.6	0.015
Extreme (-10C)		1712.4000	1754.6862	25.7	0.015
Extreme (-20C)		1712.4000	1754.6862	24.4	0.014
Extreme (-30C)		1712.4000	1754.6862	24.9	0.014
20C	15%	1712.4000	1754.6862	28.4	0.016
	-15%	1712.4000	1754.6862	21.5	0.012
	End Point	1712.4000	1754.6862	20.0	0.012

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

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	1850.3075	1909.6923		
Extreme (50C)		1850.3075	1909.6923	25.1	0.013
Extreme (40C)		1850.3075	1909.6923	23.2	0.012
Extreme (30C)		1850.3075	1909.6923	24.9	0.013
Extreme (10C)		1850.3075	1909.6923	24.3	0.013
Extreme (0C)		1850.3075	1909.6923	25.1	0.013
Extreme (-10C)		1850.3075	1909.6923	25.3	0.013
Extreme (-20C)		1850.3075	1909.6923	24.7	0.013
Extreme (-30C)		1850.3075	1909.6923	23.0	0.012
20C	15%	1850.3075	1909.6923	23.7	0.013
	-15%	1850.3075	1909.6923	23.0	0.012
	End Point	1850.3075	1909.6923	27.5	0.015

**LTE Band 7(Lowest Frequency: QPSK/ Highest Frequency: 16QAM)**

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2500.2519	2569.7471		
Extreme (50C)		2500.2519	2569.7471	9.7	0.004
Extreme (40C)		2500.2519	2569.7471	9.3	0.004
Extreme (30C)		2500.2519	2569.7471	10.3	0.004
Extreme (10C)		2500.2519	2569.7471	10.1	0.004
Extreme (0C)		2500.2519	2569.7471	10.7	0.004
Extreme (-10C)		2500.2519	2569.7471	9.8	0.004
Extreme (-20C)		2500.2519	2569.7471	9.7	0.004
Extreme (-30C)		2500.2519	2569.7471	10.0	0.004
20C	15%	2500.2519	2569.7471	4.4	0.002
	-15%	2500.2519	2569.7471	3.6	0.001
	End Point	2500.2519	2569.7471	3.3	0.001

**LTE Band 12 (Lowest Frequency: QPSK / 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	699.1565	715.8448		
Extreme (50C)		699.1565	715.8448	14.1	0.020
Extreme (40C)		699.1565	715.8448	13.3	0.019
Extreme (30C)		699.1565	715.8448	13.1	0.018
Extreme (10C)		699.1565	715.8448	13.0	0.018
Extreme (0C)		699.1565	715.8448	12.9	0.018
Extreme (-10C)		699.1565	715.8448	13.4	0.019
Extreme (-20C)		699.1565	715.8448	12.7	0.018
Extreme (-30C)		699.1565	715.8448	13.2	0.019
20C	15%	699.1565	715.8448	13.5	0.019
	-15%	699.1565	715.8448	13.7	0.019
	End Point	699.1565	715.8448	11.8	0.017

**LTE Band 13 (Lowest Frequency:16QAM / 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	777.2538	786.7413	13.6	0.017
Extreme (50C)		777.2538	786.7413		
Extreme (40C)		777.2538	786.7413		
Extreme (30C)		777.2538	786.7413		
Extreme (10C)		777.2538	786.7413		
Extreme (0C)		777.2538	786.7413		
Extreme (-10C)		777.2538	786.7413		
Extreme (-20C)		777.2538	786.7413		
Extreme (-30C)		777.2538	786.7413		
20C		15%	777.2538		
	-15%	777.2538	786.7413	12.6	0.016
	End Point	777.2538	786.7413	16.8	0.021

**LTE Band 14 (Lowest Frequency:16QAM / Highest Frequency: 16QAM)**

Limit		788	798	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	788.2529	797.7413	20.1	0.025
Extreme (50C)		788.2529	797.7413		
Extreme (40C)		788.2529	797.7413		
Extreme (30C)		788.2529	797.7413		
Extreme (10C)		788.2529	797.7413		
Extreme (0C)		788.2529	797.7413		
Extreme (-10C)		788.2529	797.7413		
Extreme (-20C)		788.2529	797.7413		
Extreme (-30C)		788.2529	797.7413		
20C		15%	788.2529		
	-15%	788.2529	797.7413	14.0	0.018
	End Point	788.2529	797.7413	13.8	0.017

**LTE Band 25 (Lowest Frequency:QPSK / Highest Frequency: QPSK)**

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.1540	1914.8473		
Extreme (50C)		1850.1540	1914.8473	25.6	0.014
Extreme (40C)		1850.1540	1914.8473	27.1	0.014
Extreme (30C)		1850.1540	1914.8473	26.9	0.014
Extreme (10C)		1850.1540	1914.8473	27.4	0.015
Extreme (0C)		1850.1540	1914.8473	28.1	0.015
Extreme (-10C)		1850.1540	1914.8473	25.8	0.014
Extreme (-20C)		1850.1540	1914.8473	26.2	0.014
Extreme (-30C)		1850.1540	1914.8473	29.4	0.016
20C	15%	1850.1540	1914.8473	30.7	0.016
	-15%	1850.1540	1914.8473	23.1	0.012
	End Point	1850.1540	1914.8473	27.6	0.015

**LTE Band 26**

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20°C							
Limit: +- 2.5 ppm =		Low Channel	2036.750	Hz	High Channel	2120.750	Hz
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse				Limit [ppm]	
		Low Channel		High Channel			
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]		
3.86	50	814.70001825	-0.001	848.30001962	-0.001	2.5	
3.86	40	814.70001692	0.001	848.30002030	-0.001	2.5	
3.86	30	814.70001703	0.001	848.30002084	-0.002	2.5	
<b>3.86</b>	<b>20</b>	<b>814.70001755</b>	<b>0.000</b>	<b>848.30001916</b>	<b>0.000</b>	<b>2.5</b>	
3.86	10	814.70001871	-0.001	848.30001894	0.000	2.5	
3.86	0	814.70001758	0.000	848.30001826	0.001	2.5	
3.86	-10	814.70001904	-0.002	848.30001857	0.001	2.5	
3.86	-20	814.70001816	-0.001	848.30001925	0.000	2.5	
3.86	-30	814.70002038	-0.003	848.30002138	-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>3.60</b>	<b>20</b>	<b>814.70001755</b>	<b>0</b>	<b>848.30001916</b>	<b>0</b>	<b>2.5</b>	
4.35	20	814.70001521	0.003	848.30001840	0.001	2.5	
3.25	20	814.70001667	0.001	848.30001728	0.002	2.5	

**LTE Band 30**

Limit		2305	2315	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2305.2582	2314.7413		
Extreme (50C)		2305.2582	2314.7413	15.7	0.007
Extreme (40C)		2305.2582	2314.7413	21.4	0.009
Extreme (30C)		2305.2582	2314.7413	18.5	0.008
Extreme (10C)		2305.2582	2314.7413	11.7	0.005
Extreme (0C)		2305.2582	2314.7413	10.6	0.005
Extreme (-10C)		2305.2582	2314.7413	20.1	0.009
Extreme (-20C)		2305.2582	2314.7413	16.6	0.007
Extreme (-30C)		2305.2582	2314.7413	18.4	0.008
20C	15%	2305.2582	2314.7413	21.7	0.009
	-15%	2305.2582	2314.7413	18.4	0.008
	End Point	2305.2582	2314.7413	13.5	0.006

**LTE Band 41 (Lowest Frequency: 16QAM / Highest Frequency: 16QAM)**

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2496.2531	2689.7400		
Extreme (50C)		2496.2531	2689.7400	24.4	0.009
Extreme (40C)		2496.2531	2689.7400	25.1	0.010
Extreme (30C)		2496.2531	2689.7400	24.4	0.009
Extreme (10C)		2496.2531	2689.7400	25.3	0.010
Extreme (0C)		2496.2531	2689.7400	24.4	0.009
Extreme (-10C)		2496.2531	2689.7400	24.2	0.009
Extreme (-20C)		2496.2531	2689.7400	25.1	0.010
Extreme (-30C)		2496.2531	2689.7400	24.3	0.009
20C	15%	2496.2531	2689.7400	25.7	0.010
	-15%	2496.2531	2689.7400	19.0	0.007
	End Point	2496.2531	2689.7400	20.5	0.008

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

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.1572	1779.8446	26.4	0.015
Extreme (50C)		1710.1572	1779.8446		
Extreme (40C)		1710.1572	1779.8446		
Extreme (30C)		1710.1572	1779.8446		
Extreme (10C)		1710.1572	1779.8446		
Extreme (0C)		1710.1572	1779.8446		
Extreme (-10C)		1710.1572	1779.8446		
Extreme (-20C)		1710.1572	1779.8446		
Extreme (-30C)		1710.1572	1779.8446		
20C		15%	1710.1572		
	-15%	1710.1572	1779.8446	26.0	0.015
	End Point	1710.1572	1779.8446	18.9	0.011

**LTE Band 71 (Lowest Frequency: 16QAM / Highest Frequency: QPSK)**

Limit		663	698	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	663.2509	697.7522	17.1	0.025
Extreme (50C)		663.2509	697.7522		
Extreme (40C)		663.2509	697.7522		
Extreme (30C)		663.2509	697.7522		
Extreme (10C)		663.2509	697.7522		
Extreme (0C)		663.2509	697.7522		
Extreme (-10C)		663.2509	697.7522		
Extreme (-20C)		663.2509	697.7522		
Extreme (-30C)		663.2509	697.7522		
20C		15%	663.2509		
	-15%	663.2509	697.7522	14.9	0.022
	End Point	663.2509	697.7522	14.3	0.021

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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 38**

LTE Band 38 (Frequency range: 2570-2620 MHz) is covered by LTE Band 41 (Frequency range: 2496-2690 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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## 9.5. RADIATED POWER (ERP & EIRP)

### RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50, §27.53, §90.542 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:

(a)(3) Mobile and portable stations. (i) For mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, except that for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth. For mobile and portable stations using time division duplexing (TDD) technology, the duty cycle must not exceed 38 percent in the 2305-2315 MHz and 2350-2360 MHz bands. Mobile and portable stations using FDD technology are restricted to transmitting in the 2305-2315 MHz band. Power averaging shall not include intervals in which the transmitter is off.

(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.

90.542(a)(7) - Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

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



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**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  $\geq$  2  $\times$  span/RBW;
- g) Trace mode = max hold(GSM, WCDMA), average(LTE);

**TEST RESULTS**

**9.5.1. ERP/EIRP Results**

**GSM**

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	512	824.2	28.46	701.46
		661	836.6	29.88	972.75
		810	848.8	<b>31.82</b>	<b>1520.55</b>
	EGPRS	512	824.2	23.98	250.03
		661	836.6	25.17	328.85
		810	848.8	<b>27.09</b>	<b>511.68</b>
GSM1900	GPRS	512	1850.2	<b>30.35</b>	<b>1083.93</b>
		661	1880	30.14	1032.76
		810	1909.8	29.32	855.07
	EGPRS	512	1850.2	<b>28.46</b>	<b>701.46</b>
		661	1880	27.45	555.90
		810	1909.8	26.83	481.95

**CDMA**

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
BC 10	1xRTT	476	817.90	14.88	30.76
		580	820.50	14.83	30.41
		684	823.10	<b>15.04</b>	<b>31.92</b>
	EV-DO Rel.0	476	817.90	14.68	29.38
		580	820.50	<b>14.83</b>	<b>30.41</b>
		684	823.10	14.82	30.34
BC 0	1xRTT	1013	824.70	20.25	105.93
		384	836.52	21.21	132.13
		777	848.31	<b>21.67</b>	<b>146.89</b>
	EV-DO Rel.0	1013	824.70	19.99	99.77
		384	836.52	20.80	120.23
		777	848.31	<b>21.97</b>	<b>157.40</b>
BC 1	1xRTT	25	1851.25	17.66	58.34
		600	1880.00	<b>18.48</b>	<b>70.47</b>
		1175	1908.75	16.70	46.77
	EV-DO Rel.0	25	1851.25	17.62	57.81
		600	1880.00	<b>18.17</b>	<b>65.61</b>
		1175	1908.75	16.84	48.31

**WCDMA**

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	18.95	78.52
		4183	836.6	19.85	96.61
		4233	846.6	<b>21.42</b>	<b>138.68</b>
	HSDPA	4132	826.4	18.07	64.12
		4183	836.6	18.84	76.56
		4233	846.6	<b>20.41</b>	<b>109.90</b>
Band 4	REL99	1312	1712.4	24.47	279.90
		1413	1732.6	23.64	231.21
		1513	1752.6	<b>24.84</b>	<b>304.79</b>
	HSDPA	1312	1712.4	23.53	225.42
		1413	1732.6	23.61	229.61
		1513	1752.6	<b>23.77</b>	<b>238.23</b>
Band 2	REL99	9262	1852.4	<b>24.59</b>	<b>287.74</b>
		9400	1880.0	24.40	275.42
		9538	1907.6	23.83	241.55
	HSDPA	9262	1852.4	<b>23.57</b>	<b>227.51</b>
		9400	1880.0	23.51	224.39
		9538	1907.6	22.83	191.87

**LTE Band 7**

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 7	20	QPSK	1/49	2510.0	22.65	184.08
			1/49	2535.0	22.98	198.61
			1/49	2560.0	<b>23.03</b>	<b>200.91</b>
		16QAM	1/0	2510.0	20.53	112.98
			1/49	2535.0	<b>21.92</b>	<b>155.60</b>
			1/49	2560.0	21.87	153.82
	15	QPSK	1/0	2507.5	21.91	155.24
			1/37	2535.0	<b>22.91</b>	<b>195.43</b>
			1/37	2562.5	22.62	182.81
		16QAM	1/37	2507.5	21.11	129.12
			1/37	2535.0	<b>22.07</b>	<b>161.06</b>
			1/37	2562.5	21.35	136.46
	10	QPSK	1/25	2505.0	22.27	168.66
			1/25	2535.0	<b>23.72</b>	<b>235.50</b>
			1/25	2565.0	23.12	205.12
		16QAM	1/0	2505.0	20.66	116.41
			1/0	2535.0	<b>22.72</b>	<b>187.07</b>
			1/25	2565.0	21.85	153.11
	5	QPSK	1/24	2502.5	21.84	152.76
			1/12	2535.0	<b>23.29</b>	<b>213.30</b>
			1/12	2567.5	22.51	178.24
16QAM		1/24	2502.5	20.90	123.03	
		1/12	2535.0	<b>22.15</b>	<b>164.06</b>	
		1/12	2567.5	21.44	139.32	

**LTE Band 12**

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 12	10	QPSK	1/25	704.0	17.83	60.67
			1/25	707.5	18.28	67.30
			1/25	711.0	<b>18.73</b>	<b>74.64</b>
		16QAM	1/25	704.0	17.75	59.57
			1/25	707.5	17.73	59.29
			1/25	711.0	<b>17.88</b>	<b>61.38</b>
	5	QPSK	1/12	701.5	17.88	61.38
			1/12	707.5	<b>18.74</b>	<b>74.82</b>
			1/0	713.5	18.65	73.28
		16QAM	1/12	701.5	16.77	47.53
			1/12	707.5	<b>17.73</b>	<b>59.29</b>
			1/12	713.5	17.64	58.08
	3	QPSK	1/8	700.5	17.71	59.02
			1/8	707.5	17.94	62.23
			1/8	714.5	<b>18.70</b>	<b>74.13</b>
		16QAM	1/8	700.5	16.46	44.26
			1/8	707.5	16.78	47.64
			1/8	714.5	<b>17.70</b>	<b>58.88</b>
	1.4	QPSK	1/3	699.7	17.35	54.33
			1/0	707.5	18.18	65.77
			1/3	715.3	<b>18.58</b>	<b>72.11</b>
		16QAM	1/0	699.7	16.40	43.65
			1/0	707.5	17.05	50.70
			1/3	715.3	<b>17.55</b>	<b>56.89</b>

**LTE Band 13**

Band	BW [MHz]	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 13	10	QPSK	1/25	782.0	<b>18.53</b>	<b>71.29</b>
		16QAM	1/25	782.0	17.48	55.98
	5	QPSK	1/12	779.5	18.73	74.64
			1/12	782.0	<b>18.95</b>	<b>78.52</b>
			1/12	784.5	18.36	68.55
		16QAM	1/12	779.5	<b>17.56</b>	<b>57.02</b>
			1/12	782.0	17.20	52.48
			1/12	784.5	17.36	54.45

**LTE Band 14**

Band	BW [MHz]	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 14	10	QPSK	1/25	793.0	<b>18.11</b>	<b>64.71</b>
		16QAM	1/25	793.0	17.04	50.58
	5	QPSK	1/12	790.5	18.27	67.14
			1/12	793.0	<b>18.65</b>	<b>73.28</b>
			1/12	795.5	17.69	58.75
		16QAM	1/12	790.5	17.02	50.35
			1/12	793.0	<b>17.25</b>	<b>53.09</b>
			1/12	795.5	16.57	45.39

**LTE Band 25**

BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
		RB Offset		[dBm]	[mW]
20	QPSK	1/49	1860.0	<b>24.41</b>	<b>276.06</b>
		1/49	1882.5	<b>24.41</b>	<b>276.06</b>
		1/49	1905.0	24.04	253.51
	16QAM	1/49	1860.0	23.13	205.59
		1/49	1882.5	<b>23.20</b>	<b>208.93</b>
		1/49	1905.0	22.98	198.61
15	QPSK	1/37	1857.5	<b>24.47</b>	<b>279.90</b>
		1/37	1882.5	24.24	265.46
		1/37	1907.5	24.33	271.02
	16QAM	1/37	1857.5	23.33	215.28
		1/37	1882.5	<b>23.66</b>	<b>232.27</b>
		1/37	1907.5	23.26	211.84
10	QPSK	1/25	1855.0	<b>24.55</b>	<b>285.10</b>
		1/25	1882.5	24.31	269.77
		1/25	1910.0	24.49	281.19
	16QAM	1/25	1855.0	23.29	213.30
		1/25	1882.5	23.14	206.06
		1/25	1910.0	<b>23.52</b>	<b>224.91</b>
5	QPSK	1/12	1852.5	24.44	277.97
		1/12	1882.5	24.44	277.97
		1/12	1912.5	<b>24.63</b>	<b>290.40</b>
	16QAM	1/12	1852.5	23.43	220.29
		1/12	1882.5	23.59	228.56
		1/12	1912.5	<b>23.67</b>	<b>232.81</b>
3	QPSK	1/8	1851.5	<b>24.57</b>	<b>286.42</b>
		1/8	1882.5	24.38	274.16
		1/8	1913.5	24.41	276.06
	16QAM	1/8	1851.5	<b>23.63</b>	<b>230.67</b>
		1/8	1882.5	23.23	210.38
		1/8	1913.5	23.28	212.81
1.4	QPSK	1/3	1850.7	<b>24.86</b>	<b>306.20</b>
		1/3	1882.5	24.34	271.64
		1/3	1914.3	24.44	277.97
	16QAM	1/3	1850.7	<b>23.64</b>	<b>231.21</b>
		1/3	1882.5	23.27	212.32
		1/3	1914.3	23.36	216.77

**LTE Band 26**

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP/EIRP	
					[dBm]	[mW]
Band 26	15	QPSK	1/37	821.5	19.23	83.75
			1/0	831.5	19.88	97.27
			1/0	841.5	<b>21.30</b>	<b>134.90</b>
		16QAM	1/37	821.5	18.08	64.27
			1/37	831.5	19.15	82.22
			1/37	841.5	<b>20.60</b>	<b>114.82</b>
	10	QPSK	1/25	819.0	19.31	85.31
			1/25	829.0	<b>20.02</b>	<b>100.46</b>
			1/25	831.5	19.86	96.83
			1/49	844.0	20.85	121.62
		16QAM	1/25	819.0	18.25	66.83
			1/25	829.0	18.78	75.51
			1/25	831.5	<b>19.02</b>	<b>79.80</b>
			1/25	844.0	20.41	109.90
	5	QPSK	1/12	816.5	19.23	83.75
			1/0	821.5	19.01	79.62
			1/12	826.5	<b>19.73</b>	<b>93.97</b>
			1/12	831.5	20.02	100.46
			1/12	846.5	21.37	137.09
		16QAM	1/12	816.5	18.15	65.31
			1/12	821.5	18.52	71.12
			1/12	826.5	<b>18.76</b>	<b>75.16</b>
			1/12	831.5	19.40	87.10
			1/12	846.5	20.20	104.71
	3	QPSK	1/0	815.5	19.12	81.66
			1/0	822.5	<b>19.46</b>	<b>88.31</b>
			1/8	825.5	19.08	80.91
			1/8	831.5	19.47	88.51
		16QAM	1/8	847.5	21.23	132.74
			1/8	815.5	17.62	57.81
			1/8	822.5	<b>18.19</b>	<b>65.92</b>
			1/8	825.5	18.12	64.86
	1.4	QPSK	1/8	831.5	18.43	69.66
			1/8	847.5	20.36	108.64
			1/3	814.7	18.91	77.80
			1/3	823.3	19.09	81.10
			1/3	824.7	<b>19.16</b>	<b>82.41</b>
		16QAM	1/3	831.5	19.71	93.54
			1/3	848.3	21.11	129.12
			1/3	814.7	17.62	57.81
1/3			823.3	17.86	61.09	
1/3			824.7	<b>18.13</b>	<b>65.01</b>	
		1/3	831.5	18.73	74.64	
		1/3	848.3	20.06	101.39	



**LTE Band 26 (Straddle)**

Band	BW	Mode	RB Size/	f [MHz]	ERP/EIRP	
	[MHz]		RB Offset		[dBm]	[mW]
Band 26 Straddle	15	QPSK	1/37	824	19.70	93.33
		16QAM	1/37		18.32	67.92
	10	QPSK	1/25	824	19.70	93.33
		16QAM	1/25		18.68	73.79
	5	QPSK	1/12	824	19.52	89.54
		16QAM	1/12		18.07	64.12
	3	QPSK	1/8	824	19.40	87.10
		16QAM	1/8		18.42	69.50
	1.4	QPSK	1/3	824	19.43	87.70
		16QAM	1/3		18.35	68.39

**LTE Band 30**

Band	BW [MHz]	Mode	RB size / RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 30	10	QPSK	1/25	2310.0	<b>22.52</b>	<b>178.65</b>
		16QAM	1/25	2310.0	21.40	138.04
	5	QPSK	1/12	2307.5	<b>22.54</b>	<b>179.47</b>
			1/12	2310.0	22.36	172.19
		16QAM	1/12	2312.5	22.05	160.32
			1/12	2307.5	<b>21.49</b>	<b>140.93</b>
	1/12	2310.0	21.26	133.66		
		2312.5	20.49	111.94		

**LTE Band 41(PC2)**

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 41	20	QPSK	1/49	2506.0	27.11	514.04
			1/49	2593.0	<b>27.16</b>	<b>520.00</b>
			1/49	2680.0	25.22	332.66
		16QAM	1/49	2506.0	<b>26.57</b>	<b>453.94</b>
			1/49	2593.0	26.34	430.53
			1/49	2680.0	24.60	288.40
	15	QPSK	1/37	2503.5	<b>27.56</b>	<b>570.16</b>
			1/37	2593.0	26.73	470.98
			1/37	2682.5	26.48	444.63
		16QAM	1/37	2503.5	<b>27.27</b>	<b>533.33</b>
			1/37	2593.0	26.41	437.52
			1/37	2682.5	26.12	409.26
	10	QPSK	1/25	2501.0	<b>27.92</b>	<b>619.44</b>
			1/25	2593.0	27.25	530.88
			1/25	2685.0	26.29	425.60
		16QAM	1/25	2501.0	<b>27.20</b>	<b>524.81</b>
			1/25	2593.0	26.47	443.61
			1/25	2685.0	25.48	353.18
	5	QPSK	1/12	2498.5	<b>28.48</b>	<b>704.69</b>
			1/12	2593.0	27.21	526.02
			1/12	2687.5	26.77	475.34
		16QAM	1/12	2498.5	<b>27.92</b>	<b>619.44</b>
			1/12	2593.0	26.54	450.82
			1/12	2687.5	26.32	428.55

**LTE Band 66**

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 66	20	QPSK	1/0	1720.0	23.76	237.68
			1/0	1745.0	<b>24.89</b>	<b>308.32</b>
			1/49	1770.0	23.04	201.37
		16QAM	1/49	1720.0	<b>23.74</b>	<b>236.59</b>
			1/49	1745.0	23.51	224.39
			1/49	1770.0	21.87	153.82
	15	QPSK	1/37	1717.5	<b>24.51</b>	<b>282.49</b>
			1/37	1747.5	24.15	260.02
			1/37	1772.5	23.41	219.28
		16QAM	1/37	1717.5	<b>23.28</b>	<b>212.81</b>
			1/37	1747.5	23.19	208.45
			1/37	1772.5	22.17	164.82
	10	QPSK	1/0	1715.0	23.72	235.50
			1/25	1745.0	<b>24.17</b>	<b>261.22</b>
			1/25	1775.0	23.62	230.14
		16QAM	1/0	1715.0	22.43	174.98
			1/25	1745.0	<b>23.13</b>	<b>205.59</b>
			1/25	1775.0	22.37	172.58
	5	QPSK	1/12	1712.5	23.49	223.36
			1/12	1745.0	<b>24.02</b>	<b>252.35</b>
			1/12	1777.5	23.46	221.82
		16QAM	1/12	1712.5	22.48	177.01
			1/12	1745.0	<b>22.99</b>	<b>199.07</b>
			1/12	1777.5	22.31	170.22
	3	QPSK	1/8	1711.5	24.45	278.61
			1/8	1745.0	<b>25.09</b>	<b>322.85</b>
			1/8	1778.5	24.12	258.23
		16QAM	1/8	1711.5	23.29	213.30
			1/8	1745.0	<b>23.89</b>	<b>244.91</b>
			1/8	1778.5	22.91	195.43
1.4	QPSK	1/3	1710.7	24.66	292.42	
		1/3	1745.0	<b>25.36</b>	<b>343.56</b>	
		1/0	1779.3	23.93	247.17	
	16QAM	1/3	1710.7	<b>23.66</b>	<b>232.27</b>	
		1/3	1745.0	22.21	166.34	
		1/3	1779.3	22.87	193.64	

**LTE Band 71**

Band	BW [MHz]	Mode	RB Size/	f [MHz]	ERP / EIRP	
			RB Offset		[dBm]	[mW]
Band 71	20	QPSK	1/49	673.0	18.15	65.31
			1/49	680.5	<b>18.94</b>	<b>78.34</b>
			1/0	688.0	18.03	63.53
		16QAM	1/49	673.0	17.14	51.76
			1/49	680.5	<b>17.58</b>	<b>57.28</b>
			1/49	688.0	17.00	50.12
	15	QPSK	1/37	670.5	17.49	56.10
			1/37	680.5	18.32	67.92
			1/37	690.5	<b>18.52</b>	<b>71.12</b>
		16QAM	1/37	670.5	16.08	40.55
			1/37	680.5	17.32	53.95
			1/37	690.5	<b>17.43</b>	<b>55.34</b>
	10	QPSK	1/25	668.0	17.11	51.40
			1/25	680.5	18.55	71.61
			1/25	693.0	<b>18.65</b>	<b>73.28</b>
		16QAM	1/25	668.0	16.08	40.55
			1/25	680.5	17.40	54.95
			1/25	693.0	<b>17.57</b>	<b>57.15</b>
	5	QPSK	1/12	665.5	16.20	41.69
			1/12	680.5	18.41	69.34
			1/12	695.5	<b>18.64</b>	<b>73.11</b>
		16QAM	1/12	665.5	15.15	32.73
			1/12	680.5	17.43	55.34
			1/12	695.5	<b>17.75</b>	<b>59.57</b>

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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 38**

LTE Band 38 (Frequency range: 2570-2620 MHz) is covered by LTE Band 41 (Frequency range: 2496-2690 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**

**GSM**

GSM850  GPRS	<p><b>UL Verification Services, Inc.</b>  <b>High Frequency Substitution Measurement</b></p> <p><b>Company:</b> Samsung  <b>Project #:</b> 4789793179  <b>Date:</b> 2021-02-20  <b>Test Engineer:</b> 22943  <b>Configuration:</b> EUT, Z-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> GPRS 850 MHz Fundamentals</p> <p><b>Test Equipment:</b>                  Receiving: VULB9163-749, and Chamber 2 SMA Cables                  Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable</p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>824.20</td> <td>32.46</td> <td>V</td> <td>3.0</td> <td>-1.0</td> <td>28.46</td> <td>38.5</td> <td>-10.0</td> <td></td> </tr> <tr> <td>824.20</td> <td>15.17</td> <td>H</td> <td>3.0</td> <td>-1.0</td> <td>11.18</td> <td>38.5</td> <td>-27.3</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>836.60</td> <td>33.84</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>29.88</td> <td>38.5</td> <td>-8.6</td> <td></td> </tr> <tr> <td>836.60</td> <td>15.93</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>11.97</td> <td>38.5</td> <td>-26.5</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>848.80</td> <td>35.76</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>31.82</td> <td>38.5</td> <td>-6.7</td> <td></td> </tr> <tr> <td>848.80</td> <td>17.29</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>13.35</td> <td>38.5</td> <td>-25.1</td> <td></td> </tr> </tbody> </table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									824.20	32.46	V	3.0	-1.0	28.46	38.5	-10.0		824.20	15.17	H	3.0	-1.0	11.18	38.5	-27.3		Mid Ch									836.60	33.84	V	3.1	-0.9	29.88	38.5	-8.6		836.60	15.93	H	3.1	-0.9	11.97	38.5	-26.5		High Ch									848.80	35.76	V	3.1	-0.9	31.82	38.5	-6.7		848.80	17.29	H	3.1	-0.9	13.35	38.5	-25.1	
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GSM850  EGPRS	<p><b>UL Verification Services, Inc.</b>  <b>High Frequency Substitution Measurement</b></p> <p><b>Company:</b> Samsung  <b>Project #:</b> 4789793179  <b>Date:</b> 2021-02-20  <b>Test Engineer:</b> 22943  <b>Configuration:</b> EUT, Z-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> EGPRS 850 MHz Fundamentals</p> <p><b>Test Equipment:</b>                  Receiving: VULB9163-749, and Chamber 2 SMA Cables                  Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable</p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>824.20</td> <td>27.98</td> <td>V</td> <td>3.0</td> <td>-1.0</td> <td>23.98</td> <td>38.5</td> <td>-14.5</td> <td></td> </tr> <tr> <td>824.20</td> <td>10.60</td> <td>H</td> <td>3.0</td> <td>-1.0</td> <td>6.61</td> <td>38.5</td> <td>-31.9</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>836.60</td> <td>29.13</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>25.17</td> <td>38.5</td> <td>-13.3</td> <td></td> </tr> <tr> <td>836.60</td> <td>11.77</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>7.81</td> <td>38.5</td> <td>-30.7</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>848.80</td> <td>31.03</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>27.09</td> <td>38.5</td> <td>-11.4</td> <td></td> </tr> <tr> <td>848.80</td> <td>12.98</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>9.04</td> <td>38.5</td> <td>-29.5</td> <td></td> </tr> </tbody> </table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									824.20	27.98	V	3.0	-1.0	23.98	38.5	-14.5		824.20	10.60	H	3.0	-1.0	6.61	38.5	-31.9		Mid Ch									836.60	29.13	V	3.1	-0.9	25.17	38.5	-13.3		836.60	11.77	H	3.1	-0.9	7.81	38.5	-30.7		High Ch									848.80	31.03	V	3.1	-0.9	27.09	38.5	-11.4		848.80	12.98	H	3.1	-0.9	9.04	38.5	-29.5	
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**CDMA**

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**WCDMA**

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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1712.40	13.12	V	4.4	9.6	18.34	30.0	-11.7	
	1712.40	19.25	H	4.4	9.6	24.47	30.0	-5.5	
	Mid Ch								
	1732.60	12.33	V	4.4	9.6	17.58	30.0	-12.4	
	1732.60	18.39	H	4.4	9.6	23.64	30.0	-6.4	
	High Ch								
	1752.60	14.00	V	4.4	9.7	19.29	30.0	-10.7	
	1752.60	19.55	H	4.4	9.7	24.84	30.0	-5.2	
Band 4 HSDPA	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-22 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> HSDPA Band 4 Fundamentals  <b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 8.5m SMA-type Cable								
	<b>f</b>	<b>SG reading</b>	<b>Ant. Pol.</b>	<b>Cable Loss</b>	<b>Antenna Gain</b>	<b>EIRP</b>	<b>Limit</b>	<b>Delta</b>	<b>Notes</b>
	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1712.40	12.20	V	4.4	9.6	17.42	30.0	-12.6	
	1712.40	18.31	H	4.4	9.6	23.53	30.0	-6.5	
	Mid Ch								
	1732.60	12.37	V	4.4	9.6	17.62	30.0	-12.4	
	1732.60	18.36	H	4.4	9.6	23.61	30.0	-6.4	
	High Ch								
	1752.60	12.98	V	4.4	9.7	18.27	30.0	-11.7	
	1752.60	18.48	H	4.4	9.7	23.77	30.0	-6.2	

Band 2 REL99	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-22 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> Rel99 Band 2 Fundamentals  <b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 8.5m SMA-type Cable								
	<b>f</b>	<b>SG reading</b>	<b>Ant. Pol.</b>	<b>Cable Loss</b>	<b>Antenna Gain</b>	<b>EIRP</b>	<b>Limit</b>	<b>Delta</b>	<b>Notes</b>
	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1852.40	16.62	V	4.5	9.6	21.70	33.0	-11.3	
	1852.40	19.51	H	4.5	9.6	24.59	33.0	-8.4	
	Mid Ch								
	1880.00	16.11	V	4.6	9.4	20.90	33.0	-12.1	
	1880.00	19.61	H	4.6	9.4	24.40	33.0	-8.6	
	High Ch								
	1907.60	16.50	V	4.6	9.1	20.99	33.0	-12.0	
	1907.60	19.34	H	4.6	9.1	23.83	33.0	-9.2	
Band 2 HSDPA	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-22 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> HSDPA Band 2 Fundamentals  <b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 8.5m SMA-type Cable								
	<b>f</b>	<b>SG reading</b>	<b>Ant. Pol.</b>	<b>Cable Loss</b>	<b>Antenna Gain</b>	<b>EIRP</b>	<b>Limit</b>	<b>Delta</b>	<b>Notes</b>
	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1852.40	15.55	V	4.5	9.6	20.63	33.0	-12.4	
	1852.40	18.49	H	4.5	9.6	23.57	33.0	-9.4	
	Mid Ch								
	1880.00	15.22	V	4.6	9.4	20.01	33.0	-13.0	
	1880.00	18.72	H	4.6	9.4	23.51	33.0	-9.5	
	High Ch								
	1907.60	15.38	V	4.6	9.1	19.87	33.0	-13.1	
	1907.60	18.34	H	4.6	9.1	22.83	33.0	-10.2	

**LTE Band 7**

20MHz QPSK	<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> 4789793179  <b>Date:</b> 2021-02-24  <b>Test Engineer:</b> 22943  <b>Configuration:</b> EUT, Z-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_QPSK Band 7 Fundamentals, 20MHz Bandwidth</p> <p><b>Test Equipment:</b>                  Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables                  Substitution: Horn 3115[00161451], 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"><b>Low Ch</b></td> </tr> <tr> <td>2510.00</td> <td>17.77</td> <td>V</td> <td>5.3</td> <td>10.2</td> <td>22.65</td> <td>33.0</td> <td>-10.3</td> <td></td> </tr> <tr> <td>2510.00</td> <td>7.93</td> <td>H</td> <td>5.3</td> <td>10.2</td> <td>12.82</td> <td>33.0</td> <td>-20.2</td> <td></td> </tr> <tr> <td colspan="9"><b>Mid Ch</b></td> </tr> <tr> <td>2535.00</td> <td>18.16</td> <td>V</td> <td>5.3</td> <td>10.1</td> <td>22.98</td> <td>33.0</td> <td>-10.0</td> <td></td> </tr> <tr> <td>2535.00</td> <td>8.53</td> <td>H</td> <td>5.3</td> <td>10.1</td> <td>13.35</td> <td>33.0</td> <td>-19.7</td> <td></td> </tr> <tr> <td colspan="9"><b>High Ch</b></td> </tr> <tr> <td>2560.00</td> <td>18.27</td> <td>V</td> <td>5.4</td> <td>10.1</td> <td>23.03</td> <td>33.0</td> <td>-10.0</td> <td></td> </tr> <tr> <td>2560.00</td> <td>9.17</td> <td>H</td> <td>5.4</td> <td>10.1</td> <td>13.93</td> <td>33.0</td> <td>-19.1</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	<b>Low Ch</b>									2510.00	17.77	V	5.3	10.2	22.65	33.0	-10.3		2510.00	7.93	H	5.3	10.2	12.82	33.0	-20.2		<b>Mid Ch</b>									2535.00	18.16	V	5.3	10.1	22.98	33.0	-10.0		2535.00	8.53	H	5.3	10.1	13.35	33.0	-19.7		<b>High Ch</b>									2560.00	18.27	V	5.4	10.1	23.03	33.0	-10.0		2560.00	9.17	H	5.4	10.1	13.93	33.0	-19.1	
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20MHz 16QAM	<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> 4789793179  <b>Date:</b> 2021-02-24  <b>Test Engineer:</b> 22943  <b>Configuration:</b> EUT, Z-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_16QAM Band 7 Fundamentals, 20MHz Bandwidth</p> <p><b>Test Equipment:</b>                  Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables                  Substitution: Horn 3115[00161451], 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"><b>Low Ch</b></td> </tr> <tr> <td>2510.00</td> <td>15.65</td> <td>V</td> <td>5.3</td> <td>10.2</td> <td>20.53</td> <td>33.0</td> <td>-12.5</td> <td></td> </tr> <tr> <td>2510.00</td> <td>6.11</td> <td>H</td> <td>5.3</td> <td>10.2</td> <td>11.00</td> <td>33.0</td> <td>-22.0</td> <td></td> </tr> <tr> <td colspan="9"><b>Mid Ch</b></td> </tr> <tr> <td>2535.00</td> <td>17.10</td> <td>V</td> <td>5.3</td> <td>10.1</td> <td>21.92</td> <td>33.0</td> <td>-11.1</td> <td></td> </tr> <tr> <td>2535.00</td> <td>7.24</td> <td>H</td> <td>5.3</td> <td>10.1</td> <td>12.06</td> <td>33.0</td> <td>-20.9</td> <td></td> </tr> <tr> <td colspan="9"><b>High Ch</b></td> </tr> <tr> <td>2560.00</td> <td>17.11</td> <td>V</td> <td>5.4</td> <td>10.1</td> <td>21.87</td> <td>33.0</td> <td>-11.1</td> <td></td> </tr> <tr> <td>2560.00</td> <td>8.27</td> <td>H</td> <td>5.4</td> <td>10.1</td> <td>13.03</td> <td>33.0</td> <td>-20.0</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	<b>Low Ch</b>									2510.00	15.65	V	5.3	10.2	20.53	33.0	-12.5		2510.00	6.11	H	5.3	10.2	11.00	33.0	-22.0		<b>Mid Ch</b>									2535.00	17.10	V	5.3	10.1	21.92	33.0	-11.1		2535.00	7.24	H	5.3	10.1	12.06	33.0	-20.9		<b>High Ch</b>									2560.00	17.11	V	5.4	10.1	21.87	33.0	-11.1		2560.00	8.27	H	5.4	10.1	13.03	33.0	-20.0	
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2535.00	17.10	V	5.3	10.1	21.92	33.0	-11.1																																																																																												
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15MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-24 <b>Test Engineer:</b> 22943 <b>Configuration:</b> EUT, Z-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_QPSK Band 7 Fundamentals, 15MHz Bandwidth  <b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 8.5m SMA-type Cable								
	<b>f</b>	<b>SG reading</b>	<b>Ant. Pol.</b>	<b>Cable Loss</b>	<b>Antenna Gain</b>	<b>EIRP</b>	<b>Limit</b>	<b>Delta</b>	<b>Notes</b>
	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	2507.50	17.01	V	5.3	10.2	21.91	33.0	-11.1	
	2507.50	7.06	H	5.3	10.2	11.96	33.0	-21.0	
	Mid Ch								
	2535.00	18.09	V	5.3	10.1	22.91	33.0	-10.1	
	2535.00	8.04	H	5.3	10.1	12.86	33.0	-20.1	
	High Ch								
	2562.50	17.86	V	5.4	10.1	22.62	33.0	-10.4	
	2562.50	9.79	H	5.4	10.1	14.55	33.0	-18.5	
15MHz  16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-24 <b>Test Engineer:</b> 22943 <b>Configuration:</b> EUT, Z-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 7 Fundamentals, 15MHz Bandwidth  <b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 8.5m SMA-type Cable								
	<b>f</b>	<b>SG reading</b>	<b>Ant. Pol.</b>	<b>Cable Loss</b>	<b>Antenna Gain</b>	<b>EIRP</b>	<b>Limit</b>	<b>Delta</b>	<b>Notes</b>
	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	2507.50	16.21	V	5.3	10.2	21.11	33.0	-11.9	
	2507.50	6.40	H	5.3	10.2	11.30	33.0	-21.7	
	Mid Ch								
	2535.00	17.25	V	5.3	10.1	22.07	33.0	-10.9	
	2535.00	6.86	H	5.3	10.1	11.68	33.0	-21.3	
	High Ch								
	2562.50	16.59	V	5.4	10.1	21.35	33.0	-11.7	
	2562.50	8.65	H	5.4	10.1	13.41	33.0	-19.6	

10MHz QPSK	<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> 4789793179  <b>Date:</b> 2021-02-24  <b>Test Engineer:</b> 22943  <b>Configuration:</b> EUT, Z-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_QPSK Band 7 Fundamentals, 10MHz Bandwidth</p> <p><b>Test Equipment:</b>                  Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables                  Substitution: Horn 3115[00161451], 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>2505.00</td> <td>17.36</td> <td>V</td> <td>5.3</td> <td>10.2</td> <td>22.27</td> <td>33.0</td> <td>-10.7</td> <td></td> </tr> <tr> <td>2505.00</td> <td>7.66</td> <td>H</td> <td>5.3</td> <td>10.2</td> <td>12.57</td> <td>33.0</td> <td>-20.4</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>2535.00</td> <td>18.90</td> <td>V</td> <td>5.3</td> <td>10.1</td> <td>23.72</td> <td>33.0</td> <td>-9.3</td> <td></td> </tr> <tr> <td>2535.00</td> <td>8.82</td> <td>H</td> <td>5.3</td> <td>10.1</td> <td>13.64</td> <td>33.0</td> <td>-19.4</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>2565.00</td> <td>18.35</td> <td>V</td> <td>5.4</td> <td>10.1</td> <td>23.12</td> <td>33.0</td> <td>-9.9</td> <td></td> </tr> <tr> <td>2565.00</td> <td>9.74</td> <td>H</td> <td>5.4</td> <td>10.1</td> <td>14.51</td> <td>33.0</td> <td>-18.5</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									2505.00	17.36	V	5.3	10.2	22.27	33.0	-10.7		2505.00	7.66	H	5.3	10.2	12.57	33.0	-20.4		Mid Ch									2535.00	18.90	V	5.3	10.1	23.72	33.0	-9.3		2535.00	8.82	H	5.3	10.1	13.64	33.0	-19.4		High Ch									2565.00	18.35	V	5.4	10.1	23.12	33.0	-9.9		2565.00	9.74	H	5.4	10.1	14.51	33.0	-18.5	
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	2502.50	16.93	V	5.3	10.2	21.84	33.0	-11.2	
	2502.50	7.08	H	5.3	10.2	11.99	33.0	-21.0	
	Mid Ch								
	2535.00	18.47	V	5.3	10.1	23.29	33.0	-9.7	
	2535.00	9.17	H	5.3	10.1	13.99	33.0	-19.0	
	High Ch								
	2567.50	17.74	V	5.4	10.1	22.51	33.0	-10.5	
	2567.50	9.83	H	5.4	10.1	14.60	33.0	-18.4	
5MHz  16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-24 <b>Test Engineer:</b> 22943 <b>Configuration:</b> EUT, Z-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 7 Fundamentals, 5MHz Bandwidth  <b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 8.5m SMA-type Cable								
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	2502.50	15.99	V	5.3	10.2	20.90	33.0	-12.1	
	2502.50	6.18	H	5.3	10.2	11.09	33.0	-21.9	
	Mid Ch								
	2535.00	17.33	V	5.3	10.1	22.15	33.0	-10.9	
	2535.00	7.82	H	5.3	10.1	12.64	33.0	-20.4	
	High Ch								
	2567.50	16.67	V	5.4	10.1	21.44	33.0	-11.6	
	2567.50	8.89	H	5.4	10.1	13.66	33.0	-19.3	

**LTE Band 12**

10MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																									
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3MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBd)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	700.50	14.43	V	2.8	-1.1	10.58	34.8	-24.2	
	700.50	21.57	H	2.8	-1.1	17.71	34.8	-17.1	
	Mid Ch								
	707.50	14.09	V	2.8	-1.1	10.22	34.8	-24.6	
	707.50	21.81	H	2.8	-1.1	17.94	34.8	-16.8	
	High Ch								
	714.50	13.89	V	2.8	-1.1	10.01	34.8	-24.8	
	714.50	22.59	H	2.8	-1.1	18.70	34.8	-16.1	
3MHz  16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBd)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	700.50	13.23	V	2.8	-1.1	9.38	34.8	-25.4	
	700.50	20.32	H	2.8	-1.1	16.46	34.8	-18.3	
	Mid Ch								
	707.50	12.94	V	2.8	-1.1	9.07	34.8	-25.7	
	707.50	20.65	H	2.8	-1.1	16.78	34.8	-18.0	
	High Ch								
	714.50	12.96	V	2.8	-1.1	9.08	34.8	-25.7	
	714.50	21.59	H	2.8	-1.1	17.70	34.8	-17.1	

1.4MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
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**LTE Band 13**

10MHz QPSK	<p><b>UL Verification Services, Inc.</b>  <b>High Frequency Substitution Measurement</b></p> <p><b>Company:</b> Samsung  <b>Project #:</b> 4789793179  <b>Date:</b> 2021-02-19  <b>Test Engineer:</b> 20890  <b>Configuration:</b> EUT / X-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_QPSK Band 13 Fundamentals, 10MHz Bandwidth</p> <p><b>Test Equipment:</b>  <b>Receiving:</b> VULB9163-749, and Chamber 2 SMA Cables  <b>Substitution:</b> 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>16.47</td> <td>V</td> <td>3.0</td> <td>-1.1</td> <td>12.45</td> <td>34.8</td> <td>-22.3</td> <td></td> </tr> <tr> <td>782.00</td> <td>22.55</td> <td>H</td> <td>3.0</td> <td>-1.1</td> <td>18.53</td> <td>34.8</td> <td>-16.2</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	16.47	V	3.0	-1.1	12.45	34.8	-22.3		782.00	22.55	H	3.0	-1.1	18.53	34.8	-16.2	
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**LTE Band 14**

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**LTE Band 25**

20MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																									
	<p> <b>Company:</b> Samsung  <b>Project #:</b> 4789793179  <b>Date:</b> 2021-02-22  <b>Test Engineer:</b> 20881  <b>Configuration:</b> EUT, Y-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_QPSK Band 25 Fundamentals, 20MHz Bandwidth                 </p> <p> <b>Test Equipment:</b>                      Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables                      Substitution: Horn 3115[00161451], 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>1860.00</td> <td>19.41</td> <td>V</td> <td>4.6</td> <td>9.6</td> <td>24.41</td> <td>33.0</td> <td>-8.6</td> <td></td> </tr> <tr> <td>1860.00</td> <td>17.42</td> <td>H</td> <td>4.6</td> <td>9.6</td> <td>22.42</td> <td>33.0</td> <td>-10.6</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1882.50</td> <td>19.64</td> <td>V</td> <td>4.6</td> <td>9.3</td> <td>24.41</td> <td>33.0</td> <td>-8.6</td> <td></td> </tr> <tr> <td>1882.50</td> <td>16.99</td> <td>H</td> <td>4.6</td> <td>9.3</td> <td>21.76</td> <td>33.0</td> <td>-11.2</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1905.00</td> <td>19.52</td> <td>V</td> <td>4.6</td> <td>9.1</td> <td>24.04</td> <td>33.0</td> <td>-9.0</td> <td></td> </tr> <tr> <td>1905.00</td> <td>16.16</td> <td>H</td> <td>4.6</td> <td>9.1</td> <td>20.69</td> <td>33.0</td> <td>-12.3</td> <td></td> </tr> </tbody> </table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									1860.00	19.41	V	4.6	9.6	24.41	33.0	-8.6		1860.00	17.42	H	4.6	9.6	22.42	33.0	-10.6		Mid Ch									1882.50	19.64	V	4.6	9.3	24.41	33.0	-8.6		1882.50	16.99	H	4.6	9.3	21.76	33.0	-11.2		High Ch									1905.00	19.52	V	4.6	9.1	24.04	33.0	-9.0		1905.00	16.16	H	4.6	9.1	20.69	33.0	-12.3
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1857.50	19.44	V	4.5	9.6	24.47	33.0	-8.5	
	1857.50	17.33	H	4.5	9.6	22.36	33.0	-10.6	
	Mid Ch								
	1882.50	19.47	V	4.6	9.3	24.24	33.0	-8.8	
	1882.50	16.86	H	4.6	9.3	21.63	33.0	-11.4	
	High Ch								
	1907.50	19.84	V	4.6	9.1	24.33	33.0	-8.7	
	1907.50	15.95	H	4.6	9.1	20.44	33.0	-12.6	
15MHz  16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1857.50	18.30	V	4.5	9.6	23.33	33.0	-9.7	
	1857.50	16.06	H	4.5	9.6	21.09	33.0	-11.9	
	Mid Ch								
	1882.50	18.89	V	4.6	9.3	23.66	33.0	-9.3	
	1882.50	15.96	H	4.6	9.3	20.73	33.0	-12.3	
	High Ch								
	1907.50	18.77	V	4.6	9.1	23.26	33.0	-9.7	
	1907.50	14.87	H	4.6	9.1	19.36	33.0	-13.6	

10MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
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5MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1852.50	19.36	V	4.5	9.6	24.44	33.0	-8.6	
	1852.50	17.03	H	4.5	9.6	22.11	33.0	-10.9	
	Mid Ch								
	1882.50	19.67	V	4.6	9.3	24.44	33.0	-8.6	
	1882.50	17.05	H	4.6	9.3	21.82	33.0	-11.2	
	High Ch								
	1912.50	20.21	V	4.6	9.0	24.63	33.0	-8.4	
	1912.50	16.77	H	4.6	9.0	21.20	33.0	-11.8	
5MHz  16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1852.50	18.35	V	4.5	9.6	23.43	33.0	-9.6	
	1852.50	16.00	H	4.5	9.6	21.08	33.0	-11.9	
	Mid Ch								
	1882.50	18.82	V	4.6	9.3	23.59	33.0	-9.4	
	1882.50	15.87	H	4.6	9.3	20.64	33.0	-12.4	
	High Ch								
	1912.50	19.25	V	4.6	9.0	23.67	33.0	-9.3	
	1912.50	15.91	H	4.6	9.0	20.34	33.0	-12.7	

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**LTE Band 26 (Part 90)**

15MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																			
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	<p> <b>Company:</b> Samsung  <b>Project #:</b> 4789793179  <b>Date:</b> 2021-02-23  <b>Test Engineer:</b> 22943  <b>Configuration:</b> EUT, Z-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_16QAM Band 26 Fundamentals, 1.4MHz Bandwidth                 </p> <p> <b>Test Equipment:</b>                      Receiving: VULB9163-749, and Chamber 2 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>814.70</td> <td>21.64</td> <td>V</td> <td>3.0</td> <td>-1.0</td> <td>17.62</td> <td>50.0</td> <td>-32.4</td> <td>Part 90</td> </tr> <tr> <td>814.70</td> <td>5.49</td> <td>H</td> <td>3.0</td> <td>-1.0</td> <td>1.47</td> <td>50.0</td> <td>-48.5</td> <td>Part 90</td> </tr> <tr> <td colspan="9"><b>Mid Ch</b></td> </tr> <tr> <td>823.30</td> <td>21.86</td> <td>V</td> <td>3.0</td> <td>-1.0</td> <td>17.86</td> <td>50.0</td> <td>-32.1</td> <td>Part 90</td> </tr> <tr> <td>823.30</td> <td>4.42</td> <td>H</td> <td>3.0</td> <td>-1.0</td> <td>0.42</td> <td>50.0</td> <td>-49.6</td> <td>Part 90</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>									814.70	21.64	V	3.0	-1.0	17.62	50.0	-32.4	Part 90	814.70	5.49	H	3.0	-1.0	1.47	50.0	-48.5	Part 90	<b>Mid Ch</b>									823.30	21.86	V	3.0	-1.0	17.86	50.0	-32.1	Part 90	823.30	4.42	H	3.0	-1.0	0.42	50.0	-49.6
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**LTE Band 26 (Straddle & Part 22)**

15MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																									
	<p> <b>Company:</b> Samsung  <b>Project #:</b> 4789793179  <b>Date:</b> 2021-02-23  <b>Test Engineer:</b> 20882  <b>Configuration:</b> EUT, Z-position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_QPSK Band 26 Fundamentals, 15MHz Bandwidth                 </p> <p> <b>Test Equipment:</b>                      Receiving: VULB9163-749, and Chamber 2 SMA Cables                      Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable                 </p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>824.00</td> <td>23.70</td> <td>V</td> <td>3.0</td> <td>-1.0</td> <td>19.70</td> <td>38.5</td> <td>-18.8</td> <td></td> </tr> <tr> <td>824.00</td> <td>6.10</td> <td>H</td> <td>3.0</td> <td>-1.0</td> <td>2.10</td> <td>38.5</td> <td>-36.4</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>831.50</td> <td>23.86</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>19.88</td> <td>38.5</td> <td>-18.6</td> <td></td> </tr> <tr> <td>831.50</td> <td>5.18</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>1.20</td> <td>38.5</td> <td>-37.3</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>841.50</td> <td>25.26</td> <td>V</td> <td>3.1</td> <td>-0.9</td> <td>21.30</td> <td>38.5</td> <td>-17.2</td> <td></td> </tr> <tr> <td>841.50</td> <td>6.80</td> <td>H</td> <td>3.1</td> <td>-0.9</td> <td>2.85</td> <td>38.5</td> <td>-35.7</td> <td></td> </tr> </tbody> </table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									824.00	23.70	V	3.0	-1.0	19.70	38.5	-18.8		824.00	6.10	H	3.0	-1.0	2.10	38.5	-36.4		Mid Ch									831.50	23.86	V	3.1	-0.9	19.88	38.5	-18.6		831.50	5.18	H	3.1	-0.9	1.20	38.5	-37.3		High Ch									841.50	25.26	V	3.1	-0.9	21.30	38.5	-17.2		841.50	6.80	H	3.1	-0.9	2.85	38.5	-35.7
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10MHz QPSK		UL Verification Services, Inc. High Frequency Substitution Measurement							
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)
		<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-23 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, Z-position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_QPSK Band 26 Fundamentals, 10MHz Bandwidth  <b>Test Equipment:</b> Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable							
		Straddle Ch							
		824.00	23.69	V	3.0	-1.0	19.70	38.5	-18.8
		824.00	7.19	H	3.0	-1.0	3.19	38.5	-35.3
		Low Ch							
		829.00	24.01	V	3.1	-0.9	20.02	38.5	-18.5
		829.00	6.61	H	3.1	-0.9	2.62	38.5	-35.9
		Mid Ch							
		831.50	23.84	V	3.1	-0.9	19.86	38.5	-18.6
		831.50	6.69	H	3.1	-0.9	2.71	38.5	-35.8
		High Ch							
		844.00	24.80	V	3.1	-0.9	20.85	38.5	-17.7
		844.00	8.14	H	3.1	-0.9	4.19	38.5	-34.3

10MHz 16QAM		UL Verification Services, Inc. High Frequency Substitution Measurement							
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)
		<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-23 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, Z-position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 26 Fundamentals, 10MHz Bandwidth  <b>Test Equipment:</b> Receiving: VULB9163-749, and Chamber 2 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable							
		Straddle Ch							
		824.00	22.67	V	3.0	-1.0	18.68	38.5	-19.8
		824.00	6.09	H	3.0	-1.0	2.09	38.5	-36.4
		Low Ch							
		829.00	22.77	V	3.1	-0.9	18.78	38.5	-19.7
		829.00	5.47	H	3.1	-0.9	1.48	38.5	-37.0
		Mid Ch							
		831.50	23.00	V	3.1	-0.9	19.02	38.5	-19.5
		831.50	5.80	H	3.1	-0.9	1.82	38.5	-36.7
		High Ch							
		844.00	24.36	V	3.1	-0.9	20.41	38.5	-18.1
		844.00	7.46	H	3.1	-0.9	3.51	38.5	-35.0

5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																																				
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		UL Verification Services, Inc. High Frequency Substitution Measurement							
3MHz QPSK	<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-23 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, Z-position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_QPSK Band 26 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
	Straddle Ch								
	824.00	23.39	V	3.0	-1.0	19.40	38.5	-19.1	
	824.00	7.31	H	3.0	-1.0	3.31	38.5	-35.2	
	Low Ch								
	825.50	23.07	V	3.0	-0.9	19.08	38.5	-19.4	
	825.50	6.26	H	3.0	-0.9	2.27	38.5	-36.2	
	Mid Ch								
	831.50	23.45	V	3.1	-0.9	19.47	38.5	-19.0	
	831.50	6.86	H	3.1	-0.9	2.88	38.5	-35.6	
	High Ch								
	847.50	25.17	V	3.1	-0.9	21.23	38.5	-17.3	
	847.50	6.79	H	3.1	-0.9	2.85	38.5	-35.7	
3MHz 16QAM	<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-23 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, Z-position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 26 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
	Straddle Ch								
	824.00	22.41	V	3.0	-1.0	18.42	38.5	-20.1	
	824.00	6.62	H	3.0	-1.0	2.62	38.5	-35.9	
	Low Ch								
	825.50	22.11	V	3.0	-0.9	18.12	38.5	-20.4	
	825.50	5.19	H	3.0	-0.9	1.20	38.5	-37.3	
	Mid Ch								
	831.50	22.41	V	3.1	-0.9	18.43	38.5	-20.1	
	831.50	5.91	H	3.1	-0.9	1.93	38.5	-36.6	
	High Ch								
	847.50	24.30	V	3.1	-0.9	20.36	38.5	-18.1	
	847.50	5.84	H	3.1	-0.9	1.90	38.5	-36.6	



		UL Verification Services, Inc. High Frequency Substitution Measurement							
1.4MHz  QPSK	<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-23 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, Z-position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_QPSK Band 26 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
	Straddle Ch								
	824.00	23.43	V	3.0	-1.0	19.43	38.5	-19.1	
	824.00	6.99	H	3.0	-1.0	2.99	38.5	-35.5	
	Low Ch								
	824.70	23.16	V	3.0	-1.0	19.16	38.5	-19.3	
	824.70	6.30	H	3.0	-1.0	2.30	38.5	-36.2	
	Mid Ch								
	831.50	23.69	V	3.1	-0.9	19.71	38.5	-18.8	
	831.50	5.87	H	3.1	-0.9	1.89	38.5	-36.6	
	High Ch								
	848.30	25.05	V	3.1	-0.9	21.11	38.5	-17.4	
	848.30	7.22	H	3.1	-0.9	3.28	38.5	-35.2	
1.4MHz  16QAM	<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-23 <b>Test Engineer:</b> 20882 <b>Configuration:</b> EUT, Z-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 26 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
	Straddle Ch								
	824.00	22.35	V	3.0	-1.0	18.35	38.5	-20.1	
	824.00	6.23	H	3.0	-1.0	2.23	38.5	-36.3	
	Low Ch								
	824.70	22.13	V	3.0	-1.0	18.13	38.5	-20.4	
	824.70	5.49	H	3.0	-1.0	1.49	38.5	-37.0	
	Mid Ch								
	831.50	22.71	V	3.1	-0.9	18.73	38.5	-19.8	
	831.50	4.51	H	3.1	-0.9	0.53	38.5	-38.0	
	High Ch								
	848.30	24.00	V	3.1	-0.9	20.06	38.5	-18.4	
	848.30	5.87	H	3.1	-0.9	1.93	38.5	-36.6	

**LTE Band 30**

10MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																			
	<p> <b>Company:</b> Samsung  <b>Project #:</b> 4789793179  <b>Date:</b> 2021-02-25  <b>Test Engineer:</b> 20882  <b>Configuration:</b> EUT, X-Position  <b>Location:</b> Chamber 1  <b>Mode:</b> LTE_QPSK Band 30 Fundamentals, 10MHz Bandwidth                 </p> <p> <b>Test Equipment:</b>                      Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables                      Substitution: Horn 3115[00167211], 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>Mid Ch</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2310.00</td> <td>9.74</td> <td>V</td> <td>5.1</td> <td>9.9</td> <td>14.55</td> <td>24.0</td> <td>-9.5</td> <td></td> </tr> <tr> <td>2310.00</td> <td>17.72</td> <td>H</td> <td>5.1</td> <td>9.9</td> <td>22.52</td> <td>24.0</td> <td>-1.5</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	Mid Ch									2310.00	9.74	V	5.1	9.9	14.55	24.0	-9.5		2310.00	17.72	H	5.1	9.9	22.52	24.0	-1.5
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5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																										
	<p> <b>Company:</b> Samsung  <b>Project #:</b> 4789793179  <b>Date:</b> 2021-02-24  <b>Test Engineer:</b> 20881  <b>Configuration:</b> EUT, X-Position  <b>Location:</b> Chamber 1  <b>Mode:</b> LTE_QPSK Band 30 Fundamentals, 5MHz Bandwidth                 </p> <p> <b>Test Equipment:</b>                      Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables                      Substitution: Horn 3115[00167211], 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>Low Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>2307.50</td><td>10.22</td><td>V</td><td>5.1</td><td>9.9</td><td>15.02</td><td>24.0</td><td>-9.0</td><td></td></tr> <tr><td>2307.50</td><td>17.75</td><td>H</td><td>5.1</td><td>9.9</td><td>22.54</td><td>24.0</td><td>-1.5</td><td></td></tr> <tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>2310.00</td><td>9.32</td><td>V</td><td>5.1</td><td>9.9</td><td>14.13</td><td>24.0</td><td>-9.9</td><td></td></tr> <tr><td>2310.00</td><td>17.56</td><td>H</td><td>5.1</td><td>9.9</td><td>22.36</td><td>24.0</td><td>-1.6</td><td></td></tr> <tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>2312.50</td><td>8.49</td><td>V</td><td>5.1</td><td>9.9</td><td>13.30</td><td>24.0</td><td>-10.7</td><td></td></tr> <tr><td>2312.50</td><td>17.24</td><td>H</td><td>5.1</td><td>9.9</td><td>22.05</td><td>24.0</td><td>-1.9</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									2307.50	10.22	V	5.1	9.9	15.02	24.0	-9.0		2307.50	17.75	H	5.1	9.9	22.54	24.0	-1.5		Mid Ch									2310.00	9.32	V	5.1	9.9	14.13	24.0	-9.9		2310.00	17.56	H	5.1	9.9	22.36	24.0	-1.6		High Ch									2312.50	8.49	V	5.1	9.9	13.30	24.0	-10.7		2312.50	17.24	H	5.1	9.9	22.05	24.0	-1.9	
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**LTE Band 41 (PC2)**

20MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
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**LTE Band 66**

20MHz QPSK	<p><b>UL Verification Services, Inc.</b>  <b>High Frequency Substitution Measurement</b></p> <p><b>Company:</b> Samsung  <b>Project #:</b> 4789793179  <b>Date:</b> 2021-02-16  <b>Test Engineer:</b> 20890  <b>Configuration:</b> EUT / Y-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_QPSK Band 66 Fundamentals, 20MHz Bandwidth</p> <p><b>Test Equipment:</b>                  Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables                  Substitution: Horn 3115[00161451], 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>1720.00</td> <td>18.52</td> <td>V</td> <td>4.4</td> <td>9.6</td> <td>23.76</td> <td>30.0</td> <td>-6.2</td> <td></td> </tr> <tr> <td>1720.00</td> <td>12.99</td> <td>H</td> <td>4.4</td> <td>9.6</td> <td>18.22</td> <td>30.0</td> <td>-11.8</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1745.00</td> <td>19.61</td> <td>V</td> <td>4.4</td> <td>9.7</td> <td>24.89</td> <td>30.0</td> <td>-5.1</td> <td></td> </tr> <tr> <td>1745.00</td> <td>13.98</td> <td>H</td> <td>4.4</td> <td>9.7</td> <td>19.26</td> <td>30.0</td> <td>-10.7</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1770.00</td> <td>17.77</td> <td>V</td> <td>4.4</td> <td>9.7</td> <td>23.04</td> <td>30.0</td> <td>-7.0</td> <td></td> </tr> <tr> <td>1770.00</td> <td>14.90</td> <td>H</td> <td>4.4</td> <td>9.7</td> <td>20.18</td> <td>30.0</td> <td>-9.8</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									1720.00	18.52	V	4.4	9.6	23.76	30.0	-6.2		1720.00	12.99	H	4.4	9.6	18.22	30.0	-11.8		Mid Ch									1745.00	19.61	V	4.4	9.7	24.89	30.0	-5.1		1745.00	13.98	H	4.4	9.7	19.26	30.0	-10.7		High Ch									1770.00	17.77	V	4.4	9.7	23.04	30.0	-7.0		1770.00	14.90	H	4.4	9.7	20.18	30.0	-9.8	
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15MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1717.50	19.28	V	4.4	9.6	24.51	30.0	-5.5	
	1717.50	13.39	H	4.4	9.6	18.62	30.0	-11.4	
	Mid Ch								
	1745.00	18.87	V	4.4	9.7	24.15	30.0	-5.9	
	1745.00	12.73	H	4.4	9.7	18.01	30.0	-12.0	
	High Ch								
	1772.50	18.14	V	4.4	9.7	23.41	30.0	-6.6	
	1772.50	16.16	H	4.4	9.7	21.43	30.0	-8.6	
15MHz  16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1717.50	18.05	V	4.4	9.6	23.28	30.0	-6.7	
	1717.50	12.17	H	4.4	9.6	17.40	30.0	-12.6	
	Mid Ch								
	1745.00	17.91	V	4.4	9.7	23.19	30.0	-6.8	
	1745.00	11.55	H	4.4	9.7	16.83	30.0	-13.2	
	High Ch								
	1772.50	16.90	V	4.4	9.7	22.17	30.0	-7.8	
	1772.50	14.82	H	4.4	9.7	20.09	30.0	-9.9	

10MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																									
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3MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-16 <b>Test Engineer:</b> 20890 <b>Configuration:</b> EUT / Y-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_QPSK Band 66 Fundamentals, 3MHz Bandwidth  <b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 8.5m SMA-type Cable								
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1711.50	19.24	V	4.4	9.6	24.45	30.0	-5.5	
	1711.50	12.74	H	4.4	9.6	17.96	30.0	-12.0	
	Mid Ch								
	1745.00	19.81	V	4.4	9.7	25.09	30.0	-4.9	
	1745.00	13.24	H	4.4	9.7	18.52	30.0	-11.5	
	High Ch								
	1778.50	18.86	V	4.4	9.7	24.12	30.0	-5.9	
	1778.50	15.01	H	4.4	9.7	20.27	30.0	-9.7	
3MHz  16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-16 <b>Test Engineer:</b> 20890 <b>Configuration:</b> EUT / Y-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 66 Fundamentals, 3MHz Bandwidth  <b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00161451], 8.5m SMA-type Cable								
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBi)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	1711.50	18.08	V	4.4	9.6	23.29	30.0	-6.7	
	1711.50	11.68	H	4.4	9.6	16.90	30.0	-13.1	
	Mid Ch								
	1745.00	18.61	V	4.4	9.7	23.89	30.0	-6.1	
	1745.00	12.13	H	4.4	9.7	17.41	30.0	-12.6	
	High Ch								
	1778.50	17.65	V	4.4	9.7	22.91	30.0	-7.1	
	1778.50	13.88	H	4.4	9.7	19.14	30.0	-10.9	

1.4MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																									
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**LTE Band 71**

20MHz QPSK	<p><b>UL Verification Services, Inc.</b>  <b>High Frequency Substitution Measurement</b></p> <p><b>Company:</b> Samsung  <b>Project #:</b> 4789793179  <b>Date:</b> 2021-02-20  <b>Test Engineer:</b> 22943  <b>Configuration:</b> EUT, Z-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_QPSK Band 71 Fundamentals, 20MHz Bandwidth</p> <p><b>Test Equipment:</b>                  Receiving: VULB9163-749, and Chamber 2 SMA Cables                  Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable</p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBd)</th> <th>ERP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>673.00</td> <td>22.06</td> <td>V</td> <td>2.8</td> <td>-1.2</td> <td>18.15</td> <td>34.8</td> <td>-16.6</td> <td></td> </tr> <tr> <td>673.00</td> <td>4.07</td> <td>H</td> <td>2.8</td> <td>-1.2</td> <td>0.16</td> <td>34.8</td> <td>-34.6</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>680.50</td> <td>22.84</td> <td>V</td> <td>2.8</td> <td>-1.1</td> <td>18.94</td> <td>34.8</td> <td>-15.8</td> <td></td> </tr> <tr> <td>680.50</td> <td>5.39</td> <td>H</td> <td>2.8</td> <td>-1.1</td> <td>1.48</td> <td>34.8</td> <td>-33.3</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>688.00</td> <td>21.92</td> <td>V</td> <td>2.8</td> <td>-1.1</td> <td>18.03</td> <td>34.8</td> <td>-16.7</td> <td></td> </tr> <tr> <td>688.00</td> <td>4.40</td> <td>H</td> <td>2.8</td> <td>-1.1</td> <td>0.52</td> <td>34.8</td> <td>-34.3</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	Low Ch									673.00	22.06	V	2.8	-1.2	18.15	34.8	-16.6		673.00	4.07	H	2.8	-1.2	0.16	34.8	-34.6		Mid Ch									680.50	22.84	V	2.8	-1.1	18.94	34.8	-15.8		680.50	5.39	H	2.8	-1.1	1.48	34.8	-33.3		High Ch									688.00	21.92	V	2.8	-1.1	18.03	34.8	-16.7		688.00	4.40	H	2.8	-1.1	0.52	34.8	-34.3	
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	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBd)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
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	665.50	2.56	H	2.7	-1.2	-1.37	34.8	-36.1	
	Mid Ch								
	680.50	22.31	V	2.8	-1.1	18.41	34.8	-16.4	
	680.50	5.04	H	2.8	-1.1	1.13	34.8	-33.6	
	High Ch								
	695.50	22.51	V	2.8	-1.1	18.64	34.8	-16.1	
	695.50	4.08	H	2.8	-1.1	0.22	34.8	-34.6	
5MHz  16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<p> <b>Company:</b> Samsung  <b>Project #:</b> 4789793179  <b>Date:</b> 2021-02-19  <b>Test Engineer:</b> 20890  <b>Configuration:</b> EUT / Z-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_16QAM Band 71 Fundamentals, 5MHz Bandwidth                 </p> <p> <b>Test Equipment:</b>                      Receiving: VULB9163-749, and Chamber 2 SMA Cables                      Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable                 </p>								
	<b>f</b>	<b>SG reading</b>	<b>Ant. Pol.</b>	<b>Cable Loss</b>	<b>Antenna Gain</b>	<b>ERP</b>	<b>Limit</b>	<b>Delta</b>	<b>Notes</b>
	<b>MHz</b>	<b>(dBm)</b>	<b>(H/V)</b>	<b>(dB)</b>	<b>(dBd)</b>	<b>(dBm)</b>	<b>(dBm)</b>	<b>(dB)</b>	
	Low Ch								
	665.50	19.08	V	2.7	-1.2	15.15	34.8	-19.6	
	665.50	1.48	H	2.7	-1.2	-2.45	34.8	-37.2	
	Mid Ch								
	680.50	21.33	V	2.8	-1.1	17.43	34.8	-17.3	
	680.50	1.60	H	2.8	-1.1	-2.31	34.8	-37.1	
	High Ch								
	695.50	21.62	V	2.8	-1.1	17.75	34.8	-17.0	
	695.50	3.30	H	2.8	-1.1	-0.56	34.8	-35.3	

## 9.6. FIELD STRENGTH OF SPURIOUS RADIATION

### RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53, §90.543 and §90.691

### LIMIT

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

Part 27.53:

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

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

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

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

(m) (4) For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less 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 90.543:

(f) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics 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. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Part 90.691:

(a) Out-of-band emission requirement shall apply only to the "outer" channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(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.

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**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) Sweep time = auto couple;
- d) Detector = rms;
- e) Ensure that the number of measurement points  $\geq$  span/RBW;
- f) Trace mode = average(FDD), Max hold(TDD);

**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**

**GSM**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		Company: Samsung Project #: 4789793179 Date: 2021-02-20 Test Engineer: 22943 Configuration: EUT / AC Adapter / Earphone, Y-Position Location: Chamber 2 Mode: GPRS 850 MHz Harmonics Test Votage: AC 120 V, 60 Hz								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
850 GPRS										
Low Ch, 824.2MHz										
1648.40	-1.7	V	3.0	40.7	1.0	-41.4	-13.0	-28.4		
2472.60	-5.6	V	3.0	41.3	1.0	-45.9	-13.0	-32.9		
3296.80	-9.3	V	3.0	42.1	1.0	-50.3	-13.0	-37.3		
1648.40	-1.0	H	3.0	40.7	1.0	-40.7	-13.0	-27.7		
2472.60	-6.0	H	3.0	41.3	1.0	-46.3	-13.0	-33.3		
3296.80	-9.0	H	3.0	42.1	1.0	-50.1	-13.0	-37.1		
Mid Ch, 836.6MHz										
1673.20	0.9	V	3.0	40.7	1.0	-38.8	-13.0	-25.8		
2509.80	-6.1	V	3.0	41.4	1.0	-46.5	-13.0	-33.5		
3346.40	-9.0	V	3.0	42.1	1.0	-50.0	-13.0	-37.0		
1673.20	1.2	H	3.0	40.7	1.0	-38.5	-13.0	-25.5		
2509.80	-7.1	H	3.0	41.4	1.0	-47.4	-13.0	-34.4		
3346.40	-8.9	H	3.0	42.1	1.0	-49.9	-13.0	-36.9		
High Ch, 848.8MHz										
1697.60	2.0	V	3.0	40.7	1.0	-37.7	-13.0	-24.7		
2546.40	-4.8	V	3.0	41.4	1.0	-45.2	-13.0	-32.2		
3395.20	-8.9	V	3.0	42.1	1.0	-50.0	-13.0	-37.0		
1697.60	1.5	H	3.0	40.7	1.0	-38.2	-13.0	-25.2		
2546.40	-6.4	H	3.0	41.4	1.0	-46.8	-13.0	-33.8		
3395.20	-8.9	H	3.0	42.1	1.0	-50.0	-13.0	-37.0		
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		Company: Samsung Project #: 4789793179 Date: 2021-02-21 Test Engineer: 22943 Configuration: EUT / AC Adapter / Earphone, Y-Position Location: Chamber 2 Mode: EGPRS 850 MHz Harmonics Test Votage: AC 120 V, 60 Hz								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
850 EGPRS										
Low Ch, 824.2MHz										
1648.40	-11.5	V	3.0	40.7	1.0	-51.2	-13.0	-38.2		
2472.60	-11.7	V	3.0	41.3	1.0	-52.0	-13.0	-39.0		
3296.80	-9.2	V	3.0	42.1	1.0	-50.3	-13.0	-37.3		
1648.40	-10.2	H	3.0	40.7	1.0	-49.9	-13.0	-36.9		
2472.60	-11.5	H	3.0	41.3	1.0	-51.8	-13.0	-38.8		
3296.80	-9.2	H	3.0	42.1	1.0	-50.3	-13.0	-37.3		
Mid Ch, 836.6MHz										
1673.20	-10.0	V	3.0	40.7	1.0	-49.7	-13.0	-36.7		
2509.80	-11.1	V	3.0	41.4	1.0	-51.5	-13.0	-38.5		
3346.40	-9.1	V	3.0	42.1	1.0	-50.2	-13.0	-37.2		
1673.20	-9.6	H	3.0	40.7	1.0	-49.3	-13.0	-36.3		
2509.80	-11.4	H	3.0	41.4	1.0	-51.7	-13.0	-38.7		
3346.40	-9.0	H	3.0	42.1	1.0	-50.1	-13.0	-37.1		
High Ch, 848.8MHz										
1697.60	-6.8	V	3.0	40.7	1.0	-46.5	-13.0	-33.5		
2546.40	-11.0	V	3.0	41.4	1.0	-51.4	-13.0	-38.4		
3395.20	-9.2	V	3.0	42.1	1.0	-50.2	-13.0	-37.2		
1697.60	-7.5	H	3.0	40.7	1.0	-47.2	-13.0	-34.2		
2546.40	-11.1	H	3.0	41.4	1.0	-51.5	-13.0	-38.5		
3395.20	-8.9	H	3.0	42.1	1.0	-50.0	-13.0	-37.0		

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-22 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT / AC Adapter / Earphone, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> GPRS 1900 MHz Harmonics <b>Test Voltage:</b> AC 120 V, 60 Hz										
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
1900 GPRS										
Low Ch, 1850.2MHz										
3700.40	-9.8	V	3.0	42.1	1.0	-50.9	-13.0	-37.9		
5550.60	-5.8	V	3.0	42.9	1.0	-47.7	-13.0	-34.7		
7400.80	-4.1	V	3.0	42.5	1.0	-45.6	-13.0	-32.6		
3700.40	-9.8	H	3.0	42.1	1.0	-50.9	-13.0	-37.9		
5550.60	-5.5	H	3.0	42.9	1.0	-47.4	-13.0	-34.4		
7400.80	-4.1	H	3.0	42.5	1.0	-45.6	-13.0	-32.6		
Mid Ch, 1880MHz										
3760.00	-8.9	V	3.0	42.1	1.0	-49.9	-13.0	-36.9		
5640.00	-5.5	V	3.0	42.9	1.0	-47.4	-13.0	-34.4		
7520.00	-4.0	V	3.0	42.4	1.0	-45.4	-13.0	-32.4		
3760.00	-9.4	H	3.0	42.1	1.0	-50.5	-13.0	-37.5		
5640.00	-5.4	H	3.0	42.9	1.0	-47.3	-13.0	-34.3		
7520.00	-4.1	H	3.0	42.4	1.0	-45.6	-13.0	-32.6		
High Ch, 1909.8MHz										
3819.60	-9.2	V	3.0	42.1	1.0	-50.3	-13.0	-37.3		
5729.40	-5.5	V	3.0	43.0	1.0	-47.5	-13.0	-34.5		
7639.20	-4.1	V	3.0	42.4	1.0	-45.5	-13.0	-32.5		
3819.60	-8.6	H	3.0	42.1	1.0	-49.7	-13.0	-36.7		
5729.40	-5.6	H	3.0	43.0	1.0	-47.5	-13.0	-34.5		
7639.20	-4.1	H	3.0	42.4	1.0	-45.5	-13.0	-32.5		
UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-22 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT / AC Adapter / Earphone, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> EGPRS 1900 MHz Harmonics <b>Test Voltage:</b> AC 120 V, 60 Hz										
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
1900 EGPRS										
Low Ch, 1850.2MHz										
3700.40	-9.5	V	3.0	42.1	1.0	-50.5	-13.0	-37.5		
5550.60	-6.1	V	3.0	42.9	1.0	-48.0	-13.0	-35.0		
7400.80	-4.1	V	3.0	42.5	1.0	-45.6	-13.0	-32.6		
3700.40	-9.5	H	3.0	42.1	1.0	-50.6	-13.0	-37.6		
5550.60	-5.8	H	3.0	42.9	1.0	-47.7	-13.0	-34.7		
7400.80	-4.0	H	3.0	42.5	1.0	-45.5	-13.0	-32.5		
Mid Ch, 1880MHz										
3760.00	-9.0	V	3.0	42.1	1.0	-50.1	-13.0	-37.1		
5640.00	-5.6	V	3.0	42.9	1.0	-47.5	-13.0	-34.5		
7520.00	-3.9	V	3.0	42.4	1.0	-45.4	-13.0	-32.4		
3760.00	-9.1	H	3.0	42.1	1.0	-50.2	-13.0	-37.2		
5640.00	-5.5	H	3.0	42.9	1.0	-47.4	-13.0	-34.4		
7520.00	-4.0	H	3.0	42.4	1.0	-45.4	-13.0	-32.4		
High Ch, 1909.8MHz										
3819.60	-9.3	V	3.0	42.1	1.0	-50.4	-13.0	-37.4		
5729.40	-5.8	V	3.0	43.0	1.0	-47.8	-13.0	-34.8		
7639.20	-4.2	V	3.0	42.4	1.0	-45.5	-13.0	-32.5		
3819.60	-9.2	H	3.0	42.1	1.0	-50.3	-13.0	-37.3		
5729.40	-5.6	H	3.0	43.0	1.0	-47.5	-13.0	-34.5		
7639.20	-3.8	H	3.0	42.4	1.0	-45.2	-13.0	-32.2		

**CDMA**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
BC 10  1xRTT	Company:		Samsung								
	Project #:		4789793179								
	Date:		2021-02-19								
	Test Engineer:		20881								
	Configuration:		EUT / AC Adapter / Earphone, Z-Position								
	Location:		Chamber 2								
	Mode:		RTT BC10 Harmonics								
	Test Voltage:		AC 120 V, 60 Hz								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch, 817.9MHz										
	1635.80	-15.4	V	3.0	40.7	1.0	-55.1	-13.0	-42.1		
	2453.70	-12.0	V	3.0	41.3	1.0	-52.2	-13.0	-39.2		
	3271.60	-10.4	V	3.0	42.1	1.0	-51.4	-13.0	-38.4		
	1635.80	-15.4	H	3.0	40.7	1.0	-55.1	-13.0	-42.1		
	2453.70	-12.3	H	3.0	41.3	1.0	-52.6	-13.0	-39.6		
	3271.60	-10.0	H	3.0	42.1	1.0	-51.1	-13.0	-38.1		
	Mid Ch, 820.5MHz										
	1641.00	-15.2	V	3.0	40.7	1.0	-54.9	-13.0	-41.9		
	2461.50	-12.7	V	3.0	41.3	1.0	-52.9	-13.0	-39.9		
	3282.00	-10.0	V	3.0	42.1	1.0	-51.0	-13.0	-38.0		
	1641.00	-15.4	H	3.0	40.7	1.0	-55.1	-13.0	-42.1		
	2461.50	-12.3	H	3.0	41.3	1.0	-52.6	-13.0	-39.6		
	3282.00	-10.0	H	3.0	42.1	1.0	-51.1	-13.0	-38.1		
	High Ch, 823.1MHz										
	1646.20	-15.3	V	3.0	40.7	1.0	-55.0	-13.0	-42.0		
2469.30	-12.6	V	3.0	41.3	1.0	-52.9	-13.0	-39.9			
3292.40	-10.4	V	3.0	42.1	1.0	-51.4	-13.0	-38.4			
1646.20	-15.6	H	3.0	40.7	1.0	-55.3	-13.0	-42.3			
2469.30	-12.3	H	3.0	41.3	1.0	-52.6	-13.0	-39.6			
3292.40	-9.6	H	3.0	42.1	1.0	-50.6	-13.0	-37.6			
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
BC 10  EV-DO Rel.0	Company:		Samsung								
	Project #:		4789793179								
	Date:		2021-02-19								
	Test Engineer:		20881								
	Configuration:		EUT / AC Adapter / Earphone, Z-Position								
	Location:		Chamber 2								
	Mode:		EVDO BC10 Harmonics								
	Test Voltage:		AC 120 V, 60 Hz								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch, 817.9MHz										
	1635.80	-15.3	V	3.0	40.7	1.0	-55.0	-13.0	-42.0		
	2453.70	-12.5	V	3.0	41.3	1.0	-52.8	-13.0	-39.8		
	3271.60	-10.5	V	3.0	42.1	1.0	-51.6	-13.0	-38.6		
	1635.80	-15.3	H	3.0	40.7	1.0	-55.0	-13.0	-42.0		
	2453.70	-11.8	H	3.0	41.3	1.0	-52.1	-13.0	-39.1		
	3271.60	-10.0	H	3.0	42.1	1.0	-51.1	-13.0	-38.1		
	Mid Ch, 820.5MHz										
	1641.00	-15.7	V	3.0	40.7	1.0	-55.4	-13.0	-42.4		
	2461.50	-12.9	V	3.0	41.3	1.0	-53.2	-13.0	-40.2		
	3282.00	-10.4	V	3.0	42.1	1.0	-51.5	-13.0	-38.5		
	1641.00	-15.7	H	3.0	40.7	1.0	-55.4	-13.0	-42.4		
	2461.50	-12.3	H	3.0	41.3	1.0	-52.6	-13.0	-39.6		
	3282.00	-9.9	H	3.0	42.1	1.0	-50.9	-13.0	-37.9		
	High Ch, 823.1MHz										
	1646.20	-15.4	V	3.0	40.7	1.0	-55.1	-13.0	-42.1		
2469.30	-12.7	V	3.0	41.3	1.0	-53.0	-13.0	-40.0			
3292.40	-9.9	V	3.0	42.1	1.0	-51.0	-13.0	-38.0			
1646.20	-15.2	H	3.0	40.7	1.0	-54.9	-13.0	-41.9			
2469.30	-12.2	H	3.0	41.3	1.0	-52.5	-13.0	-39.5			
3292.40	-9.7	H	3.0	42.1	1.0	-50.7	-13.0	-37.7			

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		<b>Company:</b>	Samsung							
		<b>Project #:</b>	4789793179							
		<b>Date:</b>	2021-02-18							
		<b>Test Engineer:</b>	20881							
		<b>Configuration:</b>	EUT / AC Adapter / Earphone, Z-Position							
		<b>Location:</b>	Chamber 2							
		<b>Mode:</b>	RTT BC0 Harmonics							
		<b>Test Voltage:</b>	AC 120 V, 60 Hz							
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, 824.7MHz</b>										
1649.40	-14.4	V	3.0	40.7	1.0	-54.1	-13.0	-41.1		
2474.10	-13.0	V	3.0	41.3	1.0	-53.3	-13.0	-40.3		
3298.80	-10.2	V	3.0	42.1	1.0	-51.3	-13.0	-38.3		
1649.40	-15.0	H	3.0	40.7	1.0	-54.7	-13.0	-41.7		
2474.10	-12.8	H	3.0	41.3	1.0	-53.1	-13.0	-40.1		
3298.80	-10.2	H	3.0	42.1	1.0	-51.3	-13.0	-38.3		
<b>Mid Ch, 836.52MHz</b>										
1673.04	-14.4	V	3.0	40.7	1.0	-54.1	-13.0	-41.1		
2509.56	-12.9	V	3.0	41.4	1.0	-53.3	-13.0	-40.3		
3346.08	-9.8	V	3.0	42.1	1.0	-50.8	-13.0	-37.8		
1673.04	-13.9	H	3.0	40.7	1.0	-53.6	-13.0	-40.6		
2509.56	-12.6	H	3.0	41.4	1.0	-52.9	-13.0	-39.9		
3346.08	-9.8	H	3.0	42.1	1.0	-50.9	-13.0	-37.9		
<b>High Ch, 848.31MHz</b>										
1696.62	-14.7	V	3.0	40.7	1.0	-54.4	-13.0	-41.4		
2544.93	-12.7	V	3.0	41.4	1.0	-53.1	-13.0	-40.1		
3393.24	-9.7	V	3.0	42.1	1.0	-50.8	-13.0	-37.8		
1696.62	-14.1	H	3.0	40.7	1.0	-53.8	-13.0	-40.8		
2544.93	-12.5	H	3.0	41.4	1.0	-52.9	-13.0	-39.9		
3393.24	-9.8	H	3.0	42.1	1.0	-50.9	-13.0	-37.9		
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		<b>Company:</b>	Samsung							
		<b>Project #:</b>	4789793179							
		<b>Date:</b>	2021-02-18							
		<b>Test Engineer:</b>	20881							
		<b>Configuration:</b>	EUT / AC Adapter / Earphone, Z-Position							
		<b>Location:</b>	Chamber 2							
		<b>Mode:</b>	EVDO BC0 Harmonics							
		<b>Test Voltage:</b>	AC 120 V, 60 Hz							
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, 824.7MHz</b>										
1649.40	-15.7	V	3.0	40.7	1.0	-55.4	-13.0	-42.4		
2474.10	-12.9	V	3.0	41.3	1.0	-53.2	-13.0	-40.2		
3298.80	-10.1	V	3.0	42.1	1.0	-51.1	-13.0	-38.1		
1649.40	-15.6	H	3.0	40.7	1.0	-55.3	-13.0	-42.3		
2474.10	-12.7	H	3.0	41.3	1.0	-53.0	-13.0	-40.0		
3298.80	-10.2	H	3.0	42.1	1.0	-51.3	-13.0	-38.3		
<b>Mid Ch, 836.52MHz</b>										
1673.04	-15.8	V	3.0	40.7	1.0	-55.4	-13.0	-42.4		
2509.56	-12.8	V	3.0	41.4	1.0	-53.1	-13.0	-40.1		
3346.08	-9.9	V	3.0	42.1	1.0	-51.0	-13.0	-38.0		
1673.04	-15.9	H	3.0	40.7	1.0	-55.6	-13.0	-42.6		
2509.56	-12.5	H	3.0	41.4	1.0	-52.8	-13.0	-39.8		
3346.08	-9.9	H	3.0	42.1	1.0	-51.0	-13.0	-38.0		
<b>High Ch, 848.31MHz</b>										
1696.62	-14.7	V	3.0	40.7	1.0	-54.4	-13.0	-41.4		
2544.93	-12.7	V	3.0	41.4	1.0	-53.1	-13.0	-40.1		
3393.24	-9.8	V	3.0	42.1	1.0	-50.8	-13.0	-37.8		
1696.62	-15.3	H	3.0	40.7	1.0	-55.0	-13.0	-42.0		
2544.93	-12.4	H	3.0	41.4	1.0	-52.8	-13.0	-39.8		
3393.24	-9.9	H	3.0	42.1	1.0	-50.9	-13.0	-37.9		

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
BC 1 1xRTT	Company:	Samsung								
	Project #:	4789793179								
	Date:	2021-02-18								
	Test Engineer:	20890								
	Configuration:	EUT / AC Adapter / Earphone, Y-Position								
	Location:	Chamber 2								
	Mode:	RTT BC1 Harmonics								
	Test Voltage:	AC 120 V, 60 Hz								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1851.25MHz									
	3702.50	-11.7	V	3.0	42.1	1.0	-52.8	-13.0	-39.8	
	5553.75	-8.3	V	3.0	42.9	1.0	-50.3	-13.0	-37.3	
	7405.00	-6.5	V	3.0	42.5	1.0	-48.0	-13.0	-35.0	
	3702.50	-11.9	H	3.0	42.1	1.0	-53.0	-13.0	-40.0	
	5553.75	-8.1	H	3.0	42.9	1.0	-50.0	-13.0	-37.0	
	7405.00	-6.5	H	3.0	42.5	1.0	-48.0	-13.0	-35.0	
	Mid Ch, 1880MHz									
	3760.00	-11.7	V	3.0	42.1	1.0	-52.8	-13.0	-39.8	
	5640.00	-8.1	V	3.0	42.9	1.0	-50.0	-13.0	-37.0	
	7520.00	-6.6	V	3.0	42.4	1.0	-48.0	-13.0	-35.0	
3760.00	-11.8	H	3.0	42.1	1.0	-52.9	-13.0	-39.9		
5640.00	-7.9	H	3.0	42.9	1.0	-49.8	-13.0	-36.8		
7520.00	-6.7	H	3.0	42.4	1.0	-48.1	-13.0	-35.1		
High Ch, 1908.75MHz										
3817.50	-11.7	V	3.0	42.1	1.0	-52.8	-13.0	-39.8		
5726.25	-8.2	V	3.0	42.9	1.0	-50.1	-13.0	-37.1		
7635.00	-6.6	V	3.0	42.4	1.0	-48.0	-13.0	-35.0		
3817.50	-11.7	H	3.0	42.1	1.0	-52.8	-13.0	-39.8		
5726.25	-8.1	H	3.0	42.9	1.0	-50.0	-13.0	-37.0		
7635.00	-6.6	H	3.0	42.4	1.0	-48.0	-13.0	-35.0		
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
BC 1 EV-DO Rel.0	Company:	Samsung								
	Project #:	4789793179								
	Date:	2021-02-18								
	Test Engineer:	20890								
	Configuration:	EUT / AC Adapter / Earphone, Y-Position								
	Location:	Chamber 2								
	Mode:	EVDO BC1 Harmonics								
	Test Voltage:	AC 120 V, 60 Hz								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1851.25MHz									
	3702.50	-11.9	V	3.0	42.1	1.0	-53.0	-13.0	-40.0	
	5553.75	-8.4	V	3.0	42.9	1.0	-50.3	-13.0	-37.3	
	7405.00	-6.2	V	3.0	42.5	1.0	-47.7	-13.0	-34.7	
	3702.50	-11.8	H	3.0	42.1	1.0	-52.9	-13.0	-39.9	
	5553.75	-8.3	H	3.0	42.9	1.0	-50.2	-13.0	-37.2	
	7405.00	-6.4	H	3.0	42.5	1.0	-47.9	-13.0	-34.9	
	Mid Ch, 1880MHz									
	3760.00	-11.7	V	3.0	42.1	1.0	-52.8	-13.0	-39.8	
	5640.00	-8.2	V	3.0	42.9	1.0	-50.1	-13.0	-37.1	
	7520.00	-6.5	V	3.0	42.4	1.0	-47.9	-13.0	-34.9	
3760.00	-11.8	H	3.0	42.1	1.0	-52.9	-13.0	-39.9		
5640.00	-8.5	H	3.0	42.9	1.0	-50.4	-13.0	-37.4		
7520.00	-6.7	H	3.0	42.4	1.0	-48.1	-13.0	-35.1		
High Ch, 1908.75MHz										
3817.50	-11.8	V	3.0	42.1	1.0	-52.9	-13.0	-39.9		
5726.25	-8.2	V	3.0	42.9	1.0	-50.1	-13.0	-37.1		
7635.00	-6.5	V	3.0	42.4	1.0	-47.9	-13.0	-34.9		
3817.50	-11.9	H	3.0	42.1	1.0	-53.0	-13.0	-40.0		
5726.25	-8.5	H	3.0	42.9	1.0	-50.5	-13.0	-37.5		
7635.00	-6.4	H	3.0	42.4	1.0	-47.8	-13.0	-34.8		



**WCDMA**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789793179							
<b>Date:</b>		2021-02-21							
<b>Test Engineer:</b>		22943							
<b>Configuration:</b>		EUT / AC Adapter / Earphone, Z-Position							
<b>Location:</b>		Chamber 2							
<b>Mode:</b>		Rel99 Band 5 Harmonics							
<b>Test Votage:</b>		AC 120 V, 60 Hz							
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	-15.8	V	3.0	40.7	1.0	-55.5	-13.0	-42.5	
2479.20	-13.0	V	3.0	41.3	1.0	-53.3	-13.0	-40.3	
3305.60	-10.3	V	3.0	42.1	1.0	-51.4	-13.0	-38.4	
1652.80	-15.8	H	3.0	40.7	1.0	-55.5	-13.0	-42.5	
2479.20	-12.8	H	3.0	41.3	1.0	-53.1	-13.0	-40.1	
3305.60	-10.3	H	3.0	42.1	1.0	-51.3	-13.0	-38.3	
<b>Mid Ch, 836.6MHz</b>									
1673.20	-15.8	V	3.0	40.7	1.0	-55.5	-13.0	-42.5	
2509.80	-12.9	V	3.0	41.4	1.0	-53.3	-13.0	-40.3	
3346.40	-10.1	V	3.0	42.1	1.0	-51.2	-13.0	-38.2	
1673.20	-15.8	H	3.0	40.7	1.0	-55.5	-13.0	-42.5	
2509.80	-12.7	H	3.0	41.4	1.0	-53.0	-13.0	-40.0	
3346.40	-10.1	H	3.0	42.1	1.0	-51.1	-13.0	-38.1	
<b>High Ch, 846.6MHz</b>									
1693.20	-15.7	V	3.0	40.7	1.0	-55.4	-13.0	-42.4	
2539.80	-12.8	V	3.0	41.4	1.0	-53.2	-13.0	-40.2	
3386.40	-10.0	V	3.0	42.1	1.0	-51.1	-13.0	-38.1	
1693.20	-15.7	H	3.0	40.7	1.0	-55.4	-13.0	-42.4	
2539.80	-12.5	H	3.0	41.4	1.0	-52.9	-13.0	-39.9	
3386.40	-9.9	H	3.0	42.1	1.0	-51.0	-13.0	-38.0	

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789793179							
<b>Date:</b>		2021-02-21							
<b>Test Engineer:</b>		22943							
<b>Configuration:</b>		EUT / AC Adapter / Earphone, Z-Position							
<b>Location:</b>		Chamber 2							
<b>Mode:</b>		HSDPA Band 5 Harmonics							
<b>Test Votage:</b>		AC 120 V, 60 Hz							
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	-15.8	V	3.0	40.7	1.0	-55.5	-13.0	-42.5	
2479.20	-13.0	V	3.0	41.3	1.0	-53.3	-13.0	-40.3	
3305.60	-10.3	V	3.0	42.1	1.0	-51.4	-13.0	-38.4	
1652.80	-15.8	H	3.0	40.7	1.0	-55.5	-13.0	-42.5	
2479.20	-12.7	H	3.0	41.3	1.0	-53.0	-13.0	-40.0	
3305.60	-10.2	H	3.0	42.1	1.0	-51.3	-13.0	-38.3	
<b>Mid Ch, 836.6MHz</b>									
1673.20	-15.7	V	3.0	40.7	1.0	-55.4	-13.0	-42.4	
2509.80	-12.9	V	3.0	41.4	1.0	-53.2	-13.0	-40.2	
3346.40	-10.1	V	3.0	42.1	1.0	-51.2	-13.0	-38.2	
1673.20	-15.8	H	3.0	40.7	1.0	-55.5	-13.0	-42.5	
2509.80	-12.6	H	3.0	41.4	1.0	-53.0	-13.0	-40.0	
3346.40	-10.0	H	3.0	42.1	1.0	-51.1	-13.0	-38.1	
<b>High Ch, 846.6MHz</b>									
1693.20	-15.7	V	3.0	40.7	1.0	-55.4	-13.0	-42.4	
2539.80	-12.8	V	3.0	41.4	1.0	-53.1	-13.0	-40.1	
3386.40	-10.0	V	3.0	42.1	1.0	-51.0	-13.0	-38.0	
1693.20	-15.7	H	3.0	40.7	1.0	-55.4	-13.0	-42.4	
2539.80	-12.5	H	3.0	41.4	1.0	-52.9	-13.0	-39.9	
3386.40	-9.8	H	3.0	42.1	1.0	-50.9	-13.0	-37.9	

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-22 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT / AC Adapter / Earphone, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> Rel99 Band 4 Harmonics <b>Test Voltage:</b> AC 120 V, 60 Hz										
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
<b>Band 4</b>										
<b>REL99</b>										
<b>Low Ch, 1712.4MHz</b>										
3424.80	-9.9	V	3.0	42.1	1.0	-51.0	-13.0	-38.0		
5137.20	-9.2	V	3.0	42.8	1.0	-51.1	-13.0	-38.1		
6849.60	-6.6	V	3.0	42.7	1.0	-48.3	-13.0	-35.3		
3424.80	-9.8	H	3.0	42.1	1.0	-50.9	-13.0	-37.9		
5137.20	-8.9	H	3.0	42.8	1.0	-50.8	-13.0	-37.8		
6849.60	-6.6	H	3.0	42.7	1.0	-48.4	-13.0	-35.4		
<b>Mid Ch, 1732.6MHz</b>										
3465.20	-9.4	V	3.0	42.1	1.0	-50.4	-13.0	-37.4		
5197.80	-9.1	V	3.0	42.8	1.0	-50.9	-13.0	-37.9		
6930.40	-6.7	V	3.0	42.7	1.0	-48.4	-13.0	-35.4		
3465.20	-9.3	H	3.0	42.1	1.0	-50.4	-13.0	-37.4		
5197.80	-8.6	H	3.0	42.8	1.0	-50.5	-13.0	-37.5		
6930.40	-6.8	H	3.0	42.7	1.0	-48.5	-13.0	-35.5		
<b>High Ch, 1752.6MHz</b>										
3505.20	-9.0	V	3.0	42.1	1.0	-50.1	-13.0	-37.1		
5257.80	-9.1	V	3.0	42.8	1.0	-50.9	-13.0	-37.9		
7010.40	-6.4	V	3.0	42.7	1.0	-48.1	-13.0	-35.1		
3505.20	-9.0	H	3.0	42.1	1.0	-50.1	-13.0	-37.1		
5257.80	-8.8	H	3.0	42.8	1.0	-50.6	-13.0	-37.6		
7010.40	-6.4	H	3.0	42.7	1.0	-48.1	-13.0	-35.1		
UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-22 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT / AC Adapter / Earphone, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> HSDPA Band 4 Harmonics <b>Test Voltage:</b> AC 120 V, 60 Hz										
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
<b>Band 4</b>										
<b>HSDPA</b>										
<b>Low Ch, 1712.4MHz</b>										
3424.80	-9.9	V	3.0	42.1	1.0	-51.0	-13.0	-38.0		
5137.20	-9.3	V	3.0	42.8	1.0	-51.1	-13.0	-38.1		
6849.60	-6.5	V	3.0	42.7	1.0	-48.3	-13.0	-35.3		
3424.80	-9.7	H	3.0	42.1	1.0	-50.8	-13.0	-37.8		
5137.20	-8.8	H	3.0	42.8	1.0	-50.6	-13.0	-37.6		
6849.60	-6.7	H	3.0	42.7	1.0	-48.4	-13.0	-35.4		
<b>Mid Ch, 1732.6MHz</b>										
3465.20	-9.3	V	3.0	42.1	1.0	-50.4	-13.0	-37.4		
5197.80	-8.9	V	3.0	42.8	1.0	-50.8	-13.0	-37.8		
6930.40	-6.7	V	3.0	42.7	1.0	-48.4	-13.0	-35.4		
3465.20	-9.3	H	3.0	42.1	1.0	-50.4	-13.0	-37.4		
5197.80	-8.6	H	3.0	42.8	1.0	-50.4	-13.0	-37.4		
6930.40	-6.7	H	3.0	42.7	1.0	-48.4	-13.0	-35.4		
<b>High Ch, 1752.6MHz</b>										
3505.20	-9.0	V	3.0	42.1	1.0	-50.0	-13.0	-37.0		
5257.80	-9.1	V	3.0	42.8	1.0	-51.0	-13.0	-38.0		
7010.40	-6.5	V	3.0	42.7	1.0	-48.1	-13.0	-35.1		
3505.20	-8.9	H	3.0	42.1	1.0	-49.9	-13.0	-36.9		
5257.80	-8.7	H	3.0	42.8	1.0	-50.6	-13.0	-37.6		
7010.40	-6.5	H	3.0	42.7	1.0	-48.2	-13.0	-35.2		

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-22 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT / AC Adapter / Earphone, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> Rel99 Band 2 Harmonics <b>Test Votage:</b> AC 120 V, 60 Hz										
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Band 2 REL99										
Low Ch, 1852.4MHz										
3704.80	-11.8	V	3.0	42.1	1.0	-52.9	-13.0	-39.9		
5557.20	-8.3	V	3.0	42.9	1.0	-50.3	-13.0	-37.3		
7409.60	-6.4	V	3.0	42.5	1.0	-47.9	-13.0	-34.9		
3704.80	-11.8	H	3.0	42.1	1.0	-52.9	-13.0	-39.9		
5557.20	-8.1	H	3.0	42.9	1.0	-50.1	-13.0	-37.1		
7409.60	-6.6	H	3.0	42.5	1.0	-48.1	-13.0	-35.1		
Mid Ch, 1880MHz										
3760.00	-11.7	V	3.0	42.1	1.0	-52.8	-13.0	-39.8		
5640.00	-8.0	V	3.0	42.9	1.0	-50.0	-13.0	-37.0		
7520.00	-6.6	V	3.0	42.4	1.0	-48.1	-13.0	-35.1		
3760.00	-11.6	H	3.0	42.1	1.0	-52.7	-13.0	-39.7		
5640.00	-7.8	H	3.0	42.9	1.0	-49.7	-13.0	-36.7		
7520.00	-6.6	H	3.0	42.4	1.0	-48.1	-13.0	-35.1		
High Ch, 1907.6MHz										
3815.20	-11.6	V	3.0	42.1	1.0	-52.7	-13.0	-39.7		
5722.80	-8.2	V	3.0	42.9	1.0	-50.2	-13.0	-37.2		
7630.40	-6.5	V	3.0	42.4	1.0	-47.9	-13.0	-34.9		
3815.20	-11.8	H	3.0	42.1	1.0	-52.8	-13.0	-39.8		
5722.80	-8.1	H	3.0	42.9	1.0	-50.0	-13.0	-37.0		
7630.40	-6.6	H	3.0	42.4	1.0	-48.0	-13.0	-35.0		
UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
<b>Company:</b> Samsung <b>Project #:</b> 4789793179 <b>Date:</b> 2021-02-22 <b>Test Engineer:</b> 20881 <b>Configuration:</b> EUT / AC Adapter / Earphone, X-Position <b>Location:</b> Chamber 2 <b>Mode:</b> HSDPA Band 2 Harmonics <b>Test Votage:</b> AC 120 V, 60 Hz										
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Band 2 HSDPA										
Low Ch, 1852.4MHz										
3704.80	-12.0	V	3.0	42.1	1.0	-53.1	-13.0	-40.1		
5557.20	-8.4	V	3.0	42.9	1.0	-50.4	-13.0	-37.4		
7409.60	-6.5	V	3.0	42.5	1.0	-48.0	-13.0	-35.0		
3704.80	-11.8	H	3.0	42.1	1.0	-52.9	-13.0	-39.9		
5557.20	-8.1	H	3.0	42.9	1.0	-50.0	-13.0	-37.0		
7409.60	-6.5	H	3.0	42.5	1.0	-48.0	-13.0	-35.0		
Mid Ch, 1880MHz										
3760.00	-11.7	V	3.0	42.1	1.0	-52.8	-13.0	-39.8		
5640.00	-8.0	V	3.0	42.9	1.0	-50.0	-13.0	-37.0		
7520.00	-6.5	V	3.0	42.4	1.0	-48.0	-13.0	-35.0		
3760.00	-11.7	H	3.0	42.1	1.0	-52.8	-13.0	-39.8		
5640.00	-7.8	H	3.0	42.9	1.0	-49.8	-13.0	-36.8		
7520.00	-6.7	H	3.0	42.4	1.0	-48.2	-13.0	-35.2		
High Ch, 1907.6MHz										
3815.20	-11.7	V	3.0	42.1	1.0	-52.8	-13.0	-39.8		
5722.80	-8.2	V	3.0	42.9	1.0	-50.2	-13.0	-37.2		
7630.40	-6.5	V	3.0	42.4	1.0	-47.9	-13.0	-34.9		
3815.20	-11.7	H	3.0	42.1	1.0	-52.7	-13.0	-39.7		
5722.80	-8.1	H	3.0	42.9	1.0	-50.0	-13.0	-37.0		
7630.40	-6.6	H	3.0	42.4	1.0	-48.0	-13.0	-35.0		

**LTE Band 7**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789793179							
<b>Date:</b>		2021-02-24							
<b>Test Engineer:</b>		22943							
<b>Configuration:</b>		EUT, Z-Position							
<b>Location:</b>		Chamber 2							
<b>Mode:</b>		LTE_QPSK Band 7 Harmonics, 10MHz Bandwidth							
<b>Test Voltage:</b>		AC 120 V, 60 Hz							
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, 2505MHz</b>									
5010.00	-19.8	V	3.0	42.8	1.0	-61.6	-25.0	-36.6	
7515.00	-19.5	V	3.0	42.4	1.0	-61.0	-25.0	-36.0	
10020.00	-13.8	V	3.0	40.9	1.0	-53.6	-25.0	-28.6	
12525.00	-9.5	V	3.0	42.1	1.0	-50.6	-25.0	-25.6	
15030.00	-9.3	V	3.0	43.7	1.0	-52.0	-25.0	-27.0	
5010.00	-19.6	H	3.0	42.8	1.0	-61.4	-25.0	-36.4	
7515.00	-17.9	H	3.0	42.4	1.0	-59.4	-25.0	-34.4	
10020.00	-11.9	H	3.0	40.9	1.0	-51.8	-25.0	-26.8	
12525.00	-9.9	H	3.0	42.1	1.0	-51.0	-25.0	-26.0	
15030.00	-8.7	H	3.0	43.7	1.0	-51.3	-25.0	-26.3	
<b>Mid Ch, 2535MHz</b>									
5070.00	-21.1	V	3.0	42.8	1.0	-62.9	-25.0	-37.9	
7605.00	-16.7	V	3.0	42.4	1.0	-58.1	-25.0	-33.1	
10140.00	-14.5	V	3.0	40.9	1.0	-54.4	-25.0	-29.4	
12675.00	-8.5	V	3.0	42.2	1.0	-49.6	-25.0	-24.6	
15210.00	-9.2	V	3.0	43.6	1.0	-51.8	-25.0	-26.8	
5070.00	-21.1	H	3.0	42.8	1.0	-62.9	-25.0	-37.9	
7605.00	-16.2	H	3.0	42.4	1.0	-57.6	-25.0	-32.6	
10140.00	-13.7	H	3.0	40.9	1.0	-53.6	-25.0	-28.6	
12675.00	-8.9	H	3.0	42.2	1.0	-50.1	-25.0	-25.1	
15210.00	-9.0	H	3.0	43.6	1.0	-51.6	-25.0	-26.6	
<b>High Ch, 2565MHz</b>									
5130.00	-21.4	V	3.0	42.8	1.0	-63.2	-25.0	-38.2	
7695.00	-14.9	V	3.0	42.4	1.0	-56.2	-25.0	-31.2	
10260.00	-13.2	V	3.0	41.0	1.0	-53.2	-25.0	-28.2	
12825.00	-5.7	V	3.0	42.3	1.0	-46.9	-25.0	-21.9	
15390.00	-9.2	V	3.0	43.6	1.0	-51.7	-25.0	-26.7	
5130.00	-21.3	H	3.0	42.8	1.0	-63.2	-25.0	-38.2	
7695.00	-16.6	H	3.0	42.4	1.0	-57.9	-25.0	-32.9	
10260.00	-13.0	H	3.0	41.0	1.0	-53.0	-25.0	-28.0	
12825.00	-8.2	H	3.0	42.3	1.0	-49.4	-25.0	-24.4	
15390.00	-9.1	H	3.0	43.6	1.0	-51.7	-25.0	-26.7	

10MHz  
QPSK

**LTE Band 12**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789793179							
<b>Date:</b>		2021-02-17							
<b>Test Engineer:</b>		20890							
<b>Configuration:</b>		EUT / AC Adapter / Earphone, Y-Position							
<b>Location:</b>		Chamber 2							
<b>Mode:</b>		LTE_QPSK Band 12 Harmonics, 5MHz Bandwidth							
<b>Test Voltage:</b>		AC 120 V, 60 Hz							
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, 701.5MHz</b>									
1403.00	-16.3	V	3.0	40.7	1.0	-56.0	-13.0	-43.0	
2104.50	-14.3	V	3.0	40.8	1.0	-54.1	-13.0	-41.1	
2806.00	-11.9	V	3.0	41.8	1.0	-52.7	-13.0	-39.7	
1403.00	-16.0	H	3.0	40.7	1.0	-55.7	-13.0	-42.7	
2104.50	-13.3	H	3.0	40.8	1.0	-53.1	-13.0	-40.1	
2806.00	-11.7	H	3.0	41.8	1.0	-52.5	-13.0	-39.5	
<b>Mid Ch, 707.5MHz</b>									
1415.00	-14.9	V	3.0	40.7	1.0	-54.7	-13.0	-41.7	
2122.50	-14.3	V	3.0	40.8	1.0	-54.1	-13.0	-41.1	
2830.00	-11.9	V	3.0	41.8	1.0	-52.7	-13.0	-39.7	
1415.00	-14.4	H	3.0	40.7	1.0	-54.2	-13.0	-41.2	
2122.50	-13.6	H	3.0	40.8	1.0	-53.4	-13.0	-40.4	
2830.00	-11.6	H	3.0	41.8	1.0	-52.4	-13.0	-39.4	
<b>High Ch, 713.5MHz</b>									
1427.00	-14.5	V	3.0	40.7	1.0	-54.2	-13.0	-41.2	
2140.50	-14.3	V	3.0	40.8	1.0	-54.1	-13.0	-41.1	
2854.00	-11.6	V	3.0	41.8	1.0	-52.4	-13.0	-39.4	
1427.00	-15.4	H	3.0	40.7	1.0	-55.1	-13.0	-42.1	
2140.50	-13.7	H	3.0	40.8	1.0	-53.6	-13.0	-40.6	
2854.00	-11.4	H	3.0	41.8	1.0	-52.2	-13.0	-39.2	

**LTE B13**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789793179							
<b>Date:</b>		2021-02-21							
<b>Test Engineer:</b>		22943							
<b>Configuration:</b>		EUT / AC Adapter / Earphone, Y-Position							
<b>Location:</b>		Chamber 2							
<b>Mode:</b>		LTE_QPSK Band 13 Harmonics, 5MHz Bandwidth							
<b>Test Voltage:</b>		AC 120 V, 60 Hz							
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, 779.5MHz</b>									
1559.00	-16.0	V	3.0	40.7	1.0	-55.7	-40.0	-15.7	
2338.50	-13.3	V	3.0	41.1	1.0	-53.4	-13.0	-40.4	
3118.00	-10.4	V	3.0	42.1	1.0	-51.5	-13.0	-38.5	
1559.00	-19.0	H	3.0	40.7	1.0	-58.7	-40.0	-18.7	
2338.50	-13.1	H	3.0	41.1	1.0	-53.2	-13.0	-40.2	
3118.00	-10.3	H	3.0	42.1	1.0	-51.4	-13.0	-38.4	
<b>Mid Ch, 782MHz</b>									
1564.00	-16.6	V	3.0	40.7	1.0	-56.3	-40.0	-16.3	
2346.00	-13.3	V	3.0	41.1	1.0	-53.4	-13.0	-40.4	
3128.00	-10.4	V	3.0	42.1	1.0	-51.5	-13.0	-38.5	
1564.00	-18.0	H	3.0	40.7	1.0	-57.7	-40.0	-17.7	
2346.00	-13.0	H	3.0	41.1	1.0	-53.1	-13.0	-40.1	
3128.00	-10.4	H	3.0	42.1	1.0	-51.4	-13.0	-38.4	
<b>High Ch, 784.5MHz</b>									
1569.00	-16.8	V	3.0	40.7	1.0	-56.5	-40.0	-16.5	
2353.50	-13.3	V	3.0	41.1	1.0	-53.4	-13.0	-40.4	
3138.00	-10.4	V	3.0	42.1	1.0	-51.5	-13.0	-38.5	
1569.00	-18.7	H	3.0	40.7	1.0	-58.4	-40.0	-18.4	
2353.50	-13.0	H	3.0	41.1	1.0	-53.1	-13.0	-40.1	
3138.00	-10.3	H	3.0	42.1	1.0	-51.3	-13.0	-38.3	

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

**LTE Band 14**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789793179							
<b>Date:</b>		2021-02-21							
<b>Test Engineer:</b>		22943							
<b>Configuration:</b>		EUT / AC Adapter / Earphone, Y-Position							
<b>Location:</b>		Chamber 2							
<b>Mode:</b>		LTE_QPSK Band 14 Harmonics, 5MHz Bandwidth							
<b>Test Voltage:</b>		AC 120 V, 60 Hz							
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, 790.5MHz</b>									
1581.00	-19.6	V	3.0	40.7	1.0	-59.3	-40.0	-19.3	
2371.50	-13.2	V	3.0	41.2	1.0	-53.3	-13.0	-40.3	
3162.00	-10.2	V	3.0	42.1	1.0	-51.2	-13.0	-38.2	
1581.00	-23.5	H	3.0	40.7	1.0	-63.2	-40.0	-23.2	
2371.50	-12.8	H	3.0	41.2	1.0	-53.0	-13.0	-40.0	
3162.00	-10.1	H	3.0	42.1	1.0	-51.1	-13.0	-38.1	
<b>Mid Ch, 793MHz</b>									
1586.00	-19.3	V	3.0	40.7	1.0	-59.1	-40.0	-19.1	
2379.00	-13.2	V	3.0	41.2	1.0	-53.4	-13.0	-40.4	
3172.00	-10.2	V	3.0	42.1	1.0	-51.2	-13.0	-38.2	
1586.00	-23.3	H	3.0	40.7	1.0	-63.0	-40.0	-23.0	
2379.00	-12.8	H	3.0	41.2	1.0	-53.0	-13.0	-40.0	
3172.00	-10.1	H	3.0	42.1	1.0	-51.2	-13.0	-38.2	
<b>High Ch, 795.5MHz</b>									
1591.00	-21.7	V	3.0	40.7	1.0	-61.4	-40.0	-21.4	
2386.50	-13.2	V	3.0	41.2	1.0	-53.4	-13.0	-40.4	
3182.00	-10.2	V	3.0	42.1	1.0	-51.3	-13.0	-38.3	
1591.00	-23.3	H	3.0	40.7	1.0	-63.0	-40.0	-23.0	
2386.50	-12.8	H	3.0	41.2	1.0	-52.9	-13.0	-39.9	
3182.00	-10.1	H	3.0	42.1	1.0	-51.2	-13.0	-38.2	

5MHz  
QPSK

**LTE Band 25**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789793179							
<b>Date:</b>		2021-02-22							
<b>Test Engineer:</b>		20881							
<b>Configuration:</b>		EUT / AC Adapter / Earphone, Y-Position							
<b>Location:</b>		Chamber 2							
<b>Mode:</b>		LTE_QPSK Band 25 Harmonics, 5MHz Bandwidth							
<b>Test Voltage:</b>		AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	
<b>Low Ch, 1852.5MHz</b>									
3705.00	-11.7	V	3.0	42.1	1.0	-52.7	-13.0	-39.7	
5557.50	-8.2	V	3.0	42.9	1.0	-50.2	-13.0	-37.2	
7410.00	-6.4	V	3.0	42.5	1.0	-47.8	-13.0	-34.8	
<b>QPSK</b>									
3705.00	-11.6	H	3.0	42.1	1.0	-52.7	-13.0	-39.7	
5557.50	-8.0	H	3.0	42.9	1.0	-49.9	-13.0	-36.9	
7410.00	-6.5	H	3.0	42.5	1.0	-48.0	-13.0	-35.0	
<b>Mid Ch, 1882.5MHz</b>									
3765.00	-11.5	V	3.0	42.1	1.0	-52.6	-13.0	-39.6	
5647.50	-7.9	V	3.0	42.9	1.0	-49.8	-13.0	-36.8	
7530.00	-6.5	V	3.0	42.4	1.0	-47.9	-13.0	-34.9	
3765.00	-11.6	H	3.0	42.1	1.0	-52.7	-13.0	-39.7	
5647.50	-7.7	H	3.0	42.9	1.0	-49.6	-13.0	-36.6	
7530.00	-6.6	H	3.0	42.4	1.0	-48.1	-13.0	-35.1	
<b>High Ch, 1912.5MHz</b>									
3825.00	-11.5	V	3.0	42.1	1.0	-52.5	-13.0	-39.5	
5737.50	-8.0	V	3.0	43.0	1.0	-49.9	-13.0	-36.9	
7650.00	-6.4	V	3.0	42.4	1.0	-47.8	-13.0	-34.8	
3825.00	-11.4	H	3.0	42.1	1.0	-52.5	-13.0	-39.5	
5737.50	-7.9	H	3.0	43.0	1.0	-49.8	-13.0	-36.8	
7650.00	-6.6	H	3.0	42.4	1.0	-48.0	-13.0	-35.0	

5MH  
z  
QPSK  
K



**LTE Band 26 (Part 90)**

15MHz  QPSK		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
		Company: Samsung Project #: 4789793179 Date: 2021-02-23 Test Engineer: 22943 Configuration: EUT / AC Adapter / Earphone, Y-Position Location: Chamber 2 Mode: LTE_QPSK Band 26 Harmonics, 15MHz Bandwidth Test Voltage: AC 120 V, 60 Hz									
		Low Ch, 821.5MHz									
		1643.00	-14.5	V	3.0	40.7	1.0	-54.2	-13.0	-41.2	
		2464.50	-12.9	V	3.0	41.3	1.0	-53.2	-13.0	-40.2	
		3286.00	-10.3	V	3.0	42.1	1.0	-51.4	-13.0	-38.4	
		1643.00	-13.9	H	3.0	40.7	1.0	-53.6	-13.0	-40.6	
		2464.50	-12.4	H	3.0	41.3	1.0	-52.7	-13.0	-39.7	
		3286.00	-10.2	H	3.0	42.1	1.0	-51.3	-13.0	-38.3	

**LTE Band 26 (Straddle)**

15MHz  QPSK		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
		Company: Samsung Project #: 4789793179 Date: 2021-02-23 Test Engineer: 22943 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 26 Harmonics, 15MHz Bandwidth Test Voltage: AC 120 V, 60 Hz									
		Straddle Ch, 824MHz									
		1643.00	-15.8	V	3.0	40.7	1.0	-55.5	-13.0	-42.5	
		2464.50	-12.9	V	3.0	41.3	1.0	-53.2	-13.0	-40.2	
		3286.00	-10.3	V	3.0	42.1	1.0	-51.3	-13.0	-38.3	
		1643.00	-15.6	H	3.0	40.7	1.0	-55.3	-13.0	-42.3	
		2464.50	-12.6	H	3.0	41.3	1.0	-52.9	-13.0	-39.9	
		3286.00	-10.2	H	3.0	42.1	1.0	-51.2	-13.0	-38.2	

**LTE Band 26 (Part 22)**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789793179							
<b>Date:</b>		2021-02-23							
<b>Test Engineer:</b>		22943							
<b>Configuration:</b>		EUT / AC Adapter / Earphone, X-Position							
<b>Location:</b>		Chamber 2							
<b>Mode:</b>		LTE_QPSK Band 26 Harmonics, 1.4MHz Bandwidth							
<b>Test Votage:</b>		AC 120 V, 60 Hz							
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, 824.7MHz</b>									
1649.40	-15.7	V	3.0	40.7	1.0	-55.4	-13.0	-42.4	
2474.10	-13.1	V	3.0	41.3	1.0	-53.4	-13.0	-40.4	
3298.80	-10.4	V	3.0	42.1	1.0	-51.5	-13.0	-38.5	
1649.40	-14.8	H	3.0	40.7	1.0	-54.5	-13.0	-41.5	
2474.10	-12.8	H	3.0	41.3	1.0	-53.1	-13.0	-40.1	
3298.80	-10.3	H	3.0	42.1	1.0	-51.4	-13.0	-38.4	
<b>Mid Ch, 831.5MHz</b>									
1663.00	-14.3	V	3.0	40.7	1.0	-54.0	-13.0	-41.0	
2494.50	-13.1	V	3.0	41.3	1.0	-53.4	-13.0	-40.4	
3326.00	-10.2	V	3.0	42.1	1.0	-51.3	-13.0	-38.3	
1663.00	-13.8	H	3.0	40.7	1.0	-53.5	-13.0	-40.5	
2494.50	-12.7	H	3.0	41.3	1.0	-53.0	-13.0	-40.0	
3326.00	-10.2	H	3.0	42.1	1.0	-51.3	-13.0	-38.3	
<b>High Ch, 848.3MHz</b>									
1696.60	-14.6	V	3.0	40.7	1.0	-54.3	-13.0	-41.3	
2544.90	-12.7	V	3.0	41.4	1.0	-53.1	-13.0	-40.1	
3393.20	-9.8	V	3.0	42.1	1.0	-50.9	-13.0	-37.9	
1696.60	-14.5	H	3.0	40.7	1.0	-54.2	-13.0	-41.2	
2544.90	-12.2	H	3.0	41.4	1.0	-52.6	-13.0	-39.6	
3393.20	-9.5	H	3.0	42.1	1.0	-50.6	-13.0	-37.6	

1.4MHz  
QPSK

**LTE Band 30**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789793179							
<b>Date:</b>		2021-02-25							
<b>Test Engineer:</b>		20882							
<b>Configuration:</b>		EUT, Z-Position							
<b>Location:</b>		Chamber 1							
<b>Mode:</b>		LTE_QPSK Band 30 Harmonics, 5MHz Bandwidth							
<b>Test Voltage:</b>		AC 120 V, 60 Hz							
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, 2307.5MHz</b>									
4615.00	-20.4	V	3.0	45.5	1.0	-64.9	-40.0	-24.9	
6922.50	-20.8	V	3.0	44.5	1.0	-64.3	-40.0	-24.3	
9230.00	-15.9	V	3.0	43.0	1.0	-57.9	-40.0	-17.9	
11537.50	-16.1	V	3.0	42.7	1.0	-57.8	-40.0	-17.8	
13845.00	-13.4	V	3.0	44.4	1.0	-56.8	-40.0	-16.8	
4615.00	-19.7	H	3.0	45.5	1.0	-64.2	-40.0	-24.2	
6922.50	-20.7	H	3.0	44.5	1.0	-64.2	-40.0	-24.2	
9230.00	-12.5	H	3.0	43.0	1.0	-54.5	-40.0	-14.5	
11537.50	-15.7	H	3.0	42.7	1.0	-57.4	-40.0	-17.4	
13845.00	-14.4	H	3.0	44.4	1.0	-57.8	-40.0	-17.8	
<b>Mid Ch, 2310MHz</b>									
4620.00	-20.2	V	3.0	45.5	1.0	-64.7	-40.0	-24.7	
6930.00	-21.5	V	3.0	44.5	1.0	-65.0	-40.0	-25.0	
9240.00	-13.3	V	3.0	43.0	1.0	-55.3	-40.0	-15.3	
11550.00	-14.2	V	3.0	42.7	1.0	-55.9	-40.0	-15.9	
13860.00	-12.6	V	3.0	44.4	1.0	-56.0	-40.0	-16.0	
4620.00	-18.5	H	3.0	45.5	1.0	-63.0	-40.0	-23.0	
6930.00	-21.4	H	3.0	44.5	1.0	-64.8	-40.0	-24.8	
9240.00	-9.5	H	3.0	43.0	1.0	-51.4	-40.0	-11.4	
11550.00	-13.2	H	3.0	42.7	1.0	-55.0	-40.0	-15.0	
13860.00	-13.9	H	3.0	44.4	1.0	-57.3	-40.0	-17.3	
<b>High Ch, 2312.5MHz</b>									
4625.00	-20.7	V	3.0	45.5	1.0	-65.3	-40.0	-25.3	
6937.50	-21.8	V	3.0	44.5	1.0	-65.3	-40.0	-25.3	
9250.00	-12.1	V	3.0	43.0	1.0	-54.0	-40.0	-14.0	
11562.50	-13.1	V	3.0	42.7	1.0	-54.8	-40.0	-14.8	
13875.00	-11.1	V	3.0	44.4	1.0	-54.5	-40.0	-14.5	
4625.00	-18.0	H	3.0	45.5	1.0	-62.6	-40.0	-22.6	
6937.50	-21.8	H	3.0	44.5	1.0	-65.3	-40.0	-25.3	
9250.00	-7.6	H	3.0	43.0	1.0	-49.5	-40.0	-9.5	
11562.50	-12.5	H	3.0	42.7	1.0	-54.3	-40.0	-14.3	
13875.00	-10.5	H	3.0	44.4	1.0	-54.0	-40.0	-14.0	

5MHz  
QPSK

**LTE Band 41 (PC2)**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789793179							
<b>Date:</b>		2021-02-22							
<b>Test Engineer:</b>		22943							
<b>Configuration:</b>		EUT, X-Position							
<b>Location:</b>		Chamber 2							
<b>Mode:</b>		LTE_QPSK Band 41 Harmonics, 10MHz Bandwidth							
<b>Test Voltage:</b>		AC 120 V, 60 Hz							
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, 2501MHz</b>									
5002.00	-16.4	V	3.0	42.8	1.0	-58.1	-25.0	-33.1	
7503.00	-13.2	V	3.0	42.4	1.0	-54.6	-25.0	-29.6	
10004.00	-9.9	V	3.0	40.9	1.0	-49.7	-25.0	-24.7	
12505.00	-0.6	V	3.0	42.1	1.0	-41.7	-25.0	-16.7	
15006.00	-1.7	V	3.0	43.7	1.0	-44.4	-25.0	-19.4	
5002.00	-17.3	H	3.0	42.8	1.0	-59.1	-25.0	-34.1	
7503.00	-14.6	H	3.0	42.4	1.0	-56.1	-25.0	-31.1	
10004.00	-11.3	H	3.0	40.9	1.0	-51.2	-25.0	-26.2	
12505.00	-3.6	H	3.0	42.1	1.0	-44.7	-25.0	-19.7	
15006.00	-4.1	H	3.0	43.7	1.0	-46.8	-25.0	-21.8	
<b>Mid Ch, 2593MHz</b>									
5186.00	-17.4	V	3.0	42.8	1.0	-59.2	-25.0	-34.2	
7779.00	-8.8	V	3.0	42.3	1.0	-50.1	-25.0	-25.1	
10372.00	-9.4	V	3.0	41.0	1.0	-49.4	-25.0	-24.4	
12965.00	8.1	V	3.0	42.4	1.0	-33.2	-25.0	-8.2	
15558.00	-1.7	V	3.0	43.5	1.0	-44.2	-25.0	-19.2	
5186.00	-17.2	H	3.0	42.8	1.0	-59.1	-25.0	-34.1	
7779.00	-12.9	H	3.0	42.3	1.0	-54.2	-25.0	-29.2	
10372.00	-10.8	H	3.0	41.0	1.0	-50.8	-25.0	-25.8	
12965.00	1.8	H	3.0	42.4	1.0	-39.6	-25.0	-14.6	
15558.00	-3.4	H	3.0	43.5	1.0	-46.0	-25.0	-21.0	
<b>High Ch, 2685MHz</b>									
5370.00	-17.2	V	3.0	42.9	1.0	-59.0	-25.0	-34.0	
8055.00	-3.0	V	3.0	42.2	1.0	-44.2	-25.0	-19.2	
10740.00	-6.1	V	3.0	41.2	1.0	-46.3	-25.0	-21.3	
13425.00	2.3	V	3.0	42.7	1.0	-39.4	-25.0	-14.4	
16110.00	-6.9	V	3.0	43.4	1.0	-49.3	-25.0	-24.3	
5370.00	-17.9	H	3.0	42.9	1.0	-59.8	-25.0	-34.8	
8055.00	-7.5	H	3.0	42.2	1.0	-48.7	-25.0	-23.7	
10740.00	-11.0	H	3.0	41.2	1.0	-51.2	-25.0	-26.2	
13425.00	-1.9	H	3.0	42.7	1.0	-43.6	-25.0	-18.6	
16110.00	-7.1	H	3.0	43.4	1.0	-49.5	-25.0	-24.5	

10MHz  
QPSK

**LTE Band 66**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement											
1.4MHz QPSK		Company:	Samsung								
		Project #:	4789793179								
		Date:	2021-02-16								
		Test Engineer:	20890								
		Configuration:	EUT / AC Adapter / Earphone, Y-Position								
		Location:	Chamber 2								
		Mode:	LTE_QPSK Band 66 Harmonics, 1.4MHz Bandwidth								
		Test Voltage:	AC 120 V, 60 Hz								
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
		<b>Low Ch, 1710.7MHz</b>									
3421.40	-9.2	V	3.0	42.1	1.0	-50.2	-13.0	-37.2			
5132.10	-8.9	V	3.0	42.8	1.0	-50.7	-13.0	-37.7			
6842.80	-6.4	V	3.0	42.7	1.0	-48.2	-13.0	-35.2			
3421.40	-9.1	H	3.0	42.1	1.0	-50.2	-13.0	-37.2			
5132.10	-8.5	H	3.0	42.8	1.0	-50.4	-13.0	-37.4			
6842.80	-6.3	H	3.0	42.7	1.0	-48.1	-13.0	-35.1			
<b>Mid Ch, 1745MHz</b>											
3490.00	-8.5	V	3.0	42.1	1.0	-49.5	-13.0	-36.5			
5235.00	-8.8	V	3.0	42.8	1.0	-50.6	-13.0	-37.6			
6980.00	-6.0	V	3.0	42.7	1.0	-47.7	-13.0	-34.7			
3490.00	-8.6	H	3.0	42.1	1.0	-49.7	-13.0	-36.7			
5235.00	-8.5	H	3.0	42.8	1.0	-50.3	-13.0	-37.3			
6980.00	-6.3	H	3.0	42.7	1.0	-48.0	-13.0	-35.0			
<b>High Ch, 1779.3MHz</b>											
3558.60	-8.1	V	3.0	42.1	1.0	-49.2	-13.0	-36.2			
5337.90	-8.2	V	3.0	42.9	1.0	-50.1	-13.0	-37.1			
7117.20	-6.1	V	3.0	42.6	1.0	-47.7	-13.0	-34.7			
3558.60	-7.7	H	3.0	42.1	1.0	-48.8	-13.0	-35.8			
5337.90	-7.9	H	3.0	42.9	1.0	-49.8	-13.0	-36.8			
7117.20	-6.1	H	3.0	42.6	1.0	-47.8	-13.0	-34.8			

**LTE Band 71**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement							
		<b>Company:</b>	Samsung						
		<b>Project #:</b>	4789793179						
		<b>Date:</b>	2021-02-21						
		<b>Test Engineer:</b>	22943						
		<b>Configuration:</b>	EUT / AC Adapter / Earphone, X-Position						
		<b>Location:</b>	Chamber 2						
		<b>Mode:</b>	LTE_QPSK Band 71 Harmonics, 5MHz Bandwidth						
		<b>Test Voltage:</b>	AC 120 V, 60 Hz						
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
5MHz QPSK									
Low Ch, 665.5MHz									
1331.00	-16.6	V	3.0	40.8	1.0	-56.3	-13.0	-43.3	
1996.50	-14.5	V	3.0	40.6	1.0	-54.2	-13.0	-41.2	
2662.00	-12.2	V	3.0	41.6	1.0	-52.8	-13.0	-39.8	
1331.00	-16.1	H	3.0	40.8	1.0	-55.9	-13.0	-42.9	
1996.50	-14.2	H	3.0	40.6	1.0	-53.9	-13.0	-40.9	
2662.00	-12.1	H	3.0	41.6	1.0	-52.6	-13.0	-39.6	
Mid Ch, 680.5MHz									
1361.00	-16.6	V	3.0	40.7	1.0	-56.4	-13.0	-43.4	
2041.50	-14.6	V	3.0	40.7	1.0	-54.3	-13.0	-41.3	
2722.00	-12.0	V	3.0	41.7	1.0	-52.6	-13.0	-39.6	
1361.00	-16.4	H	3.0	40.7	1.0	-56.2	-13.0	-43.2	
2041.50	-14.1	H	3.0	40.7	1.0	-53.8	-13.0	-40.8	
2722.00	-11.8	H	3.0	41.7	1.0	-52.4	-13.0	-39.4	
High Ch, 695.5MHz									
1391.00	-16.7	V	3.0	40.7	1.0	-56.5	-13.0	-43.5	
2086.50	-14.4	V	3.0	40.8	1.0	-54.1	-13.0	-41.1	
2782.00	-11.9	V	3.0	41.7	1.0	-52.6	-13.0	-39.6	
1391.00	-16.9	H	3.0	40.7	1.0	-56.6	-13.0	-43.6	
2086.50	-14.0	H	3.0	40.8	1.0	-53.7	-13.0	-40.7	
2782.00	-11.6	H	3.0	41.7	1.0	-52.4	-13.0	-39.4	

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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 38**

LTE Band 38 (Frequency range: 2570-2620 MHz) is covered by LTE Band 41 (Frequency range: 2496-2690 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