

LTE Band 26  10MHz  16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
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UL Verification Services, Inc. High Frequency Substitution Measurement										
LTE Band 26  3MHz  QPSK	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 Fundamentals, 3MHz Bandwidth  <u>Test Equipment:</u> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	825.50	14.58	V	3.0	-1.5	10.10	38.5	-28.4		
	825.50	20.14	H	3.0	-1.5	15.66	38.5	-22.8		
	Mid Ch									
	831.50	13.95	V	3.0	-1.4	9.48	38.5	-29.0		
	831.50	19.91	H	3.0	-1.4	15.44	38.5	-23.1		
	High Ch									
	847.50	13.75	V	3.1	-1.4	9.31	38.5	-29.2		
847.50	19.85	H	3.1	-1.4	15.40	38.5	-23.1			
UL Verification Services, Inc. High Frequency Substitution Measurement										
Company: Samsung Project #: 4789009800 Date: 2019-05-22 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 26 Fundamentals, 3MHz Bandwidth  <u>Test Equipment:</u> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable										
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Low Ch										
815.50	12.85	V	3.0	-1.5	8.35	50.0	-41.7	Part 90		
815.50	20.43	H	3.0	-1.5	15.92	50.0	-34.1	Part 90		
Mid Ch										
822.50	11.00	V	3.0	-1.5	6.51	50.0	-43.5	Part 90		
822.50	20.60	H	3.0	-1.5	16.11	50.0	-33.9	Part 90		

LTE Band 26  3MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																																	
	<b>Company:</b>		Samsung																																																																																															
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UL Verification Services, Inc. High Frequency Substitution Measurement										
LTE Band 26 1.4MHz QPSK	Company:		Samsung							
	Project #:		4789009800							
	Date:		2019-05-21							
	Test Engineer:		45585							
	Configuration:		EUT / X-Position							
	Location:		Chamber 1							
	Mode:		LTE_QPSK Band 26 Fundamentals, 1.4MHz Bandwidth							
	<b>Test Equipment:</b>									
	Receiving: VULB9163-750, and Chamber 1 SMA Cables									
	Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		
Low Ch										
824.70	10.98	V	3.0	-1.5	6.49	38.5	-32.0			
824.70	20.06	H	3.0	-1.5	15.57	38.5	-22.9			
Mid Ch										
831.50	14.15	V	3.0	-1.4	9.68	38.5	-28.8			
831.50	20.11	H	3.0	-1.4	15.64	38.5	-22.9			
High Ch										
848.30	13.75	V	3.1	-1.4	9.31	38.5	-29.2			
848.30	20.07	H	3.1	-1.4	15.63	38.5	-22.9			
UL Verification Services, Inc. High Frequency Substitution Measurement										
Company:		Samsung								
Project #:		4789009800								
Date:		2019-05-22								
Test Engineer:		45585								
Configuration:		EUT / X-Position								
Location:		Chamber 1								
Mode:		LTE_QPSK Band 26 Fundamentals, 1.4MHz Bandwidth								
<b>Test Equipment:</b>										
Receiving: VULB9163-750, and Chamber 1 SMA Cables										
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable										
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		
Low Ch										
814.70	13.11	V	3.0	-1.5	8.60	50.0	-41.4	Part 90		
814.70	20.70	H	3.0	-1.5	16.19	50.0	-33.8	Part 90		
Mid Ch										
823.30	14.41	V	3.0	-1.5	9.92	50.0	-40.1	Part 90		
823.30	20.67	H	3.0	-1.5	16.18	50.0	-33.8	Part 90		

UL Verification Services, Inc. High Frequency Substitution Measurement										
LTE Band 26  1.4MHz  16QAM	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 26 Fundamentals, 1.4MHz Bandwidth									
	<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	824.70	8.93	V	3.0	-1.5	4.44	38.5	-34.1		
	824.70	18.47	H	3.0	-1.5	13.98	38.5	-24.5		
	Mid Ch									
	831.50	11.65	V	3.0	-1.4	7.18	38.5	-31.3		
	831.50	17.91	H	3.0	-1.4	13.44	38.5	-25.1		
	High Ch									
848.30	11.65	V	3.1	-1.4	7.21	38.5	-31.3			
848.30	17.77	H	3.1	-1.4	13.33	38.5	-25.2			
UL Verification Services, Inc. High Frequency Substitution Measurement										
Company: Samsung Project #: 4789009800 Date: 2019-05-22 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 26 Fundamentals, 1.4MHz Bandwidth										
<b>Test Equipment:</b> Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable										
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes		
Low Ch										
814.70	11.11	V	3.0	-1.5	6.60	50.0	-43.4	Part 90		
814.70	18.80	H	3.0	-1.5	14.29	50.0	-35.7	Part 90		
Mid Ch										
823.30	12.17	V	3.0	-1.5	7.68	50.0	-42.3	Part 90		
823.30	18.47	H	3.0	-1.5	13.98	50.0	-36.0	Part 90		

**LTE Band 38**

LTE Band 38 20MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK_Band 38 Fundamentals, 20MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2580.00	17.53	V	5.3	9.8	22.03	33.0	-11.0	
	2580.00	21.18	H	5.3	9.8	25.68	33.0	-7.3	
	Mid Ch								
	2595.00	17.90	V	5.3	9.8	22.36	33.0	-10.6	
	2595.00	21.19	H	5.3	9.8	25.65	33.0	-7.3	
High Ch									
2610.00	19.31	V	5.4	9.8	23.75	33.0	-9.2		
2610.00	21.34	H	5.4	9.8	25.77	33.0	-7.2		
LTE Band 38 20MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-29 Test Engineer: 45585 Configuration: EUT/ X-Position Location: Chamber 1 Mode: LTE_16QAM_Band 38 Fundamentals, 20MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2580.00	16.58	V	5.3	9.8	21.08	33.0	-11.9	
	2580.00	20.19	H	5.3	9.8	24.69	33.0	-8.3	
	Mid Ch								
	2595.00	17.43	V	5.3	9.8	21.89	33.0	-11.1	
	2595.00	20.66	H	5.3	9.8	25.12	33.0	-7.9	
High Ch									
2610.00	18.77	V	5.4	9.8	23.21	33.0	-9.8		
2610.00	20.40	H	5.4	9.8	24.83	33.0	-8.2		

LTE Band 38 15MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK_Band 38 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2577.50	17.56	V	5.3	9.8	22.06	33.0	-10.9	
	2577.50	21.10	H	5.3	9.8	25.60	33.0	-7.4	
	Mid Ch								
	2595.00	18.54	V	5.3	9.8	23.00	33.0	-10.0	
	2595.00	21.77	H	5.3	9.8	26.23	33.0	-6.8	
High Ch									
2612.50	20.12	V	5.4	9.8	24.55	33.0	-8.5		
2612.50	21.67	H	5.4	9.8	26.11	33.0	-6.9		
LTE Band 38 15MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-29 Test Engineer: 45585 Configuration: EUT/ X-Position Location: Chamber 1 Mode: LTE_16QAM_Band 38 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2577.50	16.56	V	5.3	9.8	21.06	33.0	-11.9	
	2577.50	20.09	H	5.3	9.8	24.59	33.0	-8.4	
	Mid Ch								
	2595.00	17.55	V	5.3	9.8	22.01	33.0	-11.0	
	2595.00	20.78	H	5.3	9.8	25.24	33.0	-7.8	
High Ch									
2612.50	19.12	V	5.4	9.8	23.55	33.0	-9.5		
2612.50	20.71	H	5.4	9.8	25.15	33.0	-7.9		

LTE Band 38 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>									
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK_Band 38 Fundamentals, 10MHz Bandwidth									
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	2575.00	16.91	V	5.3	9.8	21.42	33.0	-11.6		
	2575.00	20.48	H	5.3	9.8	24.99	33.0	-8.0		
	Mid Ch									
	2595.00	17.25	V	5.3	9.8	21.71	33.0	-11.3		
	2595.00	20.86	H	5.3	9.8	25.32	33.0	-7.7		
High Ch										
2615.00	17.44	V	5.4	9.8	21.87	33.0	-11.1			
2615.00	20.17	H	5.4	9.8	24.59	33.0	-8.4			
LTE Band 38 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>									
	Company: Samsung Project #: 4789009800 Date: 2019-05-29 Test Engineer: 45585 Configuration: EUT/ X-Position Location: Chamber 1 Mode: LTE_16QAM_Band 38 Fundamentals, 10MHz Bandwidth									
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	2575.00	15.85	V	5.3	9.8	20.36	33.0	-12.6		
	2575.00	19.45	H	5.3	9.8	23.96	33.0	-9.0		
	Mid Ch									
	2595.00	16.08	V	5.3	9.8	20.54	33.0	-12.5		
	2595.00	19.78	H	5.3	9.8	24.24	33.0	-8.8		
High Ch										
2615.00	16.44	V	5.4	9.8	20.87	33.0	-12.1			
2615.00	19.16	H	5.4	9.8	23.58	33.0	-9.4			

LTE Band 38 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK_Band 38 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2572.50	16.00	V	5.3	9.8	20.52	33.0	-12.5	
	2572.50	19.79	H	5.3	9.8	24.30	33.0	-8.7	
	Mid Ch								
	2595.00	17.35	V	5.3	9.8	21.81	33.0	-11.2	
	2595.00	21.13	H	5.3	9.8	25.59	33.0	-7.4	
High Ch									
2617.50	18.52	V	5.4	9.8	22.94	33.0	-10.1		
2617.50	20.80	H	5.4	9.8	25.23	33.0	-7.8		
LTE Band 38 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-29 Test Engineer: 45585 Configuration: EUT/ X-Position Location: Chamber 1 Mode: LTE_16QAM_Band 38 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2572.50	15.34	V	5.3	9.8	19.86	33.0	-13.1	
	2572.50	18.87	H	5.3	9.8	23.38	33.0	-9.6	
	Mid Ch								
	2595.00	16.30	V	5.3	9.8	20.76	33.0	-12.2	
	2595.00	20.08	H	5.3	9.8	24.54	33.0	-8.5	
High Ch									
2617.50	16.93	V	5.4	9.8	21.35	33.0	-11.6		
2617.50	20.10	H	5.4	9.8	24.53	33.0	-8.5		

**LTE Band 41(PC2)**

LTE Band 41 20MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2506.00	17.83	V	5.2	9.9	22.50	33.0	-10.5	
	2506.00	19.27	H	5.2	9.9	23.94	33.0	-9.1	
	Mid Ch								
	2593.00	19.68	V	5.3	9.8	24.14	33.0	-8.9	
	2593.00	21.92	H	5.3	9.8	26.39	33.0	-6.6	
High Ch									
2680.00	17.75	V	5.4	9.8	22.12	33.0	-10.9		
2680.00	21.90	H	5.4	9.8	26.27	33.0	-6.7		
LTE Band 41 20MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 20MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2506.00	16.12	V	5.2	9.9	20.79	33.0	-12.2	
	2506.00	19.06	H	5.2	9.9	23.73	33.0	-9.3	
	Mid Ch								
	2593.00	19.22	V	5.3	9.8	23.68	33.0	-9.3	
	2593.00	22.44	H	5.3	9.8	26.91	33.0	-6.1	
High Ch									
2680.00	18.26	V	5.4	9.8	22.63	33.0	-10.4		
2680.00	21.57	H	5.4	9.8	25.94	33.0	-7.1		

LTE Band 41 15MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-05-30 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT / X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_QPSK Band 41 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2503.50	16.89	V	5.2	9.9	21.57	33.0	-11.4	
	2503.50	19.46	H	5.2	9.9	24.13	33.0	-8.9	
	Mid Ch								
	2593.00	19.75	V	5.3	9.8	24.21	33.0	-8.8	
	2593.00	22.69	H	5.3	9.8	27.16	33.0	-5.8	
High Ch									
2682.50	16.85	V	5.4	9.8	21.23	33.0	-11.8		
2682.50	21.36	H	5.4	9.8	25.73	33.0	-7.3		
LTE Band 41 15MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-05-30 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT / X-Position <b>Location:</b> Chamber 1 <b>Mode:</b> LTE_16QAM Band 41 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2503.50	16.69	V	5.2	9.9	21.37	33.0	-11.6	
	2503.50	19.30	H	5.2	9.9	23.97	33.0	-9.0	
	Mid Ch								
	2593.00	19.20	V	5.3	9.8	23.66	33.0	-9.3	
	2593.00	22.21	H	5.3	9.8	26.68	33.0	-6.3	
High Ch									
2682.50	16.54	V	5.4	9.8	20.92	33.0	-12.1		
2682.50	21.24	H	5.4	9.8	25.61	33.0	-7.4		

LTE Band 41 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2501.00	18.50	V	5.2	9.9	23.19	33.0	-9.8	
	2501.00	19.91	H	5.2	9.9	24.59	33.0	-8.4	
	Mid Ch								
	2593.00	20.25	V	5.3	9.8	24.71	33.0	-8.3	
	2593.00	22.12	H	5.3	9.8	26.59	33.0	-6.4	
High Ch									
2685.00	18.93	V	5.4	9.8	23.30	33.0	-9.7		
2685.00	20.51	H	5.4	9.8	24.87	33.0	-8.1		
LTE Band 41 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2501.00	17.95	V	5.2	9.9	22.64	33.0	-10.4	
	2501.00	20.14	H	5.2	9.9	24.82	33.0	-8.2	
	Mid Ch								
	2593.00	19.66	V	5.3	9.8	24.12	33.0	-8.9	
	2593.00	22.29	H	5.3	9.8	26.76	33.0	-6.2	
High Ch									
2685.00	18.80	V	5.4	9.8	23.17	33.0	-9.8		
2685.00	20.43	H	5.4	9.8	24.79	33.0	-8.2		

LTE Band 41 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2498.50	17.23	V	5.2	9.9	21.92	33.0	-11.1	
	2498.50	20.35	H	5.2	9.9	25.04	33.0	-8.0	
	Mid Ch								
	2593.00	20.18	V	5.3	9.8	24.64	33.0	-8.4	
	2593.00	22.54	H	5.3	9.8	27.01	33.0	-6.0	
High Ch									
2687.50	18.34	V	5.4	9.8	22.71	33.0	-10.3		
2687.50	21.53	H	5.4	9.8	25.90	33.0	-7.1		
LTE Band 41 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2498.50	18.65	V	5.2	9.9	23.34	33.0	-9.7	
	2498.50	19.35	H	5.2	9.9	24.04	33.0	-9.0	
	Mid Ch								
	2593.00	19.05	V	5.3	9.8	23.51	33.0	-9.5	
	2593.00	21.23	H	5.3	9.8	25.70	33.0	-7.3	
High Ch									
2687.50	18.54	V	5.4	9.8	22.91	33.0	-10.1		
2687.50	20.38	H	5.4	9.8	24.75	33.0	-8.3		

**LTE Band 41(PC3)**

LTE Band 41 20MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>									
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth									
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	2506.00	15.48	V	5.2	9.9	20.15	33.0	-12.9		
	2506.00	18.02	H	5.2	9.9	22.69	33.0	-10.3		
	Mid Ch									
	2593.00	16.88	V	5.3	9.8	21.34	33.0	-11.7		
	2593.00	20.38	H	5.3	9.8	24.85	33.0	-8.2		
	High Ch									
	2680.00	17.99	V	5.4	9.8	22.36	33.0	-10.6		
2680.00	19.47	H	5.4	9.8	23.84	33.0	-9.2			
LTE Band 41 20MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>									
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 20MHz Bandwidth									
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	2506.00	15.27	V	5.2	9.9	19.94	33.0	-13.1		
	2506.00	17.43	H	5.2	9.9	22.10	33.0	-10.9		
	Mid Ch									
	2593.00	17.08	V	5.3	9.8	21.54	33.0	-11.5		
	2593.00	20.57	H	5.3	9.8	25.04	33.0	-8.0		
	High Ch									
	2680.00	18.55	V	5.4	9.8	22.92	33.0	-10.1		
2680.00	20.17	H	5.4	9.8	24.54	33.0	-8.5			

LTE Band 41 15MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2503.50	15.39	V	5.2	9.9	20.07	33.0	-12.9	
	2503.50	17.04	H	5.2	9.9	21.71	33.0	-11.3	
	Mid Ch								
	2593.00	17.15	V	5.3	9.8	21.61	33.0	-11.4	
	2593.00	20.36	H	5.3	9.8	24.83	33.0	-8.2	
High Ch									
2682.50	13.85	V	5.4	9.8	18.23	33.0	-14.8		
2682.50	17.97	H	5.4	9.8	22.34	33.0	-10.7		
LTE Band 41 15MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2503.50	15.36	V	5.2	9.9	20.04	33.0	-13.0	
	2503.50	16.92	H	5.2	9.9	21.59	33.0	-11.4	
	Mid Ch								
	2593.00	18.01	V	5.3	9.8	22.47	33.0	-10.5	
	2593.00	20.33	H	5.3	9.8	24.80	33.0	-8.2	
High Ch									
2682.50	13.84	V	5.4	9.8	18.22	33.0	-14.8		
2682.50	17.97	H	5.4	9.8	22.34	33.0	-10.7		

LTE Band 41 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2501.00	15.32	V	5.2	9.9	20.01	33.0	-13.0	
	2501.00	17.20	H	5.2	9.9	21.88	33.0	-11.1	
	Mid Ch								
	2593.00	17.28	V	5.3	9.8	21.74	33.0	-11.3	
	2593.00	20.78	H	5.3	9.8	25.25	33.0	-7.8	
High Ch									
2685.00	17.50	V	5.4	9.8	21.87	33.0	-11.1		
2685.00	19.11	H	5.4	9.8	23.47	33.0	-9.5		
LTE Band 41 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2501.00	15.41	V	5.2	9.9	20.10	33.0	-12.9	
	2501.00	17.29	H	5.2	9.9	21.97	33.0	-11.0	
	Mid Ch								
	2593.00	17.16	V	5.3	9.8	21.62	33.0	-11.4	
	2593.00	20.67	H	5.3	9.8	25.14	33.0	-7.9	
High Ch									
2685.00	17.52	V	5.4	9.8	21.89	33.0	-11.1		
2685.00	19.14	H	5.4	9.8	23.50	33.0	-9.5		

LTE Band 41 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2498.50	15.46	V	5.2	9.9	20.15	33.0	-12.9	
	2498.50	17.40	H	5.2	9.9	22.09	33.0	-10.9	
	Mid Ch								
	2593.00	16.77	V	5.3	9.8	21.23	33.0	-11.8	
	2593.00	20.58	H	5.3	9.8	25.05	33.0	-8.0	
High Ch									
2687.50	16.28	V	5.4	9.8	20.65	33.0	-12.3		
2687.50	19.06	H	5.4	9.8	23.43	33.0	-9.6		
LTE Band 41 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-30 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 41 Fundamentals, 5MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables Substitution: Horn 3115[00167211], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	2498.50	15.48	V	5.2	9.9	20.17	33.0	-12.8	
	2498.50	17.18	H	5.2	9.9	21.87	33.0	-11.1	
	Mid Ch								
	2593.00	16.77	V	5.3	9.8	21.23	33.0	-11.8	
	2593.00	20.51	H	5.3	9.8	24.98	33.0	-8.0	
High Ch									
2687.50	16.39	V	5.4	9.8	20.76	33.0	-12.2		
2687.50	19.03	H	5.4	9.8	23.40	33.0	-9.6		

**LTE Band 66**

LTE Band 66 20MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 66 Fundamentals, 20MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1720.00	12.76	V	4.3	9.4	17.78	30.0	-12.2	
	1720.00	16.99	H	4.3	9.4	22.02	30.0	-8.0	
	Mid Ch								
	1745.00	13.75	V	4.4	9.4	18.84	30.0	-11.2	
	1745.00	17.84	H	4.4	9.4	22.92	30.0	-7.1	
High Ch									
1770.00	12.33	V	4.4	9.5	17.43	30.0	-12.6		
1770.00	16.53	H	4.4	9.5	21.63	30.0	-8.4		
LTE Band 66 20MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 66 Fundamentals, 20MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1720.00	10.16	V	4.3	9.4	15.18	30.0	-14.8	
	1720.00	14.45	H	4.3	9.4	19.48	30.0	-10.5	
	Mid Ch								
	1745.00	11.56	V	4.4	9.4	16.65	30.0	-13.4	
	1745.00	15.44	H	4.4	9.4	20.52	30.0	-9.5	
High Ch									
1770.00	10.29	V	4.4	9.5	15.39	30.0	-14.6		
1770.00	14.52	H	4.4	9.5	19.62	30.0	-10.4		

LTE Band 66 15MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 66 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1717.50	12.86	V	4.3	9.3	17.89	30.0	-12.1	
	1717.50	16.70	H	4.3	9.3	21.72	30.0	-8.3	
	Mid Ch								
	1745.00	13.63	V	4.4	9.4	18.72	30.0	-11.3	
	1745.00	17.34	H	4.4	9.4	22.42	30.0	-7.6	
High Ch									
1772.50	12.52	V	4.4	9.5	17.61	30.0	-12.4		
1772.50	16.37	H	4.4	9.5	21.46	30.0	-8.5		
LTE Band 66 15MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 66 Fundamentals, 15MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1717.50	10.30	V	4.3	9.3	15.33	30.0	-14.7	
	1717.50	14.57	H	4.3	9.3	19.59	30.0	-10.4	
	Mid Ch								
	1745.00	10.96	V	4.4	9.4	16.05	30.0	-14.0	
	1745.00	15.44	H	4.4	9.4	20.52	30.0	-9.5	
High Ch									
1772.50	11.15	V	4.4	9.5	16.24	30.0	-13.8		
1772.50	13.94	H	4.4	9.5	19.03	30.0	-11.0		

LTE Band 66 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 66 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1715.00	12.34	V	4.3	9.3	17.36	30.0	-12.6	
	1715.00	16.91	H	4.3	9.3	21.93	30.0	-8.1	
	Mid Ch								
	1745.00	13.44	V	4.4	9.4	18.53	30.0	-11.5	
	1745.00	17.15	H	4.4	9.4	22.23	30.0	-7.8	
High Ch									
1775.00	12.32	V	4.4	9.5	17.42	30.0	-12.6		
1775.00	16.41	H	4.4	9.5	21.50	30.0	-8.5		
LTE Band 66 10MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT / Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 66 Fundamentals, 10MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1715.00	10.85	V	4.3	9.3	15.87	30.0	-14.1	
	1715.00	14.89	H	4.3	9.3	19.91	30.0	-10.1	
	Mid Ch								
	1745.00	11.00	V	4.4	9.4	16.09	30.0	-13.9	
	1745.00	15.16	H	4.4	9.4	20.24	30.0	-9.8	
High Ch									
1775.00	10.52	V	4.4	9.5	15.62	30.0	-14.4		
1775.00	14.47	H	4.4	9.5	19.56	30.0	-10.4		

LTE Band 66 5MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>									
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 66 Fundamentals, 5MHz Bandwidth									
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	1712.50	12.44	V	4.3	9.3	17.46	30.0	-12.5		
	1712.50	16.36	H	4.3	9.3	21.38	30.0	-8.6		
	Mid Ch									
	1745.00	12.71	V	4.4	9.4	17.80	30.0	-12.2		
	1745.00	17.08	H	4.4	9.4	22.16	30.0	-7.8		
High Ch										
1777.50	12.58	V	4.4	9.5	17.68	30.0	-12.3			
1777.50	16.38	H	4.4	9.5	21.48	30.0	-8.5			
LTE Band 66 5MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>									
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 66 Fundamentals, 5MHz Bandwidth									
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Ch									
	1712.50	10.56	V	4.3	9.3	15.58	30.0	-14.4		
	1712.50	14.66	H	4.3	9.3	19.68	30.0	-10.3		
	Mid Ch									
	1745.00	11.19	V	4.4	9.4	16.28	30.0	-13.7		
	1745.00	15.05	H	4.4	9.4	20.13	30.0	-9.9		
High Ch										
1777.50	10.05	V	4.4	9.5	15.15	30.0	-14.9			
1777.50	14.51	H	4.4	9.5	19.61	30.0	-10.4			

LTE Band 66 3MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 66 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1711.50	12.42	V	4.3	9.3	17.43	30.0	-12.6	
	1711.50	16.82	H	4.3	9.3	21.83	30.0	-8.2	
	Mid Ch								
	1745.00	12.75	V	4.4	9.4	17.84	30.0	-12.2	
	1745.00	17.44	H	4.4	9.4	22.52	30.0	-7.5	
High Ch									
1778.50	12.54	V	4.4	9.5	17.63	30.0	-12.4		
1778.50	16.74	H	4.4	9.5	21.84	30.0	-8.2		
LTE Band 66 3MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	Company: Samsung Project #: 4789009800 Date: 2019-05-21 Test Engineer: 45585 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_16QAM Band 66 Fundamentals, 3MHz Bandwidth								
	<b>Test Equipment</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1711.50	10.35	V	4.3	9.3	15.36	30.0	-14.6	
	1711.50	14.70	H	4.3	9.3	19.71	30.0	-10.3	
	Mid Ch								
	1745.00	10.56	V	4.4	9.4	15.65	30.0	-14.4	
	1745.00	15.32	H	4.4	9.4	20.40	30.0	-9.6	
High Ch									
1778.50	10.20	V	4.4	9.5	15.29	30.0	-14.7		
1778.50	14.74	H	4.4	9.5	19.84	30.0	-10.2		

LTE Band 66 1.4MHz QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-05-22 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT, Z-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_QPSK Band 66 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1710.70	12.56	V	4.3	9.3	17.57	30.0	-12.4	
	1710.70	16.88	H	4.3	9.3	21.89	30.0	-8.1	
	Mid Ch								
	1745.00	12.57	V	4.4	9.4	17.66	30.0	-12.3	
	1745.00	17.46	H	4.4	9.4	22.54	30.0	-7.5	
High Ch									
1779.30	12.36	V	4.4	9.5	17.46	30.0	-12.5		
1779.30	16.85	H	4.4	9.5	21.94	30.0	-8.1		
LTE Band 66 1.4MHz 16QAM	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>								
	<b>Company:</b> Samsung <b>Project #:</b> 4789009800 <b>Date:</b> 2019-05-22 <b>Test Engineer:</b> 45585 <b>Configuration:</b> EUT, Z-Position <b>Location:</b> Chamber 2 <b>Mode:</b> LTE_16QAM Band 66 Fundamentals, 1.4MHz Bandwidth								
	<b>Test Equipment:</b> Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 8.5m SMA-type Cable								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch								
	1710.70	10.45	V	4.3	9.3	15.46	30.0	-14.5	
	1710.70	14.70	H	4.3	9.3	19.71	30.0	-10.3	
	Mid Ch								
	1745.00	10.52	V	4.4	9.4	15.61	30.0	-14.4	
	1745.00	15.15	H	4.4	9.4	20.23	30.0	-9.8	
High Ch									
1779.30	10.07	V	4.4	9.5	15.17	30.0	-14.8		
1779.30	14.72	H	4.4	9.5	19.81	30.0	-10.2		

## 10.2. FIELD STRENGTH OF SPURIOUS RADIATION

### RULE PART(S)

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

### LIMIT

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

Part 27.53:

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

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

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

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

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

Part 90.691(a):

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

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

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

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## **TEST PROCEDURE**

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

For peak power measurement with a ESU40:

- a) Set the RBW = 100 KHz for emission below 1GHz and 1MHz for emissions above 1GHz
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points  $\geq$  span/RBW;
- g) Trace mode = average(WCDMA, LTE), Maxhold(GSM, LTE Band41);;

## **RESULTS**

See the following pages.

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

### 10.2.1. SPURIOUS RADIATION PLOTS

#### GSM850

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
		Company:	Samsung									
		Project #:	4789009800									
		Date:	2019-06-01									
		Test Engineer:	45585									
		Configuration:	EUT / AC Adapter, Y-Position									
		Location:	Chamber 2									
		Mode:	GPRS 850 MHz Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes		
GSM850  GPRS	Low Ch, 824.2MHz											
	1648.40	5.3	V	3.0	38.2	1.0	-32.0	-13.0	-19.0			
	2472.60	0.4	V	3.0	38.8	1.0	-37.4	-13.0	-24.4			
	3296.80	-3.2	V	3.0	39.4	1.0	-41.6	-13.0	-28.6			
	1648.40	1.4	H	3.0	38.2	1.0	-35.8	-13.0	-22.8			
	2472.60	-7.1	H	3.0	38.8	1.0	-44.9	-13.0	-31.9			
	3296.80	-3.6	H	3.0	39.4	1.0	-42.0	-13.0	-29.0			
	Mid Ch, 836.6MHz											
	1673.20	7.3	V	3.0	38.2	1.0	-29.9	-13.0	-16.9			
	2509.80	-0.1	V	3.0	38.8	1.0	-37.9	-13.0	-24.9			
	3346.40	-3.6	V	3.0	39.5	1.0	-42.1	-13.0	-29.1			
	1673.20	4.4	H	3.0	38.2	1.0	-32.8	-13.0	-19.8			
	2509.80	-4.6	H	3.0	38.8	1.0	-42.4	-13.0	-29.4			
	3346.40	-3.8	H	3.0	39.5	1.0	-42.3	-13.0	-29.3			
	High Ch, 848.8MHz											
	1697.60	2.8	V	3.0	38.2	1.0	-34.5	-13.0	-21.5			
	2546.40	-1.8	V	3.0	38.9	1.0	-39.6	-13.0	-26.6			
	3395.20	-3.2	V	3.0	39.5	1.0	-41.7	-13.0	-28.7			
	1697.60	1.7	H	3.0	38.2	1.0	-35.5	-13.0	-22.5			
	2546.40	-6.6	H	3.0	38.9	1.0	-44.4	-13.0	-31.4			
	3395.20	-5.4	H	3.0	39.5	1.0	-43.9	-13.0	-30.9			
	GSM850  EGPRS	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
				Company:	Samsung							
				Project #:	4789009800							
		Date:	2019-06-01									
		Test Engineer:	45585									
		Configuration:	EUT / AC Adapter, -Position									
		Location:	Chamber 2									
		Mode:	EGPRS 850 MHz Harmonics									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
GSM850  EGPRS		Low Ch, 824.2MHz										
		1648.40	-7.9	V	3.0	38.2	1.0	-45.2	-13.0	-32.2		
		2472.60	-11.1	V	3.0	38.8	1.0	-48.9	-13.0	-35.9		
		3296.80	-7.5	V	3.0	39.4	1.0	-45.9	-13.0	-32.9		
		1648.40	-12.7	H	3.0	38.2	1.0	-49.9	-13.0	-36.9		
		2472.60	-11.9	H	3.0	38.8	1.0	-49.7	-13.0	-36.7		
		3296.80	-9.2	H	3.0	39.4	1.0	-47.7	-13.0	-34.7		
		Mid Ch, 836.6MHz										
		1673.20	-9.5	V	3.0	38.2	1.0	-46.7	-13.0	-33.7		
		2509.80	-10.3	V	3.0	38.8	1.0	-48.1	-13.0	-35.1		
		3346.40	-8.8	V	3.0	39.5	1.0	-47.3	-13.0	-34.3		
		1673.20	-12.2	H	3.0	38.2	1.0	-49.4	-13.0	-36.4		
		2509.80	-10.7	H	3.0	38.8	1.0	-48.5	-13.0	-35.5		
		3346.40	-9.0	H	3.0	39.5	1.0	-47.5	-13.0	-34.5		
		High Ch, 848.8MHz										
	1697.60	-10.5	V	3.0	38.2	1.0	-47.7	-13.0	-34.7			
	2546.40	-11.2	V	3.0	38.9	1.0	-49.0	-13.0	-36.0			
	3395.20	-8.7	V	3.0	39.5	1.0	-47.1	-13.0	-34.1			
	1697.60	-9.2	H	3.0	38.2	1.0	-46.4	-13.0	-33.4			
	2546.40	-11.6	H	3.0	38.9	1.0	-49.4	-13.0	-36.4			
	3395.20	-9.1	H	3.0	39.5	1.0	-47.6	-13.0	-34.6			

**GSM1900**

f MHz		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement							
		SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)
Company: Samsung									
Project #: 4789009800									
Date: 2019-06-14									
Test Engineer: 45585									
Configuration: EUT / AC Adapter, Y-Position									
Location: Chamber 1									
Mode: GPRS 1900 MHz Harmonics									
Low Ch, 1850.2MHz									
3700.40	-0.8	V	3.0	43.8	1.0	-43.5	-13.0	-30.5	
5550.60	-3.4	V	3.0	43.7	1.0	-46.1	-13.0	-33.1	
7400.80	-5.0	V	3.0	42.5	1.0	-46.5	-13.0	-33.5	
3700.40	-3.5	H	3.0	43.8	1.0	-46.3	-13.0	-33.3	
5550.60	-4.4	H	3.0	43.7	1.0	-47.2	-13.0	-34.2	
7400.80	-5.1	H	3.0	42.5	1.0	-46.6	-13.0	-33.6	
Mid Ch, 1880MHz									
3760.00	0.3	V	3.0	43.8	1.0	-42.5	-13.0	-29.5	
5640.00	0.3	V	3.0	43.7	1.0	-42.4	-13.0	-29.4	
7520.00	-5.0	V	3.0	42.5	1.0	-46.4	-13.0	-33.4	
3760.00	-2.1	H	3.0	43.8	1.0	-44.9	-13.0	-31.9	
5640.00	-3.2	H	3.0	43.7	1.0	-45.9	-13.0	-32.9	
7520.00	-4.9	H	3.0	42.5	1.0	-46.3	-13.0	-33.3	
High Ch, 1909.8MHz									
3819.60	-1.1	V	3.0	43.8	1.0	-43.9	-13.0	-30.9	
5729.40	-1.0	V	3.0	43.7	1.0	-43.7	-13.0	-30.7	
7639.20	-4.6	V	3.0	42.4	1.0	-46.0	-13.0	-33.0	
3819.60	-1.4	H	3.0	43.8	1.0	-44.2	-13.0	-31.2	
5729.40	-2.4	H	3.0	43.7	1.0	-45.1	-13.0	-32.1	
7639.20	-4.6	H	3.0	42.4	1.0	-46.0	-13.0	-33.0	

f MHz		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement							
		SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)
Company: Samsung									
Project #: 4789009800									
Date: 2019-06-14									
Test Engineer: 45585									
Configuration: EUT / AC Adapter, Y-Position									
Location: Chamber 1									
Mode: EGPRS 1900 MHz Harmonics									
Low Ch, 1850.2MHz									
3700.40	-6.1	V	3.0	43.8	1.0	-48.9	-13.0	-35.9	
5550.60	-7.4	V	3.0	43.7	1.0	-50.1	-13.0	-37.1	
7400.80	-5.0	V	3.0	42.5	1.0	-46.5	-13.0	-33.5	
3700.40	-10.7	H	3.0	43.8	1.0	-53.4	-13.0	-40.4	
5550.60	-6.8	H	3.0	43.7	1.0	-49.5	-13.0	-36.5	
7400.80	-4.9	H	3.0	42.5	1.0	-46.5	-13.0	-33.5	
Mid Ch, 1880MHz									
3760.00	-5.2	V	3.0	43.8	1.0	-48.0	-13.0	-35.0	
5640.00	-6.2	V	3.0	43.7	1.0	-48.9	-13.0	-35.9	
7520.00	-4.8	V	3.0	42.5	1.0	-46.2	-13.0	-33.2	
3760.00	-6.8	H	3.0	43.8	1.0	-49.6	-13.0	-36.6	
5640.00	-7.2	H	3.0	43.7	1.0	-49.9	-13.0	-36.9	
7520.00	-5.0	H	3.0	42.5	1.0	-46.5	-13.0	-33.5	
High Ch, 1909.8MHz									
3819.60	-7.0	V	3.0	43.8	1.0	-49.8	-13.0	-36.8	
5729.40	-6.9	V	3.0	43.7	1.0	-49.6	-13.0	-36.6	
7639.20	-5.0	V	3.0	42.4	1.0	-46.4	-13.0	-33.4	
3819.60	-6.2	H	3.0	43.8	1.0	-49.0	-13.0	-36.0	
5729.40	-7.5	H	3.0	43.7	1.0	-50.2	-13.0	-37.2	
7639.20	-4.9	H	3.0	42.4	1.0	-46.3	-13.0	-33.3	

**WCDMA Band 5**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		Company:	Saumsung							
		Project #:	4789009800							
		Date:	2019-06-03							
		Test Engineer:	45585							
		Configuration:	EUT / AC Adapter, X-Position							
		Location:	Chamber 2							
		Mode:	Rel99 Band 5 Harmonics							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch, 826.4MHz										
1652.80	-15.4	V	3.0	38.2	1.0	-52.6	-13.0	-39.6		
2479.20	-12.8	V	3.0	38.8	1.0	-50.6	-13.0	-37.6		
3305.60	-10.3	V	3.0	39.4	1.0	-48.7	-13.0	-35.7		
1652.80	-16.5	H	3.0	38.2	1.0	-53.7	-13.0	-40.7		
2479.20	-13.4	H	3.0	38.8	1.0	-51.2	-13.0	-38.2		
3305.60	-10.6	H	3.0	39.4	1.0	-49.0	-13.0	-36.0		
Mid Ch, 836.6MHz										
1673.20	-15.3	V	3.0	38.2	1.0	-52.5	-13.0	-39.5		
2509.80	-12.6	V	3.0	38.8	1.0	-50.5	-13.0	-37.5		
3346.40	-10.3	V	3.0	39.5	1.0	-48.7	-13.0	-35.7		
1673.20	-16.4	H	3.0	38.2	1.0	-53.7	-13.0	-40.7		
2509.80	-13.2	H	3.0	38.8	1.0	-51.1	-13.0	-38.1		
3346.40	-10.6	H	3.0	39.5	1.0	-49.0	-13.0	-36.0		
High Ch, 846.6MHz										
1693.20	-15.3	V	3.0	38.2	1.0	-52.6	-13.0	-39.6		
2539.80	-12.6	V	3.0	38.9	1.0	-50.4	-13.0	-37.4		
3386.40	-10.1	V	3.0	39.5	1.0	-48.6	-13.0	-35.6		
1693.20	-16.4	H	3.0	38.2	1.0	-53.6	-13.0	-40.6		
2539.80	-13.2	H	3.0	38.9	1.0	-51.0	-13.0	-38.0		
3386.40	-10.4	H	3.0	39.5	1.0	-48.9	-13.0	-35.9		
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		Company:	Samsung							
		Project #:	4789009800							
		Date:	2019-06-03							
		Test Engineer:	45585							
		Configuration:	EUT / AC Adapter, X-Position							
		Location:	Chamber 2							
		Mode:	HSDPA Band 5 Harmonics							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch, 826.4MHz										
1652.80	-15.4	V	3.0	38.2	1.0	-52.7	-13.0	-39.7		
2479.20	-12.8	V	3.0	38.8	1.0	-50.6	-13.0	-37.6		
3305.60	-10.3	V	3.0	39.4	1.0	-48.8	-13.0	-35.8		
1652.80	-16.5	H	3.0	38.2	1.0	-53.7	-13.0	-40.7		
2479.20	-13.5	H	3.0	38.8	1.0	-51.3	-13.0	-38.3		
3305.60	-10.6	H	3.0	39.4	1.0	-49.1	-13.0	-36.1		
Mid Ch, 836.6MHz										
1673.20	-15.4	V	3.0	38.2	1.0	-52.6	-13.0	-39.6		
2509.80	-12.7	V	3.0	38.8	1.0	-50.5	-13.0	-37.5		
3346.40	-10.3	V	3.0	39.5	1.0	-48.8	-13.0	-35.8		
1673.20	-16.4	H	3.0	38.2	1.0	-53.6	-13.0	-40.6		
2509.80	-13.3	H	3.0	38.8	1.0	-51.2	-13.0	-38.2		
3346.40	-10.6	H	3.0	39.5	1.0	-49.1	-13.0	-36.1		
High Ch, 846.6MHz										
1693.20	-15.3	V	3.0	38.2	1.0	-52.6	-13.0	-39.6		
2539.80	-12.6	V	3.0	38.9	1.0	-50.5	-13.0	-37.5		
3386.40	-10.1	V	3.0	39.5	1.0	-48.6	-13.0	-35.6		
1693.20	-16.4	H	3.0	38.2	1.0	-53.6	-13.0	-40.6		
2539.80	-13.2	H	3.0	38.9	1.0	-51.1	-13.0	-38.1		
3386.40	-10.4	H	3.0	39.5	1.0	-48.9	-13.0	-35.9		

**WCDMA Band 4**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
		Company:	Samsung									
		Project #:	4789009800									
		Date:	2019-06-03									
		Test Engineer:	45585									
		Configuration:	EUT / AC Adapter									
		Location:	Chamber 1									
		Mode:	Rel99 Band 4 Harmonics									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
WCDMA Band 4 REL99	Low Ch, 1712.4MHz											
	3424.80	-9.8	V	3.0	43.7	1.0	-52.5	-13.0	-39.5			
	5137.20	-9.3	V	3.0	43.8	1.0	-52.1	-13.0	-39.1			
	6849.60	-6.3	V	3.0	42.9	1.0	-48.2	-13.0	-35.2			
	3424.80	-9.9	H	3.0	43.7	1.0	-52.6	-13.0	-39.6			
	5137.20	-9.3	H	3.0	43.8	1.0	-52.1	-13.0	-39.1			
	6849.60	-6.3	H	3.0	42.9	1.0	-48.2	-13.0	-35.2			
	Mid Ch, 1732.6MHz											
	3465.20	-9.8	V	3.0	43.7	1.0	-52.5	-13.0	-39.5			
	5197.80	-9.0	V	3.0	43.8	1.0	-51.8	-13.0	-38.8			
	6930.40	-6.2	V	3.0	42.8	1.0	-48.0	-13.0	-35.0			
	3465.20	-9.9	H	3.0	43.7	1.0	-52.6	-13.0	-39.6			
	5197.80	-9.1	H	3.0	43.8	1.0	-51.8	-13.0	-38.8			
	6930.40	-6.2	H	3.0	42.8	1.0	-48.0	-13.0	-35.0			
	High Ch, 1752.6MHz											
	3505.20	-9.2	V	3.0	43.7	1.0	-51.9	-13.0	-38.9			
	5257.80	-9.0	V	3.0	43.8	1.0	-51.7	-13.0	-38.7			
	7010.40	-5.9	V	3.0	42.7	1.0	-47.7	-13.0	-34.7			
	3505.20	-9.3	H	3.0	43.7	1.0	-52.0	-13.0	-39.0			
	5257.80	-9.0	H	3.0	43.8	1.0	-51.8	-13.0	-38.8			
	7010.40	-5.9	H	3.0	42.7	1.0	-47.6	-13.0	-34.6			
			UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
			Company:	Samsung								
		Project #:	4789009800									
		Date:	2019-06-03									
		Test Engineer:	45585									
		Configuration:	EUT / AC Adapter									
		Location:	Chamber 1									
		Mode:	HSDPA Band 4 Harmonics									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
WCDMA Band 4 HSDPA	Low Ch, 1712.4MHz											
	3424.80	-9.8	V	3.0	43.7	1.0	-52.5	-13.0	-39.5			
	5137.20	-9.3	V	3.0	43.8	1.0	-52.1	-13.0	-39.1			
	6849.60	-6.3	V	3.0	42.9	1.0	-48.2	-13.0	-35.2			
	3424.80	-9.9	H	3.0	43.7	1.0	-52.6	-13.0	-39.6			
	5137.20	-9.3	H	3.0	43.8	1.0	-52.1	-13.0	-39.1			
	6849.60	-6.3	H	3.0	42.9	1.0	-48.2	-13.0	-35.2			
	Mid Ch, 1732.6MHz											
	3465.20	-9.8	V	3.0	43.7	1.0	-52.5	-13.0	-39.5			
	5197.80	-9.0	V	3.0	43.8	1.0	-51.8	-13.0	-38.8			
	6930.40	-6.2	V	3.0	42.8	1.0	-48.0	-13.0	-35.0			
	3465.20	-9.9	H	3.0	43.7	1.0	-52.6	-13.0	-39.6			
	5197.80	-9.1	H	3.0	43.8	1.0	-51.8	-13.0	-38.8			
	6930.40	-6.2	H	3.0	42.8	1.0	-48.0	-13.0	-35.0			
	High Ch, 1752.6MHz											
	3505.20	-9.2	V	3.0	43.7	1.0	-51.9	-13.0	-38.9			
	5257.80	-9.0	V	3.0	43.8	1.0	-51.7	-13.0	-38.7			
	7010.40	-6.0	V	3.0	42.7	1.0	-47.7	-13.0	-34.7			
	3505.20	-9.3	H	3.0	43.7	1.0	-52.0	-13.0	-39.0			
	5257.80	-9.0	H	3.0	43.8	1.0	-51.8	-13.0	-38.8			
	7010.40	-5.9	H	3.0	42.7	1.0	-47.7	-13.0	-34.7			

**WCDMA Band 2**

		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		Company:	Samsung							
		Project #:	4789009800							
		Date:	2019-05-24							
		Test Engineer:	45585							
		Configuration:	EUT / AC Adapter, Z-Position							
		Location:	Chamber 2							
		Mode:	Rel99 Band 2 Harmonics							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch, 1852.4MHz										
3704.80	-11.3	V	3.0	39.7	1.0	-50.0	-13.0	-37.0		
5557.20	-8.3	V	3.0	39.9	1.0	-47.2	-13.0	-34.2		
7409.60	-6.1	V	3.0	39.4	1.0	-44.5	-13.0	-31.5		
3704.80	-11.5	H	3.0	39.7	1.0	-50.2	-13.0	-37.2		
5557.20	-8.5	H	3.0	39.9	1.0	-47.5	-13.0	-34.5		
7409.60	-7.0	H	3.0	39.4	1.0	-45.5	-13.0	-32.5		
Mid Ch, 1880MHz										
3760.00	-10.8	V	3.0	39.7	1.0	-49.5	-13.0	-36.5		
5640.00	-7.9	V	3.0	40.0	1.0	-46.9	-13.0	-33.9		
7520.00	-6.3	V	3.0	39.4	1.0	-44.7	-13.0	-31.7		
3760.00	-11.2	H	3.0	39.7	1.0	-49.8	-13.0	-36.8		
5640.00	-8.2	H	3.0	40.0	1.0	-47.2	-13.0	-34.2		
7520.00	-7.0	H	3.0	39.4	1.0	-45.4	-13.0	-32.4		
High Ch, 1907.6MHz										
3815.20	-11.0	V	3.0	39.7	1.0	-49.7	-13.0	-36.7		
5722.80	-8.1	V	3.0	40.0	1.0	-47.1	-13.0	-34.1		
7630.40	-6.2	V	3.0	39.3	1.0	-44.6	-13.0	-31.6		
3815.20	-11.2	H	3.0	39.7	1.0	-49.9	-13.0	-36.9		
5722.80	-8.4	H	3.0	40.0	1.0	-47.4	-13.0	-34.4		
7630.40	-7.0	H	3.0	39.3	1.0	-45.3	-13.0	-32.3		
		UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement								
		Company:	Samsung							
		Project #:	4789009800							
		Date:	2019-05-24							
		Test Engineer:	45585							
		Configuration:	EUT / AC Adapter, Z-Position							
		Location:	Chamber 2							
		Mode:	HSDPA Band 2 Harmonics							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
Low Ch, 1852.4MHz										
3704.80	-11.2	V	3.0	39.7	1.0	-49.8	-13.0	-36.8		
5557.20	-8.2	V	3.0	39.9	1.0	-47.1	-13.0	-34.1		
7409.60	-6.1	V	3.0	39.4	1.0	-44.5	-13.0	-31.5		
3704.80	-11.4	H	3.0	39.7	1.0	-50.1	-13.0	-37.1		
5557.20	-8.5	H	3.0	39.9	1.0	-47.5	-13.0	-34.5		
7409.60	-7.0	H	3.0	39.4	1.0	-45.4	-13.0	-32.4		
Mid Ch, 1880MHz										
3760.00	-10.9	V	3.0	39.7	1.0	-49.6	-13.0	-36.6		
5640.00	-8.0	V	3.0	40.0	1.0	-46.9	-13.0	-33.9		
7520.00	-6.2	V	3.0	39.4	1.0	-44.6	-13.0	-31.6		
3760.00	-11.1	H	3.0	39.7	1.0	-49.8	-13.0	-36.8		
5640.00	-8.1	H	3.0	40.0	1.0	-47.1	-13.0	-34.1		
7520.00	-7.0	H	3.0	39.4	1.0	-45.4	-13.0	-32.4		
High Ch, 1907.6MHz										
3815.20	-11.0	V	3.0	39.7	1.0	-49.7	-13.0	-36.7		
5722.80	-8.1	V	3.0	40.0	1.0	-47.1	-13.0	-34.1		
7630.40	-6.2	V	3.0	39.3	1.0	-44.6	-13.0	-31.6		
3815.20	-11.2	H	3.0	39.7	1.0	-49.9	-13.0	-36.9		
5722.80	-8.4	H	3.0	40.0	1.0	-47.3	-13.0	-34.3		
7630.40	-6.9	H	3.0	39.3	1.0	-45.3	-13.0	-32.3		

**LTE Band 5**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
		<b>Company:</b>	Samsung							
		<b>Project #:</b>	4789009800							
		<b>Date:</b>	2019-06-14							
		<b>Test Engineer:</b>	45585							
		<b>Configuration:</b>	EUT / AC Adapter, X-Position							
		<b>Location:</b>	Chamber 1							
		<b>Mode:</b>	LTE_QPSK Band 5 Harmonics, 10MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
<b>Low Ch, 829MHz</b>										
1658.00	-15.1	V	3.0	43.6	1.0	-57.7	-13.0	-44.7		
2487.00	-12.3	V	3.0	43.4	1.0	-54.7	-13.0	-41.7		
3316.00	-10.4	V	3.0	43.6	1.0	-53.0	-13.0	-40.0		
<b>10MHz</b>										
1658.00	-16.2	H	3.0	43.6	1.0	-58.8	-13.0	-45.8		
2487.00	-12.9	H	3.0	43.4	1.0	-55.3	-13.0	-42.3		
3316.00	-10.5	H	3.0	43.6	1.0	-53.1	-13.0	-40.1		
<b>QPSK</b>										
<b>Mid Ch, 836.5MHz</b>										
1673.00	-15.1	V	3.0	43.6	1.0	-57.6	-13.0	-44.6		
2509.50	-12.2	V	3.0	43.4	1.0	-54.6	-13.0	-41.6		
3346.00	-10.2	V	3.0	43.6	1.0	-52.9	-13.0	-39.9		
1673.00	-15.8	H	3.0	43.6	1.0	-58.4	-13.0	-45.4		
2509.50	-13.0	H	3.0	43.4	1.0	-55.4	-13.0	-42.4		
3346.00	-10.4	H	3.0	43.6	1.0	-53.0	-13.0	-40.0		
<b>High Ch, 844MHz</b>										
1688.00	-15.0	V	3.0	43.6	1.0	-57.6	-13.0	-44.6		
2532.00	-12.4	V	3.0	43.4	1.0	-54.8	-13.0	-41.8		
3376.00	-10.4	V	3.0	43.7	1.0	-53.0	-13.0	-40.0		
1688.00	-16.1	H	3.0	43.6	1.0	-58.6	-13.0	-45.6		
2532.00	-13.0	H	3.0	43.4	1.0	-55.4	-13.0	-42.4		
3376.00	-10.3	H	3.0	43.7	1.0	-52.9	-13.0	-39.9		

**LTE Band 7**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789009800							
<b>Date:</b>		2019-06-14							
<b>Test Engineer:</b>		45585							
<b>Configuration:</b>		EUT / AC Adapter, Y-Position							
<b>Location:</b>		Chamber 2							
<b>Mode:</b>		LTE_QPSK Band 7 Harmonics, 20MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 2510MHz</b>									
5020.00	0.0	V	3.0	39.8	1.0	-38.8	-25.0	-13.8	
7530.00	0.0	V	3.0	39.4	1.0	-38.4	-25.0	-13.4	
10040.00	0.0	V	3.0	38.6	1.0	-37.6	-25.0	-12.6	
12550.00	0.0	V	3.0	39.0	1.0	-38.0	-25.0	-13.0	
15060.00	0.0	V	3.0	41.3	1.0	-40.3	-25.0	-15.3	
5020.00	0.0	H	3.0	39.8	1.0	-38.8	-25.0	-13.8	
7530.00	0.0	H	3.0	39.4	1.0	-38.4	-25.0	-13.4	
10040.00	0.0	H	3.0	38.6	1.0	-37.6	-25.0	-12.6	
12550.00	0.0	H	3.0	39.0	1.0	-38.0	-25.0	-13.0	
15060.00	0.0	H	3.0	41.3	1.0	-40.3	-25.0	-15.3	
<b>Mid Ch, 2535MHz</b>									
5070.00	0.0	V	3.0	39.8	1.0	-38.8	-25.0	-13.8	
7605.00	0.0	V	3.0	39.3	1.0	-38.3	-25.0	-13.3	
10140.00	0.0	V	3.0	38.6	1.0	-37.6	-25.0	-12.6	
12675.00	0.0	V	3.0	39.1	1.0	-38.1	-25.0	-13.1	
15210.00	0.0	V	3.0	41.2	1.0	-40.2	-25.0	-15.2	
5070.00	0.0	H	3.0	39.8	1.0	-38.8	-25.0	-13.8	
7605.00	0.0	H	3.0	39.3	1.0	-38.3	-25.0	-13.3	
10140.00	0.0	H	3.0	38.6	1.0	-37.6	-25.0	-12.6	
12675.00	0.0	H	3.0	39.1	1.0	-38.1	-25.0	-13.1	
15210.00	0.0	H	3.0	41.2	1.0	-40.2	-25.0	-15.2	
<b>High Ch, 2560MHz</b>									
5120.00	0.0	V	3.0	39.8	1.0	-38.8	-25.0	-13.8	
7680.00	0.0	V	3.0	39.3	1.0	-38.3	-25.0	-13.3	
10240.00	0.0	V	3.0	38.6	1.0	-37.6	-25.0	-12.6	
12800.00	0.0	V	3.0	39.2	1.0	-38.2	-25.0	-13.2	
15360.00	0.0	V	3.0	41.2	1.0	-40.2	-25.0	-15.2	
5120.00	0.0	H	3.0	39.8	1.0	-38.8	-25.0	-13.8	
7680.00	0.0	H	3.0	39.3	1.0	-38.3	-25.0	-13.3	
10240.00	0.0	H	3.0	38.6	1.0	-37.6	-25.0	-12.6	
12800.00	0.0	H	3.0	39.2	1.0	-38.2	-25.0	-13.2	
15360.00	0.0	H	3.0	41.2	1.0	-40.2	-25.0	-15.2	

LTE  
 Band 7  
 20MHz  
 QPSK

**LTE Band 12**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement											
LTE Band 12 3MHz QPSK		Company: Samsung Project #: 4789009800 Date: 2019-05-22 Test Engineer: 45585 Configuration: EUT / AC Adapter, Y-Position Location: Chamber 1 Mode: LTE_QPSK Band 12 Harmonics, 3MHz Bandwidth									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Ch, 700.5MHz									
		1401.00	-4.4	V	3.0	43.8	1.0	-47.2	-13.0	-34.2	
		2101.50	-13.0	V	3.0	43.3	1.0	-55.3	-13.0	-42.3	
		2802.00	-11.2	V	3.0	43.5	1.0	-53.7	-13.0	-40.7	
		1401.00	-2.5	H	3.0	43.8	1.0	-45.3	-13.0	-32.3	
		2101.50	-13.8	H	3.0	43.3	1.0	-56.1	-13.0	-43.1	
		2802.00	-11.6	H	3.0	43.5	1.0	-54.1	-13.0	-41.1	
		Mid Ch, 707.5MHz									
1415.00	-0.3	V	3.0	43.8	1.0	-43.1	-13.0	-30.1			
2122.50	-12.7	V	3.0	43.3	1.0	-55.0	-13.0	-42.0			
2830.00	-11.2	V	3.0	43.5	1.0	-53.7	-13.0	-40.7			
1415.00	3.4	H	3.0	43.8	1.0	-39.4	-13.0	-26.4			
2122.50	-11.1	H	3.0	43.3	1.0	-53.4	-13.0	-40.4			
2830.00	-11.6	H	3.0	43.5	1.0	-54.1	-13.0	-41.1			
High Ch, 714.5MHz											
1429.00	-3.6	V	3.0	43.8	1.0	-46.4	-13.0	-33.4			
2143.50	-13.1	V	3.0	43.3	1.0	-55.4	-13.0	-42.4			
2858.00	-11.1	V	3.0	43.5	1.0	-53.6	-13.0	-40.6			
1429.00	-2.4	H	3.0	43.8	1.0	-45.2	-13.0	-32.2			
2143.50	-13.4	H	3.0	43.3	1.0	-55.7	-13.0	-42.7			
2858.00	-11.5	H	3.0	43.5	1.0	-54.0	-13.0	-41.0			

**LTE Band 13**

LTE Band 13 10MHz QPSK	<b>UL Verification Services, Inc.</b> <b>Above 1GHz High Frequency Substitution Measurement</b>																																																																																									
	<b>Company:</b> Samsung																																																																																									
	<b>Project #:</b> 4789009800																																																																																									
	<b>Date:</b> 2019-06-06																																																																																									
	<b>Test Engineer:</b> 45585																																																																																									
	<b>Configuration:</b> EUT/ AC Adapter, Z-Position																																																																																									
	<b>Location:</b> Chamber 2																																																																																									
	<b>Mode:</b> LTE_QPSK Band 13 Harmonics, 10MHz Bandwidth																																																																																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Distance (m)</th> <th>Preamp (dB)</th> <th>Filter (dB)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="10">Mid Ch, 782MHz</td> </tr> <tr> <td>1564.00</td> <td>-6.4</td> <td>V</td> <td>3.0</td> <td>38.2</td> <td>1.0</td> <td>-43.6</td> <td>-40.0</td> <td>-3.6</td> <td></td> </tr> <tr> <td>2346.00</td> <td>-13.1</td> <td>V</td> <td>3.0</td> <td>38.7</td> <td>1.0</td> <td>-50.7</td> <td>-13.0</td> <td>-37.7</td> <td></td> </tr> <tr> <td>3128.00</td> <td>-10.9</td> <td>V</td> <td>3.0</td> <td>39.3</td> <td>1.0</td> <td>-49.2</td> <td>-13.0</td> <td>-36.2</td> <td></td> </tr> <tr> <td>1564.00</td> <td>-13.8</td> <td>H</td> <td>3.0</td> <td>38.2</td> <td>1.0</td> <td>-51.0</td> <td>-40.0</td> <td>-11.0</td> <td></td> </tr> <tr> <td>2346.00</td> <td>-13.8</td> <td>H</td> <td>3.0</td> <td>38.7</td> <td>1.0</td> <td>-51.5</td> <td>-13.0</td> <td>-38.5</td> <td></td> </tr> <tr> <td>3128.00</td> <td>-11.0</td> <td>H</td> <td>3.0</td> <td>39.3</td> <td>1.0</td> <td>-49.3</td> <td>-13.0</td> <td>-36.3</td> <td></td> </tr> </tbody> </table>										f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Mid Ch, 782MHz										1564.00	-6.4	V	3.0	38.2	1.0	-43.6	-40.0	-3.6		2346.00	-13.1	V	3.0	38.7	1.0	-50.7	-13.0	-37.7		3128.00	-10.9	V	3.0	39.3	1.0	-49.2	-13.0	-36.2		1564.00	-13.8	H	3.0	38.2	1.0	-51.0	-40.0	-11.0		2346.00	-13.8	H	3.0	38.7	1.0	-51.5	-13.0	-38.5		3128.00	-11.0	H	3.0	39.3	1.0	-49.3	-13.0	-36.3	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																
Mid Ch, 782MHz																																																																																										
1564.00	-6.4	V	3.0	38.2	1.0	-43.6	-40.0	-3.6																																																																																		
2346.00	-13.1	V	3.0	38.7	1.0	-50.7	-13.0	-37.7																																																																																		
3128.00	-10.9	V	3.0	39.3	1.0	-49.2	-13.0	-36.2																																																																																		
1564.00	-13.8	H	3.0	38.2	1.0	-51.0	-40.0	-11.0																																																																																		
2346.00	-13.8	H	3.0	38.7	1.0	-51.5	-13.0	-38.5																																																																																		
3128.00	-11.0	H	3.0	39.3	1.0	-49.3	-13.0	-36.3																																																																																		

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

**LTE Band 25**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
		<b>Company:</b>	Samsung						
		<b>Project #:</b>	4789009800						
		<b>Date:</b>	2019-05-31						
		<b>Test Engineer:</b>	45585						
		<b>Configuration:</b>	EUT / AC Adapter, Z-Position						
		<b>Location:</b>	Chamber 2						
		<b>Mode:</b>	LTE_QPSK Band 25 Harmonics, 20MHz Bandwidth						
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 1860MHz</b>									
3720.00	-11.2	V	3.0	39.7	1.0	-49.8	-13.0	-36.8	
5580.00	-8.2	V	3.0	39.9	1.0	-47.2	-13.0	-34.2	
7440.00	-6.1	V	3.0	39.4	1.0	-44.5	-13.0	-31.5	
<b>20MHz</b>									
3720.00	-11.4	H	3.0	39.7	1.0	-50.1	-13.0	-37.1	
5580.00	-8.6	H	3.0	39.9	1.0	-47.6	-13.0	-34.6	
7440.00	-7.1	H	3.0	39.4	1.0	-45.5	-13.0	-32.5	
<b>QPSK</b>									
<b>Mid Ch, 1882.5MHz</b>									
3765.00	-11.1	V	3.0	39.7	1.0	-49.7	-13.0	-36.7	
5647.50	-8.0	V	3.0	40.0	1.0	-47.0	-13.0	-34.0	
7530.00	-6.3	V	3.0	39.4	1.0	-44.7	-13.0	-31.7	
3765.00	-11.3	H	3.0	39.7	1.0	-50.0	-13.0	-37.0	
5647.50	-8.2	H	3.0	40.0	1.0	-47.2	-13.0	-34.2	
7530.00	-7.1	H	3.0	39.4	1.0	-45.5	-13.0	-32.5	
<b>High Ch, 1905MHz</b>									
3810.00	-11.8	V	3.0	39.7	1.0	-50.5	-13.0	-37.5	
5715.00	-8.8	V	3.0	40.0	1.0	-47.8	-13.0	-34.8	
7620.00	-6.3	V	3.0	39.3	1.0	-44.6	-13.0	-31.6	
3810.00	-11.2	H	3.0	39.7	1.0	-49.9	-13.0	-36.9	
5715.00	-8.4	H	3.0	40.0	1.0	-47.4	-13.0	-34.4	
7620.00	-6.9	H	3.0	39.3	1.0	-45.2	-13.0	-32.2	

**LTE Band 26**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789009800							
<b>Date:</b>		2019-06-14							
<b>Test Engineer:</b>		45585							
<b>Configuration:</b>		EUT / AC Adapter, X-Position							
<b>Location:</b>		Chamber 1							
<b>Mode:</b>		LTE_QPSK Band 26 Hamonics, 15MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 821.5MHz									
1643.00	-15.2	V	3.0	43.6	1.0	-57.8	-13.0	-44.8	
2464.50	-12.2	V	3.0	43.4	1.0	-54.6	-13.0	-41.6	
3286.00	-10.5	V	3.0	43.6	1.0	-53.2	-13.0	-40.2	
1643.00	-16.2	H	3.0	43.6	1.0	-58.8	-13.0	-45.8	
2464.50	-12.9	H	3.0	43.4	1.0	-55.3	-13.0	-42.3	
3286.00	-10.8	H	3.0	43.6	1.0	-53.4	-13.0	-40.4	
UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789009800							
<b>Date:</b>		2019-06-14							
<b>Test Engineer:</b>		45585							
<b>Configuration:</b>		EUT / AC Adapter, X-Position							
<b>Location:</b>		Chamber 1							
<b>Mode:</b>		LTE_QPSK Band 26 Hamonics, 15MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch, 831.5MHz									
1663.00	-15.1	V	3.0	43.6	1.0	-57.7	-13.0	-44.7	
2494.50	-12.3	V	3.0	43.4	1.0	-54.7	-13.0	-41.7	
3326.00	-10.3	V	3.0	43.6	1.0	-53.0	-13.0	-40.0	
1663.00	-16.2	H	3.0	43.6	1.0	-58.7	-13.0	-45.7	
2494.50	-13.0	H	3.0	43.4	1.0	-55.4	-13.0	-42.4	
3326.00	-10.4	H	3.0	43.6	1.0	-53.1	-13.0	-40.1	
High Ch, 841.5MHz									
1683.00	-15.0	V	3.0	43.6	1.0	-57.6	-13.0	-44.6	
2524.50	-12.3	V	3.0	43.4	1.0	-54.7	-13.0	-41.7	
3366.00	-10.4	V	3.0	43.7	1.0	-53.1	-13.0	-40.1	
1683.00	-16.2	H	3.0	43.6	1.0	-58.7	-13.0	-45.7	
2524.50	-12.9	H	3.0	43.4	1.0	-55.3	-13.0	-42.3	
3366.00	-10.5	H	3.0	43.7	1.0	-53.2	-13.0	-40.2	

LTE  
 Band 26  
 15MHz  
 QPSK

**LTE Band 38**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4789009800							
Date:		2019-05-30							
Test Engineer:		45585							
Configuration:		EUT / AC Adapter, Z-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 38 Harmonics, 20MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 2580MHz									
5160.00	-1.3	V	3.0	43.8	1.0	-44.0	-25.0	-19.0	
7740.00	-7.9	V	3.0	42.3	1.0	-49.2	-25.0	-24.2	
10320.00	2.5	V	3.0	40.7	1.0	-37.1	-25.0	-12.1	
12900.00	-8.2	V	3.0	41.9	1.0	-49.1	-25.0	-24.1	
15480.00	-7.7	V	3.0	43.1	1.0	-49.8	-25.0	-24.8	
5160.00	-1.4	H	3.0	43.8	1.0	-44.1	-25.0	-19.1	
7740.00	-10.6	H	3.0	42.3	1.0	-52.0	-25.0	-27.0	
10320.00	0.2	H	3.0	40.7	1.0	-39.5	-25.0	-14.5	
12900.00	-7.9	H	3.0	41.9	1.0	-48.8	-25.0	-23.8	
15480.00	-7.8	H	3.0	43.1	1.0	-50.0	-25.0	-25.0	
Mid Ch, 2595MHz									
5190.00	-2.5	V	3.0	43.8	1.0	-45.3	-25.0	-20.3	
7785.00	-6.4	V	3.0	42.3	1.0	-47.8	-25.0	-22.8	
10380.00	3.4	V	3.0	40.7	1.0	-36.3	-25.0	-11.3	
12975.00	-8.7	V	3.0	42.0	1.0	-49.8	-25.0	-24.8	
15570.00	-4.8	V	3.0	43.0	1.0	-46.9	-25.0	-21.9	
5190.00	-3.4	H	3.0	43.8	1.0	-46.2	-25.0	-21.2	
7785.00	-9.8	H	3.0	42.3	1.0	-51.2	-25.0	-26.2	
10380.00	0.5	H	3.0	40.7	1.0	-39.2	-25.0	-14.2	
12975.00	-7.1	H	3.0	42.0	1.0	-48.1	-25.0	-23.1	
15570.00	-7.0	H	3.0	43.0	1.0	-49.0	-25.0	-24.0	
High Ch, 2610MHz									
5220.00	-5.1	V	3.0	43.8	1.0	-47.9	-25.0	-22.9	
7830.00	-10.7	V	3.0	42.3	1.0	-52.0	-25.0	-27.0	
10440.00	0.6	V	3.0	40.7	1.0	-39.1	-25.0	-14.1	
13050.00	-6.3	V	3.0	42.1	1.0	-47.3	-25.0	-22.3	
15660.00	-4.9	V	3.0	42.9	1.0	-46.8	-25.0	-21.8	
5220.00	-6.0	H	3.0	43.8	1.0	-48.8	-25.0	-23.8	
7830.00	-10.6	H	3.0	42.3	1.0	-51.9	-25.0	-26.9	
10440.00	-0.6	H	3.0	40.7	1.0	-40.2	-25.0	-15.2	
13050.00	-5.7	H	3.0	42.1	1.0	-46.7	-25.0	-21.7	
15660.00	-6.1	H	3.0	42.9	1.0	-48.0	-25.0	-23.0	

LTE  
 Band 38  
 20MHz  
 QPSK

**LTE Band 41(PC2)**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement											
LTE Band 41 5MHz QPSK		Company: Samsung Project #: 4789009800 Date: 2019-06-01 Test Engineer: 45585 Configuration: EUT / AC Adapter, Y-Position Location: Chamber 1 Mode: LTE_QPSK Band 41 Harmonics, 5MHz Bandwidth									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Ch, 2498.5MHz									
		4997.00	-4.1	V	3.0	43.8	1.0	-46.9	-25.0	-21.9	
		7495.50	-12.3	V	3.0	42.5	1.0	-53.7	-25.0	-28.7	
		9994.00	3.5	V	3.0	40.6	1.0	-36.1	-25.0	-11.1	
12492.50	-5.0	V	3.0	41.6	1.0	-45.6	-25.0	-20.6			
4997.00	-0.5	H	3.0	43.8	1.0	-43.3	-25.0	-18.3			
7495.50	-8.8	H	3.0	42.5	1.0	-50.3	-25.0	-25.3			
9994.00	5.0	H	3.0	40.6	1.0	-34.6	-25.0	-9.6			
12492.50	-6.8	H	3.0	41.6	1.0	-47.4	-25.0	-22.4			
Mid Ch, 2593MHz											
5186.00	-4.6	V	3.0	43.8	1.0	-47.4	-25.0	-22.4			
7779.00	-7.6	V	3.0	42.3	1.0	-48.9	-25.0	-23.9			
10372.00	3.2	V	3.0	40.7	1.0	-36.5	-25.0	-11.5			
12965.00	-7.8	V	3.0	42.0	1.0	-48.8	-25.0	-23.8			
5186.00	-0.7	H	3.0	43.8	1.0	-43.4	-25.0	-18.4			
7779.00	-7.9	H	3.0	42.3	1.0	-49.2	-25.0	-24.2			
10372.00	6.9	H	3.0	40.7	1.0	-32.7	-25.0	-7.7			
12965.00	-4.3	H	3.0	42.0	1.0	-45.3	-25.0	-20.3			
High Ch, 2687.5MHz											
5375.00	-6.6	V	3.0	43.7	1.0	-49.3	-25.0	-24.3			
8062.50	-16.2	V	3.0	42.2	1.0	-57.4	-25.0	-32.4			
10750.00	2.2	V	3.0	40.8	1.0	-37.5	-25.0	-12.5			
13437.50	-9.4	V	3.0	42.4	1.0	-50.8	-25.0	-25.8			
5375.00	-1.2	H	3.0	43.7	1.0	-44.0	-25.0	-19.0			
8062.50	-15.9	H	3.0	42.2	1.0	-57.1	-25.0	-32.1			
10750.00	4.2	H	3.0	40.8	1.0	-35.6	-25.0	-10.6			
13437.50	-9.7	H	3.0	42.4	1.0	-51.1	-25.0	-26.1			

**LTE Band 41(PC3)**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4789009800							
Date:		2019-05-31							
Test Engineer:		45585							
Configuration:		EUT / AC Adapter, Y-Position							
Location:		Chamber 1							
Mode:		LTE_QPSK Band 41 Harmonics, 15MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 2503.5MHz</b>									
5007.00	-7.5	V	3.0	43.8	1.0	-50.3	-25.0	-25.3	
7510.50	-12.4	V	3.0	42.5	1.0	-53.9	-25.0	-28.9	
10014.00	4.9	V	3.0	40.6	1.0	-34.7	-25.0	-9.7	
12517.50	-4.7	V	3.0	41.6	1.0	-45.3	-25.0	-20.3	
15021.00	-7.4	V	3.0	43.7	1.0	-50.1	-25.0	-25.1	
5007.00	-7.3	H	3.0	43.8	1.0	-50.1	-25.0	-25.1	
7510.50	-12.9	H	3.0	42.5	1.0	-54.4	-25.0	-29.4	
10014.00	6.2	H	3.0	40.6	1.0	-33.4	-25.0	-8.4	
12517.50	-6.8	H	3.0	41.6	1.0	-47.4	-25.0	-22.4	
15021.00	-8.2	H	3.0	43.7	1.0	-50.8	-25.0	-25.8	
<b>Mid Ch, 2593MHz</b>									
5186.00	-8.6	V	3.0	43.8	1.0	-51.4	-25.0	-26.4	
7779.00	-11.3	V	3.0	42.3	1.0	-52.6	-25.0	-27.6	
10372.00	2.6	V	3.0	40.7	1.0	-37.1	-25.0	-12.1	
12965.00	-5.6	V	3.0	42.0	1.0	-46.6	-25.0	-21.6	
15558.00	-7.0	V	3.0	43.0	1.0	-49.1	-25.0	-24.1	
5186.00	-4.7	H	3.0	43.8	1.0	-47.4	-25.0	-22.4	
7779.00	-10.9	H	3.0	42.3	1.0	-52.2	-25.0	-27.2	
10372.00	5.2	H	3.0	40.7	1.0	-34.5	-25.0	-9.5	
12965.00	-2.0	H	3.0	42.0	1.0	-43.0	-25.0	-18.0	
15558.00	-7.9	H	3.0	43.0	1.0	-49.9	-25.0	-24.9	
<b>High Ch, 2682.5MHz</b>									
5365.00	-7.1	V	3.0	43.7	1.0	-49.8	-25.0	-24.8	
8047.50	-12.5	V	3.0	42.2	1.0	-53.7	-25.0	-28.7	
10730.00	1.7	V	3.0	40.8	1.0	-38.1	-25.0	-13.1	
13412.50	-9.9	V	3.0	42.4	1.0	-51.2	-25.0	-26.2	
16095.00	-6.9	V	3.0	42.4	1.0	-48.3	-25.0	-23.3	
5365.00	-2.8	H	3.0	43.7	1.0	-45.6	-25.0	-20.6	
8047.50	-13.1	H	3.0	42.2	1.0	-54.3	-25.0	-29.3	
10730.00	3.9	H	3.0	40.8	1.0	-35.9	-25.0	-10.9	
13412.50	-9.7	H	3.0	42.4	1.0	-51.1	-25.0	-26.1	
16095.00	-7.3	H	3.0	42.4	1.0	-48.7	-25.0	-23.7	

LTE  
 Band 41  
 15MHz  
 QPSK

**LTE Band 66**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4789009800							
Date:		2019-05-23							
Test Engineer:		45585							
Configuration:		EUT / AC Adapter, Z-Position							
Location:		Chamber 2							
Mode:		LTE_QPSK Band 66 Harmonics, 20MHz Bandwidth							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1720MHz									
3440.00	-9.2	V	3.0	39.5	1.0	-47.7	-13.0	-34.7	
5160.00	-8.9	V	3.0	39.8	1.0	-47.7	-13.0	-34.7	
6880.00	-4.3	V	3.0	39.7	1.0	-43.0	-13.0	-30.0	
8600.00	-3.9	V	3.0	39.0	1.0	-41.8	-13.0	-28.8	
10320.00	-1.7	V	3.0	38.6	1.0	-39.3	-13.0	-26.3	
3440.00	-9.2	H	3.0	39.5	1.0	-47.7	-13.0	-34.7	
5160.00	-9.2	H	3.0	39.8	1.0	-48.1	-13.0	-35.1	
6880.00	-5.9	H	3.0	39.7	1.0	-44.6	-13.0	-31.6	
8600.00	-4.7	H	3.0	39.0	1.0	-42.7	-13.0	-29.7	
10320.00	-1.5	H	3.0	38.6	1.0	-39.1	-13.0	-26.1	
Mid Ch, 1745MHz									
3490.00	-8.6	V	3.0	39.5	1.0	-47.1	-13.0	-34.1	
5235.00	-8.6	V	3.0	39.8	1.0	-47.4	-13.0	-34.4	
6980.00	-3.9	V	3.0	39.6	1.0	-42.5	-13.0	-29.5	
8725.00	-3.3	V	3.0	38.9	1.0	-41.2	-13.0	-28.2	
10470.00	-1.1	V	3.0	38.6	1.0	-38.6	-13.0	-25.6	
3490.00	-8.7	H	3.0	39.5	1.0	-47.3	-13.0	-34.3	
5235.00	-8.9	H	3.0	39.8	1.0	-47.8	-13.0	-34.8	
6980.00	-5.7	H	3.0	39.6	1.0	-44.4	-13.0	-31.4	
8725.00	-3.5	H	3.0	38.9	1.0	-41.4	-13.0	-28.4	
10470.00	-1.1	H	3.0	38.6	1.0	-38.6	-13.0	-25.6	
High Ch, 1770MHz									
3540.00	-8.4	V	3.0	39.6	1.0	-47.0	-13.0	-34.0	
5310.00	-8.4	V	3.0	39.9	1.0	-47.3	-13.0	-34.3	
7080.00	-2.8	V	3.0	39.6	1.0	-41.4	-13.0	-28.4	
8850.00	-2.6	V	3.0	38.9	1.0	-40.5	-13.0	-27.5	
10620.00	-1.1	V	3.0	38.5	1.0	-38.7	-13.0	-25.7	
3540.00	-8.6	H	3.0	39.6	1.0	-47.1	-13.0	-34.1	
5310.00	-8.6	H	3.0	39.9	1.0	-47.5	-13.0	-34.5	
7080.00	-6.4	H	3.0	39.6	1.0	-45.0	-13.0	-32.0	
8850.00	-2.9	H	3.0	38.9	1.0	-40.7	-13.0	-27.7	
10620.00	-1.1	H	3.0	38.5	1.0	-38.6	-13.0	-25.6	

**LTE Band 17**

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

**LTE Band 4**

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

**LTE Band 2**

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