



10.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §27.54

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

RESULTS

See the following pages.

10.4.1. FREQUENCY STABILITY RESULTS

LTE Band 4, Channel 20174, Frequency 1732.5 MHz

Reference Frequency: LTE Band 4 Mid Channel 1732.5 MHz @ 20°C				
Limit: +- 2.5 ppm = 4331.250 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	50	1732.49998159	0.002	2.5
3.85	40	1732.49998255	0.001	2.5
3.85	30	1732.49998100	0.002	2.5
3.85	20	1732.49998489	0	2.5
3.85	10	1732.49998120	0.002	2.5
3.85	0	1732.49998614	-0.001	2.5
3.85	-10	1732.49998472	0.000	2.5
3.85	-20	1732.49998258	0.001	2.5
3.85	-30	1732.49997907	0.003	2.5

Reference Frequency: LTE Band 4 Mid Channel 1732.5 MHz @ 20°C				
Limit: +- 2.5 ppm = 4331.250 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	20	1732.49998489	0	2.5
4.20	20	1732.49998293	0.001	2.5
3.60	20	1732.50001560	-0.018	2.5

LTE Band 13, Channel 23230, Frequency 782.0 MHz

Reference Frequency: LTE Band 13 Mid Channel 782 MHz @ 20°C				
Limit: +- 2.5 ppm = 1955.000 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	50	781.99999142	0.004	2.5
3.85	40	781.99999269	0.003	2.5
3.85	30	781.99999488	0.000	2.5
3.85	20	781.99999492	0	2.5
3.85	10	781.99999376	0.001	2.5
3.85	0	781.99999411	0.001	2.5
3.85	-10	781.99999451	0.001	2.5
3.85	-20	781.99999185	0.004	2.5
3.85	-30	781.99999280	0.003	2.5

Reference Frequency: LTE Band 13 Mid Channel 782 MHz @ 20°C				
Limit: +- 2.5 ppm = 1955.000 Hz				
Power Supply [Vdc]	Environment Temperature [°C]	Frequency Deviation Measured with Time Elapse		
		[MHz]	Delta [ppm]	Limit [ppm]
3.85	20	781.99999492	0	2.5
4.20	20	781.99999354	0.002	2.5
3.60	20	781.99999486	0.000	2.5

11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §27.50

LIMITS

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

27.50(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

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

TEST PROCEDURE

ANSI / TIA / EIA 603D Clause 2.2.17; ESU40 setting reference to 971168 D01 v02r02

For peak 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 = peak; f) Ensure that the number of measurement points \geq span/RBW; g) Trace mode = max hold;

For average power measurement with a ESU40:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW $\geq 3 \times$ RBW; d) Set number of points in sweep $\geq 2 \times$ span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle ≥ 98 ; h) Use trigger to capture bursts If burst duty cycle < 98 ; i) Trace average at least 100 traces in power averaging (*i.e.*, RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.

TEST RESULTS

11.1.1. ERP/EIRP Results

11.1.2. ERP/EIRP DATA

LTE Band 4

		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
LTE Band 4 20MHz QPSK	Company:		Samsung							
	Project #:		4787821625							
	Date:		01-11-17							
	Test Engineer:		JH Park							
	Configuration:		EUT / Y-Position							
	Mode:		LTE Band 4, QPSK, 20MHz							
	<u>Test Equipment:</u>		Receiving: 3117[00168724] and Chamber 1 SMA Cables Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse							
		f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin	Notes
		MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
		Low Ch								
		1720.00	5.92	V	1.54	9.12	13.50	30.0	-16.5	
		1720.00	9.01	H	1.54	9.12	16.59	30.0	-13.4	
		Mid Ch								
		1732.50	6.80	V	1.55	9.31	14.56	30.0	-15.4	
	1732.50	10.09	H	1.55	9.31	17.85	30.0	-12.2		
	High Ch									
	1745.00	6.40	V	1.56	9.37	14.21	30.0	-15.8		
	1745.00	9.18	H	1.56	9.37	16.99	30.0	-13.0		
		Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								
		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
Company:		Samsung								
Project #:		4787821625								
Date:		01-11-17								
Test Engineer:		JH Park								
Configuration:		EUT / Y-Position								
Mode:		LTE Band 4, 16QAM, 20MHz								
<u>Test Equipment:</u>		Receiving: 3117[00168724] and Chamber 1 SMA Cables Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin	Notes	
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)		
	Low Ch									
	1720.00	4.93	V	1.54	9.12	12.51	30.0	-17.5		
	1720.00	7.98	H	1.54	9.12	15.56	30.0	-14.4		
	Mid Ch									
	1732.50	5.92	V	1.55	9.31	13.68	30.0	-16.3		
	1732.50	9.13	H	1.55	9.31	16.89	30.0	-13.1		
	High Ch									
	1745.00	5.35	V	1.56	9.37	13.16	30.0	-16.8		
	1745.00	8.16	H	1.56	9.37	15.97	30.0	-14.0		
		Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								

		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
LTE Band 4 15MHz QPSK	Company:	Samsung								
	Project #:	4787821625								
	Date:	01-11-17								
	Test Engineer:	JH Park								
	Configuration:	EUT / Y-Position								
	Mode:	LTE Band 4, QPSK, 15MHz								
	<u>Test Equipment:</u>		Receiving: 3117[00168724] and Chamber 1 SMA Cables Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse							
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	
	Low Ch									
	1717.50	7.99	V	1.54	9.12	15.57	30.0	-14.4		
	1717.50	8.37	H	1.54	9.12	15.95	30.0	-14.1		
	Mid Ch									
	1732.50	6.73	V	1.55	9.31	14.49	30.0	-15.5		
	1732.50	8.88	H	1.55	9.31	16.64	30.0	-13.4		
High Ch										
1747.50	6.05	V	1.56	9.39	13.88	30.0	-16.1			
1747.50	9.74	H	1.56	9.39	17.57	30.0	-12.4			
Rev. 3.17.11		Note: For Band 4 EIRP limit is 30dBm								
		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
LTE Band 4 15MHz 16QAM	Company:	Samsung								
	Project #:	4787821625								
	Date:	01-11-17								
	Test Engineer:	JH Park								
	Configuration:	EUT / Y-Position								
	Mode:	LTE Band 4, 16QAM, 15MHz								
	<u>Test Equipment:</u>		Receiving: 3117[00168724] and Chamber 1 SMA Cables Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse							
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	
	Low Ch									
	1717.50	7.03	V	1.54	9.12	14.61	30.0	-15.4		
	1717.50	7.42	H	1.54	9.12	15.00	30.0	-15.0		
	Mid Ch									
	1732.50	5.75	V	1.55	9.31	13.51	30.0	-16.5		
	1732.50	7.88	H	1.55	9.31	15.64	30.0	-14.4		
High Ch										
1747.50	5.13	V	1.56	9.39	12.96	30.0	-17.0			
1747.50	8.78	H	1.56	9.39	16.61	30.0	-13.4			
Rev. 3.17.11		Note: For Band 4 EIRP limit is 30dBm								

High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2										
LTE Band 4 10MHz QPSK	Company:		Samsung							
	Project #:		4787821625							
	Date:		01-11-17							
	Test Engineer:		JH Park							
	Configuration:		EUT / Y-Position							
	Mode:		LTE Band 4, QPSK, 10MHz							
	Test Equipment:									
	Receiving: 3117[00168724] and Chamber 1 SMA Cables									
	Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	
	Low Ch									
	1715.00	7.13	V	1.54	9.12	14.71	30.0	-15.3		
	1715.00	7.99	H	1.54	9.12	15.57	30.0	-14.4		
	Mid Ch									
1732.50	6.26	V	1.55	9.31	14.02	30.0	-16.0			
1732.50	9.21	H	1.55	9.31	16.97	30.0	-13.0			
High Ch										
1750.00	6.35	V	1.56	9.40	14.19	30.0	-15.8			
1750.00	10.29	H	1.56	9.40	18.13	30.0	-11.9			
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm										
LTE Band 4 10MHz 16QAM	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2									
	Company:		Samsung							
	Project #:		4787821625							
	Date:		01-11-17							
	Test Engineer:		JH Park							
	Configuration:		EUT / Y-Position							
	Mode:		LTE Band 4 16QAM, 10MHz							
	Test Equipment:									
	Receiving: 3117[00168724] and Chamber 1 SMA Cables									
	Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	
	Low Ch									
	1715.00	6.15	V	1.54	9.12	13.73	30.0	-16.3		
	1715.00	7.00	H	1.54	9.12	14.58	30.0	-15.4		
Mid Ch										
1732.50	5.32	V	1.55	9.31	13.08	30.0	-16.9			
1732.50	8.24	H	1.55	9.31	16.00	30.0	-14.0			
High Ch										
1750.00	5.40	V	1.56	9.40	13.24	30.0	-16.8			
1750.00	9.38	H	1.56	9.40	17.22	30.0	-12.8			
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm										

		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
LTE Band 4 5MHz QPSK	Company: Samsung Project #: 4787821625 Date: 01-11-17 Test Engineer: JH Park Configuration: EUT / Y-Position Mode: LTE Band 4, QPSK , 5MHz Test Equipment: Receiving: 3117[00168724] and Chamber 1 SMA Cables Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse									
		f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin	Notes
		MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
		Low Ch								
		1712.50	6.95	V	1.54	9.12	14.53	30.0	-15.5	
		1712.50	7.67	H	1.54	9.12	15.25	30.0	-14.8	
		Mid Ch								
		1732.50	6.52	V	1.55	9.31	14.28	30.0	-15.7	
		1732.50	8.74	H	1.55	9.31	16.50	30.0	-13.5	
		High Ch								
	1752.50	6.38	V	1.56	9.39	14.21	30.0	-15.8		
	1752.50	10.11	H	1.56	9.39	17.94	30.0	-12.1		
		Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								
LTE Band 4 5MHz 16QAM	Company: Samsung Project #: 4787821625 Date: 01-11-17 Test Engineer: JH Park Configuration: EUT / Y-Position Mode: LTE Band 4 16QAM, 5MHz Test Equipment: Receiving: 3117[00168724] and Chamber 1 SMA Cables Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse									
		f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin	Notes
		MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
		Low Ch								
		1712.50	5.94	V	1.54	9.12	13.52	30.0	-16.5	
		1712.50	6.91	H	1.54	9.12	14.49	30.0	-15.5	
		Mid Ch								
		1732.50	5.57	V	1.55	9.31	13.33	30.0	-16.7	
		1732.50	7.77	H	1.55	9.31	15.53	30.0	-14.5	
		High Ch								
	1752.50	5.35	V	1.56	9.39	13.18	30.0	-16.8		
	1752.50	9.14	H	1.56	9.39	16.97	30.0	-13.0		
		Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								

High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2										
LTE Band 4 3MHz QPSK	Company:		Samsung							
	Project #:		4787821625							
	Date:		01-11-17							
	Test Engineer:		JH Park							
	Configuration:		EUT / Y-Position							
	Mode:		LTE Band 4, QPSK , 3MHz							
	Test Equipment:									
	Receiving: 3117[00168724] and Chamber 1 SMA Cables									
	Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	
	Low Ch									
	1711.50	6.20	V	1.54	9.12	13.78	30.0	-16.2		
	1711.50	8.44	H	1.54	9.12	16.02	30.0	-14.0		
	Mid Ch									
1732.50	7.18	V	1.55	9.31	14.94	30.0	-15.1			
1732.50	9.97	H	1.55	9.31	17.73	30.0	-12.3			
High Ch										
1753.50	6.24	V	1.56	9.38	14.06	30.0	-15.9			
1753.50	10.43	H	1.56	9.38	18.25	30.0	-11.8			
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm										
LTE Band 4 3MHz 16QAM	High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2									
	Company:		Samsung							
	Project #:		4787821625							
	Date:		01-11-17							
	Test Engineer:		JH Park							
	Configuration:		EUT / Y-Position							
	Mode:		LTE Band 4 16QAM, 3MHz							
	Test Equipment:									
	Receiving: 3117[00168724] and Chamber 1 SMA Cables									
	Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	
	Low Ch									
	1711.50	5.17	V	1.54	9.12	12.75	30.0	-17.3		
	1711.50	7.39	H	1.54	9.12	14.97	30.0	-15.0		
Mid Ch										
1732.50	6.10	V	1.55	9.31	13.86	30.0	-16.1			
1732.50	8.81	H	1.55	9.31	16.57	30.0	-13.4			
High Ch										
1753.50	5.17	V	1.56	9.38	12.99	30.0	-17.0			
1753.50	9.36	H	1.56	9.38	17.18	30.0	-12.8			
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm										

		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2							
LTE Band 4 1.4MHz QPSK	Company: Samsung Project #: 4787821625 Date: 01-11-17 Test Engineer: JH Park Configuration: EUT / Y-Position Mode: LTE Band 4 QPSK, 1.4MHz								
	Test Equipment: Receiving: 3117[00168724] and Chamber 1 SMA Cables Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	1710.70	4.90	V	1.54	9.12	12.48	30.0	-17.5	
	1710.70	6.74	H	1.54	9.12	14.32	30.0	-15.7	
	Mid Ch								
	1732.50	4.11	V	1.55	9.31	11.87	30.0	-18.1	
	1732.50	8.37	H	1.55	9.31	16.13	30.0	-13.9	
	High Ch								
	1754.30	5.71	V	1.56	9.37	13.52	30.0	-16.5	
	1754.30	8.82	H	1.56	9.37	16.63	30.0	-13.4	
	Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								
LTE Band 4 1.4MHz 16QAM	Company: Samsung Project #: 4787821625 Date: 01-11-17 Test Engineer: JH Park Configuration: EUT / Y-Position Mode: LTE Band 4 16QAM, 1.4MHz								
	Test Equipment: Receiving: 3117[00168724] and Chamber 1 SMA Cables Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	1710.70	3.86	V	1.54	9.12	11.44	30.0	-18.6	
	1710.70	5.72	H	1.54	9.12	13.30	30.0	-16.7	
	Mid Ch								
	1732.50	3.01	V	1.55	9.31	10.77	30.0	-19.2	
	1732.50	7.32	H	1.55	9.31	15.08	30.0	-14.9	
	High Ch								
	1754.30	4.81	V	1.56	9.37	12.62	30.0	-17.4	
	1754.30	7.66	H	1.56	9.37	15.47	30.0	-14.5	
	Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								

LTE Band 13

LTE Band 13 10MHz QPSK	<p align="center">High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2</p> <p>Company: Samsung Project #: 4787821625 Date: 01-18-17 Test Engineer: JH Park Configuration: EUT ONLY, X Position Mode: TX, LTE BAND 13, 10MHz BW,QPSK</p> <p>Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.</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>Margin (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>1.07</td> <td>V</td> <td>1.1</td> <td>-1.4</td> <td>-1.43</td> <td>38.5</td> <td>-39.9</td> <td></td> </tr> <tr> <td>782.00</td> <td>-11.29</td> <td>H</td> <td>1.1</td> <td>-1.4</td> <td>-13.79</td> <td>38.5</td> <td>-52.2</td> <td></td> </tr> </tbody> </table> <p>Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm</p>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	Mid Ch									782.00	1.07	V	1.1	-1.4	-1.43	38.5	-39.9		782.00	-11.29	H	1.1	-1.4	-13.79	38.5	-52.2	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes																																				
Mid Ch																																													
782.00	1.07	V	1.1	-1.4	-1.43	38.5	-39.9																																						
782.00	-11.29	H	1.1	-1.4	-13.79	38.5	-52.2																																						
LTE Band 13 10MHz 16QAM	<p align="center">High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2</p> <p>Company: Samsung Project #: 4787821625 Date: 01-18-17 Test Engineer: JH Park Configuration: EUT ONLY, X Position Mode: LTE13 10MHz FUND 16QAM</p> <p>Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.</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>Margin (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>0.06</td> <td>V</td> <td>1.1</td> <td>-1.4</td> <td>-2.45</td> <td>34.8</td> <td>-37.2</td> <td></td> </tr> <tr> <td>782.00</td> <td>-12.29</td> <td>H</td> <td>1.1</td> <td>-1.4</td> <td>-14.80</td> <td>34.8</td> <td>-49.6</td> <td></td> </tr> </tbody> </table> <p>Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm</p>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	Mid Ch									782.00	0.06	V	1.1	-1.4	-2.45	34.8	-37.2		782.00	-12.29	H	1.1	-1.4	-14.80	34.8	-49.6	
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes																																					
Mid Ch																																													
782.00	0.06	V	1.1	-1.4	-2.45	34.8	-37.2																																						
782.00	-12.29	H	1.1	-1.4	-14.80	34.8	-49.6																																						

		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2							
LTE Band 13 5MHz QPSK	Company: Samsung Project #: 4787821625 Date: 01-18-17 Test Engineer: JH Park Configuration: EUT ONLY, X Position Mode: LTE13 5MHz FUND QPSK								
	Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	779.50	0.85	V	1.1	-1.5	-1.75	34.8	-36.5	
	779.50	-11.43	H	1.1	-1.5	-14.03	34.8	-48.8	
	Mid Ch								
	782.00	0.73	V	1.1	-1.4	-1.77	34.8	-36.5	
	782.00	-10.29	H	1.1	-1.4	-12.79	34.8	-47.6	
	High Ch								
784.50	1.35	V	1.6	-1.3	-1.53	34.8	-36.3		
784.50	-11.13	H	1.6	-1.3	-14.01	34.8	-48.8		
		Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm							
LTE Band 13 5MHz 16QAM	Company: Samsung Project #: 4787821625 Date: 01-18-17 Test Engineer: JH Park Configuration: EUT ONLY, X Position Mode: LTE13 5MHz FUND 16QAM								
	Test Equipment: Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	779.50	-0.26	V	1.1	-1.5	-2.86	34.8	-37.6	
	779.50	-12.56	H	1.1	-1.5	-15.16	34.8	-49.9	
	Mid Ch								
	782.00	-0.26	V	1.1	-1.4	-2.76	34.8	-37.5	
	782.00	-11.35	H	1.1	-1.4	-13.85	34.8	-48.6	
	High Ch								
784.50	0.32	V	1.1	-1.3	-2.07	34.8	-36.8		
784.50	-12.15	H	1.1	-1.3	-14.54	34.8	-49.3		
		Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm							

11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §27.53

LIMIT

Part 27.53(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. 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. (LTE B13)

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. (LTE B13)

Part 27.53(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. (LTE B4)

TEST PROCEDURE

ANSI / TIA / EIA 603D Clause 2.2.12; ESU40 setting reference to 971168 D01 v02r02

For peak power measurement with a ESU40:

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

RESULTS

11.2.1. SPURIOUS RADIATION PLOTS

LTE Band 4

		UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
LTE Band 4 20MHz QPSK	Company: Samsung Project #: 4787821625 Date: 01-11-17 Test Engineer: JH Park Configuration: EUT / Cradle / AC Adapter / Y-Position Mode: TX, LTE BAND 4, 20MHz BW, QPSK		Chamber Chamber 2		Pre-amplifier AFS42		Filter Filter 1		Limit FCC Part 27		
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Channel (1720MHz)										
	3.4400	-18.8	V	3.0	39.5	1.0	-57.3	-13.0	-44.3		
	5.1600	-21.2	V	3.0	39.8	1.0	-60.0	-13.0	-47.0		
	6.8800	-20.3	V	3.0	39.7	1.0	-58.9	-13.0	-45.9		
	3.4400	-20.7	H	3.0	39.5	1.0	-59.2	-13.0	-46.2		
	5.1600	-17.7	H	3.0	39.8	1.0	-56.5	-13.0	-43.5		
	6.8800	-20.2	H	3.0	39.7	1.0	-58.9	-13.0	-45.9		
	Mid Channel (1732.5MHz)										
3.4650	-18.6	V	3.0	39.5	1.0	-57.2	-13.0	-44.2			
5.1975	-20.1	V	3.0	39.8	1.0	-58.9	-13.0	-45.9			
6.9300	-19.8	V	3.0	39.7	1.0	-58.4	-13.0	-45.4			
3.4650	-20.1	H	3.0	39.5	1.0	-58.6	-13.0	-45.6			
5.1975	-17.1	H	3.0	39.8	1.0	-55.9	-13.0	-42.9			
6.9300	-19.5	H	3.0	39.7	1.0	-58.2	-13.0	-45.2			
High Channel (1745MHz)											
3.4900	-18.4	V	3.0	39.5	1.0	-57.0	-13.0	-44.0			
5.2350	-18.6	V	3.0	39.8	1.0	-57.4	-13.0	-44.4			
6.9800	-20.6	V	3.0	39.6	1.0	-59.2	-13.0	-46.2			
3.4900	-19.0	H	3.0	39.5	1.0	-57.5	-13.0	-44.5			
5.2350	-18.1	H	3.0	39.8	1.0	-56.9	-13.0	-43.9			
6.9800	-20.2	H	3.0	39.6	1.0	-58.8	-13.0	-45.8			
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.											
LTE Band 4 20MHz 16QAM	Company: Samsung Project #: 4787821625 Date: 01-11-17 Test Engineer: JH Park Configuration: EUT / Cradle / AC Adapter / Y-Position Mode: TX, LTE BAND 4, 20MHz BW, 16QAM		Chamber Chamber 2		Pre-amplifier AFS42		Filter Filter 1		Limit FCC Part 27		
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Channel (1720MHz)										
	3.4400	-20.3	V	3.0	39.5	1.0	-58.8	-13.0	-45.8		
	5.1600	-20.1	V	3.0	39.8	1.0	-58.9	-13.0	-45.9		
	6.8800	-20.1	V	3.0	39.7	1.0	-58.8	-13.0	-45.8		
	3.4400	-20.1	H	3.0	39.5	1.0	-58.7	-13.0	-45.7		
	5.1600	-18.4	H	3.0	39.8	1.0	-57.2	-13.0	-44.2		
	6.8800	-20.1	H	3.0	39.7	1.0	-58.8	-13.0	-45.8		
	Mid Channel (1732.5MHz)										
3.4650	-18.9	V	3.0	39.5	1.0	-57.4	-13.0	-44.4			
5.1975	-19.1	V	3.0	39.8	1.0	-57.9	-13.0	-44.9			
6.9300	-20.1	V	3.0	39.7	1.0	-58.7	-13.0	-45.7			
3.4650	-20.6	H	3.0	39.5	1.0	-59.1	-13.0	-46.1			
5.1975	-17.1	H	3.0	39.8	1.0	-56.0	-13.0	-43.0			
6.9300	-19.7	H	3.0	39.7	1.0	-58.4	-13.0	-45.4			
High Channel (1745MHz)											
3.4900	-17.3	V	3.0	39.5	1.0	-55.9	-13.0	-42.9			
5.2350	-19.5	V	3.0	39.8	1.0	-58.3	-13.0	-45.3			
6.9800	-20.1	V	3.0	39.6	1.0	-58.8	-13.0	-45.8			
3.4900	-20.1	H	3.0	39.5	1.0	-58.6	-13.0	-45.6			
5.2350	-18.2	H	3.0	39.8	1.0	-57.1	-13.0	-44.1			
6.9800	-20.5	H	3.0	39.6	1.0	-59.1	-13.0	-46.1			
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.											

		UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
LTE Band 4 15MHz QPSK	Company: Samsung Project #: 4787821625 Date: 01-12-17 Test Engineer: YH Lim Configuration: EUT / Cradle / AC Adapter / Y-Position Mode: TX, LTE BAND 4, 15MHz BW,QPSK										
	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">Chamber Chamber 2</div> <div style="border: 1px solid black; padding: 2px;">Pre-amplifier AFS42</div> <div style="border: 1px solid black; padding: 2px;">Filter Filter 1</div> <div style="border: 1px solid black; padding: 2px;">Limit FCC Part 27</div> </div>										
		f	SG reading	Ant. Pol.	Distance	Preamp	Filter	ERP	Limit	Delta	Notes
		GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
		Low Channel (1717.5MHz)									
		3.4350	-14.8	V	3.0	39.5	1.0	-53.3	-13.0	-40.3	
		5.1525	-20.2	V	3.0	39.8	1.0	-59.0	-13.0	-46.0	
		6.8700	-19.3	V	3.0	39.7	1.0	-58.0	-13.0	-45.0	
		3.4350	-15.0	H	3.0	39.5	1.0	-53.5	-13.0	-40.5	
		5.1525	-20.0	H	3.0	39.8	1.0	-58.9	-13.0	-45.9	
		6.8700	-19.9	H	3.0	39.7	1.0	-58.6	-13.0	-45.6	
		Mid Channel (1732.5MHz)									
		3.4650	-14.8	V	3.0	39.5	1.0	-53.3	-13.0	-40.3	
		5.1975	-18.1	V	3.0	39.8	1.0	-57.0	-13.0	-44.0	
		6.9300	-19.6	V	3.0	39.7	1.0	-58.3	-13.0	-45.3	
		3.4650	-14.2	H	3.0	39.5	1.0	-52.8	-13.0	-39.8	
		5.1975	-16.9	H	3.0	39.8	1.0	-55.7	-13.0	-42.7	
		6.9300	-19.7	H	3.0	39.7	1.0	-58.4	-13.0	-45.4	
		High Channel (1747.5MHz)									
		3.4950	-14.8	V	3.0	39.5	1.0	-53.3	-13.0	-40.3	
	5.2425	-20.0	V	3.0	39.8	1.0	-58.9	-13.0	-45.9		
	6.9900	-20.2	V	3.0	39.6	1.0	-58.8	-13.0	-45.8		
	3.4950	-17.3	H	3.0	39.5	1.0	-55.8	-13.0	-42.8		
	5.2425	-19.8	H	3.0	39.8	1.0	-58.7	-13.0	-45.7		
	6.9900	-19.9	H	3.0	39.6	1.0	-58.5	-13.0	-45.5		
	Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										
LTE Band 4 15MHz 16QAM	Company: Samsung Project #: 4787821625 Date: 01-12-17 Test Engineer: YH Lim Configuration: EUT / Cradle / AC Adapter / Y-Position Mode: TX, LTE BAND 4, 15MHz BW,16QAM										
	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">Chamber Chamber 2</div> <div style="border: 1px solid black; padding: 2px;">Pre-amplifier AFS42</div> <div style="border: 1px solid black; padding: 2px;">Filter Filter 1</div> <div style="border: 1px solid black; padding: 2px;">Limit FCC Part 27</div> </div>										
		f	SG reading	Ant. Pol.	Distance	Preamp	Filter	ERP	Limit	Delta	Notes
		GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
		Low Channel (1717.5MHz)									
		3.4350	-14.9	V	3.0	39.5	1.0	-53.4	-13.0	-40.4	
		5.1525	-20.2	V	3.0	39.8	1.0	-59.0	-13.0	-46.0	
		6.8700	-19.6	V	3.0	39.7	1.0	-58.2	-13.0	-45.2	
		3.4350	-15.6	H	3.0	39.5	1.0	-54.1	-13.0	-41.1	
		5.1525	-20.3	H	3.0	39.8	1.0	-59.1	-13.0	-46.1	
		6.8700	-20.2	H	3.0	39.7	1.0	-58.8	-13.0	-45.8	
		Mid Channel (1732.5MHz)									
		3.4650	-15.2	V	3.0	39.5	1.0	-53.8	-13.0	-40.8	
		5.1975	-18.9	V	3.0	39.8	1.0	-57.7	-13.0	-44.7	
		6.9300	-19.9	V	3.0	39.7	1.0	-58.5	-13.0	-45.5	
		3.4650	-14.9	H	3.0	39.5	1.0	-53.5	-13.0	-40.5	
		5.1975	-17.4	H	3.0	39.8	1.0	-56.3	-13.0	-43.3	
		6.9300	-19.7	H	3.0	39.7	1.0	-58.3	-13.0	-45.3	
		High Channel (1747.5MHz)									
		3.4950	-15.0	V	3.0	39.5	1.0	-53.5	-13.0	-40.5	
	5.2425	-20.2	V	3.0	39.8	1.0	-59.1	-13.0	-46.1		
	6.9900	-19.8	V	3.0	39.6	1.0	-58.4	-13.0	-45.4		
	3.4950	-17.9	H	3.0	39.5	1.0	-56.5	-13.0	-43.5		
	5.2425	-20.6	H	3.0	39.8	1.0	-59.5	-13.0	-46.5		
	6.9900	-19.9	H	3.0	39.6	1.0	-58.5	-13.0	-45.5		
	Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

		UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
LTE Band 4 5MHz QPSK	Company: Samsung Project #: 4787821625 Date: 01-12-17 Test Engineer: YH Lim Configuration: EUT / Cradle / AC Adapter / Y-Position Mode: TX, LTE BAND 4, 5MHz BW, QPSK	Chamber Chamber 2		Pre-amplifier AFS42		Filter Filter 1		Limit FCC Part 27			
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Channel (1712.5MHz)										
	3.4250	-14.5	V	3.0	39.5	1.0	-53.0	-13.0	-40.0		
	5.1375	-19.1	V	3.0	39.8	1.0	-57.9	-13.0	-44.9		
	6.8500	-20.0	V	3.0	39.7	1.0	-58.7	-13.0	-45.7		
	3.4250	-15.5	H	3.0	39.5	1.0	-53.9	-13.0	-40.9		
	5.1375	-20.0	H	3.0	39.8	1.0	-58.8	-13.0	-45.8		
	6.8500	-20.4	H	3.0	39.7	1.0	-59.1	-13.0	-46.1		
	Mid Channel (1732.5MHz)										
	3.4650	-17.4	V	3.0	39.5	1.0	-56.0	-13.0	-43.0		
	5.1975	-19.1	V	3.0	39.8	1.0	-57.9	-13.0	-44.9		
	6.9300	-20.3	V	3.0	39.7	1.0	-59.0	-13.0	-46.0		
	3.4650	-15.6	H	3.0	39.5	1.0	-54.2	-13.0	-41.2		
	5.1975	-18.5	H	3.0	39.8	1.0	-57.3	-13.0	-44.3		
	6.9300	-20.3	H	3.0	39.7	1.0	-58.9	-13.0	-45.9		
	High Channel (1752.5MHz)										
	3.5050	-20.1	V	3.0	39.5	1.0	-58.7	-13.0	-45.7		
	5.2575	-19.9	V	3.0	39.8	1.0	-58.8	-13.0	-45.8		
	7.0100	-20.5	V	3.0	39.6	1.0	-59.1	-13.0	-46.1		
3.5050	-15.4	H	3.0	39.5	1.0	-54.0	-13.0	-41.0			
5.2575	-19.0	H	3.0	39.8	1.0	-57.8	-13.0	-44.8			
7.0100	-20.6	H	3.0	39.6	1.0	-59.2	-13.0	-46.2			
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.											
LTE Band 4 5MHz 16QAM	Company: Samsung Project #: 4787821625 Date: 01-12-17 Test Engineer: YH Lim Configuration: EUT / Cradle / AC Adapter / Y-Position Mode: TX, LTE BAND 7, 5MHz BW, 16QAM	Chamber Chamber 2		Pre-amplifier AFS42		Filter Filter 1		Limit FCC Part 27			
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Channel (1712.5MHz)										
	3.4250	-15.4	V	3.0	39.5	1.0	-53.9	-13.0	-40.9		
	5.1375	-20.1	V	3.0	39.8	1.0	-58.9	-13.0	-45.9		
	6.8500	-20.3	V	3.0	39.7	1.0	-59.0	-13.0	-46.0		
	3.4250	-15.7	H	3.0	39.5	1.0	-54.2	-13.0	-41.2		
	5.1375	-19.5	H	3.0	39.8	1.0	-58.3	-13.0	-45.3		
	6.8500	-20.7	H	3.0	39.7	1.0	-59.4	-13.0	-46.4		
	Mid Channel (1732.5MHz)										
	3.4650	-17.9	V	3.0	39.5	1.0	-56.5	-13.0	-43.5		
	5.1975	-18.9	V	3.0	39.8	1.0	-57.7	-13.0	-44.7		
	6.9300	-20.2	V	3.0	39.7	1.0	-58.8	-13.0	-45.8		
	3.4650	-17.4	H	3.0	39.5	1.0	-55.9	-13.0	-42.9		
	5.1975	-18.8	H	3.0	39.8	1.0	-57.6	-13.0	-44.6		
	6.9300	-20.2	H	3.0	39.7	1.0	-58.9	-13.0	-45.9		
	High Channel (1752.5MHz)										
	3.5050	-20.2	V	3.0	39.5	1.0	-58.8	-13.0	-45.8		
	5.2575	-19.5	V	3.0	39.8	1.0	-58.3	-13.0	-45.3		
	7.0100	-20.4	V	3.0	39.6	1.0	-59.0	-13.0	-46.0		
3.5050	-15.2	H	3.0	39.5	1.0	-53.8	-13.0	-40.8			
5.2575	-18.6	H	3.0	39.8	1.0	-57.5	-13.0	-44.5			
7.0100	-20.2	H	3.0	39.6	1.0	-58.8	-13.0	-45.8			
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.											

		UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
LTE Band 4 3MHz QPSK	Company:	Samsung									
	Project #:	4787821625									
	Date:	01-12-17									
	Test Engineer:	JH Park									
	Configuration:	EUT / AC Adapter / Ear Phone / Y-Position									
	Mode:	TX, LTE BAND 4, 3MHz BW,QPSK									
			Chamber	Pre-amplifier	Filter	Limit					
			Chamber 2	AFS42	Filter 1	FCC Part 27					
		f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Channel (1711.5MHz)									
		3.4230	-14.4	V	3.0	39.5	1.0	-52.9	-13.0	-39.9	
		5.1345	-17.9	V	3.0	39.8	1.0	-56.7	-13.0	-43.7	
		6.8460	-20.5	V	3.0	39.7	1.0	-59.2	-13.0	-46.2	
		3.4230	-20.6	H	3.0	39.5	1.0	-59.1	-13.0	-46.1	
		5.1345	-17.0	H	3.0	39.8	1.0	-55.8	-13.0	-42.8	
	6.8460	-20.2	H	3.0	39.7	1.0	-58.9	-13.0	-45.9		
	Mid Channel (1732.5MHz)										
	3.4650	-18.3	V	3.0	39.5	1.0	-56.8	-13.0	-43.8		
	5.1975	-19.3	V	3.0	39.8	1.0	-58.2	-13.0	-45.2		
	6.9300	-20.2	V	3.0	39.7	1.0	-58.8	-13.0	-45.8		
	3.4650	-20.2	H	3.0	39.5	1.0	-58.7	-13.0	-45.7		
	5.1975	-17.3	H	3.0	39.8	1.0	-56.2	-13.0	-43.2		
	6.9300	-20.4	H	3.0	39.7	1.0	-59.1	-13.0	-46.1		
	High Channel (1753.5MHz)										
	3.5050	-13.4	V	3.0	39.5	1.0	-51.9	-13.0	-38.9		
	5.2575	-18.0	V	3.0	39.8	1.0	-56.9	-13.0	-43.9		
	7.0100	-20.6	V	3.0	39.6	1.0	-59.2	-13.0	-46.2		
	3.5050	-15.2	H	3.0	39.5	1.0	-53.8	-13.0	-40.8		
	5.2575	-18.0	H	3.0	39.8	1.0	-56.9	-13.0	-43.9		
	7.0100	-20.6	H	3.0	39.6	1.0	-59.2	-13.0	-46.2		
		Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.									
		UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
LTE Band 4 3MHz 16QAM	Company:	Samsung									
	Project #:	4787821625									
	Date:	01-12-17									
	Test Engineer:	JH Park									
	Configuration:	EUT / AC Adapter / Ear Phone / Y-Position									
	Mode:	TX, LTE BAND 4, 3MHz BW,16QAM									
			Chamber	Pre-amplifier	Filter	Limit					
			Chamber 2	AFS42	Filter 1	FCC Part 27					
		f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
		Low Channel (1711.5MHz)									
		3.4230	-14.4	V	3.0	39.5	1.0	-52.9	-13.0	-39.9	
		5.1345	-18.6	V	3.0	39.8	1.0	-57.4	-13.0	-44.4	
		6.8460	-20.5	V	3.0	39.7	1.0	-59.2	-13.0	-46.2	
		3.4230	-20.2	H	3.0	39.5	1.0	-58.7	-13.0	-45.7	
		5.1345	-17.7	H	3.0	39.8	1.0	-56.5	-13.0	-43.5	
	6.8460	-20.6	H	3.0	39.7	1.0	-59.3	-13.0	-46.3		
	Mid Channel (1732.5MHz)										
	3.4650	-19.1	V	3.0	39.5	1.0	-57.6	-13.0	-44.6		
	5.1975	-20.1	V	3.0	39.8	1.0	-59.0	-13.0	-46.0		
	6.9300	-20.2	V	3.0	39.7	1.0	-58.8	-13.0	-45.8		
	3.4650	-20.4	H	3.0	39.5	1.0	-58.9	-13.0	-45.9		
	5.1975	-17.8	H	3.0	39.8	1.0	-56.6	-13.0	-43.6		
	6.9300	-20.5	H	3.0	39.7	1.0	-59.2	-13.0	-46.2		
	High Channel (1752.5MHz)										
	3.5050	-13.8	V	3.0	39.5	1.0	-52.4	-13.0	-39.4		
	5.2575	-20.4	V	3.0	39.8	1.0	-59.3	-13.0	-46.3		
	7.0100	-20.6	V	3.0	39.6	1.0	-59.2	-13.0	-46.2		
	3.5050	-14.9	H	3.0	39.5	1.0	-53.4	-13.0	-40.4		
	5.2575	-17.7	H	3.0	39.8	1.0	-56.6	-13.0	-43.6		
	7.0100	-20.8	H	3.0	39.6	1.0	-59.4	-13.0	-46.4		
		Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.									

		UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement										
LTE Band 4 1.4MHz QPSK	Company: Samsung											
	Project #: 4787821625											
	Date: 01-12-17											
	Test Engineer: JH Park											
	Configuration: EUT / AC Adapter / Ear Phone / Y-Position											
	Mode: TX, LTE BAND 4, 1.4MHz BW, QPSK											
	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">Chamber Chamber 2</div> <div style="border: 1px solid black; padding: 2px;">Pre-amplifier AFS42</div> <div style="border: 1px solid black; padding: 2px;">Filter Filter 1</div> <div style="border: 1px solid black; padding: 2px;">Limit FCC Part 27</div> </div>											
			f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
			Low Channel (1710.7MHz)									
			3.4214	-20.0	V	3.0	39.5	1.0	-58.5	-13.0	-45.5	
		5.1321	-16.6	V	3.0	39.8	1.0	-55.4	-13.0	-42.4		
		6.8428	-20.0	V	3.0	39.7	1.0	-58.7	-13.0	-45.7		
		3.4214	-21.1	H	3.0	39.5	1.0	-59.5	-13.0	-46.5		
		5.1321	-15.2	H	3.0	39.8	1.0	-54.1	-13.0	-41.1		
		6.8428	-20.4	H	3.0	39.7	1.0	-59.1	-13.0	-46.1		
		Mid Channel (1732.5MHz)										
		3.4650	-20.8	V	3.0	39.5	1.0	-59.3	-13.0	-46.3		
		5.1975	-19.4	V	3.0	39.8	1.0	-58.2	-13.0	-45.2		
		6.9300	-20.4	V	3.0	39.7	1.0	-59.0	-13.0	-46.0		
		3.4650	-15.8	H	3.0	39.5	1.0	-54.3	-13.0	-41.3		
		5.1975	-17.9	H	3.0	39.8	1.0	-56.7	-13.0	-43.7		
		6.9300	-19.9	H	3.0	39.7	1.0	-58.6	-13.0	-45.6		
		High Channel (1754.3MHz)										
		3.5086	-21.1	V	3.0	39.5	1.0	-59.6	-13.0	-46.6		
		5.2629	-20.4	V	3.0	39.8	1.0	-59.2	-13.0	-46.2		
		7.0172	-20.4	V	3.0	39.6	1.0	-59.0	-13.0	-46.0		
		3.5086	-20.1	H	3.0	39.5	1.0	-58.6	-13.0	-45.6		
		5.2629	-17.1	H	3.0	39.8	1.0	-55.9	-13.0	-42.9		
		7.0172	-20.3	H	3.0	39.6	1.0	-58.9	-13.0	-45.9		
		Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										
LTE Band 4 1.4MHz 16QAM	Company: Samsung											
	Project #: 4787821625											
	Date: 01-12-17											
	Test Engineer: JH Park											
	Configuration: EUT / AC Adapter / Ear Phone / Y-Position											
	Mode: TX, LTE BAND 4, 1.4MHz BW, 16QAM											
	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">Chamber Chamber 2</div> <div style="border: 1px solid black; padding: 2px;">Pre-amplifier AFS42</div> <div style="border: 1px solid black; padding: 2px;">Filter Filter 1</div> <div style="border: 1px solid black; padding: 2px;">Limit FCC Part 27</div> </div>											
			f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
			Low Channel (1710.7MHz)									
			3.4214	-21.2	V	3.0	39.5	1.0	-59.7	-13.0	-46.7	
		5.1321	-17.2	V	3.0	39.8	1.0	-56.1	-13.0	-43.1		
		6.8428	-20.4	V	3.0	39.7	1.0	-59.1	-13.0	-46.1		
		3.4214	-20.6	H	3.0	39.5	1.0	-59.1	-13.0	-46.1		
		5.1321	-15.6	H	3.0	39.8	1.0	-54.4	-13.0	-41.4		
		6.8428	-20.5	H	3.0	39.7	1.0	-59.2	-13.0	-46.2		
		Mid Channel (1732.5MHz)										
		3.4650	-20.4	V	3.0	39.5	1.0	-58.9	-13.0	-45.9		
		5.1975	-20.8	V	3.0	39.8	1.0	-59.6	-13.0	-46.6		
		6.9300	-20.0	V	3.0	39.7	1.0	-58.6	-13.0	-45.6		
		3.4650	-16.2	H	3.0	39.5	1.0	-54.8	-13.0	-41.8		
		5.1975	-19.0	H	3.0	39.8	1.0	-57.9	-13.0	-44.9		
		6.9300	-20.5	H	3.0	39.7	1.0	-59.2	-13.0	-46.2		
		High Channel (1754.3MHz)										
		3.5086	-19.6	V	3.0	39.5	1.0	-58.1	-13.0	-45.1		
		5.2629	-20.4	V	3.0	39.8	1.0	-59.3	-13.0	-46.3		
		7.0172	-20.5	V	3.0	39.6	1.0	-59.2	-13.0	-46.2		
		3.5086	-20.0	H	3.0	39.5	1.0	-58.5	-13.0	-45.5		
		5.2629	-16.9	H	3.0	39.8	1.0	-55.7	-13.0	-42.7		
		7.0172	-20.6	H	3.0	39.6	1.0	-59.2	-13.0	-46.2		
		Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

LTE Band 13

		UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement										
LTE Band 13 10MHz QPSK	Company:	Samsung										
	Project #:	4787821625										
	Date:	01-18-17										
	Test Engineer:	JH Park										
	Configuration:	EUT / AC Adapter / Earphone, X Position										
	Mode:	TX, LTE BAND 13, 10MHz BW,QPSK										
		Chamber	Pre-amplifier	Filter	Limit							
		Chamber 2	AFS42	Filter 1	Part 27							
		f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
		Mid Channel (782MHz)										
		1.5640	-18.4	V	3.0	38.2	1.0	-55.6	-40.0	-15.6		
		2.3460	-13.6	V	3.0	38.7	1.0	-51.3	-13.0	-38.3		
		3.1280	-21.7	V	3.0	39.3	1.0	-60.0	-13.0	-47.0		
		1.5640	-17.7	H	3.0	38.2	1.0	-54.9	-40.0	-14.9		
		2.3460	-16.7	H	3.0	38.7	1.0	-54.4	-13.0	-41.4		
		3.1280	-21.0	H	3.0	39.3	1.0	-59.4	-13.0	-46.4		
		Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										
		UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement										
LTE Band 13 10MHz 16QAM	Company:	Samsung										
	Project #:	4787821625										
	Date:	01-18-17										
	Test Engineer:	JH Park										
	Configuration:	EUT / AC Adapter / Earphone, X Position										
	Mode:	TX, LTE BAND 13, 10MHz BW,16QAM										
		Chamber	Pre-amplifier	Filter	Limit							
		Chamber 2	AFS42	Filter 1	Part 27							
		f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
		Mid Channel (782MHz)										
		1.5640	-18.6	V	3.0	38.2	1.0	-55.8	-40.0	-15.8		
		2.3460	-13.5	V	3.0	38.7	1.0	-51.2	-13.0	-38.2		
		3.1280	-21.0	V	3.0	39.3	1.0	-59.3	-13.0	-46.3		
		1.5640	-17.6	H	3.0	38.2	1.0	-54.8	-40.0	-14.8		
		2.3460	-18.4	H	3.0	38.7	1.0	-56.1	-13.0	-43.1		
		3.1280	-21.2	H	3.0	39.3	1.0	-59.5	-13.0	-46.5		
		Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

		UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
LTE Band 13 5MHz QPSK	Company: Samsung										
	Project #: 4787821625										
	Date: 01-18-17										
	Test Engineer: JH Park										
	Configuration: EUT / AC Adapter / Earphone, X Position										
	Mode: TX, LTE BAND 13, 5MHz BW, QPSK										
	Chamber		Pre-amplifier		Filter		Limit				
	Chamber 2		AFS42		Filter 1		FCC Part 27				
	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
	Low Channel (779.5MHz)										
	1.5590	-16.3	V	3.0	38.2	1.0	-53.5	-40.0	-13.5		
	2.3385	-14.9	V	3.0	38.7	1.0	-52.5	-13.0	-39.5		
	3.1180	-21.6	V	3.0	39.3	1.0	-59.9	-13.0	-46.9		
	1.5590	-16.3	H	3.0	38.2	1.0	-53.5	-40.0	-13.5		
	2.3385	-15.9	H	3.0	38.7	1.0	-53.6	-13.0	-40.6		
3.1180	-21.1	H	3.0	39.3	1.0	-59.4	-13.0	-46.4			
Mid Channel (782MHz)											
1.5640	-15.8	V	3.0	38.2	1.0	-53.0	-40.0	-13.0			
2.3460	-15.1	V	3.0	38.7	1.0	-52.8	-13.0	-39.8			
3.1280	-21.1	V	3.0	39.3	1.0	-59.4	-13.0	-46.4			
1.5640	-16.4	H	3.0	38.2	1.0	-53.6	-40.0	-13.6			
2.3460	-15.2	H	3.0	38.7	1.0	-52.9	-13.0	-39.9			
3.1280	-21.5	H	3.0	39.3	1.0	-59.9	-13.0	-46.9			
High Channel (784.5MHz)											
1.5690	-15.7	V	3.0	38.2	1.0	-52.9	-40.0	-12.9			
2.3535	-15.4	V	3.0	38.7	1.0	-53.1	-13.0	-40.1			
3.1380	-21.3	V	3.0	39.3	1.0	-59.6	-13.0	-46.6			
1.5690	-16.5	H	3.0	38.2	1.0	-53.7	-40.0	-13.7			
2.3535	-16.5	H	3.0	38.7	1.0	-54.2	-13.0	-41.2			
3.1380	-21.7	H	3.0	39.3	1.0	-60.0	-13.0	-47.0			
Rev. 03.03.09		Note: No other emissions were detected above the system noise floor.									
		UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
		Company: Samsung									
		Project #: 4787821625									
		Date: 01-18-17									
		Test Engineer: JH Park									
		Configuration: EUT / AC Adapter / Earphone, X Position									
		Mode: TX, LTE BAND 13, 5MHz BW, 16QAM									
		Chamber		Pre-amplifier		Filter		Limit			
		Chamber 2		AFS42		Filter 1		FCC Part 27			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes		
Low Channel (779.5MHz)											
1.5590	-17.9	V	3.0	38.2	1.0	-55.0	-40.0	-15.0			
2.3385	-14.8	V	3.0	38.7	1.0	-52.5	-13.0	-39.5			
3.1180	-21.0	V	3.0	39.3	1.0	-59.3	-13.0	-46.3			
1.5590	-17.8	H	3.0	38.2	1.0	-54.9	-40.0	-14.9			
2.3385	-15.6	H	3.0	38.7	1.0	-53.3	-13.0	-40.3			
3.1180	-21.1	H	3.0	39.3	1.0	-59.5	-13.0	-46.5			
Mid Channel (782MHz)											
1.5640	-17.8	V	3.0	38.2	1.0	-55.0	-40.0	-15.0			
2.3460	-14.5	V	3.0	38.7	1.0	-52.2	-13.0	-39.2			
3.1280	-20.9	V	3.0	39.3	1.0	-59.2	-13.0	-46.2			
1.5640	-17.7	H	3.0	38.2	1.0	-54.9	-40.0	-14.9			
2.3460	-15.0	H	3.0	38.7	1.0	-52.7	-13.0	-39.7			
3.1280	-20.8	H	3.0	39.3	1.0	-59.2	-13.0	-46.2			
High Channel (784.5MHz)											
1.5690	-17.8	V	3.0	38.2	1.0	-55.0	-40.0	-15.0			
2.3535	-14.4	V	3.0	38.7	1.0	-52.1	-13.0	-39.1			
3.1380	-21.4	V	3.0	39.3	1.0	-59.7	-13.0	-46.7			
1.5690	-17.6	H	3.0	38.2	1.0	-54.8	-40.0	-14.8			
2.3535	-16.6	H	3.0	38.7	1.0	-54.3	-13.0	-41.3			
3.1380	-20.8	H	3.0	39.3	1.0	-59.2	-13.0	-46.2			
Rev. 03.03.09		Note: No other emissions were detected above the system noise floor.									