

WCDMA Band 5

WCDMA

Band 5

REL99

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsung

Project #: 4788869685

Date: 2019-02-12

Test Engineer: 45585

Configuration: EUT, Z-Position

Location: Chamber 2

Mode: Rel99 Band 5 Fundamentals

Test Equipment:

Receiving: VULB9163-749, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	21.80	V	3.0	-1.5	17.32	38.5	-21.2	
826.40	8.68	H	3.0	-1.5	4.20	38.5	-34.3	
Mid Ch								
836.60	22.17	V	3.0	-1.4	17.71	38.5	-20.8	
836.60	8.61	H	3.0	-1.4	4.15	38.5	-34.4	
High Ch								
846.60	21.12	V	3.1	-1.4	16.68	38.5	-21.8	
846.60	7.97	H	3.1	-1.4	3.53	38.5	-35.0	

WCDMA

Band 5

HSDPA

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsung

Project #: 4788869685

Date: 2019-02-13

Test Engineer: 45585

Configuration: EUT, Z-Position

Location: Chamber 2

Mode: HSDPA Band 5 Fundamentals

Test Equipment:

Receiving: VULB9163-749, and Chamber 2 SMA Cables

Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	20.91	V	3.0	-1.5	16.43	38.5	-22.1	
826.40	6.45	H	3.0	-1.5	1.97	38.5	-36.5	
Mid Ch								
836.60	21.03	V	3.0	-1.4	16.57	38.5	-21.9	
836.60	6.05	H	3.0	-1.4	1.59	38.5	-36.9	
High Ch								
846.60	18.86	V	3.1	-1.4	14.42	38.5	-24.1	
846.60	4.32	H	3.1	-1.4	-0.12	38.5	-38.6	

WCDMA Band 2

WCDMA
Band 2
REL99

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788869685

2019-02-08

45585

EUT, X-Position

Chamber 2

Rel99 Band 2 Fundamentals

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables

Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	7.11	V	4.5	9.4	12.01	33.0	-21.0	
1852.40	15.74	H	4.5	9.4	20.64	33.0	-12.4	
Mid Ch								
1880.00	6.56	V	4.5	9.2	11.22	33.0	-21.8	
1880.00	17.44	H	4.5	9.2	22.11	33.0	-10.9	
High Ch								
1907.60	5.52	V	4.6	9.0	9.91	33.0	-23.1	
1907.60	16.76	H	4.6	9.0	21.15	33.0	-11.8	

WCDMA
Band 2
HSDPA

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788869685

2019-02-08

45585

EUT, X-Position

Chamber 2

HSDPA Band 2 Fundamentals

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables

Substitution: Horn 3115[00167451], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	6.77	V	4.5	9.4	11.67	33.0	-21.3	
1852.40	15.44	H	4.5	9.4	20.34	33.0	-12.7	
Mid Ch								
1880.00	7.98	V	4.5	9.2	12.64	33.0	-20.4	
1880.00	17.44	H	4.5	9.2	22.11	33.0	-10.9	
High Ch								
1907.60	5.28	V	4.6	9.0	9.67	33.0	-23.3	
1907.60	16.57	H	4.6	9.0	20.96	33.0	-12.0	

LTE Band 5

LTE Band 5 10MHz QPSK	<div>UL Verification Services, Inc. High Frequency Substitution Measurement</div> <div>Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Fundamentals, 10MHz Bandwidth</div> <div>Test Equipment: Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable</div> <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBd)</th><th>ERP (dBm)</th><th>Limit (dBm)</th><th>Delta (dB)</th><th>Notes</th></tr><tr><td>Low Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>829.00</td><td>17.29</td><td>V</td><td>3.0</td><td>-1.5</td><td>12.81</td><td>38.5</td><td>-25.7</td></tr><tr><td>829.00</td><td>24.00</td><td>H</td><td>3.0</td><td>-1.5</td><td>19.52</td><td>38.5</td><td>-19.0</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>836.50</td><td>14.78</td><td>V</td><td>3.0</td><td>-1.4</td><td>10.32</td><td>38.5</td><td>-28.2</td></tr><tr><td>836.50</td><td>22.57</td><td>H</td><td>3.0</td><td>-1.4</td><td>18.11</td><td>38.5</td><td>-20.4</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>844.00</td><td>13.85</td><td>V</td><td>3.1</td><td>-1.4</td><td>9.40</td><td>38.5</td><td>-29.1</td></tr><tr><td>844.00</td><td>22.62</td><td>H</td><td>3.1</td><td>-1.4</td><td>18.17</td><td>38.5</td><td>-20.3</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								829.00	17.29	V	3.0	-1.5	12.81	38.5	-25.7	829.00	24.00	H	3.0	-1.5	19.52	38.5	-19.0	Mid Ch								836.50	14.78	V	3.0	-1.4	10.32	38.5	-28.2	836.50	22.57	H	3.0	-1.4	18.11	38.5	-20.4	High Ch								844.00	13.85	V	3.1	-1.4	9.40	38.5	-29.1	844.00	22.62	H	3.1	-1.4	18.17	38.5	-20.3
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
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	829.00	17.29	V	3.0	-1.5	12.81	38.5	-25.7																																																																																		
	829.00	24.00	H	3.0	-1.5	19.52	38.5	-19.0																																																																																		
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LTE Band 5 10MHz 16QAM	<div>UL Verification Services, Inc. High Frequency Substitution Measurement</div> <div>Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / X-Position Location: Chamber 1 Mode: LTE_16QAM Band 5 Fundamentals, 10MHz Bandwidth</div> <div>Test Equipment: Receiving: VULB9163-750, and Chamber 1 SMA Cables Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable</div> <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBd)</th><th>ERP (dBm)</th><th>Limit (dBm)</th><th>Delta (dB)</th><th>Notes</th></tr><tr><td>Low Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>829.00</td><td>15.86</td><td>V</td><td>3.0</td><td>-1.5</td><td>11.38</td><td>38.5</td><td>-27.1</td></tr><tr><td>829.00</td><td>22.59</td><td>H</td><td>3.0</td><td>-1.5</td><td>18.11</td><td>38.5</td><td>-20.4</td></tr><tr><td>Mid Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>836.50</td><td>13.45</td><td>V</td><td>3.0</td><td>-1.4</td><td>8.99</td><td>38.5</td><td>-29.5</td></tr><tr><td>836.50</td><td>21.61</td><td>H</td><td>3.0</td><td>-1.4</td><td>17.15</td><td>38.5</td><td>-21.4</td></tr><tr><td>High Ch</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>844.00</td><td>12.27</td><td>V</td><td>3.1</td><td>-1.4</td><td>7.82</td><td>38.5</td><td>-30.7</td></tr><tr><td>844.00</td><td>22.56</td><td>H</td><td>3.1</td><td>-1.4</td><td>18.11</td><td>38.5</td><td>-20.4</td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch								829.00	15.86	V	3.0	-1.5	11.38	38.5	-27.1	829.00	22.59	H	3.0	-1.5	18.11	38.5	-20.4	Mid Ch								836.50	13.45	V	3.0	-1.4	8.99	38.5	-29.5	836.50	21.61	H	3.0	-1.4	17.15	38.5	-21.4	High Ch								844.00	12.27	V	3.1	-1.4	7.82	38.5	-30.7	844.00	22.56	H	3.1	-1.4	18.11	38.5	-20.4
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																	
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	829.00	15.86	V	3.0	-1.5	11.38	38.5	-27.1																																																																																		
	829.00	22.59	H	3.0	-1.5	18.11	38.5	-20.4																																																																																		
	Mid Ch																																																																																									
	836.50	13.45	V	3.0	-1.4	8.99	38.5	-29.5																																																																																		
	836.50	21.61	H	3.0	-1.4	17.15	38.5	-21.4																																																																																		
	High Ch																																																																																									
	844.00	12.27	V	3.1	-1.4	7.82	38.5	-30.7																																																																																		
844.00	22.56	H	3.1	-1.4	18.11	38.5	-20.4																																																																																			

LTE
Band 5
5MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788869685
Date: 2019-02-01
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 5 Fundamentals, 5MHz Bandwidth

Test Equipment:

Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	14.59	V	3.0	-1.5	10.11	38.5	-28.4	
826.50	23.79	H	3.0	-1.5	19.31	38.5	-19.2	
Mid Ch								
836.50	14.71	V	3.0	-1.4	10.25	38.5	-28.3	
836.50	24.07	H	3.0	-1.4	19.61	38.5	-18.9	
High Ch								
846.50	13.53	V	3.1	-1.4	9.08	38.5	-29.4	
846.50	19.85	H	3.1	-1.4	15.40	38.5	-23.1	

LTE
Band 5
5MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788869685
Date: 2019-02-01
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 5 Fundamentals, 5MHz Bandwidth

Test Equipment:

Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	13.42	V	3.0	-1.5	8.94	38.5	-29.6	
826.50	22.49	H	3.0	-1.5	18.01	38.5	-20.5	
Mid Ch								
836.50	13.45	V	3.0	-1.4	8.99	38.5	-29.5	
836.50	22.81	H	3.0	-1.4	18.35	38.5	-20.2	
High Ch								
846.50	12.16	V	3.1	-1.4	7.71	38.5	-30.8	
846.50	19.12	H	3.1	-1.4	14.67	38.5	-23.8	

LTE

Band 5

3MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsung

Project #: 4788869685

Date: 2019-02-01

Test Engineer: 47989

Configuration: EUT / X-Position

Location: Chamber 1

Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth

Test Equipment:

Receiving: VULB9163-750, and Chamber 1 SMA Cables

Substitution: Dipole 3121_DB4, 2.5m 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	14.38	V	3.0	-1.5	9.90	38.5	-28.6	
825.50	23.19	H	3.0	-1.5	18.71	38.5	-19.8	
Mid Ch								
836.50	13.83	V	3.0	-1.4	9.37	38.5	-29.1	
836.50	23.00	H	3.0	-1.4	18.54	38.5	-20.0	
High Ch								
847.50	12.31	V	3.1	-1.4	7.87	38.5	-30.6	
847.50	22.23	H	3.1	-1.4	17.78	38.5	-20.7	

LTE

Band 5

3MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company: Samsung

Project #: 4788869685

Date: 2019-02-01

Test Engineer: 47989

Configuration: EUT / X-Position

Location: Chamber 1

Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth

Test Equipment:

Receiving: VULB9163-750, and Chamber 1 SMA Cables

Substitution: Dipole 3121_DB4, 2.5m 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	12.89	V	3.0	-1.5	8.41	38.5	-30.1	
825.50	21.67	H	3.0	-1.5	17.19	38.5	-21.3	
Mid Ch								
836.50	12.41	V	3.0	-1.4	7.95	38.5	-30.6	
836.50	21.58	H	3.0	-1.4	17.12	38.5	-21.4	
High Ch								
847.50	11.27	V	3.1	-1.4	6.83	38.5	-31.7	
847.50	21.10	H	3.1	-1.4	16.65	38.5	-21.8	

LTE

Band 5

1.4MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788869685

2019-02-01

47989

EUT / X-Position

Chamber 1

LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth

Test Equipment:

Receiving: VULB9163-750, and Chamber 1 SMA Cables

Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	14.28	V	3.0	-1.5	9.79	38.5	-28.7	
824.70	23.33	H	3.0	-1.5	18.84	38.5	-19.7	
Mid Ch								
836.50	14.47	V	3.0	-1.4	10.01	38.5	-28.5	
836.50	23.34	H	3.0	-1.4	18.88	38.5	-19.6	
High Ch								
848.30	12.25	V	3.1	-1.4	7.81	38.5	-30.7	
848.30	22.30	H	3.1	-1.4	17.86	38.5	-20.6	

LTE

Band 5

1.4MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788869685

2019-02-01

47989

EUT / X-Position

Chamber 1

LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth

Test Equipment:

Receiving: VULB9163-750, and Chamber 1 SMA Cables

Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	13.00	V	3.0	-1.5	8.51	38.5	-30.0	
824.70	22.14	H	3.0	-1.5	17.65	38.5	-20.8	
Mid Ch								
836.50	13.01	V	3.0	-1.4	8.55	38.5	-30.0	
836.50	21.83	H	3.0	-1.4	17.37	38.5	-21.1	
High Ch								
848.30	10.83	V	3.1	-1.4	6.39	38.5	-32.1	
848.30	21.28	H	3.1	-1.4	16.84	38.5	-21.7	

LTE Band 41

LTE Band 41 20MHz QPSK	<div>UL Verification Services, Inc. High Frequency Substitution Measurement</div> <div>Company: Samsung Project #: 4788869685 Date: 2019-02-12 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth</div> <div>Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 2.5m SMA-type Cable</div> <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>2506.00</td><td>15.02</td><td>V</td><td>5.2</td><td>10.1</td><td>19.85</td><td>33.0</td><td>-13.2</td><td></td></tr><tr><td>2506.00</td><td>17.25</td><td>H</td><td>5.2</td><td>10.1</td><td>22.08</td><td>33.0</td><td>-10.9</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>2593.00</td><td>16.52</td><td>V</td><td>5.3</td><td>10.0</td><td>21.16</td><td>33.0</td><td>-11.8</td><td></td></tr><tr><td>2593.00</td><td>17.28</td><td>H</td><td>5.3</td><td>10.0</td><td>21.92</td><td>33.0</td><td>-11.1</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>2680.00</td><td>15.43</td><td>V</td><td>5.4</td><td>10.0</td><td>20.02</td><td>33.0</td><td>-13.0</td><td></td></tr><tr><td>2680.00</td><td>15.23</td><td>H</td><td>5.4</td><td>10.0</td><td>19.82</td><td>33.0</td><td>-13.2</td><td></td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									2506.00	15.02	V	5.2	10.1	19.85	33.0	-13.2		2506.00	17.25	H	5.2	10.1	22.08	33.0	-10.9		Mid Ch									2593.00	16.52	V	5.3	10.0	21.16	33.0	-11.8		2593.00	17.28	H	5.3	10.0	21.92	33.0	-11.1		High Ch									2680.00	15.43	V	5.4	10.0	20.02	33.0	-13.0		2680.00	15.23	H	5.4	10.0	19.82	33.0	-13.2	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
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	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
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	2593.00	15.99	V	5.3	10.0	20.63	33.0	-12.4																																																																																											
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LTE

Band 41

15MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788869685

2019-02-12

45585

EUT / X-Position

Chamber 2

LTE_QPSK Band 41 Fundamentals, 15MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables

Substitution: Horn 3115[00167451], 2.5m 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	16.99	V	5.2	10.1	21.82	33.0	-11.2	
2503.50	16.52	H	5.2	10.1	21.35	33.0	-11.6	
Mid Ch								
2593.00	15.19	V	5.3	10.0	19.83	33.0	-13.2	
2593.00	17.54	H	5.3	10.0	22.18	33.0	-10.8	
High Ch								
2682.50	15.97	V	5.4	10.0	20.57	33.0	-12.4	
2682.50	15.37	H	5.4	10.0	19.97	33.0	-13.0	

LTE

Band 41

15MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788869685

2019-02-12

45585

EUT / X-Position

Chamber 2

LTE_16QAM Band 41 Fundamentals, 15MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables

Substitution: Horn 3115[00167451], 2.5m 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	16.20	V	5.2	10.1	21.03	33.0	-12.0	
2503.50	15.74	H	5.2	10.1	20.57	33.0	-12.4	
Mid Ch								
2593.00	14.96	V	5.3	10.0	19.60	33.0	-13.4	
2593.00	17.66	H	5.3	10.0	22.30	33.0	-10.7	
High Ch								
2682.50	15.79	V	5.4	10.0	20.39	33.0	-12.6	
2682.50	15.16	H	5.4	10.0	19.76	33.0	-13.2	

LTE

Band 41

10MHz

QPSK

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788869685

2019-02-12

45585

EUT / X-Position

Chamber 2

LTE_QPSK Band 41 Fundamentals, 10MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables

Substitution: Horn 3115[00167451], 2.5m 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	17.55	V	5.2	10.1	22.39	33.0	-10.6	
2501.00	17.17	H	5.2	10.1	22.01	33.0	-11.0	
Mid Ch								
2593.00	15.52	V	5.3	10.0	20.16	33.0	-12.8	
2593.00	17.23	H	5.3	10.0	21.87	33.0	-11.1	
High Ch								
2685.00	15.71	V	5.4	10.0	20.30	33.0	-12.7	
2685.00	15.06	H	5.4	10.0	19.65	33.0	-13.4	

LTE

Band 41

10MHz

16QAM

UL Verification Services, Inc.

High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

4788869685

2019-02-12

45585

EUT / X-Position

Chamber 2

LTE_16QAM Band 41 Fundamentals, 10MHz Bandwidth

Test Equipment:

Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables

Substitution: Horn 3115[00167451], 2.5m 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	16.58	V	5.2	10.1	21.42	33.0	-11.6	
2501.00	16.16	H	5.2	10.1	21.00	33.0	-12.0	
Mid Ch								
2593.00	14.72	V	5.3	10.0	19.36	33.0	-13.6	
2593.00	17.04	H	5.3	10.0	21.68	33.0	-11.3	
High Ch								
2685.00	15.98	V	5.4	10.0	20.57	33.0	-12.4	
2685.00	15.28	H	5.4	10.0	19.87	33.0	-13.1	

LTE Band 41 5MHz QPSK	<div>UL Verification Services, Inc. High Frequency Substitution Measurement</div> <div>Company: Samsung Project #: 4788869685 Date: 2019-02-12 Test Engineer: 45585 Configuration: EUT / X-Position Location: Chamber 2 Mode: LTE_QPSK Band 41 Fundamentals, 5MHz Bandwidth</div> <div>Test Equipment: Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables Substitution: Horn 3115[00167451], 2.5m SMA-type Cable</div> <table><tr><th>f MHz</th><th>SG reading (dBm)</th><th>Ant. Pol. (H/V)</th><th>Cable Loss (dB)</th><th>Antenna Gain (dBi)</th><th>EIRP (dBm)</th><th>Limit (dBm)</th><th>Delta (dB)</th><th>Notes</th></tr><tr><td colspan="9">Low Ch</td></tr><tr><td>2498.50</td><td>16.30</td><td>V</td><td>5.2</td><td>10.1</td><td>21.14</td><td>33.0</td><td>-11.9</td><td></td></tr><tr><td>2498.50</td><td>17.15</td><td>H</td><td>5.2</td><td>10.1</td><td>21.99</td><td>33.0</td><td>-11.0</td><td></td></tr><tr><td colspan="9">Mid Ch</td></tr><tr><td>2593.00</td><td>15.82</td><td>V</td><td>5.3</td><td>10.0</td><td>20.46</td><td>33.0</td><td>-12.5</td><td></td></tr><tr><td>2593.00</td><td>17.36</td><td>H</td><td>5.3</td><td>10.0</td><td>22.00</td><td>33.0</td><td>-11.0</td><td></td></tr><tr><td colspan="9">High Ch</td></tr><tr><td>2687.50</td><td>15.65</td><td>V</td><td>5.4</td><td>10.0</td><td>20.25</td><td>33.0</td><td>-12.8</td><td></td></tr><tr><td>2687.50</td><td>15.91</td><td>H</td><td>5.4</td><td>10.0</td><td>20.51</td><td>33.0</td><td>-12.5</td><td></td></tr></table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									2498.50	16.30	V	5.2	10.1	21.14	33.0	-11.9		2498.50	17.15	H	5.2	10.1	21.99	33.0	-11.0		Mid Ch									2593.00	15.82	V	5.3	10.0	20.46	33.0	-12.5		2593.00	17.36	H	5.3	10.0	22.00	33.0	-11.0		High Ch									2687.50	15.65	V	5.4	10.0	20.25	33.0	-12.8		2687.50	15.91	H	5.4	10.0	20.51	33.0	-12.5	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
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	2593.00	15.82	V	5.3	10.0	20.46	33.0	-12.5																																																																																											
	2593.00	17.36	H	5.3	10.0	22.00	33.0	-11.0																																																																																											
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	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes																																																																																										
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2687.50	15.00	H	5.4	10.0	19.60	33.0	-13.4																																																																																												

10.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238 and §27. 53

LIMIT

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

Part 27.53:

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

TEST PROCEDURE

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

For peak power measurement with a ESU40:

- a) Set the RBW = 100 KHz for emission below 1GHz and 1MHz for emissions above 1GHz;
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 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

GSM850 GPRS	<table><tr><th colspan="10">UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement</th></tr><tr><td>Company:</td><td colspan="9">Samsung</td></tr><tr><td>Project #:</td><td colspan="9">4788869685</td></tr><tr><td>Date:</td><td colspan="9">2019-02-13</td></tr><tr><td>Test Engineer:</td><td colspan="9">47989</td></tr><tr><td>Configuration:</td><td colspan="9">EUT / AC Adapter / Earphone, Z-Position</td></tr><tr><td>Location:</td><td colspan="9">Chamber 1</td></tr><tr><td>Mode:</td><td colspan="9">GPRS 850 MHz Harmonics</td></tr><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><tr><td colspan="10">Low Ch, 824.2MHz</td></tr><tr><td>1648.40</td><td>4.9</td><td>V</td><td>3.0</td><td>43.6</td><td>1.0</td><td>-37.7</td><td>-13.0</td><td>-24.7</td><td></td></tr><tr><td>2472.60</td><td>-4.3</td><td>V</td><td>3.0</td><td>43.4</td><td>1.0</td><td>-46.7</td><td>-13.0</td><td>-33.7</td><td></td></tr><tr><td>3296.80</td><td>-8.6</td><td>V</td><td>3.0</td><td>43.6</td><td>1.0</td><td>-51.2</td><td>-13.0</td><td>-38.2</td><td></td></tr><tr><td>1648.40</td><td>4.2</td><td>H</td><td>3.0</td><td>43.6</td><td>1.0</td><td>-38.4</td><td>-13.0</td><td>-25.4</td><td></td></tr><tr><td>2472.60</td><td>-2.7</td><td>H</td><td>3.0</td><td>43.4</td><td>1.0</td><td>-45.1</td><td>-13.0</td><td>-32.1</td><td></td></tr><tr><td>3296.80</td><td>-8.0</td><td>H</td><td>3.0</td><td>43.6</td><td>1.0</td><td>-50.7</td><td>-13.0</td><td>-37.7</td><td></td></tr><tr><td colspan="10">Mid Ch, 836.6MHz</td></tr><tr><td>1673.20</td><td>5.5</td><td>V</td><td>3.0</td><td>43.6</td><td>1.0</td><td>-37.1</td><td>-13.0</td><td>-24.1</td><td></td></tr><tr><td>2509.80</td><td>-5.8</td><td>V</td><td>3.0</td><td>43.4</td><td>1.0</td><td>-48.2</td><td>-13.0</td><td>-35.2</td><td></td></tr><tr><td>3346.40</td><td>-9.1</td><td>V</td><td>3.0</td><td>43.6</td><td>1.0</td><td>-51.7</td><td>-13.0</td><td>-38.7</td><td></td></tr><tr><td>1673.20</td><td>3.9</td><td>H</td><td>3.0</td><td>43.6</td><td>1.0</td><td>-38.7</td><td>-13.0</td><td>-25.7</td><td></td></tr><tr><td>2509.80</td><td>-4.1</td><td>H</td><td>3.0</td><td>43.4</td><td>1.0</td><td>-46.5</td><td>-13.0</td><td>-33.5</td><td></td></tr><tr><td>3346.40</td><td>-7.8</td><td>H</td><td>3.0</td><td>43.6</td><td>1.0</td><td>-50.5</td><td>-13.0</td><td>-37.5</td><td></td></tr><tr><td colspan="10">High Ch, 848.8MHz</td></tr><tr><td>1697.60</td><td>7.6</td><td>V</td><td>3.0</td><td>43.6</td><td>1.0</td><td>-35.0</td><td>-13.0</td><td>-22.0</td><td></td></tr><tr><td>2546.40</td><td>-5.8</td><td>V</td><td>3.0</td><td>43.4</td><td>1.0</td><td>-48.3</td><td>-13.0</td><td>-35.3</td><td></td></tr><tr><td>3395.20</td><td>-9.0</td><td>V</td><td>3.0</td><td>43.7</td><td>1.0</td><td>-51.6</td><td>-13.0</td><td>-38.6</td><td></td></tr><tr><td>1697.60</td><td>8.8</td><td>H</td><td>3.0</td><td>43.6</td><td>1.0</td><td>-33.8</td><td>-13.0</td><td>-20.8</td><td></td></tr><tr><td>2546.40</td><td>-4.0</td><td>H</td><td>3.0</td><td>43.4</td><td>1.0</td><td>-46.4</td><td>-13.0</td><td>-33.4</td><td></td></tr><tr><td>3395.20</td><td>-7.3</td><td>H</td><td>3.0</td><td>43.7</td><td>1.0</td><td>-50.0</td><td>-13.0</td><td>-37.0</td><td></td></tr></table>	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										Company:	Samsung									Project #:	4788869685									Date:	2019-02-13									Test Engineer:	47989									Configuration:	EUT / AC Adapter / Earphone, Z-Position									Location:	Chamber 1									Mode:	GPRS 850 MHz Harmonics									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch, 824.2MHz										1648.40	4.9	V	3.0	43.6	1.0	-37.7	-13.0	-24.7		2472.60	-4.3	V	3.0	43.4	1.0	-46.7	-13.0	-33.7		3296.80	-8.6	V	3.0	43.6	1.0	-51.2	-13.0	-38.2		1648.40	4.2	H	3.0	43.6	1.0	-38.4	-13.0	-25.4		2472.60	-2.7	H	3.0	43.4	1.0	-45.1	-13.0	-32.1		3296.80	-8.0	H	3.0	43.6	1.0	-50.7	-13.0	-37.7		Mid Ch, 836.6MHz										1673.20	5.5	V	3.0	43.6	1.0	-37.1	-13.0	-24.1		2509.80	-5.8	V	3.0	43.4	1.0	-48.2	-13.0	-35.2		3346.40	-9.1	V	3.0	43.6	1.0	-51.7	-13.0	-38.7		1673.20	3.9	H	3.0	43.6	1.0	-38.7	-13.0	-25.7		2509.80	-4.1	H	3.0	43.4	1.0	-46.5	-13.0	-33.5		3346.40	-7.8	H	3.0	43.6	1.0	-50.5	-13.0	-37.5		High Ch, 848.8MHz										1697.60	7.6	V	3.0	43.6	1.0	-35.0	-13.0	-22.0		2546.40	-5.8	V	3.0	43.4	1.0	-48.3	-13.0	-35.3		3395.20	-9.0	V	3.0	43.7	1.0	-51.6	-13.0	-38.6		1697.60	8.8	H	3.0	43.6	1.0	-33.8	-13.0	-20.8		2546.40	-4.0	H	3.0	43.4	1.0	-46.4	-13.0	-33.4		3395.20	-7.3	H	3.0	43.7	1.0	-50.0	-13.0	-37.0	
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2472.60	-11.2	V	3.0	43.4	1.0	-53.6	-13.0	-40.6																																																																																																																																																																																																																																																																																																					
3296.80	-9.7	V	3.0	43.6	1.0	-52.4	-13.0	-39.4																																																																																																																																																																																																																																																																																																					
1648.40	-1.3	H	3.0	43.6	1.0	-43.9	-13.0	-30.9																																																																																																																																																																																																																																																																																																					
2472.60	-12.0	H	3.0	43.4	1.0	-54.4	-13.0	-41.4																																																																																																																																																																																																																																																																																																					
3296.80	-9.8	H	3.0	43.6	1.0	-52.4	-13.0	-39.4																																																																																																																																																																																																																																																																																																					
Mid Ch, 836.6MHz																																																																																																																																																																																																																																																																																																													
1673.20	-2.8	V	3.0	43.6	1.0	-45.4	-13.0	-32.4																																																																																																																																																																																																																																																																																																					
2509.80	-11.2	V	3.0	43.4	1.0	-53.6	-13.0	-40.6																																																																																																																																																																																																																																																																																																					
3346.40	-9.6	V	3.0	43.6	1.0	-52.3	-13.0	-39.3																																																																																																																																																																																																																																																																																																					
1673.20	-4.9	H	3.0	43.6	1.0	-47.5	-13.0	-34.5																																																																																																																																																																																																																																																																																																					
2509.80	-11.2	H	3.0	43.4	1.0	-53.7	-13.0	-40.7																																																																																																																																																																																																																																																																																																					
3346.40	-9.7	H	3.0	43.6	1.0	-52.4	-13.0	-39.4																																																																																																																																																																																																																																																																																																					
High Ch, 848.8MHz																																																																																																																																																																																																																																																																																																													
1697.60	-2.5	V	3.0	43.6	1.0	-45.1	-13.0	-32.1																																																																																																																																																																																																																																																																																																					
2546.40	-11.1	V	3.0	43.4	1.0	-53.5	-13.0	-40.5																																																																																																																																																																																																																																																																																																					
3395.20	-8.9	V	3.0	43.7	1.0	-51.6	-13.0	-38.6																																																																																																																																																																																																																																																																																																					
1697.60	-3.6	H	3.0	43.6	1.0	-46.2	-13.0	-33.2																																																																																																																																																																																																																																																																																																					
2546.40	-12.1	H	3.0	43.4	1.0	-54.5	-13.0	-41.5																																																																																																																																																																																																																																																																																																					
3395.20	-8.9	H	3.0	43.7	1.0	-51.5	-13.0	-38.5																																																																																																																																																																																																																																																																																																					

GSM1900

GSM1900 GPRS	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4788869685									
	Date: 2019-02-12									
	Test Engineer: 45585									
	Configuration: EUT / AC Adapter / Earphone, Z-Position									
	Location: Chamber 2									
	Mode: GPRS 1900 MHz Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1850.2MHz									
	3700.40	-6.0	V	3.0	39.7	1.0	-44.7	-13.0	-31.7	
	5550.60	-7.3	V	3.0	39.9	1.0	-46.2	-13.0	-33.2	
	7400.80	-5.2	V	3.0	39.4	1.0	-43.7	-13.0	-30.7	
	3700.40	-6.0	H	3.0	39.7	1.0	-44.7	-13.0	-31.7	
	5550.60	-7.5	H	3.0	39.9	1.0	-46.5	-13.0	-33.5	
	7400.80	-6.2	H	3.0	39.4	1.0	-44.7	-13.0	-31.7	
	Mid Ch, 1880MHz									
	3760.00	-4.0	V	3.0	39.7	1.0	-42.7	-13.0	-29.7	
	5640.00	-6.6	V	3.0	40.0	1.0	-45.6	-13.0	-32.6	
	7520.00	-5.3	V	3.0	39.4	1.0	-43.7	-13.0	-30.7	
3760.00	-4.5	H	3.0	39.7	1.0	-43.2	-13.0	-30.2		
5640.00	-7.2	H	3.0	40.0	1.0	-46.2	-13.0	-33.2		
7520.00	-5.9	H	3.0	39.4	1.0	-44.3	-13.0	-31.3		
High Ch, 1909.8MHz										
3819.60	-3.6	V	3.0	39.7	1.0	-42.3	-13.0	-29.3		
5729.40	-7.2	V	3.0	40.0	1.0	-46.2	-13.0	-33.2		
7639.20	-5.2	V	3.0	39.3	1.0	-43.6	-13.0	-30.6		
3819.60	-5.1	H	3.0	39.7	1.0	-43.8	-13.0	-30.8		
5729.40	-7.3	H	3.0	40.0	1.0	-46.3	-13.0	-33.3		
7639.20	-6.2	H	3.0	39.3	1.0	-44.5	-13.0	-31.5		
GSM1900 EGPRS	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: Samsung									
	Project #: 4788869685									
	Date: 2019-02-12									
	Test Engineer: 45585									
	Configuration: EUT / AC Adapter / Earphone, Y-Position									
	Location: Chamber 2									
	Mode: EGPRS 1900 MHz Harmonics									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1850.2MHz									
	3700.40	-7.4	V	3.0	39.7	1.0	-46.0	-13.0	-33.0	
	5550.60	-5.8	V	3.0	39.9	1.0	-44.8	-13.0	-31.8	
	7400.80	-3.4	V	3.0	39.4	1.0	-41.8	-13.0	-28.8	
	3700.40	-4.5	H	3.0	39.7	1.0	-43.1	-13.0	-30.1	
	5550.60	-6.3	H	3.0	39.9	1.0	-45.2	-13.0	-32.2	
	7400.80	-4.2	H	3.0	39.4	1.0	-42.6	-13.0	-29.6	
	Mid Ch, 1880MHz									
	3760.00	-7.6	V	3.0	39.7	1.0	-46.3	-13.0	-33.3	
	5640.00	-5.1	V	3.0	40.0	1.0	-44.1	-13.0	-31.1	
	7520.00	-3.4	V	3.0	39.4	1.0	-41.8	-13.0	-28.8	
3760.00	-2.5	H	3.0	39.7	1.0	-41.2	-13.0	-28.2		
5640.00	-5.4	H	3.0	40.0	1.0	-44.4	-13.0	-31.4		
7520.00	-4.2	H	3.0	39.4	1.0	-42.6	-13.0	-29.6		
High Ch, 1909.8MHz										
3819.60	-8.2	V	3.0	39.7	1.0	-47.0	-13.0	-34.0		
5729.40	-5.6	V	3.0	40.0	1.0	-44.6	-13.0	-31.6		
7639.20	-3.9	V	3.0	39.3	1.0	-42.2	-13.0	-29.2		
3819.60	-6.0	H	3.0	39.7	1.0	-44.7	-13.0	-31.7		
5729.40	-5.8	H	3.0	40.0	1.0	-44.8	-13.0	-31.8		
7639.20	-4.7	H	3.0	39.3	1.0	-43.0	-13.0	-30.0		

WCDMA Band 5

WCDMA Band 5 REL99		<p>UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement</p> <p>Company: Samsung Project #: 4788869685 Date: 2019-02-13 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone Location: Chamber 2 Mode: Rel99 Band 5 Harmonics</p>									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
WCDMA Band 5 HSDPA		<p>UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement</p> <p>Company: Samsung Project #: 4788869685 Date: 2019-02-13 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone, X-Position Location: Chamber 2 Mode: HSDPA Band 5 Harmonics</p>									
		f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
		<p>Low Ch, 826.4MHz</p>									
		1652.80	-13.8	V	3.0	38.2	1.0	-51.0	-13.0	-38.0	
		2479.20	-12.8	V	3.0	38.8	1.0	-50.6	-13.0	-37.6	
		3305.60	-10.2	V	3.0	39.4	1.0	-48.6	-13.0	-35.6	
		1652.80	-11.8	H	3.0	38.2	1.0	-49.0	-13.0	-36.0	
		2479.20	-13.4	H	3.0	38.8	1.0	-51.2	-13.0	-38.2	
		3305.60	-10.5	H	3.0	39.4	1.0	-48.9	-13.0	-35.9	
		<p>Mid Ch, 836.6MHz</p>									
		1673.20	-13.9	V	3.0	38.2	1.0	-51.2	-13.0	-38.2	
		2509.80	-12.8	V	3.0	38.8	1.0	-50.6	-13.0	-37.6	
		3346.40	-10.3	V	3.0	39.5	1.0	-48.7	-13.0	-35.7	
		1673.20	-11.9	H	3.0	38.2	1.0	-49.1	-13.0	-36.1	
		2509.80	-13.3	H	3.0	38.8	1.0	-51.2	-13.0	-38.2	
		3346.40	-10.5	H	3.0	39.5	1.0	-48.9	-13.0	-35.9	
		<p>High Ch, 846.6MHz</p>									
		1693.20	-14.7	V	3.0	38.2	1.0	-52.0	-13.0	-39.0	
		2539.80	-12.6	V	3.0	38.9	1.0	-50.5	-13.0	-37.5	
		3386.40	-10.0	V	3.0	39.5	1.0	-48.5	-13.0	-35.5	
		1693.20	-12.7	H	3.0	38.2	1.0	-50.0	-13.0	-37.0	
		2539.80	-13.2	H	3.0	38.9	1.0	-51.0	-13.0	-38.0	
		3386.40	-10.3	H	3.0	39.5	1.0	-48.8	-13.0	-35.8	
		<p>Low Ch, 826.4MHz</p>									
		1652.80	-15.0	V	3.0	38.2	1.0	-52.2	-13.0	-39.2	
		2479.20	-12.9	V	3.0	38.8	1.0	-50.7	-13.0	-37.7	
		3305.60	-10.3	V	3.0	39.4	1.0	-48.7	-13.0	-35.7	
		1652.80	-13.4	H	3.0	38.2	1.0	-50.6	-13.0	-37.6	
		2479.20	-13.3	H	3.0	38.8	1.0	-51.1	-13.0	-38.1	
		3305.60	-10.5	H	3.0	39.4	1.0	-48.9	-13.0	-35.9	
		<p>Mid Ch, 836.6MHz</p>									
		1673.20	-13.2	V	3.0	38.2	1.0	-50.5	-13.0	-37.5	
		2509.80	-12.5	V	3.0	38.8	1.0	-50.4	-13.0	-37.4	
		3346.40	-9.9	V	3.0	39.5	1.0	-48.4	-13.0	-35.4	
		1673.20	-12.2	H	3.0	38.2	1.0	-49.5	-13.0	-36.5	
		2509.80	-13.3	H	3.0	38.8	1.0	-51.1	-13.0	-38.1	
		3346.40	-10.1	H	3.0	39.5	1.0	-48.6	-13.0	-35.6	
		<p>High Ch, 846.6MHz</p>									
		1693.20	-15.2	V	3.0	38.2	1.0	-52.4	-13.0	-39.4	
		2539.80	-12.7	V	3.0	38.9	1.0	-50.5	-13.0	-37.5	
		3386.40	-10.0	V	3.0	39.5	1.0	-48.5	-13.0	-35.5	
		1693.20	-14.5	H	3.0	38.2	1.0	-51.7	-13.0	-38.7	
		2539.80	-12.9	H	3.0	38.9	1.0	-50.8	-13.0	-37.8	
		3386.40	-10.2	H	3.0	39.5	1.0	-48.7	-13.0	-35.7	

WCDMA Band 2

WCDMA Band 2 REL99	<p>UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement</p> <p>Company: Samsung Project #: 4788869685 Date: 2019-02-08 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone, X-Position Location: Chamber 2 Mode: Rel99 Band 2 Harmonics</p>									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
WCDMA Band 2 HSDPA	<p>UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement</p> <p>Company: Samsung Project #: 4788869685 Date: 2019-02-08 Test Engineer: 45585 Configuration: EUT / AC Adapter / Earphone, X-Position Location: Chamber 2 Mode: HSDPA Band 2 Harmonics</p>									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes

LTE Band 5

LTE Band 5 5MHz QPSK	<p style="text-align: center;">UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement</p> <p>Company: Samsung Project #: 4788869685 Date: 2019-02-01 Test Engineer: 47989 Configuration: EUT / AC Adapter / Earphone, Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 5 Harmonics, 5MHz Bandwidth</p>									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.5MHz										
	1653.00	-6.0	V	3.0	43.6	1.0	-48.6	-13.0	-35.6	
	2479.50	-12.4	V	3.0	43.4	1.0	-54.8	-13.0	-41.8	
	3306.00	-10.6	V	3.0	43.6	1.0	-53.3	-13.0	-40.3	
	1653.00	-5.0	H	3.0	43.6	1.0	-47.6	-13.0	-34.6	
	2479.50	-13.1	H	3.0	43.4	1.0	-55.5	-13.0	-42.5	
	3306.00	-10.8	H	3.0	43.6	1.0	-53.5	-13.0	-40.5	
Mid Ch, 836.5MHz										
	1673.00	-7.9	V	3.0	43.6	1.0	-50.5	-13.0	-37.5	
	2509.50	-12.5	V	3.0	43.4	1.0	-54.9	-13.0	-41.9	
	3346.00	-10.7	V	3.0	43.6	1.0	-53.3	-13.0	-40.3	
	1673.00	-6.8	H	3.0	43.6	1.0	-49.4	-13.0	-36.4	
	2509.50	-13.1	H	3.0	43.4	1.0	-55.5	-13.0	-42.5	
	3346.00	-10.7	H	3.0	43.6	1.0	-53.4	-13.0	-40.4	
High Ch, 846.5MHz										
	1693.00	-7.4	V	3.0	43.6	1.0	-49.9	-13.0	-36.9	
	2539.50	-12.4	V	3.0	43.4	1.0	-54.8	-13.0	-41.8	
	3386.00	-10.1	V	3.0	43.7	1.0	-52.7	-13.0	-39.7	
	1693.00	-7.2	H	3.0	43.6	1.0	-49.7	-13.0	-36.7	
	2539.50	-12.8	H	3.0	43.4	1.0	-55.3	-13.0	-42.3	
	3386.00	-10.1	H	3.0	43.7	1.0	-52.8	-13.0	-39.8	

LTE Band 41

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		4788869685							
Date:		2019-02-12							
Test Engineer:		45585							
Configuration:		EUT / AC Adapter / Earphone / X-Position							
Location:		Chamber 2							
Mode:		LTE_QPSK Band 41 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
Low Ch, 2501MHz									
5002.00	-14.8	V	3.0	39.8	1.0	-53.5	-25.0	-28.5	
7503.00	-5.9	V	3.0	39.4	1.0	-44.3	-25.0	-19.3	
10004.00	-11.8	V	3.0	38.6	1.0	-49.3	-25.0	-24.3	
12505.00	-3.3	V	3.0	39.0	1.0	-41.3	-25.0	-16.3	
15006.00	-5.9	V	3.0	41.3	1.0	-46.2	-25.0	-21.2	
5002.00	-15.8	H	3.0	39.8	1.0	-54.6	-25.0	-29.6	
7503.00	-6.4	H	3.0	39.4	1.0	-44.8	-25.0	-19.8	
10004.00	-11.7	H	3.0	38.6	1.0	-49.3	-25.0	-24.3	
12505.00	-7.7	H	3.0	39.0	1.0	-45.6	-25.0	-20.6	
15006.00	-6.4	H	3.0	41.3	1.0	-46.7	-25.0	-21.7	
Mid Ch, 2593MHz									
5186.00	-12.7	V	3.0	39.8	1.0	-51.6	-25.0	-26.6	
7779.00	-2.9	V	3.0	39.3	1.0	-41.2	-25.0	-16.2	
10372.00	-5.3	V	3.0	38.6	1.0	-42.8	-25.0	-17.8	
12965.00	4.6	V	3.0	39.4	1.0	-33.8	-25.0	-8.8	
15558.00	-1.8	V	3.0	41.1	1.0	-41.9	-25.0	-16.9	
5186.00	-13.0	H	3.0	39.8	1.0	-51.8	-25.0	-26.8	
7779.00	-2.3	H	3.0	39.3	1.0	-40.5	-25.0	-15.5	
10372.00	-5.8	H	3.0	38.6	1.0	-43.4	-25.0	-18.4	
12965.00	-4.7	H	3.0	39.4	1.0	-43.1	-25.0	-18.1	
15558.00	-6.2	H	3.0	41.1	1.0	-46.3	-25.0	-21.3	
High Ch, 2685MHz									
5370.00	-8.8	V	3.0	39.9	1.0	-47.7	-25.0	-22.7	
8055.00	-3.9	V	3.0	39.2	1.0	-42.0	-25.0	-17.0	
10740.00	-4.1	V	3.0	38.5	1.0	-41.7	-25.0	-16.7	
13425.00	-4.4	V	3.0	39.8	1.0	-43.2	-25.0	-18.2	
16110.00	-5.2	V	3.0	40.9	1.0	-45.1	-25.0	-20.1	
5370.00	-11.6	H	3.0	39.9	1.0	-50.5	-25.0	-25.5	
8055.00	-6.6	H	3.0	39.2	1.0	-44.7	-25.0	-19.7	
10740.00	-9.8	H	3.0	38.5	1.0	-47.3	-25.0	-22.3	
13425.00	-8.0	H	3.0	39.8	1.0	-46.8	-25.0	-21.8	
16110.00	-5.4	H	3.0	40.9	1.0	-45.3	-25.0	-20.3	