LTE

Band 26

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789009800
Date: 2019-05-21
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	10.65	V	3.0	-1.5	6.17	38.5	-32.3	
829.00	18.70	H	3.0	-1.5	14.22	38.5	-24.3	
Mid Ch								
831.50	11.65	V	3.0	-1.4	7.18	38.5	-31.3	
831.50	18.01	H	3.0	-1.4	13.54	38.5	-25.0	
High Ch								
844.00	11.89	V	3.1	-1.4	7.44	38.5	-31.1	
844.00	17.92	H	3.1	-1.4	13.47	38.5	-25.0	

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, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
819.00	11.38	V	3.0	-1.5	6.88	50.0	-43.1	Part 90
819.00	18.59	H	3.0	-1.5	14.09	50.0	-35.9	Part 90

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LTE

Band 26

5MHz

QPSK

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, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
816.50	12.91	V	3.0	-1.5	8.40	50.0	-41.6	Part 90
816.50	20.57	H	3.0	-1.5	16.06	50.0	-33.9	Part 90
Mid Ch								
821.50	13.01	V	3.0	-1.5	8.51	50.0	-41.5	Part 90
821.50	20.76	H	3.0	-1.5	16.27	50.0	-33.7	Part 90

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789009800
Date: 2019-05-21
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	12.10	V	3.0	-1.5	7.62	38.5	-30.9	
826.50	19.92	H	3.0	-1.5	15.44	38.5	-23.1	
Mid Ch								
831.50	13.85	V	3.0	-1.4	9.38	38.5	-29.1	
831.50	19.71	H	3.0	-1.4	15.24	38.5	-23.3	
High Ch								
846.50	13.66	V	3.1	-1.4	9.21	38.5	-29.3	
846.50	19.63	H	3.1	-1.4	15.18	38.5	-23.3	

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LTE

Band 26

5MHz

16QAM

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, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
816.50	11.01	V	3.0	-1.5	6.50	50.0	-43.5	Part 90
816.50	18.47	H	3.0	-1.5	13.96	50.0	-36.0	Part 90
Mid Ch								
821.50	10.34	V	3.0	-1.5	5.84	50.0	-44.2	Part 90
821.50	18.35	H	3.0	-1.5	13.86	50.0	-36.1	Part 90

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789009800
Date: 2019-05-21
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	10.17	V	3.0	-1.5	5.69	38.5	-32.8	
826.50	17.99	H	3.0	-1.5	13.51	38.5	-25.0	
Mid Ch								
831.50	11.65	V	3.0	-1.4	7.18	38.5	-31.3	
831.50	17.51	H	3.0	-1.4	13.04	38.5	-25.5	
High Ch								
846.50	11.36	V	3.1	-1.4	6.91	38.5	-31.6	
846.50	17.83	H	3.1	-1.4	13.38	38.5	-25.1	

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LTE

Band 26

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
815.50	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

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LTE

Band 26

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789009800
Date: 2019-05-21
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
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	12.24	V	3.0	-1.5	7.76	38.5	-30.7	
825.50	18.00	H	3.0	-1.5	13.52	38.5	-25.0	
Mid Ch								
831.50	11.85	V	3.0	-1.4	7.38	38.5	-31.1	
831.50	17.71	H	3.0	-1.4	13.24	38.5	-25.3	
High Ch								
847.50	11.65	V	3.1	-1.4	7.21	38.5	-31.3	
847.50	17.75	H	3.1	-1.4	13.30	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, 3MHz Bandwidth

Test Equpment:
Receiving: VULB9163-750, and Chamber 1 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
815.50	10.75	V	3.0	-1.5	6.25	50.0	-43.8	Part 90
815.50	18.43	H	3.0	-1.5	13.92	50.0	-36.1	Part 90
Mid Ch								
822.50	11.98	V	3.0	-1.5	7.49	50.0	-42.5	Part 90
822.50	18.67	H	3.0	-1.5	14.18	50.0	-35.8	Part 90

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Band 26

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

Test Equpment:
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

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LTE

Band 26

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

Test Equpment:
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

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LTE Band 38

LTE Band 38 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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Band 38

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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LTE

Band 38

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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LTE

Band 38

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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LTE Band 41(PC2)

LTE Band 41 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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LTE

Band 41

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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Band 41

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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Band 41

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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Band 41

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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Band 41

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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LTE Band 41(PC3)

LTE Band 41 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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Band 41

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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Band 41

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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Band 41

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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Band 41

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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Band 41

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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LTE Band 66

LTE Band 66 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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LTE

Band 66

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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LTE

Band 66

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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LTE

Band 66

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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LTE

Band 66

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

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

Test Equpment:
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	

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LTE

Band 66

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789009800
Date: 2019-05-22
Test Engineer: 45585
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
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

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4789009800
Date: 2019-05-22
Test Engineer: 45585
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
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	

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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 that 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 Log10(f/6.1) decibels or 50 + 10 Log10(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 + 10Log_{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 ≥ 3 × 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 ≥ 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.

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10.2.1. SPURIOUS RADIATION PLOTS

GSM850

GSM850

GPRS

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
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
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	

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GSM1900

GSM1900

GPRS

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

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

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	-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	

GSM1900

EGPRS

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

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

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	-6.1	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	

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WCDMA Band 5

WCDMA

Band 5
REL99

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	

WCDMA

Band 5
HSDPA

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	

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WCDMA Band 4

WCDMA

Band 4
REL99

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
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	

WCDMA

Band 4
HSDPA

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
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	

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WCDMA Band 2

WCDMA

Band 2
REL99

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	

WCDMA

Band 2
HSDPA

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	

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LTE Band 5

LTE

Band 5

10MHz

QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company:	Samsung
Project #:	4789009800
Date:	2019-06-14
Test Engineer:	45585
Configuration:	EUT / AC Adapter, X-Position
Location:	Chamber 1
Mode:	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
Low Ch, 829MHz									
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	
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	
Mid Ch, 836.5MHz									
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	
High Ch, 844MHz									
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	

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LTE Band 7

LTE

Band 7

20MHz

QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789009800
Date: 2019-06-14
Test Engineer: 45585
Configuration: EUT / AC Adapter, Y-Position
Location: Chamber 2
Mode: 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
Low Ch, 2510MHz									
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	
Mid Ch, 2535MHz									
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	
High Ch, 2560MHz									
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	

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LTE Band 12

LTE

Band 12

3MHz

QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

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	

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LTE Band 13

LTE

Band 13

10MHz

QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company:	Samsung
Project #:	4789009800
Date:	2019-06-06
Test Engineer:	45585
Configuration:	EUT/ AC Adapter, Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 13 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
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

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LTE Band 25

LTE

Band 25

20MHz

QPSK

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, Z-Position
Location: Chamber 2
Mode: 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
Low Ch, 1860MHz									
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	
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	
Mid Ch, 1882.5MHz									
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	
High Ch, 1905MHz									
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	

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LTE Band 26

LTE

Band 26

15MHz

QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789009800
Date: 2019-06-14
Test Engineer: 45585
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 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
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

Company: Samsung
Project #: 4789009800
Date: 2019-06-14
Test Engineer: 45585
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 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
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	

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LTE Band 38

LTE

Band 38

20MHz

QPSK

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	

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LTE Band 41(PC2)

LTE

Band 41

5MHz

QPSK

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 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	

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LTE Band 41(PC3)

LTE

Band 41

15MHz

QPSK

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
Low Ch, 2503.5MHz									
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	
Mid Ch, 2593MHz									
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	
High Ch, 2682.5MHz									
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	

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LTE Band 66

LTE Band 66 20MHz QPSK

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.

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