LTE

Band 12

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-04
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
699.70	14.17	V	2.8	-1.6	9.79	34.8	-25.0	
699.70	21.04	H	2.8	-1.6	16.67	34.8	-18.1	
Mid Ch								
707.50	14.27	V	2.8	-1.6	9.89	34.8	-24.9	
707.50	23.13	H	2.8	-1.6	18.75	34.8	-16.1	
High Ch								
715.30	15.21	V	2.8	-1.6	10.81	34.8	-24.0	
715.30	22.15	H	2.8	-1.6	17.75	34.8	-17.0	

LTE

Band 12

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-04
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
699.70	12.52	V	2.8	-1.6	8.14	34.8	-26.7	
699.70	19.97	H	2.8	-1.6	15.60	34.8	-19.2	
Mid Ch								
707.50	13.03	V	2.8	-1.6	8.65	34.8	-26.2	
707.50	20.46	H	2.8	-1.6	16.08	34.8	-18.7	
High Ch								
715.30	13.72	V	2.8	-1.6	9.32	34.8	-25.5	
715.30	20.80	H	2.8	-1.6	16.40	34.8	-18.4	

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LTE Band 14

LTE
Band 14
10MHz
QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-04
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 14 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
793.00	25.50	V	3.0	-1.6	20.97	34.8	-13.8	
793.00	17.48	H	3.0	-1.6	12.96	34.8	-21.8	

LTE
Band 14
10MHz
16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-04
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 14 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
793.00	24.09	V	3.0	-1.6	19.56	34.8	-15.2	
793.00	15.89	H	3.0	-1.6	11.37	34.8	-23.4	

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LTE

Band 14

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-04
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 14 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
790.50	24.96	V	3.0	-1.6	20.44	34.8	-14.3	
790.50	17.52	H	3.0	-1.6	13.01	34.8	-21.8	
Mid Ch								
793.00	25.03	V	3.0	-1.6	20.50	34.8	-14.3	
793.00	17.37	H	3.0	-1.6	12.85	34.8	-21.9	
High Ch								
795.50	25.23	V	3.0	-1.6	20.70	34.8	-14.1	
795.50	16.95	H	3.0	-1.6	12.42	34.8	-22.4	

LTE

Band 14

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-04
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 14 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 8.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
790.50	24.02	V	3.0	-1.6	19.50	34.8	-15.3	
790.50	16.07	H	3.0	-1.6	11.56	34.8	-23.2	
Mid Ch								
793.00	24.12	V	3.0	-1.6	19.59	34.8	-15.2	
793.00	16.14	H	3.0	-1.6	11.62	34.8	-23.1	
High Ch								
795.50	24.26	V	3.0	-1.6	19.73	34.8	-15.0	
795.50	16.15	H	3.0	-1.6	11.62	34.8	-23.2	

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LTE Band 30

LTE Band 30

QPSK 10MHz

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-04-09
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 30 Fundamentals, 10MHz Bandwidth

Test Equipment:
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
Mid Ch								
2310.00	12.73	V	5.0	9.7	17.35	24.0	-6.6	
2310.00	18.04	H	5.0	9.7	22.66	24.0	-1.3	

LTE Band 30

16QAM 10MHz

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-04-09
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 30 Fundamentals, 10MHz Bandwidth

Test Equipment:
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
Mid Ch								
2310.00	11.75	V	5.0	9.7	16.37	24.0	-7.6	
2310.00	16.81	H	5.0	9.7	21.43	24.0	-2.6	

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LTE Band 30

QPSK 5MHz

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-04-09
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 30 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								
2307.50	13.62	V	5.0	9.6	18.24	24.0	-5.8	
2307.50	17.86	H	5.0	9.6	22.47	24.0	-1.5	
Mid Ch								
2310.00	12.50	V	5.0	9.7	17.12	24.0	-6.9	
2310.00	17.70	H	5.0	9.7	22.32	24.0	-1.7	
High Ch								
2312.50	12.05	V	5.0	9.7	16.68	24.0	-7.3	
2312.50	16.87	H	5.0	9.7	21.51	24.0	-2.5	

LTE Band 30

16QAM 5MHz

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-04-09
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 30 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								
2307.50	12.36	V	5.0	9.6	16.98	24.0	-7.0	
2307.50	16.60	H	5.0	9.6	21.21	24.0	-2.8	
Mid Ch								
2310.00	11.33	V	5.0	9.7	15.95	24.0	-8.0	
2310.00	16.69	H	5.0	9.7	21.31	24.0	-2.7	
High Ch								
2312.50	10.92	V	5.0	9.7	15.55	24.0	-8.4	
2312.50	17.52	H	5.0	9.7	22.16	24.0	-1.8	

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LTE Band 40 (Lower side)

LTE
Band 40

QPSK
10MHz

Lower side

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK_Band 40 Fundamentals, 10MHz Bandwidth

Test Equipment:
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
Mid Ch								
2312.50	2.07	V	5.0	9.7	6.70	33.0	-26.3	
2312.50	11.42	H	5.0	9.7	16.06	33.0	-16.9	

LTE
Band 40

16QAM
10MHz

Lower side

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM_Band 40 Fundamentals, 10MHz Bandwidth

Test Equipment:
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
Mid Ch								
2310.00	0.74	V	5.0	9.7	5.36	33.0	-27.6	
2310.00	12.77	H	5.0	9.7	17.39	33.0	-15.6	

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LTE
Band 40

QPSK
5MHz

Lower side

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-05-17
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 40 Fundamental, 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								
2307.50	5.91	V	5.0	9.6	10.53	33.0	-22.5	
2307.50	11.63	H	5.0	9.6	16.24	33.0	-16.8	
Mid Ch								
2310.00	5.57	V	5.0	9.7	10.19	33.0	-22.8	
2310.00	11.07	H	5.0	9.7	15.69	33.0	-17.3	
High Ch								
2312.50	8.64	V	5.0	9.7	13.27	33.0	-19.7	
2312.50	12.62	H	5.0	9.7	17.26	33.0	-15.7	

LTE
Band 40

16QAM
5MHz

Lower side

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM_Band 40 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								
2307.50	6.64	V	5.0	9.6	11.26	33.0	-21.7	
2307.50	12.81	H	5.0	9.6	17.42	33.0	-15.6	
Mid Ch								
2310.00	6.41	V	5.0	9.7	11.03	33.0	-22.0	
2310.00	11.92	H	5.0	9.7	16.54	33.0	-16.5	
High Ch								
2312.50	7.75	V	5.0	9.7	12.38	33.0	-20.6	
2312.50	12.17	H	5.0	9.7	16.81	33.0	-16.2	

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LTE Band 40 (Upper side)

LTE
Band 40

QPSK
10MHz

Upper side

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK_Band 40 Fundamentals, 10MHz Bandwidth

Test Equipment:
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
Mid Ch								
2355.00	8.38	V	5.1	9.9	13.18	33.0	-19.8	
2355.00	10.59	H	5.1	9.9	15.39	33.0	-17.6	

LTE
Band 40

16QAM
10MHz

Upper side

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM_Band 40 Fundamentals, 10MHz Bandwidth

Test Equipment:
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
Mid Ch								
2355.00	9.82	V	5.1	9.9	14.62	33.0	-18.4	
2355.00	12.16	H	5.1	9.9	16.96	33.0	-16.0	

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LTE
Band 40

QPSK
5MHz

Upper side

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-05-17
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 40 Fundamental, 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								
2352.50	7.31	V	5.1	9.9	12.11	33.0	-20.9	
2352.50	11.56	H	5.1	9.9	16.36	33.0	-16.6	
Mid Ch								
2355.00	7.60	V	5.1	9.9	12.40	33.0	-20.6	
2355.00	11.18	H	5.1	9.9	15.98	33.0	-17.0	
High Ch								
2357.50	5.90	V	5.1	9.9	10.71	33.0	-22.3	
2357.50	12.01	H	5.1	9.9	16.82	33.0	-16.2	

LTE
Band 40

16QAM
5MHz

Upper side

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM_Band 40 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								
2352.50	3.31	V	5.1	9.9	8.11	33.0	-24.9	
2352.50	11.14	H	5.1	9.9	15.94	33.0	-17.1	
Mid Ch								
2355.00	5.74	V	5.1	9.9	10.54	33.0	-22.5	
2355.00	12.51	H	5.1	9.9	17.31	33.0	-15.7	
High Ch								
2357.50	3.95	V	5.1	9.9	8.76	33.0	-24.2	
2357.50	11.36	H	5.1	9.9	16.17	33.0	-16.8	

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LTE Band 41

LTE Band 41 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 45585
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 41 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								
2506.00	14.22	V	5.2	10.1	19.05	33.0	-14.0	
2506.00	16.24	H	5.2	10.1	21.07	33.0	-11.9	
Mid Ch								
2593.00	13.50	V	5.3	10.0	18.14	33.0	-14.9	
2593.00	15.62	H	5.3	10.0	20.26	33.0	-12.7	
High Ch								
2680.00	12.24	V	5.4	10.0	16.83	33.0	-16.2	
2680.00	12.73	H	5.4	10.0	17.32	33.0	-15.7	

LTE Band 41 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 45585
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 41 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								
2506.00	13.61	V	5.2	10.1	18.44	33.0	-14.6	
2506.00	15.67	H	5.2	10.1	20.50	33.0	-12.5	
Mid Ch								
2593.00	11.86	V	5.3	10.0	16.50	33.0	-16.5	
2593.00	14.17	H	5.3	10.0	18.81	33.0	-14.2	
High Ch								
2680.00	10.83	V	5.4	10.0	15.42	33.0	-17.6	
2680.00	11.31	H	5.4	10.0	15.90	33.0	-17.1	

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LTE

Band 41

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 45585
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 41 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								
2503.50	14.81	V	5.2	10.1	19.64	33.0	-13.4	
2503.50	16.83	H	5.2	10.1	21.66	33.0	-11.3	
Mid Ch								
2593.00	12.73	V	5.3	10.0	17.37	33.0	-15.6	
2593.00	14.82	H	5.3	10.0	19.46	33.0	-13.5	
High Ch								
2682.50	11.75	V	5.4	10.0	16.35	33.0	-16.7	
2682.50	12.47	H	5.4	10.0	17.07	33.0	-15.9	

LTE

Band 41

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 45585
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 41 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								
2503.50	13.52	V	5.2	10.1	18.35	33.0	-14.6	
2503.50	15.49	H	5.2	10.1	20.32	33.0	-12.7	
Mid Ch								
2593.00	12.19	V	5.3	10.0	16.83	33.0	-16.2	
2593.00	14.14	H	5.3	10.0	18.78	33.0	-14.2	
High Ch								
2682.50	9.75	V	5.4	10.0	14.35	33.0	-18.7	
2682.50	9.82	H	5.4	10.0	14.42	33.0	-18.6	

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LTE

Band 41

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 45585
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 41 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								
2501.00	15.35	V	5.2	10.1	20.19	33.0	-12.8	
2501.00	17.16	H	5.2	10.1	22.00	33.0	-11.0	
Mid Ch								
2593.00	12.65	V	5.3	10.0	17.29	33.0	-15.7	
2593.00	14.77	H	5.3	10.0	19.41	33.0	-13.6	
High Ch								
2685.00	10.87	V	5.4	10.0	15.46	33.0	-17.5	
2685.00	12.34	H	5.4	10.0	16.93	33.0	-16.1	

LTE

Band 41

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 45585
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 41 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								
2501.00	14.27	V	5.2	10.1	19.11	33.0	-13.9	
2501.00	16.54	H	5.2	10.1	21.38	33.0	-11.6	
Mid Ch								
2593.00	11.89	V	5.3	10.0	16.53	33.0	-16.5	
2593.00	14.51	H	5.3	10.0	19.15	33.0	-13.9	
High Ch								
2685.00	9.12	V	5.4	10.0	13.71	33.0	-19.3	
2685.00	11.14	H	5.4	10.0	15.73	33.0	-17.3	

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Band 41

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 45585
Configuration: EUT / Y-Position
Location: Chamber 2
Mode: LTE_QPSK Band 41 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								
2498.50	16.01	V	5.2	10.1	20.85	33.0	-12.1	
2498.50	17.38	H	5.2	10.1	22.22	33.0	-10.8	
Mid Ch								
2593.00	11.85	V	5.3	10.0	16.49	33.0	-16.5	
2593.00	15.95	H	5.3	10.0	20.59	33.0	-12.4	
High Ch								
2687.50	11.62	V	5.4	10.0	16.22	33.0	-16.8	
2687.50	12.45	H	5.4	10.0	17.05	33.0	-16.0	

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Band 41

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 45585
Configuration: EUT, Y-Position
Location: Chamber 2
Mode: LTE_16QAM Band 41 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								
2498.50	14.80	V	5.2	10.1	19.64	33.0	-13.4	
2498.50	16.22	H	5.2	10.1	21.06	33.0	-11.9	
Mid Ch								
2593.00	12.34	V	5.3	10.0	16.98	33.0	-16.0	
2593.00	14.26	H	5.3	10.0	18.90	33.0	-14.1	
High Ch								
2687.50	9.76	V	5.4	10.0	14.36	33.0	-18.6	
2687.50	10.33	H	5.4	10.0	14.93	33.0	-18.1	

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LTE Band 66

LTE Band 66 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 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								
1720.00	15.86	V	4.3	9.4	20.96	30.0	-9.0	
1720.00	20.58	H	4.3	9.4	25.69	30.0	-4.3	
Mid Ch								
1745.00	6.23	V	4.4	9.5	11.39	30.0	-18.6	
1745.00	21.23	H	4.4	9.5	26.40	30.0	-3.6	
High Ch								
1770.00	16.07	V	4.4	9.6	21.24	30.0	-8.8	
1770.00	20.68	H	4.4	9.6	25.85	30.0	-4.1	

LTE Band 66 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 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								
1720.00	11.43	V	4.3	9.4	16.53	30.0	-13.5	
1720.00	19.72	H	4.3	9.4	24.83	30.0	-5.2	
Mid Ch								
1745.00	4.91	V	4.4	9.5	10.07	30.0	-19.9	
1745.00	19.66	H	4.4	9.5	24.83	30.0	-5.2	
High Ch								
1770.00	14.95	V	4.4	9.6	20.12	30.0	-9.9	
1770.00	19.29	H	4.4	9.6	24.46	30.0	-5.5	

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Band 66

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-04
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 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								
1717.50	15.32	V	4.3	9.4	20.42	30.0	-9.6	
1717.50	20.16	H	4.3	9.4	25.26	30.0	-4.7	
Mid Ch								
1745.00	7.27	V	4.4	9.5	12.43	30.0	-17.6	
1745.00	21.23	H	4.4	9.5	26.40	30.0	-3.6	
High Ch								
1772.50	14.10	V	4.4	9.6	19.27	30.0	-10.7	
1772.50	20.62	H	4.4	9.6	25.79	30.0	-4.2	

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Band 66

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-04
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 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								
1717.50	14.35	V	4.3	9.4	19.45	30.0	-10.5	
1717.50	19.13	H	4.3	9.4	24.23	30.0	-5.8	
Mid Ch								
1745.00	6.18	V	4.4	9.5	11.34	30.0	-18.7	
1745.00	20.14	H	4.4	9.5	25.31	30.0	-4.7	
High Ch								
1772.50	12.79	V	4.4	9.6	17.96	30.0	-12.0	
1772.50	19.54	H	4.4	9.6	24.71	30.0	-5.3	

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Band 66

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 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								
1715.00	8.82	V	4.3	9.4	13.91	30.0	-16.1	
1715.00	20.12	H	4.3	9.4	25.22	30.0	-4.8	
Mid Ch								
1745.00	13.95	V	4.4	9.5	19.11	30.0	-10.9	
1745.00	21.38	H	4.4	9.5	26.55	30.0	-3.5	
High Ch								
1775.00	14.11	V	4.4	9.6	19.28	30.0	-10.7	
1775.00	20.51	H	4.4	9.6	25.68	30.0	-4.3	

LTE

Band 66

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 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								
1715.00	7.66	V	4.3	9.4	12.75	30.0	-17.2	
1715.00	19.17	H	4.3	9.4	24.27	30.0	-5.7	
Mid Ch								
1745.00	12.67	V	4.4	9.5	17.83	30.0	-12.2	
1745.00	20.01	H	4.4	9.5	25.18	30.0	-4.8	
High Ch								
1775.00	13.11	V	4.4	9.6	18.28	30.0	-11.7	
1775.00	19.42	H	4.4	9.6	24.59	30.0	-5.4	

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Band 66

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 Fundamentals, 5MHz Bandwidth

Test Equipment:
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								
1712.50	8.22	V	4.3	9.4	13.31	30.0	-16.7	
1712.50	20.42	H	4.3	9.4	25.51	30.0	-4.5	
Mid Ch								
1745.00	14.09	V	4.4	9.5	19.25	30.0	-10.7	
1745.00	21.08	H	4.4	9.5	26.25	30.0	-3.8	
High Ch								
1777.50	14.43	V	4.4	9.6	19.60	30.0	-10.4	
1777.50	19.99	H	4.4	9.6	25.16	30.0	-4.8	

LTE

Band 66

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 Fundamentals, 5MHz Bandwidth

Test Equipment:
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								
1712.50	8.57	V	4.3	9.4	13.66	30.0	-16.3	
1712.50	20.61	H	4.3	9.4	25.70	30.0	-4.3	
Mid Ch								
1745.00	13.16	V	4.4	9.5	18.32	30.0	-11.7	
1745.00	19.77	H	4.4	9.5	24.94	30.0	-5.1	
High Ch								
1777.50	13.43	V	4.4	9.6	18.60	30.0	-11.4	
1777.50	18.70	H	4.4	9.6	23.87	30.0	-6.1	

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Band 66

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 Fundamentals, 3MHz Bandwidth

Test Equipment:
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								
1711.50	7.63	V	4.3	9.4	12.72	30.0	-17.3	
1711.50	19.62	H	4.3	9.4	24.71	30.0	-5.3	
Mid Ch								
1745.00	13.23	V	4.4	9.5	18.39	30.0	-11.6	
1745.00	21.40	H	4.4	9.5	26.57	30.0	-3.4	
High Ch								
1778.50	14.78	V	4.4	9.6	19.95	30.0	-10.1	
1778.50	20.32	H	4.4	9.6	25.49	30.0	-4.5	

LTE

Band 66

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 Fundamentals, 3MHz Bandwidth

Test Equipment:
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								
1711.50	6.53	V	4.3	9.4	11.62	30.0	-18.4	
1711.50	19.64	H	4.3	9.4	24.73	30.0	-5.3	
Mid Ch								
1745.00	12.37	V	4.4	9.5	17.53	30.0	-12.5	
1745.00	20.05	H	4.4	9.5	25.22	30.0	-4.8	
High Ch								
1778.50	13.46	V	4.4	9.6	18.63	30.0	-11.4	
1778.50	18.96	H	4.4	9.6	24.13	30.0	-5.9	

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Band 66

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
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								
1710.70	7.41	V	4.3	9.4	12.49	30.0	-17.5	
1710.70	20.47	H	4.3	9.4	25.55	30.0	-4.4	
Mid Ch								
1745.00	13.70	V	4.4	9.5	18.86	30.0	-11.1	
1745.00	21.41	H	4.4	9.5	26.58	30.0	-3.4	
High Ch								
1779.30	14.53	V	4.4	9.6	19.70	30.0	-10.3	
1779.30	20.10	H	4.4	9.6	25.27	30.0	-4.7	

LTE

Band 66

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788768228
Date: 2019-03-05
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equipment:
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								
1710.70	6.44	V	4.3	9.4	11.52	30.0	-18.5	
1710.70	19.44	H	4.3	9.4	24.52	30.0	-5.5	
Mid Ch								
1745.00	12.60	V	4.4	9.5	17.76	30.0	-12.2	
1745.00	20.22	H	4.4	9.5	25.39	30.0	-4.6	
High Ch								
1779.30	13.95	V	4.4	9.6	19.12	30.0	-10.9	
1779.30	19.06	H	4.4	9.6	24.23	30.0	-5.8	

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10.2. RADIATED SPURIOUS EMISSION

RULE PART(S)

FCC: §2.1051, §22.917, §24.238, §27.53, §90.543 and §90.691

LIMIT

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

Part 27.53:

(a)(4) For mobile and portable stations operating in the 2305-2315 MHz and 2350-2360 MHz bands:

(i) By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.

(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. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(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 log10 (P) dB.

(m)(4) For mobile station, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge and (55 + 10 log (P)dB) at the 5.5 MHz from the channel edges.

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Part 90.543:
(c) Out-of-band emission limit. On any frequency outside of the frequency ranges covered by the ACP tables in this section, the power of any emission must be reduced below the mean output power (P) by at least 43 + 10log (P) dB measured in a 100 kHz bandwidth for frequencies less than 1 GHz, and in a 1 MHz bandwidth for frequencies greater than 1 GHz.

(f) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.12; ESU40 setting reference to 971168 D01 v03

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 Band 40,41);

NOTE 1: Radiated spurious emissions were investigated below 30MHz, 30MHz – 1GHz and above 1GHz. There were no emissions found on below 30MHz and 30MHz – 1GHz.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

NOTE 2: Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

RESULTS

See the following pages.

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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 #: 4788768228
Date: 2019-03-06
Test Engineer: 47989
Configuration: EUT / AC Adapter / Earphone, Z-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	-13.9	V	3.0	38.2	1.0	-51.2	-13.0	-38.2	
2472.60	-11.5	V	3.0	38.8	1.0	-49.3	-13.0	-36.3	
3296.80	-9.0	V	3.0	39.4	1.0	-47.4	-13.0	-34.4	
1648.40	-15.2	H	3.0	38.2	1.0	-52.4	-13.0	-39.4	
2472.60	-12.2	H	3.0	38.8	1.0	-50.0	-13.0	-37.0	
3296.80	-9.4	H	3.0	39.4	1.0	-47.8	-13.0	-34.8	
Mid Ch, 836.6MHz									
1673.20	-14.1	V	3.0	38.2	1.0	-51.3	-13.0	-38.3	
2509.80	-11.8	V	3.0	38.8	1.0	-49.6	-13.0	-36.6	
3346.40	-9.1	V	3.0	39.5	1.0	-47.5	-13.0	-34.5	
1673.20	-15.0	H	3.0	38.2	1.0	-52.3	-13.0	-39.3	
2509.80	-12.1	H	3.0	38.8	1.0	-50.0	-13.0	-37.0	
3346.40	-9.2	H	3.0	39.5	1.0	-47.6	-13.0	-34.6	
High Ch, 848.8MHz									
1697.60	-14.1	V	3.0	38.2	1.0	-51.3	-13.0	-38.3	
2546.40	-11.4	V	3.0	38.9	1.0	-49.2	-13.0	-36.2	
3395.20	-8.7	V	3.0	39.5	1.0	-47.1	-13.0	-34.1	
1697.60	-15.1	H	3.0	38.2	1.0	-52.4	-13.0	-39.4	
2546.40	-11.8	H	3.0	38.9	1.0	-49.7	-13.0	-36.7	
3395.20	-9.1	H	3.0	39.5	1.0	-47.6	-13.0	-34.6	

GSM850

EGPRS

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

Company: Samsung
Project #: 4788768228
Date: 2019-03-06
Test Engineer: 47989
Configuration: EUT / AC Adapter / Earphone, Z-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	-14.1	V	3.0	38.2	1.0	-51.3	-13.0	-38.3	
2472.60	-11.6	V	3.0	38.8	1.0	-49.4	-13.0	-36.4	
3296.80	-9.0	V	3.0	39.4	1.0	-47.5	-13.0	-34.5	
1648.40	-15.2	H	3.0	38.2	1.0	-52.5	-13.0	-39.5	
2472.60	-12.1	H	3.0	38.8	1.0	-49.9	-13.0	-36.9	
3296.80	-9.2	H	3.0	39.4	1.0	-47.6	-13.0	-34.6	
Mid Ch, 836.6MHz									
1673.20	-13.8	V	3.0	38.2	1.0	-51.0	-13.0	-38.0	
2509.80	-11.2	V	3.0	38.8	1.0	-49.1	-13.0	-36.1	
3346.40	-8.9	V	3.0	39.5	1.0	-47.4	-13.0	-34.4	
1673.20	-15.0	H	3.0	38.2	1.0	-52.2	-13.0	-39.2	
2509.80	-12.0	H	3.0	38.8	1.0	-49.9	-13.0	-36.9	
3346.40	-9.4	H	3.0	39.5	1.0	-47.8	-13.0	-34.8	
High Ch, 848.8MHz									
1697.60	-14.0	V	3.0	38.2	1.0	-51.2	-13.0	-38.2	
2546.40	-11.3	V	3.0	38.9	1.0	-49.1	-13.0	-36.1	
3395.20	-8.7	V	3.0	39.5	1.0	-47.2	-13.0	-34.2	
1697.60	-15.0	H	3.0	38.2	1.0	-52.3	-13.0	-39.3	
2546.40	-11.9	H	3.0	38.9	1.0	-49.8	-13.0	-36.8	
3395.20	-9.0	H	3.0	39.5	1.0	-47.5	-13.0	-34.5	

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GSM1900

GSM1900

GPRS

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

Company: Samsung
Project #: 4788768228
Date: 2019-03-20
Test Engineer: 47989
Configuration: EUT / AC Adapter / Earphone, 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	-4.3	V	3.0	43.8	1.0	-47.1	-13.0	-34.1	
5550.60	-1.0	V	3.0	43.7	1.0	-43.7	-13.0	-30.7	
7400.80	-4.8	V	3.0	42.5	1.0	-46.4	-13.0	-33.4	
3700.40	-4.8	H	3.0	43.8	1.0	-47.6	-13.0	-34.6	
5550.60	-3.3	H	3.0	43.7	1.0	-46.0	-13.0	-33.0	
7400.80	-4.9	H	3.0	42.5	1.0	-46.4	-13.0	-33.4	
Mid Ch, 1880MHz									
3760.00	-2.7	V	3.0	43.8	1.0	-45.5	-13.0	-32.5	
5640.00	-4.3	V	3.0	43.7	1.0	-47.0	-13.0	-34.0	
7520.00	-5.4	V	3.0	42.5	1.0	-46.9	-13.0	-33.9	
3760.00	-4.8	H	3.0	43.8	1.0	-47.6	-13.0	-34.6	
5640.00	-2.5	H	3.0	43.7	1.0	-45.2	-13.0	-32.2	
7520.00	-5.4	H	3.0	42.5	1.0	-46.8	-13.0	-33.8	
High Ch, 1909.8MHz									
3819.60	-4.5	V	3.0	43.8	1.0	-47.3	-13.0	-34.3	
5729.40	-5.9	V	3.0	43.7	1.0	-48.6	-13.0	-35.6	
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	-49.1	-13.0	-36.1	
5729.40	-4.7	H	3.0	43.7	1.0	-47.4	-13.0	-34.4	
7639.20	-4.8	H	3.0	42.4	1.0	-46.2	-13.0	-33.2	

GSM1900

EGPRS

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

Company: Samsung
Project #: 4788768228
Date: 2019-03-20
Test Engineer: 47989
Configuration: EUT / AC Adapter / Earphone, 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	-8.2	V	3.0	43.8	1.0	-51.0	-13.0	-38.0	
5550.60	-4.6	V	3.0	43.7	1.0	-47.3	-13.0	-34.3	
7400.80	-5.0	V	3.0	42.5	1.0	-46.5	-13.0	-33.5	
3700.40	-8.2	H	3.0	43.8	1.0	-51.0	-13.0	-38.0	
5550.60	-5.6	H	3.0	43.7	1.0	-48.3	-13.0	-35.3	
7400.80	-4.8	H	3.0	42.5	1.0	-46.3	-13.0	-33.3	
Mid Ch, 1880MHz									
3760.00	-7.4	V	3.0	43.8	1.0	-50.2	-13.0	-37.2	
5640.00	-7.5	V	3.0	43.7	1.0	-50.2	-13.0	-37.2	
7520.00	-4.9	V	3.0	42.5	1.0	-46.3	-13.0	-33.3	
3760.00	-7.6	H	3.0	43.8	1.0	-50.4	-13.0	-37.4	
5640.00	-6.1	H	3.0	43.7	1.0	-48.8	-13.0	-35.8	
7520.00	-4.8	H	3.0	42.5	1.0	-46.3	-13.0	-33.3	
High Ch, 1909.8MHz									
3819.60	-7.7	V	3.0	43.8	1.0	-50.5	-13.0	-37.5	
5729.40	-6.7	V	3.0	43.7	1.0	-49.3	-13.0	-36.3	
7639.20	-4.8	V	3.0	42.4	1.0	-46.2	-13.0	-33.2	
3819.60	-7.8	H	3.0	43.8	1.0	-50.6	-13.0	-37.6	
5729.40	-7.1	H	3.0	43.7	1.0	-49.8	-13.0	-36.8	
7639.20	-5.0	H	3.0	42.4	1.0	-46.4	-13.0	-33.4	

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WCDMA Band 5

WCDMA

Band 5
REL99

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

Company: Samsung
Project #: 4788768228
Date: 2019-03-06
Test Engineer: 47989
Configuration: EUT / AC Adapter / Earphone, Z-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	-12.7	V	3.0	38.8	1.0	-50.5	-13.0	-37.5	
3305.60	-10.2	V	3.0	39.4	1.0	-48.6	-13.0	-35.6	
1652.80	-16.3	H	3.0	38.2	1.0	-53.5	-13.0	-40.5	
2479.20	-13.3	H	3.0	38.8	1.0	-51.1	-13.0	-38.1	
3305.60	-10.4	H	3.0	39.4	1.0	-48.9	-13.0	-35.9	
Mid Ch, 836.6MHz									
1673.20	-15.2	V	3.0	38.2	1.0	-52.4	-13.0	-39.4	
2509.80	-12.5	V	3.0	38.8	1.0	-50.3	-13.0	-37.3	
3346.40	-10.1	V	3.0	39.5	1.0	-48.6	-13.0	-35.6	
1673.20	-16.0	H	3.0	38.2	1.0	-53.3	-13.0	-40.3	
2509.80	-12.7	H	3.0	38.8	1.0	-50.6	-13.0	-37.6	
3346.40	-10.4	H	3.0	39.5	1.0	-48.8	-13.0	-35.8	
High Ch, 846.6MHz									
1693.20	-15.2	V	3.0	38.2	1.0	-52.4	-13.0	-39.4	
2539.80	-12.4	V	3.0	38.9	1.0	-50.3	-13.0	-37.3	
3386.40	-9.9	V	3.0	39.5	1.0	-48.4	-13.0	-35.4	
1693.20	-16.2	H	3.0	38.2	1.0	-53.4	-13.0	-40.4	
2539.80	-13.0	H	3.0	38.9	1.0	-50.9	-13.0	-37.9	
3386.40	-10.5	H	3.0	39.5	1.0	-49.0	-13.0	-36.0	

WCDMA

Band 5
HSDPA

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

Company: Samsung
Project #: 4788768228
Date: 2019-03-06
Test Engineer: 47989
Configuration: EUT / AC Adapter / Earphone
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	-52.6	-13.0	-39.6	
2479.20	-12.6	V	3.0	38.8	1.0	-50.4	-13.0	-37.4	
3305.60	-10.2	V	3.0	39.4	1.0	-48.6	-13.0	-35.6	
1652.80	-16.3	H	3.0	38.2	1.0	-53.5	-13.0	-40.5	
2479.20	-13.3	H	3.0	38.8	1.0	-51.1	-13.0	-38.1	
3305.60	-10.4	H	3.0	39.4	1.0	-48.8	-13.0	-35.8	
Mid Ch, 836.6MHz									
1673.20	-15.2	V	3.0	38.2	1.0	-52.5	-13.0	-39.5	
2509.80	-12.6	V	3.0	38.8	1.0	-50.4	-13.0	-37.4	
3346.40	-10.2	V	3.0	39.5	1.0	-48.7	-13.0	-35.7	
1673.20	-16.2	H	3.0	38.2	1.0	-53.5	-13.0	-40.5	
2509.80	-13.2	H	3.0	38.8	1.0	-51.0	-13.0	-38.0	
3346.40	-10.7	H	3.0	39.5	1.0	-49.2	-13.0	-36.2	
High Ch, 846.6MHz									
1693.20	-15.2	V	3.0	38.2	1.0	-52.4	-13.0	-39.4	
2539.80	-12.5	V	3.0	38.9	1.0	-50.3	-13.0	-37.3	
3386.40	-10.0	V	3.0	39.5	1.0	-48.4	-13.0	-35.4	
1693.20	-16.1	H	3.0	38.2	1.0	-53.4	-13.0	-40.4	
2539.80	-13.1	H	3.0	38.9	1.0	-50.9	-13.0	-37.9	
3386.40	-10.2	H	3.0	39.5	1.0	-48.7	-13.0	-35.7	

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WCDMA Band 4

WCDMA

Band 4
REL99

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

Company: Samsung
Project #: 4788768228
Date: 2019-03-06
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 2
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	-9.5	V	3.0	39.5	1.0	-48.0	-13.0	-35.0	
5137.20	-9.0	V	3.0	39.8	1.0	-47.9	-13.0	-34.9	
6849.60	-6.3	V	3.0	39.7	1.0	-45.0	-13.0	-32.0	
3424.80	-9.7	H	3.0	39.5	1.0	-48.2	-13.0	-35.2	
5137.20	-9.3	H	3.0	39.8	1.0	-48.1	-13.0	-35.1	
6849.60	-7.1	H	3.0	39.7	1.0	-45.8	-13.0	-32.8	
Mid Ch, 1732.6MHz									
3465.20	-9.1	V	3.0	39.5	1.0	-47.6	-13.0	-34.6	
5197.80	-8.8	V	3.0	39.8	1.0	-47.6	-13.0	-34.6	
6930.40	-6.2	V	3.0	39.7	1.0	-44.9	-13.0	-31.9	
3465.20	-9.3	H	3.0	39.5	1.0	-47.8	-13.0	-34.8	
5197.80	-9.2	H	3.0	39.8	1.0	-48.0	-13.0	-35.0	
6930.40	-7.1	H	3.0	39.7	1.0	-45.8	-13.0	-32.8	
High Ch, 1752.6MHz									
3505.20	-8.5	V	3.0	39.5	1.0	-47.1	-13.0	-34.1	
5257.80	-8.9	V	3.0	39.8	1.0	-47.8	-13.0	-34.8	
7010.40	-5.8	V	3.0	39.6	1.0	-44.4	-13.0	-31.4	
3505.20	-8.7	H	3.0	39.5	1.0	-47.3	-13.0	-34.3	
5257.80	-9.1	H	3.0	39.8	1.0	-48.0	-13.0	-35.0	
7010.40	-7.0	H	3.0	39.6	1.0	-45.6	-13.0	-32.6	

WCDMA

Band 4
HSDPA

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

Company: Samsung
Project #: 4788768228
Date: 2019-03-06
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 2
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	-8.6	V	3.0	39.5	1.0	-47.1	-13.0	-34.1	
5137.20	-8.8	V	3.0	39.8	1.0	-47.6	-13.0	-34.6	
6849.60	-6.6	V	3.0	39.7	1.0	-45.3	-13.0	-32.3	
3424.80	-9.6	H	3.0	39.5	1.0	-48.1	-13.0	-35.1	
5137.20	-9.5	H	3.0	39.8	1.0	-48.3	-13.0	-35.3	
6849.60	-6.2	H	3.0	39.7	1.0	-44.8	-13.0	-31.8	
Mid Ch, 1732.6MHz									
3465.20	-8.9	V	3.0	39.5	1.0	-47.4	-13.0	-34.4	
5197.80	-8.8	V	3.0	39.8	1.0	-47.6	-13.0	-34.6	
6930.40	-5.2	V	3.0	39.7	1.0	-43.8	-13.0	-30.8	
3465.20	-9.4	H	3.0	39.5	1.0	-47.9	-13.0	-34.9	
5197.80	-9.0	H	3.0	39.8	1.0	-47.8	-13.0	-34.8	
6930.40	-6.9	H	3.0	39.7	1.0	-45.6	-13.0	-32.6	
High Ch, 1752.6MHz									
3505.20	-7.6	V	3.0	39.5	1.0	-46.2	-13.0	-33.2	
5257.80	-8.9	V	3.0	39.8	1.0	-47.8	-13.0	-34.8	
7010.40	-5.3	V	3.0	39.6	1.0	-43.9	-13.0	-30.9	
3505.20	-8.1	H	3.0	39.5	1.0	-46.6	-13.0	-33.6	
5257.80	-8.4	H	3.0	39.8	1.0	-47.2	-13.0	-34.2	
7010.40	-6.7	H	3.0	39.6	1.0	-45.3	-13.0	-32.3	

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WCDMA Band 2

WCDMA

Band 2
REL99

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

Company: Samsung
Project #: 4788768228
Date: 2019-03-21
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Y-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	-10.9	V	3.0	39.7	1.0	-49.6	-13.0	-36.6	
5557.20	-8.2	V	3.0	39.9	1.0	-47.1	-13.0	-34.1	
7409.60	-5.9	V	3.0	39.4	1.0	-44.4	-13.0	-31.4	
3704.80	-11.6	H	3.0	39.7	1.0	-50.3	-13.0	-37.3	
5557.20	-8.6	H	3.0	39.9	1.0	-47.5	-13.0	-34.5	
7409.60	-6.9	H	3.0	39.4	1.0	-45.4	-13.0	-32.4	
Mid Ch, 1880MHz									
3760.00	-10.8	V	3.0	39.7	1.0	-49.5	-13.0	-36.5	
5640.00	-7.8	V	3.0	40.0	1.0	-46.8	-13.0	-33.8	
7520.00	-6.2	V	3.0	39.4	1.0	-44.6	-13.0	-31.6	
3760.00	-11.2	H	3.0	39.7	1.0	-49.9	-13.0	-36.9	
5640.00	-8.2	H	3.0	40.0	1.0	-47.1	-13.0	-34.1	
7520.00	-7.1	H	3.0	39.4	1.0	-45.5	-13.0	-32.5	
High Ch, 1907.6MHz									
3815.20	-10.8	V	3.0	39.7	1.0	-49.6	-13.0	-36.6	
5722.80	-8.2	V	3.0	40.0	1.0	-47.2	-13.0	-34.2	
7630.40	-6.3	V	3.0	39.3	1.0	-44.6	-13.0	-31.6	
3815.20	-11.3	H	3.0	39.7	1.0	-50.0	-13.0	-37.0	
5722.80	-8.3	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	

WCDMA

Band 2
HSDPA

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

Company: Samsung
Project #: 4788768228
Date: 2019-03-21
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Y-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	-11.4	V	3.0	39.7	1.0	-50.0	-13.0	-37.0	
5557.20	-7.8	V	3.0	39.9	1.0	-46.7	-13.0	-33.7	
7409.60	-5.9	V	3.0	39.4	1.0	-44.3	-13.0	-31.3	
3704.80	-11.4	H	3.0	39.7	1.0	-50.0	-13.0	-37.0	
5557.20	-8.4	H	3.0	39.9	1.0	-47.3	-13.0	-34.3	
7409.60	-6.9	H	3.0	39.4	1.0	-45.3	-13.0	-32.3	
Mid Ch, 1880MHz									
3760.00	-10.8	V	3.0	39.7	1.0	-49.5	-13.0	-36.5	
5640.00	-7.8	V	3.0	40.0	1.0	-46.8	-13.0	-33.8	
7520.00	-6.1	V	3.0	39.4	1.0	-44.5	-13.0	-31.5	
3760.00	-11.1	H	3.0	39.7	1.0	-49.8	-13.0	-36.8	
5640.00	-8.0	H	3.0	40.0	1.0	-47.0	-13.0	-34.0	
7520.00	-6.9	H	3.0	39.4	1.0	-45.2	-13.0	-32.2	
High Ch, 1907.6MHz									
3815.20	-10.7	V	3.0	39.7	1.0	-49.4	-13.0	-36.4	
5722.80	-7.9	V	3.0	40.0	1.0	-46.9	-13.0	-33.9	
7630.40	-6.1	V	3.0	39.3	1.0	-44.4	-13.0	-31.4	
3815.20	-11.3	H	3.0	39.7	1.0	-50.0	-13.0	-37.0	
5722.80	-8.2	H	3.0	40.0	1.0	-47.2	-13.0	-34.2	
7630.40	-6.6	H	3.0	39.3	1.0	-44.9	-13.0	-31.9	

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LTE Band 2

LTE

Band 2

1.4MHz

QPSK

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

Company:	Samsung
Project #:	4788768228
Date:	2019-03-20
Test Engineer:	47989
Configuration:	EUT / AC Adpater / Earphone, X-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 2 Harmonics, 1.4MHz 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, 1850.7MHz									
3701.40	-11.7	V	3.0	43.8	1.0	-54.5	-13.0	-41.5	
5552.10	-8.2	V	3.0	43.7	1.0	-50.9	-13.0	-37.9	
7402.80	-5.7	V	3.0	42.5	1.0	-47.3	-13.0	-34.3	
3701.40	-11.0	H	3.0	43.8	1.0	-53.7	-13.0	-40.7	
5552.10	-8.4	H	3.0	43.7	1.0	-51.1	-13.0	-38.1	
7402.80	-5.6	H	3.0	42.5	1.0	-47.1	-13.0	-34.1	
Mid Ch, 1880MHz									
3760.00	-10.8	V	3.0	43.8	1.0	-53.6	-13.0	-40.6	
5640.00	-8.4	V	3.0	43.7	1.0	-51.1	-13.0	-38.1	
7520.00	-5.5	V	3.0	42.5	1.0	-46.9	-13.0	-33.9	
3760.00	-10.7	H	3.0	43.8	1.0	-53.5	-13.0	-40.5	
5640.00	-8.5	H	3.0	43.7	1.0	-51.2	-13.0	-38.2	
7520.00	-5.6	H	3.0	42.5	1.0	-47.1	-13.0	-34.1	
High Ch, 1909.3MHz									
3818.60	-11.2	V	3.0	43.8	1.0	-54.0	-13.0	-41.0	
5727.90	-8.1	V	3.0	43.7	1.0	-50.7	-13.0	-37.7	
7637.20	-5.8	V	3.0	42.4	1.0	-47.1	-13.0	-34.1	
3818.60	-10.8	H	3.0	43.8	1.0	-53.6	-13.0	-40.6	
5727.90	-7.9	H	3.0	43.7	1.0	-50.6	-13.0	-37.6	
7637.20	-6.0	H	3.0	42.4	1.0	-47.4	-13.0	-34.4	

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LTE Band 5

LTE

Band 5

3MHz

QPSK

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

Company:	Samsung
Project #:	4788768228
Date:	2019-03-05
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, Y-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 5 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, 825.5MHz									
1651.00	-15.5	V	3.0	43.6	1.0	-58.1	-13.0	-45.1	
2476.50	-12.7	V	3.0	43.4	1.0	-55.1	-13.0	-42.1	
3302.00	-10.9	V	3.0	43.6	1.0	-53.5	-13.0	-40.5	
1651.00	-16.5	H	3.0	43.6	1.0	-59.1	-13.0	-46.1	
2476.50	-13.2	H	3.0	43.4	1.0	-55.6	-13.0	-42.6	
3302.00	-10.8	H	3.0	43.6	1.0	-53.5	-13.0	-40.5	
Mid Ch, 836.5MHz									
1673.00	-15.6	V	3.0	43.6	1.0	-58.1	-13.0	-45.1	
2509.50	-11.1	V	3.0	43.4	1.0	-53.6	-13.0	-40.6	
3346.00	-10.7	V	3.0	43.6	1.0	-53.3	-13.0	-40.3	
1673.00	-16.4	H	3.0	43.6	1.0	-59.0	-13.0	-46.0	
2509.50	-12.6	H	3.0	43.4	1.0	-55.0	-13.0	-42.0	
3346.00	-10.9	H	3.0	43.6	1.0	-53.5	-13.0	-40.5	
High Ch, 847.5MHz									
1695.00	-15.4	V	3.0	43.6	1.0	-58.0	-13.0	-45.0	
2542.50	-11.4	V	3.0	43.4	1.0	-53.8	-13.0	-40.8	
3390.00	-10.3	V	3.0	43.7	1.0	-53.0	-13.0	-40.0	
1695.00	-16.5	H	3.0	43.6	1.0	-59.1	-13.0	-46.1	
2542.50	-12.6	H	3.0	43.4	1.0	-55.0	-13.0	-42.0	
3390.00	-10.4	H	3.0	43.7	1.0	-53.1	-13.0	-40.1	

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LTE Band 7

LTE

Band 7

10MHz
QPSK

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

Company:	Samsung
Project #:	4788768228
Date:	2019-03-05
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, Z-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 7 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, 2505MHz									
5010.00	-13.2	V	3.0	43.8	1.0	-56.0	-25.0	-31.0	
7515.00	-17.9	V	3.0	42.5	1.0	-59.4	-25.0	-34.4	
10020.00	-16.1	V	3.0	40.6	1.0	-55.7	-25.0	-30.7	
5010.00	-9.2	H	3.0	43.8	1.0	-52.0	-25.0	-27.0	
7515.00	-17.4	H	3.0	42.5	1.0	-58.9	-25.0	-33.9	
10020.00	-16.0	H	3.0	40.6	1.0	-55.5	-25.0	-30.5	
Mid Ch, 2535MHz									
5070.00	-13.1	V	3.0	43.8	1.0	-55.8	-25.0	-30.8	
7605.00	-18.3	V	4.0	42.4	2.0	-56.2	-25.0	-31.2	
10140.00	-15.9	V	3.0	40.6	1.0	-55.5	-25.0	-30.5	
5070.00	-11.3	H	3.0	43.8	1.0	-54.1	-25.0	-29.1	
7605.00	-17.8	H	3.0	42.4	1.0	-59.2	-25.0	-34.2	
10140.00	-15.8	H	3.0	40.6	1.0	-55.4	-25.0	-30.4	
High Ch, 2565MHz									
5130.00	-9.6	V	3.0	43.8	1.0	-52.4	-25.0	-27.4	
7695.00	-18.2	V	3.0	42.4	1.0	-59.6	-25.0	-34.6	
10260.00	-15.9	V	3.0	40.6	1.0	-55.6	-25.0	-30.6	
5130.00	-7.0	H	3.0	43.8	1.0	-49.8	-25.0	-24.8	
7695.00	-18.3	H	3.0	42.4	1.0	-59.6	-25.0	-34.6	
10260.00	-15.9	H	3.0	40.6	1.0	-55.5	-25.0	-30.5	

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LTE Band 12

LTE

Band 12

1.4MHz

QPSK

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

Company:	Samsung
Project #:	4788768228
Date:	2019-03-05
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, Y-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 12 Harmonics, 1.4MHz 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, 699.7MHz									
1399.40	-8.4	V	3.0	43.8	1.0	-51.2	-13.0	-38.2	
2099.10	-13.7	V	3.0	43.3	1.0	-56.0	-13.0	-43.0	
2798.80	-11.5	V	3.0	43.5	1.0	-53.9	-13.0	-40.9	
1399.40	-11.5	H	3.0	43.8	1.0	-54.3	-13.0	-41.3	
2099.10	-14.8	H	3.0	43.3	1.0	-57.1	-13.0	-44.1	
2798.80	-12.2	H	3.0	43.5	1.0	-54.6	-13.0	-41.6	
Mid Ch, 707.5MHz									
1415.00	-5.5	V	3.0	43.8	1.0	-48.2	-13.0	-35.2	
2122.50	-13.7	V	3.0	43.3	1.0	-56.1	-13.0	-43.1	
2830.00	-11.6	V	3.0	43.5	1.0	-54.1	-13.0	-41.1	
1415.00	-8.4	H	3.0	43.8	1.0	-51.2	-13.0	-38.2	
2122.50	-14.5	H	3.0	43.3	1.0	-56.9	-13.0	-43.9	
2830.00	-12.0	H	3.0	43.5	1.0	-54.5	-13.0	-41.5	
High Ch, 715.3MHz									
1430.60	-9.4	V	3.0	43.8	1.0	-52.1	-13.0	-39.1	
2145.90	-13.7	V	3.0	43.3	1.0	-56.0	-13.0	-43.0	
2861.20	-11.5	V	3.0	43.5	1.0	-54.0	-13.0	-41.0	
1430.60	-12.8	H	3.0	43.8	1.0	-55.6	-13.0	-42.6	
2145.90	-14.6	H	3.0	43.3	1.0	-56.9	-13.0	-43.9	
2861.20	-11.8	H	3.0	43.5	1.0	-54.3	-13.0	-41.3	

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LTE Band 14

LTE

Band 14

5MHz

QPSK

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

Company:	Samsung
Project #:	4788768228
Date:	2019-03-06
Test Engineer:	45585
Configuration:	EUT / AC Adapter / Earphone, X-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 14 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, 790.5MHz									
1581.00	-27.4	V	3.0	38.2	1.0	-64.6	-40.0	-24.6	
2371.50	-12.8	V	3.0	38.7	1.0	-50.5	-13.0	-37.5	
3162.00	-9.7	V	3.0	39.4	1.0	-48.0	-13.0	-35.0	
1581.00	-23.5	H	3.0	38.2	1.0	-60.7	-40.0	-20.7	
2371.50	-13.5	H	3.0	38.7	1.0	-51.2	-13.0	-38.2	
3162.00	-10.6	H	3.0	39.4	1.0	-48.9	-13.0	-35.9	
Mid Ch, 793MHz									
1586.00	-25.5	V	3.0	38.2	1.0	-62.7	-40.0	-22.7	
2379.00	-12.8	V	3.0	38.7	1.0	-50.6	-13.0	-37.6	
3172.00	-10.3	V	3.0	39.4	1.0	-48.7	-13.0	-35.7	
1586.00	-23.6	H	3.0	38.2	1.0	-60.8	-40.0	-20.8	
2379.00	-13.5	H	3.0	38.7	1.0	-51.3	-13.0	-38.3	
3172.00	-10.6	H	3.0	39.4	1.0	-49.0	-13.0	-36.0	
High Ch, 795.5MHz									
1591.00	-25.3	V	3.0	38.2	1.0	-62.5	-40.0	-22.5	
2386.50	-12.7	V	3.0	38.7	1.0	-50.4	-13.0	-37.4	
3182.00	-9.8	V	3.0	39.4	1.0	-48.2	-13.0	-35.2	
1591.00	-22.8	H	3.0	38.2	1.0	-60.0	-40.0	-20.0	
2386.50	-13.2	H	3.0	38.7	1.0	-50.9	-13.0	-37.9	
3182.00	-9.9	H	3.0	39.4	1.0	-48.3	-13.0	-35.3	

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LTE Band 30

LTE

Band 30

5MHz

QPSK

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

Company:	Samsung
Project #:	4788768228
Date:	2019-04-08
Test Engineer:	45585
Configuration:	EUT / AC Adapter / Earphone Y-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 30 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, 2307.5MHz									
4615.00	-7.4	V	3.0	43.8	1.0	-50.2	-40.0	-10.2	
6922.50	-14.9	V	3.0	42.8	1.0	-56.7	-40.0	-16.7	
9230.00	-6.4	V	3.0	41.3	1.0	-46.6	-40.0	-6.6	
4615.00	-7.3	H	3.0	43.8	1.0	-50.1	-40.0	-10.1	
6922.50	-14.0	H	3.0	42.8	1.0	-55.8	-40.0	-15.8	
9230.00	-10.1	H	3.0	41.3	1.0	-50.4	-40.0	-10.4	
Mid Ch, 2310MHz									
4620.00	-8.1	V	3.0	43.8	1.0	-50.9	-40.0	-10.9	
6930.00	-13.9	V	3.0	42.8	1.0	-55.7	-40.0	-15.7	
9240.00	-6.5	V	3.0	41.3	1.0	-46.8	-40.0	-6.8	
4620.00	-8.5	H	3.0	43.8	1.0	-51.3	-40.0	-11.3	
6930.00	-10.3	H	3.0	42.8	1.0	-52.1	-40.0	-12.1	
9240.00	-10.5	H	3.0	41.3	1.0	-50.8	-40.0	-10.8	
High Ch, 2312.5MHz									
4625.00	-9.0	V	3.0	43.8	1.0	-51.8	-40.0	-11.8	
6937.50	-12.6	V	3.0	42.8	1.0	-54.4	-40.0	-14.4	
9250.00	-7.0	V	3.0	41.3	1.0	-47.2	-40.0	-7.2	
4625.00	-13.0	H	3.0	43.8	1.0	-55.8	-40.0	-15.8	
6937.50	-8.8	H	3.0	42.8	1.0	-50.6	-40.0	-10.6	
9250.00	-11.5	H	3.0	41.3	1.0	-51.7	-40.0	-11.7	

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LTE Band 40 (Lower side)

LTE
Band 40
10 MHz
QPSK
Lower side

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

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 1
Mode: LTE_QPSK_Band 40 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, 2310MHz									
4620.00	-17.7	V	3.0	43.8	1.0	-60.6	-25.0	-35.6	
6930.00	-8.9	V	3.0	42.8	1.0	-50.6	-25.0	-25.6	
9240.00	-14.2	V	3.0	41.3	1.0	-54.5	-25.0	-29.5	
4620.00	-14.2	H	3.0	43.8	1.0	-57.0	-25.0	-32.0	
6930.00	-7.8	H	3.0	42.8	1.0	-49.6	-25.0	-24.6	
9240.00	-14.2	H	3.0	41.3	1.0	-54.5	-25.0	-29.5	

LTE
Band 40
10 MHz
16QAM
Lower side

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

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 1
Mode: LTE_16QAM_Band 40 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, 2310MHz									
4620.00	-15.0	V	3.0	43.8	1.0	-57.8	-25.0	-32.8	
6930.00	-7.1	V	3.0	42.8	1.0	-48.9	-25.0	-23.9	
9240.00	-14.6	V	3.0	41.3	1.0	-54.9	-25.0	-29.9	
4620.00	-13.6	H	3.0	43.8	1.0	-56.4	-25.0	-31.4	
6930.00	-7.0	H	3.0	42.8	1.0	-48.7	-25.0	-23.7	
9240.00	-14.7	H	3.0	41.3	1.0	-54.9	-25.0	-29.9	

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LTE
Band 40
5 MHz
QPSK
Lower side

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

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 1
Mode: LTE_QPSK_Band 40 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, 2307.5MHz									
4615.00	-16.3	V	3.0	43.8	1.0	-59.2	-25.0	-34.2	
6922.50	-9.6	V	3.0	42.8	1.0	-51.4	-25.0	-26.4	
9230.00	-16.3	V	3.0	41.3	1.0	-56.6	-25.0	-31.6	
4615.00	-14.1	H	3.0	43.8	1.0	-56.9	-25.0	-31.9	
6922.50	-10.2	H	3.0	42.8	1.0	-52.0	-25.0	-27.0	
9230.00	-15.9	H	3.0	41.3	1.0	-56.2	-25.0	-31.2	
Mid Ch, 2310MHz									
4620.00	-16.7	V	3.0	43.8	1.0	-59.5	-25.0	-34.5	
6930.00	-10.0	V	3.0	42.8	1.0	-51.8	-25.0	-26.8	
9240.00	-15.9	V	3.0	41.3	1.0	-56.2	-25.0	-31.2	
4620.00	-13.6	H	3.0	43.8	1.0	-56.4	-25.0	-31.4	
6930.00	-7.5	H	3.0	42.8	1.0	-49.3	-25.0	-24.3	
9240.00	-15.9	H	3.0	41.3	1.0	-56.2	-25.0	-31.2	
High Ch, 2312.5MHz									
4625.00	-16.5	V	3.0	43.8	1.0	-59.3	-25.0	-34.3	
6937.50	-10.1	V	3.0	42.8	1.0	-51.9	-25.0	-26.9	
9250.00	-16.1	V	3.0	41.3	1.0	-56.4	-25.0	-31.4	
4625.00	-16.1	H	3.0	43.8	1.0	-59.0	-25.0	-34.0	
6937.50	-11.3	H	3.0	42.8	1.0	-53.1	-25.0	-28.1	
9250.00	-15.9	H	3.0	41.3	1.0	-56.1	-25.0	-31.1	

LTE
Band 40
5 MHz
16QAM
Lower side

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

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / AC Adpater / Earphone, Z-Position
Location: Chamber 1
Mode: LTE_16QAM_Band 40 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, 2307.5MHz									
4615.00	-16.0	V	3.0	43.8	1.0	-58.9	-25.0	-33.9	
6922.50	-8.2	V	3.0	42.8	1.0	-50.0	-25.0	-25.0	
9230.00	-16.1	V	3.0	41.3	1.0	-56.4	-25.0	-31.4	
4615.00	-14.2	H	3.0	43.8	1.0	-57.0	-25.0	-32.0	
6922.50	-8.6	H	3.0	42.8	1.0	-50.4	-25.0	-25.4	
9230.00	-16.0	H	3.0	41.3	1.0	-56.3	-25.0	-31.3	
Mid Ch, 2310MHz									
4620.00	-16.5	V	3.0	43.8	1.0	-59.4	-25.0	-34.4	
6930.00	-8.7	V	3.0	42.8	1.0	-50.5	-25.0	-25.5	
9240.00	-16.1	V	3.0	41.3	1.0	-56.4	-25.0	-31.4	
4620.00	-13.5	H	3.0	43.8	1.0	-56.3	-25.0	-31.3	
6930.00	-6.1	H	3.0	42.8	1.0	-47.9	-25.0	-22.9	
9240.00	-15.9	H	3.0	41.3	1.0	-56.1	-25.0	-31.1	
High Ch, 2312.5MHz									
4625.00	-17.3	V	3.0	43.8	1.0	-60.1	-25.0	-35.1	
6937.50	-8.8	V	3.0	42.8	1.0	-50.6	-25.0	-25.6	
9250.00	-16.3	V	3.0	41.3	1.0	-56.6	-25.0	-31.6	
4625.00	-16.1	H	3.0	43.8	1.0	-58.9	-25.0	-33.9	
6937.50	-11.5	H	3.0	42.8	1.0	-53.3	-25.0	-28.3	
9250.00	-15.9	H	3.0	41.3	1.0	-56.2	-25.0	-31.2	

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LTE Band 40 (Upper side)

LTE
Band 40
10 MHz
QPSK
Upper side

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

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 1
Mode: LTE_QPSK_Band 40 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, 2355MHz									
4710.00	-15.8	V	3.0	43.8	1.0	-58.6	-25.0	-33.6	
7065.00	-12.2	V	3.0	42.7	1.0	-53.9	-25.0	-28.9	
9420.00	-13.9	V	3.0	41.1	1.0	-54.0	-25.0	-29.0	
4710.00	-15.3	H	3.0	43.8	1.0	-58.1	-25.0	-33.1	
7065.00	-13.1	H	3.0	42.7	1.0	-54.8	-25.0	-29.8	
9420.00	-13.5	H	3.0	41.1	1.0	-53.6	-25.0	-28.6	

LTE
Band 40
10 MHz
16QAM
Upper side

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

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 1
Mode: LTE_16QAM_Band 40 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, 2355MHz									
4710.00	-15.6	V	3.0	43.8	1.0	-58.4	-25.0	-33.4	
7065.00	-10.3	V	3.0	42.7	1.0	-52.0	-25.0	-27.0	
9420.00	-14.4	V	3.0	41.1	1.0	-54.5	-25.0	-29.5	
4710.00	-14.9	H	3.0	43.8	1.0	-57.7	-25.0	-32.7	
7065.00	-12.4	H	3.0	42.7	1.0	-54.1	-25.0	-29.1	
9420.00	-13.9	H	3.0	41.1	1.0	-54.0	-25.0	-29.0	

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LTE
Band 40
5 MHz
QPSK
Upper side

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

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / AC Adapter / Earphone, Z-Position
Location: Chamber 1
Mode: LTE_QPSK_Band 40 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, 2352.5MHz									
4705.00	-17.3	V	3.0	43.8	1.0	-60.1	-25.0	-35.1	
7057.50	-11.7	V	3.0	42.7	1.0	-53.4	-25.0	-28.4	
9410.00	-15.8	V	3.0	41.1	1.0	-56.0	-25.0	-31.0	
4705.00	-15.0	H	3.0	43.8	1.0	-57.9	-25.0	-32.9	
7057.50	-14.2	H	3.0	42.7	1.0	-55.9	-25.0	-30.9	
9410.00	-15.8	H	3.0	41.1	1.0	-55.9	-25.0	-30.9	
Mid Ch, 2355MHz									
4710.00	-16.4	V	3.0	43.8	1.0	-59.2	-25.0	-34.2	
7065.00	-12.0	V	3.0	42.7	1.0	-53.7	-25.0	-28.7	
9420.00	-15.7	V	3.0	41.1	1.0	-55.8	-25.0	-30.8	
4710.00	-16.4	H	3.0	43.8	1.0	-59.2	-25.0	-34.2	
7065.00	-14.2	H	3.0	42.7	1.0	-55.9	-25.0	-30.9	
9420.00	-15.6	H	3.0	41.1	1.0	-55.7	-25.0	-30.7	
High Ch, 2357.5MHz									
4715.00	-17.0	V	3.0	43.8	1.0	-59.9	-25.0	-34.9	
7072.50	-12.8	V	3.0	42.7	1.0	-54.5	-25.0	-29.5	
9430.00	-15.8	V	3.0	41.1	1.0	-55.9	-25.0	-30.9	
4715.00	-17.1	H	3.0	43.8	1.0	-59.9	-25.0	-34.9	
7072.50	-15.3	H	3.0	42.7	1.0	-57.0	-25.0	-32.0	
9430.00	-15.4	H	3.0	41.1	1.0	-55.5	-25.0	-30.5	

LTE
Band 40
5 MHz
16QAM
Upper side

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

Company: Samsung
Project #: 4788768228
Date: 2019-05-20
Test Engineer: 45585
Configuration: EUT / AC Adpater / Earphone, Z-Position
Location: Chamber 1
Mode: LTE_16QAM_Band 40 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, 2352.5MHz									
4705.00	-16.6	V	3.0	43.8	1.0	-59.4	-25.0	-34.4	
7057.50	-10.8	V	3.0	42.7	1.0	-52.5	-25.0	-27.5	
9410.00	-15.7	V	3.0	41.1	1.0	-55.8	-25.0	-30.8	
4705.00	-16.6	H	3.0	43.8	1.0	-59.4	-25.0	-34.4	
7057.50	-14.2	H	3.0	42.7	1.0	-55.9	-25.0	-30.9	
9410.00	-15.9	H	3.0	41.1	1.0	-56.0	-25.0	-31.0	
Mid Ch, 2355MHz									
4710.00	-17.5	V	3.0	43.8	1.0	-60.3	-25.0	-35.3	
7065.00	-12.8	V	3.0	42.7	1.0	-54.5	-25.0	-29.5	
9420.00	-15.7	V	3.0	41.1	1.0	-55.8	-25.0	-30.8	
4710.00	-18.3	H	3.0	43.8	1.0	-61.1	-25.0	-36.1	
7065.00	-13.3	H	3.0	42.7	1.0	-55.0	-25.0	-30.0	
9420.00	-15.6	H	3.0	41.1	1.0	-55.7	-25.0	-30.7	
High Ch, 2357.5MHz									
4715.00	-16.6	V	3.0	43.8	1.0	-59.4	-25.0	-34.4	
7072.50	-11.9	V	3.0	42.7	1.0	-53.6	-25.0	-28.6	
9430.00	-15.8	V	3.0	41.1	1.0	-55.9	-25.0	-30.9	
4715.00	-16.2	H	3.0	43.8	1.0	-59.1	-25.0	-34.1	
7072.50	-14.1	H	3.0	42.7	1.0	-55.8	-25.0	-30.8	
9430.00	-15.5	H	3.0	41.1	1.0	-55.6	-25.0	-30.6	

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LTE Band 41

LTE

Band 41

15MHz

QPSK

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

Company:	Samsung
Project #:	4788768228
Date:	2019-03-06
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, Z-Position
Location:	Chamber 2
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	-10.0	V	3.0	39.8	1.0	-48.7	-25.0	-23.7	
7510.50	-13.9	V	3.0	39.4	1.0	-52.3	-25.0	-27.3	
10014.00	-13.7	V	3.0	38.6	1.0	-51.3	-25.0	-26.3	
5007.00	-13.3	H	3.0	39.8	1.0	-52.0	-25.0	-27.0	
7510.50	-12.7	H	3.0	39.4	1.0	-51.1	-25.0	-26.1	
10014.00	-13.8	H	3.0	38.6	1.0	-51.4	-25.0	-26.4	
Mid Ch, 2593MHz									
5186.00	-10.0	V	3.0	39.8	1.0	-48.8	-25.0	-23.8	
7779.00	-12.4	V	3.0	39.3	1.0	-50.7	-25.0	-25.7	
10372.00	-13.1	V	3.0	38.6	1.0	-50.6	-25.0	-25.6	
5186.00	-11.9	H	3.0	39.8	1.0	-50.8	-25.0	-25.8	
7779.00	-12.7	H	3.0	39.3	1.0	-50.9	-25.0	-25.9	
10372.00	-13.0	H	3.0	38.6	1.0	-50.5	-25.0	-25.5	
High Ch, 2682.5MHz									
5365.00	-7.2	V	3.0	39.9	1.0	-46.1	-25.0	-21.1	
8047.50	-11.1	V	3.0	39.2	1.0	-49.2	-25.0	-24.2	
10730.00	-12.2	V	3.0	38.5	1.0	-49.8	-25.0	-24.8	
5365.00	-6.5	H	3.0	39.9	1.0	-45.3	-25.0	-20.3	
8047.50	-13.4	H	3.0	39.2	1.0	-51.6	-25.0	-26.6	
10730.00	-12.2	H	3.0	38.5	1.0	-49.7	-25.0	-24.7	

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LTE Band 66

LTE

Band 66

15MHz

QPSK

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

Company:	Samsung
Project #:	4788768228
Date:	2019-03-05
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, Y-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 66 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, 1717.5MHz									
3435.00	-9.4	V	3.0	43.7	1.0	-52.1	-13.0	-39.1	
5152.50	-9.3	V	3.0	43.8	1.0	-52.1	-13.0	-39.1	
6870.00	-6.2	V	3.0	42.8	1.0	-48.0	-13.0	-35.0	
3435.00	-9.8	H	3.0	43.7	1.0	-52.5	-13.0	-39.5	
5152.50	-9.4	H	3.0	43.8	1.0	-52.1	-13.0	-39.1	
6870.00	-6.1	H	3.0	42.8	1.0	-48.0	-13.0	-35.0	
Mid Ch, 1745MHz									
3490.00	-9.0	V	3.0	43.7	1.0	-51.7	-13.0	-38.7	
5235.00	-8.8	V	3.0	43.8	1.0	-51.6	-13.0	-38.6	
6980.00	-6.0	V	3.0	42.7	1.0	-47.7	-13.0	-34.7	
3490.00	-8.0	H	3.0	43.7	1.0	-50.7	-13.0	-37.7	
5235.00	-8.9	H	3.0	43.8	1.0	-51.7	-13.0	-38.7	
6980.00	-5.9	H	3.0	42.7	1.0	-47.7	-13.0	-34.7	
High Ch, 1772.5MHz									
3545.00	-8.2	V	3.0	43.7	1.0	-50.9	-13.0	-37.9	
5317.50	-8.6	V	3.0	43.7	1.0	-51.3	-13.0	-38.3	
7090.00	-5.8	V	3.0	42.7	1.0	-47.5	-13.0	-34.5	
3545.00	-8.0	H	3.0	43.7	1.0	-50.7	-13.0	-37.7	
5317.50	-8.7	H	3.0	43.7	1.0	-51.4	-13.0	-38.4	
7090.00	-5.7	H	3.0	42.7	1.0	-47.4	-13.0	-34.4	

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 38

LTE Band 38 (Frequency range: 2570-2620 MHz) is covered by LTE Band 41 (Frequency range: 2496-2690 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

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