LTE Band 5 1.4MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805451
Date: 2018-12-20
Test Engineer: 45585
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	21.60	V	3.0	-1.5	17.12	38.5	-21.4	
824.70	9.31	H	3.0	-1.5	4.82	38.5	-33.7	
Mid Ch								
836.50	21.97	V	3.0	-1.4	17.51	38.5	-21.0	
836.50	8.19	H	3.0	-1.4	3.72	38.5	-34.8	
High Ch								
848.30	22.52	V	3.1	-1.4	18.08	38.5	-20.4	
848.30	9.34	H	3.1	-1.4	4.90	38.5	-33.6	

LTE Band 5 1.4MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805451
Date: 2018-12-20
Test Engineer: 45585
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	20.27	V	3.0	-1.5	15.79	38.5	-22.7	
824.70	7.75	H	3.0	-1.5	3.26	38.5	-35.2	
Mid Ch								
836.50	20.11	V	3.0	-1.4	15.65	38.5	-22.9	
836.50	7.14	H	3.0	-1.4	2.67	38.5	-35.8	
High Ch								
848.30	21.43	V	3.1	-1.4	16.99	38.5	-21.5	
848.30	8.06	H	3.1	-1.4	3.62	38.5	-34.9	

LTE Band 12

LTE Band 12 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-07
Test Engineer: 47989
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
704.00	13.64	V	2.8	-1.6	9.26	34.8	-25.5	
704.00	20.50	H	2.8	-1.6	16.11	34.8	-18.7	
Mid Ch								
707.50	10.35	V	2.8	-1.6	5.97	34.8	-28.8	
707.50	22.14	H	2.8	-1.6	17.76	34.8	-17.0	
High Ch								
711.00	10.04	V	2.8	-1.6	5.64	34.8	-29.2	
711.00	21.16	H	2.8	-1.6	16.76	34.8	-18.0	

LTE Band 12 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-07
Test Engineer: 47989
Configuration: EUT, X-Position
Location: Chamber 2
Mode: LTE_16QAM Band 12 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
704.00	9.09	V	2.8	-1.6	4.71	34.8	-30.1	
704.00	19.33	H	2.8	-1.6	14.94	34.8	-19.9	
Mid Ch								
707.50	9.05	V	2.8	-1.6	4.67	34.8	-30.1	
707.50	21.40	H	2.8	-1.6	17.02	34.8	-17.8	
High Ch								
711.00	9.69	V	2.8	-1.6	5.29	34.8	-29.5	
711.00	20.46	H	2.8	-1.6	16.06	34.8	-18.7	

LTE

Band 12

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-07
Test Engineer:	47989
Configuration:	EUT, X-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 12 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
701.50	10.13	V	2.8	-1.6	5.75	34.8	-29.0	
701.50	20.12	H	2.8	-1.6	15.74	34.8	-19.1	
Mid Ch								
707.50	10.43	V	2.8	-1.6	6.05	34.8	-28.8	
707.50	21.60	H	2.8	-1.6	17.22	34.8	-17.6	
High Ch								
713.50	11.44	V	2.8	-1.6	7.04	34.8	-27.8	
713.50	22.39	H	2.8	-1.6	18.00	34.8	-16.8	

LTE

Band 12

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-07
Test Engineer:	47989
Configuration:	EUT, X-Position
Location:	Chamber 2
Mode:	LTE_16QAM Band 12 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
701.50	9.73	V	2.8	-1.6	5.35	34.8	-29.4	
701.50	19.00	H	2.8	-1.6	14.62	34.8	-20.2	
Mid Ch								
707.50	9.85	V	2.8	-1.6	5.47	34.8	-29.3	
707.50	21.25	H	2.8	-1.6	16.87	34.8	-17.9	
High Ch								
713.50	9.57	V	2.8	-1.6	5.17	34.8	-29.6	
713.50	21.47	H	2.8	-1.6	17.08	34.8	-17.7	

LTE

Band 12

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-07
Test Engineer:	47989
Configuration:	EUT, X-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 12 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
700.50	9.79	V	2.8	-1.6	5.41	34.8	-29.4	
700.50	20.09	H	2.8	-1.6	15.71	34.8	-19.1	
Mid Ch								
707.50	10.42	V	2.8	-1.6	6.04	34.8	-28.8	
707.50	21.33	H	2.8	-1.6	16.95	34.8	-17.9	
High Ch								
714.50	11.58	V	2.8	-1.6	7.18	34.8	-27.6	
714.50	22.66	H	2.8	-1.6	18.26	34.8	-16.5	

LTE

Band 12

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-07
Test Engineer:	47989
Configuration:	EUT, X-Position
Location:	Chamber 2
Mode:	LTE_16QAM Band 12 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
700.50	9.13	V	2.8	-1.6	4.75	34.8	-30.0	
700.50	19.19	H	2.8	-1.6	14.81	34.8	-20.0	
Mid Ch								
707.50	9.42	V	2.8	-1.6	5.04	34.8	-29.8	
707.50	20.51	H	2.8	-1.6	16.13	34.8	-18.7	
High Ch								
714.50	9.99	V	2.8	-1.6	5.59	34.8	-29.2	
714.50	20.95	H	2.8	-1.6	16.55	34.8	-18.2	

LTE

Band 12

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-07
Test Engineer:	45585
Configuration:	EUT / X-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
699.70	11.03	V	2.8	-1.6	6.65	34.8	-28.2	
699.70	20.10	H	2.8	-1.6	15.73	34.8	-19.1	
Mid Ch								
707.50	10.46	V	2.8	-1.6	6.08	34.8	-28.7	
707.50	21.53	H	2.8	-1.6	17.15	34.8	-17.7	
High Ch								
715.30	12.02	V	2.8	-1.6	7.62	34.8	-27.2	
715.30	22.43	H	2.8	-1.6	18.03	34.8	-16.8	

LTE

Band 12

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-07
Test Engineer:	45585
Configuration:	EUT / X-Position
Location:	Chamber 2
Mode:	LTE_16QAM Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
699.70	10.04	V	2.8	-1.6	5.66	34.8	-29.1	
699.70	19.07	H	2.8	-1.6	14.70	34.8	-20.1	
Mid Ch								
707.50	9.78	V	2.8	-1.6	5.40	34.8	-29.4	
707.50	20.53	H	2.8	-1.6	16.15	34.8	-18.7	
High Ch								
715.30	11.07	V	2.8	-1.6	6.67	34.8	-28.1	
715.30	21.63	H	2.8	-1.6	17.23	34.8	-17.6	

LTE Band 13

LTE Band 13 10MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-08
Test Engineer: 47989
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 13 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
782.00	21.14	V	2.9	-1.6	16.64	34.8	-18.1	
782.00	4.16	H	2.9	-1.6	-0.34	34.8	-35.1	

LTE Band 13 10MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-08
Test Engineer: 47989
Configuration: EUT, Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 13 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
782.00	20.12	V	2.9	-1.6	15.62	34.8	-19.2	
782.00	3.88	H	2.9	-1.6	-0.62	34.8	-35.4	

LTE

Band 13

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-08
Test Engineer:	47989
Configuration:	EUT, Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 13 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
779.50	21.56	V	2.9	-1.6	17.06	34.8	-17.7	
779.50	5.63	H	2.9	-1.6	1.13	34.8	-33.6	
Mid Ch								
782.00	21.20	V	2.9	-1.6	16.70	34.8	-18.1	
782.00	7.03	H	2.9	-1.6	2.53	34.8	-32.2	
High Ch								
784.50	20.96	V	2.9	-1.6	16.46	34.8	-18.3	
784.50	4.22	H	2.9	-1.6	-0.29	34.8	-35.1	

LTE

Band 13

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-08
Test Engineer:	47989
Configuration:	EUT, Z-Position
Location:	Chamber 2
Mode:	LTE_16QAM Band 13 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
779.50	20.54	V	2.9	-1.6	16.04	34.8	-18.7	
779.50	4.53	H	2.9	-1.6	0.03	34.8	-34.7	
Mid Ch								
782.00	20.79	V	2.9	-1.6	16.29	34.8	-18.5	
782.00	6.59	H	2.9	-1.6	2.09	34.8	-32.7	
High Ch								
784.50	19.97	V	2.9	-1.6	15.47	34.8	-19.3	
784.50	2.77	H	2.9	-1.6	-1.74	34.8	-36.5	

LTE Band 26

LTE Band 26 15MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-09
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
821.50	20.60	V	3.0	-1.5	16.10	50.0	-33.9	Part 90
821.50	6.33	H	3.0	-1.5	1.83	50.0	-48.2	Part 90
Mid Ch								
831.50	21.17	V	3.0	-1.4	16.70	38.5	-21.8	
831.50	7.71	H	3.0	-1.4	3.23	38.5	-35.3	
High Ch								
841.50	21.73	V	3.0	-1.4	17.27	38.5	-21.2	
841.50	6.57	H	3.0	-1.4	2.12	38.5	-36.4	

LTE Band 26 15MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-09
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
821.50	19.84	V	3.0	-1.5	15.34	50.0	-34.7	Part 90
821.50	5.71	H	3.0	-1.5	1.21	50.0	-48.8	Part 90
Mid Ch								
831.50	20.33	V	3.0	-1.4	15.86	38.5	-22.6	
831.50	6.79	H	3.0	-1.4	2.31	38.5	-36.2	
High Ch								
841.50	20.97	V	3.0	-1.4	16.51	38.5	-22.0	
841.50	6.09	H	3.0	-1.4	1.64	38.5	-36.9	

LTE

Band 26

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-09
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
819.00	20.37	V	3.0	-1.5	15.87	50.0	-34.1	Part 90
819.00	6.38	H	3.0	-1.5	1.88	50.0	-48.1	Part 90
Mid Ch								
831.50	21.23	V	3.0	-1.4	16.76	38.5	-21.7	
831.50	7.44	H	3.0	-1.4	2.96	38.5	-35.5	
High Ch								
844.00	21.39	V	3.1	-1.4	16.94	38.5	-21.6	
844.00	6.78	H	3.1	-1.4	2.33	38.5	-36.2	

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-02-01
Test Engineer: 47989
Configuration: EUT / Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 26 Fundamentals, 10MHz Bandwidth

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

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	22.22	V	3.0	-1.5	17.74	50.0	-32.3	Part 90
829.00	7.33	H	3.0	-1.5	2.85	50.0	-47.2	Part 90

LTE

Band 26

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-09
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
819.00	19.58	V	3.0	-1.5	15.08	50.0	-34.9	Part 90
819.00	5.87	H	3.0	-1.5	1.37	50.0	-48.6	Part 90
Mid Ch								
831.50	20.26	V	3.0	-1.4	15.79	38.5	-22.7	
831.50	6.36	H	3.0	-1.4	1.88	38.5	-36.6	
High Ch								
844.00	20.63	V	3.1	-1.4	16.18	38.5	-22.3	
844.00	5.82	H	3.1	-1.4	1.37	38.5	-37.1	

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-02-01
Test Engineer: 47989
Configuration: EUT / Z-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, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	20.86	V	3.0	-1.5	16.38	50.0	-33.6	Part 90
829.00	6.34	H	3.0	-1.5	1.86	50.0	-48.1	Part 90

LTE

Band 26

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-09
Test Engineer:	45585
Configuration:	EUT / Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
816.50	20.53	V	3.0	-1.5	16.03	50.0	-34.0	Part 90
816.50	6.25	H	3.0	-1.5	1.74	50.0	-48.3	Part 90
Mid Ch								
831.50	21.24	V	3.0	-1.4	16.77	38.5	-21.7	
831.50	7.33	H	3.0	-1.4	2.85	38.5	-35.6	
High Ch								
846.50	21.21	V	3.1	-1.4	16.76	38.5	-21.7	
846.50	6.93	H	3.1	-1.4	2.48	38.5	-36.0	

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-02-01
Test Engineer:	47989
Configuration:	EUT / Z-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, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
821.50	21.95	V	3.0	-1.5	17.45	50.0	-32.5	Part 90
821.50	7.25	H	3.0	-1.5	2.76	50.0	-47.2	Part 90
Mid Ch								
826.50	22.07	V	3.0	-1.5	17.59	38.5	-20.9	
826.50	7.27	H	3.0	-1.5	2.79	38.5	-35.7	

LTE

Band 26

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-09
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
816.50	19.43	V	3.0	-1.5	14.93	50.0	-35.1	Part 90
816.50	5.39	H	3.0	-1.5	0.88	50.0	-49.1	Part 90
Mid Ch								
831.50	19.91	V	3.0	-1.4	15.44	38.5	-23.1	
831.50	6.60	H	3.0	-1.4	2.12	38.5	-36.4	
High Ch								
846.50	20.71	V	3.1	-1.4	16.26	38.5	-22.2	
846.50	6.26	H	3.1	-1.4	1.81	38.5	-36.7	

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-02-01
Test Engineer: 47989
Configuration: EUT / Z-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, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
821.50	20.87	V	3.0	-1.5	16.37	50.0	-33.6	Part 90
821.50	5.97	H	3.0	-1.5	1.48	50.0	-48.5	Part 90
Mid Ch								
826.50	20.64	V	3.0	-1.5	16.16	38.5	-22.3	
826.50	5.98	H	3.0	-1.5	1.50	38.5	-37.0	

LTE

Band 26

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-09
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_QPSK Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
815.50	20.47	V	3.0	-1.5	15.96	50.0	-34.0	Part 90
815.50	6.34	H	3.0	-1.5	1.84	50.0	-48.2	Part 90
Mid Ch								
831.50	20.85	V	3.0	-1.4	16.38	38.5	-22.1	
831.50	6.84	H	3.0	-1.4	2.36	38.5	-36.1	
High Ch								
847.50	21.38	V	3.1	-1.4	16.94	38.5	-21.6	
847.50	7.23	H	3.1	-1.4	2.79	38.5	-35.7	

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-02-01
Test Engineer: 47989
Configuration: EUT / Z-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, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
822.50	21.71	V	3.0	-1.5	17.22	50.0	-32.8	Part 90
822.50	6.74	H	3.0	-1.5	2.25	50.0	-47.8	Part 90
Mid Ch								
825.50	22.13	V	3.0	-1.5	17.65	38.5	-20.9	
825.50	6.86	H	3.0	-1.5	2.38	38.5	-36.1	

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LTE

Band 26

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-09
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
815.50	19.44	V	3.0	-1.5	14.93	50.0	-35.1	Part 90
815.50	5.45	H	3.0	-1.5	0.95	50.0	-49.1	Part 90
Mid Ch								
831.50	19.75	V	3.0	-1.4	15.28	38.5	-23.2	
831.50	6.14	H	3.0	-1.4	1.66	38.5	-36.8	
High Ch								
847.50	20.71	V	3.1	-1.4	16.27	38.5	-22.2	
847.50	6.41	H	3.1	-1.4	1.97	38.5	-36.5	

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-02-01
Test Engineer: 47989
Configuration: EUT / Z-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, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
822.50	20.16	V	3.0	-1.5	15.67	50.0	-34.3	Part 90
822.50	6.24	H	3.0	-1.5	1.75	50.0	-48.3	Part 90
Mid Ch								
825.50	21.11	V	3.0	-1.5	16.63	38.5	-21.9	
825.50	6.35	H	3.0	-1.5	1.87	38.5	-36.6	

LTE

Band 26

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-09
Test Engineer:	45585
Configuration:	EUT / Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 26 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
814.70	20.59	V	3.0	-1.5	16.08	50.0	-33.9	Part 90
814.70	6.36	H	3.0	-1.5	1.85	50.0	-48.2	Part 90
Mid Ch								
831.50	20.77	V	3.0	-1.4	16.30	38.5	-22.2	
831.50	6.92	H	3.0	-1.4	2.44	38.5	-36.1	
High Ch								
848.30	21.26	V	3.1	-1.4	16.82	38.5	-21.7	
848.30	6.84	H	3.1	-1.4	2.40	38.5	-36.1	

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-02-01
Test Engineer:	47989
Configuration:	EUT / Z-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, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
823.30	21.84	V	3.0	-1.5	17.35	50.0	-32.6	Part 90
823.30	6.70	H	3.0	-1.5	2.21	50.0	-47.8	Part 90
Mid Ch								
824.70	21.64	V	3.0	-1.5	17.15	38.5	-21.3	
824.70	6.94	H	3.0	-1.5	2.45	38.5	-36.0	

LTE

Band 26

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-09
Test Engineer: 45585
Configuration: EUT / Z-Position
Location: Chamber 2
Mode: LTE_16QAM Band 26 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: VULB9163-749, and Chamber 2 SMA Cables
Substitution: Dipole 3121_DB4, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
814.70	19.41	V	3.0	-1.5	14.90	50.0	-35.1	Part 90
814.70	5.34	H	3.0	-1.5	0.83	50.0	-49.2	Part 90
Mid Ch								
831.50	19.73	V	3.0	-1.4	15.26	38.5	-23.2	
831.50	5.92	H	3.0	-1.4	1.44	38.5	-37.1	
High Ch								
848.30	20.58	V	3.1	-1.4	16.14	38.5	-22.4	
848.30	6.05	H	3.1	-1.4	1.61	38.5	-36.9	

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-02-01
Test Engineer: 47989
Configuration: EUT / Z-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, 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
823.30	20.78	V	3.0	-1.5	16.29	50.0	-33.7	Part 90
823.30	5.92	H	3.0	-1.5	1.43	50.0	-48.6	Part 90
Mid Ch								
824.70	20.67	V	3.0	-1.5	16.18	38.5	-22.3	
824.70	6.32	H	3.0	-1.5	1.83	38.5	-36.7	

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LTE Band 41

LTE Band 41 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805451
Date: 2019-01-22
Test Engineer: 47989
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2506.00	8.70	V	5.2	9.9	13.37	33.0	-19.6	
2506.00	19.30	H	5.2	9.9	23.97	33.0	-9.0	
Mid Ch								
2593.00	12.31	V	5.3	9.8	16.77	33.0	-16.2	
2593.00	19.86	H	5.3	9.8	24.33	33.0	-8.7	
High Ch								
2680.00	17.36	V	5.4	9.8	21.73	33.0	-11.3	
2680.00	18.15	H	5.4	9.8	22.52	33.0	-10.5	

LTE Band 41 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805451
Date: 2019-01-22
Test Engineer: 47989
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2506.00	17.46	V	5.2	9.9	22.13	33.0	-10.9	
2506.00	18.62	H	5.2	9.9	23.29	33.0	-9.7	
Mid Ch								
2593.00	10.00	V	5.3	9.8	14.46	33.0	-18.5	
2593.00	18.72	H	5.3	9.8	23.19	33.0	-9.8	
High Ch								
2680.00	16.75	V	5.4	9.8	21.12	33.0	-11.9	
2680.00	17.46	H	5.4	9.8	21.83	33.0	-11.2	

LTE

Band 41

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805451
Date:	2019-01-22
Test Engineer:	47989
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2503.50	17.69	V	5.2	9.9	22.37	33.0	-10.6	
2503.50	19.00	H	5.2	9.9	23.67	33.0	-9.3	
Mid Ch								
2593.00	12.54	V	5.3	9.8	17.00	33.0	-16.0	
2593.00	19.64	H	5.3	9.8	24.11	33.0	-8.9	
High Ch								
2682.50	17.10	V	5.4	9.8	21.48	33.0	-11.5	
2682.50	16.67	H	5.4	9.8	21.04	33.0	-12.0	

LTE

Band 41

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805451
Date:	2019-01-22
Test Engineer:	47989
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2503.50	16.94	V	5.2	9.9	21.62	33.0	-11.4	
2503.50	18.04	H	5.2	9.9	22.71	33.0	-10.3	
Mid Ch								
2593.00	11.51	V	5.3	9.8	15.97	33.0	-17.0	
2593.00	18.49	H	5.3	9.8	22.96	33.0	-10.0	
High Ch								
2682.50	15.85	V	5.4	9.8	20.23	33.0	-12.8	
2682.50	17.64	H	5.4	9.8	22.01	33.0	-11.0	

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LTE

Band 41

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805451
Date:	2019-01-22
Test Engineer:	47989
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2501.00	17.49	V	5.2	9.9	22.18	33.0	-10.8	
2501.00	18.96	H	5.2	9.9	23.64	33.0	-9.4	
Mid Ch								
2593.00	13.33	V	5.3	9.8	17.79	33.0	-15.2	
2593.00	19.61	H	5.3	9.8	24.08	33.0	-8.9	
High Ch								
2685.00	13.93	V	5.4	9.8	18.30	33.0	-14.7	
2685.00	17.35	H	5.4	9.8	21.71	33.0	-11.3	

LTE

Band 41

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805451
Date:	2019-01-22
Test Engineer:	47989
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2501.00	17.23	V	5.2	9.9	21.92	33.0	-11.1	
2501.00	18.75	H	5.2	9.9	23.43	33.0	-9.6	
Mid Ch								
2593.00	13.57	V	5.3	9.8	18.03	33.0	-15.0	
2593.00	19.61	H	5.3	9.8	24.08	33.0	-8.9	
High Ch								
2685.00	13.65	V	5.4	9.8	18.02	33.0	-15.0	
2685.00	17.17	H	5.4	9.8	21.53	33.0	-11.5	

LTE

Band 41

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805451
Date: 2019-01-22
Test Engineer: 47989
Configuration: EUT / X-Positiion
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	17.86	V	5.2	9.9	22.55	33.0	-10.5	
2498.50	19.08	H	5.2	9.9	23.77	33.0	-9.2	
Mid Ch								
2593.00	15.56	V	5.3	9.8	20.02	33.0	-13.0	
2593.00	19.29	H	5.3	9.8	23.76	33.0	-9.2	
High Ch								
2687.50	17.34	V	5.4	9.8	21.71	33.0	-11.3	
2687.50	17.70	H	5.4	9.8	22.07	33.0	-10.9	

LTE

Band 41

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805451
Date: 2019-01-22
Test Engineer: 47989
Configuration: EUT / X-Positiion
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	16.97	V	5.2	9.9	21.66	33.0	-11.3	
2498.50	18.46	H	5.2	9.9	23.15	33.0	-9.9	
Mid Ch								
2593.00	16.01	V	5.3	9.8	20.47	33.0	-12.5	
2593.00	18.07	H	5.3	9.8	22.54	33.0	-10.5	
High Ch								
2687.50	17.43	V	5.4	9.8	21.80	33.0	-11.2	
2687.50	18.05	H	5.4	9.8	22.42	33.0	-10.6	

LTE Band 66

LTE Band 66 20MHz QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-11
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	12.04	V	4.3	9.4	17.14	30.0	-12.9	
1720.00	16.29	H	4.3	9.4	21.40	30.0	-8.6	
Mid Ch								
1745.00	10.32	V	4.4	9.5	15.48	30.0	-14.5	
1745.00	17.36	H	4.4	9.5	22.53	30.0	-7.5	
High Ch								
1770.00	8.82	V	4.4	9.6	13.99	30.0	-16.0	
1770.00	18.09	H	4.4	9.6	23.26	30.0	-6.7	

LTE Band 66 20MHz 16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-11
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	11.01	V	4.3	9.4	16.11	30.0	-13.9	
1720.00	14.60	H	4.3	9.4	19.71	30.0	-10.3	
Mid Ch								
1745.00	9.39	V	4.4	9.5	14.55	30.0	-15.4	
1745.00	16.09	H	4.4	9.5	21.26	30.0	-8.7	
High Ch								
1770.00	7.48	V	4.4	9.6	12.65	30.0	-17.4	
1770.00	16.85	H	4.4	9.6	22.02	30.0	-8.0	

LTE

Band 66

15MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-11
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	8.36	V	4.3	9.4	13.46	30.0	-16.5	
1717.50	15.09	H	4.3	9.4	20.19	30.0	-9.8	
Mid Ch								
1745.00	12.50	V	4.4	9.5	17.66	30.0	-12.3	
1745.00	16.85	H	4.4	9.5	22.02	30.0	-8.0	
High Ch								
1772.50	10.78	V	4.4	9.6	15.95	30.0	-14.0	
1772.50	18.37	H	4.4	9.6	23.54	30.0	-6.5	

LTE

Band 66

15MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-11
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	7.07	V	4.3	9.4	12.17	30.0	-17.8	
1717.50	16.65	H	4.3	9.4	21.75	30.0	-8.3	
Mid Ch								
1745.00	11.15	V	4.4	9.5	16.31	30.0	-13.7	
1745.00	15.79	H	4.4	9.5	20.96	30.0	-9.0	
High Ch								
1772.50	9.42	V	4.4	9.6	14.59	30.0	-15.4	
1772.50	17.04	H	4.4	9.6	22.21	30.0	-7.8	

LTE

Band 66

10MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-11
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	9.87	V	4.3	9.4	14.96	30.0	-15.0	
1715.00	17.29	H	4.3	9.4	22.39	30.0	-7.6	
Mid Ch								
1745.00	6.05	V	4.4	9.5	11.21	30.0	-18.8	
1745.00	17.45	H	4.4	9.5	22.62	30.0	-7.4	
High Ch								
1775.00	12.23	V	4.4	9.6	17.40	30.0	-12.6	
1775.00	18.73	H	4.4	9.6	23.90	30.0	-6.1	

LTE

Band 66

10MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-11
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], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	11.10	V	4.3	9.4	16.19	30.0	-13.8	
1715.00	15.25	H	4.3	9.4	20.35	30.0	-9.7	
Mid Ch								
1745.00	6.66	V	4.4	9.5	11.82	30.0	-18.2	
1745.00	15.68	H	4.4	9.5	20.85	30.0	-9.2	
High Ch								
1775.00	11.41	V	4.4	9.6	16.58	30.0	-13.4	
1775.00	17.60	H	4.4	9.6	22.77	30.0	-7.2	

LTE

Band 66

5MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-11
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_QPSK Band 66 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	11.64	V	4.3	9.4	16.73	30.0	-13.3	
1712.50	16.22	H	4.3	9.4	21.31	30.0	-8.7	
Mid Ch								
1745.00	14.26	V	4.4	9.5	19.42	30.0	-10.6	
1745.00	17.51	H	4.4	9.5	22.68	30.0	-7.3	
High Ch								
1777.50	12.57	V	4.4	9.6	17.74	30.0	-12.3	
1777.50	18.51	H	4.4	9.6	23.68	30.0	-6.3	

LTE

Band 66

5MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company: Samsung
Project #: 4788805413
Date: 2019-01-11
Test Engineer: 47989
Configuration: EUT / X-Position
Location: Chamber 1
Mode: LTE_16QAM Band 66 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	10.74	V	4.3	9.4	15.83	30.0	-14.2	
1712.50	15.20	H	4.3	9.4	20.29	30.0	-9.7	
Mid Ch								
1745.00	13.92	V	4.4	9.5	19.08	30.0	-10.9	
1745.00	16.15	H	4.4	9.5	21.32	30.0	-8.7	
High Ch								
1777.50	11.02	V	4.4	9.6	16.19	30.0	-13.8	
1777.50	17.36	H	4.4	9.6	22.53	30.0	-7.5	

LTE

Band 66

3MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-11
Test Engineer:	45585
Configuration:	EUT / X-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 66 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	14.33	V	4.3	9.4	19.42	30.0	-10.6	
1711.50	15.19	H	4.3	9.4	20.28	30.0	-9.7	
Mid Ch								
1745.00	8.54	V	4.4	9.5	13.70	30.0	-16.3	
1745.00	17.49	H	4.4	9.5	22.66	30.0	-7.3	
High Ch								
1778.50	13.85	V	4.4	9.6	19.02	30.0	-11.0	
1778.50	18.41	H	4.4	9.6	23.58	30.0	-6.4	

LTE

Band 66

3MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-11
Test Engineer:	45585
Configuration:	EUT / X-Position
Location:	Chamber 1
Mode:	LTE_16QAM Band 66 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	13.26	V	4.3	9.4	18.35	30.0	-11.7	
1711.50	14.22	H	4.3	9.4	19.31	30.0	-10.7	
Mid Ch								
1745.00	11.14	V	4.4	9.5	16.30	30.0	-13.7	
1745.00	13.85	H	4.4	9.5	19.02	30.0	-11.0	
High Ch								
1778.50	11.72	V	4.4	9.6	16.89	30.0	-13.1	
1778.50	17.37	H	4.4	9.6	22.54	30.0	-7.5	

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LTE

Band 66

1.4MHz

QPSK

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-11
Test Engineer:	47989
Configuration:	EUT / X-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1710.70	12.33	V	4.3	9.4	17.41	30.0	-12.6	
1710.70	16.04	H	4.3	9.4	21.12	30.0	-8.9	
Mid Ch								
1745.00	8.15	V	4.4	9.5	13.31	30.0	-16.7	
1745.00	17.53	H	4.4	9.5	22.70	30.0	-7.3	
High Ch								
1779.30	12.48	V	4.4	9.6	17.65	30.0	-12.3	
1779.30	18.07	H	4.4	9.6	23.24	30.0	-6.8	

LTE

Band 66

1.4MHz

16QAM

UL Verification Services, Inc.
High Frequency Substitution Measurement

Company:	Samsung
Project #:	4788805413
Date:	2019-01-11
Test Engineer:	47989
Configuration:	EUT / X-Position
Location:	Chamber 1
Mode:	LTE_16QAM Band 66 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn 3117[00168717], and Chamber 1 SMA Cables
Substitution: Horn 3115[00167211], 2.5m SMA-type Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1710.70	10.93	V	4.3	9.4	16.01	30.0	-14.0	
1710.70	14.45	H	4.3	9.4	19.53	30.0	-10.5	
Mid Ch								
1745.00	7.21	V	4.4	9.5	12.37	30.0	-17.6	
1745.00	16.60	H	4.4	9.5	21.77	30.0	-8.2	
High Ch								
1779.30	11.08	V	4.4	9.6	16.25	30.0	-13.7	
1779.30	17.17	H	4.4	9.6	22.34	30.0	-7.7	

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.

(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.

10.2.1. SPURIOUS RADIATION PLOTS

GSM850

GSM850

GPRS

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

Company:	Samsung
Project #:	4788805451
Date:	2019-01-15
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, X-Position
Location:	Chamber 1
Mode:	GPRS 850 MHz Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1648.40	-8.7	V	3.0	43.6	1.0	-51.3	-13.0	-38.3	
2472.60	-6.1	V	3.0	43.4	1.0	-48.5	-13.0	-35.5	
3296.80	-9.6	V	3.0	43.6	1.0	-52.2	-13.0	-39.2	
1648.40	-8.1	H	3.0	43.6	1.0	-50.7	-13.0	-37.7	
2472.60	-4.5	H	3.0	43.4	1.0	-46.9	-13.0	-33.9	
3296.80	-9.6	H	3.0	43.6	1.0	-52.2	-13.0	-39.2	
Mid Ch, 836.6MHz									
1673.20	-7.0	V	3.0	43.6	1.0	-49.6	-13.0	-36.6	
2509.80	-5.3	V	3.0	43.4	1.0	-47.8	-13.0	-34.8	
3346.40	-9.6	V	3.0	43.6	1.0	-52.2	-13.0	-39.2	
1673.20	-8.1	H	3.0	43.6	1.0	-50.7	-13.0	-37.7	
2509.80	-6.1	H	3.0	43.4	1.0	-48.5	-13.0	-35.5	
3346.40	-9.5	H	3.0	43.6	1.0	-52.1	-13.0	-39.1	
High Ch, 848.8MHz									
1697.60	-9.7	V	3.0	43.6	1.0	-52.3	-13.0	-39.3	
2546.40	-8.4	V	3.0	43.4	1.0	-50.8	-13.0	-37.8	
3395.20	-9.1	V	3.0	43.7	1.0	-51.7	-13.0	-38.7	
1697.60	-7.5	H	3.0	43.6	1.0	-50.1	-13.0	-37.1	
2546.40	-5.4	H	3.0	43.4	1.0	-47.8	-13.0	-34.8	
3395.20	-9.0	H	3.0	43.7	1.0	-51.7	-13.0	-38.7	

GSM850

EGPRS

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

Company:	Samsung
Project #:	4788805451
Date:	2019-01-15
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, X-Position
Location:	Chamber 1
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	-13.9	V	3.0	43.6	1.0	-56.5	-13.0	-43.5	
2472.60	-11.3	V	3.0	43.4	1.0	-53.7	-13.0	-40.7	
3296.80	-9.5	V	3.0	43.6	1.0	-52.1	-13.0	-39.1	
1648.40	-14.4	H	3.0	43.6	1.0	-57.0	-13.0	-44.0	
2472.60	-11.7	H	3.0	43.4	1.0	-54.1	-13.0	-41.1	
3296.80	-9.8	H	3.0	43.6	1.0	-52.5	-13.0	-39.5	
Mid Ch, 836.6MHz									
1673.20	-11.3	V	3.0	43.6	1.0	-53.9	-13.0	-40.9	
2509.80	-11.5	V	3.0	43.4	1.0	-53.9	-13.0	-40.9	
3346.40	-9.5	V	3.0	43.6	1.0	-52.1	-13.0	-39.1	
1673.20	-14.2	H	3.0	43.6	1.0	-56.7	-13.0	-43.7	
2509.80	-12.0	H	3.0	43.4	1.0	-54.4	-13.0	-41.4	
3346.40	-9.8	H	3.0	43.6	1.0	-52.5	-13.0	-39.5	
High Ch, 848.8MHz									
1697.60	-13.8	V	3.0	43.6	1.0	-56.3	-13.0	-43.3	
2546.40	-11.4	V	3.0	43.4	1.0	-53.9	-13.0	-40.9	
3395.20	-8.8	V	3.0	43.7	1.0	-51.5	-13.0	-38.5	
1697.60	-14.2	H	3.0	43.6	1.0	-56.8	-13.0	-43.8	
2546.40	-11.8	H	3.0	43.4	1.0	-54.2	-13.0	-41.2	
3395.20	-9.2	H	3.0	43.7	1.0	-51.8	-13.0	-38.8	

GSM1900

GSM1900

GPRS

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

Company:	Samsung
Project #:	4788805451
Date:	2019-01-15
Test Engineer:	47989
Configuration:	EUT / AC Adpater / Earphone, X-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	-8.9	V	3.0	43.8	1.0	-51.7	-13.0	-38.7	
5550.60	-7.3	V	3.0	43.7	1.0	-50.0	-13.0	-37.0	
7400.80	-5.0	V	3.0	42.5	1.0	-46.5	-13.0	-33.5	
3700.40	-6.4	H	3.0	43.8	1.0	-49.2	-13.0	-36.2	
5550.60	-7.4	H	3.0	43.7	1.0	-50.2	-13.0	-37.2	
7400.80	-4.9	H	3.0	42.5	1.0	-46.4	-13.0	-33.4	
Mid Ch, 1880MHz									
3760.00	-7.9	V	3.0	43.8	1.0	-50.7	-13.0	-37.7	
5640.00	-7.4	V	3.0	43.7	1.0	-50.1	-13.0	-37.1	
7520.00	-4.8	V	3.0	42.5	1.0	-46.2	-13.0	-33.2	
3760.00	-7.2	H	3.0	43.8	1.0	-50.0	-13.0	-37.0	
5640.00	-7.5	H	3.0	43.7	1.0	-50.2	-13.0	-37.2	
7520.00	-4.9	H	3.0	42.5	1.0	-46.4	-13.0	-33.4	
High Ch, 1909.8MHz									
3819.60	-7.3	V	3.0	43.8	1.0	-50.2	-13.0	-37.2	
5729.40	-7.3	V	3.0	43.7	1.0	-50.0	-13.0	-37.0	
7639.20	-5.0	V	3.0	42.4	1.0	-46.4	-13.0	-33.4	
3819.60	-4.7	H	3.0	43.8	1.0	-47.5	-13.0	-34.5	
5729.40	-7.8	H	3.0	43.7	1.0	-50.5	-13.0	-37.5	
7639.20	-5.0	H	3.0	42.4	1.0	-46.4	-13.0	-33.4	

GSM1900

EGPRS

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

Company:	Samsung
Project #:	4788805451
Date:	2019-01-15
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, X-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	-10.5	V	3.0	43.8	1.0	-53.2	-13.0	-40.2	
5550.60	-7.5	V	3.0	43.7	1.0	-50.2	-13.0	-37.2	
7400.80	-4.9	V	3.0	42.5	1.0	-46.4	-13.0	-33.4	
3700.40	-9.7	H	3.0	43.8	1.0	-52.4	-13.0	-39.4	
5550.60	-7.5	H	3.0	43.7	1.0	-50.3	-13.0	-37.3	
7400.80	-4.8	H	3.0	42.5	1.0	-46.3	-13.0	-33.3	
Mid Ch, 1880MHz									
3760.00	-9.7	V	3.0	43.8	1.0	-52.5	-13.0	-39.5	
5640.00	-7.0	V	3.0	43.7	1.0	-49.7	-13.0	-36.7	
7520.00	-4.7	V	3.0	42.5	1.0	-46.1	-13.0	-33.1	
3760.00	-9.5	H	3.0	43.8	1.0	-52.3	-13.0	-39.3	
5640.00	-7.8	H	3.0	43.7	1.0	-50.5	-13.0	-37.5	
7520.00	-4.8	H	3.0	42.5	1.0	-46.3	-13.0	-33.3	
High Ch, 1909.8MHz									
3819.60	-9.2	V	3.0	43.8	1.0	-52.0	-13.0	-39.0	
5729.40	-7.3	V	3.0	43.7	1.0	-50.0	-13.0	-37.0	
7639.20	-5.1	V	3.0	42.4	1.0	-46.5	-13.0	-33.5	
3819.60	-8.4	H	3.0	43.8	1.0	-51.2	-13.0	-38.2	
5729.40	-7.4	H	3.0	43.7	1.0	-50.1	-13.0	-37.1	
7639.20	-5.4	H	3.0	42.4	1.0	-46.7	-13.0	-33.7	

WCDMA Band 5

WCDMA

Band 5
REL99

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

Company:	Samsung
Project #:	4788805451
Date:	2019-01-15
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, X-Position
Location:	Chamber 1
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	-14.6	V	3.0	43.6	1.0	-57.2	-13.0	-44.2	
2479.20	-12.0	V	3.0	43.4	1.0	-54.4	-13.0	-41.4	
3305.60	-10.5	V	3.0	43.6	1.0	-53.1	-13.0	-40.1	
1652.80	-15.8	H	3.0	43.6	1.0	-58.4	-13.0	-45.4	
2479.20	-12.6	H	3.0	43.4	1.0	-55.0	-13.0	-42.0	
3305.60	-10.9	H	3.0	43.6	1.0	-53.5	-13.0	-40.5	
Mid Ch, 836.6MHz									
1673.20	-14.6	V	3.0	43.6	1.0	-57.2	-13.0	-44.2	
2509.80	-12.0	V	3.0	43.4	1.0	-54.5	-13.0	-41.5	
3346.40	-10.4	V	3.0	43.6	1.0	-53.1	-13.0	-40.1	
1673.20	-15.2	H	3.0	43.6	1.0	-57.8	-13.0	-44.8	
2509.80	-12.9	H	3.0	43.4	1.0	-55.3	-13.0	-42.3	
3346.40	-9.8	H	3.0	43.6	1.0	-52.5	-13.0	-39.5	
High Ch, 846.6MHz									
1693.20	-14.3	V	3.0	43.6	1.0	-56.8	-13.0	-43.8	
2539.80	-12.2	V	3.0	43.4	1.0	-54.7	-13.0	-41.7	
3386.40	-10.2	V	3.0	43.7	1.0	-52.8	-13.0	-39.8	
1693.20	-14.1	H	3.0	43.6	1.0	-56.6	-13.0	-43.6	
2539.80	-13.1	H	3.0	43.4	1.0	-55.6	-13.0	-42.6	
3386.40	-10.3	H	3.0	43.7	1.0	-53.0	-13.0	-40.0	

WCDMA

Band 5
HSDPA

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

Company:	Samsung
Project #:	4788805451
Date:	2015-01-15
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, X-Position
Location:	Chamber 1
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	-15.2	V	3.0	43.6	1.0	-57.8	-13.0	-44.8	
2479.20	-11.6	V	3.0	43.4	1.0	-54.1	-13.0	-41.1	
3305.60	-10.7	V	3.0	43.6	1.0	-53.4	-13.0	-40.4	
1652.80	-15.8	H	3.0	43.6	1.0	-58.4	-13.0	-45.4	
2479.20	-13.3	H	3.0	43.4	1.0	-55.7	-13.0	-42.7	
3305.60	-10.6	H	3.0	43.6	1.0	-53.2	-13.0	-40.2	
Mid Ch, 836.6MHz									
1673.20	-14.3	V	3.0	43.6	1.0	-56.8	-13.0	-43.8	
2509.80	-12.2	V	3.0	43.4	1.0	-54.7	-13.0	-41.7	
3346.40	-10.7	V	3.0	43.6	1.0	-53.4	-13.0	-40.4	
1673.20	-15.0	H	3.0	43.6	1.0	-57.6	-13.0	-44.6	
2509.80	-12.8	H	3.0	43.4	1.0	-55.2	-13.0	-42.2	
3346.40	-10.0	H	3.0	43.6	1.0	-52.7	-13.0	-39.7	
High Ch, 846.6MHz									
1693.20	-14.3	V	3.0	43.6	1.0	-56.8	-13.0	-43.8	
2539.80	-12.1	V	3.0	43.4	1.0	-54.5	-13.0	-41.5	
3386.40	-10.2	V	3.0	43.7	1.0	-52.8	-13.0	-39.8	
1693.20	-14.3	H	3.0	43.6	1.0	-56.8	-13.0	-43.8	
2539.80	-12.5	H	3.0	43.4	1.0	-54.9	-13.0	-41.9	
3386.40	-9.8	H	3.0	43.7	1.0	-52.4	-13.0	-39.4	

WCDMA Band 4

WCDMA

Band 4
REL99

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

Company:	Samsung
Project #:	4788805413
Date:	2019-01-11
Test Engineer:	45585
Configuration:	EUT / AC Adapter / Earphone, X-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	-47.8	-13.0	-34.8	
6849.60	-6.2	V	3.0	39.7	1.0	-44.9	-13.0	-31.9	
8562.00	-5.3	V	3.0	39.0	1.0	-43.3	-13.0	-30.3	
10274.40	-1.9	V	3.0	38.6	1.0	-39.5	-13.0	-26.5	
3424.80	-8.0	H	3.0	39.5	1.0	-46.5	-13.0	-33.5	
5137.20	-9.7	H	3.0	39.8	1.0	-48.5	-13.0	-35.5	
6849.60	-7.2	H	3.0	39.7	1.0	-45.8	-13.0	-32.8	
8562.00	-6.0	H	3.0	39.0	1.0	-44.0	-13.0	-31.0	
10274.40	-1.8	H	3.0	38.6	1.0	-39.4	-13.0	-26.4	
Mid Ch, 1732.6MHz									
3465.20	-9.3	V	3.0	39.5	1.0	-47.8	-13.0	-34.8	
5197.80	-8.8	V	3.0	39.8	1.0	-47.6	-13.0	-34.6	
6930.40	-6.0	V	3.0	39.7	1.0	-44.7	-13.0	-31.7	
8663.00	-5.2	V	3.0	38.9	1.0	-43.1	-13.0	-30.1	
10395.60	-2.1	V	3.0	38.6	1.0	-39.6	-13.0	-26.6	
3465.20	-8.1	H	3.0	39.5	1.0	-46.6	-13.0	-33.6	
5197.80	-6.6	H	3.0	39.8	1.0	-45.4	-13.0	-32.4	
6930.40	-7.2	H	3.0	39.7	1.0	-45.9	-13.0	-32.9	
8663.00	-6.0	H	3.0	38.9	1.0	-43.9	-13.0	-30.9	
10395.60	-2.0	H	3.0	38.6	1.0	-39.6	-13.0	-26.6	
High Ch, 1752.6MHz									
3505.20	-8.6	V	3.0	39.5	1.0	-47.2	-13.0	-34.2	
5257.80	-9.0	V	3.0	39.8	1.0	-47.8	-13.0	-34.8	
7010.40	-6.0	V	3.0	39.6	1.0	-44.6	-13.0	-31.6	
8763.00	-5.0	V	3.0	38.9	1.0	-42.9	-13.0	-29.9	
10515.60	-1.5	V	3.0	38.6	1.0	-39.0	-13.0	-26.0	
3505.20	-8.7	H	3.0	39.5	1.0	-47.2	-13.0	-34.2	
5257.80	-9.5	H	3.0	39.8	1.0	-48.3	-13.0	-35.3	
7010.40	-7.1	H	3.0	39.6	1.0	-45.7	-13.0	-32.7	
8763.00	-5.7	H	3.0	38.9	1.0	-43.6	-13.0	-30.6	
10515.60	-1.3	H	3.0	38.6	1.0	-38.8	-13.0	-25.8	

WCDMA

Band 4
HSDPA

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

Company:	Samsung
Project #:	4788805413
Date:	2019-01-11
Test Engineer:	45585
Configuration:	EUT / AC Adapter / Earphone
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	-9.6	V	3.0	39.5	1.0	-48.1	-13.0	-35.1	
5137.20	-9.1	V	3.0	39.8	1.0	-47.9	-13.0	-34.9	
6849.60	-6.2	V	3.0	39.7	1.0	-44.9	-13.0	-31.9	
8562.00	-5.4	V	3.0	39.0	1.0	-43.4	-13.0	-30.4	
10274.40	-1.9	V	3.0	38.6	1.0	-39.5	-13.0	-26.5	
3424.80	-8.4	H	3.0	39.5	1.0	-46.9	-13.0	-33.9	
5137.20	-9.7	H	3.0	39.8	1.0	-48.5	-13.0	-35.5	
6849.60	-7.2	H	3.0	39.7	1.0	-45.9	-13.0	-32.9	
8562.00	-6.2	H	3.0	39.0	1.0	-44.1	-13.0	-31.1	
10274.40	-1.8	H	3.0	38.6	1.0	-39.3	-13.0	-26.3	
Mid Ch, 1732.6MHz									
3465.20	-9.3	V	3.0	39.5	1.0	-47.8	-13.0	-34.8	
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	-44.8	-13.0	-31.8	
8663.00	-5.1	V	3.0	38.9	1.0	-43.0	-13.0	-30.0	
10395.60	-2.1	V	3.0	38.6	1.0	-39.7	-13.0	-26.7	
3465.20	-8.0	H	3.0	39.5	1.0	-46.5	-13.0	-33.5	
5197.80	-9.3	H	3.0	39.8	1.0	-48.2	-13.0	-35.2	
6930.40	-7.2	H	3.0	39.7	1.0	-45.8	-13.0	-32.8	
8663.00	-5.9	H	3.0	38.9	1.0	-43.9	-13.0	-30.9	
10395.60	-2.0	H	3.0	38.6	1.0	-39.6	-13.0	-26.6	
High Ch, 1752.6MHz									
3505.20	-8.6	V	3.0	39.5	1.0	-47.1	-13.0	-34.1	
5257.80	-8.8	V	3.0	39.8	1.0	-47.7	-13.0	-34.7	
7010.40	-5.9	V	3.0	39.6	1.0	-44.6	-13.0	-31.6	
8763.00	-4.8	V	3.0	38.9	1.0	-42.7	-13.0	-29.7	
10515.60	-1.5	V	3.0	38.6	1.0	-39.0	-13.0	-26.0	
3505.20	-9.0	H	3.0	39.5	1.0	-47.5	-13.0	-34.5	
5257.80	-9.1	H	3.0	39.8	1.0	-47.9	-13.0	-34.9	
7010.40	-6.8	H	3.0	39.6	1.0	-45.4	-13.0	-32.4	
8763.00	-5.7	H	3.0	38.9	1.0	-43.6	-13.0	-30.6	
10515.60	-1.4	H	3.0	38.6	1.0	-39.0	-13.0	-26.0	

WCDMA Band 2

WCDMA

Band 2
REL99

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

Company:	Samsung
Project #:	4788805451
Date:	2019-01-15
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, X-Position
Location:	Chamber 1
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	-10.0	V	3.0	43.8	1.0	-52.7	-13.0	-39.7	
5557.20	-8.4	V	3.0	43.7	1.0	-51.1	-13.0	-38.1	
7409.60	-6.0	V	3.0	42.5	1.0	-47.5	-13.0	-34.5	
3704.80	-7.2	H	3.0	43.8	1.0	-49.9	-13.0	-36.9	
5557.20	-8.8	H	3.0	43.7	1.0	-51.5	-13.0	-38.5	
7409.60	-6.0	H	3.0	42.5	1.0	-47.5	-13.0	-34.5	
Mid Ch, 1880MHz									
3760.00	-11.4	V	3.0	43.8	1.0	-54.2	-13.0	-41.2	
5640.00	-8.5	V	3.0	43.7	1.0	-51.2	-13.0	-38.2	
7520.00	-6.0	V	3.0	42.5	1.0	-47.4	-13.0	-34.4	
3760.00	-10.0	H	3.0	43.8	1.0	-52.8	-13.0	-39.8	
5640.00	-8.7	H	3.0	43.7	1.0	-51.4	-13.0	-38.4	
7520.00	-5.9	H	3.0	42.5	1.0	-47.3	-13.0	-34.3	
High Ch, 1907.6MHz									
3815.20	-11.5	V	3.0	43.8	1.0	-54.3	-13.0	-41.3	
5722.80	-8.3	V	3.0	43.7	1.0	-51.0	-13.0	-38.0	
7630.40	-5.8	V	3.0	42.4	1.0	-47.2	-13.0	-34.2	
3815.20	-11.4	H	3.0	43.8	1.0	-54.2	-13.0	-41.2	
5722.80	-8.4	H	3.0	43.7	1.0	-51.1	-13.0	-38.1	
7630.40	-6.1	H	3.0	42.4	1.0	-47.5	-13.0	-34.5	

WCDMA

Band 2
HSDPA

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

Company:	Samsung
Project #:	4788805451
Date:	2019-01-15
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone
Location:	Chamber 1
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	-11.5	V	3.0	43.8	1.0	-54.3	-13.0	-41.3	
5557.20	-8.4	V	3.0	43.7	1.0	-51.1	-13.0	-38.1	
7409.60	-6.0	V	3.0	42.5	1.0	-47.5	-13.0	-34.5	
3704.80	-6.9	H	3.0	43.8	1.0	-49.7	-13.0	-36.7	
5557.20	-8.7	H	3.0	43.7	1.0	-51.4	-13.0	-38.4	
7409.60	-5.9	H	3.0	42.5	1.0	-47.4	-13.0	-34.4	
Mid Ch, 1880MHz									
3760.00	-11.0	V	3.0	43.8	1.0	-53.8	-13.0	-40.8	
5640.00	-8.4	V	3.0	43.7	1.0	-51.1	-13.0	-38.1	
7520.00	-6.0	V	3.0	42.5	1.0	-47.5	-13.0	-34.5	
3760.00	-9.9	H	3.0	43.8	1.0	-52.7	-13.0	-39.7	
5640.00	-8.6	H	3.0	43.7	1.0	-51.3	-13.0	-38.3	
7520.00	-5.8	H	3.0	42.5	1.0	-47.3	-13.0	-34.3	
High Ch, 1907.6MHz									
3815.20	-11.5	V	3.0	43.8	1.0	-54.3	-13.0	-41.3	
5722.80	-8.3	V	3.0	43.7	1.0	-51.0	-13.0	-38.0	
7630.40	-5.9	V	3.0	42.4	1.0	-47.2	-13.0	-34.2	
3815.20	-11.3	H	3.0	43.8	1.0	-54.1	-13.0	-41.1	
5722.80	-8.5	H	3.0	43.7	1.0	-51.2	-13.0	-38.2	
7630.40	-5.7	H	3.0	42.4	1.0	-47.1	-13.0	-34.1	

LTE Band 2

LTE

Band 2

3MHz

QPSK

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

Company:	Samsung
Project #:	4788805413
Date:	2019-01-14
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, X-Position
Location:	Chamber 1
Mode:	LTE_QPSK Band 2 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, 1851.5MHz									
3703.00	-11.3	V	3.0	43.8	1.0	-54.1	-13.0	-41.1	
5554.50	-8.5	V	3.0	43.7	1.0	-51.3	-13.0	-38.3	
7406.00	-6.0	V	3.0	42.5	1.0	-47.5	-13.0	-34.5	
3703.00	-11.2	H	3.0	43.8	1.0	-54.0	-13.0	-41.0	
5554.50	-8.3	H	3.0	43.7	1.0	-51.0	-13.0	-38.0	
7406.00	-5.8	H	3.0	42.5	1.0	-47.3	-13.0	-34.3	
Mid Ch, 1880MHz									
3760.00	-11.3	V	3.0	43.8	1.0	-54.1	-13.0	-41.1	
5640.00	-8.6	V	3.0	43.7	1.0	-51.3	-13.0	-38.3	
7520.00	-6.1	V	3.0	42.5	1.0	-47.5	-13.0	-34.5	
3760.00	-11.2	H	3.0	43.8	1.0	-54.0	-13.0	-41.0	
5640.00	-8.7	H	3.0	43.7	1.0	-51.4	-13.0	-38.4	
7520.00	-6.0	H	3.0	42.5	1.0	-47.5	-13.0	-34.5	
High Ch, 1908.5MHz									
3817.00	-11.4	V	3.0	43.8	1.0	-54.2	-13.0	-41.2	
5725.50	-8.3	V	3.0	43.7	1.0	-51.0	-13.0	-38.0	
7634.00	-5.6	V	3.0	42.4	1.0	-47.0	-13.0	-34.0	
3817.00	-11.2	H	3.0	43.8	1.0	-54.0	-13.0	-41.0	
5725.50	-8.5	H	3.0	43.7	1.0	-51.2	-13.0	-38.2	
7634.00	-5.9	H	3.0	42.4	1.0	-47.3	-13.0	-34.3	

LTE Band 5

LTE

Band 5

1.4MHz

QPSK

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

Company:	Samsung
Project #:	4788805451
Date:	2018-12-21
Test Engineer:	45585
Configuration:	EUT / AC Adapter / Earphone, Z-Position
Location:	Chamber 2
Mode:	LTE_QPSK Band 5 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, 824.7MHz									
1649.40	-15.2	V	3.0	38.2	1.0	-52.4	-13.0	-39.4	
2474.10	-12.4	V	3.0	38.8	1.0	-50.2	-13.0	-37.2	
3298.80	-10.1	V	3.0	39.4	1.0	-48.6	-13.0	-35.6	
4123.50	-10.3	V	3.0	39.8	1.0	-49.1	-13.0	-36.1	
4948.20	-9.0	V	3.0	39.8	1.0	-47.8	-13.0	-34.8	
1649.40	-16.0	H	3.0	38.2	1.0	-53.2	-13.0	-40.2	
2474.10	-13.2	H	3.0	38.8	1.0	-51.0	-13.0	-38.0	
3298.80	-10.3	H	3.0	39.4	1.0	-48.7	-13.0	-35.7	
4123.50	-10.6	H	3.0	39.8	1.0	-49.4	-13.0	-36.4	
4948.20	-9.6	H	3.0	39.8	1.0	-48.4	-13.0	-35.4	
Mid Ch, 836.5MHz									
1673.00	-15.1	V	3.0	38.2	1.0	-52.3	-13.0	-39.3	
2509.50	-12.4	V	3.0	38.8	1.0	-50.2	-13.0	-37.2	
3346.00	-10.0	V	3.0	39.5	1.0	-48.5	-13.0	-35.5	
4182.50	-10.0	V	3.0	39.8	1.0	-48.9	-13.0	-35.9	
5019.00	-8.7	V	3.0	39.8	1.0	-47.5	-13.0	-34.5	
1673.00	-16.1	H	3.0	38.2	1.0	-53.3	-13.0	-40.3	
2509.50	-13.0	H	3.0	38.8	1.0	-50.8	-13.0	-37.8	
3346.00	-10.3	H	3.0	39.5	1.0	-48.7	-13.0	-35.7	
4182.50	-10.3	H	3.0	39.8	1.0	-49.1	-13.0	-36.1	
5019.00	-9.4	H	3.0	39.8	1.0	-48.2	-13.0	-35.2	
High Ch, 848.3MHz									
1696.60	-15.0	V	3.0	38.2	1.0	-52.3	-13.0	-39.3	
2544.90	-12.2	V	3.0	38.9	1.0	-50.1	-13.0	-37.1	
3393.20	-9.4	V	3.0	39.5	1.0	-47.9	-13.0	-34.9	
4241.50	-10.1	V	3.0	39.8	1.0	-48.9	-13.0	-35.9	
5089.80	-8.8	V	3.0	39.8	1.0	-47.6	-13.0	-34.6	
1696.60	-15.8	H	3.0	38.2	1.0	-53.1	-13.0	-40.1	
2544.90	-12.7	H	3.0	38.9	1.0	-50.6	-13.0	-37.6	
3393.20	-9.6	H	3.0	39.5	1.0	-48.1	-13.0	-35.1	
4241.50	-10.3	H	3.0	39.8	1.0	-49.1	-13.0	-36.1	
5089.80	-9.4	H	3.0	39.8	1.0	-48.2	-13.0	-35.2	

LTE Band 12

LTE

Band 12

3MHz

QPSK

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

Company:	Samsung
Project #:	4788805413
Date:	2019-01-07
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, X-Position
Location:	Chamber 2
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	-16.4	V	3.0	38.1	1.0	-53.5	-13.0	-40.5	
2101.50	-13.5	V	3.0	38.5	1.0	-50.9	-13.0	-37.9	
2802.00	-11.7	V	3.0	39.1	1.0	-49.8	-13.0	-36.8	
3502.50	-8.6	V	3.0	39.5	1.0	-47.1	-13.0	-34.1	
4203.00	-10.1	V	3.0	39.8	1.0	-48.9	-13.0	-35.9	
1401.00	-17.6	H	3.0	38.1	1.0	-54.7	-13.0	-41.7	
2101.50	-12.6	H	3.0	38.5	1.0	-50.1	-13.0	-37.1	
2802.00	-12.0	H	3.0	39.1	1.0	-50.1	-13.0	-37.1	
3502.50	-8.8	H	3.0	39.5	1.0	-47.3	-13.0	-34.3	
4203.00	-10.4	H	3.0	39.8	1.0	-49.2	-13.0	-36.2	
Mid Ch, 707.5MHz									
1415.00	-16.3	V	3.0	38.1	1.0	-53.4	-13.0	-40.4	
2122.50	-13.5	V	3.0	38.5	1.0	-51.0	-13.0	-38.0	
2830.00	-11.5	V	3.0	39.1	1.0	-49.6	-13.0	-36.6	
3537.50	-8.4	V	3.0	39.6	1.0	-47.0	-13.0	-34.0	
4245.00	-10.2	V	3.0	39.8	1.0	-49.0	-13.0	-36.0	
1415.00	-17.2	H	3.0	38.1	1.0	-54.4	-13.0	-41.4	
2122.50	-13.1	H	3.0	38.5	1.0	-50.6	-13.0	-37.6	
2830.00	-11.9	H	3.0	39.1	1.0	-50.0	-13.0	-37.0	
3537.50	-8.7	H	3.0	39.6	1.0	-47.3	-13.0	-34.3	
4245.00	-10.4	H	3.0	39.8	1.0	-49.2	-13.0	-36.2	
High Ch, 714.5MHz									
1429.00	-16.0	V	3.0	38.1	1.0	-53.1	-13.0	-40.1	
2143.50	-13.3	V	3.0	38.5	1.0	-50.8	-13.0	-37.8	
2858.00	-11.4	V	3.0	39.1	1.0	-49.5	-13.0	-36.5	
3572.50	-7.9	V	3.0	39.6	1.0	-46.5	-13.0	-33.5	
4287.00	-9.8	V	3.0	39.8	1.0	-48.6	-13.0	-35.6	
1429.00	-18.6	H	3.0	38.1	1.0	-55.7	-13.0	-42.7	
2143.50	-12.7	H	3.0	38.5	1.0	-50.2	-13.0	-37.2	
2858.00	-11.9	H	3.0	39.1	1.0	-50.0	-13.0	-37.0	
3572.50	-8.2	H	3.0	39.6	1.0	-46.8	-13.0	-33.8	
4287.00	-10.2	H	3.0	39.8	1.0	-49.0	-13.0	-36.0	

LTE Band 13

LTE

Band 13

10MHz

QPSK

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

Company:	Samsung
Project #:	4788805413
Date:	2019-01-08
Test Engineer:	47989
Configuration:	EUT / AC Adapter / Earphone, Y-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	-14.2	V	3.0	38.2	1.0	-51.4	-40.0	-11.4	
2346.00	-10.4	V	3.0	38.7	1.0	-48.1	-13.0	-35.1	
3128.00	-10.5	V	3.0	39.3	1.0	-48.8	-13.0	-35.8	
3910.00	-10.8	V	3.0	39.8	1.0	-49.6	-13.0	-36.6	
4692.00	-9.4	V	3.0	39.8	1.0	-48.2	-13.0	-35.2	
1564.00	-11.9	H	3.0	38.2	1.0	-49.1	-40.0	-9.1	
2346.00	-10.7	H	3.0	38.7	1.0	-48.4	-13.0	-35.4	
3128.00	-10.9	H	3.0	39.3	1.0	-49.2	-13.0	-36.2	
3910.00	-10.9	H	3.0	39.8	1.0	-49.7	-13.0	-36.7	
4692.00	-9.9	H	3.0	39.8	1.0	-48.7	-13.0	-35.7	