WCDMA Band 5

WCDMA

Band 5
REL99

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 15K22477
Date: 12-15-15
Test Engineer: Steven.kim
Configuration: EUT ONLY, Z Position
Mode: Rel 99_850 MHz

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	21.62	V	1.1	-1.5	19.01	38.5	-19.4	
826.40	4.38	H	1.1	-1.5	1.77	38.5	-36.7	
Mid Ch								
836.60	20.65	V	1.1	-1.4	18.16	38.5	-20.3	
836.60	5.23	H	1.1	-1.4	2.74	38.5	-35.7	
High Ch								
846.60	19.11	V	1.1	-1.3	16.73	38.5	-21.7	
846.60	6.75	H	1.1	-1.3	4.37	38.5	-34.1	

Rev. 3.17.11

WCDMA

Band 5
HSDPA

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 15K22477
Date: 12-15-15
Test Engineer: Steven.kim
Configuration: EUT ONLY, Z Position
Mode: HSDPA_850 MHz

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	20.86	V	1.1	-1.5	18.25	38.5	-20.2	
826.40	3.71	H	1.1	-1.5	1.10	38.5	-37.4	
Mid Ch								
836.60	19.70	V	1.1	-1.4	17.21	38.5	-21.2	
836.60	4.09	H	1.1	-1.4	1.60	38.5	-36.9	
High Ch								
846.60	18.26	V	1.1	-1.3	15.88	38.5	-22.6	
846.60	5.84	H	1.1	-1.3	3.46	38.5	-35.0	

Rev. 3.17.11

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WCDMA Band 2

WCDMA

Band 2
REL99

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 15K22477
Date: 12-14-15
Test Engineer: Steven.kim
Configuration: EUT ONLY, X Position
Mode: REL99_1900 MHz

Test Equipment:
Receiving: 3117[00168724] and Chamber 1 SMA Cables
Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	11.31	V	1.60	8.79	18.50	33.0	-14.5	
1852.40	15.81	H	1.60	8.79	23.00	33.0	-10.0	
Mid Ch								
1880.00	9.68	V	1.62	8.62	16.68	33.0	-16.3	
1880.00	15.84	H	1.62	8.62	22.84	33.0	-10.2	
High Ch								
1907.60	7.01	V	1.63	8.45	13.83	33.0	-19.2	
1907.60	16.29	H	1.63	8.45	23.11	33.0	-9.9	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

WCDMA

Band 2
HSDPA

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 15K22477
Date: 12-14-15
Test Engineer: Steven.kim
Configuration: EUT ONLY, X Position
Mode: HSDPA_1900 MHz

Test Equipment:
Receiving: 3117[00168724] and Chamber 1 SMA Cables
Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	12.04	V	1.60	8.79	19.23	33.0	-13.8	
1852.40	15.64	H	1.60	8.79	22.83	33.0	-10.2	
Mid Ch								
1880.00	8.91	V	1.62	8.62	15.91	33.0	-17.1	
1880.00	14.94	H	1.62	8.62	21.94	33.0	-11.1	
High Ch								
1907.60	6.32	V	1.63	8.45	13.14	33.0	-19.9	
1907.60	15.59	H	1.63	8.45	22.41	33.0	-10.6	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238

LIMIT

Part 22.917(a) & Part 24.238(a) 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.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

RESULTS

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11.2.1. SPURIOUS RADIATION PLOTS

GSM 1900

GSM

GSM1900
GPRS

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K22477
Date: 12-21-15
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: GPRS 1900

Chamber: Chamber 2 | Pre-amplifer: AFS42 | Filter: Filter 1 | Limit: Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3.7004	-2.7	V	3.0	40.5	1.0	-42.1	-13.0	-29.1	
5.5506	-3.6	V	3.0	40.8	1.0	-43.4	-13.0	-30.4	
7.4008	9.7	V	3.0	40.8	1.0	-30.0	-13.0	-17.0	
3.7000	-3.7	H	3.0	40.5	1.0	-43.2	-13.0	-30.2	
5.5506	-4.6	H	3.0	40.8	1.0	-44.4	-13.0	-31.4	
7.4008	8.4	H	3.0	40.8	1.0	-31.4	-13.0	-18.4	
Mid Ch, 1880.0MHz									
3.7600	-2.3	V	3.0	40.5	1.0	-41.8	-13.0	-28.8	
5.6400	-3.3	V	3.0	40.8	1.0	-43.1	-13.0	-30.1	
7.5200	10.6	V	3.0	40.7	1.0	-29.1	-13.0	-16.1	
3.7600	-2.5	H	3.0	40.5	1.0	-42.0	-13.0	-29.0	
5.6400	-6.0	H	3.0	40.8	1.0	-45.8	-13.0	-32.8	
7.5200	11.0	H	3.0	40.7	1.0	-28.7	-13.0	-15.7	
High Ch, 1909.8 MHz									
3.8196	-4.3	V	3.0	40.6	1.0	-43.9	-13.0	-30.9	
5.7294	-0.6	V	3.0	40.8	1.0	-40.4	-13.0	-27.4	
7.6392	8.5	V	3.0	40.7	1.0	-31.2	-13.0	-18.2	
3.8196	-2.5	H	3.0	40.6	1.0	-42.1	-13.0	-29.1	
5.7294	-2.8	H	3.0	40.8	1.0	-42.6	-13.0	-29.6	
7.6392	4.1	H	3.0	40.7	1.0	-35.5	-13.0	-22.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

GSM

GSM1900
EGPRS

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K22477
Date: 12-21-15
Test Engineer: Steven Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: EGPRS 1900 MHz

Chamber: Chamber 2 | Pre-amplifer: AFS42 | Filter: Filter 1 | Limit: Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3.7004	-6.8	V	3.0	40.5	1.0	-46.3	-13.0	-33.3	
5.5506	-8.0	V	3.0	40.8	1.0	-47.8	-13.0	-34.8	
7.4008	5.6	V	3.0	40.8	1.0	-34.2	-13.0	-21.2	
3.7000	-7.2	H	3.0	40.5	1.0	-46.7	-13.0	-33.7	
5.5500	-8.4	H	3.0	40.8	1.0	-48.2	-13.0	-35.2	
7.4000	4.3	H	3.0	40.8	1.0	-35.5	-13.0	-22.5	
Mid Ch, 1880.0MHz									
3.7600	-5.3	V	3.0	40.5	1.0	-44.9	-13.0	-31.9	
5.6400	-6.5	V	3.0	40.8	1.0	-46.3	-13.0	-33.3	
7.5200	8.2	V	3.0	40.7	1.0	-31.5	-13.0	-18.5	
3.7600	-5.2	H	3.0	40.5	1.0	-44.8	-13.0	-31.8	
5.6400	-8.7	H	3.0	40.8	1.0	-48.5	-13.0	-35.5	
7.5200	7.9	H	3.0	40.7	1.0	-31.8	-13.0	-18.8	
High Ch, 1909.8 MHz									
3.8196	-7.6	V	3.0	40.6	1.0	-47.2	-13.0	-34.2	
5.7294	-3.8	V	3.0	40.8	1.0	-43.6	-13.0	-30.6	
7.6392	5.7	V	3.0	40.7	1.0	-33.9	-13.0	-20.9	
3.8196	-5.7	H	3.0	40.6	1.0	-45.3	-13.0	-32.3	
5.7294	-6.0	H	3.0	40.8	1.0	-45.8	-13.0	-32.8	
7.6392	0.5	H	3.0	40.7	1.0	-39.1	-13.0	-26.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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WCDMA Band 5

WCDMA

Band 5
REL99

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K22477
Date: 12-15-15
Test Engineer: Steven.kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: Tx, REL99,850MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.6520	-18.7	V	3.0	39.1	1.0	-56.8	-13.0	-43.8	
2.4790	-17.9	V	3.0	39.5	1.0	-56.4	-13.0	-43.4	
3.3056	-13.3	V	3.0	40.1	1.0	-52.4	-13.0	-39.4	
1.6520	-17.1	H	3.0	39.1	1.0	-55.2	-13.0	-42.2	
2.4790	-18.4	H	3.0	39.5	1.0	-56.9	-13.0	-43.9	
3.3056	-14.0	H	3.0	40.1	1.0	-53.1	-13.0	-40.1	
Mid Ch, 836.6MHz									
1.6732	-18.9	V	3.0	39.1	1.0	-57.0	-13.0	-44.0	
2.5098	-17.6	V	3.0	39.5	1.0	-56.2	-13.0	-43.2	
3.3464	-13.8	V	3.0	40.1	1.0	-53.0	-13.0	-40.0	
1.6732	-17.8	H	3.0	39.1	1.0	-55.9	-13.0	-42.9	
2.5098	-18.1	H	3.0	39.5	1.0	-56.6	-13.0	-43.6	
3.3464	-14.4	H	3.0	40.1	1.0	-53.5	-13.0	-40.5	
High Ch, 846.6MHz									
1.6932	-17.9	V	3.0	39.1	1.0	-56.0	-13.0	-43.0	
2.5390	-18.0	V	3.0	39.6	1.0	-56.5	-13.0	-43.5	
3.3860	-15.4	V	3.0	40.2	1.0	-54.5	-13.0	-41.5	
1.6932	-16.6	H	3.0	39.1	1.0	-54.8	-13.0	-41.8	
2.5390	-18.3	H	3.0	39.6	1.0	-56.8	-13.0	-43.8	
3.3860	-15.4	H	3.0	40.2	1.0	-54.6	-13.0	-41.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

WCDMA

Band 5
HSDPA

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K22477
Date: 12-15-15
Test Engineer: Steven.kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: Tx, HSDPA,850MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.6520	-19.9	V	3.0	39.1	1.0	-58.0	-13.0	-45.0	
2.4790	-18.1	V	3.0	39.5	1.0	-56.7	-13.0	-43.7	
3.3056	-13.4	V	3.0	40.1	1.0	-52.5	-13.0	-39.5	
1.6520	-18.4	H	3.0	39.1	1.0	-56.5	-13.0	-43.5	
2.4790	-18.1	H	3.0	39.5	1.0	-56.6	-13.0	-43.6	
3.3056	-14.7	H	3.0	40.1	1.0	-53.8	-13.0	-40.8	
Mid Ch, 836.6MHz									
1.6732	-19.3	V	3.0	39.1	1.0	-57.4	-13.0	-44.4	
2.5098	-18.4	V	3.0	39.5	1.0	-56.9	-13.0	-43.9	
3.3464	-14.8	V	3.0	40.1	1.0	-54.0	-13.0	-41.0	
1.6732	-19.2	H	3.0	39.1	1.0	-57.3	-13.0	-44.3	
2.5098	-18.7	H	3.0	39.5	1.0	-57.3	-13.0	-44.3	
3.3464	-15.4	H	3.0	40.1	1.0	-54.6	-13.0	-41.6	
High Ch, 846.6MHz									
1.6932	-18.7	V	3.0	39.1	1.0	-56.8	-13.0	-43.8	
2.5390	-18.2	V	3.0	39.6	1.0	-56.7	-13.0	-43.7	
3.3860	-16.0	V	3.0	40.2	1.0	-55.2	-13.0	-42.2	
1.6932	-18.3	H	3.0	39.1	1.0	-56.4	-13.0	-43.4	
2.5390	-18.5	H	3.0	39.6	1.0	-57.1	-13.0	-44.1	
3.3860	-16.8	H	3.0	40.2	1.0	-55.9	-13.0	-42.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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WCDMA Band 2

WCDMA

Band 2
REL99

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company:	Samsung
Project #:	15K22477
Date:	12-16-15
Test Engineer:	Steven.Kim
Configuration:	EUT / AC Adapter / Earphone / X Position
Mode:	Tx, REL99,1900MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.7048	-2.0	V	3.0	40.5	1.0	-41.5	-13.0	-28.5	
5.5572	-11.6	V	3.0	40.8	1.0	-51.4	-13.0	-38.4	
7.4096	-3.7	V	3.0	40.8	1.0	-43.5	-13.0	-30.5	
3.7048	-5.2	H	3.0	40.5	1.0	-44.7	-13.0	-31.7	
5.5572	-11.6	H	3.0	40.8	1.0	-51.5	-13.0	-38.5	
7.4096	-5.9	H	3.0	40.8	1.0	-45.7	-13.0	-32.7	
Mid Ch, 1880MHz									
3.7600	-4.0	V	3.0	40.5	1.0	-43.6	-13.0	-30.6	
5.6400	-11.3	V	3.0	40.8	1.0	-51.1	-13.0	-38.1	
7.5200	-2.0	V	3.0	40.7	1.0	-41.7	-13.0	-28.7	
3.7600	-4.7	H	3.0	40.5	1.0	-44.2	-13.0	-31.2	
5.6400	-11.2	H	3.0	40.8	1.0	-51.0	-13.0	-38.0	
7.5200	-4.1	H	3.0	40.7	1.0	-43.8	-13.0	-30.8	
High Ch, 1907.6MHz									
3.8152	-7.0	V	3.0	40.6	1.0	-46.5	-13.0	-33.5	
5.7228	-11.0	V	3.0	40.8	1.0	-50.8	-13.0	-37.8	
7.6304	-5.2	V	3.0	40.7	1.0	-44.9	-13.0	-31.9	
3.8152	-6.2	H	3.0	40.6	1.0	-45.8	-13.0	-32.8	
5.7228	-11.3	H	3.0	40.8	1.0	-51.1	-13.0	-38.1	
7.6304	-5.8	H	3.0	40.7	1.0	-45.4	-13.0	-32.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

WCDMA

Band 2
HSDPA

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company:	Samsung
Project #:	15K22477
Date:	12-15-15
Test Engineer:	Steven.Kim
Configuration:	EUT / AC Adapter / Earphone / X Position
Mode:	Tx, HSDPA,1900MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.7048	-7.9	V	3.0	40.5	1.0	-47.4	-13.0	-34.4	
5.5572	-10.4	V	3.0	40.8	1.0	-50.2	-13.0	-37.2	
7.4096	-2.2	V	3.0	40.8	1.0	-42.0	-13.0	-29.0	
3.7048	-7.0	H	3.0	40.5	1.0	-46.5	-13.0	-33.5	
5.5572	-10.5	H	3.0	40.8	1.0	-50.3	-13.0	-37.3	
7.4096	-5.7	H	3.0	40.8	1.0	-45.5	-13.0	-32.5	
Mid Ch, 1880MHz									
3.7600	-6.9	V	3.0	40.5	1.0	-46.5	-13.0	-33.5	
5.6400	-10.3	V	3.0	40.8	1.0	-50.1	-13.0	-37.1	
7.5200	-3.2	V	3.0	40.7	1.0	-42.9	-13.0	-29.9	
3.7600	-6.6	H	3.0	40.5	1.0	-46.1	-13.0	-33.1	
5.6400	-10.0	H	3.0	40.8	1.0	-49.8	-13.0	-36.8	
7.5200	-6.0	H	3.0	40.7	1.0	-45.8	-13.0	-32.8	
High Ch, 1907.6MHz									
3.8152	-4.9	V	3.0	40.6	1.0	-44.5	-13.0	-31.5	
5.7228	-10.5	V	3.0	40.8	1.0	-50.3	-13.0	-37.3	
7.6304	-3.4	V	3.0	40.7	1.0	-43.1	-13.0	-30.1	
3.8152	-7.9	H	3.0	40.6	1.0	-47.5	-13.0	-34.5	
5.7228	-10.5	H	3.0	40.8	1.0	-50.3	-13.0	-37.3	
7.6304	-6.1	H	3.0	40.7	1.0	-45.8	-13.0	-32.8	

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Note: No other emissions were detected above the system noise floor.

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